

Open-E iSCSI-R3 ENTERPRISE



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1 Before you get started

Congratulations on purchasing Open-E iSCSI-R3 Enterprise, the ideal solution for network-based storage management. This manual will assist you as you install and configure the hardware.

In order to quickly reach the desired configuration, please read the following pages thoroughly. The time invested is well spent - after all, you have purchased this solution for your invaluable data.

1.1 Content of this package

Before you begin installing Open-E iSCSI-R3 Enterprise, make sure that the package contains the following items:

- Open-E iSCSI-R3 Enterprise flash module,
- Quick Start brochure,
- A CD containing the manual (this document), brochures, images and additional information material,
- Source CD.

If something is missing, please contact your dealer.

1.2 System requirements

- x86-compatible PC
- CPU (2 GHz Pentium IV),
- at least 512 MB main memory,
- USB port,
- One or several suitable hard drives (SATA,SAS, SCSI, ATA),
- Optionally hardware Raid controller, Fibre Channel and iSCSI Storage.
- Network Interface Card (NIC),

Open-E iSCSI-R3 contains its own operating system no additional software is required.

● note In order to generate maximum performance, we recommend using a network card with 1 Gb or more (multicards 1Gb/s recommended for bonding), as well as a processor with at least 3 GHz. If several computers are accessing the Open-E iSCSI-R3 system, we recommend 1024 MB main memory or more.

1.3 Supported clients

- Microsoft Windows (all versions)
- Linux
- Unix
- Mac OS 8.0, 9.0 and OS X

1.4 Supported network protocols

- TCP/IP
- NetBEUI
- SNMP

1.5 Supported network file protocols

- SMB / CIFS / Samba
- Apple Talk
- FTP/sFTP

1.6 Required tools

- Grounding strap or mat in order to avoid electrostatic discharge (ESD)
- Tools for opening the computer's enclosure (typically, a screwdriver)

1.7 Safety precautions

1.7.1 Personal safety

- **caution** High voltages may occur inside computer equipment. Before removing the enclosure, please turn off the power switch and disconnect the power cords.

1.7.2 Safety for your data

If you are not using new hard drives for operating Open-E iSCSI-R3, please backup all important data prior to installation. Adding a hard drive to Open-E iSCSI-R3 goes hand in hand with complete formatting of the hard drive, which can possibly delete existing data.

1.7.3 ESD precautions

In order to avoid damage to your computer or to Open-E iSCSI-R3, please ensure you are grounded before opening the PC or the ESD package that contains Open-E iSCSI-R3. Using grounding straps or mats is the best way to ensure this safety. If you don't have grounding equipment handy, please make sure you are grounded before working with Open-E iSCSI-R3, for instance, by touching a heater.

- Avoid unnecessary touching of the components inside the PC,
- Please touch Open-E iSCSI-R3 only on the edges.

2 Features

2.1 What is iSCSI

iSCSI (**internet SCSI**) is a protocol that encapsulates SCSI (Small Computer System Interface) commands and data in TCP/IP packets for linking storage devices with servers over common IP infrastructures. By using iSCSI, you can supply high performance SANs (Storage Area Networks) using standard IP networks like LAN, MAN, WAN or the Internet.

iSCSI solutions are based on a separate operating system and often also on a special hardware. Typically, this operating system allows operating iSCSI technology.

iSCSI solutions allow users to add additional disk devices to existing networks quickly, easily, and cost-efficiently.

iSCSI is a client-server architecture. Clients of an iSCSI interface are called "initiators". Initiators issue iSCSI "commands" to request services from components, logical units, of a server known as a "target". The "device server" on the logical unit accepts iSCSI commands and processes them.

2.2 Description of the functions

Open-E iSCSI-R3 is one of the easiest ways of implementing an iSCSI technology in your network. Through its simple architecture – in principal, it is a flash memory with an USB 2.0/1.1 port and Open-E iSCSI-R3 as its operating system – Open-E iSCSI-R3 can be used with all x86 PCs containing, USB ports, IDE controller and additional SATA Controller on your main board or hardware controller.

To begin working with Open-E iSCSI-R3, all you need to do is assign an IP address to the iSCSI target – either automatically through an existing DHCP server or by assigning it manually. All other settings are handled via a web front-end which can be easily accessed through the IP address of Open-E iSCSI-R3 using the encrypted https protocol.

Open-E iSCSI-R3 allows users of client stations to delegate disk devices and aggregation and form iSCSI Targets and their local mounting from any site in the network.

2.3 Why Open-E iSCSI?

Often, storage in network environments is expanded the following way: File servers have to be shut down in order to install additional drives. In the next step, they need to be reconfigured. In is tedious work data often has to be copied manually onto larger drives, consuming a lot of time and money.

With Open-E iSCSI-R3 you can:

- Consolidated storage and backups for multiple servers.
- Improve data availability and efficiency.
- Lower costs by centralizing storage management.
- iSCSI also simplifies the installation and on-going management of a SAN versus using Fibre Channel.

Expensive hardware is, therefore, no longer necessary. Take any computer – a new rack server or an old desktop PC with USB ports 2.0/1.1– and exchange the system drive for the Open-E iSCSI-R3 USB flash module. To store data, Open-E iSCSI-R3 uses IDE (ATA) and SATA hard drives, connected to ports on your main board or hardware RAID controller.

Additionally Open-E iSCSI-R3 support software RAID, so you can create software RAID over single hard drives or over existing hardware RAID5.

For example, you can create software mirror over two hardware RAID5 for very high reliability.

Within a few minutes, you will have up to several hundred gigabytes available on your network – without much effort and any downtime.

2.4 RAID types

This manual is not intended to replace your RAID controller manual. But we want to provide you with an overview of common RAID types so that you can make an informed decision on which type to choose. Depending on whom you ask, RAID means either Redundant Array of Independent Disks or Redundant Array of Inexpensive Disks. Both are correct. In essence, you combine the capacity, speed and security of several disks into one.

RAID 0 forms one large hard disk by concatenating stripes from each member drive. Stripe size is configurable roughly between 64 KB and 1 MB. The result is a lightning-fast RAID, but with no added security. One failing drive may ruin the entire RAID.

RAID 1 mirrors hard drives. By writing identical data onto more than one drive, security is enhanced. A completely defective drive does not cause any loss of data. The drawback is reduced performance and capacity.

RAID 5 combines data striping from RAID 0 with parity checking, therefore combining speed and improved security. The loss of one drive is tolerable.

RAID 6 extends RAID 5 by adding an additional parity block, thus it uses block-level striping with two parity blocks distributed across all member disks. It was not one of the original RAID levels. The user capacity of a RAID 6 array is $N-2$, where N is the total number of drives in the array. RAID 6 does not have a performance penalty for read operations, but it does have a performance penalty on write operations due to the overhead associated with the additional parity calculations.

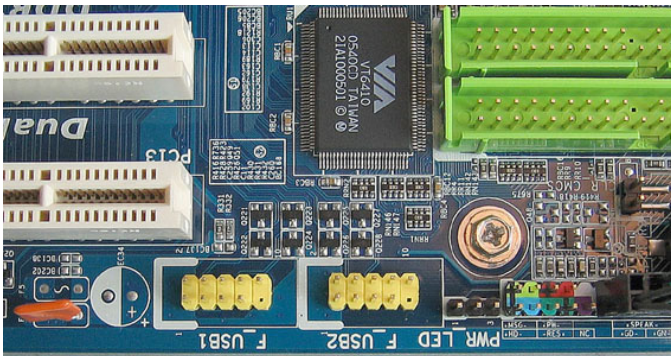
RAID 10 is a combination of RAID 1 and 0, hence the name. Data is written in a striped and mirrored configuration, providing high performance and robust security.

3 Hardware installation

3.1 Getting ready

Switch off the computer, remove the power supply, and open the PC's enclosure. In tower cases, the side parts often can be removed individually (on the backside of the enclosure you just need to remove a few screws). Many machines have U- or O shaped covers that have to be pulled off (either towards the front or the back). Should you need any assistance, please contact your dealer.

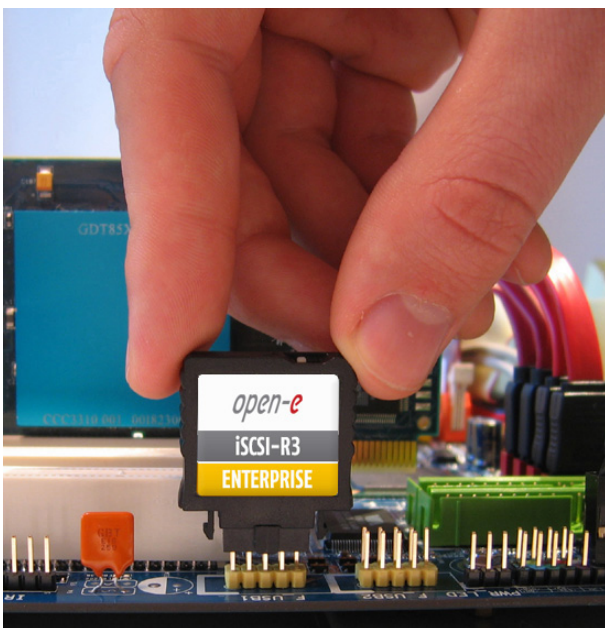
Now localize the USB connectors on your motherboard:



Every motherboard has at least two such ports. To install Open-E iSCSI-R3, you have to use one is existing.

3.2 Installing Open-E iSCSI-R3

If necessary, remove the flat band cable that connects your hard drive with the controller. Open-E iSCSI-R3 should now carefully inserted into USB the connector. As USB ports can have a notch on one side, you can only insert the connector at the preset position (see photo).



That should conclude the installation! Before putting the enclosure on your computer again, do not forget to connect your hard drives to the IDE connector, SATA connector or to the SATA port on the RAID controller. If you have a CD or DVD drive, you can remove it, as Open-E iSCSI-R3 does not support optical hard drives, but if you want to make an ISO update it is not necessary to remove the CD drives (see 5.2.3.5).

4 Configuration

4.1 The basic configuration of the iSCSI-R3 Server computer

Connect the keyboard and monitor (they will be needed for setup only). Later you can run the server in the "headless mode" (without keyboard and monitor).

- **note** Please set the BIOS to boot from USB device. If in the system is more than one USB device, make sure that system boots from PQI Disk-on-Module.
- **note** Some motherboards require following setting in bios relating "USB Mass Storage Device Configuration" in order to boot system from USB, or to work properly with USB:
 - Legacy USB device: enabled,
 - Emulation Type: Hard Disk,
 - USB Mass Storage Reset Delay: 10 sec.,
 - USB V1.1 in case with USB 2.0 can boot but still generates errors.
- **note** You may have to change the function "Halt On: All Errors" in your PC's BIOS, so that the system starts even without the keyboard. The correct configuration is "Halt On: All But Keyboard."

4.2 First-time operation of Open-E iSCSI-R3

Now start your system.



After booting is complete, Open-E iSCSI-R3 will provide you with information on the current software version and the network settings:

```

Welcome to Open-E iSCSI-R3 Enterprise                Press F1 for Help)
-----

Model:          Open-E iSCSI-R3 ENTERPRISE
Version:        2.00.IE20000000.2438
Release date:   2006-12-11
S/N:           87654321

Network settings:
Interface 1:    eth0      IP: 192.168.0.220/255.255.255.0
Interface 2:    eth1      IP: 192.168.1.220/255.255.255.0

HTTPS settings:
port:           443
allow from:     all

```

If the network has a DHCP server, Open-E iSCSI-R3 should gain access to the IP settings automatically. If that is the case, you can proceed at 4.3. If your network does not have a DHCP server, Open-E iSCSI-R3 will start with the default settings: IP address 192.168.0.220 and subnet mask 255.255.255.0.

You can change these values again by typing in the following key combination: left CTRL, left ALT and N. You can select a different IP address now. All other available functions on of the console will appear after pressing F1 key (see below).

```

-----Help-----
You can use below key sequences (C-means 'Left Ctrl',A-'Left Alt') :
C-A-N - to edit static IP addresses
C-A-P - to restore default factory administrator settings
C-A-I - to restore default factory IP configuration
C-A-T - to run Console Tools
C-A-X - to run Extended Tools
C-A-W - to run Hardware Configuration
C-A-R - to run CLI Management Tool for RAID controller
C-A-F - to run CLI Management Tool for Fibre Channel controller
C-A-H - to display hardware and drivers info
F2    - to display all network interface
F5    - to refresh console info
C-A-S - to shutdown the system
----- (100 %) -----
EXIT
-----

```

After a connection has been established, all settings can also be changed remotely via the web browser. If your network requires it, the address of the standard gateway and the broadcast address can be changed.

● note For additional information, please read the chapter “Functions of the console display.”

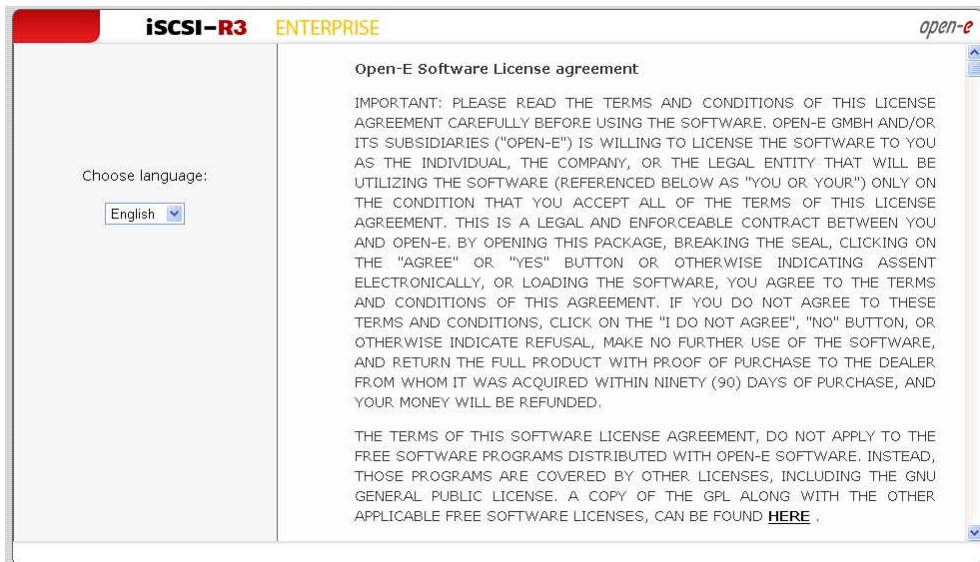
4.3 Logging into Open-E iSCSI-R3

You can establish a connection to Open-E iSCSI-R3 from every network computer. To establish this connection, use a browser (e.g. Microsoft Internet Explorer) and enter the IP address or the name of the computer hosting the Data Storage Server R server into the URL entry line: <https://192.168.0.220> (standard address) or <https://iscsi> (this name can be changed in the installation of Open-E iSCSI-R3).

● **note** For security reasons, Open-E iSCSI-R3 uses the encrypted SSL protocol (https).

You will now be asked for verification of the encryption certification. Since Open-E iSCSI-R3 does not allow for creating shares on the Internet but only on the Intranet, there is no need for global certification by an authorized body. You can accept the certificate for the session only, but also for all future use.

Now you have to accept the license in order to use the Open-E software and you can choose the language you want to use.



● **note** Page with the software agreement and available language option will be shown after first launching Open-E iSCSI-R3. Later you can change the language you can change using Language Settings, which are located in “server” through “setup”.

After accepting License agreement you can log into Open-E iSCSI-R3 using the standard password “*admin*” (this can be changed later). In order to start working, you can now set all parameters.

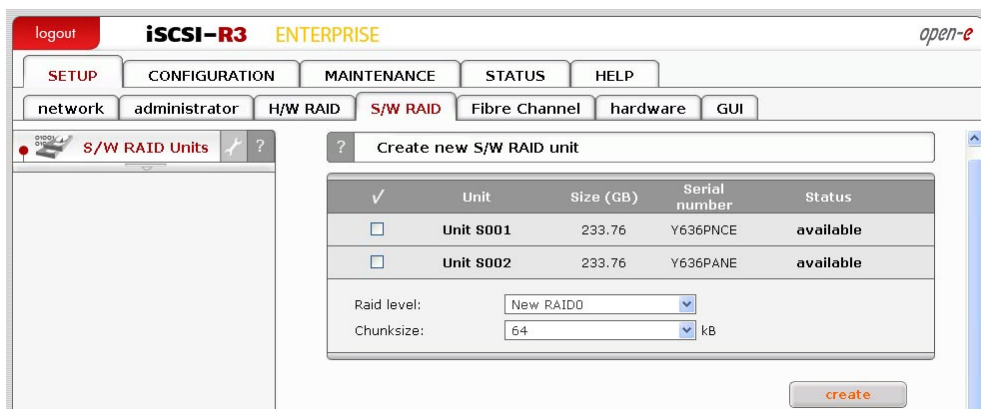


- **note** Password checking is case-sensitive. If you cannot log into Open-E iSCSI-R3, please check the status of the Shift and Caps Lock keys.
- **note** In case your web browser will show something different than expected, please delete the cache & cookies in settings menu of your web browser.

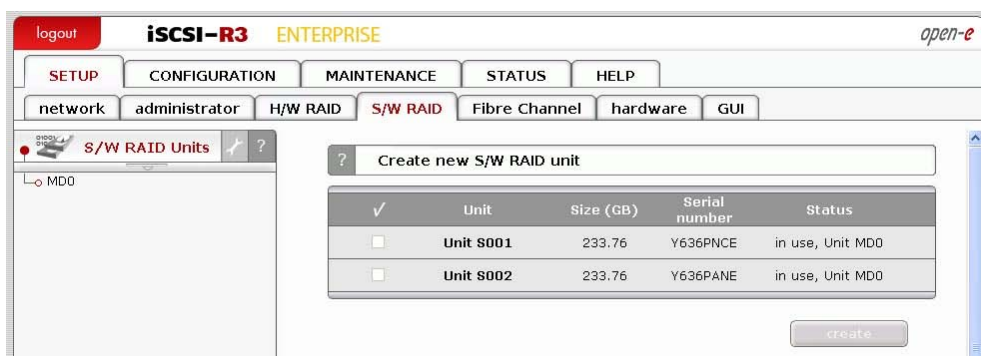
4.4 Create Disk Array

If system has Hardware RAID, please create RAID array in RAID controller setup. Please refer to the RAID controller manual. You do not have to install drivers or RAID array monitoring and maintenance software. If system has only "on motherboard BIOS RAID", please do not use it. Such on motherboard RAID are not supported.

In case you want use software RAID with single drives or even with installed hardware RAIDs, please go to menu "SETUP" → "SW/RAID" first. Here all available units are listed. A unit can be a single hard disk or a disk array (if using a hardware RAID controller). Software RAID can be created over a single hard disk or hardware disk arrays. To create a software RAID, please select units, choose the RAID level and click on "create" button.

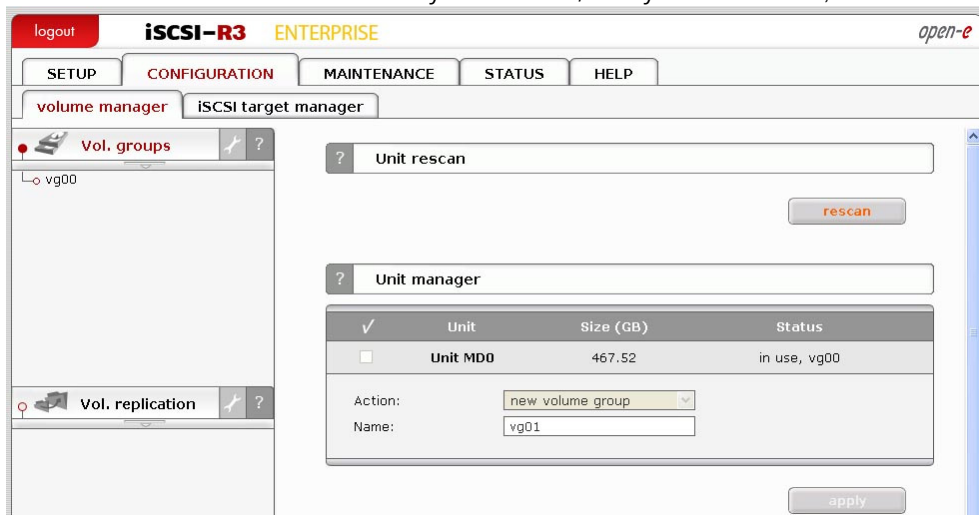


After clicking "create" button, the status will change to "in use" with additional information describing the kind of a disk array (e.g. MD0 is RAID 0)

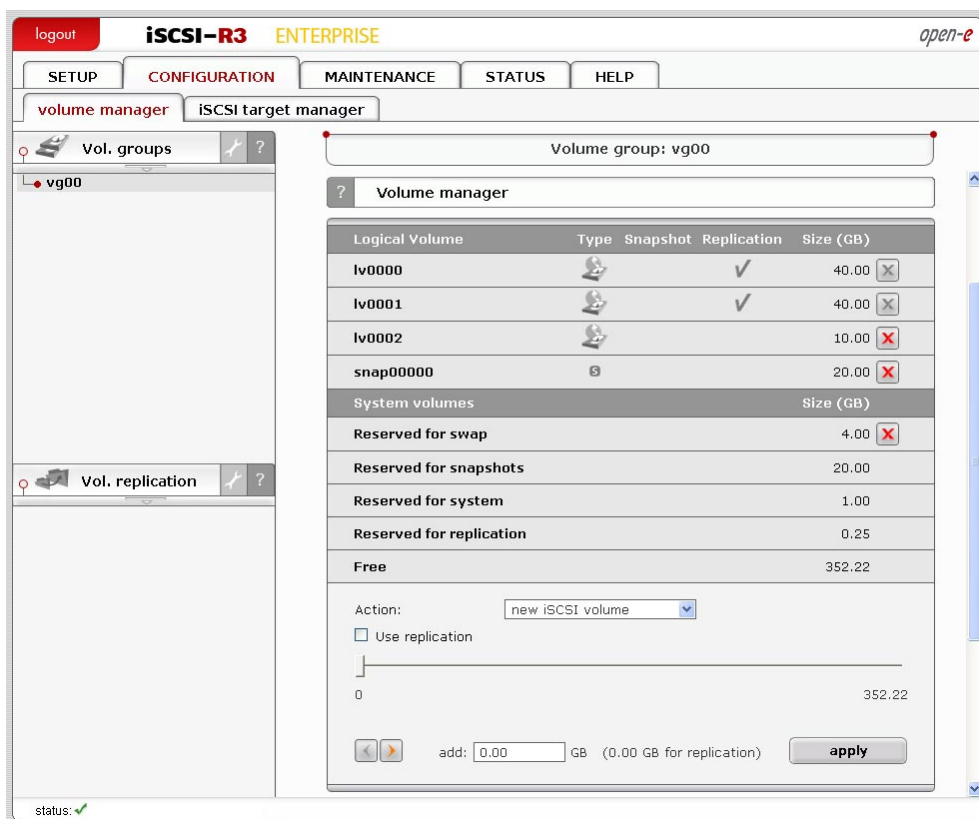


4.5 Adding Disk Array

- In the menu, please select the “CONFIGURATION” → “volume manager” and “Unit manager” function.
- You find a list of available drives/arrays (units) that can be used,
- While creating the “new volume group”, the system adds selected units only. You can use default volume group name or change it. After creating, the page is reloaded and the “Status” field should show your drives/arrays as “in use”,



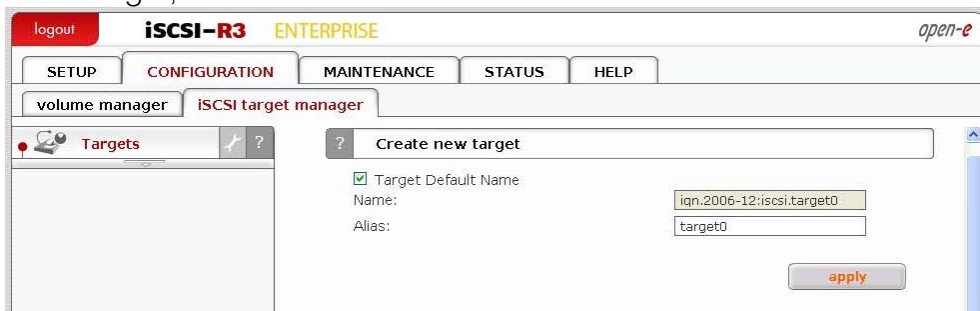
- You can possibly combine two (or more) units into one Volume Group. ext, by clicking on the right-hand side of the tree diagram on volume group name e.g. “vg00” and use function “Volume Manager” you can create new iSCSI volume,
- If you want to use snapshot feature you should create snapshot volume.



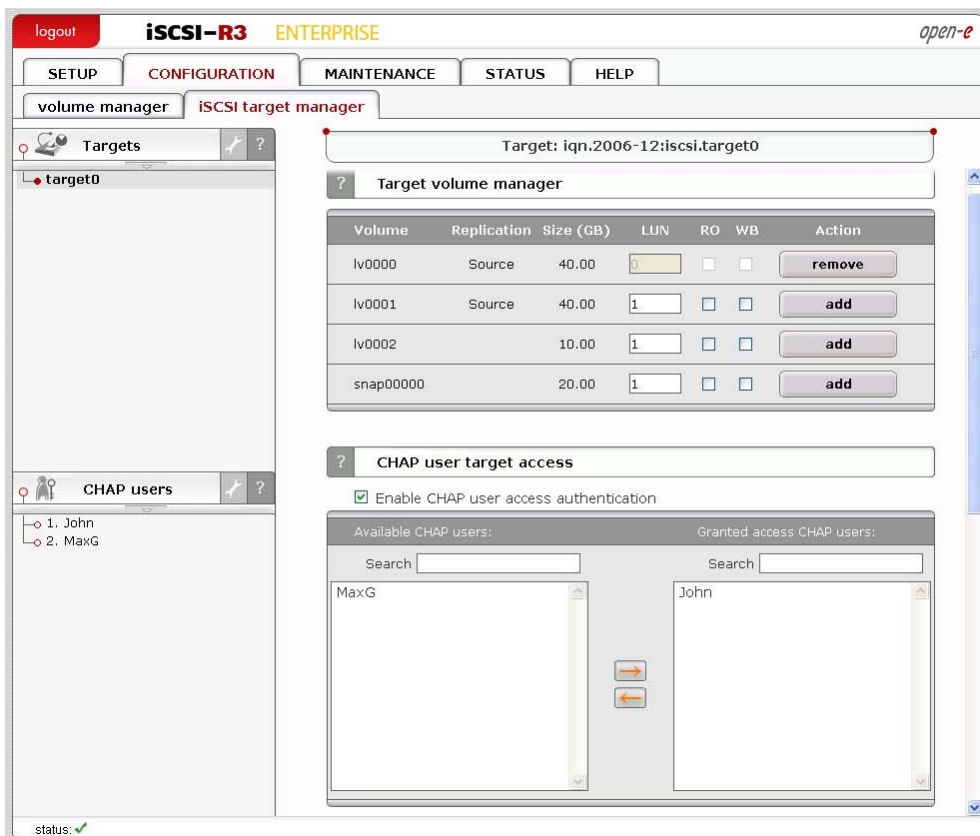
Next, with use of function “Volume Manager” you can add disk volume to a new LV, or increase size of existing LV’s (you can’t decrease LV size). To set needed LV size just use scrollbar, next to which, on the right side is shown size available to use. This function can be also used to reserve disk space for swap, snapshots, system and replication.

4.6 Creating Open-E iSCSI-R3 iSCSI targets volume

After creating iSCSI volume (in 4.5) , please choose “CONFIGURATION” → ”iSCSI target manager”, in “Create new target” Function click “apply” button to create a new iSCSI target,



Next, in the diagram “Targets”, click on the previously created target name e.g. “target0” and in “Target volume manager” function click “add” button by the desired logical volume,



In “Target Volume Manager” Function, you can add “targets volumes” only in the premises of one vg0.

● note Please create as many logical volumes, as many separate iSCSI volumes (LUNs) are required (in step 8).

If you create 5 logical volumes, you may create one target with 5 LUNs, or 5 targets with 1 LUN every, or 2 targets, where i.e. 3 LUNs belongs to first target and rest 2 LUNs belongs to the second one.

By clicking “CHAP users” on the branch, you can management the name and secure access to “logical volume” by giving CHAP user name and password (password must consist from 12 to 16 characters if you use Microsoft iSCSI Initiator).

4.6.1 Configuring end user workstation

For iSCSI technology to work correctly on end-user computers, you need to install iSCSI Initiator software (if it is not provided with the operating system). For Microsoft Windows 2000/XP/2003 systems, it is an option and the Microsoft iSCSI Initiator is available to download from the web.

Correct software configuration depends on installing individual “target volumes” by adding another disk letter in the system (in Windows XP and 2003) or as subfolder the same as with folders in UNIX system. All these functions are available via “administrative tools” → disks management.

How to connect iSCSI in Windows 2000/XP/2003:

- a. First, you have to install the iSCSI Initiator package. You must be logged in as administrator to install the Microsoft iSCSI Software Initiator package,
- b. Next, launch iSCSI Initiator software,
- c. If you set passwords on iSCSI and Target Access, on branch “General”, click on “Secret”, enter your passwords, and after entering each click “O.K.” button (your passwords is “Target secret”),
- d. In branch: “Discovery” click button “Add”, then enter your Open-E iSCSI-R3 IP address,
- e. Next click “Advanced...” button, and mark “CHAP logon information”, next give User name and Target secret and then two times click “O.K.” button,
- f. In the branch “Targets” you will see name of available iSCSI targets e.g. “iqn.2006.10:iscsi.target0”,
- g. Click “Log On” button, and if you entered password, you have to do the same as in point “e”, then press “O.K.” button, then the chosen target status will change for “Connected”
- h. Next choose settings → control panel → administrative tools → computer management → disk management,
- i. Now all available iSCSI TARGET drives will be displayed. In order to use them you have to format them and mount to the system as a next disk letter.

● **note** Microsoft iSCSI Initiator ver. 2.02 does not support dynamic disk. Target password must consist of minimum 12 and maximum 16 alphanumeric characters. Please read Manual and Release Notes of Microsoft iSCSI Initiator for more details, which you can also find on Microsoft website.

● **note** Please do not ignore time settings on iSCSI target and client station. Those settings must be the same. Time can be synchronized in the menu Web Interface “Setup” → “hardware” in Function “Set time”

5 Descriptions of function

5.1 Functions of the console display

While Open-E iSCSI-R3 can be fully administered remotely through a secure Web interface, some of the functions you can access on the console. Open-E iSCSI-R3 constantly displays following basic parameters:

- IP address
- Https settings

CTRL+ALT+n

If you press the left CTRL key + the left ALT key + n, you will be asked for the new IP address and the subnet mask. The DHCP server will be shut down.

CTRL+ALT+p

If you press the left CTRL key + the left ALT key + p, the access restrictions are lifted by entering the administrator password (in addition, there is a reset to the standard https port 443).

CTRL+ALT+i

By pressing a combination of left CTRL key, left ALT key and i, you can reset the original IP address (192.168.0.220) and the subnet settings (255.255.255.0). In this process, the DHCP server support is turned on.

CTRL+ALT+t

By pressing a combination of left CTRL key, left ALT key and t, you can run Console Tools. The menu will appear, with choice of following functions: Ping, DHCP Ping, Hardware info, Memory info, Time configuration and DNS configuration.

CTRL+ALT+x

By pressing the left CTRL key, left ALT key and x, it will display extended tools.

CTRL+ALT+w

By pressing the left CTRL key, left ALT key and w, it will display hardware configuration.

CTRL+ALT+r

By pressing the left CTRL key, left ALT key and f, it will display CLI Management Tools for Fibre Channel controller.

CTRL+ALT+h

By pressing the left CTRL key, left ALT key and h, it will display hardware and driver information.

F1, F2 and F5

Function key F1 is available to display help information while F5 will reset the console display to default. If you press F2 key all network interface will be displayed.

Shutting down and restarting

With Ctrl + ALT + DEL the Open-E iSCSI-R3 host computer will be shut down and restart, while CTRL + ALT + S shut it down. Please be careful with this option when users are connected.

ESC menu

Boot menu is available by pressing ESC after POST (Power-on self-test) during the initial start of Open-E iSCSI-R3 system. After pressing ESC, there will appear menu with possibility of launching Open-E iSCSI-R3 in different procedures of work or memory testing:

- **iSCSI-R3-Single** - system launch with (kernel) for one CPU,
- **iSCSI-R3-SMP** - system launch with (kernel) for more CPU's system,
- **iSCSI-R3-x86** - system launch with restrictions of 4GB RAM(this procedure should work on every unit with CPU better than 386 and with CPU C3),
- **iSCSI-R3-Single (Intel I/OAT support)** - system launch in procedure with one CPU,
- **iSCSI-R3-SMP (Intel I/OAT support)** - system launch in multiple-CPU,
- **Memtest** - after choosing this option , memory of the system, where Open-E iSCSI-R3 is installed, will be tested, Apart from test, there are also available information about the memory itself and its settings,
- **iSCSI-R3-RESCUE_MODE** - in this option only drivers which enables access to the net are loaded (if there is a need to connect using remote support).

5.2 Functions of Open-E iSCSI-R3 via browser access

On the following pages, we will thoroughly describe every function of Open-E iSCSI-R3. The functions are divided by menu options, which are located at the top part of the screen.

5.2.1 SETUP

In this place you can manage network interfaces, administrator settings, hardware RAID controllers, create disk array using software RAID, Fibre Channel, iSCSI initiator, hardware and GUI settings.

5.2.1.1 Network

Here you can find tree containing network interfaces. Click on Interface name to see more information about selected interface.

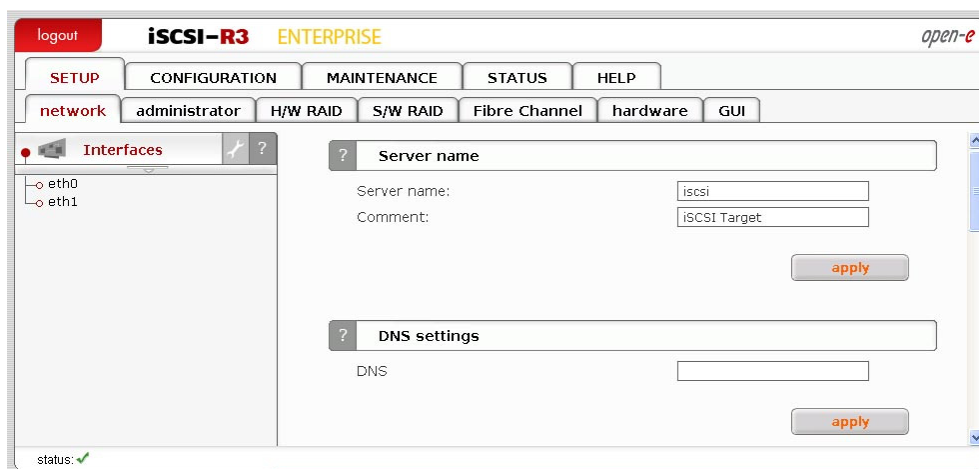
Function: Server name

Please enter server name to clearly identify your server.

In the field "Comment," please enter short description of your server.

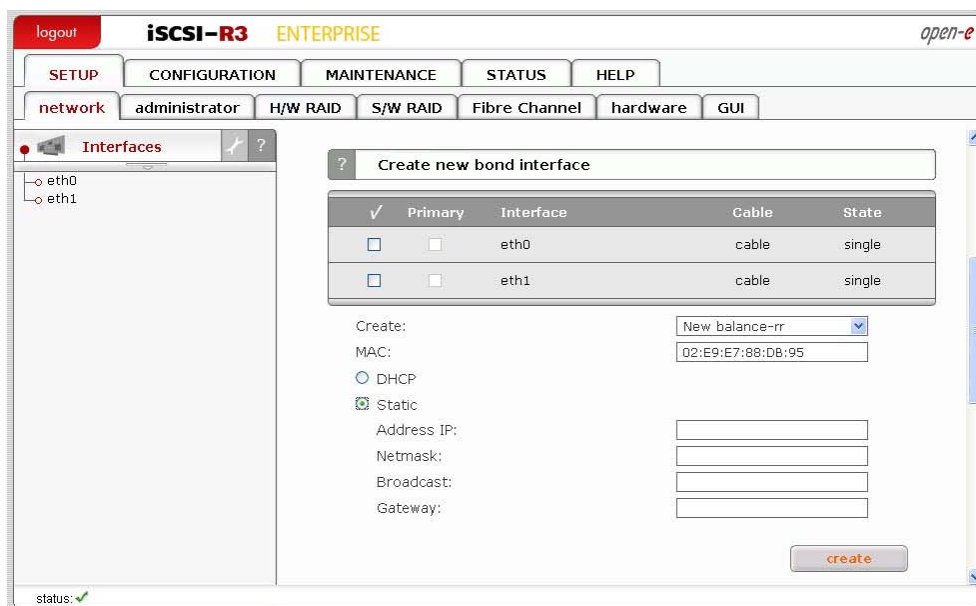
Server Name and Comment rules:

- Please make sure the server name is unique in your network.
- Select a server name that clearly identifies your new server.
- Please do not use spaces and special characters like: ~!@#\$%^&()+[]{}*,:;"'.,%|<>?/\='`_
- Server Name can not consist of digits only.
- Comment is not displayed in some systems.



Function: DNS settings

This function enables you to enter DNS addresses. Please use semicolons to separate addresses.



Function: Create new bond interface

Bonding allows for load-balancing or fail-over for the incoming and outgoing connections. Here you can create or edit bonding network interface.

In order to create bonding interface:

- select network interfaces from which you want to create a new bonding interface.
- select desired bonding mode from Create drop down menu.
- select dynamic (DHCP) or static configuration of network interface.
- if you want to dynamically get DNS address, select "get DNS".
- when using static configuration of network interface enter address IP, netmask, broadcast and gateway apply Create button, new bonding interface will be created now.

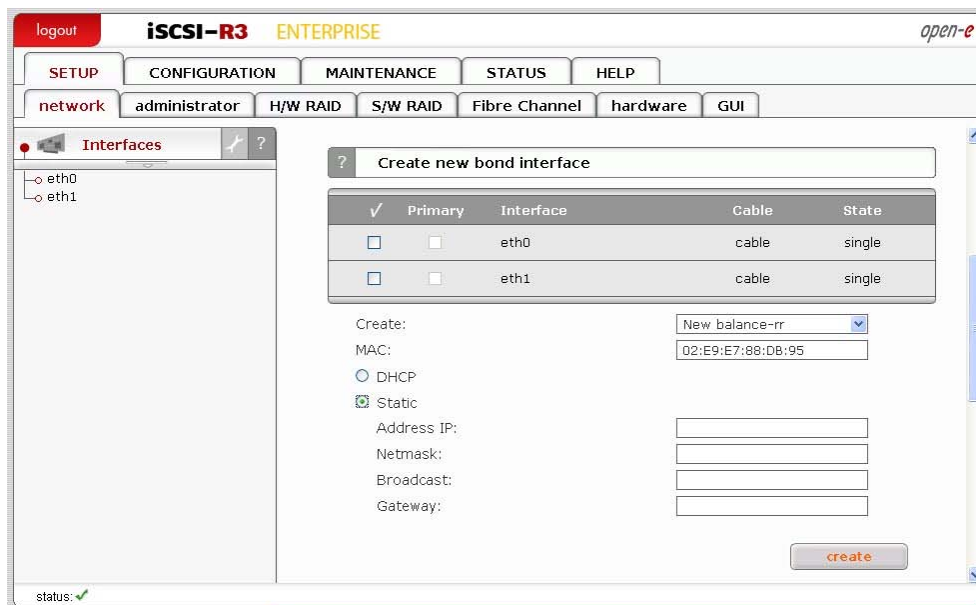
● **note** In order to take advantage of bonding more than one Ethernet NIC needs to be plugged into the box.

Each network interface is described by following fields:

- **Primary**
A string (eth0, eth2, etc) specifying which slave is the primary device. The specified device will always be the active slave while it is available. Only when the primary is off-line will alternate devices be used. This is useful when one slave is preferred over another, e.g., when one slave has higher throughput than another. The primary option is only valid for active-backup mode.
- **Interface**
Network interface name.
- **Cable**
Shows if cable is connected to NIC.
- **State**
Describes state of the network interface. NIC can be in bonding state or single.

Bonding modes:

- **balance-rr**
Transmissions are received and sent out sequentially on each bonded slave interface. This mode provides fault tolerance and load balancing.
- **active-backup**
Only one slave in the bond is active. Another bonded slave interface is only used if the active bonded slave interface fails. This mode provides fault tolerance.
- **balance-xor**
Transmit based on [(source MAC address XOR'd with destination MAC address) modulo slave count]. This selects the same slave for each destination MAC address. This mode provides load balancing and fault tolerance. This mode provides fault tolerance and load balancing.
- **broadcast**
Transmits everything on all slave interfaces. This mode provides fault tolerance.
- **802.3ad**
IEEE 802.3ad Dynamic link aggregation. Creates aggregation groups that share the same speed and duplex settings. Utilizes all slaves in the active aggregator according to the 802.3ad specification. Requires a switch that supports IEEE 802.3ad Dynamic link aggregation.
- **balance-tlb**
Channel bonding that does not require any special switch support. The outgoing traffic is distributed according to the current load (computed relative to the speed) on each slave. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave. This mode provides fault tolerance and load balancing.



Function: HTTP proxy

With this function you can enable or disable HTTP proxy.

To enable HTTP proxy:

- select "Use HTTP proxy"
- enter server name, port, user and password
- click "apply" button

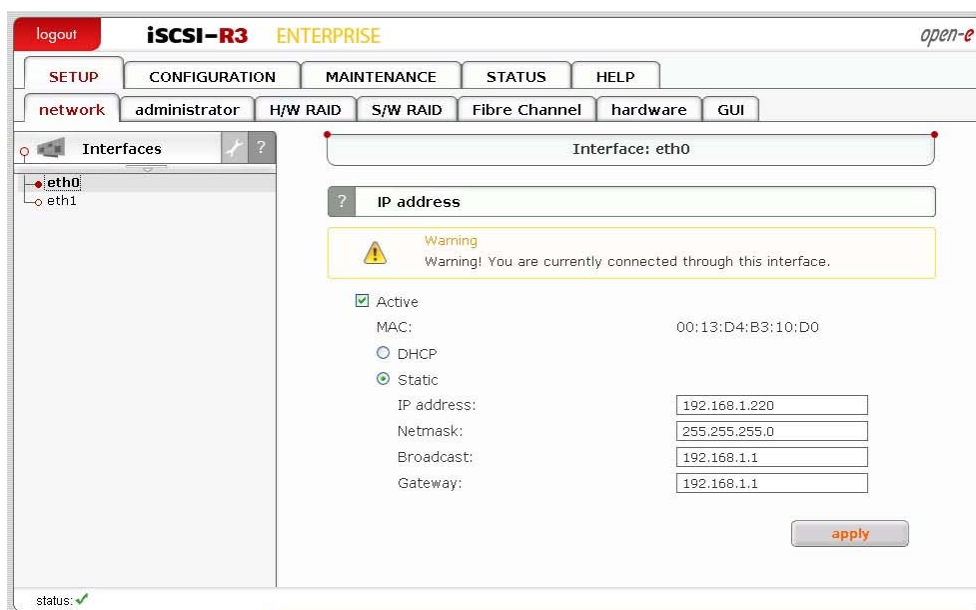
Function: IPSEC

IPSEC provides strong authentication and encryption for the connections. It makes nearly impossible to eavesdrop or forge the transmitted data. You can set IP address (optionally with a mask) of the clients that will be allowed to connect to the iSCSI target. You also must set the **Password**.

The Password cannot:

- contain spaces,
- be empty,
- contain ' " `

note Encrypted data transmission imposes considerable overhead and depending on the amount data transmitted can impact the performance significantly.



Function: IP address

Here you can set TCP/IP parameters for selected NIC.

Activate

You can activate or deactivate network interface by setting this checkbox. DHCP / Static.

You can use static or dynamic (DHCP) network interface configuration.

Get DNS

If you want to dynamically get DNS address, select "get DNS".

When using static configuration of network interface, enter:

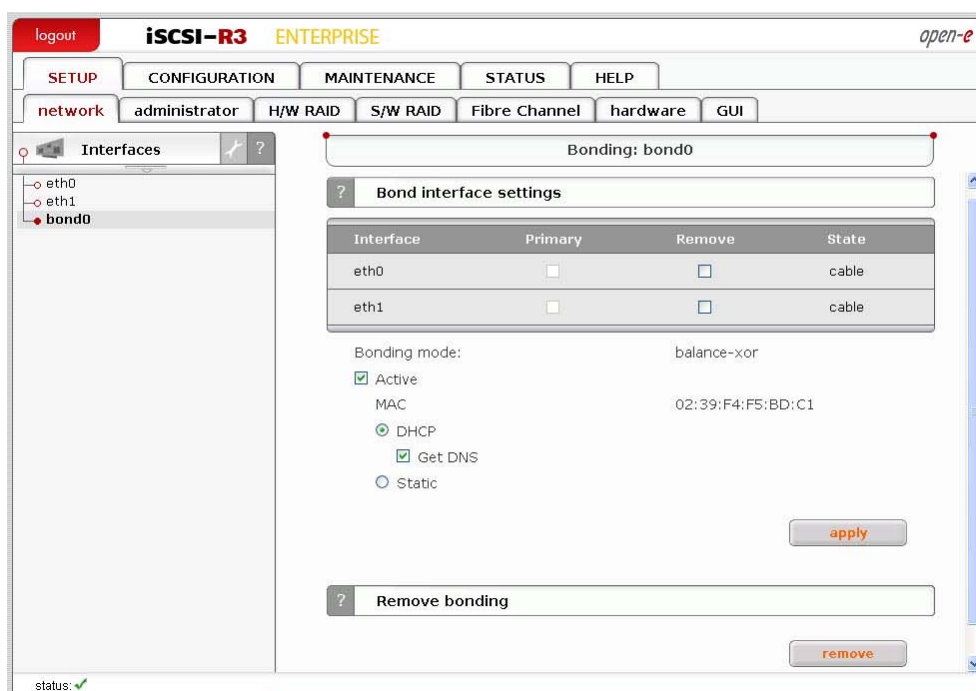
- address IP,
- netmask,
- broadcast,
- gateway.

If you set new IP address, during activation, you will lose your connection to the server and you will have to log in again. In the URL entry line of your browser, please enter the new IP address.

If you do not get access, please try the console to set new IP address. In order to access servers in another subnet, you need to enter the address of a router as Gateway.

note In case you use NTP server to maintain proper time & date, please make sure you have proper Gateway and DNS settings.

In case of creating bonding interface on left page will appear new branch "bond0". By clicking on the branch "bond0" you have the possibility of bonding's settings and removal (see below).



Function: Bond interface settings

Here you can edit a bonding network interface.

To remove network interface from bonding select it in field remove and click "apply" button. Bonding can be deactivated by setting of "Active" option. You can change bonding interface network configuration, you can use static or dynamic (DHCP) network configuration.

Each network interface is that belongs to bonding interface is described by following fields:

Primary:

A string (eth0, eth2, etc) specifying which slave is the primary device. The specified device will always be the active slave while it is available. Only when the primary is off-line will alternate devices be used. This is useful when one slave is preferred over another, e.g., when one slave has higher throughput than another. The primary option is only valid for active-backup mode.

Interface:

Network interface name.

State:

Shows if NIC is connected.

Function: Remove bonding

Here you can remove a bonding interface.

5.2.1.2 Administrator**Function: Administrator access**

Use this function to restrict access to the server administration.

Set port

You can change https port (default 443)

IP address

You can assign IP addresses (separated by a semicolon) that are granted to access the Server Web administration. This field left blank means no restriction.

Lock console without password

Disables access to the console (and LCD keys)

Lock console with password

To get access to the console (and LCD keys) you need to type password. Note that this password should be exactly 8 characters long and include only 1-4 digits.

Unlock console

Unrestricted access to the console

- **note** Please exercise caution with this function if all computers in the network receive IP addresses via DHCP: current IP can be replaced by a new one after the lease ends. Please pay attention using Lock console feature - you will not be able to reset default administrator access from the console in case of any mistake setting IP address. To restore default settings you have to re-update software in the Open-E iSCSI-R3 module or contact technical support.

The screenshot shows the iSCSI-R3 ENTERPRISE web interface. The top navigation bar includes 'logout', 'iSCSI-R3 ENTERPRISE', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'CONFIGURATION', there are sub-tabs for 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'hardware', and 'GUI'. The 'administrator' sub-tab is active, showing two configuration sections:

- Administrator access:**
 - Set port: 443
 - IP address: [empty field]
 - Lock console without password:
 - Lock console with password:
 - Unlock console:
 - [apply button]
- Administrator password:**
 - Admin. Level: Full Access (dropdown menu)
 - Enter pass: [empty field]
 - Confirm pass: [empty field]
 - [apply button]

At the bottom left, there is a 'status: ✓' indicator.

Function: Administrator password

Using this function, you can change the passwords of the server administration accounts.

Enter password

Please enter your new password.

Confirm password

Please retype your new password.

Password cannot contain:

- characters: ' " `
- spaces.

The default password for each account is “*admin*”.

- **note** Password-checking is case-sensitive. For security reasons, the password you enter will not be displayed. Please check the status of the Shift and Shift Lock keys.

logout **iSCSI-R3 ENTERPRISE** open-e

SETUP CONFIGURATION MAINTENANCE STATUS HELP

network administrator H/W RAID S/W RAID Fibre Channel hardware GUI

? E-mail notification

Send errors

1 Info
Test message sent. Please check your e-mails.

Send test message

E-mail account settings:

E-mail:

Use authentication

Account name:

Password:

SMTP Server:

Hide advanced <<

Port:

Encrypted

Destination e-mail:

Use default account e-mail

Others:

apply

? SSL certificate authority

Download SSL Certificate for your browser [SSLCert.crt](#)

status: ✓

Function: E-mail notification

The server can send an e-mail notification to the administrator in case of significant events, critical errors, warnings, etc. To enable this feature check Send errors.

E-mail

E-mail from which notifications will be send.

Account name

Account name for e-mail from which notifications will be sent.

Password

Password for account name provided above.

SMTP server

SMTP server name.

Destination e-mail

Administrator e-mail address to which notifications will be sent.

Port

Port number for SMTP server.

If you want to send a test message, please check option Send test message. If you want to have e-mail notifications encrypted, check option Encrypted.

Function: SLL certificate authority

To ensure the identity of the web administration tool by letting your web browser automatically check it whenever you connect for administration tasks, click the

SSLCert.crt link to download and install the certificate into the certificate management system of your browser.

The screenshot shows the iSCSI-R3 ENTERPRISE web interface. The top navigation bar includes 'logout', 'iSCSI-R3 ENTERPRISE', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'CONFIGURATION', there are sub-tabs for 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'hardware', and 'GUI'. The main content area is divided into two sections:

- SNMP settings:**
 - Use SNMP
 - Use SNMP v2
 - Use SNMP v3
 - Community:
 - Password:
 - Confirm password:
 - Contact:
 - Location:
 -
- Remote console access:**
 - Remote access set
 - Allow IP:
 - Set port:
 - Password:
 - Confirm password:
 -

At the bottom left, there is a 'status: ✓' indicator.

Function: SNMP settings

This function enables you to change the access over the SNMP protocol in version 2 or 3.

With SNMP you can get a lot of information (usage of CPU, system load, memory info, ethernet traffic, running processes).

System location and system contact are only for your information, for example when you connect from SNMP client, you will see your location and name.

SNMP in version 3 has encrypted transmission and authentication by community and password.

SNMP in version 2 does not have encrypted transmission and authentication is only by community.

The **community** you are setting can be max up to 20 characters and **password** min 8 characters.

Links to SNMP clients:

- <http://www.muonics.com>
- <http://www.mg-soft.com>
- <http://www.adventnet.com>

Function: Remote access

Using this function, you can administrate console tools remotely by ssh protocol (secure shell). Default user is 'cli' and you cannot change it, but password can be change.

Allow IP

You can assign IP addresses (separated by a semicolon) that are granted to server remote access. The field left blank means no restriction.

Set port

Default port is 22222 for security reasons, because high ports are invisible for port scanners. You can change it only from range 1024-65535 except ports already used.

Password

Length of password is minimum 8 characters. Be sure to use strong passwords.

Confirm password

Please retype your new password.

Password cannot contain:

- characters: ' " ` ^ & \$ # [] \ | *
- spaces.

To connect to server from Linux/MacOSX systems use:

```
ssh -2 -p 22222 -l cli address_ip
```

where:

- option: -2 is a version of ssh protocol used for connection.
- option: -p is a port for Remote Access.
- option: -l is a user (In our product the user must be "cli").
- option: address_ip is a address of server you want to connect to.

You will be ask for a password you entered on server for Remote Access.

To connect to server from Microsoft Windows, download free ssh client Putty (www.putty.nl). Please follow step-by-step below in order to configure putty client:

- In Host Name (or IP address) field please enter IP address of the server
- In Port field please enter the same port as in the server GUI (default 22222)
- In Protocol please choose SSH
- In Category: Connection → Data → Auto-login-username please enter: "cli"
- In Terminal → Keyboard → The Function Keys and keypad please select "VT100+"
- Go back to Category Session, enter session name in field Saved Sessions and click on "Save" button.
- Then click on new saved session, click "Open" and enter the "password". (In case you did not enter Auto-login-username, it will prompt for username, so please enter: "cli")

5.2.1.3 H/W RAID

Please note that the RAID controller should be supported by the Open-E iSCSI-R3.

Function: 3ware manager

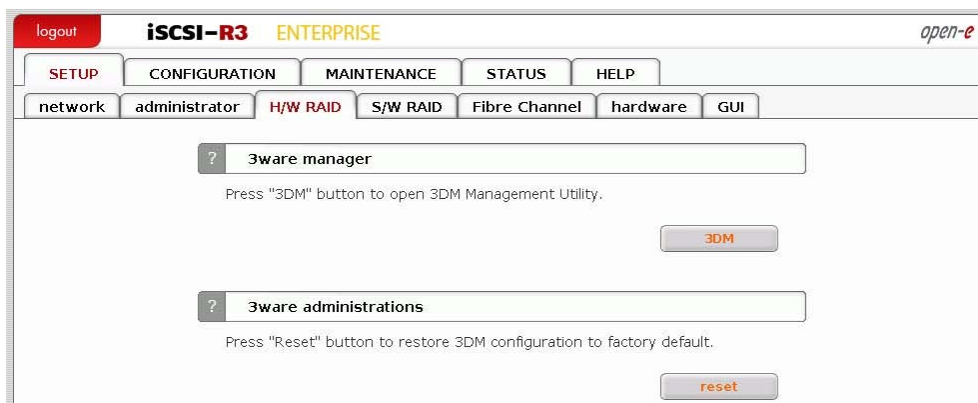
This function enables entering 3ware RAID administration. Press "3DM" button to enter. Please make sure that time difference between remote computer and server is not greater than 30 minutes. In other case such error will appear: "You have been logged out due to inactivity or Cookies are disabled when 5 sec before i log in."

Default:

Login: Administrator

Password: 3ware

note For controller 7000/8000, the scheduling tasks will be not supported.



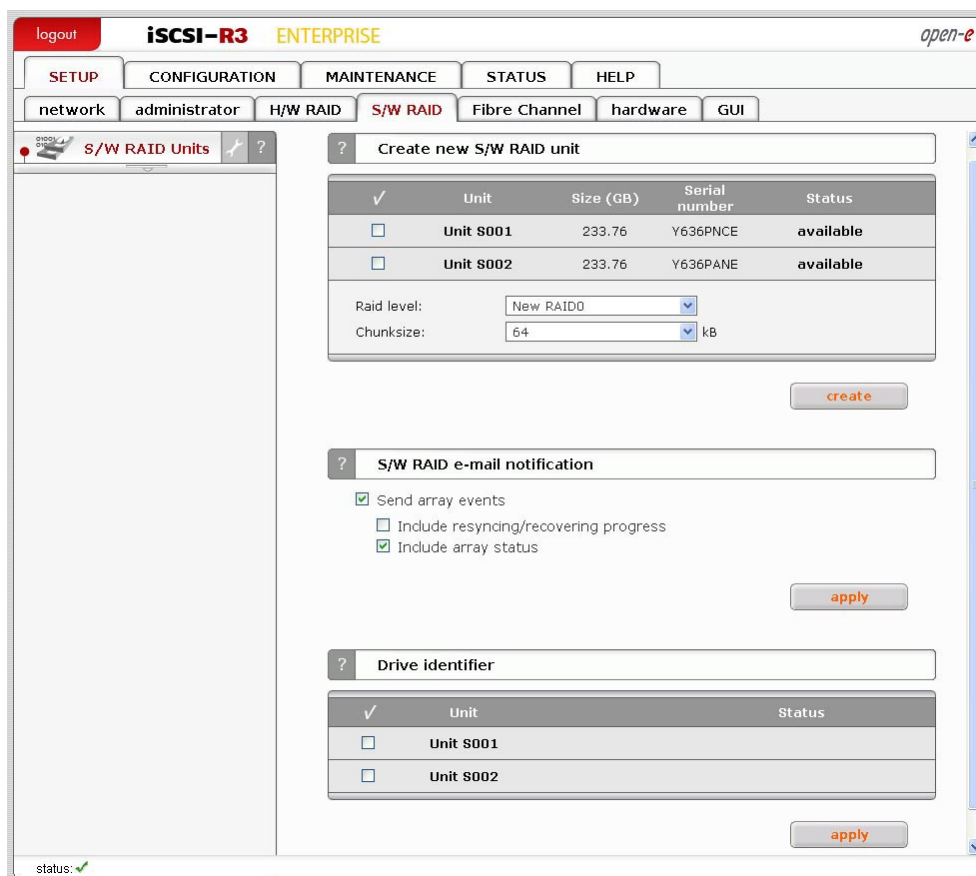
Function: 3ware administrations

This function will restore 3ware RAID Administrator password to the default : 3ware.

5.2.1.4 S/W RAID

Function: Create new S/W RAID unit

In this function you can create software RAIDs from free (not used) units. If you want to create RAIDs from used units, you need first to delete content of units in console, be aware this would ERASE all data from units.



To create a RAID select units, then from ListBox select what type of RAID it will be, then select desired Chunk size. After setting all demanded parameters press Create button.

Allow to create degraded mode

It allows to create RAID1 with one unit, RAID5 with two units or RAID6 with three units, even if minimal number of units is not meet.

● note Chunk size - its a minimal portion of data that is written at a time.

Available RAID5:

RAID 0: it is stripe array and requires [minimum] 2 units. In RAID 0 you can set the Chunksize 4k ÷ 256k. The destination size of the RAID Array will be the sum of each drive size in array.

RAID 1: mirror array requires 2 units. Destination size will be equal: (SINGLE) UNIT_SIZE, where (SINGLE) UNIT_SIZE is the size of the smallest unit in array.

RAID 5: stripe + parity algorithm array (required [minimum] 3 units - with the same capacity). You can choose from the ListBoxes: (layout) parity-algorithm [left/right] [symmetric/asymmetric]. DESTINATION SIZE: (NR_OF_UNITS-1)*(SINGLE)UNIT_SIZE, where (SINGLE) UNIT_SIZE is the size of the smallest unit in array.

The (layout) parity-algorithm in RAID 5 is described below.

RAID 5 (layout) parity-algorithm

It is possible to set one of four algorithms of placement data blocks and parity blocks in matrix. Our default option is left-symmetric, which is the best for large reads. Other recommended value is left-asymmetric.

● **note** Software RAID 5 is not a good choice for writing a lot of very small files!

Left-Asymmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
0	1	2	Parity
3	4	Parity	5
6	Parity	7	8
Parity	9	10	11
12	13	14	Parity

Right-Asymmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
Parity	0	1	2
3	Parity	4	5
6	7	Parity	8
9	10	11	Parity
Parity	12	13	14

Left-Symmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
0	1	2	Parity
4	5	Parity	3
8	Parity	6	7
Parity	9	10	11
12	13	14	Parity

Right-Symmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
Parity	0	1	2
5	Parity	3	4
7	8	Parity	6
9	10	11	Parity
Parity	12	13	14

RAID6: stripe + parity algorithm array (required, minimum 4 units - with the same capacity). You can choose from the ListBoxes: (layout)parity-algorithm [left/right] [symmetric/asymmetric]. DESTINATION SIZE: $(NR_OF_UNITS-2)*(SINGLE)UNIT_SIZE$, where (SINGLE) UNIT_SIZE is the size of the smallest unit in array.

The (layout) parity-algorithm in RAID 6 is described below.

RAID 6 (layout) parity-algorithm

It is possible to set one from four algorithms of placement data blocks and parity blocks in matrix. Our default option is left-symmetric which the best is for large reads. Other recommended value is left-asymmetric.

Left-Asymmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
0	1	Parity	Parity
2	Parity	Parity	3
Parity	Parity	4	5
Parity	6	7	Parity
8	9	Parity	Parity

Right-Asymmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
Parity	Parity	0	1
2	Parity	Parity	3
4	5	Parity	Parity
Parity	6	7	Parity
8	9	Parity	Parity

Left-Symmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
0	1	Parity	Parity
3	Parity	Parity	2
Parity	Parity	4	5
Parity	6	7	Parity
8	9	Parity	Parity

Right-Symmetric Algorithm

Unit S0	Unit S1	Unit S2	Unit S3
Parity	Parity	0	1
3	Parity	Parity	2
4	5	Parity	Parity
Parity	6	7	Parity
Parity	Parity	8	9

To remove RAID, if previously added to Volume Group please enter console Extended tools (press F1 on console to find out keyboard shortcuts) and first delete Volume Group of the RAID (**Delete content of units** function in Extended tools menu). Then the Remove button will be enabled. Otherwise simply press Remove button.

● **note** You can add spare units to RAID1, RAID5 and RAID6 arrays. Please remember that after creation of an RAID, in Function: 'Info' will be shown progress of Synchronization. Till end of this process all actions done on this array will be performed a bit slower.

● **note** If Units are connected through Fibre Channel with only one Storage or LUNS(under iSCSI) come from the same target, then its not recommended to create s/w raids on these Units, because this would slow down the system. If Units come from two different Storages or LUNS come from two different targets, then you can create s/w raids with no problem.

Function: S/W RAID e-mail notification

It is possible to send notification by e-mail about events on software RAID arrays (e.g. rebuild started, rebuild finished, span is active). In order to do so please check Send array events.

● **note** In order to Send array events you must enable "E-mail notification" in "setup" → "administrator".

Include resyncing/recovering progress

This enables informing about progress of resync/rebuild, if it's currently running. E-mail will be send for every 20 % done.

Include array status

Information about the status of event-related array will be added every event.

Function: Drive identifier

This function helps find disks in the cage of your NAS server. In case of hardware RAID installed, the whole RAID array is shown as a single drive. In this case you may not be able to determine which drive unit is which disk when using S.M.A.R.T. tool or hardware RAID management tool (depends on manufacturer of RAID controller).

When you click on "start" button then the appropriate disk will start reading and you can determine which disk is it by watching "disk-activity LEDs". For proper operation of this function there should be no other activity on hard drives.

- **note** Identification will stop automatically after one minute if you will not stop it before (by unsetting appropriate checkbox and applying form). Using this function during normal operation is not highly recommended and will cause of your server to slow down.

The screenshot shows the 'S/W RAID Units' configuration page in the iSCSI-R3 ENTERPRISE web interface. The page is titled 'Software RAID: MD0' and features a 'Manager' section with a table of RAID units. Below the table is an 'Info' section showing RAID details, and a 'Remove software RAID unit' section with a 'remove' button.

Unit	PR	F	R	ST	Size (GB)
Unit S001	0	<input type="checkbox"/>	<input type="checkbox"/>	A *	233.76
Unit S002	1	<input type="checkbox"/>	<input type="checkbox"/>	A *	233.76

attribute name	value
RAID LEVEL	RAID0
Creation time	Wed Dec 27 09:50:37 2006
Update time	Wed Dec 27 09:50:37 2006
Array size	467.52 GB
Chunk size	64K
State	clean

Function: Manager

In this function you can manage the RAID array.

Available operations:

RAID 0:

- construction of this RAID does not allow to manage it anyway. Every unit must not be Failed. If any would be the whole array would be destroyed.

RAID 1:

- To set unit as a Faulty one mark proper checkbox (in the column F) and click on Apply button.
- To delete any unit from an array mark proper checkbox (in the column R) and click on Remove button.

RAID 5:

- To set unit as a Faulty one mark proper checkbox (in the column F) and click on Apply button.

- To delete any unit from an array mark proper checkbox (in the column R) and click on Remove button.

RAID 6:

- To set unit as a Faulty one mark proper checkbox (in the column F) and click on Apply button.
- To delete any unit from an array mark proper checkbox (in the column R) and click on Remove button.

RAIDs notation:

- PR - priority in array - describes priority of unit that will be added to array if another is set to Faulty.
- F - faulty - unit can be turned off from array
- R - hot remove - unit can be removed from array without shutting down the system.
- ST - describes state of unit in array, which can be:
- A - This means that Unit is active in array
- * - Number of Unit that belongs to the array
- S - Spare or spare rebuilding - this means that unit is free and can be added to the array or is free and currently is rebuilding.

Limitations:

- There is no possibility to set any unit as faulty if the matrix is degraded or during resync/rebuild.
- While using RAID 1 and RAID 5 there is possibility to set only one disk from active as faulty. This regulation is not valid for Spare units in array.

● **note** Only one disk from Active in Array can be set as Faulty or Removed

Function: Info

From this function you can obtain information like Creation Time, RAID Level, Array and Device Size, Update Time and state.

● **note** During syncing or rebuilding of array it is recommended to preform as few disk operations as possible.
Status of syncing/rebuilding will be showed "live" - without need to refresh page manually.

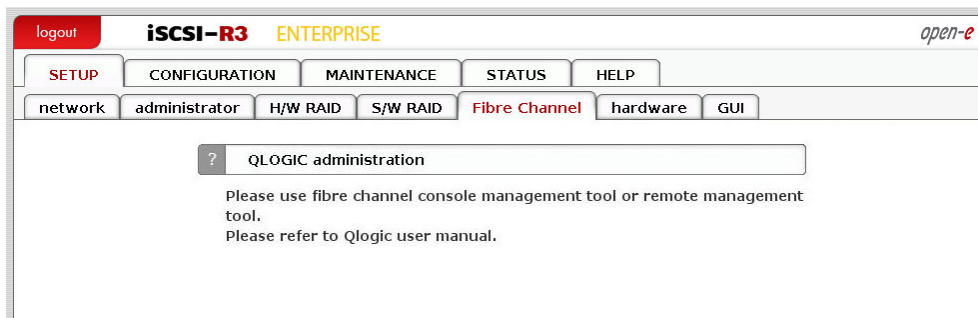
Function: Software RAID unit remove

This function allows you to remove Software RAID unit (MD[nr]).

● **note** This function is available only when no Logical Volume is created on appropriate MD[x] and unit is not resyncing.
If you want to remove software RAID unit with Logical Volume please use console **Extended tools** (*press F1 on console to find out keyboard shortcuts*) and remove Logical Volume first.

5.2.1.5 Fibre Channel

When a Fibre channel controller is detected you will find utilities and option specific to the hardware.



5.2.1.6 Hardware

Function: UPS settings

In the UPS menu you can select an UPS device (Uninterrupted Power Supply). In the settings you can select the UPS model, cable type, connection port (serial port or USB) and the length of the time-out. The time-out defines the time between a power failure and the moment the system will shut down.

Single

Means, that the server is the only system attached to this UPS and that there is no action necessary to do remote shutdown for other systems in the network.

Master

Means, that the server is connected to the UPS and sends a signal through the network to shutdown other systems in the network.

Slave

Means, that the server is reacting on a "power down-signal" from an UPS master.

● **note** When using SMART UPS with APC mode there are additional options:

Timeout - Battery Limit

This option enables sustaining the system as long as battery holds(the system will shutdown when battery charge drops to 5% or when there are 3 minutes time to total discharge of battery)

Turn off UPS after system shutdown

This will turn off the UPS after time that is set by parameter Shutdown grace delay(SLEEP) in EEPROM of UPS.

The screenshot shows the 'hardware' configuration page in the iSCSI-R3 ENTERPRISE GUI. It features two main sections: 'UPS settings' and 'Time zone settings'. The 'UPS settings' section includes a 'Use UPS' checkbox (checked), 'Set UPS mode' with radio buttons for 'APC' (selected) and 'MGE', a 'UPS mode' dropdown menu set to 'Slave', a 'UPS model' dropdown menu set to 'BackUPS Office USB', a 'Net port' text field with '223', and a 'Master' text field with '192.168.0.111'. The 'Time zone settings' section includes an 'NTP servers' text field with '1.pool.ntp.org', a 'Continuous adjusting using NTP' checkbox (checked), and a 'Time zone' dropdown menu set to 'Europe/Berlin'. Both sections have an 'apply' button. A 'status: ✓' indicator is visible at the bottom left.

Function: Time zone settings

This function allows to set NTP server settings.

Please choose a NTP server (Network Time Protocol: for more info: www.ntp.org) You may provide a fully qualified host name or IP address. Select time zone accordingly to your location.

There is also option **Continuous adjusting using NTP**, this will watch your system time and will correct it, if the difference between local time and server time has change. Setting this option on is specially recommended when using domains.

note Time setting is very important for proper work of the server.

You must have set gateway and (in case of host name) DNS network settings.

The screenshot shows the 'hardware' configuration page in the iSCSI-R3 ENTERPRISE GUI, specifically the 'Set Time' section. It includes three radio button options: 'Manual', 'Use this PC time', and 'NTP server' (selected). The 'Manual' section has 'New time' (11:34:57) and 'New date' (2006-12-27) text fields. The 'Power button settings' section has a 'Button action' dropdown menu set to 'None'. The 'S.M.A.R.T. e-mail notification' section has a checked 'Enable e-mail notification for S.M.A.R.T.' checkbox and a table listing two units for notification.

Notify	Unit	Size (GB)	Serial Number
<input checked="" type="checkbox"/>	Unit S001	233.76	Y636PNCE
<input checked="" type="checkbox"/>	Unit S002	233.76	Y636PANE

Both sections have an 'apply' button. A 'status: ✓' indicator is visible at the bottom left.

Function: Set time

With this function you can set time and date:

Manual

Just type in time & date using following format: hh:mm:ss yyyy-mm-dd.

Use this PC time

It will pick up the time & date of the PC you run the web browser.

NTP server

It will pick up the time & date from NTP server. In this case please make sure you have Internet access and proper network setup, specially gateway and DNS. You can check proper Internet access using ping from the Open-E iSCSI console (press F1 on console to find out keyboard shortcuts). To use this option you must set correct NTP server in function Clock settings.

● note Time setting is very important for proper work of the server.

Function: Power button settings

In this section you specify which action will be performed in case of power button is pressed

Options:

Reboot

Restart computer.

Halt

Power off computer.

None

No action.

Function: S.M.A.R.T. e-mail notification

This function allows you to check S.M.A.R.T. status of hard disks and send it to e-mail address.

S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) is a monitoring system for computer hard disks to detect and report on various indicators of reliability, in the hope of anticipating failures.

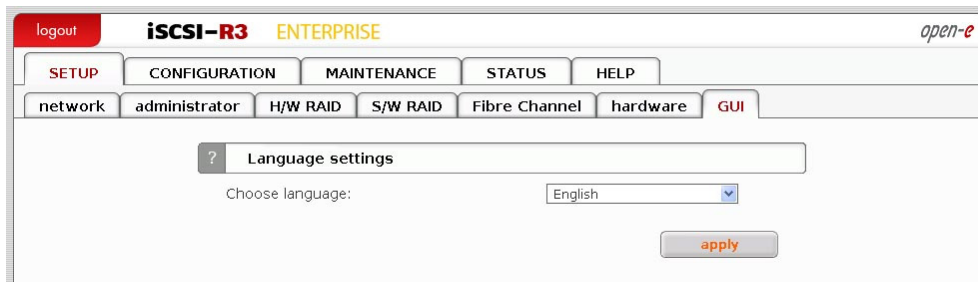
In order to enable S.M.A.R.T. e-mail notification, you have to:

- First enable E-mail notification function in setup -> administrator menu.
- Enable S.M.A.R.T. in Hardware configuration tool on console (*press F1 on console to find out keyboard shortcuts*).
- When S.M.A.R.T. is enabled you will see all detected hard drives with information about unit number, size and serial number.
- Select the checkbox of unit, from which you want to receive S.M.A.R.T. status and press "apply".
- If everything is ok, then status will be PASSED, in another case FAILED.

5.2.1.7 GUI

Function: Language settings

Select preferred language and press "apply" button.



5.2.2 CONFIGURATION

5.2.2.1 Volume manager

5.2.2.1.1 Volume Groups

Here you can view tree with created Volume Groups. After clicking on selected Volume Group you can view units assigned to that Volume, manage volume in Volume manager function, assign snapshot to Volume.

Function: Unit rescan

This function rescans your system for new units.

Function: Unit manager

This function enables you to manage physical storage devices - Units (hard drives or raid-arrays). Units that have status **available** can be used for creating a new volume group, new dynamic volume or expanding existing volume groups.

It is possible to combine two (or more) units into one Volume Group:

- While creating the "new volume group", the system adds selected units only. You can use default volume group name or change it,
- If you want to expand existing volume group select action "add to ..." with desired volume group name,
- By selecting "new dynamic volume".
-

After creating, the page is reloaded and the "Status" field should show your drives/arrays as "in use".

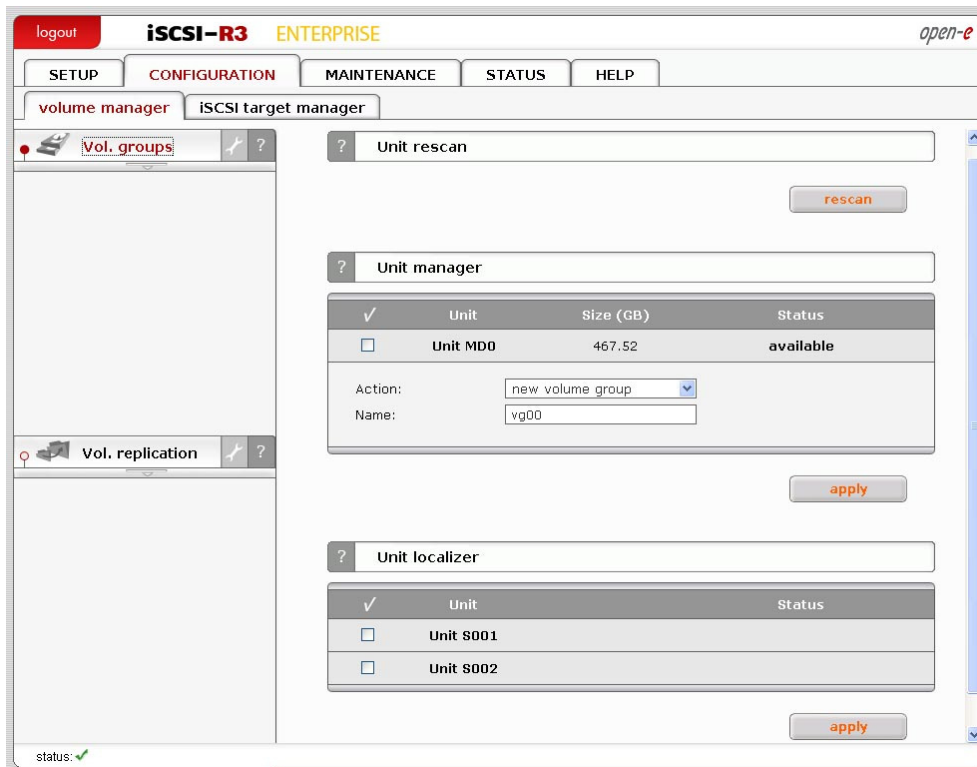
For farther management of volume group e.g. creating logical volumes, please click on the right-hand side of the tree diagram on volume group name. In function **Volume Manager** you can create a new iSCSI volume (l).

Disk notations:

- S0,S1, ..., S[x] - every disk with S notation is one of SATA / JBOD / RAID units,

- H0,H1, ..., H[x] - units with H letter are IDE units,
- MD0,MD1, ..., MD[x] - this way are softRAIDs denoted.

● **note** Units that are already used in a volume group can be made **available** again by using function **Delete content of units** under console. Be aware that this will remove all data from a Unit!!!, You can only use units with capacity greater than 5 GB, smaller units are not supported.

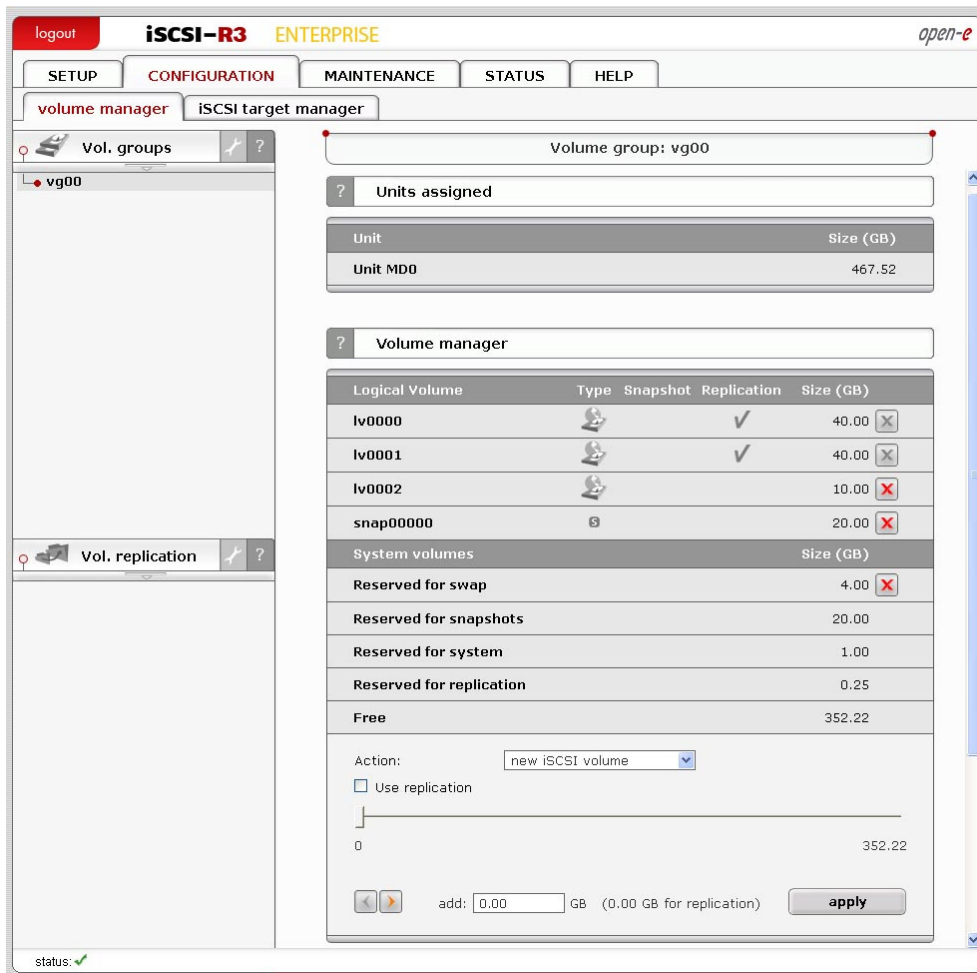


Function: Unit localizer

This function helps find disks in cage of your iSCSI server. If you connect hard drives to hardware RAID controller then you may not be able to determine which unit is which disk using S.M.A.R.T. tool or hardware RAID management tool (depends on manufacturer of RAID controller).

When you click on "start" button then appropriate disk will start reading and you can determine which disk is it by watching "disk-activity LEDs". For proper operation of this function there should be no other activity on hard drives.

● **note** Localization will stop automatically after one minute if you will not stop it before (by unsetting appropriate checkbox and applying form). Using this function during normal operation is highly not recommended and will cause slow down of your server.



Function: Units assigned

In this function you can view physical units attached to this volume group.

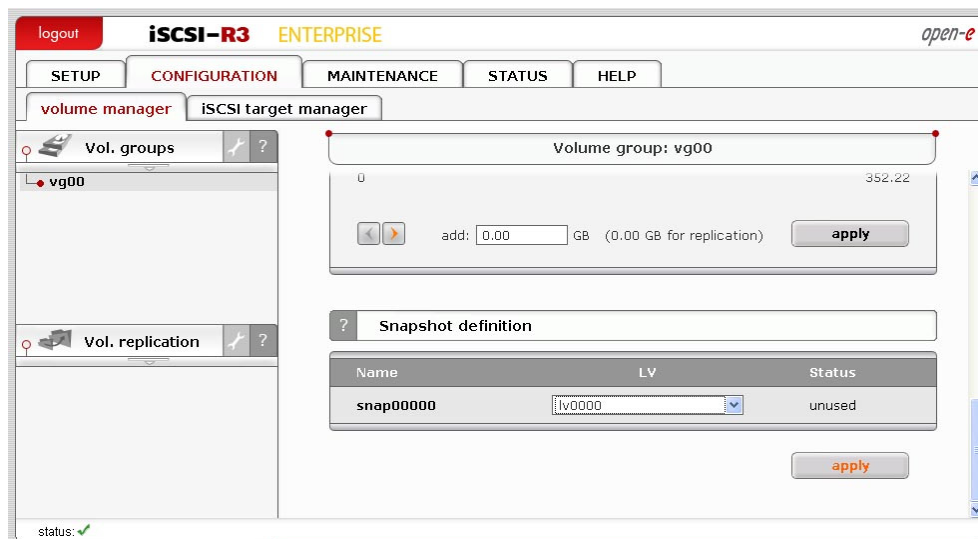
Function: Volume manager

This function allows:

- increasing existing and creating new iSCSI volume,
- reserving disk space for **swap**,
- creating, expanding and deleting snapshots.

In order to add storage space to existing iSCSI volume, select "LV" from the dropdown menu. Use scroll bar to choose the size.

- **note** While adding each new Unit there will be 4 GB space reserved for swap (if there is no swap already created). Additionally there is 1 GB space reserved for system internal use.



Function: Snapshot definition

You can set Logical Volume to which the snapshot will be assigned.

Name

Name of snapshot.

LV

Select Logical volume to which snapshot will be assigned. If Logical volume has no snapshot assigned yet, then in LV field will be "unassigned".

Status

Status of snapshot. Can be one of following:

Active

Snapshot is in active state.

Inactive

Snapshot is inactive, probable reason: overflow.

Unused

Snapshot is currently unused.

The Snapshot function enables the system administrator to freeze the data content of the volume at a certain time. From this moment on, the users work on a virtual data volume, all changes to the volume are stored in a different partition. The storage of all changes is independent of the file-system - it takes place on block-level. Snapshots can be created (active state) /removed (unused state) manually or automatically.

- **note** Please be reasonable, when you are calculating the space reserved for snapshots. Please set as snapshot size as much space as you expect to change during active snapshot. E.g. when you are doing backup from snapshot which takes one hour please set this snapshot size to as much space that will be changed during one hour. The snapshot will become inactive if the content (data changed on Logical Volume) exceeds the snapshot capacity. You do not lose data in that case, just the dataset, which is virtual for the users at the moment, will be written to the data volume. The old dataset, which has been frozen with the snapshot, is not available any longer.

- **note** When you define the schedule, use only as many snapshots in the same time as really needed. A large count of active snapshots can slow down the system considerably.
- **note** Manual creating and removing of snapshots can be done in the CONFIGURATION → volume manager → vg[nr] → Function: Volume Manager.

How to access iSCSI target snapshot

After snapshot for iSCSI target has been created and activated, you can access it by following:

- Go to menu CONFIGURATION → iSCSI target manager → Targets → [target_name],
- Use function Target volume manger, click on button "add" on the right side of snapshot you want to have access to. New LUN will be added to the target,
- Now you can connect with your iSCSI initiator and use your snapshot target,
- Example (Microsoft Windows environment). Please download Microsoft iSCSI Initiator and follow instructions,
- Start the software and add targets,
- Menu Target Portals - enter IP Address of your server and Socket (default 3260),
- In menu Available targets please "Log On" into already added target,
- Now your snapshot target will show up in your system and you can use it.

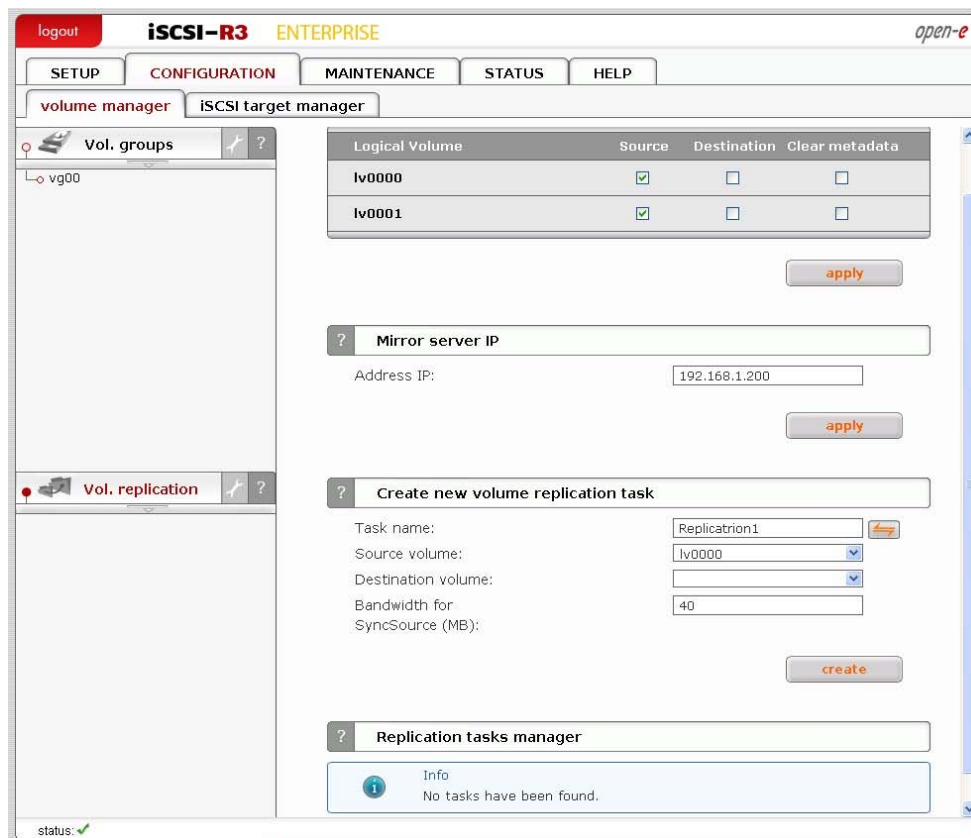
5.2.2.1.2 Volume replication

This place contains Volume replication tasks.

Function: Volume replication mode

Here you can set replication mode for every logical volume(with replication functionality). Volume can be in source(S) or destination(D) replication mode. You can also clear the metadata(CM) of a volume. Metadata describes the data of the replication.

Clearing of metadata is required when you want to start the replication process from the beginning. Another case is when the data on source volume is inconsistent and you want to restore it from a destination volume. In such a case you need to change replication mode from the destination volume to source mode and the previous source to destination mode. Before starting a replication for new source and destination please clear the metadata from previous destination volume. When replication is complete the data on previous source volume will be consistent. If volume is set to destination replication mode then it will not be visible in iSCSI initiator.



Function: Mirror server IP

Here you can set IP address of mirror server. It need to be entered in order to define volume replication task.

Setting the IP address on destination server is for security reason. This will allow only granted IP address to send data to destination target

Function: Create new volume replication task

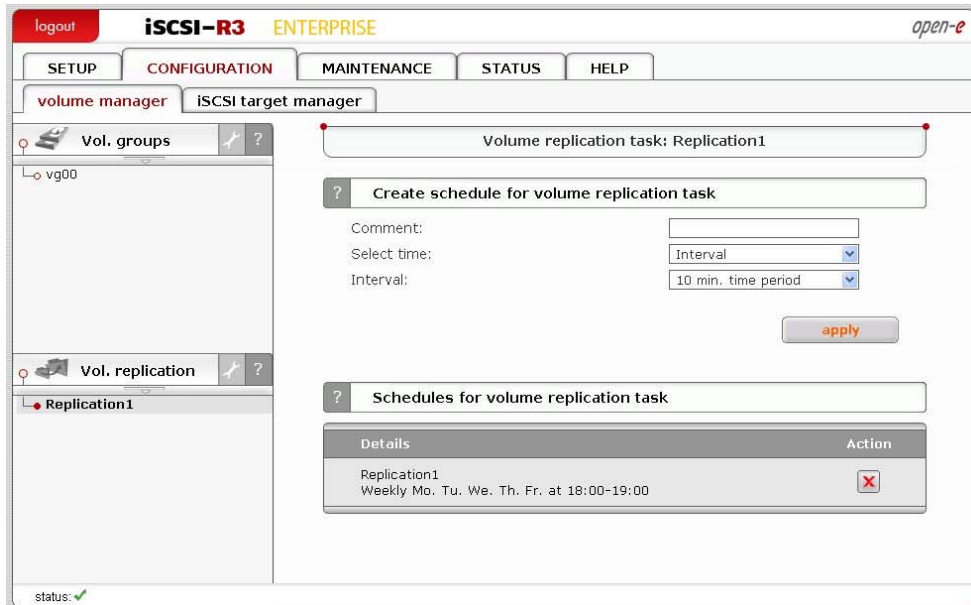
With this function you can create a volume replication task. Replication creates the same copy of data from source volume to destination volume in real time. This means that if you for example create a file on source volume then the same file will be created on the destination volume. Destination and source volumes need to be the same size in order to successfully made replication of volume. Replication can be made only between two mirror replication servers. Here you only create replication tasks. Replication tasks can be enabled in function Replication task manager.

Please enter the task name, select source volume and the destination volume. Click "Create" button in order to create a replication task.

note Volume replication process runs on randomly chosen ports from 12000-13999. These ports have to be open in firewalls as incoming and outgoing.

Function: Replication task manager

Here you can run, stop and delete previously created replication volume tasks. When replication task is running then you can't change replication mode for logical volume, delete the metadata or change the mirror server IP address. You need to stop the replication process first.



Function: Schedules for volume replication task

Here you can manage all schedules created for selected volume replication task.

5.2.2.2 iSCSI target manager

Here you can view list of all iSCSI targets and Chap users.

5.2.2.2.1 Targets

Function: Create new target

To create a target assign a name or leave the "Target Default Name" option checked.

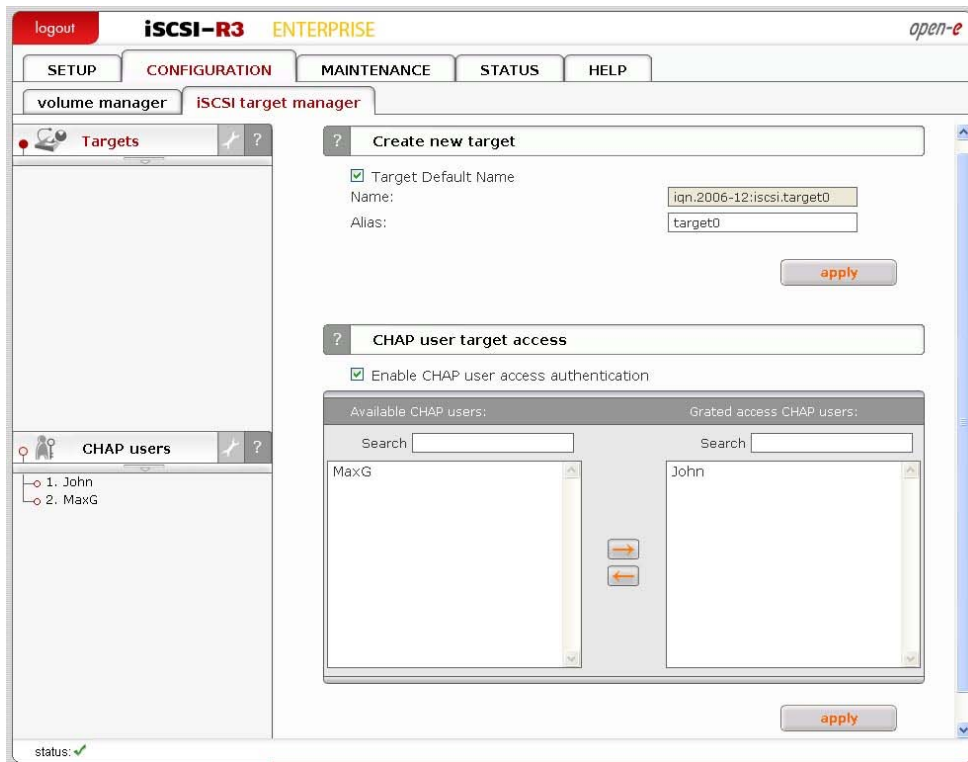
Name

Target name can contain alphanumeric characters: ' . ' : ' ' - ' . A target name is considered case-insensitive. Every character entered will be converted to low-case. No spaces and no underscores are permitted.

Alias

Alias is a name, under which target will be visible in Targets tree. The same naming rules apply for alias as for name.

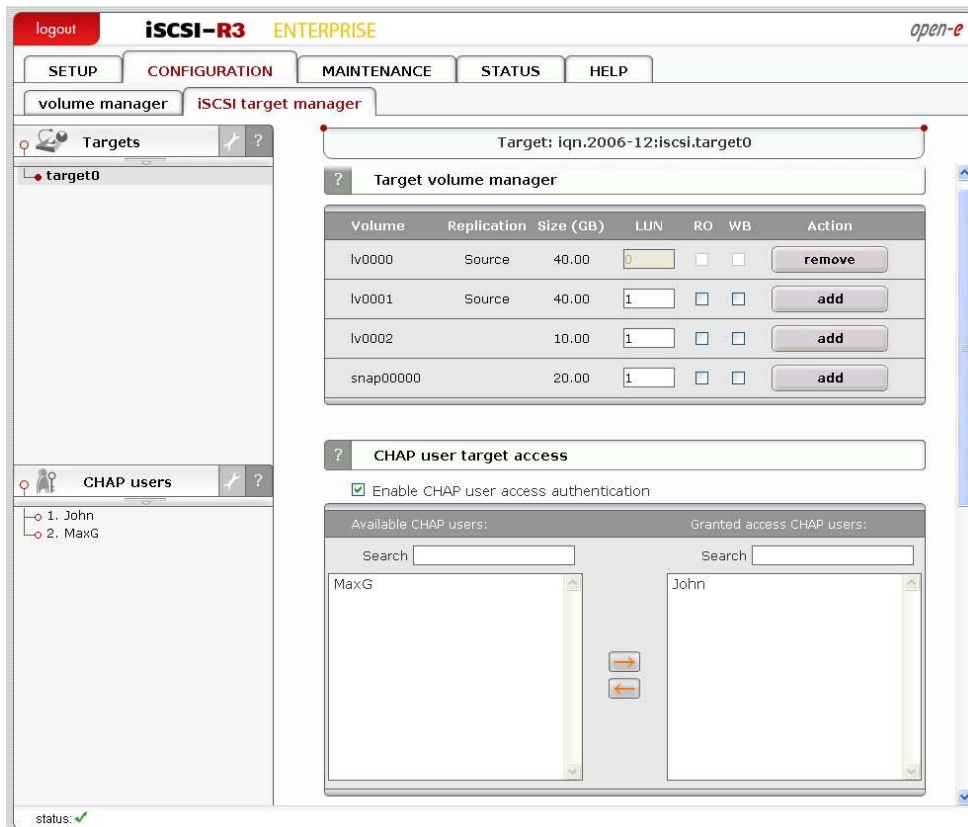
● note The server name will be used as a part of the default target name.



Function: CHAP user target access

Add CHAP users that are granted to access to this target.

- **note** You can use following keyboard keys in the lists (first set focus to desired list):
- “Home”: jump to the first,
 - “End”: jump to the last,
 - “Shift” + arrow key: for multi-select,
 - “letter key”: jump to the first position starting with pressed key.
- If you enable CHAP user access authentication but will not select any users to have access, then nobody will have access to the Target.



Function: Target volume manager

This function allows manage free and already assigned volumes in a target.

To assign a volume to the target click a volume with a button "Add". Similarly to remove already assigned volume from the target click "Remove".

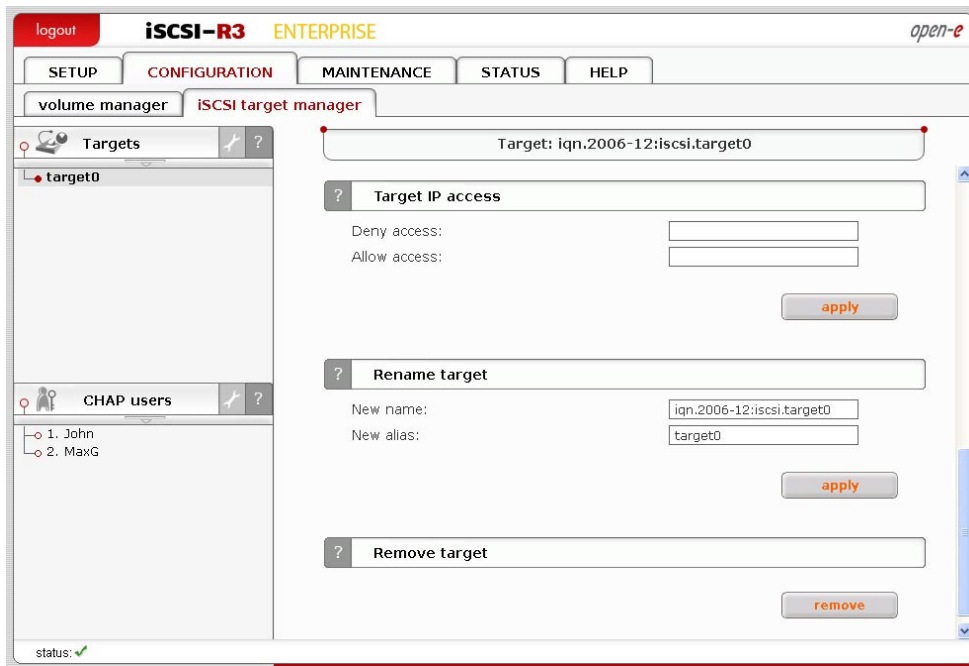
In certain circumstances you may need to adjust the LUN of the volume you are about to add. Normally, however, the LUN assignment is taken care of for you automatically. You should leave the default values. The RO option means Read Only, if it is turned on the LUN will be visible as a write protected disk.

To switch the RO option when it's disabled, you must first remove the volume from the target and then add it again setting the flag as desired.

Function: CHAP user target access

Add CHAP users that are granted to access to the Target Server.

- **note** If you enable CHAP user access authentication but will not select any users to have access, then nobody will have access to the Target Server.



Function: Target IP access

You can assign network classes or specify individual IP addresses that are permitted or denied to access the target. Entries should be delimited by commas.

When no entries are present in Denied access or Allowed access fields everyone is permitted to access the target. Specifying at least one entry in Allowed access field excludes all the clients that do not match it from accessing the target.

When you specify at least one entry in Denied access field, every CHAP user or CHAP users from network class address are denied from accessing the target.

When you specify any IP address in Allowed access field, CHAP users from that address are allowed to access the target even if the same address has been specified in Denied access field.

If you enter only Allowed access field then Denied access field will be automatically entered with 0.0.0.0/0 entry.

note Please note that already active sessions to the target will persist regardless of the newly applied settings. You can ensure that the settings are forced immediately after you apply them by going to maintenance->shutdown->connection reset and resetting the connections manually. Keep in mind that all the unsaved client data might be lost.

There is possibility of entering network class address in two ways:

- 192.168.2.0/255.255.255.0 - normal form,
- 192.168.2.0/24 - short form.

When you enter network class address in normal form, it will be automatically converted to short form.

Examples:

Denied access: 0.0.0.0/0
 Allowed access: 192.168.2.30/0; 192.168.3.45

These settings deny access from every IP address or network class address, only addresses in Allowed access field are granted for accessing the target.

Denied access: 192.168.0.0/16
 Allowed access: 192.168.2.30; 192.168.10.230; 192.168.30.0/24

These settings deny access to any IP addresses from network 192.168.0.0/16. Grant access for IP addresses 192.168.2.30, 192.168.10.230, all IP addresses from network 192.168.30.0/24 and all IP addresses that have not been denied in Denied access field.

Function: Rename target

Provide a new target name. A target name is considered case-insensitive. Every character entered will be converted to low-case.

Function: Remove target

This function removes all volumes from the target.

- **note** Please note that the data stored on the volumes are not automatically removed. You can assign the volumes to different targets and still see the data. Please remove the data prior to removing target in order to prevent leakage of sensitive or classified information.

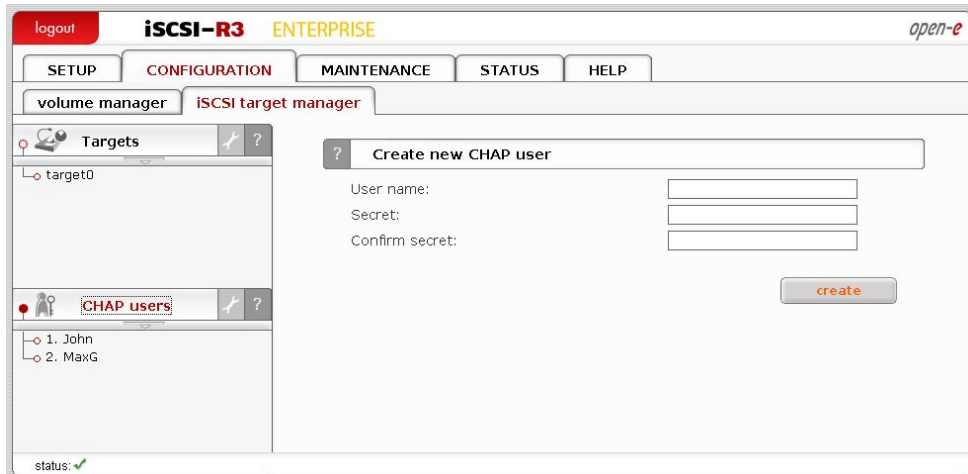
5.2.2.2.2 Chap users

Function: Create new CHAP user

To create CHAP user enter name, password, retype password and press create button.

- **note** CHAP user name cannot:
 - contain characters: ~ ! @ # \$ ^ & () + [] { } * ; : ' " . , % | < > ? / \ = ` ,
 - begin or end with a space.
 Password cannot:
 - contain characters: ' " ` ,
 - spaces,
 The length of the password must be within 12 - 16 characters.

If CHAP users forget their password, there is no way to retrieve it. You can only set a new password.

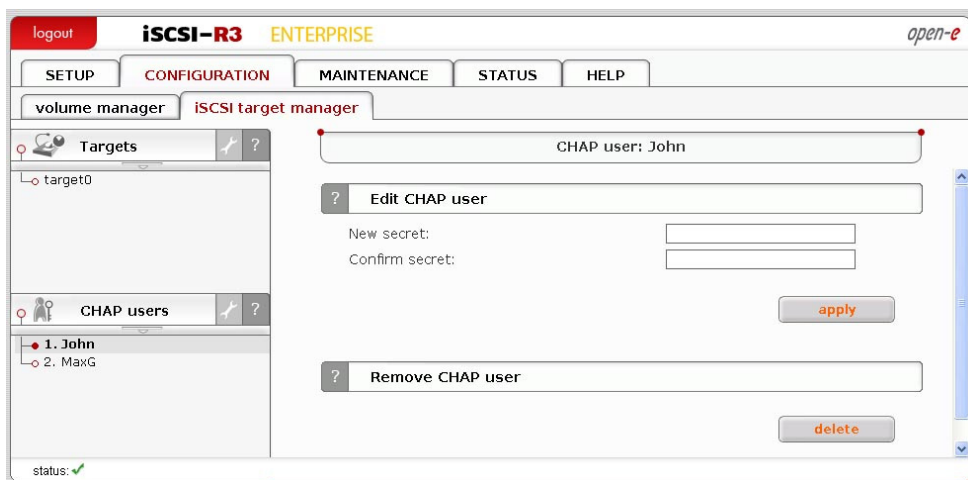


Function: Edit CHAP user

To change CHAP user password enter and confirm password, and press "apply" button.

note Password cannot:

- contain characters: ' " ` ,
- spaces,
- the length of the password must be within 12 - 16 characters,



Function: Remove CHAP user

Click "delete" button to remove the CHAP user from the system.

5.2.3 MAINTENANCE

This page accessed with the Maintenance tab contains settings and functions pertaining to general management operations.

5.2.3.1 Shutdown

Function „System shutdown“

When using this function, you can shut down the Open-E iSCSI-R3. If any of your users are currently connected, you will be asked to confirm the shutdown. If no users are connected, the process will be executed immediately without any delay.

note The Open-E iSCSI-R3 can only be turned on again manually.

Function: Schedule for shutdown

This control allows you to specify a time for a scheduled system shutdown.

The screenshot shows the 'iSCSI-R3 ENTERPRISE' web interface. The 'MAINTENANCE' tab is active, and the 'shutdown' sub-tab is selected. The 'System shutdown' section has a 'shutdown' button. The 'Schedule for shutdown' section has an 'apply' button and a list of days with checkboxes: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday. There are also time selection dropdowns for Thursday and Friday.

Function: System restart

This function allows you to restart your system.

The screenshot shows the 'iSCSI-R3 ENTERPRISE' web interface. The 'MAINTENANCE' tab is active, and the 'shutdown' sub-tab is selected. The 'System restart' section has a 'restart' button. The 'Schedule for restart' section has an 'apply' button and a list of days with checkboxes: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday. There are also time selection dropdowns for Thursday and Friday.

Function: Schedule for restart

This control allows you to specify a time for a scheduled system.

5.2.3.2 Connections

Function: iSCSI session manager

This function presents current connections to iSCSI targets. You can find here information like: target name, IP address, CID (ID of connection) and SID (ID of the session).

- **note** You can cancel connection to iSCSI targets, but the initiator may automatically reestablish connection if it's enabled on initiator side. In order to block initiator from reconnecting to target you have to deny IP address in "SETUP" → "iSCSI target manager" → "Targets" → "target[nr]" → Function Target IP access.



Function: Connection reset

It might be necessary to restart the iSCSI daemon to inform client about specific setting changes, e.g. resize of the volumes.

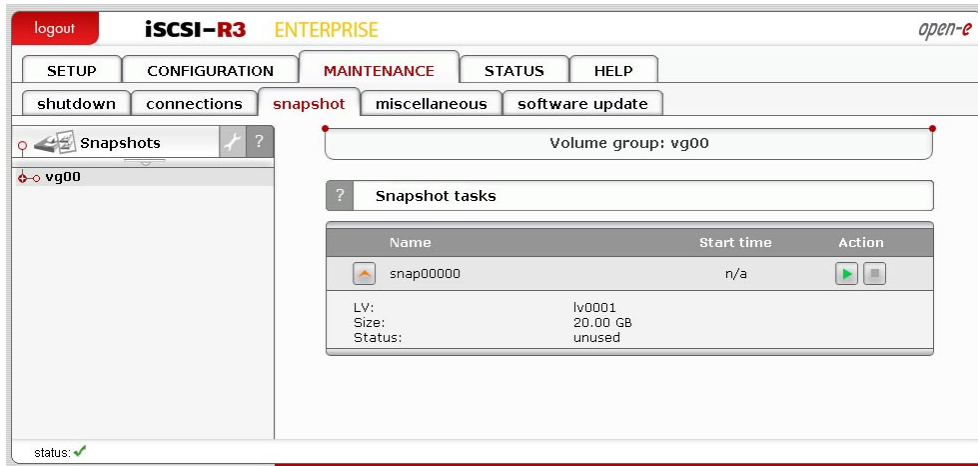
- **caution** All current connections with iSCSI initiators will be terminated immediately. It may cause loss of unsaved data files.
- **note** If your client does not reestablish the connections automatically you will have to do it manually from the clients.

5.2.3.3 Snapshot

Function: Snapshot tasks

This function enables you to manually activate (start) or deactivate (stop) snapshots. Activation of a snapshot is only possible for unscheduled snapshots (with inactive schedule setting).

- **note** When logical volume is set as a destination replication mode and data are inconsistent then there might be problems while reading data from disks on iSCSI initiator.



Function: Snapshot info

Here you can view information for selected snapshot.

Name

Name of snapshot.

LV

Logical volume for which snapshot is assigned.

Status

Status of snapshot.

Can be one of following:

- Active - Snapshot is in active state.
- Inactive - Snapshot is inactive, probable reason: overflow.
- Unused - Snapshot is currently unused.

Size

Size of snapshot.

Function: Create schedule for snapshot task

Here you can create schedule for selected snapshot task.

Comment

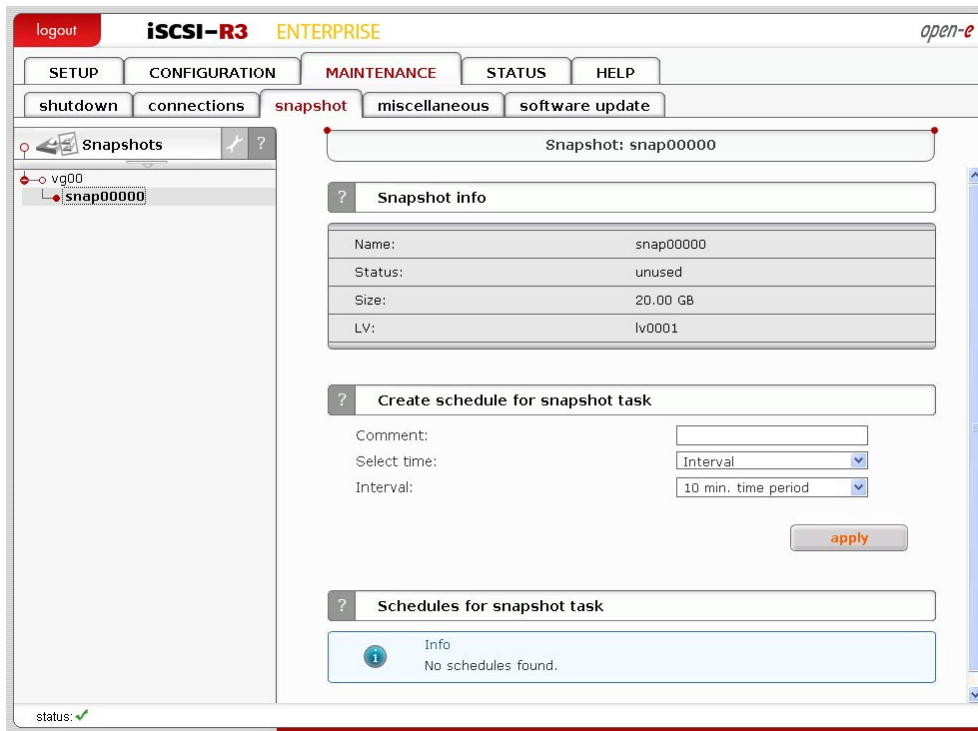
You can enter comment for snapshot schedule.

Time select

You can start creating of snapshot immediately by selecting "Now" from Time select drop down list or add to schedule.

Interval

Select time period in which snapshot will be created.



Function: Schedules for snapshot task

Here you can see all schedules created for a snapshot task.

5.2.3.4 Miscellaneous

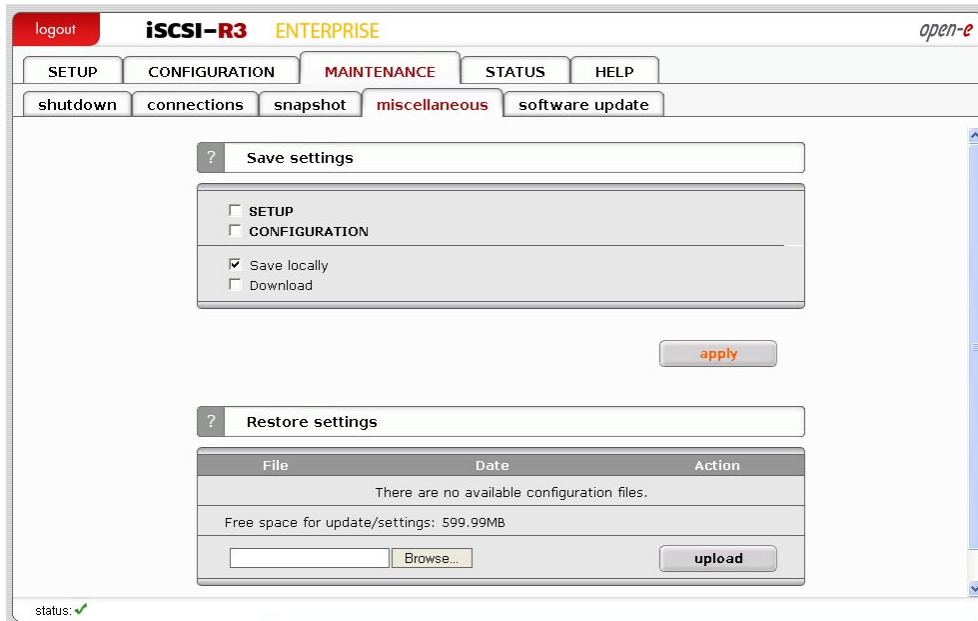
Function: Save settings

With this function you can store the configuration settings. You can save such setting as:

- Server setup,
- Network settings,
- Administrator setup,
- Hardware setup,
- Target settings,
- Users.

Select settings you want to store and click Apply. Settings can be saved locally on the server(it will be visible in function Restore setting) and/or downloadable file. Each time you save settings locally, new entry will be created and during restoring you can select witch settings to restore.

You can restore the settings using function Restore settings.



Function: Restore settings

With this function you can restore the configuration settings (previously saved). You can restore settings from files saved locally or upload configuration settings file (previously downloaded). For each entry you can see configuration file name, date of creation and actions that can be applied. By clicking Details action button you can select which settings to restore. To restore settings click on Restore action button.

You can restore following settings:

- Server setup,
- Network settings,
- Administrator setup,
- Hardware setup,
- Target settings,
- Users.

You can delete configuration settings file by clicking Delete action button. You can download configuration settings file by clicking its name. In order to upload configuration settings file (previously saved) browse a file name and click on Upload button.

You can save the settings using function Save settings.

5.2.3.5 Software update

This function allows you to update the system software. There are two ways of updating Open-E iSCSI-R3 software.



Function: Update downloader

With this function you can check if there is new update available and download it. In order to download a new update you need to be registered at Open-e.com. You also have to remember to setup correct DNS and Gateway address in SETUP → network menu.

Function: System software update

This function allows you to update the system software. When you upload update file you will see its name and size. With each update file you do following action:

- See release notes,
- Make update (Update button),
- Delete update file (Delete button).

● **note** Some updates need a system restart. In this case you will be informed about needed restart in confirmation message.

Function: Run previous system.

With this function you can run previous system.

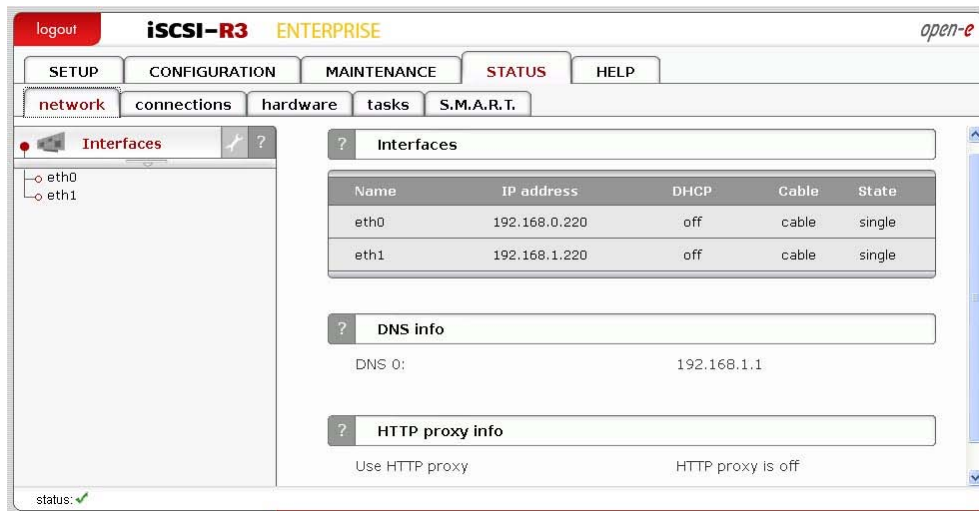
5.2.4 STATUS

This function provides a quick overview of the most important system parameters of your Open-E iSCSI-R3. The corresponding sub-functions are network, logical volume, connections, hardware, tasks and S.M.A.R.T.

5.2.4.1 Network

Function: Interfaces

Here you can view network interfaces info. In table you can see network interface name and IP address, DHCP information, cable status.

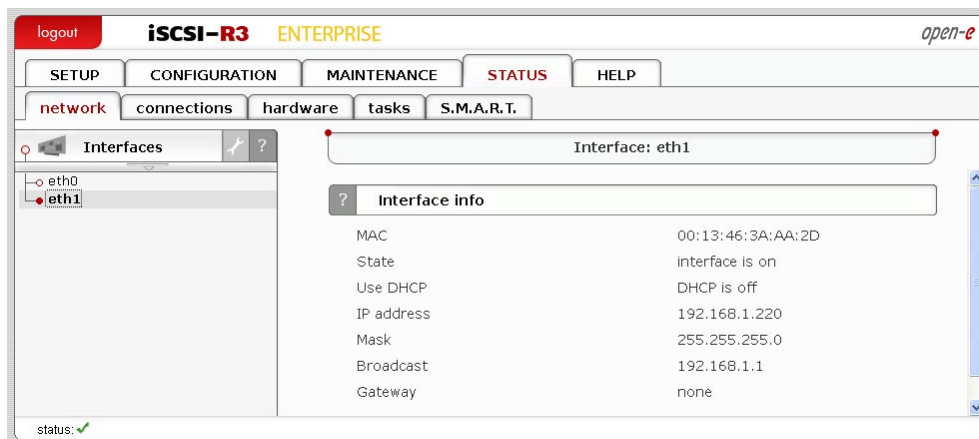


Function: DNS info

Here you can view network interfaces DNS information.

Function: HTTP proxy info

With this function you can view HTTP proxy information. You can see if proxy is enabled and which HTTP proxy IP address is assigned to it.



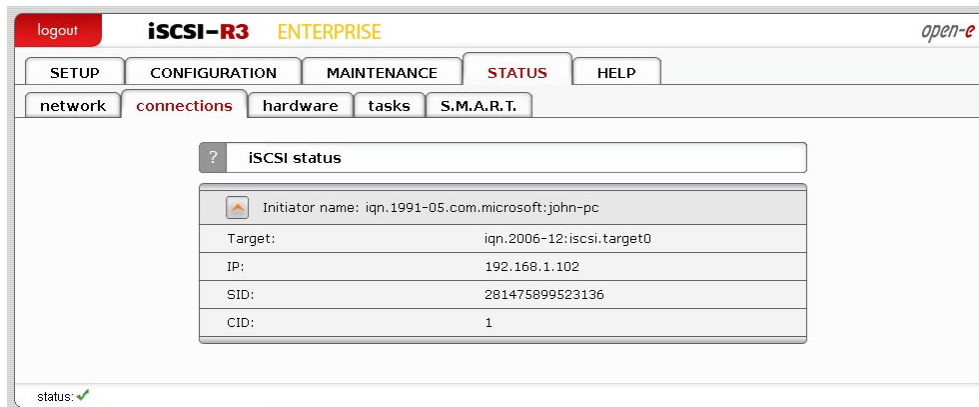
Function: Interfaces info

This function shows information about selected network interface. You can view here:

- MAC address,
- State,
- DHCP status,
- IP address,
- Mask,
- Broadcast address,
- Gateway address.

5.2.4.2 Connections

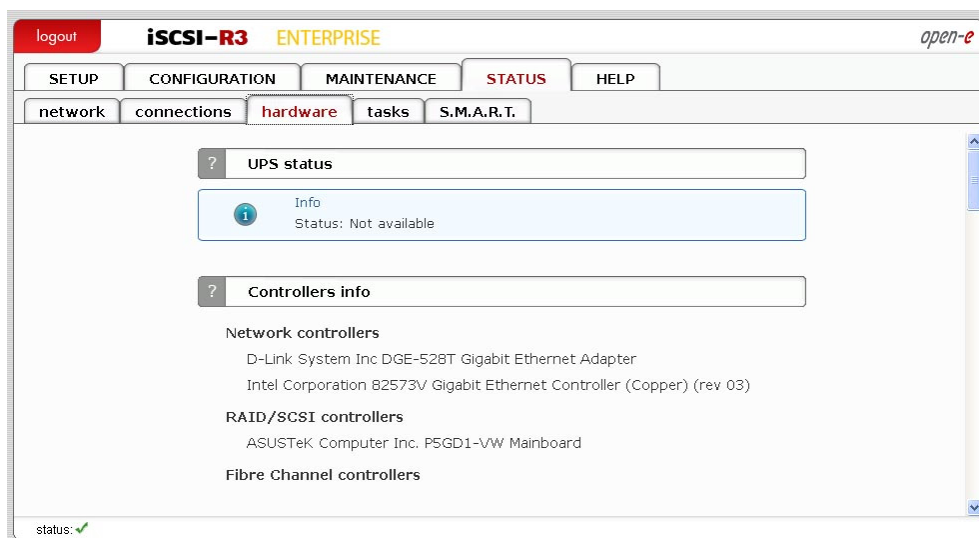
This function displays what user connections are currently active.



5.2.4.3 Hardware

The “Hardware” option provides you with information on storage and network controllers and the drivers (e.g. network driver and RAID driver).

In addition, you may also download the latest Open-E iSCSI-R3 log files or view specified or all log files without downloading in compressed form. You can also check usage of memory (RAM) and (SWAP) and also hardware monitoring.



Function: UPS status

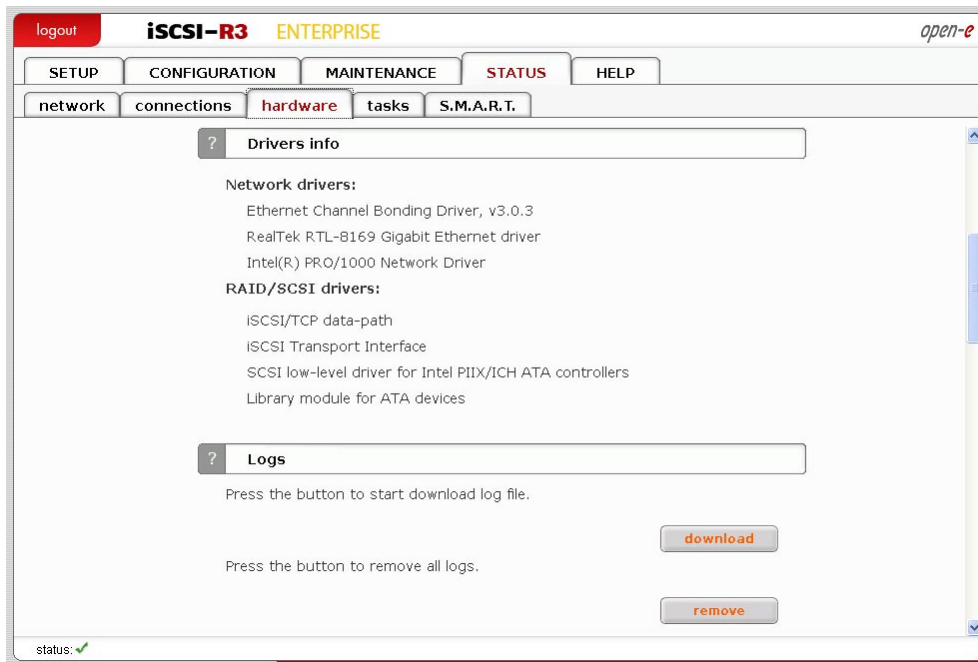
The UPS status presents the current status of ups device.

Function: Controllers info

This table lists the components installed in your server.

Function: Drivers info

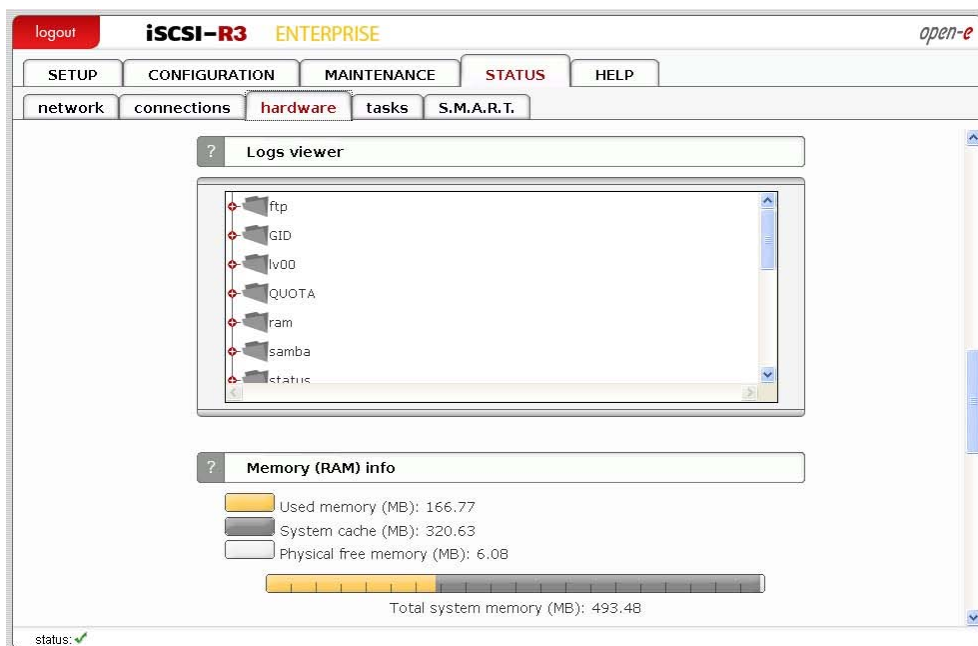
This table presents active drivers loaded for hardware detected during boot-up process.



Function: Logs

This function lets downloading or removing the logs gathered during operation of the Server. In the logs all system information, which are needed for troubleshooting in case of problems can be found.

- **note** Recovery Information of the logical volume manager are also stored in the logs. It is recommended to download logs after creating the logical volumes and store them in a save place as source for logical volume and volume groups recovery in case of a critical hardware failure.
- **note** While generating the logs a simple speed test of the disks is done. When software Raid is used with a lot of single disks, this may take up to few minutes.



Function: Logs viewer

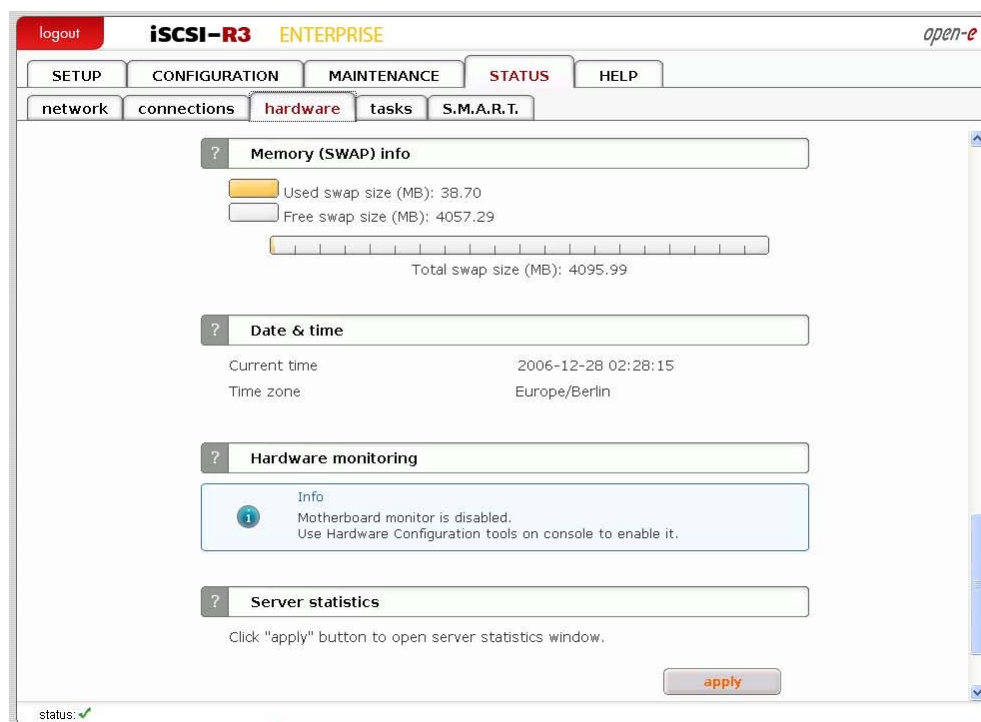
This function allows to view specified log file without downloading all log files in compressed form.

To view a log file just click on name of that file. Depends of Web browser you use you may be asked to choose appropriate program to view specified log file. To change folder just click on the name of it.

Function: Memory (RAM) info

This module presents the current memory usage.

- **note** Memory allocated by system cache will be released when some application will require additional memory. If there is almost no free memory you can enable swap or install more memory modules.



Function: Memory (RAM) info

This module presents the current memory usage.

- **note** Memory allocated by system cache will be released when some application will require additional memory. If there is almost no free memory you can enable swap or install more memory modules.

Function: Memory (SWAP) info

The memory (SWAP) info presents the current status of swap usage.

- **note** Swap is used to store memory areas on hard drives instead of RAM (Random access memory). Operating systems dumps memory area to swap when this area was not in use since a long time and there is a need to allocate some additional memory.

Function: Date & time

This function presents current date and time of your server.

Function: Hardware monitoring

This function monitors hardware. When using mbmon hardware mode you can find here information on following parameters:

- Motherboard temperature,
- CPU temperature,
- Chipset temperature,
- Vcore.

To enable Hardware monitoring you need to use **Hardware Configuration tool** on console and enable it in **hardware options** (*press F1 on console to find out keyboard shortcuts*).

Supported chipset family	
winbond	LM78/LM79, W83781D, W83782D, W83783S, W83627HF, W83697HF, AS99127F, ASB100
wl784	W83L784R, W83L785R, W83L785TS-S
via686	VT82C686A/B
it87	IT8705F, IT8712F
gl52	GL518SM, GL520SM
lm85	LM85, ADM1024, ADM1025, ADM1027, ADT7463, EMC6D10X
lm80	LM80
lm90	LM90, ADM1020, ADM1021, ADM1023
lm75	LM75

When using **xyratex** hardware mode you can find here information on following parameters:

- Disks status,
- Fans speed,
- Fan PWM,
- Power status,
- Fan status,
- Temperature.
-

When using **IPMI (sensors)** mode you information which you can see depends on motherboard. To be able to enable this mode you need to have motherboard with sensors management component that support access via IPMI.

When using **Intel SSR212 2U** mode you can find here information on following parameters:

- Power status,
- Memory Voltage,
- Voltage levels,
- Box Temperature,
- CPU Temperature,
- FAN speed.
-

When using **Intel SR2500ALLX** mode you can find here information on following parameters:

- Power status,

- Memory Voltage,
- Voltage levels,
- Box Temperature,
- CPU Temperature,
- FAN speed,
- Disks status.

When using **AOC-SAT2-MV8** mode you can find here information on following parameters:

- Unit - Displays unit name,
- Bay - Number of bay in which unit is inserted,
- Serial Number - Serial number of unit.
-

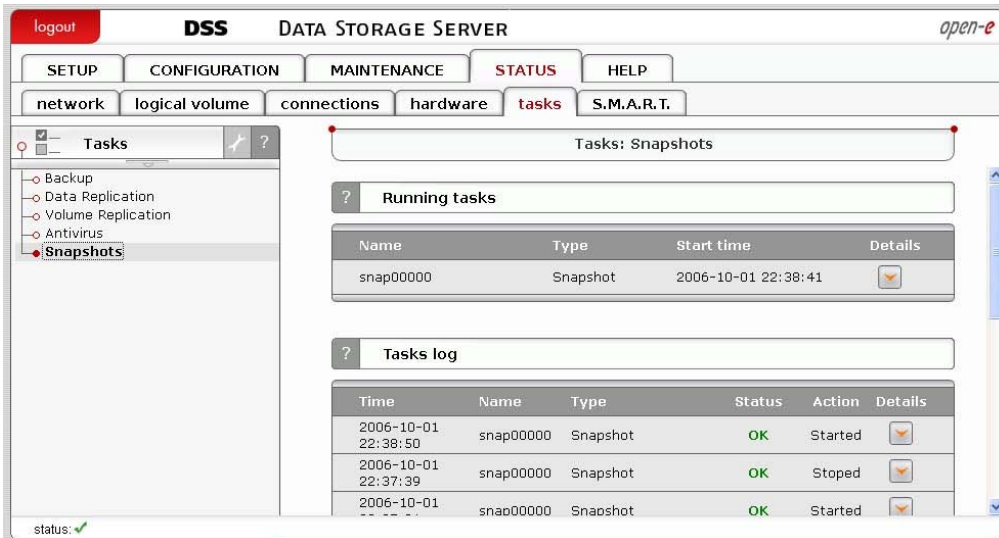
Function: Server statistics

Here you can open window with server statistics. Following statistics are available:

- System load,
- Memory,
- Uptime,
- Network.

5.2.4.4 Tasks

Here you can view statistical information on tasks from data replication, and snapshots.



The screenshot shows the DSS (Data Storage Server) web interface. The main menu includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The 'tasks' sub-menu is active, showing 'network', 'logical volume', 'connections', 'hardware', 'tasks', and 'S.M.A.R.T.'. The 'Tasks' section is expanded, showing a tree view with 'Snapshots' selected. The 'Running tasks' section displays a table with the following data:

Name	Type	Start time	Details
snap00000	Snapshot	2006-10-01 22:38:41	

The 'Tasks log' section displays a table with the following data:

Time	Name	Type	Status	Action	Details
2006-10-01 22:38:50	snap00000	Snapshot	OK	Started	
2006-10-01 22:37:39	snap00000	Snapshot	OK	Stoped	
2006-10-01	snap00000	Snaoshot	OK	Started	

5.2.4.5 S.M.A.R.T.

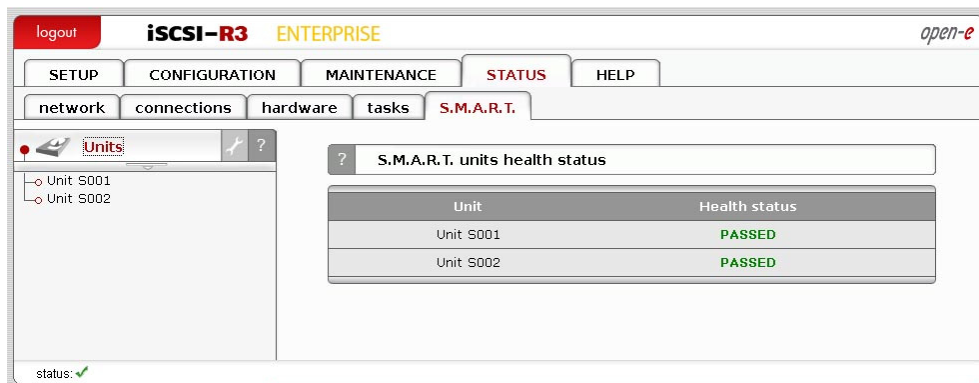
Through the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system, modern hard disk drives incorporate a suite of advanced diagnostics that monitor the internal operations of a drive and provide an early warning for many types of potential problems. When a potential problem is detected, the drive can be repaired or replaced before any data is lost or damaged.

Here you can find tree with hard drives for which you can view S.M.A.R.T. information.

It is possible to view information about separate hard drive or summary for all drives in the system.

To view S.M.A.R.T. information for a hard drive - please click on appropriate drive name.

To view summary please click on "all units"

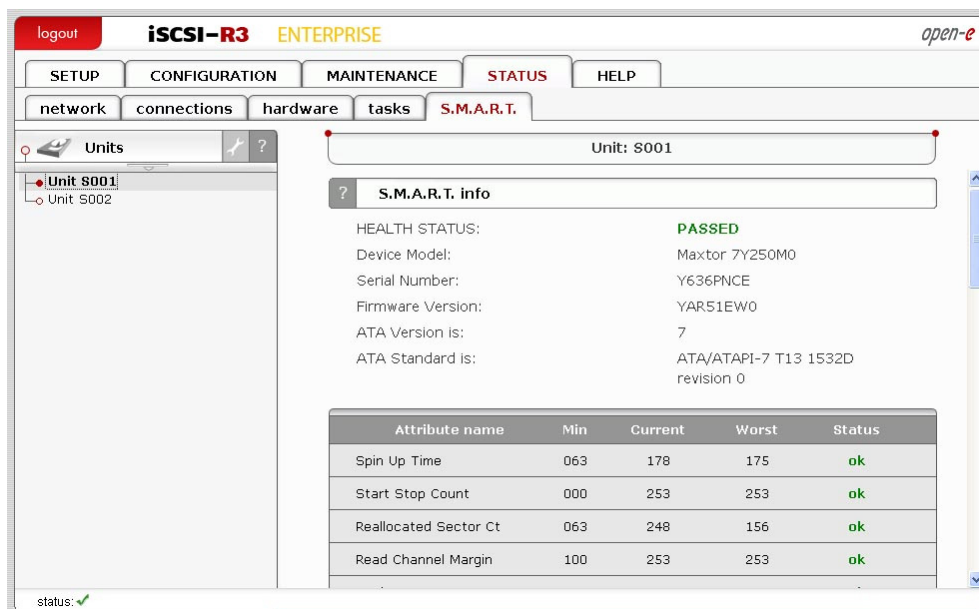


Function: S.M.A.R.T. units health status

This function allows you to check S.M.A.R.T. status of hard disks.

S.M.A.R.T. is a monitoring system for computer hard disks to detect and report on various indicators of reliability, in the hope of anticipating failures.

To enable S.M.A.R.T. checks you need to use Hardware Configuration tool on console and enable it in Functionality options (press F1 on console to *find out keyboard shortcuts*).



Function: S.M.A.R.T. info

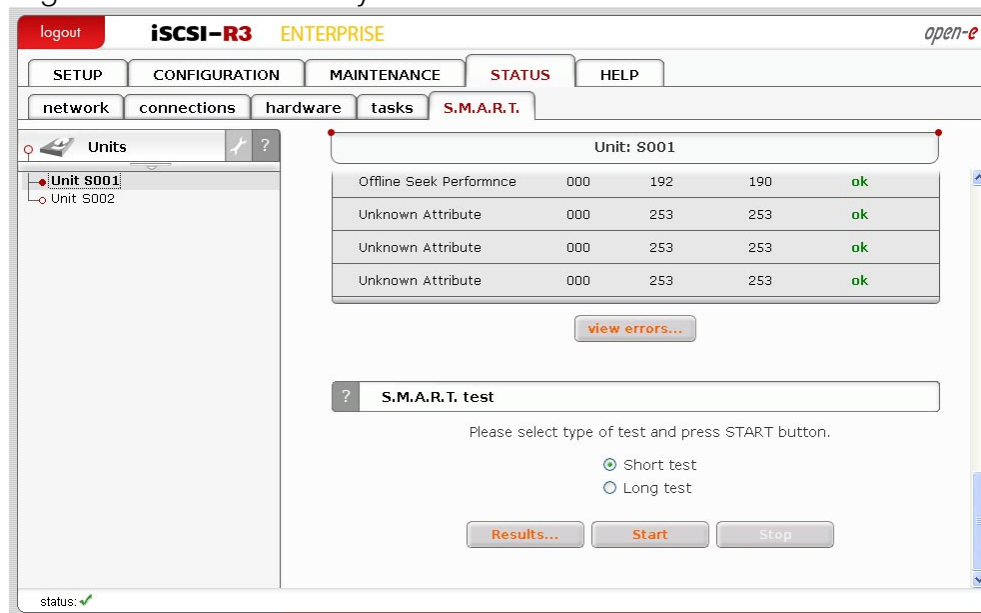
This function allows you to view S.M.A.R.T. parameters which this disk is able to return.

In the upper part of this function you can see elementary parameters of hard drive such as device model or serial number. Below there is a table with S.M.A.R.T. attributes. In first column you will find an attribute name, in second -

minimum threshold value of this parameter, then current value, next worst value and after the status.

- **note** If value of attribute have ever exceeded worst of this value then the status will be "failed".
- If value of attribute is on the edge of worst value then the status can be "pre-failed".
- On some hard drives part of attributes can be displayed as "Unknown_Attribute" - this can happen when producer of that hard drive have done some modifications in S.M.A.R.T. and this changes are not yet supported by our software.

Button "view errors" provide you ability to view S.M.A.R.T. log of that drive which is generated automatically.



Function: S.M.A.R.T. test

This function allows you to perform short and long test of hard drive.

You will be informed about progress of test.

After finish of test please click on "results" button to view test log.

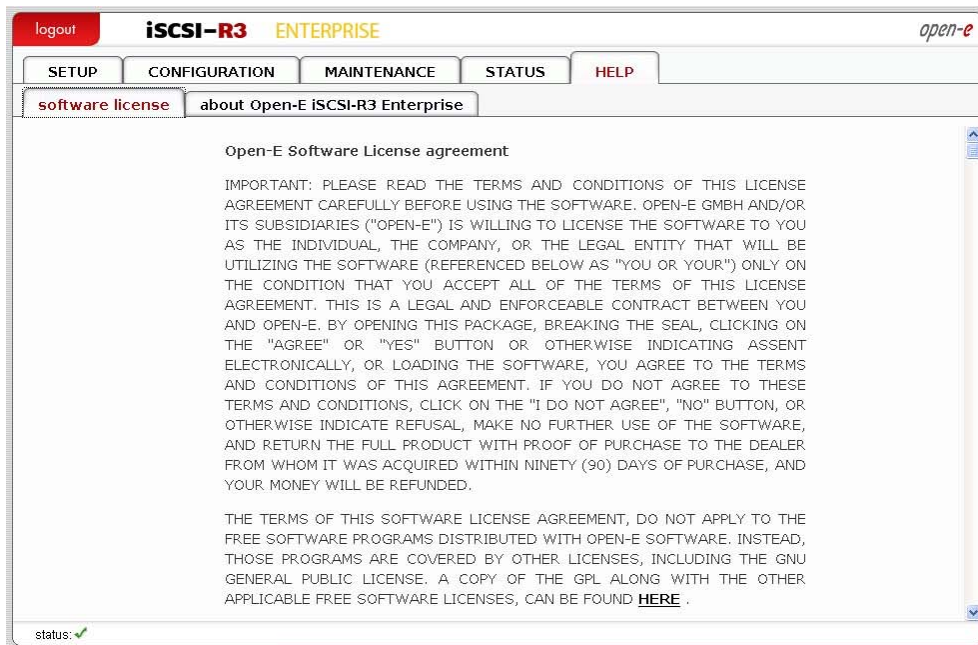
Performing a test is not recommended during normal (daily) usage of that hard drive.

- **note** It can happen that on some motherboards and controllers S.M.A.R.T. tests will not work.

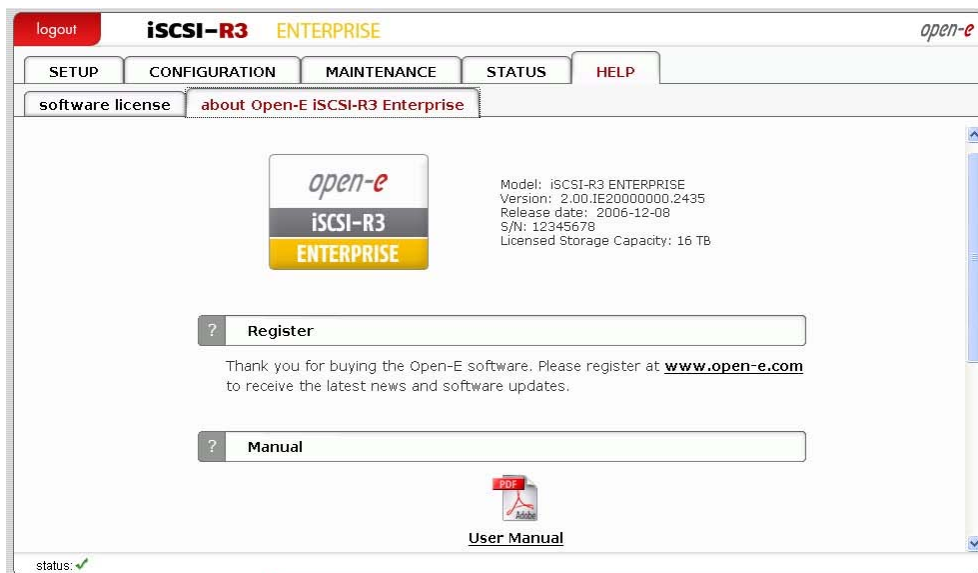
5.2.5 HELP

5.2.5.1 Software License

When accessing Help - "software License" you can read the license for software included in Open-E iSCSI-R3.



5.2.5.2 About Open-E iSCSI-R3



Function: Register

In this function you can find link to our registration form. Note that registration is required to receive updates and new versions. Registration gives you also opportunity to receive e-mail notification about software news.

Function: Manual

You can download the manual here and print for fast reference.

note In order to read the manual, you need a PDF viewer such as the Acrobat Reader (<http://www.adobe.com>).

Function: Service

Please have the following information available before contacting Technical Support team:

Logs which you can download in menu: status → hardware → logs

Your software version which you can find in menu: help → about



Function: Add license key

Here you can enter license key to expand functionality of server.

For example you can add a license key for bigger capacity of storage volume.

You log out by closing the browser window.

6 Troubleshooting Guide

Here is a list of common error messages and their meanings as well as corresponding tips on how to resolve the underlying problem. If your error message is not listed here please contact Open-E's support and service team (see section "help" above). Our staff will help you find a solution.

Error: values are not valid

You have entered an invalid parameter. IP addresses have the form aaa.bbb.ccc.ddd: All four parameters range between 0 and 255 and are always separated by periods.

Error: passwords do not match

Make sure that you type the same password in each entry field. For safety reasons, the passwords are not displayed. Type slowly. Check the status of the Shift, Caps Lock, Control, and Alt-keys.

Error: Update file not found

You instructed Open-E iSCSI-R3 to perform a systems update, but did not supply a valid Open-E iSCSI-R3 update file. Download the latest Open-E iSCSI-R3 update file from the www.open-e.com Web site. Next, copy the upgrade file into your "update" folder (please spell upgrade lower case). Finally, select "update" from the menu.

Error: invalid administrator password

Administrator password cannot begin or end with a space.

Spaces are not legitimate characters at the beginning and end of a password. Maybe you inadvertently hit the space bar during password entry. Reenter your password.

7 Appendix A

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8 Appendix B

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