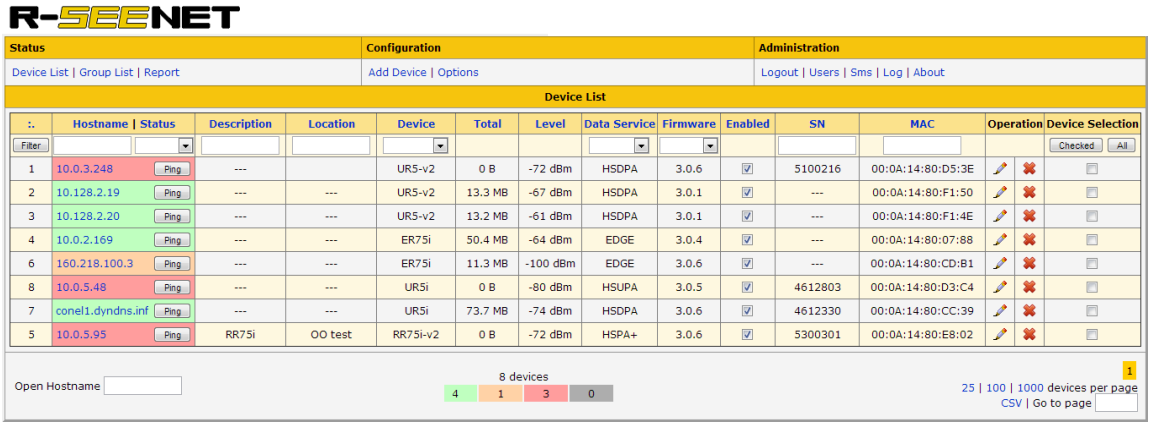
Monitoring system **R-SeeNet**

APPLICATION NOTE



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Used symbols

Danger – important notice, which may have an influence on the user's safety or the function of the device.

Attention – notice on possible problems, which can arise in specific cases.

Information, notice – information, which contains useful advice or special interest.

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1. Description of monitoring system

1.1 Introduction

R-SeeNet is the monitoring system, which allows you to monitor all types of B&B routers. This system consists of two separate program parts. First one ensures reading out statistics from routers. This program runs as a service and uses SNMP protocol (for reading out statistics). This data is stored in a MySQL database. The database of monitoring system consists of two main tables. *Devices* table contains the data about individual routers. *Stats* table contains one statistic for each router. This table is updated whenever the routers are reading. Reading period can be chosen during installation and must be chosen with regard to the number of routers. The second part is a web browser that is used to display statistical data.

To manage the monitoring system and display results of monitoring routers is used web interface. Users of this web interface are distinguished based on user permissions. By default there are a user with administrative privileges (administrator) and a normal user (user). Only the administrator has the right to add a new user and assign administrative privileges (also to existing users). There is also a user account known as superadmin, which is used for managing multiple companies. In this case, R-SeeNet is operated by one of the companies and other companies perceive it as a cloud. Individual companies cannot be entwined. The R-SeeNet databases management within the all companies will be allowed only for superadmin. Other users (administrator and user) have access to tables and statistics within the company to which they belong.

1.2 Hardware requirements

Hardware requirements for the computer on which the R-SeeNet is running depend on the number of monitored routers. For common number of routers (to one thousand) is sufficient office PC with 2 to 4 GB of memory and processor Intel Core i5. For larger numbers of monitored routers is recommended a server computer with at least 2 processors, 10 GB of memory and large fast disks due to frequent access to the database.

1.3 Data traffic

When monitoring system is reading the router through SNMP protocol, router sends 452 B and receives 495 B. This means that one router sends 2.69 MB per month, when the R-SeeNet reads out the router every 15 minutes.

1.4 Distribution

The monitoring system is supplied in versions for Windows and Linux. In case of Linux, R-SeeNet is supplied as an image for virtual box (CentOS 6.4 32 bit).

Proper functioning of the R-SeeNet system is tested on the following OS:

- Windows XP SP3
- Windows Server 2008
- Windows 7
- CentOS 6.x (32 bit)
- Debian 2.6.32-5-686 (32 bit)
- Ubuntu 10.10 (32 bit)

2. Installation

For the proper functioning of the R-SeeNet is necessary to install database system. As a part of the R-SeeNet installation package is supplied MariaDB database system. R-SeeNet is also compatible with the MySQL database system, which is not included in the installation. If you decide to use MySQL, you must install it and run before you start the installation process of the monitoring system.

2.1 Windows

After start the installation, menu with the choice of installation language is displayed. For the next step of the installation press *OK* button.

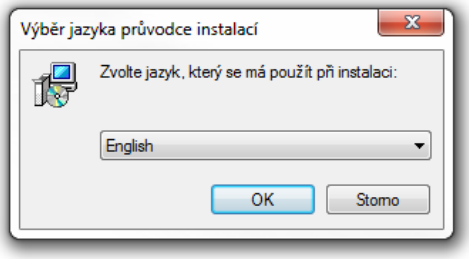

Figure 1: Installation – choice of language

Next page is the Welcome wizard window with information about the R-SeeNet version. To continue installation click *Next* button. To cancel the installation in this or other steps use *Cancel* button.

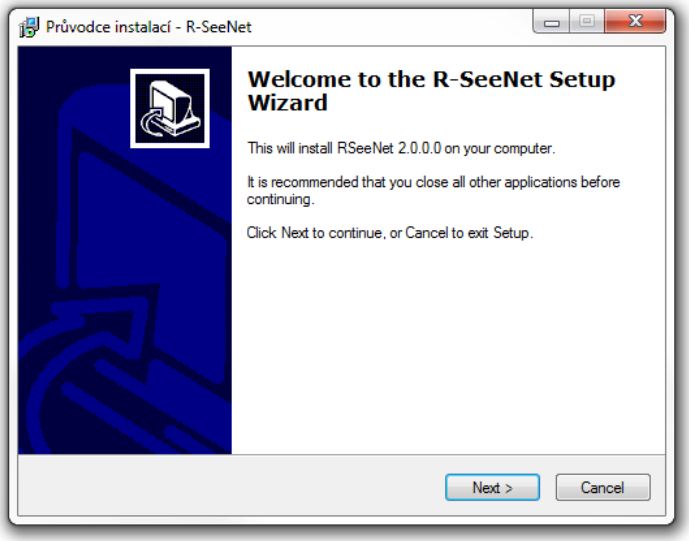

Figure 2: Installation – version

Now you can use the check boxes to select installation components. *PHP & Apache* item must be used if you have not installed *Apache* program. Without this program R-SeeNet will not work correctly. If you have not installed MySQL database system, it is necessary to check the *MariaDB Server* item. *R-SeeNet-modification mysql tables* item represents modification of MySQL database for R-SeeNet (it's necessary, if MySQL is installed in another server).

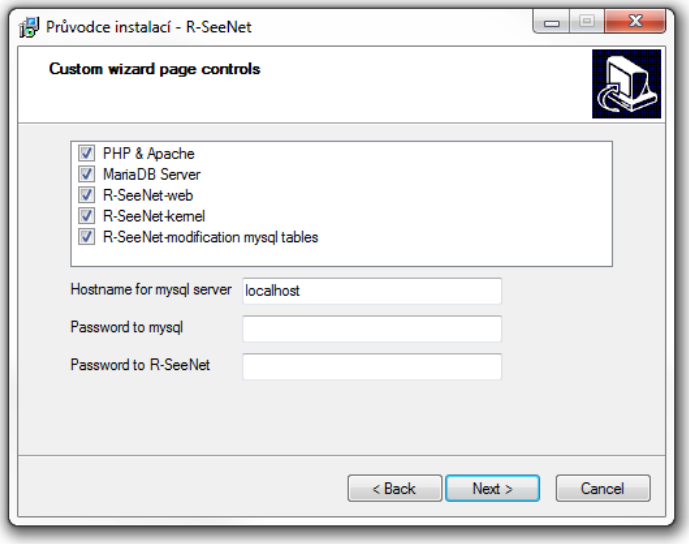

Figure 3: Installation – choice of parts

The next step is used to choose a location for the installation of R-SeeNet. If you don't want to use the default (root) directory, a new location can be selected using the *Browse* button.

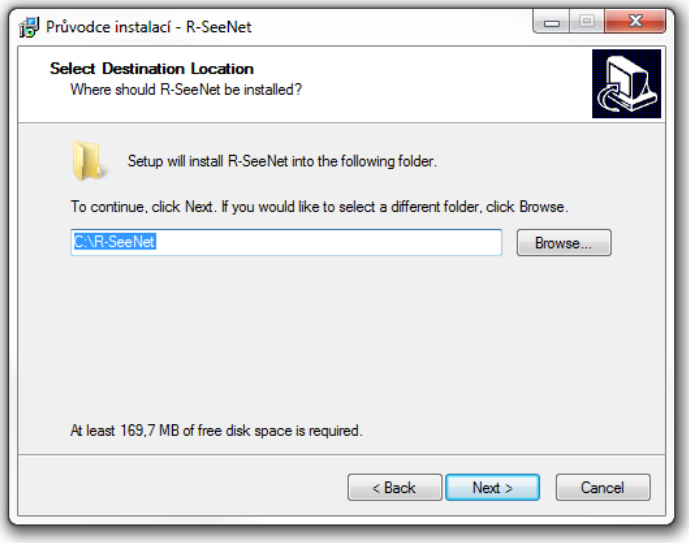

Figure 4: Installation – select destination location

At this moment, the installation is ready to run. To start press the *Install* button. Use the *Back* button if you want to return to the previous steps.

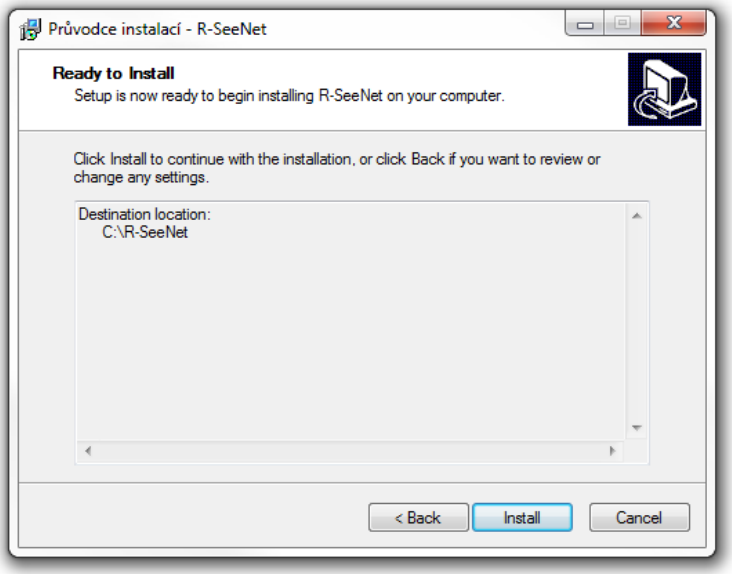

Figure 5: Installation – ready to install

Now the installation is running. It is possible to see the progress of the installation process in the middle of the window.

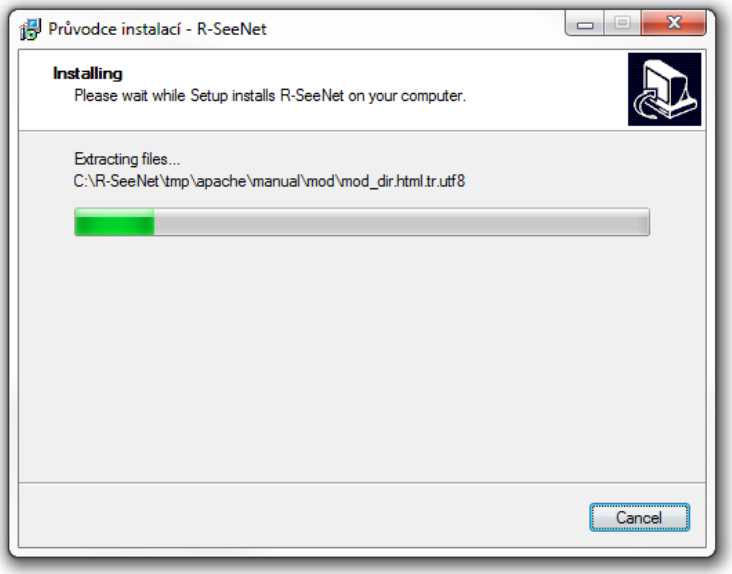

Figure 6: Installation – progress

After the program is successfully installed, it is necessary to set basic parameters of the R-SeeNet:

- *Backup Time HH:MM* – Time, when a backup of the database is made.
- *Number of attempts* – Number of attempts to read a router.
- *Monitoring Period [min]* – Period of reading a router.
- *Timeout [s]* – Waiting time for a response from a router.
- *Start delay [s]* – Delay of start reading routers after the monitoring system starts.
- *Default community* – This community is default when you add a new router.
- *Timezone* – Local time zone.
- *Ping length* – Number of sent ping messages when the ping is invoked from the monitoring system.

To confirm the set parameters press the *Continue* button.

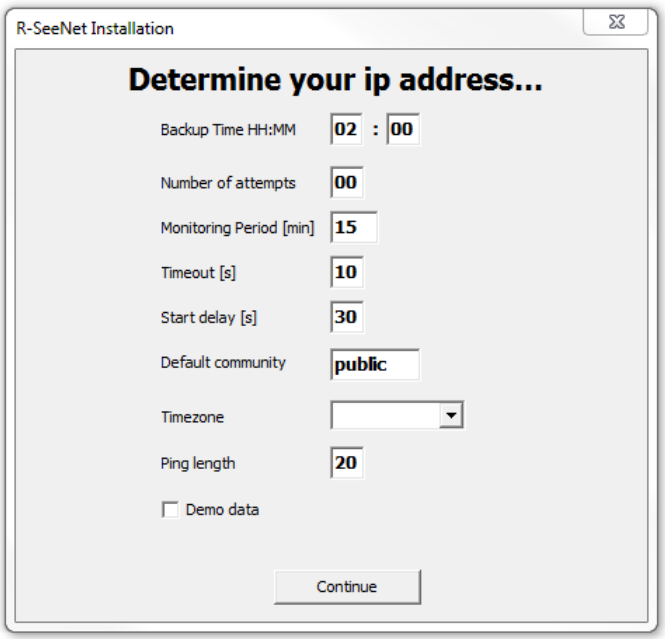

Figure 7: Installation – parameters

Now, it is possible to enter the license key for your purchased license of this program or select DEMO license of R-SeeNet.

For online activation is only necessary to enter the license key to *Registration Key* boxes and press *Register online* button.

For offline activation you must enter the license key and then there is generated installation key in Code 1 item. Send this installation key to the B&B company via e-mail support@bb-elec.com Then you will obtain activation key that you must enter into the *Code 2* field and click *Register offline* button.

Please note that the installation key is valid for one day.

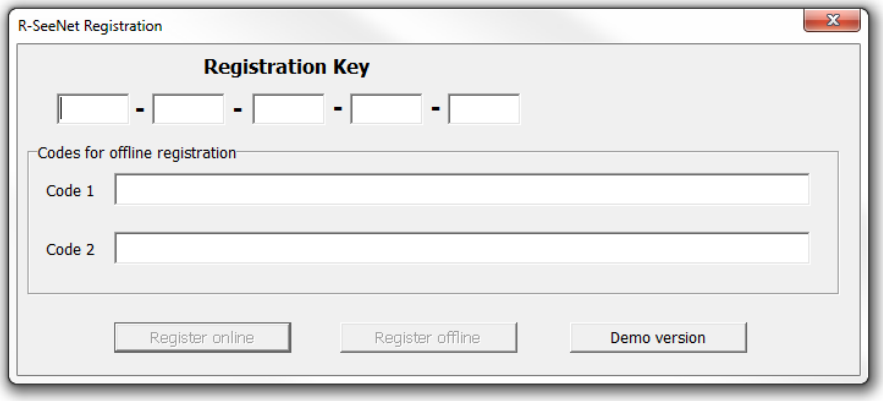

Figure 8: Registration

To completed the installation of R-SeeNet press *Finish* button.

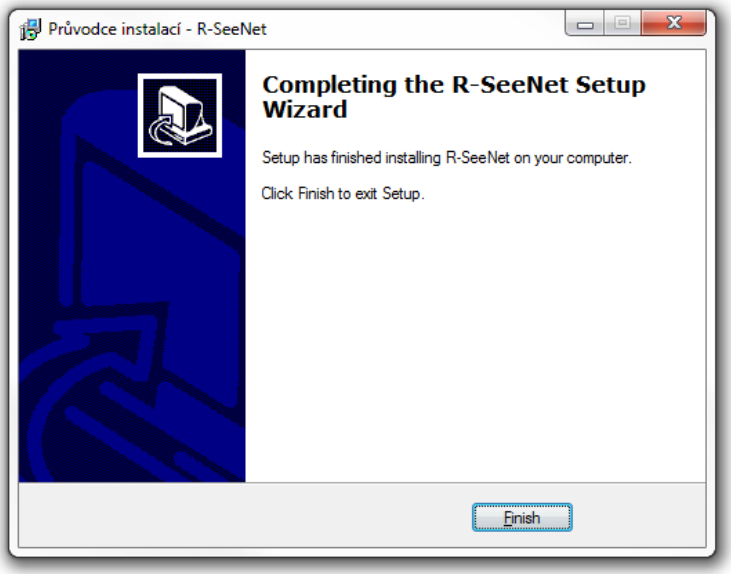

Figure 9: Installation – completing

2.2 CentOS – image for VirtualBox

Installation requires installed VirtualBox including **Extension Pack**.

In case of Linux, R-SeeNet is supplied as an image for virtual box (CentOS 6.4 32 bit). After clicking on this file, the VirtualBox window will be opened. It is necessary to choose a network card in *Settings* item (*Network* section) before starting displayed virtual machine.

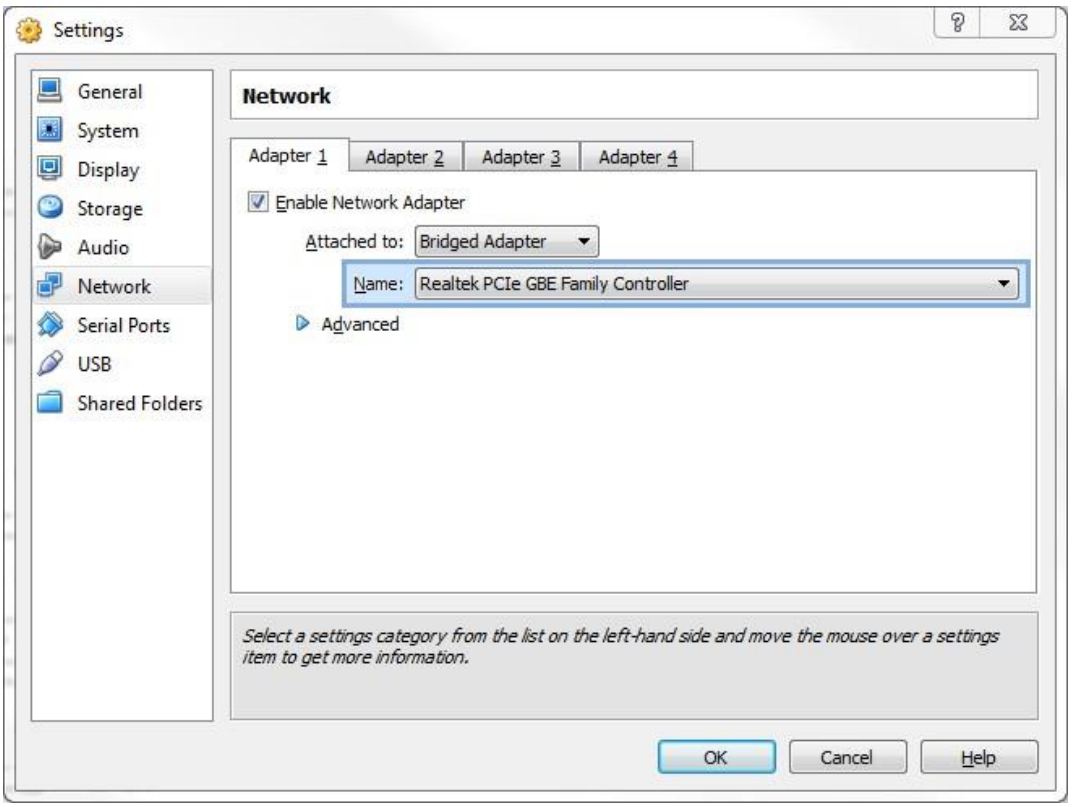

Figure 10: Settings – Network card

If you do not have enabled hardware virtualization in the BIOS, you must also disable it in the VirtualBox and set the number of processors to one (see figure below).

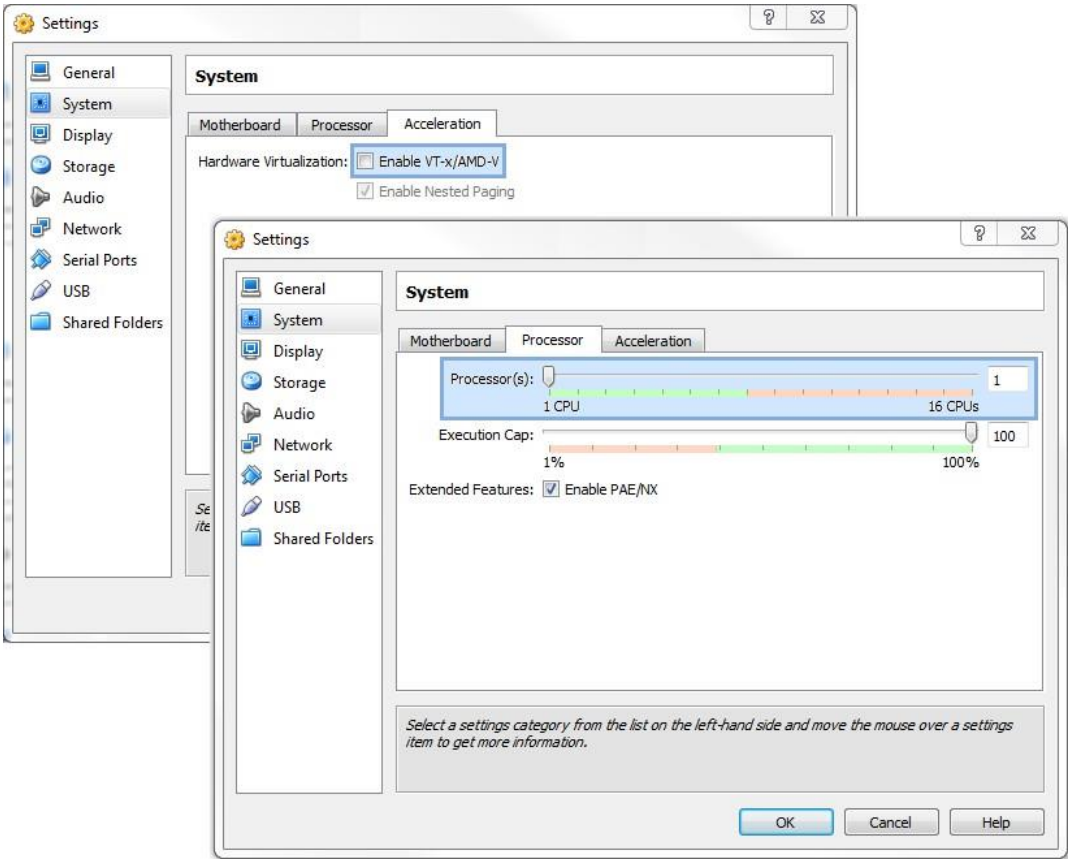

Figure 11: Settings – hardware virtualization

Then you can start the process of virtualization by clicking the green arrow titled *Start*.

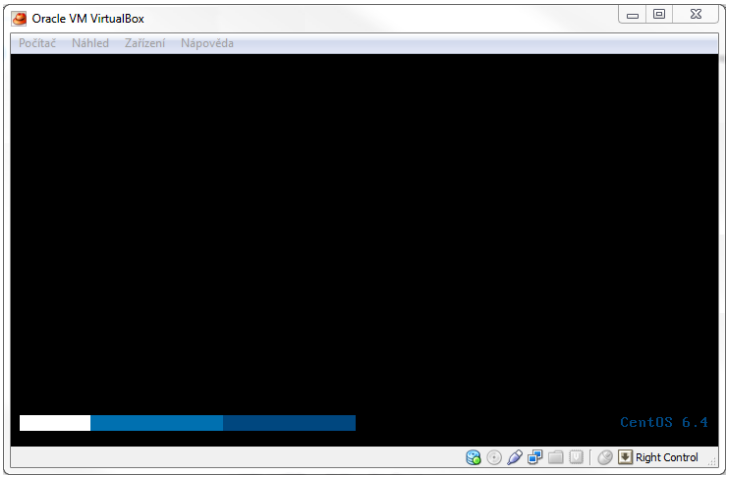

Figure 12: Running virtualization

After the Cent OS (Linux distribution based on Rad Hat Enterprise) is launched, you are prompted to enter username and password. It's set to root (username) and rootroot (password) by default. At this moment it is necessary to make network configuration settings that can be invoked by the following command:

system-config-network

If you enter the command correctly, you will see the following window with the network configuration.

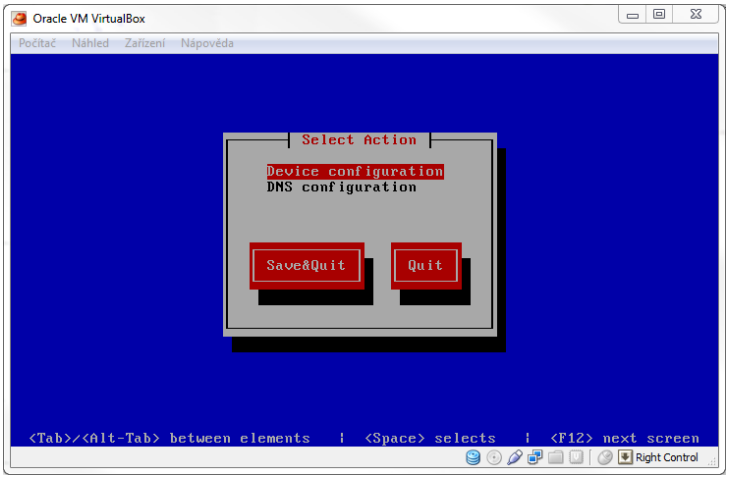

Figure 13: Network configuration

The first step in configuration is to set the name and IP addresses of the device on which the monitoring system will be located. By clicking on the *Device configuration* item and then *eth0* item is displayed the corresponding form. To save your changes, you must click on the *OK* button and *Save* button in the one level up window.

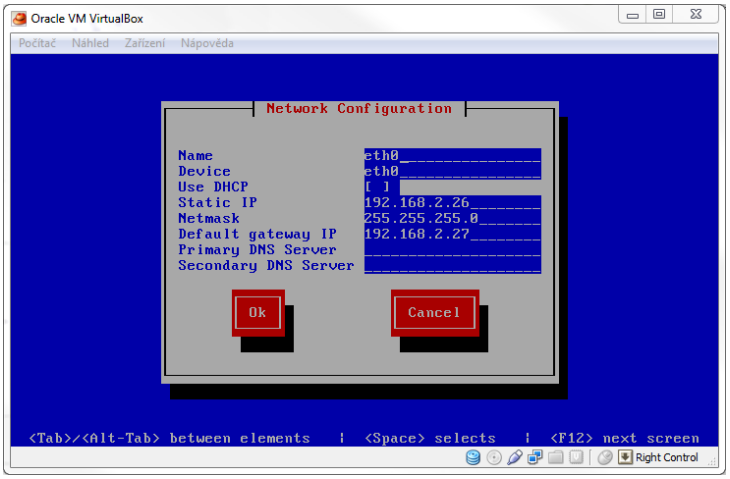

Figure 14: Device configuration

The second step in configuration is to set DNS. It can be done via the *DNS configuration* menu item. There are items for the definition of an identification name (*Hostname*) or primary to tertiary DNS. To save all the changes it is necessary to click the *OK* button and *Save&Quit* button in the one level up window. Finally, it is possible to close the window with virtualization in a traditional way.

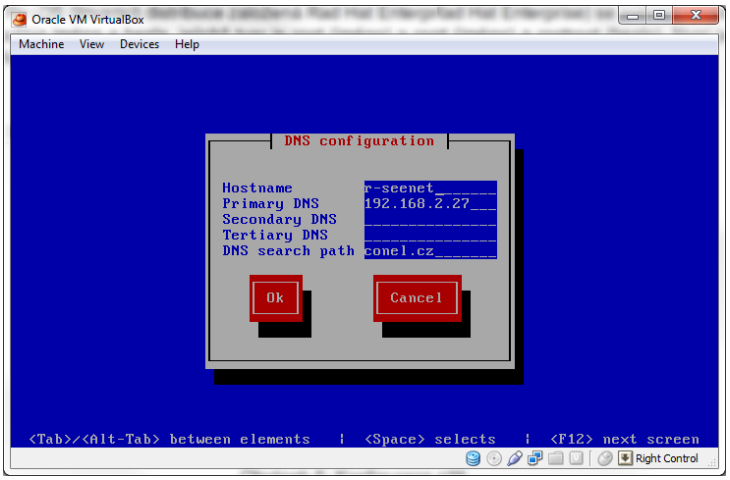

Figure 15: DNS configuration

2.2.1 Automatic startup

A detailed description of how to automatically run the VirtualBox program and selected virtual machine when operating system starts is explained in the user manual for VirtualBox. By default, it is stored in this directory c:\Program Files\Oracle\VirtualBox\doc\, which is created during the installation.

2.3 CentOS – RPM packages

The first step is key importing. For this purpose use command rpm –import klic.gpg. Then install *r-seenet-server-x.rpm* package (it is a kernel monitoring) using this command: yum localinstall r-seenet-server-x.rpm. When you first install this package, the password is automatically generated. After installation follow the instructions and insert the password to the following file:

/usr/share/r-seenet/www/config.inc.php do parametru DB_PASS

You can also find the password in this file: /etc/snmpmon.ini.

After you have installed the kernel, run SQL scripts which are written by installer on the screen during installation of the *r-seenet-server-x.rpm* package. Commands to run scripts are as follows:

- mysql -uroot -f < /usr/share/r-seenet/r-seenet.sql
- mysql -uroot -e "GRANT ALL PRIVILEGES ON snmpmon.* to SNMPMON@'%' identified by 'password'"
- mysql -uroot -e "GRANT ALL PRIVILEGES ON snmpmon.* to SNMPMON@'localhost' identified by 'password'"

Attention! Instead of word *password* insert the real password, which is written by installer. Otherwise insert the entire SQL query, which is written by installer on the screen.

The next step is the installation of package for the web application. For this purpose use command yum localinstall r-seenet-php-frontend-x.rpm.

Important notes:

- For the proper operation must be disabled SELINUX parameter in /etc/selinux/config file: SELINUX=disabled
- If the *snmpmon* service (mentioned kernel) doesn't start, you must start it manually: /etc/init.d/snmpmon start

3. Running service window

This window is not displayed in server systems.

☞ *Number of devices* – Total number of monitored devices.

☞ *Status* – Current status of service:

- *0* – Start of service, it's carried out the basic initializations and read the *Stats* table.
- *1* – Waiting for the start of the first monitoring round (it's possible to start with a few seconds delay – parameter start delay in SNMPMOON.ini).
- *2* – Initial start of each round.
- *3* – Waiting for responses from individual devices and broadcasting of other questions.
- *4* – Waiting for an answer of remaining devices (all devices have been addressed).
- *5* – Idle state before the next round.
- *100* – Error during reading *Devices* table or number of devices is zero.
- *101* – Error during the first reading *Stats* table.

☞ *Next monitor* – Time to start next monitoring round.

☞ *TCPStat* – State of establishing a TCP communication with the parent web application. The core acts as a TCP server.

- *1* – Initialization state after service start.
- *12* – The successful assignment of the communication port (65031) on which it's waiting for the request for a connection from the client.
- *2* – Connection with the client is successfully established.

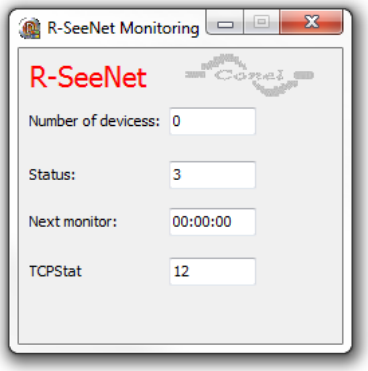

Figure 16: Running Service Window

4. Description of the web interface

To access to the monitoring system use a web interface which can be displayed by entering the IP address or domain name of the computer on which the R-SeeNet is installed. For the first login use the default login data – admin (Username), conel (Password) for user with administrative privileges or root (Username) a conel (Password) for superadmin user (use only in case of monitoring multiple companies) – and press *Login* button. However, we strongly recommended to change it as soon as it is possible.

4.1 Menu

Main menu is located at the top of each web page. In the upper right corner is displayed information about the current system version. The menu is divided into three blocks. The first one – *Status* – contains options for displaying information about monitored devices (routers). Items in the configuration part – *Configuration* – are used to edit, add and delete monitored routers. In the administration part of the main menu – *Administration* – are placed items for logging into/out of the system and finding out information about the R-SeeNet.

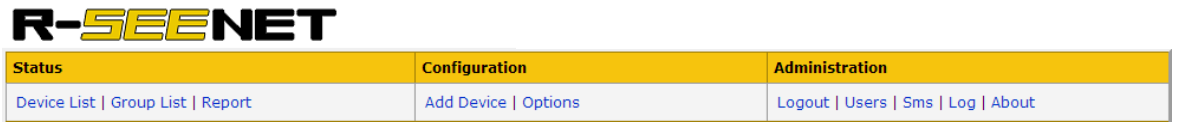

Figure 17: Main menu

4.2 Device List

List of monitored devices (routers) can be displayed by clicking on the *Device List* item in the *Status* part of the main menu. This page is also displayed as the home page after logging into the monitoring system. Each user can choose columns, which will be displayed in the *Device List* table (see section 4.10.2 *Appearance*). The meaning of each column is described in the following table.

Column	Description
:.	Identifier of the router (sequence number of added router)
Hostname [1]	IP address of primary SIM card
Hostname Alt [1]	IP address of secondary SIM card
Description	Description of the router (it can be changed by the *Edit* operation, see line at the bottom)
Device	Type of the router

Continued on next page

[1] Properties of *Hostname* and *Hostname Alt* items are described in detail below the table

Continued from previous page

Column	Description
Note	Any user-defined note about the router
Location	Location of the router (it can be changed by the *Edit* operation, see line at the bottom). If *Read location* box on the *Options* page is checked, R-SeeNet reads location, which is set in the router.
Tx	Total size of transmit data
Rx	Total size of received data
Total	Total size of transferred data (transmit and received)
Level	Signal quality of the currently selected cell
Data service	Type of transmission technology
Firmware	Current firmware version loaded in the router
Report	After clicking this button, the report of selected router is displayed
Enabled	If it's checked, reading from the router via SNMP is enabled
AutoUpdate	Enables automatic updating of router configuration
Access mode	Informs about the way of reading the router: • Polling – router is reading in a standard way • SNMP trap – router is reading via SNMP traps
SN	Serial number of the router
MAC	MAC address of the router
IMEI	IMEI number of module in the router (if it's available)
ESN	ESN number of module in the router (if it's available)
Group	Name of the routers group into which the router belongs
Operation – Edit	Editing information about the router (pencil icon)
Operation – Remove	Removes the router from the list (red cross icon)
Device Selection	Used to change the properties or delete multiple routers at once. Routers that require the multiple change of the properties are selected using the check boxes in this column. Routers will be added to the *Selected Device* list using the *Checked* button. To add all of routers use the *All* button.

Table 1: Device List description

Functions in the *Operation* column (i.e. *Edit* and *Remove*) are only available to users with administrative privileges.

Properties of *Hostname* and *Hostname Alt* items:

- After you place cursor on any IP address, the date and time of the last router reading are displayed. Press the IP address to display statistics for this router (*Device Status*).

- If you click on the *Ping* button, the ping to the router will start. After the ping is finished result is displayed in a new window.

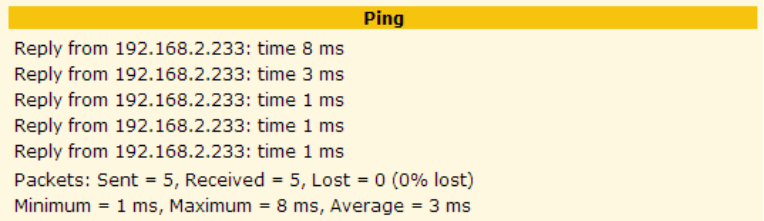

Figure 18: Ping

- The background of each cell is colored in accordance with accessibility of the router:

Color	Description
Green	Router was read in the last round
Orange	Router could not be read only in the last round of reading
Red	Router could not be read several times consecutively
Grey	Router is not allowed to read data (*Enabled* isn't checked)

Table 2: Background color

Automatic update of routers configuration doesn't be ensured by R-SeeNet as standard. It only enables or disables downloading the configuration file from a computer with a monitoring system. The update must be set in the configuration of the router automatic update.

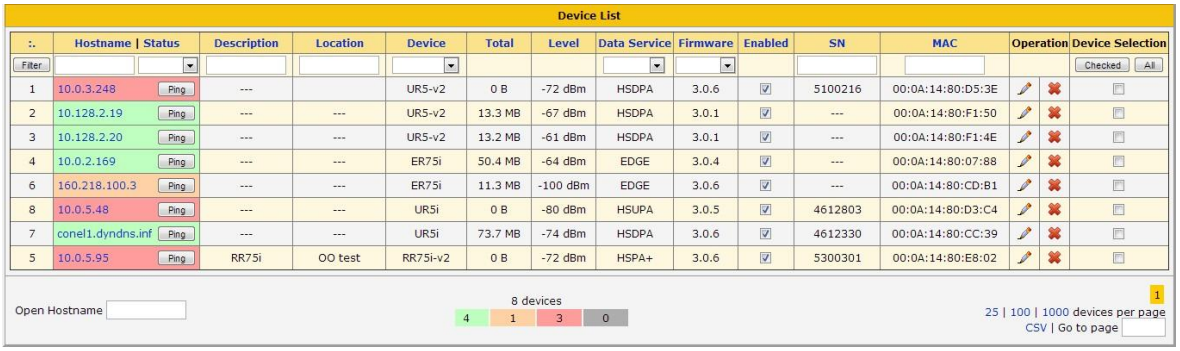

Figure 19: Device List

Tips for working with *Device List*:

- Number of routers displayed on one page can by specified by the numbers in the lower right corner (25, 100 and 1000). To browse between pages use pagination in the same corner. Another possibility is to write page number into the *Go to page* field and then press Enter.

- Routers can be sorted by any column. For sorting routers by a particular column click on the column name. Press it again to rank routers in reverse order.
- Routers can be filtered by some criterion. At first specify the criterion into the box below the name of the column and then press the *Filter* button.

In the lower right corner you can find the *Open Hostname* item, which serves as a link to a user-defined application. This link can be defined in the system settings (*Options*), *Appearance* subpage, where is the *User link* part.

4.2.1 Selected Devices

Selected Devices page is used to change the properties or delete multiple routers at once. First you must add the routers using the check box in the *Device Selection* column of *Device List* table. Routers will be added to the *Selected Device* list using the *Checked* button. To add all of routers use the *All* button. If selected routers are successfully added, link with number of routers is displayed in the upper-right corner (see figure below).

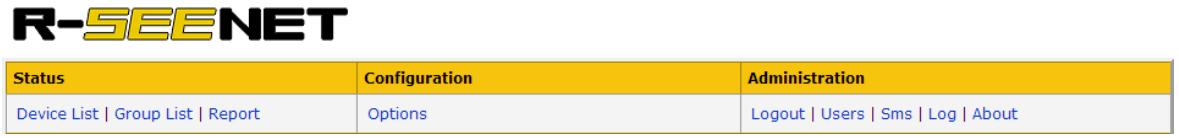

Figure 20: Header after selecting the routers

Page for editing properties of multiple routers (*Selected Devices*) is displayed by pressing new link in the header. On the left side of this page is a table with a list of selected routers and their basic properties. On the right side are options for changing properties of routers in the list. Their meanings are described in the table below.

You can change only one property of selected routers at the same time!

Item	Description
Change description to	Changes description of selected routers
Change community to	Changes password for SNMP access to the selected routers
Change location to	Changes location of selected routers
Change note to	Changes note of selected routers
Enable monitoring	Enables monitoring of routers
Disable monitoring	Disables monitoring of routers
Enable AutoUpdate	Enables automatic update of configuration
Disable AutoUpdate	Disables automatic update of configuration

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Item	Description
Remove devices	Removes selected routers from the list of routers (i.e. from *Device List*)
Clear selection	Clears the *Selected Devices* list after changing one of the above properties

Table 3: Selected Devices

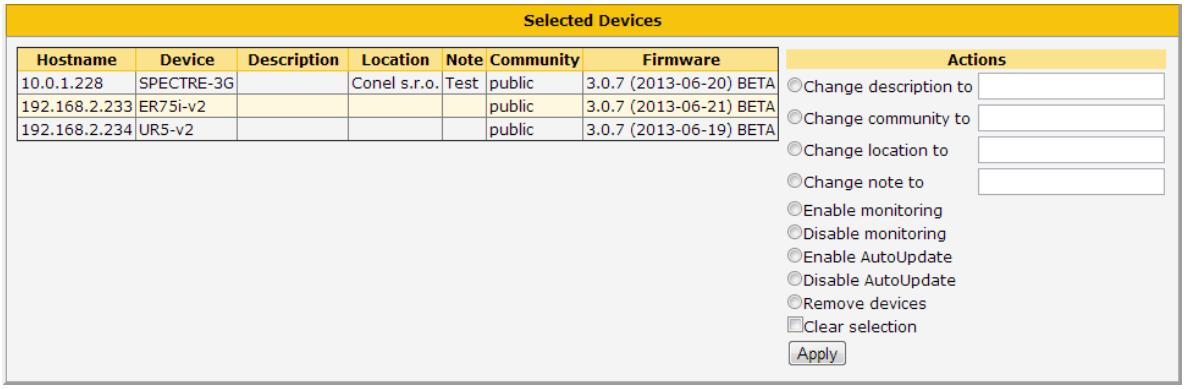

Figure 21: Selected Devices

4.3 Device Status

Device Status page displays information and statistics about the selected router. This page can be invoked by pressing the IP address of the selected router on the Device List page or by entering its IP address to the *Open Hostname* item at the bottom left corner of this page.

4.3.1 System Information

On this subpage is displayed router system information in three separate parts. The first of these contains information about the device (*Device Information*).

Item	Description
Device	Specifies type of the router. After pressing the *Refresh* button, type of the router will be deleted from the database and then it will be update again.
IP Address	IP address of primary SIM card
Alternative IP Address	IP address of secondary SIM card

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Item	Description
Phone Number	Phone number for sending SMS message
Alt. Phone Number	Alternative phone number for sending SMS message
SN	Serial number of the router
MAC address	Router MAC address
IMEI	IMEI number of module in the router
ESN	Electronic serial number (ESN) of module in the router
Firmware	Current version of firmware loaded in the router
Description	Router description defined by user
Location	Router location defined by user
Note	Note concerning the selected router
Group	Name of the routers group into which this router belongs
Uptime	Time, when PPP connection was established

Table 4: Device Information

After pressing the IP address, you will be redirected to the web interface of the selected router. Use Ping button to start ping to the router. Color of the router's IP address field has the same meaning as in the Device List. Press *Map* button to open a new window in which router location will be displayed on the map of Google company. Use the *Send SMS* button to send an SMS message to specified phone number (see section 4.14 *Sms*).

Device Information		
Device	ER75i-v2	Refresh
IP Address	192.168.2.233	Ping
Alt. IP Address	10.0.3.188	Ping
Phone Number	414541841	Send SMS
Alt. Phone Number	414541841	Send SMS
SN	---	
MAC address	00:55:33:10:45:98	
IMEI	---	
ESN	---	
Firmware	3.0.7 (2013-06-21) BETA	
Description	Router Conel	
Location	Conel	Map
Note	---	
Group	TO Test	
Uptime	0 days, 4 hours, 29 minutes	

Figure 22: Device Information

This is followed by a block of information about mobile network.

Item	Description
Technology	Transmission technology currently used in the router
PLMN	Provider code
Cell	Cell
Channel	Channel of the cell
Signal Strength	Quality of the signal strength
Neighbors	Information about neighboring cells

Table 5: Mobile Network Information

Mobile Network Information	
Technology	EDGE
PLMN	23001
Cell	69A6
Channel	30
Signal Strength	-75 dBm
Neighbours	-83 dBm (80) -93 dBm (58) -94 dBm (57) -97 dBm (59)

Figure 23: Mobile Network Information

In the third part of this page is information about system.

Item	Description
Community	Password for SNMP access to routers
Enabled	If it's checked, reading from the router via SNMP is enabled
Access mode	Informs about the way of reading the router: • Polling – router is reading in a standard way • SNMP trap – router is reading via SNMP traps
Last Read Time	Date and time of last reading router
Update configuration	Date of last configuration update

Table 6: System Information

System Information	
Community	public
Enabled	☑
Access mode	Polling
Last Read Time	25.06.2013 13:58
Update Configuration	---

Figure 24: System Information

4.3.2 Stats

This subpage displays information and statistics about the selected router in five separate blocks – *Traffic*, *Signal Strength*, *Latency*, *Tested Packet Loss* and *Router Availability*.

Traffic

Traffic section displays the statistics of data transmitted and the number of established PPP connections for both primary and secondary SIM card.

Column	Description
Traffic	Period for which data are displayed
Total data	Size of data transmitted in this period
Received	Size of data received in this period
Sent	Size of data sent in this period
Connections	Number of established PPP connections in this period

Table 7: Traffic

If the number of established PPP connections in the period is equal to zero, the router didn't lose a PPP connection in the period.

Traffic

Traffic	Total Data	Received	Sent	Connections
Today	265.6 kB	139.6 kB	126 kB	0
Yesterday	557.6 kB	281.7 kB	275.9 kB	0
Current Week	265.6 kB	139.6 kB	126 kB	0
Current Period	11.4 MB	5.4 MB	6 MB	0
Last Period	18.8 MB	7 MB	11.7 MB	7

Figure 25: Traffic

Signal Strength

The *Signal Strength* part displays signal strength statistics for a certain period (today, yesterday, this and last week, this and last month) for both SIM cards. The third table contains information about the minimum and maximum signal strength with time when it occurred.

Column	Description
Signal Strength	Period for which data are displayed
Average	Average signal strength
Minimum	Minimum signal strength
Maximum	Maximum signal strength

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Column	Description
Cells	Number of switching between cells. After you place your cursor on this number, there are displayed numbers of cells between which the router switched.
Services	Indicates how many times the router switched between different technologies. After you place the cursor on this number, there are displayed transmission technologies used in the period.

Table 8: Signal Strength

Number of switching between cells has only informative character. Switching is possible as between neighboring cells so between different cells. If there is a large number of switching, it means badly placed router antenna.

For routers ER75i, UR5i and UR5 the number of switching between cells may be different from the actual value recorded in the router. This is due to the fact that the R-SeeNet detects whether the cell was changed between two readings. Therefore, if your router will change the cell to another and back between two readings, the monitoring system doesn't recognize it.

Signal Strength

Signal Strength	Average	Minimum	Maximum	Cells	Services
Today	-97 dBm	-103 dBm	-91 dBm	8	0
Yesterday	-97 dBm	-104 dBm	-89 dBm	24	0
Current Week	-97 dBm	-103 dBm	-91 dBm	8	0
Current Period	-95 dBm	-109 dBm	-86 dBm	430	0
Last Period	-94 dBm	-108 dBm	-84 dBm	395	0

Current	Average	Minimum	Maximum
-89 dBm	-94 dBm	-109 dBm	-84 dBm
		03.06.2013 01:40	22.05.2013 12:07

Figure 26: Signal Strength

Further it is possible to see a graph with the course of signal strength in a certain period by pressing the graph image in a cell with the name of the selected period.

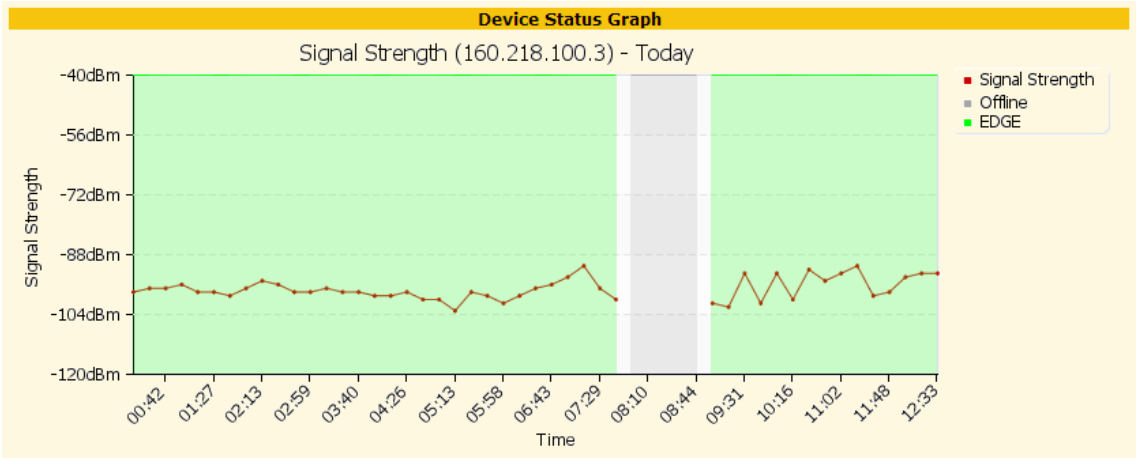


Figure 27: Signal Strength graph

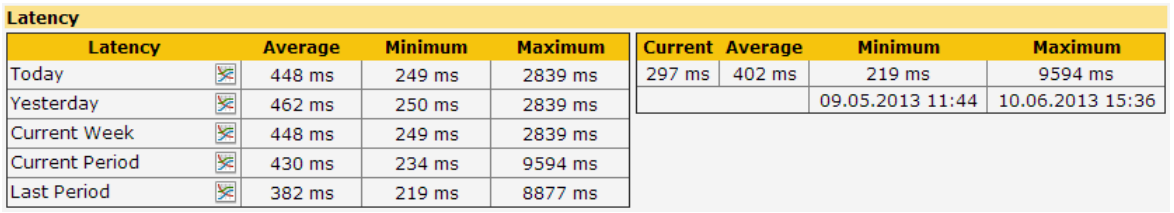
Latency

The *Latency* part displays latency statistics for a certain period (today, yesterday, this and last week, this and last month) for both SIM cards. The third table contains information about the minimum and maximum latency with time when it occurred.

Column	Description
Latency	Period for which data are displayed
Average	Average latency
Minimum	Minimum latency
Maximum	Maximum latency

Table 9: Latency

Latency is determined from a ping, which is sent by a core of monitoring system to the individual routers during reading.



Latency

Latency	Average	Minimum	Maximum
Today	448 ms	249 ms	2839 ms
Yesterday	462 ms	250 ms	2839 ms
Current Week	448 ms	249 ms	2839 ms
Current Period	430 ms	234 ms	9594 ms
Last Period	382 ms	219 ms	8877 ms

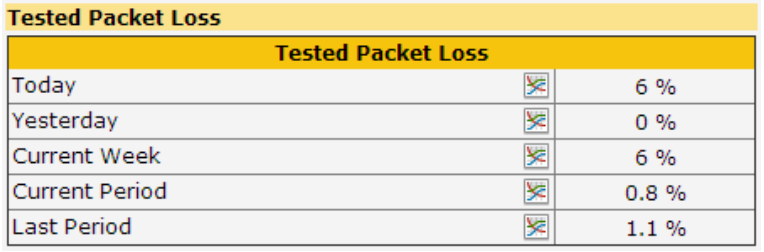
Current	Average	Minimum	Maximum
297 ms	402 ms	219 ms	9594 ms
		09.05.2013 11:44	10.06.2013 15:36

Figure 28: Latency

Further it is possible to see a graph with the course of latency in a certain period by pressing the graph image in a cell with the name of the selected period.

Tested Packet Loss

The *Tested Packet Loss* part displays lost packets statistics for a certain period. The value of packet loss rate is the ratio of lost packets to all packets sent during reading router by a core of monitoring system.



Tested Packet Loss

Tested Packet Loss	
Today	6 %
Yesterday	0 %
Current Week	6 %
Current Period	0.8 %
Last Period	1.1 %

Figure 29: Tested Packet Loss

Further it is possible to see a graph with the course of packet loss in a certain period by pressing the graph image in a cell with the name of the selected period.

Router Availability

The *Router Availability* part displays router availability statistics for a certain period. The value of availability is determined based on the time of connecting the router to the network, which is read from the router. The resulting value is calculated as a ratio of time when the router was connected to the network to elapsed time from the interval. If the router is connected for longer time than from midnight, availability is calculated as 100%.

If the router reading fails, router is considered to be available until it is successfully read. Availability will be calculated using the newly read time of connecting the router to the network.

Router Availability

Router Availability	
Today	100 %
Yesterday	100 %
Current Week	100 %
Current Period	100 %
Last Period	99.7 %

Figure 30: Router Availability

Further it is possible to see a graph with the course of router availability in a certain period by pressing the graph image in a cell with the name of the selected period.

4.3.3 Device Parameters

Form on the *Device Parameters* page allows you to edit information about the router. It is also possible to invoke this page by pressing the pencil icon (*Edit*) in *Device List*.

Column	Description
Hostname	IP address of primary SIM card
Hostname Alt	IP address of secondary SIM card
Description	Description of the router
Location	Location of the router. If *Read location* box on the *Options* page is checked, R-SeeNet reads location, which is set in the router.
Coordinates	Coordinates of the router. If GPS user module is available, the coordinates are specified by this module.
Note	Any user-defined note about the router
Community	Password for SNMP access to routers
Group	Name of the routers group into which the router belongs
Read period	Defines read period (in minutes)
Phone	Phone number for sending SMS message

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Column	Description
Phone Alt	Alternative phone number for sending SMS message
Enabled	If it's checked, reading from the router via SNMP is enabled
AutoUpdate	Enables automatic updating of router configuration
Read location	Enables (or disables) reading position, which is set in the router
Access mode	Informs about the way of reading the router: • Polling – router is reading in a standard way • SNMP trap – router is reading via SNMP traps
Accounting Start	Specifies when the accounting period begins

Table 10: Device Parameters

The changes will be applied after pressing the *Apply* button.

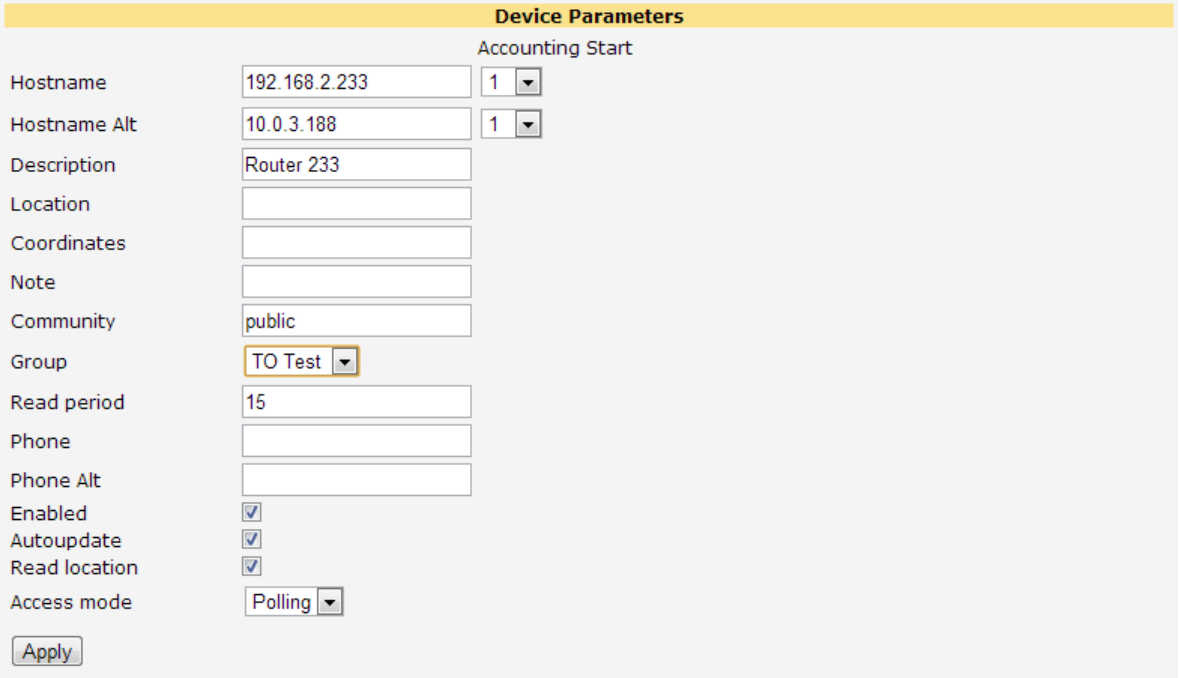

Figure 31: Device Parameters

4.4 Group List

Monitored routers can be divided into groups. An overview of these groups can be invoked by pressing the *Group List* item in *Status* section of main menu.

Column	Description
:.	Identifier of the group (sequence number of added group)
Name	Group name
Level Limit	Limit of signal quality
Traffic Limit	Limit of data transmitted for primary SIM card
Traffic Limit Alt	Limit of data transmitted for secondary SIM card
Operation – Edit	Editing information about the group (pencil icon)
Operation – Remove	Removes the group from the list (red cross icon)

Table 11: Group List

Functions in the *Operation* column (i.e. *Edit* and *Remove*) are only available to users with administrative privileges.

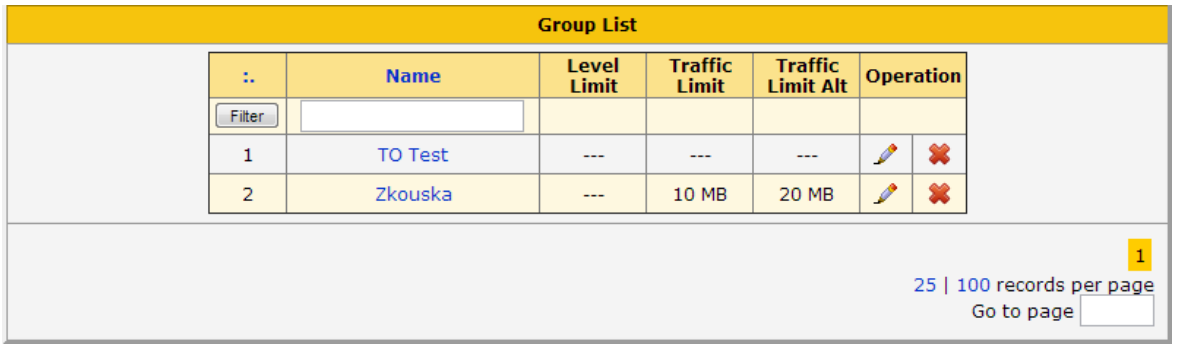

Figure 32: Group List

Tips for working with *Group List*:

- Click on the name of the group to see *Device List* with routers belonging to this group.
- Number of groups displayed on one page can by specified by the numbers in the lower right corner (25 and 100). To browse between pages use pagination in the same corner. Another possibility is to write page number into the *Go to page* field and then press Enter.
- Groups can be sorted by identifier (*:.*) or group name (*Name*). Sorting can be done by clicking on the column title. Press it again to rank groups in reverse order.
- Groups can be filtered by some criterion. At first specify the criterion into the box below the name of the column and then press the *Filter* button.

4.5 Report

The *Report* page displays statistics for a selected period relating to all routers listed in the R-SeeNet database. There are three possible periods – day, week and month. This page has several subpages, where you can see statistics about this: *Latency*, *Packet Loss*, *Availability*, *Signal Strength* and *Routers Online*. Everything can be displayed on a single page (*All*).

- Month – Month can be selected by pressing M in blue box at the bottom left corner of the calendar.
- Week – Week can be selected by pressing week number in the first column (orange-colored).
- Day – Day can be selected by pressing number of day in green box. The selected day is yellow-colored.
- Use symbols **<** and **>** to scroll through calendar by months.
- Use symbols **«** and **»** to scroll through calendar by years.

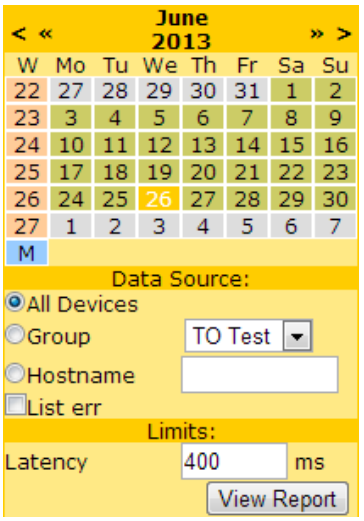

Figure 33: Calendar

In the section bellow the calendar (*Data Source*) is possible to select routers for which statistics are displayed. The following options are available:

- *All Devices* – Statistics are displayed for all routers
- *Group* – Statistics are displayed only for selected group of routers
- *Hostname* – Statistics are displayed only for one router, whose IP address or domain name is filled in this text field

In the bottom part is a *List err* check box, which allows you to view a table providing information about cases of exceeding the limit that can be specified in the following section – *Limits*. The statistics for pre-selected period are displayed using the *View Report* button.

All displayed statistics can be exported to PDF or CVS file (this file is saved with the name R_SeeNet_Report) using the appropriate link in the *Export report* item located at the top of each page with statistics (in the right of the calendar). On the next line is a time stamp indicating the period for which statistics are displayed.

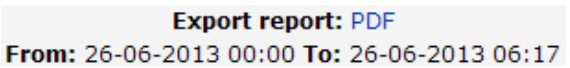

Figure 34: Top part of each Report window

For export to PDF is **not** required to install any PDF printer.

4.5.1 Latency

At the beginning of this page is displayed average latency for the selected time period. The following table lists the average values in stretches of time that are tailored to the chosen period.

Day	Latency	Day	Latency	Day	Latency
---	--- ms	---	--- ms	17-06-2013	145 ms
---	--- ms	---	--- ms	18-06-2013	160 ms
---	--- ms	---	--- ms	19-06-2013	107 ms
---	--- ms	---	--- ms	20-06-2013	130 ms
---	--- ms	11-06-2013	0 ms	21-06-2013	64 ms
---	--- ms	12-06-2013	0 ms	22-06-2013	2 ms
---	--- ms	13-06-2013	0 ms	23-06-2013	2 ms
---	--- ms	14-06-2013	0 ms	24-06-2013	2 ms
---	--- ms	15-06-2013	0 ms	25-06-2013	2 ms
---	--- ms	16-06-2013	0 ms	26-06-2013	2 ms

Figure 35: Latency

Then there is an *Average Latency* graph showing average latency in stretches of time that are tailored to the chosen period.

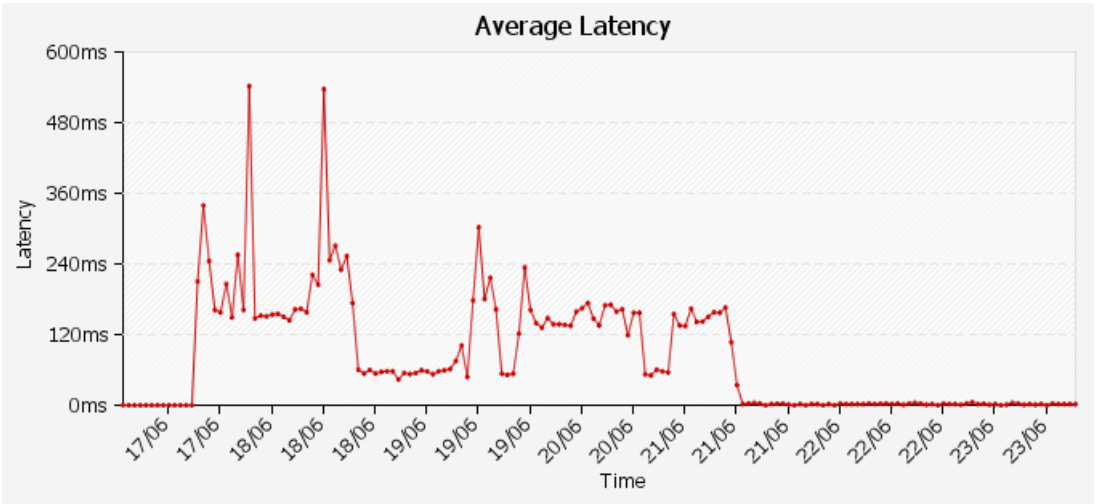

Figure 36: Latency graph

At the bottom part of this page is displayed a table with IP addresses of routers with the latency higher than specified value in selected time period.

Date	Latency	Hostname	Description	Location	Device	Firmware	SN
2013-06-01	576 ms	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---
2013-06-02	462 ms	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---
2013-06-03	402 ms	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---
2013-06-07	472 ms	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---

Figure 37: Latency – unfulfilled criterion

Maximum number of entries in the table of routers with unfulfilled criterion is 30.

4.5.2 Packet Loss

At the beginning of the *Packet Loss* page is displayed average value of packet loss for the selected period. The following table lists the average values in stretches of time that are tailored to the chosen period.

Day	Packet Loss	Day	Packet Loss	Day	Packet Loss
---	--- %	---	--- %	17-06-2013	40 %
---	--- %	---	--- %	18-06-2013	0 %
---	--- %	---	--- %	19-06-2013	2 %
---	--- %	---	--- %	20-06-2013	2 %
---	--- %	11-06-2013	62 %	21-06-2013	11 %
---	--- %	12-06-2013	100 %	22-06-2013	50 %
---	--- %	13-06-2013	100 %	23-06-2013	50 %
---	--- %	14-06-2013	100 %	24-06-2013	50 %
---	--- %	15-06-2013	100 %	25-06-2013	52 %
---	--- %	16-06-2013	100 %	26-06-2013	50 %

Figure 38: Packet Loss

Then there is an *Average Packet Loss* graph showing packet loss in stretches of time that are tailored to the chosen period.

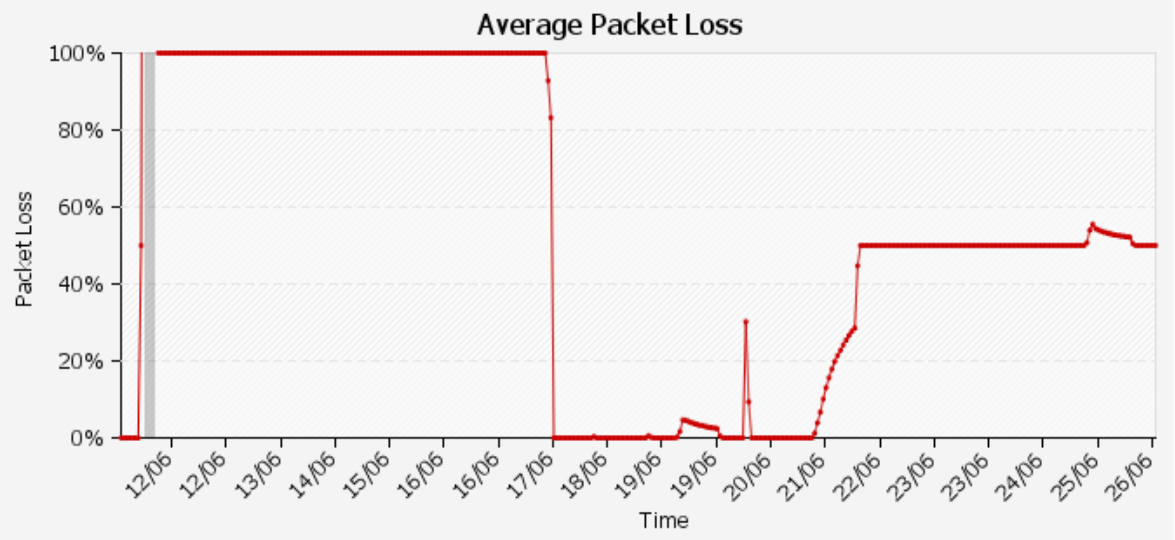

Figure 39: Packet Loss graph

At the bottom part of this page is displayed a table with IP addresses of routers with the packet loss higher than specified value in selected time period.

Date	Packet Loss	Hostname	Description	Location	Device	Firmware	SN
2013-06-21	7.0 %	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---
2013-06-19	4.2 %	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---
2013-06-16	100.0 %	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---

Figure 40: Packet Loss – unfulfilled criterion

Maximum number of entries in the table of routers with unfulfilled criterion is 30.

4.5.3 Availability

At the beginning of the *Availability* page is displayed average value of router availability for the selected period. The following table lists the average values in stretches of time that are tailored to the chosen period.

Day	Availability	Day	Availability	Day	Availability
---	--- %	---	--- %	17-06-2013	10 %
---	--- %	---	--- %	18-06-2013	58 %
---	--- %	---	--- %	19-06-2013	86 %
---	--- %	---	--- %	20-06-2013	91 %
---	--- %	11-06-2013	0 %	21-06-2013	57 %
---	--- %	12-06-2013	0 %	22-06-2013	50 %
---	--- %	13-06-2013	0 %	23-06-2013	50 %
---	--- %	14-06-2013	0 %	24-06-2013	33 %
---	--- %	15-06-2013	0 %	25-06-2013	31 %
---	--- %	16-06-2013	0 %	26-06-2013	43 %

Figure 41: Router Availability

Then there is an *Average Availability* graph showing router availability in stretches of time that are tailored to the chosen period.

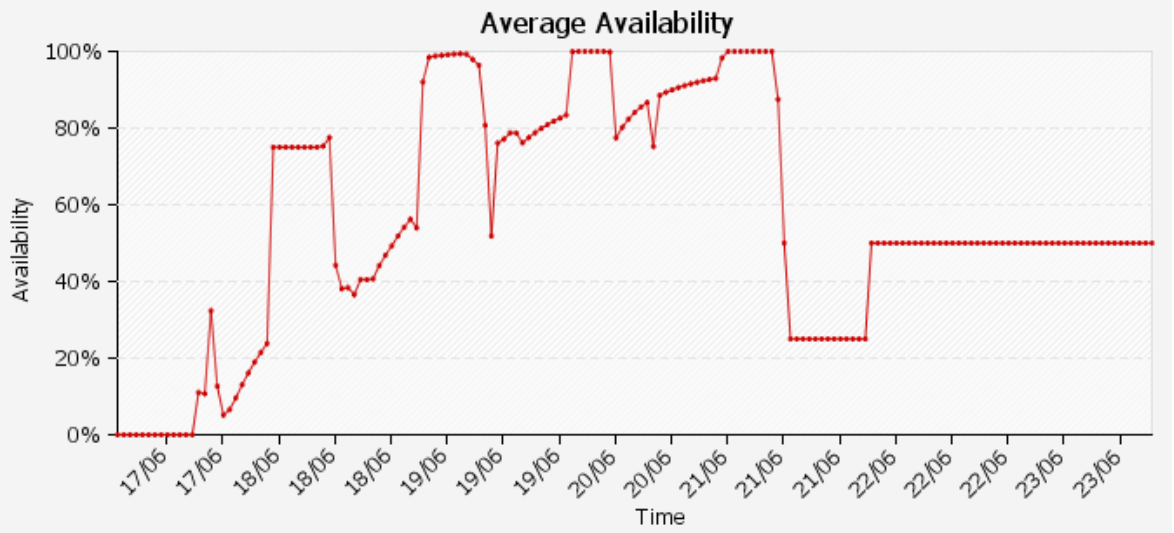

Figure 42: Router Availability graph

At the bottom part of the *Availability* page is displayed a table with IP addresses of routers with the availability lower than specified value in selected time period.

Date	Availability	Hostname	Description	Location	Device	Firmware	SN
2013-06-17	39.2 %	192.168.2.233	Router Conel	Conel	ER75i-v2	3.0.7 (2013-06-21) BETA	---
2013-06-17	29.7 %	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---

Figure 43: Router Availability – unfulfilled criterion

Maximum number of entries in the table of routers with unfulfilled criterion is 30.

4.5.4 Signal Strength

At the beginning of the *Signal Strength* page is displayed percentage of routers with signal strength better than specified criterion (below the calendar on the left). The following table lists the average values in stretches of time that are tailored to the chosen period.

Day	signal strength > -80 dBm	Day	signal strength > -80 dBm	Day	signal strength > -80 dBm
---	--- %	01-06-2013	100 %	18-06-2013	0 %
---	--- %	02-06-2013	100 %	19-06-2013	66.7 %
---	--- %	03-06-2013	100 %	20-06-2013	66.7 %
---	--- %	04-06-2013	0 %	21-06-2013	100 %
---	--- %	06-06-2013	0 %	22-06-2013	100 %
---	--- %	07-06-2013	100 %	23-06-2013	100 %
---	--- %	08-06-2013	100 %	24-06-2013	100 %
29-05-2013	0 %	09-06-2013	100 %	25-06-2013	100 %
30-05-2013	100 %	10-06-2013	100 %	26-06-2013	100 %
31-05-2013	100 %	17-06-2013	100 %	27-06-2013	100 %

Figure 44: Signal Strength

At the bottom part of this page is displayed a table with IP addresses of routers with the signal strength lower than specified value in selected time period.

Date	Signal Strength	Hostname	Description	Location	Device	Firmware	SN
19-06-2013	-91 dBm	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---
20-06-2013	-81 dBm	10.0.1.228	---	Conel s.r.o.	SPECTRE-3G	3.0.7 (2013-06-20) BETA	---

Figure 45: Signal Strength – unfulfilled criterion

Maximum number of entries in the table of routers with unfulfilled criterion is 30.

4.5.5 Routers Online

The *Routers Online* page informs about the number of online routers. There is displayed maximum and minimum value. The following graph shows the number of online routers in stretches of time that are tailored to the chosen period.

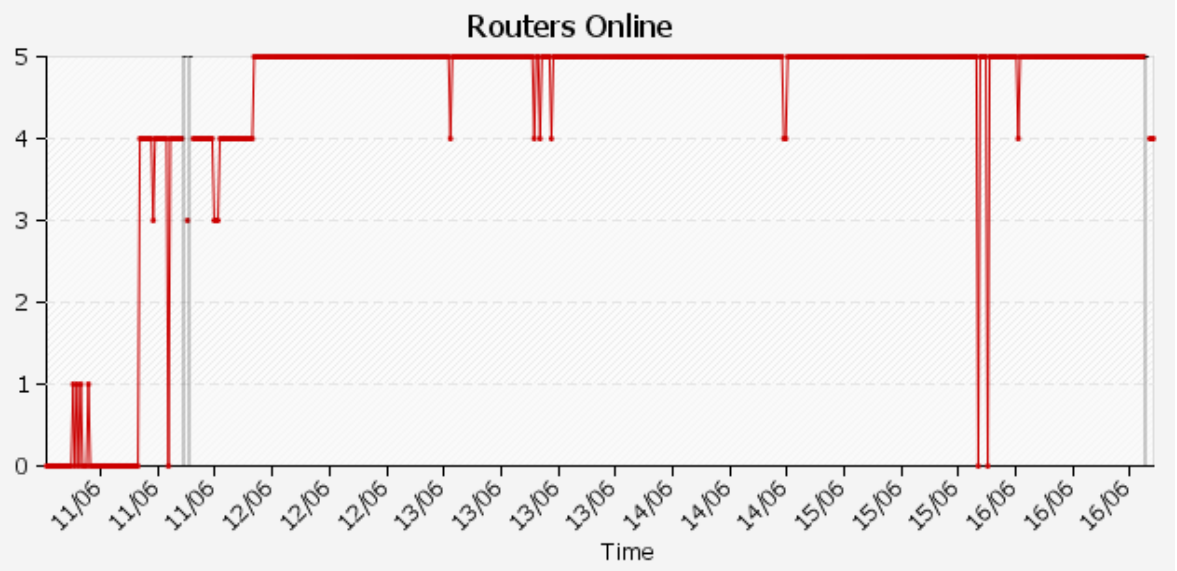

Figure 46: Routers online graph

4.5.6 All

Click on the *All* subpage to display all available statistics within the selected period on a single page.

4.5.7 Daily Report

The *Daily Report* page displays statistics relating to the number of online routers, routers availability, latency and packet loss. Statistical data refer to the previous day. At the beginning of this page is the following information:

- *Online network access routers* – Number of online routers
- *Average availability over period* – Average availability of monitored routers
- *Average Latency over period* – Average latency of monitored routers
- *Average packet loss over period* – Average packet loss of monitored routers

Then there are displayed four graphs relating to the above properties.

4.6 Add Device

The *Add Device* item from the *Configuration* part of the main menu is available only when the *Device List* page is displayed. It is also necessary to have administrator privileges.

You can add routers to the R-SeeNet database in two ways. The first possibility is manually fill and submit the form by clicking on the *Add Device* button. The items in this form have the following meanings:

Item	Description
Hostname	IP address of primary SIM card
Hostname Alt	IP address of secondary SIM card
MAC Address	MAC address of the router being added
Description	Description of the router being added
Community	Password for SNMP access to routers
Location	Location of the router being added
Note	Any user-defined note about the router being added
Phone	Phone number for sending SMS message
Phone Alt	Alternative phone number for sending SMS message
Group	Name of the routers group into which the router belongs
Read period	Defines read period
Access mode	Informs about the way of reading the router: • Polling – router is reading in a standard way • SNMP trap – router is reading via SNMP traps
Accounting Start	Specifies when the accounting period begins

Table 12: Add Device

Items marked with an asterisk (see figure on the next page) can be blank.

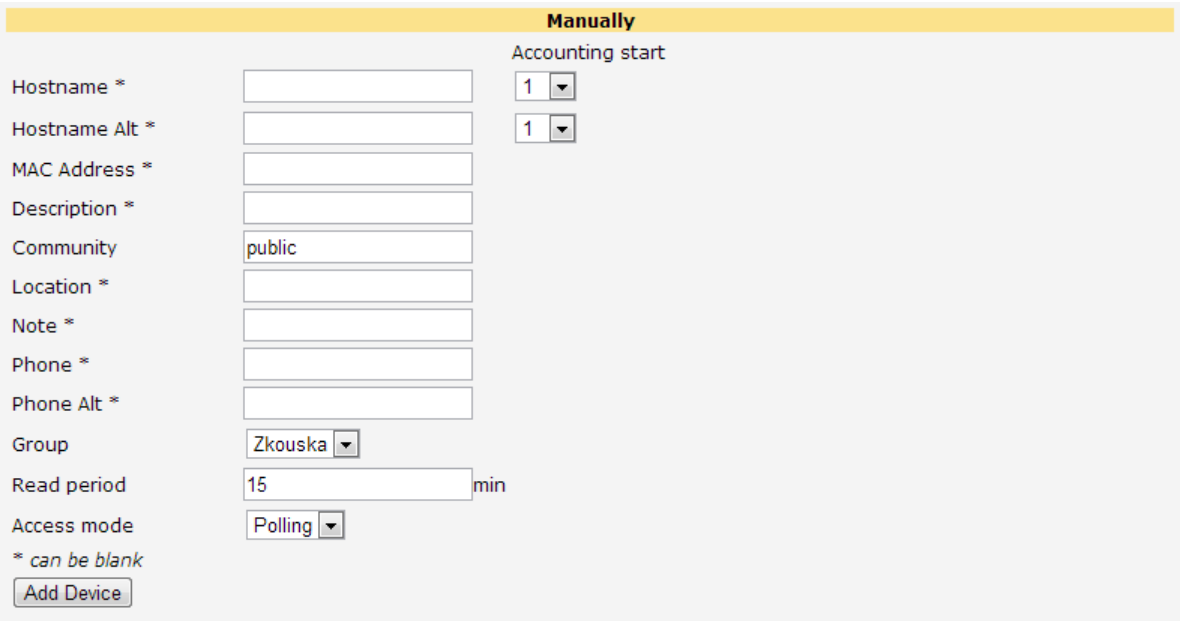

Figure 47: Add Device – Manually

Another way to add new routers into the monitoring system is importing a list of routers from a CSV file. At first select the CSV file with a list of routers (*File*) and choose the delimiter used in the CSV file (*Delimiter*), either comma or semicolon.

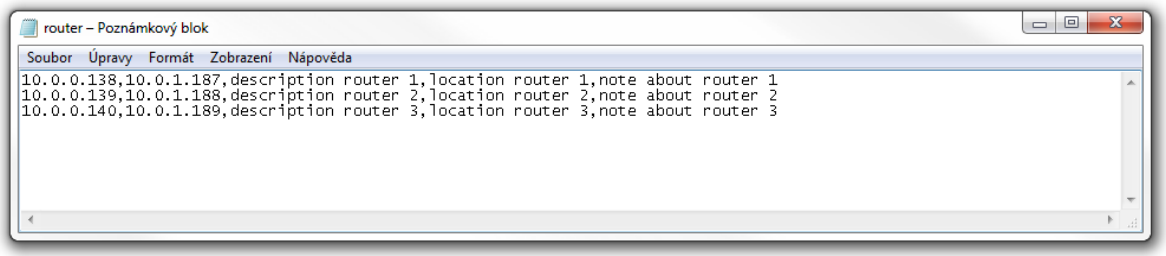

Figure 48: CSV file example

For items from *Hostname* to *Phone Alt* is necessary to specify the column in the selected CSV file, where the item is located. *None* corresponds to the situation when the item is not listed in the CSV file. The following items – *Community*, *Group*, *Read Period* and *Access mode* – must be filled in. The meaning of all items is described in the table above.

Finally press the *Import Devices* button to start the import.

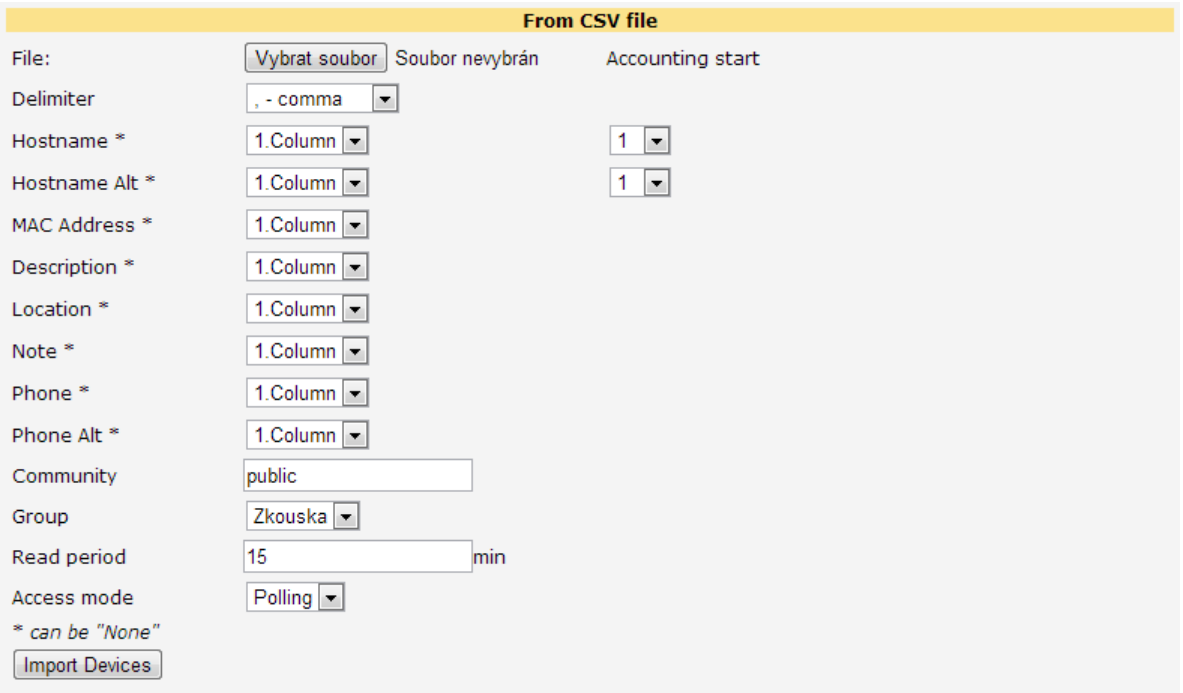

Figure 49: Add Device – CSV import

4.7 Add Group

The *Add Group* item from the *Configuration* part of the main menu is available only when the *Group List* page is displayed. It is also necessary to have administrator privileges.

Use the form on this page to add a group to the R-SeeNet database, which allows you to define a certain number of routers. For each group you can define the following parameters:

Item	Description
Name	Group name
Level Limit	Limit of signal quality
Traffic Limit	Limit of data transmitted for primary SIM card
Traffic Limit Alt	Limit of data transmitted for secondary SIM card
Report group window	Period of updating information about the group of routers for *Report* statistics (in minutes). **This value must be higher than the *Read period* value of all routers!**

Table 13: Group List

The new group is added to the monitoring system by clicking on the *Add Group* button at the bottom of this page.

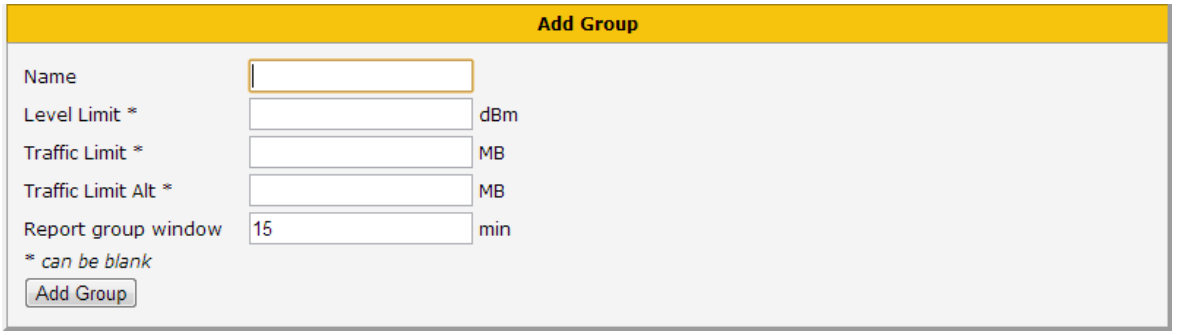

Figure 50: Add Group

4.8 Add Company

The *Add Company* item from the *Configuration* part of the menu is available only when the *Company's* page is displayed. It is also necessary to have superadministrator privileges.

Use the form on this page to add new company to the monitoring system database.

Item	Description
Name	Name of the added company
Address	Contact address
Email	Contact email
Phone	Contact phone number
Note	Any superadmin defined note about this company
DevCount	The maximum number of routers falling into this company. Number displayed behind this box indicates the number of available routers with respect to the license.

Table 14: Add Company

Note: Items *Address*, *E-mail*, *Phone* and *Note* can be blank.

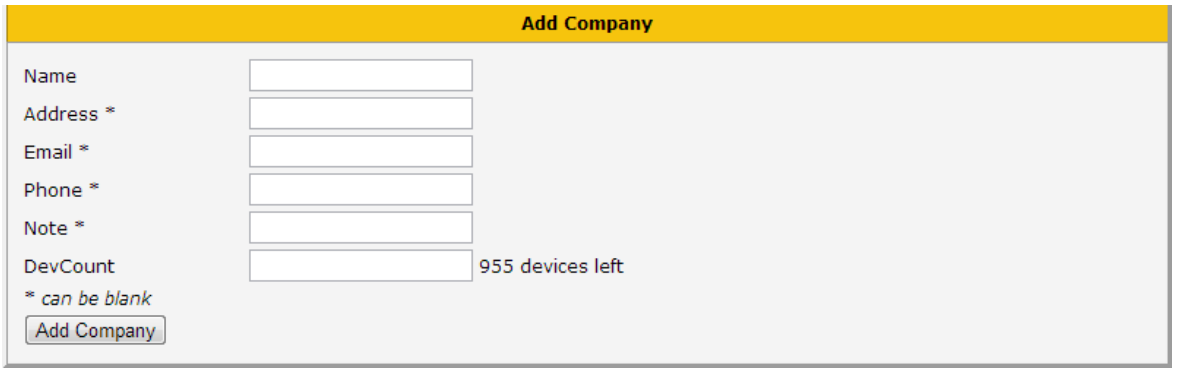

Figure 51: Add Company

4.9 Add User

The *Add User* item from the *Configuration* part of the main menu is available only when the *Users* page is displayed. It is also necessary to have administrator privileges.

Use the form on this page to add user to R-SeeNet database, who will use the web interface of monitoring system.

Item	Description
Username	Name for logging into the web interface
Password	Password for logging into the web interface
Confirm Password	Password confirmation
Name	Name of the added user
Surname	Surname of the added user
E-mail	E-mail of the added user
Phone	Phone number of the added user
Role	Type of a user account: • *Guest* – common user • *Admin* – user with administrator privileges

Table 15: Add User

Note: Items *Name*, *Surname*, *E-mail* and *Phone* can be blank.

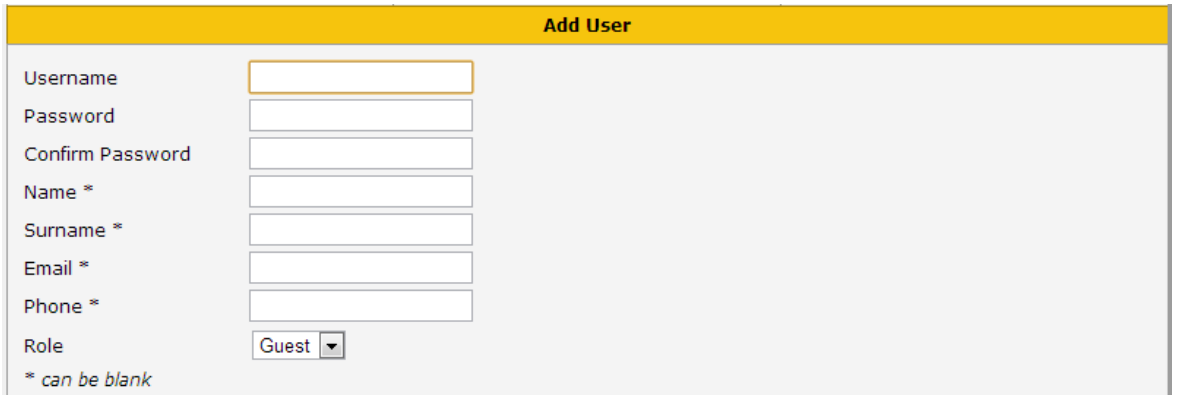

Figure 52: Add User

In the bottom part is a section (*Group settings*), where you can define the availability of existing groups for a new user and the way in which (and whether) newly added user will be informed of events in connection with the group.

Group	Enable	Events							
		Online/Offline		Traffic		Level		Unexpected trap	
		Email	SMS	Email	SMS	Email	SMS	Email	SMS
Zkouska	☑	☐	☐	☐	☐	☐	☐	☐	☐
TO Test	☑	☐	☐	☐	☐	☐	☐	☐	☐

Figure 53: Add User – Group Settings

The user is added to the database by clicking on the *Add User* button at the bottom of the *Add User* form.

4.10 Options

This page (*Options*) has six different subpages that allow you to modify the properties of R-SeeNet. These are the following subpages: *General*, *Appearance*, *Snmp*, *Email & SMS*, *Warnings* and *Report*. For common user (without administrative privileges) are only accessible *General*, *Appearance* and *Report* subpages.

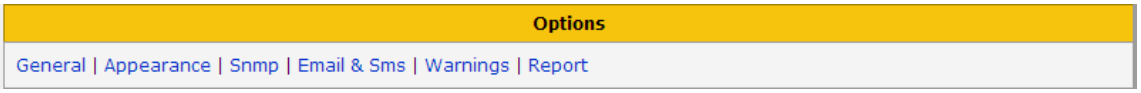

Figure 54: Options

4.10.1 General

The *General* subpage allows you to set system properties of the monitoring system.

Item	Description
Ping count	Number of ping messages sent when invoking ping on the *Device list* page.
Automatic refresh (min)	The time after which the monitoring system page will be automatically reloaded. There are values: 1, 3, 10 and 30 minutes. The *Disable* value disables this function.
Timezone	Setting the local time shift.

Table 16: Options – General

Timezone may be changed only by a user with administrator privileges.

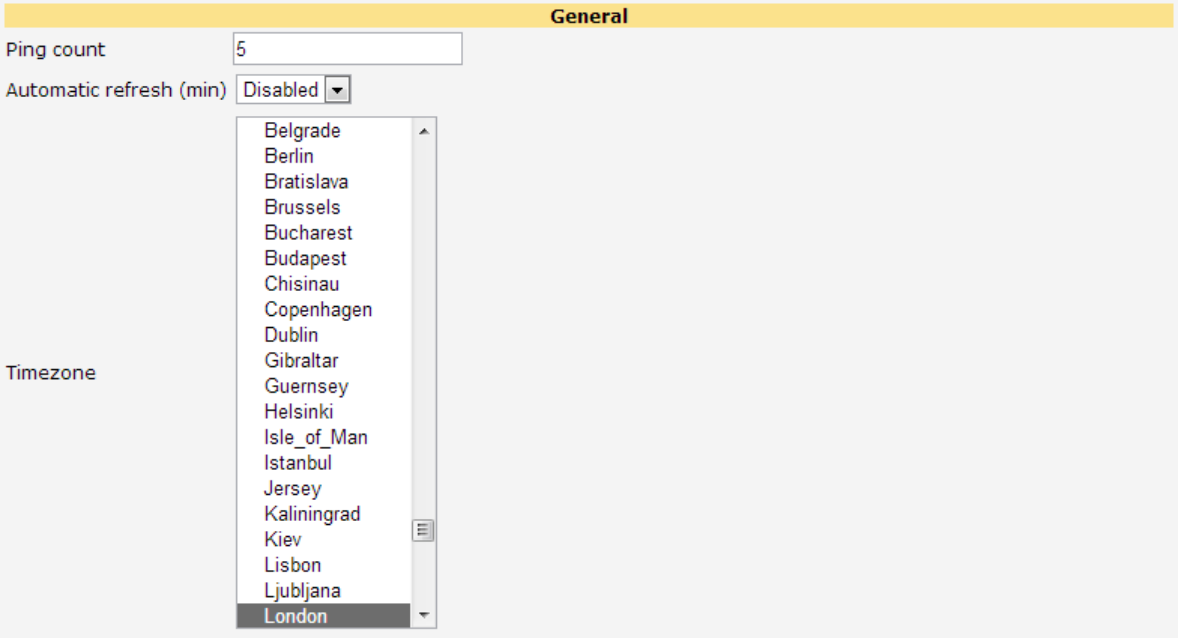

Figure 55: Options – General

4.10.2 Appearance

The *Appearance* subpage allows you to modify appearance of the monitoring system. This subpage is divided into four blocks. The first of them – *Own Logo* – allows you to insert your own logo to the header of the web interface. On the other hand, you can use the *Delete* button to delete the current logo.

This block is available only for users with administrator privileges.

Figure 56: Options – Own Logo

In this part can be set appearance of the *Device List* page. Items that are situated in the *Selected* list will be displayed on the *Device List* page as table columns. Conversely, items included in the *Available* list will not be displayed. Items can be moved between lists using the buttons with arrow. The *Up* button moves the selected item up in the list, while the *Down* button moves it downward. Meaning of each item is described in section 4.2 *Device List*.

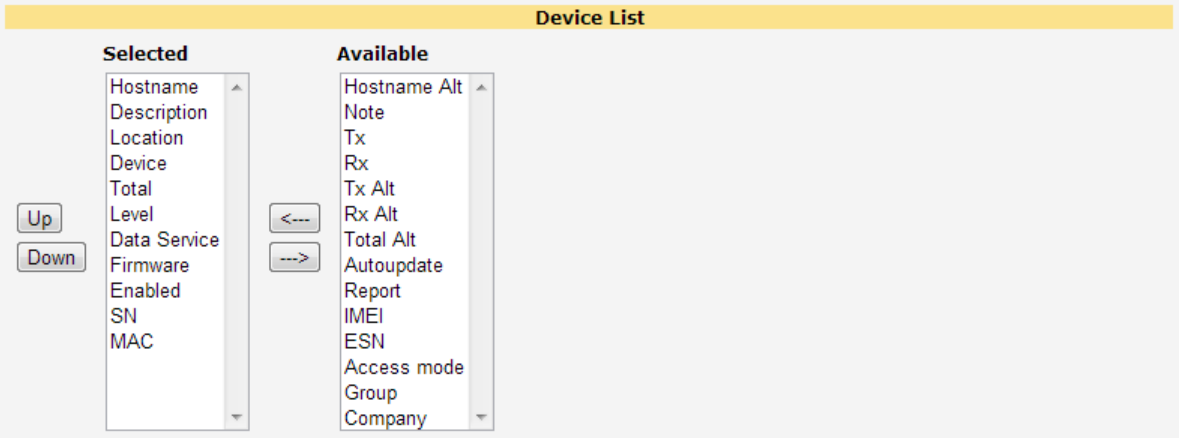

Figure 57: Options – Device List

The *Color Scheme* part allows you to set the color scheme of the monitoring system.

Figure 58: Options – Color Scheme

The last part of this page (*User Link*) allows you to define the link and text of this link to the user application displayed on the *Device List* and *Device Status* page under the Hostname field at the bottom of this page.

Figure 59: Options – User Link

4.10.3 Snmp

The *Snmp* subpage is available only for users with administrator privileges.

The password entered in *Default community* box is automatically preset when inserting new routers.

Figure 60: Options – Snmp

4.10.4 Email & Sms

The *Email & Sms* subpage is available only for users with administrator privileges.

This subpage is intended for configuration of SMS gateway and email account to send information reports by monitoring system. In the first part – *SMS Gateway* – you can set SMS gateway, which is used to send SMS messages. As the SMS gateway must be used B&B router. It is necessary to specify the following items:

Item	Description
IP Address	IP address of router used as SMS gateway
TCP Port	TCP port number
Max. SMS's per day	The maximum number of SMS messages sent per a day. If you enter zero, the number of messages is unlimited.

Table 17: SMS Gateway

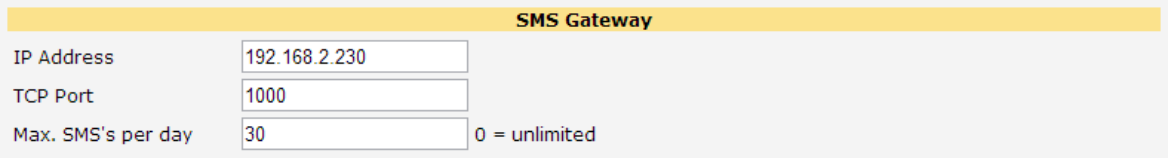

Figure 61: Options – SMS Gateway

The second part – *Email Account* – allows you to set an email account designated for sending information reports.

Item	Description
SMTP server	IP address of SMTP server
Port	Port on which the SMTP server is running (usually 25)
Email Address	Email address from which the message is sent
Email Subject	Subject of sent emails
Username	Username
Password	Password
Max. Email's per day	The maximum number of emails sent per a day. If you enter zero, the number of messages is unlimited.

Table 18: SMS Gateway

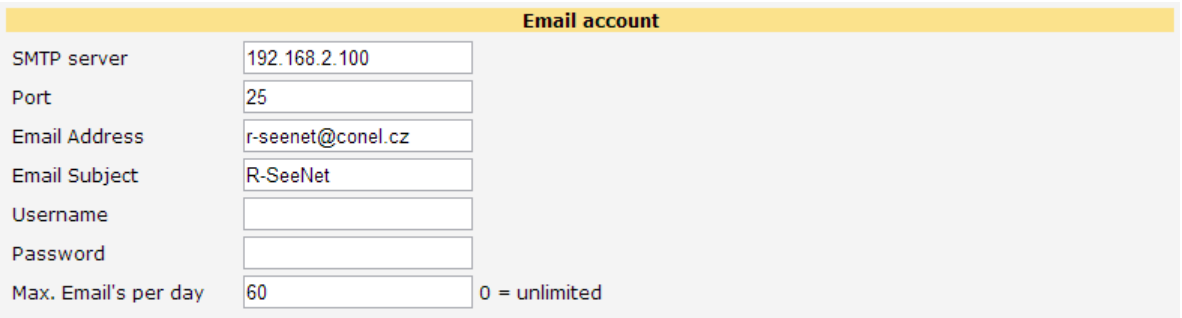

Figure 62: Options – Email Account

4.10.5 Warnings

The *Warnings* subpage is available only for users with administrator privileges.

At the beginning of this subpage is an available check box (*Warnings enabled*), which enables (or disables) use of warnings. This is followed by the *Event Strings* block, where it is possible to define a form of warning messages for each event.

Item	Event description
On offline	Offline mode
On online	Online mode
On traffic limit	Reaching the limit of transferred data for primary SIM card
On level limit	Exceeding the limit of signal quality
On unexpected trap	Receiving unexpected trap

Table 19: Event Strings

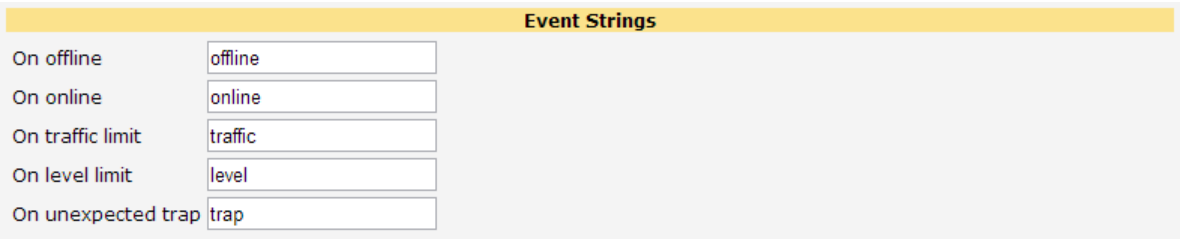

Figure 63: Options – Event Strings

The second part (*Router Identification*) allows you to choose properties of router by means of which it will be possible to identify this router.

Item	Description
Description	Description of the router
Location	Location of the router
Hostname	IP address of primary SIM card
MAC Address	MAC address of the router

Table 20: Router Identification

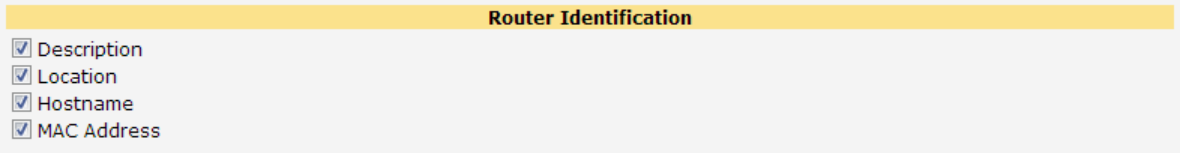

Figure 64: Options – Router Identification

4.10.6 Report

The *Daily reports generate from XX to XX hour* item specifies time for generating daily report, which can be downloaded from the *Report* page.

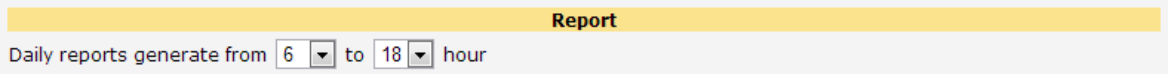

Figure 65: Options – Report

In the *List* part of this page you can choose items, which will be displayed in each report. Items that are situated in the *Selected* list will be displayed on the *Device List* page as a table column. Conversely, items included in the *Available* list will not be displayed. Items can be moved between lists using the buttons with arrow. The *Up* button moves the selected item up in the list, while the *Down* button moves it downward. Meaning of each item is described in section 4.2 *Device List*.

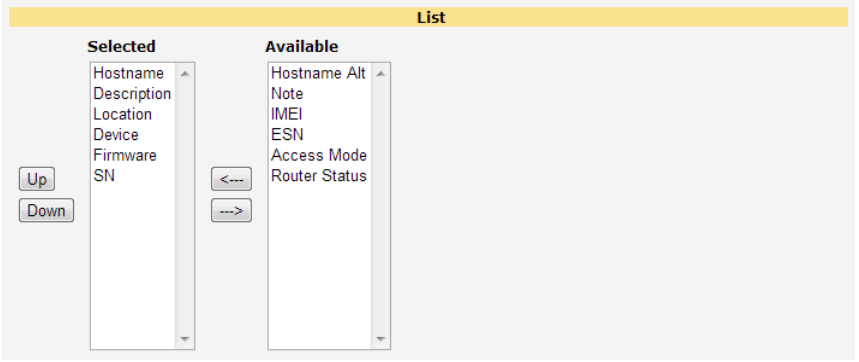

Figure 66: Options – Daily report items

4.11 Logout

To log off from the web interface of monitoring system use *Logout* item in the administration part of the main menu. After logout it will be redirected to the page with login form – *Login* (see figure below).

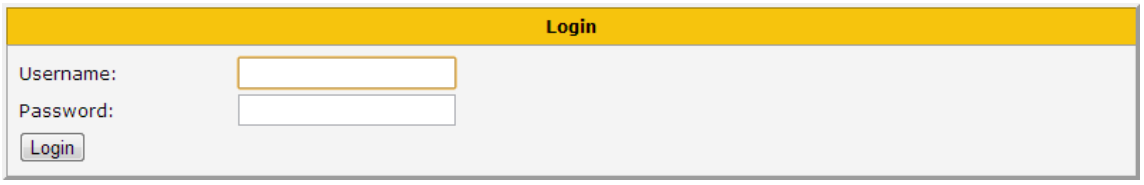

Figure 67: Login

If a user is inactive for longer than 15 minutes, they will be automatically logged out.

4.12 Companies

The *Companies* page is only available for users with superadministrative privileges.

This page displays a list of companies that use R-SeeNet for monitoring their routers. The meaning of each column is described in the following table.

Item	Description
:.	Identifier of the company (sequence number)
Name	Company name
Address	Contact address
Email	Contact email address
Phone	Contact phone number
Note	Any note about the company
Operation – Edit	Edits information about the company (pencil icon)
Operation – Remove	Removes company from the list (red cross icon)

Table 21: Companies

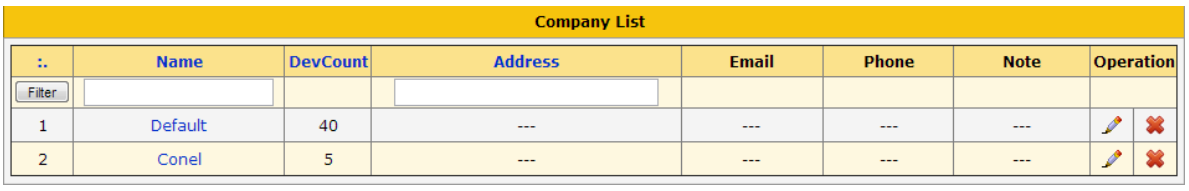

Figure 68: Companies

Tips for working with *Companies* table:

- Number of companies displayed on one page can by specified by the numbers in the lower right corner (25 and 100). To browse between pages use pagination in the same corner. Another possibility is to write page number into the *Go to page* field and then press Enter.
- Companies can be sorted by any column whose name is blue. For sorting companies by a particular column click on the column name. Press it again to rank companies in reverse order.
- Companies can be filtered by some criterion. At first specify the criterion into the box below the name of the column and then press the *Filter* button.

4.13 Users

The *Users* page is only available for users with administrative privileges.

This page displays a list of users authorized to use R-SeeNet web interface. The meaning of each column is described in the following table.

Column	Description
:.	Identifier of the user (sequence number of added user)
Username	Name for logging into the web interface
Role	Type of a user account: • *Guest* – common user • *Admin* – user with administrator privileges
Name	Name of the added user
Surname	Surname of the added user
E-mail	E-mail of the added user
Phone	Phone number of the added user
Operation – Edit	Edits information about the user (pencil icon)
Operation – Remove	Removes user from the list (red cross icon)

Table 22: Users

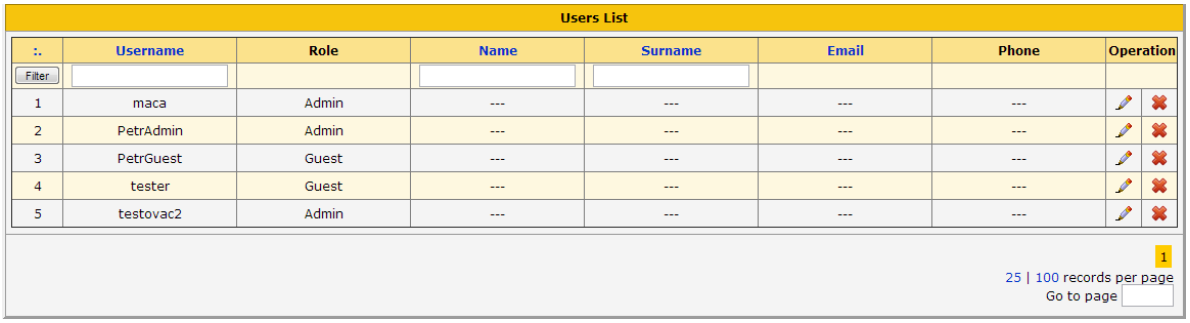

Figure 69: Users

Tips for working with *Users* table:

- Number of users displayed on one page can by specified by the numbers in the lower right corner (25 and 100). To browse between pages use pagination in the same corner. Another possibility is to write page number into the *Go to page* field and then press Enter.
- Users can be sorted by any column whose name is blue. For sorting users by a particular column click on the column name. Press it again to rank users in reverse order.
- Users can be filtered by some criterion. At first specify the criterion into the box below the name of the column and then press the *Filter* button.

4.14 Sms

The *Sms* page is available only for users with administrator privileges.

This page is used for sending SMS message through SMS gateway that can be set on the *Options* page (see section 4.10.4 *Email & Sms*).

Item	Description
Phone Number	Phone number of SMS message recipient
Message	Text of SMS message
Predefined SMS	List of predefined SMS messages

Table 23: Send SMS

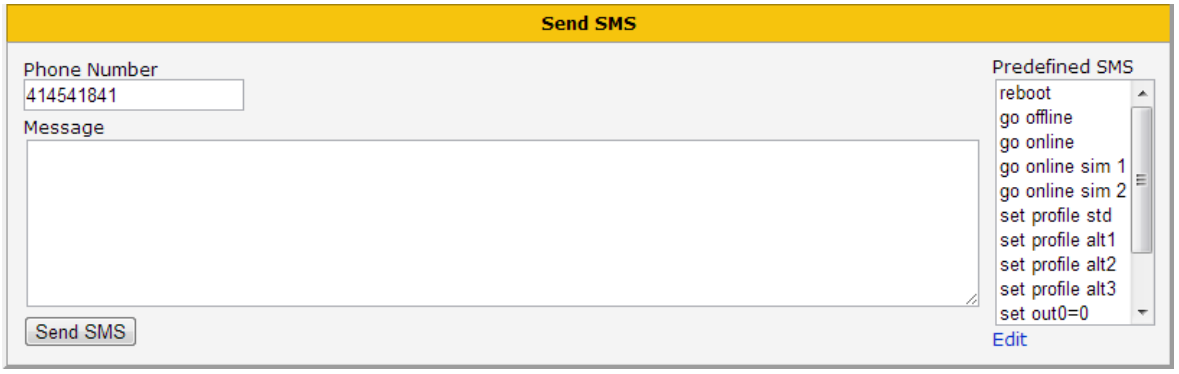

Figure 70: Send SMS

List of predefined SMS messages can be edited by pressing the *Edit* button. A red cross in the *Operation* column is used to delete the already created messages. A new message can be added to the list by entering to the box at the bottom of the page. Then it is necessary to press the *Add* button. If the *For all users* check box is selected, the message is added to the list of predefined SMS messages to all users.

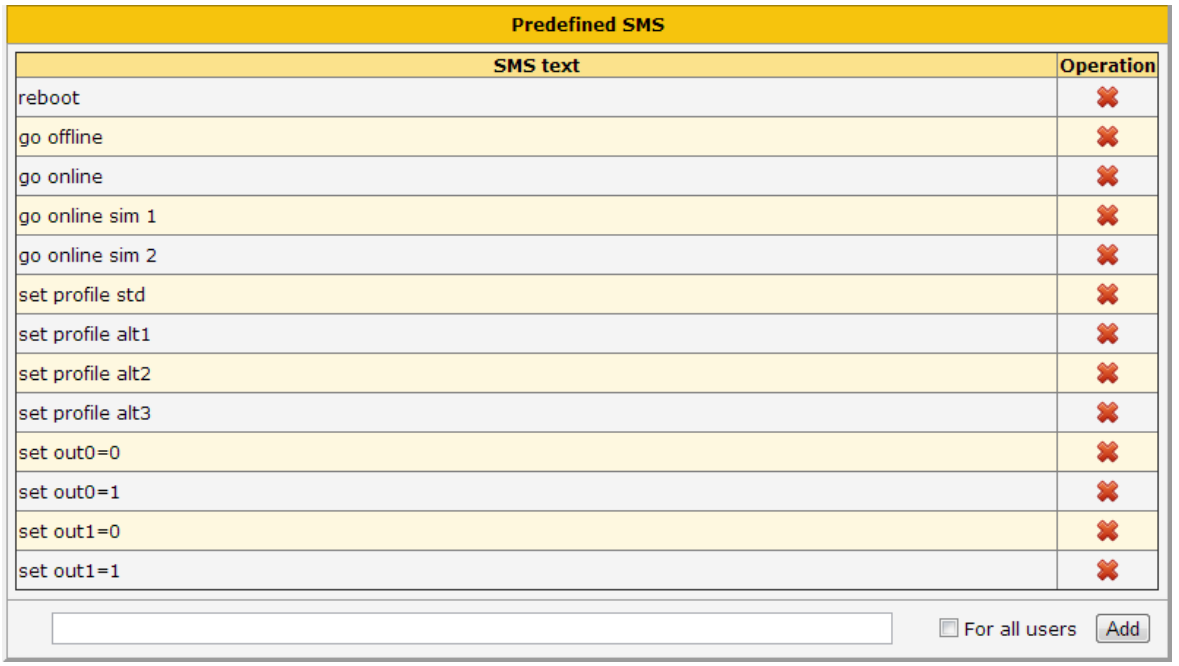

Figure 71: Predefined SMS

4.15 Log

The *Log* page is available only for users with administrator privileges.

This page contains information about all accesses and changes made in the web interface of the R-SeeNet monitoring system.

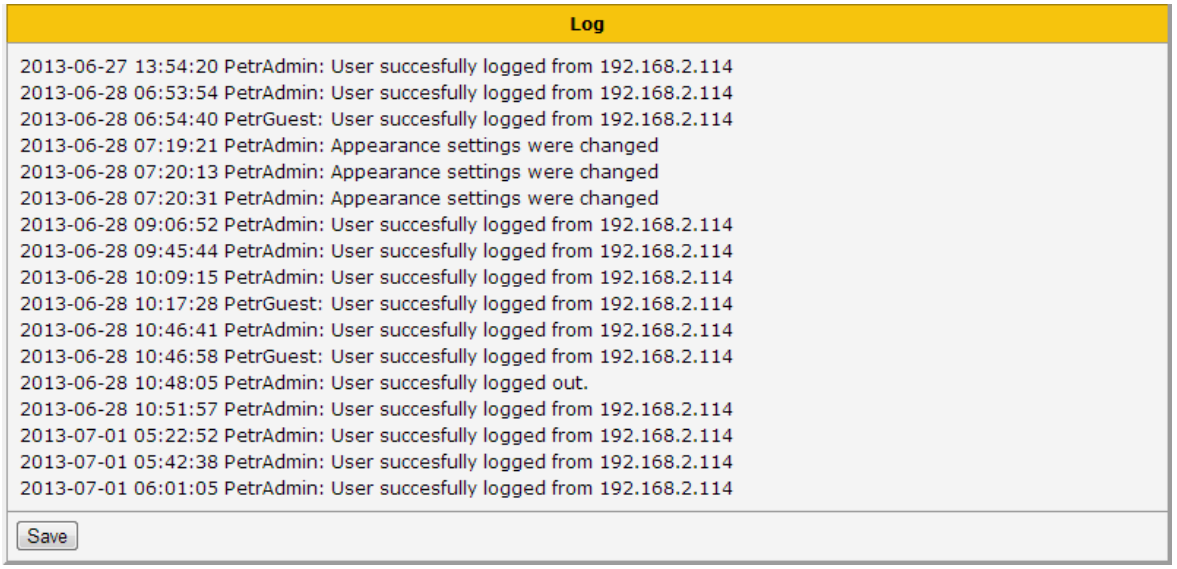

Figure 72: Log

4.16 About

On the left side of the *About* page is provided information about the current version of R-SeeNet. There is also information about the license and the current state of the R-SeeNetu core. Superadmin user also has the ability to perform online or offline activation. On the right side is displayed information about the B&B company.

4.16.1 Online activation

In the case of online activation is only necessary to enter the license key and press the *Activate* button.

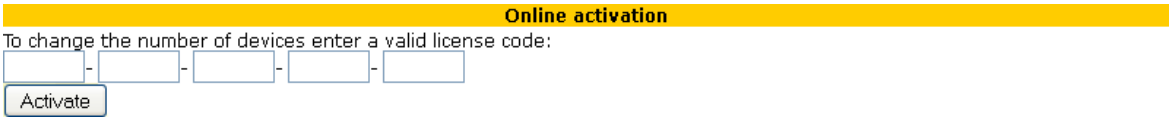

Figure 73: Online activation

4.16.2 Offline activation

In the case of offline activation is necessary to enter the license key and press *Generate* button. After pressing the button, R-SeeNet generates installation key in the *License key* field. This installation key must be sent to the B&B company – support@bb-elec.com. Then you will obtain activation key, which you must enter into the *Activation key* field and press *Activate* button.

Please note that the installation key is valid for one day.

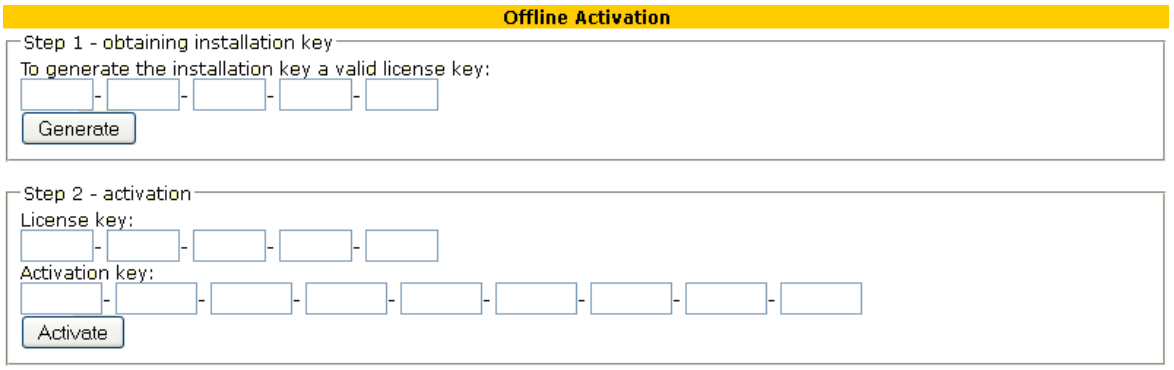

Figure 74: Offline activation

5. Database

5.1 Description of database

R-SeeNet database consists of five tables. Table *Devices* contains information about individual monitoring stations and the last states. In the *Day* table are kept statistics of each router in one day. The *Stats* table contains statistics for each router reading data during one monitoring cycle. Summary information of a monitoring cycle is stored in the table *Summary*. Routers that were unavailable in one monitoring cycle are stored in the table *Fails*.

5.2 Backing up the database

Database of monitoring system is backed up daily at the hour specified in the installation process. Backups are stored in the directory with installed R-SeeNet (C:****R-SeeNet**** as standard). Directory name is in the YYYYMMDD form (year, month, day). Backup from the previous day is deleted, when a new backup is created. Every first day of month is created a monthly backup directory in the form YYYYMM, which is held to the first day of next month.

To successfully create a backup monitoring system must contain at least one router.

5.3 Restoring the database

Before restoring the database it is necessary to stop the MySQL service and snmomonsvc service.

The backup, you want to restore, must be moved to the following directory:

R-SeeNet/mysql/data/snmpmon

6. Automatic update of routers

6.1 Location of configuration and firmware

Files with the firmware and configuration for each router must be placed in the directory of monitoring system R-SeeNet/httpdocs/temp_update.

6.2 Monitoring system settings

If you want to enable automatic update of router configuration, check the *AutoUpdate* item on the *Device List* page (see section 4.2 *Device List*). To change the properties of the router is necessary to be log in into the system.

6.3 Router settings

The router must have enabled the automatic update of firmware (possibly also update of the configuration). As a *Source* choose HTTP server. In the *Base URL* item must be filled in address of the server, where R-SeeNet is installed. It is also possible to fill in the name of the downloaded configuration (*Unit ID*) and the frequency to check if the new configuration is on the server (*Update Hour*).

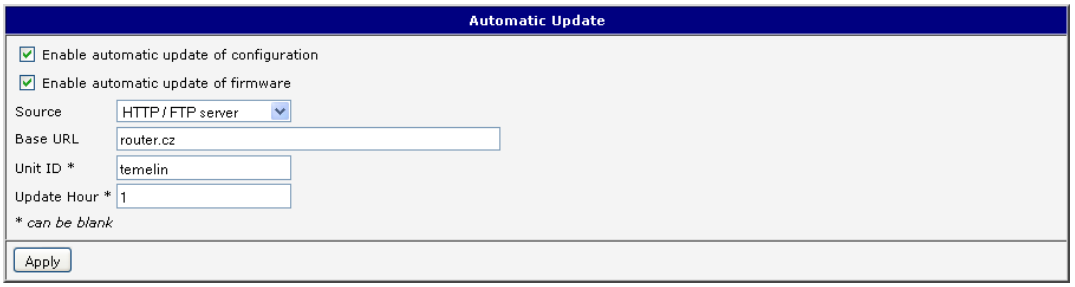

Figure 75: Automatic Update

A detailed description of the Automatic update settings in routers is explained in the Configuration manual for v2 routers (see [1]).

7. Recommended literature

[1] B&B: **Configuration manual for v2 routers**