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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 SOHO, 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 1,2 GHz or faster
- at least 512 MB main memory
- One or several suitable hard drives
- IDE port
- 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 100 MBit/s or more, as well as a processor with at least 2 GHz. If several computers are accessing the iSCSI system, we recommend 1 GB 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,
- Improved data availability and efficiency,

- Lower cost by centralizing storage management,
- iSCSI simplifies the installation and on-going management of a SAN versus 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 SMB uses IDE (ATA), SATA or SCSI hard drives and you can use software RAID units.

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.

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.

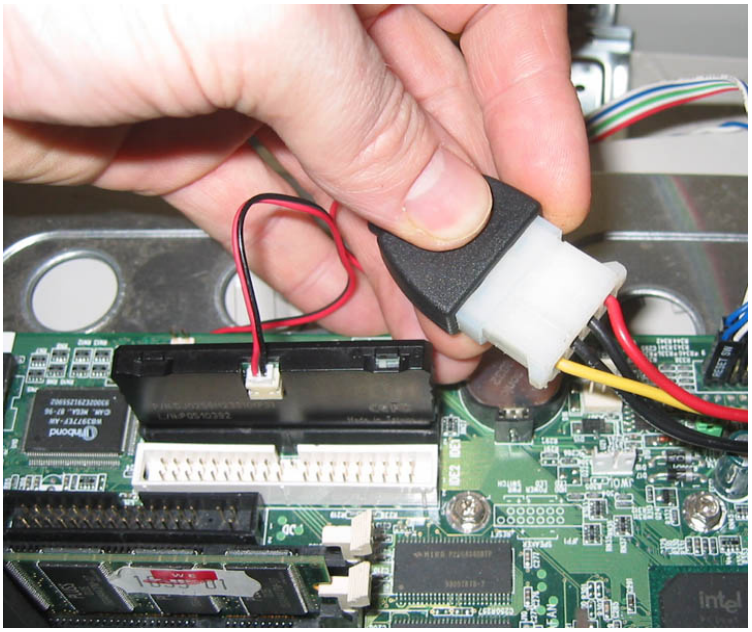
Now localize the IDE connectors on your motherboard:

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 or SATA connector.

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.

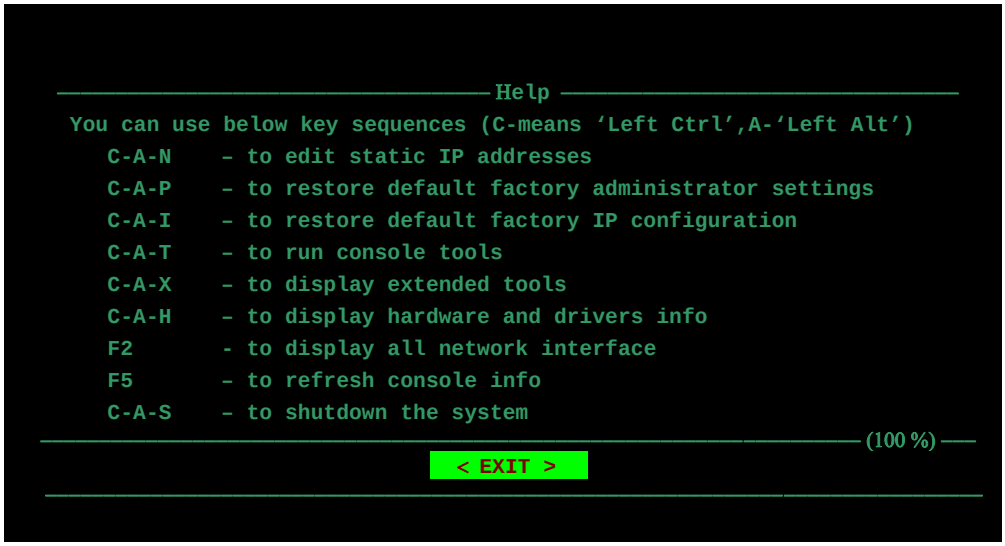
After booting graphical screen is complete, Open-E iSCSI will provide you with information on the current software version and the network settings:

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

 Model:          Open-E iSCSI SOHO
 Version:        1.52.IH00000000.1581
 Release date:   2006-02-15
 S/N:            1357186427

 Network settings:
 interface 1:    eth0     ip: 192.168.0.220/255.255.255.0

 Https settings:
                       port             443
                       allow from       all
```

Open-E iSCSI is pre-configured with following IP settings:

- IP address 192.168.0.220 and,
- netmask 255.255.255.0.

These values can be changed manually at the console by using the following key sequence: left "Ctrl" + left "Alt" + "N". Then, you can enter requested IP settings.
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 require 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 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. Please replace defaults with your own settings accordingly.

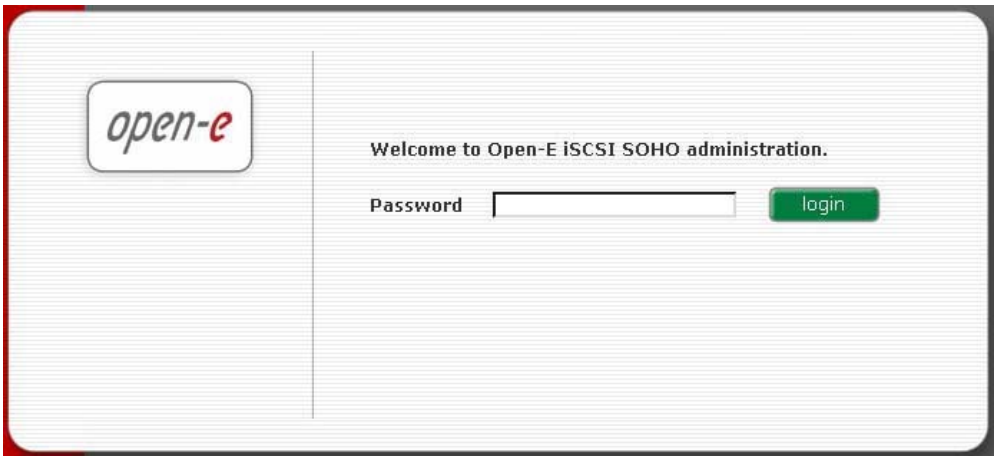
note For security reasons, Open-E iSCSI uses the encrypted SSL protocol (https).

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 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.

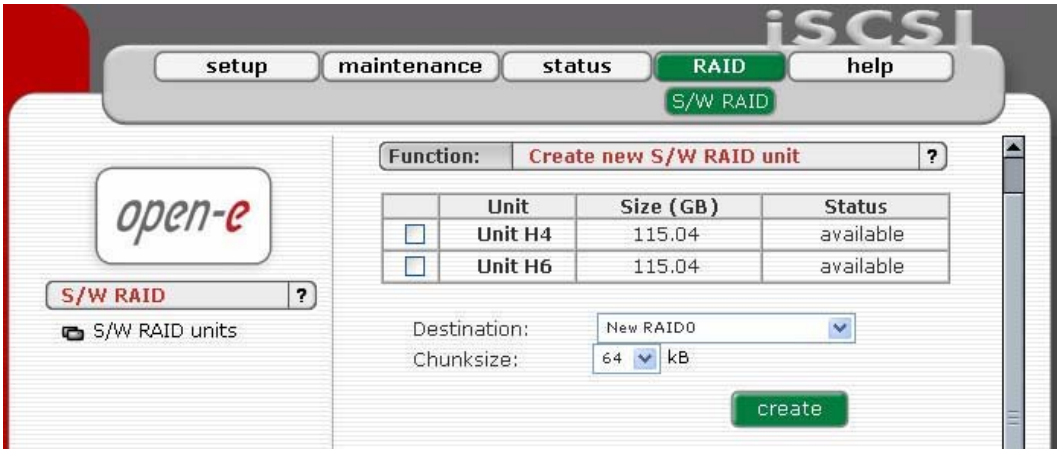
After accepting license agreement you can log into Open-E iSCSI Target using the standard password “ancom” (this can be changed later). In order to start working, you can now set all parameters.



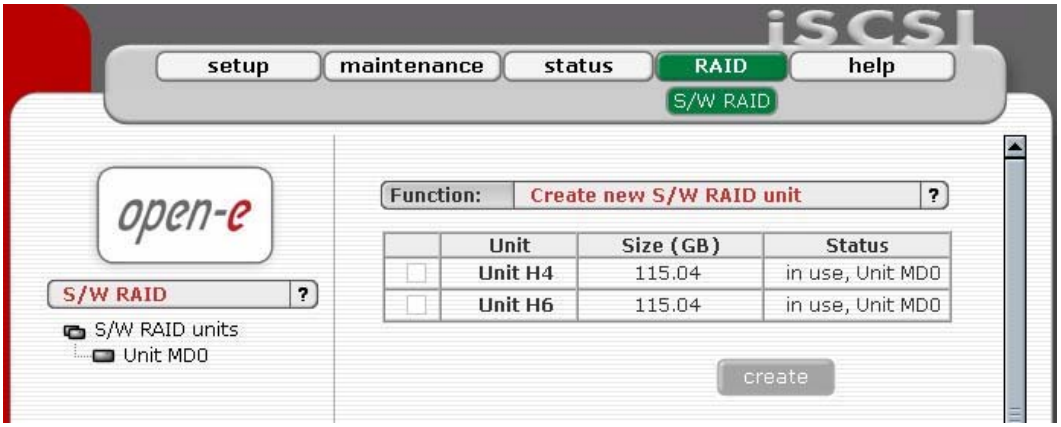
● note Password checking is case-sensitive. If you cannot log into Open-E iSCSI, please check the status of the Shift and Caps Lock keys.

4.4 Create software RAID Units (optional)

In the Open-E iSCSI SOHO, you can use disk drives as single, adding them to the new or existing Volume Group (Vg0). However, for the better security of your data, you can use software RAID with single drives or even. In order to do it, please go to menu "RAID" → "SW/RAID" first.
You will find the list of available units. Software RAID can be created with single hard disks or hardware disk arrays. To create a software RAID, please select the units, choose the RAID level and click on "create" button.

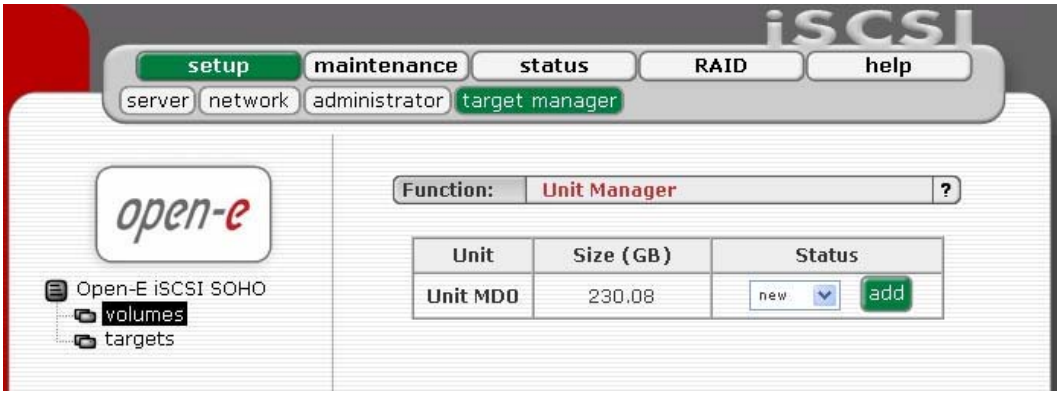


After clicking "create" a button, the status will change to "in use" with additional information describing the kind of a disk array (e.g. MD0 is RAID 0)

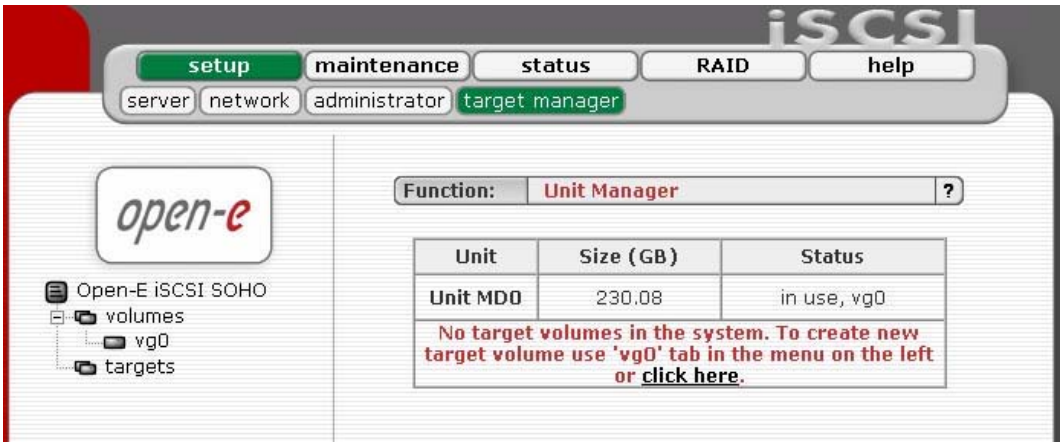


4.5 Adding Disk Units

Now, please go to menu: "setup"→"target manager" and them "volumes" on the left page. In the Function Unit Manager you will see list of available units.
In order to partition/format the unit, please click on "add" button.
To add a new unit to the Open-E iSCSI, please click "Add". After the initializing procedure, the status of the unit will change from the "Add" button into "in use, vg0".

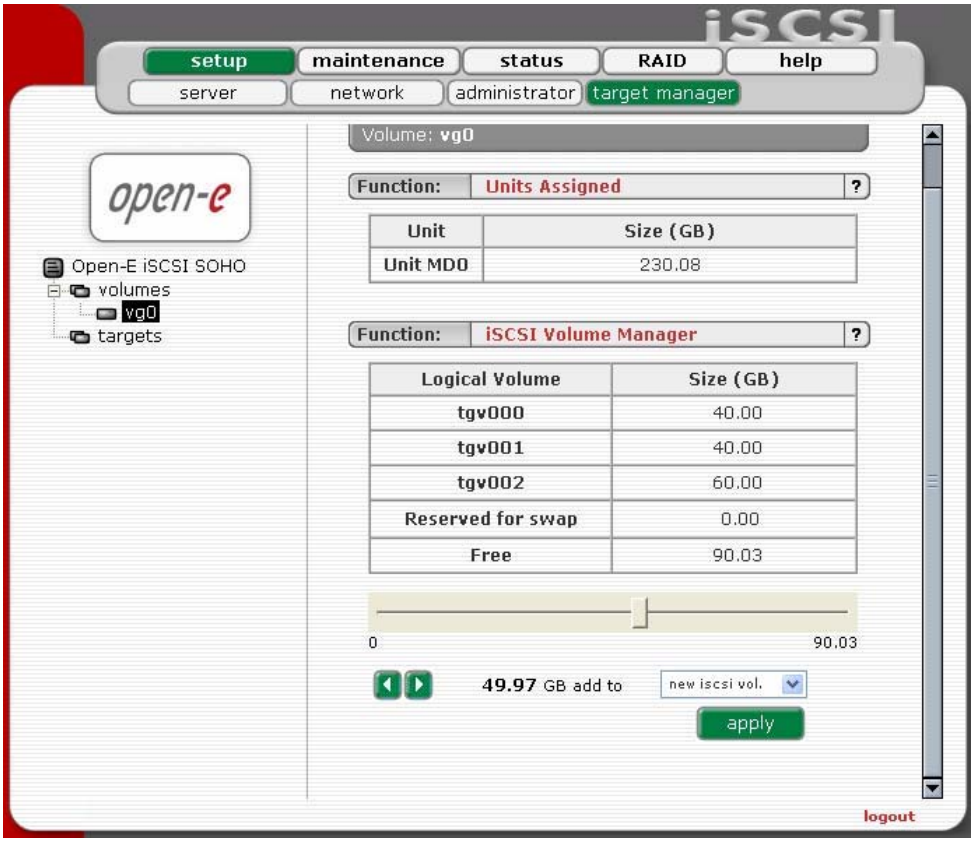


Please note that you can expand the storage capacity by adding new disk drives. In the “Unit Manager” Function Open-E iSCSI will show both 'in use' and new units. In order to add a new unit to the Volume Group (vg0), please simply click 'Add' after which Open-E iSCSI page will be restarted (see below).

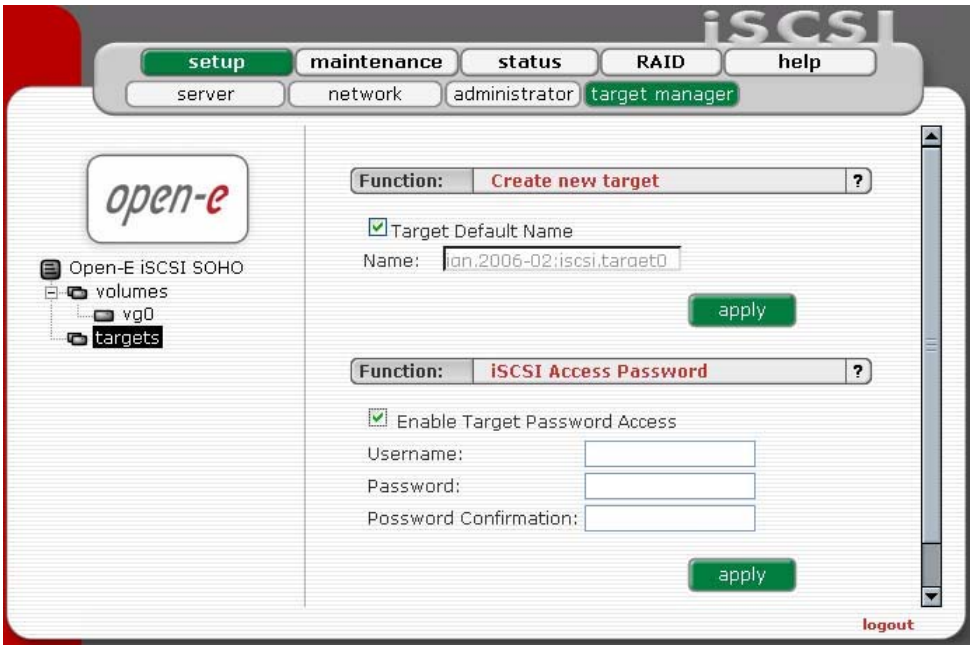


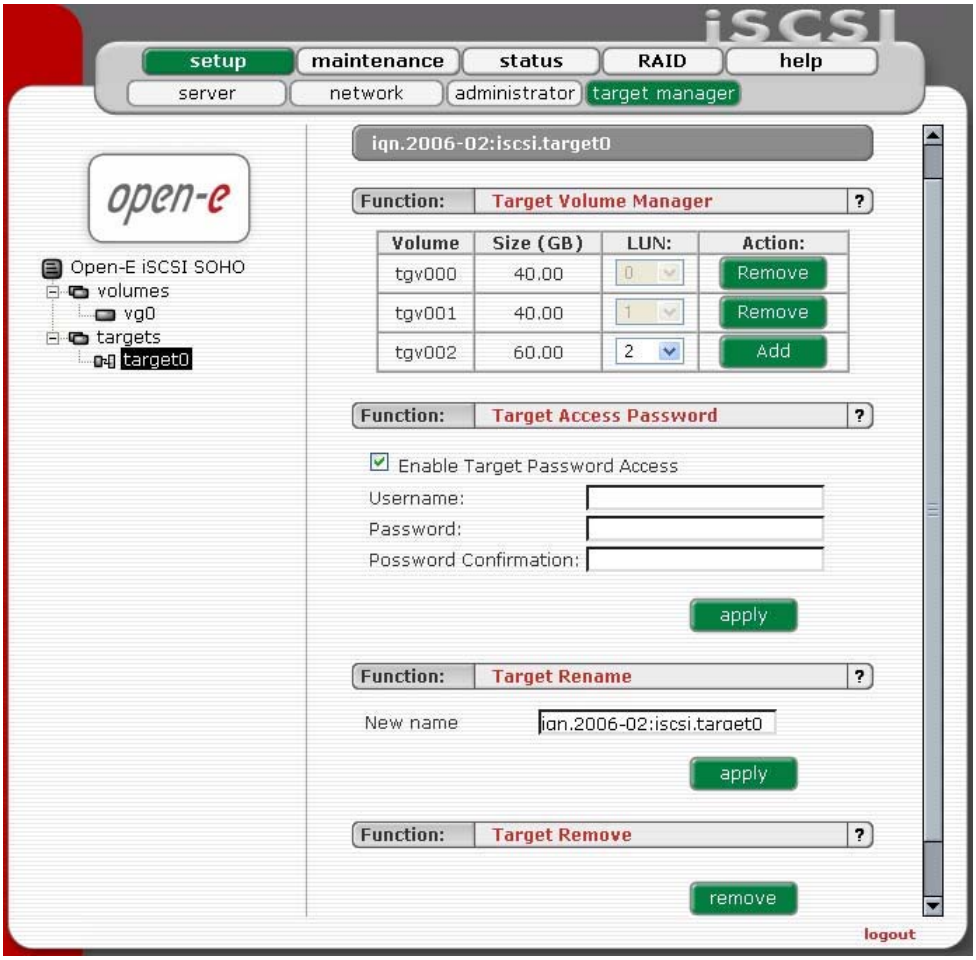
4.6 Creating iSCSI targets volume

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



After creating „tgv" click on the branch „targets" in Target Volume Manager Function, where you add „targets volumes" only in the premises of one vg0.
Here you can also change the name and secure access to "tgv" by giving 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 correct working of iSCSI technology on end-user computers, it is required to install iSCSI Initiator software (if it is not provided with the operating system). In case of Microsoft Windows 2000/XP/2003 systems, it can be optionally Microsoft iSCSI Initiator (available to download from the web).

Correct software configuration depends on installing individual “target volumes” by adding another disk letter in 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, press on branch “Initiator Setting” in “Initiator CHAP secret”, enter your passwords, and after entering each click “Save” button (your passwords is “Target secret”),
d. In branch: “Target Portals” 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 “Available Targets” you will see name of available iSCSI targets e.g. “iqn.2005.05: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. 1.06 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.

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, but some of the functions you can also 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+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

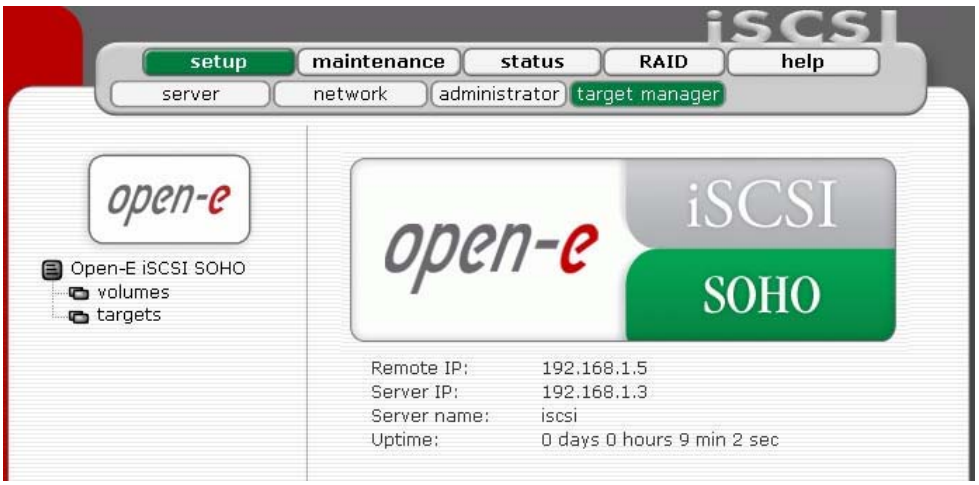
With Ctrl + ALT + DEL the Open-E iSCSI host computer will be shut down and restart, while CTRL + ALT + S shut it down. Please be careful with this option when users are connected.

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.

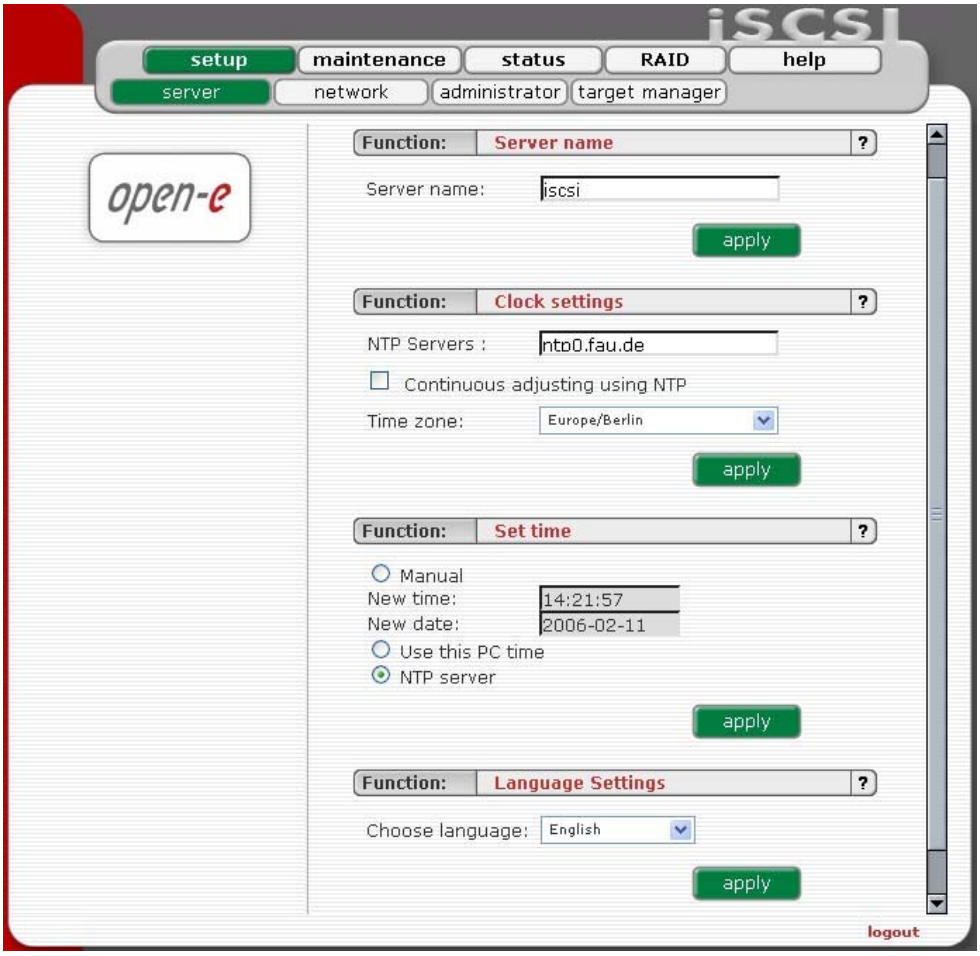
5.2.1 Setup

In this menu option, you fill find the following sub-functions: iSCSI setup, network settings, administrator and target manager.



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 “Clock settings”

Here you define an NTP server (Network Time Protocol) to synchronize your Open-E iSCSI with a time server on the Internet.

● note Time and date display are static. What is shown are the time and date at which the setup menu was accessed.

Function “Set time”

With this function, date and time can be entered manually. Alternatively, take the route via an NTP server, which has to be defined in the previous function.

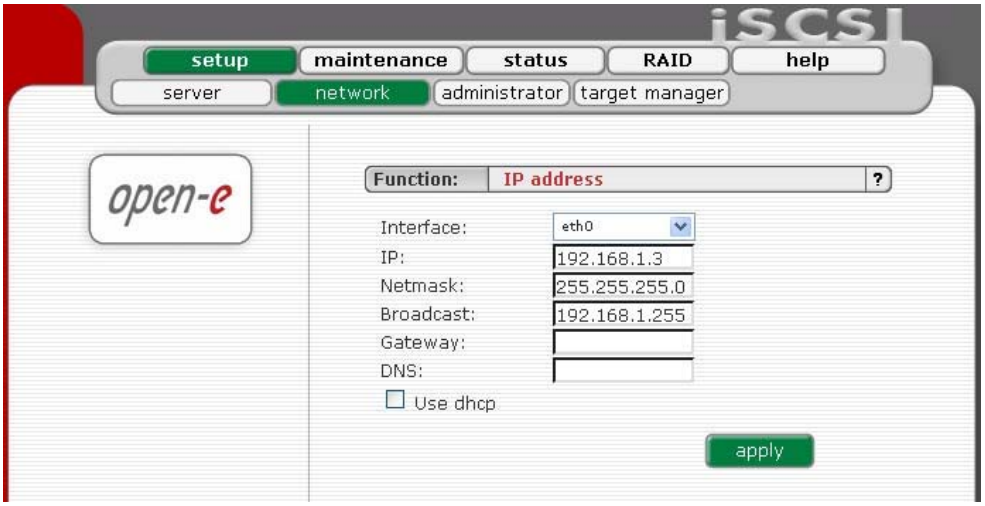
Function “Language Settings”

English and German are supported.

5.2.1.2 Network

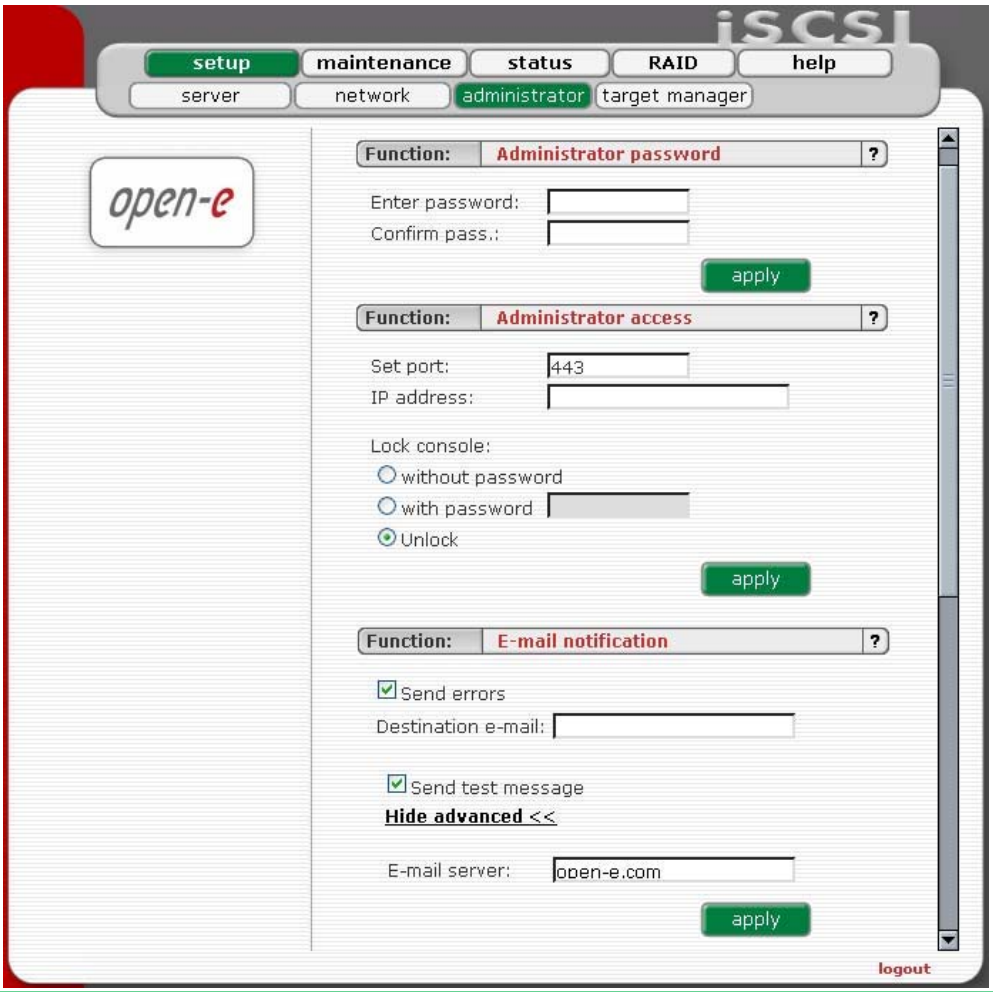
If you want to select an address instead of being assigned an IP address automatically via DHCP, you can do so here. During activation, you will lose your connection to Open-E iSCSI and you will have to log in again.
In the URL entry line of your browser, please enter the new IP address. In addition, please open the field “Network” (listed in the menu option “Setup”),

then check the new settings. If you do not get access, you need to operate Open-E iSCSI in the console mode and set up the new IP address.
In order to access servers in another subnet, you need to enter the address of a router as “Gateway.” This will not be the case in smaller networks or in networks without an Internet connection, however.



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 defining power button action.



Function “Administrator Password”

Using this function, you can change the password for Open-E iSCSI administrator.
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.

Function “Administrator Access”

Use this function to restrict access to the server administration:

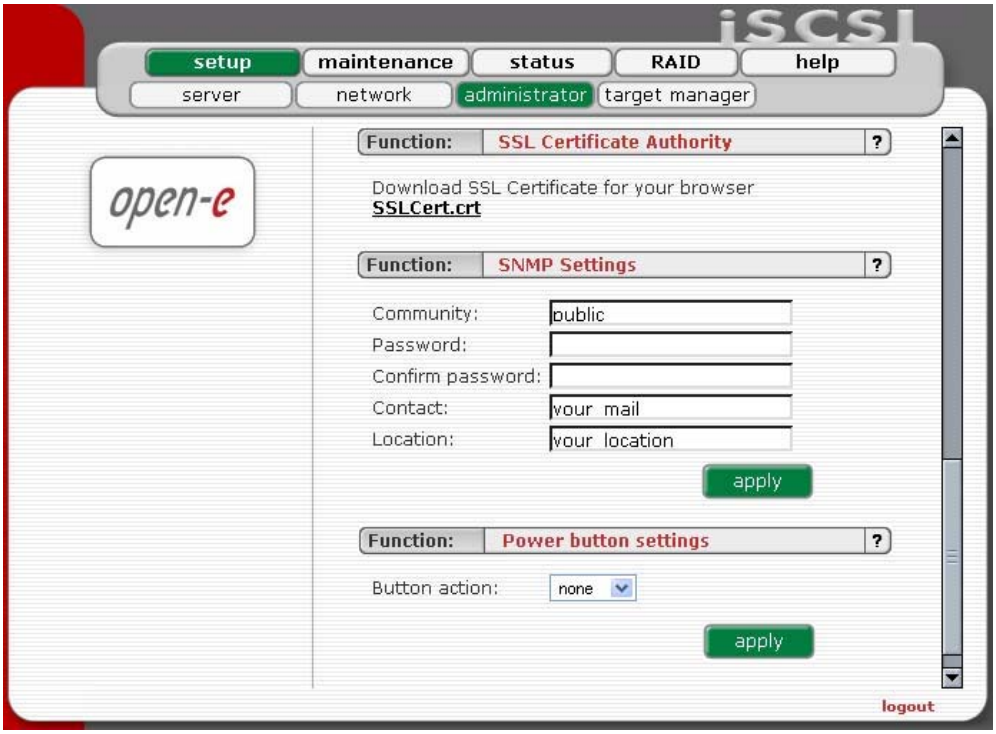
- Set port: you can change https port (default 443)
- IP address: you can assign IP addresses (separated by a semicolon) that are allowed to access the Open-E iSCSI Web administration. This field left blank means no restriction.
- Lock console without password: disables access to the console
- Lock console 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 when all computers in the network have assigned IP addresses via DHCP: any current IP can be replaced by a new one only after the lease ends. Please use Lock console feature carefully in case of any erroneous IP address settings you will not be able to reset default administrator access from the console. To restore default settings you have to re-update software in the Open-E iSCSI module or contact technical support.

Function “E-mail notification”

In case of significant events, critical errors, warnings, etc., system can send an email to the administrator. Please enter administrator email address.

note When SMTP server receiving mail, uses the monitoring function of IP numbers, it compares IP number from SMTP server (for example open-e.com) with IP number of a computer from which email was sent. This email may be treated as “spam” and will not be accepted. To avoid the above problem, use different SMTP server then the computer currently uses. The best solution for a correct email distribution is to use your local mail server.



Function “SSL Certificate Authority”

If you want to install Certificate Authority (CA) to your web browser, click on the SSLCert.crt link. Download CA on Desktop, click on it and "Install Certificate". Browser will show you a warning, that CA is not trusted and it is normal. Following the instructions, you will install CA to your web server.

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 “SNMP Settings”

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

- ethernet bandwidth,
- used memory,
- used swap,
- CPU load,
- SYSTEM load,
- Uptime,
- MAC addresses of network card.

Default SNMP community is "public" and here you can change it. The community you are setting can be max up to 20 characters. It is for your better security. 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 is used for synchronization too.

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 NAS 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.

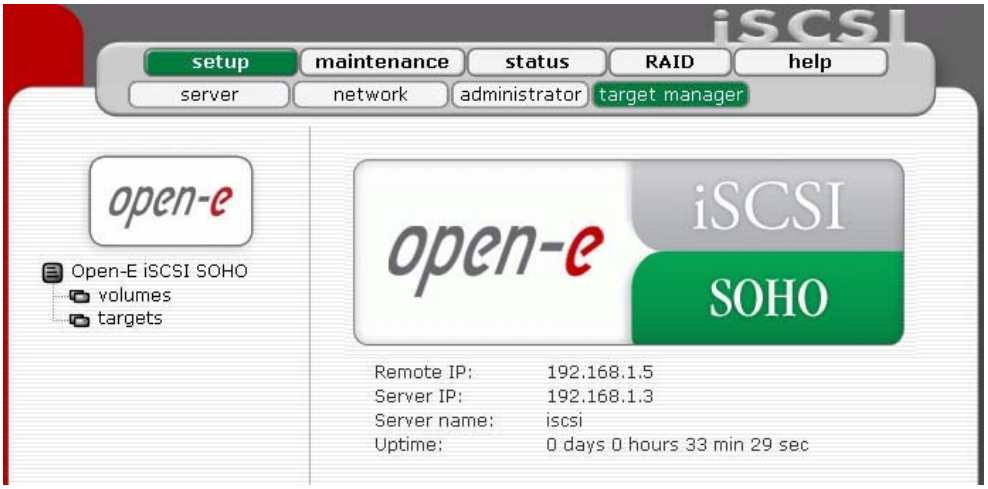
note If you can't retrieve information from SNMP client, you can check NAS_ip/check_sys/index.html. There are SystemLoad, CPU, Memory, Swap, Uptime.

Function “Power button settings”

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

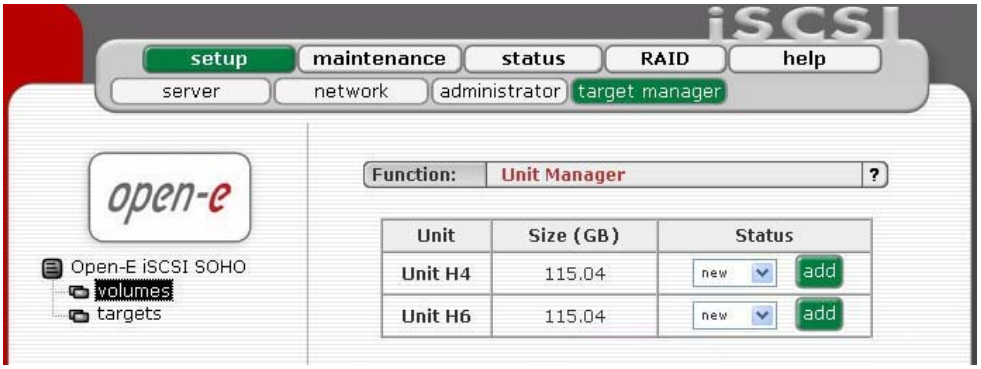
- no action (**none** option),
- restart computer (**reboot** option),
- power off computer (**halt** option).

5.2.1.4 Target Manager

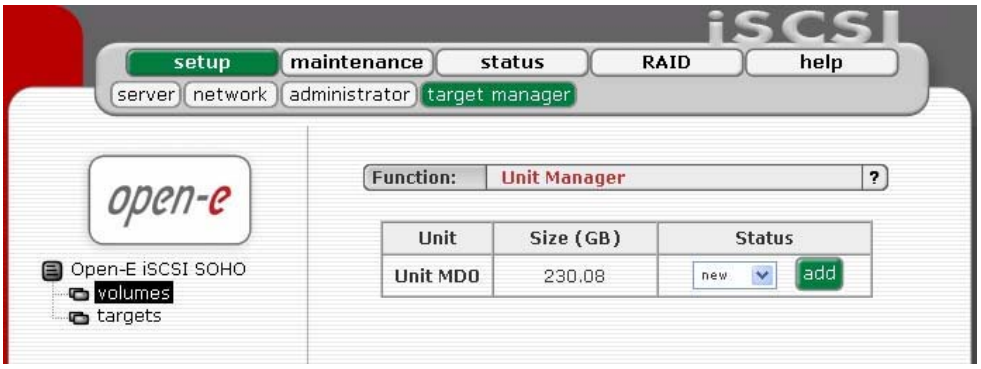


Function "Unit Manager"

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.

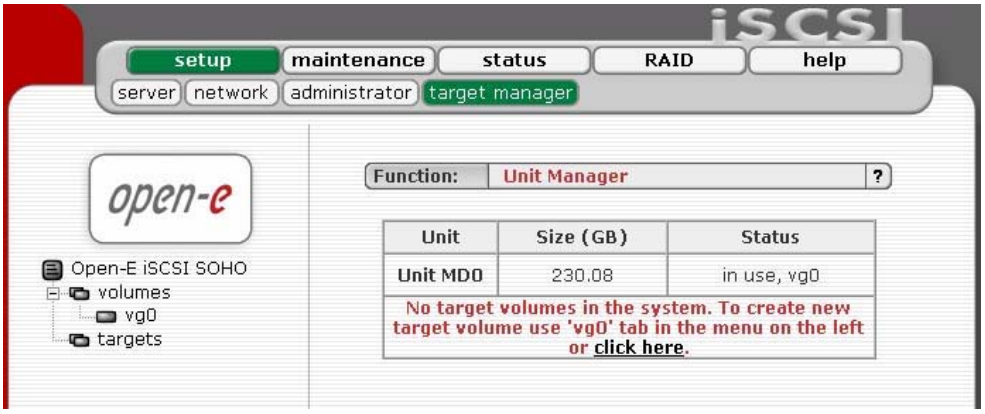


If you use a software RAID, e.g. level RAID 0, by clicking on the branch "volumes", you will be shown next screen (see below):



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.



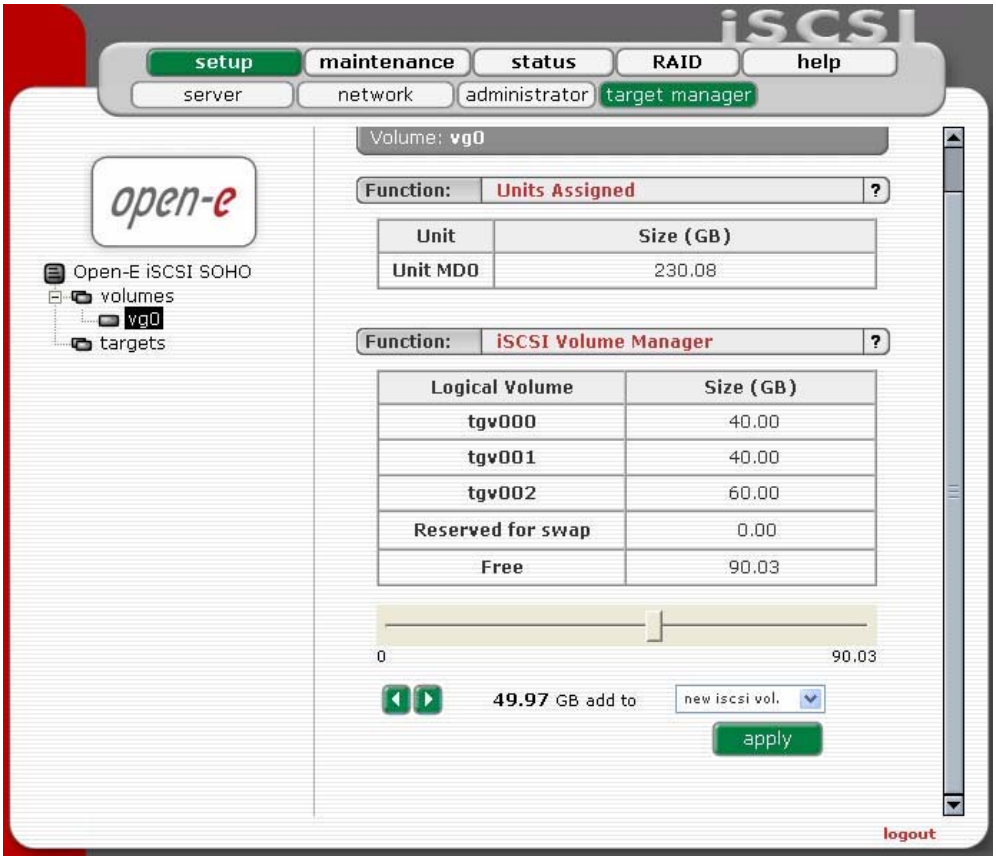
note When the added unit is integrated, it cannot be remove in Web management. You need to use extended tools in console.

Function "Units Assigned"

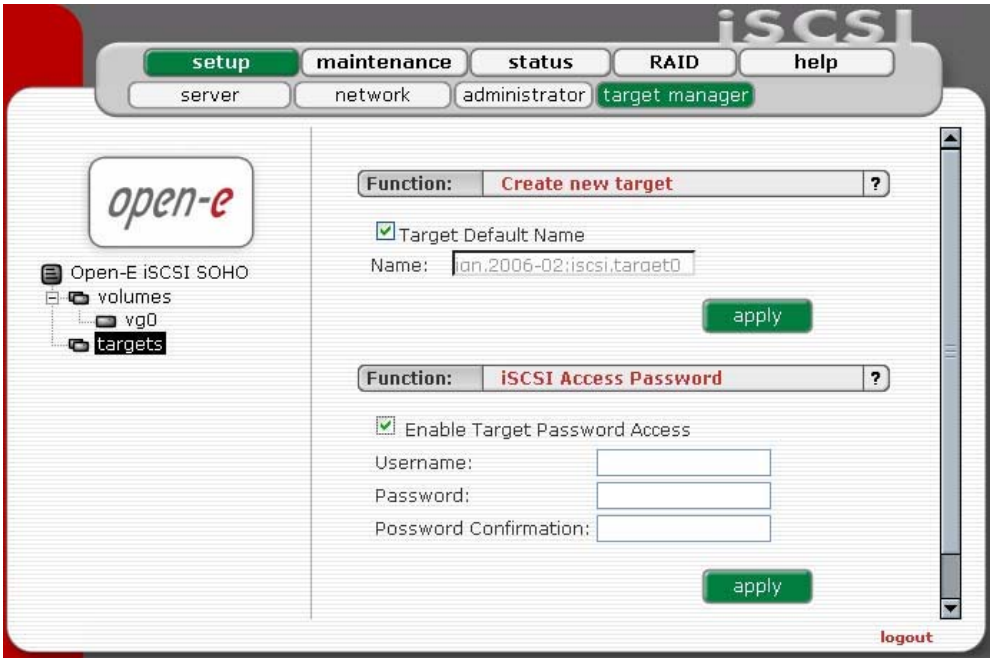
Here listed units are assigned to current volume group.

Function "iSCSI Volume Manager"

Using this function you can create new iSCSI target volumes inside one Volume Group. The iSCSI Volume is the equivalent of partitions, which are available for client stations. You can increase capacity of existing Logical Volume.



Depending on needed capacity administrator can add more capacity to particular Logical Volume. Using iSCSI Volume Manager Function you can add disk space to new LV or increase size on existing iSCSI Volume (you can't decrease the size). To set needed iSCSI Volume size use scrollbar on the right side, it shows size available for use. In order to set the precise iSCSI Logical Volume size use left or right keyboard cursor key.
This function can be also used to reserve disk space for "swap".
The SWAP is additional disk space used by the system to temporally release some amount of used RAM memory. So you can reserve some shared disk space for the system SWAP memory. We have added a lot of new features in our latest release that consume additional memory, so in some cases e.g. 512MB of RAM would not be enough and some processes like SWAP would not function without additional RAM.



Function "Create new target"

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

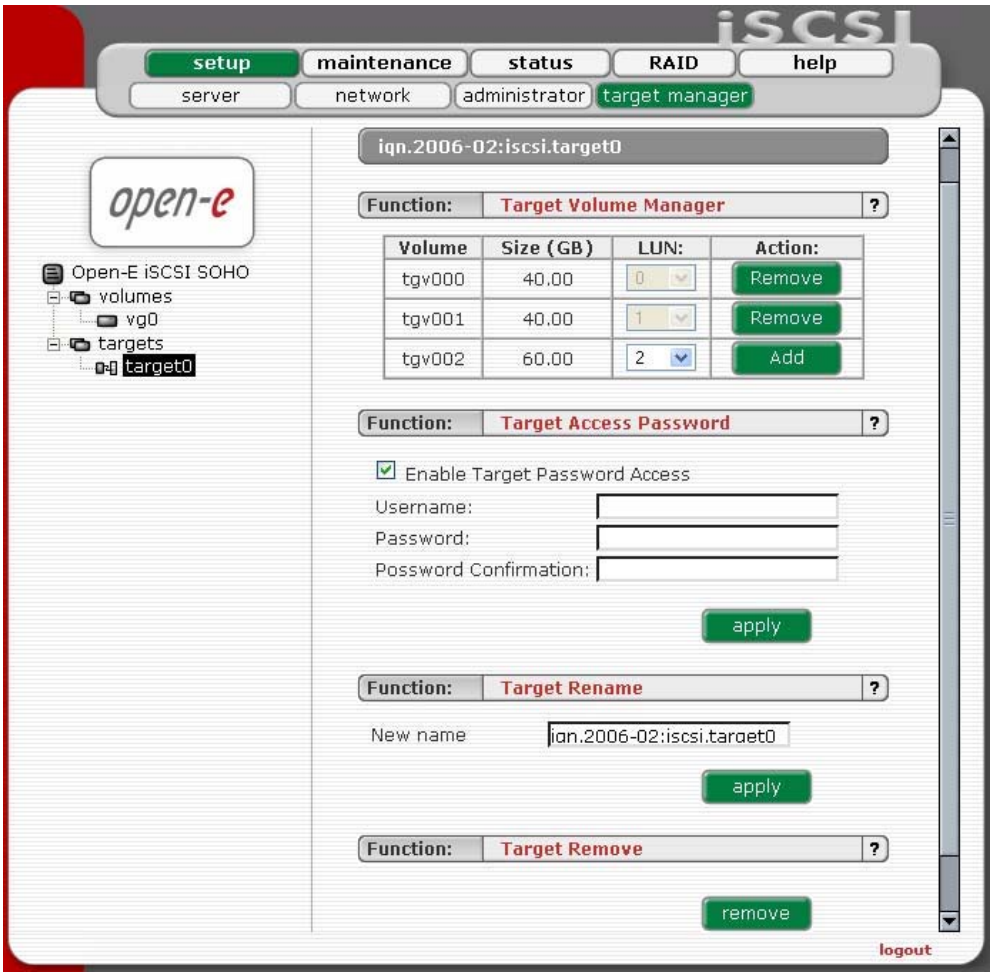
Function "iSCSI Access Password"

By using this function you can set the access password to your Open-E iSCSI. Later on client stations, in order to get access to iSCSI you have to pass them as a secret (software initiator). Software iSCSI Initiator using e.g. protocol CHAP, authorized access. CHAP (Challenge Handshake Authentication Protocol) is a protocol that is used to authenticate every connection and is based upon every password or secret sharing. CHAP requires the initiator to have both a username and secret entered in order to operate. The CHAP username is typically passed to the target and the target will lookup the secret for that username in its private table.

● note The Microsoft iSCSI software initiator requires using password from 12 to 16 alphanumerical characters.

Function “Target Volume Manager”

By using this function you can add available target volumes in premises of one target. In case of defining more than one target – free volumes will be available in actually edited volume. Analogically as with SCSI devices, it is possible to define LUN address device.



Function “Target Access Password”

This function allows to set authorization data of targets. If in the Open-E iSCSI system you set more than one Target, and you entered password to all of them, you have to pass them all in software initiator as CHAP secret.

Function “Target Rename”

This function provides a new target name.

Function “Target Remove”

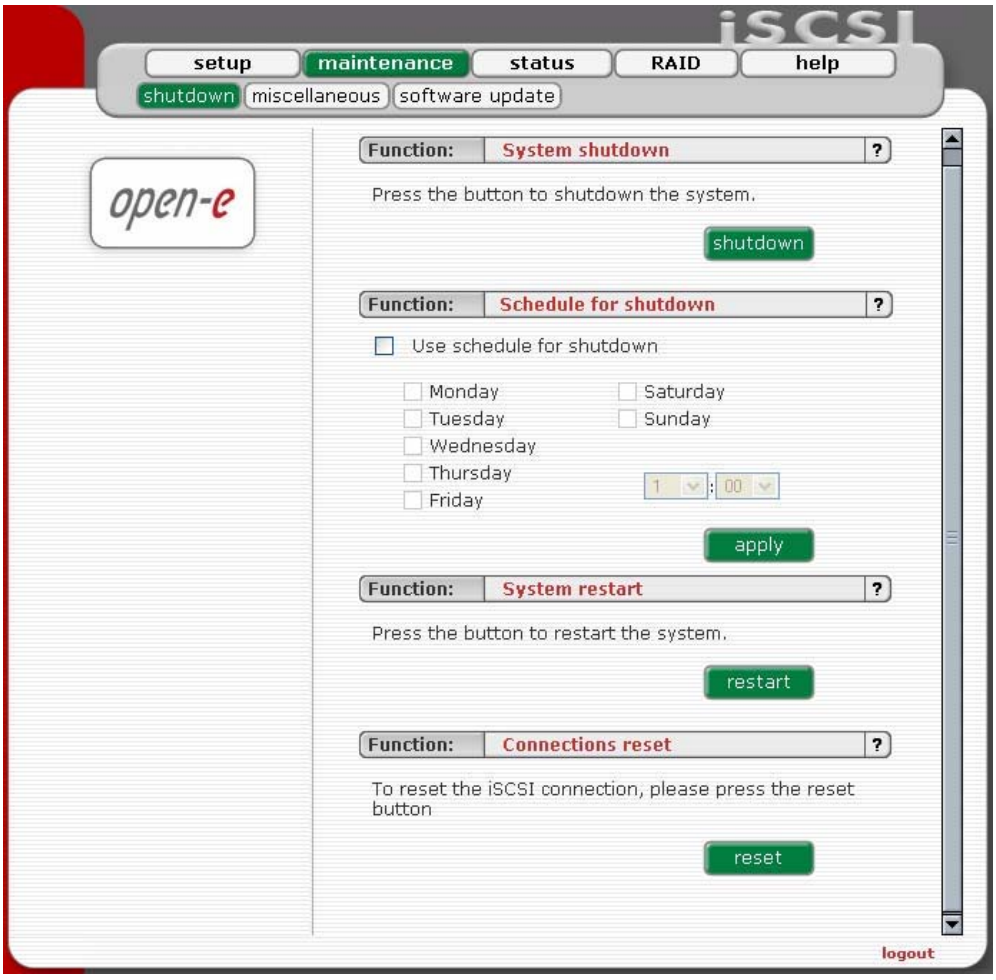
Removing target removes all the volumes from the target.

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 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.

Function “System Restart”

This function is self-explanatory: It allows restarting the system.

Function: Connection reset

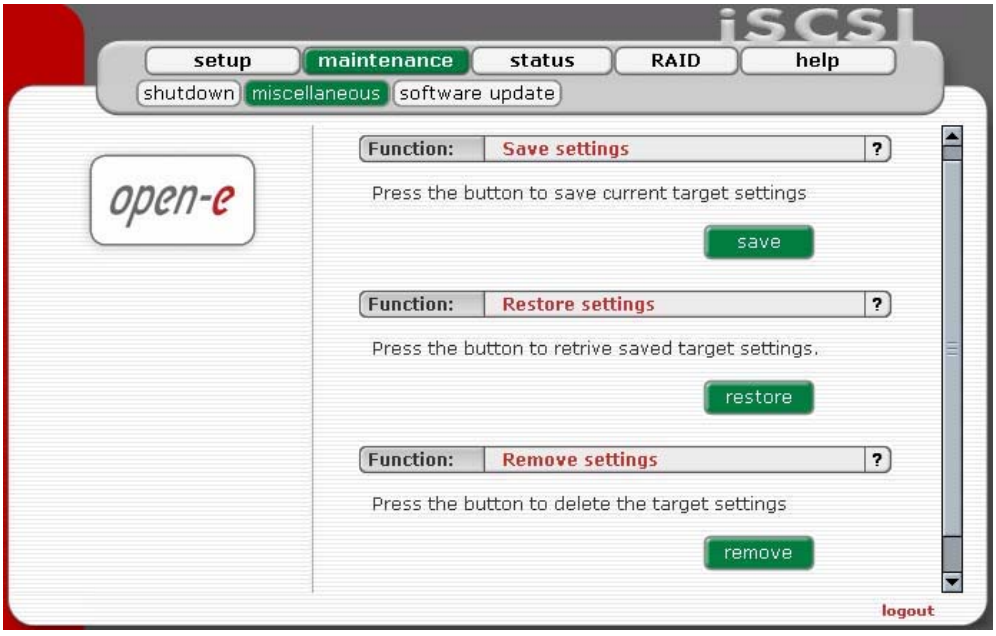
It might be necessary to restart the iSCSI daemon to inform client about specific setting changes, e.g. resize of the volumes.

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 Miscellaneous

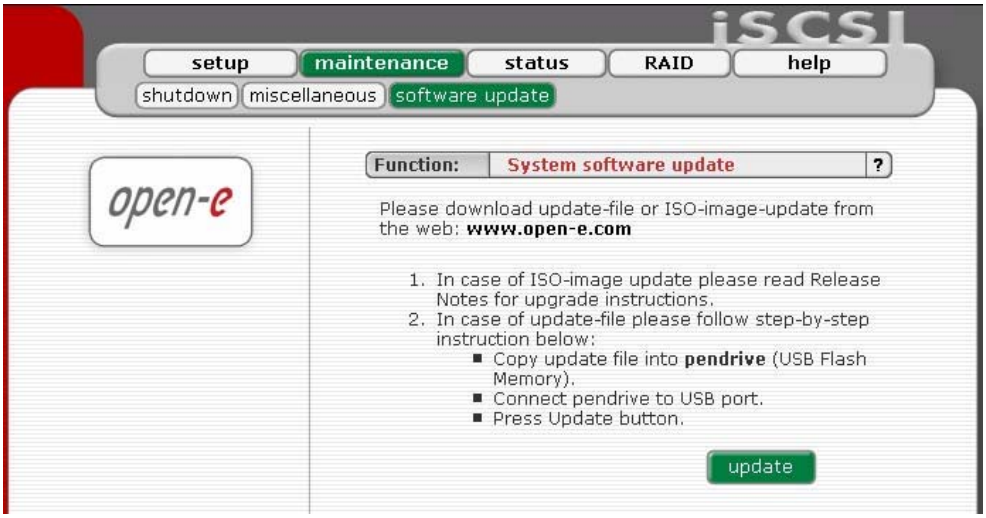
The next menu option is “miscellaneous” This function allows you to save settings, to retrieve them, and to remove them. To use those functions you must have had pen drive (USB Flash Memory) connected to USB port.



5.2.2.3 Software Update

With “Software Update” you can install the most up-to-date version of the Open-E iSCSI software. Copy the new software on the pen drive, and connect them to

the USB port and press update button. The new version will be installed immediately.



With ISO-image-update option:

The ISO-Files includes update file which must be burned on a CD with your favorite Burning software (for example: Nero Burning ROM - option: “Burn Image”, etc.).
In order to re-flash the module, please install CD-ROM as Secondary-Master and DOM (disk-on-module) as Primary-Master. 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 restart” After re-flashing, please reset the BIOS to boot from Primary-master HDD. Updating the system may take about 10 minutes.

● note Before Updating, all existing snapshots must be removed. You might have trouble accessing your volumes after updating when you leave old snapshots on the server.

With update-file option:

Copy the new software on the pen drive (USB Flash Memory), and connect them to the USB port and press update button. The new version will be installed immediately.

● note Theses update will reset all settings to factory defaults.

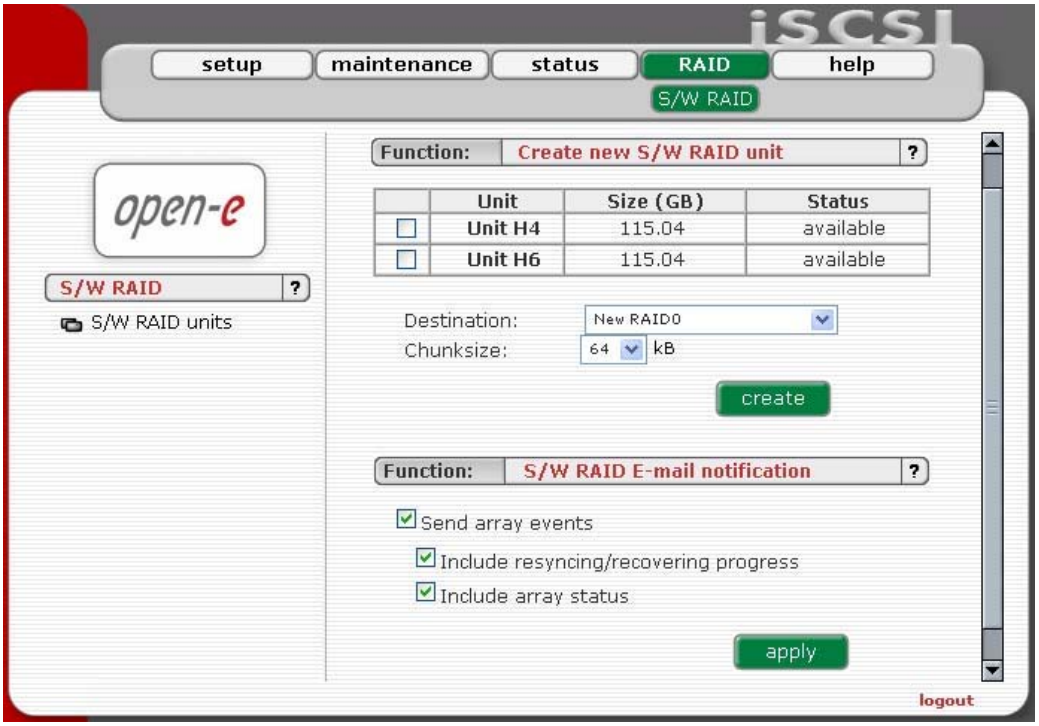
5.2.3 Raid

5.2.3.1 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. To create an RAID select units in column Status, then from ListBox select what type of RAID it will be. After setting all demanded parameters press Create button.



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 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.

To remove RAID, if previously added to Volume Group please enter Console Tool and first delete Volume Group of the RAID. Then the Remove button will be enabled. Otherwise simply press Remove button.

● note You can add spare units to RAID1 and RAID5 arrays. Please remember that after creation of a RAID, in Function: 'MD[x] Info' will show the progress of Synchronization. Till the end of this process all actions done on this array will be performed very slowly.

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

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-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

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

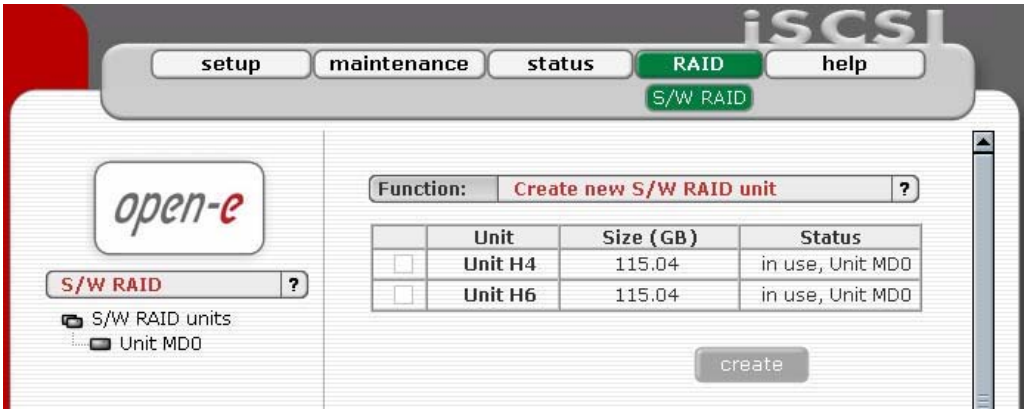
Function: “S/W RAID E-mail notification “

To send notification by e-mail about events on software RAID arrays (e.g. rebuild started, rebuild finished, span is active). To do this please check Send array events.

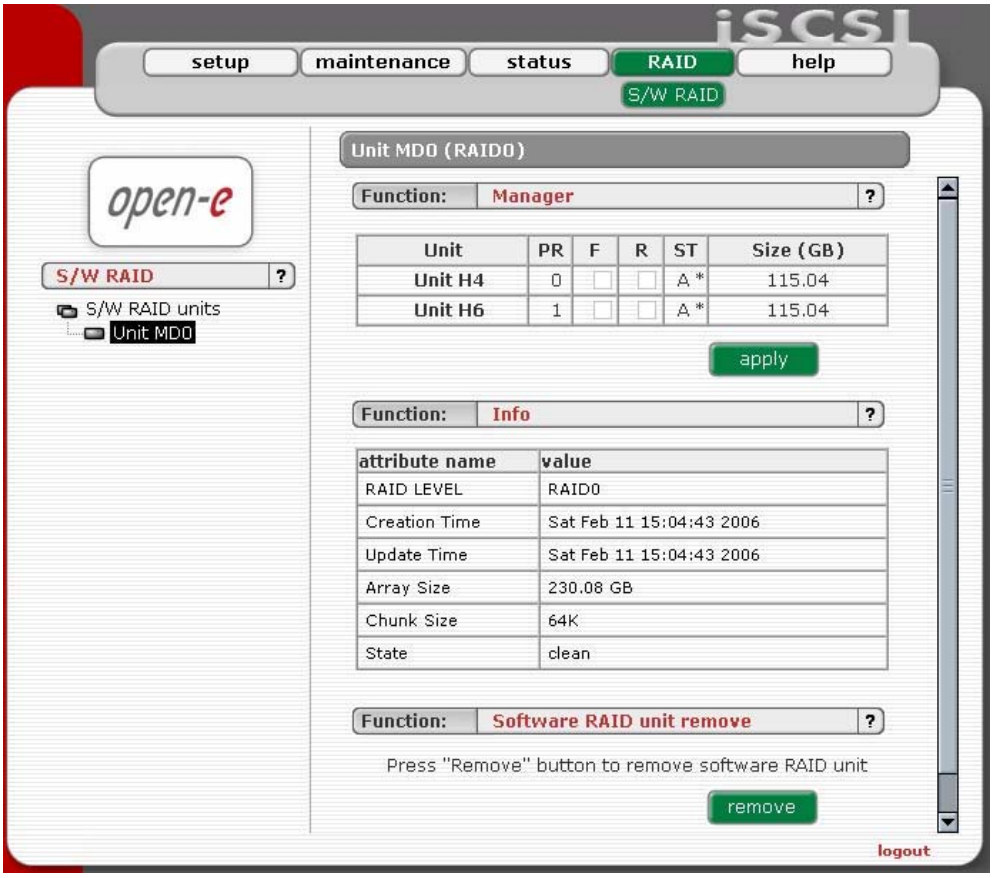
note To be able to enable "Send array events" you must enable "E-mail notification" in setup → administrator.

- 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.

RAIDs notation:

- PR - priority in array,
- F - faulty column,
- R - hot remove,
- ST - state of unit in array.

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

Function: „Software RAID unit remove“

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

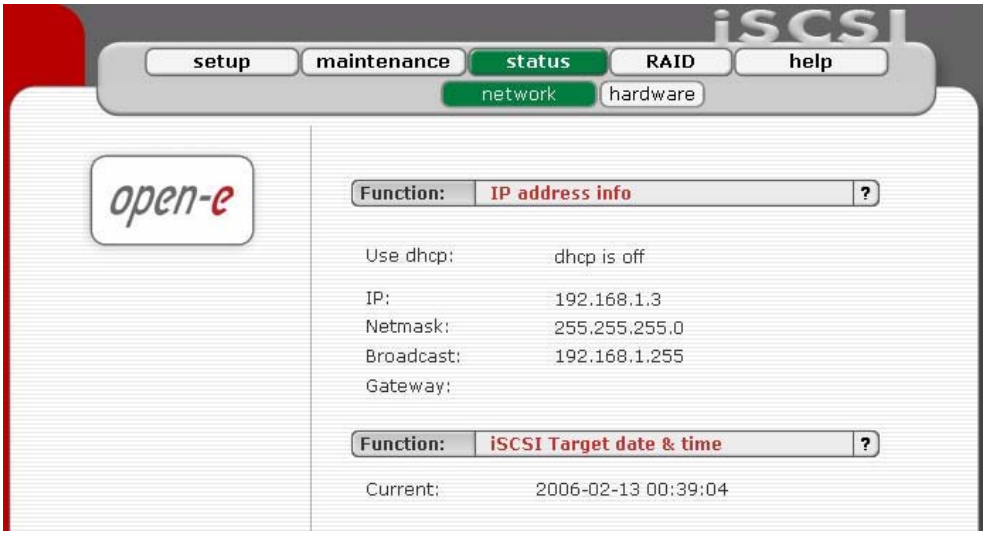
note This function is available only when no Logical Volume is created on appropriate MD[x] and unit is not resyncing. If you want to remove software RAID unit with Logical Volume please use console tools and remove Logical Volume first.

5.2.4 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 and hardware.

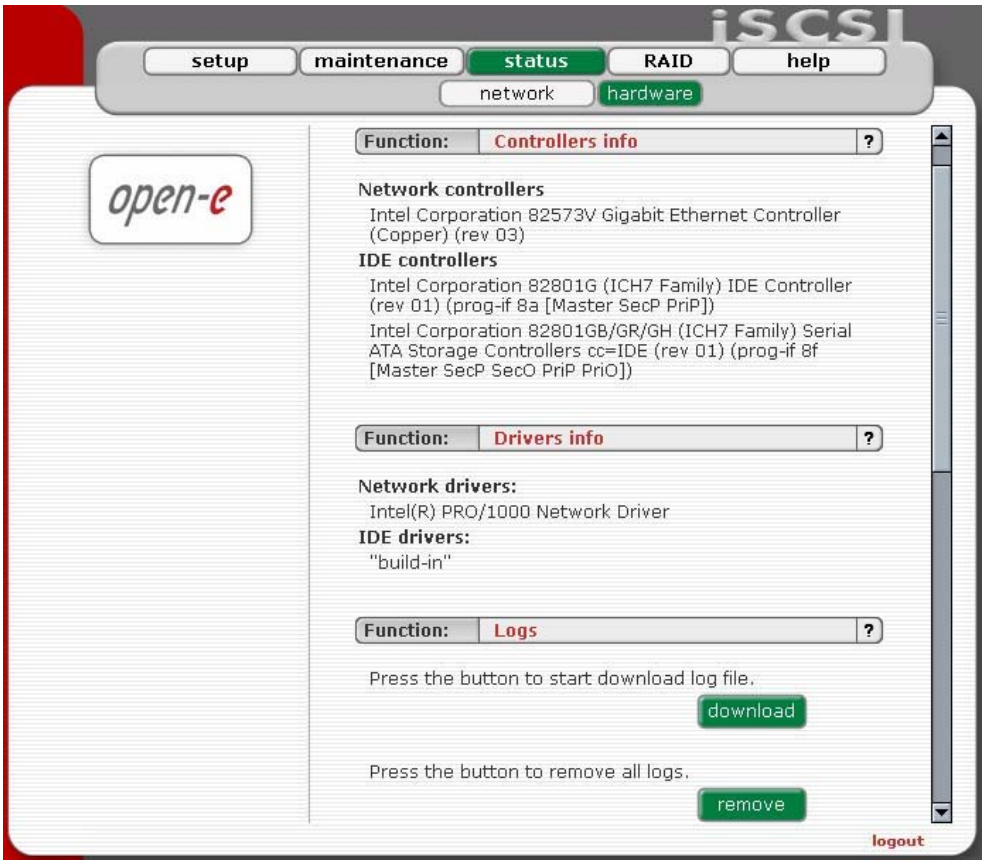
5.2.4.1 Network

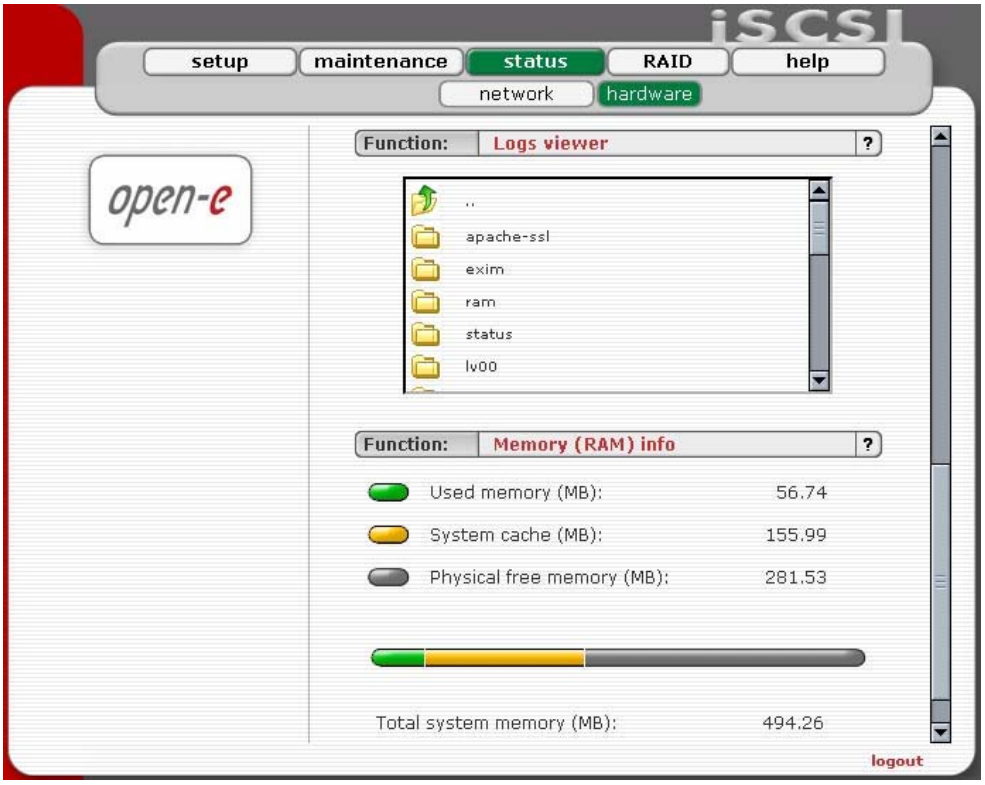
This function provides information on the IP address and the Open-E iSCSI date and time.



5.2.4.2 Hardware

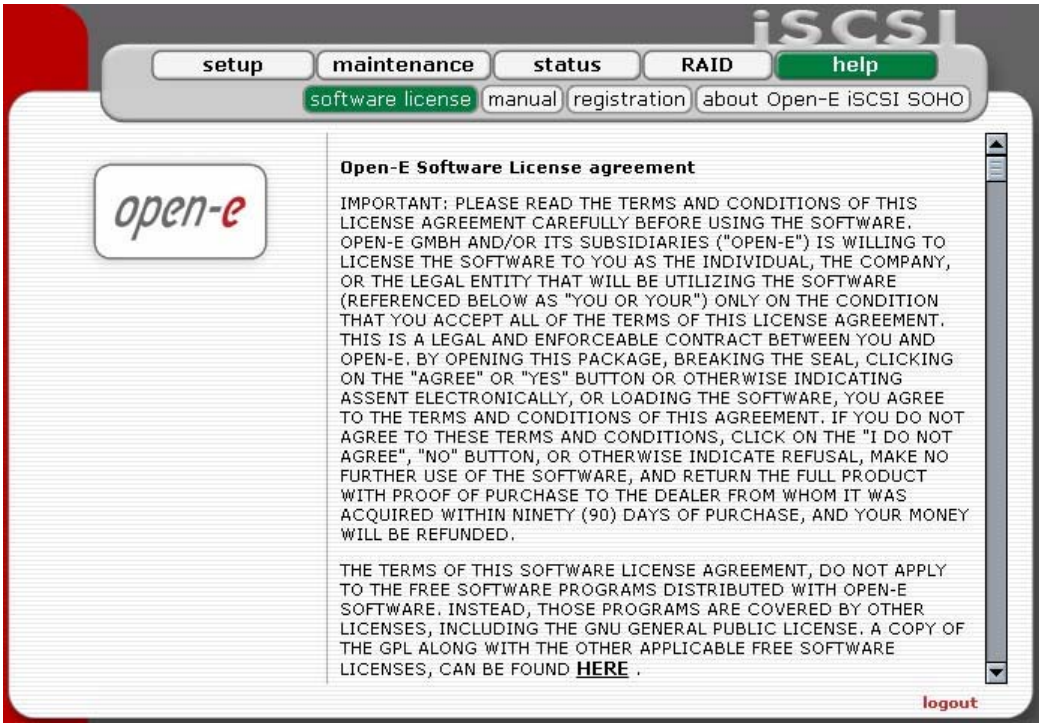
The “Hardware” option provides you with information on storage and network controllers and the drivers (e.g. network driver and IDE driver). In addition, you may also download the latest Open-E iSCSI log files, remove them and check memory (RAM) usage.



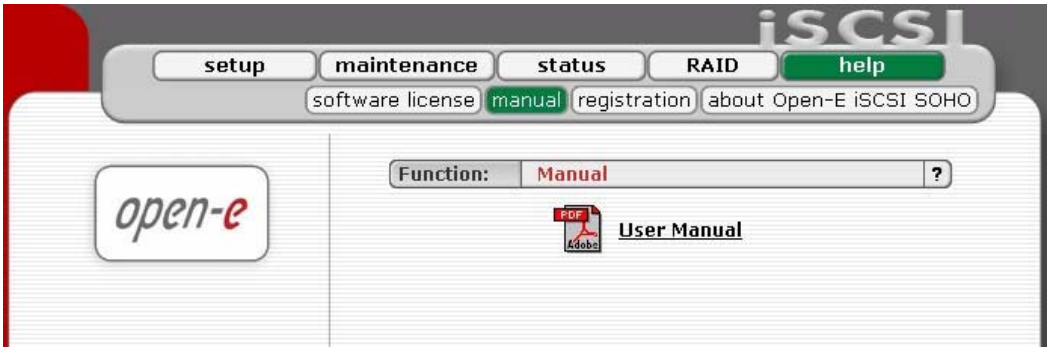


5.2.5 Help

When accessing Help - “Software License” you can read the license for software included in Open-E iSCSI SOHO.



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 solves 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: No pendrive detected

You instructed Open-E iSCSI to perform a systems update, but did not supply a valid Open-E iSCSI update file. Download the latest Open-E iSCSI update file from the www.open-e.com Web site. Next, copy the upgrade file into pendrive and connect them to USB port. Please spell upgrade lower case. Finally, press update button.

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

Open-E Software License agreement

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The limitation of liability set forth in this paragraph will apply, whether or not Open-E GmbH was advised of the possibility of the loss, liability or damages and notwithstanding any failure of essential purpose of any limited remedy.

Waiver

No delay or failure of Open-E GmbH to exercise any right under neither this agreement nor any partial exercise thereof shall be deemed to constitute a waiver or any rights granted hereunder or under law.

Unlawful Provisions

If any provision of the agreement is held to be unenforceable for any reason, all other provisions of this agreement shall nevertheless be deemed valid and enforceable to the fullest extent possible.

Entire Agreement

This agreement constitutes the sole and exclusive agreement between the parties concerning the subject matter hereof.

LIMITED WARRANTY

Open-E warrants that the media on which the software is distributed will be free from defects for a period of ninety (90) days from the date of delivery of the software to you. Your sole remedy in the event of a breach of this warranty is that Open-E will, at its option, replace any defective media returned to Open-E within the warranty period, or refund the money you paid for the software. Open-E does not warrant that the software will meet your requirements, that operation of the software will be uninterrupted, or that the software will be error-free.

Authorized Service

Only an authorized service representative can service Open-E software. Failure to comply with this requirement will void the warranty.

Applicable Law

This agreement shall be governed by German law. You agree to jurisdiction and venue in the courts located in Munich, Germany for all claims, disputes and litigation arising under or related to this agreement.

8 Appendix B

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Preamble
The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

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Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

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