# ENTERPRISE iSCSI Open-E

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# 1 Before you get started

Congratulations on purchasing Open-E iSCSI, 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 ENTERPRISE, make sure that the package contains the following items:

- Open-E flash module
- Power adapter
- 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 1 GHz or faster
- at least 512 MB main memory
- Hardware RAID Controller
- IDE port
- One or several suitable hard drives
- Network Interface Card (NIC)

Open-E iSCSI 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, as well as a processor with at least 2.8 GHz. If several computers are accessing the iSCSI 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 MAC OS X

## 1.4   Supported network protocols

- TCP/IP
- SNMP

## 1.5   Required tools

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

## 1.6   Safety precautions

### 1.6.1   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.

### 1.6.2   Safety for your data

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

### 1.6.3   ESD precautions

In order to avoid damage to your computer or to Open-E iSCSI, please ensure you are grounded before opening the PC or the ESD package that contains Open-E iSCSI. 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, for instance, by touching a heater.

- Avoid unnecessary touching of the components inside the PC
- Please touch Open-E iSCSI 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 is one of the easiest ways of implementing an iSCSI technology in your network. Through its simple architecture; it is a flash memory with an IDE interface and Open-E iSCSi as its operating system, Open-E iSCSI can be used with all x86 PCs containing an IDE controller. Older computers may also be used.

To begin working with Open-E iSCSI, all you need to do is to 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 using the encrypted https protocol.

Open-E iSCSI 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. It is tedious work data often has to be copied manually onto larger drives, consuming a lot of time and money.

With Open-E iSCSI, you can:
- Consolidated storage and backups for multiple servers.
- Improve data availability and efficiency.

ENTERPRISE iSCSI Open-E

- Lower costs by centralizing storage management.
- iSCSI also simplifies the installation and on-going management of a SAN versus using Fibre Channel.

With Open-E iSCSI, you can add storage to your existing network quickly, easily, and most important cost-efficiently. Expensive hardware is no longer necessary. Take any computer, a new rack server or an old desktop PC and exchange the system drive for the Open-E iSCSI flash module. To store data Open-E iSCSI ENTERPRISE uses IDE (ATA), SATA or SCSI hard drives and hardware RAID controllers.

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

**ENTERPRISE** iSCSI Open-E

# 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 IDE connectors on your motherboard:



Every motherboard has at least two such ports. To install Open-E iSCSI, you have to use the first (primary) port.
Often, the labeling on the IDE connectors may be tiny, but it is always there, on each and every board. Preferably look for "IDE 0" If this connector does not exist, the first port is called "IDE 1" (with the second connector being 2).

## 3.2 Installing Open-E iSCSI

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

In the package you will find an adapter cable, which provides Open-E iSCSI with power. The little white plug corresponds with the matching connector on Open-E iSCSI. As a final step, the adapter has to be connected to the white power-supply plug (see photo):
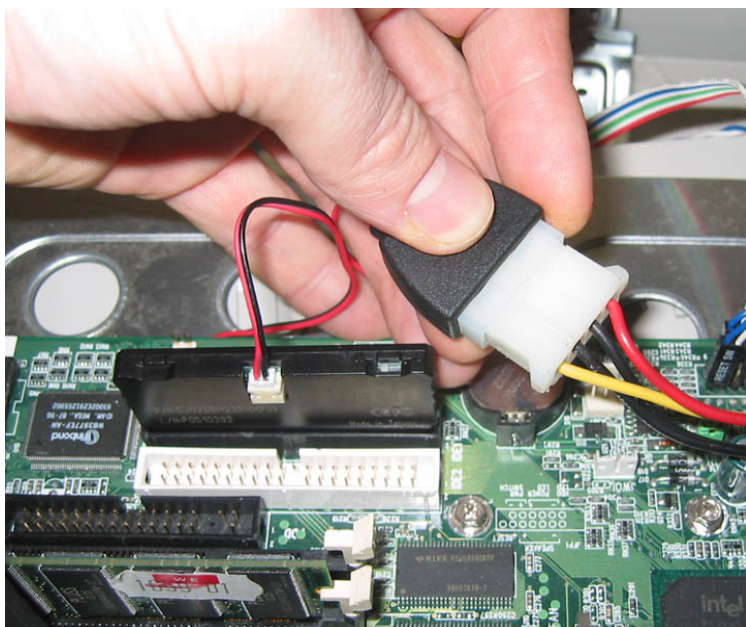


That should conclude the installation! Before putting the enclosure on your computer again, do not forget to connect your hard drives to the IDE second connector, SATA connector or to the SATA port on the RAID controller.

# 4 Configuration

## 4.1 The basic configuration of the iSCSI computer

Connect your keyboard and a monitor to the iSCSI computer. You will only need those devices for the basic configuration or extended maintenance configuration.

● 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

Now start your system.



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

```
Welcome to Open-E iSCSI                        (Press F1 for Help)
----------------------

Model:         Open-E iSCSI ENTERPRISE
Version:       1.72.IE00000000.2512
Release date:  2007-01-12
S/N:           1357186427

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
```

ENTERPRISE iSCSI Open-E

If the network has a DHCP server, Open-E iSCSI should gain access to the IP settings automatically. If that is the case, you can proceed at 3.5. If your network does not have a DHCP server, Open-E iSCSI 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).

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.

```
 ─────────────────────────── 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 display extended tools
     C-A-W    - to hardware configuration
     C-A-F    - to run CLI management Tool for fibre channels controllers
     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 >
 ────────────────────────────────────────────────────────────────
```

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


## 4.3  Logging into Open-E iSCSI ENTERPRISE

You can establish a connection to Open-E iSCSI 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 Open-E iSCSI server into the URL entry line: https://192.168.0.220.

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

You will now be asked for verification of the encryption certification. Since Open-E iSCSI 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. Later you can change the language using Language Settings, which are located in server through Setup.

After accepting license agreement you can log into Open-E iSCSI Target using the standard password "ancom" (this can be changed later). In order to start working, you can now set all parameters.
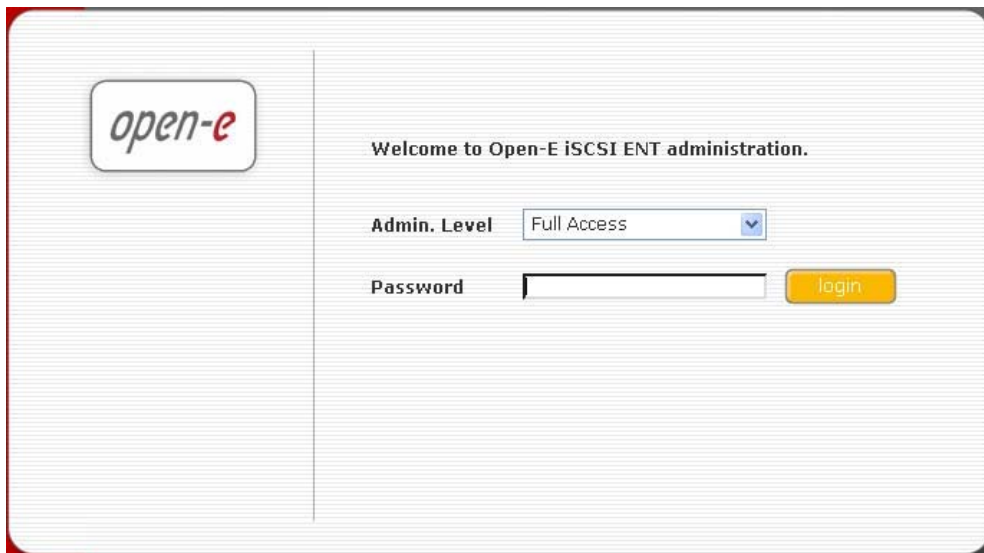


● note Password checking is case-sensitive. If you cannot log into Open-E iSCSI, please check the status of the Shift and Caps Lock keys.

## 4.4 Create RAID Units

Use the RAID manager to build a disk array, when a hardware RAID controller is installed in Open-E iSCSI. To create disk arrays utilize 3ware RAID manager (3DM or 3DM2) for RAID controllers series 7000/8000/9000. Use an ICP console for INTEL / ICP Vortex RAID controllers. For any additional information refer to a RAID controller user manual. You can use also storage devices connected to a Fibre Channel.
If the hardware RAID controller is not installed, you can use software RAID, select "RAID| FC" in the menu and then "S/W RAID".
You will find a list of any available disk drives (units).
To create a disk array, please mark any selected unit(s) and choose the appropriate RAID from the "destination". Created RAID units appear as RAID 0, 1, 5 and 6.
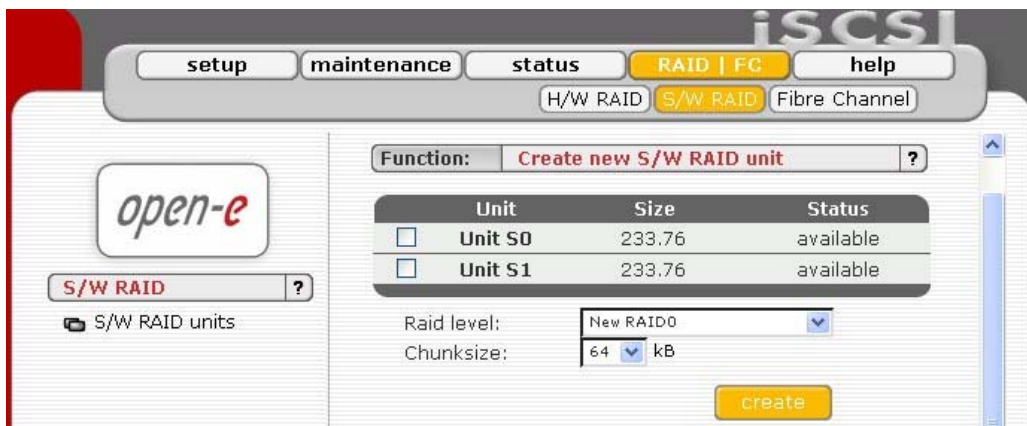


After clicking "create" button, the status will change to "in use" with additional information describing the kind of a disk array (e.g. MD0 is RAID 1)
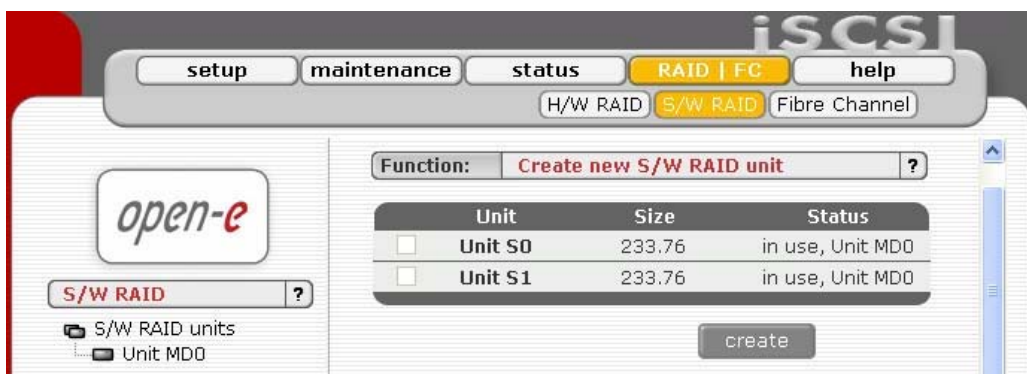
## 4.5  Adding Disk Units

Please select "setup" → "target manager" and then "volumes" on the left page. After selecting "volumes" you will find a list of all logical units. To add a new unit to the iSCSI, please click "Add". After the initializing procedure, the status of the unit will change from the "Add" button into "in use, vg0".
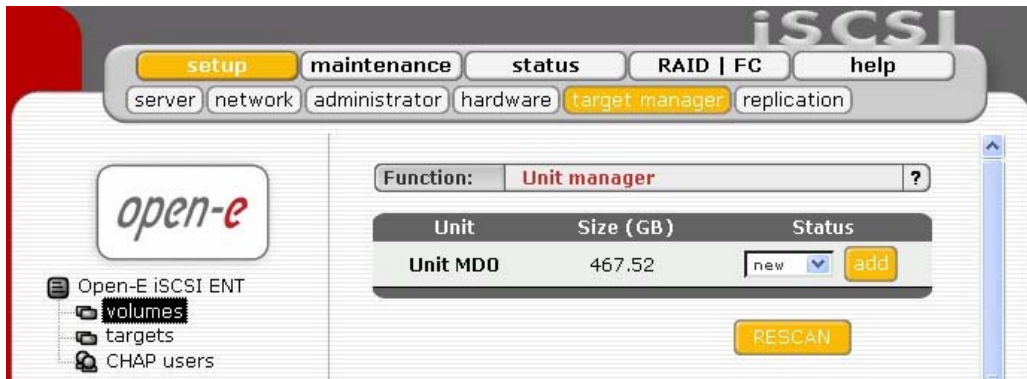
Please note that you can expand the storage capacity by adding new disk drives. In the "Unit Manager" Function Open-E iSCSI will show both "in use" and "new units". In order to add a new unit to the Volume Group (vg0), please simply click 'Add' after which Open-E iSCSI page will be restarted (see below).
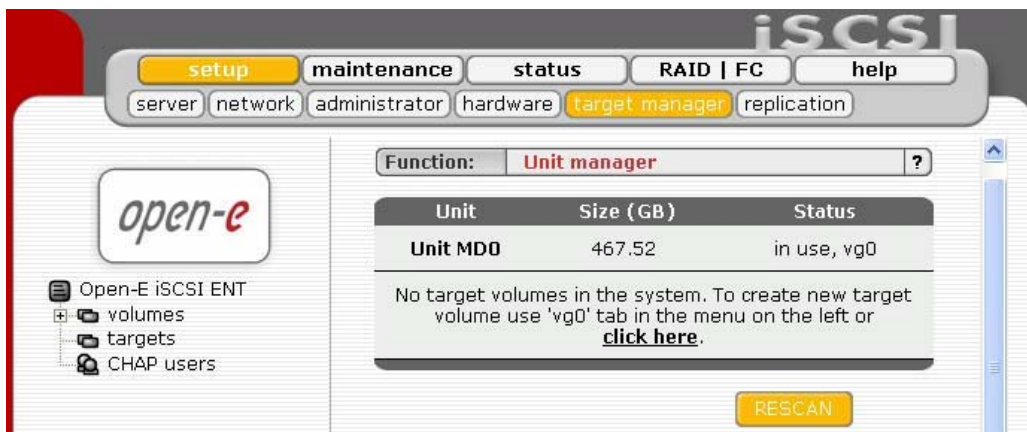
## 4.6  Creating iSCSI targets volume

Next, by clicking on the branch "vg0" you can add disk volume to new "targets volume (tgv)" and snapshot or increase size on existing tgv's and snapshot (you can't decrease tgv size and snapshot). To set needed tgv size just use scrollbar, next to it on the right side it shows the available size to use (see below).

Here you can also set the snapshots number, and add them to the particular „targets volume".

ENTERPRISE iSCSI Open-E

After creating "tgv" and "snapshots" click on the branch "targets" in Target Volume Manager Function, where you add "targets volumes" only in the premises of one vg0. Next, by clickling "CHAP user" on the branch, you can management the name and secure access to "tgv" by giving CHAP user name and password (password must consist from 12 to 16 characters if you use Microsoft iSCSI Initiator).

## 4.7  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 IP address,

e. Next click "Advanced…" button, and mark "CHAP logon information", next give User name and Target secret and then 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 Open-E iSCSI and client station. Those settings must be the same. Time can be synchronized in the menu Web Interface "setup" → "server" in Function "Clock settings"

ENTERPRISE iSCSI Open-E

# 5   Description of functions

## 5.1   Functions of the console display

While Open-E iSCSI can be fully administered remotely through a secure Web interface, some of the functions you can access on the console. Open-E iSCSI 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 +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, DNS configuration, Language settings, Modify driver option and Boot option.

### 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+f
By pressing the left CTRL key, left ALT key and f, it will display management tools for fibre channel controllers..

### CTRL+ALT+r
By pressing the left CTRL key, left ALT key and r, it will display CLI Management Tools for ICP Vortex.

● **note** This function appears in Help Console only when an ICP Vortex hardware RAID controller is installed in the iSCSI system. In order to get additional information read the user manual of ICP Vortex RAID controller manufacturer.

## 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 information will be displayed.

## Shutting down and restarting

With Ctrl + ALT + DEL the Open-E iSCSI 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.

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

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

### 5.2.1  Setup

In this menu option, you fill find the following sub-functions: server, network, administrator, hardware, target manager and replication.
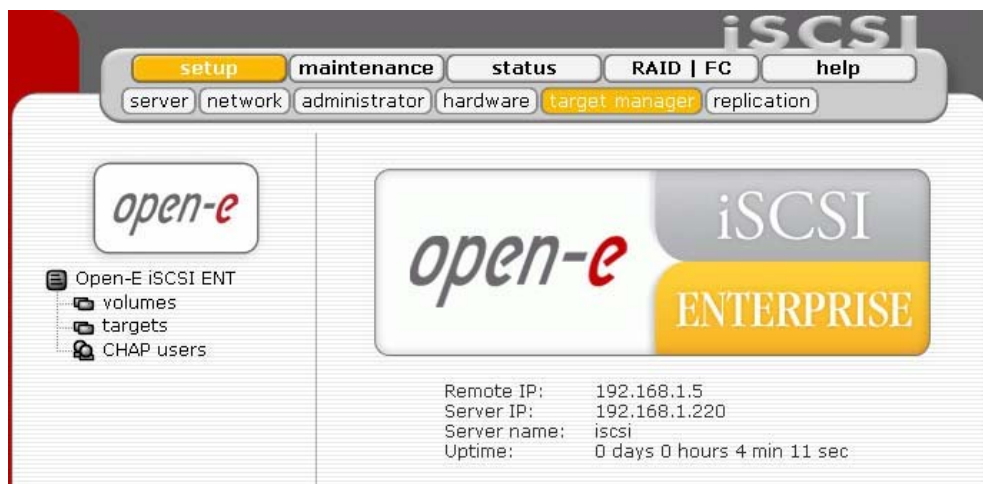
### 5.2.1.1 Server

This is a key component of the setup menu, as some of the most crucial parameters are defined here.

Function „Server name"
Select a server name, which will be used to identify iSCSI target names.



Function "Language Settings"
English and German are supported.

### 5.2.1.2 Network

In this place you can find functions helpful in management of nets parameters Open-E iSCSI system.

## Function: Bonding

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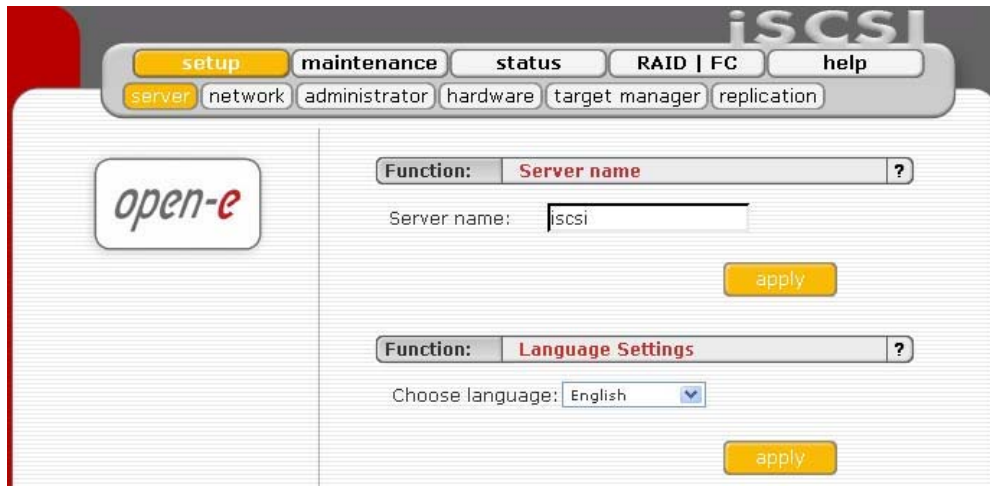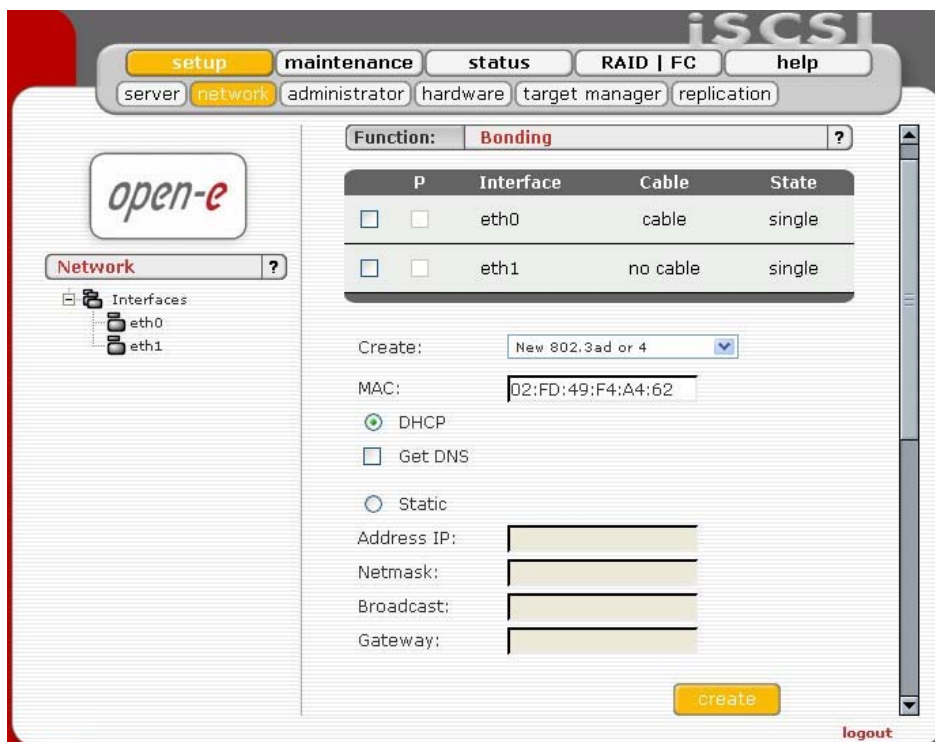- select desired bonding mode from Create drop down menu
- select dynamic(DHCP) or static configuration of network interface
- if you want to dynamically get DNS address, select "get DNS"
- when using static configuration of network interface enter address IP, netmask, broadcast and gateway
- apply Create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

● note In order to take advantage of bonding more than one ethernet NIC need to be plugged into the box.

**Each network interface is described by following fields:**

**P:**
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.

**ENTERPRISE** iSCSI Open-E

- broadcast
  Transmits everything on all slave interfaces. This mode provides fault tolerance.

- **802.3ad or 4**
  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.
  Require:
  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.

  ● note  Its recommended to create bonding only with NIC that have the same chipset.
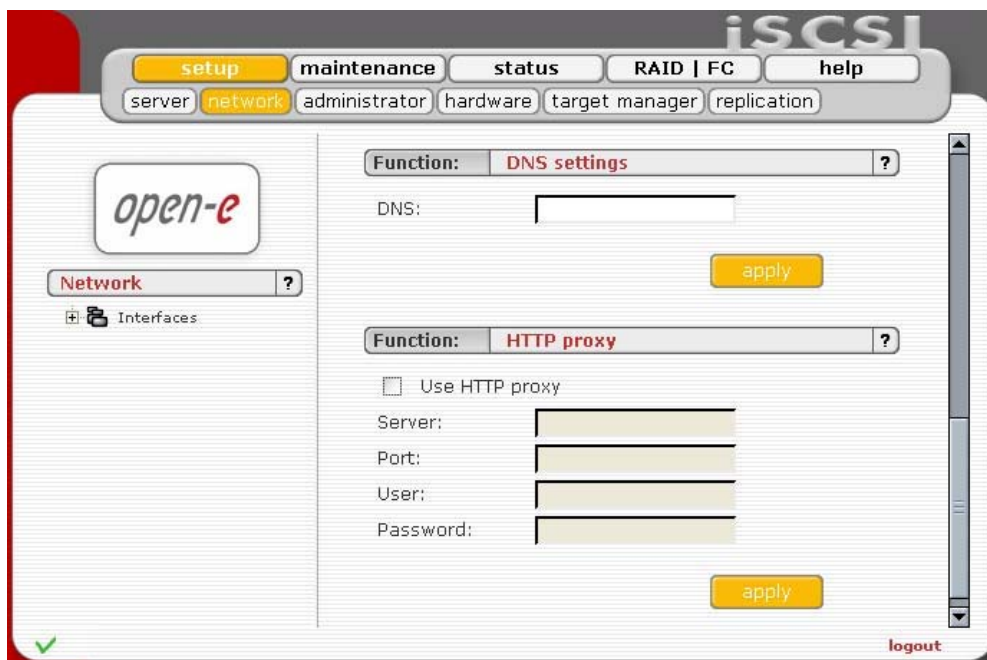


## Function: DNS settings
This function enables you to enter DNS addresses. Please use commas to separate addresses.

## 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
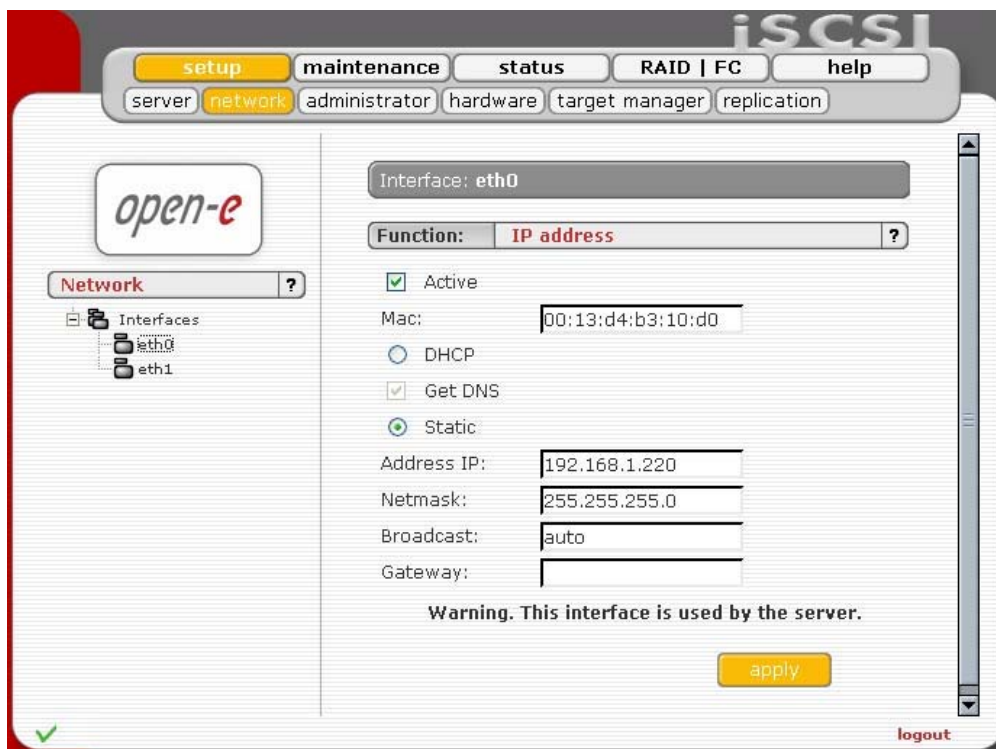
## Function "IP address"

Here you can set TCP/IP parameters for selected NIC.
You can activate or deactivate network interface by setting "Activate" checkbox.
You can use static or dynamic(DHCP) network interface configuration.
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.
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.

ENTERPRISE iSCSI Open-E

## 5.2.1.3 Administrator

In this section you may change parameters of administrator's access, enabling e-mail notification, downloading SLL Certificate for your browser and .



### Function "Administrator Password"

Using this function, you can change the password of the server administrator accounts.

For security reasons, please make sure you change the standard password and select a new one.

● 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 Caps Lock keys.

Password cannot contain:
- characters: ' " `
- spaces.

The default password for each account is "*ancom*"

## 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 allowed to access the Open-E iSCSI Web administration. This field left blank means no restriction.
- Lock console without password: disables access to the console
- Lock console with password: to get access to the console you need to type in a password. Note that this password should be exactly 8 characters long and include only 1-4 digits.
-  Unlock console: the 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 module or contact technical support.

## Function "E-mail notification"
The server can send a notification email to the administrator in case of significant events, critical errors, warnings, etc. To enable this feature check **Send errors**.

**Destination e-mail**:  Please enter the administrator e-mail address.

**Advanced settings:** E-mail server: Optionally you can provide email server address for the iSCSI internal mail server (full qualified domain name).

● note  Some SMTP servers, use monitoring functions of IP address and domain name. It compares domain name of sender SMTP server  with IP number of a computer from which email was sent, if they do not suit, this email may be treated as "spam" and will not be accepted.  This is why it is not recommended to change the default setting (open-e.com).

## Function "SSL 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.

● note  If you want to delete or view CA go to:  Tools->Internet Preferences-> Content->Certificates->Trusted Root Certification Authorities and OPEN-E GMBH which should be there.

Function "USE SNMP"

Simple Network Management Protocol (SNMP) is a protocol for monitoring a network and computer equipment.

With SNMP you can get a lot of information:

- ethernet traffic,
- memory info,
- usage of CPU,
- system load,
- running processes
- uptime,
- MAC addresses of network card.

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.

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

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

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

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

● note  For better security use only SNMP 3 version ! This version provides login, password and encrypted transmission.

## How to retrieve information from SNMP?

From Linux:
- snmpwalk - → it is command-line tool from snmp-package.

**You can get information by:**

snmpwalk -v 3 -u public -l AuthNOPriv -A MD5 -A public123 adres_ip SysUpTime
- v 3        --> use only 3 version
- u public --> community name
- A MD5   --> encrypted by MD5
- A public123      --> password
address_IP        --> IP of iSCSI server
SysUpTime        --> OID with system uptime information

To use SNMP from command line you have to know OID's, for example:

- ssCpu (processor load), mem (memory info), Location.

But it is not the best choice to retrieve info from command line. You have to install SNMP client, so you can easily read any information you want.

From MS Windows you can use following Windows Clients: PRTG, MIB Browser Professional, SNMP MIB Query Manager and INFTRAF.

● note  If you can't retrieve information from SNMP client, you can check iSCSI_ip/check_sys/index.html. There are SystemLoad, CPU, Memory, Swap, Uptime.

## 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 iSCSI 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 pass.:**  Please retype your new password.

Password cannot contain:
- characters: ' " ` ^ & $ # [ ] \/ | *
- spaces.

To connect to iSCSI from Linux/MacOSX systems use:
**ssh -2 -p 22222 -l cli address_ip**

- 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](www.putty.nl)).

- 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")

## 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.

### 5.2.1.4  Hardware

### Function: "UPS configuration"

In the function you can select a UPS device desired (Uninterrupted Power Supply). For the connection of the UPS device to the Open-E iSCSI, the USB port is most frequently used.



In the settings you can select the UPS model, cable type, connection port 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. UPS support in mode "Single" means that Open-E iSCSI 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.

Single means, that Open-E iSCSI 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 Open-E iSCSI server is connected to the UPS and sends a signal through the network to shutdown other systems in the network.

Slave means, that Open-E iSCSI server is reacting on a "power down-signal" from an UPS master.

🟡 **note**  During a power failure you cannot log into the Open-E iSCSI. Users, who are connected to the Open-E iSCSI server during the UPS-time continue to have full access to all files on the iSCSI target.

## Function "Clock settings"

Here you define an NTP server (Network Time Protocol) to synchronize your Open-E iSCSI with a time server on the Internet.
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 timezone 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 changed. Setting this option on is specially recommended when using domains.

🟡 **note**  Time setting is very important for proper work of the server. You should properly set gateway and (in case of host name) DNS network settings.
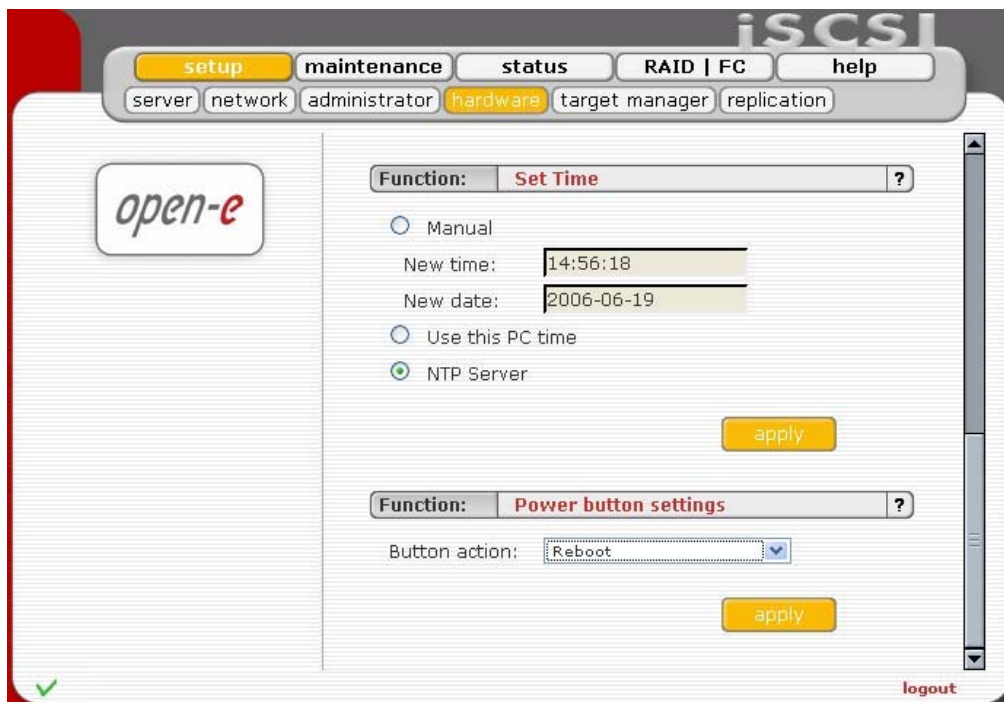


## Function "Set time"

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 and 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 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: is available:

- restart computer (reboot option)
- power off computer (halt option)
- no action (none option).

## 5.2.1.5  Target Manager
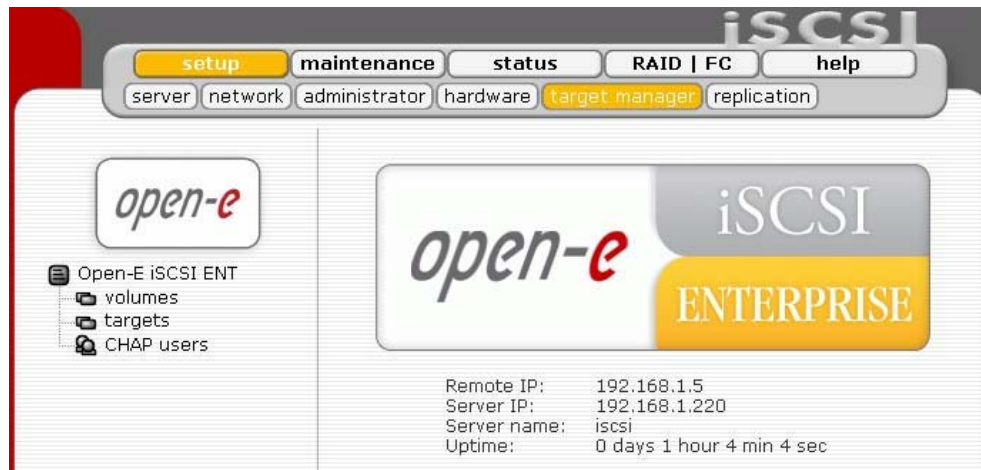


### Function "Unit Manager"

After clicking on the branch "volumes" in the left part of page you will find a list of all available units with entire disk size. In order to integrate available units into the volume group, just use the "add" button, after which the unit will combined into one volume group.

**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 If the unit is already added, it can not be removed. You can only add units with capacity greater than 5 GB, smaller units are not supported.
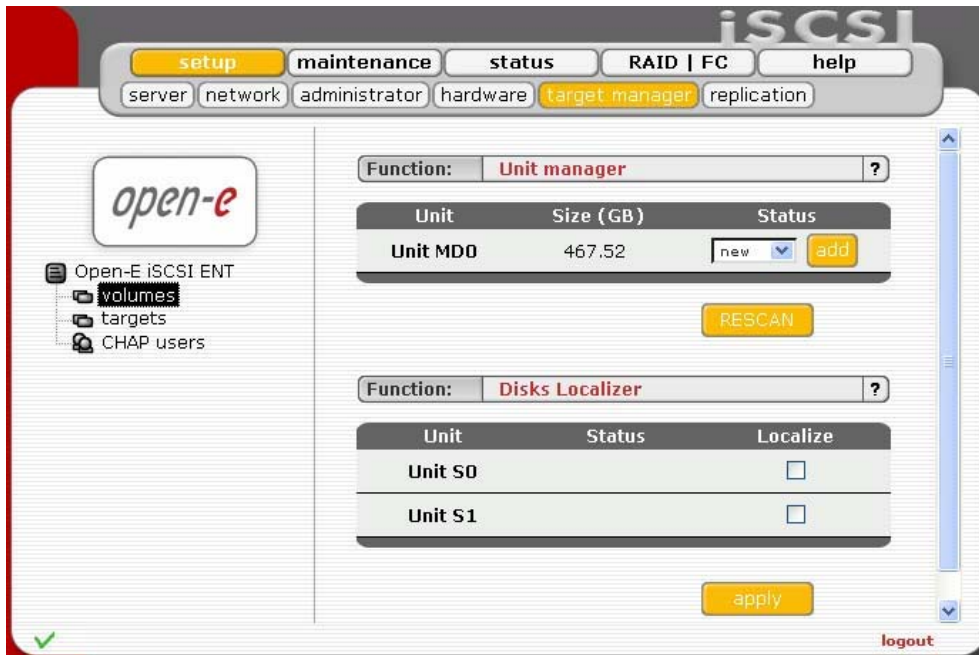
Next, the page will be reloaded, and status field will show your units as "in use" and with new group e.g. "vg0". The Volume Group is the equivalent of a physical disk from the system point of view. It is also possible to combine two (or more) units into one Volume Group by choosing one of actually existing groups like "vg0", or by choosing "new" option, which will create new group "vg1" after using "add" button.

## Function: Disks Localizer
This function helps find disks in cage in 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 manually (by unsetting appropriate checkbox and hitting apply button). Using this function during normal operation is highly not recommended and will cause slowing down your server.
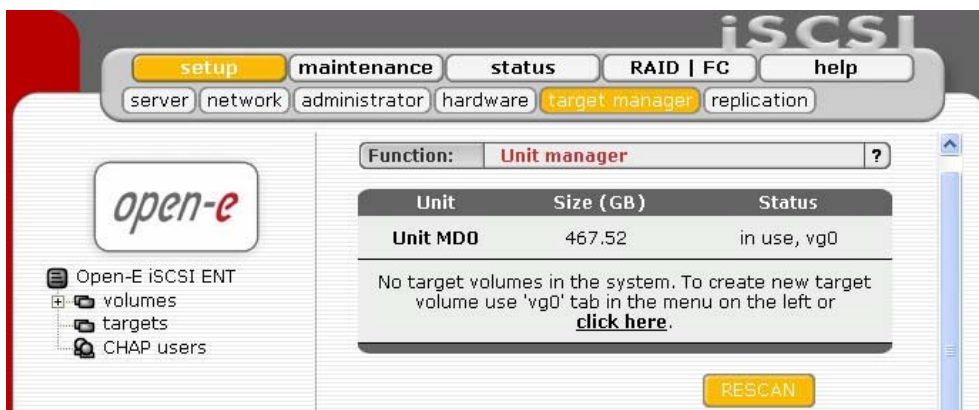
● note  When the added unit is integrated, it cannot be remove in Web
Interface. You need to use extended tools in console.

## Function "Units Assigned"

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

## Function "iSCSI Volume Manager"

This function allows increasing existing and creating new logical volumes (TGV)
as long as free (not assigned yet or new installed) space is available on selected
Volume Group. Function also shows space reserved for snapshots, replication,
swap and system. You can also remove logical volumes as long as it's not used
for replication or snapshot is not assigned to it.



To add storage space to existing logical volume select the logical volume from
the dropdown menu. Use scroll bar to choose the size. Depending on needed
capacity you can add more capacity to particular existing Logical Volume. If you
want to enable replication functionality(R) for selected logical volume, please
check option "use replication". When replication is enabled, there will be space
reserved for each logical volume that is in replication mode. Number close to
"Reserved for replication" shows how many logical volumes have replication
enabled.
This function can be also used to reserve disk space for snapshots and swap.
Usually for snapshots you need about 10% of new Volume Group.

● note  It is not possible to decrease occupied space of any logical volume.

There is no option of deleting a Logical Volume from the level of Web Gui. To achieve it please enter the Console Tools, hit: "ctrl + alt + x" to enter advanced settings. From the new window please choose: Delete LV (Logical Volume), and next the Logical Volume to be deleted. After this operation system will be rebooted.

If replication tasks are running, then its not possible to redefine or remove SWAP, because its necessary for replication to run properly.

## Function "Number of snapshots"
Here you can define number of snapshots for the server.

● note  Please take into account that changing the amount of snapshots will automatically reset all the settings in function Snapshot definition.



## Function "Snapshot definition"
This function allows you to define parameters of every snapshot.

You can set:
- number of snapshots for logical volumes in specified volume group
- logical volume (TGV), which the snapshot will be taken for.
- space reserved for the changes in file system while the snapshot is active - you enter value as a percent of space reserved for snapshots

- schedule - the time of automatic creation of the snapshot, if *inactive* - only manual snapshot activation is possible
- RO - the snapshot will be visible as a write protected disk

The Snapshot function of the server 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. Only when the snapshot is deactivated / removed the changes are permanently transferred to the actual data volume.
Snapshots can be activated/deactivated 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 will not lose data in that case, just the dataset, which is virtual for the users at the moment and will be written to the data volume. The old dataset, which has been frozen with the snapshot, is not available any longer.
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.

Manual creating and removing of snapshots can be done in the maintenance -> snapshot menu.

## Function "Create new target"

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

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

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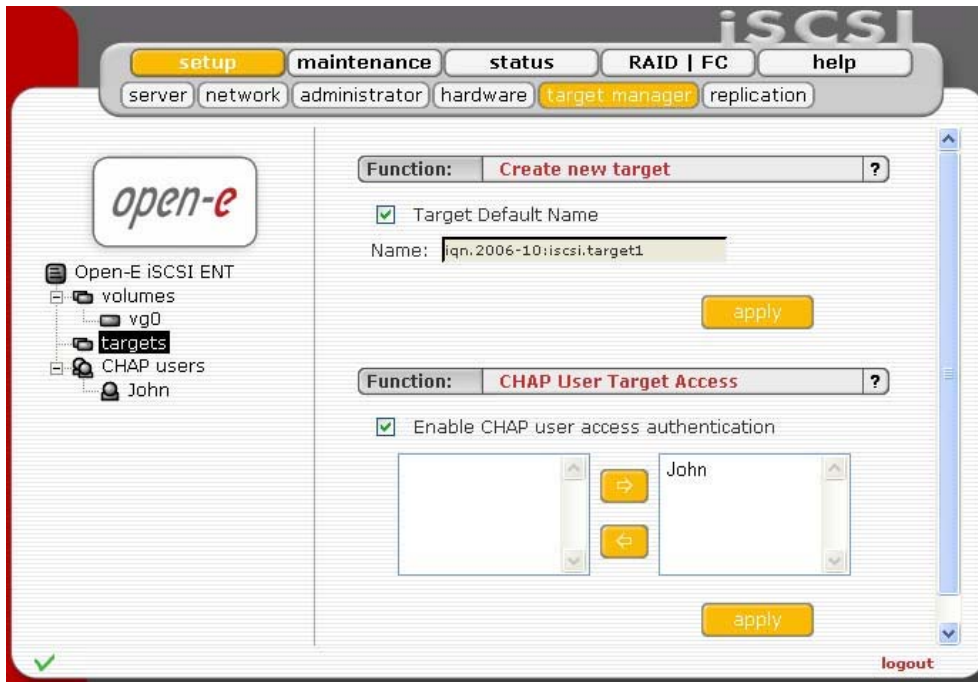
In this function you can create new targets, which will be seen in client stations as logical disks. You can change the name of any target.
After creating new target (see below) there will be created a new branch: "target0"

## 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):
- o   Home: jump to the first
- o   End: jump to the last
- o   Shift + arrow key: for multi-select
- o   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.
Additionally you can set password required to establish connection of iSCSI Initiator to iSCSI Target Server.
To do this please use the function iSCSI Access Password situated in setup → target manager → targets.

## Function "Target Volume Manager"
This function lets manage free and already assigned target volumes  and snapshot volumes.
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.
Target volumes and snapshots are not read only (RO -unchecked) by default.



## 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 doesn't 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 form accessing the target. When you specify any IP address in **Allowed access** field, CHAP users form 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

This 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

This 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 "Target Rename"
This function provides a new target name.

### Function "Target Remove"
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.

### Function: Create new CHAP user
To create CHAP user enter name, password, retype password and press create button.
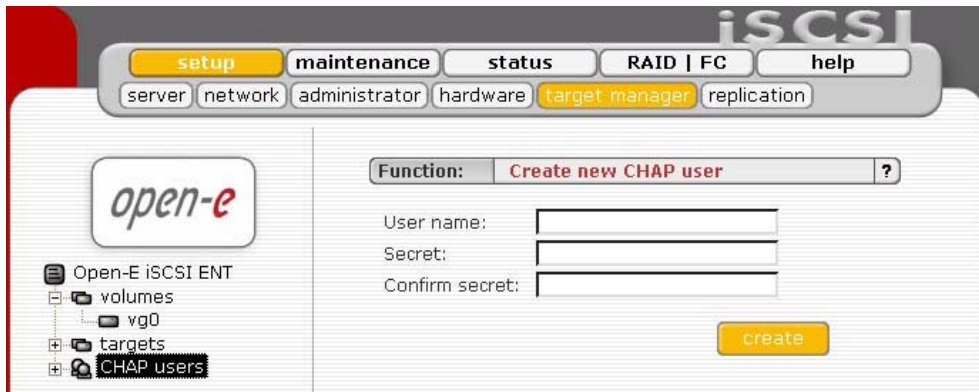
● **note** CHAP user name cannot:
- o contain characters: ~ ! @ # $ ^ & ( ) + [ ] { } * ; : ' " ., % | < > ? / \ = `
- o begin or end with a space.

● **note** Password cannot:
- o contain characters: ' " `
- o spaces.
- o 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. do this please use the function iSCSI Access Password situated in setup -> target manager -> targets.
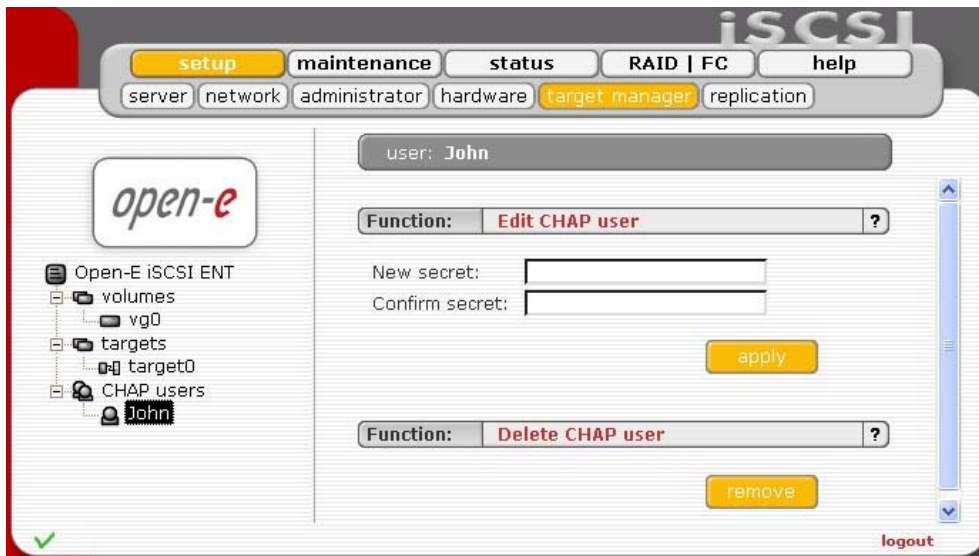


## Function: Edit CHAP user
To change CHAP user password enter and confirm password, and press "apply" button.

● **note** Password cannot:
- o contain characters: ' " `
- o spaces,
- o The length of the password must be within 12 - 16 characters.

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### Function: Delete CHAP user

Click "remove" button to remove the CHAP user form the system.


### Using snapshot with Open-E iSCSI

Usage snapshot facility heavily depends on the initiator of software support for dynamic units* and the partition scheme which you use on the operating system where you attach the targets. The most common error is if on the client side that uses an LVM/LVM2 (Linux) scheme or Microsoft's Dynamic Disks which connect to the snapshot and original volume from the same client malfunctions. This is due to the fact that normally an LVM volume bares special metadata which is used as the identify information and since a snapshot simply doubles those metadata it can confuse your partitioning software (for example logical volume manager sees two identical volumes).

In order to take proper advantage of Open-E iSCSI Target's snapshot technology the volumes your Open-E iSCSI Target exports should be imported in your operating system as Basic Volume (Windows) and you should not incorporate them as logical volumes in LVM/LVM2 (on Linux) if you plan to use snapshots and access them from the same machine at the same time.

If you plan to take snapshots and import them alongside the original volume - access them from the same client. Below is instruction how to import a target in a Microsoft basic volume:


a. Create target volumes (tgv),
b. Create a target in Open-E iSCSI,
c. Add chosen volumes to the target.
d. In MS iSCSI Initiator add Open-E iSCSI Target as an iSCSI portal in the MS iSCSI Initiator console,
e. Log onto the target,
f. Open the computer management,
g. Select the disk management,
h. Add the volumes as basic disks,
i. On Open-E iSCSI Target create snapshots: setup → target manager  and reserve desired space for snapshots (reserve about 5-20% of total space for the snapshots). Determine number of snapshots, assigned to the volumes and distribute the reserved space as needed. To activate a snapshot go Maintenance → Snapshot.
j. Follow the steps e-h to log and attach the snapshot target.

*) Currently iSCSI Microsoft Initiator ver1.06 does not support dynamic volumes.

● hint  The best solution to use snapshots without decreasing Open-E iSCSI performance is to assign separate RAID. This RAID will be optimized for a writing speed (e.g. few disks in RAID 0 only for snapshots). Follow the steps below:

a. Add RAID chosen for data as NEW (Vg0) in the menu WebGui: setup → target manager → Volumes,

b. Create one or more Tgv's. At this point, there is no free space reserved for snapshots,

c. Add the second RAID to existing Vg0, intended for snapshots, (RAID previously configured as RAID 0),

d. Now only reserve all available space for snapshots.

e. The above procedure will greatly decrease the overload of a disk intended for data and will cut down the performance drop off in Open-E iSCSI with a snapshot turned on.

## 5.2.1.6   Replication



**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: Define Volume Replication tasks

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. Additionally you can set Bandwidth for SyncSource, this will limit data write speed when replication is working in SyncSource mode. Speed limit is in MB/s. Click "Create" button in order to create a replication task.

## 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.

After clicking "Show task details" following info will be visible:
- Source volume name,
- Destination volume name,
- If source or destination volume has a status missing, this means that server is physically missing a Unit with that volume.

● note In order to run a replication tasks, SWAP is necessary. If there is no SWAP defined, then its not possible to run replication tasks.

## 5.2.2 Maintenance

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

### 5.2.2.1 Shutdown



### Function "System Shutdown"
When using this function, you can shut down the Open-E iSCSI.

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

### Function "Schedule for shutdown"
Here you can set more specific information like the time and day of a week for the shutdown.
This control lets specify a time the planned system shutdown will be taking place.

### Function "System Restart"
This function is self-explanatory: It allows restarting the system.

### Function "Schedule for Restart"
This control lets specify a time the planned system restart will be taking place.

### 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.

## 5.2.2.2  Snapshot

### Function: Snapshot
This function enables you to manually activate (create) or deactivate (remove) snapshots.
Activation of a snapshot is only possible for unscheduled snapshots (with inactive schedule setting). When target 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..



## 5.2.2.3  Miscellaneous

The next menu option is "miscellaneous" This function allows you to save settings, to retrieve them, and to remove them.

## 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 witch
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**.
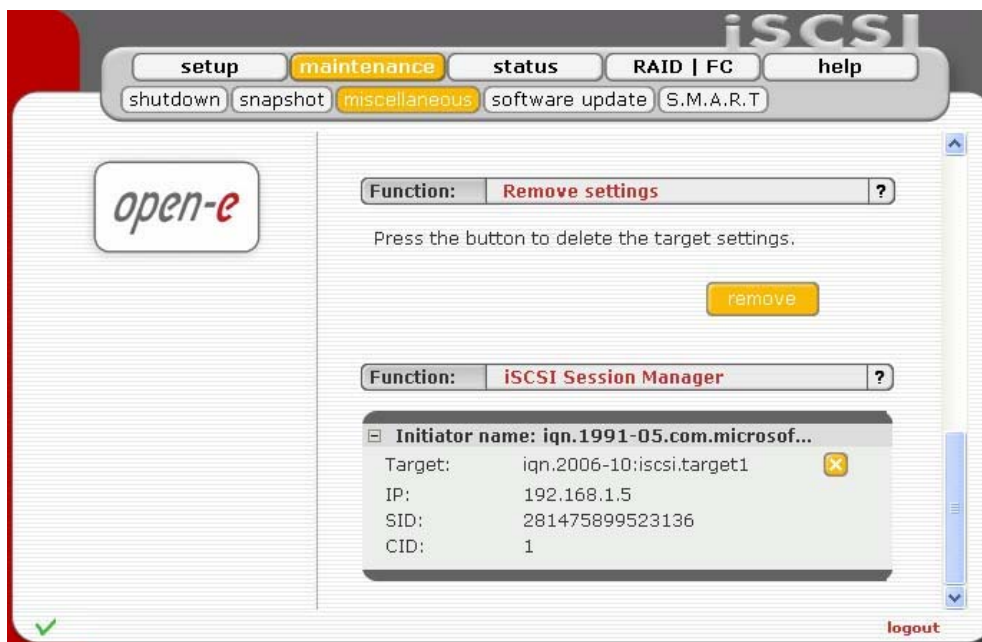


## Function: Remove settings

This function enables you to remove all target configuration with "one click".
All targets will be removed and all connections will be terminated.
This function does not remove any logical volume neither any data on it.

● note  Please use this function with caution.

## Function: iSCSI session manager

This function present 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 form reconnecting to target you have to deny IP address in "setup" → "target manager" → "targets" → "target[nr] " → Function: Target IP access.

## 5.2.2.4   Software Update

This function allows you to update the system software.
There are different ways of upgrading  iSCSI software:

**1.** Updating with online-update:
- In order to download a new online-update you need to be registered at www.open-e.com.
- You also have to remember to set correct DNS and Gateway address in "setup" → "network" menu.
- Next under menu: "maintenance" → "software update" in Function "Update downloader" press "apply" button.
- If update-file appears then you must mark it and press "Update" button, then confirm update when you will be asked. In case of a new update do as in previous updates.

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

**2. Updating directly from administrator's PC:**

- Under menu: "maintenance" → "software update" in Function "System software update" press "Browse" button and search previously downloaded  ISO-file or update-file,
- Next you must mark it and press "Update" button and confirm update when you will be asked.

**3. With update from ISO-image CD follow this steps:**

- The ISO-files which include in update file must be burned on a CD with your favorite Burning software. (For example: Nero Burning ROM - option: "Burn Image", etc.)
- Next please install CD-ROM as Secondary-Master and DOM (disk-on-module) as Primary-Master.

   **note** USB CD-ROM can be used as well.

- Please set the BIOS to boot from CD-ROM drive.
- Then boot from the ISO-CD and wait until prompt: "Update complete,  Please Remove CD and press Enter to restart"
- After update, please reset the BIOS to boot from Primary-master HDD.

Updating the system may take about 10 minutes !.

● caution  Please remember that making an update is activity that cannot be
             stopped in any way.  We strongly recommend to update system
             when UPS is connected.

### 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  www.open-
e.com.  You also have to remember to setup correct DNS and Gateway address
in "setup" → "network menu".
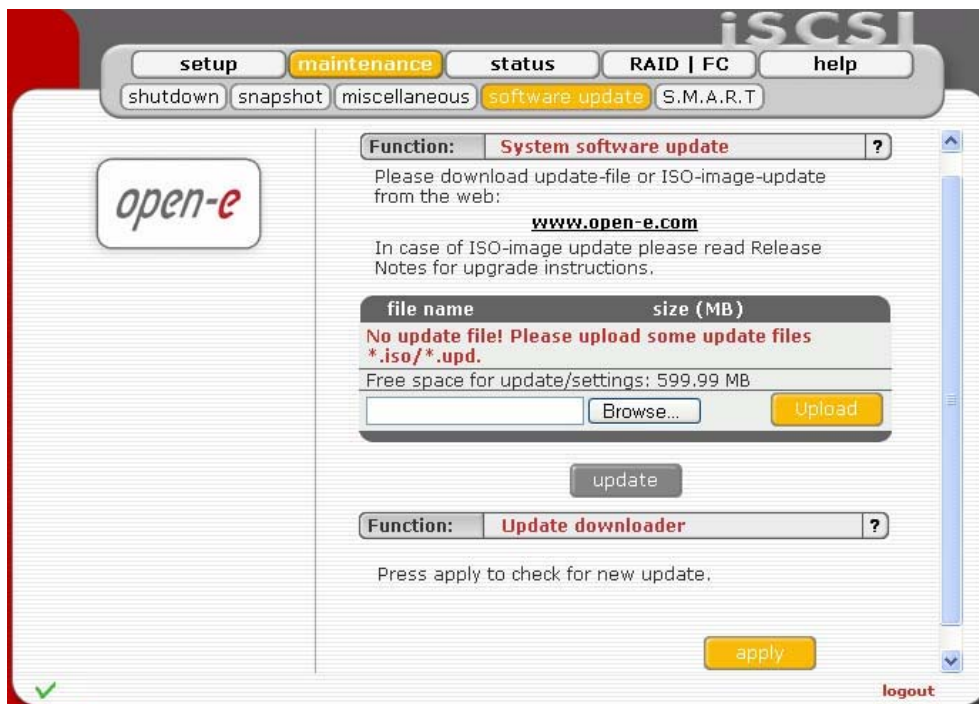


### 5.2.2.5  S.M.A.R.T.

### 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.
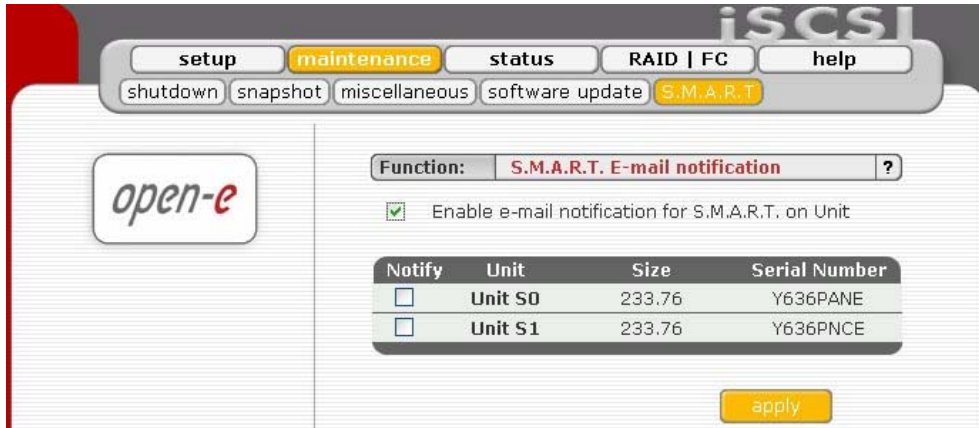
In order to enable S.M.A.R.T. e-mail notification, you have to first enable E-mail notification function in setup -> administrator menu, then enable S.M.A.R.T. in Console tools at special options (press F1 on console to find out keyboard shortcuts).
When S.M.A.R.T. is enabled you will see all detected hard drives with information about unit number, size and serial number.
Select the checkbox of unit, form 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.

● note It will be possible to enable S.M.A.R.T. when all hard disks support it and it is enabled in BIOS settings.

## 5.2.3 Status

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

## 5.2.3.1 Network

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

ENTERPRISE iSCSI Open-E
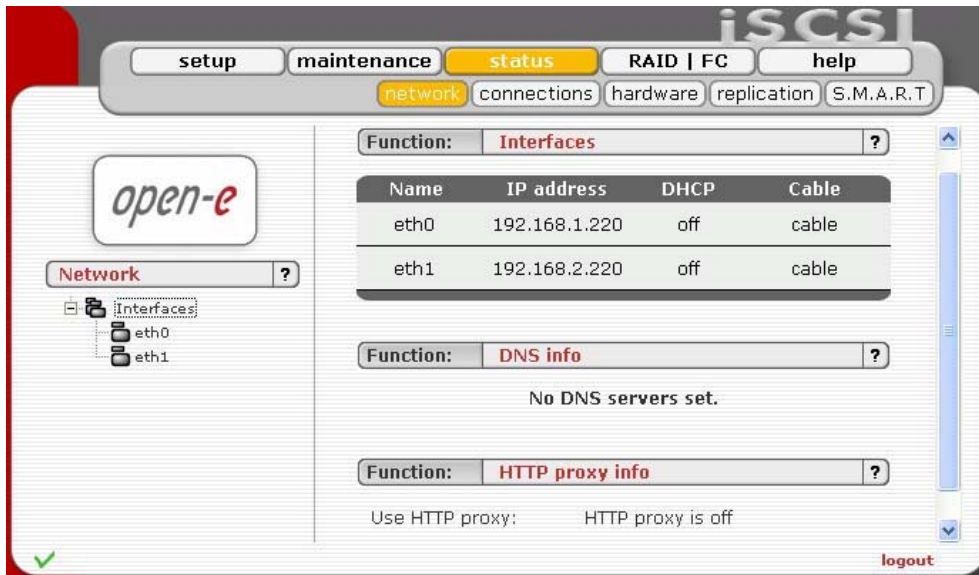
On left page, you can select network interface for information.

### Function: Interface 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
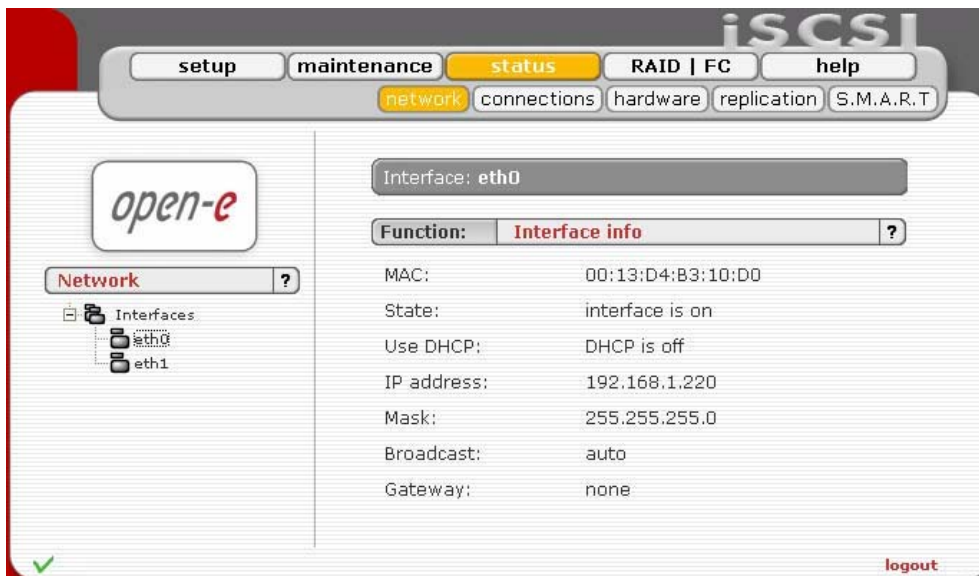


## 5.2.3.2 Connection

This function present 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).

ENTERPRISE iSCSI Open-E
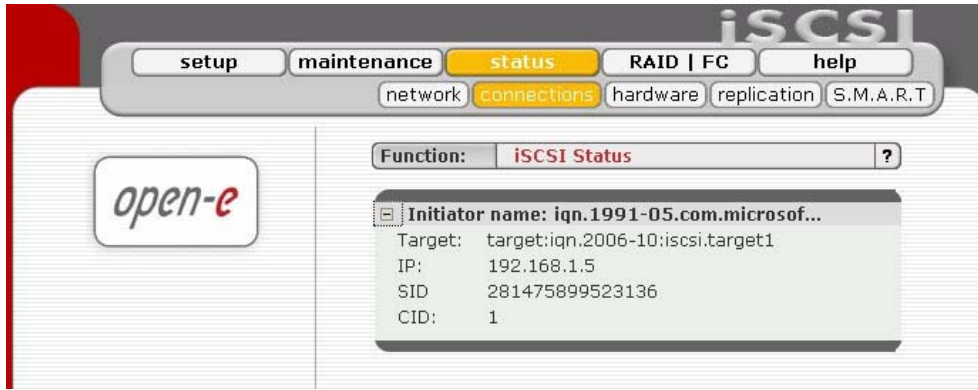
### 5.2.3.3  Hardware

The "Hardware" option provides you with information on storage and network controllers and the drivers (e.g. network driver and IDE driver). In addition, you may also download the latest Open-E iSCSI log files, remove them, check memory (RAM and SWAP) usage, monitors hardware and iSCSI Target date end time.
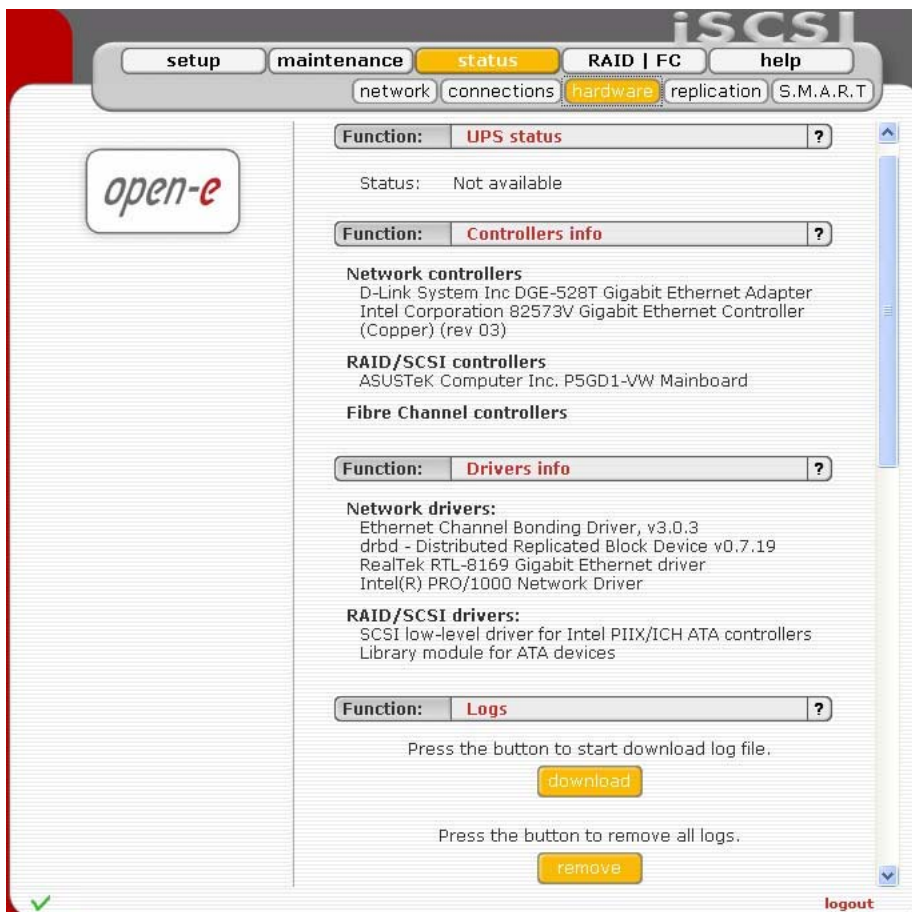
**ENTERPRISE** iSCSI Open-E

iSCSI

| setup | maintenance | status | RAID | FC | help |

network | connections | hardware | replication | S.M.A.R.T

**open-e**

**Function:** **Logs viewer** [?]

📁 ..
📁 apache-ssl
📁 exim
📁 lv00
📁 ram
📁 samba

**Function:** **Memory (RAM) info** [?]

🟢 Used memory (MB): 114.48
🟠 System cache (MB): 260.14
⚫ Physical free memory (MB): 118.95

Total system memory (MB): 493.56

**Function:** **Memory (SWAP) info** [?]

🟢 Used swap size (MB): 0.00
⚫ Free swap size (MB): 4095.99

Total swap size (MB): 4095.99

**Function:** **Hardware monitoring** [?]

**Monitor is disabled. Use Hardware Configuration tools
on console to enable it.**

**Function:** **iSCSI Target date & time** [?]

Current: 2006-10-31 01:52:40

logout

### 5.2.3.4  Replication



**Function: Volume status**
This functions displays status of each logical volume with replication functionality.

To see more details about specified logical volume please click on image  next to the logical volume name.

You can see following logical volume details:

**Connection:**
Describes connection type:
- StandAlone: Means that replication has been disabled.
- Unconnected: Mirror server is not connected.
- WFConnection:  Mirror server waits for a connection.
- WFReportParams: State will show up when connection to the mirror server is in progress.
- Connected: Source and destination servers has been connected successfully.
- ServerForDLess: Error on mirror server side.

- Timeout, BrokenPipe, NetworkFailure: States will show up when servers cannot communicate successfully while connected
- WFBitMap{S,T}: Shows when replication starts.
- SyncSource: Replication is in progress, the data are consistent.
- SyncTarget: Replication in progress, the data are inconsistent.
  - Consistency: Describes consistency of data. In case that no errors appeared the state will be set to consistent, in the opposite case it will have inconsistent flag.
  - Replication mode: Display set replication mode for logical volume. It can be source or destination.
  - Task name: Shows name of replication task, it will be visible only if replication mode is set to source.

### Function: Running tasks

This functions displays information about currently running replication tasks.

To see more details about specified task please click on image 🔽next to the task name.

Following task details will be visible if replication has finished:

Connection - describes connection type:
- StandAlone: Means that replication has been disabled.
- Unconnected: Mirror server is not connected.
- WFConnection: Mirror server waits for a connection.
- WFReportParams: State will show up when connection to the mirror server is in progress.
- Connected: Source and destination servers has been connected successfully.
- ServerForDLess: Error on mirror server side.
- Timeout, BrokenPipe, NetworkFailure: States will show up when servers cannot communicate successfully while connected
- WFBitMap{S,T}: Shows when replication starts.
- SyncSource: Replication is in progress, the data are consistent.
- SyncTarget: Replication in progress, the data are inconsistent.

Source info:
- Logical volume: Displays source logical volume name.
- Consistency: Describes consistency of data. In case that no errors appeared the state will be set to consistent, in the opposite case it will have inconsistent flag.

Destination info:
- Logical volume: Displays destination logical volume name.
- Consistency: Describes consistency of data. In case that no errors appeared the state will be set to consistent, in the opposite case it will have inconsistent flag.
- IP address: Show IP address of destination volume

Additionally following task details will be visible while replication is running:
- Remain to replicate: Shows how many MB of data remain to be replicated.
- Total size to replicate: Shows total size of data to be replicated.
- Speed (avg): Current (average) speed of replication process.
- Time left: Remaining time to finish replication.

- Destination IP:  Destination servers IP.
- Source TVG:  Name of the source logical volume.
- Destination TVG:  Name of the destination logical volume.

### Function: Tasks log

This function displays logs of replication tasks.

For every task action you will see time of creation, name, status. If action was successful it will be indicated by image ✔ and when action failed then by ✖. Tasks are sorted by date of action.

## 5.2.3.5  S.M.A.R.T.

Through the S.M.A.R.T. 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 a tree with hard drives for which you can view S.M.A.R.T. information.

It is possible to view information about separate hard drives or a 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"
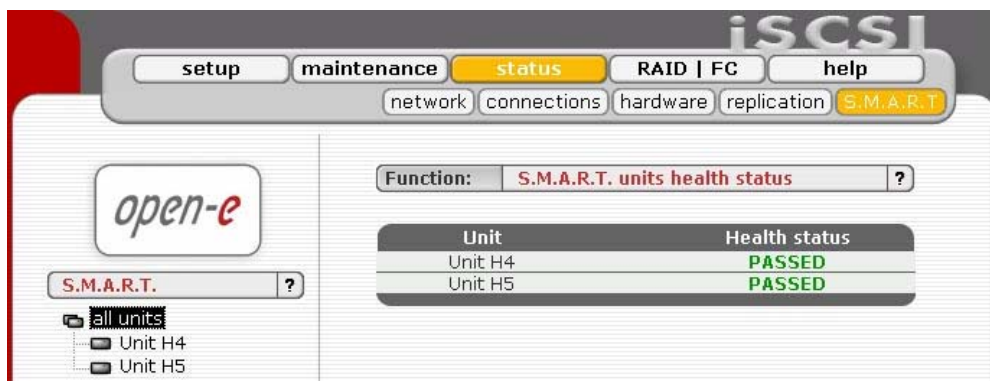


### Function: S.M.A.R.T. unit's health status

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

To enable S.M.A.R.T. checks you need to use console tools and enable it in "special options"

● note  It will be possible to enable S.M.A.R.T. when all hard disks support it and it is enabled in BIOS settings.

When S.M.A.R.T. is enabled you will see all detected hard drives with information if specified drive has passed health checks. To view more information and/or do more advanced test click on drive in drives tree on left side.



## 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 the value of this attribute ever exceeds the worst of this value then the status will be "failed". If value of attribute is on the edge of the worst value then the status can be "pre-failed". On some hard drives part of the attributes can be displayed as "Unknown Attribute". This can happen when the manufacturer of that hard drive have done some modifications in S.M.A.R.T. and these 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 tests of the hard drive. You will be informed about progress of the test. After the test finishes please click on "results" button to view test log.

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

🟠 note  On some motherboards and controllers S.M.A.R.T. tests can not be performed.

## 5.2.4  RAID | FC

In this place you can manage  hardware RAID controllers, Fibre Channel or create disk array using software RAID.

### 5.2.4.1  H/W Raid

When a raid controller is detected you'll find options and utilities to manage the hardware.
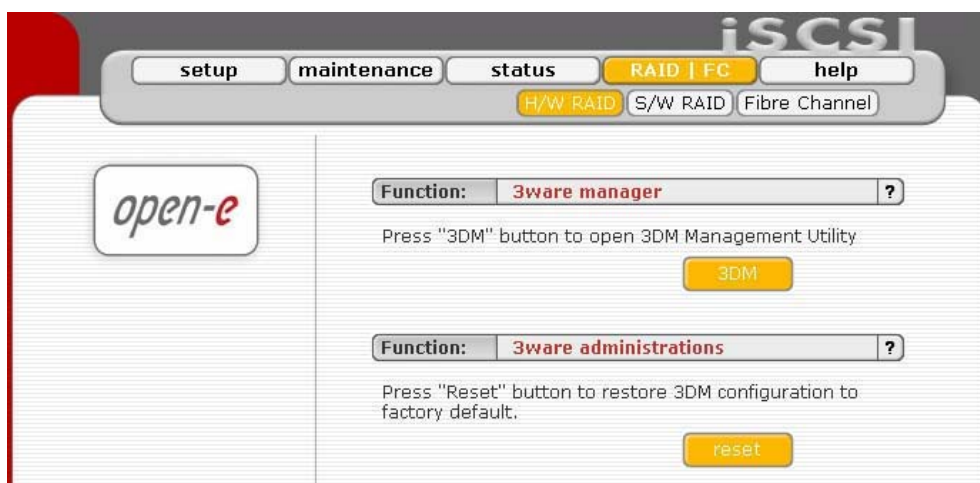


Please note that the RAID controller should be supported by the Open-E software. If a 3ware controller is installed you can click on RAID in the menu and the 3ware web base will start automatically.

### Function: 3ware manager

In case of controller 7000/8000 series  is installed, you can choose 3ware RAID manager 3DM or 3DM2.
In case of 9000 series only 3DM2 is supported.

🟠 note  If you choose 3DM2 for controller 7000/8000, the scheduling tasks will be not supported.

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## Function: "3ware administrations"

This function will disable the 3DM password request. (Default 3DM/3DM2 password: 3ware)

● note It is important to realize the need for time synchronization between an Open-E NAS/iSCSI box and the client browser you use to access the configuration panel. Since access to 3ware configuration utility expires after a certain time period (after period of inactivity). Open-E iSCSI/NAS must be in the same time zone as client station, if the difference becomes too large you'll loose authorization token to early or your authorization will be invalid immediately.

## 5.2.4.2  S/W Raid

Here you will find functions with which you can create software RAID units.

### 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 form used units, you need first to Delete content of units in console, be aware this would ERASE all data form 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.

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**Available RAIDS:**

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 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.

RAID 6: 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..

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.

The (layout) parity-algorithm in RAID 5 and 6 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.

### 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 |

### 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 |

<table>
<tr><td colspan="4">Right-Asymmetric Algorithm</td></tr>
<tr><td>Unit S0</td><td>Unit S1</td><td>Unit S2</td><td>Unit S3</td></tr>
<tr><td>Parity</td><td>0</td><td>1</td><td>2</td></tr>
<tr><td>3</td><td>Parity</td><td>4</td><td>5</td></tr>
<tr><td>6</td><td>7</td><td>Parity</td><td>8</td></tr>
<tr><td>9</td><td>10</td><td>11</td><td>Parity</td></tr>
<tr><td>Parity</td><td>12</td><td>13</td><td>14</td></tr>
</table>

| 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 |

## 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 is the best 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 |

| 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-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 |

| 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 |

## 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".

- If you check "**Include resyncing/recovering progress**" - you will be informed about progress of resync/rebuild if it is currently running. An e-mail will be send for every 20 % completed.
- If you check "**Include array status**" - to every event will be added the status of event-related array.

After choice Raid Levels and by clicking "apply" button appear in field "Status" "in use" (see below)
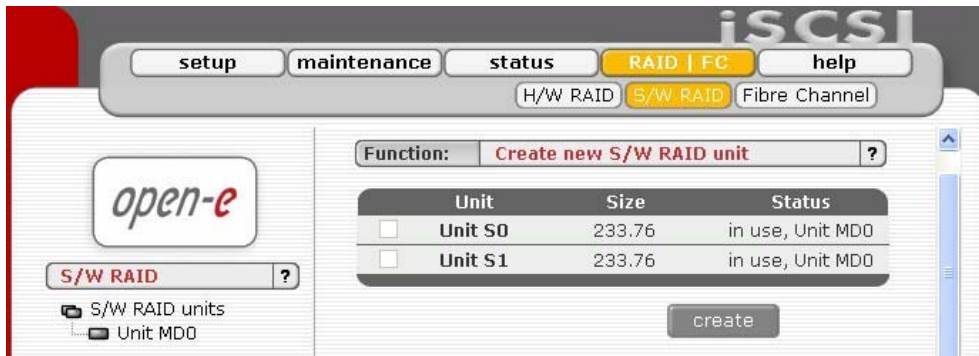
By clicking on the branch "MD0" appears new page, with Functions Manager, Info and Software RAID unit remove.
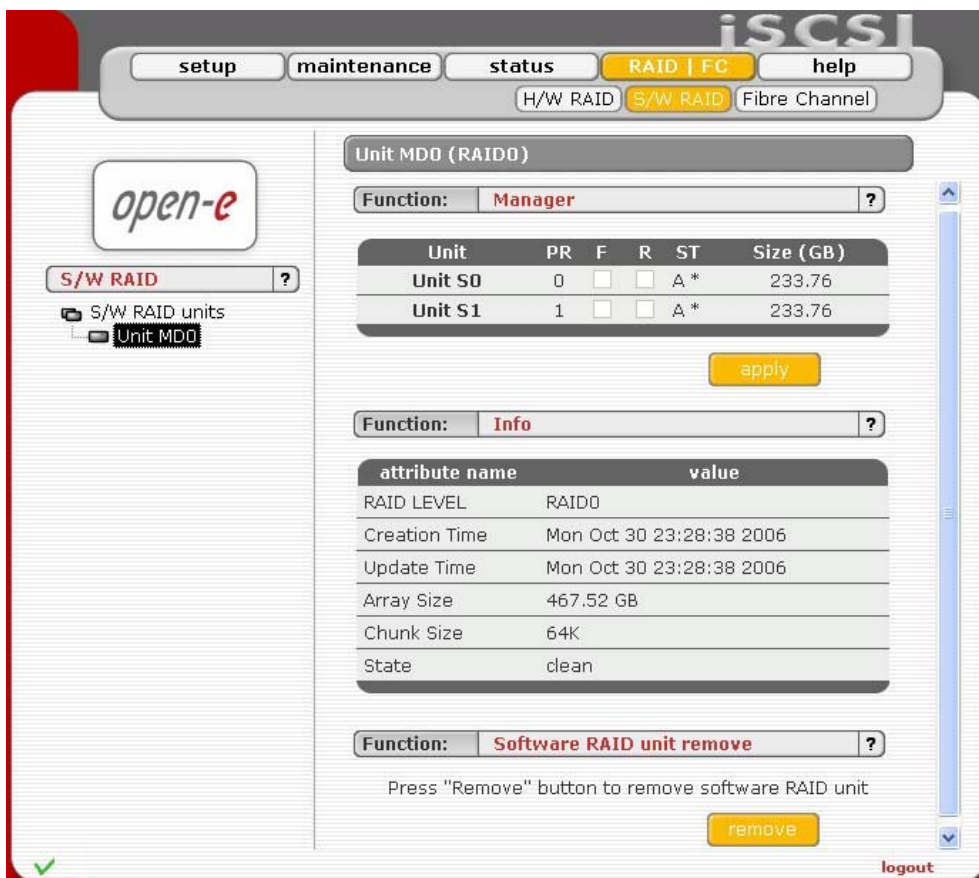


Function: „Manager"
In this function you can manage RAID array

Available operations:

RAID 0:
Construction of this RAID does not allowed 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 form 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 form 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 form 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 form array without shutting down the system.
- ST - describes state of unit in array, which can be:
  - o A - This means that Unit is active in array
  - o * - Number of Unit that belongs to the array
  - o 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 form 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 perform 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[nr] 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.

### 5.2.4.3  Fibre Channel

When a fibre channel controller is detected you will find utilities and options specific to that hardware.

#### Function: QLOGIC administration

If a QLA23xx series controller is installed, you can use command line tool in the Console Tools (press CTRL+ALT+F).

The QLA23xx controller allows for remote administration. To access the configuration daemon download the client application SANsurfer from homepage provided by QLOGIC. Install it on your system and configure to access this server. Follow the online instructions to configure. If in doubt consult documentation manual. Make sure you have the essential information handy (Ip address of your server, username and password).
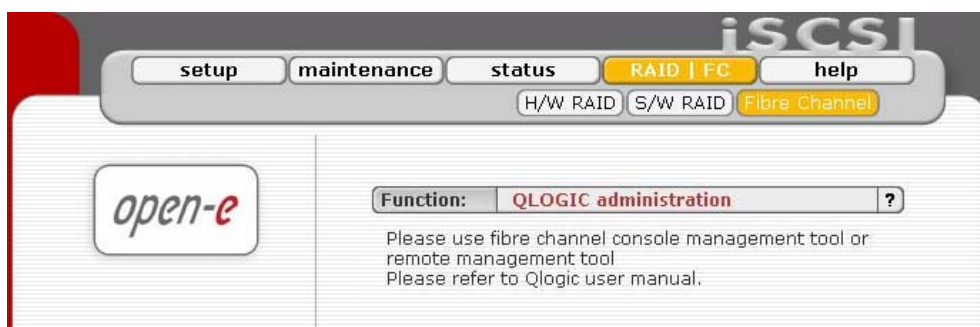


### 5.2.5  Help

When accessing Help - "Software License" you can read the license for software included in Open-E iSCSI ENTERPRISE.
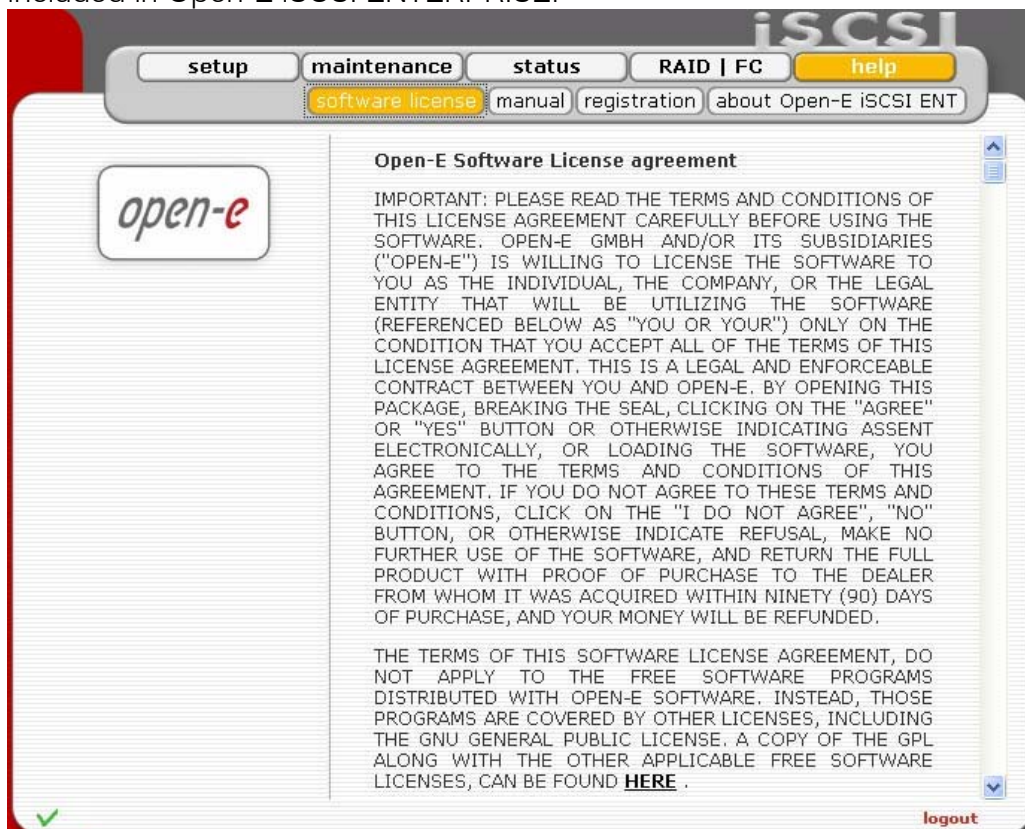
You can download a PDF version of this manual. In order to read the manual, you need a PDF viewer such as the Acrobat Reader (http://www.adobe.com).
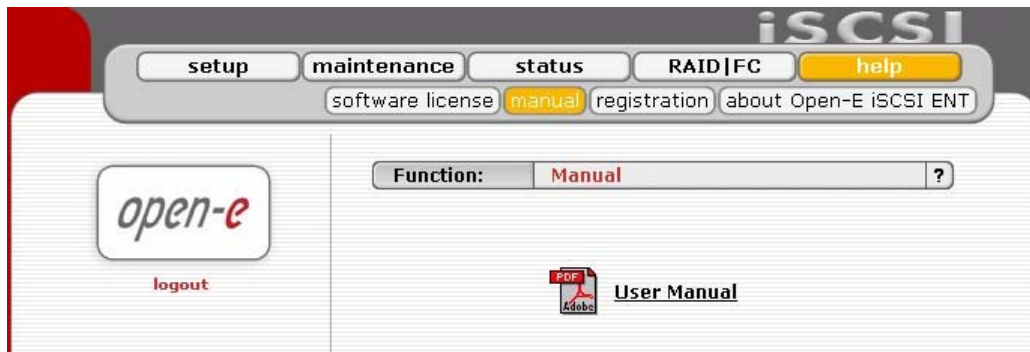


By clicking on "Registration" in the "Help" menu you can register yourself at http://www.open-e.com.



"About Open-E iSCSI ENTERPRISE" indicates which system version you are currently working with. In addition you find contact information regarding Open-E iSCSI Target; for instance how you can reach Open-E's technical hotline if you should have problems or questions.
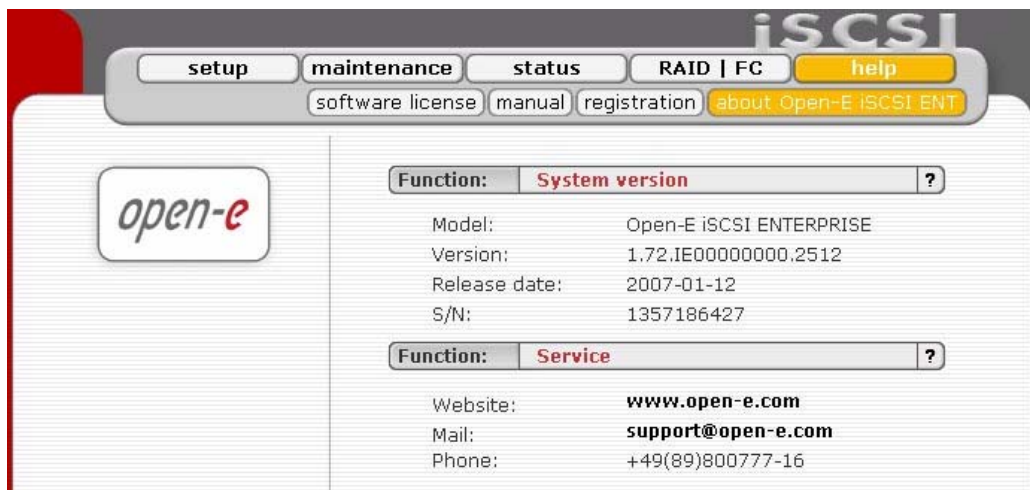


You log out by closing the browser window.

# 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.

### Open-E iSCSI does not boot, keyboard LEDs are flashing

This problem arises when you installed Open-E iSCSI into the secondary IDE slot by mistake. Open-E iSCSI is configured for and will only run in the primary IDE connector. Shut down the computer, remove Open-E iSCSI from secondary and place it into primary IDE slot. That should solve the problem.

### 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: 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.

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# 7 Appendix A

## Open-E Software License agreement

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# 8  Appendix B

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Version 2, June 1991

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