Wialon 1101
Administration Guide

wialon

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Overview and Architecture

Complex tracking system software of fifth generation in which best and innovative ideas are gathered. For practical acquaintance and testing you can try the newest version of Wialon™ B3.

Web browsers supported: Mozilla Firefox 3+, Opera 9.6+, IE 8+, Google Chrome 2.0+.

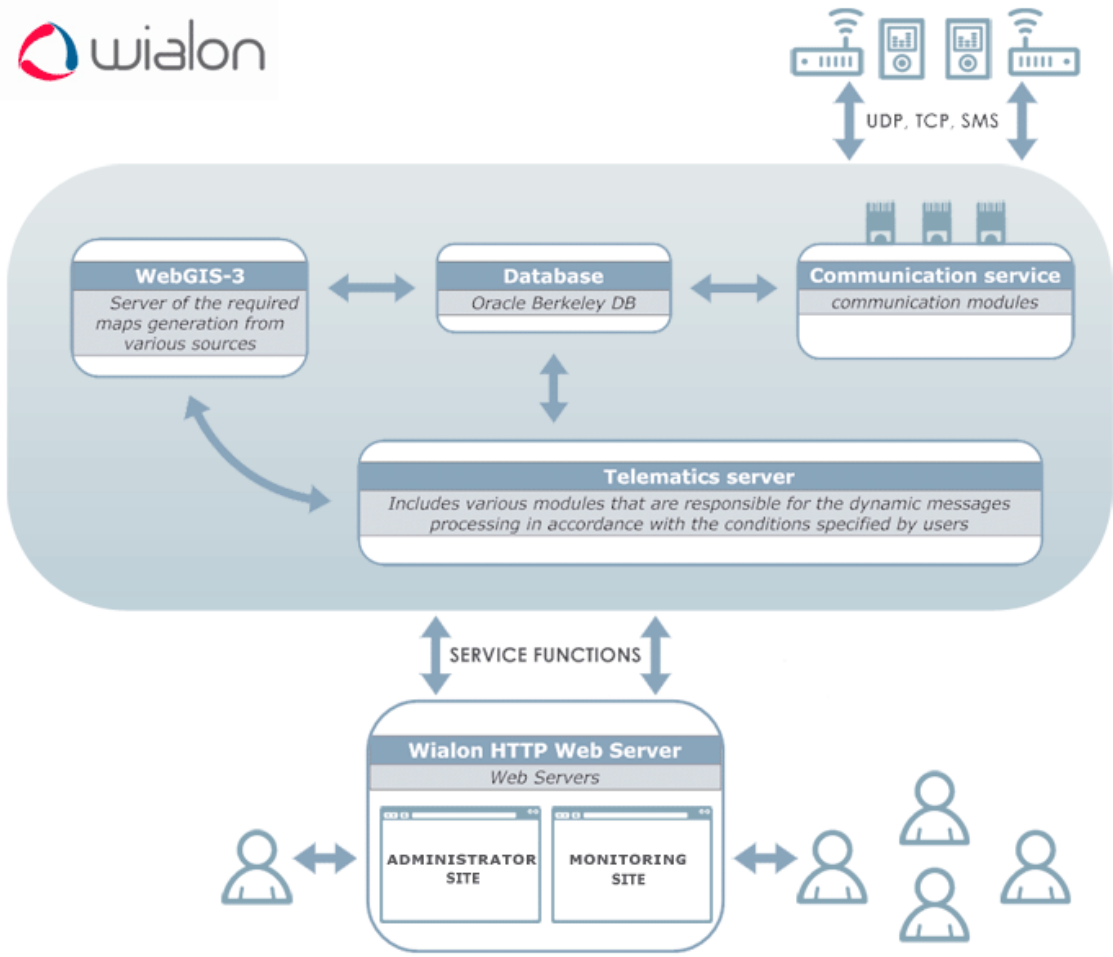
Distinctive features over similar software products are:

- Client/server architecture with support of multichannel asynchronous connections;
- Built-transactional storage system from the well-known producer in the world;
- High data performance;
- Script supporting, i.e. opportunity to work with the system at the macrolanguage;
- Distributed architecture designed for the millions of users and tracking units;
- Support for GSM modems, binary SMS, long SMS, and also possibility to work with SMPP protocol, de facto standard protocol for receiving/sending messages to mobile operators;
- Embedded web server integrated with operating system functions (Linux version);
- Modular system - for today there are about 50 modules and even more variety of plugins;
- Control access and users rights delineation;
- Close integration with WebGIS-3 server - search on map, binding of messages to roads at route construction, address definition by coordinates, image reception map and much more other;
- Unit remote control possibility via SMS/GPRS;
- Support for notification of various events such as entry and exit geofences, excess or decrease speed, change control sensors and digital inputs. Notifications can be sent by e-mail, SMS, displayed online or stored in unit history as events or violations;
- Support jobs running under a specific schedule, such as the delivery of reports via e-mail or execute a command over a unit;
- Unit groups support;
- Access from mobile phone;
- Huge, constantly expanding list of supported units (over 170 types at the moment).

Architecture

Wialon (painted blue) consists of four main parts: cartographic server WebGIS, telematics server, Database and a communication service. Altogether it receives, processes and stores data form tracked units, and sends commands to units when necessary.

- Communication with units is done via UDP, TCP/IP and SMS protocols.
- Oracle Berkeley DB database stores all messages that were received from or sent to GPS unit.
- Telematic server processes all messages and make GPS and extra information available on request.
- Cartographic server WebGIG processes cartographic data and make maps visible to Wialon users.
- Wialon HTTP Web server to connect any user to Wialon via any Internet browser. Supports http and https.



The system is not limited by this structure and can be expanded by adding necessary servers if capacity or data throughput are not enough for efficacious service operation. Any number of servers can be added to the system (see Minimum Requirements).

For you convenience, most Wialon distributions contain 'all services in one'. It means when you install a distribution, you will automatically get ready to use multicomponent tracking service.

Minimum Requirements

Wialon has rather high level of software and hardware requirements.

Software Requirements

To install Wialon, 32 or 64-bit operating system on the bases of x86 architecture is needed. Windows and Linux OS are supported. Development and testing is performed on these two operating systems, and their workability is granted. Read the specifications for each of them in further topics of the guide.

We recommend to use Linux as software platform, because this operating system has a number of advantages over Windows:

- Three recent years Wialon software is developed on Linux OS, which results in constant selfdignostics and software optimization for Linux kernel.
- All our services where the software is tested (both paid and free) use Linux Debian Lenny 64-bit. On this OS the final integration of the distribution is made, and the software is tested by thousands of users daily.
- Linux OS is designed to provide maximum security and stability. Our servers have annual uptime and are stopped rarely. Wialon can be started as non-privileged user, that is why an intruder will not be able to harm the server OS.
- Linux version of Wialon includes additional facilities to make a diagnostics of crashes and errors. In case of system failure in Windows version,there much fewer possibilities to diagnose the problem and solve it.
- In its standard package Linux contains a great number of useful system tools, for example, *logrotate* to rotate log files, *crontab* to restart the server in case of crash, *tail -f* to view log files online, etc.

The most significant point is that Windows version can be 32-bit only, and it undergoes fewer level of testing. However, the service can be started on 64-bit version but its workability is not granted.

If you use Wialon for your company's local purposes, you do not have a right person for the job, and the number of monitoring units is 100-5000, Windows version is a good solution for you.

Wialon software can be installed to the Windows versions: Windows 2003 Server, Windows 2000, Windows XP. The workability on 64-bit systems is not granted.

Wialon software can be installed to the Linux versions: all Linux versions with 2.6 kernel, Debian and the like are recommended.

Hardware Requirements

Hardware platform requirements directly depend on the number of units and users you are going to have in your tracking service, as well as on tasks posed. Below you see the set of requirements for a configuration nonmetering GIS subsystem.

Remember that using maps of embedded GIS servers causes additional requirements to RAM. The approximate calculation scheme is as follows: 512 MB plus all maps in AVD format taken with 1.5 coefficient. It means to use maps of cities and local regions 3 GB of RAM is needed, and to use maps for all USA, Russia, etc. - over 5 GB.

To define the amount of disk space needed note that a typical message from a unit occupies 150-200 bytes.

To monitor over 100 units, we recommend Core 2 Duo(Quad), from 2 GB of RAM and from 50 GB SATA HD. To monitor over 500 units, we recommend Core Quad, from 4 GB of RAM and over 100 GB SATA HD. To monitor over 2000 units, we recommend 2xXeon Quad Core, from 8 GB of RAM and from 300 GB SAS (or SATA with 10.000 turns) for DB.

In all cases we recommend to use RAID-1, RAID-5 or RAID-10. In case of Linux OS, use Linux MD RAID (software-based).

Besides, it is a good idea to store automatic backup copies (*backup* directory) in different server (for example, using NFS file system) or in an independent storage device.

For efficient server operation we recommend to use the following Internet channel width:

- up to 5 users - 2 MB
- up to 20 users - 10 MB
- up to 1000 users - 100 MB
- over 1000 users - 1 GB

Wialon server requires static IP address to receive data from units.

Supported Browsers

Supported browsers are:

- **Mozilla Firefox 3+**
- **Opera 10.0+**
- **Internet Explorer 8+**
- **Google Chrome 2.0+**

If you use a browser not mentioned above, Wialon may function incorrectly.

Wialon Administrator's Responsibilities

Wialon service administrator is in charge of the following:

- To see that there are enough free space on the disk;
- To care of hard drives state (to avoid the formation of damaged areas);
- To monitor the volume of Wialon log files;
- To monitor errors ('… error …') in Wialon log files, in case of errors promptly remove cause of trouble;
- To monitor memory consumption and CPU load;
- To maintain actucal time on the server;
- To control the logins to Wialon and do not allow restarts or attempts of restarts from users who do not have enough rights for this.

Several processes allowing to automate administrator's work are described in **System Software Configuration**.

Directory Structure

The general structure of Wialon directories:

- **backup** – the directory with backup files;
  - **curr** - the newest backup files;
  - **perv** - some previous backups;
- **custom** - the directory containing your custom configuration;
  - **skins** - the directory with your custom design of the monitoring site (if you are using not a default design);
  - **hw** - the directory with scripts needed to work with devices different from the standard package and unique for the given service);
  - **custom.txt** - **the file of your custom Wialon Configuration**;
- **dep** – the directory containing system libraries needed for Wialon operation;
- **lib** – the directory of main libraries;
- **logs** – the directory containing log files:
  - **service.log** - main log;
  - **trace.log** - trace log;
  - **http_error.log** - error log of processing HTTP queries;
  - **error.log** - all errors from trace log which contain the text 'error';
  - and an individual log for each device type and for modems;
- **plugins** – the directory with plugins (here the unenciphered folder **mps** with additional plugins is also located);
- **scripts** – the directory with the main scripts;
- **sites** – the directory for sites;
- **storage** – the directory containing database;
  - **pd** - database for objects and their parameters;
  - **pl** - database transactions log for objects and their parameters;
  - **md** - messages database;
  - **ml** - database transactions log for messages database;
- **tmp** – the directory with temporary files.

User is allowed to make changes in **custom** directory only. By default, when the software is updated, only this directory is not replaced with original files from the distribution.

License

The license is **license.cfg** file. It must be given to you as a soft copy or sent by e-mail.

Periodically (usually each 20-30 days), Wialon license connects to the license server **lic.gurtam.com** (port **31176**) 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 devices. Working service with all its configuration will not be damaged.

You place the license file to the root directory before the first start of the server.

If you have any problems with license, you cannot create any monitoring objects, and in log files there can be found phrases like: **Error fetching license: 'avl.unit'**.

Installing Wialon

Download Wialon installation files from your page of personal distributions. Depending on operation system you are using, follow installation instructions:

- **Windows**
- **Linux**

Installing Distribution (Windows)

Wialon distribution is a ZIP file. Inside is the **distro** folder which contains installation files and the installer itself (**install.exe**).

Installation Process

Before installing Wialon to Windows OS, it is needed to install .NET Framework 2.0.

1. Run **install.exe** and follow wizard instructions.
2. Read license agreement and accept it.
3. Indicate the directory to install Wialon. By default, it is *C:\Program Files\Gurtam\WialonB3*.
4. Press OK. The installation process will start.

Starting the Service

Immediately after installation, place the license file into the directory where Wialon has just been installed. After that you can finally start the software.

To start or stop the service, use one of equivalent paths:

- Start All programs Wialon B3,
- Control panel Administration Services.

Diagnostics

For any diagnostics, see the log file **WialonB3_trace.log** that is located in the directory *logs*.

Installing Distribution (Linux)

Linux is the optimal operating system for organizing Wialon service operation. This is because the product is developed in this operation system, and if any problem occurs, it is easier to solve it.

Assistance in Installing Linux

However, novice users may meet with difficulties installing Linux for the first time. To avoid troubles, you can download from https://distro.gurtam.com/iso/ images of *Debian amd64* installation disks that have already optimal configuration for installing Linux from scratch. Any of disk images is no more than 200 Mb.

Three ways to install Linux are possible:

- Linux is installed on a computer with one hard drive or hardware RAID.
- Linux is installed on a computer with two hard drives one of which will be used for backup.
- Linux is installed on a computer with two hard drives that will be organized in software RAID-1 (mirror) for more reliability of the system.

After loading a distribution, write it to CD or DVD disk. In BIOS set boot from CD option. Then insert the disk to the CD-ROM drive and restart the PC. Follow the instructions on the screen. They concern time and regional settings, language, etc.

If you have chosen the last variant (a computer with two hard drives), you will be prevented that RAID will become available after restarting. Press 'Continue' to continue the installation.

Wialon Installation Process

Before installing Wialon, it is recommended to read recommendations on configuring server file system.

Two distribution variants are available:

- 32-bit,
- 64-bit.

32-bit distribution fits to any architecture, and 64-bit can be used only for x86_64 platform. To know your platform, execute the commend *uname -m*.

Download selected distribution and unzip it using the command *tar*. In the example below, this command is applied to 0909r1 distribution:

```
tar xzf wialon-pro_0909r1_l64.tgz
```

After this action, the directory *wialonb3_install* will appear. Here run installation script *install.sh*:

```
cd wialonb3_install
./install.sh
```

Root rights are not required for installation, but the default directory */var/lib/wialonb3* assumes that an ordinary user has no edit rights. However, for correct installation of automatic administrator's scripts, log files rotation system, and unattended startup of the service it is desirable to run installation as root user.

Root rights are neither required for normal service operation. In case you need port numbers under 1024, you can use reverse proxy server: **nginx**, **lighttpd** or **Apache**.

Installation wizard will ask you some questions. If you install Wialon for the first time, it is recommended to leave default settings. At the end, the installation wizard will show you the adjusted configuration and will do installation.

```
Welcome to Wialon B3 installation script.
Please answer few questions before starting actual installation. Provide empty answers to use
defaults.

Where would you like to install Wialon B3? [/var/lib/wialonb3]
Wialon B3 dependencies need to be downloaded and unpacked. This operation is performed only once for
each service installation and can take some time, so please wait patiently.
Enter HTTP or local directory path that contain archived Wialon B3 dependencies file adf-dep-3.1.1-
l64.tgz [http://distro.gurtam.com/adf]
Install custom configuration (folder)? [yes]
Where would you like to install Wialon B3? [/var/lib/wialonb3]
Install custom configuration (folder)? [no] yes
Install periodic administrative jobs (in current user crontab)? [no] yes
Install Wialon B3 log rotation script (into /etc/logrotate.d/wialonb3) [no] yes
```

```
OK, now is time to perform Wialon B3 installation. Check all parameters below are correct:

    Wialon B3 will be installed in:                 /var/lib/wialonb3

    Install user custom configuration folder:       yes
    Install Wialon B3 as system service:            no
    Install Wialon B3 cron jobs:                    yes
    Install Wialon B3 log rotation script:          yes
    Use ADF dependencies from:                      http://distro.gurtam.com/adf/adf-dep-3.1.1-l64.tgz

Are all parameters correct? [yes]
Creating directories...
Downloading/Copying packed ADF dependencies file adf-dep-3.1.1-l64.tgz
--08:53:36--  http://distro.gurtam.com/adf/adf-dep-3.1.1-l64.tgz
          => `/var/lib/wialonb3/adf-dep-3.1.1-l64.tgz'
Resolving distro.gurtam.com... 85.17.154.142
Connecting to distro.gurtam.com|85.17.154.142|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 7,019,076 (6.7M) [application/x-gtar]

100%[==========================================================================================================
7,019,076      9.25M/s

08:53:37 (9.23 MB/s) - `/var/lib/wialonb3/adf-dep-3.1.1-l64.tgz' saved [7019076/7019076]

Copying files and directories...
Installing Wialon B3 as system service...
Installing Wialon B3 cron jobs...
Installing Wialon B3 log rotation script...

Wialon B3 installation finished successfully. Read documentation for further instructions.

Server can be used as default init.d script. After loading environment (if using /etc/init.d/ script
preloading environment is not required) as described above you may:

To start server in debug (not forked) mode with logging to stdout (press Enter to stop):
/etc/init.d/wialonb3 debug
To start server in normal mode with logging to /var/lib/wialonb3/logs: /etc/init.d/wialonb3 start
To stop server in normal mode: /etc/init.d/wialonb3 stop

Log files located in /var/lib/wialonb3/logs directory always contain maximum information regarding
service errors or status.
```

If this is the first installation, select to *Install custom configuration* for the *./custom* folder to be created. It will have then standard contents. If installing updated, do not select this option in order to save your configuration settings.

Important! If the service will be started by a user with limited access rights, add the user/group to a trust group to avoid possible conflicts. To do this, in the file *./custom/system_env.sh* comment in the variables **ADF_USER** or **ADF_GROUP** and enter user/group that will obtain full rights to the directory where Wialon is installed.

```
#ADF_USER="--user some-user"
#ADF_GROUP="--group some-user-group"
```

Immediately after installation, place the license file into the directory where Wialon has just been installed. After that you can finally start the software.

How to configure your server for Linux OS, read in System Software Configuration.

First Steps

After installation Wialon already has some default settings and almost does not requires a special configuration before the first start. The most important is to write the license file to the service directory before the start.

How to Start the Service

Linux

See instructions in the installation script. Usually, it is */etc/init.d/wialonb3 start*.

Windows

Through the *Start menu* or *Control panel* *Administration* *Services*.

Default Ports

After the first installation, you can get the access to your service through a web browser via the following ports (numbers by default):

Port	Site	Description
8021	Administration site	Access for users in the group of administrators.
8022	Monitoring site	Working application. Contains the map. Use the default login *wialon* and password *wialon* to enter the site.
8023	Management site	Access for users from the group of managers. Here the accounts are created.
8024	Mobile site	A light version of the monitoring site to access the service form a PPC or mobile phone.

In other words, if you are on the server, your administration site is accessible through the link http://localhost:8021 or http://server>IP:8021.

Users/Logins

During the first start, a password will be reset for the user *admin* to enter the administration site. Besides, the user *wialon* with the password *wialon* and the account *wialon* for this user will be automatically created. This user can be used to enter the monitoring site. It is recommended to change the password for this user. All this will be registered in the log:

```
2008/12/29 17:06:25:916: Performing initial setup for Wialon site
2008/12/29 17:06:25:916: Updating initial password for admin user to: GbykVFGtFG
2008/12/29 17:06:25:917: Created user 'wialon'
...
2008/12/29 17:06:25:917: adf_avl_create_resource('wialon')
2008/12/29 17:06:25:917: Created resource 'wialon'
```

Updates

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Wialon Pro updates are released in the way similar to Open Source products that is the way of releasing branches of the source code.

Once in four months we copy the Wialon source code to an independent branch and name it YYXX where YY is the year, and XX is the month of the release. Such a copy is made two months before the release. For example, in the July 2009 we prepare a branch for 0909 release (September 2009), in November 2009 we create a branch for 1001 release (January 2010).

After a branch has been released, we do not develop it but only correct detected bugs. As the corrections accumulate, every two weeks we make a new release candidate (for example, 0909C1, 0909C2), and then the releases themselves (for example, 0909R1, 0909R2).

Thus, the releases are stable and reliable, but by their functionality they lag behind the actual implementation for the period from two to four months. The latest stable version for the moment is Wialon 1101.

In Wialon Data Center we always use the most recent, so-called bleeding-edge version. That is why at demo login you can see differences from existing stable release installed on your server.

Installing Updates

The process of installing updated is the same as installing your first version. However, remember that all files which are not in the *custom* directory will be replaced with original files, so the features which are not a part of standard package may be lost.

When installing updates, answer *No* for *Install user custom configuration folder*. In this case the *custom* directory will not be replaces with standard content and all your settings will be saved. By default, if installing updates over an existing version, this item is already set in *No* position.

If any questions or troubles with installing and updating the software, please, do not hesitate to contact us through our technical support service.

System Configuration

Here are instructions of how to set your operation system to work with Wialon.

Common

- **Firewall**

Windows

- **Log Files Management**

Linux

- **File System**
- **/etc/sysctl.conf**
- **Firewall**
- **Network Time Synchronization**
- **Proxy Server for HTTP(S) Queries**
- **Mail Server**
- **Log Files Management**
- **Service Operation under an Ordinary User**
- **Unattended Startup of the Service**
- **Automatic Administrator's Scripts (Cron Jobs)**

Firewall

These settings are common for all operation systems.

In the table below the default input ports used for the monitoring server software are listed. Which of them should be protected by firewall is decided by the administrator of your server according to your company security policy.

Port	Type	Description
31188	TCP	Remote clients connection (such as Wialon Pro Client). This port is available after purchasing the license for remote connection from your clients.
20100:20300	TCP/UDP	Connect devices by GPRS channel.
8020	TCP	WebGIS-3 site (if available).
8021	TCP	Administration site.
8022	TCP	Monitoring site.
8023	TCP	Management site.
8024	TCP	Mobile site.

Log Files Management

These settings are used for Windows OS.

IMPORTANT!!! The size of **log** file must be **no more than 2Gb**. Otherwise, **Wialon will not start** because of OS limitations.

You can control log size manually (periodically cleaning it) or automatically.

To apply the automatic cleaning, you can use the following method. First, create the **bat** file with the contents as follows:

```
"C:\\Program Files\\WinRAR\\rar.exe" a "C:\\Program
Files\\Gurtam\\WialonB3\\logs\\WialonB3_trace.log.rar" "C:\\Program
Files\\Gurtam\\WialonB3\\logs\\WialonB3_trace.log.1"
del "C:\\Program Files\\Gurtam\\WialonB\\logs\\WialonB3_trace.log.1" /Q
rename "C:\\Program Files\\Gurtam\\WialonB3\\logs\\WialonB3_trace.log" "WialonB3_trace.log.1"
```

Here the path must be yours. At that, you need the installed archiver WinRAR (if you have other archiver, replace the first line). This text can be duplicated for any number of log files (*WialonB2.log*, *access.log*)

Then create the job to perform the **bat** file each week.

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File System Type

The strength of Linux OS is the opportunity to use file systems of different types. However, the question is how to choose the file system which fits better to *your* objectives.

Over a month, we had administered tests in Wialon Data Center. Three file systems - *ReiserFS*, *XFS* and *ext3* with different settings were tested on various hardware units to find out which file system provides maximum high-performance in work with Wialon monitoring service and WebGIS server.

The result was as follows:

1. The most effective and simple way is to add *noatime,nodiratime* parameters when installing the file system in the file */etc/fstab*.
2. If data level is not low (under 5-10GB), the difference in fast-acting is not considerable - up to 5-10%.
3. The most effective operation was shown by *XFS* file system. It was a lot faster than *ext3* when operating with ten millions of files (WebGIS-3 cache). It was also a bit better in work with large files (up to 1GB) and much faster in work with files of several tens of gigabytes. Embedded tools such as online defragmentation and backup system add advantages in system administration.

The productiveness of *ext4* file system, in theory, is no worse than *XFS*, but for the moment of testing, the support for distribution *Debian 5.0 Lenny* is not irreproachable.

File System Configuration

When configuring file system categories, RAID must be used, software- or hardware-based.

- **/boot** - ext3 - 300MB
- **/** - xfs - 5-10GB + noatime, nodiratime options

We recommand the following file system configuration for Wialon server with the expectation of more than 1000 monitored units. Let us assume that Wialon will be installed in /var/lib/wialonb3:

Dir	FS type	Size	Options
/boot	ext3	~300MB	defaults
(none)	swap	2GB	
/	xfs	5-10GB	noatime,nodiratime
/home	xfs	5-10GB	noatime,nodiratime
/var/lib/wialonb3/tmp	xfs	10-20GB	relatime,nodiratime
/var/lib/wialonb3/storage	xfs	from 50GB	noatime,nodiratime
/var/lib/wialonb3/backup	xfs	from 200GB	noatime,nodiratime

It is recommanded that the directory with backup (.backup) were located on a separate independent drive or even a server (for example, through NFS).

Actually, the following partition is possible:

Dir	FS type	Size	Options
/boot	ext3	~300MB	defaults
(none)	swap	2GB	
/	xfs	5GB	noatime,nodiratime
/var/lib/wialonb3	xfs	(all available)	noatime,nodiratime
/var/lib/wialonb3/tmp	xfs	10-20GB	relatime,nodiratime

If you use embedded GIS server (Wialon Standard or some configurations of Wialon Pro) *tmp* directory is used to store cache for images tiles. That is why the size of 20GB may be insufficient and can be enlarged up to 50-100 GB.

If in trouble with configuring file system, make use of the special distribution located on https://distro.gurtam.com/iso/ and optimized for Wialon installation. Details...

Note: Beginning from 1001 version (release-candidate of November 15, 2009) the repository (*storage* directory) is divided into four categories: messages DB (storage/md), messages DB transaction log (storage/ml), DB of devices and their properties (storage/pd), devices DB transaction log (storage/pl). Thus, when configuring file system structure, these categories can be located to separate disks, which is actual for monitoring systems containing over 10 000 units.

/etc/sysctl.conf

For the configuration file **/etc/sysctl.conf** the following settings are recommended:

```
# for atop utility better view
vm.overcommit_ratio = 100
# swapiness level
vm.swappiness = 10
# reserve memory always
vm.min_free_kbytes = 65535
# security fix
vm.mmap_min_addr = 65536
```

The most important parameter that influences file system effective operation is **vm.swappiness**. The rest can be ignored.

Firewall

Security is above all. That is why firewall is needed. We recommend using *firehol*:

```
wialon-pro:~# apt-get install firehol
```

After that in the file /etc/default/firehol substitute *NO* for *YES* and configure /etc/firehol/firehol in the way it is shown below. Do not forger indicate your IP address, otherwise the access to server will be denie. *eth0* is your network adapter.

```
version 5
tcpmss auto
FIREHOL_LOG_MODE="ULOG"

######################### trusted IP's ########################
trust_ips="IP (enter IP addresses you trust to separating them by space)"

ext_wialon="IP1"

######################### custom rules ########################
server_wialon_ports="tcp/4998 tcp/20100:20300 udp/20100:20300"
client_wialon_ports="any"

#################################################################

interface eth0 inet1
        policy                                          reject
        server          ssh                             accept src "${trust_ips}"
        server          icmp                            accept
        server          https                           accept dst "${ext_wialon}"
        server          http                            accept dst "${ext_wialon}"
        server          wialon                          accept dst "${ext_wialon}"
        client          all                             accept
```

Then run firewall:

```
wialon-pro:~# /etc/init.d/firehol start
```

Network Time Synchronization

For correct processing of data received from devices, it is necessary to set the exact time on Wialon telematic server. Use the following command to set automatic time synchronization with Internet:

```
wialon-pro:~# apt-get install ntp
```

Proxy Server for HTTP(S) Queries

Wialon and WebGIS-3 servers contain embedded HTTP/1.1 web server. That is why it is possible to connect to them through through web browser directly.

However, if:

- other services are located on the same server with Wialon and IP address is shard,
- you would like to use SSL protected access to server,
- you would like to reach the maximum high performance and safety,

then it is recommended to render services to your client through reverse proxy server.

One of the best proxy servers is **nginx**. It is easy to install (for Debian before Lenny version it is better to install it from source code):

```
wialon-pro:~# apt-get install nginx
```

Let us assume, your server DNS name is **monitor.gps.ru** (**mobile.gps.ru** for mobile site and **manager.gps.ru** for management site) and Wialon uses default ports. Then the configuration of files is approximately the following:

/etc/nginx/sites-enabled/wialon:

```
server {
        listen 80;
        server_name www.monitor.gps.ru;

        rewrite ^(.*) http://monitor.gps.ru$1 permanent;
}
server {
        listen 80;
        server_name monitor.gps.ru;

        proxy_set_header  X-Forwarded-Server    monitor.gps.ru;
        proxy_set_header  X-Forwarded-For       $remote_addr;
        client_max_body_size                    8m;
        access_log                              /var/log/nginx/wialon.access.log;

        location / {
                proxy_pass                      http://localhost:8022;
        }
}
server {
        listen 80;
        server_name mobile.gps.ru;

        proxy_set_header  X-Forwarded-Server    mobile.gps.ru;
        proxy_set_header  X-Forwarded-For       $remote_addr;
        access_log                              /var/log/nginx/wialon.access.log;

        location / {
                proxy_pass                      http://localhost:8024;
        }
}
server {
        listen 80;
        server_name manager.gps.ru;

        proxy_set_header  X-Forwarded-Server    manager.gps.ru;
        proxy_set_header  X-Forwarded-For       $remote_addr;
        access_log                              /var/log/nginx/wialon.access.log;

        location / {
                proxy_pass                      http://localhost:8023;
        }
}
```

/var/lib/wialonb3/custom/config.txt (add a line):

```
ADF_HTTP_FWD_SERVERS = monitor.gps.ru,mobile.gps.ru,manager.gps.ru
```

Mail Server

For correct operation of the system, SMTP server is needed. We recommend *postfix*:

```
wialon-pro:~# apt-get install postfix
```

Default settings are acceptable and sufficient to provide a basic operability (sending e-mails from the server).

For system administrator to get messages form the server (see automatic scripts), it is advisable to use aliases to indicate where to redirect mails. For example, if the scripts are set for the user named *root*, in the /etc/aliases can be written:

```
root: your-admin-email@domain.com
```

Log Files Management

IMPORTANT!!! The size of **log** file must be **no more than 2Gb**. Otherwise, **Wialon will not start** because of OS limitations.

While installing Wialon, the installer requests automatic activation of this option:

```
...
Install Wialon B3 log rotation script (into /etc/logrotate.d/wialonb3) [no] yes
...
OK, now is time to perform Wialon B3 installation. Check all parameters below are correct:
    Wialon B3 will be installed in:                  /var/lib/wialonb3
...
    Install Wialon B3 log rotation script:           yes
...
```

This option is set automatically as default with the first installation if you install Wialon as *root* user. In this case, you do not need to configure this option manually.

You can control log size manually (periodically cleaning it) or automatically. To apply the automatic cleaning, use **logrotate** utility. The utility functions in the following way. Log rotation is used to control disk space occupied by logs. As the result, one active log file is left (this is a log file where data is recorded by the server at the moment) and several archival quality files compressed by a special archiver.

To start rotation, place a file like **wialonb3** (or any other like "wialonb3.txt") to the directory */etc/logrotate.d*. The contents of the file may be as follows:

```
/var/lib/wialonb3/logs/*.log {
  weekly
  missingok
  rotate 5
  compress
  delaycompress
  notifempty
  create 0664 root root
}
```

Service Operation under an Ordinary User

For security reasons Wialon monitoring service can be configured in such a way that it would work under an ordinary user (for example, *wialon* or *wialon* group), and not under *root*. It is needed to create for this user:

```
wialon-pro:~# adduser wialon
```

Then correct system settings to give this user possibility to work with a greater number of file than it is provided by defaults. To do this, add to the file **/etc/security/limits.conf** the following:

```
wialon            hard    nofile          32768
wialon            soft    nofile          16384
```

Let us assume, we installed the distribution to the directory **/home/wialon/wialon-pro**. To provide our user the full access to the service, make it the owner of the following directory:

```
chown -R wialon:wialon /home/wialon/wialon-pro
```

Regardless under which user the service is started, it is required that the service worked under *wialon* user or group. To do so, write the following in the file **/home/wialon/wialon-pro/custom/system_env.sh**:

```
# Optional environment configuration for launching Wialon as system service

# Uncomment following and insert correct user and group name if you like to launch Wialon not as root
user. Be sure that specified user has full control over installation directory:
ADF_USER="--user wialon"
ADF_GROUP="--group wialon"
```

After that, the servoce can be started by the command **/home/wialon/wialon-pro/adf_script start**.

Unattended Startup of the Service

Unattended startup of the monitoring service software in Debian-like systems is easy to set. To do this, choose the option **Install Wialon B3 as system service** while installing the distribution or create symbolic link to service startup script *adf_script* manually in */etc/init.d/*:

```
wialon-pro:/var/lib/wialonb3# ln -s $PWD/adf_script /etc/init.d/wialonb3
```

To activate automatic startup of the service execute the command:

```
wialon-pro:/var/lib/wialonb3# update-rc.d wialonb3 defaults
```

To disable automatic sturtup execute another command:

```
wialon-pro:/var/lib/wialonb3# update-rc.d -f wialonb3 remove
```

If you have installed Wialon and are planning to start it not as *root* user, please, read the instructions, otherwise when starting the server, it will be run as *root* user.

Automatic Administrator's Scripts (Cron Jobs)

When installing Wialon, the installer requests automatic activation of administrator's scripts:

```
...
Install periodic administrative jobs (in current user crontab)? [no] yes
...
OK, now is time to perform Wialon B3 installation. Check all parameters below are correct:
    Wialon B3 will be installed in:                  /var/lib/wialonb3
...
    Install Wialon B3 cron jobs:                     yes
...
```

These scripts are located in the directory where Wialon is installed.

For correct operation of the warning system it is required to set mailing system on the server.

To enable/disable a script, edit the file:

- for *root* user - **/etc/crontab**
- for ordinary user, the command **crontab -e** in the console

Here is an example of lines which fit to both cases to launch these scripts automatically. Add the lines to the end of the file and indicate the path to each script if needed.

```
0 * * * * /var/lib/wialonb3/wialon-errors-check.sh
*/2 *   * * *   /var/lib/wialonb3/wialon-service-check.sh
*/1 *   * * *   /var/lib/wialonb3/wialon-db-check.sh
1 1   * * *   /var/lib/wialonb3/wialon-space-check.sh
```

The list of scripts:

- **wialon-db-check.sh** is a once-a-minute controll over DB driver and automatic restarting of the service in case of troubles:

#!/bin/sh

SCRIPT_PATH="$0" # Detect base path for service while true; do

```
ROOT=${SCRIPT_PATH%/*}
ROOT=`cd "$ROOT";pwd`
cd $ROOT
if [ -d "$ROOT/plugins" ] && [ -d "$ROOT/scripts" ] ; then
        break
fi
if [ -L "$SCRIPT_PATH" ]; then
        SCRIPT_PATH=`readlink "$SCRIPT_PATH"`
        if [ $? != 0 ]
        then
                echo "Error: Problems with resolving '$SCRIPT_PATH'"
                exit -1
        else
                continue
        fi
fi
break
```

done

if [-d "${ROOT}/logs"] && [-e "${ROOT}/logs/wialonb3_trace.log"] then

```
DT=`date --date="1 minute ago" "+%Y/%m/%d %H:%M"`
errors=`cat "${ROOT}/logs/wialonb3_trace.log"|grep "$DT"|grep "adf_storage_db_error_call"|grep "PANIC"`
if [ "$errors" != "" ]
then
        if [ -f "${ROOT}/adfservice.pid" ]
        then
                $ROOT/adf_script restart
        else
                echo "Skipping server restart"
        fi
fi
```

fi </file>

- **wialon-space-check.sh** is an everyday monitoring of free space on the DB disk:

```
#!/bin/sh

SCRIPT_PATH="$0"
# Detect base path for service
while true; do
        ROOT=${SCRIPT_PATH%/*}
        ROOT=`cd "$ROOT";pwd`
```

Wialon Configuration

Configuration parameters are mostly adjusted in the file ***./custom/config.txt***. The file is in UTF-8 format (without BOM), that is why be attentive while editing it in Windows OS. As an editor for this file in Windows, we recommend Notepad ++.

Variable values are adjusted in the following way:

- <variable> = <value>
- <variable> = <$variable + additional value>

An example of the file:

```
# Email notifications from address
AVL_NOTIFICATIONS_EMAIL_FROM = noreply@noreply.com
# Email jobs from address
AVL_JOBS_EMAIL_FROM = noreply@noreply.com
# Optional service-wide reports visual configuration file
AVL_REPORTS_STYLES_FILE=$ADF_ROOT_PATH/custom/reports_config.xml
# CMS Manager site specification
CMS_MANAGER_WEBSERVER = cms_manager:8023:*
# Wialon Web site specification
WIALON_WEB_WEBSERVER = wialon_web:8022:*
WIALON_WEB_EMAIL_FROM = noreply@noreply.com
WIALON_WEB_MAPSERVER_URL =
http://ft1.mapsviewer.com,http://ft2.mapsviewer.com,http://ft3.mapsviewer.com,http://ft4.mapsviewer.com
WIALON_WEB_ROUTESERVER_URL =
WIALON_WEB_ENABLE_LOG = 0
# Net server allowing network clients access
ADF_STORAGE_NET_SERVER = 31188:*
# Storage subsystem configuration
ADF_STORAGE_CACHE_SIZE = 64
ADF_STORAGE_BACKUP_INTERVAL = 60
ADF_STORAGE_BACKUP_HOLD_INTERVAL = 7
ADF_AVL_UNIT_HISTORY_PERIOD = 0
# SMTP server configuration
ADF_SMTP_SERVER = localhost
# GIS network server configuration
ADF_GIS_NET_REMOTE_SERVER = mapsviewer.com
# Wialon Admin site specification
AVL_ADMIN_WEBSERVER = avl_admin:8021:*
# Communications server configuration
ADF_AVL_COMM_SERVER = local:0:0:1
```

Note:
When reinstalling the system or installing updates, the installer does not replaces this file by original distribution files so that not losing your changes.

In the following sections Wialon configuration is described in details:

- **Units and Devices**
- **Database**
- **Maps**
- **Sites**
- **Modems**
- **All Variables**

Units and Devices

Two server parameters can be configured for units:

- network interface;
- port number.

How to set parameters, see Wialon Configuration.

Variable	Description
ADF_AVL_HW_BIND_ADDR	Network interface to listen to devices connections. Default value is '*', which means 'any interface'.
ADF_AVL_COMM_SERVER	Communication server configuration. The format to set the parameter: <comm-server-name>:<avl-server-host>:<avl-server-port>:<scan-hw_dir>. Default value is '31189'. The parameter *scan-hw-dir* is optional (by default, its value is '0'). It means enabling autoscanning of new devices types when the system is being initialized.
WIALON_AUTO_CREATE_UNITS	If the value is '1', unit which does not exist in the system but sends messages, will be automatically created.

See also Full list of supported tracking hardware with instructions about hardware configuration for Wialon.

Additional information about units and devices:

- **Units**
- **Devices (Hardware)**

Other variables:

- **Database**
- **Maps**
- **Sites**
- **All Variables**

Database

Here are the parameters to configure the storage system. How parameters are set, read in Wilaon Configuration.

Variable	Description
ADF_STORAGE_PATH	The path to storage files. Default directory is *./storage* (in root directory).
ADF_STORAGE_CACHE_SIZE	The size of RAM (in Mb) to store the cache of unit properties. The value should be a power of 2. Default value is 16 Mb.
ADF_STORAGE_MESSAGES_CACHE_SIZE	The size of RAM (in Mb) to store the cache of messages. The value should be a power of 2. Default value is 64 Mb.
ADF_STORAGE_DEFRAG_INTERVAL	This parameter is to set the interval of automatic defragmentation of database (in days). In addition, the time when defragmentation is done can be specified. The form is: <interval> or <interval>:<hour>. To turn off the defragmentation, set '0'. By default, the defragmentation is done everyday at 3AM (local time).
ADF_STORAGE_BACKUP_INTERVAL	The interval (in minutes) of how often database and transaction files are backed up. Default value is 60 min.
ADF_STORAGE_BACKUP_FULL_INTERVAL	*For Wialon 0909 only*. The interval of creating the full (not incremental) backup (in days). By default, it is 1 day.
ADF_STORAGE_BACKUP_HOLD_INTERVAL	*For Wialon 0909 only*. The number of last full backups to store. Default is 7 backups.
ADF_AVL_UNIT_HISTORY_PERIOD	The period to store unit history (in days). Used for database servers only. If not set or the value is '0', unit history is not deleted automatically.
ADF_STORAGE_TRASH_KEEP_PERIOD	The period (in days) to store deleted objects in the trash folder with the possibility to restore them. By default, 30 days.
ADF_STORAGE_BACKUP_PATH	The location to store database backup. Default is *backup* directory.
ADF_STORAGE_MSG_ENV_CONFIG	This variable definen parameters fro backup storage (*backup* directory). It is composed of: 1) maximum messages in one database part; 2) minimum messages in one database part; 3) fragmentation level in percents to force defragmentation over database part; 4) backup rotate interval in days; 5) maximum backup diff files size to commit them into backup database part, in MB; 6) enable (1) or disable (0) backup for messages database (*ml* and *md* folders). Default value is 20000000:1000000:20:10:50:1

Network settings to connect **Wialon Pro Client** to the server Wialon Pro:

Variable	Description
ADF_STORAGE_NET_SERVER	Set the port and network interface address to listen connections by the form <port>:<IP address>. IP address can be skiped to listen on all local network interfaces. Default port is 31188. To initialize server part in the trusted mode to any connected user (that is the authorization is not needed, and the connected user has the maximum access to all local objects), the third parameter set as '1' is needed, for example, '31188:*:1'.
ADF_STORAGE_NET_REMOTE_SERVER	*For Wialon Pro Client only*. Set the port and network interface address where Wialon Pro is located (main database). The format is: <port>:<IP address>. Default port is 31188.

Other variables:

- **Units and Devices**
- **Maps**
- **Sites**
- **All Variables**

Maps

Wialon system deals with **vector maps** in the proper closed format **AVD**.

Two main software configurations exist:

- with **embedded GIS server**, such as Wialon Standard and some configurations of Wialon Pro;
- with **external WebGIS server** (some configurations of Wialon Pro).

All Wialon products include standard WebGIS3 server. That is why installing an external WebGIS is not necessary. Note that all address information for online monitoring and reports is taken only from this WebGIS.

The embedded GIS server is selected in the configuration by default. To start using an external GIS server, make a request at any time.

Maps in AVD format are located in the directory **maps** of the program or of an external WebGIS server. After adding or deleting maps, the service automatically detects changes within several seconds.

The size of RAM needed for normal operation of GIS is in direct proportion to the size of maps used. On average, GIS subsystem requires 512MB + 1.5*<total size of all maps files>.

Note:
Precompiled maps in AVD format are available here.

Variables

This is a set of variables which can be added to your configuration file *custom/config.txt*.

Variable	Description
GIS_DRIVER_TYPE	Define GIS server type: gis_avd_driver (embedded) or gis_net_driver (external).
ADF_GIS_NET_REMOTE_SERVER	DNS and IP address of WebGIS server. Used for external WebGIS server.
WIALON_WEB_GOOGLE_KEYS	Keys to activate Google Maps API for different URLs. To get keys for your site, make a request here. How to set the value for this variable is described below.
WIALON_WEB_GOOGLE_DEFAULT	If the value is **on** and Google Maps API keys are available, this type will be active by default.
WIALON_WEB_YANDEX_KEYS	Keys to activate Yandex Maps for different URLs. To get keys for your site, make a request here. How to set the value for this variable is described below.
WIALON_WEB_YANDEX_DEFAULT	If the value is **on** and Yandex Maps keys are available, this type will be active by default.
WIALON_WEB_NAVTEQ_KEYS	The variable to activate Navteq Maps. To get a key, visit their site.
WIALON_WEB_MAPSERVER_URL	The list of URLs of WebGIS-3 servers from which WebGIS maps will be loaded by clients. The addresses must be given as full URL with prefix *http* and separated by comma. For example, http://dns1.map.ru,http://dns2.map.ru,http://dns3.map.ru. For maximum efficiency, it is recommended to have maximum four URLs. The variable can be used for external WebGIS server or for using the already existing WebGIS server.
WIALON_WEB_DEFAULT_POS	Set the default map position and zoom when the monitoring site is opened. Enter latitude, longitude, and zoom level, separating them by colon (for example, WIALON_WEB_DEFAULT_POS = 55.739162:49.199269:9).
WIALON_WEB_WEBGIS_COPYRIGHT	If you use your own WebGIS maps, enter copyright text for them here. See Creating Maps to learn how to create maps.

Google and Yandex Maps

The variables **WIALON_WEB_GOOGLE_KEYS** and **WIALON_WEB_YANDEX_KEYS** contain keys for proprietary cartographic systems linked to a certain URL.

For example, clients connect to Wialon Web server from two different URLs: http://local.dns.ru:8022 and http://remote.dns.ru. To activate Google and Yandex Maps, get activation keys for both URLs and enter them in the configuration file using the following scheme:

```
WIALON_WEB_GOOGLE_KEYS = <dns1<:port>> <KEY for dns1> <dns2> <KEY for dns2> ...
```

The result will be like this:

```
WIALON_WEB_GOOGLE_KEYS = local.dns.ru:8022 KEY_VALUE1 remote.dns.ru KEY_VALUE2
```

Note that:

- DNS addresses are set without *http:* prefix;
- If you use the standard port (80), it is not required to indicate it.

If the keys are entered correctly, the option to enable Google/Yandex Maps will appear in the User Settings dialog (in the monitoring site).

External WebGIS Server

First, install an external WebGIS server.

Let us assume, you have installed a proper WebGIS server accessible through an external static IP x.x.x.x with default configuration. It means that the maps can be viewed in a browser on the address http://x.x.x.x:8020. You would like to use this WebGIS to display map, detect addresses, search a place on the map. To do this, in the configuration file *custom/config.txt* set the following parameters and values:

```
ADF_GIS_NET_REMOTE_SERVER = x.x.x.x
WIALON_WEB_MAPSERVER_URL = http://x.x.x.x:8020
```

Instead of IP addresses DNS names can be used. If WebGIS server is located on the same server as Wialon, for the variable **ADF_GIS_NET_REMOTE_SERVER** the value **localhost** can be entered.

See also:

- **AVD Mapper**
- **Format Specification**

Other variables:

- **Units and Devices**
- **Database**
- **Sites**
- **All Variables**

Sites

There are some parameters to configure monitoring and administration sites, CMS Manager, and Wialon Mobile.

Network parameters for any site are entered in the form <DNS-name>:<port-number>:<network-interface-IP-address>. DNS name can simply indicate a unique server name or the real DNS name if the same port number is used by other servers Network interface IP address can be skipped or set as '*' to allow operating on all network interfaces.

Administration Site	
AVL_ADMIN_WEBSERVER	Network parameters for administration site are set in the form: <DNS-name>:<port-number>:<network-interface-IP-address>. Default value is avl_admin:8021:*.
CMS_ALLOW_ADMIN_LOGIN	If the value is 1, the administrator can login to all sites.
WIALON_RESET_ADMIN_PASSWORD	This variable is necessary in case if service administrator have forgotten the password to login to the administration site. The default value is 0 (no password reset is needed). If the value is 1, a new password will be reset to the log during the nearest restart of the service. After applying the new password, do not forget to delete the variable or set its value as 0.
Monitoring Site (Wialon Web)	
WIALON_WEB_WEBSERVER	Network parameters for Wialon Web in the form <DNS-name>:<port-number>:<network-interface-IP-address>. Default value is *wialon_web:8022:**.
WIALON_WEB_LANGUAGES	The list of additional languages for monitoring site interface. Separate the languages by semicolon. By default, English and Russian are available. For example, if *fi:suomi* is set, the Finnish will be added.
WIALON_WEB_DEFAULT_LANGUAGE	Set the default language for the monitoring site in the form of <domain>.
WIALON_WEB_HIDE_ACCOUNT	Set this variable to hide account information in user settings (the list of services, their limit and costs). To set the variable, enter WIALON_WEB_HIDE_ACCOUNT = on.
ADF_SMTP_SERVER	SMTP server address is set in the form <host>:<port>. This server is used to send messages from software. By default, the local computer and the port 25 are used. (!) SMTP server must maintain the operation without authentication from monitoring server IP address.
AVL_NOTIFICATIONS_EMAIL_FROM	Form this e-mail address the notifications are sent by default.
AVL_JOBS_EMAIL_FROM	The default e-mail address used to fulfill jobs.
AVL_UNIT_ICON_MAX_SIZE	The size of icon (in pixels) to display devices on the map and in the lists. Default value is *64*, maximum value is *256*.
AVL_UNIT_DEFAULT_ICON	The path to the default icon used to display devices. If this parameter is not set, the plugin initializes it to proper file.
AVL_GROUP_DEFAULT_ICON	The path to icons used to display devices groups. If this parameter is not set, the plugin initializes it to proper file.
ADF_AVL_MAP_MARKERS_PATH	The location of image files used to display markers.
WIALON_WEB_EXT_JS	Custom JS can be used for the monitoring site. It is loaded from the URL address provided by this variable.
ADF_AVL_MSGS_RENDERER_LIMIT	The variable to set limitations for rendered messages, that is how many messages can be simultaneously drawn on the map when rendering tracks.
WIALON_WEB_HELP_URL	This is URL address of online documentation provided. The link to the documentation web site/page will be placed at the top right-hand corner. If this variable is not set, no links to help materials are displayed.
Managements Site (CMS Manager)	
CMS_MANAGER_WEBSERVER	Default value is *wialon_web:8023:**. Management site (or CMS Manager) is designed to manage users and other system objects, assign access rights and perform some administration functions.

Wialon Mobile	
WIALON_MOBILE_WEBSERVER	The default value is *wialon_web:8024:**. Mobile site has simplified interface (in comparison with monitoring site) and allows to track devices via pocket PCs or mobile phones.

Note that CMS Manager and Wialon Mobile are licensed separately and can be not included in your package. Administration site is available only for users from the group of administrators.

More specific parameters to set monitoring site design and configuration:

- **Interface Languages**
- **Monitoring Site Design**
- **Reports Custom Configuration**
- **Personal Design for Your Clients**

The documentation for using above-mentioned sited is located on separate resources:

- **Wialon User Guide**
- **Administration Site**
- **Wialon Manager Guide**
- **Wialon Mobile**

Other parameters in the configuration file:

- **Units and Devices**
- **Database**
- **Maps**
- **All Variables**

Modems

Variable to configure modems.

Variable	Description
ADF_SERIAL_SMPP_REMOVE_PLUS	*For SMPP modems only.* If the value is 1, destination phone numbers are not supplied with the '+' sign at the beginning for sending SMS messages. Default value is 0.
ADF_SERIAL_SMPP_SKIP_GSM_ENCODING	*For SMPP modems only.* The variable allows sending SMS messages in their initial state, that is not encoding special symbols of SMS text according to GSM specification. Default value is 0 (messages are encoded). If the value is 1, messages are *not* encoded.
ADF_SERIAL_CONN_IDLE_TIMEOUT	*For GSM modems only.* The variable is used in CSD queries. If data does not come during the indicated period of time, connection breaks automatically. Default value is 30 seconds.
ADF_SERIAL_SMPP_SRC_ADDR_TON	*For SMPP modems only.* The type of source address number in SMS being sent. Default value is 0.
ADF_SERIAL_MAX_SMS_LENGTH	*For SMPP и GSM modems only.* The maximum number of parts to divide a large SMS message. Default value is 3.

Configuring modems can be also fulfilled on the Modems tab of administration site.

All Variables

UNITS & DEVICES	
ADF_AVL_HW_BIND_ADDR	Network interface to listen for units and users connections. Default value is '*', which means on any interface.
ADF_AVL_COMM_SERVER	Communication server configuration. The format to set the parameter: <comm-server-name>:<avl-server-host>:<avl-server-port>:<scan-hw_dir>. Default value is '31189'. The parameter *scan-hw-dir* is optional (by default, its value is '0'). It means enabling autoscanning of new equipment types when the system is being initialized.
WIALON_AUTO_CREATE_UNITS	If the value is '1', unit which does not exist in the system but sends messages, will be automatically created.
DATABASE	
ADF_STORAGE_PATH	The path to storage files. Default directory is *./storage* (in root directory).
ADF_STORAGE_CACHE_SIZE	The size of RAM (in Mb) to store the cache of unit properties. The value should be a power of 2. Default value is 16 Mb.
ADF_STORAGE_MESSAGES_CACHE_SIZE	The size of RAM (in Mb) to store the cache of messages. The value should be a power of 2. Default value is 64 Mb.
ADF_STORAGE_DEFRAG_INTERVAL	This parameter is to set the interval of automatic defragmentation of database (in days). In addition, the time when defragmentation is done can be specified. The form is: <interval> or <interval>:<hour>. To turn off the defragmentation, set '0'. By default, the defragmentation is done everyday at 3AM (local time).
ADF_STORAGE_BACKUP_INTERVAL	The interval (in minutes) of how often database and transaction files are backed up. Default value is 60 min.
ADF_STORAGE_BACKUP_FULL_INTERVAL	*For Wialon 0909 only*. The interval of creating the full (not incremental) backup (in days). By default, it is 1 day.
ADF_STORAGE_BACKUP_HOLD_INTERVAL	*For Wialon 0909 only*. The number of last full backups to store. Default is 7 backups.
ADF_AVL_UNIT_HISTORY_PERIOD	The period to store unit history (in days). Used for database servers only. If not set or the value is '0', unit history is not deleted automatically.
ADF_STORAGE_TRASH_KEEP_PERIOD	The period (in days) to store deleted objects in the trash folder with the possibility to restore them. By default, 30 days.
ADF_STORAGE_BACKUP_PATH	The location to store database backup. Default is *backup* directory.
ADF_STORAGE_MSG_ENV_CONFIG	This variable definen parameters fro backup storage (*backup* directory). It is composed of: 1) maximum messages in one database part; 2) minimum messages in one database part; 3) fragmentation level in percents to force defragmentation over database part; 4) backup rotate interval in days; 5) maximum backup diff files size to commit them into backup database part, in MB; 6) enable (1) or disable (0) backup for messages database (*ml* and *md* folders). Default value is 20000000:1000000:20:10:50:1
WIALON PRO	
ADF_STORAGE_NET_SERVER	Set the port and network interface address to listen connections by the form <port>:<IP address>. IP address can be skiped to listen on all local network interfaces. Default port is 31188. To initialize server part in the trusted mode to any connected user (that is the authorization is not needed, and the connected user has the maximum access to all local objects), the third parameter set as '1' is needed, for example, '31188:*:1'.
ADF_STORAGE_NET_REMOTE_SERVER	*For Wialon Pro Client only*. Set the port and network interface address where Wialon Pro is located (main database). The format is:

	<port>:<IP address>. Default port is 31188.
MAPS	
GIS_DRIVER_TYPE	Define GIS server type: gis_avd_driver (embedded) or gis_net_driver (external).
ADF_GIS_NET_REMOTE_SERVER	DNS and IP address of WebGIS server. Used for external WebGIS server. If WebGIS server is located on the same server as Wialon, for the variable the value *localhost* can be entered.
WIALON_WEB_GOOGLE_KEYS	Keys to activate Google Maps API for different URLs. To get keys for your site, make a request here. How to set the value for this variable is described below.
WIALON_WEB_GOOGLE_DEFAULT	If the value is **on** and Google Maps API keys are available, this type will be active by default.
WIALON_WEB_YANDEX_KEYS	Keys to activate Yandex Maps for different URLs. To get keys for your site, make a request here. How to set the value for this variable is described below.
WIALON_WEB_YANDEX_DEFAULT	If the value is **on** and Yandex Maps keys are available, this type will be active by default.
WIALON_WEB_NAVTEQ_KEYS	The variable to activate Navteq Maps. To get a key, visit their site.
WIALON_WEB_MAPSERVER_URL	The list of URLs of WebGIS-3 servers from which WebGIS maps will be loaded by clients. The addresses must be given as full URL with prefix *http* and separated by comma. For example, http://dns1.map.ru,http://dns2.map.ru,http://dns3.map.ru. For maximum efficiency, it is recommended to have maximum four URLs. The variable can be used for external WebGIS server or for using the already existing WebGIS server.
WIALON_WEB_DEFAULT_POS	Set the default map position and zoom when the monitoring site is opened. Enter latitude, longitude, and zoom level, separating them by colon (for example, WIALON_WEB_DEFAULT_POS = 55.739162:49.199269:9).
WIALON_WEB_WEBGIS_COPYRIGHT	Copyright text for WebGIS maps (displayed in the left bottom corner of the map).
SITES	
WIALON_WEB_WEBSERVER	Network parameters for Wialon Web in the form <DNS-name>:<port-number>:<network-interface-IP-address>. Default value is *wialon_web:8022:**. DNS name can simply indicate a unique server name or the real DNS name if the same port number is used by other servers Network interface IP address can be skipped or set as '*' to allow operating on all network interfaces.
WIALON_WEB_HIDE_ACCOUNT	Set this variable to hide account information in user settings (the list of services, their limit and costs). To set the variable, enter WIALON_WEB_HIDE_ACCOUNT = on.
WIALON_MOBILE_WEBSERVER	Set network parameters of mobile site in the form: <DNS-name>:<port-number>:<network-interface-IP-address>. The default value is *wialon_web:8024:**. DNS name can simply indicate a unique server name or the real DNS name if the same port number is used by other servers Network interface IP address can be skipped or set as '*' to allow operating on all network interfaces.
CMS_MANAGER_WEBSERVER	Network parameters for CMS Manager operation are set in the form: <DNS-name>:<port-number>:<network-interface-IP-address>. Default value is *wialon_web:8023:**. DNS name can simply indicate a unique server name or the real DNS name if the same port number is used by other servers Network interface IP address can be skipped or set as '*' to allow operating on all network interfaces.
AVL_ADMIN_WEBSERVER	Network parameters for administration site are set in the form: <DNS-name>:<port-number>:<network-interface-IP-address>. Default value is avl_admin:8021:*. DNS name can simply indicate a unique server name or the real DNS name if the same port number is used by other servers Network interface IP address can be skipped or set as '*' to allow operating on all network interfaces.
CMS_ALLOW_ADMIN_LOGIN	If the value is 1, the administrator can login to all sites.
	This variable is necessary in case if service administrator have forgotten the password to login to the administration site. The default value is 0 (no password reset is needed). If the value is 1, a new

WIALON_RESET_ADMIN_PASSWORD	password will be reset to the log during the nearest restart of the service. After applying the new password, do not forget to delete the variable or set its value as 0.
WIALON_WEB_HELP_URL	This is URL address of online documentation provided. The link to the documentation web site/page will be placed at the top right-hand corner. If this variable is not set, no links to help materials are displayed.
MODEMS	
ADF_SERIAL_SMPP_REMOVE_PLUS	*For SMPP modems only.* If the value is 1, destination phone numbers are not supplied with the '+' sign at the beginning for sending SMS messages. Default value is 0.
ADF_SERIAL_SMPP_SKIP_GSM_ENCODING	*For SMPP modems only.* The variable allows sending SMS messages in their initial state, that is not encoding special symbols of SMS text according to GSM specification. Default value is 0 (messages are encoded). If the value is 1, messages are *not* encoded.
ADF_SERIAL_CONN_IDLE_TIMEOUT	*For GSM modems only.* The variable is used in CSD queries. If data does not come during the indicated period of time, connection breaks automatically. Default value is 30 seconds.
ADF_SERIAL_SMPP_SRC_ADDR_TON	*For SMPP modems only.* The type of source address number in SMS being sent. Default value is 0.
ADF_SERIAL_MAX_SMS_LENGTH	*For SMPP и GSM modems only.* The maximum number of parts to divide a large SMS message. Default value is 3.
LANGUAGE	
WIALON_WEB_LANGUAGES	The list of additional languages for monitoring site interface. Separate the languages by semicolon. By default, English and Russian are available. For example, if *fi:suomi* is set, the Finnish will be added.
WIALON_WEB_DEFAULT_LANGUAGE	Set the default language for the monitoring site in the form of <domain>.
MAILING SYSTEM	
ADF_SMTP_SERVER	SMTP server address is set in the form <host>:<port>. This server is used to send messages from software. By default, the local computer and the port 25 are used. (!) SMTP server must maintain the operation without autentification from monitoring server IP address.
AVL_NOTIFICATIONS_EMAIL_FROM	Form this e-mail address the notifications are sent by default.
AVL_JOBS_EMAIL_FROM	The default e-mail address used to fulfil jobs.
IMAGES AND ICONS	
AVL_UNIT_ICON_MAX_SIZE	The size of icon (in pixels) to display units on the map and in the lists. Default value is *64*, maximum value is *256*.
AVL_UNIT_DEFAULT_ICON	The path to the default icon used to display units. If this parameter is not set, the plugin initializes it to proper file.
AVL_GROUP_DEFAULT_ICON	The path to icons used to display unit groups. If this parameter is not set, the plugin initializes it to proper file.
ADF_AVL_MAP_MARKERS_PATH	The location of image files used to display markers.
MONITORING SITE DESIGN	
WIALON_WEB_TITLE	The custom title of the page in browser.
WIALON_WEB_COPYRIGHT_TEXT	The text at the bottom center of the page, like you company name.
WIALON_WEB_COPYRIGHT_URL	The hyperlink for this text opening in a new window, like your company web site address.
WIALON_WEB_SKIN	The name of the file containing color scheme, fonts, etc. for the site. The file has to be located in *custom/skins*.
WIALON_WEB_EXT_JS	Custom JS can be used for the monitoring site. It is loaded from the URL address provided by this variable.

CUSTOM_SITES	The variable is used to create custom design of the monitoring site. Depending on its value, in the configuration file more variables appear. They are intended to define various parameters for site design. For example, if *CUSTOM_SITES = new_site*, additional variables such as NEW_SITE_WEBSERVER, NEW_SITE_SKIN, NEW_SITE_TITLE, NEW_SITE_COPYRIGHT_TEXT, NEW_SITE_COPYRIGHT_ URL, NEW_SITE_DEFAULT_POS, NEW_SITE_HIDE_ACCOUNT can appear.
OTHER	
AVL_REPORTS_STYLES_FILE	The path to XML file containing the configuration for reports styles.
ADF_SERIAL_SMPP_SRC_ADDR_TON	The type of source address number in SMS being sent. Default value is 0.
ADF_AVL_MSGS_RENDERER_LIMIT	The variable to set limitations for rendered messages, that is how many messages can be simultaneously drawn on the map when rendering tracks.

Administration Site

Administration site is accessible only for users who are administrators of the server. The site helps to manage the service: create, delete, restore system objects, inquire and receive information about the service, read system logs.

Service administrator is a user who configures the service and manages it. This is the only user who can create billing plans. An administrator, like a manager, can create users, accounts, and units, but the main administrator's job is to create a source account with its billing plan and create users-managers.

Login and Logout

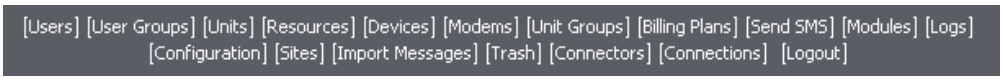
To login to the administration site, use your login name and password. Put a check mark near **Remember on this computer** if needed, and press OK.

If you have forgotten the password, you can get a new one. To do this, add the variable *WIALON_RESET_ADMIN_PASSWORD = 1* to the configuration file. After that, when you restart the service, a new password will be reset to the log. After applying the new password, do not forget to delete the variable or set its value as 0.

To logout from the site, press **logout** item (the last item in the main menu). This action will guide you back to the login page.

Site Structure

The structure of the site is simple and intuitively clear. On the top of the page there is the main menu which is a set of links (17 items).



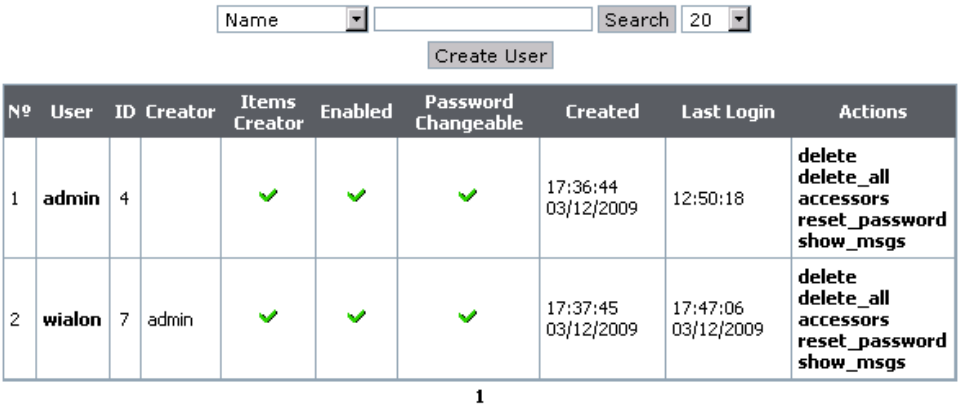
Click on these links to manage the corresponding elements of the service. Find details in the topics listed below:

- **Users**
- **User Groups**
- **Units**
- **Resources (Accounts)**
- **Devices (Hardware)**
- **Modems**
- **Unit Groups**
- **Billing Plans**
- **Send SMS**
- **Modules**
- **Logs**
- **Configuration**
- **Sites**
- **Messages Import**
- **Trash**
- **Connectors**
- **Connections**

Users

When you login to the site, the Users page opens. Here you can manage all users of the system.

The first two users are created automatically. One is **admin** with password reset to you by e-mail. The other one is **wialon** with password **wialon** needed to enter the monitoring site. It is recommended to change this password later on.

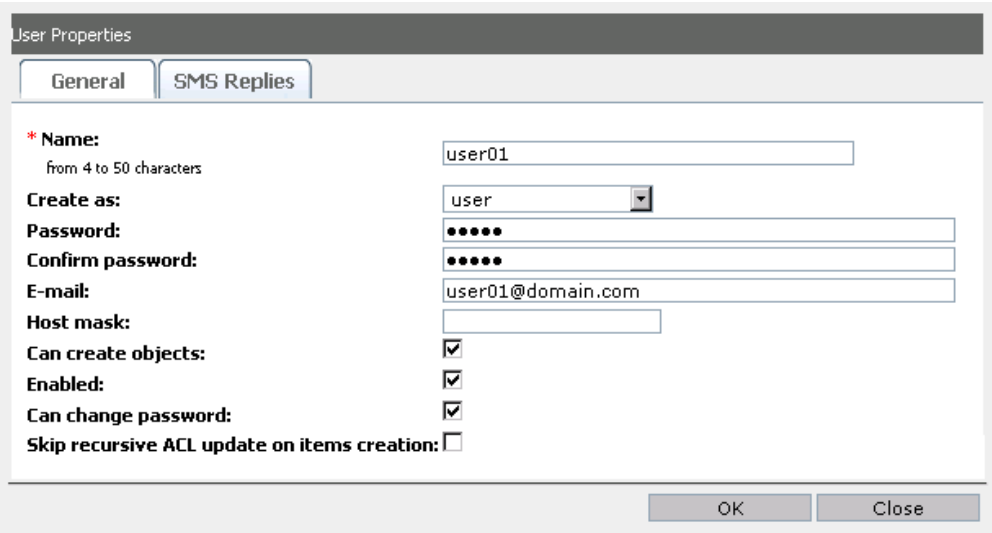


The table displays a list of users and their main properties such as name, creator, activity, last login, date created, id (assigned automatically by the system), etc. To quickly find a needed user, apply a filter. Use the asterisk sign (*) which replaces any number of unknown characters and can be placed at the beginning, at the end, at the middle of your inquiry or in several places simultaneously. You can filter users not only by name, but also by creator, creation date, last login, account, and billing plan.

Users created on this page can enter monitoring and management sites (if you not deny the access). To be able to create monitoring objects like geofences, notification, etc., a user must have an account. To attach an account to a user, go to the Resources page and create a resource as this user or give this user access to some other resource.

User Properties Dialog

To create a new user, press the **Create User** button.



Name
Enter login name for a new user. This is the only obligatory field, the rest is optional.

Create as
Indicate the creator for the user. The creator will have full access rights to this user. The user inherits creator's account and billing plan.

Password

Enter password for the user and confirm it.

E-mail
Enter user's e-mail.

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 symbol *, for example, host mask can be set like this: '212.0.13.*'.

Can create objects
Mark this check box to allow the user to create objects on the monitoring site like units, geofences, reports templates, etc.

Enabled
Mark this check box to activate the user right after creation. If a user is enabled, it means, it can login to the system. Otherwise, you can you can do it later.

Can change password
If activated, the user will have possibility to change the password to enter the monitoring site.

Skip recursive ACL update on items creation
If this option is not activated, superior system users will automatically receive access to the objects created by this user. To avoid this situation, mark this check box.

SMS Replies
In the SMS Replies tab enter user's phone number which will be authorized by the system.

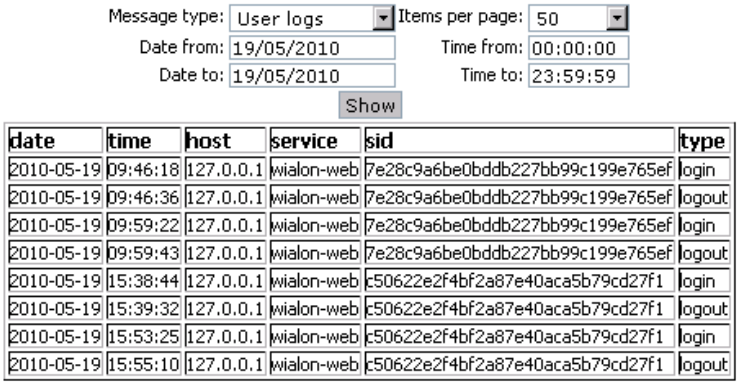
At the end press **OK**. In the popup window read the result of your action. Press **Close** to cancel.

Click on a user name in the table to view and edit properties described above. While editing a user, you can also indicate the basic **account** for the user.

Actions

The following actions can be performed over a user as system object:

- **delete** - delete user. User cannot be deleted until any objects created as this user exist in the system.
- **delete_all** - delete user and all abjects created by this user.
- **accessors** - manage access to the user (described below).
- **reset_password** - reset password. New password will be displayed in a modal window. After this action, it is impossible restore the old password.
- **show_msgs** - show messages of this user (logins to the system & logouts). Choose time interval and press **Show**.

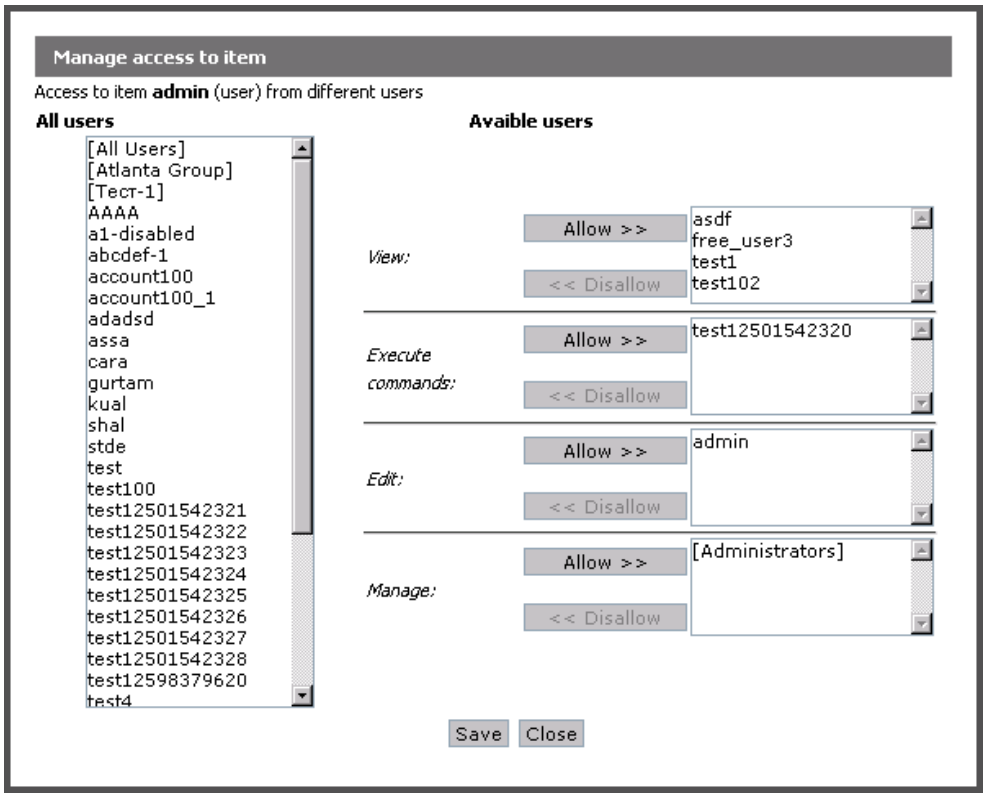


date	time	host	service	sid	type
2010-05-19	09:46:18	127.0.0.1	wialon-web	7e28c9a6be0bddb227bb99c199e765ef	login
2010-05-19	09:46:36	127.0.0.1	wialon-web	7e28c9a6be0bddb227bb99c199e765ef	logout
2010-05-19	09:59:22	127.0.0.1	wialon-web	7e28c9a6be0bddb227bb99c199e765ef	login
2010-05-19	09:59:43	127.0.0.1	wialon-web	7e28c9a6be0bddb227bb99c199e765ef	logout
2010-05-19	15:38:44	127.0.0.1	wialon-web	c50622e2f4bf2a87e40aca5b79cd27f1	login
2010-05-19	15:39:32	127.0.0.1	wialon-web	c50622e2f4bf2a87e40aca5b79cd27f1	logout
2010-05-19	15:53:25	127.0.0.1	wialon-web	c50622e2f4bf2a87e40aca5b79cd27f1	login
2010-05-19	15:55:10	127.0.0.1	wialon-web	c50622e2f4bf2a87e40aca5b79cd27f1	logout

Access Management

When press **accessors** button, you can control access to a user from other users. Four access levels are available:

- **View**: selected users can see the objects created by this user;
- **Execute commands**: the same as *view* level (this access level is applied mainly to units);
- **Edit**: selected users can change the user's properties;
- **Manage**: selected users will have all above mentioned rights and even can delete the user from the system.

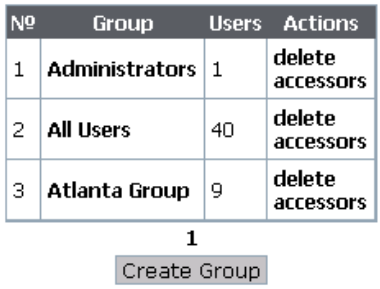


At the left there is a list of all users available. To assign rights to a user, select it from the list and press the **Allow** button against the needed access level. To deny the access, select the needed user (in one of lists on the right) and press **Disallow**.

In square brackets there are user groups. If a right is assigned to user group, it is applied to all users in this group.

User Groups

Two groups are created by default while installing the service - **Administrators** and **All Users**. They cannot be deleted. All newly created users are added to *All Users* group automatically.

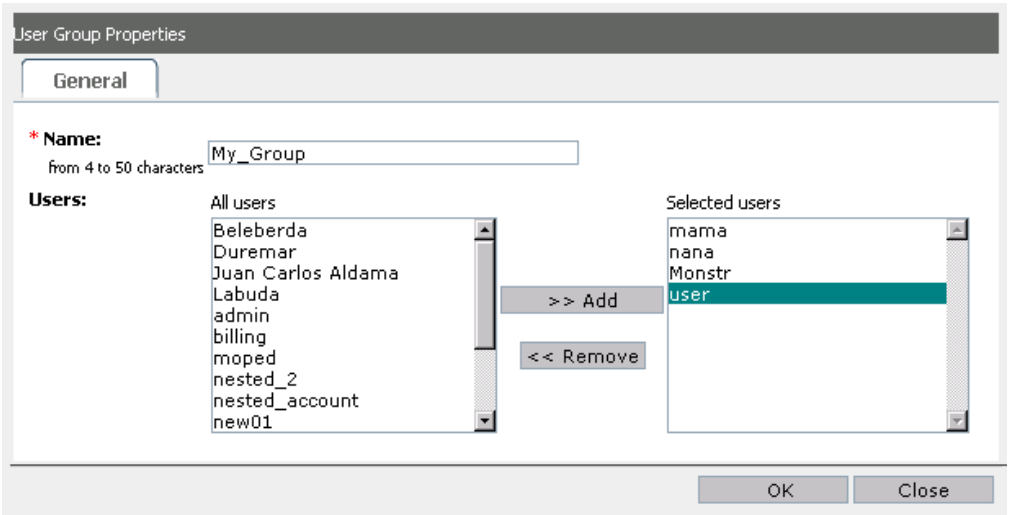


№	Group	Users	Actions
1	**Administrators**	1	**delete accessors**
2	**All Users**	40	**delete accessors**
3	**Atlanta Group**	9	**delete accessors**

1

Create Group

To create a new group, press **Create User Group** button.



Enter a name for the group and select users to form it (add users from the left column to the right). Then press OK button.

To edit a group, click on its name. In the group properties dialog you can change the name of the group or add/remove users to/from it.

To delete a group, press the **delete** button against its name. Deleting a group does not mean deleting users which belongs to this group.

Access right to user group are assigned in the same way as for separate users. See Access Management for details. If a right is assigned to a group, it means that it is applied to all abjects which belong to this group. However, if higher access was given earlier to a certain user, this high level will be preserved.

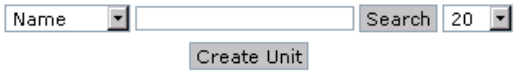
ATTENTION!
When editing groups never delete yourself (your login) from the group of administrators because you will lose the right to enter admin site.

Units

Table of Contents

On this page you can manage units and their properties. To add a new unit to the system, push **Create Unit** button. To edit an existing unit, click on its name. Unit properties dialog has several tabs described below.

However, note that creating and managing units is more handy on the management site. On the administration site, the functionality for units is limited (no trip detector, no fuel consumption, custom fields, advanced options, etc.) and in some cases read only.



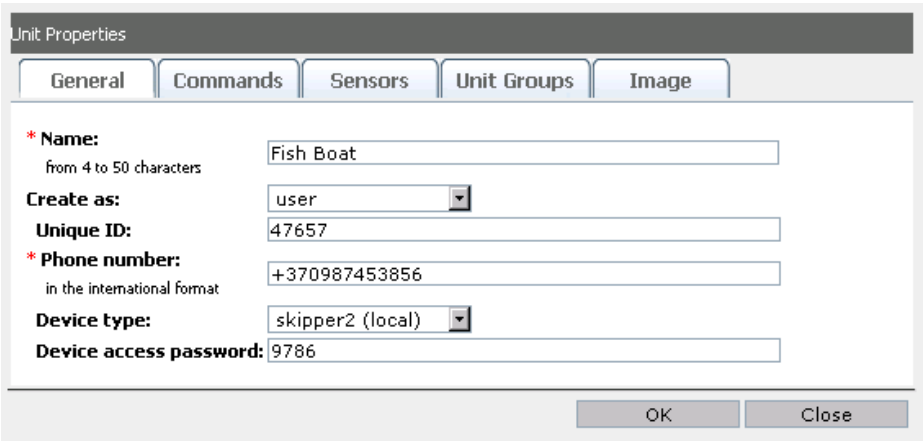
№	Unit	ID	Creator	HW Type	Unique ID	Phone	Links	Count (last day)	Last Message	Last Position	Actions
1	**20090319005f**	125		Wialon Retranslator (local)	200903190000025f		0	0	13:58:08 28/02/2009	13:58:08 28/02/2009	**delete accessors show_msgs**
2	**artal**	138	user	ARTAL (local)			0	0	17:13:26 02/09/2009	11:18:17 07/05/2009 (4.70 km from Международное 13, Москва)	**delete accessors show_msgs**
3	**sms_sim1**	109		Skipper 2 (local)		+375299000003	1	5905	14:05:42	14:05:42 (Садовая-Кудринская, Москва)	**delete accessors show_msgs**
4	**sms_sim2**	110		Skipper 2 (local)		+375299000002	0	0			**delete accessors show_msgs**

To quickly find a needed unit in the list, use the filter. First choose the criteria of search (by name, creator, phone, ID, hardware, account, billing plan). Enter a name of a part of a name (creator, phone, etc.) using asterisk sign (*) to replace any number of characters at any place of the inquiry. Push the Search button. Units which fit your request will be displayed on the list. To return all units back to the list enter '*' in the search field and apply.

As you can see in the image, lines in the table can be of different colors. They indicate unit activity. Orange background means that the unit sent last message more than one day ago. Yellow background means that the last message was more than an hour ago. Green - last message within an hour. White - messages were never received from this unit.

General

Here you indicate name, creator, device type, unique ID, phone number (SIM card number embedded to the unit), and access password (if needed) for the unit being created.



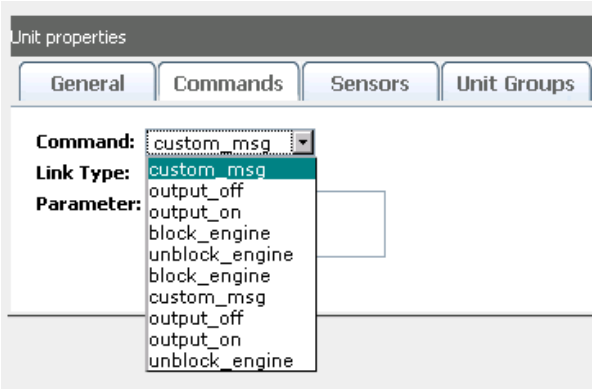
- **Name**: enter unit name from 4 to 50 characters.
- **Create as**: choose creator from the dropdown list.

- **Account**: available when editing a unit, not when creating it. It shows which account the unit belongs to.
- **Unique ID**: enter a unique ID for the unit to be identified by the system. Usually it is IMEI or serial number.
- **Phone number**: here type phone number of the unit if it has embedded SIM card. Phone number should be written in international format, that means they start from "+", then follow country code, communication statement code and the phone number itself. Examples: +7903726154,+15557654321).
- **Device type**: select unit type from the list of supported hardware. You can see the complete list of available hardware on the Devices (Hardware) page.
- **Device access password**: type password to manage unit remotely if needed.

Commands

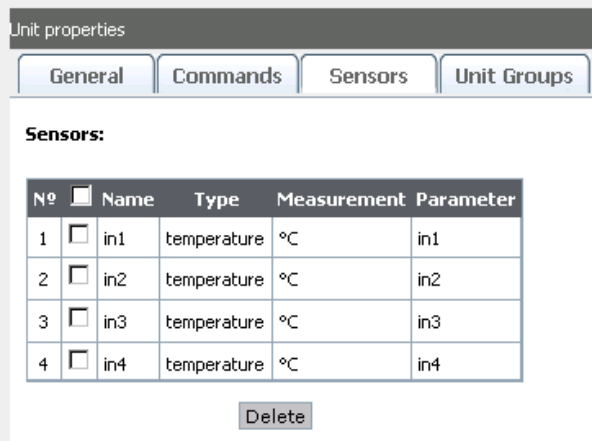
On this tab you can execute commands over units. Note that if a command is executed via GPRS, the unit has to be connected to server at the moment. To execute GSM command, an active modem on the server has to be accessible for the unit.

Choose a **command** in the dropdown list. Indicate **link type** (TCP/IP, UDP/IP, GSM, CSD, VRT) if you know which channel should be used for this command. Otherwise, leave *Any*. If the command supports custom parameters (or if it is custom text), enter them in the **parameters** field. At the end, push **Execute**.



Sensors

On this tab you can see which sensors are attached to the unit.



If needed, you can tick a sensor and delete it with the help of the appropriate button.

Unit Groups

If the unit is included into any units group(s), they are listed on this tab. Unit groups can be created and managed on the Unit Groups page.

Image

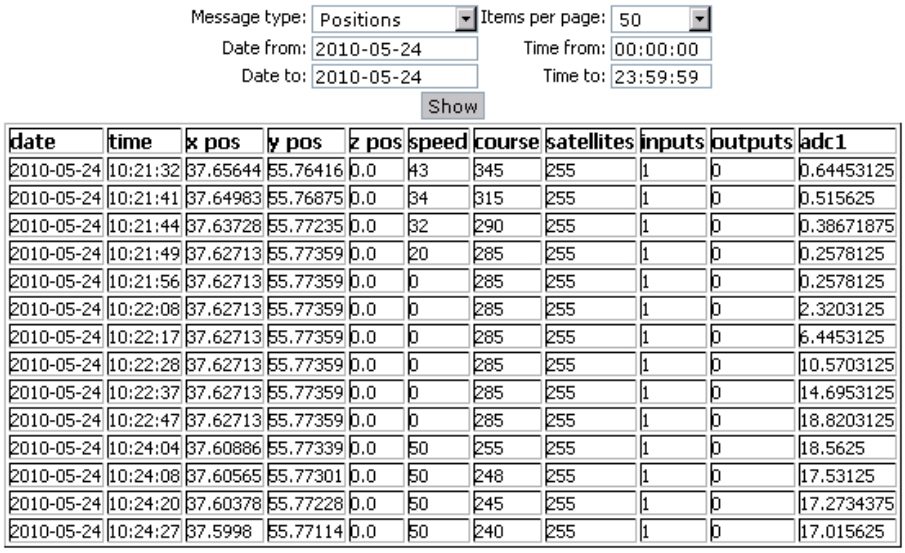
On the Icon tab you see the image that is currently used for the unit. You can also load another image (press **Browse**, select an image file, and then press **Upload**). You may reset the image to defaults by using empty file

field and pressing **Upload**. The changes are applied after pressing OK.

Actions

The following actions can be performed over a unit as system object:

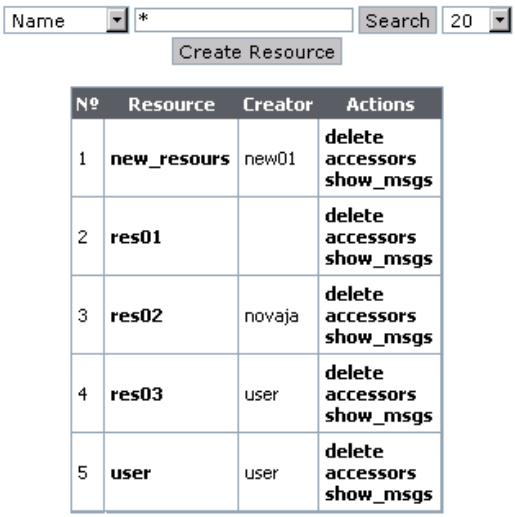
- **delete** - delete unit.
- **accessors** - manage access to the unit. Access to units is assigned in the same way as for users - see Access Management for details.
- **show_msgs** - show messages received from the selected unit. To view messages, select time interval and press **Show**. Types of messages are: SMS messages, positions (coordinated, speed, and other parameters), and commands sent to unit.



date	time	x pos	y pos	z pos	speed	course	satellites	inputs	outputs	adc1
2010-05-24	10:21:32	37.65644	55.76416	0.0	43	345	255	1	0	0.64453125
2010-05-24	10:21:41	37.64983	55.76875	0.0	34	315	255	1	0	0.515625
2010-05-24	10:21:44	37.63728	55.77235	0.0	32	290	255	1	0	0.38671875
2010-05-24	10:21:49	37.62713	55.77359	0.0	20	285	255	1	0	0.2578125
2010-05-24	10:21:56	37.62713	55.77359	0.0	0	285	255	1	0	0.2578125
2010-05-24	10:22:08	37.62713	55.77359	0.0	0	285	255	1	0	2.3203125
2010-05-24	10:22:17	37.62713	55.77359	0.0	0	285	255	1	0	6.4453125
2010-05-24	10:22:28	37.62713	55.77359	0.0	0	285	255	1	0	10.5703125
2010-05-24	10:22:37	37.62713	55.77359	0.0	0	285	255	1	0	14.6953125
2010-05-24	10:22:47	37.62713	55.77359	0.0	0	285	255	1	0	18.8203125
2010-05-24	10:24:04	37.60886	55.77339	0.0	50	255	255	1	0	18.5625
2010-05-24	10:24:08	37.60565	55.77301	0.0	50	248	255	1	0	17.53125
2010-05-24	10:24:20	37.60378	55.77228	0.0	50	245	255	1	0	17.2734375
2010-05-24	10:24:27	37.5998	55.77114	0.0	50	240	255	1	0	17.015625

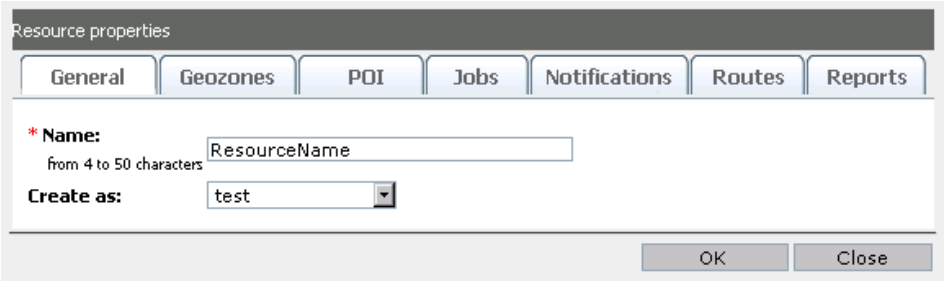
Resources (Accounts)

On this page you define possibilities available to each user. If a user is not attached to a resource, this user will be not allowed to create objects like geofences, places, drivers, etc.



Creating a Resource

To create a resource, push **Create Resource** button.

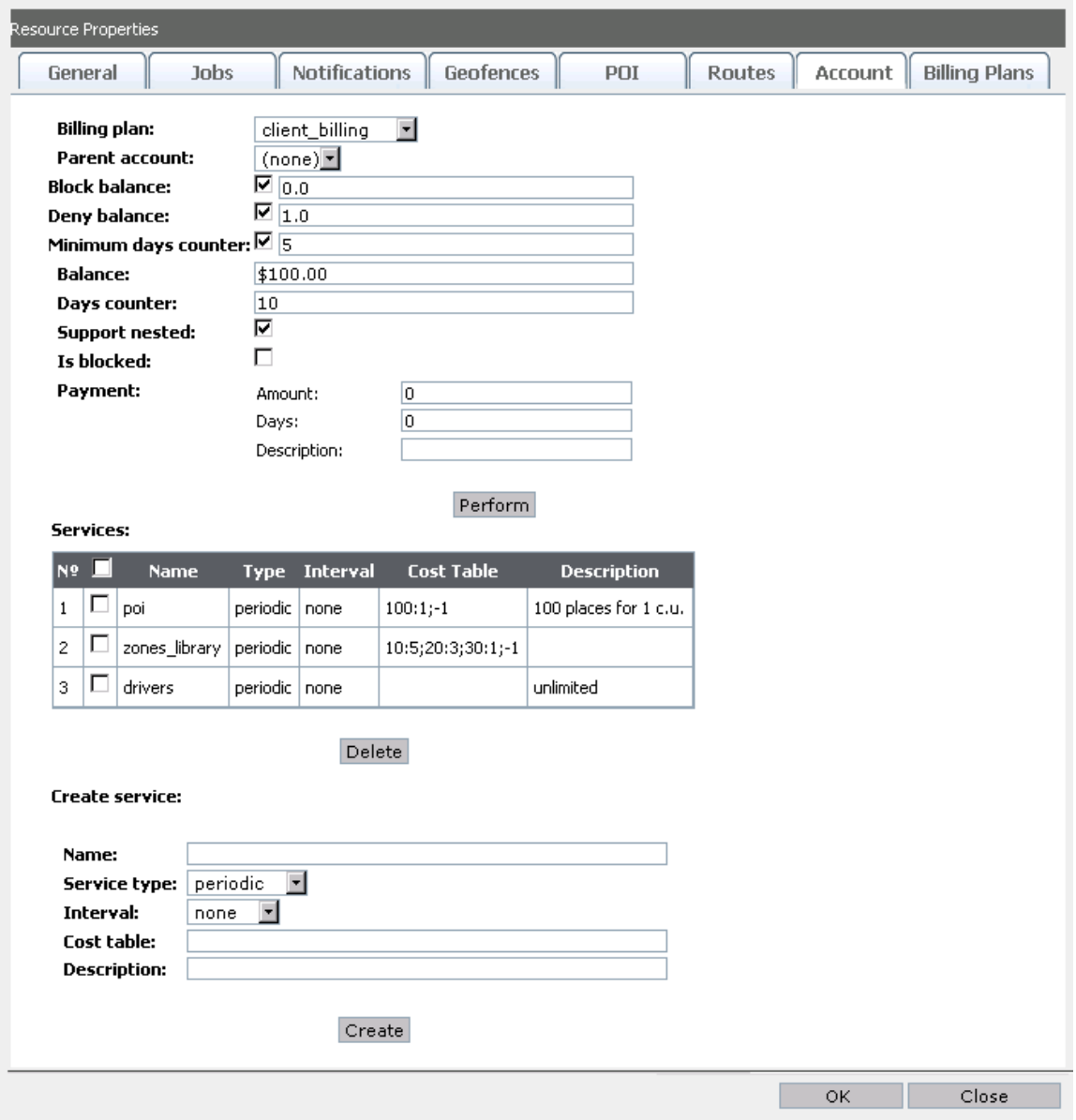


In the dialog enter a name and select a creator. A creator is required for resource to activate a billing plan.

Account and Billing Plan

When a resource is created, to view or edit its properties, click on its name in the table. On several tabs the information about geofences, POI, jobs, notifications, reports, and other objects is presented. You can view lists of objects created by users attached to this resource and delete these objects as needed.

When viewing a resource after its creation, a new tab **Account** may appear in properties dialog (the resource must have a creator). Here you assign billing plan and manage resource activity and balance (make payments, block, etc.).



To apply a billing plan to the resource, select a plan in the dropdown list and press **Activate account** button.

On the account tab you define **Billing plan** applied to the resource and **Parent plan** if needed. Parent plan is a plan of higher level of hierarchy. If some service is blocked in parent plan, it automatically becomes unavailable in dependant plans.

Define balance and/or days to automatically limit user's activity in case of nonpayment. **Block balance** is a balance to deny access to services and stop account operation. **Deny balance** is a balance block paid operations to user.

Minimum days counter works automatically and independently of balance controller. If it is activated, the account can be blocked automatically not only when the balance is 0, but also if there are no days left. It can be useful for demo access, for example, or to control monthly fee. In the field Minimum days counter indicate the number of days to block the account (if nothing is indicated, zero is assumed). However, you can enter another number, usually negative (like -3). In this case, the account will be still available several days even when the term is expired. Days are counted down automatically when a new day comes. When 5 days are left, a special warning starts to come each time when the user logs in to the site: Your account will be disabled in .. days. When days are negative, this notification is not shown.

When you make a payment, you can add not only money but days. When this period is over, account is blocked even if the balance is enough. You can block the account manually marking **Is blocked** check box.

Below you see the current **Balance** and **Days counter** showing how much days left to zero.

On the same tab you can add a payment or/and days. Enter amount, days, description, and press **Perform**. Changes in the balance will be seen when you open this dialog next time.

Support nested concerns accounts. If nested accounts are allowed, dependent accounts can be created, and they can have different billing plan. If nested accounts are not supported, all account created on this resource will be like a part of the current account and will use its billing plan.

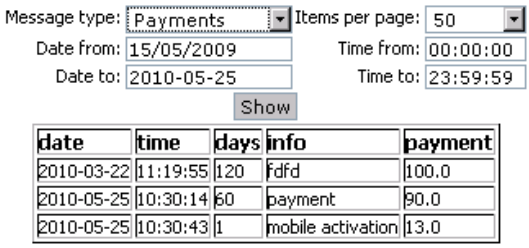
The services and their costs are inherited from the billing plan, but you can precise them in the **Services** table below as needed.

If nested accounts are supported, the tab **Billing Plan** becomes available (reload the dialog if not). Here you define which billing plans are available to resource creator. The creator then could assign these billing plans to accounts when creating them.

Actions

The following actions can be performed over a user as system object:

- **delete** - delete resource.
- **accessors** - manage access to the resource. Access rights are assigned in the same way as for users (see Access Management for details).
- **show_msgs** - show messages concerning the resource: notifications, balance or payments. Choose messages type, indicate time interval and press **Show**.



Devices (Hardware)

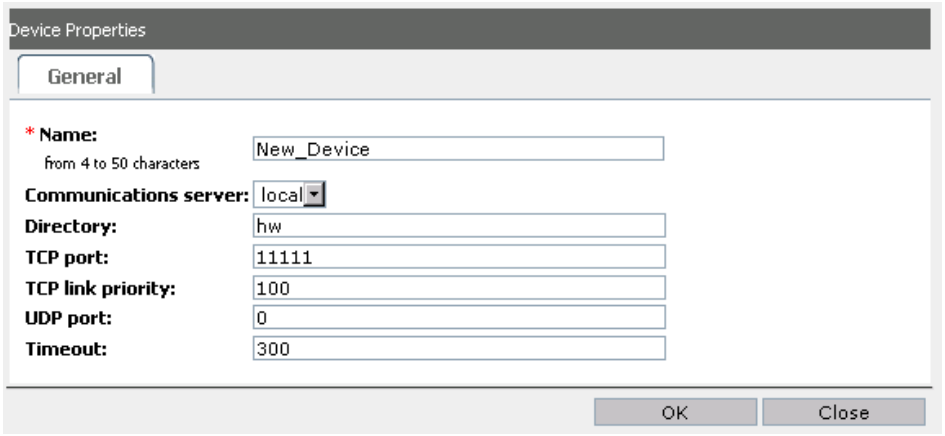
Table of Contents

On this page you see the full list of supported device, and you can also add your own hardware.

№	Hardware type	Server	TCP port	UDP port	Timeout	TCP Commands	UDP Commands	GSM Commands	Link Priority	Communications	Actions
1	**800C**	local	0	20191	300	0	0	2	100	✔	**delete begin_comm end_comm**
2	**AC3.X**	local	4998	0	300	6	0	0	100	✔	**delete begin_comm end_comm**
3	**ALT-P12**	local	20212	0	300	0	0	0	100	✔	**delete begin_comm end_comm**
4	**AMIGO GPRS**	local	20196	0	300	0	0	0	100	✔	**delete begin_comm end_comm**
5	**ARTAL**	local	20130	0	300	0	0	0	100	✔	**delete begin_comm end_comm**
6	**AT-300**	local	20101	0	300	3	0	3	100	✔	**delete begin_comm end_comm**
											delete

Device Properties

Push the **Create Device** button to add a new hardware. It assumes that you have hardware protocol and a script written specially for this kind of device.



- Enter device's **name**.
- Choose **communication server** from available servers (the server to which data will be sent).
- Enter a name for the **directory** where to locate the script. By default, this directory is located in Wialon installation directory *…/plugins/avl_comm_server/hw/*.
- Define **TCP port** to transfer data. If you use firewall, do not forget to open this port.
- Define **TCP link priority** for communications channel from 0 to 100.
- Indicate **UDP port** to transfer data. If you use firewall, do not forget to open this port.
- Define **timeout** (default value is 300 sec). This is time to maintain TCP connection before break it if there is no incoming data. Here you can use negative values which means that this hardware is used as a retranslator. Even in this case timeout value is taken into account. It is not recommended to change timeout default value.

To edit these properties, click on device name in the table.

Actions

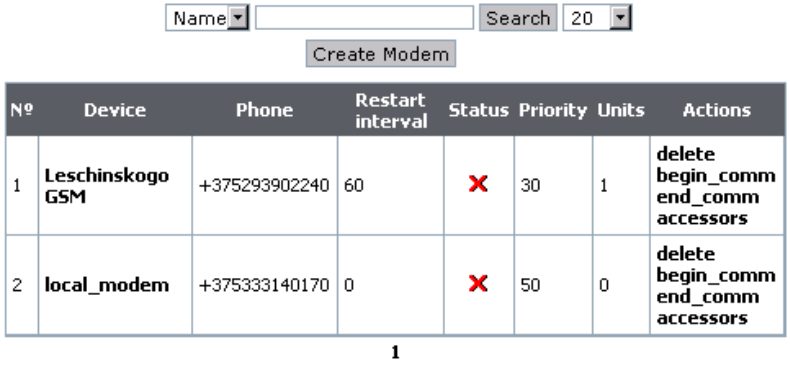
The following actions can be performed over a user as system object:

- **delete** - delete hardware.
- **begin_comm** - begin commutation that is activate the script when data through this port comes.
- **end_comm** - end commutation that is stop executing the script. In this case all data coming through this port will be lost.

Modems

The Modems page contains a list of connected modems. Here you can manage existing modems (edit their properties, activate/deactivate commutation, manage access rights, delete modems, etc.) and create new modems.

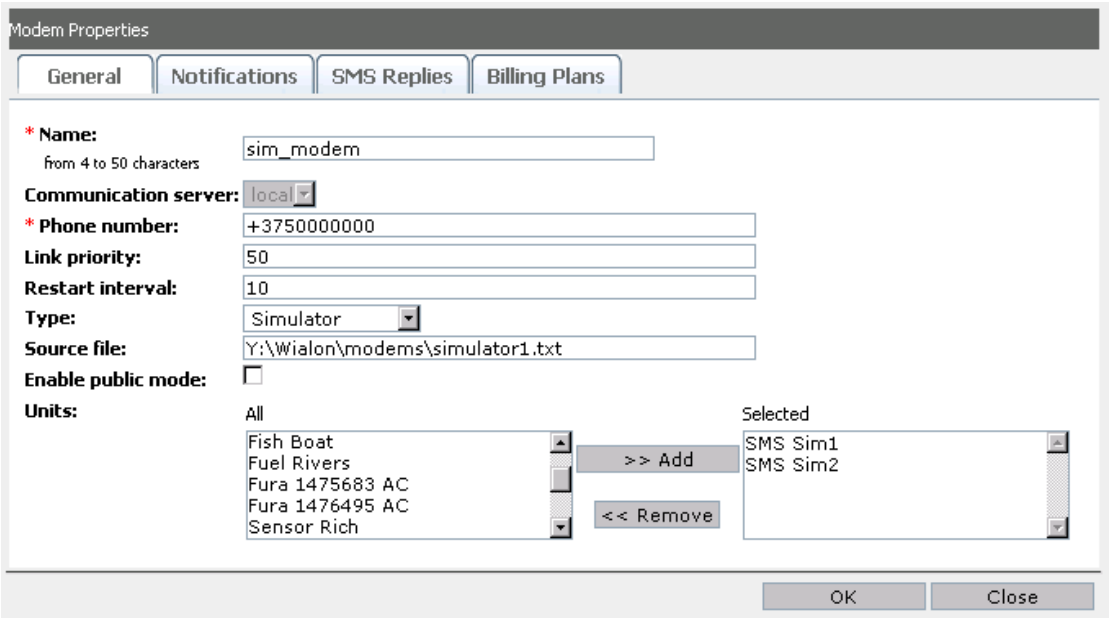
Any GSM modem connected to the server can be used in the system. It is recommended to use a modem connected via COM port. If this is USB modem, you will likely have to install a driver for it.



Some additional variables for modems are set in the configuration file.

Modem Properties

To add a new modem, push **Create Modem** button. Modem properties dialog has several tabs: General, Billing Plans, and Notifications.



- **Name**: enter a name for the modem.
- **Communications server**: choose communications server from the dropdown list.
- **Phone number**: enter phone number of SIM card installed on the modem.
- **Link priority**: define communications channel priority.
- **Restart interval**: indicate restart interval as needed (zero is not recommended). If the connection with modem is broken by any reason, after the time it will be automatically restarted. Besides, if the restart interval is zero, the modem is not started when restarting the service.
- **Type**: select modem type. Depending on your choice, adjust additional properties dedicated for the selected type (see instructions below).
- **Enable public mode**. The modem in public mode is available to all objects regardless the list of supported devices. If such modems are several and they have the same link priority, the modem that is

free at the moment will work. In case modems have different priorities, the modem with a greater priority will work.

- **Units**. If public mode is disabled, you have to form the list of devices which will be assigned to this modem to execute any operations. Units become available after creating the modem. To complete creating the modem, press OK button. If the modem is created successfully, units become available to assign.

GSM modem

Indicate **Serial port** where the modem is located. Indicate **Port speed**. If any errors appear while operating, descend this value. Usually, **SMS service center** is strictly indicated on the SIM card, and you do not have to enter it here.

Enter the name for **log file** (without extension), for example *modemus*. In the *logs* directory a file with the indicated name and the extension *.log* will be created (like *modemus.log*), and it will collect all information about modem work.

Indicate **Additional initialization AT commands** as needed (consult instructions manual for the modem). Check **Use 8-bit encoding only** if needed.

Simulator

In this case indicate the absolute path to the **Source file** from which the simulator will take data. You can use the variable *${ADF_ROOT_PATH}* that means the path of Wialon installation.

Network modem

Indicate **Server host** (you can enter IP address or DNS name), **Server port** to connect through, and the **Server password** to connect to the server.

SMPP gateway

Enter the name for **Log file** (without extension), for example *modemus*. In the *logs* directory a file with the indicated name and the extension *.log* will be created (like *modemus.log*), and it will collect all information about modem work.

Indicate **Server host** (you can enter IP address or DNS name), **Server port** to connect through, the **Server password** to connect to the server. If needed, indicate **Server type**, for example, *VMS* (voice mail system), *OTA* (over-the-air activation system), etc.

Enter **Account name** (login) and the **Source address** to recognize the sender (like phone number, company name or both). **SMPP synchro mode** is needed to make hardware diagnostics (while there is no notification that the first SMS was delivered, the second one will not be sent).

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 se characters which cannot be transmitted in 8-bit encoding. In these cases the option **Split long SMS using SAR method** can be used to solve the problem.

Check **Use 8-bit encoding only** if needed.

In addition, you can set the variable **ADF_SERIAL_SMPP_SRC_ADDR_TON** in the configuration file. This variable defines the type of source address number in SMS being sent. Default value is 0.

Actions

The following actions can be performed over a modem:

- **delete** - delete a modem.
- **begin_comm** - begin communication that is start getting data from the modem.
- **end_comm** - end communication that is stop getting data from the modem.
- **accessors** - manage the access of different users to this modem. Access to modems is assigned in the same way as for users - see Access Management for details.

Billing Plans

Billing plan is a dedicated storage system object. It can be managed *only through the administration site*.

Before managing the service, it is strongly recommended to acquaint with basic notions because you need to built a model of system objects with complicated dependences between them. Correctly built objects system is needed for your service to operate successfully.

Billing System

Wialon uses embedded billing subsystem which basic purpose is to control and limit user's activity. A billing plan is assigned to a resource (account) and defines allowed activity of users who use this resource. Billing plan is a system object defined by its name and the set of possibilities included in it.

With billing system enabled, storage system kernel performs a check for different operations (like creating objects) to be allowed. In case there is no billing plan assigned or the limit of objects is reached or the balance is not enough, the kernel will prohibit operation.

Billing plan defines the set of available services and some basic properties such as minimum balance to block an account, minimum balance to deny services, balance output format (unit of money), etc.

A billing plan also allows:

- to limit modems available to users and units;
- to limit hardware types available to users;
- to set an e-mail address from which various background operations (like notifications delivery and reports mailing, etc.) are performed;
- to adjust an individual design for reports (color, fonts, logos, signature, etc.)
- to limit any provided services.

A billing plan can operate in two basic modes:

- allow unknown services (that is services which are not prescribed in it) with zero cost and put limitations on defined services;
- allow only those services which are prescribed in it and prohibit all other services.

The second way is more reliable.

Recursive (propagated) billing plans are accessible and in many cases handful. In case of recursion, if the information about a service is not found in the current billing plan, it will be inquired recursively. The level of recursion is not limited. It is convenient to describe all used services in a basic billing plan, and make other billing plans derivative of it.

Creating a Billing Plan

Go to **Billing Plan** page to create and manage billing plans. Here you see the list of all plans created:

№	Plan	Parent Plan	Services	History	Flags	Deny Balance	Block Balance	Min Days	Currency Format	Actions
1	**Test2**	--	1	0	37	0.0	-20.0	10	$%.02f	**delete**
2	**billing**	--	7	0	37	0.0	0.0	0	$%.02f	**delete**
3	**test**	--	6	60	4	0.0	0.0	0	$%.02f	**delete**

1

Create Billing Plan

To create a new billing plan, press **Create Billing Plan** button. Billing plan properties are presented on several tabs.

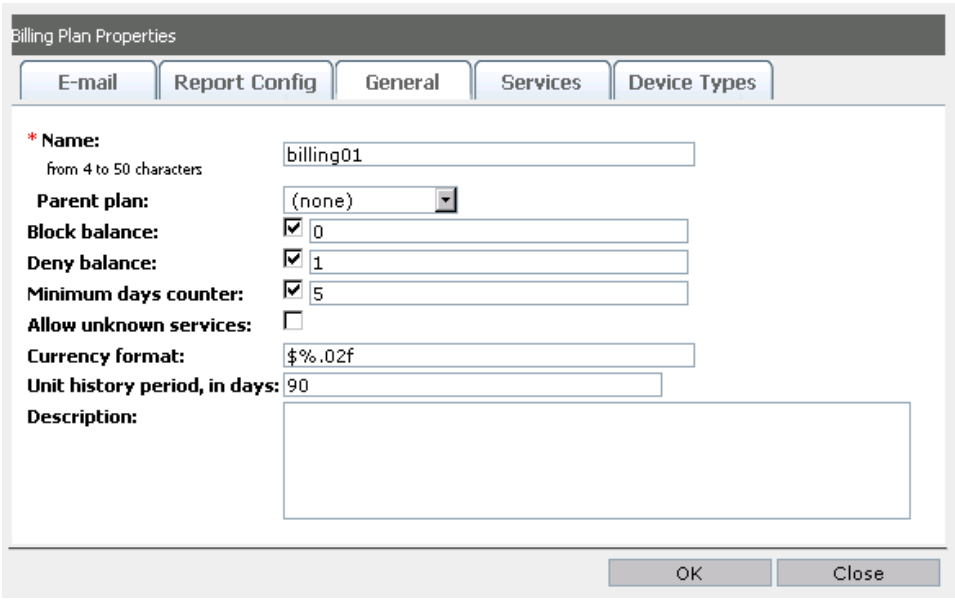
E-mail

Here you can enter e-mail address from which various system messages (notifications, reports, etc.) will be sent.

Report Config

To apply your custom style to report files read Reports Custom Configuration.

General



Name
Enter a name for a billing plan.

Parent plan
Choose a parent plan if needed. If a parent plan is selected, the billing plan beeing created at the moment will recursively inherit its settings.

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

Deny balance
Enter balance reaching which services will be denied.

Minimum days counter
Days left before the account is blocked.

Allow unknown services
If this option is activated, all services will be available on this resource if they are not blocked in service table. If this option is disabled, only services listed in service table will be available.

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

Unit history period, in days
The time period to store unit history. Of the value is '0', the history is never deleted. If, for example, '100', messages older than 100 days are automatically deleted.

Retranslator mask
Retranslator server is set in the form 'host:port'. Here you enter comma separated list of allowed retranslators. Wildcard symbols like '*' and '?' can be used.

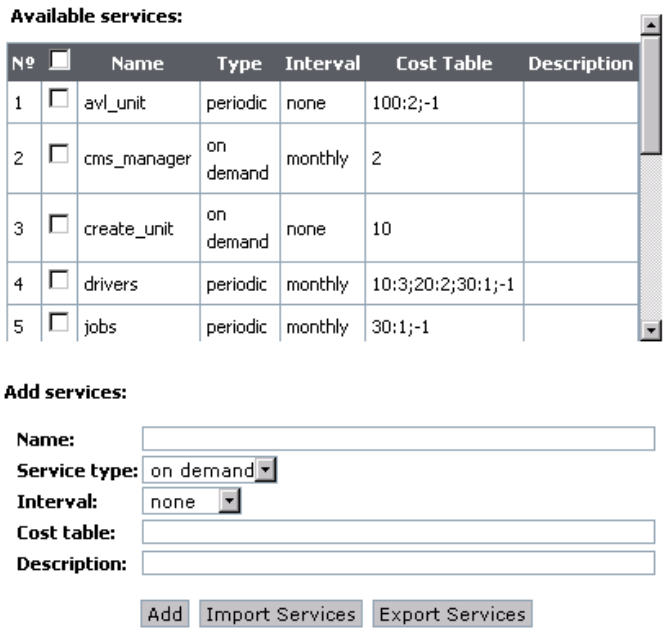
Sender's number (for notifications)
Sender's name or number from which behalf SMS notifications will be sent. Works with SMPP modems only.

Sender's number (for commands)
Sender's name or number from which behalf commands to units will be sent. Works with SMPP modems only.

Description is optional.

Services

On this tab you activate services and define costs for them. To add a service, fill in a small form:



Enter a valid service **Name** (see services table below to check how the names are correctly given).

Select **Service type**: *periodical* or *on demand*.

- **Periodical** services have a counter that changes automatically (by the kernel, when objects are created or deleted) or with a software-based method. If an interval is preset (like hourly, daily, weekly, monthly), then when the time comes, account's balance is reduced by counter value multiplied by fee for this service. In price table you can enter maximum allowed value for a counter, for example, to limit geofences allowed to create.
- Services **on demand** are transactions which cab be performed by a used as the need arises, like sending SMS or a command to a unit. Time interval for such a service (hourly, daily, weekly, monthly) defines how often the counter of a service should be reset. In this way you can limit the number of allowed SMS messages for the indicated period, for example, no more than three SMS per day.

Select **Interval** to reset counter (none, hourly, daily, weekly, monthly). If time interval is not set, services used are not calculated, and you just define the charge for a unit of service. Enter **Cost table** that is the charge for a service (or a unit of service) and limitation on amount of units. **Description** is optional. At the end push **Create** button.

To quickly create billing plans, use **import/export option**. You can import/export separate services and whole service tables from one billing plan to another.

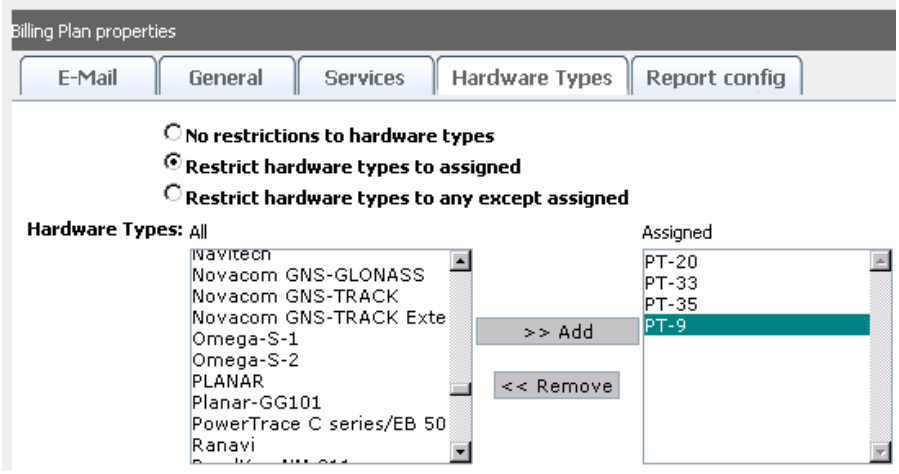
To import services, press **Import services** button. The table of all billing plans already created and their services will be displayed. Tick needed services or whole billing plans to be imported and press the Import button. If a service with the same name already exists, it is not replaced. To clear all existing services and replace them with selected services, mark **Delete all existing services** check box. To return to the previous window, press **Back**.

To export services from the current billing plan to another one, mark necessary services and press **Export services**. In the next window choose billing plans to export to and press the Export button. You can indicate additionally to replace services with the same names by new services or synchronize services (replace all with new).

Services are imported and exported with their type, cost table, description, etc.

Device Types

By default, no restrictions are applied to device types. But you may need to limit access to some equipment. Then choose *Limit device types by assigned* or *Limit device types by any except assigned* and select needed hardware.



Cost Table

Follow the rules to built a cost table:

- The format for a table: COUNTER1:VALUE1;COUNTER2:VALUE2;VALUE3.
- A counter is always positive and integer, a value can be fractional (like *2.5*).
- Each next counter must be greater than the previous one.
- If a counter is not set, the system will consider it equal to the previous counter +1.
- To block the service, set a negative value (like *-1*). Negative value is convenient at the end of the line to indicate a limitation. If their is no negative value at the end, the last cost will be applied to all newly created objects exceeding the last counter.
- To make the service free and unlimited, leave a cost table empty.

Cost table example:

Service	Value	Description
sms	3:0;-1	First three SMS are free, the forth SMS is not allowed.
sms	1:0;10:1.5;-1	The first SMS is free, from second to tenth the cost for one SMS is 1.5 charge units. The eleventh SMS is denied.
periodic	0:10;-1	10 charge unit are withdrawn from an account periodically (the interval is set separately).
avl_unit	1:0;5:10;10:3;50:1	The first unit is free, from second to 5th will cost 10, from 6th to 10th - 3, from 11th to infinity - each for 1.
zones_library	5:0;-1	5 geofences can be create (for free). The creation of a sixth geofence is prohibited.
alarm	1:0	Alarms are not limited.
messages	-1	Deny access to this facility, in particular, to the messages mode.

Services Table

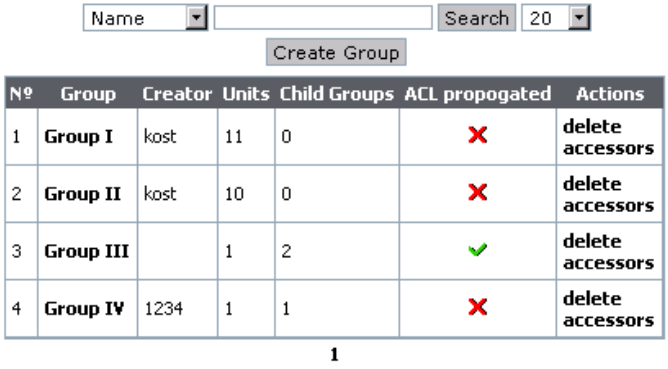
The full list of services which can form a billing plan. Note that when setting a billing plan, services names must be entered as in the table below.

Service	Type	Description
avl_unit	periodic	Activate ability to create monitoring units
avl_unit_group	periodic	Unit groups
storage_user	periodic	Users to be created (minimum one user must be allowed to create)
avl_resource	periodic	Accounts (minimum one account must be allowed to create)
create_units	on demand	For monitoring site to activate *Create Unit* button.
create_users	on demand	For monitoring site to activate *Create User* button.
create_unit_groups	on demand	For monitoring site to activate *Create Group* button.
alarms	periodic	Alarms activated.
jobs	periodic	Jobs to be performed

notifications	periodic	Notifications allowed to create
routes	periodic	Routed controlled
drivers	periodic	Ability to create and manage drivers, use them in monitoring and reports.
zones_library	periodic	Geofences
pois	periodic	POIs
sms	on demand	Sending SMS messages.
email_report	on demand	Sending a report by e-mail (job module).
email_notification	on demand	Sending notifications by e-mail.
reporttemplates	periodic	Report mode, possibility to create report templates and generate reports by them. This service is also responsible for trip detection and fuel consumption tabs in unit properties.
reportsdata	periodic	Data in reports (used in versions under 1006).
unit_sensors	periodic	Sensors allowed for one unit.
custom_fields	periodic	Custom fields for an object.
net_access	on demand	Authorization through a service connector (Wialon Pro Client).
cms_manager	on demand	Access to CMS Manager site.
wialon_web	on demand	Access to Wialon Web site.
wialon_mobile	on demand	Access to Wialon Mobile site.
retranslator	on demand	Ability to activate/deactivate retranslator.
custom_reports	on demand	Advanced reports on the monitoring site (used for units and users).
periodic	periodic	The parameter to set a periodic charge for service as a whole, like monthly charge for the service.
service_intervals	periodic	Possibility to set service intervals, control them, register services and generate reports on them.
messages	on demand	Messages mode.
reportsmngt	on demand	Access to GPRS traffic accounting (in unit properties, in jobs and notifications, in reports).

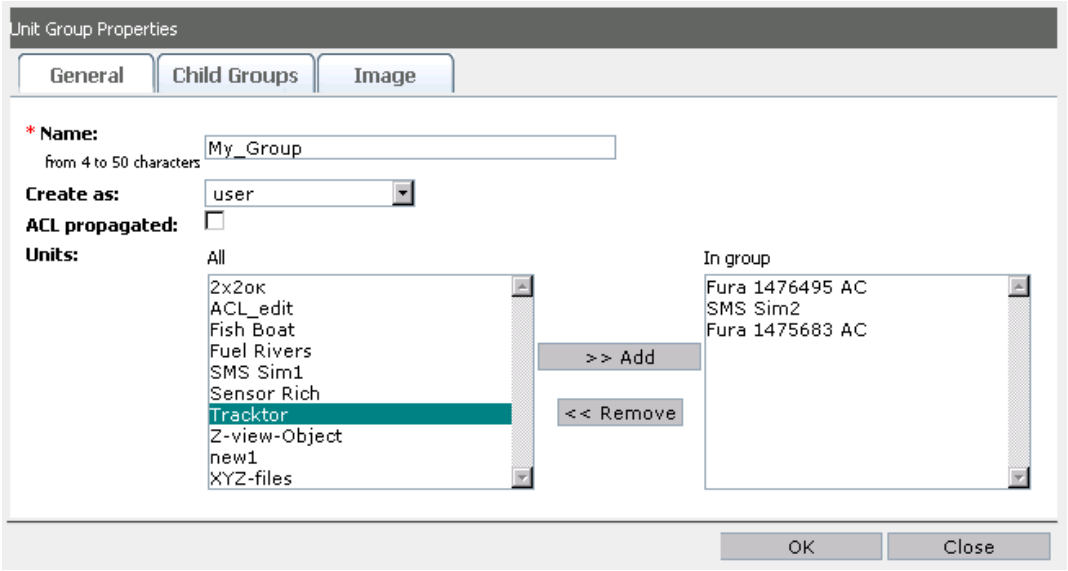
Unit Groups

Unit group is a unity including several units which 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. For example, you can assign access rights to a whole group at once.



Unit Group Properties

To edit a group, just click on its name in the table. To create a group, press **Create Unit Group** button.



General

Enter a name for the group and assign a creator. Choose units from the list to be included to the group. Select unit in the list on the left and move it to the right by pressing the **Add** button. To exclude an object from a group, select the object in the list on the right and press the **Remove** button.

If **ACL propagated** property is activated, units in the group will inherit access rights assigned here. If the flag is set and an object is included to the group, in unit properties this group will be mentioned. If the flag is not set, the group will be not indicated in unit properties, however the unit will be a part of the group.

Important! After a group is created, it is impossible to change ACL propagation.

Child Groups

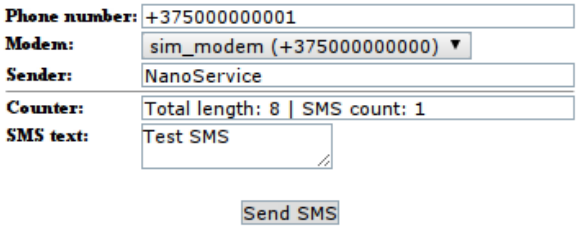
Here you can indicate that some other groups belong to this one.
(press **Browse**, select an image file, and then press **Upload**). You may reset the image to defaults by using empty file field and pressing **Upload**. The changes are applied after pressing OK.

Actions

- **delete** - delete group.
- **accessors** - manage access to the group. Access rights are assigned in the same way as for users (see Access Management for details).

Send SMS

Here you can send custom messages to units. To do it, fill in the form.



To send SMS, enter recipient's phone number (in the international format) where the message should be sent. Choose a modem from the list of available. If it is SMPP modem, you can enter sender's name/number how it will be displayed in the message.

Type message text. SMS counter shows the length (in characters) of the current SMS and the number of messages it will be divided into.

After filling in all fields, press **Send SMS**.

Modules

On this page you can control which system modules are loaded and check the version of each module.

Loaded libraries

№	Library	Path	Version
1	adf_core	/home/krsl/projects/apps/wialon/lib/libadf_core.so	3.23.0186
2	adf_image	/home/krsl/projects/apps/wialon/build/debug /libadf_image.so	1.6.0027
3	adf_chart	/home/krsl/projects/apps/wialon/build/debug /libadf_chart.so	1.1.0025
4	adf_gis	/home/krsl/projects/apps/wialon/build/debug /libadf_gis.so	3.9.0050
5	adf_http	/home/krsl/projects/apps/wialon/build/debug /libadf_http.so	3.23.0119
6	adf_zip	/home/krsl/projects/apps/wialon/build/debug /libadf_zip.so	3.3.0014
7	gis_net_driver	/home/krsl/projects/apps/wialon/build/debug /libgis_net_driver.so	1.4.0010
8	adf_net	/home/krsl/projects/apps/wialon/build/debug /libadf_net.so	7.2.0087
9	adf_avl	/home/krsl/projects/apps/wialon/lib/libadf_avl.so	5.19.0134
10	adf_serial	/home/krsl/projects/apps/wialon/build/debug /libadf_serial.so	3.12.0084

Logs

All events that are happenning in the system are registered, and the log can be viewed.

Log type to be viewed can be:

- *service* - mail log;
- *trace* - the full log containing all messages and errors;
- *http_error* - a log containing http errors;
- *error* - all records from trace log which contain the text 'error';
- and a separate log for each device.

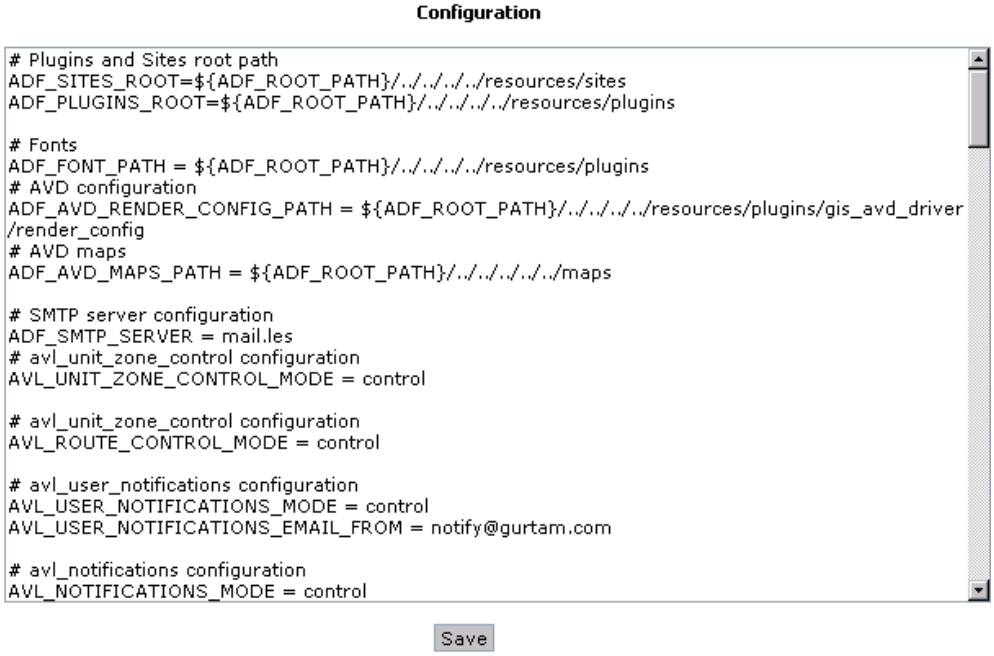
To make you request even more precise, use filter field where you can imput any word/phrase which is contained in messages you are looking for. Use wildcard symbols ? and *. Press **Show** to apply the filter.

Indicate number of records to be displayed: from 1 to 1000 (default is 100).

Be default, records are displayed from newest (at the top) to oldest (at the bottom). However, this order can be reverted - remove the flag **From end**.

Configuration

On this tab you can see and edit Wialon configuration file (*./custom/config.txt*). All variables, their meaning and possible values were described above, in Wialon Configuration.



Sites

This page gives information about sites open at the moment: site name, when started, host name, user, last access time. You can forcibly **Disconnect** a user from a site if needed or **Stop** a site at all. When disconnecting a user, its name disappear from the list.

Site name are bold. Under each site mane you see the list of users and connections to this site. Sites with green flag are accessible at the moment, sites with red mark are not active (use the **Start** button to launch the site).

Site List

№	Site	Started	Host	User	Last Access Time	Action
1	**avl_admin**	✔	**wialon-admin**			**stop**
1.1	avl_admin	13:50:08	10.1.1.4	admin	13:52:18	Disconnect
2	**wialon_web**	✔	**wialon_web**			**stop**
2.1	wialon_web	12:33:05	10.1.3.2	user_test	13:52:18	Disconnect
2.2	wialon_web	12:34:08	10.1.4.2	user_test	13:52:17	Disconnect
2.3	wialon_web	13:50:02	10.1.1.4	user01	13:51:18	Disconnect
3	**wialon_mobile**	✔	**wialon_mobile**			**stop**
4	**cms_manager**	✔	**cms_manager**			**stop**
4.1	cms_manager	13:51:19	10.1.1.4	user01	13:52:18	Disconnect
5	**trace_orange**	✘	-			**start**
6	**agrogps**	✘	-			**start**
7	**wialon**	✔	**wialon**			**stop**

Messages Import

This page is to import messages from files to a unit. The instructions of how to do it are given right on the page.

Supported formats are:

- Raw GPRMC navigator logs in formats 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

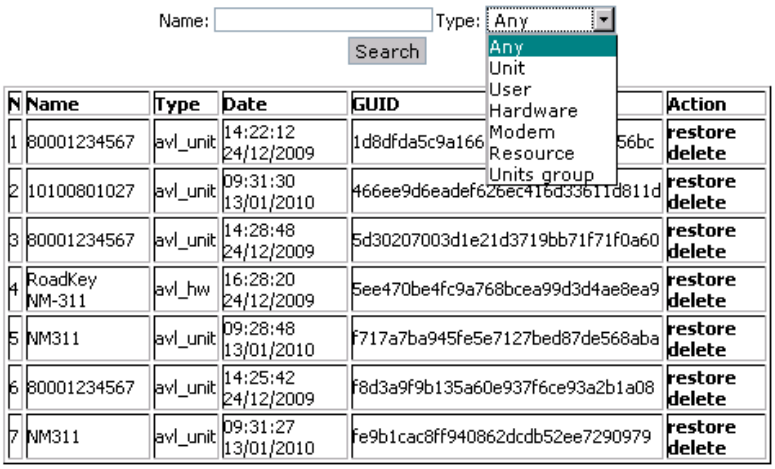
To improve upload performance, you may first compress files with ZIP or GZIP utility for your operating system. After upload is complete, files will be unpacked on the server and processed.

Choose a destination unit in the dropdown list. Then indicate the path to its messages file. If the messages are located in several files, you can **Add File**. At the end press the **Upload** button to start the process. The result will be reported on the top.

Trash

If any object of the system was deleted, it is placed into the trash folder, and can be restored during an defined period of time. The default period is 30 days but it can be altered in the configuration file (ADF_STORAGE_TRASH_KEEP_PERIOD variable, see Wialon Configuration => Database for details…)

To see all deleted objects located in the trash folder, just press **Find**. However, it is more convenient to search object using special instruments. First of all you can filter them by type: unit, user, hardware, modem, resource, unit group (select the type in the dropdown list). If you know object's name or part of its name, enter it in the search field, replacing unknown symbols by asterisk signs.



N	Name	Type	Date	GUID	Action
1	80001234567	avl_unit	14:22:12 24/12/2009	1d8dfda5c9a166 56bc	restore delete
2	10100801027	avl_unit	09:31:30 13/01/2010	466ee9d6eadef62bec416d33611d811d	restore delete
3	80001234567	avl_unit	14:28:48 24/12/2009	5d30207003d1e21d3719bb71f71f0a60	restore delete
4	RoadKey NM-311	avl_hw	16:28:20 24/12/2009	5ee470be4fc9a768bcea99d3d4ae8ea9	restore delete
5	NM311	avl_unit	09:28:48 13/01/2010	f717a7ba945fe5e7127bed87de568aba	restore delete
6	80001234567	avl_unit	14:25:42 24/12/2009	f8d3a9f9b135a60e937f6ce93a2b1a08	restore delete
7	NM311	avl_unit	09:31:27 13/01/2010	fe9b1cac8ff940862dcdb52ee7290979	restore delete

In the table you see object name and type, date deleted, and object's GUID (globally unique identifier of the object). Found object can be restored (**restore** button) or deleted from the system completely (**delete** button).

Connectors

If any computers or programs are directly connected to the server at the moment, they are listed on this page. Logistics server, unit connection server or another database server can be considered as computers. A client application which requires connection to the server can be considered as a program.

Active connectors

№	GUID	Host	Started	Trusted local	Trusted remote	Users	Actions
1	7837bef7d1b0085582660fe35b872453	10.2.2.6	14/11/08 21:47:09	✗	✗	trace_front	Disconnect
2	91ef0ade5a12212487141230524b3bb1	10.2.1.8	20/11/08 07:19:20	✓	✗		Disconnect
3	5f4251551c647b89777d49aa349368cf	10.2.1.7	20/11/08 07:19:32	✓	✗		Disconnect
4	270ce61c0671251232ba1b31c304329e	10.2.1.5	21/11/08 06:13:43	✓	✓		Disconnect
5	f8e87db80f47bc333ec0563a81ddd8fc	10.2.1.6	21/11/08 11:42:46	✓	✗		Disconnect

In the table you see connector's GUID (globally unique identifier), host, activation time, trusted mode, user.
Trusted local means that connected client has full access to all local objects and does not require authorisation.
Trusted remote shows that the server can get access to manage other computer or application without authorization and has full access to all local objects of the client. You can **disconnect** a computer or a program if needed.

These parameters are set in the configuration file - see Database configuration, variable ADF_STORAGE_NET_SERVER.

```
        cd $ROOT
        if [ -d "$ROOT/plugins" ] && [ -d "$ROOT/scripts" ] ; then
                break
        fi
        if [ -L "$SCRIPT_PATH" ]; then
                SCRIPT_PATH=`readlink "$SCRIPT_PATH"`
                if [ $? != 0 ]
                then
                        echo "Error: Problems with resolving '$SCRIPT_PATH'"
                        exit -1
                else
                        continue
                fi
        fi
        break
done

# Check associated service
if [ -e "$ROOT/adf_script" ]
then
        res=`df $ROOT/storage/|grep /`
        cnt=0
        for i in $res; do
        if [ $cnt == 4 ]
        then
                len=${#i}
                if [ $len -gt 2 ] && [ ${i:0:2} -gt 80 ]
                then
                        echo "Wialon hard drive space checker notification: $i. Please enlarge space."
                fi
                break
        fi
        let cnt=cnt+1
        done

fi
```

- **wialon-service-check.sh** is a script to check service operability every two minutes and restart it in case of unforeseen cessation:

```
#!/bin/sh

SCRIPT_PATH="$0"
# Detect base path for service
while true; do
        ROOT=${SCRIPT_PATH%/*}
        ROOT=`cd "$ROOT";pwd`
        cd $ROOT
        if [ -d "$ROOT/plugins" ] && [ -d "$ROOT/scripts" ] ; then
                break
        fi
        if [ -L "$SCRIPT_PATH" ]; then
                SCRIPT_PATH=`readlink "$SCRIPT_PATH"`
                if [ $? != 0 ]
                then
                        echo "Error: Problems with resolving '$SCRIPT_PATH'"
                        exit -1
                else
                        continue
                fi
        fi
        break
done

# Check associated service
if [ -e "$ROOT/adf_script" ]
then
        log=`$ROOT/adf_script check`
        if [ "$log" != "" ]
        then
                BASE=`basename $ROOT`
                HOST=`hostname`
                echo "$BASE($HOST): $log"
        fi
fi
```

- **wialon-errors-check.sh** is an every hour check inspection of the service log file to detect such text as *error* (various errors) and notify the administrator about these cases:

```
#!/bin/sh

SCRIPT_PATH="$0"
# Detect base path for service
while true; do
        ROOT=${SCRIPT_PATH%/*}
        ROOT=`cd "$ROOT";pwd`
        cd $ROOT
        if [ -d "$ROOT/plugins" ] && [ -d "$ROOT/scripts" ] ; then
                break
        fi
        if [ -L "$SCRIPT_PATH" ]; then
                SCRIPT_PATH=`readlink "$SCRIPT_PATH"`
                if [ $? != 0 ]
                then
                        echo "Error: Problems with resolving '$SCRIPT_PATH'"
                        exit -1
                else
                        continue
                fi
        fi
        break
done

# Check service trace log file for errors
if [ -f "$ROOT/logs/wialonb3_trace.log" ]
then
        DT=`date --date="1 hour ago" "+%Y/%m/%d %H:"`
        cat $ROOT/logs/wialonb3_trace.log|grep error|grep "$DT"
fi
```

Connections

Active connections are displayed on this page (equipment connected to the server at the moment). In the table you see hardware type, connection type, host and port, unit name, time when connected. As needed, an item cam be disconencted.

Choose Device Type from the dropdown list. All connections which involve this kind of device will be displayed. Indicate also Connection Type as needed (TCP, UDP or any).

To make your query more precise, use unit name/ID mask in the Unit text field. After entering or changing the mask, press <ENTER>.

According to the formulated request the corresponding connections will be displayed. In the table you see device type, link type, host, port, unit name (and unit ID in brackets), last run time, the button to disconnect device from the server.

Active Connections

№	Device Type	Connection Type	Host	Port	Unit	Started	Actions
	Any	Any			*s*		Total: 6
1	SkyWave	TCP	10.1.4.5	20253	test16 (500000)	17:28:25	disconnect
2	SkyWave	TCP	10.1.4.5	20253	sky10 (500001)	17:28:25	disconnect
3	SkyWave	TCP	10.1.4.5	20253	sky11 (500002)	17:28:25	disconnect
4	SkyWave	TCP	10.1.4.5	20253	sky12 (500003)	17:28:25	disconnect
5	SkyWave	TCP	10.1.4.5	20253	sky14 (500004)	17:28:25	disconnect
6	SkyWave	TCP	10.1.4.5	20253	sky15 (500005)	17:28:25	disconnect

Additional Settings for the Monitoring Site

Attention! Such facilities as personal design, custom logo and copyright on the monitoring site, and report style configuration are **not available** for Wialon Standard version 1001 and hither.

Interface Languages

- how to translate the monitoring site to a different language;
- how to make a translation available on the monitoring site;
- hot to edit the translation.

Monitoring Site Design

- how to make a custom design for the monitoring site: color scheme, headings, captions, links, logo.

Reports Custom Configuration

- how to create a custom style for report files: colors, fonts, layout, alignment, etc.

Personal Design for Your Clients

- how to create an unique design of the monitoring site for a certain user.

User Registration through the Web Interface

- how to adjust unattended registration of new users.

Automatic Login to the Monitoring Site

- how to set an automate login to the monitoring site if clicking a link.

Interface Languages

To translate the monitoring site to your language is simple. Through our technical support service make a request for a file these phrases to translate: **wialon.lng**.

The file is in UTF-8 format. We recommend NotePad++ to edit it.

The file contains the original phrases in English and their equivalent in the destination language. Here is a small example (translation into Spanish):

```
msgid "Command"
msgstr "Comando"

msgid "Command '%s' for unit '%s' was successfully executed."
msgstr "El comando '%s' para '%s' fue ejecutado"

msgid "Command '%s' for unit '%s' was successfully scheduled."
msgstr "El comando '%s' para '%s' fue programado"

msgid "Command parameter"
msgstr "Parametro de comando"

msgid "Commands"
msgstr "Comandos"

msgid "Comment"
msgstr "Comentario"

msgid "Completely"
msgstr "Completamente"

msgid "Compress report files"
msgstr "Comprimir los archivos del reporte"
```

When translating, it is important to preserve the order and format of all special symbols (most of them begin from %). If the translation is not needed for a phrase or is not clear, such phrases can be skipped - in the resulting file they will remain in the initial state.

Pay attention to sharp-shaped symbols (#) that can be found at endings of the phrases. The sharp is always followed by a number. These symbols show that the phrase can have various translations depending on the context. This is convenient for languages which use cases (grammatical forms of nouns and adjectives). When translating such phrases, omit the sharp and the number. For example (German):

```
msgid "Months#1"
msgstr "Monate"

msgid "Months#2"
msgstr "Monaten"
```

Never make any changes in original English phrases. It will cause the problem to find your translation.

Enabling New Languages

After completing the translation, create the directory *i18n/<domain>* and place the file there. Then restart the server to apply changes. Domain is a two-lettered sign to indicate the country, for example, lv - Latvia, ru - Russia, nl - Netherlands, etc. To make this translation available on the monitoring site, add to the configuration file (/custom/config.txt) the line like below:

WIALON_WEB_LANGUAGES = <domain>:<country>

and for set the language to be selected automatically:

WIALON_WEB_DEFAULT_LANGUAGE = <domain>

Here is an example for Finnish

```
WIALON_WEB_LANGUAGES = fi:suomi
WIALON_WEB_DEFAULT_LANGUAGE = fi
```

After this operation you can continue editing this file online. If you have any changes to apply, it is not needed to restart the service each time. After saving translation file, it is just required only to resave the configuration file */custom/config.txt* (for example, add and delete a space, and press Ctrl-S).

Note.
As software updates are released, new strings appear in language files. To make a translation of these new phrases, contact technical support and inquire *wialon.lng* again.

Note.
Beginning from the version 1101 service restart is not required to activate a new language.

Monitoring Site Design

Your monitoring site can have a unique design (colors, logo, copyright, title, etc.).

Page Title in Browser

To substitute the standard title for your custom, in the configuration file *config.txt* set the value **WIALON_WEB_TITLE**, for example:

```
WIALON_WEB_TITLE=Welcome to our service
```

Copyright

The standard copyright is *Gurtam*. To substitute it for your own, use two variables:

- **WIALON_WEB_COPYRIGHT_TEXT** - the text at the bottom center of the page.
- **WIALON_WEB_COPYRIGHT_URL** - the hyperlink for this text, opens in a new window.
- **WIALON_WEB_WEBGIS_COPYRIGHT** - the copyright text for WebGIS (displayed in the left bottom corner of the map).

Example:

```
WIALON_WEB_COPYRIGHT_TEXT=Your company
WIALON_WEB_COPYRIGHT_URL=http://your_company_url
WIALON_WEB_WEBGIS_COPYRIGHT=Your company maps
```

Logo

To set your logo on the monitoring site, replace the file **label.png** in *custom/skins/your_skin/images/label* with your logo.

Tips.\\Note that logo image default size is 300×25 pixels. If you logo is higher, then in the file *color.js* set the value *top_panel_height* corresponding to your logo. For instance, for a logo 300×25 top_panel_height=42, for a logo 300×40 top_panel_height=57.

Color Theme

The location of the default theme is *sites/wialon_web/default_skin*. All custom themes are located in the directory **custom/skins**.

The theme is formed by the files of following types:

- CSS - cascading style sheets.
- JS - JavaScript files.
- Images (PNG, GIF, JPEG).

Modifying files that form the theme helps to alter color scheme and main images.
Attention! It is not allowed to change site functional elements layout.

Preparing a New Theme

To create a new theme:

- Make a full copy of folder **default_skin** from *sites/wialon_web* to *custom/skins*, rename it, for example, **your_skin**.
- In the configuration file set the variable **WIALON_WEB_SKIN**:

```
WIALON_WEB_SKIN=your_skin
```

- Restart the server.

Adjusting Colors and Sizes

Color format is like in CSS, for example, *#FF0000*, *red*, *#F00*. The format for sizes (width, hight) is set in pixels.

colors.js (*custom/skins/your_skin/js*) file contains colors and dimensions of the main panels.

- Monitoring mdoe:
  - **top_panel_bg_clr** - background color of the top panel;
  - **top_panel_fg_clr** - foreground color of the top panel;
  - **bottom_panel_bg_clr** - background color of the bottom panel;
  - **bottom_panel_fg_clr** - foreground color of the bottom panel;
  - **left_panel_bg_clr** - background color of the left panel;
  - **left_panel_fg_clr** - foreground color of the left panel;
  - **center_panel_bg_clr** - background color of the central panel;
  - **center_panel_fg_clr** - foreground color of the central panel;
  - **top_panel_height** - top panel hight in pixels (42 by default);
  - **bottom_panel_height** - bottom panel hight in pixels (35 by default);
  - **left_panel_width** - left panel width in pixels (350 by default);
- Messages Mode:
  - **msg_filter_panel_bg_clr** - background color of the left panel (messages filter);
  - **msg_filter_panel_fg_clr** - foreground color of the left panel;
  - **msg_map_panel_bg_clr** - background color of the central panel (map);
  - **msg_map_panel_fg_clr** - foreground color of the central panel;
  - **msg_table_panel_bg_clr** - background color of the bottom panel (messages table);
  - **msg_table_panel_fg_clr** - foreground color of the bottom panel;
  - **msg_filter_panel_width** - left panel width in pixels (messages filter, 350 by default);
  - **msg_map_panel_height** - central panel hight in pixels (map, 400 by default);
- Reports Mode:
  - **report_filter_panel_bg_clr** - background color of the left panel (reports filter);
  - **report_filter_panel_fg_clr** - foreground color of the left panel;
  - **report_map_panel_bg_clr** - background color of the central panel (map);
  - **report_map_panel_fg_clr** - foreground color of the central panel;
  - **report_table_panel_bg_clr** - background color of the bottom panel (resulting report table);
  - **report_table_panel_fg_clr** - foreground color of the bottom panel;
  - **report_filter_panel_width** - left panel width in pixels (reports filter, 350 by default);
  - **report_map_panel_height** - central panel hight in pixels (map, 400 by default);
- Dialogs:
  - **dlg_title_top_clr** - starting color for gradient of dialog title (set without symbol '#');
  - **dlg_title_bottom_clr** - ending color for gradient of dialog title (set without symbol '#');
- Log:
  - **log_panel_fade** - log panel transparency rate (valued from 0.0 to 1.0, 0.0 - totally transparent, 1.0 - opaque);

Color gamut and visual properties of embedded panels are altered through CSS files that are located in: *custom/skins/your_skin/css*.

Replacing Sounds

Sounds can be played on the monitoring site when new notifications or messages from driver come.

To change a melody for notifications, a wave file named *notify.wav* should be placed to the folder *custom/skins/your_skin/sounds/notify_online*.

To change a melody for messages, a wave file named *notify.wav* should be placed to the *custom/skins/your_skin/sounds/unit_cmds_response*.

Product Author's Information

In the system login page as well as at the right top corner of the main window **Wialon** logo is placed . It cannot be removed or replaced. If hover the logo, the tooltip *Powered by Wialon* is displayed. This logo is not the link to the site of the product developer.

Reports Custom Configuration

A personal style can be applied to report files like color, fonts, alignment, etc. To do this:

1. Create an XML file in UTF-8 coding (like *custom/reports_config.xml*) which stores report style.
2. In the configuration file *custom/config.txt* set the variable **AVL_REPORTS_STYLES_FILE** with the value **$ADF_ROOT_PATH/custom/reports_config.xml** (the path to XML file containing the configuration for reports styles).

Individual report configuration can be applied to each billing plan. To do this, copy report configuration code to **Report config** tab in the **Billing Plan** page.

An example of report configuration file:

```
<report bg_color="e5e8e9" indent="20,20,20,20">
        <images>
                <img1 align="l" src="plugins/trace_front/images/trace_b2b.png"></img1>
        </images>
        <fonts chart="DejaVuSans.ttf" default="DejaVuSans.ttf"></fonts>
        <head align="cc" bg_color="57a4c1" border="3" border_color="ffffff" font_color="ffffff"
font_size="15" img="img1" space_after="50"></head>
        <content bg_color="e5e8e9" font_size="15"></content>
        <unit_name align="cc" bg_color="57a4c1" border="3" border_color="ffffff" font_color="ffffff"
font_size="12" min_height="50" space_after="40"></unit_name>
        <table_defs>
                <trips_table>
                        <table_name align="cc" bg_color="aaaac1" border="1" border_color="57a4c1"
font_color="000000" font_size="12" min_height="0" space_after="50"></table_name>
                        <table_header align="cc" bg_color="cfd1d1" border="1" border_color="57a4c1"
column_no_wrap="0,2" font_size="10" repeat_header="1"></table_header>
                        <table_body align="lc" bg_color="e5e8e9,f4f4f4" border="1" border_color="57a4c1"
colors_to_rows="1" font_size="10" space_after="30"></table_body>
                </trips_table>
                <total_table>
                        <table_name align="cc" bg_color="aaaac1" border="1" border_color="57a4c1"
font_color="000000" font_size="12" min_height="0" space_after="50"></table_name>
                        <table_header align="cc" bg_color="cfd1d1" border="1" border_color="57a4c1"
font_size="10" repeat_header="1"></table_header>
                        <table_body align="cc" bg_color="e5e8e9,f4f4f4" border="1" border_color="57a4c1"
colors_to_rows="1" font_size="10" space_after="30"></table_body>
                </total_table>
                <default>
                        <table_name align="cc" bg_color="aaaac1" border="1" border_color="57a4c1"
font_color="000000" font_size="12" min_height="0" space_after="50"></table_name>
                        <table_header align="cc" bg_color="cfd1d1" border="1" border_color="57a4c1"
font_size="10" repeat_header="1"></table_header>
                        <table_body align="lc" bg_color="e5e8e9,f4f4f4" border="1" border_color="57a4c1"
colors_to_rows="1" font_size="10" space_after="30"></table_body>
                </default>
        </table_defs>
        <tables>
                <style def_id="trips_table" table="Trips"></style>
                <style def_id="total_table" table="Total"></style>
        </tables>
        <chart caption_top="1" dset_color="ff0000,ff00,ff" font="chart" font_axis_size="16"
font_name_size="40" grid_color="0000cc" height="350" scale="2"></chart>
</report>
```

Common report options: <report>

```
orientation_landscape: "0" page format A4, orientation portrait
                       "1" page format A4, orientation landscape

password:              "any string" set password for reading document[only pdf]
                       "" no password

indent:                "n,n,n,n" set page indents[only pdf]
                       [left,right,top,bottom]

content:               "0" do not make content table
                       "1" make content table

unit_new_page:         "0" unit placement without page transfer
                       "1" each unit on new page

bg_color               "rrggbb" set report background color
```

Font aliases, used in report: <fonts>

```
alias="font_file.ttf", like default="DejaVuSans.ttf{B}"
possible flags after font name: {B} - bold : {I} - italic : or its combination [html only]
```

Images, used in report: <images>

On the first place set unique name of image (img1 src="..." align="r")

```
src            "path_to_image" (only PNG picture)
align          "s" set image align (right or left)
```

Report header options: <head>

```
bg_color:               "rrggbb" set report header background color
font_color:             "rrggbb" set report header font color
font_size:              "n" set report header font size
font:                   alias from <fonts>
border:                 "n" set report header border width [0 - no border]
align:                  "ss" set report header text align: first char - horizontal align, possible values 'l' - left; 'c' - center; 'r' - right second char - vertical align, possible values 't' - top; 'c' - center; 'b' - bottom example : "rt" - text in the right and top corner
min_height:             "n" set report header rect minimal height
space_after:            "n" set free space after header
border_color:           "rrggbb" set report header border color
img                     "unique_name_of_image"
```

Content table options: <content>

```
bg_color:               "rrggbb" set content table background color
font_color:             "rrggbb" set content table font color
font_size:              "n" set content table font size
font:                   alias from <fonts>
border:                 "n" set content table border width [0 - no border]
```

Unit name options: <unit_name>

```
bg_color:               "rrggbb" set table name background color
font_color:             "rrggbb" set table name font color
font_size:              "n" set table name font size
font:                   alias from <fonts>
border:                 "n" set table name border width [0 - no border]
align:                  "ss" set table name text align
min_height:             "n" set table name rect minimal height
space_after:            "n" set table name after header
border_color:           "rrggbb" set unit name border color
```

Data table definition: <table_defs>

Use in this tag unique table name for definition table style:

```
<table_defs>
        <table1>
                <!-- Here use tags for discription table -->
                <table_name> ... </table_name>
                <table_header> ... </table_header>
                <table_data> ... </table_data>
        </table1>
</table_defs>
```

Data table name options: <table_name>

```
bg_color:               "rrggbb" set table name background color
font_color:             "rrggbb" set table name font color
font_size:              "n" set table name font size
font:                   alias from <fonts>
border:                 "n" set table name border width [0 - no border]
align:                  "ss" set table name text align
min_height:             "n" set table name rect minimal height
space_after:            "n" set table name after header
border_color:           "rrggbb" set table name border color
```

Data table header options: <table_header>

```
bg_color:               "rrggbb[,rrggbb,rrggbb,...]" set array of header background colors
font_color:             "rrggbb[,rrggbb,rrggbb,...]" set array of header text colors
font_size:              "n" set table header font size
font:                   alias from <font>
border:                 "n" set table header border width [0 - no border]
```

```
align:                  "ss,[ss,ss,...]" set array of cells aligns: see <head align>
column_no_wrap:         "n,[n,n,...]" set array of unwrapped cells
border_color:           "rrggbb" set table header border color
```

Data table body options: <table_body>

```
bg_color:               "rrggbb[,rrggbb,rrggbb,...]" set array of data text colors
font_color:             "rrggbb[,rrggbb,rrggbb,...]" set array of data text colors
font_size:              "n" set table data font size
font, font_normal, font_bold, font_italic:      alias from <fonts>, uses in report row with
flags: AVL_REPORT_ROW_FLAG_BOLD, AVL_REPORT_ROW_FLAG_ITALIC
border:                 "n" set table header border width [0 - no border]
align:                  "ss,[ss,ss,...]" set array of cells aligns: see <head align>
colors_to_rows:         "0" - background and text colors applies to table columns
                        "1" - background and text colors applies to table rows
space_after:            "n" set free space after table
border_color:           "rrggbb" set table body border color
```

Table styles: <tables>

```
table           Real table name, like "Total", "SMS messages"
def_id          Style from <table_defs>
```

Chart options: <chart>

```
font_colors:            "rrggbb,rrggbb,rrggbb[,rrggbb,..]" first three colors applies to chart
name, legend and axis text colors, next triple of colors applies to next chart etc...
bg_color:               "rrggbb[,rrggbb,rrggbb,...]" set array of charts background colors
grid_color:             "rrggbb[,rrggbb,rrggbb,...]" set array of charts grid colors
caption_top:            "0" chart caption draws in the bottom
                        "1" chart caption draws in the top
legend_align:           "s[,s,...]" set charts legend position
                        possible values: "l"(left),"r"(right),"t"(top),"b"(bottom)
x_axis_vertical:        "0"     x axis has horizontal lables
                        "1"     x axis has vertical lables from up to down
                        "2"     x axis has vertical lables from down to up
dset_color:             "rrggbb[,rrggbb,rrggbb,...]" set array of datasets colors (same in the
every chart)
dset_interpolate:       "n[,n,n,...]" set array of datasets to interpolate (same in the every
chart)
                        example "1,0,1" means that 1,3 datasets in the chart draws with
interpolation, 2 - without
font:                   alias from <fonts>
font_name_size:         "n" set chart name font max initial size
font_legend_size:       "n" set chart legend font size
font_axis_size:         "n" set chart axis font size
scale:                  "n" set chart image scale aspect
height:                 "n" set resulting image height
space_after:            "n" set free space after chart
```

Personal Design for Your Clients

Any user can have his/her unique design of the monitoring site with custom logo and copyright. The scheme to do this:

1. Crete copy of existing monitoring site;
2. Develop an individual design for the site;
3. Set remote access to the site.

1. Creating a Copy of the Monitoring Site

Make a copy of the site giving it a corresponding name (in our case it is *new_site*). Make also a copy of the theme. Create the directory *./custom/skins* if needed.

```
krsl@s3:~$ cd /var/lib/wialonb3
krsl@s3:~/var/lib/wialonb3$ cd sites
krsl@s3:~/var/lib/wialonb3/sites$ ln -s wialon_web/ new_site
krsl@s3:~/var/lib/wialonb3/sites$ cd ../custom/skins
krsl@s3:~/var/lib/wialonb3/custom/skins$ cp -r ../../sites/wialon_web/default_skin/ ./new_site
```

Then add this new site to Wialon configuration (*custom/config.txt*):

```
CUSTOM_SITES = new_site
```

Define the port for the new site:

```
NEW_SITE_WEBSERVER = new_site:8025:$LOCALIP
```

Copy existing settings and substitute WIALON_WEB for NEW_SITE everywhere. *Note:* In the example the list of settings is incomplete.

```
# new_site additional site configuration
NEW_SITE_SKIN = new_site
NEW_SITE_TITLE = Навигация - новый сайт
NEW_SITE_COPYRIGHT_TEXT = NEW_SITE.RU
NEW_SITE_COPYRIGHT_URL = http://new_site.ru
NEW_SITE_DEFAULT_POS = 57.62431:39.85551:9
NEW_SITE_HIDE_ACCOUNT = on
```

After that, restart Wialon. If there is no errors, the new site will become available on 8025 port: http://server-IP:8025

2. Monitoring Site Design

This step was described in detailed above. See Monitoring Site Design.

3. Set Access to Site

1. Create a DNS record at your hoster. Indicate there that the packages for the link *monitor.new_site.com*, for example, are directed to your server external IP.
2. Set to process queries from *monitor.new_site.com* on the port **8025** (see Proxy Server for HTTP(S) Queries.

User Registration through the Web Interface

It is possible to register new user in the system without administrator. It can be useful to quickly give users test access to monitoring site.

Select (or create) a user which will be creator for other users. Remember its ID (you can check it on the users page on the administration site).

Then from the registration page send a request in the form:

```
http://DNS-name[:port]/webavl_sdk/wialon_service.html?
svc=create_user&creator_id=USER_ID&name=NEW_USER_NAME&password=NEW_USER_PASSWORD
```

where:

- DNS is the monitoring site address (port number is optional);
- USER_ID is creator's identification number;
- NEW_USER_NAME is the name for a user you are creating;
- NEW_USER_PASSWORD is a password for this user.

Automatic Login to the Monitoring Site

To create an automatic login to the monitoring site, use a link like of the following form:

```
http://DNS/login_action.html?user=USER_NAME&passw=USER_PASSW&action=login&skip_auto=1&lang=LANG
```

where:

- DNS is the monitoring site address;
- USER_NAME is user name of a user to login to the site;
- USER_PASSW is this user's password;
- LANG is interface language For example, *en* for English).

Backup Resources

Backup System

- backup system description;
- settings for backup system;
- backup directories.

Database Errors

- origins of DB errors;
- errors detection;
- DB check for errors.

Database Recovery after Fail

- DB recovery from the backup;
- recovery with db_dump и db_load.

Reserve Scheme of Operation

- how to organize reserve operation of your service;
- reserve scheme of operation.

Backup System

Backup is made automatically according to schedule. To turn off backup option, set the parameter **ADF_STORAGE_BACKUP_INTERVAL** as **0**.

The default location of backup files is **backup** directory. To indicate another location, set the path using the parameter **ADF_STORAGE_BACKUP_PATH** (without slash at the end).

Wialon 0909 and earlier versions store backup copies according to the date, for example, **backup/20090712, backup/20090713**.

Wialon 1001 locates the latest backup to the directory **backup/curr**. Old backups are automatically deleted as unnecessary.

See also:

- **Database Errors**
- **Database Recovery after Fail**
- **Reserve Scheme of Operation**

Database Errors

See Database and Backup System to know how the backup system is organized in different versions of Wialon.

In some cases Wialon does not start because of failure in database files. Various factors can cause the database failures:

- Simultaneous work of two Wialons with one database.
- File system failure.
- Incorrect shutdown of Wialon software or operation system.
- Conflicts in access rights to DB files.

There are cases when Wialon is already started as root user, but another user is trying to start it as different user (not having rights to roll out the process).

How to Detect Database Errors

Usually, when starting the service you can find the following messages in the log:

```
2009/03/24 07:57:44:861: adf_storage_db_error_call: adf_storage:
/var/lib/wialon/storage/log.0000000038: log file unreadable: Permission denied
2009/03/24 07:57:44:861: adf_storage_db_error_call: adf_storage: PANIC: Permission denied
2009/03/24 07:57:44:862: adf_storage_db_error_call: adf_storage: Invalid log file: log.0000000038:
DB_RUNRECOVERY: Fatal error, run database recovery
2009/03/24 07:57:44:862: adf_storage_db_error_call: adf_storage: PANIC: DB_RUNRECOVERY: Fatal error,
run database recovery
2009/03/24 07:57:44:868: adf_storage_db_error_call: adf_storage: unable to join the environment
2009/03/24 07:57:44:918: storage_service::open_environment: recovering environment...
2009/03/24 07:57:48:693: adf_storage_db_error_call: adf_storage:
/var/lib/wialon/storage/log.0000000038: log file unreadable: Permission denied
2009/03/24 07:57:48:693: adf_storage_db_error_call: adf_storage: PANIC: Permission denied
2009/03/24 07:57:48:693: adf_storage_db_error_call: adf_storage: Invalid log file: log.0000000038:
DB_RUNRECOVERY: Fatal error, run database recovery
2009/03/24 07:57:48:693: adf_storage_db_error_call: adf_storage: PANIC: DB_RUNRECOVERY: Fatal error,
run database recovery
2009/03/24 07:57:48:700: adf_storage_db_error_call: adf_storage: unable to join the environment
2009/03/24 07:57:48:753: storage_service::open_environment: error recovering environment:
DB_RUNRECOVERY: Fatal error, run database recovery
```

Database Error Check

For final error check, go to the installation directory and type the following in the command line:

For Wialon 1001 and Higher

1. ./shell
2. cd storage/ml/
3. db_verify -h ../md/ m-0000001.db (повторите этот пункт для всех *.db файлов из папки md/)
4. cd storage ../pl/
5. db_verify -h ../pd/ archive.db
6. db_verify -h ../pd/ objects.db
7. db_verify -h ../pd/ props.db

For Wialon 0909 and Lower

1. ./shell
2. cd storage/
3. db_verify messages.db (при большом объеме файла может занять много времени)
4. db_verify archive.db
5. db_verify objects.db
6. db_verify props.db

If none of *db_verify* commands delivers any errors, it is good. Otherwise, you need to do Database Recovery.

The description of these commands can be fount here: **db_verify**.

Database Recovery after Fail

Recovery From the Backup

In most cases, these situations are not critical. First of all, you can try to recover your DB from the backup copy (by defaults, it is saved hourly). Copy the contents of the *backup* folder to the *storage* folder. Beforehand copy *storage* folder contents to a secure place.

Database Recovery For Wialon 0909 and Lower

If a recovery form a backup copy failed, you can restore database integrity by deleting incorrect messages. Go to Wialon installation directory, and in the command line type the following:

1. ./shell
2. cd storage
3. db_dump -r messages.db | db_load messages.db.new
4. mv messages.db messages.db.old
5. mv messages.db.new messages.db

Detailed description of these commands you can find here: **db_dump**, **db_load**

These commands are applicable for Linux. To download similar utilities for Windows go here.

Database Recovery For Wialon 1001 and Higher

Wialon 1001 and higher are much more reliable and failure protected. To recover DB for these versions, please, contact Gurtam Help System.

See also:

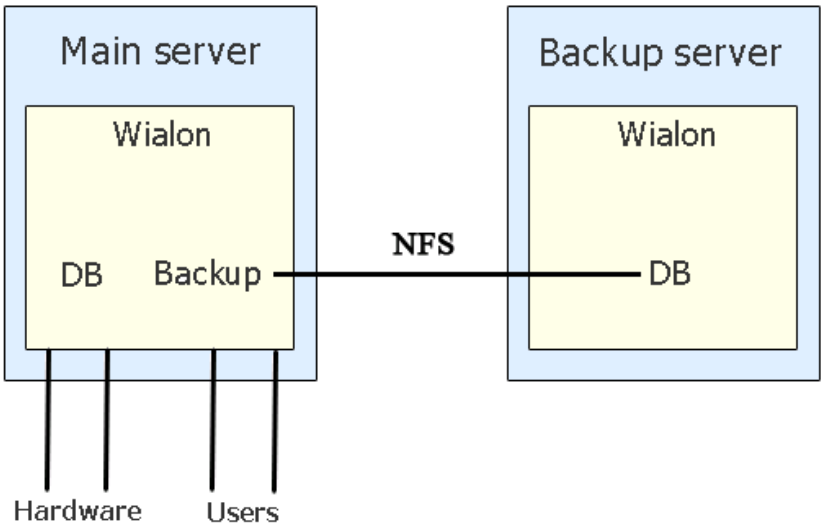
- **Backup System**
- **Database Errors**
- **Reserve Scheme of Operation**

Reserve Scheme of Operation

Security is one of the main characteristics of tracing systems. That is why it is so important to devote much attention to build a reliable scheme of software functioning.

When Wialon is used for corporate purposes, and its work is limited by moderate number of units (50-100), existing transaction database technologies and internal means of backup system work out this problem completely. But when the number of objects approaches to 1000 units and users are more than 200, regardless the faultless and reliable Wialon operation, it is important to have a reserve scheme of operation.

In case of hardware malfunction (like Winchester or CPU failures) it is strongly recommended to organize a reserve scheme of service operation beforehand.



To organize a reserve operation scheme, you need to have two physical servers with Wialon installed. At this, an additional license is nor required. You can use the same license on both configurations, because they will never work simultaneously. The main server with static external IP address is permanently in the work. File backup is adjusted in such a way backup gets from the main server to the *storage* folder of the reserve server. Thus, all current database is located on two different computers.

To implement this scheme, one can use Network File System (NFS) technology.

In case of main server collapse, its external IP address is assigned to the reserve server, and Wialon is started on it. Thus, the reserve server supersedes the main server, and all data from units gets on it. Besides, users has access to the service and their work is not interrupted. On the reserve serve there is a separate backup which stores database in a special folder. When the main server is renewed, we return to the main scheme: the reserve server is stopped, its backup folder id copied to the main server, and the main server is started.

See also:

- **Backup System**
- **Database Errors**
- **Database Recovery after Fail**

Creating Maps

AVD Maps Concept

.avd format refers to vector graphics files, which contain a map of a particular place or region. This format means to be used in applications developed on the basis of **ADF** software platform such as WebGIS.

The main concepts for the format are:

- **Layer**

A set of objects that form together a collection. The number of layers is defined by the number of separable detail layers. For example, roads, plants, and buildings can form a separate layer, or each of them can have its own layer. Layers are considered when rendering (drawing) a map, but in the source file data for all layers is stored together.

- **Level**

A parameter used to limit the amount of information displayed on the map. It is used when scaling (zooming) the map. 17 levels exist, and each has its minimum and maximum scale. The lowest and most detailed level is 0. Usually, it presents maximum amount of information (maximum elements). In the table below explore which levels are commonly used to draw different elements:

Levels	Element Type
0-4	Cities, towns, villages
5-10	Regions
9-15	Countries, states
15-16	Map of the world

The placement of particular element on a particular level is defined by system administrator while compiling the map, and by system designer while adjusting layers rendering configuration.

- **Tag**

A special mark on the map, for example, city, country, etc. It can be used for search or for render. Examples: *tag: minsk,country_by tag: moscow,country_ru* Tags go in a comma-separated line each after another without spaces. The name the map file (without .avd extension) is automatically added as a tag.

More about maps:

- **AVD Mapper**
- **Render Configuration**
- **Format Specification**

AVD Mapper

Using the application *AVD Mapper* you can create vector maps in AVD format using vector maps in different formats like MP, MapInfo, ESRI Shape, OSM (OpenStreetMap). Note that a source map must be in WGS-84 coordinate projection in grades.

The application *AVD Mapper* is launched from the console and is managed through the command line. Both Linux and Windows operating systems are supported. The application *avd_mapper_win* is a shell for the console utility which allows Windows OS users to adjust input parameters through graphical user interface.

Program Start

```
avd_mapper  -o <file_name> [-n <map-name>] [-t <map-tag>] [-p <number>] [--max-level=<number>]
[--min-level=<number>] [-i] [--clear-bg-flag] [--skip-render-flag] [--skip-search-flag]
[--mp-check-caps] [--pfm-config=<xml-file-path>]... <input-map-file> [<input-map-file>]
```

- o , - - output =< file_name >
Map file name to generate. The format is *path/filename.avd*. The path can be either absolute or relative. If creating the file in the current folder, you can do not even indicate it at all.

- n , - - name =< map-name >
Map name, for example, the name of the city.

- t , - - tag =< map-tag >
Map tag, optional grouping attribute for maps (city, country, etc.).

- p , - - priority =< number >
Map priority, default - 100. Greater priority means earlier map render. Maps with minor priority are rendered later and are situated above those with greater priority.

- - max-level =< number >
Max level to draw the map. Default - detect automatically.

- - min-level =< number >
Min level to draw the map. Default - detect automatically.

- - i
Create search index file that is add information for search (cities, streets, houses). This parameter is highly recommended.

- - clear-bg-flag
Clear background on render map flag, used for combining multiple maps. Do not display maps with higher priority which are situated in lower layers. If maps overlay, the top, more detailed, map is displayed. Background will be white. The flag is highly recommended to be used.

- - skip-render-flag
Skip map rendering at all. Do not include drawing information in the map (if the map will be used for search only).

- - skip-search-flag
Skip map search. Do not enable possibility for reverse geocoding (address search by coordinates) if the map will be used for rendering only.

- - mp-check-caps
Check CAPs in MP file address info (Cities, Regions, Countries).

- - pfm-config=<xml-file-path>
Path to PFM→AVD feature types conversion configuration (XML file with configuration for MP maps).

- - osm-config=<xml-file-path>
Flat text file with cities information for OSM maps city detection.

< input-map-file >
Path to input map files.

-h, - -help
Show program usage (help in console).

In order to avoid errors when starting the program, be attentive with special signs: a single hyphen (-) precedes single-letter keys, double hyphen (–) precedes expressions. Pay attention also on spaces and equal

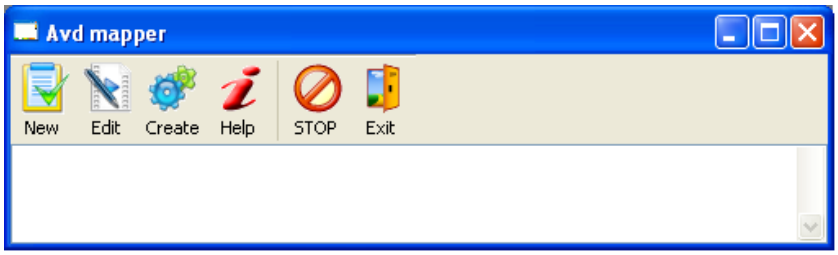
sign (=).

When generating maps from the Polish (MP) format, only data from the zero level is used.

AVD Mapper for Windows

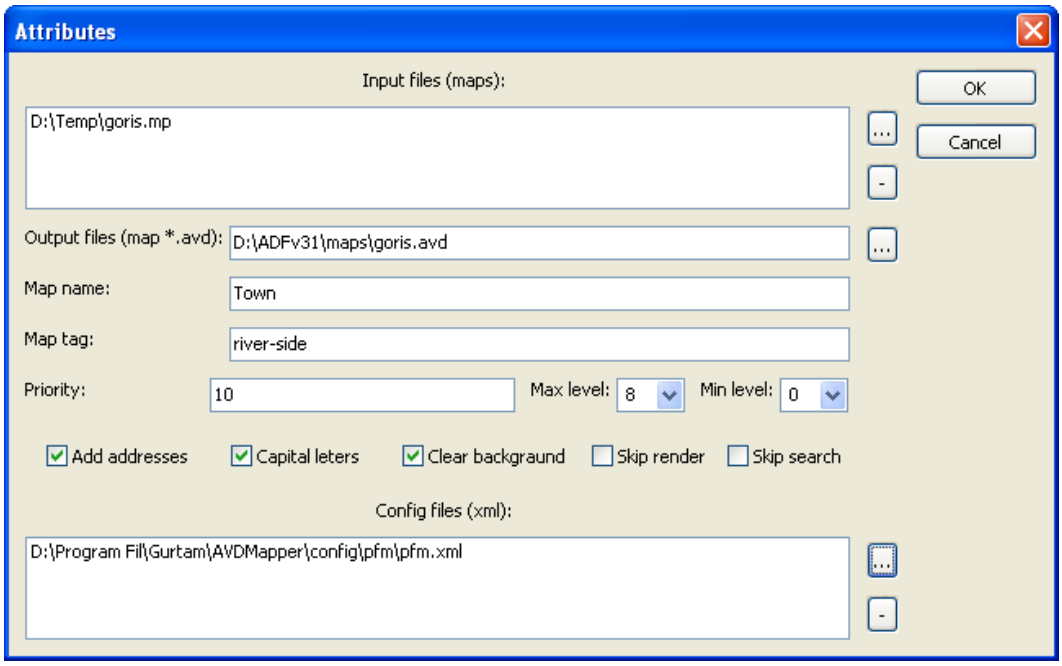
This utility is designed to make easier working with the panel program avd_mapper. It is not a version of avd_mapper, and all changes made in avd_mapper automatically affect avd_mapper_win. The utility operates on the bases of Windows OS.

To launch the application, double-click on tis icon. Starting window has the following appearance:



Buttons	
New	Start creating a new map. If any map is already being creating, all its parameters will be lost.
Edit	Editing entered data. If you have already created a map, you can still edit its parameters.
Create	Start the process of creation.
Help	Read help information.
STOP	Abort the process of creation. Used in case if the program has hung. It is not recommended to press the *Stop* button until 3 minutes have passed after pressing *Create*.
Exit	Exit the program.

New and *Edit* buttons invoke the dialog box to enter various parameters for future map:



Input files (maps)
Complete path to an input (source) file (supported formats are *.mp, *.osm, *.xml). Enter manually or push the Browse button on the right to choose a file on your computer.

Output files (map *.avd)
Output file name in the format *path/filename.avd*. The path can be either absolute or relative. If creating the file in the current folder, you can do not even indicate it at all.

Map name
Map name, for example, the name of the city.

Map tag
Map tag like city, country, etc.

Priority

Map priority, default - 100. Greater priority means earlier map render. Maps with minor priority are rendered later and are situated above those with greater priority.

Max level
Max level to draw the map. Default - detect automatically.

Min level
Min level to draw the map. Default - detect automatically.

Clear backgraund
Clear background on render map flag, used for combining multiple maps. Do not display maps with higher priority which are situated in lower layers. If 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, that is do not include drawing information in the map (then the map will be used for search only).

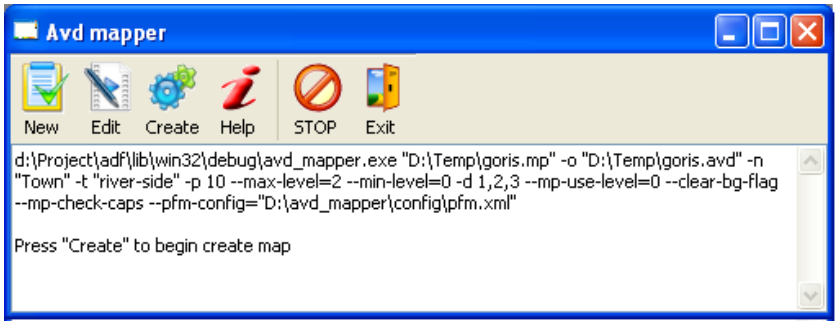
Skip search
Skip map search, that is do not enable possibility for reverse geocoding (address search by coordinates) if the map will be used for rendering only.

Add addresses
Add information for address search.

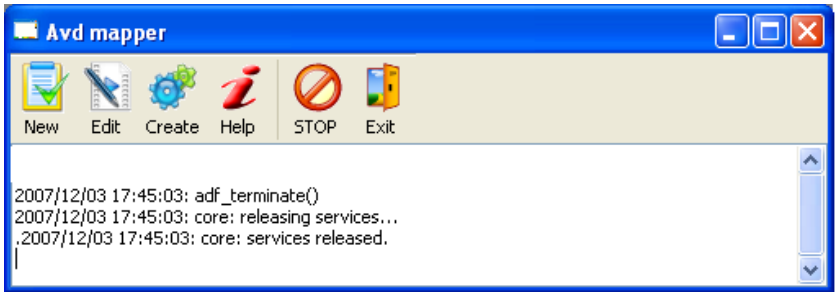
Capital leters
Check CAPs in MP file address info (Cities, Regions, Countries).

Config files (xml)
Path to XML file which contains configuration for MP maps.

After entering all parameters, press OK. The program will display a command line with your parameters.



Press the *Create* button to start compilation. If a lot of strings have appeared, it may mean that the program has hung up or the map being generated is very large.



In case of any wrong parameters, there will be error messages.

Creating a Map from MP Format

Configuration file

To create a map from the Polish MP format, you have to use a special configuration file (XML) - parameter **–pfm-config**. If several configuration files are set, each next file will redefine some map types.

An example of such configuration file is included into AVD Mapper distribution. It is located *config/pfm.xml*. However, you can create and use your own file according to your requirements. See an 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>
```

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 movements to existing roads.

type
Source type from MP 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 - form 20 to 200 km.

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

Compilation example

```
avd_mapper goris/goris.mp -o maps/goris.avd --pfm-config avd_mapper/config/pfm.xml --pfm-config
goris/pfm.xml\\  --priority 10 --clear-bg-flag --min-level 0 --max-level 6 -i --tag armenia
```

To store captions used for the map correctly, you have to meet one of the following conditions:

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

Parameters explanation

goris/goris.mp
Where to take a source map in MP format.

-o maps/goris.avd
Where to put the resulting map.

–pfm-config avd_mapper/config/pfm.xml
Where the configuration file is located.

–priority 10
Defines the map priority as 10.

–clear-bg-flag
Indicates that lower areas will be not rendered if if several areas overlay.

–min-level 0 –max-level 6
Maximum and minimum levels to display the resulting map. In this case, from 0 to 6.

-i
Add address search information.

–tag armenia
The tag used for this map.

Map name parameter (**–name**) can be skipped if there is map name in source MP file.

Maps from Other Vector Formats

To create maps from other vector formats such as MapInfo, ESRI shapefile, etc., it is necessary to use a configuration XML file as a source file. Usually, it is located in the same directory with other map files (layers). It must be encoded in UTF-8 without BOM:

```
<conv name="Kharkiv_City" encoding="cp1251">
    <!--Optional coordinates transformation coofficients. Any amount of points possible:-->
        <convertion>
            <poiny lon="127.568846" lat="50.319412" x="7.451271" y="8.562714"/>
            <poiny lon="127.568832" lat="50.319425" x="7.451275" y="8.562724"/>
            <poiny lon="127.568839" lat="50.319419" x="7.451279" y="8.562734"/>
        </convertion>
    <!--Layer definition:-->
        <layer file="Kharkiv10_Address.TAB">
            <features type="67" max_level="0" name="$Address_ru" region="Kharkiv" house=
"$Address_ru" is_house="1" street="#Str_Code.Kharkiv10_Streets.Name_ru.Str_Code='%'"
street_type="#Str_Code.Kharkiv10_Streets.Type_ru.Str_Code='%'">
            </features>
        </layer>
        <layer file="Kharkiv10_Social.tab">
            <features type="67" max_level="0" name="$Type_ru">
            </features>
        </layer>
        <layer file="Kharkiv10_Railways.tab">
            <features type="25" max_level="1" name="$Name_ru" data_type="pl">
            </features>
            <features type="171" max_level="1" name="$Name_ru" data_type="pg">
            </features>
        </layer>
        <layer file="Kharkiv10_Hydro.tab">
            <features type="131" max_level="1" name="$Name_ru" data_type="pg">
            </features>
        </layer>
</conv>
```

The file starts and ends with the **conv** tag. The following keys can be used inside this tag: **name** - map name, **encoding** - file encoding information.

In the **point** tag of the **conversion** section, you can set additional parameters to change map scale. It is done to convert local coordinate system commonly set in meters (like WGS84 Geocentric Projection or Gauss-Kruger UTM Projection) to an international coordinate system set in grades (WGS84 Geodetic Projection). There you adjust how points of one coordinate system correspond to those in the other one. Two or three (better three) points are required for coordinates conversion (if more, the rest are not considered). If any of the point is not correctly defined, the final map will be disproportional and inaccurate. It is better to use points closer to map borders (for example, crossroads).

Parameters **lat** (latitude - north, south), **lon** (longitude - east, west) set numbers in grade coordinate system. If you take these parameters in the program *GPSMapEdit*, for example, from a recorded track, make sure you take them not from grades-minutes-seconds which are displayed in the status line, but from object properties in the **Source** tab. Or you can convert the values from grades-minutes-seconds to fractional numbers of grades yourself.

Parameters **x** and **y** are derived from the local coordinate system at the corresponding point. These can be fractional numbers. Depending on file format, these values can vary.

The main part for map conversion is the description of layers required for data acquisition. The **layer** tag allows to describe each layer separately as well as transfer the map according to various attributes.

The **file** key is used to define the layer file (usually, *.tab*, *.shp*, and others). If XML file meant for conversion is located in the directory different from the layer files, it is required to indicate the path to the layer file.

Next, you indicate the **features** layer properties. In the **type** key set the value of AVD map elements (see it in *pfm.xml* or *osm.xml*). The **name** parameter is used to display captions for different objects on the map. Only Latin letters and $ sign are accepted. If other symbols are used, the file may be converted with errors or not

converted at all. Besides, there you indicate the level to display the data in (the **max_level** parameter). 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. If you have used this method, then the **dump_attr** parameter will display only the fields which have been used during the conversion.

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.

More about maps:

- **AVD Maps Concept**
- **Render Configuration**
- **Format Specification**

Render Configuration

Rendering of different elements of AVD maps is defined by a configuration file in XML format encoded as UTF-8. All configuration files are located in **plugins\gis_avd_driver\render_config\layers** and have the name like **layer_<layer-name>.xml**.

An example of a layer file:

```
<layer levels="0-7" bg_color="f6f6f6" priority="1" name="base">

<style name="Urban area" features="1" levels="0-4" color="E8E3D8" type="polygon"/>
<style name="Industrial zone" features="2" levels="0-2" color="D1D0CD" type="polygon"/>
<style name="Car park" features="55" levels="2" color="D1D0CD" type="polygon"/>

<style name="A black area" features="3" levels="0-7" color="000000" type="polygon"/>
<style name="A dark red area" features="4" levels="0-7" color="952F0C" type="polygon"/>
<style name="A dark green area" features="5" levels="0-7" color="397E43" type="polygon"/>
...
<!-- Labels -->
<style name="Urban area" features="1" levels="0-2" color="000000" type="label" halo_color="ffffff"
face="DejaVu Sans Book" align="center" size="8" halo_size="1"/>
<style name="Industrial zone" features="2" levels="0-1" color="000000" type="label" halo_color="ffffff"
face="DejaVu Sans Book" align="center" size="8" halo_size="1"/>

<style name="A black area" features="3" levels="0-7" color="000000" type="label" halo_color="ffffff"
face="DejaVu Sans Book" align="center" size="8" halo_size="2"/>
<style name="A dark red area" features="4" levels="0-7" color="000000" type="label" halo_color="ffffff"
face="DejaVu Sans Book" align="center" size="8" halo_size="2"/>
<style name="A dark green area" features="5" levels="0-7" color="000000" type="label"
halo_color="ffffff" face="DejaVu Sans Book" align="center" size="8" halo_size="2"/>
...
</layer>
```

The attribute **layer levels** sets rendering levels for the given layer:

- **bg_color** – map background color in RGB or Alpha-RGB format.
- **name** – layer name (to chose layer while rendering the map).
- **style name** - a mark.
- **features** – a property of a particular element.
- **levels** – levels used to scale the map.
- **color** – color for the element in RGB or Alpha-RGB format.
- **type** – render type: *image*, *polygon*, *line*, *dash*, *label*, *line-image*.
- **flags** – 0 and 1 flags are possible. 0 – use all elements. 1 – use only elements with directions such as one-way roads or flow of rivers.

If there is the attribute **type="label"**, the following elements may appear:

- **face** – the font for captions of different objects drawn on the map.
- **align** – caption alignment - *center*, *along* or *along_box* (in a rectangle, often used for international road numbers).
- **size** – font size for captions. If several numbers follow comma-separated without spaces, the first one will be used on the first visible layer, the second correspondingly on the second layer, and so on. If the quantity of numbers and the quantity of levels do not coincide, the last indicated font size will be taken for posterior levels.
- **halo_color** – color to outline the caption (useful to separate captions from other graphical elements). Set in RGB or Alpha-RGB format.
- **halo_size** – The size of this outline (usually 1-2 px).
- **label_spacing** – if caption align is *along* the object, this parameter will define the distance between repeated captions.

If there is the attribute **type="line"**, the following elements may appear:

- **width** – line thickness. If several numbers follow comma-separated without spaces, the first one will be used on the first visible layer, the second correspondingly on the second layer, and so on. If the quantity of numbers and the quantity of levels do not coincide, the last indicated line width will be taken for posterior levels.
- **border_color** – line border color (for example, the road can be black and its borders can be white.

If there is the attribute **type="image"**, the following elements may appear:

- **file** – image filename without extension (PNG format).

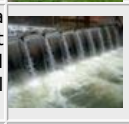
Format Specification

Vector maps in the closed AVD format allow ADF-based programs to render map images in various projections, fulfil the search of named element, use geocoding including reverse geocoding.

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 aren't motorways. Typically maintained by central, not local government. Need not necessarily be a divided highway.		
	highway	trunk_link			PL	4	2	The link roads (sliproads/ramps) leading to/from a trunk road from/to a trunk road or lower class highway.		
0x0003	highway	primary			PL	5	2	Roads generally linking larger towns.		
	highway	primary_link			PL	6	2	The link roads (sliproads/ramps) leading to/from a primary road from/to a primary road or lower class highway.		
0x0004	highway	secondary			PL	7	2	Roads generally linking smaller towns and villages.		
	highway	secondary_link			PL	8	2	The link roads (sliproads/ramps) leading to/from a secondary road from/to a secondary road or lower class highway.		
0x0000	highway	tertiary			PL	9	2	Minor roads.		0-6 7-8
	highway	tertiary_link			PL	10	2	The link roads (sliproads/ramps) leading to/from a tertiary road from/to other minor roads.		
0x000a	highway	unclassified			PL	11	1	Unclassified roads typically form the lowest form of the interconnecting grid network.		0-6 7-8
0x0042	highway	unsurfaced			PL	12	1	Unpaved roads.		
								Roads for agricultural use, gravel roads in the forest etc., usually		

	highway	track			PL	13	1	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'.		
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 aren't 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 form 10 to 100 thousand people.		
0x0b00 0x0c00 0x0d00 0x0e00 0x0f00 0x1000 0x1100 0x0010	place	village_green hamlet	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 ares.		
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	Футбол.		
	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
0,01	10	0	-1	1000
0,02	20	0	0	2000
0,05	50	0	1	5000
0,1	100	0	2	10000
0,15	150	0	3	15000
0,2	200	0	4	25000
0,5	500	1	5	50000
1	1000	1	6	1000000
2	2000	1	7	2000000
5	5000	1	8	5000000
10	10000	1	9	10000000
20	20000	1	10	20000000
50	50000	2	11	50000000
100	100000	2	12	100000000
150	150000	2	13	150000000
200	200000	2	14	250000000
500	500000	2	15	500000000
1000	1000000	2	16	1000000000

More about maps:

- **AVD Maps Concept**
- **AVD Mapper**
- **Render Configuration**

Wialon Pro Client

Software distribution Wialon Pro Client includes only Wialon Web server. It is connected to the remote database Wialon Pro via TCP/IP connection (Internet or LAN).

The installation process for Windows OS or Linux OS is fully the same as installing server software with the difference that the licence file is not needed. As the distribution includes embedded GIS server, all maps in AVD format must be located to the **maps** directory (localy).

List of Supported Devices

At the moment, Wialon supports more than 170 devices, including personal GPS trackers, GPS Automatic Vehicle Locators, and Pocket PC/cell phone software. The table below shows a list of personal trackers and automobile controllers:

ALT-P12	Falcom STEPP II	MVT400	Teltonika GH1201
Antares 5	FORT-300	MVT600	Teltonika GH3000
ARTAL-GSM-AE	FuelAlarm	Navifleet Telematic	TLT-2H
ARUSNAVI	GALILEO	Naviset GT100	TM32
ASC-5	Gelix-2	Navitech UTP V4	TM4-2
ASC-6	Geneko FOX Lite	Navitech UTP V5	TOBE Etrack
Astron GT-3	GlobalTrack G200X	Netvisor 11	Topplan GPS Box
AT-300	GlobusGPS GL-TR1	Novacom GNS-TRACK	TR-102
Atomika-300	GlobusGPS GL-TR2	Novacom GNS-TRACK Extended	TR-151
ATrack	GLOSPACE SGK-T	Obdtrac	TR-203
Auto Leaders 800C	GoPass 9xx	OKO-E	Tracer X2
Autofon	GSM VENDING	OMEGA-L-1	Trivi-08L
Autoscan GPS	GSS Micro MV	OMEGA-SN-2	TRIVI-V5
AVT2000	GT03	Pilot-D	TSS-705pg
AvtoPeleng	GT30	Planar-GG101	TZ AVL-03
AvtoScan GPS	GT60	Portman GT2000	TZ GT-01
AVTS-1500	GuardMagic VB	PowerTrace EB 501	TZ-GT02
Azimuth GSM	iBeacon	PT-20	VCSTS-8
Azimuth Retranslator	IntelliTrac X8	PT-33	VIC-ZONE T30
CANby	iTrack Gold	PT-35	VIC-ZONE T300
CAP Angler-1000	Krot	PT-9	Voyager 2
CAP WP AVL	Laipac S-911	Ranavi	Voyager RTS
CARSAT - KB1024	Locarus 702	Report Systems RS-906	VT30
CAT-6	Locarus 702x	ReportSystems RS-909	VT310
Cellocator	LT1010	RMU-900	WMCS AM120
CH-4713	M2M-UA GPS	RoadKey HM-311	Xexun TK-102
Choco	MAC PRO	Rover 8	Xexun TK-103
CKAYT Retranslator	MB-04	Rover 9	АвтоГРАФ GSM
CMT-02	MBO3	Speedtrac	Автосторож GSM AS3.X
CTATT-2	MCS 1	STAR TRACKER	АПЭЛ Т-104
Cyber GLX	Megastek GPT-68	StarFinder AVL 110	ГАЛС-Т1
DB-8S	MS PGSM4	STaRLink AVL	ГАЛС-Т1-М
DeasyTrack	MT-2000A	STaRLink eBike	Гранит Навигатор
Dialog M2	MT-4	STARTRACKER GOLD	Дрозд К-1
Dialog M3	MT80	T-06H	Дрозд-К1
Dozor X2	MT88	Teletrack TT-221	Дрозд-М1
Easytrac	MUK-A1	Telic Picotrack	Каньон 5-xx
ED Pointer	MVT 15	Teltonika AT1000	Скаут МТ-500
ED Watch	MVT 17	Teltonika FM2200	СКРТ 25
eLoc GL-100	MVT100	Teltonika FM3101	СКРТ 45
Emcraft MTDS-300	MVT340	Teltonika FM4100	Шкипер
Enfora Mini-MT	MVT380	Teltonika FM4200	Шкипер GPRS