Wialon Local

User Guide

as of May 01, 2019

wialonlocal

Contents

This manual contains detailed instructions for using the satellite monitoring system Wialon Local version 1804.

Version release date: 24.04.2018.

Bug fixes for Wialon Local software version 1804 are carried out for 3 years from the date of its release; informational support — for 5 years.

To quickly find the required information, **use the search** in the upper part of the left panel.

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Basic Definitions and Components

GPS tracking system Wialon Local is a software product that allows the end users to control their units (vehicle fleet, machinery, employees, pets, etc.).

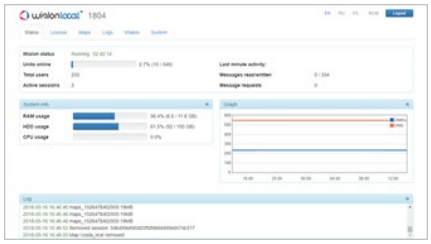
Unit tracking includes:

- detecting units' position and watching their movements on the map;
- observing dynamic changes of various units' parameters such as speed, fuel level, temperature, voltage, etc.;
- managing units (sending commands and messages, assigning jobs and routes, adjusting notifications, etc.) and drivers (phone calls, SMS, work shifts);
- controlling units' movements along the routes;
- interpreting the information derived from unit in various kinds of reports (tables, charts);
- and much more.

Tracking results can be presented on the computer screen as well as exported to files in different formats.

The main components of Wialon Local are described below.

Administration Panel

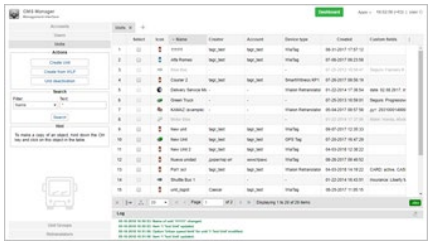


The administrator of Wialon Local can start and stop Wialon, watch its operation, monitor errors, take care of memory consumption and CPU load, etc.

In addition, the configuration of the system is adjusted in the Administration Panel where one can purchase components, install updates, add maps, sites, and modems, etc.

The detailed description of the Administration Panel can be found in the section 'Administration Panel' of this guide.

CMS Manager (Management System)



CMS Manager is a special interface developed for the managers of Wialon Local. CMS refers to Content Management System. Content in this context is **system macro objects** which are:

- **accounts (resources)**,
- **billing plans**,
- **users**,
- **units**,
- **unit groups**,
- **retranslators**.

Macro objects differ from micro objects in several ways:

- They exist independently and are not a part of a bigger object like a resource.
- They can include smaller items as their contents, and those items are deleted together with the macro object they belong to. As mentioned above, a resource can hold geofences, jobs, notifications, drivers,

report templates and orders. A unit can contain sensors, commands, custom fields, and service intervals. Users and unit groups can only contain custom fields.
- Access rights are assigned to macro objects, and they affect these objects themselves as well as their contents. That is why the dialog of macro object properties usually has a special 'Access' tab to manage rights.
- Some macro objects like retranslators, accounts (resources), and billing plans can be accessed only through the management interface that is CMS Manager.

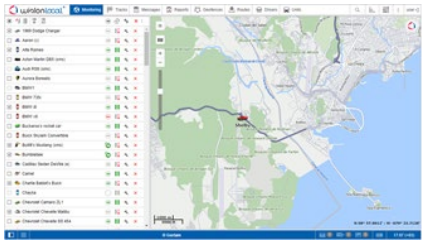
CMS Manager is designed to work with these items: create, configure, update, copy, import, export, delete them, and, what is the most important, distribute **access rights** to these objects. An access right is a possibility to view some system objects and perform allowed actions over them.

These functions can be also partially fulfilled in the user interface. However, the main difference here is that CMS Manager has a handy easy-to-use interface that allows to work with a great number of items, filter them by different criteria, display them in the form of a table, create tabs with search results, and much more. Besides, the exclusive privilege of CMS Manager is the possibility to work with accounts (that is to control payment, restrict services and adjust their cost) and retranslators.

Note.
There is one type of macro object that is not available in CMS Manager — route. Routes can be created only in the user interface of Wialon Local. They store checkpoints and schedules inside and do not depend on any resource. However, it is possible to manage access to routes — through user properties dialog.

The detailed description of CMS Manager interface can be found in the section 'Management System' of this guide.

Main Interface (Tracking System)



The main interface of Wialon Local is an interface where the end users watch their units and create and configure diverse **system micro objects** for their tracking purposes:

- **geofences**,
- **jobs**,
- **notifications**,
- **drivers**,
- **trailers**,
- **report templates**.

These items cannot exist independently and are a part of some resource.

The detailed description of Wialon Local user interface can be found in the section 'Monitoring System'.

Wialon DB

Wialon Local has an embedded data storage system Wialon DB, a proprietary DBMS with stable support for transactional processing and replication features. Physically it is located in the folder *storage* of your Wialon Local. All kind of communication with the database is done either via the provided web interfaces or using various development tools.

WebGIS

WebGIS is a cartographic server included in Wialon Local. All the address information used for the tracking of units and for the reports is taken by default from it.

The detailed description of WebGIS can be found in the corresponding section.

Wialon Administration

Wialon administration is described in the following sections:

- Technical Specification and Requirements
- Administering Tasks
- Installation of Wialon Local
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    - License
    - Maps
    - Logs
    - Wialon
    - System
- Local Communication Gate

Technical Specification and Requirements

Operation System and Accompanying Software

Wialon Local is an all-in-one solution installed from an ISO file that inludes:

- base operating system Debian GNU/Linux 9 (*Stretch*) in form of an image *netinstall* (the missing files are installed from network package repositories);
- additional software for proper functioning of the server (nginx, postfix, ntp, openssh, iptables, fail2ban and some other);
- Wialon Local and its components.

Some OS components, hardware drivers and the modules of Wialon Local itself require network access during the installation process.

It is not recommended to install other software packages apart from the ones that are needed for proper operating of Wialon Local.

Server Requirements

Wialon Local can be installed and work only on a 64-bit operating system.

See below the minimum requirements to the server with the data storage for 2 years. These requirements were calculated on the basis of typical tasks solved by the servers and their configuration.

For a server with up to 100 units:

1. CPU: Core i7;
2. RAM: 16 GB (only Wialon);
3. HD: soft-based RAID1 from 250 GB;
4. Internet channel width (from the server): from 25 Mbit/s.

For a server with up to 4000 units and its own WebGIS:

1. CPU: Xeon E31230 and higher;
2. RAM: from 64 GB (Wialon + maps);
3. HD: soft-based RAID10, 4×2 TB and more;
4. Internet channel width (from server): from 50 Mbit/s.

For a server with up to 10000 units (the maximum number of units possible on one distribution):

1. CPU: 2 up-to-date Xeon CPUs;
2. RAM: from 128 GB;
3. HD: software-based RAID10, 8×2 TB and more;
4. Internet channel width (from server): from 100 Mbit/s.

⚠ In some cases the automatic installation can be unavailiable.

You should undertand that the above listed requirements are for guidance only and the selection of the hardware that Wialon Local is going to be installed on is particular and should, first of all, be based on the volume of the information

you are planning to work with.

Node.js update

In order for Wialon local version 1704 and above to function correctly, the Node.js 6.x package is required. Support for older versions of Node.js, starting with the release of 1804, will be discontinued.

The official Debian 8 and Debian 9 repositories include earlier versions of packages. When installing from our distribution package, the required Node.js version is installed automatically.

If you receive a notification that the version of Node.js that is used on your server is out of date, you can update it manually.

To do this, log in to the terminal on behalf of the main user (root) and run the following commands:

```
cd /home/wialon/wlocal/
service wlocal stop
./adf_script stop
apt-get install -y curl
curl -sL https://deb.nodesource.com/setup_6.x | bash -
apt-get install -y nodejs
npm -g install forever
npm install
chown -R wialon:wialon /home/wialon/
service wlocal restart
```

Check the availability of your sites after they restart. To update Node.js, you can also contact technical support. In this case, in the letter specify SSH credentials (IP, login and password) to access the server console. The instruction is also located on the official site of the Node.js developer.

Installing an update from version 1704 to 1804 is not possible without updating NodeJS.

Administering Tasks

The maintenance of the Wialon Local server must be performed by a qualified Linux system administrator with competencies that allow to perform the tasks stated below.

Primary Tasks

- Install, delete, relocate, start and stop the service.
- Backup the database.
- Configure, troubleshoot and maintain the storage system.
- Configure the network subsystem and network interfaces, configure the server to work with domain services (DHCP, DNS, NTP, SSH) and with auxiliary services (postfix/exim,nginx).
- Ensure availability of the license server.
- Control the Wialon service status, the operating system, and the devices.
- Check server logs, Wialon logs and device logs, control log rotation using logrotate.
- Manage the global server settings of Wialon.
- Configure and provide the operation of Wialon sites.
- Control free disk space.

Secondary Tasks

- Automate routine operations.
- Configure the mail subsystem.
- Configure the security system (iptables,fail2ban).
- Configure modems of GSM, SMPP gateway and network types.

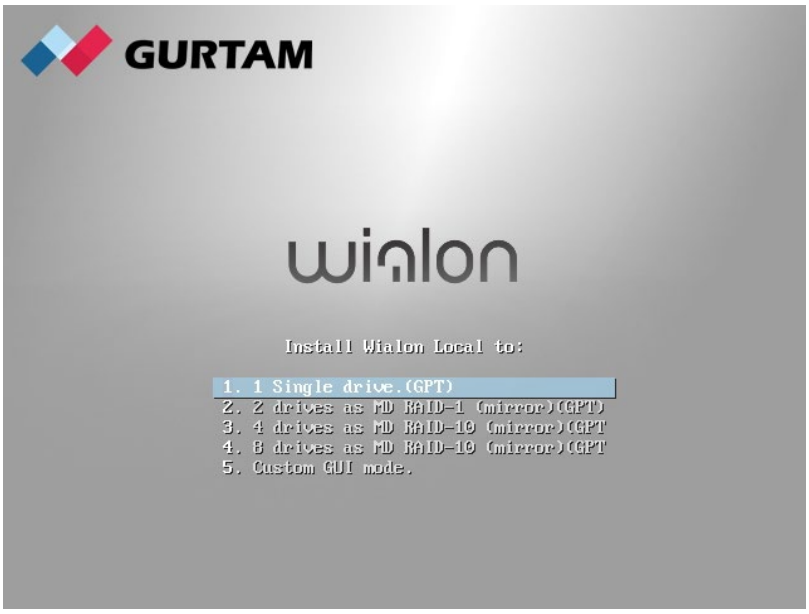
Installation of Wialon Local

The distribution of Wialon Local contains also operating system Debian Linux (*Stretch*). In case of installation onto a Windows server, use a virtual machine.

First, download ISO image from the distribution server and record it on a CD, DVD, or USB flash drive.

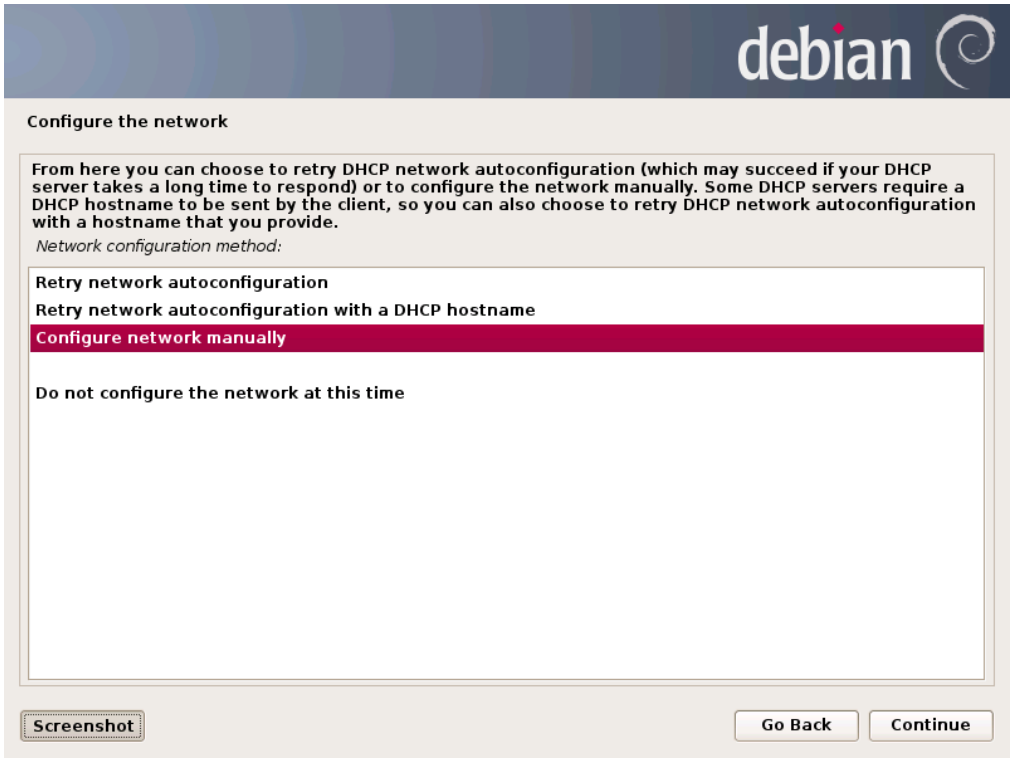
Adjust BIOS configuration so that to boot from the CD/DVD drive. Then follow the instructions on the screen:

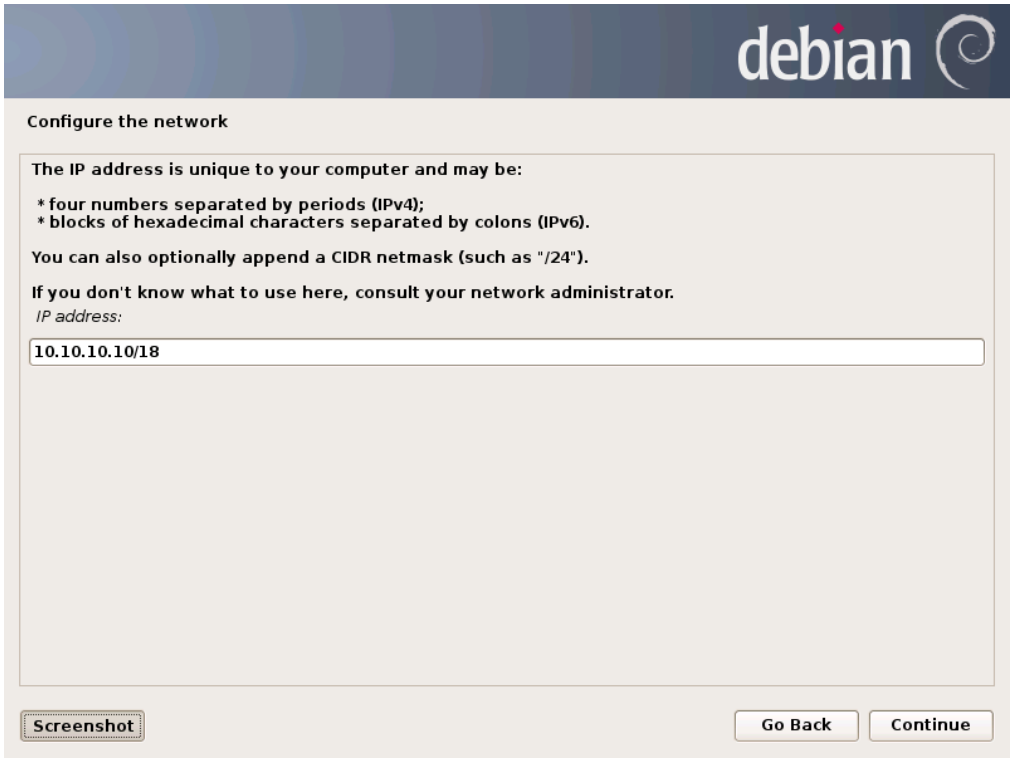
1. Select the installation type: one, two (RAID-1), four (RAID-10) or eight (RAID-10) drives.



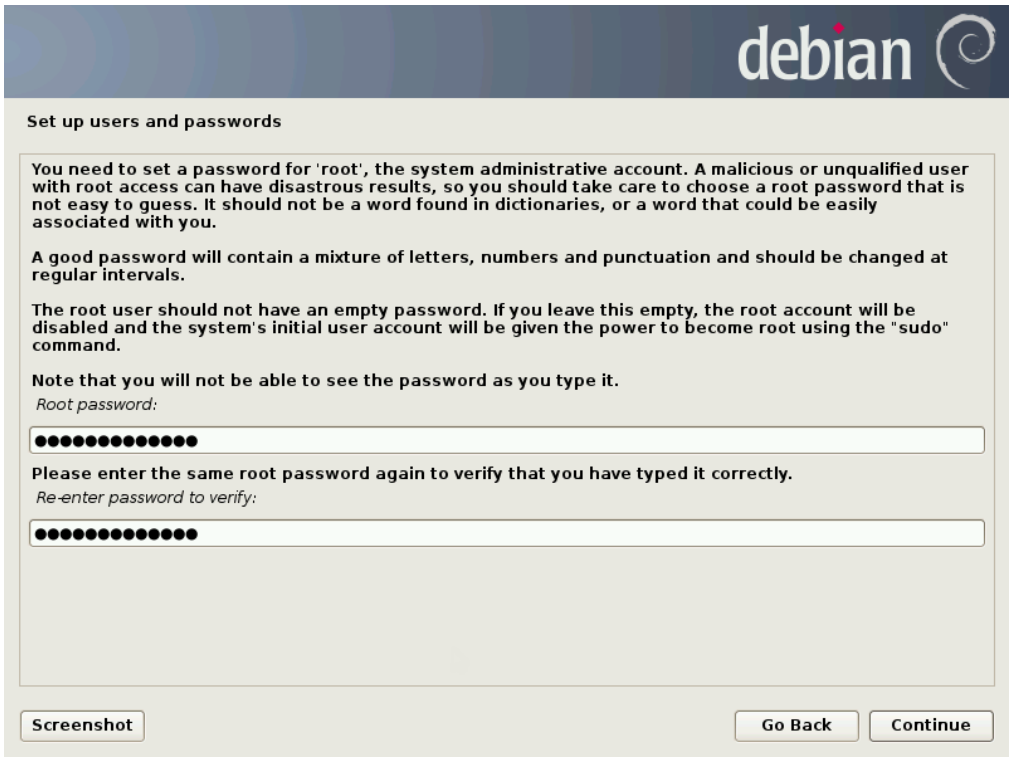
2. If more than one network is detected, you will be asked to select which one should be used during the installation process.

However, if DHCP server is not available during the installation, check network availability and repeat network adjustment or set network parameters manually:

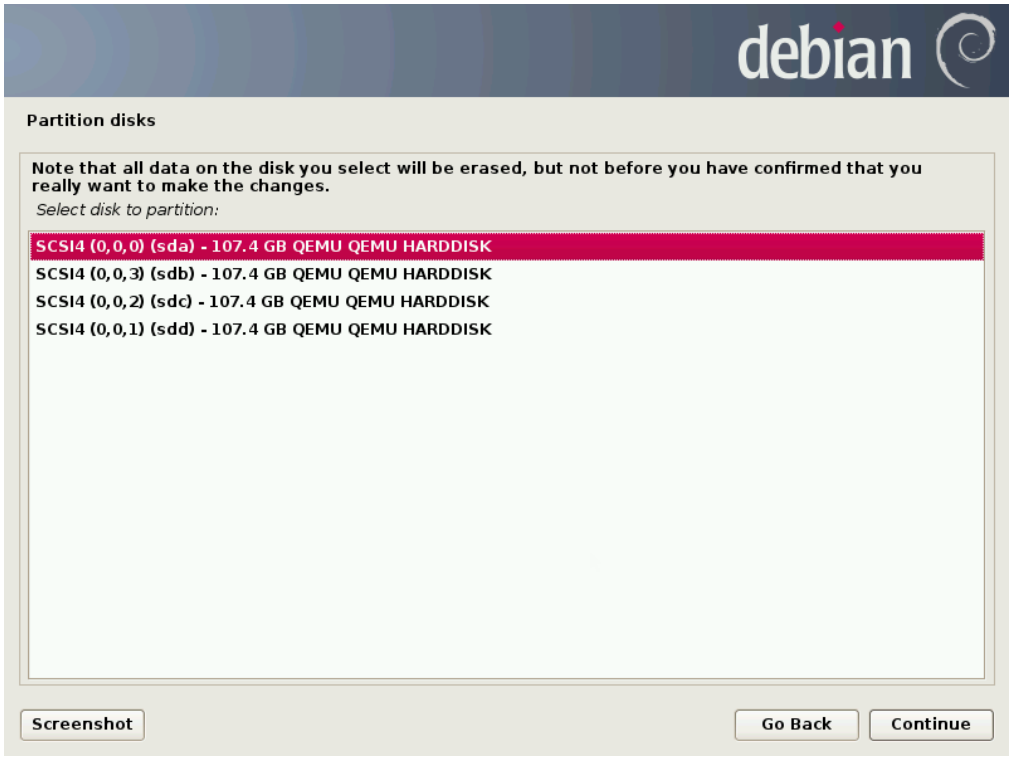




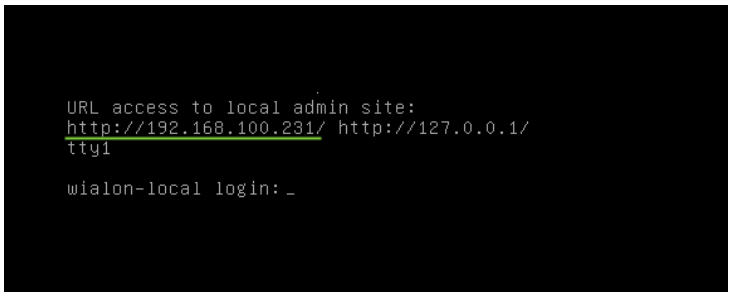
3. Set up password for the *root* account — main account of your Debian OS.



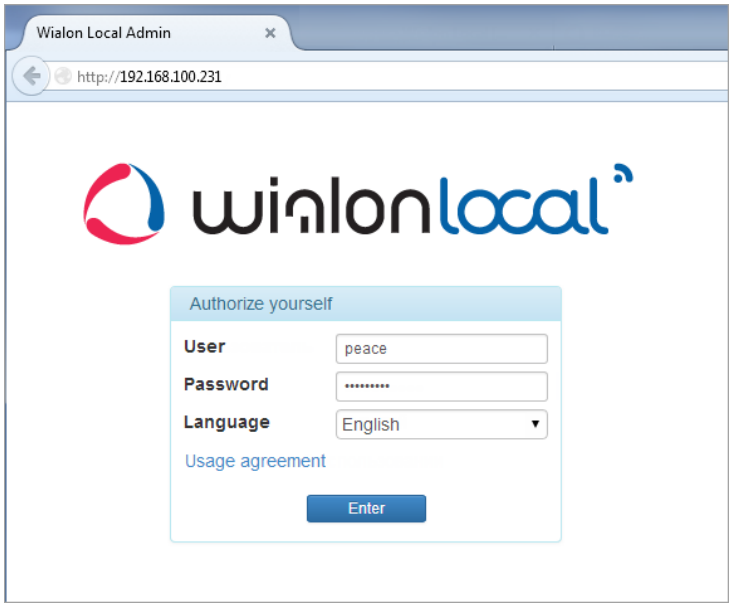
4. If installation on one drive was selected at the beginning, specify a particular drive here.



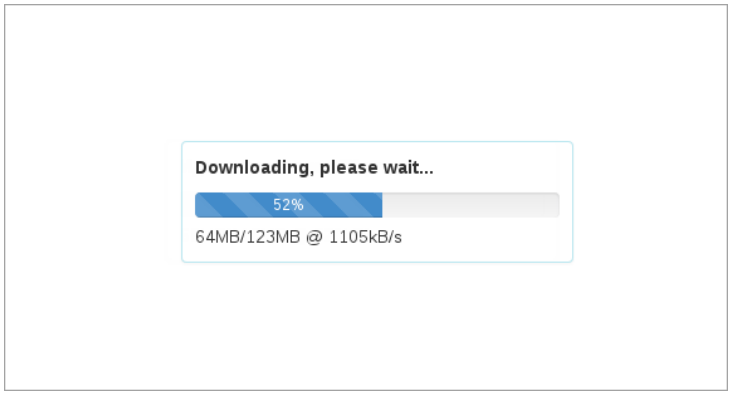
5. When the installation process is complete, the system will reboot automatically (do not forget to readjust BIOS settings back). After the reboot, the URL address of Wialon Local administration system will be shown.



6. Enter this URL in the address bar. To authorize, use the user name and the password given to you when purchasing Wialon Local.



7. After a successful authorization, Wialon Local will be downloaded and installed. This may take some time.



8. When the process is complete, you log into the Administration Panel.

When you first log in to the administration system, you can receive a message that reads: *You are looking for site that is not available here. Please check your DNS configuration.*

In this case, you should register your new address for the administration system in the /etc/nginx/conf.d/lcm.conf file. For example,

```
server_name      192.168.100.231 127.0.0.1 your-new-name.server;
```

The default interfaces of Management and Tracking systems are available on the 8025 and 8024 ports, respectively.

Depending on the configuration of your server, a non-standart installation may be required. In case of difficulties, contact tecnical support.

License

The license is integrated into your personal build of software.

Every day, Wialon Local connects to the license server *lic.gurtam.com* (port 31176) and confirms the usage of the product on one server at a time. If this license check is blocked because of firewall or lack of Internet connection, it will cause a ban to use the program. In this case, you will not be able to create new units and use Gurtam Maps. Some time later, however, all services of Wialon Local get denied except for the Administration Panel.

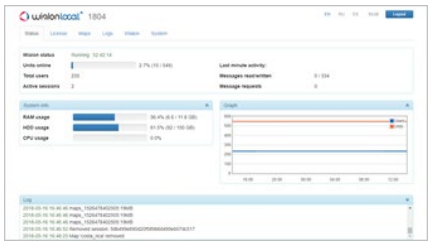
Several times a day Wialon Local connects to the server *local-api.wialon.com* to fetch updates. This server is also responsible for the authorization of the administrator. A successful authorization of the administrator, as well as successful purchases are possible only with enabled Internet connection.

If there is a problem with the license, you cannot create any units, and phrases like *Error fetching license: 'avl.unit'* can be found in log files.

Administration Panel

The configuration of the system is adjusted in the Administration Panel where one can purchase components, install updates, add maps, sites, and modems, etc.

The administrator of Wialon Local can start and stop Wialon, watch its operation, monitor errors, take care of memory consumption and CPU load, etc.



- **Status**
- **License**
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  - **WebGIS**
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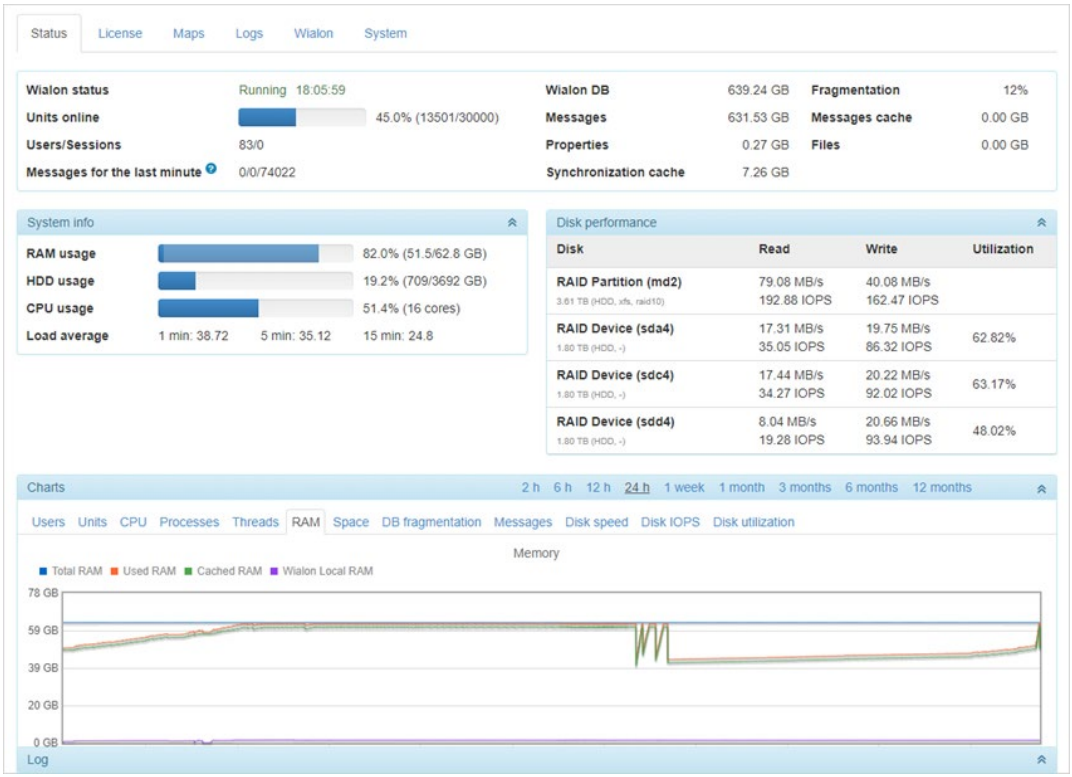
- **Logs**
- **Wialon**
  - Root User
  - Default Billing Plan Settings
  - Sites
  - Modems
  - Trash
- **System**
  - Backup Server

Status

The *Status* page displays information about the main parameters of the service performance in real time.



General Status Information

The top block displays the general status information about Wialon Local.

Wialon status — the current state of Wialon Local: running or stopped. The duration of the *Running* status is displayed in the *hours:minutes:seconds* format.

Units online — the percentage ratio of the number of units online to the total number of the created units. The value in parenthesis is displayed in the *x/y* format, where *x* is the number of units online and *y* is the number of all created units.

Users/Sessions — the number of users created in the system and the number of active sessions at the moment. One user can create multiple sessions.

Messages for the last minute — the number of messages for the last minute. The data is displayed according to three parameters: (requests (the number of messages requests), read, written).

Wialon DB — the total size of the Wialon database.

Messages — the total size of all messages in the Wialon database.

Properties — the total size of all elements and their properties in the Wialon database.

Synchronization cache — the size of the cache used to synchronize the main database with the backup server (if the server is configured). The worse the connection, the larger the cache size.

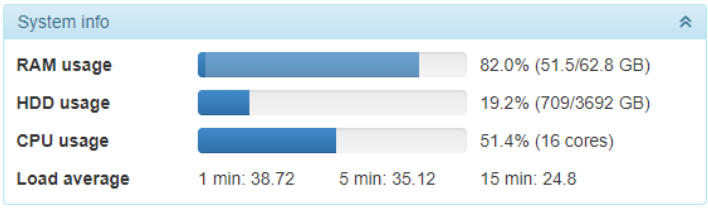
Fragmentation — the current level of database fragmentation (expressed as a percentage).

Messages cache — the size of the message cache on the disk. The more intense the flow of messages from the equipment, the higher the readings.

Files — the total size of files (icons, pictures, etc.) that are stored in the database.

System info

The *System info* block displays the usage of available memory and the average processor load.



RAM usage — the amount of RAM in use. It is shown as a percentage in the *x/y* format, where *x* is the amount of memory used and *y* is its total amount. The process indicator for RAM simultaneously shows the data for the *Used* (darker color) and *Cached* values.

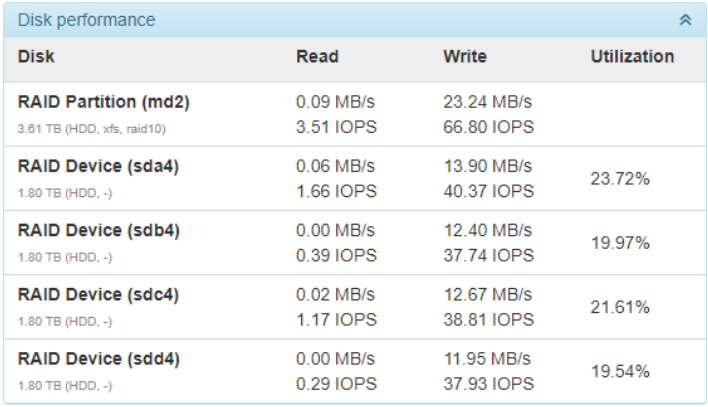
HDD usage — the amount of disk space in use. It is shown as a percentage in the *x/y* format where *x* is the amount of the used space on the disk and *y* is its total volume. If the value of the used disk space reaches 90%, the administrator receives an alert (the administrator's e-mail is specified on the *System* page). In addition, if the critical level of free space (5 GB) is reached, the service stops automatically to avoid database corruption. In this case, an e-mail is also sent to the administrator.

CPU usage — the data on CPU usage (expressed as a percentage). The total number of cores of the installed processors is shown in parenthesis.

Load average — server load indicator for the last 1/5/15 minutes.

Disk performance

The *Disk performance* block displays the data on the intensity of reading, writing and the load on hard disks where the Wialon Local database is located.



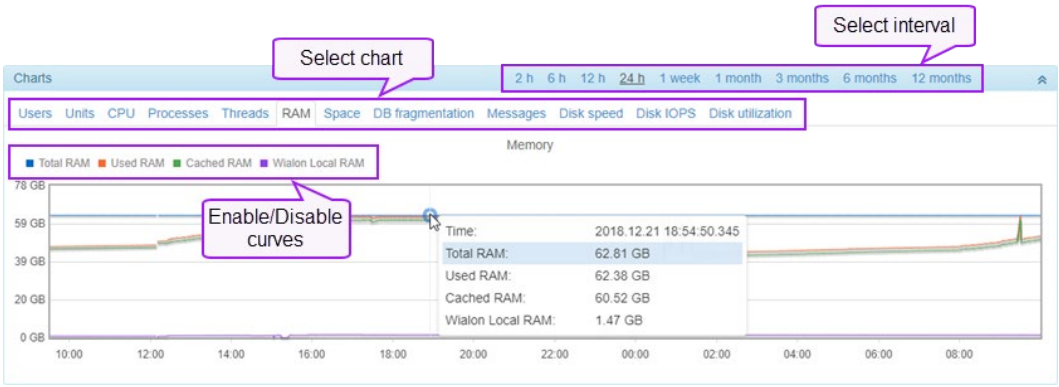
For each disk, the information is displayed according to the following parameters:

- **Read** — read speed in MB/s.
- **Write** — write speed in MB/s.
- **Utilization** — disk load as a percentage.

The disks are displayed in the block in accordance with their hierarchy.

Charts

The *Charts* block displays visual information on various characteristics. The time interval is selected in the upper right part of the block.



The table below lists all the charts and the curves available for them.

Chart	Curves
Users	Users, Sessions
Units	Units, Units online
CPU	CPU, Load average
Processes	Processes
Threads	Threads (the total number of all threads in the system), Wialon threads (threads occupied by Wialon), Local threads (threads occupied by the *wlocal* service)
RAM	Total RAM, Used RAM, Cached RAM, Wialon Local RAM
Space	Total space, Used space, DB, Messages, Properties, Files, Messages cache, Logs directory, Synchronization cache
DB fragmentation	DB Fragmentation
Messages	Read messages, Written messages, Messages requests
Disk speed	A curve for each disk where the DB is located
Disk IOPS	A curve for each disk where the DB is located
Disk utilization	A curve for each disk where the DB is located

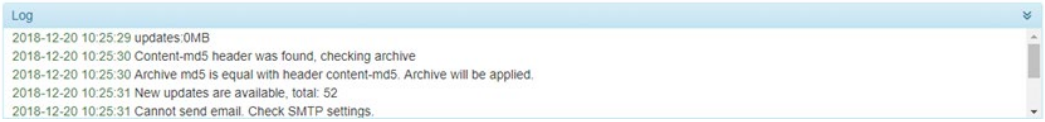
To enable or disable the display of any curve, click on its name above the chart.

The gaps in some sections of the curves indicate that the *wlocal* service was stopped at the time intervals to which the curves correspond (for the *Users/Units* charts, it signals that Wialon was stopped).

When you hover the mouse cursor over the point of the chart, tooltips appear.

Log

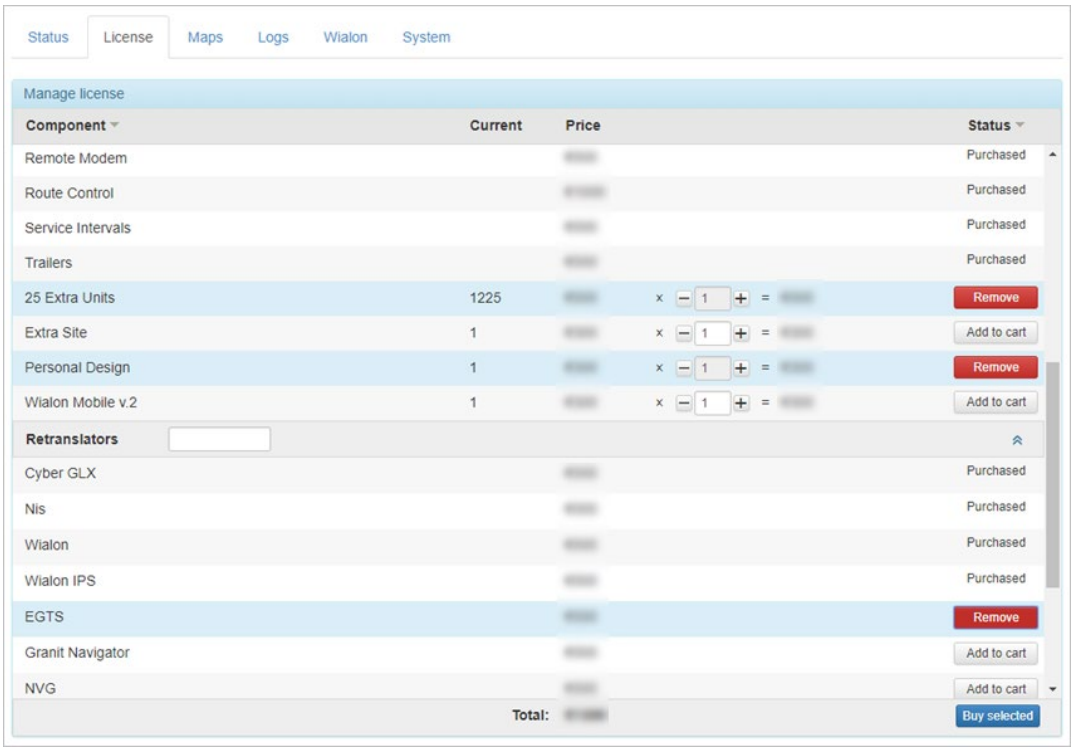
A log is displayed at the bottom of each page in the Administration Panel. It displays information about current events that take place in Wialon Local. For instance, about its starting or stopping, availability of updates, components installation, etc. When the page is reloaded, all events are removed from the log.


Log
2018-12-20 10:25:29 updates:0MB
2018-12-20 10:25:30 Content-md5 header was found, checking archive
2018-12-20 10:25:30 Archive md5 is equal with header content-md5. Archive will be applied.
2018-12-20 10:25:31 New updates are available, total: 52
2018-12-20 10:25:31 Cannot send email. Check SMTP settings.

License

Attention!
The amount of available system functionality depends on the configuration of the distributive included in your package.

On this page, you can control your license — see what you already have and activate new components according to your needs. There are three types of components: modules, retranslators, and hardware.



Modules
The modules are mostly helpful for extending the possibilities of your service. These can either be new features for the end users (such as *Notifications*, *Fuel Control*, *Advanced Reports*, etc.) or an enhancement of the general qualities of the service (such as *Hot Backup*, *Personal Design*, *Extra Site*, etc.).

Retranslators
Here you can activate new retranslation protocols for your service.

Hardware
Here you activate new types of devices to be used in your system. They go in groups according to the manufacturer. This means that purchasing a XYZ hardware you purchase all types of devices produced by the XYZ company. Visit *GPS Hardware* to find the full list of supported devices and for further information.

In all the blocks, items are sorted alphabetically, however, the purchased items are placed above forming their own sublist. The sorting type can be changed — by current usage, price, or purchase status. Just click on the corresponding column title once (for direct sorting order) or twice (for reverse sorting order). To quickly find a certain item, use the text filter which is located in the header of each of three blocks.

The division of the items by status (purchased or not) can be disabled. Just click on *Status* in the header twice (unlike other titles, this one has three states — up, down, and none). With sorting by status disabled, you can get the list of items strongly alphabetically or by other criteria.

The activated components have the status *Purchased*. The components available for purchase have the *Add to cart* button in their status. Press this button to add new components to your service. The total cost of your purchase is indicated below. When finished, press *Buy selected* and confirm your actions.

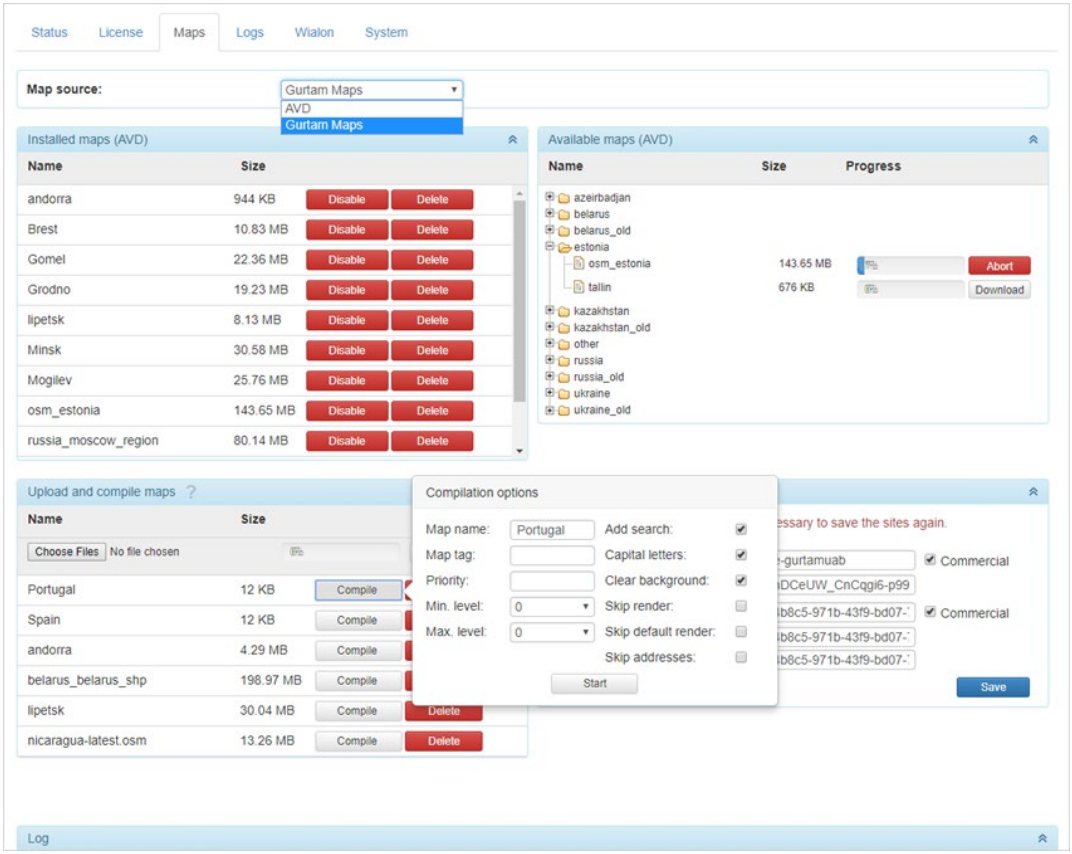
In order the changes to take effect, go to the *System* page and install the updates. To complete the procedure, Wialon Local is automatically restarted. Sometimes you may also need to refresh the page and clear the cache.

Current amount is indicated for such components as units, extra sites, mobiles, and personal designs. When purchasing them, the price is given for one piece, and in case of units — for a package of 25 units.

If there is no connection to the license server, only the previously installed components are shown in the list.

Maps

On the *Maps* tab, the cartographic system is being configured. The maps are important for the end users in two ways. First, they serve as a background to place tracking units on it, build tracks of movements, draw geofences, etc. Second, the maps define the accuracy of the address information that appears during online tracking and in reports.



Map Source

First of all, choose the map source: either AVD or Gurtam Maps (they cannot be used together).

Choosing **Gurtam Maps** means that Gurtam is responsible for maintaining the map server and updating cartographic data. That is why if you select Gurtam Maps, other sections on this page collapse indicating that they are not required.

Select **AVD** if you prefer to create and manage your own WebGIS server. The process is described below.

Configuring AVD Maps

Installed maps (AVD)
Here you see the list of the installed maps. Maps can get here either from the section on the right or from the section below. A new map is added as enabled, however, you can disable it. In this case, it still stays on your server but is invisible to the users. A map can be also deleted permanently, that is erased from the server.

Available maps (AVD)
This is the list of the ready-to-use AVD maps provided by Gurtam. To install one of them, select it in the list and download it. The map appears in the *Installed maps* section immediately after downloading. For quicker search, all available maps are sorted into folders by country.

Upload and compile maps

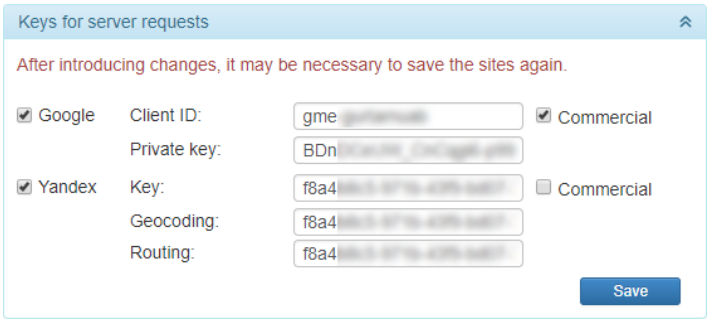
If you have your own maps, you can upload them and then install on your server. If an uploaded map is in AVD format, it gets into the *Installed maps* section at once. If you have another kind of source map, it needs compilation after uploading. Press the *Compile* button, adjust the compilation parameters, and press *Start*. More information about how to create maps can be found here.

Files for loading should be zipped and contain no nested folders.

Keys for server requests

Requests for geocoding and routing using Google and Yandex maps can go not only directly to the cartographic server, but also firstly be sent to the server where Wialon Local is installed.

In this section of administrative settings, you can specify the keys required for server requests. For each of the cartographic services, you can specify a personal or commercial key. This is regulated by enabling or disabling the *Commercial* option.



Check the required cartographic server, specify the key for it and click on the *Save* button. The fields for personal and commercial Google keys differ (*Key* is replaced with the *Client ID* and *Private key* fields).

The settings from this section are automatically inserted into the Maps tab in the settings of the websites of Wialon Web type if the *Server key* option is activated there.

When making changes in this section, you may need to save the site settings again on the *Wialon* tab.

WebGIS

Standard WebGIS server is included to the Wialon local. By default any address information used for online tracking and reports is taken directly from it.

AVD format files are used in WebGIS. Files of such a format could be created from other vector data formats, such as MP, MapInfo, ESRI Shape, OSM (OpenStreetMap). Note that the source map should be done in WGS-84 coordinate system (in grades).

Source maps in the supported vector format should be downloaded to the server. Source maps' files should be given as data archive including a set of configuration files. Depending on the source map format, the archive should include a particular set of files. To successfully unpack the archive on the server, the first one should not contain subfolders.

Compilation Parameters

Map name
Map name, for example, the name of the city for which the map is created.

Map tag
Map tag like city, country, etc. Could be used for a search or as a drawing filter.

Priority
Map priority; 100 by default. Bigger priority means earlier map render. Maps with minor priority are rendered later and are situated above those with bigger priority.

Min level
The minimum desired level on which to draw a map (0-16).

Max level
The maximum desired level on which to draw a map (0-16).

Add search
Add search info to the map.

Capital letters
Consider letter case (lower/upper) in the MP file address info (cities, regions, countries).

Clear background
Clear background on render map flag is used for combining multiple maps. Maps with higher priority situated in lower layers are not displayed. If maps overlay, the top (more detailed) map is displayed. The background is white. The flag is highly recommended to be used.

Skip render
Skip map rendering means not to include drawing information for the map (then the map is used for a search only).

Skip default render
Not to include the drawing information for the map into the file by default. Map rendering is available only for the billing plans with the corresponding map tags.

Skip addresses
Not to add information to the file for reverse geocoding (determining the address by coordinates) on the map (it is used

only for rendering).

Creating a Map from MP Format

To create a map from the Polish MP format, you have to use a special XML configuration file. To download it on server, an archive consisting of a source map in MP format and of a configuration XML file should be created. The names of the configuration XML file and of the archive must be the same.

Standard configuration file transforming MP files to AVD files (pfm.xml) can be downloaded here: http://distro.gurtam.com/maps_cfg/. You can create your own configuration file according to your requirements.

Example:

```
<pfm>
<feature type="0x0001" shape="PL" avd_type="1" max_level="2" name="A restricted access
major divided highway, normally with 2 or more running lanes plus emergency hard
shoulder. Equivalent to the Freeway, Autobahn, etc." use_addr="1" is_street="1"/>

<feature type="0x0002" shape="PL" avd_type="3" max_level="2" name="     Important
roads that aren't motorways. Typically maintained by central, not local government.
Need not necessarily be a divided highway." use_addr="1" is_street="1"/>

<feature type="0x0003" shape="PL" avd_type="5" max_level="2" name="Roads generally
linking larger towns." use_addr="1" is_street="1"/>

<feature type="0x0004" shape="PL" avd_type="7" max_level="2" name="Roads generally
linking smaller towns and villages." use_addr="1" is_street="1"/>

<feature type="0x0000" shape="PL" avd_type="9" max_level="2" name="Minor roads."
use_addr="1" is_street="1"/>
<feature type="0x000a" shape="PL" avd_type="11" max_level="1" name="Unclassified roads
typically form the lowest form of the interconnecting grid network." use_addr="1"
is_street="1"/>
<feature type="0x0042" shape="PL" avd_type="12" max_level="1" name="Unpaved roads."
use_addr="1"/>

<feature type="0x3008" shape="POI" avd_type="59" max_level="0" name="A fire station."
use_addr="1" is_house="1"/>
<feature type="0xf001" shape="POI" avd_type="60" max_level="0" name="Bus station."
use_addr="1" is_house="1"/>
<feature type="0x2f06" shape="POI" avd_type="61" max_level="0" name="A bank."
use_addr="1" is_house="1"/>
<feature type="0x2b00" shape="POI" avd_type="62" max_level="0" name="A hotel."
use_addr="1" is_house="1"/>
</pfm>
```

The following parameters are used in the configuration XML file:

use_addr
Use this element when searching an address by coordinates.

is_city
Use this element when searching a place by name (city).

is_street

Use this element when searching a street by name (street). Locking (snap) to roads function can also use this element.

is_house
Use this element when searching a house by name or number (house).

is_road
The road. This element can also be used to lock unit's movements to existing roads.

type
Source type from MP file (Polish format).

shape:
PG — polygon, *PL* — polyline, *POI* — point.

avd_type
Resulting map type in AVD file (0—255).

max_level
Maximum level to store map data in AVD format. Levels depend on metrage: o level — from 10 to 250 meters, 1 level — from 250 m to 20 km, 3 level — from 20 to 500 km.

name
The name of an object, area, point, that is custom mark.

Note.
The following conditions should be met in order to store map inscriptions properly:

- source MP file must be encoded in Win 1251, and the inscription (IMG ID) must contain the string *CodePage=1251*;
- source MP file must be encoded in Win UTF-8, and the inscription (IMG ID) must contain the string *CodePage=1252* or other value different from 1251.

Creating Maps From OSM Format

To create maps from OSM format files, a configuration XML file or allCountries.txt are used. To download on server, an archive containing OSM format source map, configuration XML file, and allCountries.txt should be formed. The last one (allCountries.txt) is an additional file for address binding. The document consists of world cities list in which the population size is indicated. An approximate radius of a city is calculated on the basis of the special algorithm and depends on the population size.

osm.xml is a configuration file transferring OSM files to the standard AVD files.

Standard configuration file transferring OSM files to AVD files (osm.xml) and allCountries.txt could be downloaded here: http://distro.gurtam.com/maps_cfg/.

Maps from Other Vector Formats

To create maps from other vector formats such as MapInfo, ESRI shapefile, etc., it is necessary to download an archive consisting of the source map layers in a corresponding format and of a configuration XML file.

XML file should be encoded in UTF-8 without BOM:

```
<conv name="cheljabinskaja" encoding="utf8">
        <layer file="chel-roads-l.shp">
                <features max_level="1" name="$NAME" use_addr="1" is_street="1"
region="$ADDR_REGIO" street="$NAME">
                        <mod filter="(highway ='bridleway') or (highway
```

```
='living_street')" type="14"/>
                        <mod filter="(highway ='path') or (highway ='steps')"
type="16"/>
                </features>
        </layer>
        <layer file="chel-buildings-a.shp">
                <features type="210" max_level="1" name= "$ADDR_HOUSE" is_house="1"
region="$ADDR_REGIO" street="$ADDR_STREET" house="$ADDR_HOUSE" use_addr="1"/>
        </layer>
        <layer file="chel-city-p.shp">
                <features type="64" max_level="2" name="$NAME" address="$NAME">
                        <mod filter="PLACE ='village'" type="66" is_city="1"
region="$ADDR_REGIO" max_level="1" name="$NAME" address="$NAME"/>
                        <mod filter="PLACE = 'town'" type="65" is_city="1"
region="$ADDR_REGIO" max_level="1" name="$NAME" address="$NAME"/>
                        <mod filter="PLACE = 'city'" type="64" is_city="1"
region="$ADDR_REGIO" max_level="1" name="$NAME" address="$NAME"/>
                </features>
        </layer>
        <layer file="chel-landuse-a.shp">
                <features type="166" max_level="1" name="$NAME">
                        <mod filter="LANDUSE ='Military'" type="173" max_level="1"
name="$NAME"/>
                        <mod filter="LANDUSE ='cemetery'" type="147" max_level="1"
name="$NAME"/>
                        <mod filter="LANDUSE ='commercial'" type="151" max_level="1"
name="$NAME"/>
                        <mod filter="LANDUSE ='forest'" type="165" max_level="1"
name="$NAME"/>
                        <mod filter="LANDUSE ='nature_reserve'" type="184"
max_level="1" name="$NAME"/>
                        <mod filter="LANDUSE ='residential'" type="166" max_level="1"
name="$NAME"/>
                </features>
        </layer>
        <layer file="chel-admin-a.shp">
                <features type="0x004a" shape="PG" avd_type="0" max_level="0"/>
        </layer>
</conv>
```

The file starts and ends with the **conv** tag. The following keys can be used inside this tag: **name** — map name, **encoding** — file encoding for a conversion.

The main part of a map conversion is the description of the layers used to receive data. The **layer** tag allows to describe each layer individually and, if provided by different attributes, converse a map according to them.

The **file** key is used to define the layer file.

Then you should indicate the **features** layer properties. In the **type** key it is necessary to indicate the elements' type value from the map in the format *.avd (see it in *pfm.xml* or *osm.xml*). The **name** parameter is used to display any properties of a converting objects. This parameter will be used as a caption for objects on the map. Only Latin letters and $ sign are accepted. In the above mentioned example the names for the used fields could be found in the files indicated there,i.e., in *.shp. If other symbols are used, the file may be converted with errors or not converted at all. If you would like to convert such files, you should change the fields' names for the latin ones.

It is also necessary to indicate the level on which the maps from the file will be situated. The **max_level** parameter is in charge for it. Depending on your preferences, you can vary these parameters from 0 to 2 or leave them as in *pfm.xml* or *osm.xml*.

The following parameters are optional:

- **data_type** — object type: polygon (pg), polyline (pl), point (poi). Example: *data_type="pg"*.
- **address** — define address by the indicated value.
- **region** — define region name by the indicated value. Example: *region="$Region"*.
- **street** — define street name by the indicated value. Example: *street="$st"*.
- **street_type** — define street type by the indicated value. Example: *street_type="$sts_type"*.
- **house** — define house number by the indicated value. Example: *house="$number"*.
- **is_city** — define if this object is a city. If it is not, do not use this parameter. Example: *is_city="1"*.
- **is_street** — define if this object is a street. If it is not, do not use this parameter. Example: *is_street="1"*.
- **is_house** — define if this object is a house. If it is not, do not use this parameter. Example: *is_house="1"*.
- **dump_attr** is responsible for displaying particular object properties (in *stdout*). It works in the same way as the **name** parameter, but it displays information for a user who is converting the map.

Dollar sign in quotes (**"$"**) means that letters which follow will be used as a variable and substituted with this variable value. To use a usual text together with a variable, it is necessary to mark it with '**|**' sign from both sides. To retrieve data from some other layer, use the hash sign (**#**). After '#', set three parameters. In the first parameter indicate the field from which the value should be taken, and then put a dot (**.**). The second parameter indicates the layer (filename without extension) to be used to get data, put a dot again. The third parameter indicates which field from the indicated layer should be used. The forth parameter can be used if the value is hidden in a string field or among a number of values — enter field, equal sign (**=**), and '%' sign in single quotes (**'%'**). Do not forget to separate all parameters with dots.

Here is an example.

Let us assume, that we have two layers:

- the *cities* layer with the fields *ID*, *Name*, *Region*;
- the *streets* layer with fields *ID*, *City*, *CityID*, *Name*.

Then,

- to get street name and the city, use
  $Name*|, |*#CityID.Cities.Name;
- to get the city and region while searching by another field, use
  $Name*|, |*#City.Cities.Region.Name='%'.

If you have noticed that the layer file contains objects of different types (you can check it with the **dump_attr** parameter), and you want to display them as different types, use the '**mod**' tag. There you set filtration conditions and object type expected as the result of conversion process. In the **filter** parameter enter the condition as SQL query. The **type** parameter is set in the same manner as it was described above.

In one *layer* there can be any number of *features*. In one *feature* there can be any number of *mod*.

If there is an error when reading the file, try to open it in another program, for example, Internet Explorer: if there are any errors in file body, IE displays only the correct part of the file. However, note that the check is performed only for opening/closing tags.

Use comments to make further editing and usage of the file easier.

Format Specification

Vector maps in the closed AVD format allow rendering map images in various projections, fulfill the search of named objects, and detect location by given coordinates.

- Conversion Table: Polyline (PL)
- Conversion Table: POI
- Conversion Table: Polygon (PG)
- Scale (AVD)

Conversion Table: Polyline

.MP	.OSM				.AVD					
Code	Key	Value	Keys	Key_ values	Type	AVD Type (0-255)	Data level (0-2)	Comment	Image	Icon
0x0001	highway	motorway			PL	1	2	A restricted access major divided highway, normally with 2 or more running lanes plus emergency hard shoulder. Equivalent to the Freeway, Autobahn, etc.		
	highway	motorway_link			PL	2	2	The link roads (sliproads/ramps) leading to/from a motorway from/to a motorway or lower class highway. Normally with the same motorway restrictions.		
0x0002	highway	trunk			PL	3	2	Important roads that are not motorways. Typically maintained by central, not local government. Need not necessarily be a divided highway.		
	highway	trunk_link			PL	4	2	The link roads (sliproads/ramps) leading to/from a trunk road from/to a trunk road or lower class highway.		
0x0003	highway	primary			PL	5	2	Roads generally linking larger towns.		
	highway	primary_link			PL	6	2	The link roads (sliproads/ramps) leading to/from a primary road		

								from/to a primary road or lower class highway.		
0x0004	highway	secondary			PL	7	2	Roads generally linking smaller towns and villages.		
	highway	secondary_link			PL	8	2	The link roads (sliproads/ramps) leading to/from a secondary road from/to a secondary road or lower class highway.		
0x0000	highway	tertiary			PL	9	2	Minor roads.		0-6 7-8
	highway	tertiary_link			PL	10	2	The link roads (sliproads/ramps) leading to/from a tertiary road from/to other minor roads.		
0x000a	highway	unclassified			PL	11	1	Unclassified roads typically form the lowest form of the interconnecting grid network.		0-6 7-8
0x0042	highway	unsurfaced			PL	12	1	Unpaved roads.		
	highway	track			PL	13	1	Roads for agricultural use, gravel roads in the forest etc., usually unpaved/unsealed but may occasionally apply to paved tracks as well.		
0x0005	highway	residential			PL	14	1	Roads accessing or around residential areas but which are not a classified or unclassified highway. Streets.		0-6 (7-9)
0x0006 0x000b 0x0008 0x0009 0x0049	highway	living_street			PL	15	1	A street where pedestrians have priority over cars, children can play on the street, maximum speed is low. Sometimes called 'Home Zone'.		(0-5) (6)
0x0007	highway	service			PL	16	1	Generally for access to a building, motorway service station, beach, campsite, industrial estate, business park, etc. This is also commonly used for access to parking and trash collection.		(0-5) (6)
	highway	bridleway			PL	17	1	Roads for horses, cartage.		
	highway	cycleway			PL	18	1	Cycleways for bicycles.		
								A lane is a route for		

	cycleway	lane			PL	18	1	bicycles that lies within the roadway.		
	cycleway	track			PL	18	1	A route for bicycles that is separate from the road.		
	highway	footway			PL	19	1	Footpaths for pedestrians, e.g. walking tracks and gravel paths.		
0x0048 0x0016	highway	pedestrian			PL	19	1	For roads used mainly/exclusively for pedestrians/shopping areas. Also for tagging squares and plazas.		
	highway	bus_guideway			PL	20	1	A busway where the vehicle guided by the way (though not a railway) and is not suitable for other traffic.		0-6 (7-9)
	junction	roundabout			PL	21	1	Circle movement.		
0x0014	railway	rail			PL	25	1	Full sized passenger or freight trains in the standard gauge for the country or state.		
	railway	tram			PL	25	1	One or two carriage rail vehicles, usually sharing motor road for trams.		
0x003f	railway	subway			PL	26	1	A city passenger rail service running mostly grade separated. Metro/underground/subway lines.		
	railway	disused			PL	25	1	A section of railway which is no longer used but where the track and infrastructure remains in place.		
	railway	monorail			PL	27	1	A railway with only a single rail.		
0x001f	waterway	river			PL	30	2	For narrow rivers which will be rendered as a line.		
0x0018	waterway	canal			PL	30	1	An artificial open waterway used for transportation, waterpower, or irrigation.		
0x0026	waterway	stream			PL	30	1	A naturally-formed waterway that is too thin to be classed as a river. An active, able-bodied person should be able to jump over it if trees along it are not too thick.		
0x0044	waterway	drain			PL	30	1	An artificial waterway for carrying storm water or		

								industrial discharge.		
	waterway	weir			PL	30	1	A barrier built across a river, sometimes to divert water for industrial purposes. Water can still flow over the top.		
	waterway	dam			PL	31	1	A wall built across a river or stream to impound the water. A dam normally does not have water flowing over the top of it.		
	aeroway	runway			PL	35	1	A strip of land kept clear and set aside for aeroplanes to take off from and land on.		
0x0045 0x001d	boundary	administrative	admin_level	8	PL	191	1	State, county, local council.		
0x001c					PL	192	1	Region boundary.		
0x001e	boundary	administrative	admin_level border_type	2 nation	PL	193	2	National boundary.		

Conversion Table: POI

.MP	.OSM		.AVD					
Code	**Key**	**Value**	**Type**	**AVD Type (0-255)**	**Data level (0-2)**	**Comment**	**Image**	**Icon**
0xf201	highway	traffic_signals	POI	50	0	Lights that control the traffic.		
0xf002 0x2f08 0x2f17 0xf001 0xf003 0xf004	highway	bus_stop	POI	51	0	A small bus stop.		
0x2f03	highway	services	POI	52	0	A service station to get food and eat something, often found at motorways.		
0xf007	railway	station	POI	53	0	A railway station.		
0xf006	railway	halt	POI	53	0	A small railway station, may not have a platform, trains may only stop on request.		
0x4600	amenity	pub	POI	55	0	A place selling beer and other alcoholic drinks; may also provide food or accommodation.		
0x2d02	amenity	nightclub	POI	55	0	A nightclub.		

0x2d00								
0x2a0e	amenity	cafe	POI	55	0	A cafe.		
0x4500	amenity	restaurant	POI	55	0	A restaurant.		
0x2a0d	amenity	fast_food	POI	55	0	An area with several different restaurant food counters and a shared eating area. Commonly found in malls, airports, etc.		
0x2f0b	amenity	parking	POI	56	0	Car park or a parking.		
0x2f02	amenity	car_rental	POI	56	0	A place to rent a car.		
	amenity	taxi	POI	56	0	A place where taxis wait for passengers.		
0x2f01 0x4400	amenity	fuel	POI	57	0	Petrol station, gas station, marine fuel, etc.		
0x2e05	amenity	pharmacy	POI	58	0	A pharmacy.		
	amenity	hospital	POI	58	0	A hospital.		
0x3001	amenity	police	POI	59	0	A police station.		
0x3008	amenity	fire_station	POI	59	0	A fire station.		
0xf001	amenity	bus_station	POI	60	0	Bus station.		
0x2f06	amenity	bank	POI	61	0	A bank.		
	amenity	bureau_de_change	POI	61	0	Currency exchange, a place to change foreign bank notes and travellers cheques.		
	amenity	atm	POI	61	0	An ATM or cash point.		
0x2b00	tourism	hotel	POI	62	0	A hotel.		
0x2b01	tourism	motel	POI	62	0	A motel.		
0x2b02	tourism	guest_house	POI	62	0	Guest house.		
	tourism	hostel	POI	62	0	A hostel.		
0x0100 0x0200			POI	63	2	A megalopolis over 5 million people.		
0x0300 0x0400	place	city	POI	64	2	A city of 1-5 million people (MP). A city over 100 thousand people (OSM).		
0x0500 0x0600 0x0700 0x0800 0x0900 0x0a00 0x0006 0x0004	place	town	POI	65	1-2	A town from 10 to 100 thousand people.		
0x0b00 0x0c00 0x0d00 0x0e00 0x0f00 0x1000 0x1100 0x0010	place	village_greenhamlet	POI	66	1	A village below 10 thousand people.		
0x640a			POI	67	0	Captions.		
0x3002 0x6408			POI	149	0	A hospital.		

	place	continent	POI	195	2	A continent.		
0x6602	place	state	POI	196	2	A state.		
0x1e00	place	region	POI	197	1	A region.		
0x1f00	place	country	POI	198	1	A country, area.		

Conversion Table: Polygon

.MP	.OSM		.AVD					
Code	**Key**	**Value**	**Type**	**AVD Type (0-255)**	**Data level (0-2)**	**Comment**	**Image**	**Icon**
0x0047 0x003b 0x0045 0x0049 0x0040 0x0041	waterway	riverbank	PG	130	2	Used for large rivers, to define an area between the opposite riverbanks.		
divided by size	natural	water	PG	131	2	Lakes, water bodies, etc.		
divided by size	landuse	reservoir	PG	131	2	An artificial reservoir.		
0x0028			PG	132	2	Sea, ocean.		
	waterway	riverbank	PG	133	2	A large river.		
	leisure	park	PG	140	1	A park, open green area for recreation.		
	leisure	common	PG	140	1	An area where the public can walk anywhere.		
0x004e 0x004f 0x008e 0x0086 0x0087 0x0088	leisure	garden	PG	141	1	A garden.		
0x006d	amenity	townhall	PG	146	1	A town hall building (mayor's office).		
0x001a	amenity	grave_yard	PG	147	1	A graveyard.		
	landuse	cemetery	PG	147	1	A cemetery.		
0x000a	amenity	school	PG	148	1	A school.		(0-5) (6)
	amenity	university	PG	148	1	A university.		(0-5) (6)
								(0-5)

	amenity	college	PG	148	1	A college.		(6)
0x3002	amenity	hospital	PG	149	1	A hospital.		(0-5) (6)
	amenity	pharmacy	PG	149	1	A pharmacy.		(0-5) (6)
0x6408	building	clinic	PG	149	1	A clinic.		(0-5) (6)
0x000b	building	hospital	PG	149	1	A hospital.		(0-5) (6)
	shop building	supermarket	PG	151	1	A supermarket.		
	building	shopping	PG	151	1	A shop.		
	tourism	camp_site	PG	153	0	Camping, a place where you can pitch a tent.		
	tourism	caravan_site	PG	153	0	A place where you can park a caravan overnight or for longer periods.		
	tourism	picnic_site	PG	154	0	A place where you can have an outdoor picnic. May have facilities such as tables and benches.		
	tourism	theme_park	PG	155	1	Theme park, amusement park.		
	tourism	attraction	PG	156	0	A general tourism attraction.		
	tourism	zoo	PG	157	1	A zoo.		
	tourism	artwork	PG	158	1	A tag for public pieces of art.		
	historic	archaelogical_site	PG	159	0	Archaeological museum.		
0x0050 0x0081 0x0082 0x0083 0x0084 0x0085 0x0052 0x008f 0x0090 0x0091	landuse	forest	PG	165	2	Managed forest or woodland plantation.		
0x0001 0x0002 0x0003	landuse	residential	PG	166	1	Predominantly houses or apartment buildings.		
	landuse	retail	PG	167	1	Predominantly shops.		

	landuse	commercial	PG	168	1	Predominantly office buildings, business parks, etc.		
0x000c	landuse	industrial	PG	169	1	Predominantly workshops, factories, warehouses.		
0x0006			PG	169	0	Garages, vehicle sheds.		
	landuse	blownfield	PG	170	1	A district to be developed, an empty area.		
	landuse	greenfield	PG	170	1	Describes land scheduled for new development where there have been no buildings before .		
	landuse	railway	PG	171	1	Area for railway use, generally off-limits to the general public.		
	landuse	construction	PG	172	1	Something under construction.		
0x0004	landuse	millitary	PG	173	1	For land areas owned/used by the military for whatever purpose.		
0x0014 0x000d 0x0015 0x0016 0x0017 0x001e 0x001f 0x0020 0x0098	natural	wood	PG	184	2	Natural woodland (trees). Only for completely unmanaged/wild areas.		
0x0051 0x0096 0x008b	natural	marsh	PG	185	1	Low poorly drained land that is sometimes flooded and often lies at the edge of lakes, streams, etc.		
0x0018	sport	golf	PG	194	1	Golf course.		
	sport	horse_racing	PG	194	1	Hippodrome, racecourse.		
	sport	multi	PG	194	1	Sports ground, playing field.		
	sport	football	PG	194	1	Football.		
	sport	soccer	PG	194	1	Football or soccer.		
	building	stadium	PG	194	1	A stadium, a major sports arena with substantial tiered seating.		
	leisure	golf_course	PG	194	1	Golf course.		
	leisure	stadium	PG	194	1	A stadium.		
	leisure	track	PG	194	1	A track, e.g. running, cycle-racing, greyhound, horses.		
	leisure	pitch	PG	194	1	A field for playing football/soccer, cricket, baseball sports, etc.		
	building	palace	PG	207	1	A palace.		(0-5) (6)
	building	postoffice	PG	208	1	A post office.		(0-5) (6)

	building	restaurant	PG	209	1	A restaurant.		(0-5) (6)
0x006f 0x006f	amenity	public_building	PG	210	1	Public building.		(0-5) (6)
0x0013 0x006c	building	yes	PG	210	1	General tag for buildings.		(0-5) (6)
0x006e	building	terminal	PG	210	1	A building.		(0-5) (6)
	denomination	baptist catholic christian evangelical lutheran Roman Catholic roman_catholic	PG	211	0	A church.		(0-5) (6)
0x9999	surface		PG	212	2	Ground surface.		(0-5) (6)

Scale (AVD)

Scale (km)	Scale (m)	Data level	Zoom level	Value
0,02	20	0	0	2000
0,05	50	0	1	5000
0,1	100	0	2	10000
0,1	100	0	3	10000
0,2	200	0	4	20000
1	1000	1	5	100000
1	1000	1	6	100000
2	2000	1	7	200000
5	5000	1	8	500000
10	10000	1	9	1000000
20	20000	1	10	2000000
50	50000	2	11	5000000
100	100000	2	12	10000000
100	100000	2	13	10000000
200	200000	2	14	20000000

Gurtam Maps

By choosing Gurtam Maps as a map source all the address information used for online tracking and reports will be taken from Gurtam Maps.

- Conversion Table: Polyline (PL)
- Conversion Table: POI
- Conversion Table: Polygon (PG)
- Scale Gurtam Maps

Conversion Table: Polyline

.MP	.OSM				Gurtam Maps					
Code	Key	Value	Keys	Key_ values	Type	GM Type	Data level (0-2)	Comment	Image	Icon
0x0001	highway	motorway			PL	1	2	A restricted access major divided highway, normally with 2 or more running lanes plus emergency hard shoulder. Equivalent to the Freeway, Autobahn, etc.		0-4 5-9 10-12
	highway	motorway_link			PL	2	2	The link roads (sliproads/ramps) leading to/from a motorway from/to a motorway or lower class highway. Normally with the same motorway restrictions.		0-4 5-7
0x0002	highway	trunk			PL	3	2	Important roads that are not motorways. Typically maintained by central, not local government. Need not necessarily be a divided highway.		0-4 5-9 10-12
	highway	trunk_link			PL	4	2	The link roads (sliproads/ramps) leading to/from a trunk road from/to a trunk road or lower class highway.		0-4 5-7
0x0003	highway	primary			PL	5	2	Roads generally linking larger towns.		0-5 6-12
								The link roads		0-5

	highway	primary_link			PL	6	2	(sliproads/ramps) leading to/from a primary road from/to a primary road or lower class highway.		6-7
0x0004	highway	secondary			PL	7	2	Roads generally linking smaller towns and villages.		0-5 6-9
	highway	secondary_link			PL	8	2	The link roads (sliproads/ramps) leading to/from a secondary road from/to a secondary road or lower class highway.		0-5 6-7
0x0000	highway	tertiary			PL	9	2	Minor roads.		0-5 6-8
	highway	tertiary_link			PL	10	2	The link roads (sliproads/ramps) leading to/from a tertiary road from/to other minor roads.		0-5 6
0x000a	highway	unclassified			PL	11	1	Unclassified roads typically form the lowest form of the interconnecting grid network.		0-3 4-7
0x0042	highway	unsurfaced			PL	12	1	Unpaved roads.		0-3 4-7
	highway	track			PL	13	1	Roads for agricultural use, gravel roads in the forest etc., usually unpaved/unsealed but may occasionally apply to paved tracks as well.		---
0x0005	highway	residential			PL	14	1	Roads accessing or around residential areas but which are not a classified or unclassified highway. Streets.		0-4 5-7
0x0006 0x000b 0x0008 0x0009 0x0049	highway	living_street			PL	15	1	A street where pedestrians have priority over cars, children can play on the street, maximum speed is low. Sometimes called 'Home Zone'.		0-2 3-5
0x0007	highway	service			PL	16	1	Generally for access to a building, motorway service station, beach, campsite, industrial estate, business park, etc. This is also commonly used for access to parking and trash		0-2 3-5

								collection.		
	highway	bridleway			PL	17	1	Roads for horses, cartage.		---
	highway	cycleway			PL	18	1	Cycleways for bicycles.		---
	cycleway	lane			PL	18	1	A lane is a route for bicycles that lies within the roadway.		---
	cycleway	track			PL	18	1	A route for bicycles that is separate from the road.		---
	highway	footway			PL	19	1	Footpaths for pedestrians, e.g., walking tracks and gravel paths.		.....
0x0048 0x0016	highway	pedestrian			PL	19	1	For roads used mainly/exclusively for pedestrians/shopping areas. Also for tagging squares and plazas.		.....
	highway	bus_guideway			PL	20	1	A busway where the vehicle guided by the way (though not a railway) and is not suitable for other traffic.		0-3 4-7
	junction	roundabout			PL	21	1	Circle movement.		0-3 4-6
0x0014	railway	rail			PL	25	1	Full sized passenger or freight trains in the standard gauge for the country or state.		=
	railway	tram			PL	26	1	One or two carriage rail vehicles, usually sharing motor road for trams.		⟵
0x001f	waterway	river			PL	30	2	For narrow rivers which will be rendered as a line.		
0x0018	waterway	canal			PL	30	1	An artificial open waterway used for transportation, waterpower, or irrigation.		
0x0026	waterway	stream			PL	30	1	A naturally-formed waterway that is too thin to be classed as a river. An active, able-bodied person should be able to jump over it if trees along it are not too thick.		
0x0044	waterway	drain			PL	30	1	An artificial waterway for carrying storm water or industrial discharge.		
	waterway	weir			PL	30	1	A barrier built across a river, sometimes to divert water for industrial purposes. Water can still		

								flow over the top.		
	waterway	dam			PL	31	1	A wall built across a river or stream to impound the water. A dam normally does not have water flowing over the top of it.		
	aeroway	runway			PL	35	1	A strip of land kept clear and set aside for aeroplanes to take off from and land on.		
0x0045 0x001d	boundary	administrative	admin_level	8	PL	191	1	State, county, local council.		
0x001c					PL	192	1	Region boundary.		
0x001e	boundary	administrative	admin_level border_type	2 nation	PL	193	2	National boundary.		

Conversion Table: POI

.MP	.OSM		Gurtam Maps					
Code	**Key**	**Value**	**Type**	**GM Type**	**Data level (0-2)**	**Comment**	**Image**	**Icon**
0xf201	highway	traffic_signals	POI	50	0	Lights that control the traffic.		
0xf002 0x2f08 0x2f17 0xf001 0xf003 0xf004	highway	bus_stop	POI	51	0	A small bus stop.		
	highway	metro	POI	500		Metro.		
	highway	tram	POI	501		A tram stop.		
0x5900 0x5901	highway	airport	POI	503		Airport.		
0x2f03	highway	services	POI	52	0	A service station to get food and eat something, often found at motorways.		
0xf007	railway	station	POI	53	0	A railway station.		
0x4600	amenity	pub	POI	55	0	A place selling beer and other alcoholic drinks; may also provide food or accommodation.		
0x2d02 0x2d00	amenity	nightclub	POI	55	0	A nightclub.		
0x2a0e	amenity	cafe	POI	55	0	A cafe.		
0x4500	amenity	restaurant	POI	55	0	A restaurant.		
0x2a0d	amenity	fast_food	POI	55	0	An area with several different restaurant food counters and a shared eating area. Commonly found in malls, airports, etc.		

0x2f0b	amenity	parking	POI	56	0	Car park or a parking.		
0x2f02	amenity	car_rental	POI	56	0	A place to rent a car.		
	amenity	taxi	POI	56	0	A place where taxis wait for passengers.		
0x2f01 0x4400	amenity	fuel	POI	57	0	Petrol station, gas station, marine fuel, etc.		
0x2e05	amenity	pharmacy	POI	58	0	A pharmacy.		
	amenity	hospital	POI	58	0	A hospital.		
0xf001	amenity	bus_station	POI	60	0	Bus station.		
0x2f06	amenity	bank	POI	61	0	A bank.		
	amenity	bureau_de_change	POI	61	0	Currency exchange, a place to change foreign bank notes and travellers cheques.		
	amenity	atm	POI	61	0	An ATM or cash point.		
0x2b00 0x2b01 0x2b02	tourism	hotel	POI	62	0	A hotel, a motel, a guest house		
	tourism	hostel	POI	62	0	A hostel.		
0x0100			POI	302		Capital.		
0x0200			POI	63	2	A megalopolis over 5 million people.		
0x0300 0x0400	place	city	POI	64	2	A city of 1-5 million people (MP). A city over 100 thousand people (OSM).		
0x0500 0x0600 0x0700 0x0800 0x0900 0x0a00 0x0006 0x0004	place	town	POI	65	1-2	A town from 10 to 100 thousand people.		
0x0b00 0x0c00 0x0d00 0x0e00 0x0f00 0x1000 0x1100 0x0010	place	village_greenhamlet	POI	66	1	A village below 10 thousand people.		
0x640a			POI	67	0	Captions.		
	place	continent	POI	195	2	A continent.		
0x6602	place	state	POI	196	2	A state.		
0x1e00	place	region	POI	197	1	A region.		
0x1f00	place	country	POI	198	1	A country, area.		

Conversion Table: Polygon

.MP	.OSM		Gurtam Maps					
					Data			

Code	Key	Value	Type	GM Type	level (0-2)	Comment	Image	Icon
0x0047 0x003b 0x0045 0x0049 0x0040 0x0041	waterway	riverbank	PG	130	2	Used for large rivers, to define an area between the opposite riverbanks.		
divided by size	natural	water	PG	131	2	Lakes, water bodies, etc.		
divided by size	landuse	reservoir	PG	131	2	An artificial reservoir.		
0x0028			PG	132	2	Sea, ocean.		
	waterway	riverbank	PG	133	2	A large river.		
	leisure	park	PG	140	1	A park, open green area for recreation.		
0x004e 0x004f 0x008e 0x0086 0x0087 0x0088	leisure	garden	PG	141	1	A garden.		
0x006d	amenity	townhall	PG	145-146	1	A town hall building (mayor's office), administrative building.		0-2 3
0x001a	landuse	grave_yard	PG	147	1	A graveyard, a cemetery		
0x000a	amenity	school	PG	148	1	A school.		
	amenity	university	PG	148	1	A university.		
	amenity	college	PG	148	1	A college.		
0x3002	amenity	hospital	PG	149	1	A hospital.		
	shop building	supermarket	PG	151	1	A supermarket.		0-2 3
	tourism	camp_site	PG	153	0	Camping, a place where you can pitch a tent.		
	tourism	caravan_site	PG	153	0	A place where you can park a caravan overnight or for longer periods.		
	tourism	picnic_site	PG	154	0	A place where you can have an outdoor picnic. May have facilities such as tables and benches.		
	tourism	theme_park	PG	155	1	Theme park, amusement park.		
	tourism	attraction	PG	156	0	A general tourism attraction.		
	tourism	zoo	PG	157	1	A zoo.		
	tourism	artwork	PG	158	1	A tag for public pieces of art.		
	historic	archaelogical_site	PG	159	0	Archaeological museum.		
0x0050 0x0081 0x0082								

0x0083 0x0084 0x0085 0x0052 0x008f 0x0090 0x0091	landuse	forest	PG	165	2	Managed forest or woodland plantation.		
0x0001 0x0002 0x0003	landuse	residential	PG	166	1	Predominantly houses or apartment buildings.		0-3 4-7
	landuse	retail	PG	167	1	Predominantly shops.		0-3 4-7
	landuse	commercial	PG	168	1	Predominantly office buildings, business parks, etc.		0-3 4-7
0x000c	landuse	industrial	PG	169	1	Predominantly workshops, factories, warehouses.		0-3 4-7
0x0006			PG	169	0	Garages, vehicle sheds.		0-3 4-7
	landuse	blownfield	PG	170	1	A district to be developed, an empty area.		
	landuse	greenfield	PG	170	1	Describes land scheduled for new development where there have been no buildings before.		
	landuse	railway	PG	171	1	Area for railway use, generally off-limits to the general public.		
	landuse	construction	PG	172	1	Something under construction.		
0x0004	landuse	millitary	PG	173	1	For land areas owned/used by the military for whatever purpose.		
	landuse	airport	PG	401	1	Airport area.		
0x0014 0x000d 0x0015 0x0016 0x0017 0x001e 0x001f 0x0020 0x0098	natural	wood	PG	184	2	Natural woodland (trees). Only for completely unmanaged/wild areas.		
0x0051 0x0096 0x008b	natural	marsh	PG	185	1	Low poorly drained land that is sometimes flooded and often lies at the edge of lakes, streams, etc.		
0x0018	sport	golf	PG	194	1	Golf course, football, stadium.		
	building	palace	PG	207	1	A palace.		0-2 3

	building	postoffice	PG	208	1	A post office.		0-23
	building	restaurant	PG	209	1	A restaurant.		0-23
0x006f 0x006f	amenity	public_building	PG	210	1	Public building.		0-23
0x0013 0x006c	building	yes	PG	210	1	General tag for buildings.		0-23
	denomination	baptist catholic christian evangelical lutheran roman_catholic	PG	211	0	A church.		0-23
0x9999	surface		PG	212	2	Bottom surface.		

Scale (Gurtam Maps)

Scale (km)	Scale (m)	Data level	Zoom level	Value
0,02	20	0	0	2000
0,05	50	0	1	5000
0,1	100	0	2	10000
0,1	100	0	3	10000
0,2	200	0	4	20000
1	1000	1	5	100000
1	1000	1	6	100000
2	2000	1	7	200000
5	5000	1	8	500000
10	10000	1	9	1000000
20	20000	1	10	2000000
50	50000	2	11	5000000
100	100000	2	12	10000000
100	100000	2	13	10000000
200	200000	2	14	20000000

Logs

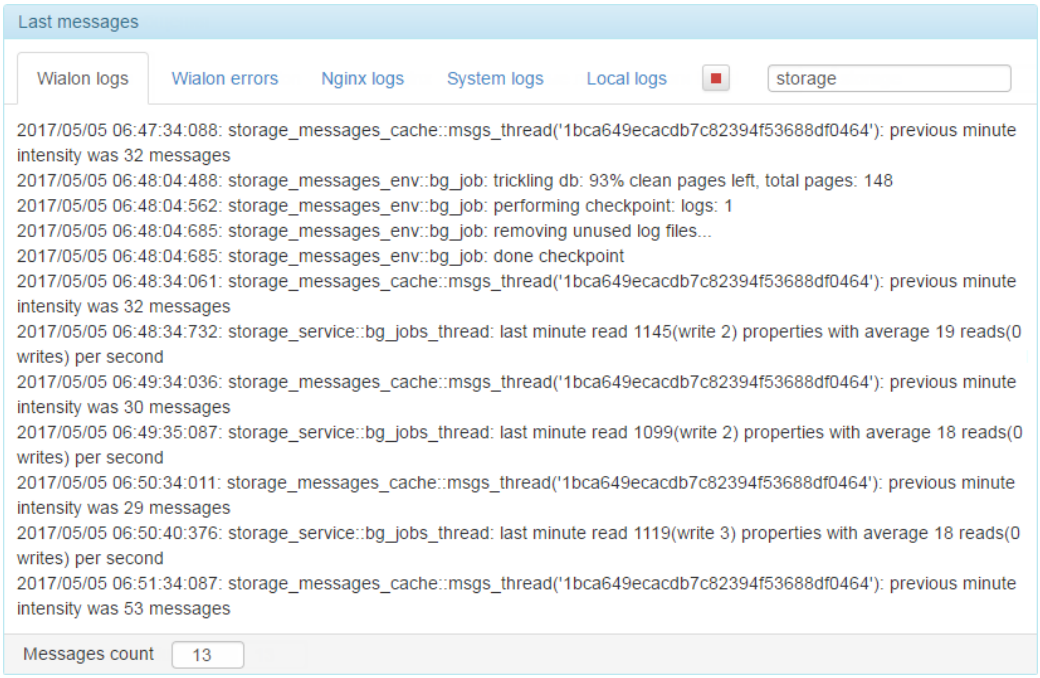
On this page, you can observe different kinds of logs kept in the system. The last hundred messages are available for (in parentheses you can see their physical location on your server):

- Wialon Local logs (/home/wialon/wlocal/logs/trace.log*);
- Wialon Local errors (/home/wialon/wlocal/logs/error.log*);
- Nginx logs (/var/log/nginx/error.log*);
- System logs (/home/wialon/wlocal/logs);
- Wialon Local logs of the administration site (/home/wialon/wlocal/logs/lcm/lcm.log*).

New messages are added to the bottom.

In the upper right corner there is a dynamic filter that allows to sort the log's contents according to the introduced value (corresponds to the *grep* utility).

You can also adjust the quantity of lines shown in the log. To do this, enter the necessary number in the line *Messages cont* below (corresponds to the *tail* utility).



It is possible to stop or start the los using the buttons and , respectively. If the log is stopped, the two options described above cannot be applied to it.

The system checks for errors once an hour, and if there are any, a report is sent to the administrator (whose e-mail is adjusted on the *System* page).

A system administrator also has access to the following additional logs in the console:

- Logs of the access to web and cms (/var/log/nginx/*).
- Logs of the mail system if the SMTP is not adjusted (/var/log/mail.log*).
- Wialon Local logs without users' work, that is automatic processes only (/home/wialon/wlocal/logs/service.log*).

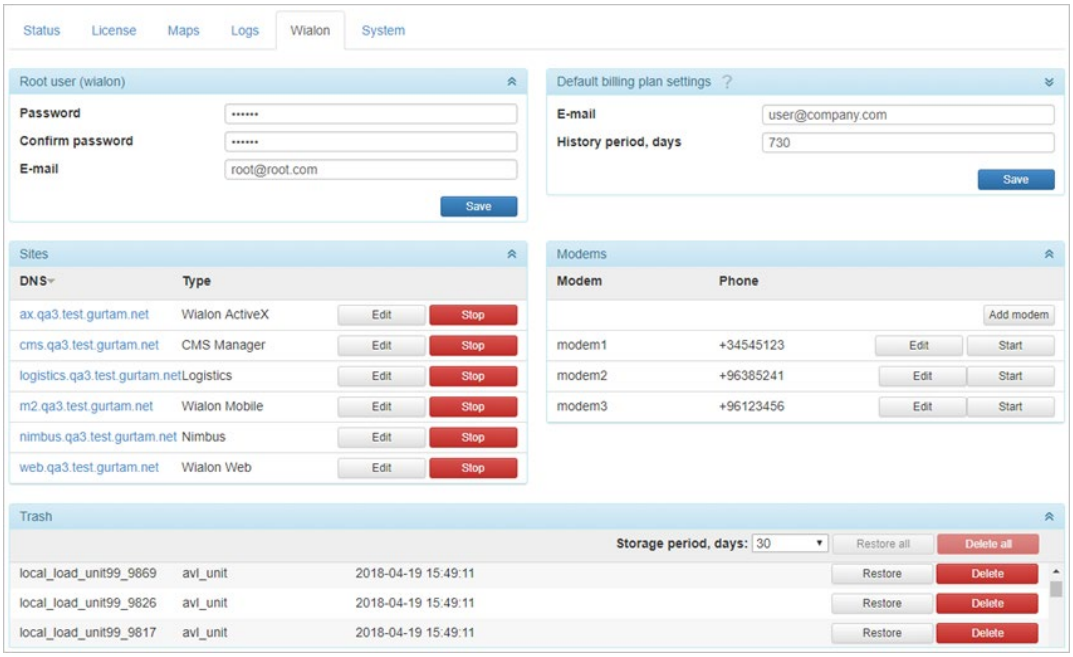
Logs of working with the hardware (/home/wialon/wlocal/logs/). You can see the contents of a log using the command *cat*. As a rule, you can understand which log to what type of hardware belongs. For example, from the contents of the log *2016/05/02 06:25:13:284: Received GPRS message from unknown unit (Wialon Retranslator): ID: 123456789000121* you can see that Wialon Retranslator is used as hardware type.

- The logs of the administrator of the website (/home/wialon/wlocal/logs/lcm/*). These logs are divided into general, errors and messages about restarts and sessions.

All the logs are rotated by means of the preinstalled and adjusted logrotate. By default the previous 10 days of logs are stored, but it is possible to enlarge this period by means of changing the corresponding configuration file in the directory /etc/logrotate.d/ (replace rotate 10 with the value you need). For instance, for Wialon Local logs that is /etc/logrotate.d/wlocal. After you have changed the file, update the configuration using the command *logrotate -f -v /etc/logrotate.d/$filename$*, where $filename$ is the name of the file you have changed.

Wialon

This page is accessible only when Wialon Local is operating. Here you configure sites and modems, manage recycle bin, etc.



Further information:

- Root User
- Default Billing Plan Settings
- Sites
- Modems
- Trash

Root User

The root user is *wialon*. With this username and initially the same password, you can login to the main tracking interface (Wialon Local Web), CMS Manager, and other Wialon Local services (sites). ⚠ To prevent unauthorized access to the capabilities of the top user it's recommended to change the password immediately after installing Wialon Local.

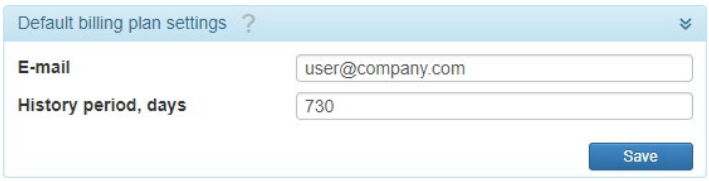
On the Wialon page, you can enter e-mail address and password for the root user. E-mail is required for reset password procedure, password — for login action.

Note that only the root user can create and manage billing plans, apps, and perform conversion.

Default Billing Plan Settings

In this section you can configure the root user's billing plan:

- **E-mail** — the root user's (wialon) e-mail. It is used for sending system messages.
- **History period, days** — the data storage period for the root user's billing plan (that is, of the whole server). The messages deleted on the expiry of the indicated period, cannot be restored.



Sites

By default, two sites are available: one of Wialon Web type and one of CMS Manager type. More sites can be activated through the 'License' page.

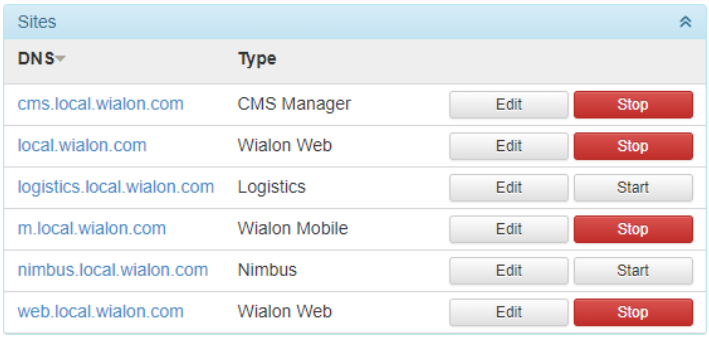
For your first login use the root user's login and password.

There are five types of sites:

- CMS Manager (management system where accounts, users, units, retranslators are created);
- Wialon Web (the main tracking interface where the end users watch their units, generate reports, etc.);
- Wialon Mobile (a simplified tracking interface for mobile devices);
- Logistics (service for working with orders);
- NimBus (service for work with passenger transportation).

You can have only one CMS Manager, however, several Wialon Web sites (the *Extra Site* module) and Wialon Mobile sites can be added, each located on its own DNS and, perhaps, has a personal skin (paid option).

The *Sites* section is a table where for each available site its DNS and type are specified. Also, there are buttons for changing site settings and starting/stopping them. Stopping the site makes it impossible for users to log on to the system. To open the required site, click on its DNS link.



To configure the site, press the *Edit* button. For sites such as Wialon Web, CMS Manager, Logistics and NimBus, additional options are available. In the settings dialog, you can specify an individual site name, add copyrights (the link will be displayed in the bottom panel), and apply a personal design.

Note.
After (re)starting Wialon Local, all sites are (re)run regardless of their previous state.

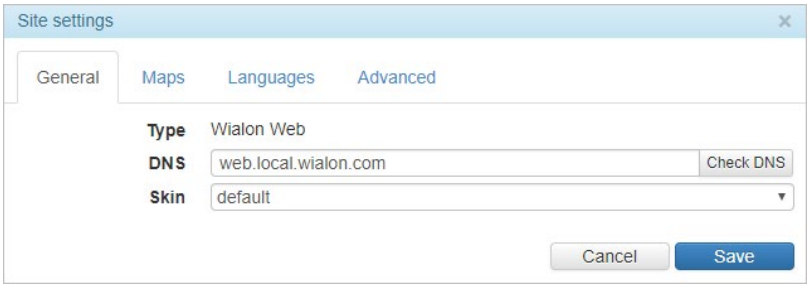
Personalization

Personalization of Wialon Web

The sites of Wialon Web type (main tracking interface) can have a personalized look (each of them).

First of all, there is a paid option of *Personal Design*. It provides a possibility to customize color scheme, fonts, and styles specially developed for your site (in addition to logos, favicon, and copyright link). However, no changes can be made to the layout of the functional blocks (like panels and menus) and standard icons. Usually, new look is appealing to your corporate style.

Personal designs are known also as skins. To apply one, choose its name in the appropriate dropdown list.

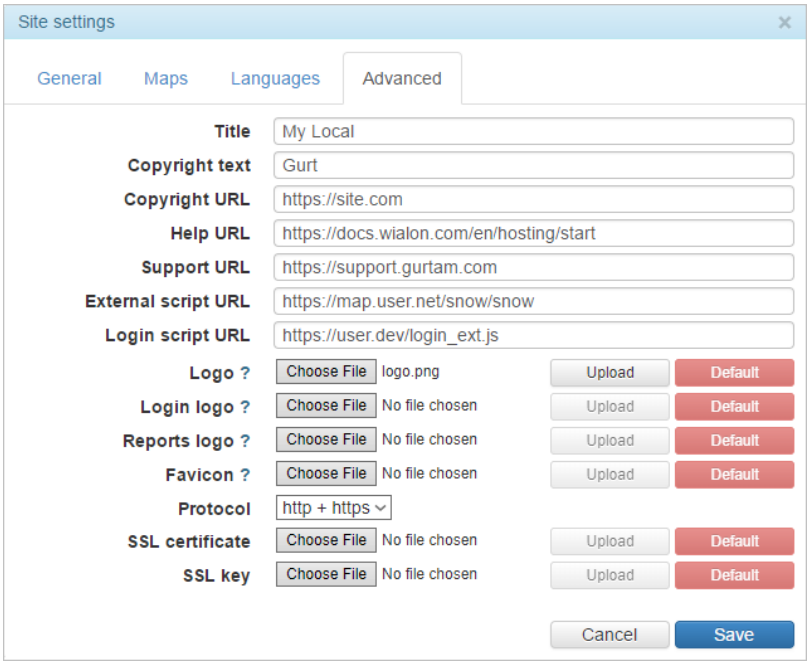


Some level of customization is possible even without a personal design. You can give a title to your site, place your logos, and add copyright information. For the logos and favicon, make sure they meet the requirements introduced in corresponding tooltips. After choosing an image, do not forget to press *Upload*. In addition, URL addresses of support and help services can be indicated on this tab. Such services could be used in the main tracking interface. Moreover, the corresponding fields allow you to indicate an external script which will be available in the monitoring system and login script as well.

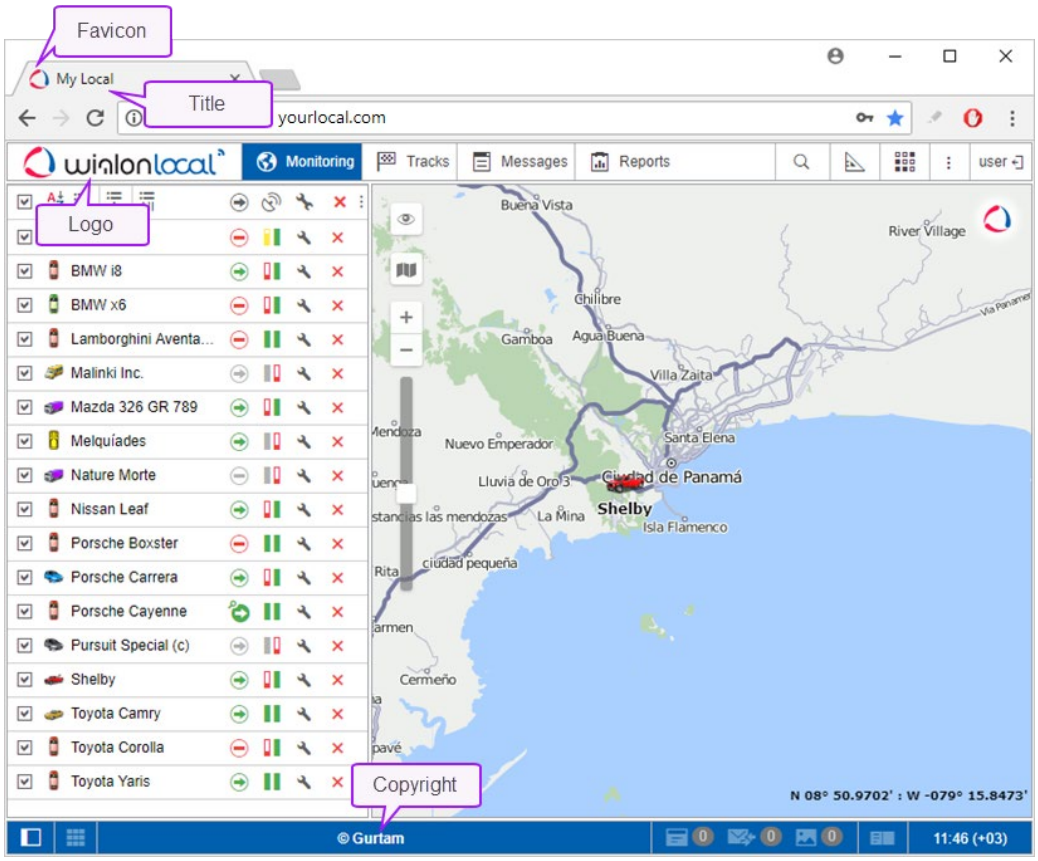
For any site you can choose the protocol (http/http+https/https) and load a SSL certificate and a SSL key. If the latter ones have not been loaded, a self-signed certificate will be created.

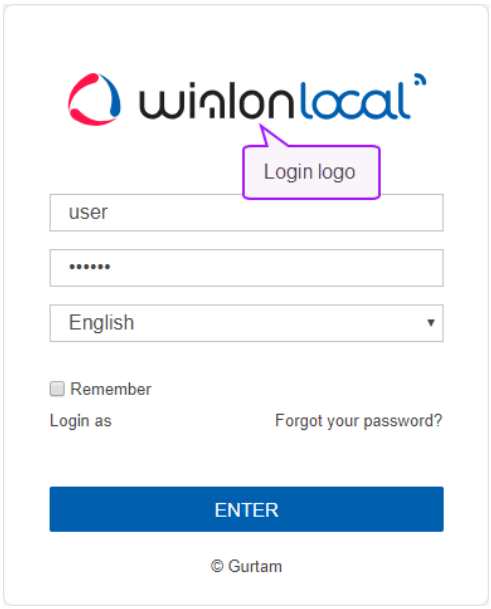
Press *Save* to finalize changes.

To come back to the initial look, empty all text fields on this tab and reset all images to *Default*.



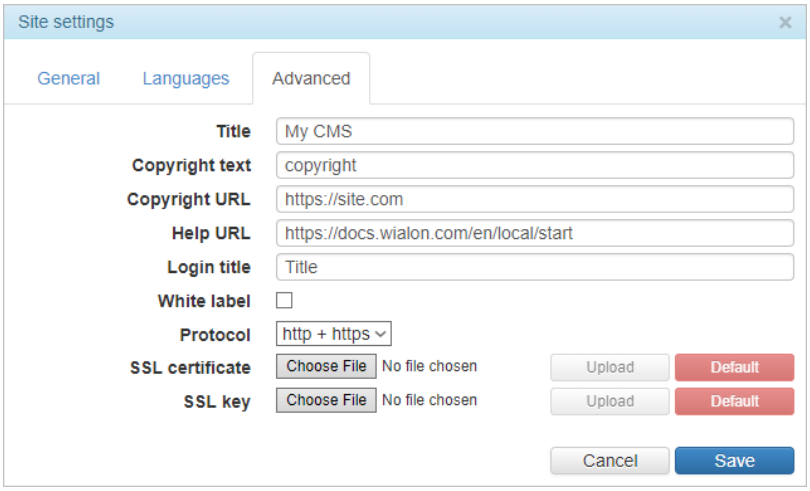
Here is where you can find all these things:





Personalization of CMS Manager

Some personalization options are also available for the site CMS Manager.

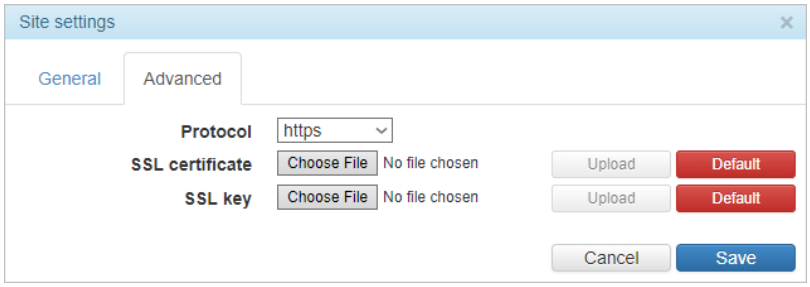


You can choose titles for the site and the login (it is shown on the login page if the *White lable* option is activated), indicate the copyright information (text and URL), select the protocol (http/http+https/https), load a SSL certificate and a SSL key. You can also hide the logos (the *White label* option) and enter the Help URL. Note that if there is no Help URL indicated, in CMS Manager there will be a link to the default documentation, taking into account the language of the interface. If there is a URL indicated, the language of the interface will not be taken into account. To disable the link to the documentation, you need to type *skip* in this field.

After making changes to a site, it is recommended to restart it and clear the cache.

Personalization of Logistics

For the Logistics site you can choose the protocol (http/http+https/https), load the SSL certificate and a SSL key.



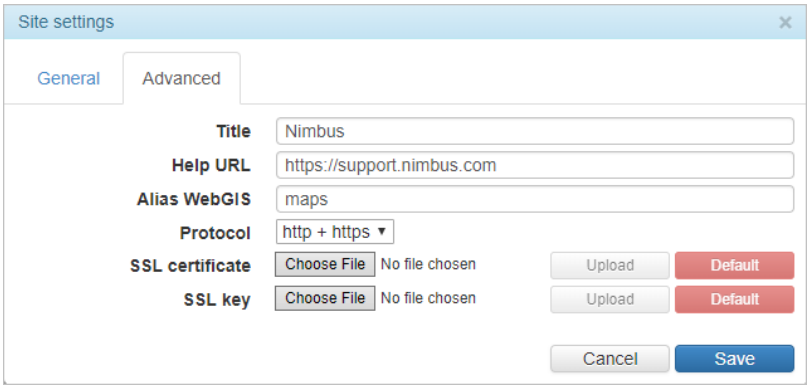
Note that for the operation of Logistics via the https protocol, the site (Wialon Web or CMS Manager) indicated in the *Base URL* field on the *General* tab is required to use the https protocol (that is, in the *Protocol* field, *http+https* or *https* must be selected).

The presence of the logo on the login page depends on the settings of the *White label* option of the CMS Manager site. Thus, if it is activated, the logo on the login page of the Logistics site is not displayed.

Personalization of NimBus

For the NimBus website you can specify the title of the page, Help URL, Alias WebGIS (WebGIS title within the application), select the protocol (http/http+https/https), upload SSL certificate and SSL key.

After applying changes, the site becomes unavailable for a period of up to 10 minutes.



Note that for the operation of Logistics via the https protocol, the site (Wialon Web or CMS Manager) indicated in the *Base URL* field on the *General* tab is required to use the https protocol (that is, in the *Protocol* field, *http+https* or *https* must be selected).

Maps

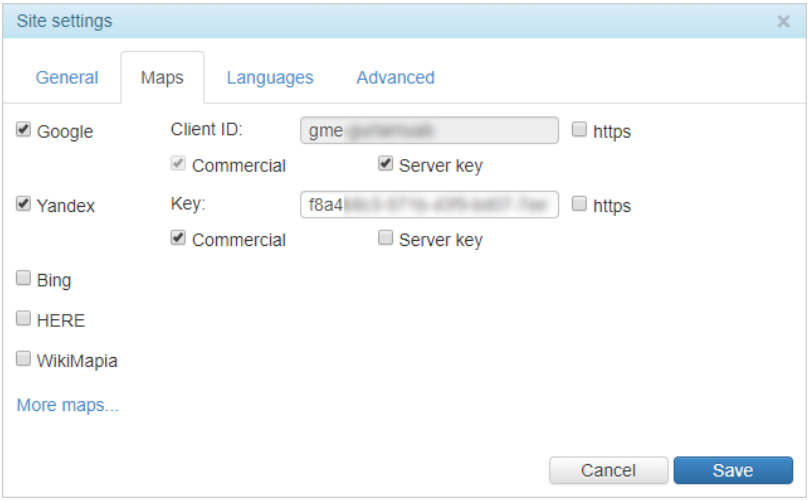
Maps are added separately for each site. By default, users get access to Gurtam Maps/WebGIS (on a fee basis; depending on the system settings) and OpenStreetMap. Other maps can also be used as a base for unit monitoring: Google, Yandex, Bing, HERE, WikiMapia, Visicom, Regio, 2GIS, Luxena, MyIndia, Kosmosnimki, ArcGIS, OpenSeaMap, Mapbox, what3words. However, most of them require activation keys.

Check the required maps on the same-name tab and specify activation keys, if necessary. When the *https* option is enabled, maps operate via a secure protocol.

For Google and Yandex maps it is possible to specify a free or commercial key. Switching is regulated by the *Commercial* option.

The Yandex key for the Logistics application is sent from the site specified in the *Base URL* field of the general settings.

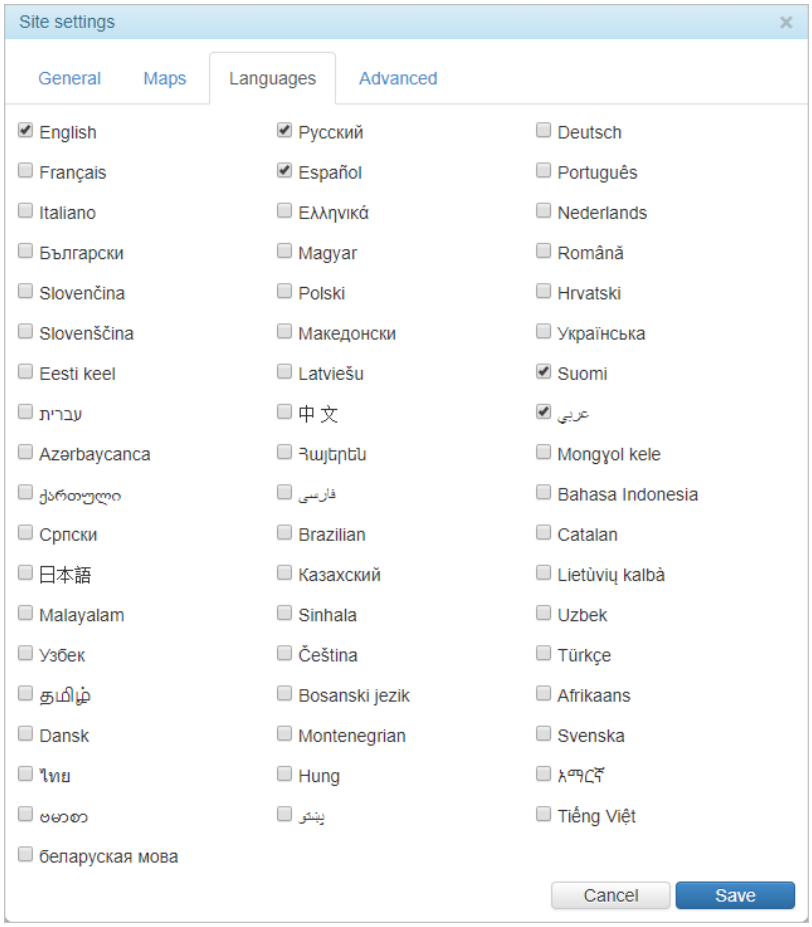
If the server keys settings are specified and the *Server key* option is activated, the data is automatically inserted in the maps settings of the website.



Even if the maps are connected to the site, they must also be activated in the user settings in the monitoring system.

Languages

The monitoring system is translated into many languages. In the *Languages* tab, select the ones you want to make available. If no language is marked, all the languages will be available.



If the required language is not listed, contact technical support.

Modems

This component requires separate licensing.

To create a new modem, press the *Add modem* button at the top of the section. Three types of modems are supported: GSM modem, SMPP gateway, and network modem. Some of the parameters of their configuration are common and others differ.

To delete a modem, open its settings and press *Delete* at the bottom of the dialog.

Modem Common Parameters

Name
Enter a name for the modem.

Phone
Enter the phone number of the SIM card installed in the modem.

Link priority
Define communications channel priority. The modem with the highest priority will be chosen the first (the higher the number, the higher the priority).

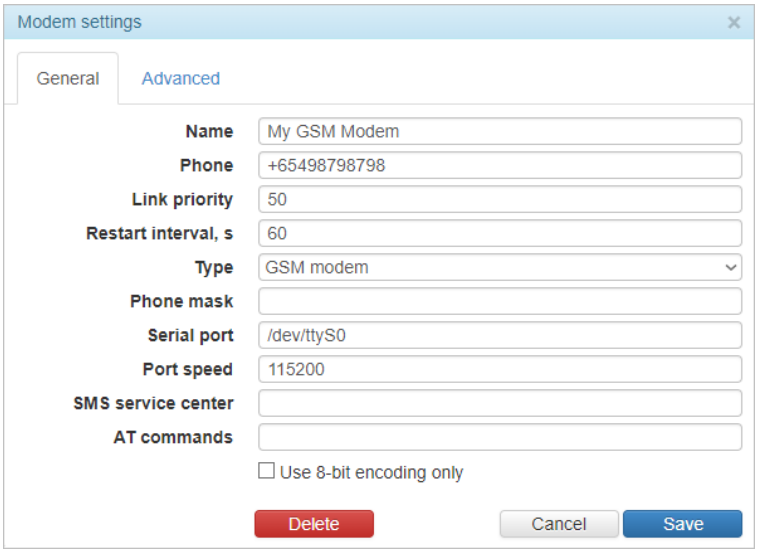
Restart interval
Indicate restart interval in seconds. If the connection with the modem is broken by any reason, after the time it will be automatically restarted. Note that if the restart interval is zero, the modem is not started when restarting the service.

Phone mask
Use this field if you want the messages to the phone numbers that correspond to the indicated mask to be sent from this particular modem. Otherwise, the messages will be sent via another modem or will not be sent at all. If the same mask is indicated for several modems, the values of the *Priority* field are taken into consideration. When entering the phone number mask, you can use the special characters * (replaces several characters), ? (replaces one character) and ! (excludes the symbols specified after it from the search) or their combinations. For instance, a phone mask may look as follows:

- *372* — all numbers that contain *372*,
- +44* — numbers that start with *+44*,
- ?31* — numbers in which the second and the third characters are *31*,
- !*116 — all numbers, except for those that end with *116*.

GSM Modem Parameters

To use a GSM modem execute in the server's console the *addgroup wialon dialout* command.



Serial port

For GSM-modem, you can specify the physical port of the server to which it is connected.

Port speed

The speed of the GSM-modem port. If any errors appear while operating, descend this value.

SMS service center

Usually, SMS service center is strictly indicated on the SIM card, and you will not have to enter it here.

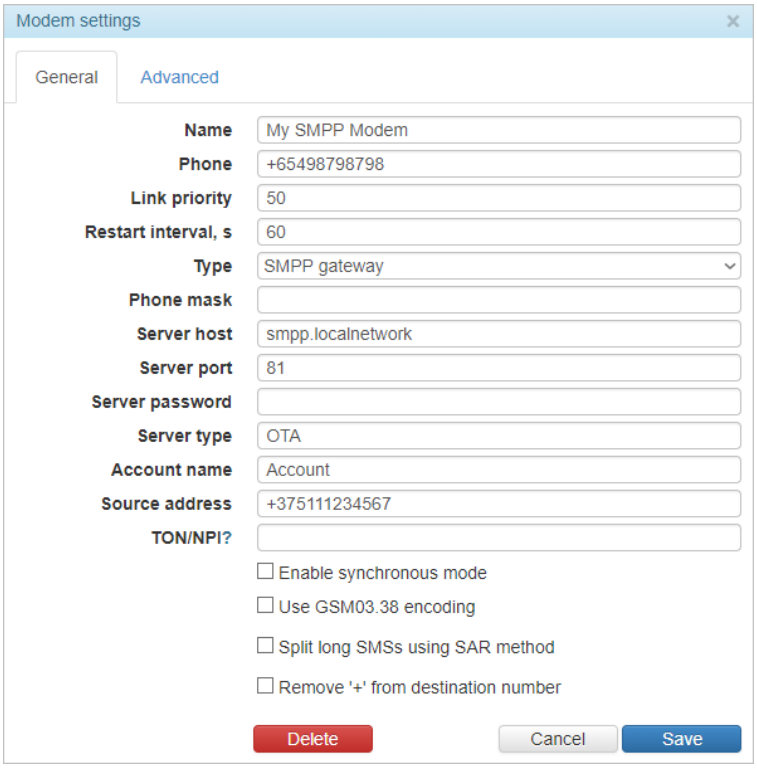
AT commands

Indicate additional initialization AT commands if they are required according to modem instructions manual. If you need to indicate several commands, use commas to separate them from each other.

Use 8-bit encoding only

Check this option if you want to exclude other kind of encoding (if you are going to receive information that includes only Latin letters and special characters).

SMPP Gateway Parameters



Server …
Indicate server host (IP address or DNS name), server port, and password to connect to the server. If needed, indicate server type, which can be *VMS* (voice mail system), *OTA* (over-the-air activation system), or other.

Account name & **Source address**
Enter account name (login) and the source address to recognize the sender (like phone number, company name or both).

TON/NPI
Define format if necessary.

Enable synchronous mode
SMPP synchro mode may be useful to make hardware diagnostics. This works by the following algorithm: while there is no notification that the first SMS was delivered, the second one will not be sent.

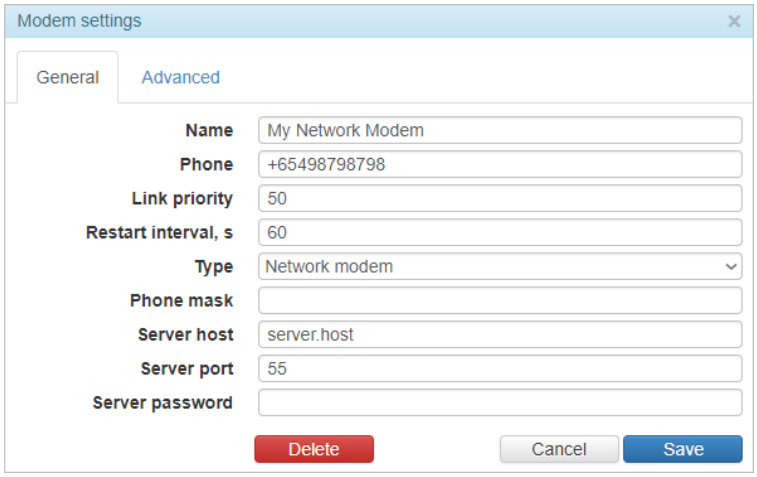
Use GSM03.38 encoding
Check this option if you want to exclude other kind of encoding.

Split long SMSs using SAR method
By default, SMS messages are transmitted with UDH method (User Data Header) where system information is placed at the beginning. SAR method (segmentation and reassembly) allows to place this information at the end in TLV format, which is essential for several languages that have characters which cannot be transmitted in 8-bit encoding. In these cases, enable the *Split long SMSs using SAR method* option to solve the problem.

Remove '+' in destination number
Check the option to eliminate the plus symbol from destination phone numbers.

Parameters for Network Modem

To connect a remote physical modem send a request for the installation of a special utility to the technical support.



Indicate server host, server port, and password to connect to the server.

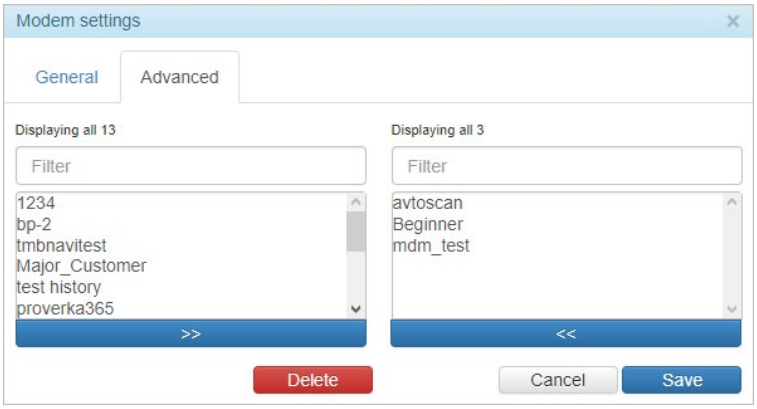
Server host is an IP address or a DNS name where the utility is installed.

Server port is a port where the utility is waiting for connection.

Server password is an optional field that is adjusted in the configuration file of the utility.

Advance Parameters

Modem activity can be restricted to selected billing plans. Modem is unavailable for all billing plans by default. To use a modem for a billing plan it is necessary to move the corresponding billing plan from the right column to the left one.



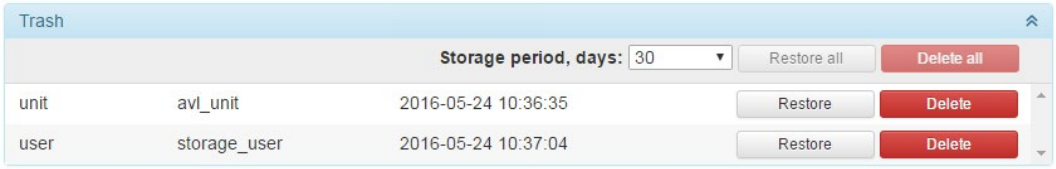
SMS sending

The mechanism of the selection of the channel for sending SMS is as follows:

1. The billing plan from the account from which the sending is realized (which belongs to the resource with a job/driver/notification o where a unit has been created) is being checked.
2. All the available modems in this billing plan are found.
3. The modems are organized according to their priority from the highest to the lowest.
4. A search of the phone number according to the mask is realized, and the modem that corresponds to it receives the highest priority. If there are several modems like this, the values of the *Priority* field from their properties are taken into consideration.
5. If the current found modem is stopped, the following one is selected for sending SMS.

Trash

The units deleted from the system are placed in trash. It means that they can be restored. A required term of storage should be chosen from the dropdown list in the header of a trash block (30 days by default).



On the list, you can see unit's name, type, and date and time of deletion. Unit types are the following:

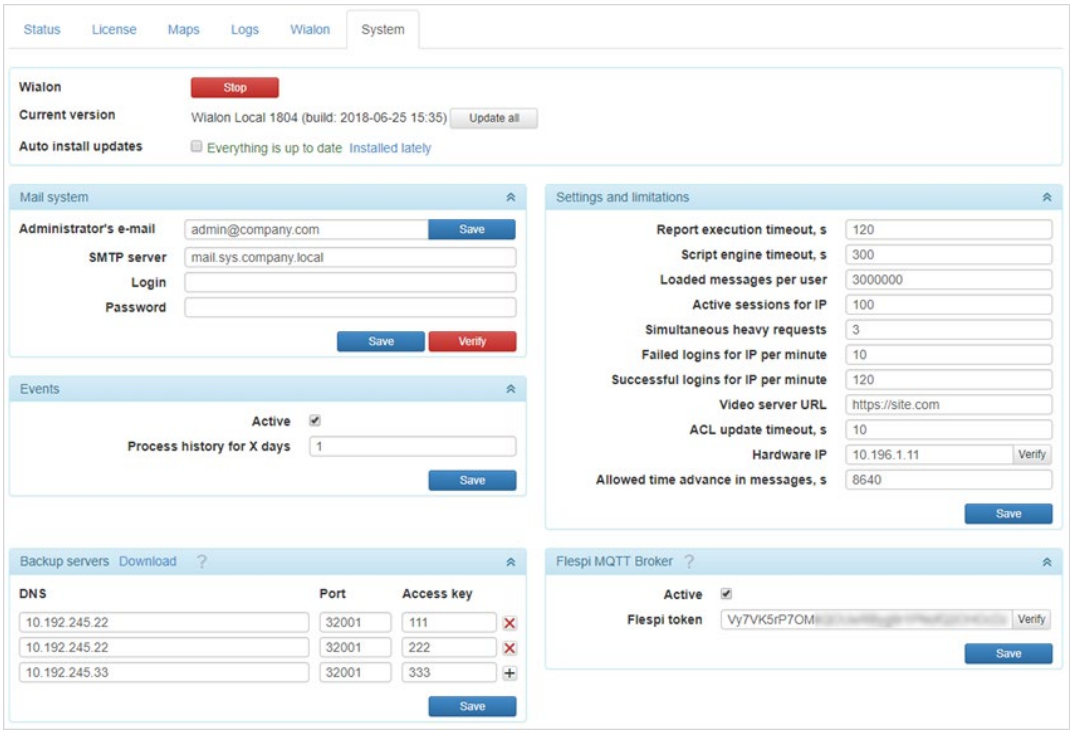
- *avl_unit* — unit;
- *storage_user* — user;
- *avl_resource* — resource;
- *avl_unit_group* — unit group;
- *avl_retranslator* — retranslator;
- *avl_route* — route.

Any unit from the list can be restored or deleted from the system completely. To restore/delete multiple units at once, select them with mouse click and then click *Restore all* or *Delete all* in the header.

Attention!
Deleted units are *always* restored into the root account *wialon*. If needed, you can transfer them later to the accounts that stay lower in the hierarchy. Moreover, you should take into consideration that restoring units is, in fact, their re-creation, which means that it requires free slots.

System

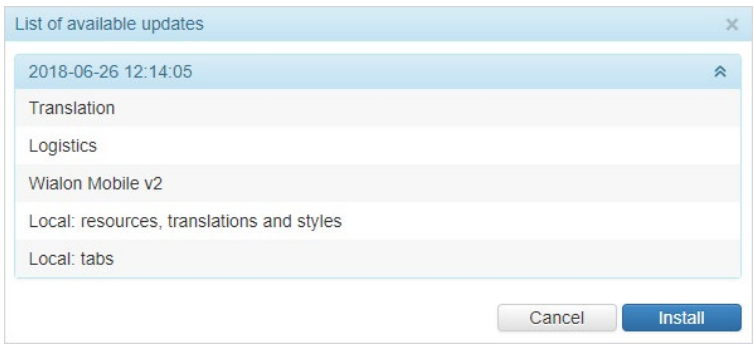
On this page, you can start/stop Wialon Local manually, install updates, adjust mail server, and set important limitations.



Updates

Updates can come from two sources: either you have purchased something on the *License* page or Gurtam has published a new release for Wialon Local.

You can choose to install updates manually or automatically. If you enable the *Auto install updates* option, the system will automatically detect the availability of updates and install them immediately. If the option is disabled, you will be informed about updates in the log, and a corresponding phrase (such as *3 updates available* instead of *Everything is up to date*) will appear near the checkbox. To see the list of available updates, click on the *Release notes* link. In the opened window, press the row with the date and time of the update to expand the list.



You can install updates manually either in the *List of available updates* window (the *Install* button) or in the *System* tab (the *Install now* link). Click the *Installed lately* link to see the list of adjusted updates.

No matter how you install updates, manually or automatically, Wialon Local will be restarted. This will cause restarting

of sites, modems, etc., and all active sessions will be forcibly finished.

The currently used version of Wialon Local is indicated in the appropriate row.

Upon the arising of any failures connected with modules, you can change the situation by reinstalling them. To do so, click on the *Update all* button located on the *System* tab and then install the uploaded update.

Mail System

Here you can also indicate your e-mail (the *Administrator's e-mail* field) which is used for the following: - to reset the password in case you lose it; - to send system reports about available updates, occurring errors, deficient disk space, etc.

Among the additional software provided and installed together with the operational system Debian there is *postfix* specially adjusted for Wialon Local. It is used for sending mail (either to administrator about Wialon Local operation or to end users with reports and notifications).

Sender's address is chosen in the following order (if one is empty, the following is taken):

1. e-mail from billing plan
2. administrator's email (from the System page)
3. noreply@gurtam.com

You may also adjust another SMTP server. In this case, all mail except for messages to the administrator will go through it.

Enter your SMTP server address. It may prove to be enough if you have your own SMTP server. However, if you use an external server for sending mail (like gmail.com, for example), you will need authorization. In this case, you enter your login and password you obtained in that mail system.

Attention!
When connecting to a third-party SMTP server, use the authorization without plain text encryption.

When finished, press *Save* and restart Wialon Local. To check if the mailing system is configured properly, you can press *Verify*. A test message will be sent to the administrator's e-mail. You can also see the results of this check in the Log below.

Most mail systems perform special checks for spam messages. They compare the original IP address from which the messages go with the MX record of the sender's domain. If the MX record is not found, sending messages might be suspended, or the sender's address might be added to the *grey list* (this eventually might lead to total denial of processing and sending messages). To avoid such situation, when you register your sites related to Wialon Local, make sure that external IP address of the server is included in the MX records of the domain.

Events

In the *Process history for X days* field, indicate the number of days valid for events module. In other words, if 5 days is indicated in this field, and your equipment sends messages for the past 30 days (stored in black box), then events will not be recalculated.

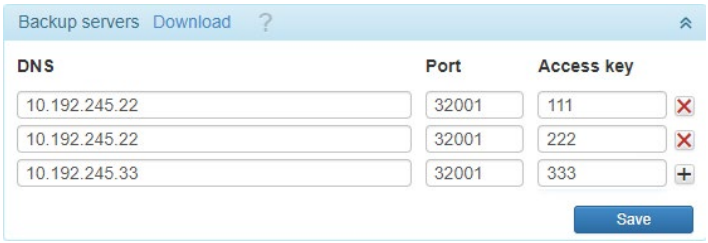
Note.
If the events are not activated (the corresponding checkbox is not marked),

- the *Info* tab of the mobile application displays only online data, and the *History* of movements is empty;
- the *Info* tab of the mobile application does not display the information about sensors;
- drivers' activities based on their assignment to units are not be formed;
- notifications on fuel filling and theft do not work.

Note that the maximum number of days for history processing corresponds to 365 days. Though a large amount of information requires the corresponding time for processing, it is recommended not to exceed the value of several days.

Backup Servers

In this section, for each backup server, specify the DNS, port, and access key. These parameters are checked with the ones specified in the config.txt file of the backup server.



Settings and Limitations

In order to provide actual data, all the **online queries** have their execution time. If it is exceeded, the browser does not wait for an answer from the server and the query's execution stops. This restriction is 3 minutes for the reports and 5 minutes for the scripts.

To ensure a stable operation of the server and to prevent it from overloading you can adjust the limitations listed below.

Report execution timeout, s
If the execution of a report on the server exceeds this value, it is aborted. The recommended value is 300.

Script engine timeout, s
If the execution of scripts on the server exceeds this value, it stops. The recommended value is 600.

Loaded messages per user
The number of messages that can be loaded by a user into all user's sessions. If this limit is met, this user may have difficulties in executing reports, building tracks, importing messages, etc. The recommended value is 15,000,000.

Active sessions for IP
The maximum number of active sessions of one user from one IP address. The recommended value is 100.

Simultaneous heavy requests
By heavy requests, we mean message loading, report execution, etc. In this field, you indicate how many heavy requests can be processed simultaneously in a session. The recommended value is 3.

Failed logins for IP per minute
Maximum unsuccessful logins from one IP address in a minute. The recommended value is 10.

Successful logins for IP per minute
Allowed successful logins from one IP address in a minute. If these two limits are met, IP address will be temporarily blocked. It can cause difficulty to log in to the system. The recommended value is 120.

Video server URL
Address of the video server.

ACL update timeout, s
The interval of recalculation of users's access rights to their units. The smaller the interval is, the higher is the load on the server. The recommended value is 500.

Hardware IP IP-address of the server to which the data from the units should be sent. It is displayed in the properties of all units in the *Server address* field.

Allowed advance in messages, s

Allowed timing advance in messages at which their delayed registration is carried out (values from 0 to 84600 are available). Applicable in cases when the device time is ahead of the server time.

If you leave these fields empty o fill them in with zeroes, there will be no restrictions. See the recommended default adjustments.

Flespi MQTT Broker

The section is displayed if the applications that use **flespi** are purchased.

Enable the *Active* checkbox to work with such applications.

Below indicate the *Flespi token* — the key designed to connect to the flespi services and transfer the data of applications that use it.

To obtain a token, log in to flespi using one of the available methods (Facebook, GitHub, Google, Microsoft, flespi). Once authorization is complete, a new token is generated and inserted into the required field. The token is valid for 1 year. Once a month, the validity of the token is checked and if less than 90 days remain, it is prolonged automatically.

If the key is not specified or specified incorrectly, or obsolete, applications that use flespi cannot be started. To check the validity of the current token, click *Verify*.

Backup Server

'Hot Backup' installation software is installed to provide online data backup. This installation software is recommended to be installed and activated on the server different from the one where your operating Wialon Local is launched.

Hot backup server provides real time full replication of Wialon Local database (*storage* directory). There is a possibility of simultaneous usage of several hot backup servers with no additional licensing needed.

Installation

Requirements:

Backup server needs to be installed on the 64 bit Linux operating system. The key requirement is a HDD capacity. It should be no less than the HDD of the main server. If this server is supposed to be used as the main, its parameters must be similar to the parameters of the original server.

Installation process:

- download the archive;
- unpack the archive in the working directory;
- to activate hot backup system it is necessary to set the variable in the configuration file (custom/config.txt):

```
ADF_STORAGE_SYNC_SERVER = interface:port:access_key
```

where *interface* is the backup server's address (if there are several interfaces, choose the one that will be used for backup); *port* is the port where the backup server will listen for connections; *access key* is an optional parameter necessary for additional protection of the connection to the port (it is mainly used with remote backup servers);

- launch *adf_script* start.

Enter the same parameters (address, port and access key if set) of your backup server on the site of Wialon Local administrator.

Recovery from Failure

See below two variants of actions in case of a failure of the main server.

Recovery of the Main Server's Work

The steps that should be followed to use reserve server database copy in case of Wialon Local server failure:

- stop Wialon Local on the main server;
- stop hot backup server;
- recover main server's working capacity;
- reinstall Wialon Local on it;
- move 'storage' directory from backup server to the main one;
- start Wialon Local on the main server.

If AVD cards are used, it is not necessary to restore the contents of the folder *maps* from the backup. However,

downloading and readjustment of maps may slow down the process of restoring the service for the end users.

To save as much data as possible, the devices must have a black box. In this case the messages will be downloaded completely within several hours after launching the service (if there are thousands of units; if there are fewer — the downloading will take less than an hour).

Using Backup Server as the Main One

This alternative allows reducing the time of server's inaccessibility to the end users.

Since it is supposed that in case of hardware failure the backup server will become the main one, it is strongly recommended that their characteristics coincide, including the supplementary equipment (backup power supply, modems, etc.).

The action sequence in this case is as follows:

- Install Wialon Local on the backup server. The installation steps must be performed up to the step 5 inclusive. To avoid accidental or intentional executing of the step 6, it is recommended to restrict the access to the administration system to the local IP. To do this, it is necessary to change the line *server_name* in the file */etc/nginx/conf.d/lcm.conf* leaving only *localhost* (127.0.0.1) in it and restart *nginx*.
- Install backup module to the backup server, define the path for saving *storage* by means of a symlink.
- In case of a failure of the main server stop the backup module and transfer the main IP to the backup server (that is switching the cable or changing the network settings).
- Log on to the administration system of the backup server, enter user name and password, repeat the configuration of the administration system of the main server (sites, maps, skins, restrictions, modems, etc.).
- Start Wialon Local on the backup server.

In order to back up maps, administration system's configuration or other necessary archives you can add *lsyncd* — the utility will instantly synchronize the files' changes on local and remote servers.

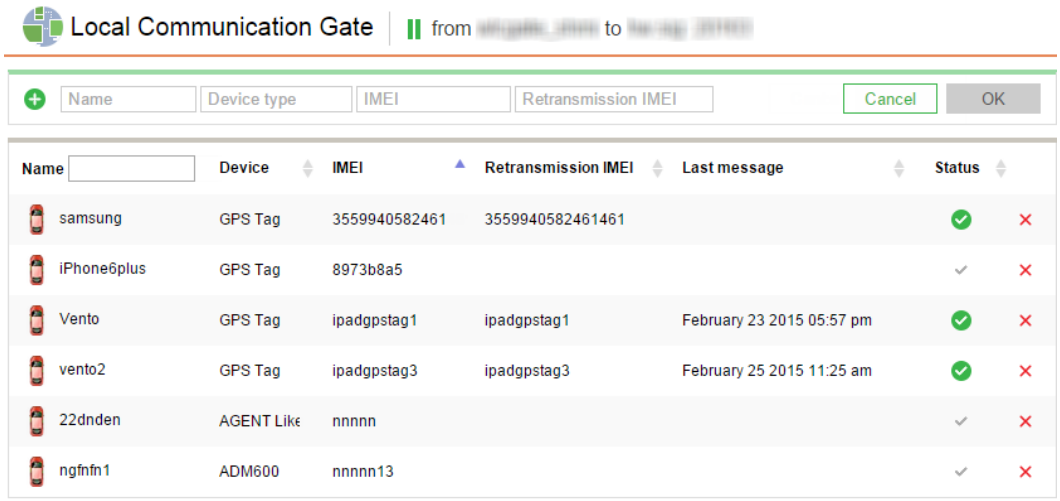
Local Communication Gate

Local Communication Gate is a service enabling retransmission of messages from any type of hardware to your Wialon Local server. Data coming from a device is transmitted by the protocol Wialon Retranslator in real-time mode.

To get access to the app, contact Gurtam Help System and provide the following information:

- external IP address of the server with actual Wialon Local,
- agreement number (the same as login to the Admininstration Panel).

To start using the service, direct your device to the IP address 193.193.165.169 (check port). Then add a unit in Local Communication Gate and launch retransmission.



To add a new unit to the retranslator, give it a name, indicate device type, IMEI (unique ID) and retransmission IMEI. For existent units, not only these parameters are displayed but also the time of the last message received and the status (being retransmitted or not). Any of these parameters can be used to sort the list of units. Besides, to quickly find a unit, you can use the dynamic filter by name.

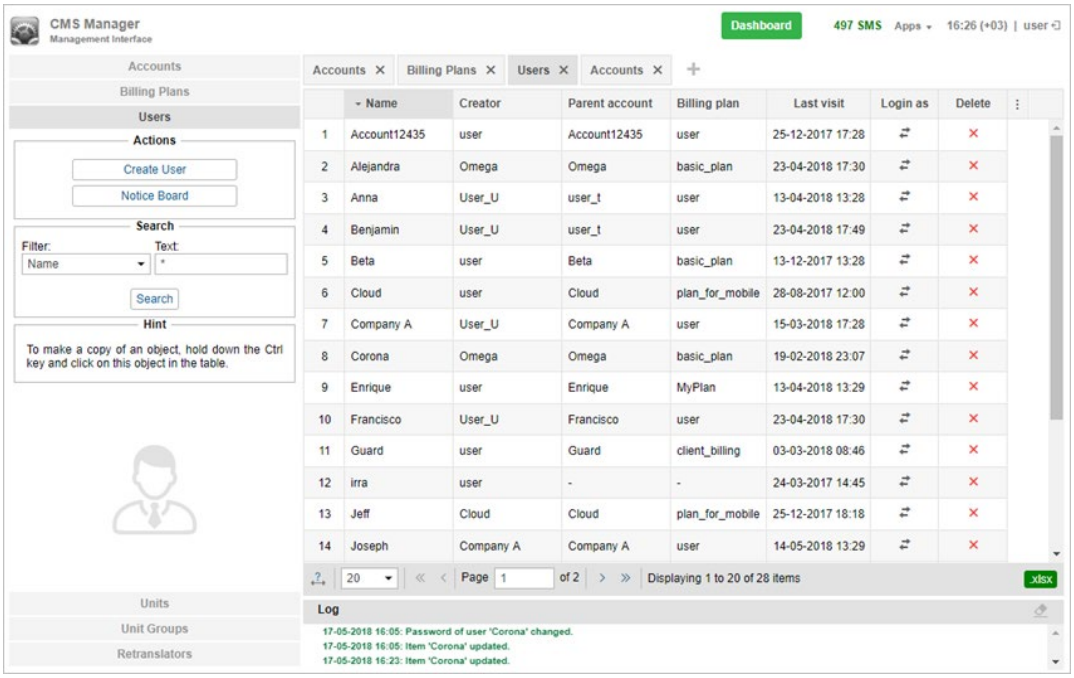
Retransmission of a unit can be stopped or restarted at any moment. Apart from that, in the top panel there is a button to start/stop the process altogether.

Select a unit with a single click to edit its settings. Note that IMEIs cannot repeat within one type of hardware. Duplications are emptied automatically.

Management System

The management of GPS tracking system Wialon Local is realized through a specialized interface designed for Wialon Local managers — CMS Manager. CMS Manager allows you to manage your tracking service by means of such system macro objects as accounts, billing plans, users, units, retranslators, and others.

CMS manager allows you to create, configure and remove these items, manage access rights, copy and export their contents and properties.



For further information, please see:

- **Managing the Service: First Steps**
- **Service Structure**
- **Access Rights**
- **CMS Interface**
- **Accounts**
- **Billing Plans**
- **Users**
- **Units**
- **Unit Groups**
- **Retranslators**
- **Import and Export**
- **Measurement System and Conversion**
- **Service Hierarchy**
- **Apps**

Managing the Service: First Steps

The correct organization of accounts, sub-accounts, and billing plans from the very start can, to a great degree, determine the easiness with which your team members and customers manage the Wialon Local service. Our downloadable pdf manual will help you in configuring the Wialon service hierarchy.

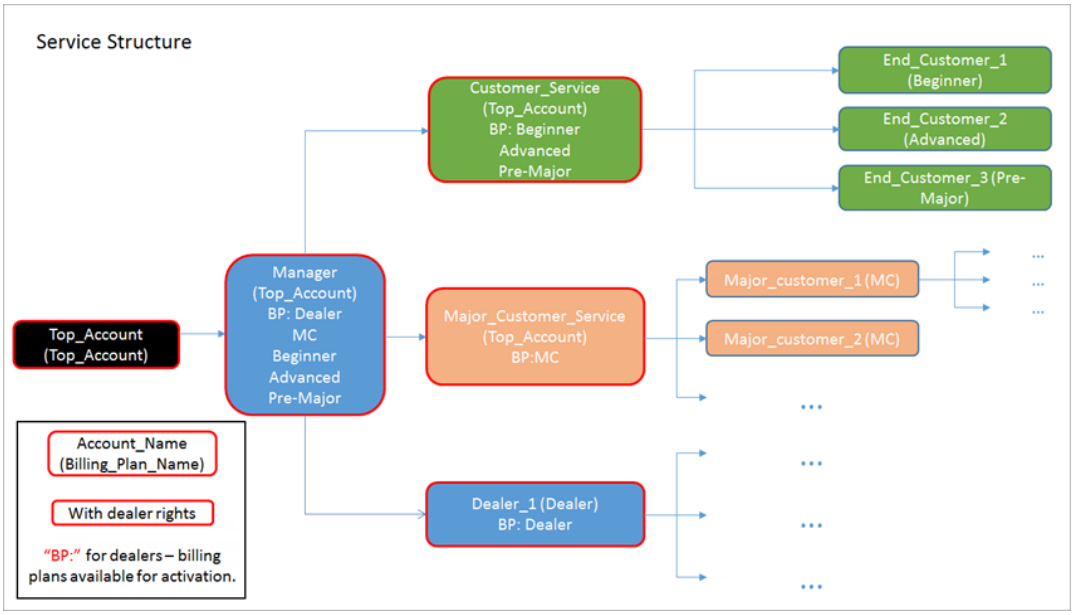
Service Structure

The effectiveness of the service management depends on the account structure created by you. The perfect structure has a clearly arranged hierarchy. Below are the recommendations necessary to help you clarify the peculiarities of the account hierarchy. Understanding these points will help you to further build the service structure that meets the needs of your business.

When creating the structure, it is important to understand the following rule: an item cannot have more rights or features than the superior item. This is true for account services, access rights, etc.

First Log in to the System

When you first log in to the system (CMS Manager), such elements as account, user, and appointed billing plan are available to the service owner. All three elements have an identical name. Below you will find more information about this account.



System Account

Top_account (individual name for every client) is a top leve account. It is created automatically when a new service activated. The top-level account for every client is created with its own individual name, serving as the global service identifier in Wialon Local. The billing plan name and the account name are the same. This billing plan has all the available functionality by default. The top-level account is a system account, that is why the owner of the service does not have access rights to edit it or to edit its billing plan.

Therefore, the first obligatory step for the Top_account user is to create a management account.

Creating Accounts

Manager is the account which is created for the service management. It is created under a top-level account. Access rights and available capabilities of the Manager user can be restricted only by the Top_account user only. This account is considered to be the starting point for creating the proper account structure. Due to its high place in the hierarchy, the Manager user can create new accounts as well as manage them (change access rights, control payments, block, etc.). This account receives the same billing plan as the Top_account. All the necessary billing plan restrictions can be added

in the account properties.

The next step for the Manager user is to estimate the number of connected end users. Depending on the result of this assessment, the corresponding account should be chosen and created (either Customer_Service or Major_Customer_Service).

Customer_Service is the account which is created for managing users with a small number of units (End_Customer_1,2,3). Such an account can be used in the sphere of personal tracking or private vehicle tracking. A set of user functions for this account includes creating, changing, controlling, and providing technical support for users/accounts belonging to it. The process of configuring account capabilities (manual enabling of the available functionality) for each end user can be quite time-consuming. Therefore, in order to automate this process, a set of ready-made billing plans (for example, Beginner, Advanced, Pre-Major) can be created in Customer_Service account. Note that these billing plans should be paid separately. Depending on the available functionality of the created billing plans, the level of service cost will vary.

The ideal structure presupposes the existence of an individual account for every end user, as well as creation of units with necessary restrictions inside their own account (restriction on deleting a unit and its messages is considered to be the minimum required restriction).

Major_Customer_Service is the account for managing major clients with dozens/hundreds of units (Major_Customer_1,2,3). Such an account provides a possibility to activate individual special billing plan either for all major customers (Major_Customer_1,2,3) or for each customer individually. Major_Customer_Service can have a developed hierarchy of subordinate accounts with a structure similar to the structure of the entire service.

In addition, a separate place is occupied by the dealer account (see below).

Dealer_1 is the account for the dealer. The user-dealer possesses a high degree of independence, its own customer support service, as well as the maximum available functionality.The structure of the dealer subordinate accounts can be created similar to the whole service structure.

Access Rights

Access Control List, or ACL.

The access right is the ability to see certain system objects and carry out authorized actions on them. In the first place, access rights are applied to the macro objects of the system such as accounts (resources), units, users, unit groups, and retranslators. Read more about CMS Manager here.

The access rights are defined primarily by the service manager in the CMS Manager interface. However, some features can be available to the end user. Rightholders can be any users of the system including managers and end users of any level.

Rights are assigned to each user individually when creating or editing it on the *Access* tab. An alternative way to set access rights is through the object properties dialogs on the *Access* tab.

Types of Rights

The set of **standard rights** that can be applied to any type of macro object includes:

- View item and its basic properties
- View detailed item properties
- Manage access to this item
- Delete item
- Rename item
- View custom fields
- Manage custom fields
- View admin fields
- Manage admin fields
- Edit not mentioned properties
- Change icon
- Query messages or reports
- Edit ACL propagated items
- Manage item log
- View and download files
- Upload and delete files

Find more about standard rights here.

In addition, for each element type there are **special rights** — a proper list of allowed/forbidden actions which are individual for this particular type of objects. For instance, unit ACL includes a special right to create, edit and delete service intervals, user ACL includes the right to act as a given user, resource ACL — the right to create, edit, and delete geofences, etc. See more information about special rights for each type of object in the following sections:

- Unit ACL
- Unit Group ACL
- User ACL
- Resource/Account ACL
- Route ACL

On the *Access* tab of every item, the rights are divided into two sections. The left section displays standard rights, and it is the same for any type of the object. The right section contains special rights, and its contents depend on the type of the element to which access is set.

Hierarchy

It is important to maintain the hierarchy when assigning rights:

- The user-creator has full rights to the created item, which can be limited only by the user of the higher level.
- It is impossible to give a user more rights to an item than the creator of this user has on the same item.
- A user can transfer the rights to other users, but no more than he has himself and only if he has transfer rights.

Standard Rights (Item ACL)

There are 16 *standard rights*, i.e. rights that every macro object has.

Type of right	Code	Description
View item and its basic properties	0x1	Allows to see the item in various lists and panels. The *General* tab (at least, name, creator, and resource or account) is available in the item properties dialog. However, no properties can be changed without additional rights. This is a basic right: without it, all other rights have no effect.
View detailed item properties	0x2	Allows to view more item properties. It influences both units (viewing the *Trip Detection* and *Fuel Consumption* tabs) and accounts (the contents of the *General* tab in the account properties dialog is supplemented, and the *Services* and *Restrictions* tabs appear in this dialog; the *Account* tab is added in the user settings dialog.)
Manage access to the item	0x4	Allows to grant other users rights to the item. As a rule, the *Access* tab becomes available in the item properties where the user can set access rights to this item. Besides, the item appears on the *Access* tab in the dialogs of other users, where the rights can be established as well.
Delete item	0x8	Allows to delete the item from the system.
Rename item	0x10	Allows to rename the item.
View custom fields	0x20	The *Custom fields* tab becomes available for viewing in the properties of an object (unit, unit group, user, resource). Moreover, the *Profile* tab also becomes available for viewing in the unit properties. Both *View custom fields* right and the next one (*Manage custom fields*) influence only the objects mentioned above (units, unit groups, users, resources).
Manage custom fields	0x40	Allows to create, delete, and change custom fields in the unit/group/user/resource properties, as well as edit the contents of the *Profile* tab in the unit properties. This right is valid only together with the previous one.
View admin fields	0x1000	Allows user to view custom fields with limited access (admin fields) on the *Custom Fields* tab of unit/group/user/resource properties.
Manage admin fields	0x2000	Allows user to create, delete, and edit admin fields.
Edit not mentioned properties	0x80	Allows to edit some advanced item properties. This right is applicable only to units (gives the opportunity to edit color schemes for a track/sensor on the *Advanced* tab, or enable the icon rotation on the *Icon* tab).
Change icon	0x100	Allows to change the icon assigned to the item. It is valid only for units and unit groups, since other items do not have such a feature.
Query reports or messages	0x200	Allows to query messages and create reports for given item.
Edit ACL propagated items	0x400	Works only on unit groups Allows to add/remove objects to/from a group.

Manage log	0x800	Allows to see the log of an item which appears in the table report *Log*. You should have the *Query messages or reports* access right to see it.
View and download files	0x4000	Allows to use the file server to view and download files for the chosen item.
Upload and delete files	0x8000	Allows to use the file server to upload and delete files for the chosen item.

If a user has the right to see the unit, its affiliation to the account, creator, groups, assigned driver, etc., these rights can be fully realized only if this user has at least the minimum rights to the corresponding items (account, user-creator, group, driver).

Read about other Access Control Lists:

- Unit ACL
- Unit Group ACL
- User ACL
- Resource/Account ACL
- Route ACL

Unit ACL

A user can obtain the ability to see a unit on map, track its state (speed, sensor values, etc.), change its properties, execute commands, generate reports about its activity, use unit in jobs and notifications, etc.

Standard Access Rights

Some details about standard rights for units:

- **View item and its basic properties**
  The following information is available in the unit properties dialog: on the *General* tab — name, creator, account, counters; on the *Advanced* tab — color schemes for sensors and tracks; on the *Sensors* tab — the list of sensors; on the *Unit Groups* tab — the list of groups where the unit belongs (if the groups are accessible). The information about the current state of the unit can be seen in its tooltip and in the extended unit information: the time of the last message, current location, speed, altitude, satellites, values of counters, sensors, and parameters, as well as presence in geofences and assigned driver. The check box allows to see the unit in various lists and panels, monitor its movements on the map in real time (though the tracks cannot be built) and watch its movement along the routes (but it cannot be assigned to the rounds). This check box also allows to control unit groups, i.e. add/remove the unit to/from groups which can be done through the properties dialog of the unit group.

- **View item detailed properties**
  Gives access to the settings used for the reports. The user can see the properties applied to the reports: the *Trip Detection* and *Fuel Consumption* tabs, report parameters and messages filtration settings on the *Advanced* tab. Neither editing these things nor report execution is allowed.

- **Edit not mentioned properties**
  Allows to edit the color schemes for sensors and tracks on the *Advanced* tab.

- **Query messages or reports**
  Allows to view messages for the selected interval (except for the log), query reports (except for the tables *Log* and *Custom Fields* which require additional rights), and build tracks.

- **Manage log**
  Allows to query the unit log through messages or reports (if the check box *Query messages or reports* is enabled) and make custom records in the log (if the box *Manage events* is checked).

Other standard access rights (*Manage access to this item*, *Delete item*, *Rename item*, *View custom fields*, *Manage custom fields*, *View admin fields*, *Manage admin fields*, *Change icon*, *View and download files*, *Upload and delete files*) work as described above. The *Edit ACL propagated items* check box does not affect units at all.

Special Access Rights

Below is the list of special rights which can be applied to units:

Unit ACL	
View connectivity	Allows to view the device type, unique ID, phone number(-s), device access password on the *General* tab, as well as the filtration parameters of the messages on the *Advanced* tab. In addition, the device

settings	type, phone number(-s), and UID also appear in the unit tooltip and in the extended unit information. If SMS service is activated, the user can also send text messages to this unit.
Edit connectivity settings	Allows to edit the device type, unique ID, phone number(-s), device access password on the *General* tab, and messages filtration parameters on the *Advanced* tab.
Create, edit, and delete sensors	Sensors and their values are always visible, but this check box allows to edit and delete them, as well as create new ones. Additionally, the calculation tables and graphs of the created sensors become available for editing.
Edit counters	Allows to change the values of the counters (GPRS traffic, mileage, engine hours) and methods of their operation.
Delete messages	Allows to delete data messages and messages about sent commands in the *Messages* panel. It also allows to delete the records from the log (if the *Manage log* check box is enabled). Works only in combination with *Query messages or reports* check box.
Execute commands	Allows to send commands (e.g. from the *Monitoring* panel). In addition, when configuring tasks and notifications, this right is checked to display the commands in the list of the available commands.
Manage events	Allows to register such events as fuel fillings, maintenance work, custom event, and unit status. A special registrar in the *Monitoring* panel is used for that. Also this check box allows to delete already registered events. If the *Manage log* check box is enabled, a record can be added to the unit log.
View service intervals	Allows to view the *Service Intervals* tab in the unit properties dialog as well as view the maintenance state in the unit tooltip and extended unit information.
Create, edit, and delete service intervals	Allows to edit and delete service intervals as well as create new ones. Works only in combination with the previous check box.
Import messages	Allows to import messages to a unit database. Works only in combination with the *Query messages or reports* check box.
Export messages	Allows to export messages from a unit to a file. Works only in combination with the *Query messages or reports* check box.
View commands	Enables the *Commands* tab in the unit properties.
Create, edit, and delete commands	Allows to create, edit, and delete commands on that tab. Works only in combination with the previous check box.
Edit trip detector and fuel consumption	Allows to edit such tabs as *Trip Detection*, *Fuel Consumption*, *Eco Driving*, and report parameters on the *Advanced* tab. Works only in combination with the *View detailed item properties* check box.
Use unit in jobs, notifications, routes, retranslators	Allows to create jobs and notifications for the unit, assign it to routes, and use it in retranslation.

Unit Group ACL

The set of rights for unit groups is the same as for individual units. The access rights given to a group extend to the units that belong to it. For example, if the right to view commands is given to a user, then the user will be able to see the commands of each unit in the group.

Besides, some access rights can affect not only units in the group but the group itself. For example, if the right to change the icon is granted to theuser, then this user will be able to change both the icon of any unit in the group and the icon of the group itself. Here is the list of rights with dual action:

- View item and its basic properties
- Manage access to this item
- Delete item
- Rename item
- View custom fields
- Manage custom fields
- View admin fields
- Manage admin fields
- Change icon
- Query reports or messages
- Manage item log
- View and download files
- Upload and delete files

The *Edit ACL propagated items* check box is the right that allows to add and remove the units to/from the group.

The rest of access rights affect only units. See Unit ACL for details.

When using groups, consider the following features and strictly follow the hierarchy of rights:

- The group can only expand the access to the unit, but not narrow it down. If the user's rights to the unit and the group to which the unit belongs are different, a wider list of rights is applied.
- The creator of the group must have rights to the units. Only in this case it will be possible to transfer access to these objects to other users through the group.
- If an object belongs to a group, it can become available to a bigger number of users, since they have access to the group and automatically receive the access to the units that are included in it.

User ACL

One user can have access rights to other users, and then edit their properties, define rights, etc. In this way, for instance, a service manager sets the rights to the clients of the service.

Standard Access Rights

Some of the standard access rights are applicable to users:

- **View item and its basic properties**
  The user appears in various panels and lists. The *General* tab with all its contents and the *Advanced* tab (access to Wialon Mobile and e-mail) are available in the dialog of user properties. User name is displayed in different reports and in the *Creator* field.
- **Manage access to this item**
  The user appears in the dialogs of other users in the *Access* tab, where the access rights can be assigned to him as to the system element.
- **Edit not mentioned properties**
  Allows to edit the user properties on the *Advanced* tab, change individual user settings as well as send messages to this user from the management system.
- **Query reports or messages**
  Enables the *Logs* tab in the user properties dialog, which displays user activity (entries to/exits from various system services). This check box also gives permission to generate user reports. It should be noted that to execute the *Custom fields* report, one needs to have access to the custom fields of this user. In addition, the *Log* report can be executed if in addition there is the *Manage item log* access right.

Standard check boxes *Delete item*, *Rename item*, *View custom fields*, *Edit custom fields*, *View admin fields*, *Manage admin fields*, *Manage item log*, *View and download files*, and *Upload and delete files* work for users as described above.

Such access rights as *View detailed item properties*, *Change icon*, and *Edit ACL propagated items* do not affect users at all.

Special Access Rights

Here is the list of special rights that can be applied to users:

User ACL	
Manage user's access rights	In the dialog of user properties, the *Access* tab becomes available where the user can be given rights to various system objects. Besides, user rights can be changed automatically – through appropriate jobs and notifications.
Act as given user	The right to enter under the name of the given user, create objects on his behalf, etc.
Change flags for given user	Allows to change the properties on the *General* tab of the user properties dialog. However, to change the password, the previous box should be checked as well.

Resource/Account ACL

If a user gets access to a resource, they can view and use their contents for the tracking purposes, i.e. geofences, jobs, notifications, drivers, report templates, etc. Manipulations with these items are possible in the main interface of Wialon Local.

If a resource is also an account, then advanced access rights can be applied to it, such as add payments, define permitted service and their cost, etc. Such manipulations are possible only in the CMS Manager interface.

Standard Access Rights

The following standard (Item ACL) rights can be applied to resources/accounts:

- **View item and its basic properties**
  Allows to see whether system objects such as units, users, unit groups belong to this account. It is usually written on the first tab of their properties dialog.
- **View detailed item properties**
  Applicable to accounts only. The second and third sections of the account properties dialog become visible as well as the *Services*, *Restrictions*, and *Advanced* tabs. If the end user is given this right to their account, the *Account* tab will appear in the user settings which allows to view the current balance of the account, information on used and available services, etc.
- **Delete item**
  Allows to delete the resource with all its contents. However, to delete an account, you should additionally check the *Manage account* box.
- **Query reports or messages**
  For resources, this check box allows to generate the *Log* table and see how different users created, edited, and deleted the contents of the resource (the *Manage item log* check box is required). It also allows user to generate reports on drivers and trailers, as well as driver and trailer groups if they belong to this resource. For accounts, this check box gives permission to see the *Statistics* tab (the history of payments and withdrawals) but only if you check the *View detailed item properties* box, too. The similar sub-tab appears on the *Account* tab of the account properties dialog.
- **Edit not mentioned properties**
  Allows to edit the FTP-server settings on the *Advanced* tab of the account.

Standard access rights *Manage access to this item*, *Rename item*, *View custom fields*, *Edit custom fields*, *View admin fields*, *Edit admin fields*, *Manage item log*, *View and download files*, *Upload and delete files* work for resources/accounts as described above.

Such check boxes as *Change icon* and *Edit ACL propagated items* do not affect resources or accounts at all.

Special Access Rights

The following special rights can be applied to resources/accounts:

Resource ACL	

View geofences	Allows to view the geofences created within a resource.
Create, edit, and delete geofences	Allows to edit and delete the geofences of this resource, as well as create new ones.
View jobs	Allows to view jobs created within a resource.
Create, edit, and delete jobs	Allows to edit and delete the jobs of this resource, as well as create new ones.
View notifications	Allows to view notifications created within a resource.
Create, edit, and delete notifications	Allows to edit and delete the notifications of this resource, as well as create new ones.
View drivers	Allows to view drivers and driver groups of a resource. In addition, it allows to view the automatic binding list of the drivers.
Create, edit, and delete drivers	Allows to edit and delete the drivers and driver groups of this resource, as well as create new ones. Moreover, it allows to create and edit the automatic binding list of the drivers.
View passengers	Allows to view passengers created within a resource. In addition, it allows to view the automatic binding list of the passengers.
Create, edit, and delete passengers	Allows to edit and delete the passengers of this resource, as well as create new ones. Additionally, it allows to create and edit the automatic binding list of the passengers.
View trailers	Allows to view trailers and trailer groups created within resource. Moreover, it allows to view the automatic binding list of the trailers.
Create, edit, and delete trailers	Allows to edit and delete the trailers and trailer groups of this resource, as well as create new ones. In addition, it allows to create and edit the automatic binding list of the trailers.
View report templates	Allows to view report templates created within a resource.
Create, edit, and delete report templates	Allows to edit and delete the report templates of this resource, as well as create new ones.
Manage account	For accounts only. Combined with the *Delete item* check box, it allows to completely delete the account from the system, together with the resource and its contents, account creator and all objects created by this user. In combination with the *View detailed item properties* check box, it gives permission to control the billing plan and payment (the *General* tab), number and cost of services (the *Services* tab), and some other parameters (the *Restrictions* tab).
View orders	Allows to view orders created within a resource.
Create, edit, and delete orders	Allows to edit and delete orders of this resource, as well as create new ones.

Note.

In the main Wialon Local interface, only manipulations with inner resource contents are possible (i.e. geofences, notifications, report templates, drivers, etc.), including the permission to see the log of content changes. The account-related activities (such as payment control, tariffication, etc.) can be performed only in the CMS Manager interface.

Route ACL

Route access rights can be the following:

- **View item and its basic properties**
  Activating this right allows to see a route in the *Routes* panel.
- **Manage access to this item**
  Allows to transfer the right to the routes to other users. Moreover, this right allows to see the route not only in the panel but also on the map. The user can edit the route (add, delete check points, and change their radius), add schedules, show list of rounds for the route, and copy the route.
- **Delete item**
  Allows to delete a route.
- **Rename item**
  Allows to rename a route.
- **Query reports or messages**
  Allows to receive reports containing data about the available route.

Creator

One of the key moments in the management of the Wialon Local monitoring system is the correct and consistent assignment of the creator for certain macroobjects of the system.

The creator of a system object is a user on whose behalf the object was created and to which account it belongs. Initially (when creating an object), the user-creator gets full access rights to this object and can also give other users access to it. The creator of any user automatically gets full rights to all the elements created by this user.

Building a hierarchy with the help of the creator allows to divide the amount of work between several users, assign different rights to objects, and also reduce the amount of processed information on the screen at the expense of 'unnecessary' data.

There cannot be objects in the system that do not have a creator. The creator is assigned when creating an object and cannot be changed later. Usually (when a user, a unit or a unit group is created) the creator is selected from the list of existing users. However, when a new account is set up, its creator can be created with it simultaneously.

To assign a user the creator of an object, you need the *Act as given user* access right, as well as a direct hierarchical relationship to it. The users than cannot be assigned creators of an object, are not shown in the list of available users. If an object is created by means of copying or you do not have manage rights to any user, the field of selecting a creator is unavailable and the current user (i.e. you) is assigned the creator. While viewing the properties of an object, the creator is only shown if there is some access to this user.

It is impossible to delete the user that is the creator of some object. You first should delete the object. For basic users it should be done manually. As to the account creator, it is possible to delete it only by deleting its account.

Access Dialog

To assign rights, make sure to check the following boxes: *Manage user's access rights* to the user which is being granted the rights, and *Manage access to this item* to the objects for which the rights are set.

To set access to an object, go to its properties dialog and open the *Access* tab. This tab is displayed only if you have the *Manage access to this item* right.

On the left, you will see the list of the users. This list includes only those users towards whom you have the *Manage user's access rights* right). The users who already have some access to the item are highlighted and displayed at the top of the list. To quickly search for users, apply the dynamic filter located above the list. Enter the name or part of the user name. The users whose name corresponds to the mask will be displayed.

Another way to facilitate your work with the list is to use sorting. You can sort the items either in the alphabetic or access rights order. To do it, click on the corresponding button to the right of the dynamic filter. The button shows the variant of order different from the one in use.

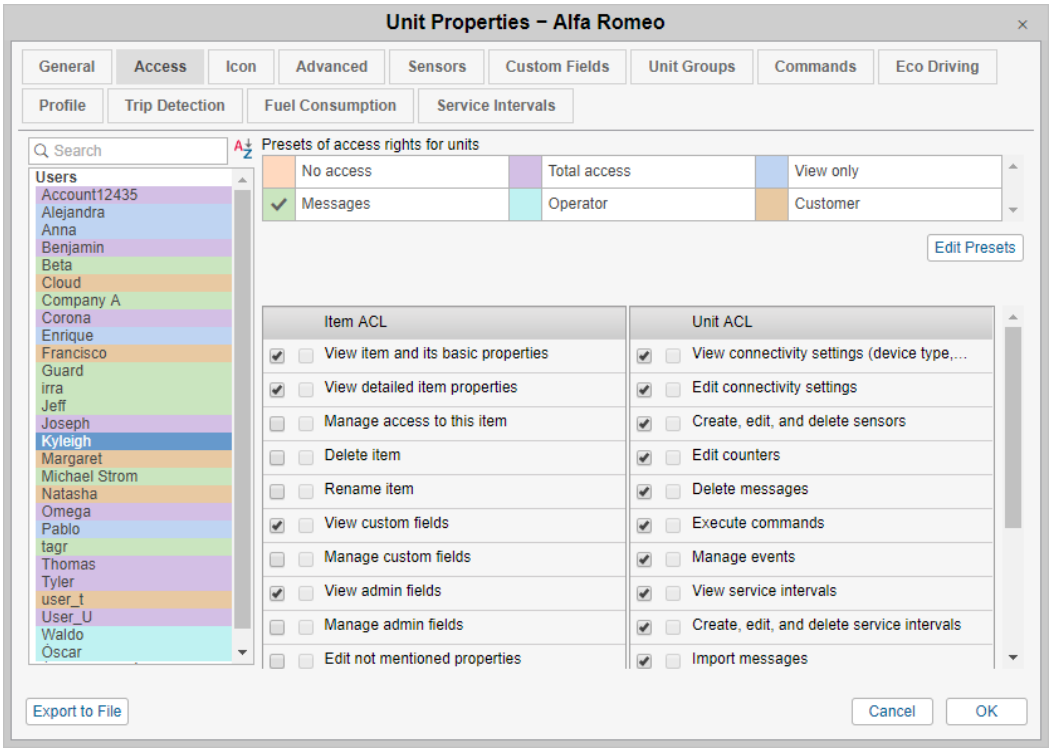
— activates access rights order.

— activates alphabetical order.

Note.
If the number of items exceeds 1000, alphabetical order will be used by default.

The right part of the dialog displays the list of access rights and the existing access rights presets. The list of rights is divided into two sections — standard and special. Their detailed description can be found in the following sections:

- Standard Rights (Item ACL);
- Unit ACL;
- User ACL;
- Unit Group ACL;
- Resource/Account ACL;
- Route ACL.



There are 2 columns of checkboxes in each section of the access rights list. The first one (direct rights) is used to enable/disable rights. The second one (combined rights) shows the rights the user currently has (the column is for viewing only).

There may be a case when the direct rights are enabled but not applied to the chosen user. It happens when the users superior to the chosen one do not possess these rights (hierarchy restriction). The absence of checkboxes in the second column signifies such a restriction.

In the case of units the reverse situation is possible — while the box is checked in the second column, it is not checked in the first one. It means the unit is included into groups towards which the user possesses more rights than towards the unit itself. As long as the unit belongs to these groups, the user will possess the same rights both for this unit and the group.

Below are some principles of assigning access:

- To set the rights, select the user on the left, and on the right click the checkboxes with the required rights, or use a preset above.
- You can select several users at once — press <shift> or <ctrl> keys and and assign the same rights to several users.
- If you click a checkbox which does not work without another one, the latter will be marked automatically. For example, if you click the checkbox *Manage custom fields*, the checkbox *View custom fields* will be selected automatically, because you can neither edit nor remove the fields you cannot see.
- For the same reason it can be impossible to remove a checkbox while there are others depending on it. Those subordinate checkboxes must be removed first.
- To place or remove all the checkboxes in one section at once, hold the <ctrl> key and click on any checkbox.

When finished, click OK to apply new rights.

Access Rights Presets

The presets facilitate and speed up the assigning of the access rights. You can create different sets of rights for

different roles, for example, for operators, managers, customers, etc. Moreover, personal presets can be made for each type of object (unit, route, etc.). The created presets are then applied to the selected users with a single mouse click.

The presets section is located in the dialog above the access rights list. You can edit or delete the presets provided by default as well as create new ones. The *Edit Presets* button is located below the presets list. After clicking on this button, the left part of the dialog and access rights list will be displayed as disabled, and the buttons for working with presets will appear.

To create a new preset, click the *Create* button. A new preset will appear in the presets list. Give it a name (double click on the name field), and then check the required boxes in the activated access rights list below. Click *Save*.

A new preset can be created by copying an existing one. To do this, click the button which appears when you hover your mouse over the preset. Make changes (edit name and checkboxes), and then click *Save*. Note that you cannot create presets with identical checkboxes for the elements of the same type. Such copies will be removed.

To delete access rights preset, click the button which appears when you mouse over the preset.

Each preset has its own color which is given to it upon creation. The color cannot be changed. If a preset is applied to any user, then the user name will be highlighted in the corresponding color in the left part of the dialog. However, there are some exceptions in color application. If there are no flags chosen in the preset (for example in *No Access* preset), then its color is not applied (users without access are not highlighted in the list). The users who have access different to all the presets are highlighted in yellow in the list. This color differs from all other colors of the presets. The same color is given to the users whom the preset cannot be completely applied to (when the 'distributing' user does not have the rights which he is going to pass to others). Moreover, yellow background is applied to the users possessing combined rights but lacking direct ones.

Note 1.
The setting of user access is slightly different from the standard one. Its detailed description can be found below).

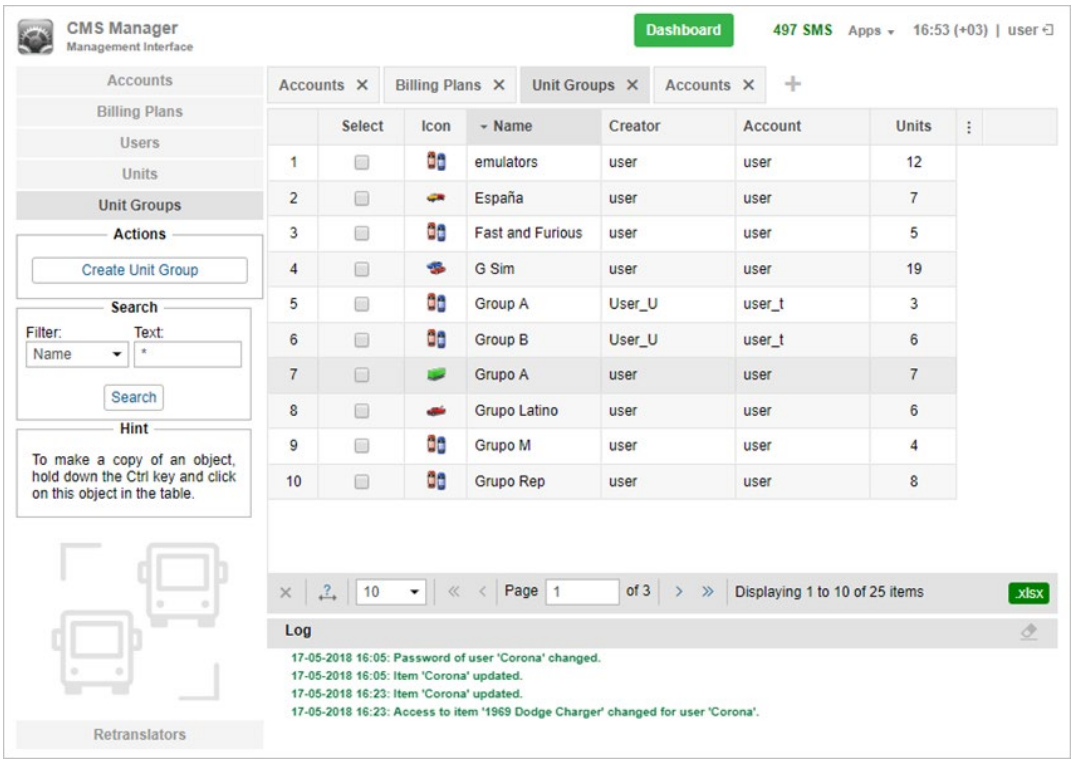
Note 2.
Access to units can be changed not only manually, but also automatically — through the corresponding types of jobs and notifications.

CMS Interface

CMS interface is simple and in many cases intuitively comprehensible. In many places, there are tooltips which give explanatory information to various buttons, icons, dialog boxes and other controls.

The work area can be divided into several sections:

- **Top panel** is located at the top of the window. It shows your login, current time, and some buttons (Logout, Settings, Import/Export, English/Russian, Help). There, in the top panel, is also a place where warning messages come up.
- **Navigation and search panel** is located on the left side of the screen. It contains five tabs — in accordance with five object types: accounts, billing plans, users, units, unit groups, and retranslators.
- **Results panel** is the largest, central part. Here you can manipulate system objects (create, edit, delete, configure, assign rights, etc.).
- **Log** is situated at the bottom of the window. Here, the messages about the operations performed, as well as errors, are displayed.



Top Panel

There is the logo of CMS Manager system in the left corner of the top panel. The right part of the top panel contains the following elements:

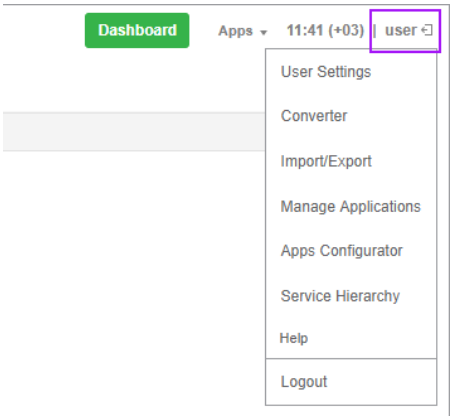
- number of days till account blocking (displayed in green, but turns red as soon as the number of days left reaches 0);
- *Apps* button — opens the list of available applications;
- current time (time zone in brackets);
- login (the right corner) — the name used to enter the management system (another login can be displayed in brackets if the main user is logged in as another user).

If the current time is displayed in red, this means a loss of connection with the server. This can be caused by the internet connection failure, or by some internal problems of the service.

Note.
For top users, this panel displays the number of available SMS, as well as the number of units left before reaching the limit.

User menu

User login is displayed in the right corner of the top panel. Click on it in order to open the additional menu. The menu contains the following items:



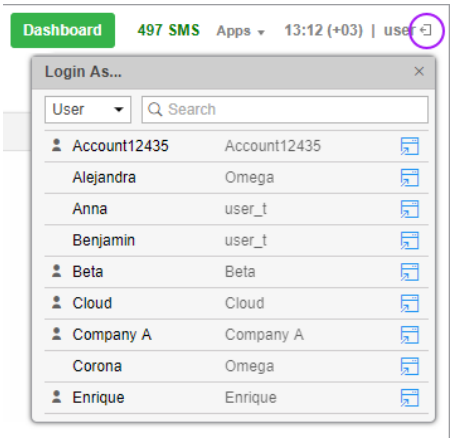
- **User Settings**
  Opens the user settings dialog for viewing and/or editing.
- **Import/Export**
  Can be used to transfer the settings of units, users, resource contents (see Import and Export).
- **Manage Applications**
  Allows you to view and edit the list of authorized applications, and mobile notifications.
- **Service Hierarchy**
  Allows you to view information about the service structure.
- **Help**
  Help request. Can be unavailable.
- **Logout**
  Button to log out of the system (end of session).

Note.
Additional menu items are available for the top users:

- Conversion — converts objects from the metric system to the American and vice versa;
- Apps Configurator — allows to add and configure applications.

Login as Another User

It is possible to login to the system as another user. To do so, you need to possess the *Act as given user* right towards the user.



If you would like to log in as another user from the authorization page, you need to enter your username and password and then click on the *Login as* caption and enter the name of the user in the appeared window. When you are logged in as another user, you can see only those items that are available to this user and perform actions allowed to this user. Note that the login history is kept in the account of the user under whose name the system has been entered.

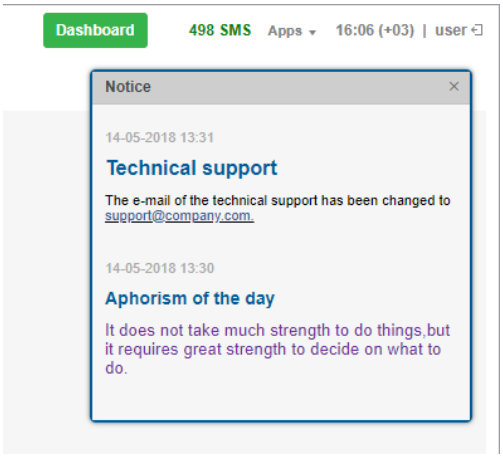
You can also switch to another user after entering the system. However, in this case the login is not saved in the user history. To swith to another user, click on the icon (door with arrow) located to the right of the user name in the top panel. Afterwards, opens the dialog with the list of available units. The users-creators of accounts are marked with the icon to the left of their names. Click on the name of the required user to sign under it in the current tab, or click on the icon at the end of the line to open the page in a new tab. For the search convenience, it is possible to use a dynamic filter. The search can be filtered by users or accounts. This is regulated by the filter in the upper left corner of the window.

There is also an alternative way to log in as another user. Go to the *Users* tab in the navigation panel. In the table of results, click on the *Login as* icon.

When you log on under a different user, its name is written in brackets next to your login (in the right corner of the top panel). To switch back to the main user, click on the icon (door with arrow) to the right of the name, and confirm your action in the appeared window.

Information notices

In the upper panel, under the username, information messages from the service manager, as well as notifications of the number of days remaining before the shutdown, can appear. Information messages are displayed in the boxes with a blue frame, warning messages — with the red one.



Navigation and Search

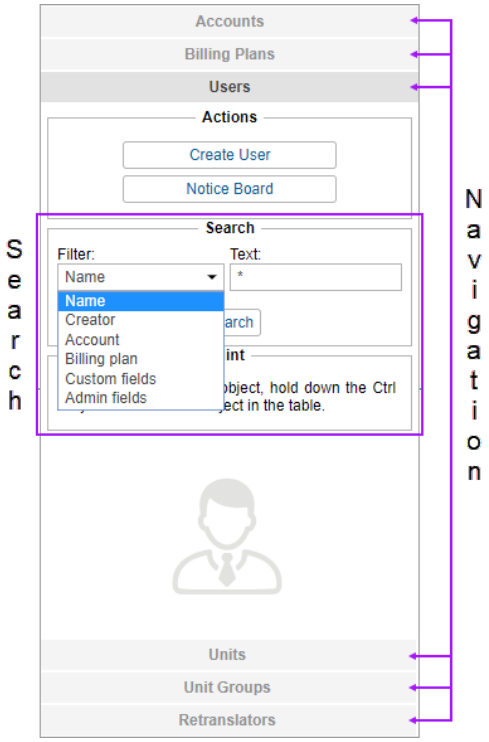
The navigation and search panel is on the left side of the window. Here you can form a query for what kind of objects should be displayed in the results panel.

Navigation

There are several tabs in the navigation panel. Each of them corresponds to a certain system object: *Accounts, Billing Plans, Users, Units, Unit Groups, Retranslators*. To navigate between them, just click on the name of the required tab.

Each tab consists of two sections: *Actions* and *Search*. The *Actions* section contains a button for creating a new object of the selected type. Detailed instructions for creating and configuring objects are given in the further topics of this guide.

The *Search* section is used to find existing objects. Then, the found objects are displayed in the results panel where you can manage them (view, edit, etc.)



Search

To search objects:

1. Specify a filter;
2. Form a request in the *Text* field;
3. Click the *Search* button or <enter>;
4. The found objects will be displayed in the results panel on the right.

Note.
To find all the objects of a certain kind (for example, all users), leave the *Text* field empty (or with just a single asterisk) and press <enter>. The filter should be set to the default position, i.e. name.

Search Filter

In the *Filter* field choose the criterion on the basis of which the search is made. It can be:

- *Name*: the name given to the object when it was created;
- *Creator*: the creator of the object;
- *Account*: the account which the required object belongs to.

Individual filters for accounts:

- *Parent account*: search by the account from which the object was created;
- *Billing plan*: search by the billing plan used;
- *Blocked accounts*: search among the blocked accounts;
- *Custom fields*: search by the custom fields;
- *Admin fields*: search by the administrative fields.

Individual filters for resources:

- *Custom fields*: search by the custom fields;
- *Admin fields*: search by the administrative fields.

Individual filters for users:

- *Billing plan*: search by the billing plan used;
- *Custom fields*: search by the custom fields;
- *Admin fields*: search by the administrative fields.

Individual filters for units:

- *Unique ID*: the unique identification number given during the creation of the unit;
- *Phone number*: the phone number of the SIM card embedded to the equipment (two phone numbers are possible);
- *Device type*: the equipment type/name;
- *Unit group*: the group which the unit belongs to;
- *Custom fields*: search by the custom fields;
- *Admin fields*: search by the administrative fields;
- *Profile fields*: search by the profile fields;
- *Activated*: search among activated units;
- *Deactivated*: search among deactivated units.

Individual filters for unit groups:

- *Custom fields*: search by the custom fields;
- *Admin fields*: search by the administrative fields.

Individual filters for retranslators:

- *Protocol*: search by the protocols used;
- *Server*: search by the server name;
- *Unit name*: search by the unit name;
- *Started*: search by the running retranslators.

Search Text

Formulate you request in the *Text* field. Use the allowed characters and the asterisk sign (*). The asterisk is a wildcard that represents any combination of characters. The asterisk can be placed at the beginning, middle, or end of the request and can be used multiple times. For example, to find all MANs, select search by name, type **man** in the *Text* field, and click the *Find* button (or <enter>). All units whose name contains this combination of characters (both at the beginning and at the end of the name) will be found and displayed. The request is not case sensitive.

Another wildcard character that can be used is the question sign (?). It replaces any single character.

To separate different parts of the request, use the comma (,). For instance, to find all MANs and all Ivecos, type **man*,*iveco**.

Results Panel

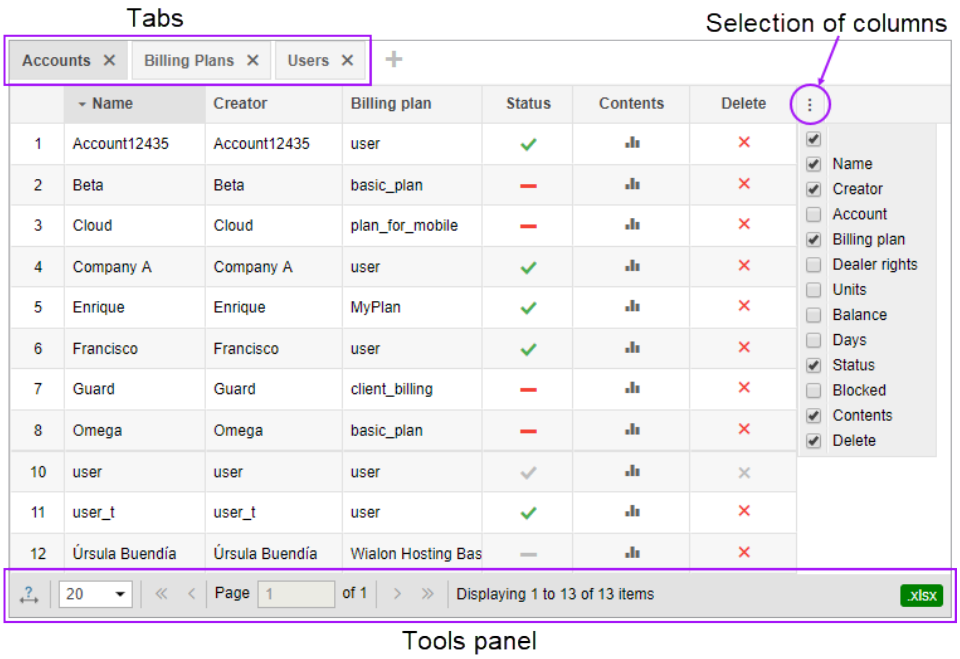
The results panel is located at the right top part of the window. Here the results of search are displayed.

It is possible to create up to five tabs in the results panel. To create a new tab, press on the inactive *New* tab that is on the right of all created tabs. To navigate between the tabs, just click on the required one. To close the tab, click the button × next to its name.

The caption on the tab displays item type: users, units, accounts, retranslators, or unit groups. Also, when navigating through tabs, if they represent different item types, the navigation and search panel changes, too.

Your actions (such as search) are always applied to the active tab. If this tab already contains any records, they will be replaced.

Managing Tables



The data is given in the form of a table. Records are sorted by name in the direct order that is from *A* to *Z*. To sort the data by any other criterion presented in the table, it is necessary to click on the corresponding name of the table. Note that if sorting by column is available, when you hover over its name, the arrow of the cursor changes to a pointer (hand).

Table contents and, correspondingly, the number of columns, depend on the type of objects displayed. For example, accounts table contains the biggest number of columns.

A set of columns can be adjusted according to your needs. To do this, click on the last column in a table header (⋮). Afterwards, in the appeared menu select the checkboxes for the required columns, or deselect them for the columns which are not needed at the moment.

At the bottom of the table, there is the *tools* bar that can be used to perform several tasks such as deleting items, moving to another page, etc. Moreover, when working with such system elements as accounts (resources), users, units, and unit groups, it is possible to save table data in Excel format. To do this, click on the corresponding icon in the right corner of the tools bar.

The width of the columns can be adjusted manually. To do this, click and drag the column edge in the required direction. To reset the settings, press the *Columns auto width* button.

You can change the order of the columns. To do this, left-click on the heading of the desired column and drag it to a new position.

The adjusted set of columns, their width and order are saved during the current session.

Also in the tools bar, you can set the number of items displayed on the page. To do this, click on the drop-down list and select the required number (10, 20, 50, 100, 500, 1000).

To navigate between pages, use the arrow-shaped buttons. It is also possible to enter the page number manually and press <enter>.

Standard Operations

As a rule, you can apply a number of standard operations to any system element displayed in the table (accounts, billing plans, users, units, unit groups, or retranslators): create a new item of this kind (except billing plans), view or edit the properties of an object, copy or delete an object.

Creating New Items

To create a new object, open the corresponding panel on the left and press the *Create* button. The button is disabled if the current user does not have enough rights.

Fill in the required fields and tabs of the dialog and press *OK*. The*OK* button remains disabled until there is enough information in the dialog and it is correct. Any macro obkect must have a name from 4 to 50 characters, and the text fields of the dialog should not contain any prohibited characters.

The new object does not immediately appear in the table. To display it, you need to apply the search parameters.

Copying

Copying is applied to units, users, groups of units, retranslators and billing plans (accounts and resources cannot be copied). Copying is an alternative way of creating new objects. This method is especially useful if you want to create an object with properties similar to the existing one.

To make a copy of an object, hold the <ctrl> key and click on the required object in the table. This opens the item properties dialog, all fields and tabs of which are identical to the properties of the item being copied (at least those properties which can be shown according to your access level). You can alter any properties if needed, e.g. individual information such as name, phone number, etc. Then press *OK* to complete the creation.

Hint.
In many situations, instead of copying you can use the *Import/Export* tool.

Viewing and Editing

To view or change the properties of an item, click on it in the table. The properties dialog will open. If you do not have enough access rights to the item, the *OK* button is not available and you cannot save any changes. Besides, some properties and even the entire tabs can be hidden.

If you made any changes and want to save them, press *OK*. To quit dialog without saving changes, press *Cancel* or click on the cross icon in the right-hand corner of the dialog.

Deleting Items

To delete an item, check it in the *Select* column. To select all the items at once, press <ctrl> on the keyboard and check any box in the corresponding column. Then click the *Delete checked items* button at the bottom of the table. After receiving a warning message, click *OK* to delete, or *Cancel* to take no action. Several items can be selected, too. The result of the action is displayed in the log.

Remember that a certain access right is required to delete items (*Delete items*). Items that are not allowed to be deleted cannot be checked.

Keep in mind some pecularities of deleting different types of objects:

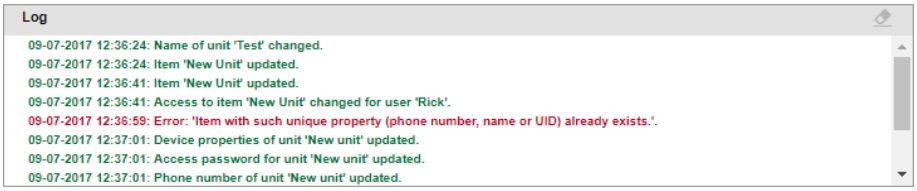
- Deleting of a unit group or retranslator does not delete units that are included in them.
- To delete a user, use the red delete button that is displayed next to each user in the table. However, you can only delete a user who is not the creator of any single object of the system. Read more about deleting users.
- An account can be deleted only with all its contents and dependent objects, that is why deleting accounts is different from deleting other system objects. Read more about deleting accounts.

Log

The log is located at the bottom of the page. It serves to display messages about the current operations performed by the user-manager.

The structure of a record is simple: date, time, text (description of the event).

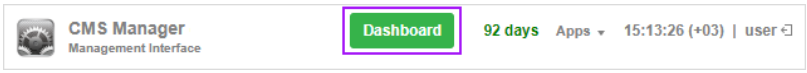
The log uses text of different colors in order to visually separate different types of entries from each other. Green color is used in messages about creating an object, changing its properties, successful removal, etc. Error messages are highlighted in red.



You can clear the entires in the log using the button in the upper-right corner of the log window.

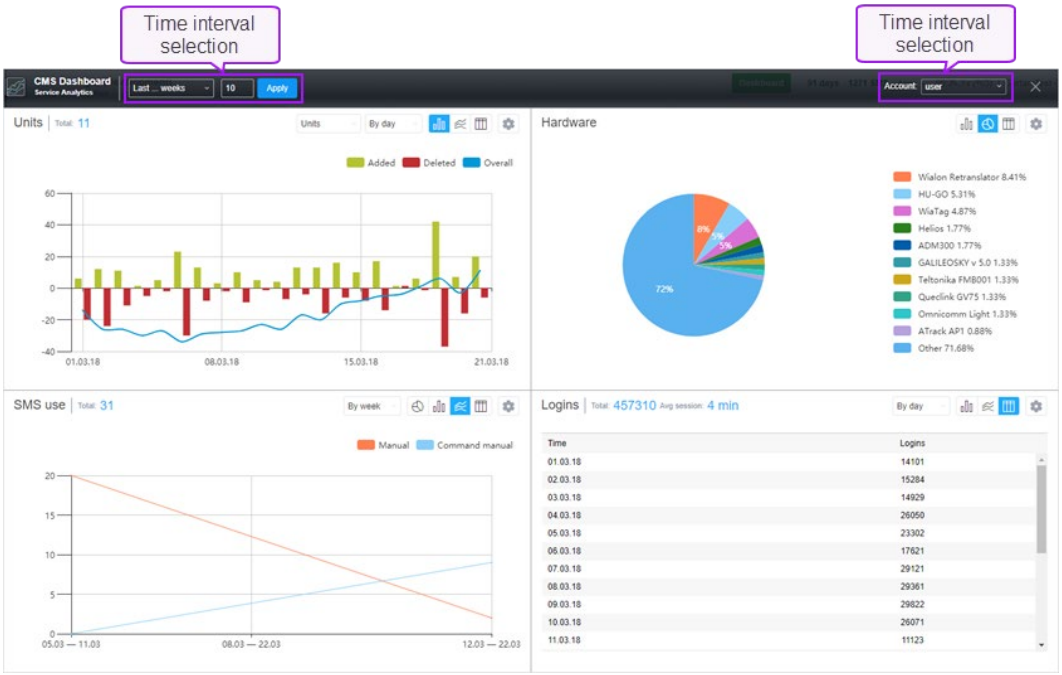
Dashboard

Dashboard — is a tool that displays statistics in the form of graphs or tables. To open the Dashboard, click on the same name button, located in the top panel of the management system.



Dashboard Structure

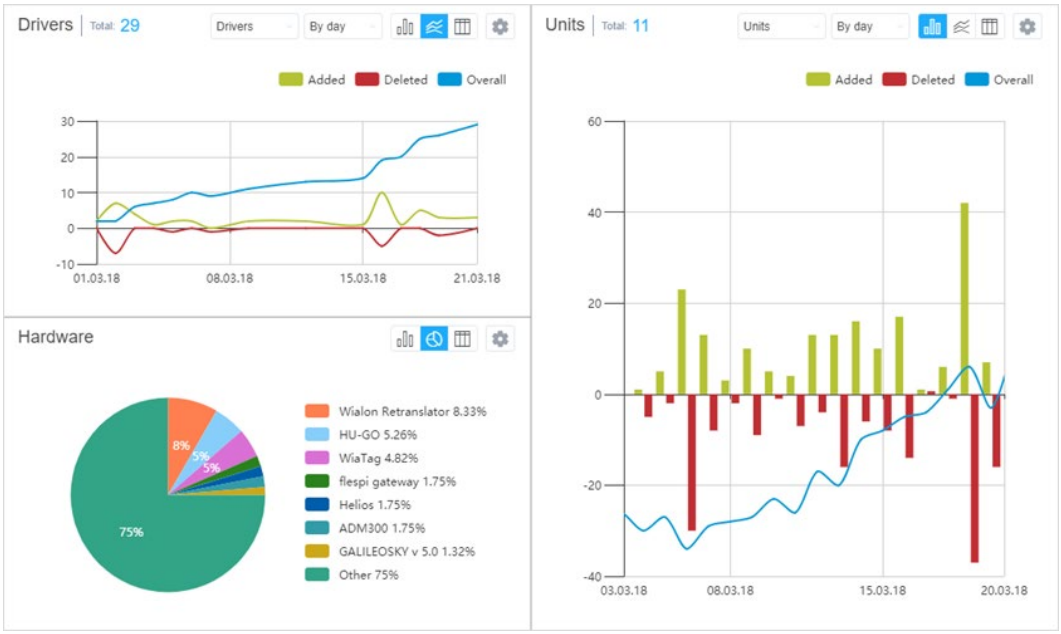
Information on the page is presented in the form of information blocks (graphs) with statistical data for the specified period. In the top panel of the Dashboard, you can select the time interval (on the left), as well as the account (on the right) for which the statistics is required.



The number of blocks can vary from 1 to 8.

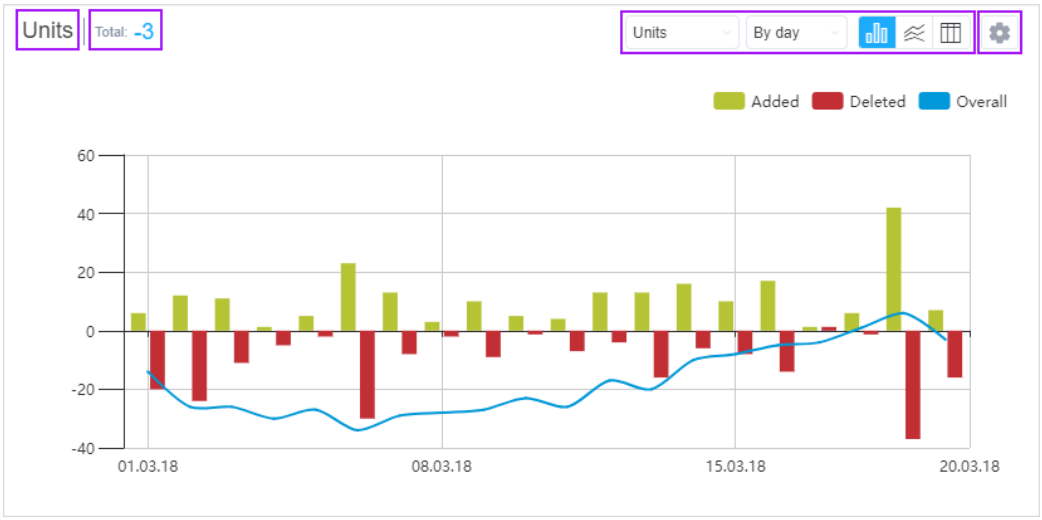
Information blocks can be added, deleted, moved, and resized.

- Click on an empty cell to **add** a new graph.
- To **move** the information block with a graph, move the mouse cursor over its header (the arrow of the cursor changes to the *hand* pointer) and, while holding the left mouse button, drag the graph to the required position).
- Click on the *basket* icon in the settings of the graph to **remove** it.
- To **change the ratio** between the blocks, drag the horizontal or vertical separator up/down or left/right, accordingly.



Information Block

The name of the graph is indicated in its header on the left together with the *Total* indicator. On the right there are drop-down lists and switches, which, depending on the graph type, allow to change its form, the type of the object or grouping. Here is also the button to open the settings window.

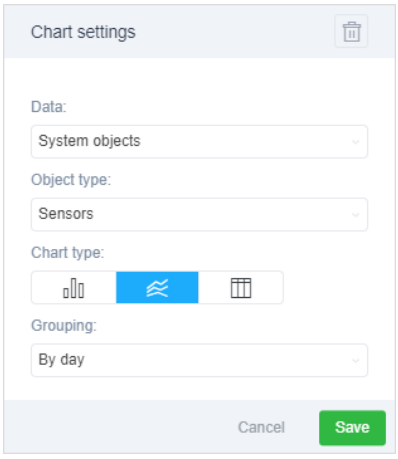


When you move the cursor over the elements of a bar, line or pie chart, toolptips appear with the information on the selected element.

Such graphs as a *bar* and *line chart* are scaled with the mouse scroll wheel.

Visualization of some elements of the graphs in the information blocks can be switched off. To do it, click on the button of the required element located above (for the bar or line chart) or on the right (for the pie chart) from the graph.

If you need to edit the graph, click on the *gear* button, located in the upper right corner of the header. Make the necessary adjustments in accordance with the data type and press *Save*.

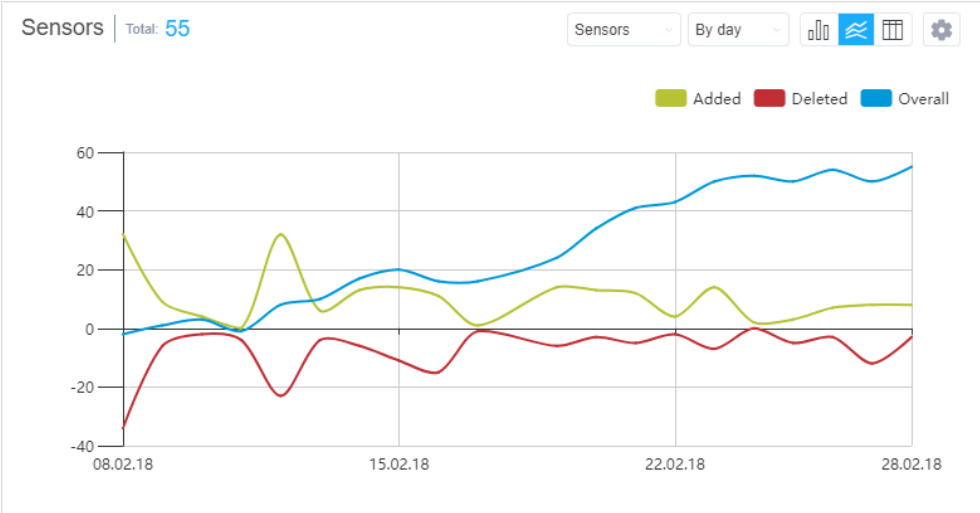


Graphs for 4 types of data are available on the *Dashboard* page: system objects, hardware, SMS use and logins.

System Objects

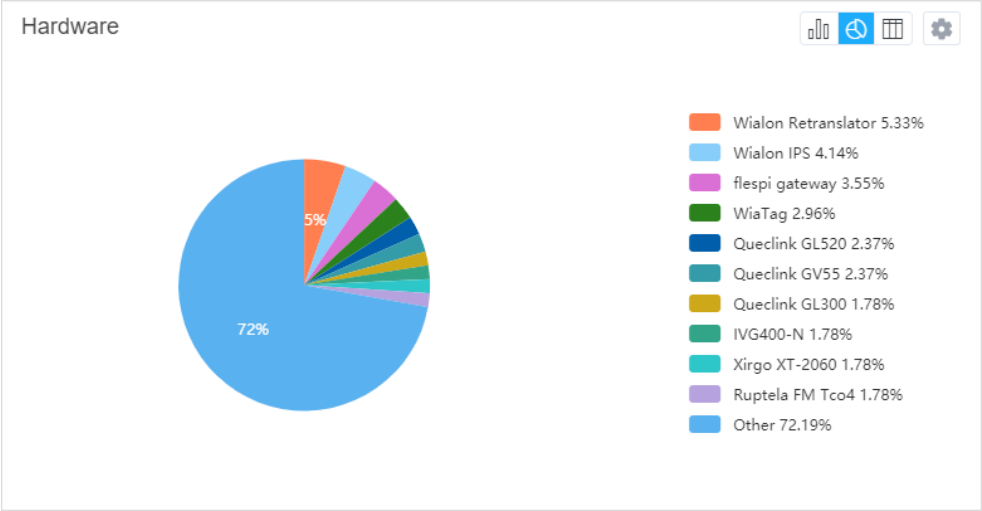
This block contains information on the increase or decrease in the number of system objects in use (units, users, resources, routes, notifications, jobs, sensors, drivers, trailers, geofences, passangers). The *Total* indicator shows the total increase or decrease for the reporting period.

The data of the *System objects* graph can be presented in the form of a bar or a line chart, or a table and grouped by days/weeks/months/quarters. Each graph contains the information about added and deleted objects. The bar and line charts also show the difference between the number of added and deleted objects from the beginning of the period to the selected point on the graph (*Overall*).



Hardware

This block contains the information about the added or deleted units with a certain type of hardware. The *Hardware* graph data can be presented in the form of a bar or a pie chart, or a table.

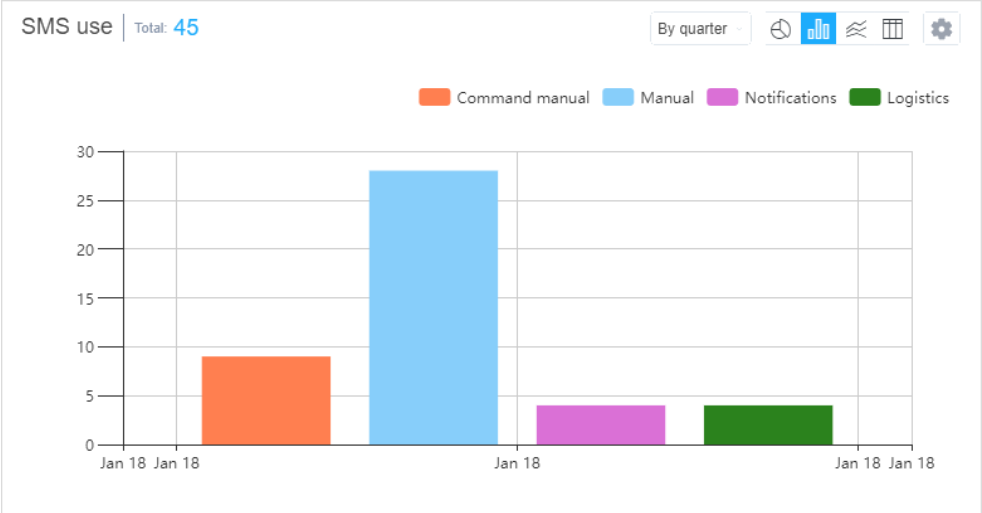


SMS Use

This block contains the information about the SMS consumption. The *Total* indicator displays the total number of SMS messages sent during the reporting period.

In the settings of this chart, in the *Display data for* drop-down menu, you can select the type of data that will be displayed in the chart.The following options are available:

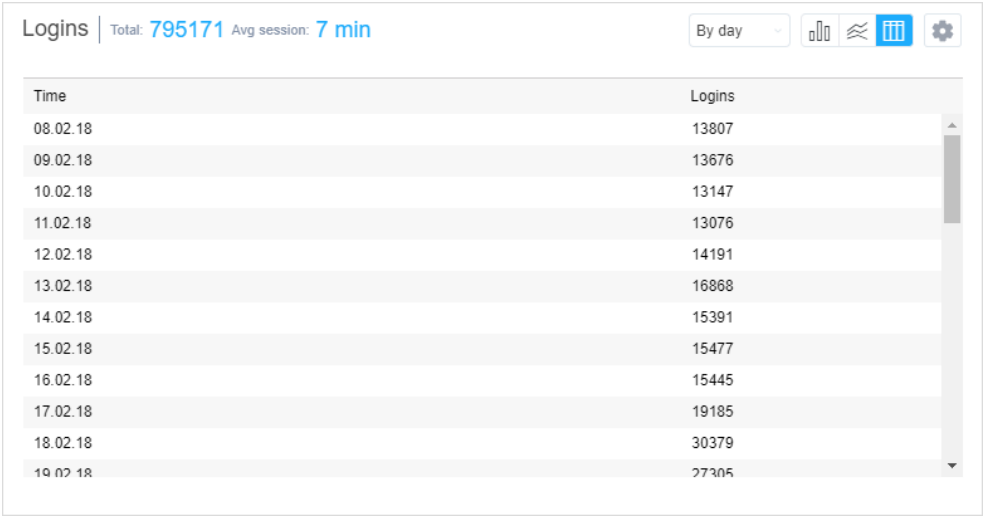
- *Consumption*
  The data on the total SMS consumption can be presented in the form of a bar or a line chart, or a table and grouped by day/week/month/quarter.
- *Dispatch method*
  The data on the method of sending SMS messages can be presented in the form of a pie, a bar or a line chart, or a table.
- *Users*
  The data about users can be presented in the form of a pie chart or a table.



Logins

This block contains the information about the entries in the system. The *Total* indicator displays the total number of entries to the system and the average time of the session.

These graphs can be presented in the form of a bar, a line chart or a table and grouped by day/week/month/quarter.



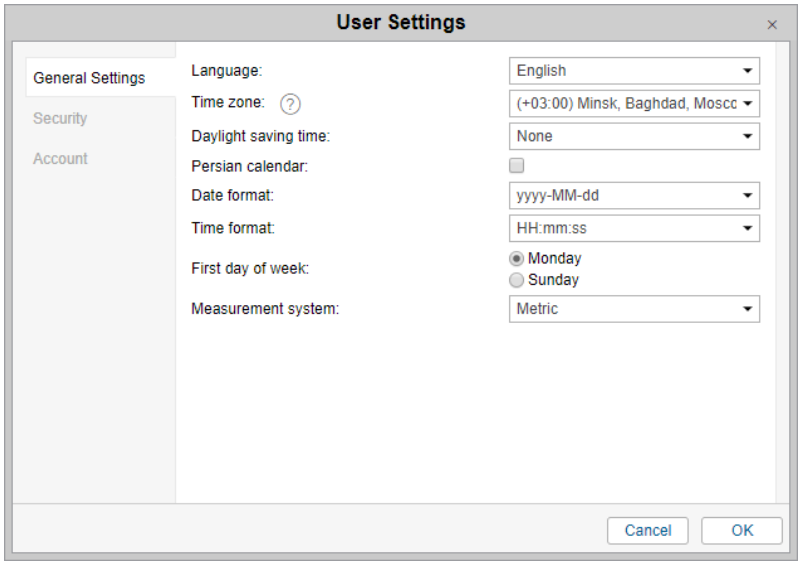
Time	Logins
08.02.18	13807
09.02.18	13676
10.02.18	13147
11.02.18	13076
12.02.18	14191
13.02.18	16868
14.02.18	15391
15.02.18	15477
16.02.18	15445
17.02.18	19185
18.02.18	30379
19.02.18	27305

CMS Settings

To view or change the settings of the current user-manager, select *User settings* in the user menu.

The *User settings* dialog contains two tabs:

1. **General settings** — here you can indicate your time zone, e-mail, change password, etc.
2. **Security** — on this tab you can configure authorization settings and activate two-factor authentication.
3. **Account** — here you can view your billing plan, account balance, available and used services, etc.



The CMS Manager parameters are a reduced version of the User settings dialog.

Accounts

In most cases, the terms *resource* and *account* can be used as synonymous. However, in some situations it may be useful to understand the difference between them.

A *resource* is a macro object of the system, which includes various micro objects created by users for different monitoring purposes: geofences, jobs, notifications, drivers, trailers, passengers,report templates and orders. The content of the resource can be easily saved to a file or copied from one resource to another (see Import and Export).

The main difference between the account and the resource is the use of its own billing plan. One account may contain several resources or even other dependent accounts. The point is that the account includes not only the content of the resource (micro objects mentioned above), but also stores information about other macro objects, such as units, users, unit groups, retranslators, routes or other dependent resources or accounts.

The account counts both macro and micro objects of the system and charges money for their usage. The billing plan is applied to the account and not the user. Therefore, Wialon manager uses an account to limit the activity of a user, define the number and cost of available services, control payment, etc.

The creator is the key component of an account. For micro objects, the affiliation with the account is defined by the resource it was created in. However, for macro objects it is defined by the creator. All macro objects created on behalf of the account creator, as well as other users whose creator it is, are automatically assigned to this account.

An account is most often created for each customer individually. However, within the same account, a number of users with different access rights can be created. For instance, we can create an account *Vehicle Fleet* with users *Boss*, *Accountant*, *Machinist*, *Manager*, etc., and each of these users will use Wialon in their own way.

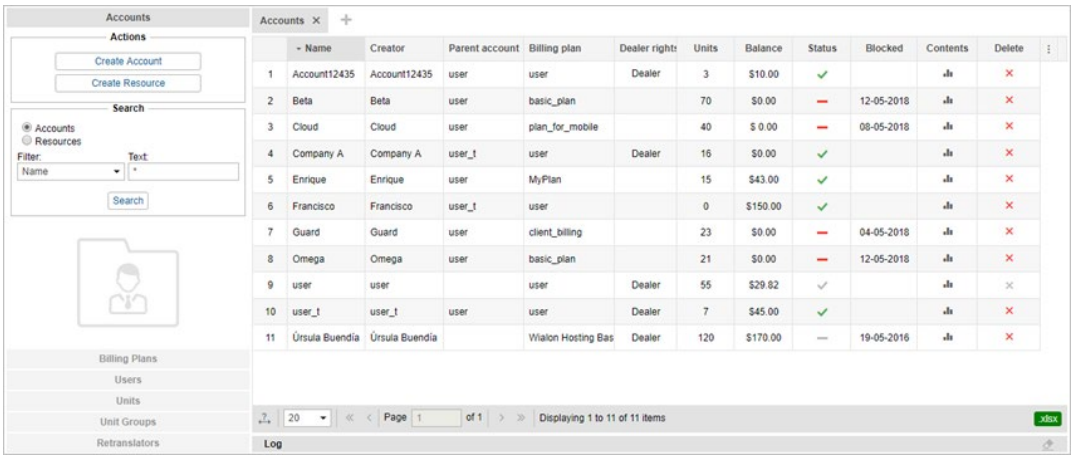
All dependent macro and micro objects are deleted together with their account. Read more about deleting accounts here.

- Working with Accounts
- Creating Resources
- Creating Accounts
- Account Properties
- List of Services
- Report on Account Contents
- Deleting Accounts/Resources
- Transferring Units from One Account into Another

Working with Accounts

Working with accounts and resources is possible only in CMS Manager. Click on *Accounts* in the navigation panel. Here you can:

- create new accounts and resources;
- find and display existent accounts and resources;
- control the balance of a client, add payment and days;
- allow/deny/limit access to different services;
- edit and delete accounts and resources;
- view the contents of accounts.



On the *Accounts* tab of the navigation panel you can create a new account/resource, or find it among existing ones. This tab uses a switch, depending on the position of which either only accounts (by default) or only resources are displayed. To refresh table data after changing position of the switch, click *Search*.

There are only three columns for a resource in the results panel — name, creator, and account.

The results panel for an account displays its name, creator, parent account, billing plan, presence of the dealer rights, number of units in it and in subordinate accounts (taking into account the access rights of the creator), current balance, number of days left (the estimated blocking date is shown in the tooltip), status (active or blocked), date of blocking (if blocked), buttons for querying a report on the account contents and for deleting it. Note that the ways of deleting resources and accounts differ.

If blocking by days is activated in the account, then the amount of days left is displayed in the results panel in black color. If the same is activated in the billing plan, then gray color is used. If blocking by days is disabled, nothing is displayed.

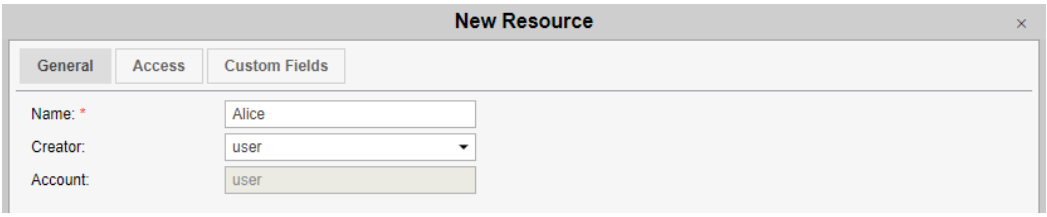
To open the properties dialog of an account or resource, click on them in the list. Depending on the level of access, certain tabs and fields of the dialog may be unavailable for editing or hidden at all. The resource properties dialog can contain up to 3 tabs — *General*, *Access*, and *Custom Fields*. Meanwhile, the account properties dialog can contain up to 6 tabs. The *General* tab is always available.

It is possible to save resource contents to a file or copy elements from one resource to another using the import/export tool.

Creating Resources

Resources can be created or deleted only in the interface of CMS Manager. To create a new resource, click the corresponding button on the *Accounts* tab of the navigation panel.

Below are described the parameters used while creating a resource.



Name
Enter a unique name from 4 to 50 characters. In the system, there cannot be resources with the same name.

Creator
Choose a creator for a new resource.

Account
This shows which account the resource belongs to. In other words, this is the resource creator account.

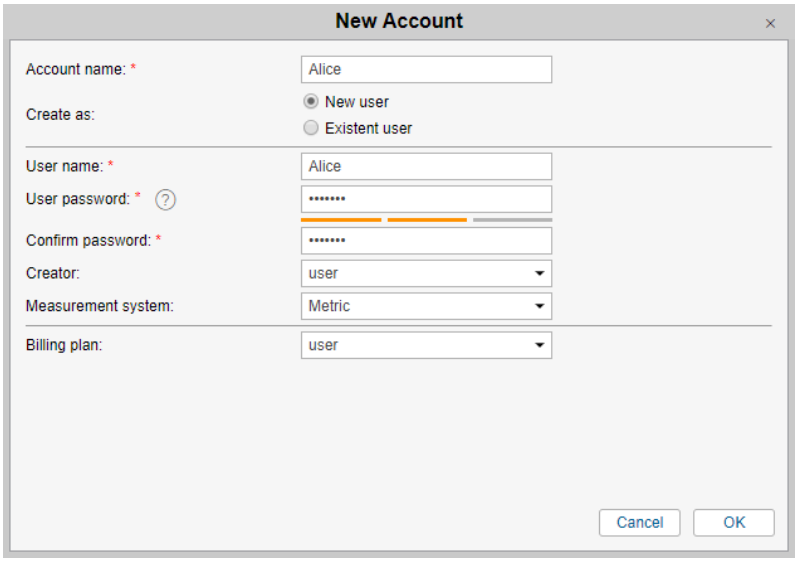
Note that the measurement system is borrowed from its creator by default. However, it can be changed afterwards through the conversion.

When all the fields are set correctly, click *OK* to save the changes. A corresponding entry appears in the log. The creator of the resource automatically receives full access rights towards created objects.

Creating Accounts

Accounts can be created or deleted only in the interface of CMS Manager. To create a new account, click the corresponding button on the *Accounts* tab of the navigation panel.

The parameters that are used while creating an account are described below.



Account name
Enter a unique name from 4 to 50 characters. In the system, there cannot be accounts with the same name.

Create as
A creator for a new system object can be either an existent user or a new one.

- *New user*
  A new user will be created and assigned as creator. Enter login name for a new user. By default, the name of the account is the same as login name but you can give the user a different name. Then type a password and confirm it. You can also specify the creator for a new user if you do not want it to be the current user. In addition, for a new user, you can set the system of measures. Usually, it is inherited from the current user but you can readjust it here. Note that if the creator of a new user cannot distribute billing plans (account is not a dealer one), then the billing plans section is disabled.

- *Existent user*
  The drop-down list will prompt you to select a user from the ones already existing in the system. Note that the user who is already the creator of system macro objects cannot become the creator of new accounts as such an operation violates current hierarchy. However, this user can create a resource. When an account is created by an existent user, its measurement system is borrowed from its creator. However, it can be changed afterwards through the conversion.

Billing plan
Billing plan usage is considered to be a distinctive feature of the account. Select a suitable billing plan for the account from the drop-down list. If there are no billing plans available, then account cannot be created.

When all the fields are set correctly, click *OK*. A corresponding entry appears in the log. As a result of this operation, an account is created, and a user can also be created at the same time. In this case, the account creator automatically

receives full access rights to the system elements created by it.

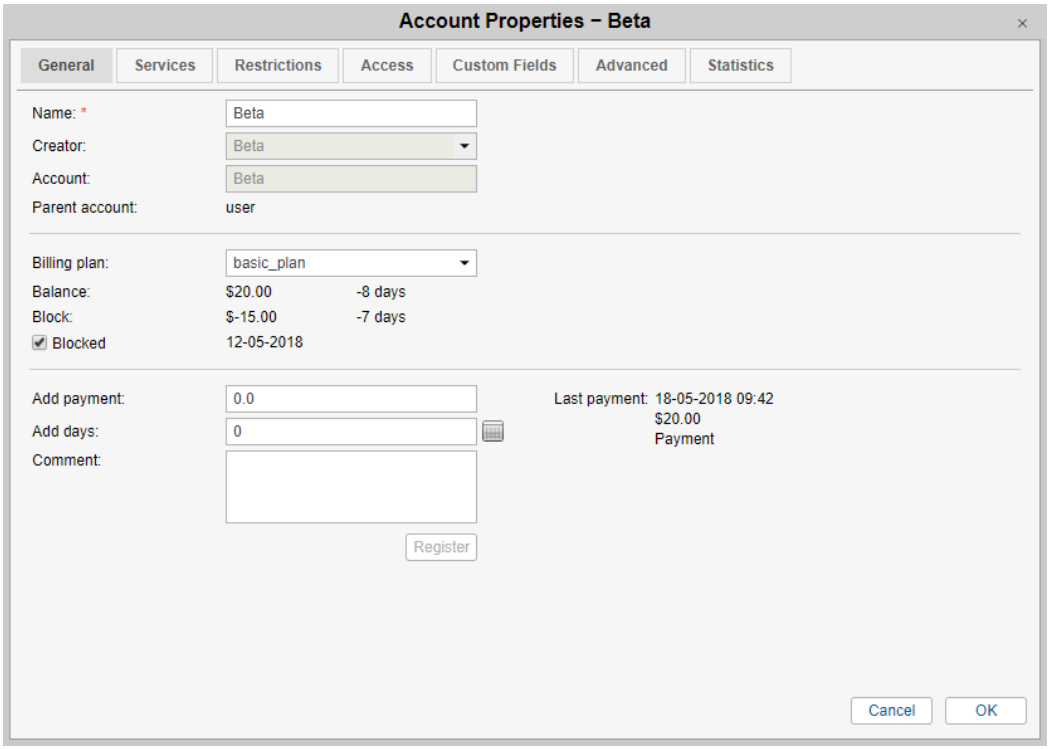
Account Properties

Account Properties dialog can contain up to 6 tabs. Their availability depends on the access rights.

General

The *General* tab has 3 sections. However, only the first one is available to the users with the minimum access. This section holds the name of the account, information about the creator, account, and parent account.

The second and third sections are designed mainly to add payment and block/unblock account.



The second section lists the billing plan, current balance, blocking limits, and the status of the account: active or blocked.

The *Balance* row shows the current monetary balance as well as the number of days left (if the option *Block by days* is enabled on the Restrictions tab of the same dialog). The row below specifies the limits at which the account is supposed to be blocked. Here, the limits are just displayed; they can be modified on the same *Restrictions* tab.

If the account is blocked, the corresponding checkbox is selected and the date of the blocking is shown in addition. If the account is active, the box is unchecked and the date of the estimated blocking is displayed (only if the option *Block by days* is enabled for the account). You can change the state of the checkbox manually if you, for instance, need to unblock the account as soon as the payment arrives. This box can also be checked manually to block the account, however, this strategy works correctly only if the money balance is zero or negative or if the amount of days left is less than 0. Note that to alter the position of the checkbox, there is no need to open the dialog — it can be done in the list of accounts itself, in the *Status* column.

Adding a payment or days is done in the third section of the *General* tab.

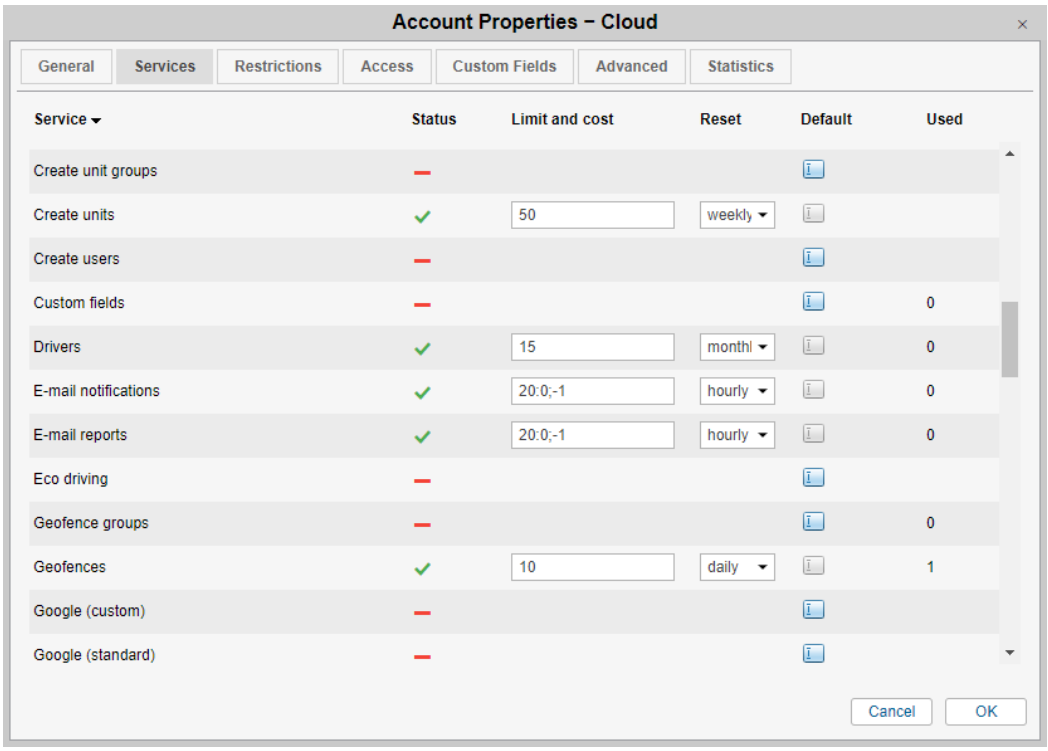
To register a payment, enter the sum and comment (obligatory) and click *Register*. The sum will be added to the current

balance, and the payment will be saved in the payment history (see the Statistics tab).

If the option *Block by days* is enabled, the field to add days will be available as well. The required number of days can be entered manually or specified using the calendar (the button to the right of the days entry field). Money and days can be added simultaneously in one payment or separately from each other.

Services

The *Services* tab in the Account properties dialog allows to manage the number of available units, SMS, geofences and other system objects, as well as enable or disable access to different services (such as retranslator, Wialon Mobile, jobs, etc.) and define their cost. The list of available services depends on the billing plan and activated modules.



Services can be sorted by the first or second column, i.e. by name (alphabetically) or status (enabled/disabled).

Service statuses:

- ✔ — service enabled,
- ▬ — service disabled.

For enabled services, you can set the allowed number and cost, as well as the reset interval, if necessary. To set a quantitative limit on the service, just enter the necessary number in the corresponding field. For example, if you set the *Geofences* field as 11, it will mean that only 11 geofences can be created within this account.

In some cases, a reset interval should be added to the quantity. For example, to set a limit of 5 text messages per hour. Other possible reset intervals are per day, per week, or per month.

Along with the limit, you can set the cost in the format: COUNTER1:VALUE1;COUNTER2:VALUE2;VALUE3. The counter must be a positive integer (but values can be fractional). Each next counter (COUNTER (N + 1) must be greater than the previous one (COUNTER (N). Here are some examples of cost lines:

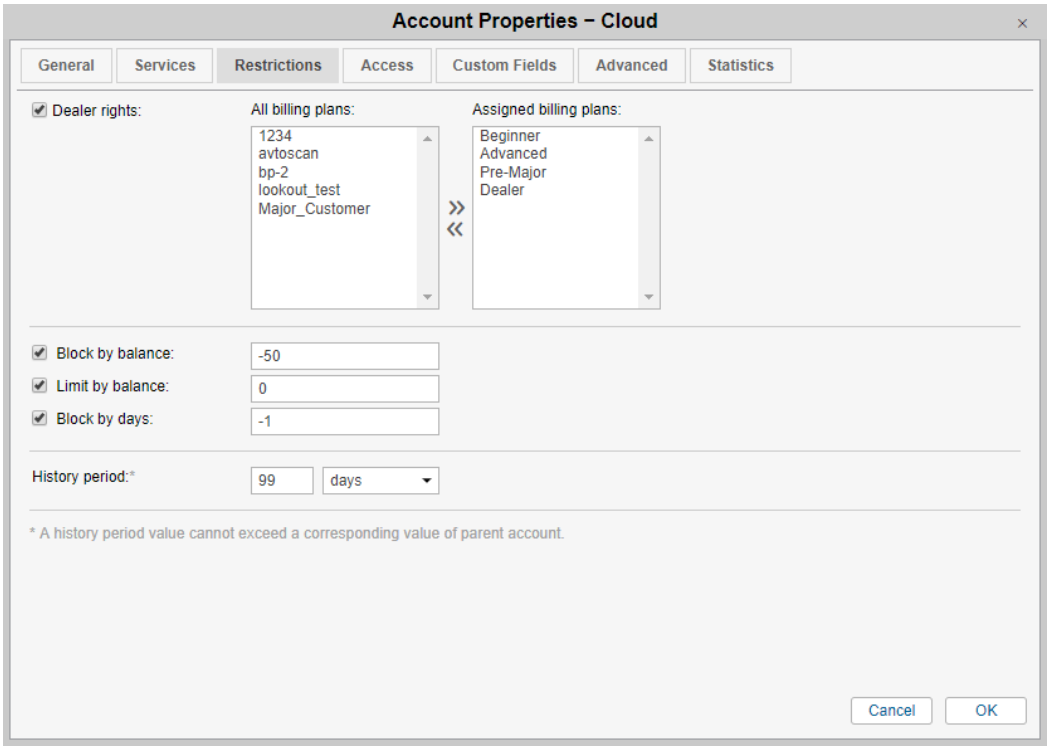
Service	Cost line	Interpretation
SMS messages	1:0;10:1.5;-1	The 1st SMS is free, from 2nd to 10th the cost for one SMS is 1.5 c.u. The 11th SMS is not allowed to be sent.
Units	1:0;5:10;10:3;50:1	The first unit is free, from 2nd to 5th they will cost 10 c.u., from 6th to 10th — 3 c.u., from 11th to infinity — 1 c.u.

Geofences	5:0;-1	5 geofences can be created for free. The creation of the 6th geofence is prohibited.

The gray icon next to the service means that the state and restrictions for this service are taken from the billing plan assigned to the account. If the state or restrictions have been modified at some point and thus redefined for the account individually, the button becomes active. Press it to restore the values of the default billing plan.

In the *Used* column, you can see the number of objects of the corresponding type, which have already been created in the account. This is relevant only for countable types of services (such as units, drivers, etc.) and makes no sense for uncountable (such as SKD, Eco driving, etc.).

Restrictions



Dealer rights
Check this box to create a sub-dealer, i. e. the account with the same rights and features (access to modules, services, billing plans) as the parent account. Next, specify the billing plans that will be available to it.

The *Dealer rights* option cannot be deactivated as long as it is a parent account.

The next three options are connected with restricting the activity of users in case of nonpayment. Usually, these values are either zero or negative (to give users the possibility to use the tracking system for some time after the expiration of the balance or days). If these options are not enabled, they will be borrowed from the assigned billing plan or parent account.

Block by balance
Enter the balance (the amount of money in the account), at which the account will be blocked.

Limit by balance
Indicate the balance of the account, after reaching which certain services and access to the CMS Manager should be disabled.

The following services become unavailable once the balance limit is reached:

- create units;
- create unit groups;
- create resources;
- create users;

- messages;
- apps.

The following services become unavailable once the balance limit is reached only if the price was indicated in the *Services* tab:

- SMS messages;
- E-mail notifications;
- E-mail reports;
- Google services;
- Yandex services.

Block by days
Specify the number of days reaching which the account will be blocked. This will work regardless of the *Block by balance* option. If both these parameters are adjusted, an account will be blocked when either of these conditions is met. In this case, the account can be blocked automatically not only with zero or negative balance but also if the specified number of days has expired. It can be useful for the demo access, for example, or the monthly fee control. When the counter reaches the number of days specified in this field, the service is automatically blocked.

If the *Block by days* option was activated and this state was saved, on the *General* tab will appear the balance of days left, as well as the line to add days when registering payment. Days counter decreases automatically every day. The days are counted according to UTC +3.

When 5 days are left, a special warning starts to come up each time the user logs in to the system: *Your account will be blocked. … days left.* Messages continue to appear until the number of days on the counter becomes less than zero. Then, the user receives the following message: “Attention! Your account will be blocked soon.”

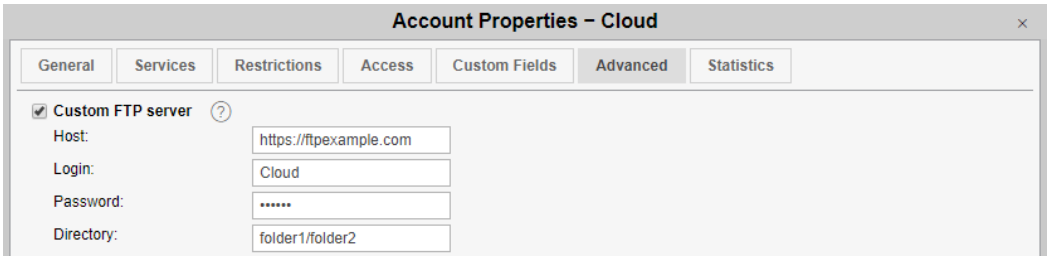
History period
This setting allows you to specify the amount of time that the data will be stored on the server. It can be indicated in days or months. Start typing the value into the field, and then select the days/months option from the appeared drop-down list. All the messages older than the indicated period will be automatically removed from the database. The default value of history storing is taken from the billing plan settings. If the period indicated for the account exceeds the one indicated for the billing plan assigned to this account, the period of data storage is taken from the billing plan. If the history period value is less than the one indicated for the billing plan, then the history storing period is taken from the account settings. To restore the default value, enter *0*.

Attention! A subordinate account cannot have more features than the parent one. Therefore, if the history period set for it is higher than the parent account's one, the restriction is taken from the latter.

Advanced

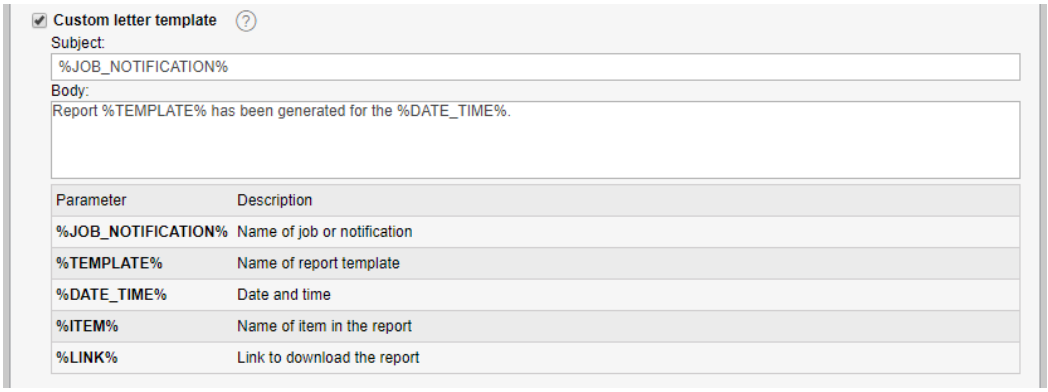
Custom FTP server

When sending a report to e-mail by job or notification, there is a possibility to choose if you would like to receive files/archives or a link to the FTP server where they are stored. To receive the link, activate the *Custom FTP server* option on the *Advanced* tab and specify its host, login, password and a directory for files/archives storage.



Custom letter template

To specify the subject and the body of a letter that is automatically sent by e-mail upon job or notification execution, it is necessary to check this box and fill in the corresponding fields. Fields can be filled manually or chosen from a standard set of parameters (click required ones) which will be converted to the latest values at the moment of sending. The type of the job or the action for the notification must be *Send a report by e/mail*.

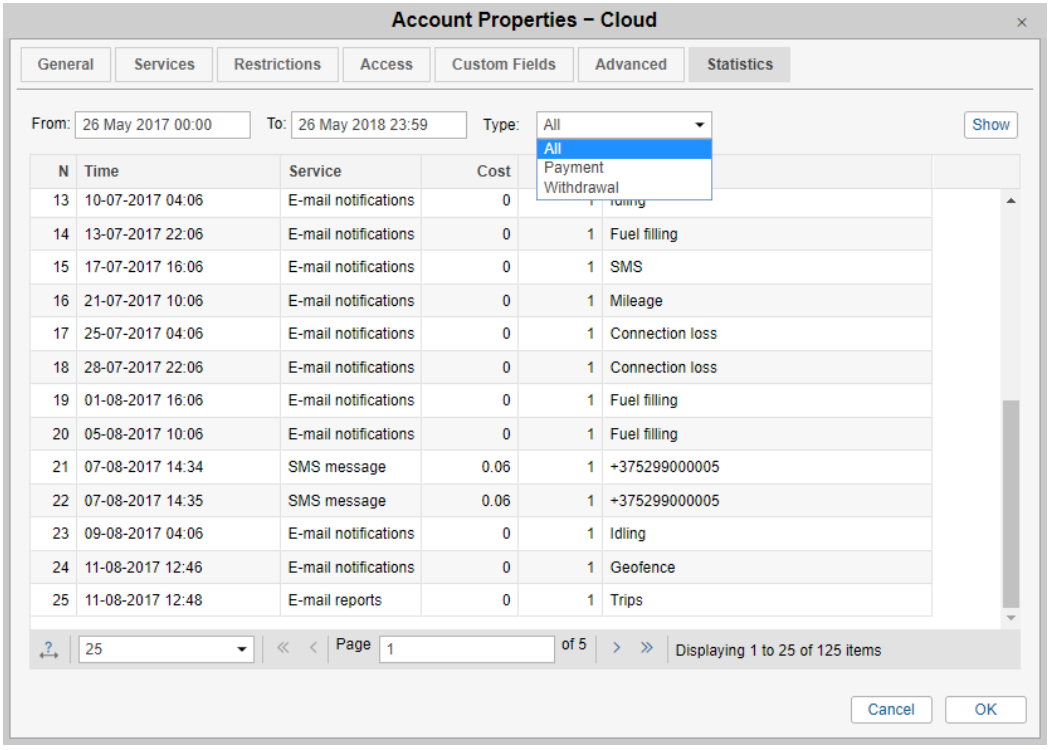


Other tabs of the *Account* or *Resource* properties dialog — *Access* and *Custom Fields* — have standard contents described above.

Statistics

On the *Statistics* tab, you can view all additions to the balance as well as all withdrawals. Define time interval and press *Show*. All payments and withdrawals are shown in the table. Moreover, to see them separately, use a drop-down filter (in this case you should press the *Show* button again).

The table shows both payments and added days together with the comments given when payment/days were added.



List of Services

Here is the full list of services available in Wialon system.

Service	Description
Admin fields	Allows to create admin fields in the properties of unit, user or group (on the *Custom Fields* tab); defines the available quantity (in total) and the cost of such fields.
Advanced reports	Allows to use advanced reports, i.e., reports by unit groups, users, drivers, trailers, as well as groups of drivers and trailers (except for the *Log* table for users and unit groups). Works within Reports module.
Commands	Activates the corresponding tab in the *Unit Properties* dialog; defines the quantity (total for all units) and cost of commands.
Create resources	Activates the button to create resources and accounts on the corresponding panel (available only in CMS Manager).
Create unit groups	Activates the button to create unit groups in the corresponding panel.
Create units	Activates the button to create units in the corresponding panel.
Create users	Activates the button to create users in the corresponding panel.
Custom fields	Activates the corresponding tab in the properties of unit, user or group; defines cost and quantity (in total) of custom fields; does not affect drivers and trailers.
Drivers	Activates Drivers module and defines cost and quantity of drivers; if disabled, the Drivers panel is not shown, and any mentioning of drivers disappears from notifications, user settings, and *SMS* dialog.
E-mail notifications	Allows to send notifications by e-mail. Recommended limitation — 10 reports per hour (not to overload the server).
E-mail reports	Allows to send a report by e-mail (within the Jobs module). Recommended limitation — 10 reports per hour (to avoid server overload).
Eco driving	Activates Eco Driving tab in the *Unit properties* dialog, as well as the same-name table in reports. Besides, Eco driving app does not work without this service.
Geofences	Activates the *Geofences* module and defines the cost and quantity of geofences; if disabled, the *Geofences* panel is not shown, and any mention of geofences disappears from reports and user settings.
Google (standard)	Allows to regulate access to the Google maps, geocoding, and routing for the lower-level accounts. The service works with the key purchased from Google. It is recommended to use this service and disable the custom one.
Google (custom)	Allows to regulate access to the Google maps, geocoding, and routing for the lower-level accounts. The service works with the key purchased from Google. With this service used, Google maps do not work in the Logistics application.
GPRS traffic	Allows to control GPRS traffic through jobs, notifications, reports, and unit properties.
Groups of drivers	Defines the available quantity and cost of driver groups; works within the *Drivers* module.
Groups of geofences	Defines the available quantity and cost of geofence groups; works within the *Geofences* module.
Groups of trailers	Defines the available quantity and cost of trailer groups; works within the *Trailers* module.

Groups of passengers	Defines the quantity and cost of passenger groups; works within the *Passengers* module.
Import/Export	Enables access to the dialogs of import/export in the user menu; activates the *Create from WLP* button in the *Units* panel and the *Export in file* button in the unit properties dialog.
Jobs	Activates the *Jobs* panel and defines the available quantity and cost of jobs.
Locator	Activates the *Locator* option in the user menu.
Maintenance	Defines the available quantity and cost of the service intervals; if activated, the *Service Intervals* tab appears in the *Unit Properties* dialog, maintenance can be registered in the Monitoring panel, and the corresponding notifications and reports appear.
Management system	Access to CMS Manager.
Messages	Access to the *Messages* panel.
Mobile client	Activates access to Wialon mobile client.
Mobile notifications	Activates the corresponding action in notifications, as well as the tab in the *Manage Applications* dialog (in user menu).
NimBus	Activates access to the NimBus app.
Notices to users	Allows to receive notices from the administrator of the service.
Notifications	Activates the *Notifications* panel and defines the cost and allowed quantity of notifications.
Orders	Activates access to the Logistics application and allows to generate corresponding reports either on units or drivers.
Passengers	Activates the *Passengers* panel and defines the cost and quantity of passengers.
Profile	Activates the *Profile* tab in the *Unit Properties* dialog and the same-name table in the reports.
Quick Start	Access to the *Quick Start* tutorial. For the sites with a personal design there is no video from Wialon in the *Quick Start*.
Reports	Activates the *Reports* module and defines the cost and allowed quantity of report templates; if disabled, associated jobs and notifications disappear and the trip detector cannot be used.
Resources	Activates the *Accounts* panel in CMS Manager; defines the quantity and cost of resources and accounts.
Retranslators	Allows to transmit messages from units to other servers and systems; activates the corresponding panel in CMS Manager; defines the allowed quantity and cost of retranslators.
Route rounds	Allows to create routes and defines the number of allowed rounds and their cost (within the Routes module).
Route schedules	Allows to create schedules and defines the number of allowed schedules and their cost (within the Routes module).
Routes	Activates the Routes module — enables the *Routes* panel and associated reports and notifications.
SDK	Remote access to the system via SDK and access to Apps.
Sensors	Activates the correcponding tab and defines the number of sensors (calculated for all units in overall) and their cost.
Site access	Here you can allow/deny access to different sites within your system (like Wialon Mobile v2, extra sites, etc).
SMS messages	Defines the number and cost of text messages.
Tachograph	Activates the *Driver activity* and *Infringements* tables in reports on drivers.
Toll roads	Activates the *Toll roads mileage* and *Toll roads cost* columns in the *Trips* report and adds the corresponding statistics fields in the advanced settings of a report template. The service uses the Platon toll system.

Trailers	Activates the *Trailers* panel and defines the cost and quantity of trailers.
Unit deactivation	Allows to view the information about deactivated units. Top-level users and users with dealer rights are also able to deactivate units.
Unit groups	Defines the cost and quantity of unit groups.
Units	Activates the corresponding panel and defines the cost and quantity of units.
Users	Activates the corresponding panel and defines the cost and quantity of users.
Video	Activates the video surveillance mode.
Wialon Mobile	Allows to track units from a mobile phone (Wialon Mobile v1).
Wialon Mobile (2)	Allows to track units from a mobile phone (Wialon Mobile v2). If mobile service URL is different from *m.wialon.com*, it can be disabled only through the *Site access* feature.
Yandex (custom)	Allows to regulate access to Yandex maps for the lower-level accounts. This service works with the key purchased from Yandex. If used, Yandex Maps do not work in the Logistics App.
Yandex (standard)	Allows to regulate access to Yandex maps for the lower-level accounts. This service works with the key purchased from Yandex. Geocoding, routing and panorama are available for the service. For geocoding and routing you can set the allowed number of requests.
Yandex (standard) — geocoding	Activates the geocoding for the *Address* tool, the *Monitoring* panel, the *Messages* panel, and the application Logistics.
Yandex (standard) — panorama	Activates the viewing of panoramic images of the locality for Yandex Maps.
Yandex (standard) — routing	Activates the possibility of building routes by Yandex Maps for the *Routing* tool.

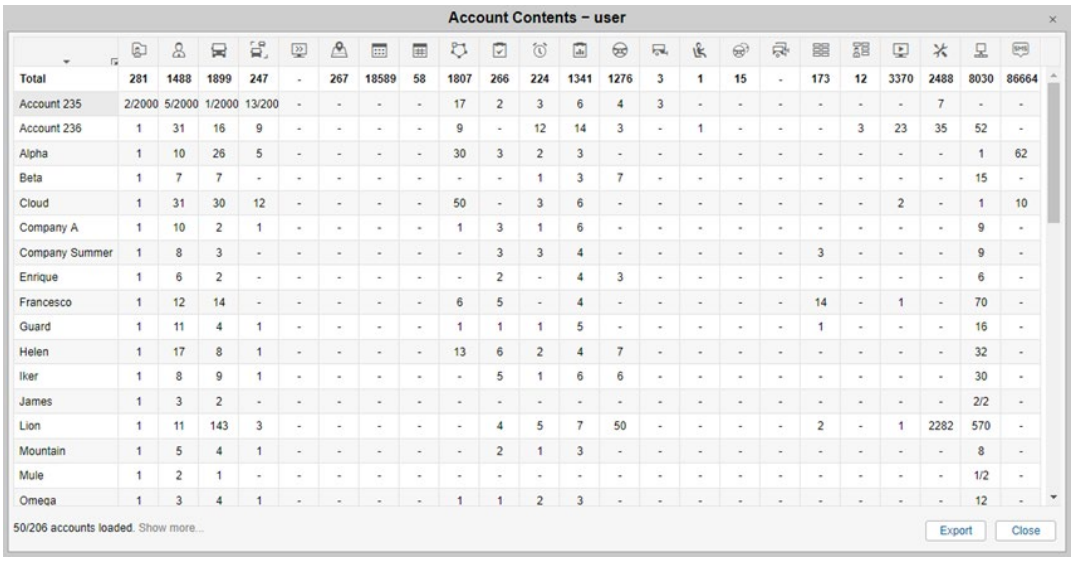
Note.

If you see *Apps* in front of a service name, it means this service is an application.

Report on Account Contents

CMS Manager provides an opportunity to view a report on the account contents. The report is presented as a table displaying the amount of all the macro and micro objects included into the account.

On the *Accounts* tab in the table of results, click the button in the *Contents* column to view the report on the contents of the corresponding account.



Total	281	1488	1899	247	-	267	18589	58	1807	266	224	1341	1276	3	1	15	-	173	12	3370	2488	8030	86664
Account 235	2/2000	5/2000	1/2000	13/200	-	-	-	-	17	2	3	6	4	3	-	-	-	-	-	-	7	-	-
Account 236	1	31	16	9	-	-	-	-	9	-	12	14	3	-	1	-	-	-	3	23	35	52	-
Alpha	1	10	26	5	-	-	-	-	30	3	2	3	-	-	-	-	-	-	-	-	-	1	62
Beta	1	7	7	-	-	-	-	-	-	-	1	3	7	-	-	-	-	-	-	-	-	15	-
Cloud	1	31	30	12	-	-	-	-	50	-	3	6	-	-	-	-	-	-	-	2	-	1	10
Company A	1	10	2	1	-	-	-	-	1	3	1	6	-	-	-	-	-	-	-	-	-	9	-
Company Summer	1	8	3	-	-	-	-	-	-	3	3	4	-	-	-	-	-	3	-	-	-	9	-
Enrique	1	6	2	-	-	-	-	-	-	2	-	4	3	-	-	-	-	-	-	-	-	6	-
Francesco	1	12	14	-	-	-	-	-	6	5	-	4	-	-	-	-	-	14	-	1	-	70	-
Guard	1	11	4	1	-	-	-	-	1	1	1	5	-	-	-	-	-	1	-	-	-	16	-
Helen	1	17	8	1	-	-	-	-	13	6	2	4	7	-	-	-	-	-	-	-	-	32	-
Iker	1	8	9	1	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	30	-
James	1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2/2	-
Lion	1	11	143	3	-	-	-	-	-	4	5	7	50	-	-	-	-	2	-	1	2282	570	-
Mountain	1	5	4	1	-	-	-	-	-	2	1	3	-	-	-	-	-	-	-	-	-	8	-
Mule	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/2	-
Omega	1	3	4	1	-	-	-	-	1	1	2	3	-	-	-	-	-	-	-	-	-	12	-

To adjust the table, click the corresponding button (left top corner of the table), and choose the required columns. The table is automatically rebuilt according to the chosen parameters. To facilitate the work with the data presented in the table, you can highlight any line by clicking on it.

By default, the table uses alphabetic sorting (by account name). However, the data from the table can be sorted by columns (from a larger to a smaller value and vice versa). To do so, click on the required column.

A table may contain numeric values separated by a slash ('/'). It is used when any of the features have been indicated. For example, the available amount of units is 20, but only five of them are currently used. Therefore, in the table it is displayed as 5/20.

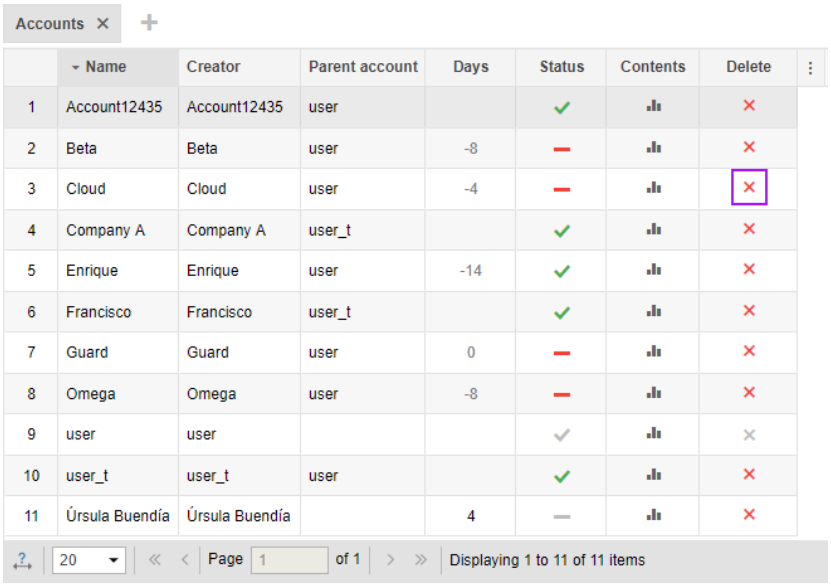
Left bottom corner of the dialog contains the information on the amount of accounts loaded and the total amount of accounts. If the total amount of accounts exceeds 100, the data on the accounts is loaded in parts. For instance, if there are 200 accounts available, you receive information on the first 100, then press *Show more*, and view the remaining 100.

A report on account contents can be exported into CSV file. To do so, click on the *Export* button in the lower-right corner of the table.

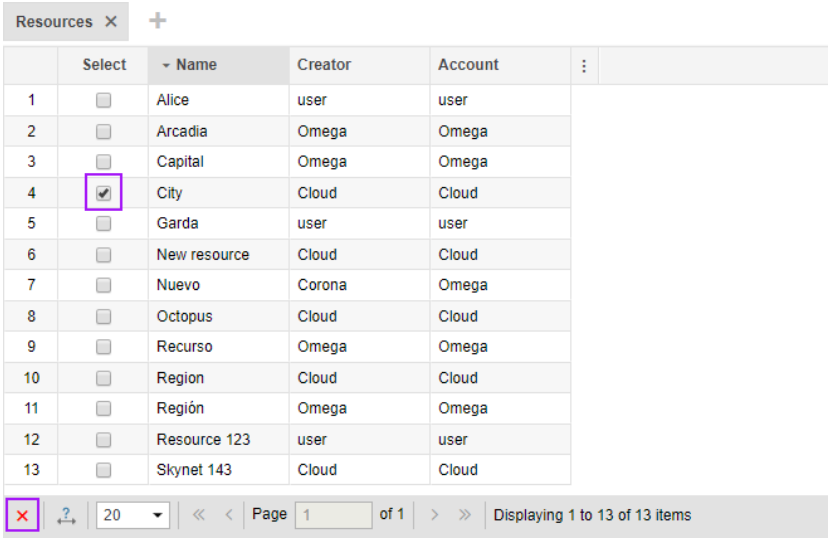
Deleting Accounts/Resources

To delete an account or resource, you should possess the appropriate level of access to it. In most cases, the removal occurs when a service agreement is broken and a client stops using the system.

To delete an account, click the delete button in the corresponding column and confirm your action. When you delete an account, all its contents (geofences, drivers, trailers, passengers, jobs, notifications, report templates) are deleted, too. Besides, all users, units, unit groups, resources, routes, retranslators that belong to this account and created by this account's creator (or other user established as account's creator) are deleted as well.



To delete a resource, chech the corresponding box in the *Select* column, and click delete button in the bottom of the table. Note that all the contents of a resource will be deleted along with it (geofences, drivers, trailers, passengers, jobs, notifications, report templates).



Transferring Units from One Account into Another

The *Units* service must be activated for the account to which a unit is transferred.

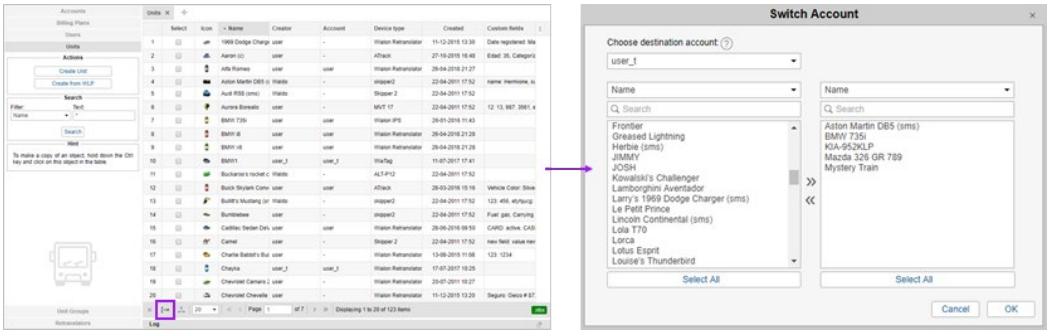
You can transfer units from the currently used account to the subordinate ones or between the subordinate ones. The account should possess the dealer rights in order for the feature to be available .

The following access rights towards a unit are required to transfer it from one account into another:

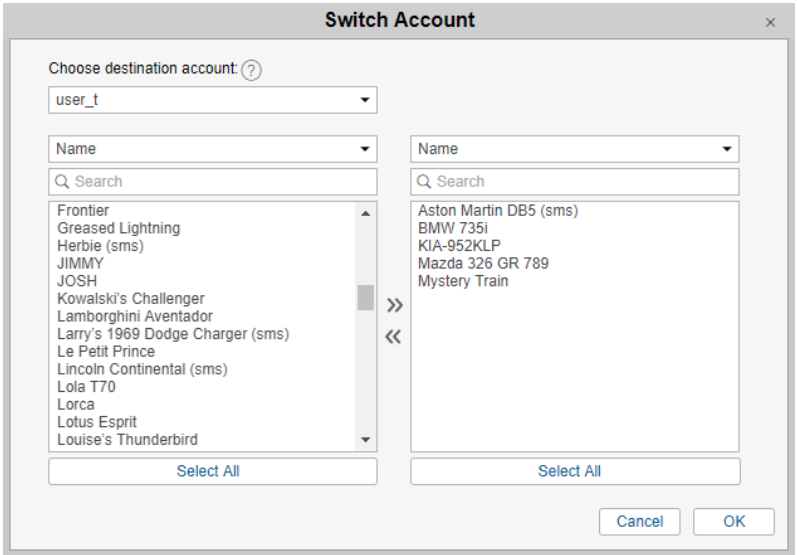
- Manage access to this item;
- Delete item;
- Edit connectivity settings;
- Delete messages.

Moreover, it is necessary to possess the *View item and its basic properties* right towards the creator of the unit and *Act as given user* towards the creator of the account you want to transfer the units to. The latter, in turn, must have the right to view the item and their properties towards the units from the right list of the dialog of switching account.

The units are transferred in the management interface. To begin with, open the *Units* tab. Then click on the *Switch account* button (unavailable if the account does not have the dealer rights) located to the right of the *Delete selected items* button.



The *Switch Account* dialog is as follows:



There are two lists in its central part. The left list contains all the units that can be transferred, that is, the units towards

which you have the appropriate access rights. The list on the right shows the units you want to transfer. The selection is done according to the principles described in the *Multiple Select Box* section'. To transfer units from the left list to the right one and vice versa, use the arrows between them. To make the selection easier, there are filters above each list.

After selecting the units, in the dropdown list in the upper part of the dialog, you can see the accounts these units can be transferred to (based on the access rights). Choose the necessary account and click *OK*. Confirm your actions. As a result, for the units the creator and belonging to the account will be changed; for the accounts — the counter of created/available units.

Billing Plans

Attention!
Only the top user can create and manage billing plans.

Billing plan defines the set of available services, their cost, and some basic properties such as minimum balance to block an account, minimum balance to deny services, currency format, etc.

A billing plan assigned to an account defines initial set of allowed/denied services, which can be redefined later (extended or narrowed) for each account individually. If you adjust services through a billing plan, you can apply limitations and costs to several accounts at once (which are associated with this plan). If you adjust services in accounts themselves, each account is to be edited separately.

Working with Billing Plans

You can work with *Billing Plans* only in the interface of CMS Manager. Open the *Billing plans* tab in the navigation panel of the management system. Here you can create new billing plans, as well as view, edit, and delete the existing ones.

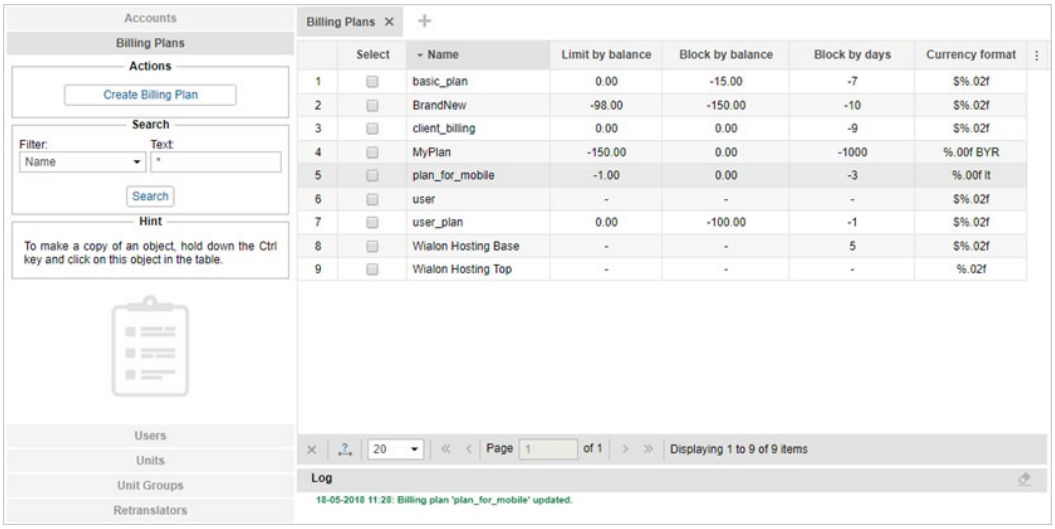


Table of results for billing plans contains the following columns: name of a billing plan, limit by balance, block by balance, block by days, and currency format.

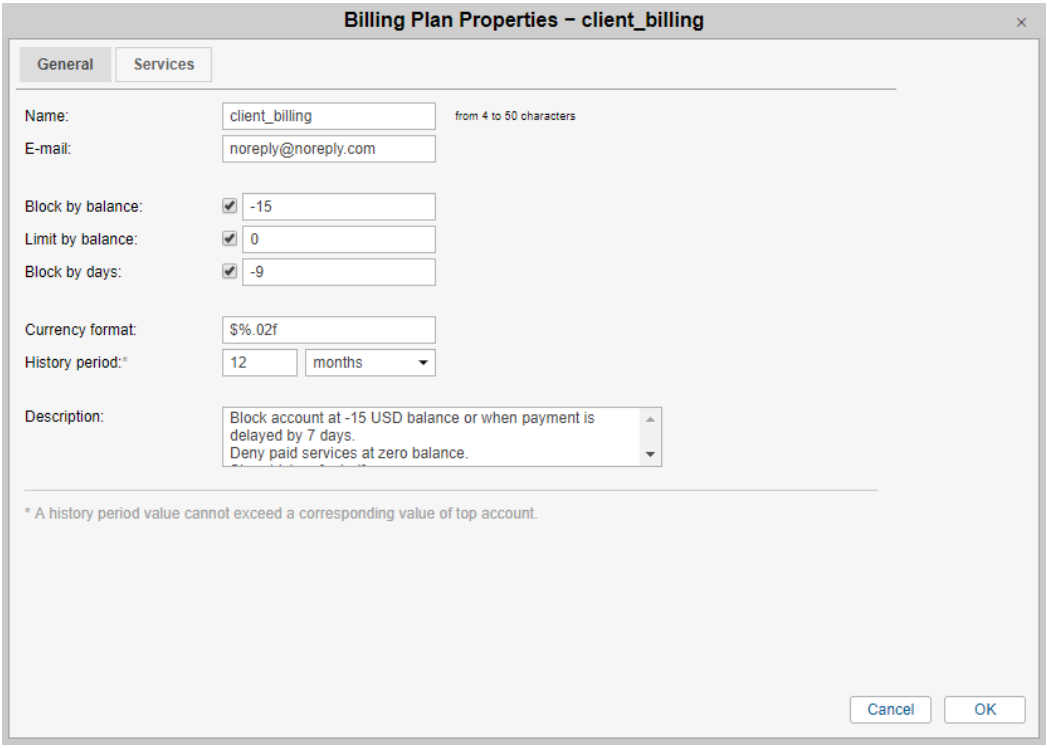
The above mentioned criteria are described in depth in the following sections:

- General Properties
- Services

General Properties

To create a new billing plan, click on the corresponding button. In the appeared dialog, it is necessary to indicate general parameters of the billing plan. Some of them may be redefined in a particular account separately.

Editing a list of services available to this billing plan is implemented on the *Services* tab in the properties dialog of a created billing plan.



Name
Billing plan name (from 4 to 50 symbols).

Parent plan
Select the parent (recursive) billing plan, if necessary. If it is assigned, the current billing plan inherits all its properties. These properties can be changed later but considering that the capabilities of a filial billing plan cannot exceed the capabilities of the parent one.

E-mail
In this field you can introduce the e-mail to be used for sending various system messages (notifications, reports, etc.). Read more about the mail system.

Most mail systems perform special checks for spam messages. They compare original IP address from which the message goes with the MX record of the sender's domain. If MX record is not found, sending messages might be suspended, or the sender's address might be added to the *grey list* (this eventually might lead to total denial of processing and sending messages). To avoid such situation, when you register your tracking site, make sure that the server address *mx.gurtam.com* is included in the MX records of your domain.

Block by balance
Enter the balance reaching which the account should be blocked.

Limit by balance

Indicated the balance of accounts, after reaching which certain services, as well as access to the CMS Manager, should be disabled. It works similar to the *Limit by balance* restriction.

Block by days
Works independently of the *Block by balance* option. If both of these parameters are adjusted, an account will be blocked when meeting either of set conditions. When the number of days specified in this field remains, the service is blocked automatically. In this case, when 5 days are left, the user begins to receive a warning message at each login to the site: *Your account will be disabled in … days.*

Note.
The three above-mentioned features can be enabled or disabled according to your needs. Usually, their value is zero.

Currency format
Enter a currency sign before or after *%.02f*.

History period
The time period to store unit history. This time period can be entered either in days or months (choose from the dropdown list). For example, if the value is 100 days, then messages older than 100 days are automatically deleted. This parameter can also be redefined for each account separately.

Map tags
This field makes sense only if own cartographical service is used by the system. Enter tags of maps that should be available with this billing plan. Separate tags with commas. If the field is empty, it assumes that all default maps will be available.

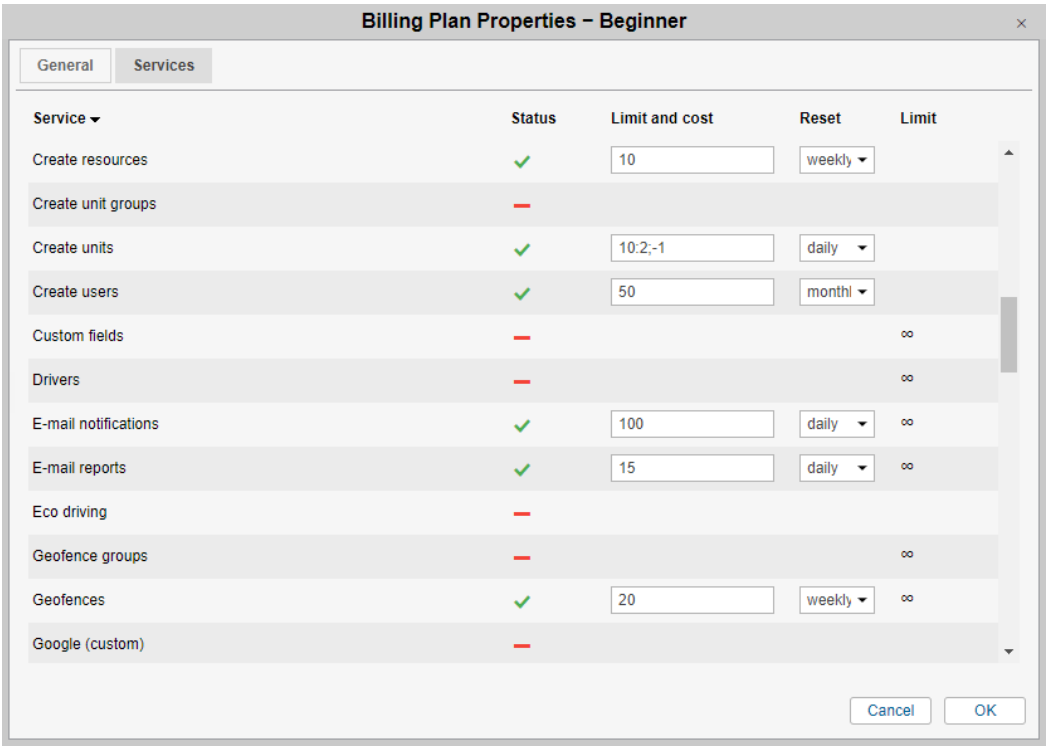
Tags are indicated in the following way:

- Map name — an indicated map will be available as main one.
- '**+**' symbol is indicated before a map name — an indicated map is enabled in addition to the main one.
- '**-**' symbol is indicated before a map name — an indicated map is disabled.

Description
Give a description (optional).

Services

This tab provides the list of all services available for this billing plan, their state and cost.



Adjustments of limit and cost of services are made in the same manner as for the accounts. However, there are some differences. For example, the *Limit* column shows the maximum allowed quantity of a service considering top account limitations.

Availability of services, their cost and allowed number can be also set (redefined) for each account individually, on the same-name tab.

Attention!
Disabling a feature in a billing plan does not mean that the same feature is automatically disabled in the account which is associated with this plan. If a feature is redefined (that is not default) in the account itself, the priority is given to the account.

Users

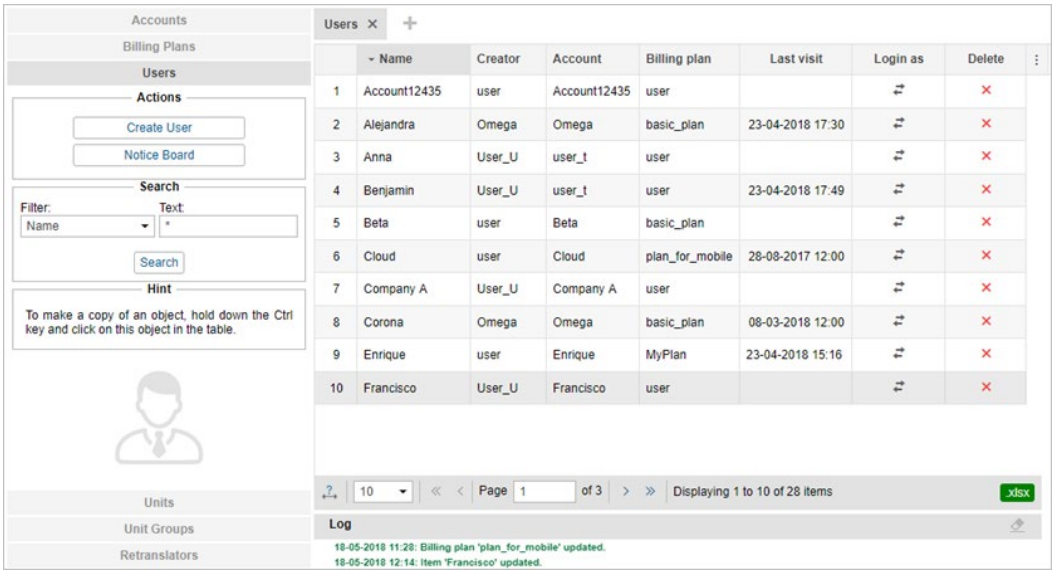
User is a system macro object which has its unique name (login) and password. Using this login and password users can enter one of Wialon interfaces where they can control their units (end users) or manage the system itself (users-managers).

A user has access rights to interact with other system objects (units, other users, resources, etc.). These rights are assigned by a system manager. Besides, a user can be a creator of these objects, which also affects the hierarchy of access rights. Manager's duty is to properly build this hierarchy.

Users as system objects also have some specific applications in Wialon Local main interface, as described below (send SMS, control user activity, etc.).

Working with Users

Working with users is possible both in CMS Manager and in the main interface. In CMS Manager, open the *Users* tab in the navigation panel on the left of the window.



There is a button to create a new user, a filter to search existent users, and a button (optional) to send informational notices to your users.

The table of results displays the name of the user, its creator, account, the billing plan, the date and time of a last visit in the system, the button for deleting users, as well as logging in as them. Availability of buttons and information depends on your access rights.

Standard operations described below (such as create, view, edit, copy) can be applied to users in the same way as to other system objects. However, the following pecularities should be taken into consideration:

- A user can be created not only independently but also together with an account or resource.
- Users cannot be deleted as easily as other system objects. Actually, only users who are not creators of any other system objects can be deleted. To delete a user, press the red *delete* button against their name and confirm your intentions (a dash is displayed instead of the button if you have no rights for deletion). If you are trying to delete a user who is the creator of any items in the system, you get an alert which lists all

these objects, and they should be deleted prior to their creator. Nevertheless, automatic deletion of all subordinated items together with their creator is still possible — through deleting an account they belong to.

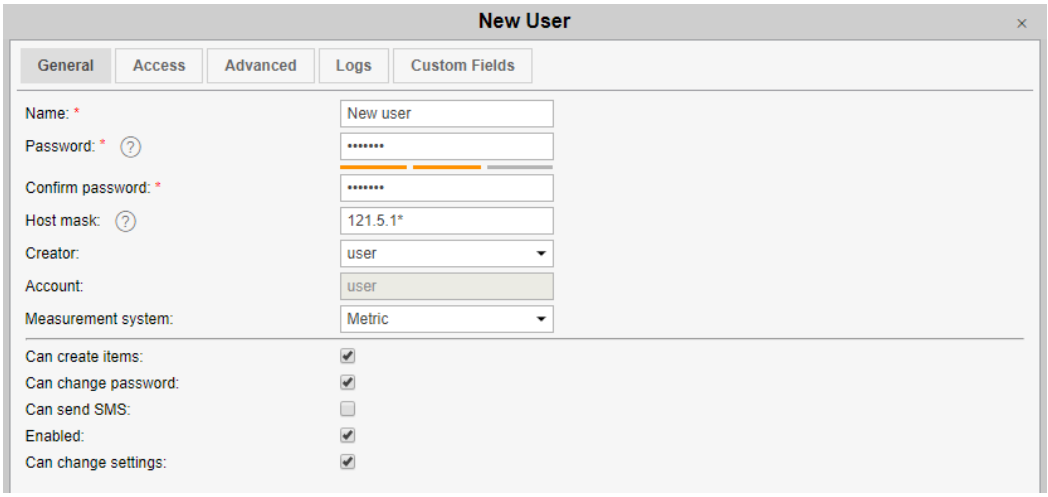
Directly from the table, you can switch to another user, i.e. log in to the system as another user (access right *Act as given user* is required). To do this, use the buttons in the right column of the table. If logged in as a different user, both user names are displayed on the top panel. To return to the main user, click on its name in the top panel (before the brackets).

User Properties

User properties are configured when creating, editing or copying a user in a special dialog on several tabs. The availability of different tabs and parameters depends on the access you have towards the user. Two tabs are available in any case — *General* and *Advanced*. Some properties become uneditable if the user account is blocked.

General

This tab contains the basic properties like name, password, allowed activity, etc.



Name
User name must be between 4 and 50 characters (read more about the Input Rules).

Password
Password is required for each user. To ensure a high quality of password protection, it is recommended to adhere to the following rules when creating it:

- the minimum password length is 4 characters;
- use of uppercase and lowercase letters;
- use number or symbols along with letters.

You have to enter the password twice (the second time is in the *Confirm password* field).

Host mask
The host mask can be applied to the user to restrict IP addresses from which this user can log on to the system (for example, to restrict access only to working computers). To set a mask, use the wildcard character *, for example, the host mask can be set like this: *212.0.13.**. You can indicate several masks separated by commas. The maximum number of symbols in this field is 1024. If no mask is set, the user can log in from any computer.

Creator
Select the creator from the dropdown list. User's creator can be any other user. Creator is important to build hierarchy of the access rights. The user inherits account and billing plan from the creator. The creator is assigned when the user is being created and cannot be changed afterwards.

Account
Here you can see to which account the user belongs to (if you have any access to this account). Account and creator

cannot be changed.

Measurement system
Choose a measurement system which will be applied to the current user. This parameter is shown only upon creating a new user. For existing users, it can be changed by the converter. Moreover, users can change a measurement system by themselves in the monitoring system. To do so, it is necessary to summon the user settings dialog and choose a proper measurement system on the *General Settings* tab.

Can create items
This checkbox defines if the user can or cannot create units, users, accounts, resources, unit groups, routes, and retranslators.

Can change password
If disabled, the user cannot change their password.

Can send SMS
If disabled, the user cannot send SMS messages to drivers, units, and other users from the main interface of Wialon Local.
However, this option does not affect the execution of the commands via SMS channel.

Enabled
If disabled, the user cannot login to any interface of the system.

Can change settings
If disabled, the user cannot change their own settings (see User Settings), however, can see them.

To edit most of these properties, you should have the *Change flags for given user* access right. Changing password requires also the *Act as given user* access right.

Access

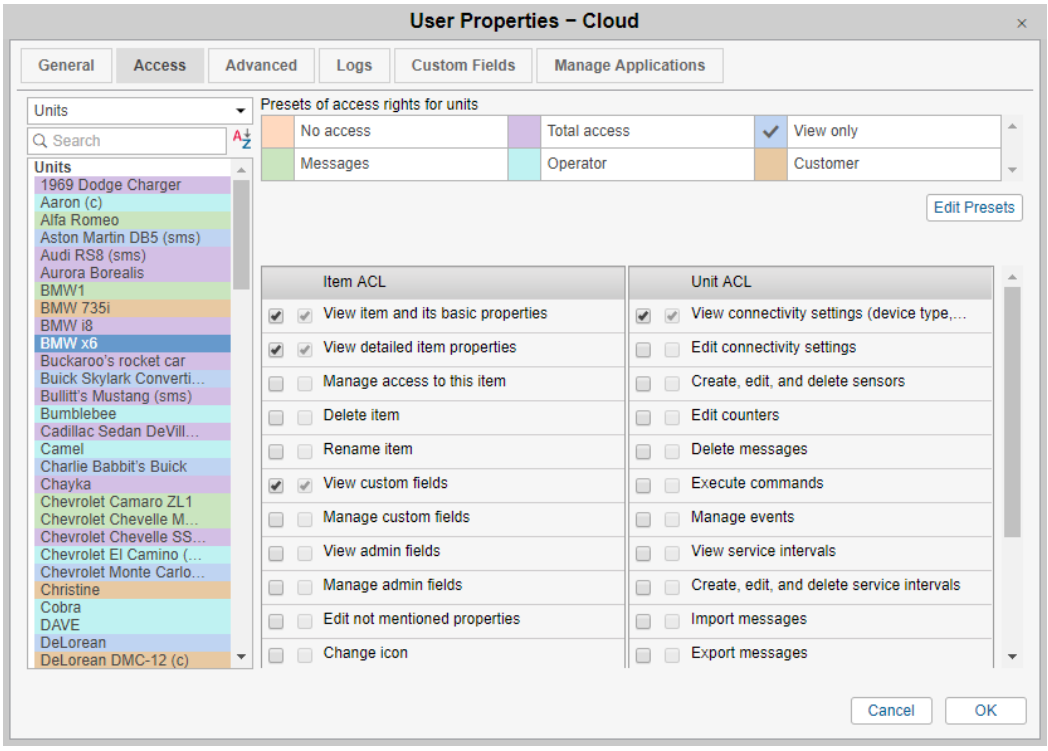
Access required: *Manage user's access rights*.

Here you give the user access rights to the objects that exist in the system: units, resources (accounts), unit groups, routes, and other users.

On the left, you select the objects. To quickly find a required object, use filters — choose object type in the dropdown list and set a name mask below. Objects that meet your request will be displayed in the list. Also, to facilitate a search, the list can be sorted alphabetically or by access rights. To use the sorting, click the corresponding button to the right of the dynamic filter.

The objects, to which the user already has any access, are highlighted in color. If there is no access, the background is transparent.

Select an object on the left and mark actions allowed to the user on the right. Find more information about the access rightshere.



Note that here you set the rights of a specific user to various objects of the system. However, the user, in turn, is also a system object and therefore can be accessed by other users. In other words, other users can obtain access rights toward this user. To set access to a user as a system object, open the properties dialog of some other user and choose *Users* in the dropdown filter.

Advanced

On this tab, you can specify the e-mail address to which the user should receive notifications from the administration of the service.

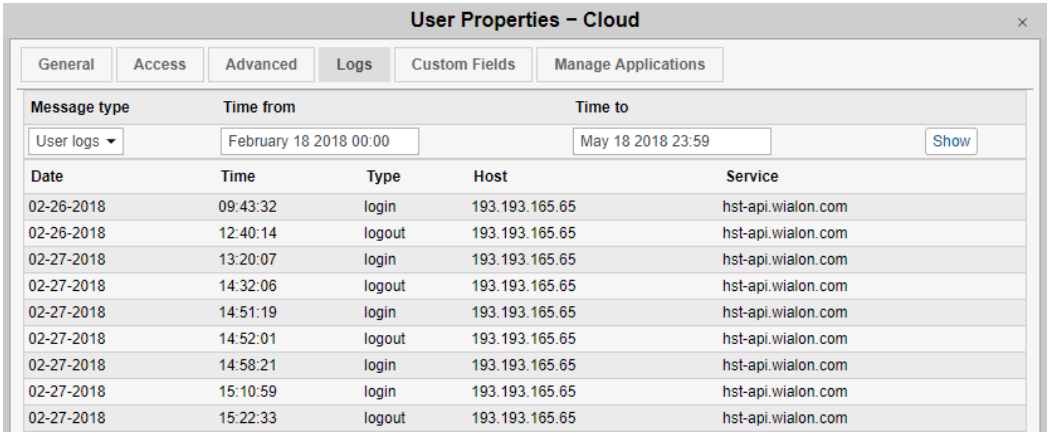
The settings specified in the tab can be changed by the user himself in the user's settings after the login.

To edit these properties, the *Edit not mentioned properties* access right is required.

Logs

Access rights required: *Query reports or messages*.

In the log, you can see when a user logged in or out of the system, what service he used, from which host. Specify the time period and click the *Show* button.



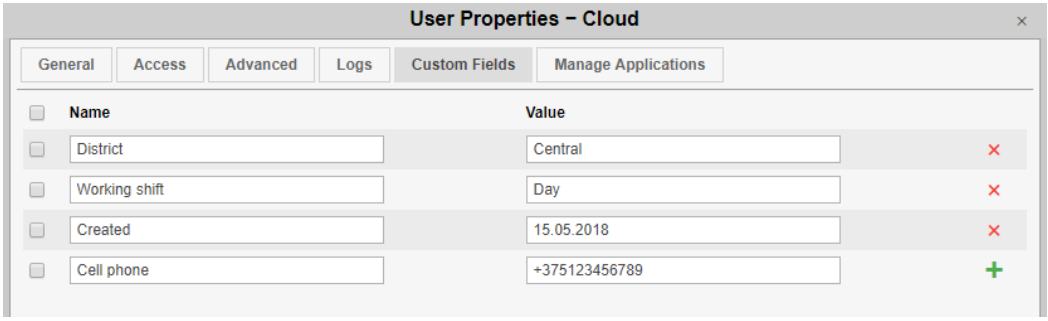
Note.
Besides the log, user activity can be controlled in different reports that are available in the main interface of Wialon

Local.
Read more about the application of users here.

Custom Fields

Access required: *View custom fields* — to view general custom fields; *Manage custom fields* — to create, edit, and delete general custom fields for the given unit; *View admin fields* — administrative custom fields; *Manage admin fields* — to create, edit, and delete administrative fields.

On this tab, you can add any information about the user, whether it is home address or working shift. In the left field enter the name of the field, in the right field its value. To save a custom field, click the *Add* button, to delete — *Delete*. At the end of the dialog edit, click *OK* in the lower right corner. The next time you open the dialog, the fields will be automatically sorted alphabetically. Part of the fields can be marked as *administrative* (checkbox in front of the field), i.e. they will only be visible to users with the appropriate rights.



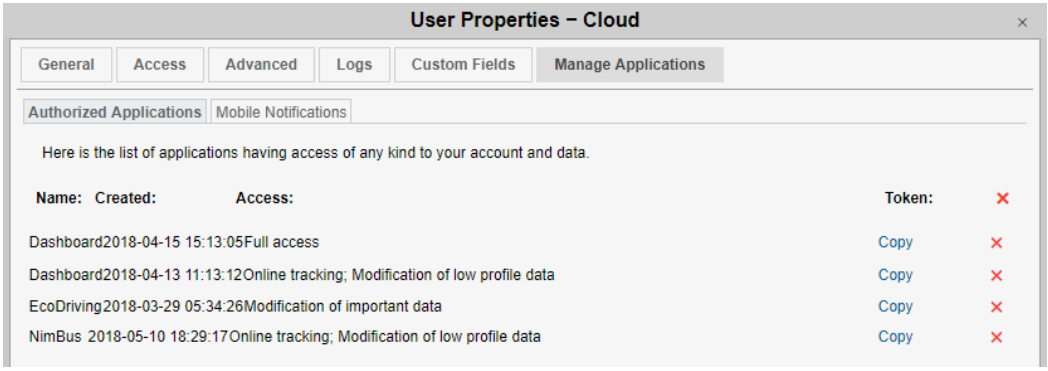
Manage Applications

Authorized Applications

This tab contains the list of applications that have any access to your account and data. To the left, there is an application name, to the right, you can see the access rights that the application has towards your data or account. To block an access for the application, it is necessary to delete the corresponding application from the list.

Mobile Notifications

This tab contains the list of applications which are allowed to send notifications to your mobile devices. To the left, there is an application name, to the right, you can see a device type. To block mobile notifications sending, it is necessary to delete the corresponding application from the list.

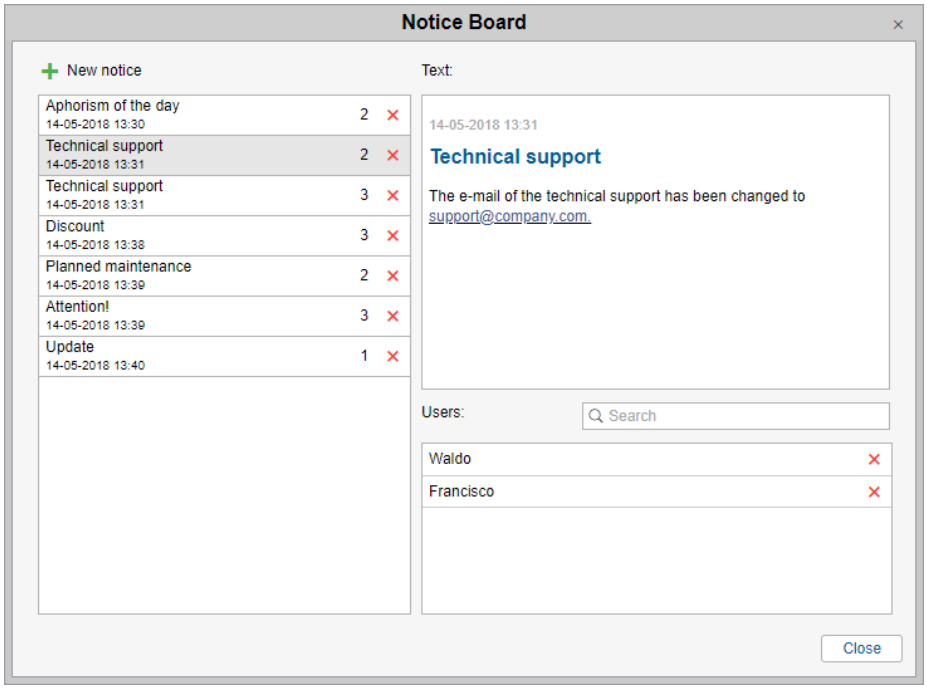


Notice Board

You can send information messages (notices) to the users of the system. To send them, you should have the *Edit not mentioned properties* and *View detailed item properties* access rights towards the user. The billing plan of the user must also have the service *Notices to users* and the account must be active (not blocked). Otherwise, they do not appear in this dialog.

To open the dialog of the *Notice Board*, click the corresponding button in the *Users* panel.

If there are some sent notices, the list of their subjects is shown in the left part of the dialog.

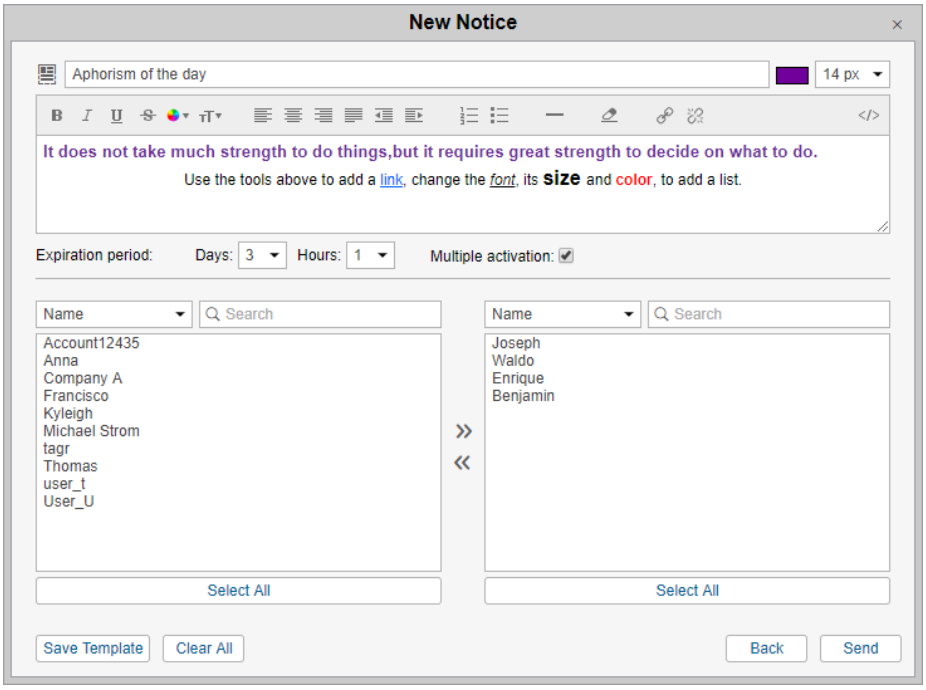


If you click on the subject of the notice, its text is shown in the field on the right. To delete a notice, click the button in the form of the red cross in front of its name. Apart from being deleted from the list, the sending to the recipients is cancelled as well.

Under the field with the text there is the list of the users to whom the selected notice has been sent to. To quickly find necessary users, use the dynamic search. It is possible to delete users (the notice will stop being showed to them) by clicking the red cross in front of their names.

Creating Notices

To create a new notice press the *New notice* button in the upper left corner of the dialog. The following dialog opens:



Introduce the topic of the notice in the field *Subject* and the text of any length below. Above the field with the text there are the tools that can be used for changing the font and its color, aligning the text, adding lists (numbered o bulleted) or a horizontal line, add an outdent or an indent. You can also add hyperlinks in the text of your message. To do so, enter the text you need to be shown as a hyperlink, click the *Add link* button, type or paste the required link in the appeared field and click on the green flag on its right. In the left part of the tools panel there is the *Show code* button by pressing which you can see the text in the form of a code.

Once you have entered and configured the text, adjust the expiration period (from 1 hour to 30 days) and enable the *Multiple activation* option if you need the notice to be shown to the recipient during his every login in the system during the specified validity period. If the option is disabled, the notice will only be shown once (till the user closes it).

Continue with choosing one or several addresses in the lower part of the dialog. The selection is done in the list on the left. Transfer the required users to the right list (by double click or using the *Add* button).

To quickly find the necessary users, use the dynamic filter above the list. Users can be searched by different criteria: name, creator, account, billing plan, custom fields, and admin fields. To select all the users at once, click on the *Select All* button.

The sent notices are shown to the corresponding users in a popup window (both in management and monitoring systems).

Notice Templates

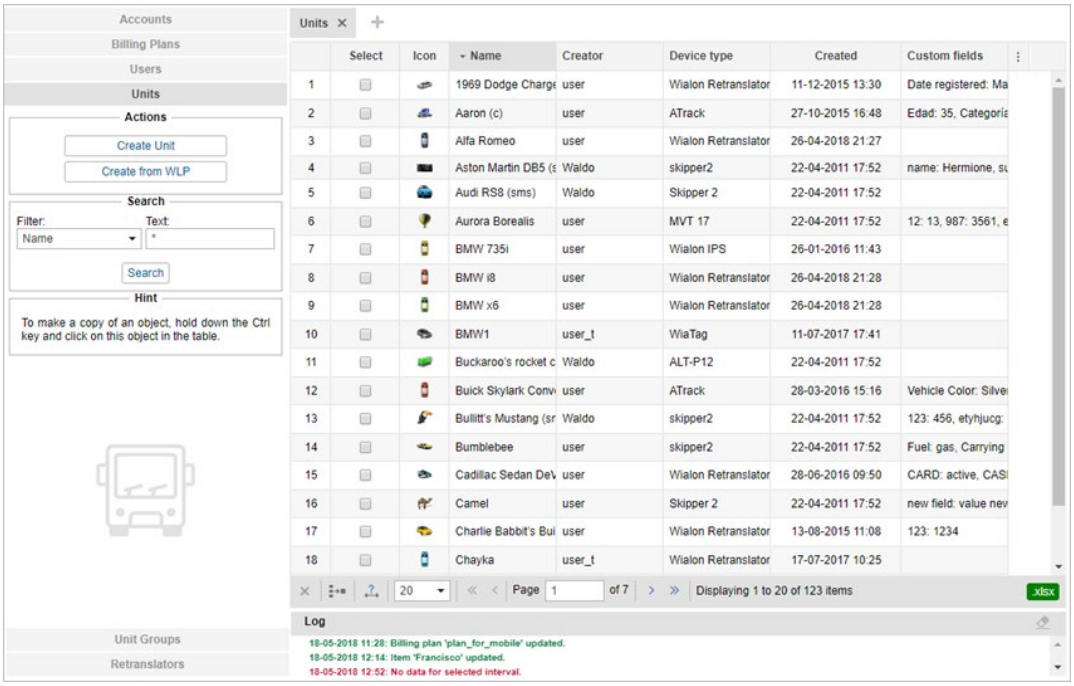
The system provides a possibility to save the created notices as templates, which can be used later for creating new information messages. To do this, use the *Save Template* button at the bottom of the dialog. Please note that the minimum input information required to save a template is its subject.

To open the list of available notice templates, click on the *Templates* button ( ) in the upper right corner of the dialog of creating a notice. If you want to use a created template, click on its name. You can also copy and delete templates using the buttons and , correspondingly.

Units

Unit is a vehicle, machine, person, animal or other moving or stationary object, which is monitored by satellite monitoring. In the Wialon Local system, the unit is characterized by the type of equipment (GPS or GLONASS device) and the unique identification code of the unit in the system (ID). With units, you can work both in CMS Manager and in the main Wialon Local interface.

To work with units in CMS Manager, open the *Units* tab in the navigation panel. Units configured here become available for tracking (viewing on the map, monitoring various parameters and many others).



Here you can create a new unit, view existing ones, view or edit their properties, define access rights to units, and remove units from the system. Read Standard operations for details. Besides, you can transfer units from one account into another.

Moreover, there is a possibility to create units with settings imported from WLP files. To do so, click the *Create from WLP* button. Choose a file, indicate the parameters, and click *Next*. Afterwards, a unit with the indicated parameters is created, and a properties dialog of the created unit opens.

Unit Deactivation

Deactivated units are the units that are temporarily unavailable for monitoring. Working with such units and their data is impossible until they are activated.

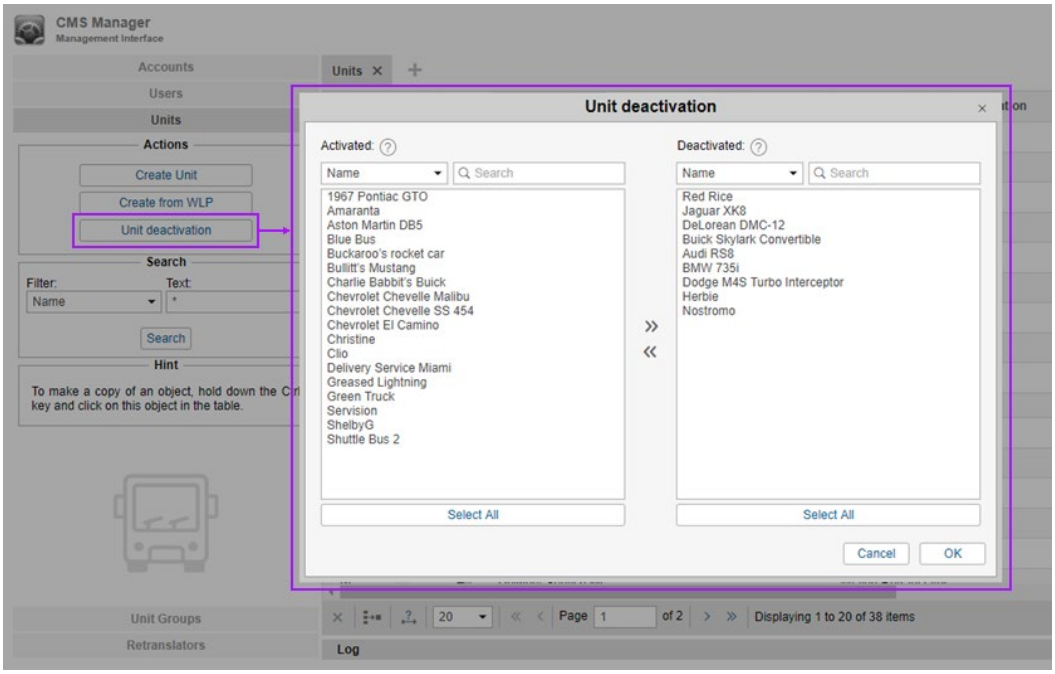
Deactivation of a unit may be necessary in case it is used, for instance, for a limited period of a year and does not need to be monitored the rest of the time.

This functionality is only available to top-level users and users with dealer rights when using a billing plan with charges for each unit. The maximum number of deactivated units cannot exceed 50% of the total number of units available to the top-level user.

To be able to deactivate a unit, not only the user himself needs the *Unit deactivation* service, but also the creator of

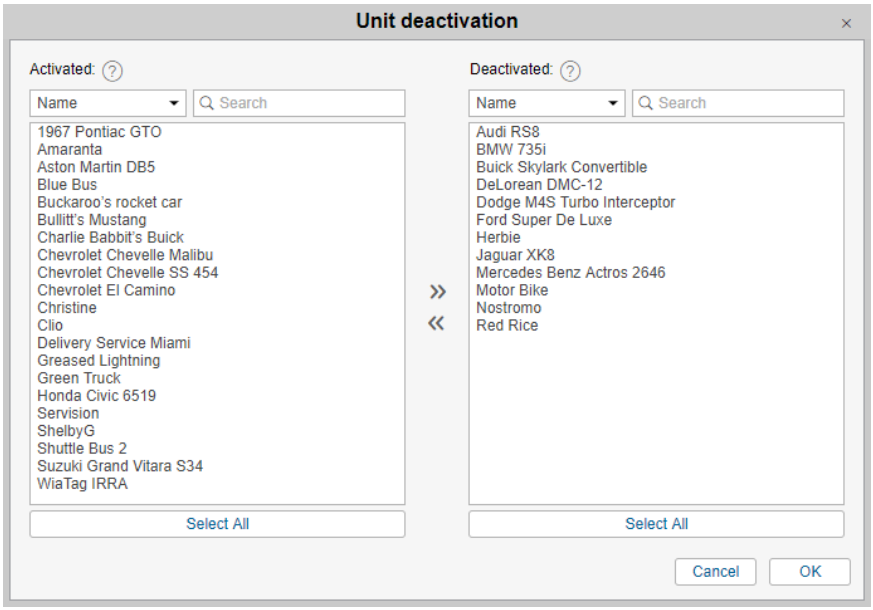
this unit.

Click the *Unit deactivation* button in the navigation panel to open the deactivation menu. The menu consists of two lists, above each of which the filter and dynamic search are located, allowing to quickly find the required units.



In the list of activated units, only the units to which a user has the *Edit connectivity settings* access right are displayed.

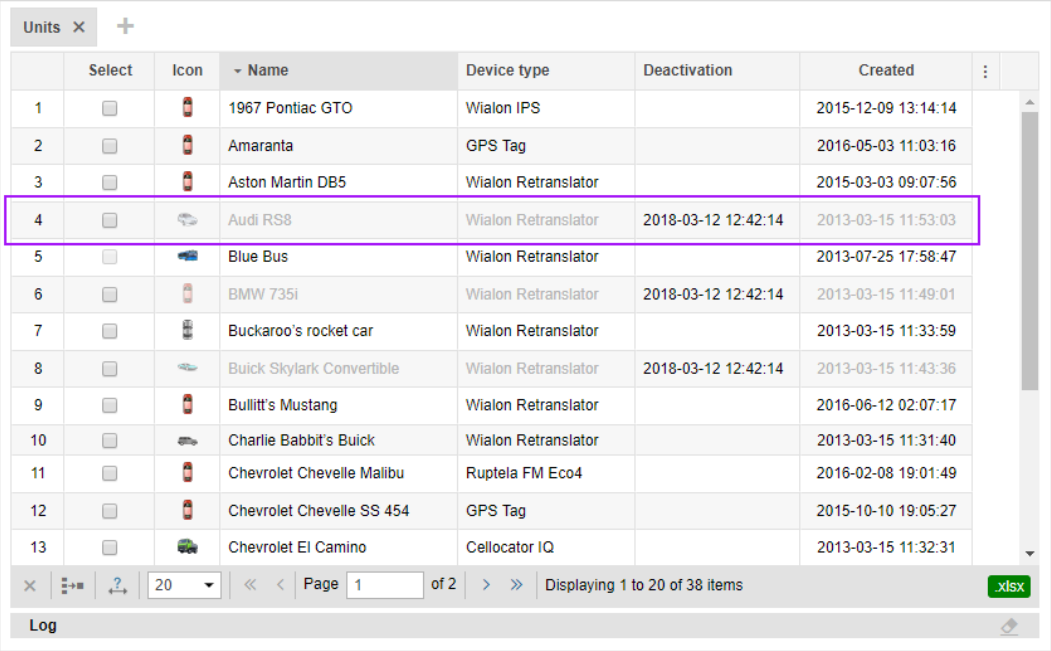
To move units from one list to the other, use the arrow keys between them or double-click the required unit. When the limit is reached, the transfer of units to the list on the right becomes impossible. The corresponding entry indicating the names of the units that were not deactivated appears in the log.



Press *OK* to save the changes. The selected units are deactivated for 90 days. However, they are not displayed in the monitoring system, and the dialogs of their properties in CMS Manager become read-only. At the end of this period, the units are automatically activated. Manually this can be done at any time (the process is similar to deactivation).

If the limit of deactivated units is exceeded when the changes are saved (for instance, by another user), an error message is displayed in the log, and only the number that fits into the limit is deactivated.

The information about the deactivated units is displayed in the *Deactivation* column in the results window. The date and time of the deactivation are indicated (in red, if there are less than 7 days left) in front of the names of such units, and in the tooltip — the number of days before the automatic activation. The rows of the deactivated units are pale-colored.

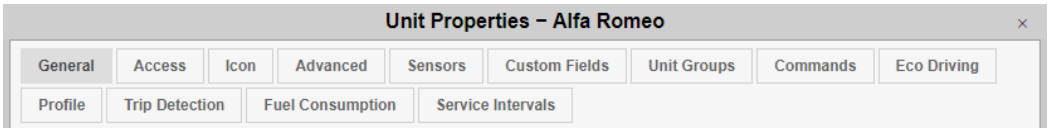


In case the corresponding service for the account is turned off, all the deactivated units in it are automatically activated.

Unit Properties Dialog

Unit properties dialog is displayed when you create, edit or copy a unit. It contains many tabs and fields that define different unit parameters and how the program interprets the data received from this unit.

The number of tabs can vary depending on your access rights (max — 11).



Use the following links to find out the details about each parameter:

- **Sensors**
  - Sensor Properties
  - Sensor Types
  - Sensor Parameter
  - Validation of Sensors
  - Calculation Table
  - Signed Parameters Converting
  - Temperature Coefficient
  - Math Consumption Wizard
- General Properties
- Counters
- Access
- Icon
- Advanced Properties
- Custom Fields
- Unit Groups
- Commands
- Eco Driving
- Profile
- Trip Detection

- Fuel Consumption
- Service Intervals

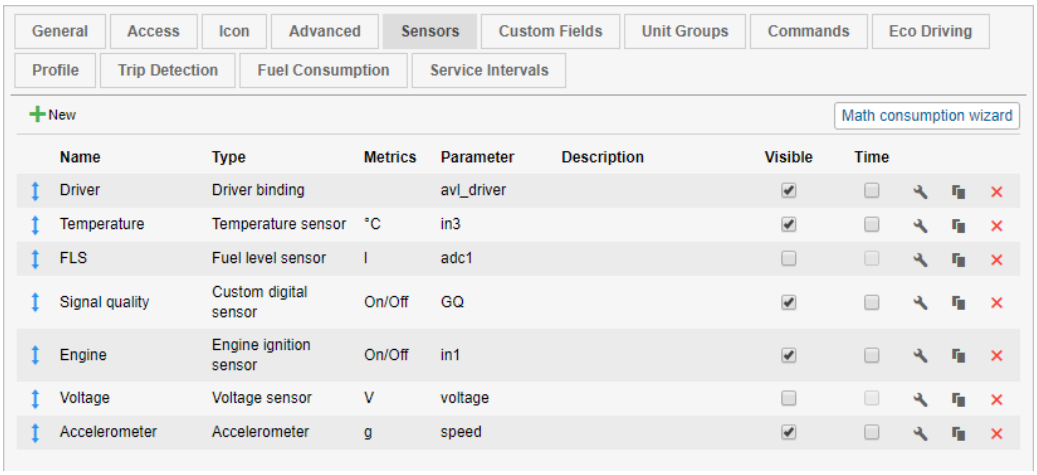
Sensors

On the Sensors tab of the Unit Properties dialog, displays a list of all the sensors created for this unit. The table shows the name of the sensor, its type, unit of measure, the parameter on which the sensor is based, description, visibility and time checkboxes. On this tab you can view, create, configure and delete sensors.

To create a new sensor, press the *New* button (+), fill in the fields and press *OK*. If you use similar devices for different units, it is convenient to configure sensors once, and then import them to other units.

Such buttons as *Properties*, *Copy*, and *Delete* are used to work with the created sensors, and located at the end of the line of the sensor name. To quickly create a sensor with similar settings, press *Copy* in the line of a template sensor. To edit a sensor or just view its settings, press *Properties*. To delete a sensor, press *Delete*.

To make any alterations on this tab, you need the *Create, edit, and delete sensors* access right. Otherwise, you can only view existing sensors and their settings.



There is a ***Visible*** checkbox in the line with each sensor. It controls whether the sensor is shown or hidden. By default, depending on sensor type the checkbox is enabled or disabled. However, you may want to hide or show some particular sensors. Hiding is reasonable if a sensor is used as a validator and does not have its proper value.

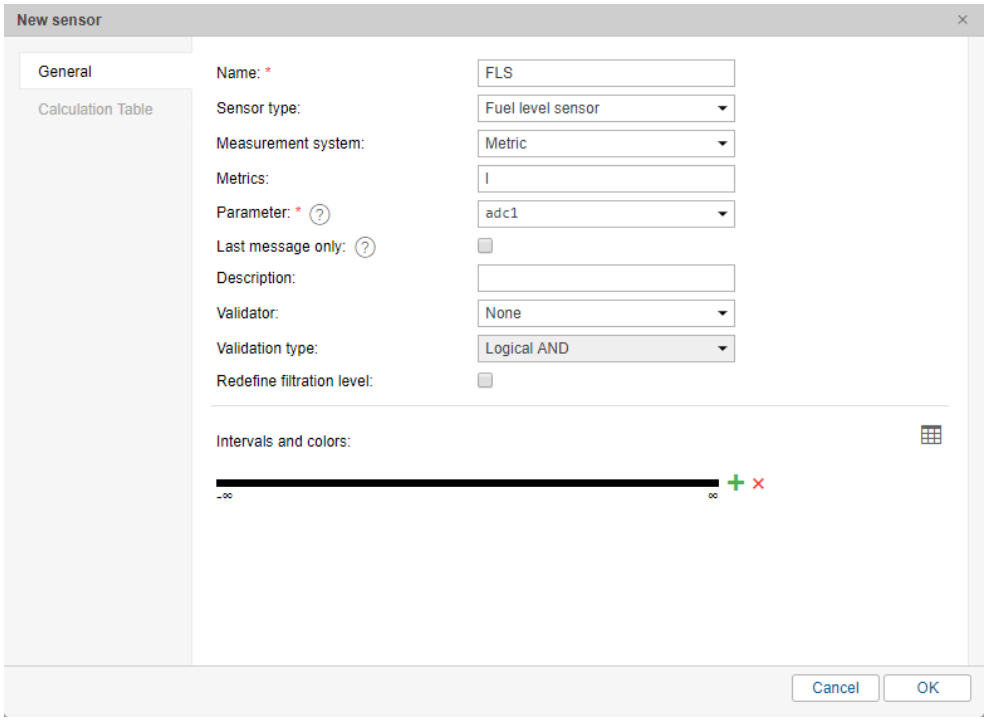
If a sensor is visible, then the ***Time*** checkbox may become enabled for it. If this box is checked, in the additional information about the unit, in addition to the value of the sensor in parentheses, it can also be specified how long the value of the sensor parameter remains unchanged. For example, “Ignition: On (15 minutes 35 seconds ago)”.

Attention!
Some limitations are applied to this feature. The sensor should have no calculation table, validators, custom intervals, and the parameter of the sensor should not contain any references to other sensors. In these cases, the Time checkbox will be unavailable.

The order of the sensors can be changed manually. To place sensors in a required order, just drag them up and down holding the arrow-shaped icon on the left. The order, as well as visibility, is taken into account in the unit tooltip, extended unit information, track player, track hittest, and in the Messages panel. Only visible sensors are shown and they are displayed in the order as given here, in unit properties dialog.

Sensor Properties

When creating, editing or copying a sensor, an additional dialog with sensor properties is displayed. It consists of several tabs. In the first one, the basic properties are adjusted:



Name
Type the name of the sensor. It must consist of one or more characters. The name is visible in the unit tooltip, in reports and messages.

Sensor type
Choose the sensor type to form the dropdown list of available types.

Measurement system
In the dropdown list, choose a measurement system in which the sensor values will be received. This property and the corresponding dropdown list are only displayed for those sensors whose units of measurement differ depending on the selected system of measures.

Metrics
Metrics is presented in reports (also in chart legends), tasks, tooltips etc. As a rule, every kind of sensors has its own default metrics (units of measurement). For some sensor types, units of measurement cannot be changed, for others, you can do it manually. This is particularly applicable for digital sensors such as engine operation sensor or custom digital sensors. Instead of default On/Off values you can set *Activated/Deactivated*, *Laden/Unladen*, *Open/Closed*, etc.

Parameter
Select or enter the parameter(s) whose data the sensor will interpret.

Last message only
This checkbox affects sensor value in the unit tooltip and similar places. If enabled, the value of the sensor is calculated only from the most recent message, and in the case when no required parameters are present in the last message, there are marked as *Unknown*. If disabled, the *last known* values are displayed even if they appear invalid (no matter how up-

to-date they are).

Description
This field is optional. It is displayed only in the list of sensors in the unit properties dialog.

Validator and **Validation type**
Validation is optional. It determines the interdependence of sensors from each other.

Next, you need to set the calculation table for the sensor. It is especially needed for analog sensors. Not all sensors send ready-made values that can be put into a report and understood by the end user. If the possibility to transform parameters is not provided with a device itself, this transformation is adjusted with the help of the Calculation Table or the Calculation Table Wizard.

Consumption, liters per hour
This option is used to calculate fuel consumption mathematically for the sensors of the *Engine ignition*, *Absolute engine hours* and *Relative engine hours* types.

Intervals and colors

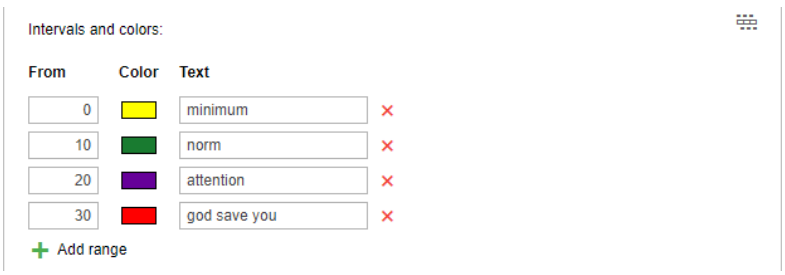
Wialon system provides a possibility to differentiate sensor values by color. For this purpose in sensor properties, it is possible to create intervals of values and choose their colors. There is also a possibility to accompany received digital values with text.

By default, any sensor values (from -∞ to +∞) are displayed in black. Click the + button next to the scale to set the interval, select a color for it, and enter text. Note that values are set for each interval individually. Here are some peculiarities of setting intervals and choosing their color that could be useful:

- No value in the first field corresponds to -∞, in the second — to +∞;
- If you add an interval that intersects with an existing one and goes beyond its boundaries, the added interval will overwrite the existing interval;
- If you add an interval that intersects with an existing one and does not exceed its boundaries, the added interval will be inserted inside the existing one. In addition, both the intervals to which the existing one was divided will receive its text and color;
- You can select a color from a color picker or indicate its text value (in HEX) in the corresponding field.

Upon completion, all the set intervals of a chosen color along with their text info are shown on the scale. Each interval of the scale, its color, and text can be edited. To do so, click the corresponding interval on the scale and set the necessary parameters. To delete all the set intervals from the scale, click the *Delete* button to the right of it.

To enter intervals, select colors and specify text values, an alternative interface is also provided - in the form of a table. To switch to the table view, click the corresponding icon to the right of the scale. Click the same button to switch back to the scale. Note that the scale is automatically switched to the table view if more than 10 intervals were created.



If a sensor sends values smaller than ones indicated in the first interval, such values are considered to be a part of the first interval.

Created intervals can be used in several cases:

- to visualize sensor state in the corresponding column of the Monitoring panel;
- to display multicolor tracks of unit movements;
- to show unit on the map according to the sensor state (if it is chosen to replace usual icons with the motion state signs);
- to quickly find the necessary information on sensors either in the unit tooltip or in the extended unit information;
- to visualize sensor state in the *Nearest Units* tool;
- to color the lines of the charts in reports in different colors.

In the first three cases, on the *Advanced* tab of the Unit Properties of the unit, you must also specify a sensor for each case individually.

Additional Properties

Additional sensor properties are the parameters that are peculiar to sensors of a strictly defined type:

Redefine filtration level
This property is specific for fuel level sensors. Filtration degree is usually adjusted on the Fuel Consumption tab. However, in some cases each sensor needs to be set up individually. This option provides such a possibility.

Filtration level
The possibility of indicating filtration level is applicable to the following sensors: temperature sensor, engine revs sensor, voltage sensor, accelerometer, custom sensor, weight sensor. This option allows to apply the smoothing algorithm to the sensor values. It is necessary to indicate the level of such smoothing (from 0 to 255) in the corresponding field. The filtration level is indicated individually for the sensors of such type. The filtration level is only taken into account in reports (in tables and in charts while drawing smoothed lines).

Validate unbinding
This property is specific for sensors of driver/trailer binding. If the option is activated, the driver bound to the unit can be automatically unbound from it only if the empty value comes from the same parameter which was used to bind the driver. Otherwise, the removal of the driver based on any parameter will result in the removal of all drivers assigned to this unit. The same works for the trailers as well.

Unbinding code
This property is also applicable to the drivers/trailers binding sensors. Any code can be entered in the Unbinding code field. If the code is specified, the driver/trailer unbinding is carried out both when the empty value is received, and when the code is received.

Overflow by raw data
This option appears only for differential counter sensors with overflow. If it is activated, raw data is analyzed first, and then the calculation table is applied. It means that raw data (and not data processed with calculation table as in the case when the option is disabled) is taken to estimate overflow.

Timeout
This property is a specific feature for engine ignition sensor and custom digital sensor. Indicate time value (in seconds). If nothing is indicated in the field or 0 is entered, the option is considered to be disabled. If the time between messages exceeds the one indicated by you, then the period of time on which the timeout has been exceeded will be considered invalid, and the remaining time will be divided into intervals (before and after the invalid time period). In other words, the last message before, and the first message after the invalid time period will be considered the end of the first and the beginning of the second interval, correspondingly.

For example, a custom digital sensor is used and 1-hour timeout has been indicated. The following data comes from the digital sensor: 1 (22:00), 1 (22:10), 1 (07:50), and 1 (08:00). If the timeout property had not been indicated, we would

have one continuous interval (from 22:00 to 08:00). But using 1 hour timeout we receive the following situation: there is less than 1 hour between the 1st and 2nd message, so we have the first interval (from 22:00 to 22:10); between the 2nd and 3rd messages more than 1 hour passes, so this data is considered to be an invalid time period (from 22:10 to 07:50); and there is less than an hour between the 3rd and 4th message, so we receive the second interval (from 07:50 to 08:00).

Consumption, l/h

This option is designed for the motor operation sensors and is used for calculating fuel consumption mathematically. If the ignition is off, the consumption is considered to be 0 l/h.

With overflow

This option is available for the sensors, that can be influenced by occasional resets (mileage sensor, absolute engine hours, absolute fuel consumption sensor). When this option is enabled, the system uses the following algorithm. The value from the latest message is compared to the previous one. If the value is greater than the previous one, their difference is added to the previous value. If it is less, the value from the latest message is added. Therefore, this function guarantees receiving correct mileage data.

Text parameters

This option is available only for the custom sensors. It should be activated if a sensor sends text parameters instead of numeric. In this case, in the table of intervals and colors, you can list these parameters and give them broader descriptions. For example, a device sends parameters *error1*, *error2*, *error3*, etc. In accordance with the documentation for the device, you can specify a decryption for each parameter(i.e. *Power supply disconnected*, *Invalid data*, etc.). Besides, you can use special characters like * (asterisk). For example, the values can be entered as *error** and its text would be simply *Error*.

Sensor Types

There are many types of sensors. When configuring a sensor (see sensor properties), the selection of sensor type depends on the device used and its principle of operation.

The table contains all sensor types currently available in the Wialon Local system. Moreover, here you can find units of measurement for the sensor values (either in metric or American/imperial systems), as well as short description for each sensor type.

Mileage

The name of the sensor	Metrics		Description
Mileage sensor	kilometers (km)	miles (mi)	The sensor shows the distance traveled. It can be used to detect trips and parkings.
Relative odometer	kilometers (km)	miles (mi)	The sensor shows the distance traveled since the previous message. It can be used to detect trips and parkings.

Digital

The name of the sensor	Metrics	Description
Engine ignition sensor	On/Off or any	This is engine operation sensor that is used in the report on engine hours as well as in trips/stays detection and counters. It also allows to configure the fuel consumption during idling.
Alarm trigger		Sensor which non-nil value allows marking a message as an alarm message (SOS).
Private mode	On/Off or any	This sensor is used to determine trip type (*Business*, *Private*).
Real-time motion sensor	On/Off	The sensor determines unit motion state in real time. Its values are used to show the motion state in the *Monitoring* panel and on the map (if the *Replace unit icons with motion state signs* option is activated in the *User Settings* dialog). The sensor can be based on such parameters as speed, ignition, engine revolutions, etc. Its parameter can contain formulae, which allows using validation.
Custom digital sensor	On/Off or any	This sensor can register two states (on/off, activated/deactivated, etc.).

Gauges

The name of the sensor	Metrics	Description
Voltage sensor	volts (V)	The sensor shows some parameter value (not necessarily voltage). It can be used to analyze input data.

Weight sensor	tons (t)	pounds (lb)	This sensor is used to detect weight of transported cargo.
Accelerometer	g		This type of sensor is used to measure acceleration at X, Y, Z axes and immediately detect a collision of cars.
Temperature sensor	Celsius degrees (°C)	Fahrenheit degrees (°F)	The sensor shows the value of temperature or some other parameter. It can be used to analyze input data. See the example of configuration.
Temperature coefficient			Temperature coefficient that affects fuel level calculations at different temperature in the tank. See the example of configuration.

Engine

The name of the sensor	Metrics	Description
Engine revs sensor	rounds per minute (rpm)	The sensor displays engine speed.
Engine efficiency sensor	any	The sensor determines the coefficient when working under load used for the mathematical calculation of the fuel consumption. Can function as a reduction coefficient if its values are between 0 and 1.
Absolute engine hours	hours	The sensor registers the total amount of engine hours. It also allows to configure the fuel consumption during idling.
Relative engine hours	hours	The sensor registers the amount of engine hours with regard to the intensity of work. See the example of configuration. It also allows to configure the fuel consumption during idling.

Fuel

The name of the sensor	Metrics		Description
Impulse fuel consumption sensor	liters (l)	gallons (gal)	The sensor shows the accumulated value of impulses. To convert the incoming value into the amount of consumed fuel, the calculation table should be applied. For such sensor type the calculation table is applied to the difference between two adjacent messages. After sensor creation and adjustment it is necessary to enable impulse fuel consumption sensor on the corresponding tab. ⚠ Note that if a device sends not an accumulated value of impulses, but the number of impulses between the messages, it is necessary to use instant fuel consumption sensor.
Absolute fuel consumption sensor	liters (l)	gallons (gal)	The sensor detects fuel consumption over all period of vehicle operation. After sensor creation and adjustment it is necessary to enable absolute fuel consumption sensor on the corresponding tab.
Instant fuel consumption sensor	liters (l)	gallons (gal)	The sensor shows fuel consumed from the previous measure (message). After the sensor creation and adjustment it is necessary to enable instant fuel consumption sensor on the corresponding tab.
Fuel level sensor	liters (l)	gallons (gal)	This sensor is placed in the tank. After sensor creation and adjustment (see examples) it is necessary to enable fuel level sensor on the corresponding tab.
Fuel level impulse	liters	gallons	The sensor detects the number of impulses in a period. Fuel level in the tank is calculated

sensor	(l)	(gal)	from the received values.

Other

The name of the sensor	Metrics	Description
Counter sensor	any	The sensor can show passenger traffic or count the number of some actions such as opening/closing the door, etc. There are several types of counters: — instant (counts the number from the previous to the current message), — differential (shows total number), differential with overflow (2 bytes), — switcher from OFF to ON (counts the number of activations), — switcher from ON to OFF (counts the number of deactivations). Besides, you can enter any unit of measurement for this sensor (it is displayed in the *Formatted value* column of the *Sensor tracing* table).
Custom sensor	any	This is a custom sensor for which you can set any unit of measure. Its values can be displayed in the unit tooltip, in the extended unit information or sent to report.
Driver binding		This sensor can be used to detect drivers assigned to units.
Trailer binding		This sensor can be used to detect trailers attached to units.
Passengers sensor		This sensor supports detection of passengers entering and leaving a vehicle.

Sensor Parameter

Parameter is a required sensor property. Most of sensors are based on a parameter coming in messages.

Parameters can be of any names. These names are predefined in the device configuration, for example, *param199, param240, TEMP, pwr_int, gsm, can6*, and the like. Read device specification to find out which parameters are available and what they measure. In the *Messages* panel you can also request messages from the unit and view the available parameters in the corresponding column.

The parameters from the last message appear in the dropdown list of available parameters when creating or editing a sensor. However, even if the parameter you need is not on the list, you can enter its name manually.

The same parameter can be used to create any number of sensors. The maximum number of sensors allowed can be viewed in the *Account* tab of the User Settings dialog.

Virtual Parameters

Some parameters are defined in the system by default and are suitable for almost any type of equipment:

speed	speed of motion
altitude	altitude above sea level (may be not supported by some devices)
sats	satellites count
course	course (direction of motion)
lat	geographical latitude
lon	geographical longitude
time	Unix time of the message

Note.
Some rare types of devices may not support any of these parameters, e.g., altitude or speed.

Inputs and Outputs

The system supports up to 32 digital inputs and outputs. They are adjusted in the following format:

inN	digital input parameter, N — input number
outN	digital output parameter, N — output number
adcN	analog input parameter, N — input number

For example, *adc8* is a parameter that registers the values coming from the eighth analog input.

Usually, the data from digital inputs and outputs are presented in messages in the following format: I/O = 0/0, where I refers to inputs, O — outputs. If I/O = 0/0, it means all bits (inputs and outputs) are inactive. If a value in any of them is not zero, it means that one input/output or several of them are active. To define which exactly, hexadecimal number (which you see in a message) should be converted into a bit number.

For instance, when ignition was activated, we received the message with the parameter I/O = 10/0. To get the bit number (input) in which the value of the sensor is shown, it is necessary to enter the received value in the calculator in the mode of hexadecimal values (HEX). That is, enter 10 and switch to the binary mode (BIN). We get a new number -

10000. Now we have to calculate in which position 1 has appeared. The calculation is done from right to left. In the given case 1 is in position 5, i.e. the ignition sensor is connected to the fifth port. Since the changed number is before the fraction (I/O), it is the input. Consequently, the parameter name is in5 (digital input 5).

For a sensor, it is also possible to specify the parameter name as *in* or *out* to indicate the sum of all inputs and outputs, respectively.

Constant Parameter

Besides, **constN** parameter can be used to create a sensor that always returns the same value. N is any number, e.g., const10, const-8.5. Such a sensor can be helpful in charts or as a validator.

Such a sensor can be used both independently (for example, in charts to indicate some critical mark) or as a part of validation chain or in expressions.

Expressions

Parameter for a sensor can be set in the form of expression where you can use:

- parameters in the current message (*adc1*, *in1* etc.),
- parameters in the previous message (they begin from the hash sign #, for example, *#adc1*),
- bitwise parameters (like *param199:3*),
- sensors (sensor name must be in square brackets, for example, *[Fuel level]*),
- constant numbers (*const10*, *const-4.54* etc.),
- mathematical operation signs:

+	addition
−	subtraction
*	multiplication
/	division
^	exponentiation & rooting
( )	brackets of priority
|	value availability check
:	conversion operation

For example, ^*const2* — square, ^*const0.5* — extract the square root.

If one of the parameters that an expression includes is not valid, its total value is also invalid.

Note.
Parameters from the previous message are not available in notifications and in tooltips for charts.

Expressions allow to create a great variety of sensors that meet any needs and tasks.

Example 1: Detecting Speed by GPS Coordinates

It is possible to create a sensor to detect speed by coordinates. It will have the following parameter:

```
((lat-#lat)^const2+(lon-#lon)^const2)^const0.5/(time-#time)*const200000
```

Explanation:
The traditional formula to calculate the speed of the movement is 'distance divided by time'. To calculate the distance, we apply Pythagorean theorem: squared difference of latitudes in neighboring messages plus the squared difference

of longitudes in neighboring messages, and then the square root is extracted from this sum. So, we get the distance (in degrees). This value is divided by the difference of time in two neighboring messages. As the result, we have the distance in degrees per second. To convert this to the more habitual kilometers per hour (or miles per hour), we apply a special coefficient. It varies depending on geographical position. In the example above it is equal to 200000 and applicable to Moscow.

If you have the ignition sensor, the parameter can be set in the following way:

```
((lat-#lat)^const2+(lon-#lon)^const2)^const0.5/(time-#time)*const200000*[Ignition sensor name]
```

Example 2: Relative Engine Hours Sensor

To obtain data about real engine hours, create two sensors:

1. relative engine hours sensor,
2. engine hours coefficient sensor in accordance with engine revolutions.

First, create a sensor of *Relative engine hours* type. The parameter for the sensor is:

```
(time-#time)*[Name of coefficient sensor]/const3600
```

That is, time difference in neighboring messages multiplied by the coefficient of the intensity of work and divided by 3600. The division by 3600 is applied to convert seconds into hours.

Then, create the coefficient sensor that will define the intensity of work depending on engine revolutions. Dependency scheme can be the following:

- 1 minute work with the intensity of 2000 rpm corresponds to 90 seconds of engine work ⇒ coefficient 1.5
- 1 minute work with the intensity of 1500 rpm corresponds to 60 seconds of engine work ⇒ coefficient 1
- 1 minute work with the intensity of 1000 rpm corresponds to 40 seconds of engine work ⇒ coefficient 0.67
- 1 minute work with the intensity of 500 rpm corresponds to 20 seconds of engine work ⇒ coefficient 0.33

Suppose, the *param1* sends engine revolutions. Then the coefficient parameter is the following:

```
(param1+#param1)/const2
```

That is the arithmetic average of engine revolutions between neighboring messages.

To convert revolutions into coefficient, adjust the calculation table for this sensor:

- x=500 y=0.33
- x=1000 y=0.67
- x=1500 y=1
- x=2000 y=1.5

Do not forget to set the relative engine hours sensor as the counter of engine hours (the General tab).

Example 3: Value Availability Check

There is equipment installed on the vehicle, which sends some parameter (for example, param1). Then the equipment gets out of order. A new one is installed. The new equipment sends the same data in another parameter (for example, param2). To exclude data loss during report generation, it is necessary to use value availability check in the *Parameter* field upon creating a sensor. The old equipment worked all December, the new one — all January, and

we need a report for these two months. If the value availability check is used during the parameter indication (*param1|param2* entered as sensor parameter), then the system takes a value from the *param1* parameter, and if the *in1* value is invalid (for example, the equipment is broken), then the system takes a value from the *param2* parameter. In other words, when using the value availability check, the system takes into account the first valid value of the parameter received.

```
param1|param2
```

Does not work with digital sensors.

Textual Parameters

Most parameters are designed to send numeric data, however, in some cases, they may provide textual data. This can be, for example, a name of a status (business/private), some state (free/waiting/busy, on/off), time passed since a certain event, etc.

Sensors with textual parameters do not require configuration of calculation tables. Textual data is displayed as it is. However, the application of text-based sensors is limited — their values can be shown only in additional information about the unit, in messages panel, in track player, and in track hittest.

Converstion of Parameters

The conversion of parameters can only be applied to the parameters that are received directly from the hardware. The cases of application are described below.

Bitwise parameter control

The bitwise parameter control gives an opportunity to control a specific bit and not the whole parameter. For example, in order to control the third bit of the parameter *param199* it is necessary to put a colon and the number of the required bit after its name.

```
param199:3
```

This feature is applicable when a device sends various data in one parameter: for instance, the first bit shows alarm condition (on/off), the second bit indicates the state of the driver's door (open/closed), the third — headlights, etc. Thus, using bitwise control it is possible to create several sensors on the basis of one parameter.

Note.
The parameters of the *double* type are converted into *int*, and only then the bit is retrieved.

We advise you not to address directly a bit above the 53rd. If necessary, you can use the following scheme:

1. Create a sensor in which the required parameter comes. For example, *Sensor1*.
2. Create another sensor. For example, *Sensor2*.
3. For the parameter of the second sensor, specify the formula *[Sensor1]/const4294967296*. In that way, a shift of 4 bytes to the right occurs.

Conversion of textual parameters

If there is a textual parameter in the sensor formula, it is converted into 53-bit integer. By default, it is interpreted as decimal, however, positional notation can be specified after colon. For example, there is a parameter called *text_param* and it has the value *100*, then:

```
text_param = 100
text_param:16 = 256
text param:2 = 4
```

Determination of the day number in a year

To determine the number of the day in the year (relative to January 1), it is necessary to indicate *d* after the colon. For example, for March 28, 2017 11:00:00 the Unix time corresponds to the value *1490698800*. Therefore,

```
time = 1490698800
time:d = 87
```

Validation of Sensors

Validation is configured in the sensor properties and defines interdependence of the sensors.

Validator is a sensor whose value affects the current sensor. It is selected from the list of available sensors previously created for the same unit. **Validation type** is the way the validator affects the current sensor. The following validation methods are available:

- *Logical AND*: values of both sensors are analyzed, and the logical function AND is applied. It means, the output is true (1) if both values are not null. As a result, current sensor value can be either 0 or 1.
- *Logical OR*: both values are analyzed, and the logical function OR is applied. It means, the output is true if at least one value is not null. As a result, current sensor value can be either 0 or 1.
- *Not-null check*: if validator is not null, current sensor value is considered true and displayed without transformations. Otherwise, it is blank.
- *Mathematical AND*: the mathematical function AND is applied.
- *Mathematical OR*: the mathematical function OR is applied.
- *Sum up*: values are summed up.
- *Subtract validator from sensor*: the validator value is subtracted from the sensor value.
- *Subtract sensor from validator*: the sensor value is subtracted from the validator value.
- *Multiply*: values are multiplied.
- *Divide sensor by validator*: the sensor value is divided by the validator value.
- *Divide validator by sensor*: the validator value is divided by the sensor value.
- *Replace sensor with validator in case of error*: if the main sensor has no available data, all values are taken from the validator.

Note.
Validation chain can consist of any number of sensors. So, one sensor can be a validator for another sensor and at the same time depend on the third sensor.

Examples

Logical OR

The example is the following: every door of a vehicle is equipped with a sensor. Every sensor indicates whether the door is opened or closed. It is necessary to know if the vehicle is opened or closed, and it does not matter which door is open.

For this purpose the sensor with *Custom digital sensor* type should be created in Wialon Local for every door. Then, one by one, validate the sensors indicating *Logic OR* as the validation type. When using the *Logic OR* function, the vehicle is considered to be opened if any of its doors is opened (the 1st, or the 2d, or the 3d, etc.). For convenience,

we can remove the *Visibility* checkbox for all used sensors, except for the last validated sensor. Therefore the visible sensor shows whether the vehicle is closed or opened.

Mathematical AND

Suppose, there is a vehicle with the sensors installed on every door, and these sensors show whether the door is opened or not. In this example it is necessary to know the state of every door individually. The equipment used in our example sends a value about the state of the doors in one parameter (each bit represents the door).

The sensor with the *Custom sensor* type is created in Wialon Local and the parameter for incoming value of the state of the doors is indicated. Then the sensor with the *Customer digital sensor* type is created for every door individually indicating constant parameter (for the first — const1, for the second — const2, for the third — const4, for the fourth — const8). The earlier created custom sensor should be indicated as the validator with the validation type *Mathematical AND* for every created custom digital sensor. Therefore, using *Mathematical AND* the verification of a received parameter is implemented, and we find out the state of every door.

Mathematical Operations Usage

Example 1

Suppose, a unit has three different kinds of equipment installed (brush, plough, and thrower). Each of them is connected to a digital input which shows whether it is active at the moment or not. Using the validation system, we can control all three pieces of equipment not separately from each other but at once, in one sensor.

For each piece of equipment, we create a sensor, so, as a result we have three sensors — A, B and C. Let them all be custom digital sensors. With this, each sensor must have a calculation table adjusted in such a way that each sensor has a unique value. For example, when one sensor (brush) is activated, it sends 1, as usual; the second sensor (plough) sends 10; and the third sensor (thrower) sends 100. Thus, if you sum up the received values, you can easily estimate which sensor(s) are activated. Possible values:

- 0 — all equipment is off;
- 1 — the brush is on;
- 10 — the plough is on;
- 11 — the brush and plough are on;
- 100 — the thrower is on;
- 101 — the brush and thrower are on;
- 110 — the thrower and plough are on;
- 111 — all equipment is on.

To make this scheme work, adjust dependency between the sensors. Let us make Sensor A basic. Then the validator for Sensor A will be Sensor B, with the validation type *Sum up*. Sensor C will be validator for Sensor B (with the same validation type).

It is also useful to assign a color to each possible value (see Advanced Properties) so that these colors could be used to visualize sensor in the Monitoring panel, on the map or in tacks.

Example 2

Supposedly, there is a vehicle with two fuel tanks. Each tank has its own fuel level sensor. We need to know total fuel level of the two tanks.

In Wialon Local create a sensor with the type *Custom sensor* for one tank, and the *Fuel level sensor* for the other. For the latter, activate the validation by the sensor with the *Custom sensor* type, validation type — *Sum up*. If it is more convenient, the visibility checkbox for the validated sensor can be kept, for the other — can be removed.

Therefore we can see the validated sensor value which is the total fuel level for these fuel tanks.

Using any mathematical operation as a validation method is equal to indicating sensor parameter using formula. In other words, any mathematical operation as a method of validation has an alternative without validation usage. In order to understand how it works, we shall use the above mentioned example with two tanks where we should know the total fuel level of two tanks.

In Wialon Local create two sensors with *Custom sensor* type (*Tank1* and *Tank2*) and a fuel level sensor (*Total*). In the parameter of the *Total* sensor, enter the formula [Tank1]+[Tank2]. The *Tank1* and *Tank2* sensors show their own fuel level, and the *Total* sensor shows the total fuel level of both tanks.

The advantage of using formulas is in the amount of information received. For example, if *Tank2* is validated by *Tank1*, we would know *Tank1* fuel level, but *Tank2* would show us only the total fuel level for these two tanks. Using formulas, we also know *Tank2* fuel level.

The disadvantage of using formulas is the creation of a greater amount of sensors than with the use of validation.

Calculation Table

The calculation table is very important in sensors configuration (see sensor properties). According to the calculation table adjusted, raw data coming in a parameter is transformed into sensor values, for instance, some abstract 86 is interpreted as 10.5 liters of fuel.

The calculation table is not always necessary. For example, if the sensor is digital and sends only 1 or 0, which correspond to the *On/Off* states, there is no need in the value calculation table for such a sensor.

Attention!
The completed calculation table is essential for the analog engine ignition sensor since it is necessary to determine how all available analog values are transformed into two available states — On/Off.

Calculation table recalculates data according to to the equation of the straight line **Y = a×X + b**, where

- **X** is the input value that comes from the device;
- **Y** is the output value that is included in the reports, charts, tooltips, etc.;
- **a** is the coefficient that determines the slope or gradient of the line (tangent of the angle, or relation of the opposite cathetus to the adjoining one);
- **b** is the displacement of a straight line along the Y-axis.

Upon the arrival of the value (i.e. **X**), it is substituted into the calculation table, **a** and **b** are calculated automatically, and the output receives a final value, i.e. **Y** (it gets into reports, graphs, tooltips, etc.).

Each row of the table operates only within its segment that is to the *X* value of the next row. That is why *X* values cannot be repeated.

It is possible to get the tangent of the angle (that is needed to be substituted for the *a* coefficient) using mathematics. To do it, find on the *X* and *Y* axes the segments of values operation (deltas). Then divide the values $\Delta\mathbf{y}/\Delta\mathbf{x}$. The result value is the tangent of the angle.

Lower and upper bounds are used to set the limits for input values. Note that the bounds correspond to the half-open interval. In other words, the lower bound is included in the interval of valid values while the upper one is not. In case of receiving values beyond the indicated interval, these values are considered to be invalid. Moreover, depending on the enabling/disabling of the *Apply after calculation* checkbox, the indicated limits are applied to the raw values X (disabled checkbox), or to the processed values Y (enabled checkbox).

Incorrect pairs of values can be removed with the button ×. To remove all pairs at once, click the delete button in the header of the table.

A graphic for the created calculation table can be viewed by clicking the *Show chart* icon at the top of the table header.

Methods of filling the table

1. Fill in *all* available fields (*X*, *b*, and *a*). Use this method to get the calculation table under your complete control.
2. Fill in only *X* and *b* values, and *a* set as zero. This method is convenient if you need to convert an analog signal to a digital one.
3. Fill in only *X* and *a* values. In this case, *b* is calculated automatically. This method is convenient if you need to get a curve knowing the angles, but without recalculating the Y offset.

4. In some cases it is possible to adjust the calculation table knowing the *X* and *Y* values. In such cases use the calculation table wizard (right part of the dialog box).

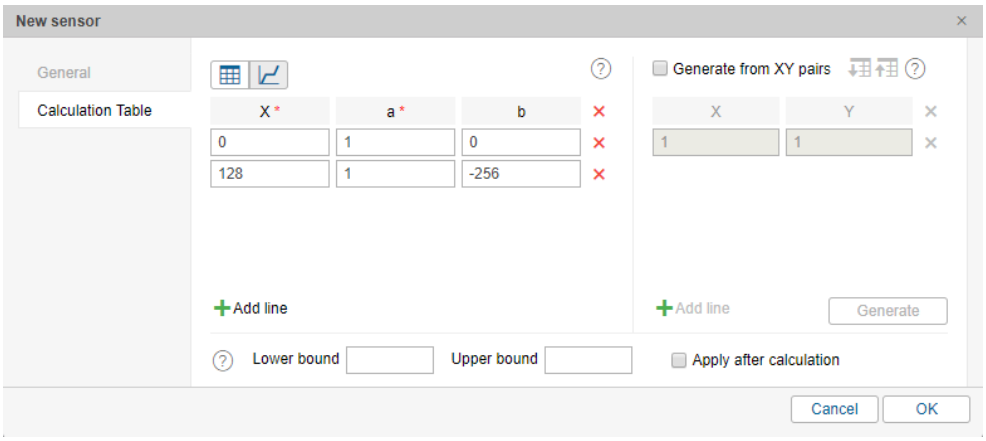
Chart Managing

A chart can be managed using the following buttons:

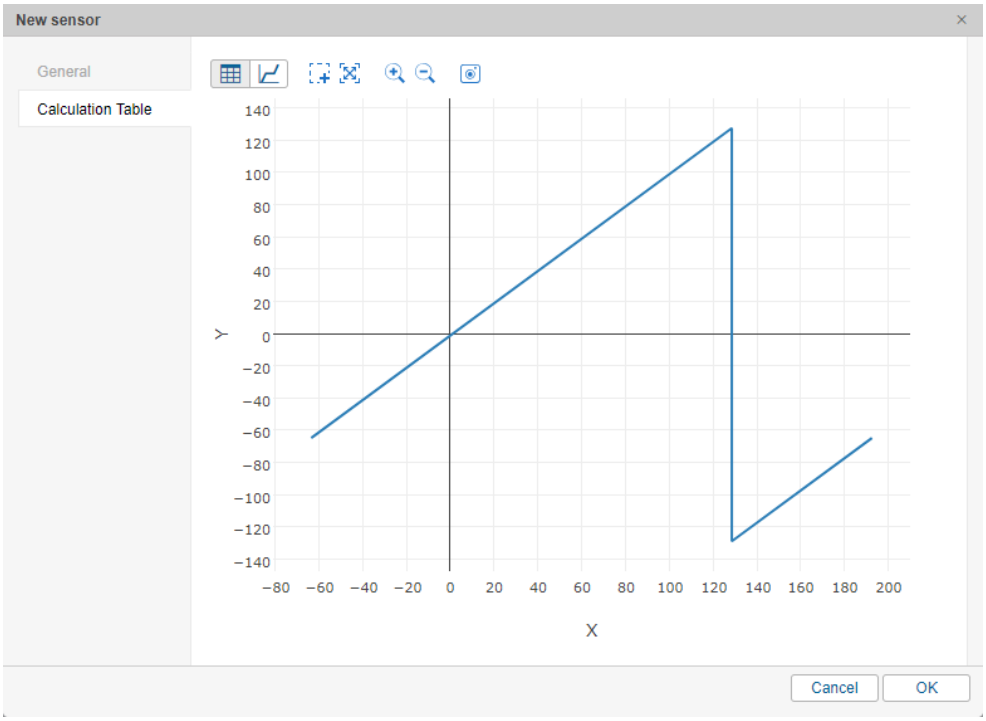
Area selection	When this button is activated, it becomes possible to scale (zoom) any selected area of the chart. To do this, select the appropriate area by holding the left mouse button. The procedure can be repeated any number of times.
Autoscaling	This button allows to return to the default chart scale.
Zoom in/zoom out	The buttons to scale a chart along the X-axis. Click the button in order to make the visible area of the chart twice as wide/narrow in regards to the current position. Yet the center of the chart stays in its place.
Save as PNG	This button allows to save the visible chart area along with the axis in PNG format.

Example 1: Temperature Sensor

As an example, let us create a calculation table for the temperature sensor. Suppose that the data is coming in complement code, i.e. the positive values are from 0 to 127, and negative from 128 (which corresponds to -128 degrees) to 255 (which corresponds to -1 degree).



On the basis of the values indicated in the table, a chart is made. To view the chart, click the *Show chart* icon.

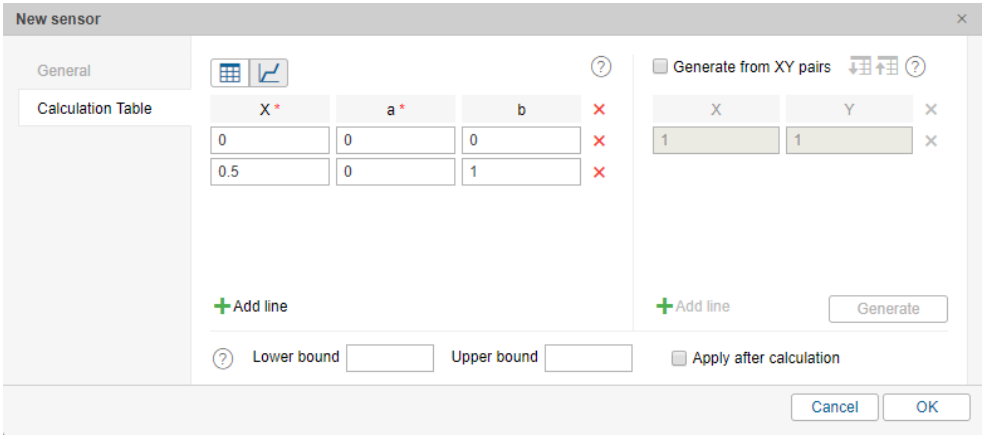


Note.

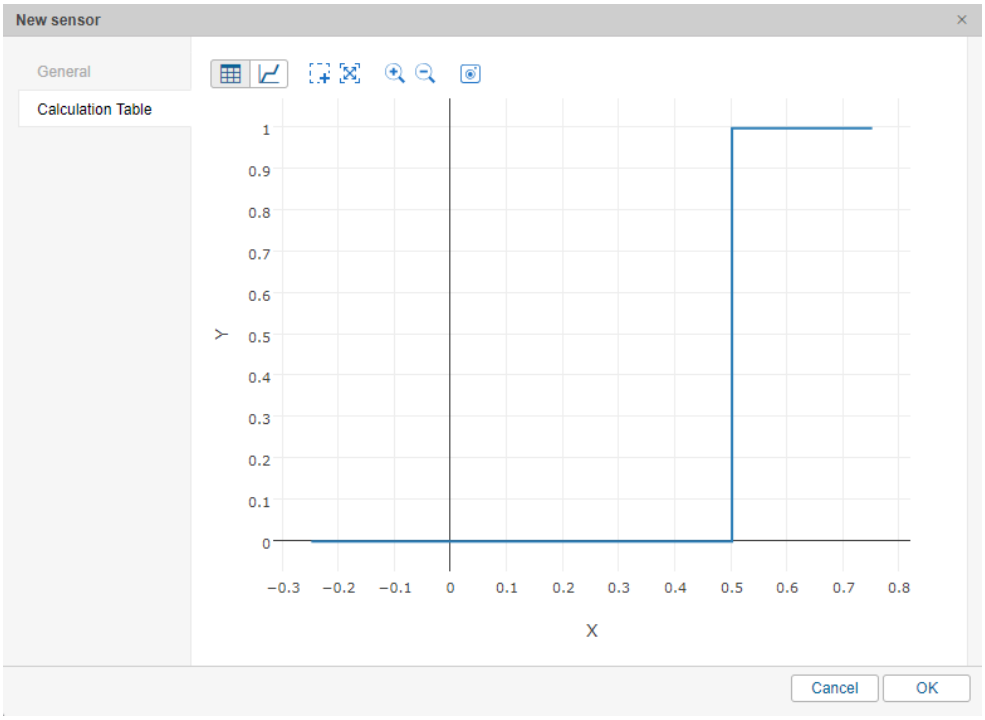
The calculation graph always has a somewhat extended view — along the X axis it stretches to the right and to the left. This is due to the fact that on the first interval the function also works in the opposite direction — up to minus infinity, and on the last interval — up to plus infinity.

Example 2: Engine Ignition Sensor

It is possible to configure a non-digital ignition sensor based on the parameter sending voltage. For instance, the voltage up to 0.5 V would mean *ignition off*, and over 0.5 V — *ignition on*. For such a sensor, we should create a calculation table as shown above:



Move to the *Calculation Chart* and see if the result meets your expectations.



Calculation Table Wizard

The Calculation Table Wizard is a tool that simplifies the process of creating a calculation table. It is sufficient to indicate input *X* values and corresponding output *Y* values. You can use the calculation table wizard to calibrate a sensor experimentally. For instance, you fill in different volumes of fuel into the tank and each time you take the readings from the sensor. The Calculation Table Wizard is located on the right side of the dialog window. It is disabled by default. To use a wizard, indicate the *Generate from XY pairs* flag.

Enter the pairs and click *Generate* in order for them to be processed by the system. On the basis of values indicated in the wizard, a calculation table will be created.

The program calculates *a* and *b* using the following algorithm:

- **a** is calculated by the formula Δ**Y**/Δ**X**. X- and Y-axial displacement is calculated separately for each interval, and then Y-axial displacement is divided by X-axial displacement, that is $\Delta Y/\Delta X$.
- **b** is calculated by the formula **b = Y — a × X**.

Note.
In the upper right corner of the table wizard there are buttons for exporting the introduced XY pairs into a CSV file and importing values from CSV or TXT files.

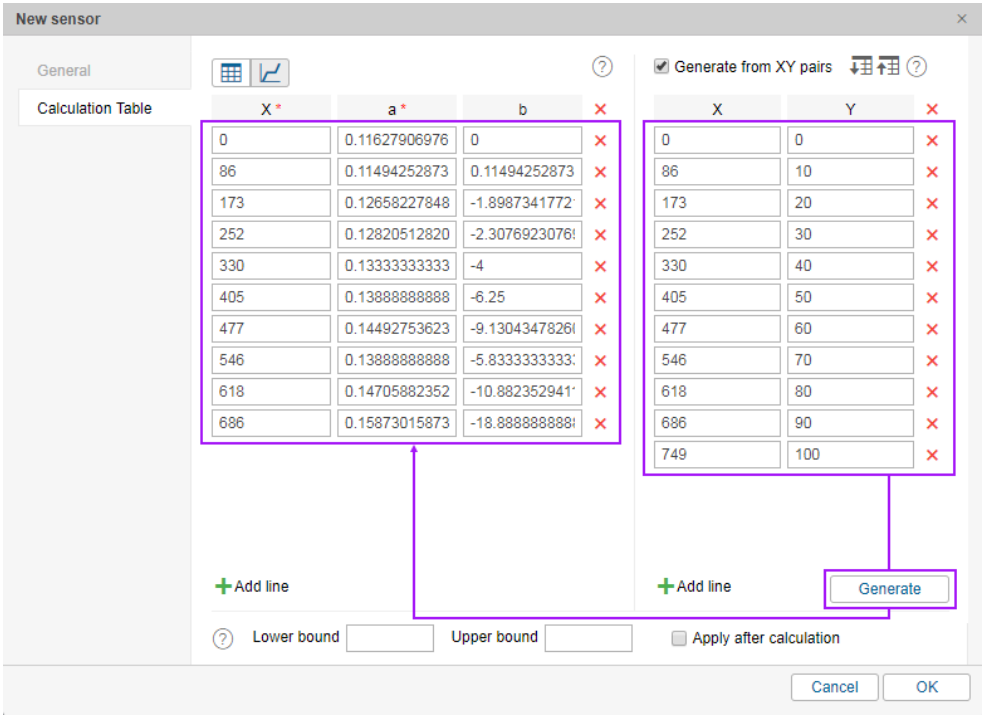
Example 1: Fuel Level Sensor

Suppose that 10 liters of fuel was filled and the sensor sent the value 86, then 20 liters were added and the sensor showed 173, and so on. In the end, we can form a table:

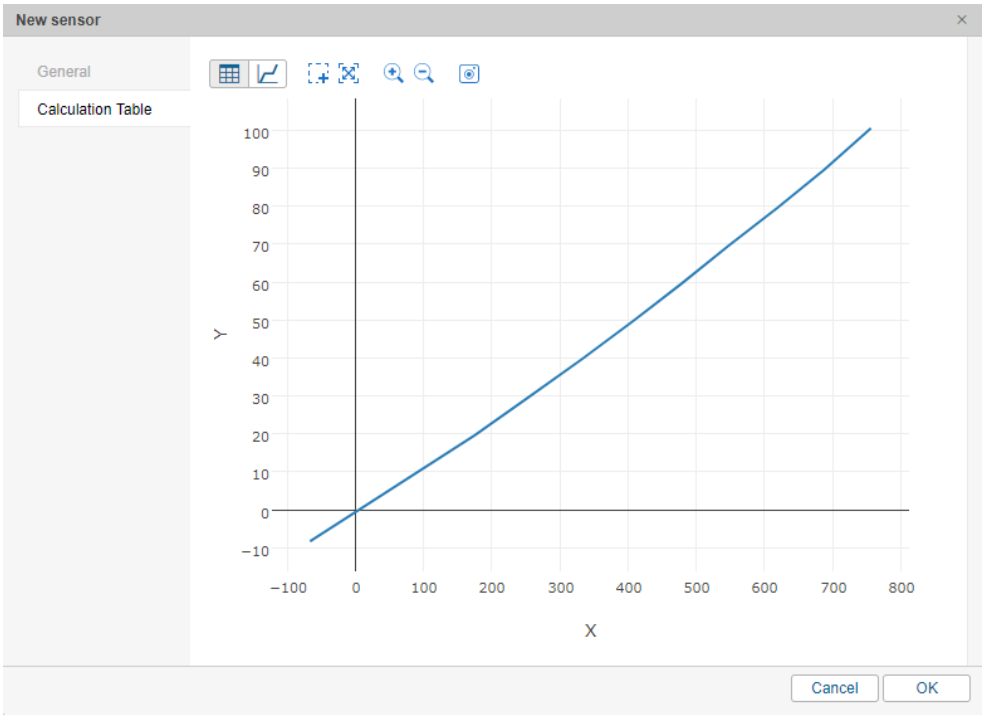
Input values (X)	Output values (Y)
0	0
86	10
173	20
252	30
330	40
405	50
477	60

546	70
618	80
686	90
749	100

Enter these pairs into the wizard and click *Generate*. Based on the entered values, a calculation table (on the left) is generated.



In order to view a chart, click the *Show chart* icon.



Note.
All the data entered and saved on this tab is available when you open the dialog. Any changes in the calculation table do not affect the Wizard. In other words, the Wizard only shows the entered values but does not reflect the current situation.

Now let us see how *a* and *b* were calculated. The first interval starts with 0 and lasts until 86. At that, at the last point the

output is 10. So, *X* displacement is $\Delta\mathbf{X}$ = 86 — 0 = 86, and *Y* displacement is $\Delta\mathbf{Y}$ = 10 — 0 = 10. Now *a* coefficient can be calculated: **a** = $\Delta\mathbf{Y}/\Delta\mathbf{X}$ = 10 / 86 = 0,11627906976744186.

For other intervals, we apply the same calculation scheme (there will be one interval less than there are rows in the Calculation Wizard):

Interval	X	Y	a	b
N	X	Y	$(Y_{(i+1)} — Y_{(i)}) / (X_{(i+1)} — X_{(i)})$	Y — a × X
1	0	0	(10 — 0) / (86 — 0)	0 — a×0
2	86	10	(20 — 10) / (173 — 86)	10 — a×86
3	173	20	(30 — 20) / (252 — 173)	20 — a×173
4	252	30	(40 — 30) / (330 — 252)	30 — a×252
5	330	40	(50 — 40) / (405 — 330)	40 — a×330
6	405	50	(60 — 50) / (477 — 405)	50 — a×405
7	477	60	(70 — 60) / (546 — 477)	60 — a×477
8	546	70	(80 — 70) / (618 — 546)	70 — a×546
9	618	80	(90 — 80) / (686 — 618)	80 — a×618
10	686	90	(100 — 90) / (749 — 686)	90 — a×686
11	749	100	(110 — 100) / (812 — 749)	100 — a×749

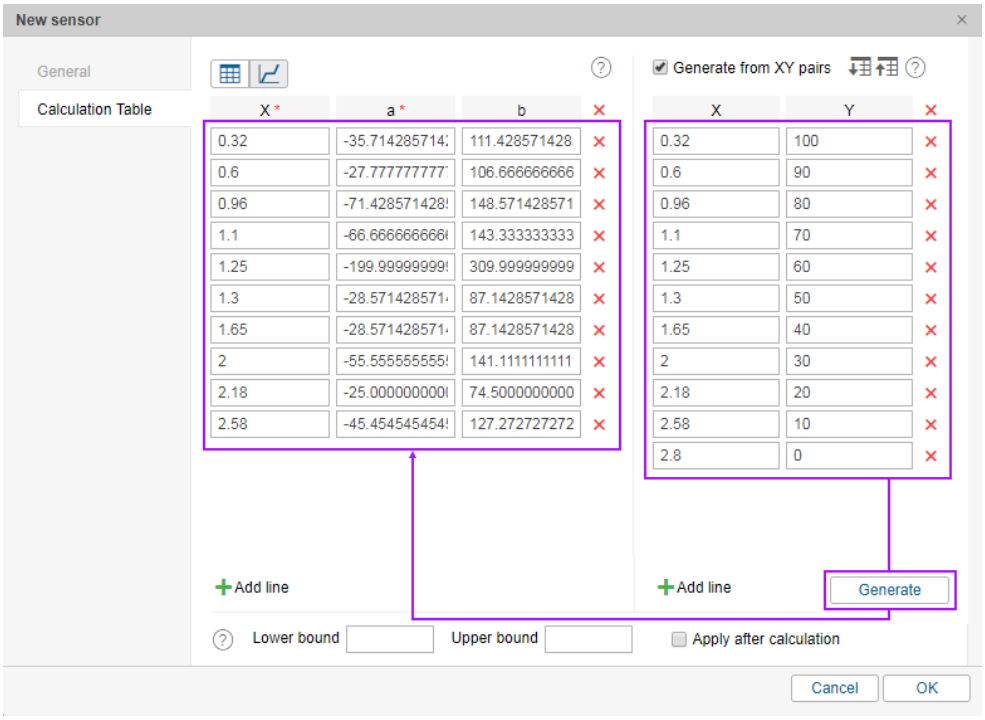
Example 2: Fuel Level Sensor

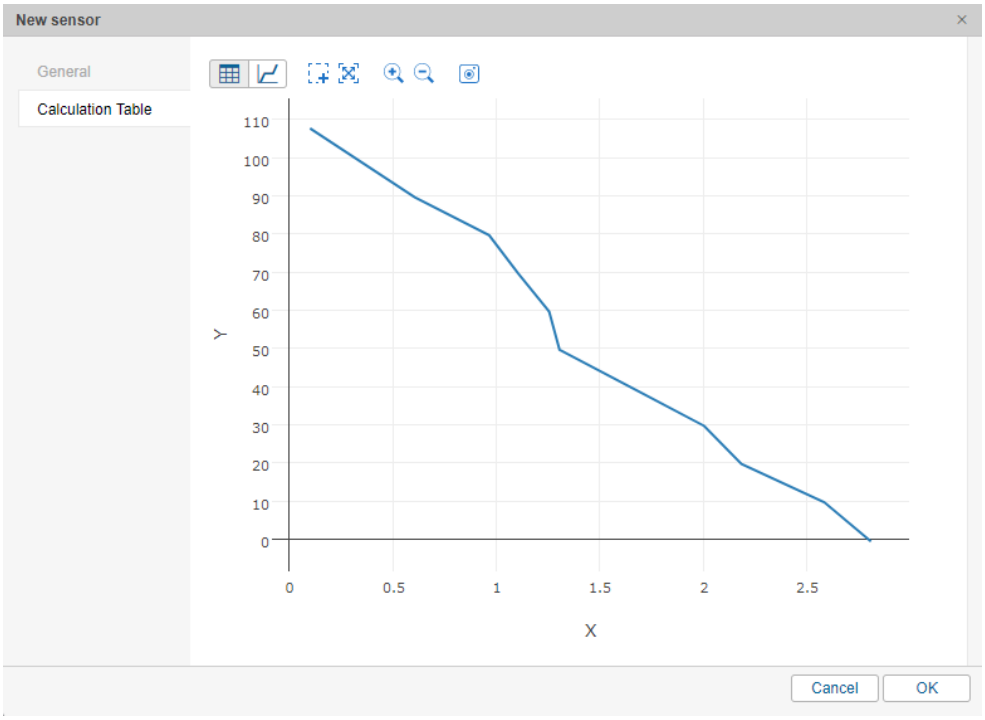
In this example, input *X* values decline while output *Y* values grow. Insert the pairs into the Wizard in any order — they will be rearranged automatically.

Initial data:

Input values (X)	Output values (Y)
2.8	0
2.58	10
2.18	20
2.0	30
1.65	40
1.3	50
1.25	60
1.1	70
0.96	80
0.6	90
0.32	100

Enter these pairs into the Wizard, generate the calculation table and view the calculation chart.





Calculated intervals for this sensor are as follows:

Interval	X	Y	a	b
N	X	Y	$(Y_{(i+1)} — Y_{(i)}) / (X_{(i+1)} — X_{(i)})$	Y — a × X
1	0,32	100	(90 — 100) / (0,6 — 0,32)	100 — a×0,32
2	0,6	90	(80 — 90) / (0,96 — 0,6)	90 — a×0.6
3	0,96	80	(70 — 80) / (1,1 — 0,96)	80 — a×0.96
4	1,1	70	(60 — 70) / (1,25 — 1,1)	70 — a×1.1
5	1,25	60	(50 — 60) / (1,3 — 1,25)	60 — a×1.25
6	1,3	50	(40 — 50) / (1,65 — 1,3)	50 — a×1.3
7	1,65	40	(30 — 40) / (2,0 — 1,65)	40 — a×1.65
8	2,0	30	(20 — 30) / (2,18 — 2,0)	30 — a×2
9	2,18	20	(10 — 20) / (2,58 — 2,18)	20 — a×2.18

10	2,58	10	(0 — 10) / (2,8 — 2,58)	10 — a×2.58

Signed Parameters Converting

It is supposed that data received by Wialon Local in the format of two- and four-byte integer appears to be unsigned. In other words, all the incoming values (both positive and negative) are displayed as unsigned, i.e. positive.

If the equipment used by you sends signed values in any parameter (for example, temperature parameter), it is necessary to create a sensor on the basis of this parameter and adjust a calculation table in a proper way.

Parameter Analysis

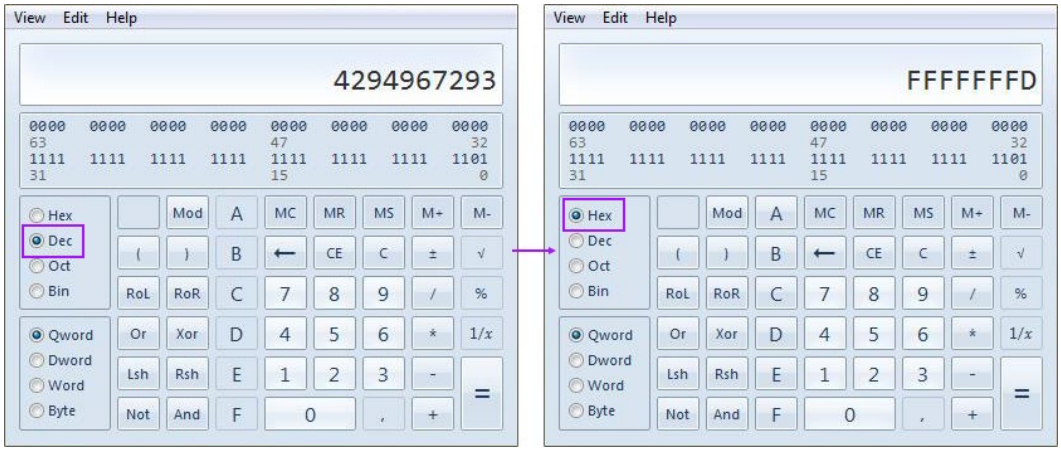
Switch to the *Messages* panel and request messages for any interval of time. Indicate *Show parameters as raw data*. In the column *Parameters* find the parameter you are interested in and analyse its incoming values.

Time	Altitude, m	Parameters
2015-12-11 13:38:28	206	adc1=2.586, param240=1, pwr_ext=28.138, param24=6, battery_charge=0, I/O=5/0
2015-12-11 13:38:59	210	adc1=2.608, param240=1, pwr_ext=28.138, param24=4, battery_charge=0, I/O=5/0
2015-12-11 13:39:09	223	adc1=2.564, param240=1, pwr_ext=28.129, param24=3, battery_charge=0, I/O=5/0
2015-12-11 13:39:39	223	adc1=2.608, param240=1, pwr_ext=28.157, param24=2, battery_charge=0, I/O=5/0
2015-12-11 13:39:50	232	adc1=2.586, param240=1, pwr_ext=28.138, param24=2, battery_charge=0, I/O=5/0
2015-12-11 13:40:20	247	adc1=2.586, param240=1, pwr_ext=28.119, param24=1, battery_charge=0, I/O=5/0
2015-12-11 13:40:50	263	adc1=2.556, param240=1, pwr_ext=28.138, param24=0, battery_charge=0, I/O=5/0
2015-12-11 13:40:50	260	adc1=2.578, param240=1, pwr_ext=28.157, param24=0, battery_charge=0, I/O=5/0
2015-12-11 13:41:20	267	adc1=2.578, param240=1, pwr_ext=28.157, param24=4294967295, battery_charge=0, I/O=5/0
2015-12-11 13:41:51	257	adc1=2.556, param240=1, pwr_ext=28.148, param24=4294967295, battery_charge=0, I/O=5/0
2015-12-11 13:42:42	265	adc1=2.549, param240=1, pwr_ext=28.129, param24=4294967295, battery_charge=0, I/O=5/0
2015-12-11 13:42:42	258	adc1=2.549, param240=1, pwr_ext=28.129, param24=4294967295, battery_charge=0, I/O=5/0
2015-12-11 13:42:52	244	adc1=2.556, param240=1, pwr_ext=28.138, param24=4294967295, battery_charge=0, I/O=5/0

You can see that when the temperature goes down and crosses 0 degrees threshold the necessary negative numbers are constituted with enormously large ones.

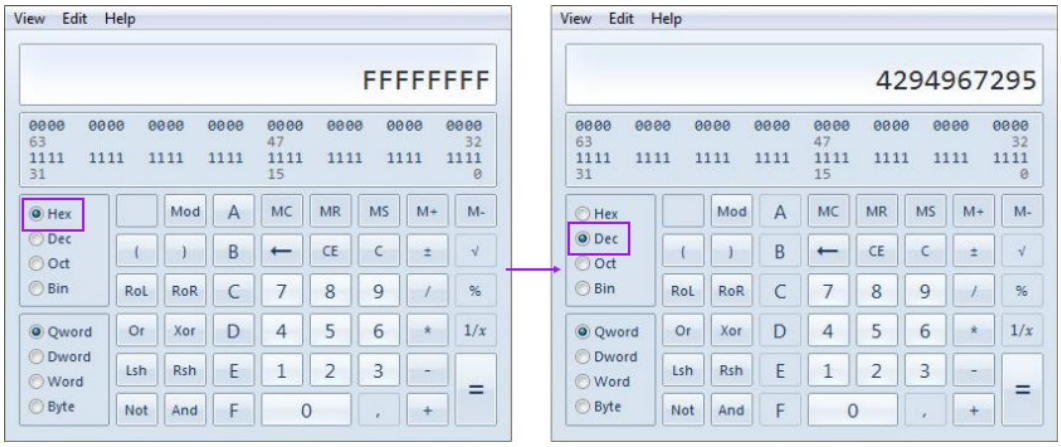
Defining the Maximum Value

Firstly, you should define the maximum threshold for such numbers. In order to do so, take any of the *incredibly large digits*, which occurs in the values of the parameter, and enter it into a calculator in the decimal mode (Dec.). Afterwards, switch to the hexadecimal displaying (Hex. mode).



Count the register length in the number appeared. Possible values are: 2, 4, 8. If the register length is less, we should round it up (for example, 5 should be rounded up to 8). In our case the register length is 8.

Now letter *F* should be entered in to the calculator in Hex. mode as many times as the register length appears to be after rounding up. Afterwards, switch to the *Dec* mode. Appeared result is the maximum possible number. You should write it down or memorize.



Sensor Calculation Table

Switch to the unit properties dialog and create a sensor on the basis of this parameter. Now you should create a calculation table for it. Switch to the *Calculation Table* tab and deselect *Continue last segment* checkbox.

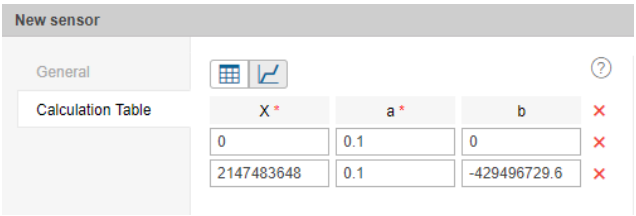
We have found out that all the interval of possible values is from 0 to 4294967295. Therefore possible values start from 0 to the half of the maximum number and negative numbers go from the half to the end of the maximum number (where the maximum number is the smallest negative number module). Divide the maximum number by 2, which equals 4294967295 : 2 = 2147483647,5. It means that positive values start from 0 to 2147483647 and negative —from 2147483648 to 4294967295.

In the calculation table **X** is the raw value sent by the parameter, **a** is the coefficient, **b** is the necessary correction. And all these values are needed to get a certain **Y** which appears to be a real value of temperature.

Whether the coefficient (**a**) is used for this parameter can be found out in the equipment specification. In our case, the coefficient equals 0.1, therefore if the value of the parameter sent by the equipment equals 6, the real temperature is 0.6 degrees.

For the first segment, correction for **b** is not needed (i.e., 0) but the second segment needs it because the values go in reverse order (maximum number corresponds to the smallest negative temperature value module). To calculate **b** shifting ,it is necessary to add one (because we already have 0) and multiply by a coefficient. Therefore we have: (4294967295+1)x0.1 = 429496729.6. The received value should be deducted, that is why it should be entered into the calculation table as negative.

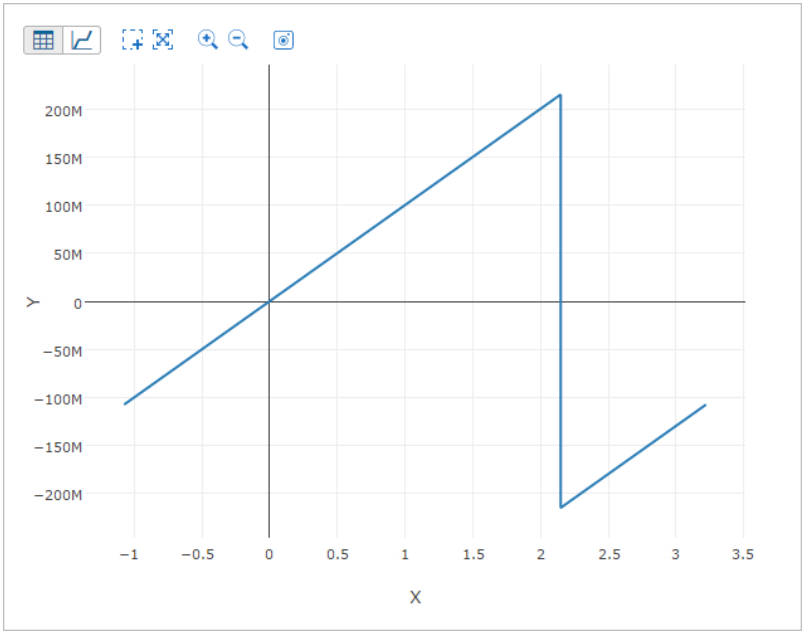
Now you can enter both the intervals (for positive and negative numbers) in the calculation table.



Note.
Calculation can be also made in the *Hex* mode. To do this, enter the letter *F* as many times as the number of digits (in our case 8), and then divide by 2. Then go to the *Dec* (decimal digits) mode and save or memorize the resulting number. This is the maximum positive value.

Result Analysis

You can analyse the resulting table, switching to the *Calculation Table* tab and clicking *Refresh* button.



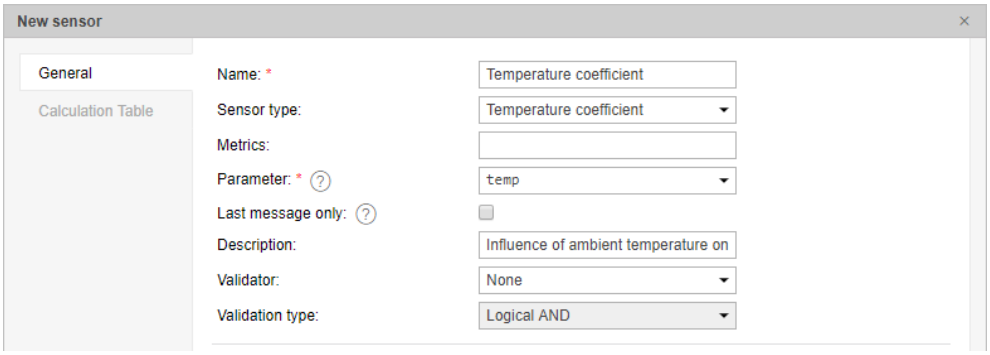
Besides, you can estimate the sensor setting in the Messages panel. Request messages on the unit for the same time interval, and this time select *Show parameter as sensor values*.

1	2015-12-11 13:38:28	0	0.60
2	2015-12-11 13:38:59	0	0.40
3	2015-12-11 13:39:09	0	0.30
4	2015-12-11 13:39:39	0	0.20
5	2015-12-11 13:39:50	0	0.10
6	2015-12-11 13:40:20	0	0.30
7	2015-12-11 13:40:50	0	0.00
8	2015-12-11 13:40:50	0	- 0.10
9	2015-12-11 13:41:20	0	- 0.30
10	2015-12-11 13:41:51	0	- 0.30

Temperature Coefficient

Temperature coefficient is a sensor which is created on the basis of a parameter that sends the temperature/voltage and is used to adjust the fuel level in the tank. Any liquids can be compressed and expanded depending on the ambient temperature, that is why the readings of fuel level sensor, especially of high volumes (for example, tanker), may seem to be incorrect without taking into account the temperature values.

The temperature coefficient sensor, as well as other sensors, is created in the unit properties on the *Sensors* tab. Press *New* and fill in the required fields. The type of sensor is *Temperature coefficient*, name and description is any of your choice. Unit of measurement is not obligatory. Be sure to clearly indicate the parameter that sends the temperature data.



Afterwards, switch to the *Calculation Table* tab and using the Wizard enter the coefficient values — the maximum and minimum temperature coefficient. Beforehand, some preliminary preparations should be done:

1. Look through the specification and find out the maximum and minimum working temperatures of your fuel level sensor. In our case they are t_{max} = +100 and t_{min} = -60°C.
2. Find out the nominal temperature for the reference volume, in other words the temperature which does not change fuel amount that is, does not require the use of a coefficient. In our case the value is the following: t_{rated} = +20°C.
3. Find out the density of a fuel you use (ρ). In our case it is diesel fuel, whose density is 0.89 t/m^3.

Calculate the values of the coefficients using the following formulas:

$$P_1 = \frac{(t_{rated} - t_{min})p}{1000} + 1$$

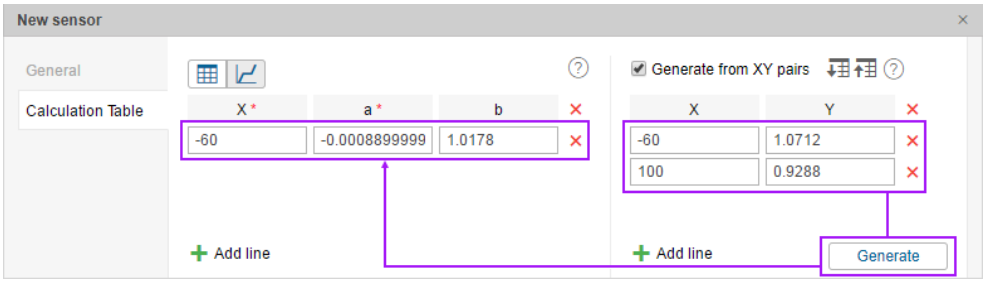
$$P_2 = 1 - \frac{(t_{max} - t_{rated})p}{1000}$$

Thus we have:

$$P_1 = \frac{(20 - (-60)) \times 0.89}{1000} + 1 = 1.0712$$

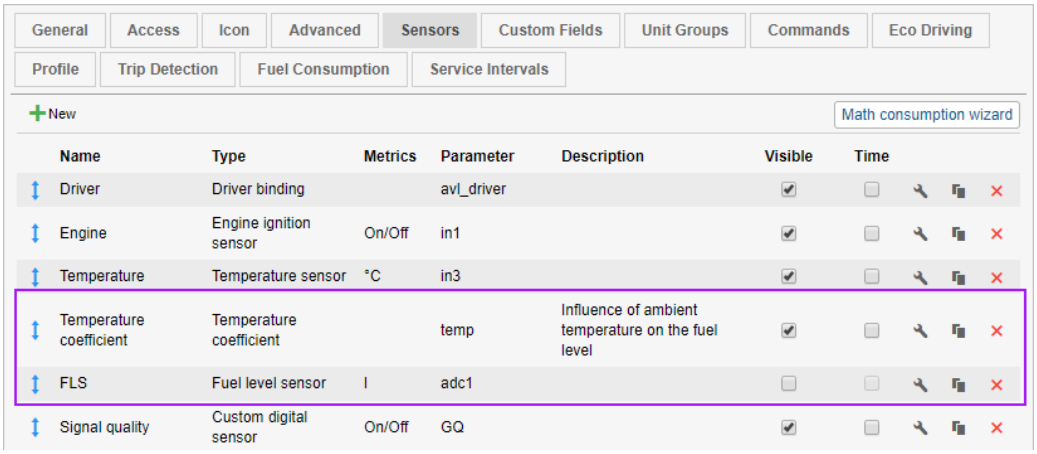
$$P_2 = 1 - \frac{(100 - 20) \times 0.89}{1000} = 0.9288$$

Now enter the data found for the minimum and maximum temperature values into the fields of the *Calculation Table Wizard* and generate a calculation table.



Note.

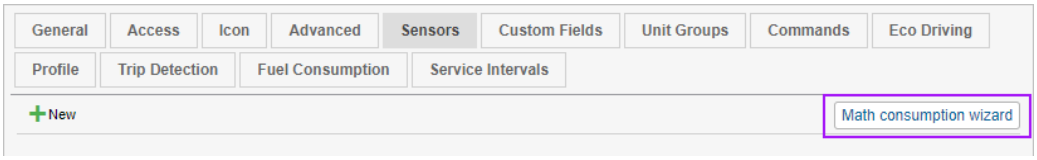
If the parameter sends not temperature, but, for example, voltage, then instead of the minimum, maximum, and rated temperature it is necessary to know the minimum and maximum voltage and also a rated voltage of a reference amount, and do the calculations on the basis of this data.



Math Consumption Wizard

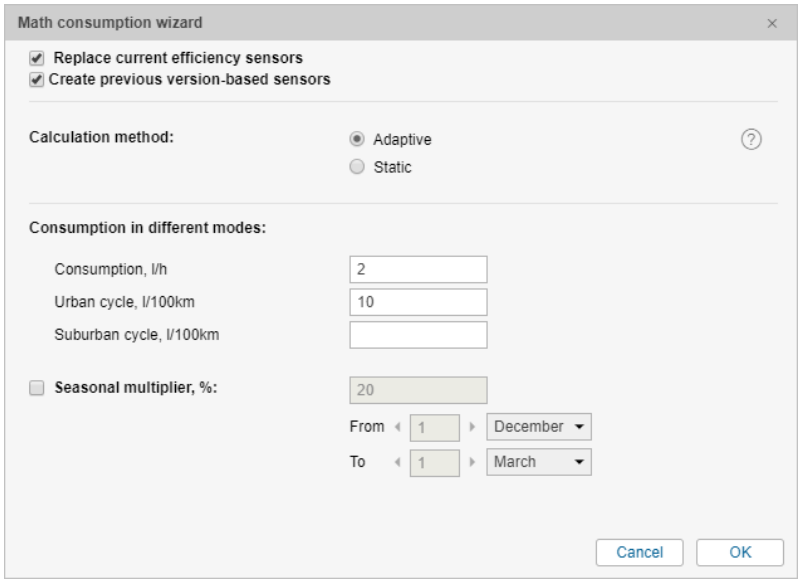
The Wizard simplifies the process of creating and configuring the sensors for the mathematical calculation of fuel consumption.

To open the Wizard, click on the corresponding button in the upper right corner of the *Sensors* tab of the unit properties.



While opening the math consumption wizard, the system searches for existing engine operation sensors (ignition, relative and absolute operating hours) and engine efficiency sensors, and also checks the values of the previous settings.

The window of the Wizard consists of three sections and looks in the following way:



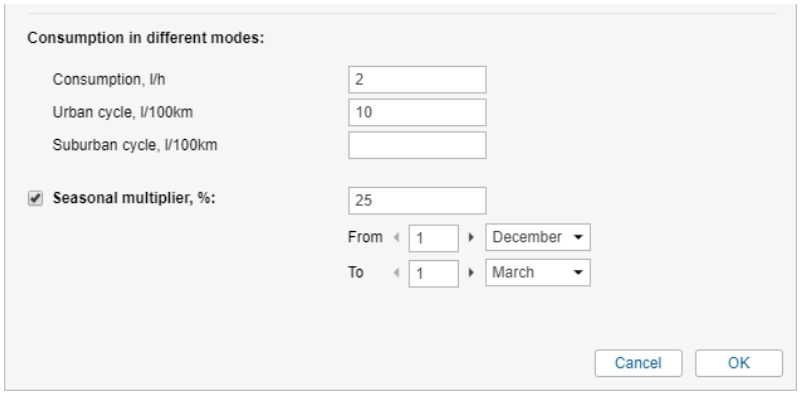
In the right section, two options may be available for activation according to the previous properties of the unit:

- **Replace current efficiency sensors**
  Is shown if engine efficiency sensors have been found. The checkbox of this option is activated by default. In case of pressing *OK* the sensors created before are replaced by the new ones. If the checkbox is not activated, the new sensors are added to the existing ones.
- **Create previous version-based sensors**
  Is shown if some previously configured checkboxes of calculating fuel have been found. If the option is activated, the two sections of the Wizard located below become inactive and are filled with the available data.

In the second section, it is necessary to choose the calculation method: adaptive or static. The **adaptive** method supposes the calculation of fuel according to the speed of the unit; the **static** — that the introduced consumption is used for calculating fuel by rates.

The contents of the third section depend on the chosen calculation method. If the **adaptive** one is chosen, it will be as

follows:



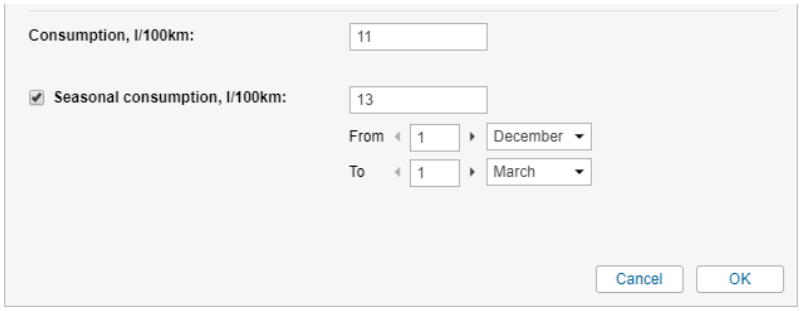
- **Consumption in different modes**:
  Consumption, l/h — the fuel consumption during idling. If the field is filled in, its value is put in the first ignition sensor. If it is not, then the fuel consumption during idling is calculated as [urban cycle/10] (according to the statistical data).
  Urban cycle, l/100 km — fuel consumption in the urban cycle (obligatory option).
  Suburban cycle, l/100 km — fuel consumption in the suburban cycle.

After pressing the *OK* button, the ignition sensor is created (or the consumption during idling for the existing sensors is modified), as well as the engine efficiency sensor with the parameter *(speed + #speed)/const2*. The data for the consumption in urban and suburban cycles and the minimum moving speed from the trip detector is used for the calculation table.

- **Seasonal multiplier, %**
  In this part of the math consumption wizard the multiplying or reduction coefficient for different seasons is adjusted. In the *Seasonal multiplier* field the coefficient in per cent is indicated (for the reduction coefficient it should be a negative number). In the fields *From* and *To* the time frames of the season are entered.

If the values for the seasonal multiplier are indicated, after pressing the *OK* button the engine efficiency sensor with the parameter *time: d* is created.

If the **static** calculation method is selected, the values indicated in the fields below are used for calculating fuel by rates.



- **Consumption, l/100 km** — fuel consumption per 100 km. As a result, the engine ignition sensor with the parameter *(speed+#speed)/const2* (the consumption is calculated as [fuel consumption/10]) and the engine efficiency sensor with the parameter *(speed+#speed)/const20* are created. If a unit had a relative odometer configured, the engine efficiency sensor has the parameter *([odometer]/((time - time)/const3600))/const10*.
- **Seasonal consumption, l/100 km** — fuel consumption according to the season. The time frames of the season are indicated in the fields *From* and *To*. As a result, the engine efficiency sensor with a multiplying (the indicated value is higher than the consumption per 100 km) or the reduction (the indicated value is lower than the consumption per 100 km) coefficient *time:d* is created.

All the sensors created by means of the math consumption wizard have the word *(Wizard)* in their names.

General Properties

Access required: *Edit connectivity settings* — to view and edit devices type, phone number, UID, and access password.

On the *General* tab of the Unit Properties dialog the following parameters are set:

Name
The name of the unit must be between 4 and 50 characters. By this name the unit is shown to the map, in the worklist, in the reports.

Device type
Select device type from the list of the supported hardware. Three devices that are most often used by the current user are listed on the right and can be easily selected with a simple mouse click. To display the full list of available device types, click on the entry field once (it should be empty). To quickly find a necessary device type, use the dynamic filter. On the right of the entry field there is a button which can be used to configure the device parameters for the given unit, however, it is active only if this configuration is supported within the selected device type. Note that upon creating a unit from WLP file there can be a situation when the device type used by the source unit is not available for your account. In this case the device type of a new unit is automatically changed for the Wialon Retranslator.

Server address
The IP address of the server to which the data arrives, and the port of the device (determined automatically after selecting the type of the device). This field is displayed for the user who has the *View connectivity settings* access right with regard to the unit.

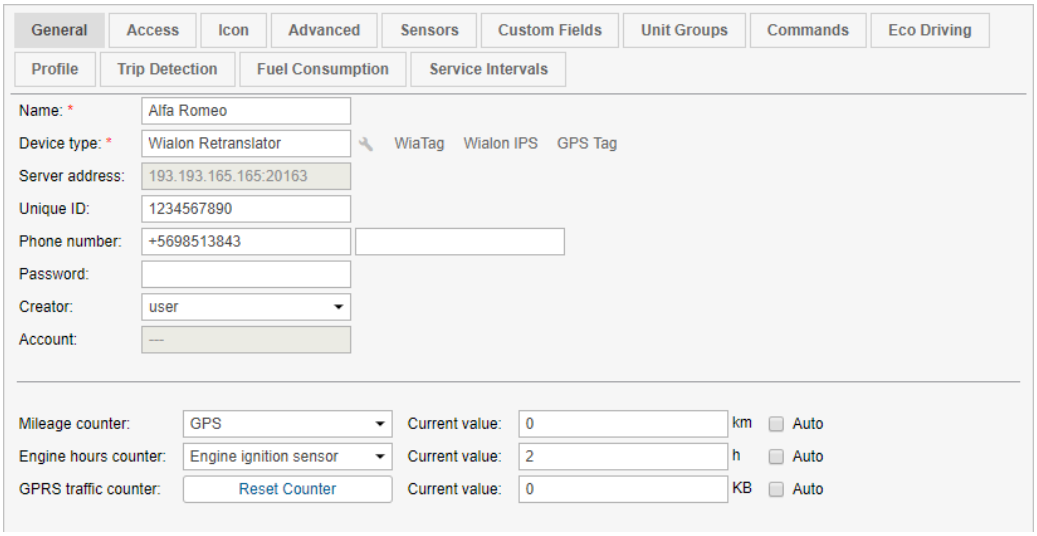
Unique ID
Enter the unique ID for the unit required to identify it by the system. Usually it is IMEI or serial number. Some types of devices may support two unique IDs. In this case, the additional input field appears on the right. Th maximum number of symbols for an ID is 100.

Phone number
Here enter the phone number of the unit if it has embedded SIM card. The phone number should be in the international format, e.g., +15557654321. If your device supports two SIM cards, you can enter the second phone number on the right.

Device access password
This password is required for some device types to execute commands or send data.

Creator
The user who is the creator for this unit (if you have any access to this user). Read more about the creator here.

Account
Here you can see to which account the unit belongs (if you have any access to this account).



Attention!

Units with the same ID within a certain type of device type as well as units or drivers with the same phone numbers cannot exist in the system. If you are attempting to create a unit with an ID or a phone number that is already in use in the system, a special alert is displayed. However, the unit is created anyway but with *empty* ID or phone number values which can be edited later.

Note.

Unit parameters can be set in different measurement systems. When creating new units, the system of measures for them is taken from the settings of the current user. Therefore, to set a system of measurement for a unit, it is necessary to select a corresponding system of measurement in the settings of the current user. For existing units, the system of measures can only be changed by conversion.

Counters

Access required: *Edit counters* — to edit current values of counters and calculation methods.

Parameters for counters are adjusted on the *General* tab. Counters are widely used in the system — in online monitoring, as well as in reports. Three types of standard counters are supported: mileage counter, engine hours counter, and GPRS traffic counter.

Mileage Counter

Mileage counter is used to calculate distance in reports.

The mileage counter can be set to one of four methods of calculating:

- GPS — mileage is calculated by GPS coordinates (possible for any unit).
- Mileage sensor — mileage is calculated in accordance with the mileage sensor.
- Relative odometer — mileage is calculated according to the relative odometer sensor which counts the distance traveled since the last message.
- GPS + engine ignition sensor — mileage is calculated by GPS coordinates taking into account the readings of the ignition sensor.

Note that if a sensor (including sensor-validator) needs a parameter from the previous message, such a sensor cannot be used as a method of mileage calculation.

The selected type of calculation technique affects the mileage and duration readings in the reports. If you choose to calculate mileage by a sensor, and your unit does not have it, the mileage values will be zero.

Engine Hours Counter

The engine hours counter calculates engine hours by one of three sensors (engine hours are measured in hours):

- engine ignition sensor;
- absolute engine hours sensor;
- relative engine hours sensor.

Note that if a sensor (including sensor-validator) needs a parameter from the previous message, such a sensor cannot be used as the method of engine hours calculation.

Engine hours counter is widely used in tabular reports.

GPRS Traffic Counter

The GPRS traffic counter is used to calculate Internet traffic consumed by the unit to transmit and receive data. Traffic is measured in kilobytes (KB). At any moment, you can reset this counter manually by pressing the *Reset counter* button. You will be offered to save the event of reset and the current value in the unit events history to be exported to the report later.

Counters' values are updated every 10 minutes.

Counter Properties

You can set the *Current value* for each counter, and further calculations will start from the indicated point. In order to

add the new data to the current value automatically, activate the *Auto* option on the right of the counter. You can manually reset the counters by entering '0' to the current value field.

The values of counters can be altered not only in this dialog but also with the help of appropriate jobs and notifications. Values of mileage and engine hours counters can be shown in the unit tooltip and in the extended unit information.

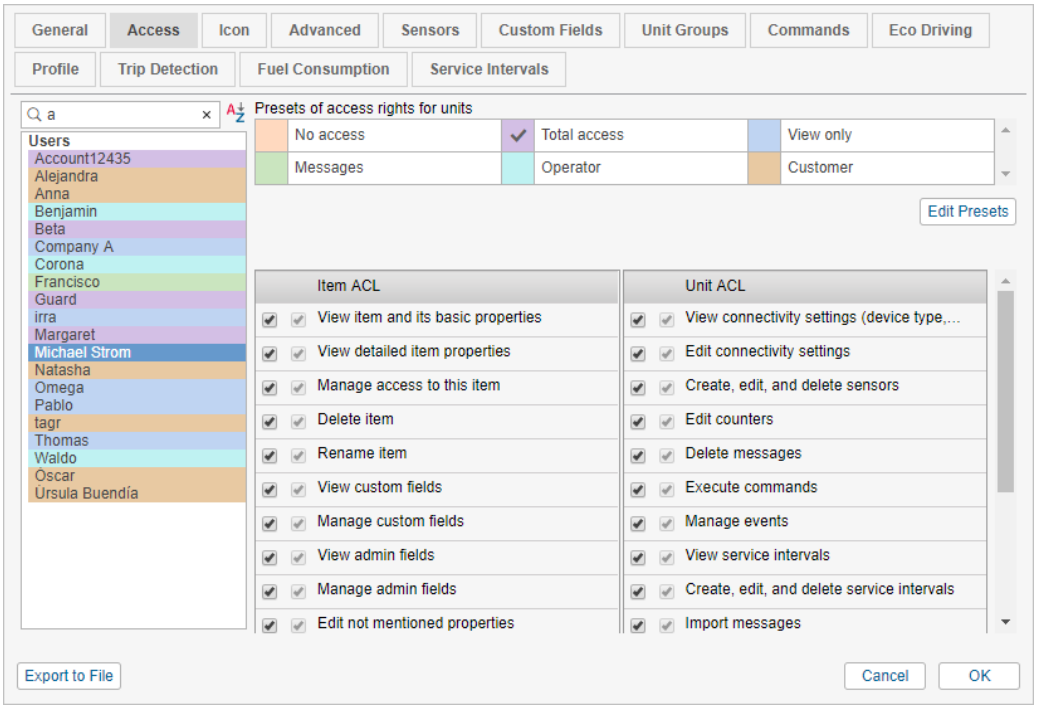
Access

Required access: *Manage access to this item* towards the unit you are editing; *Manage user's access rights* towards the users in the left part of the dialog.

On the *Access* tab of the Unit Properties dialog you can indicate which access rights different user has towards the unit.

The list of users whose access can be changed is displayed on the left. The users with the colored background at the top of the list are those who already have some access to this unit.

On the right, the list of both standard and special access rights is displayed where the allowed actions are checked.



Read more about the access rights here.

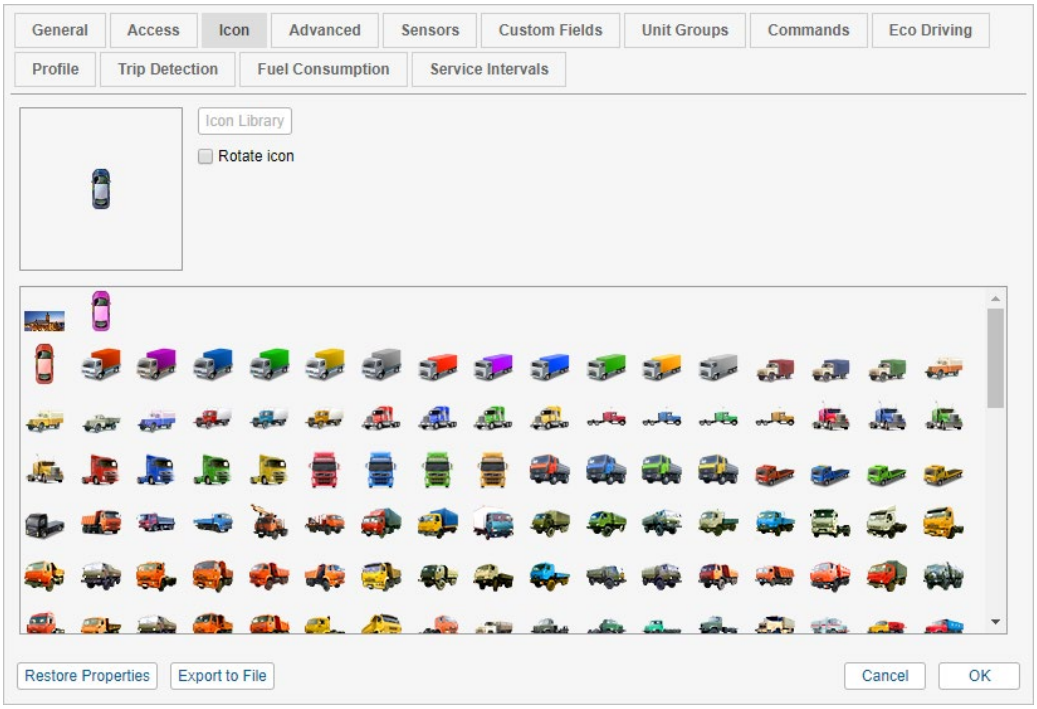
Icon

Required access: *Change icon* — to choose an icon for a unit; *Edit not mentioned properties* — to rotate unit icon.

On the *Icon* tab of the Unit Properties dialog you can select or load any image to display your unit on the map and on different unit lists.

To display a unit, you can either use standard icons (click the *Icon Library* button) or upload a custom image from your computer. To upload an image from computer, click on the current icon, select an image on your computer, and press *OK*. Supported formats are PNG, JPG, GIF, and SVG. Recommended image size is 32×32 pixels.

To delete the current icon, hover the cursor over it and click the *Delete* button. The current icon changes to the default one.



Depending on the course, unit icon can rotate to show the direction of movement. To do this, enable the *Rotate icon* option. It is recommended to select an icon that looks strictly north (i.e. up), otherwise the rotation of the icon may be misleading.

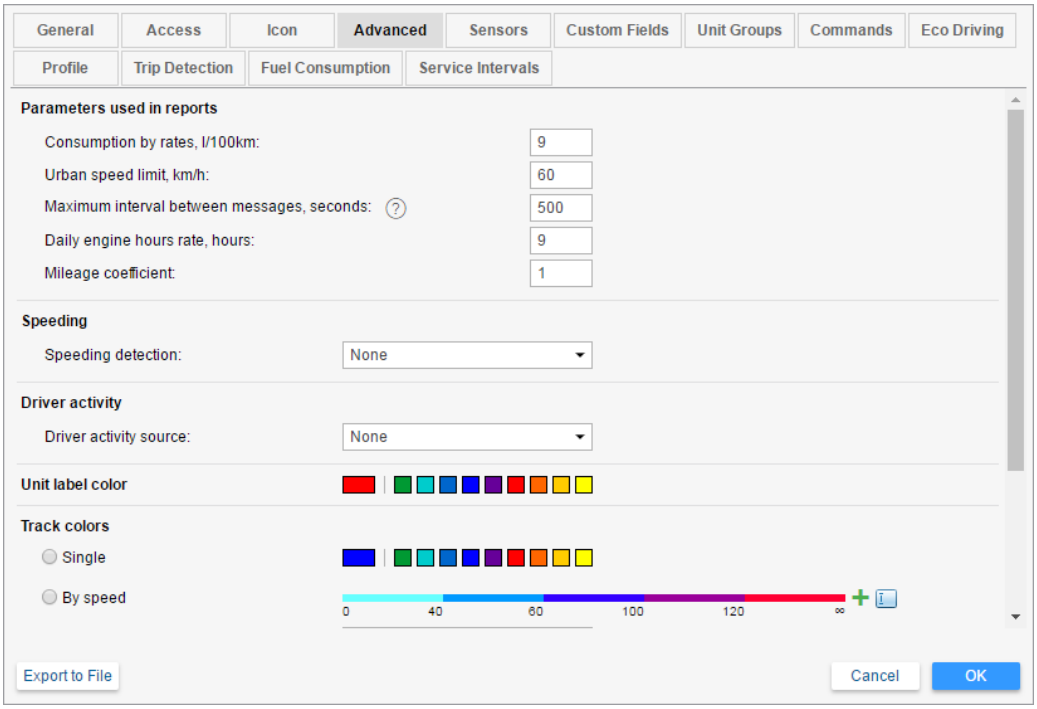
If the unit has the icon by default, and the group into which it is included, has the icon not by default, the unit takes over the group icon. It should be noted that in this case the icon of the group does not rotate, even if the corresponding box was checked.

Note that in order to upload individual icons for units, unit groups, and geofences you can use the Icon Library application (for top accounts only). Icons uploaded to the system using this applicationare available in the standard icon library. To facilitate the work with the library, the uploaded icons are placed in the same list, but separately from the standard ones (at the top).

Advanced Properties

Required access: *View detailed properties* — to view parameters for reports, driver's activity source, and messages filtration settings (the first, the second, the third, and the last sections); *Edit not mentioned properties* — to edit color schemes of the track/sensor (middle sections); *Edit trip detector and fuel consumption* — to edit report parameters, and driver's activity source; *Edit connectivity settings* — to edit parameters of messages filtration (last section).

On the *Advanced* tab of the Unit Properties dialog, various parameters are set for generating reports, colors for tracks are adjusted, and speed limitations are set.



Parameters Used in Reports

Consumption by rates, l/100 km

In this field the fuel consumption per 100 km is indicated. To modify it, you need the *Edit trip detector and fuel consumption* access right towards the unit. Positive digital values can be introduced here. The default value is 0.

Urban speed limit

This setting is used in the report on trips. If the unit goes with the speed under indicated here, it is considered as urban mileage. If the speed is higher, this mileage is regarded as suburban. This property can be used in the trips reports, statistics, and in the advanced drivers reports.

Maximum interval between messages

Indicate the maximum interval between messages (in seconds). The excess of the specified value is interpreted by the system as a connection loss. This is reflected in the report on connection problems, while calculating intervals in the report on engine hours and during the calculation of fuel consumption by mathematical calculation or by FLS.

Daily engine hours rate

Indicate the daily rate of engine hours to use this value in the engine hours report (when calculating the utilization and useful utilization). The engine hours operation is defined by the corresponding counter.

Mileage Coefficient
The mileage coefficient is useful to compare the detected mileage with the mileage by odometer. The corresponding column can be included in any tabular report containing information about mileage, and in the statistics.

Speeding

In this section, a method for speeding detection can be selected. The selected option defines the order of further actions.

None
The default setting for this method is set to *None*. It means that speedings are not registered by the system (this option is relevant, for example, for stationary units where such data is not necessary).

Use fixed limit
Fixed limit as a method of speeding detection means that the speed limit for a unit is chosen individually. In other words, the maximum speed limit for a unit is specified in the corresponding field. Upon receiving messages with the speed higher than the indicated one, the speeding is registered by the system. Moreover, here you can enter the minimum speeding duration (1 second by default). Any speeding with duration less than the indicated one is not registered by the system as speeding.

Use limits from roads
Attention!
The *Use limits from roads* method is relevant only for the Gurtam Maps cartographic service.

Using this method you do not indicate any particular speed limit, but the registration of speeding depends on the current speed limitation road signs used on various road sections. In other words, the system contains the data on speed limits for the particular road section, and if a unit exceeds this speed limit, the speeding is registered. If this method has been chosen, you can indicate the tolerance on speeding value. It means that speeding consists of a total of speed limit and tolerance values. For example, in some countries exceeding speed limit by 10 km/h is not a violation, that is why you can indicate 10 km/h tolerance on speeding. Therefore, on an area with a speed limit of 60 km/h, the unit can move with a speed of 70, and this speed is be considered a speeding. Moreover, here (the same as for the previous method) the minimum speeding duration can be indicated.

In order to register the speeding, it is necessary to receive at least two speeding messages in a row.

Speedings are registered in the system, and subsequently you can generate a speedings report. Moreover, during building a track you can enable speeding markers which highlight the corresponding events on the track.

Driver Activity

Information on driver activity helps to track whether the driver follows the AETR standards or not. Such information is displayed in the unit or driver tooltips as well as in the extended unit information if the corresponding checkbox is indicated in the *User Settings* dialog.

This section allows to choose the source for determining driver activity. The dropdown list contains 3 items: *None*, *Tachograph*, and *Bindings*. If the *None* item is chosen, the unit or driver tooltips, or the extended unit information do not show the current data on the driver activity. If the *Tachograph* item is chosen, the information on the activity of a driver bound to this unit is received from the tachograph installed in the vehicle. If the *Binding* item is chosen (for example, if a vehicle is not equipped with a tachograph), the activity of a driver bound to this unit is determined in the following way:

- *Driving* status is registered as the driver activity when either trip or stop have been detected for a unit.
- *Work* status is registered when parking has been detected.
- *Rest* status is registered upon unbinding a driver from such a unit.

Unit label color

By default, the names of the units and drivers assigned to the units are red on the map. However, you can change this color here and even set various colors for different units.

Track Colors

Different colors can be used to show on the map not only the unit itself, but also its movements (tracks).

Tracks can be built in the Tracks panel, Messages panel, Reports panel, or in the Monitoring panel (the *Quick track* option).

Different parts of the track can be colored differently. The settings are made in the *Track Colors* section on the *Advanced* tab of the unit properties. There are 4 mutually exclusive options: *By trips*, *Single*, *By speed*, *By sensor*. The option selected in the properties of the unit is also selected for it by default in the tracks panel.

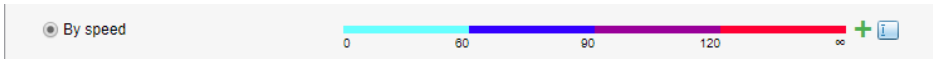
By trips
This option is designed to change the color of the track in accordance with the trips, which are determined by the trip detector.

Single
This option is designed to color the track in one color, which is convenient, for instance, when building tracks for unit groups so that they do not visually merge with each other. The color of the track is selected from the palette. When you sequentially build several tracks for one unit, a different color is used for each of them (taken in order from the palette).

By Speed
This option is designed to change the color of the track depending on the speed. To set the values for the speed intervals and indicate their colors, click the add interval button (+). The track color is set for each interval individually. In other words, it is necessary to set an interval, select the color, and click *OK*. Afterwards, the same procedure should be done for the rest of intervals. Pay attention to some peculiarities of setting intervals and choosing their color:

- No value in the first field corresponds to -∞, in the second — to +∞.
- When you add an interval that intersects with an existing one and goes beyond its boundaries, the added interval overwrites the existing interval.
- When you add an interval that intersects with an existing one and does not exceed its boundaries, a new interval is inserted inside the existing one. Both intervals, to which the existing one was broken, receive its color.
- You can select a color from the palette or specify it in the HEX format in the field above it.

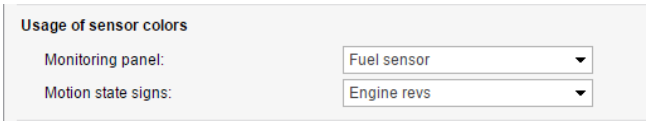
Upon completion, the intervals of the selected color are displayed on the scale. To edit the interval, click on it with the left mouse button, make the changes and click *OK*. To reset the settings to their default state, click the button to the right of the scale.



By Sensor
This option is designed to change the color of the track depending on the readings of a sensor. Select a sensor from the dropdown list (the list is formed on the basis of all the sensors created for a unit). For each created sensor, you can set the interval values and pick their colors on the corresponding tab. Therefore, when this option is activated, the colors indicated on the interval scale in the properties of the selected sensor are used to draw the track.

Usage of Sensor Colors

From the dropdown list, select the sensor, the colors of which you would like to use for visualization of the sensor state in the monitoring panel or to indicate the units on the map by the color according to the latest sensor value.



Messages Validity Filtration

All the messages are stored in the system without any exception. However, in the case of data spikes, lack of coordinates, etc. such messages may distort the mileage count and various indications in the reports. That is why, it is recommended to enable the filtration of data, in which invalid messages are not taken into account. To adjust the filtration settings, fill in the fields described below. Please note, that the filtration applies only to *new* messages.

Allow positioning by cellular base stations
Positioning by cellular base stations (*LBS detection*) is an alternative method of defining unit location. This method involves the use of cellular base stations as reference points for the location detection. Note that the method is not as accurate as the use of GPS, and just allows to receive the approximate location. When enabling this checkbox, the *LBS detection* is used only if it is newer than the GPS data.

Skip invalid messages
Some controllers may send a flag about coordinates validity/invalidity in messages. A message with invalid coordinates is marked by the flag of invalidity, and when sending such a message to the server, the current time and the last valid coordinates are given. Wialon will consider this message as a message without position data, and it will be not used when constructing movement tracks, detecting location in reports, etc. However, if this message contains other parameters (such as sensors), they will be used.

Minimum satellites
If the number of satellites locked is lower, the message is considered to be invalid. Some types of equipment can give out the correct coordinates with only two satellites. The recommended value is at least three.

Maximum HDOP value
HDOP stands for the Horizontal Dilution of Precision. HDOP is an error in the horizontal plane, at which the messages are considered valid. The smaller this parameter, the more accurately the coordinates are determined. If the HDOP value in the message is greater than the specified value, this message is marked as non-valid. Any messages with missing or zero coordinates, also undergo filtering, even if the device did not mark such a message as invalid. A message is recognized as invalid if at least one coordinate (longitude or latitude) is zero.

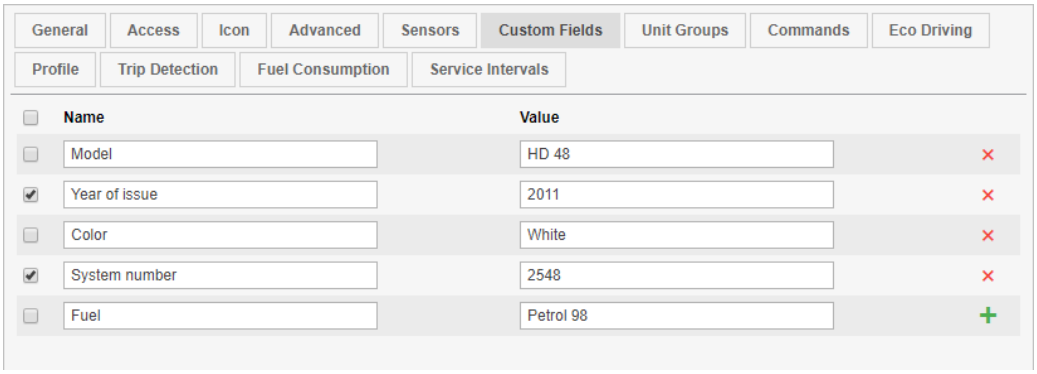
Maximum speed value
The messages containing speed higher than or equal to the value set here are marked as invalid. The default *0* value does not affect filtering.

Custom Fields

Required access: *View custom fields* — to view general custom fields; *Manage custom fields* — to create new fields, as well as edit and delete existing ones; *View admin fields* — to view administrative custom fields; *Manage admin fields* — to create, edit, and delete administrative fields.

On the *Custom Fields* tab of the Unit Properties dialog, you can create fields that display additional information about the unit, for example, fuel type, year of manufacture, load capacity, etc. Moreover, here you can indicate any external links. Some of these fields can be marked as *administrative* (the checkbox before the field), i.e. they are visible only to users with the appropriate rights.

Enter a field name and its value and click the *Add* button. To delete an incorrect field, click *Remove*.



The next time you open the unit properties dialog, the entered fields will automatically be arranged in alphabetical order.

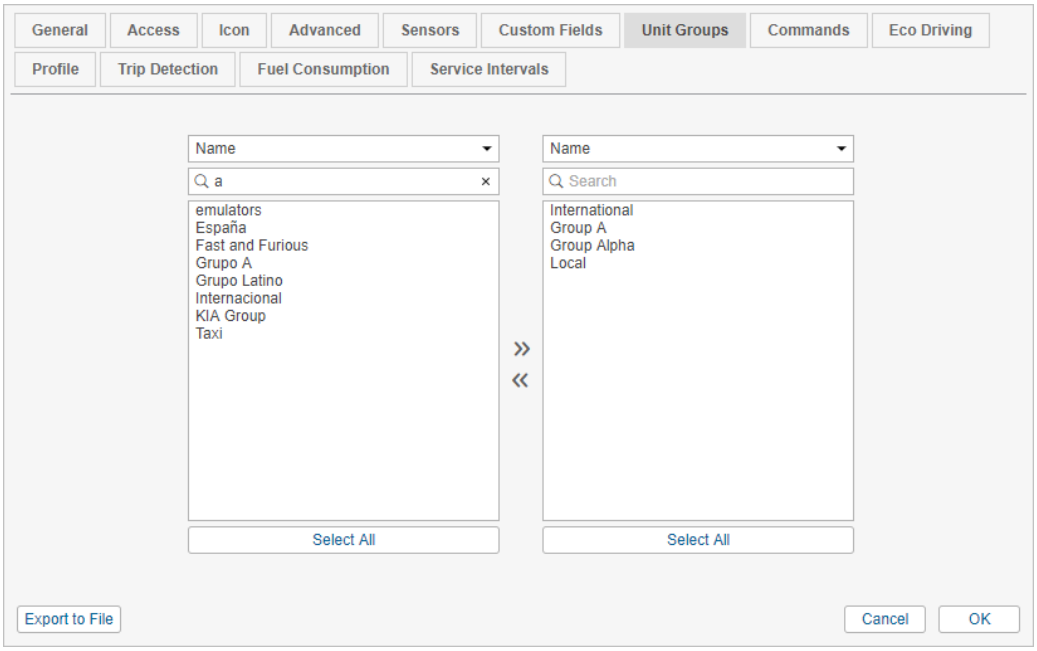
Application of the unit custom fields:

- In the unit tooltip and in the extended unit information (if enabled in the User Settings);
- In the Custom Fields table that can be generated both for a unit and for a unit group;
- In the Monitoring panel to search units by some property;
- In the text of notifications.

Unit Groups

On the *Unit Groups* tab of the Unit Properties dialog you can view whether the unit is included in some group or not.

To the left is a list of existing groups, to the right — only those groups that include this unit. Use the *Add/Delete* buttons to include a unit in a particular group or exclude it from the group.

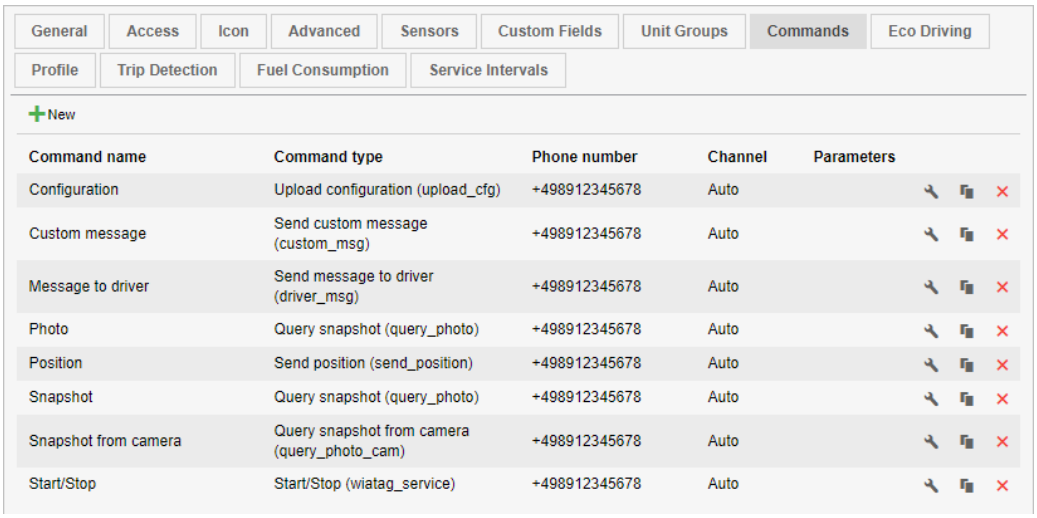


Commands

Required access: *View commands* — to view this tab and its contents; *Create, edit, and delete commands* — to create, edit, and delete commands.

The *Commands* tab of the Unit Properties dialog gives possibility to create and configure commands for the given unit. To send a command to a unit, it must be registered here.

A command can be sent both manually (from the Monitoring panel) and automatically (with the help of notifications and jobs) as well as via SMS. A command can be executed for several units at once, but in this case it should be configured in the properties of all those units and have an identical name.



To create a new command, click the *New* button (+). Afterwards fill in the reqiored fields, and press *OK*. Such buttons as *Properties*, *Copy*, and *Delete* are used to work with the created commands, and are located at the end of the line opposite the command name. Sometimes it is convenient to create commands from existing ones — press *Copy* in the template command line. To view or edit the configuration of an existing command, press *Properties*. To delete a command, press *Delete* (×).

Command Properties

Commands have the following properties:

Command name
The name of the command (names cannot be repeated within the same unit).

Command type
The original name of the command in the system. The list shows only the commands supported by this device. See the list of standard commands supported by Wialon Local.

Channel
Select the channel (the type of connection) by which the command should be sent: *Auto, TCP, UDP, Virtual, SMS*. If the *Auto* type is set, the program automatically selects a channel which is available at the moment of execution (if several are available, the priority is given according to the list of the types). The list of connection types also depends on the device type indicated on the *General* tab.

Note that if the channel type is TCP or UDP, the unit is required to be connected at the moment of the execution. If it is not connected, you can send a *Virtual* command. In this case, it is queued and sent over the GPRS channel when the connection is established. The Virtual commands are not available for all the hardware types and can be added upon request.

To execute the GSM command, the device's phone number must be specified in the unit properties in the international format, and the user should have the right to send SMS.

Phone number

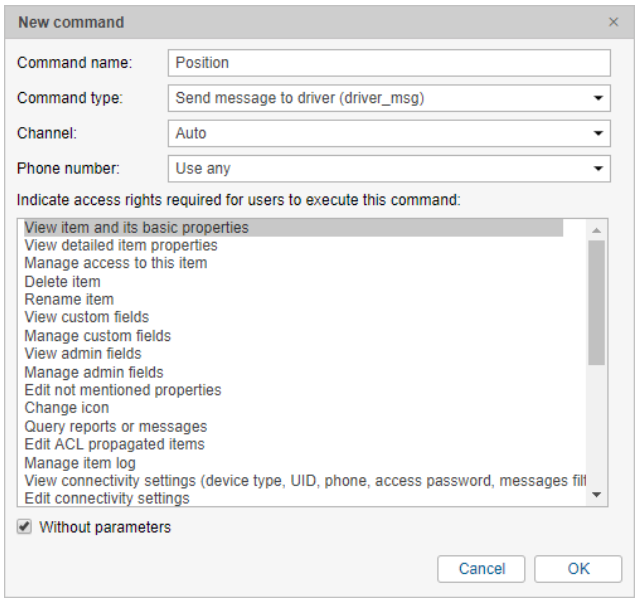
Phone number is required only for SMS commands. Some types of devices can support two SIM cards, so a unit can have two different phone numbers. Here you choose which of them should be used to send the command: first/second/any. The same as with the parameters and link type, the phone number selected here cannot be changed at the moment of sending the command.

Access rights

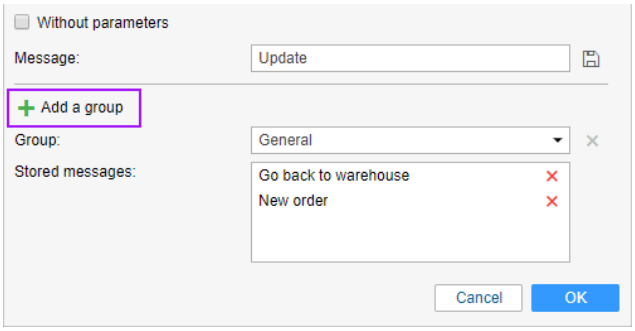
Indicate the access rights the user must have to execute this command. To select a combination of rights, press the <ctrl> key. Regardless of the rights listed here, the *Execute commands* checkbox is required anyway.

Parameters

Some commands require additional parameters. It can be, for instance, the input/output number, report interval, etc. These parameters can be set when configuring the command, and in this case, they are applied automatically each time when the command is being executed. Thus, several commands with different parameters and link types can be created on the basis of one command type. However, it is not obligatory to set parameters when creating a command, because you can indicate them during the execution manually. To do so, mark the checkbox *Without parameters*. It is impossible to change parameters (as well as connection type or phone number) if they are set.



When creating the *Send custom message* command, it is possible to create groups and add messages into them. It allows to quickly find the required message while executing the command. To create a new group, click *Add a group*.



Enter the name for the group in the appeared field. Press *Save* . The group is added to the drop-down list of the

message groups.
To add a message to the group, enter the text of the message. Then, in the drop-down list of groups choose the one it should belong to.

Press *Save*. The message appears in the list below. Messages and groups can be removed by pressing the button ×. To save the changes, click *OK*. If you want to dismiss the changes, press *Cancel*.

For details on sending the commands, see *Commands*.

Eco Driving

Required access: *View detailed item properties* — to view the tab; *Edit trip detector and fuel consumption* — to edit the tab.

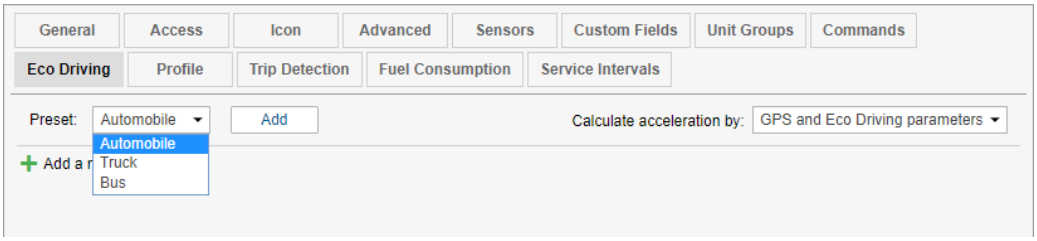
Driving behavior influences the condition of a transported cargo, as well as the technical condition of a vehicle used. Wialon Local system possesses the functionality that allows to receive an assessment of the driving quality. The functionality helps to evaluate how a driver treats the entrusted vehicle, and as a result, improve the safety of driving, prolong the life of the vehicle fleet, reduce fuel costs, and ensure the safety of the cargo.

With these settings configured correctly, you can execute the special Eco Driving report as well as include columns with penalties and general rating into many other reports.

Settings

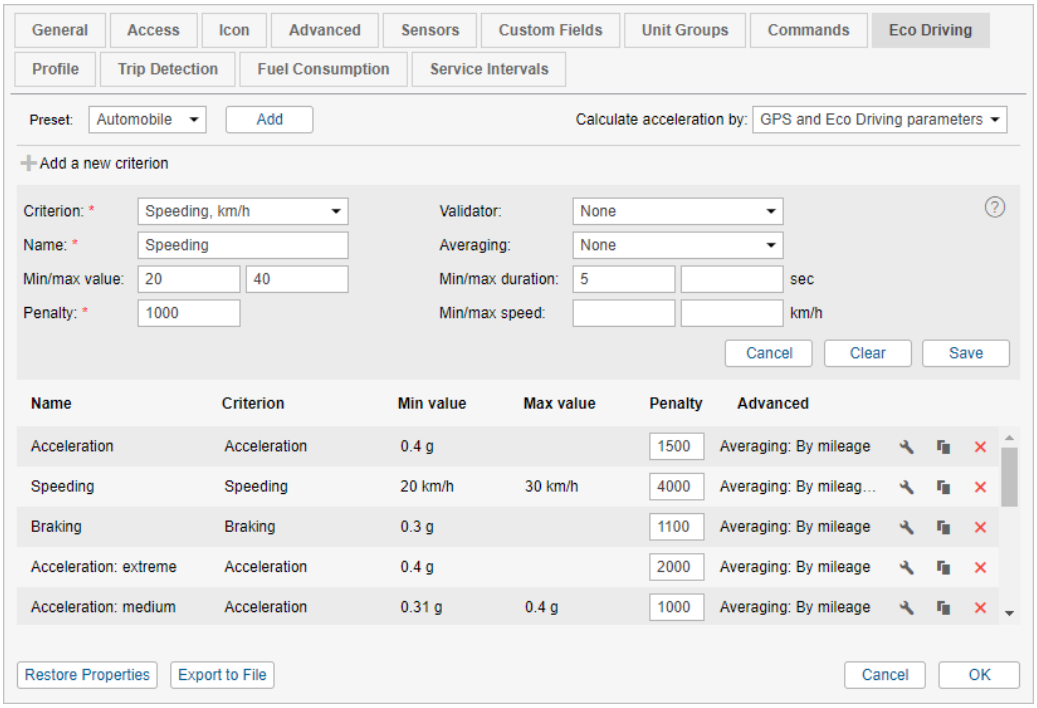
The *Eco Driving* tab is a form where you should indicate the parameters used for penalty scoring. To add the eco driving criteria, choose one of two options: use a preset criterion of one of the available templates or customize your own.

In the top left part of the *Eco Driving* tab window, select one of the three available templates: *Automobile*, *Truck*, *Bus*.



Click *Add*. Below appears a list of preset criteria for the selected transport type (if there are already criteria set for the unit, the criteria from the list is added to the existing ones). Select the required criterion and click the button in the shape of the wrench to change it. Press *Save*. To add your own criteria, press *Add a new criterion* and fill in the required fields. Parameters are conditionally divided into 2 types: key parameters (obligatory fields, marked with an asterisk), and additional (optional) ones. Key parameters include criterion, name, sensor (if *Custom* criterion is chosen), and penalty value. In addition, here you can specify the minimum/maximum violation value. Additional parameters include validator, multiplier, averaging, minimum/maximum duration, and speed. After filling out the form, you can either save the selected criterion with its name and individual parameters, or clear the form using the corresponding button.

To calculate acceleration (speedup, slowdown, turn, and reckless driving), the system uses different methods of data analysis: GPS, Eco Driving parameters or a combined one (GPS and Eco Driving parameters). By default, the data is analyzed on the basis of the combined method. When choosing GPS, the calculation of acceleration is made based on the positional data. When choosing Eco Driving parameters, the calculation is made in accordance with special parameters, which contain maximum acceleration value for the period between the messages. Only some devices can transfer these parameters. If GPS and Eco Driving parameters are chosen together, acceleration calculation is made based on both the positional data and special parameters. Afterwards, the system chooses the biggest value. Note that the chosen method is applied to all the configured criteria.



Criteria

Criterion is a key parameter on the basis of which a driving quality can be determined. Wialon Local system supports the work with the following criteria: speeding, acceleration, braking, turning, reckless driving, and a custom one. The detailed information on every criterion is presented below.

Speeding

In the corresponding fields indicate a speeding value (minimum — maximum) in km/h which should be detected as a violation, and also a penalty value charged for this violation. Moreover, additionally you can select a validator (multiplier), averaging, and also indicate min/max duration and min/max speed at which a violation is detected. Note that speedings are detected by the road speed limits. However, in additional settings it is possible to specify the min/max speed at which the violation is fixed.

Acceleration

This parameter is used to detect unreasonably hard vehicle speedups. In the corresponding fields, indicate an acceleration value (min — max) measured in g which should be detected as a violation, and also a penalty value charged for this violation. Moreover, additionally you can select a validator (multiplier), averaging, and also indicate min/max duration and min/max speed at which a violation is detected. Such option as min/max speed can be applied, for example, in order to exclude low speed accelerations from a report.

Braking

This parameter is used to detect unreasonably hard deceleration of the vehicle. In the corresponding fields indicate a braking value (min — max) measured in g which should be detected as a violation, and also a penalty value charged for it. Also, additionally you can choose a validator (multiplier), averaging, and also indicate min/max duration and min/max speed at which a violation is detected. Such option as the min/max speed can be applied, for example, in order to exclude low speed braking from the report.

Turn

This parameter helps to evaluate the quality of passing the maneuver on the basis of the course during the turn, as well as the acceleration of the vehicle. In the corresponding fields indicate a value (min — max) measured in g which should be detected as a violation, and also a penalty value charged for this violation. Moreover, additionally you can choose a validator (multiplier), averaging, and also indicate the min/max duration and min/max speed on which a violation is detected.

Reckless Driving

This parameter is used to detect unreasonably hard accelerations prior to deceleration. In the corresponding fields,

indicate a value (min — max) measured in g which should be detected as a violation, and also a penalty value charged for it. Also, additionally you can choose a validator (multiplier), averaging, and also indicate the min/max duration and min/max speed at which a violation is detected.

According to the indicated settings the system detects so-called peaks of violations, afterwards sets value for every peak, and also identifies intervals on which the peaks can be found. Furthermore, if you have several *Reckless Driving* criteria with different violation settings, the system determines which one of them suits most. Afterwards, the filters indicated in the additional parameters section are triggered:

- **min/max speed** — on the basis of the received parameters, the system determines the maximum speed on the interval. Then the calculated speed is compared to the indicated speed range. If the calculated speed matches this filter, such a violation gets into the report. Otherwise, it is not included.
- **min/max duration** — if the duration of the criterion exceeds the *minimum* duration value indicated in the filter, such a violation gets into the report. If the duration of the criterion exceeds the *maximum* duration value, the penalty is multiplied by the number of maximum values detected on the violation interval.

As it has been mentioned before, a validator (multiplier) can be used for this criterion. The basic principles of using the validator (multiplier) are described below, in the *Additional parameters* section.

Custom
This parameter uses any sensor created in the system for a violation detection. Using a custom criterion, it is necessary to select a sensor itself (from the dropdown list), indicate the min/max violation value, and a penalty charged for it. Afterwards, you can choose a validator (multiplier), averaging, and indicate the min/max duration and min/max speed at which a violation is detected.

Key Parameters

Criterion
Violation type (speeding, acceleration, braking, turn, reckless driving, custom).

Name
Any name for the criterion chosen above. It is considered to be an obligatory field because the system allows the same criterion to be chosen multiple times.

Penalty
A number of penalty points charged for the violation of such type.

Sensor
This parameter is available upon choosing the *Custom* criterion. Any sensor created for the unit can be used. Violations are registered using the values of the chosen sensor. Note that when working with a digital sensor you can indicate additional settings:

- Violations from device — when this checkbox is activated, the duration of the violation coincides with the interval of the sensor operation (from on to off).

Min/max value
It is a range of violation values. If the received parameter value falls within the range, a violation is recorded (minimum value is included into the range, and the maximum is not).

Note.
For all the criteria except the custom one, the integration of intervals can be applied. In other words, if a repeated violation occurs during 10 seconds after the end of the primary one, then both these violations will be connected into one.

Note.
Take into consideration that when evaluating the driving behavior, the speeding is determined by road limits.

Additional Parameters

Validator
One of the sensors created for the unit, which is used to confirm or deny the incoming values by the selected criterion. The violation gets into the report upon receiving a positive value from the validator. Otherwise, the violation is not included into it.

Moreover, if you check the *Multiplier* box, the sensor chosen as a validator is used as a coefficient, multiplying the penalty score.

Here it is an example. If the main objective of the company is to provide the safety of the cargo during its transportation, the severity of violation evaluation should become higher. It is necessary to create a weight sensor and use it as a validator-multiplier. 0 value is received when the vehicle is empty, any positive value received for the loaded one. So, in case of speeding by the loaded vehicle the penalty value is multiplied by the value of the validator.

Min/max duration, sec
The range of the duration of the criterion (from — to) at which a violation is recorded. If the duration of the criterion exceeds the *minimum* value indicated in the duration range, such a violation gets into the report. If the duration of the criterion exceeds the *maximum* value indicated in the duration range, the penalty is multiplied by the number of maximum values detected on the violation interval.

Min/max speed, km/h
the speed range (from — to) at which a violation is recorded. The system determines the maximum speed at a violation interval. Afterwards, this speed is compared with the specified range values. If the determined speed matches the indicated speed range, such a violation gets into a report. Otherwise, it is not included.

Averaging
There are 3 options for working with averaging:

- **Averaging is disabled**. The penalty points received for the trip are summarized. Besides, they are accumulated in a linear progression. So, the bigger the trip interval is, the more violations can be registered.

However, this method does not match everyone. Therefore, it is possible to connect penalties with time or mileage intervals, and receive average value of penalty points for the interval.

- **Averaging by mileage**. Using the averaging by mileage, the total amount of penalty points is divided by the number of one-kilometer intervals of the trip. Therefore, as a result we receive average amount of penalty points for every kilometer of the trip.

Note that if a trip is less than 1 kilometer, averaging by mileage cannot be applied to the trip.

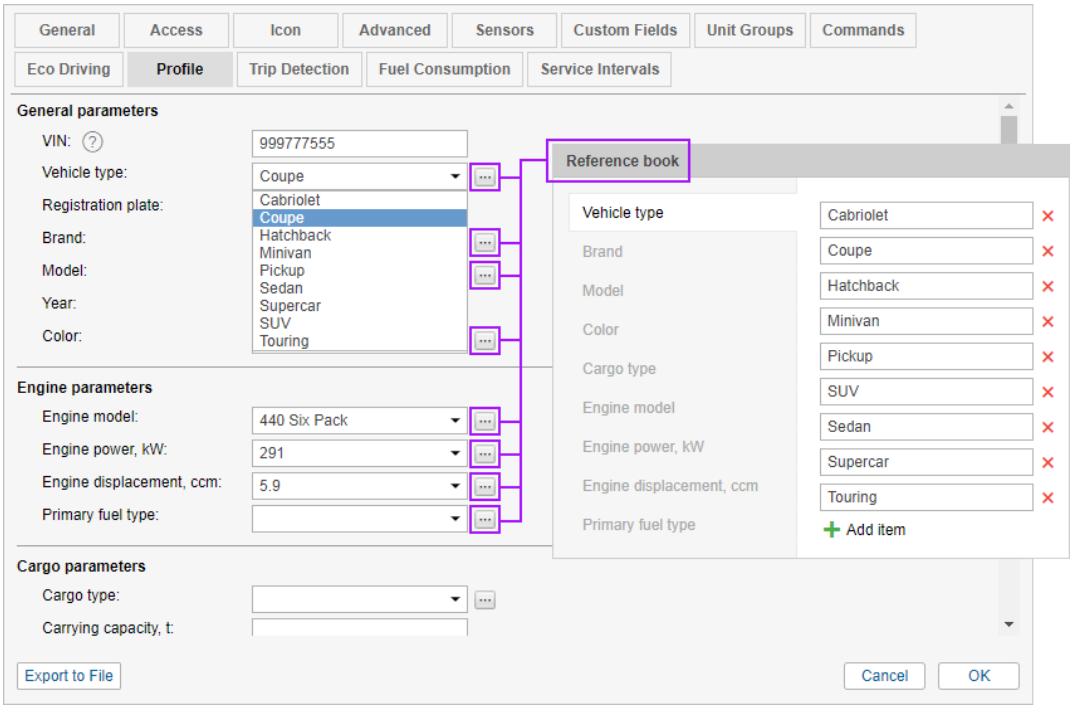
- **Averaging by time**. Using the averaging by time, the total amount of penalty points for the trip is divided by the number of one-minute intervals of the trip. Therefore, as a result we receive the average amount of penalty points for every minute of the trip.

Note that if a trip is less than 1 minute, then averaging by time cannot be applied.

Profile

Required access: *View custom fields* — to view this tab, *Manage custom fields* — to edit this tab.

On the *Profile* tab of the unit properties dialog in the corresponding fields you can enter registration and technical information concerning a vehicle. Depending on the checkboxes indicated in user settings, profile information can be displayed either in the work list or in the unit tooltip. Besides, the characteristics of the unit can be displayed in the corresponding report. Moreover, the characteristics, as well as other unit properties can be imported or exported.



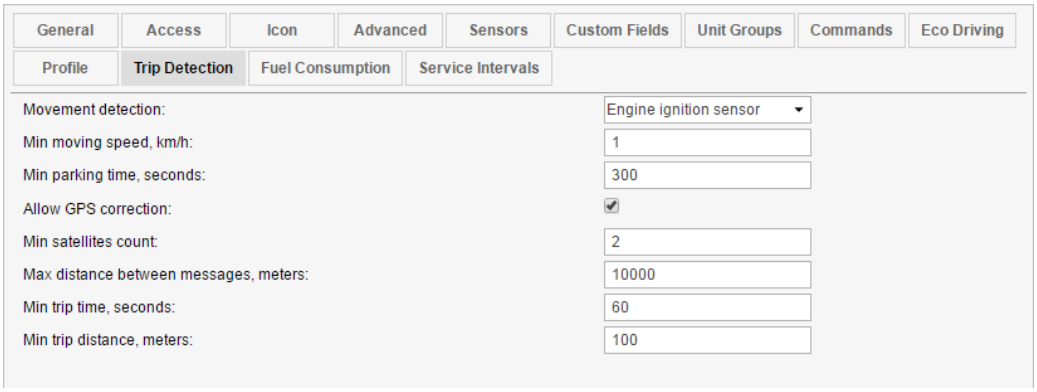
In addition to the standard input fields, the combo boxes (fields which allow to enter the value, the select the value from the drop-down list, and filter the drop-down list based on the entered value) are also displayed in the *Profile* tab. The dropdown list consists of values saved in the reference book. The reference book may contain up to 100 values for each combo box. The reference book can be filled in manually (open using the button to the right of a combo box and add new values) or automatically (enter values in combo boxes and save the entered characteristics).

Depending on the settings of the unit, different measurement systems can be applied to the characteristics.

Trip Detection

Required access: *View detailed properties* — to view this tab; *Edit trip detector and fuel consumption* — to edit this tab.

The trip detector is configured in the Unit Properties dialog and is used to detect movement intervals (trips) and idles (stops, parkings). Depending on the equipment and settings on this tab, the reports, depending on the intervals of movement and idles, can look quite different. Therefore, it is important to set the correct settings here.



Movement Detection

There are five main methods to detect movement:

1. **GPS speed**
   can be applied to any device type and configuration. The parameters of this method are described below.
2. **GPS coordinates**
   can be used for devices that send location data only, since speed is not taken into account when calculating motion. The movement is detected if coordinates in two successive messages are different. This type of movement detection is always used with GPS correction (see below).
3. **Engine ignition sensor**
   is available for units that have ignition sensor. The movement is detected upon meeting two conditions: the sensor should be switched on and the message is received at a speed that is greater than or equal to the minimum speed. The end of the movement is detected when the sensor is switched off or a speed value is less then the indicated minimum moving speed. Also, movement is considered to be terminated when the timeout is exceeded.
4. **Mileage sensor**
   can be used for units which have a mileage sensor. The sensor transmits the absolute mileage. The movement is detected when the values of the distance sensor increase and the message is received at a speed greater than or equal to the minimum speed. Moreover, if the speed parameter is absent or invalid, the state of motion is determined only by the growth of the values of the mileage sensor.
5. **Relative odometer**
   shows what distance the unit has travelled since the previous message. The movement is detected upon receiving a message with more than 0 value of a relative odometer and speed value higher than the minimum moving speed. Moreover, the state of movement can be detected using relative odometer values only, if the speed parameter is missed or invalid.

After the movement detection method is chosen, use the parameters described below. These parameters allow to

detect the states of movement, such as trips, parkings, and stops.

Detection of Movement States

Min moving speed
Specify what speed should be considered as the beginning of the motion. This is required to exclude data outliers. The equipment can determine coordinates with some inaccuracy, therefore assign a low speed to the unit that is not actuaaly moving. Set this parameter to exclude such cases from the trips. When determining movement by a sensor (for example, ignition), this parameter is used to detect stops inside a trip.

Min parking time
Specify how long (in seconds) the unit should be motionless to register this as a parking. This option allows you to include stops (in traffic jams, at lights or intersections) in a trip (instead of breaking the trip). However, if the time interval between two closest messages is longer than the minimum parking time, the trip is broken into two parts. When detecting trips by the sensor (for example, ignition), this parameter is applied only to intervals with the sensor off or at a speed less than a minimum moving speed. If *Allow GPS correction* is on, the value of the minimum parking time should be no less than 10 seconds. Note that to detect a parking duration, it is necessary to receive at least two messages with a speed value below the min moving speed indicated.

Allow GPS correction
This option is applied automatically for the first two types of motion detection. In case you use one of the sensors (ignition, mileage, or odometer), to receive more precise data in reports, you can use GPS correction in addition. To activate GPS correction of trip/stay detection, check the *Allow GPS correction* box and configure the parameters described below.

Min satellites count
Specify the number of available satellites at which you should consider the data to be valid. Recommended number is three and more, but for some types of equipment two is enough.

Max distance between messages
This setting is applied in the following situation: if from the previous message to the current one a unit has moved a distance greater than the specified one, the previous interval is terminated and a new one begins. The value of this field should be at least 50 meters.

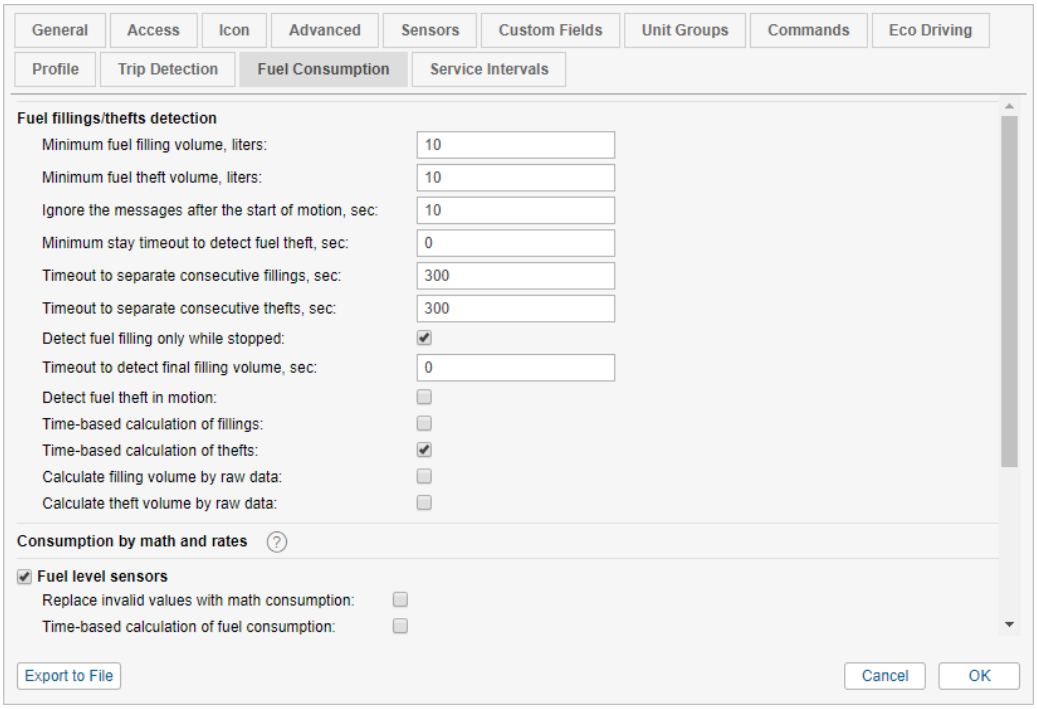
Min trip time
This parameter is designed to exclude cases of the data outliers. For example, the unit in a parking lot moved from one place to another, and movement of 40 seconds was detected. To exclude such cases from trips, set the minimum trip time (in seconds).

Min trip distance
This is a similar parameter. But here you indicate the minimum trip distance. For example, the car is parked, and the device sends coordinates according to which the car has moved slightly. It can happen due to the permissible equipment error. This situation can be counted for movement and to exclude it, indicate how far the unit should move to consider it a trip.

Fuel Consumption

Required access: *View detailed properties* — to view the tab; *Edit trip detector and fuel consumption* — to edit the tab.

Fuel fillings and thefts can be detected only if a unit has fuel level sensors and has the *Fuel level sensors* option activated. Fuel consumption is calculated if there are fuel consumption sensors. The determination accuracy depends on the accuracy of the installed sensors as well as on their correct configuration. The parameters adjusted on this tab are used during the calculations. For your convenience they are divided into several sections.



Fuel Fillings/Thefts Detection

Minimum fuel filling volume
The minimum increase of the fuel level that should be considered a filling.

Minimum fuel theft volume
The minimum decrease of the fuel level that should be considered a theft.

Ignore the messages after the start of motion
This feature allows to skip the indicated number of seconds at the beginning of the movement, when due to different factors the received fuel level data may not be very accurate. The beginning of the movement is registered when the minimum moving speed set in the *Trip detection* tab is achieved.

Minimum stay timeout to detect fuel theft
The minimum duration of the interval with no movement, followed by a decrease in the fuel level in the tank for more than the minimum fuel theft volume indicated above.

Timeout to separate consecutive fillings
The system can sometimes detect more than one fuel filling during a short time interval. In such cases, they can be combined in one if the time between them (timeout) does not exceed the time specified in the setting.

Timeout to separate consecutive thefts
This feature is similar to the previous one. Thefts are not summed up if the timeout is exceeded and if the fuel level has increased between them.

Detect fuel filling only while stopped
If this feature is activated, the changes of the fuel level are searched only within the intervals with no movement. This allows to reduce the number of false refueling that may be caused, for example, by the fuel level fluctuation during the movement. The initial fuel level is taken from the first message without movement or from the last message with movement.

Timeout to detect final filling volume
in the process of filling there can be interruptions. This option appears if the previous one is selected and allows to set the duration of such interruptions. In this case to determine the fuel level after refueling, not the last message that corresponds to a filling is used, but the one that follows the indicated timeout.

Detect fuel thefts in motion
Traditionally, fuel thefts are searched during the stops. This feature allows to search for them during the motion, too. For example, it may be useful for ships. However, in many cases it may cause the detection of false fuel thefts due to probable fuel level differences while, for instance, moving on rough terrain.

Time-based calculation of fillings
It is recommended to use this calculation method for the units with high fuel consumption during the idling (generator, tower crane, etc.). When it is activated, the whole time period is taken into account regardless of trips/stops.

For a time-based fuel calculation the *Time-based calculation of fillings*, *Time-based calculation of thefts* and *Time-based calculation of fuel consumption* options should be activated simultaneously.

Time-based calculation of thefts
The feature is similar to the previous one, only applicable to fuel thefts.

Calculate fuel filling volume by raw data
With this feature activated, the initial and the final fuel levels on the interval corresponding to the fuel filling are replaced with the values from the messages before applying the filtration.

Calculate theft volume by raw data
With this feature activated, the initial and the final fuel levels on the interval corresponding to the fuel theft are replaced with the values from the messages before applying the filtration.

Note.
Fuel fillings and thefts can be controlled by means of the tabular *Fuel Fillings* and *Fuel Thefts reports, as well as the* Send fuel information by e-mail or SMS job or the notification about fuel fillings/thefts.

Fuel Level Sensors

When this type of sensors is used, the fuel consumption is determined on the basis of its level in the tank according to the following scheme: [fuel level value at the beginning of the interval] — [value at the end of the interval] + [fillings] — [thefts].

Note.
The intervals are different for different tables. You can learn more about the intervals from the description of the tables.

Replace invalid values with math consumption
If the feature is activated, in case of erroneous values on an interval they are replaced by the values calculated mathematically. The mathematical calculation uses the data indicated in the properties of ignition, relative and absolute engine hours sensors (option *Consumption, l/h*) and the value of the engine efficiency sensor.

Time-based calculation of fuel consumption

If the option is enabled, while calculating the fuel, all the time is taken into consideration, it does not matter whether the unit has been moving or not. If it is disabled, the fuel level during the intervals with no motion is not considered during the calculations.

Filter fuel level sensors values
This feature allows to apply median filtering to the received values of the sensor to exclude data emissions (sudden increases or decreases). The minimum filtration level is 0 (zero) — with a smoothing of 3 messages. Then all the filtration levels from 1 to 255 are multiplied by 5 to determine the number of messages which are used for smoothing. Therefore, the higher the filtration level is, the more the fuel chart is approximate to a straight line, that is why it is not recommended using the filtration level higher than 8 (the optimum is from 0 to 3).

Example. Let us suppose that at the beginning of a period covered the value of a fuel level sensor is 230 l, and at the end — 150 l. The consumption by the FLS is: 230 — 150 = 80 (l).

Impulse Fuel Consumption Sensors

Two types of impulse fuel consumption sensors are used in Wialon: simple accumulative and with overflow (on reaching a definite value, the impulses counter resets and the calculation restarts from zero). It is not practical to use the first type, while the sensors with overflow are widely spread.

This calculation method takes into consideration the values of the sensors from the previous and the current messages: the previous value is subtracted from the current one and, if needed, the calculation table is applied to the received value. The sum of the values received on the interval corresponds to the amount of the fuel consumed.

Every sensor of this type must have a calculation table from impulses to liters (gallons).

Two options are available in this section:

Max impulses
If there is a limit after which the impulse counter is zeroed (overflow), it can be indicated in this field. However, with this limit adjusted in case of an emergency reset, the calculations will be meaningless.

Skip first zero value
If this option is activated and the value of the *Max impulses* field is *0*, the difference between the current and previous sensor values is taken into account when calculating the fuel consumption. If the value of the *Max impulses* field is nonzero, the *Skip first zero value* option is not taken into account when calculating the fuel consumption.

Absolute Fuel Consumption Sensors

The sensors of this type show the fuel consumption during all the period of vehicle operation. AbsFCS values increase all the time, so overflow of such a sensor is not expected.

The fuel consumption is calculated in the following way: the sensor's value at the beginning of the interval is subtracted from the sensor's value at the end of the interval and, if needed, the calculation table is applied (to every sensor of this type individually).

Instant Fuel Consumption Sensors

If this type of sensors is used, the hardware sends messages that contain the amount of the fuel consumed from the previous message till the current one. Accordingly, to determine the fuel consumption on an interval, the values of the InsFCS are summed.

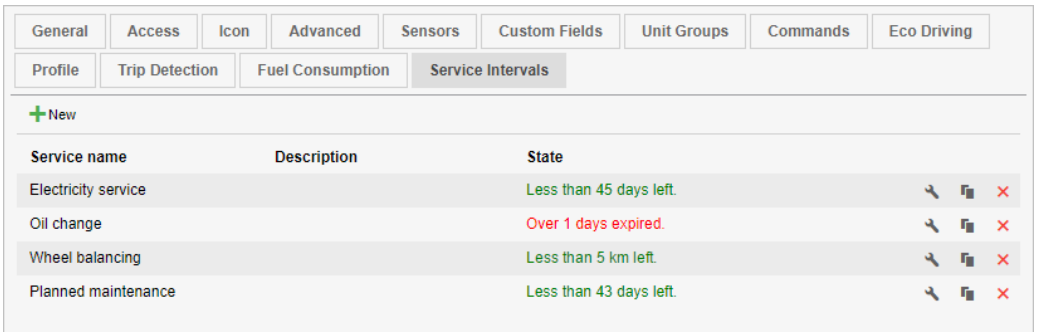
For instance, the hardware has sent three messages with the following values: x1 = 0,01 l, x2 = 0,023 l, x3 = 0,048 l. The fuel consumption during this interval is: x1 + x2 + x3 = 0,01 + 0,023 + 0,048 = 0,081 (l).

Service Intervals

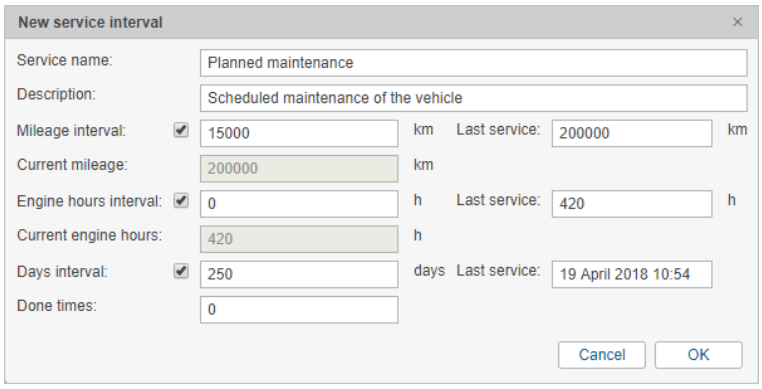
Required access: *View service intervals* — to view this tab and its contents; *Create, edit, and delete service intervals* — to create new intervals, and to edit and delete existing ones.

On the *Service Intervals* tab of the Units Properties dialog, you can define maintenance intervals to perform all the necessary maintenance activities in time.

In the list you see the name of each interval, its description (if available) and the state — how many days, engine hours or mileage have left or how long they are overdue. Depending on the state (time left or expired), the lines are either red or green.



To add a new service interval, click *New* (+). Then enter the required parameters: name, description, interval and the time of the last execution.



There are three ways to indicate the interval:

- **Mileage interval** means that the service should be performed every indicated number of kilometers (miles) traveled.
- **Engine hours interval** means that the service should be performed every indicated number of engine hours.
- **Days interval** means that the service should be performed every indicated number of days.

You can simultaneously select several interval types at once, and each of them is tracked independently. For example, the term by days can already be expired, and at the same time, the term by mileage — not.

When selecting an interval, indicate which counter value (or day) was when this kind of service was performed the previous time. Enter this value into the *Last Service* field. For your convenience, the current values of the counters are indicated below.

Attention!
Check your counters properties on the *General* tab, and do not forget to mark the *Auto* checkbox.

Done times: here you indicate how many times this kind of service has already been done. This number can be entered into the field manually or changed automatically when registering a service of this kind. Besides, after registration the time of the Last Service changes, and the count of days/mileage/engine hours are zeroed and started again.

At the end press *OK*. The newly created service interval appears in the list. To manage the intervals, use the buttons located in the end of the line opposite to the interval name:

- *Copy* opens a dialog with the parameters of the selected interval. You can edit these parameters and save the interval under another name.
- *Properties* opens a dialog to view and/or edit the interval.
- *Delete* deletes the selected interval.

Service Intervals in Use

Tracking

Service intervals with their terms can be indicated in the unit tooltip and in the extended unit information. See User Settings.

Events Registration

Maintenance works can be registered in unit history and used in the report later. When registering maintenance, it can be bound to a certain service interval (existing in unit properties). After registration, the count of days/mileage/engine hours is restarted, the number of executions is added, and the last service term changes. The changes can be estimated in the unit tooltip, in extended unit information, as well as in the unit properties dialog.

Notifications

You can create a notification with the *Maintenance* control type. With the help of this tool you can receive automatic notifications by e-mail, SMS, in the online pop-up window or by other means about service terms which are approaching or expired.

Reports

Three tables related to service intervals can be generated for units or unit groups: *Maintenance*, *Upcoming maintenance*, and *Utilization cost*. The report on maintenance represents the list of registered maintenance works. The report on upcoming maintenance contains a list of service works set for a unit, as well as the status of their execution. The report on utilization cost includes maintenance works as well as fillings.

Some information about maintenance can be shown in Statistics: total duration of maintenance works, total cost of maintenance works, number of services performed, number of maintenance and refueling costs, and the total cost of operation.

Unit Groups

Unit group is a series of monitoring units that are combined together on the basis of a certain feature or without it. Unit groups are widely used in the Wialon Local system and are useful to both managers and end users. Therefore, it is possible to work with unit groups both in CMS Manager and in the main interface.

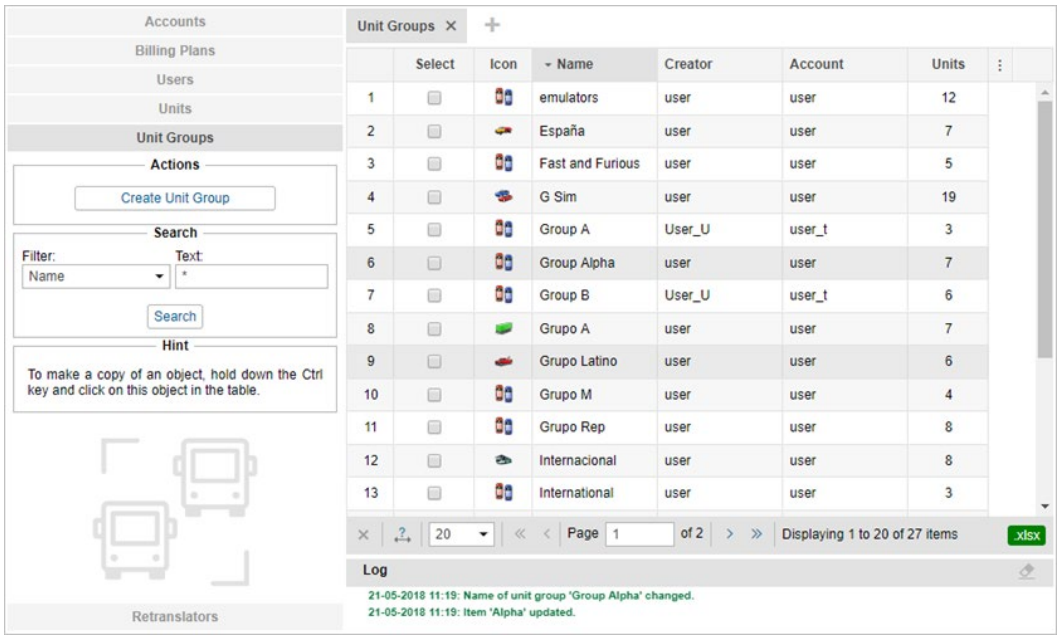
Unit Groups in Management

Unit groups help in the management of the system. They facilitate the assignment of rights to units, allowing you to give the user access to a whole group at once.

Unit groups are widely used for the monitoring purposes.

Working with Unit Groups

To work with groups of units, open the *Unit Groups* tab in the navigation panel of CMS Manager. Here you can create, view, edit, copy, and delete unit groups.



There is a button to create a new unit group, as well as a search filter. The table of resultsdisplays the name of the group, the icon assigned, the creator, the account, and the number of units. Standard operations with objects (create, view, edit, copy, delete) were described below.

Unit Group Properties

When creating, copying, editing or just viewing unit group properties, you see a dialog with several tabs where group configuration is adjusted. The number of tabs can vary depending on your access rights (max — 4).

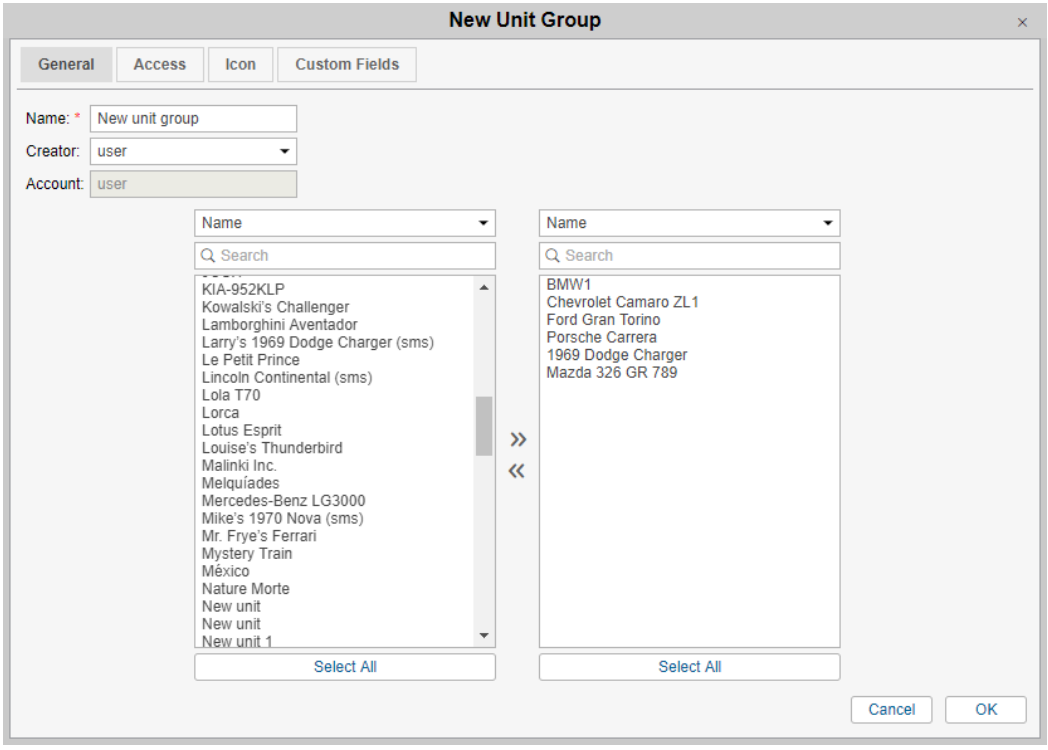
General

Name
The name of a unit group must be between 4 and 50 characters which must not be forbidden.

Creator
The creator is the user on behalf of whom the group was created (displayed if the current user has at least minimal access to it).

Account
Here you can see which account the unit group belongs to (if you have any access to this account). This property, as well as the creator, cannot be changed afterwards.

Units
Add units to the group. On the left, there is a list of all available units. For convenience of search it is possible to use the dynamic filter. This filter works not only by name, but also by phone number, unique ID, device type, fields, etc. On the right, there is a list of units in the group. To add a unit to the group, double-click on it or click *Add*. To remove a unit from the group, press *Remove* or double-click on the unit in the right column.
If you are editing an existing group, you are required to have *Edit ACL propagated items* access to this group to add/remove units. Otherwise, all units in both sections will be gray and you will not be able to move them.



Note.
In addition to the manual way to create groups, there is an automatic method that is available in the Wialon Local user interface. See Notification Action for details.

Access

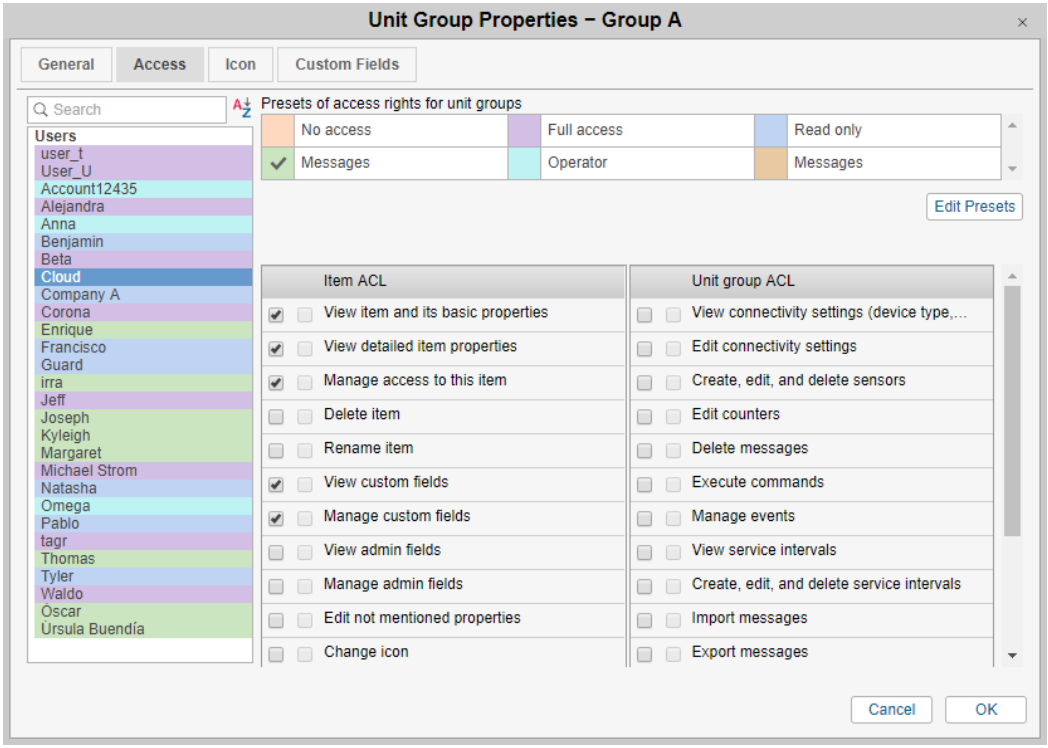
Required access: *Manage access to this item* — to group; *Manage user's access rights* — to users.

On this tab, you can define the access rights that different users will have to this group.

On the left, there is a list of users whose access rights can be controlled. Colored background indicates the users who already have some access.

Select a user on the left and check access boxes for this user on the right. Access rights are divided into two sections — standard rights (Item ACL) and special rights (Unit group ACL).

Here you can read more about access granting.



Icon

Required access: *Change icon* — to view this tab and change the icon of the group.

Image for the group can be selected from the set of standard icons (the *Icon Library* button) or loaded from the disk (the *Browse* button).

The icon is used mainly to display the group in the Unit Groups list. However, it may also be used to display units that belong to this group. If a unit has a default icon, and a unit group which it belongs to has a non-default icon, then unit acquires the icon of this unit group. Here you can read more about icons.

Custom Fields

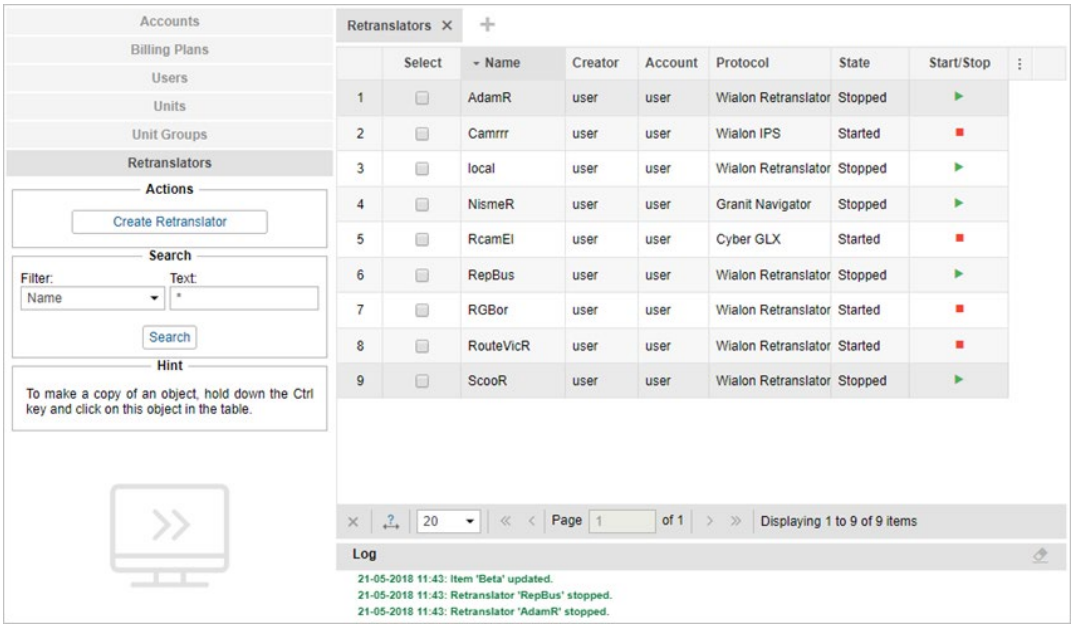
Required access: *View custom fields* — to view general custom fields; *Manage custom fields* — to create, edit, and delete general custom fields; *View admin fields* — to view administrative custom fields; *Manage admin fields* — to create, edit, and delete administrative fields.

Here you can enter any additional information about the unit group. Information is entered in the form of fields: <field_name> — <field_value>. Enter a field name and its value and press the *Add* button. To delete a field, click *Remove*. Administrative fields (seen only to users with special access rights) are marked in the first column.

Retranslators

Messages from units can be retranslated in real-time from your server to other servers or systems. It is possible to retransmit data to several servers simultaneously and at different protocols. The ID of a retranslated unit can be different from its ID in Wialon Local.

Retranslation is possible only in CMS Manager and it is done in the Retranslators panel. There you can create any number of retranslators that will transmit messages of selected units to other systems. At any moment, any retranslator can be stopped or resumed again.



To create a retranslator, press the *Create Retranslator* button. In the dialog enter a name for the retranslator (at least 4 characters) and choose a retranslation protocol.

The number of available retranslation protocols depends on your license. The full list of protocols is the following:

- Wialon Retranslator,
- Nis (M2M),
- Granit Navigator,
- SCOUT,
- Cyber GLX,
- Wialon IPS (1.1),
- VT 300,
- EGTS,
- SOAP,
- TransNavi,
- NVG,
- RTTI.

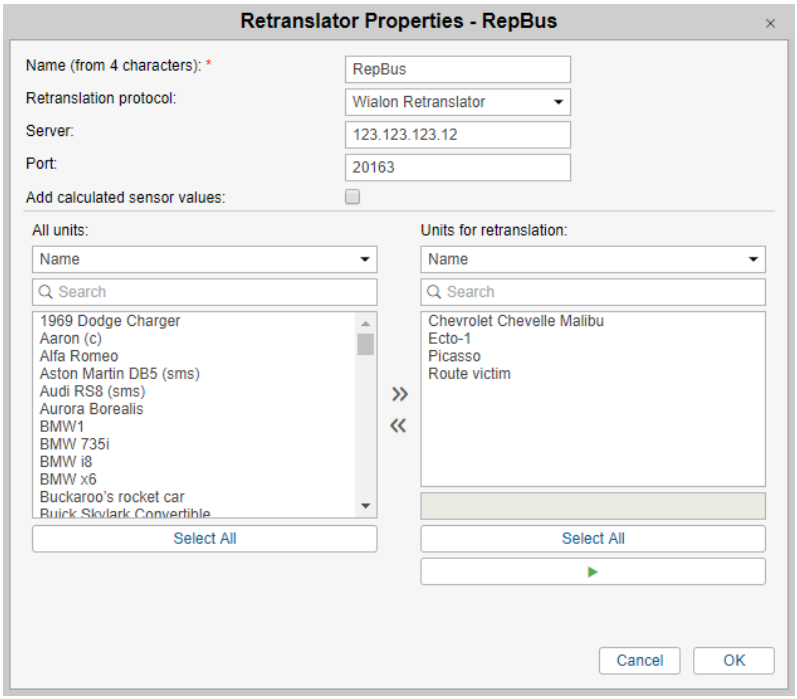
Then indicate the retranslation server, port, and in some cases authorization (*auth*). If the port is not indicated, it is automatically set by default. Authorization for Nis protocol is login and password separated by a colon (login:password). As for the EGTS protocol, you can disable authorization if it is irrelevant, indicate the time interval (in seconds) at the end of which the authorization will be repeated, and set the dispatcher ID. Also, you can indicate the carrier ID for the RTTI

protocol. Moreover, note that such retranslation protocols as Wialon Retranslator and Wialon IPS support the option of calculated sensor values retransmission. Check the corresponding box (*Add calculated sensor values*) to enable the option.

Below is a list of available units. For convenience of search you can use the dynamic filter. Here units can be filtered not only by name, but also by phone number, unique ID, device type, creator, profile fields, etc. After the necessary units have been found, move them from the left list (available units) to the right one (units for retranslation) by double-clicking on a unit or using the arrow-shaped buttons. Note that the dynamic filter can be applied to the list of units for retranslation as well (filtering by name and redefined ID). To delete units, move them from the right list to the left one using the *Remove* button (arrows pointing left). Besides, you can input a new ID for units to be retranslated. For retransmission by Granit Navigator protocol, the unit ID should be a number in the range from 0 to 65535.

Attention!

- The data from the units with empty IDs cannot be transmitted. For that reason, such units are not saved in the list of units for retranslation and when you reopen the dialog, you see them in the left part again.
- For units with two IDs, the first one is shown.



When a new retranslator is created, it is stopped. It can be started from the list of retranslators or in the dialog of its properties.

In the results panel, you can see the retranslator's name, creator, retranslation protocol, server address, state, and buttons to start/stop retranslator and delete it. Click on a retranslator to view/change its properties.

There is a specially developed app to work with retranslators — Protocoller.

Past Period Retranslators

This option makes it possible to retransmit messages from units for the past period of time. In other words, you can specify a particular period of time in the past for which you would like to retransmit the data of the selected units. Note that data retransmission for the past period does not start immediately (it can take up to 10 minutes before beginning).

The required actions:

- In the retranslator dialog check the box *Retransmit past period data*;
- Indicate the period of retransmission (from — to);
- Press the start button to the right of the retransmitting period field.

Note.
This option is active only if the prime retranslator has already been started.

The progress of the data retransmission is shown in percentage in the *History* column of the results panel. The indicated value shows the percentage of the units for which data retransmission has already been finished.

Import and Export

The Import/Export tool is designed to easily transfer and copy different objects and their properties. The Import/Export tool is available in both Wialon Local interfaces — manager's and user's. To open the tool, click on the corresponding item in the User Menu of CMS Manager or the main interface.

Import/Export Subject

You can import/export:

- unit properties (sensors, commands, fuel consumption settings, etc.),
- contents of a resource (geofences, drivers, notifications, etc.),
- user settings (Monitoring panel settings, contents of user's tooltip, user's custom fields, etc.).

Moreover, you can choose particular items to be imported/exported, for example, you can indicate not all but certain service intervals or sensors (for units), certain geofences and jobs (for resources), etc.

Import/Export Destination

Import and export of data can be done with the help of the files or directly from one object to another.

Exporting **to a file** allows you to store information on a computer and use it when necessary. For instance, you can create templates of unit properties, which makes it considerably easier to create and configure new units. Two file formats are supported:

1. *WLP* is a native format for Wialon Local. It can be used to store and transfer different kinds of data such as unit properties, resource contents, and user settings.
2. *KML* (if compressed — *KMZ*) is a widely known file format used to display geographic data in Google Earth and Google Maps. This format can be used in Wialon Local to exchange geofences between resources as well as import and export them from/to external sources.

Exporting **to an object** allows you to transfer data (properties or contents) straight from one object to another one of the same type or to several objects at once. For example, you can copy geofences from one resource to another.

Required Access

Access rights are important for import/export. Keep in mind two simple rules:

1. You can export from an object only those properties or contents that are available to you (you should have at least view access to these properties in the initial object).
2. You can import into an object only those properties or contents that are editable for you (you need the *Create, edit, delete* access to these properties in the destination object).

See more:

- Import from WLP
- Export to WLP
- Import from KML/KMZ
- Export to KML/KMZ

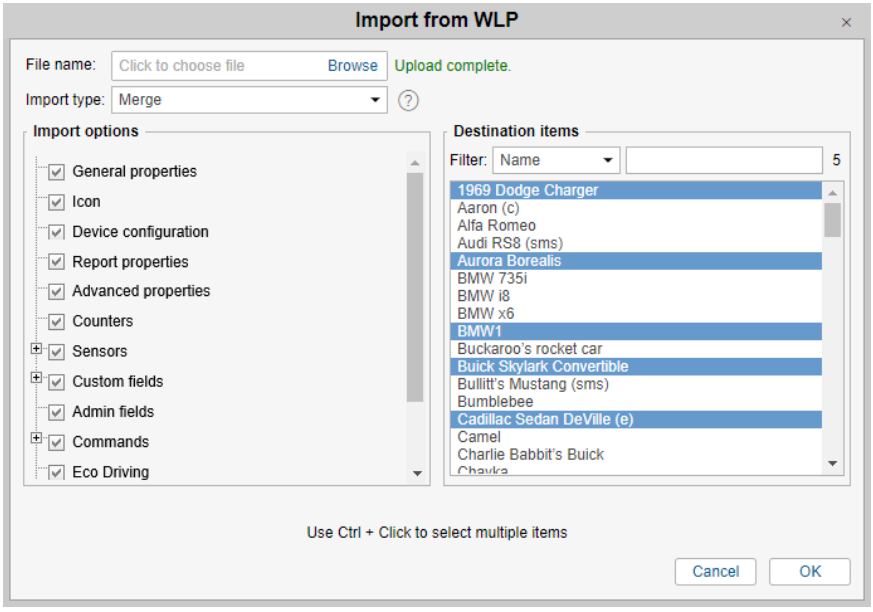
- Unit Properties Transfer
- Resource Contents Transfer
- User Settings Transfer

Import from WLP

This option allows you to import unit properties, resource contents, or user settings from a WLP file to an object of the appropriate type. It makes sense only if you already have any WLP files.

Choose a file and press *Upload*. Afterwards, the chosen file is processed on the server, and available contents are displayed in the *Import options* section. At the same time, objects of a proper type are displayed in the section on the right (*Destination items*).

Note.
This list is filtered by units of measure, since it is not possible to import data if the source and destination items have different systems of measurement. For more information see the Measurement System and Conversion section.



If the file contains the properties of the unit, the list of found properties is displayed to the left, and the list of available units is displayed to the right. If the file contains data from the resource, the list of found elements is displayed to the left, and the list of available resources is displayed to the right. If the file contains user settings, the list of these settings is displayed to the left, and the list of available users is displayed to the right.

On the left, select the data to import, and on the right — the destination objects. Use the dynamic filter to quickly find a necessary object (works by various criteria).

For unit properties (such as sensors, custom fields, commands, service intervals) and resource contents you should also choose import type:

- *Replace:*
  data will be replaced completely.
- *Merge:*
  items with the same name will be replaced and the new items will be added.
- *Append:*
  items with the same name will be left intact and the new ones will be added.

At the end press *OK*. See the log to check the status of the operation.

Regardless of the selected type of import, the *Replace* type is always used when importing the **eco driving criteria**, that is, the old data is deleted and the new one is entered.

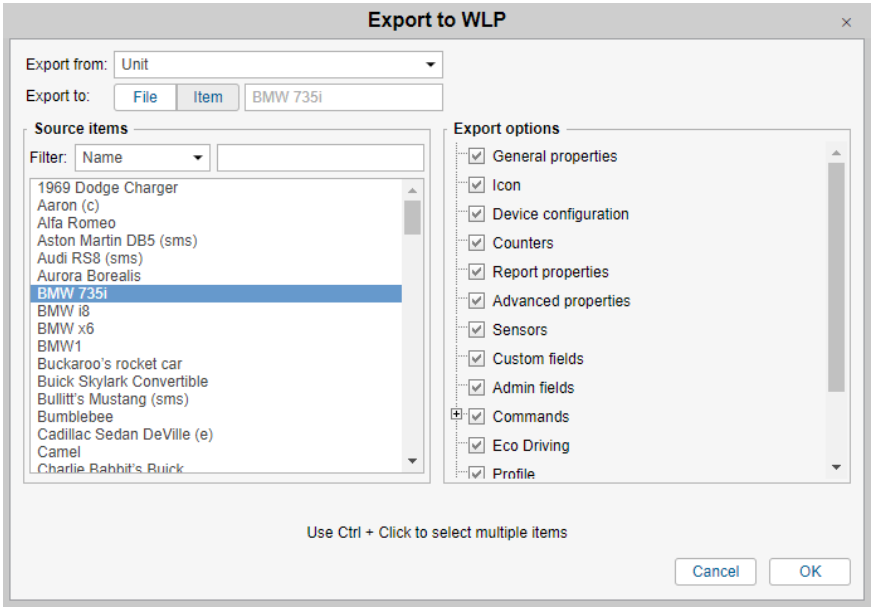
Export to WLP

This option allows you to export data from an object to a WLP file or straight to another object.

Choose object type (unit/resource/user) in the *Export from* dropdown list. Then select the export destination — to a file or an item.

Export to an item

In the *Source items* section, select a necessary item (just one). To quickly find certain object, use the dynamic filter (works by various criteria). When the item is selected, its available properties or contents are displayed on the right, in the *Export options* section. Choose the data for export. To tick all items at once, hold the *Ctrl* key and select any item. Repeat the same operation to uncheck all items at once.

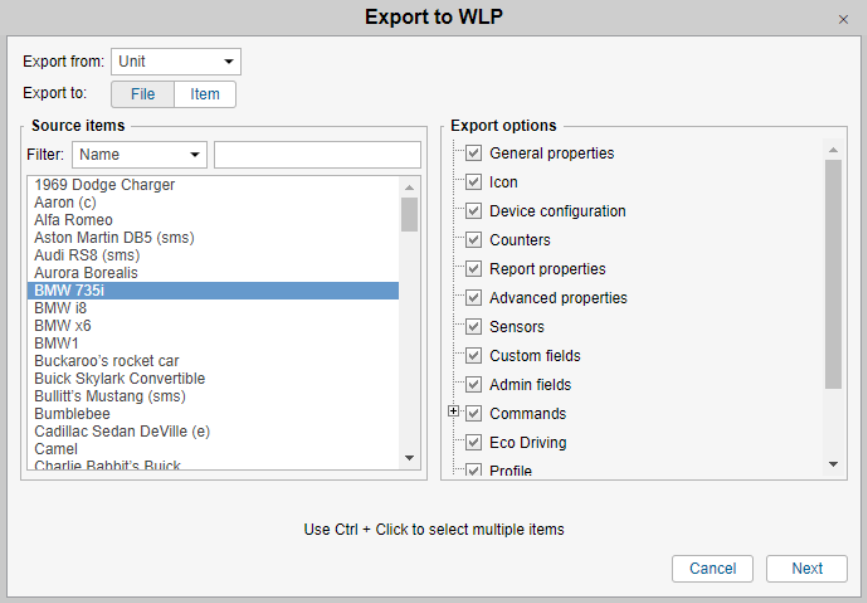


If you selected an export to an item, the Import dialog described above is displayed. Select destination objects there and press *OK*.

Export to a file

You can choose one or more objects to export to a file. To select multiple items, use the *Ctrl* or *Shift* keys. However, note that when exporting several objects, the subitems of Commands, Sensors etc. cannot be expanded. Thus, you can export only the whole contents of such tabs.

You can additionally type a name for the file. Otherwise, the file is named after the origination item (if only one is chosen) or have a name like *Units/Resources/Users* (if multiple items are selected).

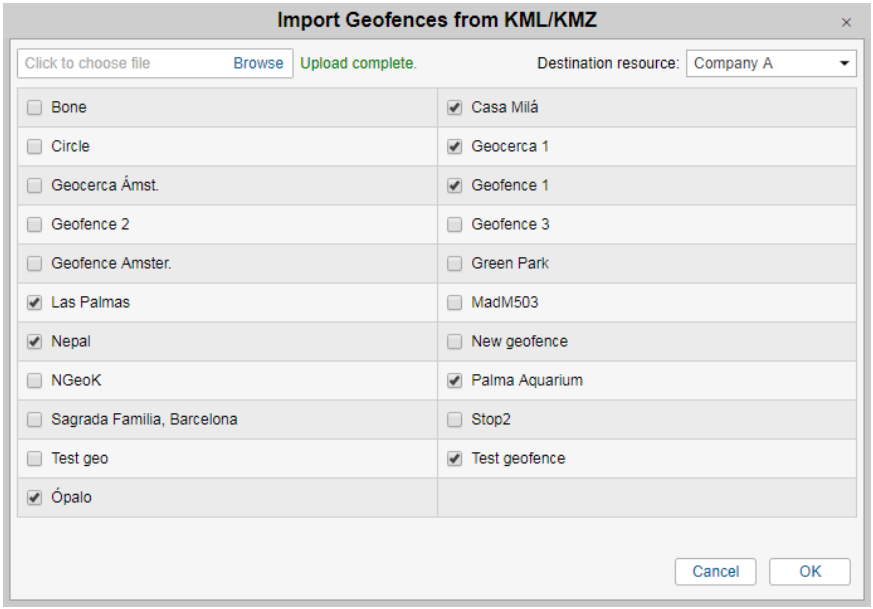


If you export to a file, after you press *OK*, the file is stored on the disk. As a result, you get a single WLP file (in case of one source item) or an archive with several files (in case if multiple source items).

Import from KML/KMZ

This option allows you to import geofences from a file to a resource.

Indicate the path to a proper file and press *Upload*. The file is processed on the server, and its contents are displayed below. Check items to be imported and select a destination resource. In the dropdown list, you can see only those resources to which you have *Create, edit, and delete geofences* access.

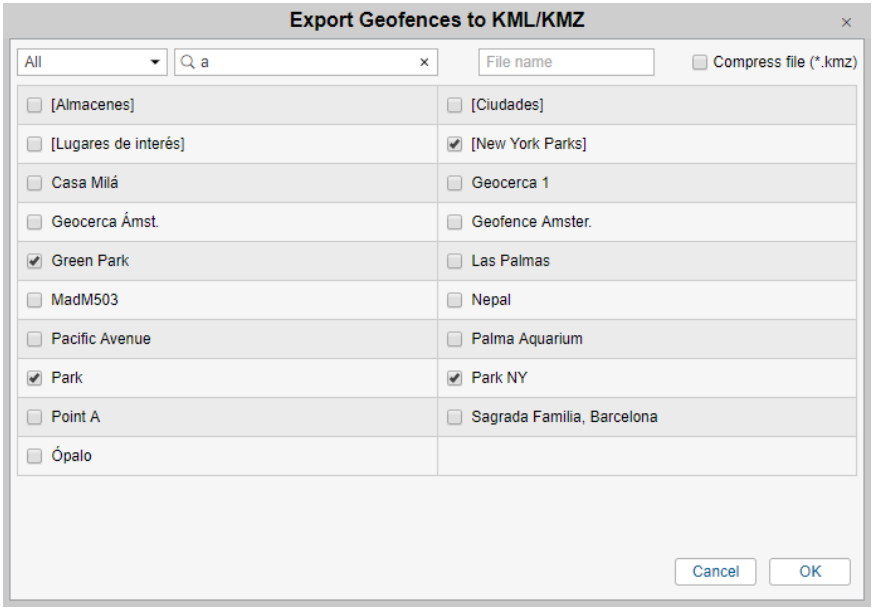


See the log to check how the operation goes. If the import fails, you get a warning message.

Export to KML/KMZ

This option allows you to export geofences from all available resources to a file.

When you export to KML/KMZ, the list of all available geofences (depending on the item type chosen) is displayed. Check the items you want to export and press *OK*. Optionally, you can enter a file name and compress file as KMZ. After that, press *OK* and save the file.



Unit Properties Transfer

Almost any unit properties can be imported and exported:

- **General properties**
  Unit name, device type, phone number(s), unique ID(s), device access password (from the *General* tab).
- **Icon**
  Icon of the unit and the state of the *Rotate icon* checkbox. Note that to transfer an individual icon, you must have the *View item and its basic properties* right towards a unit the icon of which you are going to transfer.
- **Device configuration**
  Device configuration parameters (from the *General* tab).
- **Counters**
  The current values of counters and their calculation parameters (from the *General* tab).
- **Report properties**
  Parameters used in reports, as well as speeding and driver activity parameters from the *Advanced* tab.
- **Advanced properties**
  Color parameters and messages filtration parameters from the *Advanced* tab.
- **Sensors**
  Contents of the *Sensors* tab.
- **Custom fields**
  Contents of the *Custom Fields* tab.
- **Admin fields**
  Available admin fields from the *Custom Fields* tab.
- **Commands**
  Contents of the *Commands* tab.
- **Eco Driving**
  Contents of the *Eco Driving* tab.
- **Profile**
  Contents of the *Profile* tab.
- **Trip detector**
  Contents of the *Trip Detector* tab.
- **Fuel consumption**
  Contents of the *Fuel Consumption* tab.
- **Service intervals**
  Contents of the *Service Intervals* tab.

An exception is user access and group membership (if you want to transfer such data, it's better to use the copy function), as well as information about the creator and account.

Units with the same unique ID within one device type, as well as units or drivers with the same phone numbers cannot exist in the system. If you attempt to import such fields, their values are emptied, and you can edit them later.

Resource Contents Transfer

Any contents of a resource can be imported and exported:

- **geofences**,
- **jobs**,
- **notifications**,
- **drivers**,
- **trailers**,
- **passengers**,
- **report templates**.

When transferring geofences from one resource to another, the standard icons from the geofence library can be transferred using one of the previously described methods (KML/KMZ, and WLP import/export). Other images of geofences are transferred using KML/KMZ files only.

Drivers and trailers are exported without images. If you need to transfer them, you can use the copy function instead of import/export.

Drivers with the same phone numbers (or with phone numbers that already belong to some units) cannot exist in the system. Therefore, when you try to import such fields, their value will be reset (they can be edited later).

Note that when importing drivers and trailers by merger or replacement, of all their attachments (bindings) are lost.

If the report template contains parameters to filter intervals by geofences, these parameters should be checked (and probably corrected) when the template is copied to another resource as geofences can be bind to a template only within the same resource. Also, connection with units can be lost because the new owner of the template does not have enough access to the units.

The same is true for jobs and notifications if they mention geofences, units, users, reports, groups etc., since the new *owner* of a notification/task must have access rights to work with these objects.

User Settings Transfer

Individual settings can be transferred from one user to others or stored in a file.

You can import data from the *User Settings* dialog, *Settings*, *Maps* tabs, and *Monitoring* panel. To do so, you should have the *Edit not mentioned properties* access to a user you import the data to. Most of User Properties can be imported, too (the tabs *General*, *Advanced*, *Custom Fields*). To import them, you should have the *Change flags for given user*, *Edit not mentioned properties*, and *Manage custom/admin fields* access rights, accordingly. Such unique settings as e-mail, password, account information, access rights, etc. cannot be transferred.

Here is the list of settings that can be chosen for import/export:

- **Time zone**:
  time zone and DST.
- **Date and time settings**:
  date and time format, first day of week, and Persian calendar.
- **Additional information about the unit**:
  settings from the *Show additional information about the unit* section (they affect the content of the unit tooltip and unit extended view in the work list).
- **Monitoring panel configuration**:
  the columns selected in the *Monitoring* panel.
- **Unit visualization on map**:
  settings from the *Unit visualization on map* section.
- **Other items on map**:
  settings from the *Other items on map* section.
- **City**:
  the *City* field on the *Settings* tab.
- **Address format**:
  settings for formatting the address from the *Map* tab.
- **User interface parameters**:
  log status (open/hidden), shortcuts (on/off), settings for online notifications and messages.
- **Format of coordinates**:
  degrees or degrees and minutes.
- **Map source**:
  the map source selected by the user.
- **Geodata source**
  the geodata source selected by the user.
- **General flags**:
  checkboxes from the *General* tab of the *User Properties* dialog (including host mask).
- **Custom fields**:
  custom and administrative fields from the User Properties dialog.
- **Templates of access rights**:
  templates of access rights created by this user.
- **Custom message parameters**:
  Send custom message command settings.

You can also make a **full copy** of a user. It includes not only the parameters mentioned above but also some hidden

parameters (such as operational settings for Apps).

Note.
When you import settings to the user, they are applied after the user refreshes the page or performs a login procedure.

Measurement System and Conversion

Wialon Local works with different measurement systems: metric, U.S., imperial, and metric with gallons. The corresponding feature can be set for units, resources, and users during their creation. The system of measures for routes is also set when it is created and is determined by the user's settings.

The table below provides you with the units of measurement (and their abbreviations) for the systems used:

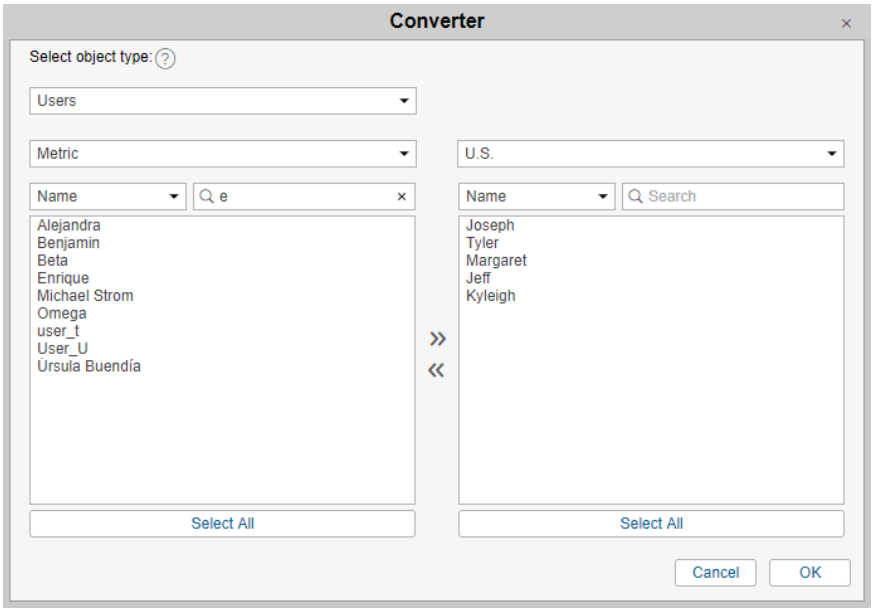
	Metric	**U.S./imperial**	**Metric with gallons**
Mileage (large values)	Kilometers (km)	Miles (mi)	Kilometers (km)
Mileage (small values)	Meters (m)	Feet (ft)	Meters (m)
Speed	Kilometers per hour (km/h)	Miles per hour (mph)	Kilometers per hour (km/h)
Fuel amount	Liters (lt)	Gallons (gal)	Gallons (gal)
Fuel consumption	Liters per 100 kilometers (lt/100 km)	Miles per gallon (mpg)	Kilometers per gallon (kpg)
Temperature	Degrees Celsius (°C)	Degrees Fahrenheit (°F)	Degrees Celsius (°C)
Area	Hectares (ha)	Square miles (mi^2) or feet (ft^2)	Hectares (ha)
Weight	Tons (t)	Pounds (lbs)	Tons (t)
Carrying capacity	Tons (t)	Pounds (lbs)	Tons (t)
Dimensions	Millimeters (mm)	Inches (in)	Millimeters (mm)

American and imperial systems, in fact, use the same units of measurement. The major difference is observed in calculating the volume of fuel. Below is a conversion from one system of measures to another:

1 U.S. gallon ≈ 0.833 imperial gallon
1 imperial gallon ≈ 1.201 U.S. gallons

Conversion

The system of measurement for the elements which already exist can be changed with the help of conversion. Only the top-level user can use *Conversion*. It is available in the interface of the management system. To bring up the conversion dialog, it is necessary to select the corresponding item in the user menu. The dialog has the following view:



In the dropdown list, select the object type (units, resources, users, routes) for which the conversion is made. To the right of the dropdown list there is a brief description of the actions that a re performed on the objects of the corresponding type.

Below the object type, select initial and target measurement systems for conversion. For example, if you choose *Metric ⇒ U.S.*, a list of elements currently using the metric system is formed below.

From the list you select the objects which should be converted. To add these objects for conversion, use double-click or select an object and press the corresponding button (the arrow pointing right) between the lists. The added objects form the list on the right. To remove items from this list, either double-click them or select and press the corresponding button (the arrow pointig left). To select multiple items, hold the *Ctrl* key and click on the required items. To perform the conversion of the added items, click *OK* and confirm your actions in the appeared window. The success of the procedure is reflected in the log.

Conversion Effects

Ideally, users have the same measurement system as resources and units used by them. In this case everything that the user sees during online tracking in different panels and dialogs and also everything that is received by e-mail using jobs and notifications has the same system of measures.

For Units

If conversion is performed over units, the units' parameters such as a trip detector, fuel consumption settings, counters, eco driving criteria, etc. are recalculated. This affects the representation of units in the tracking system. Changes affect not only units' properties, but also the display of messages, tracks, tooltips, etc.

Note.
The conversion does not affect the sensors of the unit. If it is necessary, their measurement system can be changed manually in the corresponding dropdown menu.

For Resources

When converting resources, some contents of these resources, particularly, circle-shaped geofences, different settings of jobs and notifications, etc. are recalculated to other measurement systems.

Note.
The units of measure can be set individually in the section of advanced settings for every report template regardless

of the resource it belongs to. Units of measurement chosen for a particular report template are displayed in the resulting report (whether done online or received according to a job or notification). Neither resource measurement system nor measurement system of a unit is taken into account.

For Users

When converting users, the measurement system for the selected users is changed. It affects different online calculations, particularly the work of such tools as Distance, Area, Routing, Nearest units. Address defining parameters are recalculated as well.

Besides, the system of measures set for the current user is selected automatically during creating report templates, units, other users, resources (regardless of who is chosen as the creator or in which resource the item is created). At the same time, during the creation of these items, the system of measures can be changed manually. It does not affect such items as geofences, jobs and notifications, because their measurement system is taken from the resource they belong to.

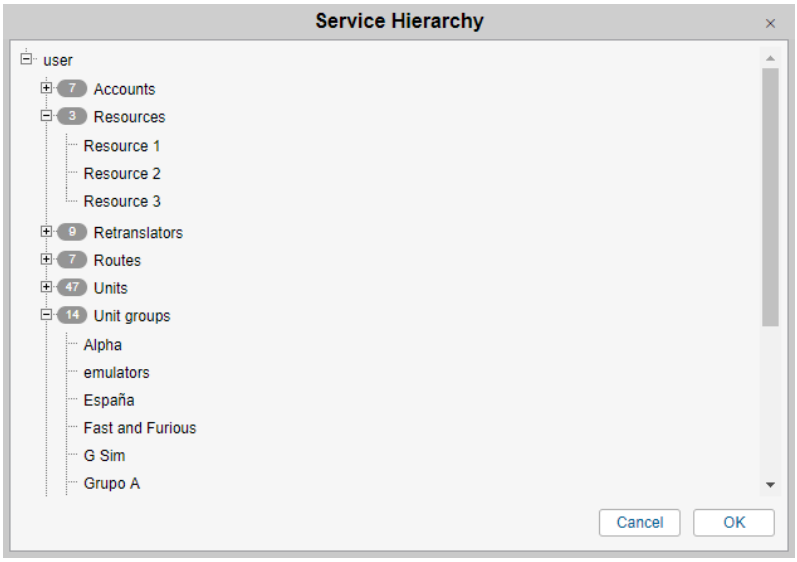
For Routes

When converting routes, a new system of measures is applied to the calculation of the radius of control points.

Service Hierarchy

Attention!
This feature is available both for top users and dealers.

Service hierarchy is a sort of report with a schematic representation of the information concerning the structure of your service. Select the corresponding item in the user menu in order to generate a table containing information on the types of macro objects used in your service, their amount, and the way these objects correlate with each other.



Apps

Using SDK, you can implement your own tools and features and add them to your Wialon Local as additional applications.

Applications can be managed only by top users. *Apps Configurator* item of the user menu allows you to do this. Click on this item to open the *Apps Configurator* dialog. It contains two tabs: *Installed* and *Library*. On these tabs you can have a look at all the available applications, as well as configure and add new ones.

Installed

A list of added apps can be found on the *Installed* tab. To add a new application, click *Add* and indicate the following information:

Name
Enter the name of the application (at least 4 characters). It is displayed in the lists of available applications, as well as in the heading of the application when it is open.

Description
Enter any description of your app (optional).

URL
Type the URL where the application is hosted. Name and URL are mandatory, other parameters are optional.

Advanced URL parameters
Specify advanced URL parameters if necessary (Active SID, Current user, Base URL, Host URL, Language, Authorize hash).

Required services
Select services (features) which are required for the default activation of the application. If the list of features available to a user does not match this list (or if you leave this section empty), the application is disabled for the user.

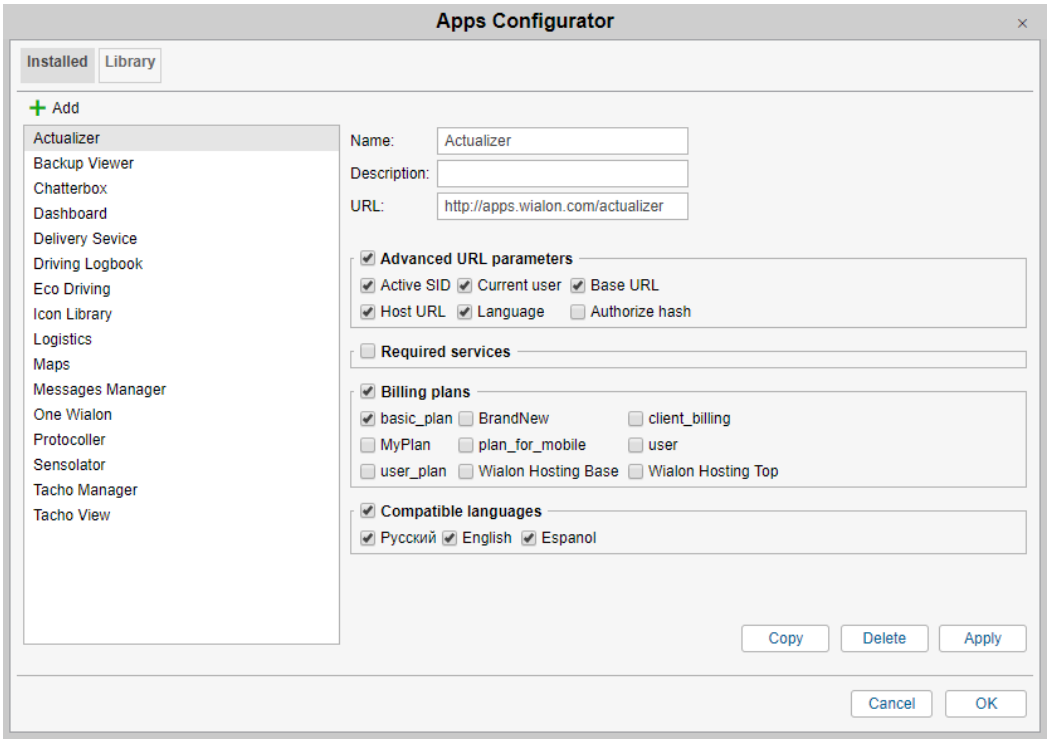
Billing plans
Select the billing plans for which this application should be available to.

Compatible languages
You can restrict access to the application for various interface languages. For example, if the Russian language is selected, this means that the application is available only when the Russian language of the interface is selected. If nothing is selected, it is assumed that the application should be available to all languages.

After setting all the parameters, press *Add* and when closing the dialog click *OK* to save the changes.

Other operations with applications:

- To edit an application, select it on the left, change the parameters, press *Apply*, and then, when closing the dialog, click *OK*.
- To delete an application, select it on the left and press *Delete*. Then, when closing the dialog, click *OK*.
- To create a new application by copying, select the sample application on the left and press *Copy*. Edit the parameters, click *Apply*, and then, when closing the dialog, click *OK*.
- To ignore all the changes made, press *Cancel*.

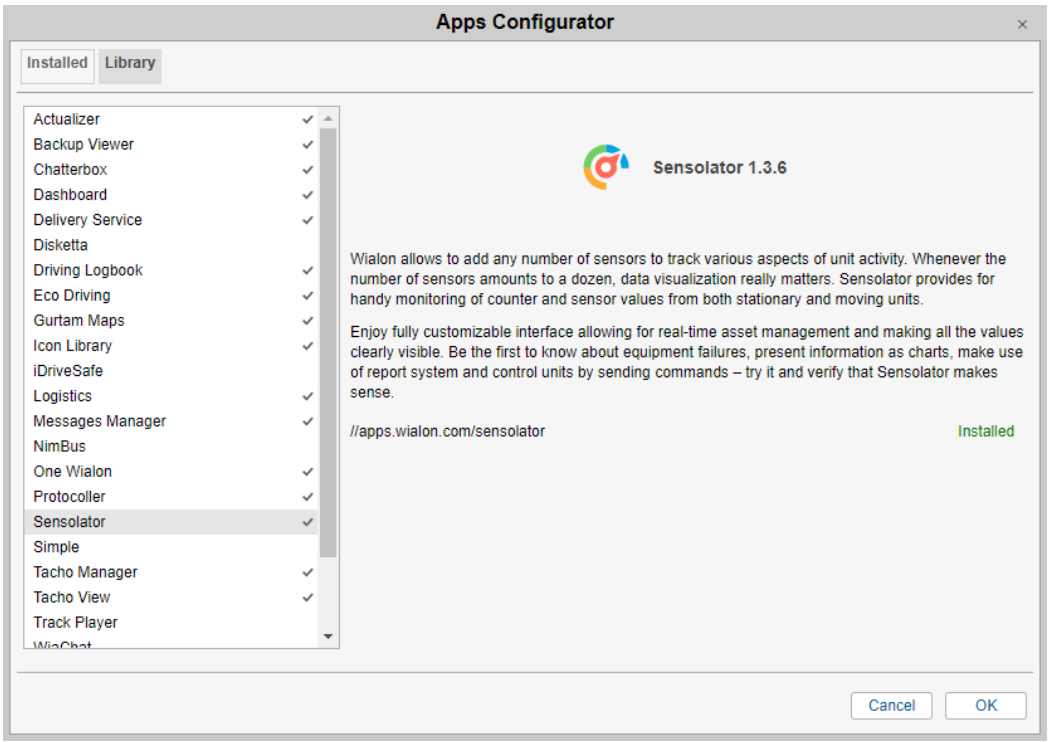


Added applications become available in the billing plans tab and in account properties on the *List of Services* tab. You can enable and disable applications added by you and control their availability to other users.

Library

On the *Library* tab, you can select a suitable application and add it with a single mouse click. Adding application from the library is a little bit easier as all the mandatory parameters and the advanced URL parameters are indicated by default.

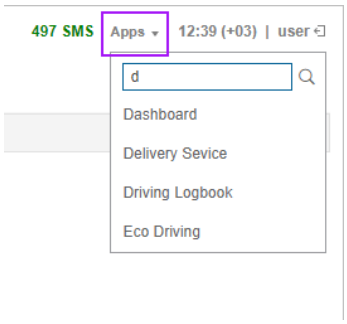
The list of applications is on the left. To the right of the list is a field that displays the current information for the application selected in the list. This information includes the following: application icon, its name, short description, URL, and release date. To add an application from the library, you must select it from the list. Then, if this application is not already installed, the *Add* button is activated below the description. To complete the procedure click *Apply* and then *OK*.



See also Apps review.

Starting Applications

To start an application, click on the *Apps* item in the top panel. A menu opens that lists all available applications (in alphabetical order). The dynamic filter is used to quickly find the necessary one. Click on the app's name to open it in a new tab of the browser.



Monitoring System

The monitoring system is used by end users to control their units (vehicle fleet, machinery, employees, pets, etc.).

Unit tracking includes:

- detecting the position of units and watching their movements on the map;
- observing dynamic changes of various unit parameters such as speed, fuel level, temperature, voltage, etc.;
- management of units (sending commands and messages, assigning jobs and routes, adjusting notifications, etc.) and drivers (phone calls, SMS, registering work shifts, binding to unit, etc.);
- interpreting information derived from a unit in various kinds of reports (tables, charts, movement tracks, event markers, complete statistics, etc.);
- and much more.

Tracking results can be either presented on a computer screen or exported to files in different formats.

System Requirements and Optimization

Consider these requirements to get the most from Wialon Local.

Web Browser

Supported browsers are:

- **Google Chrome 55+**
- **Mozilla Firefox 51+**
- **Opera 36+**
- **Internet Explorer 11 (EDGE)**

If you use a browser not mentioned above, Wialon Local may function incorrectly.

Computer Capability

Computer capability affects browser operation. The key points of high performance are **CPU** (central processor) and **RAM** capacity. Multi-core processors do not affect browser operation in most cases. The exception is Google Chrome that can use more than one core in its operation.

Considering all above mentioned, the *minimum requirements* are:

- CPU at 1,6 Hz clock rate;
- 512 MB of RAM.

and *recommended requirements*:

- CPU at 2,4 Hz clock rate
  (if Google Chrome is used as web browser, a processor with two and more cores is recommended);
- 2 GB of RAM.

Monitor size and screen resolution should be also considered. The bigger the monitor is, the more data is queried from server and processed by CPU. It is especially true for the maps and when the Internet connection is slow. The solution for big monitors is to not use browser in full-screen mode.

Antivirus software can slow down computer performance as well as gathering actual data from units. If Wialon Local is getting slower, you can add it to the list of exceptions or simply disable antivirus monitoring during Wialon Local session. You can also create a rule which allows Wialon Local to develop any activity.

Internet Connection

Wialon Local requires 1 Mbit Internet connection channel for one computer. If more than one operator will work simultaneously, do some tests and choose the most appropriate speed.

Furthermore, when working with Wialon Local, your IP address should not be changed within a session.

Optimization Measures

Here are some tips, which will help you to improve Wialon Local performance in cases when more than a hundred units

are connected.

1. Web Browser

Web browser is very important. See the list of supported browsers above. The most efficient is Google Chrome. It is followed by Mozilla Firefox and Opera. The slowest, according to our tests, is Internet Explorer.

Wialon Local efficiency strongly depends on browser event system. Each browser has its individual event model. As the tracking system is rather dynamic and tracks change with up to 2-second delay, some browsers (like Internet Explorer) cannot process such a large quantity of events. The solution here is to use a more powerful computer.

2. Graphics & Tooltips

Graphic elements displayed on the map and in lists are resource-consuming. If you notice that your browser is getting slower, try to disable the mapping of the following elements: units, geofences, places, tracks, as well as names, direction arrows, and 'tails' for units (these elements are disabled with the three corresponding buttons in the 'Visible layers' menu). Limit the number of units displayed in the Monitoring panel. Limit the number of other objects displayed on other panels that are frequently used (apply the filter for doing that). Enable only those elements that are necessary for your work at the moment. Several settings to adjust the way units are displayed are set in user settings in the section 'Unit visualization on map'.

Unit's tooltip contents are also important. In User Settings dialog in the section 'Show additional information about the unit', you select which information should be presented in unit's tooltip and in extended unit information. To avoid browser overload, disable unusable items or even all items. If there are a lot of geofences or geofences composed of multiple points and the option 'Presence in geofences' is enabled, then your browser could be strongly overloaded. So, make sure this option is disabled.

If Internet connection is slow, disable geofences' rendering on map. Besides, if you query reports (containing map), messages, and tracks, clear your request as soon as it is no longer useful.

Pay attention to the fact that in order the charts to be shown the browser you use has to support the WebGL component. If the browser or the operating system cannot support it, you should enable the option 'Render charts on server' in User Settings (limited functionality will be available).

3. Queries to Server

When Wialon Local starts, not all data is loaded at once. It is made to speed up the loading and operation. That is why some action that done for the first time may take more time than for future work. Resource-consuming reports (such as reports on groups or reports with grouping and detalization) should be avoided. Enclosed rows of detalization stay hidden until you expand them, and if there is a hundred or more enclosed rows the browser may hang.

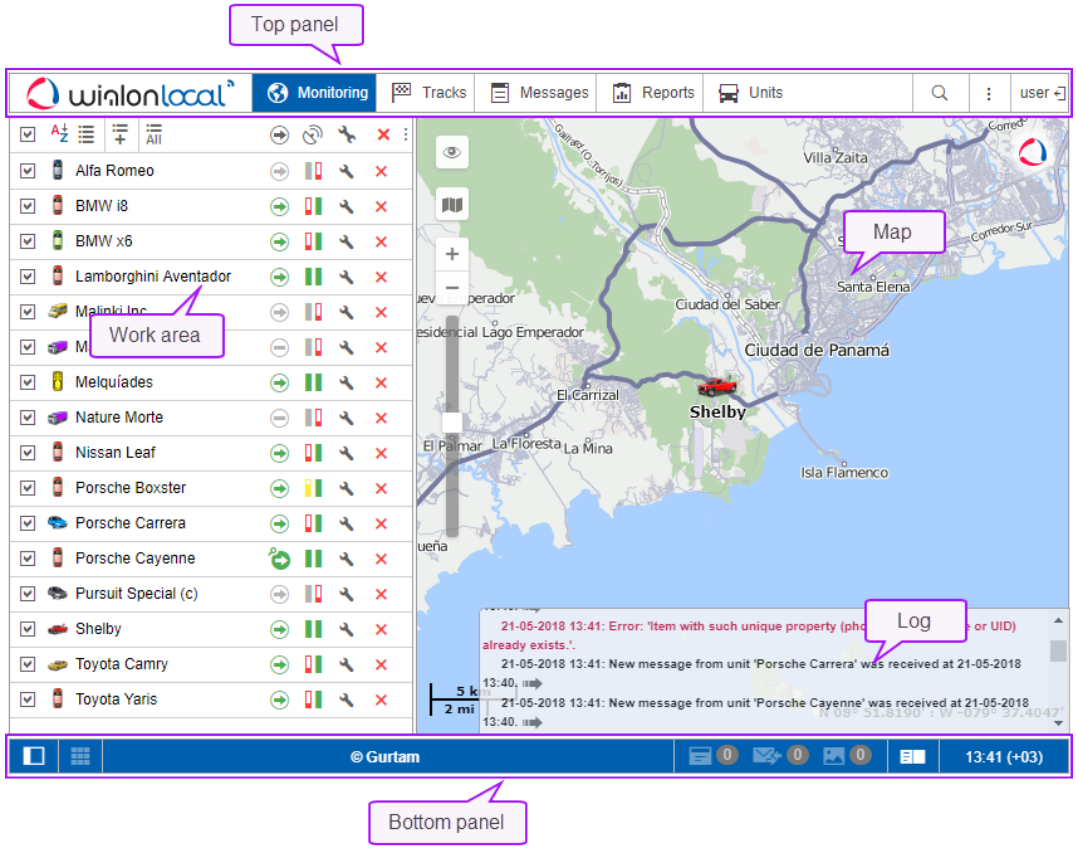
User Interface

User interface of Wialon Local is simple and in many cases intuitive. There are plenty of screen tips and helpers associated with various buttons, icons, dialog boxes, edit fields, and other elements of the interface. Moreover, special icons are located in the interface. They are used to deal with the most 'difficult places', as a help textopens when you click on any of them.

Generally, the following basic structural elements can be distinguished in the interface design:

- work area,
- map,
- top panel,
- bottom panel,
- log.

There are also a lot of other different panels and windows which can be activated if necessary.



Note.
To switch to the full-screen mode, press *F11*. This feature is provided by the majority of browsers.

Further information:

- Login
- Top Panel
- Work Area
- Bottom Panel

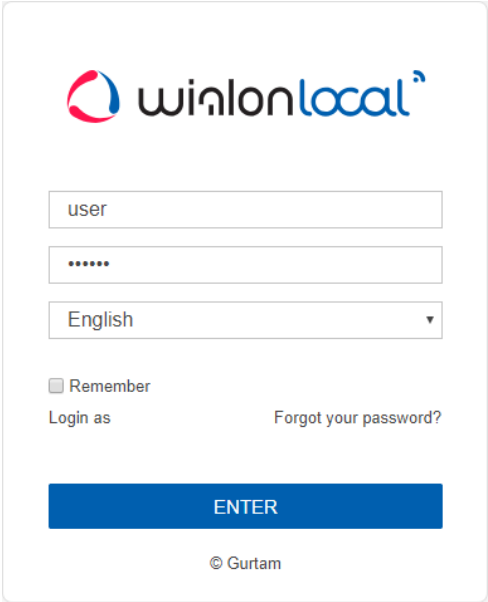
Map
- Log
- Shortcuts
- Calendar
- Filters and Masks
- Input Rules

Login

Enter the service URL into the address line of your browser.

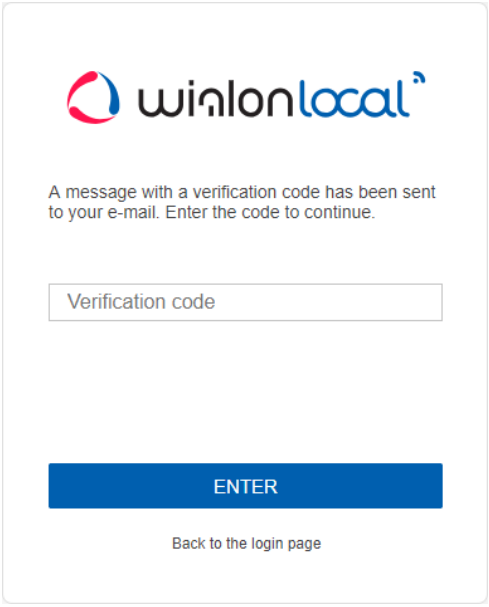
On the login page, enter your **username** and **password**. Note that the characters used in these fields are case sensitive. Afterwards choose the interface **language**. If you want, you can change it at any time after logging in (in the user settings).

After all the necessary fields are indicated, click *Enter*.



If you use a personal computer, you can additionally check the *Remember* box. In this case, the next time you enter the system you will not be asked to input your login and password again. Moreover, this checkbox is necessary to automatically enter the system in case of losing the session. It should be noted that this option is limited to 30 days. Also, the box becomes unchecked when you exit the system.

For an account with two-factor authentication enabled, in addition to the password, you must enter a verification code, which is sent to the e-mail or via SMS (the code is vaild for 5 minutes). If the login did not occur and the entered code became red, then it was entered incorrectly. If you enter the wrong code repeatedly, the login will be temporarily blocked.

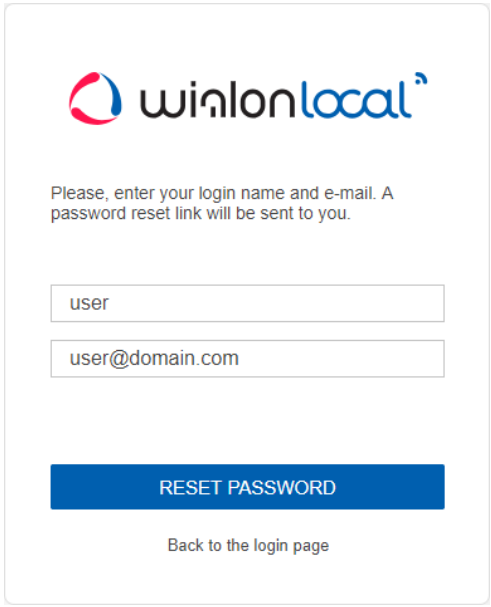


Note.
If the current time is displayed in red and in the middle of the screen you can see a warning message (*Unable to connect to the server. The page will be reloaded automatically when connection is restored*), then there is no connection to the server for more than two minutes. This can be caused by the Internet connection failure or some internal system problems. After the connection is restored the message disappears automatically, and the system continues its work. If the connection to the server is lost for 5 minutes and more, the session will be finished. However, when the connection with the server is restored, the user automatically logs in to the login page.

A quick login without entering (or even knowing) a user name and password is possible, provided that there is an active session available. Then URL-link should contain the *sid* parameter, e.g., http://wialonb3.gurtam.com/?**sid=3086417ea744b0dbb85202cebe3ff134**. Note that the input must be from the same IP address. However, be careful giving away such links, as, while the session is active, anyone who has this link can log into the system and perform different actions allowed to that user. To abort the current session, just exit the system (press *Logout*).

Getting a New Password

If you have already registered in the system but forgot the password, please, follow the *Forgot your password?* link. There you will be asked to enter your user name and e-mail address. Then press the *Reset password* button. A link to the page containing your new password will be sent to you. Follow this link to get your new password.

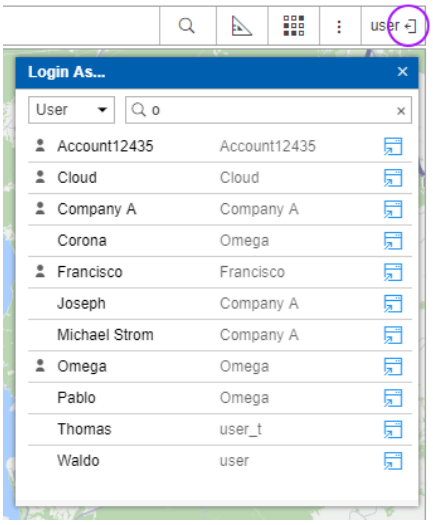


If you have pressed *Forgot your password?* by accident, just ignore the e-mail with a password reset link and use your previous login and password. If you still follow this link, you will have to use a new password.

Password Change

The current password for the user you logged in as can be changed in the *Security* tab of the User Settings dialog. However, not all users are allowed to do this. Contact your service administrator for more information.

Login as Another User



User impersonation allows you to access and operate as if you were logged in as another (subordinate) user. To impersonate, you need to have the *Act as given user* access right towards the user.

If you would like to log in as another user from the authorization page, you need to enter your username and password and then click on the *Login as* caption and enter the name of the user in the appeared window. When you are logged in as another user, you can see only those items that are available to this user and perform actions allowed to this user. Note that the login history is kept in the account of the user under whose name the system has been entered.

You can switch to another user even after entering the system. However, in this case the login is *not* saved in the user's history. To switch it, click on the icon (the door with the arrow) to the right of the username. Afterwards, the dialog containing two columns (a user name and an account name) is opened. Users-creators of accounts are marked with the icon to the left of their names. Click on the name of the required user to authorize in the current tab, or click on the icon at the end of the line to open the page in a new tab. For the search convenience, it is possible to use the dynamic search. The search can be filtered by users or accounts. This is regulated by the filter in the upper left corner of the window.

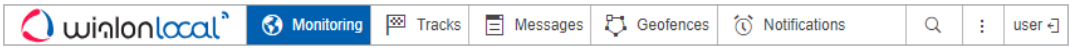
There is also an alternative way to log in as another user. Go to the Users panel, where each user has a special button for logging in under his name. If you do not have enough access privileges, the button is disabled.

After authorization as another user, the user name is written in brackets to the right of the main one (in the right corner of the Top panel). To switch back to the main user, click on the icon (door with arrow) to the right of the name, and confirm your action by pressing *OK* in the appeared window.

Top Panel

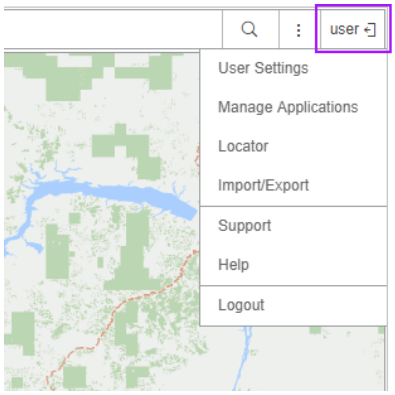
In the upper panel to the left are the logo of the tracking services provider, and to the right is the menu setting button and the user name under which the user logs on.

The main menu of the program occupies the central part of the top panel. It contains different elements depending on the settings applied and also on the modules provided.



User Menu

In the right corner of the top panel, the user's login is displayed, under which the authorization has been made. Meanwhile, one more login can be specified in parenthesis if the main user logged in on behalf of the other.



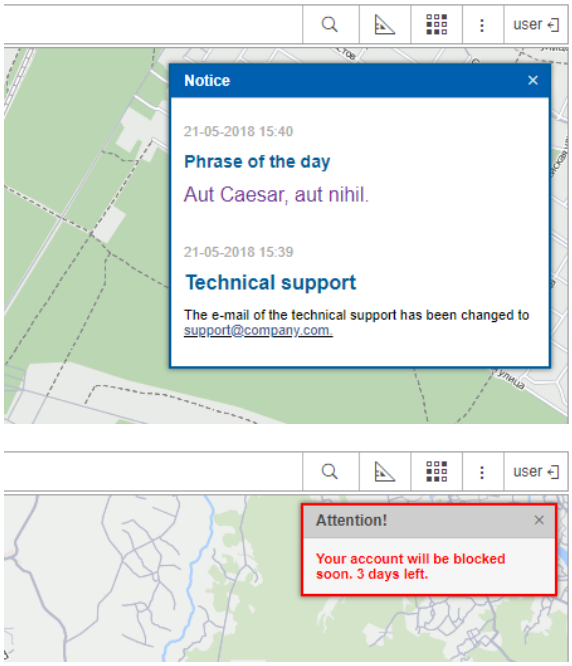
When clicking on the user name, an additional menu appears. It contains the following options:

- **User settings**
  Opens the user settings dialog for viewing and/or editing.
- **Manage applications**
  Opens the manage applications dialog.
- **Locator**
  Opens the locator's dialog.
- **Import/Export**
  Enables to transfer the settings of units, users, resources' contents (refer to Import and Export).
- **Quick Start**
  Opens the tutorial. The button can be unavailable if there is no corresponding service.
- **Help**
  Help request. Can be unavailable.
- **Technical support**
  Technical support request. Can be unavailable.
- **Logout**
  Button to log out of the system (session termination).

Help and *Technical support* are links to third-party Internet resources containing either documentation or technical support. By default, they are disabled. The options are activated in the Administration panel.

Information Notices

Information notices from the service manager can appear in the top panel under the username, as well as notices on the amount of days left before blocking the tracking system (if specified by the tariff agreement).


user
Notice
21-05-2018 15:40
Phrase of the day
Aut Caesar, aut nihil.
21-05-2018 15:39
Technical support
The e-mail of the technical support has been changed to support@company.com.

user
Attention!
Your account will be blocked soon. 3 days left.

Work Area

In the left part of the screen there is a work area in which various actions with different elements of the system are performed, as well as various requests are formed.

Depending on the tag chosen in the top menu, one of the following panels can be opened in the work area:

- Monitoring — tracking units position, state and movements.
- Tracks — viewing movement history.
- Messages — viewing the messages that come from the units.
- Reports — a wide range of instruments for analyzing and sorting the data received from a unit.
- Geofences — creating, editing, removing geographical areas.
- Routes — creating and monitoring the traffic route of a unit according to its schedule.
- Drivers — creating drivers and assigning them to units.
- Trailers — creating trailers and binding them to units.
- Passengers — creating passengers and binding them to units.
- Jobs — creating, editing, removing jobs performed on schedule.
- Notifications — creating, editing and removing notifications of events.
- Users — managing other users.
- Units — managing available units.

Top menu also can include two panels which are not shown in the work area. They have their separate windows. They are:

- Search on Map — dynamic search of system's micro objects on the map;
- Tools — tools for calculation distance and area, laying the best routes, searching for the nearest units, etc.
- Apps — applications that solve various user's tasks.

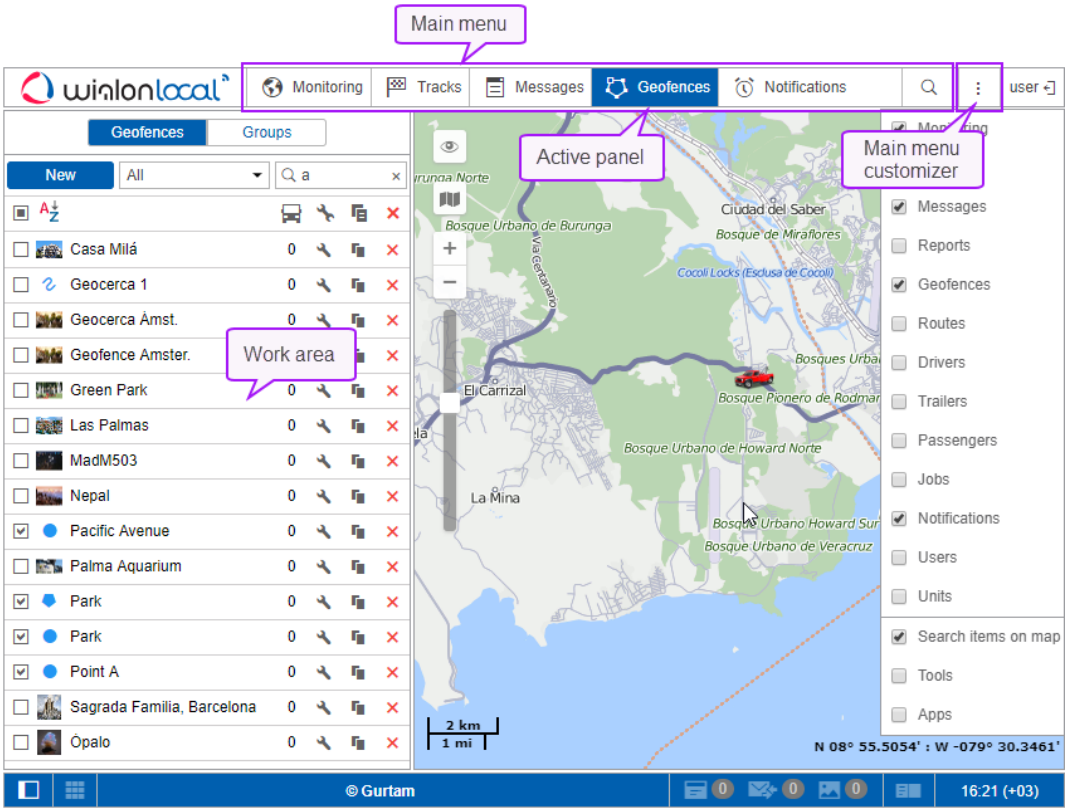
The width of the work area can be changed. To do this, click on its right border and drag it to the required direction, holding the mouse button. Moreover, you can hid the work area by pressing the button located in the lower left corner .

Main Menu Adjustment and Navigation

To adjust the main menu click the customizer icon and select the menu items to work with. The selected items immediately appear in the top menu.

The panel that is currently open is highlighted with a darker background. To navigate through the menu, you just need to click on the required name. The contents of the left panel (the work area) changes automatically.

Keyboard shortcuts are used to facilitate navigation through the panels.



All the range of items chosen for the main menu is displayed at the top. The names of the panels are shortened if there is a lack of space. That is why you should choose only those items that you actually use.

Alternative Means of Navigation

If the browser window is small, but there are a lot of panels selected, inscriptions generally become not visible, and menu panels are presented just with icons. In such cases clicking on the icon mostly leads to switching on/off the layer on the map. Therefore, in such cases to switch the panels you should additionally hold the *Ctrl* key.

Another means of navigation is through the menu settings window. If you click on the name of any item in the settings window, you will be taken to the corresponding panel. In this case, if before it was not displayed in the menu, it appears. Also, do not forget that when you call the panel from the menu settings window the layer is activated automatically.

The same occurs in case of *forced* transitions between panels, for example, when requesting a report from the monitoring panel or during transition *from reports* to *messages*. Even if the requested panel is not displayed in the main menu, the transition is successful. In this case the corresponding item is added to the menu and the layer becomes active.

Bottom Panel

The bottom panel allows you to activate or hide certain windows, and also contains buttons that control how units are displayed on the map. The current time is also displayed here.

The following buttons are located in the left part of the bottom panel:

— hide/show the work area;
— hide/show minimaps.

In the right corner of the bottom panel the following buttons are located:

— hide/show the online notifications window;
— hide/show the window with the messages from drivers or SMS;
— hide/show the window the the pictures from units;
— hide/show log.

The lower right corner shows the current time and, in parentheses, a time zone (you can change it in the User Settings).

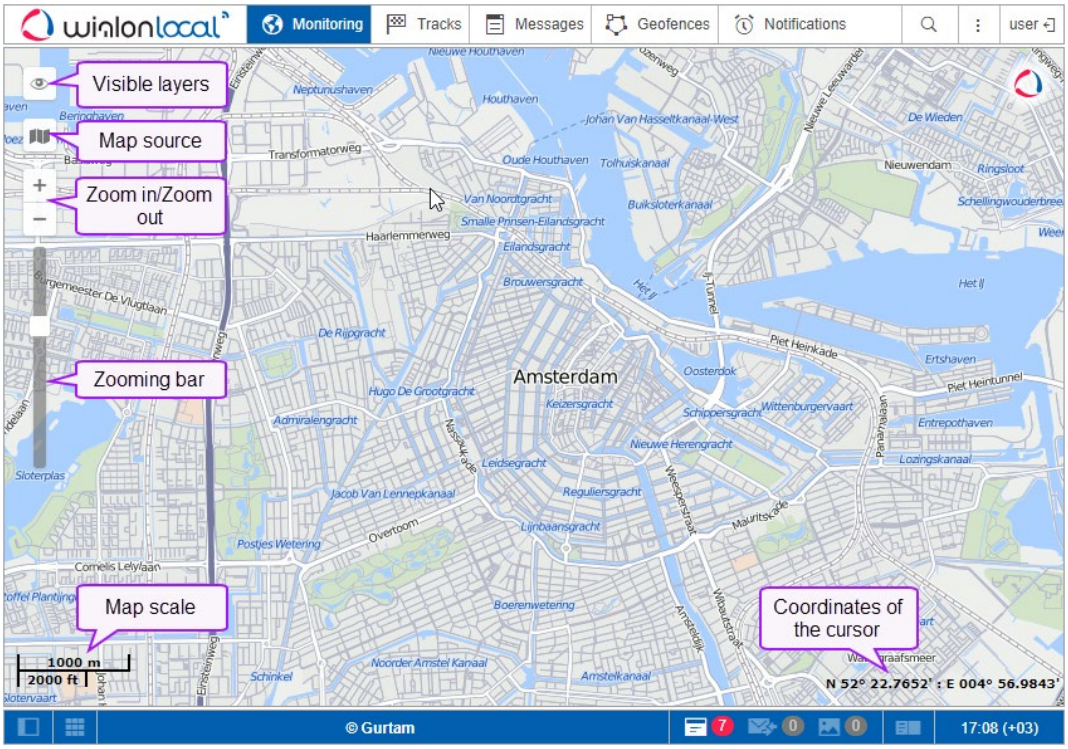
In the center of the bottom panel can be located your copyright with a link to the site.

Map

The map is available regardless of which panel is activated. Usually, it takes up most of the screen. Units and their traces, geofences and other elements can be displayed on the map.

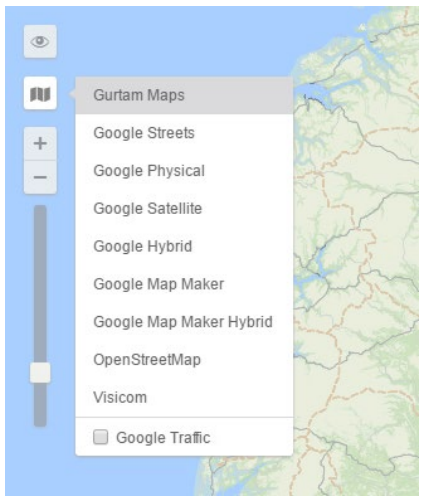
Map size can be adjusted in relation to the work area and the log. To do this, drag up/down or left/right the map scale slider, which is located between the corresponding parts of the interface.

To maximize the map size as much as possible, you can hide the work area and the log completely (using the and buttons) and switch to the full-screen mode by pressing *F11*.



Map Source

To change the map source, click the button in the top left corner of the map. Map selection menu is conditionally divided into two sections. The upper section contains base map layers, i.e. map sources. The bottom one contains additional or, in other words, informational layers which overlay the base ones (traffic, maritime navigation, etc.). Select another map from the list and the map area already displayed on your screen will be loaded from another source. It is applicable to both the main map and the mini-map.



To activate more maps, go to the User Settings. There you can also save the current position of the map for the further system logins. If the option for switching on any kind of maps is not available, contact your tracking system administrator.

If additional map layers are available, then they can be displayed on top of the base ones. In other words, all the maps can display the information on road traffic condition or maritime navigation. To enable it, you should select the

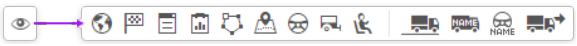
corresponding checkbox in the section of additional layers in the map selection menu (*Google Traffic*, *Yandex Traffic*, etc.).

Attention!
The map selected in this menu affects only the displayed (graphical) map layer. Geocoding (address definition, etc.) is implemented mainly in Gurtam Maps.

Visible Layers

The map provides the possibility to display with graphic layers. In other words, different graphic layers can be enabled/disabled on the map. The layers display graphic elements of such panels as monitoring, tracks, messages, reports, geofences, routes, drivers, trailers, and passengers.

Displaying layers on the map is possible only if there are corresponding panels in the main menu. For example, if the main menu contains a monitoring item, then on the map you can enable the same layer showing the current location of the indicated units. When you add an item to the main menu, its layer is automatically activated. When you remove an item, the layer is removed.



Enabling/disabling a graphic layer is implemented in the layers menu. To access this menu, click the *Eye* icon (top left corner of the map). The layers menu is divided into 2 sections: layers of panels (on the left) and layers of units (on the right). Each graphic layer is represented by the icon of its panel. Working with the layers of panels is described above. Layers of units serve to control the view on the map (unit *traces*, their names, the assigned drivers' names, the direction arrows).

The Order of Displaying Layers

The layers are displayed in a specific order. Depending on the rendering priority, they can be divided into 7 groups, which are listed below. The elements of each next group are rendered upon the previous one. Some groups also have an internal rendering hierarchy.

I. Base map layers

II. Additional map layers

III. Base vector layers

1. Geofences rendered in the browser
2. Elements rendered on the server
3. Trips in the trips report
4. Routes

IV. Additional vector layers

1. Inscriptions for drivers and trailers
2. *Tails* of units
3. Direction arrows of the movement of units
4. Names of units
5. Status icons
6. Inscriptions of the markers of the LBS Detector instrument

V. Markers

1. Icons of the geofences rendered in the browser
2. Markers of the drivers and trailers unassigned from units
3. Unit markers

4. Markers of the drivers and units assigned to the units
5. Markers of the Messages panel
6. Markers of the initial/final position of the tracks in the tracks and reports panels
7. Markers of the tracks hittest when geofences, reports, tracks are rendered on the server
8. Names of geofences

VI. Instruments

- Track Player
- Distance
- Area
- Address
- Routing
- Hittest
- Nearest Units
- LBS Detector

VII. Editing Layers

- Created geofence

Using the Map While Working with Different Panels

The map is common for all panels. It means that while switching between the panels, zoom and coordinates of the map center remain the same. Graphic elements such as track lines, markers, geofences, icons of units remain in their places. Therefore, for example, if you made a report showing parking locations on the map and then switched to the *tracks* panel to create tracks for the unit's movement (even if this is a completely different unit), all the graphical elements, lines, markers, etc. still will be shown on the map until you delete them or switch them off.

Such panels as *Monitoring*, *Tracks*, *Messages*, *Reports*, *Geofences*, *Routes*, *Drivers* and *Trailers* can have their layers on the map. Graphic elements applied to a map when working in a particular panel, can be easily switched on and off. Displaying or hiding the graphic information on the map is adjusted for each layer individually in the layers menu, which can be opened by clicking on the *Eye* icon in the upper left corner of the map. Here you can read more about the work area.

Map Navigation

To navigate through the map (or, more accurately, move the map across the screen), left-click anywhere and, without releasing the button, drag in the desired direction.

Zooming the Map

To scale the map, you can also use several methods:

1. **Using scale on the map**
   In the upper left corner of the map, under the navigation buttons, there is a scale bar that allows you to zoom in (+) or zoom out (-). In this case, the center of the map does not change its position. You can press + and - buttons to change the scale in a step-by-step mode, or click anywhere on the gradation scale.
2. **Using mouse scroll wheel**
   It is even more convenient to adjust zoom level using the mouse scroll wheel. Scroll up to zoom in and scroll down to zoom out. Direct the cursor to the required place so that it is not lost from view when the scale is changed.
3. **Using mouse and *Shift* button**

To zoom in on the area you selected, hold the *Shift* button and left-click any rectangle on the map

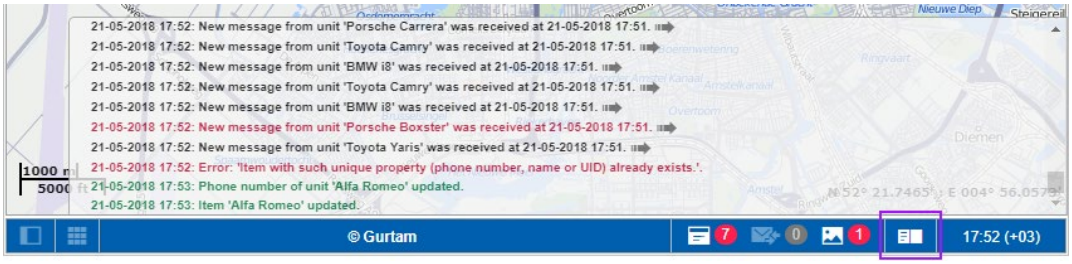
4. **Using double-click**
   Double-click any point of the map to zoom in on it.

In the lower left corner of the map the current scale of the map is indicated. In the lower right corner, you can see the geographical coordinates of the place the cursor points at. The coordinate format is selected in User Settings => Maps and can be either degrees or degrees and minutes.

Log

Log is an interface element that allows to look through the records of current operations, such as the arrival of a new message/SMS, changing the unit configuration, etc. The log contains the messages from units in the work list. Depending on quantity of units and equipment configuration, messages in the log can be received even every second.

The *Show/hide log* button is located in the bottom panel. The size of the log can be adjusted. In the middle of the top edge of the log there is a separator. Drag it up or down to change the size of the log. It means that by clicking on this border and dragging it up or down you can change the size of the log. The log window is semitransparent, this allows the map and units to be always visible under the log.



If the events registered in the log happen in a certain place (for example, a new location of a unit is detected), you can move to this place on the map if you click on the black arrow at the end of the entry .

The log uses fonts of different colors in order to separate different type of entries from each other. Black color is used to register the state of the unit, change its location, receive new SMS messages from units and etc. Green color indicates the activity of the user: creating and editing of places, geofences, user settings changes, etc. Red color is used to display error messages and alarm messages from units.

Note.
When emptying the black box or retransmitting past data, messages older than one hour from the latest known positional message of the unit are omitted in the log.

Shortcuts

Keyboard shortcuts ensure more convenient and quick means to navigate through the system. This feature is activated in User Settings.

Shortcuts for panels navigation:

- **M** — Monitoring;
- **T** — Tracks;
- **E** — Messages;
- **R** — Reports;
- **G** — Geofences;
- **O** — Routes;
- **D** — Drivers;
- **I** — Trailers.
- **J** — Jobs;
- **N** — Notifications;
- **U** — Users;
- **Y** — Units.

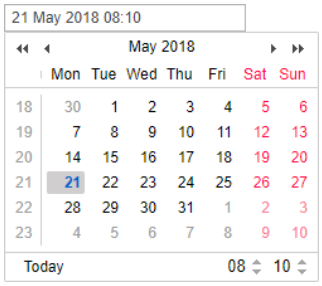
Shortcuts for tools activation:

- **1** — Track Player;
- **2** — Distance;
- **3** — Area;
- **4** — Address;
- **5** — Routing;
- **6** — Hittest;
- **7** — Nearest units;
- **8** — LBS Detector;
- **9** — SMS;
- **F** — Search on Map.

Other shortcuts:

- **A** — Apps;
- **S** — User Settings;
- **~** — show/hide the Left Panel;
- **L** — show/hide the Log.

Calendar



The calendar is used in many cases: to specify the time intervals to generate reports, indicate the date and time in notifications, jobs, routes, etc.

The calendar date includes the year, month (the name of the month is written) and day. The date mask selected in the current user settings dialog affects only the arrangement order of the year, month and day. The earliest possible date is January 1, 1971.

A for time, its format corresponds to the mask selected in the user settings dialog. The only exception is that, regardless of the mask applied, seconds are not displayed in the calendar.

There are several methods to work with the calendar and quickly set up a desired date and time: manual input, clicking buttons, using mouse scroll, etc.

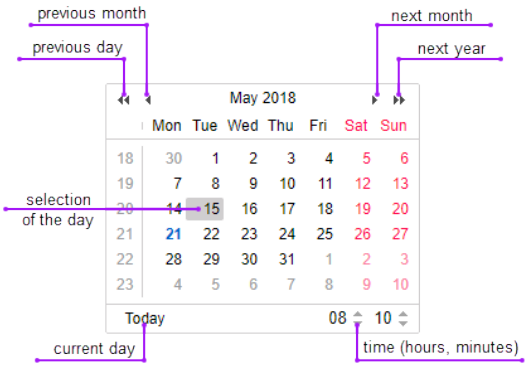
Method 1.

The date and time can be adjusted without opening the calendar itself — in the text field above it. You can do this either manually, using the keyboard, or using the mouse scroll wheel. Place the cursor over the time element you want to alter and scroll up (to increase) or down (to decrease).

Method 2.

Open the calendar, move the mouse cursor in the date and time input field and click the left button. Use the arrows to select the year and month. To change these values you can either click on these buttons or use the mouse scroll. Single arrows are used to select the month, double — to select the year. After moving to the required month and year, click the left mouse button on the ate below. This closes the calendar, and the date you selected appears in the text box.

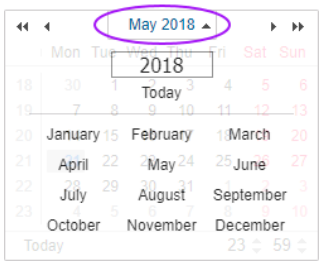
If you need more accuracy, then before selecting the date, specify the time in the lower right corner of the calendar. You can use the numeric input from the keyboard, as well as the scroll wheel. Changes are accepted after clicking the left mouse button on the date or pressing the *Enter* key.



Method 3.

Today's date can be set in one click. Open the calendar and press the *Today* button. This action affects the year, month and day but does not affect hours and minutes.

Method 4.



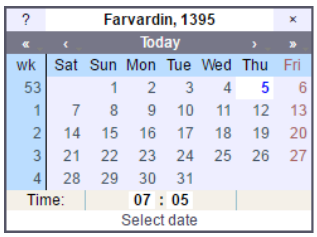
In the calendar, click the left mouse button on the field with the month and year. Below is the field with the year number. There enter the required year from the keyboard, then click on the name of the month and select the day.

Additionally, you can set the hours-minutes in the manner described above.

The Persian Calendar

Above was described the method of working with the Gregorian calendar. However, Wialon Local additionally works with the Iranian calendar (also known as the Persian solar calendar). It is used in Iran and Afghanistan.

The Persian calendar can be activated in *User Settings*. If Persian (Farsi) is selected as the interface language, the calendar is also in Persian and is shown from right to left. In other cases it is in English (in Latin characters and Arabic numbers) and shown from left to right.



In the Persian calendar, just as in the ordinary calendar, you can set a date, quickly select the present day, turn over the months and years, specify the time. By clicking on the question mark at the top you can call up more detailed information. To close the calendar, click the cross-shaped button. In addition, the calendar can be dragged anywhere.

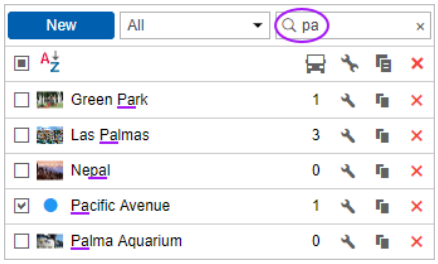
Filters and Masks

When creating various objects in the monitoring system (geofences, drivers, custom fields, sensors, etc.), lists are generated from them. Objects from the lists are displayed in the alphabetic order, with numbers first, then letters of the Latin alphabet, and then Cyrillic. Uppercase and lowercase letters are not taken into account. When you create a new object (for example, new job or custom field), it is originally added to the end of the list. When you later open this list, the objects will be arranged in the alphabetical order. After renaming, the object remains at its former place until you reopen the list.

Filters and masks are used for convenience. They allow to narrow the list of items in such a way that only the objects necessary for users are shown. Also, they allow to find the objects with particular characteristics or name in the list and specify the objects of tracking system towards which a report, notification, etc. will be applied.

Dynamic Search

If the list contains a large number of items, it may be difficult to quickly find the required one. For your convenience, you can use the fast dynamic search. It is applicable for most panels. Start entering the name of the item (geofences, units, routes, etc. — depending on the panel you currently in). The name can be typed starting from any place. While you enter the text, the list shows the items that match your query.



If you leave the filter field empty, *all* the available items will be displayed in the list.

The dynamic filter can also be found in the unit properties dialog, unit groups, and users when adjusting the access rights. Moreover, the dynamic filter is used to select a resource when creating notifications, jobs, geofences, drivers/trailers (their groups, automatic binding lists), and also report templates.

The peculiarities of the dynamic filter usage in the Monitoring panel are described in the *Unit List Management* section.

When sarching, you can also enter the special characters such as * and ?, the usage of which is described below.

Name Mask

Besides the dynamic search, filters are also used to specify an item, which is affected by report, notification, etc. To do this, specify a mask for the name of the element where you can use special characters: **asterisk (*) and question mark (?)**.

An asterisk sign is a special symbol, which can be inserted into the query text to indicate any combination of valid characters in the unit name. An asterisk can be put anywhere in the query (at the beginning, in the middle, at the end) or in several places at once, depending on what part of the name is known or is the same for a number of items. For example, if you type **H*nda**, all *Hondas* and *Hyundais* will be found.

Another special symbol that can be used is the question mark (?). It replaces any single character (only one character).

The same as the asterisk sign, it can be put at any place of the query.

The request is case sensitive.

For example, a unit has two fuel sensors with the names *Fuel level sensor* and *Fuel in tank*. It is necessary to create a notification that takes into account the readings of both of these sensors. To do this, in notification properties you need to set the name mask so that it matches both sensors. In this case, the best choice is **Fuel**:

In all cases where it is suggested to set a mask, you can do without the use of asterisks and question marks, but in this case you need to enter the exact name as it is in the system.

To find *all* items of a certain type (users, sensors, geofences, etc.), simply enter one asterisk in the query field.

Masks are used:

- in notifications to specify the monitored sensor, route or driver, as well as set SMS text mask or parameter in messages;
- in user properties to set host mask for users;
- in reports to specify the driver, sensor, event/violation, route and its geofence, and when selecting geofences;
- in the Messages panel to filter found messages;
- in all panels of the mask instead of the dynamic filter.

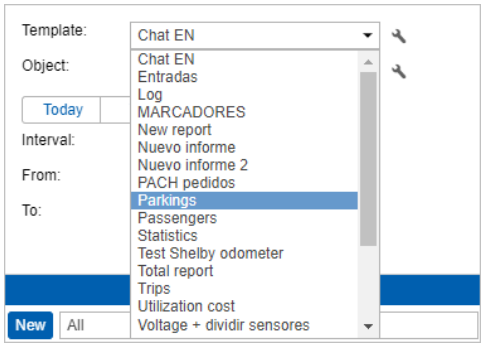
Manipulations with Lists

When working with lists, keys and keyboard shortcuts can be used. Using the keys facilitates a lot of operations, such as list navigation, search of necessary items and their selection.

Dropdown Lists

Dropdown lists are widely used in the monitoring system. They provide a possibility to work with a large amount of items. For example, this can be a list of units available when generating a report, requesting messages, etc., a list of tables when editing a report templates, etc.

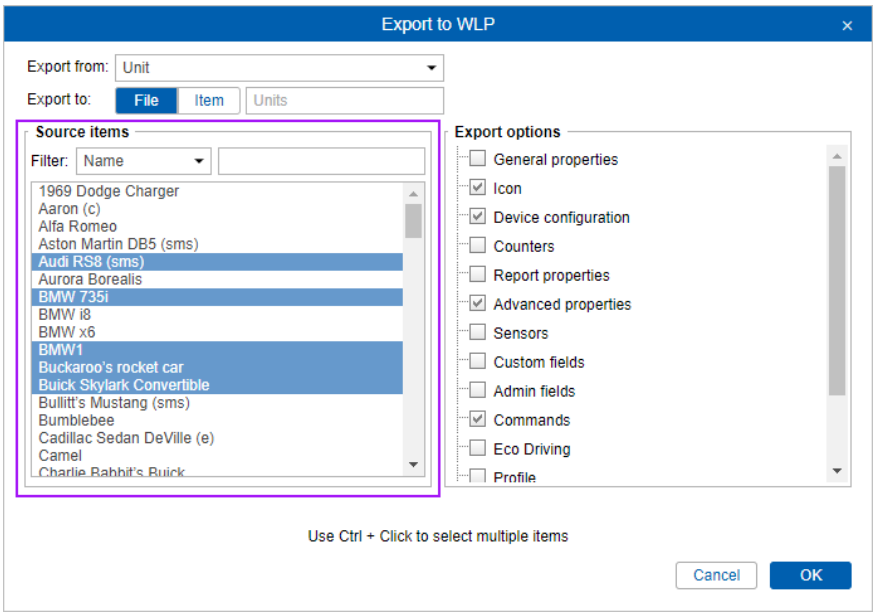
When building tracks or querying messages and reports, you can use dynamic search in dropdown lists. For tracks and messages you can quickly find a necessary unit in the dropdown list, for reports you can find templates or objects. To use the dynamic search, click the corresponding dropdown list and start entering the name. You can use a wildcard character asterisk (*) to facilitate the search. As a result, the dropdown list is filtered according to the indicated symbols.



To work with the dropdown list, you can use a keyboard. Use arrows (up/down) for navigation through the list and the *Enter* key for choosing a necessary item.

Multiple Selection List Box

In the lists of such type you can select multiple items. To choose several items throughout the list, hold the *Ctrl* button, and consequently click on the necessary items.

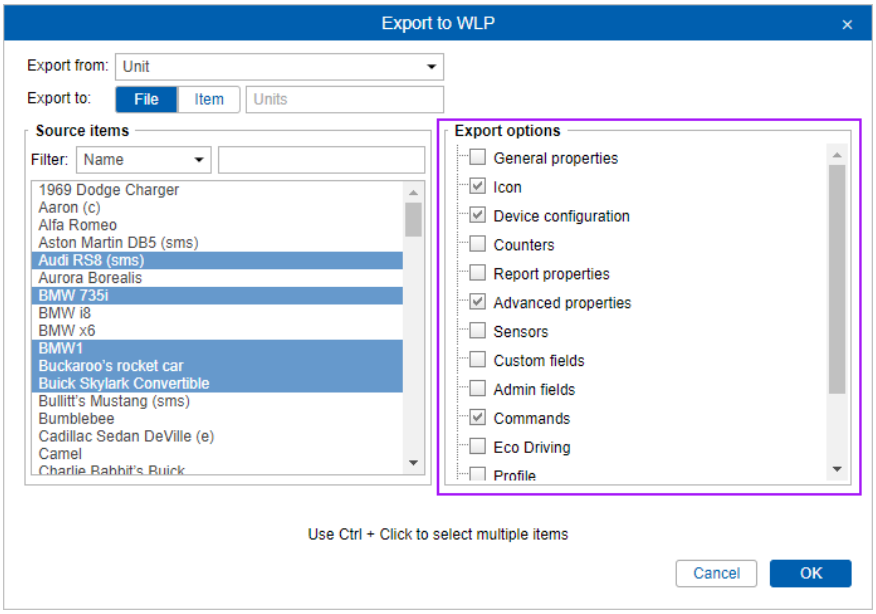


Moreover, the following keys, and their combinations can be used:

Home — move to the beginning of the list;
End — move to the end of the list;
<⇑> (up arrow) — move to the previous item;
<⇓> (down arrow) — move to the next item;
Ctrl + *A* — select all;
Shift + *Home* — select everything from the current place to the beginning of the list;
Shift + *End* — select everything from the current place to the end of the list;
Shift + ⇑ — consequently select the items going up from the current one;
Shift + ⇓ — consequently select the items going down from the current one.

Checkbox List

Multiple selection lists may contain checkboxes indicating whether the item is selected or not. The *Ctrl* + *click* combination can be used in such lists in order to check/uncheck all the items at once.



Attention!

When working on MacOS, it is necessary to use the *Cmd + click* combination instead of *Ctrl + click*.

Input Rules

All fields for editing are checked for correctness of the input data. If the data is incorrect, the field is highlighted in red.

Incorrect entries are:

- Not enough characters in the name or a phone number. The names of monitoring units, unit groups and users must consist of at least 4 characters. Other objects like places, geofences, drivers, report templates, etc. can have names from one character in length.
- Excessive number of characters (more than 50) in names of monitoring units, unit groups and users.
- Letters in numeric fields (phone numbers, sensor values, radius, fuel consumption and trip detector settings, etc.)
- Forbidden characters:
  - double quotation marks **"**
  - curly brackets **{ }**
  - the backslash \
- Partly forbidden characters:
  - **spaces** are not allowed at the beginning and at the end of editable fields (however, they are allowed at the middle);
  - **comma** cannot be used in numeric fields as a separator (to introduce fractional numbers use a period as a separator).
  - in report templates (column names, table titles, and statistics fields) you cannot use comma, colon, or **&** symbol.

Using angle brackets ('>' and '<') is allowed but not recommended as, in some cases, they are automatically replaced with '>' and '<'.

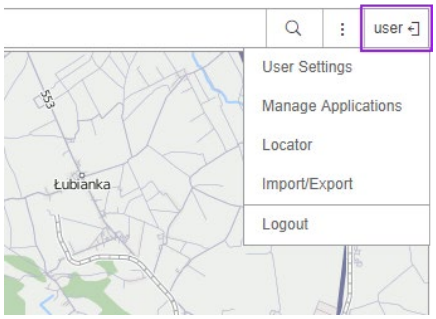
If any entry in a dialog is not valid, it is impossible to save changes or create an object, because the *OK* button becomes inactive. There can also be the *Incorrect entry* alert when trying to save incorrect data.

Phone numbers and e-mail addresses

Phone numbers must be entered in an international format and contain all the necessary codes (country code, communication statement or city code, and then the phone number itself). Brackets, spaces and hyphens are not allowed. The only symbol that can be used for entering phone numbers is **plus** (+) which, if necessary, is typed at the beginning of the number. Examples: *+19176726154, +15551234567*.

E-mail addresses must be in the format *user name — the 'at' sign (@) — domain name*. E-mails can contain letters of Latin alphabet, as well as dots (.), hyphens (-) and underscores (_). Example: *username@domain.net*.

User Settings



Users can configure some system operation parameters according to their needs and tasks.

Note.
User settings can be changed if the corresponding checkbox has been marked in the user properties dialog.

To view user settings click on the username in the top panel and then choose *User Settings* in the menu.

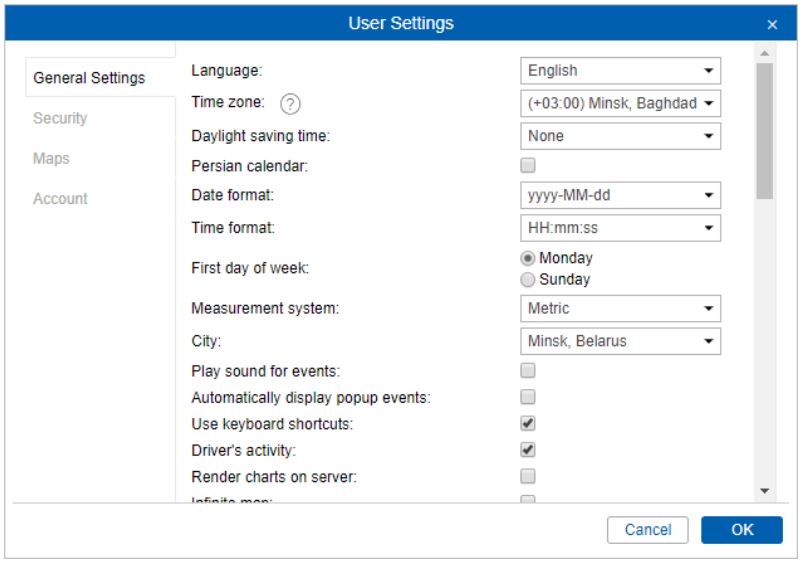
The *User Settings* dialog can contain up to four tabs, depending on the system configuration:

- General Settings
- Security
- Maps
- Account

Hint.
The settings of one user can be imported to other users. Here you can learn more about the transfer of user settings.

General Settings

The first tab of the User Settings dialog contains general settings. Here you indicate your time zone, input your e-mail address, change the password to enter the system, and set many other parameters.



Language
The language menu. Contact your service administrator to expand the list of available languages.

Time zone
The choice of time zone influences the time parameters that are displayed in all dialogs and panels.

Daylight saving time
Specify DST options if you use summer and winter time in your region — choose the most appropriate DST schedule on the dropdown list. *None* — summer time is not used.

Persian calendar
This option allows to activate the Iranian calendar also known as Persian solar calendar. It is used in Iran and Afghanistan. If the option is chosen, the Persian calendar replaces the usual (Gregorian) calendar in the places where a user should indicate some time interval (to build a track, to query messages or a report, to setup a job or assign a route, etc.) Note that the Persian calendar can be used to indicate particular dates of an interval only (from – to). Working with *quick intervals* (*Today*, *Yesterday*, *Week*, *Month*, *Year*), the Gregorian calendar is applied. If the interface is in Arabic, the calendar is in Farsi (language spoken in Iran) and is shown from right to left. Otherwise, it is in English (in Latin characters and Arabic numbers) and is shown from left to right (see details). Enabling/disabling the Persian calendar requires reloading the page.

Date and time format
Select the format of the date and time that is convenient for you. Depending on the entered mask, the date elements can be arranged in different order and have a different appearance. A month, for example, can be displayed with a word or a number, a year with two or four digits, and so on. In addition, the day can also be included. The syntax instructions for each field are given in a tooltip. In the drop-down list, you can select one of the predefined masks. The table below shows some examples of formats:

Date mask	Time mask	Result 1	Result 2
yyyy-MM-dd	HH:mm:ss	2014-01-25 09:45:33	1987-12-02 17:20:00

d/MM/yy	HH:mm	25/01/14 09:45	2/12/87 17:20
d MMMM yyyy dddd	hh:mm:ss tt	25 January 2014 Saturday 09:45:33 am	2 December 1987 Wednesday 05:20:00 pm
dd MMM yyyy ddd	hh:mm tt	25 Jan 2014 Sat 09:45 am	02 Dec 1987 Wed 05:20 pm

First day of week
Select either Monday or Sunday as the first day of the week. This affects the appearance of the calendar and the manner of counting weeks in general.

Measurement system
Select one of the available measurement systems. The corresponding units of measurement are used in such tools as Distance, Area, Routing, Nearest Units. The measurement system also influences address processing, as well as the creation of routes. However, the earlier created units and resources (together with geofences, jobs, and notifications) possess the measurement system selected upon their creation. As for reports, their measurement system is set separately (see Report settings –> General).

City
In this field you can indicate your city. It is used in the Nearest Units and Address tools as the default city. Enter the name of the city. When you enter the first letters, the dropdown menu with the names corresponding to the request opens automatically. You can either continue typing in the name or choose it from the dropdown menu (there can be several cities with the same names in different countries).

In addition, this setting determines the position of the map when entering the monitoring system. However, if there are monitored units on the map, the map is scaled so that all of them are in sight.

Distance from unit to geofence
This option activates the calculation of the distance from a unit to a geofence when using the latter as the address. The maximum allowable value is 100 km or miles (depending on the selected system of measures).

To work with this option, activate the *Geofences* service in the account properties.

Play sound for events
A sound can be played when an online notification is triggered or a driver's message is received. In Windows OS, QuickTime Alternative can be used as media player. If you use Opera, you may need additional adjusting, so that the request to play or save the sound does not appear.

Automatically display popup events
If you want the online notifications and messages from drivers to be automatically shown on the display, it is necessary to check this box. If you remove the check mark, only a number in the red circle in the bottom panel of the program near the corresponding icon indicates that new events have been received.
If you close the online notifications window or the chat with driver window using the cross in the upper right corner,the *Automatically display popup events* box will uncheck. The box can be checked again either in the user settings window or by clicking on the *Online notifications* or *Chat with drivers* buttons in the bottom panel.

Use keyboard shortcuts
Check this box to activate the Shortcuts.

Infinite map
Allows the circular (*infinite*) movement of the map to the right or left. This option should be activated *only* when tracking is carried out around the 180th longitude (Fiji, Chukotka, etc.).

Driver's activity
Check this boxto show the information on driver's activity in the unit and driver tooltips, as well as in the extended unit information.

Render charts on server
Check this box to use the static charts in the monitoring system.

Show Additional Information about the Unit

Here you can choose what additional information about the unit should be displayed in different places of the tracking system.

If you check the boxes in the **left column**, the information will be shown in the unit tooltip (displayed as you hover the mouse pointer over the unit's icon).

If you check the boxes in the **right column**, the information will be shown in the extended unit information in the work list.

To check all the items from any column, hold the *Ctrl* key on the keyboard and check any box of the corresponding column.

Last message
The time when the last message was received and how long ago.

Location
The last detected address of the unit's location or coordinates if address information is not available.

Presence in geofences
If a unit in the latest message was within a certain geofence, the name of the geofence is displayed in the unit tooltip and in the extended unit information with sorting by area (from small to large), and it has the color that is assigned in geofence properties. This option also affects units count in the *Geofences* panel.

Speed
The speed in the latest positional message.

Altitude
The altitude in the latest positional message (if device is able to give such data).

Counters
The values of mileage counter and engine hours counter. See Counters.

Satellites
The number of satellites captured in the latest positional message.

Coordinates
GPS coordinates of the unit, taken from the latest positional message received (in decimal degrees).

Connectivity settings
Device type, unique ID(s), and phone number(s) specified in unit properties. This information is available to users with 'Edit connectivity settings' access flag.

Sensors values
The sensors configured for the unit and their values converted according to the calculation table.

Parameters
The latest known parameters. Their names and values match those of the messages without conversion to other units.

Drivers
The name, photo, and phone number of the driver(s) currently bound to the unit.

Trailers
the name and photo (if available) of the trailer(s) currently bound to the unit.

Custom fields
Custom fields from the properties of the unit (general or/and admin fields depending on access).

Profile
Profile information of the unit.

Maintenance state
Specified service intervals and terms for their implementation (days/engine hours/kilometers left or expired).

Note.
The counters are refreshed once a minute, as well as the information about drivers and trailers. Check for presence in geofences is performed every two minutes. Other information is refreshed instantly.

Unit Visualization on Map

Replace unit icons with motion state signs
When the box is checked, all icons of the units are replaced by conventional signs showing their activity. The green arrow indicates that the unit is moving, and its direction shows — which way. The yellow circle means that the unit is standing with the engine running, the red square — that the unit is standing with the engine off. See *Unit presentation on map*.

Display overlapping units in one icon

If two or more units are *overlapping*, their icons are grouped into the common one. It facilitates the visual perception of the map. The common icon has a value indicator showing a number of units in it. To see the list of units the common icon contains, hover your mouse cursor over the icon for a pop-up window to appear. Upon clicking the common icon the map is scaled in such a way that all the units of the common icon get into the vision field. Note that overlaying icons cannot be grouped into the common one on the 2 largest scales. When you view the map on such a scale, accuracy is important, so all the icons are visible, regardless of their overlapping.

Show unit icons at map borders
If a unit is outside the visible area, its iconis displayed at the map border in the direction where the unit is located. Click on this icon to see this unit on the map.

Blur icons of inactive units
Indicate this flag in order to differentiate unit states on the map.

Trace
It is possible to indicate the length of the trace which is added to a moving unit on the map (the *Points in traces* parameter), and select the color and width for it.

Multicolor sensors in unit tooltip
Sensors, if chosen to be displayed in the unit tooltip, can change their colors according to the received values. The color scheme can be adjusted on the first tab of sensor's properties. In the unit tooltip, the color can be applied either to the whole row with the sensor (both its name and value) or only to its value — select the desired option in the dropdown list. If *Multicolor sensors in unit's tooltip* is disabled, the default color (black) is used.

Other Items on Map

Display names of routes' check points on map
Depending on the checkbox, route check points can be displayed with or without their names on the map.

Display names of geofences on map
Depending on this checkbox, geofences can be displayed on the map with their names or without them. The color of the captions is adjusted in geofence properties.

Display overlapping geofences in one icon

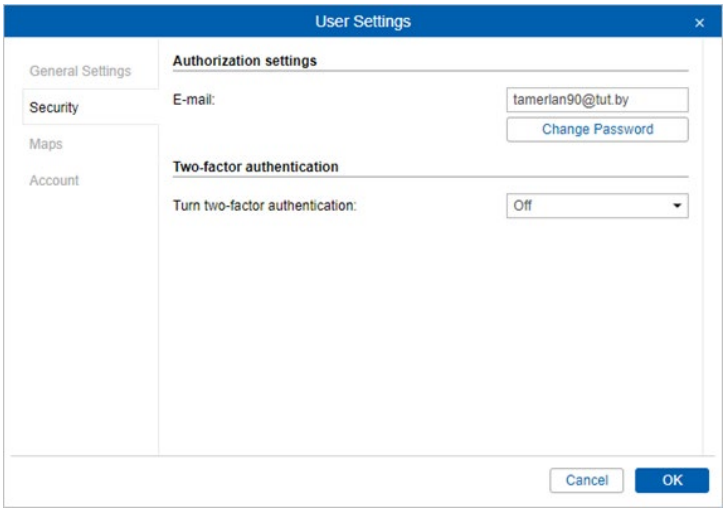
If several icons of geofences overlap when displayed on the map, they can be grouped into one. Place the cursor over this icon to know what geofences are hidden behind it. Note that for reports this option is set independently — in the advanced options of a report template.

Render geofences on server

By default, all geofences are rendered in the browser. Rendering on the server is advisable, if not a very powerful computer is used for monitoring, but the speed of Internet connection is quite high. In such cases, this option allows you to significantly increase the performance of the Wialon Local system.

Security

On the *Security* tab of the user settings dialog you can make the authorization settings and enable two-factor authorization.



Authorization settings

E-mail
An e-mail address is required to recover the password in case it is lost and to receive a verification code when the two-factor authentication is enabled.

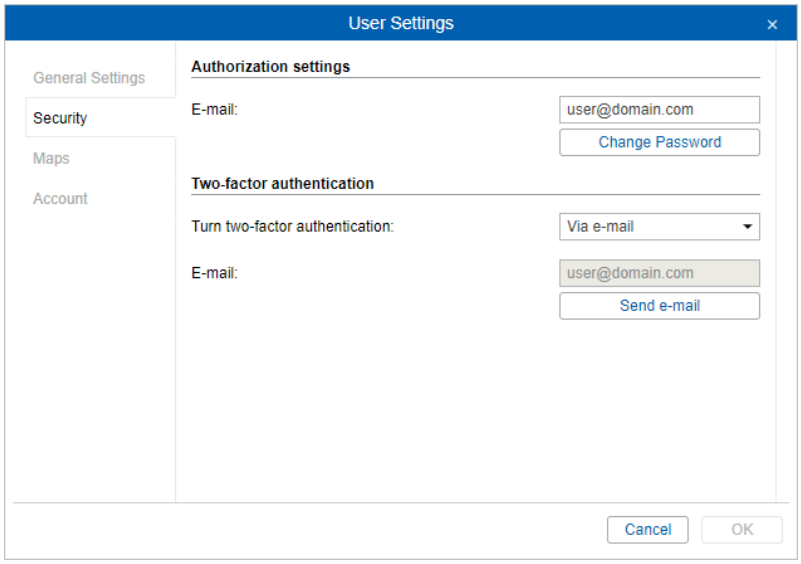
Change password
Type in your current password, and then your new password (twice). Click *OK* to save.

Attention! No every user at the time of its creation is provided with the right to change the password.

Two-factor authentication

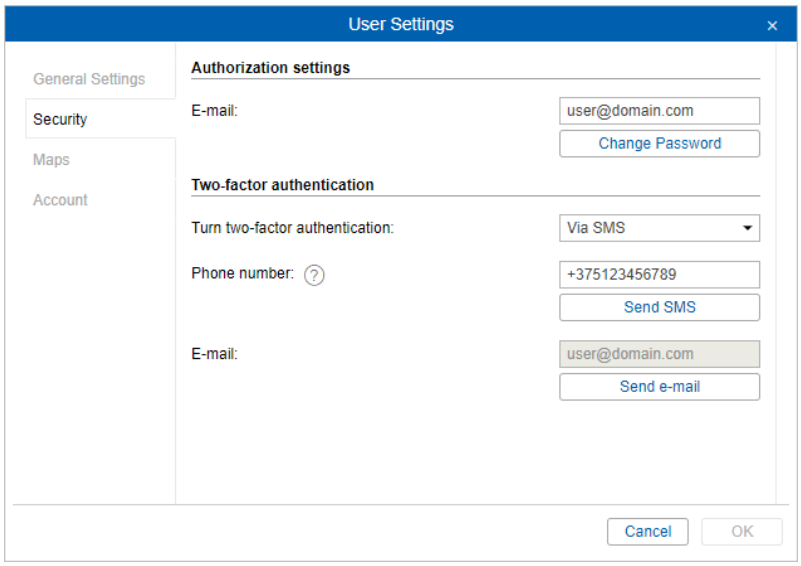
To enable two-factor authentication, in the drop-down menu select the method of receiving the confirmation code: via e-mail or by SMS.

Via e-mail
The code is sent to the e-mail address specified in the authorization settings. To confirm the address, press *Send e-mail* and enter the received code in the line that appears.



Via SMS

Specify the phone number to which you want the code to be sent. To confirm the phone number, press *Send SMS* and enter the received code in the line that appears. Standard rates apply for SMS messages.



In order to receive text messages, you should activate the *SMS Messages* service in the account properties and the *Can send SMS* function in the user properties.

In case SMS cannot be sent (for example, the service is disabled or the number of available text messages is exceeded), the confirmation code is sent to the e-mail specified in the authorization settings.

Advanced settings

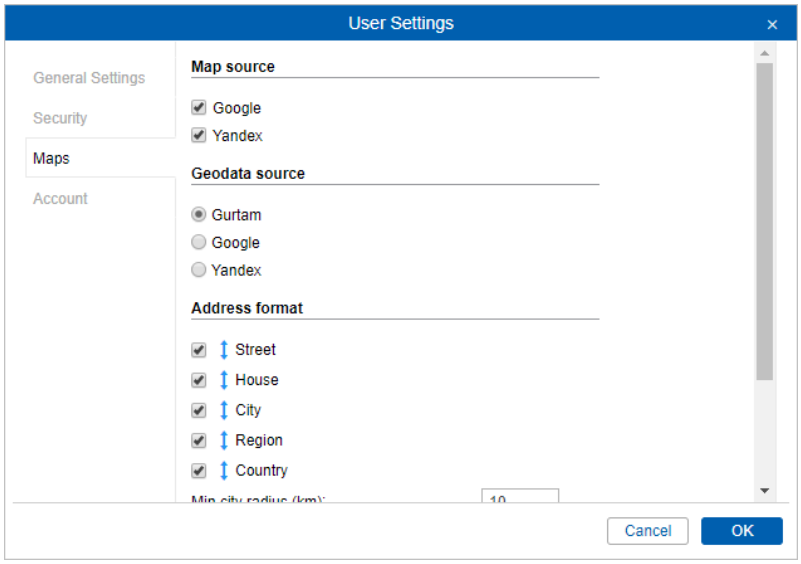
Notify about account blocking by e-mail

Activate this option to receive notifications about account blocking to the e-mail address specified in user properties. Notifications start arriving daily 5 days prior to blocking.

To work with this option, activate the *E-mail notifications* service in the account properties.

Maps

Maps settings are adjusted in the User Settings dialog on the *Maps* tab.



Map source
Here you can enable or disable certain layers of maps by checking the appropriate boxes. Changes are applied after clicking *OK* and refreshing the page. To select a different map as a base layer, choose it in the maps menu.

The following maps can be used in Wialon: Google Maps, Bing Maps, OpenStreetMap, Kosmosnimki, 2GIS, WikiMapia, Visicom, Yandex, HERE, Regio, Luxena, MyIndia, ArcGIS, Mapbox, OpenSeaMap (additional layers). By default, all address information in Wialon Local is taken from the WebGIS server. However, it is possible to take the address information from the Gurtam Maps cartographic service (for a fee).

Some maps go in blocks. For example, when you enable Google Maps, several map layouts appear on the menu at once: Google Streets, Google Physical, Google Satellite, Google Hybrid, and Google Street View for tracking on mini map. Moreover, if the additional layers are available (for example, traffic layer, maritime navigation), they can be visually displayed on top of any chosen map.

Use of cartographic services is stipulated by the procedures established by the author or by other rightsholders of such services. When choosing a cartographic service you confirm that you acknowledge and accept the full responsibility for its possible misuse.

Geodata source
In this section, you can select the source of address information used in the *Monitoring* panel, in the tooltips of units and tracks, in the *Messages* panel, while creating geofences and routes. Possible sources of geodata are Gurtam, Google, Visicom, Yandex, Mapbox, HERE, Luxena, what3words, ArcGIS. Only the maps that are activated in the site's properties are displayed in the list of available.

If a geodata source other than Gurtam is chosen, the *Address format* block becomes unavailable.

Address format (only for Gurtam Maps)
Here you can specify the format for displaying address information in tooltips, tools, messages, and other places. Choose which of standard address components should be displayed: country, region, city, street, and house (at least one of these items should be selected). For example, if your units move mainly within the same city or town you can omit the country, region, and city and leave only the street name and house number in addresses. Address components can

be put in any order. To change this order, drag components up and down using the arrow-shaped buttons. This format affects addresses mainly in cities/towns/villages.

This format is especially relevant if the units are moving around the city. For addresses outside the city (near roads), the following two settings are important:

- *Max distance from unit* determines that if the unit is on ttheroad or close to it and there is a city/town/village at a specified distance, the address is displayed as the name of the road and the distance to that city (if several cities are found, then to the nearest one).
- *Min city radius* determines that if at a distance specified as *Max distance from unit*, no settlement is found, then the address is bound to some other city. The radius of the city that can get into the address information can be specified in this parameter. It may be necessary, for example, if only large cities should appear in addresses.

Format of coordinates
The coordinates of the cursor shown in the lower right corner of the map can be either in degrees or in degrees and minutes. This option *only* influences the cursor's position format.

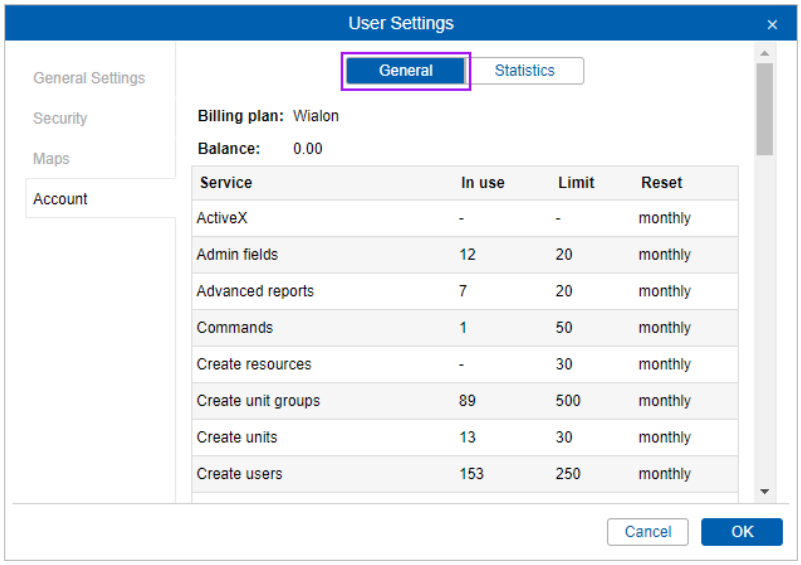
For the *Map source* and *Format of coordinates* blocks there is a possibility to check all the boxes at once. To do so, hold the *Ctrl* key and check any box of the corresponding block.

Account

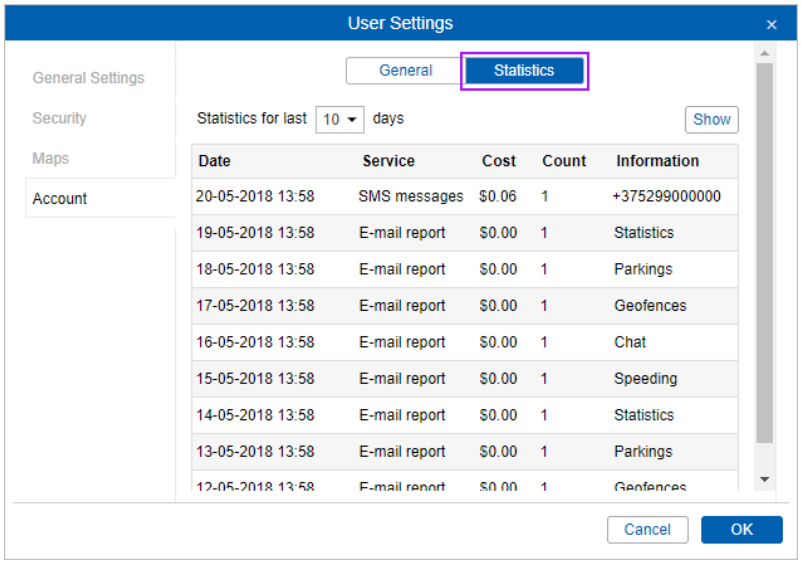
Attention!
The availabilty if this tab depends on the configuration of the service.

On the *Account* tab of the User Settings dialog you can view the information on the billing plan, current state of account, services used and available, etc.

The tab contains two sections: General and Statistics. The General section contains the information on the billing plan, current state of account, balance and days left. You see also how many objects (such as geofences, devices, users, etc.) you can create and how many of them already exist. The table specifies services, their status, limit and reset interval. If the limit is 0, it means the service is unavailable. If you see a dash in the limit, it means that no limitations are applied to this service.



To view statistics, click on the *Statistics* icon. On the page that opens, specify the time interval for which you want to get statistics, and click *Show*. The table below will download the data for the transactions that have been performed.



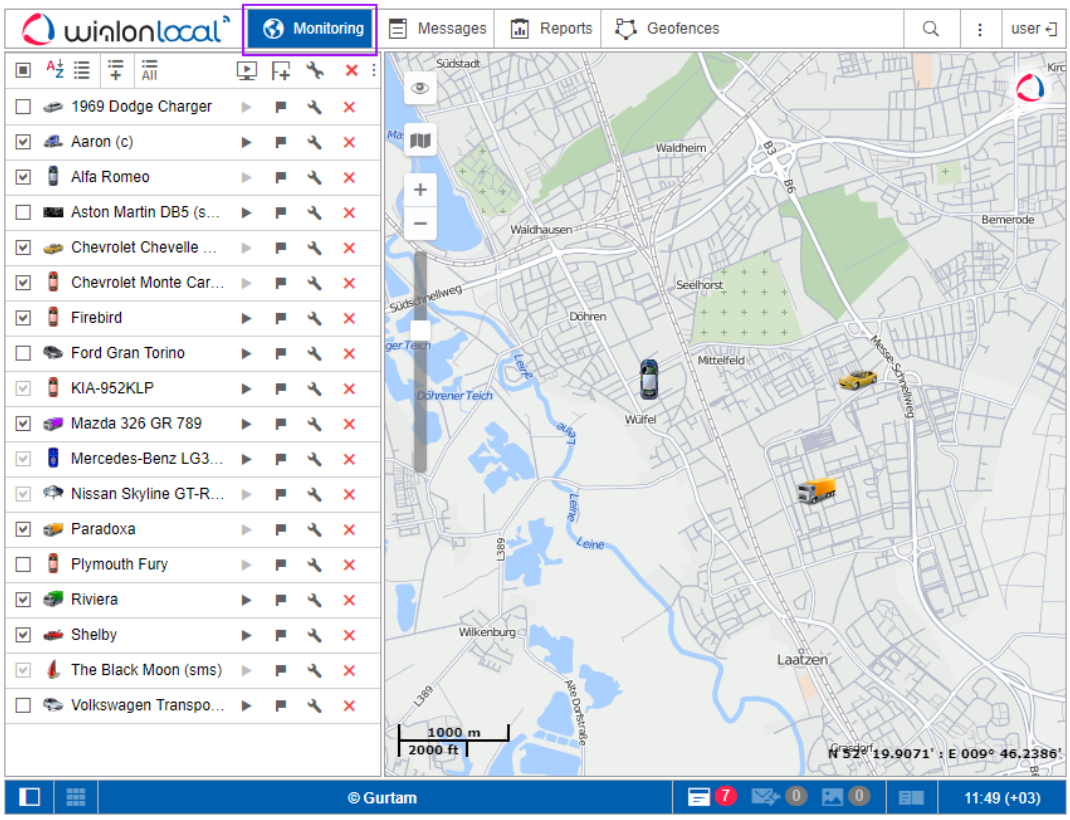
Monitoring

The *Monitoring* panel displays the work list of units and gives access to the basic features connected with tracking.

The work list can contain either all units available to the current user or just some of them. Units can be easily added and removed from the work list, which does not lead to their removal from the system. Here you can find more information on how to manage the work list.

Near the name of each unit can be a number of buttons and signs that allow you to estimate the state of the unit or perform some kind of action on it. The choice of signs and buttons to be displayed in the *Monitoring* panel can be adjusted. These columns can also be used to sort units in the work list.

To open 'Monitoring' panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer.



To locate a unit on the map, click on its name in the work list. The map centers on this unit. However, the scale of the map remains the same.

The map displays only those units that are checked in the first column of the work list. You can mark all the units at the same time, checking the box in the top left corner of the list. Remove this checkbox to to remove unit icons from the map. Units will be visible on the map only if the corresponding layer is activated.

Note that in order for *units* to be displayed on the map, you should check if the corresponding layer is active.

Units are visible on the map only when they fall into the visibility zone. You can move and zoom the map according to your needs.

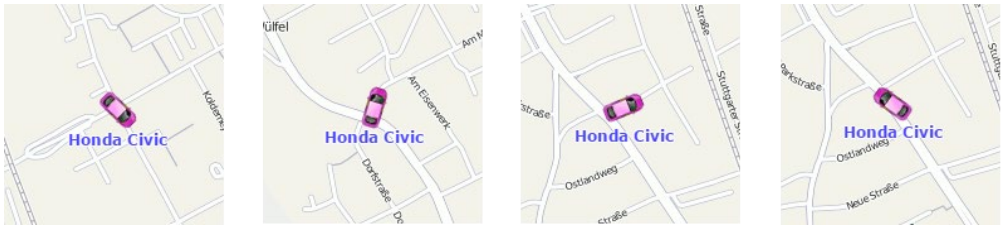
However, if *Show unit icons at map borders* is selected in User Settings, in case a unit leaves the visible area of the

map, its icon is displayed on the edge of the map. Click on the icon to move to the unit on the map.

In order not to lose the current location of the unit on the map, enable the *Watch unit on map* feature. The units marked in this column are always visible on the map. When a new message arrives from such units, the map is automatically scaled so that all these units are in sight.

Unit Presentation on Map

By default, the unit on the map is displayed by the icons assigned to them and their names (captions color is red). Icons for units can be selected from a standard set, e.g. , or you can upload your own image using the Unit Properties => Image dialog. In addition, the icon can rotate depending on the course (direction) of the unit. This feature is also defined in unit properties.

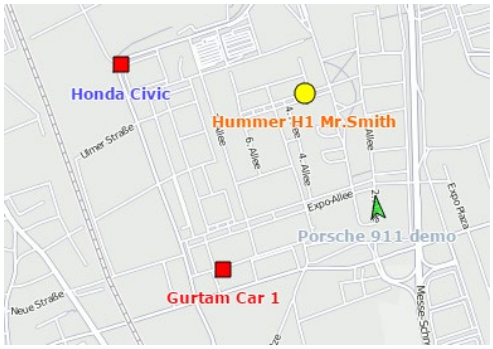


Icons overlapping each other on the map can be replaced by the common icon with a number indicator. To do this, select *Display overlapping units in one icon* in the *User Settings* dialog.

Alternatives for Icons

Unit icons can be replaced with motion state signs. This option is called *Replace unit icons with motion state signs* and is set in User Settings. The following symbols are possible:

- green arrow — the unit is moving, the direction of the arrow indicates the direction of movement;
- red square — the unit is not moving (if there is an ignition sensor, it also means that the unit is standing with the engine off);
- yellow circle — the unit is not moving with the engine on (only for units that have ignition sensors).



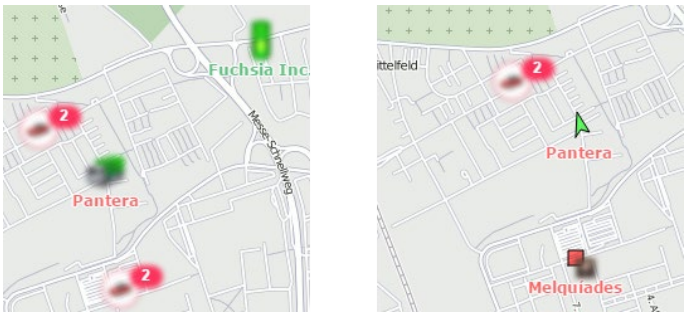
Besides, the colors of these icons (arrow, square, circle) can be different and depend on the value of sensor. This functionality is adjusted on the *Advanced* tab of unit properties. In other words, the shape of the icon is defined by the state (standing still — square, moving — arrow), and the color depends on the sensor value (intervals and colors are adjusted in sensor properties).

Unit names can be shown or hidden when displaying a unit on the map. It depends on the state of the ( ) button in the layers menu on the map.

Displaying Inactive Units

Monitoring units are conditionally divided into active and inactive ones. Inactive units are those units from which there have been no messages with coordinates for more than 48 hours. Other units are considered active.

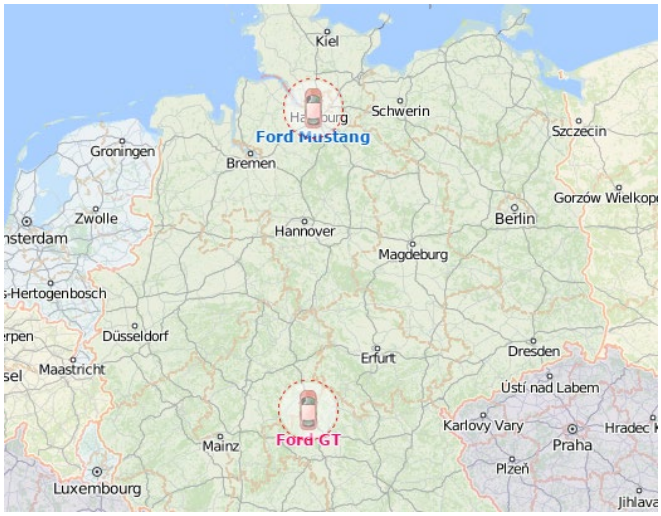
The system supports the possibility of differentiating unit states on the map. To do this, check the *Blur icons of inactive units* box in user settings. In this case inactive units are displayed on the map with blurred icons and transparent names. If the signs of motion are used instead of icons, then transparency is used both for signs and names. If the *Display overlapping units in one icon* box is checked in *User Settings*, and all the units with overlapping icons are inactive, then the icon for them is displayed blurry. Moreover, the icons of drivers or trailers bound to the inactive unit are also blurred until they are unbound.



Displaying Units with LBS Detector

LBS detection is an alternative method of finding units on the map. The accuracy of this method is inferior to determining the location using GPS, but if the unit experiences troubles with GPS connection you can switch to the *LBS detection* method. To do this, it is necessary to check the *Allow positioning by cellular base stations* box on the *Advanced* tab of the unit properties dialog. Therefore, if *LBS detected* data is more recent than GPS data, it is used to determine current location of the unit.

When using *LBS detection*, units are displayed on the map in the following way: the current icon of the unit is placed into a transparent white circle with a red dotted stroke, the brightness of the icon decreases.



Other Markings

If the unit is currently in motion, the green arrow shows the direction of its movement, and the unit can be followed by a blue *tail* (trace) which shows the track for the last few messages. If the unit is stationary (according to the last message), this arrow is not shown. If there was no motion within several latest messages, the trace is not shown (or the page has just been loaded). The length of the trace is 5 messages, however, it can be changed together with the trace width and color in User Settings.

Direction arrows, traces, the names of assigned drivers and units can be disabled. To do this, use the corresponding buttons in the layers menu on the map:

— hide/show the traces of the unit;

— hide/show the name of the unit;

— hide/show the name of the assigned driver (if there are any);

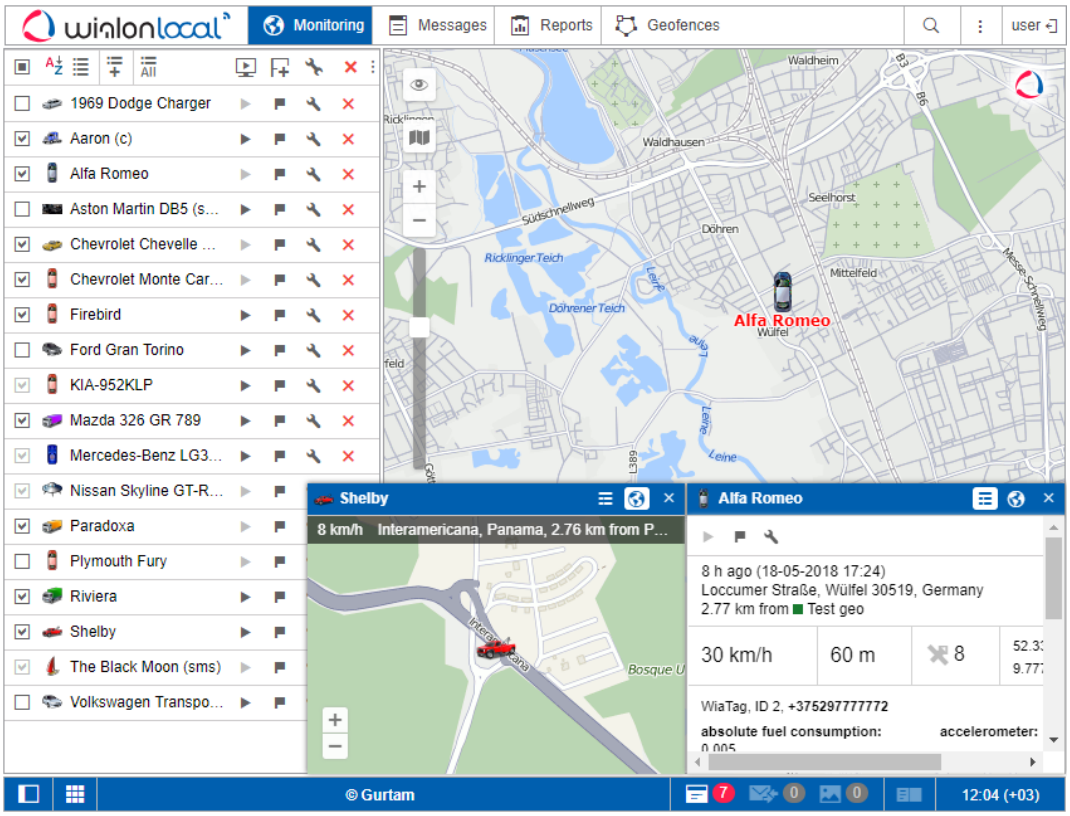
— hide/show the direction of movement of the unit.

If the names of both units and assigned drivers are enabled simultaneously, the latter are shown in parenthesis. The colors of the captions are taken from the units' properties.

Minimaps

Minimap is an additional window (help window) focused on the current information about the selected unit. Double click on the name of a unit in the monitoring list to open its minimap. The selected unit is centered on the map. Moreover, the window can be open by double-clicking on a unit on the map. However, in this case the unit is not centered on the map.

Note that if no messages with coordinates have been received from a unit, nothing happens when you double click on it.



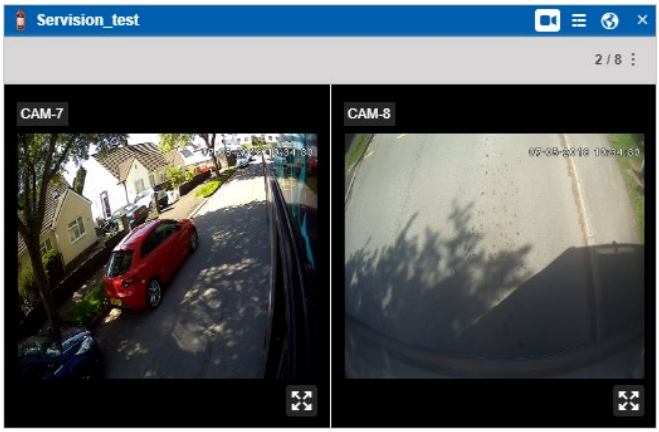
Minimap Modes

There are three modes available for minimaps: video, info, and map modes. They can be switched using the buttons / / in the right corner of the mini window header.

Video
This mode allows to monitor a unit online and watch the video for a previous period. To work with it, activate the *Video service* for the user and provide the *View connectivity settings* access right towards the unit.

Besides the methods mentioned above, to switch to the video monitoring mode you can press the corresponding button in the *Monitoring* panel.

At the top of the mini window, there are *Live* and *Archive* modes switch buttons (on the left), as well as the button for video display settings (on the right). By pressing the latter, it is possible to choose the cameras (the maximum number of cameras is defined by the settings of the device) and change their order by pulling the arrows on the left from the camera name to the required position. By default, the first camera is displayed.



The video is displayed in real time. Click on it to stop the broadcast; click again to resume it. The button in the lower right corner of the video allows you to switch to full screen mode. At the same time, broadcasting from other cameras stops.

In addition to the standard player, video playback is also possible via a third-party player. To do this, enter the player's IP address and protocol in the *IP* field in the *Device configuration* (Unit properties → General → Device type → Icon).

Note that the protocol of the link to a third-party player must match the protocol of the monitoring site.

Info

Switch to the info mode using the corresponding button in the minimap header. This mode dispays extended unit information selected in the right column of checkboxes in the corresponding block of *User Settings*.

Map

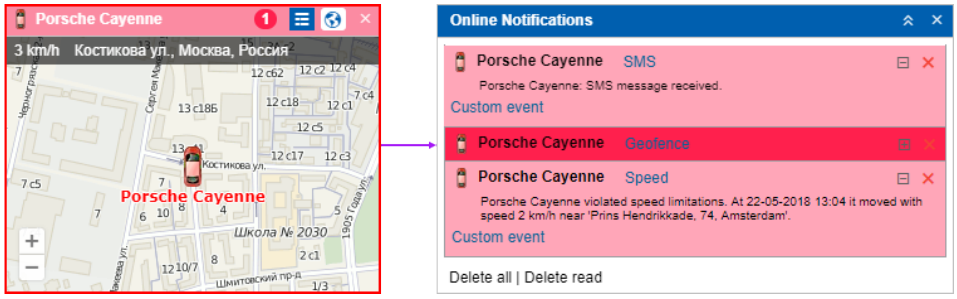
The main purpose of the map mode is to show the location of a unit, as well as its speed and address from the last received message. The map cannot be moved, because it is automatically centered on the last position of a unit and it does not leave the field of vision. Except for this peculiarity, working with mini windows in the map mode is completely identical to working with the main map.

In the map mode, with the help of the corresponding buttons in the lower right corner of the mini-window, you can activate Google Street View or Yandex Panorama. These are submodes which allow to track units along the 'real' streets. Google Street View is a Google Maps feature that allows you to view panoramic views of the streets of many cities around the world from a height of about 2.5 meters. The service makes it possible to view houses, roads and all surrounding objects on the street, creating the illusion of a virtual presence. At the moment, the service covers North America, Australia, New Zealand, Western Europe, Japan, Indonesia and Brazil. Yandex Panorama is also a panoramic view technology featured in Yandex maps. At the moment, Yandex Panorama allows you to view the panoramas of the streets of Russia, Ukraine, Belarus, Kazakhstan and Turkey.

Google Street View required the activation of Google Maps (*User Settings*) and requires the availability of coverage for the geographical area. For Yandex Panorama to work, activate the Yandex map and cover the corresponding viewing area.

Online Notifications in Minimaps

Minimaps provide you with an alternative way of viewing online notifications. Upon online notification triggering an opened minimap of a corresponding unit is highlighted in red. If the minimap is hidden, then it will be shown automatically upon receiving of a notification. To receive and view online notifications in minimaps, it is necessary to check the *Blink minimap* box while choosing a notification action.



An icon indicating a number of unread notifications appears in a minimap's header near the mode switcher. Click the icon to view received notifications. The concept of work with notification is identical to the one used in online notifications window. To return to the initial mode used, click the notifications icon once again. Note that a minimap is not synchronized to the online notifications window, therefore an activity of reading or deleting notifications in a minimap does not lead to any changes in the window of online notifications.

The maximum number of minimaps corresponds to 9 items. That is why if all the available windows are already opened, and a notification has come for a unit not opened in a minimap, then a notification will be available in the window of online notifications only.

Manipulations with Minimaps

There is a scaled icon and a unit name in the header of every help window in order to simplify the search of the necessary one. A mode switch and a close button are also situated in the header. You can open up to 9 help windows in the tracking system. Besides, you can use only one minimap per unit.

The button in the left corner of the bottom panel can be used to hide/show all minimaps at once. Apart from that, to avoid excessive information, minimaps are automatically hidden when you switch to the *Reports*, *Messages*, and *Routes* panels (but even then, they can be shown forcibly if necessary). Minimaps are shown automatically upon leaving these panels.

The latest used layout of minimaps is restored each time a user authorizes in the system.

Unit Additional Information

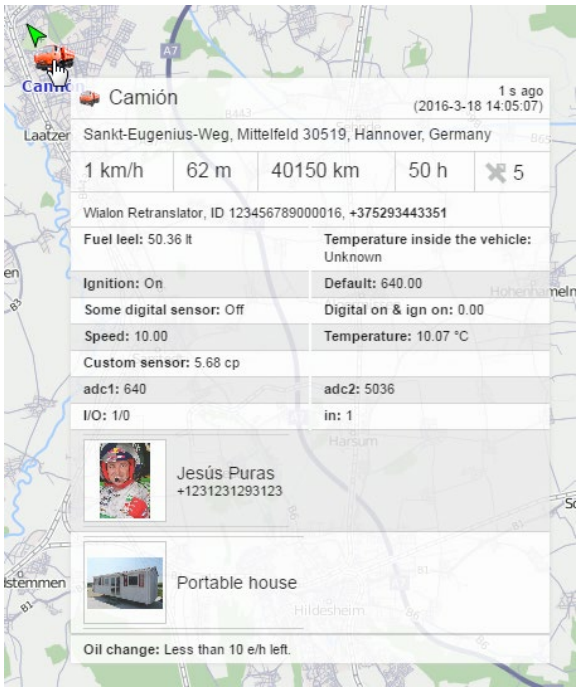
Additional information includes the following items: last message, location, presence in geofences, distance to the geofence (if the *Distance from unit to geofence* option is activated), speed, altitude, coordinates, counters, satellites, connectivity settings, sensor values, parameters, drivers, trailers, custom fields, and maintenance intervals.

Additional information can be found in the tooltip of a unit, as well as in the extended unit information of the monitoring panel work list.

Unit's Tooltip

A tooltip to a unit is displayed when you hover the mouse pointer over a unit on the map, in the work list, in any dialogs, and so on. You can copy the information from the tooltip by selecting and saving the necessary fragment to the clipboard. The content for this tooltip is selected in the *User Settings*.

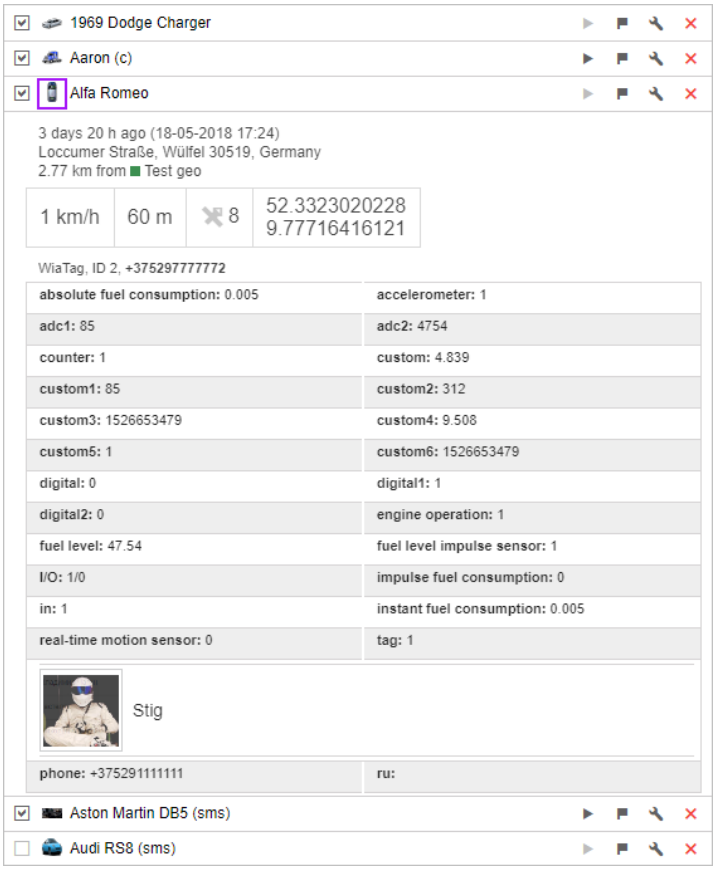
For example, the tooltip may look like this:



The characteristics are displayed in the tooltip in the same order they go in the *Profile* tab of the unit properties.

Extended Unit Information

Apart from that, additional information about the unit can be obtained by clicking on the unit icon in the working list of the dashboard (in both modes). Click on the unit's icon in the Monitoring panel to see the extended information. The content of the extended unit view is also adjusted in the User Settings.



You can apply extended view to any number of units in the work list. To hide the extended information, click on the unit icon again.

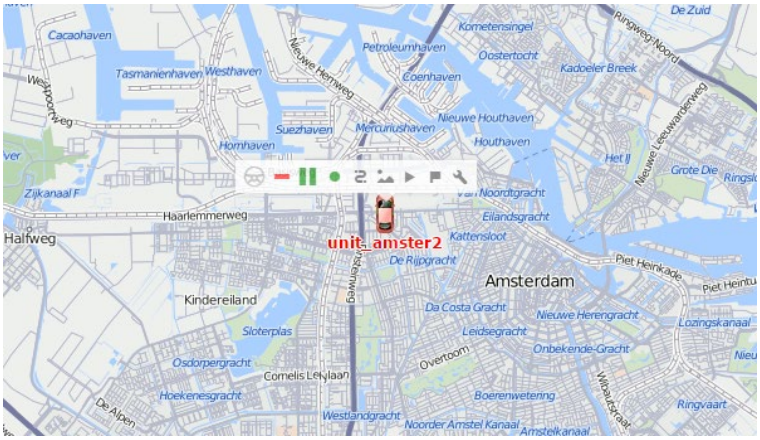
Note.
The values indicated in the pop-up window as well as in the expanded display, depending on the unit settings, can be presented in the metric system of measures (kilometers, meters, kilometers per hour, liters), American (miles, feet, miles per hour, gallons) or imperial (miles, feet, miles per hour, gallons).

Monitoring Options Menu

To summon the monitoring options menu, click on a required unit on the map. This menu contains the same functionality that was selected in the monitoring options. In addition, regardless of the options selected, the menu always contains the buttons for generating a quick report and building a quick track.

The monitoring menu does not contain the unit location icon, tracking option, and clear list button even if they are chosen as the monitoring options.

During a movement of a unit the menu moves with it and always displays updated information about the unit. To close it, click anywhere outside this menu.



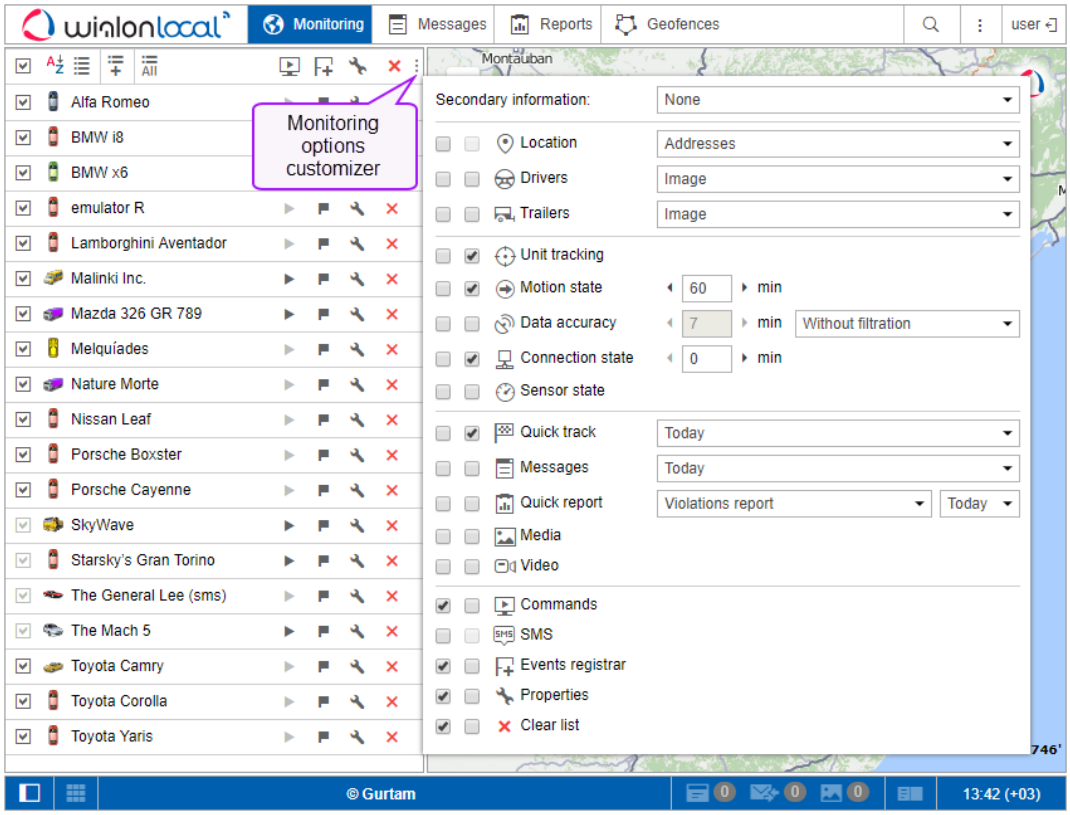
Monitoring Options

All the options that can be found in the *Monitoring* panel are described below. Depending on the tasks assigned, you can choose to display some columns and hide the others. To customize the columns in the *Monitoring* panel, press the special button in the upper right corner (three vertical dots). In the left column, mark the checkboxes that should be displayed in the work list and in the monitoring options menu. In the right column, you can select more rarely used options — they will be shown in the additional menu and will be available there.

All the options in the *Monitoring* panel can nominally be divided into two types:

1. *Of information.* These icons contain some information about the current state of the unit (movement/stop, sensor value, connection state, data accuracy). For additional information, see the tooltip which appears when you hover the mouse cursor over the icon.
2. *Of action.* A click on these options allows to perform an action on the unit (event registration, command or report execution, messages query, track building, properties editing, removal from the work list, etc.). As a rule, all further instructions can be found in the corresponding dialogs. Active action buttons turn blue when you mouse over them.

The icons in the upper part of the work list can also be used. In some cases it allows to sort the units according to some properties (e.g. at the top are the moving units, at the bottom — the stationary ones, and vice versa).



Secondary Information

All the options in the *Monitoring* panel are divided into 5 sections. The first one contains the *Secondary information* option, which allows to display the contents of the text columns under the unit names. The following alternatives are possible:

- None;
- Address;
- Geofence;
- Driver's name;
- Driver's phone number;
- Trailer.

Options of information

Next two sections include the options connected with the display of the information about the units. If one or several parameters in the first section (text parameters) are turned on, you can adjust the width of the corresponding columns in the *Monitoring* panel. To do it, hover the mouse cursor over the space between the columns whose width you want to change. When the dotted line appears, drag it to the desired side.

Location

This column displays the location of the units either in the form of addresses or in the form of geofences. By pressing the icon in the header, the units in the work list can be sorted according to their location (in direct or reverse alphabetical order). *Resolving* means the address is being searched. *N/A* appears for units whose location is not available, for example, in case a unit has never sent any messages.

- Addresses
  Depending on the selected format, addresses can be longer (if they include state, region, and other elements) or shorter (e.g., street and building number only).
- Geofences
  If geofences are chosen to determine the location, once a unit gets into several of them, all the geofences are displayed and separated by commas. They are also sorted by area (from smaller to a larger one) and highlighted in the color selected in the geofence properties. If a unit is outside of all available geofences, the address is displayed as its location. In any case, this column is the widest in the *Monitoring* panel which is why it is not recommended to turn it on if there is not enough space on the screen.

Attention!
To determine whether a unit is inside a geofence, the option *Presence in geofences* should be activated in the *General Settings* tab. This option is enabled automatically if you select geofences for the location column.

Drivers

The column with the information about the drivers. This column can contain the driver's photo, photo, and name, or photo and phone number depending on the display option chosen in the *Monitoring* panel customizer. The tooltip always contains the photo, name, and phone number of the driver.

- — no drivers bound;
- — the assigned driver has no photo;
- — several drivers are bound to the unit;
- — the assigned driver is running out of the allowed driving time (monitored when the *Driver activity* option is activated in the unit properties on the *Advanced* tab). If a photo is uploaded for the driver, an exclamation mark is displayed to the right of it instead of the icon.

Trailers

The column with the information about the trailers. This column may contain the photo or photo and name of the trailer depending on the display option chosen in the *Monitoring* panel customizer. The tooltip always contains the

photo and name of the trailer bound to the unit.

- — no trailers bound;
- — the bound trailer has no photo;
- — several trailers are bound (see more information in the tooltip).

Unit Tracking

/ In order to monitor the unit and always see it upon receiving the message, press the tracking icon next to its name. The icon will turn green, and a dot will appear inside of it. The unit should be already checked in the first (*Show on map*) column. If you click the icon in the header, the option will be applied to all the units marked in the first column.

Motion State

This column shows whether a unit is moving or stationary, as well as whether the ignition is on or off (in case there is a corresponding sensor). The motion state is defined on the basis of speed information in the latest message or a real-time motion sensor, if available.

To monitor the unit motion state, it is necessary to indicate the validity period of motion state icons (the corresponding line in the *Monitoring* panel customizer). The validity period is the time interval (in minutes), after which the traffic state signs become inactive. Moreover, when the validity period expires, unit movement directions become hidden. The validity period can take a value from 1 to 999 minutes.

- — the unit is moving (if there is an ignition sensor, this icon also shows that the unit is moving with the engine off, that is, it is being towed or transported);
- — the unit is moving, the engine is on;
- — the unit is stationary;
- — the unit is stationary, the engine is on;
- — the last message from the unit was received over an hour ago: the unit was moving;
- — the last message from the unit was received over an hour ago: the unit was stationary;
- — the unit data is received with the help of LBS detection;
- — the data obtained with the help of LBS detection is outdated;
- — there are no messages from the unit.

In case the unit is stationary, the tooltip displays the duration of this state. If the unit has a real-time motion sensor, the information about the duration is absent.

Data Accuracy

This column indicates the data accuracy: how many satellites locked the unit and when the latest message was received. To find out the exact time of the latest information update, hover the mouse cursor over the icon and study the tooltip.

The *first bar* indicates the availability of the satellites:

- green — the satellites are available (see the exact number of the locked satellites in the tooltip);
- red — the satellites are not available;
- grey — the satellites are not available for the period greater than the one indicated in the *Options customizer* menu.

The *second bar* shows the latest data received from the unit:

- green — the unit sent the data less than 5 minutes ago;
- yellow — the unit sent the data within the last hour;
- orange — the unit sent the data in the last 24 hours;
- red — no messages for a long period of time;
- grey — the object never sent the data.

You can customize the unit filtering in the *Monitoring* panel and/or on the map by relevance of the latest message. To do this, change *Without filtration* to *Monitoring panel* or *Panel + Map* and specify the filtration interval in minutes. The filtration can affect only the work list in the *Monitoring* panel or both the work list and the map. Read more about the dynamic work list here.

Actualizer app can help reveal inactive units. This application allows to set any period of inactivity.

Connection State

Shows whether there is connection with the unit at the moment.

- — the unit is connected;
- — the unit is not connected.

A unit is considered to be connected if it has TCP or UDP commands available, or it has sent messages within last X minutes. The required number of minutes can be indicated in the corresponding line of the *Monitoring panel* customizer (from 0 to 999). By default, the value is 0. It means that the connection state is determined automatically and does not depend on the time of receiving messages.

Sensor State

This column displays the state of the sensor:

- (or any other color) — visualizes the sensor value (the color is set in the sensor properties, and the sensor is selected in the *Advanced properties* tab);
- — text parameters (can be properly adjusted through a custom sensor);
- — the option is not activated for this unit;
- — the value is unknown.

When placing the mouse cursor over the square, you can see the name of the sensor and its value (or description) in the tooltip.

Options of action

The parameters of the last two sections are designed for the execution of some action on the unit.

Quick Track

The buttons allow to build a track of unit movements.

- — show a track on the map;
- — remove a track from the map;
- — not enough rights to query tracks for this unit.

When pressing the *Show Track* button next to a unit, the track of this unit appears on the map. In the panel settings,

you should also specify the interval for track building: *Yesterday*, *Week*, *Month* or *Other* (manual mode). Other parameters (such as line width, annotations, markers, trip detector, etc.) are taken from the *Tracks* panel. All 'quick' tracks are displayed in the *Tracks* panel where you can manipulate them in the same way as the usual ones: show/hide, remove from the map, etc. Track colors can be set in the unit properties in the *Advanced* tab or in the *Tracks* panel as well.

Messages

Request messages from a unit.

- — display messages;
- — not enough rights to query messages from this unit.

The requested data is displayed in the *Messages* panel. The standard time interval (*Today*, *Yesterday*, *Week* or *Month*) for the query is set in the *Monitoring* panel customizer. If *Other* is selected, the interval is taken from the *Messages* panel. In this case, only messages with data are loaded, and the style of display is taken from the panel itself.

Quick Report

Quick report execution.

- — execute a report;
- — not enough rights to execute reports for this unit or a report template is unavailable.

The requested report is generated in the panel based on the template selected in the *Monitoring* panel customizer. Standard time interval (*Today*, *Yesterday*, *Week* or *Month*) is also configured there. Time interval can either be standard or *Other*, which means it is taken from the *Report* panel.

Media

View the latest media files (pictures or video) received from the unit (works for the devices that have such functionality).

- — the button to view media files;
- — no pictures (video) available.

Video

Opening a mini-window in the mode of video monitoring.

- — click the button to open a mini-window in the mode of video monitoring;
- — there is no video available for the unit.

Commands

Buttons to send commands to units:

- — there are available commands;
- — there are available commands, including GPRS commands (using TCP or UDP channel);
- — there are available commands, including GPRS commands, however, the current user does not have enough access rights to execute them;

- — there are no commands available or no rights to execute them.

SMS

Send SMS to the unit or driver (the addressee is selected in the dropdown menu if both options are available). For full functionality, the current user should have the rights to send SMS, as well as the right to *Edit connectivity settings* of the unit.

- — send SMS to the unit or driver;
- — the user has the right to send SMS, but there are no available phone numbers of the unit or driver.

Events Registrar

Manual registration for such events as fuel fillings, maintenance service and other events in the unit history.

- — open registrar;
- — not enough rights to register events for this unit.

Properties

View unit or group properties dialog (depending on the mode of work list display). In case of groups, the button can be different depending on the access rights.

- — some group properties can be edited;
- — view only.

Clear List

The buttons used to clear the list. To remove all the units or groups from the list, press the button in the header of the table. The same button is located in front of each unit or group and allows to remove the items individually.

If the options are selected for the additional menu (i.e. checked in the second column of the *Monitoring* panel customizer), you can find them in the column with the icon under the button .

Other

Other buttons and signs that can be found in the *Monitoring* panel:

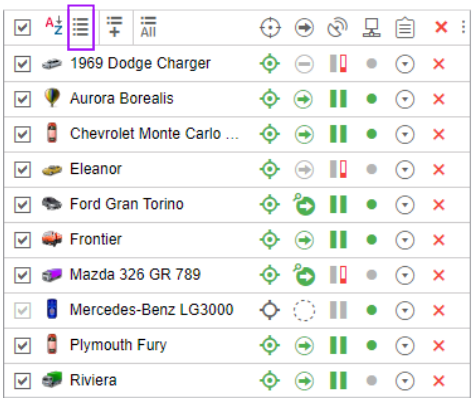
	The units that are selected for display on the map are checked in the first column of the table. To select all the units, check the icon at the top of the table.
	A switch-button which shows that the items of the work list are sorted by name in direct order.
	A switch-button which shows that the items of the work list are sorted by name in reverse order.
	A switch-button which shows that the work list displays singular units.
	A switch-button which shows that the work list displays a tree view of the units (with grouping). Read more about the work list settings.
	The button to find and add the units or groups to the list.
	The button to add all available units or groups to the work list.
	Monitoring panel customizer (columns selection).

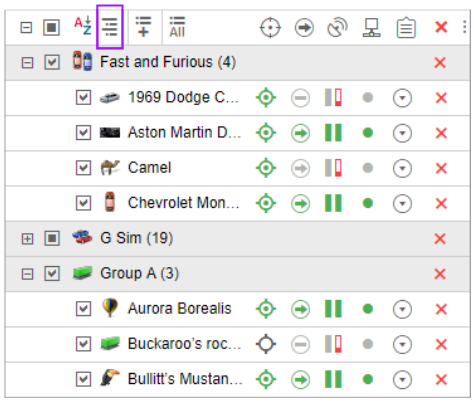
Work List Management

To monitor units, you need to place them in the work list. Only units presented in the work list can be used to display on the map, as well as to apply various control elements: jobs and notifications execution, reports generating, drivers and trailers assigning, messages or tracks viewing, finding nearest units, etc.

The work list has several display modes:

- simple list mode;
- tree-like mode.





Each of these lists is independent, and their settings are stored separately. When you switch between them, all settings that were last applied to this type of list are restored.

Simple List Mode

Adding units to the work list

To add units to the work list, use the following buttons in the header of a list:

- — add *all* units available;
- — add particular unit(s). The search tool is used.

Moreover, there are alternative ways of adding units to the work list:

- from the Online Notifications window (adding a unit that triggered the notification);
- dynamic formation of the list depending on the relevance of the data.

Removing units from the work list

Units can be removed from the work list individually or allat once:

- — the button next to each unit to remove this particular unit from the list;
- — the button in the header of the list to clear the work list (to remove all units).

Note that deleting units from the work list does not lead to their deleting from the system. They can be added back to the work list using the ways described above. Units can be deleted from the system in the *Units* panel.

Sorting

By default, the work list is sorted by names arranged in direct alphabetical order. The order can be reversed. To do this, use the switch button or in the header.

Besides, it is possible to sort units by other attributes such as motion state, connection quality, etc. To do this, click the corresponding button in the header:

- — location (if Gurtam Maps are selected as the map source);
- — sensor state;
- — commands;
- — motion state;
- — last message time;
- — online connection state;
- — media files;
- — quick track;
- — driver information;
- — trailer information.

For instance, to sort units by the motion state, use the corresponding button . The list is rearranged in such a way that all the moving units appear at the top of the list, and those that are not moving appear at the bottom. To reverse the motion state order of units, click the button again.

The presence or absence of certain columns is adjustable in the *Monitoring Panel Customizer*.

Tree-like Mode

In this mode, work list units are displayed in groups. Next to the name of the group in parenthesis you can find the number of units included in it. To view the units in the group or the current information on them, expand the group (+ in front of the group name). Any group unit can be removed from the work list (though it is not removed from the group itself).

To add all groups currently not presented in the work list, click the *Add all available* button . At the same time, if the list was empty, the groups are added with all the units included in them. If the group has already been present in the worklist, the list of its units remains unchanged.

When you add units that are not included in any group, they are automatically placed in the *Units outside groups* group. Such a group cannot be edited, although it has many characteristics typical of an ordinary unit group.

To expand/collapse a unit group (i.e. show/hide its units), use the +/- button in front of a group name. To display group units on the map, check a corresponding box. To display a particular unit from a group, expand the group and mark the checkbox with this unit.

If at the end of the list when the group is expanded there is the ellipsis (…), this means that not all the group units have been added to the list at the moment. When you hover the cursor over the ellipsis, you can see how many units are not displayed, and add them if necessary.

A tooltip shows the list of all units included in the group.

The following actions can be performed over a unit group from the *Monitoring* panel:

- — commands sending;
- or — unit group's properties viewing/editing.

Search Tool

There is a convenient tool for finding units and adding them to the work list. To open the unit search dialog, click the *Add to the list* button in the work list header.

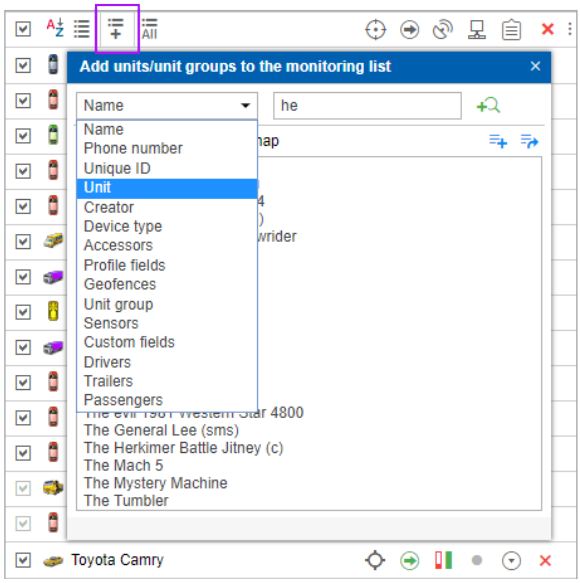
Unit search dialog displays all the available groups (in square brackets) and units in alphabetical order. To add units or unit groups, double click on them. If the simple list mode has been activated, then single units (one or more) are added to the work list even if you double click on a group.

If the tree-like mode has been activated, a group is added to the work list in a collapsed form. To add a unit group with complete set of units, double click on a group. To add a unit group with some particular unit, click on this unit then. When you add units that do not belong to any of the groups, they are automatically placed in the *Units outside groups* group.

In order for the added units to be instantly displayed on the map, activate the *Show added units on map* checkbox in the unit search dialog.

Search by criteria

If you have a large number of units/groups, you can use special filters to quickly find the item. The dropdown list contains the following search criteria: name, creator, custom fields, profile fields, phone number, unique ID, device type, access from user, geofences, sensor, drivers, trailers, passengers, etc.



Select a search parameter and then type a key word into the next field. For instance, to find all MANs, select search by name, and in the template field type *man*. All units and groups which names contain the combination of characters *man* (both at the beginning and at the end of the name) will be found and displayed immediately. Comma sign (,) can be applied to string together several requests. For example, to find all MANs and all Ivecos, type ***man*,*iveco***.

If you leave the search field empty, all the units that have the selected property (sensors, ID, etc.) will be displayed, for example, all units that have a driver assigned to them. Then you can type a driver's name or code to narrow the search.

Most of search parameters (except for geofences, drivers, and trailers) are taken from, and can be viewed and changed in the Unit Properties. When using a search by sensor, not only the name of a sensor can be entered in the template field, but also a part of its description, parameter type or parameter name.

After the first search is complete, you can continue the search on the second (third, etc.) level: search among the results of the previous search. To do this, click *Add to the search list*. The principles of inquiry formation remain the same.

If your search is successful and you want to include the results in the work list, you can do this with a double click or using the buttons:

- — add search result to the work list;
- — replace the existing work list with the search results.

Dynamic Work List

The work list in the *Monitoring* panel can be formed dynamically according to the time the last message from a unit was received. Units are removed and added to the list and map automatically. The work list updated every 10 seconds.

The function can be enabled in the Monitoring panel customizer. Change the *Without filtration* option to *Monitoring panel* or *Panel + Map* and specify the filtration interval in minutes. Then only those units from which data was received

during the specified interval will be displayed in the *Monitoring* panel. If the *Panel + Map* option is selected, the units are added not only to the worklist, but also to the map.

Attention!
With this mode enabled, some functions of the system become unavailable or operate differently:

1. Manipulations with the work list (such as searching, adding, and removing units) are impossible.
2. The filtration by the time of the last message does not affect the work list if the treelike view is selected.

Commands

A command is a request that can be sent to a unit. In response, the unit can send its coordinates, take a picture, activate an output, block engine, etc. Available commands depend on the type of device used and its configuration.

To be executed, a command should be configured in Unit Properties in the corresponding tab. To send a command, the user must have the rights specified in its properties, as well as the *Execute commands* right in relation to the unit.

Standard Commands

17 standard commands are reserved in Wialon Local:

Icon	Command	Name in the system	Parameters
	Query position (request current coordinates of the unit)	query_pos	—
	Block engine	block_engine	—
	Unblock engine	unblock_engine	—
	Activate output	output_on	output number
	Deactivate output	output_off	output number
	Download messages	download_msgs	time interval (from – to)
	Set data transfer interval (how often unit sends data to the server)	set_report_interval	interval in seconds
	Send custom message (to send a non-standard command to a unit)	custom_msg	command text
	Send message to driver	driver_msg	message text
	Send position	send_position	coordinates
	Send route	send_route	checkpoints
	Send waypoints	send_waypoints	checkpoints
	Query configuration	request_configuration	—
	Start/Stop WiaTag	wiatag_service	—
	Upload configuration	upload_cfg	path to configuration file
	Upload firmware	upload_sw	path to firmware file
	Query snapshot	query_photo	—
	Query snapshot from camera	query_photo_cam	camera's number
	Query DDD file (for tachographs)	query_ddd	—

To download the requested configuration file, use the *Disketta* application (the required file is located in the *Unit* folder). To find out the name of the configuration file, generate a table with messages for the corresponding period.

If your device supports a command that is not mentioned in the list above, this command can still be sent. To do this, use the standard command *Send custom message*. In this case, you should know the exact name of the command (as it is written in the device configuration).

Sending and Tracking Commands

There are several ways to send a command to a unit:

- Manually from the Monitoring panel, including sending the command to a whole group of units.
- As a job ran automatically according to a schedule.
- As an action for a triggered notification (command is sent when specified conditions are met).
- From a mobile device using a plain SMS text message.
- From the Wialon Mobile Client.

⚠ Such commands as *Upload configuration* and *Upload firmware* have their own peculiarities. If these commands have been saved for units without selecting a file, sending these commands as a job/notification or sending them to the whole group of units is impossible.

⚠ Such commands as *Send route* and *Send waypoints* also have some peculiarities. When you send them, you should manually indicate the route parameters. Therefore, these commands cannot be sent via job or notification.

Information about commands sent to a unit is available:

- In the Messages panel (all commands sent to a unit).
- In the Executed commands report (only successfully executed commands).
- Immediately after sending a command — in the log.

Executing Commands from the Monitoring Panel

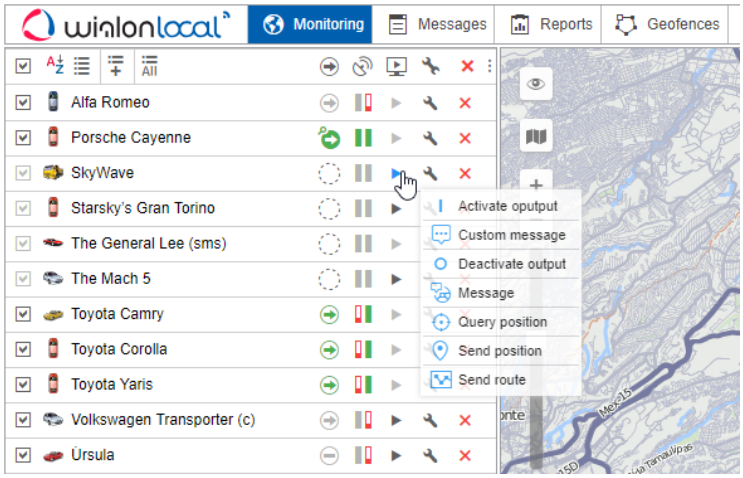
Command can be sent from the *Monitoring* panel. This option must be activated in the Monitoring panel customizer. The button can have different looks:

▸ there are available commands for the selected unit;

gprs there are GPRS commands among the available ones;

▸ or gprs there are no commands supported by the selected unit or the current user has not enough access to the unit.

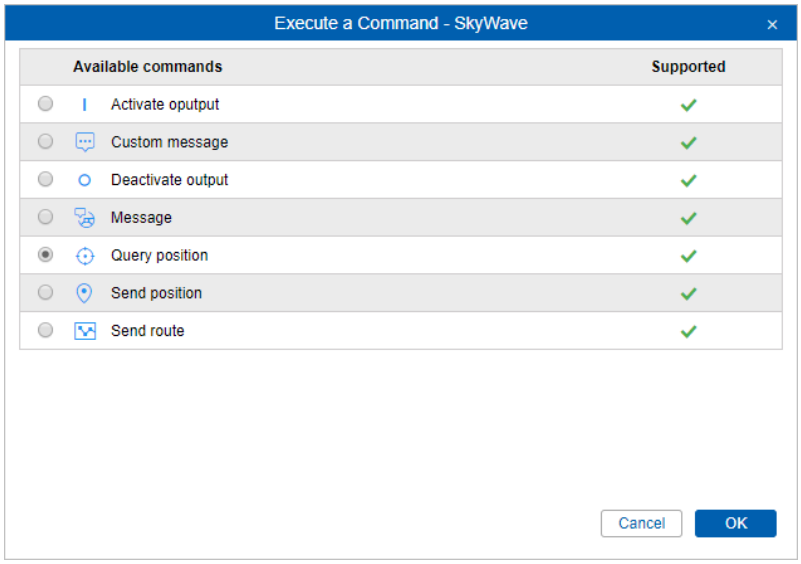
Put the cursor over the active button next to the required unit to see the list of available commands. The list can contain only commands configured in Unit Properties => Commands. Furthermore, only commands available at the moment are shown (the availability of link types is important here).



1. Click the command button ▸ or gprs.
2. Select the required units. This step can be omitted if a command is sent to one unit.
3. Select a command from the list of commands available at the moment. When sending a command to several units, special symbols indicate whether this command can be sent to all selected units or only to some of them:

- ✓ all selected units support this command;

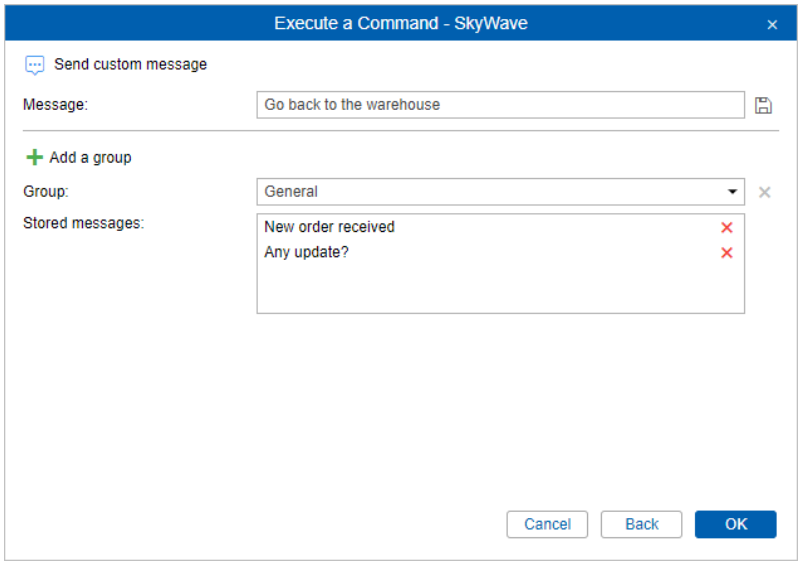
- ⚠ not all of the selected units support this command (more information is in the tooltip).



1. If needed, set additional parameters, for example, input/output index, report interval, path to load a configuration or firmware file, checkpoints of the route, etc.
2. Press *OK*. The command is executed immediately, and its result is reported in the log. To show or hide the log window click on the double-arrow in the right bottom corner of the window.

While executing the *Send custom message* command, it is possible to enter the text in the following ways:

- You can enter the message manually in the corresponding field. To make the search process easier during the next command execution, it is possible to add a message to a group. The principle of working with groups has been described above.
- It is possible to choose a previously saved message. In the drop-down list of groups, choose the one which contains the message. Below, you get the list of available messages. Select the required one and press *OK* to execute the command.

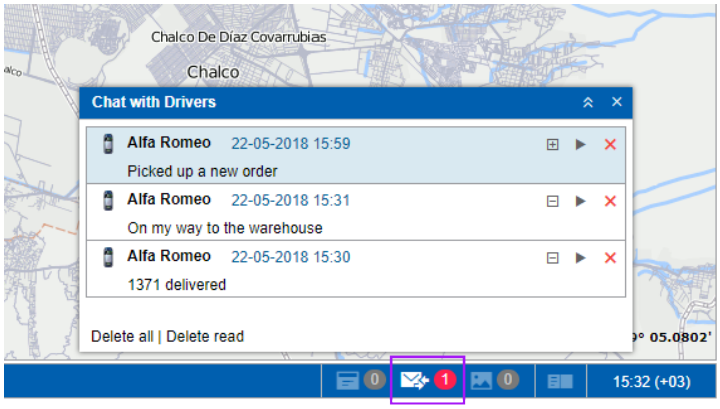


Note.
To send a command to a group of units, it is necessary that this command be registered in the propertis of each of these units on the *Commands* tab and have the same name. If, when sent to several units, the command is called the same, but belongs to a different type and the parameters are not specified, then the command is sent without parameters and, as a result, cannot be executed.

Chat with Driver

The operator (dispatcher) can exchange messages with drivers. To do this, select the *Send message to driver* command and enter the text.

In case the driver answers, the message appears in a special pop-up window. A new message can be accompanied by a sound (see User Settings). If you have unread messages, the number of them is indicated in the red circle next to the chat icon in the bottom panel. If there are any messages in the window (either read or unread), the icon itself is active which means it is coloured and can be clicked on.



Newly received messages are added to the top of the list. Unread notifications have a blue background by default. To expand/hide the full text of a message, use the switch button (+/-) or click on the header of the notification outside the text.

When clicking on a message, the map is centred on the place where this message was sent. When clicking on the unit name, the map is focused on its last location.

To delete a message, click on the cross to the right of its title. You can also delete the read messages or all messages if you use the appropriate buttons at the bottom of the messages window. The window is closed automatically when you delete all messages. If the online notifications window is closed by clicking on the grey cross in the upper right corner, the window stops appearing automatically when new notifications are received. Click on the corresponding button in the bottom panel to open the window.

In addition, the window itself can be dragged around the screen and resized. The position and size of the window is remembered until the next opening.

The operator can quickly send a reply to the driver (the *Send messages to driver* command should be configured in the unit properties in advance). Click on the green triangle-shaped button and enter the responce text in the dialog box to send it.

Besides, you can generate the report called *Chat*, which contains all the chat history including the operator and driver messages for the specified period of time.

Note. The automatic appearance of messages from the drivers on the screen can be turned off. To do this, uncheck the *Automaticall display popup events* box in the user settings. In this case, the arrival of a new notification will be indicated only by the appearance of a figure in a red background in the bottom panel of the program next to the communication icon. To read the notifications, you need to click on this sign.

It is convenient to communicate with the driver with the help of a specially developed app — Chatterbox. This application allows to send not only commands but also text messages.

Sending Route/Sending Waypoints

To send a route, it is necessary to indicate its name in the corresponding field of the dialog.

To send a route/waypoints, it is necessary to indicate its checkpoints in the command dialog. Checkpoints can be found in various sources: addresses, geofences, routes. You can apply the search filter (buttons at the top of the dialog) which

helps you to expand/narrow the number of sources to be used. Enabled button means that the corresponding source is applied as a filter.

To indicate a checkpoint, start typing in the corresponding field. In the dropdown list, depending on the filter used, you can find the possible variants along with their source information.

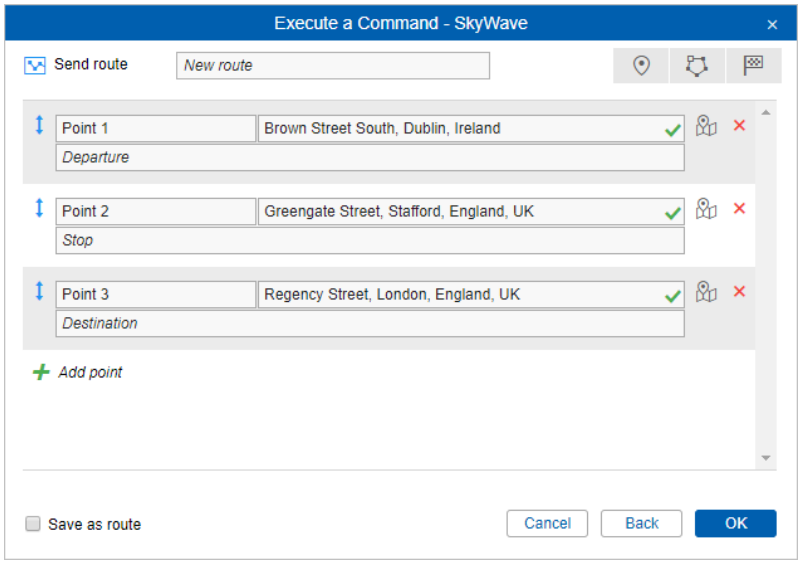
Moreover, you can add a checkpoint directly from the map. To do this, click on the icon to the right of the field. Move on the map to the target position, and double click on it. As a result, a checkpoint will be indicated automatically.

If a checkpoint is added from a route, all the points of the route are added. However, if the route contains moving units as checkpoints, they will be omitted.

the coordinates of the first checkpoint are used when you add them from line or polygon type geofences.

After the required checkpoint is entered, a green check mark appears to the right of it. This check mark is a point validity indicator which shows that a checkpoint possesses coordinates. The checkpoint name cannot be edited, it is filled in automatically. If you try to edit the name, the search results will be reset (point validity indicator disappears) and you should start the search again. Every indicated checkpoint has a *Notice* field under it. This field is optional.

The indicated checkpoints can be saved as a route, and afterwards you can use it in the *Routes* panel of the tracking system. To do this, check the box at the bottom of the dialog. You can also give a name to the route during checkbox activation (for sending waypoints only). Click *OK* to complete the procedure. Route saving takes place simultaneously with the sending of the command.



Events Registrar

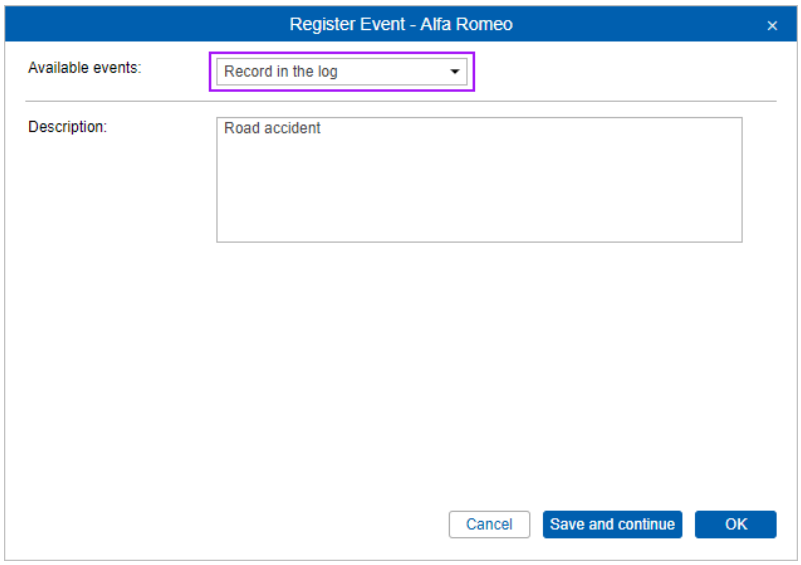
Different events can be registered in the unit history and then shown in the corresponding reports. Some events such as speeding, idling, visits to geofences, sensor values, etc. can be detected automatically by the system with the help of notifications. Other events such as fuel filling, maintenance or any custom events are registered in unit history manually with the help of a special tool — **Events Registrar**.

To display the registrar, press the button in the monitoring panel . If you do not see such a button, it can be added with the help of the monitoring panel customizer.

Attention!
To register events for a unit, the *Manage events* access right is needed. Otherwise, the registrar button is not active.

In the drop-down menu, select the required type of the event:

- make a record in unit log,
- register custom event,
- register unit status,
- register filling,
- register maintenance work.

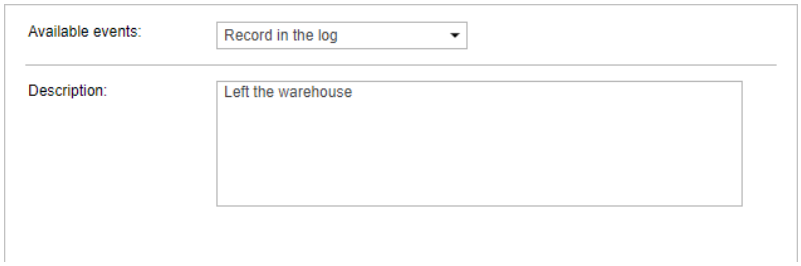


Fill in the required fields and click *OK*. If you need to register several events for one unit, click *Save and continue*. The entry will be added to the log (the corresponding caption appears in the lower-left corner of the dialog), and you can proceed to register the next event.

Note.
Units of measurement which you may encounter in the registrar dialog depend on the measurement system set in the unit properties.

Record in the Log

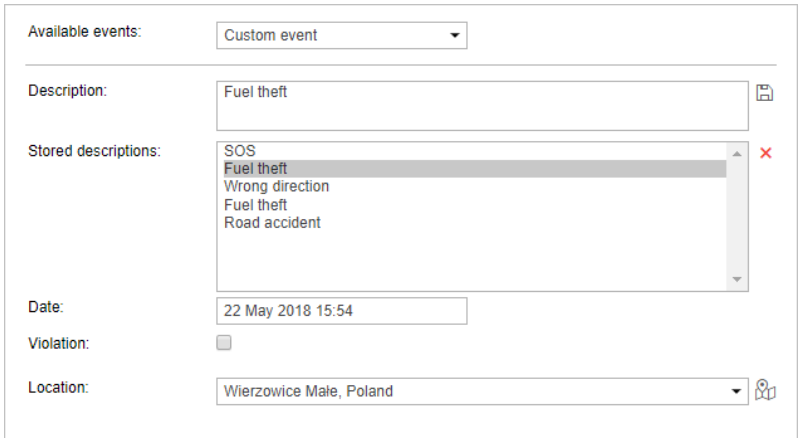
Using this option, you can add any text note to the unit log. It will be labeled as *Manual record* and dated by the time of creation. Such records can be viewed in messages (messages type *Log*) and in reports generated for this unit (query the *Log* table).



To add messages to the log, you should have not only the *Manage events* access, but also the *Manage log* access.

Custom Event

To register a custom event, enter its name, description and location. To add the location, click on the icon to the right of it. On the map that appears, double-click on the required position. The address is defined by the maps selected as geodata source in User Settings. Gurtam Maps. In addition, the position can be entered manually. To clear the field, delete the address.

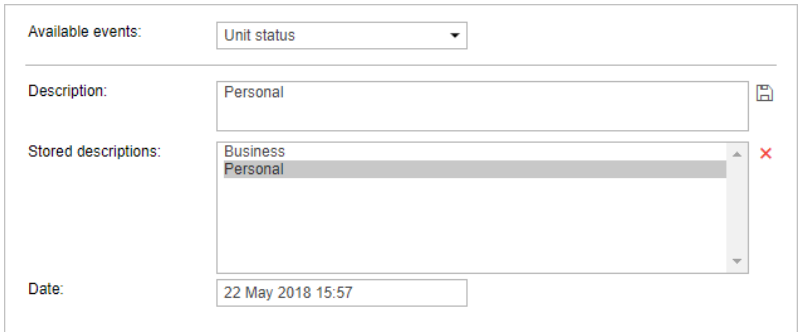


The description of the registered event can be saved. To do this, click on the *Save* icon to the right of it. The saved description appears in the list below. To select an existing description, click on it. To delete a description from the list, select it and click on the *Delete* icon.

If you check the *Violation* option, the event will be registered in the unit history as violation, otherwise it will be registered as a simple event. It means this event will appear in different kinds of reports: Events or Violations.

Unit Status

Using this functionality, you can register the beginning of a state, which can be afterwards displayed in some reports. For instance, the status can be like *business/private* is a vehicle is used both for personal and business needs.



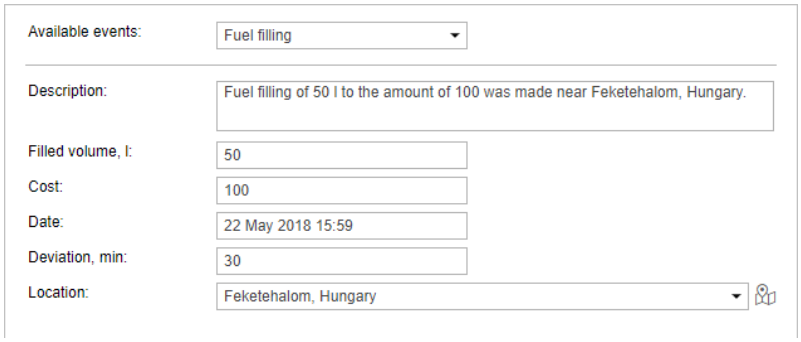
The process of registration is the same as for custom event. You choose date and time and enter any text. The text can be saved and used in other registrations. The date and time chosen means the beginning of the status. The state comes to end when a new state is registered.

Statuses can be set automatically (for example, when the unit enters a geofence) — see Notifications. Columns with the corresponding contents are available in several reports which are Trips, Engine hours, Rides, and Parkings.

Fuel Filling

In the *Monitoring* panel, you can manually register fuel fillings for units. Manual registration helps to estimate the difference between the registered fuel filling and the factual one, compare consumed amount with consumption rates, calculate running costs, etc.

To register fuel filling, select the corresponding event in the drop-down list and fill in the required fields.



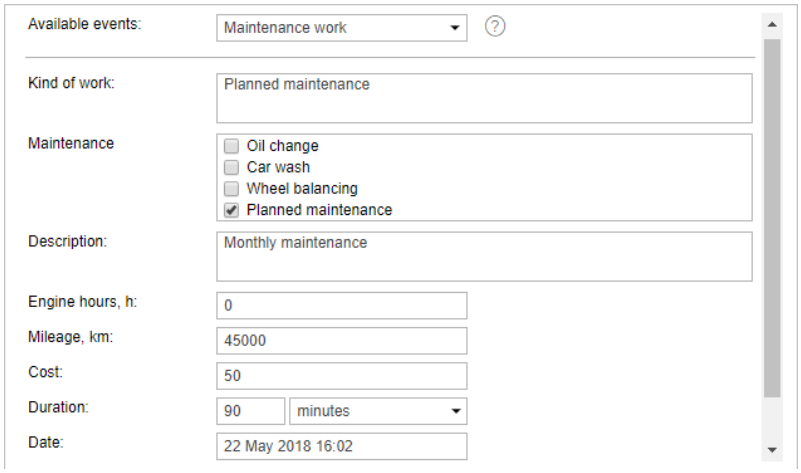
Enter the volume of filled fuel and its cost. Fractional numbers (up to hundredth) can be also used for fuel volume and cost. To enter fractional numbers, use a *period* as the separator. For example, to register fuel filling for 77 dollars and 88 cents, enter *77.88*.

Entered values are automatically added to the *Description* field above. If necessary, you can edit the description manually. Then enter the date and time when the filling took place, possible deviation from this time in minutes and specify the location.

Registered fuel fillings participate in the following reports: *Fuel fillings*, *Events*, *Utilization cost*.

Maintenance Work

To register a maintenance work, select the corresponding event in the drop-down list and fill in the required fields.



Enter the following data:

- kind of work (type from the keyboard or select from the list below);
- description;
- values of mileage and engine hours counters at the moment of the event (the current values are displayed but you can edit them);
- cost;
- service duration in minutes, hours or days (choose the type of the interval from the drop-down list);

- date and time of maintenance (by default, the current date and time are displayed);
- location (press the *Select Location* icon and double click on the map to specify the position or edit this field manually).

Attention! In the *Mileage* field it is not possible to enter a value that exceeds 2147483 km.

In the upper part of the dialog, you see the list of service intervals from the *Service intervals* tab. Check the services that have been carried out. This is required in order for the selected intervals to be zeroed and the countdown to start anew. Keep in mind that if you select any maintenance interval here, the contents of the *Kind of work* field changes correspondingly.

Attention! Registered events are not editable. They can only be deleted from the unit history in the *Messages* panel (special access is required).

Registered Events in Reports

Registered fillings and maintenance can appear in the report on events together with other actions. A registered custom event depending on your choice can get in the report on events or report on violations. Both reports have the similar structure.

When transporting registration data to a report on events (violations), the information is distributed among the columns, the contents of which are taken from certain fields of the registration dialog. The table below gives a correspondence between the column of the report and the fields of registrar.

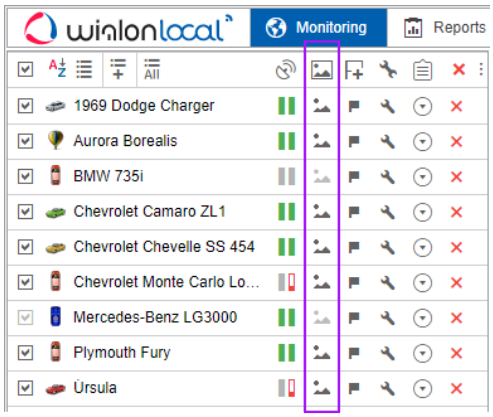
Column Header	Column Content
Event time	Date and time when event happened.
Time received	Date and time when event was registered.
Event text	Text is taken from the *Description* field. For maintenance, if there is no description, the text can be taken from the *Kind of work* field.
Location	Unit location at the time of the event. It is taken from the coordinates indicated while registering the event (press the *Select Location* button and double-click on the map).

If any of the above-mentioned fields are not filled out correctly, the corresponding columns will be empty.

Other reports that use registered events are the report on maintenance and utilization costs.

Media Files from Messages

If the equipment supports such an option, units can send pictures or video files. Pictures and videos can be viewed in the *Messages* panel, as well as in the *Monitoring* panel. To display a special column in the *Monitoring* panel, activate the *Media* option in the Monitoring panel customizer.



Press the button to open a special window in which you can view pictures and videos. The viewer window contains the latest picture (video), as well as the total number of available pictures (videos) received during the current session.

The above-mentioned way is for viewing pictures (videos) from a particular unit. To view pictures (videos) from *all* units, press the *Media* button at the bottom of the screen. If there are media files available, the button becomes active (blue) and the number of available images (video) is displayed. If the number is in a red background, it means that new images have appeared since the last window was opened. ⓘ In this window, only images (videos) received during current session are displayed.

To navigate through the images (video files), use the arrows. Between them, you can see the number of the pictures (videos) viewed and the number of available images (videos). Media files are sorted according to the time of their arrival

on the server.

The date and time of picture (video) arrival is displayed above each of them. Below the media file you can see a unit name and address information from the message.

Some media files can be enlarged with a special button in the right top corner. To close a media file viewer, use the button in the lower right corner.

All images received from the unit can be viewed in reports and messages. Moreover, in messages you can also view video files.

You can get an image from a unit at any time using the *Query snapshot* command.

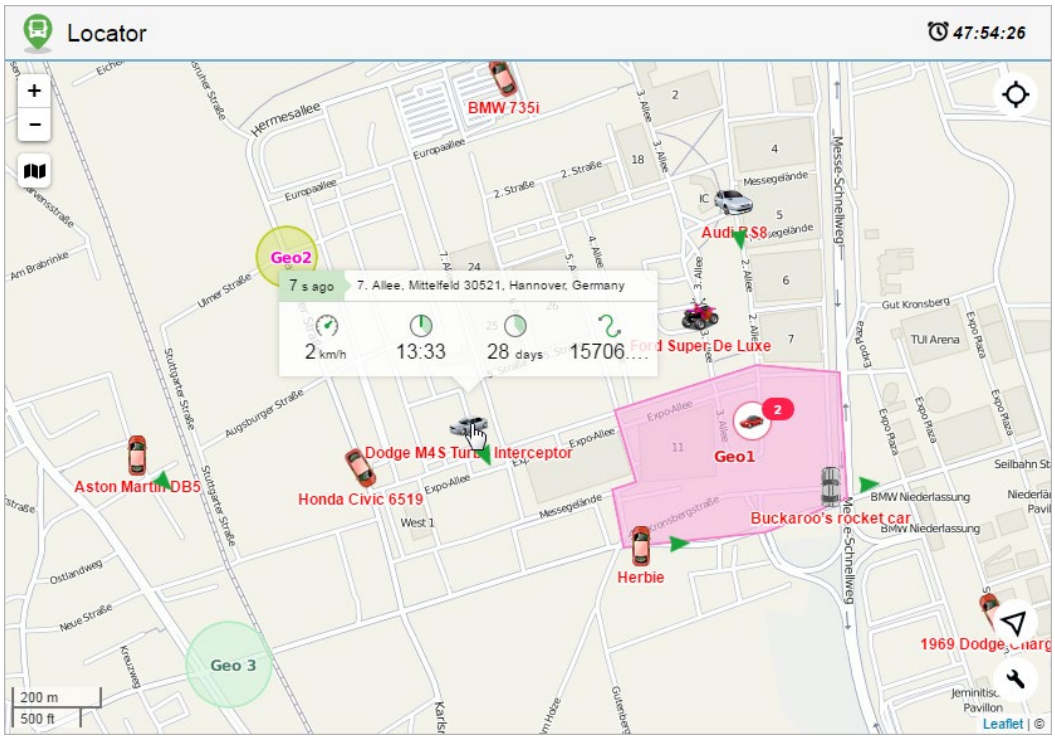
Locator

Locator is used to generate links and share the current location of your units. Conditionally the locator can be divided into two parts — links creation and their viewing. Links are created in the locator dialog window. To open the dialog, choose the corresponding item in the user menu. Viewing is performed on the map of the locator map, which becomes available when clicking on the provided link.

Viewing on the Map

Open a link to view the map of the locator where units are displayed along with geofences (if they have been indicated in the link creation settings). Gurtam Maps, OpenStreetMap, and, if available, Google Maps are used to show the location of units. To choose a map layer, point the cursor on the icon below the scaling buttons (upper left corner). You can also enable/disable displaying of geofences on the map here.

If the life span of the link is less than 48 hours, it will be shown in the upper right corner of the window.



Units

A unit is presented on the map by its icon. The unit name and movement direction arrows are shown as well (by default). You can also activate units traces, or so called *tails* (switched off by default). Click the button in the lower right corner to enable/disable the above mentioned settings.

If among the units presented on the map you need to monitor a particular one, you can use the monitoring tool. Click on the corresponding button (/) in the right top corner and select the necessary unit from the dropdown list. Afterwards the map will be scaled and centered on the selected unit. To disable scaling and centering, select a dash from the dropdown list. Note that you cannot monitor all the available units at once. Therefore, if you select *All units* in the dropdown list, only search is performed, and all the available units get into the field of view.

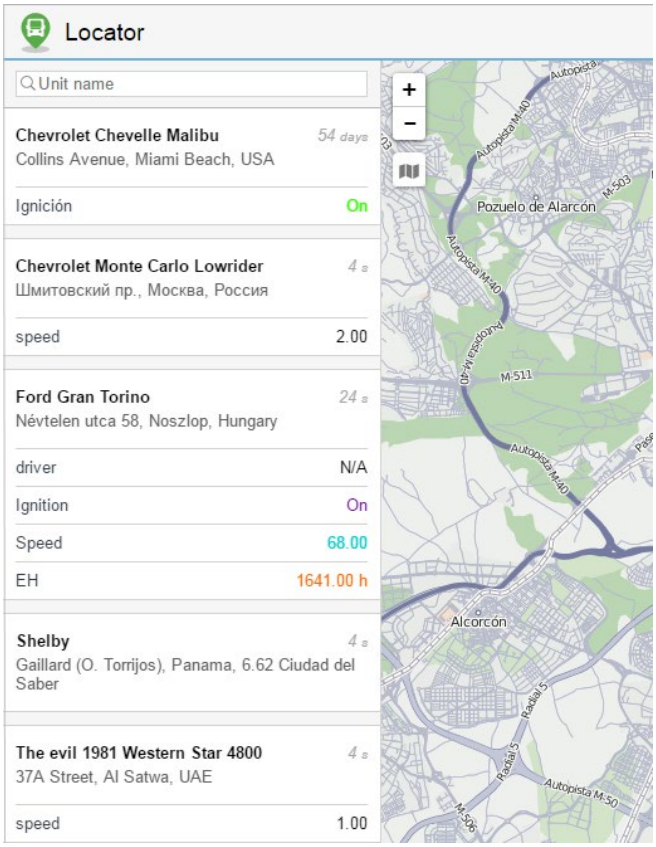
After the unit has been found, you can view its latest data. The data is shown in the window that is opened by clicking on the unit. The amount of provided information depends on the unit state (moving/stationary). If it is moving (movement arrow is an indicator), then the following parameters are shown for it: speed, time of movement, its duration and covered distance. For a unit which is not moving such parameters as speed and covered distance are irrelevant, therefore only two parameters are shown for it: the time of the start of the stationary state and its duration. Besides, regardless of the unit state the header of the opened window contains such information as the time passed from the last message and address from the last message. Note that upon receiving new messages either position of a unit on the map or its current parameters are automatically refreshed.

If it is necessary to know where the unit (units) was since the launch of the locator, you can generate and view its track. The track is displayed for a period of not more than 24 hours. To do this, click on the button in the upper right corner and select the required unit from the dropdown list. Afterwards, a track is built, and the map is scaled in order for the whole track to be displayed. If the tracks are built for several units at a time, they are shown in different colors on the map and the map itself is scaled so that they all get in the field of vision. To remove a track from the map, click on the track building button again or uncheck the boxes of the units whose tracks you want to delete. Note that in the locator the track color is selected randomly and it does not depend on any unit settings.

Note.
The track of movements can be viewed only if a user indicates such a possibility when creating the link.

Sensors

If sensor masks have been indicated when generating a link, in the left part of the window of the locator there will be a list of units with their names, the time of receiving the last message and the latest location, as well as the names of the sensors, their values and metrics. If for some sensor intervals and colors are set, the adjusted color will be used for showing its value in the list.



Current Location

Locator provides a possibility of defining your current location on the map. This is particularly helpful if you use a locator from a mobile device.

To determine your current location press the button in the lower right corner. Afterwards, the map is scaled and centered on your location. Due to browser restrictions, the determination of the current location is only available during the connection via the *https* protocol.

If a particular unit has been chosen using the monitoring tool, and then you press the defining location button, both the unit and your current location get into the field of vision. However, as it was stated before, upon arrival of new messages from the unit selected in the monitoring tool, the map continues scaling and centering on it until the monitoring is disabled (select dash from the dropdown list).

Scaling

When the locator is opened, the map is automatically scaled so that all units get into the field of vision. To move around the map, drag it using the mouse.

The map can be scaled using either the corresponding buttons in the upper right corner (+/-) or the mouse scroll. A graduated scale located in the lower left corner helps you understand the distances on the map.

Depending on the scale used and the number of items available, some icons can overlap each other. In this case, the assembly of icons is replaced by the group icon (the number of elements is shown for every group):

6 — for units;

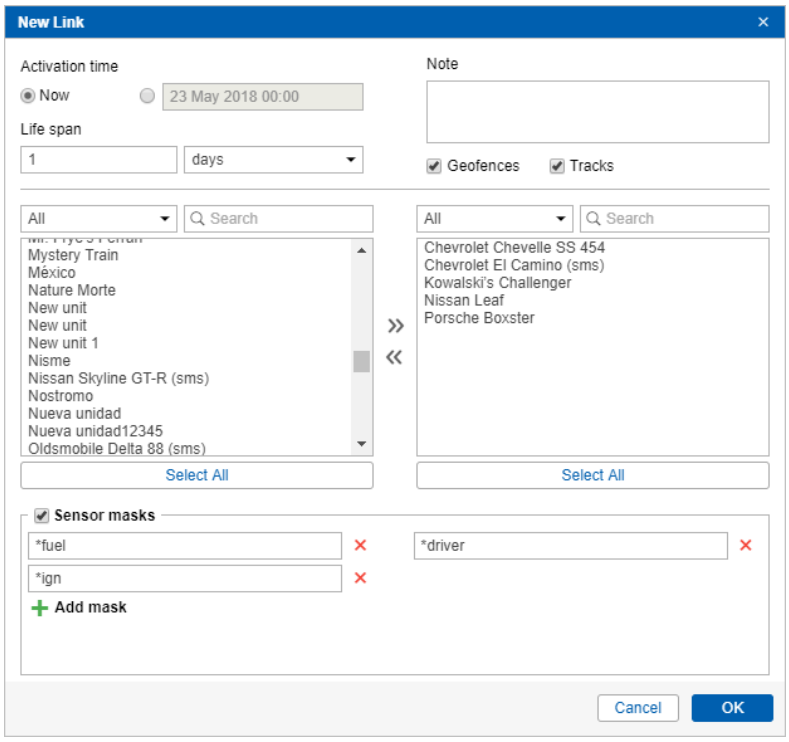
4 — for geofences.

Click on the group item to see the list of all items (icon + name).

Links Creation

Links are generated and edited in the locator dialog, which is accessible through the user menu.

To create a new link, click the *New link for sharing units* button and fill in the fields of the form.



Indicate the activation time for the link in the upper left corner of the dialog. It can be *Now* or any other moment in the *future* (indicate the date and time in the calendar). Note that the activation time cannot exceed 100 days.

Furthermore, enter the life span of the link into the corresponding field. The value can be indicated in minutes, hours, or days (select from the dropdown list). Note that you can specify any value (from 0 to 1000) or make it unlimited (enter 0).

You can enter a note for your link in the upper right corner of the window. This allows to distinguish the link in the general list. Besides, the note (if entered) is shown in the header of the page of the locator itself.

You can also check the *Geofences* box here to share them in the link. Moreover, you can provide the possibility of generating and viewing the track of a unit by activating the *Tracks* checkbox. ! The user that provides the possibility to view the track of a unit must have the *Query reports or messages* right.

Below, you select the units whose location you want to share. The selection is made in list on the left. Transfer the required units to the list on the right (use double clicks or the *Add* button).

For the convenience of choosing units or unit groups, the contents of the list can be changed using the filter above it. The following variants are available: *All*, *Units*, *Unit groups*, *Units outside groups*. To find the required unit quickly, you can also use the dynamic filter.

Sensors with their values and metrics can also be shown in the locator. To do this, it is necessary to enable the corresponding option and indicate the masks of the sensors to be displayed.

To generate the link, click *OK*. To dismiss the changes, press *Cancel*.

List of Links

Generated links get in the corresponding list containing such information as the start and end time of its operation, note how much is left before the expiration date (if the activation time has already come), the number of units, as well as the checkboxes of geofences and tracks activation. When you hover the cursor over the number of units, its list will be shown in the tooltip. If there is less than one hour left before the link's expiration, the corresponding line is highlighted in red.

Click on the link to open it in a new tab. To copy the URL of a link, click on the button to the right of it. The link can also be edited (spanner-shaped button), or deleted (cross-shaped button).

! *Attention!*

- After expiration, the link is automatically deleted.
- When the user password is changed, all locator links are automatically deleted.

Locator Integration

Use the following form of code to integrate the locator into your web-site:

```
<iframe src="link_address&lang=en" width="700" height="400"></iframe>
```

Necessary actions:

- In the link list click on the icon to the right of the link and copy it.
- Paste the copied link instead of *link_address*.

Such parameters as *width* and *height* stand for the corresponding properties of the integrated window. The *Lang* parameter stands for the language used.

Manipulations with Link

As has been described earlier, there are 3 settings for the unit displaying (movement direction, name, 'tails'). Changing these settings the corresponding information is added to the locator's URL:

'Tail' (on/off)

```
&tails=1/0
```

Name (on/off)

```
&labels=1/0
```

Arrow (on/off)

```
&directs=1/0
```

Therefore, to save the applied settings and use them afterwards, it is necessary to utilize not the original link (created in the locator dialog), but the modified one (received when the settings of unit presentation on the map are changed).

Moreover, there is a possibility to select a map source in advance. The information on the map source is added to the locator URL. The procedure is the same for any available map, consider the example of the OpenStreetMap:

```
&map=OpenStreetMap
```

If it is necessary to display the tracks of all available units on the map, use the parameter

```
&build_tracks=all
```

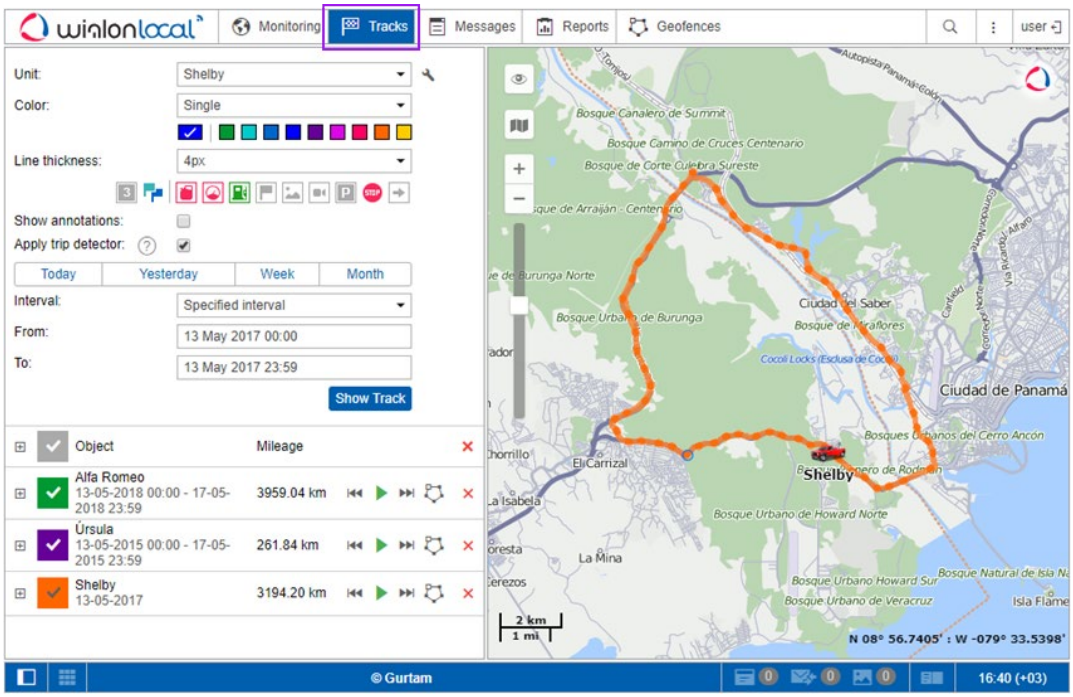
In this case, the map shows the tracks rendered since the creation of the link.

Tracks

Track is a line drawn on the map to show how a unit moved during the indicated period. A track is mapped by the points from where messages came. Each point stores the date and time when the message was received and coordinates at the point, as well as other parameters (speed, sensors etc.). Besides, markers indicating places of fuel fillings, parkings and other events can be drawn on the track.

Any number of tracks can be drawn on the map. They can represent different units and various time intervals. To prevent tracks from being confused with each other, you can set different colors for them. Besides, different segments of the track can be of different colors depending on the speed or sensor values.

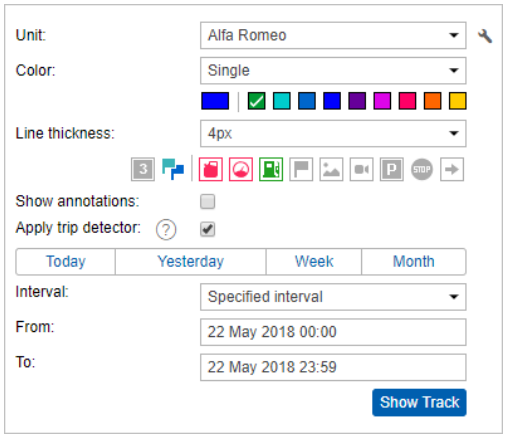
To open the *Tracks* panel, select a corresponding name in the top panel or click on the necessary item in the main menu customizer.



To build a track, it is necessary to have the *Query reports or messages* right towards a corresponding unit.

Mapping a Track

To build a track in the *Tracks* panel, do the following:



1. Select a **unit** in the dropdown list. Its contents depend on the work list in the *Monitoring* panel and access to the units. In case the work list is empty (when the dynamic work list is used or when units were deleted from the work list manually), the units to which you possess the corresponding rights will be displayed.
2. Adjust the desired **parameters** for the track (color, thickness, etc.).
3. Define the **time interval** within which you want to get the data.
4. After filling in all the fields, press *Show Track*.

To display the *tracks* on the map, the corresponding layer must be activated.

The principle of interval adjustment is the same as in the reports (see Query and View Reports). The third and fourth steps can be combined into one if you use one of the *quick intervals* (the buttons *Today*, *Yesterday*, *Week*, and *Month*).

A point-to-point track built according to preset parameters will appear on the map (if the unit has any messages with coordinates for the period). If it takes too long for the track to appear on the map, it means you either indicated an interval that is too long or your Internet speed is too low.

If within the indicated period the unit was not moving, there will be no track on the map. However, it will be in the list of tracks below, and the distance traveled will be 0 km.

A track or its part can be displayed on the map as a dashed line. Such situation indicates that the data on this part of the track might be inaccurate. For instance, the maximum interval between messages is exceeded (see the *Advanced* tab) or the number of satellites is less than 4 (if the validity filtration of messages is disabled).

Alternative methods to build a track on the map are:

- In the *Monitoring* panel with the help of quick track buttons.
- In the *Messages* panel when you view data messages.
- In the *Reports* panel, if the appropriate option is selected in the report template.

Track Parameters

After you have built a track, it is impossible to change its parameters (time, unit, color, annotations). In case of error, delete the incorrect track and create a new one.

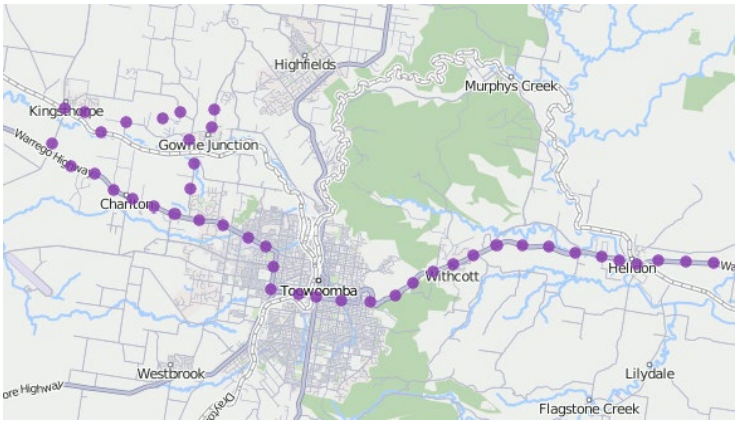
Track Color

There are four mutually exclusive color settings for the track: *By trips*, *By Speed*, *By sensor* and *Single*. One of these settings, except the first one, can be initially set on the *Advanced* tab of the unit settings. If the setting is not specified, or a single colour of the track is selected, the *By trips* option is selected by default in the track panel.

For a *Single* track, you can choose a colour in the palette every time you build a track, or, if the colour is not specified, for each new track the colour will be selected automatically from the colour range (it is selected circle-wise). The colour is selected in the same manner if the *Single* setting is applied to the unit, and another colour is chosen manually from the palette.

Track Line Thickness

Indicate the **thickness** of the track in pixels (from 1 to 15). A track can be represented as unconnected points (the points from which the messages were received). If you need this option, select the *Points only* option.

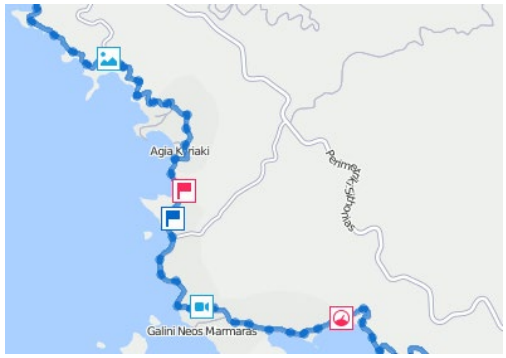


Markers

Markers can be used only if you have access to reports.

You can enable markers to highlight the places of significant events on the track. The choice of possible markers is the same as in reports:

- fuel thefts,
- speeding,
- fuel fillings,
- events (if a violation took place, the marker is red),
- pictures from messages,
- video from messages,
- parking places,
- short stops,



- initial position,
- final position.

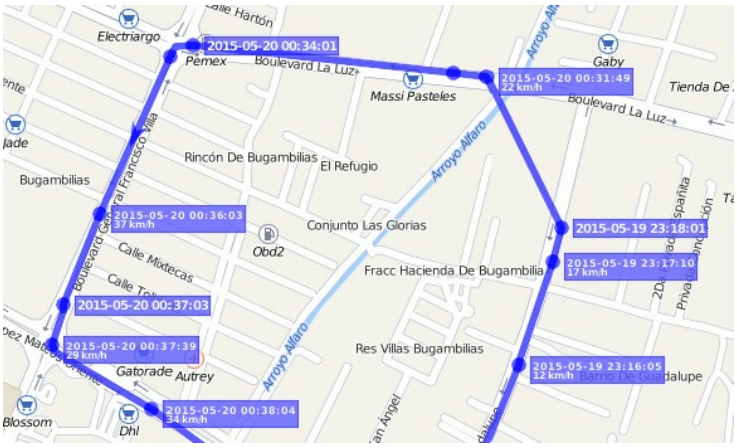
Select the markers before building a track. To activate a marker, just click on its icon to make it colorful. If at least one kind of marker is selected, additional marker options can be applied:

- numbering,
- grouping.

Markers in tracks are drawn and used on the same principles as in reports.

Annotations

Indicate whether you want **annotations** to be displayed. Annotations are hints which are attached to each point of the track to show the date and time when the message was received, as well as the speed of the movement of the unit at that time. Annotations are rather informative but they make visual perception of the track more complicated. That is why sometimes it is reasonable to switch them off. Full information about any point of the track can be obtained from the tooltip that appears when you hover the cursor over a point. ⓘ The system of measures in the annotations depends on the settings of the current user, not on the settings of the unit.



Trip Detector

Trip detector checkbox affects the distance value and track visualization. For example, in the places of stops and parkings not a conglomeration of points will be displayed, but just one, and the mileage will include only the intervals detected as trips.

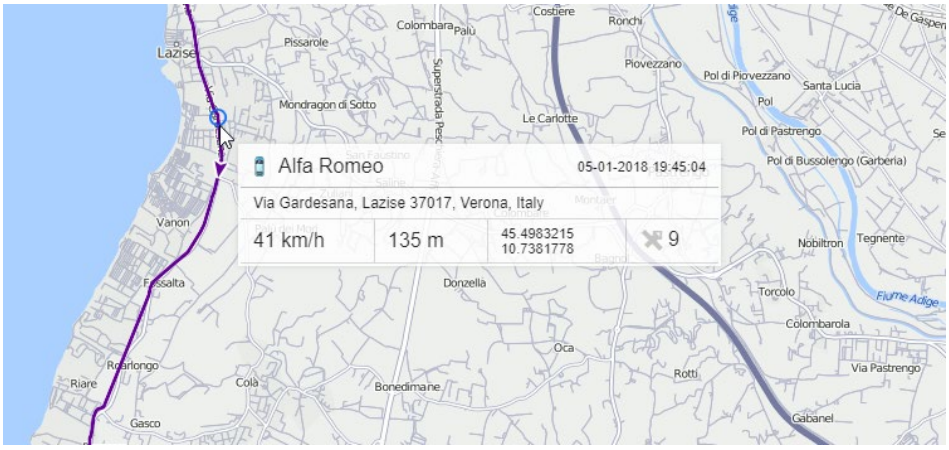
Also, this option allows you to view the trips made within the track. Press the + to the left of the track to expand the list of its trips. Click on the required trip to center the map on it. Note that the Track Player tool works for the whole track. The trip detector is set up in Unit Properties => Trip Detector.

ⓘ The mileage in tracks can sometimes differ from the mileage in reports (if there are invalid messages within the interval). In such cases, more accurate mileage is provided in reports.

Track Management

You can add tracks on any unit for any time interval. The list of tracks created will be displayed in the work area at the left. To prevent tracks merging, select different colors for them.

Hover the cursor over a track to get accurate information about a specific point of the track (points where messages were received). Messages are searched in the radius of 50 pixels from the cursor. Points found are highlighted by a a pulsating circle, and a tooltip appears with the following information: time, address, speed, altitude, coordinates, satellites, and sensor values. Messages with zero speed are marked with bigger points. Measurements used in the tooltip are borrowed from the unit properties (speed in kilometers or miles per hour, altitude in meters or feet), as well as mileage in the list of tracks. The information from the tooltip can be copied to the clipboard.



You can manage tracks in the left part of the window under the *Show Track* button. The name of a unit is displayed on the list, as well as the time interval and traveled mileage. Mileage in tracks can sometimes differ from mileage in reports (if there are invalid messages within the interval). In such cases, more accurate mileage is provided in reports.

It is possible to view all created tracks on the map simultaneously or select just some of them. The tracks with marked checkboxes are displayed. Unmark a checkbox to hide the track. Using the checkbox in the header, you can select/unselect all tracks at once. You can temporarily hide all tracks by disabling the corresponding layer in the top panel.

If there are several tracks available, you can sort them by length or name. To do this, click in the header of the list above mileage or name columns. Click again to sort the list in reverse order.

Use the arrows ⏮ ⏭ to quickly locate the initial/final point of the track. To see the whole track and focus the map on it, just click on its name in the list.

You can play the track by clicking the button next to it. Pressing the*Play* button ▶ opens a special tool Track Player and launches playback. The unit icon will move along the track line at the selected speed.

Furthermore, another special tool can be applied to a track — Hittest. It allows you to get the comprehensive information for any point of the track.

To delete a track, click on an appropriate button next to it ✕. Using a similar button in the header of the list, you can delete all tracks at once.

Moreover, a built track can be saved as a line geofence. To do this, click on the corresponding button ⬡. Note that if the number of points of a track is more than 10000, it is saved in several geofences with the same name and a digital

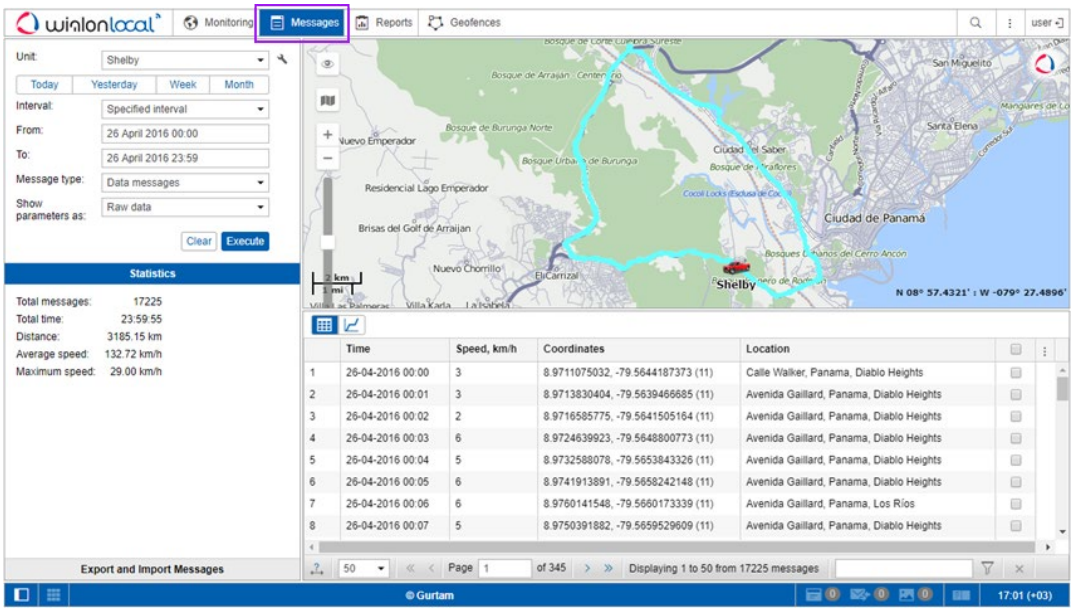
index in brackets. For example, *Geofence (1)*, *Geofence (2)*, etc.

Messages

The *Messages* panel gives access to the units database. Here you can view all messages received from units (coordinates, parameters, speed, etc.), as well as SMS messages received from them, commands sent to units and events registered in units history. Besides, this data can be exported to a number of formats.

To open the *Messages* panel, select a corresponding name in the top panel or click on the necessary item in the main menu customizer. The workspace of the panel can be divided into four sections:

- in the left top corner you can set the parameters of your request;
- in the bottom left part there is the statistics for current request or a panel to export/import messages;
- in the top right section there is the map;
- at the lower right section there are messages themselves.



The sectors can be resized (the left ones — in width, the right ones — both in width and height). To do this, click on the border between them with the left mouse button and, while holding it, move the border to the right/left or up/down. At the same time, if less than 10% of the map is left while expanding the lower sector, the map automatically collapses. To return it, press on the line under the top panel.

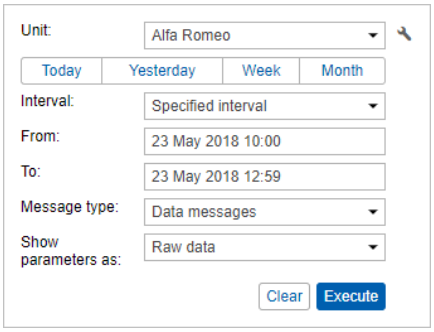
There is a specially developed app to work with messages — Messages Manager.

Working with Messages

Requesting Messages from Server

The request is formulated in the *Messages*, in the top left corner of the window. Specify the following parameters:

1. Select a unit. The dropdown list contains not all the units available to you, but only the units from the work list of the monitoring panel. In case the work list is empty (when the dynamic work list is used or when units were deleted from the work list manually), the units to which you possess the corresponding rights are displayed. The button in the shape of a spanner located to the right of the dropdown list serves to open the Unit Properties dialog.
2. Specify the time interval to show messages for. The principle of interval adjustment is the same as in the reports (see Query and View Reports). The second and fourth steps can be combined if you choose one of the *quick intervals* (the buttons *Today*, *Yesterday*, *Week*, and *Month*).
3. Select the message type from the dropdown list (each type is described in detail below):
   - **data messages**,
   - **SMS messages**,
   - **sent commands**,
   - **registered events**,
   - **log**.



4. At the end, press the *Execute* button. The table will be generated in the right part of the window. To clear the table (and the map), press *Clear*.

Note.
There are alternative ways to query messages:

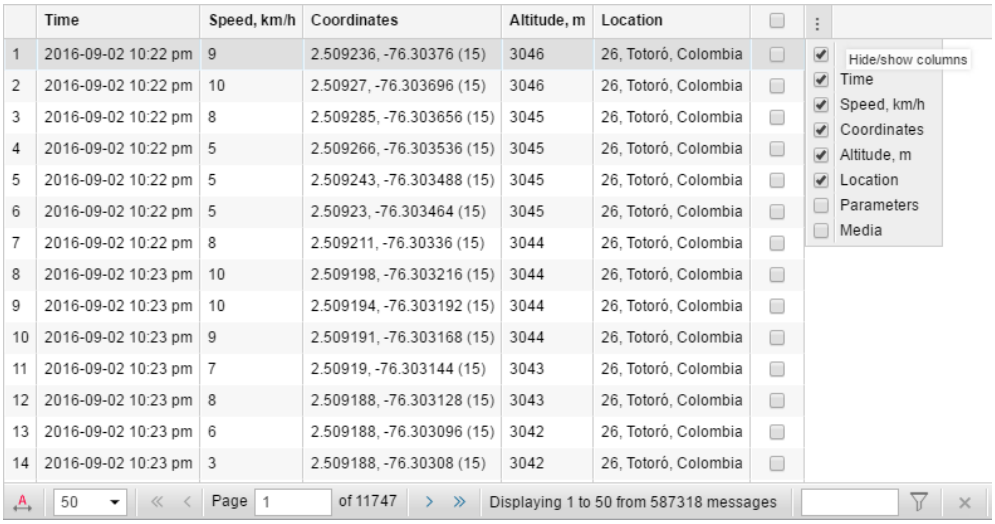
- from the Monitoring panel;
- from the table or chart of the online report.

Note that to display the *messages track* on the map, you should check if the corresponding layer is active.

Viewing Messages

Messages of any type are displayed in the form of a table.

If a long time interval is selected, there can be many messages. In this case they are presented on several pages. Use the navigation panel (blue arrows) to move from page to page, or enter the page number manually and press *Enter* to display a certain page. Apart from that, in the dropdown list you can set the number of messages to be displayed on one page: 25, 50, 100, 500, 1000.



The width of the columns can be adjusted. To do this, move the cursor to the border of the column, click the left mouse button and, while holding it, drag the border to the desired direction. If you want to expand the table, press the *Set column auto width* button so that the letter *A* appears there . In this case, the column width will be set according to contents in the cells. To save the column width when moving through the pages, make the button inactive . Note that when loading many messages (500, 1000 per page), it is better to disable the column auto width because it can considerably slow down the loading process especially if the number of parameters differs from one message to another.

The contents of the table are adjustable. It is possible to hide and display any column. To display the columns, click the button in the right corner of the header of the table. Then select the columns you need in the dropdown list. Note that all the columns cannot be hidden simultaneously. If sensors are displayed, each of them has its own column that can be enabled or disabled. By default, only visible sensors are displayed (the rest can be enabled manually). The set of columns and their width are only saved for one unit during one session. If the unit or message type is changed, or the page is refreshed, the settings are reset.

Messages Filter

To quickly find a necessary message, use a special filter. Data messages (with parameters displayed as raw data) can be filtered by parameter names and parameter values, SMS messages and registered events — by message/event text, sent commands — by values of additional parameters, log — by the description of the action. The filter is disabled for data messages with the parameters shown as sensor values.

The rules for setting the filter were given above. You can use wildcard characters (* or ?) or input your query without them. For example, to find all messages with images enter 'image'. Other available parameters depend on the type of equipment used.

To search for several parameters at once, enter their masks separated by commas. In this case, the results are highlighted in different colours and moved to the beginning of the line. Their order corresponds to the entered masks.

For parameter values, the usage of the * and *?* signs is supported if string values are compared. That is, the search can be specified as: *adc? = 0.5 **. Only operators = (equal) and <> (not equal) are used in this case.

In addition, the filter supports the following operations: =, >, <, >=, <= <>. For instance, a search can be specified as follows:

- param = 3.1415 (equal);
- param > 3.14 (more);
- param < 3.14 (less);
- param >= 3.14 (more o equal);
- param <= 3.14 (less or equal);
- param <> 3.1415926535 (not equal);

- 2.71 < param < 3.15 (more …, but less …).

The characters * and *?* can be used for parameter names. Therefore, a search can be specified as: *adc? > 0.5*.

The search of input/output values is carried out according to the principle *if any of the values is equal, greater or less*, that is, the query *I / O <2* will include *I/O = 0/2* among the results, since there is a value *0*, which is less than *2*.

To apply the filter, press *Enter* or the *Apply* button on the right of the filer. After this, messages that contain the requested parameters or text will be displayed in the table. To remove the filter and show all available messages again, clear the query text field and apply the filter again. If the filter is applied, the number of found (filtered) messages is displayed on the left.

Attention!
The filter only works on the current page with messages. However, when you go through the pages, the filter is applied to each new page automatically.

Deleting Messages

The message can be deleted if you think it is invalid. To delete messages you need to have enough the appropriate access to the unit.

In the last column of the table, mark the messages that should be deleted (one or more). Then click the *Delete* button × and confirm your intentions. If the checkbox in the header of the table is ticked, all messages on the current page will be selected.

After the operation, the newly deleted messages still remain in the table, but become inactive. The next time when you load messages, the deleted messages will be completely removed from the database.

Note.
It is impossible to delete the last incoming message, as well as the last message with the position (valid coordinates). That is why the delete checkbox for these messages is always dimmed.

Data Messages

If you request messages with data, the table of messages will contain information about the message time, speed, coordinates, location, and available parameters. In addition, in the *Statistics* section you can find summary information. There you will see the number of messages found upon request, the time from the first to the last message, the distance traveled, the average and the maximum speed. The mileage in messages in some cases may differ from the mileage in the reports (if there are invalid data on the interval). In such cases, the mileage in the reports should be considered more accurate.

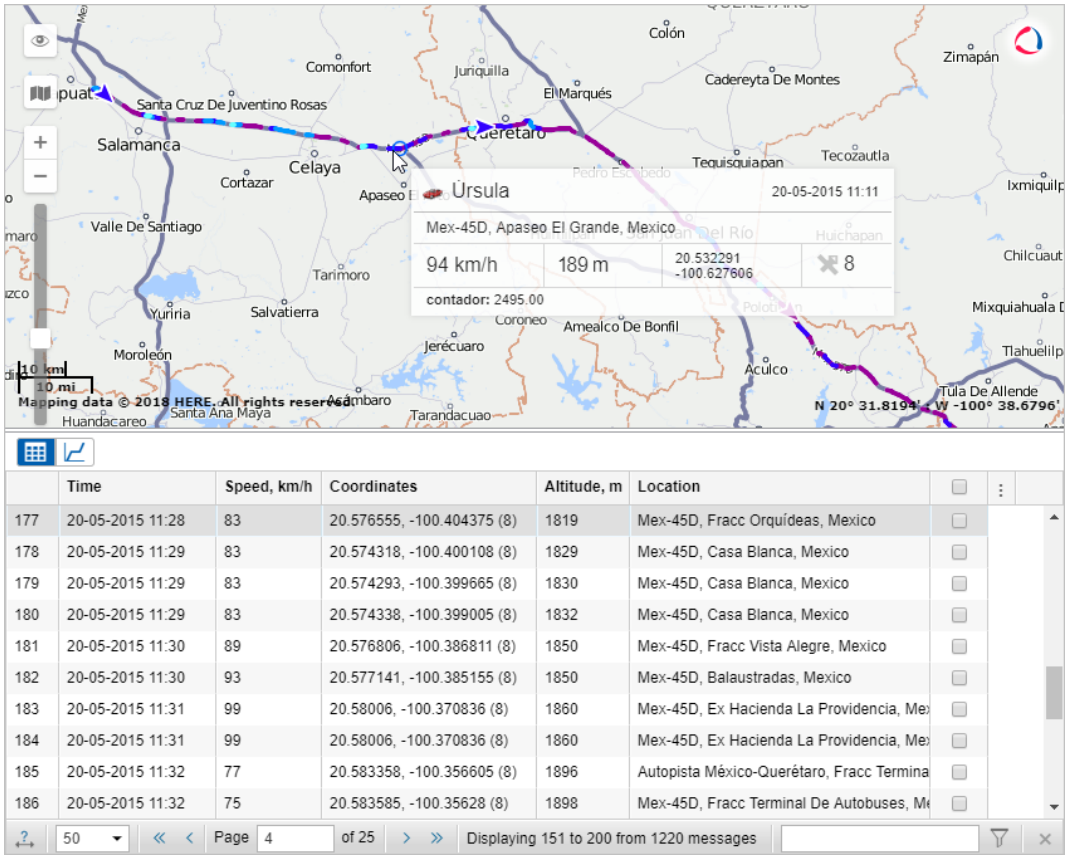
There are two ways to display the parameters:

- **raw data** — all the parameters are displayed in one line in the corresponding column.
- **sensor values** — each sensor has its individual column in the table, and the values are given according to the calculation table. By default, only visible sensors are displayed but you can enable other sensors manually (see Viewing Messages).

The table of messages has the following columns:

- **Time** — the date and time when the message was received.
- **Speed** — the speed of movement of the unit according to the message.
- **Coordinates** — the latitude and longitude of the position of the unit and the number of the locked satellites (indicated in parentheses).
- **Altitude** — sea level elevation. If only zeros are shown, it means the device does not transmit altitude.
- **Location** — the address of the unit when sending the message.
- **Parameters** (if available) — the values of the parametres of all available sensors. The messages can be filtered by parameters. Instead of one column with parameters, columns with sensors can be displayed (if *sensors values* is selected).
- **Media** — if there is an image or video sent by the unit, in this column you can find the button for viewing the media file. Click *Save as* in the lower left corner of the image file viewer to save it.
- **Delete** — checkboxes to delete messages (this button is displayed only if the user possesses the corresponding rights).

Red rows in the table mean alarm messages registered by the system.



	Time	Speed, km/h	Coordinates	Altitude, m	Location
177	20-05-2015 11:28	83	20.576555, -100.404375 (8)	1819	Mex-45D, Fracc Orquídeas, Mexico
178	20-05-2015 11:29	83	20.574318, -100.400108 (8)	1829	Mex-45D, Casa Blanca, Mexico
179	20-05-2015 11:29	83	20.574293, -100.399665 (8)	1830	Mex-45D, Casa Blanca, Mexico
180	20-05-2015 11:29	83	20.574338, -100.399005 (8)	1832	Mex-45D, Casa Blanca, Mexico
181	20-05-2015 11:30	89	20.576806, -100.386811 (8)	1850	Mex-45D, Fracc Vista Alegre, Mexico
182	20-05-2015 11:30	93	20.577141, -100.385155 (8)	1850	Mex-45D, Balaustradas, Mexico
183	20-05-2015 11:31	99	20.58006, -100.370836 (8)	1860	Mex-45D, Ex Hacienda La Providencia, Mex
184	20-05-2015 11:31	99	20.58006, -100.370836 (8)	1860	Mex-45D, Ex Hacienda La Providencia, Mex
185	20-05-2015 11:32	77	20.583358, -100.356605 (8)	1896	Autopista México-Querétaro, Fracc Termina
186	20-05-2015 11:32	75	20.583585, -100.35628 (8)	1898	Mex-45D, Fracc Terminal De Autobuses, Me

50 | Page 4 of 25 | Displaying 151 to 200 from 1220 messages

Using the Map

The track for the selected period is displayed on the map. It is generated together with the table. Select the message and click on it. The message will be highlighted in gray, the map will be centered on this point and a blue marker will be set there.

By default, the track is blue, but you can adjust the settings to color the track in accordance with the speed or sensor value. This can be set in the unit properties dialog on the *Advanced* tab.

When you hover the mouse cursor over the track, the nearest message is searched. If such a message is found within a radius of 50 pixels, the point of receiving the message is highlighted by a pulsating circle, and detailed information is displayed in the pop-up window: the time the message was received, the speed of the unit's movement at that point, altitude, coordinates, number of satellites, readings of sensors.

Note.
If after the *Messages* panel you switch to other panels, the map layout, as well as all the track lines are saved. To remove unnecessary graphics, go back to the *Messages* panel and press *Clear*. More information on how to use the map while working with different panels can be found here.

Charts

Besides the table view, some data can be presented in the graphical form. To switch between the modes, use and buttons, correspondingly.

Go to the graphical mode to view the graphs of the parameters contained in the messages. The *Chart Legend* panel opens in the work area to the left. Here, select the parametres you want to be displayed. You can check several parameters simultaneously — in such a case the graph contains more than one curve. For convenience, these curves are highlighted in different colors.

In the place of the table with messages, a graph appears, which can be scaled with the mouse. To do this, select the required fragment by holding the left mouse button. Hover over the key points on the graph to view their values.

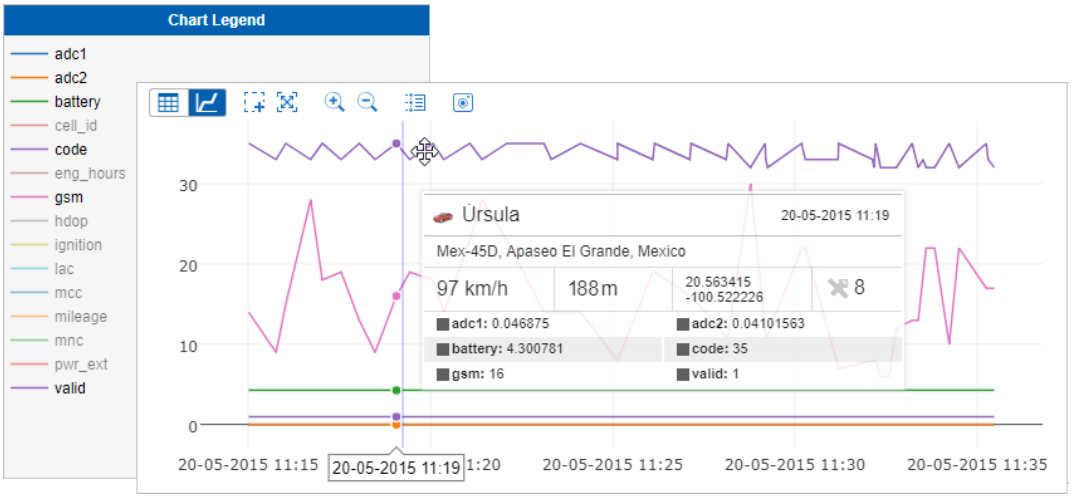


Chart Legend
adc1
adc2
battery
cell_id
code
eng_hours
gsm
hdop
ignition
lac
mcc
mileage
mnc
pwr_ext
valid
30
20
10
0
Ursula
20-05-2015 11:19
Mex-45D, Apaseo El Grande, Mexico
97 km/h
188 m
20.563415
-100.522226
8
adc1: 0.046875
adc2: 0.04101563
battery: 4.300781
code: 35
gsm: 16
valid: 1
20-05-2015 11:15
20-05-2015 11:19
1:20
20-05-2015 11:25
20-05-2015 11:30
20-05-2015 11:35

SMS Messages

SMS messages can be sent by a unit while executing a command, generating an alarm or in other cases, which depend on the device type. The table generated for this request consists of three columns: the time when the message was received, the text of the message and the SIM card number embedded into the unit. Messages can be filtered by text.

	Time	Text	Phone	
1	2015-03-24 10:00:49 pm	SIGNAL,0002,24/03/15,19:00:46,5354.4342,N,02736.7896,E,18.0km,274.1,A,010000	+375000000000	
2	2015-03-24 10:01:49 pm	PC,0002,24/03/15,19:01:46,5354.8711,N,02736.2582,E,20.0km,326.9,A,010000	+375000000000	
3	2015-03-24 10:02:50 pm	PC,0002,24/03/15,19:02:47,5354.6567,N,02735.7368,E,70.0km,237.6,A,010000	+375000000000	
4	2015-03-24 10:03:50 pm	PC,0002,24/03/15,19:03:47,5354.3469,N,02735.4559,E,80.0km,210.6,A,010000	+375000000000	
5	2015-03-24 10:04:50 pm	PC,0002,24/03/15,19:04:47,5354.2010,N,02735.9707,E,25.0km,118.2,A,010000	+375000000000	
6	2015-03-24 10:05:49 pm	PC,0002,24/03/15,19:05:46,5353.5088,N,02736.7261,E,42.0km,149.8,A,010000	+375000000000	
7	2015-03-24 10:06:50 pm	PC,0002,24/03/15,19:06:47,5353.2661,N,02736.6971,E,42.0km,186.5,A,010000	+375000000000	
8	2015-03-24 10:07:49 pm	SIGNAL,0002,24/03/15,19:07:46,5353.0776,N,02736.2205,E,26.0km,238.6,A,010000	+375000000000	
9	2015-03-24 10:08:49 pm	PC,0002,24/03/15,19:08:46,5352.8552,N,02736.0219,E,80.0km,210.2,A,010000	+375000000000	

Sent Commands

The commands sent to the unit by users are displayed on the *Sent Commands* request. There is a special button in the monitoring panel to send commands to units. The table includes:

- **Time** — the time when the command was sent to the unit.
- **User** — the login name of the user who performed the command. If there is a dash in this cell, it means you have no access to this user, that is why the login name is hidden.
- **Command name** — the command name as it is written in the unit properties.
- **Command type** — the command type (see the list).
- **Parameters** — for the commands that require additional parameters (message to the driver, input activation/deactivation, report period, custom message, etc.).
- **Execution time** — the time when the command was executed. If execution failed due to billing limitations (e.g., you ran out of SMS messages), this column contains only dashes.
- **Channel** — the type of connection used to transmit the command (*TCP*, *UDP*, *Virtual*, *SMS*).

	Time	User	Command name	Command type	Parameters	Channel	
1	2016-05-21 01:35:35 pm	user	Send position	Query position		SMS	
2	2016-05-21 01:55:47 pm	user	Deactivate output	Deactivate output	1	SMS	
3	2016-05-23 01:55:53 pm	user	STOP	Block engine		SMS	
4	2016-05-25 00:58:08 pm	user	Message	Send custom message	Route 1675	SMS	
5	2016-05-27 01:58:18 pm	user	Interval	Set data transfer interval	15	SMS	

Registered Events

Different types of events can be registered in the unit history automatically or manually.

Automatic registration is adjusted with the help of notifications (delivery method must be *Register event for unit*, *Register as violation* or *Register unit status*. In such a manner, you can control geofence visits, connection loss, idling, service intervals, etc.

Manually an event can be registered in the special registrar in the monitoring panel. With this method, you can register fuel fillings, maintenance, unit statuses, and any custom event.

Traffic counter reset and routes statuses can be saved as events.

In the table you see:

- the time when the event was detected (automatic registration) or registered (manual registration);
- type: event (traffic counter reset, events from notifications, some custom events, route control statuses), violation (violations from notifications, some custom events), maintenance (registered manually);
- event text which is taken from the text of a notification or from the description entered while registering manually.

	Time	Type	Event text	
1	2015-08-21 06:16:05 am	Violation	Connection o coordinates loss.	
2	2015-09-15 02:00:00 pm	Event	Personal	
3	2015-10-06 04:16:00 pm	Maintenance	Maintenance service 'Electricity check' was registered.	
4	2015-10-07 01:58:00 pm	Event	Accident	
5	2015-10-21 04:20:00 pm	Maintenance	Maintenance service 'Oil change' was registered.	
6	2015-10-30 03:58:00 pm	Event	Fuel theft 20l	
9	2015-11-19 01:57:00 pm	Event	Business	
10	2015-11-19 01:57:00 pm	Maintenance	Maintenance service 'Wheel balancing' was registered.	

Unit Log

Any manipulations with the unit properties or its database are logged in the system automatically. In addition, records can be added to the unit log manually — through the event registrar. To see the unit log or add messages to it, you should have not only the *Query reports or messages* access but also *Manage log*.

Any changes in the Unit Properties dialog are logged, as well as import, export, and removal of messages, assignment or reset of a driver. etc.

The log contains the following information:

- **Time** — the date and time when the change was done.
- **User** — name of the user who entered the record or changes.
- **Action** — the description of the change performed. Messages can be filtered by the text in this description.
- **Host** — the address of the computer from which the user made the changes (if the action was performed automatically, it can be a *job* or *notification* type entry).
- **Delete** — the button to delete records.

	Time	User	Action	Host	Parameter 1	
1	2015-10-27 04:48:40 pm	user	Unit 'AARON' created	10.192.5	AARON	
2	2015-10-27 04:48:40 pm	user	Command 'Send Command' created	10.192.5	Send Command	
3	2015-10-27 04:48:40 pm	user	Command 'Locate Vehicle' created	10.192.5	Locate Vehicle	
4	2015-10-27 04:48:40 pm	user	Sensor 'RPM' created	10.192.5	RPM	
5	2015-10-27 04:48:40 pm	user	Sensor 'driver' created	10.192.5	driver	
6	2015-10-27 04:48:40 pm	user	Sensor 'Ignition' created	10.192.5	Ignition	
7	2015-10-27 04:48:40 pm	user	Sensor 'Satellite' created	10.192.5	Satellite	
8	2015-10-27 04:48:40 pm	user	Sensor 'Engine Temp' created	10.192.5	Engine Temp	

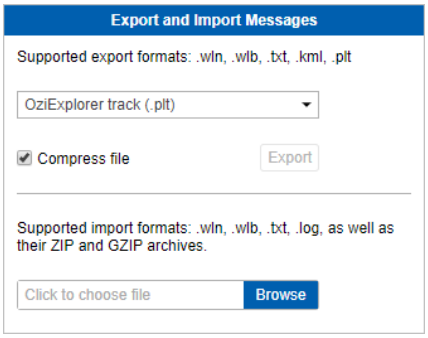
Unit log can also presented as a report.

Export/Import Messages

Messages can be imported and exported. It concerns only the messages of the first type, that is, data messages.

Attention!
The size limit for the imported file/archive is 64 MB, which, in case of the archive, is approximately 3.5 million messages.

Export



To export messages to a file, open the *Export and Import Messages* tab in the lower left section of the window. Select the destination format and click *Export*. Depending on your browser configuration settings, you will be offered to open or save the file. The file with exported messages can be compressed. For this, leave the checkbox *Compress file* marked.

The supported export formats are:

- OziExplorer track(.plt) — data format of the Ozi Explorer program that stores a track as a list of coordinates of the track points.
- NMEA messages (.txt) — a text file of the National Marine Electronics Association. This text protocol is used for marine navigation equipment.
  Attention!
  Parameters (sensors) are not stored when exporting to this format.
- Google Earth (.kml) — an XML-based format used in the Google Earth program to transmit three-dimensional geospatial data.
- Wialon messages (.wln) — a format to be used with the Wialon Local software.
- Wialon binary messages (.wlb) — a binary format to be used with Wialon Local software.

Import

Saved files on the disk containing messages from the unit can be imported into the units you create. To import messages, select the *Export and Import Messages* tab in the left section of the window.

The supported import formats are:

- Raw GPRMC navigator logs in format defined by NMEA 0183 specification — searched in files with the extension .txt or .log.
- Wialon messages — search in files with the extension .wln.
- Wialon binary messages — search in files with the extension .wlb.

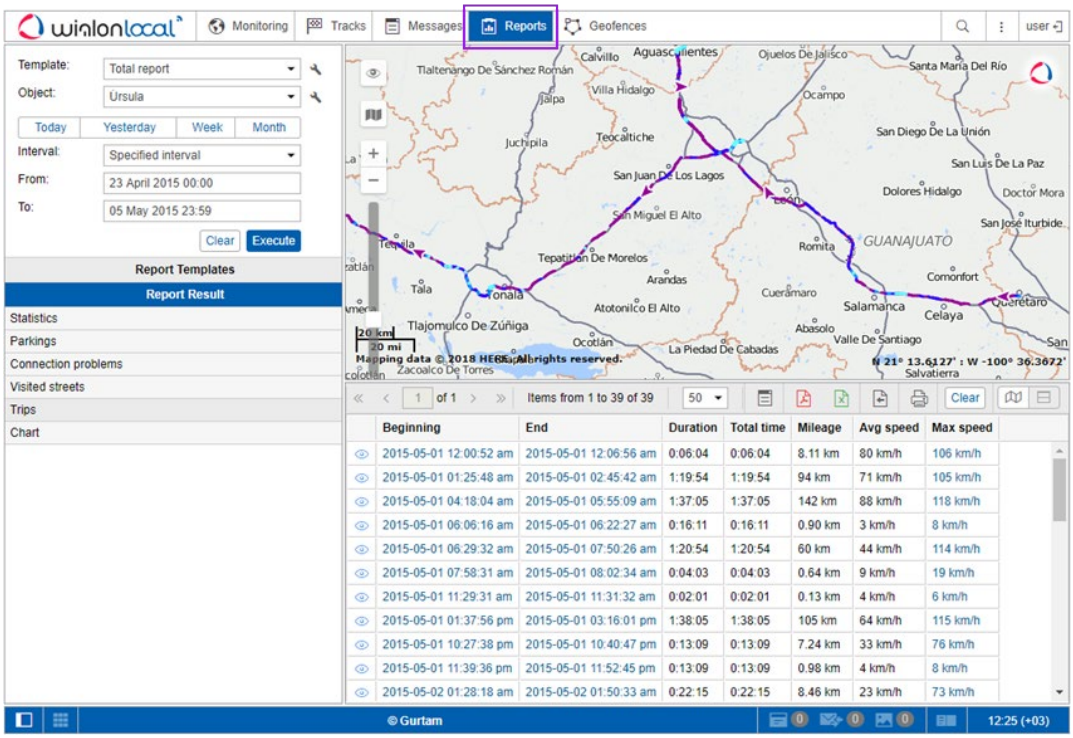
Click on the empty field, specify the file to import the messages from, and click *Upload*.

Hint.
To speed up and simplify the process, first compress the files with ZIP or GZIP utilities. When uploading is completed, the files will be unpacked and processed on the server. This process can be traced in the log.

Reports

To switch to the *Reports* panel, click on the *Reports* header in the top panel and select the same name item in the main menu customizer.

Reports on the activity of a unit can be presented in the form of tables and graphs. They can be viewed in a browser window, as well as exported to files of various formats.

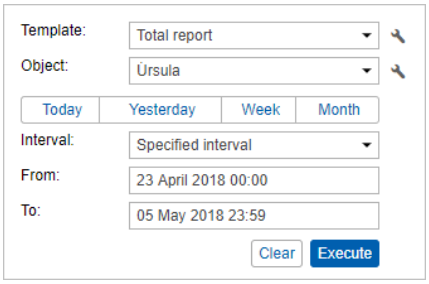


The *Reports* panel window can be divided into four sections:

- in the upper left corner, the report parameters are adjusted;
- in the lower left corner there are report templates. After a report is generated, this section changes to the navigation bar;
- in the upper right section, there is the map (or another chart or table);
- in the lower right section, you see the report itself (tables, charts, images).

The sectors can be resized (the left ones — in width, the right ones — both in width and height). To do this, click on the border between them with the left mouse button and, while holding it, move the border to the right/left or up/down. At the same time, if less than 10% of the map is left while expanding the lower sector, the map automatically collapses. To expand it, press the line under the top panel.

Query and View Reports



It is not possible to generate a report if no templates have been created in advance.

To generate a report, set its parameters (template, object, time interval) and click *Execute*.

Template

Select the required report template from the drop-down list. By default, the one that was created and edited last within the current session is selected. To the right of the list is the button for editing the properties of the selected template ( ).

Object

Select the system object that you want to execute the report on (the current user should have the *Query messages or reports* access right). Depending on the report type specified in the template, you can select a unit, unit group, user, driver, trailer, route, resource, retranslator, group of drivers or trailers, passenger or group of passengers. For the *Unit group* report type, you can specify more than one object. Click the *Add object* button + and in the drop-down list, select the required unit or unit group (shown in square brackets). If specific objects are bound to the template, only they will be available in the drop-down list. To view/edit the properties of the selected system object, click the button in the form of a wrench to the right of it.

If the report type is *Unit*, only those objects that are currently in the *Monitoring* panel work list (and *not all* the objects to which you have the required access) are included in the drop-down list. In case the work list is empty (when the dynamic work list is used or when units were deleted from the work list manually), the units to which you have the *Query messages or reports* access right will be displayed.

Interval

The report execution interval can be specified in two ways: manually or with the help of one of the available pre-set intervals.

Use buttons *Today*, *Yesterday*, *Week*, *Month* to select a pre-set interval. If you press one of those four quick buttons, the report launches immediately (there is no need to press *Execute*).

If the *Week* interval is selected, the report is executed for the last *full week*, that is, for the previous week from Monday to Sunday. The *Month* interval works in the same way.

To select the interval manually, there are several options (the drop-down list to the right of the *Interval* field):

- *Specified interval*
  For such an interval you can specify the date and time of the beginning and end (to minutes).
- *Starts 'From' until today*
  Specify the exact start time. The current time will be automatically set as the end of the interval.
- *For previous*
  The number and the time interval (minutes/hours/days/weeks/months/years) for such an interval are indicated below. To select a numerical value for the interval, use the arrow keys or the mouse wheel. Valid values are from 1 to 99. Press and hold the arrows to rewind at an increased speed. When the *Include current* option is activated, the report is executed not for the last full period, but for the current one.

When choosing an interval, note that the number of lines of the generated report is limited to 100 000 for optimal system performance.

There are alternative ways to receive reports in the monitoring system:

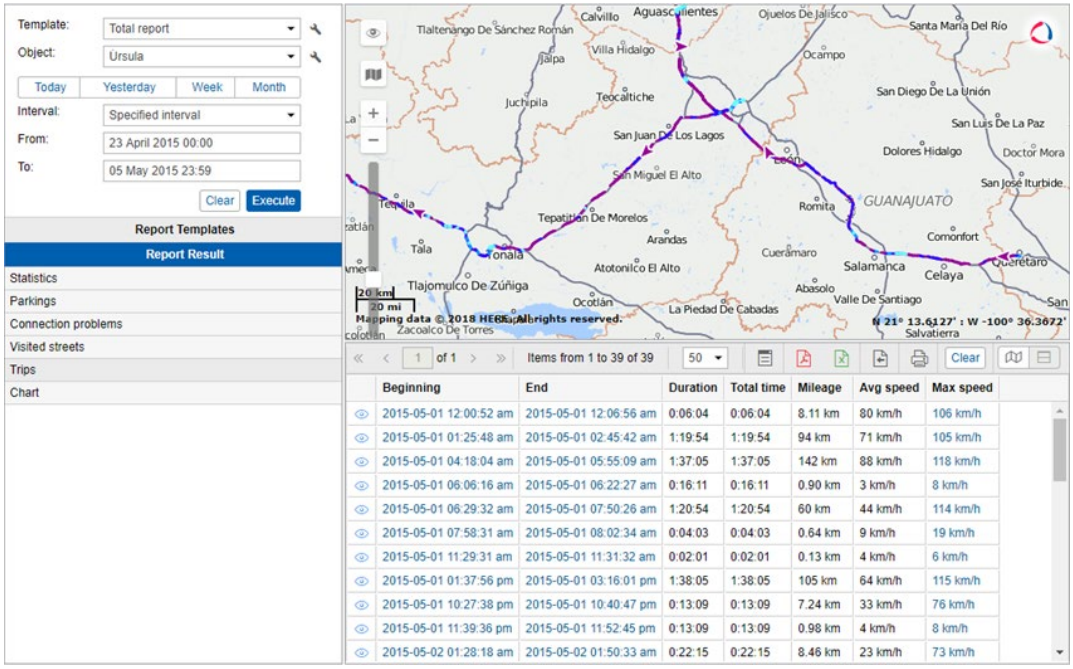
- receive reports by e-mail at the specified time (adjusted through jobs);
- receive a report when an event happens (adjusted through notifications);
- quick report generation from the monitoring panel.

Online Report

After executing a report, under the *Report Templates* panel appears another one — *Report Results*; in the lower right part of the window, tables or charts are displayed. If no information has appeared, it means that there is no required data about the unit for the specified time interval.

The *Report Result* panel displays a list of its contents: tables, charts, statistics. Click on the name of the required component to open it in the lower part of the window. The name of the opened table/chart/statistics has a darker background, as well as a blue dot if two report windows are displayed simultaneously.

Information in the report can be presented in the form of tables or charts. Some information can be visualized on the map, for example, tracks and markers.



If there are columns with blue text in the table, it means that there are coordinates for this point. Click on the cell to move to the location on the map.

A table report can contain up to 100 000 lines, therefore it is divided into pages. To navigate between pages, use the navigation buttons at the top of the window (blue arrows):

› show the next page;
‹ show the previous page;
« go to the first page;
» go to the last page.

The page number can be entered manually. After typing in a number, press *Enter* to go to the required page.

You can also adjust the number of rows per page by selecting one of the available options (25, 50, 100, 200, 500) in the drop-down list in the toolbar for working with tables (located above the table).

The toolbar also contains the following buttons:

— the button to go to the messages;

— the button for quick export to PDF (landscape orientation, A4 format and fixed page width is a default setting for a

PDF file);

— the button for quick export to Excel;

— the button to export the report to a file;

— the button for printing the report.

To remove a report and the *Report Result* section from the screen, press *Clear*.

/ — the switch buttons between the *Map-report view* and *Dual report view* modes.

Transfer from tabular report to messages

it is possible to go to the messages straight from an online report table. This can be useful for analyzing the data messages from a unit.

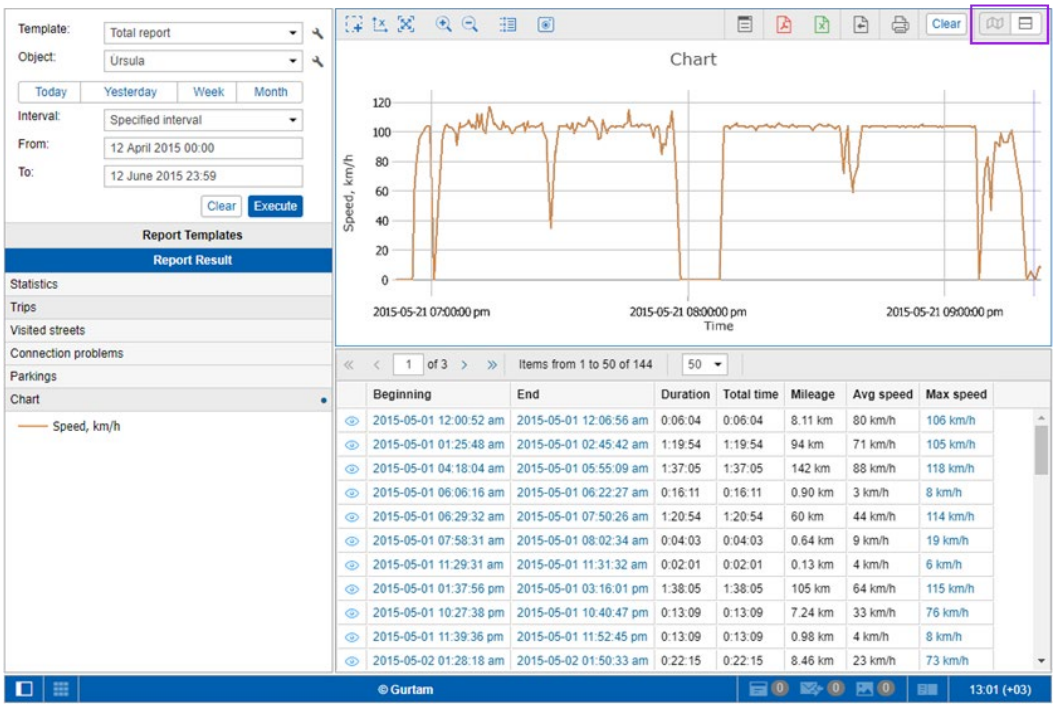
To move from the table to messages, press the *Transfer to messages* button . After pressing it, the text in some cells which indicate time (such as *Time*, *Beginning*, *End*, etc.) becomes purple. These links work as links. Click on the link to go to messages.

Messages are loaded for the entire reporting period, and the page with the selected message opens immediately. The line with this message is highlighted in grey. The map is centered on the selected message, which is indicated with a red marker.

By default, the transfer button is inactive. If the button was active in one of the tables, this state is preserved when switching between tables. However, when you switch from the table to the chart, the button returns to the default state, i.e. it is inactive.

Dual report view

If the report contains several charts or tables, it is possible to activate the dual report view. To do this, press the *Dual report view* button. The chart or table will replace the map. By default, a chart or table which follows the current one in the *Report result* list opens.

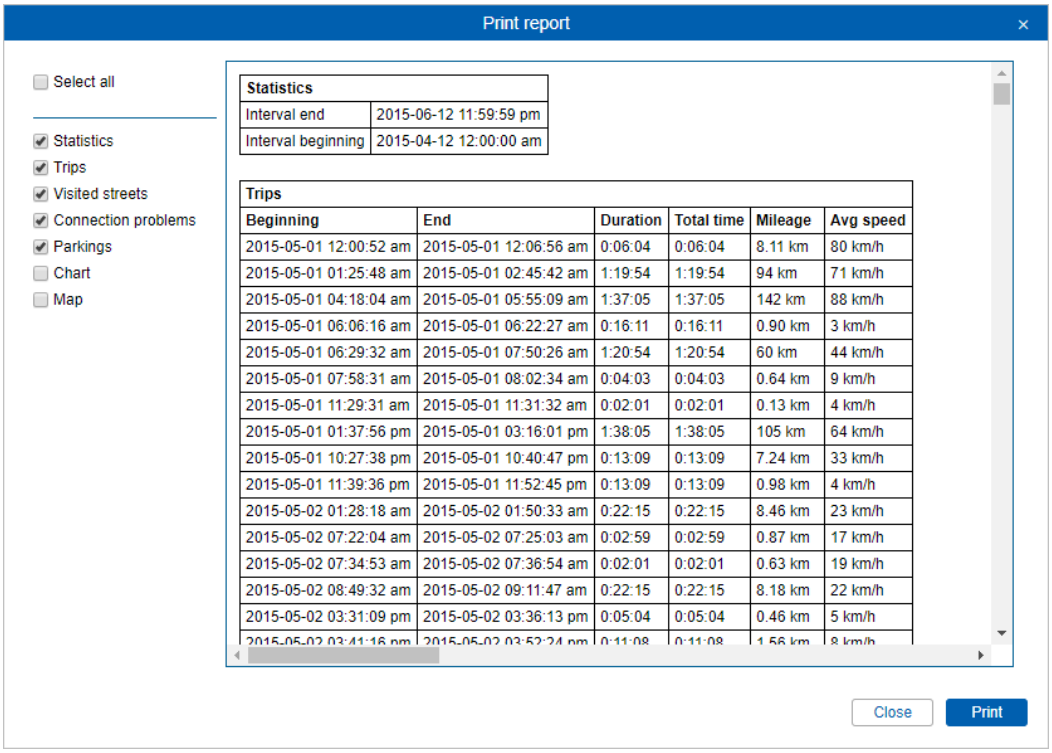


To switch between the pages of the report, activate the top or bottom window by clicking on it (its frame turns blue) and select the required page in the report result panel. Active page is marked with the icon .

Print Report

After generating an online report, you can print it without first exporting it to a file. To do this, press the *Print* button, which is located above the active table or chart only when there is a generated report in the browser window.

In the left part of the *Print Report* dialog, you see the list of sections which are included in the report. Check those that you are going to print. On the right, you can preview these tables, charts, map, etc. To start printing, press *Print*. To exit, click *Close*.



Statistics	
Interval end	2015-06-12 11:59:59 pm
Interval beginning	2015-04-12 12:00:00 am

Trips

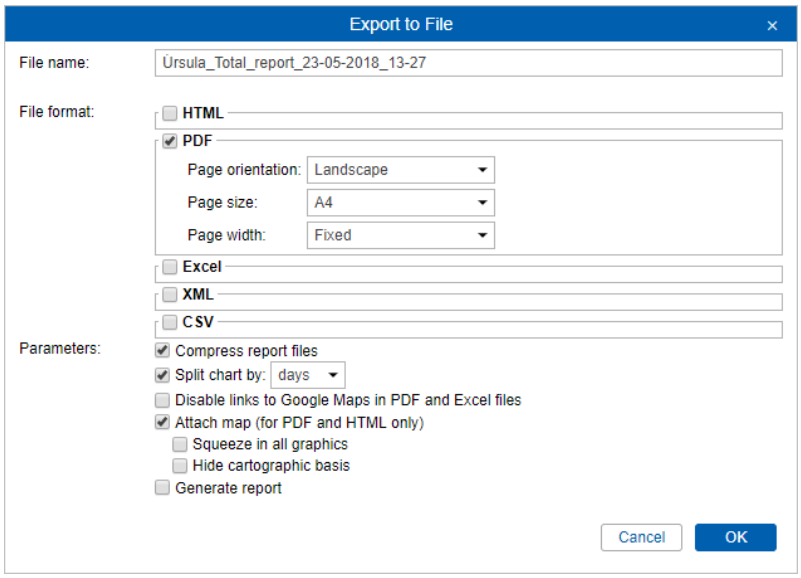
Beginning	End	Duration	Total time	Mileage	Avg speed
2015-05-01 12:00:52 am	2015-05-01 12:06:56 am	0:06:04	0:06:04	8.11 km	80 km/h
2015-05-01 01:25:48 am	2015-05-01 02:45:42 am	1:19:54	1:19:54	94 km	71 km/h
2015-05-01 04:18:04 am	2015-05-01 05:55:09 am	1:37:05	1:37:05	142 km	88 km/h
2015-05-01 06:06:16 am	2015-05-01 06:22:27 am	0:16:11	0:16:11	0.90 km	3 km/h
2015-05-01 06:29:32 am	2015-05-01 07:50:26 am	1:20:54	1:20:54	60 km	44 km/h
2015-05-01 07:58:31 am	2015-05-01 08:02:34 am	0:04:03	0:04:03	0.64 km	9 km/h
2015-05-01 11:29:31 am	2015-05-01 11:31:32 am	0:02:01	0:02:01	0.13 km	4 km/h
2015-05-01 01:37:56 pm	2015-05-01 03:16:01 pm	1:38:05	1:38:05	105 km	64 km/h
2015-05-01 10:27:38 pm	2015-05-01 10:40:47 pm	0:13:09	0:13:09	7.24 km	33 km/h
2015-05-01 11:39:36 pm	2015-05-01 11:52:45 pm	0:13:09	0:13:09	0.98 km	4 km/h
2015-05-02 01:28:18 am	2015-05-02 01:50:33 am	0:22:15	0:22:15	8.46 km	23 km/h
2015-05-02 07:22:04 am	2015-05-02 07:25:03 am	0:02:59	0:02:59	0.87 km	17 km/h
2015-05-02 07:34:53 am	2015-05-02 07:36:54 am	0:02:01	0:02:01	0.63 km	19 km/h
2015-05-02 08:49:32 am	2015-05-02 09:11:47 am	0:22:15	0:22:15	8.18 km	22 km/h
2015-05-02 03:31:09 pm	2015-05-02 03:36:13 pm	0:05:04	0:05:04	0.46 km	5 km/h
2015-05-02 03:41:16 pm	2015-05-02 03:52:24 pm	0:11:08	0:11:08	1.56 km	8 km/h

Note.
In Internet Explorer 10, maps and charts cannot be printed if the *Enhanced Protected Mode* option is on.

Export Report to File

To get a report as a file, press the *Export to file* button .

Specify the desirable file format or several formats at once. Supported formats are HTML, PDF, Excel, XML, CSV. For some formats, you may need to specify additional export options.



Reports in the form of files can also be received by e-mail automatically – using jobs and notifications.

Export Parameters

The report file can be assigned any name by entering it manually in the *File name* field of the export dialog. If the name is not specified, the file is formed with the default name.

Activate the *Compress report files* box to compress the file into an archive. For HTML, CSV and XML formats, and if the total amount of files exceeds 20 MB, forced archiving occurs even if the checkbox is not checked. With other formats, archiving is performed in accordance with the checkbox state.

The *Split chart by:* option allows to receive, depending on your selection, a separate chart for each day or week of the reporting period.

Indicate whether it is necessary to attach the map to the exported report. Graphical objects (such as map, chart) can be exported only into HTML or PDF files. Note that the map will be attached to the file only if any graphical elements (such as tracks, markers, geofences, etc.) are selected in the report template. By default, the map is scaled in order fot the track/markers/last unit position to be seen on it. If these elements are not shown on the map, the map is not attached. If the *Squeeze in all graphics* checkbox is marked, the map is scaled in such a way that geofences are shown on the map along with the above mentioned elements. Only Gurtam Maps can be attached to the report. Furthermore, the map layer can be hidden (using the *Hide cartographic basis* option) — in this case tracks and markers are shown on the blank background.

The function of using a link to display the location (if the coordinates are available) is supported for the files exported in PDF or Excel. It works as follows: open the exported report (PDF/Excel), place the cursor on the corresponding field of a report, for example, the beginning/end time or address information from the unit (the cursor pointer changes to *hand*) and click on the link. Google Maps cartographic service will be opened in your browser, where the marker indicates the

location. If there is no need to show the location, you can disable links to Google Maps in PDF and Excel files by marking the corresponding checkbox in the export parameters.

In order to disable the function described above, use the *Disable links to Google Maps in PDF and Excel files* option.

More parameters can be adjusted for some file formats. Those additional parameters are described below.

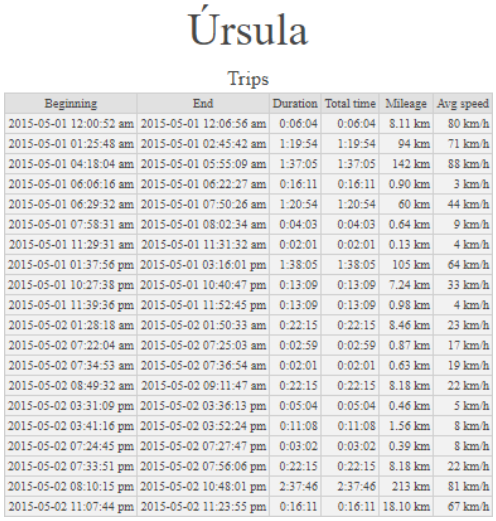
Usually you export to a file a report that is already in the browser. However, you can also generate a new one according to the parameters set in the left panel. In this case, you should check the *Generate report* option.

Press *OK*. Depending on the browser settings, you will be offered to open a file or save it.

Report Formats

HTML

Choose the HTML format to receive a report in the form of a web page, which can be opened in any Internet browser installed on the computer.



Úrsula

Trips

Beginning	End	Duration	Total time	Mileage	Avg speed
2015-05-01 12:00:52 am	2015-05-01 12:06:56 am	0:06:04	0:06:04	8.11 km	80 km/h
2015-05-01 01:25:48 am	2015-05-01 02:45:42 am	1:19:54	1:19:54	94 km	71 km/h
2015-05-01 04:18:04 am	2015-05-01 05:55:09 am	1:37:05	1:37:05	142 km	88 km/h
2015-05-01 06:06:16 am	2015-05-01 06:22:27 am	0:16:11	0:16:11	0.90 km	3 km/h
2015-05-01 06:29:32 am	2015-05-01 07:50:26 am	1:20:54	1:20:54	60 km	44 km/h
2015-05-01 07:58:31 am	2015-05-01 08:02:34 am	0:04:03	0:04:03	0.64 km	9 km/h
2015-05-01 11:29:31 am	2015-05-01 11:31:32 am	0:02:01	0:02:01	0.13 km	4 km/h
2015-05-01 01:37:56 pm	2015-05-01 03:16:01 pm	1:38:05	1:38:05	105 km	64 km/h
2015-05-01 10:27:38 pm	2015-05-01 10:40:47 pm	0:13:09	0:13:09	7.24 km	33 km/h
2015-05-01 11:39:36 pm	2015-05-01 11:52:45 pm	0:13:09	0:13:09	0.98 km	4 km/h
2015-05-02 01:28:18 am	2015-05-02 01:50:33 am	0:22:15	0:22:15	8.46 km	23 km/h
2015-05-02 07:22:04 am	2015-05-02 07:25:03 am	0:02:59	0:02:59	0.87 km	17 km/h
2015-05-02 07:34:53 am	2015-05-02 07:36:54 am	0:02:01	0:02:01	0.63 km	19 km/h
2015-05-02 08:49:32 am	2015-05-02 09:11:47 am	0:22:15	0:22:15	8.18 km	22 km/h
2015-05-02 03:31:09 pm	2015-05-02 03:36:13 pm	0:05:04	0:05:04	0.46 km	5 km/h
2015-05-02 03:41:16 pm	2015-05-02 03:52:24 pm	0:11:08	0:11:08	1.56 km	8 km/h
2015-05-02 07:24:45 pm	2015-05-02 07:27:47 pm	0:03:02	0:03:02	0.39 km	8 km/h
2015-05-02 07:33:51 pm	2015-05-02 07:56:06 pm	0:22:15	0:22:15	8.18 km	22 km/h
2015-05-02 08:10:15 pm	2015-05-02 10:48:01 pm	2:37:46	2:37:46	213 km	81 km/h
2015-05-02 11:07:44 pm	2015-05-02 11:23:55 pm	0:16:11	0:16:11	18.10 km	67 km/h

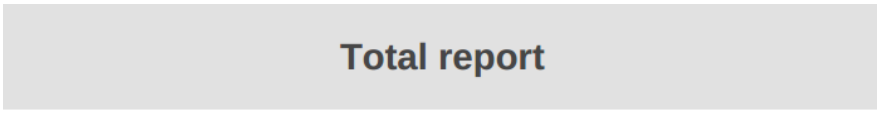
PDF

PDF is a widely known file format. To view these files Adobe Acrobat Reader is used (for Windows OS only). This type of file is well suited for printing.

You can additionally specify the page orientation (landscape or portrait) and format (A4 or A3) when exporting a PDF-file.

For reports with a large number of columns, the *Page width* option may also be appropriate. The standard page width is *fixed* which means it depends on the selected page format and orientation. However, if the table is too wide and does not fit the specified page width, this table will not be exported (only the heading will be displayed). In such cases, you can select *automatic* page width, and the width of the page will correspond to the largest row in the table. If *Auto, compact* is selected, the cell width is equal to the length of the largest word in it. If *Auto, no wrap* is selected, the cell width is equal to the largest phrase in it (no line breaks are applied).

Note that if the automatic page width is selected, the page format and orientation become relative — they define only the height of the page, not the width.



Úrsula 1
Statistics 1
Trips 1
Visited streets 4
Connection problems 13
Parkings 818
Charts 823
Chart 823

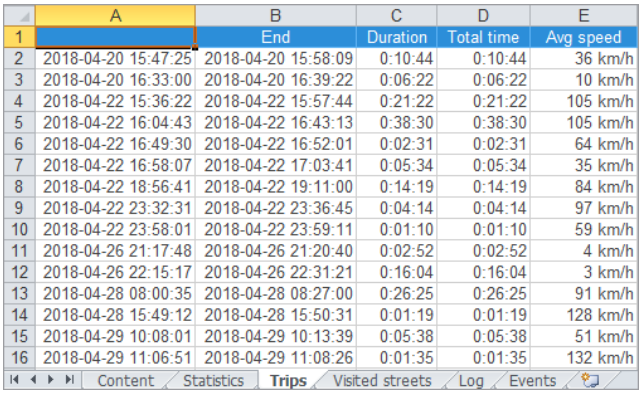
Úrsula

Trips

Beginning	End	Duration	Total time	Mileage	Avg speed
2015-05-01 12:00:52 am	2015-05-01 12:06:56 am	0:06:04	0:06:04	8.11 km	80 km/h
2015-05-01 01:25:48 am	2015-05-01 02:45:42 am	1:19:54	1:19:54	94 km	71 km/h
2015-05-01 04:18:04 am	2015-05-01 05:55:09 am	1:37:05	1:37:05	142 km	88 km/h
2015-05-01 06:06:16 am	2015-05-01 06:22:27 am	0:16:11	0:16:11	0.90 km	3 km/h
2015-05-01 06:29:32 am	2015-05-01 07:50:26 am	1:20:54	1:20:54	60 km	44 km/h
2015-05-01 07:58:31 am	2015-05-01 08:02:34 am	0:04:03	0:04:03	0.64 km	9 km/h
2015-05-01 11:29:31 am	2015-05-01 11:31:32 am	0:02:01	0:02:01	0.13 km	4 km/h
2015-05-01 01:37:56 pm	2015-05-01 03:16:01 pm	1:38:05	1:38:05	105 km	64 km/h
2015-05-01 10:27:38 pm	2015-05-01 10:40:47 pm	0:13:09	0:13:09	7.24 km	33 km/h
2015-05-01 11:39:36 pm	2015-05-01 11:52:45 pm	0:13:09	0:13:09	0.98 km	4 km/h
2015-05-02 01:28:18 am	2015-05-02 01:50:33 am	0:22:15	0:22:15	8.46 km	23 km/h

Excel

Excel (.xslx) is a popular product from the Microsoft Office suite. Here the data is presented in the form of spreadsheets. The report is divided into several tab pages. The data is automatically stored in tables and is suitable for subsequent processing by the tools of this program.



	A	B	C	D	E
1		End	Duration	Total time	Avg speed
2	2018-04-20 15:47:25	2018-04-20 15:58:09	0:10:44	0:10:44	36 km/h
3	2018-04-20 16:33:00	2018-04-20 16:39:22	0:06:22	0:06:22	10 km/h
4	2018-04-22 15:36:22	2018-04-22 15:57:44	0:21:22	0:21:22	105 km/h
5	2018-04-22 16:04:43	2018-04-22 16:43:13	0:38:30	0:38:30	105 km/h
6	2018-04-22 16:49:30	2018-04-22 16:52:01	0:02:31	0:02:31	64 km/h
7	2018-04-22 16:58:07	2018-04-22 17:03:41	0:05:34	0:05:34	35 km/h
8	2018-04-22 18:56:41	2018-04-22 19:11:00	0:14:19	0:14:19	84 km/h
9	2018-04-22 23:32:31	2018-04-22 23:36:45	0:04:14	0:04:14	97 km/h
10	2018-04-22 23:58:01	2018-04-22 23:59:11	0:01:10	0:01:10	59 km/h
11	2018-04-26 21:17:48	2018-04-26 21:20:40	0:02:52	0:02:52	4 km/h
12	2018-04-26 22:15:17	2018-04-26 22:31:21	0:16:04	0:16:04	3 km/h
13	2018-04-28 08:00:35	2018-04-28 08:27:00	0:26:25	0:26:25	91 km/h
14	2018-04-28 15:49:12	2018-04-28 15:50:31	0:01:19	0:01:19	128 km/h
15	2018-04-29 10:08:01	2018-04-29 10:13:39	0:05:38	0:05:38	51 km/h
16	2018-04-29 11:06:51	2018-04-29 11:08:26	0:01:35	0:01:35	132 km/h

Content | Statistics | **Trips** | Visited streets | Log | Events

Note.

When exporting a report to PDF, HTML, Excel the **alignment** is used. The columns with text (names of sensors, geofences, drivers, users, SMS and notification text, location addresses, etc.) are aligned to the left. The columns with numeric data (time, duration, speed, mileage, fuel, payments, count, etc.) are aligned to the right.

XML

XML represents information in the form of a text file used for storing structured data (instead of existing database

files), for exchanging information between programs, and for creating more specialized markup languages (such as XHTML) on its basis.

```
<?xml version="1.0"?>
- <report lang="en" tz="134228528" name="Total report">
  - <stats>
      <row name="Interval end" vt="30" val="1431464399" txt="2015-05-12 11:59:59 pm"/>
      <row name="Interval beginning" vt="30" val="1428786000" txt="2015-04-12 12:00:00 am"/>
    </stats>
  - <tables>
    - <table id="unit_trips" name="Trips" rows="66" flags="16777344" cols="6">
      - <header>
          <col name="Beginning"/>
          <col name="End"/>
          <col name="Duration"/>
          <col name="Total time"/>
          <col name="Mileage"/>
          <col name="Avg speed"/>
        </header>
      - <row>
          <col vt="30" val="1430427652" txt="2015-05-01 12:00:52 am"/>
          <col vt="30" val="1430428016" txt="2015-05-01 12:06:56 am"/>
          <col vt="40" val="364" txt="0:06:04"/>
          <col vt="40" val="364" txt="0:06:04"/>
          <col vt="10" val="8112.750600" txt="8.11 km"/>
          <col vt="20" val="80.235995" txt="80 km/h"/>
        </row>
```

CSV

CSV is a text file format used for the presentation of tabular data. Each line of this file corresponds to one line of the table, and the columns are separated from each other by a special delimiter character - a comma (,) or a semicolon (;). Each table is saved in a separate file.

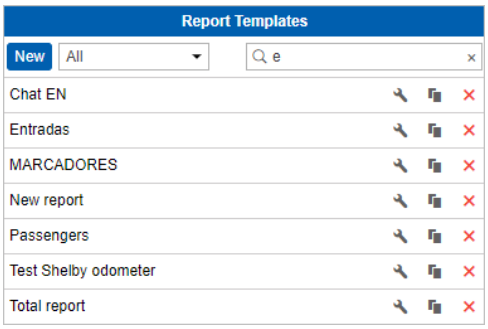
To export to a CSV file, you should additionally choose the encoding (utf8, cp1251) and a delimiter (comma or semicolon). Depending on the state of the *Show column headers* checkbox, the file will start with the header line or immediately with the data.

	A	B	C	D	E
1	Duration	Total time	Avg speed	Mileage	Max speed
2	0:10:44	0:10:44	36 km/h	6.40 km	81 km/h
3	0:06:22	0:06:22	10 km/h	1.03 km	29 km/h
4	0:21:22	0:21:22	105 km/h	37 km	121 km/h
5	0:38:30	0:38:30	105 km/h	68 km	129 km/h
6	0:02:31	0:02:31	64 km/h	2.70 km	82 km/h
7	0:05:34	0:05:34	35 km/h	3.22 km	71 km/h
8	0:14:19	0:14:19	84 km/h	20 km	117 km/h
9	0:04:14	0:04:14	97 km/h	6.85 km	126 km/h
10	0:01:10	0:01:10	59 km/h	1.14 km	70 km/h
11	0:02:52	0:02:52	4 km/h	0.17 km	5 km/h
12	0:16:04	0:16:04	3 km/h	0.90 km	5 km/h
13	0:26:25	0:26:25	90 km/h	40 km	143 km/h

Ursula_Total_report_23-05-2018_13-13

Report Templates

A report can only be generated on the basis of a previously created template. A list of all available templates is located in the lower left part of the window under the *Report Templates* header. Here you can create, edit and delete templates for reports, as well as copy and move them from one account to another.



The template contains information about which tables and charts will be included in the report, what kind of content will be presented in the tables, the order of the columns in tables and sections in the report, which graphical elements will be rendered on the map, and many other parameters which define the look of the resulting report.

When you hover the cursor over the name of a template, the tooltip displays its name, the name of the resource to which it belongs (if you have access to more than one), the type of the report, the list of tables and charts that it contains. When you click on a template, it becomes selected in the *Template* field.

The templates in the list are arranged in alphabetical order. When searching for a template, it is convenient to use the dynamic filter. Enter the name of the report or its part into the search field. Additional search parameters are set in the drop-down list, where you can select a particular resource or leave *All*.

The following actions are available:

- or — edit or view a report template (depends on your access level);
- — create a new template using the selected one as the basis;
- — delete a template (if the button is dimmed, you do not have enough rights).

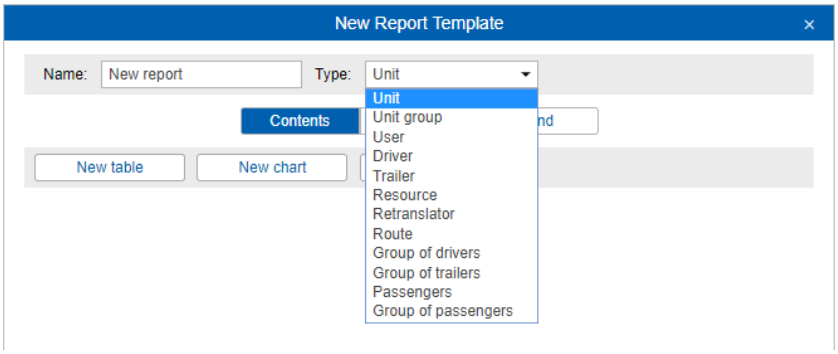
Note.
If a template belongs to the resource to which you do not have the *Create, edit, and delete report templates* access right, you will not be able to edit or delete this template.

Creating a report template

To manipulate the report templates, the user should have the Create, edit, and delete report templates access right to at least one resource.

To create a new report template, press the ***New*** button. If you have access to more than one resource, select the required one and click ***Next***.

At the top of the report template creation window, you must specify its **name** and select the **type**.



The following types are available:

- **Unit** — the template is used to analyze the data from any single unit.
- **Unit group** — the template is used to analyze the data from several units simultaneously.
- **User** — the template is used to analyze the activity of users.
- **Driver** — the template is used to analyze the work of drivers.
- **Trailer** — the template is used to analyze the use of trailers.
- **Resource** — the template is used to track the changes in the contents of the resource.
- **Retranslator** — the template is used to analyze the work of retranslators.
- **Route** — the template is used to analyze the passing of routes.
- **Group of drivers** — the template is used to analyze the work of several drivers at the same time.
- **Group of trailers** — the template is used to analyze the operation of several trailers simultaneously.
- **Passengers** — the template is used to analyze passenger traffic.
- **Group of passengers** — the template is used to analyze the traffic of the groups of passengers.

It is not recommended to change the report type later, because when you change the type, all the contents and settings of the template are lost.

Below are the *Contents*, *Settings* and *Bind* tabs, on each of which the properties of the future report template are configured.

A list of the content added to the report template is shown below. To rename a component, click on it with the left mouse button and make the necessary changes. The following buttons are available for working with the content list:

— drag the component up/down;

— edit the properties of the table/chart;

— copy the table/chart;

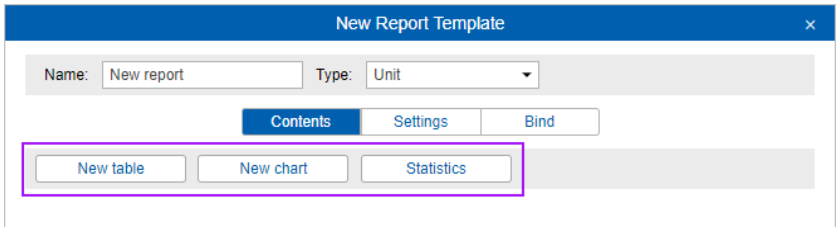
— delete the component.

Note. Regardless of where the chart is located in the report template, in the list of results of the executed report all the charts are located under all tables, and the statistics data occupy the top lines.

Contents

On the *Contents* tab, you can add tables, charts, or statistics to the report template.

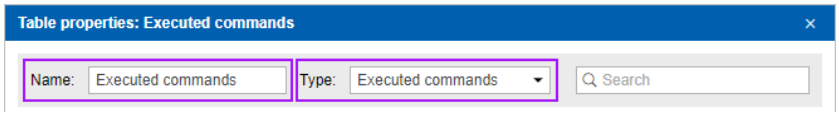
To add the required component, click on one of the three available buttons: *New table*, *New chart*, *Statistics*.



Tables

To add a table to the report template, click the *New Table* button on the *Contents* tab of its properties.

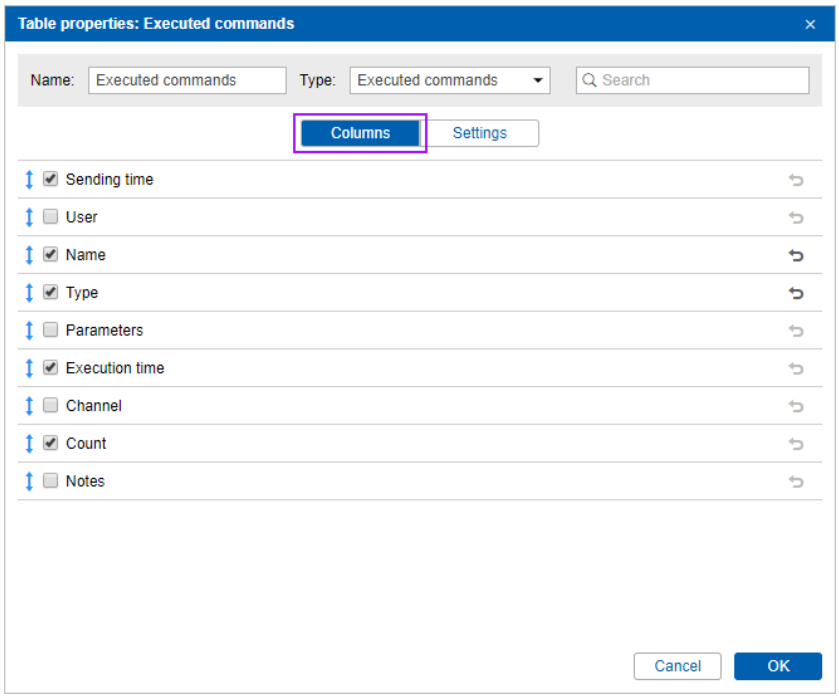
In the *New table* dialog, specify the name and type.



Columns Selection

The set of available table types differs depending on the selected type of the report template. The list of tables and their description are presented in the chapters below.

Each type of the table has its own set of columns which can be included in it. The list of available ones is shown on the *Columns* tab after selecting the type of table. To quickly find the required one, you can use dynamic filter. Select the ones you want to see in the report. To select all the columns, press the *Ctrl* button and click on any unselected column. Removing a selection from all the columns works in the same way. Identical principle is used in the settings of the reports, where geofences, events, etc. should be selected.



To change the name of the column, click on it with the left button and edit the text. To return the original name of the column, press the *Default* button ↩ (the button is inactive if the name has not been changed).

What is more, the order of the columns can be changed as well. To do this, drag the icon of the double arrow ↕, located to the left of the name of the desired column, up or down.

Some alternative types of reports are available as apps:

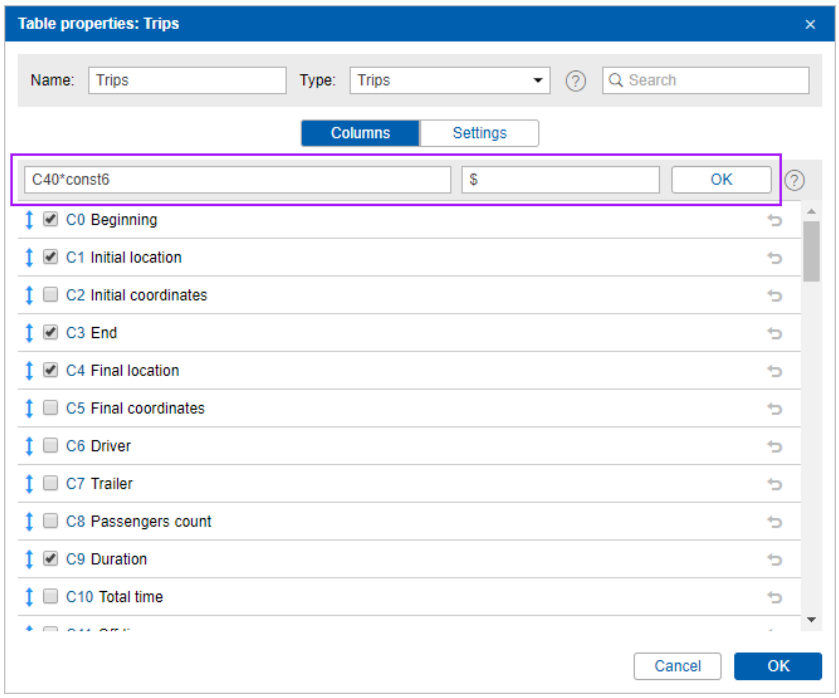
- iDriveSafe — evaluation of the quality of driving;
- Driving Logbook — a tax report that defines the actual use of the company car for personal or business

purposes (based on the trips report);
- Dashboard — presentation of key indicators of fleet efficiency in a graphical form.

Any number of tables can be added to the template, and the same table can be added to the report several times with different column configurations, data grouping settings, etc.

Calculator

The calculator is available in the *Trips*, *Engine Hours*, *Orders* and *Summary* tables. It allows to add custom columns to them. To the left of the column names, indices in the C0, C1, C2 … CN format are indicated. Indices **do not change** regardless of the position of the column in the list.



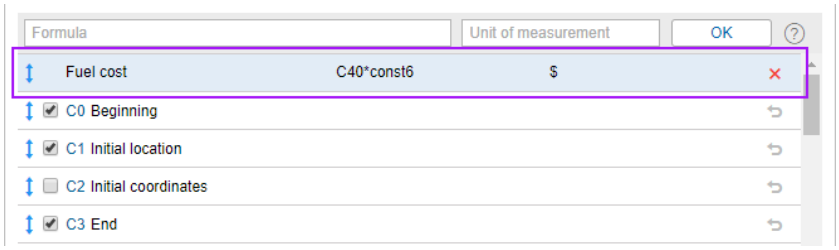
To add an arbitrary column to the table, enter the calculation formula in the *Formula* field. To do this, you can use:

- indeces of the columns of the table — you can enter them manually or click on the required ones in the list of available columns;
- parameters of the unit: *rcoef* — consumption by rates, *dehr* — standard hourly rate, *mcoef* - mileage coefficient;
- constants (for example, *const2/5*);
- mathematical operations +, -, *, / and () to indicate their priority.

Thus, the formula can, for example, be as follows *(C1 + C2 + C7)*const1.5/rcoef*.

Specify the unit of measurement in the next field (up to 10 characters) and click *OK*. The custom column automatically goes to the top of the list, however, if necessary, its position can be changed in the standard way. Such columns differ from the rest by the absence of an index and the background of a blue color.

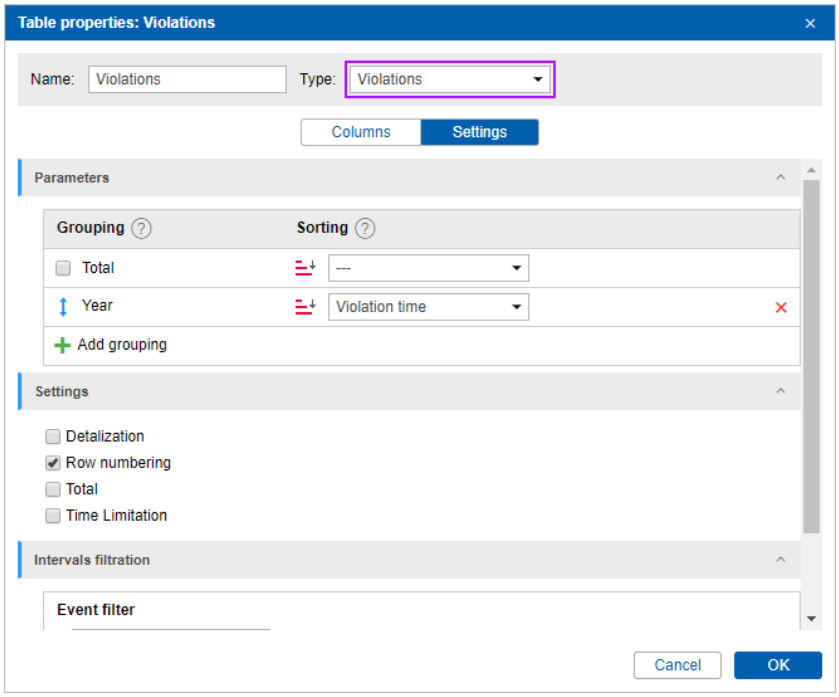
All time segments in the calculator use seconds as the unit of measurement.



To edit the name, formula, or units of measurement for the created column, click in the desired field with the left mouse button and make the required changes. Click anywhere in the dialog to confirm the changes.

Table Settings

For each table, in addition to selecting columns, there are additional settings, located in the same-name tab.



The tab is divided into three sections:

- Parameters;
- Settings;
- Intervals filtration.

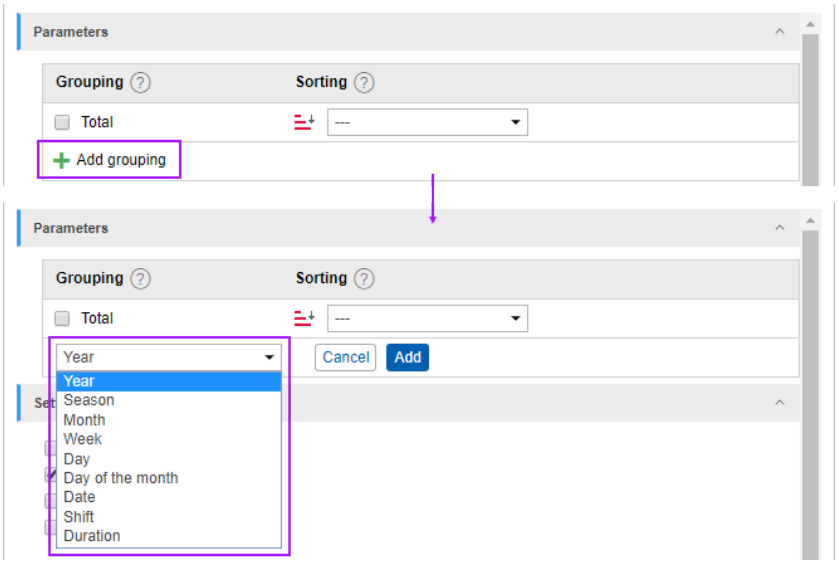
Parameters

In the *Parameters* section, you can configure the grouping and sorting of the report data.

Grouping

Grouping is the arrangement of information based on the indicated characteristics.

When adding a new grouping, click *Add grouping*, select a time interval in the appeared drop-down list and click *Add*.



From the available time intervals (year, season, month, week, day of the month, day, date, shift, duration), select those based on which you want to group the tabular data. Grouping can be either single- or multi-level. Multi-level grouping implies that there are several groupings for different time intervals. When using it, it is required to assign a hierarchy (specify nesting). For example, the grouping can be as follows: tabular data is grouped by year, within each year by months, and within months by days. Nesting is adjusted by dragging the intervals in the *Grouping* column up or down, with the element above in the list containing the ones that are located below.

If grouping by such intervals as season and duration is selected, at the bottom you can find a special block where it is necessary to set values for the intervals.

- **For seasons**
  Enter the name of the season, for example, summer, autumn, etc. Afterwards, use the drop-down lists to specify its duration. Note that the duration of the season is a period from the beginning of the first specified month to the end of the last. The minimum duration of the season is one month. Thus, if the *Wintry* season lasts during February, in both drop-down lists you must select *February*. To activate the season, click the *Add* button. The maximum number of seasons is 12.
- **For duration**
  For each interval of duration, you must enter a name (for example, interval 1), then specify the duration in seconds, minutes, hours or days (select from the drop-down list), and also activate it by clicking the *Add* button. The maximum number of duration intervals is 5. Using the *Trips* report as an example, let us look at how the use of duration intervals influences the presentation of the report data. The following periods are indicated: *Short trips* — up to 15 minutes, *Medium-term trips* — up to 1 hour, *Long trips* — up to 3 hours. Information in the report will be presented in the following way: short trips — from the minimum trip time

indicated in the trip detector up to 15 minutes, medium-term trips — from 15 minutes up to 1 hour, long trips — from 1 up to 3 hours.

Depending on the report type, besides standard groupings (by time intervals), additional groupings can be used as well (for example, by geofence, route, sensor, user, event, action type, violation type, trips, streets). In this case, the grouping works **by the name** of the element.

Sorting

Sorting is the distribution of information in a table in descending or ascending order based on the selected characteristics.

Sorting allows to distribute the grouped data by any selected column of the report table.

Next to each added grouping interval, in the *Sorting* column there is a drop-down list where you can specify the column included in the report so that the data will be sorted by the specified characteristic (column) within the grouping. The selected sorting criterion is applied to the subsequent (nested) grouping level. In addition, to the left of the drop-down list there is an icon with the help of which you can set the direction of sorting (from smaller to greater and vice versa).

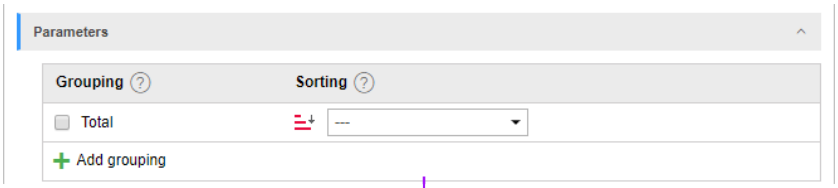
Tabular data can be sorted even if the grouping is absent. To do this, in the drop-down list in front of the *Total* interval select the sorting parameter and also set the direction of grouping.

Example

Let us consider the example of grouping and sorting use.

We create a report on trips. In this report we are interested in the maximum speed, duration, and mileage. Mark these columns. In addition, the information should be grouped by years, months and dates; the dates, in turn, should be sorted by the maximum speed (from high to low).

By default, there is no grouping, i.e. without adding grouping or sorting settings, we would get a detailed report where an individual line would correspond to each criterion. These lines would be arranged in chronological order or according to the sorting, indicated next to the *Total* grouping.



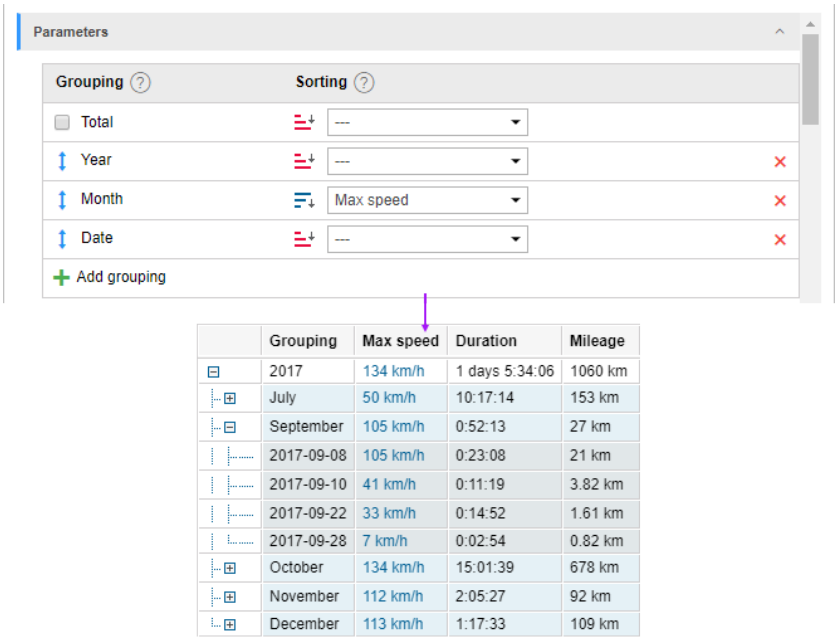
Max speed	Duration	Mileage
15 km/h	0:08:41	0.46 km
40 km/h	0:22:44	2.08 km
41 km/h	0:06:24	1.75 km
28 km/h	0:17:01	2.54 km
33 km/h	0:12:21	3.07 km
41 km/h	0:26:06	2.79 km
29 km/h	0:12:33	1.74 km
27 km/h	0:12:17	0.38 km
41 km/h	0:07:23	1.67 km
50 km/h	0:27:31	8.16 km
49 km/h	0:38:11	9.54 km
105 km/h	0:23:08	21 km

In order to get the result that corresponds to our task, we need to add the *Year*, *Month* and *Date* groupings. If necessary, we can move the grouping criteria to the desired position in the list (we need the Year –> Month –> Date sequence).

Next, we determine the sorting criteria and the direction. Since we want to set sorting for the level nested in months (for dates), we select the corresponding criterion from the drop-down list of months. Then click the icon of sorting direction to adjust it from a bigger to a smaller value.

By default, the data is sorted in chronological order.

The report looks as follows:



Compared to the table for which the grouping and sorting settings are not specified, this table has two additional columns. The first one is a column containing the '+' and '-' buttons, which help show/hide nesting levels. The second is the *Grouping* column, which shows the levels themselves. The information in the table is grouped by years, and by clicking on the *plus* the next levels of grouping (months, dates) are opened. The dates are sorted by the maximum speed (from high to low).

Time intervals and their use in reports

- **Total** — the highest level of grouping (cannot be moved). If it is checked, the report contains a grouping with the resulting data (the total duration of any state, the total number of registered events, etc.) in which all the subsequent groupings are nested (if there are any).
- **Year** — the grouping of the information in the table by years.
- **Month** — the grouping of the information in the table by months.
- **Week** — the grouping of the information in the table by weeks. The number of the week is displayed (e.g. week 26, etc.).
- **Day** — the grouping of the information in the table by days of the week (e.g. Monday, Tuesday, etc.).
- **Day of the month** — the grouping of the information in the table by days of the month (e.g. the 1st, 2nd, etc. day of the month).
- **Date** — the grouping of the information in the table by dates.
- **Shift** — the grouping of the information in the table by shifts.

When grouping data, the events that **began** in the interval are included in it. To determine the duration of an event, its entire duration is taken into account, even if it has already ended in another interval. That is why in the *Duration* column there may be values exceeding the size of the interval itself.

When grouping the table data, it makes sense to use the ***Total time*** column, which, unlike the *Duration* column, shows not the sum of the intervals (e.g. the total time of all trips), but the time from the beginning of the first interval to the end of the last one. This allows, for instance, to calculate the total time of the working day (convenient for travel sheets).

Retrieve intervals

This option applies only to the reports with the grouping by shifts. If it is not activated, the whole interval of the trip which intersected with the shift, gets in the report. If it is activated, then only the data from the messages received

within the specified interval is included in the report.

Settings

The following settings are available in this section:

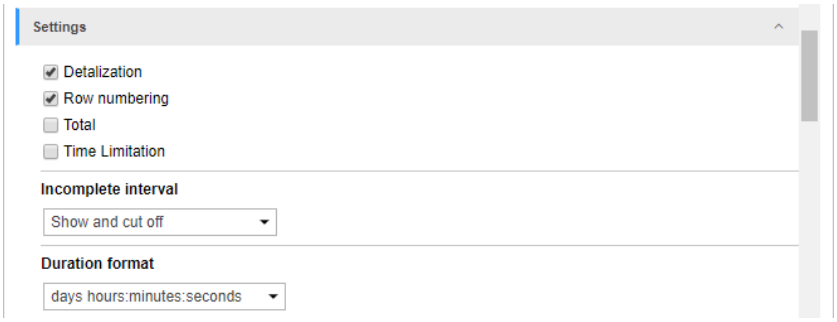
- detalization,
- row numbering,
- total,
- time limitation,

as well as

- incomplete interval,
- duration format.

These settings are universal for all the table types. However, individual parameters can be applied to some of them, which is described for each table separately.

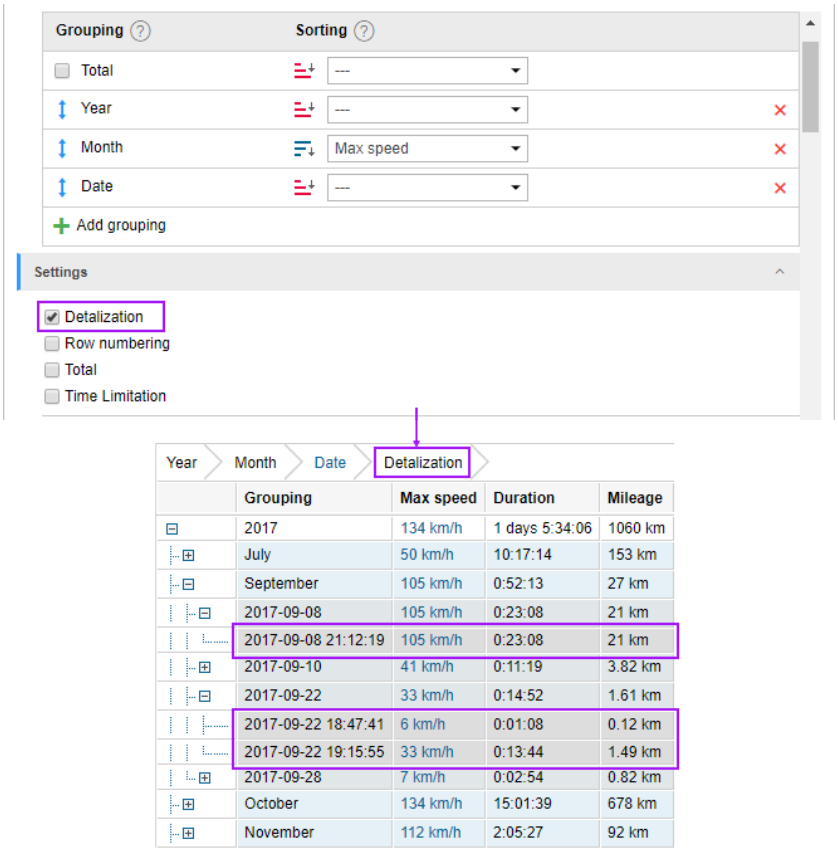
Some tables have fields obligatory for submission. For instance, events should be marked in the *Chronology* table. The *Settings* tab of such tables and the required fields or blocks in it are marked with a red *asterisk*.



Detalization

Reports with grouping can be extended using the detalization option. Detalization gives an opportunity to move to a final level of nesting (date and time). To view the final level of nesting, you can open ('+' at the beginning of the line) all the previous levels one-by-one, or click on the corresponding level of nesting.

We can add detalization in the report (check the corresponding box in the table parameters), suggested previously as an example of grouping and sorting use. Since in this example we already have grouping by years, months and dates, the detalization will allow us to expand the level of nesting right before the time of event (hours, minutes, seconds).



Grouping	Max speed	Duration	Mileage
2017	134 km/h	1 days 5:34:06	1060 km
July	50 km/h	10:17:14	153 km
September	105 km/h	0:52:13	27 km
2017-09-08	105 km/h	0:23:08	21 km
2017-09-08 21:12:19	105 km/h	0:23:08	21 km
2017-09-10	41 km/h	0:11:19	3.82 km
2017-09-22	33 km/h	0:14:52	1.61 km
2017-09-22 18:47:41	6 km/h	0:01:08	0.12 km
2017-09-22 19:15:55	33 km/h	0:13:44	1.49 km
2017-09-28	7 km/h	0:02:54	0.82 km
October	134 km/h	15:01:39	678 km
November	112 km/h	2:05:27	92 km

It should be noted that sorting is applied to the nested level. Since the detalization is the final level of nesting, you can also set the sorting for detalization in the list of groupings in a similar way.

The detalization function is applied only to the grouped tables, not the detailed ones. The exception is reports on groups of units, drivers, trailers and passengers, as the grouping by units is provided in them by default.

Row Numbering

Numbering is an additional (always the first) column and can be added to the table of any type.

№	Max speed	Duration	Mileage
1	15 km/h	0:01:34	0.14 km
2	40 km/h	0:08:36	0.54 km
3	41 km/h	0:08:41	0.46 km
4	28 km/h	0:22:44	2.08 km
5	33 km/h	0:06:24	1.75 km
6	41 km/h	0:04:27	0.27 km
7	29 km/h	0:31:30	1.65 km
8	27 km/h	0:08:18	0.84 km
9	41 km/h	0:17:01	2.54 km
10	50 km/h	0:12:21	3.07 km
11	49 km/h	0:04:50	0.49 km
12	105 km/h	0:34:51	1.52 km
13	41 km/h	0:26:06	2.79 km

If grouping is used in the table, numbering becomes multilevel. The main level is the numbering of the main lines with the help of integers. The nested level is the numbering of hidden lines according to the *number of the main line — point — number of the nested line* scheme.

Year > Month > Date

	№	Grouping	Max speed	Duration	Mileage
⊟	1	2017	134 km/h	1 days 5:34:06	1060 km
⊞	1.1	July	50 km/h	10:17:14	153 km
⊟	1.2	September	105 km/h	0:52:13	27 km
	1.2.1	2017-09-08	105 km/h	0:23:08	21 km
	1.2.2	2017-09-10	41 km/h	0:11:19	3.82 km
	1.2.3	2017-09-22	33 km/h	0:14:52	1.61 km
	1.2.4	2017-09-28	7 km/h	0:02:54	0.82 km
⊞	1.3	October	134 km/h	15:01:39	678 km
⊟	1.4	November	112 km/h	2:05:27	92 km
	1.4.1	2017-11-06	112 km/h	1:16:31	60 km
	1.4.2	2017-11-04	95 km/h	0:43:33	32 km
	1.4.3	2017-11-22	4 km/h	0:05:23	0.15 km
⊞	1.5	December	113 km/h	1:17:33	109 km

Total

This option adds the last line which contains the resulting data: the total duration of some state, the total number of registered events, etc.

Year > Month > Date

	№	Grouping	Beginning	End	Duration	Engine hours	Mileage	Trips count
⊟	1	2014	14.11.2014 09:27	31.12.2014 10:17	20:41:30	20:46:51	1132 km	56
⊟	1.1	November	14.11.2014 09:27	28.11.2014 10:35	6:33:38	6:34:56	334 km	20
	1.1.1	14.11.2014	14.11.2014 09:27	14.11.2014 09:50	0:23:02	0:23:02	27 km	1
	1.1.2	15.11.2014	15.11.2014 22:34	16.11.2014 00:08	0:41:12	0:41:12	47 km	2
	1.1.3	17.11.2014	17.11.2014 09:25	17.11.2014 14:12	0:35:55	0:35:55	30 km	3
	1.1.4	19.11.2014	19.11.2014 09:33	19.11.2014 20:02	0:51:19	0:51:19	54 km	2
	1.1.5	20.11.2014	20.11.2014 08:58	20.11.2014 09:06	0:08:48	0:08:48	4.65 km	5
	1.1.6	21.11.2014	21.11.2014 09:04	21.11.2014 19:42	1:23:06	1:24:24	30 km	5
	1.1.7	22.11.2014	22.11.2014 16:41	22.11.2014 17:34	0:39:11	0:39:11	32 km	2
⊞	1.2	December	01.12.2014 09:44	31.12.2014 10:17	14:07:52	14:11:55	798 km	36
	-----	**Total**	**14.11.2014 09:27**	**31.12.2014 10:17**	**20:41:30**	**20:46:51**	**1132 km**	**56**

In online reports, the final line is always at the bottom of the window, regardless of the number of pages in the table and the position of the scroll bar.

Total does not display the location information, as well as some other data that cannot be summarized.

For the *Duration* column of the *Eco driving* table, the duration of the **trips** at the specified time interval and not the duration of violations is indicated in the *Total* line.

Time Limitation

This function allows to indicate which time intervals, days of the week, days, months must be included in the report. For instance, if you check only working days of the week and working hours or only odd days of the month, etc., only they will be included in the report.

There are two time-limiting algorithms, which depend on the *Cut off intervals* options:

If the option is not activated, then the state (for example, the trip) that started within the specified interval, but ended beyond its limits, *does not terminate*.As a result, its duration is fully included in the report.

If the option is activated, then the state (for example, the trip) that started inside the interval, but ended beyond its limits, *terminates*. As a result, the report includes only its duration within the specified interval, and the rest is ‘cut off’.

Example

The interval from 9:00 to 18:00 is selected as the time limitation interval. Two trips were registered: the first - from 7:50 to 12:00, the second - from 13:00 to 18:20.

According to the first algorithm (the *Cut off intervals* option is not activated), only the trip that started within the time limitation interval will be included in the report as a whole. That is, in the report we get one trip lasting from 13:00 to 18:20.

- According to the second algorithm (the option the *Cut off intervals* option is activated), the report will include two trips that are on the specified interval - from 9:00 to 12:00 and from 13:00 to 18:00.

To apply a limitation equal to the whole day, you need to set the interval from 00:01 to 23:59.

Incomplete interval

The *Incomplete interval* option does not apply to all intervals of the table, but only the last (trips, sensor operation, etc.), since its ending does not always coincide with the end of the reporting period. To display this interval, the following options are provided:

- **Show and cut off**
  the interval is displayed in the report and in the ending column has the time of the last message for the reporting period;
- **Do not show in report**
  the incomplete interval is not displayed in the report;
- **Show and mark as incomplete**
  the interval is displayed in the report and has the label *Unknown* in the ending column.

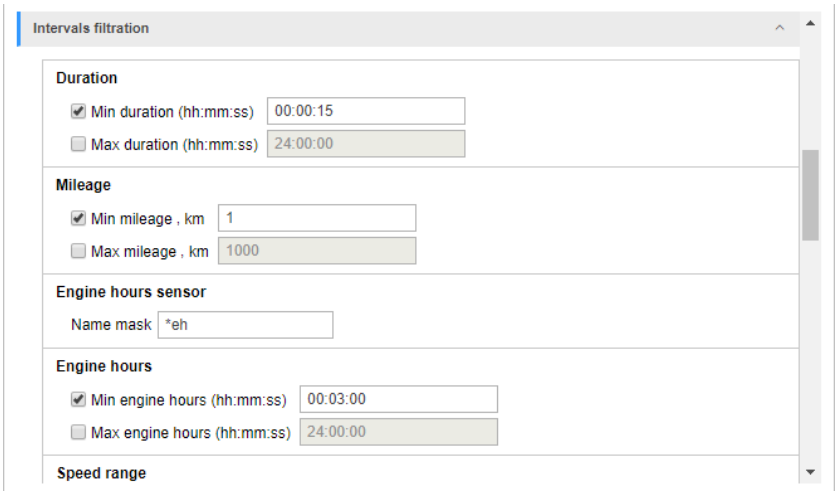
Duration Format

In tables where duration is encountered, you can select the format for displaying it. The following options are available:

- **days hours:minutes:seconds**
  when displayed in the report, it is displayed as follows: *5 days 12:34:56*.
- **hours:minutes:seconds**
  in the report, the duration is displayed as follows: *132:34:56*, that is, the hours are not combined in days (if there are more than 24). The option affects not only the cells, but also the *Total* row.
- **hours (with two decimal places)**
  the duration in the report is displayed as *3.45* instead of *3:27*.

Intervals Filtration

Most table reports in the Wialon Local system involve retrieving time intervals which meet certain criteria from the unit's history. These are reports on trips, parkings, stops, engine hours, rounds, geofences and visited streets, reports on the operation of sensors and speeding, and others. For such reports, additional filtering options are provided, which specify the conditions for displaying information in the table.



Available parameters of filtration vary depending on the type of report and allow you to limit the range of intervals that fall within it. For instance, the report does not include trips, stops or speeding intervals, if their duration is less than the minimum duration specified in the intervals filtration. It is also possible to display only visited geofences in which parking has been detected or during which the sensor was turned on. All possible filters are described below.

Filters can be used both separately and in combination with each other. Each filer is applied directly to the time interval under consideration, and the report displays the value that combines the results of all the filters used.

All filters except the mileage filter work only with integer values.

Additional parameters

The filter is available for the *Eco driving* table. When the *Show all trips* option is activated, all trips, not just trips with violations, are included in the report for units with customized eco-driving parameters.

Counter sensor value range

This filter can only be used for the *Counter Sensors* and *Fuel Traffic* tables. It allows to display in the report the intervals at which the messages with values that are within the specified limits are received.

Custom sensors masks

In the filter you can indicate the masks of custom sensors, which must be taken into account when generating a report on digital sensors.

Driver

The filter allows to display the intervals at which the unit did not have a driver or there was a certain driver or group of drivers. If you want the report to include only the intervals at which a particular driver controlled the unit, select the *With driver* option and specify the mask of the driver's name in the field below. In this case, all intervals with the driver are displayed, regardless of whether the driver was present at the beginning, end, middle or along the whole interval. If the

Driver group option is selected, only the intervals at which the vehicle was driven by any driver in the group (the mask of the name can also be specified) are analyzed when generating the report. In addition, you can activate the *Retrieve intervals* option to remove only the segments with the specified driver or group.

If the *Without driver* option is selected, the table displays only the intervals at which there are segments without drivers. These segments can also be retrieved.

Duration

In the filter, you can specify the minimum and/or maximum duration of the interval.

Engine hours

The minimum and/or maximum duration of engine hours. In addition, the engine hours sensor mask can be specified in the *Engine hours sensor* filter.

Engine hours sensor

In this filter, you can specify a mask for the name of the engine hours sensor. It affects the calculation of engine hours in the tables which have the corresponding columns, as well as the engine hours filter if it is turned on.

Event filter

This filter is only available for the *Events* table. If it contains an event mask, only the events that satisfy it are included in the report. When the option *Custom events only* is activated in the filter, only custom events fall into the report. If the option is not activated, in addition to custom events, the fields with online notifications are also displayed in the report.
Fuel fillings

The filter allows to display intervals *with* or *without fuel fillings* in the report. In the first case, you can additionally specify the minimum and maximum volume of fillings, and also activate the *Sum up fillings* option. Summing up assumes that only those intervals fall into the report, the amount of fillings on which falls within the specified limits.

Fuel thefts

The filter allows you to display in the report intervals with fuel thefts or without them. In the first case, you can additionally specify the minimum and maximum amount of theft, and also activate the *Sum up thefts* option. Summing up assumes that only those intervals where the amount of thefts falls within the specified limits get into the report.

Geofences/Units

This filter is divided into two parts. In the first one, you can specify the geofences by which the intervals should be filtered. In order to consider the position of the unit in any geofence or outside of it, set the radio button to the left of its name in the list from the *None* position to the 'Inside' or 'Outside', respectively. In addition to individual geofences, you can also specify their groups. It is the same as specifying each geofence which belongs to the group. The number of geofences in a group is dynamic, that is, it changes when you change the list of geofences which belong to it. These changes are taken into account when building the report.

In the second part of the filter, units are selected in the same way. Thus, it is possible to get the intervals of the unit's location inside or outside the zone of another unit. The size of the zone is defined by the *Radius* parameter. Only those units to which you have the *Query messages or reports* access right are displayed.

To quickly search for geofences and units in the list, the dynamic filter is available. To select all units in a column, hold the *Ctrl* key.

When determining the time of intersection of a unit with geofences or zones of other units, the *Maximum interval between messages* option is taken into account from the *Advanced* tab of the unit's properties.

The *Retrieve Intervals* option is available in the filter. It allows you to remove the segments inside/outside of the specified geofences or units from the intervals.

In the filters by geofences/units in the *Sensors* section for the *Fuel Traffic* table, the *Include only units with tank fuelling box* option is available. It allows you to display in the report results only those units that were near the unit on the specified interval and had registered fillings.

Merge intervals condition

In this filter, which is available for the *Counter Sensors* and *Fuel Traffic* tables, you must specify a timeout. If you generate a timeout between some intervals less than the indicated one, the intervals are merged. In this case, firstly the merger is carried out, and then the filtration on the basis of remaining parameters is executed.

Mileage

In the filter, you can specify the minimum and/or maximum mileage within the interval. It can use both integer and fractional values. Use a period as the separator for fractional values.

Parkings

The filter allows you to display only those intervals within which there were parkings, or only those within which there were none. Select the *With parkings* or *Without parkings* option from the drop-down list. In the filter, you can also specify the minimum length of parking. As a result of using this option, the report on geofences, for example, displays only such visited geofences in which a parking period of at least the specified duration was detected. The *Sum up intervals* option allows you to summarize the time of parking, that is, show in the report, for example, only those geofences, the **total** number of parkings in which was not less than the specified time.

Sensors

The filter allows to display intervals in the report table with the sensor turned on or off, and, additionally, specify the minimum and/or maximum duration of such intervals. In order for each interval to be shown in a separate row of the table, check the *Retrieve intervals* option. Intervals can also be summed if the maximum and/or minimum duration of the sensor on/off state is specified. To specify a certain sensor, whose turning on/off should be taken into account, specify its mask in the *Sensors mask* filter. If several masks are specified, only those intervals at which all these sensors were simultaneously turned on/off are selected. If the sensor masks are not specified, the report takes into account all the sensors of the unit.

Sensors masks

Here you can enter the sensor masks which will be considered when generating the report. Sensors masks affect the *Sensors* filter, *Counter* column, and information on fuel (if any of these options is selected in the report template). Note that the engine hours mask is indicated individually in the corresponding field.

Speed

In the filter, you can set the minimum and/or maximum speed within the interval. As a result, the report shows the intervals at which the speed that falls within the given limits is met at least once. If you want only those segments within which the speed does not leave the specified limits to get in the report, activate the *Retrieve intervals* option in the filter.

Stops

This filter allows you to display only those intervals at which there were stops, or only those at which there were no stops. To do this, select either the *With stops* or *Without stops* option from the drop-down list. If the filter is not used, the report displays all the intervals, regardless of whether there were any stops or not.

Trailer

Intervals filtration by the presence or absence of trailers assigned to the unit. Works similarly to the filtration by driver.

Trips

The filter allows you to display only those intervals that intersect with trips (it is not required for the entire trip to be a part of the interval) or only those that do not intersect with the trips. It is convenient to use the *Trips* filter, for example, in the report on geofences: in order to cut off excess visits to the same geofence during the unit's parking (when the coordinates are unsteady), select the *With trips* filter.

Violation

The filter is available in the *Eco driving* table and allows to enter the name masks of the violations that are to be taken into account while generating a report.

Charts

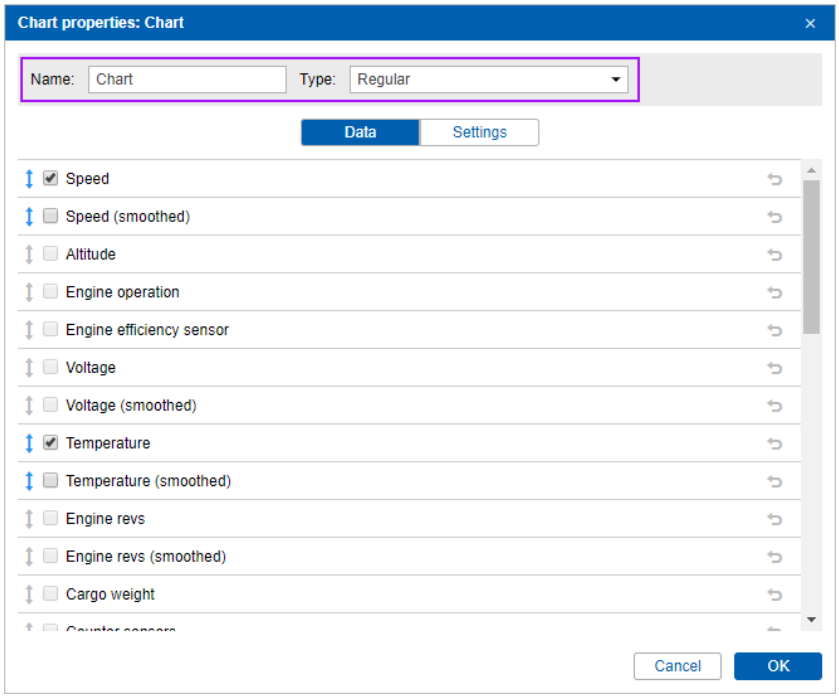
In addition to the tabular form, some information in the report can be presented in the form of a chart. For example, a chart may reflect a change in fuel level or speed at a given time interval, the parameters of sensors, etc.

To create a chart, the corresponding equipment must be installed and configured on the unit (this does not concern charts for speed and altitude). To create and configure sensors, see the *Units –> Sensors* section.

To add a chart to the report template, click on the *New Chart* button on the *Contents* tab of its properties.

Charts can only be added to reports of the *Unit* and *User* type.

In the dialog for creating a new chart, specify its name and select the type.



Below are the *Data* and *Settings* tabs where you can specify the paramateres of the chart.

Types of Charts

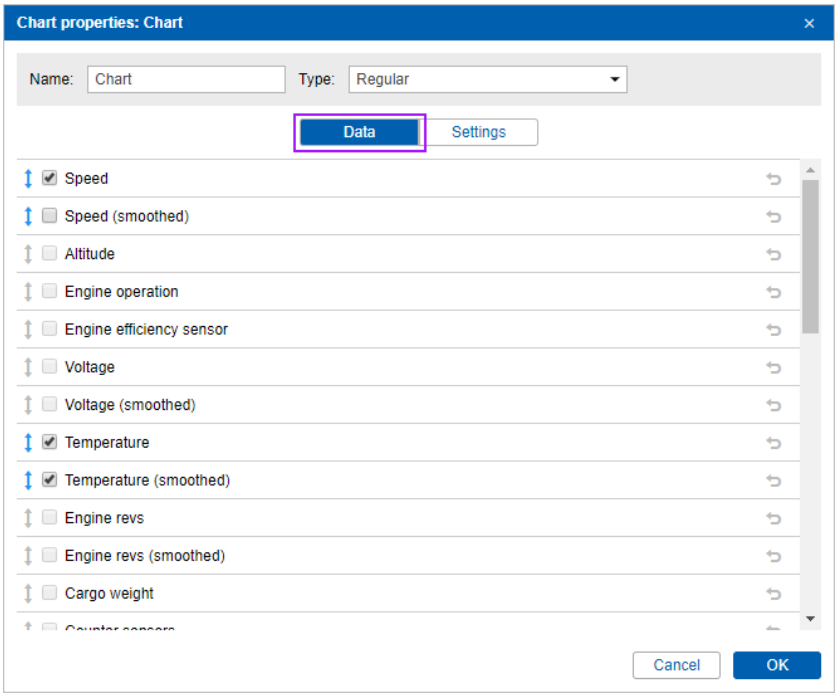
As with the tables, there are several **types** of charts:

- Regular;
- Processed fuel level;
- Speed/Fuel consumption.

Regular Charts

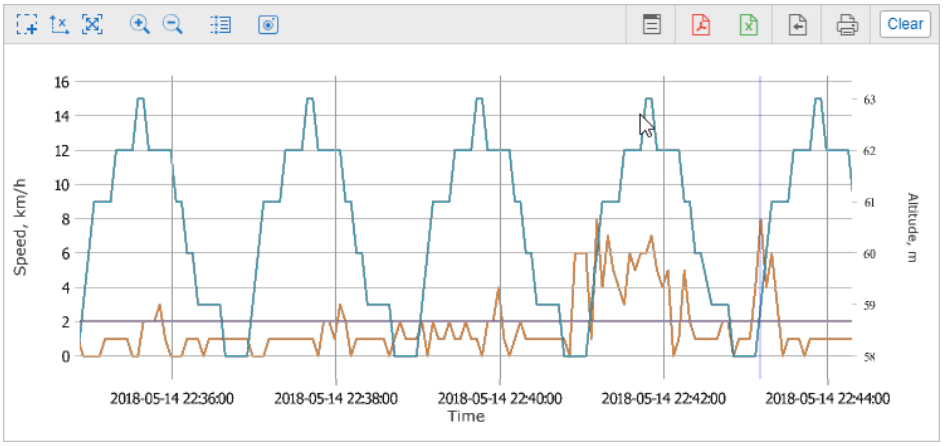
The charts of this type differ in that the X axis always lays time, and the data for the Y axis is selected on the *Data* tab from the list:

- Speed (km/h or mph);
- Altitude (meters or feet);
- Engine operation (on/off);
- Engine efficiency sensor;
- Voltage (volts);
- Temperature (degrees Celsius);
- Engine revs (rpm);
- Cargo weight;
- Counter sensor;
- Custom sensors;
- Custom digital sensors (on/off);
- Absolute mileage;
- Mileage in trips;
- Instant mileage;
- Fuel level (liters or gallons);
- Processed fuel level (liters or gallons);
- Fuel consumption by ImpFCS;
- Fuel consumption by AbsFCS;
- Fuel consumption by InsFCS;
- Fuel consumption by FLS;
- Fuel consumption by math;
- Fuel consumption by rates.



You can simultaneously select two points. In this case the chart will contain two curves, for example, speed and engine revs. You can select even more points but note that only two variables can exist in one chart in addition to time. It means if Y axis represents speed scale on the left and temperature scale on the right, nothing can be added to this graph. But if Y axis represents speed scale on the left and consumption by ImpFCS on the right, it is still possible to add consumption by AbsFLS and other methods, since they are all measured in the same metrics.

The picture below shows the speed chart combined with the fuel level chart. To receive such a chart, it is required to set the chart type as *Regular* and select the *Speed* and *Fuel level* data.



Each curve on a chart is assigned its own color. On the left, in the *Report Result* block, you can specify which color corresponds which curve. Their names are taken from the report template. In addition to the name for the curves, the units of measurement are also indicated.

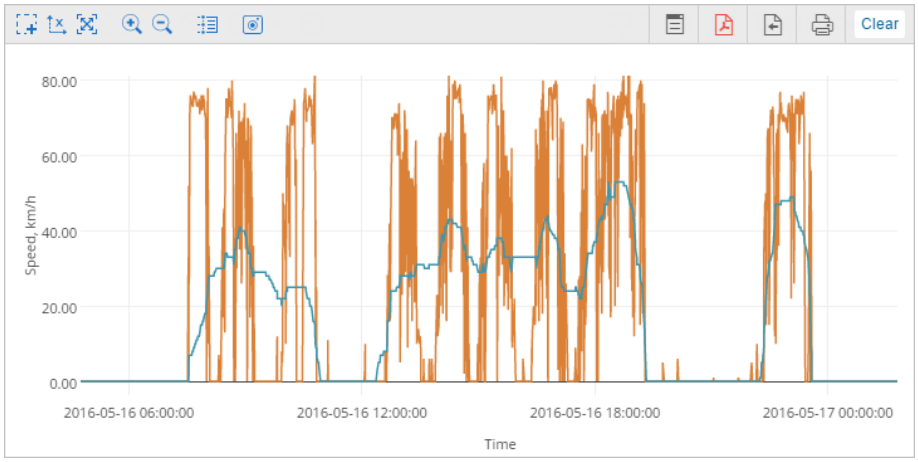
The names of the lines of the chart can be changed in its properties in the report template. However, if the curve is built based on some sensor, then it is given the name of the sensor.

Click on the curve name in the *Report Result* section to enable/disable its display on the chart.

Smoothing

Almost all charts of the *Regular* type are provided in two forms: raw and smoothed (***smoothed*** is indicated in parentheses after the name). Smoothing affects the style of the chart display. The chart without smoothing is built straight from a message to message, and, as a result, has an angular outline. If you choose smoothing, the chart has a smoother outline. The level and algorithm of smoothing for all charts is the same.

Below is an example of a chart in which a raw speed chart is displayed with an orange line, and a blue one shows a smoothed chart.

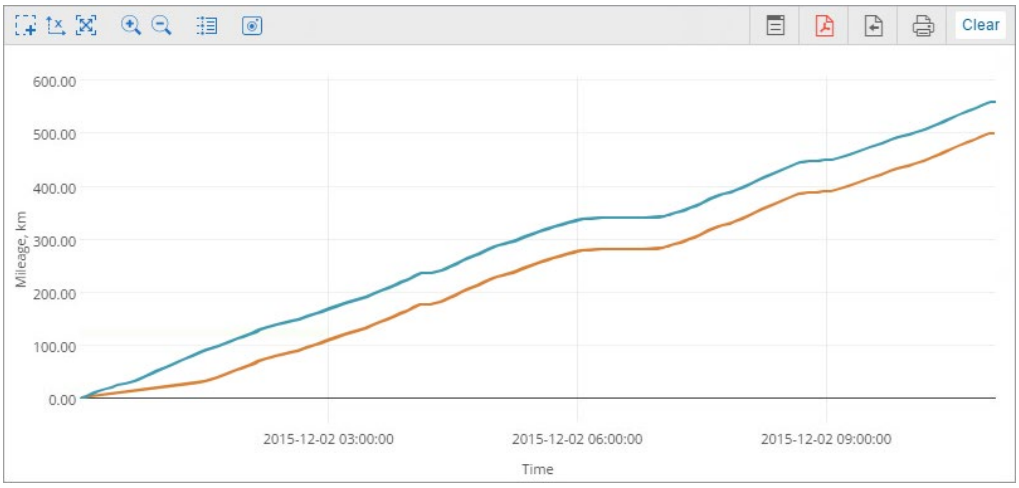


Fuel Level Charts

Fuel level chart represents 'raw' data, whilst in the *Processed fuel level* chart the filtration is applied.

Mileage Charts

Four kinds of mileage charts can be created: absolute mileage, mileage in trips, instant mileage, and instant mileage smoothed. The first two show how mileage changed (increased) over time. Absolute mileage chart is built on the basis of all messages, which means that any inaccuracy and outlying data affect the resulting chart. Mileage in trips chart displays the data taking trip detector settings into account. Below you see the chart with curves for absolute mileage (blue) and mileage in trips (orange).

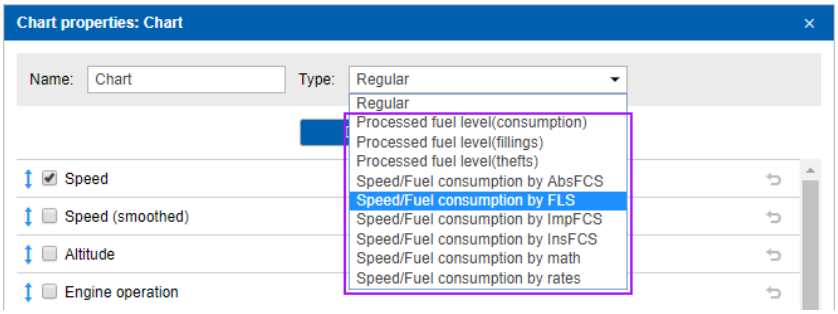


The *Instant mileage* chart represents the data in the *mileage from the previous message to the current one* form, that is the difference in the distance between two adjacent messages. This kind of chart can be useful to detect excessive mileage during connection loss, or to detect made-up additions to the mileage in cases where it is determined by special sensors (see the settings of the mileage counter in the unit properties. Instant mileage can be smoothed.

Special Charts

Along with the regular charts, the following charts are available:

- Processed fuel level
- Speed/Fuel Consumption by…



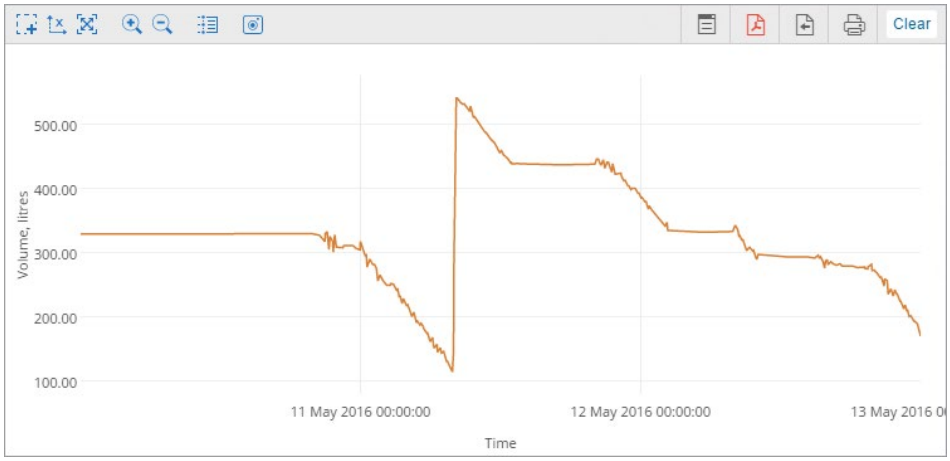
Settings for these charts are fixed and cannot be changed. Editing is available only for the name of the chart. Also, it is possible to select the required sensors (indicate the mask of the sensor) or split sensors.

Processed Fuel Level

The *Processed fuel level* chart shows the values which are used while calculating fuel level, fillings and thefts in tables.

The chart shows the dependence of fuel level on mileage (mileage/liters). It can also show the dependence of the fuel level on time (time/liters) if the *Time-based fuel level sensors consumption* option is turned on in the unit settings.
In both cases the chart is processed taking the filtration into account, which is set on the *Fuel Consumption* tab (the *Filter fuel level sensors values* option) or in the sensor properties.

Below are two fuel level charts: the first one is processed (time-based FLS and filtration are on, filtration level is 25), and the second one is not processed.



A special *Processed fuel level* chart should be distinguished from two similar regular charts:

1. Regular *Fuel level* chart represents the *raw* data (no filtration is applied). The *Time-based fuel level sensors consumption* checkbox does not affect the chart.
2. Regular *Processed fuel level* chart represents dependence of filtered and smoothed on the basis of

mileage data from time.

These regular charts can represent data only in the *Time/Fuel level* form. At the same time, it is possible to overlay other charts, such as, for instance, voltage chart.

Speed/Fuel Consumption Chart

This chart shows the dependence of average fuel consumption on speed. The data for it is taken from fuel consumption sensors of different types (such as impulse, absolute, instant) or fuel level sensor, or predefined consumption by math or rates. The corresponding calculation methods must be specified in the properties of the unit in the *Fuel Consumption* tab.

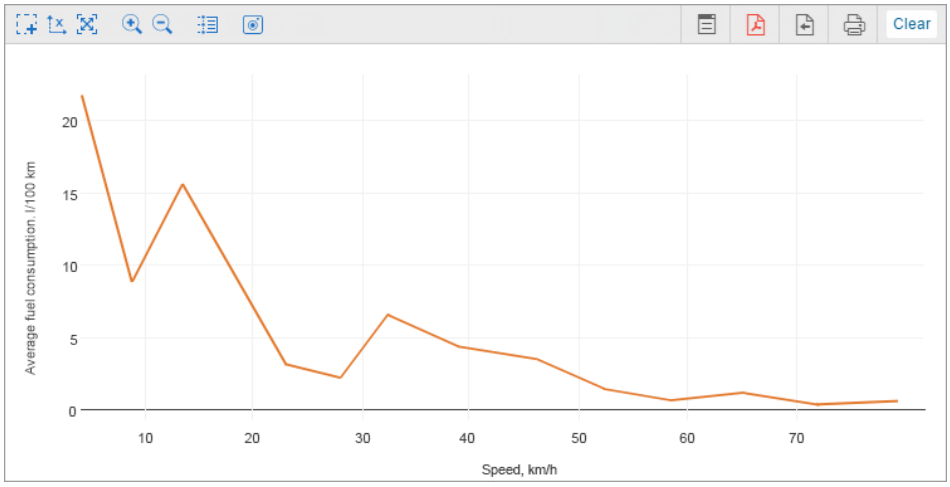
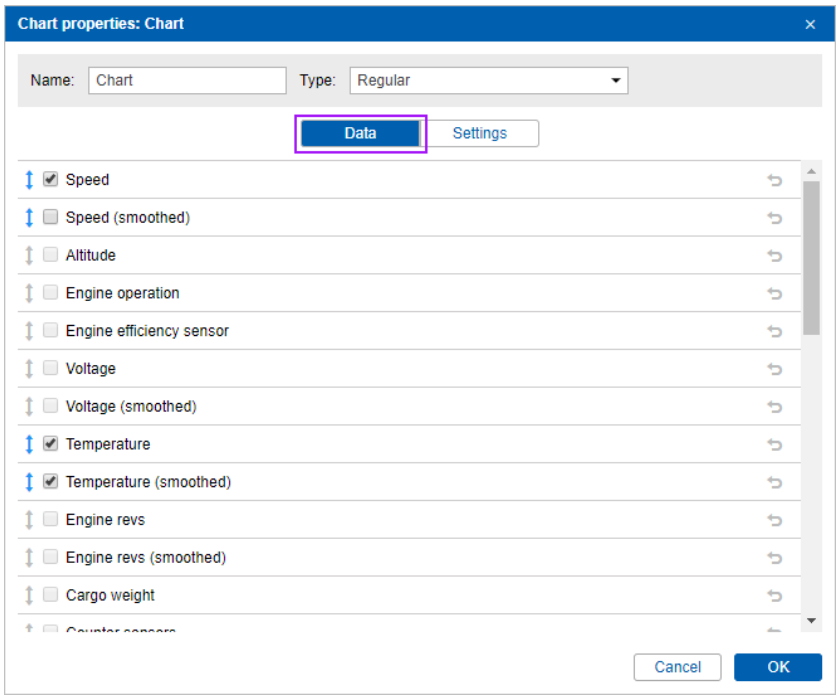


Chart Properties

There are two tabs in the chart properties: *Data* и *Settings*.

Data Selection

On the *Data* tab, you can select the curves that should be displayed in the chart. The selection is only available for charts of the *Regular* type.



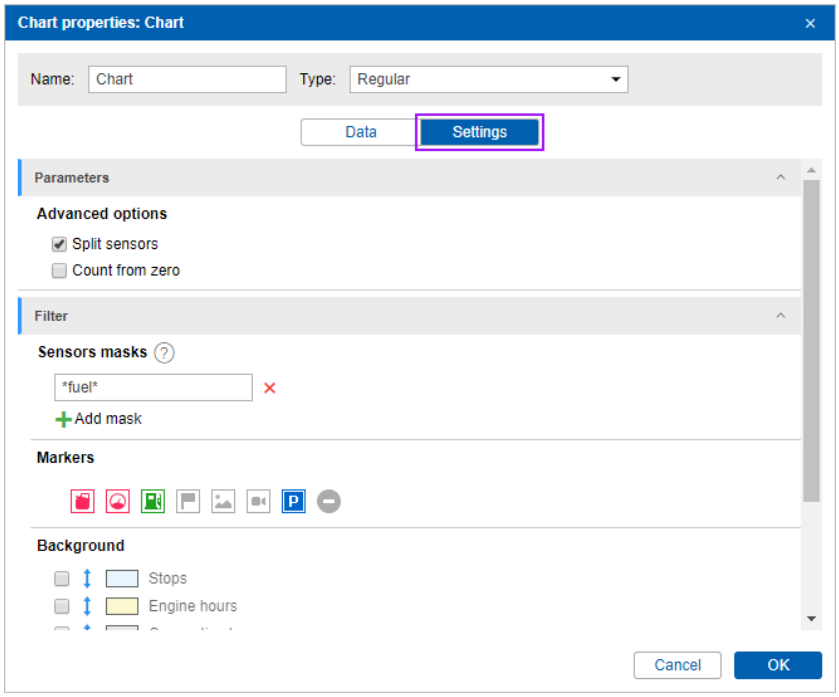
Mark the curves you want to see in the report. Two points can be checked simultaneously. In this case, two curves are displayed, for instance, speed and engine revs. There can be more curves, but only if there are no more than two variables in the chart, besides time.

To change the name of the point, click on it with the left mouse button and edit the text. To return the original name, click the *Default* button (the button is inactive if the name has not been changed).

In addition, it is possible to change the order of the items. To do this, drag the double arrow icon , located to the left of the required curve, up or down.

Chart Settings

In addition to selecting columns, the settings are available on the same-name tab.



The tab is divided into two sections:

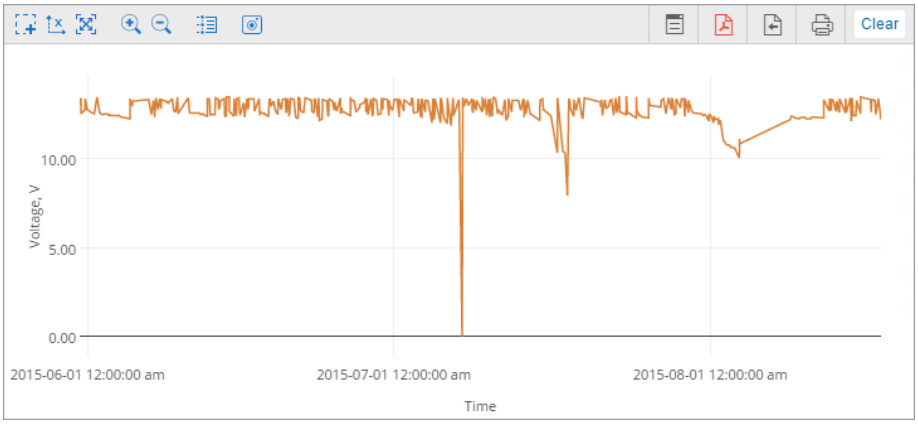
- Parameters;
- Filter.

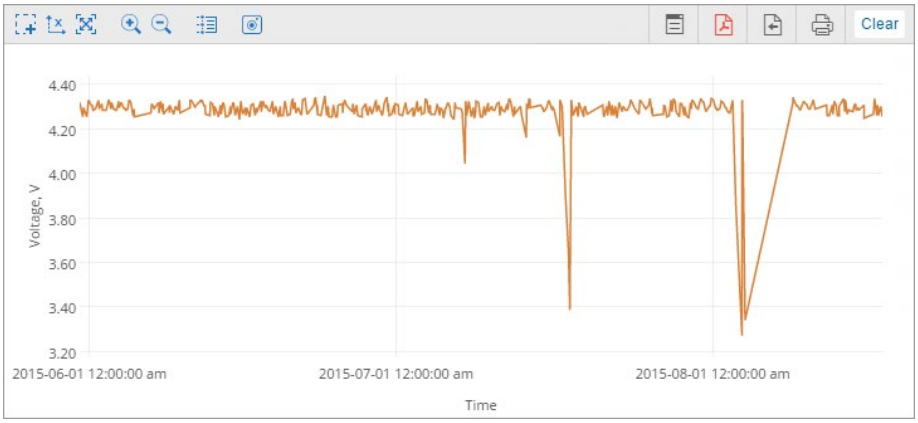
Parameters

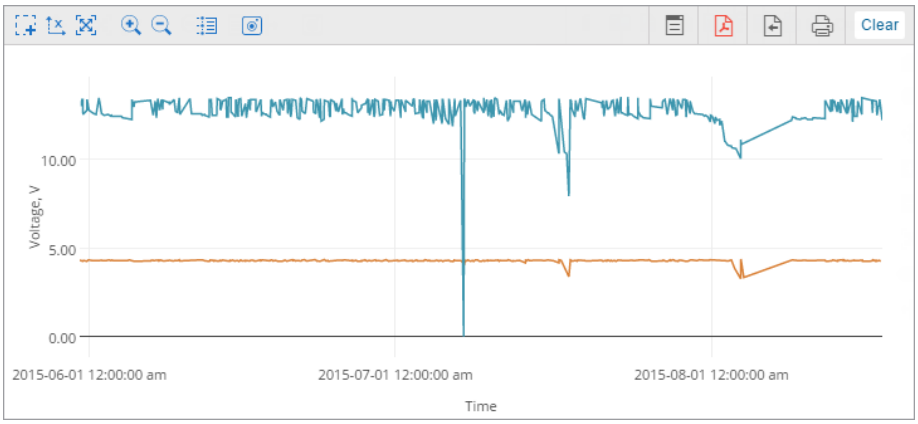
In the *Parameters* section it is possible to activate the *Split sensors* and *Count from zero*.

Split sensors

If a unit has several sensors of the same type and you need to create a chart by this type, then by default the curves of such sensors are displayed in the same chart. Check the *Split sensors* option to create an individual chart for each sensor. For example, for a unit with two voltage sensors, external and internal, a chart with two curves (the option is not checked) can be built, as well as two charts with one curve (if the option is checked).





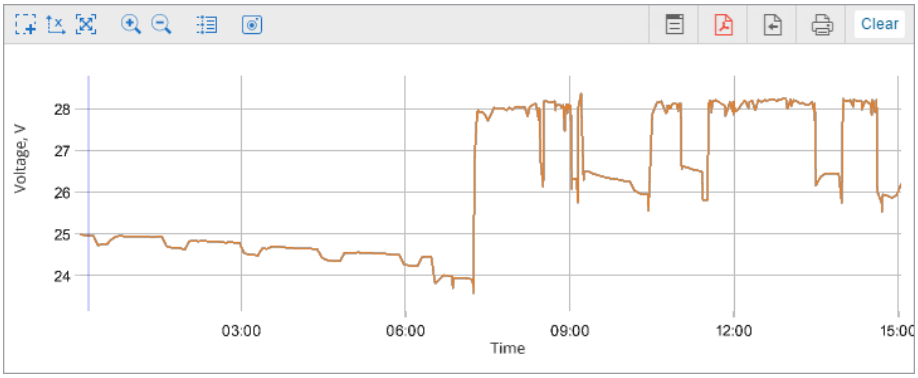


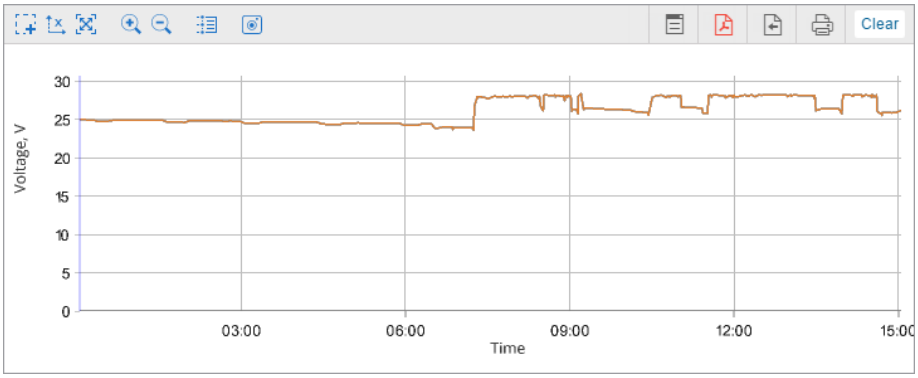
If for the data points selected for a chart there are several sensors, the upper one is split. Let us assume that a unit has two voltage sensors and two temperature sensors, and you are building a voltage/temperature chart for it. If the *Split sensors* option is off, you will get one chart with four curves in it. If the *Split sensors* option is on, you will get two charts with three curves on each: one chart will contain the first voltage sensor and both temperature sensors, and another one will contain the second voltage sensor and both temperature sensors.

Count from Zero

The *Count from Zero* option is responsible for scaling the chart. By default, the range of the Y scale depends on the range of values falling within the specified interval. That is, if, for example, the temperature fluctuates from 3 to 5 degrees, then the reading on the Y scale starts at 3, and the curve in this case occupies the maximum space on the chart. If the *Count from zero* option is activated, the Y axis on the graph is always built from zero to the largest value (if the values are negative, then from the lowest value to zero).

The image below shows an example of two voltage charts for the same unit within the same time interval. The first chart is regular, the second — with the *Count from Zero* option turned on.





Filter

The following settings are available in the *Filter* section:

- Sensor masks;
- Markers;
- Background;
- Line color.

Sensor masks

This option allows you to specify the sensors on the basis of which the chart should be built. The option does not influence the *Speed*, *Altitude*, *Fuel consumption by math* charts, as they can be built regardless of whether a unit has sensors or not.

Specify the mask of the required sensor. To do it, enter its full name or part of the name. You can use special characters: '*' (replaces any number of characters) or '?' (replaces one character). The name of the sensor cannot contain commas.

If the masks are not specified, the sensors of the required for building the chart type are determined automatically.

Markers

This option allows to specify the event markers, which should be displayed in the chart. Here, the same markers are used as for the events on the map.

The setting of graphical elements filtration influence the display of markers and backgrounds.

Background The intervals of such events as stops, parkings, trips, connection losses, and work of engine hours can be used as a chart background. Using these backgrounds you can correlate a chart value and an interval to which it corresponds. Different colors can be assigned for the event intervals. To select a color, click on the color box, choose the color from the palette and click *OK*.

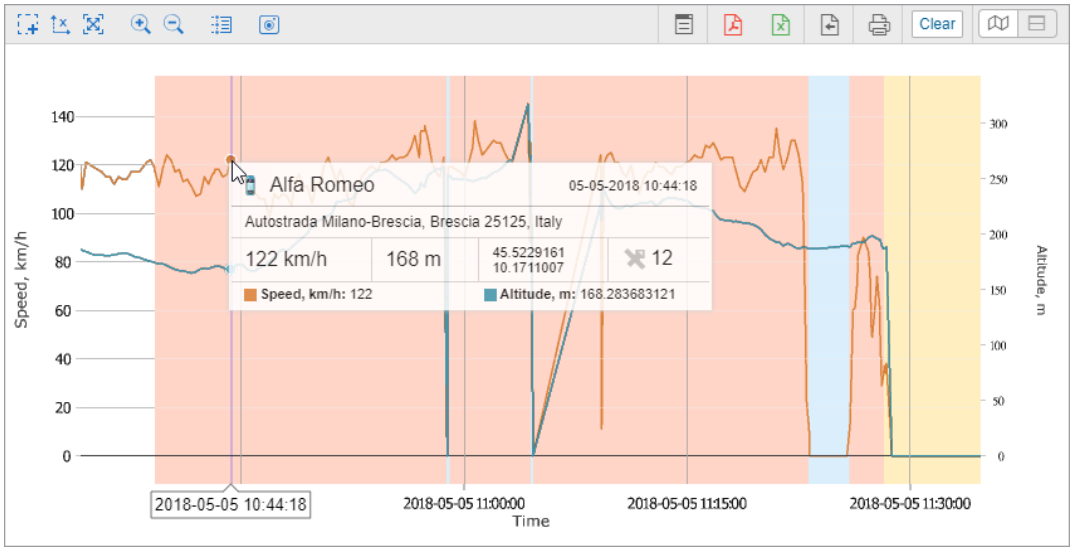
The background of the event intervals is opaque and has a display priority, that is, the interval above is overlapped by the lower ones. To change the priority, drag the desired interval of events up or down using the double arrow icon to the left of the name of the desired interval.

Line color

This section allows to use the sensor's color scheme to display the line of a corresponding chart. To apply the sensor's color scheme, indicate its mask in the field opposite the curve name (the fields correspond to the items selected in the *Data* tab). If no mask is indicated, the default colors are used.

Chart Management

It is possible to scale, move the charts and view the information about individual points.



Above the chart, there is a toolkit with useful buttons:

Area selection	Click this button to scale (zoom in) any selected area. Hold left mouse button and select required area. This operation can be repeated multiple times.
Lock/unlock Y axis	Switching from work with a single axis (X) to multiple axes (XY).
Autoscaling	Return to the original scale of the chart.
Zoom in/zoom out	The buttons change the scale of the chart by fifty percent with respect to the visible zone. The center of the chart remains fixed.
Messages/point tracing	Switching between these modes makes it possible to look through the information on one chart or on all available ones by hovering the cursor.
Save as PNG	The button allows you to save the visible area of the chart along with the coordinate axes in PNG format.
Lock charts	This button appears in the *Dual report view* mode. Activating this button allows to apply the same actions to the charts simultaneously.

If the X axis shows time, you can click any place of the chart to move to the corresponding location on the map.

Transfer from chart to messages

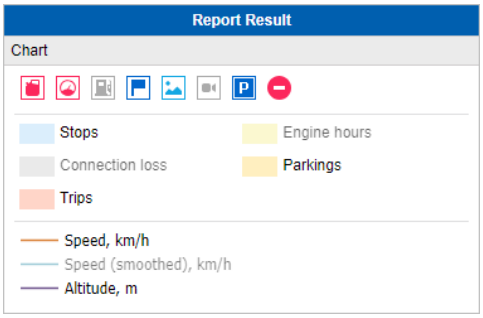
This function is useful for analyzing the source data from the unit. In order to request messages from the unit from the chart, click the *Transfer to messages* button located on the right side of the toolbar. Click the left mouse button anywhere in the chart. As a result, you will go to the message panel with open data for the period specified in the report. Other functionality works in the same way as transfer from tabular report to messages.

When switching between charts, the state of the button automatically changes to the original one.

The rest of the buttons work the same as in the table reports.

Chart Legend

A chart legend can be found in the work area. The legend is divided into sections and contains information about the selected charts and their properties. Click on the name of the element in the legend to enable or disable its display in the chart (by default, all are displayed).



Statistics

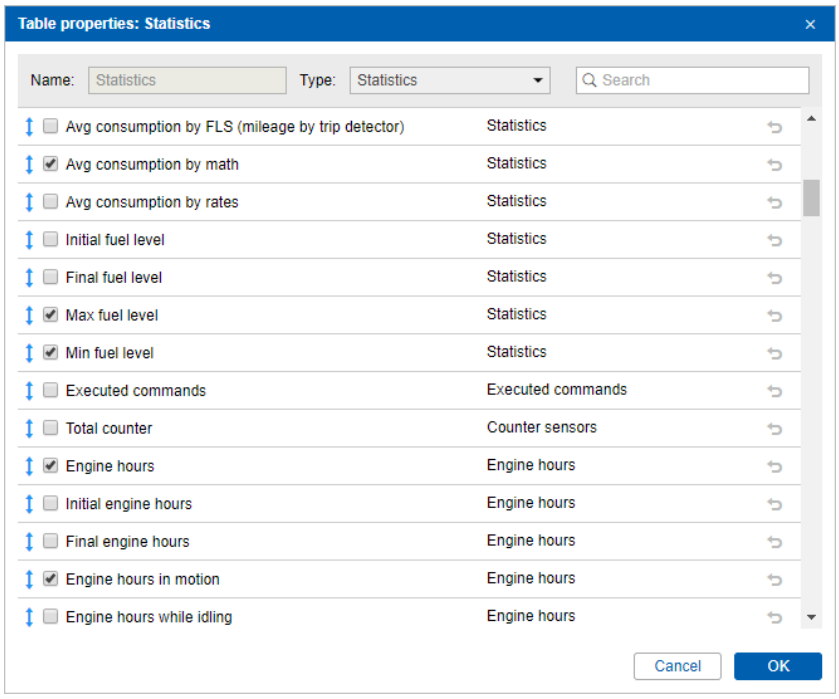
Statistics is a table consisting of two columns where the first one contains the parameters you have chosen, and the second one shows their values.

Events count	43
Executed commands	7
Parking time	386 days 3:28:31
Parkings count	139
Stops count	303
Move time	5 days 12:04:27
Mileage in trips	9093 km
Mileage (adjusted)	9093 km
Urban mileage in trips	1202 km
Suburban mileage in trips	7891 km
Initial mileage	0.00 km
Final mileage	9229 km
Average speed in trips	69 km/h
Max speed in trips	125 km/h
Trips count	139

The statistics table gives information on the report as a whole, for example, on the beginning and end of the report interval, the number of messages, the name of the unit, the time zone, the time of report execution, and other statistics, depending on the selected type of template.

To add a statistics table to a report template, click the *Statistics* button on the Contents tab of its properties.

In the dialog window of the *Statistics* table properties, mark the points you want to include in the table. To find the required ones, use the dynamic search, located in the upper right corner. Search is carried out both by the name of the line (the left column) and by the subgroup to which it belongs to (right).



To change the name of a table item, click on it with the left mouse button and make the changes. To cancel changes, click on the *Default* button (the button is inactive if the name has not been changed).

You can also change the order of the rows. To do this, drag up or down the *double arrow* button to the left of the name of the desired line.

The statistics table is added to the list of contents of the report template. It always goes first and cannot be moved.

The following items are available for display in the statistics table for the reports of the *Units* type.

Statistics

- **Report** — the name of the report template.
- **Unit** — the name of the unit.
- **Report execution time** — the time of report generation when a user executed the report online or it was generated automatically as a job or notification.
- **Interval beginning** — the beginning of the reporting interval.
- **Interval end** — the end of the reporting interval.
- **Time zone** — the time zone as it is set in user settings.
- **Messages** — the messages analyzed within the reporting period.
- **Mileage in all messages** — the mileage in all messages according to the selected mileage counter (without filtration by trip detector).
- **Consumed** — the volume of consumed fuel detected by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the volume of consumed fuel detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates.
- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the average fuel consumption in trips detected by one of the methods mentioned above. It can be presented either as liters per 100 kilometers or miles per one gallon. The whole mileage of the reported interval is normally taken for these calculations. However, average consumption by FLS can take either all mileage or mileage by trip detector.
- **Initial fuel level** — the fuel level at the beginning of the interval.
- **Final fuel level** — thefuel level at the end of the interval.
- **Max fuel level** — the maximum fuel level.
- **Min fuel level** — the minimum fuel level. More information about the fuel in reports can be found here.

Engine hours

- **Engine hours** — the duration of the engine hours. It can be calculated by the engine hours sensor or by the ignition sensor depending on the unit properties.
- **Initial engine hours** — the value of the engine hours at the beginning of the interval.
- **Final engine hours** — the value of engine hours at the end of the interval.
- **In movement** — the time interval during which the unit was in motion.
- **Idling** — a total time interval during which the unit did not move with the engine running (idling).
- **Mileage in engine hours** — the distance traveled during the engine hours operation.
- **Initial mileage in engine hours** — the value of the mileage sensor at the moment of the beginning of the reporting period.
- **Final mileage in engine hours** — the value of the mileage sensor at the end of the reporting period.
- **Avg engine revs** — the average rate of engine revolutions.
- **Max engine revs** — the maximum rate of engine revolutions.
- **Avg temperature in e/h** — the average temperature during the engine hours.
- **Engine efficiency duration** — the duration of the attached implements operation (if there is an engine efficiency sensor).
- **Engine efficiency idling** — the engine hours minus the engine efficiency time.

Utilization — the duration of the engine hours work divided by the engine hours rate, indicated on the *Advanced* tab of the device properties.

- **Useful utilization** — the duration of the engine efficiency divided by the engine hours rate.
- **Productivity** — the duration of the engine efficiency divided by the engine hours duration.
- **Consumed in e/h** — the volume of the consumed fuel detected by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in e/h** — the fuel volume used in engine hours. It can be detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. More information about the fuel in reports can be found here.
- **Avg consumption in e/h** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in e/h** — the average fuel consumption in the engine hours determined in accordance with a fuel sensor readings or calculated by math or rates.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in motion** — the average fuel consumption in motion.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in motion** — the amount of fuel consumed at idle determined in accordance with a fuel sensor readings or calculated by math or rates.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in idle run** — the fuel volume used in the engine hours during idle running determined in accordance with a fuel sensor readings or calculated by math or rates.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in e/h in trips** — the average fuel consumption during the work of engine hours in trips determined in accordance with a fuel sensor readings or calculated by math or rates.

Events

- **Events count** — the number of the registered events.

Fuel fillings

- **Total filled** — the volume of fuel filled during the reporting interval.
- **Total registered** — the registered fuel volume regardless of binding to sensors and calculation methods.
- **Difference** — the difference between the registered and detected fillings.
- **Total fillings** — the number of fuel fillings detected within the reporting period.

Fuel thefts

- **Total fuel stolen** — the total volume of stolen fuel.
- **Total thefts** — the number of thefts detected within the reporting period.

SMS messages

- **SMS messages** — the number of SMS messages received from a unit.

Speedings

- **Initial mileage** — the mileage sensor reading at the time of the start of the first speeding at the reporting interval. If there is no mileage sensor, the mileage is counted from 0.
- **Final mileage** — the mileage sensor reading at the end of the speeding interval.

Parkings

- **Parking time** — the total duration of parkings for the reporting period. Parking is determined by the trip detector. If it is disabled, the number of parkings is counted as zero.
- **Parkings count** — the number of parkings for the reporting period.

Trips

- **Move time** — the total duration of all trips.
- **Engine hours** — the engine hours of attachable equipment.
- **Mileage in trips** — the total distance traveled in all trips.
- **Mileage (adjusted)** — the total mileage of the movement intervals determined by the trip detector, multiplied by mileage coefficient (the setting in the additional properties of the unit).
- **Urban mileage in trips** — the distance traveled at a speed that is defined as the speed in the city.
- **Suburban mileage in trips** — the distance traveled at a speed that is defined as the speed outside the city. Urban speed limit is configured in the additional settings of the unit.
- **Initial mileage** — the mileage sensor value at the beginning of the reporting interval (it makes sense if there is an absolute odometer).
- **Final mileage** — the mileage sensor value at the end of the reporting interval.
- **Toll roads mileage** — the distance that a unit travelled during the trip on the roads on which the *Platon* system is used.
- **Toll roads cost** — a sum of money (in RUB) for the toll roads mileage calculated on the basis of the covered distance and the *Platon* tariff.
- **Average speed in trips** — the average speed in trips (total mileage divided by the time of travel).
- **Maximum speed in trips** — the maximum speed registered during the trips.
- **Trips count** — the number of trips.
- **Consumed in trips** — the volume of consumed fuel detected by any sort of fuel sensor. If several sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in trips** — the fuel consumed in trips. It can be detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. More information about fuel in reports can be found here.
- **Rates deviation by ImpFCS/AbsFCS/InsFCS/FLS in trips** — the difference between the fuel consumption detected by a sensor and the fuel consumption rates.
- **Avg consumption in trips** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in trips** — the average fuel consumption in trips determined in accordance with a fuel sensor readings or calculated by math or rates.
- **Avg mileage per unit of fuel by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in trips** — the average fuel consumption presented as *kilometers per liter* or as *miles per gallon*.

Violations

- **Violations count** — the number of violations registered within the reporting period.

Executed commands

- **Executed commands** — the number of commands sent to a unit.

Unit latest data

All the items in this section do not depend on the reporting interval. The latest information is taken at the moment of the report execution.

- **Mileage counter** — the mileage counter value.
- **Engine hours counter** — the engine hours counter value.
- **GPRS traffic counter** — the consumed traffic.
- **Unit last location** — the latest unit location detected (address or coordinates).
- **Last message time** — the time when the latest message from the unit was received.

Visited streets

- **Streets count** — the number of visits of streets.

Maintenance

- **Total maintenance duration** — duration of all registered services.
- **Total maintenance cost** — total cost of all maintenance works.
- **Services count** — the number of services performed.

Typically, for all of the points mentioned above, you can make more detailed reports, presented in the form of tables or charts, described above.

Utilization cost

- **Total utilization cost** — the total cost of all registered service works and fuel fillings.
- **Count of services and fillings** — the total number of all registered service works and fuel fillings.

Counter sensors

- **Total counter** — the sum of values of all sensors of the *counter* type.

Images

- **Images** — the number of images received from unit. And if there are any, the resulting report contains a section with all the received images for the reporting period. Supported format is JPEG.

Eco driving

- **Penalties** — the overall penalty for various Eco Driving criteria for the reporting period.
- **Rank** — the received penalty points converted into a grade using a 6-point scoring system.

Video

The list of video files received from a unit.

Orders

- **Total orders** — the total amount of orders within the indicated time period.
- **Orders visited** — orders in which the arrival of a courier to an address is detected or any status is set.
- **Orders visited in time** — orders in which the arrival of a courier to an address is detected on time (in advance) or any status is set.
- **Orders visited late** — orders in which the arrival of a courier to an address is detected late or any

status is set late.

- **Non-visited orders** — orders in which the arrival of a courier to an address is not detected.
- **Orders fulfilled** — orders in which the arrival of a courier to an address is detected, the *Confirm* status is set.
- **Orders fulfilled in time** — orders which are fulfilled on time (in advance), the *Confirm* status is set.
- **Orders fulfilled late** — orders which are fulfilled late, the *Confirm* status is set.
- **Orders visited without status** — orders in which the arrival of a courier to an address is detected, a status is not set.
- **Orders rejected** — orders for which the *Reject* status is set.
- **Order's avg time (estimated)** — the ratio of the time calculated by the system for the delivery of all orders to the total number of orders.
- **Order's avg time (actual)** — the ratio of time spent delivering orders to a total amount of orders.
- **Avg time deviation in orders** — the difference between the actual and estimated average time for delivery of an order.
- **Order's avg mileage (actual)** — the ratio of a distance covered by a courier to a total amount of orders.
- **Order's avg weight** — the ratio of the total weight of orders to their total number.
- **Order's avg volume** — the ratio of the total volume of orders to a total amount of orders.
- **Order's avg cost** — the ratio of total cost of orders to a total amount of orders.
- **Avg fuel consumption for an order** — the ratio of a total amount of fuel consumed to a total amount of orders.
- **Orders' estimated mileage** — the total distance calculated by the system for the delivery of orders.
- **Orders' actual mileage** — the total distance covered by a courier delivering orders.
- **Fuel consumed in orders** — the total amount of fuel consumed while delivering orders.
- **Orders' total weight** — the overall weight of all created orders.
- **Orders' total volume** — the overall volume of all created orders.
- **Orders' total cost** — the overall cost of all created orders.

Moreover, the following data may be included in the statistics for orders:

- **Percentage of orders visited in time**;
- **Percentage of orders visited late**;
- **Percentage of non-visited orders**;
- **Percentage of orders fulfilled in time**;
- **Percentage of orders fulfilled late**;
- **Percentage of orders visited without status**;
- **Percentage of orders rejected**.

If the report is executed not for the unit, then, depending on the type of the report template, the statistics includes the data listed below.

Report template type	Statistics data
Unit group	*Statistics*: Report; Group; Interval beginning; Interval end; Report execution time.
User	*Statistics*: Report; User; Interval beginning; Interval end; Report execution time; *Logins*: Time spent on site; Logins count.
Driver	*Bindings*: In movement; Idling; *Statistics*: Report; Driver; Interval beginning; Interval end; Report execution time; *Orders*: Total orders; Orders visited; Orders visited in time; Orders visited late; Non-visited orders; Orders fulfilled; Orders fulfilled in time; Orders fulfilled late; Orders visited without status; Orders rejected; Percentage of orders visited in time; Percentage of orders visited late; Percentage of non-visited orders; Percentage of orders fulfilled in time; Percentage of orders fulfilled late; Percentage of

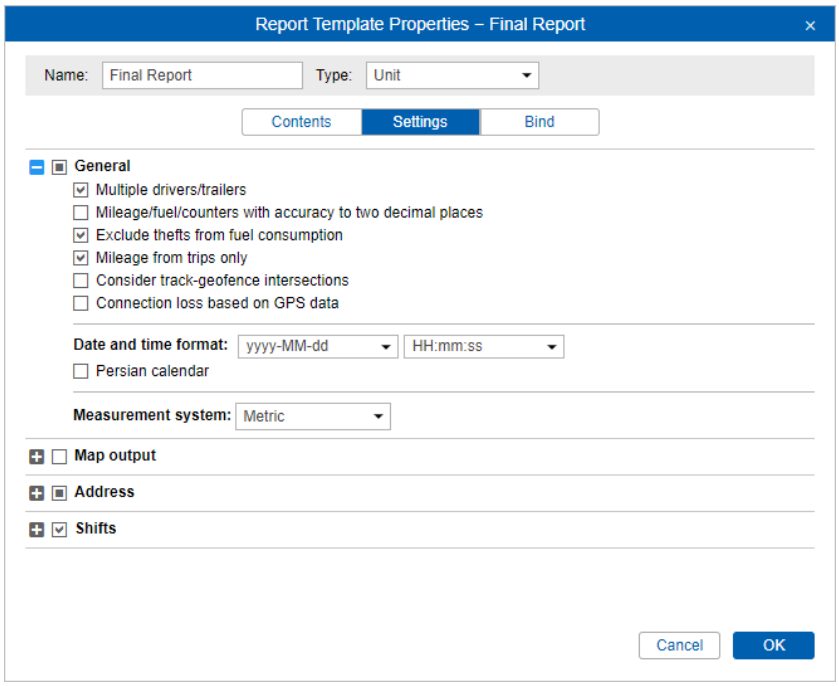
	orders visited without status; Percentage of orders rejected; Order's avg time (estimated); Order's avg time (actual); Avg time deviation in orders; Order's avg mileage (actual); Order's avg weight; Order's avg volume; Order's avg cost; Avg fuel consumption for an order.
Trailer	*Statistics*: Report; Trailer; Interval beginning; Interval end; Report execution time.
Resource	*Statistics*: Report; Resource; Interval beginning; Interval end; Report execution time; SMS sent; SMS available. The number of text messages that are displayed in these fields does not depend on the interval of report execution. The information is displayed for the period corresponding to the *Reset* option on the *Services* tab of the tariff billing properties.
Retranslator	*Statistics*: Report; Retranslator; Interval beginning; Interval end; Report execution time.
Route	*Statistics*: Report; Route; Interval beginning; Interval end; Report execution time.
Group of drivers	*Bindings*: In movement; Idling; *Statistics*: Report; Group of drivers; Interval beginning; Interval end; Report execution time.
Group of trailers	*Statistics*: Report; Group of trailers; Interval beginning; Interval end; Report execution time.
Passengers	*Statistics*: Report; Passenger; Interval beginning; Interval end; Report execution time.
Group of passengers	*Statistics*: Report; Group of passengers; Interval beginning; Interval end; Report execution time.

As a rule, for all of the above points, you can make more detailed reports in the form of tables or charts, described above.

Report Settings

On the *Settings* tab of the report template creation dialog, the following sections may be present depending on the type of the template:

- General,
- Map output,
- Address,
- Shifts.



Click on the '+' to the left of the name of the required section in order to make the adjustment. If you want to activate all the items included in the section, check its name.

General

In the *General* section, the format of the date and time, the measurement system, and also, depending on the type of the report, a number of other options are activated, described below.

Multiple drivers/trailers

This option is useful if a table added to the report template contains such columns as *Driver* or *Trailer*. If the box is not checked, then, regardless of the number of drivers/trailers appointed to a unit for the particular interval (trip, parking, etc.), only the first one is shown in the table. If the box is checked, then all the drivers/trailers appointed to a unit for the particular interval are shown in the table.

Mileage/fuel/counters with accuracy to two decimal places

This option allows you to always see all the mileage, fuel and sensor values to within two decimal places. If the option is not activated, the default settings are used: mileage is less than 20 and fuel less than 50 is output to the nearest hundredth, and the values above are indicated in whole numbers; any values of the sensor counters — only integers.

If you see *0.00* in a cell, it means the initial value had thousands or even smaller fractions, which can be seen if you export report to XML, CSV or Excel.

Exclude thefts from fuel consumption

This option can be useful if you want to ignore thefts when calculating fuel consumption in different tables and statistics. By default, however, thefts are considered a part of fuel consumption. That is, if the option is enabled, such columns as *Consumed by FLS* and *Average consumption by FLS* are calculated without considering fuel thefts.

Mileage from trips only

This option affects mileage calculation. If the checkbox is not marked, the mileage is calculated according to all messages without any filtering. If the checkbox is marked, only the part of the mileage that is considered a trip is taken into account.

Consider track-geofence intersections

This option allows to detect a visit to a geofence in case the trip had an intersection with the geofence by any segment of its track. This option can be applied to such reports as *Geofences*, and *Rides*.

Connection loss based on GPS data

This option can be applied to the *Connection problems* and *Chronology* tables, as well as to charts when selecting the background for connection loss. If the checkbox is marked, time intervals with no messages from units or messages without coordinates are shown in the corresponding reports or in charts. If no checkbox is marked, you can see only time

intervals without messages.

Skip empty rows

This option allows to hide the rows without any data.

Mileage and fuel with accuracy to two decimal places

This option allows you to always see all the mileage and fuel values with an accuracy of two decimal places. If the option is not activated, the default settings are used: mileage less than 20 and fuel less than 50 are displayed to the nearest hundredth, and the values above — as whole numbers.

Date and time format

This option allows you to select a convenient format for displaying the date and time. Initially, the date and time mask parameters are taken from the *User Settings* dialog. However, they can be changed at your discretion.

Persian calendar

This option makes it possible to use the Persian solar calendar in the resulting report for the fields with the indicated date.

Measurement system

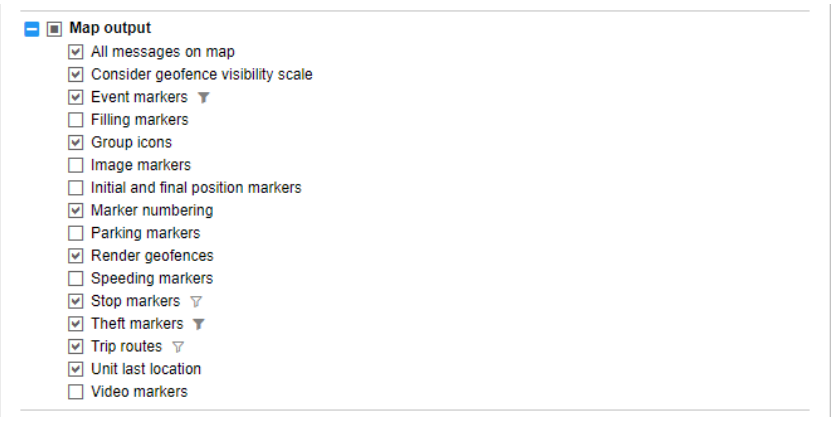
This option defines the metrics for such parameters as mileage, speed, fuel, and temperature in reports.

Note.
Depending on the measurement system selected in the report template for which the intervals filtration has been applied, you should remember that the values of filtration parameters are not converted into the corresponding values of another measurement system. Nonetheless, the metrics is changed to the corresponding metrics of the selected system. For example, if you have 50 kilometers mileage and 100 kilometers per hour speed, after choosing the US measurement system, you receive 50 miles mileage and 100 miles per hour speed.

Map Output

The lines of the online report, which contain information about the location of the unit at the time of an event, are highlighted in blue. If you click on the line with the left mouse button, the message is marked on the map with a special marker, and the map, in turn, is centered on its location. A similar option works for some *Regular* charts (where the X scale represents time): when using the trace tool, you move to the message on the map.

Some elements can be drawn on the map as a part of the report. They can be selected in the *Map output* section of the report template dialog. These can be tracks traveled by unit, geofences, as well as special markers in the form of small icons which can be put in the places of events, fillings, thefts, speedings, etc. All this is configured when creating or editing a report template on the *Settings* tab in the *Map output* section.

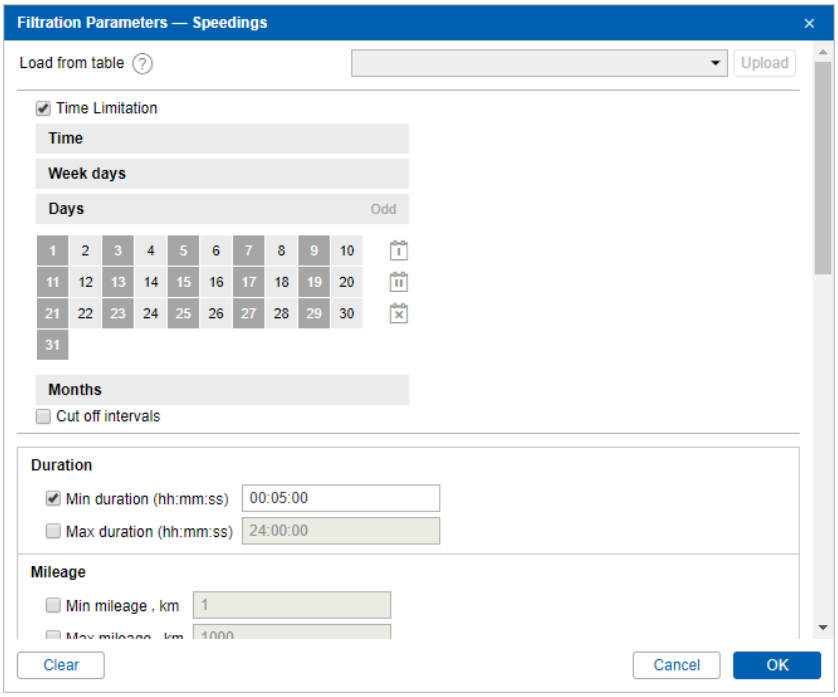


All graphical elements are shown for the current report. If generating a new report, all tracks and markers from the previous report are erased and replaced by new. When switching to other panels, all graphical elements from the current online report, as well as a map position and zoom remain on the map. To remove them, return to the *Reports* panel and click the *Clear* button. Alternatively, the graphics of any panel can be hidden or displayed again. To do this, check the corresponding boxes in the horizontal menu. More information about using map with different panels can be found here.

Graphical Elements Filtration

Intervals filtration is supported for some graphical elements (e.g. markers of speedings, events, fillings, thefts, parkings, and stops, as well as trip routes) adjusted upon working with a report template. To set intervals filtration means to indicate parameters considered for displaying graphical elements on the map. The values of filtration parameters are indicated for each element individually. A set of available filtration parameters for such an element corresponds to a set used for the intervals filtration in a similar-type table.

To open the filtration parameters dialog, it is necessary to click the corresponding icon (▽) to the right of a graphical element. Note that to set the filtration parameters, it is required to check the box of a corresponding graphical element first.



If intervals filtration has been already set for a table of the corresponding type, and such a filtration needs to be set for displaying graphical elements on the map as well, you can facilitate a process of indicating the filtration parameters by uploading those applied to the table. To do so, select a corresponding table in the drop-down list (the first line of the dialog) and click *Upload*.

To reset the indicated filtration parameters, click *Clear*. To leave the dialog without applying changes, press *Cancel*. To apply selected settings, click *OK*.

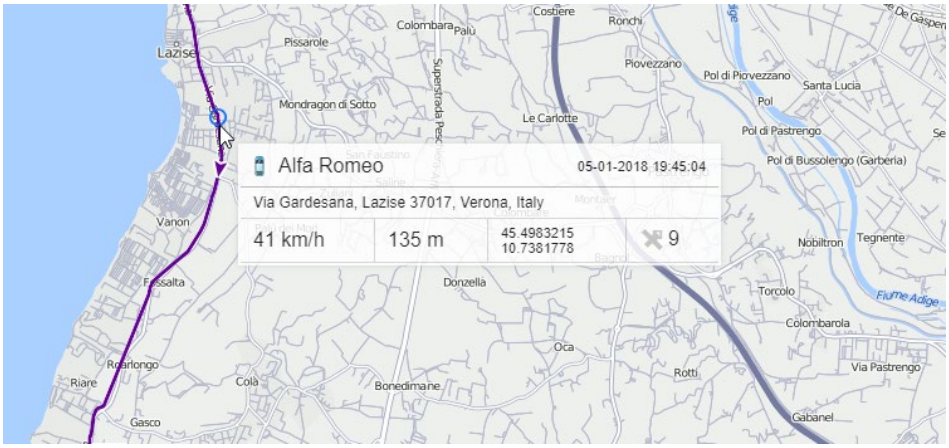
Attention!
The filtration set for displaying graphical elements on the map also affects the corresponding markers and backgrounds chosen for charts.

Tracks in Reports

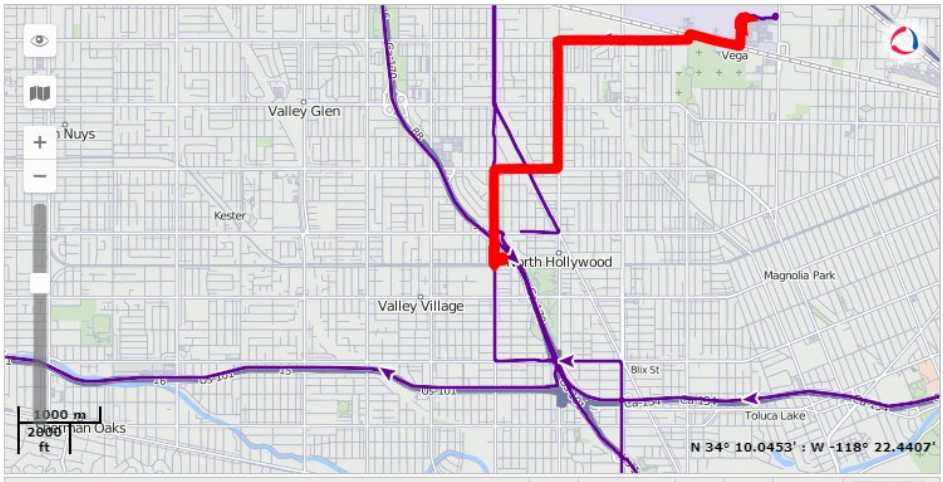
The routes traveled by a unit in a selected period of time can be shown on the map. To do this, select one of the options: *Trip routes* or *All messages on map* in the report template dialog. In accordance with the first option, only the intervals considered as trips (according to the Trip Detector) are displayed as tracks with different colors. In this case, it is required to activate the *By trips* option in the advanced user settings. In case of the *all messages on map* option, all the messages with valid coordinates are converted into a track regardless of trips, parkings, stops, etc. If in the unit history there are intervals where the connection was lost (there were no messages for a long time) or coordinates were not determied in messages, such intervals are displayed with a dashed line.

By default, the routes are drawn with blue color. However, you can choose another color or even have multi-colored tracks according to the speed or sensor state. The set of colors to be used in tracks is defined in Unit Advanced Properties).

Besides, to get the information about track points, hover the mouse cursor over and see the information in a tooltip (time, speed, coordinates, altitude, sensor values). Note that messages are searched in the radius of 50 pixels to the cursor.



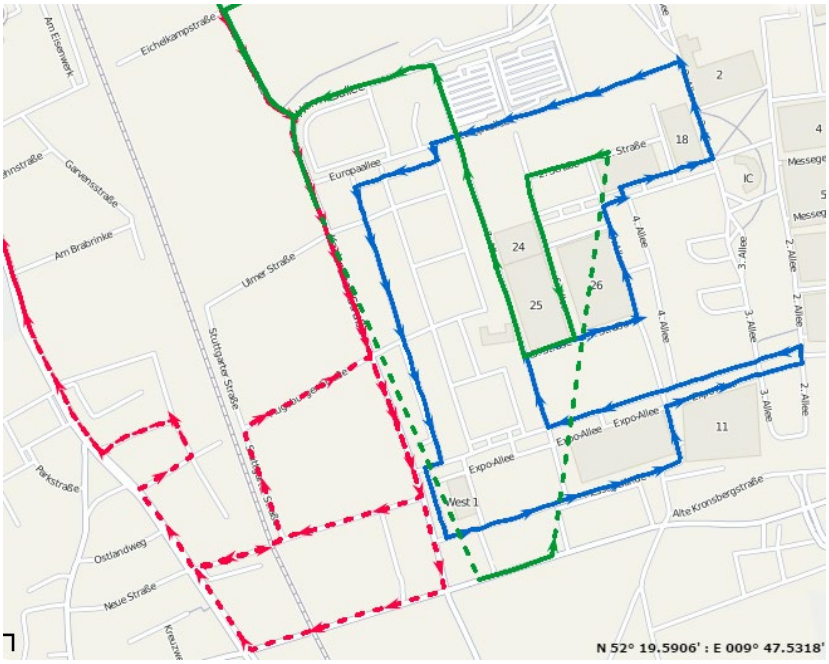
If tracks or all messages are on, then such tables as *Trips*, *Rides*, *Engine hours*, *Speedings* are supplied with an additional first column containing the icon of the binoculars. When clicking on the icon, the map is centered at a certain segment of the track, and this segment is highlighted by a bold red line on the map.



1 of 1 | Items from 1 to 22 of 22 | 50 | Clear

Beginning	End	Duration	Total time	Avg speed	Mileage	Max speed	Trips count
2017-10-04 18:17:06	2017-10-04 19:05:35	0:48:29	0:48:29	11 km/h	8.68 km	56 km/h	1
2017-10-07 01:03:18	2017-10-07 03:22:06	2:18:48	2:18:48	42 km/h	97 km	113 km/h	1
2017-10-07 03:59:46	2017-10-07 05:55:00	1:55:14	1:55:14	75 km/h	143 km	117 km/h	1
2017-10-08 18:50:31	2017-10-08 18:58:37	0:08:06	0:08:06	53 km/h	7.12 km	65 km/h	1
2017-10-08 20:46:44	2017-10-08 20:54:43	0:07:59	0:07:59	40 km/h	5.33 km	68 km/h	1
2017-10-08 21:41:31	2017-10-08 23:50:19	2:08:48	2:08:48	84 km/h	180 km	120 km/h	1
2017-10-08 23:58:31	2017-10-09 01:09:17	1:10:46	1:10:46	38 km/h	45 km	104 km/h	1
2017-10-11 21:28:15	2017-10-11 22:11:41	0:43:26	0:43:26	16 km/h	11.59 km	82 km/h	1
2017-10-12 06:09:33	2017-10-12 06:21:56	0:12:23	0:12:23	3 km/h	0.59 km	4 km/h	1
2017-10-12 06:31:02	2017-10-12 06:54:55	0:23:53	0:23:53	18 km/h	7.05 km	73 km/h	1
2017-10-13 04:05:19	2017-10-13 04:59:10	0:53:51	0:53:51	56 km/h	50 km	134 km/h	1
2017-10-13 05:04:42	2017-10-13 05:08:31	0:03:49	0:03:49	4 km/h	0.24 km	5 km/h	1
2017-10-13 05:17:21	2017-10-13 06:23:44	1:06:23	1:06:23	14 km/h	15.54 km	102 km/h	1

Tracks can be rendered for units groups, too (see the Advanced Reports section). It is reasonable to assign different colors for units in a group to differentiate them on the map. However, note that the number of simultaneously drawn messages can be limited by your service provider.



Geofences on the Map

Created geofences can be a part of a report. They are displayed on the map if you check the *Render geofences* box in the *Map* section of the report template.

Geofences are displayed with their captions and images or icons (if you have selected any). The color and the font size of the caption is taken from their properties. Apart from that, additional options can be applied to geofences:

- *Group icons*.
  The geofences that overlap each other can be replaced by one conditional item, and its tooltip contains the detailed information. The same can be applied to markers.
- *Consider geofence visibility scale*.
  By default, all the geofences are rendered on the map. However, they can be seen or hidden according to their visibility parameter set in the properties.

Note.
Geofences are taken only from the same account as the report template itself.

Markers

Most types of reports can have additional information visualized on the map with the help of special markers. To get these markers in a report, select the required markers in a report template.

The table below presents all possible markers and their icons.

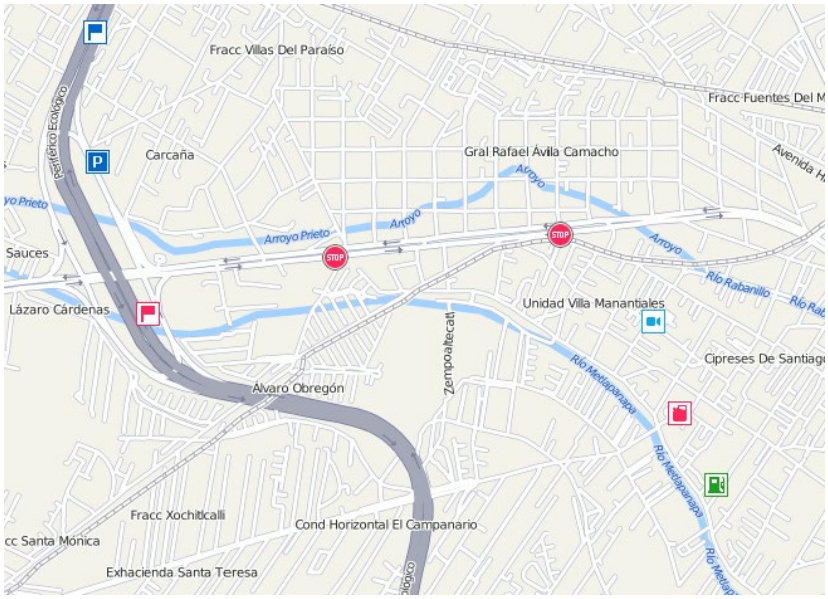
	Parking marker	Marks a location where, according to the trip detector, a parking takes place. A tooltip shows the beginning of a parking time and parking duration.
	Stop marker	Marks a location where, according to the trip detector, a stop takes place. A tooltip shows the beginning of a stop time and stop duration.
	Filling marker	Marks a location where, according to sensors data, a fuel filling takes place. A tooltip shows filling time and the amount of fuel filled.
	Theft marker	Marks a location where, according to the sensors data, a fuel theft takes place. A tooltip shows theft time and the amount of fuel stolen.
	Event marker	Marks the locations where events were automatically registered by means of notifications. The events registered manually, including fuel fillings, are also shown by such markers if a location (and preferably a description) is indicated during event registration. A tooltip shows the event time and the text of the event.
	Violation marker	If you select event markers, then both event and violation markers are to be displayed, because violation is a special case of an event.
	Speeding marker	Marks a location where speed limits indicated in the unit properties were violated. A tooltip shows the initial time of the speeding interval (i.e. the time of receiving the first message with a speed value exceeding the allowed one), the allowed speed (indicated in the unit properties), the value of speeding and the total duration of a speeding interval.
	Image marker	Marks a location where pictures from a unit were received.
	Video marker	Marks a location where videos from a unit were received.

The panoramic images of the territory can be displayed when clicking on the markers of parkings and stops. For this, maps with panoramas (for instance, Yandex Panorama or Google Street View) should be selected in user settings. If there are pictures of the territory with the coordinates of the marker, when pointed at it, the cursor changes from *arrow* to *hand*. Click on the marker to open a panorama snapshot in the window of the *Address* tool. Double-click on another such marker to update the information.

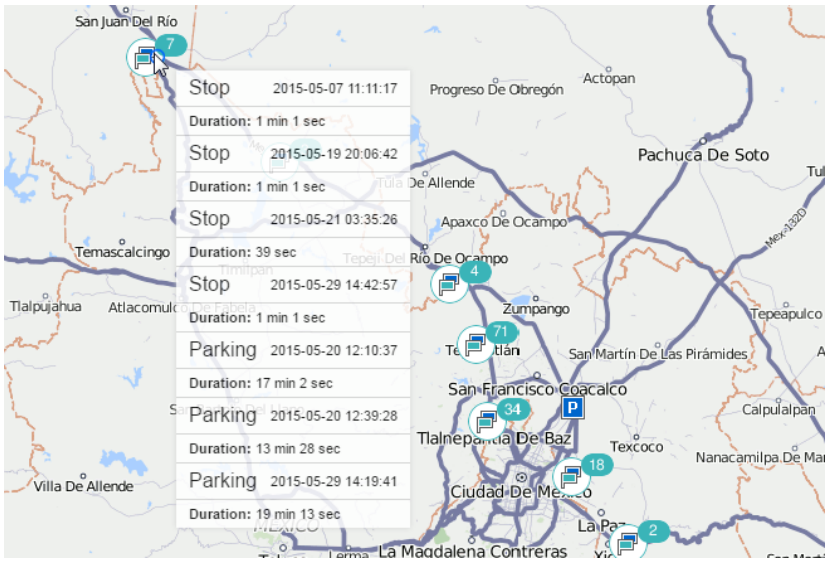
Note.
When enabling event markers, in addition to event markers you get violation markers because a violation is a special case of event.

Markers appear on the map after a report is generated. If you see no markers, it means there are no events of the indicated type or the current map scale is not enough (try to zoom in).

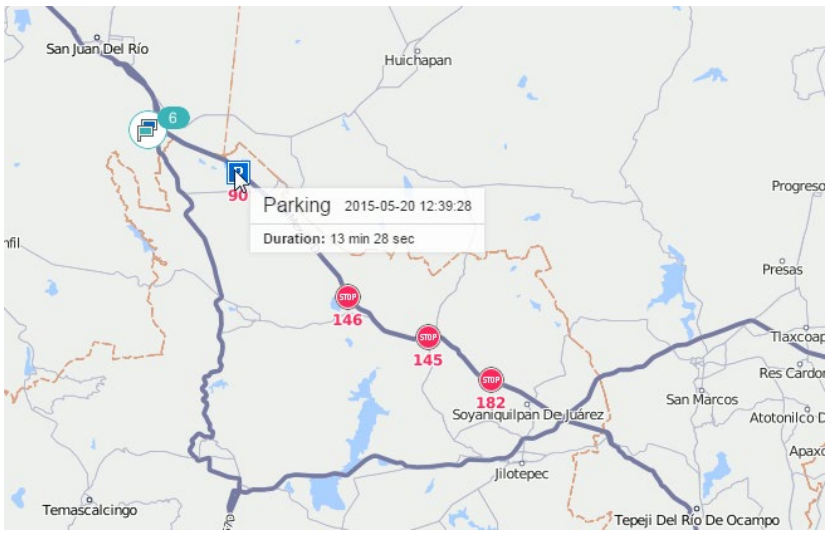
When hover the mouse cursor over a marker, you see additional information in a tooltip: for stops and parkings — starting time and duration, for events and violations — time and notification text, for fillings and thefts — time and fuel volume, for speedings — starting time, speed limitation as it is defines in unit properties, how much the speed is exceeded, and duration of this speeding.



Moreover, markers, as well as geofences can be grouped in case they overlap each other — indicate the *Group icons* option in the report template for it. In case of markers grouping, a number of elements included in a group is indicated. More detailed information about what happened in that place is available in the tooltip. However, if there are more than 100 grouped markers, only their names appear in the tooltip, without detailed information.

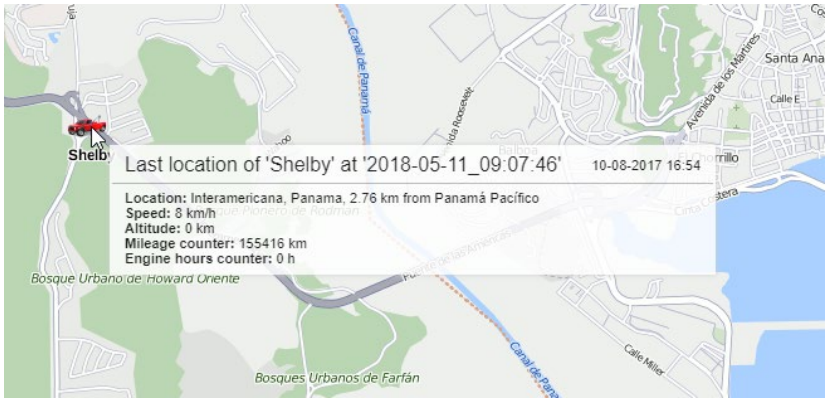


You can enable the *Marker numbering* option in a report template. In this case, each marker has its sequence number which is indicated below the marker in red color. Numbers are assigned chronologically, and each marker type has its own numeration.



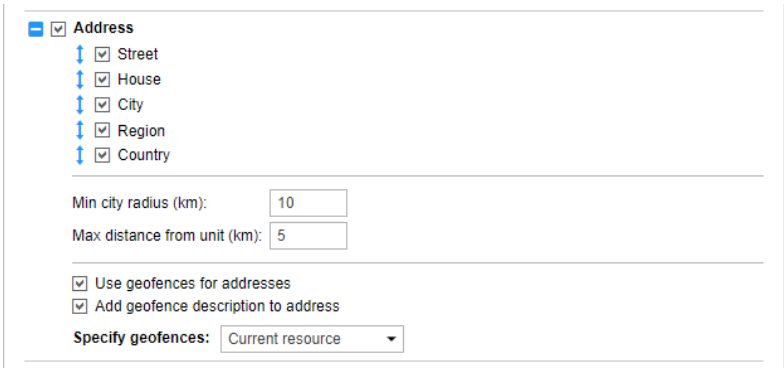
Unit Last Location

The last location of the unit can be displayed on the map. To enable this feature, select the *Unit last location* checkbox in map output settings of the report template. Last location does not depend on the reported interval, it is taken from the latest message received from the unit. Units are displayed on the map by their icons or by motion state signs (depending on User settings) as well as by their names considering the Unit label color option. In the pop-up tooltip you can find the time when the message was received, speed at that point, altitude, and the values of mileage and engine hours counters. If the report is executed for a group of units, the name of the selected unit is also shown in the tooltip.



Address

Many reports use the following address information: initial/final location of the unit during the trip, place of fuel filling or theft, location where the unit parked or had speeding, location where connection was lost, message received, event registered, etc. The source of the address information can be Gurtam Maps or the created geofences.



Addresses from Map

Specify the format for displaying the address information. To do this, select which elements of the address should be displayed (country, region, city, street, and house are available), and arrange them in the preferred order, pulling up or down the double arrow ↕. If none of the five items is selected, the coordinates are displayed.

This format is especially relevant if the units are moving around the city. For addresses outside the city (near roads), the following two settings are important:

Min radius
If at a distance indicated as the maximum distance from the unit, no city is found, the address is bound to another city. The radius of the city, which can get into the address information, is indicated in this parameter. It may be required, for example, that only large cities appear in addresses.

Max distance from unit
If the unit is on the road and at a specified distance from it there is a city, the name of the road and the distance to this city get to its address.

Note.
Addresses for reports can be taken only from Gurtam Maps (not Google, Yandex, or other services). If you find inaccurate address information in the reports, you can update the map of your region/city. To do this, send a new map of your region in the proper format to the technical support.

Addresses from Geofences

Sometimes maps may not contain the exact addresses in certain regions. In such cases, you can use geofences as addresses. Besides, you can specify your own names for certain addresses.

If the *Use geofences for addresses* option is activated, additional parameters become available. In particular, you can choose to display geofence's description alongside with its name (the *Add geofence description to address* option). To see the distance at which the unit is away from the geofence, specify the **radius of geofence search**. The maximum allowable value is 100 km or miles (depending on the selected system of measures).

The range of geofences used as addresses is adjustable. By default, all geofences that belong to the same resource as the report template are used. However, geofences from *all* available resources can be used if necessary. Alternatively, to narrow this range, you can specify a particular group of geofences to be used (it should be created in the same resource as the report template itself). Select the option in the *Specify geofences* drop-down list (groups of geofences are displayed in square brackets).

If the geofences are selected as addresses, but the location of the unit is not found, the address information is taken from the map and is formed according to the parameters specified above. When two geofences overlap each other, a smaller one is selected for the address.

To work with these options, activate the *Geofences* service in the account properties.

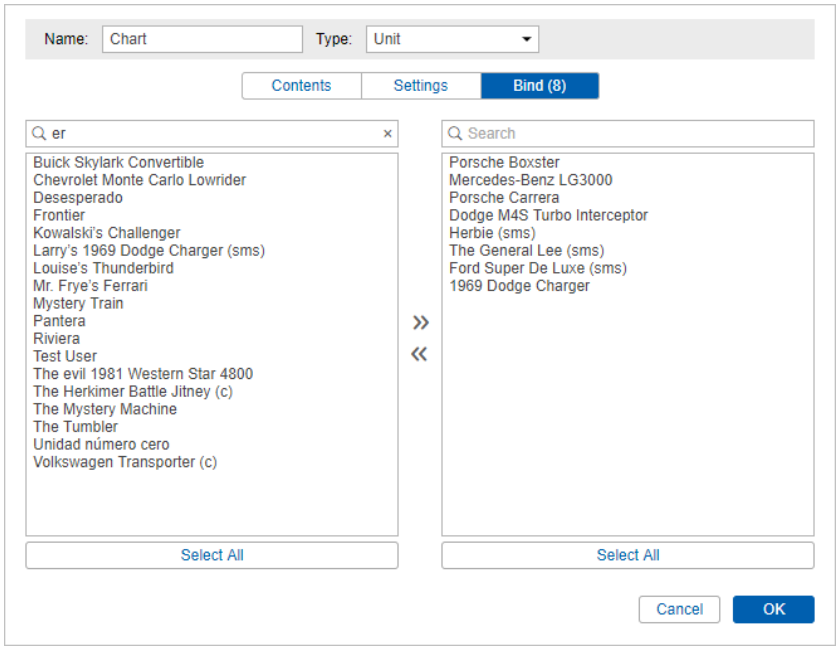
Shifts

If the option is enabled, the information in the report is structured according to the shifts you specify. For example, a transport company has a vehicle and two drivers. According to calculations, the profit from the vehicle usage comes only if it is used in two shifts: from 9 a.m. till 7 p.m., and from 9 p.m. till 7 a.m. Assume that we are interested in the report on trips during these shifts and information about what happened during the rest of the time is not important. So, it is necessary to adjust shifts correspondingly, and mark the checkboxes in order for this setting to be used. Moreover, for this particular situation it is necessary to apply grouping by shifts and use intervals retrieving.

If you need the events that occurred in a shift, that finishes in a new day, to be attributed by the system to the previous day (that is to the day of its beginning), enable the *Do not split overnight shifts* option.

Binding

The report template, depending on its type, can be bound to specific elements of the system. Binding allows you to restrict the list of items for which the report is run.

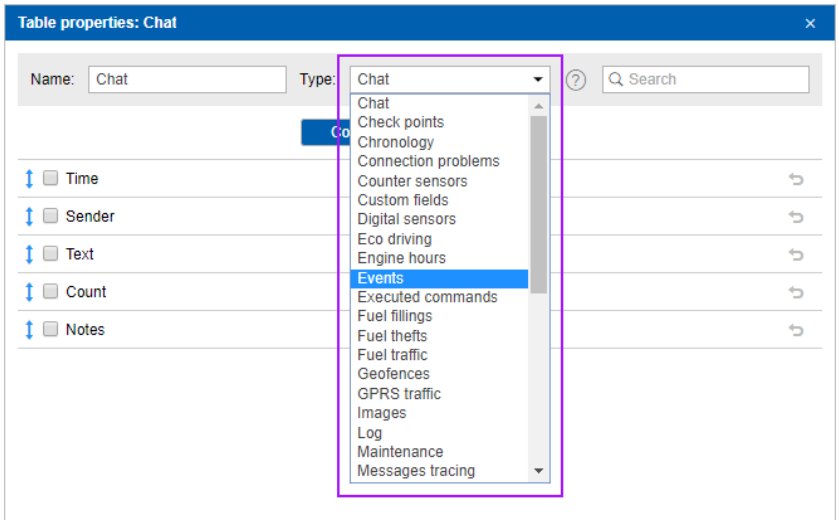


To move the required items from the left list to the right one, double-click the required items or click the *Add* button (rightwards arrow). For convenience of search it is possible to use dynamic filter above the list. The numeric indicator in parentheses next to the name of the tab indicates the number of bound items.

Thus, when generating a query from the template, the drop-down list of items contains only those that have been bound.

Table types

At the moment, the following types of tables are available for units and unit groups:



- Account Tree (for resource)
- Chat
- Check Points
- Chronology
- Connection Problems
- Counter Sensors
- Custom Fields
- Digital Sensors
- Eco Driving
- Engine Hours
- Events
- Executed Commands
- Fuel Fillings
- Fuel Thefts
- Fuel Traffic
- Geofences
- GPRS Traffic
- Images
- Logs
- Maintenance
- Messages Tracing
- Orders
- Non-visited Geofences
- Parkings
- Profile
- Rides
- Rounds (for unit)
- Rounds (for route)
- Sensor Tracing

- SMS Messages (for unit)
- SMS Messages (for resource)
- Speeding
- Stops
- Summary
- Trips
- Unfinished Rides
- Upcoming Maintenance
- Utilization Cost
- Video
- Violations
- Visited Streets

A template can contain any number of tables and charts. You can even add the same table type several times with different configuration of columns, data grouping, and other settings.

To add any of the tables mentioned above to the template, click the *Add Table* button and select the table from the list.

Each table type has its own set of columns that can be included in it. After the table type is selected, the list of available columns is displayed below. Check the columns you would like to include in the resulting table. To select all columns at once, press *Ctrl* and click on any checkbox. To make all columns deselected, repeat the same operation. This combination works also for reports where you choose geofences, events, etc.

You can assign other names to column headings. To do this, click on the title and edit the text. In the same way you can change the name of the table itself (the *Name* text box at the top of the dialog). To restore the default column names, use the *Restore default* button (if it is gray, the current name is default).

Besides, you can change the order of the columns. Drag the double-arrow sign up/down to move them up and down.

Some alternative types of standard reports are available as applications:

- iDriveSafe — assessment of the driving behavior;
- Dashboard — graphic presentation of key performance indicators of your fleet;
- Driving Logbook — a tax report that determines the actual use of the company car for private and/or business purposes (on the basis of the *Trips* report).

Account Tree (for resource)

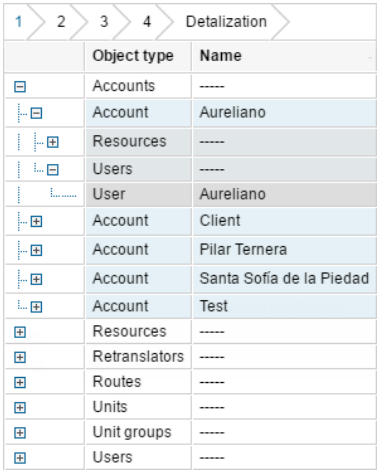
This report provides you with information about the structure of an account. In other words, the table helps you understand which object types the selected account consists of, as well as the hierarchy among these objects.

The table may contain the following columns:

- **Object type** — accounts, resources, users, units, unit groups, retranslators, routes.
- **Name** — the name of an object.

The type of objects in the report template can be specified. Then only the objects of the selected types are displayed in the report.

In addition, the data are presented more clearly if you group by type of object in the report template.



Chat

This report combines the commands of the *Send message to driver* type sent to the unit, and replies from the unit. How chatting with the driver works was written above

- **Time** — the date and time when the message was received.
- **Sender** — the driver or operator (username is indicated in brackets).
- **Text** — the text of the message.
- **Count** — the number of messages.
- **Notes** — an empty column to add your custom comments after printing or exporting the report.

Time	Sender	Text	Count
2016-04-07 11:34:32	Driver	Order received	1
2016-04-12 11:58:58	Driver	Filled 20 gal.	1
2016-05-20 09:55:50	Operator (user)	Route 45 for today.	1
2016-05-20 09:56:28	Driver	Connection test.	1
2016-05-20 09:59:36	Driver	Route 125. Started at 08:15.	1
2016-05-25 12:18:27	Driver	On the way to warehouse.	1

Check Points

Route points refer to check points indicated when creating a route. The table can include:

- **Point name** — the name given to this check point while creating it.
- **Real arrival** — the time when the unit entered the check point.
- **Scheduled arrival** — the time when the unit was supposed to enter the check point according to the schedule.
- **Initial location** — the location at the time of entry.
- **Real departure** — the time when the unit left the check point.
- **Scheduled departure** — the time when the unit was supposed to leave the check point according to the schedule.
- **Final location** — the location at the time of departure.
- **Result** — *Visited* (both entrance and exit were detected), *Entrance only*, *Exit only*, *Skipped*.
- **Route** — the name of the route to which this check point belongs.
- **Schedule** — the name of the schedule.
- **Round** — the name of the round.
- **Arrival time deviation** — positive value if delayed, negative value if in a hurry in regards to the arrival time set in the point properties.
- **Departure time deviation** — positive value if delayed, negative value if in a hurry in regards to the departure time set in the point properties.
- **Presence duration** — the time spent at the check point.
- **Presence mileage** — the mileage at the check point.
- **Section duration** — the time spent to travel from the previous check point to the current one.
- **Section mileage** — the mileage from the previous check point.
- **Count** — the number of points.
- **Driver** the name of the driver (if available).
- **Trailer** — the name of the trailer (if it was bound).
- **Notes** — an empty column for your custom comments.

Point name	Result	Route	Arrival time deviation	Departure time deviation	Presence duration
Westcliff Drive	Visited	Santa Cruz Tour	0:00:00	0:00:44	0:00:00
Punto de control 3	Visited	Santa Cruz Tour Bus Route	0:00:00	0:01:08	0:00:00
Punto de control 2	Visited	Santa Cruz Tour Bus Route	0:00:43	0:00:43	0:01:00
UCSC Campus	Visited	Santa Cruz Tour	-0:02:16	-0:01:36	0:00:40
Metro Station	Visited	Santa Cruz Tour	-0:02:01	-0:01:41	0:00:20
Punto de control 1	Visited	Santa Cruz Tour Bus Route	-0:00:01	-0:00:16	0:00:45
Santa Cruz Boardwalk	Visited	Santa Cruz Tour	-0:01:42	-0:01:32	0:00:10
Punto de control 3	Visited	Santa Cruz Tour Bus Route	0:00:54	0:01:09	0:01:15
Westcliff Drive	Visited	Santa Cruz Tour	-0:00:17	0:00:43	0:01:00

Chronology

The *Chronology* report gives information about all the actions and changes in the unit state during the indicated period of time. Unlike most of other tables that are dedicated to a particular state (parkings, sensors, trips, etc.), this table combines events of various kinds, which allows to see the complete picture of movement.

The following types of events can be included in the report (in the template select the required):

- Trips
- Parkings
- Stops
- Engine hours
- Fillings
- Thefts
- Events
- Drivers
- Trailers
- Speedings
- Connection loss
- Sensor trigger (enter one or two masks to indicate the required sensors; note that when you enter a mask, the sensors are firstly filtered by their type (digital sensors), and then by name)

The following columns can be selected to form the table:

- **Type** — trip, parking, stop, engine hours, filling (or reg. filling), theft, event (or violation), driver, connection loss, sensor.
- **Beginning** — the time taken from the message that precedes the one in which the beginning of the given state was fixed.
- **Initial location** — the location of the unit at the initial moment.
- **End** — the moment when the detected activity finished.
- **Final location** — the location of the unit at the final moment.
- **Duration** — how long the state lasted.
- **Description** — for trips and speedings — mileage, for events and violations — the text of notification, for engine hours — duration, for drivers — driver's binding/unbinding and name, for fuel fillings and thefts — the volume of fuel and sensor name, for sensors — sensor activation/deactivation.
- **Notes** — an empty column for your custom comments.

Type	Beginning	Initial location	End	Duration	Description
Trip	2015-05-30 06:10:10	Mex-2, San Luis Río Colorado	2015-05-30 07:52:22	1:42:12	Mileage: 128 km
Engine hours	2015-05-30 06:10:10	Mex-2, San Luis Río Colorado	2015-05-30 10:19:13	4:09:03	Duration: 4 hours 9 minutes
Stop	2015-05-30 07:28:05	Mex-2, Sonoita Centro	2015-05-30 07:32:07	0:04:02	-----
Parking	2015-05-30 07:52:22	Mex-2, General Plutarco Elías Calles	2015-05-30 09:58:50	2:06:28	-----
Trip	2015-05-30 09:58:50	Mex-2, General Plutarco Elías Calles	2015-05-30 10:19:05	0:20:15	Mileage: 27 km
Parking	2015-05-30 10:19:05	Mex-2, Puerto Peñasco	2015-05-30 17:08:12	6:49:07	-----
Sensor	2015-05-30 10:19:13	Mex-2, Puerto Peñasco	2015-05-30 10:19:13	0:00:00	Deactivated sensor: Motor
Engine hours	2015-05-30 17:44:42	Mex-2, Puerto Peñasco	2015-05-30 19:38:12	1:53:30	Duration: 1 hours 53 minutes
Sensor	2015-05-30 17:44:42	Mex-2, Altar	2015-05-30 19:38:12	1:53:30	Deactivated sensor: Motor
Trip	2015-05-30 17:48:40	Mex-2, Puerto Peñasco	2015-05-30 19:37:57	1:49:17	Mileage: 131 km

Note that the system does not calculate the duration of the state for fillings and thefts. Therefore, the beginning and end time for fillings/thefts, as well as the initial and final location coincide in the *Chronology* table, and the duration column displays zero value.

Connection Problems

This kind of report lists the time periods when the system did not receive data from the unit. The parameters for this report are adjusted in Unit Properties => Advanced where you set *Maximum interval between messages*.

The following information can be presented in this kind of report:

- **Beginning** — the date and time when connection loss happened.
- **End** — the date and time when connection was recovered. Note that if the time passed between receiving the last message for the reporting interval and the end of a report interval exceeds a value of a maximum interval between messages, then a connection loss interval will be added to the report. The beginning of this interval corresponds to the time of receiving the last message, and the end corresponds to the end of a reporting interval.
- **Duration** — the time interval of connection loss.
- **Location** — the address where the unit was right before the loss of connection.
- **Count** — the number of connection gaps detected in a certain time interval (it is advisable when grouping rows by days/weeks/months or for reports about groups of units).
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if it was bound).
- **Notes** — an empty column for your custom comments.

Beginning	Duration	Location	Count	Driver
2015-05-30 00:00:00	13:38:28	Dózsa György utca 98-106, Noszlop	1	Jon
2015-12-14 16:38:31	15:48:25	Szent István út 2-42, Ajka	1	Jon
2015-12-15 09:12:22	0:18:28	Táncsics utca 26-34, Magyarpolány	1	Samuel
2015-12-15 16:20:23	0:06:36	Szent István út 2-42, Ajka	1	Jack
2015-12-22 21:10:52	0:05:13	Szent István út 2-42, Ajka	1	Jack
2015-12-27 23:34:00	0:17:37	Szent István út 2-42, Ajka	1	Arnold
2015-12-27 23:52:16	0:28:20	Szent István út 2-42, Ajka	1	Jon
2015-12-28 10:37:38	0:05:48	Padragi út 97-125, Padragkút	1	-----

Additional filtration by driver, trailer and geofences/units can be applied to this report.

Counter Sensors

This table shows the operation of the *Counter* type sensors. In the template, set the mask (filter) for sensors or select *All sensors*. A table can consist of the following columns:

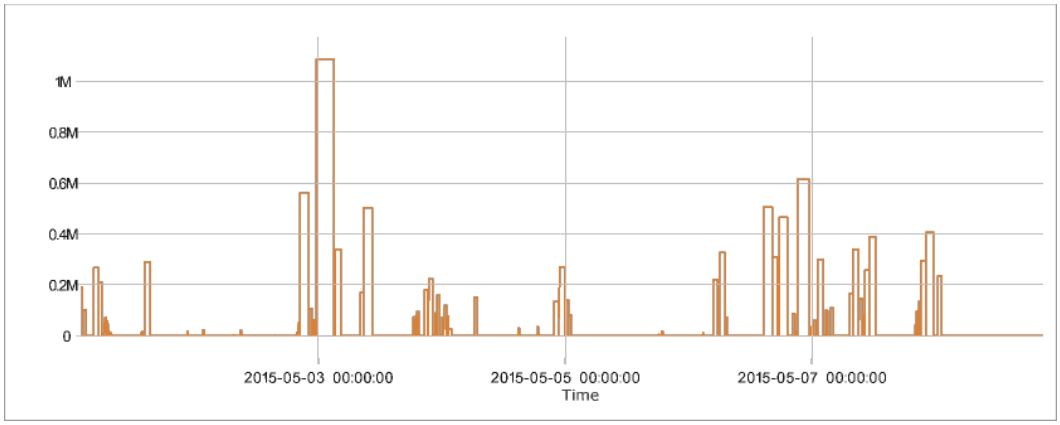
- **Sensor** — the name of the sensor.
- **Activated** — the time of activation.
- **Deactivated** — the time of deactivation.
- **Duration** — operation time.
- **Total time** — the time from the beginning of the first activation to the end of the last.
- **Location** — the location at the moment of sending the data.
- **Mileage** — the distance traveled for the operation period.
- **Mileage (adjusted)** — mileage subject to the coefficient set in the unit properties on the *Advanced* tab.
- **Avg speed** — the average speed at this interval.
- **Max speed** — the maximum speed at this interval.
- **Counter** — the value of the counter meter (can be shown with an accuracy of hundreds — see Report Settings –> General).
- **Geofences/Units** — the column that includes the names of the geofences or units which were crossed during a given interval. The required geofences and units should be indicated in the filtration parameters. If at some interval there were several geofences or units like that, in the report there will be the name of the geofence with the smallest area or the name of the unit with the smallest radius of approximation. If the sizes coincide, all the names will be included.
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if it was bound).
- **Penalties** — the penalties calculated for the adjusted Eco Driving criteria.
- **Rank** — the received penalty points converted into a 6-point rating system.
- **Notes** — an empty column for your custom comments.

№	Sensor	Activated	Duration	Location	Mileage	Max speed	Counter
1	Counter sensor	2012-06-25 12:39:20	0:32:06	Joachima Chreptowicza, Augustów	42 km	136 km/h	037
2	Counter sensor	2012-06-25 13:17:02	0:44:24	Mikołaja Kopernika, Grajewo	61 km	141 km/h	732
3	Counter sensor	2012-06-25 14:12:20	0:28:04	Legionów, Łomża	39 km	118 km/h	205
4	Counter sensor	2012-06-25 15:01:42	0:12:52	Stacyjna, Stare Lubiejewo	19.14 km	125 km/h	747
5	Counter sensor	2012-06-25 15:35:30	0:16:46	E67, 0.38 km from Sadzawki	21 km	136 km/h	862
6	Counter sensor	2012-06-25 15:58:38	0:20:52	Tadeusza Kościuszki, Wyszków	29 km	122 km/h	773
7	Counter sensor	2012-06-25 16:19:30	0:48:04	Pułtuska, Serock	66 km	136 km/h	1122
8	Counter sensor	2012-06-25 17:26:00	0:12:16	E30, Sochaczew	18.13 km	145 km/h	521
9	Counter sensor	2012-06-25 17:57:32	0:16:50	Podgrodzie, Łowicz	21 km	115 km/h	998
10	Counter sensor	2012-06-25 18:15:38	0:13:44	Dorzeczna, Głowno	16.85 km	136 km/h	696
11	Counter sensor	2012-06-25 18:29:22	0:43:14	E30, 2.39 km from Zelgoszcz	96 km	158 km/h	105
12	Counter sensor	2012-06-25 19:15:38	0:10:42	E30, Piekło	24 km	167 km/h	518
13	Counter sensor	2012-06-25 19:27:08	0:17:32	E30, Wola Koszucka	38 km	156 km/h	562
14	Counter sensor	2012-06-25 20:04:18	0:10:42	E30, Nagradowice	17.68 km	145 km/h	789
-----	-----	**2012-06-25 12:39:20**	**5:28:08**	-----	**507 km**	**167 km/h**	**6067**

The mileage values are displayed in the table as fractional numbers. However, when exporting to an Excel file the values are rounded.

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, drivers, fuel fillings, fuel thefts and geofences/units.

The value of the counter sensor can be visualized in the chart that shows the operation intervals of the counter and its value. You can learn more about charts here.


1M
0.8M
0.6M
0.4M
0.2M
0
2015-05-03 00:00:00
2015-05-05 00:00:00
2015-05-07 00:00:00
Time

Custom Fields

The *Custom fields* table represents a list of custom fields available on the corresponding tab of the unit properties dialog (see Unit Properties –> Custom Fields). To get this report, you need the *View custom fields* and/or *View admin fields* access to a unit/user/unit group. The type of fields is selected in the right part of the report template dialog (all/general/admin fields).

Possible columns:

- **Name** — the name of the field.
- **Value** — the value of the field.
- **Notes** — an empty column for your custom comments.

Name	Value	Notes
Carrying capacity	3 t	
Fuel	diesel	
Year	2009	

To get custom fields for a unit group (see Other Reports), make sure the *Detalization* option is enabled. Note that individual fields of each unit are displayed and not the fields of the selected unit group. To display group fields in the report template, activate the *Group itself* option.

Digital Sensors

Usually, digital sensors have two states: on/off, activated/deactivated, etc. For example, it can be an ignition or cargo load sensor. All sensors are configured in Unit Properties –> Sensors.

To receive the information about a specific sensor, specify its name or part of the name using wildcard symbols — an asterisk * (replaces several characters) or question mark **?** (replaces one symbol). The sensor name cannot contain commas. If the sensor mask is not specified, the information in the table is displayed for all sensors of the unit.

The table can contain the following columns:

- **Sensor** — the name of the controlled sensor.
- **Activated** — the time taken from the first message that contains information about the activation of the sensor.
- **Deactivated** — time when the sensor was deactivated.
- **Duration** — the interval when the sensor was on.
- **Total time** — the time from the beginning of the first activation to the end of the last one.
- **Location** — the location of th eunit at the moment of activation.
- **Mileage** — the distance traveled while the sensor was on.
- **Mileage (adjusted)** — mileage subject to the coefficient set in the unit properties (the *Advanced* tab).
- **Initial mileage** — the mileage sensor value at the moment of a sensor activation. If the mileage parameter was not saved at the reporting interval, the mileage is counted from zero.
- **Final mileage** — the mileage sensor value at the time the sensor is turned off.
- **Avg speed** — the average speed of movement with the sensor on.
- **Max speed** — the maximum speed with which the unit moved with the sensor turned on.
- **Activations count** — the number of activations (can be helpful either in grouping table data by years/months/weeks/days/shifts or for the reports on unit groups).
- **Driver** the name of the driver (if available).
- **Trailer** — the name of the trailer (if it was bound).
- **Penalties** — penalties calculated for the adjusted Eco Driving criteria.
- **Rank** — penalty points, converted to 6-point rating system.
- **Notes** — an empty column for your custom comments.
- **Custom sensor initial value** — the custom sensor value at the moment of activation of the digital sensor.
- **Custom sensor final value** — the custom sensor value at the moment of deactivation of the digital sensor.

If there are several custom sensors, separate columns with initial and final values are displayed for each of them. The name of each custom sensor and units of measurement (if they were specified when creating the sensor) are indicated next to the name of each of these columns in parenthesis. In case there are no suitable sensors, the columns are not displayed.

Sensor	Activated	Deactivated	Duration	Total time	Location	Mileage
Motor	2015-05-30 06:10:10	2015-05-30 10:19:13	4:09:03	4:09:03	Mex-2, San Luis Río Colorado	155 km
Motor	2015-05-30 16:55:11	2015-05-30 17:14:50	0:19:39	0:19:39	Mex-2, Puerto Peñasco	0.17 km
Motor	2015-05-30 17:44:42	2015-05-30 19:38:12	1:53:30	1:53:30	Mex-2, Puerto Peñasco	131 km
Motor	2015-05-30 20:08:35	2015-05-31 08:34:26	12:25:51	12:25:51	Mex-2, Altar	796 km
Motor	2015-05-31 17:35:05	2015-05-31 17:35:56	0:00:51	0:00:51	Avenida Monte Seir, Fracc Santa Rocío	0.01 km
Motor	2015-05-31 17:45:46	2015-05-31 18:12:54	0:27:08	0:27:08	Avenida Monte Seir, Fracc Santa Rocío	8.64 km
Motor	2015-05-31 18:56:07	2015-05-31 19:15:02	0:18:55	0:18:55	Boulevard Jesús Kumate Rodríguez, Culiacán	8.83 km
Motor	2015-06-01 21:58:49	2015-06-01 22:06:35	0:07:46	0:07:46	Avenida Quinta Poniente, Fracc Santa Rocío	0.62 km
Boton SOS	2015-06-05 03:46:14	2015-06-05 03:46:21	0:00:07	0:00:07	Avenida Monte Seir, Fracc Santa Rocío	0.00 km
Boton SOS	2015-06-05 03:48:01	2015-06-05 03:48:23	0:00:22	0:00:22	Avenida Monte Seir, Fracc Santa Rocío	0.00 km
Motor	2015-06-07 03:40:51	2015-06-07 04:36:00	0:55:09	0:55:09	Avenida Siderita 1461, Ampl Valle Del Pedregal	0.00 km

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, driver, trailer, fuel fillings, fuel thefts and geofences/units.

Eco Driving

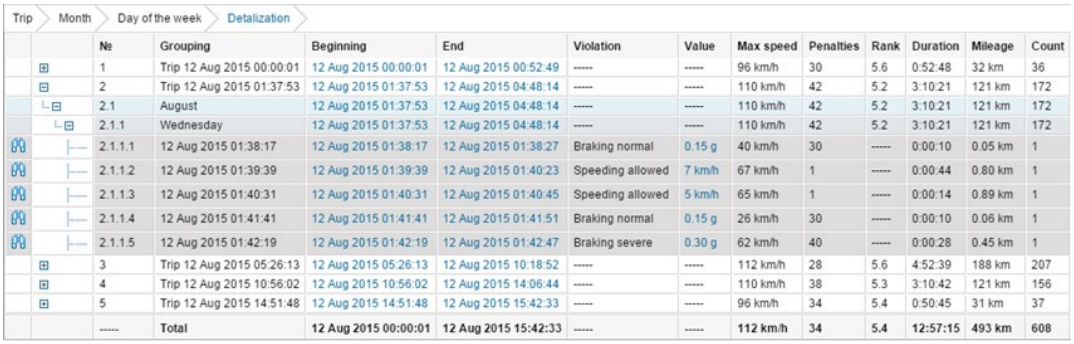
The report provides you with the information on how a driver handles the entrusted vehicle. Analysis of the driving behaviour can help you extend the life of the vehicle, reduce fuel costs, ensure cargo safety and also understand the reason of any case of emergency.

Before generating the *Eco Driving* report it is necessary to indicate settings on the corresponding tab of the unit properties dialog.

A table may contain the following information:

- **Violation** — the type of violation. When you use grouping, violations with the same name will be merged into one group.
- **Beginning** — the time when violation began.
- **Initial location** — an address of unit location on the moment of violation beginning.
- **End** — the end time of violation.
- **Final location** — the address where the unit was located at the moment of the end of the violation interval.
- **Value** — the parameter value during the violation.
- **Avg speed** — the average speed during the violation.
- **Max speed** — the maximum speed during the violation.
- **Penalty** — the penalty value indicated on the *Eco Driving* tab of the unit properties.
- **Rank** — the penalty points converted to a 6-point rating system (can be useful if grouping by years, months, weeks, days, shifts, or trips has been applied).
- **Rating by violations** — an individual index number of a unit/driver calculated on the basis of the committed violations. The lower the rating, the less violations are committed. ⓘ This column can be used in the report on unit groups and driver groups only.
- **Mileage** — mileage for the interval of violation or grouping.
- **Mileage (adjusted)** — mileage taking into account the coefficient set in unit properties (the *Advanced* tab).
- **Initial mileage** — the mileage counter value at the moment of the beginning of the violation. If the mileage parameter was not saved at the reporting interval, the mileage is counted from zero.
- **Final mileage** — the mileage counter value at the end of the violation interval.
- **Duration** — the duration of the violation or grouping interval.
- **Count** — the number of violations of this type.
- **Driver** — the name of the driver on this vehicle.

Special attention should be paid to the *Rating by violations* column. It can be used in the report on unit groups and driver groups only. If the column is included in the table, then units/drivers can be placed in the table according to the violations committed (from the lower rating to the highest one). To do this, select the total grouping by rating in the parameters of the report template. The violations rating is calculated by the system on the basis of the eco driving ranks. In case the ranks are similar, the system takes the covered mileage into account. The higher the mileage value woith the same rating, the lower the rating by violations is. Note that the system supports visual marking of the rating fields according to the eco driving rank. To do this, select the colors and the values matching them in the corresponding block of the report template parameters.



Trip | Month | Day of the week | Detalization

	№	Grouping	Beginning	End	Violation	Value	Max speed	Penalties	Rank	Duration	Mileage	Count
⊞	1	Trip 12 Aug 2015 00:00:01	12 Aug 2015 00:00:01	12 Aug 2015 00:52:49	-----	-----	96 km/h	30	5.6	0:52:48	32 km	36
⊟	2	Trip 12 Aug 2015 01:37:53	12 Aug 2015 01:37:53	12 Aug 2015 04:48:14	-----	-----	110 km/h	42	5.2	3:10:21	121 km	172
└⊟	2.1	August	12 Aug 2015 01:37:53	12 Aug 2015 04:48:14	-----	-----	110 km/h	42	5.2	3:10:21	121 km	172
└⊟	2.1.1	Wednesday	12 Aug 2015 01:37:53	12 Aug 2015 04:48:14	-----	-----	110 km/h	42	5.2	3:10:21	121 km	172
	2.1.1.1	12 Aug 2015 01:38:17	12 Aug 2015 01:38:17	12 Aug 2015 01:38:27	Braking normal	0.15 g	40 km/h	30	-----	0:00:10	0.05 km	1
	2.1.1.2	12 Aug 2015 01:39:39	12 Aug 2015 01:39:39	12 Aug 2015 01:40:23	Speeding allowed	7 km/h	67 km/h	1	-----	0:00:44	0.80 km	1
	2.1.1.3	12 Aug 2015 01:40:31	12 Aug 2015 01:40:31	12 Aug 2015 01:40:45	Speeding allowed	5 km/h	65 km/h	1	-----	0:00:14	0.89 km	1
	2.1.1.4	12 Aug 2015 01:41:41	12 Aug 2015 01:41:41	12 Aug 2015 01:41:51	Braking normal	0.15 g	26 km/h	30	-----	0:00:10	0.06 km	1
	2.1.1.5	12 Aug 2015 01:42:19	12 Aug 2015 01:42:19	12 Aug 2015 01:42:47	Braking severe	0.30 g	62 km/h	40	-----	0:00:28	0.45 km	1
⊞	3	Trip 12 Aug 2015 05:26:13	12 Aug 2015 05:26:13	12 Aug 2015 10:18:52	-----	-----	112 km/h	28	5.6	4:52:39	188 km	207
⊞	4	Trip 12 Aug 2015 10:56:02	12 Aug 2015 10:56:02	12 Aug 2015 14:06:44	-----	-----	110 km/h	38	5.3	3:10:42	121 km	156
⊞	5	Trip 12 Aug 2015 14:51:48	12 Aug 2015 14:51:48	12 Aug 2015 15:42:33	-----	-----	96 km/h	34	5.4	0:50:45	31 km	37
	-----	**Total**	**12 Aug 2015 00:00:01**	**12 Aug 2015 15:42:33**	-----	-----	**112 km/h**	**34**	**5.4**	**12:57:15**	**493 km**	**608**

Note that it is easier to analyse the received report, if the grouping option was applied to the report template. The information received in the report can be grouped on the basis of different criteria, such as time (year, month, week, day, shift), type of violation and trips.

Moreover, in addition to grouping an option of detalization can be applied. This option allows to view the final level of nesting (date and time) inside of grouping. However, take into consideration that a penalty and rank can be given for a violation that occured at a certain time interval (not immediately). That is why on the final level of nesting (date and time) a dash is given in the *Rank* column, and the *Penalty* column receives the value indicated on the *Eco Driving* tab of the unit properties.

If grouping is used in the *Eco driving* table or the *Total* line is added to it, the *Duration* column indicates the duration of the **trips** at the specified time interval and not the duration of the violations.

Penalty Scoring System

The value of penalty points for a particular criterion is indicated on the *Eco driving* tab of the unit properties dialog. Afterwards the indicated points are used in the report for driving quality evaluation. The calculation of penalty points is made using the special algorithm. The main peculiarities are presented below.

Without grouping

- If no averaging has been used, the penalty value (earlier indicated on the *Eco Driving* tab) is displayed next to every criterion in the corresponding column. The *Total* line (if available) contains the value which corresponds to the sum of points scored for violations.
- If averaging (by mileage/by time) has been used, the main difference is that the *Total* value corresponds to the value received as a result of dividing the total number of scored penalty points by the number of minute intervals (averaging by time), or by the number of kilometer intervals (averaging by mileage) in a trip.

With grouping

- If no averaging has been used, the total number of penalty points for the violations of a particular group is displayed next to every group in the corresponding column. The *Total* line (if available) contains a sum of penalty scores received for all the violations.
- If averaging (by mileage/by time) has been used, this averaging is applied to every group of parameters in the report table. Besides, if the *Total* line is available, the averaging will be applied to the total number of the scored penalty points. The algorithm of averaging is described above. You can also get acquainted with it on the *Eco Driving* tab of the unit properties dialog.

Penalty–Rank Conversion

The system allows to recalculate the received penalties into a six-point evaluation system.

The following algorithm is used:

Penalty	Rank

0	6.0
Less than 20	5.9
20-50	5.0
50-100	4.0
100-200	3.0
200-500	2.0
More than 500	1.0

Engine Hours

The *Engine hours* report shows how long the unit worked, how much time was in motion, how much fuel was spent for this period. Also, the duration and efficiency of the work of the attachable equipment can be shown.

To generate this report, the unit is supposed to have such sensors as ignition or absolute/relative engine hours sensor. The method of calculating engine hours is set in Unit Properties –> General. In Unit Properties –> Advanced you can also set *Daily engine hours rate* to calculate utilization and productivity.

There are two properties which can be used in engine hours report. They are timeout (indicated for a sensor) and maximum interval between messages (set for a unit). Both properties are used to cut off invalid intervals when the amount of engine hours is defined. If values for both timeout and maximum interval between messages are indicated, the system will use the property with the minimum value indicated.

Additionally, you can specify the daily engine hours. For this, enter the name mask of the engine hours sensor in a special filter in the reports template. It allows to create a separate table for each engine if there are several.

The table can contain the following columns:

Beginning	Initial location	End	Engine hours	Total time	Mileage
2015-05-30 06:10:10	Mex-2, San Luis Río Colorado	2015-05-30 10:19:13	4:09:03	4:09:03	155 km
2015-05-30 16:55:11	Mex-2, Puerto Peñasco	2015-05-30 17:14:50	0:19:39	0:19:39	0.17 km
2015-05-30 17:44:42	Mex-2, Puerto Peñasco	2015-05-30 19:38:12	1:53:30	1:53:30	131 km
2015-05-30 20:08:35	Mex-2, Altar	2015-05-31 08:34:26	12:25:51	12:25:51	796 km
2015-05-31 17:35:05	Avenida Monte Seir, Fracc Santa Rocío	2015-05-31 17:35:56	0:00:51	0:00:51	0.01 km
2015-05-31 17:45:46	Avenida Monte Seir, Fracc Santa Rocío	2015-05-31 18:12:54	0:27:08	0:27:08	8.64 km
2015-05-31 18:56:07	Boulevard Jesús Kumate Rodríguez, Culiacán	2015-05-31 19:15:02	0:18:55	0:18:55	8.83 km
2015-06-01 21:58:49	Avenida Quinta Poniente, Fracc Santa Rocío	2015-06-01 22:06:35	0:07:46	0:07:46	0.62 km
2015-06-05 03:37:19	Avenida De Los Hacendados, Penitenciaría	2015-06-07 00:14:13	44:36:54	1 days 20:36:54	1225 km
2015-06-07 03:40:51	Avenida Siderita 1461, Ampl Valle Del Pedregal	2015-06-07 04:36:00	0:55:09	0:55:09	0.00 km
2015-06-07 10:26:49	Avenida Siderita 1461, Ampl Valle Del Pedregal	2015-06-07 10:39:11	0:12:22	0:12:22	0.00 km

- **Beginning** — the time when the engine hours interval begins.
- **Initial location** — the location at that moment.
- **End** — the time when the engine hours interval ends.
- **Final location** — the location at that moment.
- **Engine hours** — the value of engine hours on the interval. For an accurate engine hours calculation, the equipment should send a valid parameter value of the engine sensor. In case of receiving an invalid value, it is necessary to replace the sensor with validator using the correct value (for example, 0).
- **Initial engine hours** — the value of engine hours at the beginning of the interval.
- **Final engine hours** — value of engine hours at the end of the interval.
- **Total time** — duration of the interval. If grouping by days is enabled, it shows the time from the beginning of the first engine hours interval to the end of the last interval.
- **Off-time** — the period of time passed from the end of the previous interval to the beginning of the current one (determined starting from the second interval).
- **In movement** — the interval of time during which the unit moved.
- **Idling** — the time when the unit was standing with the engine on. Note that idling cannot be detected if the equipment does not send messages containing speed value.
- **Mileage** — the distance traveled during the operating hours.
- **Mileage (adjusted)** — mileage subject to the coefficient set in the unit properties (the *Advanced* tab).
- **Initial mileage** — the value of the mileage sensor at the moment of the beginning of the reporting period.
- **Final mileage** — the value of the mileage sensor at the end of the reporting period.
- **Avg speed** — average speed during the interval of engine operation.

- **Max speed** — the maximum speed during the interval of engine operation.
- **Counter** — the counter sensor value.
- **Initial counter** — the counter value at the beginning of the interval.
- **Finale counter** — the counter value at the end of the interval.
- **Avg engine revs** — the average rate of engine revolutions.
- **Max engine revs** — the maximum rate of engine revolutions.
- **Avg temperature** — the average temperature value registered for the interval of engine operation.
- **Min temperature** — the minimum temperature value registered for the interval of engine operation.
- **Max temperature** — the maximum temperature value registered for the interval of engine operation.
- **Initial temperature** — the temperature value at the beginning of engine hours operation.
- **Final temperature** — the temperature value the end of engine hours operation.
- **Status** — the status of the unit registered during engine hours operation (if there are several, the first one is displayed).
- **Cargo weight** — the weight of the transported cargo.
- **Driver** — the name of the driver (if identified).
- **Trailer** — the name of the trailer (if it was bound).
- **Movement productivity** — percentage ratio of engine hours in movement to the duration of engine hours.
- **Engine efficiency duration** — the duration of the operation of attached equipment (if there is the engine efficiency sensor).
- **Engine efficiency idling** — the engine operation time after deduction of efficiency time (total engine hours subtract engine efficiency duration).
- **Utilization** — the percentage ratio of the duration of engine hours to engine hours rate (engine hours divided by daily engine hours rate indicated in the unit properties).
- **Useful utilization** — the percentage ratio of the duration of engine efficiency to the engine hours rate.
- **Productivity** — the percentage ratio of the duration of engine efficiency to the duration of engine hours.
- **Consumed** — the volume of consumed fuel detected by any sort of fuel sensor. If several sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the fuel volume used in engine hours. It can be detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Here you can find more details about fuel in reports.
- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several sensors are available, their values sum up.
- **Avg consumption by …** — the average consumption in engine hours.
- **Consumed in motion by …** — the fuel volume used in engine hours while moving.
- **Avg consumption in motion by …** — the average consumption in engine hours while moving.
- **Consumed in idle run by …** — the fuel volume used in engine hours during idle running.
- **Avg consumption in idle run by …** — the average fuel consumption in idling.
- **Avg consumption by … in trips** — the average fuel consumption in trips.
- **Initial fuel level** — the fuel level at the beginning of the interval.
- **Final fuel level** — the fuel level at the end of the interval.
- **Max fuel level** — the maximum fuel level.
- **Min fuel level** — the minimum fuel level.
- **Penalties** — the penalties calculated for the adjusted Eco Driving criteria.
- **Rank** — the received penalty points converted into a grade using 6 point scoring system.
- **Notes** — an empty column for your custom comments.

For the engine hours report, you can apply intervals filtration by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, driver, trailer, fuel fillings, fuel thefts, and geofences/units. If the engine hours are counted according to the engine hours sensor, it is possible to filter the intervals not only by the duration of their operation (i.e., the duration of their on-state), but also by the value of the engine hours sent by the sensor itself.

Events

All events registered by the system (including violations) can be shown in the report on events.

There are different ways to add events to the unit history:

1. Using notifications if the method of delivery is *Register event for unit*.
2. Manually using the events registrar.
3. Save, reset, change the values of counters with the help of the corresponding jobs or notifications.
4. Manually using custom events registered from the online notifications window.
5. Automatically, upon completing a route by the unit.

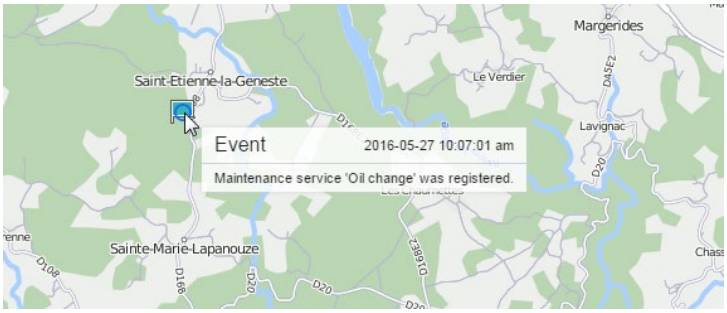
To get a report on specific events, in the report template you can additionally specify a **mask**. Based on this mask, only those events whose text (description) corresponds to the specified parameters (for instance, the notification text) will be selected for the report generation.

The following columns can be displayed in this report:

- **Event time** — the time when the event happened.
- **Time received** — time when the server received the data.
- **Event text** — the text that was specified when creating a notification or when registering an event manually.
- **Location** — the location of the unit at the moment of the event. If the event is registered manually, the unit's location is detected on the basis of messages received upon event registration. The same is true for the events registered by storing counters' values in the unit properties.
- **Driver** — the name of the driver (if identified).
- **Count** — the count of events.
- **Notification text** — the text available upon registering an event from an online notifications window.
- **Notes** — an empty column for your custom comments.

Event time	Time received	Event text	Location
2015-11-24 15:38:54	2015-11-24 15:38:54	Route 'España': unit is late.	Carretera de Puertollano 2
2015-11-24 15:43:05	2015-11-24 15:43:05	Route 'Nueva ruta1': unit is late.	Carretera de Puertollano 2, Ciudad Real 13002
2016-01-28 09:57:00	2016-03-28 09:57:58	Maintenance service 'Wheel balancing' was registered.	London Road 87-91, Corringham
2016-02-28 09:56:00	2016-03-28 09:56:56	Fuel filling of 50 lt to the amount of 85 was made	Lexham Gardens 48-86, Kensington
2016-03-25 11:31:00	2016-03-25 11:33:02	Maintenance service 'Oil change' was registered.	Luke Lane 1-5, Churchdown
2016-03-28 09:56:00	2016-03-28 09:56:16	Business	-----
2016-03-29 15:19:57	2016-03-29 15:19:57	Mileage counter value is 10 km.	-----
2016-04-11 12:44:23	2016-04-11 12:44:23	Mileage counter value is 200000 km.	-----
2016-05-24 16:06:10	2016-05-24 16:06:10	Mileage counter value is 200000 km.	-----
2016-05-27 10:07:01	2016-05-27 10:11:13	Maintenance service 'Oil change' was registered.	D168, Saint-Etienne-la-Geneste 19160

In addition, you can use special markers for this report: a green flag stands for an event, a red flag — for a violation. In the tooltip you can find the detailed information. The markers of events and violations are enabled with the help of additional settings in the report template *Event markers*.



Executed Commands

This kind or report lists all the commands that were sent to a unit and successfully executed. Possible columns are:

- **Sending time** — the time when the command was sent to the unit.
- **User** — the name of the user who sent the command (hidden if you do not have access rights to the user).
- **Command name** — the name of the command as it is written in the unit properties.
- **Command type** — the type of the command (see the list).
- **Parameter** — the additional parameter in the command (some commands do not have such parameters).
- **Execution time** — the time when the command was executed.
- **Channel** — the type of connection used to execute the command (*TCP*, *UDP*, *Virtual*, *SMS*).
- **Count** — the number of sent commands.
- **Notes** — an empty column for your custom comments.

Sending time	User	Command name	Command type	Parameters	Execution time	Channel
2012-08-02 18:13:07	wialon	45645646	Query position	-----	2012-08-02 18:13:08	SMS
2012-08-02 18:18:33	wialon	Engine on	Unblock engine	-----	2012-08-02 18:18:34	SMS
2012-08-02 18:20:20	wialon	Message 1	Custom message	yahoo!	2012-08-02 18:20:20	Virtual
2012-08-02 18:23:12	user	Where	Query position	-----	2012-08-02 18:23:13	TCP
2012-08-02 18:23:17	user	Where	Query position	-----	2012-08-02 18:23:18	TCP
2012-08-02 18:23:25	user	Fridge yes	Activate output	6	2012-08-02 18:23:25	SMS
2012-08-02 18:24:31	wialon	Message 1	Custom message	hello!	2012-08-02 18:24:31	Virtual
2012-08-02 18:25:34	wialon	Where	Query position	-----	2012-08-02 18:25:35	SMS
2012-08-02 18:25:38	wialon	Where	Query position	-----	2012-08-02 18:25:39	SMS

This is the list of successfully executed commands. To view *all* the commands sent to the unit regardless of their execution, go to the *Messages* panel.

More details about the commands can be found in the Commands section.

Fuel Fillings

This report shows where and when a vehicle was filled up. The parameters for the report are set in Unit Properties –> Fuel Consumption. This report is generated on the basis of fillings registered manually or detected by sensors. The table cannot be generated if no fuel fillings are found for the indicated time interval.

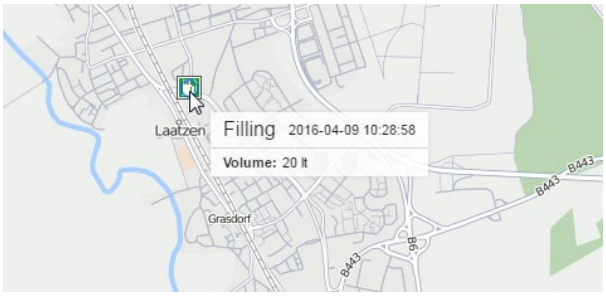
This report may include the following columns:

- **Time** — the moment of the most significant change in the fuel level.
- **Location** — the location of the unit at the time of filling (if a filling is registered manually, the location of the unit is detected on the basis of the messages received at the time of filling registration).
- **Initial fuel level** — the fuel level before the filling.
- **Final fuel level** — the fuel level after the filling.
- **Filled** — the volume of filled fuel (the name of the sensor can be indicated in parenthesis).
- **Registered** — the volume of registered fuel.
- **Difference** — the difference between the detected and registered filling volume.
- **Description** — a brief description indicated during the manual registration of fuel filling.
- **Sensor** — the sensor which detected the filling.
- **Driver** — the name of the driver (if identified).
- **Trailer** — the name of trailer (if one was bound).
- **Count** — the number of fillings.
- **Counter** — the indications of the counter sensor.
- **Mileage** — the mileage sensor value at the moment of filling. If the mileage parameter was not saved throughout the reported period, the mileage is counted from 0.
- **Notes** — an empty column for your custom comments.

Time	Location	Filled	Sensor name	Mileage
2015-12-11 13:21:56	Temasek Boulevard, 3, Singapore	15 l	Fuel level	6.23 km
2015-12-11 13:30:31	East Coast Park Service Road, Singapore	25 lt	Fuel level	14.67 km
2015-12-11 13:49:26	Temasek Boulevard, 3, Singapore	50l	Fuel level	36 km
2015-12-11 14:03:04	Temasek Boulevard, 3, Singapore	14.40 lt	Fuel level	53 km
2015-12-11 14:16:49	Temasek Boulevard, 3, Singapore	35 l	Fuel level	70 km
2015-12-11 14:30:30	Temasek Boulevard, 3, Singapore	24 l	Fuel level	87 km
2015-12-11 14:44:15	Temasek Boulevard, 3, Singapore	43 l	Fuel level	103 km

The intervals filtration by geofences/units, drivers, trailers, filling volume, and sensor masks can be additionally applied to this table. Note that in the case of sensor masks, intervals filtration is only applied to the fuel filling detected by sensors.

You can use special markers for this report to mark places of fillings on the map.



See also Fuel Thefts.

Fuel Thefts

In this report, you can find out when, where and how much fuel was stolen. The parameters for this report are set in Unit Properties –> Fuel Consumption.

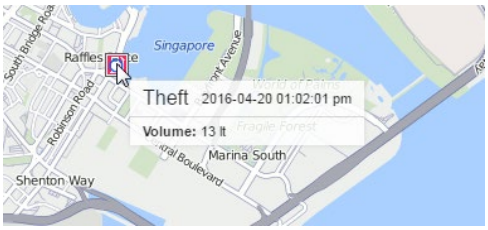
In the table, you can have the following columns:

- **Beginning** — the date and time when the theft began.
- **Initial location** — the unit location at the time of the beginning of theft.
- **Time** — the moment of the most significant drop in the fuel level.
- **Final location** — the location of the unit at the time of the end of theft.
- **Initial fuel level** — fuel level before the theft.
- **Initial speed** — the speed at the time of the beginning of theft.
- **Stolen** — the stolen fuel volume.
- **Final fuel level** — the fuel level after the theft.
- **Final speed** — the speed of movement at the time of the end of theft.
- **Sensor name** — the sensor that detected fuel theft.
- **Driver** — the name of the driver (if identified).
- **Trailer** — the name of the trailer (if one was bound).
- **Count** — the number of thefts.
- **Counter** — the counter sensor value.
- **Mileage** — the mileage sensor value at the moment of theft. If the mileage parameter was not saved throughout the reported period, the mileage is counted from 0.
- **Notes** — an empty column for your custom comments.

Beginning	Initial location	Initial fuel level	Stolen	Final fuel level	Sensor name	Driver
2012-11-19 10:26:46	Bemeroder Straße	125.04 lt	42.54 lt	82.50 lt	fuel_10	987654
2012-11-23 11:09:47	Alte Kronsbergstraße	130.20 lt	52.85 lt	77.34 lt	fuel_10	987654
2012-11-26 12:46:23	Giesener Straße	103.12 lt	20.62 lt	82.50 lt	fuel_5	987654

The intervals filtration by geofences/units, driver, trailer, and theft volume can be additionally applied to this table.

Special markers can be shown on the map in the places of thefts.



See also Fuel Fillings.

Fuel Traffic

This report is designed to display the data about fuel fillings and thefts, as well as the intervals of operation of the counter sensor of the unit in one table.

For each type of activity (fuel filling, theft, counter operation) you can customize its intervals filtration in the parameters of the table. If in the filtration parameters there are other selected units and at the moment of activity they were close to the unit for which the report is executed, the algorithm of fuel fillings analysis is run. Thus, when executing, for example, a report on a tanker, one can see not only its fuel activity, but also the amount of fuel received by the units near it (at least one message from such units should be received during the activity interval from a distance less than the radius specified in the filtration parameters).

Read about setting the parameters used in the report in the *Fuel Consumption* and *Sensor Properties* sections.

The *Fuel Traffic* report may include the following columns:

- **Beginning** — depending on the type (see below) — the activation time of the sensor, the time of the fuel filling or theft.
- **End** — depending on the type — the deactivation time of the sensor, the time of the fuel filling or theft.
- **Duration** — the time from the beginning to the end (0 for fuel fillings and thefts).
- **Location** — the position of the unit while sending the data (is associated with the *End* field).
- **Type** — the kind of the current activity determined by the system (filling, theft, counter operation).
- **Volume** — depending on the type — the quantity calculated by the counter sensor or the data from the *Filled* or *Stolen* columns taken from the columns of the same name in the corresponding tables.
- **Sensor name** — the name of the sensor by which the type was determined.
- **Geofences/Units** — the column that includes the names of the geofences or units with which an intersection was recorded during a given interval. Necessary geofences and units are indicated in the filtration parameters. If there are several geofences or units that have been triggered, the report displays the name of the geofence with the smallest surface or the name of the unit with the smallest radius of approximation. If the sizes coincide, all the names are included.
- **Filled** — the sum of the fuel fillings (if any) of the units shown in the *Geofences/Units* column. Only the fillings registered automatically and the time of which is within the interval from *Beginning* to *End* are taken into account.
- **Deviation** — the difference between the values of the *Volume* and *Filled* columns.
- **Driver** — the name of the driver assigned to the unit on the current interval.
- **Notes** — an empty column where you can introduce your custom comments after you have printed or exported the report.

Beginning	Duration	Location	Type	Volume	Sensor name	Filled	Deviation	Notes
2017-02-03 08:24:06	0:07:44	Windy Bank Lane, Dewsbury, England	Counter	25 l	DFM	-----	-----	
2017-02-03 08:52:51	0:09:52	Windy Bank Lane, Dewsbury, England	Counter	45 l	DFM	-----	-----	
2017-02-03 09:16:49	0:03:23	Windy Bank Lane, Dewsbury, England	Counter	78 l	DFM	-----	-----	
2017-02-03 09:22:28	0:03:06	Windy Bank Lane, Dewsbury, England	Counter	51 l	DFM	-----	-----	
2017-02-03 09:25:51	0:02:54	Windy Bank Lane, Dewsbury, England	Theft	105 l	FLS	95	10	
2017-02-03 09:28:45	0:00:16	Windy Bank Lane, Dewsbury, England	Counter	34 l	DFM	-----	-----	
2017-02-03 09:29:01	0:00:26	Windy Bank Lane, Dewsbury, England	Counter	29 l	DFM	-----	-----	
2017-02-03 09:49:27	0:08:38	Windy Bank Lane, Dewsbury, England	Counter	28 l	DFM	-----	-----	

Geofences

To generate a report on geofences, you should select one or several geofences in the parameters of the table. In this report you can use both the geofences from the resource in which the report template is created and the geofences from other resources to which the user has the *View geofences* access right. The resource is selected in the dropdown list above the list of geofences. It is also possible to select the *All* option — the list will contain the geofences from all the resources to which the user has the necessary access right. The geofences in the list are sorted by name. To quickly find one, use the dynamic filter.

The following columns can be selected for this table:

- **Geofence** — the name of the geofence.
- **Type** — polygon, line, circle, unit (if units are selected instead of geofences in the report template).
- **Area** — the total area of the geofence (if the metric system is used, the area will be indicated in hectares).
- **Perimeter** — the perimeter of the geofence. The perimeter for a line is its length (line thickness is not taken into account).
- **Description** — description of the geofence (taken from the geofence properties).
- **Time in** — the time when the unit entered the geofence.
- **Time out** — the time when the unit left the geofence.
- **Duration in** — the duration of the visit.
- **Total time** — the time from the beginning of the first visit to the end of the last one.
- **Parkings duration** — the time spent in parkings.
- **Off-time** — the time between the previous visit and the current one (is defined starting from the second visit of the geofence).
- **Mileage** — mileage inside the zone.
- **Mileage (adjusted)** — mileage subject to the coefficient set in the unit properties (on the *Advanced* tab).
- **Counter** — the value of the counter sensor.
- **Initial counter** — the counter value when entering the geofence.
- **Finale counter** — the counter value when exiting the geofence.
- **Avg engine revs** — the average rate of engine revolutions.
- **Max engine revs** — the maximum rate of engine revolutions.
- **Avg temperature** — the average temperature value registered inside a geofence.
- **Min temperature** — the minimum temperature value registered inside a geofence.
- **Max temperature** — the maximum temperature value registered inside a geofence.
- **Initial temperature** — the temperature value when entering a geofence.
- **Final temperature** — the temperature value when leaving a geofence.
- **Off-mileage** — the mileage traveled from the previous visit.
- **Off-mileage (adjusted)** — the mileage traveled from the previous visit subjected to the coefficient.
- **Avg speed** — the average speed with which the unit moved in the geofence.
- **Max speed** — the maximum speed with which the unit moved in the geofence.
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if one was bound).
- **Visits** — the number of visits (can be helpful either in grouping table data by years/months/weeks/days/shifts or for the reports on unit groups).
- **Consumed** — the amount of consumed fuel detected by any sort of fuel sensor. If several sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the volume of consumed fuel detected by a

fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. More details about fuel in reports can be found here.

- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the average fuel consumption by one of the methods mentioned above.
- **Penalties** — the penalties calculated for the adjusted Eco Driving criteria.
- **Rank** — penalty points converted to a 6-point rating system.
- **Notes** — an empty column for your custom comments.

Geofence	Type	Perimeter	Time in	Duration in	Mileage	Max speed
Grot	Polygon	17.50 km	2013-01-15 16:01:00	0:03:00	6.28 km	45 km/h
Furnaces ITK	Line	20.98 km	2013-01-15 16:04:00	0:02:00	2.88 km	35 km/h
Garage	Circle	8.53 km	2013-01-15 16:11:00	0:04:00	7.20 km	47 km/h
Furnaces ITK	Line	20.98 km	2013-01-15 16:24:02	0:01:59	6.17 km	56 km/h
Settlement	Circle	18.85 km	2013-01-15 16:24:02	0:01:59	6.17 km	56 km/h
Grot	Polygon	17.50 km	2013-01-15 16:30:01	0:03:00	6.28 km	45 km/h
Furnaces ITK	Line	20.98 km	2013-01-15 16:33:01	0:02:00	2.88 km	35 km/h

Instead of geofences, you can select units in the reports template. Additionally, indicate the radius for these units (in meters). In this case, the units are considered as *moving geofences*, and the activity of the selected unit is analyzed with respect to these moving geofences. The *Query reports or messages* access is required to these units.

The intervals filtration by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, drivers, trailers, fuel fillings and thefts can be applied to this table.

Geofences can be displayed on the map. To do this, activate the *Render geofences* option in the report template.

Note that the monitoring system provides a possibility to detect a geofence visit at its intersection with the segment of the trip track. This option can be enabled in the General settings of the report template.

See related reports — Non-visited Geofences, Rides.

GPRS Traffic

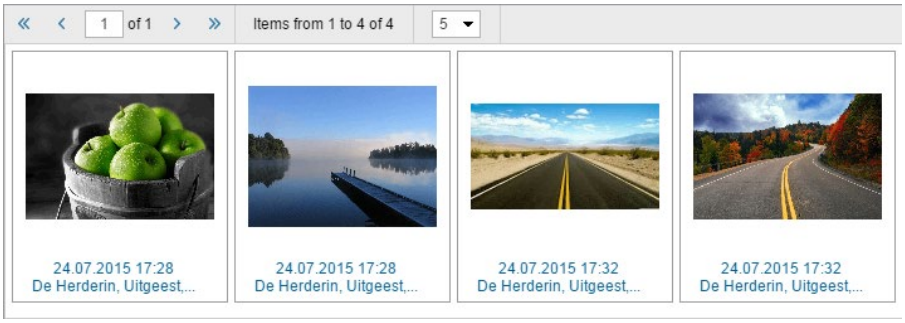
This report is executed if a unit has registered events of GPRS traffic counter reset or traffic storage was adjusted with the help of a corresponding job.

Time	Current value	Absolute value	Reset	Notes
2017-07-20 12:14:02	6.39 MB	0 B	No	
2017-07-20 12:29:02	350 KB	0 B	Yes	
2017-07-20 12:44:02	500 KB	0 B	Yes	
2017-07-20 12:59:02	350 KB	0 B	No	
2017-07-20 13:14:02	68 KB	0 B	No	
2017-07-20 13:29:02	6.39 MB	6.39 MB	Yes	
2017-07-20 13:44:02	0 B	6.39 MB	Yes	
2017-07-20 13:59:02	0 B	6.39 MB	Yes	

- **Time** — the time when the counter value was registered.
- **Current value** — the value at the moment of registration.
- **Absolute value** — the total size of GPRS traffic at the moment of registration.
- **Reset** — determines whether the reset of GPRS trafic was detected. *Yes* — detected, *No* — not detected.
- **Notes** — an empty column for your custom notes.

Images

This report shows all the images received from a unit. Click on the image to open it. Click *Save as* in the lower left corner of the image file viewer to save it.



Moreover, every image contains additional information, such as the date, time, and the place of sending the image. Click on this information to center the map on the location of the unit at the moment of sending the image. The location is shown on the map with the blue marker.

In addition, you can use special markers for this report.

Logs

The *Log* table can be generated for units, unit groups, users, resources, retranslators or routes. The log contains records about changes made in the properties of the object or its contents. To view the log of a unit, in addition to the *Query messages or reports* access right, you need the *Manage log* access.

- **Time** — the date and time when the change was saved.
- **User** — the name of the user who made the change. You can specify the username mask in the report template so that only the changes made by a certain user will be displayed.
- **Item name** — the name of the item. ⓘ This column is used only in the user report.
- **Item type** — a unit, unit group, user, resource, retranslator or route.
- **Action** — the description of the change made.
- **Host** — the address of the computer from which the user made the changes, or *job* or *notification* if the change was made as a result of automatic system actions.
- **Notes** — an empty column for custom notes.

Log example for a resource:

Time	User	Item type	Action	Host
2012-07-13 12:42:31	Duremar	Resource	Job 'locate' switched on.	10.1.3.11
2012-07-13 12:42:31	Duremar	Resource	Job 'locate' updated.	10.1.3.11
2012-07-13 12:54:44	user	Resource	Job 'SMS SIM's' switched off.	10.1.3.11
2012-07-13 13:23:22	user	Resource	Job '1_fish-004-picasso' created.	10.1.3.11
2012-07-13 13:47:22	Duremar	Resource	Job '1_fish-004-picasso' updated.	10.1.3.11
2012-07-13 14:33:08	Duremar	Resource	Notification 'Idles' updated.	10.1.3.11
2012-07-16 16:17:58	user	Resource	Job 'locate' switched off.	10.1.3.11
2012-07-16 16:18:00	user	Resource	Job '1_fish-004-picasso' switched off.	10.1.3.11
2012-07-16 17:55:22	Duremar	Resource	Driver 'Vodilla Duremara' created.	10.1.3.11
2012-07-16 17:59:00	Duremar	Resource	Driver 'VodDur' deleted.	10.1.3.11
2012-07-16 17:59:46	user	Resource	Access rights for user 'Duremar' changed	10.1.3.11

The user log presents two types of information: changes made by the user and changes made by other users in regards to this user as a system object. There is also the *Item name* column available in the log:

Time	User	Item name	Item type	Action	Host
2012-07-19 11:58:28	Duremar	user	Resource	Notification 'Idles' updated.	10.1.3.11
2012-07-19 11:58:28	Duremar	user	Resource	Notification 'SMS ctrl' updated.	10.1.3.11
2012-07-19 11:58:28	Duremar	user	Resource	Notification 'Уведомление о входе в зону' updated.	10.1.3.11
2012-07-19 11:59:35	Duremar	Duremar	Resource	Notification '32489' created.	10.1.3.11
2012-07-19 12:03:50	Duremar	SMS Sim004	Unit	Mileage counter changed from 888 km to 32489 km	notification
2012-07-19 12:03:56	Duremar	SMS Sim004	Unit	Mileage counter changed from 32489 km to 32489 km	notification
2012-07-19 14:02:36	user	Duremar	User	User flags changed.	10.1.1.3
2012-07-19 14:02:36	user	Duremar	User	Custom field 'wer' deleted	10.1.1.3

Group itself is an additional parameter for the log of a unit group. If this checkbox is disabled, the log shows the changes made to units in the group (the detalization is required in this case):

	Unit	Time	User	Item type	Action	Host	Count
⊟	123test	2012-07-19 10:20:29	user	Unit	Messages imported	10.1.3.11	3
	123test	2012-07-19 10:20:29	user	Unit	Messages imported	10.1.3.11	1
	123test	2012-07-19 11:30:43	user	Unit	Access rights for user 'Duremar' changed	10.1.3.11	1
	123test	2012-07-19 11:48:25	user	Unit	Custom field 'pole 2' created	10.1.3.11	1
	Picasso	-----	-----	-----	-----	-----	-----
⊞	SMS Sim004	2012-07-19 10:21:31	user	Unit	Messages imported	10.1.3.11	8
⊞	SMS Sim007	2012-07-19 10:25:10	user	Unit	Messages imported	10.1.3.11	3
	SMS Sim011	-----	-----	-----	-----	-----	-----

If the *Group itself* option is enabled, the log shows the changes made to the unit group as a system object:

Time	User	Item type	Action	Host
2012-07-19 14:06:55	user	Unit group	Units in group updated.	10.1.1.3
2012-07-19 14:06:55	user	Unit group	Access rights for user 'user007' changed	10.1.1.3
2012-07-19 14:06:55	user	Unit group	Unit icon changed	10.1.1.3
2012-07-19 14:06:55	user	Unit group	Custom field 'Satus' created	10.1.1.3

Maintenance

The *Maintenance* table contains the list of the service works performed during the indicated period and registered by the user for the selected unit. The following columns can be included in the table:

- **Service time** — the date and time indicated at the time of registration.
- **Registration time** — the date and time when the event was registered.
- **Kind of work** — the information taken from the *Kind of work* field.
- **Comment** — the information taken from the *Description* field.
- **Location** — the location indicated at registration.
- **Duration** — the duration of technical work.
- **Cost** — the cost of service.
- **Mileage** — the value of the mileage counter at the time of maintenance.
- **Engine hours** — the value of the engine hours counter at the time of maintenance.
- **Count** — the number of services.
- **Notes** — an empty column for your custom comments.

Service time	Kind of work	Location	Cost	Mileage	Engine hours
2012-10-15 18:24:00	TO-1	A9, Pegnitz	387.00	2193 km	2 days 7:00:00
2012-11-17 18:26:00	TO-2	-----	122.77	4610 km	7 days 21:00:00
2012-12-28 18:29:00	TO-1	A9, Pegnitz	403.00	5107 km	13 days 21:00:00
2012-12-04 16:19:00	Total condition	-----	58.00	7599 km	26 days 2:00:00
2013-02-04 16:18:00	Oil change	-----	67.00	7599 km	26 days 2:00:00
2013-02-04 16:19:00	Maintenance	Willy-Brandt-Platz	99.00	7599 km	26 days 2:00:00

Attention!
If the row in the table is blue, it means that the location was indicated on the map during the registration.

Messages Tracing

The main objective of this report is to facilitate the work with the parameters from the messages. That is why the parameter values are presented not as a single data array, but have a particular structure. It means that every parameter is located in its own column.

Along with the parameter values this report can include other columns:

- **Time** — the date and time when the message was sent.
- **Speed** — the speed of a unit from the received message.
- **Coordinates** — the coordinates of the unit.
- **Location** — the location of the unit at the time when the message was sent.
- **Value** — the value of the parameter sent in a message.
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if one was bound).
- **Notes** — an empty column to add your custom comments after printing or exporting the report.

№	Time	Speed	Coordinates	Location	device_status	hdop	mileage	pwr_ext	pwr_int
1	03.06.2015 02:00:03	12 km/h	36.893184 : -119.764280	USA, Fresno, E Sarazen Avenue	131458	1.04	580125.00	12.08	0.10
2	03.06.2015 06:00:00	12 km/h	36.893184 : -119.764280	USA, Fresno, E Sarazen Avenue	131458	1.04	580125.00	12.04	0.10
3	03.06.2015 06:06:25	14 km/h	36.893184 : -119.764280	USA, Fresno, E Sarazen Avenue	143746	1.04	580125.00	14.21	0.10
4	03.06.2015 06:06:51	27 km/h	36.893264 : -119.765128	USA, Fresno, E Sarazen Avenue	160134	1.54	580125.00	14.07	0.11
5	03.06.2015 06:06:54	19 km/h	36.893236 : -119.765256	USA, Fresno, E Sarazen Avenue	160134	1.16	580125.00	14.16	0.11
6	03.06.2015 06:06:55	22 km/h	36.893156 : -119.765336	USA, Fresno, N Ponderosa Dr	160134	1.04	580125.00	14.12	0.11
7	03.06.2015 06:06:57	27 km/h	36.893028 : -119.765344	USA, Fresno, N Ponderosa Dr	160134	1.51	580125.00	14.17	0.11
8	03.06.2015 06:07:15	45 km/h	36.891404 : -119.765352	USA, Fresno, N Ponderosa Dr	4354438	0.98	580125.00	14.15	0.10
9	03.06.2015 06:07:21	38 km/h	36.890688 : -119.765288	USA, Fresno, N Ponderosa Dr	4354438	1.03	580125.00	14.05	0.11
10	03.06.2015 06:07:29	23 km/h	36.890340 : -119.765152	USA, Fresno, N Millbrook Avenue	4354438	0.97	580125.00	13.98	0.10
11	03.06.2015 06:08:30	76 km/h	36.880464 : -119.768816	USA, Fresno, N Fort Washington Rd	4354438	0.97	580125.00	13.96	0.11
12	03.06.2015 06:09:18	63 km/h	36.874244 : -119.773840	USA, Fresno, N Fort Washington Rd	4354438	0.96	580125.00	13.90	0.10
13	03.06.2015 06:09:27	59 km/h	36.873620 : -119.775352	USA, Fresno, N Fort Washington Rd	4354438	0.97	580125.00	13.93	0.11
14	03.06.2015 06:10:08	29 km/h	36.872368 : -119.778968	USA, Fresno, N Friant Rd	4354438	0.96	580125.00	13.96	0.10
15	03.06.2015 06:10:11	35 km/h	36.872168 : -119.779080	USA, Fresno, N Friant Rd	4354438	1.40	580125.00	13.85	0.11

Note that you can click on a link in such columns as *Time*, *Coordinates* and *Speed* to view the position of a unit on the map.

Note.
This table cannot be generated for unit groups.

Orders

Attention!
To generate a report, activate the *Orders* service first.

This kind of report displays detailed information about orders that were used while creating the route in the Logistics app. The table can contain the following columns:

- **Name** — the name of the order.
- **Time from** — the time from which the order should be delivered (the beginning of the delivery interval).
- **Time to** — the time until which the order should be delivered (the end of the delivery interval).
- **Estimated arrival time** — the approximate time of arriving at the destination point (system calculation).
- **Actual arrival time** — the actual time of arriving at the destination point.
- **Deviation** — the difference between the actual and estimated arrival time.
- **Estimated mileage** — the approximate distance to the destination point (system calculation).
- **Actual mileage** — the actual distance to the destination point.
- **Estimated time to point** — the approximate time for covering the distance between the previous and current destination points (system calculation).
- **Actual time to point** — the actual time spent on covering the distance between the previous and current destination points.
- **Fuel consumed** — the amount of fuel spent on delivery.
- **Avg temperature** — the average temperature over the delivery period.
- **Min temperature** — the minimum temperature value registered for the interval of delivery.
- **Max temperature** — the maximum temperature value registered for the interval of delivery.
- **Initial temperature** — the temperature value at the beginning of delivery.
- **Final temperature** — the temperature value at the end of delivery.
- **Status** — the status of the order delivery (confirmed/rejected/not set).
- **Comment** — a comment entered when the status was submitted.
- **Address** — the address of the delivery point.
- **Weight** — total weight of goods in the order.
- **Volume** — the quantitative value (for example, items) of the order indicated at its creation.
- **Cost** — the total cost of goods in the order.
- **Client name** — the name of the client.
- **Driver** — the name of the driver.
- **Files** — the number of files attached to the order.

Order	Estimated mileage	Actual mileage	Status	Comment	Weight	Volume	Cost
Order1	3.20 km	3.50 km	Confirmed	no problem	250 kg	5	300
Order2	4.32 km	4.35 km	Confirmed	no problem	100 kg	2	500
Order3	5.38 km	4.82 km	Rejected	nobody home	600 kg	10	1000
Order4	15.27 km	13.19 km	Confirmed	no problem	50 kg	1	25
Order5	4.76 km	3.62 km	Confirmed	no problem	75 kg	2	240
Order6	5.50 km	5.35 km	Confirmed	no problem	111 kg	111	111
Order7	7.14 km	4.77 km	-----	-----	222 kg	222	22
Order8	13.37 km	13.19 km	-----	-----	45 kg	15	70
Order9	3.77 km	3.62 km	-----	-----	44 kg	44	44
Order10	5.03 km	5.25 km	Confirmed	-----	150 kg	3	600
Order11	3.85 km	3.80 km	Confirmed	-----	230 kg	5	170

Additional parameters can be selected for this kind of report. In other words, the report on orders can be generated on the basis of orders of the selected type:

- **All orders** — all orders for the indicated time period.
- **Visited** — the arrival of a courier to the address is fixed, or the status is set.
- **Visited late** — orders are visited and fixed with a delay, or the status is set with a delay.
- **Fulfilled** — the arrival of a courier to the address is detected and fixed, the *Confirm* status is set.
- **Rejected** — the orders for which the *Reject* status is set.
- **Visited without status** — the arrival of a courier to the address is detected, the status is not set.
- **Non-visited** — the arrival of courier to the address is not detected.

Non-visited Geofences

This report gives the list of geofences that were not visited during the indicated time period.

In the parameters of the table, select one or several geofences. In this report, you can use both the geofences from the resource in which the report template is created, as well as the geofences from other resources to which the user has the *View geofences* access right. The resource is selected in the dropdown list above the list of geofences. It is also possible to select the *All* option — then the list will contain the geofences from all the resources to which the user has the necessary access right. The geofences in the list are sorted by name. To quickly find one, use the dynamic filter.

Suppose, we have 11 points (geofences) that a unit should visit every day. We would like to find out whether there are geofences which were ignored within the work week from June 1 to June 5. To do this, we enable grouping by days (with detalization), select necessary geofences and columns for the table.

- **Geofence** — the name of the geofence.
- **Type** — the type of geofence: line, polygon, or circle.
- **Area** — the total area of the geofence (if the metric system is used, the area is indicated in hectares).
- **Perimeter** — the perimeter of the geofence.
- **Count** — the number of geofences that were skipped.
- **Description** — the information from the same-name field of the geofence's properties.
- **Notes** — an empty column for your custom comments.

From this report we see that on June 1 *Point 11* and *Point 7* were ignored, on June 4 — *Point 2*, and on June 5 — five geofences. June 2 and 3 are absent, which means that all the predefined geofences were visited on those days. You can click on the names of the geofences to move the map to their first point.

1 2	№	Date	Geofence	Type	Perimeter	Count
⊟	1	2012-06-01	-----	-----	-----	2
┆	1.1	-----	Point 11	Circle	2.09 km	1
┆	1.2	-----	Point 7	Polygon	1.47 km	1
⊟	2	2012-06-04	-----	-----	-----	1
┆	2.1	-----	Point 2	Circle	2.09 km	1
⊟	3	2012-06-05	-----	-----	-----	5
┆	3.1	-----	Point A	Line	152.82 m	1
┆	3.2	-----	Point 2	Circle	2.09 km	1
┆	3.3	-----	Point B	Line	813.81 m	1
┆	3.4	-----	Point 11	Circle	2.09 km	1
┆	3.5	-----	Point 7	Polygon	1.47 km	1

When the table is applied to a unit group, you can find one more parameter in the report template — **Consider group as a whole**. When the box is checked, a group report is structured in the same way as an individual report, and the information is given for each separate unit from the group. When the *Consider group as a whole* checkbox is marked, the report structure is different — you get the list of geofences that were not visited by any units from the group.

Parkings

Parkings are estimated according to the parameters set in the Trip Detection when configuring a unit. To get the information as accurate as possible, it is advised that you configure each parameter individually for every piece of equipment.

A parking is an interval of time when the following conditions are met:

1. **Insignificant speed**. The speed detected must fall in the range from 0 to the *Minimum moving speed*. When this speed is reached, the behavior of the unit is regarded as movement (=trip), if by the time and distance traveled it corresponds to the trip definition (the *Minimum trip time* and *Minimum trip distance* parameters). The parking, respectively, ends. However, if the time or distance traveled does not fit the scope of the trip, the parking is prolonged.

2. **Sufficient time interval**. This speed must continue for a period of time (and not less than *Minimum parking time*). If this time is not reached, the behaviour of the unit is not regarded as parking, but as a stop.

3. **Insignificant location change**. As it has been noted above, parking is also considered an insignificant movement in space, that is, a movement that does not exceed the *Minimum trip distance* parameter, if it is equal to or greater than the *Minimum parking time* parameter.

The following information is presented in this kind of report:

- **Beginning** — the time when the parking started.
- **End** — the time when the parking ended.
- **Duration** — the time interval of a parking.
- **Total time** — the time from the beginning of the first parking to the end of the last parking.
- **Off-time** — the time interval from the end of the previous parking to the beginning of the current parking (defined starting from the second parking).
- **Location** — the address where the unit was stationary. If there was an insignificant movement detected, the initial address is used.
- **Coordinates** — the coordinates of the unit during the parking (in decimal degrees).
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if one was bound).
- **Counter** — the values of the counter sensor.
- **Initial counter** — the counter value at the beginning of the parking.
- **Finale counter** — the counter value at the end of the parking.
- **Avg temperature** — the average temperature value registered for the parking interval.
- **Min temperature** — the minimum temperature value registered for the parking interval.
- **Max temperature** — the maximum temperature value registered for the parking interval.
- **Initial temperature** — the temperature value at the beginning of the parking interval.
- **Final temperature** — the temperature value at the end of the parking interval.
- **Avg weight** — the average weight value registered for the parking interval.
- **Min weight** — the minimum weight value registered for the parking interval.
- **Max weight** — the maximum weight value registered for the parking interval.
- **Initial weight** — the weight value at the beginning of the parking interval.
- **Final weight** — the weight value at the end of the parking interval.

Status — the status of the unit registered during the current parking interval (if there are several, the first one is displayed).

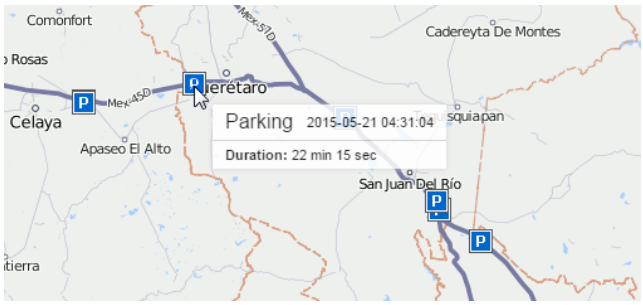
- **Count** — the number of parkings (useful when grouping rows by years/months/weeks/days/shifts or for the reports on unit groups).
- **Notes** — an empty column for your custom comments.

№	Beginning	End	Duration	Total time	Location
1	2015-05-01 00:06:56	2015-05-01 01:25:48	1:18:52	1:18:52	Mex-45D, Apaseo El Grande
2	2015-05-01 02:45:42	2015-05-01 04:18:04	1:32:22	1:32:22	Mex-45, Azteca
3	2015-05-01 05:55:09	2015-05-01 06:06:16	0:11:07	0:11:07	Mex-45D, Encarnación De Díaz
4	2015-05-01 06:22:27	2015-05-01 06:29:32	0:07:05	0:07:05	Mex-45D, Encarnación De Díaz
5	2015-05-01 07:50:26	2015-05-01 07:58:31	0:08:05	0:08:05	Boulevard A Zacatecas, Jesús María
6	2015-05-01 08:02:34	2015-05-01 13:37:56	5:35:22	5:35:22	Circuito Aguascalientes Norte, Jesús María
7	2015-05-01 15:16:01	2015-05-01 22:27:38	7:11:37	7:11:37	Libramiento, Res Tepeyac
8	2015-05-01 22:40:47	2015-05-01 23:39:36	0:58:49	0:58:49	Calle Productividad, Lagos De Moreno
9	2015-05-01 23:52:45	2015-05-02 01:28:18	1:35:33	1:35:33	Calle Productividad, Lagos De Moreno
10	2015-05-02 01:50:33	2015-05-02 07:22:04	5:31:31	5:31:31	Libramiento, Res Tepeyac

See Data in Reports to learn how time (duration) can be formatted.

The intervals filtration (by parking duration, sensor state, driver, trailer, fuel fillings/thefts, and geofences/units) can be applied to this table.

The parkings can be displayed on the map. To make use of this feature, select Parking markers in the report template.



Attention!
Parkings should be distinguished from stops.

Profile

This kind of report shows the profile information indicated on the corresponding tab of the unit properties dialog.

The following columns can be included in the table:

- **Name** — the name of an element.
- **Value** — the indicated value.
- **Notes** — an empty column for your custom comments.

Name	Value
Axles	2
Brand	VW
Cargo type	any
Carrying capacity, t	1.5
Color	red
Depth, mm	1500
Effective capacity	500
Gross vehicle weight	2.5
Height, mm	1500
Model	Multivan
Registration plate	0123oo7
Vehicle type	van
VIN	19YUA31581L000000
Width, mm	1500
Year	2010

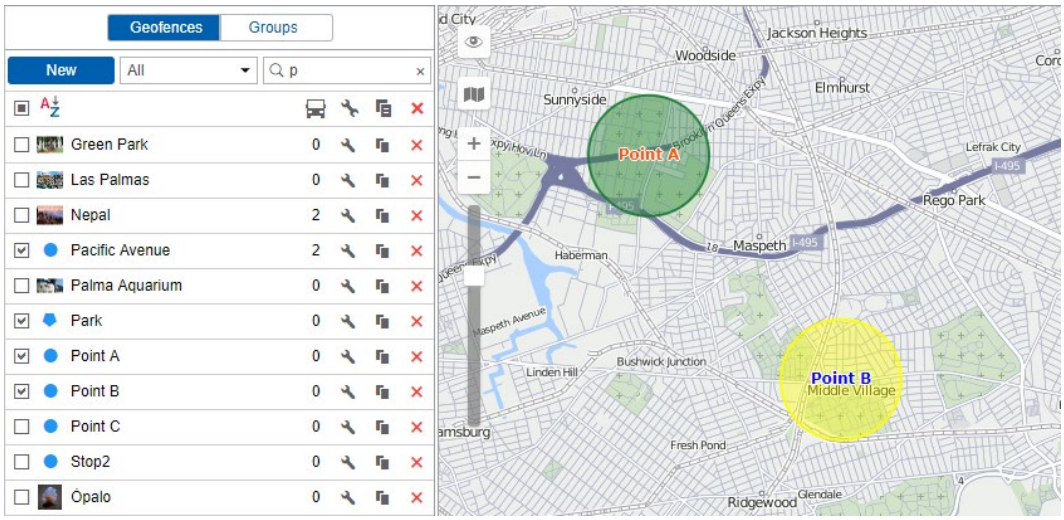
Rides

Wialon Local can track rides between geofences if one of them (or several) is set as the starting point, and the other (or several) as the final one. Two factors are important to generate such report: when a unit leaves the starting geofence and when it enters the final one. In such case a ride between geofences is considered complete. In addition, all rides between geofences are determined taking into account the trip detector.

This report is useful, for instance, to control the transportation of a cargo from one place to another in several trips.

Preparing Geofences

To get a report on rides between geofences, you must first create geofences that determine the beginning and end of the ride. The beginning and the end can be the same geofence if the ride starts and ends in one place, for example, if you need to transport cargo from point A to point B and this will take more than one trip. Create two geofences and then specify them as the starting and ending points in the report template.



Ride Parameters

When you create a report template for rides, you can set additional parameters for it.

Allow circle ride
Check this option if the beginning and end of the ride must be in the same geofence. At the same time, in order for the report to work, it is necessary that a geofence (or a unit) have both boxes checked — beginning and end of the ride.

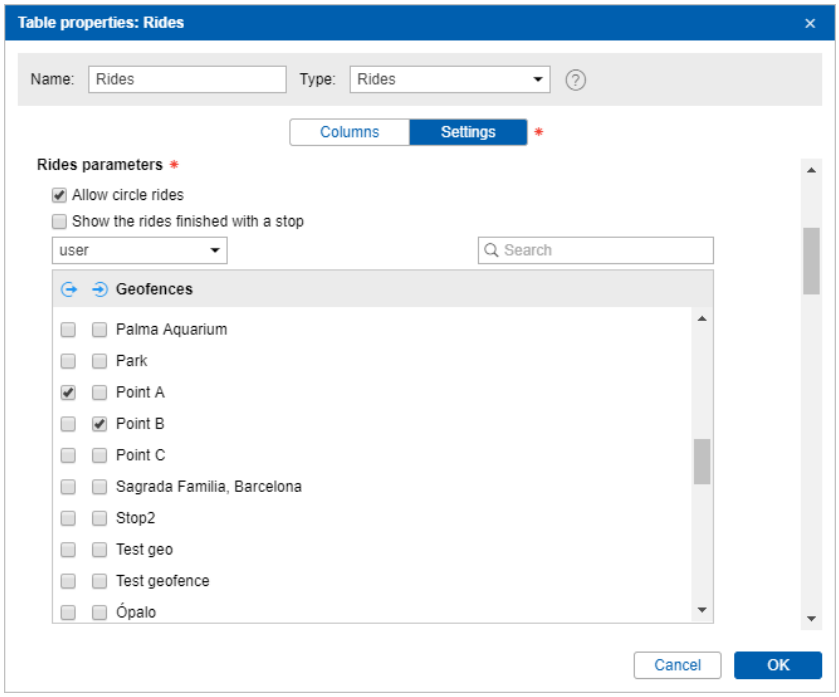
Show the rides finished with a stop
This can be used as an additional filter. If this option is selected, only visiting the geofences with a stop at the final point are considered the end of the ride. Note that a stop is considered to be a unit state in which its speed is less than the minimum moving speed indicated in the trip detector. A ride begins when a unit leaves the starting point. If a unit enters the final destination (after the beginning of the ride has been detected), but does not make a stop there, the ride continues.

Starting and terminal points
In this section you choose which geofences and units will be analyzed in the report. You can not only use the geofences from the resource in which the report template is created, but also the geofences from other resources to which the user has the access right *View geofences*. The resource is chosen in the dropdown list above the geofences' names. It is

also possible to choose the *All* option — then the list will contain the geofences from all the resources to which the user has the necessary access right. The geofences in the list are sorted by name. To quickly find one, use the dynamic filter.

In addition, you can use units as 'moving geofences'. For them, you can additionally set the radius of the unit zone. Both geofences and units are arranged in alphabetical order. To quickly find the required item, use the filter. What is more, the beginning of the trip may be in the unit zone, and the end — in the ordinary geofence. For instance, three cars work in the field and harvest, and one takes the crop to the warehouse.

If a unit simultaneously gets into several geofences (unit zones) specified as starting or terminal points of the trip, the geofence (unit zone) with the smallest area is included in the report.



If the *Counter* column is selected for the table, you can indicate its mask in the *Sensors masks* field on the *Settings* tab. Besides, intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, sensor state, driver, trailer, fuel thefts, fillings, and geofences/units.

Note that monitoring system provides a possibility of detecting geofence visit in case a trip intersects a geofence by any segment of its track. This option can be enabled in the advanced settings of a report template.

Report on Rides

The report on rides gives the list of all performed rides. The table can contain the following information:

- **Ride** — this column specifies the start and end point of movement (names of geofences or units are hyphenated).
- **Ride from** — the departure geofence.
- **Ride to** — the destination geofence.
- **Beginning** — the date and time when the ride began.
- **End** — the date and time when the ride ended.
- **Mileage** — the distance traveled during the ride.
- **Mileage (adjusted)** — mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Ride duration** — the amount of time spent to perform the ride.
- **Total time** — the time from the beginning of the first ride to the end of the last one.
- **Parkings duration** — the total amount of time spent on parkings during the trip.
- **Avg speed** — the average speed calculated for the ride.
- **Max speed** — the maximum speed registered during the ride.

Driver — driver's name (if identified).

- **Trailer** — trailer's name (if bound).
- **Counter** — the counter sensor value (can be helpful either in grouping table data by years/months/weeks/days/shifts or for the reports on unit groups).
- **Initial counter** — the counter value at the beginning of the trip.
- **Finale counter** — the counter value at the end.
- **Avg temperature** — the average temperature value registered during a ride.
- **Min temperature** — the minimum temperature value registered during a ride.
- **Max temperature** — the maximum temperature value registered during a ride.
- **Initial temperature** — the temperature value at the beginning of a ride.
- **Final temperature** — temperature value at the end of a ride.
- **Count** — the number of rides.
- **Status** — the unit status registered during the current ride (if there are several, the first one is displayed).
- **Cargo weight** — the weight of a cargo transported within a trip between geofences.
- **Consumed** — the volume of consumed fuel detected by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math** — the volume of consumed fuel detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math.
- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math** — the average fuel consumption during the ride detected by one of the methods mentioned above.
- **Initial fuel level** — the fuel level at the beginning of the ride.
- **Final fuel level** — the fuel level at the end of the ride.
- **Max fuel level** — the maximum fuel level.
- **Min fuel level** — the minimum fuel level.
- **Penalties** — the penalties calculated for adjusted *Eco Driving* criteria.
- **Rank** — the received penalty points converted into a grade using a 6-point scoring system.
- **Notes** — an empty column for your custom comments.

Ride	Beginning	End	Ride duration	Mileage	Driver	Trailer	Consumed
Settlement - Furnaces ITK	2012-08-16 18:27:20	2012-08-17 08:11:32	13:44:12	9.68 km	Eric Claptonon	trailer 3t	0.97 lt
Grot - Furnaces ITK	2012-08-18 14:04:26	2012-08-18 14:05:26	0:01:00	1.75 km	Eric Claptonon	trailer 3t	0.18 lt
Garage - Furnaces ITK	2012-08-18 20:56:36	2012-08-18 21:01:24	0:04:48	8.15 km	Mister X	trailer 3t	0.82 lt
Grot - Furnaces ITK	2012-08-18 21:07:06	2012-08-19 11:39:08	14:32:02	15.00 km	Mister X	trailer 3t	1.50 lt
Settlement - Furnaces ITK	2012-08-26 16:24:04	2012-08-27 18:04:50	1 days 1:40:46	10.21 km	Eric Claptonon	trailer 3t	1.02 lt

See also Unfinished Rides.

Rounds (for unit)

If any routes were assigned to a unit and events about routes were stored in the unit history, a report based on these events can be generated:

- **Route** — the name of the route given during its creation.
- **Schedule** — the name of the schedule on the basis of which the route was created.
- **Round** — the name of the round.
- **Beginning** — the start time of the round (activation time or entrance in the first check point).
- **Initial location** — the unit location at the beginning of the route.
- **End** — the end time of the round (entrance to the last point).
- **Final location** — the unit location at the end of the route.
- **Result** — *Finished* (the route was activated successfully, and later on the entrance to the last point was detected) or *Not finished* (the last point was not visited).
- **Skipped points** — the number of skipped checkpoints (a detailed report can be generated — Check Points).
- **Duration** — the time taken to perform the route.
- **Total time** — the time from the beginning of the first route to the end of the last route.
- **Mileage** — the distance traveled while performing the route.
- **Avg speed** — the average speed on the route.
- **Max speed** — the maximum speed on the route.
- **Count** — the number of routes.
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if bound).
- **Notes** — an empty column for your custom comments.

Route	Beginning	Initial location	End	Mileage
Santa Cruz Tour Bus Route	01.04.2016 00:00:44	Oxford Way 320, Santa Cruz, CA 95060, USA	01.04.2016 00:05:34	3.98 km
Santa Cruz Tour	01.04.2016 00:00:49	David Way, Santa Cruz, CA 95060, USA	01.04.2016 00:08:24	7.21 km
Santa Cruz Tour	01.04.2016 00:08:29	Pacific Avenue 802, Santa Cruz, CA 95060, USA	01.04.2016 00:20:44	11.67 km
Santa Cruz Tour Bus Route	01.04.2016 00:09:09	Laurel St Ext, Santa Cruz, CA 95060, USA	01.04.2016 00:17:54	7.87 km
Santa Cruz Tour	01.04.2016 00:20:49	Pacific Avenue 802, Santa Cruz, CA 95060, USA	01.04.2016 00:33:04	11.67 km
Santa Cruz Tour Bus Route	01.04.2016 00:21:29	Laurel St Ext, Santa Cruz, CA 95060, USA	01.04.2016 00:30:14	7.87 km
Santa Cruz Tour	01.04.2016 00:33:09	Pacific Avenue 802, Santa Cruz, CA 95060, USA	01.04.2016 00:45:24	11.67 km
Santa Cruz Tour Bus Route	01.04.2016 00:33:49	Laurel St Ext, Santa Cruz, CA 95060, USA	01.04.2016 00:42:34	7.87 km
Santa Cruz Tour	01.04.2016 00:45:29	Pacific Avenue 802, Santa Cruz, CA 95060, USA	01.04.2016 00:57:44	11.67 km
Santa Cruz Tour Bus Route	01.04.2016 00:46:09	Laurel St Ext, Santa Cruz, CA 95060, USA	01.04.2016 00:54:54	7.87 km
Santa Cruz Tour	01.04.2016 00:57:49	Pacific Avenue 802, Santa Cruz, CA 95060, USA	01.04.2016 01:10:04	11.67 km

More information on how different route statuses are defined (route beginning, route end, point skipped, point visit, etc.) can be found here.

In addition, in report template, you can indicate **masks for geofences and routes**. That is, not all routes completed by the unit for the specified period can be displayed in the report, but only those that correspond to the specified route name mask or use a certain geofence(-s). Both filters can be used separately or simultaneously.

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, driver, trailer, fuel thefts, fillings, and geofences/units.

Rounds (for route)

If the route was completed by some units, then on the basis of this data it is possible to build a corresponding report. It can include:

- **Beginning** — the start time of the round (activation time or entrance in the first checkpoint).
- **Last activity** — the time of receiving of the latest data concerning this round.
- **Round** — the name of the round.
- **Schedule** — the name of the schedule.
- **Order** — the order of checkpoints.
- **Unit** — the name of the unit that performed the round. If several units are assigned to the round during its creation, dashes are displayed in the report.
- **Status** — *Finished* (the route was successfully activated, and the entrance to the last point was subsequently recorded) or *Not finished* (the last point was not visited).
- **Points** — the total number of checkpoints in the route (a detailed report can be generated — Check Points).
- **Skipped** — the number of checkpoints skipped.
- **Visited** — the number of checkpoints visited.

Beginning	Round	Schedule	Unit	Status	Points	Skipped	Visited
2012-09-18 11:35:00	11:35 POA	11-50	SMS Sim012	Finished	4	1	3
2012-09-18 12:12:00	1234p 12-13	12-13	SMS Sim012	Finished	4	0	4
2012-09-18 12:39:00	1234p 12:43 - 12:59 12:39:00	12:43 - 12:59	SMS Sim012	Finished	4	0	4
2012-09-18 15:08:00	1234p 1KT - 4KT	new var 0	SMS Sim012	Finished	4	0	4
2012-09-18 15:17:00	5834-577	new all 0	SMS Sim012	Finished	4	0	4
2012-09-19 09:59:00	1234p 1KT - 4KT	10:00 - 10:10	SMS Sim012	Finished	4	0	4
2012-09-19 10:09:00	1234p 10:10 - 10:20	10:10 - 10:20	SMS Sim012	Finished	4	0	4
2012-09-19 11:49:00	POA-1408 11-50	11-50	SMS Sim012	Finished	4	2	2

The report type should be *Route*.

Sensor Tracing

This table shows sensor values at certain points in time. The table can be exported in MS Excel where you can build any custom charts based on the data provided.

The report can include *all messages* or take a value in a time interval (like take a value every 10 minutes). One or the other alternative is chosen when configuring report template. If tracing interval is indicated, the system will search and display sensor value from the message which is the closest to the necessary point in time.

Available columns:

- **Speed** — the speed of the unit from the message from which the value was taken.
- **Coordinates** — the coordinates of the unit from the message.
- **Location** — the location of the unit at the moment of sending the message with the sensor's value.
- **Sensor** — the name of the sensor.
- **Time** — the time of the message from which the value was taken.
- **Value** — the value (numbers only).
- **Formatted value** — the value based on the indicated units of measurement or the value of the text sensor.
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if bound).
- **Notes** — an empty column for custom notes.

Sensor	Time	Value	Formatted value
Internal battery	2015-03-26 01:00:18	4.31	4.31 V
Battery Torton	2015-03-26 01:00:18	13.36	13.36 V
SOS button	2015-03-26 01:00:18	0.00	Off
Incidents	2015-03-26 01:00:18	-----	-----
Motor	2015-03-26 01:00:18	1.00	On
Odometer GPS	2015-03-26 01:00:18	78684.16	78684.16 km
Signal GSM	2015-03-26 01:00:18	21.00	21.00

Activate the appropriate checkbox to get a separate column for each sensor. This option is available only in reports for single units, not for unit groups. If you choose this option, the columns *Values* or/and *Formatted value* will be generated for each sensor individually. This allows exporting sensor values to MS Excel and eventually building various charts and diagrams on this basis.

If you activate the options *Each sensor in separate column* and *Skip invalid values* simultaneously, only the lines that have at least one sensor's value is shown in the generated report. The lines without any sensor's value are not shown. The name of a column containing formatted values is marked by a special symbol (*). Formatted value fields may contain textual information (in brackets) indicated for value intervals.

Time	Internal battery	Battery Torton	Internal battery*	Battery Torton*
2015-03-26 01:00:18	4.31	13.36	4.31 V	13.36 V
2015-03-26 02:00:39	4.31	13.27	4.31 V	13.27 V
2015-03-26 03:08:06	4.31	13.27	4.31 V	13.27 V
2015-03-26 04:08:09	4.31	13.45	4.31 V	13.45 V
2015-03-26 05:08:41	4.30	13.45	4.30 V	13.45 V
2015-03-26 06:09:23	4.29	13.41	4.29 V	13.41 V
2015-03-26 07:10:06	4.29	13.41	4.29 V	13.41 V
2015-03-26 15:12:25	4.28	13.08	4.28 V	13.08 V
2015-03-26 19:36:32	4.30	13.36	4.30 V	13.36 V

In addition, you can choose a driver/trailer and geofences/units to be controlled (see intervals filtration for details).

Invalid Values

If a received value is out of range (the bounds are indicated in sensor properties), then a dash (« —— ») is displayed in the lines with the values of the sensor. To exclude such rows, check the *Skip invalid values* option in the report template.

The cases when a sensor sends text values (as opposed to numeric) or no values at all are also considered *invalid*.

In order for the text parameters to be recognized as valid and displayed in the *Formatted value* column, activate the *Text parameters* option when creating a custom sensor.

SMS Messages (for unit)

In this report, you can view all SMS messages received from a unit in a specified period. The report can contain the following columns:

- **Time received** — the date and time when the data was received by the server.
- **SMS text** — the text of the message.
- **Count** — the number of messages.
- **Notes** — an empty column for your custom comments.

Time received	SMS text	Count
2015-05-30 00:00:05	PC,0002,29/05/15,21:00:02,5352.7099,N,02736.5601,E,10.0km,117.2,A,010000	1
2015-05-30 00:01:04	SIGNAL,0002,29/05/15,21:01:01,5352.8849,N,02736.7341,E,16.0km,32.8,A,010000	1
2015-05-30 00:02:05	PC,0002,29/05/15,21:02:02,5353.0823,N,02737.2334,E,55.0km,58.7,A,010000	1
2015-05-30 00:03:04	PC,0002,29/05/15,21:03:01,5352.6586,N,02737.6424,E,43.0km,152.9,A,010000	1
2015-05-30 00:04:04	PC,0002,29/05/15,21:04:01,5352.5111,N,02737.5737,E,58.0km,197.8,A,010000	1
2015-05-30 00:05:05	PC,0002,29/05/15,21:05:02,5352.3752,N,02738.2606,E,20.0km,111.1,A,010000	1
2015-05-30 00:06:05	PC,0002,29/05/15,21:06:02,5352.1704,N,02738.8358,E,10.0km,123.7,A,010000	1
2015-05-30 00:07:05	SIGNAL,0002,29/05/15,21:07:02,5352.8444,N,02739.3751,E,33.0km,27.7,A,010000	1
2015-05-30 00:08:05	PC,0002,29/05/15,21:08:02,5353.1712,N,02739.0478,E,41.0km,332.0,A,010000	1

SMS Messages (for resource)

This report provides a possibility to view information about all the SMS messages sent by users of any resource for the indicated period of time. The report may contain the following columns:

- **Time** — the time of sending a message.
- **User** — the name of a user sending a message.
- **Phone** — the phone number to which the message was sent.
- **Count** — the number of messages sent.
- **Parts** — the number of parts a message consists of.

Time	User	Phone	Parts
2015-12-03 10:03:22	user	+378297777805	1
2015-12-03 10:06:51	Client1	+355295557805	2
2015-12-15 08:36:18	user	+375297777777	1
2015-12-15 08:36:27	InKa	+342589632587	1
2016-03-25 10:01:11	user	+341578965441	1
2016-03-25 10:04:50	Client1	+375291503177	1
2016-03-25 11:04:03	user	+3752934433350	3
2016-04-07 09:59:58	user	+378956895478	1
2016-05-03 10:35:38	Client1	+375775503177	1

Speeding

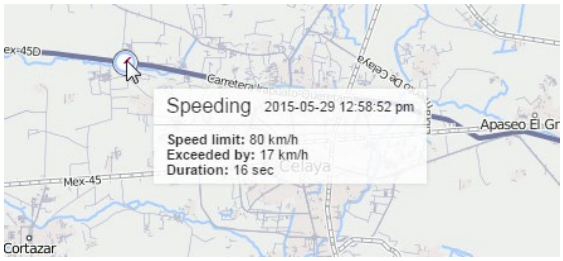
This kind of report shows speed limitation violations. The speed limit depends on the method for determining the speeding selected in the properties of the unit on the Advanced tab. The following information can be presented in this kind of report:

- **Beginning** — the date and time when the speed limit was exceeded.
- **Location** — the location of the device at the moment of speeding.
- **Duration** — the amount of time the violation continued.
- **Total time** — the time from the beginning of the first speeding to the end of the last speeding.
- **Max speed** — the maximum speed within the period of speeding.
- **Speed limit** — the maximum allowed speed on a particular road section or in the unit properties.
- **Mileage** — the distance traveled with the exceeded speed.
- **Mileage (adjusted)** — the mileage subject to the coefficient set in unit properties (the *Advanced* tab).
- **Initial mileage** — the mileage sensor value at the moment of the beginning of speeding. If no saving of mileage parameter was made through the reported period, the mileage is counted from 0.
- **Final mileage** — mileage sensor value at the end of speeding interval.
- **Avg speed** — the average speed within the interval.
- **Driver** — the name of the driver (if identified).
- **Trailer** — the name of the trailer (if bound).
- **Count** — the number of speed violations.
- **Notes** — an empty column for your custom comments.

Beginning	Duration	Max speed	Speed limit	Mileage	Driver
2015-05-01 00:02:44	0:00:09	95 km/h	80 km/h	0.21 km	Jon
2015-05-01 02:28:31	0:01:16	104 km/h	80 km/h	2.15 km	Jon
2015-05-01 04:23:18	0:00:59	96 km/h	60 km/h	1.55 km	-----
2015-05-01 04:34:14	0:00:17	103 km/h	90 km/h	0.52 km	-----
2015-05-01 06:40:59	0:00:58	97 km/h	90 km/h	1.50 km	Ben
2015-05-01 07:04:55	0:00:07	97 km/h	90 km/h	0.22 km	-----
2015-05-01 07:05:47	0:04:12	96 km/h	60 km/h	6.37 km	Ben
2015-05-01 14:23:47	0:03:42	105 km/h	90 km/h	6.20 km	Josh

Intervals filtration (by speeding duration, mileage, driver, geofences/units) can be applied to this table.

You can use special markers for this report:



Other means to control speed are described in Notifications.

Stops

A stop is one or more consecutive messages with a zero speed. Stops can be registered at lights, intersections, in traffic jams, etc.

Stops should be distinguished from parkings. Parameters to detect trips, parkings, and stops are adjusted in the trip detector. If there are several messages in succession, they are united in one stop. If total time of such a stop reaches *Minimum parking time*, it is registered as a parking (not a stop).

The following information is presented in this kind of report:

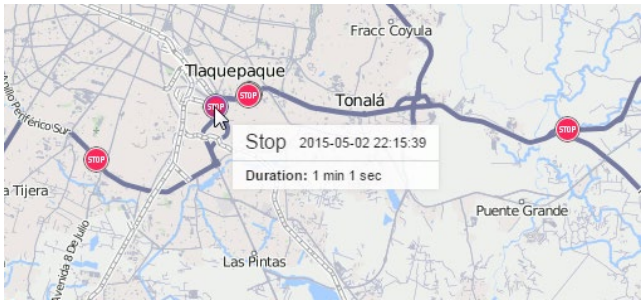
- **Beginning** — the time when the stop started.
- **End** — the time when the stop ended.
- **Duration** — the total time of the stop.
- **Total time** — the time from the beginning of the first stop to the end of the last stop.
- **Off-time** — the time from the end of the previous stop to the beginning of the current one (to be defined beginning from the second stop).
- **Location** — the address where the unit stopped.
- **Coordinates** — the coordinates of the unit at the moment of a stop (in decimal degrees).
- **Driver** — the name of the driver (if available).
- **Trailer** — the name of the trailer (if bound).
- **Count** — the number of stops.
- **Counter** — the counter sensor values (can be helpful either in grouping table data by years/months/weeks/days/shifts or for the reports on unit groups).
- **Notes** — an empty column for your custom comments.
- **Avg weight** — the average weight value registered for the stop interval.
- **Min weight** — the minimum weight value registered for the stop interval.
- **Max weight** — the maximum weight value registered for the stop interval.
- **Initial weight** — the weight value at the beginning of the stop interval.
- **Final weight** — the weight value at the end of the stop interval.

№	Beginning	End	Duration	Location	Driver	Trailer
1	2012-06-25 13:11:26	2012-06-25 13:14:02	0:02:36	Grajewo, Mikołaja Kopernika	Spider Man	Milk can
2	2012-06-25 13:16:10	2012-06-25 13:17:02	0:00:52	Grajewo, Mikołaja Kopernika	Spider Man	Milk can
3	2012-06-25 14:01:26	2012-06-25 14:01:30	0:00:04	Zjazd, Łomża	Spider Man	Milk can
4	2012-06-25 14:03:28	2012-06-25 14:03:38	0:00:10	Łomża, Wojska Polskiego	Spider Man	Milk can
5	2012-06-25 14:04:14	2012-06-25 14:04:16	0:00:02	Łomża, Wojska Polskiego	Spider Man	Milk can
6	2012-06-25 14:06:38	2012-06-25 14:06:40	0:00:02	Łomża, Legionów	Spider Man	Milk can
7	2012-06-25 14:07:36	2012-06-25 14:07:38	0:00:02	Łomża, Legionów	Spider Man	Milk can
8	2012-06-25 14:11:14	2012-06-25 14:12:20	0:01:06	Łomża, Legionów	Spider Man	Milk can
9	2012-06-25 14:40:24	2012-06-25 14:41:54	0:01:30	Stare Lubiejewo, Ogrodowa	Spider Man	Milk can
10	2012-06-25 15:52:14	2012-06-25 15:55:06	0:02:52	Wyszków, Białostocka	Spider Man	Milk can
11	2012-06-25 15:58:06	2012-06-25 15:58:38	0:00:32	Wyszków, Tadeusza Kościuszki	Spider Man	Milk can
12	2012-06-25 17:07:30	2012-06-25 17:07:34	0:00:04	62, 0.85 km from Wyszogród	Spider Man	Milk can

See Data in Reports to learn how time (duration) can be formatted.

Intervals filtration (by stop duration, sensor state, driver, trailer, fuel fillings and thefts) can be applied to this table.

This kind of report can be supplemented with the corresponding markers on the map.


Fracc Coyula
Tlaquepaque
Tonalá
Stop 2015-05-02 22:15:39
Duration: 1 min 1 sec
Puente Grande
Las Pintas

Summary

The tabular report *Summary* allows you to display a variety of generalizing data related to the reporting interval and, at the same time, not tied to any conditions (such as trips, sensor operation, geofence visits, etc.). In other words, the summary report processes all the messages for the indicated period, regardless of how long the unit worked and was in motion.

The following columns can be included:

- **Mileage in trips** — the mileage on the interval taking the trip detector into account.
- **Mileage in all messages** — the mileage for the reporting interval by the mileage counter.
- **Mileage (adjusted)** — the mileage on the interval by the mileage counter multiplied by the mileage coefficient (a setting in the unit properties). More information about the mileage in reports can be found here.
- **Avg speed** — the average speed on the interval.
- **Max speed** — the maximum speed on the interval. More information about the speed in reports can be found here.
- **Move time** — the time in trips.
- **Engine hours** — the time of engine hours operation.
- **Engine efficiency duration** — the duration of operation of the attached implements (if there is an engine efficiency sensor).
- **Parkings** — the total time of parkings on the interval.
- **Counter** — the counter sensor value.
- **Initial counter** — the counter value at the beginning of the interval.
- **Final counter** — the counter value at the end of the interval.
- **Custom sensor initial value** — the custom sensor value at the beginning of the interval. If there are more than one custom sensors, a separate column is built for each of them and the name is written in brackets. If required, you can indicate the name masks of custom sensors in the *Intervals filtration* section of the *Settings* tab.
- **Custom sensor final value** — the value of the custom sensor at the end of the interval.
- **Difference** — the difference between the initial and final values of custom sensor.
- **Utilization** — the percentage ratio of the duration of engine hours to the engine hours rate (engine hours divided by daily engine hours rate indicated in the unit properties).
- **Useful utilization** — the percentage ratio of the duration of engine efficiency to the engine hours rate.
- **Productivity** — the percentage ratio of the duration of engine efficiency to the engine hours duration.
- **Consumed** — the volume of consumed fuel detected by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Consumed by…** — the volume of consumed fuel detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Besides, in the report template (on the right) you can specify additional parameters to calculate fuel: throughout the reporting period, in trips or in engine hours.
- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by…** — the average fuel consumption on the interval. More details about the fuel in reports can be found here.
- **Avg mileage per unit of fuel by …** — the average mileage per unit of fuel based on the indications of a particular sensor.
- **Initial fuel level** — the counter value at the beginning of the interval.

- **Final fuel level** — the counter value at the end of the interval.
- **Total fillings** — the number of the detected fuel fillings.
- **Total thefts** — the number of the detected fuel thefts.
- **Filled** — the volume of filled fuel (only fuel fillings detected by a sensor).
- **Stolen** — the volume of stolen fuel.
- **Penalties** — the penalties calculated for the adjusted Eco Driving criteria.
- **Rank** — the received penalty points converted into a grade using a 6-point scoring system.

Fuel can be calculated for the whole interval, in trips or in engine hours, which is selected in the additional parameters of the table. This option affects such columns as *Consumed…* and *Avg consumption…*.

As additional settings, you can specify masks for sensors (fuel, counters), including the engine hours sensor.

The *Retrieve Intervals* option is available for this table if grouping by shifts is configured for it or if a value in the field *Summary by:* is selected.

The *Summary* table is presented by one row — the summarized data for a selected period of time. However, the report template parameters for this table contain an individual option — *Summary by*. This option allows to select a time interval (shifts/days/weeks/months) according to which the table data is arranged. This option can be used either in the reports for units or in reports for units groups.

Note.
Often a value received from the analog sensor may differ from the corresponding value in the *Total* row. It is stipulated by the analog data leaping, and application of grouping by days/weeks/months towards the values received as a result of processing such data. In other words, the analog data values (with or without leaps) are divided into intervals and then summarized. That is why the value of the summarized intervals can be sufficiently different from the value not divided into intervals. And since the values in the *Total* row are not divided into intervals, you can receive the difference compared to the values from the analog sensors. For example, calculating fuel, a value in the *Consumed by FLS* column may differ from the corresponding value in the *Total* row.

Trips

This kind of report shows the intervals of movement with the indication of time, location, and other parameters such as speed, mileage, fuel, and many others. The intervals of movement (trips) are detected according to the parameters set in the Trip Detection and adjusted for each unit individually.

The following columns can be included in this kind of report:

- **Beginning** — the date and time when the trip began.
- **Initial location** — the address where the device was at the beginning of the trip.
- **Initial coordinates** — the geographical coordinates of the location of the unit at the beginning of the trip (in decimal degrees).
- **End** — the date and time when the trip ended.
- **Final location** — the address where the device was at the end of the trip.
- **Final coordinates** — the geographical coordinates of the location of the unit at the end of the trip (in decimal degrees).
- **Driver** — the name of the driver (if identified).
- **Trailer** — the name of the trailer (if bound).
- **Passengers count** — the number of passengers transported within a trip.
- **Duration** — the time interval of the trip.
- **Total time** — the time from the beginning of the first trip to the end of the last trip.
- **Off-time** — the period of time passed from the end of the previous trip to the beginning of the current one (defined beginning from the second trip).
- **Following off-time** — the period of time passed from the end of the current trip to the beginning of the next one.
- **Engine hours** — the time of the operation of engine hours during the trip.
- **Mileage** — the distance traveled during the whole trip.
- **Mileage (adjusted)** — the mileage taking a coefficient set in unit properties (the *Advanced* tab) into account.
- **Urban mileage** — the distance traveled in the urban area.
- **Suburban mileage** — the distance traveled in the suburban area (i.e. at high speed). The urban/suburban speed line is indicated in theUnit Properties —> Advanced (the *Urban speed limit* setting).
- **Initial mileage** — the mileage sensor value at the beginning of trip. If the mileage parameter was not saved throughout the reported period, the mileage is counted from 0.
- **Final mileage** — the mileage sensor value at the end of the trip.
- **Toll roads mileage** — the distance that the unit passed during the trip on the roads on which the Plato system is used.
- **Toll roads cost** — a sum of money (in RUB) for the toll roads mileage calculated on the basis of the covered distance and the Platon tariff.
- **Avg speed** — the average speed within the trip.
- **Max speed** — the maximum speed registered within the interval.
- **Trips count** — the number of completed trips.
- **Counter** — the counter sensor value.
- **Initial counter** — the counter value at the beginning of the trip.
- **Final counter** — the counter value at the end of the trip.
- **Avg engine revs** — the average rate of engine revolutions.
- **Max engine revs** — the maximum rate of engine revolutions.
- **Avg temperature** — the average temperature value registered in a trip.

- **Min temperature** — the minimum temperature value registered in a trip.
- **Max temperature** — the maximum temperature value registered in a trip.
- **Initial temperature** — the temperature value at the beginning of a trip.
- **Final temperature** — the temperature value at the end of a trip.
- **Status** — the unit status registered during the current trip (if there are several, the first one is displayed).
- **Cargo weight** — the weight of a cargo transported within a trip.
- **Messages count** — the number of messages that formed the trip.
- **Consumed** — the volume of consumed fuel detected by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the volume of consumed fuel detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. More information about fuel in reports can be found here.
- **Rates deviation by ImpFCS/AbsFCS/InsFCS/FLS** — the difference between consumed fuel detected by a sensor and consumption rates. If a number in this cell is negative, it means the detected consumption does not exceed the indicated rates.
- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the average fuel consumption during the trip detected by one of the methods mentioned above.
- **Avg consumption in idle run by …** — the average fuel consumption during the idle run.
- **Avg mileage per unit of fuel by …** — the average fuel consumption (per one liter/gallon) detected by one of the methods mentioned above.
- **Initial fuel level** — the fuel level at the beginning of the trip.
- **Final fuel level** — the fuel level at the end of the trip.
- **Max fuel level** — the maximum fuel level during the trip.
- **Min fuel level** — the minimum fuel level during the trip.
- **Penalties** — the penalties calculated for the adjusted *Eco Driving* criteria.
- **Rank** — the received penalty points converted into a grade using a 6-point scoring system.
- **Notes** — an empty column for your custom comments.

Attention!
Availability of the *Toll roads mileage* and *Toll roads cost* columns is stipulated by a special service. Contact your service provider if you would like to use this functionality.

Beginning	Initial location	End	Final location	Duration	Mileage	Consumed
2012-07-16 11:38:14	Velden am Wörther See, Seecorso	2012-07-16 11:59:06	Velden am Wörther See, Am Corso	0:20:52	2.20 mi	0.09 gal
2012-07-16 12:29:06	Velden am Wörther See, Klagenfurter	2012-07-16 12:41:14	Tibitsch, Süd-Autobahn	0:12:08	3.99 mi	0.17 gal
2012-07-16 12:51:16	Tibitsch, Süd-Autobahn	2012-07-16 16:11:00	Brünner-Bundesstraße, Hobersdorf	3:19:44	223 mi	9.48 gal
2012-07-16 16:41:16	Brünner-Bundesstraße, Hobersdorf	2012-07-16 18:34:28	Přerov, Polní	1:53:12	101 mi	4.28 gal
2012-07-16 19:22:26	Přerov, Polní	2012-07-16 22:31:12	E75, Słostowice	3:08:46	196 mi	8.34 gal
2012-07-16 22:45:48	E75, Słostowice	2012-07-16 23:36:32	Łódź, Romualda Traugutta	0:50:44	47 mi	2.00 gal
2012-07-17 12:06:32	Łódź, Brzezińska	2012-07-17 14:24:48	Warszawa, Trakt Brzeski	2:18:16	89 mi	3.77 gal
2012-07-17 15:47:00	Stara Miłosna	2012-07-17 18:12:58	E30, Kozula	2:25:58	94 mi	3.98 gal

See Data in Reports to find more about formatting time, mileage, fuel, etc.

Also, the intervals filtration by duration, mileage, engine hours, speed range, stops, sensors, driver, fuel fillings, fuel thefts, and geofences/units can be applied to this table.

The tracks of the trips can be displayed on the map. To make use of this feature, in the report template, select the options connected with the rendering of tracks on the map.

Unfinished Rides

See the Rides topic to learn how to prepare rides for this report.

A ride is considered to be unfinished when the unit leaves the starting point, and then, not having visited any of the final points, again appears in the point marked as the beginning. It can be the same zone from where the unit left (if circle rides are not allowed), or some other geofence with a starting point mark.

The following columns are available for the report:

- **Ride** — the departure and destination point.
- **Ride from** — the departure point.
- **Ride to** — the destination point.
- **Beginning** — the date and time when the ride began.
- **End** — the date and time when the ride ended.
- **Mileage** — the distance traveled during the ride.
- **Mileage (adjusted)** — the mileage subject to the coefficient set in the unit properties on the *Advanced* tab.
- **Ride duration** — the amount of time it took to perform the ride.
- **Total time** — the time from the beginning of the first ride to the end of the last ride.
- **Parkings duration** — the time spent on parkings.
- **Avg speed** — the average speed calculated for the ride.
- **Max speed** — the maximum speed registered during the ride.
- **Driver** — driver's name (if identified).
- **Trailer** — trailer's name (if bound).
- **Counter** — the counter sensor value.
- **Initial counter** — the value of a counter at the moment of leaving a departure geofence.
- **Final counter** — the value of the counter at the moment of entering a destination end.
- **Count** — the number of rides (can be helpful either when grouping the table data by years/months/weeks/days/shifts or for the reports on unit groups).
- **Status** — the unit status registered during the current ride (if there are several, the first one is displayed).
- **Consumed** — the volume of consumed fuel detected by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the volume of consumed fuel detected by a fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. More information on fuel in reports can be found here.
- **Avg consumption** — the average fuel consumption by any sort of fuel sensor. If several such sensors are available, their values sum up.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the average fuel consumption during the ride detected by one of the methods mentioned above.
- **Initial fuel level** — the fuel level at the beginning of the ride.
- **Final fuel level** — the fuel level at the end of the ride.
- **Max fuel level** — the maximum fuel level.
- **Min fuel level** — the minimum fuel level.
- **Penalties** — the penalties calculated for the adjusted *Eco Driving* criteria.
- **Rank** — the received penalty points converted into a grade using a 6-point scoring system.
- **Notes** — an empty column for your custom comments.

Ride	Beginning	End	Ride duration	Mileage	Parkings duration	Driver
Furnaces ITK - Furnaces ITK	2012-06-11 19:13:16	2012-06-12 09:43:56	14:30:40	13.60 km	13:58:18	Mister X
Furnaces ITK - Furnaces ITK	2012-06-12 18:28:42	2012-06-13 08:18:24	13:49:42	8.40 km	13:41:40	Mister X
Furnaces ITK - Furnaces ITK	2012-06-13 08:21:06	2012-06-13 10:05:10	1:44:04	4.80 km	1:35:36	Mister X
Furnaces ITK - Furnaces ITK	2012-06-14 08:19:54	2012-06-14 09:44:06	1:24:12	4.54 km	1:15:20	Mister X
Furnaces ITK - Furnaces ITK	2012-06-14 18:45:30	2012-06-14 18:46:02	0:00:32	0.09 km	0:00:00	Mister X
Furnaces ITK - Furnaces ITK	2012-06-14 18:46:02	2012-06-15 08:16:32	13:30:30	19.18 km	12:42:24	Mister X
Furnaces ITK - Furnaces ITK	2012-06-15 08:18:32	2012-06-15 16:55:08	8:36:36	9.55 km	8:31:14	Mister X
Furnaces ITK - Furnaces ITK	2012-06-15 17:01:02	2012-06-15 17:15:04	0:14:02	8.16 km	0:00:00	Mister X
Furnaces ITK - Furnaces ITK	2012-06-15 17:16:06	2012-06-15 17:16:22	0:00:16	0.32 km	0:00:00	Mister X
Furnaces ITK - Furnaces ITK	2012-06-15 17:48:14	2012-06-15 17:48:28	0:00:14	0.29 km	0:00:00	Mister X
Furnaces ITK - Furnaces ITK	2012-06-16 10:57:56	2012-06-16 10:58:08	0:00:12	0.27 km	0:00:00	Mister X
Furnaces ITK - Furnaces ITK	2012-06-16 11:04:26	2012-06-16 11:04:42	0:00:16	0.31 km	0:00:00	Mister X
Furnaces ITK - Furnaces ITK	2012-06-16 11:06:34	2012-06-16 14:24:02	3:17:28	7.57 km	2:38:16	Mister X

See the Rides section to find out more information about the additional parameters for *Unfinished rides*.

Upcoming Maintenance

The upcoming maintenance table contains the list of service works set for a unit and the status of their execution. A table may include the following columns:

- **Service interval** — the name of the scheduled maintenance work indicated on the *Service Intervals* tab of the unit properties dialog in the *Service name* field. The work should be repeated throughout a particular interval indicated in the *Service Intervals* tab.
- **State** — the overall state of the execution of the service work. In other words, it is the remaining or expired interval of mileage, engine hours, and days.
- **State by mileage** — the remaining or expired mileage interval.
- **State by engine hours** — the interval of the remaining or expired engine hours.
- **State by days** — the interval of the remaining or expired days.
- **Description** — the information taken from the corresponding field on the *Service Intervals* tab.
- **Frequency** — the interval (mileage, engine hours, or days) that shows how often a vehicle maintenance should be performed.
- **Notes** — an empty column for your custom comments.

Service interval	State	Description	Frequency
Oil change	10 days expired; 1 km left; 1 h left	Oil + pair of hands	1 km; 1 h; 1 days
Full diagnostics	59 days expired; 7 h left; 1 km left	Inspection, consumables	10000 km; 7000 h; 20 days
Hydraulics service	15 days expired; 5 h expired; 6 km left	Better call Saul	6000 km; 5000 h; 50 days
Electricity check	25 days expired; 5 h left; 70 km expired	Tesla service station	7000 km; 5000 h; 100 days

Note that there is no need to indicate the time interval for the *Upcoming maintenance* report generation, because this table provides you with the information on all the indicated service works regardless of the time period.

Moreover, an individual parameters of grouping (without any connection to the time intervals) are used in the *Upcoming maintenance* table. The data can be grouped on the basis of the state (planned/expired maintenance), service interval, or unit (for reports on unit groups).

Utilization Cost

The table on utilization costs unites two kinds of expenses: maintenance and fillings. Both of these features have their own detailed tables (see Maintenance and Fuel Fillings). This table is designed to show running costs. Note that only fillings registered manually in a special Events Registrar get here (fillings detected by a fuel sensor are *not* considered).

The table can be composed of the following columns:

- **Time** — the date and time that were indicated during the registration.
- **Registration time** — the date and time when the event was registered.
- **Expense item** — either maintenance or filling.
- **Description** — the custom description specified at registration.
- **Location** — the location specified at registration (together with comments entered manually).
- **Cost** — the service or filling cost.
- **Count** — the number of services and/or fillings.
- **Notes** — an empty column for your custom comments.

№	Time	Expense item	Description	Location	Cost
1	2012-11-16 16:03:00	Maintenance	Oil change	Lindenstraße	33.00
2	2012-11-22 16:08:00	Filling	Fuel filling of 55 lt to the amount of 27.33 was made.	-----	27.33
3	2012-11-30 16:10:00	Filling	Fuel filling of 59 lt to the amount of 29.07 was made.	-----	29.07
4	2012-12-13 16:11:00	Filling	Fuel filling of 57 lt to the amount of 28.44 was made.	-----	28.44
5	2013-01-02 16:00:00	Maintenance	Total condition	Hasselweg, Müllingen	588.00
6	2013-02-01 16:12:00	Filling	Fuel filling of 70 lt to the amount of 33.09 was made.	-----	33.09
7	2013-02-04 16:09:50	Filling	Fuel filling of 69 lt to the amount of 30 was made.	-----	30.00

Blue rows mean that the location on the map was indicated during the registration.

Video

This report provides you with a list of video files received from a unit. The report contains the fixed number of columns:

- **Time** — the time a video file was received;
- **Location** — the location of a unit when sending a video file;
- **Video** — an icon that opens a video.

Time	Location	Video
2015-07-22 15:44:38	Berliner Ring, Wandlitz 16348, Barnim, Germany	
2015-07-22 15:46:04	E26, Wittstock/Dosse 16909, Ostprignitz-Ruppin, Germany	
2015-07-22 15:54:00	E26, Fehrbellin 16833, Ostprignitz-Ruppin, Germany	
2015-07-22 15:54:26	Berliner Ring, Hohen Neuendorf 16556, Oberhavel, Germany	
2015-07-22 15:54:48	Berliner Ring, Neuenhagen bei Berlin 15366, Märkisch-Oderland, Germany	
2015-07-22 17:16:19	Soltauer Straße, Neu Wulmstorf 21629, Harburg, Germany	
2015-07-22 17:16:33	E22, Rosengarten 21224, Harburg, Germany	
2015-07-22 17:16:40	E22, Seevetal 21218, Harburg, Germany	
2015-07-22 17:16:51	E22, Seevetal 21220, Harburg, Germany	
2015-07-22 17:17:47	E26, Rastow 19077, Ludwigslust-Parchim, Germany	

Violations

Violations are a particular case of events. The report on violations gives the list of violations detected and registered in the unit history.

Violations can be recorded in two ways:

1. With the help of notifications if *Register as violation* is selected as an action;
2. With the help of manually registered custom events if they have the *Violation* box checked.

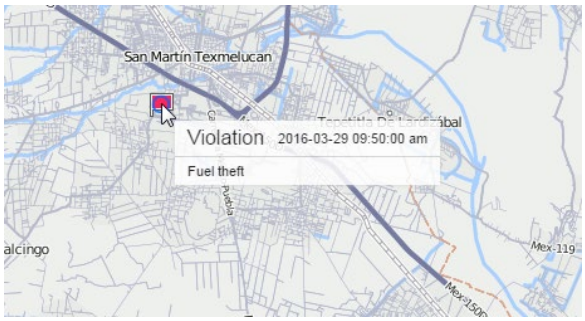
To make a report on a particular kind of violations, enter a mask in the report template to filter the text/description of violations (such as *speed*, *accident*, *temperature*, etc.). Only the messages whose text corresponds to the given mask are added to the table.

The following information can be presented in this kind of report:

- **Violation time** — the time when the violation happened.
- **Time received** — the time when the server received the data.
- **Violation text** — the text of the notification or the description of the event.
- **Location** — unit location at the moment of violation.
- **Driver** — the name of the driver (if identified).
- **Count** — the number of violations.
- **Notes** — an empty column for your custom comments.

Violation time	Time received	Violation text	Location
2015-08-21 06:16:05	2015-12-04 12:10:17	Connection o soordinates loss.	-----
2016-03-28 15:06:00	2016-03-28 15:07:10	Ful theft 40 l.	Amecameca
2016-03-29 09:44:00	2016-03-29 09:45:02	Unit violated speed limitations.	Avenida del Infante Don Luis 17-25, Boadilla del Monte 28660
2016-03-29 09:50:00	2016-03-29 09:50:41	Fuel theft 30 l.	Carretera El Moral, El Moral

In addition, you can use special markers for this report.



Visited Streets

This report shows what streets were visited and when. Highways, roads, and other places with available addresses are also considered as streets in this report.

The following columns can be presented in this kind of report:

- **Street** — the name of the street, road, highway, etc.
- **Initial location** — the place where the first message from this street was received. It can be the same as the previous cell or more detailed (for example, it can additionally contain a house number).
- **Beginning** — the time when the unit started moving along the street.
- **End** — the time when the unit left the street.
- **Duration** — the total time the unit was on the street.
- **Mileage** — the distance that was traveled by the unit while moving along the street.
- **Mileage (adjusted)** — the mileage subject to the coefficient set in advanced unit properties. More information about mileage in the report can be found here.
- **Avg speed** — the average speed while moving along the street.
- **Max speed** — the maximum speed detected while moving along the street. More information about speed in reports can be found here.
- **Streets count** — the number of performed visits (can be helpful if there is grouping by years/months/weeks/days/shifts).
- **Notes** — an empty column for your custom comments.

Street	Beginning	End	Duration	Mileage	Max speed
Mex-45D	2015-05-01 00:00:52	2015-05-01 01:49:04	1:48:12	39 km	106 km/h
Carretera Irapuato-Queretaro	2015-05-01 01:49:04	2015-05-01 02:00:12	0:11:08	16.52 km	98 km/h
Mex-45D	2015-05-01 02:00:12	2015-05-01 02:40:39	0:40:27	42 km	105 km/h
Mex-45	2015-05-01 02:40:39	2015-05-01 04:45:22	2:04:43	43 km	103 km/h
Carretera León-Silao	2015-05-01 04:45:22	2015-05-01 04:57:30	0:12:08	16.62 km	99 km/h
Calle Torrejón De Ardoz	2015-05-01 04:57:30	2015-05-01 04:57:35	0:00:05	0.14 km	74 km/h
Boulevard Aeropuerto	2015-05-01 04:57:35	2015-05-01 04:57:48	0:00:13	0.30 km	73 km/h
Carretera León-Aguascalientes	2015-05-01 04:57:48	2015-05-01 05:19:45	0:21:57	31 km	116 km/h
Mex-45D	2015-05-01 05:19:45	2015-05-01 06:40:39	1:20:54	74 km	118 km/h
Mex-45	2015-05-01 06:40:39	2015-05-01 07:14:02	0:33:23	23 km	97 km/h
Boulevard José María Chávez	2015-05-01 07:14:02	2015-05-01 07:19:55	0:05:53	1.39 km	33 km/h

When clicking on a green cell in the table, the map is moved so that to display a point where the unit entered or left the indicated street, or reached the maximum speed.

Sometimes there can be gaps in cells. This means that only one message was received on this street, and therefore it is difficult to determine the length of time it was on the street, the mileage, and the average and maximum speed.

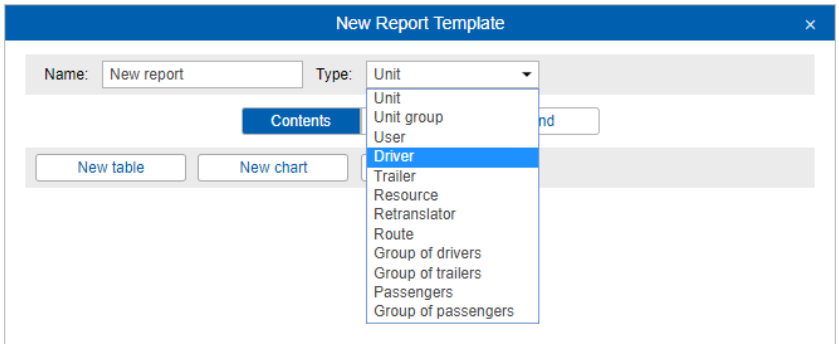
Intervals filtration by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, fuel fillings and thefts can be applied to this table. For example, you can display only the streets where a particular sensor was turned on, or the streets where the sensor was turned off. To specify the sensor, you can set a mask for it. This function is convenient, for example, for snow removal equipment — it allows you to know that the car did not just pass along the street, but had the brushes on.

Other Reports

Attention! To create reports on users, drivers, trailers, passengers, as well as groups of units, drivers and trailers, you need to have an additional *Advanced Reports* package.

Other reports include reports on groups of units and users (except the *Logs* table), reports on drivers, trailers, passengers and their groups, as well as a report on user logins for a resource.

The selection is made in the *Type* drop-down list of the report template.



The following types are available:

- Reports on Unit Groups
- Reports on Users
- Reports on Drivers
- Reports on Trailers
- Reports on Passengers

Reports on Unit Groups

Data from several units can be gathered in one report if these units are from a unit group. To get a report on several units, select the *Unit group* type for the report template.

The functionality of these reports is very similar to reports on separate units but has a number of peculiarities and restrictions.

In the *Unit group* reports the following features are **available**:

- Any tables except *Messages Tracing*;
- Graphical elements on the map: geofences, markers, unit last location icons, tracks and all messages on the map;
- Some graphs in the Statistics: *Report*, *Group*, *Interval beginning*, *Interval end*, *Report execution time*;
- Advanced options: U.S. measurement units, address format, etc.

All tables available for units are available for unit groups as well. Besides, the Unit latest data table is available for unit groups *only*. Moreover, the *Eco driving* report on unit groups contains a unique column *Rating by violations*.

In the *Unit group* reports the following features are **not available**:

- Charts;
- Most of statistics excluding those mentioned above.

Note that if in the *Total* line of the unit group report you want to receive the correct data on the initial or final fuel levels, such parameter as *Unit* should occupy the main position (drag to the top) in the grouping list of the report template.

Tables for Unit Groups

There are some peculiarities in configuring tables for unit groups. The first column of the table shows the list of all units included into a selected group (in alphabetical order). This column is put in front of all the other ones indicated in a template. The *Count* column (if included in the report template) shows the number of events registered for the reporting period of a given unit.

Below is an example of a table on parkings for a group of 5 units. The table provides us with the following data: the beginning of the first parking, the end of the last parking, the summarized duration of all parkings for the reported period. Every line is dedicated to a single unit.

№	Grouping	Beginning	End	Duration	Count
1	Picasso	2012-08-27 18:17:00	2012-08-30 09:01:56	1 days 21:59:47	5
2	ShootingStar	2012-08-27 18:17:01	2012-08-30 09:01:57	1 days 21:52:35	4
3	SMS Sim004	2012-08-27 18:17:00	2012-08-31 13:49:22	2 days 23:39:11	6
4	SMS Sim007	2012-08-27 18:17:01	2012-08-30 09:01:56	1 days 21:52:34	4
5	Vliegende	2012-08-27 18:17:01	2012-08-30 09:01:57	1 days 21:52:35	4

If the option of **detalization** is applied, the nesting level appears. This means that you can expand the contents of a basic line ('+' at the beginning of a line, or the corresponding number in the heading of the column) and see the detailed list of events for a given unit. The number of hidden lines corresponds to the number in the *Count* column.

Unit > Detalization

	№	Grouping	Beginning	End	Duration	Count
⊞	1	Picasso	2012-08-27 18:17:00	2012-08-30 09:01:56	1 days 21:59:47	5
⊟	2	ShootingStar	2012-08-27 18:17:01	2012-08-30 09:01:57	1 days 21:52:35	4
	2.1	ShootingStar	2012-08-27 18:17:01	2012-08-28 09:03:05	14:46:04	1
	2.2	ShootingStar	2012-08-28 18:20:05	2012-08-29 09:13:58	14:53:53	1
	2.3	ShootingStar	2012-08-29 14:46:16	2012-08-29 15:01:16	0:15:00	1
	2.4	ShootingStar	2012-08-29 17:04:19	2012-08-30 09:01:57	15:57:38	1
⊞	3	SMS Sim004	2012-08-27 18:17:00	2012-08-31 13:49:22	2 days 23:39:11	6
⊞	4	SMS Sim007	2012-08-27 18:17:01	2012-08-30 09:01:56	1 days 21:52:34	4
⊞	5	Vliegende	2012-08-27 18:17:01	2012-08-30 09:01:57	1 days 21:52:35	4

In addition to detalization, you can apply the **grouping** by years/months/weeks/days/shifts. In this case, the table data is grouped by a selected time interval. If several grouping intervals are chosen, they are arranged in several levels of nesting. If grouping is set, detalization can be found on the final level of nesting, and it still shows a detailed list of events for a given unit.

Unit > Date > Detalization

	№	Grouping	Beginning	End	Duration	Count
⊞	1	Picasso	18:17:00	2012-08-30 09:01:56	1 days 21:59:47	5
⊞	2	ShootingStar	18:17:01	2012-08-30 09:01:57	1 days 21:52:35	4
⊟	3	SMS Sim004	18:17:00	2012-08-31 13:49:22	2 days 23:39:11	6
⊞	3.1	2012-08-27	18:17:00	2012-08-28 09:03:04	14:46:04	1
⊞	3.2	2012-08-28	18:20:05	2012-08-29 09:13:57	14:53:52	1
⊟	3.3	2012-08-29	11:20:00	09:01:57	16:20:54	3
	3.3.1	SMS Sim004	11:20:00	11:27:13	0:07:13	1
	3.3.2	SMS Sim004	14:46:15	15:02:17	0:16:02	1
	3.3.3	SMS Sim004	17:04:18	2012-08-30 09:01:57	15:57:39	1
⊞	3.4	2012-08-30	12:11:01	2012-08-31 13:49:22	1 days 1:38:21	1
⊟	4	SMS Sim007	18:17:01	2012-08-30 09:01:56	1 days 21:52:34	4
⊞	4.1	2012-08-27	18:17:01	2012-08-28 09:03:04	14:46:03	1
⊞	4.2	2012-08-28	18:20:06	2012-08-29 09:13:58	14:53:52	1
⊟	4.3	2012-08-29	14:46:16	09:01:56	16:12:39	2
	4.3.1	SMS Sim007	14:46:16	15:01:17	0:15:01	1
	4.3.2	SMS Sim007	17:04:18	2012-08-30 09:01:56	15:57:38	1
⊞	5	Vliegende	18:17:01	2012-08-30 09:01:57	1 days 21:52:35	4

To expand the enclosed information, click on the plus-shaped button at the beginning of each line. It is also possible to expand the nested levels by clicking the corresponding numbers-buttons in the heading of the nesting column. To hide all the expanded lines, click on the button '1'.

If there is no data for the given unit, all the cells (except for the name) contain only dashes. In some cases it is not convenient, so you can disable such uninformative lines. To do so, enable the *Skip empty rows* option in the report template.

Unit Latest Data Table

This kind of the table is available only for unit groups. As for the separate units, this information is available in the statistics. The table presents the last location and the values of their counters.

The following columns can be selected to form the table:

- **Grouping** — the column with the names of the units (appears automatically).
- **Last message** — the time when the latest message from the unit was received.
- **Last coordinates** — the time when the last message with valid coordinates was received (not always coincides with the previous column).
- **Location** — the address or coordinates of the last location.
- **Speed** — the speed according to the last message.
- **Mileage** — the mileage counter value.
- **Engine hours** — the value of the engine hours counter.
- **Traffic** — the value of the GPRS traffic counter.
- **Driver** — the name of the driver (if detected).
- **Trailer** — the name of the trailer (if detected).

- **Notes** — an empty column for your custom comments.

Grouping	Last message	Last coordinates	Location	Speed	Mileage	Traffic
Picasso	2016-03-09 17:59:51	2016-03-09 17:59:51	Narciso Mendoza, Sinaloa 81217	6 km/h	1641475 km	0 B
ShootingStar	2016-03-09 17:59:51	2016-03-09 17:59:51	Culiacán, Sinaloa	30 km/h	125943 km	759.55 MB
SMS Sim004	2016-03-09 17:59:51	2016-03-09 17:59:51	Aguaruto Centro, Sinaloa 80308	18 km/h	32489 km	0 B
SMS Sim007	2016-03-09 17:59:52	2016-03-09 17:59:52	Culiacán, Sinaloa	0 km/h	399187 km	2.48 MB
Vliegende	2016-03-09 17:51:26	2016-03-09 17:51:26	Hermosillo, Sonora	34 km/h	377776 km	0 B

By default, the latest information refers to the time of the report execution. However, the latest information at the end of the report interval can also be displayed. To do this, enable the ***Consider report interval*** checkbox in the template.

Apart from that, the filtration by geofences/units can be used for this report. This allows to quickly find the units which are situated in a certain place or close to other units.

The last location can be visualized on the map by unit icons — activate the *Unit last location* option in the report template.

Reports on Users

Several tables and charts can be generated for users.

In the Statistics the following fields are available: report template name, user name, reporting interval (beginning/end), report execution time, total time spent in the system, and logins count.

Log Table

A set of columns for this table matches the one used in the same report on units.

Logins Table

This kind of table shows to what services the user logged in and how often. The table can contain the following columns:

- **Login time** — the time when the user logged on to one of the services.
- **Logout time** — the time when the user exited the service.
- **Duration** — the time interval the user was online.
- **Host** — the address of the computer from which the user logged in.
- **Site** — the name of the service where the user logged in.
- **Count** — the number of logins.
- **Notes** — the empty column for custom notes.

Login time	Logout time	Duration	Host	Site
10 Aug 2015 15:04	10 Aug 2015 15:04	0:00:00	212.98.173.148	hosting.wialon.com
10 Aug 2015 15:04	10 Aug 2015 15:05	0:00:18	212.98.173.148	hosting.wialon.com
10 Aug 2015 15:05	10 Aug 2015 15:05	0:00:26	212.98.173.148	hosting.wialon.com
10 Aug 2015 15:05	10 Aug 2015 15:05	0:00:02	212.98.173.148	hosting.wialon.com
10 Aug 2015 15:06	10 Aug 2015 15:09	0:02:58	212.98.173.148	hosting.wialon.com
10 Aug 2015 15:07	10 Aug 2015 15:09	0:01:17	212.98.173.148	hosting.wialon.com
11 Aug 2015 15:09	11 Aug 2015 15:15	0:06:01	212.98.173.148	hosting.wialon.com
12 Aug 2015 14:09	12 Aug 2015 19:27	5:17:39	212.98.173.148	hosting.wialon.com
12 Aug 2015 14:10	12 Aug 2015 14:12	0:02:04	212.98.173.148	hosting.wialon.com
17 Aug 2015 15:36	17 Aug 2015 15:41	0:04:13	212.98.173.148	hosting.wialon.com
18 Aug 2015 16:04	18 Aug 2015 16:04	0:00:06	212.98.173.148	hosting.wialon.com

The same settings as for all the other tables can be applied to the user logins table: grouping, detalization, row numbering, total row, and time limitations. In the example below, you can see the user logins table with grouping by days, detalization, numbering, and total row.

Date | Detalization

	№	Grouping	Login time	Logout time	Duration	Host	Site	Count
⊞	1	10 Aug 2015	10 Aug 2015 09:40	10 Aug 2015 15:09	5:25:19	-----	-----	9
⊞	2	11 Aug 2015	11 Aug 2015 15:09	11 Aug 2015 15:15	0:06:01	-----	-----	1
⊞	3	12 Aug 2015	12 Aug 2015 14:09	12 Aug 2015 14:12	5:19:43	-----	-----	2
⊞	4	17 Aug 2015	17 Aug 2015 15:36	17 Aug 2015 15:41	0:04:13	-----	-----	1
⊟	5	18 Aug 2015	18 Aug 2015 16:04	18 Aug 2015 19:54	1:25:44	-----	-----	4
	5.1	18 Aug 2015 16:04	18 Aug 2015 16:04	18 Aug 2015 16:04	0:00:06	212.98.114.112	hosting.wialon.com	1
	5.2	18 Aug 2015 16:04	18 Aug 2015 16:04	18 Aug 2015 17:21	1:17:24	212.98.114.112	hosting.wialon.com	1
	5.3	18 Aug 2015 16:38	18 Aug 2015 16:38	18 Aug 2015 16:40	0:02:08	212.98.114.112	hosting.wialon.com	1
	5.4	18 Aug 2015 19:48	18 Aug 2015 19:48	18 Aug 2015 19:54	0:06:06	212.98.114.112	hosting.wialon.com	1
⊞	6	20 Aug 2015	20 Aug 2015 13:58	20 Aug 2015 13:59	0:37:41	-----	-----	2
⊞	7	21 Aug 2015	21 Aug 2015 17:49	21 Aug 2015 18:08	0:18:51	-----	-----	1
	-----	**Total**	**10 Aug 2015 09:40**	**21 Aug 2015 18:08**	**13:17:32**	-----	-----	**20**

One report can display logins of more than one user. However, in this case, the report type should not be *User* but

Resource. All the users that belong to an account for which such a report is executed, get into the report. See the example:

User > Detalization

	Grouping	Login time	Logout time	Duration	Count
⊞	Forbidden User	2013-09-25 11:24:30	2015-05-15 17:24:01	1:54:30	10
⊞	Hog's Head	2014-08-11 16:22:49	2014-08-11 18:00:21	1:37:32	1
⊞	adols	2015-05-12 12:40:04	2015-05-20 20:00:16	0:05:00	3
⊞	bidden	2014-07-02 11:13:53	2015-05-06 15:09:40	0:04:31	3
⊟	demo	2014-01-17 17:10:25	2015-05-20 19:13:52	0:11:42	4
	demo	2014-01-17 17:10:25	2014-01-17 17:11:24	0:00:59	1
	demo	2015-05-18 12:16:34	2015-05-18 12:27:04	0:10:30	1
	demo	2015-05-20 17:08:02	2015-05-20 17:08:08	0:00:06	1
	demo	2015-05-20 19:13:45	2015-05-20 19:13:52	0:00:07	1
⊞	little	2014-05-07 10:26:47	2015-05-18 13:40:48	2:16:36	6

Custom Fields Table

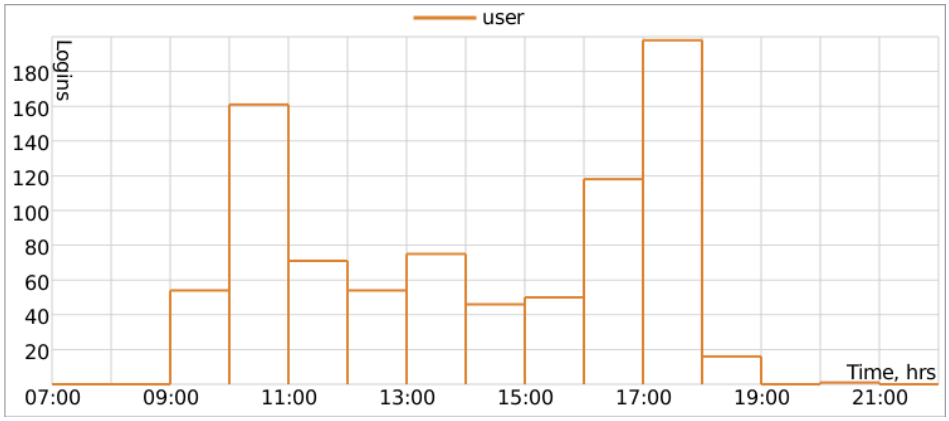
The *Custom fields* table represents the list of custom fields entered in the corresponding tab of the user properties dialog. This report has the same characteristics as the same report for units and groups.

Name	Value
dispatcher	yes
region	Furmankan, East 7 Road
shift	2
units under control	17
working schedule	13:00-17:00, 18:00-22:00

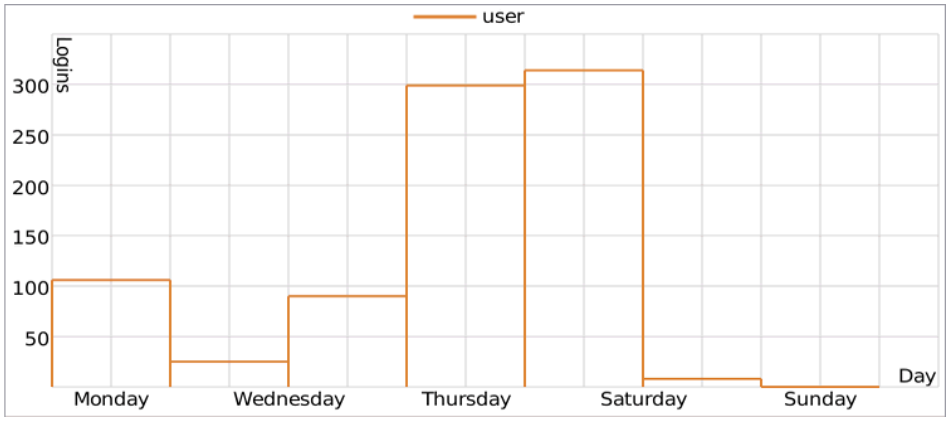
Charts Applied to Users

Two kinds of charts can be attached to the report on user logins: Logins/Hours and Logins/Days of the week. To get these charts, click the *Add Chart* button and select the type in the dropdown list of the report template.

The *Logins/Hours* chart shows the frequency of the user's logons to the system at different times (hours):



The *Logins/Days of week* chart shows how often the user logged to the system on different days of the week:



Reports on Drivers

To generate reports on drivers or driver groups, the *Query reports or messages* access right to the resource which these drivers or groups belong to is required. Moreover, a driver and a report template should belong to the same resource.

The following types of tables can be applied to drivers:

- Bindings,
- Custom fields,
- Driver activity,
- Eco driving,
- Infringements,
- Orders,
- SMS messages.

Bindings

The *Bindings* table shows when and to which unit the driver was assigned, how long his work shifts lasted, how much fuel was spent, the distance traveled, etc.

The following columns can be included in this kind of report:

- **Unit** — the name of the unit to which the driver was bound.
- **Beginning** — the date and time when the driver was bound to the unit.
- **Initial location** — the initial position, that is, the address at that moment (if available).
- **End** — the date and time when the driver was unbound from the unit.
- **Final location** — the final position, the address at that moment (if available).
- **Duration** — the duration of a work shift.
- **Total time** — the time from the beginning of the first shift to the end of the last shift.
- **Engine hours** — the total amount of engine hours for a working interval of the driver.
- **Engine hours in movement** — the number of engine hours for the interval of movement with the bound driver.
- **Engine hours in idle run** — the number of engine hours for the interval of idling with the bound driver.
- **Mileage** — the distance traveled within the period.
- **Mileage (adjusted)** — the mileage taking into account the coefficient set in the unit properties on the *Advanced* tab.
- **Urban mileage** — the distance traveled in the urban area.
- **Suburban mileage** — the distance traveled in the suburban area. It is calculated in regards to speed. The urban/suburban speed line is indicated in Unit Properties —> Advanced (the *Urban speed limit* setting).
- **Avg speed** — the average speed on a given interval.
- **Max speed** — the maximum speed registered within this work shift.
- **Counter** — the value of the counter sensor.
- **Status** — the status of the unit registered during the interval (if there are several, the first one is displayed).
- **Violations** — the number of violations.
- **Count** — the number of bindings found on a given interval.
- **Consumed** — the amount of fuel consumed in total for all fuel sensors.

Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates — the volume of consumed fuel detected by any fuel sensor (such as impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates.

- **Avg consumption** — the average fuel consumption, determined from the available fuel sensors.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates** — the average fuel consumption in the trip detected by one of the methods mentioned above.
- **Initial fuel level** — the fuel level at the beginning of the work shift.
- **Final fuel level** — the fuel level at the end of the work shift.
- **Penalties** — the penalties calculated for the adjusted *Eco Driving* criteria.
- **Rank** — the penalty points, converted into a grade using a 6-point rating system.
- **Notes** — an empty column for your custom comments.

In addition, in the report template to the right of the list of columns, you can specify the units to which the report is applied. If no units are selected in this section, the report will be applied to all available units.

The report is designed in such a way that the first column is the list of units to which the driver was bound. It is recommended to apply the detalization option to this table to get a possibility to expand any unit and see more detailed information about all work shift.

Unit | Detalization

Grouping	Unit	Beginning	End	Duration	Violations	Count
SMS Sim004	-----	18.03.2016 11:00	18.03.2016 11:55	0:40:15	3	3
18.03.2016 11:00	SMS Sim004	18.03.2016 11:00	18.03.2016 11:10	0:10:05	2	1
18.03.2016 12:00	SMS Sim004	18.03.2016 11:20	18.03.2016 11:35	0:15:03	0	1
18.03.2016 13:00	SMS Sim004	18.03.2016 11:40	18.03.2016 11:55	0:15:07	1	1
Fish Boat	-----	18.03.2016 15:00	18.03.2016 15:55	0:35:14	4	3
18.03.2016 15:00	Fish Boat	18.03.2016 15:00	18.03.2016 15:10	0:10:05	1	1
18.03.2016 16:00	Fish Boat	18.03.2016 15:30	18.03.2016 15:45	0:15:05	2	1
18.03.2016 17:00	Fish Boat	18.03.2016 15:45	18.03.2016 15:55	0:10:04	1	1
Picasso	-----	18.03.2016 18:00	18.03.2016 18:55	0:45:19	2	3
18.03.2016 18:00	Picasso	18.03.2016 18:00	18.03.2016 18:15	0:15:10	1	1
18.03.2016 19:00	Picasso	18.03.2016 18:20	18.03.2016 18:25	0:05:04	0	1
18.03.2016 20:00	Picasso	18.03.2016 18:30	18.03.2016 18:55	0:25:05	1	1

To determine the intervals of binding, the messages from the unit are also taken into account. If there are such messages, they are considered to be of more priority than the messages about binding (the intervals are counted according to them).

Custom Fields

The *Custom fields* represents the list of custom fields entered in the corresponding tab of the driver's properties. Possible columns:

- **Name** — custom field name.
- **Value** — custom field value.
- **Notes** — an empty column for your custom comments.

Name	Value
Age	30
Category	A, B, C
Driving experience	10
Phone number	+345458796541

Driver Activity

The *Driver Activity* table shows such information as the type of driver's action, the crew of a vehicle, the state of the tachograph cards. It may include the following columns:

- **Beginning** — the date and time when activity begins.
- **Card** — the state of the digital tachograph (inserted/not inserted).

- **Activity** — the type of driver's activity (rest, work, driving, available, not available).
- **Source** — the source of data, which is used to generate information about driver activity. The following column values are available: *E* — the data about trips is used; *T* — the tachograph data is used; *U* — the data about driver unbinding is used; *None* — the data source is unknown.
- **Unit** — the name of the unit to which the driver is bound.
- **Driving** — the time of driving.
- **Work** — the hours of active work (time spent by the driver on vehicle repair, fuel filling, etc.).
- **Availability** — the hours of passive work (time spent by the second driver in the moving vehicle).
- **Rest** — the time for rest of the driver (vehicle is stopped, the driver rests in a specially designated place).
- **Overall work** — the total time spent by the driver on such actions as driving, work, reserve.
- **Slot** — the slot for digital tachograph card (Driver or Co-driver).
- **Status** — the vehicle crew size (single/crew).
- **Daily mileage** — the distance covered by the bound driver during the day (24 hours).

Beginning	Card	Activity	Driving	Work	Availability	Rest	Slot	Status
01.04.2014 18:37	Inserted	Rest	0:00:00	0:00:00	0:00:00	8:23:00	Driver	Single
02.04.2014 03:00	Inserted	Rest	0:00:00	0:00:00	0:00:00	3:24:00	Driver	Single
02.04.2014 06:24	Inserted	Work	0:00:00	0:48:00	0:00:00	0:00:00	Driver	Single
02.04.2014 06:25	Inserted	Driving	2:47:00	0:00:00	0:00:00	0:00:00	Driver	Single
02.04.2014 09:12	Inserted	Rest	0:00:00	0:00:00	0:00:00	0:42:00	Driver	Single
02.04.2014 09:14	Inserted	Driving	1:22:00	0:00:00	0:00:00	0:00:00	Driver	Single
02.04.2014 10:36	Inserted	Rest	0:00:00	0:00:00	0:00:00	0:46:00	Driver	Single
02.04.2014 11:22	Inserted	Driving	1:49:00	0:00:00	0:00:00	0:00:00	Driver	Single
02.04.2014 13:11	Inserted	Rest	0:00:00	0:00:00	0:00:00	2:48:00	Driver	Single
02.04.2014 15:59	Inserted	Driving	6:06:00	0:00:00	0:00:00	0:00:00	Driver	Single

While creating this report template, you should select in the parameters of the table the way to determine driver activity: DDD files (are sent by the tachograph), online data (generated online on the basis of the events of bindings and trips) or bindings and trips (messages are used as the source). If the *Bindings and trips* option is selected, the result of the report changes when you change the settings of the trip detector, delete messages, bind and unbind, etc.

Eco Driving

This reports is similar to the report for a unit.

Infringements

This report shows information on the violation of labor routine by the driver. It may include the following columns:

- **Time**: date and time of violation recording.
- **Infringement**: type of driver's activity the conditions of which have been violated.
- **Description**: a short description of the infringement.
- **Seriousness**: the extent of the infringement.

№	Time	Infringement	Description	Seriousness
1	05.04.2014 22:58	Rest period	Insufficient daily rest period of less than 11 h	Serious
2	22.04.2014 20:23	Rest period	Insufficient reduced daily rest period of less than 9 h	Very serious
3	02.05.2014 12:13	Rest period	Insufficient weekly rest period of less than 45 h	Very serious
4	05.05.2014 02:33	Rest period	Insufficient split daily rest period of less than 3 h + 9 h	Very serious
5	23.06.2014 23:57	Driving time	Exceeded extended daily driving time of 10 h	Minor
6	30.11.2014 14:44	Rest period	Insufficient weekly rest period of less than 45 h	Minor
7	21.01.2015 18:18	Rest period	Insufficient reduced daily rest period of less than 9 h	Minor
8	22.01.2015 20:30	Rest period	Insufficient split daily rest period of less than 3 h + 9 h	Very serious
9	23.01.2015 05:58	Driving time	Exceeded extended daily driving time of 10 h	Very serious
10	23.01.2015 09:25	Break	Exceeded uninterrupted driving time of 4 h 30 min	Minor

While creating this report template you should choose in the parameters of the table a driver activity source: DDD files (are sent by the tachograph), online data (are formed online on the basis of the events of bindings and trips) or bindings and trips (messages are used as the source). If the *Bindings and trips* option is chosen, the report's result changes in case of changes in the trip detector's settings, deleting messages, bindings, and unbindings, etc.

Orders

This reports is similar to the report for a unit.

SMS Messages

This report shows the correspondence of the dispatcher with the driver via SMS. The dispatcher (operator) can send messages to the driver from the Wialon Local interface through a special SMS window. The driver sends messages from his mobile phone. This mobile phone number must be indicated in the driver's properties.

The following columns can be included in the table:

- **Time** — the date and time when the message arrived.
- **Type** — the message type: *sent* (message sent by the dispatcher) or *received* (message received from the driver).
- **Text** — the text of the message.
- **Phone** — the phone number of the driver.
- **Modem phone** — the phone number of the modem that sent/received an SMS.

Time	Type	Text	Phone	Modem phone
2011-11-04 11:40:13	Sent	5 orders in Central park area.	+375299000200	-----
2011-11-04 11:40:16	Recieved	OK	+375299000200	+375000000000
2011-11-04 11:40:44	Sent	Ready?	+375299000200	-----
2011-11-04 11:40:47	Recieved	5 min	+375299000200	+375000000000
2011-11-04 11:41:00	Recieved	Got jammed	+375299000200	+375000000000
2011-11-04 11:43:11	Sent	Richard Wagner st., 7a, entrance 3; Strombringer ave., 354; West 6th st., 1667;	+375299000200	-----
2011-11-04 11:43:40	Sent	Opera house, back entrance; Kings parkway, 47.	+375299000200	-----
2011-11-04 11:44:07	Recieved	Accepted	+375299000200	+375000000000
2011-11-04 14:44:14	Recieved	Route finished	+375299000200	+375000000000
2011-11-04 14:47:43	Recieved	SOS. Broke down. Between Kings Parkway and 47th East street.	+375299000200	+375000000000

Additional Possibilities

For the *Binding* and *SMS messages* tables, you can apply grouping by days/weeks/months, but you need to take into account that in these tables only one level of nesting is possible, i.e. at the first level - units, on the second — generalized information for the specified date/week/month (the second level is not disclosed).

In addition, you can query statistics for the reports, where the following fields are possible: report template name, driver name, report interval (beginning and end), and report generation time.

Tracks of the driver's movements can be displayed on the map.

Most tables can be generated for a group of drivers.

Unit › Trailer › Date › Detalization

	Grouping	Unit	Beginning	End	Duration	Count
⊟	Ducati	-----	2014-06-17 16:03:30	2016-03-18 23:59:59	13:04:36	3
⊞	Michael Schumacher	-----	2016-03-18 13:32:48	2016-03-18 23:59:59	10:27:11	1
⊞	Valentino Rossi	-----	2014-06-17 16:03:30	2016-03-14 18:40:17	2:36:47	1
⊞	Vin Diesel	-----	2016-03-18 13:31:48	2016-03-18 13:32:26	0:00:38	1
⊟	Honda	-----	2014-02-18 11:27:05	2016-03-18 13:32:30	15:00:35	3
⊞	Valentino Rossi	-----	2016-03-18 13:32:01	2016-03-18 13:32:30	0:00:29	1
⊟	Casey Stoner	-----	2014-02-18 11:27:05	2016-03-18 13:33:06	15:00:06	2
⊞	2010-02-18	-----	2010-02-18 11:27:05	2010-02-20 16:27:11	05:00:06	1
⊞	2011-03-18	-----	2011-03-18 13:33:06	2011-03-18 18:33:06	05:00:00	1
⊟	2012-03-18	-----	2012-05-10 13:33:06	2012-05-10 18:33:06	05:00:00	2
	2012-03-18 13:33:06	Honda	2016-03-18 13:33:06	2016-03-18 15:30:00	02:02:54	1
	2012-03-18 13:33:06	Honda	2016-03-18 15:30:00	2016-03-18 18:33:06	02:57:06	1

Note.
The Total row cannot be used in reports for driver and trailer groups.

Reports on Trailers

To generate reports on trailers or trailer groups, the *Query reports or messages* access to the resource to which these trailers or groups belong to is required. Moreover, the driver and the report template should belong to the same resource.

Two tables can be created for trailers:

- Bindings,
- Custom Fields.

Bindings

This table shows working intervals of the selected trailer if it was bound to a unit. It comes along with the information on fuel consumed, distance traveled, etc. The parameters and possible columns for this table are the same as in the similar table for drivers (with the *Violations* column being absent). The Bindings table can be also generated for trailer groups — it gives a possibility to build complicated four-level reports (trailers –> units –> dates/weeks/months –> single bindings). More information about bindings for driver groups can be found here.

Unit | Trailer | Date | Detalization

	Grouping	Unit	Beginning	End	Duration	Count
⊟	Ducati	-----	2014-06-17 16:03:30	2016-03-18 23:59:59	13:04:36	3
⊞	Comfortable house 1	-----	2016-03-18 13:32:48	2016-03-18 23:59:59	10:27:11	1
⊞	Comfortable house 2	-----	2014-06-17 16:03:30	2016-03-14 18:40:17	2:36:47	1
⊞	Comfortable house 3	-----	2016-03-18 13:31:48	2016-03-18 13:32:26	0:00:38	1
⊟	Honda	-----	2014-02-18 11:27:05	2016-03-18 13:32:30	15:00:35	3
⊞	Modern equipment	-----	2016-03-18 13:32:01	2016-03-18 13:32:30	0:00:29	1
⊟	Mixing machine	-----	2014-02-18 11:27:05	2016-03-18 13:33:06	15:00:06	2
⊞	2010-02-18	-----	2010-02-18 11:27:05	2010-02-20 16:27:11	05:00:06	1
⊞	2011-03-18	-----	2011-03-18 13:33:06	2011-03-18 18:33:06	05:00:00	1
⊟	2012-03-18	-----	2012-05-10 13:33:06	2012-05-10 18:33:06	05:00:00	2
	2012-03-18 13:33:06	Honda	2016-03-18 13:33:06	2016-03-18 15:30:00	02:02:54	1
	2012-03-18 13:33:06	Honda	2016-03-18 15:30:00	2016-03-18 18:33:06	02:57:06	1

Custom Fields

This table represents the list of custom fields created in the trailer properties. It is not available for trailer groups.

№	Name	Value
1	Mileage	55000
2	Model	Bambi
3	Year	2007

Reports on Passengers

To generate reports on passengers and groups of passengers, it is necessary to possess the *Query reports or messages* access right towards the resource to which these passengers belong. Moreover, a passenger (passengers) and a report template should belong to the same resource.

The *Bindings* report can be generated on passengers.

The *Bindings* table may include the time and location of the passengers boarding/leaving a vehicle, name of the unit used by passengers, duration of a trip, etc.

- **Beginning** — the time a passenger was bound to a unit.
- **Initial location** — the location of the passenger when binding to a unit.
- **End** — the time the passenger was unbound from a unit. If the unbinding happened automatically and in the table the *Show and mark as incomplete* parameter is selected as the action for an incomplete interval, *Unknown* is shown in the field.
- **Final location** — the location of the passenger when unbinding from a unit. If the unbinding happened automatically and in the table the *Show and mark as incomplete* parameter is selected as the action for an incomplete interval, a dash is shown in the field.
- **Unit** — the name of the unit to which the passenger was bound.
- **Driver** — the name of the driver of the unit to which a passenger was bound.
- **Duration** — the time the passenger spent on the trip (time between binding and subsequent unbinding). In case of an automatic unbinding, *0:00:00* is indicated in this field.

Beginning	End	Unit	Driver	Duration
11 Oct 2016 12:37:24	11 Oct 2016 12:39:12	Honda	OM1	0:01:48
11 Oct 2016 12:39:39	11 Oct 2016 12:42:14	Euro0	yami_driver1	0:02:35
11 Oct 2016 12:46:38	11 Oct 2016 12:48:16	Euro0	yami_driver1	0:01:38
11 Oct 2016 12:50:57	11 Oct 2016 12:53:46	BMW	OM	0:02:49
11 Oct 2016 12:55:38	11 Oct 2016 12:58:42	BMW	OM	0:03:04
11 Oct 2016 13:03:50	11 Oct 2016 13:08:51	BMW	OM	0:05:01
11 Oct 2016 13:10:56	11 Oct 2016 13:12:31	BMW	OM	0:01:35

Data in Reports

Time in Reports

The time of completion/start/end of any state is displayed in the reports in the format specified in the Settings --> General section of a report template.

In the tables that include the duration of a state, the hours may not be combined into days (if the interval is longer than 24 hours). It means that instead of *5 days 12:34:56* it is displayed as *132:34:56*. To disable days and leave only hours, select the *hours:minutes:seconds* duration format in the table properties of the report template. This option does not only affect the formatting in the cells, but also the row *Total*. Moreover, the duration may be shown in the format of *hours* (with two decimal places). For instance, *3.45* instead of *3:27*. This is done by means of activating the *hours (with two decimal places)* option.

If grouping is used, a table receives additional column (*Grouping*) which displays the time in the following way:

- Grouping by years shows corresponding years (for example, 2015);
- Grouping by months shows the names of the months (for example, August);
- Grouping by weeks shows the number of the week in a year (for example, week 10; note that the first week is considered to be the first *full* week in a year.)
- Grouping by day of the week shows the corresponding day (for example, Friday);
- Grouping by day of the month shows the corresponding day (from day 1 to day 31);
- Grouping by dates shows the corresponding date in the format selected in the advanced settings of the report template;
- Grouping by shifts shows the corresponding shift (for example, shift 1).

Attention!
To receive reliable data for time/duration, it is important to correctly indicate the *time zone* and *DST* options in User Settings.

Mileage

Mileage can appear in reports on trips, geofences, rides, speedings, digital sensors, etc., as well as in statistics and processed fuel level chart.

Mileage is calculated according to settings of mileage counter on the *General* tab of the unit properties. Besides, mileage can also depend on Trip Detector because the intervals of movement and parkings are detected by it.

Mileage can be ordinary or adjusted. The adjusted mileage may be useful to coordinate the mileage detected by the program and mileage detected by the vehicle itself. The correction coefficient is set in the unit properties on the *Advanced* tab.

In Statistics and in various tables, you can find many possibilities for mileage:

- Mileage in all messages — the full mileage without any filtration by the trip detector. It is always the longest mileage because it also includes all adjustment of data.
- Mileage in trips — the total mileage of all movement intervals found according to the trip detector.
- Mileage (adjusted) — the mileage in trips multiplied by the correction coefficient.
- Mileage in engine hours — the mileage in the intervals of engine hours.

- Urban mileage — the distance traveled at the speed which is considered as the speed in populated areas.
- Suburban mileage — the distance traveled at the speed which is considered as the speed outside populated areas. *Urban speed limit* is a setting in the unit properties which defines if unit is moving in the urban area or outside of it.
- Initial mileage — the mileage sensor value at the beginning of the interval (trip, street visit, sensor operation, etc.).
- Final mileage — the mileage sensor value at the end of the interval.
- Mileage counter — the absolute mileage (the mileage counter value at the moment of the report generation).

In many tabular reports, mileage can be displayed. It can be calculated either by all messages or by messages in trips. Choice of the method of calculation is defined by the *Mileage from trips only* checkbox in the General section of the *Report Template* dialog.

If less than 20 (miles or kilometers), the mileage is displayed with accuracy to hundredths (other decimal places are simply cut). Measurement units for speed and mileage (kilometers and kilometers per hour or miles and miles per hour) are selected in the additional settings of the *Report Template* dialog. There you can also set the *Mileage/fuel/counters with accuracy to two decimal places* option to always see the mileage with the hundredths.

Speed

The average and maximum speed values can be included in the same reports as the mileage: trips, geofences, rides, speedings, digital sensors. Note that the **average speed** directly depends on the mileage because it is calculated by dividing mileage by duration (for example, distance traveled with a sensor on divided by the duration of an on state. That is why a situation can happen when the average speed is zero and the maximum speed is a positive number. It can happen (1) if the duration of a state is zero (see explanation above); (2) if the mileage is zero (the unit was parked or the mileage counter is set incorrectly); (3) if the mileage is insignificant, for example, *0,01*, and the result of division is smaller than 1. Note that mileage can be calculated either by all messages or by trips only (the option in the settings of a report), and this obviously affects the resulting values of the average speed.

The **Maximum speed** has nothing to do with the mileage and any counters. To calculate the maximum speed within an interval, all messages which get to this interval are analyzed and the largest speed value is selected and displayed in the corresponding cell.

The speed is given only in integer numbers.

Fuel in Reports

Many reports can provide the information about the fuel: fuel level (initial/final), the volume of filled/stolen/registered/consumed fuel, average consumption, etc.

In most cases to receive the information about the fuel you need the unit to have corresponding sensors installed. They should be configured in the *Sensors* of the *Unit properties* dialog and the corresponding calculation methods should be selected on the *Fuel Consumption* tab.

AThe following abbreviations are used:

- FLS — fuel level sensor;
- ImpFCS — impulse fuel consumption sensor;
- AbsFCS — absolute fuel consumption sensor;
- InsFCS — instant fuel consumption sensor.

Without special fuel sensors, you can control the fuel in the following ways:

- register fillings manually in the *Monitoring* panel;
- use the mathematical calculation of the fuel consumption that is based on the consumption rates from the

ignition, relative or absolute engine hours sensors multiplied by the values of the engine efficiency sensors (if any). The latter can be used for taking into account the load, the movement in urban and suburban cycles and the work during different seasons.

The consumption by math does not require fuel sensors. The consumption rates and coefficients indicated in the properties of the ignition and engine efficiency sensors are multiplied by time.

In a report template several methods of calculating fuel can be selected simultaneously. In this case a separate column is generated for each method. Moreover, if there are several sensors of the same type, then a separate column is generated for each of them. If you want a certain sensor to be used for the fuel calculation, enter its name mask in the *Sensor masks* filter of the parameters of the table. If in the report template you select columns that do not correspond to the unit's properties, zeros are displayed in the cells of the resulting report.

In the statistics, there is no possibility to show the information for each sensor separately. In such rows as *Avg consumption …*, *Consumed by …*, *Rates deviation …*, etc. you can get only one value for each type of a fuel sensor (FLS/ImpFCS/AbsFCS/InsFCS). That is why the consumed fuel (*Consumed by …*) in the statistics is the sum of the sensors of this type, and the average consumption (*Avg consumption …*) is the arithmetic average of those sensors. However, the calculation of the deviation from rates (*Rates deviation …*) depends on the adjustments of the sensors. If a unit has two sensors of the same type, the deviation from rates is calculated for each sensor separately, but for the statistics (as it can be only one row) the sum of those deviations is shown. Thus, the formula is:

- *Rates deviation = (Consumed by FLS1 — Consumed by rates) + (Consumed by FLS2 — Consumed by rates)*

The fuel consumption detected by FLS, as well as the average consumption according to FLS, can be calculated including fuel thefts or excluding them. This is adjusted in the settings of a report template (check the *Exclude thefts from fuel consumption* box). Depending on this option, you can get the summarized information about the fuel consumption or the information about the fuel consumed by the vehicle.

By default, the fuel level is given in integer numbers. The volume of the consumed/registered/stolen fuel, as well as the average consumption is given to the nearest hundredth if their value is below 50 (if it is higher, then integer numbers are used). However, if required, you can see fuel values always with the accuracy to hundredths. Check the *Mileage/fuel/counters with accuracy to two decimal places* option in the report template (the rest of the numbers is rounded off).

If the U.S. measurement units are selected, the fuel is measured in gallons and the average consumption — in mpg (miles per gallon) unlike the European system where the average consumption is measured in l/100km (liters per 100 kilometers).

The fuel calculation algorithms process the messages taking into account the filtration that is configured on the *Fuel Consumption* tab (the *Filter fuel level sensors values* option).

Consumption Math

During the mathematical calculation the fuel consumption is computed separately for each pair of messages.

The following algorithm is used:

1. The status of each engine sensor (engine ignition, absolute and relative engine hours sensors) in the current message is determined.
2. For the operating sensors the values indicated in the *Consumed, l/h* field of their properties are summed.
3. The values of the engine efficiency sensors are calculated.
4. The received values are summed according to the formula *k1 + (k2 - 1) + (k3 - 1) + … + (kn – 1)*. In that way the coefficient is formed. If the sum of the coefficients is less than 0 or invalid, the total coefficient is 1.

5. To determine the current fuel consumption of the unit, the value from the point 2 is multiplied by the value of the point 4.
6. The value from the previous message till the current one is multiplied by the value from the point 5.
7. The consumption for each message pair for the indicated interval is summed and in that way the fuel consumption is determined by the consumption math.

Fuel

The whole process of working with fuel sensors can be broken down into successive stages (in the subsections of stages you can find important options, terms, situations, etc.):

1. Data preparation
    - Option: Ignore the messages after the start of motion;
    - Term difference: 'Mileage-based calculation' VS 'Time-based calculation'.
2. Filtration
    - Option: Filter fuel level sensors values;
    - Option: Filtration level.
3. Fillings Detection
    - Option: Minimum fuel filling volume;
    - Option: Detect fuel filling only while stopped;
    - Option: Ignore filtration when calculating filling volume;
    - Special Case: How a filling is processed?
4. Thefts detection
    - Option: Minimum fuel theft volume;
    - Option: Idling;
    - Option: Detect fuel theft in motion;
    - Option: Ignore filtration when calculating theft volume.
5. Consumption calculation
    - Option: Replace invalid values with math consumption;
    - Option: Exclude thefts from fuel consumption;
    - Special Case: Filling/theft is sliced with one of interval frontiers.

Data preparation

Note: **Ellipsis** (…) substitutes **Unit properties –> Fuel consumption** when indicating the option paths.

Among important options the next list should be mentioned:

- Option: Ignore the messages after the start of motion;
- Special Case: Mileage-based calculation VS Time-based calculation.

Ignore the messages after the start of motion

... → 'Fuel fillings/thefts detection' block → 'Ignore the messages after the start of motion, sec'

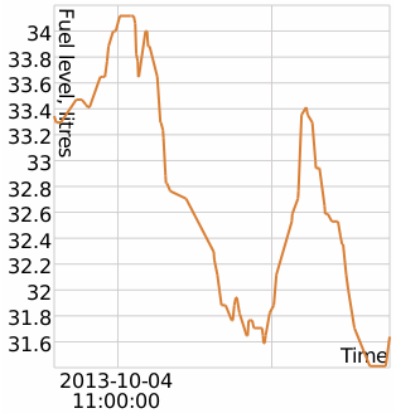
This option allows you to exclude messages after starting the movement within the designated time interval in seconds. Cross-border messages with an ignored interval are connected by a line.

Here is the whole algorithm:

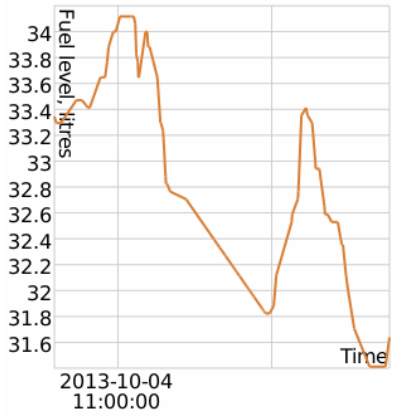
1. a start motion message is taken and is used to define the amount of messages being ignored;
2. this message is regarded as a left-frontier message;
3. then we add seconds set in the option to this message timestamp to get the end moment of the ignored time period;
4. all FLS messages which got in this time period are ignored while processing;
5. the first message that comes after the ignored period (p.3), is called a right-frontier message;
6. Both left- and right-frontier messages are joined by the line being drawn (instead of taking the ignored messages into account while building the chart).

All the processed charts have the option for such correction (except for the Regular charts, where the data is raw).

This is the chart with no ignoring:



The chart with the ignore option turned on:



Mileage-based calculation VS Time-based calculation

... → 'Fuel fillings/thefts detection' block → 'Time-based calculation of fillings'
... → 'Fuel fillings/thefts detection' block → 'Time-based calculation of thefts'
... → 'Fuel level sensors' block → 'Time-based calculation of fuel consumption'

The convergence of the data (i.e., when the sum of interval results equals the whole interval result) is guaranteed when all the mentioned options are activated/deactivated:

1. Time-based calculation of fillings;
2. Time-based calculation of thefts;
3. Time-based calculation of fuel consumption.

While *Time-based calculation* (all three options) is **switched on** the x-axis is time:

- fuel consumption/idling looks like a slowly descending curve on graph;
- thefts/fillings — a quick falling in the fuel level for a short period of time (theft/filling processing time).

While *Time-based calculation* is **switched off** (the data is calculated as mileage-based) the x-axis is mileage:

- fuel consumption in motion looks like a slowly descending curve;
- idling is marked as a vertical falling of fuel level;
- thefts/fillings on stops are marked as vertical rising of fuel level.

Filtration

Note: **Ellipsis** (**…**) substitutes **Unit properties –> Fuel consumption** when indicating the option paths.

Two options are connected with filtering:

- Option: Filter fuel level sensors values;
- Option: Filtration level (0..255).

Filtration enabling and filtration level setting

... → 'Fuel level sensors' block → 'Filter fuel level sensors values';
... → 'Fuel level sensors' block → 'Filtration level (0..255)'.

When using the filtration make sure to:

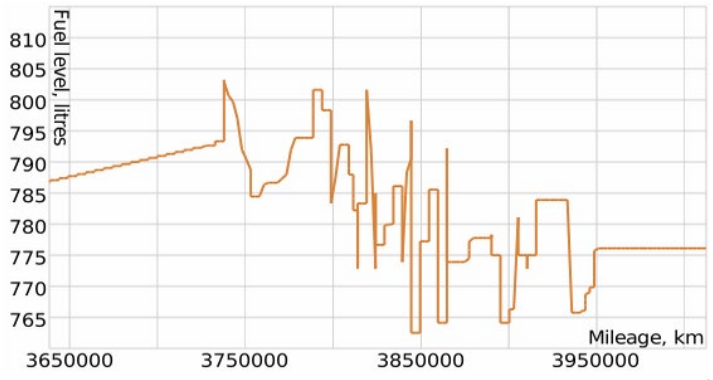
1. check the *Fuel level sensors* area (*Unit properties → Fuel consumption*);
2. check *Filter fuel level sensors values*;
3. set a non-zero value for the *Filtration level (0…255)*.

Filtering should be used when it is necessary to remove erroneous values, significantly larger/smaller than the remaining values. During filtering median smoothing is used.

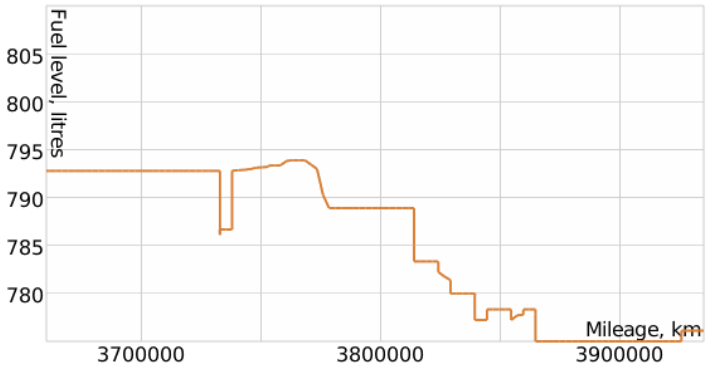
Attention!

- The value 0 in the *Filtration level* option is not the zero filtering, but the minimum possible filtering (for three messages — since this is the minimum amount of data required for median smoothing).
- Any number from 1 to 255 set in *Filtration level* is multiplied by 5. The result number is the amount of messages that is filtered.
- To disable the filtration completely, uncheck the *Filter fuel level sensors values* option.

The chart with the disabled filtration:



The chart with the enabled filtration:


Fuel level, litres
805
800
795
790
785
780
Mileage, km
3700000
3800000
3900000

Fillings Detection

Attention!
In order to detect fillings, the processed data is used (it is done on the *Data preparation* and *Filtration* steps).

Note: **Ellipsis** (**…**) substitutes **Unit properties** → **Fuel consumption** when indicating the option paths.

Three options are attached to this detection:

- Option: Minimum fuel filling volume, liters;
- Option: Detect fuel filling only while stopped;
- Option: Ignore filtration when calculating the filling volume;
- Special Case: How a filling is processed?

Minimum fuel filling volume

... → 'Fuel fillings/thefts detection' block → 'Minimum fuel filling volume, liters'

This option helps to exclude false fillings, because sensors may send false data rise in motion.

Detect fuel filling only while stopped

... → 'Fuel fillings/thefts detection' block → 'Detect fuel filling only while stopped'

In normal conditions transport vehicles are fueled during stops. This option narrows its search to stops/parkings only.

Calculate fuel filling volume by raw data

... → 'Fuel Fillings/Thefts Detection' block → 'Calculate fuel filling volume by raw data'

When filtration is switched on, some fuel level deviations may occur at the beginning and end of a filling. To avoid it, the system uses unfiltered data when filling volume is calculated.

Special Case: How a filling is processed?

Filling time frontiers and its volume

The filling is performed.
Let the fuel volume in this message be *Vcurr*,the fuel volume in the previous message — *Vprev*. If the difference *d* (=*Vcurr* - *Vprev*) for the current message is positive, then the current message is marked as an **initial** filling message.
Time passes by. The filling is close to the finish. When *d-value* for some message becomes negative (i.e. the fuel volume in the current message is less than in the previous one), then it is called the **final** filling message. If the fuel level does not change during the time indicated in the *Timeout to separate consecutive fillings* parameter in the *Fuel Consumption* tab of the unit properties, the filling is considered finished as well.

The **volume** of the filling equals to *Vfinal - Vinit* (the difference in fuel volumes between the final and initial filling messages).

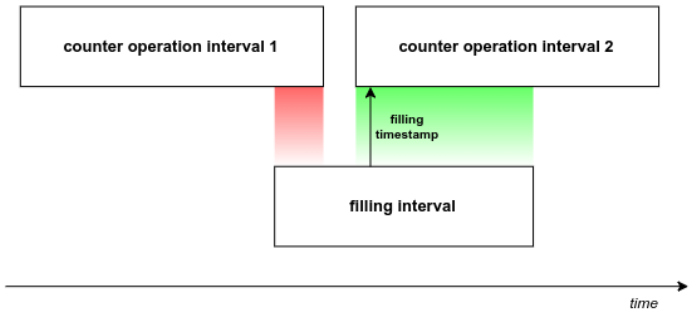
Filling timestamp calculation algorithm

Now it is time to find the filling timestamp.
Iteratively for every message within the filling interval (exclude the last one) the system seeks delta(=*Vnext - Vcurr*) for the next message which shows the fuel level growth between the current message and the next one.
The timestamp of the message whose delta is ultimately the biggest among others is regarded as the filling timestamp (in other words, the left message is selected from the message pair whose delta is the biggest one).
It is worth highlighting, that a filling timestamp is calculated dynamically based on the available data from the sensors.

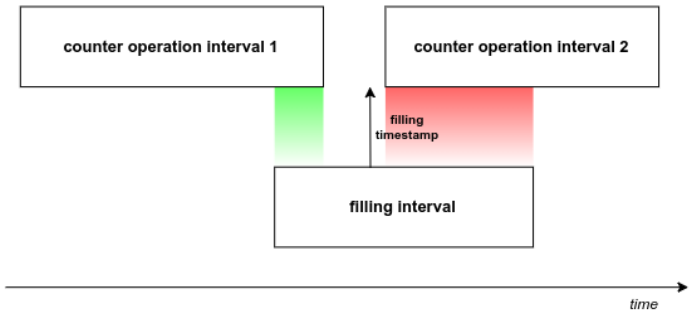
Determining fuel fillings in the 'Fuel traffic' table

The *Fuel Traffic* table determines the fuel activity of the unit (fuel filling, theft, counter operation), according to which the report is being executed, as well as the units that were near it. The following algorithm explains what principle the system uses to determine to which of the nearby units fuel was distributed.

The intervals for the distribution and reception of fuel are considered to be adjacent if the time of the fuel filling of the unit that receives fuel has fallen into the interval of operation of the counter of the unit that distributed it (see the diagram).



If there was no such match, the algorithm searches for the intersection of the entire fuel filling interval of the unit that received the fuel, with the intervals of the counter of the unit that distributed it and selects the first one (see the diagram).



Thefts Detection

Attention!
In order to detect thefts the processed data is used (it is done on the *Data preparation/* and *Filtration* steps).

The next options are crucial while detecting thefts:

- Minimum fuel theft volume, liters;
- Idling;
- Detect fuel theft in motion;
- Ignore filtration when calculating theft volume.

Minimum fuel theft volume

'Unit properties' → 'Fuel consumption' → 'Fuel fillings/thefts detection' block → 'Minimum fuel theft volume, liters'

This option defines the required drop of the fuel level minus the fuel consumption for motion/idling, so that the theft is detected.

Idling

'Unit properties' → 'Fuel consumption' → 'Consumption math' block → 'Idling, liters per hour'

The option allows to detect thefts on stops/parkings. The system finds the difference between the spent fuel volume according to the sensors and a mathematically calculated one. In case of a non-zero difference, which is equal to or more than the value set in the minimum fuel theft volume option, the fuel theft is detected.

Detect fuel theft in motion

'Unit properties' → 'Sensors' → Sensor type 'Engine ignition' → 'Consumption, liters per hour'
'Unit properties' → 'Sensors' → Sensor type 'Absolute engine hours' → 'Consumption, liters per hour'
'Unit properties' → 'Sensors' → Sensor type 'Relative engine hours' → 'Consumption, liters per hour'

By default this option is unchecked. In case there is a necessity to control thefts in motion a user may use the option. But if sharp fuel level drop takes place then false theft may be detected.

Calculate theft volume by raw data

'Unit properties' → 'Fuel consumption' → 'Fuel Fillings/Thefts Detection' block → 'Calculate theft volume by raw data'

Similar to fillings, the filtration may deviate the start and the end fuel level values of thefts. To ignore such deviations, the system uses unfiltered data while calculating the volume of theft.

Special Case: How a fuel theft is detected?

Time frame of a theft and its volume

A theft is being performed.
Let us suppose that the fuel volume in the current message is *Vcurr*, the fuel volume in the previous message is *Vprev*. If the difference *d* for the current message (*d* = *Vcurr* - *Vprev*) is negative, the message is considered the **initial** message of the theft.
Time passes. When the value *d* is positive for some message (that is the fuel volume in the current message is higher than in the previous one), the message is considered as the **final** message of the theft. If the fuel level does not change during the time indicated in the *Timeout to separate consecutive thefts* parameter on the *Fuel Consumption* tab of the unit properties, the theft is considered finished as well.

The theft **volume** equals to *Vfinal* - *Vinit* (the difference of fuel levels between the final and the initial messages).

Theft timestamp calculation algorithm

Now we are looking for the timestamp of the theft.
The system seeks a delta with the following message (*d* = *Vnext* - *Vcurr*) for every message within the theft interval. The delta shows the decrease in the fuel level between the current and the future messages.
The message timestamp that has the highest delta is considered to be the theft timestamp (in other words, the left message with the biggest delta is selected from the pair of messages).
It is worth emphasizing that the timestamp of a fuel theft is calculated dynamically depending on the values of the sensors in every particular situation.

Consumption calculation

Attention!
In order to calculate the consumption, the processed data is used (it is done on the *Data preparation* and *Filtration* steps).

Note: **Ellipsis** (**…**) substitutes **Unit properties** → **Fuel consumption** when indicating the option paths.

Two options and a special case are closely connected with this step:

- Replace invalid values with math consumption;
- Reports → Report Template Properties → Options → Exclude thefts from fuel consumption;
- Special Case: filling/theft is sliced with one of the interval frontiers.

Replace invalid values with math consumption

... → 'Fuel level sensors' block → 'Replace invalid values with math consumption'

In case of values falseness, they are replaced with the values calculated mathematically. The mathematical calculation uses the data indicated in the properties of ignition, relative and absolute engine hours sensors (the *Consumption, l/h* option) and the value of the engine efficiency sensor.

Algorithm: Let Vinit to be the initial volume for the interval (what interval is taken is defined in the specified report template), Vfinal — the final volume. Then the difference is calculated between them with respect to fillings volume, i. e. Vinit – Vfinal + Vfill. In case the calculated value is equal to or greater than zero, the interval is marked as correct. But if the result value is negative, the consumption is treated as falsy and math consumption takes place.

Exclude thefts from fuel consumption

Reports → Report Template Properties → Options → 'Exclude thefts from fuel consumption'

This option defines whether a theft is considered a consumption in calculations of various kinds of indicators. Keeping this option switched on is valuable when ignoring deviations because of the detected thefts.

Switch it off when a discharge is authorized, for instance, agriculture vehicles are filled with refueller and the user wishes to know the total turnover of spent fuel during the specified period of time.

Special Case: filling/theft is sliced with one of interval frontiers. What is the way filling/theft being detected?

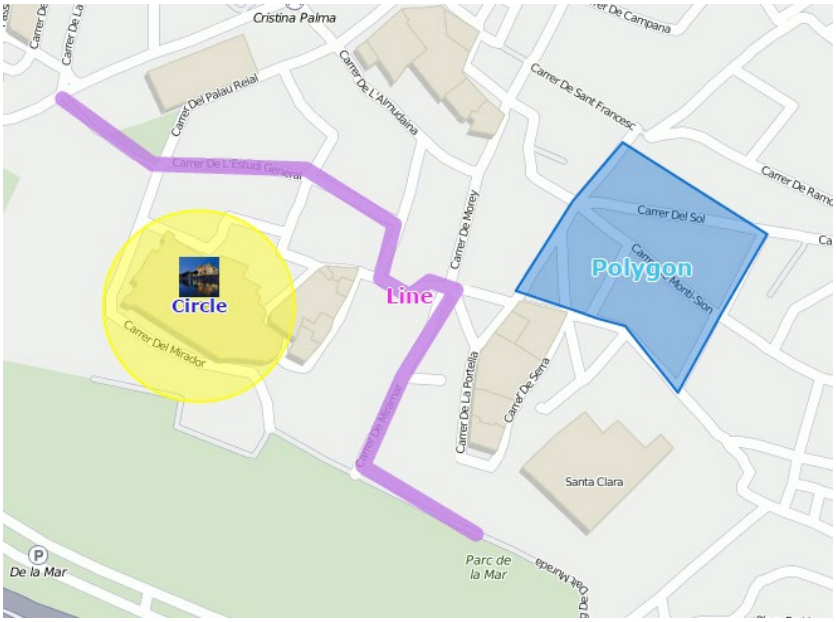
Let us consider the case on the example of filling. Assume we have sliced the filling with the initial frontier of the interval. As described in the *How a filling is processed* section, a filling timestamp is defined dynamically according to the unique case. Since we have sliced the filling with an interval, the second message of the interval becomes the initial filling message and it informs that the fuel level has grown compared to the previous value (the first message is the reference used to calculate the delta (*d=Vcurr - Vprev*) for the second message, it cannot be calculated for the first message because of the absence of the previous one).

The filling final message remains the same.
The filling volume declines compared to unsliced filling reference (because of the initial message shifts to the right).
The filling timestamp might hold the position/shift to the right, because it all depends on whether the message, whose timestamp is regarded as an unsliced filling timestamp, is taken into account when calculating the time of the filling. If it is taken, the filling time does not change.

Geofences

Geofence, or geographical zone, is an area on the map that is important for the tracking purposes and requires special attention. Geofences can be used to control unit activity in these areas or, on the contrary, outside them. You can choose an image for a geofence or add a description.

A geofence can have a shape of a line (for example, an avenue or any road), polygon (a city or park or plant), or circle with any radius.



Geofences are widely used in Wialon Local. Along with the visual enrichment of the map, they can be used in reports, notifications, and unit tooltips. Geofences can also be used as check points for route configuration. The tooltip of the geofence may contain dynamically updated images and videos from external sources.

To open the Geofences panel, click the corresponding name in the top panel or choose the necessary item in the main menu customizer. Afterwards, choose a mode which allows you to work either with geofences or groups of geofences. Note that geofence creation is available in the *Geofences* mode only, while the other options can be used in the *Groups* mode as well.

Creating a Geofence

Here are three steps to create a geofence.

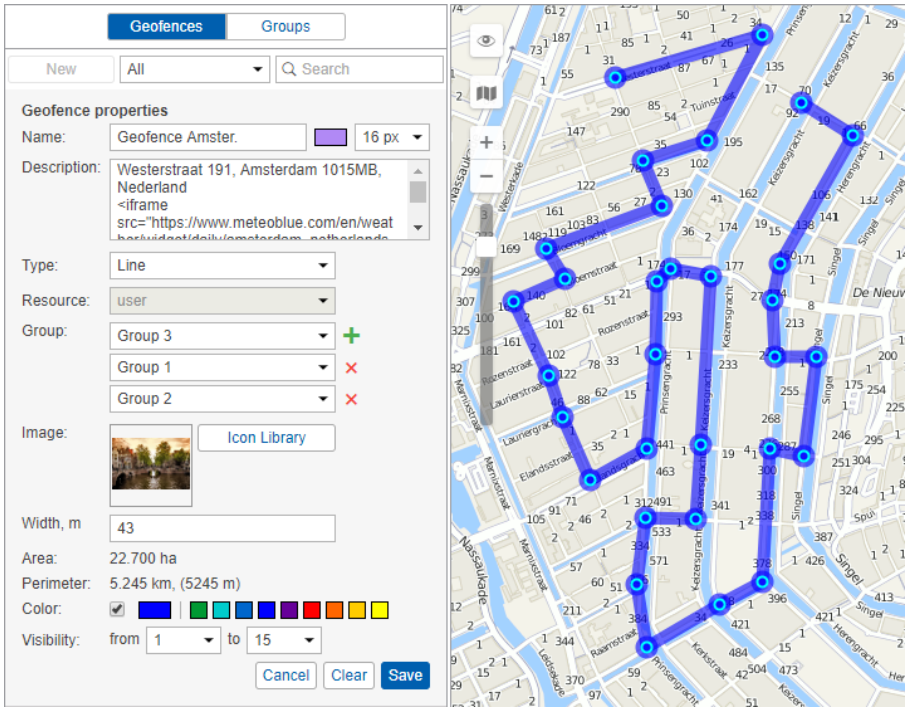
1. Map Geofence

Start working with geofences by choosing the corresponding mode.

Press the *New* button, and help window will provide you with the instructions on the creation of the geofence. Select a geofence type on the left: *line*, *polygon* or *circle*.

Then map a geofence. Here are the basic rules for mapping a geofence:

- Double-click on any place of the map to put the first point. Then add more points using the same method. Put the points as close or as far from each other as you want.
- To insert a point between two other points, double-click on a segment between them.
- To move a point to another place, click on it and holding the left mouse button drag to another place on the map. Then release the mouse button.
- To delete a point, just double-click on it. Note that points cannot be deleted if there are only two points — for lines, or three — for polygons.



Hint.
A quick way to map a geofence is by using the Routing tool (create lines) or the Address tool (create circles).

2. Set Geofence Properties

Name
The name is used while tracking units, as well as in reports and notifications. It is a required parameter. It can consist of one or more symbols. Besides, you can specify caption color and size. It has sense if in User Settings the *Display*

names of geofences on map option is enabled.

Description
This field is optional. Description is displayed in the geofence's tooltip. It can also be added to the geofence's name if the geofence is used as address source in reports. When you create a geofence, the description is filled in automatically with the address information taken from the first point you map. However, you can edit it or simply delete. Its length is not limited. You can use *html* (including *iframe*) tags in descriptions in order to format text or get images from other sites. For example, you can embed video from web cameras, get photos from crossroads, load weather or currency exchange, etc.

Type
Geofence can be of the shape of the line, polygon, or circle. For line, you also can indicate its thickness, for circle — radius (in meters or feet, depending on resource settings).

Resource
This option is shown if the current user has access to more than one resource. The resource chosen while creating a geofence defines the measurement system used to calculate its area, length, radius, thickness, etc. (metric, U.S. or imperial system).

Group
While creating a geofence you can include it in one or several existing geofence groups. To do this, choose the necessary geofence in the dropdown list. Use the button + to add lines; × — to delete a geofence from a group.

Image
You can attach any image to a geofence. An image can be chosen from the standard icons (the *Icon Library* button) or loaded from your computer by pressing the corresponding area and choosing the file you need. Supported formats are PNG, JPG, GIF, and SVG. Moreover, you can use the Icon Library application (for top accounts only) which enables uploading individual icons for geofences. The icons uploaded to the system using this application will be available for you in the standard *Icon Library*. To facilitate the work with the library, the uploaded icons are placed in the same list, but separately from the standard ones (at the top). All loaded images are automatically resized by 64×64 pixels to display the geofences on the map and on the list. However, in the tooltip for a geofence you can see an enlarged image (up to 256x256 px). In the geofence's editing dialog you can delete the image used. To do so, point a cursor on it, and click the appeared delete button. Click *OK* to save changes, or *Cancel* to dismiss them.

Area & Perimeter
These fields are not editable, they are calculated automatically.

Note.
Area and perimeter values also depend on resource settings, and can be given in hectares and kilometers or square miles, square feet and miles (feet), respectively.

Color
This color will be used to render a geofence on the map and to display it in a unit's tooltip and in the extended unit information, as well as some other places where next to the geofence's name where a unit is located, a square of the same color is shown. The color is chosen using the palette or manually (by entering its RGB code). You can also choose if geofence's shape should be shown on the map. For this purpose the corresponding flag to the left of the color palette is used.

Visibility
Here you specify map zooms at which geofences will be displayed or not. For example, if a geofence is a city, it has sense to see it on remote scales, whereas if it is a building it is more logical to see it on more detailed scales. Different map types can have different graduation of map scales. However, all possible values fall into the range from 1 to 19, where 1 is the most detailed scale (small streets and houses are displayed) and 19 is an overview (the whole world).

3. Save Geofence

When finished, press *Save*. In case of a mistake, press *Clear* and try again. To close the create mode without saving results, press *Cancel*.

Note.
Geofences can be saved to a file and easily transferred from one resource to another.

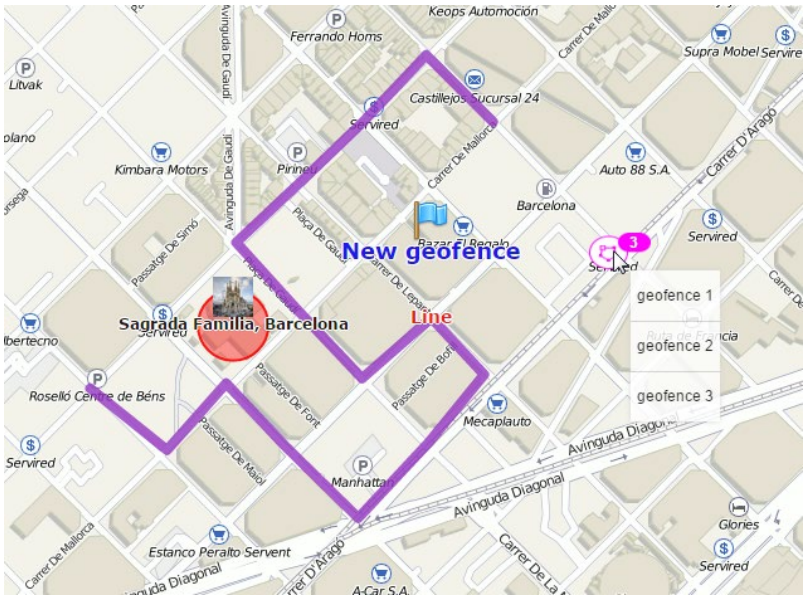
Geofences Management

In the work area there is a list of all available geofences. To move to the necessary geofence on the map, click on its name in the list.

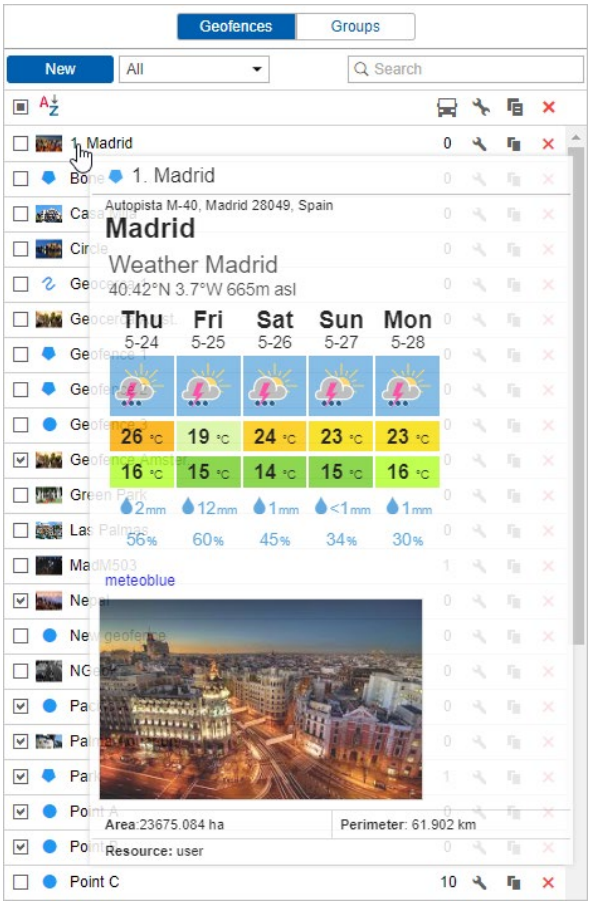
Put check marks in the left column of the table to choose the geofences you want to be displayed on the map. Deselect these boxes to remove geofences from the map. A check mark at the header of the list selects/deselects all the geofences if their visibility corresponds to the current map scale and the appropriate layer is enabled.

If you have ticked too many geofences or they are very big, it can slow down browser performance. In this case, the setting of rendering geofences on server may help.

A geofence can be presented on the map by its name (if the *Display names of geofences on map* checkbox is enabled in User Settings), by the image or shape assigned (if that option is activated in geofence properties), as well as any combination of these three elements. The geofences that overlap each other can be replaced by one conditional item.



Placing a cursor over a geofence name (in the list) or its icon (on the map), you will get the following information about it in the popup tooltip: name, type, description (if specified), enlarged image, the name of the resource (if you have access to several), as well as the list of units located inside the geofence at the moment. Depending on geofence type, there will be also area, perimeter, length, and/or radius. The measuring units for these parameters depend on the measurement system chosen for a resource to which the geofence belongs. If a description contains links to other images, they will be shown as well. For instance, a tooltip of a geofence can look like this:



The following code has been used to add weather forecast to the tooltip:

```
 <iframe src="https://www.meteoblue.com/en/weather/widget/daily/city-of-london_united-
kingdom_2643741?
geoloc=fixed&days=4&tempunit=CELSIUS&windunit=KILOMETER_PER_HOUR&coloured=coloured&picto
  frameborder="0" scrolling="NO" allowtransparency="true" sandbox="allow-same-origin
allow-scripts allow-popups" style="width: 216px;height: 245px"></iframe><div><!-- DO
NOT REMOVE THIS LINK --><a
href="https://www.meteoblue.com/en/weather/forecast/week/city-of-london_united-
kingdom_2643741?
utm_source=weather_widget&utm_medium=linkus&utm_content=daily&utm_campaign=Weather%2BWid
 target="_blank">meteoblue</a></div>
```

To find or to sort geofences there is a filter and a fast search provided. The filter is a dropdown list with several predefined criteria:

By property:

- Polygons;
- Lines;
- Circles.

By resource:

- Here you can find a list of the resources available for the current user (if they are more than one). Click on any of them to display geofences belonging only to this particular resource.

To find a needed geofence quickly, you can use the dynamic filter above the list. Type the name of the geofence or some part of the name and observe the search results.

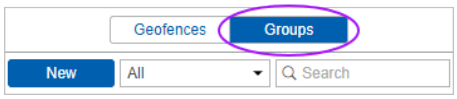
The following icons and buttons are used in the panel *Geofences*:

	Shows how many units are there inside the geofence at the moment. These units are listed in the tooltip (the data refreshes once in two minutes). If there are question signs (?) in this column, it means the option *Presence in geofences* is disabled. If needed, activate it in User Settings.
	The button to view or edit (depends on the access rights) geofence properties: size, shape, name, color, position, etc. ⓘ It is prohibited to edit the geofences that have more than 5000 points.
	The button to copy a geofence. You can edit a geofence and save it under another name.
	The button to delete a geofence(s). To delete several geofences at once, check them in the first column of the table and press the delete button at the top of the list. If the button is dimmed, it means you don't have enough access rights to the resource which the geofence belongs to.

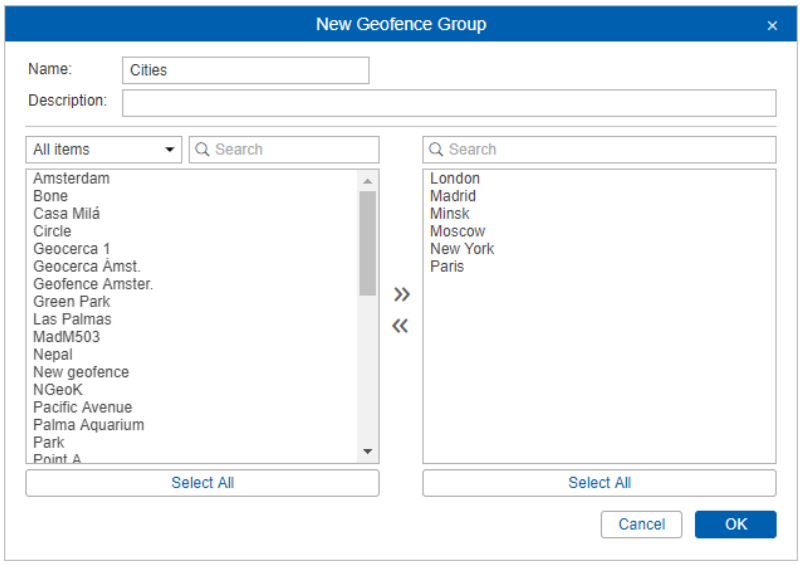
Groups of Geofences

Created geofences can be formed into groups. Groups are used to unite geofences on the basis of any criteria, and serve as intervals filtration parameters in several report templates. Moreover, groups of geofences are used in the notifications of the corresponding type. A group may contain only geofences belonging to the same resource as the group itself.

To work with groups, choose the corresponding mode in the *Geofences* panel.



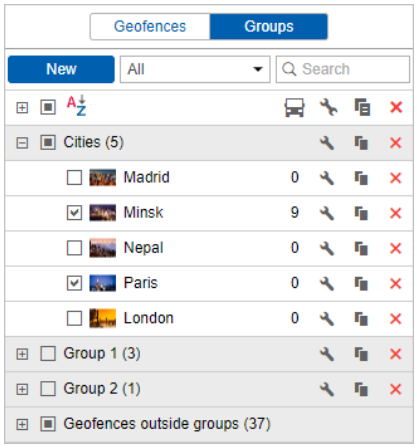
To create a new group of geofences, click the *New* button. Enter a name and description, and choose geofences to be included in a group. Click *OK*.



A list of created groups of geofences is displayed in the work area. Groups are arranged alphabetically. The same as for geofences, a filter or a dynamic search can be used for groups. Moreover, groups can be edited, copied, or deleted. Note that upon deleting a group you can not delete its contents.

Geofences not included in any group can be found in the *Geofences outside groups*.

Series of standard actions are available for geofences in a group (unfold a group in order the corresponding buttons to appear).


Geofences
Groups
New
All
Search
Cities (5)
Madrid 0
Minsk 9
Nepal 0
Paris 0
London 0
Group 1 (3)
Group 2 (1)
Geofences outside groups (37)

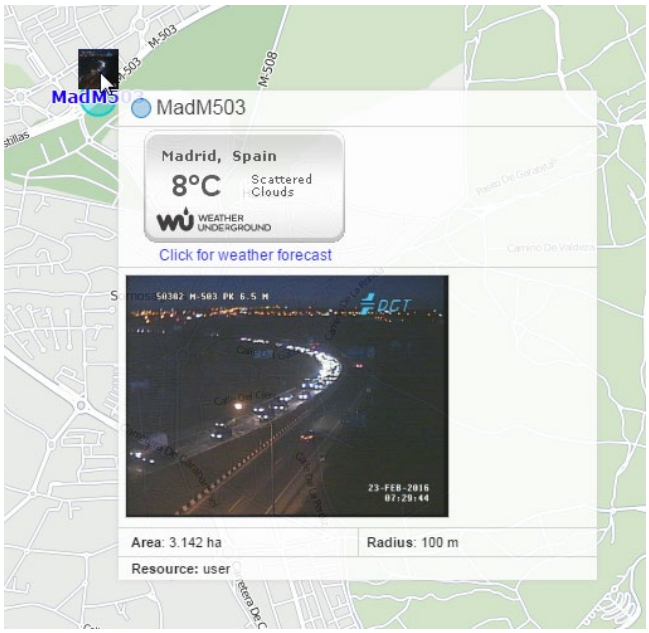
Usage

While Tracking Online

Geofences can be displayed on the map (the ones that have flags in the panel *Geofences* are shown). That simplifies the visual perception of the map and enriches it. Different regions can be selected by different colors and you can estimate the presence of the unit in definite areas. If a geofence is displayed on the map, you can press *Ctrl* and put the mouse cursor over it to see its tooltip (name, type, list of units inside, etc.). In case of the geofences that have images assigned, the tooltips appear as you just point them with the cursor.

In a unit tooltip and in its additional information you can see its presence in geofences if the option *Presence in geofences* is enabled in User Settings.

Besides, it is possible to get images from external sources in geofences tooltips (webcam videos, photos, rates of exchange, etc.).



Besides, a column with geofences where units are located can be displayed in the *Monitoring panel* instead of ordinary addresses.

Note that in order *Geofences* to be displayed on the map you should check if the corresponding layer is active.

In Notifications

You can be notified by e-mail, SMS, online or by other means when your unit leaves or enters a geofence. It is also possible to set speed limitations and sensor range for a unit during its presence in a geofence. Besides, entering a geofence or leaving it can be automatically accompanied by an action: send a message to the driver, block the engine, change user access to this unit, and many others. See Notifications.

In Reports

Geofences can be used in reports as addresses (in the *Location* column), if the *Use geofences for addresses* checkbox

is enabled in the *Advanced settings* block of the report template.

Many tables are generated on the basis of geofences. Among them there are the following:

- Geofences: visits to geofences (all entries and exits to/from the selected geofence(s) are given together with visit duration, distance travelled within the geofence, average and maximum speed, etc.).
- Non-visited Geofences: geofences which were ignored (non-visited) during a period of time or on certain days.
- Rides and Unfinished Rides: rides from one geofence to another (convenient to control how a cargo is transported in several trips).

Geofences can be also used to filter intervals in reports.

When a report is generated, geofences can be rendered on the map.

In Routes

Geofences can be used as check points while configuring routes.

Routes

Wialon Local tracking system provides an opportunity to track a unit being on route and supposed to visit definite check points in predefined or arbitrary order, at definite time or without any strict schedule.

To understand how routes work, three notions are important: route, schedule, and round.

Route is a set of check points, each characterized by its location on map. The number of check points in a route is unlimited.

Schedule is a timetable which holds time of visit for each point. One route can have many schedules attached to it.

Round is a route, its schedule and assigned unit put together.

So, to configure a route, perform the following steps:

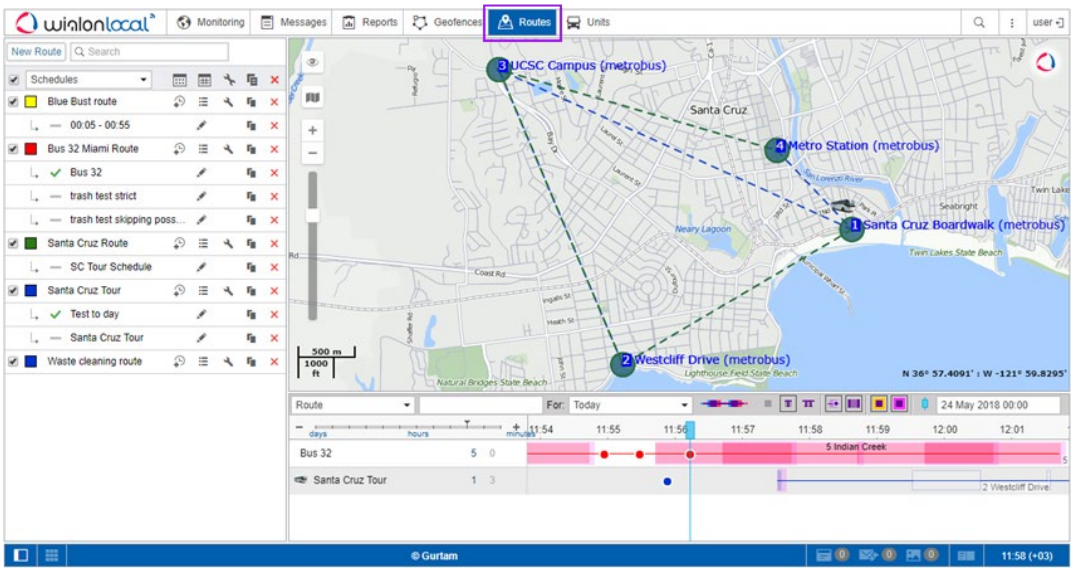
1. Create a route itself, i.e. mark a check point on the map.
2. Create one or more schedules for this route.
3. Assign rounds manually or adjust automatic creation of rounds.

Note that in order routes to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

When everything is configured properly, you can analyze unit performance on route by various means:

1. In a specially designed online timeline.
2. In reports.
3. Get notifications about round progress.

To open the *Routes* panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer. Here you can configure routes and observe the progress of active rounds.



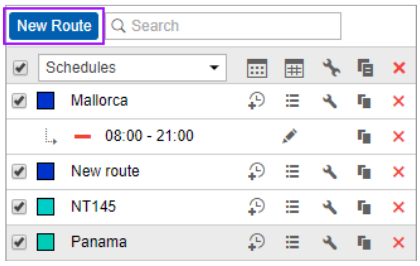
Routes take their measurement system from User Settings.

The sectors can be resized. To do it, click on the border between them with the left mouse button and, while holding it, move the border to the right/left or up/down. At the same time, if less than 10% of the map is left while expanding the

lower sector, the map automatically collapses. To return it, press on the line under the top panel.

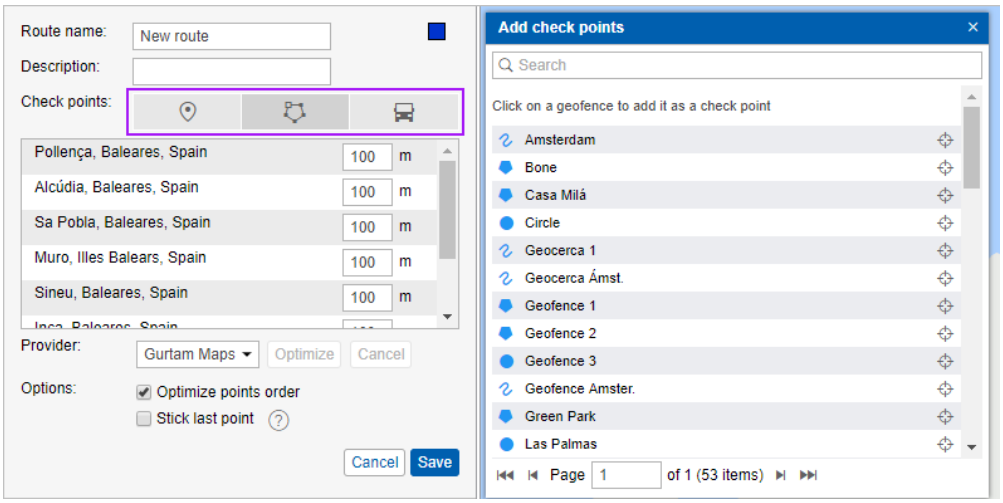
Creating a Route

To create a new route, press the *'New Route'* button.



Input a name for route (at least four characters), give description (optional), and choose color which will be used to display the route on the map and in the timeline.

A route consists of check points that are supposed to be visited. Check points can be added by various means: directly from the map, from geofences, and from moving units.



Adding Check Points

Click on the corresponding icon to add check points using one of the four methods:

1. **From map/address**.
   Either enter address or simply double-click on the map to indicate a place for a check point. The usage of the Address tool was described above. When necessary point is found, add it to the route by clicking *Add as check point*. Before adding, edit point name (the Address field) if necessary, because it will be impossible later.

2. **From geofences**.
   If you click on this icon, the list of geofences will be displayed. To the left of a geofence name, you can see its type (circle, line, polygon). Click on geofences to add them as check points. To quickly find a needed one, use the dynamic filter on the top. On the right there is a button to move to a geofence on the map, however, it will be visible only if this geofence is marked to be displayed on the map in the Geofences panel (the similar is with units). If you have more than 100 geofences, they will be divided into pages, and to view them all you will need to use navigation buttons on the bottom of the list.

3. **From units**.
   A check point may have no fixed coordinates, that is to be a moving unit. In this case, to visit this point will mean to approach within indicated radius. To add a unit as a check point, click on it in the list.

When points are added, you can edit their radius (except geofences) and place them in desired order, remove points or add more if necessary. To change points sequence order, just drag points up and down holding them at blue arrow-shaped icons. Radius for geofences is not specified because their shape and size are taken as they are. And check points cannot be renamed.

Remember that copies of geofences are created in the route, so route check points created from them lose connection with their predecessors completely when the route is created. You can then edit or delete those original geofences, and it will not affect the route in any way. However, units as check points are different as the connection with the unit is always maintained unless the unit is deleted.

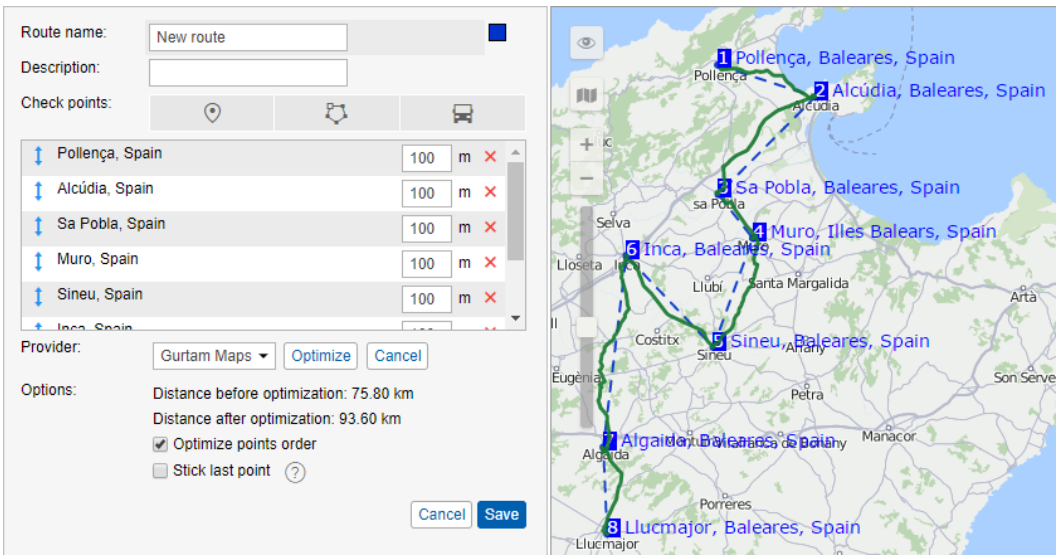
When finished, press *Save*. The route will appear on the list. To see it on the map, click on its name. It is strongly recommended to estimate the result visually and double check all points before proceeding because afterwards, when the route has schedules, it is impossible to edit it.

Attention!
When a route has schedules, it becomes impossible to edit its check points (add, delete, set sequence order). If you need to alter such a route, make a copy of it and make all necessary changes there. Then delete the original route. However, in this case you will have to configure schedules and rounds for this route again.

Route Optimization

Whichever method you choose to add check points to a route, you can afterwards apply the function of optimization to those points. The program will automatically detect the shortest way to visit all the points. The shortest route can be built considering existing roads, or avoiding highways, or by foot, etc. — these additional parameters depend on map provider selected. The default cartographical sources is Gurtam Maps. Though, Google Maps, Yandex Maps, Visicom, and HERE Maps can also be chosen from the dropdown list.

To apply optimization, press the *Optimize* button. See the route distance before and after optimization below. To restore the initial route, press *Cancel* near the button of optimization.

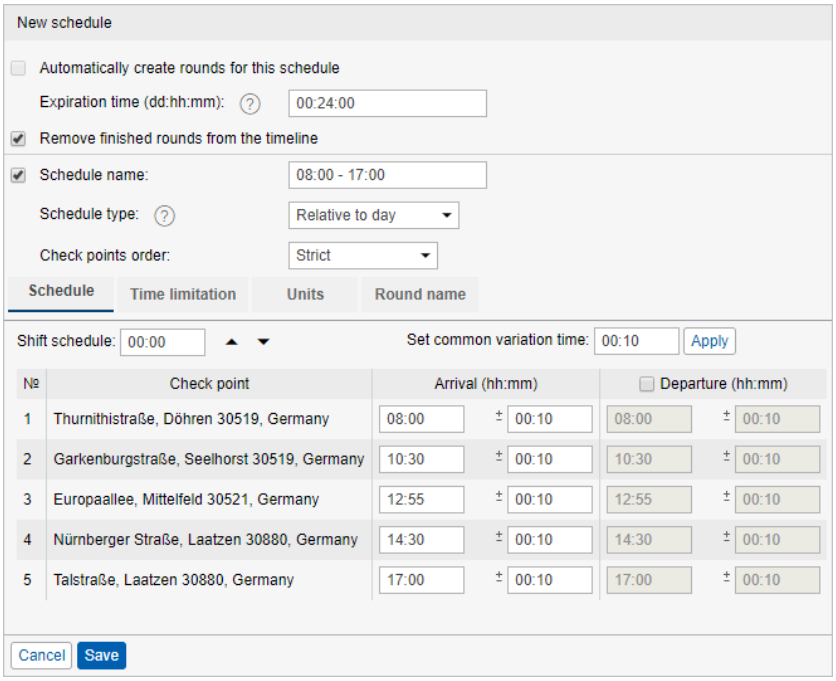


To build a route, you can also use specially designed app — Delivery Service, or such tool as *Routing*.

Schedule

A schedule is a list of route check points with times of their intended visit. One route can have unlimited number of schedules. Different schedules can be applied in odd and even days, at weekends and weekdays, in different months, etc.

To create a schedule for a route, press the *Add schedule* button against this route and adjust required parameters.



General parameters

- *Automatically create rounds for this schedule*
  Rounds can be created automatically without any assistance of a dispatcher. When the time draws near the first point visit, the round is activated and the system starts to track it. This option works only with *Relative to day* schedule type. Besides, one or more units should be selected on the *Units* tab of the same dialog.

- *Expiration time (DD:HH:MM)*
  This is time after which the round (if not finished) will be finished forcibly and obtain the *Aborted* status.

- *Schedule name*
  You can use automatically generated name for the schedule. It is composed of first point time and last point time or it can be *Copy of …* if the schedule is created using the copying method. However, you can give schedule any desired name if you put the checkbox before its name.

- *Remove finished rounds from the timeline*
  It is advisable to leave this option checked. Otherwise, finished rounds will remain on the timeline and soon will become too numerous and difficult to navigate through them.

Schedule type

- *Relative to activation*
  Scheduled time of point visit will refer to time from round beginning. Such schedule can be used at anytime.

- *Relative to day*
  Scheduled time of point visit will refer to time of day. Such schedule can be used in different days (once in a day).
- *Absolute*
  Scheduled time of point visit includes also a date. Such schedule can be used only once.

Check points order

This parameter is extremely important for route control.

- *Strict*
  All check points are supposed to be visited in the sequence order they are places in the route. No skipping is allowed. It means, while we are waiting for the arrival to the Point #3, any visits to other check points are ignored if they happen. The route is considered as finished when unit (after visiting all points) enters the last check point.

- *Skipping possible*
  Check points are supposed to be visited in the default order, however, it is possible that unit would visit not all of them. If after the visit to the Point #2 the unit gets to the Point #4, then the Point #3 is considered as skipped (even if visited later). The round is estimated as finished when a unit enters the last check point, and it does not matter how many of other points it has visited.

- *Arbitrary*
  Check points can be visited in any order but only when all of them are visited, the routes finishes.

Schedule grid

Here you see the list of all check points of a route and their visiting time. For visiting time you can indicate only arrival or both arrival and departure. Besides, you can set deviation time to give a unit some degree of freedom to visit the point (for example, +/- 5 minutes).

- *Arrival time* to a check point. Time format is *hh:mm*.
- *Arrival variation* (hh:mm) corresponds to a time interval on which an arrival time is allowed to vary. For example, deviation time is 5 minutes, arrival time is 16:30, then a unit has to come to a check point between 16:25 and 16:35.
- *Departure time* from a check point.
- *Departure variation* corresponds to a time interval on which a departure time is allowed to vary.

The same variation time of arrival/departure can be set for all check points simultaneously. To do so, indicate common variation time in the corresponding field and click *Apply*.

If a schedule contains an arrival time only, then a check point is considered to be visited upon arriving to it. If both arrival and departure time is indicated, then a check point becomes visited when both arrival and departure are detected.

Variation from arrival to the 1st check point is highly important, because a round is created (appears on the timeline) in advance. If the 1st check point arrival variation equals zero or has a small value, then it can be a situation when a visit is not detected. For example, a check point is visited before creation of a corresponding round. Therefore, it is recommended to set a larger arrival variation value for the 1st check point.

Time limitation

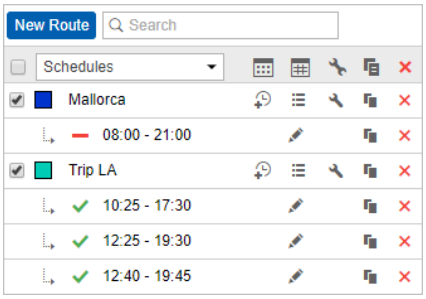
Time limitations can be applied to schedule to restrict its operation to certain time intervals, days of the week, days of the month or months. For example, you can select only event or odd days or only working hours of weekdays, etc. Note that this option does not work with *Absolute* schedule type.

Units

Choose unit(s) to be assigned to this schedule and thus create rounds. If rounds are created automatically, then units have to be indicated. If rounds are created manually, then a unit can be assigned upon a round creation. If several units are chosen, then the first that begins the round will be assigned to it. Required access right is *Use unit in retranslators, jobs, and notifications*.

Switch to the *Units* tab. Here you can see two lists. The units to be assigned are situated in the left one, the right one contains already chosen units. The left list contains not all the units available to you, but those situated in the monitoring panel work list. In case the work list is empty (when the dynamic work list is used or when units have been deleted from the work list manually), the units to which you possess enough rights will be displayed.

Round name



Here you can set name that will be applied to rounds created on the basis of this schedule do differentiate it from other rounds. Special tags can be used to form the name:

- %ROUTE% — route name;
- %SCHEDULE% — schedule name;
- %FIRSTPOINT% — first check point name;
- %LASTPOINT% — last check point name;
- %DATE% — date of round creation;
- %TIME% — time of round creation.

When you have configured the first schedule, others can be easily created by copying and shifting. Press the *Copy schedule* button against necessary schedule and alter some parameters. Enter shifting time (hh:mm) and press up or down icon (shift schedule upwards or backwards in time). Besides, you may want to change schedule name.

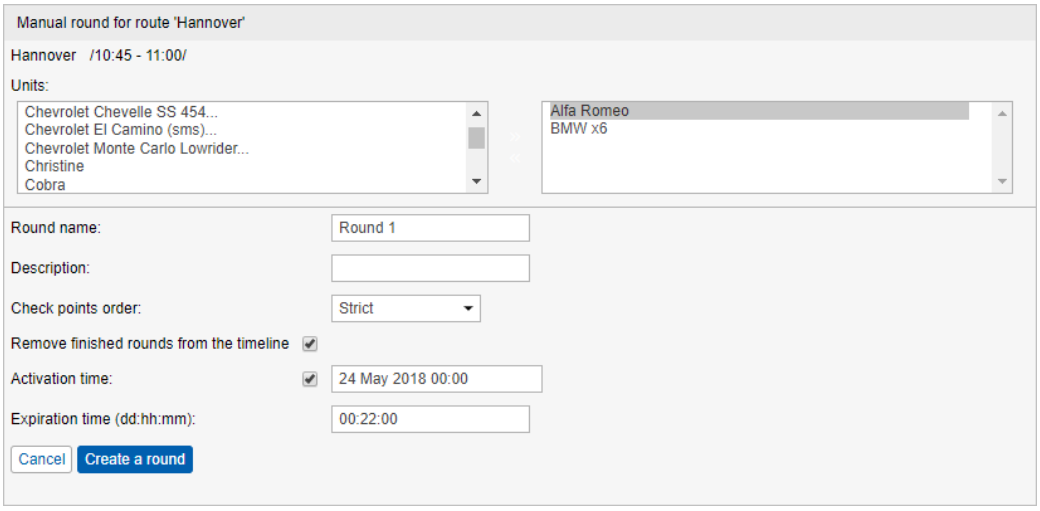
Rounds

Round is a route, its schedule and assigned unit put together. Unit performs a route (visits the check points of the route) according to the predefined schedule.

Rounds can be created manually or automatically.

Manual Round Creation

To create a round manually, press *Create manual round button* located next to the required schedule.



At the top, you can see the name of chosen route and schedule. Underneath you can see two lists. The units to be assigned are situated in the left one, the right one contains already chosen units. The left list contains not all the units available to you, but those situated in the monitoring panel work list. In case the work list is empty (when dynamic work list is used or when units have been deleted from the work list manually), the units to which you possess enough rights will be displayed. Afterwards enter round name and description, decide upon points order, expiration time, and other parameters (see Schedule for details). New parameter here is *Activation time*.

This is date and time to start the control. Activation time is especially important for schedules of *Relative to activation* type. The round then will be tracked from this time on. Activation time can be omitted — in this case we consider that the route starts when unit enters the first check point (if points order is *Strict*) or any check point (in other points orders).

At the end, press *Create a round*.

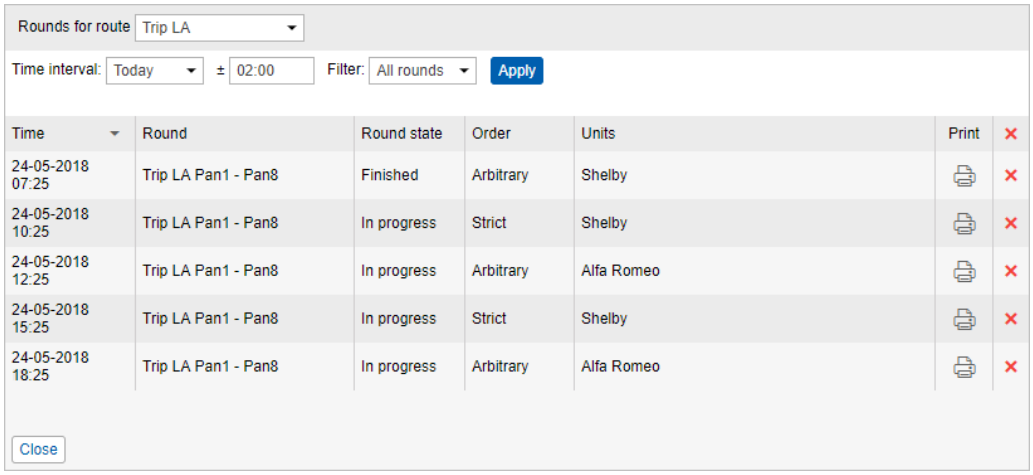
Automatic Creation of Rounds

Automatic creation of rounds is possible in two ways:

- The first method is available for the schedules of the *Relative to day* type after the assignment of at least one unit. Activate the *Automatically create rounds for this schedule* option and press *Save* or switch on the corresponding button before the name of the schedule.
- The second method is implemented with the help of the notification of the corresponding type.

Round List

To see the list of rounds created or planned for a certain schedule of a certain route, press the button .



Choose the time period (Hour, Today, Yesterday, Week) or set your custom interval. For the intervals like *Today* or *Yesterday*, it is convenient to slightly extend the period by some more hours (+hh:mm) if the working shift ends after midnight.

It is possible to specify the required rounds using the filter. You can observe either all rounds or the rounds of a certain status: in progress, pending, finished, estimated or aborted. When all the parameters have been set, press the *Apply* button to display the rounds you need. Besides, in the drop-down list in the upper left corner, you can choose to display the list of rounds for one route or for all the routes simultaneously.

The table displays the following information about the rounds: their beginning time, name, state (finished, aborted, estimated, in progress, history), points order (arbitrary, strict, skipping possible), and unit(s) bound.

The information about any round can be printed. To do it, press the printer button in the *Print* column next to the required round. The printing report consists of two tables. The first one provides the information about the round (its name, description, state, units, activation time, route name and schedule), the second — about its checkpoints (number, address, time of the arrival and, if activated in the schedule, of the departure). Press *Print* button to print.

At the end of the row there is the delete button . It removes the rounds and, as a result, they disappear from the timeline and receive the *History* status. However, all the information about them is stored and can be accessed through the reports.

Route Control

There are several methods of tracking units on routes and you can choose what suits you better.

Online Control

Active rounds are displayed in the timeline which is situated in the right lower part of the screen. Here you see all rounds which are in the progress at the moment as well as all manually created rounds. The round that have been activated 10 and more days ago are deleted from the timeline automatically.

If there are many rounds, you can filter them according to adjusted parameters: by route name, by schedule, round, unit. A criterion is chosen in the dropdown list, and in the text field on the right you enter name mask of a route/schedule/round/unit. You can also specify a time interval to show rounds for. To apply adjusted filtration parameters, press *Enter*.

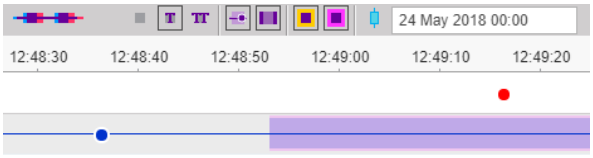
Additionally, you can apply grouping to this list of rounds . Then each row on the list will be dedicated to one route/schedule/round/unit. The name of such a row will contain the number of items it holds (in brackets).

Timeline scale is adjustable — it can display a period of time equal to a fortnight or just a minute. In some scales, point names can overlap and become partly hidden. That is why there are several possibilities in displaying captions for check point:

- do not show point names at all;
- show names for *hot* check points, i.e. points where units are located at the moment or points awaiting arrival at;
- show captions for all check points.

You can move the timeline right and left by simple dragging. Besides, it can move by itself in such a way to maintain the current moment in focus — press *Lock current time* for this . While this button is pressed, the timeline cannot be moved manually.

On the timeline, a route is represented by a horizontal line of such colour that was assigned to it. Check points are represented as vertical sections on this line and they are situated in the places where the arrival to a check point is expected according to the schedule. A check point can be also displayed as a rectangle if not only arrival but departure time as well are indicated in the schedule. Besides, check points which contain only arrival time can be expanded to rectangles at the expense of deviation time (if specified). For this, apply the *Mark deviation time* option .



Until a point is visited, it is displayed on the timeline as an empty rectangle; when visited, this rectangle obtains a filling of the colour assigned to the route. In addition, you can enable contours highlighting schedule violations:

- yellow — late visit (delay);
- pink — early visit (outrunning).

If a point has been visited in accordance to schedule, no contour will be applied. If a point has been skipped, it will obtain a red contour and a red filling regardless appointed route colour.

Apply the *In fact* option to see how a unit really visited the points — time of the real visit will be shown above the planned line.

Notifications about Routes

While a unit is performing a round, you can receive notifications about how it is going. To do this, create a notification of the *Route control* type and adjust it properly depending on your needs. You can be notified when a round has started or finished, if a check point has been skipped, and in some other cases. These notifications can be sent by e-mail or SMS, shown online in a popup window, stored in unit history as events or violations, etc. See Notifications for details.

Reports on Routes

All events connected with the unit performance on routes are stored in the system automatically.

The following tables, which base on the information about routes, can be added to the reports:

- Rounds (for unit)
- Check Points
- Rounds (for route)

Routes Management

Routes in the panel are listed in the alphabetical order. To quickly find a definite route, use the dynamic filter situated above the list. Enter route name or its part and observe the results.

In the dropdown list above the list, you can choose how routes are displayed:

- *Routes* — the simplest list of routes without any sublevels.
- *Schedules* — routes and their schedules.
- *Check points* — routes and their check points.
- *Active units* — routes and units which are currently performing them.

The following icons are used in the panel:

— edit route, i.e. change its name, description, color, and check points radius;

— add a new schedule for this route;

— see the list of rounds for this route (finished, in progress, pending);

— create a round for this manually;

— copy a route (i.e. create a new route on the basis of chosen one) or a schedule;

— delete a route or a schedule;

— automatic creation of rounds for this schedule is enabled (click to disable);

— automatic creation of rounds for this schedule is disabled (click to enable);

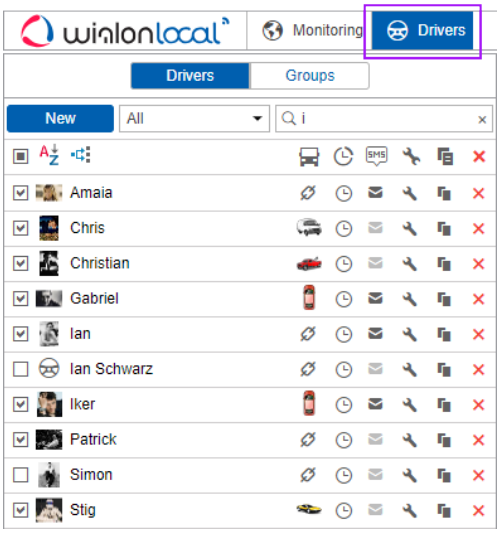
— automatic creation of rounds for this schedule is impossible because the schedule type is not *Relative to day*.

To see a route on the map, enable the checkbox before its name. Click on the name of the route name to center the map on this route. Note that check points names are displayed on the map by default. Uncheck the corresponding box in user settings dialog in order the names not to be displayed.

Drivers

Wialon Local system provides a possibility to create and manage the list of drivers working for you. One click of a mouse can assign driver to a unit, i.e. attach to a vehicle. Then in the reports on this unit, a driver will be indicated. It is particularly useful when several drivers work with the same unit. There is also a possibility to detect drivers automatically with the help of iButton system. Moreover, created drivers can be formed into groups.

To start working with drivers, choose the *Drivers* item in the top panel, or click the necessary item in the main menu customizer. Afterwards, select the mode you would like to work with (drivers or groups).



Creating a Driver

In the corresponding monitoring panel choose the appropriate mode (*Drivers*), click the *New* button, and indicate required parameters.

Name
Give driver a name that will be visible during the tracking process and in reports.

Code
Enter unique driver code needed to identify the driver if an automatic method of binding will be used. Codes of different drivers should be different.

Description
Type any comments (optional). It is shown in the driver tooltip.

Phone number
Enter driver's phone number. It is shown in the driver tooltip and can be used to send SMS messages to the driver and make calls. Note that units or drivers with the same phone numbers cannot exist in the system. If you attempt to create a driver with a phone number that is already reserved to another driver or unit, a special alert will be displayed, and this phone number will not be saved.

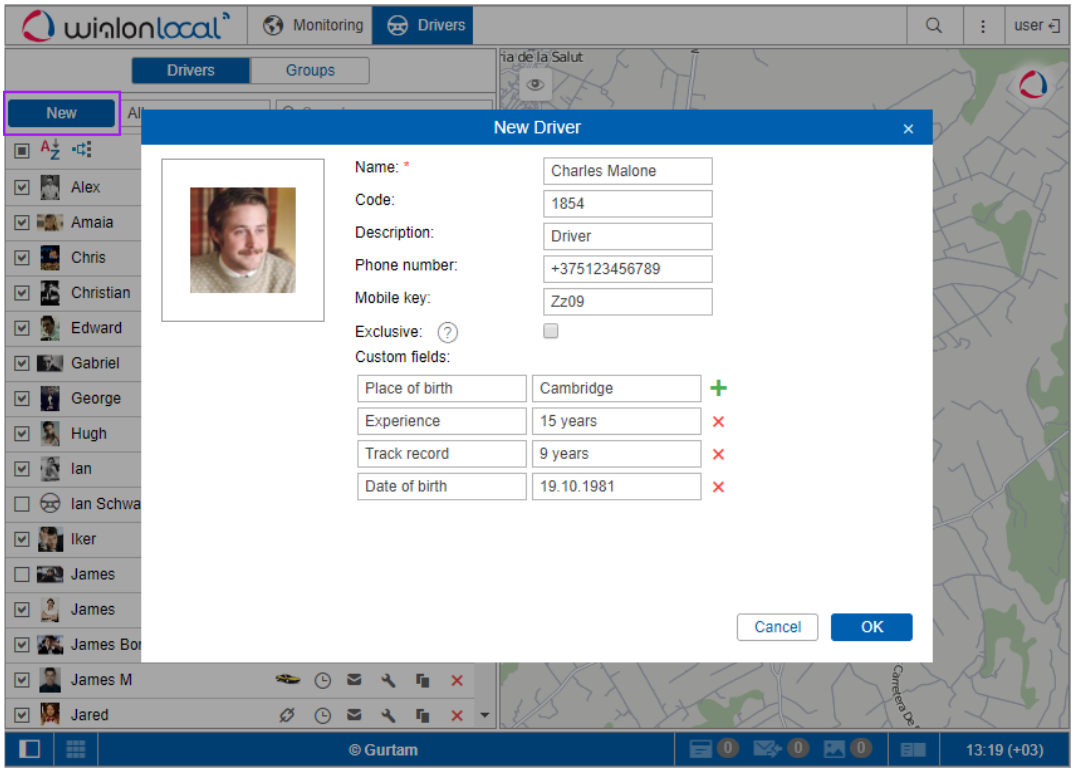
Mobile key
Password for mobile authorization.

Exclusive
If this flag is enabled, this driver can be the only one assigned to a unit. In case you bind this driver to a unit (in real time) which already has one or more assigned drivers, those drivers are reset automatically. This flag works only for drivers within a common resource.

Photo
To quickly identify a driver, you can attach their photo or any other image. To do this, press the *Browse* button and find and load an image from the disk. Supported formats are PNG, JPG, GIF, and SVG. In the editing dialog you can delete an image used. To do so, point a cursor on it, and click the appeared delete button. Click OK to save changes, or Cancel to dismiss them.

Custom fields
Create the driver card adding any information as custom fields (information may include external links). They are shown in the driver tooltip and can be summoned in reports. Note that custom fields with the same name cannot coexist within one particular driver.

At the end click *OK*. The new driver appears in the list.



Hint.

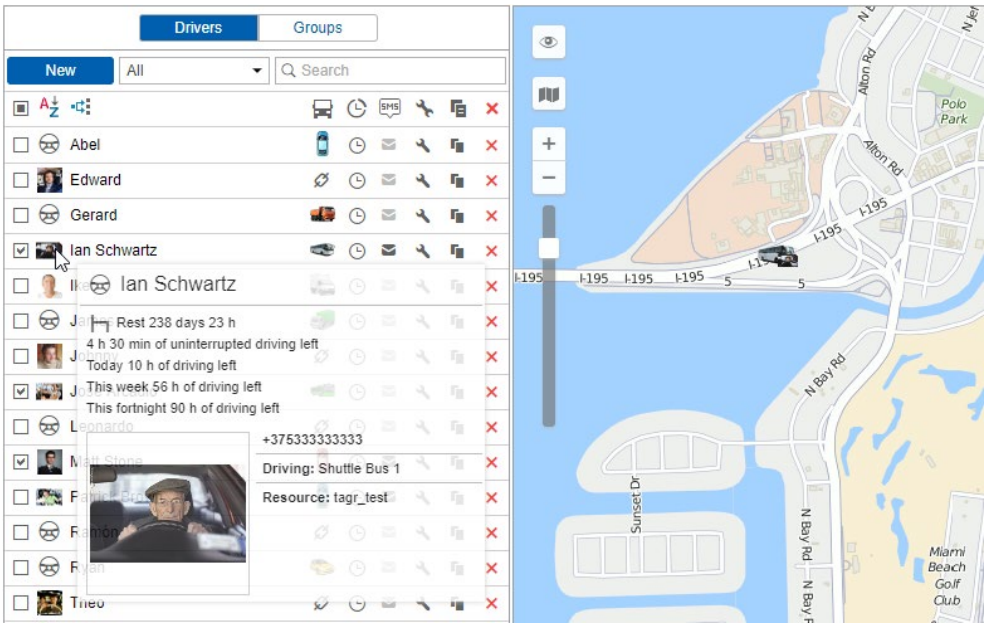
Like any other resource contents, drivers can be imported and exported through files or directly from one resource to another. However, that is not true for driver groups.

Managing Driver List

Drivers are listed in the alphabetic order. To quickly find a certain driver, use the dynamic filter above the list. There are also filters to display drivers belonging to a certain resource or group or display drivers according to their status (loose/bound). Those filters are presented in the form of drop-down menus above the list.

To display a driver on the map, tick the checkbox on their left. As drivers do not have their own coordinates, they borrow their location from units to which they are assigned. Click on the driver's name on the list to center the map on their position. An assigned driver is represented by a small icon at the bottom right corner of the unit's icon. If a driver is not attached to any unit at the moment, their last known position is shown (with a bigger icon). If there is no data about the driver's location (for example, if they have never been bound to any unit), such a driver is not shown on the map.

Note that in order for drivers to be displayed on the map you should check if the corresponding layer is active.



DDD files received from tachograph contain driver's activity information. Such files can be uploaded automatically (due to the corresponding settings of an equipment), or manually (using the TachoManager application). Received information on driver's activity helps to control whether a driver follows the AETR standards or not. Driver's activity is displayed in the tooltip of each driver, and contains the following data:

- current state (driving, work, availability, rest), and its duration;
- uninterrupted driving info (time left for driving/exceeded driving time/missed rest beginning, and also the necessary rest duration);
- driving info for the current shift (time left for driving/exceeded driving time/missed rest beginning, and also the necessary rest duration);
- week's driving info (time left for driving/exceeded driving time/missed rest beginning, and also the necessary rest duration);
- two-weeks driving info (time left for driving/exceeded driving time/missed rest beginning, and also the necessary rest duration).

If there is less than 1 hour left for driving in the current shift or less than 3 hours left for driving in the week or two weeks, the tooltip contains a warning and the color of the driver icon changes to red or an exclamation mark appears on the right (if there is a photo of the driver).

Moreover, the tooltip shows the driver's name, phone number, enlarged photo, resource (if there are several), description, and custom fields (if any were set). Moreover, a unit name can be shown in a tooltip is a driver is bound to it.

If a driver is bound to a unit, the unit icon is displayed on the right of trailer's name. If you place the cursor over this icon, the unit's tooltip is displayed (the same as in the Monitoring panel).

Several actions can be performed over drivers:

or — bind/unbind driver to/from a unit as well as delete incorrect bindings (disabled if not enough access);

— register working shift or delete bindings;

— send SMS to driver (the button is not displayed if the current user does not have enough rights; if the button is dimmed, it means there is no phone number in driver's properties);

or — edit or view driver's properties;

— create a new driver using this one as a basis;

— delete driver (the button is dimmed if you have not enough rights).

Driver Assignment

Several drivers can be assigned to a single unit. To assign drivers to units, you need to have access flag *Create, edit, and delete drivers* towards the resource where those drivers belong.

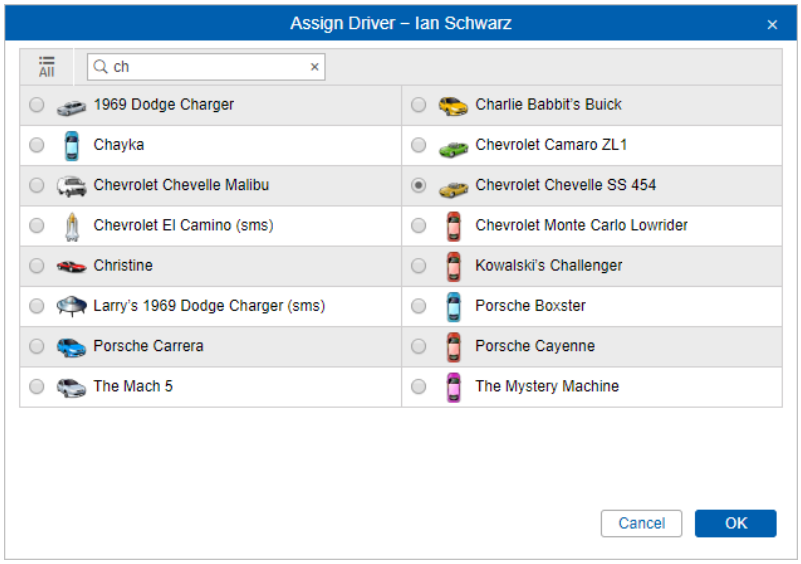
There are two ways to bind a driver to a unit: manual and automatic.

Manual Binding

The manual assignment can be performed in both modes (*Drivers*, *Groups*) of the *Drivers* panel. Use the corresponding switch button ***Bind / Unbind*** to attach or detach drivers to/from units. The button is disabled if your access is not sufficient.

Click *Bind to unit* button ( ), choose a unit the driver to be bound to, and click *OK*.

Availability of units in this list depends on the work list in the Monitoring panel. If there are no units in the list, click *Add all available* button . If the list is still empty, then you have no access rights to these units.



To unbind a driver from a unit, click an icon of a unit opposite to driver name, and then use the corresponding button ( ). Besides, you can unbind a driver by registering a working shift, or deleting bindings from history.

Automatic Binding

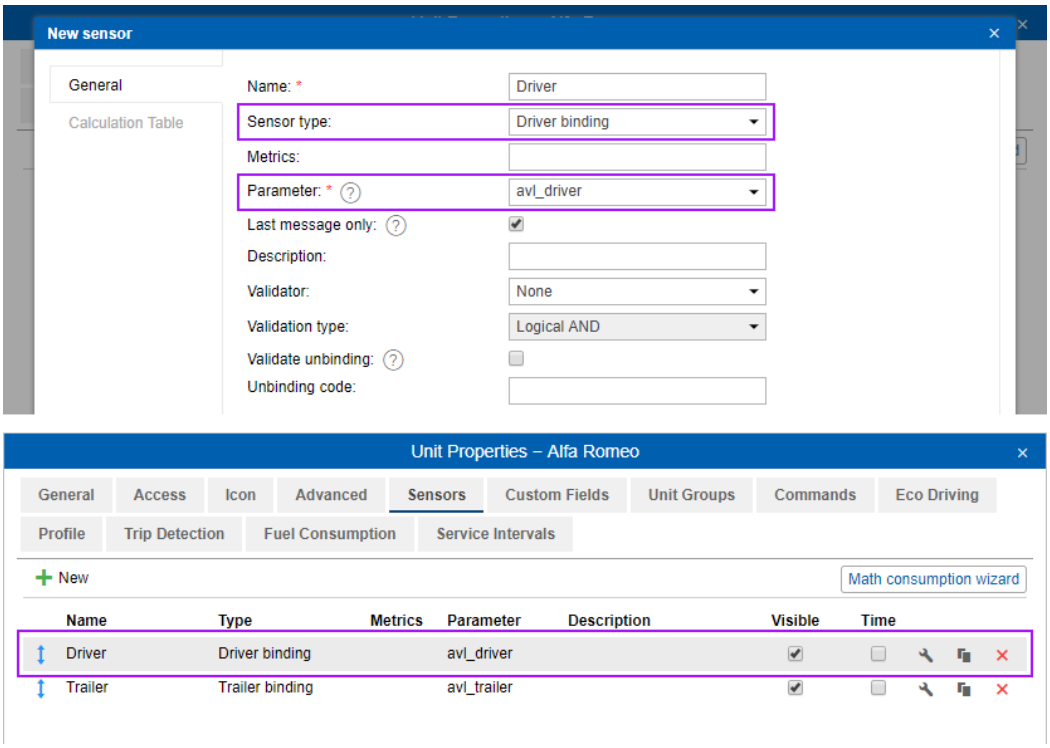
To detect a driver automatically the corresponding equipment should be installed. For instance, contact memory devices, namely digital electronic keys (e.g. RFID chips) are widely used in personnel access control systems. When getting into the vehicle, the driver applies the electronic key to the reader connected to the tracker. If the parameter received from the tracker contains the key code, the driver gets bound. However, if the value of the parameter is empty, the driver gets unbound.

To use the automatic method of binding, some adjustments should be done in the system beforehand.

1. A special sensors of *Driver binding* type should be created in the properties of each unit intended for auto-binding. A parameter for this sensor can be avl_driver or some other depending on your equipment and its configuration. One or

more driver sensors can be created on the basis of different parameters. If more than one driver binding sensor exist within a unit, the option *Validate unbinding* can be useful. If the option is activated, a driver bound to a unit automatically can be unbound from this unit only if empty value comes from the same parameter that was used to bind the driver. Otherwise, driver reset coming from any parameter will lead to the reset of all drivers bound to this unit.

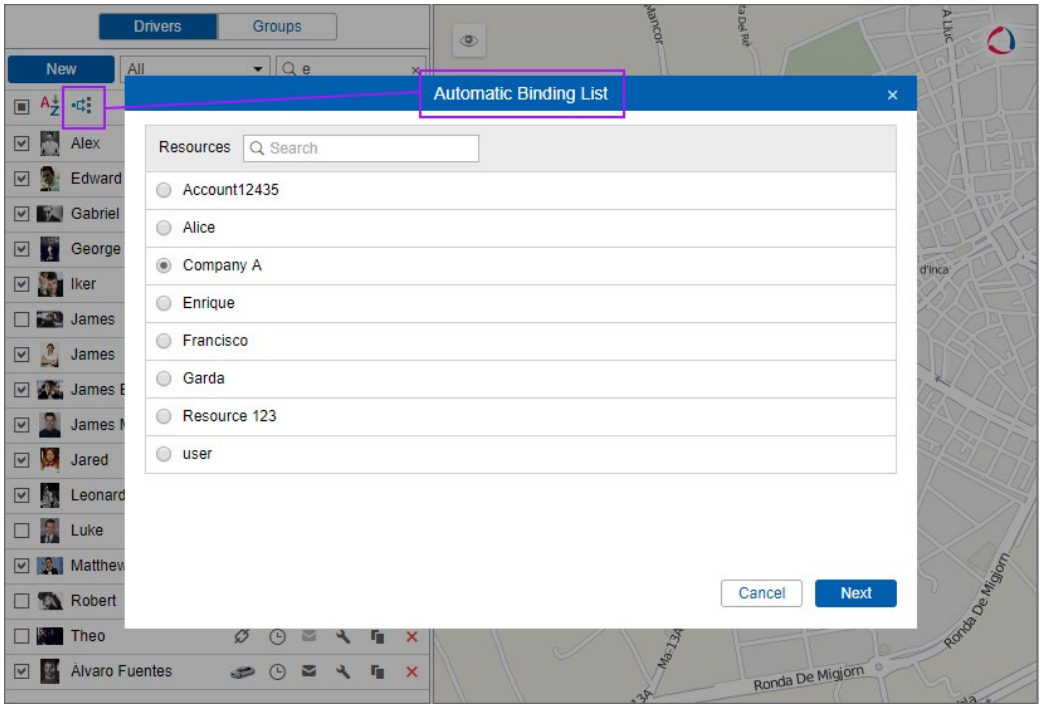
Note.
A driver can be unbound from the unit upon receiving the parameter with the unbinding code configured in the properties of the *Driver binding* sensor, and also upon the activation of the corresponding notification (for example, upon switching off the engine). When a driver with enabled *Exclusive* checkbox is assigned to a unit, all others are automatically unassigned. This function is relevant for drivers created within the same resource.



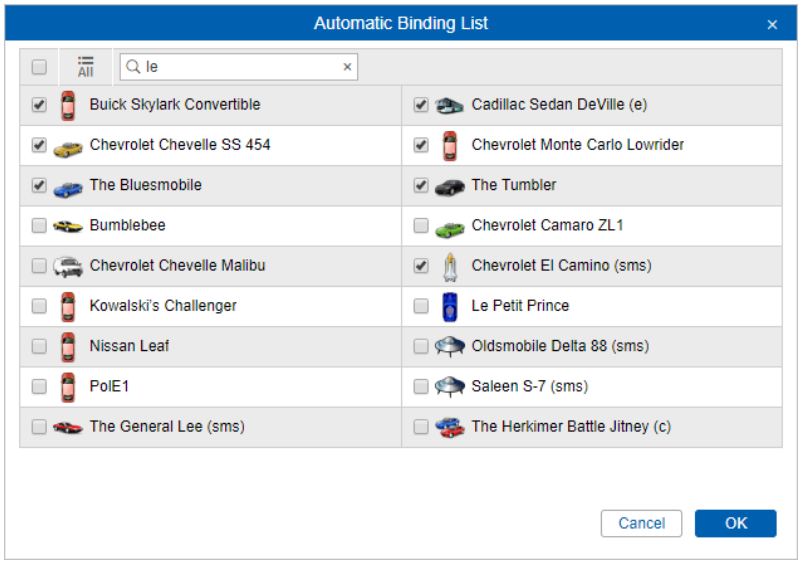
2. Create a list of units for any resource the drivers of which are intended to be bound automatically. In order to do so, click the *Auto-binding* icon ( ), and follow the steps listed below.

Upon clicking the *Automatic binding* icon a list of available resources is opened. Here you choose a resource the drivers of which will be used in automatic binding (with the units chosen in the next dialog). In order to understand which drivers belong to a particular resource, go back to the *Drivers* panel, and apply a filter by resource (dropdown menu to the right of *Create* button).

After choosing a resource, click *Next*. If only one resource is available, then it will be chosen automatically.



The next dialog contains a list of units to which the drivers from a chosen resource can be bound automatically. Depending on the access rights possessed, the list can be viewed or edited.

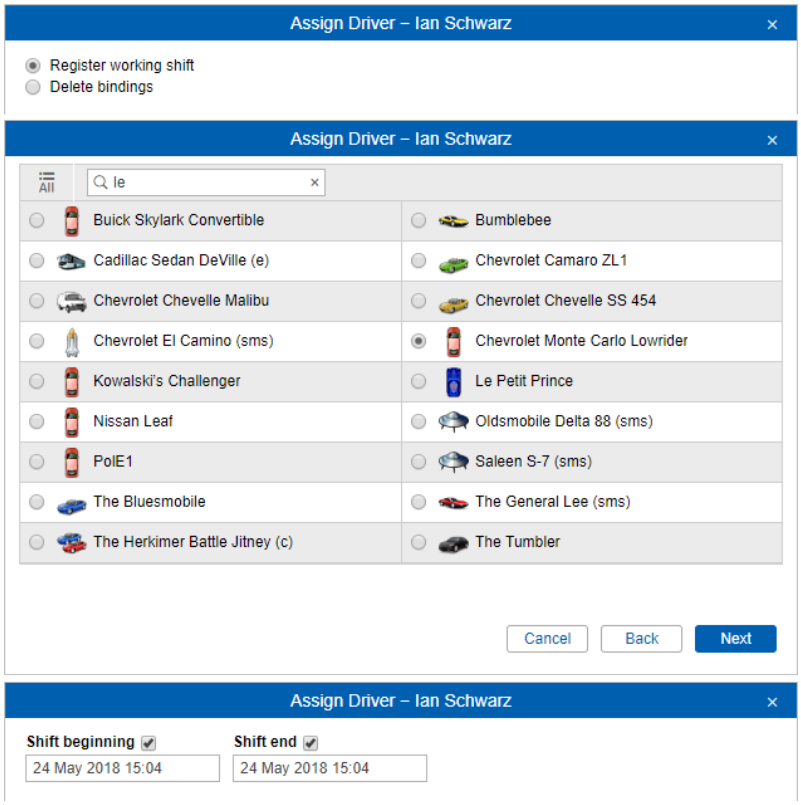


Thus, a driver will be automatically bound to a unit with the help of iButton in case that (1) this unit has a special sensor in its properties and (2) this unit is indicated in the list of auto-attachable units applied to the resource where the driver belongs.

Automatic binding of drivers is removed in the same way: summon *Automatic binding* dialog, choose a resource, and uncheck flags of units for which the automatic binding will not be used.

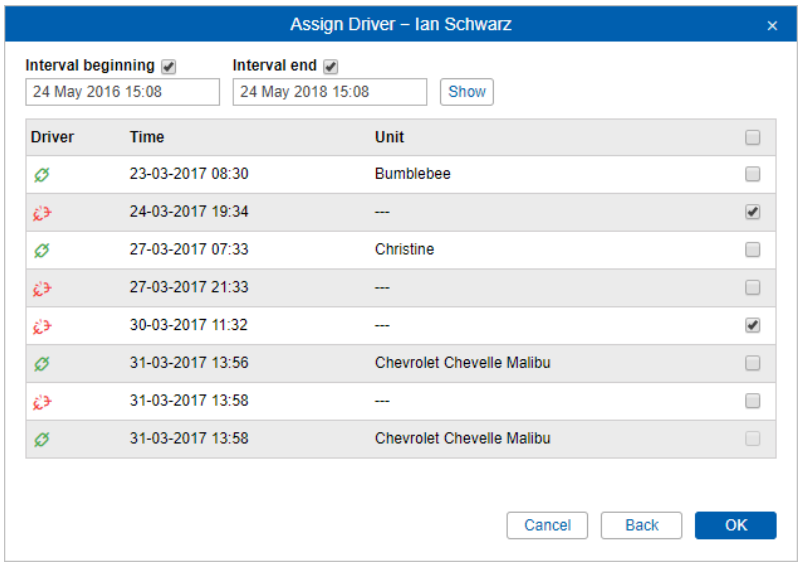
Register Working Shift

This option can be used, for example, if you want to register working shift post factum. Use the corresponding button ( ) opposite to a trailer's name, choose the *Register working shift* option, and click *Next*. In the appeared dialog window choose a unit to which the trailer will be assigned in the indicated shift, click *Next*. Now indicate time of shift beginning and end. Moreover, you can indicate either only beginning or only end time. For example, you have indicated shift beginning, and you would like its end to be registered automatically when a unit arrives to garage (as a geofence). To do so, create a notification of *Geofence* type with method of action *Reset trailer*. Anyway, registering a working shift you can use only past dates or current time (no future allowed).



Delete Bindings

Incorrect registrations of drivers can affect reports and their informational efficiency. That is why sometimes you may need to delete such (un)bindings from the database. In the dialog, choose the last option — *Delete bindings* — and press *Next*. Specify time interval and press *Show* to display all bindings and unbindings of the driver on the interval. Check invalid messages and press *OK* to delete them.



Note.
Like with units, the last message from the driver (whether assign or reset) cannot be deleted.

Simultaneous Bindings

A driver can be bound simultaneously only to one unit. If somehow (for example, through registration of shifts) you are trying to bind a driver to another unit, later assignment cuts off the previous one.

However, several drivers can be assigned to one unit at once. It is reasonable with long-distance truck drivers and truckers.

If you want to avoid situation when a unit may have several drivers assigned to it, use the flag *Exclusive* in driver properties. If a driver with such a flag is bound to a unit, other previously assigned drivers are reset automatically. Note the following restrictions:

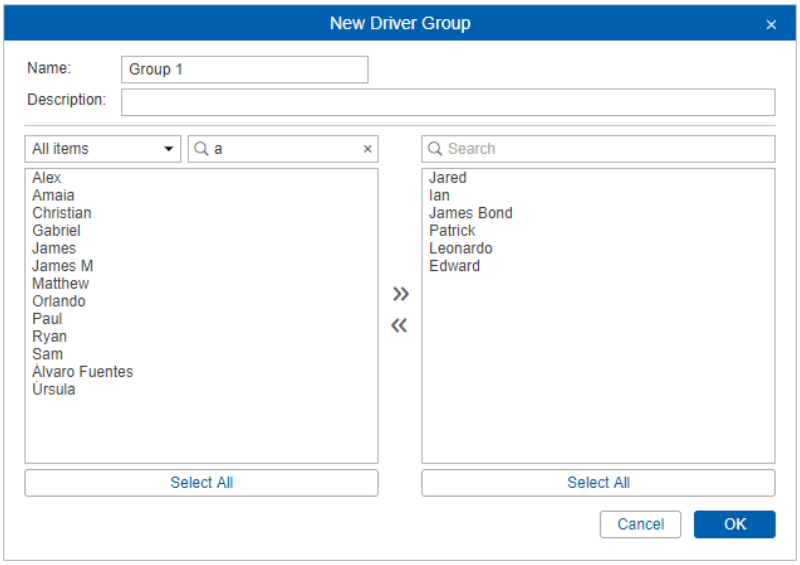
- For correct operation, all drivers must belong to one resource.
- It works only in real time, i.e. there are no such rules when registering work shifts of drivers.
- It does not work in reverse way, i.e., if a driver with activated *Exclusive* checkbox is assigned to a unit at the moment and another driver without that checked is being assigned, both of those drivers will be bound.

Groups of Drivers

Created drivers can be formed into groups. Groups can unite drivers by any criteria. Driver groups are used in group reports. ! Only drivers who belong to the same resource as the group itself can compose the group.

To start working with groups, choose the corresponding mode in the *Drivers* panel.

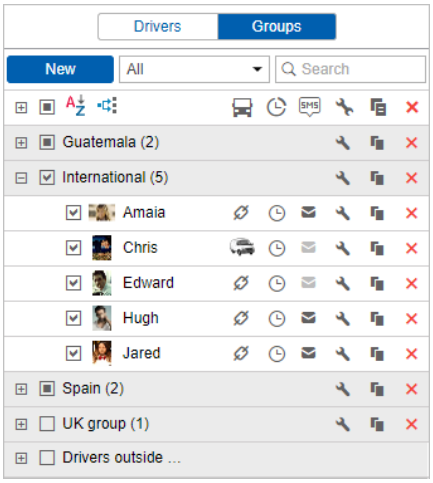
To create a new group of drivers, press the *New* button. Enter its name and description. The drivers to form the group are chosen in the list at the left. The contents of the list can change according to the option chosen in the filter above. It can display all the drivers, a group of drivers (the names of the groups are shown in brackets) or the drivers outside groups. Move necessary drivers to the right list using double clicks or the *Add* button. Press *OK*.



A list of created driver groups is displayed in the work area. Groups are arranged alphabetically. The same as for drivers, a filter or a dynamic search can be used for groups. Moreover, groups can be edited, copied, or deleted. Note that upon deleting a group you can not delete its contents.

Drivers not included in any group can be found in the *Drivers outside groups*.

Series of standard actions are available for drivers in a group (unfold a group in order the corresponding buttons to appear).


Drivers
Groups
New
All
Search
Guatemala (2)
International (5)
Amaia
Chris
Edward
Hugh
Jared
Spain (2)
UK group (1)
Drivers outside ...

Usage of Drivers

While Tracking Online

The name of the driver is displayed (if available) in unit's tooltip and in extended unit information. To activate this option, check *Driver* the in User Settings. The photo and phone number is also displayed if available.

Besides, it is possible to have a special column in the *Monitoring* panel to display drivers. For this, it is required to activate *Show drivers column* in the Monitoring panel customizer.

Attention!
When a new driver is assigned, information about it in tooltip is refreshed within a minute (not instantly).

Drivers can be located **on the map**, which was described above.

In Notifications

Drivers appear in notifications. You can configure a notification to get informed when a driver is assigned to a unit or unbound from it. Using notifications, you can also unbind driver automatically, for example, when entering the depot.

In Reports

The drivers can be also mentioned in reports if the appropriate column is chosen in report template. This is available for the following tables: Trips, Engine hours, Rides, Unfinished rides, Fuel fillings, Fuel thefts, Speedings, and some others. To see drivers in a resulting report, choose the appropriate column in the report template.

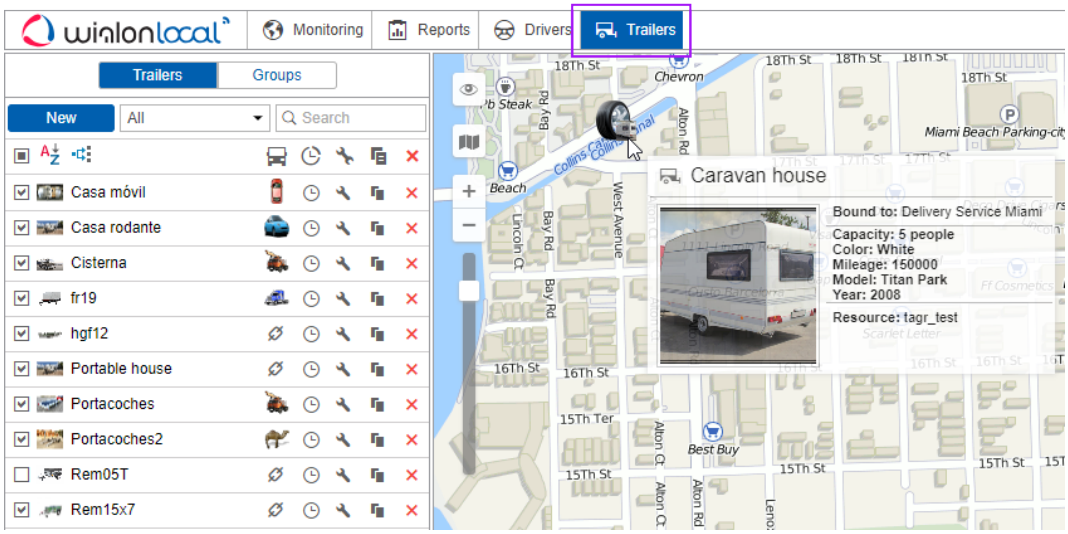
Beginning	End	Duration	Mileage	Driver
2013-03-13 10:58:10	2013-09-04 06:41:21	174 days 19:43:11	0.00 km	John
2013-09-04 06:41:21	2013-09-04 08:17:38	1:36:17	14.38 km	John
2013-09-04 10:47:20	2013-09-04 11:11:54	0:24:34	0.54 km	John
2013-09-04 11:11:54	2013-09-04 11:29:27	0:17:33	0.47 km	John
2013-09-04 22:28:37	2013-09-04 22:37:00	0:08:23	0.45 km	John
2013-09-04 22:37:00	2013-09-04 22:56:05	0:19:05	7.39 km	John
2013-09-04 22:56:05	2013-09-04 23:20:30	0:24:25	27 km	John

In different kinds of reports, drivers can be used as a criteria of intervals filtration, meaning that you can get trips, parkings, etc. for certain driver (or without any) if you set his name mask in the report template.

Besides, if you have the Other Reports module, you can generate a report totally dedicated to working shifts of a certain driver or even a group of drivers.

Trailers

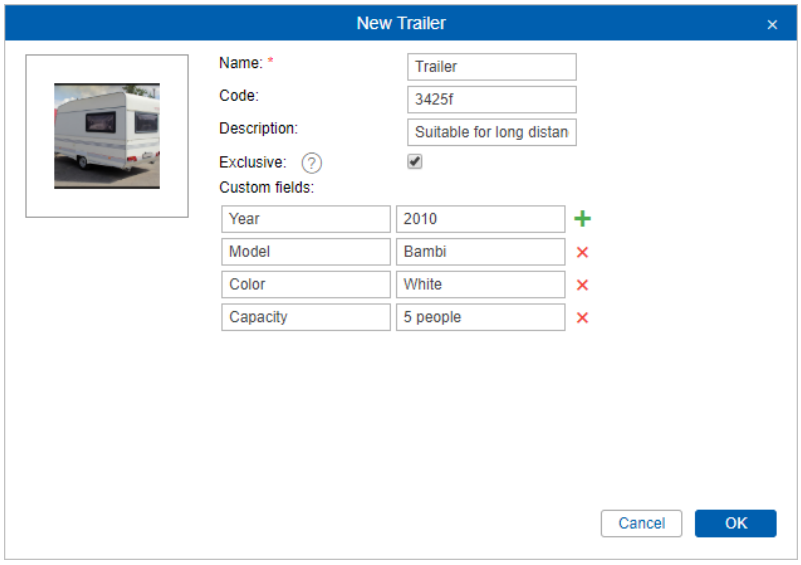
Trailers refer to any kind of mechanisms attached to or driven by the main vehicle (*unit*) and not having their own trackers or controllers. They are very similar to drivers in functionality and implementation.



To open the *Trailers* panel, select a corresponding name in the top panel or click on the necessary item in the main menu customizer.

Creating a Trailer

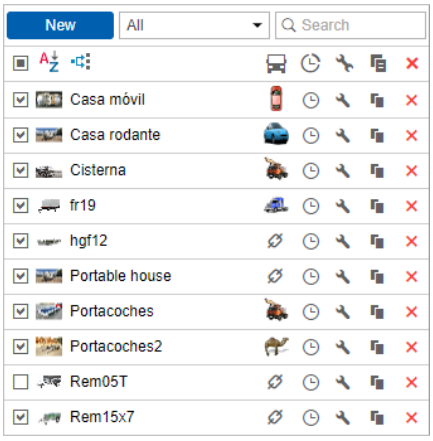
Go to the Trailers panel and press the *New* button. In the dialog, enter a name, identification code (for automatic binding), description and custom fields. This information is shown in trailer's tooltip, and used in reports. You can upload an image for the trailer which will be used to show the trailer in the list and on the map. It is recommended to upload square images in order their proportions not to be altered. Properties of trailers are the same as those of drivers.



Hint.

Like any other resource contents, trailers can be imported and exported through files or directly from one resource to another. However, it is not applicable to trailer groups.

Managing Trailer List



Trailers are listed in the alphabetical order. To quickly find a certain trailer, use the filter (choose filtration by property or by resource from dropdown list to the right of the *New* button). Besides, the usage of a dynamic search is supported as well.

To display a trailer on the map, tick the checkbox on its left. As trailers do not have their own coordinates, they borrow their location from units to which they are bound. Click on trailer's name in the list to center the map on its position. A bound trailer is represented by a small icon at the bottom right corner of unit's icon. If a trailer is not attached to any unit at the moment, its last known position is shown (with a bigger icon). If there is no data about trailer's location (for example, if it has never been bound to any unit), such a trailer is not shown on the map.

Note that in order trailers to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

If a trailer is bound to a unit, unit icon is displayed on the right of trailer's name. If you place the cursor over this icon, the unit's tooltip is displayed (the same as in the Monitoring panel).

Several actions can be performed over trailers:

- or — bind/unbind trailer to/from a unit as well as delete incorrect bindings (disabled if not enough access);
- — register working interval, or delete bindings;
- or — edit or view trailer's properties;
- — create a new trailer using this one as a basis;
- — delete trailer (the button is dimmed if you have not enough rights).

Binding and Unbinding Trailers

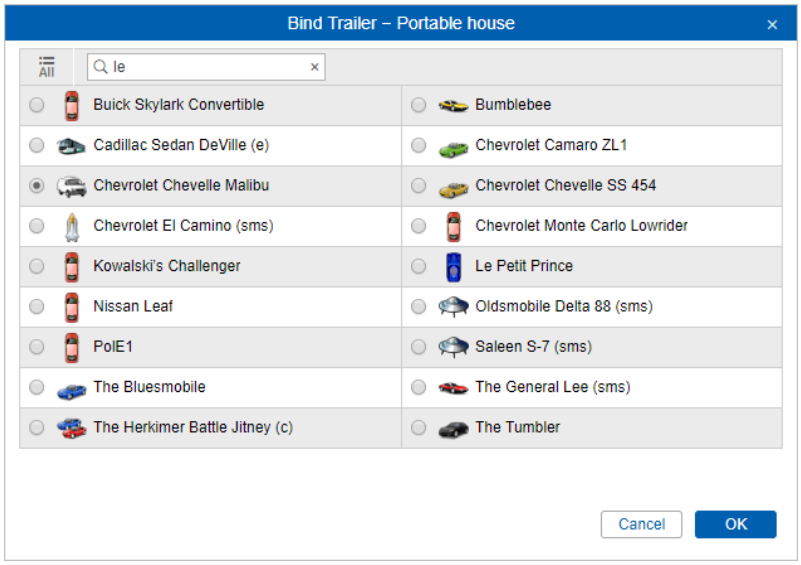
Like with drivers, trailers can be bound to units either manually or automatically. To assign trailers to units, you need to have the *Create, edit, and delete trailer* access right towards the resource where the trailers belong. The conception of simultaneous bindings of trailers to units is the same as for drivers.

Manual Binding

Manual binding/unbinding can be performed in the *Trailers* panel. A special switch button is located against each trailer — or correspondingly. If you do not have enough access rights, then the button is disabled .

Click *Bind to unit* button ( ), choose a unit the trailer to be bound to, and click *OK*.

Availability of units in this list depends on the work list in the Monitoring panel. If there are no units in the list, click on the *Add all available* button . If the list is still empty, then you have no access rights to these units.

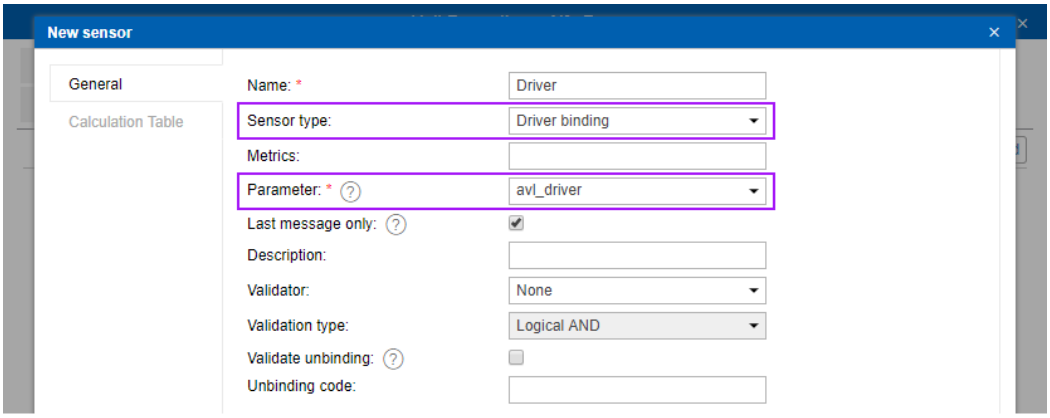


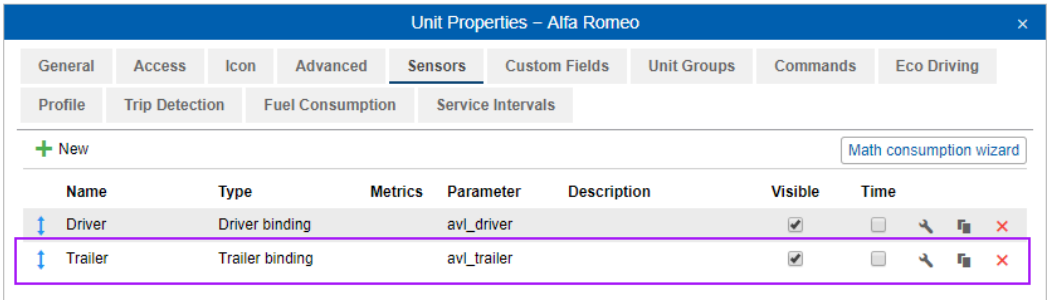
To unbind a trailer from a unit, click an icon of a unit opposite to trailer's name, and then use the corresponding button ( ). Besides, you can unbind a trailer by registering a new working shift, or by deleting bindings from history.

Automatic Binding

Automatic method of binding trailers to units requires both special equipment (such as iButton system), and special adjustments in the system.

1. Create a special sensor of the *Trailer binding* type in the properties of each unit intended for auto-binding. A parameter for this sensor can be avl_driver or some other depending on your equipment and its configuration.

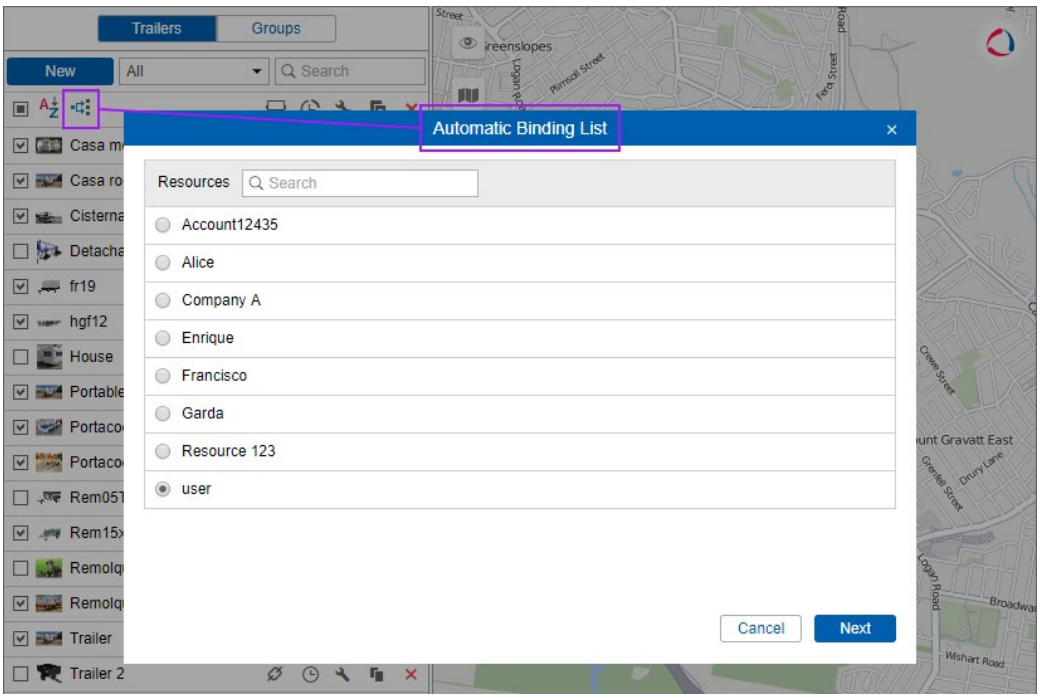




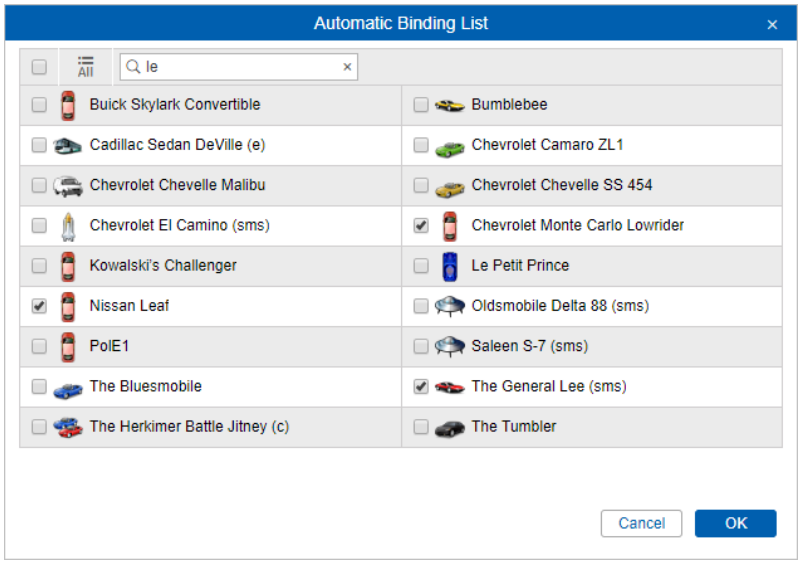
2. Create a list of units for any resource the trailers of which are intended to be bound automatically. In order to do so, click on the *Auto-binding* icon ( ), and follow the steps listed below.

Click on the *Automatic binding* icon to open a list of available resources. Here you choose a resource the trailers of which will be used in automatic binding (with the units chosen in the next dialog). In order to understand which trailers belong to a particular resource, go back to the *Trailers* panel, and apply a filter by resource (the dropdown menu to the right of the *Create* button).

After choosing a resource, click *Next*. If only one resource is available, then it is selected automatically.



The next dialog contains a list of units to which the trailers from a selected resource can be bound automatically. Depending on the access rights possessed, the list can be viewed or edited.

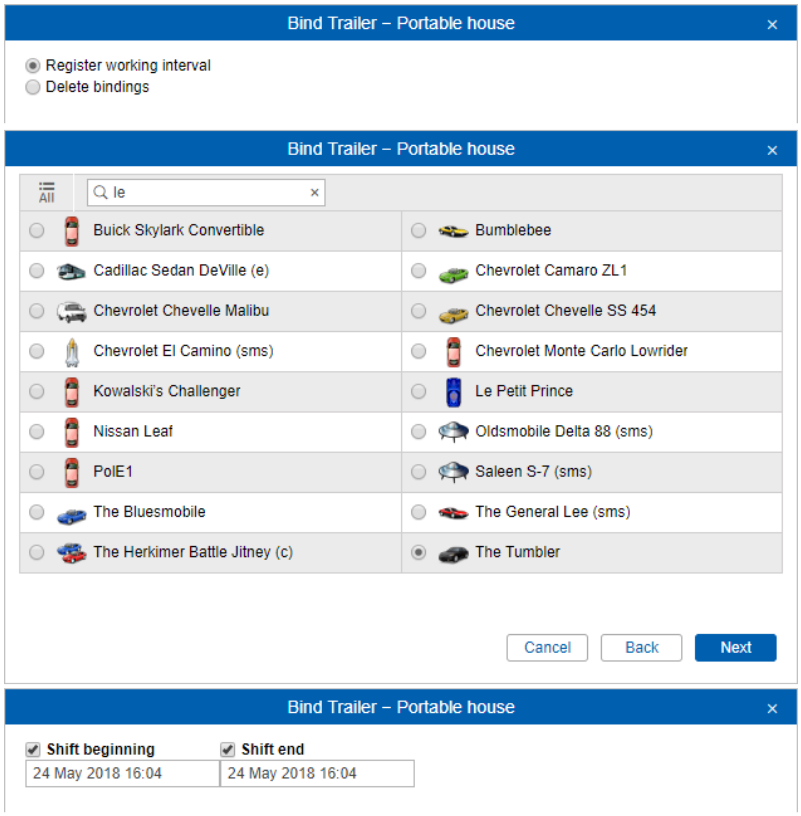


Thus, a trailer is automatically bound to a unit with the help of iButton in case that this unit has a special sensor configured in its properties and that this unit is indicated in the list of auto-attachable units applied to the resource where the trailer belongs.

Automatic binding of trailers is removed in the same way: summon the *Automatic binding* dialog, select a resource, and uncheck the boxes of units for which the automatic binding is not used.

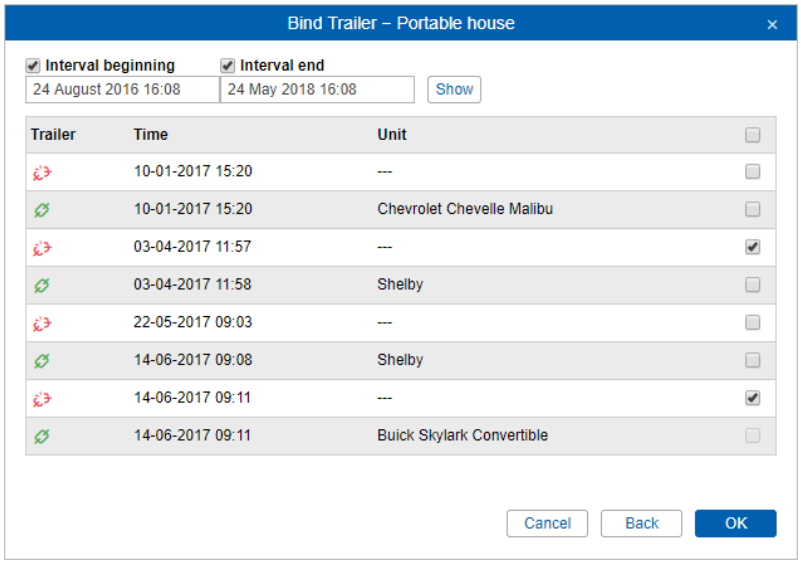
Register Working Shift

This option can be used, for example, if you would like to register working shift post factum. Use the corresponding button ( ) opposite to a driver's name, choose the *Register working shift* option, and click *Next*. In the appeared dialog window select a unit to which the driver will be assigned in the indicated shift, click *Next*. Now indicate time of shift beginning and end. Moreover, you can indicate either only beginning or only end time. For example, you have indicated shift beginning, and you would like its end to be registered automatically when a unit arrives to garage (as a geofence). To do so, create a notification of the *Geofence* type with the *Reset driver* method of action. Anyway, registering a working shift you can use only past dates or current time (no future allowed).



Delete Bindings

Incorrect registrations of trailers can affect reports and their informational efficiency. That is why sometimes you may need to delete such (un)bindings from the database. In the interval registering dialog choose the last option — *Delete bindings* — and press *Next*. Specify time interval, and press *Show* to display all bindings and unbindings of the trailer on the interval. Check invalid messages and press *OK* to delete them.



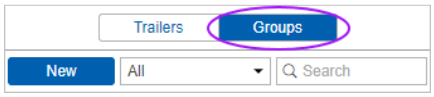
Note.

Like with units, the last message from the trailer (whether it is a binding or unbinding) cannot be deleted.

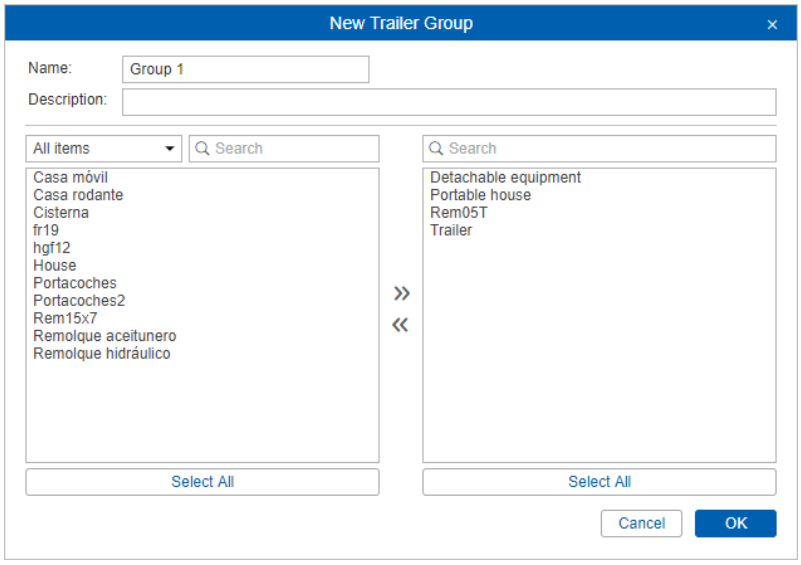
Groups of Trailers

Created trailers can be formed into groups. Trailer groups can unite drivers by any criteria, and they can be used to query reports for groups. ! Only a trailer belonging to the same resource as the group itself can be added to the group.

To start working with groups, choose the corresponding mode in the *Trailers* panel.



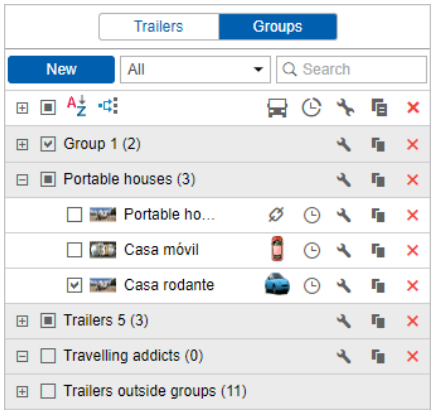
To create a new group of trailers, press the *New* button. Enter its name and description. The trailers to form the group are chosen in the list at the left. The contents of the list can change according to the option chosen in the filter above. It can display all the trailers, a group of trailers (the names of the groups are shown in brackets) or the trailers outside groups. Move necessary trailers to the right list using double clicks or the *Add* button. Press *OK*.



A list of created trailer groups is displayed in the work area. Groups are arranged alphabetically. The same as for trailers, a filter or a dynamic search can be used for groups. Moreover, groups can be edited, copied, or deleted. Note that upon deleting a group you can not delete its contents.

Trailers not included in any group can be found in the *Trailers outside groups*.

Series of standard actions are available for trailers in a group (unfold a group in order the corresponding buttons to appear).



Usage of Trailers

Online tracking:

- Trailers can be displayed on the map if they are checked in the panel in the first column.
- Trailers can be displayed in unit's additional information if this option is selected in the *User Settings* dialog.
- Trailers can be displayed in the *Monitoring* panel as a column if this option is selected in the *User Settings* dialog.

In notifications:

- You can configure a notification to get informed when a trailer is bound to a unit or unbound from it.
- Using notifications, you can also unbind trailer automatically, for example, when entering the destination point.

In reports:

- Many tables (such as *Trips*, *Geofences*, *Parkings* etc.) can have a column that displays a trailer if any was bound to the unit on certain interval.
- As a part of *Advanced Reports* module, you can generate tables for individual trailers and trailer groups. Two tables are currently available — *Bindings* and *Custom fields*.

Passengers

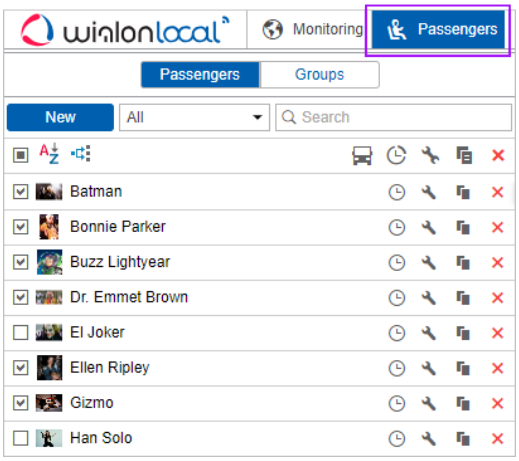
Wialon Local system provides the means to control passengers doing regular trips by special transport (for example, school buses or corporate vehicles). RFID tags are commonly used for this purpose. Upon getting into and out a vehicle, passengers bring their tags against a reader. Received data is sent to Wialon Local where it can be further used for the monitoring purposes.

Algorithm of controlling a passenger

RFID tag sends identical information upon bringing it against a reader. Therefore, the algorithm should be used in order to establish a strict line between getting into and out a vehicle:

- The first operation of a RFID tag in 24 hours means a passenger gets into a vehicle. The second operation of the same tag in the same vehicle means a passenger gets out. If the second operation of the tag occurs in the same vehicle within 1 minute after getting into/out, then it is considered to be a false one. Such an operation is ignored by the system.
- If a passenger gets into a vehicle using RFID tag, and afterwards the same tag operates in the other vehicle, then the system recognizes it as getting out of the first vehicle and getting into the second one.
- If no RFID tag operation detected within 10 hours after a passenger gets into a vehicle using a RFID tag, then such a passenger is recognized by the system as the one left a vehicle.

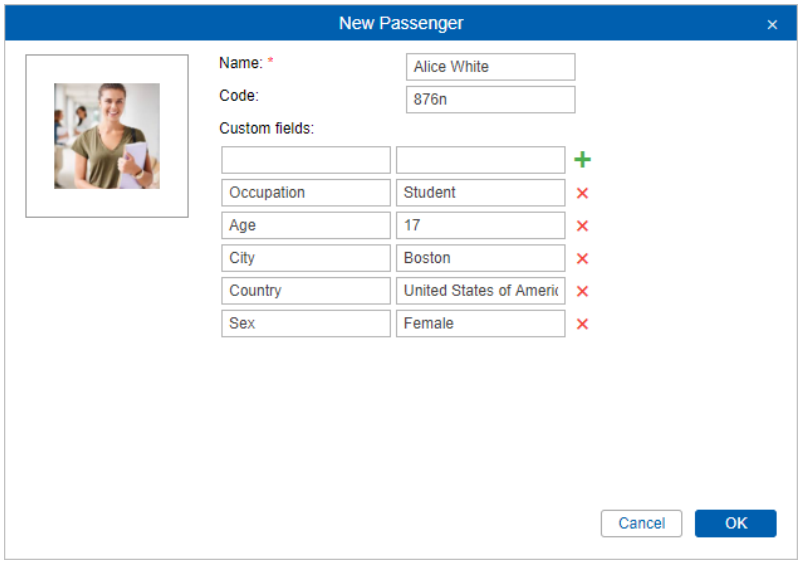
To implement control over a passenger, it is necessary to create passengers in the interface of the monitoring system and form automatic binding lists. Data received from a RFID tag provides a possibility to implement online monitoring, generate reports on passengers, and send corresponding notifications.



Creating a Passenger

To create passengers, it is necessary to possess the *Create, edit, and delete passengers* access right towards a resource.

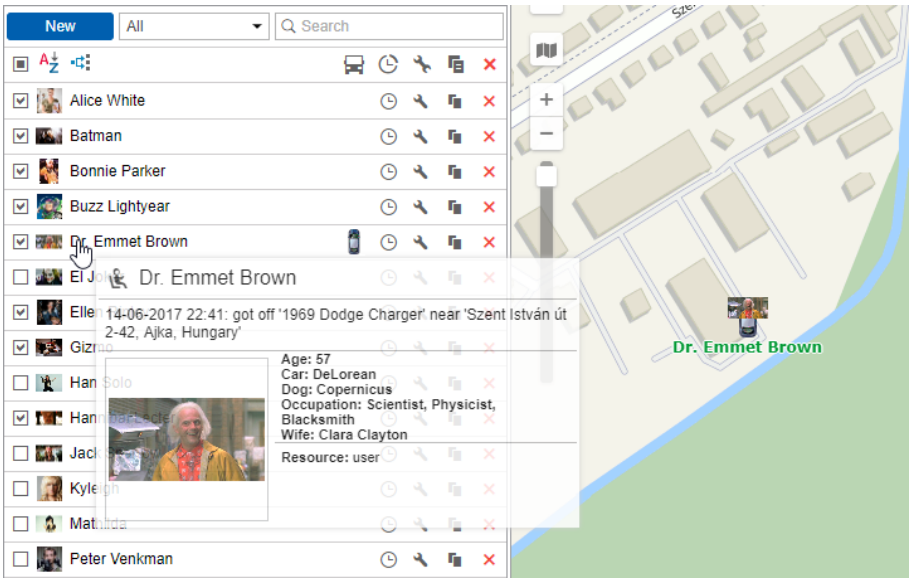
To summon a passenger creation dialog, go to the *Passengers* panel and click *New*. Here enter a name, identification code (for automatic binding), and, if necessary, fill in custom fields. This kind of information is shown in passenger's tooltip and partially in reports. You can upload passenger's image in different formats: PNG, JPG, GIF, and SVG. An image is used to identify a passenger either in the list or on the map. It is recommended to upload square images in order their proportions not to be altered. Detailed description of parameters used upon passenger creation is provided in the section of driver creation.



Managing Passenger List

To view a passenger list, it is necessary to possess the right *View passengers* towards a resource.

Passengers are listed in the alphabetical order. To quickly find a certain passenger, use the filter (choose filtration by property or by resource from dropdown list to the right of the *New* button). Besides, the usage of a dynamic search is supported as well.



To display a passenger on the map, indicate its checkbox (the corresponding visible layer should be activated). Passengers do not possess their own coordinates, therefore they borrow their location from units to which they are bound. Click on the passenger's name in the list to center the map on its position. A bound passenger is represented by a small icon in the bottom right corner of the unit's icon. If a passenger is not bound to any unit at the moment, its last known position is shown (with a bigger icon). If there is no data about passenger's location (for example, if it has never been bound to any unit), such a passenger is not shown on the map.

In the passenger's tooltip you can find its name, enlarged image, and custom fields (if any were set), as well as a name of a unit to which a passenger is currently bound.

Passenger's line may contain an icon of a unit to which a passenger is currently bound. In this case you can view unit's info by pointing an icon with a mouse.

The following actions can be performed over passengers:

- — view or edit passenger's history (— getting into, — getting out, — automatic unbinding);
- or — edit or view passenger's properties;
- — copy a passenger (create a new passenger using this one as a basis);
- — delete a passenger (the button is inactive if you have no enough rights).

Binding and Unbinding Passengers

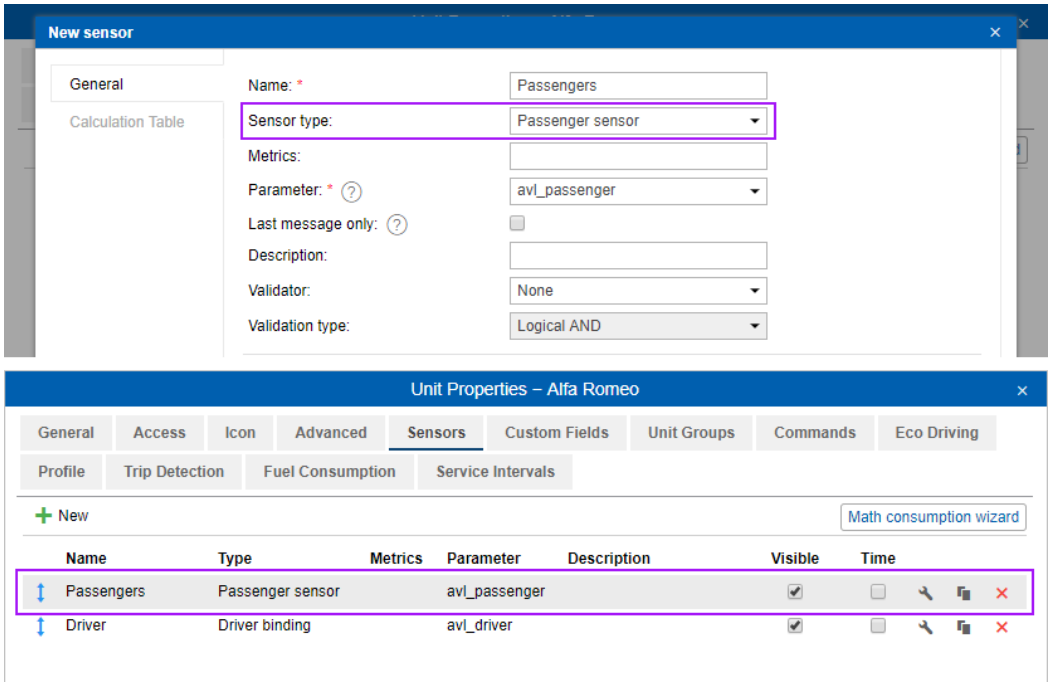
Attention

To bind/unbind a passenger, it is necessary to possess the *Create, edit, and delete passengers* acess right towards a resource.

Automatic binding is the only way for passengers to be bound to a unit. Automatic identification method requires utilization of the corresponding equipment. Dealing with passenger flow, RFID tags become commonly used. Getting into/out of a vehicle, a passenger brings a RFID tag against a reader.

Automatic binding/unbinding of passengers requires special adjustments to be done in the system as well:

1. Create the passenger type sensor for each unit intended for passengers binding. A parameter for this sensor can be *avl_driver* or some other depending on your equipment and its configuration.

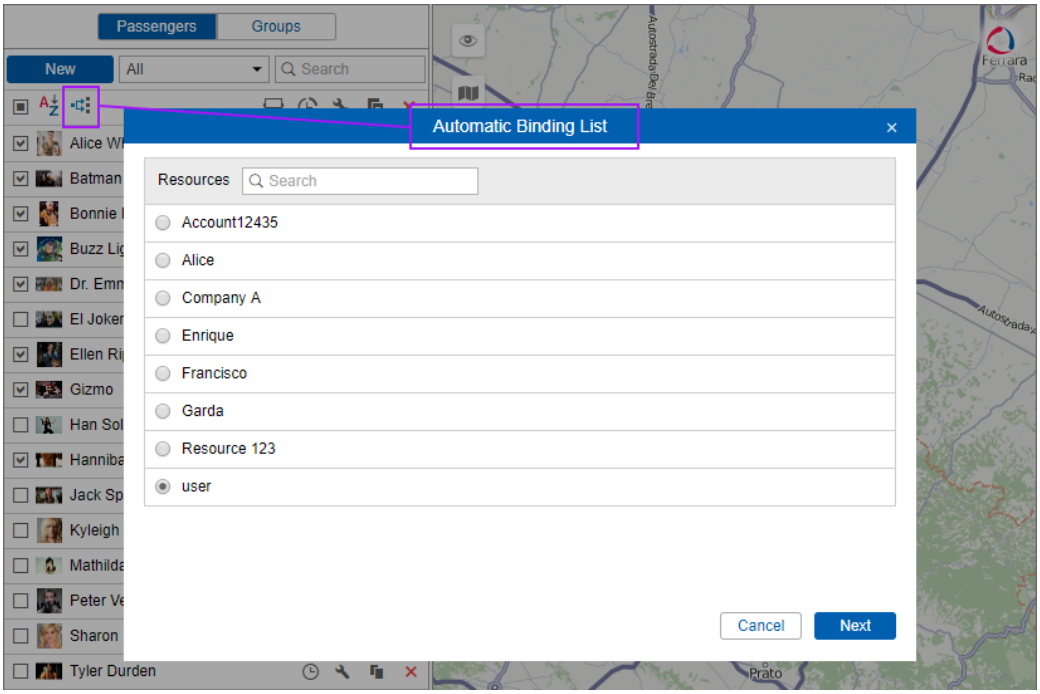


2. Create automatic binding list. To do so, click on the *Auto-binding* icon ( ) and follow the steps described below.

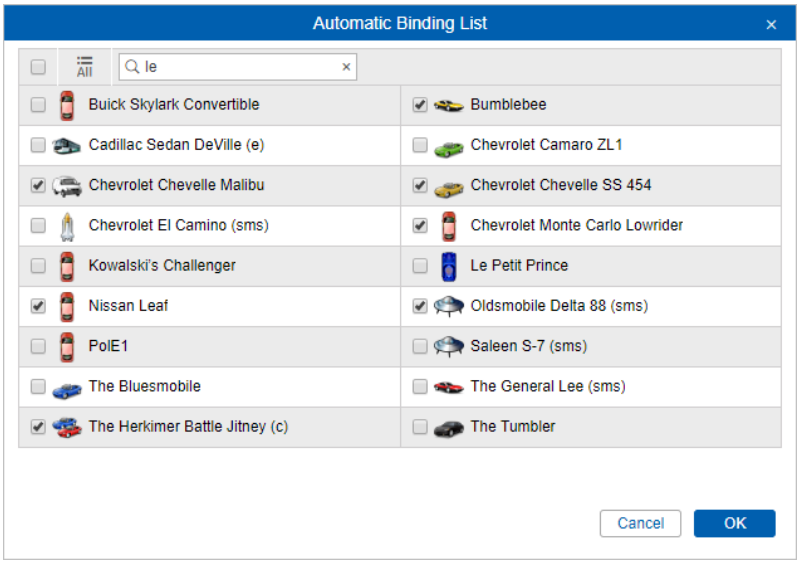
Click on the *Automatic binding* icon to open a list of available resources. You should possess at least minimum rights towards a resource creator, otherwise it is impossible to work with resource contents.

Here you choose a resource the passengers of which will be used in automatic binding (with the units chosen in the next dialog). In order to understand which passengers belong to a particular resource, go back to the *Passengers* panel, and apply a filter by resource (dropdown list to the right of the *Create* button).

After choosing a resource, click *Next*. If only one resource is available, then it will be selected automatically.



The next dialog contains a list of units to which passengers from a chosen resource can be bound automatically. Depending on the access rights possessed, the list can be viewed or edited.



Thus, a passenger will be automatically bound to a unit with the help of a RFID tag in case this unit has a special sensor configured in its properties and this unit is indicated in the automatic binding list of a resource to which this passenger belongs.

Automatic binding of passengers is removed in the same way: open the *Automatic binding* dialog, choose a resource, and uncheck the boxes of the units for which the automatic binding will no longer be used.

History

To view the history of bindings and unbindings of the passenger, press the button to the right of its name. In the window that opens, specify the interval for which you want to see the history and click *Show*.

The following icons are used in the dialog box:

- — *In* (entry);
- — *Out* (unloading);
- — *Auto checkout* (automatic unbinding after 10 hours from the moment of entering the vehicle).

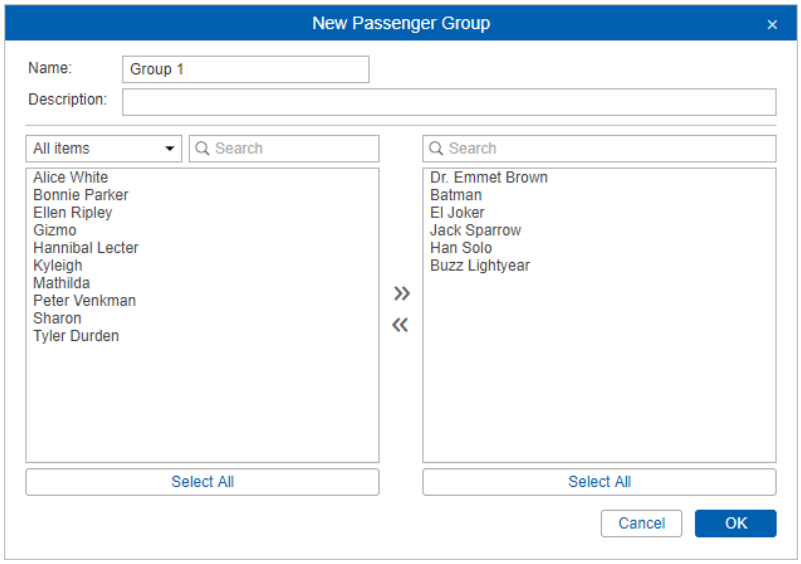
Similar to the messages from the unit, the last registered binding or unbinding cannot be removed.

Groups of Passengers

Groups of passengers are destined for uniting them by some criterion and are used in reports. Only the passengers who belong to the same resource as the group itself can form a part of it.

To start working with groups, choose the corresponding mode in the *Passengers* panel.

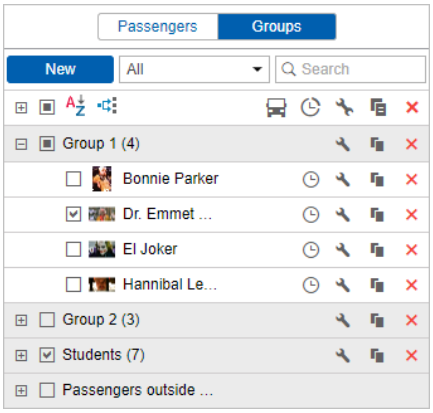
To create a new group of passengers, press the *New* button. Enter its name and description. The passengers to form the group are chosen in the list at the left. The contents of the list can change according to the option chosen in the filter above. It can display all the passengers, a group of passengers (the names of the groups are shown in brackets) or the passengers outside groups. Move necessary passengers to the right list using double clicks or the *Add* button. Press *OK*.



The list of created groups of passengers is displayed in the work area. The groups are arranged alphabetically. If you point the name of the group with the cursor, you can see in the tooltip the list of the passengers that form it. The same as for drivers, a filter or a dynamic search can be used for groups. Moreover, groups can be edited, copied, or deleted. Note that deleting a group does not mean deleting its contents.

The passengers that do not belong to any group can be found in *Passengers outside groups*.

Some standard actions are available for passengers in a group (unfold a group in order the corresponding buttons to appear).


Passengers
Groups
New
All
Search
Group 1 (4)
Bonnie Parker
Dr. Emmet ...
El Joker
Hannibal Le...
Group 2 (3)
Students (7)
Passengers outside ...

Usage of Passengers

Online tracking:

- Passengers can be displayed on the map if their checkboxes are selected. Despite the fact that they do not have their own coordinates, the passenger's location can be calculated by the unit to which the passenger is bound or was bound. To display the passenger it should be marked with a checkbox in the left column in the passenger panel. If a passenger is bound to a unit, it is displayed in the lower right corner of the unit icon, if not, its last known position is displayed at the moment.

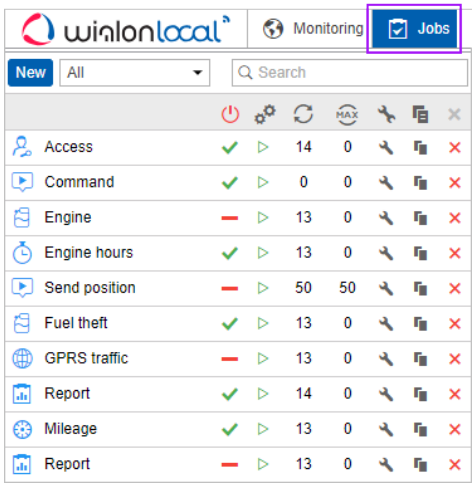
In notifications:

- You can configure the *Passenger activity* notification to get informed when a passenger gets into or out of a vehicle.
- You can configure the *Passenger alarm* notification to get informed if a passenger does not leave a vehicle within the indicated time interval.

In reports:

- Such report as *Trips* may include a column displaying a number of passengers carried by a unit within a trip.
- As a part of the *Advanced Reports* module, you can generate the *Bindings* table showing time and location of getting into and out of a vehicle, name of a unit used by passengers, duration of a trip, etc.

Jobs



A job is a set of actions to be performed on a predefined schedule. A job can be command execution, sending reports by e-mail, changing access to units, etc.

To configure jobs, open the *Jobs* panel by choosing a corresponding name in the top panel or clicking on the necessary item in the main menu customizer. Here you can see the list of all jobs created, information on their state, and the button to create a new job.

In the list, jobs are sorted by name. Use the dynamic filter to save your time when looking for a certain job. Input job name or its part into the search box and observe the results. The other way to filter jobs can be used if you have access to more than one resource. Then, on the dropdown list, choose a resource to display only jobs belonging to it.

Direct a mouse pointer over a job to view details in the tooltip: job type, parameters, schedule, last execution time (whether successful or not), resource (if there is access to several), and other parameters depending on job configuration. In columns on the right, you can see job state (on/off), the number of executions already made, and the number of maximum executions allowed.

The system supports running test execution of a job. Test execution is a single execution of a created job regardless to its activation time and number of executions indicated. Test execution is implemented upon clicking the corresponding icon in the work list, and takes up to 1 minute. A result of a test execution is recorded in the log. Moreover, the information on job's test execution can be viewed in the corresponding report on user. Note than during a test execution of a job, the icon becomes inactive until it finishes.

In the panel, the following icons and buttons are used:

Job type	Different kinds of jobs are marked with special icons in the first column: — command execution; — sending report by e-mail; — sending information about fuel by e-mail or SMS; — access management; — job on mileage counters; — job on engine hours counters; — job on GPRS traffic counting.
/	Clicking on job state sign at the header of the table, you can enable/disable all jobs at once (if you have access rights on them). Enable or disable a certain job.
	Job's test execution column. Test execution can be run for a particular job only. To run it, click .
	The first (left) column shows how many successful executions there were; the second (right) column shows maximum executions allowed.
	Buttons to view and/or alter job properties (depending on your access).

	Create a new job on the basis of this one.
×	Delete selected job.

Note.

If a job belongs to some resource to which you do not have access rights to *Create, edit, and delete jobs*, then some kind of actions towards this job, such as enable/disable, edit or delete will be unavailable.

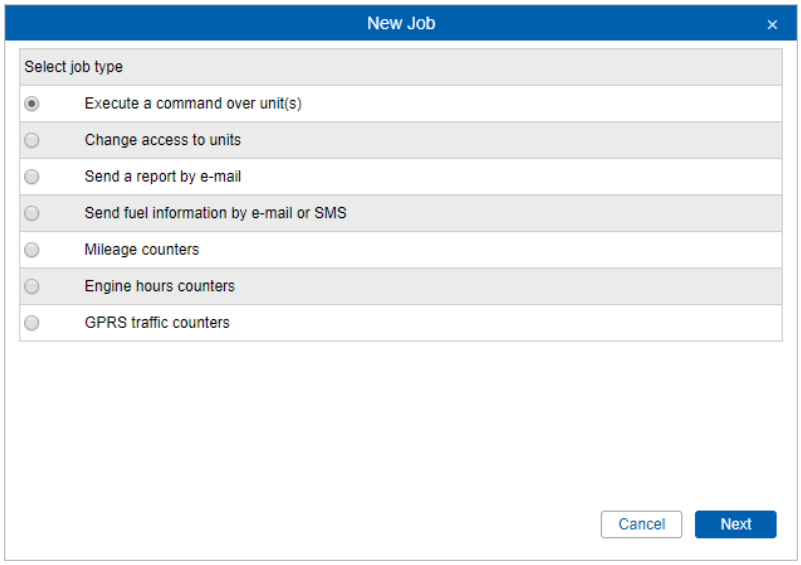
Configuring Jobs

To make manipulations with jobs, you should have at least one resource with the *Create, edit, and delete jobs* access right.

To create a new job, press the *New* button. In the dialog choose job type:

- Execute a command over unit(s),
- Change access to units,
- Send a report by e-mail,
- Send fuel information by e-mail or SMS,
- Mileage counters,
- Engine hours counters,
- GPRS traffic counters.

Then follow instructions in the dialog. For any type, you have to select units to apply this job to and set the basic parameters like activation time and schedule. For each type of job, adjust also individual parameters described below.



Selecting Units for Jobs and Notifications

Access required: *Use unit in jobs, notifications, routes, retranslators* (resource's creator where the job belongs is supposed to have this access to units to assign then this job).

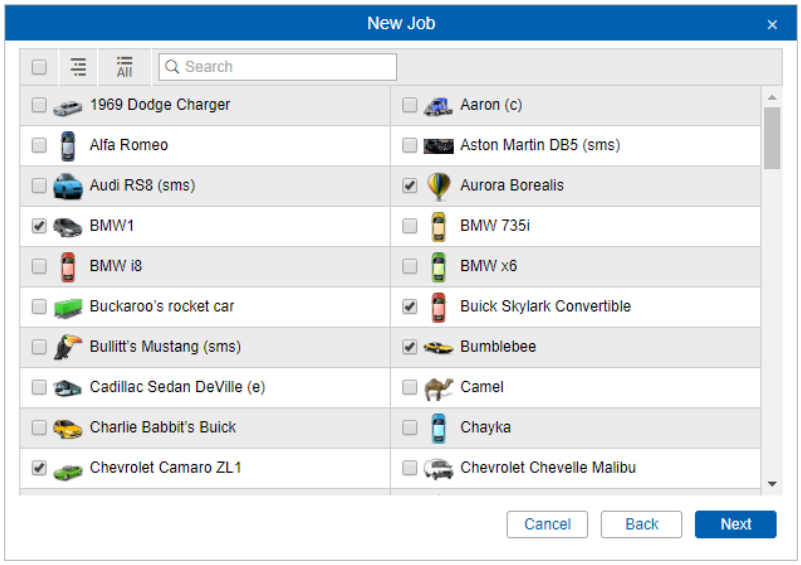
Dialog of choosing units for a job or notification consists of the units currently displayed in the work list of the Monitoring panel.

If you see no units, press the *Display all* button . If it does not help, it means there is not enough access to any of units.

You can switch between units and groups by clicking the switch-button / . If a unit group have been selected, then the action is applied to all the units the group contains on the moment of action implementation. The list of current units you can find in a group's tooltip.

Mark units/groups to apply a job/notification to. Put the flag in the header of the table to select all items.

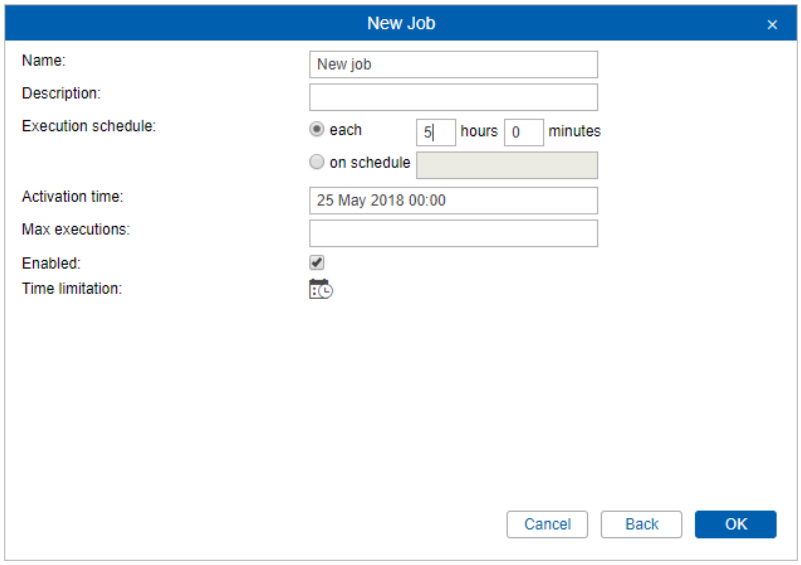
Please note that if there are more than a hundred units on this page, their icons are not displayed.



Upon editing a job/notification, units selecting dialog contains both units selected for a job/notification and units currently displayed in the work list. In order a unit to be listed in the dialog, it is necessary to possess the *Use unit in jobs…* access right towards this unit. If a job or notification that you are editing contains units to which you do not possess enough rights, you will be warned about it and in case you save the job/notification, those units will be lost.

Parameters for Jobs

These parameters are adjusted in the last page of the dialog:



Name
It is used in the list of jobs or as mail topic if the job is to send some information by e-mail.

Description
Job description is optional. Is can appear in the job tooltip.

Execution schedule
Use one of two ways to set the schedule:
(1) Periodic execution — each *N* hours and/or minutes.
(2) On schedule. Execution time is set in 24-hour format *hours:minutes* or just *hours*. If you need to indicate several points in time, separate them with spaces. Example:

```
8:00 22:00
```

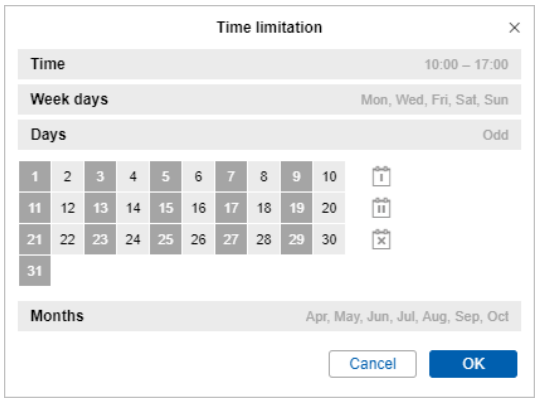
In this case, the job will be executed at 8 AM and 10 PM daily (if other conditions concerning execution days are not set on the *Time Limitation* tab).

Activation time
Date and time when the job will be activated.

Maximum executions
Enter the number of job executions after which the job will be automatically disabled. If you leave this field empty, the job will be executed endlessly until you delete it or disable manually.

Enabled
This check box indicated whether the job is on or off. When creating a job, enable this check box to activate the job just after creation. If this check box is not marked, the job will appear on the list anyway, and you can activate it later.

Time limitation
In the right part of the dialog one can define time limitations by days, months, time, etc. For instance, the job can be assigned to a unit just on weekdays and within working hours from 9 AM to 6 PM. Or you may want to reset traffic counter once a month on the first day of the month. To do this, select the day *1*.



Job name and schedule are required fields, other parameters are optional.

Hint.

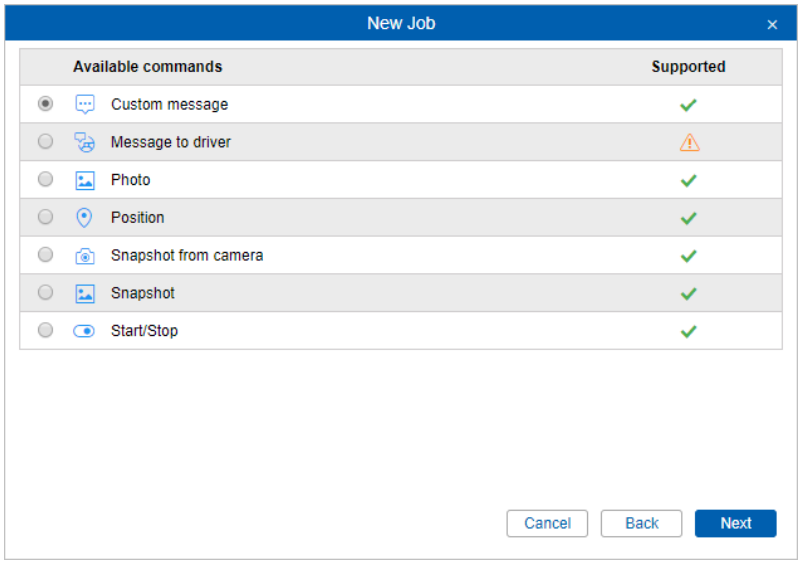
1. To get the daily report, select the *For previous 1 days* interval of the report and enter some night time, e.g. 3 am, in the execution schedule. Then, when you come to work, all the necessary reports for the previous day will already be in your e-mail box.
   If the workday ends after midnight, as some cars may arrive late, the daily report can be configured in the following way. Select the *For previous 24 hours* interval of the report, and enter 4 am as the activation time for the job. Then the report will automatically be executed once a day, at 4 am, and will contain the analysis of the data for the past day. In this case, the trips that end after midnight will not be split into two parts.
2. To receive a weekly report, select the *For previous 1 weeks* report interval, enter some night time in the execution schedule, and in the time control limit, select Monday. Thus, by Monday you will have reports for the past week.
3. To receive a monthly report, select the *For previous 1 months* report interval, specify the time in the execution schedule, and in the time control limit, check the box of the first day of the month. Thus, the corresponding report will arrive on the first day of each month for the previous month.

Execute a Command over a Unit

While creating a job of this type, select a command to be executed from the given list. The list consists of all commands that are configured in selected units (if you have the *Execute commands* right to these units).

Not all of selected units may be able to execute a chosen command, and it is seen from the indicator:

- ✓ a green sign means that all the selected units support this command;
- ⚠ a yellow triangle means that not all the selected units can perform it (see details in the tooltip). Restrictions can be placed due to access rights or device type used.



For some commands, you should set such additional parameters as input/output number, online report interval, etc. More information about executing commands can be found here.

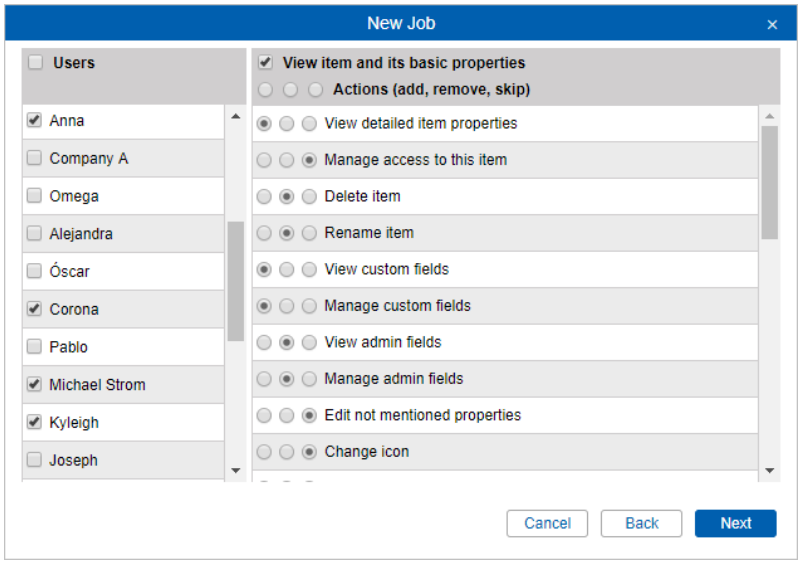
Attention!
When the time comes to execute a command as a job, all kinds of rights are checked beforehand. The user who is a creator of a resource where the job belongs should have the following access rights towards a unit: *Execute commands* and the set of flags specified in properties of this command.

Change Access to Units

This job is used to change users' access rights automatically, for example, if you want to give someone demo access for several days or restrict access to working hours.

To configure this job, select users and assign them new access. On the list, there are only users to which you have the *Manage user's access rights* access right.

Check the required users on the left and check the boxes on the right.



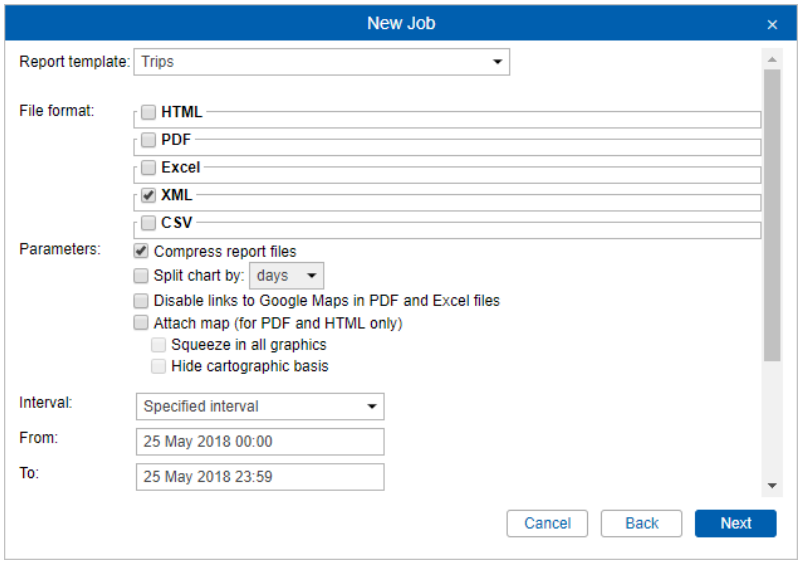
Attention!
This type of job can be performed successfully only if at the moment of its execution the user has all the necessary access rights. The user who is the creator of the resource which the job belongs to should have the *Manage access to this item* access right.

Send a Report by E-mail

This job can be used to automatically generate and send reports about units' activity to your e-mail(s).

Choose report template, file format(s) and parameters. Specify report interval: choose particular dates or specify any time interval for previous X minutes/days/weeks/months/years. Afterwards, for the *Content* item specify whether you would like to receive files/archives or the link to an FTP server where the corresponding files/archives are stored. In the *Recipients* section enter e-mail address(es) to send reports to.

To find out more on file formats or parameters description, see *Export Report to Files*.



In the list of report templates, only those that belong to the same resource as the job are displayed. Depending on template type, you choose appropriate objects for report generation in the next page of the dialog — units, groups, users, drivers, routes, resources, or retranslators. To apply the job for those objects, you should have a special access to them — *Query messages or reports* (besides, units are taken here from the work list of the Monitoring panel).

Reports can be sent as a job using file compression. In this case a letter sent to e-mail contains ZIP archive. The name of the archive consists of a report template name and a date (yyyy-mm-dd). Upon receiving such a letter, extract files to a folder and open them with applications dealing with corresponding formats. Here are some rules of files zipping:

- **Compulsory zipping**: for the files in HTML, CSV, and XML formats, as well as for the files with total size exceeding 20 MB.
- **Zipping upon flag activation**: for the files in PDF or XLSX format.

Hint.

- To receive a report by e-mail, in the general properties of the billing plan, specify the e-mail address from which system messages will be sent.

- To get the **daily report**, select the *For previous 1 days* interval of the report and enter some night time, e.g. 3 am, in the execution schedule. Then, when you come to work, all the necessary reports for the previous day will already be in your e-mail box.
  If the workday ends after midnight, as some cars may arrive late, the daily report can be configured in the following way. Select the *For previous 24 hours* interval of the report, and enter 4 am as the activation time for the job. Then the report will automatically be executed once a day, at 4 am, and will contain the analysis

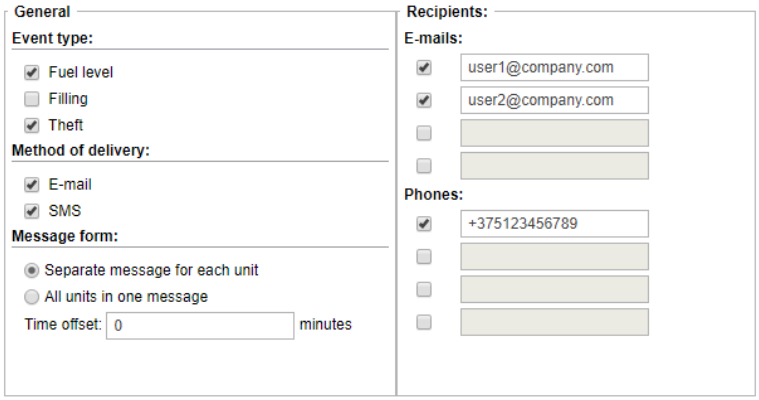
of the data for the past day. In this case, the trips that end after midnight will not be split into two parts.

- To receive a **weekly report**, select the *For previous 1 weeks* report interval, enter some night time in the execution schedule, and in the time control limit, select Monday. Thus, by Monday you will have reports for the past week.
- To receive a **monthly report**, select the *For previous 1 months* report interval, specify the time in the execution schedule, and in the time control limit, check the box of the first day of the month. Thus, the corresponding report will arrive on the first day of each month for the previous month.

Send Fuel Information

You can get information about fuel (fillings, thefts, fuel level) by e-mail or SMS according to predefined schedule. This information is given in *liters* only.

To detect fuel fillings and thefts, the appropriate unit settings are used (see Unit Properties –> Fuel Consumption).



Additional parameters to configure this report are:

- Event type: filling, theft, fuel level (all three can be chosen). Fuel level means fuel level at the beginning and at the end of the interval (the interval is set later).
- Method of delivery: by e-mail and/or SMS. On the right, enter your e-mail(s) and phone number(s) in the international format. When all slots to enter e-mails and phones are filled, additional slots appear automatically. Note that if the *Can send SMS* checkbox is not selected in the user properties, then the corresponding delivery method becomes unavailable.
- Message form: one unit in one message or all units in one message.
- Time offset (in minutes): a parameter which allows you to analyze messages from the black box. In this case, time offset value is subtracted from interval beginning.

If the filling or theft falls on the joint of the intervals, it is possible they will not be determined. For instance, the minimum amount of theft is 15 liters, the schedule of task execution is once an hour (9:00, 10:00, 11:00, 12:00, etc.). In this case, if within the last 5 minutes of an hour 10 litres were drained, and 10 more within the first 5 minutes of the following hour, they will fall into different intervals, and the job will not be executed, since each of these thefts does not reach the minimum value. That is why, to exclude a large number of joints, it is recommended not to create a job with a very frequent execution interval. In any case, you can execute a report on fillings and thefts for a day, week, month, etc., which will include all the events.

Upon sending fuel information, the system uses the following data collection algorithm:

- 1st job execution — data for the interval from an indicated activation time (minus time offset) to the job execution time;
- Subsequent executions — data for the interval from the previous job execution (minus time offset) to the current job execution.

Information on fuel fillings and thefts is sent only in case such events have been detected. Information on fuel level is sent anyway. In case there is no data to detect fuel level, an addressee receives the text *Fuel level unknown*.

SMS Format

```
Unit Name
x a/b/c
```

where

- *Unit Name* is unit name as set in unit properties (to save traffic it is recommended to use no other letters but Latin);
- x — sensor number;
- a — fuel level;
- b — fuel filling;
- c — fuel theft.

For example, SMS message

```
Iveco_1501
1 66/-/-
2 100/-/10
```

means that according to the first sensor the unit Iveco_1501 has 66 lt of fuel, and no fillings and thefts were detected; according to the second sensor (fuel in the second tank, for example) fuel level is 100 lt, no fillings were found, and 10 lt theft was detected.

Dashes may mean one of the following:

1. The corresponding flag is not ticked in job parameters. For example, it is not chosen to send fuel level.
2. There are no valid data (it may happen with fuel level).
3. Required events were not detected (it may happen with fillings and thefts).

Note.
Whether fuel volume is sent in liters or gallons depends on the resource settings (where the job belongs) and not on the unit settings.

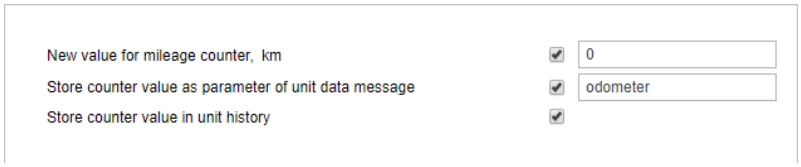
Jobs on Counters

Counters of three types are used in the Wialon tracking system: counters of GPRS traffic, mileage, and engine hours. They can be set up in the unit properties of the unit on the *General* tab.

Jobs about counters allow you to automate the saving of the values of the counters, and also adjust the accounting of mileage, engine hours and GPRS traffic.

Mileage Counters

With this type of job, you can save the current value of the mileage counter, reset it to zero or any other value, and save it as a parameter in the message.



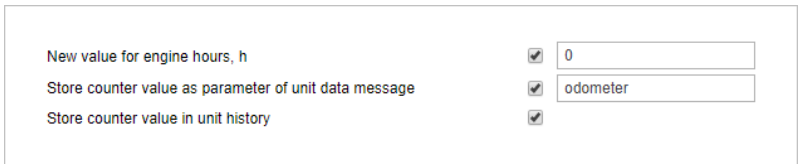
To set a new value or reset the counter, select the *Set new value for mileage counter* option and enter the desired value below. The counter will obtain this value each time when the job is executed. Depending on the resource settings, different measurement systems can be used.

Mark the *Store counter value as parameter of unit data message* checkbox to save the counter value as a parameter in the data message (a sensor with this parameter should be created for the unit). It can be used to get initial and final mileage for trips. When entering the parameter name, it is advisable to use underscores instead of spaces. It is recommended to store the counter values while the unit is parked, for example, once a day at night.

The *Store counter value in unit event history* can be used to store the current mileage counter value. It is especially recommended if the counter is subject to zeroing according to the job.

Engine Hours Counters

This type of job is similar to the previous one, but it is applied to the engine hours sensors.



Check the *Store counter value as parameter of unit data message* box to save the current value of the mileage counter as a parameter in the message, which allows to subsequently create an engine hours sensor on its basis. When entering the parameter name, it is advisable to use underscores instead of spaces. For more accurate calculations it is recommended to store the counter values during the parking of the vehicle, for example, once a day at night.

The *Store counter value in unit history* checkbox is responsible for storing the value, and in its field a new value (in hours) that will be applied to the counter after the job is completed is entered.

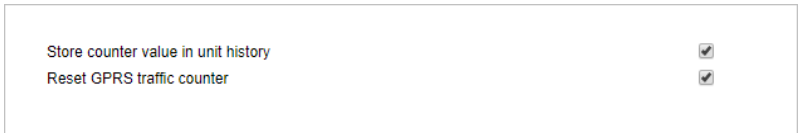
Attention!
This type of job can be performed successfully only if at the moment of its execution the user who is the creator of the resource to which the job belongs has the *Edit counters* right to a unit.

If you save the values of traffic, mileage, engine hours or counters in the unit history, they are recorded in the system as registered events, which allows you to display them in the Events or Chronology reports later. Saving the value of the counter as a parameter in the message occurs in the unit database in such messages as Data Message, while the hourly rate is displayed in seconds, and the mileage value, depending on the unit settings, is in meters or feet.

GPRS Traffic Counters

This job is designed to:

1. regularly automatically reset the traffic counter;
2. store GPRS traffic counter value in the unit history, which allows you to receive reports on the traffic consumed.



Indicate the status of the *Store counter value in unit history* option. If the option is activated, each traffic reset is registered in the system, and then you can generate a report on events or report on traffic to see traffic consumption. If the option is not activated, resets are not registered as an event.

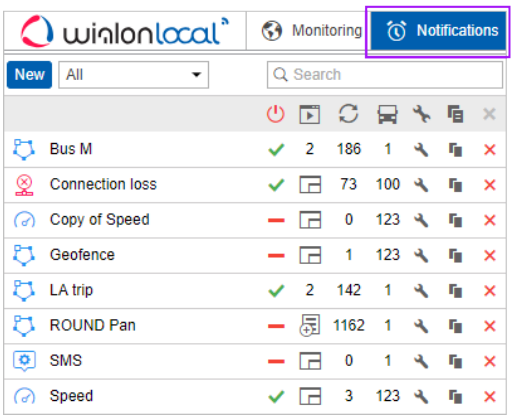
The *Reset GPRS traffic counter* option is used to reset the counter to 0 when the job is performed.

Each of two options can be used both individually and together with each other. When we check both boxes, we get a job that will reset the counter oon the specified schedule, and the reset value will be stored in the history.

Notifications

You can be notified about any unit activity that you consider significant. It can be speeding, location, sensors values, etc. A notification can be delivered by e-mail or SMS, shown online in a popup window or replied by some other means.

To create, edit and view notifications, open the Notifications panel, choosing a corresponding name in the top panel or clicking on the necessary item in the main menu customizer.



How to Create a Notification

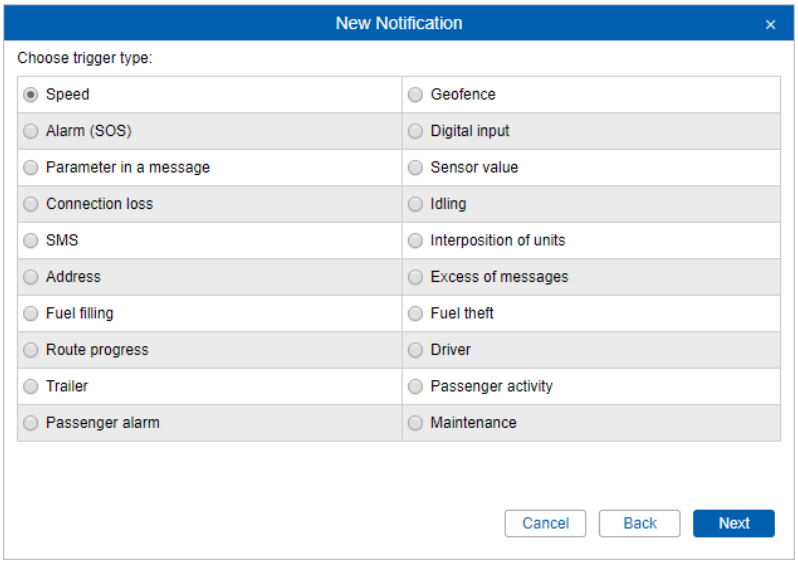
1. Click the *New* button.
2. Choose unit(s) to create a notification for, and click *Next*. Units are selected in the same way as in jobs More information can be found here.
3. Select what you would like to control: geofence, speed, alarms, sensor values, message parameter, etc. Click *Next*. More information can be found here.
4. Adjust control parameters needed for the notification type selected in the previous window: select geofences, indicate speed limits, etc. Click *Next*. More information can be found here.
5. Input your text for the notification using special tags listed in the table below. They will be substituted with real values when notification triggers. More information can be found here.
6. Indicate how the notification should be delivered: sent by e-mail or SMS, popup online, registered in unit history, etc. More information can be found here.
7. Key in a name for the notification and adjust the schedule for its performance. More information can be found here.
8. Click *OK*. The created notification appears on the list in the left part of the window.

All of the steps of creating notification are described in detail below.

Attention!
To create a notification, the *Use unit in jobs, notifications, routes, retranslators* access right is required. However, sometimes it is not enough — if a notification concerns an action, you need to have rights to perform those actions, and only then the notification triggers.

Notification Type

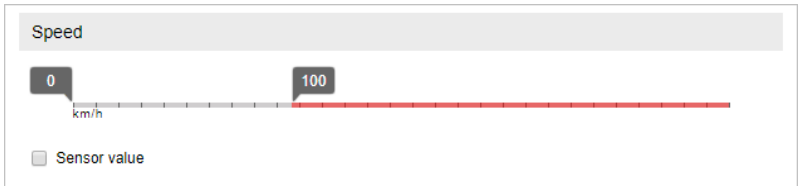
There are different conditions for triggering notifications.



Speed

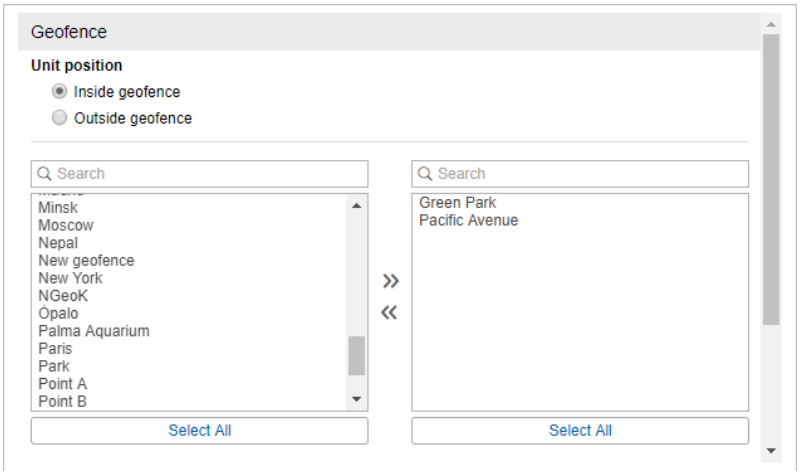
Set the minimum and maximum permitted speed values indicated on the scale by two markers. To place the marker to the required position, you can either move it on the scale, or enter a value from the keyboard. The range in which the notification triggers is highlighted in red.

Additionally, you can activate the sensor value control — in this case the notification triggers only if both conditions are met.



Geofence

When choosing this type of notification, in the next window specify the control type: inside or outside the geofence. Also, select the geofences or groups of geofences (shown in the square brackets), for which this notification will work. For the search convenience, you can use the dynamic filter above the list. The geofences should be created in advance and belong to the same resource as the notification.



Select the logical operator – the value on the basis of which the notification is activated.

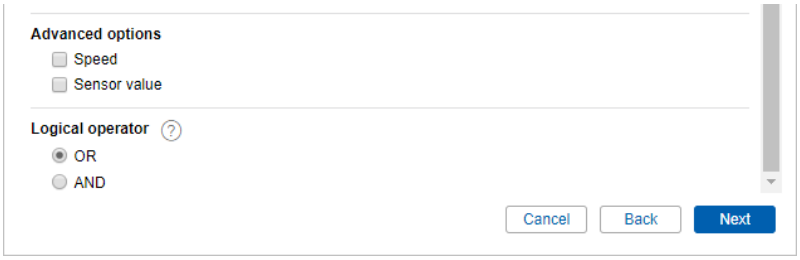
For the unit inside the geofence:

- *OR* — the notification is activated when the unit enters any of the selected geofences.
- *AND* — the notification triggers when the unit enters all the marked geofences simultaneously.

For the unit outside the geofence:

- *OR* — the notification is activated when the unit leaves any geofence, when before it was in all the selected geofences.
- *AND* — the notification triggers when the unit leaves all the marked geofences simultaneously.

In addition, you can adjust speed limitations and/or sensor value range — then the notification triggers only if all the specified conditions are met.



Alarm (SOS)

For this type of notification, no specific settings are required. However, the equipment you use must either support the corresponding functionality, or the compliant sensor should be set in the unit properties.

Digital input

Specify the number of the digital input and the control type: trigger in case of its activation or deactivation.

Parameter in a message

This type of notification helps to trace the parameters in the messages. The controlled parameter must be real, that is, sent by the equipment. Virtual parameters, such as speed, alt, sats, etc. cannot be controlled by this type of notification.

Four control types are provided: value range, text mask, parameter availability, and parameter lack. Only real parameters, i.e. sent by the device itself can be considered whereas virtual parameters such as speed, altitude, sats (satellites) etc. cannot be controlled by this type of notification.

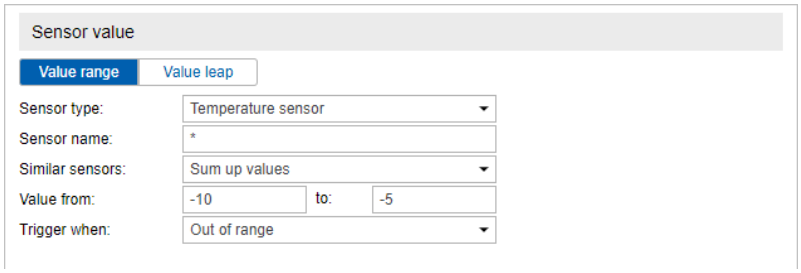
To control *Value range*, specify the parameter name, define the minimum and maximum values for it, and select whether to trigger in the specified range or out of it. If you need to get notifications for all parameters except 0, select a value range from 0 to 0 and select the trigger type *Out of specified range*.

To control *text*, enter the parameter name and *Text mask* using wildcard symbols (? and *).

For such types of control as the *Parameter availability* and *Parameter lack*, it is sufficient to indicate the parameter name. For the notification to work for the parameter appearance and disappearance, on the last page of the dialog select the *Generate notification only when state changed* option. For *in* and *out* parameters it is possible only to control the parameter availability/lack.

Sensor value

With this type of notification, you can control either the sensor getting some undesirable value (*Value range*) or an abrupt significant change in the sensor value (*Value leap*). To specify the sensors which should be controlled by the notification, select the sensor type in the dropdown list or set the name mask using wildcard symbols (* and ?). Both methods can be used simultaneously. If several sensors that meet these conditions (same type or name mask, or both) are found, their values can be summed or calculated individually — select the corresponding option. Then enter the minimum and maximum values and select the control type: trigger in the specified range or out of it.
If you control the value leap, enter a delta. The notification triggers when the delta is exceeded. Note that the indicated delta is compared to the module of the delta of values.



Connection loss

The notification can trigger when the connection is lost or restored. Select the required option in the *Notification* section. You can select both options at once.

Then choose the control type:

1. No data. It can be a simple connection loss when no messages are received from the unit during a period of time.

2. No coordinates. There are also cases when all sensors are active and their values are known, but it is impossible to locate the unit (for example, someone has covered the GPS aerial).

Set the loss time of data/coordinates (in minutes), after which the notification should trigger.

Using the *Geofences* option, you can monitor connection loss in regards to specific geofences or groups of geofences.

Choose the control type: trigger inside or outside a geofence. Also, select the geofences or groups of geofences (shown in the square brackets), for which this notification will work. Note that the geofences should be created in advance and belong to the same resource as the notification.

Idling

Here you need to specify the speed and time to determine what situation should be considered as idling (vehicle parking in supposedly working hours). It is recommended to specify a speed greater than 0 in order to exclude possible equipment errors. Indicate the time allowed for parking. If this time is exceeded, a notification will trigger. Note that the maximum allowed time of idling is 98 hours and 59 minutes.

In addition, you can activate the *Sensor value* control — in this case the notification will trigger only if both conditions are met. It is convenient, for example, to control idles with the engine or implements turned on.

Using the *Geofences* option, you can monitor idling in regards to specific geofences or groups of geofences. Choose the control type: trigger inside or outside a geofence. Also, select the geofences or groups of geofences (shown in the square brackets), for which this notification will work. The geofences should be created in advance and belong to the same resource as the notification.

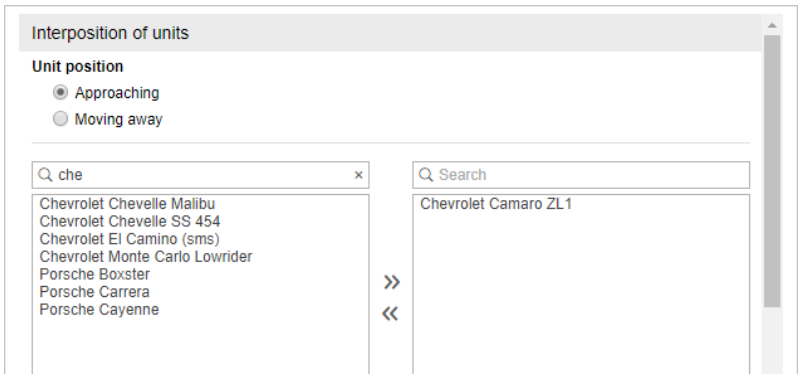
SMS

You can receive a notification when a SMS message arrives. To specify which SMS messages you are interested in, enter a mask for message text. This feature can be useful, for example, when a device sends SMS of a certain content in case of malfunction.

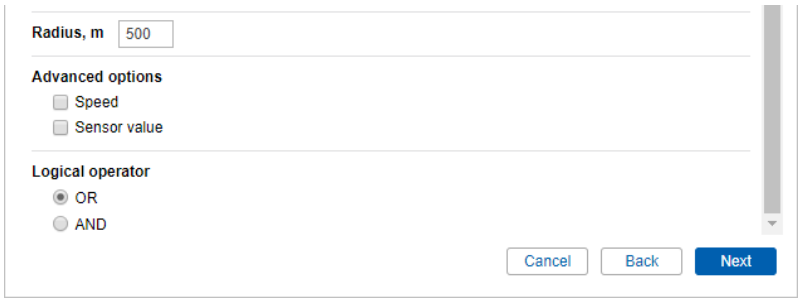
Interposition of units

This notification allows you to control the approaching of the units and their moving away from each other. Select the control type (approaching or moving away) and the logical operator (the value, on the basis of which the notification is activated). If *OR* is selected, the notification is activated when the unit approaches or moves away from any of the selected units. If the logical operator *AND* is selected, the notification goes off when the unit simultaneously approaches

or moves away from the marked units. Specify the radius in meters — the distance between the units whose decrease or increase will trigger the notification. Next, select the units whose position will be estimated in regards to the units selected for the notification. For the search convenience, you can use the dynamic filter above the list.



In addition, you can adjust speed limitations and/or sensor value range — then the notification will trigger only when all the conditions are met.



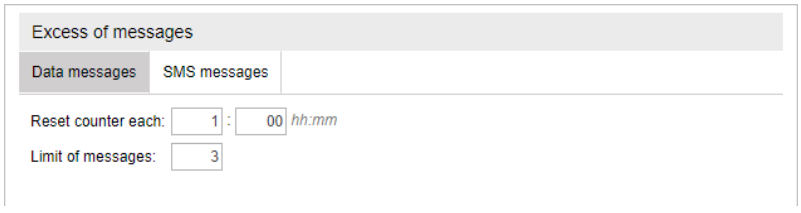
The interposition of units is checked by the system using the latest messages only.

Address

This type of notification is similar to geofence control. It allows you to control the entrance/exit or being *in* or *out of* a particular place. Enter some address parameters (e.g. city, street, and house) and then select the most appropriate option from the found addresses. Also specify the radius of the point. In addition, filters for the sensor and speed can be applied.

Excess of messages

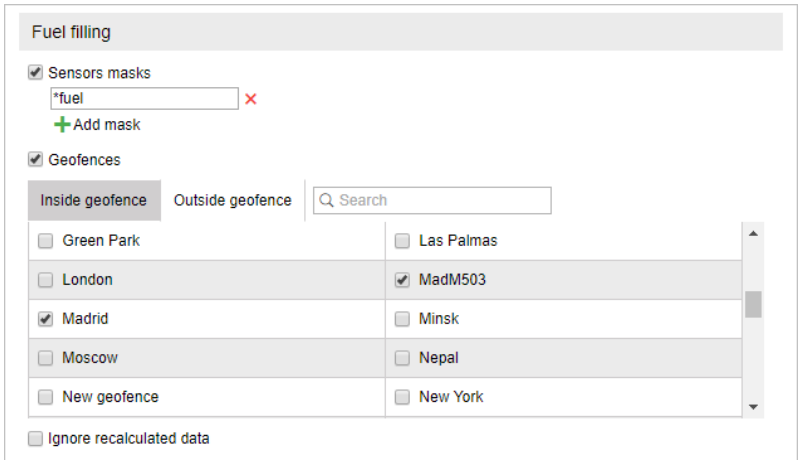
With this type of notification, you can be warned if a unit exceeds the limit of messages you have set. This can be either ordinary data messages or only SMS messages. Indicate the limit of messages and set the reset interval. For example, if you configure a notification, as shown in the example below, the notification will trigger if unit sends 3 or more SMS messages within 1 hour.



Fuel filling

This notification type allows you to control fuel fillings. When creating the notification, you can specify the sensor masks that should be used to estimate fuel fillings and their volume. Also, using the *Inside geofence* and *Outside geofence* options, you can monitor fuel fillings in regards to specific geofences. Geofences must be created in advance and belong to the same resource as the notification.

The notification is triggered when the minimum amount of fuel filling indicated on the *Fuel consumption* tab of the unit properties is reached, and also after the system receives enough data to estimate the full amount of fuel filling (the entire volume of data, messages from the black box, imported messages, etc. received). In order for the notification to arrive only once (after reaching the minimum volume of fuel filling), it is necessary to activate the *Ignore recalculated data* option.

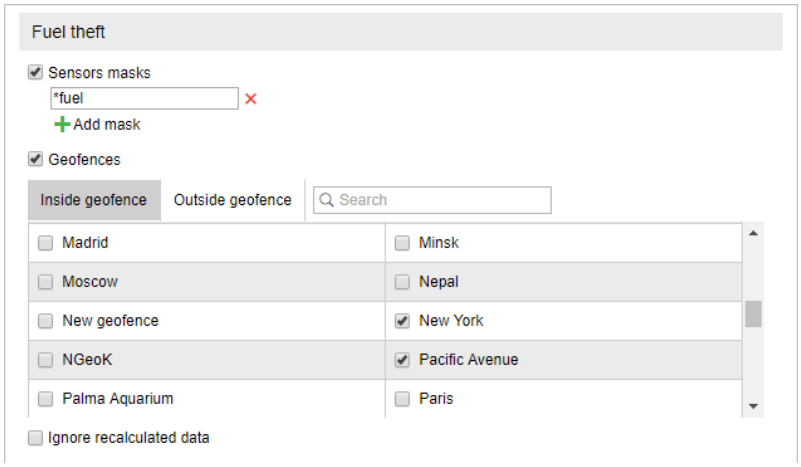


Notification is triggered for each fuel level sensor individually.

Fuel theft

Notification of this type allows you to monitor fuel thefts. When creating a notification, you can specify the sensor masks that should be used to estimate fuel thefts and their volume. Also, using the *Inside geofence* and *Outside geofence* options, you can monitor fuel thefts for certain geofences. Geofences must be created in advance and belong to the same resource as the notification.

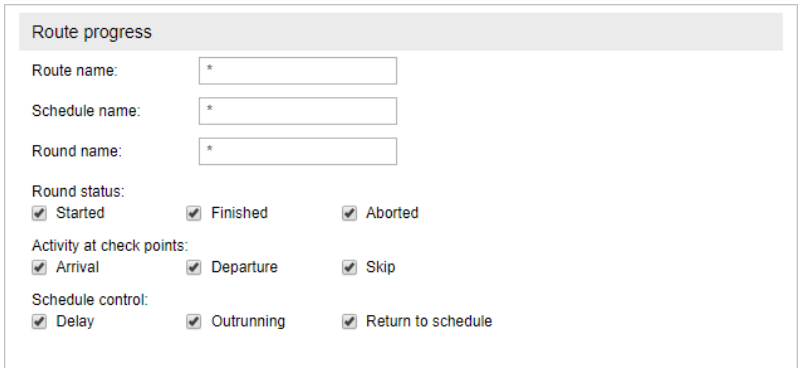
The notification is triggered when the minimum amount of fuel theft indicated on the *Fuel consumption* tab of the unit properties is reached, and also after the system receives enough data to estimate the full amount of the fuel theft (all data, messages from the black box, imported messages and etc. received). In order for the notification to come only once (after reaching the minimum amount of fuel theft), it is necessary to activate the *Ignore recalculated data* option.



Notification is triggered for each fuel level sensor individually.

Route progress

For this type of notification, select the statuses to control: round start, round finish, arrival to check point, check point skip, departure from check point, etc. Additionally, you can specify a name mask for a route, schedule and/or round.



Driver

Choose control type: driver assignment or driver reset. To control both activities, two notifications of different types will be required. Using this notification you can control all drivers (*) or just some of them — input driver's name (or code) mask.

Trailer

Choose control type: trailer assignment or reset. Settings to adjust are the same as for previous type.

Passenger Activity

To receive notifications on passenger's activity, choose control type: check in/out. Moreover, indicate passenger's code in the corresponding field. To control all the passenger, leave just the asterisk sign (*) in the field.

Passenger Alarm

Indicate a timeout upon the expiry of which you'll receive an alarm message if any passenger of a chosen resource stays in a vehicle. Timeout is started to count upon passenger binding.

First, you choose trigger type: notify when service term approaches or notify when service term is expired. Then indicate the interval before or after the term for the notification to trigger. This interval can be in days, kilometers, engine hours, or together. You can control either all intervals existing in the 'Service Intervals' tab in unit properties or just several intervals. To specify target intervals, enter a name mask using wildcard symbols like asterisk (*) and question sign (?). Then indicate how much mileage, or time, or how many engine hours should be left or expired to make the notification trigger.

Notification about maintenance triggers only once — when a critical point is met (mileage, engine hours or time) about any maintenance interval. Then information about service work done should be delivered through event registrar or through unit properties dialog. Only after that, the notification starts working again.

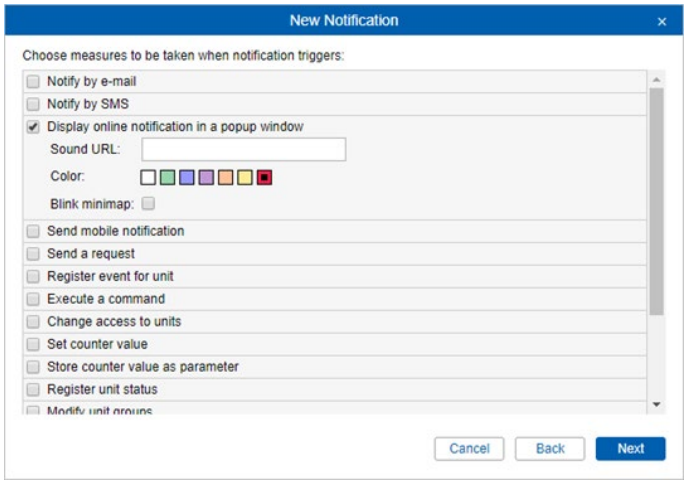
Notifications' triggering peculiarities:

- If upon creation of notification a unit with an already exceeded maintenance interval is chosen, then the notification for such a unit will not trigger.
- If no position messages have been sent to a unit, then the notification for such a unit will not trigger.

Note.
As each notification belongs to some resource, it takes its measurement units from this resource. If the american or imperial measurement system is set for the resource, then speed is shown in miles per hour (mph), radius in feet (ft), and mileage in miles (mi). Otherwise (in case of metric system), it will be kilometers per hour, meters and kilometers, correspondingly.

Notification Action

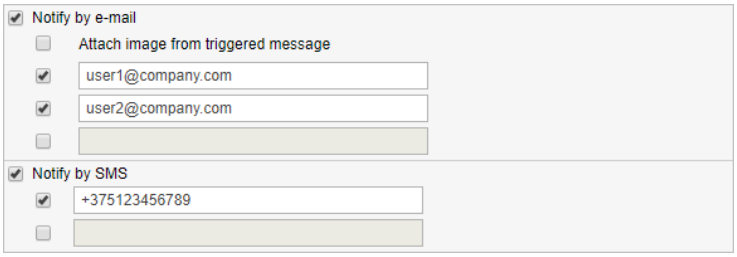
Notification action is the way system will react when a notification triggers.



Notify by e-mail

You can indicate one or more e-mail addresses to send a notification to. When all fields for entering addresses are filled, additional slots appear automatically. The header of the message will contain the name of the notification, and the name of the unit in the parentheses. The body of the letter will contain the text of the notification, where the tags will be replaced with specific values.

In addition, if the device allows, an image sent by the unit in the message may be attached to the notification. To do this, check the *Attach image from triggered message* option.



To receive a notification by e-mail, in the general properties of the billing plan, specify the e-mail address from which system messages will be sent.

Notify by SMS

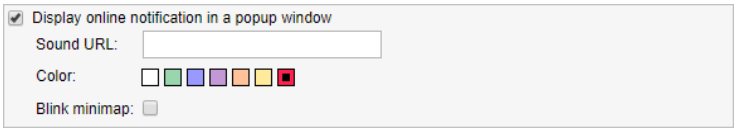
Key in one or more telephone numbers in the international format, for example, +375293293294. When all slots to enter phones are filled, additional slots appear automatically.

Note that if the *Can send SMS* checkbox is not selected in the user properties, then the corresponding notification delivery method becomes unavailable.

Display online notification in a popup window

A notification can be displayed in a popup window. It can be silent or accompanied by a specific sound. If no URL is

given for the sound, the standard tune will be used. Otherwise, enter sound URL to use a custom tune. Recommended file size is up to 0.5 MB.



There is a possibility to inform on a notification triggering by blinking a minimap. To enable this option, indicate the *Blink minimap* flag in this section.

Attention!
Different browsers can have restrictions regarding formats of audio files:

	MP3	WAV	Ogg	AAC
Internet Explorer 9+	+			+
Google Chrome 11+	+	+	+	
Mozilla Firefox 12+		+	+	
Safari 5+	+	+		+
Opera 10+		+	+	

To highlight a notification, you can set an individual color to it. This color will be applied to the background of the triggered notification so that you could easily notice it.

Send mobile notification

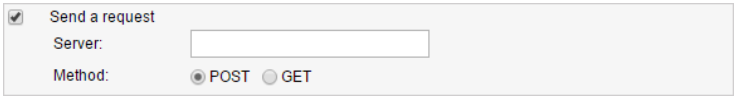
In this case upon notification triggering a mobile notification is sent to a user/users of an application. Choose the necessary application in the upper field. Then the system checks the possession of the necessary rights towards users: *View detailed item properties*, *Act as given user*. Current user as well as the creator of a resource to which a notification belongs are checked for the possession of these rights. Afterwards on the basis of this check a list of users is formed in the field below. Here you can indicate a user/multiple users (choosing the corresponding flags) or all the users (holding *Ctrl* and checking any user checkboxes) to whom a notification will be sent. To facilitate the search, you can use the dynamic filter.

Note that mobile notifications service availability depends on the selected service package.

Note that in order to receive mobile notifications, a user of Wialon Mobile Client should authorize in the application and enable the *Notifications* option.

Send a request

You can transfer a notice on the triggered notification to external systems. Choosing this measure it is necessary to indicate server address as well as HTTP request method (*POST* or *GET*).



Register event for unit

In this case notification text is stored in unit history. Then a report on these events can be generated.

Register as violation

Upon checking this option the notification will be registered not only as event but also as violation, and one more report type will be available to you. For further information, see reports on Events and Violations.

Execute a command

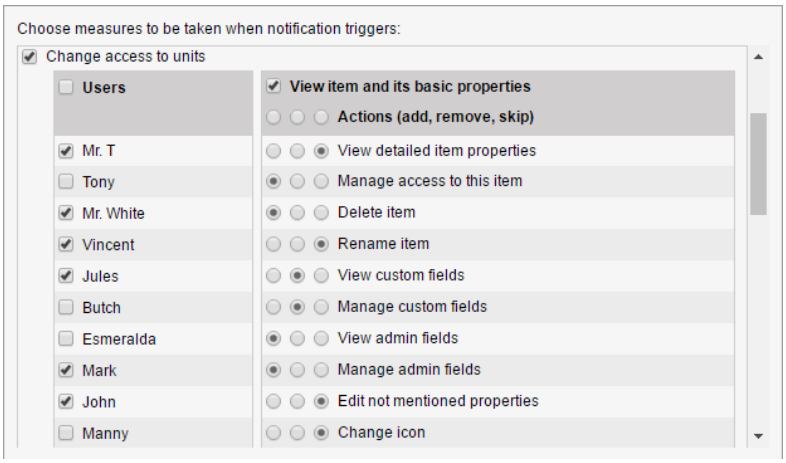
For this action, choose a command to be executed over unit(s). The list consists of all commands configured in the properties of selected units. So, different commands on the list may be supported by different units. Support status is seen with special indicators:

- ✓ command is supported by all selected units;
- ⚠ not all of selected units support given command (see details in the tooltip).

For some commands, you should set additional parameters like input/output number, online report interval, etc.
More about executing commands...

Change access to units

Choose users whose access rights will be modified when trigger conditions occur. Specify access that will be applied to those users after the notification triggers. This feature can be used, for instance, in the following situation.



Set counter value

Counter values can be changed (or zeroed) when notification triggers. Select one or more counters (mileage counter, engine hours counter, traffic counter) and set new values for them.

Store counter value as parameter

Current values of mileage or engine hours counters can be stored as parameters in unit data messages (*odometer* or *engine_hours* correspondingly). These parameters can be used to create sensors on their basis (for example, engine hours sensor) and to get initial/final mileage in reports. For more precise calculations, it is recommended to store counters while the unit is parked, for example, once a day at night time.

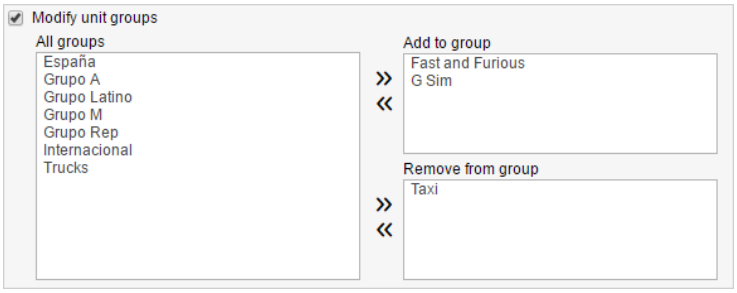
Register unit status

A new status can be set for unit when a notification triggers. For instance, when unit enters a geofence, *private* state

can automatically switch to *business*.

Modify unit groups

You can change the contents of unit groups when a notification triggers — add triggered unit to a group or remove it from a group. On the left, there is a list of all available unit groups. Move necessary groups to the right to *Add to group* or *Remove from group* sections.



Send a report by e-mail

Select report template, object, file format(s), and report parameters. Note that choosing an object, sometimes it is convenient to use the *Triggered unit* option — in this case a report is generated for the same unit that the notification triggers for. Afterwards, for the *Content* item specify whether you want to receive files/archives or the link to an FTP server where the corresponding files/archives are stored. Indicate report interval: choose particular dates or specify any time interval for previous X minutes/days/weeks/months/years. Enter e-mail address(es) to which report to be sent upon notification triggering.

To find out more on file formats or parameters description, see *Export Report to Files*.

For report generating, it is necessary to possess the *View messages and reports* right.

Change icon

If this action is selected, the current unit icon is replaced by the specified one when the notification triggers. The window with the available icons is opened by clicking the *Library* button.

Create a round

After the notification triggers, a new round can be created for a unit. For example, when one round is finished, a new round can be assigned, or when a unit leaves the geofence (for example, a garage), a new round is automatically created for it. More about the parameters that can be configured for rounds are described in the *Routes* section.

Reset driver

This feature can be used, for example, to reset driver automatically when the unit returns to the depot. This action can

be completed successfully only if you have enough rights for the resource where the driver under question belongs — *Create, edit, delete drivers*. Note that driver resetting can take place only within the resource to which a notification belongs.

Reset trailer

Similar to the previous one but concerns trailers. This action can be completed successfully only if you have enough rights for the resource where the trailer under question belongs — *Create, edit, delete trailers*. Moreover, the same as for driver resetting, trailers should belong to the same resource in order the action to be executed correctly.

Notification Text

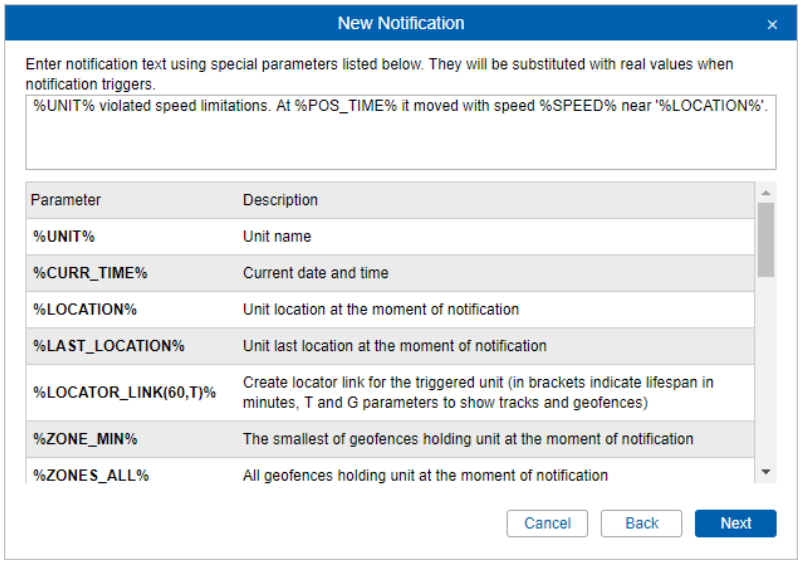
Text can be set for such actions as notify by SMS or e-mail, register an event in unit history, or display popup window online.

The text of a notification can be written in any language, contain any characters, words and phrases, and be of any size. Large messages are acceptable for e-mail notifications. Of course, for SMS notifications it is better to form more compact messages.

To be more informative, a notification should contain special parameters (tags) which are substituted with real values in an incoming notification.

Example.
The text *«'%UNIT%' violated speed limitations. At '%POS_TIME%' it moved %SPEED% near '%LOCATION%'»* can be transformed to *'Rover-119' violated speed limitations. At '2000-01-01 12:01:37' it moved 136 km/h near 'KU 8, Thurnau, DE'*.

Measurement units (kilometers or miles) used to decipher parameters depend on resource settings where the notification belongs. Date and time format are taken from the creator of this resource.



Below is the list of parameters applicable to most types of notifications:

%UNIT%	Unit name.
%CURR_TIME%	Current date and time.
%LOCATION%	Unit location at the moment when notification triggered.
%LAST_LOCATION%	Last known unit location (may be useful if there is no position in the triggered message).
%LOCATOR_LINK(60,T)%	Create locator link for the triggered unit (in brackets indicate lifespan in minutes, T and G parameters to show tracks and geofences).
%ZONE_MIN%	The smallest of geofences holding unit at the moment of notification.
%ZONES_ALL%	All geofences holding unit at the moment of notification.
%SPEED%	Speed registered at the moment when notification triggered (is not applicable to fuel fillings/thefts).

%POS_TIME%	Date and time of the triggered message or the latest message with position in case the triggered message has no position.
%MSG_TIME%	Date and time of the message triggered.
%DRIVER%	Driver's name (can be displayed only if the driver belongs to the same resource as notification).
%TRAILER%	Trailer's name (can be displayed only if the trailer belongs to the same resource as notification).
%SENSOR(*)%	Unit sensors and their values (indicate sensor mask in brackets).
%ENGINE_HOURS%	Engine hours at the moment of notification.
%MILEAGE%	Mileage at the moment of notification.
%LAT%	Latitude at the moment of notification (e.g., N 55° 45.7530').
%LON%	Longitude at the moment of notification (e.g., E 37° 35.2068').
%LATD%	Latitude without formatting.
%LOND%	Longitude without formatting.
%GOOGLE_LINK%	Link to Google Maps with the position at the moment of notification (e.g. http://maps.google.com/?q=55.762550N,37.586780E).
%CUSTOM_FIELD(*)%	Unit custom fields. If you leave the asterisk sign in the brackets, all accessible custom fields (both regular and administrative) will be shown with their values (in the format 'key: value'). However, you can get the value of a certain field if you specify its complete name in the brackets. In this case, the resulting notification text will contain the value of the specified field (only the value but not its name).

There are also parameters which make sense only with certain types of notifications:

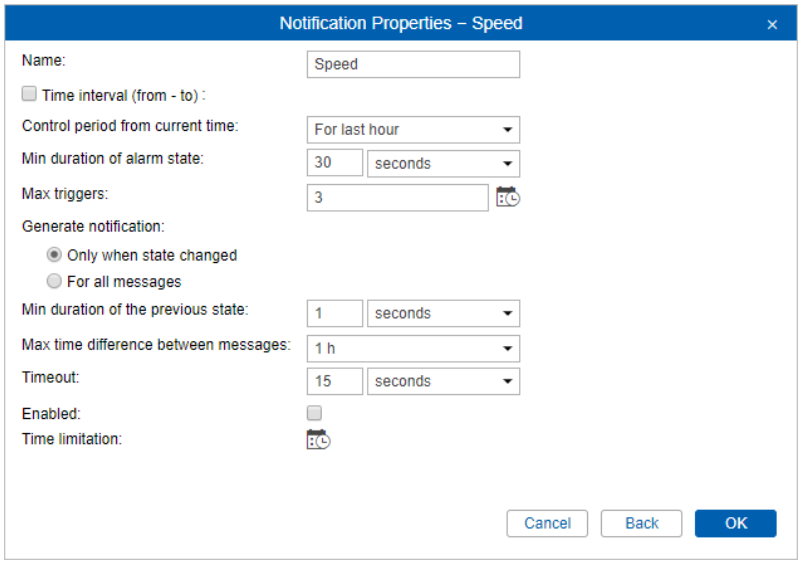
%ZONE%	The name of the geofence for which the notification has triggered (for the notifications of the *Geofence* type). In the text of the *Outside geofence* notification, the %ZONE% parameter is replaced with the names of the geofences (separated by a comma) which the unit entered at the time of the previous message and has already left. If there is no previous positional message or there are no geofences that satisfy the condition described above, the text of the notification shows only the name of there parameter (i. e. %ZONE%).
%SENSOR_NAME%	Triggered sensor name (used in various notifications).
%SENSOR_VALUE%	Triggered sensor value.
%SERVICE_NAME%	Service interval name (used in notifications about maintenance).
%SERVICE_TERM%	Service interval state — left/expired value (used in notifications about maintenance).
%TRIGGERED_SENSORS%	All triggered sensors and their values (used in notifications about maintenance).
%LOSE_RESTORE%	Connection loss/Connection restored (used in notifications about connection loss).
%PARAM_NAME%	Parameter name (used in parameter control).
%PARAM_VALUE%	Parameter value (used in parameter control).
%SMS_TEXT%	Text from SMS message (used in SMS control).
%VOLUME%	The volume of the fuel filling or theft (for the corresponding notifications).
%INITIAL_LEVEL%	The fuel level at the moment when the filling or theft began.
%FINAL_LEVEL%	The fuel level at the moment when the filling or theft finished.
%TIME_FROM%	The time when the fuel filling or theft began.
%TIME_TO%	The time when the fuel filling or theft finished.
%DURATION%	The duration of the fuel filling or theft (in minutes).
%DRIVER_ID%	Driver's code (used in notifications about drivers).

%DRIVER_NAME%	Driver's name (used in notifications about drivers).
%TRAILER_ID%	Trailer's code (used in notifications about trailers).
%TRAILER_NAME%	Trailer's name (used in notifications about trailers).
%OTHER_UNIT%	Name of another unit (used in notifications about interposition of units).
%ROUTE_NAME%	Route name (used in notifications of route control).
%ROUTE_STATUS%	Round execution status (used in notifications of route control).
%ROUTE_POINT%	Check point name (used in notifications of route control).
%ROUTE_SCHEDULE%	Schedule name (used in notifications of route control).
%ROUND_NAME%	Round name (used in notifications of route control).
%COUNTRY%	Country.
%REGION%	Region (state, etc.).
%CITY%	City (town, etc.).
%STREET%	Street.
%HOUSE%	House.

Note that a parameter must be marked by percent sign from both sides. Otherwise, it will be considered as plain text and will not be converted to real values.

Notification Parameters

The last page of the dialog window contains the parameters for triggering notifications. Their set may vary depending on the chosen notification type.



- **Name**
  The name of the notification.

- **Time interval (from – to)**
  Time interval is the period of notification validity. It is unlimited by default (the *Time interval* box is not checked). However, if it is necessary, any notification validity period can be set with an accuracy of minutes (check the box and indicate the required interval). Upon the expiration of the indicated time period, the notification will be automatically switched off (or permanently removed if the units mentioned in this notification do not exist anymore).

- **Control period from current time**
  This is the period between the time when the notification triggered and the current server time. If this interval is exceeded, the message is not taken into account.

- **Min duration of alarm state**
  This parameter is designed to exclude the cases of accidental notification trigger. For example, a tracker can show that a unit had left the indicated geofence but returned 10 seconds later. Set the interval in seconds, minutes, or days (select the interval type from the drop-down list). The maximum allowable value is 24 hours (1440 minutes, 86400 seconds). ! Minimum duration value is applicable directly to the main triggering condition (notification type) and does not influence the additional ones (speed, sensor value, etc.).

- **Max triggers**
  After reaching the maximum number of triggers specified in the field, the notification turns off automatically.
  It is possible to set time limitation for this parameter. To do it, press the icon and specify the restrictions. As a result, the maximum number of notification triggers will be applied only to the indicated intervals. In case there are several intervals, after reaching the maximum number of triggers in one of them, the notification triggers an unlimited number of times before the next tracking period starts.

Generate notification: (1) when the state changes, (2) for all messages
In the first case it is required for the unit not to be in an alarm state in the moment of notification activation. The state should change to an alarm for the notification to trigger. In the second case, the notification will trigger as soon as an alarm state is detected regardless of the previous state. If the second option is selected, the following parameters are irrelevant.

- **Min duration of the previous state**
  This parameter is designed to exclude excessive triggers. For example, a unit can return to the normal state for a very short period and then return to the alarm. This parameter is necessary for the notification not to trigger twice. Set the interval in seconds, minutes, or days (select the interval type from the drop-down list). Maximum allowable value is 24 hours (1440 minutes, 86400 seconds).

- **Max time difference between messages**
  When the system receives a message which is identified as an alarm (i.e. contains the parameters intended for notifications), the previous message is analyzed. If the time difference between the current message and the alarm exceeds the *Max time difference between messages* parameter, the notification does not trigger.

- **Timeout**
  The time interval after receiving the message, after which it will be analyzed. It is recommended to set a bigger time value if the device has a 'black box' which might require some time to unload all the messages stored during the period of communication loss (for instance, while it was abroad). Set the interval in seconds or minutes (select the interval type from the drop-down list). The maximum allowable value is 30 minutes (1800 seconds).

- **Enabled**
  This parameter determines whether the notification is active after its creation or editing or not.

- **Process LBS messages**
  If this parameter is checked, the system takes into account the location received with the help of the LBS detector.

- **Time limitation**
  It is possible to set limitations depending on time, day or month. For example, the control can be performed only on weekdays and within working hours. Click here to learn more about the parameters for jobs.

Notifications Management

On the list of notifications, you can get the following information:

Notification state: ✔ — enabled, ━ — disabled.
How many times a notification has already triggered.
How many units are under control of this notification (see the list of these units in the tooltip).

Control type	Action(s)
speed geofences alarm (SOS) digital input activation/deactivation sensor value parameter in a message connection loss idling SMS interposition of units address visit excess of messages fuel filling fuel theft route progress driver control trailer control maintenance (service intervals)	e-mail SMS online popup window mobile notifications sending POST/GET request sending event registration violation registration command execution modify users access level manipulate counters register unit status modify unit groups send a report by e-mail — icon change; create new round reset driver reset trailer 2, 3, etc. — if there are several notification actions chosen, a digital indicator shows the quantity of such actions.

Hover the mouse cursor over a notification to see detailed information in the tooltip: control type, parameters, actions, life time, max triggers, text, and resource (if available).

The following actions can be executed over notifications:

- ✔ / ━ enable/disable notification,
- enable/disable all notifications at once,
- edit a notification settings,
- create a new notification using this one as the basis,
- delete a notification.

If you have just view access to the resource where a notification is located, you cannot edit or delete it, and some buttons look different:

✔ / ━ you cannot change notification state,

- view notification properties (editing not available),
- impossible to delete the notification.

Using the dynamic filter, you can save your time when looking for a certain notification on the list. Enter notification name or its part into the search box above the list and estimate the results.

The other way to filter notifications can be used if you have access to more than one resource. Then, on the dropdown list, choose resource name to display only the notifications that belong to this resource. Note that if you have just view rights to a resource, you cannot edit or delete these notifications.

Online Notification

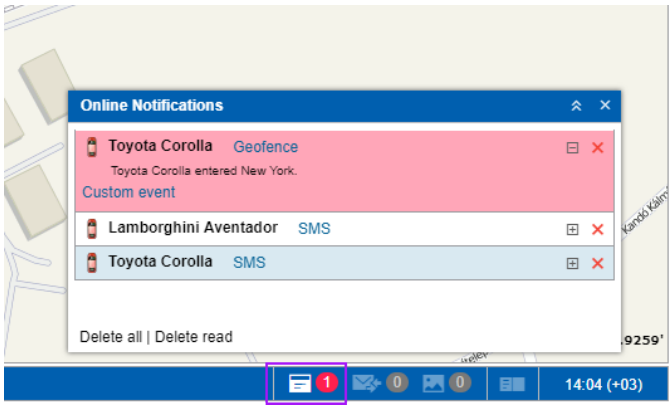
Online notifications receiving is regarded as one of the actions of informing a user on units' activity.

Online notifications can be received only by users authorized into the system on the moment of notification triggering. Online notifications are not stored into the system after a session's termination.

By default online notifications are displayed in the popup window upon their triggering. It is stipulated by the 'Automatically display popup events' flag indicated in user settings. To work manually with popup window, it is necessary to uncheck the above mentioned flag. It can be done by simply closing the window. Afterwards, to summon the window, you should click the corresponding button in the bottom panel. This button is also used as unread notifications indicator. Moreover, you can view a number of unread online notifications on your browser's tab.

Some actions available from the online notifications window:

- to center the map on the place of a notification triggering, click a notification name or text;
- to place the marker on the latest unit location, click unit name (this action will also add a unit both on the map and in the work list of the monitoring panel).



The system supports quick access to a custom event registration directly from the online notifications window. A notification's text will be used as a comment upon registering an event from the online notifications window. Afterwards, a registered event and its comment can be viewed in the 'Events' report.

Note.
Any user who has any access to a resource will get all online notifications created in this resource.

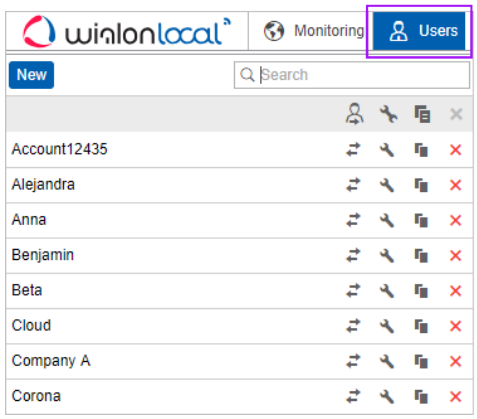
Note.
Online notifications can also be viewed in minimaps.

Note.
The system supports receiving browser push notifications. Their main advantage is that you can see a notification working on any tab of your browser, or even if a browser is minimized. You can enable browser push notifications in the dialog window which appears upon receiving the first online notification.

Users

User is a system object defined by its specific name (login) and password. Users can login to Wialon Local and control their units with the help of different tools and features. Different users can have different access to units and different set of allowed activities. They can create their own geofences, report templates, etc. non-visible to other users.

Working with Users



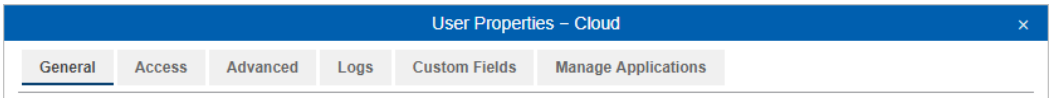
To work with users, open the *Users* panel, choosing a corresponding name in the top panel or clicking on the necessary item in the main menu customizer.

On the panel, there is a button to create new users, and a list of available users. For your convenience, the users are arranged by name. If there are many users, use the dynamic filter above the list to easily find them. Use buttons against each user to perform an action over a user:

— The button to log in as this user. It is disabled if you do not have enough access privileges.

or — Edit or view user's properties (depending on your access). User properties dialog can contain up to five tabs that were described above:

- General,
- Access,
- Advanced,
- Logs,
- Custom fields,
- Manage applications.



— Create a copy of this user.

— Delete user from the system. If the button is dimmed, it means you have not enough rights to delete it.

Application of Users

If you have access to several users, it affects system in whole. You can create objects under a selected user or within their account. As a rule, the information that a certain object (driver, geofence, unit, etc.) belongs to a certain resource or account is displayed in object's tooltip or properties dialog. Besides, in all panels containing filters, there is an additional filter by user/account (in the form of a dropdown list).

Actions of users in the system are logged. For instance, you can view user's (operator's) chat with driver, learn which commands were sent to units by this user, what alterations this user made to some object properties, what objects created, etc. This functionality is available mainly through reports.

In advanced reports on users you can create the most detailed tables on users' logins and logouts as well as get charts of their activity by hours and days.

Users' access to units can be changed automatically:

- with the help of the the appropriate job (for instance, you can allow access only during the working shift);
- with the help of the notification with the appropriate action (for instance, deny access when a route is complete).

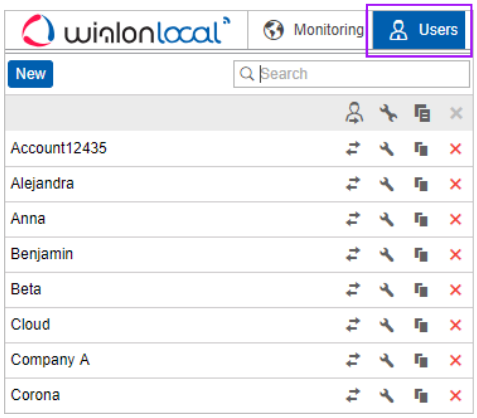
Individual settings can be transferred from one user to others.

Units

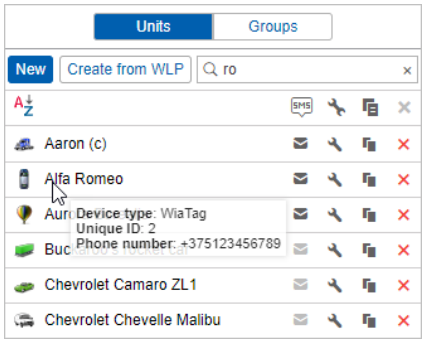
Unit is a vehicle, equipment, person, pet or any other moving or stationary object that can be monitored via GPS tracking system.

The *Units* panel provides the possibility to create (including creation from WLP), view, edit, copy, and delete units, export/import their properties and send SMS messages to them.

To work with units, open the *Units* panel by clicking the corresponding name in the top panel or choosing the corresponding item in the main menu customizer. Afterwards, choose a mode which allows you to work either with units or groups of units. Note that unit creation is available in the *Units* mode only, while other options can be used in the *Groups* mode as well.



Managing Units



To create a unit, click *Create*, fill in general properties, and click *OK*. The created unit appears in the work area. It also appears automatically in the work list of the *Monitoring* panel (in the group view mode) of the account it has been created in.

Units are listed in the alphabetic order. Each unit has an icon. To facilitate unit search, use dynamic filter. Such information as unit type, unique ID, and phone number(s) can be found in unit's tooltip. To do so, place a cursor on the unit. In order to view unit's tooltip it is necessary to possess the *Edit connectivity settings* right towards a unit.

The following icons are used to perform standard actions over units:

— Send SMS to unit's SIM card. It can be a command or other message. SMS icons are not displayed if this feature is not activated for the current user. If the icon is inactive, then there is no phone number indicated in unit properties or a current user has no enough rights towards a unit. If two phone numbers are given in unit properties, choose one of them when the dialog of SMS sending opens. More information about sending SMS messages can be found here.

— View or edit unit properties. To get the most efficient results both in reports and in online monitoring, unit should be set up correctly, in accordance with device type used, available sensors, and tracking tasks. Unit is configured in unit properties dialog that was described above. Depending on your access level, the dialog can contain up to 13 tabs which detailed description can be found in the following topics:

- General,
- Access,
- Icon,
- Advanced,
- Sensors,
- Custom Fields,
- Unit Groups,
- Commands,
- Eco Driving,
- Profile,
- Trip Detection,
- Fuel Consumption,
- Service Intervals.

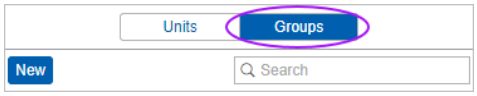
— Create a copy of this unit.

— Delete a unit from the system completely. If the icon is inactive, then you do not possess enough rights to perform such an action. Note that routes assigned to a unit are deleted together with it.

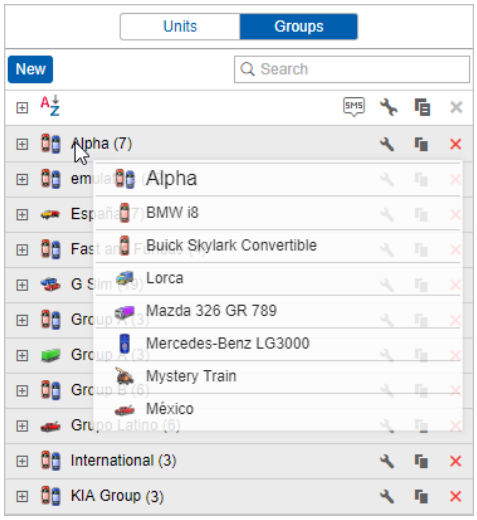
Unit Groups

Created units can be formed into groups. Groups are used to unite units on the basis of any criteria.

To work with unit groups, choose the corresponding mode in the *Units* panel.



To create a group, click *Create*, fill in general properties, choose units forming a group, and click *OK*. The group appears automatically in the work list of the *Monitoring* panel (in the group view mode) of the account it has been created in.



A list of unit groups created is displayed in the work area. Groups are listed in the alphabetic order. To the right of each group name you can see a number of units in it. To see names of units forming a group, place a cursor on the necessary group (names are shown in a tooltip). To facilitate a search of the necessary unit group, use dynamic search above the list.

The following icons are used to perform standard actions over units:

or — Edit or view unit group properties — depends on your access (change name, add more units, remove units, manage access, etc.). The dialog of unit group properties can contain up to 4 tabs which were described above:

- General,
- Access,
- Icon,
- Custom fields.

— Create a new group using this one as a basis (copy).

— Delete the group from the system. Deleting a group does not mean deleting the units included. If the icon is inactive, then you do not possess enough access rights to perform such an action.

Working with unit groups, consider some specific features of access rights:

- A group can be used to give a user access to several units at once.
- With groups, access to a unit can be widened but not narrowed.

- The creator of the group must have rights to units in this group. Otherwise, it would not be possible to transfer the rights properly.
- To add/remove unit to/from a group, you are required to have the *Edit ACL propagated items* access right towards this group.

Application of Unit Groups

Unit groups are widely used in the user interface of Wialon Local:

1. Online tracking of unit groups:
    - display/remove from the map a group of units with one mouse click;
    - send commands to a group of units at once;
    - observe a certain parameter (sensor value, movement state, etc.) for a group of units in one window.
      More information about work list management can be found here.
2. Advanced reports:
    - all tabular reports can be generated for a unit group;
    - draw tacks of all grouped units on the map.
      More information about the reports on groups of units can be found here.
3. Configuring jobs, notifications, and routes:
    - When configuring jobs, notifications or routes, they can be applied to a group of units at once, which accelerates the process.
      More information about job creation and edit can be found here.

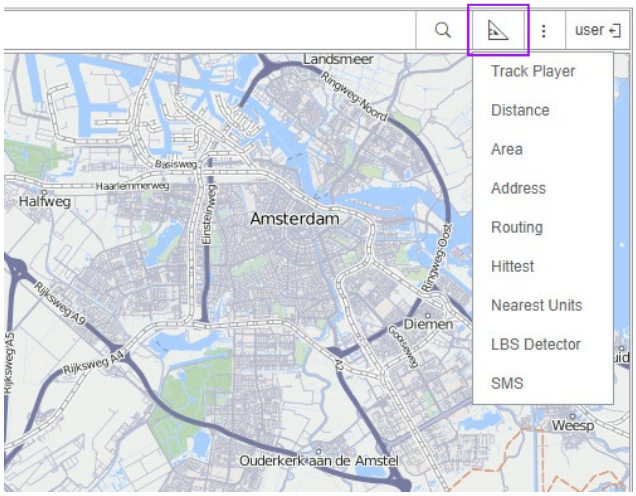
Unit groups also have some specific functions in the management system, which were described above.

At that, unit groups are easy to handle. Deleting groups does not mean physical removal of units belonged to this group. That is why you can easily create, manipulate and delete groups. Besides, the dynamic formation of groups is supported — see Notification Action. It means, if some preset conditions are met, a unit can be added to a group automatically or removed from it.

Tools

To find a necessary tool, open **Tools** dropdown menu, choosing a corresponding name in the top panel or clicking on the necessary item in the main menu customizer.

With a help of such features as *Track Player, Distance, Area, Address, Routing, Hittest, Nearest units, and LBS Detector* you can measure the length of polyline or just a distance between two points, measure an area of any piece of the map, find out the address of some place, get to know the shortest way to a certain destination point, analyze movement tracks, etc.



To get more accurate measurements, observe the following rules:

- To add a point, double-click on any place on the map;
- To insert a point, double-click on the segment between two points;
- To delete a point, double-click it;
- To change position of a point, click on it and holding the left mouse button drag to another place on the map.

To quickly access a tool, use shortcuts. Any tool can be minimized or closed with two corresponding buttons located in the upper right-hand corner of the window of each tool. Besides, these windows can be dragged over the screen. Their custom position is stored (for each tool individually), and next time they will be opened in the place they were closed the previous time.

Measurement system applied to tools which require online calculations (such as Distance, Area, Address, Routing, Nearest units) is taken from the settings of current user (see User Settings). Measurements for tools associated with track processing (such as Track Player, Hittest) are borrowed from units' properties.

Find detailed information about each tool:

- Track Player
- Distance
- Area
- Address
- Routing
- Hittest
- Nearest Units
- LBS Detector

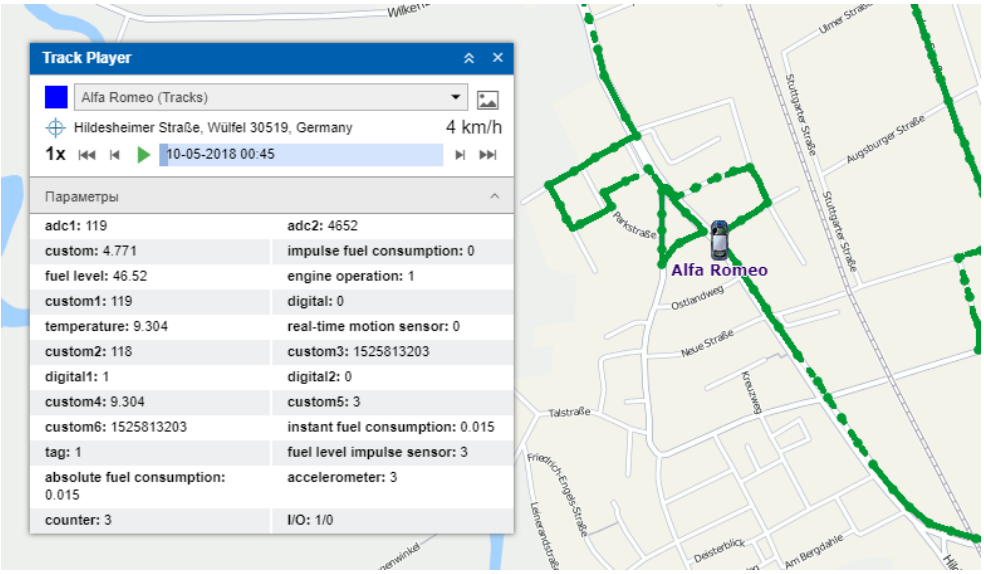
- SMS
- Search on Map

Track Player

The *Track Player* tool allows viewing how unit was moving and how its various parameters were changing with time. The tool can be applied to tracks only. There are four ways to get a track on the map:

1. In the Tracks panel, it is possible to request tracks of unit movements for any period of time.
2. In the Messages panel, while viewing messages for the indicated period, the track is mapped automatically.
3. In the Reports panel, while generating a report the track is mapped if the corresponding option (*Trip routes* or *All messages on map*) is activated in report template.
4. Tracks can be built directly from the Monitoring panel with the *Quick Track* button.

The most recently built track (in any panel) becomes selected in the Track Player automatically. However, you can switch tracks manually choosing them in the dropdown list. A track name coincides with the name of the unit, and the panel where the track was built is specified in brackets (Tracks, Reports, Messages).



Player Settings

Adjust appropriate **playback speed** using the speed slider bar. It can vary from real time speed (1x) to acceleration by 1000 times (1000x). Regardless selected value, messages with zero speed and no movement will be played at maximum velocity. If you change playback speed while playing a track, new value will be applied after you press *Pause* and then *Play* again.

Note.
Playback speed is a rather conventional thing. Playback performance depends on type of browser used, computer processing power, number of messages in the track, and time intervals between messages. It is likely that the track will be played more slowly than you expect because, in any case, all messages will be played even if it takes more time.

The **map** can be moved manually or automatically. This setting is adjusted with the switch button . If it is disabled, the map can be moved only manually. If it is active, the map is moved automatically in the following cases:

- along with the unit, while playing a track;
- when locating initial and final position in the track with special buttons;
- when moving along the track point-by-point manually;

- when navigating the track by clicking on different places of the timeline;
- when choosing a new track in the dropdown list (the map is moved to the first point of the track).

If the device used is able to send **pictures**, they can be displayed, too. This option can be disabled though — use the switch button .

Playback

To start playing the track, press the *Play* button . At this, it transforms to the *Pause* button, which can be used to stop playback. If after a pause playback is started again, it continues from the place it has been stopped the previous time. There is a similar button in the Tracks panel, against each track on the list. When the playback is completed the unit stays in the point of its last location, and the button changes from *Pause* to *Play*. If you click this button once again a time scale will be set to zero, and a track will be played from the very beginning.

As messages are being played, the selected unit is moving over the map. It can be represented by its icon or movement state signs. It is also convenient to use rotating icons — see Unit Presentation on Map. A unit being played is easily distinguished from the real unit by the color of its name — purple for playable units, red for real units. While playback is performed, the real unit temporarily disappears from the map.

While playing, address and speed of each point are displayed above the timeline. Below the timeline, you can track also changing values of parameters and sensors (visible sensors only). Expand two below sections to see their full contents. There can be a great number of parameters and sensors and you may want to single out those you want to track during playback. Double-click on necessary items to move them to the main section of the player (right below the timeline). Then you can collapse sections with all parameters and sensors.

As a track is played, all data in these sections is refreshed dynamically according to message being played at the moment. If there are images in messages, they popup in corresponding places, too.

Track playback can be invoked from any message. Navigate throughout the track by clicking on any place of the timeline or track itself. Besides, you can use the buttons:

- — go to first point (accompanied by the marker on the map),
- — go to last point (accompanied by the marker on the map),
- — move to next point of the track,
- — move to previous point of the track.

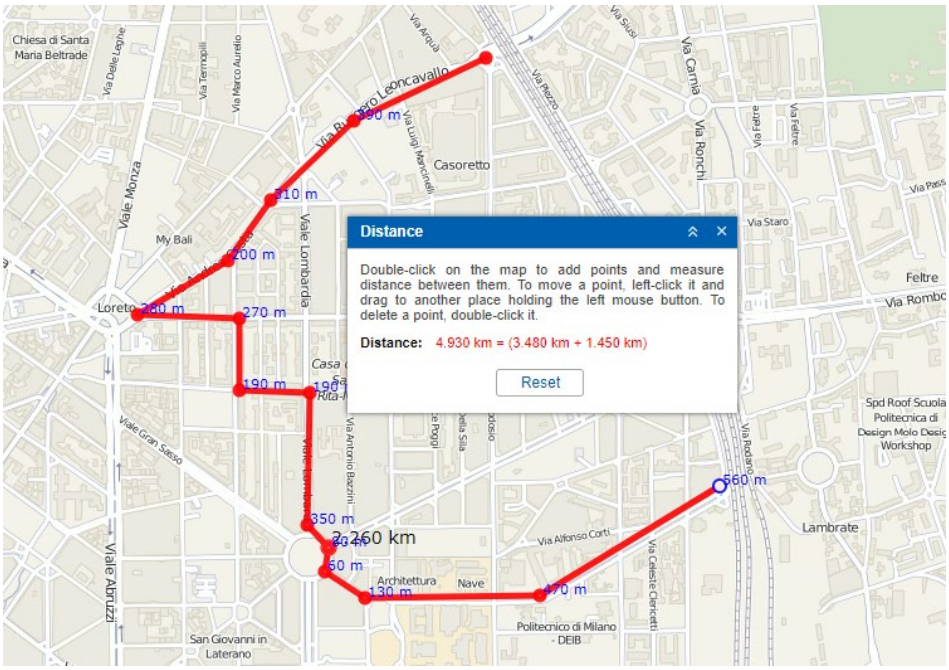
Tracks can be also played in a special app — Track player. This application allows playing tracks of several units at once.

Distance

The *Distance* tool is designed to measure the distance between two objects. To indicate the initial point, double-click on any place of the map. Then sequentially add new points. At any moment, you can move the map or zoom it using any of ways described above.

Near each point, the distance from the previous point is indicated. The total sum of all segments is known from the popup window in the corner. To know the sum, the mouse pointer must be placed over the last point of the polyline. Unlike other points that are red, it is white with blue border. If the cursor points some other place, the total sum will also include the distance to the current cursor position. At the same time, in brackets two numbers are given: the sum of all segments drawn + the distance to the cursor (if the cursor is over the last drawn point, this distance is 0m).

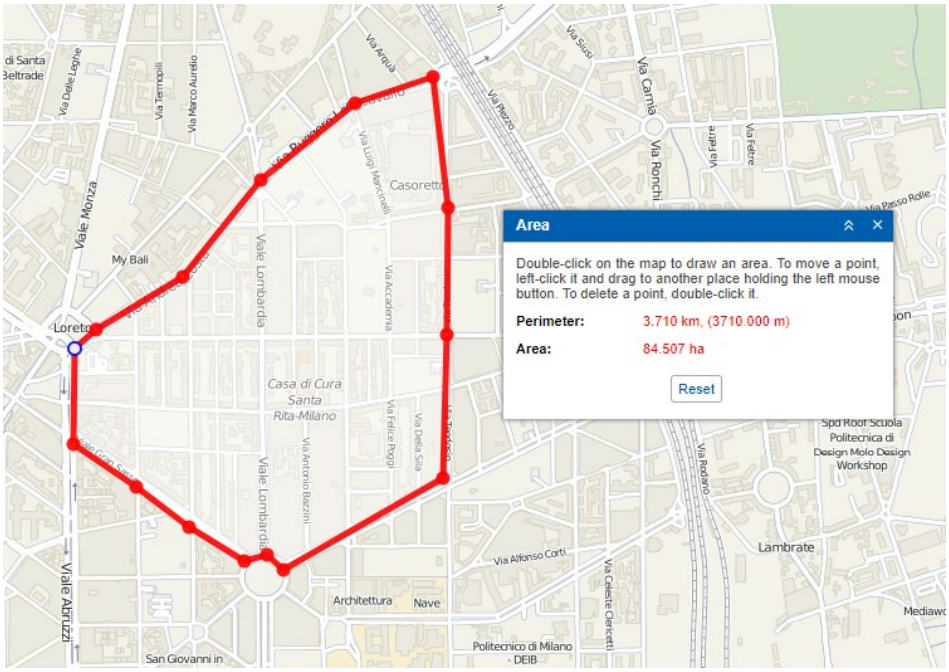
When the line is on the map, move the cursor along the line to get the distance from the starting point to the current cursor position. Cursor position is marked by a white point (if put the cursor over, it becomes plus-shaped), and a black font is used to display distance value.



To clear the map and start new measurements, use the *Reset* button.

Area

The *Area* tool is designed to measure the perimeter and total area between the objects. To draw a polygon, follow the same directions as for polyline creation. The perimeter and total area are indicated in the instrument's window.



Note that for users with metric system of measurement the area value is given in hectares, for users with U.S./imperial — in square miles and square feet.

Use the *Reset* button to clear the map and draw a new area. To close the *Area* tool, click the cross in the upper right corner.

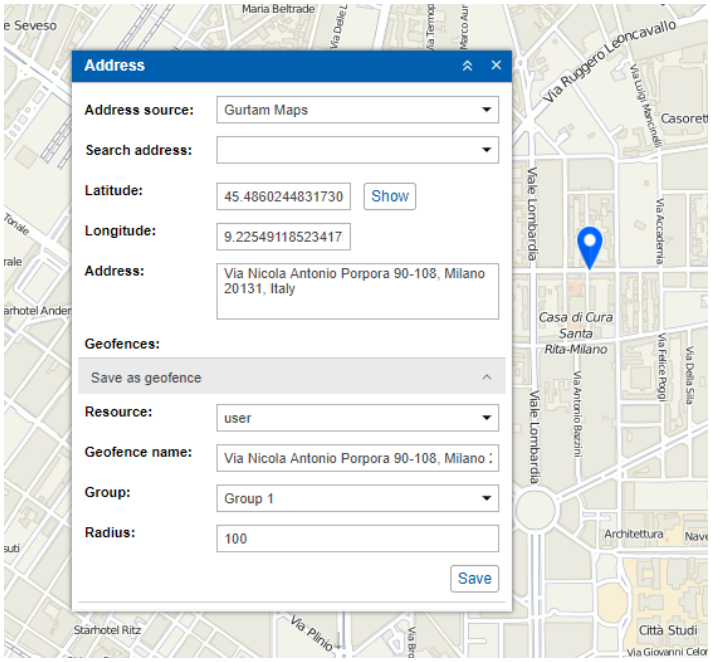
Address

The *Address* tool is designed to:

- search for a place on the map: after entering the address, the map is moved to the specified place;
- address definition: double-clicking on any point in a special window displays the address information for the specified location.

Select *Tools* –> *Address* on the menu to make use of the tool.

The default provider for address information is Gurtam Maps. Though you can choose another source (depending on maps activated and their support): Google, Yandex, Visicom, Luxena, what3words, etc. (see Map Source).



If *City* parameter is set in the User Settings, then when the address tool is loaded, this city is selected by default, and you only have to enter the street and the house.

Search by Address

Start entering address details into the *Search address* field and choose the appropriate matching from the appeared address list. If nothing is found try to rephrase your request. A found place is indicated on the map with the blue marker.

The window of the *Address* instrument displays such information as coordinates and address (if available). If the location gets into any geofences, their list is displayed in the *Geofences* field (the square with its color is displayed to the left of the geofence name), indicating the distance to them (if the Distance from unit to geofence option is activated).

If you have moved the map or scaled it, you can reset changes pushing the *Show* button.

Address Detection

Double-click the point on the map whose address you want to receive. After that, the latitude, longitude and address of

the specified point appear in the corresponding fields of the *Address* tool. The dot itself will be indicated on the map with a blue marker. If this place falls within the scope of some geozones, then their list is displayed in the *Geozones* field (the square with its color is displayed to the left of the geofence name), indicating the distance to them (if the *Geozone search radius* option is activated).

The address can also be determined by coordinates. Enter the latitude and longitude in degrees and degrees from the degree (they need to be separated by a dot) and click *Show*. The map will be centered around this place, and it will be marked with a marker. The available address information and geozones will also be shown.

To know address of a point on the map, just double-click on it. See the address and coordinates in the instrument's window. If it gets into any geofences, they will be listed below.

It is possible also to detect address by coordinates. Input latitude and longitude in grades and fractions (they should be separated by a dot) and push the *Show* button. The map will be centered at this point.

Save as Geofence

The found place can be saved as a circle-shaped geofence. To do so, there is the *Save as geofence* section at the bottom of the *Address* window. Unfold the section by clicking on it. Here the following parameters are indicated: resource (can be chosen from the dropdown list), geofence name, group (to include the geofence in an existing group) and radius.

To save the geofence, click the corresponding button. The saved geofence becomes available for viewing and editing on the *Geofences* tab.

Routing

The *Routing* tool tool helps to quickly make routes from one point to another visiting any number of intermediate points. You can define the sequence of points yourself or the program will optimize it for you. You can indicate key points double-clicking on the map or entering needed addresses. Resulting route can be either saved as a geofence with or without control points, or a route, and can be used for routes control or geofences control later on.

Choose *Tools –> Routing* to make use of this feature. Set points and click *Calculate*.

Provider Selection

Gurtam Maps is a default cartographical service for making a route. Besides, depending on the maps available at your service, other map providers can also be used: Google, Yandex, HERE, etc. However in this case the order of points should be chosen manually (or previously determined using Gurtam Maps). Some providers offer additional options. For example, if Google is selected, the route can be mapped regarding the way you travel: by car (default option), or walking, or avoiding highways (tick the appropriate check box). Yandex adds possibility to take into account traffic jams.

Points Placement

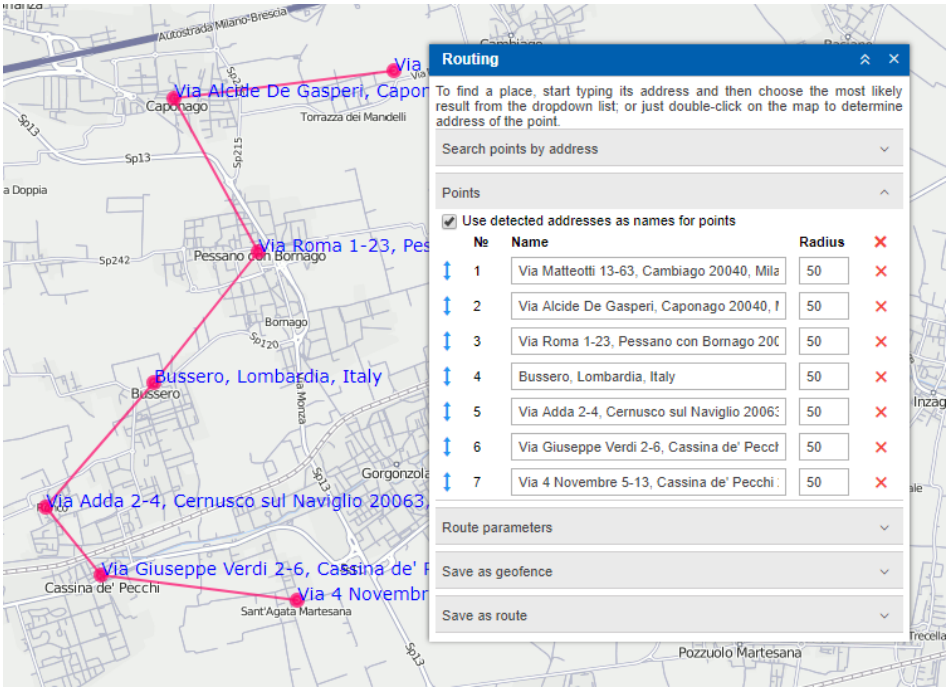
There are two basic ways to set key points for route:

1. *With the mouse*.
   Just make several double-clicks on the map to mark key points. If the option *Use detected addresses as names for points* is enabled in the *Points* panel, then address information is set as point name. If no address information is available, the point is added anyway but with empty name.
2. *With the address tool*.
   In the *Address* panel indicate addresses to be visited (city, street, house). The usage of the Address tool was described in details in the previous section. The found points can be added to the route automatically (if the box *Auto save of points* is checked), or manually (with the *Add point* button if the box is not checked).

Note.
If you are going to use this route for Route Control, it is recommended to enter departing point as the first point of the route.

When all points are set, it is possible already to draw the route (the *Calculate* button). However, before doing that, you can edit key points, especially if you are going to save this route as geofence or as a route.

The list of points is displayed in the *Points* panel. Here you can edit point name, its radius, and delete unnecessary point.



Route Calculation

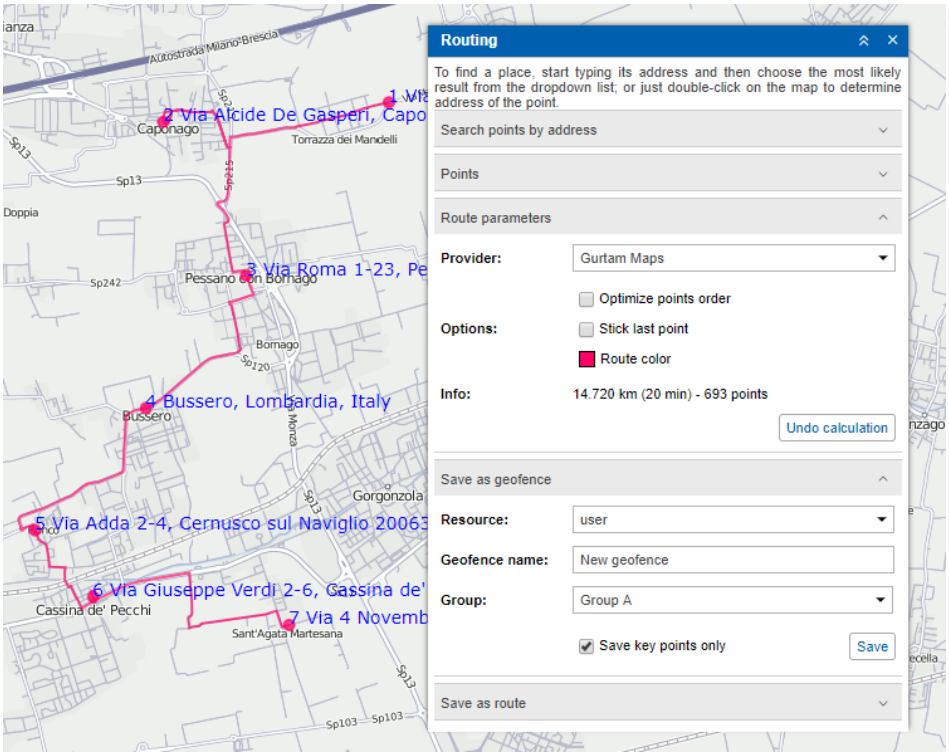
Upon building a route with Gurtam Maps, different sequence of route points may be used:

- Default option is that the points follow in the order you put them.
- To build the shortest way of passing route points, enable the *Optimize points order* checkbox. In this case the 1st route point is fixed, and a route is laid without snapping to roads. The last point can be fixed either (for example, if a unit leaves the depot and after a while comes back), therefore regardless to the sequence of route passing, the last point indicated is the last route point as well. For this, enable the flag *Stick last point*.

At the end, click the *Calculate* button and estimate the result. If you need to change some parameters (for example, add more points), click *Undo calculation*. If you want to build a new route, remove all points using the corresponding button special button (on the *Points* tab of the instrument).

In addition, you can choose line color as well as view information about a route — its length, approximate route duration, and number of points.

If the calculation is made using routing, then the route will be built considering the existing roads. Gurtam Maps is supported as default routing provider for this instrument.



Saving as Geofence or Route

After the calculation and visualization has been done, the result can be saved either as a line-shaped geofence or as a route. Geofence saving section is automatically opened after calculation by default. Here you should enter the geofence name, choose a resource and a geofence group (if you want to include the created geofence in an existing group) and click the *Save* button. There are two variants for saving in this section:

- If the *Save key points only* box is checked, a geofence corresponds to a line going straight through the key points;
- If the flag is not activated, then geofence corresponds to the full line of a route (can contain any number of points).

The newly created geofence appears on the Geofences panel where it can be edited and used for different purposes.

As it was mentioned before, the result can also be saved as a route. To do so, it is necessary to unfold the corresponding section, indicate a name for the route, and click *Save*. The created route appears in the Routes panel where it could be edited or used.

To build a route, you can also make use of a specially designed app — Delivery Service.

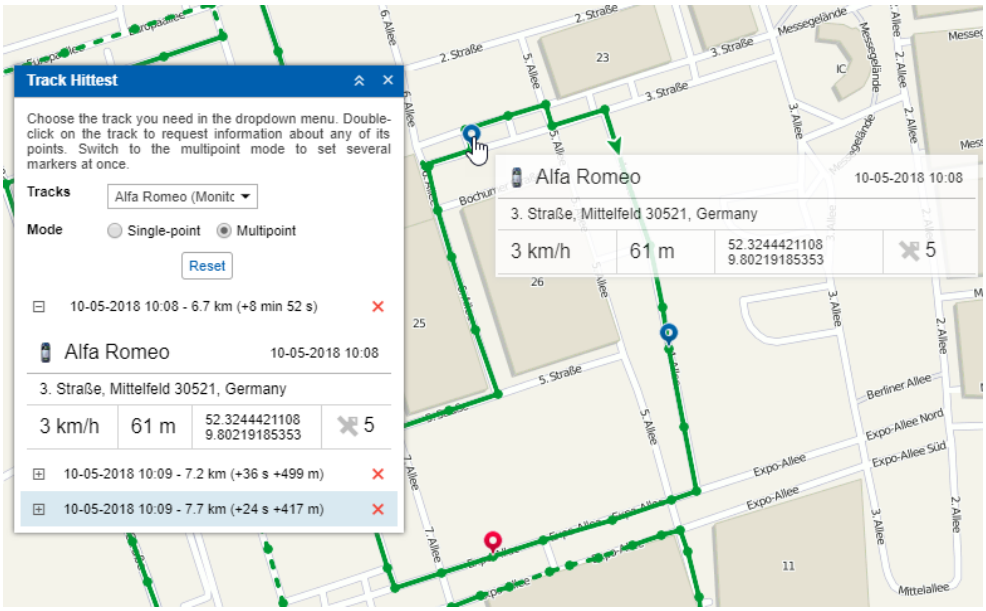
Hittest

The *Hittest* tool is applied to tracks only. There three ways to get a track on the map:

1. Open the Tracks panel and request tracks of unit movement for the indicated period.
2. In the Messages panel, while viewing messages for the indicated period, the track is mapped automatically.
3. In the Report panel, while generating a report the track is mapped if the corresponding option (*Trip routes* or *All messages on map*) is selected in report template.
4. Tracks can be built directly from the monitoring panel with the *Quick Track Building* button.

When you hover the mouse cursor over the track, the nearest point of the message is searched. If such a point is within a radius of 50 pixels, then it is indicated by a pulsating circle, and the pop-up window displays information: the time of the message arrival, the speed of the unit's movement at that point, coordinates (+ number of satellites), altitude, sensors. Information from the pop-up window can be highlighted and copied to the clipboard.

Double-click anywhere on the track (or even on the map), and the message closest to that point will be found and immediately highlighted with a marker. The map will be centered on this point. Depending on the mode (single point, multipoint), you can obtain information about one point or several.



When you hover the cursor on the marker, in the pop-up window you can get detailed information on the message: time, position, speed, altitude, coordinates, satellites, sensor values (only *visible* sensors). The same information is also duplicated in the table on the right side of the screen. In addition, the shift from the starting point of the track (distance and time) is indicated there.

If multipoint mode is selected, several points can be marked on the track at the same time. The active (selected) point is highlighted with a blue marker, the remaining points are highlighted in red. In addition, the active point is highlighted in blue in the table. Either click on the marker of the point or the required line in the table to navigate between points. The table shows the distance from the starting point of the track, and in parentheses — the shift in time and distance from the previous set point.

Nearest Units

The *Nearest units* tool is designed to help you to find units which are the nearest to a certain place according to their last message.

Select *Instruments* –> *Nearest Units* on the menu. In a special window set the parameters of your request and observe search results.

Request

There are two ways to indicate a place:

1. Double-click on the map in this place.
2. Enter address in the *Search* field and then choose the most likely variant below.

In the selected place, a red marker appears, and at the bottom the list of nearest units is displayed.

If in User Settings the parameter *City* is set, then the city/town is already specified when you open the tool.

Note.
Only Gurtam Maps can be used for address detection.

Additional Parameters

Several additional parameters can be applied to the search:

Number of units to show
5, 10 or 20 units can be shown (choose the number from the dropdown list).

Consider routing
When choosing this option, the distance from the indicated place to a unit is calculated not directly but taking into account existing roads. Moreover, enabling this option you can not only receive the distance between the indicated point and a unit, but also time which is necessary for covering this distance.

Routing provider
By default, it is Gurtam Maps. However, in can be Google, Yandex, Visicom, and HERE as well.

Geofence
Any geofence can be selected as district limitation. The filter by geofence is applied to found results only. This feature is designed to exclude from search results the units which are far away from the indicated place.

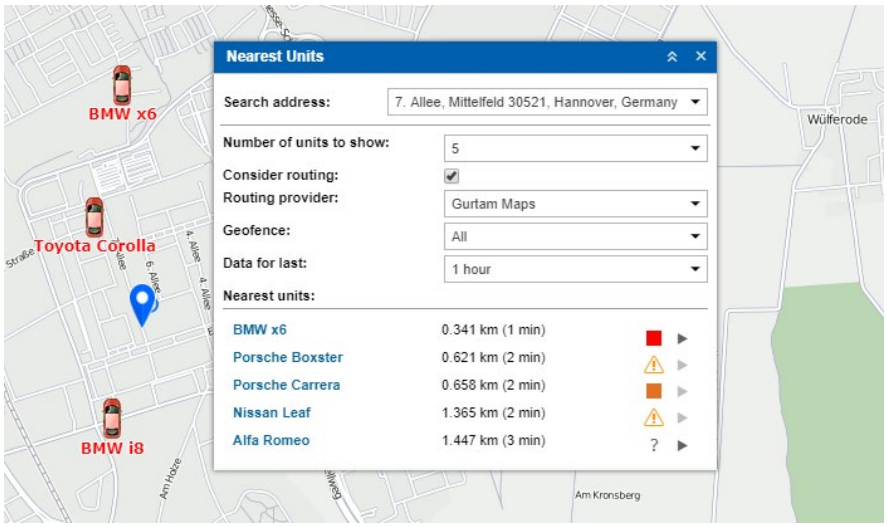
Data for last
Units which have not been sending messages for a long time can make difficulties for locating nearest units. Then it is handy to narrow the search interval: for last 5 or 30 minutes, 1, 6, 12 or 24 hours, or set *Anytime* (no limitations). If unit last message does not get into the specified interval, this unit will not be considered.

Search Results

Search results are presented at the bottom of the window as a list of units. There you can see the following information:

unit name (click to focus the map on unit),

- driver's phone number (if any driver with indicated phone number is bound to unit),
- distance to the indicated place (if routing is applied, the first number stands for a distance considering routing and the number in brackets stands for the time necessary to cover this distance, if available),
- sensor state indicator (adjusted on the Advanced tab of unit properties),
- buttons to send commands to unit (including messages to driver).



If you are not satisfied with search results, please, check your work list because the search of nearest units is performed on the basis of units displayed on that list.

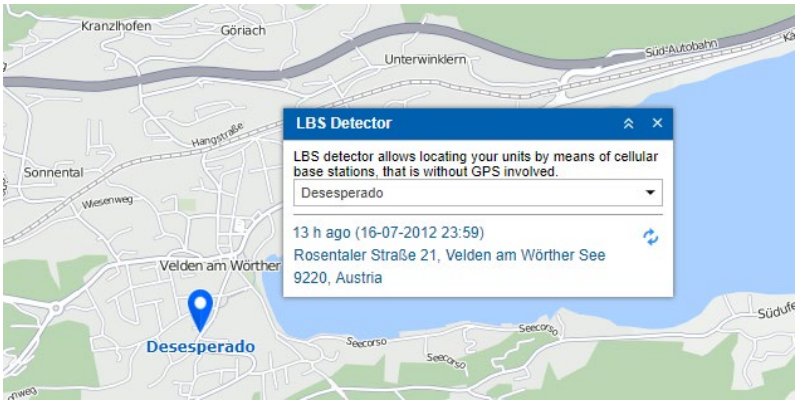
LBS Detector

The *LBS Detector* is a tool which helps to detect unit's location on the map using mobile network.
Note that this instrument enables to determine a location of the nearest base station only. So, the knowledge of the base station location implies the unit is nearby.

Choose the corresponding item in the instruments menu to open the *LBS Detector*. The further actions are listed below.

Working with LBS Detector

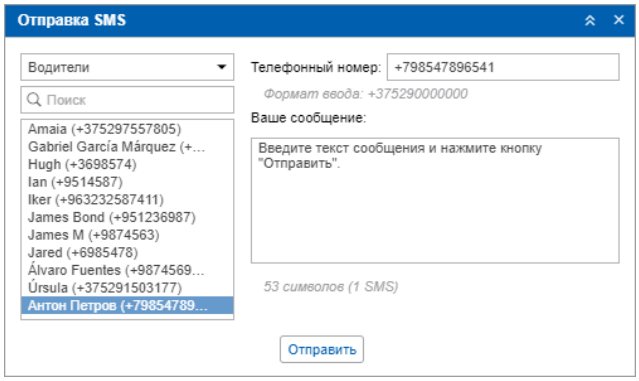
Choose a necessary unit in the dropdown list. Its contents depend on the work list of the Monitoring panel and access to those units (*Query reports or messages*). Besides, the list contains only the units with corresponding parameters.



After the unit is chosen, a search starts automatically. Then the map is centered on the found location identified with the blue marker. Also, unit's name can be enabled/disabled below the marker by pressing the corresponding button in the bottom panel. Moreover, the window of the LBS Detector shows such information as time of defining the latest location and its address. To the right of this data there is a *Refresh* button pressing which the location information will be updated.

SMS

SMS messages can be sent to drivers, units, and to any phone number. SMS dialog is accessible in the Monitoring, Units, and Drivers panels, as well as in the Tools dropdown menu. The buttons are not shown if the current user does not have enough rights to send SMS messages. Besides, to send SMS to a unit, the user is required to have the right *Edit connectivity settings* to this unit.



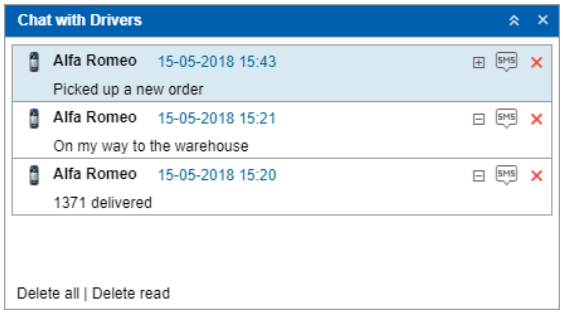
In the dropdown list *Drivers/Units* select addressee. Below you will see the list of objects of the selected type, but only objects that have a phone number in their properties. This phone number is displayed in brackets after object's name. If a unit has two phone numbers, such unit is displayed on the list twice — with each number. To quickly find a needed object on the list, use the dynamic filter.

On the right of the dialog, the phone number of the selected item is displayed. It is taken from the object's properties. However, you can input any other number in international format.

As you type your message, below you can see the number of symbols used and the number of SMS messages that will be needed to send your message. Remember that letters of the Latin alphabet are optimal.

After you have typed the text, press *Send*. After that, in the dialog as well as in the log there will be a record about how successful the operation has been.

A driver can send SMS to a dispatcher from his phone. This phone number must be indicated in driver's properties. Drivers' messages appear in the log and popup in a special window (the same as for drivers' messages sent from a device in the form of a command). Besides, if there are unread messages, the number of them is shown in red circle next to the chat icon in the bottom panel. To reply to an SMS, click on the *SMS* button against the message.

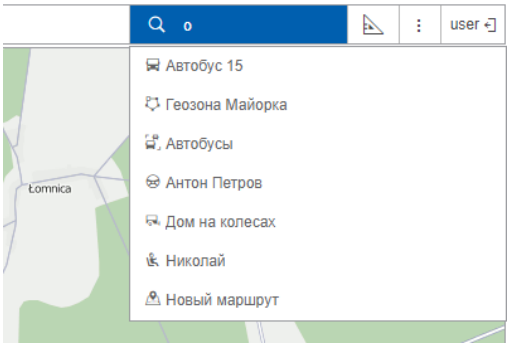


SMS chat of a dispatcher with a driver can be shown in a special table called SMS.

Correspondence with driver can be also fulfilled with the help of a specially developed app — Chatterbox.

Search on Map

In the top panel to the left of the user name there is the *Search on Map* tool (search icon). This tool is used to dynamically search the necessary item by its name. The search is made among units, geofences, unit groups, drivers, trailers, passengers, and routes. Moreover, if the names of the above mentioned items do not contain indicated symbols, then addresses corresponding to the entered filter are shown (search is carried out only by Gurtam Maps, regardless of the selected geodatabase).



Search Process

Click the corresponding icon in order to use the *Search on Map* tool. In the appeared field enter a search filter (type in symbols of a desired item's name). Moreover, searching a unit you can enter its unique ID, as well as registration plate or VIN number indicated on *Profile* tab of a unit properties dialog. Upon entering the first symbol the list of the items corresponding to the filter appears below. Items in the list are displayed using their names, and icons specifying their type. If lots of items correspond to the indicated filter, then the list will contain single result for each item’s type.

Switching to the Item on the Map

Click on the necessary item in a search list in order it to be shown on the map. The alternative way to do this is to use up and down arrow keys and *Enter* on the keyboard. The map is centered on the chosen item. Moreover, the map is scaled in such a way that the chosen item gets into the vision field. After you choose the item in the list, the search tool is folded up.

Apps

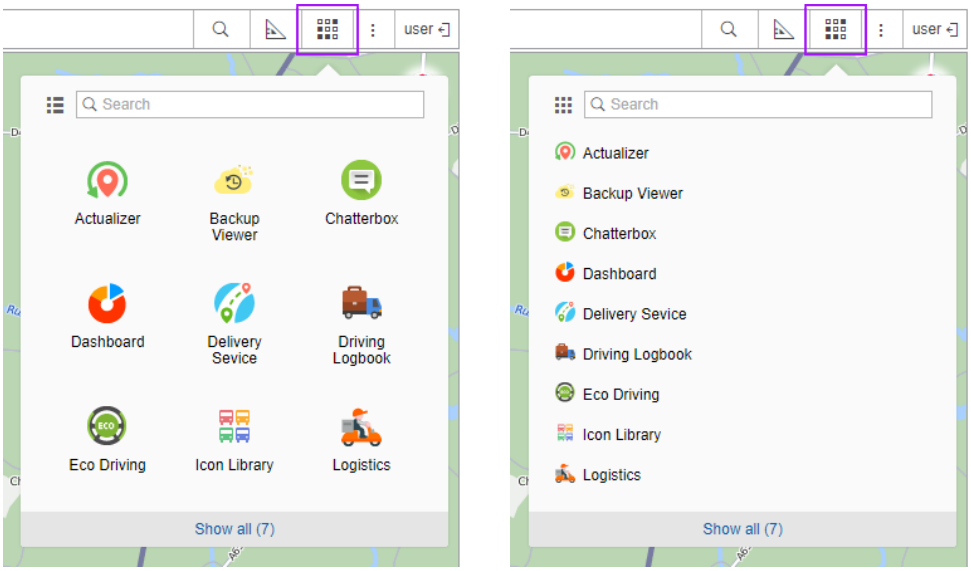
Along with the basic features of Wialon Local, you can get access to additional applications. Those applications can be highly customized reports, specialized tools, or just a calculator.

Applications are implemented and added by the administrator of your tracking service. More information about app can be found here.

To open the *Apps* menu, choose the corresponding icon in the top panel or click the necessary item in the main menu customizer.

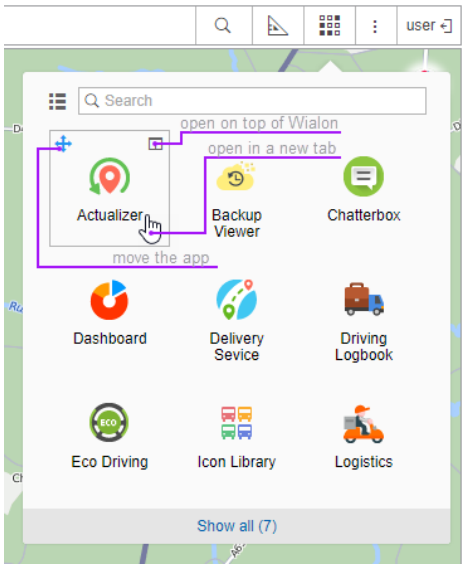
The appeared menu contains the list of available applications. In its upper part there is a dynamic filter; in the lower — the *Show all* button (the number of hidden apps is shown in parenthesis).

Using the buttons / in the upper left corner of the menu you can change its type. There are two options: grid and list.



The applications are arranged in alphabetical order by default. You can change their positions in the menu using the arrow-shaped buttons that appear when hovering over the name of an application in the list. The option is available in both modes (grid and list). Click the left mouse button on such arrow and, while holding it, drag the application to the place you need. If you open the menu later, the order of applications you have set up will be saved. New applications will be added to the end of the list.

An application can be opened either in a new tab of the browser or in a separate window over Wialon Local. To open an application in a new tab, click its logo (name). In order to open it over Wialon Local, use the button which appears when hovering the cursor over the app logo.

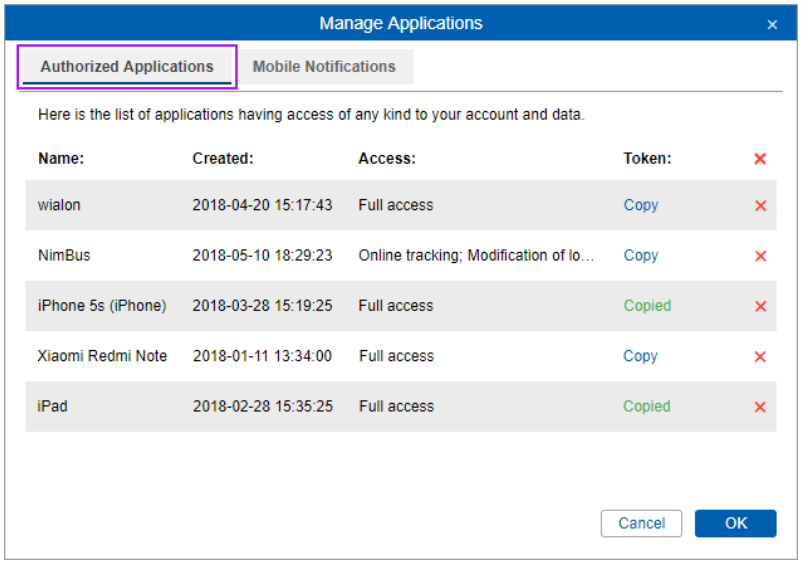


You can open any number of apps simultaneously. The windows with applications can be dragged over the screen, resized, and closed down.

Manage Applications

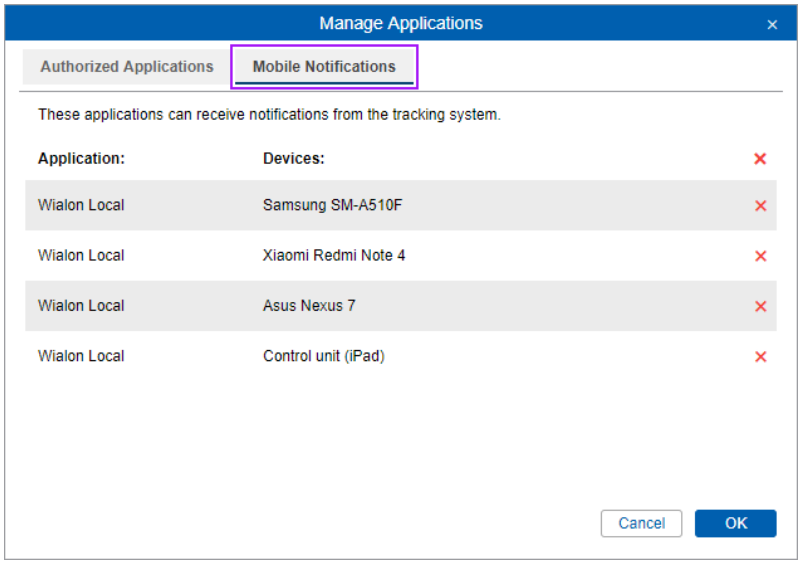
Authorized applications

This tab shows the list of applications, which have access to your account data. For each application, there is the following information: its name, the date and time of the token creation, and the access rights which it has towards the account. To copy the token, click *Copy* in the line of the required application. It will be saved to the clipboard. To prevent the application from accessing the data, remove it from the list by pressing the ✕ button at the end of the line. Press OK to save the changes.



Mobile Notifications

This tab contains the list of applications which are allowed to send notifications to your mobile devices. To the left there is an application name, to the right you can see a device type. To prevent the application from sending mobile notifications, remove it from the list (✕).



Wialon on Mobile

You can track your units not only from a full-sized desktop computer but also from a smartphone, tablet, and other mobile devices. The interface is adapted for such cases. Moreover, a special mobile application for Android and iOS is available as well as two previously developed web applications.

- **Wialon Mobile Client**
  - Login and Authorization
  - Settings
  - Units
  - Map
  - Tracking
  - Notifications
  - Commands
- **Wialon Mobile v2**

Wialon Mobile Client

Wialon Mobile Client is an application providing you with the basic Wialon Local capabilities on your mobile devices. Wialon Mobile Client is available for both Android (smartphone) and iOS (smartphones, tablet computer) platforms.

The set of Wialon Mobile Client functionality amounts to the following: tracking of unit location and moving state (trip, stopping, parking), controlling ignition state (on/off), monitoring data actuality (time passed from the last message received) and latest events (trip, parking, fuel filling/theft), as well as sending several commands.

The Wialon mobile client is available on two platforms: Android (smartphone) and iOS (smartphone, tablet).

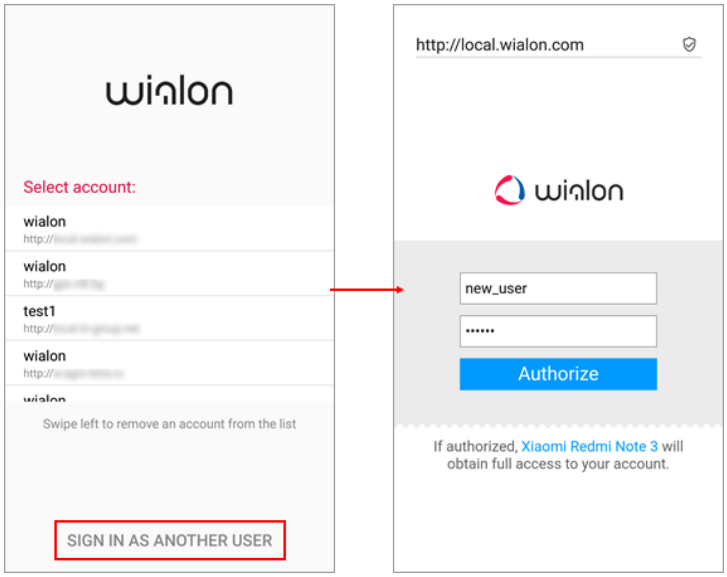
Further information:

- Login and Authorization
- Settings
- Units
- Map
- Tracking
- Notifications
- Commands

Login and Authorization

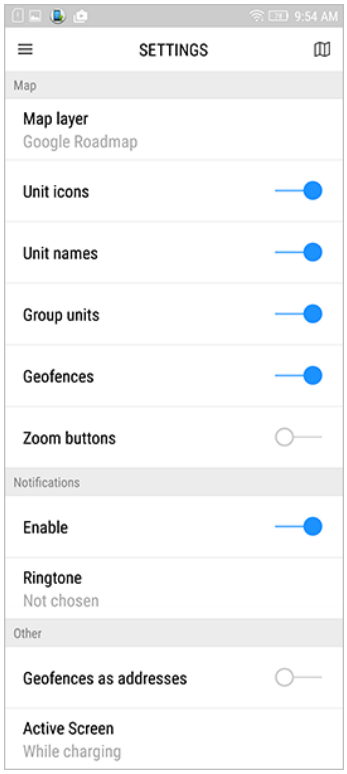
To work with the application, select the required account from the list on the main page.

If the account is not on the list or the list is empty, you need to go through the authorization process. To do this, press *Sign in as another user* (or *Sign in* in case the list is empty), specify the server address with the protocol (http or https) and click the icon at the end of the input line. In the opened window, enter the user name and password and tap *Authorize*. If the authorization is successful, you will be redirected to the page with the units available for monitoring.



To remove an account from the list, swipe it to the left and confirm the deletion.

Settings



To work with the Wialon Mobile Client settings, go to the side menu (tap a 'hamburger' in the top left corner of the bar or swipe the screen to the right), and select *Settings*. Here you can indicate settings for a map, notifications, etc.

Map

- Map layer — select a map to work with: Gurtam Maps, OpenStreetMap, Google Roadmap, Google Satellite, Google Terrain, Google Hybrid, Mapbox Streets, Mapbox Satellite, Mapbox Satellite Streets. Mapbox maps are available only for the Android version of the application.
- Unit icons — enable/disable displaying of units' icons on the map.
- Unit names — enable/disable displaying of units' names on the map.
- Group units — enable/disable displaying of a grouping icon when units are clustered on the map.
- Geofences — enable/disable displaying of geofences on the map.
- Zoom buttons — enable/disable displaying of scaling buttons on the map.

Notifications

Enable/disable receiving of mobile notifications and choose a notifications ringtone. Note that to receive mobile notifications, it is necessary to configure their sending in Wialon Local. In other words, it is necessary to create a new notification in the corresponding panel of the monitoring system and select *Send mobile notification* as a way of notification action.

Other

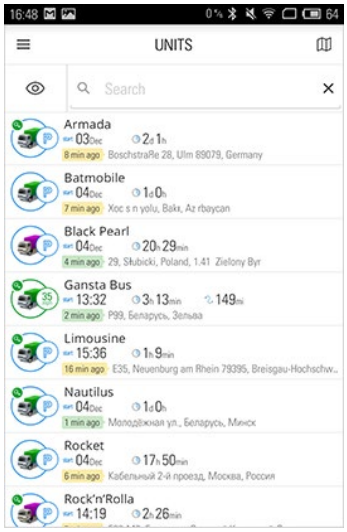
Geofences as addresses — enable/disable the substitution of address information with unit's presence in geofences.

Active screen — here you can adjust a period of time during which your screen to be active. The following variants are available:

- While charging — the screen is active upon device charging;
- Always — the screen is always active;
- Disabled — the option is not used (screen activity interval corresponds to the one chosen in device settings).

Units

First start of the application brings us to the *Units* mode, or simply work list. In the work list you can monitor units' parameters, or you can switch either to the *Map* or *Tracking* mode from here.



The work list contains dynamically updated unit information. This information includes current moving state, data actuality, state beginning time, duration, and address. Note that address information can be substituted by unit's presence in geofences. To do so, activate *Geofences as addresses* checkbox in the *Other* section of the Wialon Mobile Client settings.

Further let us look into the possible options of graphic information presentation:

Current state

Wialon Mobile Client uses the *GPS speed* method to detect movement regardless to the one chosen on the *Trip Detection* tab. A proper functioning of this method requires receiving of location information and speed. Therefore, to detect movement states, the minimum moving speed value should be higher than 0. Moreover, the other settings used for movement states detection are also taken into account in the application.

Trip

Stop

Parking

Current state unknown (check trip detection properties)

Last known state is no longer relevant as it was detected more than a week ago

No data from unit

Ignition state

Ignition is on (green circle with key). Ignition off — key not shown

Attention!
Unit's current state as well as ignition state are available only if you have the *Query messages or reports* access right.

Data actuality

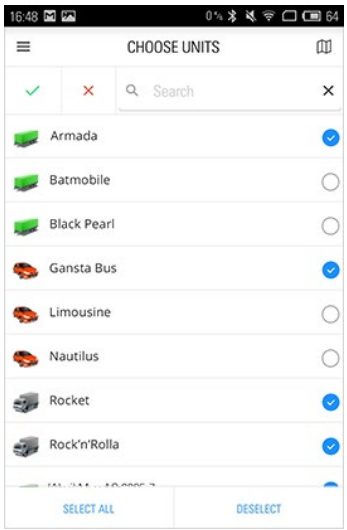
2 s ago — the last message with coordinates was received no more than 5 minutes ago

10 min ago — the last message with coordinates was received no more than an hour ago

7 h ago — the last message with coordinates was received no more than 24 hours ago

42 days ago — the last message with coordinates was received more than a day ago

On the first launch of Wialon Mobile Client the work list contains all the units available in the Monitoring panel of Wialon Local. However, it is more convenient if the work list contains the units you are currently interested in. To form the work list, it is necessary to move to the *Choose units* menu by clicking on the *Eye* icon to the left of the dynamic search (for iOS — to the right of the dynamic search).



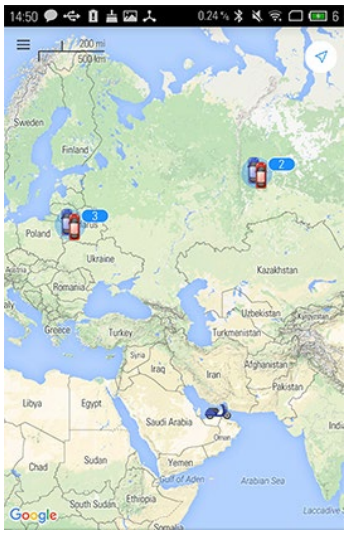
Units indicated by a flag in this menu are added to the work list. You can either choose all the necessary units one by one (tap it), or choose all the units at once (corresponding button in the end of the list). Use dynamic search to find a particular unit.

To get back to the work list after units choosing, it is necessary to save or dismiss indicated changes. In the interface of Android use the green check mark icon (save changes) or red cross icon (dismiss changes) to the left of the dynamic filter. Using iOS device, tap *Save* or *Cancel* buttons situated on both sides of the menu name.

Map

Map mode can be activated by choosing the corresponding item in the main menu, or by tapping the map's icon situated in all the available modes to the right of their names. Units from the work list are displayed on the map. By default the map is centered in such a way that all the units get into vision field. Note that geofences created in Wialon Local can be shown on the map of mobile client (enable the corresponding option in the *Settings* mode of Wialon Mobile Client).

Interacting with Map



Zooming

Map zooming is made by special controls appeared in the bottom right corner of the map. These controls can be enabled/disabled in the *Settings* mode (choose in the main menu).

Moreover, map zooming can be made using special gestures on the screen:

- Double tap — zoom in.
- Two fingers tap — zoom out.
- Two fingers stretch/pinch — zoom in and zoom out, correspondingly.
- Double tap without releasing on the second tap, and then slide the finger down — to zoom in, or up — to zoom out.

Tilt gestures

You can tilt the map by placing two fingers on it and moving them up (increasing tilt angle) or down (decreasing tilt angle).

Map rotation

To rotate the map, place two fingers on it and apply a rotate motion. After the map has been rotated, a compass icon appears in the top right corner. Tap it in order the map to return to default position (North in the top of the screen).

Finding Device Location

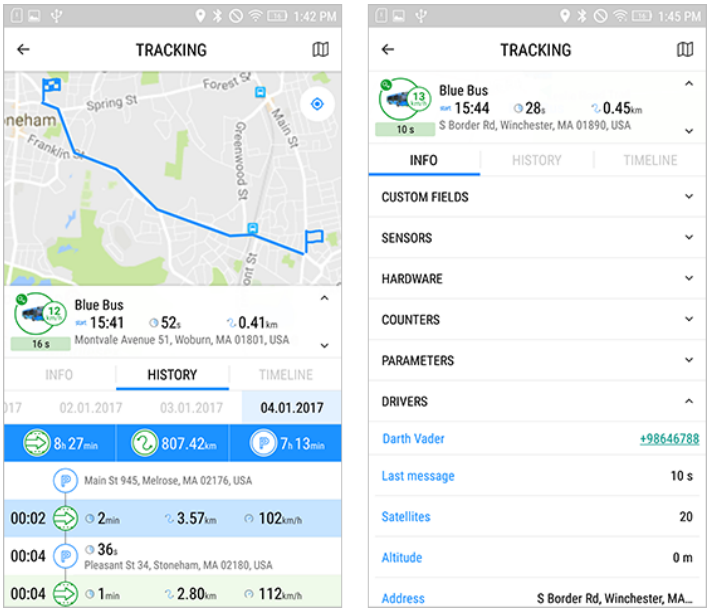
Finding your own location is an additional feature of the application's map mode (can be used only if Gurtam Maps cartographic service is chosen). Tap the *Arrow* control in the top right corner in order your current location to be shown on the map by a marker (the control receives active state). Upon moving the map and loosing location marker from the vision field, the *Arrow* button changes to the *Target* one, by tapping which the map will be centered on your location once again.

From the *Map* mode you can move to the main menu (corresponding button in the upper left corner), or to the *Track* mode (tap unit icon on the map).

Tracking

There are several ways of switching to the *Tracking* mode. One of them (switching from the *Map* mode) has been described in the previous section. The other way is to move from the work list (the *Units* mode). To do so, tap the line of the necessary unit in the work list.

The *Tracking* mode provides you with the possibility to monitor both unit's location on the map, and parameters received from a unit. Note that unit's location can be shown as address (by default) or as unit's presence in geofences (the *Geofences as addresses* checkbox in the *Other* section of the Wialon Mobile Client settings)



In order for the unit movement arrows to be shown on the map in the mobile client, activate the option *Show/Hide unit movement direction* in the main interface of Wialon Local.

History

You can view unit's events on the *History* tab. All the events are presented here chronologically and are formed on the basis of the messages received within 24 hours. The messages that were generated more than 24 hours ago are not registered as events after being unloaded from the black box.

Types of events and provided information:

Trip

Event's start time, duration, covered distance, unit's average speed.

Parking

Event's start time, duration, location address. The duration of the parkings which are the first and/or the last events of the day is not indicated.

Fuel filling

Event's time, amount of fuel filled, location address.

Fuel theft

Event's time, amount of theft, location address.

Choose any event in the history to display it on the map. In order for the map to be centered on a unit of monitoring, tap its icon.

Note that some values of event parameters (time intervals, amounts of fuel, unit's location) may differ from the values of the same parameters in the reports of the monitoring system. It occurs due to the implementation of different calculation systems in the web version of Wialon and in the Wialon mobile client. For example, upon detecting fuel fillings/thefts, the mobile client uses the time of the last message received before a fuel level change, while the web version of Wialon uses time of the first message from the interval with the biggest difference of fuel levels. Moreover, the movement state in the Wialon mobile client is determined only by the GPS speed, while other methods can be used in the web version of Wialon.

Note that in the Wialon mobile client the correctness of the data received on any event depends on the parameters indicated on the trip detector tab.

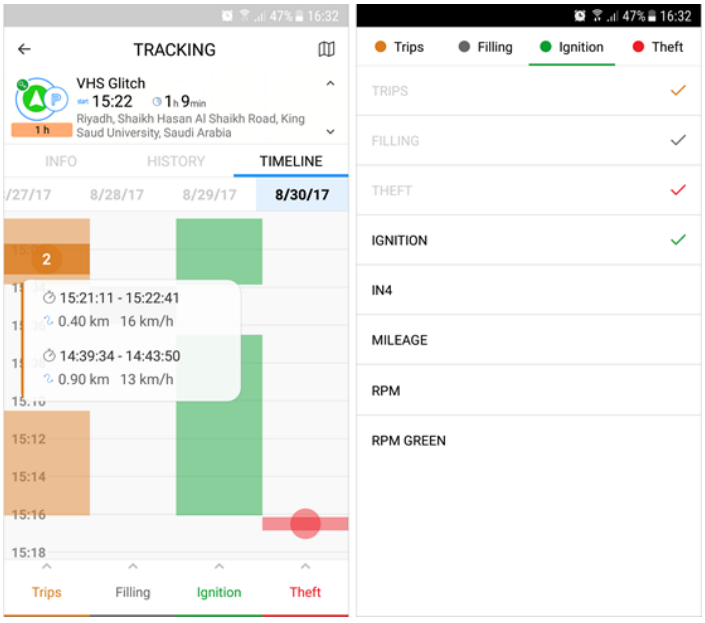
Info

The *Info* tab displays an extended unit's information: location address, attached drivers (with phone numbers) and trailers, equipment data, values of custom fields, sensors, counters, and parameters. Activate recalculation of events (the *Active* option) so that the information about sensors becomes available.

Timeline

On the *Timeline* tab, you can visually evaluate the duration of events, find out their number and get detailed information about the grouped events (by tapping quantative indicator). Events include trips, fuel fillings and thefts. Besides, sensor state change (ignition sensor, custom digital sensor) and sensor values increase (mileage sensor, relative odometer, counter) are considered to be event types as well.

On the tab, you can view up to 4 event types simultaneously. Trips, fillings, and thefts are displayed by default at the bottom of the screen. To select other types, open the corresponding menu by tapping the event type at the bottom of the screen.



Events can be viewed on the map. To see the event, tap its tooltip. The map will be centered on it, and the event will be shown in one of the following ways based on the type:

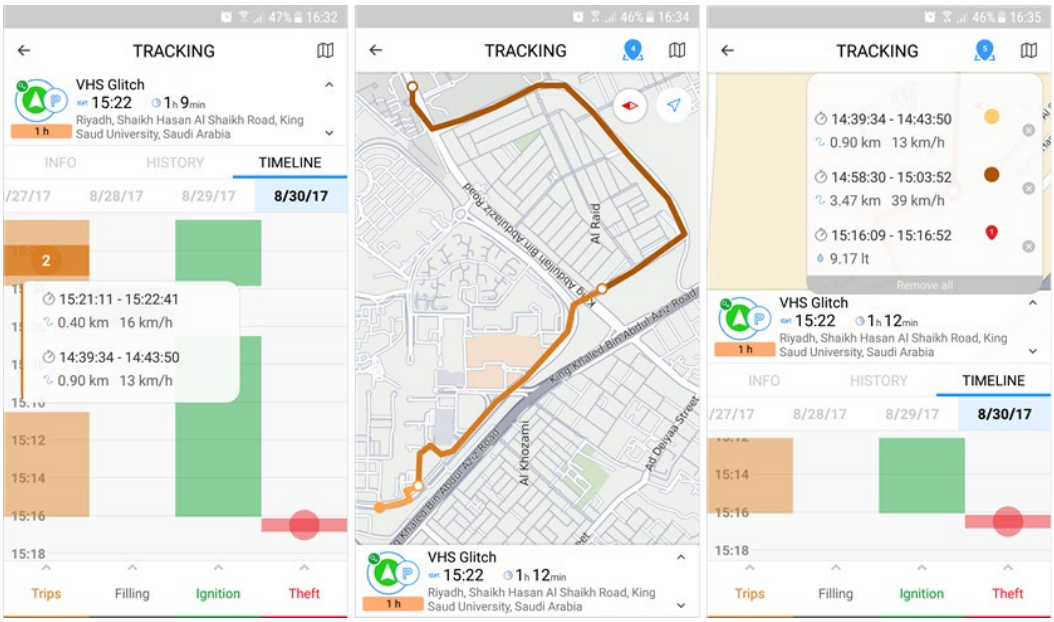
- *trips* — as a color track (if there are several tracks, they will be displayed in different shades of the same color);
- *fuel fillings and thefts* — as a marker;
- *sensors* — as a part of the track, which corresponds to the interval of sensor activation.

Tapping the tooltip again removes the event from the map.

When switching between the tabs in *Tracking* section, the events disappear from the map. Go back to the *Timeline* tab to return the events to the map.

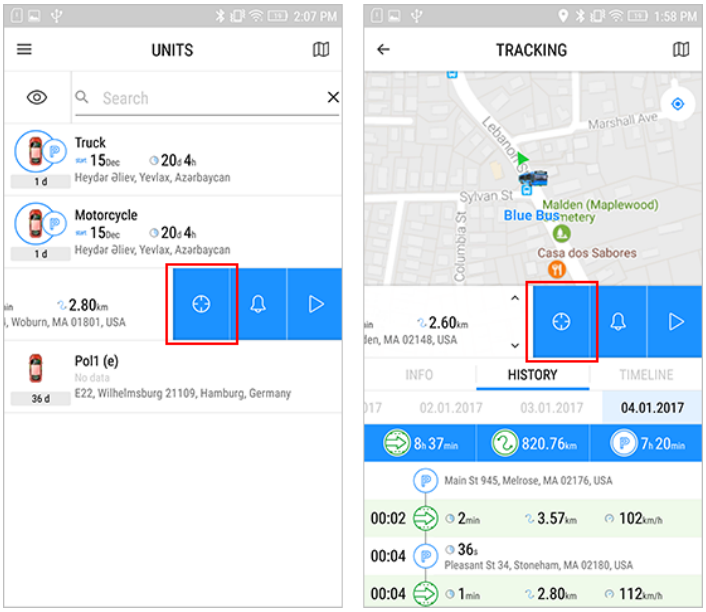
The maximum number of events that can be simultaneously displayed on the map is 10.

The events selected for display on the map are added to the event cache. To see the cache, tap the icon in the upper right corner of the screen. After tapping on the event, the map will center on it. It is possible to remove one or several events from the cache (tap the delete icon next to its name) or all events at once (tap *Remove all*). The event cache is cleared if you change the type of events available for display.



Locator

The application supports a locator functionality. Locator is used to generate links and share current units' location. Locator can be available either from the work list (the *Units* mode) or from the *Tracking* mode. To generate a link, use left swipe in the line of a corresponding unit, and tap the *Target*. In the appeared menu, select locator's link validity period (from 1 hour to week). Then choose a necessary action: send a location link by any messenger on your smartphone, copy it, open in a browser, etc. Viewing is performed on locator's map which becomes available upon clicking on the provided link.


2:07 PM
UNITS
Search
Truck
15Dec
20d 4h
1 d
Heydər Əliev, Yevlax, Azərbaycan
Motorcycle
15Dec
20d 4h
1 d
Heydər Əliev, Yevlax, Azərbaycan
2.80km
, Woburn, MA 01801, USA
Pol1 (e)
No data
36 d
E22, Wilhelmsburg 21109, Hamburg, Germany
1:58 PM
TRACKING
Lebanon St
Marshall Ave
Sylvan St
Columbia St
Malden (Maplewood)
Blue Bus
metery
Casa dos Sabores
2.60km
len, MA 02148, USA
INFO
HISTORY
TIMELINE
02.01.2017
03.01.2017
04.01.2017
8h 37min
820.76km
7h 20min
Main St 945, Melrose, MA 02176, USA
00:02
2min
3.57km
102km/h
00:04
36s
Pleasant St 34, Stoneham, MA 02180, USA
00:04
1min
2.80km
112km/h

Notifications

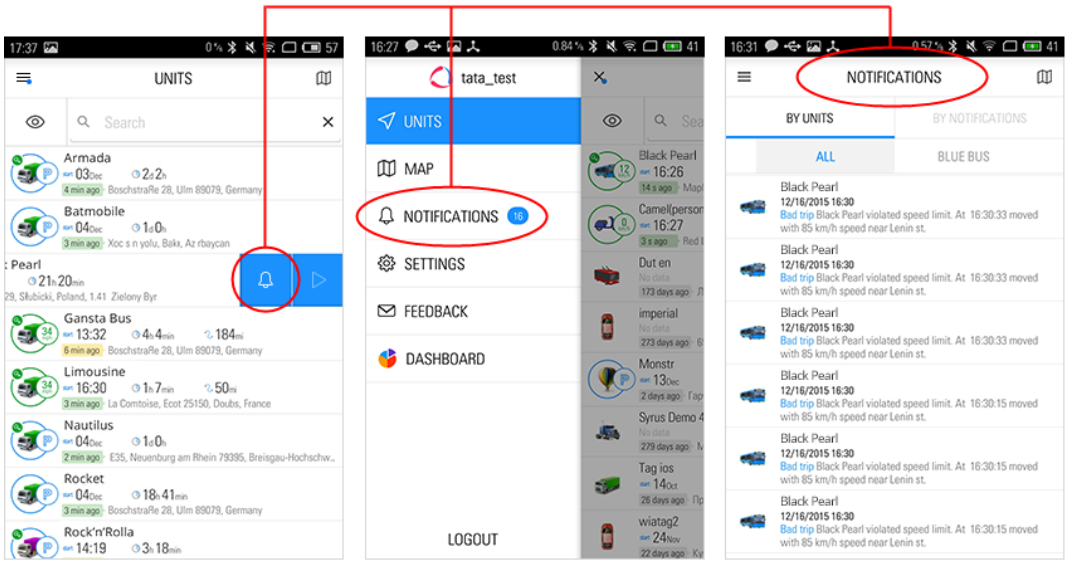
To receive mobile notifications, it is necessary to configure their sending in Wialon Local. In other words, it is necessary to create a new notification in the corresponding panel of the monitoring system and select *Send mobile notification* as a way of notification action. Notification receiving should also be activated in the *Settings* mode of Wialon Mobile Client.

Moreover, to send mobile notifications it is necessary to activate such services as *Mobile notifications* and *Wialon Mobile Client*.

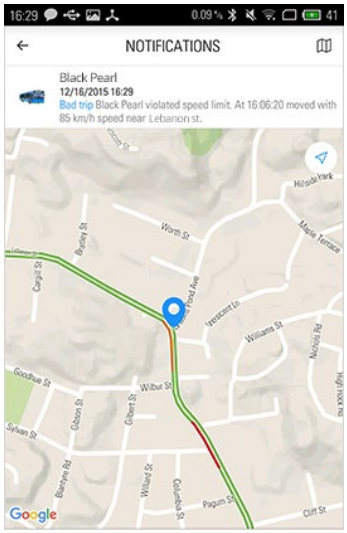
Received notifications are automatically saved in the system, and afterwards can be viewed in the corresponding mode. Note that notifications are stored in the system within 30 days. Besides, the number of notifications per one user is limited to 2000 items.

Blue marker on the icon of switching to the main menu signals about receiving a notification. The number of received notifications is displayed to the right of the corresponding menu item. After switching to the *Notifications* mode the marker disappears.

Switching to the *Notifications* mode is done via the same called menu item. Moreover, it is possible to be done through the work list or through the *Tracking* mode. To do so, swipe to the left in the line of a unit for which a notification have triggered and tap the *Bell*.



The *Notifications* mode features a list of all the mobile notifications received. Tap any notification in the list to view unit's location on the map during notification triggering.



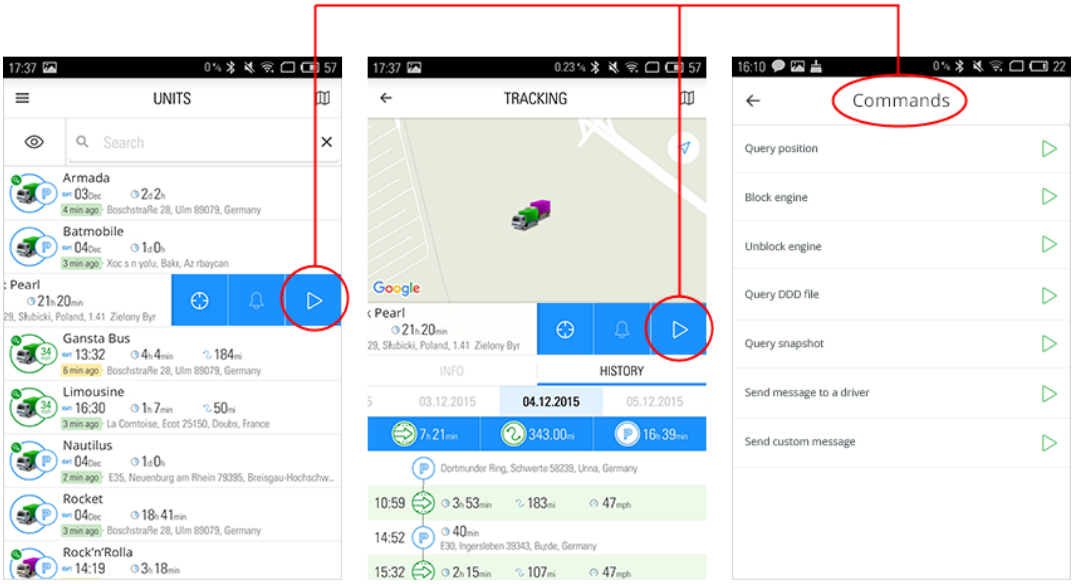
On mobile devices with iOS operating system the notifications received while the application was closed are only displayed if opened by clicking on the push notification in the status bar.

Commands

The following commands are supported in Wialon Mobile Client:

- Query position;
- Block engine;
- Unblock engine;
- Activate output;
- Deactivate output;
- Set data transfer interval (how often unit sends data to the server);
- Send custom message (sending of a non-standard command to a unit);
- Send message to driver;
- Upload configuration (not supported for iOS);
- Upload firmware;
- Query snapshot;
- Query snapshot from specified camera;
- Query DDD file.

Switching to the command sending menu can be done either from the work list (the *Units* mode) or from the *Tracking* mode. To do so, swipe to the left in the line of the corresponding unit, tap triangle, and choose the necessary command.



Here you can view detailed information on commands.

Wialon Mobile v2

Wialon Mobile v2 is a specially developed program which gives access to lite version of Wialon from different mobile devices such as Android, iPod, iPhone.

Requirements for mobile operating system:

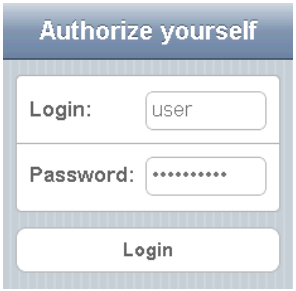
- iOS;
- Android 1.6+;

Only native browsers can be used, and cookies should be activated in the browser.

Wialon Mobile basic features are:

- displaying unit current position on map;
- unit movements for latest 5 messages;
- dynamic filter of units by name;
- information about unit state, connection, driver, sensor values, etc.;
- tracking of moving units;
- geolocation.

Login



To access Wialon Mobile v2, enter its address in browser, e.g., http://m.wialon.com. On the login page input your user name and password, the same as you use to login to the system from an ordinary computer.

Enable cookies in your mobile browser. It is required for correct operation of the program.

If you have logged in successfully, the main menu becomes available.

Navigation

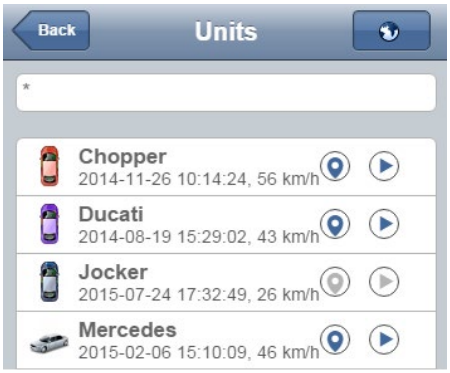
The following options are accessible through the main menu:

- **Units**: show the list of available units with short information on them;
- **Map**: show units on the map (to be 'seen', unit has to have a special flag enabled in its properties – *Show on map*);
- **Settings**: custom configuration of the program (map, icons, etc.);
- **Logout**: logout from the program.

Units and Commands

Upon the first login, no units are displayed in the list until you apply a filter. However, the next time you log in your previous work list will be displayed.

To add or remove units from the work list, use a filter at the top. As you type,



the work list is updated dynamically to fit your query (see dynamic filter). To display all units, type *.

Units in the list are displayed by their names and icons. Additional information on each unit is available as well: last message's time and speed. Tap a unit in the list in order its properties to be displayed.

Moreover, there are two buttons to the right of each unit in the work list. One of them enables/disables a unit displaying on the map, tapping the other button you can send commands (if the button is active). These are the states of the buttons:

— a unit is displayed on the map

— a unit is not displayed on the map;

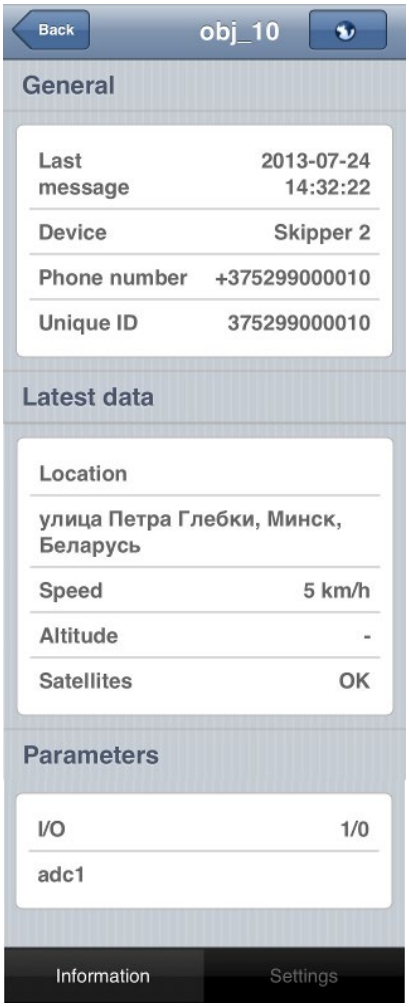
— commands are available;

— no available commands.

If you would to send a command to a unit, tap the corresponding button. Afterwards, a menu of available commands is opened. Choose the necessary one and tap it to send. Note that commands' creation is available in the interface of monitoring system only.

Unit Properties

Unit properties are divided into two tabs:



Information — information on current state of unit:

- *General* — last messages time, device type, phone number, unique ID (phone number and UID are available only if the current user has *manage* access to this unit);
- *Position* — location (if available), speed of movement, altitude, satellites locked, course (direction of movement, if available);
- *Counters* — mileage, engine hours, GPRS traffic.
- *Sensors* — sensors and their values.
- *Parameters* — state of inputs/outputs and other parameters available in the last message.
- *Custom fields* — unit custom fields from its properties.

Settings — unit display on the map:

- *Show on map* — if activated, unit will be seen on the map (the option is stored only for the current user);
- *Watch on map* — if activate, each time new message from this unit comes, the map automatically moves to its latest location (the option is stored only for the current user).

To return to the work list, press *Back*. All altered properties are saved automatically.

Settings

Program settings are also divided into two tabs:

General settings:

- *Language* — choose English or Russian as interface language.

Unit settings:

- *Show icons* — enable or disable displaying units' icons in the work list. By default, the option is activated. However, you may want to disable it in order to increase program performance. Smooth scrolling of the work list depends on mobile device properties, Internet connection quality, and other factors.

Map settings:

- *Show unit names* — unit can be displayed on the map either as just an icon or together with its name.
- *Use geolocation* — enable/disable geolocation function.
- *Address provider* — default address provider is Gurtam Maps, however, Google Maps can be activated, too. If no address information is available, then coordinated are shown.

Unit's tooltip:

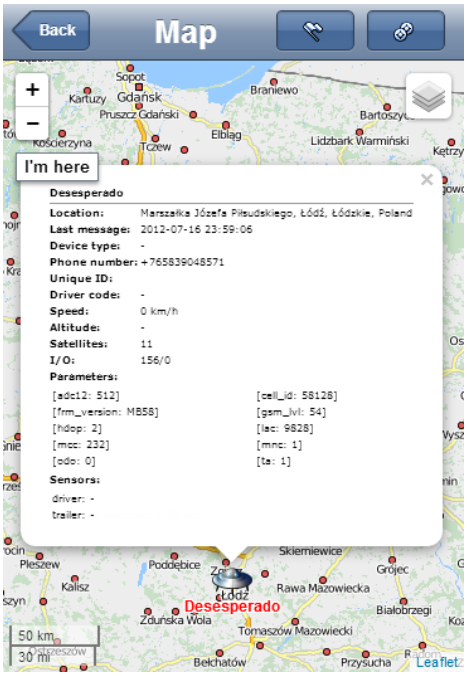
- *Parameters* — display values of raw parameters taken from the last message in unit's tooltip that appears when you click on unit's icon on the map.
- *Sensors* — display values of sensors in unit's tooltip.

To return to the work list, press Back. All altered properties are saved automatically and affect only the current user.

Map

The Map mode is designed to locate current position of units and track them. On the map, there can be displayed only those units which have the *Show on map* flag enabled in their properties.

On the map, a unit is represented with its icon and with name (if the last is



chosen in settings (the option *Show unit names*). Besides, it can have a tail (red line) that shows its movements for last 5 messages (if these movements were detected within the current session).

If you click on a unit displayed on the map, in the tooltip you can see the detailed information about this unit.

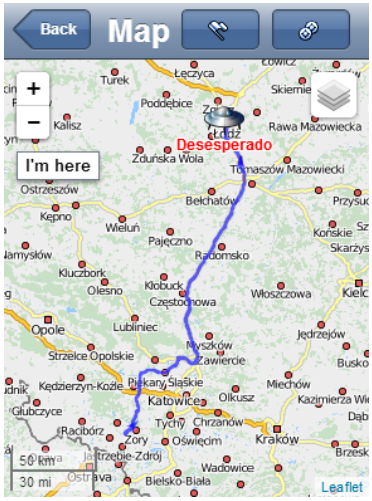
If you move to the map from the main menu, the map is scaled in the way to let you see all selected units. If you move to the map from unit properties, the map is centered on this unit.

However, map zoom can be altered, and the map itself can be moved. The scale can be changed with the help of plus/minus buttons in the top left corner as well as with the help of scroll button. To move the map, just drag it to the desired direction. In Apple devices, the map can be also zoomed using multitouch function. Current scale is displayed at the bottom.

You can choose from several kinds of maps:

- Gurtam Maps,
- Google Maps (if keys provided).

Tracks



A track of unit's movement can be built for any period of time. In the Map mode, press the *Tracks* button on the top panel and adjust required track parameters.

Choose a unit in the dropdown list. Only units with the flag *Show on map* are displayed on this list. Press the *Units* button above to go to the work list and set those flags if necessary.

Set time interval (from — to) and other track parameters:

- *Trips* — apply trip detector while building the track;
- *Annotations* — show annotations at the points where messages were received (time and speed is given in the annotation);
- *Color* — track can be of different colors depending on speed or sensor values or be just one-colored.

More about track parameters...

After adjusting all parameters, press the *Execute* button below. Your track will be shown on the map.

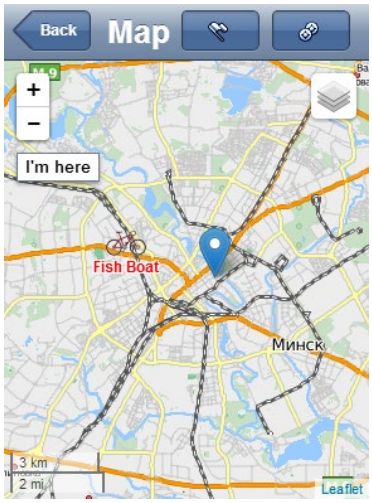
None that any number of tracks can be drawn on the map, either for different units or for one unit at different time periods. To remove all those tracks from the map, press *Clear*.

Click on any point of the track to get detailed information for this point: message time, speed of movement, address (or coordinates), satellites count.

If you click on unit icon, you will be offered two options: *Remove track* and *Information*. The first one is designed to remove all tracks drawn on the map for this unit. The second is to see a standard tooltip with detailed information on the

unit.

Geolocation



Wialon Mobile v2 supports geolocation function. Geolocation is the identification of the real-world geographic location of an object, such as mobile phone or an Internet-connected computer terminal known from the Internet Protocol (IP) address, MAC address, hardware embedded article/production number, embedded software number, or other information.

Geolocation is activated in settings. Note that you may need to additionally check browser settings.

When you switch to the map mode, the program essays to locate you. Your supposed position will be indicated on the map with a special marker. In addition, the button ***I`m here*** will appear on the screen. Click on this button at any time to move the map to your current location. Click on this marker to see available address information.

In case geolocation is not successful, an error is displayed and the corresponding marker and button are not shown.

Note.
Google Maps are activated separately and can be missing in your package. At that, Gurtam Maps are always available.

Logistics

Logistics is a multifunctional program created to implement control over all the working stages of a courier delivery service.

The documentation of the app is here.

NimBus

NimBus is an application that allows dispatch services of passenger transport to plan rides and control their execution.

The documentation of the app is here.

SDK

SDK is a software development kit that allows you to integrate Wialon with other systems, as well as create additional applications and sites for Wialon platform. It provides an API (application programming interface) as a source code based specification intended to be used as an interface by software components to communicate with each other. All documentation available at http://sdk.wialon.com

Two areas of SDK development are available at the moment:

- **Remote API** gives access to data through low-level HTTP (hypertext transfer protocol) requests. Using it, you can develop your own web services, mobile device applications, etc. on Wialon basis.
- **JavaScript API** gives you access to Wialon functions from your web application using JavaScript. IT considerable decreases time of creation a web application because basic procedures have been already implemented.