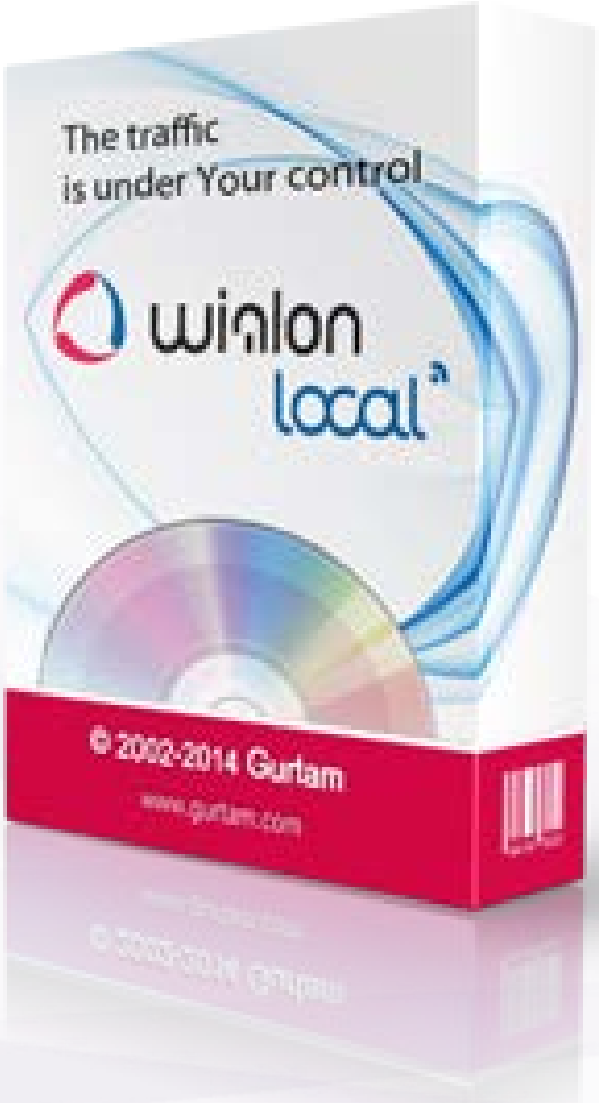
Wialon Local 1504

User Guide

as of May 21, 2015



wialonlocal

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ActiveX

SDK

What's New in Wialon Local 1504

This section contains description of the main differences between 1504 and 1408 versions of Wialon Local.

Eco Driving
This module is designed to make an assessment of driving behavior. It detects rough maneuvers (like turns, breaks, acceleration), speeding, and other criteria of custom choice (sensor based). Sensitivity range and penalties for those criteria are adjustable. The module includes a tab in unit properties dialog (for parameters adjustment), a tabular report for a unit, appropriate columns for other tables, and an app.

Tachograph
This module allows working with DDD files generated by tachographs. Those files can be loaded into Wialon database and then processed by the system giving the result in the form of tables and charts. The module includes one command, two tabular reports for drivers — 'Driver activity' and 'Infringements', and two apps — Tacho Manager and Tacho View.

Routing in Gurtam Maps
Gurtam Maps developed their own routing, that is an ability to find the shortest way from one spot to another and calculate supposed distance and travel time. Routing by Gurtam Maps is now available in tools (Routing itself, Nearest Units), in the Routes module, and in some apps (Delivery Service, Gurtam Maps).

Mobile Client
A special application for Android and iOS based mobile devices has been implemented. It can track units on map, show their current state and data, provide with the history of movements and stationary periods, display notifications adjusted in the tracking system.

New Locator
New Locator has replaced the old one. Now user can create any number of Locator pages, each holding different set of units and, if necessary, geofences and POIs. In the new Locator, one can track units on map, see their latest state, and build tracks.

LBS Detector
Implementation of the LBS Detector tool provides you with a possibility to find out an approximate location of a unit even if GPS is not available at the moment. A unit's location is detected considering the nearest cellular base stations.

Custom Icon Library
Icon Library is a new app which enables creation of custom sets of icons for units, POIs, and unit groups.

Private Mode Sensor
This new type of sensor helps to distinguish private trips from business ones, which is extremely useful in Driving Logbook, the app specially designed to prepare tax reports.

Retransmission of Message History
Traditional real-time retransmission has been supplemented with 'past period' retransmission, meaning that messages for any period of time in the past can be sent to other servers or systems. This is a great alternative to the method of export/import.

Speeding detection
New possibilities in speeding detection include applying of speed limitations from roads (as opposed to earlier used method of establishing the limit in unit's properties). Tolerance range is also provided as a setting.

Multi-Point Commands
Two new commands ('Send route' and 'Send waypoints') have been supported. A sequence of points to be visited is sent to a driver/courier by means of these commands.

Minimaps
The old minimap has been given a new life. Now a minimap (a small individual window for tracking) can be opened for several units at once. Not only last position can be observed there, but also any information on latest state, sensors, geofences etc. Manipulations with unit can be made straight from its minimap as well.

Search Tool
This is a special tool to quickly find and locate any item on the map (unit, POI, geofence, driver etc.).

Other features:

- weight sensor implementation
- Imperial measurement system supported
- area calculated in hectares (for metric system only)
- dynamic filters added in many places
- ctrl+click to select/unselect all added in many places
- enabling checkboxes by clicking their captions
- logical grouping of sensors
- possibility to focus on track in a printed report
- new actions for notifications: send mobile (push) notification, send POST/GET request
- import/export of standard POI icons
- new map layers: HERE, GoMap.Az
- Spanish in CMS Manager
- new command type: query snapshot from specified camera
- mileage sensor with overflow
- possibility to disable checkpoints' names on the map (for routes)
- retransmission protocols updated
- 'Retrieve intervals' option in geofences' filter for reports
- custom fields for a resource
- saving a calculated route from the Routing tool
- centering the map on an object is attended by visual effects
- POIs' copying button
- GUI optimization

Basic Definitions

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

Unit tracking includes:

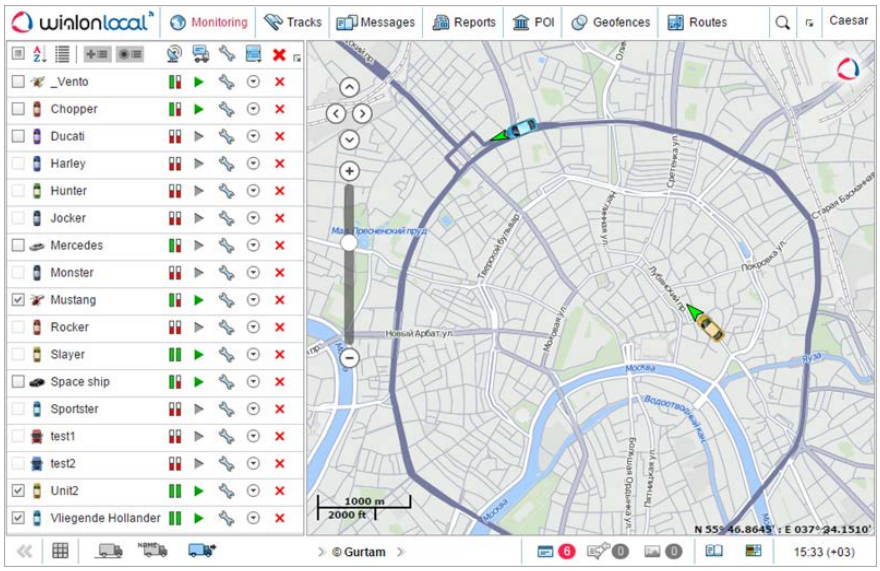
- detecting unit position and watching its movements on map;
- observing dynamic change of various unit parameters such as speed, fuel level, temperature, voltage, etc.;
- management of units (sending commands and messages, assigning jobs and routes, adjusting notifications, etc.) and drivers (phone calls, SMS, work shifts);
- control of unit movement along a route with check points;
- interpreting information derived from the 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.

Main Interface (Tracking System)

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

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



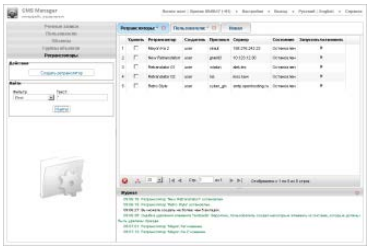
These items cannot exist independently and are a part of some resource.

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

CMS Manager (Management System)

CMS Manager is a special interface developed for Wialon Local managers. 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 are different from micro objects in several ways:

- They exist independently and are not a part of a bigger object like 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 POIs, geofences, jobs, notifications, drivers, and report templates. A unit can contain sensors, commands, custom fields, and service intervals. Users and unit groups can hold only custom fields.

- Access rights are assigned to macro objects, and they affect those objects themselves as well as their contents. That is why macro object properties dialog usually has a special *Access* tab to manage rights.
- Some macro objects like retranslators, accounts (resources), and billing plans are accessible only through the management interface that is CMS Manager.

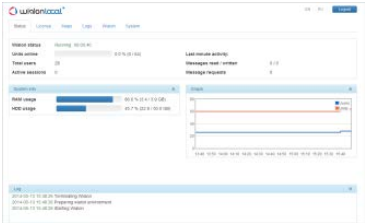
CMS Manager is designed to work with these items — create, configure, update, copy, import, export, delete them, and what is the most important distribute **access rights** to these objects. Access right is a possibility to view some system objects and perform allowed actions over them.

Partly these functions can be also 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 many more. Besides, the exclusive privilege of CMS Manager is 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 check points 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 of this guide entitled «Management System».

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, 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 Administration Panel can be found in the section of this guide entitled «Administration Panel» .

Wialon Administration

- Technical Specification and Requirements
- Installation of Wialon Local
- License
- Administration Panel
  - Status
  - License
  - Maps
  - Logs
  - Wialon
  - System
- Changelog
- Local Communication Gate

Technical Specification and Requirements

Operational System and Accompanying Software

Wialon Local is provided as all-in-one solution which includes basic OS (Debian Linux) and components installed via ISO file. Some components, like hardware drivers and modules of Wialon Local itself, require network access during the installation process.

Provided OS is Debian Linux (Jessie), highly customized to meet the needs of Wialon Local. It is not recommended to use it for other software except for the products that are needed for Wialon Local to operate properly.

Apart from the OS, there are some software components (like inbound *nginx* and *postfix* servers) installed for proper functionality of your Wialon Local server (to have your DNS working and e-mails sent).

Wialon DB

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

Server Requirements

Consider these requirements to get the most from Wialon Local.

Minimum server requirements:

1. CPU: Core i7
2. RAM: 16 GB (Wialon only)
3. HD: any RAID from 2TB

For a server with 4000 tracking units, we recommend:

1. CPU: Xeon E31230 and higher
2. RAM: from 64 GB (Wialon + Maps)
3. HD: software-based RAID10, 8x2TB and more
4. Internet channel width (from server): from 50 Mbit/s

For a server with 10000 tracking units, we recommend:

1. CPU: two up-to-date Xeon CPUs
2. RAM: from 128 GB
3. HD: software-based RAID10, 8x2TB and more
4. Internet channel width (from server): from 100 Mbit/s

Naturally, there is some level of approximation in these hardware requirements. Storage volume may vary a lot depending on how frequently and what amount of parameters units send. Operation of jobs and notifications, execution of reports, amount of units in online tracking, total number of system items created by users, hardware extension — the more of all these, the more cores of the CPU and total RAM you should use.

Installation of Wialon Local

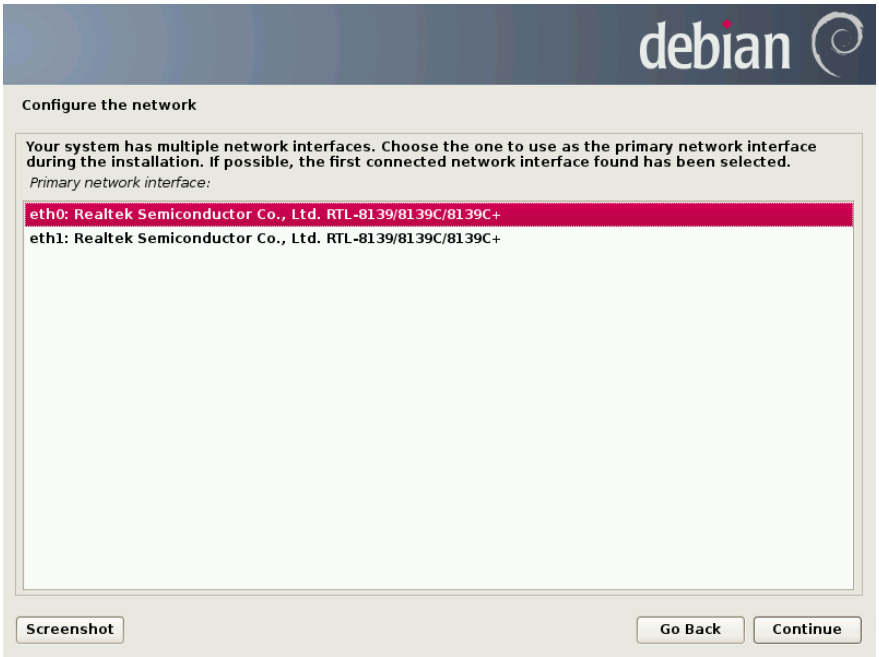
The distribution of Wialon Local contains also operating system Debian Linux (Jessie). In case of installation onto Windows server, use a virtual machine.

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

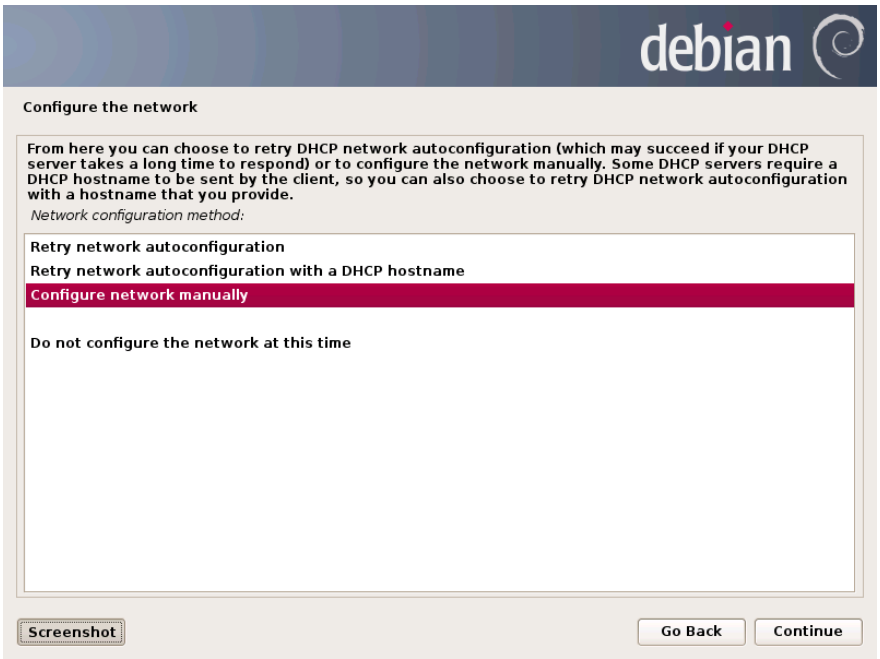
Adjust BIOS configuration in such a way to boot from CD/DVD drive. Then follow the instructions on the screen:

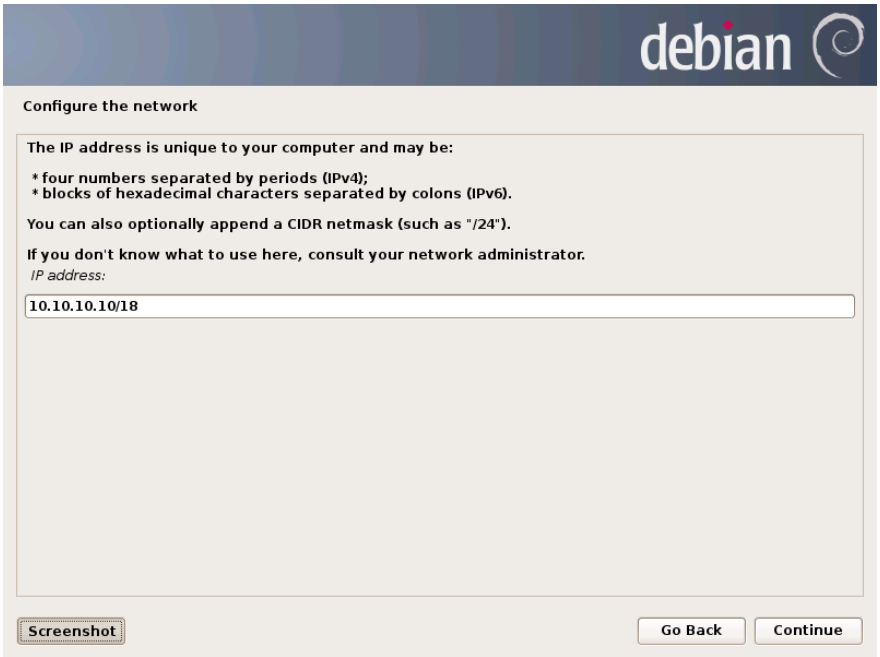
1. Choose installation type: on one drive, two (RAID-1), or four (RAID-10) drives.

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

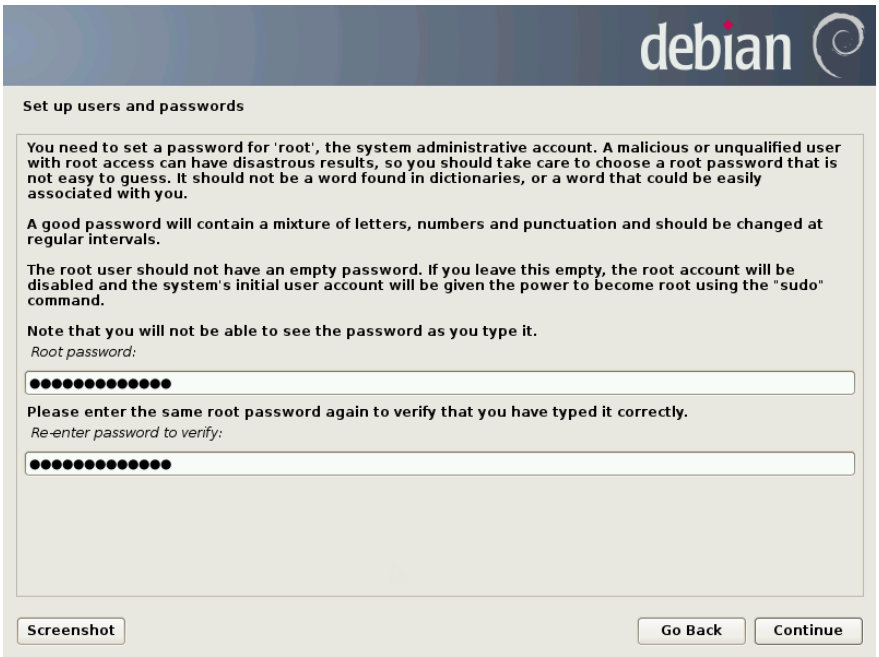


However, if DHCP server is not available during the installation, check network availability and repeat network adjustment or set network parameters manually:

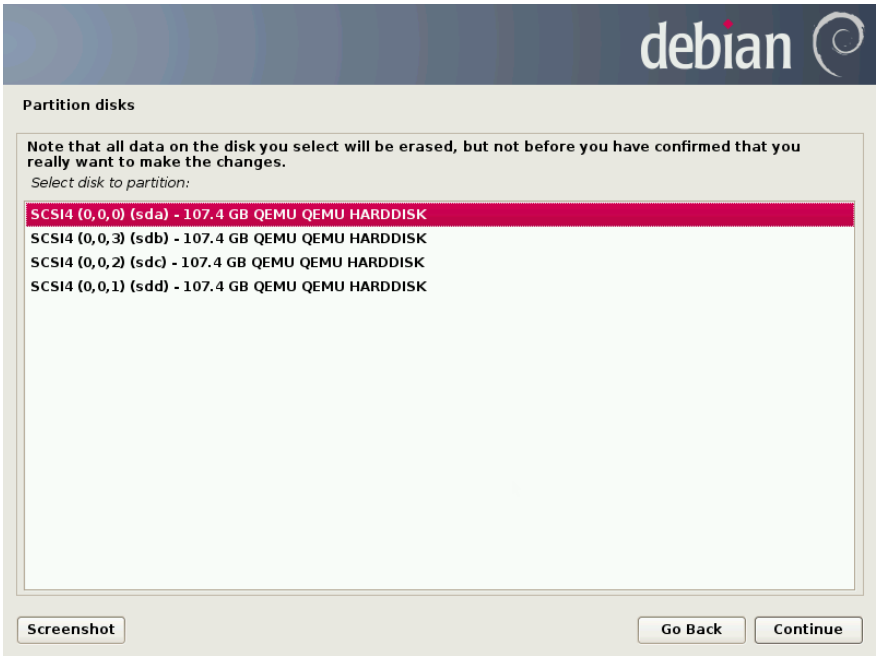




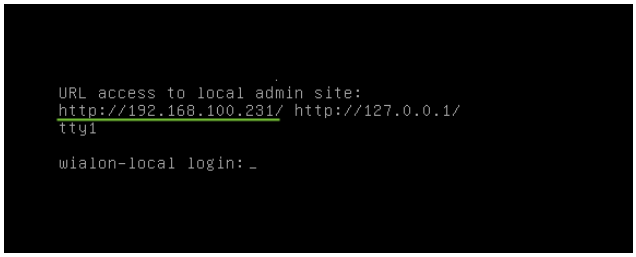
3. Set up password for *root* account — main account of your Debian OS.



4. If installation on one drive was chosen in the beginning, select a particular drive here.

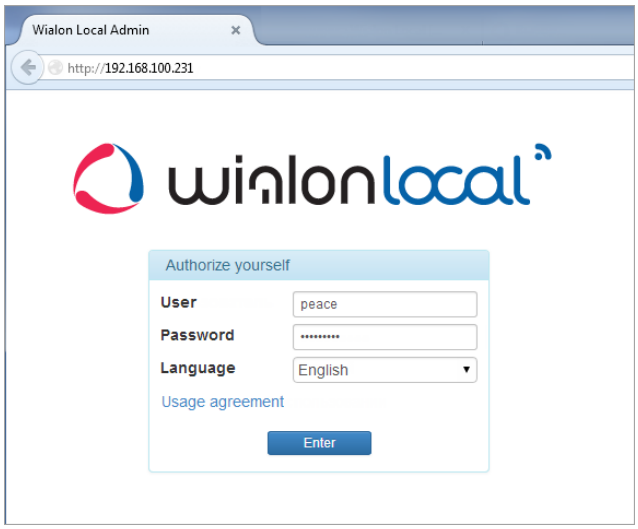


5. When installation process is complete, the system will reboot automatically (do not forget to readjust BIOS settings back). After reboot, URL address for Wialon Local administration system will be shown.

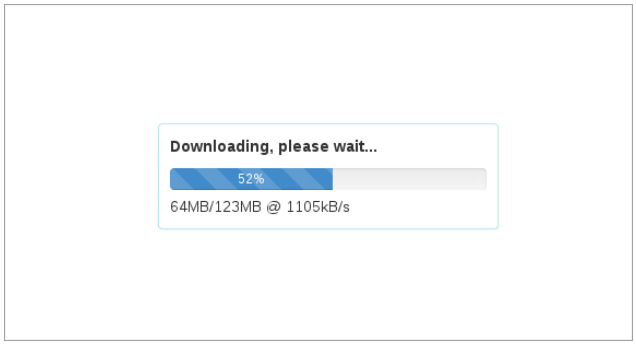


6. Enter this URL in your browser's address bar. To authorize, use user name and password given to you when

purchasing Wialon Local.



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



8. When the process is complete, the Administration Panel will show up.

Entering administration system, you can get a warning like on the image below (*You are looking for site that is not available here. Please check your DNS configuration.*)

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

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

License

The license is integrated into your personal build of software.

Every day, Wialon Local connects to the license server and confirms the product usage 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. At that, working service with all its configuration will not be damaged.

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

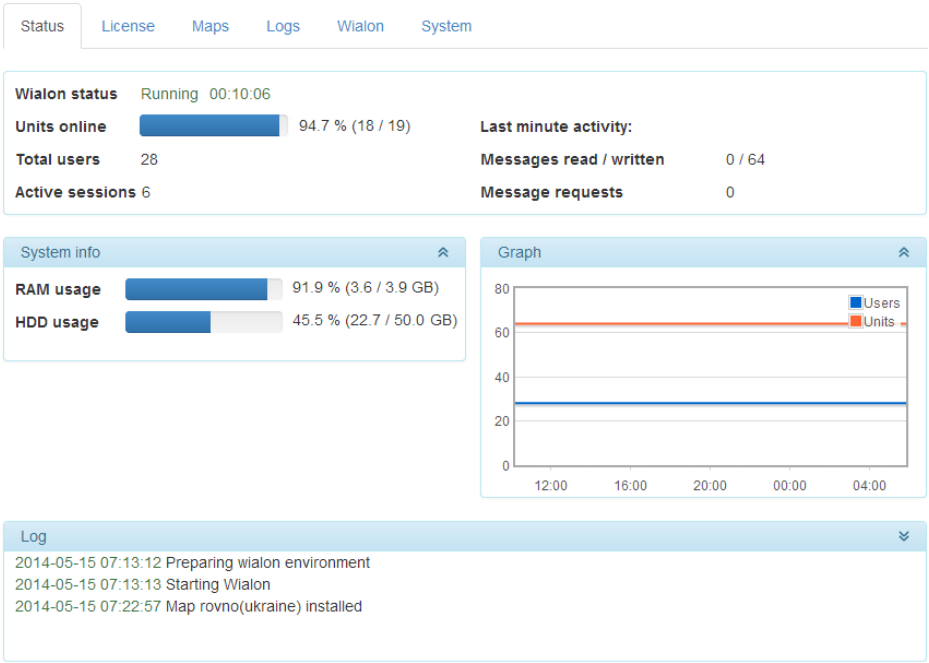
If there is a problem with license, you cannot create any monitoring units, and phrases like *Error fetching license: 'avl.unit'* can be found in log files.

Administration Panel

- **Status**
- **License**
- **Maps**
  - **Gurtam Maps**
  - **WebGIS**
- **Logs**
- **Wialon**
  - Root User
  - Sites
  - Modems
  - Trash
- **System**
  - Backup Server

Status

On this page, basic and most vitally important parameters of service operation are shown.



Wialon status
Your Wialon Local can be either running or stopped. If it is running, you can see also for how long — in the format hh:mm:ss. Time is zeroed when you restart Wialon.
Wialon can be started/stopped on the System page. It is also restarted when updates are installed.

Units online
This row shows the percentage of online units (figure before slash) relative to all units created (figure after slash).

Total users
The number of all users created in the system.

Active sessions
The number of sessions active at the moment. Note that one user can create multiple sessions.

In the *Last minute activity* section, database load is shown:

Messages read / written
The number of messages read from the database (first figure) and written to the database (second figure) within the last minute.

Message requests
The number of requests for providing messages that the database received within the last minute.

In the *System info* section, you see the following data:

RAM usage
Percentage and absolute volume of memory being used.

HDD usage
Percentage and absolute volume of disk space being used. If 90 and more percent of disk space is reached, a warning is sent to the administrator (whose e-mail is adjusted on the System page).

Graph
The graph shows the dynamics of service operation for the last 24 hours (or since the last global launch). Blue line

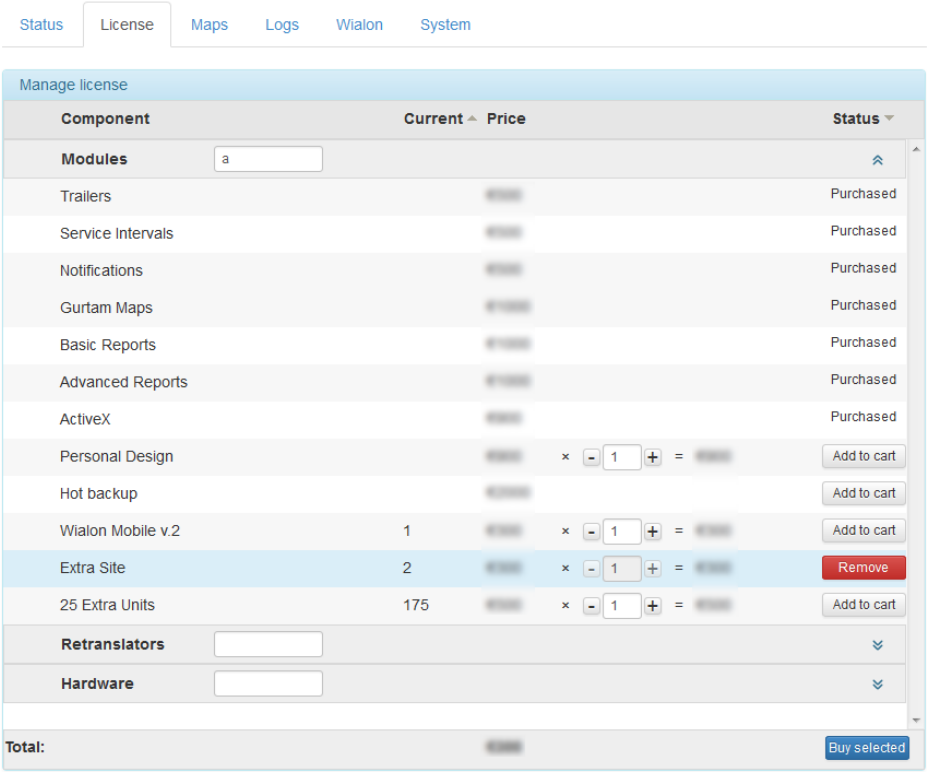
represents the number of users, orange line — units.

Log

The Log is located on the bottom of each page in the Administration Panel. Here current events occurring in the system are reported. For example, Wialon starting and terminating, availability of new updates, installation of components, etc. The log clears when you reload the page.

License

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



Modules

Modules are mostly helpful for extending your service possibilities. This can be either new features for end users (like “Notifications”, “Fuel Control”, “Advanced Reports”, etc.) or enhancement of general service qualities (like “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 manufacturer. This means, purchasing XYZ hardware you purchase all types of devices made by XYZ company. Visit GPS Hardware to find the full list of supported devices and further information.

In all blocks, items are sorted alphabetically, however, purchased items are placed on top forming their own sublist. 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 certain item, use text filter which is located in the header of each of three blocks.

Division of 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.

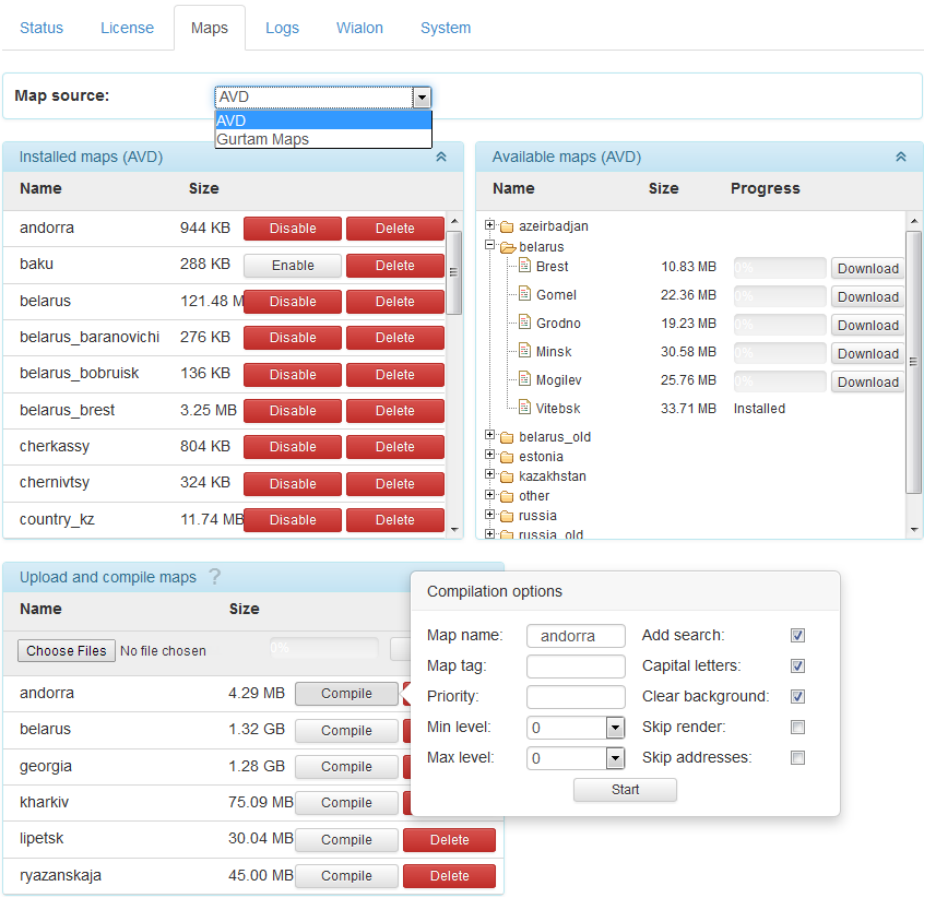
Activated components have the status *Purchased*. Components available for purchase have the *Add to card* button in their status. Press this button to add new components to your service. The total cost of your purchase is indicated below. When finished, press *Buy selected* and confirm your actions.

For changes to take effect, go to the System page and install updates. To complete the procedure, Wialon will be automatically restarted. Sometimes you may also need to refresh the page and clear 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.

Maps

On this page, you configure your cartographic system. Maps are important for end users in two ways. First, maps serve as a background to place tracking units on it, build tracks of movements, draw geofences, etc. For another thing, maps define the accuracy of address information that appears during online tracking as well as in reports.



Map Source

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

Choosing **Gurtam Maps** means that Gurtam will be 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 you will not need them.

This module is paid and can be purchased on the License page.

Choose **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 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 will stay on your server but invisible for the users. A map can be also deleted permanently, that is erased from the server.

Available maps (AVD)

This is the list of ready-to-use AVD maps provided by Gurtam. To install one of them, select it in the list and download it. The map will appear 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 will need compilation after uploading. Press the Compile button, adjust compilation parameters, and press “Start”. How to create maps...

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

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
	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.		0-5 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 collection.		0-2 3-5
	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					
Code	**Key**	**Value**	**Type**	**GM Type**	**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.		
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_vard	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.		0-2 3
	building	restaurant	PG	209	1	A restaurant.		0-2 3
0x006f 0x006f	amenity	public_building	PG	210	1	Public building.		0-2 3
0x0013 0x006c	building	yes	PG	210	1	General tag for buildings.		0-2 3
	denomination	baptist catholic christian evangelical lutheran roman_catholic	PG	211	0	A church.		0-2 3
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

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, default – 100. Bigger priority means earlier map render. Maps with minor priority are rendered later and are situated above those with bigger priority.

Min level
Min level to draw the map. Default – to be detected automatically.

Max level
Max level to draw the map. Default – to be detected automatically.

Add search
Add search info to the map.

Capital letters
Consider a 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 the maps overlay, the top (more detailed) map is displayed. Background will be 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 will be used for a search only).

Skip default render
The drawing information for the map should not be included to the file by default. Map rendering will be available only for the billing plans with the corresponding map tags.

Skip addresses
Skip addresses means not to enable possibility for reverse geocoding (address search by coordinates). The map will be used for rendering only.

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.

Standard configuration file transforming MP files to AVD files (pfm.xml)could 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 configuration XML file:

use_addr
Use this element when searching 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
A 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 properly store map inscriptions:

- 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:

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 a description of 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, 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 *features* 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 easier further editing and usage of the file.

winlonlocal

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.		
								The link roads (sliproads/ramps) leading		

	highway	secondary_link			PL	8	2	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.		
	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.		0-6 (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 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.		
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_vard	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)
	amenity	college	PG	148	1	A college.		(0-5) (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

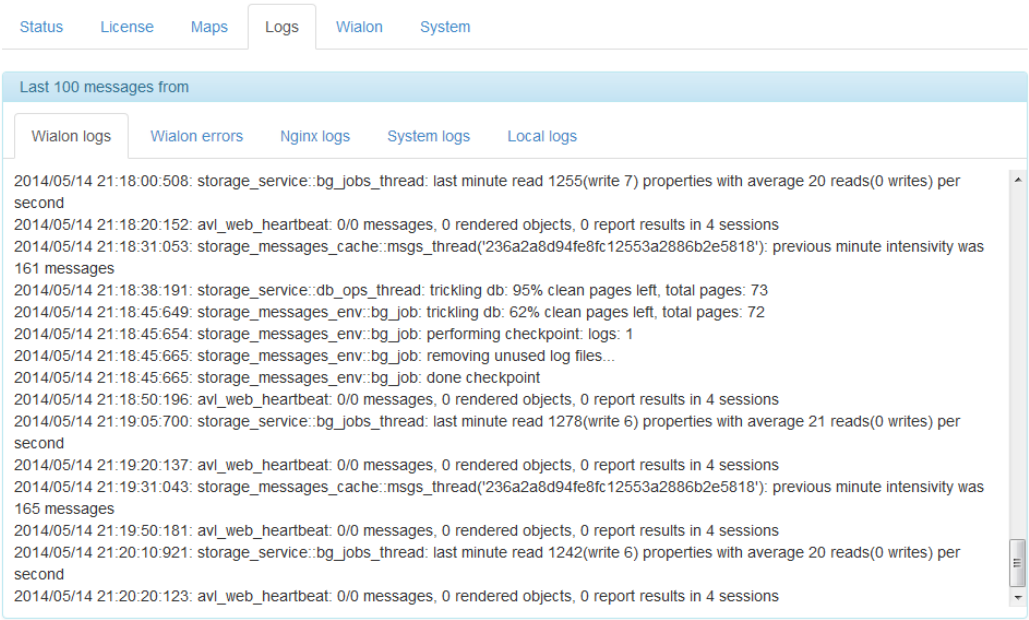
2	2000	1	7	200000
5	5000	1	8	500000
10	10000	1	9	1000000
20	20000	1	10	2000000
50	50000	2	11	5000000
100	100000	2	12	10000000
100	100000	2	13	10000000
200	200000	2	14	20000000

Logs

On this page, you can observe different kinds of logs kept in the system. Last hundred messages are available for:

- Wialon logs
- Wialon errors
- Nginx logs
- System logs
- Local logs

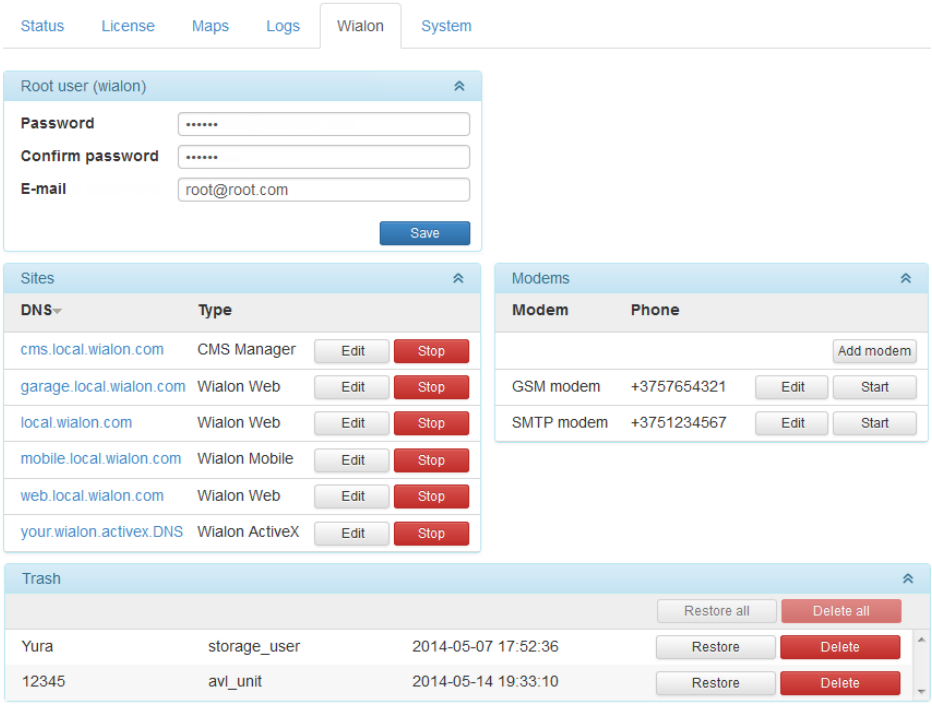
New messages are added to the bottom.



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).

Wialon

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



Further information:

Root User

The root user is “wialon”. With this username and initially the same password, you can login to the main tracking interface (Wialon Web), CMS Manager, and other Wialon services (sites).

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.

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.

Four types of sites exist:

- CMS Manager (management system where accounts, users, units, retranslators are created);
- Wialon Web (the main tracking interface where end users watch their units, generate reports, etc.);
- Wialon Mobile (a simplified tracking interface for mobile devices);
- ActiveX (a third-party software solution providing possibility to connect to Wialon database from external applications).

You can have only one CMS Manager site and one ActiveX, however, several Wialon Web sites ("Extra Site" module) and Wialon Mobile sites can be added, each located on its own DNS and, perhaps, wearing personal skin (paid option for Wialon Web sites).

Press the Edit button to adjust site configuration — mainly DNS. Additional options are available for sites of Wialon Web type. You can define your custom title for a site, add copyright (this link will be displayed in the bottom panel), and apply a personal design.

In the table, you see site DNS, type, and two buttons: to reconfigure a site and to stop/start it. Stopping a site means that users will not be able to login. Click on DNS link to open a site.

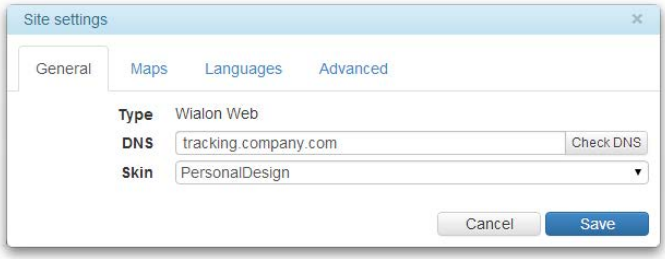
Note.
After (re)starting Wialon, all sites are restarted, too, regardless what state they were before.

Personalization

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

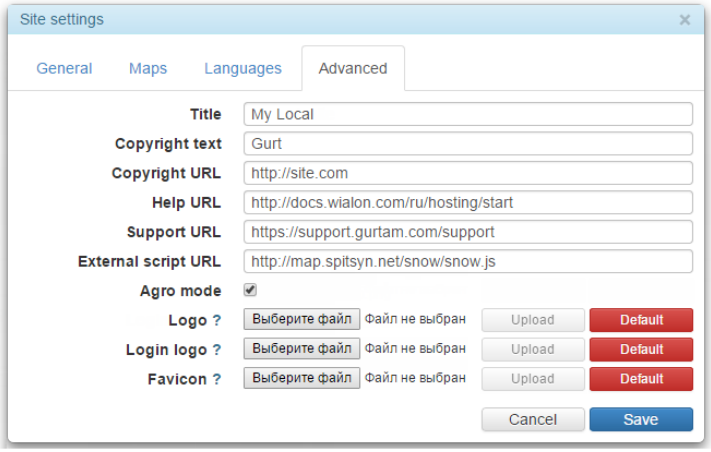
First of all, there is a paid option of "Personal Design". It provides possibility to customize color scheme, fonts, and styles specially developed for your site (in addition to logos, favicon, and copyright link). However, no changes can be made to the layout of functional blocks (like panels and menus)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

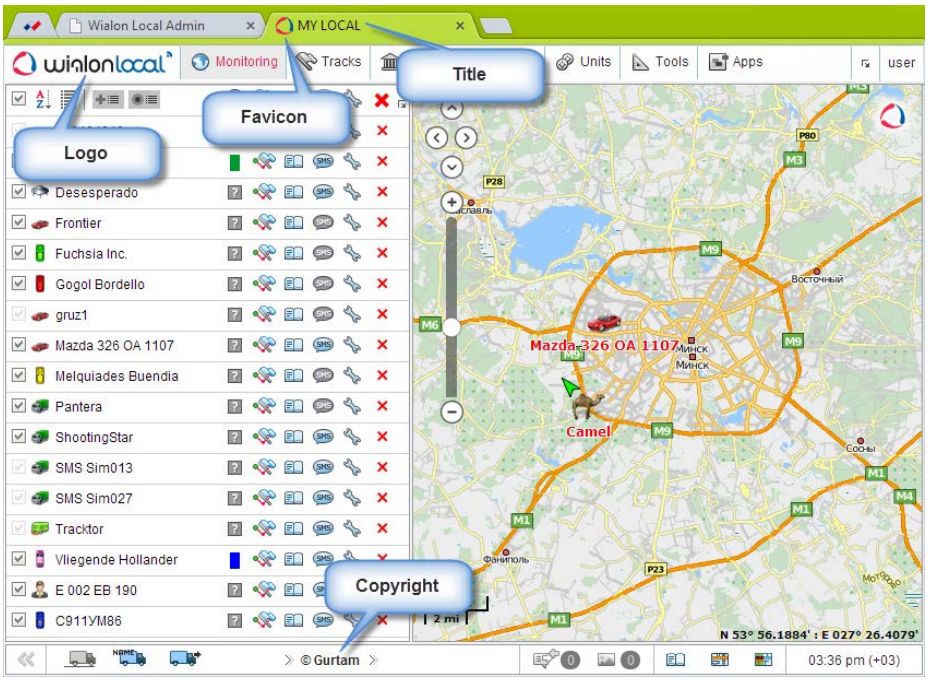


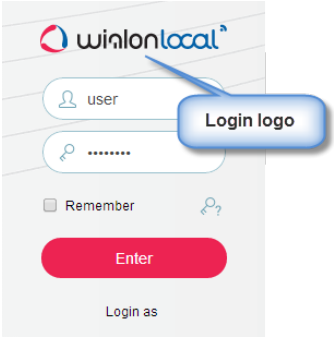
Some level of customization is possible even without personal design. You can give a title to your site, place your logos, and add copyright information. For the logos and favicon, make sure they meet requirements introduced in corresponding tooltips. After choosing an image, do not forget to press "Upload". 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 tab allows you to indicate an external script which will be available in the monitoring system. To finalize changes press "Save".

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:





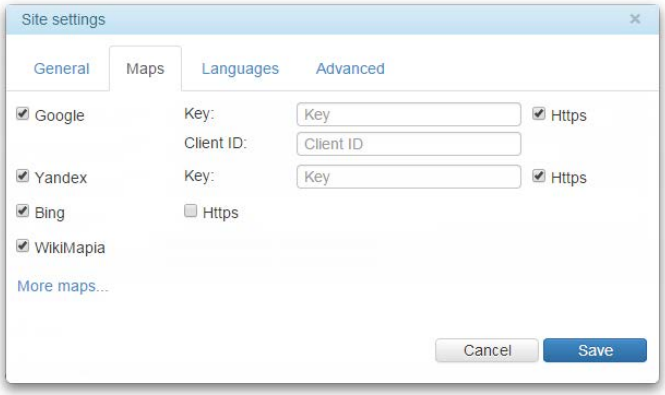
After making changes to a site, it is recommended to restart it and clear cache.

Maps and Languages

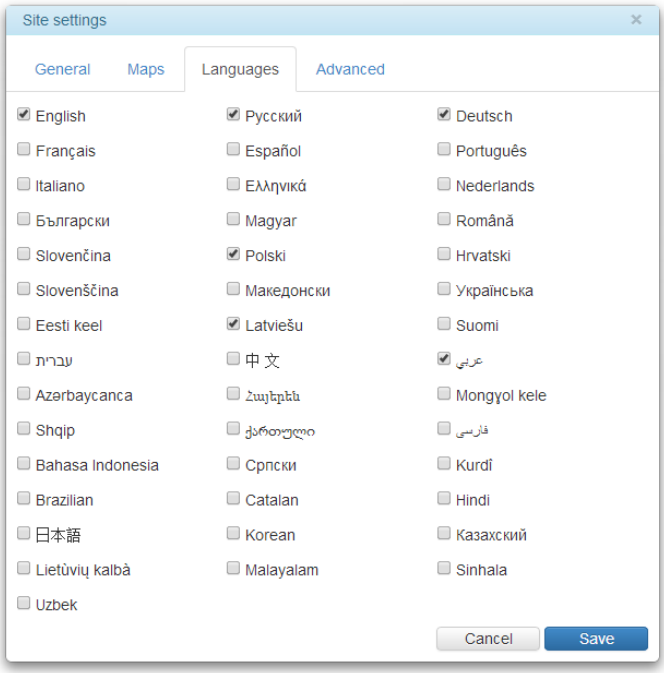
Maps should be enabled for each site separately. By default, users get access to Gurtam Maps / WebGIS (according to your system configuration) and OpenStreetMap. Other maps can be used as background for tracking units, too. The list of such maps includes Google, Yandex, Bing, WikiMapia, Navitel, Visicom, Regio, ArcGIS, 2GIS, Luxena, MyIndia. However, most of them require activation keys.

Select maps you need and enter activation keys (if needed) on this tab. Note that even with maps enabled for the site, users still have to activate maps they need in their own settings. For Google maps you can indicate 'client ID' in the

corresponding field. Moreover, if the 'Https' flag is indicated, then working with maps the secure protocol will be used.



On the Languages tab, select necessary languages. Note that if no flag is chosen, then all the languages will be available by default.



Modems

This module is paid and can be purchased on the License page.

To create a new modem, press the “Add modem” button on top of the section. Two types of modems are supported: GSM modem and SMPP gateway. Some of parameters of their configuration are common and others differ.

Modem Common Parameters

Name
Enter a name for the modem.

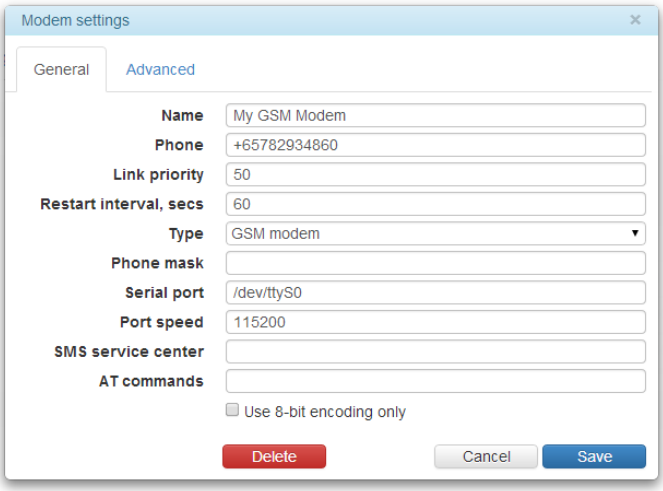
Phone
Enter phone number of SIM card installed on the modem.

Link priority
Define communications channel priority.

Restart interval
Indicate restart interval in seconds. If the connection with 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 to restrict modem activity to indicated phone numbers. If a mask is entered here, this modem will be used only to send messages to phone numbers that correspond to this mask. Otherwise, message will be sent via another modem or not be sent at all.

GSM Modem Parameters



Serial port
Indicate serial port where the modem is located.

Port speed
Indicate port speed. If any errors appear while operating, descend this value.

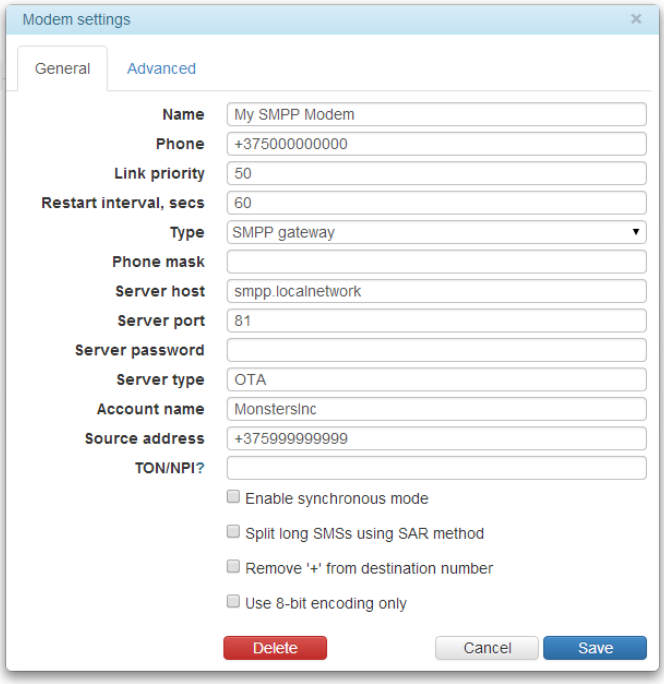
SMS service center
Usually, SMS service center is strictly indicated on the SIM card, and you will not have to enter it here.

AT commands
Indicate additional initialization AT commands if they are required according to modem instructions manual.

Use 8-bit encoding only

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

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.

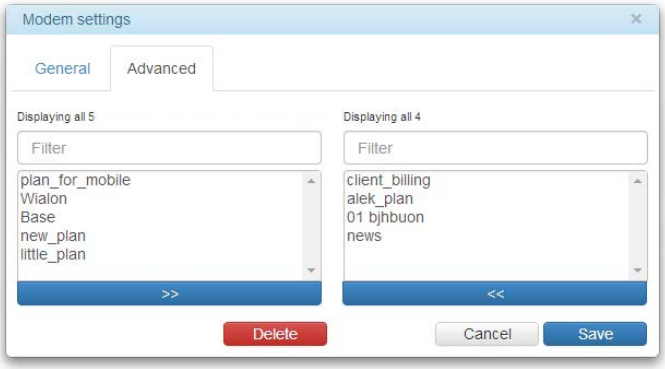
Split long SMSs using SAR method
By default, SMS messages are transmitted with UDH method (User Data Header) where system information is placed at the beginning. SAR method (segmentation and reassembly) allows to place this information at the end in TLV format, which is essential for several languages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

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

Use 8-bit encoding only
Check this option if you want to exclude other kind of encoding.

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.



Note.

To delete a modem, open its settings and press “Delete” on the bottom of the dialog.

Trash

The Trash preserves objects deleted from the system and allows restoring them if needed.

On the list, you can observe object's name, type, and date and time of deletion. Object types are the following:

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

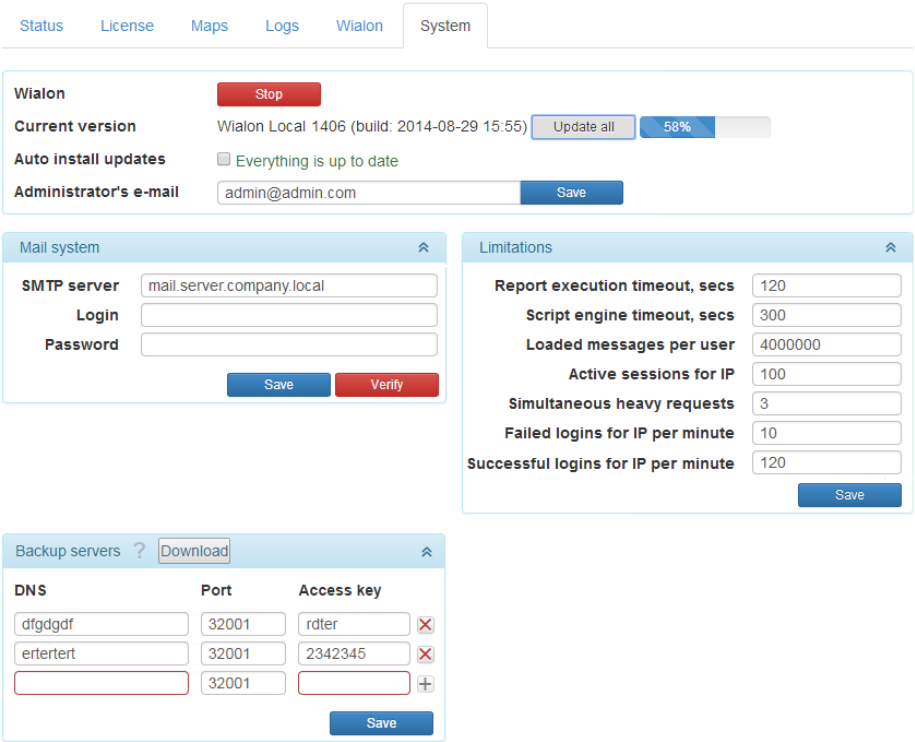
Found object can be restored or deleted from the system completely. To restore/delete multiple objects at once, select them with mouse click and then press “Restore all” or “Delete all” in the header.

System

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

Here you can also indicate your e-mail (“Administrator's e-mail”) which will be used for the following:

- to reset password in case you loose it;
- to send system reports about available updates, occurring errors, deficient disk space, etc.



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 option “Auto install updates”, the system will automatically detect 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 (like “3 updates available” instead of “Everything is up to date”) will appear near the checkbox. To install updates manually, press the link “Install now”.

No matter how you install updates, manually or automatically, Wialon will be restarted. This will cause restarting of sites, modems, etc., and all active sessions will be forcibly finished.

A 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 button ‘Update all’ situated on the tab ‘System’ and then install the uploaded update.

Mail System

For correct operation of the system, SMTP server is needed. It is used for sending mail (either to administrator about Wialon operation or to end users with reports and notifications).

Set SMTP server address first. 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 below.

When finished, press “Save”. 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 results of this check in the Log below.

Limitations

Adjust these limitations to ensure stable operation of the server and prevent it from overloading.

Report execution timeout, secs
If a report execution takes more time than indicated here, it will be aborted.

Script engine timeout, secs
If execution of scripts exceeds this time, it stops.

Loaded messages per user
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.

Active sessions for IP
Maximum number of active sessions of one user from one IP address.

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.

Failed logins for IP per minute
Maximum unsuccessful logins from one IP address in a minute.

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.

Backup Server

This module is the subject for an additional licensing and may be not included to your package.

'Hot Backup' installation software is installed to provide online data backup. This installation software is recommended to install and activate 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.

Installation

Requirements:

Reserve server needs to be installed on the 64 bit Linux operating system. The key requirement is a HDD capacity. It should be no less the HDD of the principal server.

Installation process:

- download 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
```

- launch **adf_script start**

Recovery from Failure

In case of Wialon Local server failure you should start using reserve server database copy. The following steps should be followed:

- stop Wialon on the principal Local server
- stop hot backup server
- move 'storage' directory from reserve server to the principal one
- start Wialon on the principal Local server

In case of server hardware failure, a new Wialon Local is started:

- 'custom' directory is taken from original Wialon Local
- 'storage' directory is taken from hot backup server

Changelog

This is a list of updates released for Wialon Local 1504.

May 12, 2015

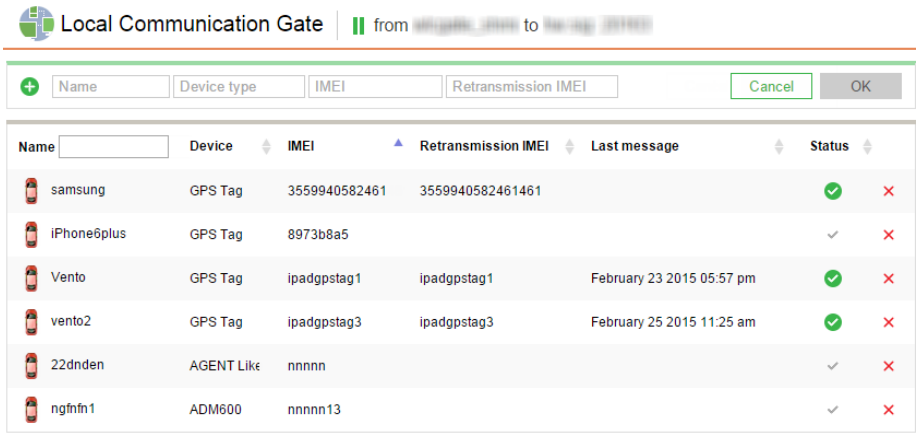
1. “Backup Server” module updated.

May 4, 2015

1. Monitoring site optimization.
2. External JS scripts for monitoring site supported.

Local Communication Gate

Local Communication Gate is an app enabling retransmission of messages from any type of hardware to your Wialon Local server. To get access to the app, contact Gurtam Help System.



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 time of last received message and 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.

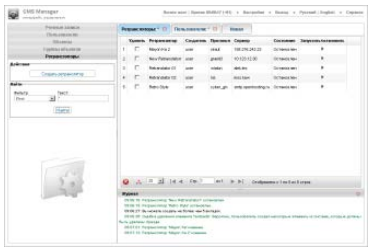
Retransmission of a unit can be stopped or restarted at any moment. Apart from that, in the top panel there is a button to start/stop the process altogether.

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 Hosting is fulfilled through a special interface — CMS Manager. It is specially designed for Wialon Local managers. CMS Manager allows you to manage your tracking service by means of system macro objects, which are accounts, billing plans, users, units, retranslators, and others.

For further information, please view:



- **Access Rights**
- **CMS Interface**
- **Accounts**
- **Billing Plans**
- **Users**
- **Units**
- **Unit Groups**
- **Retranslators**
- **Import and Export**
- **Conversion**
- **Apps**

Access Rights

Access Control List, or ACL.

Access rights refer to the possibility to see certain system objects and carry out permitted actions over them. In the first place, access rights are applied to the system macro objects such as accounts (resources), units, users, units groups, and retranslators. See more...

Access rights are defined primarily by service manager of the management interface – CMS Manager. However, in some cases it can be done by end users. 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 this user, on the *Access* tab. Alternatively, access rights can be rearranged through dialogs of other macro objects, on their *Access* tab.

Types of Rights

The set of **standard rights** ('Item ACL') that are applicable to any type of macro object is as follows:

- View item and its basic properties
- View detailed item properties
- Manage access to this item
- Delete item
- Rename item
- View customs 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

See more about standard rights...

Besides, **special rights** can be applied to each object type – a list of permitted/prohibited actions that make sense for those particular types of objects. For example, unit ACL includes a special right to create, edit and delete service intervals, user ACL includes a right to act as given user, resource ACL includes 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 ACL
- Route ACL

On the *Access* tab of every item, all rights are divided into two sections. The left section displays standard rights, and it is the same for any object. The contents of the right section depend on item type as it represents special rights.

Hierarchy

It is important to maintain the hierarchy when assigning rights:

- The user-creator has all the rights on created item, and they can be limited only by the user of a higher level.
- It is impossible to give a user more rights on an item, than the creator of this user has towards this item.

- If a user is allowed to define rights for other users, no more rights than this user has can be given.

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 seeing the item in different lists and panels. The 'General' tab (at least, name, creator, and resource or account) is available in item properties dialog. However, no property can be changed without additional rights. This right is basic, no other rights have any sense without it. This access right is often referred to as 'minimum access' or 'view right'. Units: to see counters, sensors, some advanced properties (color schemes for sensors and tracks), drivers, current location on map, to control unit groups. User: the 'General' tab with all its contents and the 'Advanced' tab (e-mail).
View detailed item properties	0x2	Allows viewing more properties of the item in question. It works only for units — i.e., the user can see but not edit the tabs 'Trip Detection' and 'Fuel Consumption', and the parameters for the reports and messages filtration settings are shown on the 'Advanced' tab.
Manage access to the item	0x4	Allows transferring rights on this item to other users, i.e., the 'Access' tab becomes available in the item properties where user can establish which actions are allowed to other users in relation to this item. User: this user can be assigned to the rights of settings by other users.
Delete item	0x8	Allows deleting the item from the system.
Rename item	0x10	Allows renaming the item.
View custom fields	0x20	The 'Custom Fields' tab becomes available for viewing in the item properties. So far as only units, groups, users, and resources have such a tab. This right and the next one do not affect other types of objects.
Manage custom fields	0x40	Allows user to create, delete, and change custom fields in unit/group/user/resource 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 editing some advanced item properties. This right is applicable only to units — i.e., gives the opportunity to edit color schemes for track/sensor on the 'Advanced' tab, or enable icon rotation on the 'Icon' tab.
Change icon	0x100	Allows changing item's icon. It is valid only for units and unit groups, because other items do not have such feature as an icon.
Query reports or messages	0x200	You can query messages and create reports for an item. Enabling this right for Units provides with a possibility to view messages for the selected interval, query reports, and build tracks. For a User: provides access to viewing user activity (logins, logouts) either through reports or on the 'Logs' tab. For a Resource: provides with a possibility to use the 'Statistics' tab (history of payments).
Edit ACL propagated items	0x400	Only for unit groups.
Manage log	0x800	Allows seeing item log in reports (or messages).

View and download files	0x4000	Allows a user to use file server for viewing and downloading files for the chosen item.
Upload and delete files	0x8000	Allows a user to use file server for uploading and deleting files the chosen item.

If a user has rights to see a unit's creator and account, its groups, assigned driver, etc., these rights can be fully sensible only if this user has also at least view access to those items (user-creator, account, group, driver).

See also:

- Unit ACL
- Unit Group ACL
- User ACL
- Resource ACL
- Route ACL

Unit ACL

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

Standard access rights have been described above. Below is the list of special rights which can be applied specifically for units:

Unit ACL	
Edit connectivity settings	Allows user to see and edit device type, unique ID, phone number(s), device access password on the 'General' tab, and messages filtration parameters on the 'Advanced' tab. Device type, phone(s), and UID appear also in unit's tooltip and in extended unit information. If SMS service is activated, then the user can also send SMS messages to this unit.
Create, edit, and delete sensors	Sensors and their values are available without any particular rights, however, this access flag allows to edit and delete them as well as create new. Besides, calculation tables of created sensors become available for editing.
Edit counters	Allows changing values of the counters (GPRS traffic, mileage, engine hours) and methods of their operation.
Delete messages	Allows deleting data messages and messages about sent commands in the Messages panel. It also allows deleting records from the log (if the 'Manage log' flag is enabled). Works only in combination with 'Query messages or reports'.
Execute commands	Allows executing commands over the unit (for example, sending them from the Monitoring panel).
Manage events	Allows user 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. Having such flag activated user can also delete registered events. If the flag 'Manage log' is enabled, user can also add a record to a unit log.
View service intervals	Allows viewing the 'Service Intervals' tab in unit properties dialog as well as viewing maintenance state in unit's tooltip and in extended unit information.
Create, edit, and delete service intervals	Allows user to edit and delete service intervals as well as create new. Works only in combination with the previous flag.
Import messages	Allows importing messages to a unit database. Works only in combination with 'Query messages or reports'.
Export messages	Allows exporting messages from this unit to a file. Works only in combination with 'Query messages or reports'.
View commands	Enables the 'Commands' tab in unit properties.
Create, edit, and delete commands	Allows to create, edit, and delete command on that tab. Works only in combination with the previous flag.
Edit trip detector and fuel consumption	Allows editing such tabs as 'Trip Detection', 'Fuel Consumption', and 'Eco Driving'. Works only in combination with 'View detailed item properties'.
Use unit in jobs, notifications, routes, retranslators	Allows user to create jobs and notifications for this unit, assign it to routes, and use it in retranslation.

Some details about standard rights for units:

View item and its basic properties

The following information is available in 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 – list of sensors; on the 'Unit Groups' tab – list of groups where unit belongs (if those groups are accessible). Information about unit's current state can be seen in its tooltip and in extended unit information: last message time, current location, speed, altitude, satellites, values of counters, sensors, and parameters as well as presence in geofences and assigned driver. Unit can be displayed in different lists and panels, watched on the map in real time (although tracks cannot be built), its performance on routes can be observed (although assigning it to a round is prohibited). This flag also allows controlling unit groups, i.e., add/remove unit to/from groups which can be done through unit group properties dialog.

View item detailed properties

The user can see properties applied to reports: the 'Trip Detection' and 'Fuel Consumption' tabs, reports parameters and messages filtration settings on the 'Advanced' tab. Editing these things is not allowed, neither is report execution.

Edit not mentioned properties

These properties are 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 unit log through messages or reports (if the flag 'Query messages or reports' is enabled) and make custom records in the log (if the flag 'Manage events' is enabled).

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 has been described above. The flag 'Edit ACL propagated items' does not affect units at all.

Unit Group ACL

The set of rights for unit groups is the same as for individual units. Access given to a group is applied for 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 commands of each unit in the group.

Besides, some access rights can affect not only units in a group but a group itself. For example, if the right to change icon is given to a user, 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 flag **Edit ACL propagated items** is the right that allows adding and removing units to/from the group.

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

User ACL

Users can receive rights on any system objects including other users. Put it differently, user can be both a subject and an object of ACL relations. If User A has access to user B, then User A can see User B in the system, view and edit its properties and individual settings, control its activity in the system, etc.

Standard Rights

Some of the standard access rights are applicable to users:

- **View item and its basic properties**
  User appears in various panels and lists. The 'General' tab with all its contents and the 'Advanced' tab (e-mail) are available in the User Properties dialog (only view). User name can be displayed in different reports and in 'Creator' field.
- **Manage access to this item**
  User appears on the 'Access' tab of the User Properties dialog of other users, where access to this user (as system object) can be adjusted.
- **Edit not mentioned properties**
  Allows to edit the 'Advanced' tab in the User Properties dialog and change individual user settings as well as send notices to this user from CMS Manager.
- **Query reports or messages**
  Enable the 'Logs' tab in the User Properties dialog — there you can observe user's activity (logins, logouts to different services of the system). This flag also allows generating reports concerning a user ('Logins', 'Custom fields', and the corresponding charts). However, to query the 'Custom Fields' table it is necessary to possess the 'View custom fields' right towards a user. Moreover, the 'Log' table requires a possession of the 'Manage item log' right towards a user.

Standard flags **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.

Access rights such as 'View detailed item properties', 'Change icon', and 'Edit ACL propagated items' do not affect users at all.

Special Rights

Special rights that can be applied to users:

User ACL	
Manage user's access rights	In the User Properties dialog, the 'Access' tab becomes available where the user can be given rights to various system objects. Besides, user's rights can be changed automatically – through appropriate jobs and notifications.
Act as given user	Right to log in to the system as given user, make this user creator of system objects, etc.
Change flags for given user	Allows changing properties on the 'General' tab of the User Properties dialog. However, changing password requires also the previous right.

Resource ACL

Access to a resource means access to its contents such as POIs, geofences, jobs, notifications, drivers, report templates, etc. User can have either just view access to those items or edit privileges. Manipulations with those items are possible in the main interface of Wialon Hosting.

If a resource is actually an account (which means that it has its billing plan activated), then more access rights can be applied, like add payments, define permitted service and their cost, etc. Such manipulations are possible only in CMS Manager.

Standard 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 like units, users, units groups belong to this account. It is usually written on the first tab of their properties dialog.
- **View detailed item properties**
  The tabs 'Payment', 'Features', and 'Account' appear in the Account Properties dialog, where you can see account's balance, available services and their cost. If the end user gets this right to their own account, they can see the 'Account' tab in User Settings (it gives information on used and available services, account's balance, etc.
- **Delete item**
  Allows deleting resource with all its contents. However, to delete an account, you should additionally have the flag 'Manage account'.
- **Query reports or messages**
  For resources, this flag allows to generate the 'Log' table and see how different users created, edited, and deleted resource's contents (at that, the flag 'Manage item log' is required). This access flag allows also user to generate reports on drivers and trailers as well as driver and trailer groups if they belong to this resource. For accounts, this flag gives possibility to see the 'Statistics' tab (history of payments and withdrawals) but only if you have the flag 'View detailed item properties', too. The similar sub-tab appears on the 'Account' tab of the Account Properties dialog.

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 flags as 'Edit not mentioned properties', 'Change icon', and 'Edit ACL propagated items' do not affect resources or accounts at all.

Special Rights

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

Resource ACL	
View POIs	Allows to view POIs belonging to this resource.
Create, edit, and delete POIs	Allows to edit and delete POIs belonging to this resource as well as create new.
View geofences	Allows to view geofences belonging to this resource.
Create, edit, and delete	Allows to edit and delete geofences belonging to this resource as well as create new.

geofences	
View jobs	Allows to view jobs belonging to this resource.
Create, edit, and delete jobs	Allows to edit and delete jobs belonging to this resource as well as create new.
View notifications	Allows to view notifications belonging to this resource.
Create, edit, and delete notifications	Allows to edit and delete notifications belonging to this resource as well as create new.
View drivers	Allows to view drivers and driver groups belonging to this resource. Moreover, allows to view the list of units attached to this resource of drivers and intended for automatic binding (the Units button in the Drivers panel).
Create, edit, and delete drivers	Allows to edit and delete drivers and driver groups belonging to this resource as well as create new. Moreover, allows to create and edit drivers-units association list.
View trailers	Allows to view trailers and trailer groups belonging to this resource. Moreover, allows to view the list of units attached to this resource of trailers and intended for automatic binding (the Units button in the Trailers panel).
Create, edit, and delete trailers	Allows to edit and delete trailers and trailer groups belonging to this resource as well as create new. Moreover, allows to create and edit trailers-units association list.
View report templates	Allows to view report templates belonging to this resource.
Create, edit, and delete report templates	Allows to edit and delete report templates belonging to this resource as well as create new.
Manage account	For accounts only. Combined with the flag 'Delete item', allows to delete an account from the system completely, including resource with its contents, account's creator and all objects created by this user. In combination with the flag 'View detailed item properties', gives possibility to control payment and days (the 'Payment' tab), number and cost of services (the 'Features' tab).

Note.
In the main Wialon interface, only manipulations with inner resource contents is possible (i.e., geofences, notifications, report templates, drivers, etc.), including the possibility to see the log of changes concerning this contents. Actions concerning accounts (such as payment control, tariffing, etc.) can be performed only in CMS Manager.

Route ACL

Route access rights could be the following:

- **View item and its basic properties**
  Having this right indicated allows a user to see the route in the 'Routes' panel.
- **Manage access to this item**
  When this right is indicated, a user can transfer the right to the routes on other users. Moreover, this right allows a user to see the route not only in the panel but also on the map. A user is enabled to 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 deleting a route.
- **Rename item**
  Allows renaming a route.
- **Query reports or messages**
  Allows a user to receive reports containing data for the available route.

Creator

Creator is a user that initially has full access rights to an object being created and can define access rights for other users. The creator of a user also automatically gets manage rights to units created by this user. Afterwards creator's rights can be dimensioned if needed.

Building hierarchy with the help of creator allows to divide the whole work among several users, assign different rights to objects, as well as reduce information content processed on the screen.

In the system, there can be no objects without 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 existent users. However, when a new account is created, its creator can be created with it simultaneously.

It is impossible to delete a user that is the creator of some object. You first should delete this object. For usual users it is done manually. What concerns an account creator, it can be deleted only deleting this account.

To establish access rights it is necessary to have the flag *Manage access to this item* both for the user who is supposed to obtain rights and the object to which the access is given.

Access Dialog

To manage access to system objects, you are required to have the flag *Manage access to this item* towards these objects and the flag *Manage user's access rights* towards users to give them rights.

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

On the left, you will see the list of users (only those on which you have the right 'Manage user's access rights'). Users already having some access to the item are highlighted with colored background and displayed on the upper part of the list. To quickly find a user, enter user's name or its part into the filter above.

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

— access rights sorting to be used.

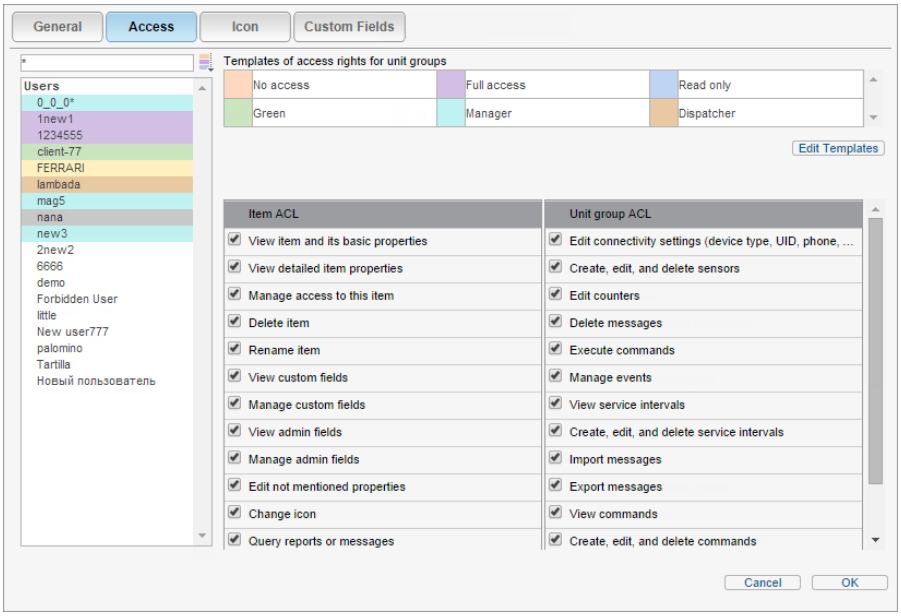
— alphabetic sorting to be used.

Note.
If the number of items exceeds 1000, then the default setting for sorting is alphabetical.

On the right, you see the list of access flags. When you switch users on the left, checkboxes on the right change depending on access that is provided to the selected user.

Rights are divided into two sections — standard (see Item ACL) and special (lower part). Special rights differ according to item type:

- Unit ACL
- User ACL
- Unit Group ACL
- Resource ACL
- Route ACL



Here are some principles to bear in mind when assigning access:

- To set rights, select a user on the left and assign access flags or a template on the right.
- Several users can be selected at once — use <shift> or <ctrl> keys for that.

- If you are trying to set a flag which does not work without another flag, that another flag will be marked automatically. For example, if you mark the flag 'Manage custom fields', the flag 'View custom fields' will be added to it, because it is impossible to edit something you cannot even see.
- The same is with removing flags. It is impossible to remove a flag while there are other flags depending on it. Those subordinate flags must be removed first.
- To place or remove all flags in one section at once, hold on the <ctrl> key and click on any flag.
- If you are trying to assign a right you do not have yourself, it will be reset upon saving action.

When finished, press OK to apply new rights.

Access Rights Templates

Templates facilitate the assigning of access rights. Different sets of rights could be created for different roles, for example, operator, manager, customer, etc. Moreover, personal templates can be made for any type of element (unit, route, etc.). The created templates can be applied to the chosen user within one mouse click.

Templates section is situated in the dialog at the top of access rights list. You can edit or delete the templates provided by default as well as create new ones. 'Edit Templates' button situated at the bottom of templates list provides such an opportunity. Upon the clicking of this button the left part of the dialog and access rights list is shown as disabled, and the buttons of working with templates appear.

To create a new template, click the 'Create' button. A new template appears in the templates list. Name it (double click on the name field), and then put the necessary flags in the activated access rights list below. Click 'Save'.

A new template can be created by making a copy of an existing one. To do so, click on the corresponding button which appears when you point on a template with mouse cursor. Make changes (edit name and flags), and then click 'Save'. Note, that you can not create templates with identical flags for the elements of the same type. Such copies will be deleted.

To delete access rights template click on the corresponding button which appears when you point a mouse cursor on a template.

Each template has its own color which is given to it upon creation. The color can not be changed. If a template is applied to any user, then the user name will be highlighted in the corresponding color in the left part of the dialog. Though there are some exceptions in color appliance. If there are no flags chosen in the template (for example the 'No Access' template), then its color is not applied (users without access are not highlighted in the list). The users which have an access different to all the templates are highlighted in yellow in the list. This color differs from all the other colors of the templates. The same color is given to the users to which the template can not be completely applied (when the 'distributing' user does not have the rights which he is going to pass to the others).

Attention!
Establishing access to users as system objects is a bit different from other objects (see user properties dialog).

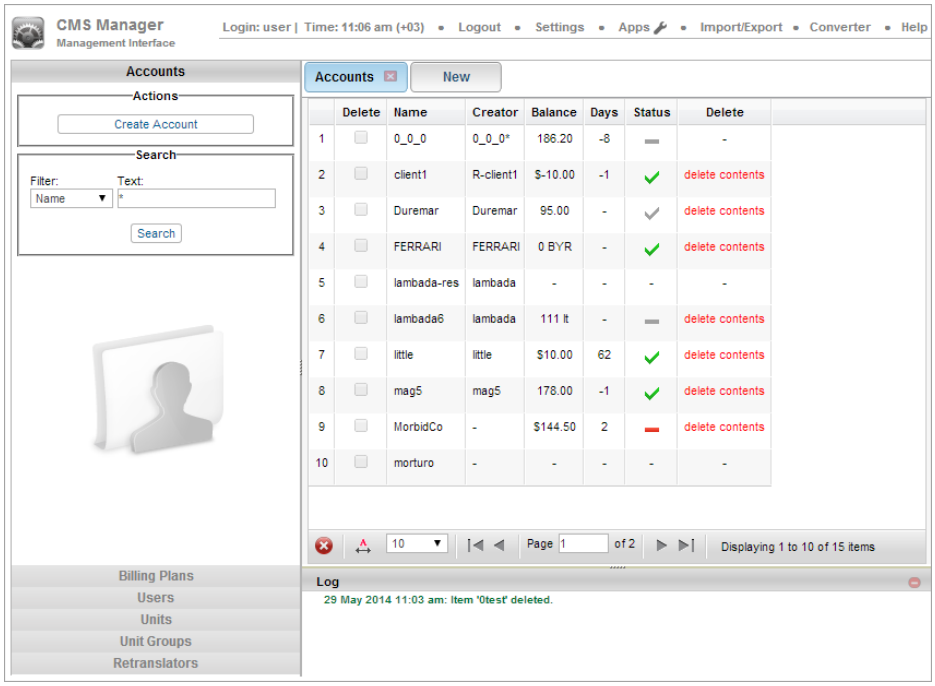
Hint.
User's access to units can be changed not only manually but also automatically — through some types of jobs and notifications.

CMS Interface

CMS interface is simple and in many cases intuitively intelligible. There is plenty of screen tips associated with various buttons, icons, dialog boxes and other controls.

The work area can be divided into several sections:

- **Top panel** is situated at the top of the window. It shows your login, current time, and some buttons (Logout, Settings, Import/Export, Converter , Apps, Help). Here, in the top panel, all warnings are shown.
- **Navigation and search panel** is a panel at the left of the window. 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 you can view messages about succeeded actions or occurred errors.



Sizes of all panels are customizable. To adjust the size of the results panel and the log in relation to each other, drag the horizontal slider between them up or down. To adjust the width of the navigation panel, find a vertical slider and drag it right or left.

Top Panel

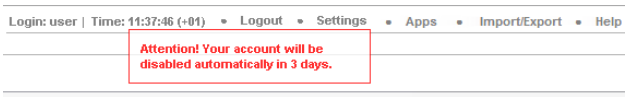
In the top panel of CMS Manager you can find the following features:

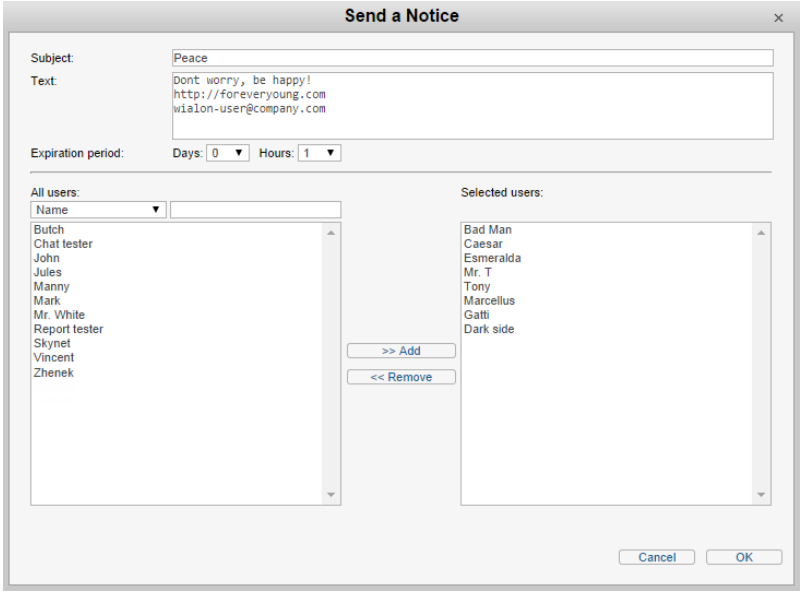
- login you have used to enter the management system
  (another login can be displayed in brackets if the main user is acting as another user);
- current time (time zone in brackets);
- the Logout button to exit or reenter;
- Settings button to configure some CMS settings;
- Apps menu to open available applications;
- Import/Export button to store and copy different items and their properties;
- a link to Help (optional).

Note.
More buttons are displayed for top users:

- Conversion — enables to transfer some objects from one metric system to another;
- the button in the shape of a wrench to manage Apps.

Information notices from service administrator can appear in the top panel as well as notices on the amount of days left before blocking the tracking system (if stipulated by the tariff agreement).





Navigation and Search

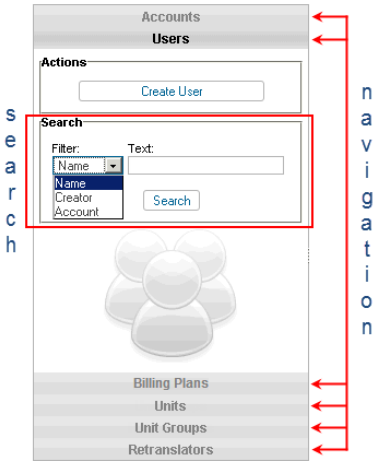
Navigation and search panel is situated on the left of the window. Here you form a query for items to be displayed in the results panel.

Navigation

There are five tabs in the navigation panel. Each of them represents some system object: *Accounts, Billing Plans, Users, Units, Unit Groups, Retranslators*. To move to a tab, just click on its name.

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

The **Search** section is used to find already created objects and display them in the results panel where you can manage objects, view and edit their properties.



Search

To search objects:

1. Specify a filter;
2. Form a request in the Text field;
3. Push the Search button or <enter>;
4. Observe the found objects in the results panel on the right.

Note.
To simply **find all objects** of some kind (for example, all users), leave the Text field empty (or with just a single asterisk) and press <enter>.

Search Filter

In the *Filter* combo box select the search criteria. It can be:

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

If you are searching for units, some additional filters are available along with these ones:

- *Unique ID*: unique identification number given to a unit when creating it;
- *Phone number*: the phone number of a SIM card embedded to equipment (or two);
- *Device type*: equipment type/name;
- *Unit group*: a group where a unit is included;
- *Custom fields*: custom fields configured in unit properties;
- *Admin fields*: administrative fields configured in unit properties.

If any of these properties is not available to you according to your access rights, searching by this criteria will be unsuccessful.

Retranslators can be filtered according to protocol, and billing plans — only by name.

Search Text

Formulate you request in the *Text* field. Use any characters allowed and the asterisk sign (*). The asterisk is a wildcard sign that represents any combination of characters. The asterisk can be placed at the beginning, at the middle or at the end of the request text. It can be used even several times. For example, to find all MANs, select search by name, type ***man*** in the Text field, and push the Find button (or <enter>). All units which names contain 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. As well as the asterisk sign, it can be put at any place of the query.

Comma sigh (,) can be applied to string together several requests. For instance, you would like to find all MANs and all Ivecos. In this case, type ***man*,*iveco***.

Results Panel

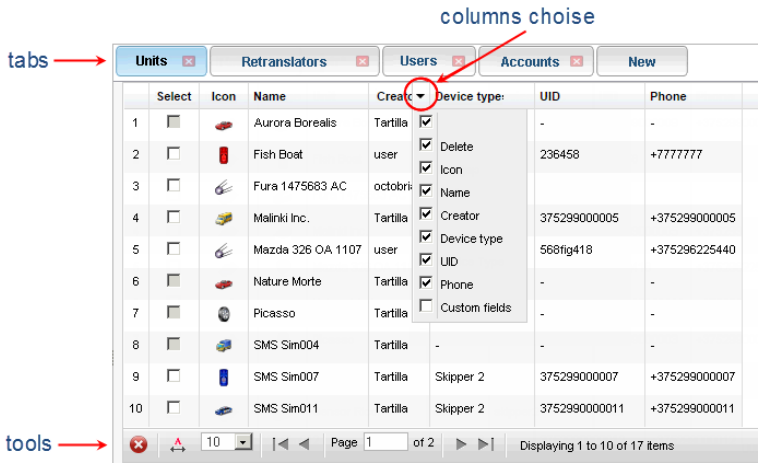
The results panel is located at the right top part of the window. Here the results of search are displayed.

It is possible to create up to five tabs in the results panel. To create a new tab, press on an inactive **New** tab that is situated on the right of all created tabs. To navigate between tabs, just click on a needed one. To close a tab, press on a red cross near its name.

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

Your actions (such as search) are always applied to an 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*.

For different type of objects, table contents are also different. The most columns are provided for units.

The set of columns is adjustable. To customize it, click on the table header and check needed items (or vice versa, unselect some items to hide them).

At the bottom of the table, there is **tools panel** that is useful to perform several tasks such as delete objects, move to another page, etc.

Columns width can be adjusted manually. To do this, click on a column edge and holding the left mouse button drag it in the needed direction. To restore auto width, push *Columns auto width* button.

Adjust the number of rows to be displayed on one page (10, 50, 100, 500, 1000 are available).

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

Standard Operations

A number of standard actions can be performed over any object displayed in the table (account, user, unit, unit group or retranslator): create a new item of this kind (except billing plans), view or edit objects' properties, copy or delete an object. Billing plans can be only viewed and edited, and they are available only to the top user.

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 necessary fields and tabs of the dialog and press OK. OK button remains disabled until information in the dialog is enough and correct. For example, it is impossible to create an item with no name or with name shorter than 4 characters. Do not use any prohibited symbols in text fields of the dialog. Read Input Rules for details.

A newly created object will not be displayed in the table until you apply some search parameters.

Copying

Copying is a quick way to create new objects having similar properties with existent objects. Units, users, unit groups, amd retranslators can be copied (but not accounts/resources or billing plans).

To make a copy of an object, hold the <ctrl> key and click on the needed object in the table. A properties dialog with information identical to the properties of the object being copied will open (at least, those properties which can be shown according to your access level). However, the very tab which represents access rights *cannot* be copied. You can alter any properties if needed, e.g., unique information like name, phone number, etc. Then press OK to complete creation.

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

View and Edit

To view or change item's properties, click on it in the table. A dialog with its properties will open. If you have not enough access to the item, OK button is not available and you cannot save any changes. Besides, some properties and even the whole tabs can be hidden.

If you have made any changes and want to save them, press OK. To quit dialog without saving changes, press *Cancel* or click on a small cross sign 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 put any flag in the corresponding column. Then push the button 'Delete checked items' at the bottom of the table. When getting a warning message, confirm your intentions or cancel the action. Several items can be selected, too. The result of the action is displayed in the log.

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

You should know some particularities of deleting different types of objects:

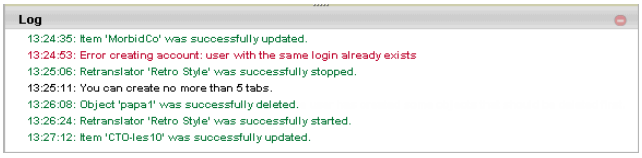
- Deletion of a unit group or retranslator does not result in deletion of units that are included in them.
- To delete a user, use the red *delete* button that is displayed against each user in the table. However, only users who are not creators for any system objects can be actually deleted. See more...
- An account can be deleted only with all its contents and depending objects, that is why deleting accounts is different from deleting other system objects. See more...

Log

The log is situated at the bottom of the window. It contains records of current events and operations running in the system.

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

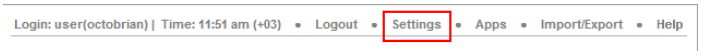
The log uses fonts of different colors in order to separate different type of entries from each other. Black color is for information messages, for example, about the number of tabs allowed to create. Green color is used for preventive messages, for example, when a new object is created or successfully deleted, or its configuration is changed. Red records mean error messages.



You can clean up the log using the appropriate button that is in the right top corner of the log panel.

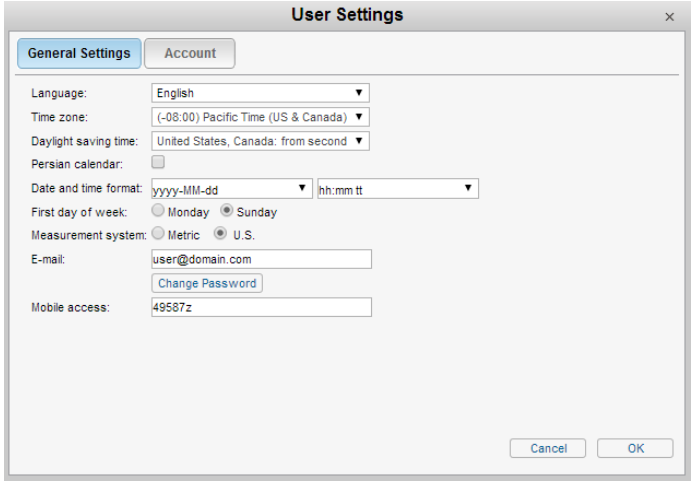
CMS Settings

To view and change CMS settings, click on the Settings button on the top panel. Here you can customize some parameters.



The User Settings dialog contains two tabs:

1. **General Settings** – there you can indicate your time zone, e-mail, change password, etc.
2. **Account** – there you can see your current balance and days left, services used and left, transactions made, etc.



The User Settings dialog in CMS Manager is a reduced version of the User Settings dialog in the main interface.

Accounts

In most cases, resource and account can be used as synonymic notions, however, sometimes it is needed to understand the difference between them.

Resource is a system macro object which includes different micro objects as its contents, which are POIs, geofences, jobs, notifications, drivers, trailers, and report templates. Availability of a resource gives user opportunity to create such objects. These contents can be easily saved to a file or copied to another resource (see Import and Export).

A resource becomes an account or rather a part of an account in case a separate billing plan was activated while creating this resource. In most cases the names of an account, associated resource, and their creator is the same name.

More than one resource (or even dependent account) can be connected to an account. The point is that an account can hold not only a resource and its contents (micro objects mentioned above) but also information about other macro objects as units, users, unit groups, routes as well as other dependent resources and accounts.

The count of both macro and micro objects is done in the account and money is written off for their use. A billing plan is applied to an account and not to a user. Therefore, Wialon Hosting manager uses account to limit users' activity, define number and cost of available services, control payment, etc.

Creator is a crucial part of an account. Micro objects are classified to an account by their resource, but macro objects reveal their belonging to an account through their creator. All macro objects created by the same user who is a creator of an account (or by other users whose creator is this user) are automatically attached to this account.

An account is usually created for each client individually, however, a number of users can exist within one account and have different rights and access to units. For instance, we can create an account *Vehicle Fleet 666* with users *Boss*, *Accountant*, *Machinist*, *Manager*, etc., and each of these users will use Wialon in their own way.

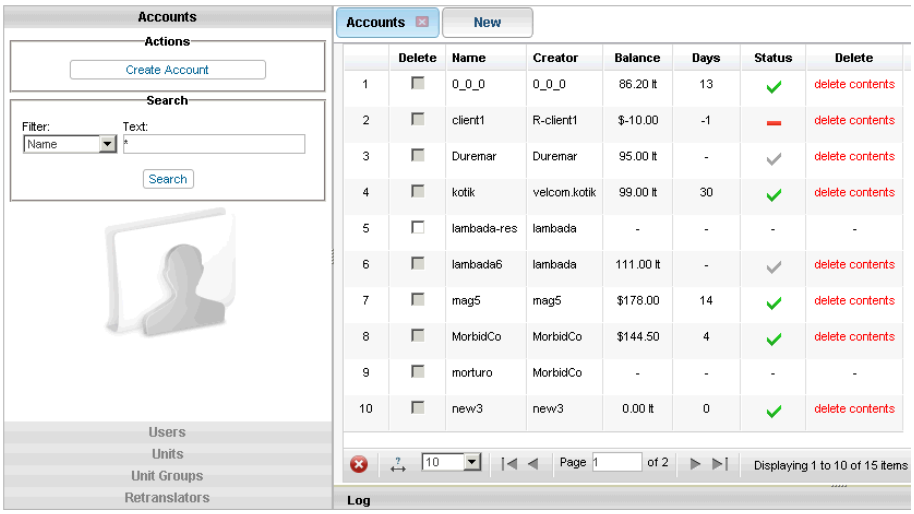
All dependent macro and micro objects are deleted together with their account. More...

- Working with Accounts
- Creating Accounts
- Payment Control
- Features
- Deleting Accounts
- Transferring Units from One Account into Another

Working with Accounts

Working with accounts is possible only in the management interface that is CMS Manager. Open the Accounts panel in the navigation panel. Here you can:

- create new accounts;
- find and display existent accounts;
- control clients' balance, add payment and days;
- allow/deny/limit access to different services (features);
- edit and delete accounts.



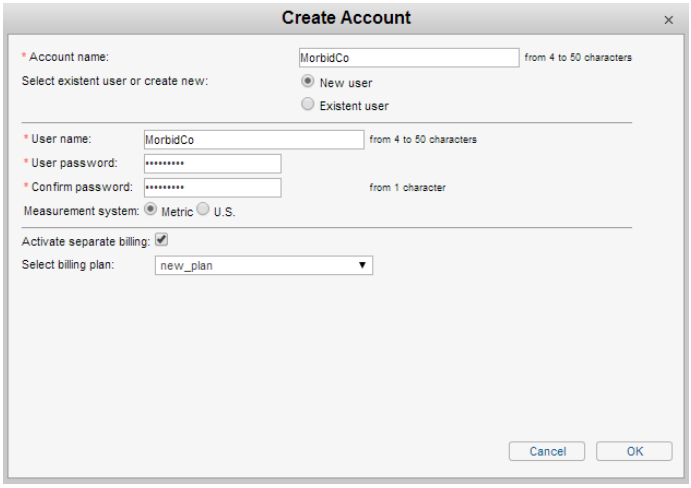
In the table of results, you see accounts'/resources' names, creators (if available), columns to see account's balance, days left (see estimated blocking date in the tooltip), status (Active/Blocked), and buttons for deletion. Only accounts (not resources) can hold information about status, balance and days. Besides, accounts and resources differ by the way on deleting them. More...

Click on any account/resource in the table to see its properties. Depending on your access, certain tabs and fields of the dialog can be hidden or unavailable for editing. The **Account Properties dialog** can contain up to 6 tabs (however, resources can have only 2). By default, only the *General* tab is available. There you can change only account's/resource's name and see its parent account and creator. On the *Payment*, *Statistics*, *Features*, *Custom Fields* and *Account* tabs you can control payment, add days, define services availability, enter any information regarding a resource and store it, etc. (see Payment Control and Features for details).

Besides, it is possible to store resource contents in a file or copy elements from one resource to another. See Import and Export for details.

Creating Accounts

Accounts can be created and deleted only by service manager. To create a new account, press the 'Create Account' button. Fill in the given fields and press OK. If this button is not active, then you have no rights to create system objects.



Account name
Give the account its unique name from 4 to 50 characters. In the system, there can be no accounts with the same names.

Creator
As a creator of the account an existent user can be selected or a new user can be created together with the account.

- *New user*: a new user will be created and assigned as account's creator. Choose a login and create a password for a new user. By default, an account's name is used as login, but you can enter any other name. Set a measurement system for the user. The metric system uses kilometers and liters, the U.S. and imperial systems — miles and gallons (see the difference here).
- *Existent user*: in the dropdown list, choose a user from available ones. ⓘ Note, that the user which appears to be a creator of system macro objects can not become a creator of new accounts as such an operation violates current hierarchy. Attempt of such an operation is recorded in the log as an error of account creation.

ⓘ *Note*.
When a resource is created, its measurement system is initially taken from its creator. However, it can be changed afterwards through the conversion.

Activate separate billing
If activated, a separate billing plan can be assigned to this account (select billing plan from the dropdown list). If not activated, an account with the same billing plan as yours will be created, so a user with the same possibilities as yours will be created.

ⓘ *Note*.
If you have no billing plans, separate billing cannot be used.

If all fields are filled in correctly, the OK button becomes active. Push the button to save the account. See the result in the log.

As the result, a new account (or resource) is created or both account and user are created. Resource is created in case if an account is created as an existent user and separate billing is not activated.

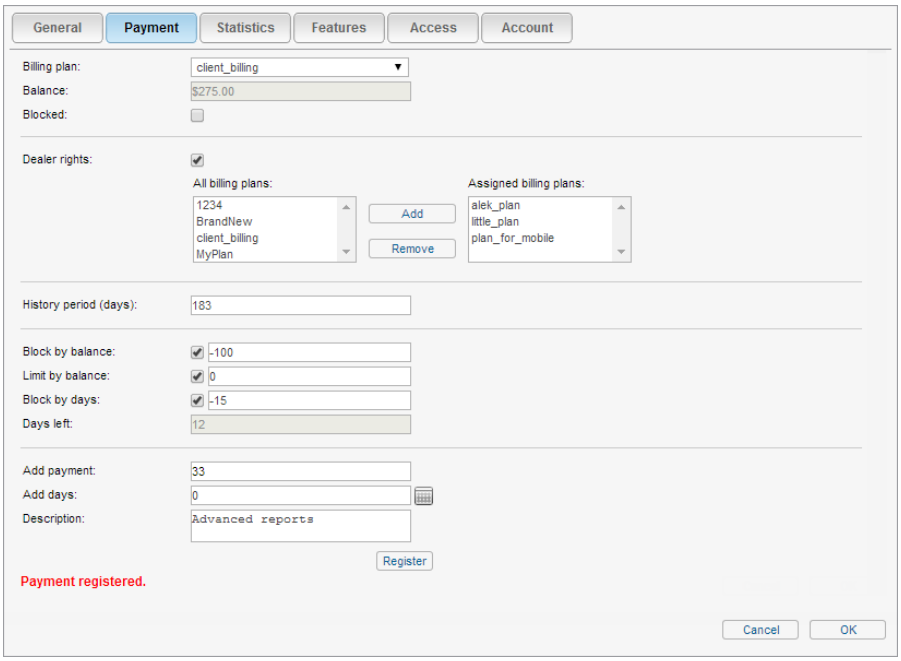
By default, the user indicated while creating the account is assigned to be its creator. However, *manage* access to the account are given both to this user and the manager who created the account. If a user was created together with

account, this user receives *manage* access to account and *edit* access to user itself. The creator of such a user then is the manager who has created it.

Payment Control

In the account properties dialog on the Payment and Statistics tabs, you can view account balance, add payment and days, etc.

Payment



Billing plan
To change billing plan, select one from the dropdown list of available plans.

Balance
In this field, you see the current balance of the account.

Blocked
This flag shows whether the account is active or disabled at the moment. If a critical level of balance/days is reached, the account is blocked automatically. When a payment is made for such a blocked account, you can remove the Blocked flag manually to quickly return the account to life (although it would be done for you automatically anyway but a little bit later). This flag can be also used to block the account manually, however, note that it will work correctly only if the level of balance/days is zero or negative. The state of this flag can be changed without opening the Account Properties dialog — straight from the list of accounts (see the last column).

Dealer rights
Activate this flag to create a subdealer. It means this account will possess the same rights as you (access to modules, services, billing plans). Then choose billing plans that will be available to this account.

History period
You can set history period to store data (in days). It means that all messages older than this term will be automatically removed from the database. The value of history period should not exceed the same value in the properties of the billing plan assigned to this account. To restore the default value, enter '0'.

The next three options refer to restricting user's activity in case of nonpayment. Usually, these values are either zero or negative. It is to give users possibility to use the tracking system for a while even when payment date is expired. If these options are not activated here, in this dialog, they take over assigned billing plan or top account.

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

Limit by balance
Enter balance reaching which paid services will be denied.

Block by days
Enter days counter reaching which the account will be blocked. This will work independently of 'Block by balance' option. If both of these parameters are adjusted, an account will be blocked when meeting either of set conditions. In this case, the account can be blocked automatically not only when the balance is low, but also if there are no days left. It can be useful for demo access, for example, or to control monthly fee. When the days counter embedded in the system says that days left on an account have reached the value indicated in this field, the account is blocked automatically.

Days left
If the previous option was activated and this state was successfully saved, the field 'Days left' appears at the next opening of the dialog. It shows how many days have left before zero. At that, when 5 days are left, a special warning starts to come each time when the user logs in to the system: “Your account will be disabled in .. days.” When days are negative, another notification is displayed: “Attention! Your account will be blocked soon.”

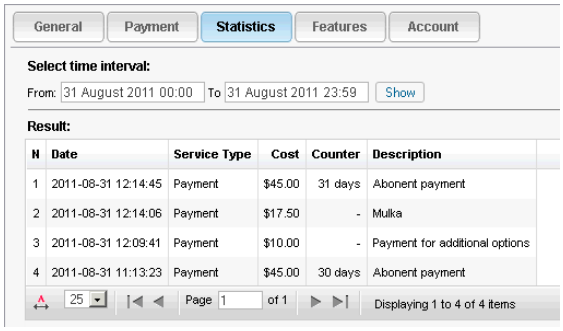
Add payment and days
To register a payment, enter sum and description (description is required). The sum will be added to the current balance, and the payment will be saved in payment history (see the Statistics tab).

Days are added in the same manner as payment. Indicate the needed number of days in 'Add days' field or choose the final day in the calendar. Then enter description and press 'Register'. Days and money can be added simultaneously in the same payment or separately from each other.

Note.
If you have not enough rights to view the Payment tab, then the current balance, days left, and billing plan can be viewed (but not altered) on the Account tab.

Statistics

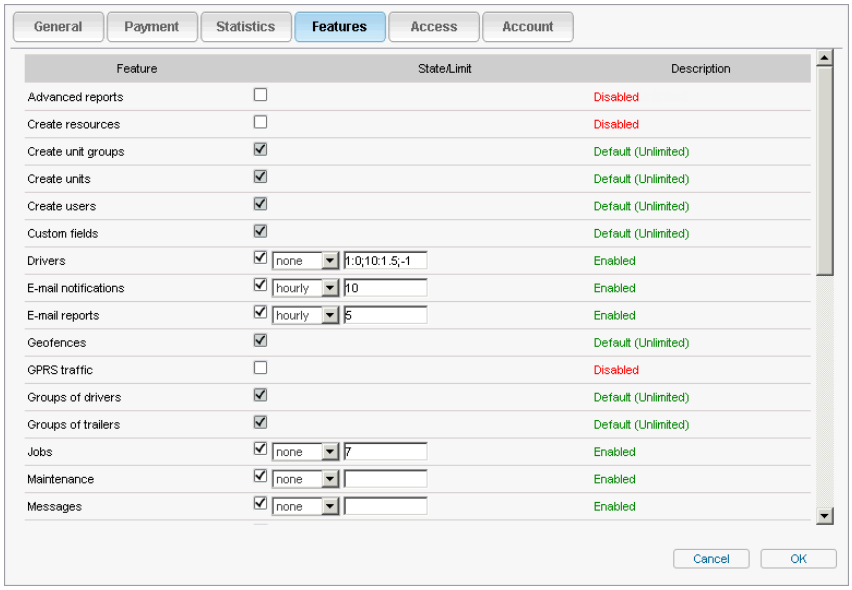
On the *Statistics* you can estimate services expenses for indicated period of time (payment history). Define time interval and press *Show*. All registered payments will appear in the table regardless whether money or days were added.



Features

The *Features* tab in 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, and many others) and define their costs.

On this tab, you see the list of services available according to chosen billing plan.



On the left you see service name, in the middle you indicate limitations and cost, on the right you see current state of the service.

List of Services

Here is the full list of services available in Wialon system. Your Features tab may contain not all of them.

Service	Description
ActiveX	Remote access to the system via ActiveX.
Admin fields	The possibility to create admin fields in the properties of unit, user or group (on the Custom Fields tab); defines cost and quantity (summarized, by objects of different types) of admin fields.
Advanced reports	The possibility to generate reports on unit groups and use intervals' filtration in reports. Works within Reports service.
Commands	Activates the corresponding tab in the Unit Properties dialog; defines the quantity (all units in sum) and cost of commands.
Create resources	Activates the button to create resources and accounts on the corresponding panel (in CMS Manager only).
Create unit groups	Activates the button to create unit groups on the corresponding panel.
Create units	Activates the button to create units on the corresponding panel.
Create users	Activates the button to create users on the corresponding panel.
Custom fields	Activates the corresponding tab in the properties of unit, user or group; defines cost and quantity (summarized, by objects of different types) 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 mention of drivers disappears from notifications, user settings, and SMS dialog.
E-mail notifications	The possibility to send notifications by e-mail. Recommended limitation — 10 reports in an hour (not to overload the server).

E-mail reports	The possibility to send a report by e-mail (within the Jobs module). Recommended limitation — 10 reports in an hour (to avoid server overload).
Eco driving	Activates Eco Driving tab in the unit properties dialog, as well as same-name table in reports.
Geofences	Activates Geofences module and defines cost and quantity of geofences; if disabled, the Geofences panel is not shown, and any mention of geofences disappears from reports and user settings.
GPRS traffic	The possibility to control GPRS traffic through jobs, notifications, reports, and unit properties.
Groups of drivers	Defines quantity and cost of driver groups; works within Drivers module.
Groups of trailers	Defines quantity and cost of trailers; works within Trailers module.
Jobs	Activates the Jobs panel and defines cost and allowed quantity of jobs.
Maintenance	Defines cost and quantity of service intervals; if activated, the Service Intervals tab appears in the Unit Properties dialog, maintenance can be registered in the Monitoring panel, and corresponding notifications and reports appear.
Management system	Access to CMS Manager.
Messages	Access to the Messages panel.
Mobile notifications	Activates the corresponding action in notifications, as well as corresponding tab in 'Manage Applications' dialog (in user menu).
Notices to users	Possibility to receive notices from the administrator of the service.
Notifications	Activates the Notifications panel and defines cost and allowed quantity of notifications.
POIs	Activates the POI panel and defines cost and allowed quantity of POIs.
Reports	Activates Reports and defines cost and allowed quantity of report templates; if disabled, associated jobs and notifications disappear and trip detector cannot be used.
Resources	Activates the Accounts panel in CMS Manager; defines quantity and cost of resources and accounts.
Retranslators	Possibility to transmit messages from units to other servers and systems; activates the corresponding panel in CMS Manager; defines allowed quantity and cost of retranslators.
Route rounds	Defines the count of allowed rounds and their cost (within Routes module).
Route schedules	Defines the count of allowed schedules and their cost (within Routes module).
Routes	Activates Routes module — enables the Routes panel and associated reports and notifications.
SDK	Remote access to the system via SDK and access to Apps.
Sensors	Defines the count 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, extra sites, etc).
SMS messages	Count and cost of SMS messages.
Tachograph	Activates 'Driver activity' and 'Infringements' tables in reports on drivers.
Trailers	Activates the Trailers panel and defines cost and quantity of trailers.
Unit groups	Activates the corresponding panel and defines cost and quantity of unit groups.
Units	Activates the corresponding panel and defines cost and quantity of units.
Users	Activates the corresponding panel and defines cost and quantity of users.
Wialon Mobile (2)	The possibility to track unit from a mobile device (Wialon Mobile).

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

Limitations and Cost

In the central column, you define service state and enter limitations. Check services to make them available to this account or unselect services to deny access to them. This flag has three states: *on*, *off* and *default*. If the state is *on*, you can enter quantitative restriction manually, for example, allow only 10 geofences to be created for this account.

Besides, you can specify more sophisticated limitations different cost for different number of items. Cost line is set in the format: COUNTER1:VALUE1;COUNTER2:VALUE2;VALUE3. A counter must be positive and integer (however, values can be fractional). Each next counter must be greater than the previous one. -1 means that the service is prohibited.

Here are some examples of cost lines:

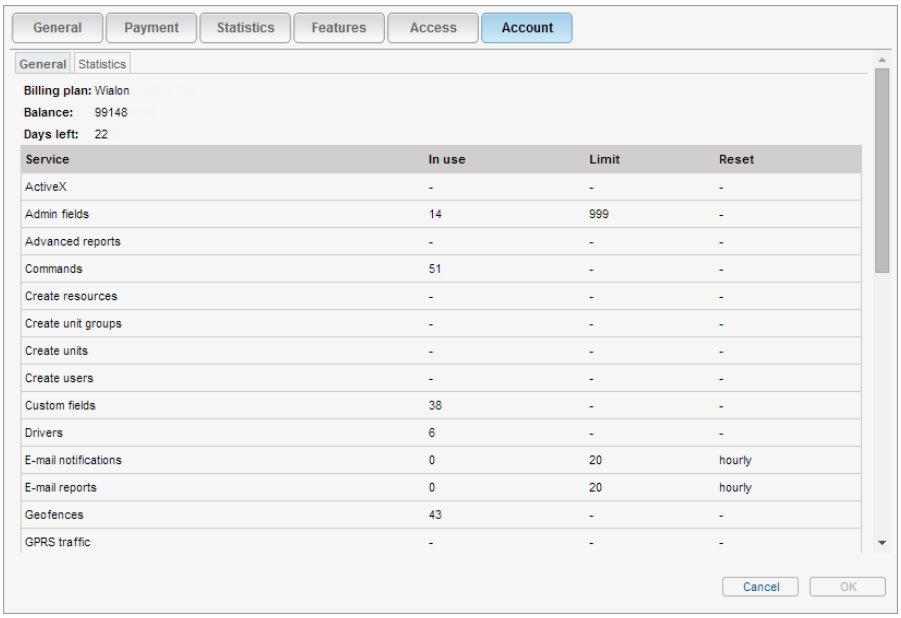
Service	Cost line	Interpretation
SMS messages	1:0;10:1.5;-1	The 1st SMS is free, from 2nd to 10th the cost for one SMS is 1.5 charge units. The 11th SMS is denied.
Units	1:0;5:10;10:3;50:1	The first unit is free, from 2nd to 5th they will cost 10 charge units, from 6th to 10th – 3 charge units, from 11th to infinity – each for 1.
Geofences	5:0;-1	5 geofences can be created free. The creation of a 6th geofence is prohibited.

In the right column you see the current state of the service (enabled/disabled) and, if the state is *default*, the description of default conditions is given in the brackets.

Note.
If you have not enough rights to view the Features tab, then available services can be viewed (but not altered) on the *Account* tab.

Account

On the *Account* tab the chosen billing plan and account balance are indicated, and the list of available features is presented. If a service is periodic (limited number of items in an interval), the interval is indicated. For example, 10 SMS messages in one day (*daily*). 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.

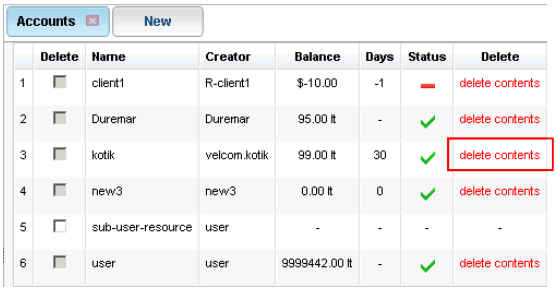


Note.
The information presented on this tab is available to the end user in the User Settings dialog.

Deleting Accounts

To delete an account, you need to have *manage* access to it. In most cases, you may need to delete an account when account service agreement is broken.

To delete an account, press **delete contents** and then confirm your intentions.



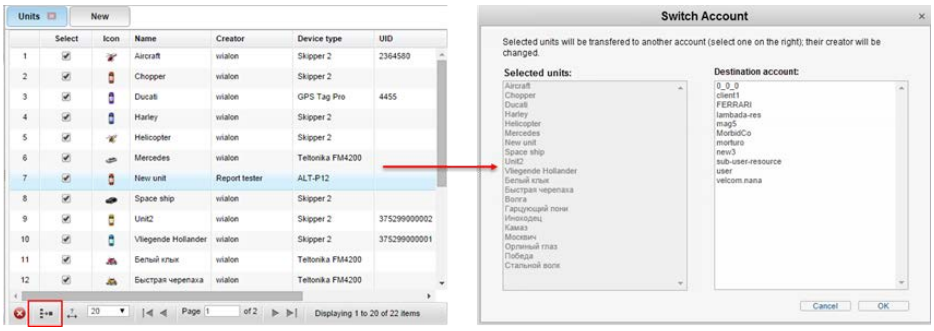
When deleting an account, all its contents (geofences, drivers, etc.) is deleted, too. Besides, all users, units, unit groups, resources are deleted, too, if they are created as account's creator or other users which were created as account's creator.

There can be resources among accounts. Resources are deleted by standard method. To **delete a resource** choose the corresponding flag in the first column, and click delete button in the bottom of the table. All the contents of a resource will be deleted along with it (POIs, geofences, jobs, notifications, report templates, drivers).

Transferring Units from One Account into Another

Units can be transferred from one account into another. In order this feature to be active you should possess the dealer rights for your account. The hierarchy of transferring units goes either from the account currently used to the lower standing ones or just between the lower standing ones.

Units are transferred in the management interface. To start with, go to the 'Units' tab and check the boxes for the units you would like to transfer. Then at the bottom of the table click the button which switches accounts for the units (the button is available only if you have dealer rights for the account). The 'Switch Account' dialog appears.



There are two lists available in the dialog. The left one is for units, the right one is for accounts. The left list consists of the units chosen earlier. If you possess enough rights for units, then these units are shown in the list. If there are no enough rights for a unit, then the notification appears in front of the list. The necessary rights towards a unit to possess:

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

Moreover, it is necessary to possess the right 'View item and its basic properties' towards a unit.

The right list displays appropriate account to one of which units can be transferred. To transfer units into an account you should possess the right of managing this account and the right of viewing its detailed properties. Besides, this account should have a sufficient number of enabled units and should not be blocked. Moreover, you should possess the right 'Act as given user' towards the creator of the account into which the units to be transferred. Note that the creator should possess the right of viewing items and their basic properties towards the items from the left list.

The system carries out the search of accounts corresponding to the above stated criteria. All the found accounts are added to the list. If the search gives no result, then the notification of no appropriate accounts to be displayed in the right list.

To complete units transfer choose the necessary account and click 'OK'. Upon transfer completion some parameters will be changed. For units it concerns a creator and belonging to an account, for accounts it concerns a counter of created/available units.

Billing Plans

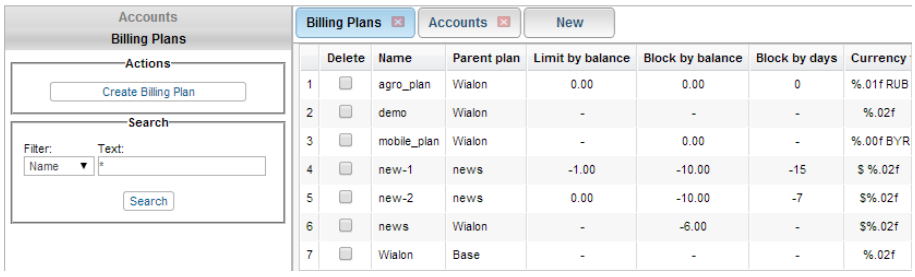
Attention!
Only the top user can manage billing plans.

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

In CMS Manager, open the *Billing Plans* tab in the navigation panel on the left of the window. Here you can view and edit billing plans assigned to account in your system.



	Delete	Name	Parent plan	Limit by balance	Block by balance	Block by days	Currency
1		agro_plan	Wialon	0.00	0.00	0	%.01f RUB
2		demo	Wialon	-	-	-	%.02f
3		mobile_plan	Wialon	-	0.00	-	%.00f BYR
4		new-1	news	-1.00	-10.00	-15	$ %.02f
5		new-2	news	0.00	-10.00	-7	$%.02f
6		news	Wialon	-	-6.00	-	$%.02f
7		Wialon	Base	-	-	-	%.02f

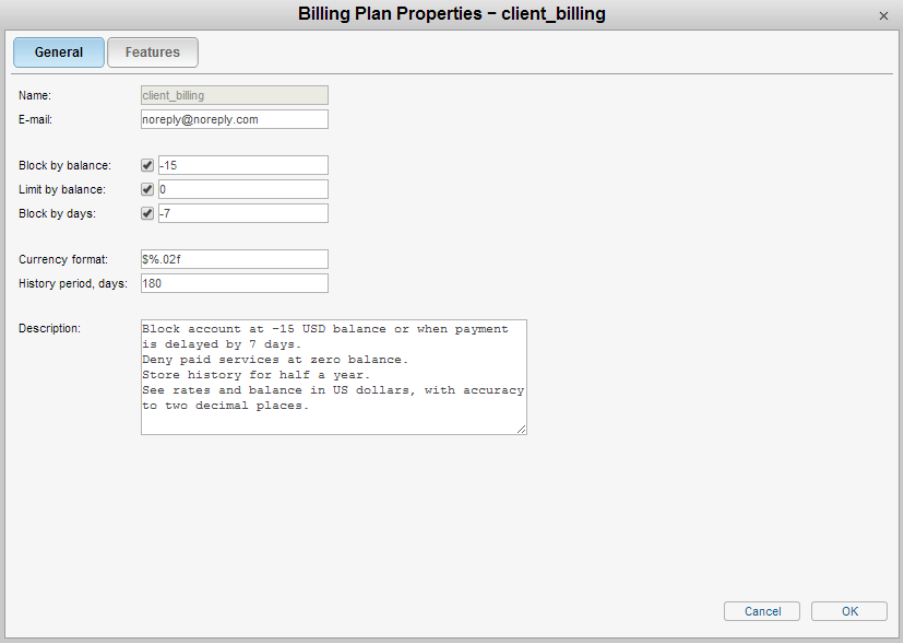
In the table of results, you can see the list of billing plans as well as some of their parameters, which are described in detail below.

Further information:

- General Properties
- Features

General Properties

On this tab you can configure general parameters of a billing plan. Some of them may be redefined in a particular billing plan separately — on the Payment tab.



Name
Cannot be changed.

E-mail
E-mail address from which various system messages (notifications, reports, etc.) will be sent.

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

Limit by balance
Enter balance reaching which paid services will be denied.

Block by days
Works independently of 'Block by balance' option. If both of these parameters are adjusted, an account will be blocked when meeting either of set conditions. When the days counter embedded in the system says that 'Days left' on an account have reached the value indicated in this field, the account is blocked automatically. At that, when 5 days are left, a special warning starts to come each time when the user logs in to the system: “Your account will be disabled in .. days.”

Note.
Usually, three above-mentioned values are either zero or negative. This provides a possibility to use the tracking system for a while even when payment date is expired. Besides, all or some of these three options can be disabled at all.

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

History period, days
The time period to store unit history. For example, if the value is '100', messages older than 100 days are automatically deleted. This parameter can be redefined for each account separately. Moreover, if you set zero here, history period will be unlimited.

Map tags

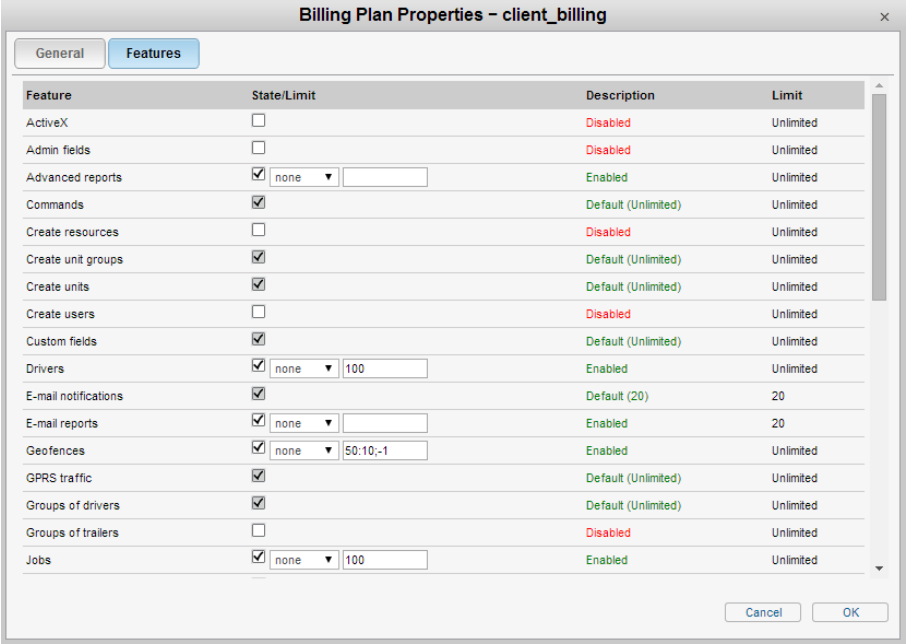
This field makes sense only if your service uses own WebGIS for cartography. Enter tags of maps that should be available with this billing plan. Separate tags with commas. If the field is empty, it assumes that all default maps will be available.

Description

Give a description (optional).

Features

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



In the 'State/Limit' column, you can enter allowed number of items of the king and their cost, or enable/disable a service in general. These adjustments are made in the same way as in similar account settings.

Description will let you know what is the current state if the service. 'By default' means that no particular limitations are applied to this service within this billing plan — that is limitations (if they exist) will be taken from the top account and parent billing plan.

The 'Limit' column shows what maximum amount of items is possible for this service reasoning from the top account settings.

In addition to usual services, billing plans can be used to give access to Apps and different sites (Monitoring, CMS Manager, Mobile). By default, they are disabled.

Availability of a service, its cost and allowed number can be also set (redefined) for each account separately — on the Payment tab.

Attention!
Disabling a feature in a billing plan does not mean that the same feature will be automatically disabled in an 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. The state of services is borrowed from the billing plan, if in account it says 'By default'.

Users

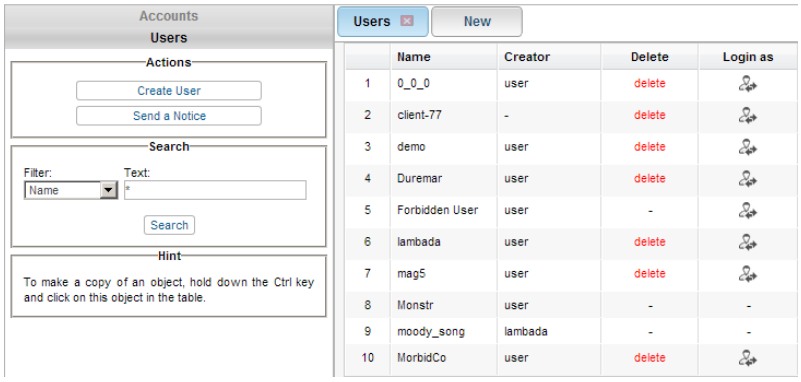
User is a system macro object defined by its specific name (login) and password. Using these login and password users can enter one of Wialon Local interfaces where they can control their units (end users) or manage the system itself (users-managers).

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 right hierarchy. Manager's duty is to properly build this hierarchy.

Users as system objects also have some specific applications in Wialon Local main interface that is 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.

In the table of results, you can see user's name, creator, buttons to delete users and login 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 particularities should be taken into consideration:

- A user can be created not only independently but also together with an account or resource.
- Users cannot be as easily deleted 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 a creator of any items in the system, you will get a alert which cites all those 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.

Straightaway form the table, you can login to the system as another user (access flag 'Act as given user' is required). To do this, use buttons in the right column of the table. If connected as different user, both user names are displayed on the top panel. To return to the main user, click on their name in the top panel (before brackets, in bold).

User Properties

User properties are configured when creating, editing or copying a user. The properties are divided into several tabs. Availability of different tabs and parameters depends on access you have to the user. Two tabs are available in any case — General and Advanced. Furthermore, some properties become uneditable when the account of this user is blocked.

General

Here the basic properties like name, password, allowed activity, etc. are set. They are defined while creating a user and can be altered only if you have *manage* access to this user.

Name
User name (login) from 4 characters.

Password
Password is required for each user. When you set a password, you are asked to input it twice — second time is for confirmation.

These login and password will be used by this user to enter the system.

Host mask
Host mask can be applied to user to restrict IP addresses from which to enter service sites. For example, to allow user to login to sites from office only. To set a mask, use the wildcard character *, for example, host mask can be set like this: '212.0.13.*'. If no mask is set, the user can login from any computer.

Creator
Select creator from the dropdown list. User's creator can be any other user. Creator is important to build hierarchy of access rights. A user inherits account and billing plan from the creator.

Account
Here you can see to which account the user belongs (if you have any access to this account). Account and creator cannot be changed.

Measurement system
This parameter is shown only when creating a new user. For existing users, it can be changed either through the converter or by themselves in their own settings.

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

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

Can change password
If disabled, user cannot change their password used for login action.

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

Can send SMS
If disabled, user cannot send SMS messages to drivers, units, and other users from Wialon Hosting main interface. SMS buttons will be then hidden.

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

Access

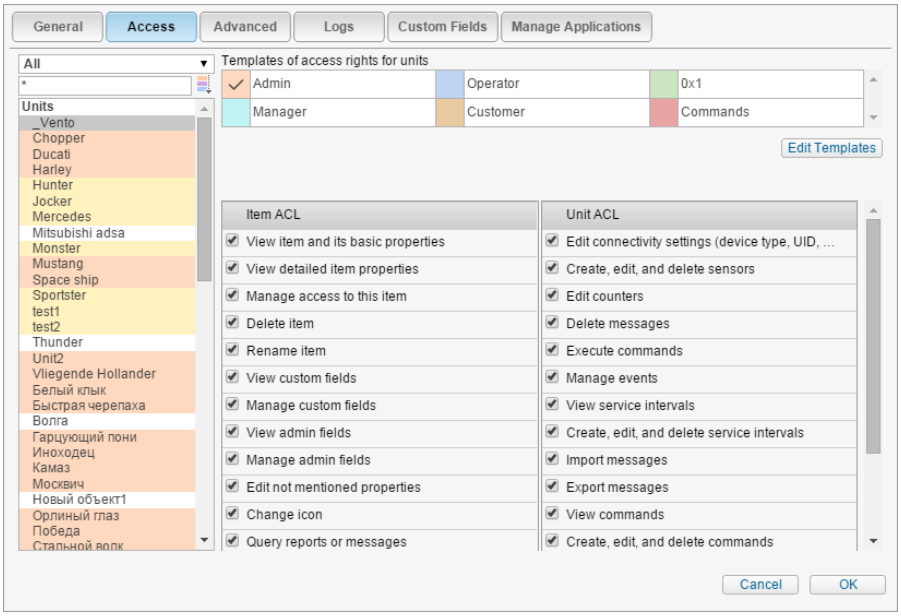
Access required: *Manage user's access rights*.

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

On the left, you select objects. To quickly find a needed 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 you should click the corresponding button to the right of the dynamic filter.

Colored background highlights objects to which the edited/created user already has any access.

Select an object on the left and mark actions allowed to the user on the right. More about access rights...



Note that this tab allows you to set access rights for a user to different system objects. However, user as such is a system object, too, 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 system object, open the properties dialog of some other user and choose *Users* in the dropdown filter.

Advanced

Then enter e-mail address that will be used to send notifications to this user from the service administration.

These settings can be changed by users themselves — in their User Settings dialog.

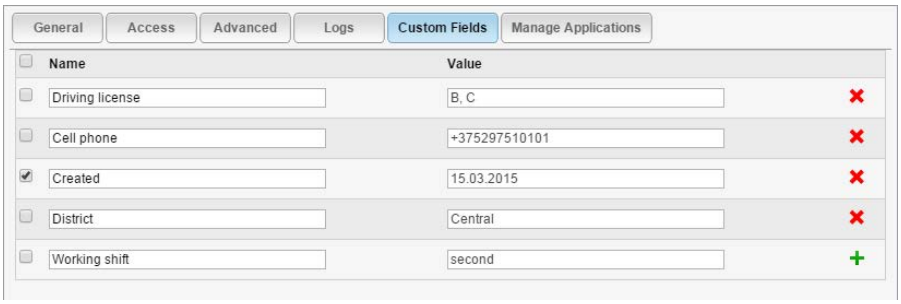
To edit those properties, the access flag *Edit not mentioned properties* is required.

Custom Fields

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

Any kind of information can be added to a user with the help of custom fields. This can be private phone, home address, post, experience, working shift, and so on. Administrative fields (seen only to users with special access rights) are marked in the first column.

On the left enter field name, and on the right field value. Then press the Add button. When finished, press OK.

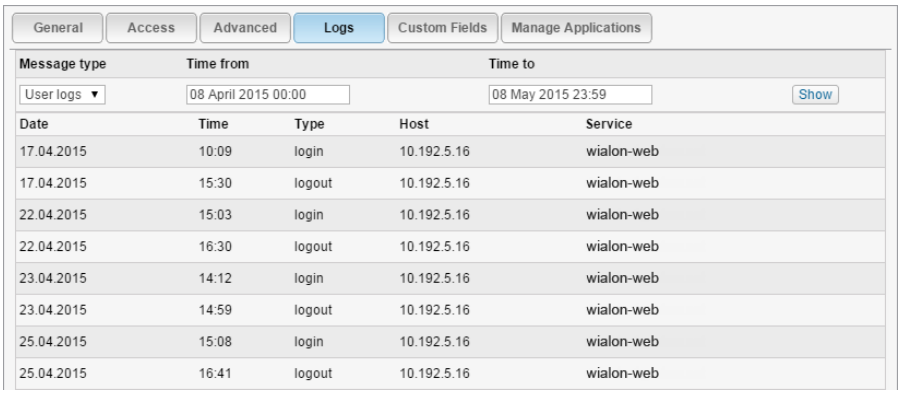


Next time you open the dialog custom fields will be automatically alphabetized.

Logs

Access rights required: *Query reports or messages*.

Here you can view all users' logins/logouts to/from different system interfaces for an indicated period. Specify the period and push *Show*.



Note.
Besides the log, user's activity can be controlled through different reports that are available in Wialon Hosting user interface. More...

Manage Applications

Authorized Applications

This tab contains the list of applications having any access to your account and data. To the left there is an application name, to the right you can see access rights possessed by an application 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.

General | Access | Advanced | Logs | Custom Fields | **Manage Applications**

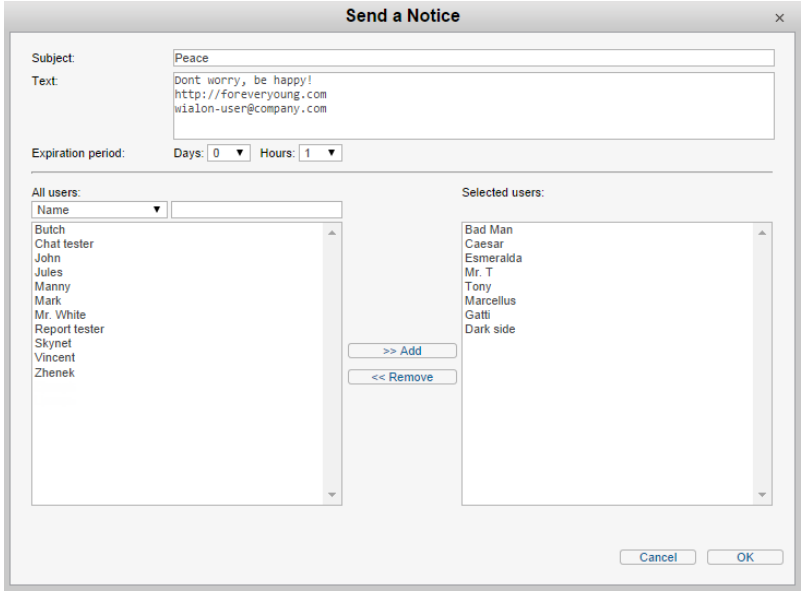
Authorized Applications | Mobile Notifications

Eco Driving	View data access; Modification of crucial data	✕
New App	Modification of crucial data	✕
Super App	Modification of important data	✕
Track Player	Online tracking; View data access; Modification of low profile data	✕
website.com	Modification of low profile data; Modification of crucial data	✕

Notices for Users

You can send an informing notice to the users of the system. To do this, press the button *Send a Notice* in the Users panel. This will summon a dialog where you input a subject for your message and add text of any length. Either hyperlinks or e-mail addresses can be added to the text. Then choose users to send the notice to, and decide upon life span of your message. When finished, press OK.

To send such notices to users, you are required to have the access 'Edit not mentioned properties' to those users. Besides, their accounts should be active (not blocked) and they should have the service 'Notices to users' activated in their billing plans. Otherwise, those users are not shown in the list of supposed recipients. To quickly find necessary users on the list, use the dynamic filter above the list; users can be searched either by name or by custom fields.

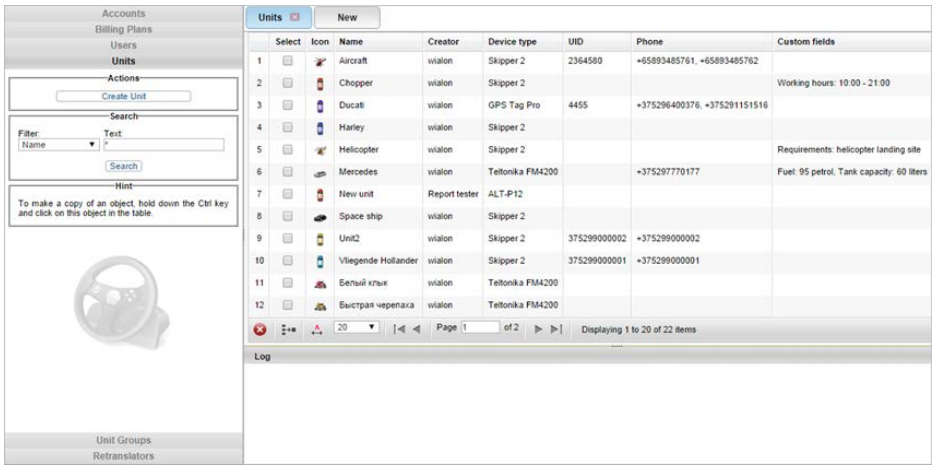


Notices are shown in the top panel when the user logs in (see an example). Expiration period (from 1 hour to 30 days) defines the period during which the notice will appear on the screen each time the user logs in to the system until the user closes the notice.

Units

Unit is a system macro object defined by its specific device type and unique identification number (UID). It represents a vehicle, machine, person, pat or any other mobile or stationary object that can be controlled with the help of a GPS tracking system.

Working with units is possible both in CMS Manager and in the main Wialon Hosting interface. To work with units in CMS Manager, open the *Units* tab in the navigation panel. Units configured here become available for tracking (watch on the map, control different parameters, etc.).

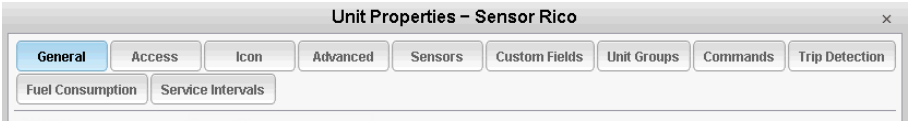


Here you can create a new unit, observe existent units, view or edit their properties, define access rights to units, and remove units from the system. Read Standard operations for details.

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 will interpret data received from this unit.

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



Use the following links to get to know the details about each parameter:

- **Sensors**
  - Sensor Properties
  - Sensor Types
  - Sensor Parameter
  - Validation of Sensors
  - Calculation Table
  - Calculation Table Wizard
  - Custom Intervals
  - Signed Parameters Converting
  - Temperature Coefficient
- General Properties
- Counters
- Access to Unit
- Icon
- Advanced Properties

Custom Fields
- Unit Groups
- Commands
- Eco Driving
- Trip Detection
- Fuel Consumption
- Service Intervals

Sensors

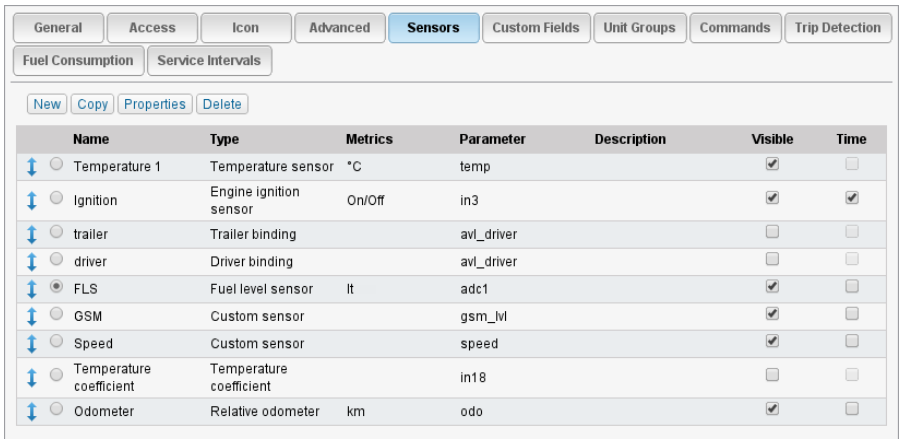
On the Sensors tab of Unit Properties dialog, sensors connected to equipment are added and configured as well as edited and removed.

On the list of available sensors you see sensor name, type, metrics, parameter, and custom description.

To create a new sensor, push 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.

To quickly create a sensor with similar settings, select this sensor and press *Copy*. To edit an existing sensor or just view its settings, select this sensor and press *Properties*. To delete a sensor, select this sensor and press *Delete*.

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



Name	Type	Metrics	Parameter	Description	Visible	Time
Temperature 1	Temperature sensor	°C	temp		☑	☐
Ignition	Engine ignition sensor	On/Off	in3		☑	☑
trailer	Trailer binding		avl_driver		☐	☐
driver	Driver binding		avl_driver		☐	☐
FLS	Fuel level sensor	lt	adc1		☑	☐
GSM	Custom sensor		gsm_lvl		☑	☐
Speed	Custom sensor		speed		☑	☐
Temperature coefficient	Temperature coefficient		in18		☐	☐
Odometer	Relative odometer	km	odo		☑	☐

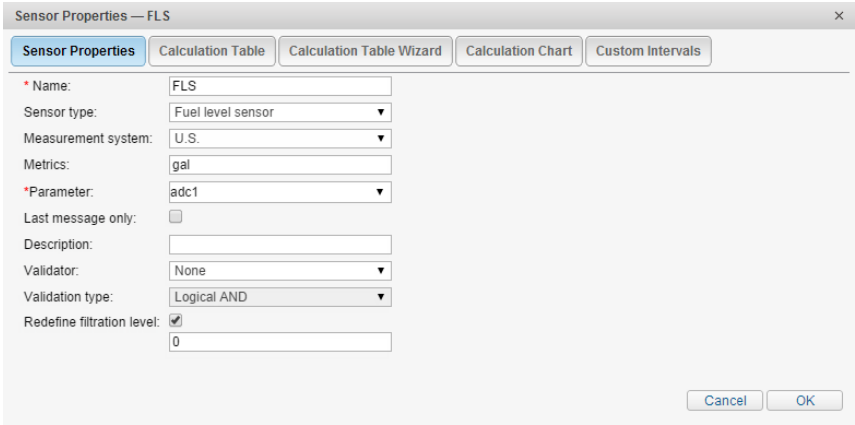
There is the **Visible** checkbox against each sensor. It controls whether sensor is shown or hidden. By default, the checkbox is enabled or disabled depending on sensor type. However, you may want to hide or show some particular sensors. Hiding is reasonable especially if a sensor is used as a validator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

If a sensor is visible, then the **Time** flag may become available for it. Activation of this flag affects how the sensor appears in additional information (unit's tooltip, etc.). If the Time flag is enabled, duration of the last state is shown in brackets, for example: *Ignition: On (47 minutes 33 seconds ago)*.
Attention! Some limitations are applied to this feature. The sensor should have no calculation table, validators, custom intervals, nor contain references to other sensors in its parameter. In these cases, the Time checkbox will be unavailable.

Sensors' order on the list can be changed manually. To place sensors in a desirable order, just drag them up and down holding on the arrow-shaped icon on the left. Sensors' order and visibility is considered in unit's tooltip, extended unit information, track player, track hittest, and in the Messages panel. Only visible sensors are shown and they follow 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 consist of several tabs. On the first one, the basic properties are adjusted:



Name
Give a name to the sensor. It must consist of one or more characters. The name will be visible in unit's tooltip, in reports and messages.

Sensor type
Choose the sensor type to form the dropdown list of available types (the list depends on modules purchased).

Measurement system
In the dropdown menu choose a measurement system (metric, U.S., imperial) in which the sensor values will be received. This property and the corresponding dropdown menu are displayed only for the sensors the metrics of which differs depending on the measurement system.

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 could not be changed, for the others you could 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 input *Activated/Deactivated*, *Laden/Unladen*, and the like.

Parameter
Parameters come in messages. If the unit already has messages, parameter name can be picked up from the list of available in the last message.

Last message only
This flag affects sensor's value in unit's tooltip and similar places. If enabled, sensor's value will be calculated only from the most recent message, and in case when no required parameters are present in the last message, there will be 'Unknown'. If disabled, the *last known* values are displayed (no matter how up-to-date they are).

Description
This field is optional. Add any description and options if needed.

Validator and **Validation type**
This is optional. Validation defines dependency of sensors from each other.

Then you have to set calculation table for the sensor. It is especially needed for analogue sensors. Not all sensors send ready values that can be put into a report and be intelligible to any user. If the possibility to transform parameters is not provided with device itself, this transformation is adjusted with special Calculation Table or Calculation Table Wizard.

Additional Properties

More properties can be applied to some specific types of sensors:

Redefine filtration level
This property is specific for fuel level sensors. Filtration degree is adjusted traditionally on the Fuel Consumption tab. However, in some cases each sensor needs to be set up individually. This option gives such a possibility. ⓘ Individual filtration works only if the option 'Merge same name sensors (fuel level)' is disabled on the Fuel Consumption page.

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 smoothing algorithm to sensor values. It is necessary to indicate the level of such a smoothing (from 0 to 255) in the corresponding field. Filtration level for the sensors of such type is indicated individually.

Validate unbinding
This property is specific for sensors of driver/trailer binding. 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 which was used to bind the driver. Otherwise, driver reset coming from any parameter will lead to the reset of all drivers bound to the unit. And similar with trailers.

Unbinding code
This property is also applicable to the drivers/trailers binding sensors. Any code could be entered in the Unbinding code field. If the code is entered, then driver/trailer unbinding will be implemented either receiving an empty value or receiving the code.

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 calculation table is applied. It means that raw data (and not data processed with calculation table as in case when the option is disabled) is taken to estimate overflow.

Timeout
This property is a specific feature for engine ignition sensor, custom digital sensor, and engine efficiency sensor. Indicate time value (in seconds) in this field. If nothing is indicated in the field or 0 is entered in it, then the option is considered to be disabled. If 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, custom digital sensor is used and 1 hour timeout has been indicated. The following data comes from digital sensor: 1 (22:00), 1 (22:10), 1 (07:50), and 1 (08:00). If timeout property had not been indicated, then 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 1st and 2d message, so we have first interval (from 22:00 to 22:10); between 2d and 3d message more than 1 hour pass, so this data is considered to be an invalid time period (from 22:10 to 07:50); and there is less than hour between 3d and 4th message, so we receive the second interval (from 07:50 to 08:00).

With overflow
This option is available for the sensors, which could be influenced by occasional resets (mileage sensor, absolute engine hours, absolute fuel consumption sensor). Enabling this option 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, the difference of these values is added to the previous value. If it is less, then the value from the latest message is added. Therefore, this function guarantees receiving correct mileage data.

Sensor Types

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

The table contains all sensor types currently available in the Wialon 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 every sensor type.

Mileage			
Mileage sensor	kilometers (km)	miles (mi)	The sensor showing the distance traveled. It can be used to detect trips and stays.
Relative odometer	kilometers (km)	miles (mi)	The sensor shows the distance traveled since the previous message. It can be used to detect trips and stays.
Digital			
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. See an example of configuration.
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').
Custom digital sensor	On/Off or any		This sensor can register two states. Its values can be displayed in unit's tooltip, in extended unit information or sent to report.
Gauges			
Voltage sensor	volts (V)		The sensor showing 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 showing some parameter value (not necessarily temperature). It can be used to analyze input data. See an example of configuration.
Temperature coefficient			Temperature coefficient that affects fuel level calculations at different temperature in the tank.
Engine			
Engine revs sensor	rounds per minute (rpm)		The sensor displays engine speed.
Engine efficiency sensor	on/off		Defines whether an attached implement is operating. Shows the time of work between shifts of states (from 1 to 1 or 0).
Absolute engine hours	hours		The sensor registers the total amount of engine hours.
Relative engine hours	hours		The sensor registers the amount of engine hours subject to intensity of work.
Fuel			
Impulse fuel			The sensor shows an accumulated value of impulses. To convert the incoming value into the amount of consumed fuel, a calculation table should be applied. For such sensor type a calculation table is applied to the difference between two adjacent messages. After sensor creation and adjustment it is necessary to

consumption sensor			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 messages, then it is necessary to use absolute fuel consumption sensor.
Absolute fuel consumption sensor	liters (lt)	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			The sensor shows fuel consumed from the previous measure (message). After sensor creation and adjustment it is necessary to enable instant fuel consumption sensor on the corresponding tab.
Fuel level sensor	liters (lt)	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 sensor	liters (lt)	gallons (gal)	The sensor detects the number of impulses in a period. Fuel level in the tank is calculated from received values.
Other			
Counter sensor	any		The sensor can show passenger traffic or count the number of some actions like opening/closing the door, etc. Several types of counters are known: – 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.
Custom sensor	any		This is a custom sensor for which you can set any unit of measure. Its values can be displayed in unit's tooltip, in 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.

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 normally predefined in 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.

If the configured unit already has any messages, it is recommended to explore them and find available parameters (go to the Messages panel). Parameters from the last message appear on 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.

One parameter can be used to create as many different sensors as you want. The maximum number of sensors allowed can be viewed on the Account tab of User Settings dialog.

Virtual Parameters

Some of supported parameters are reserved in the system as default:

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	time in message

Note.
Some rare devices may not support all of the parameters mentioned above, 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 referred to as parameter that registers the values coming from the eighth analog input.

Normally, 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 any of them is not zero, it means that an input/output or several of them are active. To define, which of them exactly, hexadecimal number (which you see in message) must be converted into bit number.

For example, when ignition was activated, the message with parameter I/O = 10/0 was received. We need to retrieve bit (input in our case) number from the received value – 10. To achieve this, open the calculator in the HEX mode and key in 10. Then switch to the BIN mode and get the binary number – 10000 in our case. Now count in which position 1 appeared (count from right to left). In our example, this is the 5th position, so, the ignition is connected to digital input 5. This means that the required parameter is *in5*.

Bitwise Parameter Control

There is a possibility of bitwise parameter control. That means that not the whole parameter value can be analyzed

but a certain bit. For this, indicate bit number after parameter name separating it with colon. For example, *param199:3* should be written to control the 3rd bit of the parameter named param199.

This feature is applicable when a device sends various data in one parameter: for example, the first bit shows alarm condition (on/off), the second bit indicates driver's door state (open/closed), the third – headlights, etc. Thus, using bitwise control it is possible to create several sensors on basis of one parameter.

Note that doubles are converted to integers, and only then the bit is retrieved.

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 mark some critical line) or as a part of validation chain or in expressions.

Expressions

Parameter for a sensor can be set in the form of expression. In those expressions 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
|	operation 'or'

For example, *^const2* – square, *^const0.5* – take the square root.

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

Expressions allow creating a great variety of sensors, which can satisfy any needs and assigned 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 movement is 'distance divided by time'. To calculate the distance, we apply Pythagorean theorem: squared difference of latitudes in neighboring messages plus squared difference of longitudes in neighboring messages, and then the square root is taken 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 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 like this:

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

Example 2: Relative Engine Hours Sensor

To get real engine hours in report, create two sensors:

1. relative engine hours sensor,
2. coefficient sensor which depends on engine revolutions.

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

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

The meaning: time difference in neighboring messages multiplied by the coefficient of 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 like this:

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

Let us assume that *param1* sends engine revolutions. Then the coefficient parameter will be like this:

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

The meaning: 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).

Exapmle 3: Operation 'OR'

There is an equipment installed on the vehicle. It sends some parameter (for example, in1). Then the equipment has been broken. A new one has been installed. The new equipment sends the same data in the other parameter (for example, in2). To exclude data loss during report generation, it is necessary to use operation 'or' in 'Parameter' field when creating a sensor. The old equipment has lasted all December, the new one — all January, and we need a report for these two months. If the 'or' operation has been used during parameter indication ('in1|in2' entered as sensor parameter), then the system would take a value from 'in1' parameter, and if there is no such a parameter, then would take it from 'in2' parameter.

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 calculation table. 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.

Other Textual Parameters

If a textual parameter is used in an expression, it is converted into 64-bit integer. By default, it is interpreted as decimal, however, positional notation can be specified after colon. Examples:

```
calc(text_param) = 100
calc(text_param:16) = 256
calc(text_param:2) = 4
```

Validation of Sensors

Validation defines dependency of sensors from each other. It is adjusted in sensor properties.

Validator is a sensor that affects the current sensor. Validator is another sensor which must be created in advance. It is chosen from the list of available sensors.

Validation type defines in which way the validator will affect the current sensor. The following validation methods are available:

- *Logical AND*: values of both sensors are analyzed, and the logical function AND is applied. That 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. That 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. In the other case, 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*: validator value is subtracted from sensor value.
- *Subtract sensor from validator*: sensor value is subtracted from validator value.
- *Multiply*: values are multiplied.
- *Divide sensor by validator*: sensor value is divided by validator value.
- *Divide validator by sensor*: validator value is divided by 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 the state of the particular door does not really matter.

For this purpose the sensor with ‘Custom digital sensor’ type should be created in Wialon for every door. Then, one by one, validate the sensors indicating ‘Logic OR’ as validation type. Using ‘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…). If it is more convenient, then the visibility for all the sensors used except for the last validated one could be switched off. Therefore the visible sensor shows whether the vehicle is closed or opened.

Mathematical AND

In the following example 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 the doors' state value in one parameter (each bit represents the door).

The sensor with 'Custom sensor' type is created in Wialon and the parameter for incoming value of the doors' state is indicated. Then the sensor with '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

Let us suppose, three different kinds of equipment is installed on a unit (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, one sensor (brush) if activated, will send 1, as usual; the second sensor (plough) will send 10; and the third sensor (thrower) will send 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 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.

Two sensors with 'Fuel level sensor' type should be created in Wialon. One of them is set to be a validator for the other with 'Sum up' validation type. If it is more convenient, then the visibility flag for the validated sensor should stay, for the other — could be unchecked. 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.

Three fuel level sensors should be created in Wialon ('Tank1', 'Tank2', and 'Total'). In the parameter of 'Total' sensor enter the formula [Tank1]+[Tank2]. 'Tank1' and 'Tank2' sensors show their own fuel level, and 'Total' sensor shows us the total fuel level of both the tanks.

The advantage of using formulas is in the amount of information received. For example, if 'Tank2' is validated by 'Tank1', then we would know 'Tank1' fuel level, but 'Tank2' would show us only the total fuel level for these two

tanks. Using formulas, we will also know ‘Tank2’ fuel level.

The only disadvantage for formula usage is creating of greater amount of sensors than during validation usage.

Calculation Table

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.

Attention: filled calculation table is essential for analog engine ignition sensor because it must be defined how all available analog values are transformed into two available states – On/Off.

However, in some cases calculation table is not needed. It is especially true for digital sensors that send 1 or 0, and this corresponds to 'On/Off". So, there can be no need in transforming this data in some way. On the contrary, analog sensors usually require calculation table.

Calculation table recalculates data according to straight-line equation **Y = a×X + b**, where

- **X** is input value — values coming from device;
- **Y** is output value — processed values which gets into reports, charts, tooltips, etc.;
- **a** is a coefficient that determines the slope or gradient of that line (tangent of angle, or relation of the opposite cathetus to the adjoining one);
- **b** determines the point at which the line crosses the y-axis.

When a new message comes, necessary parameters are retrieved and substituted into the formula as *X* values; *a* and *b* are computed automatically according to the calculation table adjusted for the sensors. As a result, *Y* values become known.

Each row of the table operates only within its segment that is till the *X* value of the next row. That is why *X* values cannot repeat.

If you use *a* coefficient and want to take into account the previous segment for Y-axial displacement, enable the **Continue last segment** flag.

It is possible to get the tangent of angle (that is needed to be substituted for *a* coefficient) using mathematics. To do this, find on *X* and *Y* axes segments of values operation (deltas). Then divide the values **Δy/Δx**. The result value is the tangent of angle.

Lower and upper bounds may be useful to set limits for input values. If some *X* value is out of range, it is treated as invalid. If you use a lower bound, then the lower bound value should be smaller than or equal to the first X value in the calculation table (and preferably very close to this value). The upper bound should be greater than or equal to the last X value in the calculation table.

After entering each pair of value, press *Add*. Incorrect pairs can be removed with the button ×. To remove all pairs at once, click on the Clear Tale button.

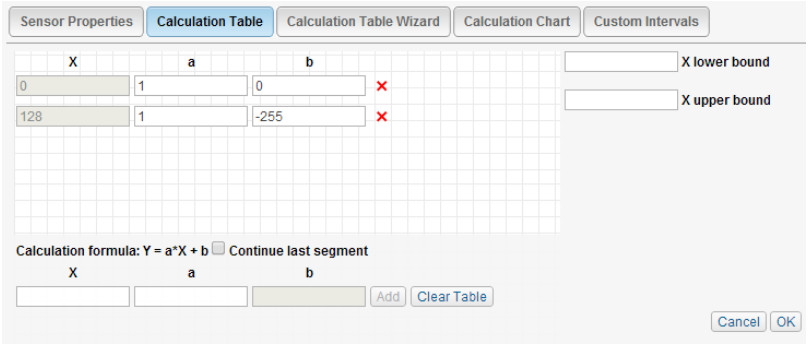
The graphic implementation of the created calculation table can be viewed in the Calculation Chart tab. Push the Refresh button to build the chart based on your calculation table.

Here are several ways to compile a calculation:

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. At that, *Continue last segment* option should be disabled. This method is convenient if converting a analogue signal to a digital.
3. Enable *Continue last segment* option and fill in only *X* and *a* values. In this case, *b* is calculated automatically. This method is convenient if needed to get a curve knowing the angles.
4. In many cases it is possible to adjust the calculation table knowing input *X* values and corresponding output *Y* values. In these cases use Calculation Table Wizard.

Example 1: Temperature Sensor

As an example, let us create a calculation table for temperature sensor. Let us assume that the data is coming in complement code. Thus, the positive values are form 0 to 127, and negative from 128 (which corresponds to -127 degrees) to 255 (which corresponds to -1 degree).



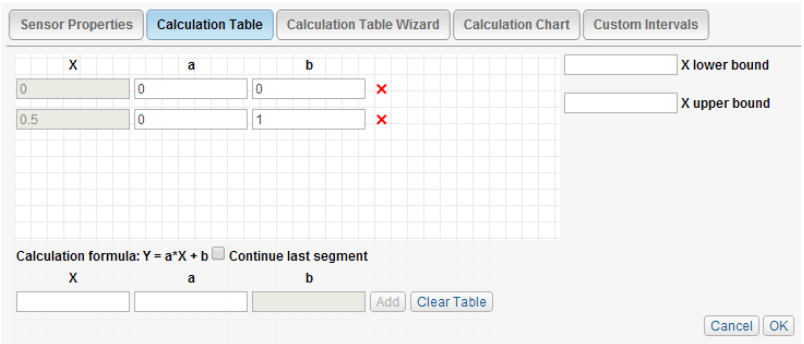
Move to the *Calculation Chart* tab to estimate the result (press *Refresh*).

Note.

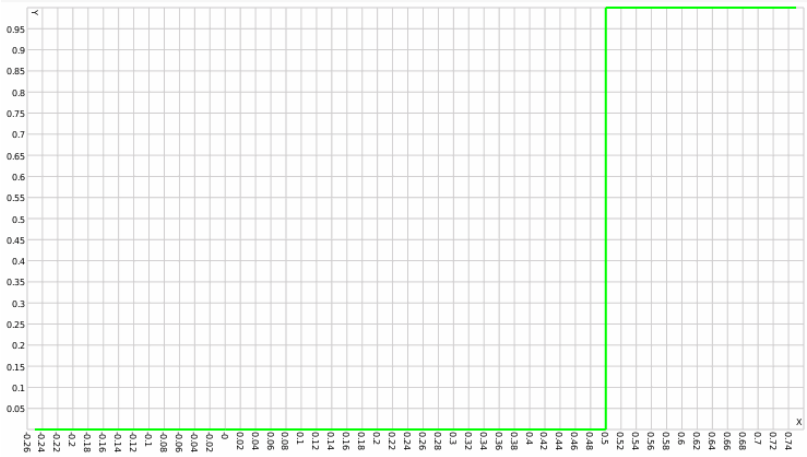
The function continues operating to infinity if there are no limitations. The chart extends also to the left to minus infinity. If there are limitations, the chart expands quarter-size to both sides, right and left.

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 like this one:



Move to the *Calculation Chart* and see if the result meets your expectations (press *Refresh*).


Y
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
X
-0.26
-0.24
-0.22
-0.2
-0.18
-0.16
-0.14
-0.12
-0.1
-0.08
-0.06
-0.04
-0.02
-0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
0.22
0.24
0.26
0.28
0.3
0.32
0.34
0.36
0.38
0.4
0.42
0.44
0.46
0.48
0.5
0.52
0.54
0.56
0.58
0.6
0.62
0.64
0.66
0.68
0.7
0.72
0.74

Calculation Table Wizard

This way of creating a calculation table for a sensor is less complicated. It is enough to enter input *X* values and corresponding output *Y* values. You can use the calculation table wizard when calibrating a sensor experimentally. For instance, you fill different volumes of fuel into the tank and each time you take the readings from the sensor.

After entering each pair of values, push the *Add* button. Incorrect pairs can be deleted with × button. When all pairs are entered, press **Generate calculation table**. The calculation table on the previous tab will be replaced with new data.

The program calculates *a* and *b* using the following algorithm:

- **a** is calculated by the formula **ΔY/ΔX**. 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**.

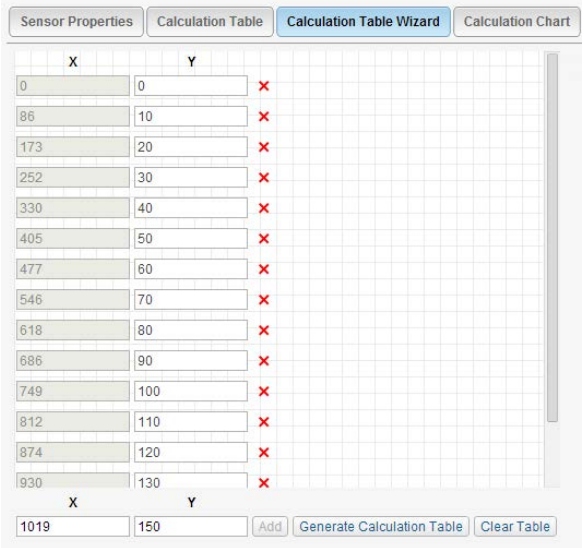
When reopening the dialog, all data entered on this tab is preserved. However, note that if any changes were made on the Calculation Table tab, they will not affect the Calculation Table Wizard. In other words, the Calculation Table Wizard displays only values you entered but not always reflects the real situation.

Example 1: Fuel Level Sensor

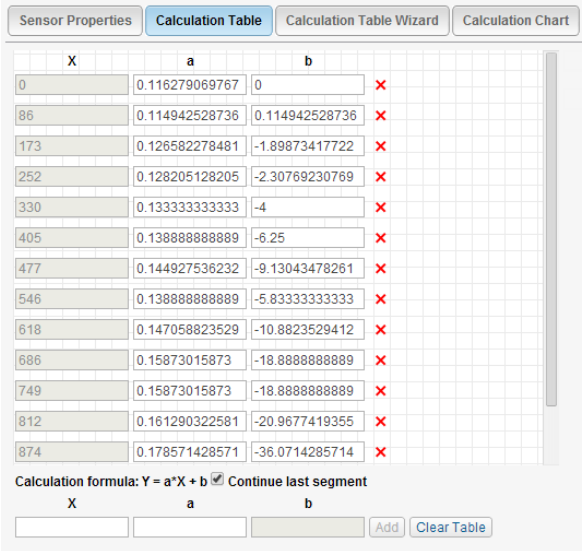
Let us imagine that we poured 10 liters of fuel and the sensor returned the value 86, then we poured 20 liters and got 173, and so on. In the end, we can form a table:

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
812	110
874	120
930	130
989	140
1019	150

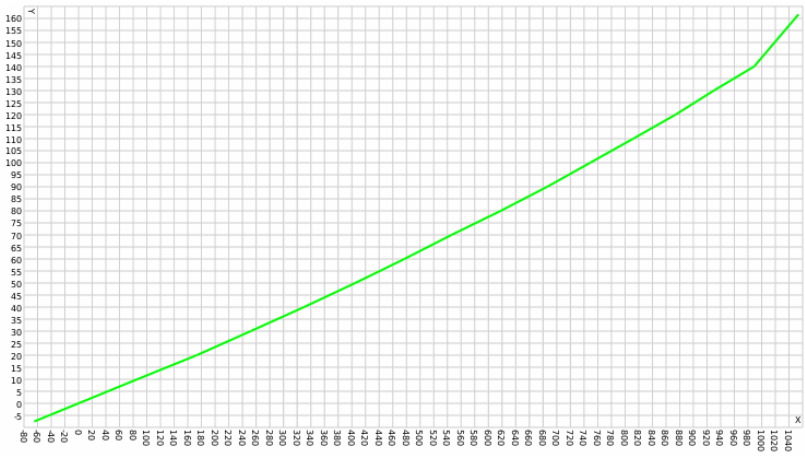
These pairs of values should be inserted into calculation table wizard:



Then press *Generate Calculation Table* and go to the *Calculation Table* tab.



Then go to the *Calculation Chart* tab and press *Refresh*:



Note.
When reopening the dialog, all data entered on this tab is preserved. However, note that if any changes were made on the Calculation Table tab, they will not affect the Calculation Table Wizard. In other words, the Calculation Table Wizard displays only values you entered but not always reflects the real situation.

Now let us see how *a* and *b* were calculated. The first interval starts with 0 and lasts until 86. At that, in the last point the output is 10. So, *X* displacement is Δ**X** = 86 — 0 = 86, and *Y* displacement is Δ**Y** = 10 — 0 = 10. Now *a* coefficient

can be calculated: **a** = **ΔY/ΔX** = 10 / 86 = 0,11627906976744186. The same algorithm is applied to all intervals:

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
12	812	110	(120 — 110) / (874 — 812)	110 — a×812
13	874	120	(130 — 120) / (930 — 874)	120 — a×874
14	930	130	(140 — 130) / (989 — 930)	130 — a×930
15	989	140	(150 — 140) / (1019 — 989)	140 — a×989

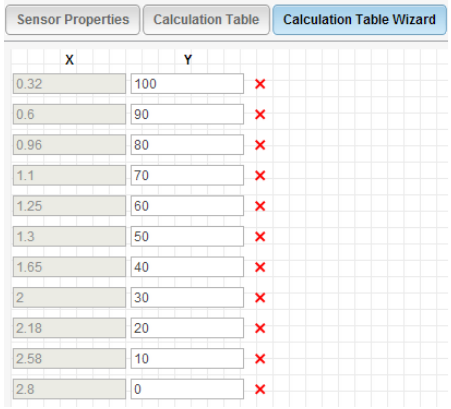
Example 2: Fuel Level Sensor

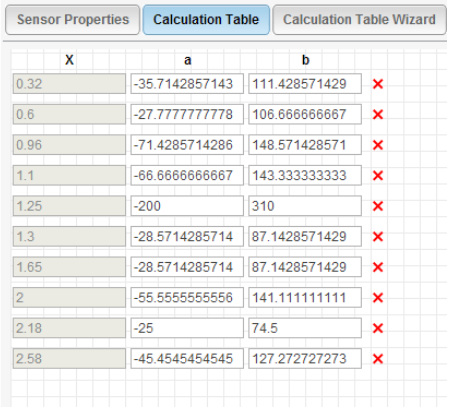
In this example, input *X* values decline while output *Y* values grow. Insert the pairs into the wizard in any order – they will be rearranged automatically.

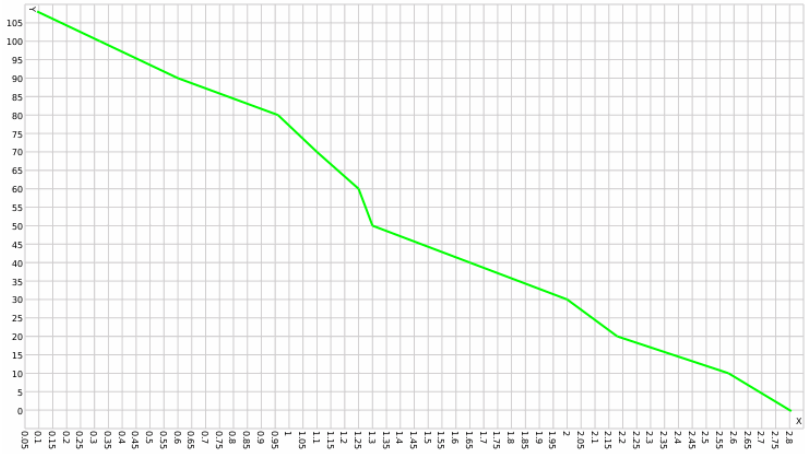
Initial data:

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

Insert these data into the wizard, generate the calculation table and get the calculation chart.





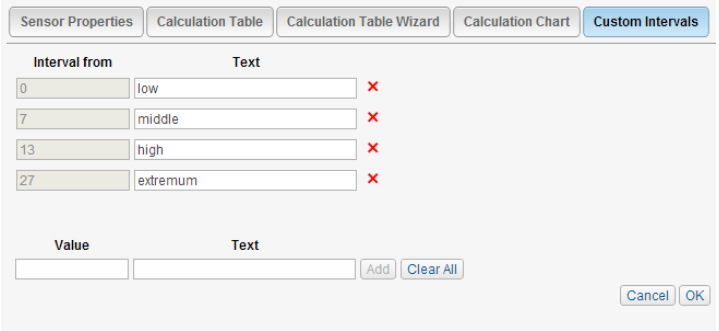


Calculated intervals for this sensor are as follows:

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

Custom Intervals

Sometimes you may need to see some text instead of numeric values of a sensor. This tab helps you to create custom intervals for the sensor and their textual meaning.



Note that like in the calculation table, all intervals operate *from* indicated value. The exception is the first interval, which operates not only from this value to the next but also from minus infinity to this value.

For example, if you input intervals like in the example above, they will be interpreted in the system as follows:

Interval from	Interval to	Text
-∞	6.(9)	low
7	12.(9)	middle
13	26.(9)	high
27	+∞	extremum

These textual interpretations will appear instead of sensors numeric values in tooltip while track hittesting in monitoring panel, tracks, messages panels, reports panel (if displaying on map option is chosen), and also in the corresponding window when you hittesting the track using the similarly-named tool.

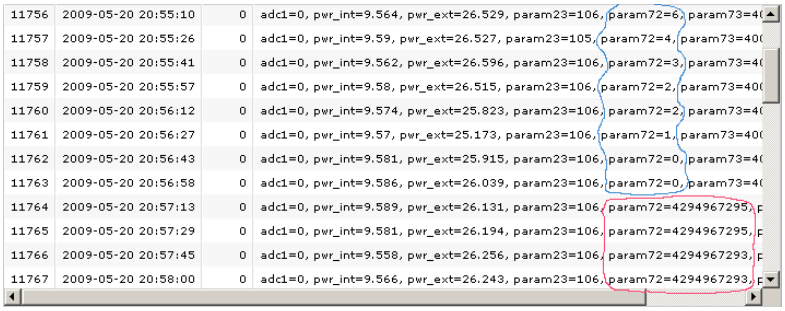
Signed Parameters Converting

It is supposed that data received by Wialon 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.

In case when 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 necessary parameter and analyse its incoming values.



11756	2009-05-20 20:55:10	0	adc1=0, pwr_int=9.564, pwr_ext=26.529, param23=106, param72=6, param73=4
11757	2009-05-20 20:55:26	0	adc1=0, pwr_int=9.59, pwr_ext=26.527, param23=105, param72=4, param73=40
11758	2009-05-20 20:55:41	0	adc1=0, pwr_int=9.562, pwr_ext=26.596, param23=106, param72=3, param73=4
11759	2009-05-20 20:55:57	0	adc1=0, pwr_int=9.58, pwr_ext=26.515, param23=106, param72=2, param73=40
11760	2009-05-20 20:56:12	0	adc1=0, pwr_int=9.574, pwr_ext=25.823, param23=106, param72=2, param73=4
11761	2009-05-20 20:56:27	0	adc1=0, pwr_int=9.57, pwr_ext=25.173, param23=106, param72=1, param73=40
11762	2009-05-20 20:56:43	0	adc1=0, pwr_int=9.581, pwr_ext=25.915, param23=106, param72=0, param73=4
11763	2009-05-20 20:56:58	0	adc1=0, pwr_int=9.586, pwr_ext=26.039, param23=106, param72=0, param73=4
11764	2009-05-20 20:57:13	0	adc1=0, pwr_int=9.589, pwr_ext=26.131, param23=106, param72=4294967295, p
11765	2009-05-20 20:57:29	0	adc1=0, pwr_int=9.581, pwr_ext=26.194, param23=106, param72=4294967295, p
11766	2009-05-20 20:57:45	0	adc1=0, pwr_int=9.558, pwr_ext=26.256, param23=106, param72=4294967293, p
11767	2009-05-20 20:58:00	0	adc1=0, pwr_int=9.566, pwr_ext=26.243, param23=106, param72=4294967293, p

You can see that when 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 such numbers appeared in parameter values and put 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 put in to the calculator in Hex. mode as much 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.

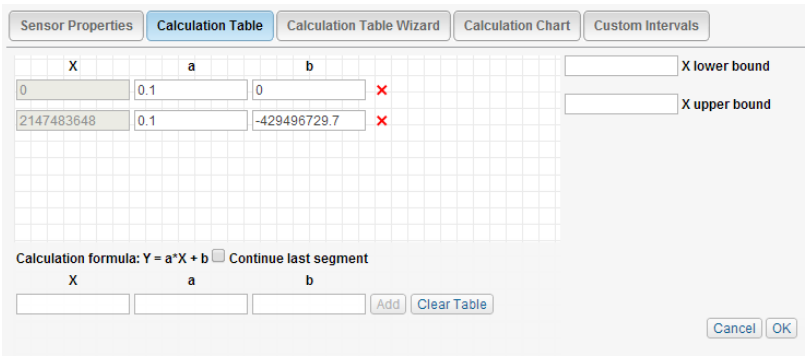
We have found out that all the interval of possible values is from 0 to 4294967295. Therefore possible values start from 0 to the half of the maximum number and negative numbers go from the half to the end of the maximum number (where the maximum number is the smallest negative number module). Divide 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 a raw data sent by parameter, **a** — coefficient, **b** — necessary correction. And all these values are needed to get some **Y** which appears to be a real temperature value.

Whether (**a**) coefficient is used for this parameter you can find out in the equipment specification. In our case coefficient equals 0.1, therefore if parameter's value sent by equipment equals 6 then the real temperature is 0.6 degrees.

The first piece doesn't need **b** correction (i.e., 0) but the second piece 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 coefficient. Therefore we have: (4294967295+1)x0.1 = 429496729.6. The received value should be deducted that's why it should be put to the calculation table as negative.

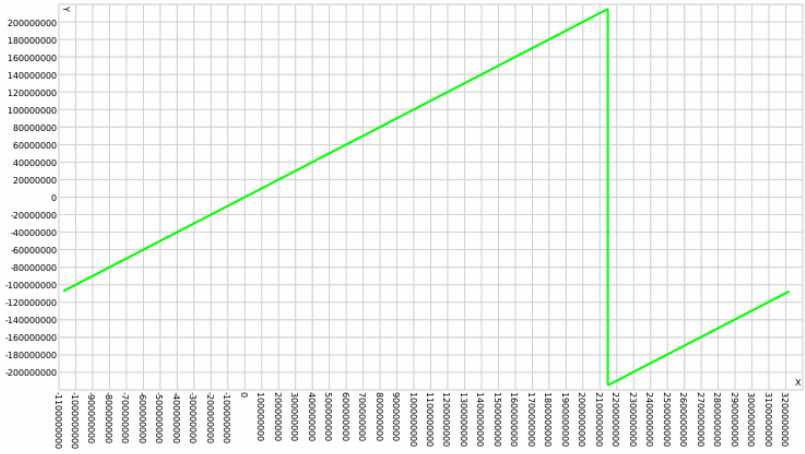
Now you can insert both the intervals (either for positive and negative numbers) in the calculation table.



Notice.
Calculation could be also made in 'Hex' mode. In this case you should put letter *F* as much times as the register length appears to be (which is 8 in our case) and then divide by 2. Afterwards, switch to the 'Dec' mode (decimal numbers) and save or memorize a number received. This is the maximum positive value.

Result Analysis

You can analyse received table, switching to the 'Calculation Table' tab and pressing 'Refresh' button.



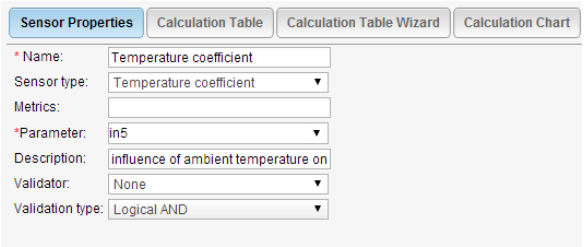
Besides, you can estimate sensor's adjustment in the Messages panel. Request messages on the unit for the same time interval and this time choose 'Show parameter as sensor values'.

11756	2009-05-20 20:55:10	0	0.60
11757	2009-05-20 20:55:26	0	0.40
11758	2009-05-20 20:55:41	0	0.30
11759	2009-05-20 20:55:57	0	0.20
11760	2009-05-20 20:56:12	0	0.20
11761	2009-05-20 20:56:27	0	0.10
11762	2009-05-20 20:56:43	0	0.30
11763	2009-05-20 20:56:58	0	0.00
11764	2009-05-20 20:57:13	0	0.00
11765	2009-05-20 20:57:29	0	-0.10
11766	2009-05-20 20:57:45	0	-0.30
11767	2009-05-20 20:58:00	0	-0.30

Temperature Coefficient

Temperature coefficient is a sensor which is created on the basis of a parameter sending temperature/voltage and applicable for a fuel level correction. Any liquids depending on ambient temperatures could occupy different volume, that's why fuel level sensor's information, especially of high volumes (for example, tanker), could seem to be incorrect without considering temperature values.

Temperature coefficient sensor as well as the other sensors is created in the unit's properties in the tab 'Sensors'. Press 'New' button and fill in the necessary fields. Sensor type is *Temperature coefficient*, name and description is any of your choice. Unit of measurement is not necessary to be indicated. The parameter sending temperature data is obligatory for indication.



Afterwards, switch to the 'Calculation Table Wizard' tab where you should put in two coefficient values, maximum and minimum temperature coefficient. Beforehand, some preliminary preparations to be done:

1. Look through the specification and find out maximum and minimum working temperatures of your fuel level sensor. In our case they will be: t_{max} = +100 and t_{min} = -60°C.
2. Find out rated temperature for the reference amount, in other words the temperature which doesn't change fuel amount and and won't require a coefficient application. In our case the value is the following: t_{rated} = +20°C.
3. Find out the density of a fuel used by you (ρ). In our case it is diesel, the density of which is 0.89 t/m^3.

Calculate coefficients' values using the following formulas:

$$P_1 = \frac{(t_{rated} - t_{\min})p}{1000} + 1$$

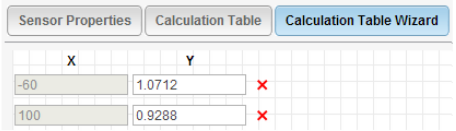
$$P_2 = 1 - \frac{(t_{max} - t_{rated})p}{1000}$$

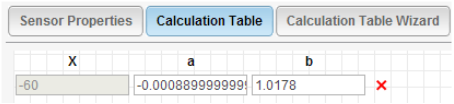
Thus we have:

$$P_1 = \frac{(20 - (-60)) \times 0.89}{1000} + 1 = 1.0712$$

$$P_2 = 1 - \frac{(100 - 20) \times 0.89}{1000} = 0.9288$$

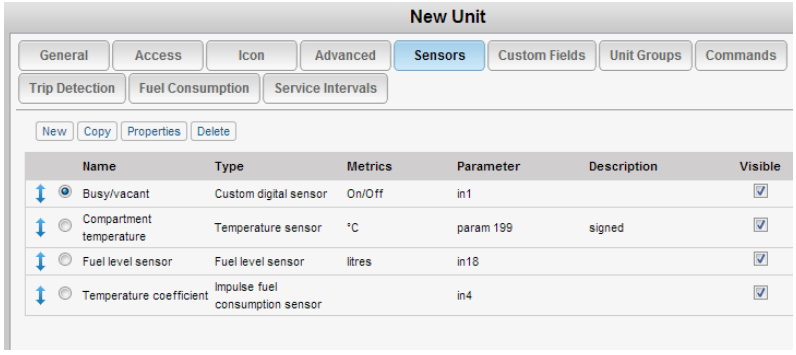
Now insert the data found for the minimum and maximum temperature values into the fields of 'Calculation Table Wizard' and generate a calculation table.





Notice.

If not the temperature, but, for example, voltage is sent by parameter, then instead for 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.



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
Enter a name for the unit from 4 to 50 characters.

Device type
Select device type from the list of devices provided according to your License. Three devices most used by the current user are listed on the right and can be easily chosen by simple click. To display the full list of available device types, click on the entry field once (at that 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 device parameters for the given unit, however, it is active only if this facility is supported within selected device type.
See also the full list of supported hardware.

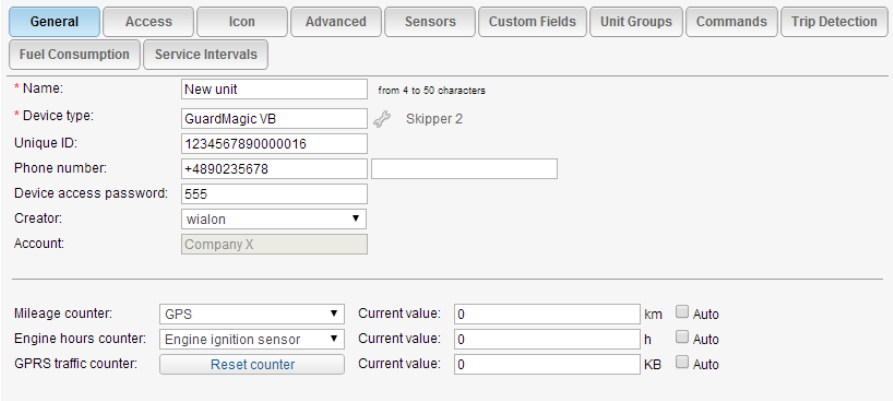
Unique ID
Enter a unique ID for the unit to be identified by the system. Usually it is IMEI or serial number. Some types of devices may support two unique IDs. In this case, an additional input field appears on the right.

Phone number
Here type phone number of the unit if it has embedded SIM card. 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
User who is creator for this unit (if you have any access to this user).

Account
Here you can see to which account the unit belongs (if you have any access to this account). Like creator, account is set while creating a unit cannot be changed later.



Attention!
Units with the same unique IDs within certain 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 a repeated ID or phone number, a special alert will be displayed. However, unit will be created anyway but with *empty* ID or phone number which could be edited later.

Note.
Parameters of units could be set in metric system of measurement (kilometers, liters), U.S. (miles, gallons), and imperial (miles, gallons). System of measurement for new units created is taken from current user settings. Therefore, to choose a system of measurement for a unit it is necessary to choose a corresponding system of measurement in the

settings of a current user. System of measurement for already existing units can be changed by conversion.

Counters

Access required: *Edit counters* – to edit counters current values 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.

Four methods are suggested for calculating mileage:

- GPS: mileage is calculated by GPS coordinates. It means if the change of coordinates was detected, the distance between them is added to mileage.
- Mileage sensor: mileage is calculated by mileage sensor.
- Relative odometer: mileage is calculated by relative odometer sensor.
- GPS + engine ignition sensor: mileage is calculated by GPS coordinates considering ignition state.

Be careful when selecting a method. If you choose to calculate mileage by a sensor, and your unit does not have this sensor, then mileage values will be zero.

Engine Hours Counter

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.

Engine hours counter is widely used in tabular reports.

GPRS Traffic Counter

GPRS traffic counter may be disabled in your package.

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 if pressing the *Reset counter* button. You will be offered to save the event of reset and the current value in unit events history to be exported to a report later.

Counter Properties

You can set the **Current value** for each counter, and the further calculations will start from the indicated point. In order the new data were added to the current value automatically, activate the **Auto** option at the right of the counter. You can manually zero counters if entering '0' to the current value field.

Counters values 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 unit's tooltip and in extended unit information.

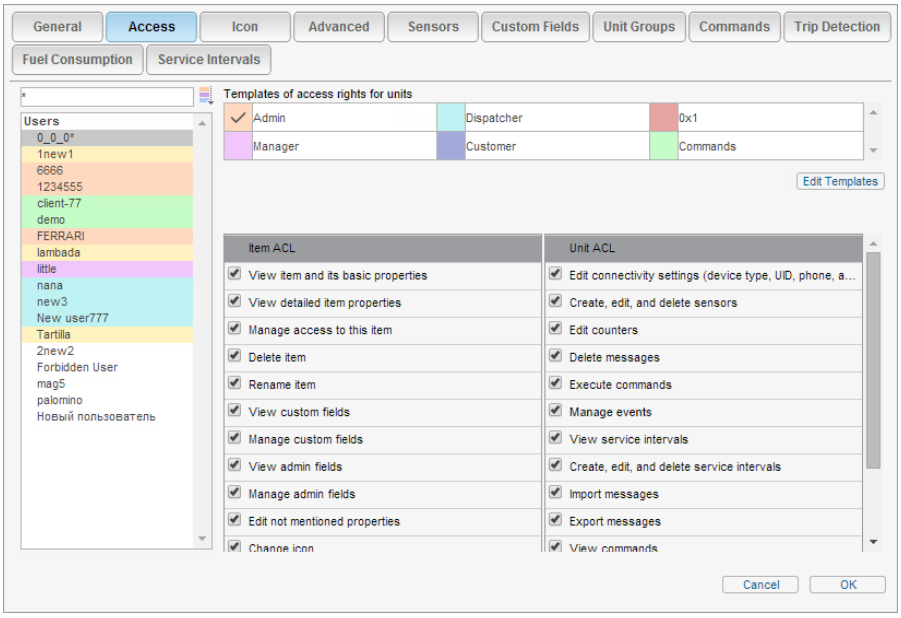
Access to Unit

Access required: *Manage access to this item* on the unit you are editing; *Manage user's access rights* on the users in the left part of the dialog.

On the *Access* tab of the Unit Properties dialog you can define access to the unit on behalf of different users.

The list of users whose access can be changed is displayed on the left. Users with colored background on 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 allowed actions are ticked.



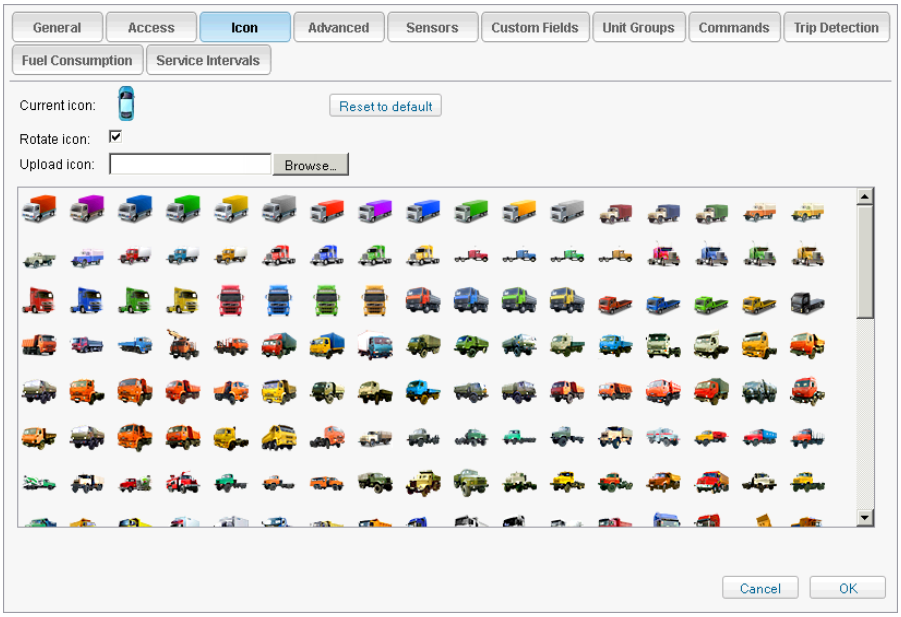
See the main topic about Access Rights for details.

Icon

Access required: *Change icon* — for choosing an icon for a unit; *Edit not mentioned properties* — for unit's icon rotation.

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 lists.

There is a number of standard icons: push the **Icon Library** button and select one. Alternatively, you can load your own image: push **Browse** and select a file on the disk. Supported formats are PNG, JPG and GIF.



Depending on course, unit icon can be rotated to show direction of movement. For this, enable *Rotate icon* option. Rotated icon should be faced North, otherwise, it may confuse you. You can find some images suitable for rotation in the Icon Library.

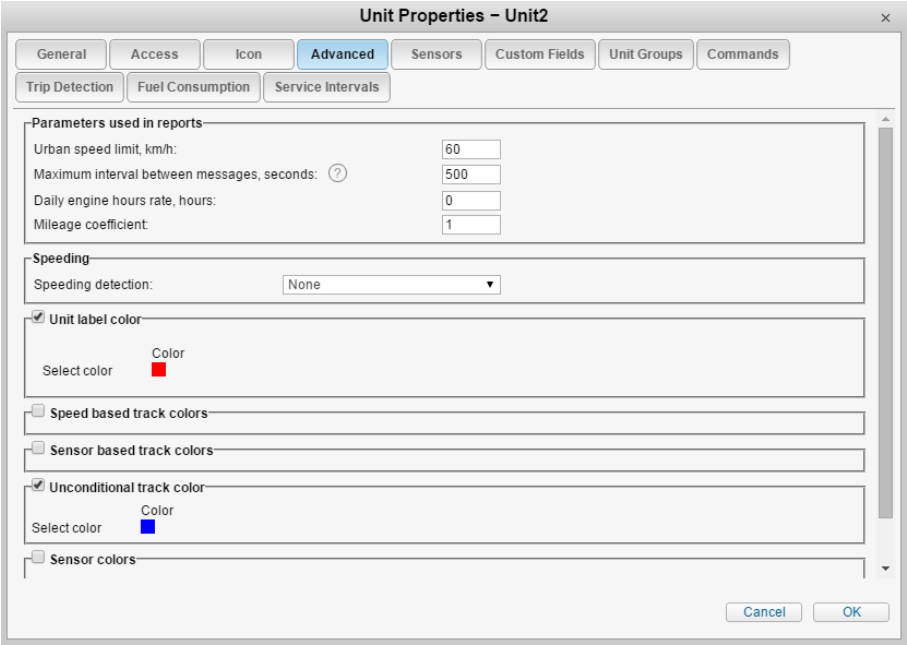
The button *Reset to default* allows returning the default icon in case it has been changed. Default icon may be useful sometimes. If a unit has a default icon, and a unit group where it belongs has a non-default icon, then unit acquires the icon of this unit group. Note that in this case a group icon will not be rotated even if the corresponding flag is chosen.

Note, that in order to upload individual icons for units, unit groups, and POIs you can use the Icon Library application (for top accounts only). 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).

Advanced Properties

Access required: *View detailed properties* – to view parameters for reports and settings of messages filtration (first and last sections); *Edit not mentioned properties* – to edit color schemes for track/sensor (middle sections); *Edit connectivity settings* – to edit parameters of messages filtration (last section).

On the *Advanced* tab of the Unit Properties dialog messages validity parameters are defined, colors for tracks are adjusted, and speed limitations are set.



Parameters Used in Reports

Speed limit

Enter the maximum speed allowed. All messages with higher speed will be detected as cases of violation and exported to the report on speeding.

Urban speed limit

This setting is used in 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 mileage. This property can be used in reports on speed, in statistics, and in advanced reports on drivers.

Maximum interval between messages

Maximum interval between messages (in seconds) is needed to exclude invalid messages. When the indicated value is exceeded it is regarded as connection loss (GSM). These cases can be viewed in the report on connection quality. In addition, this setting is used in the engine hours report to cut off false intervals of engine hours operation.

Daily engine hours rate

If the unit has an engine hours sensor, here you can indicate the daily rate of engine hours to use this value in the report on engine hours (to estimate utilization and useful utilization). Engine hours operation is defined by the corresponding counter.

Mileage Coefficient

Mileage coefficient is useful to compare detected mileage with mileage by speedometer. The corresponding column can be included in any tabular report containing information about mileage, and in statistics.

Speeding

This block deals with speeding detection method. The chosen variant defines the sequence 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 nonmoving units, because such data brings no sense for them).

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, maximum speed limit for a unit is indicated in the corresponding field. Upon receiving messages with 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
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 any road sections. In other words, the system contains data on speed limits for the particular road section, and if a unit exceeds this speed limit, then the speeding is registered. If this method have been chosen, then you can indicate 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 the road section with 60 km/h speed limit sign a unit can be driven 70 km/h, and this speed will not be a speeding. Moreover, here (the same as for the previous method) the minimum speeding duration can be indicated.

In order the speeding to be registered it is necessary to receive not less than two speeding messages in a row.

Speedings are registered in the system, and subsequently you can generate a report on speedings. Moreover, during building a track you can enable speeding markers which highlight the corresponding events on track.

Colors

Different colors can be used to show unit itself on the map or its movements (tracks). Tracks can be built in the Tracks panel, Messages panel, Reports panel, or in the Monitoring panel (quick tracks). Track segments can be different colors depending on speed, sensor values and so on.

These properties are adjusted for each unit individually. Note that 'speed based', 'sensor based' and 'unconditional' options are mutually exclusive (only one can be chosen).

How to set up colors

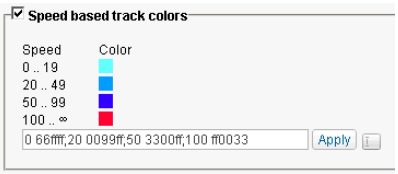
Enter pairs: speed/sensor value and corresponding color. Separate value and color with a space, and pairs themselves with semi ';'. For example, if '0 ff0000; 60 cc0000ff' is entered, the track consisting of messages with speeds from 0 to 59 km/h will be displayed in red color, over 60 km/h – in blue.

For your convenience, there is a color palette which is shown when you click on any colored square box. To apply settings push the *Apply* button. To restore default colors push *Reset to default* .

The color for some range can be transparent. For this, its first bite should be 0x01. For example, the string '0 1ff0000;0.9 00ff00' means that the values from 0 to 0.9 will be transparent, from 0.9 and upper – green.

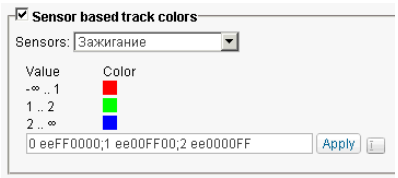
Unit label color
By default, unit names on the map are red. However, you can change this color here and even set different colors for different units.

Speed based track colors
Activate this feature to make track color different according to speed of movement. Input speed values and set colors that should correspond.



Sensor based track colors

The track can be drawn in different colors according to values from a sensor. Choose a sensor to be taken into account. Then define sensor values and colors corresponding to them.



Unconditional track color

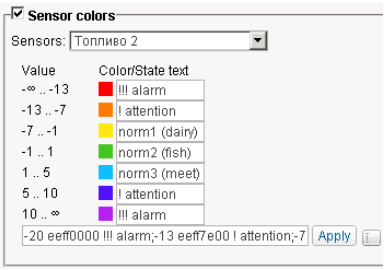
Track color set here is applied to all tracks of the unit regardless speed or sensor values. This option allows assigning an individual track color for each unit, which is very useful for rendering unit group tracks on the map. Individual colors help to differentiate tracks from each other.

Sensor colors

This feature can be used in two ways:

1. To visualize sensor state in the appropriate column of the Monitoring panel.
2. To show unit on the map (the option *Replace unit icons with motion state signs* in User Settings): the unit can be displayed on the map with special signs as arrow (moving), square (stationary) or yellow (stationary but engine on) which will obtain the color defined on this tab.
3. To visualize sensor state in the Nearest Units tool.

Value intervals and colors are set in the manner as for track colors. Besides, you can enter description for each interval. These descriptions will be used in popup windows for the Sensor Value column in the monitoring panel. If no description is assigned here, the exact value will be displayed in the popup window.



Message Validity

Enable filtration of unit position information in messages

All the messages without any exception are stored in the system. However, if having outlying data, it can affect reports and other processes based on database analysis. That is why, it is recommended to enable filtration of data. For example, if there are outlying data, messages without coordinates, etc., these messages can be marked as invalid and ignored when generating reports, calculating mileage, and so on. To adjust filtration settings, fill in the fields:

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 considered to be invalid. Recommended value is three and more, but some equipment can give correct coordinates beginning from two satellites.

Maximum HDOP value

HDOP refers to Horizontal Dilution of Precision. Here you set the minimum HDOP value for messages to be

regarded as valid. The lower this parameter, the more accurate the coordinates.

Maximum speed

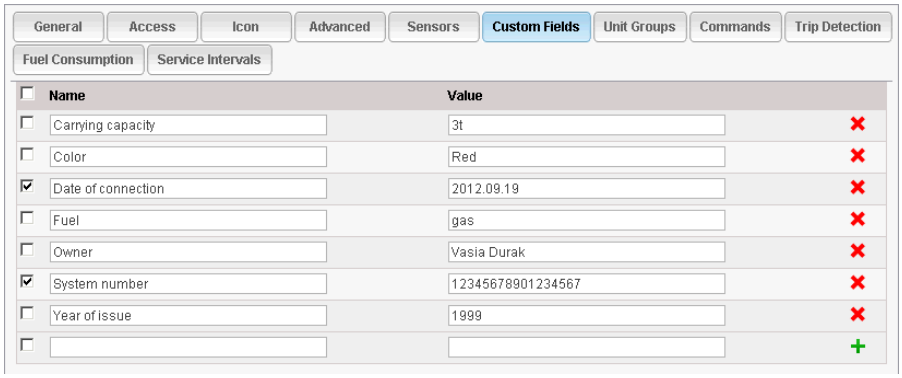
The messages containing speed higher than or equal to one set here are marked as invalid.

Custom Fields

Access required: *View custom fields* – to view general custom fields; *Manage custom fields* – to create, edit, and delete general custom fields for given unit; *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 input information of any type. This can be some notes or precisions about the equipment, vehicle or any other information needed. Administrative fields (seen only to users with special access rights) are marked in the first column.

Input a field name and its value and press the *Add* button. To delete an incorrect field, press *Remove*.



When the next time you will open unit properties dialog, the entered fields will be alphabetized. The same will happen when displaying custom fields in unit's tooltip.

Application of unit custom fields:

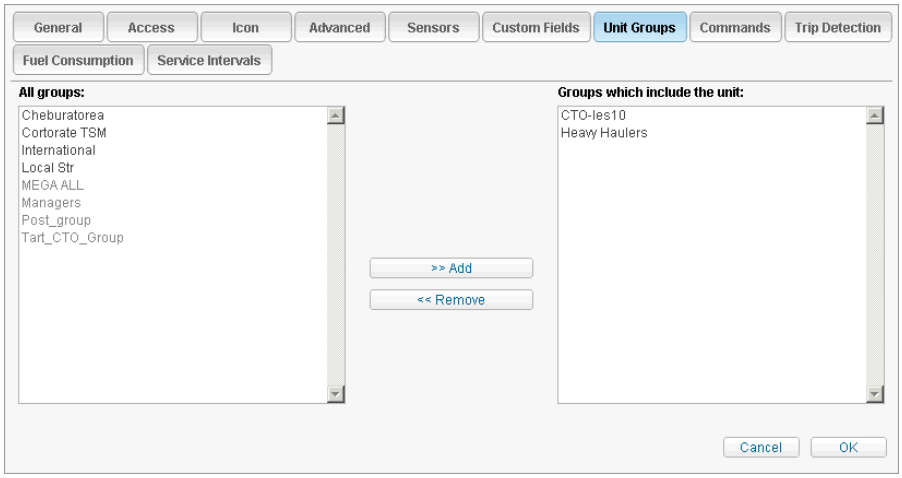
- In unit's tooltip and in extended unit information (if enabled in User Settings);
- In Custom Fields table that can be generated both for a unit and for a unit group;
- In the Monitoring panel to search units by some property;
- In the text of notifications.

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. You can also see the list of all existent groups and include the unit to one or several groups if needed.

To include/exclude the unit in/from groups, use the appropriate buttons *Add* and *Remove* or double-click on a group in the appropriate list.

If you do not have rights to change units in given group ('Edit ACL propagated items'), such group name is dimmed (grey).

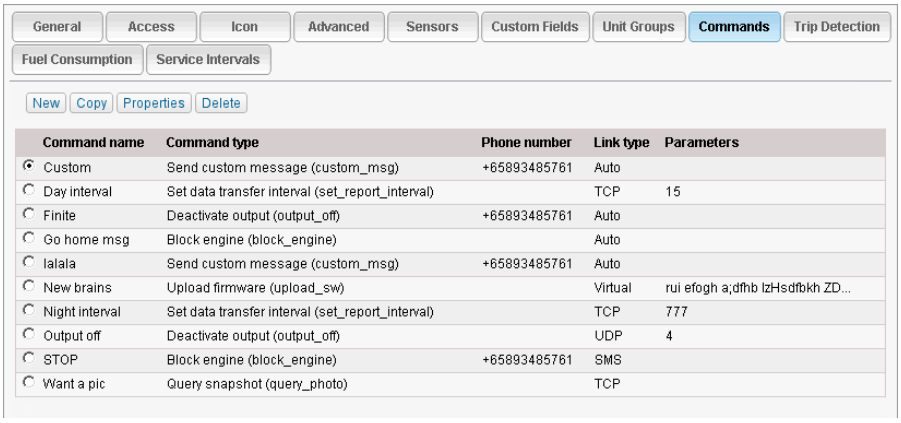


Commands

Access required: *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 be able to send a command to a unit, it is crucial that this command is 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 bare exactly the same name.



Command name	Command type	Phone number	Link type	Parameters
Custom	Send custom message (custom_msg)	+65893485761	Auto	
Day interval	Set data transfer interval (set_report_interval)		TCP	15
Finite	Deactivate output (output_off)	+65893485761	Auto	
Go home msg	Block engine (block_engine)		Auto	
lalala	Send custom message (custom_msg)	+65893485761	Auto	
New brains	Upload firmware (upload_sw)		Virtual	rui efogh a;dfhb lzHsdfbkh ZD...
Night interval	Set data transfer interval (set_report_interval)		TCP	777
Output off	Deactivate output (output_off)		UDP	4
STOP	Block engine (block_engine)	+65893485761	SMS	
Want a pic	Query snapshot (query_photo)		TCP	

To create a new command, press the *New* button. Sometimes it is convenient to create a new command using existing one as the basis – select a template command and press *Copy*. To view or change configuration of an existing command, select it and press *Properties*. To delete a command, select it and press *Delete*.

Command Properties

A command has the following properties:

Command name
Input command name. Names cannot be repeated within one unit.

Command type
Choose command type from the list of commands supported by the device used. See the list of standard commands supported in Wialon.

Link type
Select the link type to be used each time when sending the command (Auto, TCP, UDP, Virtual, SMS). If *Auto* link type is set, the program will automatically select a channel which is available at the moment of execution (if several are available, then the priority is given like in the list of link types). The list of link types also depends on the device type indicated on the *General* tab.

Note that if the link type is TCP or UDP, it is required that the unit was connected at the moment of execution. If the command is executed through GSM channel, a phone number in the international format should be present in unit properties and the user is supposed to have rights to send SMS messages.

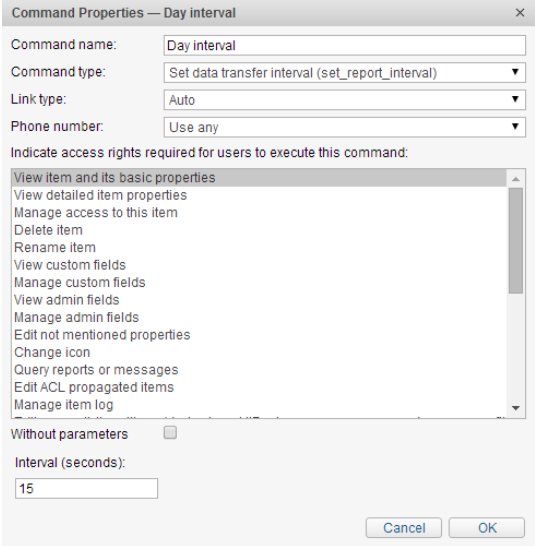
Phone number
Phone number is required for SMS commands only. Some types of devices can support two SIM cards, so a unit can have two different phone numbers. Here you choose which of them will be used to send the command: first/second/any. Like with parameters and link type, the phone number selected here cannot be changed at the moment of sending the command.

Access rights
Indicate access rights which would be required for users to execute this command. To choose a combination of rights,

press <ctrl> key and select several items. Regardless of selected rights, the flag *Execute commands* is required anyway.

Parameters

Additional parameters may be necessary for some commands. It can be like input/output number, report interval, etc. Those parameters can be set when configuring the command, and in this case, they will be 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 command, because you can indicate them when executing (manually only). To do so, mark the checkbox *Without parameters*. It will be impossible to change parameters (as well as link type or phone number) if they are set.



More about commands...

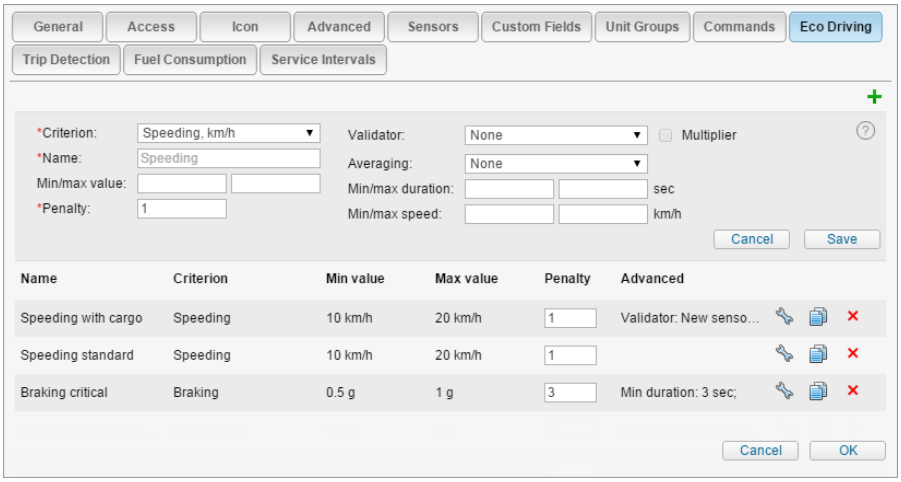
Eco Driving

Driving behavior influences condition of a transported cargo, as well as technical condition of the vehicle used. Wialon system possesses the functionality enabling to receive the estimation of driving quality. The functionality helps to evaluate how a driver treats the entrusted vehicle, and as a result promote driving safety, prolong vehicle life, reduce fuel costs, and ensure cargo safety.

'Eco Driving' tab is available if you possess the corresponding billing service (provided on demand). Besides, for viewing the tab it is necessary to possess 'View detailed item properties' right, and for editing — 'Edit trip detector and fuel consumption' right towards a unit.

Settings

'Eco Driving' tab is presented by the form where you should either choose or insert the parameters used for penalty scoring. It is conditionally divided into 2 sections: key parameters (obligatory ones), and additional (optional for indicating). Criterion, name, sensor (if 'Custom' criterion is chosen), penalty value are considered to be the key parameters. Moreover, in this section you can indicate minimum/maximum violation value. Additional parameters section contains validator, multiplier, averaging, minimum/maximum duration and speed. After indicating of all the necessary parameters you can either save the chosen criterion with individual name and other parameters, or clear the form by using the corresponding buttons.



Key Parameters

- **Criterion** — violation type (speeding, acceleration, braking, turn, 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 a 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.
- **Min/max value** — is a range of violation values. If a received parameter value falls within the range, then a violation is recorded (minimum value is included into the range, and the maximum is not).

Note that intervals of violations for such criterion as acceleration/braking can be connected. In other words, if a repeated violation occurs during 30 seconds after the end of a primary one, then both these violations will be connected into one.

Additional Parameters

- **Validator** — any of the sensors created for a unit. It is applied to confirm or contradict the received values of a chosen criterion.

Moreover, if you check the 'Multiplier' flag, then the sensor chosen as a validator is used as a coefficient multiplying a penalty score.

Here it is an example. If the main objective of the company is to provide a cargo safety during its transportation, then the violations evaluation severity 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 a validator's value.

- **Min/max duration, sec** — duration range for the criterion (from — to) on which a violation is recorded. If a duration for the criterion is less than indicated minimum value, then a violation is not recorded. If a maximum indicated value is exceeded, then a violation will be automatically terminated, and a new one started.
- **Min/max speed, km/h** — speed range (from — to) on which a violation is recorded.
- **Averaging** — there are 3 variants to work with averaging:

Averaging is disabled. Penalty points received for the trip are summarized. Besides, they are accumulated in a linear progression. So, the more trip interval is, the more violations to be registered. That is why this way cannot match everyone. Therefore, there is a possibility 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 1 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, then averaging by mileage cannot be applied to the trip.

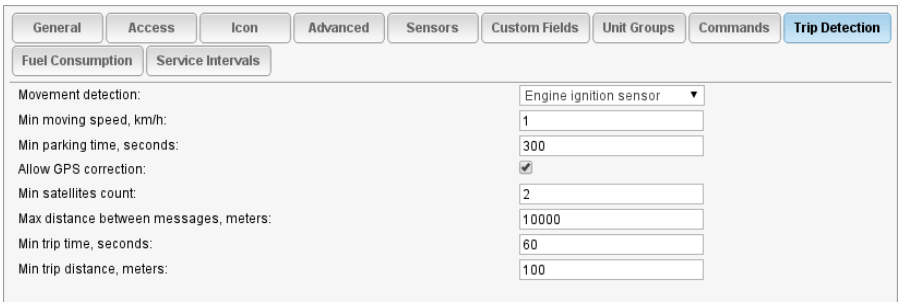
Averaging by time. Using the averaging by time, the total amount of penalty points for the trip is divided by the number of 1 minutes intervals of the trip. Therefore, as a result we receive average amount of penalty points for every minute of the trip.
Note, that if a trip is less than 1 minute, then averaging by time cannot be applied for the trip.

Trip Detection

Access required: *View detailed properties* – to view this tab; *Edit trip detector and fuel consumption* – to edit this tab.

On the *Trip Detection* tab of the Unit Properties dialog you define parameters to detect movement intervals (trips) and idles (stops, parkings). Trip is a period of time when a unit was moving. Stay is a period of time when a unit was motionless.

Depending on the equipment installed and the parameters set on this tab, reports can look rather different.



Movement Detection

There are five main methods of how movement intervals are detected:

- **GPS speed**
  This method is universal and can be applied to any device type and configuration. The parameters of this method are described below.
- **GPS coordinates**
  This method is universal as well. The movement is detected if the coordinates in two successive messages are different. The fact is that some equipment types do not provide speed parameter in messages. In this case, movement can be detected by coordinates without installing additional equipment.
- **Engine ignition sensor**
  This method is available for units having ignition sensor. If so, the trip begins when the sensor is switched on and ends when the sensor is switched off. Also the trip is considered to be terminated when exceeding a timeout.
- **Mileage sensor**
  This method can be used for units which have a mileage sensor. The sensor transmits the absolute mileage. The beginning of a trip is detected when the mileage value increases, and the end is detected when mileage value stops to grow.
- **Relative odometer**
  Shows what distance was rolled from the previous message. Note that 'Min moving speed' parameter must be '0'.

After you have established the way to detect intervals of movement and stay, consider the parameters below. They are needed to distinguish trips, parkings, and stops.

Min moving speed
Specify which speed should be considered as the beginning of the motion. This is needed to exclude outliers of data. The equipment can locate coordinates with an accuracy of ±10, so a speed of 1-2 can be assigned to the unit that is not moving in fact. To exclude such cases from the trips, set this parameter. When defining movement by a sensor (for example, ignition), this parameter is used to detect stops inside a trip.

Min parking time
Set time in seconds how long the unit should be immovable to register this as a parking. This option allows regarding

stops in traffic jams, at a lights or at an intersections as a part of a trip (instead of breaking the trip). When defining movement by a sensor (for example, ignition), this parameter is applied only to intervals with when the sensor is off. If 'Allow GPS correction' is on, the value of the minimum parking time should be no less than 10.

Allow GPS correction

For non-sensor-based detection, this option is applied automatically. In case you use one of the sensors (ignition, mileage, or odometer), you can use GPS correction in addition – to receive more precise data in reports. To activate GPS correction of trip/stay detection, put a check mark near 'Allow GPS correction' and configure the parameters described below.

Min satellites count

It means how many satellites are needed to consider data to be valid. Recommended number is three and more, but two are enough for some types of equipment.

Max distance between messages

Indicate the distance to exclude outliers of data. It means if according to the message received the unit moved relatively to the previous message greater distance, then the previous trip is over and a new trip begins. The value in this field should be at least 50.

Min trip time

This is also to exclude cases of outliers of data. For example, the unit on the parking moved from one place to another, and movement during 40 seconds was detected. To exclude such cases from trips, set 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 because of permissible equipment error. In order to not count such situation as movement, indicate how far the unit has to move to consider it as the start of a trip.

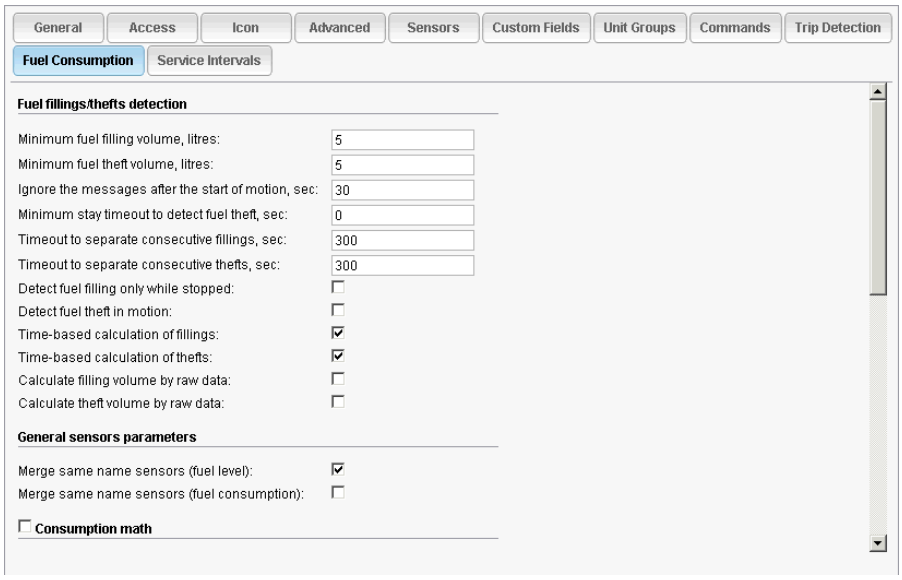
Fuel Consumption

Attention!
This module is licensed separately.

Access required: *View detailed properties* — to view this tab; *Edit trip detector and fuel consumption* — to edit this tab.

Wialon has instruments to calculate fuel level and fuel consumption. Parameters to calculate fuel and calculation method itself are set on this tab.

Fuel fillings and thefts can be detected only if unit has fuel level sensors. Fuel consumption calculation will be more accurate if unit has fuel consumption sensors, however, it can be calculated mathematically, too.



Fuel fillings/thefts detection

Minimum fuel filling volume
How considerable should be increasing of fuel level to be regarded as a filling.

Minimum fuel theft volume
How considerable should be fuel level fall to be regarded as a theft.

Ignore the messages after the start of motion
At the very beginning of movement the data on fuel level can be not very accurate, so you can ignore these messages.

Minimum stay timeout to detect fuel theft
How long should continue a stay accompanied with fuel level decreasing to be regarded as fuel theft.

Timeout to separate consecutive fillings
Two or more fuel fillings can be made during one stop/parking. They can be either stuck together or regarded as separate events. It depends on time passed between them.

Timeout to separate consecutive thefts
The similar parameter regarding fuel thefts. Thefts are not summed up if timeout is exceeded or fuel level grows up between those thefts.

Detect fuel filling only while stopped
If activated, the volume of filling registered can be fewer. In this case, fuel level before filling is taken from the messages with zero speed only.

Time after the start of motion to fix final level
This option appears when the previous is selected. By default, the first fuel level sent after the start of motion is taken as final for the filling (or the first level sent after the ignore interval). If you set this option, the maximum fuel level sent during the indicated interval will be taken as final (excluding messages sent during the ignore interval).

Detect fuel thefts in motion
Traditionally, fuel theft is better detected while the unit is stationary. However, you can enable this option to detect thefts even in motion. Note that in many cases activation of this option can lead to the situation when false thefts are defined.

Time-based calculation of fillings
Can be used for not very mobile units like tower cranes etc. If activated, the whole time period regardless trips/parkings is taken into account when calculating filling volume.

Time-based calculation of thefts
Works similar as the previous option but applied to fuel thefts.

Calculate filling volume by raw data
Sometimes, filtration may cause underestimation of filled fuel volume. Therefore, this particular option can be applied to ignore filtration and calculate filled fuel volume by raw data (the system will search min and max fuel level, the difference between these values is filled volume).

Calculate theft volume by raw data
Along similar lines, filtration can be disabled while calculating fuel theft volume to prevent underestimation of fuel stolen (the system will search min and max fuel level, the difference between these values is theft volume).

Note:
Fuel fillings and thefts can be controlled through reports (see Fuel Fillings and Fuel Thefts tables) as well as through the appropriate job.

General sensors parameters

Merge same name sensors (fuel level)
If there are several fuel level sensors with the same names, their values can be summed. If this feature is not activated, the search of fillings/thefts is done for each sensor separately. If a message contains no value of a sensor, this message is ignored in calculations.
Attention! With this option enabled, no individual filtration can be applied to fuel level sensors (FLS).

Merge same name sensors (fuel consumption)
If a unit has several engines and absolute fuel consumption sensors or impulse fuel consumption sensors are installed, this feature is useful. The values from different sensors will be summed (the sensors must have the same names). If the option is not activated, each sensor is controlled separately.

Consumption math

This is a purely mathematical method of calculate fuel consumption (no sensors are required). To use this method, the following parameters should be set:

- **Idling**: fuel consumption when staying with engine on.
- **Urban cycle**: fuel consumption when moving with a speed of 36 km/h (22 mph).
- **Suburban cycle**: fuel consumption when moving with a speed of 80 km/h (50 mph). Fuel consumption for other speed values is calculated mathematically.
- **Coefficient when moving under load**: the impact of loading on fuel consumption calculations. This coefficient will be used when engine efficiency sensor value is above zero.

Consumption by rates

This is also a mathematical method. If the previous method takes account of speed and load, this method considers the season (winter/summer time). Specify the following parameters:

- **Summer consumption**: the rate of fuel consumption in summer time.
- **Winter consumption**: the rate of fuel consumption in winter time.
- **Winter from/to**: winter period.

Fuel level sensors

Fuel consumption is defined from fuel level in the tank where fuel level sensors are installed. The difference between the average values at the beginning and at the end of the period is calculated.

Replace invalid values with math consumption
If this setting is enabled, in case when it is impossible to detect fuel level by sensors, calculation by math will be applied for this particular segment.

Time-based calculation of fuel consumption
This option is useful for non-moving units (hoisting cranes, for example). As a rule, fuel consumption is calculated by mileage, but it can be calculated by time as well.

Filter fuel level sensors values
Apply smoothing algorithm for sensors. The greater this parameter, the smoother are the charts. You can adjust the level of smoothing manually (from 0 to 255) – in the parameter called 'Filtration level'.
For fuel level sensors (FLS), filtration degree can be adjusted individually for each – in sensor properties. However, this individual filtration works only if the option 'Merge same name sensors (fuel level)' is off.

Impulse fuel consumption sensors

The readings are taken from impulse fuel consumption sensors. A sensor of this type needs a calculation table to convert impulses to fuel volume. If there is a limit after which impulse counter is zeroed, this limit can be specified (*Maximum impulses* field). However, with such a limit, in case of abnormal reset, the further calculations become senseless. In such a case, the limit must be 0.

Absolute fuel consumption sensors

The readings are taken form absolute fuel consumption sensors. The calculation table is applied to each sensor separately, and then the difference between transformed sensor values in two consecutive messages is calculated. You may need to add a coefficient to get values that are more precise. Then add to the calculation table the following entries: *X:0, a:coefficient value, b:0*. For example, to increase fuel consumption level for 10%, *a* coefficient must be *1.1*.

Instant fuel consumption sensors

The readings are taken from instant fuel consumption sensors. It is calculated how much fuel has been consumed since the previous message. Thus, unlike other fuel sensors, there is no connection between consecutive messages.

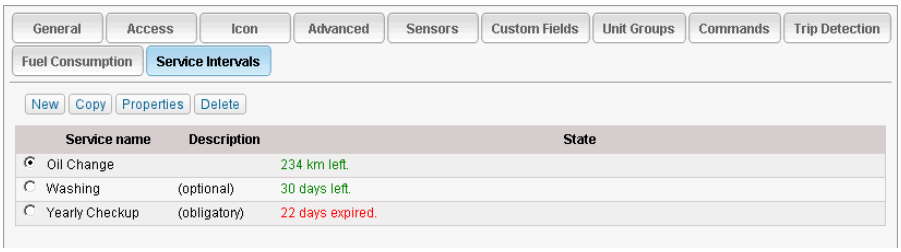
Service Intervals

Attention!
This module is licensed separately.

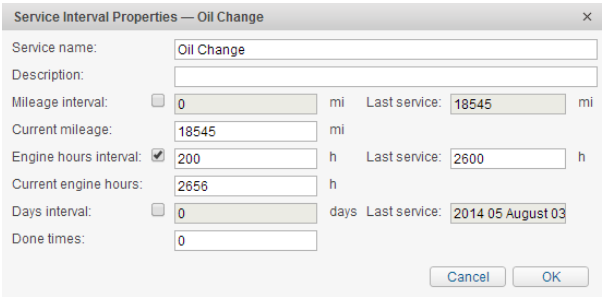
Access required: *View service intervals* — to view this tab and its contents; *Create, edit, and delete service intervals* — to create, edit, and delete service intervals for given unit.

On the *Service Intervals* tab of the Units Properties dialog, you can define maintenance intervals to perform all necessary routine servicing in time. These can be oil change, yearly checkup or just a washing.

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 are already expired to do this service. Depending on the state (time left or expired), the lines are red or green.



To add a new service interval, press the *New* button. Then enter necessary parameters: name, description, interval and last execution time.



Three ways to indicate an interval are possible:

- **Mileage interval** means that the service has to be done every *n* number of kilometers (miles) travelled.
- **Engine hours interval** means that the service must be done every *n* number of engine hours.
- **Days interval** means that the service must be done every *n* number of days.

You can simultaneously choose several interval types at once, and each of them will be tracked independently. For example, the term by days can be expired, and at the same time, the term by mileage has not passed yet.

When choosing an interval, indicate which counter value (or day) was when this kind of service was made 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 much time this kind of service was already done. This number can be entered into this 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 will be zeroed and started again.

At the end press OK. The newly created service interval will appear on the list. To manage intervals, use the following buttons:

- *New* opens a dialog to create a new service interval and set parameters for it.
- *Copy* opens a dialog with all 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 unit's tooltip and in extended unit information. See User Settings.

Events Registration

Maintenance works can be registered in unit history and used in 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 will be restarted, done times will be added, and the last service term will change. The changes can be estimated in unit's tooltip, in extended unit information as well as in unit properties dialog.

Notifications

There is a notification of the *Routine servicing* control type. With the help of this tool you can receive automatic notifications by e-mail, SMS, in online popup window or by other means about service terms which are approaching or expired. See Notifications.

Reports

Two tables concerning service intervals can be generated for units or unit groups: *Maintenance* and *Utilization cost*. The report on maintenance presents the list of registered maintenance works. 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, the number of services done, total utilization cost, and the number of fillings and services.

Unit Groups

Unit group is a system macro object incorporating several units that have something in common. Unit groups have broad application in Wialon and are useful both for managers and for end users. That is why working with unit groups is possible both in CMS Manager and in the main interface.

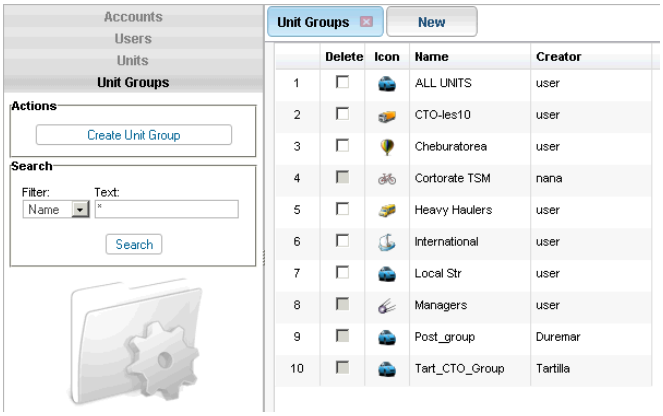
Unit Groups in Management

Unit groups can be used in management system in two ways: they make easier assigning access rights to units. You can give a user access to a group of units at once.

How to use unit groups for tracking purposes is described below.

Working with Unit Groups

To work with groups of units, open *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 and a filter to search existent groups. In the table of results, you can see group's name, image, creator (if available), and button to delete group. 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 on which group configuration is adjusted. The number of tabs can vary depending on your access rights (max — 4).

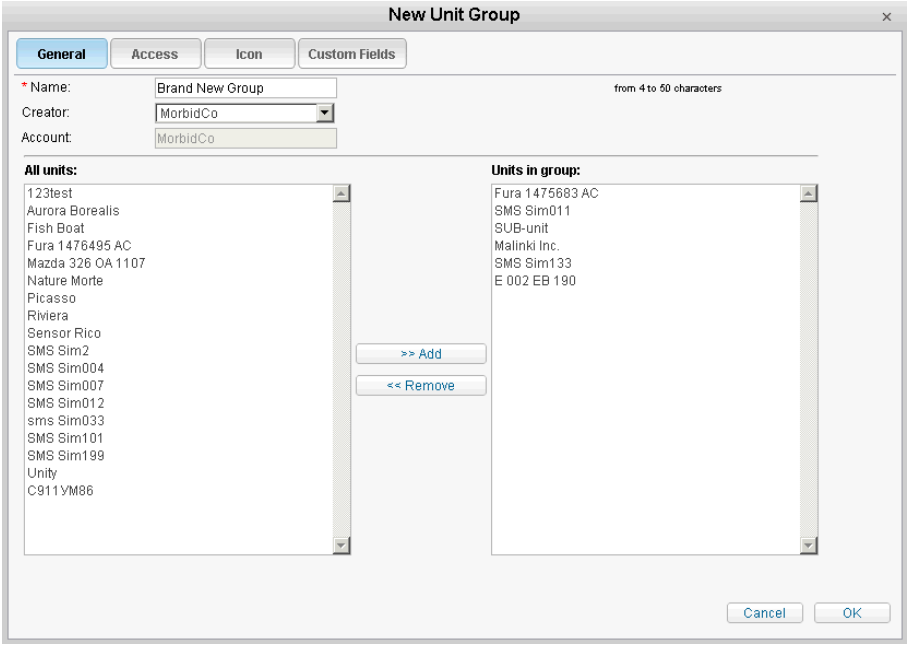
General

Name
Give group a valid name (see Input Rules).

Creator
Creator is important to build hierarchy of access rights. Do not forget that the creator automatically gets manage access to units in the group.

Account
Here you can see to which account the unit group belongs (if you have any access to this account). Account and creator cannot be changed afterwards.

Units
Add units to the group. On the left, there is a list of all units available. To facilitate a search of the necessary units you can use dynamic filter. Here units can be filtered not only by name, but also by device type, creator, custom fields (if these properties are accessible), or unit groups. On the right, there is a list of units in the group. To add a unit to the group, double-click on it or push the *Add* button. To remove a unit from the group, push *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:.
Along with the manual way to manipulate groups, there is an automated way to add/remove units to/from a group. See Notification Action for details.

Access

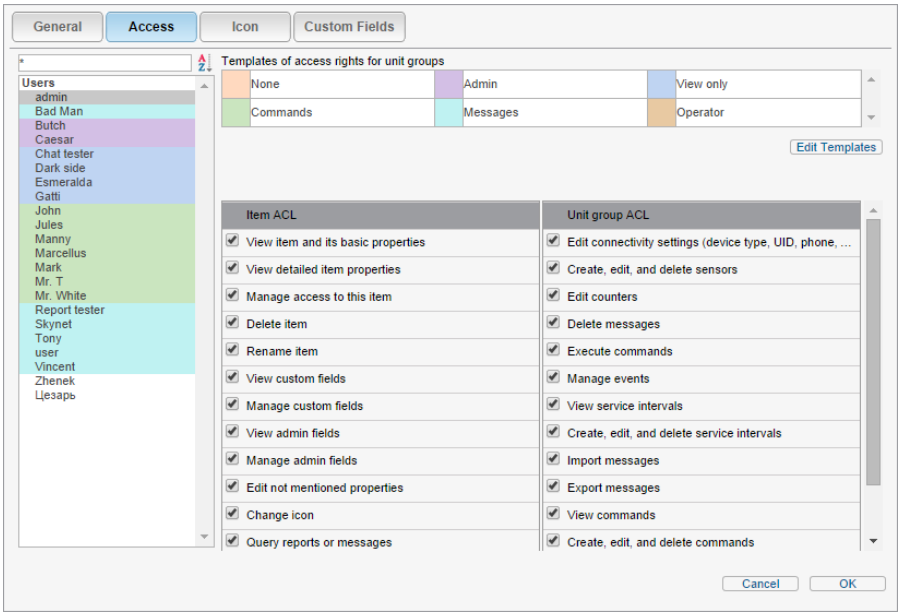
Access required: *Manage access to this item* — to group; *Manage user's access rights* — to users.

On this tab, you can define access 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 those users who already have any access.

Select a user on the left and check access flags for this user on the right. Access rights are divided into two sections — standard rights (Item ACL) and special rights (Unit group ACL).

More about access setup...



Icon

Access required: *Change icon* — to view this tab and change icon.

Image for the group can be selected from a set of standard icons (the *Icon Library* button) or loaded from disk (the *Browse* button).

Icon is used mainly to display group in the Unit Groups list. However, it may be applied also to display units that belong to this group. If a unit has a default icon, and a unit group where it belongs has a non-default icon, then unit acquires the icon of this unit group. More about icons...

Custom Fields

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

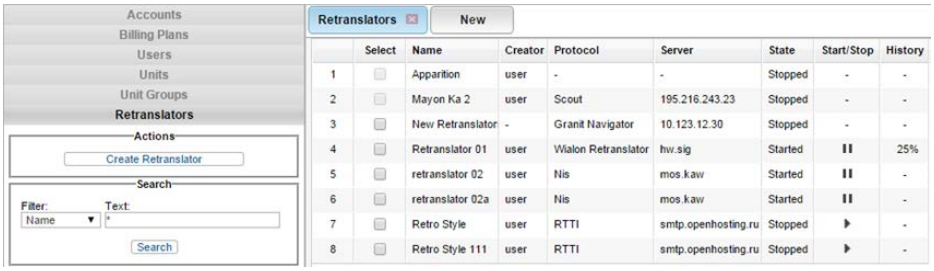
Here you can enter any additional information about this unit group. Information is entered in the form of fields: <field_name> — <field_value>. Key in a field name and its value and press the *Add* button. To delete a field, press *Remove*. Administrative fields (seen only to users with special access rights) are marked in the first column.

Retranslators

Attention!
This functionality is available if *Retranslator* module is activated.

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.

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 started again.



To create a retranslator, press the **Create Retranslator** button. In the dialog input a name for the retranslator (at least 4 characters) and choose a retranslation protocol.

The number of available retransmission protocols depends on your License. The full list is the following:

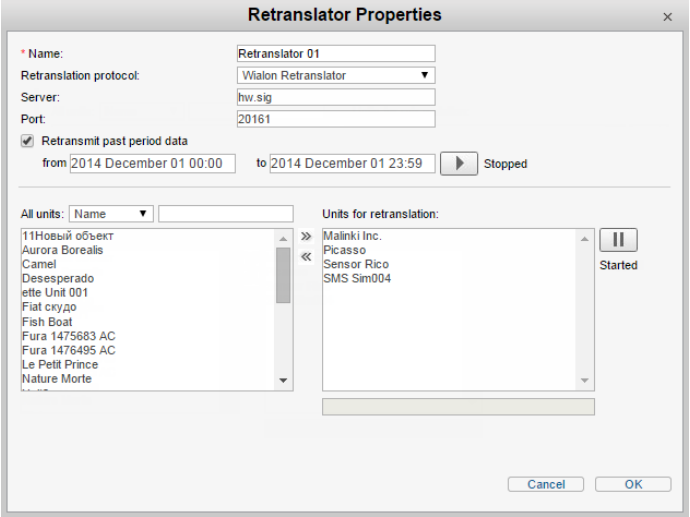
- Wialon Retranslator,
- Nis (M2M),
- Granit Navigator,
- Scout,
- Cyber GLX,
- Wialon IPS,
- VT 300,
- EGTS,
- SOAP,
- TransNavi,
- NVG,
- RTTI.

Then indicate retranslation server, port, and in some cases authorization (*auth*). If the port is not indicated, it is set to defaults. Authorization for Nis protocol is login and password separated by colon (login:password). As for the EGTS protocol, you can disable authorization if it is irrelevant, indicate time interval (in seconds) at the end of which authorization will be repeated, and set dispatcher ID. Moreover, you can indicate carrier ID for the RTTI protocol.

Below select units for retranslation. To facilitate a search of the necessary units you can use dynamic filter. Here units can be filtered not only by name, but also by device type, creator, custom fields (if these properties are accessible), or unit groups. 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. Besides, you can input a new ID for units to be retranslated. To retransmit data by Granit Navigator protocol, unit ID should be a number in the range from 0 to 65535.

Attention!

- Data from 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 will see them in the left part again.
- For units with two IDs, the first 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 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 possible retransmitting messages from units for the past period of time. In other words, you can specify particular period of time in the past for which you would like to retransmit data of the chosen units. Note, that data retransmission for the past period does not start immediately (it could take up to 10 minutes before beginning).

The necessary actions:

- In retranslator dialog check the box 'Retransmit past period data';
- Indicate the period of retransmission (from — to);
- Press start button to the right of the retransmitting period field.

Note.
This option is active only if the prime retranslator have already been started.

Retransmitting data progress is shown in percentage on the 'History' column of the results panel. The indicated value shows percentage of the units for which data retransmission has been already 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 Hosting interfaces — manager's and user's. To open the tool, click on a corresponding button in the top panel of CMS Manager or in the User Menu of 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

Data can be imported and exported via files or directly from one object into another.

Exporting **to a file** gives you possibility to store data on disc 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. It can be used to store and transfer different kinds of data like 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 Hosting to exchange POIs and geofences between resources as well as import and export POIs and geofences from/to external sources.

Exporting **to an object** allows you to transfer data (properties or contents) straight from an object to another object 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. Bear 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 originated object).
2. You can import into an object only those properties or contents that are editable for you (you need 'create, edit, delete' access to these properties of the destination object).

See more:

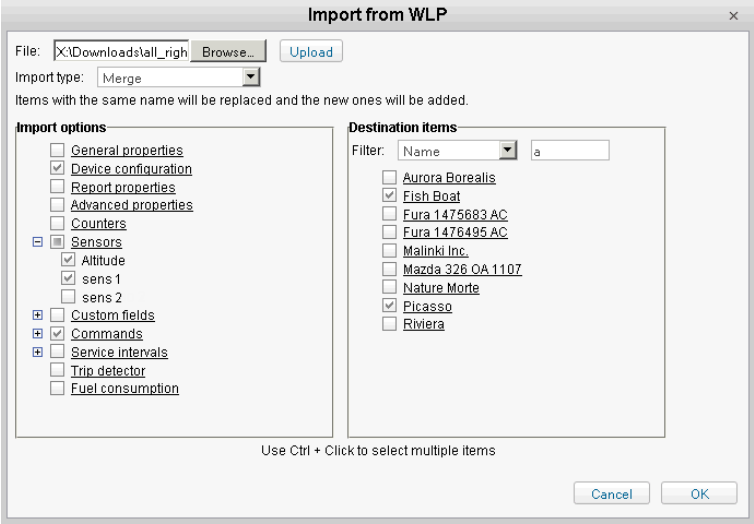
- Import from WLP
- Export to WLP
- Import from KML/KMZ
- Export to KML/KMZ
- Unit Properties Transfer
- Resource Contents Transfer
- User Settings Transfer

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.

Indicate the path to the file and press *Upload*. The file will be processed on the server, and available contents will be displayed in the section *Import options*. At the same time, in the section on the rights (*Destination items*) objects of proper type will be displayed.

Note.
Filtration by measurement system takes place in this list, because you cannot import data if the source and destination items have different systems of measurement. For more information see the section Conversion.



If the loaded file contains unit properties, all available units will be displayed on the right; if it contains resource contents, all available resources; if it contains user settings, all available users.

Check data to be imported on the right and select destination objects on the left. Use the dynamic filter to quickly find a necessary object. In case of units, they can be filtered not only by name but also by device type, creator, custom fields (if these properties are accessible), or unit groups.

For unit properties (such as sensors, custom fields, commands, service intervals) and resource contents you should choose also export 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 whether the operation has succeeded.

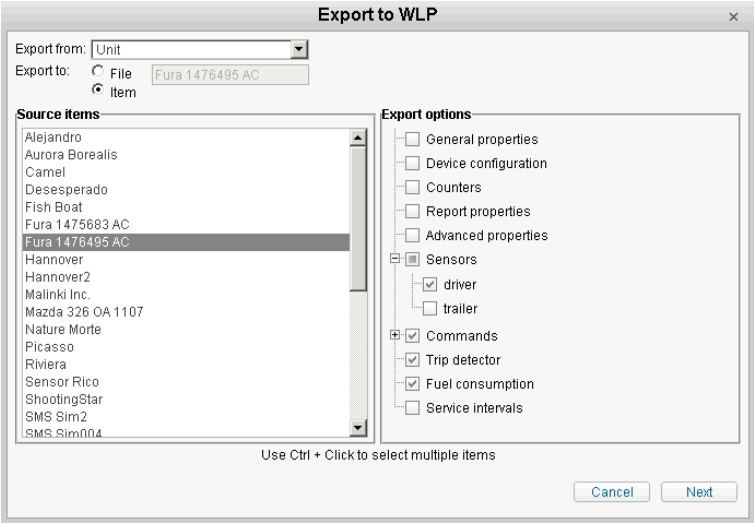
Export to WLP

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 dropdown list *Export from*. Then select export destination — to a file or an item.

Export to an item

In the *Source items* section, select a necessary item (just one). If a unit has been chosen as an 'Export from' option, then a dynamic filter can be applied to the list of source items. Units can be filtered not only by name, but also by device type, creator, custom fields (if these properties are accessible), or unit groups. When a certain item is selected, its available properties or contents are displayed on the right, in the section *Export options*. Choose data for export. To tick all items at once, hold <ctrl> key and select any item. Repeat the same operation to uncheck all items at once.

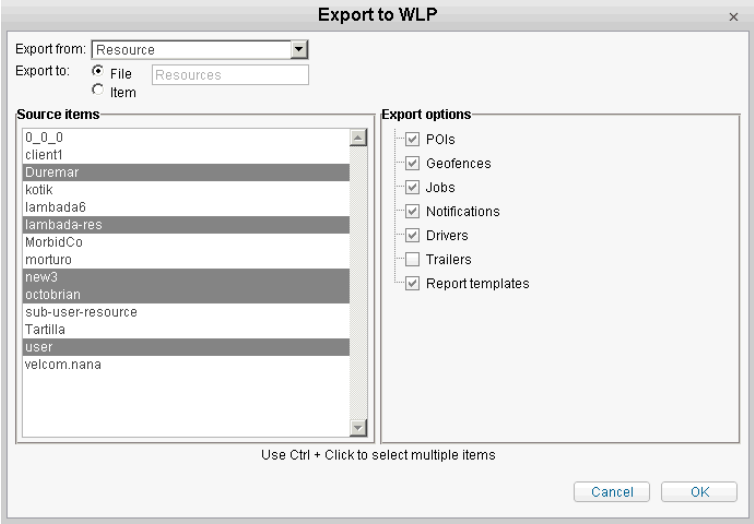


If you perform export to an item, then the Import dialog described above is displayed. Select destination objects there and press OK.

Export to a file

You can choose one or more objects to export them to a file. To select multiple items, use <ctrl> or <shift> keys. However, note that when exporting several objects 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 will be named after the origination item (if only one is chosen) or have a name like 'Units'/'Resources'/'Users' (if multiple items are selected).

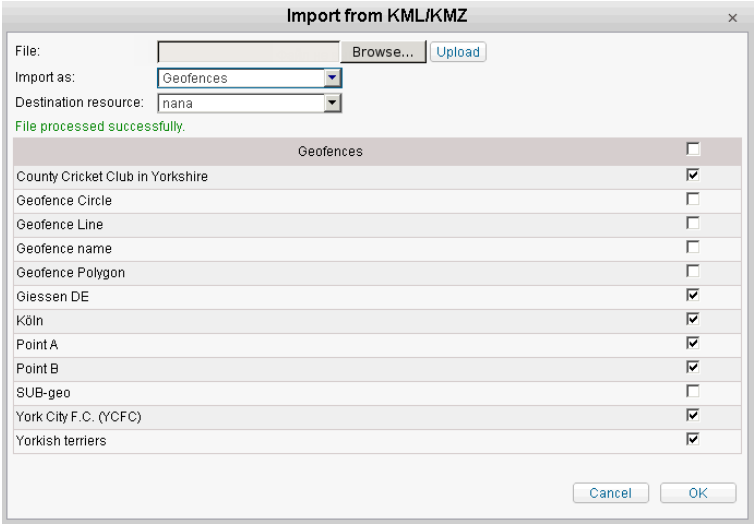


If you export to a file, then after you press OK, file is stored on the disk. As a result, you get a single WLP file (in case of one source item) or an archive with several files (in case if multiple source items).

Import from KML/KMZ

This option allows you to import POIs and geofences from a file to a resource.

Indicate the path to a proper file and select object type (geofences or POIs). Then press *Upload*. The file will be processed on the server, and its contents will be 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 access *Create, edit, and delete POIs* or *Create, edit, and delete geofences* correspondingly.



When all settings are adjusted, press OK. If the executed file contains any developed geofences (lines, polygons), they will be omitted if you are trying to convert them into POIs. Only circle-shaped geofences can be transformed into POIs. However, any POI can become a circle-shaped geofence, but with this it will lose its image and title formatting, and other geofence properties (address source, ride beginning/end) will be set to defaults. POI with zero radius will acquire default radius – 100m.

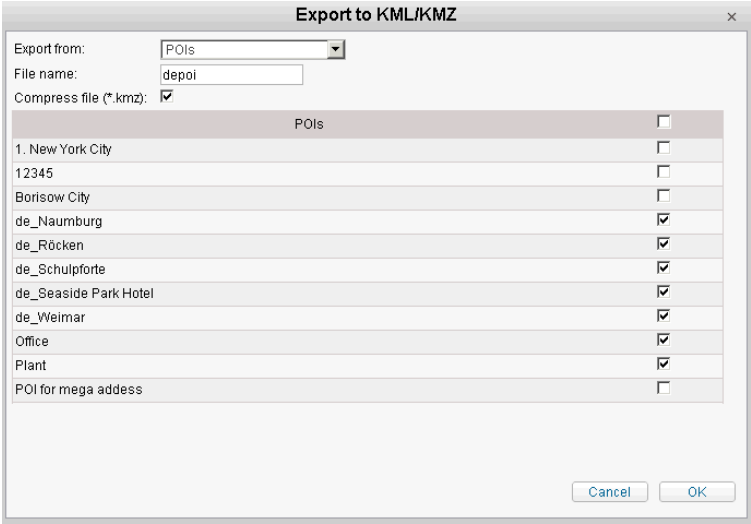
See the log to check how the operation goes. If the import failed, you get a warning alert.

You can check the result of the operation if you open the appropriate panel (POI or Geofences) and apply a filter by resource. New items will be selected in the first column of the list. It allows to not only see them on the map, but also easily delete them all together if necessary.

Export to KML/KMZ

This option allows you to export POIs or geofences from all available resources to a file.

When you export to KML/KMZ, the list of all available POIs or geofences (depending on item type chosen) is displayed. Check items you want to export and press OK. Optionally, you can enter 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).
- **Device configuration**: device configuration parameters (from the General tab).
- **Counters**: current values of counters and their calculation parameters (from the General tab).
- **Report properties**: five upper parameters from the Advanced tab.
- **Advanced properties**: color schemes for sensors and tracks from the Advanced tab as well as messages filtration parameters form the same tab.
- **Sensors**: contents of the Sensors tab.
- **Custom fields**: contents of the Custom Fields tab.
- **Commands**: contents of the Commands tab.
- **Eco Driving**: contents of the Eco Driving 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.

Exceptions are icon, access, groups, and information about account and creator. These properties cannot be transferred. In case you need this data to be transferred (except account/creator), use the copying option.

Units with the same unique IDs within one device type as well as units or drivers with the same phone numbers cannot exist in the system. If you are attempting to import such fields, their values will be emptied, and you can edit them later.

Resource Contents Transfer

Any contents of a resource can be imported and exported:

- **POIs**
- **Geofences**
- **Jobs**
- **Notifications**
- **Drivers**
- **Trailers**
- **Report templates**

Transferring POIs from one resource to another, POIs' standard library icons can be transferred using one of the earlier described methods (KML/KMZ, and WLP import/export). The other POI images are transferred using KML/KMZ files only.

Photos of drivers and trailers cannot be exported. If you need to transfer them, you can use the copying option instead of import/export.

Note also that drivers with the same phone numbers (or with phone numbers that belong already to some units) cannot exist in the system. If you are trying to import such phones, their values will be emptied, and drivers will be created without phone numbers.

If a 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. It is because geofences can be tied to a template only within the same resource. It is also possible that connection with units could be lost because the new owner of the template may not have enough access to those units.

This is a similar situation with jobs and notifications if they concern geofences, units, users, reports, groups etc. Remember that imported jobs and notifications can work correctly only if geofences and templates are checked and access to units/users/groups is proved.

User Settings Transfer

Individual settings can be transferred from one user to others or stored in a file.

You can import data from User Settings dialog, the tabs *Settings*, *Maps*, and *Monitoring Panel*. For this, you are required to have access 'Edit not mentioned properties' to a user you are importing into. Most of User Properties can be imported, too (the tabs *General*, *Advanced*, *Custom Fields*). To import them, you should have access rights 'Change flags for given user', 'Edit not mentioned properties', and 'Manage custom/admin fields', 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**: options from the section 'Show additional information about the unit' (they affect contents of unit's tooltip and unit extended view in the work list).
- **Monitoring panel configuration**: columns chosen in the Monitoring panel.
- **Unit visualization on map**: options from the section 'Unit visualization on map'.
- **Other items on map**: options from the section 'Other items on map'.
- **Address provider and city**: the 'City' field on the 'Settings' tab.
- **Address format**: parameters for address format form the 'Maps' tab.
- **User interface parameters**: state of the log (open/hidden), shortcuts (on/off), settings for online notifications and messages.
- **Format of coordinates**: degrees or degrees and minutes.
- **Maps and layers**: choice of activated maps.
- **Mobile access**: access key to Wialon Mobile v1.
- **General flags**: checkboxes from the General tab of User Properties dialog (including host mask).
- **Custom fields**: custom and administrative fields from User Properties dialog.
- **Templates of access rights**: templates of access rights created by this user.

You can also create a **complete copy** of a user. It will include not only above-mentioned parameters but also some hidden parameters (like operational settings for Apps).

Note.
Settings imported to a user can be applied only after this user refreshes the page or reenters the system.

Conversion

Wialon Hosting works with three measurement systems: metric, U.S., and imperial. The corresponding feature could be set for units, resources and users during their creation. Measurement system for routes depends on user settings at the moment of creation.

The system of measurement for the elements which already exist could be changed with the help of conversion. Only the top level managers have the 'Converter' button in the top panel.

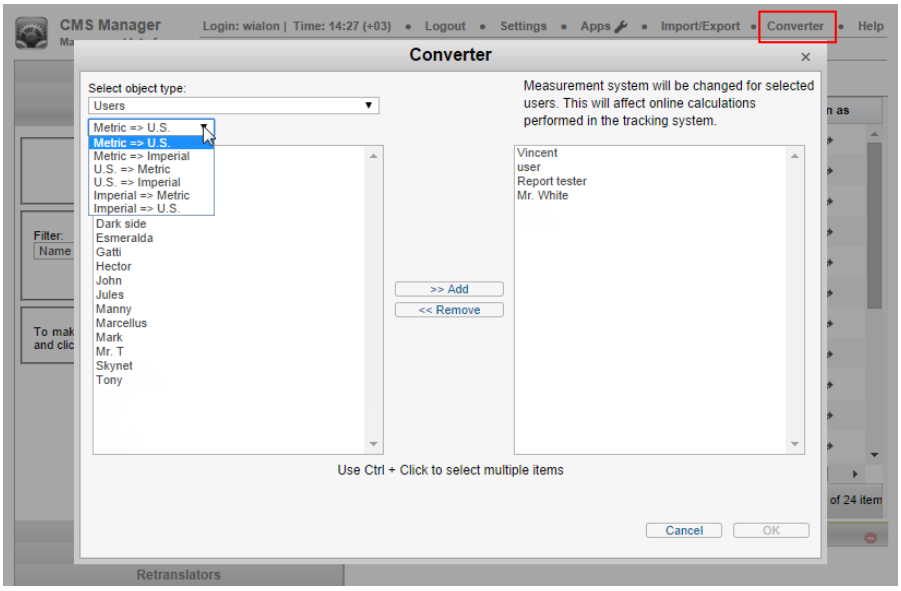
The table below provides you with the units of measurement (and their abbreviations) for the systems used:

	Metric	U.S./Imperial
Mileage (large values)	Kilometers (km)	Miles (mi)
Mileage (small values)	Meters (m)	Feet (ft)
Speed	Kilometers per hour (km/h)	Miles per hour (mph)
Fuel amount	Liters (lt)	Gallons (gal)
Fuel consumption	Liters per 100 kilometers (lt/100 km)	Miles per gallon (mpg)
Temperature	Degrees Celsius (°C)	Degrees Fahrenheit (°F)
Area	Hectares (ha)	Square miles (mi^2) or feet (ft^2)
Weight	Tons (t)	Pounds (lb)

Actually american and imperial systems both use the same units of measurement. The major difference is only in fuel amount calculation. You can find the difference between american and imperial gallon:

1 U.S. gallon ≈ 0.833 Imperial gallon
1 Imperial gallon ≈ 1.201 U.S. gallons

The Converter dialog has the following view:



In the dropdown menu, choose an object type (units, resources, users) over which a conversion will be made. To the right of the dropdown menu there is a brief description of the actions to be made over the objects of a corresponding type.

In the dropdown menu below the object type you choose a conversion pair: from metric into U.S./imperial, from U.S. into metric/imperial, and from imperial into metric/U.S. systems, correspondingly. On the basis of a measurement system from which a conversion is made a list of elements will be formed. For example, if you choose 'Metric U.S.', a list of elements currently using the metric system is formed below.

In the list you choose the objects which should be converted. To add these objects for a conversion you should double-click them with the left mouse button or select an object and press 'Add'. The added objects form the list on the right. To remove items from this list double-click them with the left mouse button or select and press 'Remove'. To select multiple items, click on them with the left mouse button holding <ctrl> button pressed on the keyboard. To implement conversion of the added items press OK. Then confirm your actions in the appeared window. Conversion result can be observed 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 can see 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 measurement.

For Units

If a conversion is made over units, then units' parameters such as trip detector, fuel consumption settings, counters, etc. will be recalculated. This affects units' representation in the tracking system. Changes will affect not only units' properties, but also displaying of their messages, tracks, tooltips and etc.

Note.
A conversion doesn't influence unit sensors. If it is necessary, their measurement system could be changed manually choosing the necessary one in the corresponding dropdown menu.

For Resources

If a conversion is implemented over resources, then some contents of these resources, particularly, POIs, circle-shaped geofences, different settings of jobs and notifications, etc. will be recalculated to the other measurement system.

Note.
Measurement system could 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 one or another report template are given in the resulting report (whether made 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

If a conversion is made over users, then the measurement system for the chosen users will be changed. It will affect different online calculations, particularly the work of such tools as Distance, Area, Routing, Nearest units. Address defining parameters will be recalculated as well.

Besides, a measurement system set for the current user is chosen automatically during creating report templates, units, other users, resources (regardless of who is chosen as creator or in which resource an item is created). Herein, on the stage of the items' creation, a measurement system could be changed manually. It doesn't concern such items as POIs, geofences, jobs and notifications, because their measurement system is taken from a resource they belong to.

For Routes

Conversion made over routes concerns only their checkpoints — their radius.

Apps

Using SDK, you can implement your own tools and features and add them to your Wialon as additional applications.

Only the top user can manage applications. To open the Apps dialog, click on the wrench icon in the top panel.

In the Apps dialog two tabs are situated: *Installed* and *Library*. Using these tabs you can look through all the applications available at the moment and add them if necessary.

Installed

A list of added apps can be found on the Installed tab. There are four basic applications available to all users: Chatterbox, Dashboard, iDriveSafe, Track Player. They cannot be edited or deleted (only disabled).

This tab also serves for adding new applications. To do so, choose the upper item 'New' and enter parameters. The parameters to configure an application are the following:

Name
Enter a visible name for your app (at least 4 characters).

Description
Enter any text as a description of your app (optional).

URL
Type URL address where your application is placed. 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
Choose services (features) which are required for default activation of the application. If the list of features available to a user does not fit this list (or if you leave this section empty), the application will be disabled for this user.

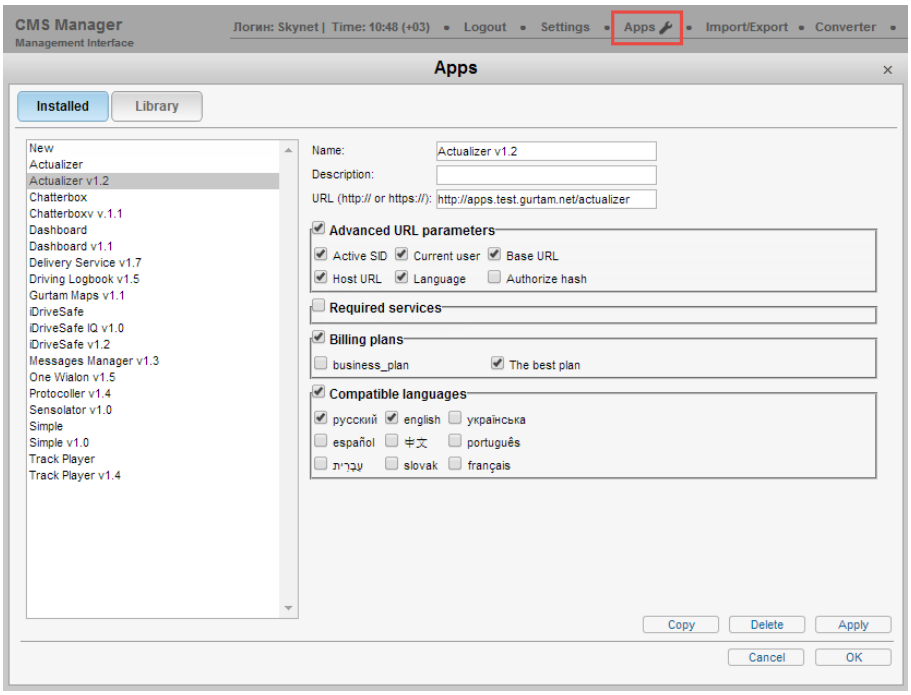
Billing plans
Select billing plans where this application will be mentioned as a service (feature). If no plans selected, your application will be added to all available billing plans.

Compatible languages
Application availability can be limited by chosen interface language. For example, if you tick English here, it will mean that the application will be available only when English is chosen as interface language. If no languages selected, it assumes that the application is compatible with all languages.

After setting all parameters, press *Add* and when closing the dialog press *OK* to save the changes.

Other operations with applications:

- To change an application, select it on the left, edit parameters, and press *Apply*, and then, when closing the dialog, press *OK*.
- To delete an application, select it on the left and press *Delete*, and then, when closing the dialog, press *OK*.
- To create a new application from an existing one, select the base application on the left, edit parameters, and press *Apply*, and then, when closing the dialog, press *OK*.
- To ignore all the changes made, press *Cancel*.

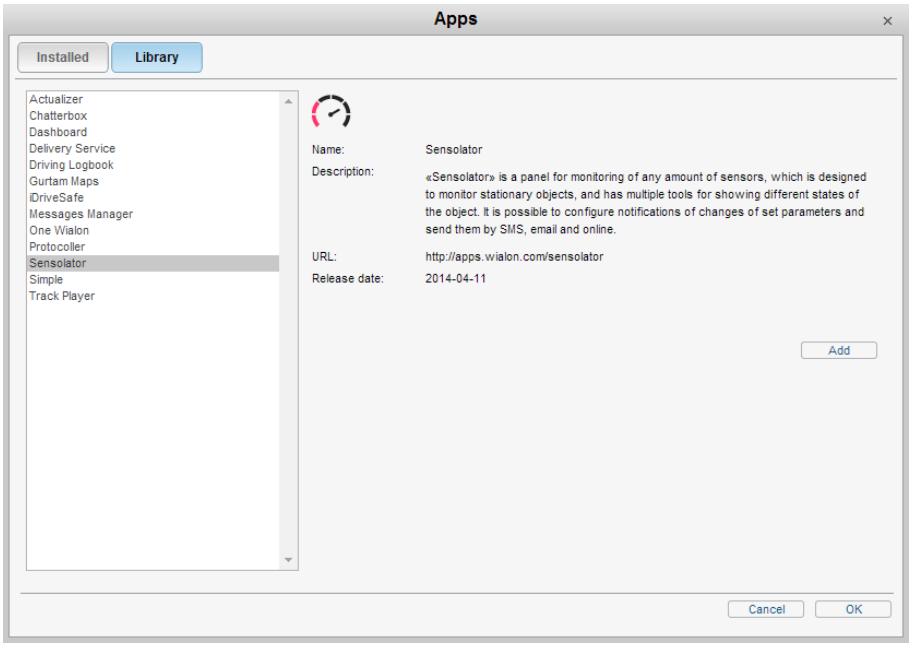


Added applications become available in billing plans and in account properties on the Features tab. They look like other services, but with 'Apps:' in front of a name of an app. You can enable and disable applications added by you and control their availability to other users.

Library

The list of all standard apps is situated on the Library tab. Adding application from the library is a little bit easier as all the mandatory parameters and also the advanced URL parameters are indicated by default.

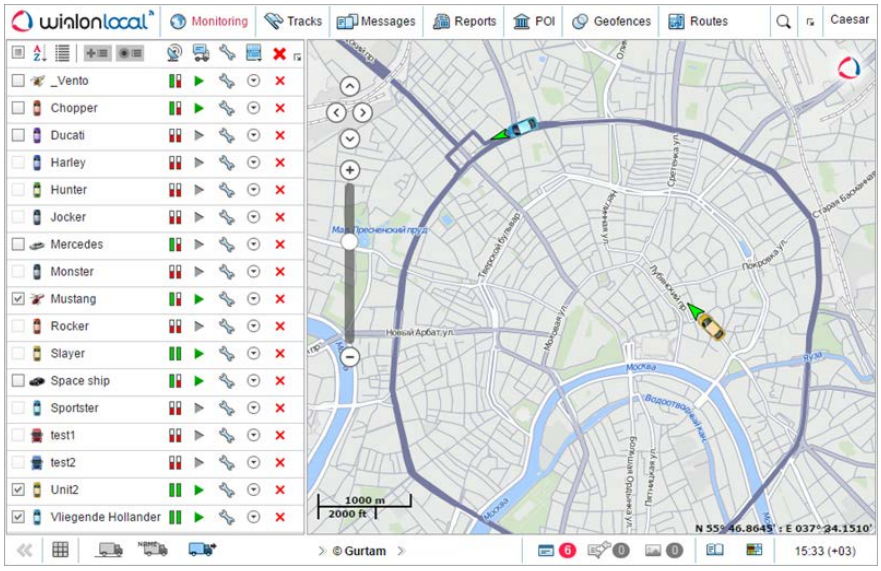
Choose an app on the list to see detailed information about it on the right: an app's icon, its name, short description, URL address, and the date of release. If the application has not been added before, the Add button should be active. Pressing this button will switch you automatically to the Installed tab. There you can edit app operational parameters if needed (for example, you can change or translate a description). To complete the procedure press Apply and then OK.



See also Wialon Apps review.

Monitoring System

The monitoring system is used by end users to control their units (vehicle fleet, machinery, employees, pets, etc.).



Unit tracking includes:

- detecting unit position and watching its movement on map;
- observing dynamic change 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 Optimization

Consider these requirements to get the most from Wialon Local.

Web Browser

Supported browsers are:

- **Mozilla Firefox 21+**
- **Google Chrome 29+**
- **Opera 10+**
- **Internet Explorer 8+**

To make its performance better, it is recommended to install Chrome Frame plugin that is compatible with Windows 7 / Vista / XP SP2.

If you use a browser not mentioned above, Wialon 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 is getting slower, you can add it to the list of exceptions or simply disable antivirus monitoring during Wialon session. You can also create a rule which allows Wialon to develop any activity.

Internet Connection

Wialon 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, your IP address should not be changed within a session.

Optimization Measures

Here are some tips, which will help you to improve Wialon 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 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 bottom panel. 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.

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.

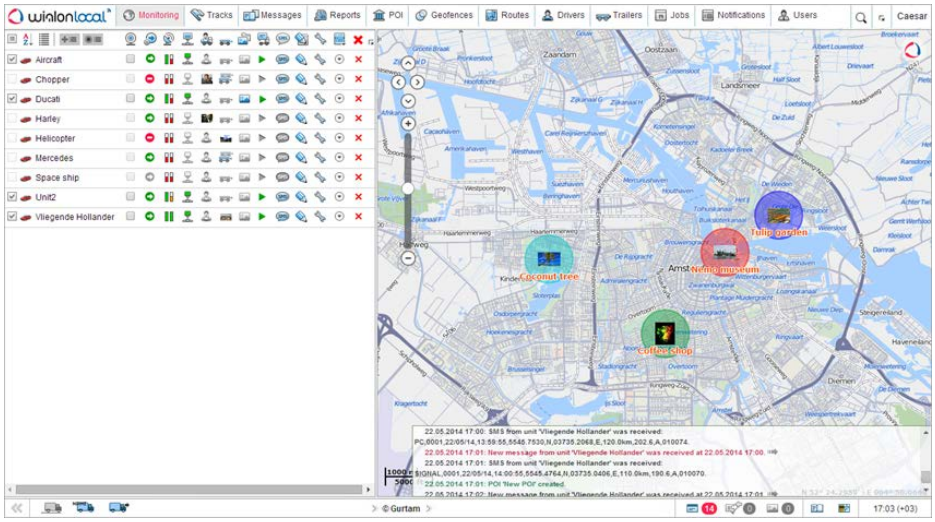
User Interface

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 situated in the interface. They are used to deal with the most 'difficult places', as a help text will be opened by clicking on any of them.

Generally, the following basic structural elements could 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 could be activated if necessary.



Notice.
To switch for the full-screen mode, press <F11> button. This feature is provided by the majority of browsers.

Further information:

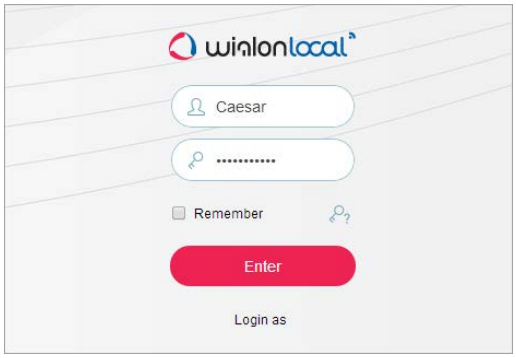
- Login
- Top Panel
- Work Area
- Bottom Panel
- Map
- Log
- Shortcuts
- Calendar
- Filters and Masks
- Input Rules

Login

Enter service URL into the address line of your browser.

On the login page, type your **username** and **password** given to you while registering, choose interface **language**, and then press **Enter**.

If you are using a private computer, you can additionally put a check mark near **Remember on this computer**. In this case, the next time you enter the system you will not be asked to input your login and password again. Moreover, this flag is necessary to automatically enter the system in case of session loss. Note, that the term of use of this flag is limited to 30 days. Besides, the flag is unchecked if you logout of the system.

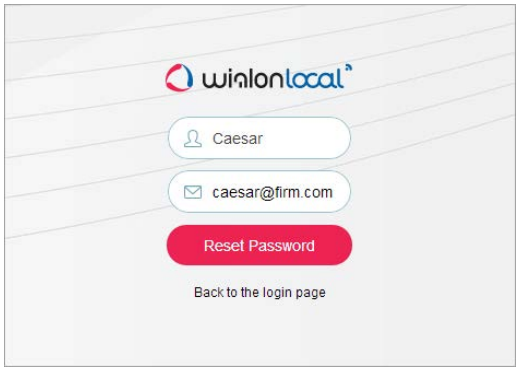


Note.
If current time is displayed in red and in the middle of the screen you can see a warning message ("Unable to connect to the server. The page will be reloaded automatically when connection is restored"), then connection to the server has been lost for more than two minutes. It could be caused by Internet connection failure or some internal system problems. After connection is restored the message disappears automatically, and the system continues its work. In case of server connection loss for 5 minutes and more the session will be finished. However, upon server connection restoration, an automatic entrance to the login page takes place.

A quick login without entering (or even knowing) 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 a login to the system through such a link can be successful only within one IP address. However, be careful giving away such links as while the session is alive anyone having this link can login to the system and perform different actions allowed to that user. To abort a session, just exit the system (press 'Logout').

New Password Receiving

If you have already registered in the system but forgot the password, please, follow **Forgot your password?** link. There you will be asked to enter your user name and e-mail address indicated during registration. Then push the **Reset password** button. A password reset link 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 password reset link and use your

former login and pass. If you still follow this link, you will have to accept the new password.

How to Change Your Password

The current password can be changed after authorization in the User Settings dialog. However, not all the users are allowed to do this. Contact your service administrator for additional information.

Login as Another User

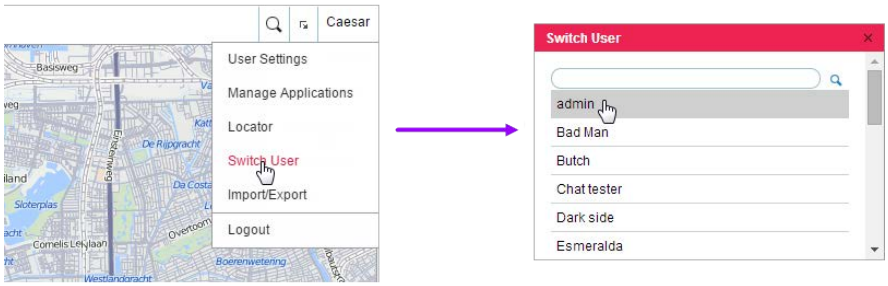
It is possible to login to the system as another user (either to the monitoring interface or to CMS Manager). To do so, you need to have 'Act as given user' flag in access rights for this particular user.

To login as another user, enter your user name and password, as usual, and then click on **Login as** caption and enter login name of a needed user.

When you are logged in as another user, you can see only items available to this user and perform actions allowed to this user. Herewith, login history is saved to this user.

You can switch to another user even after entering the system, however, in this case login will not be saved in the user's history. Go to the Users panel and you will find the 'Login as' button against each user. If you do not have enough access privileges, the button will be disabled.

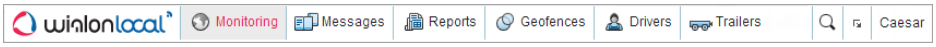
After authorization as another user, the user name is written in brackets to the right of the main one (in the right corner of the Top panel). To switch back to the main user, click on the current user name, choose *Switch User* and in the appeared window select a main user (will be highlighted in bold). This window could be used to login as another user after authorization as well.



Top Panel

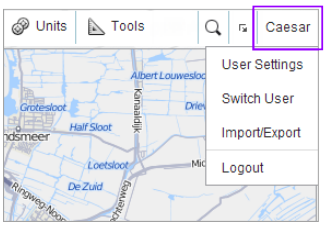
The logo of tracking services provider is situated in the left corner of the top panel and in the right corner you can see the setting menu button and user name under which you have logged in to the system.

The main menu of the program occupies the central part of the top panel. It could contain different elements depending on the settings applied and also on the modules provided.



User Menu

User login is displayed in the right corner of the top panel, under which an authorization has been made. Meanwhile, the other login could be specified in brackets if the main user logged in under the other user's name.



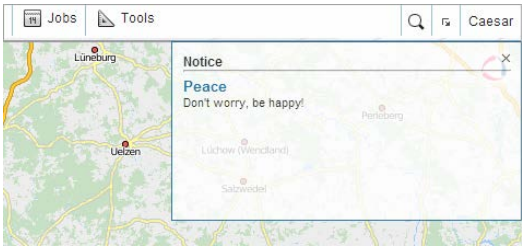
Clicking on the user's name an additional menu appears. It contains the following options:

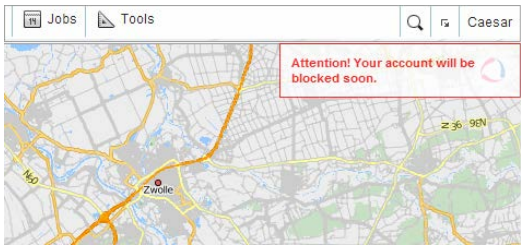
- **User settings**
  Opens the user settings dialog for viewing and/or editing.
- **Manage applications**
  Opens the manage applications dialog.
- **Locator**
  Opens the locator's dialog.
- **Switch user**
  Enables to login as another user. Could be disabled.
- **Import/Export**
  Enables to transfer units' settings, users, resources' contents (refer to Import and Export).
- **Help**
  Help request. Could be unavailable.
- **Support**
  Technical support request. Could be unavailable.
- **Logout**
  Button to log out of the system (session termination).

'Help' and 'Support' are links to outside Internet resources containing either documentation or technical support. By default, they are disabled. These options can be activated on the site settings' corresponding tab of administration system.

Information Notices

Information notices from service manager could appear in the top panel under the user's name, as well as notices on the amount of days left before blocking the tracking system (if stipulated by the tariff agreement).




Jobs
Tools
Caesar
Attention! Your account will be blocked soon.
Zwolle

Work Area

Work area, where different actions with various elements of the system take place and different requests to be composed, is situated in the left part of the screen.

Depending on the tag chosen in the top menu, one of the following panels could be opened in the work area:

- Monitoring — tracking units position, state and movements.
- Tracks — viewing movement history.
- Messages — viewing messages come from units.
- Reports — wide range of survey instruments and sorting of data received from a unit.
- POI — creating, editing, removing points of interest on the map.
- Geofences — creating, editing, removing geographical areas.
- Routes — creating and monitoring a unit's traffic route according to its schedule.
- Drivers — creating drivers and assigning them to units.
- Trailers — creating trailers and binding them to units.
- Jobs — creating, editing, removing jobs performed by schedule.
- Notifications — creating, editing and removing events' notifications.
- Users — managing other users.
- Units — managing available units.
- Unit Groups — grouping units according to the user's wish.

Top menu also could include two panels which are not shown in the work area. They have their separate windows. They are:

- Tools — tools for calculation distance and area, laying the best routes, searching for the nearest units, etc.
- Apps — applications enabling to tackle with various user's targets.

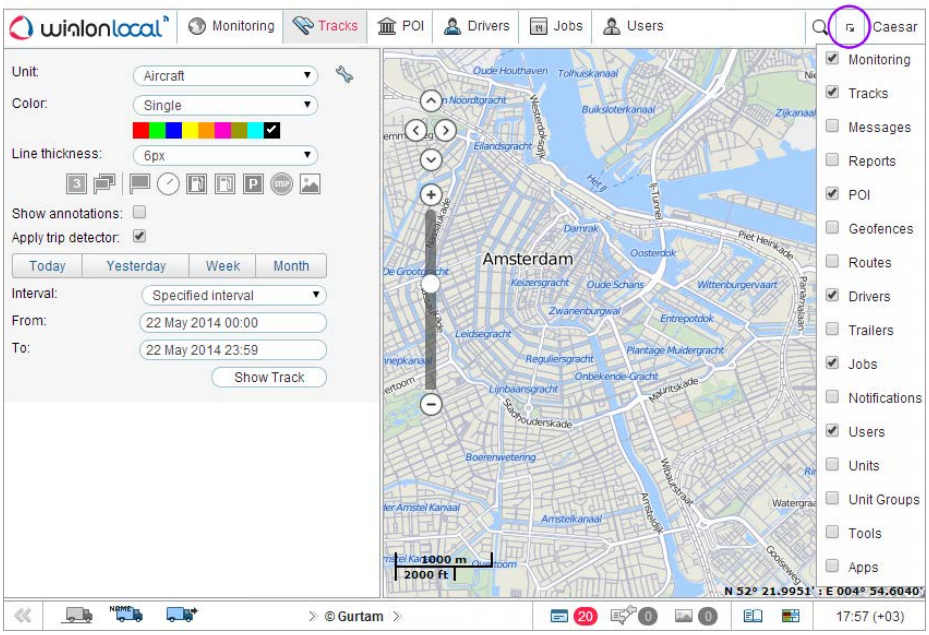
The width of the work area could be changed. To do this, please click on its right border and drag to the direction needed, holding the mouse button pressed. Moreover, work area could be hidden completely by pressing the button situated in the left bottom corner «.

Main Menu Adjustment and Navigation

To adjust the main menu click on and select the menu items which you are going to work with. The chosen ones should immediately appear in the top menu.

A name of a panel currently opened in the work area has a darker ground. To navigate through the menu, you just need to click on the necessary name. Contents of the left panel (work area) will change automatically.

Keyboard shortcuts are used for faster navigation through the panels.



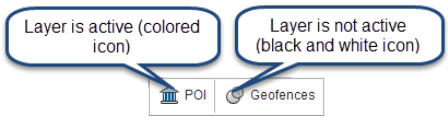
All the range of items chosen for the main menu is displayed at the top. The names of the panels will be shortened if there is a lack of space. That is why you should choose only those items which you are currently using.

Layers on the Map

The name of each panel is accompanied by the corresponding icon. It serves not only for a fast identification of the panel, but in some cases - as an indicator of the layer on the map (whether it is *on* or *off*).

Layers are relevant for many, but not for all panels. For example, in messages panel a unit's traffic track for a chosen period of time could be shown on the map, in monitoring panel - units' icons, showing their current location, etc. At the same time, in jobs and users panels there is nothing to be shown on the map.

Any of these layers could be switched on/off randomly. Panel's icon is used as a switch. If it's highlighted in color, then the layer is switched on; if it's black-and-white, then the layer is switched off or this particular panel could not have any layer on the map.



After adding any panel to the menu, the icon of the panel is activated automatically. Remove a panel from the main menu and its layer is automatically removed from the map.

Alternative Means of Navigation

If size of a browser window is not large, but there are a lot of panels selected, inscriptions could possibly be not visible, and menu panels would be 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 <ctrl> on the keyboard.

Another means of navigation is through the menu settings window. Clicking on the name of any clause in settings window, transition to the corresponding panel occurs. In such case, if it were not displayed in menu, it would show up. Also, don't forget, that the layer will be activated automatically after panel's selection in menu settings window.

The same occurs in case of “forced” transitions between panels, for example, during report request out of monitoring panel or during transition *from reports* to *messages*. Even if requested panel is not displayed in main menu, a transition takes place successfully. In this case the corresponding clause is added to the menu and the layer becomes active.

Bottom Panel

Bottom panel contains the buttons used to show/hide particular windows, as well as the buttons regulating units' presentation on map. Moreover, here your current time is displayed.

At the left end of the bottom panel you see three buttons to manage unit display mode as well as SMS button:

— hide/show work area;
— hide/show minimaps;
— hide/show unit traces;
— hide/show unit names;
— hide/show unit movement direction (course) arrows (see Unit Presentation on Map for details)

In the right corner of the bottom panel the following buttons are situated:

— hide/show online notifications window;
— hide/show messages from drivers or SMS;
— hide/show pictures from units;
— hide/show log;
— map source menu.

Current time and time zone shown in brakets (which could be changed in user settings) are displayed in the right bottom corner.

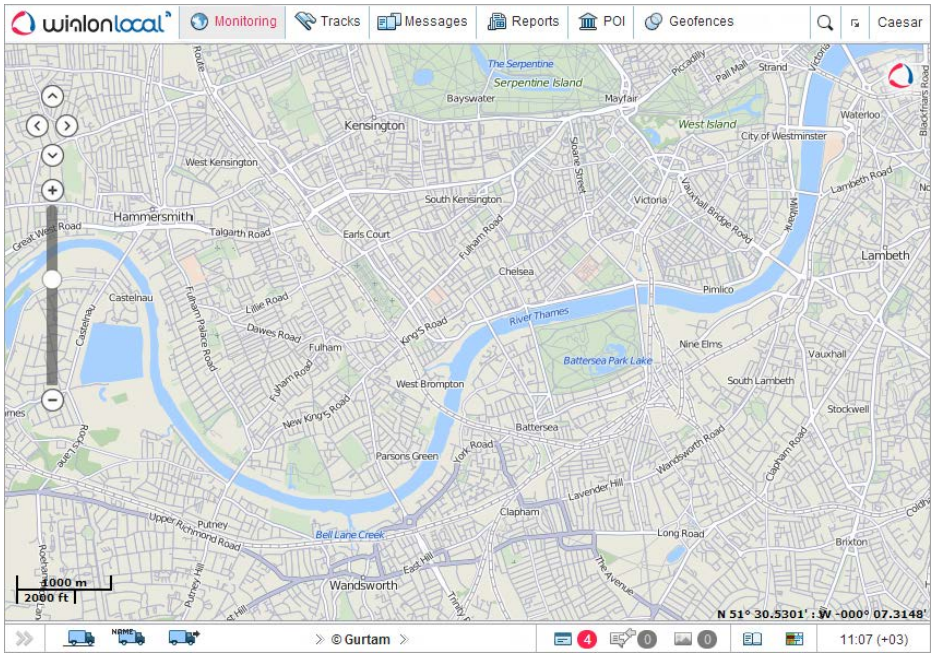
Your copyright with the hyperlink to our web-site could be situated in the middle of the bottom panel.

Map

The map is available regardless of which panel is activated. Usually, it occupies the most of the screen. Units and their traces, POI, geofences and other elements can be displayed on the map.

Map size can be adjusted in relation to work area and log. To do so, drag map scale slider, which is situated in the middle left part of the map, up or down.

To maximize the map size as much as possible, you can hide the work area and the log completely (and buttons) and switch to the full-screen mode by pressing <F11> that is supported by most of browsers.



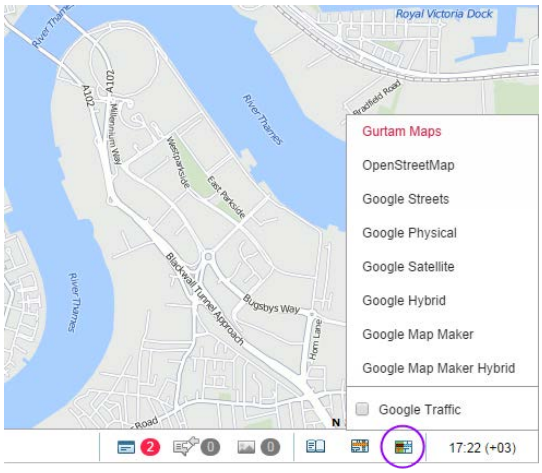
Using the Map While Working with Different Panels

The map is common for all panels. It means that while switching the panels, zoom and coordinates of the map center remain the same. Graphic elements such as track lines, markers, POIs, geofences, units' icons stay on their places as well. Therefore, for example, if you've made a report showing parking locations on the map, and then switched to the *tracks* panel to create tracks for unit's movement (even if this is an absolutely different unit), all the graphical elements, lines, markers, etc. still will be shown on the map, until you delete them or switch them off.

A lot of panels could have their layers on the map, such as: 'Monitoring', 'Tracks', 'Messages', 'Reports', 'POI', 'Geofences', 'Routes', 'Drivers', and 'Trailers'. Graphical elements plot on the map in any panel, can be easily switched on/off. Displaying or hiding one or another layer is adjusted for every layer individually — using special switch-button, situated in front of the panel's name in top menu. More...

Map Source

To change a map source, click button in the bottom panel. Map choosing menu is conditionally divided into two sections, top and bottom one. Top section contains main map layers, i.e., map sources. Bottom section contains additional or, in other words, informational layers which overlay the main ones (traffic, etc.). Choose another map from the list and the map area already displayed on your screen will be reloaded from the other source. It is applicable to the main map as well as to the mini-map.



To activate more maps, go to User Settings. There, as well, you can save current position of the map for the further system logins. If you don't have an option for enabling some particular kinds of maps, please, contact your tracking system administrator.

If additional map layers are available, then they can be displayed on the main ones. In other words, all the maps can display the information on road traffic condition. To enable it, you should select the corresponding flag in the section of additional layers in the map choosing menu ('Google Traffic', 'Yandex Traffic').

Attention.
A map, chosen in this menu influences only the displayed (graphical) map layer. Geocoding (address definition, etc.) is implemented mainly in Gurtam Maps.

Map Navigation

There are two basic ways to navigate through the map (or, more precisely, for moving a map on the screen).

1. **Using corresponding buttons**
   There are four arrow-like buttons in the left top corner of the map for moving it up, down, right and left, correspondingly.
2. **Using a mouse**
   Click with the left mouse button on any place of the map and holding it drag to the side needed.

Zooming the Map

Map zooming can also be implemented in several ways:

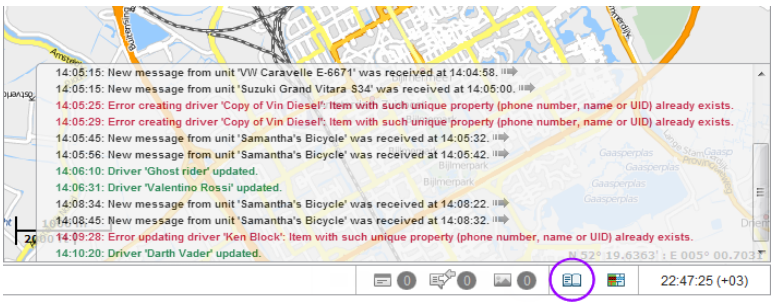
1. **Using scale on the map**
   Zooming scale is situated in the top right corner of the map under navigation buttons. The scale allows to zoom in (+) or zoom out (-). At the same time, the center of the map is staying stable. You can press “+” and “-” buttons to change zoom in step by step mode, or click on any place on the gradation scale.
2. **Using mouse scroll wheel**
   It is even more convenient to adjust zoom level using mouse scroll wheel. Scroll up corresponds to zoom in, scroll down — to zoom out. During the scrolling action, point a mouse cursor on the place needed so that it would not get out of sight.
3. **Using mouse and <shift> button**
   To zoom in the chosen area, hold <shift> button and select some area of the map with the left mouse button, the map will be zoomed within this area.
4. **Using double-click**
   Double-click on any place of the map to zoom it in.

In the left bottom corner of the map the current scale of the map is indicated. Right bottom corner shows us geographical coordinates, mouse cursor is pointed on. Coordinates' format can be either degrees or degrees and minutes. It can be selected in User Settings => Maps.

Log

Log is an interface element, enabling to look through records of current operations, such as: new message/SMS receiving, unit configuration changing, etc. The log contains messages from units in the work list. Depending on quantity of units and equipment configuration, the messages in the log can be received even every second.

Show/hide log button is situated on the bottom panel. A size of the log could be adjusted. Pointing on the upper border of the log a cursor changes its shape to a vertical double arrow. 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 map and units to be always visible under the log.



If an event registered in the log happens in a certain place (for example, a new location of a unit is detected), you can move to this place on the map clicking 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. The black color is used for registering unit's state, changing of its location, receiving new SMS messages from units and etc. The green indicates user's activity: creation and editing of places, POIs, geofences, user settings changes, etc. Red color is used to display error messages and alarm messages from units.

Note.
When emptying a black box or retransmitting past data, messages older than an hour from latest known positional message of a 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;
- **P** — POI;
- **G** — Geofences;
- **O** — Routes;
- **D** — Drivers;
- **I** — Trailers.
- **J** — Jobs;
- **N** — Notifications;
- **U** — Users;
- **Y** — Units;
- **Z** — Unit groups.

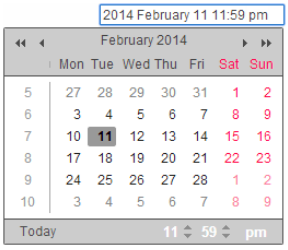
Shortcuts for tools activation:

- **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 Left Panel;
- **L** — show/hide Log.

Calendar



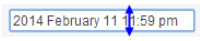
The calendar is used in many cases: specifying time intervals to generate reports, indicating date and time in notifications, jobs, routs, etc.

The calendar date includes year, month (word) and day. Date mask chosen in a current user settings dialog influences only the arrangement order of a year, month and day. The earliest possible date is the 1st January 1971.

Concerning time, its format corresponds to the mask chosen in the user settings dialog. The only exception is that regardless of the mask chosen, seconds are not displayed in the calendar.

There are several methods to handle the calendar and quickly set up a desired date and time: manual input, clicking buttons, using mouse scroll, etc.

Method 1.

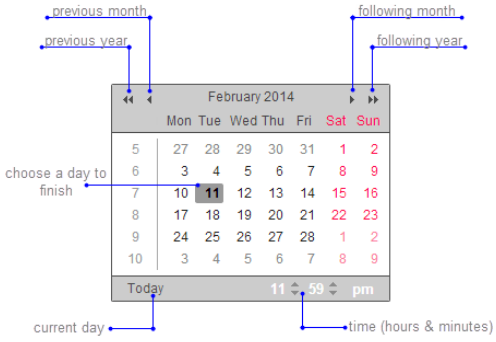


Date and time can be adjusted without opening the calendar itself – in the text field above it. You can input numbers straight from the keyboard or use the mouse scroll. Place the cursor over time element you want to alter and scroll up (increase value) or down (decrease value).

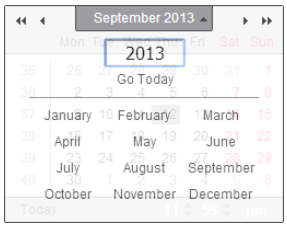
Method 2.

If you open the calendar, you can adjust date and time clicking on the appropriate buttons: on the top of the calendar – single arrows for months, double arrows for years; on the bottom – arrows for hours and minutes. To change these values you can either click on these buttons or use the mouse scroll. Besides, time can be time on the keyboard.

To finish with date/time selection, choose a day in the central part of the calendar. Only then your adjustments will be applied and the calendar will close.



Method 3.



Today's date can be set with one click. Open the calendar and press the *Today* button. This action affects year, month and day but not exact time.

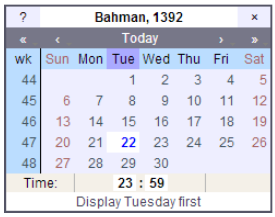
Method 4.

Click on month and year area in the top of the calendar. Year field will appear below. Enter a year using keyboard, click on a month below and then select a day.

The Persian Calendar

There was the usual Gregorian calendar. However, Wialon works also with the Iranian calendar also known as Persian solar calendar. It is used in Iran and Afghanistan.

The Persian calendar can be activated in User Settings. At that, if Arabic is selected as interface language, the calendar will be in Farsi (language spoken in Iran) and shown from right to left. Otherwise, it will be in English (in Latin characters and Arabic numbers) and shown from left to right.



In this calendar, you can adjust year, month, day and time, set the today's day with one click, etc. Click the question sign on the top to invoke the help window with detailed information. To close the calendar, click on a cross. Besides, you can drag the calendar to any place of the screen.

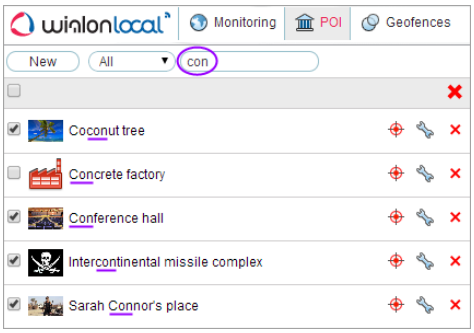
Filters and Masks

Lists are composed of various objects created in tracking system (geofences, POI, drivers, custom fields, sensors, etc.) Objects from the lists are shown in the alphabetic order, provided that the figures go first, then Latin alphabet letters, and then Cyrillic. Capitalization is not taken into account. New object created (for example, new job or custom field) is originally added to the end of a list. Next time you open this list the objects will be arranged in the alphabetical order. After renaming an object it remains at its former place until reopening the list.

Filters and masks are applied for users' convenience. They enable to narrow a list of items in such a way that only the objects necessary for users will be shown. Also, you can find objects with particular characteristics or name in a list and specify the objects of tracking system towards which a report, notification, etc. will be applied.

Dynamic Filter

If a list contains a great number of items, it may not be so easy to find a necessary one quickly. For your convenience, you can use quick dynamic search. It is applicable for all the panels, except for the *Tracks*. Start entering item's name (geofences, units, routes, etc. — depending on the panel you currently in). A name could be typed beginning from any part. While typing items that correspond to your query will be immediately displayed.



If you leave the filter field empty, *all* the available items will be displayed in a list.

The dynamic filter can be found also in unit properties dialog, unit groups and users when adjusting access rights. However, the difference is that search results are displayed not while typing but after you press the *Apply* button. Moreover, dynamic filter is used for choosing a resource upon creation of notifications, jobs, POIs, drivers/trailers (their groups, association lists), and also report templates.

The peculiarities of the dynamic filter usage in the Monitoring panel are described in Unit List Management section.

Searching you can enter special characters such as * and ?, the usage of which is described below.

Mask Name

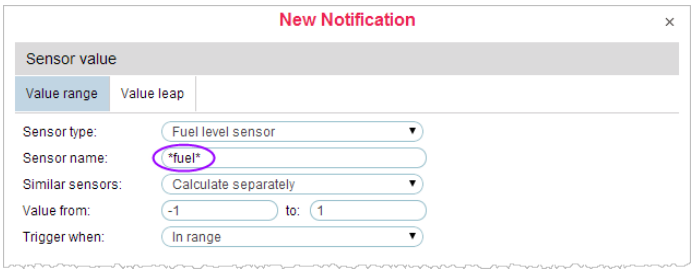
Besides the dynamic search, filters are also used for specification of an item, which will be effected by report, notification, etc. Item's name mask is created for this purpose, there you can apply special characters: **asterisk (*) and question mark (?)**.

The asterisk sign is a special symbol, which could be inserted in any place of the word in a search field to represent any combination of symbols allowed. The asterisk sign could be put in any place of a search field It can be placed in any place of the query (at the beginning, in the middle, at the end) or in several places at once, depending on which 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 sigh (?). It replaces any single character (only one character). As well as the asterisk sign, it can be put at any place of the query.

The request is not case sensitive.

For example, a unit has two fuel sensors with the names *Sensor fuel level* and *Fuel in tank*. We are going to create a notification that would be based on both of them. To achieve it, in notification properties we must set sensor name mask in such a way that it would correspond to the names of both sensors. In our case, the best choice is **fuel**:



You can do a search without using the asterisk but then you have to indicate the name (geofence, driver, sensor, etc.) exactly as it exists in the system.

To find *all* items of some kind (users, sensors, geofences, etc.), simply type one asterisk in the input box of search terms.

Masks are employed:

- in notifications to specify sensor, route or driver under control as well as set SMS text mask or parameter in messages;
- in user properties to set host mask for users;
- in reports to specify driver, sensor, event/violation, route and its geofence, and when selecting geofences;
- in the Messages panel to filter found messages;
- in all panels masks can be used instead of the dynamic filter.

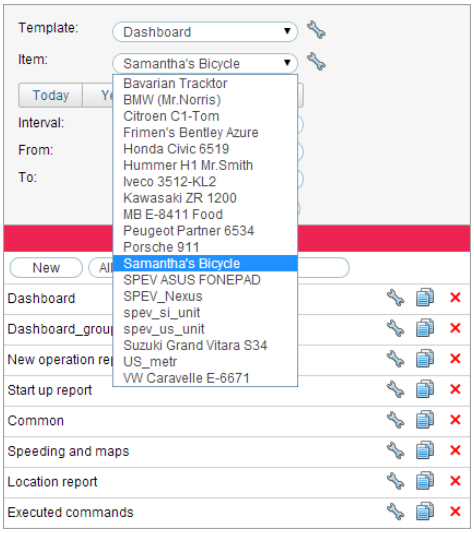
Manipulations with Lists

Keyboard keys and their combinations can be used working with lists. Using the keys facilitates a lot of operations, such as list navigation, search of necessary items, and their selection.

Dropdown Lists

Means of quick search are also developed for the dropdown lists. For example, this could be the list of units available during reports' generating, messages' request, etc., list of tables during report templates' editing and so on.

To apply quick search open the list and then enter on keyboard the first letter of item's name. Whether to use capital or lower-case letters is not important, the important thing is a keyboard layout. If the list consists of names, beginning with a specified letter, the list will shift to the first of them.



Continue to press the same button, and you will keep going through the list, highlighting other items beginning with this letter, and after showing all of them, return to the first one. Moreover to navigate through the list you can you

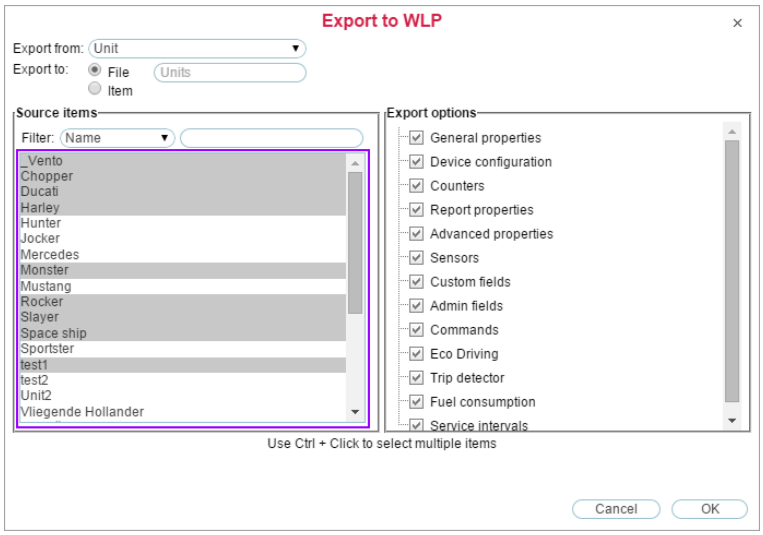
arrows (up/down) and combinations of keyboard buttons <ctrl + home> (move to the beginning of the list) and <ctrl + end> (move to the end of the list).

You can specify the beginning of the name with more than one letter, to do so you need to enter them quickly, while one letter search hasn't been applied yet.

When the choice is made, press <enter> on the keyboard. The dropdown list folds up and the necessary item is chosen.

Multiple Select Box

In the lists of such type you can choose multiple items. To choose several items throughout the list, hold <ctrl> button, and consequently click on the necessary items.

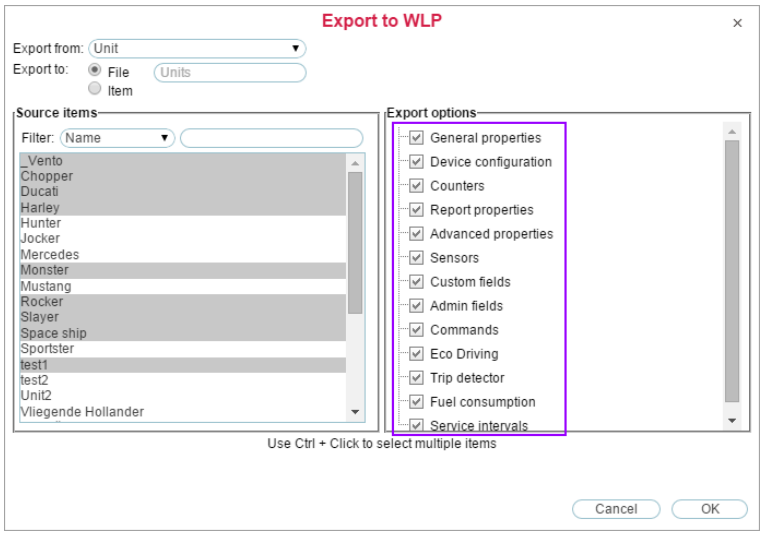


Moreover, the following keys, and their combinations can be used:

<home> — move to the list beginning;
<end> — move to the list end;
< > (arrow up) — move to the previous item;
< > (arrow down) — move to the next item;
<ctrl + A> — choose all;
<shift + home> — choose everything from the current place to the list beginning;
<shift + end> — choose everything from the current place to the list end;
<shift + > — consequently choose the items going up from the current one;
<shift + > — consequently choose the items going down from the current one.

Checkbox list

Multiple choice lists may contain checkboxes indicating whether the item is chosen or not. <ctrl + click> combination can be used in such lists in order to check/uncheck all the items at once.



Attention!

Working on MacOS it is necessary to use <cmd + click> combination instead of <ctrl + click> one.

Input Rules

All editable fields are checked to approve that entered data is valid. If there is incorrect data, the field is highlighted red.

Incorrect entries are:

- Not enough characters in the name or a phone number. Names of monitoring units, units 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.
- Excessive number of characters (more than 50) in names of monitoring units, units 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 the delimiter (for entering fractional numbers the dot is used).
  - 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 will be automatically substituted for '>' and '<'.

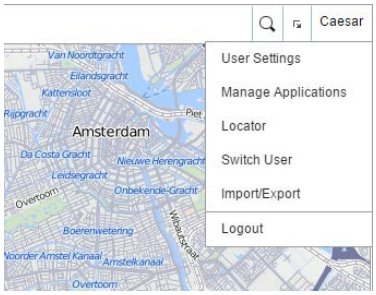
If any entry in a dialog is not valid, it is impossible to save changes or create an object, because OK button becomes not available. There can be also an alert when trying to save incorrect data – *Incorrect entry*.

Phone numbers and e-mail addresses

Phone numbers must be in international format. They must contain all necessary codes (country code, communication statement or city code, and then the phone number itself). Brackets, spaces and hyphens are not allowed. The only character that is used entering phone numbers is **plus** (+) which, if necessary, could be typed before the digits. 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.

To view user settings click on the username in the top panel and then choose *User Settings* in the menu.

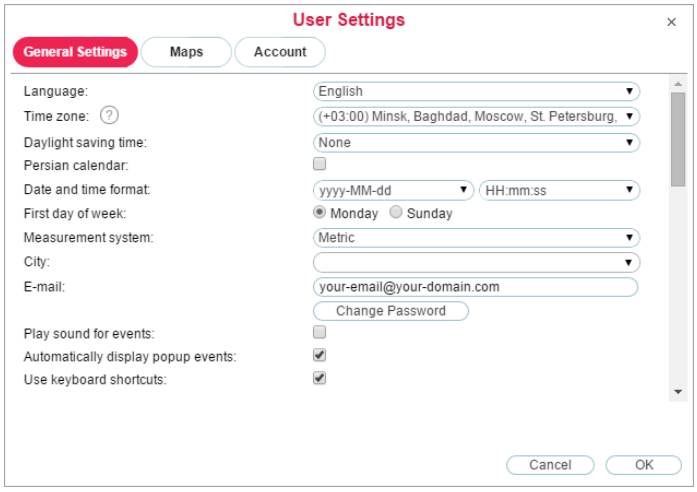
The User Settings dialog can contain up to three tabs that depend on system configuration:

- General Settings
- Maps
- Account

Hint.
Settings from one user can be imported to other users. More....

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 enlarge the list of available languages.

Time zone
Indicate your time zone accurately because all time values in messages got from devices are displayed in accordance with time zone selected. Changing time zone requires reloading the page.

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 will replace 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.) At that, if Arabic is selected as interface language, the calendar will be in Farsi (language spoken in Iran) and shown from right to left. Otherwise, it will be in English (in Latin characters and Arabic numbers) and shown from left to right (see details). Enabling/disabling the Persian calendar requires reloading the page.

Date and time format
These masks of date and time format define date and time presentation throughout the system. For example, months can be written in words or numbers, year can consist of two or four digits, day of week can be included or not. Moreover, you can change the order in which those items appear in the date. Instructions upon the syntax of these fields is given in their tooltips. Besides, you can just choose one of predefined masks in the dropdown list. Here are 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
Choose Monday or Sunday as the first day of week. This will affect the appearance of the calendar and the manner of counting weeks in general.

Measurement system
This parameter defines whether kilometers and meters ('Metric') or miles and feet ('U.S.' and 'Imperial') will be used in tools like Distance, Area, Routing, Nearest Units. It also influences address processing in some way, as well as creation of routes. However, in most other places of the tracking system measurements used depend on either unit's or resource's properties but not on a current user.

City
In this field you can indicate your city. It will be used in the Nearest Units and Address tools as the default city. Enter the name of the city. Upon entering of the first letters the dropdown menu with the names corresponding to the request will be automatically opened. You can either continue typing in the name or choose it from the dropdown menu (there can be several towns with the same names in different countries).

Position of the map upon entering the tracking system is stipulated by the city indicated in this setting (if the field is blank, then Minsk is considered to be a chosen city by default). However, if there are any units displayed on the map, then upon the entering the map will be scaled in such a way that all of them will be visible.

E-mail
This e-mail address will be used to send you a reset password link in case you forget your password.

Change password
If you push this button, some additional fields will appear. You will be asked to input your current password, and then your new password (two times). New password can be applied on the login page. *Note*: However, not all users are allowed to change their passwords.

Mobile access
If you are going to use mobile phone or PPC to manage the server, enter the access key. If you leave this field empty, the access will be denied.

Play sound for events
The sound can be played for online notifications and drivers' messages. When a notification or message from driver pop up, the browser will play sound. In Windows OS, QuickTime Alternative can be used as media player.

Automatically display popup events
If ticked, online notifications and messages from drivers pop up automatically. However, if you remove the flag, only a number on red background in the bottom panel will indicate that there are new events.
Closing online notifications or chat with driver windows using the cross in the upper right corner leads to unchecking the 'Automatically display popup events' box. The box could 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 shortcuts
Check this box to activate Shortcuts.

Show Additional Information about the Unit

Here you choose additional information about the unit to be displayed in different places of the tracking system.

In the **left column**, check information to be shown in unit's tooltip (displayed as you hover mouse pointer over unit's icon).

In the **right column**, check items to be shown in extended unit information in the work list.

To check all the items from any column, hold <ctrl> on the keyboard and check any box of the corresponding column.

Last message
Time when the last message was received and how long ago.

Location
The last detected address (or coordinates).

Presence in geofences
If unit is situated in a geofence, geofence's name will be displayed in unit's tooltip and in extended unit information with sorting by area (from small to large), and it will have the same color as assigned in geofence properties. This option also affects units count in the Geofences panel.

Speed
Speed in the latest message.

Altitude
Altitude in the latest message (if device is able to give such data).

Counters
Values of mileage counter and engine hours counter. See Counters.

Satellites
The number of satellites locked.

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
Sensors configured for the unit and their known values will be listed. Custom sensor name is displayed and the value processed according to calculation table of this sensor.

Parameters
Latest known parameters like CAN bus, power voltages, and many others. Their names (as they come in messages) and their raw values can be shown as additional information.

Drivers (licensed separately)
Name, photo, and phone number of the driver(s) currently bound to the unit.

Trailers (licensed separately)
Name and photo (if available) of the trailer(s) currently bound to the unit.

Custom fields
Custom fields from unit properties (general or/and admin fields depending on access).

Maintenance state (licensed separately)
Service intervals together with their states (days/engine hours/kilometers left or expired) are shown.

Note!
Counters are refreshed once a minute, as well as information about drivers and trailers. The check for presence in geofences is performed every two minutes. Other information is refreshed immediately.

Unit Visualization on Map

Replace unit icons with motion state signs
If marked, unit icons are hidden, and all units are displayed with motion direction arrows (if they are in motion) or with blue rhomb shaped marker (if they are stationary). See also Unit presentation on map.

Display overlapping units in one icon
If one or more units overlay on the map, their icons can be grouped into one. It lightens visual reception of the map. The exception is in two biggest zooms where all icons are displayed regardless their overlapping.

Show unit icons at map borders
If a unit gets out of view, its icon will be displayed at map border in the direction where the unit is located. Click on this icon to move to this unit 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 choose the color and width for it.

Other Items on Map

Display overlapping POIs in one icon
If several POI icons overlap when displayed on the map, they can be grouped into one icon. Place the cursor over this icon to know which POIs hide behind it. Note that for reports this option is set independently — in

advanced options of report template.

Display names of POIs on map
Depending on this flag, POI can be displayed on the map with its name or without it (only with image or/and a circle). Default color for these captions is orange, however, it can be changed for each POI individually (see POI properties).

Display names of routes' check points on map
Depending on the flag, routes' check points can be displayed with or without their names on the map.

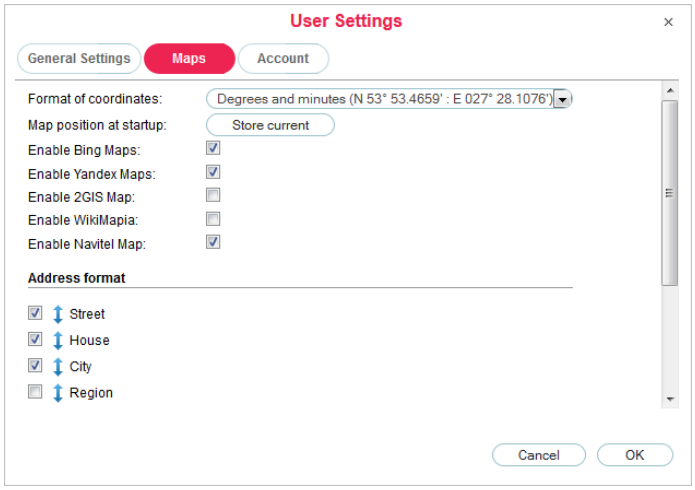
Display names of geofences on map
If activated, geofences are displayed on the map with captions. Caption color is magenta (purple).

Render geofences on server
By default, all geofences are rendered in browser. This may slow down browser work if your computer is not very powerful. But if you have good Internet connection, it is possible to increase Wialon system performance by enabling the option of rendering on server.

Render POIs on server
The same idea with POIs. If you have good Internet connection, it is possible to increase Wialon system performance by enabling the option of rendering on server.

Maps

Maps settings are adjusted in User Settings dialog on the Maps tab.



Format of coordinates
Format of coordinates can be either degrees or degrees and minutes. Selected format affects coordinates of cursor displayed in the lower right corner of the map. However, in messages and POI coordinates can be displayed only in degrees; in reports and event registrar — only in degrees and minutes.

Enable…
Tick the appropriate check boxes to activate more map layers. The changes will take effect after clicking OK and refreshing the page. To choose a different map as a base layer, choose it in the maps menu at the top panel of the program.

The following maps can be used in Wialon Local: Google Maps, Bing Maps, 2GIS, WikiMapia, Navitel, Visicom, Yandex, HERE, Regio, Luxena, MyIndia, ArcGIS, GoMap.az. Besides, Gurtam Maps or WebGIS (depending on your system configuration) and OpenStreetMap are available by default.

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, Google Map Maker, Google Map Maker Hybrid, and Google Street View for tracking on mini map. Moreover, if the additional layers are available (for example, traffic layer), then they can be visually put over any chosen map.

List of available maps is adjusted by the administrator.

Address format (for Gurtam Maps only)
Here you can define how addresses will look in tooltips, tools, messages, and other places. Choose which of standard address components to 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 country, region, and city and leave only street name and house number in addresses. Address components can be put in any order. To change this order, drag components up and down sticking to arrow-shaped buttons. This format affects addresses mainly in cities/towns/villages.

When out of cities/towns/villages (on motorways between them), address information is given according to the following parameters:

- *Max distance from unit* defines that if unit is on a road or close to it and there is a city/town/village in the indicated distance then the address is displayed as name of the road and distance to that city (if several cities fit, we take the nearest).
- *Min city radius* defines that if no cities/towns/villages have been found in the distance indicated as 'Max distance from unit' then the address is bound to the nearest city which radius is equal or larger than 'Min city radius' values. This parameter can be used to eliminate small towns from address information and stick

to large cities instead.

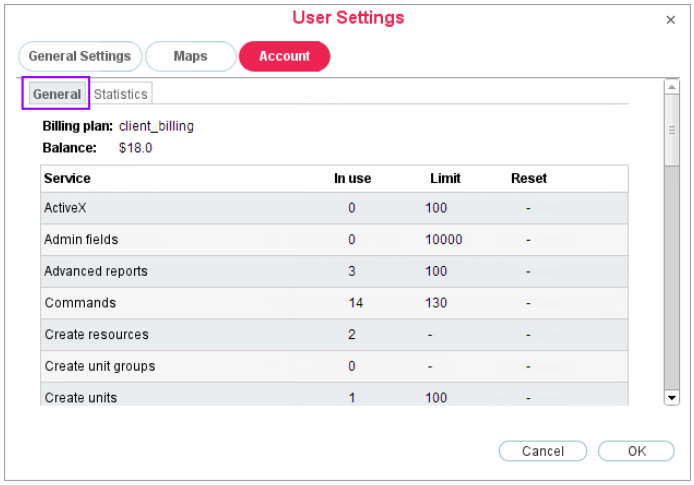
For every block (enabling maps, address format) there is a possibility to check all the boxes at once. To do so, hold <ctrl> button on the keyboard and check any box of the corresponding block.

Account

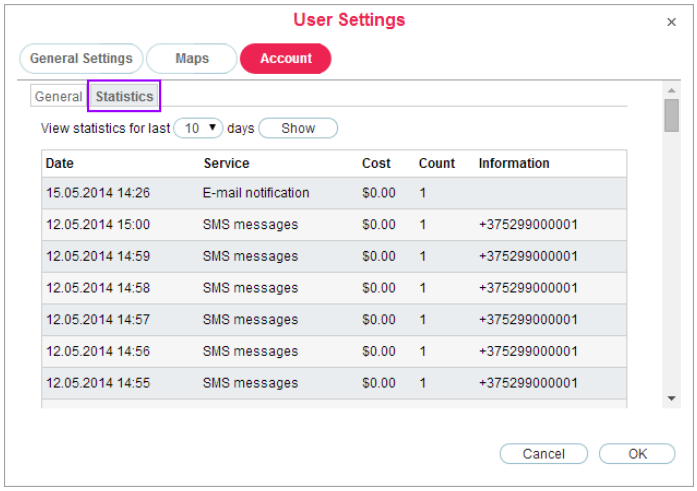
Attention! This tab could be unavailable due to the service configuration peculiarities.

On the Account tab of User Settings dialog you can view information on the billing plan, current state of account, services used and available, etc.

The tab contains two sections: General and Statistics. In the General section, information on billing plan, current state of account, balance and days left is presented. You see also how many objects (like POIs, 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.



In the Statistics section, you can see transactions for given period. Specify time period and push the Show button to see statistics.



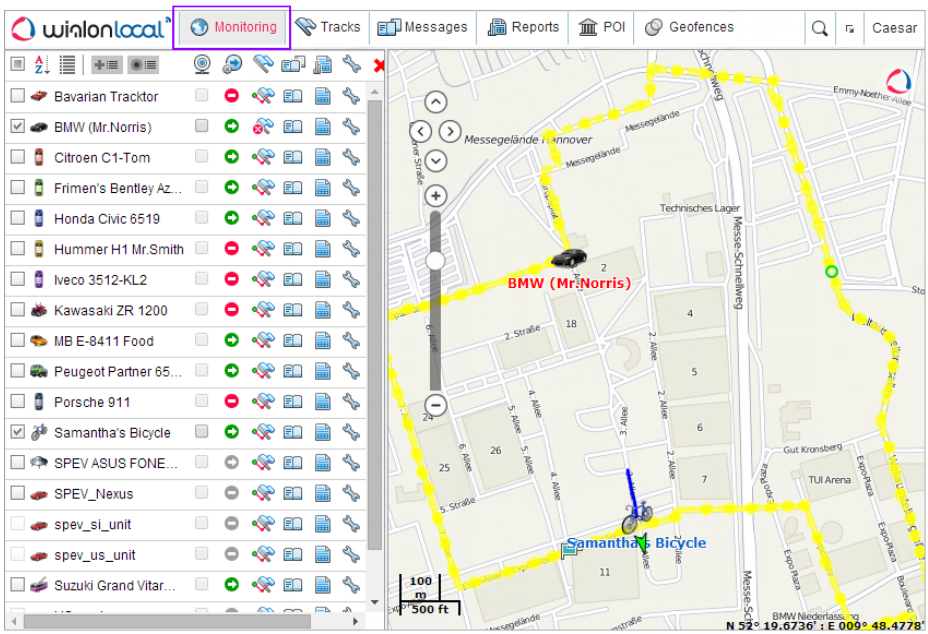
Monitoring

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. See how to manage the work list...

Near the name of each unit, there can be a number of buttons and signs that allows to estimate unit's state or perform an action over it. The choice of signs and buttons to be displayed in the Monitoring panel is customizable. These columns can be also 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 will be centered on this unit. At that, current map zoom will remain the same.

Only units checked in the first column of the work list are shown on the map. To display all units from the work list, mark a check box in the left top corner of the list. Remove this checkbox to remove unit icons from the map.

Note, that in order *units* to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

Units are seen on the map if they get into view according to the current map position. You can move and zoom the map according to your needs.

However, if the option **Show unit icons at map borders** is selected in User Settings, in case a unit gets out of view, its icon is displayed by map border. Click on the icon to move to the unit on the map.

It is possible to watch a unit constantly. For this, enable the option **Watch unit on map** against a necessary unit in the corresponding column ( ) of the Monitoring panel. Units marked in this column are always seen on the map. If such a unit gets out of view, the map automatically centers at this unit each time when a new message comes.

To track stationary units, make use of a specially designed app — Sensolator.

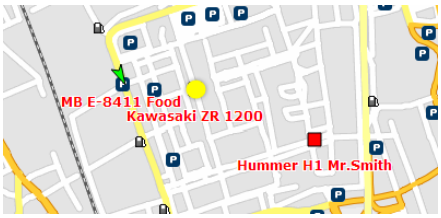
Unit Presentation on Map

By default, units on the map are displayed with 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 load your own image. See the dialog Unit Properties => Image. Unit icon can be rotated on the map according to course (movement direction). This feature is also defined in unit properties.

Alternatives for Icons

Unit icons can be replaced with motion state signs:

- yellow circle – the unit is not moving but the engine is on;
- red square – the unit is not moving, and the engine is off (if the unit has ignition sensor);
- green arrow – the unit is moving, and arrow's direction shows movement direction.



This option is called **Replace unit icons with motion state signs** and set in User Settings.

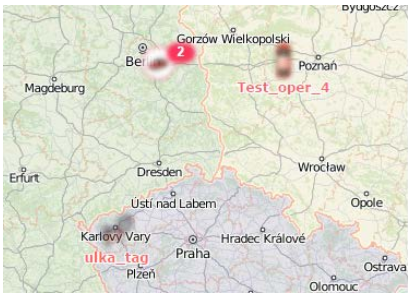
Besides, the colors of these icons (arrow, square, circle) can be different and dependent on a sensor value. This functionality is adjusted in Unit Properties => Advanced (*Sensor color in the Monitoring panel*). In other words, the shape of the icon is defined by state (if standing – square, if moving – arrow), and the color depends on sensor value (intervals and colors are adjusted in unit properties).

Unit names can be either shown or hidden when displaying a unit on the map. It depends on the state of the button in the bottom panel.

Displaying Inactive Units

Monitoring units are conditionally divided on active and inactive ones. If data messages from a unit have not been received for more than 48 hours, then a unit is considered to be inactive.

Unit's icon and its name can help you to find out unit's condition. Inactive units are displayed on the map with a blurred icons and transparent names. If signs of motion are used instead of icons, then transparency will be used both for signs and names. If the flag 'Display overlapping units in one icon' is chosen in 'User Settings', and all the units with overlapping icons are inactive, then the icon for them will be displayed blurred. Moreover, either drivers' or trailers' icons binded to an inactive unit are also displayed blurred until unbinding.



Other Markings

If a unit is currently in motion, a green arrow shows movement direction, and the unit can be followed by a blue 'tail' (trace) which shows unit track for several latest 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 been just loaded). Trace default length is 5 messages, however, it can be changed together with trace width and color in User Settings.

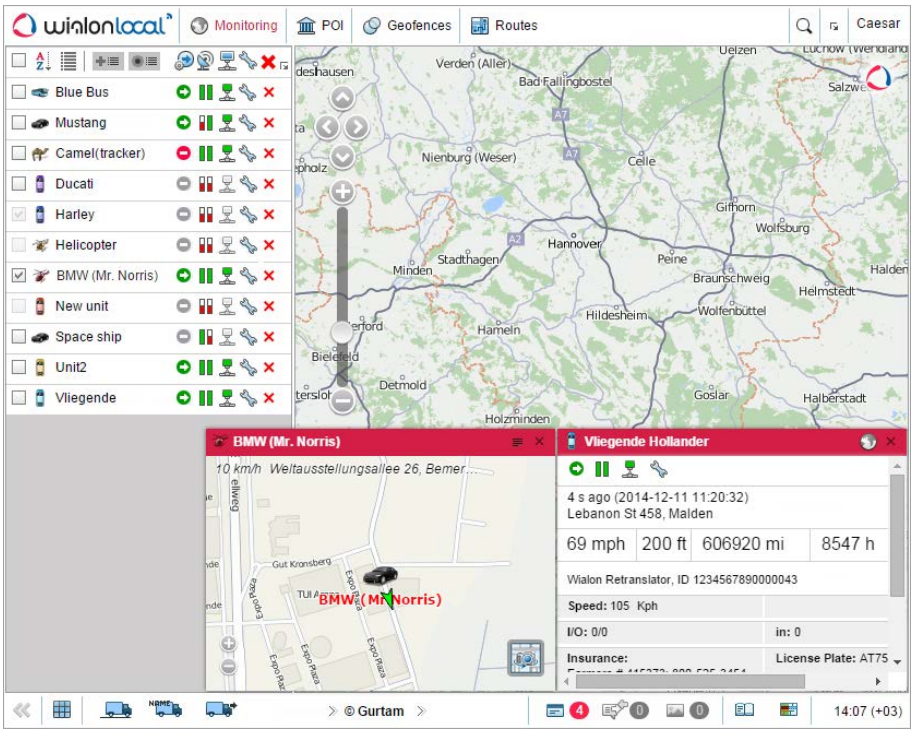
Both direction arrows and traces can be disabled. To do this, use the appropriate buttons in the bottom panel:

– hide/show unit traces;
– hide/show unit movement directions.

Minimaps

Minimap is an additional window (help window) focused on the current information about the chosen unit. Double click on unit's name in the monitoring panel list to open its minimap. The chosen unit is also centered on the map. Moreover, the window can be open by double-clicking 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, then no actions take place when you double click on it.



Minimap Modes

There are two modes available for minimaps: map mode, and info mode. They can be switched using the corresponding button in the right corner of a help window header .

Map

The primary target of a map mode is to show a unit location, as well as its speed and address from the last received message. The map cannot be moved, because it is automatically centered on the unit's last location and the unit does not leave the visual field. Except for this peculiarity, working with help windows in map mode is completely identical to working with the main map.

Moreover, in the map mode you can activate Google Street View. This is a submode which provides a possibility of tracking units on 'real' streets. Google Street View is a technology featured in Google Maps that provides panoramic views from positions along many streets in the world. Its coverage spreads throughout Western Europe, North America, Australia, Japan, Brazil, and some other countries.

This submode works only if Google Maps are activated in 'User Settings' and if there is coverage for requested geographical area.

Info

Switch to the info mode using the corresponding button in the minimap header. Here you can find the main buttons and icons chosen for the monitoring panel work list. Moreover, info mode includes additional information about the unit configured in the 'User Settings' dialog.

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.

Minimaps can be hidden/shown if you press the corresponding button in the left corner of the tracking system bottom panel . To avoid the excessive information minimaps are automatically hidden when you switch to the reports, messages, and routes panels (they can be shown forcibly if necessary). Minimaps are shown automatically upon leaving these panels.

Minimaps opened in the right order and necessary size are saved for a user, and will be unchanged during the later log ins.

Unit Additional Information

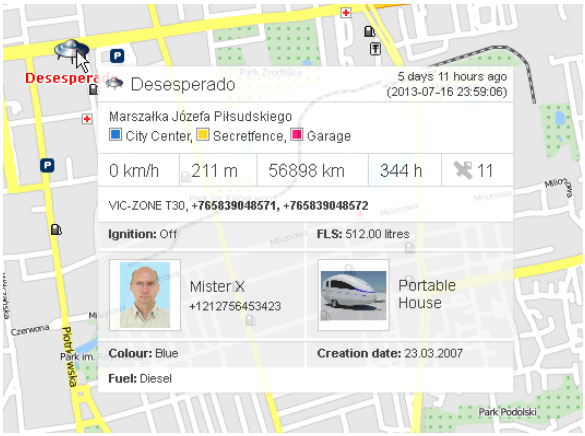
Additional information includes the following items: last message, location, presence in geofences, speed, altitude, counters, satellites, connectivity settings, sensor values, parameters, drivers and trailers, custom fields, intervals for maintenance.

Additional information can be found in a unit's tooltip as well as in the extended unit information of the monitoring panel work list.

Unit's Tooltip

Hover the mouse pointer over the unit on the map, in the work list, or in a dialog to see detailed information about unit current state in a popup info tip. The content for this tooltip is selected in User Settings.

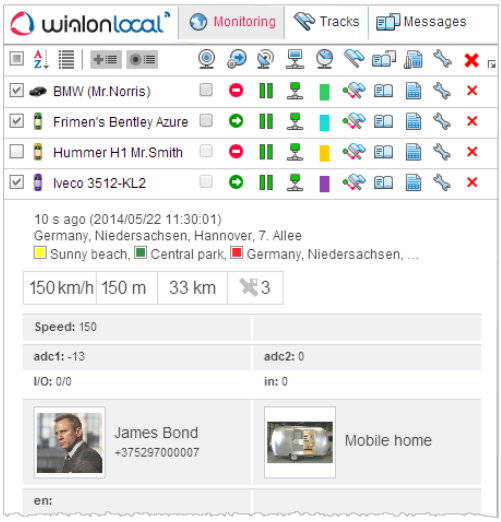
For example, a unit's tooltip can look like this:



Note.
All measurements used in the tooltip are taken from corresponding properties of the unit itself.

Extended Unit Information

Apart from that, additional information about the unit can be summoned and displayed stationary in the work list itself. Click on unit's icon in the Monitoring panel to see extended information. Content of the extended unit view is also regulated through User Settings.



You can apply extended view to any number of units on the work list. To hide the extended information back, just

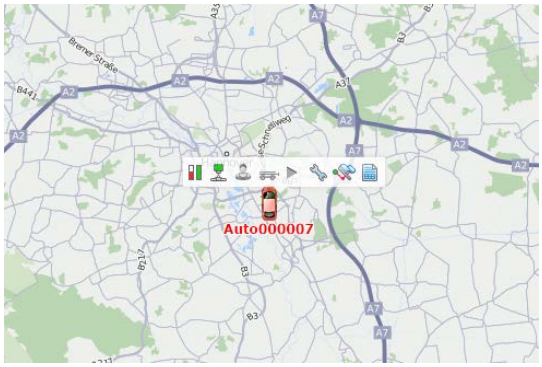
click on unit's icon again.

Attention!
Extended information is not available in the treelike view of units with sorting by groups.

Menu by Clicking on a Unit

Click on a unit on the map to open the menu at the top of a unit. This menu contains the same icons and buttons which have been chosen for the monitoring panel table. Moreover, regardless to the chosen icons/units the menu always contains the buttons for generating quick report and building quick track. The menu does not contain the following items even if they are chosen in the monitoring panel table — unit location icon, tracking option, and clear list button.

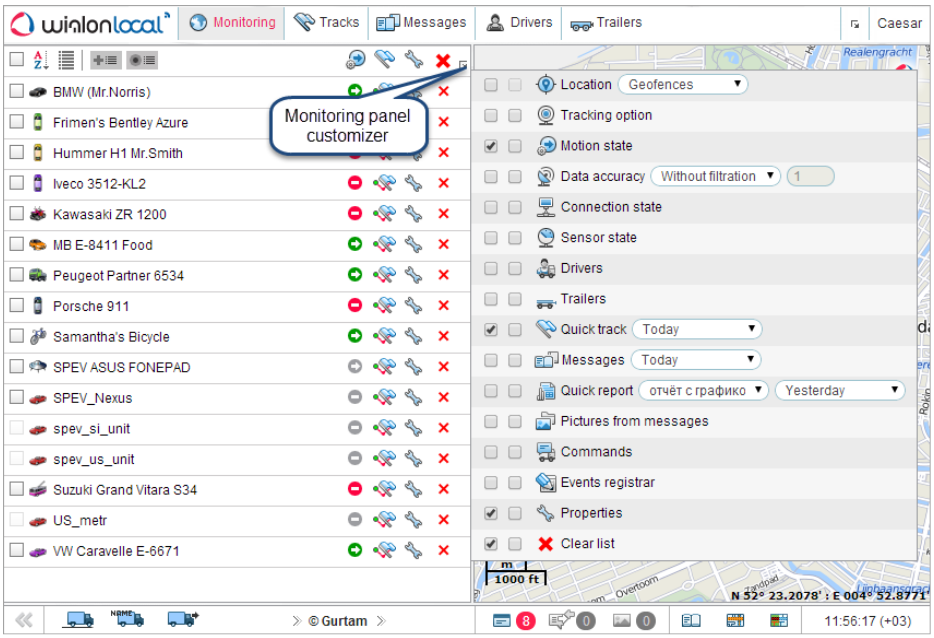
During a movement of a unit the menu moves with it and always displays updated unit information. To close it click on any place of the program.



Icons Explanation

The list of all icons that can be found in the Monitoring panel is presented below. The number of options available here depends on purchased modules.

According to your individual needs, you can hide or show certain columns using the Monitoring Panel customizer. Choose the elements to be displayed in the work list. If you mark an item in the left checkbox, it will have its own column in the work list as well as in the menu opening by clicking on a unit. If you mark an item in the right checkbox, it will get into unit actions menu. If marked in none of checkboxes, the item is not displayed in the Monitoring panel.



All icons can be divided into two groups:

1. *Operational*: icons-buttons, if clicked they allow to perform an action over a unit (such as event registration, command execution, messages query, report generation, track building, properties editing, removal from the work list, etc.). Further instructions can be found in appropriate dialogs and panels that are invoked by these buttons.
2. *Informational*: icons that give information about unit current conditions (moving or stationary, sensor value, connection state, data accuracy, driver, etc.). Further information in such cases can be found in tooltips. To read a tooltip, put a mouse pointer over a chosen icon.

Icons at the head of the table are also applicable. In many cases, they allow to sort items on the list according to a condition: for instance, moving units at the top, stationary units at the bottom.

Location

A column with units' last location – either in the form of addresses or in the form of geofences. By pressing the icon in the header, units in the work list can be sorted according to their location (by alphabet in direct or reverse order). 'Resolving' means an address is being searched. 'N/A' goes for units which location is not available, for example, in case a unit has never sent any messages.

- Addresses
  If you use Gurtam Maps in the system, depending on chosen format, addresses can be longer (including state, region, etc.) or shorter (e.g., just street and building number). If you use your own WebGIS, addresses can have only full format, and if no address information is available, then coordinated are displayed instead.
- Geofences
  If a unit gets into several geofences, all of them are displayed. At that they are sorted by area (from small to large) and written in color set in geofences' properties. If a unit is outside of all geofences available, then

its location will be indicated by an address. *Attention*! To calculate units inside geofences, the option *Presence in geofences* should be activated on the 'General Settings' tab. That is why this flag is enabled automatically if you choose geofences for the location column.

Tracking option

If selected in this column, unit will be always in sight on the map when a new message comes from it. To select all units, press the button in the header. More...

Motion state

This column shows whether unit is moving or stationary, as well as whether ignition is on or off (if there is an appropriate sensor).

- – unit is moving,
- – unit is moving, engine is on,
- – unit is stationary,
- – unit is stationary, engine is on;
- – the last message from unit was received over an hour ago: unit was moving;
- – the last message from unit was received over an hour ago: unit was stationary.

Unit state is detected according to its speed value in the last message and ignition sensor state (if there is such). Apart from that, if a unit is stationary, in the tooltip you can see for how long.

Data accuracy

This column indicates data accuracy – shows how many satellites were locked and when the latest message was received. To know the precise time of the latest information update, place a cursor over the icon and read a tooltip.

First bar shows satellites availability:

- green – satellites are available (see the precise number of satellites locked in the tooltip),
- red – satellites are not available.

Second bar shows the last data was get from unit:

- green – unit sent data less than 5 minutes ago,
- yellow – unit sent information within the last hour ,
- orange – unit sent data within the last day,
- red – there was no messages for a long period of time.

According to their last message time, units can be automatically displayed or hidden. To make use of this option, change *Without filtration* to *Monitoring panel* or *Panel + Map* and specify filtration interval in minutes. The filtration can affect only the work list in the monitoring panel or both the work list and the map. More...

There is a special app helping to reveal inactive units — Actualizer. The application allows setting any period of inactivity.

Connection state

Shows whether there is connection with unit at the moment.

- – unit is connected,
- – unit is not connected.

Unit is considered as online if it has TCP or UDP commands available or it has sent messages within last 10 minutes.

Sensor state

In this column sensor state can be shown with different colors.

- (or a small square of any other color) – visualizes sensor's value;
- – the option is not activated for this unit;
- – the value is unknown.

When putting a cursor over the square, in the tooltip you can see the value or description. How to adjust these colors...

Drivers

The column with information on drivers. In the tooltip, you can see name, photo, and phone of driver(s) assigned to unit.

- – no drivers bound,
- — a driver assigned has no photo,
- — several drivers are bound to the unit.

Trailers

The column with information about trailers. In the tooltip, you can see name and photo of trailer(s) bound to unit.

- — no trailers bound,
- — a bound trailer has no photo,
- — several trailers are bound (see more information in the tooltip).

Quick track

The column of buttons to build tracks of unit movements. In panel settings, you should also specify the interval for quick track building: 'Yesterday', 'Week', 'Month' or 'Other' (manual mode).

- – show track on the map,
- – remove track from the map,
- – not enough rights to query tracks for this unit.

When pressing the Show Track button opposite a unit, a track of this unit appears on the map. Many parameters for quick track building are borrowed from the Tracks panel: line width, annotations, markers, trip detector, etc. Moreover, the interval is also taken from there if it is set as 'Other'. Track colors can be set in unit properties (Advanced tab) or in the Tracks panel as well.

All 'quick' tracks are displayed in the Tracks panel where you can manipulate them in the same way as usual tracks: show/hide, remove from the map, focus, apply hittest, etc.

Messages

Buttons to query data messages.

- — display messages,
- — not enough rights to query messages from this unit.

When pressing the button, you will automatically move to the Messages panel where requested data will be displayed in the tabular form. Time interval ('Today', 'Yesterday', 'Week' or 'Month') for the query is set in the Monitoring panel customizer. In case of 'Other', the interval is taken from the Messages panel. Only messages of data time are loaded in this way. Parameters can be displayed in raw form or as sensors. It depends on what is chosen in the Messages panel itself a the moment.

Quick report

Quick report generation.

- — execute a report,
- — not enough rights to execute reports for this unit or report template is unavailable.

When pressing the active button, a report is generated for the unit. A template for the quick report is selected in the Monitoring panel customizer as well as time interval ('Today', 'Yesterday', 'Week' or 'Month'). Choose a template from the dropdown list. Note, this list contains only templates dedicated to single units. Time interval can be either standard or 'Other', which means it will be taken from the Report panel. The requested report itself is displayed in the Reports panel and navigated/managed from there.

Pictures from messages

View pictures received from the unit (useful if such functionality is provided for type of device used).

- – the button to load pictures,
- – no pictures available.

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 has not enough access rights to execute them,
- – there are no commands available or no rights to execute them.

SMS

Send SMS to unit or driver (the addressee is selected in the dropdown menu if both options are available).

- – send SMS to unit or driver,
- – sending SMS is not possible.

To explore the full functionality of this option, the current user must have rights to send SMS messages, access to unit *Edit connectivity settings*, a driver must be bound to the unit, and both (unit and driver) must have phone numbers in their properties.

Events registrar

This column contains buttons to display event registrar dialog. It is used to register fuel fillings, maintenance service and other events to unit history.

- – open registrar,
- – not enough rights to register an event for this unit.

Properties

View unit/group properties dialog (depending on work list display mode). In case of groups, the button can be different regarding [[cms/rights/rights|access rights.

- – some properties of the group are editable;
- – only view access.

Clear list

Buttons to remove individual units/groups from the work list or clear the whole list at once.

- – remove all units/groups from the work list (if pressed in the header of the table) or remove a group (if pressed against a group),
- – remove a particular unit from the work list.

If an option is selected for the additional menu (that is checked in the second column of the Monitoring panel customizer), you will find it in the column with the icon under the button . The additional menu that can contain any of the above mentioned buttons and signs.

Other buttons and signs that can be found in the Monitoring panel.

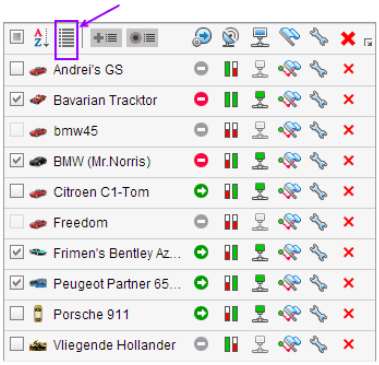
	The first column in the table is filled by check boxes. Put flags near units you want to be displayed on the map. Put a flag at the top of the table to mark all units at once.
	A switch-button showing that items of the work list are sorted by name in direct order.
	A switch-button showing that items of the work list are sorted by name in reverse order.
	A switch-button showing that the work list displays singular units.
	A switch-button showing that the work list displays a tree view of units (with grouping). More about the work list settings...
	The button to add units/groups to the list using a filter.
	The button to add all available units/groups to the work list.
	Monitoring panel customizer that helps you to choose columns to be displayed and options for the additional menu.

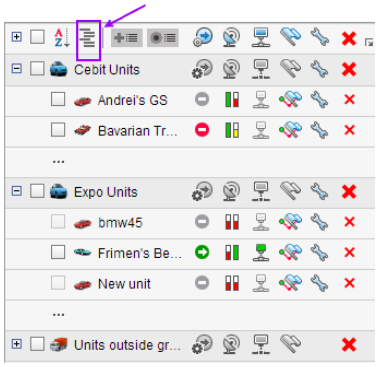
Unit List Management

Unit work list affects the tracking process in many ways. It is not only about what you can see on the list and on the map but also how you manipulate units in other panels when creating jobs, notifications, querying messages, reports, and tracks, assigning drivers or trailers, looking for nearest units, etc.

Two display modes are possible for the work list:

- simple list of single units;
- treelike view of units with sorting by groups.





Each of those lists is independent and their settings are stored separately. When switching between them, previously applied settings are restored for each.

Singular Units

Adding units to the list

To add units to the work list, use one of two buttons located above the list:

- – add *all* available units;
- – find necessary units using a special search tool.

However, there are some alternative ways to add units to the work list:

- from the Online Notifications window (you can add a unit for which a notification has triggered);
- dynamic formation of the list regarding data accuracy.

Removing units from the list

Units can be removed from the work list by one or all together:

- a button against each unit to remove this single unit from the list;
- a button at the head of the list to clear the work list (remove all units).

Note that units are deleted from the list and not from the system. They can be added back at any time using the ways described above. To delete a unit from the system completely, go to the Units panel.

Sorting

For your convenience, items on the list are sorted by name. They can be sorted in direct alphabetical order or in reverse order. To change the order, use the switch button or .

Besides, it is possible to sort units by other attributes like motion state, connection quality, etc. To do this, push the appropriate button in the head of the table. Possible filters are:

- last location;

- sensor state availability,
- commands availability,
- motion state,
- last message time,
- online connection state,
- pictures from messages availability,
- quick track availability,
- driver information availability,
- trailer information availability.

For instance, to sort units by state, press the button . Then at the top of the list there will be moving units, and at the bottom – staying or vice versa if you press this button twice.

Available columns are defined in the Monitoring panel customizer. Signs and icons used in the columns are described in Icons Explanation.

Treelike View

This mode of the work list shows the tree of units with sorting by groups. In the end of a name of each group in brackets you can see a number of units of the corresponding group. Expand a group to see all of them and information about their current state. Signs and icons used here are the same as in the singular view. Units can be easily removed from the list and with this they are not removed from the group itself.

The button to add all available objects allows adding all not-yet-present groups to the work list. The newly added groups will have the complete set of units inside. However, if a group was on the list already, its currently represented set of units remains untouched.

To collapse/expand a group (that is show/hide its units), use the *plus/minus* button in the first column of the table. The checkbox before group's name is responsible for units' visibility on the map. This button allows you to quickly draw all group's units on the map or otherwise remove them with one mouse click. However, each unit has the same checkbox, so the visibility of units can be controlled individually, too.

If units not included into any of the groups are added to the list, a special virtual group is generated for them – *Units outside groups* . This group cannot be edited, however, it possesses many of the features of ordinary groups.

If you expand a group and see omission points at the end of its list of units, it means that not all of them are displayed in the current list. Point mouse cursor over this sign to see how many units are missing; press this button to add them.

In the tooltip of a group, you can see the list of *all* its units. Besides, in tooltips of some icons situated against each group, you can see specific information concerning certain parameter (again, all units in one tooltip):

- — sensor state;
- — motion state (moving/stationary, ignition on/off);
- — data accuracy (number of satellites and last message time);
- — connection state (connected/not connected);
- — assigned drivers;
- — assigned trailers.

The following actions can be performed over a group from the Monitoring panel:

- — send a command to a group of units (a list of available commands is shown if you hover the cursor; commands execution dialog opens if you press the button);
- or — view/edit group properties).

Search Tool

It is not needed to display all available units on the work list. Units can be easily added to and removed from the list. Sometimes it is more convenient to work with a certain group of units and have it on the screen.

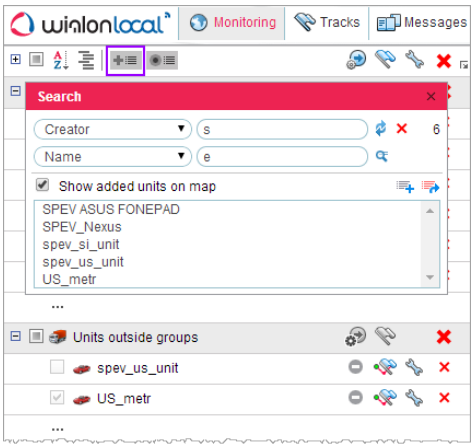
There is a convenient tool to search necessary units and add them to the work list. To open this tool, press the button

on top of the panel. There you see the list of all groups (in square brackets) and then all units in alphabetical order. Double-click on a unit/group to add it to the work list. If it happens to be in the simple view, one or more singular units will be added. If the treelike view is on, groups are added to the list (collapsed). If you choose a group to be added, all its units are added with it. If you choose a unit to be added, its group is added and it will have just this unit inside if you expand this group. However, there will be omission points to indicate that there are more units in this group (press to add them). If you add a unit whose group is already in the list, this unit will be added to its group, however, you will not notice it if the group is collapsed. If you add a unit that does not belong to any of the groups, a special virtual group *Units outside groups* appears on the work list.

Apart from that, if the checkbox *Show added units on map* is enabled, all units being added with any of described methods appear not only on the work list but on the map, too.

Search by criteria

When you have many units/groups, it is handy to perform a search among them by certain parameters: name, creator, custom fields. In case of units, there are even more criteria: phone number, unique ID, device type, access from user, geofences, unit groups, sensor, driver, and trailer.



Select search parameter and then type a key phrase. 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.

If you leave the search field empty, all units possessing the selected property (sensors, ID, etc.) will be displayed, for example, all units having a driver assigned to them. Then you begin to type driver's name or code to narrow the selection.

Most of search parameters (except geofences, drivers, and trailers) are taken and can be viewed and changed in Unit Properties. If doing a search by sensor, not only sensor name 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, another search can be done on the second (third etc.) level: a search among the first search results. To do this, push **Add to the search list** . The principals of inquiry formulation remain the same.

If the search is successful and you want to include the results in the work list, you can do it by double-click (described above) or using the following buttons:

- add search result to the work list;
- replace the current work list with search results.

Dynamic Work List

The work list in the Monitoring panel can be formed dynamically according to the time when the last message from a unit was received. Units are removed and added to the list and map automatically. The work list updated each 10 seconds.

The function can be enabled in the Monitoring panel customizer. Change *Without filtration* option to *Monitoring panel* or *Panel + Map* and specify filtration interval in minutes. The filtration can affect only the work list in the monitoring panel or both the work list and the map.

ATTENTION!
With this mode enabled, some other functionality becomes not available or operates in different way:

1. Manipulations with the work list (such as search, addition and removal of units) are impossible.
2. The filtration by last message time does not affect the work list if the treelike view is selected.

Commands

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 type of device used and its configuration.

A command should be configured in Unit Properties beforehand. Only then users will be able to execute it. Besides, users are required to possess access rights specified for each command of a unit individually as well as the flag *Execute commands*.

Standard Commands

17 standard commands are reserved in Wialon Local:

Icon	Command	Name in the system	Parameters
	Query position (get unit current location)	query_pos	—
	Block engine	block_engine	—
	Unblobk 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
	Upload configuration	upload_cfg	path to configuration file
	Upload firmware	upload_sw	path to firmware file
	Query snapshot	query_photo	—
	Query snapshot from specified camera	query_photo_cam	camera's number
	Query DDD file (for tachographs)	query_ddd	—

If your device supports a command that is not mentioned on the list above, this command can be sent anyway. To do this, use the standard command *Send custom message*. In this case, you should know exact name for the command (how it is written in device configuration).

Command can hold predefined parameters of its execution. This is adjusted for each unit individually in its properties.

Sending and Tracking Commands

There are several ways to send a command to a unit:

- Manually from the Monitoring panel, including commands sent to a group of units.
- As a job fulfilled according to schedule.
- As an action for a triggered notification (command is sent when specified conditions are met).
- From a mobile device by means of simple SMS text message.
- From a mobile device with the help of Wialon Mobile.

Such commands as 'Upload configuration' and 'Upload firmware' have their own peculiarities. If these commands have been saved for units without choosing a file, then sending the commands as a job/notification or sending them to a group of units is impossible.

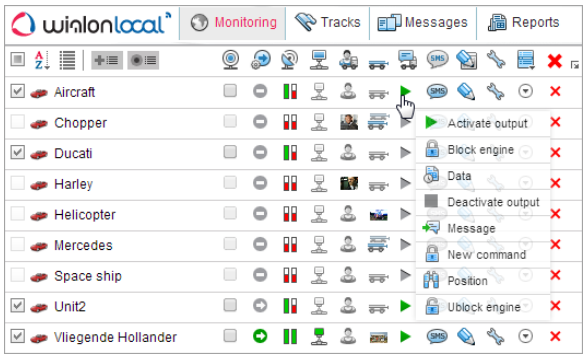
Information about commands sent to a unit is available:

- In the Messages panel (all commands sent to unit).
- In Executed commands report (only successfully executed commands).
- Immediately after sending a command – in the log.

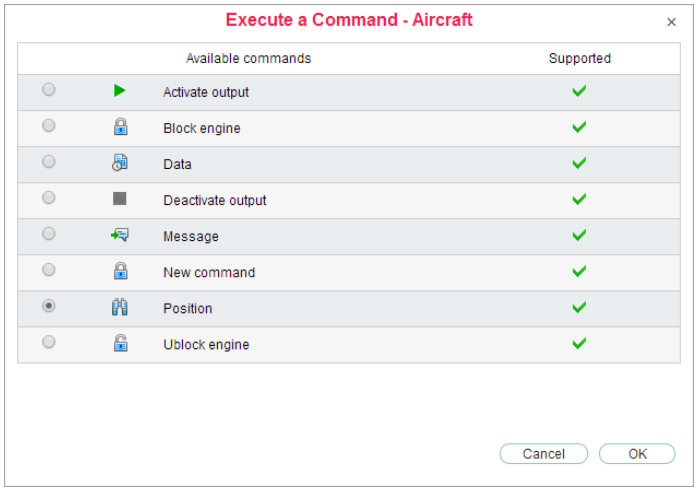
Executing Commands from the Monitoring Panel

In the Monitoring panel, there can be a button to send commands. If not, it can be activated through the Monitoring panel customizer. The button can obtain different looks:
there are available commands for the selected unit;
there are GPRS commands among available;
or 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 against the needed 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 (link type availability is important here).



1. Push the command button or .
2. Select a command from the list of commands available at the moment.
3. Set additional parameters if needed, for example, input/output index, report interval, path to load configuration or firmware file, checkpoints of the route, etc. (depending on command type).
4. Press OK. The command will be executed immediately, and its result will be reported in the log. To show or hide the log window click on the double-arrow in the right bottom corner of the window.

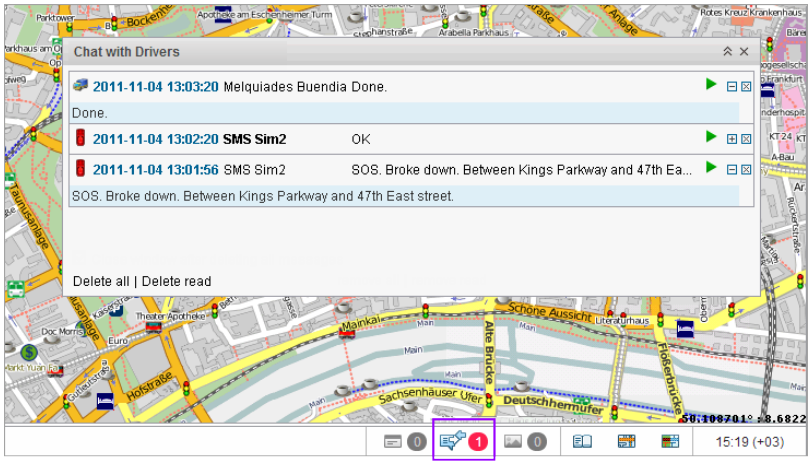


Note.
If a command you are trying to send has the same name but belongs to different types and parameters are not adjusted, then it will be sent without parameters and thus may not be executed properly.

Chat with Driver

Operator (dispatcher) can exchange messages with drivers. To do this, select the command **Send message to driver** and type a text.

In case the driver answers, driver's message will popup in a special window. New message can be accompanied with sound (see User Settings). If you have unread messages, the number of them is shown in 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 colourful and can be pressed on.



Newly received messages are added to the top of the list. Unread notifications has a sky-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 in a place with no text.

When clicking on a message, the map is focused on the place where this message was received. When clicking on a unit name, the map is focused on unit's last location.

To delete a message, click on the cross at its right. You can also delete read messages or all messages at all if you use the appropriate buttons at the bottom of the messages window. The window is closed automatically if you delete all messages. If the online notifications' window is closed by clicking on the grey cross in the upper right corner, then the window ceases to appear automatically upon receiving of notifications until the window is opened by clicking the corresponding button in the bottom panel.

The window itself can be moved over the screen and resized.

The operator can quickly send a reply to the driver (a command of the appropriate type *Send messages to driver* should be configured in unit properties in advance). When clicking on the green triangle-shaped button, command executing dialog appears and the operator can type the messages and send it.

Besides, you can generate a report called Chat, which will contain all chat history including operator's messages and driver's answers.

Correspondence with driver can be fulfilled with the help of a specially developed app — Chatterbox. This application allows sending not only commands but also SMS messages.

Sending Route/Sending Waypoints

To send route/waypoints it is necessary to indicate its checkpoints in the command dialog. Checkpoints can be found in various sources: addresses, geofences, POIs, routes. You can apply 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, disabled means the opposite.

To indicate a checkpoint start typing a text into the corresponding field, and in the dropdown list, depending on the filter used, you can find the possible variants along with their source information.

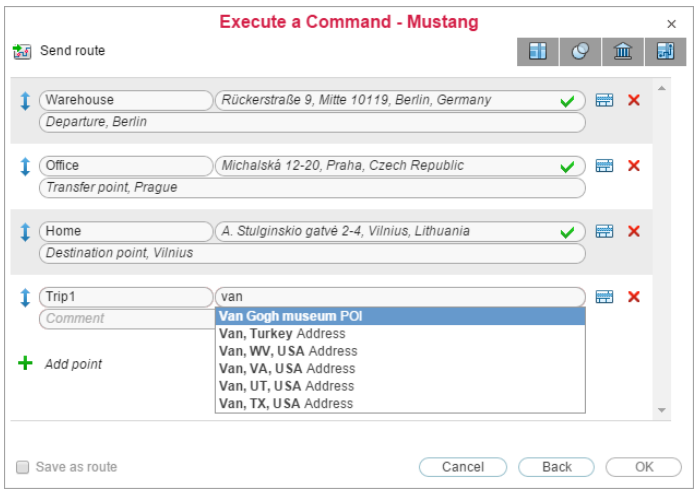
Moreover, you can add a checkpoint directly from the map. To do so, click on the map summoning button situated to the right of the field. Move on the map to the target position, and double click on it. As a result a checkpoint will be indicated automatically.

If a checkpoint is added from a route, then all the points of the route will be added. However, if the route contains moving units as checkpoints, then they will be omitted.

Coordinates of the first checkpoint are used when you add them from line or polygon type geofences.

After the necessary 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. Checkpoint's name cannot be edited, it is filled in automatically. If you try to edit a name, the earlier search results will be reset (point validity indicator disappears) and you should begin the search once again. Every indicated checkpoint has a 'Notice' field under it. This field is not an obligatory one.

Indicated checkpoints can be saved as a route, and afterwards you can use it in the Routes panel of the tracking system. To do so, check the box in the bottom of the dialog. You can also give a name to the route during flag activation. Click 'OK' to complete the procedure. Route saving takes place along with sending a command.



Events Registrar

Different events can be registered in 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 on the monitoring panel . If you do not see such a button, it can be added through the monitoring panel customizer.

Attention!
To register events for a unit, the access right *Manage events* is needed. In the other case, the registrar button is dimmed.

Push the registrar button and choose a type of event to be registered (the list depends on purchased modules):

- make a record in unit log,
- register custom event,
- register unit status,
- register filling,
- register maintenance work.

Note.
Measurement units which you may encounter in the dialog (e.g., to indicate fuel volume or mileage) depend on properties of the unit for which the registration is being made.

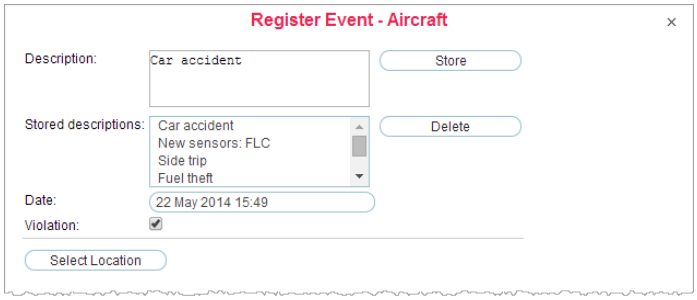
Make a Record in Unit Log

Using this option, you can add any text note to unit log. It will be labeled as 'Manual record' and dated time you have created it. Such records can be viewed in messages (choose *Log* as messages type) and in a report generated for this unit (query the *Log* table).

To add messages to unit log, you should have not only *Manage events* access, but also *Manage log* access.

Register Custom Event

Select **Register custom event** in the registrar and press Next. Give the event a name, enter description and choose the place.



There is a possibility to save events descriptions to speed up the process. To do this, enter your description and press **Store**. The description will appear below in **Stored descriptions**. To select a previously saved description for a new event, just click on one of them. To delete a saved description, select it and press **Delete**.

If you check **Violation**, the event will be registered in unit history as violation, otherwise it is registered as simple event. It means this event will appear in different kinds of reports: Events or Violations.

Register 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.

Register Filling

In the Monitoring panel, you can register fuel fillings for units manually. Manual registration helps to estimate the difference between registered and detected fuel, compare consumed fuel with consumption rates, calculate running costs, etc.

In the registrar, select **Register filling** and press Next.

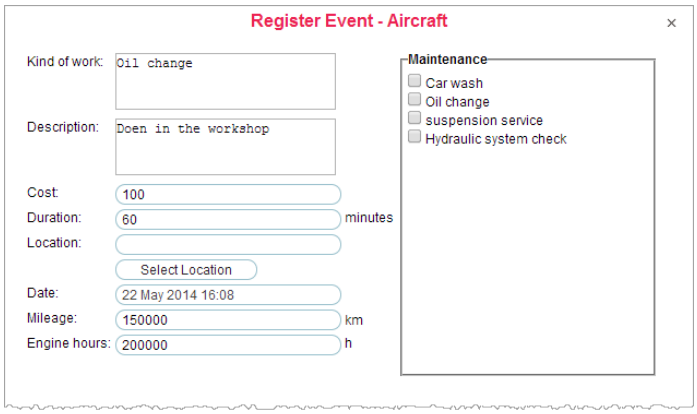
Enter the volume of filled fuel and its cost. Fractional numbers (up to hundredth) can be also used for fuel volume and cost. To enter fractional numbers, use *point* as delimiter. For example, to register fuel filling for 77 dollars and 88 cents you enter '77.88'.

Entered values will be automatically added into the Description field below. If necessary, you can edit the text manually. Then enter date and time when the filling happened and possible deviation from this time in minutes.

Besides, it is possible to indicate the place where the filling happened. To do this, press the Select Location button. The focus will switch to the map, and you can indicate the place by double-click. The address of the place will be detected by Web-GIS and written in the Location field. Press the Reset Location button to clean this address and indicate another one. Besides, you can manually edit this field (for example, you can add gas station name). When the focus is on the map, the dialog moves to the top left-hand corner, and the Restore Dialog button appears. If you press it, the dialog becomes active again even if you do not indicate any place on the map.

Register Maintenance Work

In the registrar choose *Register maintenance work* and press Next.



Enter the following data:

- kind of work (type from the keyboard or select from available service intervals on the right),
- custom description,
- cost,
- service duration in minutes,
- location (press the Select Location button and double click on the map or edit this field manually),
- date and time when the work was done (be default, the current date and time are offered),
- values of mileage and engine hours counters at the moment of the event (the current values are displayed but you can edit them).

In the right part of the dialog, you see the list of service intervals contained in Unit Properties => Service Intervals. Check the services that were done that time. This this action the interval selected will be zeroed and will start the count again. Note that if you select anything here, the contents of 'Kind of work' field changes.

Attention!
Registered events are not editable, however, they can be deleted from the database 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 things. Registered custom event depending on your choice can get into 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 columns which contents are taken from certain fields of registration dialog. The table below gives the correspondence between the column in report and the field in registrar.

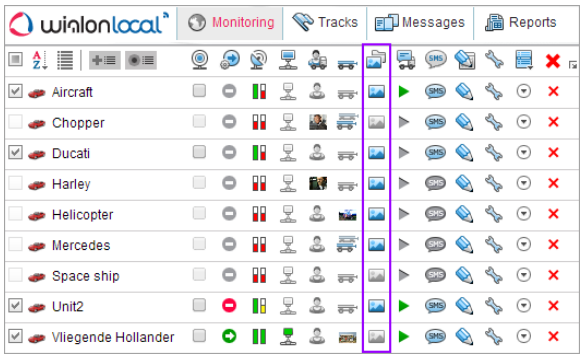
Column Header	Column Content
Event time	Date and time when event happened.
Time received	Date and time when event was registered.
Event text	Text is taken from the **Description** field. For maintenance, if there is no description, the text can be taken from the field 'Kind of work'.
Location	Unit location at the moment of 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 above-mentioned fields are not filled correctly, then the corresponding columns will be empty.

Other reports that use registered events are report on maintenance and utilization costs.

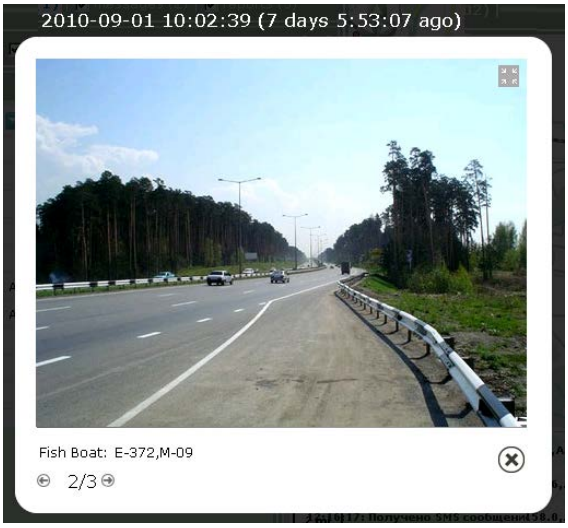
Pictures from Messages

If the equipment supports such an option, units can send pictures along with messages. Pictures 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 option *Picture from message* in the Monitoring panel customizer.



After pressing the button, picture viewer will be displayed. You can view all the pictures received during the current session as well as the latest picture received prior to your login.

The above-mentioned way is to view pictures of a certain unit. To view pictures of *all* units, press the pictures button at the bottom of the screen. It is active (that is colorful and able to be pressed) if there are pictures in the current session. Their number is displayed at the right of the button. If new pictures have appeared after last opening of the window, the number is displayed in red circle to attract your attention. ⓘ In this window, only images received during current session are displayed.



To move between images, use arrows. Between them, you can see the number of the pictures viewed and the number of available images. Pictures are sorted according to the time they come to the server.

Above each picture, there is its date and time. Under each picture, you can see a unit name and address information from the message.

Some pictures can be enlarged with a special button in the right top corner. To close a picture viewer, use the button in the right bottom corner.

All images received from units can be observed in reports and messages.

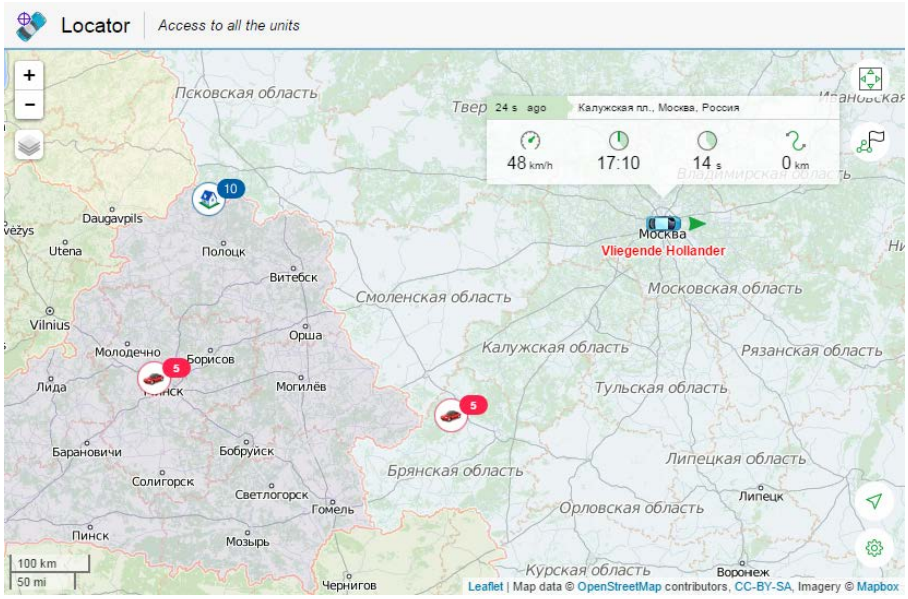
ⓘ You can get a picture from a unit at any time using the *Query snapshot* command.

Locator

Locator is used to generate links and share current units' location. Conditionally locator can be divided into two sections — links creation, and their viewing. Links are created in the locator's dialog window. To open the dialog, choose the corresponding item in the user menu. Viewing is performed on locator's map which becomes available upon clicking on the provided link.

Viewing on the Map

Open a link to view locator's map where units to be displayed along with POIs and geofences (if it has been indicated in a link creation settings). Gurtam Maps, OpenStreetMap, and, if available, Google Maps are used to show units' location. To choose a map layer, point a cursor on the corresponding icon below the scaling buttons (left top corner). This icon also helps to enable/disable displaying of geofences/POIs on the map.



Units

A unit is presented on the map by its icon. Unit name and movement direction arrows are shown as well (by default). You can also activate unit traces, or so called 'tails' (switched off by default). Click a gear shaped button in the right bottom corner to enable/disable the above mentioned settings.

If among the number of units presented on the map you need to monitor a particular one, you can use the monitoring tool. Click on the corresponding button (quadrate with green arrows) in the right top corner and choose the necessary unit from the dropdown list. Afterwards the map will be scaled and centered on the chosen unit. To disable scaling and centering it is necessary to quit the monitoring option (choose dash from the dropdown list). Note that you cannot monitor all the available units at once. Therefore, if the 'All units' item is chosen in the dropdown list, then a search instead of monitoring will be used, and all the available units will get into vision field.

After the unit has been found, you can view its latest data. The data is shown in the window opened by clicking on a unit. The amount of provided information depends on a unit state (moving/stationary). If a unit is moving (movement arrow is an indicator), then the following parameters are shown for it: speed, time of movement beginning, its duration, and covered distance. For a unit which is not moving such parameters as speed and covered distance does not make sense, therefore only two parameters will be shown for it: time of beginning the stationary state, and its duration. Besides, regardless to the unit state the header of the opened window contains such information as 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 will be automatically refreshed.

If it is necessary to know the history of unit's movement, you can generate and view its track (for the last 24 hours).

To do so, click on the corresponding button in the right top corner (green points and flag), and choose the necessary unit from the dropdown list. Afterwards, a track is built, and the map scaled in order the whole track to be displayed. To remove a track from the map, click on the track building button once again.

Current Location

Locator provides a possibility of defining your current location on the map. It could be particularly helpful if you use a locator from a mobile device.

To define your current location press the corresponding button (green arrow) in the bottom right corner. Afterwards, the map will be scaled and centered on your location.

If a particular unit has been chosen using the monitoring tool, and afterwards you press the defining location button, then both the unit and your current location get into vision field. However, as it was stated before, upon receiving new messages from the unit chosen in the monitoring tool, the map continues scaling and centering on it until the monitoring is disabled (choose dash from the dropdown list).

Scaling

Upon the locator opening the map is automatically scaled in such a way that all the units to get into vision field. 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 mouse scroll. A graduated scale situated in the left bottom corner helps you to understand distances on the map.

Depending on the used scale and the number of available items some of the icons could be overlayed by each other. In this case the assembly of icons will be substituted by the group icon (a number of elements is shown for every group):

— for units;

— for POIs.

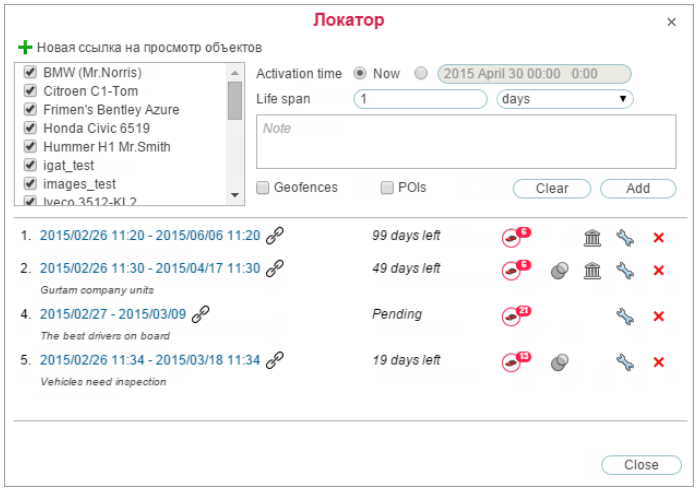
Click on the group item in order the list of all items to be shown (icon + name).

Links Creation

Links are generated and edited in locator's dialog situated in the user menu. Click on the user name in the right corner of the top panel to open the menu.

To create a new link, press green plus shaped button, and enter the fields of the form.

In the left side of the form select the units or unit groups the location of which you would like to share. To select all the units at once, hold <ctrl> on the keyboard and click any flag (the same action is used to unselect all the flags).



Afterwards indicate link activation time to the right of the list. By default a link is considered to be active from the

moment of its adding. You can see it by the 'Now' position of the radio button. To indicate another time for link activation, switch radio button to the next position. It enables time field. Click on this field to open the calendar where it is necessary to indicate date and time for link activation. Note that link activation term cannot exceed 100 days.

Furthermore enter the link life span into the corresponding field. The value can be indicated in hours or days (choose from the dropdown list). Note that link's life span can be unlimited. Indicate 0 in the field to apply this option.

Below is the field where, if necessary, you can enter a note for a link. This allows to identify the necessary link in the list of links. Besides, a note (if it has been entered) will be shown in the header of locator's page itself.

Optionally you can also check geofence and/or POI checkbox in order to share them in the link.

Click 'Add' button in order to generate a link, or 'Cancel' to clear this form.

List of Links

Generated links are placed in the corresponding list containing such information as sequence number, the link itself (displayed by the link beginning and termination time), notes, link life span, units' number icon, and also geofences and/or POIs indicators. If there is less than hour left before link to be terminated, the corresponding line is highlighted in red.

Click on the link to open it in a new tab. To copy URL-address 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!

- Upon exceeding of the life span the link is automatically deleted.
- Upon changing the user's password all the locator's links are automatically deleted.

Locator Integration

Use the following form of code to integrate locator into your web-site:

```
<iframe src="link_address&lang=ru" 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. 'Lang' parameter stands for the language used.

Manipulations with Link

As has been described earlier, there are 3 settings for a 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 basic link (created in

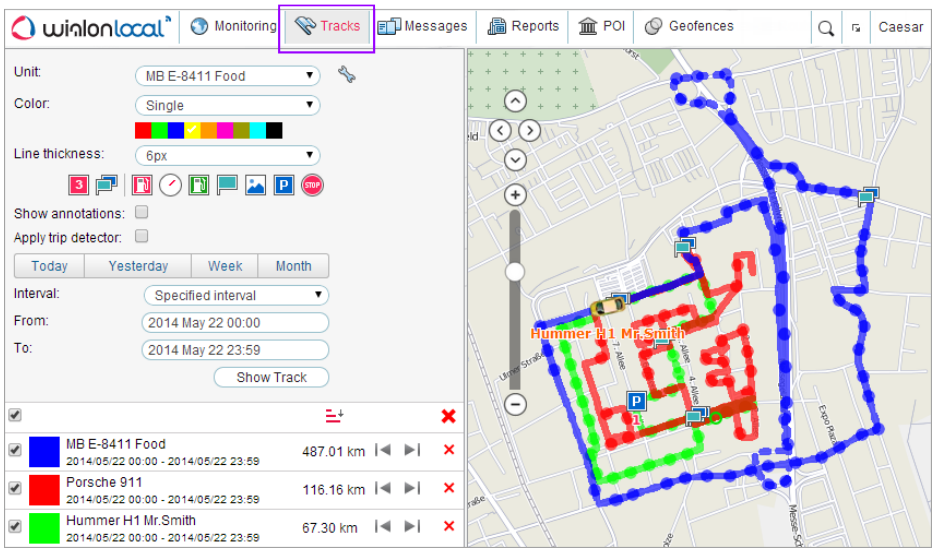
locator's dialog), but the modified one (received by changing settings of unit presentation on the map).

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 also 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.

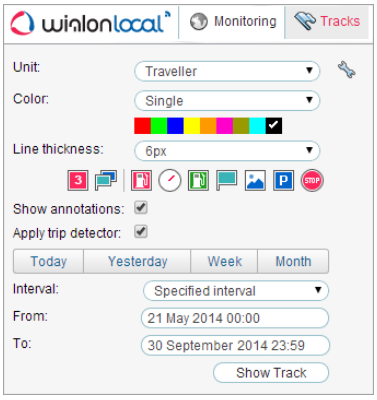
Any number of tracks can be drawn on the map. They can represent different units and various time intervals. To prevent tracks from being confused with each other, you can set different colors for them. Besides, different segments of the track can be of different colors depending on speed or sensor values.

To open the Tracks panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer.



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 those units. 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 the corresponding rights will be displayed.
2. Adjust the desired **parameters** for the track (color, thickness, etc.).
3. Define a **time interval** within which you want to get the data.
4. After filling in all the fields, press **Show Track**.

Note, that in order *tracks* to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

The principle of interval adjustment is the same as in reports (see Query and View Reports). The third and fourth steps can be united into one if you choose 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 unit has any messages with coordinates for the period). If it takes too long for the track to appear on the map, it may mean you have 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 travelled will be 0 km.

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 viewing data messages.
- In the Reports panel, if the appropriate option is selected in report template.

When mapping a track you can get a dashed line that means that some track coordinates are doubtful. It may occur if there were no coordinates at all or they were invalid. This situation may be caused by connection loss or poor satellite visibility. Connection loss is detected according to the parameters set in unit properties on the Advanced tab (see the options 'Maximum interval between messages' and 'Minimum satellites').

Track Parameters

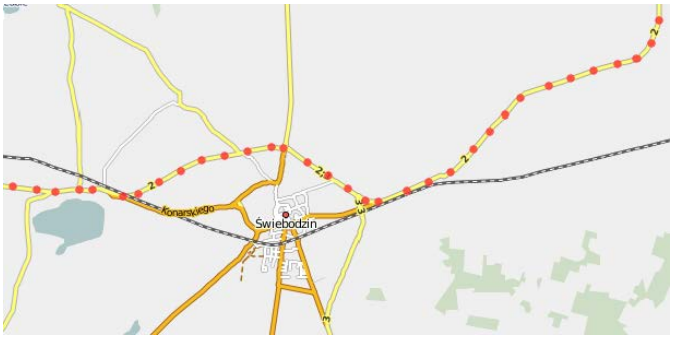
After you have built a track, it is impossible to change its parameters (time, unit, color, annotations). In case of error, delete incorrect track and create a new one.

Track Color

A track color depends on unit settings (see Unit Properties => Advanced). There are three alternative color settings available: 'Speed based track colors', 'Sensor based track colors' and 'Unconditional track color'. Initially, one on these settings is chosen for a unit. If the setting is not specified, then track color is single. Track color for a single track is chosen before every track building. If a color is not specified in the color range, then a new color for every new track is chosen automatically from the color range going circle-wise. Also, if a unit has 'Unconditional track color' setting and you have chosen the other color from the color range manually, then a new color will be automatically chosen from the color range going circle-wise for every next track.

Track Line Thickness

Indicate **track width** in pixels (from 1 to 15). Track can be represented as a number of not connected points (from where messages were received) – for this choose the option *Points only*.



Markers

Markers in tracks are unavailable if a user has no access to reports.

You can enable markers to highlight places of significant happenings 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 would be red),
- pictures from messages.
- parking places,
- short stops,

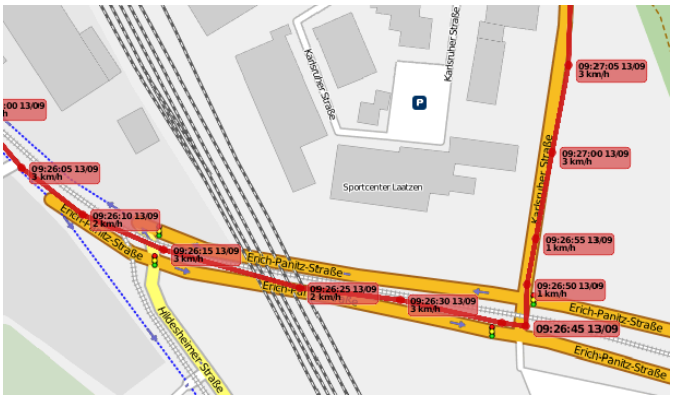
Choose desired markers before building a track. To activate a marker, just click on its icon so that it became colorful. If at least one kind of marker is selected, additional marker options can be applied:

- numbering,
- grouping.

Markers in tracks are drawn and used along the same principles as markers 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 when (date and time) the message was received. On big zooms, information about speed becomes also available. Annotations are rather informative but they make visual reception of track more complicated. That is why it is reasonable sometimes 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. ⓘ Measurement system in annotations depends on current user's settings.



Trip Detector

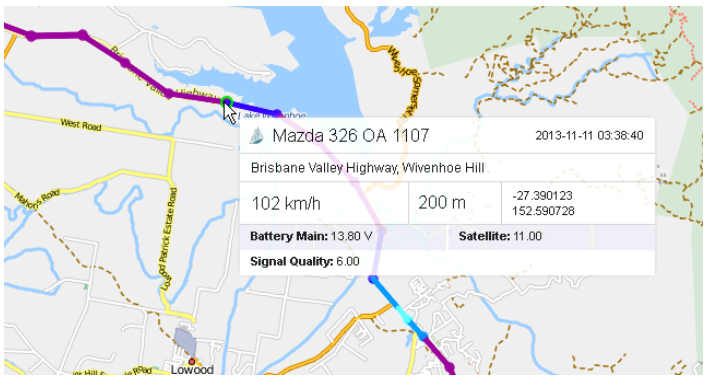
Trip detector flag affects distance value and track visualization. For example, in places of stops and parkings there will be just one point instead of conglomeration of points, and the mileage will include just intervals detected as trips. Trip detector is set up in Unit Properties => Trip Detector.

ⓘ Like in the Messages panel, distance is calculated by coordinates (it does not depend on mileage counter). That is why distance in tracks can differ from mileage in reports.

Tracks 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 track to get accurate information about track point (points where messages were received). Messages are searched in the radius of 50 pixels to the cursor. Points found are highlighted by 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 unit's properties (speed in kilometers or miles per hour, altitude in meters or feet) as well as mileage in the list of tracks.



You can manage tracks in the left part of the window under the *Show Track* button. Unit name is displayed on the list as well as time interval and travelled mileage. Like in the Messages panel, distance is calculated by coordinates (it does not depend on mileage counter). That is why distance in tracks can differ from mileage in reports.

It is possible to view all created tracks on the map simultaneously or select just some of them. The tracks marked with flags are displayed. Unmark a track to hide it. 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 so, click in the header of the list above mileage or name columns. Click again to reverse the sort 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.

To delete a track, click on an appropriate button against it ✕. Using a similar button at the header of the list, you can delete all tracks at once.

A track can be played. That means unit's icon will move along the track line with selected speed. Pressing the Play button ▶ against a track will open a special tool — Track Player — and playback will launch.

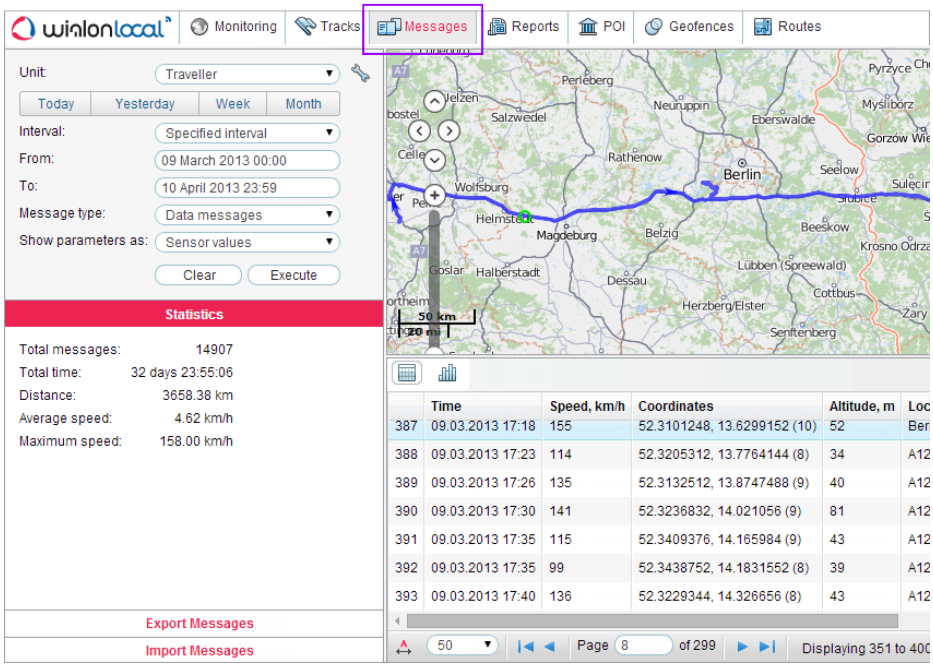
Furthermore, another special tool can be applied to a track — Hittest. It allows you to get the exhaustive information for any point of the track.

Messages

The Messages panel gives access to units database. Here you can view messages received from units (coordinates, parameters, speed, etc.) as well as SMS messages received from units, commands sent to units and events registered in units history. Besides, data messages can be exported to a number of formats.

To open the Messages panel, choose 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 parameters of your request;
- in the bottom left part there is statistics for current request or a panel to export/import messages;
- in the top right section there is the map;
- at the right bottom there are messages themselves.



Vertical sizes of the messages panel and the map are adjustable. To control them, click on the splitter between them and holding the mouse button, drag in a required direction.

There is a specially developed app to work with messages — Messages Manager.

Working with Messages

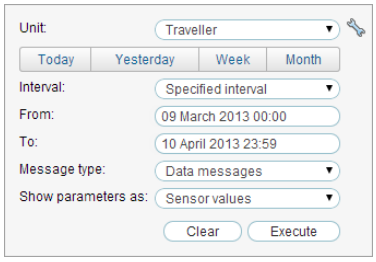
Working with messages is query messages, view and filter them, and delete them.

Request Messages from Server

The request is formulated in the Messages, in top left corner of the window. You specify the following parameters:

1. Select a unit messages of which you would like to work with. The dropdown list contains not all the units available to you, but only the units from the work list of monitoring panel. 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 the corresponding rights will be displayed. Spanner shaped button situated to the right of the dropdown list serves to summon up a Unit Properties dialog.

2. Specify time interval to show messages for. The principle of interval adjustment is the same as in reports (see Query and View Reports). The second and fourth steps can be united into one if you choose one of the 'quick intervals' (the buttons *Today*, *Yesterday*, *Week*, and *Month*).



3. Select 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. A table will be generated in the right part of the window. To clear table (and map), press **Clear**.

Note.

There are alternative ways to query messages:

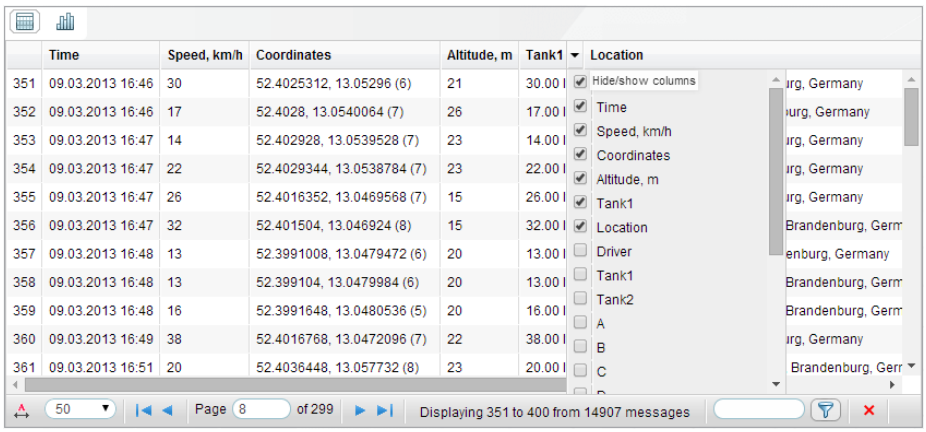
- from the Monitoring panel;
- from a table or chart of an online report.

Note, that in order *messages track* to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

Viewing Messages

Messages of any type are displayed in the form of a table.

If a large time interval is selected, there will be probably many messages. In this case they will be presented in several pages. Use navigation panel (blue arrows) to move through the pages, or enter page number manually and press <enter> to display certain page. Apart from that, you can set the number of messages to be displayed on one page: 25, 50, 100, 500, 1000.



The width of the columns is also customizable. To change it, drag column edge with the mouse in the required direction. To reset columns width, push **Set column auto width** button in such a way that *A* letter appeared there . In this case, column width will be set according to contents in the cells. To save columns width when moving to other page of messages, make the button inactive . Note that if loading many messages (500, 1000 per page), it is better to disable column auto width because it can considerably slow down the loading process especially if the number of parameters differs from one message to another.

Table's content is adjustable. It is possible to hide and show back any column. To choose columns to be displayed, place the cursor over table's header. Near each column name there is a button to show the dropdown list where you can choose what to display. Note that all 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).

Messages Filter

To quickly find a necessary message or filter found messages by a parameter, use a special filter. If applied to data messages (with parameters shown as raw data), the filter involves parameter names, in SMS messages and registered events – message/event text, in sent commands – additional parameters values, for log – description of the action. The filter is disabled for data messages with parameters shown as sensor values.

Details instructions for filter usage were given above. You can use wildcard characters (* or ?) or input your query without them. For example, to find all messages with images input “image”. Other available parameters depend on device type used.

To apply the filter, press <enter> or the Apply button on the right of the filer. At that, messages corresponding to your query will be displayed. To remove filtration and show all available messages again, clear filter text field and apply the filter again. If the filter is applies, the number of found (filtered) messages is displayed on the left.

Attention!
The filter affects only the current page. However, while leafing through pages, the filter is applied to each new page automatically.

Deleting Messages

Deleting a message can be applied when you think the message is invalid and can badly affect reports, tracks, etc. Deleting messages is available only if you have enough access to the unit.

In the last column of the table, tick messages to be deleted (one or more). Then press the Delete button and confirm your intentions. If the checkbox at the head of the table is ticked, all messages on the current page will be selected.

After the operation, the newly deleted messages still remain on the table, however, the delete checkbox for such messages is dimmed which indicates that the messages are deleted. Next time when you load messages, the deleted messages will be completely removed from the table.

Note:
Deleting last incoming message or last message with position (valid coordinates) is impossible. That is why the delete

checkbox for these messages is always dimmed.

Data Messages

If you request data messages, the table of messages will contain information about time, speed, coordinates, location, as well as parameters. Besides, resultant information will be given in statistics. You can observe messages in in the form of a table or as a chart.

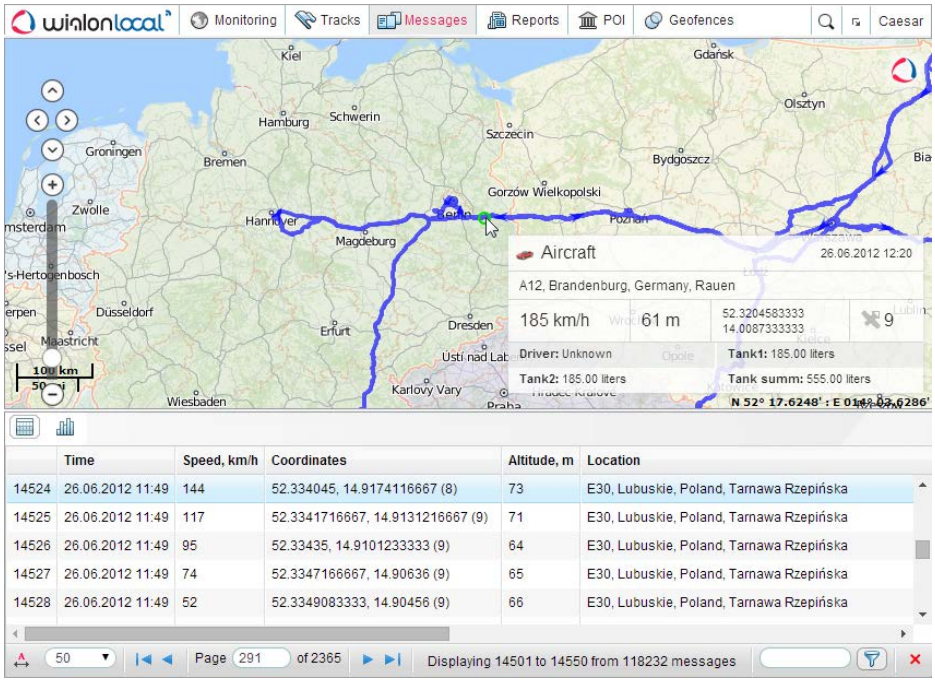
The way to display parameters can be one of the following:

- **Raw data** – all parameters are displayed in one column, in one line in their initial form.
- **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** when the message was received.
- **Speed** registered at that point. It is calculated as the distance traveled between the previous message and the current one divided on time between these two messages (in km/h or mph depending on unit's properties).
- **Coordinates**: latitude and longitude, in the brackets the number of satellites locked is displayed.
- **Altitude**: elevation over sea level. If there are only zeros, it may mean your device does not detect altitude (in meters or feet depending on unit's properties).
- **Location**: country, city, street, etc. (according to user's settings).
- **Parameters** (if available) can be given in one row (if *raw data* is selected) or separate column for each parameter (if *sensors values* is selected). You can filter messages by parameters.
- **Image** (if available): the button to display a picture made by unit and sent with the message.
- **Delete** (if allowed): checkboxes to delete messages.

Red rows in the table mean alarm messages registered by the system.



Note.
Measurement system (either metric or U.S.) used to display speed, altitude as well as statistic information depends on unit's properties.

Statistics

In the **Statistics** section the general information about the request is given:

- **Total messages**: the number of messages for the whole period;
- **Total time**: the interval between the first and the last message in the selected period;
- **Distance**: the distance traveled by the unit within the indicated time interval (calculated by coordinates, mileage counter does not affect this value);
- **Average speed**: the average of all speed values registered during the period;
- **Maximum speed**: the maximum speed registered.

Using the Map

The track for the chosen period is displayed on the map. It is generated together with the table. Click on any message in the table to move to this point on the map. The map is centered on this point and a blue marker is set there.

By default, track color is blue, but you can adjust settings to paint the track depending on speed or sensor value. This is set in unit properties dialog on the Advanced tab.

Besides, to get information about track points, hover mouse cursor over and see information in a tooltip (time, address, speed, altitude, coordinates, satellites, sensor values). Note that messages are searched in the radius of 50 pixels from the cursor.

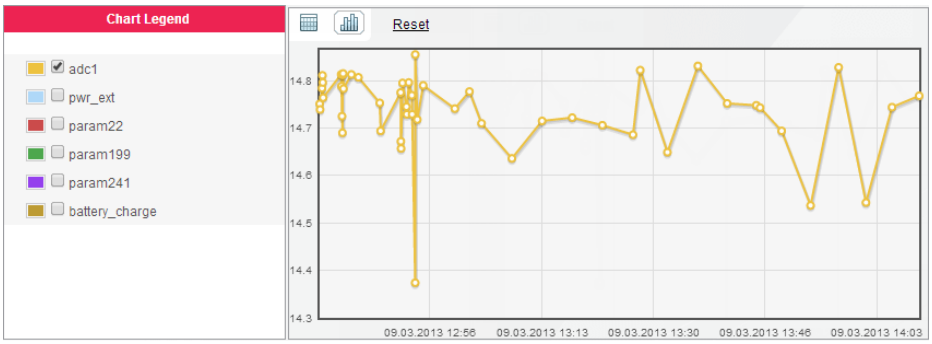
Note:
If after the Messages panel you switch to Map or Reports panel, map layout and all track lines are preserved. To remove unnecessary graphics, go back to the Messages panel and press the **Clear** button. More...

Charts

Besides tables, some data can be presented in the graphical form. To switch between the modes, use and buttons correspondingly.

In the graphical mode, parameters charts are available. When you switch to the graphical mode, the **Chart legend** panel opens on the left. There you tick parameters to be displayed in the chart. Several parameters can be selected simultaneously. Then the chart will contain several curves. For your convenience they will by drawn with different colors.

The chart can be zoomed with the help of a mouse. Select the necessary section holding the left mouse button. Place the mouse pointer over a point to get the precise value at the point in a tooltip.



SMS Messages

SMS messages can be sent by unit while executing a command, generating an alarm or in other cases, which depend on device type. A table generated for this request will consist of three columns: time when message was received, message text, and SIM card number embedded into unit. Messages can be filtered by text.

	Time	Text	Phone	
1	08:11:04	SIGNAL,0002,28/09/11,06:11:01,5353.6443,N,02738.6399,E,80.0km,0.0,A,010000	+375000000000	
2	08:12:04	PC,0002,28/09/11,06:12:01,5354.2013,N,02738.1792,E,46.0km,336.5,A,010000	+375000000000	
3	08:13:04	PC,0002,28/09/11,06:13:01,5354.4164,N,02737.8881,E,1.0km,323.9,A,010000	+375000000000	
4	08:14:02	SIGNAL,0002,28/09/11,06:13:59,5354.4342,N,02736.7896,E,18.0km,274.1,A,010000	+375000000000	
5	08:15:03	PC,0002,28/09/11,06:15:00,5354.8711,N,02736.2582,E,20.0km,326.9,A,010000	+375000000000	
6	08:16:03	PC,0002,28/09/11,06:16:00,5354.6567,N,02735.7368,E,70.0km,237.6,A,010000	+375000000000	
7	08:17:03	PC,0002,28/09/11,06:17:00,5354.3469,N,02735.4559,E,80.0km,210.6,A,010000	+375000000000	

Sent Commands

Commands sent to the unit by user(s) are displayed for this request. There is a special button in the monitoring panel to send commands to units. The resulting table includes:

- **Time**: time when the command was sent to the unit.
- **User**: 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**: command name as it is written in unit properties.
- **Command type**: command type (see the list).
- **Parameter**: for those commands that require additional parameters (like message to driver, input activation/deactivation, report period, custom message, etc.).
- **Execution time**: time when the command was executed. If execution failed due to billing limitations (e.g., you ran out of SMS messages), this cell will contain only dashes.
- **Channel**: channel type used to transmit the command (*TCP*, *UDP*, *Virtual*, *SMS*).

	Time	User	Command name	Command type	Parameters	Execution time	Channel	
1	2012-08-02 18:13:07	wialon	45645646	Query position		2012-08-02 18:13:08	SMS	
2	2012-08-02 18:18:33	wialon	Engine on	Unblock engine		2012-08-02 18:18:34	TCP	
3	2012-08-02 18:20:20	wialon	Message 1	Send custom message	yahoo!	2012-08-02 18:20:20	Virtual	
4	2012-08-02 18:23:12	user	Where	Query position		2012-08-02 18:23:13	SMS	
5	2012-08-02 18:23:17	user	Where	Query position		2012-08-02 18:23:18	SMS	
6	2012-08-02 18:23:25	wialon	Fridge yes	Activate output	6	2012-08-02 18:23:25	SMS	
7	2012-08-02 18:24:31	wialon	Message 1	Send custom message	hello!	2012-08-02 18:24:31	Virtual	
8	2012-08-02 18:25:34	wialon	Where	Query position		2012-08-02 18:25:35	SMS	

Registered Events

Different types of events can be registered in 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:

- time when the event was detected (automatic registration) or registered (manually by user);
- 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 notification text or from description entered while registering manually.

	Time	Type	Event text
1	2010-04-26 09:47:00	Event	Königstor, Kassel, DE
2	2010-04-26 09:51:00	Event	Werner-von-Siemens-Straße, Baunatal, DE
3	2010-04-26 09:52:00	Event	Wilhelmsplatz
4	2010-04-26 09:54:00	Event	Fuel filling of 50 gal to the amount of 22 dinars was made near Gut Kragenhof, Kassel, DE.
5	2010-04-26 09:59:00	Violation	Service term is 1 mile expired.
6	2010-04-26 10:03:00	Event	Maintenance term is 1 km expired.
7	2010-04-26 10:06:00	Event	Speeding detected. The unit is moving 100 mph.
8	2010-04-26 10:07:00	Filling	Fuel filling of 40 lt to the amount of 13 was made near Gallierstraße, Bonn, DE.
9	2010-04-26 10:09:00	Event	Connection loss detected from 2010.04.26 10:10.

Unit Log

Any manipulations with unit properties or its database are logged in the system automatically. In addition, records can be added to unit log manually – through event registrar. To see unit log or add messages to it, you should have not only *Query reports or messages* access but also *Manage log*.

Any changes in Unit Properties dialog are logged as well as import, export, and removal of messages, assignment or reset of a driver and others.

Unit log contains the following information:

- **Time** – date and time when the change was done (saved).
- **User** – name of the user who did it.
- **Action** – description of the change performed. Messages can be filtered by text in this description.
- **Host** – the address of the computer from which the user did the change or it can be 'job' or 'notification' if the action was automatic.
- **Delete** – buttons to delete records.

	Time	User	Action	Host	
1	10:21:31	user	Messages imported	10.1.3.11	
2	11:59:57	user	Access rights for user 'Duremar' changed	10.1.3.11	
3	12:00:40	user	Command modified	10.1.3.11	
4	12:03:32	user	Access rights for user 'Duremar' changed	10.1.3.11	
5	12:03:50	Duremar	Mileage counter changed from 888 km to 32489 km	notification	
6	12:03:56	Duremar	Mileage counter changed from 32489 km to 32489 km	notification	
7	15:08:00	user	Messages exported	10.1.3.11	
8	15:13:02	user	Deleted SMS message dated 10:38:17	10.1.3.11	
9	15:13:16	user	Deleted data message dated 10:38:11	10.1.3.11	
10	15:13:29	user	Deleted command message dated 12:03:45	10.1.3.11	

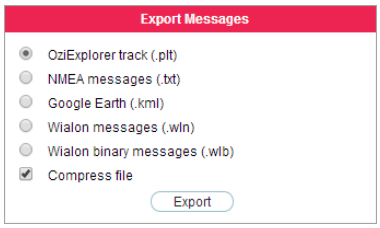
Unit log is also presented as a report.

Export/Import Messages

Messages can be imported and exported. It concerns only messages of the first type that is data messages.

Attention!
Size limit for an imported file/archive is 64 MB, which, in case of archive, is approximately 3.5 million messages.

Export

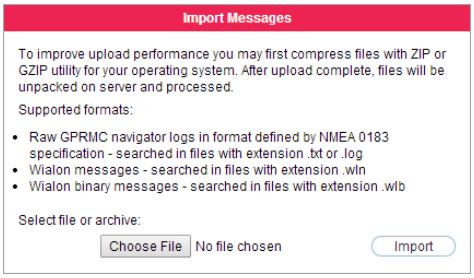


Open the Export Messages tab in the left section of the window. Select destination format and push *Export*. Depending on your browser configuration settings, you will be offered to open or save the file. The resulting file can be compressed. For this, leave the flag *Compress file*.

The supported formats are:

- OziExplorer track(.plt): Ozi Explorer format that stores track as a list of coordinates of track's points.
- NMEA messages (.txt): National Marine Electronics Association text file, communications protocol used in sea navigation equipment.
  Attention! Parameters (sensors) are not stored when exporting to this format.
- Google Earth (.kml): an XML-based format used in Google Earth to transmit three-dimensional geospatial data.
- Wialon messages (.wln): a format to be used with Wialon software.
- Wialon binary messages (.wlb): a binary format to be used with Wialon software.

Import



Select the Import Messages tab in the left section of the window.

The supported formats are:

- Raw GPRMC navigator logs in format defined by NMEA 0183 specification – searched in files with extension .txt or .log.
- Rainbow Skipper messages from MMC card – searched in files with extension .gps.
- Wialon messages – searched in files with extension .wln.
- Wialon binary messages – searched in files with extension .wlb.

Push *Browse* to define a file (or an archive) to import messages from and push the *Import* button.

Hint.
To simplify and accelerate the process, you may first compress files with ZIP or GZIP. When uploading process is completed, files will be unpacked and processed on the server.

Reports

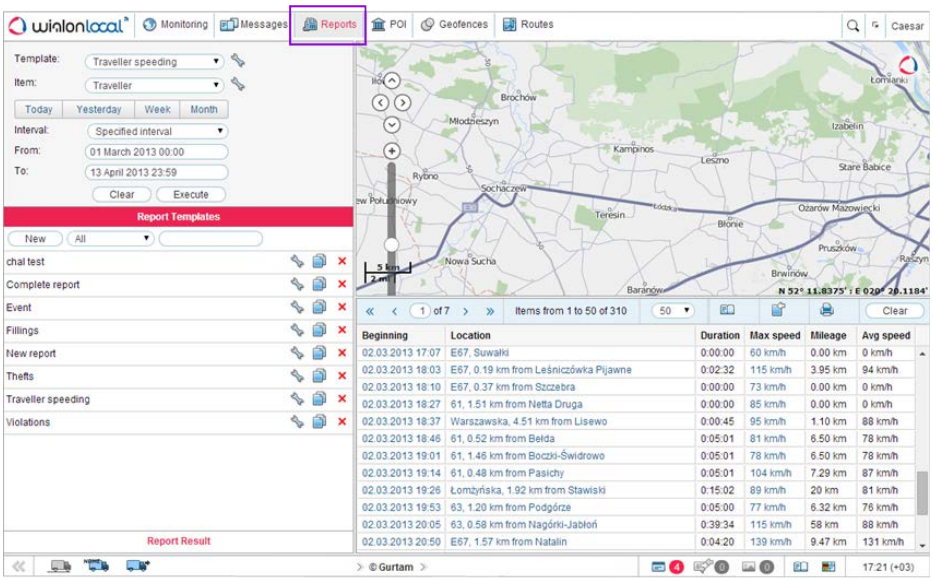
Attention!
This module is licensed separately.

Wialon Local allows building various kinds of reports on units, users, resources, retranslators, routes, drivers, trailers as well as groups of units, drivers, or trailers.

However, corresponding modules are required to query reports about all those items. For instance, reports on unit groups come as a part of the Advanced Reports module. To see reports on routes (rounds), the Route Control module is required, etc. In addition, the set of available tables, charts, filters, columns, etc. depends on purchased modules and activated services.

Reports on activity of a unit (included in the Basic Reports module) can be presented as tables or charts. Here you can create report templates, generate reports and view them right in the browser or export them to the files of various formats like PDF, XML, XLS (Excel), HTML, CSV.

To open the Reports panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer.



The Reports panel window can be divided into four sections:

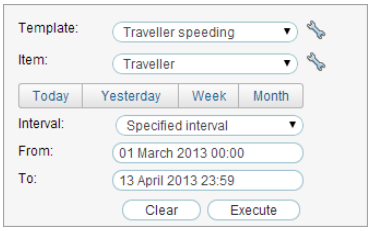
- In the top left-hand corner, the basic parameters to generate a report are adjusted.
- In the bottom left-hand corner, you create and store your report templates. After an online report is generated, this section changes for the navigation bar.
- In the top right-hand section, there is the map.
- In the bottom right-hand section, you see the report itself if it has been generated online. A report appears in the form of tables and charts.

The sizes of the sections are changeable. Click on the horizontal or vertical slider and holding the left mouse button drag it up/down or left/right.

Query and View Reports

To generate a report, set the following parameters:

Report template



The last created or edited report template is chosen in the dropdown list by default. Choose any other template from the dropdown list if necessary. On the right of the selected template, there is a button to display template properties for viewing and editing.

If no templates are available, it is impossible to generate a report. How to create a report template...

Item

Choose a system object to apply the report to. Depending on the template selected above, you will be offered to choose unit, unit group, user, driver, route, retranslator, or resource. As in case of templates, on the right of the selected object there is a button to check object's properties. Usually, all objects of the appropriate type and enough access (*Query messages or reports* is required) are displayed in this dropdown list. However, in case with units, *not all* units are displayed in this dropdown list but only those which are in the work list of the Monitoring panel at the moment. 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 the corresponding rights will be displayed.

Interval type

Use buttons **Today**, **Yesterday**, **Week**, **Month** for quick report generation for the most frequently wanted intervals. What concerns the last two, you will get a report for *previous* week or month (that is last full week or month), and week starts on Monday. Note that if you press one of those four quick buttons, the report launches immediately (no need to press 'Execute').

Otherwise, you can select other types of intervals to specify the reporting period more accurately. Three ways to specify the interval are possible here:

- **Specified interval**: specify date and time (to minutes) of the interval beginning and end.
- **Starts 'From' until today**: specify the beginning only, and the and will be set automatically as the current date and time.
- **For previous** [select the number] hours/days/weeks/months/years. The current day (week, etc.) can be included to the interval or not depending on the state of *Include current* checkbox.

When report parameters are adjusted, press the **Execute** button below.

Note.

There are alternative ways to receive reports in the tracking system:

1. getting reports by e-mail at specified time (adjusted through jobs);
2. getting a report when an event happens (adjusted through notifications);
3. quick report generation from the Monitoring panel (see Monitoring => Icons Explanation).

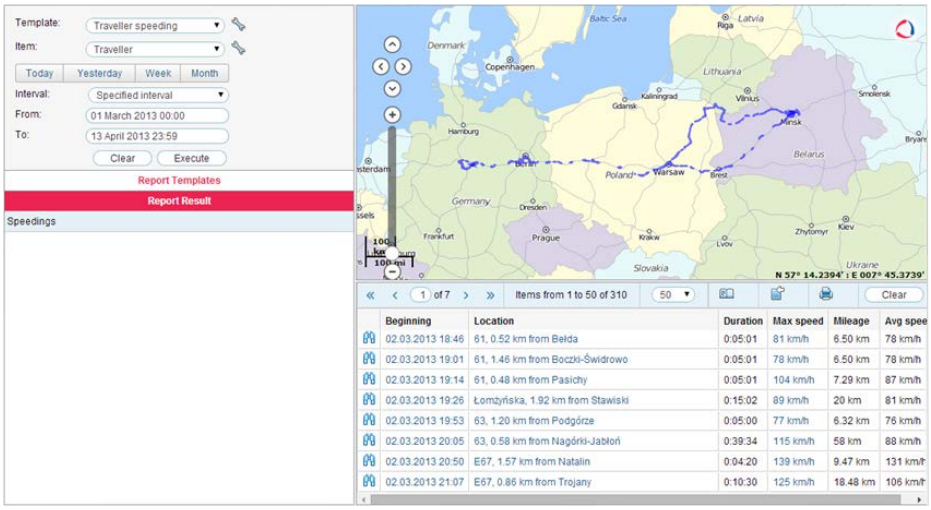
Note, that in order *units' track* to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

Online Report

To generate a report online, adjust the parameters described above and push the **Execute** button. If no tables or charts appear on the right, it means there is no data about the selected object for the selected period or poor report content is selected in the template.

After executing a report, the Report Templates panel changes to **Report Results** that displays report contents and provides navigation through the report. Usually, a report contains several pages. To switch between them, use navigation links in the Report Results panel. The name of the active page is bold and highlighted with a light blue background.

The information in reports can be presented in the form of tables or charts. Some information can be visualized on the map, for example, tracks and markers.



If the text in a cell is blue, it means that there are coordinates for this point. Click on such a cell to move to that place on the map.

To adjust the number of rows to be displayed on one page, choose the number in the dropdown menu: 25, 50, 100, 200, 500. To navigate between the pages, use the blue buttons in the toolkit:

› go to the next page,
‹ go to the previous page,
« go to the first page,
» go to the last page.

The page number can be entered manually. After entering a number, push <enter> on the keyboard to go to the required page.

To delete an online report, push **Clear**. The map and the report itself will be cleaned, and the Report Result panel will be replaced by Report Templates again. However, you can switch between these two panels manually. To do this, just click on the header of the corresponding panel.

Other buttons located in the toolkit allow to:

— transfer to messages;
— quick export to PDF (landscape orientation, A4 format, and fixed page width is a default setting for PDF file);
— quick export to Excel;
— export report to a file;
— print report.

Transfer from tabular report to messages

The tracking system allows transferring to messages straight from a tabular online report. It can be useful for analysis

of unit data messages.

To move from table to messages, it is necessary to press the 'Transfer to messages' button in the toolkit. After pressing it, text in some time cells becomes purple and works as a link. By clicking on the link transfer to messages is performed. Depending on the table type columns with time indication can vary, for instance, 'Time', 'Beginning', 'End', etc.

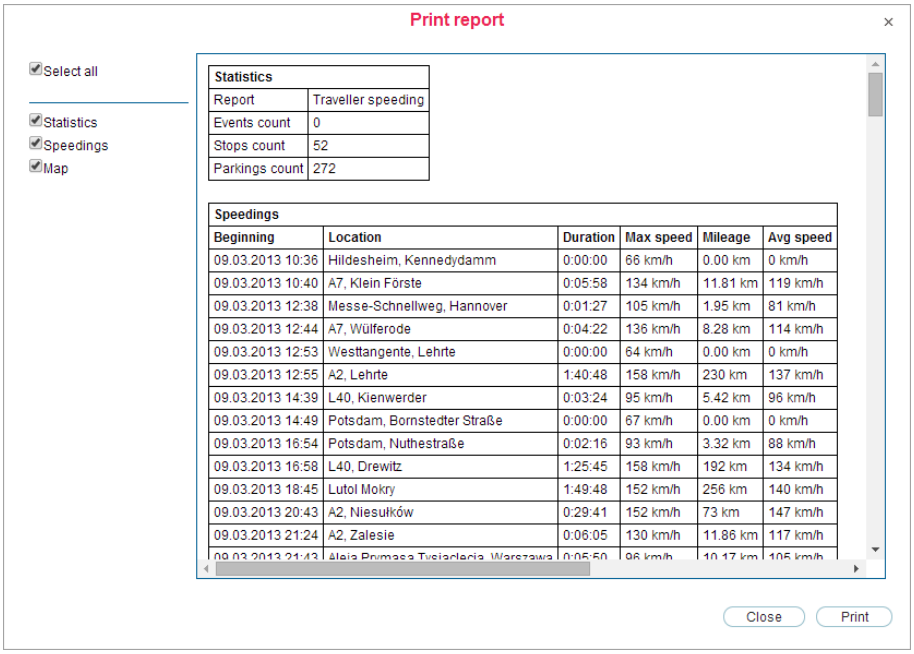
Messages are loaded for the whole report period, at that a page with selected message is opened first. The line with this message is highlighted in grey. The map is centered in regard to the selected message which is indicated with a red marker.

By default, the transfer button is released. When switching from table to chart it is restored to default state, in spite of the fact that it could be pressed before in one of report tables.

Print Report

After generating an online report, it can be printed without saving it to the disk. To do this, press the **Print** button that becomes accessible only when there is a report in 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 of them that you are going to print. On the right, you can preview all these tables, charts, map, etc. To start printing, press *Print*. To exit, press *Close*.



Statistics	
Report	Traveller speeding
Events count	0
Stops count	52
Parkings count	272

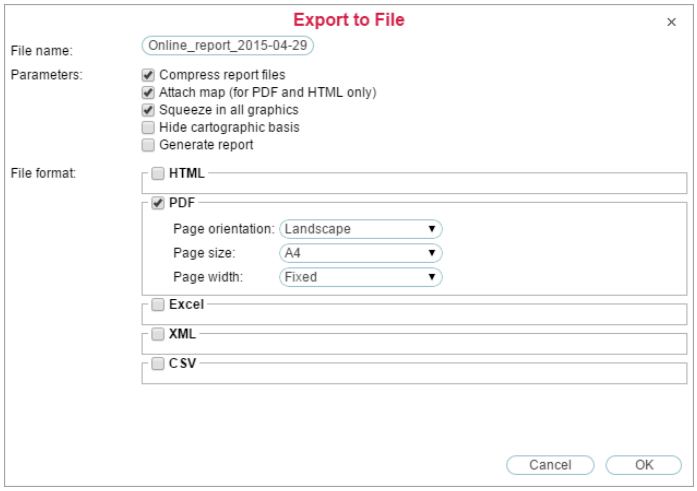
Speedings					
Beginning	Location	Duration	Max speed	Mileage	Avg speed
09.03.2013 10:36	Hildesheim, Kennedydamm	0:00:00	66 km/h	0.00 km	0 km/h
09.03.2013 10:40	A7, Klein Förste	0:05:58	134 km/h	11.81 km	119 km/h
09.03.2013 12:38	Messe-Schnellweg, Hannover	0:01:27	105 km/h	1.95 km	81 km/h
09.03.2013 12:44	A7, Wülferode	0:04:22	136 km/h	8.28 km	114 km/h
09.03.2013 12:53	Westtangente, Lehrte	0:00:00	64 km/h	0.00 km	0 km/h
09.03.2013 12:55	A2, Lehrte	1:40:48	158 km/h	230 km	137 km/h
09.03.2013 14:39	L40, Kienwerder	0:03:24	95 km/h	5.42 km	96 km/h
09.03.2013 14:49	Potsdam, Bornstedter Straße	0:00:00	67 km/h	0.00 km	0 km/h
09.03.2013 16:54	Potsdam, Nuthestraße	0:02:16	93 km/h	3.32 km	88 km/h
09.03.2013 16:58	L40, Drewitz	1:25:45	158 km/h	192 km	134 km/h
09.03.2013 18:45	Lutol Mokry	1:49:48	152 km/h	256 km	140 km/h
09.03.2013 20:43	A2, Niesułków	0:29:41	152 km/h	73 km	147 km/h
09.03.2013 21:24	A2, Zalesie	0:06:05	130 km/h	11.86 km	117 km/h
09.03.2013 21:43	Aleja Prymasa Tysiąclecia, Warszawa	0:05:50	96 km/h	10.17 km	105 km/h

Note.
In Internet Explorer 10, maps and charts cannot be printed if the option 'Enhanced Protected Mode' is on.

Export Report to File

To get a report in the form of a file that is suitable to save on disk, print or send by e-mail, push the 'Export to file' button .

Choose desirable file format or several formats at once and specify parameters. Supported formats are HTML, PDF, Excel, XML, CSV.



Reports in the form of files can be regularly sent to your e-mail automatically – through jobs and notifications.

Export Parameters

Give the file any name. This is optional and if left empty, a file will be given a default name (like 'Online_report').

Specify whether to apply compression to file or not – 'Compress report files' option. Compression is mandatory for HTML and CSV file as well as for cases when more than one format is selected.

Indicate the corresponding flag if it is necessary to attach map to the exported report. It can be done only for HTML or PDF files. Note that the map will be attached to the file only if any graphical elements (as tracks, markers, geofences, etc.) are chosen in the report template. By default the map is scaled in order track/markers/last unit position to be seen on it. If these elements are not shown on map (not chosen in report template), then the map will not be attached. If the 'Squeeze in all graphics' flag is chosen, then the map is scaled in such a way that POIs and geofences to be shown on map along with the above mentioned elements. Gurtam Maps or WebGIS (depending on your system configuration) can be attached to the exported files. Furthermore, the map layer can be hidden ('Hide cartographic basis' option) so that tracks and markers will be shown on the blank background.

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.

At the end, press OK. Depending on browser settings, you will be offered to open file or save it.

Report Formats

HTML

Your report will be generated as Internet page and will open in any browser.

PDF

PDF is a widespread format suitable for electronic usage as well as for printing. To view these files Adobe Acrobat Reader is used (for Windows OS only).

You can additionally adjust such page parameters as orientation (landscape or portrait) and page size (A4 or A3). If a table in the report contains many columns, page width option can be also useful. The standard page width is *fixed* which means it depends on selected page format and orientation. However, if a table is too wide and does not match the fixed page width, this table will not be exported (only the heading will be displayed). In such cases, you can select *automatic* page width, which means it will correspond to the largest row in the table. If *Auto, compact* is selected, cell with is equal to the length of the largest word in it. If *Auto, no wrap* is selected, cell with is equal to the largest phrase in it (no line breaks are applied). Note that if automatic page width is selected, page format and orientation become relative — they define only page height.

Excel

Your report will be presented as Microsoft Excel electronic table (*.xlsx* file).

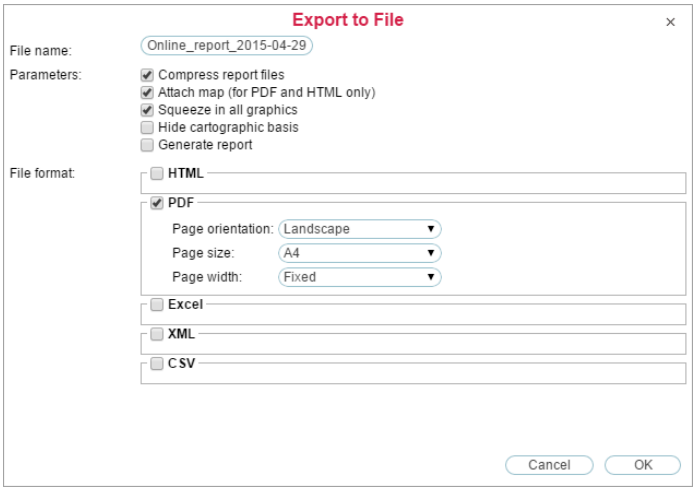
Note.
When exporting PDF, HTML, Excel the **alignment** is used. The columns containing text (names of sensors, geofences, drivers, users, SMS and notification text, location addresses, etc.) are aligned left. The columns containing numeric data (time, duration, speed, mileage, fuel, payments, count, etc.) are aligned right.

XML

XML is a textual data format that is notable for structured data storage and useful for data exchange between programs.

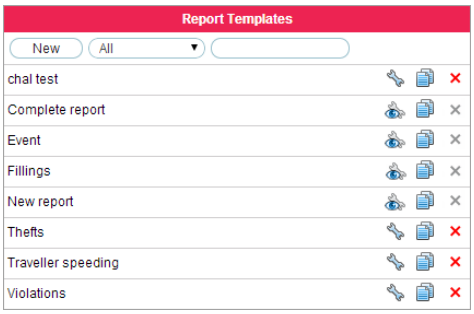
CSV

CSV is a textual data format used for the digital storage of data structured in a table of lists form, where each row in the file corresponds to a row of a table, and the columns are separated from each other by a special delimiter. You can additionally set coding (utf8, cp1251) and delimiter (comma or semicolon).



Report Templates

The list of all templates available is located in the bottom left-hand corner of the window under the header **Report Templates**. Here you can create, edit and delete templates for reports, as well as copy them and move them from one account to another.



Templates contain information upon which tables and charts to be included in the resulting report, what kind of content to be presented in tables, sequence order of columns in tables and sections in the report, which graphical elements to be rendered on the map, and many other parameters which define the look of the resulting report.

In the tooltip, you see the name of the resource which holds this template (if you have access to more than one resource). If clicking on a template, it becomes selected in the *Template* field of report generation parameters.

When searching for a template on the list, it is convenient to use the dynamic filter. Enter template name or its part into the search text box and observe the results. Additional search parameters are set in the dropdown list where you can choose the 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 this one as a basis;
- — delete a template (if the button is dimmed, you have not enough rights).

Note.
If a template belongs to some resource to which you do not have access rights to *Create, edit, and delete report templates*, then you will not be able to edit or delete this template.

Creating Report Template

To make manipulations with reports templates, you should have at least one resource with the access right *Create, edit, and delete report templates*.

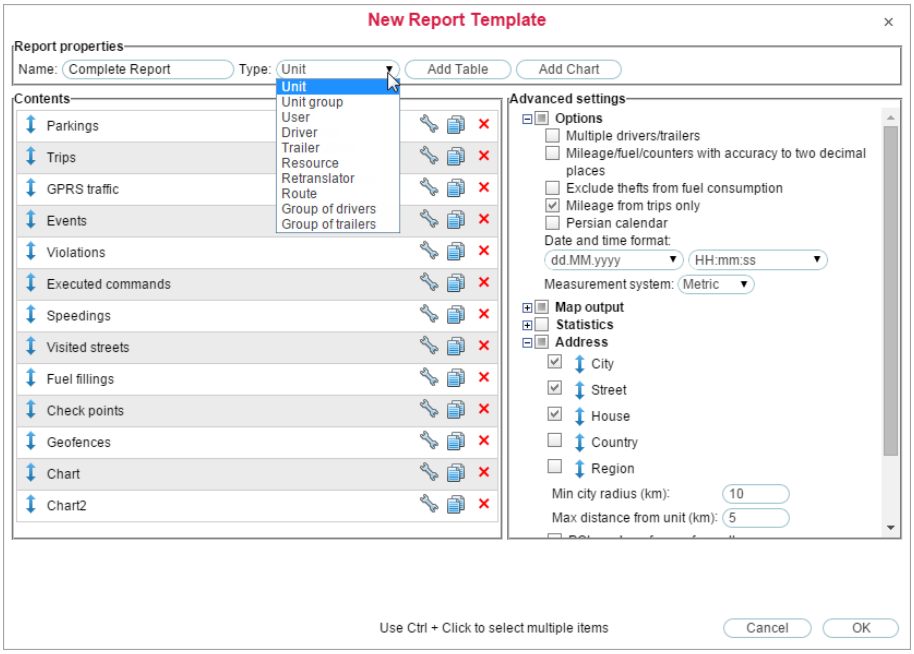
To create a new report template, press the **New** button. In the dialog enter a **name** for the template and choose its **type**:

- *Unit* — such template can be applied to separate units;
- *Unit group* — such template will be used to gather information about several units at once (see unit group);
- *User* — such template can be used to analyze users' activity in the system;
- *Driver* — such template can be used to analyze drivers' work;
- *Trailer* — such template can be used to analyze the usage of a trailer;
- *Resource* — such template is used to analyze how resource contents change;
- *Retranslator* — such template is used to analyze the work of retranslators;
- *Route* — such template can be used to analyze units' performance on routes;
- *Group of drivers* — such template can be used to analyze the work of several drivers (simultaneously);
- *Group of trailers* — such template can be used to analyze the usage of several trailers (simultaneously).

It is not recommended to change template type when editing a previously created template because all template contents will be lost with this action.

Add tables and charts to your template, choose items for statistics, adjust map output, and decide upon other parameters of the report. All added contents will be displayed at the left of the dialog.

Attention!
The set of report types as well as the set of tables and charts available for each type depends on your services and modules.



In the left part of the dialog, you can set the sequence order of the pages and give them custom names if needed. To change section name, click on it and enter any text. To manage template contents, use the following buttons:

— drag up/down,
— edit a table/chart,
— make a copy of a table/chart,
— delete page.

Note.

No matter where you place a chart, in the resulting report all charts follow after all tables, and the Statistics section goes first.

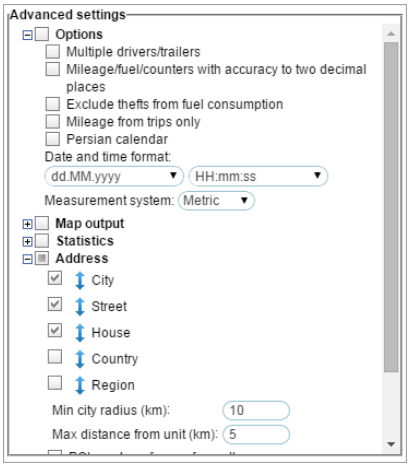
Advanced Settings

The right part of the Reports Template dialog contains advanced settings. They are divided into four sections:

- Options
- Map output
- Statistics
- Address

Depending on template type, all or just several of these sections may be displayed.

Options



Multiple drivers/trailers option usage makes sense if a table containing such columns as 'Driver' or 'Trailer' is added to the report template. 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 of them will be 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. By default, mileage less than 20 and fuel less than 50 is displayed with accuracy to hundredths, and larger values are given as integers (if the value is rounded to 0, the result is printed as 0.00). Counter sensors of any values are by default displayed as integers, too. However, if you consider it is necessary, mileage, fuel, and counters can be shown with accuracy to two decimals (other decimal places are simply cut). 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 can be chosen if you want to ignore thefts when calculating fuel consumption in different tables and statistics. Normally, thefts are considered as a part of fuel consumption. That is, if the option is enabled, columns like *Consumed by FLS* and *Average consumption by FLS* are calculated without considering fuel thefts.

Mileage from trips only is an option that affects mileage calculation. Mileage can be calculated either by all messages or by messages in trips (considering trip detector).

Persian calendar and **Date and time format** options are applied to cells of the resulting report where time is shown. These options are adjusted in the same way as in the User Settings dialog.

Measurement system option defines the metrics for such parameters as mileage, speed, and fuel in reports.

Note.
If you check/uncheck this box for a report template where the intervals filtration is applied,

Depending on the chosen measurement system in a report template for which the intervals filtration has been applied you should consider that the values of filtration parameters will not be converted to the corresponding values of the other measurement system automatically. Nonetheless, the metrics will be changed to the corresponding metrics of the chosen system. For example, if you have 50 kilometers mileage and 100 kilometers per hour speed, after choosing the american measurement system you will receive 50 miles mileage and 100 miles per hour speed.

One more option is provided for group reports — **Skip empty rows**. It is used to withdraw uninformative rows from the resulting table. For example, you create a report about fuel thefts, but not each and every unit in the selected group has thefts, so there can be a lot of empty rows in the table.

Address

Here you choose how address information is presented in the resulting report. Address information can be displayed in many reports: initial/final location in 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.

Addresses can be taken either from your main map (Gurtam Maps / WebGIS) or from your POIs and geofences.

Addresses from Gurtam Maps

You can select which address items to be displayed (country, region, city, street, and house are available) and specify their sequence order (for this, drag items up and down with blue arrows). If none of five address items is chosen, coordinates are displayed instead of addresses.

For addresses which fall out of city bounds (near or on roads), two settings are important:

- **Max distance from unit** says that if unit is located near a road and there is a city (i.e., city, town, village) within the indicated distance, then in the address you will have the road's name and distance to the city.
- **Min radius** says that if no city has been found within maximum distance from unit (the previous option), then the address is bound to another city. How big this city should be to form the address, you indicate here – minimum radius of a city. This can be used to eliminate small cities from addresses.

Note.
Addresses for reports can be taken only from Gurtam Maps (no Google, Yandex, or other services can be used). If you find inaccurate address information in the reports, updating the map of your region/city may help. For this, make a request to the technical support and enclose a new map in proper format.

Addresses from WebGIS

Address is searched in the radius of 1 km from the point where a message was received. If in this radius there is no available address information, then coordinates are displayed.

Addresses from POIs and Geofences

Sometimes Gurtam Maps or WebGIS may not contain addresses for some regions. In these cases, you can use geofences and POIs created in the appropriate panels as addresses. Besides, you can make use of this feature to customize some addresses, make them clearer.

Use POIs for addresses options allow to use POIs' names instead of usual addresses extracted from Gurtam Maps / WebGIS. If coordinates of unit location get into the radius of 100 meters from this POI (or other radius indicated in unit properties), the address will be takes from its name. If unit location gets into the radius of two or more places, the nearest is used. If both options (geofences and POI as addresses) are activated, the priority is given to POIs.

Use geofences for addresses options allow to use geofences' names instead of usual addresses. Those geofences require having the flag *Address source* in their properties. If coordinates of unit location get into such a geofence, its name will be used in address cell. If two different geofences overlay, the smallest is used.

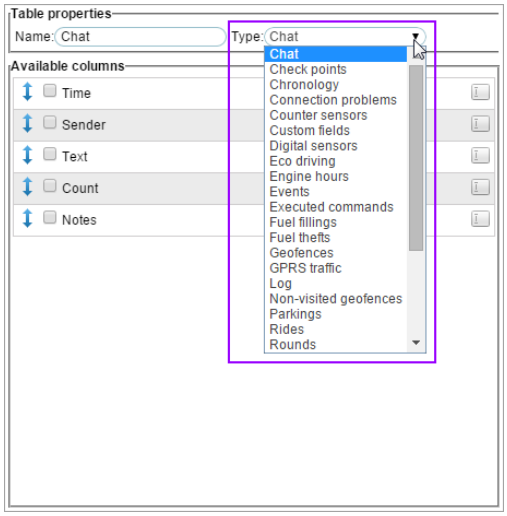
POIs and geofences from all resources option is useful if you choose to show POI and/or geofences as addresses. By default, only geofences and POIs that belong to the same resource as the reports template are used. However, if the given option is activated and user has access to geofences and POIs in several resources, all of them will be used.

Add POI/geofence description to address option is also useful if you choose to show POI and/or geofences as addresses. If you enable it, not only POI/geofence name will be displayed in the address but also the description text from their properties.

If no POI or geofence are found in given location, the address from the map is displayed.

Tables

The following tables (for units and unit groups) can be added to a report:



- Table Parameters
- Intervals Filtration
- Chat History
- Check Points
- Chronology
- Connection Problems
- Counter Sensors
- Custom Fields
- Digital Sensors
- Eco Driving
- Engine Hours
- Events
- Executed Commands
- Fuel Fillings
- Fuel Thefts
- Geofences
- GPRS Traffic
- Logs
- Maintenance
- Non-visited Geofences
- Parkings
- Rides
- Rounds (for unit)
- Rounds (for route)
- Sensor Tracing
- SMS Messages (for unit)
- SMS Messages (for resource)
- Speeding
- Stops
- Summary
- Trips
- Unfinished Rides
- Utilization Cost
- 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 above mentioned tables to the template, click the **Add Table** button and choose a table from the list.

Each table type has its set of columns that can form this table. After you have chosen table type, the list of columns available is displayed below. Check the columns you would like to include in the resulting table. To select all columns at once, press <ctrl> on the keyboard and click on any checkbox. To make all columns unselected, repeat the same operation. This combination works also for reports where you choose geofences, events, etc.

You can rename columns, clicking on their names and editing 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 default column names, use the button **Restore default** (when it is gray, it means the current name is default).

Besides, you can apply to the columns any sequence order. Move them up and down dragging the button .

Several alternatives to standard reports are available as applications:

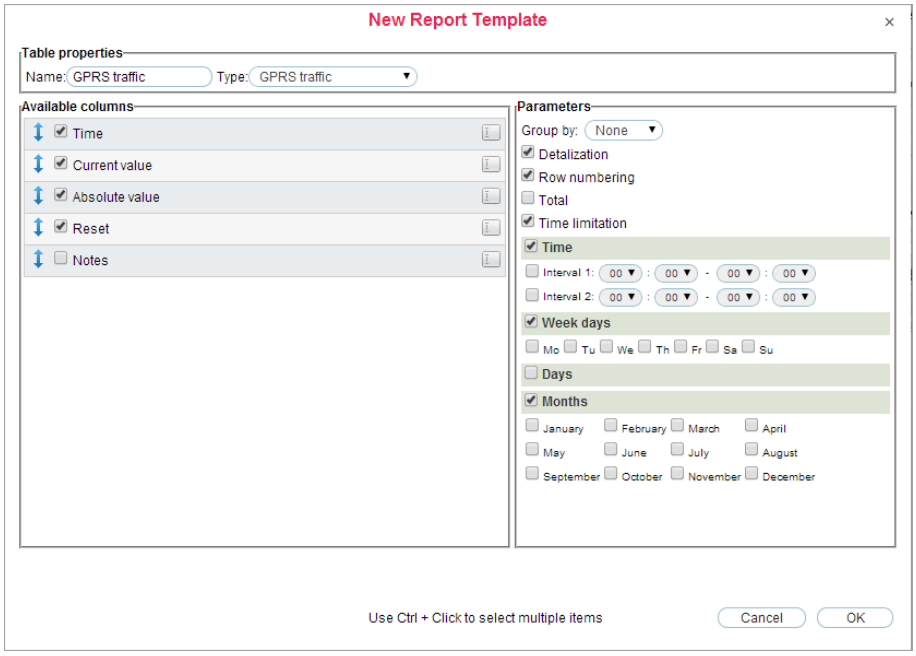
- iDriveSafe — assessment of driving behavior;
- Dashboard — graphic presentation of key performance indicators of your fleet;
- Driving Logbook — tax report determining actual use of the company car for private and/or business purposes (on the basis of Trips report).

Table Parameters

In the right part of the report template dialog, you can set additional parameters for the table such as:

- grouping,
- detalization,
- row numbering,
- total row,
- time limitation.

These parameters can be applied to any kind of table.



Grouping

Data given in the table can be grouped by time intervals such as days, weeks and months. By default, the grouping is off. It means the data is given in the detailed view that is each row of the table represents a separate event (such as fuel filling, violation, parking, SMS, etc. depending on table type selected), and these rows are arranged in the chronological order.

If any grouping interval is set, then each row in the table will correspond to an interval (day, week, or month). An additional column named **Date**, **Week**, or **Month** will be added as the first column of the table. A week can begin either on Monday or Sunday, which depends on User Settings.

Below there are two examples. The first one is a detailed report on parkings from 1st to 4th of July 2012. No grouping is applied.

Beginning	End	Duration	Location
2012-07-01 17:15:10	2012-07-01 17:26:58	0:11:48	Via Imbarcadero, Brenzone
2012-07-01 17:39:24	2012-07-02 12:00:48	18:21:24	Via Dante Alighieri, Brenzone
2012-07-02 13:03:30	2012-07-02 21:22:08	8:18:38	Via Derna, Stafalo
2012-07-02 21:33:24	2012-07-02 22:42:54	1:09:30	Via Gardesana, Lazise
2012-07-02 23:10:58	2012-07-03 13:13:54	14:02:56	Via Dante Alighieri, Brenzone
2012-07-03 13:31:04	2012-07-03 17:17:00	3:45:56	Via Navene Vecchia, Malcesine
2012-07-03 17:36:44	2012-07-04 11:32:38	17:55:54	Via Dante Alighieri, Brenzone
2012-07-04 12:05:58	2012-07-04 12:50:54	0:44:56	Via Santa Cristina, Bardolino
2012-07-04 14:45:54	2012-07-04 15:11:50	0:25:56	Autostrada Torino-Piacenza, 4.41 km from Tortona
2012-07-04 17:23:20	2012-07-04 17:51:58	0:28:38	Autostrada dei Fiori, Riva Ligure (Grange)
2012-07-04 19:38:04	2012-07-05 23:56:40	1 days 4:18:36	Avenue du Docteur Raymond Picaud, Cannes

The second table represents parkings for the same unit and interval, but here the data is grouped by days.

Date	Beginning	End	Duration	Count
2012-07-01	17:15:10	2012-07-02 12:00:48	18:33:12	2
2012-07-02	13:03:30	2012-07-03 13:13:54	23:31:04	3
2012-07-03	13:31:04	2012-07-04 11:32:38	21:41:50	2
2012-07-04	12:05:58	2012-07-05 23:56:40	1 days 5:58:06	4

When using a grouping, all events that *began* in the analyzed interval are included in this interval, and when calculating event's duration *all* its duration is considered. That is why in the example above the total duration of parkings for the 4th of July is “1 days 5:58:06” that is larger than a day.

It is convenient to include the **Count** column in the table with a grouping. In this column, you get the count of events which happened within the current interval (day/week/month). In a detailed report, this column will contain only ones. At the same time, it is recommended to exclude such columns as **Location** when configuring a table with a grouping because events happen in different places. However, even if you have selected this column, note that the location for the first event in the interval will be displayed.

One more column can be useful for tables with groupping – **Total time**. The meaning of this column is similar to 'Duration' column but a bit different. 'Duration' shows the sum of intervals, for example, the sum of all trips detected. 'Total time' shows time from the beginning of the first interval to the end of the last, for example, time from the beginning of the first trip on a day to the end of the last trip on the same day (so, you can know real working shift).

Detalization

A table with a grouping applied can be supplemented with detalization that is also reasonable for the advanced reports. Then a plus-shaped button will be added at the beginning of each row. Press this plus to expand the hidden contents for a certain row. To expand an enclosed level of all rows at once, press the corresponding number in the header of the table.

For example, if there were four parkings detected at a day, in the grouped report the beginning of the first parking and the end of the last one will be indicated. But if you expand the hidden contents, you can get a detailed information for each of parkings in between. In the examples below you see the same report on parkings with grouping and detalization.

1 2	Date	Beginning	End	Duration	Location	Count
⊟	2012-07-01	17:15:10	2012-07-02 12:00:48	18:33:12	Via Imbarcadero, Brenzone	2
┊	-----	17:15:10	17:26:58	0:11:48	Via Imbarcadero, Brenzone	1
┊	-----	17:39:24	2012-07-02 12:00:48	18:21:24	Via Dante Alighieri, Brenzone	1
⊟	2012-07-02	13:03:30	2012-07-03 13:13:54	23:31:04	Via Derna, Stafalo	3
┊	-----	13:03:30	21:22:08	8:18:38	Via Derna, Stafalo	1
┊	-----	21:33:24	22:42:54	1:09:30	Via Gardesana, Lazise	1
┊	-----	23:10:58	2012-07-03 13:13:54	14:02:56	Via Dante Alighieri, Brenzone	1
⊟	2012-07-03	13:31:04	2012-07-04 11:32:38	21:41:50	Via Navene Vecchia, Malcesine	2
┊	-----	13:31:04	17:17:00	3:45:56	Via Navene Vecchia, Malcesine	1
┊	-----	17:36:44	2012-07-04 11:32:38	17:55:54	Via Dante Alighieri, Brenzone	1
⊟	2012-07-04	12:05:58	2012-07-05 23:56:40	1 days 5:58:06	Via Santa Cristina, Bardolino	4
┊	-----	12:05:58	12:50:54	0:44:56	Via Santa Cristina, Bardolino	1
┊	-----	14:45:54	15:11:50	0:25:56	Autostrada Torino-Piacenza, 4.41 km from Tortona	1
┊	-----	17:23:20	17:51:58	0:28:38	Autostrada dei Fiori, Riva Ligure (Grange)	1
┊	-----	19:38:04	2012-07-05 23:56:40	1 days 4:18:36	Avenue du Docteur Raymond Picaud, Cannes	1

Detalization can be applied only to grouped tables; it does not affect detailed tables.

Row Numbering

Row numeration can be added to any table type. To switch the numeration on, check **Row numeration** box in table advanced parameters. The numeration is added to the table as its first column.

№	Beginning	End	Duration	Location
1	2012-07-01 17:15:10	2012-07-01 17:26:58	0:11:48	Via Imbarcadero, Brenzone
2	2012-07-01 17:39:24	2012-07-02 12:00:48	18:21:24	Via Dante Alighieri, Brenzone
3	2012-07-02 13:03:30	2012-07-02 21:22:08	8:18:38	Via Derna, Stafalo
4	2012-07-02 21:33:24	2012-07-02 22:42:54	1:09:30	Via Gardesana, Lazise
5	2012-07-02 23:10:58	2012-07-03 13:13:54	14:02:56	Via Dante Alighieri, Brenzone
6	2012-07-03 13:31:04	2012-07-03 17:17:00	3:45:56	Via Navene Vecchia, Malcesine
7	2012-07-03 17:36:44	2012-07-04 11:32:38	17:55:54	Via Dante Alighieri, Brenzone
8	2012-07-04 12:05:58	2012-07-04 12:50:54	0:44:56	Via Santa Cristina, Bardolino
9	2012-07-04 14:45:54	2012-07-04 15:11:50	0:25:56	Autostrada Torino-Piacenza, 4.41 km from Tortona
10	2012-07-04 17:23:20	2012-07-04 17:51:58	0:28:38	Autostrada dei Fiori, Riva Ligure (Grange)
11	2012-07-04 19:38:04	2012-07-05 23:56:40	1 days 4:18:36	Avenue du Docteur Raymond Picaud, Cannes

When numeration and detalization meet together, you get two-level numeration. The first level is a usual numeration of

main rows with integer numbers. The second level is the numeration of nested rows as “main row number – dot – nested row number”.

1 2	№	Date	Beginning	End	Duration	Location	Count
⊟	1	2012-07-01	17:15:10	2012-07-02 12:00:48	18:33:12	Via Imbarcadero, Brenzone	2
├……	1.1	-----	17:15:10	17:26:58	0:11:48	Via Imbarcadero, Brenzone	1
└……	1.2	-----	17:39:24	2012-07-02 12:00:48	18:21:24	Via Dante Alighieri, Brenzone	1
⊟	2	2012-07-02	13:03:30	2012-07-03 13:13:54	23:31:04	Via Derna, Stafalo	3
├……	2.1	-----	13:03:30	21:22:08	8:18:38	Via Derna, Stafalo	1
├……	2.2	-----	21:33:24	22:42:54	1:09:30	Via Gardesana, Lazise	1
└……	2.3	-----	23:10:58	2012-07-03 13:13:54	14:02:56	Via Dante Alighieri, Brenzone	1
⊟	3	2012-07-03	13:31:04	2012-07-04 11:32:38	21:41:50	Via Navene Vecchia, Malcesine	2
├……	3.1	-----	13:31:04	17:17:00	3:45:56	Via Navene Vecchia, Malcesine	1
└……	3.2	-----	17:36:44	2012-07-04 11:32:38	17:55:54	Via Dante Alighieri, Brenzone	1
⊟	4	2012-07-04	12:05:58	2012-07-05 23:56:40	1 days 5:58:06	Via Santa Cristina, Bardolino	4
├……	4.1	-----	12:05:58	12:50:54	0:44:56	Via Santa Cristina, Bardolino	1
├……	4.2	-----	14:45:54	15:11:50	0:25:56	Autostrada Torino-Piacenza, 4.41 km from Tortona	1
├……	4.3	-----	17:23:20	17:51:58	0:28:38	Autostrada dei Fiori, Riva Ligure (Grange)	1
└……	4.4	-----	19:38:04	2012-07-05 23:56:40	1 days 4:18:36	Avenue du Docteur Raymond Picaud, Cannes	1

Total

The **Total** row can be added to any table regardless its type, grouping or detalization applied. The total row is added as the last row in the table and contains the resulting information such as total duration of a state, total number of events registered, etc.

1 2	Date	Beginning	End	Duration	Location	Count
⊞	2012-07-01	17:15:10	2012-07-02 12:00:48	18:33:12	Via Imbarcadero, Brenzone	2
⊞	2012-07-02	13:03:30	2012-07-03 13:13:54	23:31:04	Via Derna, Stafalo	3
⊞	2012-07-03	13:31:04	2012-07-04 11:32:38	21:41:50	Via Navene Vecchia, Malcesine	2
⊞	2012-07-04	12:05:58	2012-07-05 23:56:40	1 days 5:58:06	Via Santa Cristina, Bardolino	4
	-----	**2012-07-01 17:15:10**	**2012-07-05 23:56:40**	**3 days 21:44:12**	-----	**11**

In online reports the total row is located at the bottom of the window regardless the number of pages in the table or scrolling bar location.

Location information is not given in the total row (replaced by dashes).

Time Limitation

Time limitations can be applied to tables to limit data analysis by some time intervals, days of the week, days of the month or months. For example, you can select working days and working time to be considered while generating the table.

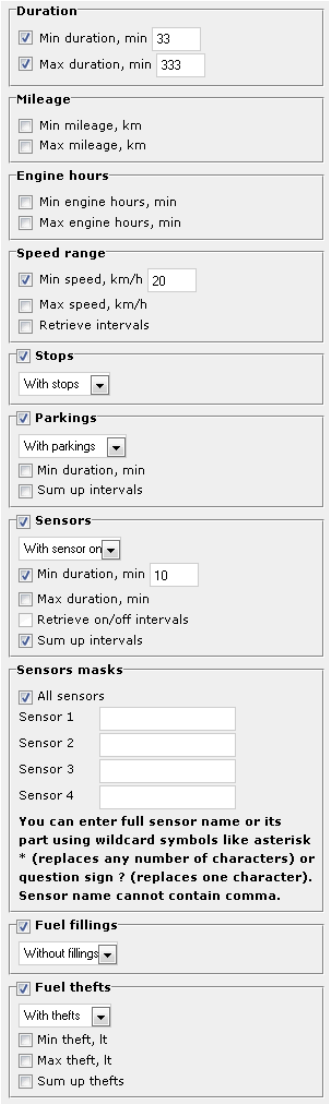
There are two algorithms available for time limitation. According to the first one ('Cut off intervals' flag is not chosen) if any state (for example, trip) begins inside the indicated time limitation interval, and ends outside it, then such a state will not be terminated, and its full duration will be included in the report. According to the second one ('Cut off intervals' flag is chosen) if any state (for example, trip) begins inside the limitation interval, and ens outside it, then the report will include only the duration of such a state inside the indicated interval, and everything outside the interval will be 'cut off'.

For example, if the period from 9:00 till 18:00 is chosen as time limitation interval, and two trips has been registered, the first — from 7:50 till 12:00 and the second — from 13:00 till 18:20, then:

- according to the first algorithm, only the trip started inside the limitation interval will be entirely included in the report. I.e., there will be one trip from 13:00 till 18:20 in the report.
- according to the second algorithm, two trips within the indicated limitation interval will be included in the report (from 9:00 till 12:00 and from 13:00 till 18:00).

Intervals Filtration

Several tables are supplied with additional parameters to filter intervals. There you can set conditions to select information to be displayed in the resulting report. These conditions affect reports that concern selecting intervals from the collection of messages. These reports are: Counter sensors, Digital sensors, Geofences, Engine hours, Parkings and Stops, Rides and Unfinished rides, Speedings, Trips, and others.



The set of filtration parameters varies depending on table type. The following parameters are possible: duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, driver, trailer, fuel fillings and thefts, geofences. Adjusting these parameters will limit the scope of intervals getting to the report. For example, you can indicate the minimum duration and minimum mileage for the trips to be displayed. Alternatively, you can query visited geofences with a stop at least 10 minutes in them.

Incomplete interval

This filter affects only the last interval in the report. In many cases, reported period ends and the last interval (trip, sensor operation, etc.) still continues. You can choose one of the following options to deal with such unfinished intervals:

- *Show and cut off*: show the incomplete interval and consider that it ends with the last message within the reported period;
- *Do not show in report*: do not show the incomplete interval in the report;
- *Show and mark as incomplete*: the incomplete interval will be shown and will have 'Unknown' as the end time.

Duration

Minimum and/or maximum duration of the interval.

Mileage

Minimum and/or maximum distance traveled in the interval.

Engine hours sensor

Enter name mask for engine hours sensor. It affects calculations in reports which contain any information on engine hours as well as engine hours filter below.

Engine hours

Minimum and/or maximum duration of engine hours. In addition, engine hours sensor mask can be specified in the filter below – *Engine hours sensor*.

Speed range

Indicate minimum and/or maximum speed to be considered. It means that only those intervals will be displayed in the report which contain at least one message with speed falling into the range. But more helpful might be retrieving intervals. If you check the *Retrieve intervals* box, the report will focus on intervals where *all* speeds fall into the range.

Trips

This filter is used to show only intervals which somehow intersect with trips or, on the contrary, do not intersect.

Stops

Tick the checkbox and choose one of the two possibilities: *With stops* or *Without stops*. Then in the resulting table, only intervals that meet the given condition will be shown. If the Stops option is not selected, then all intervals are displayed regardless if there were any stops or not.

Parkings

The settings are similar to those for stops. In addition, you can indicate the minimum parking duration. For instance, you can query geofences where there is a parking of a specified time (the *Minimum duration* flag). Besides, the parking time can be summed up (the *Sum up intervals* flag). That means the geofences where the total parkings make up the

specified time will be displayed.

Sensors
The intervals where there are messages with sensor on or off can be selected. In addition, you can indicate minimum and/or maximum time of sensor's on/off state. Like in parkings, the duration can be summed up (the *Sum up intervals* flag). Besides, the intervals of on/off state can be retrieved, and each of them can be presented as a separate row of the table (the *Retrieve intervals* flag). To indicate a certain sensor to be controlled, type its mask below. If you select several, then the intervals which contain points with all these sensors on/off (simultaneously) will be selected. If no masks are specified, then all digital sensors are considered.

Sensors masks
You can enter up to 4 masks. Sensors masks can affect *Sensors* filter, *Counter* column, and information on fuel (if any of these options is selected in the report template).

Driver
This filter allows to select intervals with a certain driver or without any drivers. Choose the option *With driver* and specify driver's name mask. The resulting table will contain only intervals with a corresponding driver – it does not matter whether this driver is at the beginning, in the middle, at the end or in all course of the interval. In addition, you can enable the option *Retrieve intervals* to retrieve only segments with a specified driver from the scope of intervals.

If the option *Without driver* is selected, the resulting table will consist of intervals which contain segments without any drivers. Those segments can be retrieved as well.

Trailer
This filter works in the same way as the previous one, but it allows to filter intervals according to presence or absence of a trailer assigned to a unit.

Fuel fillings
Intervals with fillings or without fillings can be displayed in the table. If the first case is chosen, then you can additionally indicate max and min filling volume. Fillings can be summed up. In this case, the indicated filling volume will be applied to the total of fillings found.

Fuel thefts
Intervals with fuel thefts or without thefts can be displayed. If the first case is chosen, then you can additionally indicate max and min theft volume. Like fillings, fuel thefts can be summed up.

Geofences/Units
The filter is divided into two parts – geofences and units. In the upper part you can select geofences to be analyzed for the report. You can focus on unit activity in or out of a geofence. To put a geofence under control, move the marker from *None* to *In* or *Out* against a required geofence. Only geofences that belong to the same resource as the reports template itself can be displayed here.
In the same way you can choose units (they are considered as 'moving geofences'). In this case, indicate radius for these units. Thus, you can get information about unit activity in or out of the area of selected units. Only units to which you have *Query reports or messages* access are displayed here. To quickly find a necessary geofence or unit, use the dynamic filter. To select all items at once, use the <ctrl> key.
In addition, you can enable the option *Retrieve intervals* to retrieve only segments inside or outside selected geofences or units.

You can enter either integer or fractional numbers. Use point as a delimiter for fractional numbers.

Each of described above limitations can be applied either independently or along with other limitations. If the option *Retrieve intervals* (in the *Sensors* or *Speed* sections) is combined with other conditions, then the filtration by other conditions is applied *after* retrieving the appropriate intervals.

Chat History

This report unites commands of the kind *Send message to driver* and replies from the driver. How to carry a chat with a driver...

- **Time**: date and time when the message was received.
- **Sender**: driver or operator (operator's username in brackets).
- **Text**: message text.
- **Count**: the number of messages.
- **Notes**: an empty column to add your custom comments after printing or exporting the report.

Time	Sender	Text	Count
2010-04-26 04:47:57	Operator (user)	Return to the depot	1
2010-04-26 04:48:48	Driver	Finishing.	1
2010-04-26 04:53:31	Driver	Filled 50 gal.	1
2010-04-26 04:53:54	Operator (user)	Filling registered	1
2010-04-26 04:58:45	Operator (user)	New order near Gorky Park.	1
2010-04-26 04:59:14	Driver	10 min	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**: time when the unit entered this point.
- **Scheduled arrival**: time when the unit was supposed to be there according to the schedule.
- **Initial location**: location at that time.
- **Real departure**: time when the unit left this point.
- **Scheduled departure**: time when the unit was supposed to leave the point according to the schedule.
- **Final location**: location at that time.
- **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**: schedule name.
- **Round**: round name.
- **Arrival time deviation**: positive value if delayed, negative value if in a hurry in regard to arrival time set in point properties.
- **Departure time deviation**: the same for departure time.
- **Presence duration**: time spent in the check point.
- **Presence mileage**: mileage in the check point.
- **Section duration**: time spent to travel from the previous check point to this one.
- **Section mileage**: mileage from the previous check point.
- **Count**: points count.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Notes**: an empty column for your custom comments.

Point name	Arrival time	Arrival time deviation	Departure time	Presence duration	Result	Route	Driver
Base	2011-10-28 13:42:58	0:00:00	-----	0:00:00	Entrance only	Route 36A	Ury Gagarin
Point 1	2011-10-28 13:45:30	0:45:30	2011-10-28 13:46:26	0:00:56	Visited	Route 36A	Ury Gagarin
Point 2	2011-10-28 13:49:22	0:49:22	2011-10-28 13:50:10	0:00:48	Visited	Route 36A	Ury Gagarin
Point 3	2011-10-28 13:54:26	3:54:26	2011-10-28 13:54:50	0:00:24	Visited	Route 36A	Ury Gagarin
Point 4	-----	0:00:00	-----	0:00:00	Skipped	Route 36A	Ury Gagarin
Point 5	2011-10-28 14:00:42	0:00:00	-----	0:00:00	Entrance only	Route 36A	Ury Gagarin
Point 6	2011-10-28 14:04:34	7:04:34	2011-10-28 14:05:06	0:00:32	Visited	Route 36A	Ury Gagarin
Point 7	2011-10-28 14:06:58	0:06:58	2011-10-28 14:07:30	0:00:32	Visited	Route 36A	Ury Gagarin
Finish	2011-10-28 14:08:58	0:08:58	2011-10-28 14:10:18	0:01:20	Visited	Route 36A	Ury Gagarin

Chronology

This kind of report gives information about all actions and changes in unit state during the indicated period of time. Unlike most of other tables which are dedicated to certain things (parkings, sensors, trips, etc.), this table can gather events of various kinds which allows to estimate movement history in the whole.

The following things can be included to the chronology (in the template select necessary):

- Trips
- Parkings
- Stops
- Engine hours
- Fillings
- Thefts
- Events
- Drivers
- Trailers
- Speedings
- Connection loss
- Sensor trigger (enter one or two masks to indicate needed 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**: when the detected activity began.
- **Initial location**: unit location at the moment of activity beginning.
- **End**: when the detected activity finished.
- **Final location**: unit location at the moment of activity end.
- **Duration**: how long this activity lasted.
- **Description**: for trips and speedings – mileage, for events and violations – the text of notification, for engine hours – duration, for drivers – registered driver name or 'driver unbound', 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	2012-06-24 19:00:02	Gedimino gatvė, Marijampolė	2012-06-24 20:22:20	1:22:18	Mileage: 96 km
Stay	2012-06-24 20:22:20	Zdrojowa, 2.09 km from Augustów	2012-06-25 12:29:24	16:07:04	-----
Event	2012-06-25 11:27:00	-----	2012-06-25 11:27:00	0:00:00	Oil change
Trip	2012-06-25 12:29:24	Zdrojowa, 2.12 km from Augustów	2012-06-25 14:42:12	2:12:48	Mileage: 148 km
Stay	2012-06-25 14:42:12	Ogrodowa, Stare Lubiejewo	2012-06-25 15:35:30	0:53:18	-----
Trip	2012-06-25 15:35:30	E67, 0.38 km from Sadzawki	2012-06-25 17:38:16	2:02:46	Mileage: 156 km
Stay	2012-06-25 17:38:16	E30, Zabostów Mały	2012-06-25 17:50:04	0:11:48	-----
Trip	2012-06-25 17:50:04	E30, Zabostów Mały	2012-06-25 19:44:40	1:54:36	Mileage: 203 km
Stay	2012-06-25 19:44:40	E30, Chwałszyce	2012-06-25 19:55:44	0:11:04	-----
Trip	2012-06-25 19:55:44	E30, Chwałszyce	2012-06-25 20:25:08	0:29:24	Mileage: 39 km
Stay	2012-06-25 20:25:08	Tadeusza Kościuszki, Poznań	2012-06-26 10:12:58	13:47:50	-----
Trip	2012-06-26 10:12:58	Stanisława Wyspiańskiego, Poznań	2012-06-26 10:59:48	0:46:50	Mileage: 82 km
Stay	2012-06-26 10:59:48	Rogoziniec	2012-06-26 11:21:44	0:21:56	-----
Trip	2012-06-26 11:21:44	Rogoziniec	2012-06-26 13:26:00	2:04:16	Mileage: 184 km
Stay	2012-06-26 13:26:00	-----	2012-06-29 13:23:40	2 days 23:57:40	-----
Connection loss	2012-06-26 13:40:44	Storkower Straße, Berlin	2012-06-29 13:23:40	2 days 23:42:56	-----
Trip	2012-06-29 13:23:40	Osloer Straße, Berlin	2012-06-29 14:58:30	1:34:50	Mileage: 150 km

Connection Problems

This kind of report lists cases when connection with server or satellites was lost. 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**: date and time when connection loss happened.
- **End**: date and time when connection was recovered.
- **Duration**: time interval of connection loss.
- **Location**: the address where the unit was right before the connection broke.
- **Count**: the number of connection gaps detected.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Notes**: an empty column for your custom comments.

№	Beginning	End	Duration	Location	Driver
1	2012-07-06 01:34:36	2012-07-06 14:02:08	12:27:32	Avenue du Docteur Raymond Picaud, Cannes	Spider Man
2	2012-07-06 14:59:24	2012-07-06 16:19:24	1:20:00	Allée Hélène Boucher, Capitou	Spider Man
3	2012-07-06 17:48:18	2012-07-08 17:10:30	1 days 23:22:12	Avenue du Docteur Raymond Picaud, Cannes	Spider Man
4	2012-07-08 23:48:22	2012-07-09 12:45:04	12:56:42	Boulevard Leader, Cannes	Eric Clapton
5	2012-07-09 15:43:32	2012-07-10 18:32:20	1 days 2:48:48	Boulevard Leader, Cannes	Eric Clapton
6	2012-07-10 19:56:04	2012-07-11 16:43:18	20:47:14	Avenue du Docteur Raymond Picaud, Cannes	Mister X
7	2012-07-11 22:46:28	2012-07-12 13:33:58	14:47:30	Boulevard Leader, Cannes	Mister X
8	2012-07-15 15:06:28	2012-07-15 16:24:54	1:18:26	Via Alessandro Manzoni, Milano	Spider Man
9	2012-07-17 00:05:38	2012-07-17 12:06:32	12:00:54	Marszałka Józefa Piłsudskiego, Łódź	Spider Man

Additional filtration by driver, trailer, and geofences/units can be applied to this report.

Counter Sensors

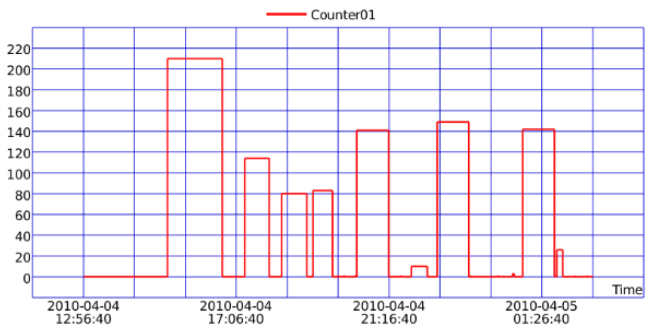
This table shows the operation of *counter* type sensors. In the template, you set the mask (filter) for sensors or choose **All sensors**. Possible columns are:

- **Sensor**: sensor name.
- **Activated**: activation time.
- **Deactivated**: deactivation time.
- **Duration**: operation time.
- **Total time**: time from the first activation beginning to the last activation end (useful if grouping by days is enabled).
- **Location**: unit location when counter was activated.
- **Mileage**: distance travelled for the operation period.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Avg speed**: average speed in this period.
- **Max speed**: maximum speed in this period.
- **Counter**: the value (can be sown with accuracy to two decimal places – see Advanced Settings).
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Notes**: an empty column for your custom comments.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

№	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**

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.

Counter sensor's value can be visualized in the chart that shows counter's operation intervals and its value. More about charts...



Custom Fields

The table *Custom fields* represents the list of custom fields entered in the corresponding tab of unit properties dialog (see Unit Properties => Custom Fields).

To get this report, you need the access 'View custom fields' and/or 'View admin fields' for 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**: custom field name.
- **Value**: custom field value.
- **Notes**: an empty column for your custom comments.

Name	Value
Carrying capacity	3 tonnes
Fuel	Gas
Year mark	1999

There is no point to apply additional parameters such as grouping, Total row, and numbering to this kind of report. It does not matter what interval you choose for the report, because only the current fields contained in unit properties can be displayed.

To get custom fields for unit group (see Other Reports), make sure the option *Detalization* is enabled. Pay attention that individual fields of each unit will be displayed, and not the fields of the selected unit group. To get the fields of group itself, check the option *Group itself* in report template.

Digital Sensors

Usually, digital sensors have two states: on/off, activated/deactivated, busy/free and so on. For example, it can be ignition sensor or cargo load sensor. All sensors are configured in Unit Properties => Sensors.

In the report template you can select up to four sensors using masks. Enter sensor's full name or a part of the name using wildcard symbols like asterisk * (replaces several characters) or question mark **?** (replaces one symbol). Sensor name cannot contain commas. Check the **All sensors** check box to automatically select all existing digital sensors. If no sensors are selected or sensors are indicated incorrectly, the table cannot be formed.

The table can contain the following columns:

- **Sensor**: the name of the sensor under control.
- **On**: time when the sensor was activated.
- **Off**: time when the sensor was deactivated.
- **Duration**: the interval when the sensor was on.
- **Total time**: time from the beginning of first activation to the end of last last (useful if grouping by days is enabled).
- **Location**: unit location at the moment of activation.
- **Mileage**: the distance travelled while the sensor was on.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Avg speed**: average speed of movement when the sensor was on
- **Max speed**: maximum speed detected in the interval.
- **Activations count**: the number of activations.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Notes**: an empty column for your custom comments.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

Sensor	Activated	Deactivated	Duration	Location	Mileage	Max speed
Air conditioner	2012-06-25 12:32:06	2012-06-25 14:38:34	2:06:28	Zdrojowa, 2.12 km from Augustów	146 km	141 km/h
Air conditioner	2012-06-25 14:58:18	2012-06-25 15:15:04	0:16:46	Ogrodowa, Stare Lubiejewo	21 km	125 km/h
Air conditioner	2012-06-25 15:34:42	2012-06-25 17:38:36	2:03:54	E67, 0.38 km from Sadzawki	156 km	145 km/h
Air conditioner	2012-06-25 17:49:40	2012-06-25 19:13:58	1:24:18	E30, Zabostów Mały	141 km	158 km/h
Air conditioner	2012-06-25 19:15:38	2012-06-25 19:46:04	0:30:26	E30, Piekło	62 km	167 km/h
Air conditioner	2012-06-25 19:55:36	2012-06-25 20:22:22	0:26:46	E30, Chwałszyce	38 km	146 km/h
Air conditioner	2012-06-25 20:33:52	2012-06-25 20:46:24	0:12:32	Tadeusza Kościuszki, Poznań	3.05 km	46 km/h
Air conditioner	2012-06-26 10:12:58	2012-06-26 11:00:10	0:47:12	Stanisława Wyspiańskiego, Poznań	82 km	146 km/h
Air conditioner	2012-06-26 11:21:26	2012-06-26 13:23:00	2:01:34	Rogoziniec	184 km	185 km/h
Air conditioner	2012-06-26 13:26:00	2012-06-26 13:40:26	0:14:26	Warschauer Straße, Berlin	1.93 km	0 km/h
Air conditioner	2012-06-29 13:04:24	2012-06-29 14:58:36	1:54:12	Storkower Straße, Berlin	155 km	192 km/h
Air conditioner	2012-06-29 15:26:22	2012-06-29 17:36:58	2:10:36	Autobahntankstelle West, Köckern	236 km	197 km/h
Air conditioner	2012-06-29 18:58:18	2012-06-29 20:34:46	1:36:28	A9, Pegnitz	210 km	212 km/h

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 treats the entrusted vehicle. Analyses of driving behaviour could help you to prolong vehicle life, reduce fuel costs, ensure cargo safety, and also understand the reason for any case of emergency.

Before generating 'Eco Driving' report it is necessary to indicate settings on the corresponding tab of unit properties dialog.

A table may contain the following information:

- **Violation** — a type of violation.
- **Beginning** — time of violation beginning.
- **End** — time of violation end.
- **Value** — parameter value during violation.
- **Speed** — vehicle speed during violation.
- **Penalty** — penalty value indicated on the 'Eco Driving' tab of unit properties.
- **Count** — number of violations of such type.
- **Driver** — name of a driver on this vehicle.

1 2	№	Violation	Beginning	End	Value	Speed	Penalty	Count
⊞	1	Instant acceleration	2015-02-20 17:57:30	2015-02-22 18:16:27	-----	133 km/h	2	29
⊞	2	Turning acceleration	2015-02-20 17:57:40	2015-02-22 18:17:47	-----	133 km/h	1860	62
⊟	3	Braking bad	2015-02-20 17:57:56	2015-02-22 18:20:20	-----	133 km/h	3	56
	3.1	Braking bad	2015-02-20 17:57:56	2015-02-20 17:57:59	0.13 g	45 km/h	40	1
	3.2	Braking bad	2015-02-20 18:01:11	2015-02-20 18:01:16	0.12 g	33 km/h	40	1
	3.3	Braking bad	2015-02-20 18:02:06	2015-02-20 18:02:09	0.11 g	62 km/h	40	1
	3.4	Braking bad	2015-02-20 18:16:52	2015-02-20 18:16:54	0.16 g	54 km/h	40	1
	3.5	Braking bad	2015-02-20 18:33:31	2015-02-20 18:33:35	0.15 g	79 km/h	40	1
⊞	4	Custom	2015-02-20 18:00:19	2015-02-22 18:15:08	-----	133 km/h	680	34
⊞	5	Speeding light	2015-02-20 18:05:15	2015-02-22 17:30:31	-----	133 km/h	1	62
⊞	6	Speeding hard	2015-02-20 18:06:20	2015-02-22 17:12:38	-----	133 km/h	16	61
	-----	**Total**	**2015-02-20 17:57:30**	**2015-02-22 18:20:20**	-----	**133 km/h**	**2562**	**304**

Note that it is easier to analyse the received report, if a grouping option has been applied to a report template. Information received in a report can be grouped on the basis of different criteria, such as time (day, week, month), type of violation, and trips.

Penalty Scoring System

The value of penalty points for a particular criterion is indicated on the 'Eco driving' tab of a 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, then the penalty value (earlier indicated on the 'Eco Driving' tab) is displayed opposite to every criterion in the corresponding column. And 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, then the main difference is that the 'Total' value corresponds to the quotient received as a result of division of the scored penalty points total number 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, then a total number of penalty points for the violations of a particular group is displayed opposite to every group in the corresponding column. And 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, then this averaging is applied to every group of parameters in the report table. Besides, if the 'Total' line is available, then 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 a unit properties dialog.

Engine Hours

Engine hours report shows working actively of a unit, its productivity and utilization as well as fuel consumption and some more things. The activity and efficiency of work of attached implements can be also analyzed.

To generate this report, the unit is supposed to have sensors like ignition, engine efficiency 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 (to be indicated for a sensor) and maximum interval between messages (to be set for a unit). Both properties are used to cut off invalid intervals during defining of engine hours amount. If values for both timeout and maximum interval between messages are indicated, then the system will use the property with minimum value indicated.

Additionally, you can specify engine hours sensor to be used in this report. For this, enter its name mask in a special filter in the reports template. It allows creating a separated table for each engine if there are several.

In the table, you can see:

Beginning	Initial location	Engine hours	In movement	Idling	Mileage	M. productivity	Utilization	Consumed
2012-06-25 12:32:06	Zdrojowa, 2.12 km from Augustów	2:06:28	2:01:52	0:04:36	146 km	96.4 %	52.7 %	16.80 lt
2012-06-25 14:58:18	Ogrodowa, Stare Lubiejewo	0:16:46	0:16:26	0:00:20	21 km	98.0 %	7.0 %	2.42 lt
2012-06-25 15:34:42	E67, 0.38 km from Sadzawki	2:03:54	1:59:56	0:03:58	156 km	96.8 %	51.6 %	17.95 lt
2012-06-25 17:49:40	E30, Zabostów Mały	1:24:18	1:23:42	0:00:36	141 km	99.3 %	35.1 %	16.26 lt
2012-06-25 19:15:38	E30, Piekło	0:30:26	0:28:14	0:02:12	62 km	92.8 %	12.7 %	7.13 lt
2012-06-25 19:55:36	E30, Chwałszyce	0:26:46	0:25:18	0:01:28	38 km	94.5 %	11.2 %	4.42 lt
2012-06-25 20:33:52	Tadeusza Kościuszki, Poznań	0:12:32	0:08:02	0:04:30	3.05 km	64.1 %	5.2 %	0.35 lt
2012-06-26 10:12:58	Stanisława Wyspiańskiego, Poznań	0:47:12	0:43:42	0:03:30	82 km	92.6 %	19.7 %	9.38 lt
2012-06-26 11:21:26	Rogoziniec	2:01:34	1:52:06	0:01:08	184 km	92.2 %	50.7 %	21.21 lt
2012-06-26 13:26:00	Warschauer Straße, Berlin	0:14:26	0:00:00	0:14:26	1.93 km	0.0 %	6.0 %	0.22 lt
2012-06-29 13:04:24	Storkower Straße, Berlin	1:54:12	1:32:52	0:21:20	155 km	81.3 %	47.6 %	17.82 lt
2012-06-29 15:26:22	Autobahntankstelle West, Köckern	2:10:36	2:10:12	0:00:24	236 km	99.7 %	54.4 %	27.19 lt
2012-06-29 18:58:18	A9, Pegnitz	1:36:28	1:36:08	0:00:20	210 km	99.7 %	40.2 %	24.20 lt

- **Beginning**: time when engine hours interval begins.
- **Initial location**: location at that moment.
- **End**: time when engine hours interval ends.
- **Final location**: location at that moment.
- **Engine hours**: value of engine hours on the interval.
- **Total time**: duration of the interval. If grouping by days is enabled, it shows time from the beginning of the first engine hours interval to the end of last interval.
- **Off-time**: period of time passed from the end of the previous interval to the beginning of the current one.
- **In movement**: time when the unit had been moving within this interval.
- **Idling**: time when the unit was standing with the engine on.
- **Mileage**: distance traveled with engine on.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Counter**: counter sensor value.
- **Initial counter**: counter value at the beginning.
- **Finale counter**: counter value at the end.
- **Avg engine revs**: average rate of engine revolutions.
- **Max engine revs**: maximum rate of engine revolutions.
- **Status**: unit status registered during engine hours operation (if there are several, the first one is displayed).
- **Cargo weight**: weight of a transported cargo.
- **Driver**: driver's name if such was identified.
- **Trailer**: trailer's name if any was bound.
- **Movement productivity**: percentage ratio of engine hours in movement to engine hours duration.
- **Engine efficiency duration**: the duration of attached implements operation (if having engine efficiency sensor).

Engine efficiency idling: engine operation time after deduction of efficiency time (total engine hours subtract engine efficiency duration).

- **Utilization**: percentage ratio of engine hours duration to engine hours rate (engine hours divided by daily engine hours rate indicated in unit properties).
- **Useful utilization**: percentage ratio of engine efficiency duration to engine hours rate.
- **Productivity**: percentage ratio of engine efficiency duration to engine hours duration
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: fuel volume used in engine hours. It can be detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Details about fuel in reports...
- **Avg consumption by …**: average consumption in engine hours.
- **Consumed in motion by …**: fuel volume used in engine hours while moving.
- **Avg consumption in motion by …**: average consumption in engine hours while moving.
- **Consumed in idle run by …**: fuel volume used in engine hours during idle running.
- **Avg consumption in idle run by …**: average fuel consumption in idling.
- **Avg consumption by … in trips**: average fuel consumption in trips.
- **Initial fuel level**: fuel level at the beginning of the interval.
- **Final fuel level**: fuel level at the end of the interval.
- **Max fuel level**: maximum fuel level.
- **Min fuel level**: minimum fuel level.
- **Notes**: an empty column for your custom comments.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, driver, trailer, fuel fillings, fuel thefts, and geofences/units.

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 unit history:

1. Triggered notifications which method of delivery is *Register event for unit*.
2. Events registered manually by the user in events registrar.
3. Manipulations with counters (change, store, reset counter value) with the help of corresponding jobs or notifications.
4. When unit performs a route (if it was chosen to save events on route).

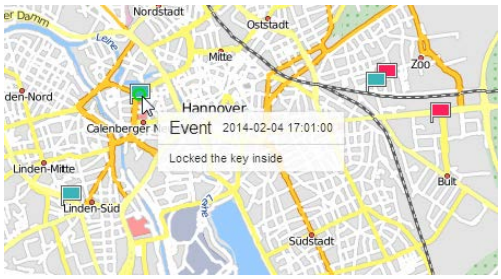
To make a report dedicated just to events of a certain kind, in report template enter a mask to filter events text/description (like *speed*, *traffic*, *filling*, etc.). Only those messages which text corresponds to the given mask will be added to the table.

The following columns can be included to this table:

- **Event time**: time when the event happened.
- **Time received**: time when the server received this data.
- **Event text**: notification text or event description.
- **Location**: unit location at that moment of event. Some events (like manipulations with counters or manually registered events) may have no location.
- **Count**: the count of events.
- **Notes**: an empty column for your custom comments.

Event time	Event text	Location
2012-02-12 15:47:00	Fuel level sensor installed	-----
2012-08-09 09:54:43	GPRS traffic counter value: 193 KB.	-----
2013-01-03 15:49:00	Speeding detected: 133 km/h near 'Kings Cross Station'.	Littleton Street, Wandsworth
2013-02-04 15:48:00	Fuel theft 10 lt	Redruth Road, Hackney
2013-02-04 15:51:00	Connection loss near 'Kendals Close'.	Kendals Close, Radlett

In addition, you can use special markers for this report: a green flag means event, a red flag means violation. In the tooltip you can find the detailed information.



Executed Commands

This kind or report gives a list of commands sent to a unit and successfully executed. Possible columns are:

- **Sending time**: time when the command was sent to the unit.
- **User**: login name of the user who performed the command (hidden if you do not have access rights to some user).
- **Command name**: command name as it is written in unit properties.
- **Command type**: command type (see the list).
- **Parameter**: additional parameter in the command (for messages it is text).
- **Execution time**: time when the command was executed.
- **Channel**: channel type used to transmit 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 a list of successfully executed commands. To see *all* commands sent to the unit regardless their execution, go to the Messages panel.

More about commands...

Fuel Fillings

These reports show where and when a vehicle was filled up. The parameters for this report to be generated are set in Unit Properties => Fuel Consumption. At that, fillings registered manually are not taken into account.

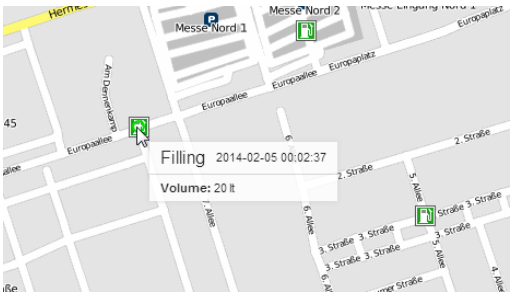
- **Time**: date and time of filling.
- **Location**: unit location at that moment.
- **Initial fuel level**: fuel level before the filling.
- **Filled**: the volume of filled fuel (sensor name may be indicated in brackets).
- **Final fuel level**: fuel level after the filling.
- **Registered**: the volume of registered fuel.
- **Difference**: difference between detected and registered filling volume.
- **Sensor**: sensor which detected the filling.
- **Driver**: driver's name if one was identified.
- **Trailer**: trailer's name if any was bound.
- **Count**: the number of fillings.
- **Mileage**: distance travelled from the interval start to the filling end.
- **Notes**: an empty column for your custom comments.

Time	Location	Initial fuel level	Filled	Final fuel level	Sensor name
2013-01-13 12:48:59	7. Allee	52.85 lt	137.93 lt	190.78 lt	fuel_3
2013-01-15 12:48:59	Bemeroder Straße	87.66 lt	137.93 lt	225.59 lt	fuel_3
2013-01-17 12:48:59	Alte Kronsbergstraße	50.27 lt	137.93 lt	188.20 lt	fuel_3
2013-01-18 12:49:58	Giesener Straße	4.41 lt	95.39 lt	99.80 lt	fuel_7
2013-01-19 13:10:01	Karlsruher Straße	3.12 lt	50.27 lt	53.40 lt	fuel_10

Intervals filtration by geofences/units, driver, trailer, and filling volume can be additionally applied to this table.

You can use special markers for this report to mark places of fillings on the map.

Attention!
If no fillings were detected, the table is not generated. Furthermore, registered fillings are ignored then, too.



See also Fuel Thefts.

Fuel Thefts

This report is aimed to show all thefts – when, where and how much fuel was stolen. The parameters for this report are set in Unit Properties => Fuel Consumption.

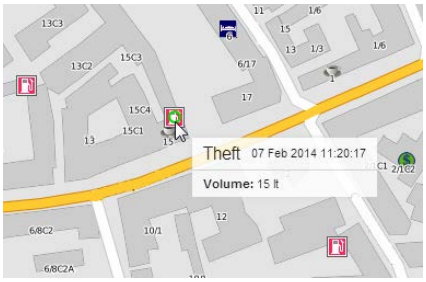
In the table, you can have:

- **Beginning**: date and time when the theft began.
- **Initial location**: unit location at that moment.
- **Time**: moment of the most significant drop of fuel level.
- **Final location**: unit location at that moment.
- **Initial fuel level**: fuel level before the theft.
- **Initial speed**: speed at the beginning.
- **Stolen**: stolen fuel volume.
- **Final fuel level**: fuel level after the theft.
- **Final speed**: speed at the end.
- **Sensor name**: sensor which detected fuel theft.
- **Driver**: driver's name if any was identified.
- **Trailer**: trailer's name if any was bound.
- **Count**: the number of thefts.
- **Counter**: counter sensor value.
- **Mileage**: distance travelled from the interval start to the theft end.
- **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

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.

Geofences

This report shows when and how often a unit visited different geofences. In the right part of the template dialog, the list of all geofences is displayed. You can indicate one or more geofences to put them under control of this report, otherwise the report will not be generated. The list of geofences includes only those geofences which belong to the same resource as the report template itself (so, you need to have access to them). Geofences on the list are sorted by name.

The following columns can be selected for this table:

- **Geofence**: geofence name.
- **Type**: polygon, line, circle, unit (if units and not geofences are selected in the report template).
- **Area**: total area of the geofence (if the metric system is used, then area will be indicated in hectares).
- **Perimeter**: perimeter of the geofence. Perimeter for a line is its length (line thickness is not taken into account).
- **Description**: taken from geofence properties.
- **Time in**: the time when the unit entered the geofence.
- **Time out**: time when the unit left the geofence.
- **Duration in**: duration of the visit.
- **Total time**: time from the first visit beginning to the last visit end (useful if grouping by days is enabled).
- **Parkings duration**: time spent in parkings.
- **Off-time**: time between the previous visit and the current one.
- **Mileage**: mileage in this visit.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Counter**: value of counter sensor.
- **Initial counter**: counter value at the entrance.
- **Finale counter**: counter value at the exit.
- **Avg engine revs**: average rate of engine revolutions.
- **Max engine revs**: maximum rate of engine revolutions.
- **Off-mileage**: mileage traveled from previous visit.
- **Off-mileage (adjusted)**: mileage traveled from previous visit subjected to the coefficient.
- **Avg speed**: average speed the unit was moving in the geofence.
- **Max speed**: maximum speed detected in that visit.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Visits**: the number of visits.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Details about fuel in reports...
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: average fuel consumption by one of the methods mentioned above.
- **Notes**: an empty column for your custom comments.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

Geofence	Type	Area	Perimeter	Time in	Duration in	Mileage	Max speed
Grot	Polygon	15.47 km²	17.50 km	2013-01-15 16:01:00	0:03:00	6.28 km	45 km/h
Furnaces ITK	Line	39.86 km²	20.98 km	2013-01-15 16:04:00	0:02:00	2.88 km	35 km/h
Garage	Circle	9.48 km²	8.53 km	2013-01-15 16:11:00	0:04:00	7.20 km	47 km/h
Furnaces ITK	Line	39.86 km²	20.98 km	2013-01-15 16:24:02	0:01:59	6.17 km	56 km/h
Settlement	Circle	28.27 km²	18.85 km	2013-01-15 16:24:02	0:01:59	6.17 km	56 km/h
Grot	Polygon	15.47 km²	17.50 km	2013-01-15 16:30:01	0:03:00	6.28 km	45 km/h
Furnaces ITK	Line	39.86 km²	20.98 km	2013-01-15 16:33:01	0:02:00	2.88 km	35 km/h

Instead of geofences, you can choose units in the reports template. Additionally, you indicate radius for these units (in meters). In this case, those units are considered as 'moving geofences', and the activity of the unit selected to generate the report is analyzed in regard to these moving geofences. The access *Query reports or messages* is required to those units.

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, drivers, trailers, fuel fillings and thefts.

Geofences can be displayed on the map. For this choose *Render geofences* option in the report template.

See related reports – Non-visited Geofences, Rides.

GPRS Traffic

Attention!
This report can be not included to your package.

To apply this report to a unit, this unit must have registered events of GPRS traffic counter reset or traffic storage should be adjusted in jobs.

№	Time	Current value	Absolute value	Reset
1	2010-11-23 12:07:08	83.22 MB	0 B	No
2	2010-11-23 12:08:46	83.22 MB	0 B	No
3	2010-11-23 12:09:14	83.22 MB	83.22 MB	Yes
4	2010-11-23 12:10:14	0 B	83.22 MB	Yes
5	2010-11-23 12:12:30	8.55 MB	83.22 MB	No
6	2010-11-23 15:29:12	8.55 MB	83.22 MB	No
7	2010-11-23 15:30:41	8.55 MB	91.76 MB	Yes
8	2010-11-23 15:32:18	0 B	91.76 MB	Yes
9	2010-11-23 15:33:02	0 B	91.76 MB	Yes
10	2010-11-23 15:34:00	72.41 MB	91.76 MB	No
11	2010-11-23 17:55:16	72.41 MB	91.76 MB	No
-----	**2010-11-23 17:55:16**	**72.41 MB**	**91.76 MB**	-----

- **Time**: time when the counter value was registered.
- **Current value**: value at the moment of registration.
- **Absolute value**: GPRS traffic total size by the moment of registration.
- **Reset**: *Yes* – reset was fulfilled, *No* – no reset was fulfilled.
- **Notes**: empty column for your custom notes.

Logs

The *Log* table can be generated for any type of an object presented in reports, i.e., for unit, unit group, user, resource, retranslator, or route. Log contains records about changes made in object's properties or its contents. To see the log of a unit, it is no enough to have *Query messages or reports* access to it; in addition, you need *Manage log* access.

- **Time** – date and time when the change was done (saved).
- **User** – name of the user who did it. You can specify user's name mask in report template and so get only changed made by a certain user.
- **Item type** – unit, unit group, user, resource, retranslator, or route.
- **Action** – description of the change performed.
- **Host** – the address of the computer from which the user did the change or it can be 'job' or 'notification' if the action was automatic.
- **Notes** – 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

User's log provides with two types of information: changes made by this user and changes made by other users in regard to this user as system object. One more column is available in this report – 'Item name':

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

The log of u nit group has an additional parameter – 'Group itself'. If this checkbox in disabled, the log shows changes made to units in the group (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 option 'Group itself' is enabled, the log shows changes made to this unit group as 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

This table contains the list of service works (maintenance) done during the indicated period and registered by users who have at least *edit* access to this unit. The table can be composed of the following columns:

- **Service time**: date and time that were indicated during the registration.
- **Registration time**: date and time when the event was registered.
- **Kind of work**: the text from the field 'Kind of work'.
- **Comment**: the text from the field 'Description'.
- **Location**: location indicated while registering (together with comments entered manually).
- **Duration**: duration of work.
- **Cost**: service cost.
- **Mileage**: mileage counter value at the moment of registration.
- **Engine hours**: engine hours counter value at the moment of registration.
- **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.
Blue rows mean that the place was indicated on the map during the registration.

Non-visited Geofences

This report gives the list of geofences that were not visited during the indicated time period. In report template, choose geofences to be checked when generating the table. The list of geofences includes only those geofences that belong to the same account as the report template itself. Geofences on the list are sorted by name. If the list is large, it is convenient to use name mask to quickly find necessary geofences.

Let us assume, we have 11 stores (geofences) to be visited every day. We would like to find out whether there are geofences which were ignored within the work week from 1st to 5th of June. To do this, we enable grouping by days (with detalization), select necessary geofences and columns for the table.

- **Geofence**: geofence name.
- **Type**: geofence type (line, polygon, or circle).
- **Area**: total geofence area (if the metric system is used, then area will be indicated in hectares).
- **Perimeter**: geofence perimeter.
- **Count**: the number of geofences that were skipped.
- **Notes**: an empty column for your custom comments.

From this report we see that on 1st of June 'Point 11' and 'Point 7' were ignored, on 4th of June — 'Point 2', and on 5th of June — five geofences. 2nd and 3rd are missed in the list, and it means that all predefined geofences were visited on those days. You can click on geofences' names to move the map to the first point of a geofence.

1 2	№	Date	Geofence	Type	Area	Perimeter	Count
⊟	1	2012-06-01	-----	-----	-----	-----	2
├	1.1	-----	Point 11	Circle	0.35 km²	2.09 km	1
├	1.2	-----	Point 7	Polygon	0.11 km²	1.47 km	1
⊟	2	2012-06-04	-----	-----	-----	-----	1
├	2.1	-----	Point 2	Circle	0.35 km²	2.09 km	1
⊟	3	2012-06-05	-----	-----	-----	-----	5
├	3.1	-----	Point A	Line	764.10 m²	152.82 m	1
├	3.2	-----	Point 2	Circle	0.35 km²	2.09 km	1
├	3.3	-----	Point B	Line	0.04 km²	813.81 m	1
├	3.4	-----	Point 11	Circle	0.35 km²	2.09 km	1
└	3.5	-----	Point 7	Polygon	0.11 km²	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 flag is off, a group report is structured in the same way as individual report, and the information is given for each separate unit from the group. When the flag 'Consider group as a whole' is on, report structure is different — you get the list of geofences that were visited by none of the units in the group.

Parkings

Parkings are estimated according to parameters set in Trip Detection when configuring a unit. To get 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 satisfied:

1. **Insignificant speed**. The speed detected must fall in the range from 0 to the *Minimum moving speed*. When this speed is achieved, unit's behavior is regarded as movement (=trip), if by time and distance it corresponds to trip definition (*Minimum trip time* and *Minimum trip distance* parameters). Then the parking finishes. However, if by time or distance the movement does not fall into trip definition, the parking is prolonged.

2. **Sufficient time interval**. Insignificant speed must continue not less than *Minimum parking time*. If this time is not achieved, unit's behaviour is not regarded as parking. It may be regarded as a stop, but only in case there was a zero speed registered.

3. **Insignificant location change**. As it has been already noted above, the parking is also an insignificant movement in space, that is a travel which in not longer than *Minimum trip distance* if by time it not shorter than *Minimum parking time*.

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**: time interval of the parking.
- **Total time**: time from the first parking beginning to the last parking end (useful if grouping by days is enabled).
- **Off-time**: time interval from the previous parking and to the current parking beginning.
- **Location**: the address where the unit was stationary. If there was an insignificant movement detected, the initial address is used.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Counter**: counter sensor values.
- **Initial counter**: counter value at the beginning of the parking.
- **Finale counter**: counter value at the end of the parking.
- **Status**: unit status registered during the current parking interval (if there are several, the first one is displayed).
- **Count**: the number of parkings.
- **Notes**: an empty column for your custom comments.

№	Beginning	End	Duration	Location	Driver
1	2012-06-25 20:25:08	2012-06-25 20:36:46	0:11:38	Tadeusza Kościuszki, Poznań	Spider Man
2	2012-06-25 20:46:20	2012-06-26 10:12:58	13:26:38	Stanisława Wyspiańskiego, Poznań	Spider Man
3	2012-06-26 10:59:48	2012-06-26 11:21:44	0:21:56	Rogoziniec	Spider Man
4	2012-06-26 13:26:00	2012-06-29 13:23:40	2 days 23:57:40	Warschauer Straße, Berlin	Ury Gagarin
5	2012-06-29 14:58:30	2012-06-29 15:26:26	0:27:56	Autobahntankstelle West, Köckern	Ury Gagarin
6	2012-06-29 17:36:48	2012-06-29 18:58:18	1:21:30	A9, Pegnitz	Ury Gagarin
7	2012-06-29 20:34:26	2012-06-30 11:51:14	15:16:48	Willy-Brandt-Platz, München	Ury Gagarin
8	2012-06-30 12:19:50	2012-06-30 14:14:46	1:54:56	Brundageplatz, München	Ury Gagarin
9	2012-06-30 15:12:16	2012-06-30 15:48:26	0:36:10	Rasthaus Irschenberg, Irschenberg	Ury Gagarin
10	2012-06-30 16:57:02	2012-06-30 19:19:20	2:22:18	Europabrücke, 2.74 km from Sankt Peter	Ury Gagarin
11	2012-06-30 20:43:18	2012-07-01 16:59:22	20:16:04	Via Dante Alighieri, Brenzone	Ury Gagarin
12	2012-07-01 17:15:10	2012-07-01 17:26:58	0:11:48	Via Imbarcadero, Brenzone	Ury Gagarin
13	2012-07-01 17:39:24	2012-07-01 23:59:26	6:20:02	Via Dante Alighieri, Brenzone	Spider Man
-----	**2012-06-25 20:25:08**	**2012-07-01 23:59:26**	**5 days 14:45:24**	-----	-----

See Data in Reports to learn how time (duration) can be formatted.

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!
You should distinguish parkings from stops.

Rides

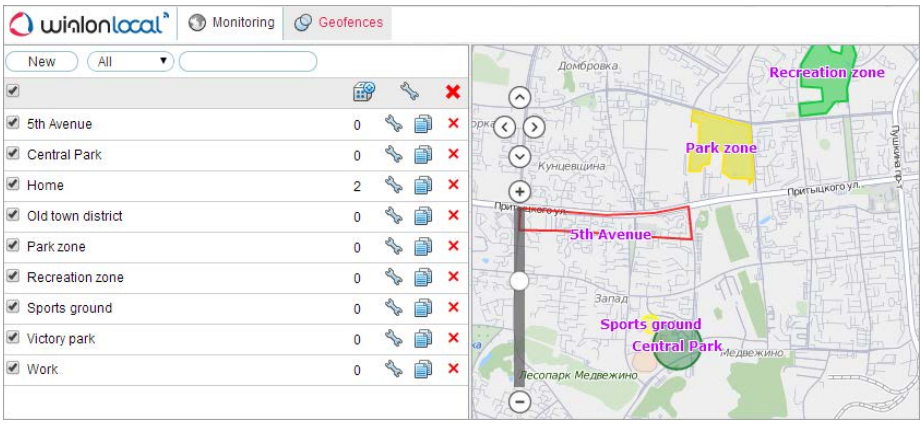
A ride is a travel from one point (called ride beginning) to another (called ride ending). A ride can be done many times in a specified time period. Rides are useful, for example, when controlling cargo transportation form one point to another in several attempts.

For the report to be generated, two factors are significant:
1) when a unit leaves the ride beginning zone;
2) when a unit enters the ride ending zone.
If both of these factors occur, then a ride is completed and can be included in the report. In addition, trip detector is taken into consideration.

Preparing a Ride

To get a report on rides performed, geofences are needed to indicate ride beginning and ride end. The beginning and the end can be the same geofence if the ride starts and ends in one place, for example, if it is necessary to travel ride around some shops and come back to the base.

Let us assume that it is needed to transport goods from one place to another, and more than one ride is needed to do this. To control this process, we create **Point A** geofence and make it the beginning of the ride. Then create **Point B** geofence and make it the end of the ride.



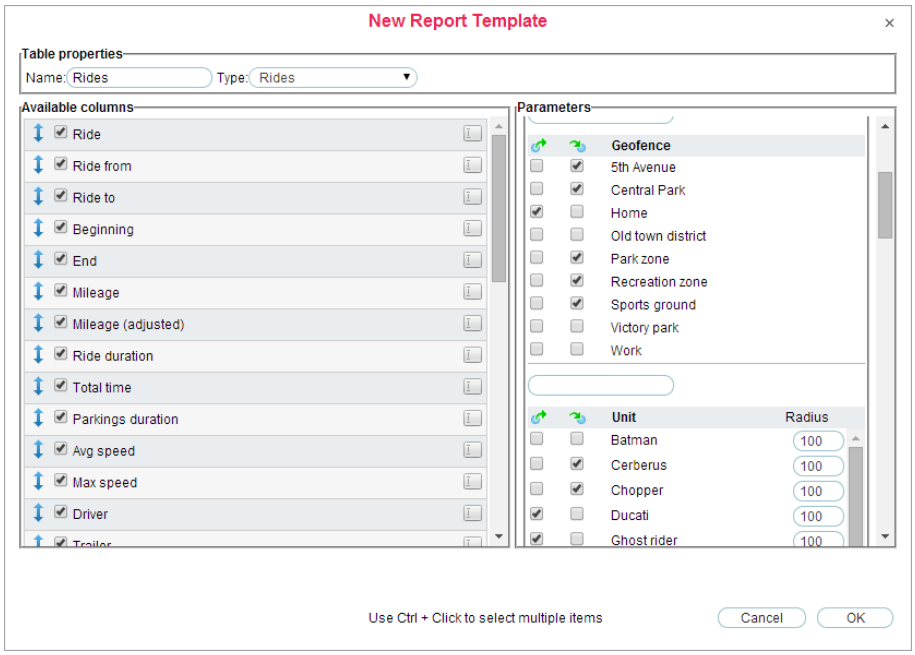
Rides Parameters

When you create a template for rides, pay attention on additional parameters to be set.

Circle ride is a ride that starts and finishes in the same geofence, that is a unit must leave this geofence and return after a while. Such a geofence must have both flags – ride beginning and ride end.

The option **Show rides started/finished with a stop only** can be used as an additional filter. If activated, it means that ride beginning and end can be only a visit to a corresponding geofence with a stop in it. If a unit visited a geofence with ride beginning flag but did not make a stop there, this ride will be not considered by the system. In a similar way, if a unit visited a geofence with ride end flag but did not make a stop there, the ride will continue (if ride beginning was detected before).

In the **Redefine ride beginning/end** section, you choose which geofences and units will be analyzed in this report. The list of geofences includes only those geofences that belong to the same resource as the report template itself. When you create this type of report template, some of the geofences can be already ticked – it means they have corresponding flags in their properties. You can remove flags or set more flags if needed. Besides, you can choose units as so-called 'moving geofences'. For them, set radius to outline unit's area. Geofences and units on the lists are sorted by name. If the list is large, it is convenient to use name mask to quickly find necessary items. You can even set ride beginning at unit area and ride end at an ordinary geofence.



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.

Report on Rides

The report on rides gives the list of all performed rides. The table can contain the following information:

- **Ride**: ride mane consists of starting geofence name and final geofence name hyphenated compound.
- **Ride from**: can be used instead of the previous column. Only the departure geofence is indicated here.
- **Ride to**: destination geofence.
- **Beginning**: date and time when the ride began.
- **End**: date and time when the ride ended.
- **Mileage**: distance travelled in this ride.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Ride duration**: how much time it took to perform the ride.
- **Total time**: time from the first ride beginning to the last ride end (useful if groupping by days is enabled).
- **Parkings duration**: time spent in parkings.
- **Avg speed**: average speed calculated for this ride.
- **Max speed**: maximum speed registered during this ride.
- **Driver**: driver's name if he was identified.
- **Trailer**: trailer's name if any was bound.
- **Counter**: counter sensor value.
- **Initial counter**: counter value at the beginning.
- **Finale counter**: counter value at the end.
- **Count**: the number of rides.
- **Status**: unit status registered during the current ride (if there are several, the first one is displayed).
- **Cargo weight**: weight of a cargo transported within a trip between geofences.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: average fuel consumption in the ride detected by one of the methods mentioned above.
- **Initial fuel level**: fuel level at the beginning of the ride.
- **Final fuel level**: fuel level at the end of the ride.
- **Max fuel level**: maximum fuel level.
- **Min fuel level**: minimum fuel level.
- **Notes**: an empty column for your custom comments.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

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 unit and events about routes were stored in unit history, a report based on these events can be generated:

- **Route**: route name.
- **Schedule**: schedule name.
- **Round**: round name.
- **Beginning**: round beginning time (activation time or entrance in the first check point).
- **Initial location**: unit location at the beginning of the route.
- **End**: round end time (entrance to the last point).
- **Final location**: 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 check points skipped (on this bases more detailed report can be generated – see Check Points).
- **Duration**: time taken to perform the route.
- **Total time**: time from the first route beginning to the last route end (useful if grouping by days is enabled).
- **Mileage**: distance traveled while performing the route.
- **Avg speed**: average speed on the route.
- **Max speed**: maximum speed on the route.
- **Count**: the number of routes.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Notes**: an empty column for your custom comments.

Beginning	Initial location	End	Final location	Route name	Geofence	Result	Skipped points	Duration	Total time	Mileage
2011-10-21 11:42:17	Messegelände, Hannover, Germany	2011-10-21 11:42:17	Messegelände, Hannover, Germany	New Route 36478	Frontier Route	Not finished	0	0:00:00	0:00:00	0.00 km
2011-10-21 13:11:05	Europaplatz, Hannover, Germany	2011-10-21 13:40:10	Europaplatz, Hannover, Germany	Route 57	Frontier Route	Finished	1	0:29:05	0:29:05	7.03 km
2011-10-21 13:42:55	Messegelände, Hannover, Germany	2011-10-21 14:10:18	Europaplatz, Hannover, Germany	Route 36	Frontier Route	Finished	2	0:27:23	0:27:23	6.66 km
2011-10-28 11:42:17	Messegelände, Hannover, Germany	2011-10-28 11:42:17	Messegelände, Hannover, Germany	New Route 36470	Frontier Route	Not finished	0	0:00:00	0:00:00	0.00 km
2011-10-28 13:11:05	Europaplatz, Hannover, Germany	2011-10-28 13:40:10	Europaplatz, Hannover, Germany	Route 5	Frontier Route	Finished	1	0:29:05	0:29:05	7.03 km
2011-10-28 13:42:55	Messegelände, Hannover, Germany	2011-10-28 14:10:18	Europaplatz, Hannover, Germany	Route 36A	Frontier Route	Finished	1	0:27:23	0:27:23	6.66 km

How different route statuses are defined (route beginning, route end, point skipped, point visit, etc.), find here.

In addition, in report template, you can indicate **masks for geofences and routes**. It means you can get in a report not all routes performed by a unit within the indicated period, but only the routes which use a certain geofence or which correspond to the given mask of route name. Both filters can be used simultaneously or separately from each other.

Besides, these filters affect the data layout in the table if the grouping by days/weeks/month is used. For instance, if the data is grouped by days and the filter by geofence is on, the table is built on the basis of geofences. If the data is grouped by days and the filter by routes is on, the table is built on the basis of routes. If both filters are activated, the sorting is made on the basis of both.

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)

A special report can be built to show units' performance of a certain route. The following columns can be presented:

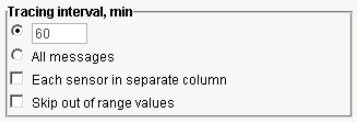
- **Beginning** — round beginning time (activation time or entrance in the first check point).
- **Last activity** – time of latest event concerning this round.
- **Round** – round name.
- **Schedule** – schedule name.
- **Order** – check points order.
- **Unit** — name of unit preforming the round.
- **Status** — 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).
- **Points** — total number of check points in the route (on this bases more detailed report can be generated – see Check Points).
- **Skipped** — the number of check points skipped.
- **Visited** — the number of check points 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

Report type should be *Route*.

Sensor Tracing

This table shows sensor values in certain point 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:

- **Sensor**: sensor name.
- **Time**: the time of the message from which the value was taken.
- **Value**: the value (numbers only).
- **Formatted value**: the value with units of measurement.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Notes**: an empty column for custom notes.

Sensor	Time	Value	Formatted value
Voltage sensor	2013-02-05 00:07:09	12.53	12.53 V
Voltage sensor	2013-02-05 00:57:11	12.51	12.51 V
Voltage sensor	2013-02-05 01:47:13	12.50	12.50 V
Voltage sensor	2013-02-05 02:37:16	12.49	12.49 V
Voltage sensor	2013-02-05 03:27:19	12.48	12.48 V
Voltage sensor	2013-02-05 04:17:21	12.47	12.47 V
Voltage sensor	2013-02-05 05:07:23	12.46	12.46 V
Voltage sensor	2013-02-05 05:57:25	12.46	12.46 V
Voltage sensor	2013-02-05 06:47:28	12.47	12.47 V
Voltage sensor	2013-02-05 07:37:31	12.45	12.45 V
Voltage sensor	2013-02-05 08:27:32	12.42	12.42 V
Voltage sensor	2013-02-05 09:17:34	12.44	12.44 V
Voltage sensor	2013-02-05 10:10:47	14.80	14.80 V

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. Besides, with this option enabled, it is impossible to skip out-of-range values. If you choose this option, the columns 'Values' or/and 'Formatted value' will be generated for each sensor individually (sensor name is given in brackets then). This allows exporting sensor values to MS Excel and eventually building various charts and diagrams on this basis.

Time	Value (Air conditioner)	Value (Counter sensor)
2012-06-10 03:08:46	On	0.00
2012-06-10 03:08:52	On	15.00
2012-06-10 03:08:58	On	17.00
2012-06-10 03:09:00	On	11.00
2012-06-10 03:09:02	On	7.00
2012-06-10 03:09:10	On	0.00
2012-06-10 03:09:14	Off	1.00
2012-06-10 03:09:18	Off	0.00
2012-06-10 03:09:20	On	1.00
2012-06-10 03:09:24	On	0.00
2012-06-10 03:09:54	On	0.00
2012-06-10 03:09:56	On	0.00
2012-06-10 03:10:16	Off	0.00

In addition, you can choose a driver/trailer and geofences/units to be controlled (see intervals filtration for details).

Out of range values

If a value received is out of range (the bounds are indicated in sensor properties), then the phrase *Out of range* is displayed as formatted value and the number «-348201,39» gets into the Value column. To exclude such rows, flag

the option *Skip out of range values* in the report template.

SMS Messages (for unit)

This report gives possibility to view all SMS messages received from a unit in a specified period. Here you see date and time when the message was received and the text of the message.

- **Time received**: date and time when the data was received by the server.
- **SMS text**: message text.
- **Count**: the number of messages.
- **Notes**: an empty column for your custom comments.

Time received	SMS text
2010-03-26 17:36:02	GPS:1 Sat:7 Lat:53.914577 Long:27.451012 Alt:272 Speed:0 Dir:0 Date: 2010/3/26 Time: 15:35:48
2010-03-26 17:37:14	WARNING: Not supported Param ID detected: 245
2010-03-29 07:22:28	04B8B24213C00000401F7112609901D60263C09B000141F0769415F6
2010-03-29 10:01:20	Param ID:3245 New Text:212.98.191.50
2010-03-29 10:02:43	WARNING: Not supported Param ID or Value detected: 311
2010-03-29 10:04:38	Param ID:3231 New Val:1
2010-03-29 10:04:47	WARNING: Not supported Param ID or Value detected: 11

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 information may contain the following columns:

- **Time** — time of sending a message.
- **User** — name of a user sending a message.
- **Phone** — a phone number the message is sent to.
- **Parts** — number of parts the message consists of.

Time	User	Phone	Parts
2014-06-04 14:13:41	user1	+375299000001	1
2014-06-04 14:15:54	user1	+375299000001	1
2014-06-04 14:15:59	user1	+375299000001	1
2014-06-04 14:16:03	user1	+375299000001	1
2014-06-04 14:16:07	user1	+375299000001	1
2014-06-05 12:27:40	user2	+375299000001	1
2014-06-05 12:27:45	user2	+375299000001	1
2014-06-05 12:27:49	user2	+375299000001	1

Speeding

This kind of report shows speed limitation violations. The parameters for this report are set in Unit Properties => Advanced in the block of speeding. The messages (at least two in succession) containing a speed value greater than set in that parameter will become the basis for this report. If these messages are several in succession, they are united in one speeding event.

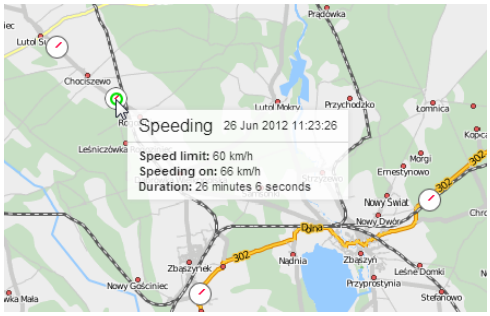
The following information can be presented in this kind of report:

- **Beginning**: date and time when the speed limit was exceeded.
- **Location**: device location at that moment.
- **Duration**: how long the violation continued.
- **Total time**: time from the first speeding beginning to the last speeding end (useful if grouping by days is enabled).
- **Max speed**: maximum speed within this period.
- **Speed limit**: maximum allowed speed on particular road section or in unit properties.
- **Mileage**: the distance travelled with exceeded speed.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Avg speed**: average speed within the interval.
- **Average excess**: average speed excess within the interval.
- **Driver**: driver's name (if a driver was identified).
- **Trailer**: trailer's name if any was bound.
- **Count**: the number of speed violations.
- **Notes**: an empty column for your custom comments.

Beginning	Location	Duration	Max speed	Mileage	Driver
2012-06-25 18:27:30	E30, Cesarka	0:00:38	136 km/h	1.44 km	Spider Man
2012-06-25 18:30:56	E30, Szczawin Przykościelny	0:39:08	158 km/h	88 km	Spider Man
2012-06-25 19:16:16	E30, Krągola	0:09:04	167 km/h	22 km	Spider Man
2012-06-25 19:28:14	E30, Wola Koszucka	0:02:18	146 km/h	5.57 km	Spider Man
2012-06-25 19:32:30	E30, Chwalibogowo	0:08:56	156 km/h	21 km	Spider Man
2012-06-25 19:59:02	E30, Borzejewo	0:04:20	146 km/h	10.20 km	Spider Man
2012-06-26 10:28:20	E30, 10.68 km from Poznań	0:01:36	146 km/h	3.82 km	Eric Clapton
2012-06-26 10:31:24	E30, Leśniczówka Palędzie	0:26:30	146 km/h	63 km	Eric Clapton
2012-06-26 11:28:28	E30, 3.06 km from Kolonia Golińsk	0:11:18	147 km/h	27 km	Mister X
2012-06-26 11:40:58	E30, Kolonia Raków	0:08:08	146 km/h	19.80 km	Mister X

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:

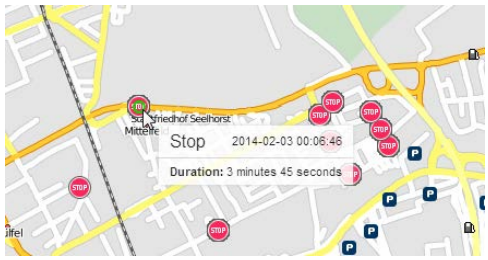
- **Beginning**: the time when the stop started.
- **End**: the time when the stop ended.
- **Duration**: total time of the stop.
- **Total time**: time from the first stop beginning to the last stop end (useful if grouping by days is enabled).
- **Off-time**: time from the end of the previous stop to the beginning of this one.
- **Location**: the address where the unit stopped.
- **Driver**: driver's name if available.
- **Trailer**: trailer's name if any was bound.
- **Count**: the number of stops.
- **Counter**: counter sensor values.
- **Notes**: an empty column for your custom comments.

№	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 by corresponding markers on the map.



Summary

This kind of report allows to from a table with diverse data concerning a period of time and at the same independent of any conditions like trips, sensor operation, geofence visit, etc. In other words, summary report processes all the messages for the indicated period regardless to the unit's duration of work, and time spent in motion.

The following columns can be included:

- **Mileage in trips** — mileage on the interval by trip detector.
- **Mileage in all messages** — mileage on the interval by mileage counter.
- **Mileage (adjusted)** — mileage on the interval by mileage counter multiplied by mileage coefficient (a setting in unit properties). More about mileage in reports...
- **Avg speed** — average speed on the interval.
- **Max speed** — maximum speed on the interval. More about speed in reports...
- **Move time** — time in trips.
- **Engine hours** — time of engine hours operation.
- **Engine efficiency duration** — the duration of attached implements operation (if having engine efficiency sensor).
- **Parkings** — total time of parkings on the interval.
- **Counter** — counter sensor value.
- **Initial counter** — counter value at the beginning of the interval.
- **Final counter** — counter value at the end of the interval.
- **Custom sensor initial value** – 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 name is written in brackets. Custom sensors name masks can be indicated in the right part of the template dialog.
- **Custom sensor final value** – custom sensor value at the end of the interval.
- **Difference** – difference between initial and final values of custom sensor.
- **Utilization** — percentage ratio of engine hours duration to engine hours rate (engine hours divided by daily engine hours rate indicated in unit properties).
- **Useful utilization** — percentage ratio of engine efficiency duration to engine hours rate.
- **Productivity** — percentage ratio of engine efficiency duration to engine hours duration.
- **Consumed by…** — the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Besides, in report template (on the right) you can specify additional parameters to calculate fuel: on the whole intervals, in trips or in engine hours.
- **Avg consumption by…** — average fuel consumption on the interval. Details about fuel in reports...
- **Initial fuel level** — counter value at the beginning of the interval.
- **Final fuel level** — counter value at the end of the interval.
- **Total fillings** — number of fuel fillings detected.
- **Total thefts** — number of fuel thefts detected.
- **Filled** — volume of filled fuel (only fuel fillings detected by a sensor).
- **Stolen** — volume of stolen fuel.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

Fuel can be calculated for the whole interval, in trips or in engine hours, which is chosen in 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 engine hours sensor.

When a report is generated for a single unit, it makes sense to enable grouping by days/weeks/month. Otherwise, there will be only one row in the resulting table — summarized data for the whole interval. In reports for units groups (without grouping) a row corresponds to a unit.

Unit	Mileage	Move time	Engine hours	Parkings	Consumed by rates	Filled	Stolen
Fish Boat	1761 km	1 days 14:10:47	0:00:00	2 days 19:48:49	174 lt	0 lt	0 lt
Nature Morte	221 km	12:04:48	0:00:00	3 days 15:39:08	0 lt	0 lt	0 lt
Riviera	9.06 km	0:14:25	0:00:00	4 days 10:37:04	106 lt	147 lt	7 lt
SMS Sim004	37529 km	3 days 12:29:27	0:00:00	3 days 12:02:45	447 lt	0 lt	0 lt
SMS Sim011	137 km	9:27:44	9413:13:06	3 days 20:45:21	0 lt	0 lt	0 lt
SMS Sim012	49 km	11:02:56	0:00:00	3 days 19:10:04	391 lt	0 lt	0 lt

Trips

This kind of report shows intervals of movement with indication of time, location, and other parameters such as speed, mileage, fuel, and many others. Intervals of movement (trips) are detected according to parameters set in Trip Detection and adjusted for each unit individually.

The following columns can be included in this kind of report:

- **Beginning**: date and time when the trip began.
- **Initial location**: the address where the device was at the beginning of the trip.
- **End**: date and time when the trip ended.
- **Final location**: the address where the device was at the end of the trip.
- **Driver**: driver's name (if a driver was identified).
- **Trailer**: trailer's name if any was bound.
- **Duration**: time interval of the trip.
- **Total time**: time from the first trip beginning to the last trip end (useful if grouping by days is enabled).
- **Off-time**: period of time passed from the end of the previous trip to the beginning of the current one.
- **Engine hours**: time of engine hours operation during the trip (you can specify engine hours sensor entering name mask for it in the report template).
- **Mileage**: the distance traveled in the whole trip.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Urban mileage**: the distance traveled in urban area.
- **Suburban mileage**: the distance traveled in suburban area. It is calculated in regard to speed. The urban/suburban speed line is indicated in Unit Properties => Advanced (*Urban speed limit* setting).
- **Initial mileage**: mileage counter value at the moment of trip beginning. If no saving of mileage parameter was made through the reported period, mileage is counted from 0.
- **Final mileage**: mileage counter value at the moment of trip ending.
- **Avg speed**: average speed within the trip.
- **Max speed**: maximum speed registered within this interval.
- **Trips count**: the number of trips made.
- **Counter**: counter sensor value.
- **Initial counter**: counter value at the beginning of the trip.
- **Finale counter**: counter value at the end of the trip.
- **Avg engine revs**: average rate of engine revolutions.
- **Max engine revs**: maximum rate of engine revolutions.
- **Status**: unit status registered during the current trip (if there are several, the first one is displayed).
- **Cargo weight**: weight of a cargo transported within a trip.
- **Messages count**: the number of messages that formed the trip.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Details about fuel in reports...
- **Rates deviation by ImpFCS/AbsFCS/InsFCS/FLS**: difference between consumed fuel detected by a sensor and consumption rates. If a number in this cell is negative, it means detected consumption does not exceed the indicated rates.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: average fuel consumption in the trip detected by one of the methods mentioned above.
- **Avg consumption in idle run by ...**: average fuel consumption in the trip during idle run.
- **Avg mileage per unit of fuel by ...**: average fuel consumption (per one liter/gallon) in the trip detected by one of the methods mentioned above.
- **Initial fuel level**: fuel level at the beginning of the trip.
- **Final fuel level**: fuel level at the end of the trip.
- **Max fuel level**: maximum fuel level in the trip.
- **Min fuel level**: minimum fuel level in the trip.
- **Notes**: an empty column for your custom comments.

- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

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 discover more about formatting time, mileage, fuel, etc.

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, stops, sensors, driver, fuel fillings, fuel thefts, and geofences/units. For example, you can query trips with a sensor on

The tracks of the trips can be displayed on the map. To make use of this feature, select Tracks on map option in report template.

Unfinished Rides

See the previous topic Rides to learn how to prepare rides for this report.

Unfinished is a ride when a unit left a beginning-ride geofence and after a while entered a beginning-ride geofence again. This can be the same geofence (if circle rides are not allowed) or another one.

The structure of the report is the same as for usual rides:

- **Ride**: departure and destination geofences.
- **Ride from**: can be used instead of the previous column. Only the departure geofence is indicated here.
- **Ride to**: destination geofence.
- **Beginning**: date and time when the ride began.
- **End**: date and time when the ride ended.
- **Mileage**: distance travelled in this ride.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Ride duration**: how much time it took to perform the ride.
- **Parkings duration**: time spent in parkings.
- **Avg speed**: average speed calculated for this ride.
- **Max speed**: maximum speed registered during this ride.
- **Driver**: driver's name if he was identified.
- **Trailer**: trailer's name if any was bound.
- **Counter**: counter sensor value.
- **Initial counter**: counter value at the beginning.
- **Finale counter**: counter value at the end.
- **Count**: the number of rides.
- **Status**: unit status registered during the current ride (if there are several, the first one is displayed).
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Details about fuel in reports...
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: average fuel consumption in the ride detected by one of the methods mentioned above.
- **Initial fuel level**: fuel level at the beginning of the ride.
- **Final fuel level**: fuel level at the end of the ride.
- **Max fuel level**: maximum fuel level.
- **Min fuel level**: minimum fuel level.
- **Notes**: an empty column for your custom comments.
- **Eco driving**: penalties calculated for adjusted Eco Driving criteria.

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 Rides to find out more information about additional parameters for *Unfinished rides*.

Utilization Cost

The table on utilization costs unites two kinds of expenses: maintenance and fillings. Both of these things 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 (*no* fillings detected by a fuel sensor).

The table can be composed of the following columns:

- **Time**: date and time that were indicated during the registration.
- **Registration time**: date and time when the event was registered.
- **Expense item**: maintenance or filling.
- **Description**: custom description entered when registering.
- **Location**: location indicated while registering (together with comments entered manually).
- **Cost**: 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 place was indicated on the map during the registration.

Violations

Violations are particular case of events. The report on violations gives the list of violations detected and registered in unit history.

Violations are:

1. Triggered notifications which method of delivery is *Register as violation*;
2. Manually registered custom events if they have the *Violation* flag.

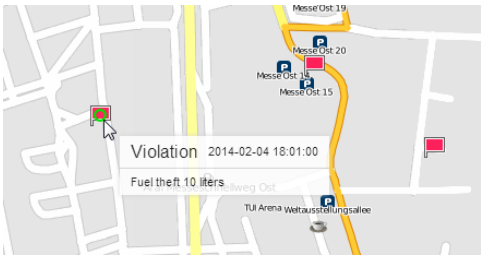
To make a report dedicated just to violations of a certain kind, in report template enter a mask to filter violations text/description (like *speed*, *accident*, *temperature*, etc.). Only those messages which text corresponds to the given mask will be added to the table.

The following information can be presented in this kind of report:

- **Violation time**: time when the violation happened.
- **Time received**: time when the server received this data.
- **Violation text**: notification text or event description.
- **Location**: unit location at that moment.
- **Count**: the number of violations.
- **Notes**: an empty column for your custom comments.

Violation time	Violation text	Location
2012-12-16 17:34:00	Fuel theft 10l	Daugai, Pergalės gatvė
2013-01-07 17:39:00	Unit 'Shoothing Star': connection loss at 2013-01-07 11:38:44 near 'Vytauto gatve'.	Daugai, Vytauto gatvė
2013-01-16 17:36:00	Unit 'Shooting star' violated speed limitations. At 2013-01-05 11:38:44 it moved with speed 100 km/h.	Daugai, Sporto gatvė
2013-01-16 17:41:00	Fuel theft 13 lt	Maironio gatvė, Doškonys

In addition, you can use special markers for this report.



Visited Streets

This report shows which 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**: street, roads, highway, etc. name.
- **Initial location**: place where the first messages from this street was received. It can be the same as the previous cell or more detailed (for example, it can additionally contain house number).
- **Beginning**: time when the unit started moving along this street.
- **End**: time when the unit left the street.
- **Duration**: total time the unit was there.
- **Mileage**: distance that was traveled by the unit while moving through this street.
- **Mileage (adjusted)**: mileage subject to the coefficient set in advanced unit properties. About mileage in reports...
- **Avg speed**: average speed while moving along this street.
- **Max speed**: maximum speed detected while moving along this street. About speed in reports...
- **Streets count**: the number of performed visits (useful if grouping by days/weeks/month is enabled).
- **Notes**: an empty column for your custom comments.

№	Street	Beginning	End	Duration	Mileage	Avg speed	Max speed
1	Gartenstraße, Velden am Wörther See	2012-07-16 00:05:18	2012-07-16 00:24:30	0:19:12	0.04 km	0 km/h	6 km/h
2	Elisabethpromenade, Velden am Wörther See	2012-07-16 00:24:30	2012-07-16 10:50:00	10:25:30	0.06 km	0 km/h	10 km/h
3	Augsdorfer Straße, Velden am Wörther See	2012-07-16 10:50:00	2012-07-16 11:16:12	0:26:12	0.19 km	0 km/h	31 km/h
4	Seecorso, Velden am Wörther See	2012-07-16 11:16:12	2012-07-16 11:39:28	0:23:16	1.42 km	4 km/h	37 km/h
5	Augsdorfer Straße, Velden am Wörther See	2012-07-16 11:41:44	2012-07-16 11:51:58	0:10:14	0.39 km	2 km/h	23 km/h
6	Am Corso, Velden am Wörther See	2012-07-16 11:55:50	2012-07-16 12:09:06	0:13:16	0.46 km	2 km/h	14 km/h
7	Klagenfurter Straße, Velden am Wörther See	2012-07-16 12:09:06	2012-07-16 12:32:16	0:23:10	1.44 km	4 km/h	56 km/h
8	Klagenfurter Straße, Velden am Wörther See	2012-07-16 12:33:00	2012-07-16 12:39:10	0:06:10	1.82 km	18 km/h	59 km/h
9	Süd-Autobahn, Tibitsch	2012-07-16 12:40:34	2012-07-16 12:53:00	0:12:26	1.09 km	5 km/h	112 km/h
10	Kärntner Straße, Sankt Peter	2012-07-16 13:08:26	2012-07-16 13:12:36	0:04:10	7.43 km	107 km/h	107 km/h
11	Klagenfurter Schnellstraße, Sankt Peter	2012-07-16 13:14:08	2012-07-16 13:20:10	0:06:02	10.50 km	104 km/h	112 km/h
12	Klagenfurter Schnellstraße, Olsa	2012-07-16 13:24:02	2012-07-16 13:27:20	0:03:18	6.18 km	112 km/h	126 km/h
13	Klagenfurter Schnellstraße, 3.64 km from Olsa	2012-07-16 13:27:26	2012-07-16 13:34:22	0:06:56	8.43 km	73 km/h	103 km/h
14	Murtal-Schnellstraße, 1.08 km from Unzmarkt	2012-07-16 13:49:36	2012-07-16 13:52:44	0:03:08	4.20 km	80 km/h	101 km/h

When clicking on a green cell in the table, the map is moved in such a way to display a point where the unit entered or left the indicated street, or reached the maximum speed, and this place is highlighted by a special marker.

Sometimes there can be gaps in cells. It may happen when only one message from a place was received in succession. In such cases, just the name of the street and arrival time are given.

Intervals filtration can be applied to this table: by duration, mileage, engine hours, speed range, trips, stops, parkings, sensors, fuel fillings and thefts. For example, you can get streets where a sensor was on or the streets where a sensor was off.

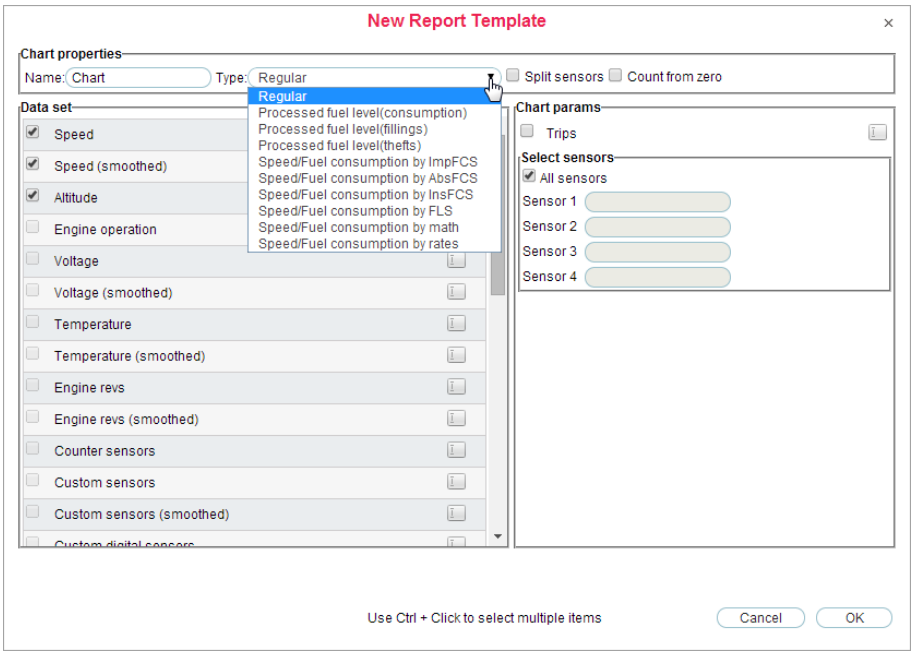
Charts

Some reports give information in the form of a chart. For instance, it can be a chart showing how a unit speed varied with time or a chart showing dependence of fuel consumption on speed, and many other kinds of charts.

To receive charts in reports you need to have corresponding equipment (sensors) properly installed and configured (except for some charts like Speed or Altitude which do not require any special sensors). How to create and configure sensors, read in the section Sensors.

To add a char to a report template, click the **Add Chart** button in the template properties dialog. A chart cannot be included to a report if report type is *Unit group*.

Enter a name for a chart or live default *Chart* (the same for all charts).



Regular Charts

There are several **types** of charts. First of all, this is Regular type. Their X axis always presents time scale, and you choose data for Y axis:

- Speed
- Altitude
- Engine operation
- Voltage
- Temperature
- Engine revs
- Cargo weight
- Counter sensor
- Custom sensors
- Custom digital sensors
- Absolute mileage
- Mileage in trips
- Instant mileage
- Fuel level (no filtration is applied)
- Processed fuel level (filtration is applied)
- Fuel consumption by ImpFCS
- Fuel consumption by AbsFCS

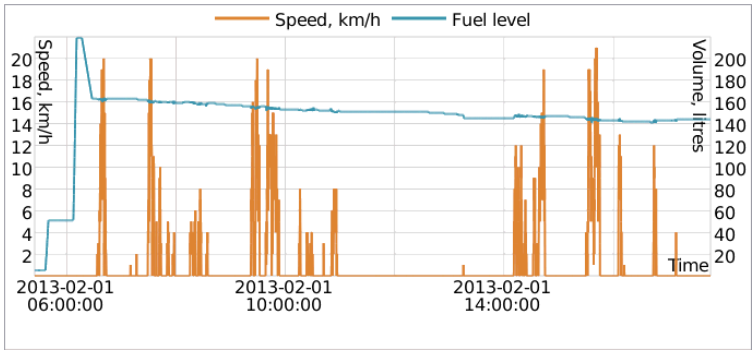
- Fuel consumption by InsFCS
- Fuel consumption by FLS
- Fuel consumption by math
- Fuel consumption by rates

Attention!
This list depends on purchased modules.

The names of these items are editable. However, when building a curve for a sensor, it will borrow sensor name.

Select data set for the chart checking necessary items in the list. You can select two items, then the chart will contain two curves, for example, speed and engine revs. You can select even more items but note that only two variables can exist in one chart in addition to time. It means if Y axis presents speed scale at the left and temperature scale at the right, there is no place for engine revs. But if Y axis presents speed scale at the left and consumption by ImpFCS at the right, it is still possible to add consumption by AbsFLS and other methods because all they are measured in the same metrics and will use Y right scale.

In the picture below there a speed chart united with fuel level chart. To receive such a chart, it is needed to set Regular chart type and select Speed and Fuel level for data set.



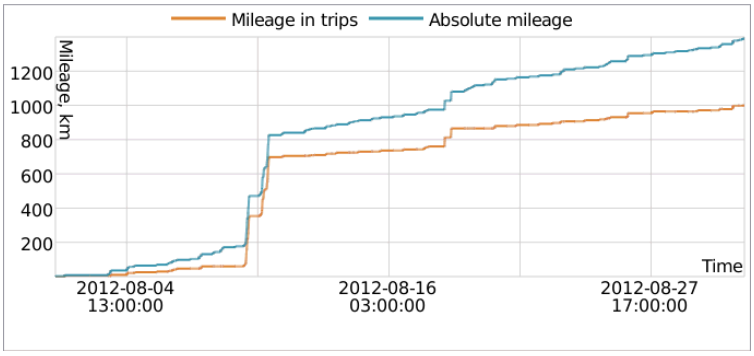
If there are more than one curve in the chart, they are displayed in different colors. At the top of the chart you can see the names of all lines as they are indicated in the report template or sensors names. In addition, the metrics are indicated for all axes.

Fuel Level Charts

Fuel level chart represents 'raw' data. On the contrary, *Processed fuel level* chart shows filtered data. At that, *Processed fuel level* chart does not work if the flag *Time-based calculation of fuel consumption* is disabled.

Mileage Charts

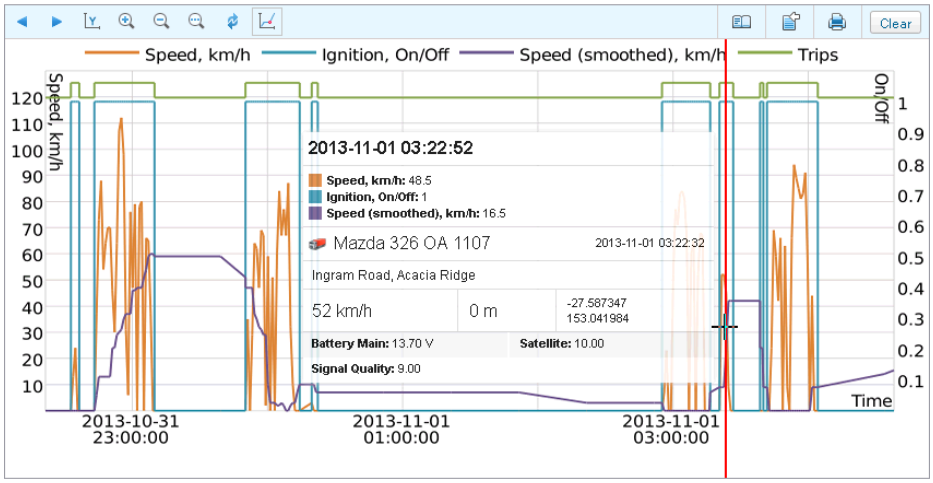
Four kinds of mileage chart can be created: absolute mileage, mileage in trips, instant mileage, and instant mileage smoothed. The first two show how mileage changed (increased) with time. Absolute mileage chart is built on the bases of *all* messages. That means any inaccuracy and outlying data affect the resulting chart. Mileage in trips chart considers trip detector that is chows mileage in trips only. Below you see the chart with curves: absolute mileage (blue) and mileage in trips (orange).



Instant mileage represents data in the form 'mileage from the previous message to the current one' that is 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.

Chart Management

A handy interface provides enough tools to work with charts. You can adjust a needed zoom, move along the chart left and right, get a precise sensor value in the indicated point, etc.



Above the chart, there is a toolkit with useful buttons:

Scroll right/left	To navigate a chart along the X axis, use the corresponding arrow-shaped buttons. They are useful if the current zoom level does not hold the whole chart. The chart shifts right and left by a quarter of its visible part.
Y axis auto zoom	Use this button to scale the Y axis. If the button is pressed and you are changing chart zoom along the X axis, then the Y scale is recalculated automatically in such a way to use the maximum of chart space. If the button is released, the Y scale always stays unchanged.
Zoom in/out	The buttons to scale a chart along the X axis make visible area of the chart twice as wide or twice as narrow in regard to the current position. At that, the center of the chart stays in its place.
Custom zoom	When the custom zoom is activated, a mouse cursor is displayed as a blue vertical line. Holding the left mouse button you can select a needed area of a chart to increase it. You can repeat the operation several times.
Reset	To see the chart in its initial position and scale, press the Reset button.

Pay attention that there is one more parameter which affects chart zoom. This option is set in report template and called *Count from zero*. If it is on, the Y axis will always have zero despite of the position of the *Y axis auto zoom* button.

Chart tracing

To get a sensor value in a given point, activate *Trace chart values* option. A mouse cursor is then displayed as a red vertical line. Place it over any place on the chart and get detailed information at that point (as in the picture above). Three sections can be contained in the popup tooltip:

1. Time where the cursor is placed and all values of the curves for this point.
2. Message nearest to this point: time (can slightly differ from the time of the cursor!), location, speed, coordinates, altitude.
3. Values of all visible sensors at this point.

If the X axis shows time, you can click on any place of the chart to move to the corresponding location on the map.

Transfer from chart to messages

You can move to unit's messages straight from an online chart to analyze initial data. To do this, press the 'Transfer to messages' button in the toolkit. Then, click on any place of the chart to load messages for the reported period with focus on clicked point. Other functionality is the same as with tables.

When switching between charts, the button is released automatically.

Chart Parameters

Select Sensors

In the right part of the dialog, you can indicate sensors to form the chart. This selection does not affect such charts as Speed, Altitude, Fuel consumption by math and Fuel consumption by rates because they do not need any sensors to be built.

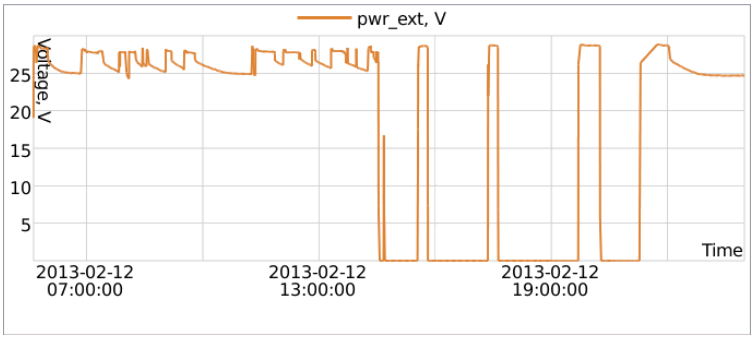
To indicate necessary sensors, enter a mask to search sensors – full sensor name or its part using wildcard symbols like asterisk * (replaces any number of characters) or question sign ? (replaces one character). Sensor name cannot contain comma.

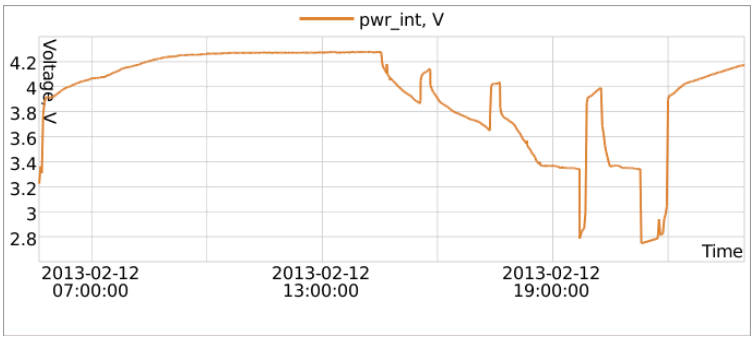
You can skip this possibility and select **All sensors** option. In this case, the system will automatically define sensors of a required type when building a certain chart.

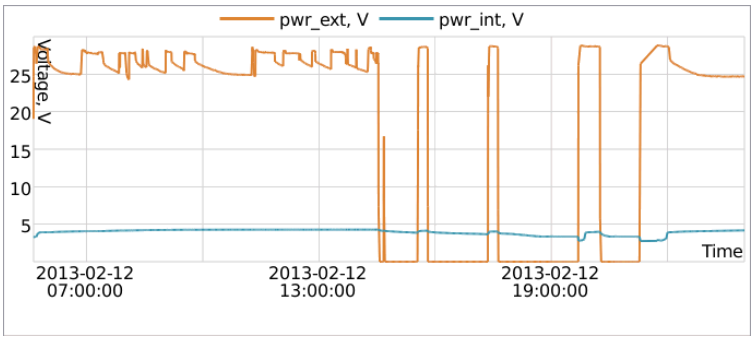
If any masks are assigned and *All sensors* option is selected, the chart will be built for all sensors and masks will be cleaned.

Split Sensors

If there are several sensors of the same type and a chart of the same type is created, the curves for all sensors will appear in one chart. To split them, choose the appropriate option **Split sensors**. Then an individual chart will be built for each sensor. For example, there is a unit with two voltage sensors – external voltage and internal voltage. If creating a voltage chart for this unit, we can get one chart with two curves on it or two chart with one curve on each (if *Split sensors* option is enabled).





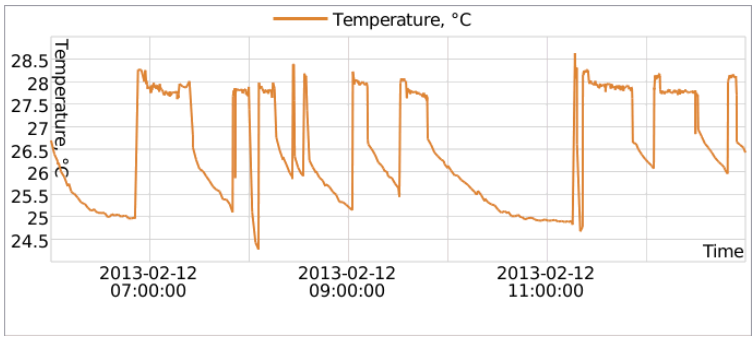


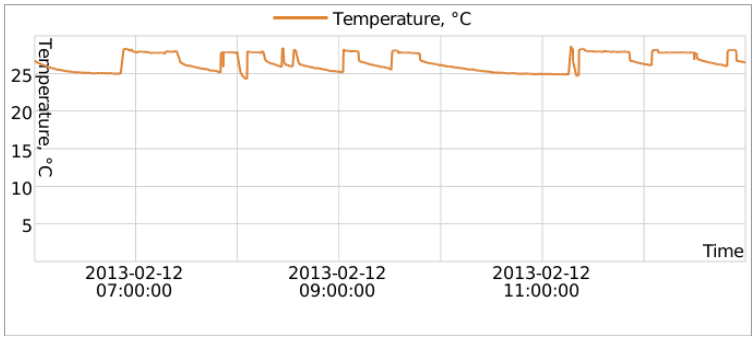
If several data is selected for the chart and for each several sensors exist, the *upper* one will be split. Let us assume that a unit has two voltage sensors and two temperature sensors, and you are building a voltage/temperature chart for it. If *Split sensors* option is off, you will get one chart with four curves in it. If *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 again two temperature sensors.

Count from Zero

This flag is responsible for chart zoom. By default, Y scale range depends on the range of values found within the interval. For instance, if the temperature varies from 3 to 5, Y axis begins from 3, and the curve occupies maximum space in the chart. If the option **Count from zero** is activated, Y axis is built from zero to the highest value (or from the lowest value to zero if the values are negative).

In the picture below you see two temperature charts built for one unit for the same period. The first chart is regular; the second one has the flag **Count from zero**.





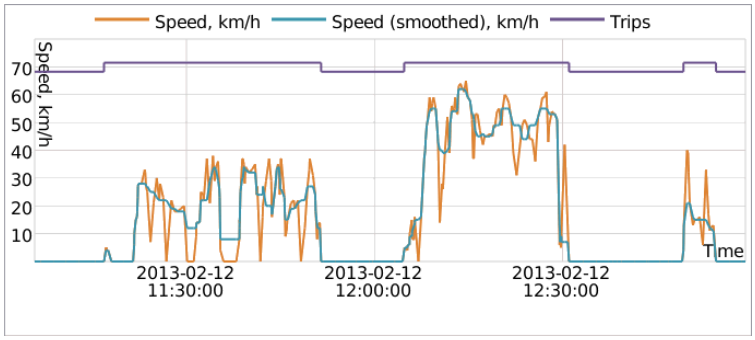
Trips

The chart can contain a special line displaying unit state: upper position is for movement (trip), lower position is for stay. Movement/stay intervals are detected according to trip detector settings. If trip detector is not set, the line will not appear. To activate the line, choose **Trips** option in chart parameters.

Smoothing

Almost all regular charts can be presented in two forms: raw and smoothed. Raw charts are drawn from one message to another in a linear way and have angular look. Smoothed charts look more streamlined. The smoothing algorithm is the same for all chart kinds.

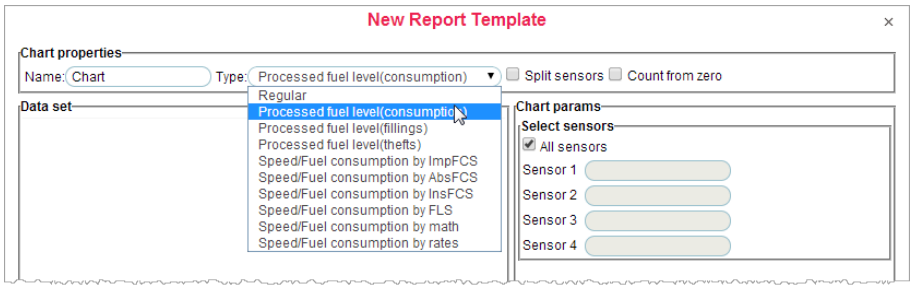
Below is an example where the orange line displays a raw speed chart, and the blue line displays a smoothed speed chart. The violet line is to indicate trip and stay intervals.



Special Charts

Along with the regular charts, you can generate the following charts:

- Processed fuel level
- Speed/Fuel Consumption by…



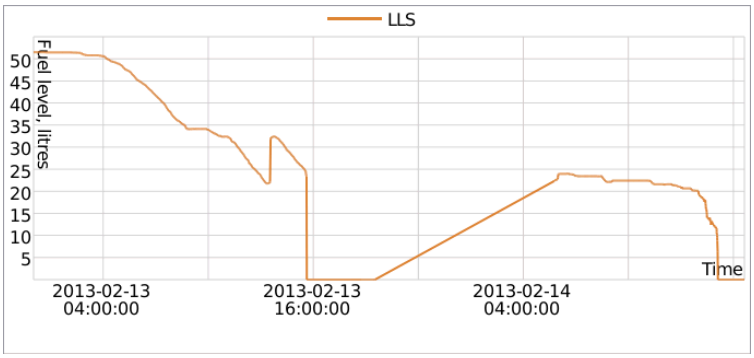
The axes of these charts cannot be changed, however, it is possible to change chart name and use *Select sensors* and *Split sensors* options.

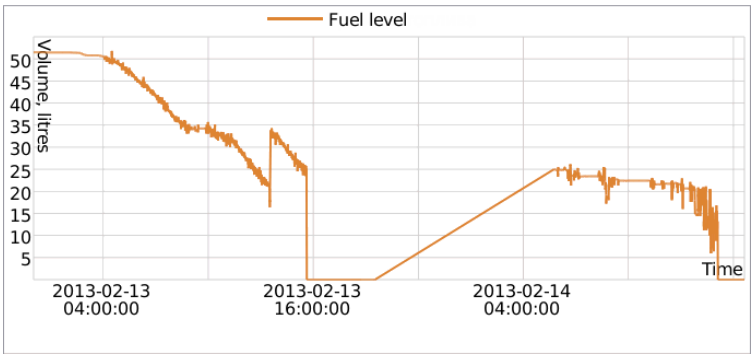
Processed Fuel Level

Processed fuel level chart shows the values which are used while calculating fuel level, fillings and thefts in tables.

The chart shows how fuel level changes in time or depending on mileage. The caption of the tab will be correspondingly Time/Fuel level or Mileage/Fuel level. The chart Time/Fuel level is built only if in unit configuration the option *Time-based fuel level sensors consumption* is on. In all other cases, the chart Mileage/Fuel level is built. Besides, the data is processed according to filtration level set on the Fuel Consumption tab (the option *Filter fuel level sensors values*) or in sensor properties.

Below are two fuel level charts: the first one is processed (time-based FLS is on, filtration is on, filtration level is 25), and the second one is not processed.





A special chart *Processed fuel level* should be distinguished from two similar regular charts:

1. Regular chart *Fuel level* represents the raw data (no filtration is applied). The flag *Time-based fuel level*

sensors consumption does not affects the chart.

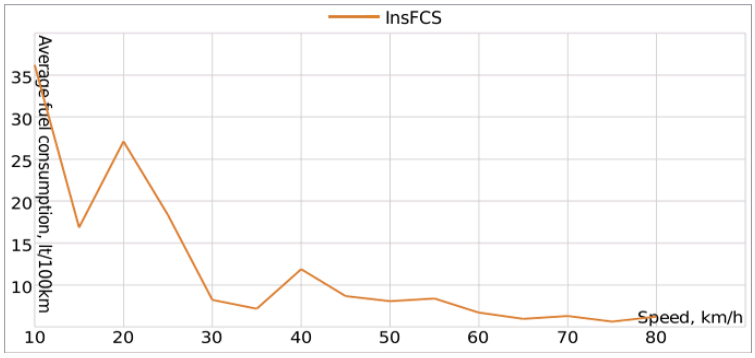
2. Regular chart *Processed fuel level* is not available if the option *Time-based fuel level sensors consumption* is off. If the option is on, the filtration is applied.

These regular charts can represent data only in the form Time/Fuel level. Besides, it is possible to overlay other charts, such as voltage chart, for example. Special charts cannot be combined with other charts.

Speed/Fuel Consumption Chart

This chart shows dependence of average fuel consumption on speed. The data for these charts can be taken from fuel consumption sensors of different types (as impulse, absolute, instant) or fuel level sensor, or predefined consumption by math or rates. The appropriate calculation methods must be indicated in unit properties on the Fuel Consumption tab.

For example, to create this chart, a unit with instant fuel consumption sensor (InsFCS) was used.



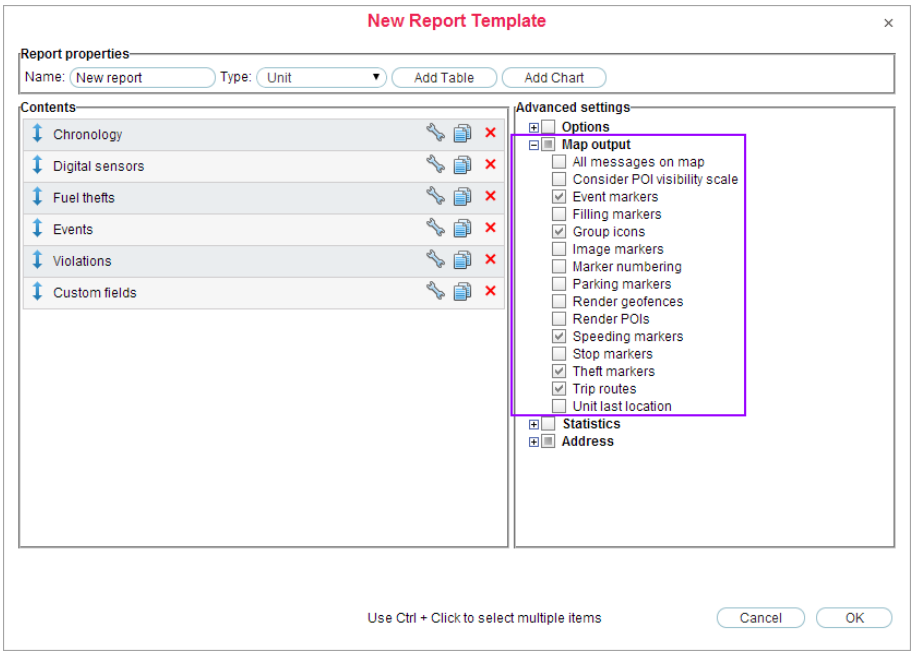
Map Output

In the Reports panel, the map can be scaled and moved in the same way as everywhere else: zoom, move, apply tools, change the map source, etc. Even being in the Reports panel you can still track your units. Besides, some specific map options can be applied exactly to reports.

The map with tracks can be also exported to HTML or PDF file together with report text. To include the map to the exported report, in the Export dialog check the box *Attach map*.

In such reports as 'Trips', 'Parkings', 'Fuel fillings' and many others which contain information about unit location, this location can be easily shown on the map. To move to a place where something happened, click on a green row of the table. The map will be centered on the place and a marker will appear there. A similar feature is available in the regular charts (where the X axis displays time): when using the trace tool, you move to the requested massage 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 routes traveled by unit, created POI and 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 graphical elements are shown for the current report. If generating a new report, all tracks and markers from the previous report will be erased and replaced by new.

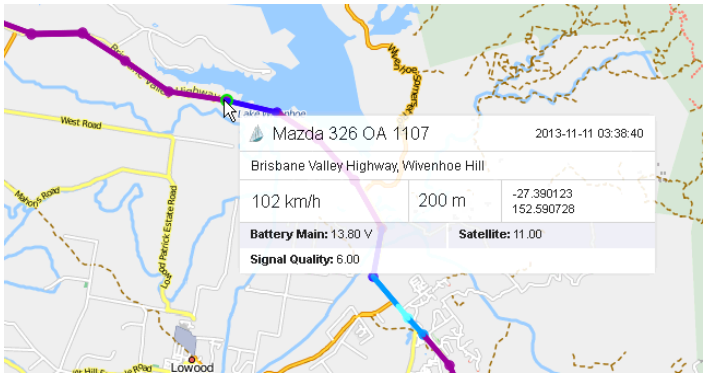
When switching to other panels, all graphical elements from the current online report as well as map position and zoom remain on the map. To remove them, return to the Reports panel and push the Clear button. Alternatively, the graphics of any panel can be hidden or displayed again. To do this, check the corresponding boxes in the horizontal menu. More...

Tracks on Map

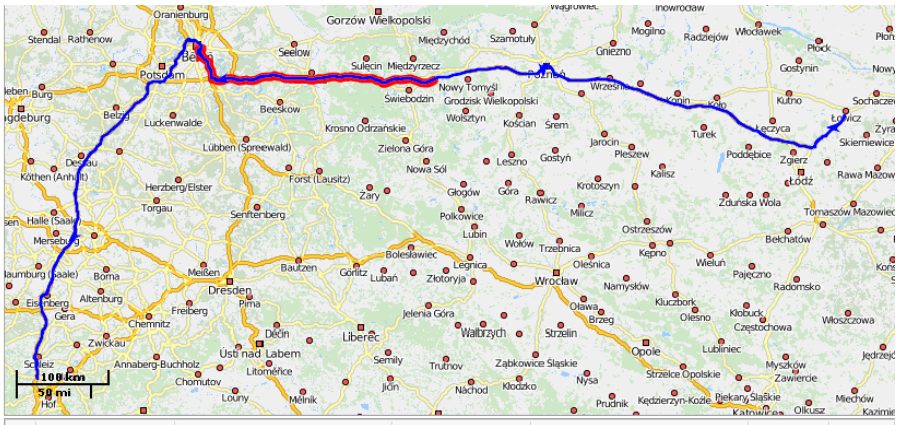
The routes traveled by a unit in a chosen period of time can be shown on the map. To do this, in advanced settings a report template dialog select the corresponding options – *Trips routes* or *All messages on map*. These options are similar but a bit different. In case of *Trip routes*, only the intervals considered as trips (according to Trip Detector) will be displayed as tracks. In case of *All messages on map*, all messages with valid coordinates will be converted into a track. If in unit history there are intervals where the connection has been lost (no messages for a long time) or coordinates miss 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 many-colored tracks according to speed or sensor state. The set of colors to be used in tracks is defined in Unit Advanced Properties).

Besides, to get information about track points, hover mouse cursor over and see information in a tooltip (time, speed, coordinates, altitude, sensor values). Note that messages are searched in the radius of 50 pixels to the cursor.

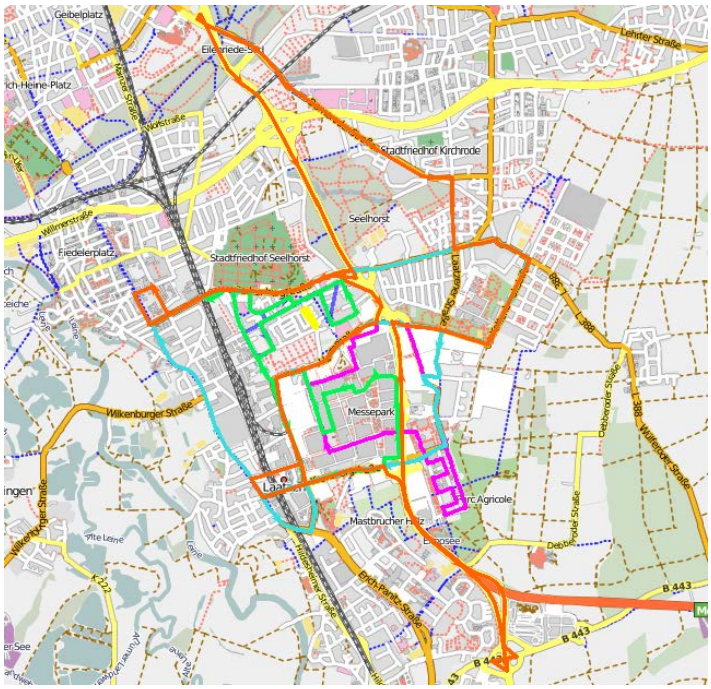


If tracks or all messages are on, then in such tables as Trips, Rides, Engine hours, Speedings will be supplied with an additional first column containing the icon of the binoculars. When clicking on the icon, the map is centered at a certain segment of the track, and this segment is highlighted by a thick red line on the map.



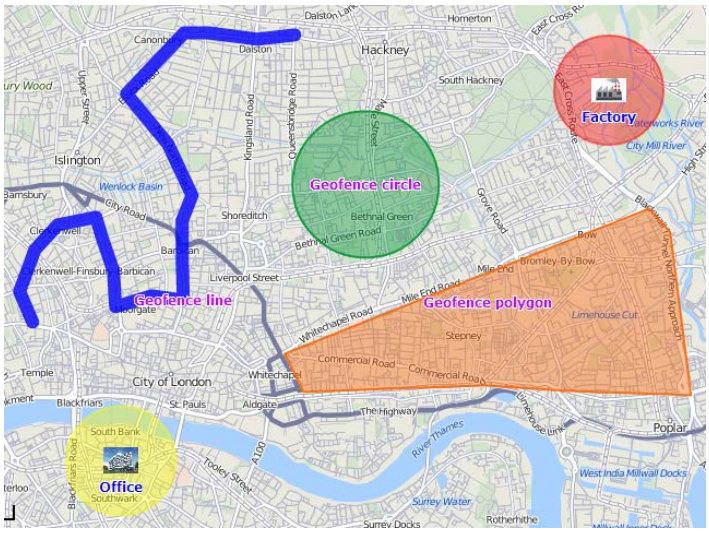
	Beginning	Initial location	End	Final location	Driver	Duration
	2012-06-25 18:00:00	Prymasowska, Łowicz	2012-06-25 19:44:40	E30, Chwałszyce	Spider Man	1:44:40
	2012-06-26 11:21:44	Rogoziniec	2012-06-26 13:26:00	Warschauer Straße, Berlin	Spider Man	2:04:16
	2012-06-29 13:23:40	Osloer Straße, Berlin	2012-06-29 14:58:30	Autobahntankstelle West, Köckern	-----	1:34:50
	2012-06-29 15:26:26	Autobahntankstelle West, Köckern	2012-06-29 16:59:32	A9, Gefell	-----	1:33:06

Tracks can be rendered for units groups, too (see Other Reports). It is reasonable to assign different colors for units in group to differentiate them on the map. However note that the number of simultaneously drawn messages can be limited by your service provider.


Geibelplatz
Lehrter Straße
Stadtfriedhof Kirchrode
Seelhorst
Fiedelerplatz
Stadtfriedhof Seelhorst
Wilkenburger Straße
Messepark
Mastbrucher Holz
Erich-Panitz-Straße
Debberoder Straße
Wülferoder Straße
B 443
K 222

POIs and Geofences on Map

Created POI and geofences can be a part of a report. They will be displayed on the map if you check the corresponding boxes – *Render geofences* and *Render POIs* in the report template. Both geofences and POI are displayed with captions – purple for geofences and orange for POIs (if no other color is selected in POI properties).



Apart from that, additional options can be applied to POIs:

- *Group icons*.
  POI as well as markers can be united in one conditional icon when they overlap and details are given in the tooltip.
- *Consider POI visibility scale*.
  By default, all POIs are rendered on the map. However, they can be seen or hidden according to their visibility parameter set in POI properties.

Note.
POI and geofences are taken only from the same account that report template.

Markers

Most kinds of reports can have additional information visualized on the map with the help of special markers. To get these markers in a report, select necessary markers in a report template.

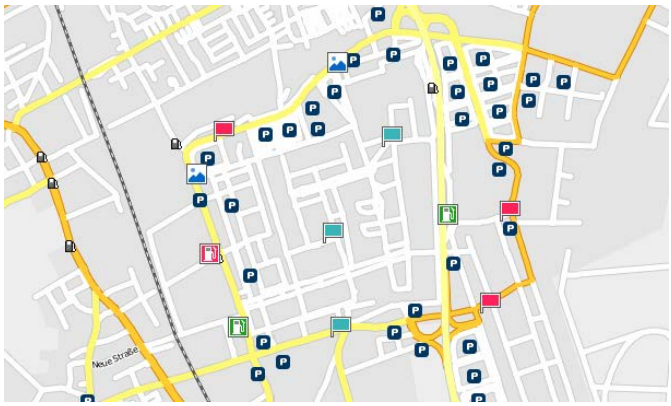
The table below presents all possible markers and their icons.

	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 amount of fuel filled.
	Theft marker	Marks a location where according to sensors data a fuel theft takes place. A tooltip shows theft time and amount of fuel stolen.
	Event marker	Marks a location where events were automatically registered in notifications, routes, and etc. The events registered manually, including fuel fillings, are also shown by such markers if a location (and preferably a description) is indicated upon event registration. A tooltip shows event time and text of an event.
	Violation marker	If you choose event markers, then both event and violation markers 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 have been violated. A tooltip shows the initial time of speeding interval (i.e., the time of receiving the first message with 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 have been received.

Note.
When enabling event markers, in addition to event markers you will get violation markers because violation is a special case of event.

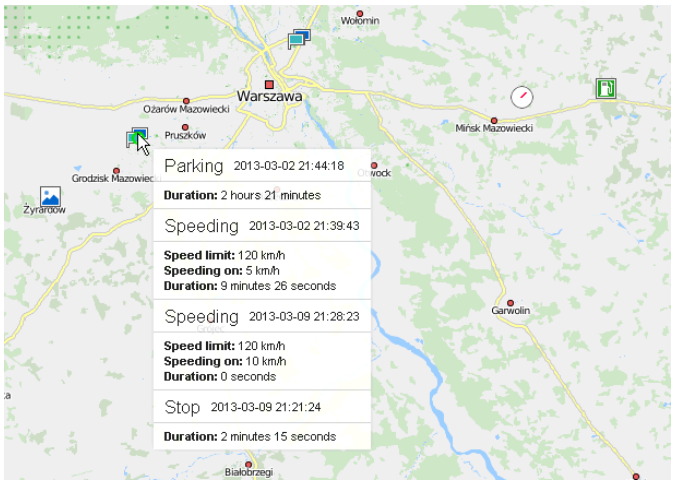
Markers appear on the map after report is generated. If you see no markers, it means there is no events of the indicated type or the current map scale is not enough (try to zoom in).

When hover the mouse cursor over a marker, in a tooltip you see additional information: 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.

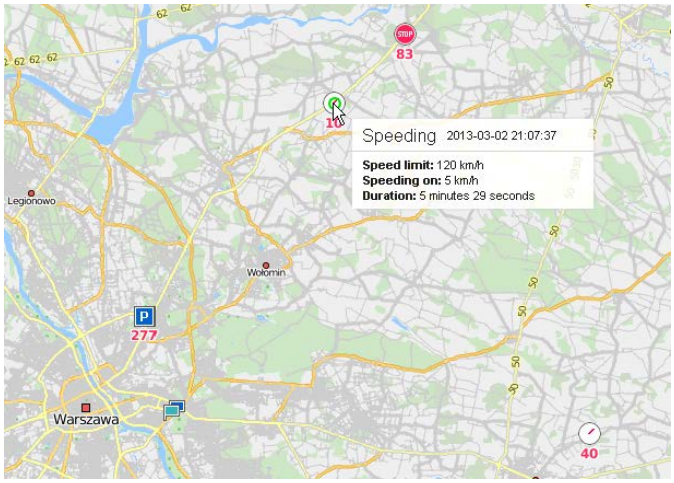


Apart from that, markers as well as POIs can be united in one conditional icon when they overlap — *Group icons* option in report template. Then more detailed information about what happened in that place will be available in the tooltip. However, if there are more than 100 grouped markers, only their names appear in the tooltip, without detailed

information.

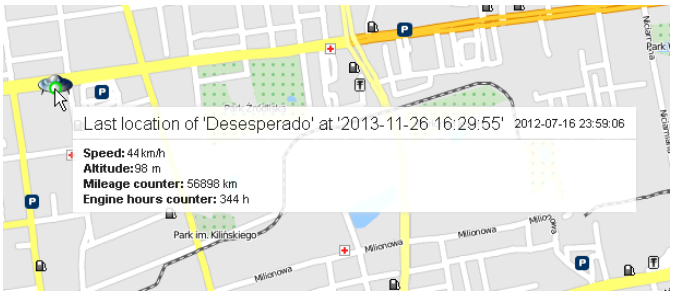


You can enable *Marker numbering* option in report template. In this case, each marker will have its sequence number which is indicated below the marker in red colour. Numbers are assigned chronologically, and each marker type has its own numeration.



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 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. In the popup tooltip you will find time when message received, speed at that point, altitude, and the values of mileage and engine hours counters.



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.

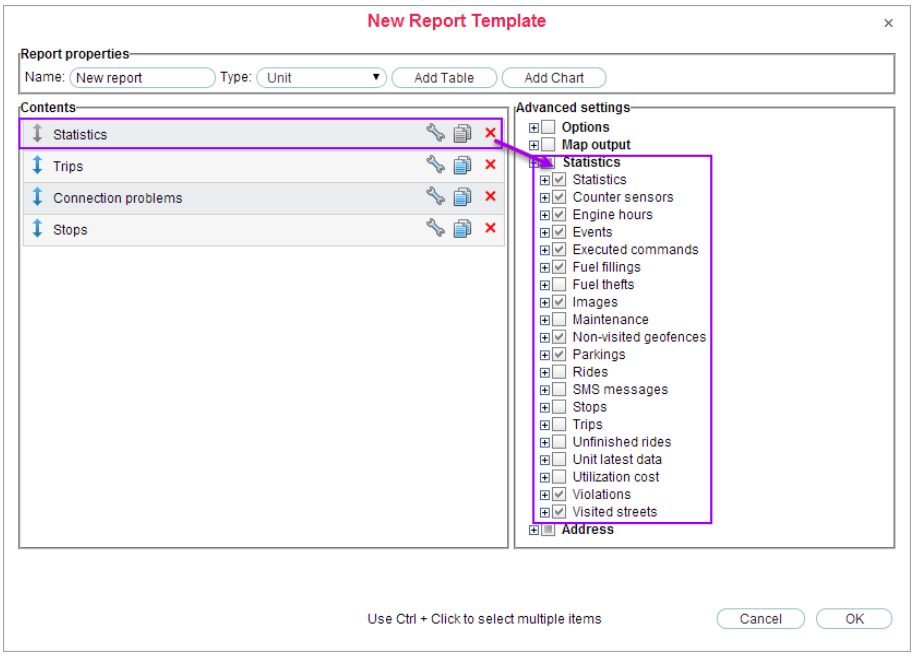
Report	Complete Report
Unit	Fish Boat
Interval beginning	2009-02-18 17:17:00
Interval end	2010-03-31 23:59:59
Messages	26334
Mileage counter	2634 km
Engine hours counter	666 hours 0 minutes
Parking time	22 days 2 hours
Parkings count	54
Move time	1 days 14 hours
Mileage in trips	1761 km
Average speed in trips	46 km/h
Maximum speed in trips	186 km/h
Trips count	53

Statistics is a special table giving general information and results. It can contain reports name, unit name, reported interval, number of messages analyzed for the report, and any statistical information you select.

It is recommended to include Statistics to any report as it contains the basic information about the report itself.

Statistics is adjusted in report template in the section of *Advanced settings*. Check fields you would like to include in Statistics. For your convenience, items are divided into subgroups. To select all items in a subgroup, tick the checkbox near its name.

If any item in statistics is checked, the section *Statistics* appears at the left part of the report template. You can edit it if you click on the button against it. Then you can add and remove items, rename them, and change their position. In the middle column the subgroup is indicated.



In the resulting report, Statistics is always displayed at the beginning of the reports.

The following information can be included in Statistics for reports of *Unit* type. For other types of reports, statistics is different and can contain just a couple of rows: report template name, object's name, report interval beginning, report interval end, and time of report generation.

Statistics

- **Report**: reports template name.

Unit: unit name.

- **Report execution time**: time of report generation when a user executed the report online or it was generated automatically as a job or notification.
- **Interval beginning**: reporting interval beginning.
- **Interval end**: reporting interval end.
- **Time zone**: time zone as it is set in user settings.
- **Messages**: messages analyzed within the reporting period.
- **Mileage in all messages**: mileage in all messages according to the mileage counter selected (without filtration by trip detector).
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: 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**: fuel level at the beginning of the interval.
- **Final fuel level**: fuel level at the end of the interval.
- **Max fuel level**: maximum fuel level.
- **Min fuel level**: minimum fuel level. Details about fuel in reports...

Counter sensors

- **Total counter**: the sum of values of all sensors of *counter* type.

Eco driving

- **Penalty**: overall penalty for Eco Driving.

Engine hours

- **Engine hours**: engine hours duration. It can be calculated by engine hours sensor or by ignition sensor depending on unit properties.
- **Mileage in engine hours**: distance travelled during engine hours operation.
- **Avg engine revs**: average rate of engine revolutions.
- **Max engine revs**: maximum rate of engine revolutions.
- **Engine efficiency duration**: the duration of attached implements operation (if having engine efficiency sensor).
- **Engine efficiency idling**: engine hours minus engine efficiency time.
- **Utilization**: percentage ratio of engine hours duration to engine hours rate.
- **Useful utilization**: percentage ratio of engine efficiency duration to engine hours rate.
- **Productivity**: percentage ratio of engine efficiency duration to engine hours duration.
- **Consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in e/h**: fuel volume used in engine hours. It can be detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Details...
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in e/h in trips**: average fuel consumption in engine hours detected by one of the methods mentioned above.

Events

- **Events count**: the number of events registered.

Executed commands

- **Executed commands**: the number of commands sent to unit.

Fuel fillings

- **Total filled**: the volume of fuel filled during the reporting interval.
- **Total registered**: registered fuel volume regardless binding to sensors and calculation methods.
- **Difference**: the difference between 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.

Images

- **Images**: the number of images received from unit. And if there are any, the resulting report will contain a section with all those images. Supported format is JPEG.

Maintenance

- **Total maintenance duration**: time spent for servicing.
- **Total maintenance cost**: total cost of all maintenance works.
- **Services count**: the number of services performed.

Non-visited geofences

- **Non-visited geofences count**: the number of geofences which were not visited.

Parkings

- **Parking time**: total duration of parkings for the reporting period. Parkings are detected by Trip Detector. IF it is not set properly, there may be no parkings found.
- **Parkings count**: the number of parkings for the reporting period.

Rides

- **Rides count**: the number of accomplished rides.

SMS messages

- **SMS messages**: the number of SMS messages received from unit.

Stops

- **Stops count**: the number of stops for the reporting period.

Trips

- **Move time**: total duration of all trips.
- **Engine hours**: engine hours worked.
- **Mileage in trips**: total distance travelled in all trips.
- **Mileage (adjusted)**: the same distance multiplied by mileage coefficient (a setting in unit properties).
- **Urban mileage in trips**: distance travelled at speed which is considered as speed in populated areas.
- **Suburban mileage in trips**: distance travelled at speed which is considered as speed outside populated areas. Urban speed limit is a setting in unit properties which defines if unit is moving in urban area or outside it.
- **Average speed in trips**: average speed in trips (total mileage divided by move time).
- **Maximum speed in trips**: the maximum speed registered during the trips.

- **Trips count**: the number of trips.
- **Consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in trips**: fuel consumed in trips. It can be detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates. Details...
- **Rates deviation by ImpFCS/AbsFCS/InsFCS/FLS in trips**: the difference between fuel consumption detected by a sensors and fuel consumption rates.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in trips**: average fuel consumption in trips detected by one of the methods mentioned above.
- **Avg mileage per unit of fuel by ImpFCS/AbsFCS/InsFCS/FLS/math/rates in trips**: average fuel consumption presented as 'kilometers per liter' or as 'miles per gallon' .

Unfinished rides

- **Unfinished rides count**: the number of unfinished rides.

Unit latest data

Note that all items in this section do not depend on report interval. The latest information is taken at the moment of report execution.

- **Mileage counter**: mileage counter value.
- **Engine hours counter**: engine hours counter value.
- **GPRS traffic counter**: consumed traffic.
- **Unit last location**: the latest unit location detected (address or coordinates).
- **Last message time**: the time when the latest messages from the unit was received.

How mileage and engine hours are calculated is adjusted in unit properties on the General tab.

Utilization cost

- **Total utilization cost**: total cost of all registered service works and fuel fillings.
- **Count of services and fillings**: total number of all registered service works and fuel fillings.

Violations

- **Violations count**: the number of violations registered within the reporting period.

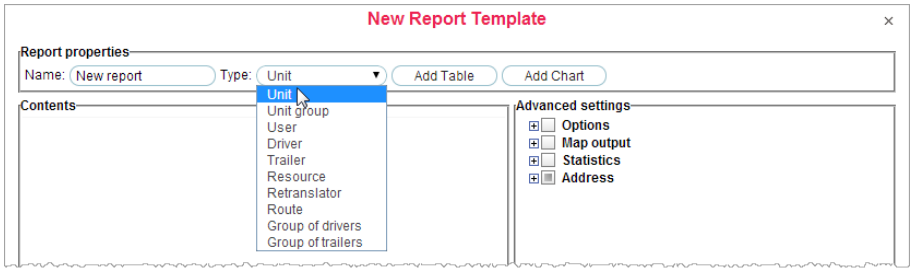
Visited streets

- **Streets count**: the number of found visits of streets.

Other Reports

Attention! To create reports on unit groups, users or drivers, you need *Advanced reports* module to be included in your package.

Advanced reports are reports on unit groups, users (except the Log table), drivers, trailers, and groups of drivers and trailers. These report types are defined when creating a template.



- Reports on Unit Groups
- Reports on Users
- Reports on Drivers and Driver Groups
- Reports on Trailers and Trailer Groups

Reports on Unit Groups

Attention!
This is part of the Advanced Reports module.

Data from several units can be gathered in one report if these units 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 *Unit group* reports the following features are **available**:

- Any tables;
- Graphical elements on map: POI, geofences, any markers, unit last location icons, tracks and all messages on map;
- Some graphs in Statistics: 'Report', 'Group', 'Interval beginning', 'Interval end', 'Report execution time';
- Advanced options: U.S. measurements, address format, etc.

All tables available for units are available for unit groups, too. Besides, the table Unit latest data is available for unit groups *only*.

In *Unit group* reports the following features are **not available**:

- Charts;
- Most of statistics excluding those mentioned above.

Tables for Unit Groups

When configuring tables for unit groups, take into account some peculiarities. As the first column of the table, you will see the list of all units included into the selected group (in the alphabetical order). Other columns are defined in the template in the same way as for usual tables. In the columns such as 'Count' there will be the number of events registered in the reporting period for the given unit.

Below is an example of a table on parkings for a group of six units (detalization is off) The table provides us with the following data: beginning of the first parking, end of the last parking, summarized duration of all parkings for the reported period. One row is dedicated to one unit.

№	Unit	Beginning	End	Duration	Location	Count
1	Fish Boat	2012-08-25 10:17:46	2012-09-10 09:59:18	14 days 22:11:52	Messegelände	38
2	Picasso	2012-08-27 18:17:00	2012-09-12 17:44:07	14 days 19:26:07	Europaallee	8
3	SMS Sim004	2012-08-27 18:17:00	2012-09-12 17:44:06	14 days 19:26:08	Messe-Schnellweg, Hannover	8
4	SMS Sim007	2012-08-27 13:54:57	2012-09-12 17:52:06	14 days 23:38:11	Karlsruher Straße	54
5	SMS Sim011	2012-08-27 13:56:57	2012-09-12 17:52:07	14 days 23:38:17	Wülfeler Straße	54
6	ShootingStar	2012-08-27 18:17:01	2012-09-12 17:44:06	14 days 19:26:06	Karlsruher Straße	8

If the option of **detalization** is applied (either full or partial), the second level appears. That means you can expand the contents of a basic row and see a detailed list of events for the given unit. The number of hidden rows will coincide with the number in the 'Count' column.

1 2	№	Unit	Beginning	End	Duration	Location	Count
⊞	1	Fish Boat	2012-08-25 10:17:46	2012-09-10 09:59:18	14 days 22:11:52	Messegelände	38
⊞	2	Picasso	2012-08-27 18:17:00	2012-09-12 17:44:07	14 days 19:26:07	Europaallee	8
⊟	3	SMS Sim004	2012-08-27 18:17:00	2012-09-12 17:44:06	14 days 19:26:08	Messe-Schnellweg, Hannover	8
├	3.1	SMS Sim004	2012-08-27 18:17:00	2012-08-28 09:03:04	14:46:04	Messe-Schnellweg, Hannover	1
├	3.2	SMS Sim004	2012-08-28 18:20:05	2012-08-29 09:13:57	14:53:52	Bemeroder Straße	1
├	3.3	SMS Sim004	2012-08-29 11:20:00	2012-08-29 11:27:13	0:07:13	Emslandstraße	1
├	3.4	SMS Sim004	2012-08-29 14:46:15	2012-08-29 15:01:17	0:15:02	Hermesallee	1
├	3.5	SMS Sim004	2012-08-29 17:04:18	2012-08-30 09:01:57	15:57:39	Am Mittelfelde	1
├	3.6	SMS Sim004	2012-08-30 12:11:01	2012-09-11 09:48:27	11 days 21:37:26	Thurnithistraße	1
├	3.7	SMS Sim004	2012-09-11 10:11:20	2012-09-12 09:20:21	23:09:01	Messe-Schnellweg	1
└	3.8	SMS Sim004	2012-09-12 17:04:15	2012-09-12 17:44:06	0:39:51	B6, Laatzen	1
⊞	4	SMS Sim007	2012-08-27 13:54:57	2012-09-12 17:52:06	14 days 23:38:11	Karlsruher Straße	54
⊞	5	SMS Sim011	2012-08-27 13:56:57	2012-09-12 17:52:07	14 days 23:38:17	Wülfeler Straße	54
⊞	6	ShootingStar	2012-08-27 18:17:01	2012-09-12 17:44:06	14 days 19:26:06	Karlsruher Straße	8

In addition to detalization, you can apply the **grouping** by days/weeks/months. In this case, it matters which level of detalization you choose – partial or full. **Partial detalization** assumes only one enclosed level. So, the first level will contain the list of units with general information for the whole reported period, and the second level will give general information about events for each day, week or month where those events were detected.

1 2	№	Unit	Week	Beginning	End	Duration	Location	Count
⊞	1	Fish Boat	August, Week 34	2012-08-25 10:17:46	2012-09-10 09:59:18	14 days 22:11:52	Messegelände	38
⊟	2	Picasso	August, Week 35	2012-08-27 18:17:00	2012-09-12 17:44:07	14 days 19:26:07	Europaallee	8
├	2.1	Picasso	August, Week 35	2012-08-27 18:17:00	2012-09-11 09:48:26	13 days 19:37:13	Europaallee	6
└	2.2	Picasso	September, Week 37	2012-09-11 10:11:20	2012-09-12 17:44:07	23:48:54	M9	2
⊟	3	SMS Sim004	August, Week 35	2012-08-27 18:17:00	2012-09-12 17:44:06	14 days 19:26:08	Messe-Schnellweg, Hannover	8
├	3.1	SMS Sim004	August, Week 35	2012-08-27 18:17:00	2012-09-11 09:48:27	13 days 19:37:16	Messe-Schnellweg, Hannover	6
└	3.2	SMS Sim004	September, Week 37	2012-09-11 10:11:20	2012-09-12 17:44:06	23:48:52	Messe-Schnellweg	2
⊞	4	SMS Sim007	August, Week 35	2012-08-27 13:54:57	2012-09-12 17:52:06	14 days 23:38:11	Karlsruher Straße	54
⊞	5	SMS Sim011	August, Week 35	2012-08-27 13:56:57	2012-09-12 17:52:07	14 days 23:38:17	Wülfeler Straße	54
⊞	6	ShootingStar	August, Week 35	2012-08-27 18:17:01	2012-09-12 17:44:06	14 days 19:26:06	Karlsruher Straße	8

Full detalization (applied together with grouping by days/weeks/months) allows to reach all enclosed rows. In our example, weekly information can be expanded, and each event of the type shown.

1 2 3	№	Unit	Beginning	End	Duration	Location	Count
⊞	1	Fish Boat	2012-08-25 10:17:46	2012-09-10 09:59:18	14 days 22:11:52	Messegelände	38
⊞	2	Picasso	2012-08-27 18:17:00	2012-09-12 17:44:07	14 days 19:26:07	Europaallee	8
⊟	3	SMS Sim004	2012-08-27 18:17:00	2012-09-12 17:44:06	14 days 19:26:08	Messe-Schnellweg, Hannover	8
├ ⊟	3.1	August, Week 35	2012-08-27 18:17:00	2012-09-11 09:48:27	13 days 19:37:16	Messe-Schnellweg, Hannover	6
│ ├	3.1.1	2012-08-27	2012-08-27 18:17:00	2012-08-28 09:03:04	14:46:04	Messe-Schnellweg, Hannover	1
│ ├	3.1.2	2012-08-28	2012-08-28 18:20:05	2012-08-29 09:13:57	14:53:52	Bemeroder Straße	1
│ ├	3.1.3	2012-08-29	2012-08-29 11:20:00	2012-08-29 11:27:13	0:07:13	Emslandstraße	1
│ ├	3.1.4	2012-08-29	2012-08-29 14:46:15	2012-08-29 15:01:17	0:15:02	Hermesallee	1
│ ├	3.1.5	2012-08-29	2012-08-29 17:04:18	2012-08-30 09:01:57	15:57:39	Am Mittelfelde	1
│ └	3.1.6	2012-08-30	2012-08-30 12:11:01	2012-09-11 09:48:27	11 days 21:37:26	Thurnithistraße	1
└ ⊟	3.2	September, Week 37	2012-09-11 10:11:20	2012-09-12 17:44:06	23:48:52	Messe-Schnellweg	2
├	3.2.1	2012-09-11	2012-09-11 10:11:20	2012-09-12 09:20:21	23:09:01	Messe-Schnellweg	1
└	3.2.2	2012-09-12	2012-09-12 17:04:15	2012-09-12 17:44:06	0:39:51	B6, Laatzen	1
⊞	4	SMS Sim007	2012-08-27 13:54:57	2012-09-12 17:52:06	14 days 23:38:11	Karlsruher Straße	54
⊞	5	SMS Sim011	2012-08-27 13:56:57	2012-09-12 17:52:07	14 days 23:38:17	Wülfeler Straße	54
⊞	6	ShootingStar	2012-08-27 18:17:01	2012-09-12 17:44:06	14 days 19:26:06	Karlsruher Straße	8

The grouping does not affect the report in any way if the detalization is off.

To expand enclosed rows, click on the plus-shaped button at the beginning of each row of higher level. It is possible to open all rows of 2nd or 3rd level if you click on the corresponding number in the header of the table. To hide all enclosed rows back, click on the button '1'.

If there is no data for the given unit, in other cells there will be '—'. In some cases that can be not convenient, then you can disable such uninformative rows. To do this, enable the option *Skip empty rows* in the report template.

Unit Latest Data

This kind of table available only for unit groups. As for separate units, this information is available in statistics. The table presents last location and counters values known.

The following columns can be selected to form the table:

- **Unit**: unit name.
- **Last message**: time when the latest message form the unit was received.
- **Last coordinates**: time when the latest message with valid coordinates was received (not always

coincides with the previous column).

- **Location**: address or coordinates of the last location.
- **Speed**: speed according to the last message.
- **Mileage**: mileage counter value.
- **Engine hours**: engine hours counter value.
- **Traffic**: GPRS traffic counter value.
- **Driver**: name of driver (if any detected).
- **Trailer**: name of trailer (if any detected).
- **Notes**: an empty column for your custom comments.

Unit	Last message	Last coordinates	Location	Speed	Mileage	Engine hours	Traffic
New car12	2012-12-17 17:39:28	2012-12-17 17:39:28	Hannover, Expo-Allee	0 mph	50979 mi	106980:05:48	0 B
New car13	2012-12-17 17:39:26	2012-12-17 17:39:26	Hannover, Europaallee	0 mph	21416 mi	0:00:00	935.44 MB
New car14	2012-12-17 17:39:26	2012-12-17 17:39:26	Messe-Schnellweg, Hannover	1 mph	116172 mi	0:00:00	3.38 MB
New car15	2012-12-17 17:39:20	2012-12-17 17:39:20	Hannover, Messegelände	5 mph	130291 mi	289:00:00	5.33 MB
New car16	2012-12-17 17:39:26	2012-12-17 17:39:26	Hannover, Am Brabrinke	3 mph	122019 mi	0:00:00	85.52 MB
New car8_	2012-12-17 17:39:22	2012-12-17 17:39:22	Hannover, Giesener Straße	1 mph	12512 mi	194642:35:03	11 KB
New car9	2012-12-17 17:39:26	2012-12-17 17:39:26	Hannover, Weltausstellungsallee	2 mph	135721 mi	0:00:00	0 B

By default, the latest information refers to report execution time. However, it can be bound to the end of reporting interval. To do this, enable the **Consider report interval** checkbox in the template.

Apart from that, filtration by geofences/units can be used for this report. This allows to quickly find units which are situated in a certain place or close to other units.

Last location can be visualized on the map by units icons – activate the option *Unit last location* in the report template.

Reports on Users

Two tables about users can be generated (*Logins* and *Custom fields*) and two charts (*Logins/Hours* and *Logins/Days of week*).

Tables Applied to Users

This kind of table shows user activity: logins to different services. The table can contain the following columns (they are adjusted after you press the 'Add Table' button):

- **Login time**: time when user logged in a service.
- **Logout time**: time when user exited the service.
- **Duration**: time interval user was online on the service.
- **Host**: the address of the computer from which user logged in.
- **Site**: the name of service where user logged in.
- **Count**: the number of logins.

Login time	Logout time	Duration	Host	Site
2010-04-19 11:54:20	2010-04-19 11:54:20	0:00:00	127.0.0.1	wialon-web
2010-04-21 11:37:10	2010-04-21 11:49:42	0:12:32	127.0.0.1	wialon-web
2010-04-21 11:50:52	2010-04-21 18:07:03	6:16:11	127.0.0.1	wialon-web
2010-04-22 09:42:00	2010-04-22 14:00:44	4:18:44	127.0.0.1	wialon-web
2010-04-22 13:53:56	2010-04-22 14:28:52	0:34:56	127.0.0.1	cms-manager
2010-04-22 14:53:28	2010-04-22 14:55:44	0:02:16	127.0.0.1	wialon-web
2010-04-22 14:56:05	2010-04-22 14:58:47	0:02:42	127.0.0.1	cms-manager
2010-04-22 14:58:52	2010-04-22 14:59:02	0:00:10	127.0.0.1	cms-manager

The same params as for all tables can be applied to user logins table: grouping, detalization, row numbering, total row, and time limitations. In the example below you can see user logins table with grouping by days, detalization, numbering, and total row.

	№	Date	Login time	Logout time	Duration	Host	Site	Count
⊞	1	2010-04-19	11:54:20	11:54:20	0:00:00	127.0.0.1	wialon-web	1
⊞	2	2010-04-21	11:37:10	18:07:03	6:28:43	-----	-----	2
⊟	3	2010-04-22	09:42:00	17:36:44	5:46:40	-----	-----	6
	3.1	-----	09:42:00	14:00:44	4:18:44	127.0.0.1	wialon-web	1
	3.2	-----	13:53:56	14:28:52	0:34:56	127.0.0.1	cms-manager	1
	3.3	-----	14:53:28	14:55:44	0:02:16	127.0.0.1	wialon-web	1
	3.4	-----	14:56:05	14:58:47	0:02:42	127.0.0.1	cms-manager	1
	3.5	-----	14:58:52	14:59:02	0:00:10	127.0.0.1	cms-manager	1
	3.6	-----	16:48:52	17:36:44	0:47:52	127.0.0.1	wialon-web	1
⊞	4	2010-04-23	10:27:26	18:08:15	0:28:59	-----	-----	2
⊞	5	2010-04-26	11:59:11	18:10:33	6:11:22	127.0.0.1	wialon-web	1
	-----	-----	**2010-04-19 11:54:20**	**2010-04-26 18:10:33**	**18:55:44**	-----	-----	**12**

The table *Custom fields* represents the list of custom fields entered in the corresponding tab of user properties dialog. This report has the same characteristics as the same kind of 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

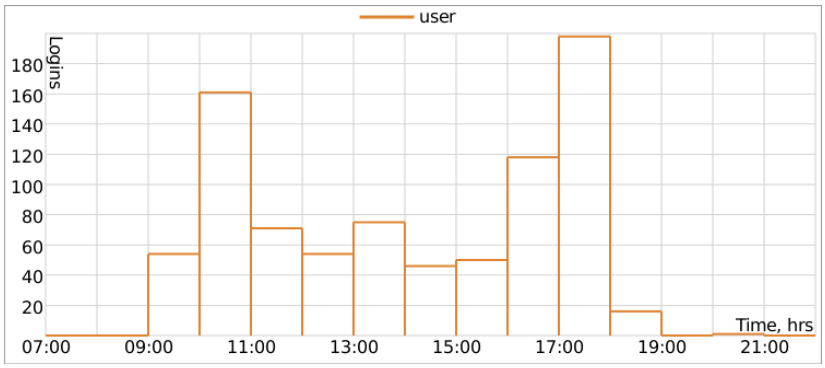
In the Statistics the following fields are available: report name, user name, reporting interval (beginning/end), report execution time, total time spent in the system, and logins count.

Report	Logins
User	user
Interval beginning	2010-04-19 00:00:00
Interval end	2010-04-26 23:59:59
Time spent on site	18:55:44
Logins count	12

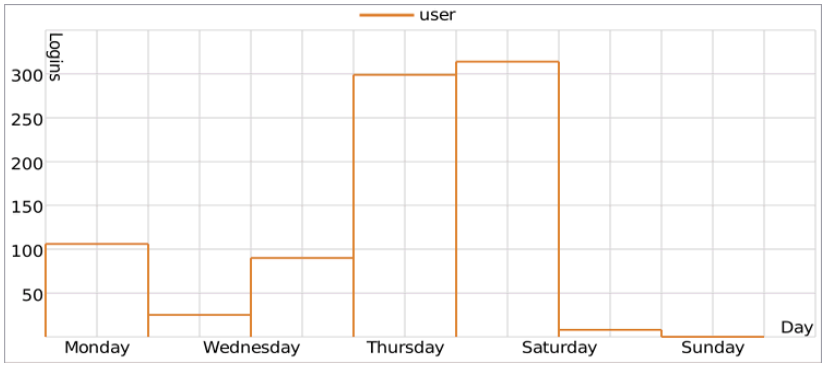
Charts Applied to Users

Two kinds of charts can be attached to the report on user logins: Logins/Hours and Logins/Days of week. To get these charts, in report template push the button Add Chart and choose the type in the dropdown list.

Logins/Hours chart shows how user's activity in different hours of the day:



Logins/Days of week chart shows how often user logged to the system in different days of the week:



Reports on Drivers and Driver Groups

Five kinds of tables can be applied to drivers:

- SMS messages,
- Bindings,
- Custom Fields,
- Driver Activity,
- Infringements.

To generate reports on drivers or driver groups, the proper access to the resource where those drivers or groups belong is required – 'Query reports or messages' flag.

SMS Messages

This report shows chat of a dispatcher with a driver via SMS messages. A dispatcher (operator) can send messages to a driver from Wialon interface through a special SMS window. A driver sends messages from his mobile phone. This mobile phone number must be indicated in driver's properties.

The following columns can be included in the table:

- **Time** – date and time when message came.
- **Type** – message type: *sent* (a message that was sent by a dispatcher) or *received* (a message that was received from a driver).
- **Text** – text of the message.
- **Phone** – driver's phone number.
- **Modem phone** – phone number of the modem that sent/received 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

Bindings

A table of *Bindings* can be built for each driver. This report shows which units the selected driver was working on, for how long, how much fuel was consumed, distance traveled etc.

The following columns can be included in this kind of report:

- **Beginning**: date and time when the driver was assigned.
- **Initial location**: the address (if available) at that moment.
- **End**: date and time when the driver was reset.
- **Final location**: the address (if available) at that moment.
- **Duration**: time interval of the trip.
- **Total time**: time from the first trip beginning to the last trip end (useful if grouping by days is enabled).
- **Mileage**: the distance traveled within the period.
- **Mileage (adjusted)**: mileage subject to the coefficient set in unit properties (*Advanced* tab).
- **Urban mileage**: the distance traveled in urban area.
- **Suburban mileage**: the distance traveled in suburban area. It is calculated in regard to speed. The urban/suburban speed line is indicated in Unit Properties => Advanced (*Urban speed limit* setting).
- **Avg speed**: average speed within the interval.

- **Max speed**: maximum speed registered within this working shift.
- **Counter**: counter sensor value.
- **Status**: unit status registered during the interval (if there are several, the first one is displayed).
- **Violations**: the number of violations occurred.
- **Count**: the number of bindings found.
- **Consumed by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: the volume of consumed fuel detected by a fuel sensor (like impulse/absolute/instant fuel consumption sensor, fuel level sensor) or calculated by math or rates.
- **Avg consumption by ImpFCS/AbsFCS/InsFCS/FLS/math/rates**: average fuel consumption in the trip detected by one of the methods mentioned above.
- **Initial fuel level**: fuel level at the beginning of the working shift.
- **Final fuel level**: fuel level at the end of the working shift.
- **Notes**: an empty column for your custom comments.

When creating/editing a report template, you can also choose units to be under control of this report. Their list is on the right of the columns list. If no units are selected, it means that all units will be considered.

The report is designed in such a way that the first column is the list of units on which the driver was working. 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 working shifts on it.

1 2	№	Unit	Beginning	End	Duration	Violations	Count
⊟	1	Fish Boat	2012-12-17 18:45:00	2012-12-20 16:26:34	6:39:33	3	3
├	1.1	Fish Boat	2012-12-17 18:45:00	2012-12-17 18:52:00	0:07:00	0	1
├	1.2	Fish Boat	2012-12-19 18:51:00	2012-12-19 18:51:59	0:00:59	1	1
└	1.3	Fish Boat	2012-12-20 09:55:00	2012-12-20 16:26:34	6:31:34	2	1
⊟	2	Fura 1476495 AC	2012-12-17 18:52:00	2012-12-19 16:55:59	10:56:56	0	4
├	2.1	Fura 1476495 AC	2012-12-17 18:52:00	2012-12-17 18:52:59	0:00:59	0	1
├	2.2	Fura 1476495 AC	2012-12-18 09:44:00	2012-12-18 09:53:59	0:09:59	0	1
├	2.3	Fura 1476495 AC	2012-12-18 12:00:00	2012-12-18 18:44:59	6:44:59	0	1
└	2.4	Fura 1476495 AC	2012-12-19 12:55:00	2012-12-19 16:55:59	4:00:59	0	1
⊟	3	Desesperado	2012-12-15 18:55:00	2012-12-20 18:55:13	12:29:38	0	2
├	3.1	Desesperado	2012-12-15 18:55:00	2012-12-16 04:55:59	10:00:59	0	1
└	3.2	Desesperado	2012-12-20 16:26:34	2012-12-20 18:55:13	2:28:39	0	1

Custom Fields

The table Custom fields represents the list of custom fields entered in the corresponding tab of driver's properties. Possible columns:

- **Name**: custom field name.
- **Value**: custom field value.
- **Notes**: an empty column for your custom comments.

Name	Value
Age	43
Category	C
Group	Baltic
Work experience	7 years

Driver Activity

Driver activity table shows such information as type of driver's action, crew size of a vehicle, tachograph card state. It may include the following columns:

- **Beginning** — date and time of message coming.
- **Card** — digital tachograph card state (inserted/not inserted).
- **Activity** — type of driver's activity (rest, work, driving, available, not available).
- **Driving** — driving time interval.
- **Work** — active working hours (time spent by a driver for vehicle reparing, fuel filling, etc.)
- **Availability** — passive working hours (time spent by a second driver in the moving vehicle).
- **Rest** — driver's rest time interval (vehicle is stopped, driver takes rest in a special place or equipped cabin)
- **Slot** — slot for digital tachograph card (driver/driver2).

- **Status** — vehicle crew size (single/crew).

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

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** — 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

Additional Possibilities

You can apply the option of grouping (by days/weeks/months) to the tables 'Bindings' and 'SMS messages'. However, those tables generated for single drivers can have only one enclosed level of rows. On the first level you see the list of units, on the second – summarized information for certain day, week, or month. And this second level cannot be expanded.

In addition, you can query statistics for such reports, which can include the following fields: report template name, driver name, report interval (beginning and end), and report generation time.

Tracks of driver's movements can be built on the map.

The table of bindings can be generated for a group of drivers.

Bindings for Driver Groups

The columns available for this report are the same as for the similar report on single drivers. However, with driver groups you can build complicated multi-level tables.

In the Bindings table for driver groups, the first level contains drivers themselves, the second level contains units (if the grouping is off) or days/weeks/months (if the grouping is on and detalization is partial). The forth level appears if the grouping is on and the detalization is full.

1 2 3 4	№	Driver	Beginning	End	Duration	Count
⊟	1	James Bond	2012-12-05 09:10:00	2012-12-21 17:27:59	4 days 12:14:34	12
⊞	1.1	Fish Boat	2012-12-07 13:10:00	2012-12-21 07:27:00	3 days 18:20:08	4
⊞	1.2	Fura 1475683 AC	2012-12-05 09:10:00	2012-12-13 12:59:59	7:49:57	3
⊞	1.3	Picasso	2012-12-12 12:59:00	2012-12-14 13:05:59	0:01:58	2
⊞	1.4	Mazda 326 OA 1107	2012-12-21 07:27:00	2012-12-21 17:27:59	10:00:59	1
⊞	1.5	Desesperado	2012-12-11 13:06:00	2012-12-17 12:58:05	0:01:32	2
⊟	2	Driver 13-02-2010	2012-12-15 18:55:00	2012-12-20 18:55:13	1 days 8:36:54	11
⊞	2.1	Fish Boat	2012-12-17 18:45:00	2012-12-20 16:26:34	6:39:33	3
⊟	2.2	Fura 1476495 AC	2012-12-17 11:23:00	2012-12-19 23:23:59	13:27:43	6
⊟	2.2.1	2012-12-17	11:23:00	18:52:59	1:30:47	2
	2.2.1.1	-----	11:23:00	12:52:48	1:29:48	1
	2.2.1.2	-----	18:52:00	18:52:59	0:00:59	1
⊟	2.2.2	2012-12-18	09:44:00	18:44:59	6:54:58	2
	2.2.2.1	-----	09:44:00	09:53:59	0:09:59	1
	2.2.2.2	-----	12:00:00	18:44:59	6:44:59	1
⊟	2.2.3	2012-12-19	12:55:00	23:23:59	5:01:58	2
	2.2.3.1	-----	12:55:00	16:55:59	4:00:59	1
	2.2.3.2	-----	22:23:00	23:23:59	1:00:59	1
⊞	2.3	Desesperado	2012-12-15 18:55:00	2012-12-20 18:55:13	12:29:38	2
⊞	3	Anti-Gagarin	2012-12-20 12:48:19	2012-12-21 23:59:59	1 days 11:11:40	1
⊞	4	Swan M.M.	2012-11-26 10:41:17	2012-11-26 10:41:43	0:00:26	1

Note.

The Total row cannot be used in reports on driver and trailer groups.

Reports on Trailers and Trailer Groups

To generate reports on trailers or trailer groups, the proper access to the resource where those trailers or groups belong is required — 'Query reports or messages' flag.

Two tables are possible for trailers:

- Bindings
- Custom Fields

Bindings

This table shows working intervals if the chosen trailer if it was bound to units. It comes along with information on fuel consumed, distance traveled etc. Parameters and possible columns for this table are the same as in the similar table for drivers (with the exception that the column 'Violations' is absent). The Bindings table can be also generated for trailer groups — it gives possibility to build complicated four-level reports (trailers –> units –> dates/weeks/months –> single bindings). More...

1 2 3 4	№	Trailer	Beginning	End	Duration	Count
⊟	1	Plough	2012-12-20 16:33:00	2012-12-28 13:26:04	3 days 5:04:11	5
⊞	1.1	Fura 1476495 AC	2012-12-20 16:33:00	2012-12-27 16:31:59	3 days 0:02:57	3
⊞	1.2	Alejandro	2012-12-24 11:33:00	2012-12-28 13:26:04	5:01:14	2
⊟	2	Trailer 3t	2012-12-28 16:02:40	2012-12-28 16:23:42	0:12:47	4
⊟	2.1	Fish Boat	2012-12-28 16:02:40	2012-12-28 16:16:55	0:12:23	2
⊟	2.1.1	2012-12-28	16:02:40	16:16:55	0:12:23	2
	2.1.1.1	-----	16:02:40	16:06:15	0:03:35	1
	2.1.1.2	-----	16:08:07	16:16:55	0:08:48	1
⊟	2.2	Alejandro	2012-12-28 16:17:25	2012-12-28 16:23:42	0:00:24	2
⊟	2.2.1	2012-12-28	16:17:25	16:23:42	0:00:24	2
	2.2.1.1	-----	16:17:25	16:17:42	0:00:17	1
	2.2.1.2	-----	16:23:35	16:23:42	0:00:07	1
⊟	3	Trailer 5t	2012-12-28 13:07:28	2012-12-28 23:59:59	10:51:26	3
⊞	3.1	Desesperado	2012-12-28 13:07:28	2012-12-28 13:08:08	0:00:40	1
⊞	3.2	Alejandro	2012-12-28 13:08:53	2012-12-28 23:59:59	10:50:46	2

Custom fields

This table represents the list of custom fields created in trailer properties. It is not available for trailer groups.

Name	Value
Capacity	3t
Colour	Blue
VIN	45673948

Data in Reports

Time in Reports

Time when an event happened/begun/finished is given in reports in the form of date and time: YYYY:MM:DD HH:MM:SS.

Duration of a state is given in the format HH:MM:SS. If a duration is bigger than a day, first the number of days is indicated, and then HH:MM:SS. It can look like that: '5 days 12:34:56' which means '5 days, 12 hours, 34 minutes, 56 seconds'. However, duration larger than 24 hours can be not combined into days. So, there will be “132:34:56” instead of “5 days 12:34:56”. To disable days and leave only hours, go to report template properties dialog and set the *Duration format* option to *Hours and minutes*. This parameter affects not only time formatting in the cells but in the *Total* row as well.

If grouping is used, the time appears as follows:

- If grouping by days is used, the column called 'Date' is added. It gives the date in the format YYYY:MM:DD. If the columns 'Beginning' and 'End' are selected, they will contain only time (HH:MM:SS). However, if a state began in one day and finished in another, in the 'End' column date and time will be given.
- If grouping by weeks is used, the column called 'Week' is added. The month and the number of week of year are indicated there. The first week of year is considered the first *full* week. If a week begins in one month and ends in another, it refers to the month where it begins.
- If grouping by months is used, the column called 'Month' is added.

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 in unit properties. Besides, mileage can depend also 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 mileage detected by the program and mileage detected by vehicle itself. Correction coefficient is set in 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 trip detector. It is always the longest mileage because it includes also all adjustment of data.
- Mileage in trips — total mileage of all movement intervals found according to trip detector.
- Mileage (adjusted) — mileage in trips multiplied by correction coefficient.
- Mileage in engine hours — mileage in intervals of engine hours.
- Urban mileage — distance traveled at speed which is considered as speed in populated areas.
- Suburban mileage — distance traveled at speed which is considered as speed outside populated areas. Urban speed limit is a setting in unit properties which defines if unit is moving in urban area or outside it.
- Initial mileage — mileage counter value at the beginning of the interval (trip, street visit, sensor operation, etc.).
- Final mileage — mileage counter value at the end of the interval.
- Mileage counter — absolute mileage (mileage counter value at the moment of 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 flag 'Mileage from trips only' in additional settings of the Report

Template dialog.

Mileage if less than 20 (miles or kilometers) 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 additional settings of the Report Template dialog. There you can also set the option *Mileage/fuel/counters with accuracy to two decimal places* to see mileage always with hundredths.

Speed

Average and maximum speed values can be included in the same reports as mileage: trips, geofences, rides, speedings, digital sensors. Note that the **average speed** directly depends on mileage because it is calculated by dividing mileage by duration (for example, distance travelled with a sensor on divided by duration of on state. That is why a situation can happen when the average speed is zero and maximum speed is a positive number. It can happen (1) if state duration is zero (see explanation above); (2) if mileage is zero (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 one. Note also that mileage can be calculated either by all messages or by trips only (option in template's advanced settings), and this will obviously affect resulting values of average speed.

Maximum speed has nothing to do with mileage and any counters. To calculate 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.

Speed is given only in integer numbers.

Fuel in Reports

Many reports can provide information about fuel: fuel level (initial/final), the volume of filled/stolen/registered/consumed fuel, average consumption, etc.

Abbreviations used:

- FLS — fuel level sensor;
- ImpFCS — impulse fuel consumption sensor;
- AbsFCS — absolute fuel consumption sensor;
- InsFCS — instant fuel consumption sensor.

To receive the most accurate information about fuel, you need to:

- install fuel sensors on your unit;
- properly configure the sensors in unit properties;
- on the Fuel Consumption select calculation methods corresponding to these sensors.

However, even if you do not have special fuel sensors, you can control fuel in the following ways:

- register fillings manually in the Monitoring panel;
- use mathematical method to calculate fuel consumed (it takes into account urban and suburban cycle, idle running, and moving under load);
- use consumption rates to calculate fuel consumed (it takes into account consumption rates in winter and summer periods);
- use mathematical method and consumption rates to calculate average fuel consumption within a given interval of movement.

To calculate fuel consumption by rates or math, you do not need any sensors to be installed. To use these method, it is enough to enter necessary values in the *Fuel Consumption* tab of unit properties dialog.

In report template several methods of calculating fuel can be selected simultaneously. In this case a separate column will be generated for each method. Above all, if there are several sensors of the same type (or corresponding to the given mask) and they are not summed (the option 'Merge same name sensors' is off), then a separate column will be generated for each of these sensors. If you want a certain sensor to be used for fuel calculations, enter its name mask in the reports templates in the filter called “Sensor masks”.

If in the report template you select columns which do not match with unit configuration, in the resulting report there will

zeros in those cells.

In statistics, there is no possibility to show a separate row for each sensor. Even if they are not merged, in the rows like 'Avg consumption …', 'Consumed by …', 'Rates deviation …' etc. you can get only one row for each type of fuel sensor (FLS/ImpFCS/AbsFCS/InsFCS). That is why consumed fuel ('Consumed by …') in statistics is the sum of sensors of a type, and average consumption ('Avg consumption …') is the arithmetic mean between those sensors. However, calculation of deviation from rates ('Rates deviation …') depends on sensors adjustments. If a unit has two sensors of the same type with different names (or with the same name and the merging of sensors is disabled), rates deviation 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)*

If there are two fuel sensors with the same names and the merging is enabled, the formula is:

- *Rates deviation = (Consumed by FLS1 + Consumed by FLS2) — Consumed by rates*.

Fuel consumption detected by FLS as well as average consumption according to FLS can be calculated including fuel thefts or excluding them. This is adjusted in additional options of a report template — the checkbox *Exclude thefts from fuel consumption*. Depending on this option, you can get summarized information about fuel consumption or information about fuel consumed exactly by a vehicle.

Fuel level is given in integer numbers. The volume of fuel consumed/registered/stolen as well as average consumption are given correct to the nearest hundredth (other decimal places are simply cut). However, if the value is over 50 (liters/gallons), it is shown as integer. However, if you consider it is necessary, you can see fuel always with accuracy to hundredths. For this, check the option *Mileage/fuel/counters with accuracy to two decimal places* in report template.

If the U.S. measurements are selected, fuel is measured in gallons, and average consumption in mpg (miles per gallon) unlike the European system where average consumption is measures as lt/100km (liters per 100 kilometers).

All fuel data is processed before getting to reports. The data is processed according to filtration level set on the Fuel Consumption tab (the option *Filter fuel level sensors values*).

Fuel

All the sensor workflow can be divided into sequential steps (there are important options, terms in step subsections):

1. Data preparation
    - Option: Ignore the messages after the start of motion;
    - Options: Merge sensors;
    - 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”** is option paths.

Among important options the next list should be mentioned:

- Option: Ignore the messages after the start of motion;
- Option: Merge same name sensors;
- 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"
```

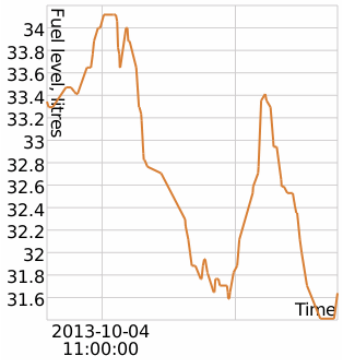
This option allows messages being ignored after motion has started for a period of time in seconds. Messages which are frontier ones to ignored time period are joined by drawn line.

Here is whole algorithm more precisely:

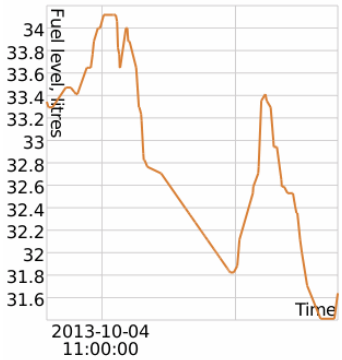
1. all starts with start motion message, it is used to define the amount of messages being ignored;
2. this message is regarded as left-frontier message;
3. then we add seconds set in the option to this message timestamp to get end moment of ignored time period;
4. all FLS messages being within this time period are ignored while processing;
5. the first message which comes after ignored period (p.3), is called right-frontier message;
6. Both left- and right-frontier messages are joined by line being drawn (instead taking ignored messages into account while building graph).

All processed graphs have the option for such correction (except for the Regular graphs, where data is raw).

This is the graph with no ignoring:



This graph is being ignore option 10 set:



Merge same name sensors

```
... → "General sensors parameters" block → "Merge same name sensors (fuel level)"
... → "General sensors parameters" block → "Merge same name sensors (fuel
consumption)"
```

In case of desire to group an amount of sensors into one result please use the next approach: set the same sensor *type* ("Unit properties"→ "Sensors" → Choose desired sensor → "Properties", "Sensor type" field); set the same sensor *name* (the same menu, "Name" field);

The table below shows "option ↔ sensor type" matching:

Option	Sensor type
"Merge same name sensors (fuel level)"	- fuel level sensor; - impulse fuel level sensor
"Merge same name sensors (fuel consumption)"	- impulse fuel consumption sensor; - absolute fuel consumption sensor; - instant fuel consumption sensor

Note: you can group several sensor types (up to all types you got in the list).

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"
```

Convergence of data (i.e., when sum of interval results equals to whole interval result) is guaranteed when all mentioned options 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) **switched on** the x-axis is time:

- fuel consumption/idling looks like slowly descending curve on graph;
- thefts/fillings – quick falling of fuel level on a small period of time (theft/filling processing time).

While "Time-based calculation" **switched off** (data is calculated as mileage-based) the x-axis is mileage:

- fuel consumption in motion looks like slowly descending curve;
- idling – because mileage is not incremented, should be seen as vertical falling of fuel level;
- thefts/fillings on stops – because mileage is not incremented, should be seen as vertical rising of fuel level.

Filtration

Note: **Ellipsis (…)** substitutes **“Unit properties → Fuel consumption”** is 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)".
```

To use filtration be sure to:

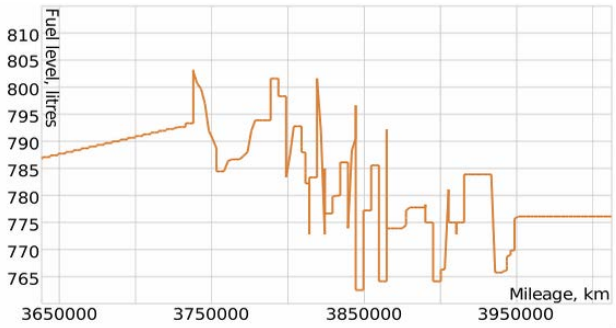
1. check “Fuel level sensors” area (“Unit properties → Fuel consumption”);
2. check “Filter fuel level sensors values”;
3. set non-zero value for “Filtration level (0..255)”.

It is OK to use filtration when wrong messages appeared, i.e., with unreasonably bigger/smaller values. During filtering median smoothing is used.

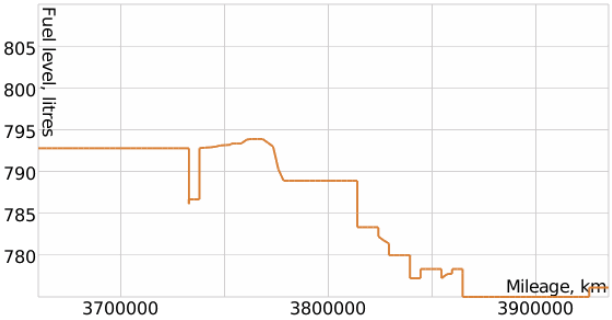
ATTENTION!

- If value 0 is set in “Filtration level” option, a user must be aware of that filtration is not disabled this way, but its minimal level is used instead (three messages being filtered, because that is the minimum input required for median smoothing).
- Any number from 1 to 255 being set in “Filtration level” is multiplied by 5. The result number is the amount of messages to be filtered.
- To disable filtration completely please uncheck “Filter fuel level sensors values” option.

There is the chart filtration disabled:



This chart is for enabled filtration 10:



Fillings Detection

ATTENTION! In order to detect fillings the processed data is used (it is done on "Data preparation and "Filtration steps).

Note: **Ellipsis** (**...**) substitutes **"Unit properties → Fuel consumption"** is 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 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 quit false fillings, because in motion sensors may send false data rise.

Detect fuel filling only while stopped

```
... → "Fuel fillings/thefts detection" block → "Detect fuel filling only while
stopped"
```

In normal conditions transport vehicles are fueled on stops. This option narrows its search to stops/parkings.

Ignore filtration when calculating filling volume

```
... → "Fuel level sensors" block → "Ignore filtration when calculating filling
volume"
```

When filtration switched on then 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 calculated.

Special Case: How a filling is processed?

Filling time frontiers and its volume

The filling is processing.
Assume, that fuel volume in this message is *Vcurr*, previous message fuel volume – *Vprev*. If the difference *d* (=*Vcurr* - *Vprev*) for the current message is positive, then current message will be marked as **initial** filling message.
Time passes by. The filling is close to finish. When *d-value* for some message becomes negative (i.e., the current message fuel volume is less than in previous one), then it is called **final** filling message.
Filling **volume** equals to *Vfinal* - *Vinit* (difference in fuel volumes between final and initial filling messages).

Filling timestamp calculation algorithm

Now it's time to find the filling timestamp.
Iteratively for every message within 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.
Message timestamp which delta is the ultimately biggest among others is regarded as filling timestamp (in other

words, the left message is chosen from the message pair which delta is the biggest one).

Worth highlighting, that a filling timestamp is calculated dynamically depend on the current unique case.

Thefts detection

ATTENTION! In order to detect thefts the processed data is used (it is done on "Data preparation and "Filtration steps).

Note: **Ellipsis** (**...**) substitutes **“Unit properties → Fuel consumption”** is option paths.

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

```
... → "Fuel fillings/thefts detection" block → "Minimum fuel theft volume, liters"
```

This option defines applicable fuel level falling minus fuel consumption for motion/idling to call such falling the theft and detect it.

Idling

```
... → "Consumption math" block → "Idling, liters per hour"
```

The option allows to detect thefts on stops/parkings. System finds difference between fuel volume spent according to sensors and mathematically calculated one. In case of non-zero difference which is equal to or more than value set in minimum fuel theft volume option then fuel theft detected.

Detect fuel theft in motion

```
... → "Fuel fillings/thefts detection" block → "Detect fuel theft in motion"
```

On 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.

Ignore filtration when calculating theft volume

```
... → "Fuel level sensors" block → "Ignore filtration when calculating theft volume"
```

Similar to fillings, filtration may deviate start and end fuel level values on thefts. To ignore such deviations the system uses unfiltered data while computing theft volume.

Consumption calculation

ATTENTION! In order to calculate consumption the processed data is used (it is done on "Data preparation and "Filtration steps).

Note: **Ellipsis** (**...**) substitutes **"Unit properties → Fuel consumption"** is option paths.

Two options and special case are toughly 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 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 math calculation which uses data set in "Consumption math" area. Algorithm: Let's say Vinit – initial volume for the interval (the way what interval is taken is defined in specified report template), Vfinal – final volume. Then difference is calculated between them with respect to fillings volume like Vinit – Vfinal + Vfill. In case of caluclated value is equal to or greater than zero the interval is marked as correct. But if the result value is negative then consumption is treated as falsy and math consumption takes place (with further whole interval falsy values replacing).

Exclude thefts from fuel consumption

```
Reports → Report Template Properties → Options → "Exclude thefts from fuel
consumption"
```

That option defines whether a theft took part in consumption while computing different indices. Keeping this option switched on is valuable when ignoring deviations because of detected thefts. Switch it off when discharge is authorized, as an example, agriculture vehicles are being filled with refueller and the user is to get fuel turnover being spent during specified period of time.

Special Case: filling/theft is sliced with one of interval frontiers. What is the way filling/theft being detected?

Let's examine the case on a filling example. Assume we've sliced the filling with the interval initial frontier. As described in how a filling is processed section a filling timestamp is defined dynamically according to the unique case. Since we've sliced the filling with interval, the second interval message becomes the initial filling message and it informs that 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 its 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 is all about the case whether the message, which timestamp is regarded as unsliced filling timestamp, is taking into account during calculation the time where the filling has occurred.

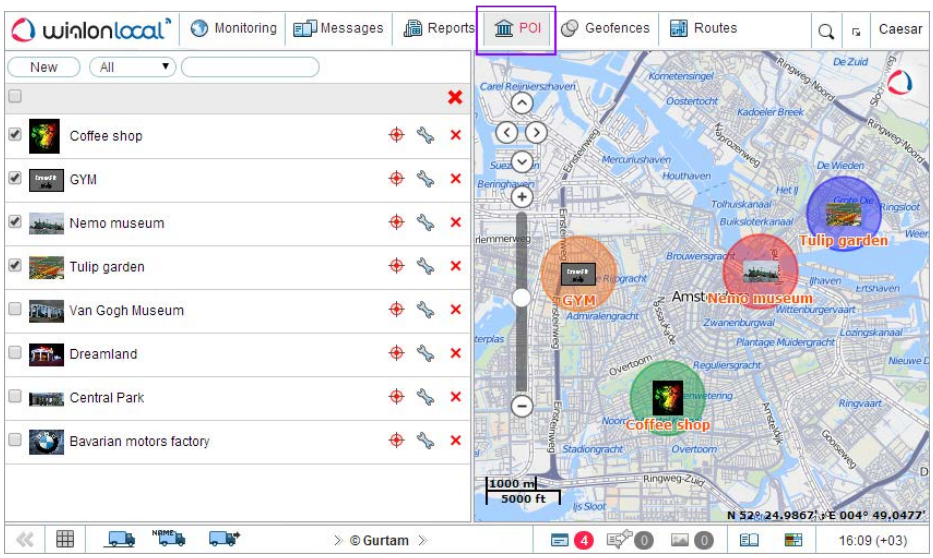
POI

POI (point of interest) is a place on the map that has some importance for you and requires a special attention in the tracking process. Each place can have its image on the map (an icon). In addition, you can add any comments.

In Wialon Local, POIs have various applications:

- POIs visually enrich the map by marking important places.
- In POI tooltip, you can get dynamically updated images from external sources (video from web cameras, photos of crossroads, weather, etc.).
- POIs can be used as addresses in reports (in the 'Location' columns).
- POIs can be used as check points for routes.

To open the POI panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer.



Learn more:

- Creating POI
- POI Management

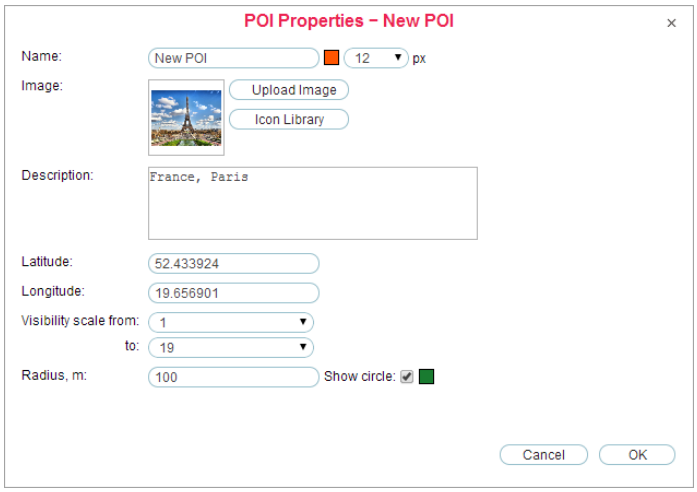
Creating POI

To create POIs, you should have *Create, edit, and delete POIs* access to at least one resource.

POIs are created on the *POI* panel. Press the *New* button and double-click on the map to locate a new POI. Fill in the dialog of POI properties (at least, name is required) and press OK.

An alternative way to create POIs is to import them from a file or another resource.

POI Properties



Name
Name is a required parameter for a POI like any other system object. It can be of one or more symbols. Besides, you can specify font color and size for the caption. It has sense if POI names on map are enabled in User Settings.

Image
Each POI can have its own image. An image can be chosen from the standard icons (*Icon Library* button) or loaded from your computer (*Upload Image* button). Supported formats are PNG, JPG and GIF. Moreover, you can use the Icon Library application (for top accounts only) which enables to upload individual icons for POIs. 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 POI on the map and on the list. However, in the tooltip for the POI you can see enlarged image (up to 256x256 px).

Description
When you create a POI, this field is automatically filled with address information for the point. However, you can edit it and write any custom description. 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.

Latitude & Longitude
Coordinates are indicated automatically depending on the point on the map you have double-clicked when creating the POI. However, you can edit coordinates manually if necessary.

Visibility scale
Visibility scale is map zooms at which POI will be displayed or not. For example, if a POI is a city, it has sense to see it on remote scales, whereas if a POI 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).

Radius
Default radius for a POI is 100 (whether meters or feet, depends on resource settings). Radius can be used for

address detection in reports as well as to display the POI on the map. Tick the *Show circle* checkbox and choose the color if you want the POI to be displayed on the map as a circle with the specified radius.

When finished, press OK. The newly create POI will appear at the bottom of the list. However, when the list is reloaded, the POI will take its place according to the alphabet. At that, the flag to display the POI on the map will be enabled.

Attention!
One resource cannot contain more than 31744 POIs.

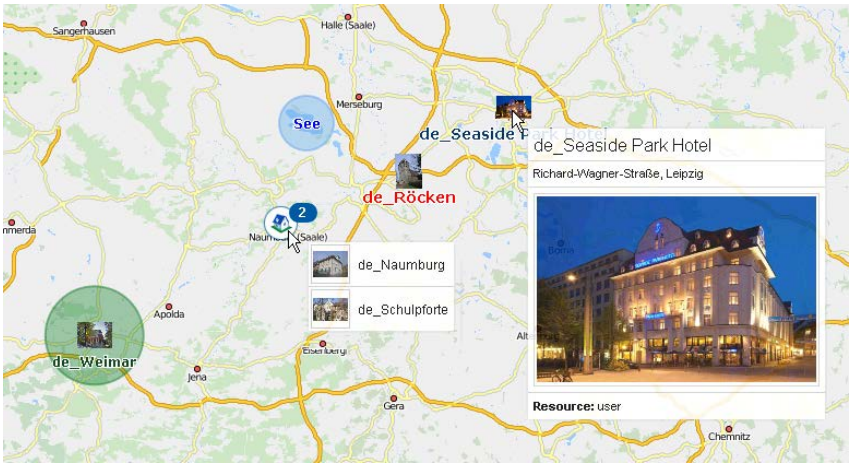
Further information – POI Management.

POI Management

POI are sorted by name. To quickly find a certain place, use the dynamic filter above the list. Begin to input the name of a place and see the results. To move to a certain POI on the map, simply click on its name on the list.

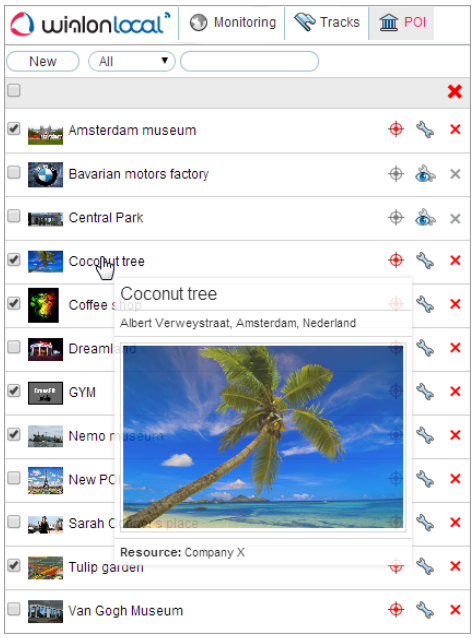
In the first column of the table, tick those POIs that should be seen on the map. Put the flag at the header of the list to select/unselect all POIs. POIs can be presented on the map by their names (default color is orange), attached images and circles as well as any combination of these three items. Overlapping POIs can be grouped under one icon. Parameters of POI visualization are adjusted both in POI properties and in User Settings.

Note, that in order *POIs* to be displayed on the map you should check if the corresponding layer icon in the main menu is active.



If you have too many POIs to show on the map, it may slow down browser performance. In this case, enable the option of rendering POIs on server (see User Settings => Maps).

Place a mouse cursor over a place name on the list or on the map to see related information in a tooltip: name, description, enlarged image, and a resource where the POI belongs (if there is access to several resources). If POIs are rendered on the server, only name and description can be displayed in the tooltip. If the description contains links to any external content, it is shown in the tooltip. For example, a tooltip of a POI can look like this:



All POIs regardless resource they belong to are displayed on the list. However, you can easily filter them by this parameter. To do this, in the dropdown list choose account name to display only POI belonging to this resource. This

filter is not displayed if the current user has access only to one resource. To find a POI by name, use the dynamic filter.

The following buttons can be used to manage created POIs:

	Change POI location. When you push this button against a POI, a red marker appears on its place. Double-click on any other place on the map to move your POI there and press *Save*. Otherwise, press *Cancel* to ignore changes.
	Edit or view POI properties. These buttons are used to open POI Properties dialog where you can edit POI or just view its properties (depending on your access).
	Copy POI. Pushing the 'Copy' button you open the same dialog as for POI creation. The difference is that in this case all the fields of the dialog are already completed in the same way as for original POI.
	Delete POI. To remove place, press the *Delete* button against it and confirm your intention. You can even delete several POIs at once if you check them and press the *Delete* button at the heading of the table.

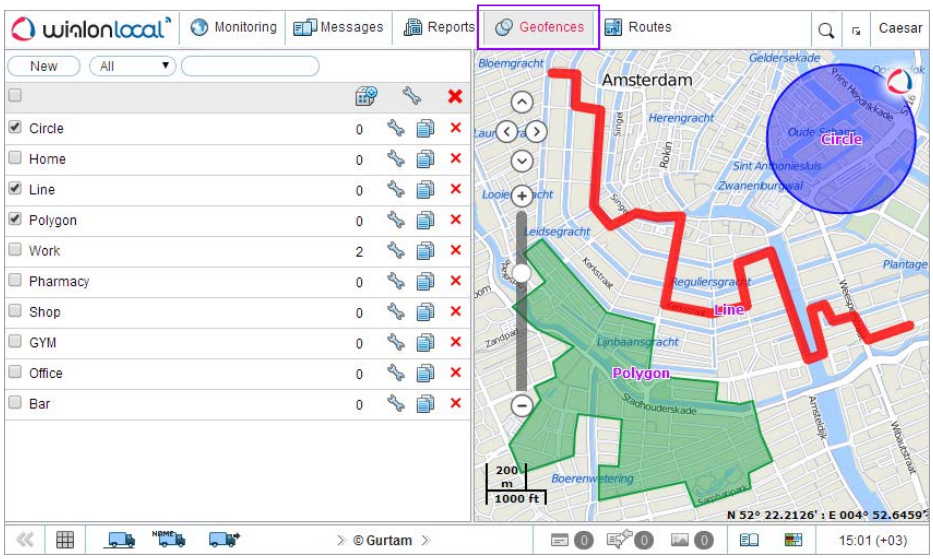
Note.
If you have not enough rights for a resource (you have *View POIs* but do not have *Create, edit, and delete POIs*), you cannot move, edit or delete its POIs. That is why the corresponding buttons are dimmed.

Geofences

Geofence, or geographical zone, is some area on the map that is important for your tracking purposes. Geofences can be used to control unit activity in these areas or, on the contrary, outside them.

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.

To open the Geofences panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer.



After entering the Geofences panel, you can view, create, edit, and delete geofences.

Creating a Geofence

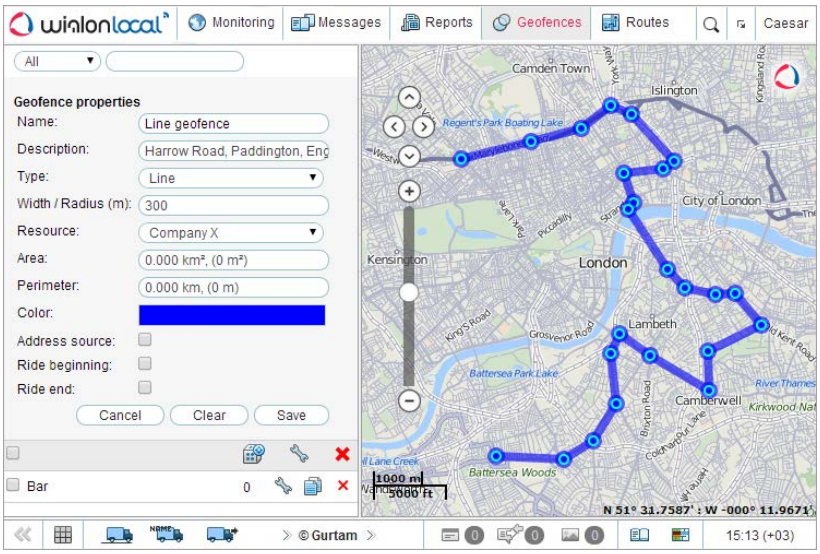
Here are three steps to create a geofence.

1. Map Geofence

After you have pressed the **New** button, a help window appears to provide you with the instructions about drawing geofences. Choose 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 **Address tool** (create circles).

2. Set Geofence Properties

- **Name**: a geofence name that is used while tracking units as well as in reports and notifications.
- **Description**: this field is optional. Description is displayed in geofence's tooltip. It can be also added to 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 put. However, you can edit it or simply delete.
- **Type**: line, polygon or circle. For line, you also have to indicate its thickness, for circle – radius (in meters or feet, depending on resource settings).

- **Resource**: this option is shown if current user has access to more than one resource. The resource chosen while creating a geofence defines measurement system used to calculate its area, length, radius, thickness, etc. (metric, american, or imperial system).
- **Area & Perimeter**: these fields are not editable, they are calculated automatically. Area and perimeter values also depend on resource settings, and can be given in hectares, square miles, or square feet.
- **Address source**: check this box if you want to use a geofence instead of a usual addresses. In this

case, a geofence name can be used in reports in the location columns. It happens if *Geofences as address source* option is activated in the report template.

- **Ride beginning/end**: these parameters are important for reports on rides. The same geofence can be simultaneously the end of one ride and the beginning of another, but cannot be the beginning and the end of one ride.
- **Color**: choose a color using the palette or enter a color RGB code. This color will be used to render a geofence on the map and to display this geofence in a unit's tooltip and in extended unit information (if a unit is located in this geofence).

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*. Created geofence appears at the end of the list and on the map.

Note.
Geofences can be saved to a file and easily imported and exported from one resource to another.

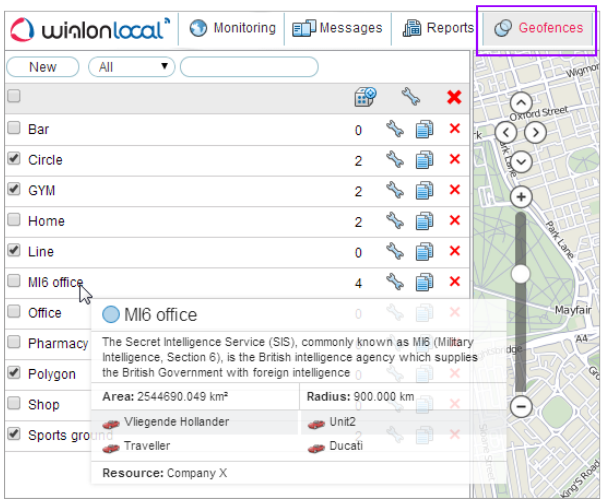
Geofences Management

In the work area there is a list of all created geofences. Put check marks in the left column to choose geofences to be displayed on the map. Unselect this box to remove geofences from the map. Geofences can be displayed with captions or not (depending User Settings). If you have ticked too many geofences or they are very big, it can slow down browser performance. In this case, the option to render geofences on the server can help (see User Settings => Maps).

Geofences are given in the alphabetical order. When you create a new geofence, it appears at the end of the list with map checkbox enabled. However, when the list is reloaded, new geofences take their places according to their names.

Placing a cursor over a geofence name, you will get information about it in the popup tooltip: geofence type, its belonging to a resource (if you have access to more than one resource), description, as well as the list of units located inside the geofence. Depending on geofence type, there will be also area, perimeter, length, and/or radius. Metrics for these parameters depends on the metrics chosen for a resource to which a geofence belongs. These parameters could be displayed in kilometers, meters, hectares (metric system is chosen), or in miles, feet, square miles, square feet (american or imperial system is chosen).

For your convenience, there is a filter with several predefined criteria to sort geofences:



By some property:

- All geofences;
- Geofences used as address;
- Ride beginning;
- Ride end;
- Ride beginning and end;
- Polygons;
- Lines;
- Circles.

By resource:

- Here is a list of all resources available for the current user (if there are more than one). Click on any of them to display geofences belonging only to this particular resource.

To quickly find a needed geofence, you can use the dynamic filter above the list. Type a geofence name or a part of the name and observe the search results.

Here is an explanation of icons and buttons used in the Geofences panel:

	Shows how many units are there inside the geofence at the moment. These units are listed in the tooltip (this data refreshes once in a minute). If there are question signs (?) in this column, it means the option is disabled. To activate it, go to User Settings and check the item *Presence in geofences*.
	The button to edit geofence properties (size, shape, name, color, position, etc.).
	The button to view a geofence properties (editing is disabled).
	The button to copy a geofence. You can edit a geofence and save it under another name.
×	The button to delete a geofence. 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 have not enough access rights to the resource which the geofence belongs to.
✖	The button in the header of the table to delete selected geofences.

Usage

While Tracking Online

Geofences can be displayed on the map and mark some area of interest and simplify visual reception of the map. If a geofence is displayed on the map and the mouse cursor is placed over it, you can press <ctrl> to see its tooltip (name, type, list of units inside, etc.).

Note, that in order *Geofences* to be displayed on the map you should check if the corresponding layer icon in the main menu is active.

If a unit is situated in a geofence, this fact can be shown in unit's tooltip and in extended unit information. For this, check the option *Presence in geofences* in User Settings. Besides, a column with geofences where units are located can be displayed in the Monitoring panel (instead of ordinary addresses).

In Notifications

You can be notified by e-mail, SMS, online or by other means when your unit leaves a geofence or enters in a geofence. It is possible also to set speed limitations and sensor range for unit during its presence in a geofence. Besides, on an entrance to a geofence or an exit from it, an action can be performed automatically: send a message to driver, block the engine, change users' access to this unit, and many others. See Notifications.

In Reports

Geofences can be used in reports as addresses (in the Location column), if *Geofences as address source* is checked.

Geofences can be used in many tabled reports, for example:

- Geofences: visits to geofences (all entries and exits to/from 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.

Routes

Attention!
This module is licensed separately.

Wialon 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:

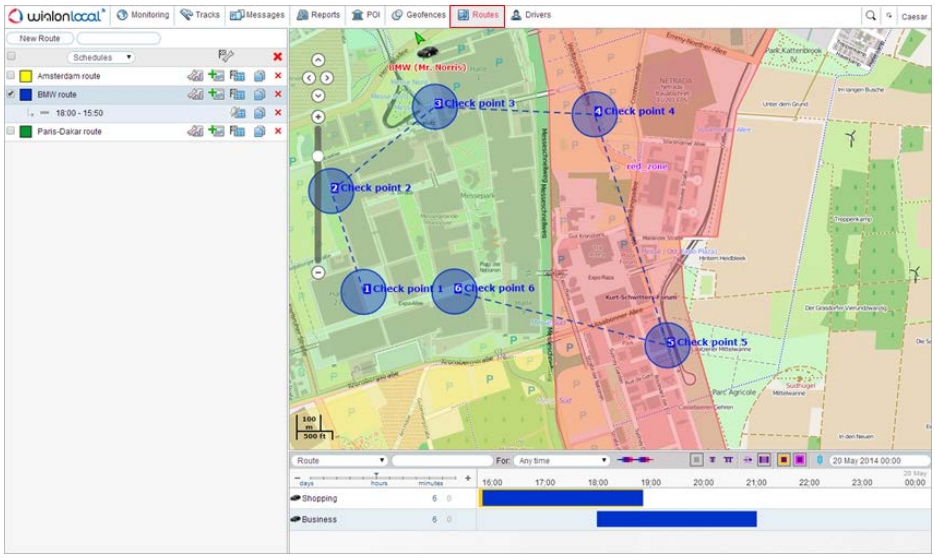
1. Create a route itself, i.e., mark check point on map.
2. Create one or more schedules for this route.
3. Assign rounds manually or adjust automatic creation of rounds.

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.

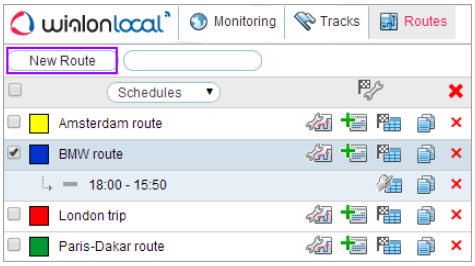
To open the Routes panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer. Here you can configure routes and observe the progress of active rounds.



Routes take their measurement system from User Settings.

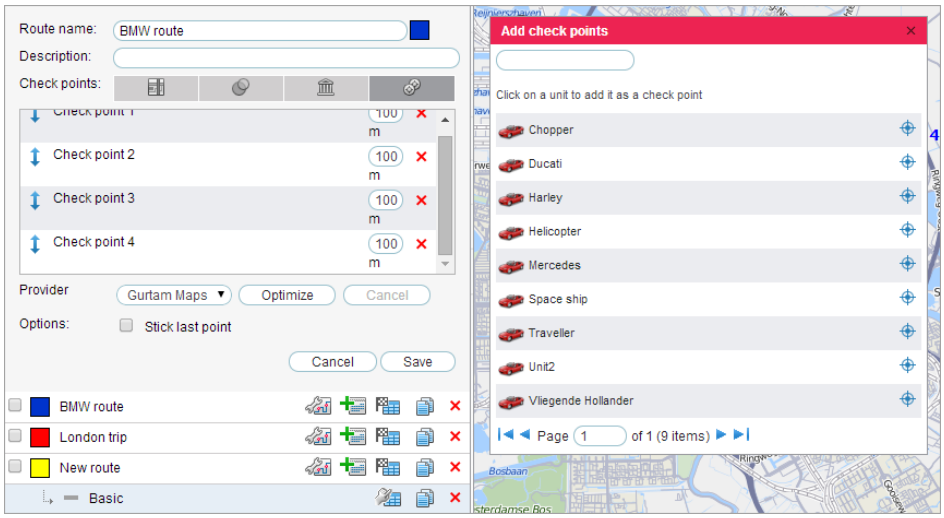
Creating a Route

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 POIs or geofences, and as 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 POIs and 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 POIs**.
   In a similar manner, you can add POIs for the route.

4. **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 POIs and 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 POIs and geofences, and it will not affect the route in any way. Meanwhile, units as check points are different because their IDs are stored in the route. So, the connection with the unit is always maintained unless the unit is deleted.

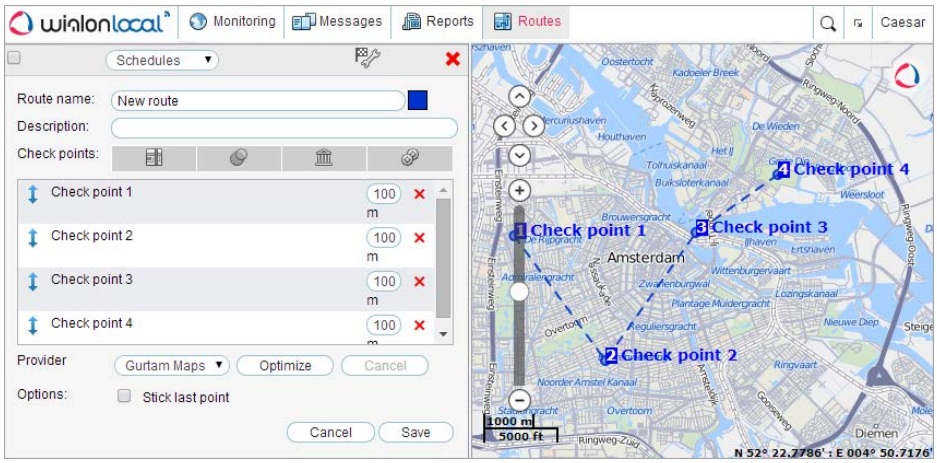
When finished, press *Save*. The route will appear on the list. To see it on the map, click on its name. It is strongly recommended to estimate the result visually and double check all points before proceeding because afterwards, when the route has schedules, it is impossible to edit it.

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.

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 / WebGIS. 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.

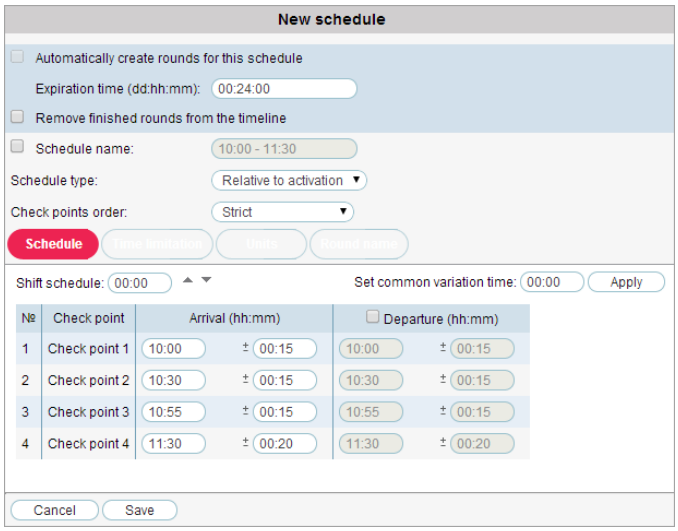


To build a route, you can also use specially designed app — Delivery Service, or such tool as "Routing".

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 contained in the route and times of their visit. Visit time can indicate only arrival or both arrival and departure. Besides, you can set variation time to give unit some degree of freedom to visit the point (like plus or minus 5 minutes). Time format here is *hh:mm*.

Enter arrival time for each check point. To indicate departure time as well, tick this option to activate it. Variation time can be set automatically. Enter value into the appropriate box and press *Apply*.

If time is set 00:00, then any visit of the point at any time will be considered as perfectly in accordance with the schedule (not late, not early).

If a route is going to have arbitrary points order, you can indicate time interval within which each check point should be visited. It is especially convenient for delivery services and the like. For example, a point should be visited between 18:00 and 20:00. Then write 18:00 as arrival time and 20:00 as departure time. At that, time variations should be zero.

Time limitation

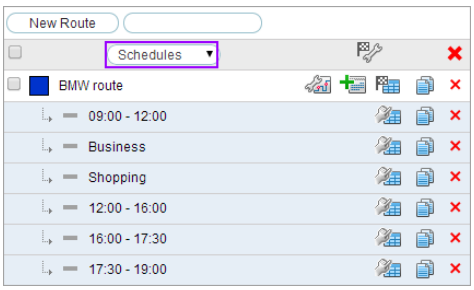
Time limitations can be applied to schedule to restrict its operation to certain time intervals, days of the week, days of the month or months. For example, you can select only event or odd days or only working hours of weekdays, etc. Note that this option does not work with *Absolute* schedule type.

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 tab 'Units'. 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 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.

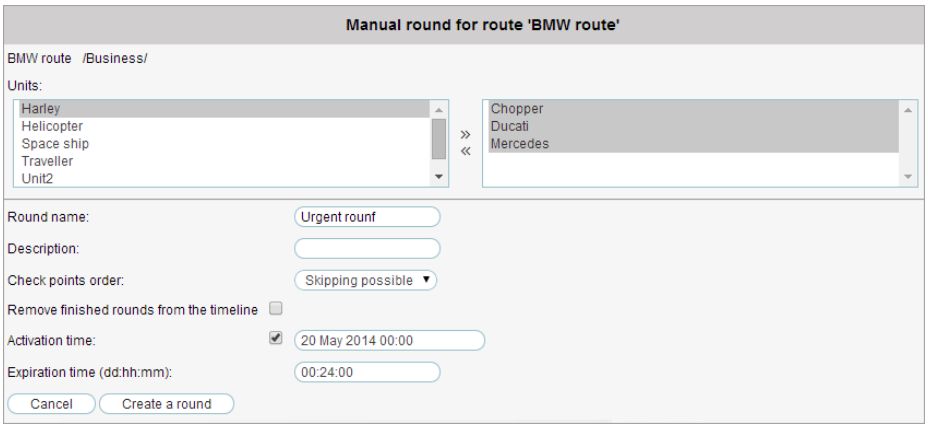
Rounds

Round is a route, its schedule and assigned unit put together. Unit performs a route (that is to say visits route's check points) according predefined schedule.

Rides can be created manually or automatically.

Manual Round Creation

To create a round manually, press *Create manual round button* against a needed 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 Round Creation

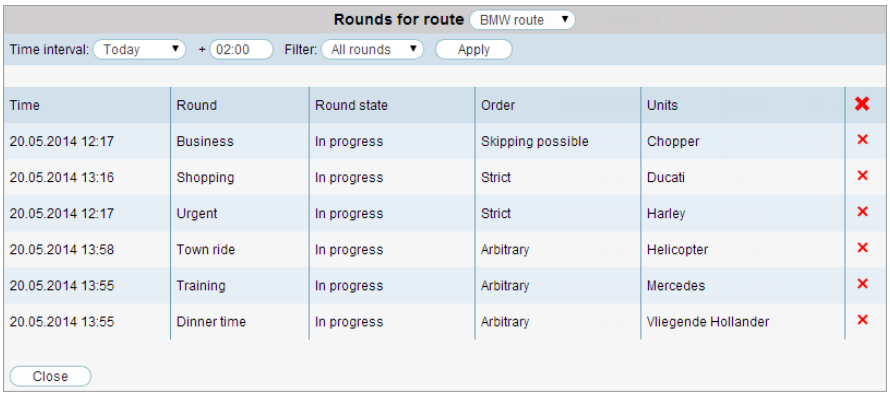
Automatic creation of rounds is adjusted in schedule properties – set the option *Automatically create rounds for this schedule*.

Besides, automatic creation of rounds can be enabled straight from the Routes panel – using the corresponding switch button before each schedule name.

Another way to create a route automatically is through notifications. You can create a notification with trigger action to assign a new route after the previous one is finished.

Round List

To see the list of rounds created or planned for a certain schedule of a certain route, press the button .



Choose time period (Hour, Today, Yesterday, Week) or set your custom interval. For 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.

You can observe either all rounds or rounds of a certain status: in progress, pending, finished, estimated. When all parameters have been set, press the Apply button to display rounds you need. Besides, in the header of the table, you can choose a route to show rounds for, or you can request a list of rounds for *all* tour routes.

In the table you see the round beginning time, name, state (finished, aborted, estimated, in progress, history), points order (arbitrary, strict, skipping possible), and unit(s) bound to this round. Finished and aborted (finished forcibly due to expiration) rounds can be deleted. It means they disappear from the timeline and get the status 'History'. Yet, all information about them is stored and can be reached through 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.

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:

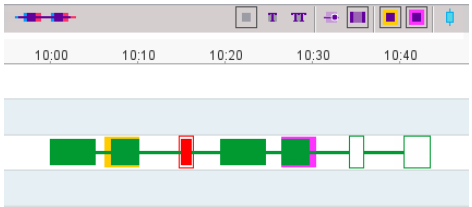
- do not show point names at all;
- show names for 'hot' check points i.e., points where units are located at the moment or points awaiting arrival at;
- show captions for all check points.

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 'Lick 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 option 'Mark deviation time' .

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 'In fact' option to see how a unit really visited the points – time of 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 units' performance on routes are stored in the system automatically. This data can be used to generate the following types of 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 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'.

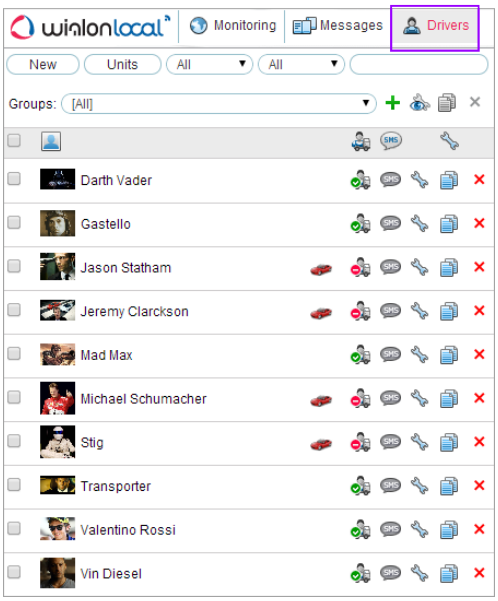
To see a route on the map, enable the checkbox before its name. Click on route's name to center the map on this route. Note that check points' names are displayed on the map by default. Uncheck the corresponding box in user settings dialog in order the names not to be displayed.

Drivers

Attention!
This module is licensed separately.

In this panel, you can manage the list of drivers who form your personnel. 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 especially convenient when different persons drive a unit. There is also possibility to detect drivers automatically with the help of iButton system.

To open the Drivers panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer. Afterwards, you are able to work with drivers list.



Creating a Driver

Push the **New** button and set 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 driver's tooltip.

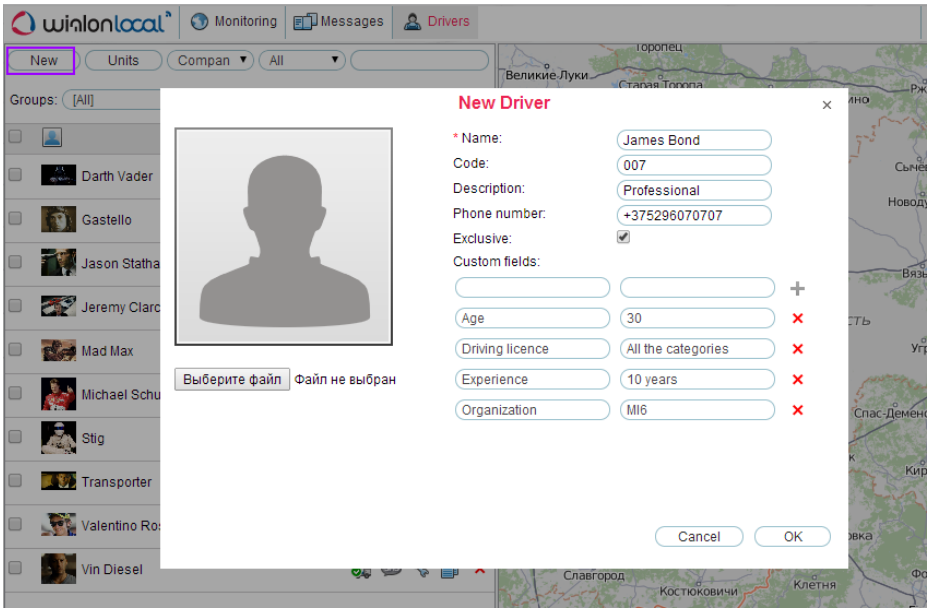
Phone number
Enter driver's phone number. It will be shown in driver's tooltip and can be used to send SMS messages to the driver and make calls. Note that units or drivers with the same phone numbers cannot exist in the system. If you attempt to create a driver with a phone number that is already reserved to another driver or unit, a special alert will be displayed, and this phone number will not be saved.

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, and GIF.

Custom fields
Create driver's card adding any information as custom fields. They are shown in driver's tooltip and can be summoned in reports. Note that custom fields with the same name cannot coexist within one particular driver.

At the end press OK. The new driver will appear on the list.



The same dialog opens when editing a driver.

Hint.
Like any other resource contents, drivers can be imported and exported through files or directly from one resource to

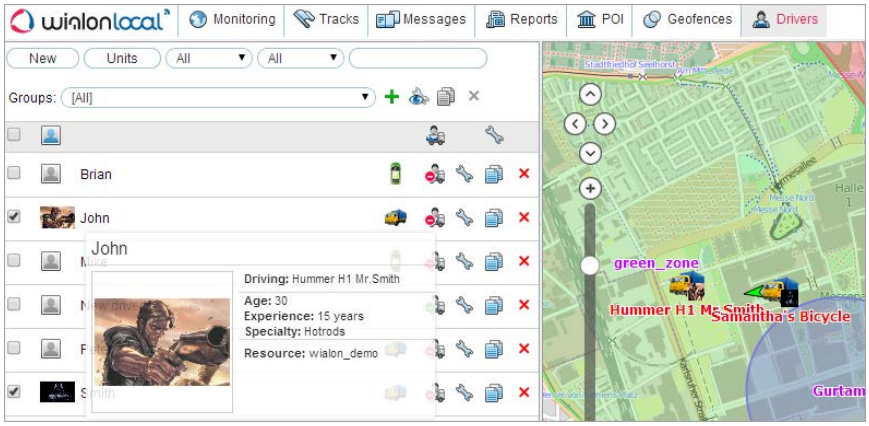
another. However, that is not true for driver groups.

Managing Driver List

Drivers are listed in the alphabetical 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 dropdown 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 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 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 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 drivers to be displayed on the map you should check if the corresponding layer icon in the main menu is active.



In the tooltip of each driver, you can see their name, phone number, enlarged photo, resource (if there are several), description, and custom fields (if any were set). Unit that is driven by this driver is also indicated if the driver is bound to any. If you have Skype on your computer, the phone number is highlighted, and you can make a call if clicking on it.

If a driver 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 drivers:

or – bind/unbind driver to/from a unit as well as delete incorrect bindings (disabled if not enough access);

– 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's Assignment

Several drivers can be assigned to one unit. To assign drivers to units, you need to have access flag 'Create, edit, and delete drivers' on the resource where those drivers belong.

There are two ways to bind a driver to a unit: manual and automatic.

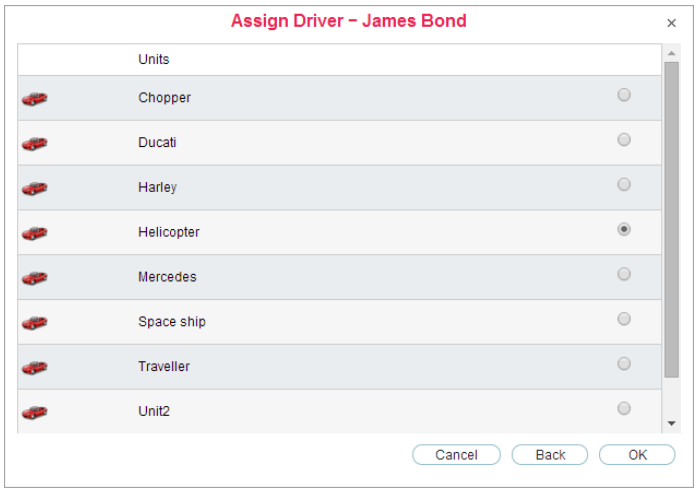
Manual Binding

The manual assignment can be performed in the Drivers panel. Use the corresponding switch button **Bind / Unbind** to attach and detach drivers to/from units. The button is disabled if your access is not sufficient.

Press the button **Bind to unit** and choose one of two options: *Bind to unit* or *Register working shift*. The first option is used if the assignment must be registered right in the moment. The second option is used to fix driver's work post factum. Select an option and press Next.

Choose a unit to bind a driver to. 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.



If you register a working shift, there will be one more page where you indicate shift beginning and shift end (or one of them). For example, you can indicate just the beginning of the shift, and the end can be detected automatically when the unit arrives to garage (as a geofence) — to do this, create a notification of *Geofence* type with method of action *Reset driver*. In any case, when registering a working shift, you can use only past dates or current time (no future allowed).

The button **Unbind from unit** is used to remove driver from unit manually (the first option) or register a working shift in the same way as it was described above.

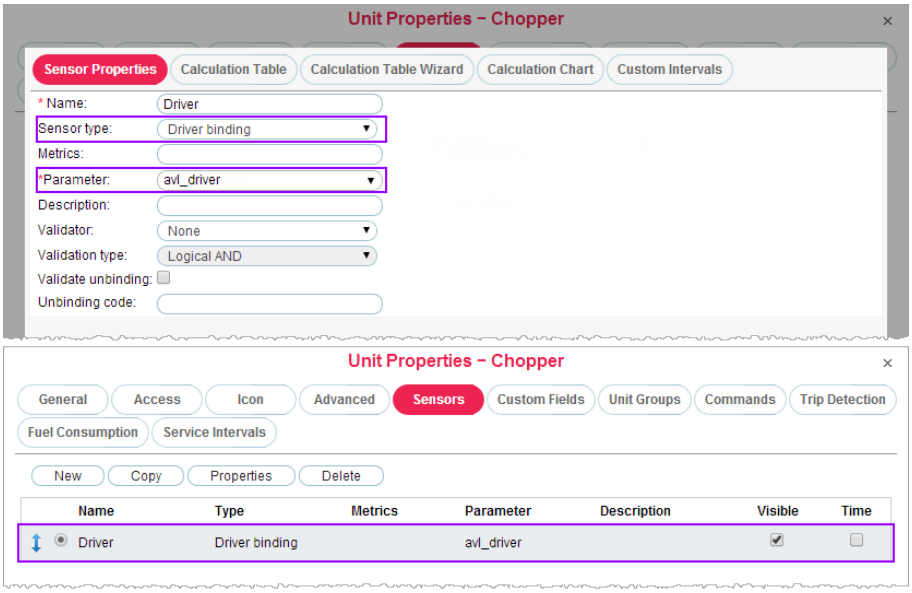
Automatic Binding

To detect a driver automatically the corresponding equipment has to be installed. In authorized personnel

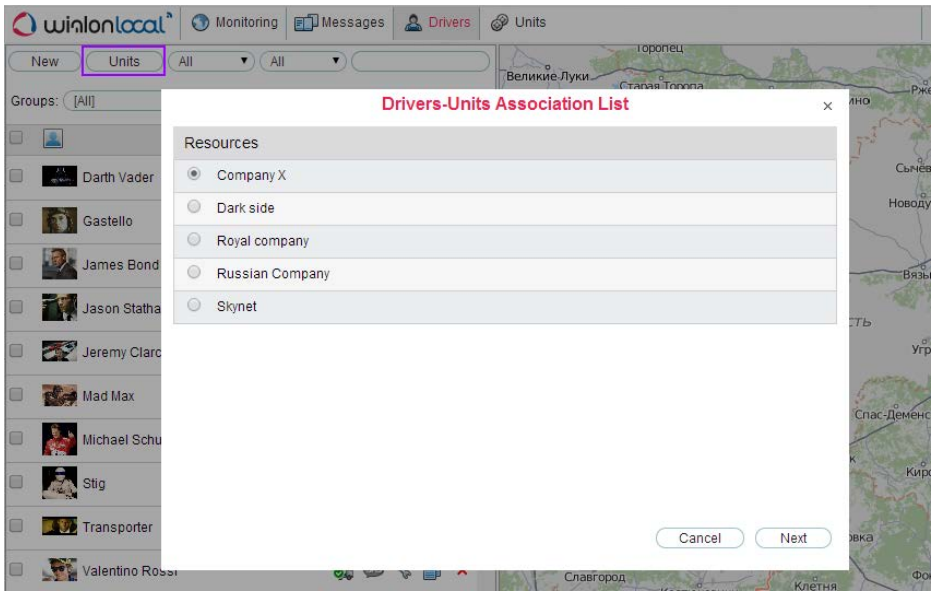
control system iButtons with i-wire bus inside are widely used. When getting into the vehicle, the driver applies the electronic key to be identified by the system.

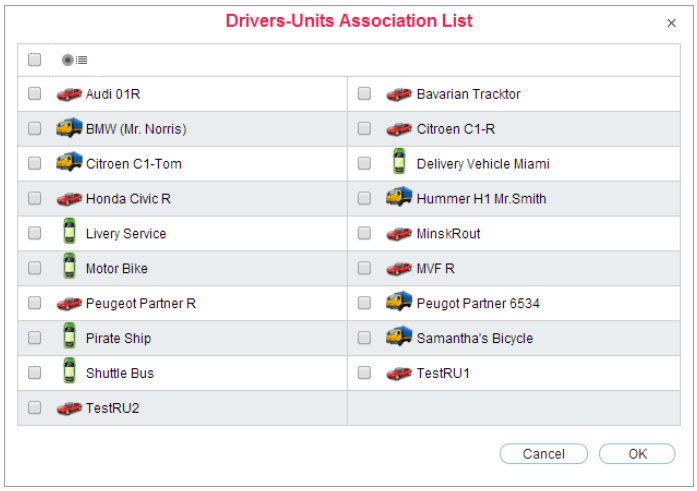
To use the automatic method of binding, some adjustments should be done in the system beforehand.

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 zero 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.



2. Drivers-units association list should be created. Press the *Units* button in the Drivers panel and create lists of automatically attachable units for each resource of drivers.

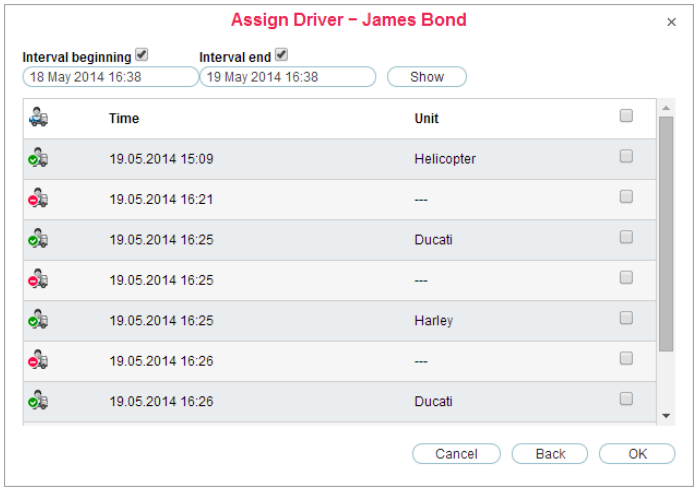




Thus, a driver will be automatically bound to a unit with the help of iButton in case that (1) this unit has a special sensor in its properties and (2) this unit is indicated in the list of auto-attachable units applied to the resource where the driver belongs.

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 drivers' properties. If a driver with such a flag is bound to a unit, other previously assigned drivers are reset automatically. Note the following restrictions:

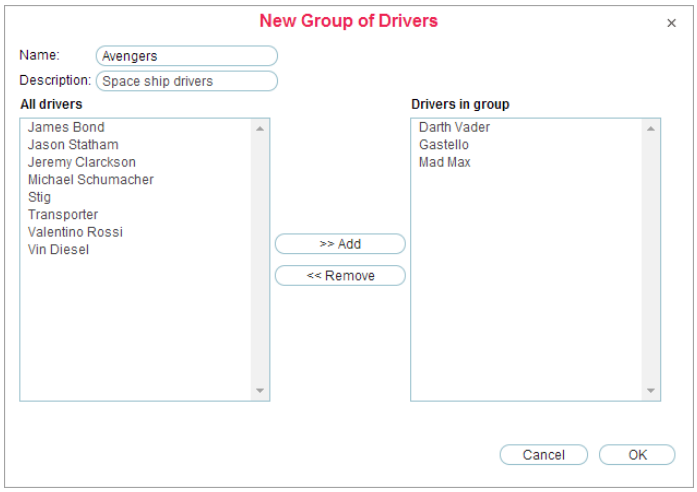
- For correct operation, all drivers must belong to one resource.
- It works only in real time, i.e., there are no such rules when registering drivers' working shifts.
- It does not work in reverse way, i.e., if a driver with Exclusive flag is assigned to a unit at the moment and another driver without that flag is being assigned, both of those drivers will be bound.

Groups of Drivers

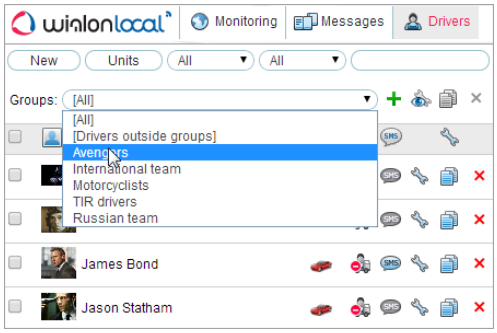
Groups can be created from any available drivers. Driver groups are used to filter the list of drivers as well as to query reports for a group.

To create a new group of drivers, press the button +. Enter name and description and choose drivers to fill the group. Press OK.

Only drivers who belong to the same resource as the group itself can compose the group.



Created groups are displayed on the dropdown list. Choose a group in the list and the drivers belonging to it will be displayed below. Besides, you can choose to display all drivers outside groups. On the right of the selector, you will find buttons to edit, copy, and delete a selected group as well as create a new one.



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** 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	Location	Duration	Driver
2012-07-16 00:05:18	Gartenstraße, Velden am Wörther See, Austria	11:10:14	Stde D.S.
2012-07-16 11:19:58	Seecorso, Velden am Wörther See, Austria	0:18:16	Stde D.S.
2012-07-16 11:59:06	Am Corso, Velden am Wörther See, Austria	0:30:00	Stde D.S.
2012-07-16 12:41:14	Süd-Autobahn, Tibitsch, Austria	0:10:02	Stde D.S.
2012-07-16 16:11:00	Brünner-Bundesstraße, Austria, Hobersdorf	0:30:16	Shal A.V.
2012-07-16 18:34:42	Polní, Přerov, Czech Republic	0:47:44	Shal A.V.
2012-07-16 22:31:12	E75, Poland, Słostowice	0:14:36	Shal A.V.
2012-07-16 23:36:44	Romualda Traugutta, Łódź, Poland	0:10:22	Shal A.V.
2012-07-16 23:54:06	Marszałka Józefa Piłsudskiego, Łódź, Poland	0:05:00	Shal A.V.

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.

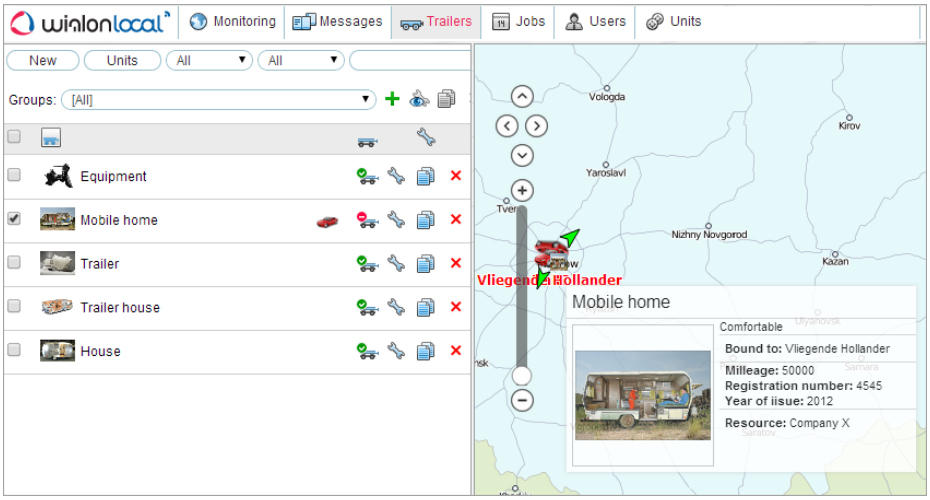
Besides, if you have Other Reports module, you can generate a report totally dedicated to working shifts of a certain driver or even a group of drivers. More...

Trailers

Attention!
This module is licensed separately.

Trailers refer to any kind of motor-drawn implements attached to 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, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer.



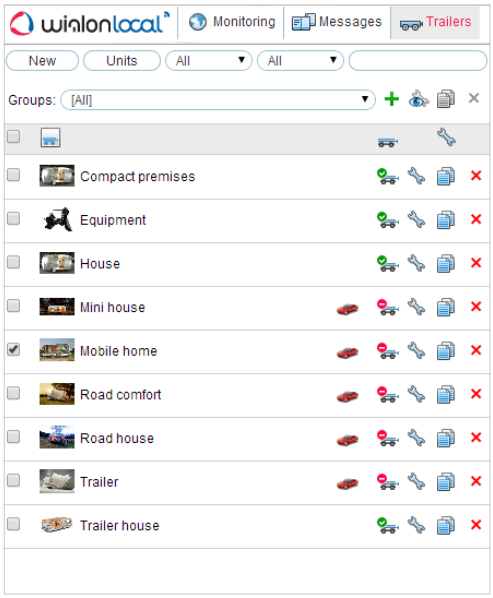
Creating a Trailer

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 (two last will be shown in trailer's tooltip). You can upload an image for the trailer which will be used to show the trailer on the list and on the map. Images with square aspect ratio are recommended. 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, that is not true for trailer groups.

Managing Trailer List



Trailers are listed in the alphabetical order. To quickly find a certain trailer, use the dynamic filter above the list. There are also filters to display trailers belonging to a certain resource or group, or display trailers according to their status (loose/bound). Those filters are presented in the form of dropdown menus above the list.

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);
- 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 access flag 'Create, edit, and delete trailers' on the resource where those 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. The button is disabled if there is not enough access.

After pressing the binding button (), choose one of two options: *Bind to unit* or *Register working interval*. The first option is used if the assignment must be registered right at the current moment. The second option is used to register trailer's work interval post factum. Select an option and press Next.

On the next page, select a unit. 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.

If the working interval option was chosen, you should additionally indicate date and time of work beginning and end.

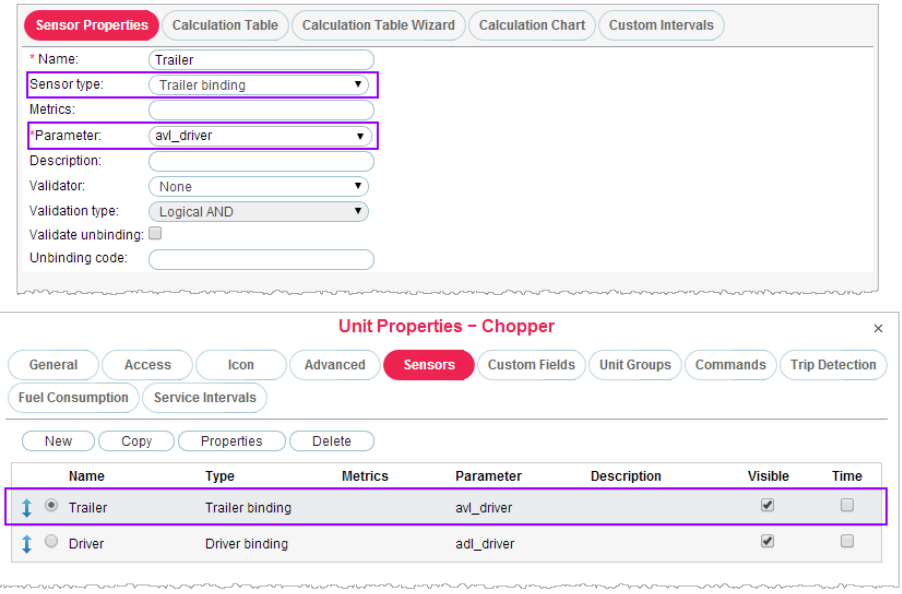
Several trailers can be bound to one unit.

Using the unbinding button, you can either detach a trailer from unit or, again, register a working interval. Besides, unbinding can be done automatically via special notification action (e.g., when unit arrives at the garage).

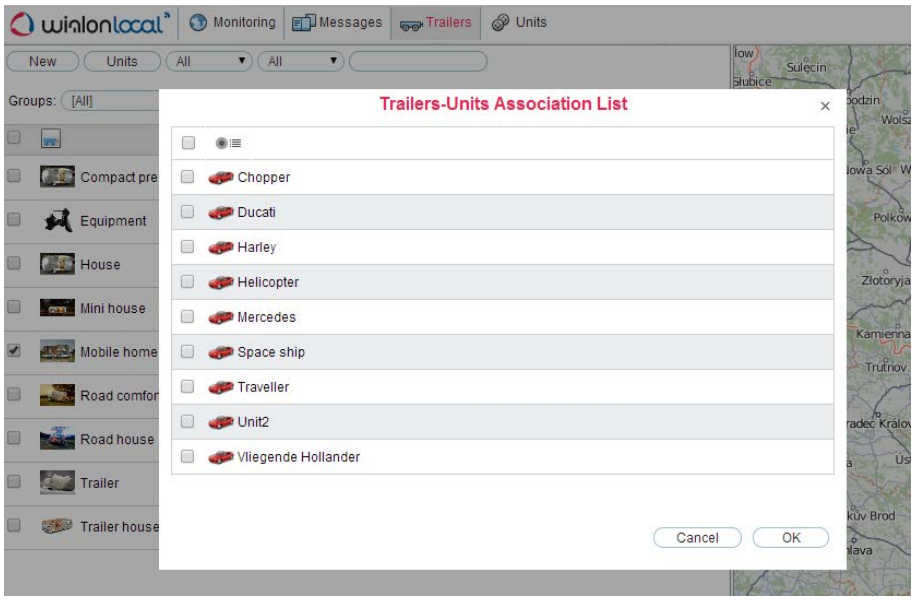
Automatic Binding

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 *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.



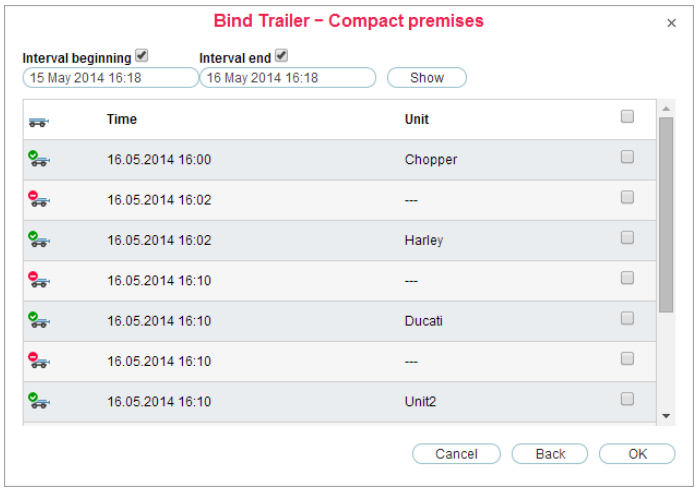
2. Press the *Units* button in the Trailers panel and create lists of automatically attachable units for each resource of trailers.



Thus, a trailer will be 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.

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. Open ' bind/ unbind' 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!

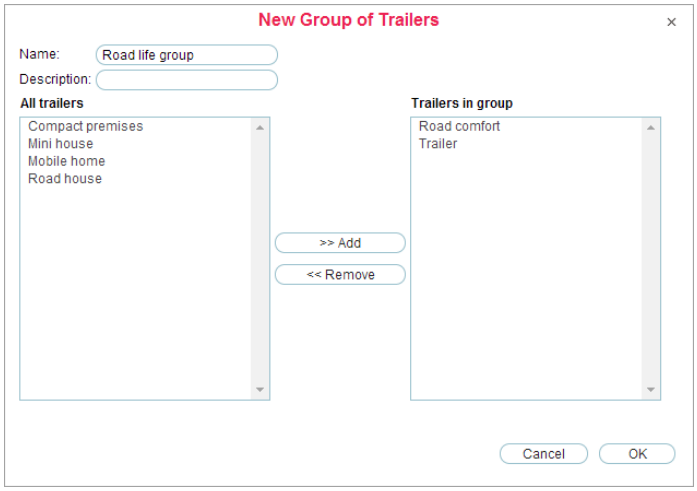
Like with units, the last message from the trailer (whether it is a binding or unbinding) cannot be deleted.

Groups of Trailers

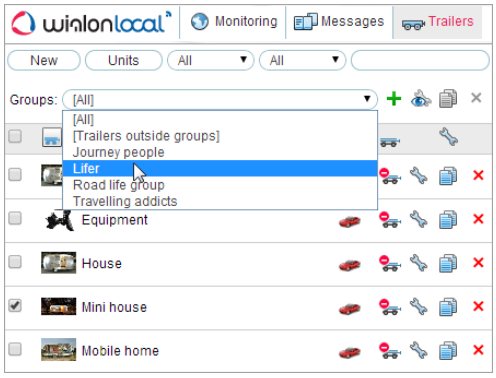
Groups can be formed from any available trailers. Trailer groups can be applied to filter trailer list and to query reports for groups.

To create a new group of trailers, press the button +. Enter name and description and choose trailers to compose the group.

Only trailer belonging to the same resource as the group itself can be added to the group.



Created groups are displayed in the dropdown list. It operates also as a filter, i.e., if you choose a group from this list, all trailers of this group will be displayed below. You can also choose to display all trailers or just trailers outside groups. On the right of a selected group, you will find buttons to edit, copy, or delete it as well as the button to create a new group.



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 tooltip and in extended unit 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.

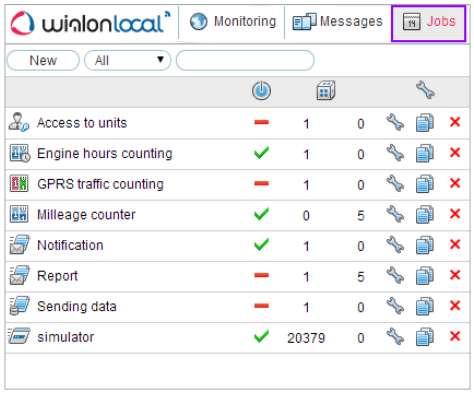
In reports:

- 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.
- You can generate tables for individual trailers and trailer groups (in terms of 'Basic Reports' module). Two tables are currently available — 'Bindings' and 'Custom fields'.

Jobs

Attention!

This module is licensed separately. In addition, the set of available job types depends on purchased modules.



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 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.

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 engine hours counting; — job on mileage counting; — 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.
	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 these jobs, such as enable/disable, edit or delete will be unavailable.

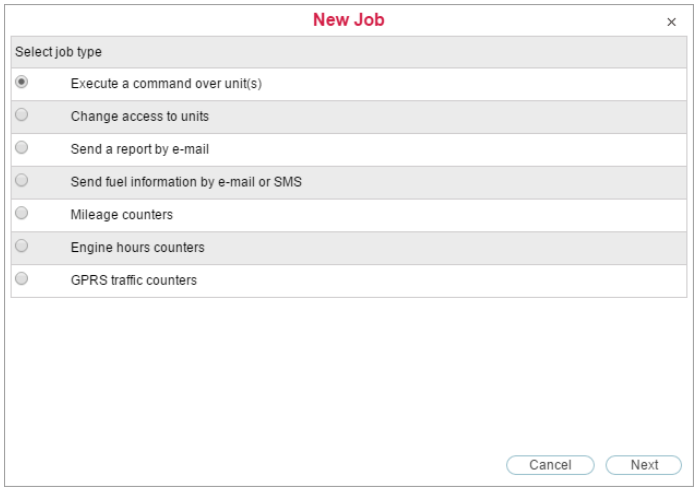
Configuring Jobs

To make manipulations with jobs, you should have at least one resource with the access right *Create, edit, and delete jobs*.

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).

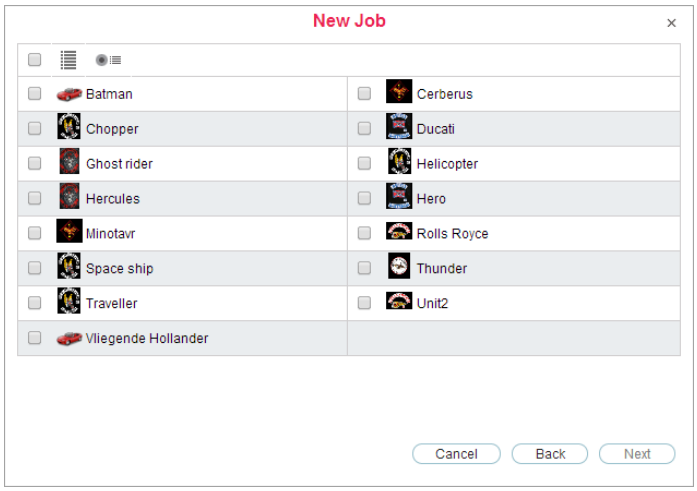
Dialog of choosing units for a job or notification consists of the units currently displayed in the work list of the Monitoring panel.

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 you select a group, it means the action will be applied to all units in this group. The list of units is in 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.

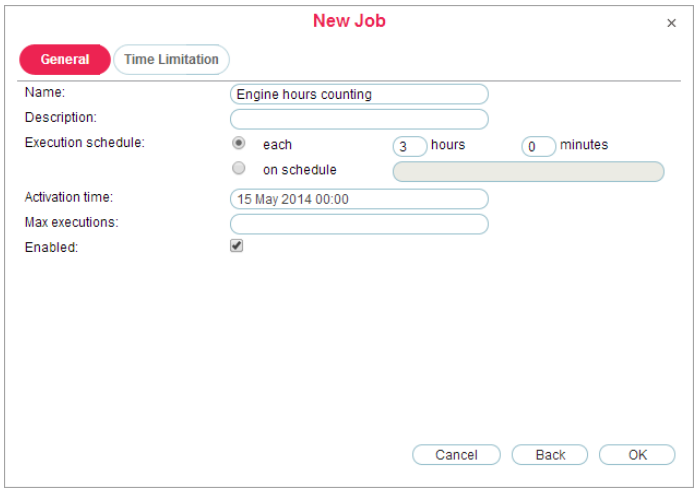
Please note that if there are more than a hundred units on this page, their icons are not displayed.



While editing a job or notification, this page contains units selected for the job (they are checked) and units displayed on the work list at the moment. You can add more units for the action or remove some. However, only unit with *Use unit in jobs…* flag can be displayed here. If a job or notification that you are editing contains units to which you have not enough rights, you will be warned about it and in case you save the job/notification, those units will be lost.

Basic 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 job's tooltip.

Execution schedule
Two ways to set schedule exist:
(1) Periodic execution: *each … hours and minutes*.
(2) On schedule. Key in time in the format of *hours:minutes* or just *hours*. If you need to indicate several points in time, separate them by spaces.

Activation time
Date and time when the job will be activated.

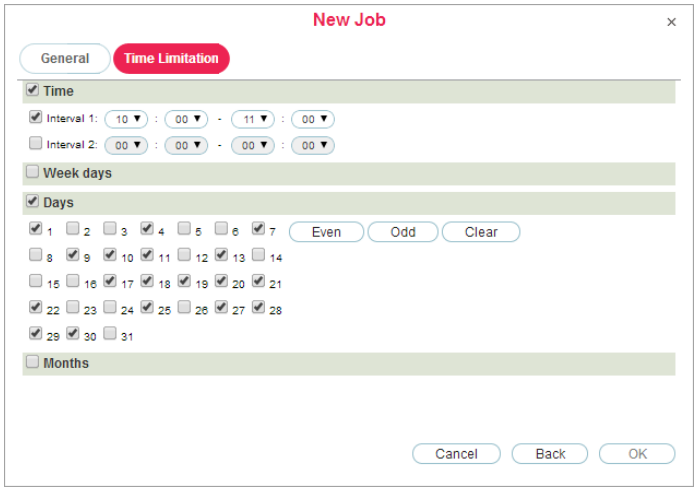
Maximum executions
Enter the number of job executions after which it will automatically deleted. If you leave this field empty, the job will be executed endlessly until you delete it or disable manually.

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 limitations

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*.



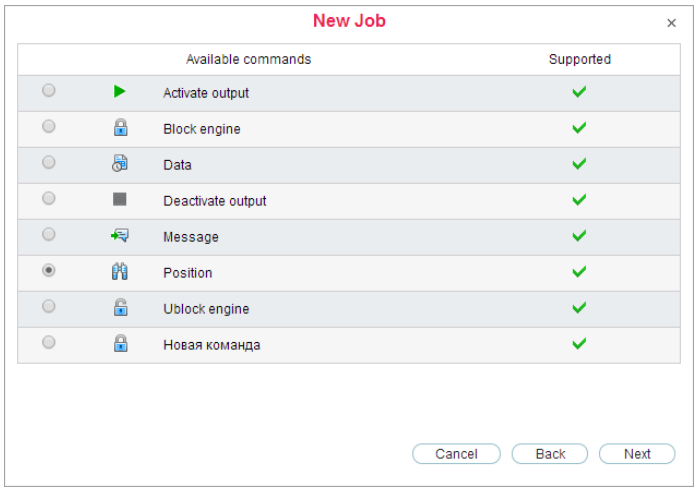
Job name and schedule are required fields, other parameters are optional.

Execute a Command over a Unit

While creating a job of this type, choose a command to be executed from the given list. The list consists of all commands that are configured in selected units (if you have *Execute commands* rights 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 selected units support this command;
- ⚠ a yellow triangle means that not all of 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 additional parameters like input/output number, online report interval, etc.
More about executing commands...

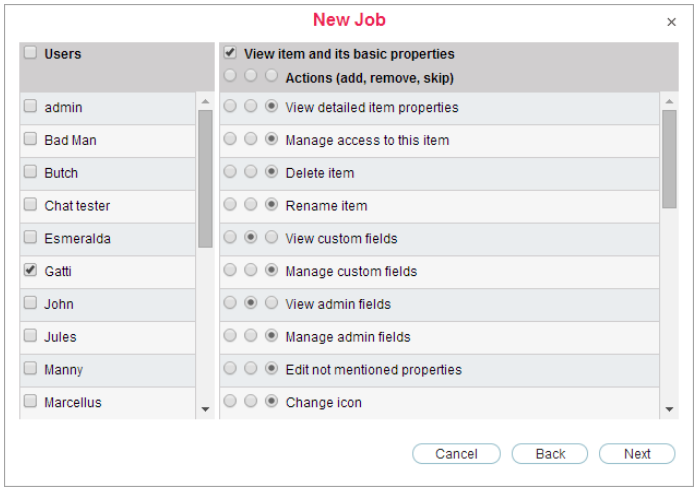
Attention!
When the time comes to execute a command as a job, all kinds of rights are checked beforehand. The user who is a creator of a resource where the job belongs should have the following access flags to unit: 'Execute commands' and the set of flags specified in properties of this command.

Change Access to Units

This job is aimed 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 access *Manage user's access rights*.

Check necessary users on the left and indicate access flags on the right. You can set flags, remove flags, or leave them untouched.



Attention!
This type of job can be performed successfully only if at the moment of its execution necessary rights are OK. The user who is a creator of the resource where the job belongs should have unit ACL flag 'Manage access to this item'.

Jobs about Counters

Counters of three types are used in Wialon tracking system: counters of GPRS traffic, mileage, and engine hours. They can be set up in unit properties.

Jobs about counters allow you to automate accounting of mileage, engine hours, and GPRS traffic.

Mileage Counters

This kind of job can help you to fulfill control over mileage counter automatically, according to schedule. With this job you can store mileage counter value in unit history, reset mileage counter, set a new value for it, save its value as parameter in data message.

To set a new value or to reset the counter, choose the option **Set new value for mileage counter** and input the desired value below. The counter will obtain this value each time when the job is executed.

Set the flag **Store counter value as parameter of unit data message** to save the counter value as parameter in data message. Later on it can be used to get initial and final mileage for trips. It is recommended to store the counter while the unit is parked, for example, once a day at night time.

The option **Store counter value in unit history** can be used to store current mileage counter value. It is especially recommended if according to the job properties, the counter has to be reset or altered.

Engine Hours Counters

This is analogue of the previous type of job but it is applied to engine hours sensors.

If you store engine hours sensor as parameter in data message, you can use this parameter to create engine hours sensor on its basis.

Attention!
This types of job can be performed successfully only if at the moment of its execution all necessary rights are OK. The user who is a creator of the resource where the job belongs should have unit ACL flag 'Edit counters'.

Counters' values (traffic, mileage, engine hours) are stored in unit history as registered events, which is needed for creating reports – Events or Chronology. When counter values are stored as parameters, it means new data messages are added to unit database. Those messages bear data message type, and mileage and engine hours are displayed there in meters or feet (depending on unit's properties) and seconds correspondingly.

GPRS Traffic Counters

This job is aimed to:

1. Automate traffic counter reset;
2. Store GPRS traffic counter value in unit's history.

For example, you can assign to reset the traffic counter once a month and register each reset with the current value in unit history.

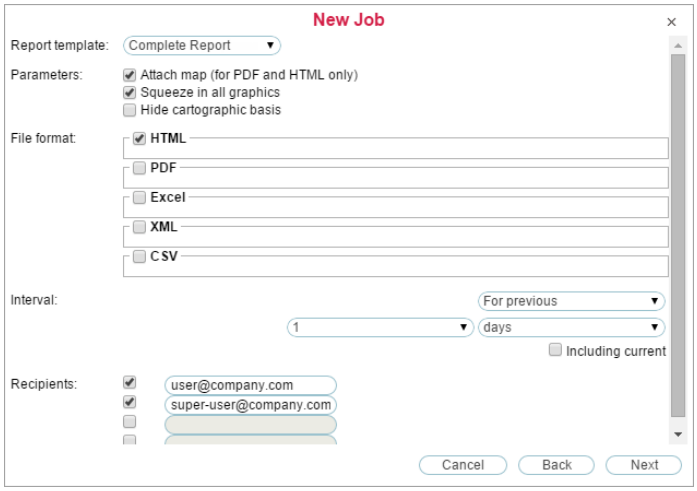
Indicate the status of the option **Store counter value in unit history**. If the option is activated, each reset is registered in the system, and then you can generate a report on events or report on traffic to see traffic consumption. If the option is not activated, resets are not registered anywhere.

The option **Reset GPRS traffic counter** is to set the counter to 0 each time when the job is performed.

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 time interval — for previous … days/weeks/months/years. In the Recipients section enter e-mail address(es) where to send reports. More about parameters of report export...



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).

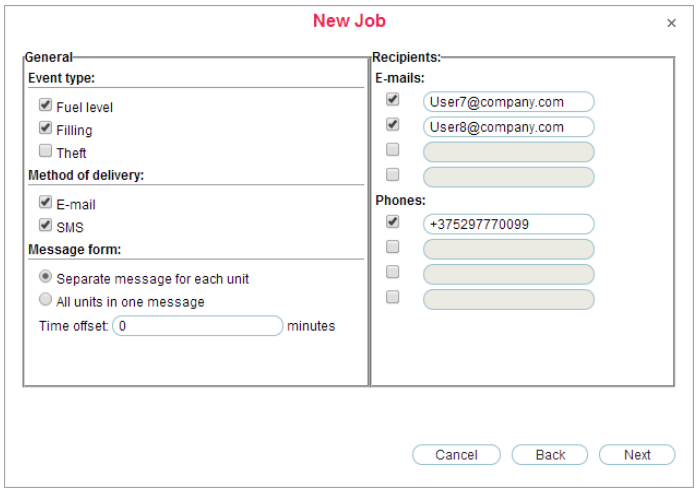
Only compressed files of reports can be sent as a job. Subject for the e-mail is taken from the name of job, and the repository itself derives its name from the report template name plus date (yyyy-mm-dd). After you have received a letter with a report, extract files to some folder and open them with appropriate applications depending on file formats.

Note.
If in your company the workday sometimes finished after midnight (because some vehicles may arrive late at night), then you can adjust the parameters for the daily report in the following way. Select report interval 'for previous 24 hours' and set job activation time at 4 AM. Then the report will be automatically generated every day at 4 AM. It will contain data for the last day, and the trips finished after midnight will not be divided into two parts.

Send Information about Fuel

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.
- Message form: one unit in one message or all units in one message.
- Time offset (in minutes). This parameter allows you to analyze messages from the black box. In this case, time offset value is subtracted from interval beginning.

Note.
Information about fuel filling and thefts is sent only in case if any has been detected. Information about fuel level is given in any case.

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).

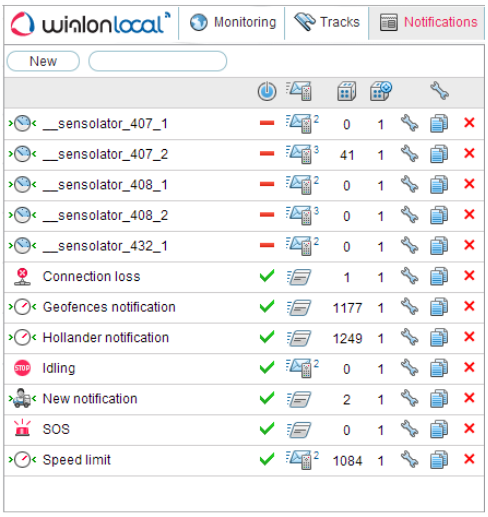
Note.
Whether fuel volume will be sent in liters or gallons, depends on resource settings (where the job belongs) and not on units' settings.

Notifications

Attention!
This module is licensed separately. In addition, the set of available notification types and actions depends on purchased modules.

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.



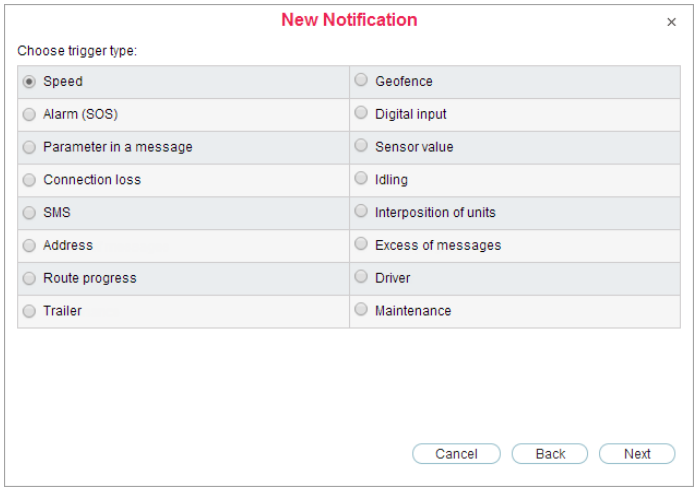
How to Create a Notification

1. Push the **New** button.
2. Choose unit(s) to create a notification for, and push Next. Units are selected in the same way as in jobs. More...
3. Select what you would like to control: geofence, speed, alarms, sensor values, message parameter, etc. Push Next. More...
4. Adjust control parameters needed for the notification type selected in the previous window: select geofences, indicate speed limits, etc. Push Next. More...
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...
6. Indicate how the notification should be delivered: sent by e-mail or SMS, popup online, registered in unit history, etc. More...
7. Key in a name for the notification and adjust the schedule for its performance. More...
8. Push OK. The created notification will appear on the list in the left part of the window.

All of the steps of creating notification are described in detail below.

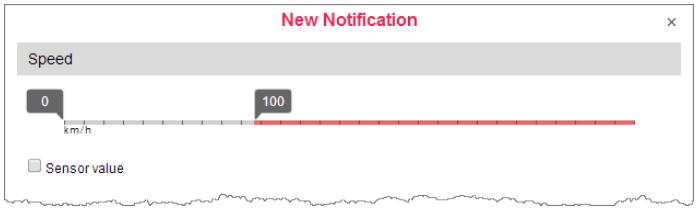
Attention!
To create a notification, the access flag *Use unit in jobs, notifications, routes, retranslators* is required. However, sometimes it is not enough – if a notification concerns an action, you need to have rights to perform those actions, and only then the notification will trigger.

Notification Type



Speed

Define the minimum and/or maximum speed values. If a unit goes out of this range, the notification will trigger. In addition, you can activate *sensor value control* – in this case, the notification will trigger only if both conditions are met.



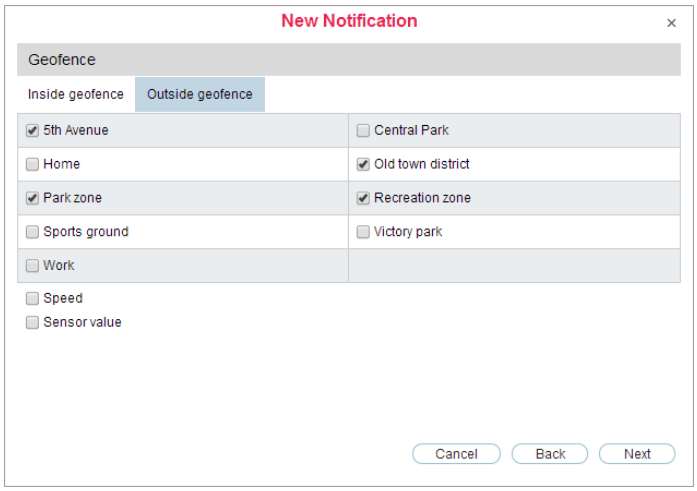
Geofence

In case of this choice, in the following window you select geofence(s) to control and control type: control entries to or exits from geofence(s). Those geofences should be created in advance and belong to the same resource with the notification. To choose several geofences at once, hold <ctrl> key and click on needed geofences in sequence.

In addition, you can narrow trigger case adjusting speed limitations or sensor value range inside (outside) the geofence. Then the notification will trigger when a unit being inside (outside) a controlled geofence breaks these limitations.

For additional speed control, indicate lower and higher speed limit, and the notification will trigger if beyond the limits.

For sensor control, you can set trigger inside the indicated values as well as outside them. Choose sensor types on the dropdown list or set the mask using a wildcard symbol (*). If there will be two or more sensors of the same type or mask found, their values can be summed or calculated separately (select the corresponding option).

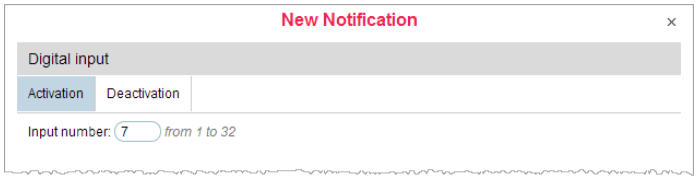


Alarm (SOS)

For this type of notification, no specific settings are needed.

Digital input

Specify the number of digital input and select control type: trigger on input activation or deactivation.



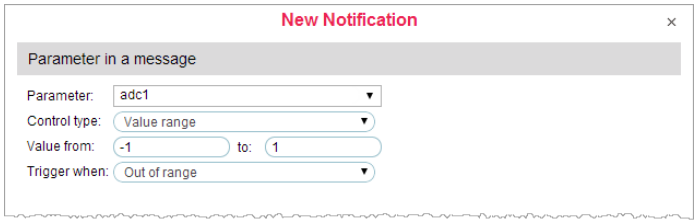
Parameter in a message

Four control types are provided: value range, text mask, parameter availability, and parameter lack. Only real parameters, i.e., sent by 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 parameter name, define 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, set 0 as min and as max value and choose trigger type 'Out of specified range'.

To control *text*, enter parameter name and *Text mask* using wildcard symbols (? and *).

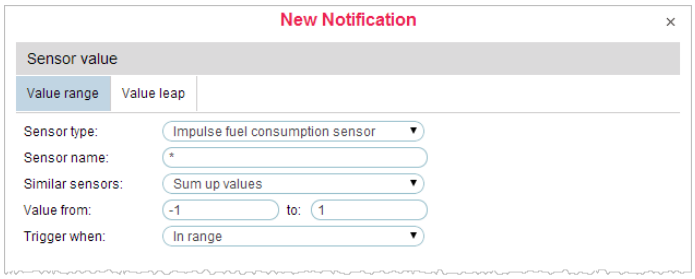
For *Parameter availability* and *Parameter lack*, it is enough to indicate parameter name. These two last mentioned options can be interpreted as parameter appearance and disappearance if on the last page of the dialog you set the option 'Generate notification only when state changed'. For *in* and *out* parameters it is possible only to control parameter availability/lack.



Sensor value

With this notification type, you can control either sensor getting some undesirable value (*Value range*) or abrupt significant change in sensor value (*Value leap*). To specify sensors to be controlled by the notification, choose sensor type on the dropdown list or set the name mask using wildcard symbols (*). You can as well do both. If there will be found two or more sensors meeting these conditions (same type or name mask or both), their values can be summed or regarded separately — select the corresponding option. Then enter minimum and maximum values and select control type: trigger in the specified range or out of it.

If you control value leap, then enter delta. Notification triggers when delta is exceeded. Note, that an indicated delta is compared to the module of values' delta.



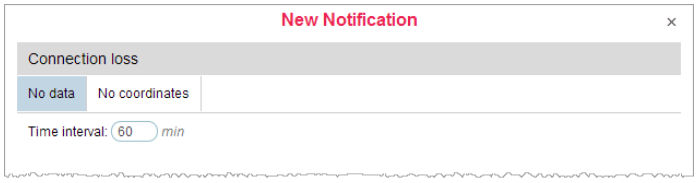
Connection loss

Choose 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.

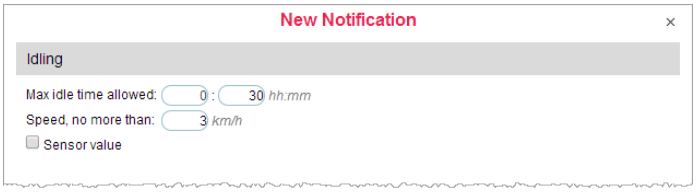
2. No coordinates. There are also cases when all sensors are active and their values are known, but it is impossible to locate the unit. It is especially true if someone covered GPS receiver.

Indicate loss time: how long (in minutes) the connection/coordinates loss should continue before a notification triggers.



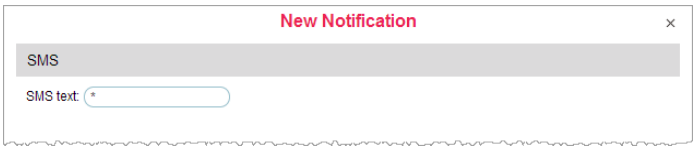
Idling

For this type of control, indicate speed and time. Speed should be more than 0 in order to exclude possible equipment errors. Indicate also time allowed for staying. If this time exceeded, this will be considered as an idle, and the notification will trigger. In addition, you can activate *sensor value control* – in this case the notification will trigger only if both conditions are met. It is convenient to control idles with engine on, for example.



SMS

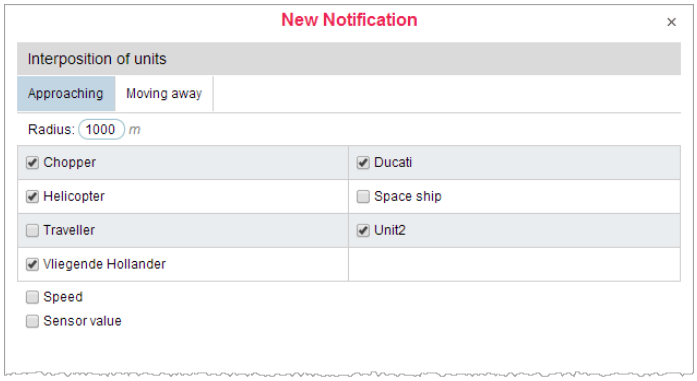
You can receive a notification when a certain SMS message comes. To define, which SMS messages you are interested in, enter a mask for message text. This feature can be useful, for example, when a device sends SMS of a certain content in case of malfunction.



Interposition of units

This type of notification allows you to control approaching of units to each other and moving away from each other. Select control type (approaching or moving away) and specify radius in meters – if this distance between units is insufficient or exceeded, then the notification will trigger. Choose units which position will be estimated regarding the units that were chosen for the notification itself.

In addition, you can narrow trigger case adjusting speed limitations or sensor value range (like in geofence control).

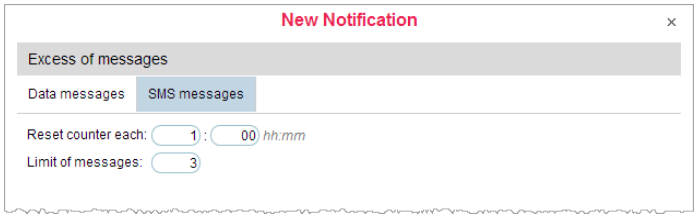


Address

This type of notification is similar to geofence control. You can control 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 found addresses. Additionally, adjust the radius of controllable area.

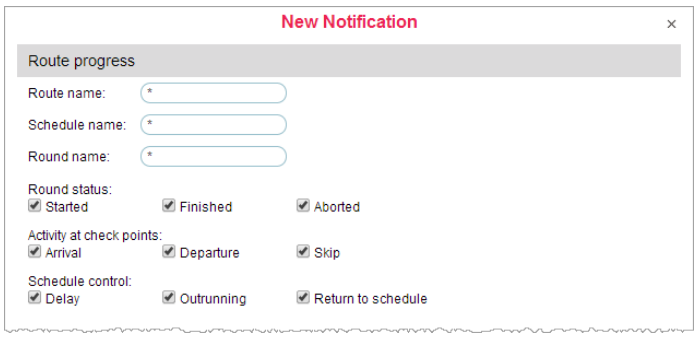
Excess of messages

With this notification, you can be warned if a unit exceeds the limit of messages you have set. Either usual data messages or only SMS messages can be under control of this type of notification. Indicate the limit of messages and set the reset interval. The example below assumes that the notification will trigger if unit sends 3 or more SMS messages in an hour's time.



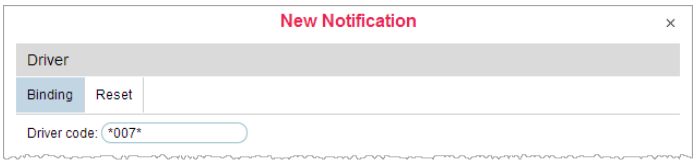
Route progress

For this type of notification, select statuses to control: round start, round finish, arrival to check point, check point skip, departure from check point, etc. Additionally, you can specify name masks for routes, schedule and/or round.



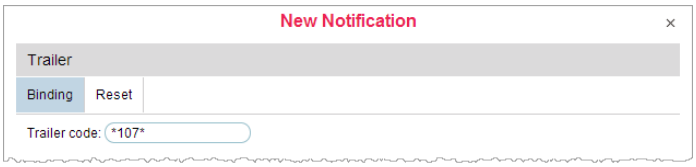
Driver

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

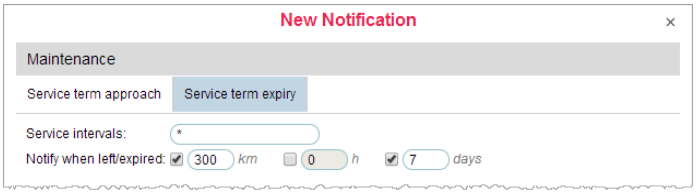
Choose control type: trailer assignment or reset. Settings to adjust are the same as for previous type.



Maintenance

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.

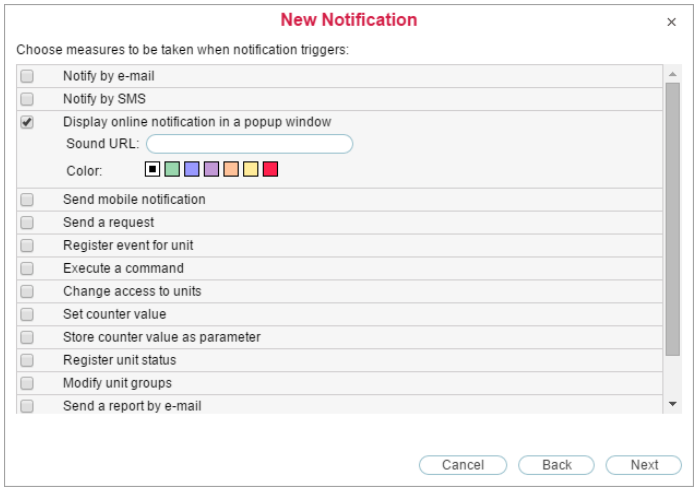
Notification about maintenance triggers only once – when a critical point is met (mileage, engine hours or time) about any maintenance interval. Then information about service work done should be delivered through event registrar or through unit properties dialog. Only after that, the notification starts working again.



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.

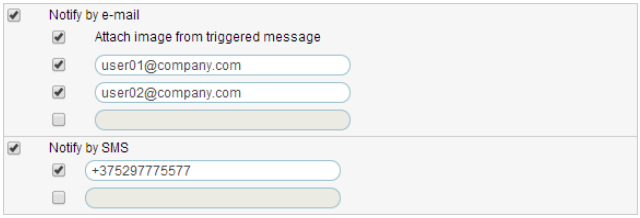


Notify by e-mail

You can indicate one or more e-mail addresses to send a notification to. When all slots to enter addresses are filled, additional slots appear automatically. Besides, you can check the option *Attach image from triggered message* if your the device used takes pictures.

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.



Display online notification in 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.

Attention!

Different browsers can have restrictions regarding formats of audio files:

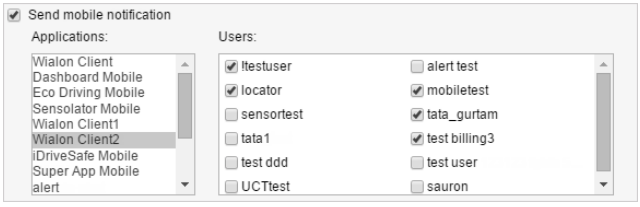
	MIDI	MP3	WAV	Ogg	AAC
Internet Explorer 9+	+	+			+
Google Chrome 11+	+	+	+	+	
Mozilla Firefox 12+	+		+	+	
Safari 5+	+	+	+		+
Opera 10+	+		+	+	

To highlight a notification, you can set an individual colour to it. This colour 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 mobile notification is sent to a user/users of an application. Choose the

necessary application in the left 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 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 right field. Here you can indicate a user/multiple users (choosing the corresponding flags) or all the users (holding <ctrl> and checking any user's flag) to whom a notification will be sent. Note, that mobile notifications service availability depends on the chosen service package.



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 is additionally proposed. If you check it too, 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

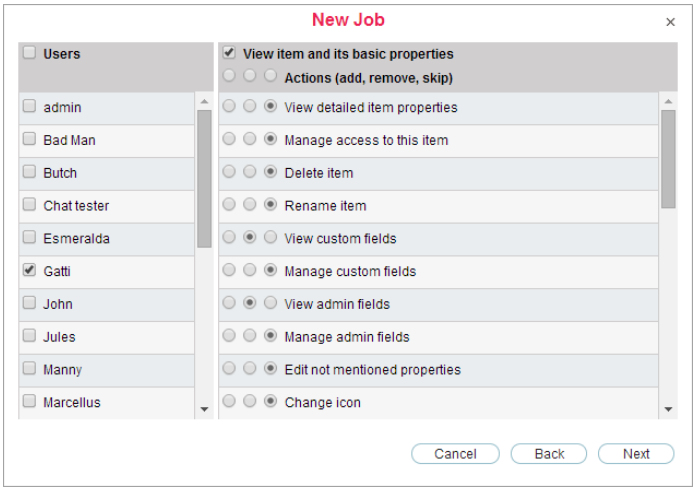
For this action, choose a command to be executed over unit(s). The list consists of all commands configured in the properties of selected units. So, different commands on the list may be supported by different units. Support status is seen with special indicators:

- ✓ 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

Enter e-mail address(es) to send a report to if the notification triggers. Select report template, object, file format(s), and other parameters to get a needed report. Sometimes it is convenient to choose *Triggered unit* option – then the report will be generated for the same unit that the notification has triggered for.

Create a round

Creating a new round for unit can be chosen as an action undertaken after the notification triggers. For example, when one round is finished, a new round can be assigned, or when unit leaves its garage (as a geofence), a round is automatically created for it.

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'.

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'.

Notification Text

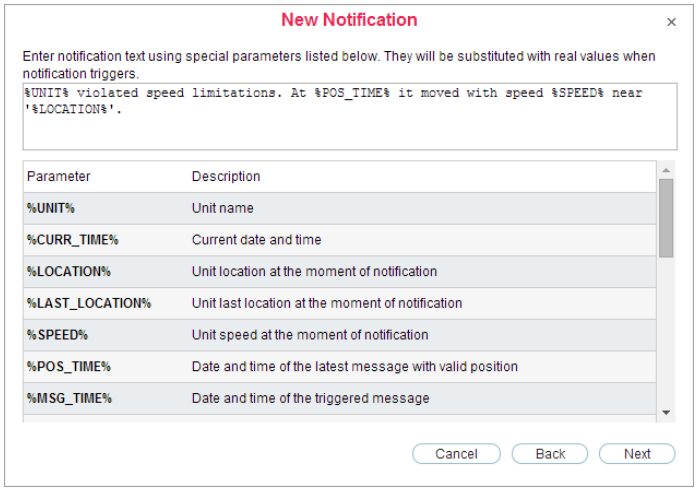
Text can be set for such actions as notify by SMS or e-mail, register an event in unit history, or display popup window online.

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 any type of notification:

%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)
%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
%POS_TIME%	Date and time of the latest message with 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)
%ALL_SENSORS%	All sensors and their values
%ENGINE_HOURS%	Engine hours at the moment of notification
%MILEAGE%	Mileage at the moment of notification

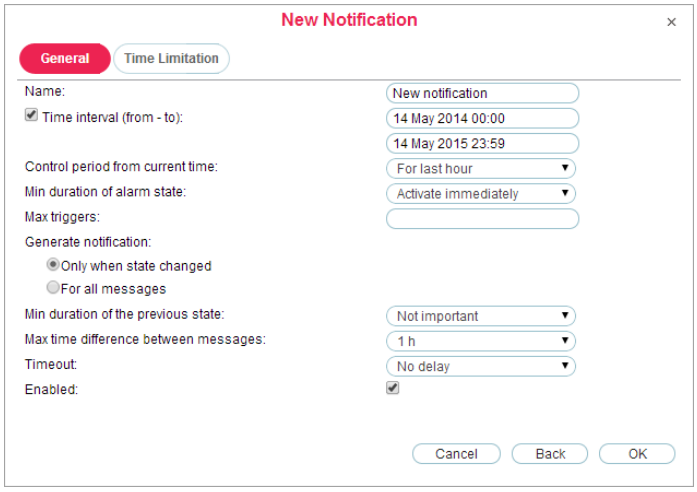
%LAT%	Latitude at the moment of notification (e.g., N 55° 45.7530')
%LON%	Longitude at the moment of notification (e.g., E 37° 35.2068')
%LAT%	Latitude without formatting
%LON%	Longitude without formatting
%GOOGLE_LINK%	Link to Google Maps with the position at the moment of notification (e.g., http://maps.google.com/?q=55.762550N,37.586780E)
%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%	Triggered geofence name (used in notifications of geofence control)
%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)
%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)
%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 sigh from both sides. Otherwise, it will be considered as plain text and will not be converted to real values.

Notification Parameters



Here you set general parameters for a notification as well as define the specific character of its operation. The set of parameters can vary depending on notification type.

- **Name**
  Key in any mane. It will be displayed on the list of notifications and in the notification itself.

- **Time interval (from – to)**
  Time interval is a notification validity period. It is unlimited by default (the Time interval box is not checked). Though, if it is necessary any notification validity period could be set accurate to the minutes (check the box and indicate an interval needed). Upon the expiration of the indicated time period, a notification will be automatically switched off (or permanently deleted if units mentioned in this notification do not exist anymore).

- **Control period from current time**
  This is a period of 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 aimed to exclude cases of accidental trigger that can be caused by equipment errors and inaccuracy. For example, a tracker can show that a unit left a geofence but returned 10 seconds later. In this field you can define how much time the alarm state have to continue in order to be registered. Choose an interval from 10 seconds up to 1 day.

- **Max triggers**
  How many notifications can be delivered until it will be switched off (or permanently deleted if units mentioned in this notification do not exist anymore).

- **Generate notification: (1) Only when state changed, (2) For all messages**
  In the first case, the notification will trigger when unit state changes, that is if at the moment when the notification was activated a unit is already in an alarm state, the notification will not trigger. In the second case, the notification will trigger as soon as an alarm state is detected. If the second option is selected, the following parameters are not needed.

- **Min duration of the previous state**
  This parameter is needed to exclude excessive triggers. For example, the unit can return to the normal state for a very short time and then returns back to the alarm state. In order that the notification in such a case would not trigger twice, this parameter is used. Choose an interval from 10 seconds up to 1 day.

- **Max time difference between messages**

Maximum time between the latest message and the previous one to form a notification. If the interval between the current message and the previous one exceeds this value, the notification does not trigger.

- **Timeout**
  Delay from the moment when message was received and before it will be checked. This delay is especially recommended if a unit has a black box that usually requires time to unload all messages stored in the period of communication loss (for instance, while it was abroad).

- **Enabled**
  If activated, the notification after creation/editing will be active. If not, it will be disabled.

- **Time limitations**
  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.

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	e-mail
geofences	SMS
alarm (SOS)	online popup window
digital input activation/deactivation	mobile notifications sending
sensor value	POST/GET request sending
parameter in a message	event registration
connection loss	violation registration
idling	command execution
SMS	modify users access level
interposition of units	manipulate counters
address visit	register unit status
excess of messages	modify unit groups
route progress	send a report by e-mail
driver control	create new round
trailer control	reset driver
maintenance (service intervals)	reset trailer

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.

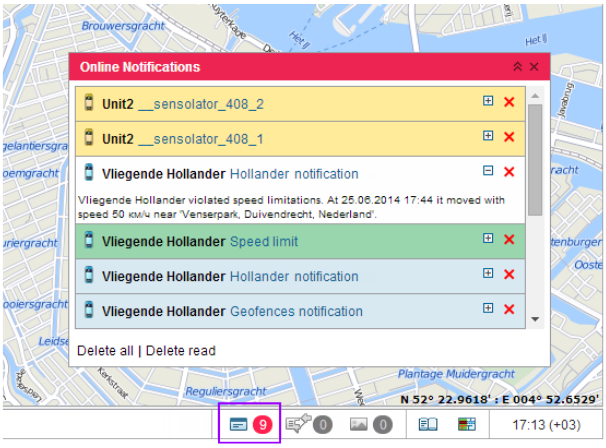
Using the dynamic filter, you can save your time when looking for a certain notification on the list. Enter notification name or its part into the search box above the list and estimate the results.

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 will popup in a separate window and can be accompanied by a special sound (see User Settings). If special parameters are not specified in notification properties, the standard audio signal is used. However, you can assign your own sounds, for each notification individually.

As more notifications come, they are stored in the same window.



Newly received notifications are added to the list on the top. Unread notifications has a sky-blue background by default. The caption for an online notification is taken from notification's name provided during its creation and is highlighted in blue. To expand or minimize a particular notification, use the switch button **+/–** or click on the header of the notification in a place with no text.

Records in this window can have different background (if this was set in action parameters). Colorful backgrounds can be applied to highlight most important messages or visually separate notifications of various types from each other. Background becomes lighter after the notification has been read.

If clicking on a notification, the map is centered on the place where the event happened. If clicking on unit's name, the map is centered on the latest unit position. At that, the unit is added to the work list of the Monitoring panel with the flag 'Show on map'.

To delete a notification, click on a red cross against it. It is possible also to delete all notifications or delete all read notifications (*Delete all* or *Delete read*). The window is closed automatically when you delete all notifications. If the online notifications' window is closed by clicking on the grey cross in the upper right corner, then the window ceases to appear automatically upon receiving of notifications until the window is opened by clicking the corresponding button in the bottom panel.

The notification window can be hidden or shown, resized or dragged over the screen. To resize the window, click on its right or bottom edge and drag in the necessary direction. To hide the window, click on the Online Notifications icon on the bottom of the screen (or use the standard little cross in the upper right-hand corner of the window).

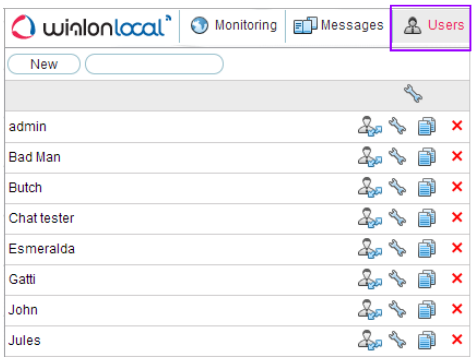
By default, the notification window appears automatically when a new online notification triggers. However, if you remove the flag *Automatically display popup events* in User Settings, only the number in red circle next to the notifications icon will indicate that there are new messages. If there are any messages in the window (either read or unread), the icon itself is active which means it is colorful and can be pressed on.

Note.
Any user who has any access to a resource will get all online notifications created in this resource.

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



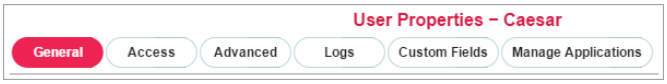
To work with users, open the Users panel, choosing a corresponding name in the top panel or clicking on the necessary item in the main menu customizer.

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 login as this user. It is disabled if you do not have enough access privileges. More...

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.

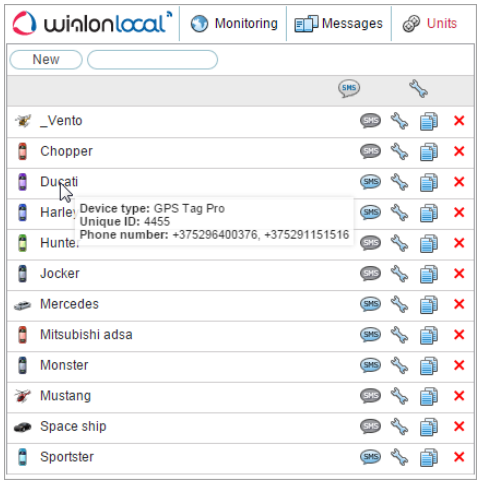
In reports on users you can create the most detailed tables on users' logins and logouts as well as get charts of their activity by hours and days.

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. More...

Units



Unit is a vehicle, machine, person, pet or any other moving or stationary object that can be controlled with the help of a GPS tracking system.

To work with units, open the Units panel, 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 units available to the current user. Displayed are the units available for tracking on the Monitoring panel. Here you can create, view, copy, edit, delete units, import/export their properties and send SMS messages.

On the list, units are displayed in the alphabetical order. Besides, every unit has its own icon. To quickly find a necessary unit, apply the dynamic filter. Place a mouse cursor over unit to display its details in a tooltip: type, ID(s), phone number(s). This information is given only to users who have the access right *Edit connectivity settings* to unit.

Use the following buttons against each unit to perform standard actions over it:

- — Send SMS to unit's SIM card. It can be a command or other message. SMS buttons are not displayed if this feature is not activated for the current user. If the button is dimmed, it means there is no phone number in unit properties or the current user has not enough rights to the unit. If two phone numbers are given in unit properties, choose one of them when the dialog of SMS sending opens. More about sending SMS messages...

- — 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 12 tabs which detailed description can be found in the following topics:
  - General,
  - Access to Unit,
  - Icon,
  - Advanced,
  - Sensors,
  - Custom Fields,
  - Unit Groups,
  - Commands,
  - Trip Detection,
  - Fuel Consumption,
  - Service Intervals.

- — Create a copy of this unit.

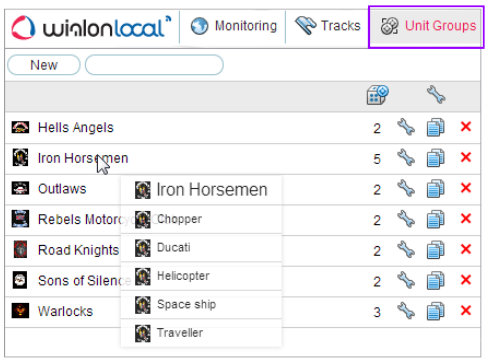
- — Delete a unit from the system completely. To do this, you need *manage* rights. If the button is dimmed, it means you do not have enough access (*manage* rights are required). Routes assigned to unit are deleted together with it.

Unit Groups

Unit group is a system macro object incorporating several units that have something in common. In many cases, it is convenient to operate a group of units instead of performing an action over each unit individually.

Working with Unit Groups

To open the Unit Groups panel, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer. Here you can create, view, copy, edit, and delete unit groups.



On the panel, there is a button to create new groups, a filter, and a list of unit groups available to the current user. On the list, there is an indication of the number of units in each group. If you hover the mouse cursor over a group, in a tooltip you can see which units there are and their current location. For your convenience, the groups are arranged by name. If there are many unit groups, use the dynamic filter above the list to easily find a necessary one.

Use buttons against each unit group to perform a standard action over it:

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 button is dimmed, it means you have not enough access.

When working with unit groups, consider some specific features relating to 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 rights *Edit ACL propagated items* on 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...
2. Advanced reports:
   - all tabular reports can be generated for a unit group;
   - draw tacks of all grouped units on the map.

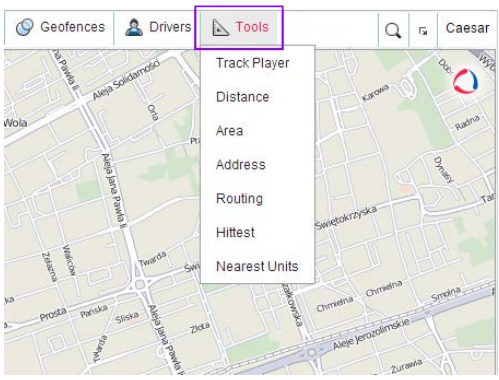
More...

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...

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:

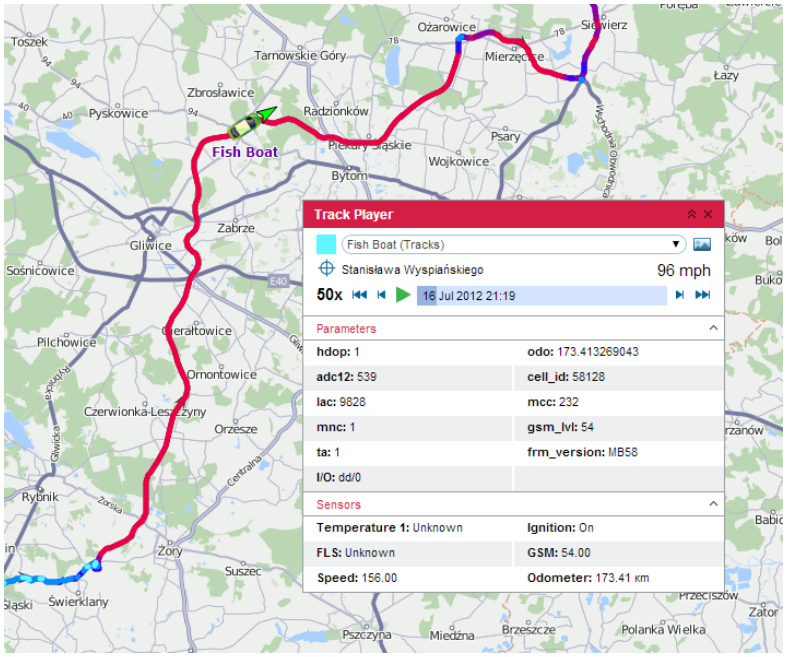
- Track Player
- Distance
- Area
- Address
- Routing
- Hittest
- Nearest Units
- LBS Detector
- SMS
- Search on Map

Track Player

This 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, request tracks of units' 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 unit's name, 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 90 times (90x). 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 cam 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.

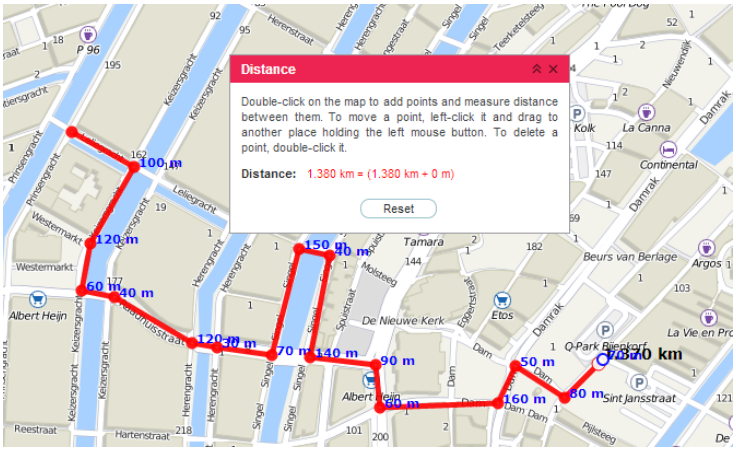
Tracks can be also played in a special app — Track player. This application allows playing tracks of several units at once.

Distance

Choose **Tools => Distance** 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 the 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).

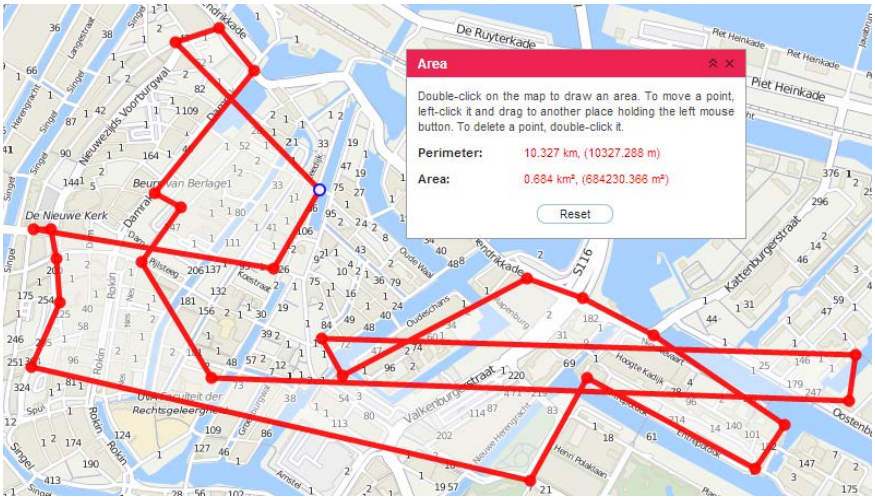
When the line is on the map, move the cursor along the line to get the distance from the starting point to the current cursor position. Cursor position is marked by a white point (if put the cursor over, it becomes plus-shaped), and a black font is used to display distance value.



To clean the map and start new measurements, use the **Reset** button.

Area

Choose **Tools => Area** on the menu. 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 clean the map and draw a new area.

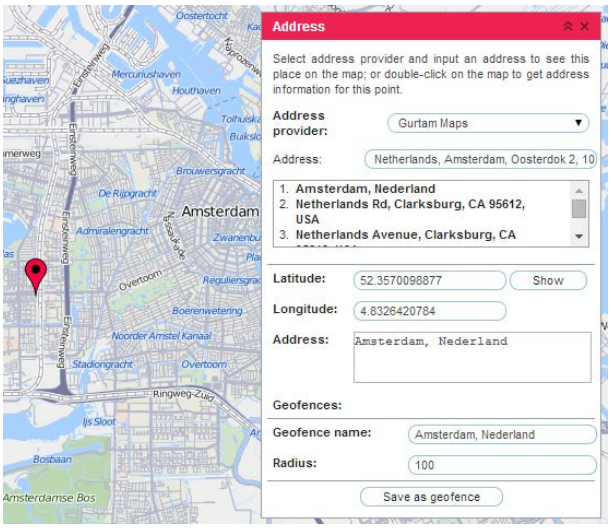
Address

The address tool is designed to:

- find a place (city, house, etc.) on map;
- detect the address of a place.

Choose **Tools** **Address** on the menu to make use of the tool.

The default provider for address information is Gurtam Maps / WebGIS. Though you can choose another source (depending on maps activated and their support): Google, Yandex, Visicom, Luxena, etc. (see Map Source).



In User Settings, you can indicate *City*. Then this city/town will be selected automatically when you open the Address tool.

Search by Address

To start searching, input the first letters of the name of the city/town into the **City** field. After typing three or more characters, in the **Results** field a list of places starting with these letters will appear. If the place you are looking for is the first on the list, push <enter>. In other case, select the necessary item in the list and click on it. The similar actions can be performed in the **Street** field. After selecting the street, a list of houses located there becomes available. Choose one, and the map will be centered at this house.

The found place will be marked with a blue marker. Information (coordinates and address if available) will be displayed below. If it gets into any geofences, their list will be given, too. On the left of geofence name there will be a square box with color assigned to this geofence.

The search can be stopped on city or street if it is enough for you.

The **Back** button is used to go back to the street search (if you are already selecting a house) or to the city search (if you are in the street field).

If you have moved the map or scaled it, you can reset changes pushing the **Show** button.

To start a new search, press **New search**.

Address Detection

To know address of a point on the map, just double-click on it. See the address and the coordinates in the popup 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 with 100 m radius. The detected address will be used as the name for this geofence (however, you can edit it).

Routing

This 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 press *Calculate*.

Selecting Provider

Gurtam Maps / WebGIS 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.

Placing Points

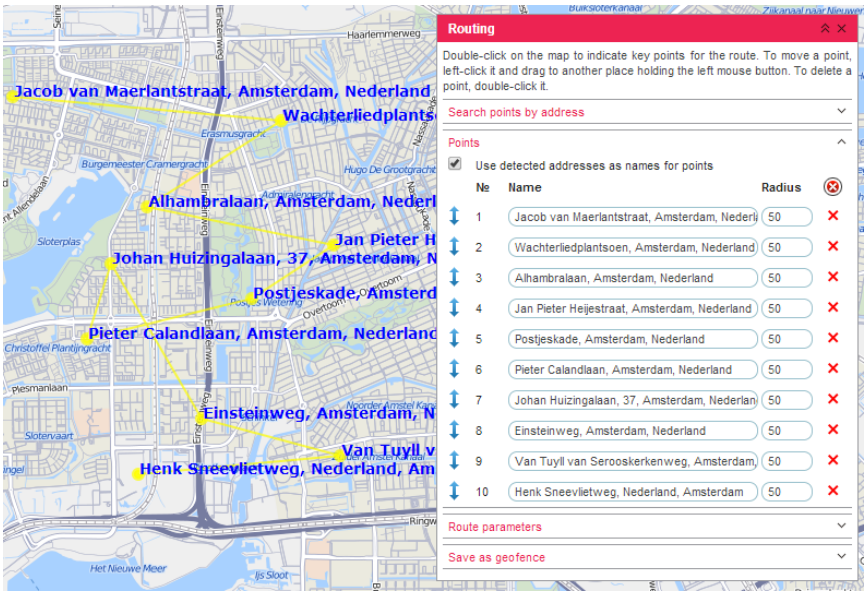
There are two basic ways to set key points for route:

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 flag **Auto save of points** is enabled), or manually (with the **Add point** button if this flag is disabled).

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

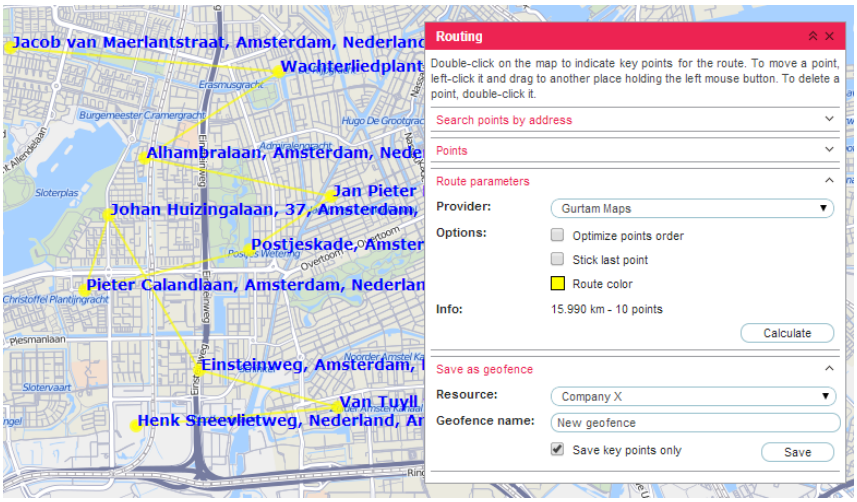
If building a route with Gurtam Maps / WebGIS, sequence order of points can be interpreted in two ways:

- Default option is that the points follow in the order you put them.
- Point order can be optimized in order to make the route as short as possible. For this you should enable the flag **Optimize points order**. The route will be drawn beginning from the first point (without snapping to roads). The last point can be fixed (for example, if a unit lefts the depot and after a while is expected to come back), that is regardless any sequence order offered by the program the last point will be that which was set the last. For this, enable the flag **Stick last point**.

At the end, press the **Calculate** button and estimate the result. If you need to change some parameters (for example, add more points), press **Undo calculation**. If you want to build a new route, remove all points with the special button on the head of the points list.

In addition, you can choose line color as well as view information about route – its length and number of points.

If the calculation is made using routing, then the route will be built considering the existing roads. The default routing provider is Gurtam Maps. Though, the other sources can be chosen as well: Google Maps, Yandex, HERE, etc.



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 geofence name, choose a corresponding resource, and click 'Save' button. There are two variants for saving in this section:

- If 'Save key points only' flag is activated, then 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 will appear 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

This 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.

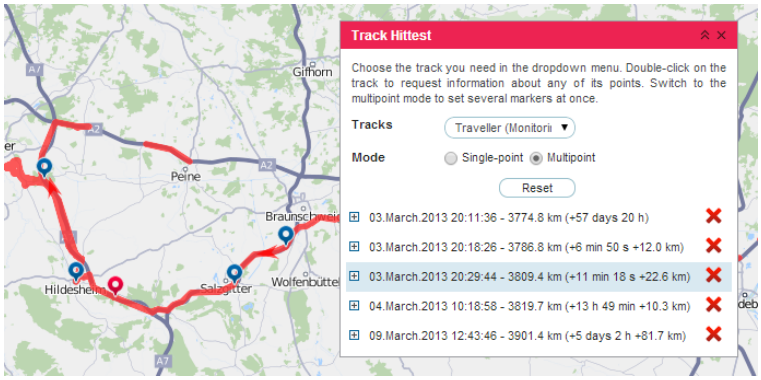
2. In the Messages panel, while viewing messages for the indicated period, the track is mapped automatically.

3. In the Reports 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.

Choose a track in the dropdown list. Hover the cursor over track to get accurate information about any point in a tooltip. This point will be highlighted with the pulsating circle. Double-click at any place of the track (or even on the map), and the nearest to your click message will be found and indicated by the marker. The map will be centered on this point.

Two modes are available here: single-point and multipoint. Depending on your choice, you can get information about one or more points at once. The information is displayed in the popup window when placing the cursor over a marker. The information is: date and time, location, speed, altitude, coordinates, satellites, sensors values (visible sensors only). It is duplicated in the table at the top of the screen.



If the multipoint mode is selected, you can mark several point of the track. The active (selected) point is then blue and others are red. In the table, the active point is also highlighted by blue color. To navigate from one point to another, click on a corresponding marker on the map or corresponding row in the table. Besides, if the multipoint mode is selected, the displacement from the starting point (in time and distance) is calculated, and in brackets you can find the displacement from the previously put point.

Nearest Units

This tool is designed to help you to find units which are the nearest to a certain place according to their last message.

Choose **Tools** **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 or WebGIS (depending on your system configuration) 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
Depending on the availability of the maps you can choose routing provider among Gurtam Maps, Google, Yandex, Visicom, or HERE.

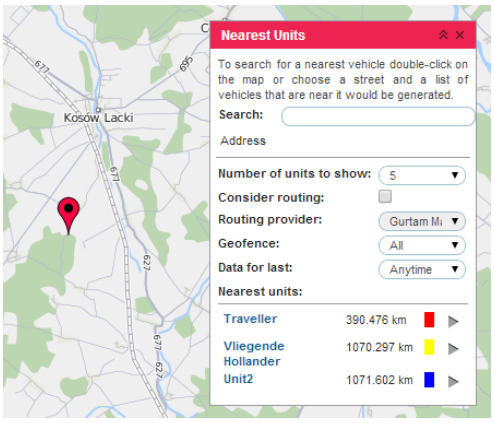
Geofence
Any geofence can be selected as district limitation. The filter by geofence is applied to found results only. This feature is designed to exclude from search results the units which are far away from the indicated place.

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.

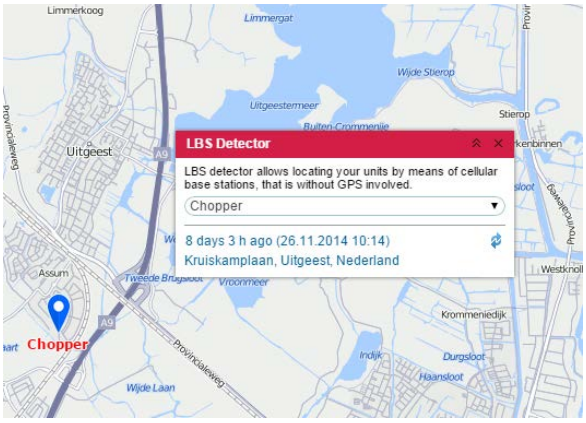
LBS Detector

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

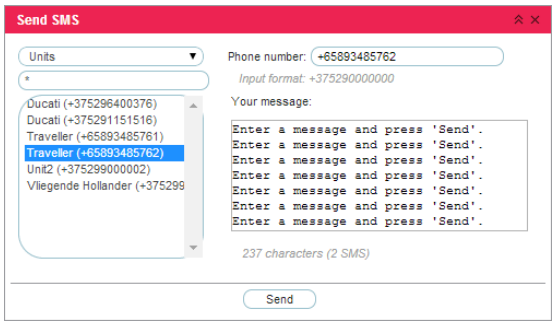
Choose a necessary unit in the dropdown list. Its contents depend on the work list of the Monitoring panel and access to those units ('Query reports or messages'). Besides, the list contains only the units with corresponding parameters.



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, LBS Detector's window 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 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.



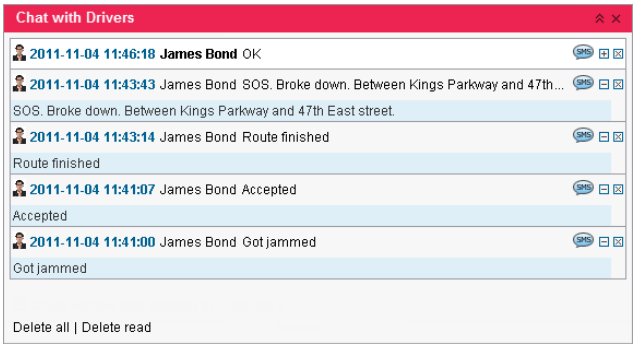
In the dropdown list *Drivers/Units* select addressee. Below you will see the list of objects of the selected type, but only objects that have a phone number in their properties. This phone number is displayed in brackets after object's name. If a unit has two phone numbers, such unit is displayed on 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.

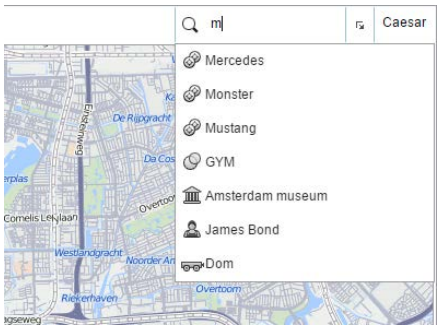


If you have the *Basic Reports* module in your package, SMS chat of a dispatcher with a driver can be shown in a special table called SMS.

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, POIs, unit groups, drivers, trailers, 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 Process

Click the corresponding icon in order to use ‘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. Upon indication of 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

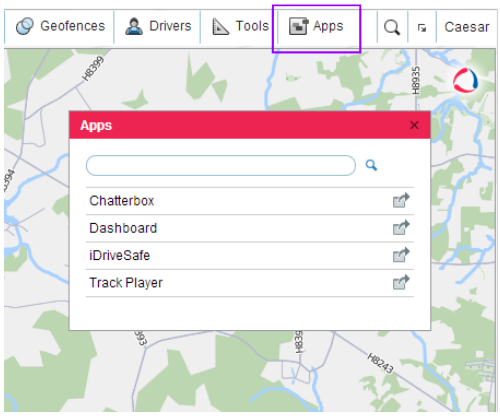
Click on the necessary item in a search list in order it to be shown on the map. The alternative way to do this is to use up and down arrow keys and <enter> on the keyboard. The map is centered on the chosen item. Moreover, the map is scaled in such a way that the chosen item gets into the vision field. After you choose the item in the list, the search tool will be 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...

To open the **Apps** menu, choose a corresponding name in the top panel or click on the necessary item in the main menu customizer. The appeared menu contains the list of available applications arranged in alphabetic order.

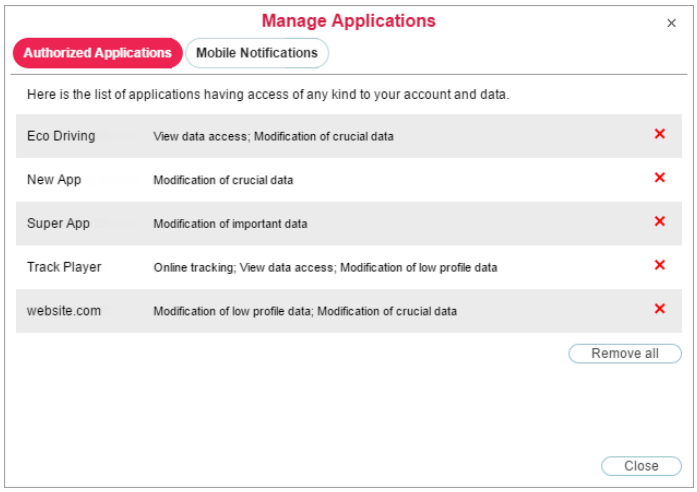


Click the name of an application to open it in a new tab of your browser. An application can be also opened in a separate window over Wialon Local by clicking the corresponding button to the right of application name. Windows with applications can be dragged over the screen, resized, and collapsed.

Manage Applications

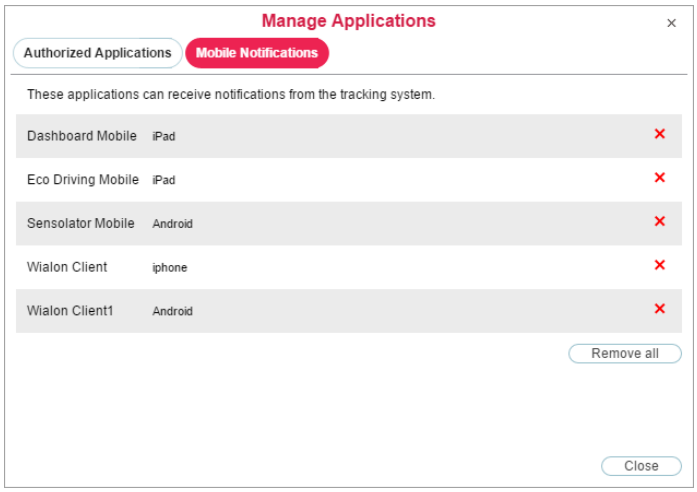
Authorized applications

This tab contains the list of applications having any access to your account and data. To the left there is an application name, to the right you can see access rights possessed by an application 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.



Wialon Mobile

You can track your units not only from a full-sized desktop computer but also from a smartphone.

Mobile Client for Wialon is available on two platforms — Android and iOS.

Download on the App Store | GET IT ON Google play

Attention!
Mobile Client requires enabled SDK module.

Here is the list of some arbitrary signs you will encounter in the mobile application:

Current State

unit is moving

small halt

unit is still

current state unknown (check trip detection properties)

last known state is no longer relevant as it was detected more than a week ago

unit has no data

Figures on the right show when the state began and for how long it has continued, and traveled distance is displayed for movement. Speed is taken from the most recent message.

Attention!

Unit's current state and ignition as well as passed events
are available only if you have ' Query messages or reports' right.

Optional Signs (Ignition)

ignition on

ignition off

Available only if the unit has ignition sensor properly installed and adjusted.

Actuality

22 s ago — last message was received no more than 5 minutes ago

10 min ago — last message was received no more than an hour ago

7 h ago — last message was received no more than 24 hours ago

42 days ago — last message was received more than a day ago

History (Events)

unit was moving

unit was stationary

Detailed information on the right includes: for intervals of movement — duration, mileage, and maximum speed; for intervals of stillness — duration and location (address).

Commands

The following types of commands are supported: Query position, Block engine, Unblock engine, Query DDD file, Query snapshot, Send custom message, Send message to driver.

Wialon Mobile (2)

Attention!
This module is licensed separately.

Wialon Mobile 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:

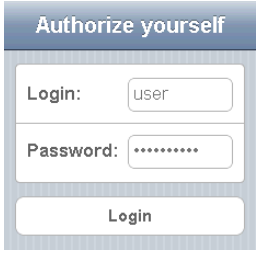
- iOS
- Android 1.6+

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, 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.

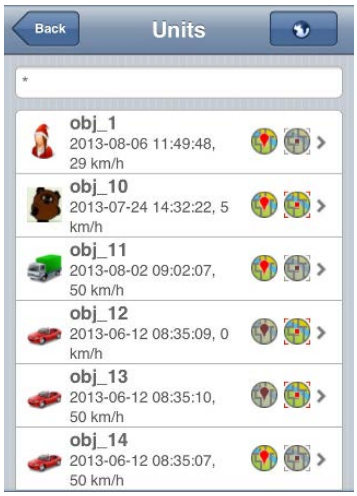
Navigation

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

At the first login, no units are displayed on the list until you apply a filter. However, further times your previous work list will be restored.



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 on the list are displayed with their names and icons. Additional information on each unit is available as well: time, speed, and location.

If clicking on a unit, its properties are displayed.

Unit Properties

Unit properties are divided into two tabs:

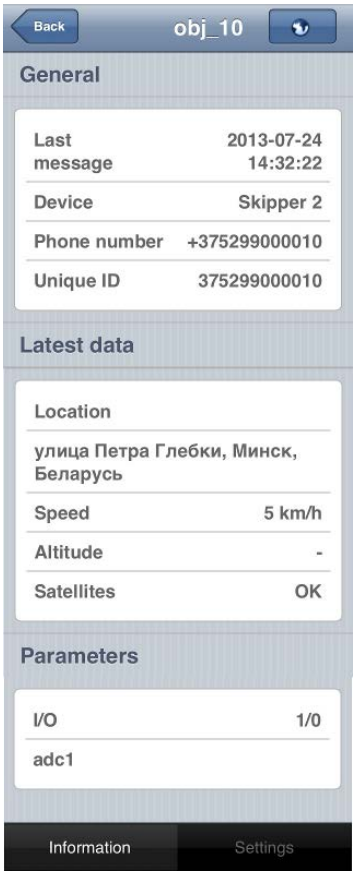
Information — information on current state of unit:

- *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:

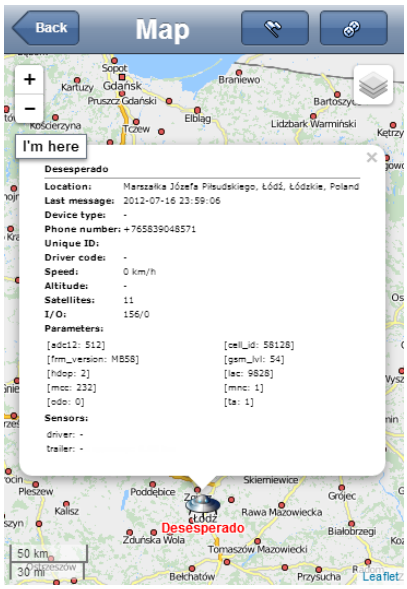
- *Show unit names* — unit can be displayed on the map either as just an icon or together with its name.
- *Use geolocation* — enable/disable geolocation function.
- *Address provider* — default address provider is Gurtam Maps or WebGIS (depending on your system configuration), however, Google Maps can be activated, too. If no address information is available, then coordinates 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.

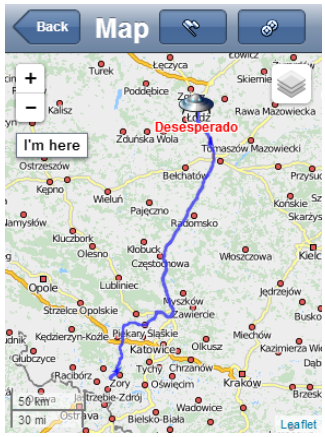
If you move to the map from the main menu, the map is scaled in the way to let you see all selected units. If you move to the map from unit properties, the map is centered on this unit.

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 / WebGIS,
- Google Maps (if keys are 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...

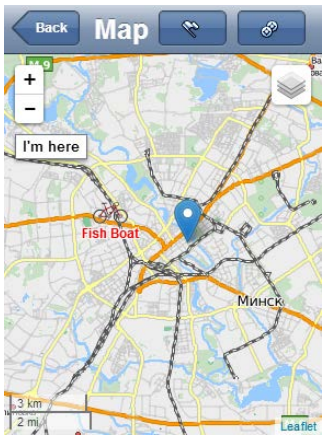
After adjusting all parameters, press the *Execute* button below. Your track will be shown on the map.

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 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.

ActiveX

Attention!
This module is licensed separately.

Documentation available at http://sdk.wialon.com/wiki/en/sidebar/activex/activex.

SDK

SDK is a software development kit that allows for the creation of additional applications and sites for Wialon Local 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 Local functions from your web application using JavaScript. IT considerable decreases time of creation a web application because basic procedures have been already implemented.