

MANUAL

OPEN-E DATA STORAGE SOFTWARE V6

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1. Before you get started

Congratulations on purchasing Open-E Data Storage Software V6, the ideal solution for network-based storage management. This manual will assist you as you install and configure the hardware.

In order to reach the desired configuration as quickly as possible, 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. System requirements

- x86 - compatible PC,
- CPU 1 GHz,
- 2 GB main memory,
- USB port,
- One or several suitable hard drives (SATA,SAS, SCSI, ATA),
- Optionally a hardware RAID controller, Fibre Channel and iSCSI Storage,
- Network Interface Card.

Open-E Data Storage Software V6 contains its own operating system no additional software is required.

NOTE In order to achieve maximum performance, we recommend using a network card with 1 Gb or more (multicards 1Gb/s recommended for bonding), as well as a processor with at least 2 GHz. If several computers are accessing the DSS V6 system, we recommend 4 GByte main memory.

1.2. Supported clients

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

1.3. Supported network protocols

- TCP/IP
- SNMP

1.4. Supported network file protocols

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

1.5. Required tools

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

1.6. Safety precautions

1.6.1. Personal safety

CAUTION High voltages may occur inside computer equipment. Before removing the chassis, 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 Data Storage Software V6, please backup all important data prior to installation. Adding a hard drive to Open-E Data Storage Software V6 goes hand in hand with a complete format 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 Data Storage Software V6, please ensure you are grounded before opening the PC or the ESD package that contains Open-E Data Storage Software V6. Using grounding straps or mats is the best way to ensure this safety. If you do not have grounding equipment handy, please make sure you are grounded e.g. by touching a heater before working with Open-E Data Storage Software V6, for instance, by touching a heater.

- Avoid touching the components inside the PC unless necessary,
- Please hold Open-E Data Storage Software V6 only on the edges.

2. Features

Open-E Data Storage Software V6 is an all-in-one IP-Storage OS offering NAS and iSCSI (target and initiator) functionality in a single application with excellent enhanced management and superior reliability for organizations of all sizes.

2.1. What is Open-E Data Storage Software V6

NAS (**Network Attached Storage**) solutions are defined as storage systems that are directly hooked up to a network infrastructure. Also, they operate independently and do not have to be connected to a server via a controller or host adapter. The term "storage" here generally refers to all systems that either provide data storage or actually store or organize data. Currently, data storage is the most common and most widespread type of NAS systems.

NAS solutions are based on a separate operating system (and often also on special hardware), which operates independently from the servers on a network. Typically, this operating system is software that is optimized for providing data (file server).

NAS solutions allow users to add additional storage to existing networks quickly, easily, and cost-efficiently.

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 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 has 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.

Open-E Data Storage Software V6 provides a fast, reliable, and scalable platform for IP-Storage and combines the power of NAS & iSCSI in a single operating system. No matter if you need file sharing, storage consolidation, backup and recovery, virtualization or replication, Open-E Data Storage Software V6 offers excellent price-to-performance ratio, enhanced manageability, and increased productivity.

The flexible design of Open-E Data Storage Software V6 enables organizations of all sizes to create effective NAS and/or IP-SAN/iSCSI solutions that can adapt to and meet the simplest or most complex storage needs.

Open-E Data Storage Software V6 is built on the proven Open-E NAS-R3 and Open-E iSCSI-R3 family with all of its superior security, stability and management advantages, and is Open-E's sixth generation of IP-storage software.

Open-E Data Storage Software V6 adds new back-up capabilities, simplified setup and storage management, extensibility, and is specially tuned to provide optimal data-throughput and data protection for centralized storage. Open-E DSS V6 increases iSCSI target efficiency by supporting multiple iSCSI initiators on different volumes, without sacrificing NAS performance.

2.2. Open-E Data Storage Software V6 functionality

Open-E Data Storage Software V6 is one of the easiest ways of implementing an NAS server and/or iSCSI technology in your network. Through its simple architecture – in principle, it is a flash memory with a USB 2.0/1.1 port and Open-E Data Storage Software V6 as its operating system – Open-E Data Storage Software V6 can be used with all x86 PCs containing USB ports, an IDE controller and an additional SATA Controller on their mainboard or hardware controller.

To begin working with Open-E Data Storage Software V6, all you need to do is assign an IP address to the NAS server and/or 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 Data Storage Software V6 using the encrypted https protocol.

Open-E Data Storage Software V6 allows users to create so-called shares (i.e., resources within a network that numerous users or user groups have certain access to). The access rights to the shares are controlled through the user and user group settings.

Open-E Data Storage Software V6 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 Data Storage Software V6?

Often, storage in network environments is expanded the following way: file servers have to be shut down in order to install additional drives. Next they need to be reconfigured. This tedious task often includes copying data manually onto larger drives, consuming a lot of time and money.

With Open-E Data Storage Software V6, you can:

- add storage to your existing network quickly, easily, and most important, cost-efficiently,
- consolidated storage and backups for multiple servers,
- improve data availability and efficiency,
- lower costs by centralizing storage management,
- simplify the installation and on-going management of a SAN by using iSCSI versus using Fibre Channel.

Expensive hardware is, therefore, no longer necessary. Take any computer – a new rack server or an old desktop PC with USB ports 2.0/1.1 (internal or external) – and exchange the system drive for the Open-E Data Storage Software V6 USB flash module. To store data, Open-E Data Storage Software V6 uses IDE (ATA) and SATA hard drives, connected to ports on your mainboard or hardware RAID controller.

Additionally Open-E Data Storage Software V6 supports software RAID, so you can create software RAID over single hard drives or over existing hardware RAIDs.

For example, you can create a software mirror over two hardware RAID5s for very high reliability.

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

2.4. RAID types

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

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

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

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

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

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

3. Open-E DSS V6 installation instructions

IMPORTANT

NOTE DSS V6 is a standalone bootable storage OS. The software for the Lite version and the regular version of DSS V6 is the same; however the Lite version has a limited feature set. After installation and boot, DSS V6 works as the full version in trial mode. Later you can convert the trial mode to the full or Lite version by entering the appropriate key.

NOTE Starting with both the zip and ISO file you can boot DSS V6 or install it onto the storage server hardware. We recommend installing the software onto a hard drive, SSD, or a small Logical Unit (volume) in your RAID. The following RAID controllers are supported as a bootable media: MegaRAID, Smart Array, 3ware, Adaptec and Areca.
Only 2GB is needed for the DSS V6 software, and this drive or Logical Unit cannot be used for your storage volumes. USB flash drives are not recommended for long term use due to reliability issues.
As mentioned above, the DSS V6 software has a boot option to install DSS V6 on a writable FAT or FAT32 partition or a RAID Logical Unit. The Installer automatically creates a 2GB partition on the selected media and copies the DSS software image onto it.
Whole space of a destination media will be reserved for Open-E DSS V6. You will NOT be able to use remaining space for storage purposes. Please use as low capacity device as you can (but not less than 2GB).

3.1. Preparing a USB flash drive as the boot media/installer with the ZIP file

Please uncompress the downloaded zip file onto an empty FAT or FAT32 formatted USB-flash drive in Windows, Linux or another OS. If you encounter trouble use FAT for the USB drive and put your system BIOS into legacy mode on the USB port.

After uncompressing the zip file on the USB-stick the root directory must ONLY contain the following directories: bxxxx, boot and file mmenu_upd.sh where: xxxx is the software build number.

- To make the USB-stick bootable, enter the directory called "boot" and run the bootinst.exe (in Windows) or bootinst.sh (in Linux). In Windows please use "safe hardware remove" function and sync in Linux before removing the USB flash drive from the system.
- Continue to boot your storage server with your media.

3.2. Preparing a CD as the boot media/installer with the ISO File

The ISO-File must be burned onto a CD with your favorite burning software. (For example: Nero Burning ROM - option: "Burn Image", or ISORecorder, etc.)

- Please set the BIOS to boot from your CD/DVD-ROM drive.
- A USB CD/DVD-ROM can be used as well if your system supports it for booting.

NOTE When you run DSS V6 from a CD it is not able to save some configuration data, such as the DSS V6 network settings and product key, so booting and running from writable media is preferable.

The ISO image can be used with a CD creation utility to burn a bootable CD which can be loaded into the storage server CD drive. Then you can boot from this CD to run DSS V6 or select to use the installer to install the DSS V6 software on a drive or Logical Unit in the system.

3.3. Booting DSS V6 Installer

Plug your media into the destination environment.

The first boot menu will show the software version. You may press enter or it will skip automatically within 5 seconds.

The second menu allows you to select either 32 or 64 bit architecture to boot DSS V6. The default is 64 bit architecture and will be chosen automatically after 5 seconds if no key is pressed. On a 32 bit system the boot will fail unless 32 bit system is selected. The default boot architecture (32 or 64 bit) can be set and saved after the software is installed.

The third menu option is the interactive DSS V6 installer utility. Select this to install DSS V6 on writable media in your system.

- 32bit system (2.6.27)
- 64bit system (2.6.27)
- Run software installer

When you run the installer, please follow the instructions. Finally, reboot your storage server from new media (set you BIOS boot options back from CD/DVD/USB to the media where you installed the software).

NOTE The software defaults to the trial version. DSS V6 can be used for evaluation up to 60 days with the default trial product key. When you decide to purchase the full version or switch to the Lite version, you can continue to use the software and all your data and settings will remain intact.

You will see an option to run the memory test on the system by choosing “Run Memtest utility” in the first menu.

In order to convert the trial version into Lite or the full version, please enter your DSS V6 product key in the WEB GUI from menu: HELP-> about Data Storage Software V6 -> Extensions keys loader.

4. Configuration Data Storage Server

4.1. First-time operation of Open-E Data Storage Software V6

Now start your system.



After booting is complete, Open-E Data Storage Software V6 will provide you with information on the current software version and the network settings:

```
Welcome to Data Storage Software V6 (Press F1 for Help)
-----
Model: Data Storage Software V6
Version: 6.00up98.8101.7337 64 bit
Release date: 2013-02-14
S/N: TRI00022
Licensed storage capacity: unlimited

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

This is TRIAL version. 60 day(s) left for evaluation

Self test O.K.
```

If your network has a DHCP server, Open-E Data Storage Software V6 should configure the IP settings automatically. If that is the case, you can proceed to 4.2. If your network does not have a DHCP server, Open-E Data Storage Software V6 will start with the default settings: IP address 192.168.0.220 and subnet mask 255.255.255.0.

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

```
----- Help -----  
You can use below key sequences (C-means 'Left Ctrl',A-'Left Alt'):  
C-A-N - to edit static IP addresses  
C-A-P - to restore default factory administrator settings  
C-A-I - to restore default network settings (IP, BONDING)  
C-A-T - to run Console Tools  
C-A-X - to run Extended Tools  
C-A-W - to run Hardware Configuration  
C-A-R - to run RAID Tools  
C-A-F - to run Fibre Channel Tools  
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  
C-A-K - shutdown / restart menu  
----- (100 %) -----  
EXIT
```

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

NOTE For additional information, please read the chapter “Console display functions”

4.2. Entering product key and logging into Open-E Data Storage Software V6

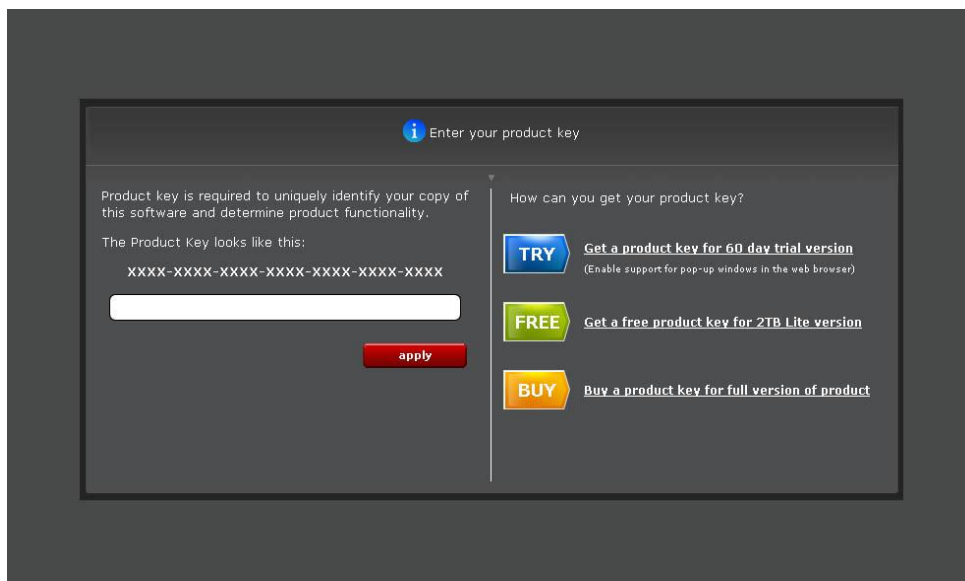
You can establish a connection to Open-E Data Storage Software V6 from every network computer. To establish this connection, use a browser (e.g. Microsoft Internet Explorer) and enter the IP address or the name of the computer hosting the Data Storage Software V6 into the URL entry line:

- <https://192.168.0.220> (standard address) or
- <https://dss> (this name can be changed in the installation of Open-E Data Storage Software V6 settings).

NOTE For security reasons, Open-E Data Storage Software V6 uses the encrypted SSL protocol (https).

You will now be asked to verify the encryption certification. Since Open-E Data Storage Software V6 only allows to create shares 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 sessions.

Next, the window for entering the product key will appear.

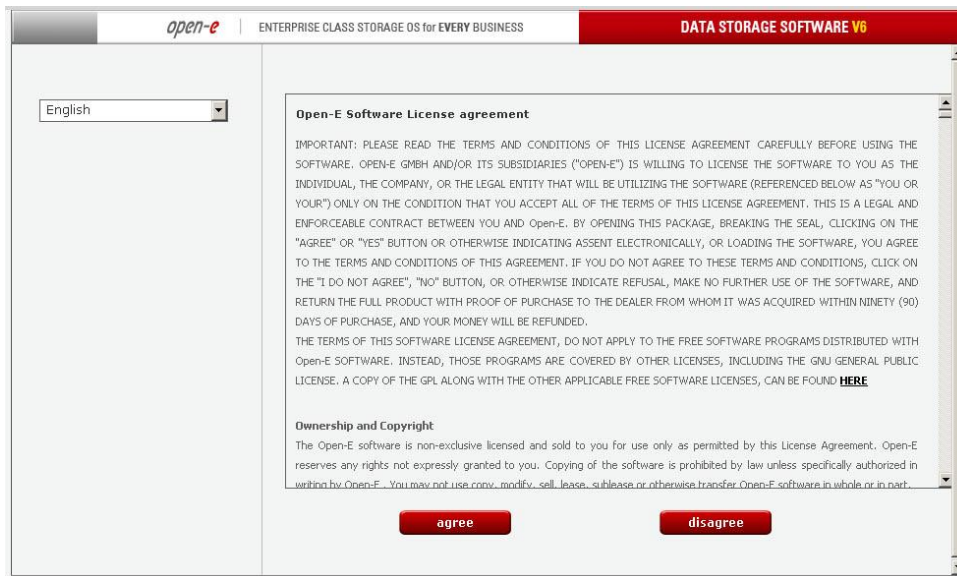


If you have one already please enter and click apply button. After restart, open the web GUI with your browser again.

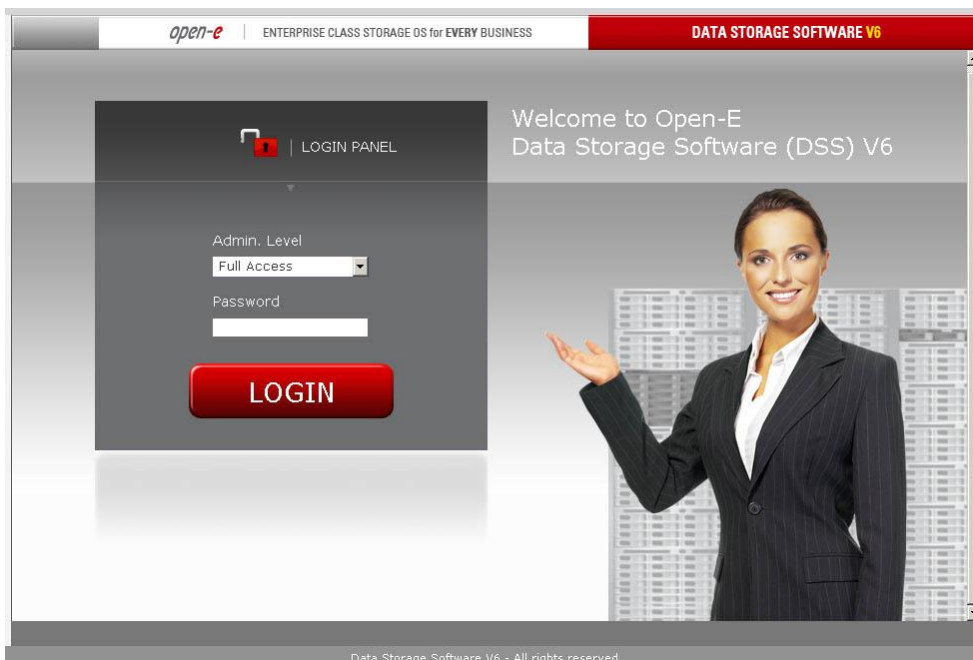
NOTE If you don't have product key yet you can use one of the three links on the right (60 day trial version, FREE 2TB Lite version or buy the full version of the product).

NOTE In order to convert the trial version into Lite or the full version, please enter your DSS V6 product key in the WEB GUI from menu: HELP-> about Data Storage Software V6 -> Extensions keys loader.

NOTE After you first launch Open-E Data Storage Software V6 you will see a page with the software agreement and available language options. Later you can change the language used by modifying language settings, which are located in the Server tree accessible through "Setup".



After accepting the license agreement you can log into Open-E Data Storage Software V6 using the standard password "**admin**" (this can be changed later). In order to start working, you can now set all the necessary parameters.



NOTE The password is case-sensitive. If you cannot log into Open-E Data Storage Software V6, please make sure the Shift and Caps Lock keys are not pressed.

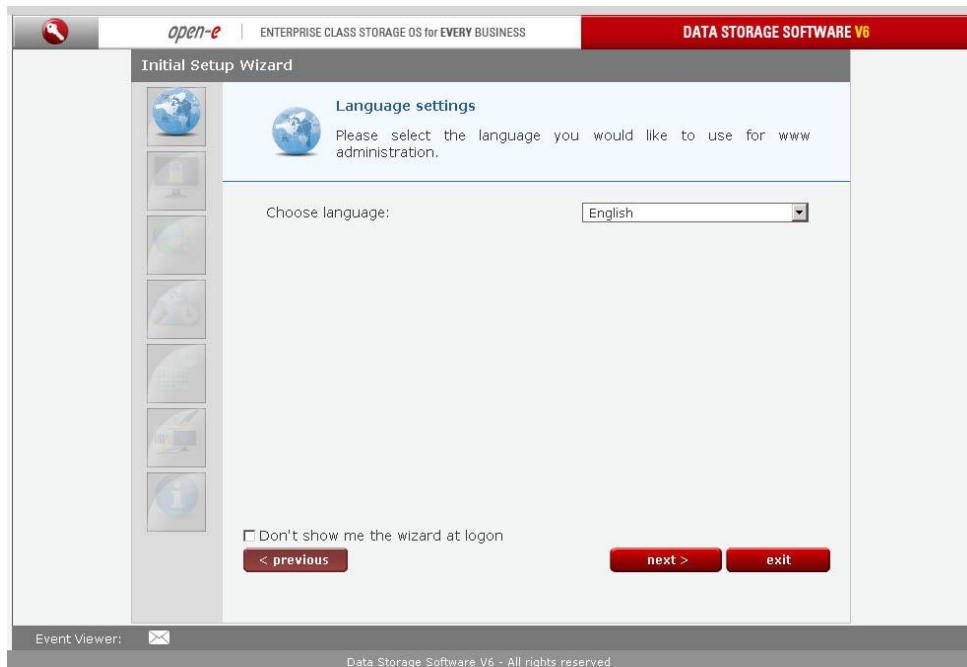
NOTE If your web browser shows something different than expected, please delete the cache and cookies in the settings menu of your web browser.

4.3. Initial Setup Wizard

After logging to the Open-E DSS V6 an Initial Setup Wizard will appear. The six steps Wizard will allow for an initial configuration of your DSS V6

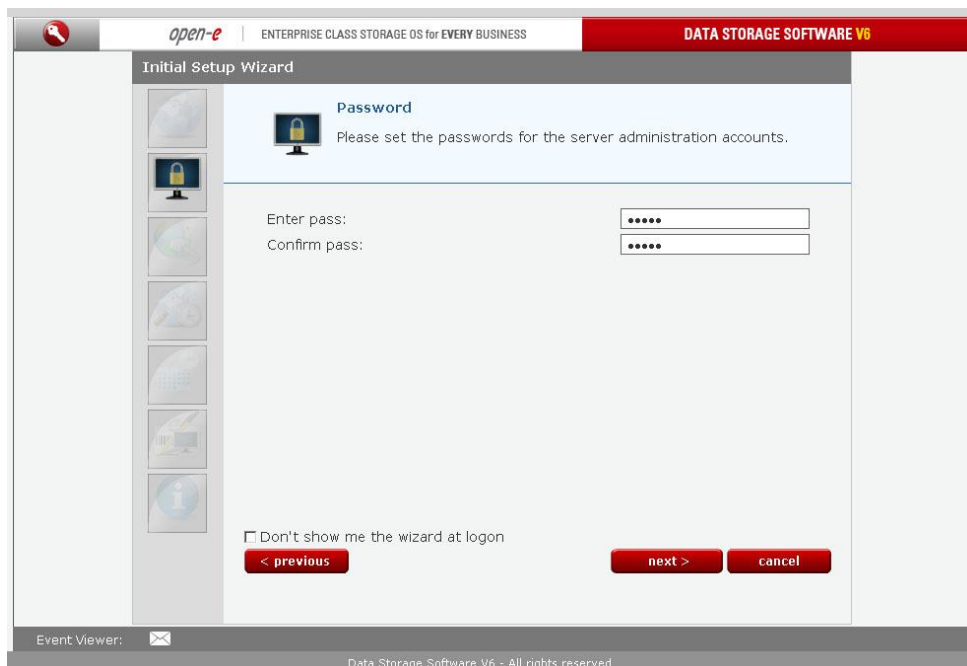
Language settings

In first step, you can choose the language you want to use.



Password

In these step you can set the passwords for the server administration accounts.



IP address

These are the settings of your network interface you are connected to at the moment. The gateway and DNS will be needed for NTP server which will be set (if you wish) in the next steps. If it's possible, the discovered values of these parameters are proposed to you in this form.

The screenshot shows the 'Initial Setup Wizard' window for 'DATA STORAGE SOFTWARE V6'. The current step is 'IP address'. The interface includes a sidebar with navigation icons, a main content area with a globe icon and explanatory text, and a configuration section for the 'eth0' interface. The configuration section offers 'DHCP' and 'Static' options, with 'Static' selected. Fields for IP Address, Netmask, Broadcast, Gateway, and DNS are filled with suggested values. A checkbox for 'Don't show me the wizard at logon' is present, along with 'previous', 'next', and 'cancel' buttons. The footer contains 'Event Viewer' and 'Data Storage Software V6 - All rights reserved'.

Initial Setup Wizard

IP address

These are the settings of your network interface you are connected to at the moment. The gateway and DNS will be needed for NTP server which will be set (if you wish) in the next steps. If it's possible, the discovered values of these parameters are proposed to you in this form.

Interface eth0
Intel Corporation 82571EB Gigabit Ethernet Controller (rev 06)

DHCP

Static

IP Address:

Netmask:

Broadcast:

Gateway:

DNS:

Don't show me the wizard at logon

< previous next > cancel

Event Viewer:

Data Storage Software V6 - All rights reserved

Time zone settings

This function allows you to adjust time and date settings. Select time zone suitable for your location.

The screenshot shows the 'Initial Setup Wizard' window for 'DATA STORAGE SOFTWARE V6'. The current step is 'Time zone settings'. The interface includes a sidebar with navigation icons, a main content area with a globe and clock icon and explanatory text, and a configuration section with a 'Time zone' dropdown menu set to 'Europe/Berlin'. A checkbox for 'Don't show me the wizard at logon' is present, along with 'previous', 'next', and 'cancel' buttons. The footer contains 'Event Viewer' and 'Data Storage Software V6 - All rights reserved'.

Initial Setup Wizard

Time zone settings

This function allows you to adjust time and date settings. Select time zone suitable for your location.

Time zone:

Don't show me the wizard at logon

< previous next > cancel

Event Viewer:

Data Storage Software V6 - All rights reserved

Set time

This function allows you to adjust NTP server settings. You can define an NTP server (host name or an IP address). Select time zone suitable for your location. With the Continuous adjusting using NTP option enabled your system time will be monitored and corrected if the difference between the local time and the server time changes. Enabling this option is especially recommended when using domains.

The screenshot shows the 'Set time' step of the Initial Setup Wizard. The interface includes a sidebar with navigation icons, a main content area with a title 'Set time' and a descriptive paragraph. Below the text, there are two radio button options: 'Manual' and 'Use NTP'. The 'Use NTP' option is selected. Under 'Manual', there are input fields for 'New time' (23:33:30) and 'New date' (2010-05-10). Under 'Use NTP', there is an input field for 'NTP servers' (1.pool.ntp.org). At the bottom, there is a checkbox 'Don't show me the wizard at logon' and three buttons: '< previous', 'next >', and 'cancel'.

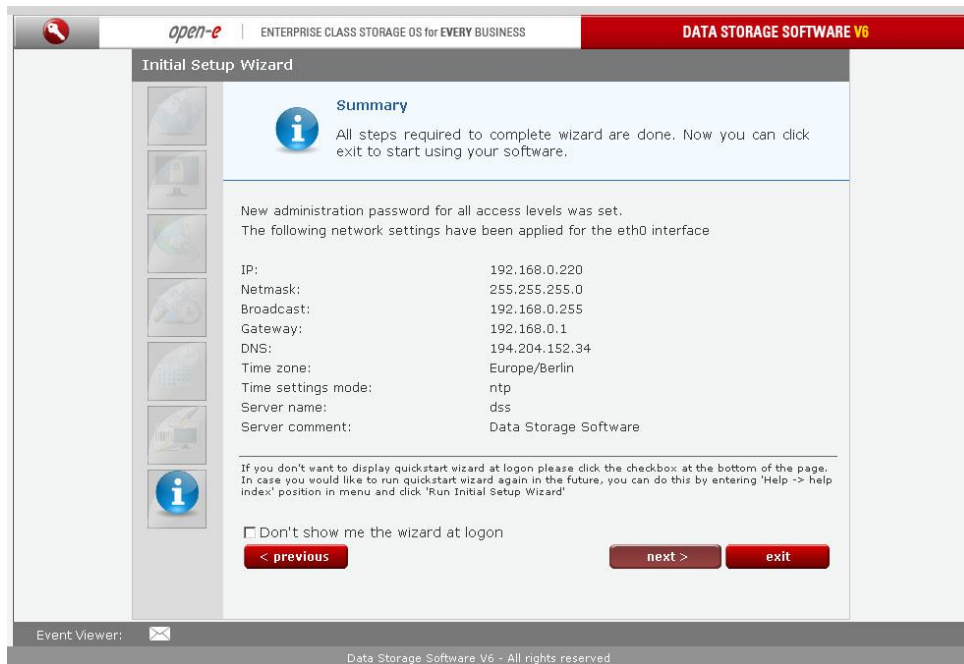
Server name

Please provide a server name to clearly identify your server on the network. Comment is optional, but it's nice to have one.

The screenshot shows the 'Server name' step of the Initial Setup Wizard. The interface includes a sidebar with navigation icons, a main content area with a title 'Server name' and a descriptive paragraph. Below the text, there are two input fields: 'Server name' (dss) and 'Comment' (Data Storage Software). At the bottom, there is a checkbox 'Don't show me the wizard at logon' and three buttons: '< previous', 'next >', and 'cancel'.

Summary

All steps required to complete wizard are done. Now you can click exit to start using your software.

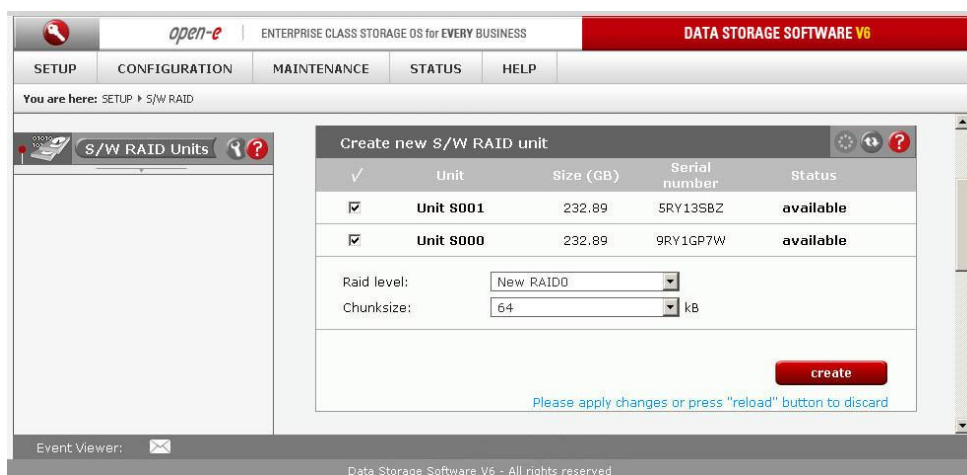


If you don't want to display quick start wizard at logon please click the checkbox at the bottom of the page. In case you would like to run quick start wizard again in the future, you can do this by entering 'Help -> help index' position in menu and click 'Run Initial Setup Wizard'. If you do not want to Initial Setup Wizard re-load at login to the DSS V6, please check the box for "Do not show me the wizard at logon 's

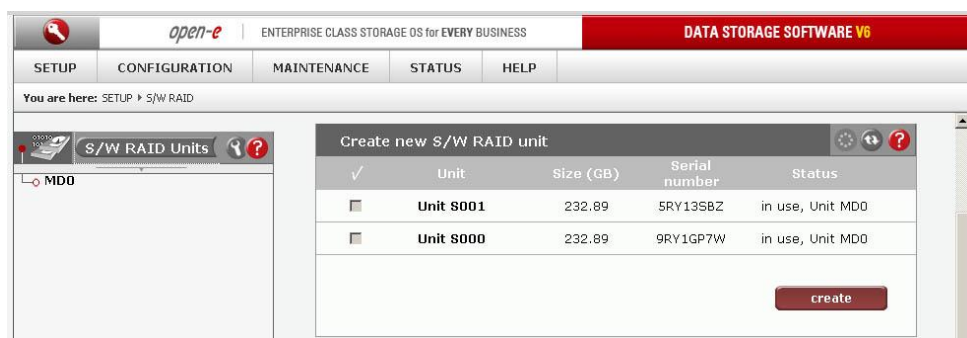
4.4. Create Disk Array

If your system has a hardware RAID, please create a RAID array in the RAID controller setup. Please refer to the RAID controller manual. You do not have to install drivers or RAID array monitoring and maintenance software. If your system has motherboard RAID functionality, please do not use it as it is not supported.

In case you want to use software RAID with single drives or even with installed hardware RAID, please go to the “S/W RAID” tree in the “Setup” menu first. You will find a list of available units. A unit can be a single hard disk or disk arrays if you have a hardware RAID in the system. Software RAID can be created for a single hard disk or hardware disk arrays. To create a software RAID, please select relevant units, choose the RAID level and click on the “create” button.

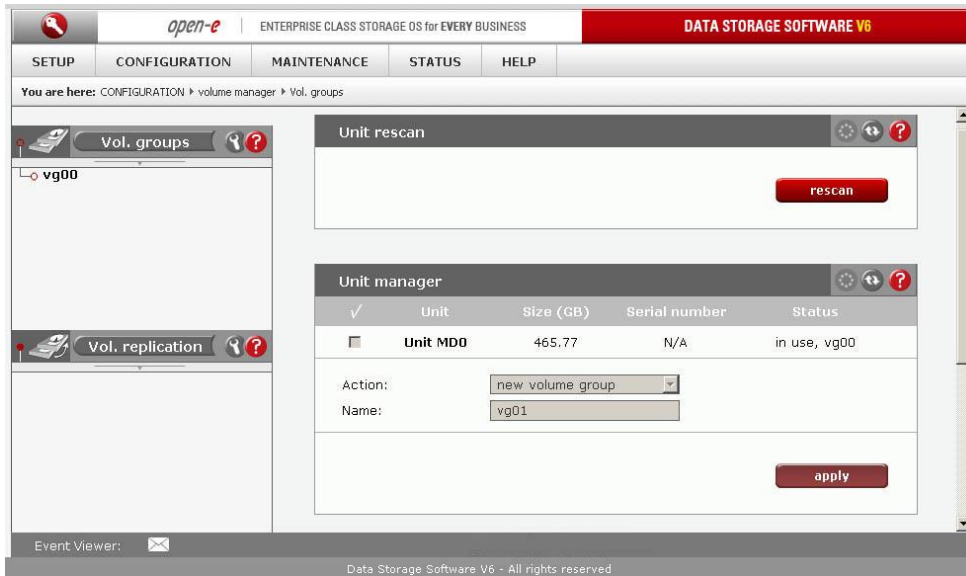


After clicking the “create” button, the status will change to “in use” and additional information describing the kind of disk array (e.g. MD0 is RAID 0) will be displayed.

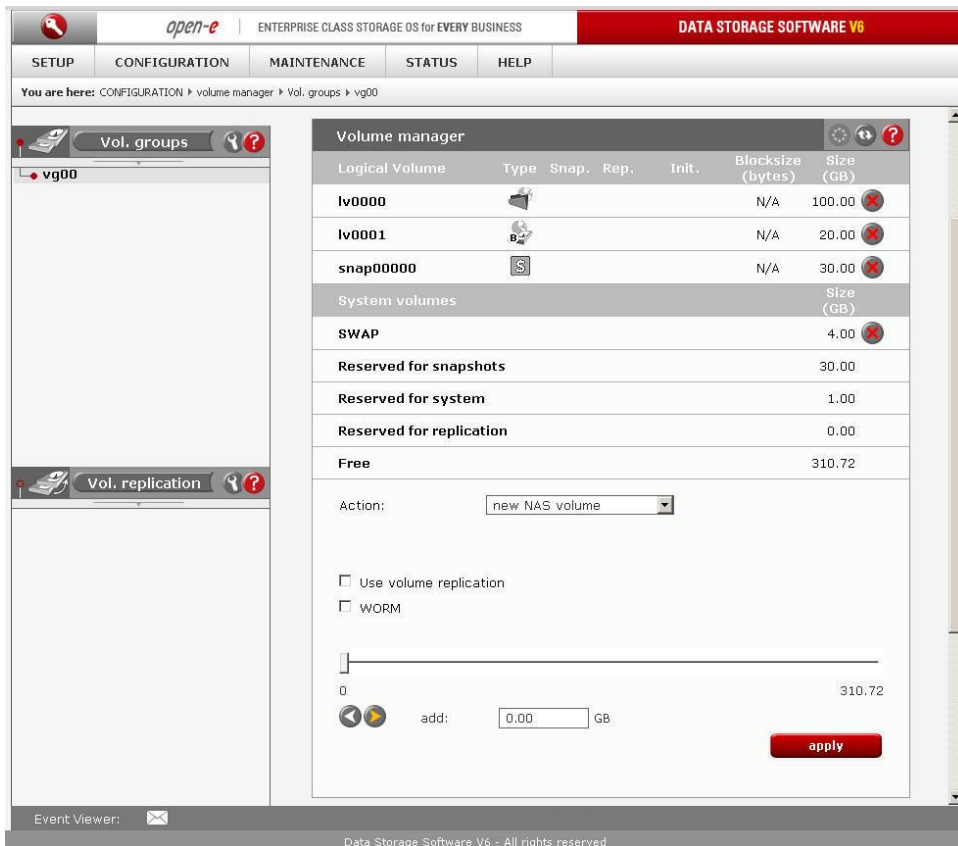


4.5. Adding Disk Array

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



- It is possible to combine two (or more) units into one volume group; by clicking on the right-hand side of the tree diagram on the volume group name, e.g. “vg00,” and using the “Volume Manager” function you can create a new NAS volume and/or a new iSCSI volume
- If you want to use the snapshot feature you should create a snapshot volume.



Next, using the “Volume Manager” function you can add a disk volume to a new LV, or increase the size of existing LVs (you cannot decrease LV size). To set the needed LV size just use the scrollbar. On the right side of it you will find a counter of available space. This function can be also used to reserve disk space for swap, snapshots, system and replication.

4.6. Creating Open-E Data Storage Software V6 shares

In the upper menu, please select “CONFIGURATION” followed by “NAS settings.” Here, you can select the authentication type. In smaller networks, authentication should be done via the used workgroup name, which has to correspond to the workgroup name of the client PC.

In the menu “CONFIGURATION” → “NAS Resources,” select “Shares” on the right-hand side of the tree diagram. Now create the first share.

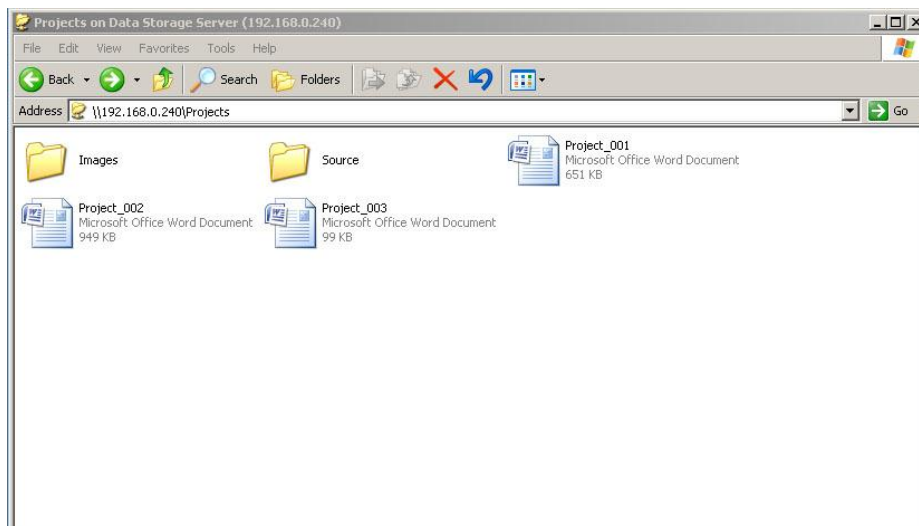
NOTE The workgroup/domain name that was configured in Open-E Data Storage Software V6 has to match the network settings. Otherwise, the configured shares will not be visible in the network environment.

NOTE If you made changes to the workgroup and server name in Open-E Data Storage Software V6 configuration, it can take some time until each workstation computer in the Windows network recognizes the new name.

4.6.1. Access to Windows Shares

Access to newly created shares is possible via the Windows Explorer. After entering the IP address of your Open-E Data Storage Software V6 (in this example \\192.168.0.240), all visible shares should be available immediately. Please keep in mind that sometimes it takes a few minutes until new shares or changes to become accessible.

When accessing invisible shares, you need to know the corresponding share name beforehand and attach it to the IP address with a backslash (\\):



Open-E supports Windows ACL (Access Control List) for read, write and execute options, based on the POSIX standard written by SGI.

Some examples on how to use ACL (with ADS or PDC authentication):

1. Deny access to a directory for every user (group):
 - a. create a new folder or select one of your existing folders (you must be the owner of the folder or a superuser to set ACL permissions)*
 - b. go to the "directory properties" (click the right mouse button on the directory then choose "Properties")
 - c. select a the "security" tab
 - d. choose the group "Everyone"
 - e. click the "Remove" button – only you and your group will have access to the selected directory **
 - f. click the "Apply" buttonNow only you have permissions to access this directory.

2. Allow full access to this directory for a group called "WORK":
 - a. make sure that the group WORK is created
 - b. in the security window click the "Add" button
 - c. click the "Remove" button (point 1)
 - d. select the group "WORK" (Advanced → Find Now will show you all users and groups) and click OK
 - e. enable Full Control in the "Allow" column,
 - f. click the "Apply" button.

3. Set "read only" permissions to the file for everyone:
 - a. create a new file (you must be its the owner or a superuser to set permissions)*
 - b. go to the permissions window,
 - c. select the group "Everyone",
 - d. leave only "read" permissions in the "Allow" column,
 - e. click the "Apply" button,
 - f. do the same for your group and yourself.Now the group "Everyone" has "read only" permissions to this file.

4. Changing the directory owner:
 - a. in the Open-E web interface go to Resources → shares
 - b. within the "Set Superuser" function select your user and restart the connection (Maintenance → Shutdown → Function Connections reset) or wait about 15 minutes,
 - c. go to the file properties for the directory in question (right mouse click on the directory and click the "Security" tab), and click the "Security" tab),
 - d. click the "Advanced" button
 - e. select the Owner tab
 - f. click the "Other Users or Groups" button select the user that will be the new owner (Advanced → Find Now will show all users and groups), click OK***
 - g. select the user from the list and click OK and the "Apply" button
 - h. click OK and re-open this window to refresh owner information

5. Allow full access to this directory for the user "BIG BOSS":
 - a. make sure that the "BIG BOSS" exists,
 - b. in the security window click the "Add" button
 - c. select the user "BIG BOSS" (Advanced → Find Now will show you all users and groups) and click OK
 - d. enable Full Control in the Allow column
 - e. click the "Apply" button

6. Allow "read" access to this directory for a group called "COMPANY":

- a. make sure that the group "COMPANY" exists
 - b. in the security window click the "Add" button
 - c. select the group "COMPANY" (Advanced → Find Now will show you all users and groups) and click OK
 - d. enable "Read & Execute" in the Allow column
 - e. click the "Apply" button
7. Create a "read only" directory with full access subdirectories for the group "ALL" (using inheriting permissions):
- a. create a folder called "ROOT",
 - b. go to the security window,
 - c. remove both "Everyone" and your group,
 - d. click the "Advanced" button and then the "Add" button,
 - e. select the group "ALL" and click OK,
 - f. change "Apply onto" to "This folder only",
 - g. within permissions leave only "Traverse Folder / Execute File" and "List Folder / Read Data" Click OK,
 - h. click the "Add" button once again and add "ALL" group,
 - i. This time change "Apply onto" to "Subfolders and files only" (this step will put any inherited permissions into effect),
 - j. select "Full Control" and click OK
 - k. click "Apply" to save the permissions.

With these settings users from the group "ALL" cannot remove the "ROOT" folder or make any changes to its contents. All new files/folders will be based on the access given by inherited permissions.

Example:

- file /ROOT/some_file.txt can be changed but cannot be removed,
 - directory /ROOT/directory cannot be removed but a users from the group ALL can create folders and files in this directory,
 - file /ROOT/directory/my_file.txt can be removed or changed by the group ALL (provided the inherited permissions have not been changed).
8. Inherited permissions
- If the file or directory has inherited permissions, all newly created subfolders will inherit the main folder permissions. All permissions can be changed. Please keep in mind that changing permissions in the main folder will trigger the same changes to the inherited permissions of any subfolder within.
9. UNIX Rights in Windows:
Folder permissions

Permissions	--x	r--	-w-	r-x	rw-	-wx	rw x
Traverse Folder / Execute File	√			√		√	√
List Folder / Read Data		√		√	√		√
Read Attributes	√	√		√	√	√	√
Read Extended Attributes		√		√	√		√
Create Files / Write Data			√		√	√	√
Create Folders / Append Data			√		√	√	√
Write Attributes			√		√	√	√
Write Extended Attributes			√		√	√	√
Delete Subfolders and Files							√
Delete							√
Read Permissions	√	√	√	√	√	√	√
Change Permissions							√
Take Ownership							√

Example application of ACL permission in a small company.

The company has 10 users

Name	Group	Position	Rights
Chris	Company	Director	All rights to everything
Robert	Company	Manager	All rights to everything besides the Director's home directory
Jennifer	Company	Secretary	Read access to the "DOCUMENTS" directory
Clint	Company Developers	Main Developer	Read and write to the "DEVELOPERS" directory read and write to the "CHANGES" directory
Brad	Company Developers	Developer	Read to „DEVELOPERS“ Read and write to „Changes“
Johnny	Company Developers	Developer	Read to „DEVELOPERS“ Read and write to „Changes“
Tom	Company Developers	Developer	Read to „DEVELOPERS“ Read and write to „Changes“
John	Company Graphics	Graphic Designer	Read to „GRAPHICS“ Read and write to „Changes“
Ben	Company Graphics	Graphic Designer	Read to „GRAPHICS“ Read and write to „Changes“
Bill	Company	Cleaner	Only access to his home directory

First create users and groups in your domain:

- run Start menu → Programs → Administrative Tools → Active Directory Users and Computers,
- click the right mouse button on your domain name and select New → User
- fill out all necessary fields to create user Chris,
- create all remaining users (back to point 2).
- click the right mouse button on your domain name and select New → Group
- create the following groups: Developers, Graphics, and Company,
- add users to groups - right mouse click on the Developers group. On the Members tab click Add. Add users to groups (groups Company, Developers, Graphics).

Connection to a Windows domain:

- go to the Open-E DSS V6 Web interface and select "Configuration" → "NAS settings"
- select ADS or PDC (depends on your system - if you have an NT4 Domain or Windows 2003 (with no Kerberos**** fix) then select PDC, else select ADS),
- enter your domain name - in PDC this will be the IP address and administrator password in ADS enter the full domain name (for example COMPANY.COM.DE),
- enter your domain/Kerberos server IP address,
- enter the name and password of an Administrator user account existing on your domain,
- click the "apply" button to connect the domain.

Creation of shares and set permissions:

- Create a Company share (go to the Open-E DSS V6 web interface → Configuration → NAS resources → Shares),
- set permissions for all users or select only company groups,
- go to the share \\YOUR_NAS_SERVER_NAME\\Company,
- create folders "WORK", "HOME" and "FORALL",
- set permissions for the folder WORK - right mouse click → properties → security.
- deny access for everyone (point 1), change the owner to the user Chris (point 4) with full access and add Robert with full access,

- g. create folders DEVELOPER, GRAPHIC, DOCUMENTS and CHANGES in the folder WORK,
- h. change the owner of the DEVELOPER directory to Clint (with full rights). Add "read only" access for the group Developers,
- i. add full access to the directory GRAPHIC for the group Graphics,
- j. change the owner of the CHANGES directory to Clint (with full rights). Add full rights or the groups Graphics and Developers,
- k. give Jennifer "read-only access" to the DOCUMENTS directory,
- l. in the HOME directory create a separate private directory for each user, change user (the owner and the directory names should be the same). Remove access for the Company group (point 1).
- m. add full access to the directory "FOR ALL" for the group Company.

* If you are a superuser all files and directories will be created as a local ROOT user.
 ** New directories with no inherited permissions do not have ACL permissions at the beginning - they have only standard UNIX permissions 0777 (Windows 2003 shows every special permissions in the normal view in the security window. Windows 2000 does not show any permissions in the normal view - only in the advanced view). To enable ACL for this directory, first select "Full Access" for everyone and click the "Apply" button. Subsequently do the same for your group and your user. Subdirectories created in this directory should have ACL permissions inherited from their parent. If permissions are inherited then the "ALLOW" column is grey. To disable permission just use the "Deny" column. If you change ACL permissions always check that a new set of permissions for one group does not interfere with permissions for other user/groups or any connections between these accounts. Windows 2003 handles such changes much better than Windows 2000.

*** This function is available in Windows 2003 - in other Windows versions only your user can be selected.

**** Kerberos is a server for distributing security keys. Normally it resides only on the domain but it can also be located on an external server. In Windows 2003 this server ignores specified key types, and authorization works only when entering the IP address, not the DSS V6 name.

4.6.2. Accessing Open-E Data Storage Software V6 shares under Linux

Please use the following command to mount an NFS share:

- `mount -t nfs 192.168.0.220: /share_name /local_mount_point`
 where:
 192.168.0.220 is the Open-E Data Storage Software V6 IP address

IMPORTANT NOTE:

On some versions of DSS V5 and older the path must be: `/share/share_name`

Please use the following command to mount an SMB share:

In a shell:

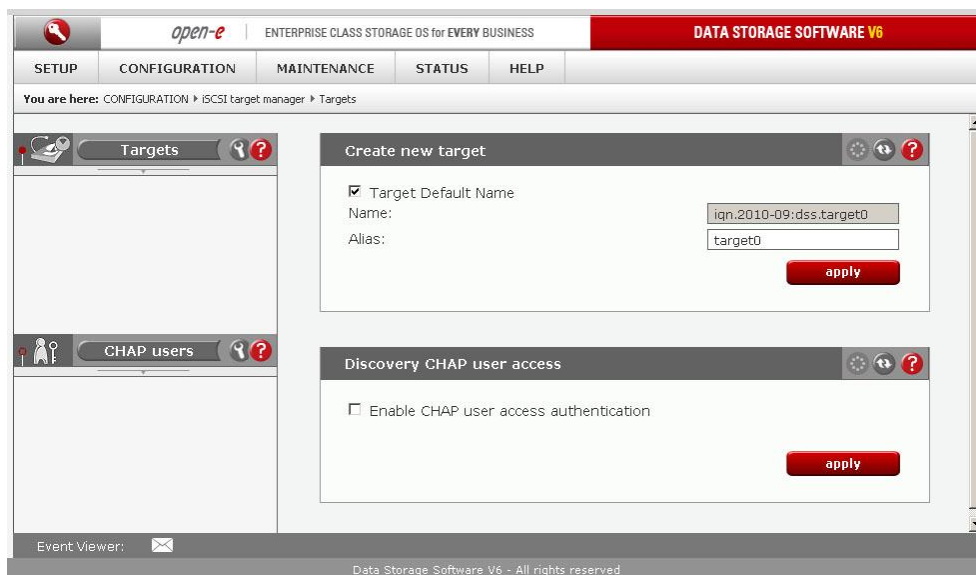
- `mount -t smbfs -o username=root,password=12345 //192.168.0.220/test /mnt-smb`
 where 'test' is the share name


In X-Windows:

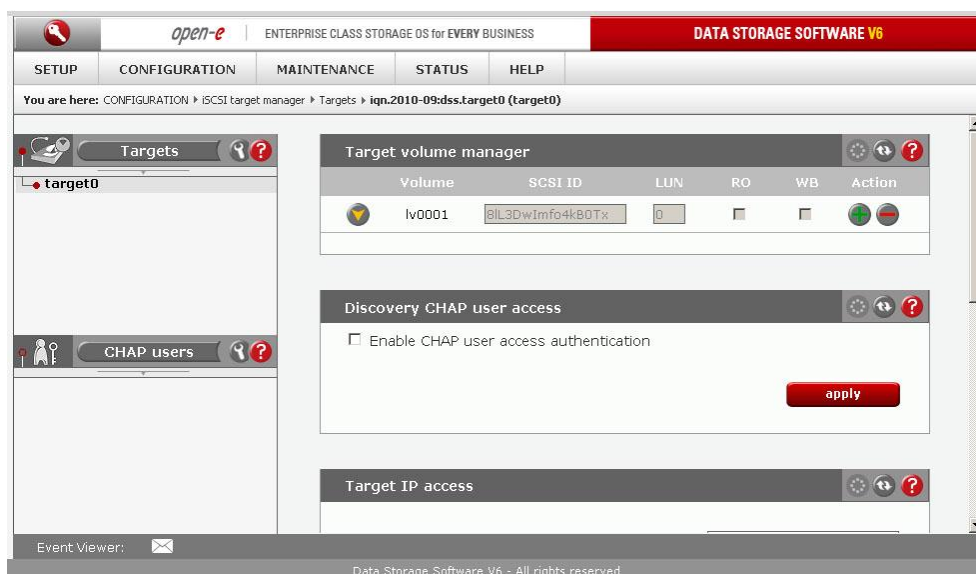
- `Smb://root@192.168.0.220/`

4.7. Creating Open-E Data Storage Software V6 iSCSI targets volume

After creating an iSCSI volume (see 4.5) , please choose “CONFIGURATION” → ” iSCSI target manager” → ”Targets, within the “Create new target” function click the “Apply” button to create a new iSCSI target.



Next in the “Targets” diagram click on the name of a target you have created (e.g. “target0”) and within the “Target volume manager” function click  button located under Action.



Using the “Target volume manager” function you can add “target volumes” only within the scope of one volume group.

NOTE You can create as many logical volumes and as many separate iSCSI volumes (LUNs) are required (see 4.5).

If you create 5 logical volumes, you may create one target with 5 LUNs or 5 targets with 1 LUN each, or 2 targets where e.g. 3 LUNs belong to the first target and the remaining 2 LUNs belong to the second one.

By clicking on “CHAP users” in the left hand pane you can manage secure access to logical volumes by inputting a CHAP user name and password (password must consist from 12 to 16 characters if you use

Microsoft iSCSI Initiator). Next in “Discovery CHAP user access” you can access to this target to specified CHAP users.

NOTE You If you enable CHAP user access authentication but do not select any users, nobody will have access to the target.

4.7.1. Configuring end user workstation

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

Correct software configuration consists of installing individual target volumes by adding new disk letters in the system (in Windows XP and 2003) or subfolders as with folders in the 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 an administrator to install the Microsoft iSCSI Software Initiator package,
- b. next, launch the iSCSI Initiator software,
- c. if you have Chap Users for Targets, click on “Discovery” tab, click the “Add” button, then enter your Open-E Data Storage Software V6 IP address,
- d. next click the “Advanced...” button and check “CHAP logon information,” next put in the User name and the Target secret which was given earlier in “Discovery CHAP user access” (WebGui DSS V6) and then two times click the “OK” button,
- e. on the “Targets” tab you will see name of available iSCSI targets, e.g. “iqn.2010.09:dss.target0”,
- f. click “Log On” button, and if you have entered a password, you need to repeat the steps outlined in point “e,” then press the “OK” button. The status for the chosen target will now change to “Connected,”
- g. next choose Settings → control panel → administrative tools → computer management → disk management,
- h. now all available iSCSI target drives will be displayed. In order to use them you have to format them and mount them in the system under a new disk letter.

NOTE Microsoft iSCSI Initiator ver. 2.08 does not support dynamic disks. Target password must consist of minimum 12 and maximum 16 alphanumeric characters. Please read the manual and release notes for the Microsoft iSCSI Initiator for more details, which you can also find on the Microsoft website.

NOTE Please do not ignore the time settings on the Open-E DSS V6 iSCSI target and the client stations. Those settings must be identical. Time can be synchronized using the “Set time function in the Web interface menu Setup.

5. Functions

5.1. Console display functions

While Open-E Data Storage Software V6 can be fully administered remotely through a secure Web interface, some of its functions can be accessed via the console. Open-E Data Storage Software V6 constantly displays the 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 a new IP address and a subnet mask. The DHCP server will be shut down.

CTRL+ALT+p

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

CTRL+ALT+i

By pressing a combination of left CTRL key, left ALT key and i, you can reset the original IP address (192.168.0.220) and bonding. During this process, the DHCP server support is turned off

CTRL+ALT+t

By pressing a combination of left CTRL key, left ALT key and t, you can run the Console Tools. A menu with the following functions will appear: Ping, DHCP Ping, Hardware info, Memory info, Time configuration, Language settings, Modify driver options, Console lock/unlock and Boot options.

CTRL+ALT+x

After pressing the left CTRL key, left ALT key and x, the console will display the Extended Tools.

CTRL+ALT+w

After pressing the left CTRL key, left ALT key and w, the console will display the hardware configuration.

CTRL+ALT+r

After pressing the left CTRL key, left ALT key and r, the console will display the RAID Tools

CTRL+ALT+f

After pressing the left CTRL key, left ALT key and f, the console will display the Fibre Channel Tools.

CTRL+ALT+h

After pressing the left CTRL key, left ALT key and h, the console will display hardware and driver information.

F1, F2 and F5

The function key F1 displays help information while F5 resets the console display to default. If you press the F2 key all network interface will be displayed. Shutting down and restarting

Shutting down and restarting

With Ctrl + ALT + K the Open-E Data Storage Software V6 host computer will be restarted, while CTRL + ALT + S will shut it down. Please be careful with this option if any users are connected.

5.2. Functions of Open-E Data Storage Software V6 via browser access

The following pages will thoroughly describe every function of Open-E Data Storage Software V6. The functions are divided according to menu options, which are located at the top of the screen

5.2.1. SETUP

Within this tab you can manage network interfaces, administrator settings, hardware RAID controllers, create disk arrays using software RAID, as well as find Fibre Channel, iSCSI initiator, hardware and GUI settings.

5.2.1.1 Network

5.2.1.1.1 Interfaces

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

Function: Server name

Server Name

Please enter a server name to clearly identify your server. This name is used primarily for **NAS protocols**, which makes it different from the **hostname**, which is primarily used internally (for **failover** and **volume replication** functions).

Comment

Here you can enter a short description of your server.

Server name and comment rules:

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

Function: Hostname

Hostname is one of the names used to identify this machine. It is primarily used for internal processes (most importantly, **Failover** and **volume replication**). It is different from the **server name** in that server name is primarily used for **NAS protocols**.

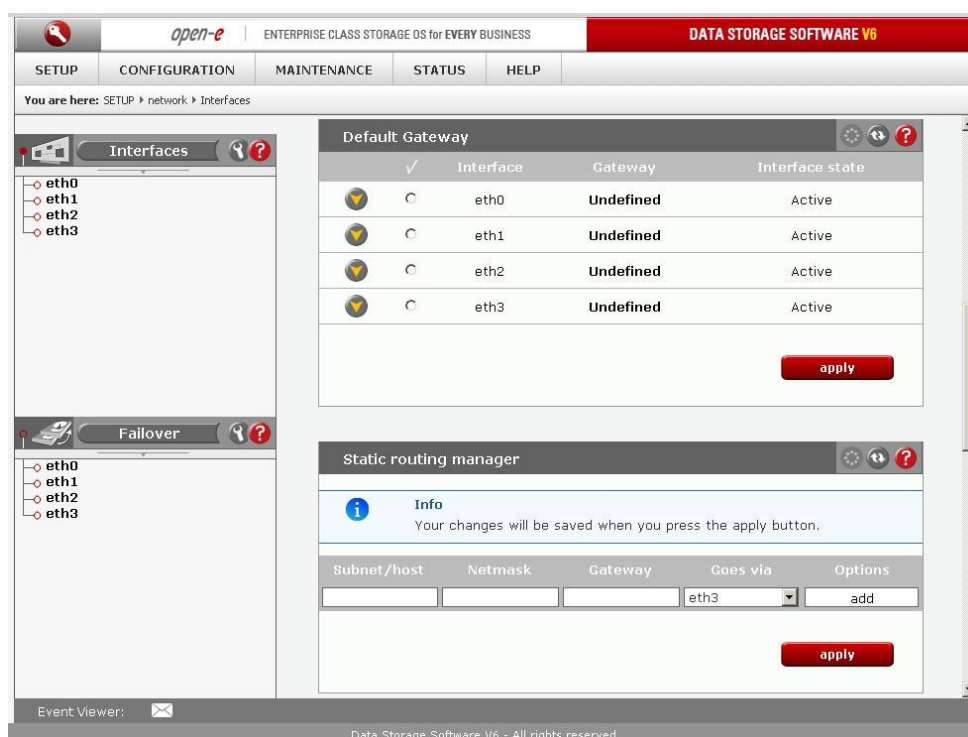
Hostname needs to start with a lowercase letter; the other characters may consist of lowercase letters, digits, minus signs and dots.

NOTE It is not possible to change the hostname while the failover service is running.

NOTE Changing hostname requires a reboot.

Function: DNS settings

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



Function: Default gateway

This function allows you to set a default gateway for the storage system. Only **one** default gateway can be set up at any given time.

NOTE The default gateway will become inactive if any of the following conditions are met:

- the interface with the default gateway has become part of a bonding interface,
- the interface with the default gateway has been removed or deactivated (concerns both physical and bonding interfaces).

NOTE It is possible to set the default gateway on an inactive interface. In such a case, the gateway will remain inactive until that interface is activated.

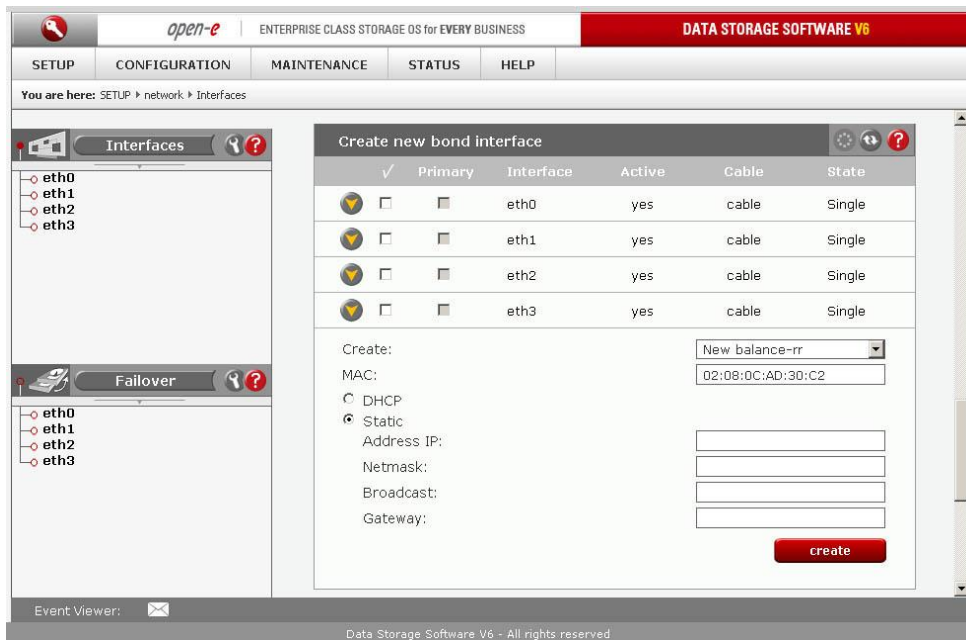
NOTE If the interface you are setting the default gateway on does not have any gateway defined (i.e. the Gateway field says Undefined), you will need to define a gateway first (under the text console, please press CTRL+ALT+N and select the interface followed by Gateway).

Function: Static routing

This function allows you to set up routes to subnetworks or hosts.

NOTE You can change the order in which the routing rules are applied by changing their positions on the list.

NOTE Setting up static routing may be necessary if you have several network interfaces in the same subnetwork. Please see the following document for more information: [CONFIGURATION SEVERAL NETWORK ADAPTERS IN THE SAME SUBNETWORK](#)



Function: Create new bond interface

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

In order to create a bonding interface:

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

NOTE In order to take advantage of bonding more than one ethernet NIC needs to be plugged into the box.

Please note that MAC addresses need to have a 02 prefix, for example:
02:xx:yy:zz:vv:nn

Each network interface is characterized by the following fields:

Primary

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

Interface

Network interface name.

Cable

Shows if a cable is connected to the NIC.

State

Characterizes the state of the network interface. NIC can be in a bonding or single state.

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

Transmission is based on the following equation: [(the source MAC address XOR'd with the destination MAC address) modulo (slave count)]. This selects the same slave for each destination MAC address. This mode provides fault tolerance and load balancing.

broadcast

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

802.3ad

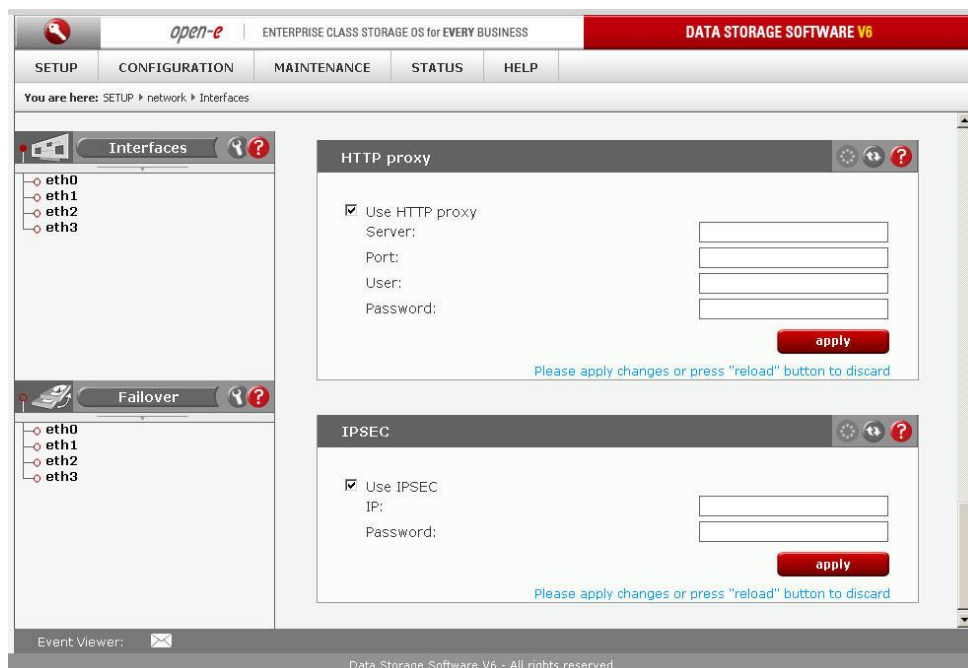
IEEE 802.3ad Dynamic link aggregation. Creates aggregation groups that share the same speed and duplex settings. Utilizes all slaves in the active aggregator according to the 802.3ad specification. Requires a switch that supports IEEE 802.3ad Dynamic link aggregation.

balance-tlb

Channel bonding that does not require any special switch support. The outgoing traffic is distributed according to the current load (computed relative to 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.

WARNING

Using cards from different manufacturers or cards based on different chipsets in one bond team may cause low performance or unstable behavior.



Function: HTTP proxy

With this function you can enable or disable an HTTP proxy.

To enable an HTTP proxy:

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

NOTE Proxy server name should not contain the `http://` prefix, port and the password. An example of a correct proxy server name: `www.server.com`.

Function: IPSEC

IPSEC provides strong authentication and encryption for the connections. It makes nearly impossible to eavesdrop or forge the transmitted data.

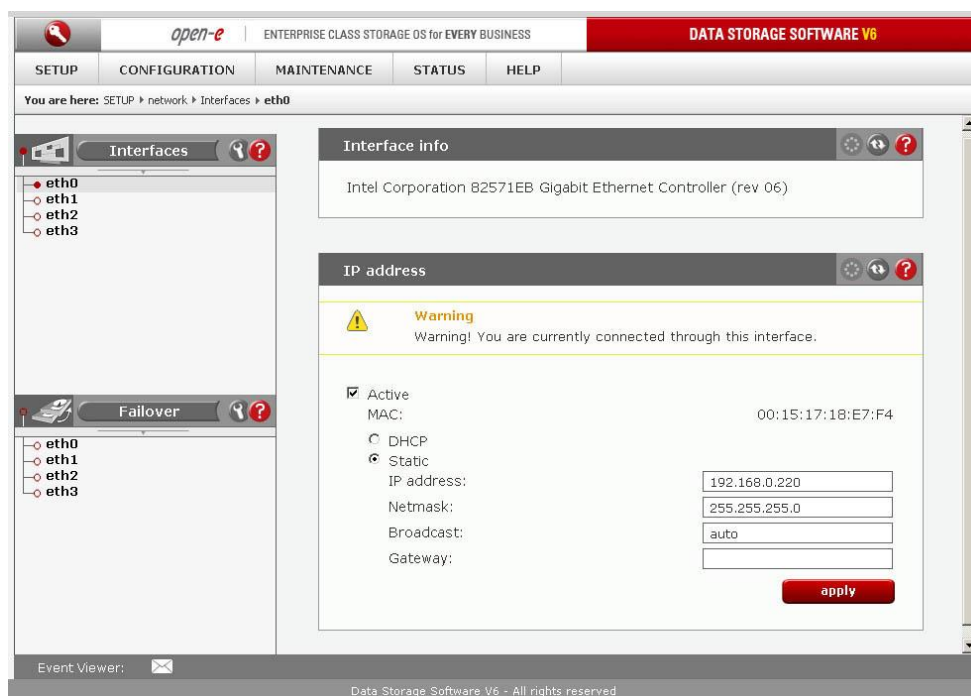
IP

IP address (optionally with a mask) of the clients that will be allowed to connect to the iSCSI target.

Password

The Password cannot contain spaces, special characters like ' ' ` or be empty.

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



Function: Interface Info

Here you can view network interface info.

Function: IP address

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

Activate

You can activate or deactivate a network interface by setting this checkbox.

DHCP / Static

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

Get DNS

If you want to dynamically get a DNS address, select **Get DNS**.

When using static configuration of network interface, enter:

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

If you set a new IP address, you will lose your connection with the server during activation 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 use the console to set a new IP address. In order to access servers in another subnet, you need to enter the address of the router as the gateway.

NOTE If you use an NTP server to maintain proper time and date, please make sure you have appropriate gateway and DNS settings.

When creating a bonding interface, a new branch called “bond0” will appear on the left hand side of the screen. By clicking on it you can modify bonding settings (see below).

The screenshot shows the open-e web interface with the following elements:

- Header:** open-e logo, "ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS", and "DATA STORAGE SOFTWARE V6".
- Navigation:** SETUP, CONFIGURATION, MAINTENANCE, STATUS, HELP.
- Breadcrumbs:** You are here: SETUP > network > Interfaces > bond0.
- Left Panel:**
 - Interfaces:** eth0, eth1, eth2 (bond0), eth3 (bond0), bond0.
 - Failover:** eth0, eth1, bond0.
- Main Content Area:**
 - Bond interface settings:**

Interface	Primary	Remove	Active	State
eth2	<input type="checkbox"/>	<input type="checkbox"/>	yes	cable
eth3	<input type="checkbox"/>	<input type="checkbox"/>	yes	cable

Bonding mode: balance-rr

Active

MAC: 02:05:F1:19:CE:C4

DHCP

Static

Address IP:

Netmask:

Broadcast:

Gateway:

apply
 - Remove bonding:** **remove**
- Footer:** Event Viewer: [icon] | Data Storage Software V6 - All rights reserved.

Function: Bond interface settings

Here you can configure bond interface settings.

To remove a network interface from bonding, tick the Remove field next to it followed by Apply. By unchecking the Active checkbox you can deactivate the bonding. Below, you can change the network configuration (static or dynamic [DHCP]) for the bonding interface.

Each network interface which belongs to a bonding interface is characterized by the following fields:

Primary:

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

when one slave has higher throughput than another. The primary option is only valid for active-backup mode.

Interface:

Network interface name.

State:

Shows if NIC is connected.

NOTE Interfaces which have Virtual IP configured are disabled.

WARNING Using cards from different manufacturers or cards based on different chipsets in one bond team may cause low performance or unstable behavior.

Function: Remove bonding

Here you can remove a bonding interface.

5.2.1.1.2 Failover

Here you can view a list of active interfaces (including bonding) for which you can configure virtual IP.

This section will not display interfaces which are inactive or already part of a bond.

The screenshot shows the 'Failover status' page in the open-e web interface. The page is divided into several sections:

- Global status:**
 - Service running: **ok**
 - Node status: primary/active
 - Ping node group status: **ok**
- Individual ping node status:**
 - IP: 192.168.2.107: **ok**
 - IP: 192.168.2.106: **ok**
- Failover services:**
 - iSCSI: off
 - NFS: **on**
- Communication via:**
 - bond0: **ok**
 - eth1: **ok**
- Task status:**
 - [NAS] MirrorTask: running
 - [COMMON] failover_data: running

The left sidebar shows a tree view of network interfaces, including eth0, eth1, eth2 (bond0), eth3 (bond0), and bond0. Below the tree view, there is a 'Failover' section with a similar tree view showing eth0, eth1, and bond0.

Function: Failover Status

This function displays failover statistics. These include:

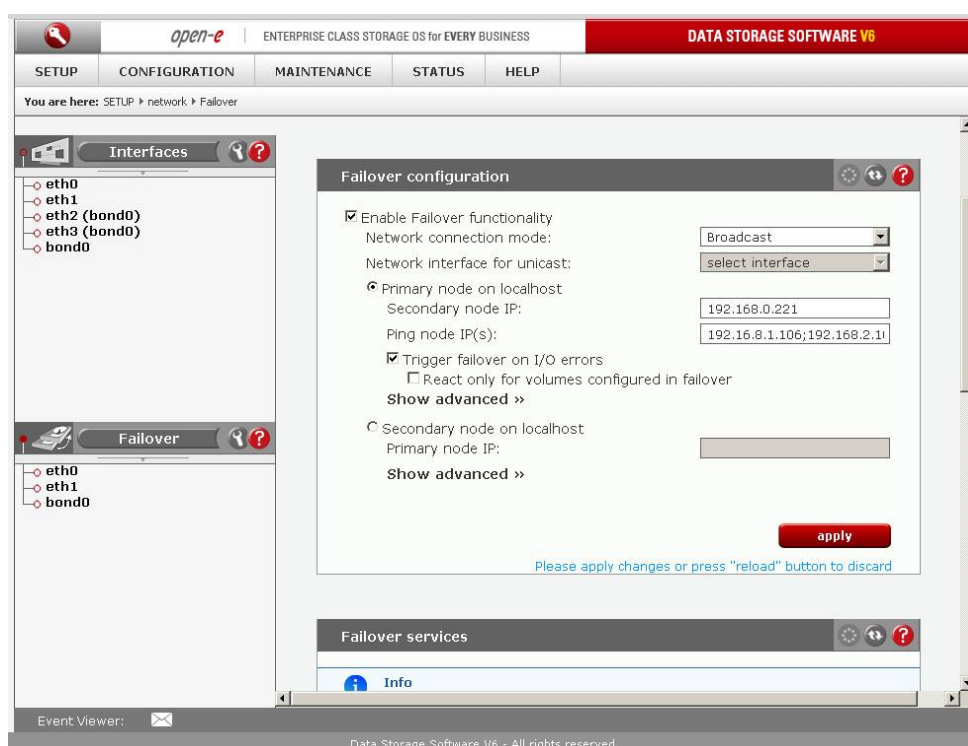
- failover initialization status (*service running*),
- node status (*primary/secondary* and *active/passive*),
- ping node accessibility status (*ping node*),
- connection status for the network interfaces configured to communicate within the failover,

Additionally, the function displays the statistics for the tasks taking part in the failover. The tasks are run exclusively on active nodes

NOTE Switching a node into active state causes the tasks to be executed and the virtual IP addresses to become operational.

NOTE Ping node configuration on the secondary node is only synchronized with the primary node when the failover service is active. This means that this configuration on the secondary node may become obsolete - please make sure the failover service is completely initialized before checking ping node status on the secondary node

NOTE Each node checks its connections with the ping nodes individually. If, for instance, a ping node is reachable from the primary node, but has the status "failed" on the secondary node, please make sure the secondary node has a clear path to the ping node.



Function: Failover Configuration

In this section you can configure your system as either the Primary or the Secondary node.

Network connection mode:

1. Broadcast - with this mode, management packets will be broadcasted,
2. Unicast - with this mode, management packets will be unicasted between specified IP addresses; please indicate the network interface via which these packets should be sent under Network interface for unicast. Please also make sure that this address is entered under the appropriate field (Primary node IP or Secondary node IP) on the other node.

Trigger failover on I/O errors:

The failover action will be triggered when an I/O error occurs on any volume.

React only for volumes configured in failover:

The failover action will be triggered only in case an I/O error will occur on the source volume added to failover configuration.

Primary node on localhost:

1. Secondary node IP - designates the IP of the system which has already been configured as the Secondary node.
2. Warn time - specifies how much time (in seconds) should elapse until the failover functionality issues a warning.
3. Dead time - sets the failure (death) detection time. The dead time directive is used to specify how quickly the system should decide if a node in a failover is dead.
Dead time must be smaller or equal to Init time.
4. Init time - sets the initial dead time detection interval. The init time parameter is used to set the time which elapses until a failover node is declared dead and the Secondary node becomes the Primary. If the Primary node becomes available before the init time runs out, the state of the failover nodes will not change.
5. Keep alive time - sets the failover keep-alive interval, i.e. the frequency at which failover state packets are sent between nodes.

Secondary node on localhost:

Primary node IP - designates the IP of the system which will be configured as the Primary node

Ping node IP:

A ping node is a pseudo-member of a failover. It is located outside of the failover and serves to answer ICMP requests from failover members. (this means the ping node **cannot** be either the primary or the secondary node). It is there to make sure the outside connection for the failover members remains online. For instance, if the ICMP request from the active node to the ping node fails, a similar request is performed by the passive node. If this one succeeds, the nodes perform the failover. The ping node needs only to be able to receive and reply to ICMP echo requests.

NOTE You can indicate up to 10 ping nodes. Please use comma as the semicolon (e.g. *192.168.0.1;192.168.0.2* etc.). Automatic failover will only take place if all ping nodes become unavailable to the primary node (e.g. the server does not take action when at least one ping node is reachable).

Serial port:

This options allows you to connect the node via a serial cable. Select the port to which the given cable has been connected.

Keep failover functionality after volume replication failure:

When activated, this option will allow automatic failover to be carried out after the volume replication between the nodes has been broken. Please note that in certain circumstances this may lead to data loss. Details can be found in the pop-up window which appears after ticking the checkbox for this option.

NOTE Warn, dead and init timers are started simultaneously.
Default values for timers:

- Warn time - 5000ms
- Dead time - 10000ms
- Init time - 15000ms
- Keep alive time - 1000ms

NOTE Configuring the cluster with low warn, dead and init timers may result in unstable behavior. Optimal timer settings are dependent on server hardware and network topology. It is recommended to test different timer settings for optimum performance.

NOTE Before starting failover please make sure the LUN configuration is the same on both nodes, i.e. that the LUNs are of the same size and type (block I/O or file I/O) and that

the LUN order is preserved.

WARNING: Inconsistencies in this area may lead to data loss!

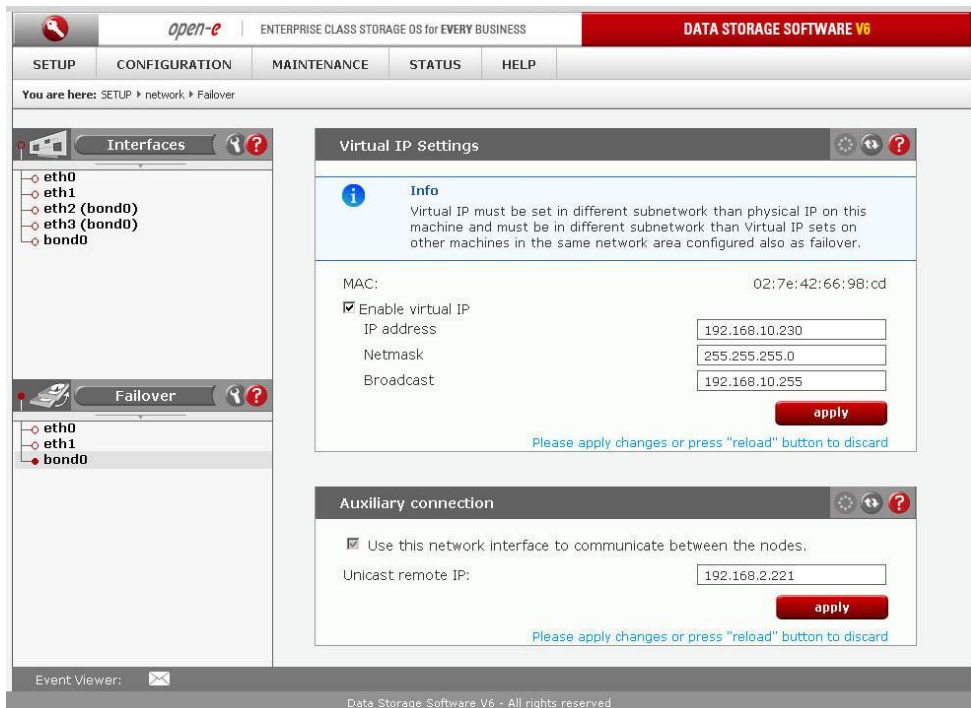
- NOTE** If you see the following error message: Service is under heavy load or the time values you have set are too low, you need to readjust the time values (they are dependent on your network connectivity and system load). When using low deadtime value, one of your nodes may wrongly assume the other one is dead, which will lead to a situation where both nodes are active (the so-called "split brain"). Please observe the following guidelines for deadtime value tuning:
- set the keepalive time to 1000 ms, it should be lower than warntime,
 - set deadtime to 60 s,
 - set warntime to half the deadtime value you wish to use,
 - observe the messages in the error box (lower left-hand corner of the Web GUI) or your email, if you have set up email notification for failover. If there are no relevant warnings, your proposed deadtime is fine and you can skip to the next step. Otherwise, set warntime to the longest time interval between the heartbeat packets as indicated in the error box. If the errors persist, increase warntime further. Please note deadtime always needs to be greater than warntime,
 - set deadtime to double the current warntime value,
 - set warntime to slightly less than deadtime.

Function: Virtual IP Settings

With this function you can view the MAC address and assign virtual IP settings for your chosen interface. The virtual IP is shared between the failover nodes. For example, *primary node* has the IP address *192.168.1.1*, while *secondary node*'s address is *192.168.1.2*. The virtual IP address is *192.168.1.3*. In this situation, the *primary node* (the active node) will be available under *192.168.1.3*. In case of *primary node* failure, the *secondary node* will take over the *192.168.1.3* address to ensure all connections can continue to the same address.

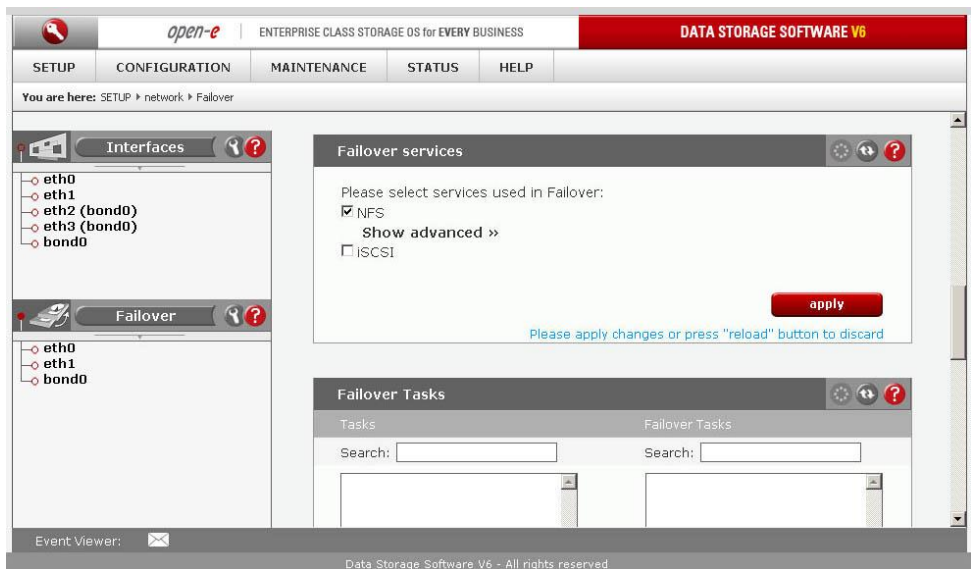
NOTE Virtual IP needs to be unique within its network environment and the same on both nodes (Primary and Secondary). Changes to virtual IP settings can be done only when failover configuration is not active.

NOTE Virtual IP can be in a different subnet work than the node IPs, e.g. *192.168.2.1* as opposed to *192.168.1.1* and *192.168.1.2*.



Function: Auxiliary connection

This option is used to configure the interfaces on which the Failover sends UDP broadcast/unicast traffic. At least two interfaces needs to be specified. If you have chosen to use unicast when configuring failover, you need to indicate the IP address for the network card on the other node which should respond to the packets sent from the interface you are currently configuring.



Function: Failover services

In Failover Services it is possible to choose which services will be used in Failover. You can choose one or both of the following options:

- NFS - for NFS service,
- iSCSI - for iSCSI service.

After choosing NFS service it is possible to use NAS tasks in Failover Tasks module. Shares located on these logical volumes have to have enabled only NFS service. All other services for these shares will be deactivated.

For NFS failover service system need to create `failover_data` volume, that will be used for storing internal NFS daemon settings. After `failover_data` volume is created, system automatically creates new replication task called `failover_data`. This task is automatically associated to Failover Tasks. As long as NFS service is enabled it is not possible to remove this task from Failover Tasks.

System automatically chooses the volume group where `failover_data` volume will be created. That volume needs to contain local hard drives only and have at least 2GB of free space.

The volume group can be also set manually through advanced settings. Only Volume groups with at least 2GB of free space and containing local hard drives will be shown on the list.

In case there is no space left on volume groups, there are two solutions:

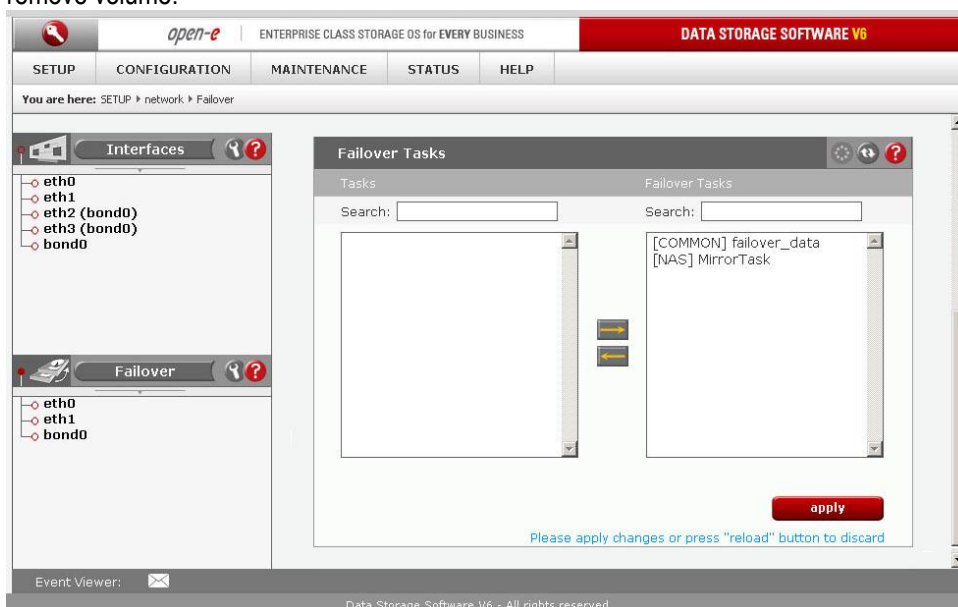
- add new hard drive and create new volume group,
- delete reserved pool on one of existing volume groups and create a new reserve pool with a smaller size

A few words about `failover_data` replication task:

- It's not possible to manually create `failover_data` task from `failover_data` volume.
- `failover_data` volume and `failover_data` task can be created only through Failover services.
- If a task already exists, it will be replaced by the new one.

For `failover_data` volume it's possible to:

- switch between primary and secondary mode,
- manage (start/stop) associated with it replication task,
- clear meta data,
- remove volume.

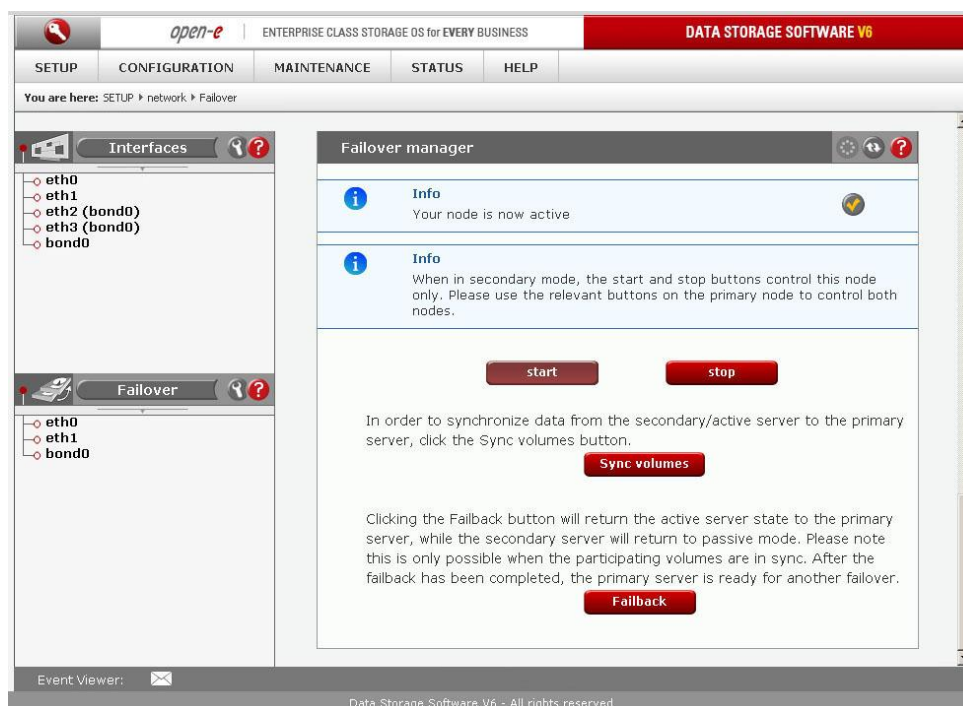


Function: Failover Tasks

This function displays all available tasks for iSCSI volumes. In order to select a task for a failover, move the selected task to the **Failover Tasks** column. Please note any changes can only be made before the failover is initialized in the **Failover manager** function. To remove a task during failover operation, go to **CONFIGURATION** → **Volume manager** → **Replication tasks**.

NOTE The function is available only on the primary node.

NOTE You can only move a task to the Failover tasks column when the secondary node has an appropriate reverse task set up.



Function: Failover Manager

This function allows you to stop, run or change the operation mode for the given server.

On the *primary* server the **Start/Stop** action buttons control both servers. On the *secondary* server, they control the secondary server only.

In order to delegate (switch) active server state to the passive server click the Manual failover button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process.

In order to synchronize data from the *secondary/active* server to the *primary* server, click the **Sync volumes** button.

Clicking the **Failback** button will return the *active* server state to the *primary* server, while the *secondary* server will return to *passive* mode. Please note this is only possible when the participating volumes are in sync. After the failback has been completed, the *primary* server is ready for another failover.

NOTE It is only possible to switch the operation mode from *active* to *passive* (by clicking the **Manual failover** or the **Failback** button) when all volumes taking part in the failover tasks (see the **Failover Tasks** function) are consistent and the replication connection has been successfully established. It is not possible to perform the manual failover/failback operations when the replication process is uploading data.

5.2.1.1.2.1 Failover quick start guide

- Set up volume replication on the primary and the secondary servers. Please note that all volume replication restrictions apply here (volumes cannot be larger than 16TB, they need to be exactly of the same size and need to have the same I/O method selected [file I/O or block I/O]).

- Start the replication task on the primary server.
- On both systems, create a new target with exactly the same::
 - Target Name (Example: iqn.2008-11:mirror01)
 - SCSI-ID (Example: dF5NU3iE8ZAcK2XQ)
 - LUN# (Example: 0)
 and assign the failover volume as the LUN by clicking on the green "+" button.

NOTE Every time you disconnect a LUN from its target (clicking on "-" button) the SCSI-ID and LUN# will be reset to the original default values. So, before clicking the "+" button again, please copy & paste the SCSI-ID and LUN# from the primary to the secondary systems. Make sure the primary and secondary system have an identical settings. Different settings can cause some initiators to lose connection to the target during failover.

- Go to **SETUP -> Failover**. For both systems, click **Enable failover functionality** in the **Failover configuration** box. On the primary node, select **Primary node on localhost** and enter the secondary node IP and ping node IP, while on the secondary node select **Secondary node on localhost** and enter the primary node IP. Also, select your preferred connection mode (unicast/broadcast).
- The options available under the **Show advanced** tag are described in the Failover configuration help text.
- From the GUI menu of both systems, enter **SETUP -> Failover -> [interface_designation]** and configure the network interfaces to be used for failover purposes.
- Please note that one of the interfaces in each system needs to hold the *virtual IP*. In addition, it needs to have two auxiliary connections. The interface with the virtual IP can also serve as one of the auxiliary connections. To enable virtual IP, select an interface card and click on the **Enable Virtual IP** box. Next, enter the virtual IP address, net mask and the broadcast, followed by **apply**. Please note virtual IP needs to be the same on both nodes. To set up an auxiliary connection, click **Use this network interface to communicate between the nodes** in the **Auxiliary connection** box, followed by **apply**.

Important note on setting virtual IP addresses

Please set the virtual IP address in a different subnetwork than the physical IP address. If you wish to have more than one pair of Failover systems, please set each pair in a different subnetwork.

- In the Failover services box on the primary node select iSCSI, then click on apply.
- In the Failover tasks box on the primary node select the failover task (i.e. the volume replication task you have set up earlier) and click on the right arrow button, then click on apply.
- Click on start in the Failover manager box on the primary system.
- Check the status in the Failover status box; all values must show as OK; also, the source and destination volumes should be Consistent.
- Connect to the mirror target with an iSCSI initiator using the virtual IP previously assigned.
- Create a partition and format the iSCSI disk.
- Test the failover function by clicking the Manual failover button in the Failover manager box on the primary system.
- Afterwards, the secondary system should show up as active in the Failover status box. The primary node will report the status suspend.
- In order to test failback, first click on Sync volumes button in the Failover manager box on the secondary system.
- Please check the task status in the Failover status box. It must read Consistent.
- Click on the Failback button in the Failover manager box on the secondary system.
- Afterwards, the primary system is back in active mode and ready for another failover

NOTE Please note that in order to receive failover email notifications, you need to set up email service in **SETUP -> Administrator -> E-mail notification**.

5.2.1.1.2.2 NFS Failover quick start guide

- Set up NAS volume replication on the primary and the secondary servers. **Please note** that all volume replication restrictions apply here (volumes cannot be larger than 16TB, they need to be exactly of the same size).
- Start the replication tasks on the primary server.
- On the primary node create shares on the volumes that are used for replication tasks. During the failover start, the corresponding shares will be automatically created on the secondary node.

NOTE If you have manually created shares on the secondary node, make sure that they have exactly the same configuration as the corresponding shares on the primary node.

- Go to **SETUP -> Failover**. For both systems, click **Enable failover functionality** in the **Failover configuration** box. On the primary node, select **Primary node on localhost** and enter the secondary node IP and ping node IP, while on the secondary node select **Secondary node on localhost** and enter the primary node IP. Also, select your preferred connection mode (unicast/broadcast).
- The options available under the **Show advanced** tag are described in the Failover configuration help text.
- From the GUI menu of both systems, enter **SETUP -> Failover -> [interface_designation]** and configure the network interfaces to be used for failover purposes.
- Please note that one of the interfaces in each system needs to hold the *virtual IP*. In addition, it needs to have two auxiliary connections. The interface with the virtual IP can also serve as one of the auxiliary connections. To enable virtual IP, select an interface card and click on the **Enable Virtual IP** box. Next, enter the virtual IP address, net mask and the broadcast, followed by **apply**. Please note virtual IP needs to be the same on both nodes. To set up an auxiliary connection, click **Use this network interface to communicate between the nodes** in the **Auxiliary connection** box, followed by **apply**.

Important note on setting virtual IP addresses

Please set the virtual IP address in a different subnetwork than the physical IP address. If you wish to have more than one pair of NFS failover systems, please set each pair in a different subnetwork. This limitation will be removed in the future.

- In the **Failover services** box on the primary node select **NFS**, then click on **apply**.
- In the **Failover tasks** box on the primary node select the failover task (i.e. the volume replication task you have set up earlier) and click on the right arrow button, then click on **apply**.
- Click on **start** in the **Failover manager** box on the primary system.
- Check the status in the **Failover status** box; all values must show as *OK*; also, the source and destination volumes should be *Consistent*.
- Mount the share using the virtual IP previously assigned. Use UDP connection.
- Test the failover function by clicking the **Manual failover** button in the **Failover manager** box on the primary system.
- Afterwards, the secondary system should show up as *active* in the **Failover status** box. The primary node will report the status *suspend*.
- In order to test failback, first click on **Sync volumes** button in the **Failover manager** box on the secondary system.
- Please check the task status in the **Failover status** box. It must read *Consistent*.

- Click on the **Failback** button in the **Failover manager** box on the secondary system.
- Afterwards, the primary system is back in *active* mode and ready for another failover.

NOTE Please note that in order to receive failover email notifications, you need to set up email service in **SETUP -> Administrator -> E-mail notification**.

5.2.1.2 Administrator

Function: Administrator access

Use this function to restrict access to server administration.

HTTPS port

You can change the https port here (the default setting is 443).

Allow access IP

Here you can assign IP addresses (separated by a semicolon) that are allowed to access the server administration webpage. When left blank, the field indicates no restrictions.

Lock console without password

Disables access to the console (and LCD keys).

Lock console with password

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

Unlock console

Unrestricted access to the console.

NOTE Please exercise caution with this function if all computers in the network receive IP addresses via DHCP: current IP can be replaced by a new one after the lease ends. Please pay special attention when using the Lock console feature - you will not be able to reset to default administrator access from the console if you make a mistake while setting the IP address. If you need to restore the default settings, please access the console, press CTRL+ALT+X to enter the Extended Tools view and select Restore default administrator settings.

The screenshot displays the open-e web interface. At the top, there is a navigation bar with the open-e logo, the text "ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS", and a red header "DATA STORAGE SOFTWARE V6". Below this is a menu with "SETUP", "CONFIGURATION", "MAINTENANCE", "STATUS", and "HELP". The "SETUP" menu is expanded to show "You are here: SETUP > administrator".

The main content area contains two configuration panels:

- Administrator access:** This panel has a title bar with a refresh icon, a back icon, and a help icon. It contains the following fields:
 - HTTPS port: A text input field containing "443".
 - Allow access IP: A text input field.
 - Radio buttons for console access:
 - Lock console without password
 - Lock console with password: (with an empty text input field next to it)
 - Unlock console
 - An "apply" button at the bottom right.
- Administrator password:** This panel also has a title bar with a refresh icon, a back icon, and a help icon. It contains the following fields:
 - Admin. Level: A dropdown menu currently set to "Full Access".
 - Enter pass: A text input field.
 - Confirm pass: A text input field.
 - An "apply" button at the bottom right.

At the bottom of the interface, there is an "Event Viewer" icon and a footer that reads "Data Storage Software V6 - All rights reserved".

Function: Administrator password

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

Enter password

Please enter your new password.

Confirm password

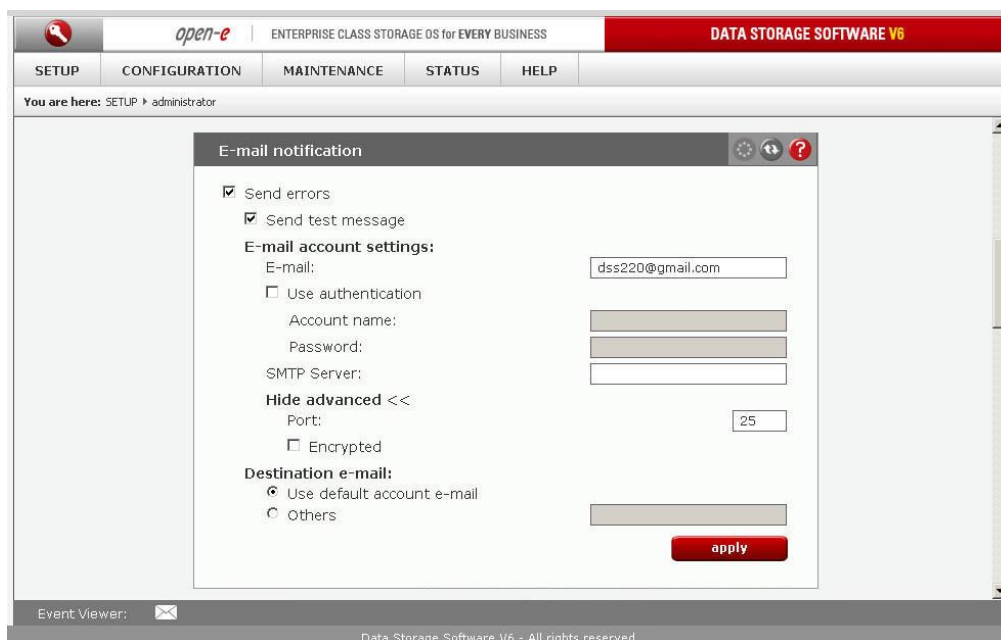
Please retype your new password.

Passwords cannot contain:

- special characters such as ' " `
- spaces.

The default password for each account is *admin*.

NOTE Passwords are case-sensitive. For security reasons, the password you enter will not be displayed. Please make sure the Shift and Caps Lock keys are not pressed.



Function: E-mail notification

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

E-mail

E-mail address from which notifications will be send.

Account name

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

Password

Password for the account provided above.

SMTP

SMTP server name.

Destination e-mail

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

Port

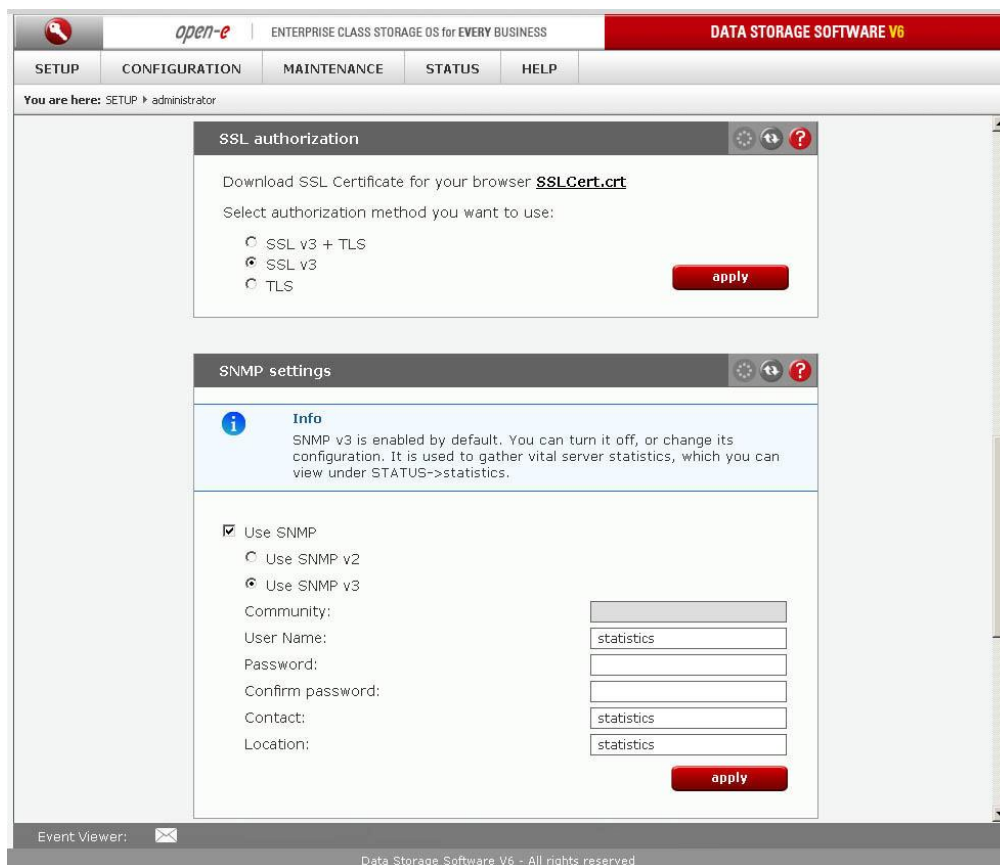
Port number for the SMTP server.

If you want to send a test message, please check the Send test message option.

If you want to encrypt e-mail notifications, check the Encrypted option. E-mail notifications are encrypted with the TLS protocol.

Function: SLL certificate authority

To ensure the identity of the web administration tool by letting your web browser automatically check it whenever you connect for administration tasks, click the SSLCert.crt link to download and install the certificate into the certificate management system of your browser.



Function: SNMP settings

This function enables you to configure access over the SNMP protocol in versions 2 or 3.

With SNMP enabled you receive a wealth of information (CPU usage, system load, memory info, ethernet traffic, running processes).

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

SNMP in version 3 has an encrypted transmission feature as well as authentication by community string and password.

SNMP in version 2 does not have encrypted transmission and authentication is done only via the community string.

The community string you are setting can contain up to 20 characters, while the password needs to have at least 8 characters.

Links to SNMP clients:

<http://www.muonics.com>

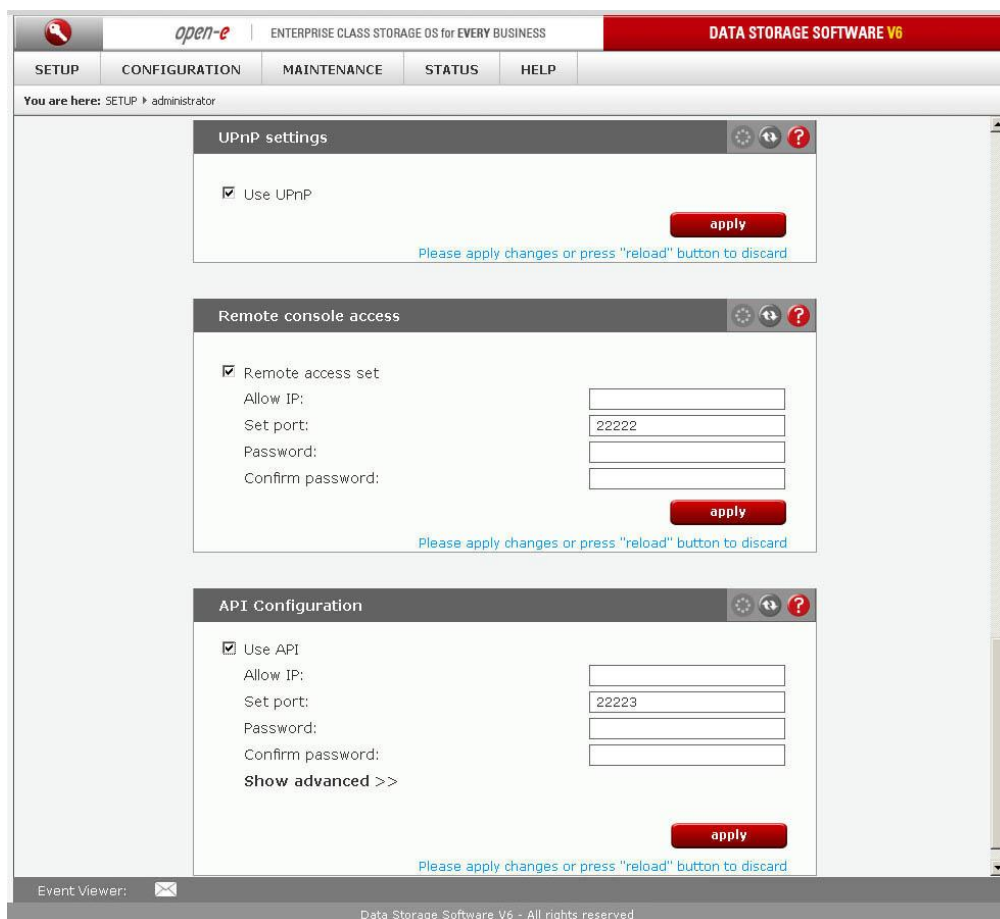
<http://www.mg-soft.com>

NOTE Our storage system supports SNMP protocol in MIB-II standard. List of MIBs:

- mib-2.host
- mib-2.ip
- mib-2.tcp
- mib-2.udp
- mib-2.interfaces
- mib-2.at
- system.

Function: UPnP settings

This function enables UPnP protocol for device notification.



Function: Remote console access

Using this function, you can manage console tools remotely via the SSH protocol (secure shell). The default user is called `cli` and cannot be altered. The password, however, can be changed.

Allow IP

Here you can assign IP addresses (separated by a semicolon) which are granted remote access to the server. When left blank, the field indicates no restrictions.

Set port

The default port is 22222 for security reasons, seeing as high-number ports are invisible to port scanners. You can change the setting only to a port within the 1024-65535 range. You cannot indicate ports already in use.

Password

Password length is 8 characters minimum. Be sure to use strong passwords.

Confirm password

Please retype your new password.

Password cannot contain:

- special characters such as ' " ` ^ & \$ # [] \ | * ,
- spaces.

To connect to the server from Linux/MacOSX systems use:

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

where:

- option: -2 indicates the SSH protocol version used for connection,
- option: -p indicates the remote access port,
- option: -l indicates the user (the user needs to be `cli`),
- option: address_ip indicates the address of the server you want to connect to.

You will be asked for the remote access password you have entered on the server.

To connect to the server from Microsoft Windows, download the free SSH client ([Putty](#)):

- in the Host Name (or IP address) field please enter the IP address of the server,
- in the Port field please enter the same port as in the server GUI (default 22222),
- in the Protocol field please select SSH,
- in the category: Connection -> Data -> Auto-login-username please enter: cli,
- in Terminal -> Keyboard -> The Function Keys and keypad please select VT100+,
- go back to the Session category, enter the session name in the Saved Sessions field and click on the Save button,
- next click on the newly saved session, click Open and enter the password. (If you have not entered the Auto-login-username, Putty will prompt you for a username, so please enter cli).

Function: API configuration

Using this function, you can administer the system remotely with the SSH (Secure SHell) protocol. Default user is 'api' and cannot be changed - however, you can change the password.

Allow IP

You can assign IP addresses (separated by a semicolon) which are granted access to server configuration. Empty field means no restriction.

Set port

Default port is 22223 for security reasons, because high ports are invisible to port scanners. You can change it to any port within the 1024-65535 range, except for the ports which are already used.

Password

Minimum password length is 5 characters. Be sure to use strong passwords.

Confirm password

Please retype your new password.

Passwords cannot contain:

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

Example syntax of an SSH command:

```
ssh -2 -p 22223 -l api ip_address command
```

- option: -2 sets the version of the ssh protocol used for the connection,
- option: -p sets the connection port,
- option: -l sets the user (the user must be api),
- option: ip_address sets the address of the server you want to connect to,
- option: command; use help to display all available commands.

You will be asked for the password you entered in the API configuration menu.

It is also possible to authenticate without a password by using the key generated after clicking **generate and download**, or downloading a previously generated key by clicking **download**. On GNU/Linux systems make sure that the key file has read only rights for the owner (400).

Example syntax of an SSH command using a key:

```
ssh -i path_to_the_downloaded_key -2 -p 22223 -l api ip_address command
```

- option: -i sets the path to the downloaded key file,
- option: -2 sets the version of the SSH protocol used for the connection,
- option: -p sets the connection port (default: 22223),
- option: -l sets the user (the user must be api),
- option: ip_address sets the IP address of the storage server you want to connect to,
- option: command; use 'help' to show all available commands.

NOTE Every time the generate and download button is pressed, it generates a new key and the old key expires.

5.2.1.3 H/W RAID

Please note that your RAID controller must be supported by the Open-E Data Storage Software V6 in order to function properly.

Function: 3ware manager

This function enables you to enter the 3ware RAID administration. Press the **3DM** button to enter. Please make sure that the time difference between the remote computer and the server is not greater than 30 minutes. Otherwise the following error will appear:

You have been logged out due to inactivity or Cookies are disabled.

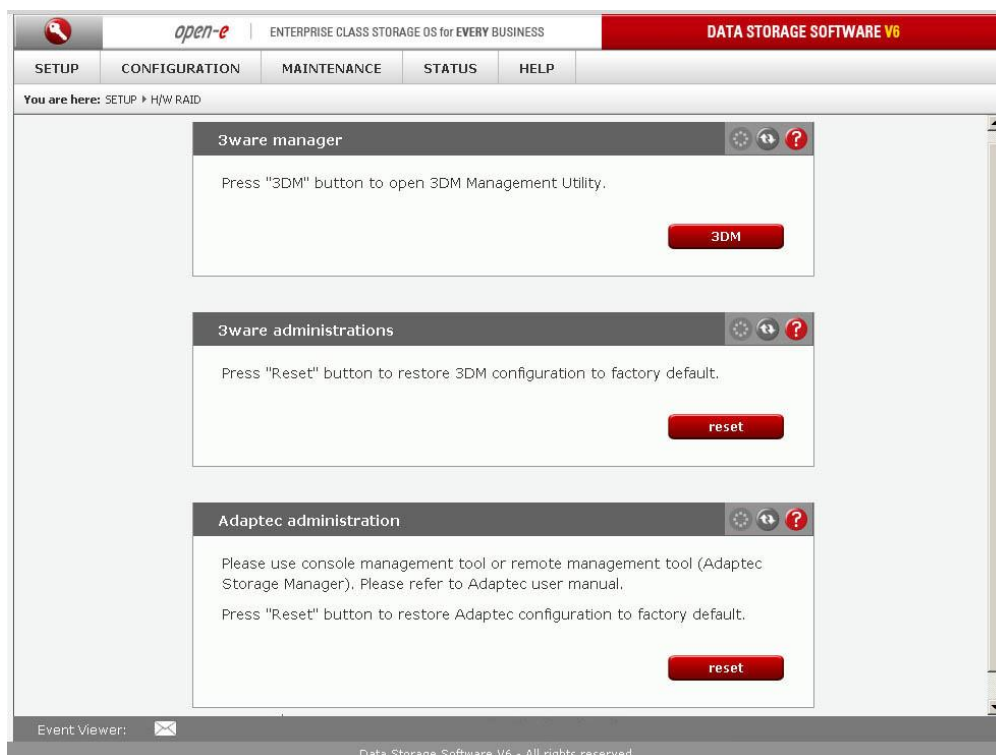
Default login details:

- Login: Administrator
- Password: 3ware

NOTE Scheduling tasks are not supported for 7000/8000 controllers.

Function: 3ware administrations

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



Function: Adaptec administration

If an Adaptec RAID series controller is installed, you can use a command line tool in the console tools (*press F1 in the console to list available keyboard shortcuts*) or the Adaptec Storage Manager tool (which should have come with your Adaptec controller). When connecting remotely to the Adaptec Storage Manager tool, the default user and password are raid.

Reset

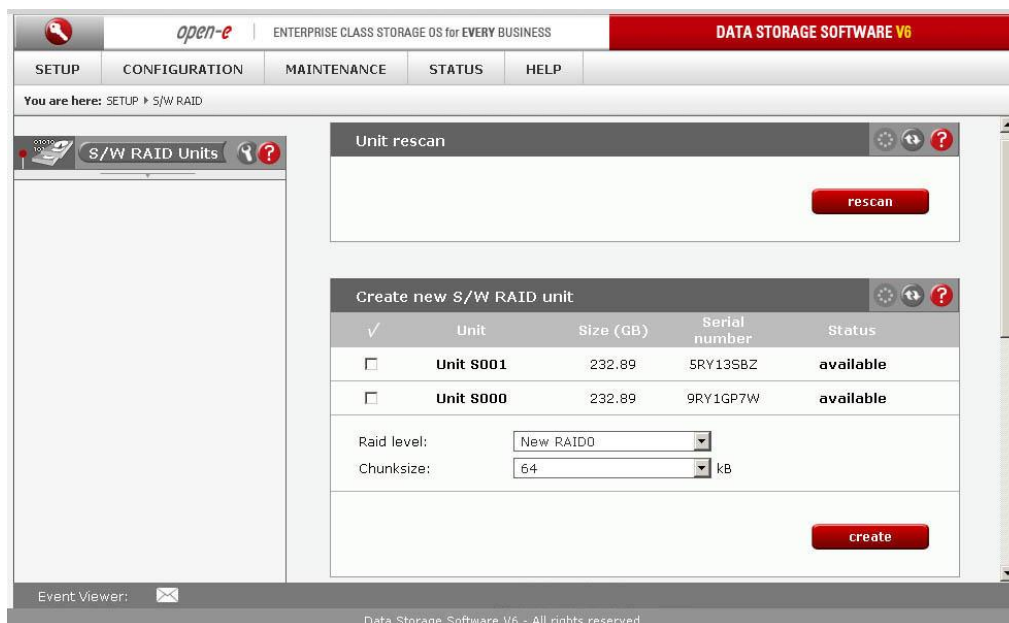
Restores factory default settings for the Adaptec Storage Manager.

NOTE It is not recommended to change the Agent system base port number (in the Agent system port menu) in the Adaptec Storage Manager, as this may cause other services to malfunction.

5.2.1.4 S/W RAID

Function: Unit rescan

This function rescans your system for new units.



Function: Create new S/W RAID unit

With this function you can create software RAIDs from out of free (unused) units. If you want to create RAIDs from used units which have already been in use, you need first to delete the contents of these units in the console first, however please be aware this will ERASE all data from the units. To create a RAID select corresponding units, then use the RAID type and Chunk size menus to configure the new RAID. After setting all required parameters press the Create button.

Allow to create degraded mode

This option allows you to create a RAID1 with one unit, a RAID5 with two units or a RAID6 with three units, even if the minimal number of units is not met.

NOTE Chunk size /- the minimal portion of data that is written at a time.

Available RAIDs:

RAID 0: a stripe array; requires [minimum] 2 units. In RAID 0 you can set a chunk size from within 4k ÷ 256k. The destination size of the RAID array will be the sum of the size of each drive in the array

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

RAID 5: a stripe + parity algorithm array; requires [minimum] 3 units with the same capacity. You can choose the following from the drop-down menus: (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 the array

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

RAID 5 (layout) parity-algorithm

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

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

Left-Asymmetric Algorithm

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

Right-Asymmetric Algorithm

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

Left-Symmetric Algorithm

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

Right-Symmetric Algorithm

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

RAID6: a stripe + parity algorithm array; requires minimum 4 units with the same capacity. You can choose the following from the drop-down menus: (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 the array

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

RAID 6 (layout) parity-algorithm

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

Left-Asymmetric Algorithm

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

Right-Asymmetric Algorithm

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

Left-Symmetric Algorithm

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

Right-Symmetric Algorithm

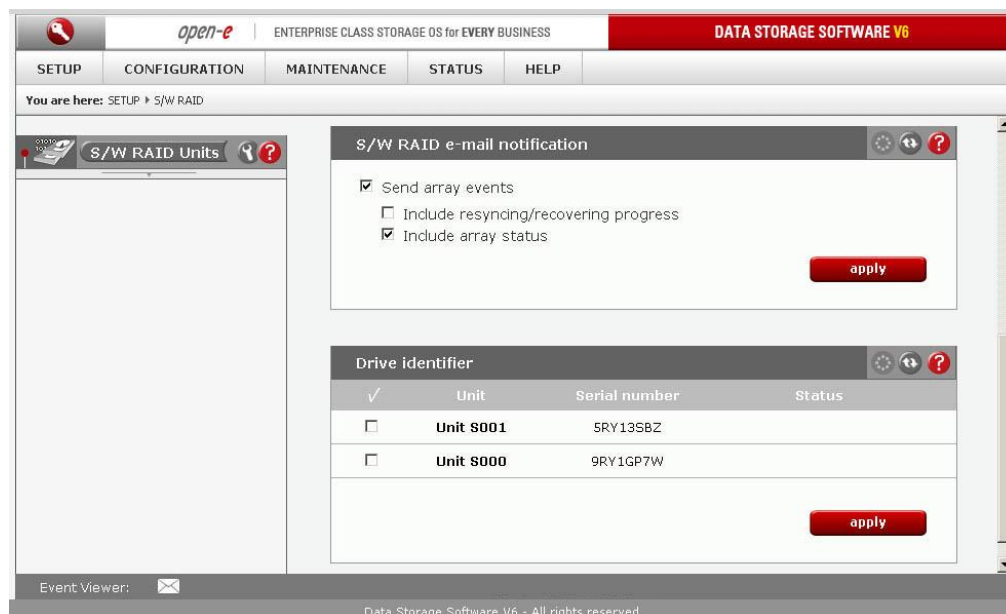
Unit S0	Unit S1	Unit S2	Unit S3
Parity	Parity	0	1
3	Parity	Parity	2
4	5	Parity	Parity
Parity	6	7	Parity
Parity	Parity	8	9

To remove a RAID which has been previously added to a volume group, please enter the Extended Tools in the console (press F1 in the console to list keyboard shortcuts) and first delete the volume

group for the RAID in question (the respective function is Delete content of units in the Extended Tools menu). This will enable the Remove button. Otherwise simply press the Remove button.

NOTE You can add spare units to RAID1, RAID5 and RAID6 arrays. Please remember that after creating a RAID, the Info function will show the synchronization progress. Until this process is finished all actions performed on this array will be slower.

TIP If units come from the same storage (Fibre Channel or iSCSI), efficiency will drop when using software RAID with them. To achieve optimal performance, you should use units that come from at least two different storages (for Fibre Channel or iSCSI connections).



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, RAID degraded). In order to do so please check the Send array events box.

NOTE In order to be able to send array events via e-mail you must first enable "E-mail notification" in "SETUP" → "Administrator".

Include resyncing/recovering progress

This enables information about resync/rebuild progress to be sent via e-mail, provided that any such processes are taking place. E-mail will be sent for every 20% done.

Include array status

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

Function: Drive identifier

This function has been designated to assist you in finding disks in your NAS server cage. If you have a hardware RAID installed, the whole RAID array is shown as a single drive, so you may not be able to determine which drive unit represents which disk when using the S.M.A.R.T. tool or a hardware RAID management tool (depending on the manufacturer of the RAID controller).

When you click on the Apply button, the appropriate disk will start reading and you can determine which disk it is by watching the disk-activity LEDs. For this function to operate properly there should be no other activity in progress on the hard drives in question.

NOTE Identification will stop automatically after one minute if you do not stop it before (by unchecking the appropriate option and clicking Apply). Using this function during normal operation is not recommended and will cause your server to slow down.

After clicking on “MD0” in the left hand pane a tree with the available software RAID units will be displayed.

The screenshot shows the open-e Data Storage Software V6 interface. The top navigation bar includes tabs for SETUP, CONFIGURATION, MAINTENANCE, STATUS, and HELP. The current page is 'S/W RAID Units' under the 'MD0' section. The 'Manager' section displays a table of RAID units with columns for Unit, PR, F, R, ST, Serial number, and Size (GB). Below the table is an 'apply' button. The 'Info' section shows a table of attributes and values for the RAID array. Below the info section is a 'Remove software RAID unit' section with a 'remove' button.

Unit	PR	F	R	ST	Serial number	Size (GB)
Unit S001	0	<input type="checkbox"/>	<input type="checkbox"/>	A *	5RY13SBZ	232.89
Unit S000	1	<input type="checkbox"/>	<input type="checkbox"/>	A *	9RY1GP7W	232.89

attribute name	value
RAID LEVEL	RAID0
Creation time	Thu Jun 18 23:23:06 2009
Update time	Thu Jun 18 23:23:06 2009
Array size	465.77 GB
Chunk size	64K
State	clean

Function: Manager

In this function you can manage the RAID array.

Available operations:

RAID 0:

The design of this RAID does not permit management of it. No units can have failed status. If any of them fail, the whole array will be disabled.

RAID 1:

- To mark a unit as Faulty check the appropriate option (in the F column) and click Apply.
- To delete any unit from an array check the appropriate option (in the R column) and click on Remove
-

RAID 5:

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

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

RAID 6:

- To mark a unit as Faulty check the appropriate option (in the F column) and click Apply,
- To delete any unit from an array check the appropriate option (in the R column) and click Remove,

RAID notation:

- PR - **priority in array** - represents the priority of a spare unit which will be added to the array if another unit is marked as Faulty. The higher the priority, the sooner will this unit be used,
- F - **faulty** - unit can be removed from the array,
- R - **hot remove** - unit can be removed from the array without shutting down the system,
- ST - characterizes the **state of a unit** in the array, which can be:
 - A - **active**,
 - * - **unit number within the array**,
 - S - **spare or spare rebuilding** - this means that the unit is free and can be added to an array or is free and currently rebuilding.

Limitations:

- It is not possible to set any unit as Faulty, if the matrix is degraded or during resync/rebuild.
- When using RAID 1 and RAID 5, it is possible to mark only one disk from among the active disks as faulty. This regulation is not valid for spare units in an array.

NOTE Only one disk from within the active group in an array can be marked as Faulty or Removed

Function: Info

Using function you can obtain the following information: Creation Time, RAID Level, Array and Device Size, Update Time and State.

NOTE It is recommended to perform as few disk operations as possible during array syncing or rebuilding.
Syncing/rebuilding status will be shown on the fly /- there is no need to refresh the page manually.

Function: Software RAID unit remove

This function allows you to remove a software RAID unit (MD[#]).

NOTE This function is available only when no volume group is created on the corresponding MD[x]. If you want to remove a software RAID unit along with a volume group, please use the Extended Tools in the console and remove the volume group first.
Ctl-Alt-X
Select Delete content of units

5.2.1.5 Fibre Channel

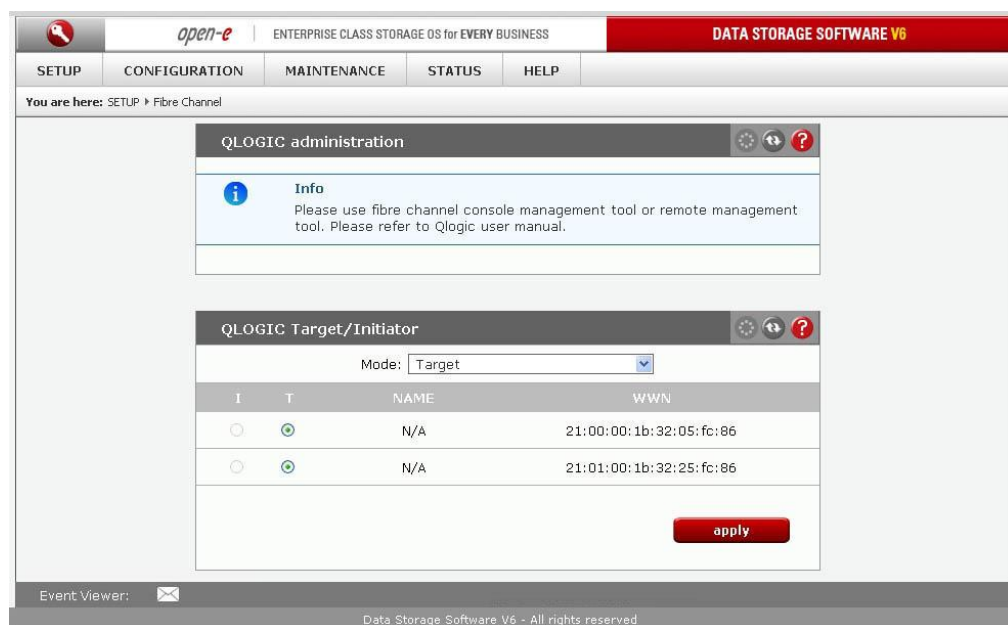
When a Fibre channel controller is detected you will find here utilities and options specific to the hardware.

Function: QLOGIC administration

If you have a QLA23xx or QLA24xx series controller installed, you can use the command line tool in the console tools (*press F1 in the console to list keyboard shortcuts*).

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

NOTE Using controllers from two different families (2Gb and 4Gb family) at the same time is not permitted.



Function: QLOGIC Target/Initiator

Here you view a list of all connected QLOGIC HBA's.

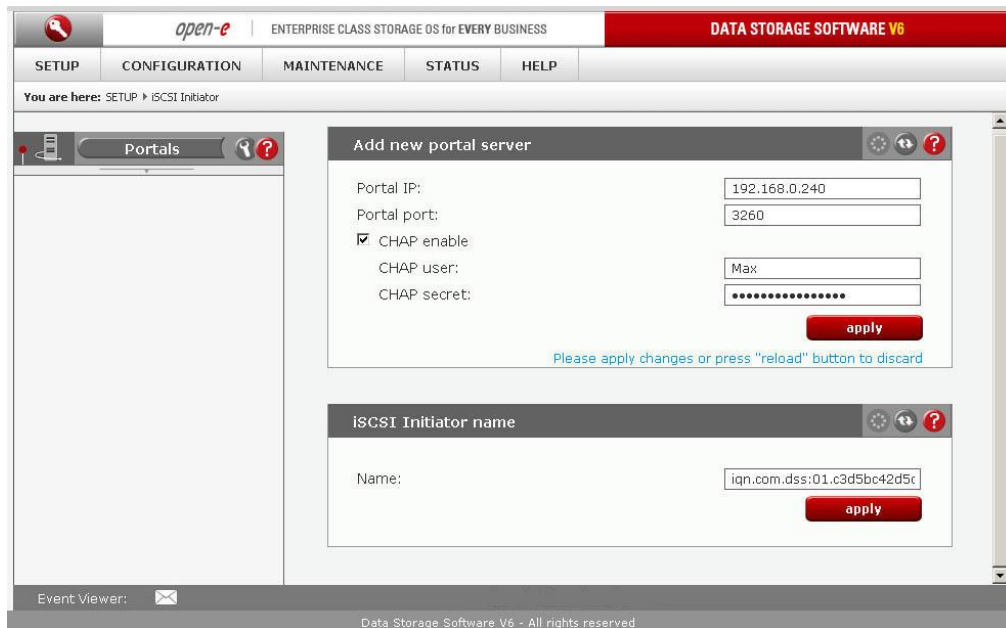
I / T

These options allows you to designate a QLOGIC HBA as either an initiator, or a target.

NOTE If your QLOGIC HBA does not belong to the QLA22XX or QLA23XX product family then the target option (I/T) will be unavailable.

5.2.1.6 iSCSI Initiator

Here you can view a list of all connected iSCSI server portals. Click on the portal IP to manage portal targets or remove a portal



Function: Add new portal server

With this function you can connect to a remote iSCSI server and add it as a new portal server. It will be visible in the iSCSI Initiator on the left. Following options are available:

Portal IP:

Please enter the IP address of the iSCSI server.

Portal Port

Enter the Port on which the iSCSI server runs (the default setting is 3260)

CHAP enable

If you want to enable CHAP user authentication please check the CHAP enable box and enter the CHAP username and its secret.

Function: Initiator iSCSI name

Here you can change the name and the alias for iSCSI initiator name.

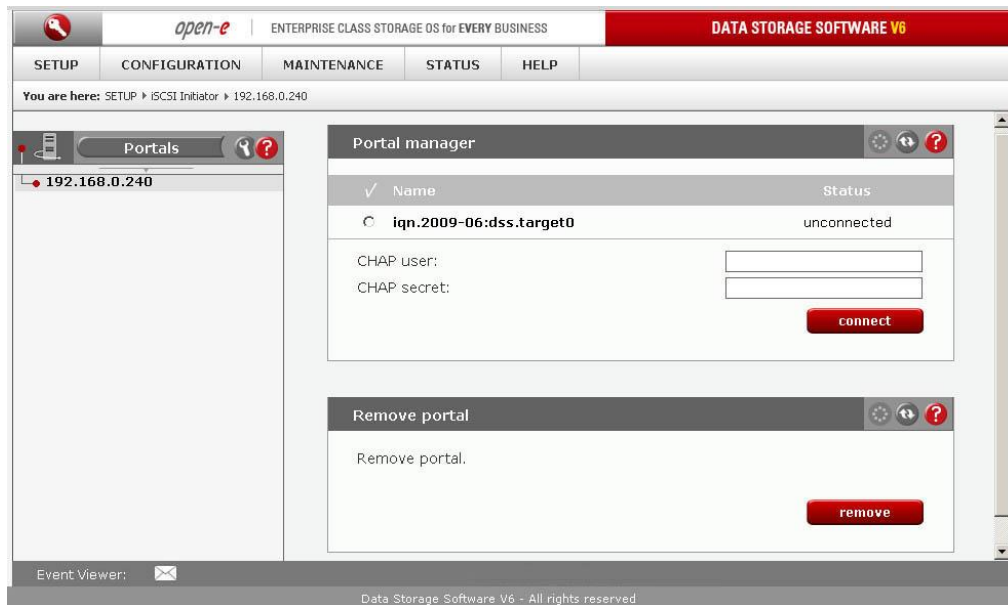
Name

iSCSI initiator name may contain alphanumeric characters: ' . ' : ' ' - ' and is considered case-insensitive. Every character entered will be converted to lower case. No spaces and no underscores are permitted.

Function: Portal manager

This function displays available targets for the selected iSCSI portal server. In order to connect to an iSCSI target, select its name and click the **Connect** button. If target authentication is enabled, then enter the CHAP username and its secret. Connected targets will be available in **CONFIGURATION -> Volume manager** as units. You can manage them as you would local units.

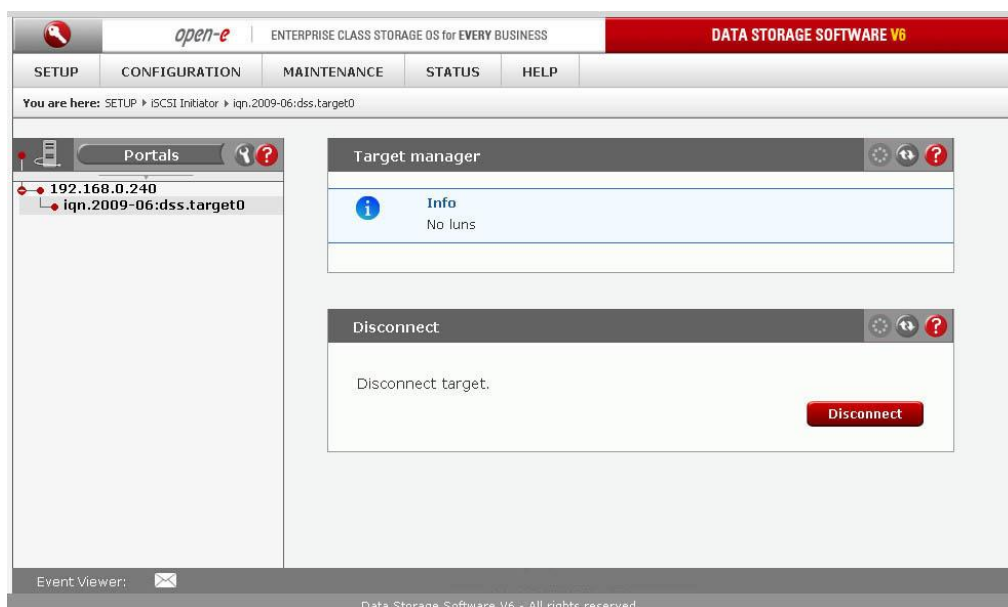
NOTE In order to disconnect from a target, select its name in the iSCSI Initiator tree and click the **Disconnect** button. Before removing an iSCSI portal server, you need to disconnect all targets from it.



Function: Remove portal

Here you can remove the selected portal server.

NOTE You can only remove a portal server if all its targets are disconnected from it. In order to disconnect a target from a portal server, please select it from the iSCSI initiator tree and click on the **Disconnect** button.



Function: Target manager

Here you can view the connected target's name as well as its size. You can also disconnect the target from the portal server using the **Disconnect** function.

Function: Disconnect

Here you can disconnect the selected target from the portal server..

NOTE You can only disconnect a target from a portal server if the target in question does not belong to any volume group or software RAID unit. Otherwise please first remove the volume group or software RAID unit in the console tools (press *F1* in the console to list keyboard shortcuts).

5.2.1.7 Hardware

Function: UPS settings

Here you can configure your UPS device (Uninterrupted Power Supply). In order to use UPS device, please select the option **Use UPS**.

Set UPS vendor

Select the UPS vendor for your UPS device. Vendors APC and MGE are available.

UPS Mode:

Single

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

Server

This option determines that the server is connected to the UPS and sends a signal through the network to shut down other systems in the network.

Client

This option determines that the server reacts to a power down-signal from the UPS server.

When using an APC-originated device with the Server UPS mode enabled the following fields are available:

Server Net port

TCP port on which the UPS server is connecting to the UPS client.

When using an APC-originated device with the Client UPS mode enabled the following fields are available:

Server Net port

TCP port on which the UPS client is connecting to the UPS server.

Server IP

IP address of the master APC UPS.

When using an MGE-originated device with the Master UPS mode enabled the following fields are available:

User name

User name allowed to connect from the slave UPS.

Password

Password for the user name above.

Slave IP

IP address of the slave MGE UPS.

When using an MGE-originated device with the Slave UPS mode the following fields are available:

User name

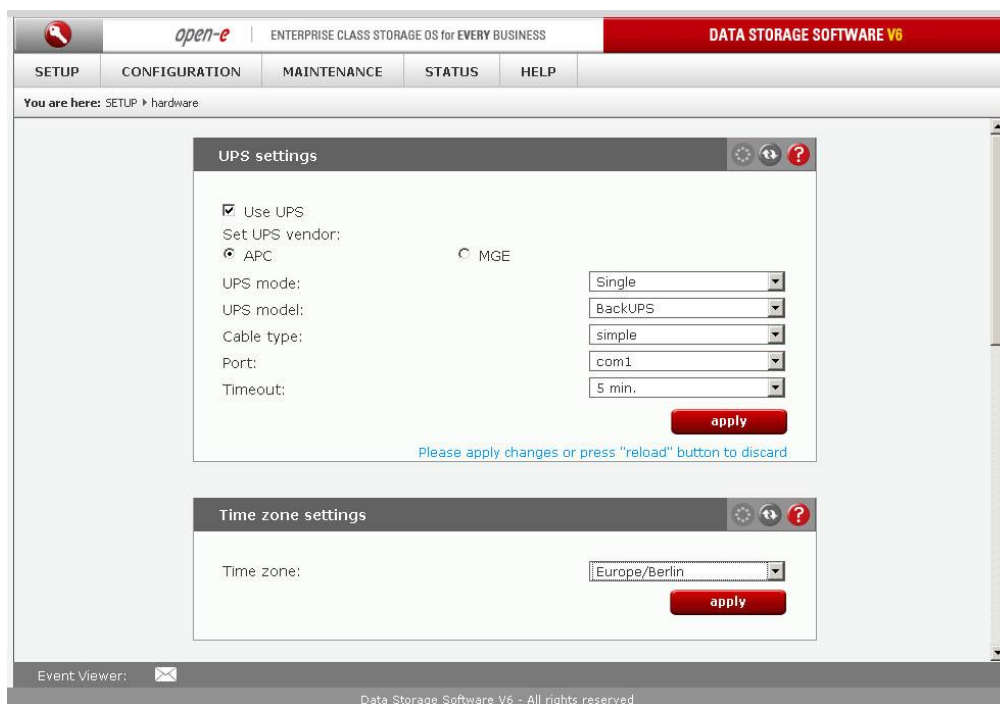
User name which will connect to the master UPS. It needs to be the same as the one on the master UPS.

Password

Password for the user name above.

Master IP

IP address of the master MGE UPS.



UPS model

The model of your UPS device.

Port

Port to which the UPS is connected.

Cable type

Cable type for your APC UPS.

Timeout

The timeout defines the time between a power failure and the moment the system shuts down.

Timeout - Battery Limit

This option enables you to sustain the system as long as the battery holds (the system will shut down when the battery charge drops to 5% or when there are 3 minutes left to total battery discharge).

Turn off UPS after system shutdown

This will turn off the UPS device after the time period set in the Shutdown grace delay (SLEEP) parameter in the UPS EEPROM expires.

NOTE When using slave and master UPS modes, all UPS devices need to come from the same vendor.

Function: Time zone settings

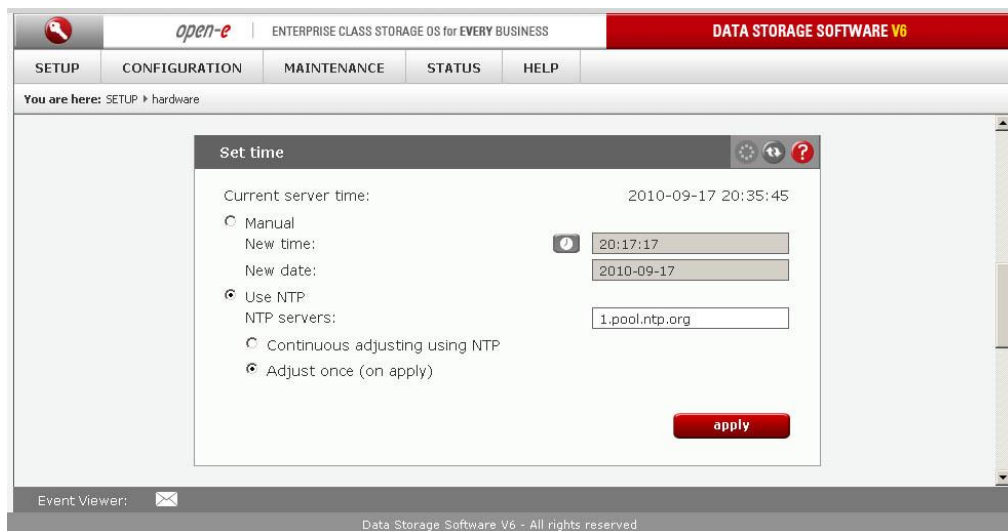
This function allows you to adjust NTP server settings.

Please select an NTP server (Network Time Protocol: for more info please see: www.ntp.org)

You may provide a fully qualified host name or an IP address. Select time zone suitable for your location.

With the **Continuous adjusting using NTP** option enabled your system time will be monitored and corrected if the difference between the local time and the server time changes. Enabling this option is especially recommended when using domains.

NOTE Time setting is very important for proper functioning of the server. The gateway and (with host names) DNS network settings must be configured beforehand.



Function: Set time

With this function you can set the time and date:

Manual

Type in the time and date using the following format: *hh:mm:ss yyyy-mm-dd.*

Use this PC time

The time and date on the PC you run the web browser on will be used.

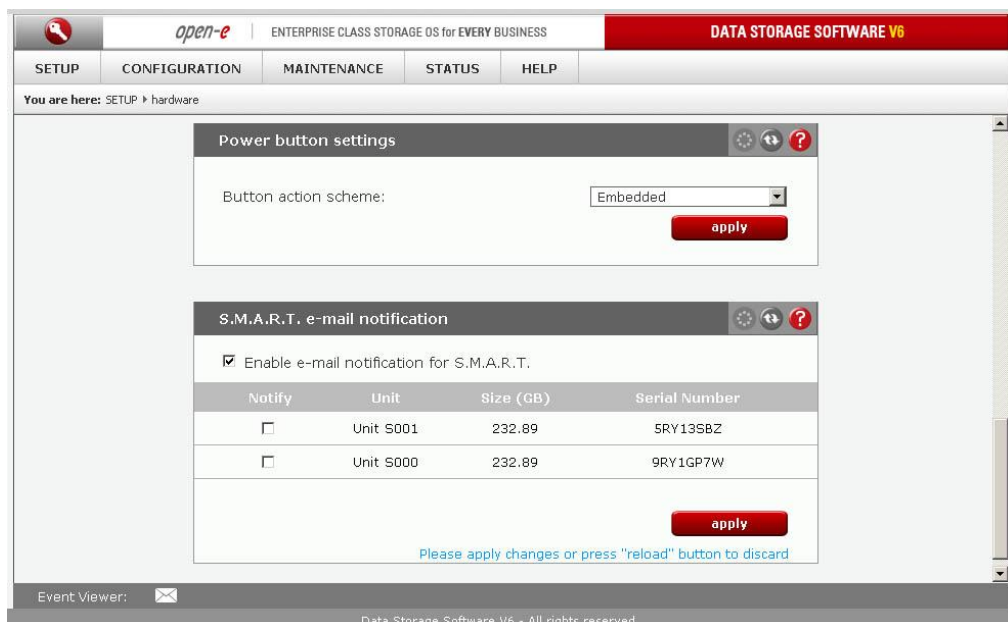
NTP server

This will pick up the time and date from an NTP server. In this case please make sure you have Internet access and proper network setup, especially the gateway and DNS. You can check proper Internet access by using ping from the console tools.

At the console, press **Ctl-Alt-T**. Select 'Ping'.

To use this option you must set the correct NTP server in the **Time zone settings** function.

NOTE Time setting is very important for proper functioning of the server.



Function: Power button settings

In this section you specify what action will be performed when the power button is Pressed

Options:

None

No action.

Halt

Power off computer.

Reboot

Restart computer.

Embedded

When you select this option, it activates the following power button behavior:

- | - shutdown (1)
- |_| - restart (2)
- |_|_|_| - network settings reset (5)
- |_|_|_|_|_|_|_| - administrator settings reset (10)

Key:

| - single power button press

_ - maximum time period in which a press will increase the press counter

NOTE After the _ period expires, each subsequent press will reset the press counter (unless the previous count meets one of the schemes outlined above).

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

This function allows you to check hard disk status via S.M.A.R.T. and send the results to an e-mail address.

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

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

- first enable the E-mail notification function in the “Setup” → “Administrator” menu,
- enable S.M.A.R.T. in the Hardware configuration tool in the console (*press F1 in the console to list keyboard shortcuts*),
- when S.M.A.R.T. is enabled you will see all the detected hard drives with information on unit number, size and serial number,
- check the box next to the unit for which you want to receive S.M.A.R.T. status and press “Apply” button,
- if everything is OK, the unit status will report as PASSED, otherwise it will show up as FAILED.

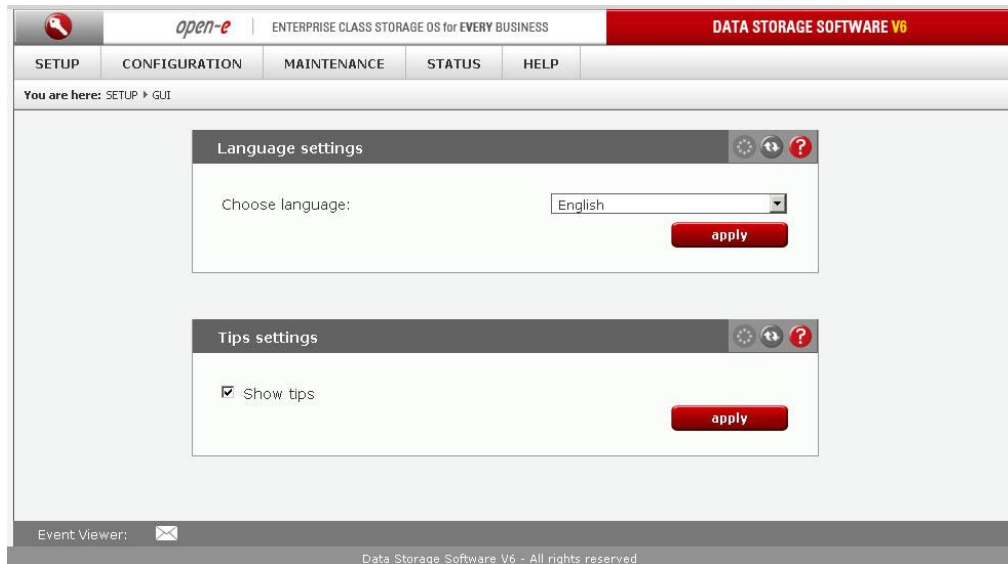
5.2.1.8 GUI

Function: Language settings

Select your preferred language and click **Apply**.

Function: Tips settings

In this function you can enable additional tips which will be shown in the error, warning and info messages. Those tips are actually links to other places in the administration panel. This way you can perform some operations faster.



5.2.2. CONFIGURATION

5.2.2.1 Volume manager

In this section you can view units assigned to that volume, manage the volume within the Volume manager function, or assign snapshots to it.

5.2.2.1.1 Volume groups

Function: Unit rescan

This function rescans your system for new units.

Function: Unit manager

This function allows you to manage physical storage devices - units (hard drives or RAID arrays). Units that report as *Available* can be used to create a new volume group, a new dynamic volume, or to expand existing volume groups.

It is possible to combine two (or more) units into one volume group:

- when creating a new volume group the system adds selected units only. You can use the default volume group name or change it,
- by selecting “New dynamic volume”,
- if you want to expand an existing volume group select the “Add to ...” action with the name of the volume group in question.

After the creation process the page is reloaded and the **Status** field should show your drives/arrays as being *In use*.

For further volume group management, e.g. logical volume setup, please click on the volume group name in the tree diagram in the left-hand pane. With the **Volume Manager** function you can create a new NAS volume (N) and/or a new iSCSI volume (I).

Disk notations:

- S0,S1, ..., S[x] - every disk with the S notation is part of a SATA / JBOD / RAID unit,
- H0,H1, ..., H[x] - units with the H letter are IDE units,

- MD0,MD1, ..., MD[x] - this denotes software RAIDs.

NOTE

- Units already being used in a volume group can be made available again by using the Delete content of units function in the console. Please be aware that this will remove all data from the unit!!!,
- You can only use units with capacities greater than 5 GB, smaller units are not supported.

The screenshot displays the open-e Data Storage Software V6 console interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'You are here: CONFIGURATION > volume manager > Vol. groups'. The main content area is divided into three sections:

- Unit rescan:** A section with a 'rescan' button.
- Unit manager:** A table listing units with columns for 'Unit', 'Size (GB)', 'Serial number', and 'Status'. One unit, 'Unit MD0', is listed with a size of 465.77 GB and a status of 'available'. Below the table, there is an 'Action:' dropdown menu set to 'new volume group' and a 'Name:' input field containing 'vg00'. An 'apply' button is located at the bottom right of this section.
- Drive identifier:** A table listing drives with columns for 'Unit' and 'Serial number'. Two units are listed: 'Unit S001' with serial number '5RY13SBZ' and 'Unit S000' with serial number '9RY1GP7W'. An 'apply' button is located at the bottom right of this section.

The bottom of the console shows an 'Event Viewer' icon and the text 'Data Storage Software V6 - All rights reserved'.

Function: Drive identifier

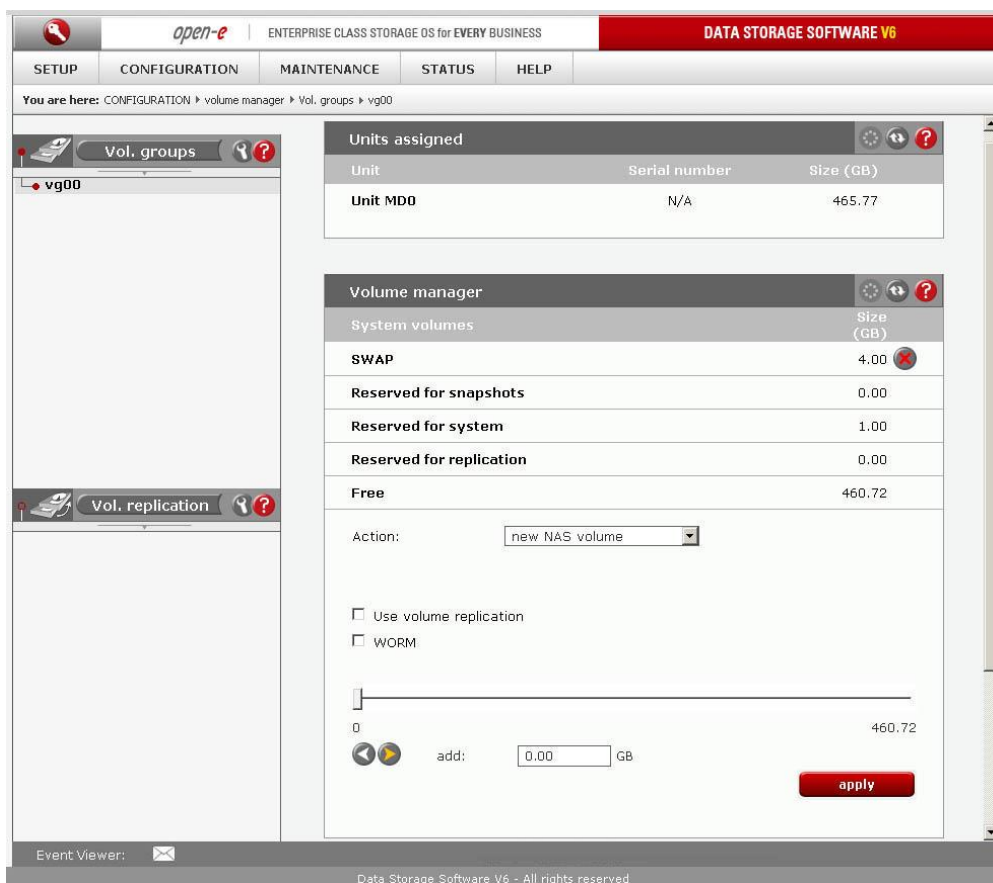
This function has been designated to assist you in finding disks in your NAS server cage. If you have a hardware RAID installed, the whole RAID array is shown as a single drive, so you may not be able to determine which drive unit represents which disk when using the S.M.A.R.T. tool or a hardware RAID management tool (depending on the manufacturer of the RAID controller)..

When you click on the “Apply” button, the appropriate disk will start reading and you can determine which disk it is by watching the disk-activity LEDs. For this function to operate properly there should be no other activity in progress on the hard drives in question.

NOTE Identification will stop automatically after one minute if you do not stop it before (by unchecking the appropriate option and clicking “Apply”). Using this function during normal operation is not recommended and will cause your server to slow down.

Function: Units assigned

With this function you can view physical units attached to this volume group



Function: Volume manager

This function allows you to:

- modify existing and create new NAS (N), iSCSI (I) or Fibre Channel (FC) volumes,
- reserve disk space for Reserved Pool,
- create, modify and delete snapshots.

In order to add storage space to an existing NAS, iSCSI or FC volume, **select modify [volume_name]** from the drop-down menu. Use the scroll bar to indicate the size.

The **Options** drop-down menu is available for iSCSI volumes only. It allows you to add a new iSCSI volume to an existing target or create a new target for the volume. The menu items are as follows:

- **Create new target automatically** - this will create a new target and add the newly created iSCSI volume to it,
- **Add to existing target alias [target_alias]** - the newly created iSCSI volume will be added to the selected target,
- **Just create volume** - the newly created iSCSI volume will not be added to any target. In order to add it to a target, go to **CONFIGURATION -> iSCSI target manager**, select the target from the left-hand pane and add the volume with the green plus (+) sign.

Use volume replication

Selecting this option when creating a new volume or modifying an existing one (NAS (N), iSCSI (I) or Fibre Channel (FC)) will enable volume replication for that volume. For tips on setting up replication over WAN, please see the help text for the *Mirror server IP* box.

In order to remove replication functionality from a volume:

- select the **modify** option from the **Action** combo box, e.g. *modify lv0001*,

- uncheck the option **Use replication**,
- leave the volume size unchanged,
- click the **Apply** button.

NOTE The initial synchronization required by volume replication is much quicker with uninitialized volumes (block I/O iSCSI, uninitialized file I/O iSCSI and FC, NAS) as the synchronization process does not have to cover the entire volume. Please note this is only valid if volume replication is activated while creating a volume - if you initialize volume replication after the volume has been created, the synchronization will take longer.

WORM

Write Once Read Many - this option is available for NAS volumes only; WORM-enabled volumes can be read multiple times, but written to only once. Enabling WORM for a NAS volume is only possible after selecting **new NAS volume** from the drop-down menu. Once WORM is enabled it cannot be undone; It is not possible to remove WORM from an existing volume.

NOTE WORM volumes are subject to the following limitations:

- they cannot be used for volume replication,
- a share created on a WORM volume cannot be used as a destination share in a data (file) replication process,
- a share created on a WORM volume cannot be published via NFS and cannot be accessed via HTTP (HTTP share access function),
- a share created on a WORM volume cannot be used as an antivirus quarantine share,
- a share created on a WORM volume cannot host a local backup database.

NOTE Maximal NAS (N), iSCSI (I) and Fibre Channel (FC) volume size (with replication) is limited to 16TB (terabytes). For each 4TB there is 128MB reserved for metadata.

Volume size (TB)	Metadata size (MB)
0÷4	128
4÷8	256
8-12	384
12-16	512

If your volume (including volume replication) fails to be created, increase the Vmalloc size. This can be done via the **Hardware Console Tools** (ALT+CTRL+W) -> **Tuning options** -> **Vmalloc size**.

Initialize

This option is available when creating an iSCSI (I) or Fibre Channel (FC) volume. The goal of the process is to provide better stability. The volume will be initialized immediately after it has been created. There can be only one volume being initialized at any one time. If there are more volumes to be initialized, a Waiting indicator will appear next to the queued volume(s). Using the button next to the indicator you can send the initializing volume to the back of the initialization queue. Every queued volume can also be sent to the back of the queue.

You can set initialization to be **slow**, **medium** or **fast**. The faster the initialization, the more CPU-intensive it will be.

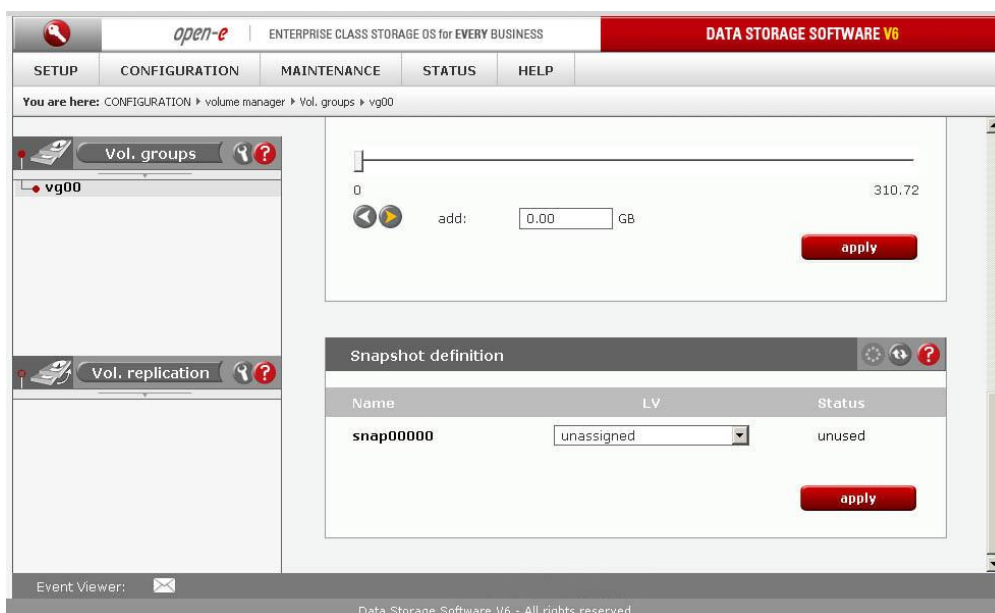
Blocksize

This option is available when creating a Fibre Channel volume (FC). Blocksize indicates the nominal size, expressed in bytes, of a block of data. Possible values:

- 512 bytes (default)
- 1024 bytes
- 2048 bytes
- 4096 bytes

Blocksize has an influence on performance and space management. The greater value the better performance, but data might take up more space. This option is unavailable when modifying an FC volume and for FC snapshots.

NOTE When adding each new unit there will be 4 GB space reserved for Reserved Pool (if a Reserved Pool has not been already created). Additionally, 4 GB of space is reserved for internal system use. Reserved Pool creates a small amount of storage capacity from the Volume and is used for system features. This prevents users from accidentally using all of the available free space that would inhibit the use of certain features regarding Replication that is needed to draw upon to perform properly. A technical recommendation to any storage solution is to reserve a small amount free space from the Volume, unless you are fully aware that you will not be needed utilizing this feature in the future or for testing reasons.



Function: Snapshot definition

Here you can set the logical volume to which the snapshot will be assigned.

Name

Snapshot name.

LV

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

Status

Snapshot status. Can be one of the following:

Active

Snapshot is active.

Inactive

Snapshot is inactive, probable reason: overflow.

Unused

Snapshot is currently unused.

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

NOTE Please be reasonable when you are calculating the space reserved for snapshots. Please set as much space for a snapshot as you expect to change during snapshot activity, e.g. when you are performing a backup from a snapshot which takes one hour please set the size of this snapshot to as much space as will be changed during one hour. The snapshot will become inactive if the contents (data changed on logical volume) exceed the snapshot capacity. You do not lose data in that case. However, the old dataset, which has been frozen with the snapshot, is not available any longer.

When you define a schedule, use only as many snapshots at the same time as actually needed. A large count of active snapshots can slow down the system considerably.

Manual creation and removal of snapshots can be done via the following path:
CONFIGURATION → **Volume manager** → **vg[nr]** → **Function: Volume Manager**.

How to access NAS snapshot

After a snapshot has been created and activated, you can access it by following these steps:

- Go to menu **CONFIGURATION** → **NAS settings** menu and select the network protocol on which the snapshots will be accessible, exactly like all other shares. This needs to be done only once. When establishing access to a snapshot the second time, this action is not necessary. You can activate access to snapshots on the following protocols:
 - NFS,
 - SMB (Network neighborhood),
 - FTP,
 - AFP.
- create a new share that will be assigned to the activated snapshot,
- go to the **CONFIGURATION** → **NAS resources** menu,
- within the Create new share function:
 - enter share name,
 - use the **Specified path** option and select the snapshot that you want to have access to,
 - click **Apply to create a share**,
- now you can start to explore your share(snapshot) using the specified network protocol.

How to access iSCSI target snapshot

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

- Go to menu **CONFIGURATION** → **iSCSI target manager** → **Targets** → [target_name] menu,
- enter the Target volume manager function and click the Add button on the right side of the snapshot you would like to have access to. A new LUN will be added to the target,
- now you can connect with your iSCSI initiator and use your snapshot target,
- here is an example (Microsoft Windows environment): please download Microsoft iSCSI Initiator and follow its instructions,
- start the software and add targets,
- access the Target Portals menu and enter the IP address of the iSCSI server and the socket (default 3260),
- in the Available targets menu please log into a previously added target,
- now your snapshot target will show up in your system and you can use it.

5.2.2.1.2 Volume replication

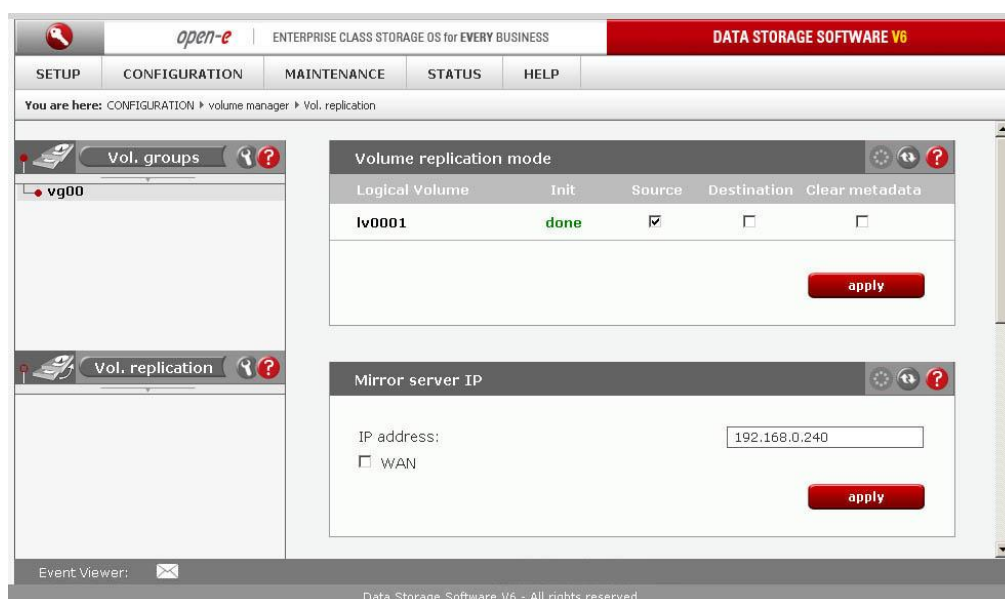
Function: Volume replication mode

Here you can set the replication mode for every logical volume (with replication functionality available). A volume can be in a **source (S)** or a **destination (D)** replication mode.

You can also clear the **metadata (CM)** of a volume. Metadata describes the replication data.

Clearing metadata is required when you want to start the replication process from the beginning. Another usage example is when the data on the source volume is inconsistent and you want to restore it from the destination volume. In this situation you need to switch replication modes between the volumes (i.e. the destination volume should now be in source mode, while the previous source should be switched to destination mode). Before starting a replication for a new source and destination please clear the metadata from the previous destination volume. When replication is complete the data on the previous source volume will be consistent. If a volume is set to the destination replication mode then it will not be visible in the iSCSI initiator.

NOTE In case the problems occur while switching replication mode please tick both boxes (mode choosing and clear metadata) at the same time.



Function: Mirror server IP

Here you can set the IP address for a mirror server. It needs to be entered in order to define the volume replication task.

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

The **WAN** option gives you the possibility of replicating over Internet. Please perform the following steps to set up this kind of replication:

- on Router 1 redirect ports 12000-13999 and 40000 to Server 1,
- on Router 2 redirect ports 12000-13999 and 40000 to Server 2,
- on Server 1, tick the WAN box and enter a unique combination of 6 to 12 characters in the ReplicationID field [allowed characters: a-z A-Z 0-9],
- on Server 2, tick the WAN box and enter the same ReplicationID as on Server 1,
- on Server 1, enter the IP address for Router 2 in the Mirror server IP field,
- on Server 2, enter the IP address for Router 1 in the Mirror server IP field,
- replication should now succeed over WAN.

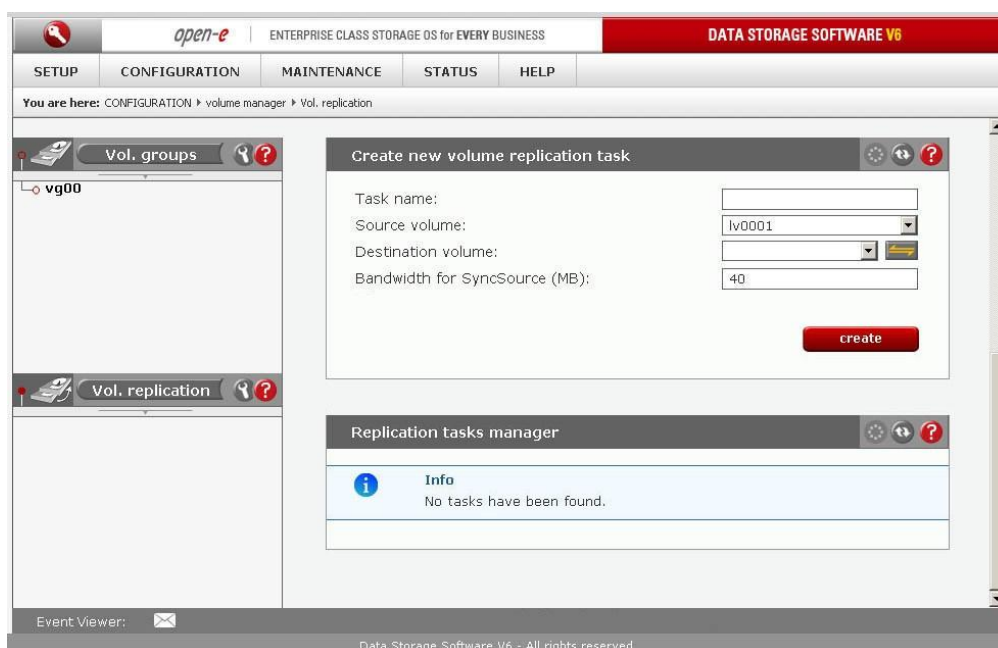
Function: Create new volume replication task

Using this function you can create a volume replication task. This creates a mirror copy of data from the source volume to the destination volume in real time, meaning that if you, for example, create a file on the source volume the same file will be created on the destination volume. Destination and source volumes need to be the same size in order to successfully perform the replication. Replication can be performed only between two mirror replication servers.

Please note this function allows you only to create replication tasks. In order to enable them, use the **Replication Task Manager** function.

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

NOTE Volume replication process runs on randomly selected ports from 12000- 13999. These ports have to be open in firewalls for both incoming and outgoing traffic.



Function: Replication tasks manager

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

Function: Create schedule for volume replication task

Here you can create a schedule for the selected volume replication task.

Comment

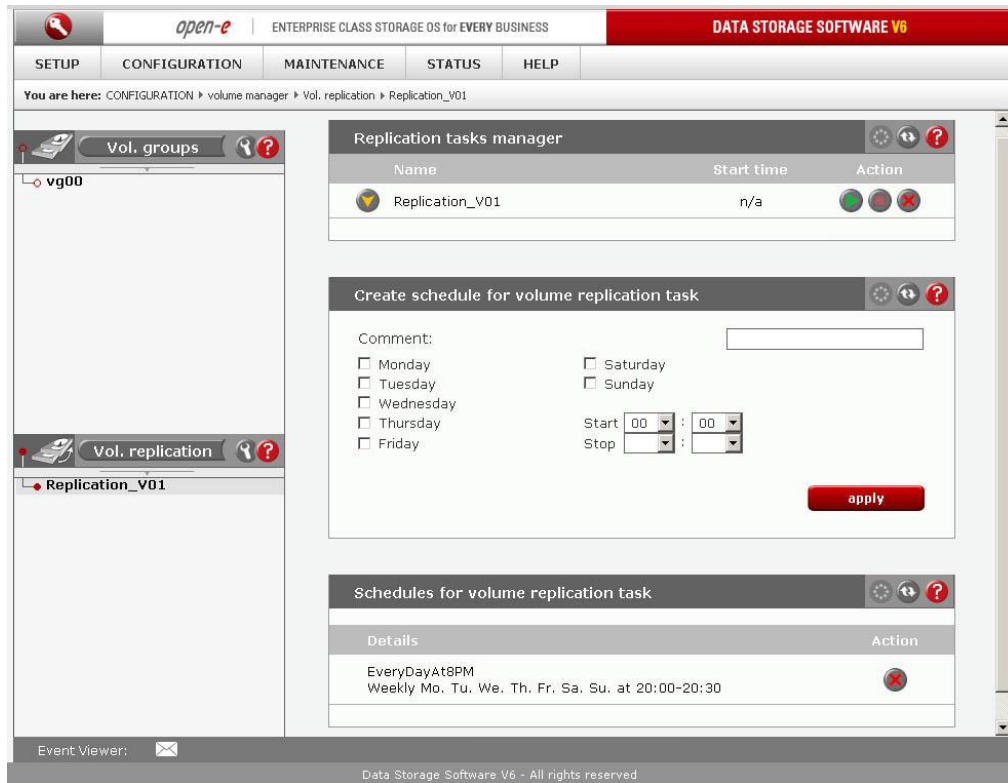
You can enter a comment for the replication schedule.

Time select

You can start the volume replication immediately by selecting **Now** from the **Time select** drop-down list or schedule it for later.

Interval

Select the interval at which the replication will be executed.



Function: Replication task manager

Here you can run, stop, and delete existing volume replication tasks. When a replication task is running, you cannot change the replication mode for the logical volume, delete the metadata, or change the mirror server IP address. You need to stop the replication task first.

Function: Create schedule for volume replication task

Here you can create a schedule for the selected volume replication task.

Comment

You can enter a comment for the replication schedule.

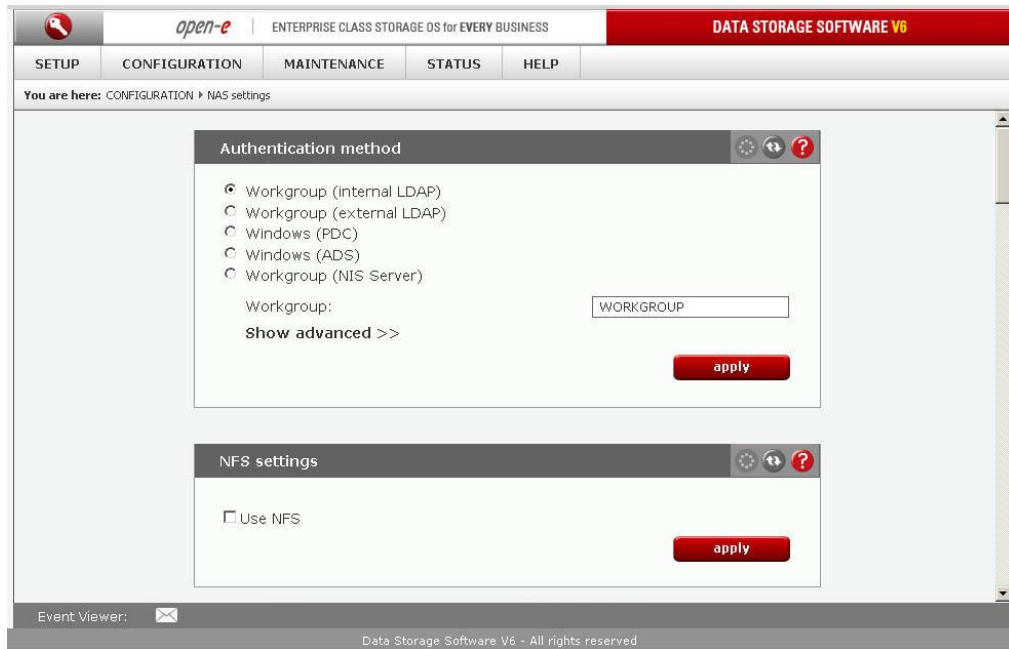
Time select

You can start the volume replication immediately by selecting Now from the Time select dropdown list or schedule it for later.

Interval

Select the interval at which the replication will be executed.

5.2.2.2 NAS settings



Function: Authentication method

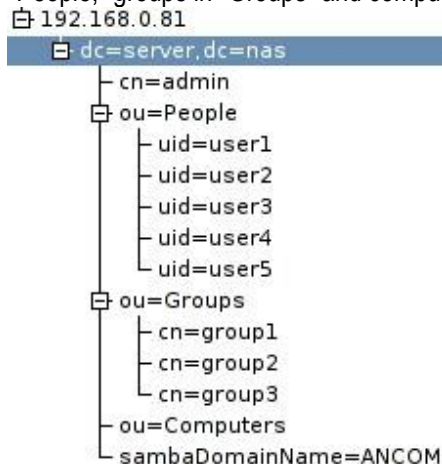
The server administrator can choose one of the following authentication methods for the users:

Workgroup (internal LDAP)

With this method you need to create all user/group accounts in the **NAS Resources** menu. In the **Workgroup** field please enter your network workgroup name. New users are assigned to the default group called **Users**.

Workgroup (external LDAP)

In the case of external LDAP (Lightweight Directory Access Protocol) the NAS server imports users/groups from an external LDAP server. Please fill in all fields accordingly. In the **Show advanced** list you can set the Base DN, and the LDAP administrator DN (Distinguished Name) and password. **Base DN** should look like this: "dc=server,dc=nas" (DC - Domain Component), where "server" and "nas" can be set exactly as they are set on the remote LDAP server. In the **LDAP administrator DN** field you should enter the base DN (as above) with an additional prefix such as "cn=admin," (CN - Common Name). Users should be stored in the Organization Unit (ou) "People," groups in "Groups" and computers in "Computers." See sample organization tree below:



Windows (PDC)

In this case the NAS server will use the Windows Primary Domain Controller user database for user authentication. This method can be used with NT4/2000/2003 servers. If a Windows 2000/2003 server runs the ADS native mode, please use the Windows (ADS) method.

NOTE If you encounter problems getting connected to a PDC server running under NT4, please get connection follow the instructions below:

1. run the Server Manager program from the Start menu→ Programs→ Administrative Tools (Common) → Server Manager.
2. in the Server Manager menu select Computer->Add to Domain. **WARNING:** If a NAS resource has already been added, you must remove it,
3. in the Computer Name field enter the NAS server name (NetBIOS name),
4. click Add,
5. next, access the NAS server web administration and go to CONFIGURATION → NAS settings,
6. choose Windows (PDC) as the authentication method,
7. in the Server IP field enter the NT server IP address,
8. in the Name and Password fields enter the NT4 administrator account name and password,
9. click Apply. **WARNING:** If the connection fails, you will need to restart the process (go back to point 1).

Windows (ADS)

This option can be used for Windows 2000/2003 ADS servers:

- Please enter the realm name of your Windows 2000/2003 server. It can be found in the Windows system by clicking the right mouse button on **My Computer** and selecting **Properties**, then clicking the **Computer name** tab. Real name is the same as the domain name.
- The KDC IP address must be taken from the same system as the realm name.
- Enter the administrator login and password,
- Click **Apply** to connect to the Windows (ADS) domain.

NOTE Windows (ADS) password cannot contain the following special characters
~!@#\$%^&()+[]{}*,:;"'.,%|<>?/\='`

NOTE In order to connect to an NAS share via AFP (AppleTalk Filing Protocol) while user authentication is set to ADS (Active Directory Services) and the Mac workstation prompts for username and password, please enter the username as follows:

User Name: DOMAIN_NAME+USER_NAME (the "+" character belongs to the syntax!)

DNS server IP should be the same as the domain controller IP!

Workgroup (NIS server)

Please choose this option if you want to use a user/group database from a Network Information Service server.

NOTE

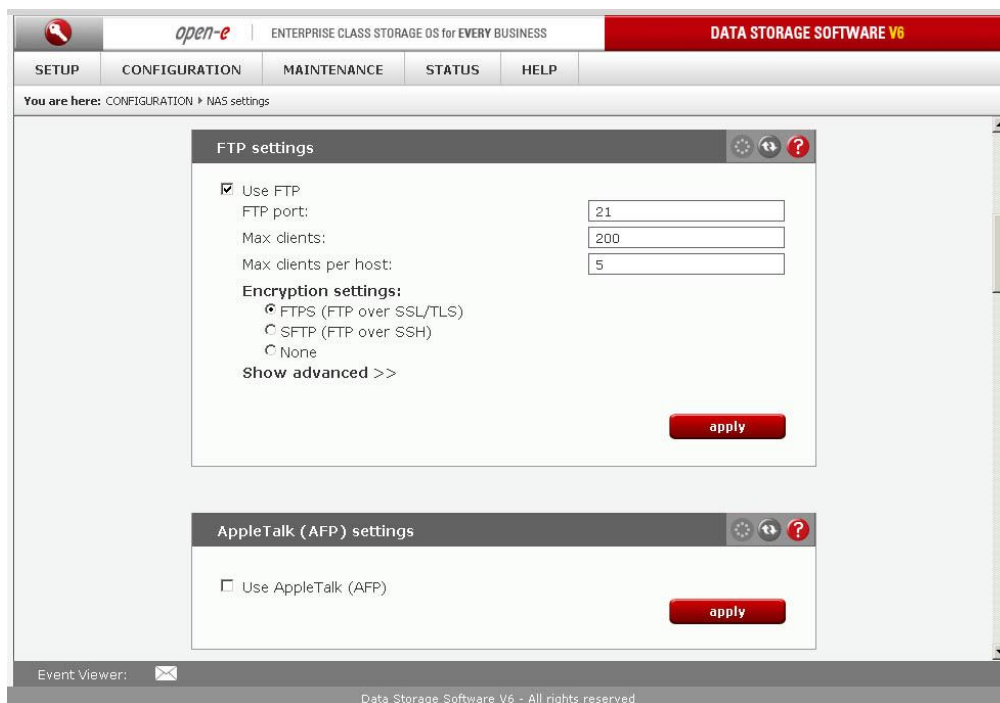
1. Workgroup name cannot begin/end with space and cannot contain special characters such as: ~!@#\$%^&()+[]{}*,:;"'.,%|<>?/\='`
2. When changing the authentication method you run the risk of losing ACLs (Access Control Lists). In this case please set user/group access rights for every share and reset ACLs.
3. If SMB authentication is enabled, please edit the Windows registry: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lanmanworkstation\parameters\ and change the value of the DWORD 'enableplaintextpassword' key to '1' hexadecimally.

Function: NFS settings

Click **Use NFS** to enable access to shares and/or snapshots via NFS.

Network File System (NFS) is a protocol for distributed file system which allows a computer to access files over a network as easily as if they were on its local disks.

NOTE If the hosts file has an entry in the DNS field but does not have the reverse DNS entry then the connection to NFS will not work.



Function: FTP settings

To enable FTP services check **Use FTP**.

FTP port

Determines the port the FTP service is listening to.

Max clients

Limits the total number of concurrent FTP connections.

Max clients per host

Limits the total number of connections originating from a single host.

Min. port

Minimal port number for the FTP passive mode. Needs to be smaller than the maximum port number.

Max. port

Maximal port number for the FTP passive mode. Needs to be greater than 1024.

Encryption settings

FTPS (FTP over SSL/TLS)

Data transfer will be encrypted with the SSL protocol. Following FTP clients have been tested with this mode:

- CoreFTP(Windows)
- FileZilla (Windows)
- IglFTP (Windows and Linux)
- SSLFTP (Linux console client)

SFTP (FTP over SSH)

Data transfer will be encrypted with the SSH protocol.

Only version 3 of the protocol is supported. Following FTP clients have been tested with this mode:

- psftp (Linux)
- FileZilla (Linux, Windows)
- WinSCP (Windows) - Make sure to change the protocol version to **3**. In order to perform this please check the */"Advanced options/"* in WinSCP Login. Then proceed in the menu: Environment -> SFTP -> Protocol options -> Preferred SFTP protocol version: select 3. Additionally it is recommended to force the binary file transfer under menu: Options -> Preferences -> Transfer -> Transfer mode -> Binary. If you encounter a problem with a temporary file called filepart, then disable the resume support under menu: Options -> Preferences-> Transfer -> Endurance -> Enable transfer/resume to temporary -> disable

NOTE If the NAS server uses Windows domain authorization (ADS) the short domain name along with a plus sign must precede the username, e.g. Realm: DOMAIN.LOCAL user: Administrator
WinSCP User Name: DOMAIN+Administrator

NOTE Most of the SFTP clients uses 22 TCP port as a default. In case of any connection issues please try to change the port to 22 in FTP settings.

NOTE After accessing the server with the SFTP option enabled, you will see two folders: pub and share. The pub folder will be empty. After you access share, you will see all the FTP-enabled shares on the server. However, those shares your user does not have access to will be empty. This behavior will be fixed in an upcoming release.

None

If None is selected, then data will be sent without any encryption.

Advanced settings

Idle timeout

This option allows you to set a timeout (in seconds) for an idle connected client. An idle client does not receive any data on either the control or the data connection. Inputting 0 equals no timeout.

No transfer

This option allows you to set a timeout (in seconds) for a connected client whose data connection is idle (e.g. it is not sending or receiving data). Control connection is not subject to this timeout. Inputting 0 equals no timeout.

Passive port range

Range of port addresses when FTP service is connected in passive mode.

FXP support

Enables support for the File eXchange Protocol.

Delay engine on

Enables runtime delay. It is recommended to keep this option on for security purposes.

NOTE The possibility to access the server via FTP (File Transfer Protocol) offers additional flexibility, as users can access storage either from the Intranet or Internet. An FTP client (e.g. SmartFTP) is ideal, but the Internet Explorer or a similar browser is also suitable.

To establish a connection, the FTP client needs several pieces of data:

- IP address: 192.168.0.220 (this is the standard address)
- Port: 21
- User: anonymous
- Password: 123

Access rights allocation is done via the IP address of the PC currently in the process of accessing. Read access is therefore granted on the basis of these usually typical and anonymous login data. As a standard, the FTP server uses port 21, but that can be changed via the FTP port setting. If you use the Internet Explorer when accessing, you need to enter the following data into the address line: *ftp://192.168.0.220*. You will not be prompted to enter the username and password, as the Internet Explorer first establishes an anonymous connection. If you have changed the FTP port, add this information to the address line the following way: *ftp://192.168.0.220:4711* (in this example, 4711 represents the new port number).

How to enter IP address

In order to allow specific computers access enter the privileged IP addresses separated by semicolons.

For example: 192.168.0.1; 192.168.0.2; 192.168.0.222; etc.

In order to assign writing privileges to the entire address area between 192.168.0.1 and 192.168.0.254 enter:

192.168.0.0/24

In order to assign writing privileges to the entire address area between 192.168.0.1 and 192.168.255.254 enter:

192.168.0.0/16

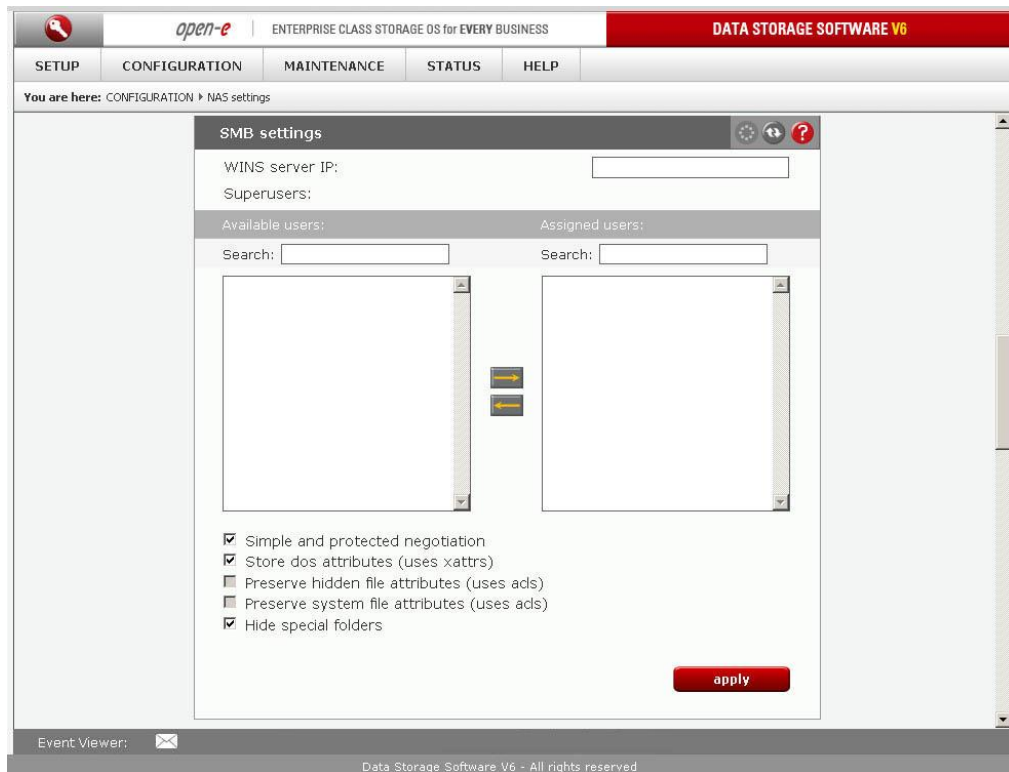
There are many more combinations possible. You can find additional information about IP calculation on the Internet.

Just search for **ipcalc**. For example, *192.168.0.1/28* will set the range from 192.168.0.1 to 192.168.0.14; *192.168.0.100/29* will set the range from 192.168.0.97 to 192.168.0.102 etc.

You can easily calculate the network IP range using an IP address calculator like the one available here: <http://www.subnet-calculator.com/>

Function: AppleTalk (AFP) Settings

Here you can activate the AppleTalk protocol in the network to access shares on the NAS Server.



Function: SMB settings

This function allows you to edit SMB protocol specific parameters. There are several options you can change:

Wins server IP

If you have a WINS server on your network you should indicate the WINS server IP here..

Superuser

Superuser is a user who has the permission to take ownership of folders and files which belong to other users. These rights can be useful when an administrator wants to change access rights (ACL) for folders or files created by other users. To give superuser privileges to a user select them in the menu. Superuser privileges allow to modify, remove and add new files to the share. This includes all files and directories, even those the superuser does not have ownership of.

Simple and protected negotiation

Simple and Protected Negotiation (SPNEGO) is a negotiation protocol. If you use a PDA device to access shares on NAS please uncheck it.

NOTE To connect to your PDA device use netbiosname, not IP address.

Store DOS attributes (uses xattrs)

This option enables you to preserve all MS-DOS attributes using Linux xattrs attributes. It cannot be set when you are using the options `Preserve hidden file attributes` or `Preserve system file attributes`.

Preserve hidden file attributes and Preserve system file attributes (uses ACLs)

These options enable you to preserve the following MS-DOS attributes: hidden and system. These attributes are mapped to x (EXECUTE) attributes for group and others in the Linux POSIX ACL. Windows ACL permissions are also mapped to Linux attributes. In order to avoid attribute mismatch, it is strongly recommended to disable these options. These cannot be set when you are using the `Store DOS attributes` option.

Hide special folders

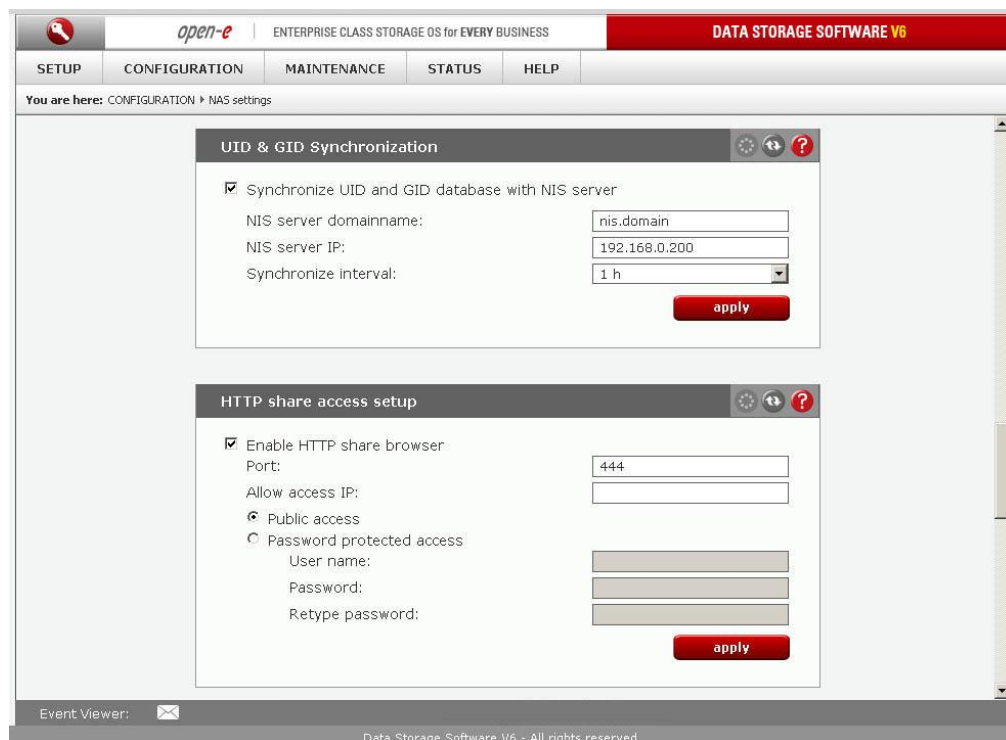
This option hides special folders that are created by MAC OS/OSX systems. With that option enabled, users cannot see MAC OS/OSX system files via the SMB protocol

MAC OS/OSX system files:

1. .DS_Store,
2. .AppleDouble,
3. Temporary Items Network,
4. Trash Folder,
5. TheFindByContentFolder,
6. TheVolumeSettingsFolder,
7. .AppleDesktop,
8. .AppleDB,
9. Icon?,
10. .Volumelcon.icns,
11. .FBIndex,
12. .FBClockFolder.

NOTE Changes to the ACLs and/or xattrs settings need to be confirmed seeing as these changes can make files invisible to users. It is not recommended to change these settings on servers that already have some data stored. If after changing the Preserve hidden file attributes (uses ACLs) and/or Preserve system file attributes (uses ACLs) settings any files are not visible, users can use the following command which will remove the hidden attribute from the files: `attrib -S -H x:* */s /d`, where: *x* - network drive.

Any change to SMB settings will disconnect users that are currently connected. These also need to be accepted by users; the acceptance prompt will only appear if any users are connected to SMB. If the user clicks the Cancel button the settings will be saved but the connection to SMB will not be reset



Function: UID & GID synchronization

Synchronize UID and GID database with NIS server

Enable this option if you want to synchronize user id and group id database with NIS server.

NIS server domainname

NIS server domainname without http prefix.

NIS server IP

IP address of your NIS server.

Synchronize interval

Time period when synchronization will be run.

Function: Http share access setup

Here you can set up a http access to shares.

Turning this option on will enable the http share browser. Access to shares will be available via a Web browser. You can browse and download your files when you enter the following in the address line:

`https://SERVER_IP_ADDR:PORT`

`https://SERVER_NAME:PORT`

For example:

`https://192.168.0.220:444`

Port

Port on which the http share browser will be available, the default port is 444..

Allow access IP

List of IP addresses which will have access to the http share browser

You can set up one of the following access modes for the shares:

Public access

When this option is set, everybody will have access to the shares over http.

Password protected access

When this option is set, access to the shares will be password protected.

User name

Please enter a username that will have access to the shares over http.

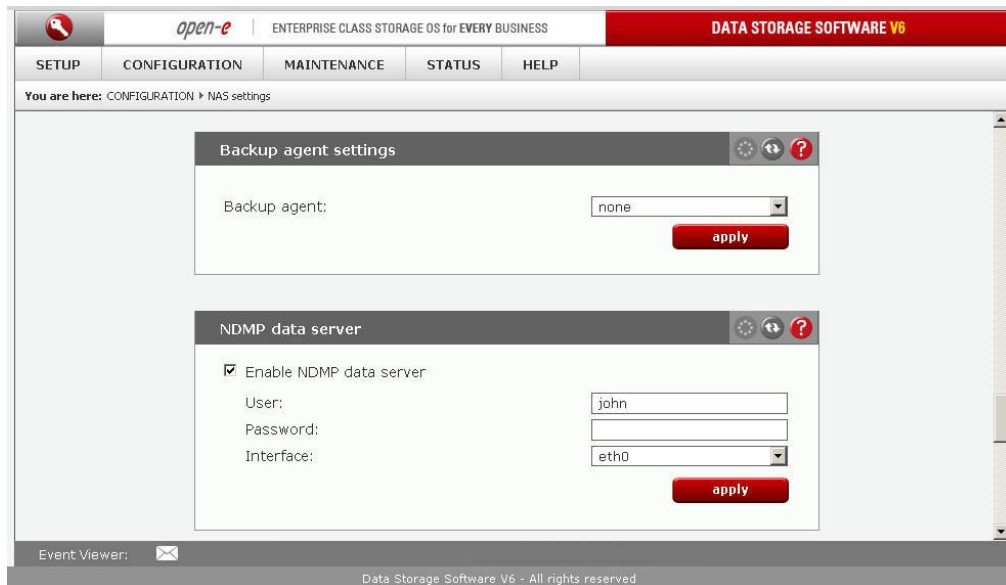
Password

User password.

Retype password

User password confirmation.

NOTE In order to access your share via a Web browser, you need to enable the Use http share access option for the share in question. You can do this via the Http share access function in the CONFIGURATION → NAS resources → [share_name] menu



Function: Backup agent settings

Here you can enable one of pre-installed backup agent (client). Currently, agents are supported:

- Veritas - Backup Exec,
 - Dantz - Retroclient,
 - CA - BrightStor.
- agents are supported

If you enable the backup agent, your backup server will find the agent running on the NAS server and will use it for backup. Alternatively, you can find and back the NAS shares up over the network neighborhood. But using a backup agent will be significantly faster.

Veritas:

Here you need to provide an IP address of a server running Veritas Backup Exec. Veritas Backup Exec may prompt for the **Directory Pass** password.

Backup:

1. in the Veritas Backup Exec set up a user in the menu Network → Logon Account Management,
2. next enter the password provided earlier in the NAS Server function Backup client setting,
3. after clicking Backup a Backup Job Properties window will appear, in which a list of network shares will be displayed,
4. after clicking the Remote Selections branch followed by Unix Agents, a NAS server name will appear,
5. after clicking the server displayed as "NAS_server/logical volume," a window called Logon Account Selection will appear in which you need to select the same username as in step 1,
6. after user selection, the logical volume and NAS server shares will appear. Selecting the correct share and clicking Run Now will cause this share to be backed up.

NOTE Under some settings, the Logon Account Selection window will not appear automatically. In this case you need to right-click the servername ("NAS_Server/share_volume") and select Connect As... in the context menu. Only then will the Logon Account Selection window appear.

Restore:

1. after selecting Restore, a Restore Job Properties window will appear,
2. in Properties → Source on the left side of the window click Selection, and the name of the NAS server whose shares have been backed up earlier will be displayed,

3. choose the folder you want to be restored from the correct backup file,
4. from the Source → Resource Credentials menu choose a user account for the NAS (NAS_server/share_volume) server and click Run Now.

NOTE In order to use an incremental method, select it from the Setting → General → Backup Method menu. Please use the following method: "Incremental - Using modified time" (Reset Archive bit - does not work on XFS partition types).

NOTE The backup agent works with Veritas version up to 10 inclusive.

BrightStor:

Allow IP or Network IP:

Please enter the appropriate backup server's IP address in order to grant it access to the NAS server. If you leave this field empty, all BrightStor backup servers in the network will have access to the NAS server.

User:

After providing a username only this BrightStor user will have access to the NAS server. If left empty, all users will be able to access the NAS server.

Before you start to back your data up you need to configure the device the backup will be stored on and add your NAS server as the source. Please follow these steps in order to perform this:

1. from the menu bar select Configuration, followed by Device configuration. The Device configuration wizard will appear. It will assist you in configuring backup devices on your server,
2. select Windows Server and click Next,
3. within the options select File System Device and click Next,
4. click Add, which will cause a file system device to be added to the list,
5. click on the Location field in the newly created entry and select the path that will be mapped to the file system device,
6. click the Finish button to complete the Device configuration wizard,
7. click Exit to quit device configuration,
8. the last thing to do is to format your newly created file system device. In order to do this, choose Device from the Quick start menu and select your newly created filesystem device,.
9. click on the Format button and the format form will appear,
10. enter the media name and click OK to format the media.

NAS server configuration:

1. select Backup from the Quick start menu,
2. right-click on Unix/Linux Systems in the Source branch,
3. select Add Machine/Object and the Add client form will appear,
4. enter the host name and the IP address of your NAS server,
5. click Add in order to add your NAS to the list,
6. click Close to quit the Add Machine/Object form.

Backup:

1. select Backup from the Quick start menu,
2. in the Source branch, select the NAS server volumes you want to back up,
3. click the Start button and the Security and agent information form will appear,
4. click the Agent button if you want to modify NAS server information,
5. click OK and the Submit job form will appear,
6. if you want to start the backup process later make sure that the job execution time is properly set,
7. enter the job description and click OK to start the backup process.

Restore:

1. select Restore from the Quick start menu,
2. from the Source branch, select the NAS server volumes you want to restore,
3. click Start followed by OK, and the Submit job form will appear,
4. if you want to start the backup process later make sure that the job execution time is properly set,
5. enter the job description and click OK to start the restore process.

Retroclient:**NAS server configuration:**

1. select Configure from the menu, then click on Clients and the Backup Clients form will appear,
2. click Add and the Add backup client form will appear,
3. enter the IP address of your NAS server and click on Add. The Connection form will appear,
4. enter the password to connect to the NAS server and click OK. The password for Dantz Retroclient is set to admin. The NAS server is now properly configured to work with Dantz Retroclient..

Backup set creation:

1. from the menu, select Configure followed by Backup sets and the Backup sets form will appear,
2. click on the Create New button and the Backup sets creation wizard will appear. Click on Next,
3. from the backup media options, select File and click on Next,
4. enter the name and the location where the backup will be stored. Click on Next,
5. select backup set security and click Next,
6. click on Finish, which will conclude the backup set creation process.

Backup:

1. select Backup from the menu, then click on the Backup button and the source selection form will appear,
2. select the NAS server volumes which you would like to back up. Click OK,
3. the Backup process form will appear, click on Backup to start the backup process.

Restore

1. select Restore from the menu, then click on the Entire volume button,
2. select the source backup set from which you want to perform the restore process,
3. select the destination NAS server volume,
4. click OK followed by Replace to begin the restore process..
The password for Dantz Retroclient is set to "admin".

Backup Exec

NOTE This option is valid only for Symantec BackupExec 11.5 and higher. If you want to use Veritas BackupExec (version 10 or lower), please use the Veritas backup client as described above.
There is no possibility to change the username, it must always be ralus.
The minimal password length is 4 characters.
After connection has been established, at the server level you will be presented with a list of folders to be backed up. Please note that only the shares folder is a valid backup source or destination - it contains all your shares

NOTE The built-in Symantec Backup Exec Agent for Linux requires you to purchase the product activation key which must be installed on your Backup Exec server. Please contact your vendor in order to purchase the Symantec product. Without the product activation key, the agent will be fully functional for 30 days as a TRIAL.

NOTE In Windows, the full computer name can be found via the following path: **My computer - > Preferences -> Computer Name -> Full Computer Name.**

Function: NDMP data server

NDMP (Network Data Management Protocol) is a protocol for direct communication between NAS and backup devices. It bypasses the backup server, thus providing better speeds.

In order to use NDMP, click the **Enable NDMP data server** checkbox.

User

Enter here the user authorized to access the NDMP server. The same user name and password should be configured at the NDMP client software.

Password

Enter here the password for the authorized user.

Interface

Select the network interface to be used for the NDMP server.

NOTE The NDMP Data server can be used with the following software:

NDMPCopy

NDMPCopy transfers data between filers using the Network Data Management Protocol (NDMP). When you use rsh to perform this transfer, the data flows from the source machine to the rsh host and then again from the rsh host to the destination machine. This can put a double load on the network and unnecessary load on the rsh host. With NDMPCopy, data is transferred directly from the source machine to the destination machine, and the NDMP host and network are not burdened with the extra load. The program can be downloaded from the official NDMP web site (<http://www.ndmp.org>).

NetBackup

NetBackup should be configured with following parameters:

- at least one NDMP host should be configured,
- at least one client of the /"NDMP, NDMP/" type should be added.

Steps for backup process in 3-way mode:

- it is necessary to run **Device Configuration Wizard** and add at least two NDMP hosts (the first is a source and the second is a destination with the tape drive). It is also possible to add NDMP hosts from **Media and Device Management/Devices/NDMP Hosts**,
- next, create policy rules and set policy storage unit which is identical to the destination NDMP host,
- finally, set the ndmp client which is the origin for the backup process.

After the steps above have been completed the backup in 3-way mode can be established from the NDMP host to the storage unit through NetBackup management.

NOTE The Data Storage Software with the enabled NDMP Data server functionality can be used in the following data backup scenarios:

Server to server copy with NDMPCopy

The data can be moved between two Data Storage Servers using the NDMPCopy utility.

To copy data user must define source and destination and authentication credentials for data servers. The command line for copying data is the following: `ndmcopy source destination [options]`.

Source has the following format: `src_filer:src_dir`, where `src_filer` is the name of the filer being copied from, and `src_dir` is the absolute pathname of the directory being copied. The destination has the format `dest_filer:dest_dir`, where `dest_filer` is the name of the filer being copied to, and `dest_dir` is the absolute pathname of the directory to which the source directory is being copied. The destination directory is created if it does not already exist.

Please note that you will need to include the keyword **shares** in both the source and the destination path as per the following example:

```
ndmcopy 192.168.0.1:/shares/sourceshare 192.168.0.2:/shares/destinationshare.
```

Options:

- **-sa none** | *user:password source authentication*. If this flag is followed by the word *none*, then no authentication is used. If it is followed by a user specification then text authentication is used. The default is text authentication with user *root* and no password.
- **-da none** | *user:password destination authentication*. If this flag is followed by the word *none*, then no authentication is used. If it is followed by a user specification then text authentication is used. The default is text authentication with user *root* and no password.
- **-sport port**. NDMP port to use for the source filer. This should normally be left unchanged. The default is 10000.
- **-dport port**. NDMP port to use for the source (DESTINATION?) filer. This should normally be left unchanged. The default is 10000.
- **-dhost hostname**. The destination host for data transfer (if it is not the same as the destination NDMP host). This is useful if your destination host has multiple network interfaces and the bulk data should go over a different link than the NDMP connection. One example of this would be if the filers are connected to the host running *ndmcopy* via a 10 Mb/s ethernet, but the filers are linked together by a 100 Mb/s ethernet as well. The hostname should be specified by:
 - **-dhost**. The name or IP address of the interface on the destination machine.
 - **-level 0 – 9**. Without the **-level** option *ndmcopy* always performs a level 0 dump. When the **-level** option is provided the restore process is requested to "incrementally restore" the dumped files and uses the *restore_symboltable* file in the process so that incremental dumps can be carried out. Each restore will leave behind a *restore_symboltable* file regardless of this option.
- **-v**. Increase the verbosity. The default (level 1) will display the dump log messages received from the dumping filer. One **-v** (level 2) displays NDMP status information as well.
- **-q**. Increase the quietness (decrease the verbosity). This flag will counteract any **-v** flags present. If there are more **-q** flags than **-v** flags, no status information will be displayed. Usually it does not make sense to specify both **-q** and **-v**, but it is a possibility.

Backup/restore with regular backup software

You can use the *NetBackup* application to backup the data through the NDMP DATA interface. It is necessary to install the *NetBackup* server and client software as explained in the original *NetBackup* Install Guide.

Next, configure the *NetBackup* application to use the remote/local NDMP server as follows:

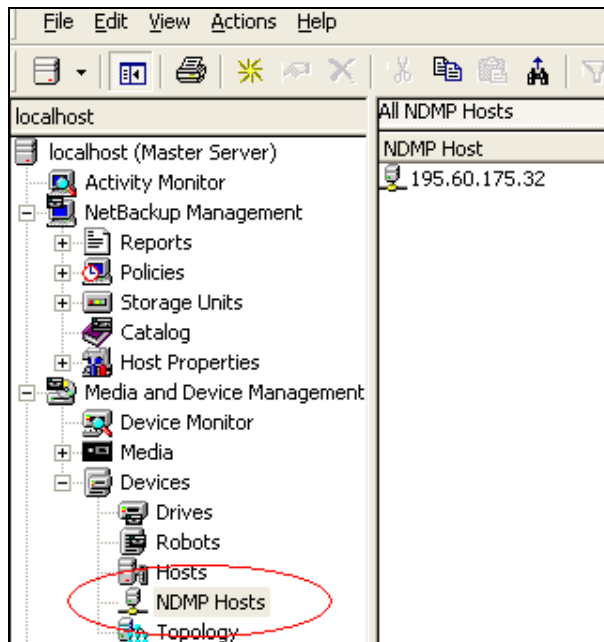
- add and configure devices (robots for the tape managing, disk arrays, tapes),
- add the storage unit which defines the media on the NDMP host and the media server,
- create the NDMP policy and define:
 - attributes,
 - NDMP client to backup,
 - path on this client to the backup,

- storage unit to be use,
- schedules.

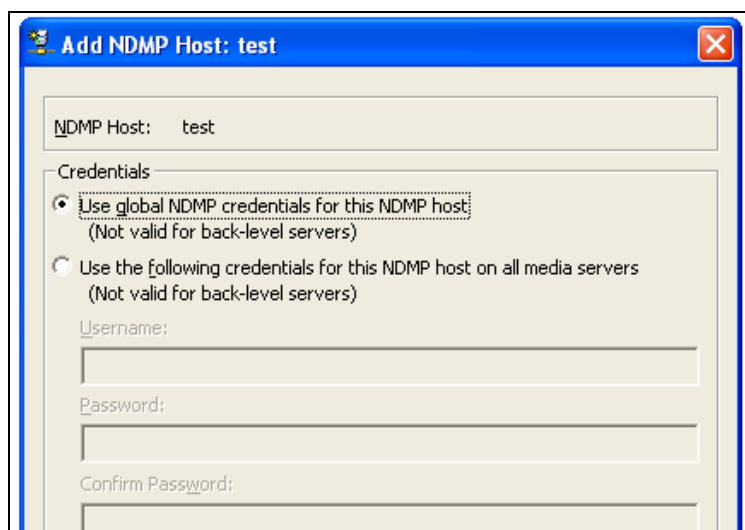
How to configure NDMP in NetBackup

Configuration of storage devices.

1. To start configuring storage devices in the NetBackup Administration Console, select Device Management → Devices → NDMP Hosts to view detailed information about the NDMP servers that are referenced in your Media Manager configuration.



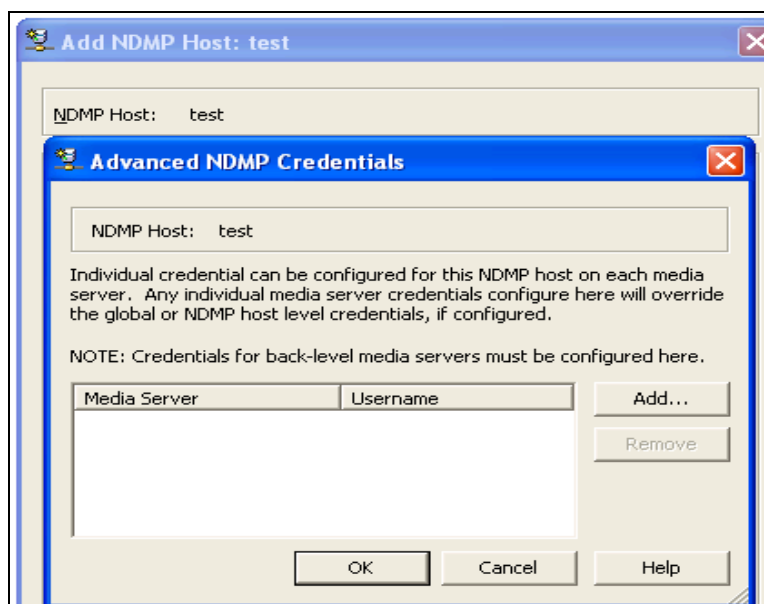
2. To add an NDMP host, select Actions → New → New NDMP Host. Specify the NDMP host name. After that, the new NDMP Host dialog appears.



Specify the following:

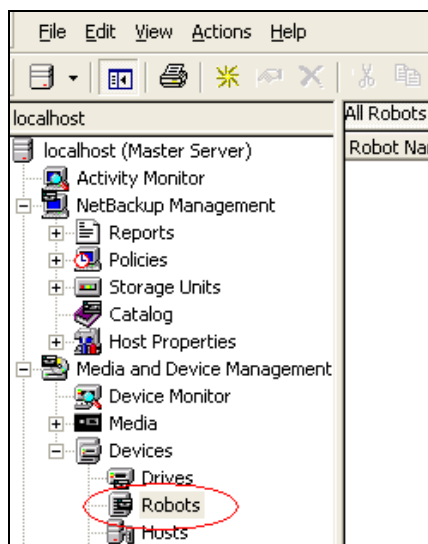
- Use global NDMP credentials for this NDMP host.
Select this option to enable all NetBackup media servers under the master server to access this NDMP host using a pre-defined global NDMP login. This login is created under Properties → Master Server → Properties → NDMP, on the NDMP Global Credentials dialog.

- Use the following credentials for this NDMP host on all media servers.
Select this option to enable all NetBackup media servers connected to the NDMP host to access the NDMP host using the login and password you specify on this dialog.
- Use different credentials for this NDMP host on each media server.
Select this option to specify NDMP logins for particular NetBackup servers, then click Configuration. The Advanced NDMP Credentials dialog appears.



Press Add to add one or more servers and specify each server credential as in the previous case. To perform three-way backups, you must authorize access to the desired NDMP host as described in the previous section.

- Three-way backups: for the hostname, specify the NDMP host that has no attached tape drive.
 - NDMP to Media Manager backups: for the NDMP host name, specify the NDMP host that will be backed up to the media manager storage unit defined on the NetBackup server.
3. To start configuring robots in the NetBackup Administration Console, select Media and Device Management → Devices → Robots. To add a robot, select Actions → New → New robot. After that, the new Robot dialog appears. The properties that appear in this dialog vary, depends on the server platform type and robot type.



Specify the properties for the robotic library.

Media Manager Robot Types

Robot Type	Description
ACS	Automated Cartridge System
ODL	Optical Disk Library
TL4	Tape Library 4MM
TL8	Tape Library 8MM
TLD	Tape Library DLT
TLH	Tape Library Half-inch
TLM	Tape Library Multimedia
TSH	Tape Stacker Half-inch

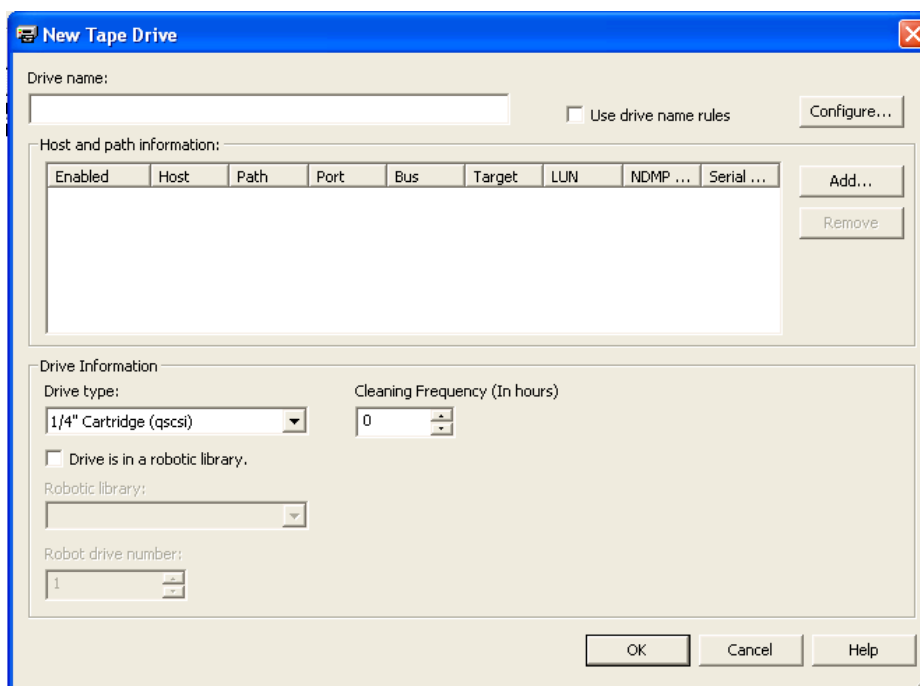
Robot Control Configuration Overview

ot Control	Media Manager Robot Type	Supported Media Server	Platform Information Required for Configuration
Local	ODL	AIX, Solaris, and HP-UX (except HPIA64)	Robotic device file
Local	TL4	UNIX	Robotic device file
Local	TL4, TL8, and TLD	Windows	Robot device or Port, Bus, Target and LUN
Local	TL8	UNIX	Robotic device file
Local	TLD	UNIX	Robotic device file
Type of Robot Control	Media Manager Robot Type	Supported Media Server	Platform Information Required for Configuration
Local	TLH	Local UNIX (except HPIA64, AIX, Linux and Linux64) and Windows	Library name
Local	TLH	AIX	LMCP device file
Local	TSH	AIX, Solaris, Linux, and Linux64	Robotic device file
Remote	ACS	All except HPIA64 and Linux64	ACSL host
Remote	TL8	All	Robot control host
Remote	TLD	All	Robot control host
Remote	TLH	All (except Linux64)	Robot control host
Remote	TLM	All (except Linux64)	DAS/SDLC server
NDMP	ACS, TL8, TLD, and TLH	Windows, AIX, Solaris, HP-UX, and Linux (except Linux64)	NDMP host name and Robot device

For robot control attached to an NDMP host, you must specify Robot Device path, NDMP Host name and SCSI coordinates (only for windows hosts).

After pressing OK, a prompt appears asking whether you want to stop and restart the NetBackup Device Manager Service; (this also stops and restarts any robotic processes). If your changes are complete, answer yes to this prompt.

- To add a drive in the NetBackup Administration Console, select Media and Device Management → Devices. Select Actions → New → New Tape Drive. The properties that appear in this dialog vary slightly, depending on the type of host platform and the robot type.



Drive Name

This name is used to identify the drive. It is important to note that each drive name must be unique. Descriptive names are recommended. Drive names are limited to 48 characters.

Drive Name Rule

Select the Use Drive Name Rules checkbox to automatically create drive names based on the rules you specify. You can use drive name rules when a drive is first added to your configuration. The default drive name rule creates names in the format VendorID.ProductID.INDEX. For example, the default name for a Quantum DLT8000 drive is QUANTUM.DLT8000.000. You can update the global drive name rule or create a local drive name rule. A global rule is stored in the EMM database and used on all connected device hosts. The global rule is used for the drive name unless a host-specific rule, or local rule, is specified.

Use any of the following drive attributes as part of a drive name rule.

- Host name
- Robot number
- Robot type
- Drive position
- Drive position information varies depending on the robot type. Drive position information can be ACS coordinates, TLM/TLH vendor drive name, or simply the robot drive number.
- Drive type
- Serial number
- Vendor ID
- Product ID
- Index

A Custom Text field is also available which accepts any of the allowable Media Manager characters. Press Configure to use the name configuration wizard.

Host and Path Information

Specify the device host and path for the drive by pressing Add. You can specify multiple paths to the same physical device. Adding multiple paths may cause the drive to become shared.

Drive Type

Specifies the type of drive that you are adding

Media Manager media types

Media Type	Description
QCART	1/4 inch cartridge tape
HCART	1/2 inch cartridge tape
HCART2	1/2 inch cartridge tape 2
HCART3	1/2 inch cartridge tape 3
4MM	4MM cartridge tape
8MM	8MM cartridge tape
8MM2	8MM cartridge tape 2
8MM3	8MM cartridge tape 3
DLT	DLT cartridge tape
DLT2	DLT cartridge tape 2
DLT3	DLT cartridge tape 3
DTF	DTF cartridge tape

Tape drive specification examples

Manufacturer	Media type	NetBackup default drive type
Certance		
	LTO	HCART
Exabyte		
	VXA-2	8MM2
HP		
	Ultrium 230 (LTO)	HCART
	Ultrium 460 (LTO2)	HCART2
	Ultrium 960 (LTO3)	HCART3

Manufacturer	Media type	NetBackup default drive type
IBM		
	3580 Ultrium (LTO)	HCART
	3580 Ultrium 2 (LTO2)	HCART2
	3580 Ultrium 3 (LTO3)	HCART3
	3590B	HCART
	3590E	HCART
	3590H	HCART
	3592J	HCART2
Quantum		
	DLT 4000	DLT2
	DLT 7000	DLT
	DLT 8000	DLT2
	SDLT 220	DLT3
	SDLT 320	DLT2
	SDLT 600	DLT
	SLT1	DLT
	DLT VS80	DLT
	DLT VS160	DLT
	DLT-V4	DLT
	LTO-2	HCART2
	LTO-3	HCART3
Sony		
	AIT-1	8MM
	AIT-2	8MM
	AIT-3	8MM2
	AIT-4	8MM3
	S-AIT	HCART
	DTF-1	DTF
	DTF-2	DTF
STK (Sun StorageTek)		
	T9840A	HCART
	T9840B	HCART
	T9840C	HCART3
	T9940A	HCART2
	T9940B	HCART2
Tandberg		
	LTO	HCART
	LTO2	HCART2
	LTO3	HCART3
	VXA-172	8MM3

Manufacturer	Media type	NetBackup default drive type
	VXA-320	8MM3
	SLR7	QSCSI
	SLR75	QSCSI
	SLR100	QSCSI
	SLR140	QSCSI

Cleaning Frequency.

NetBackup does not support cleaning drives in some robot types. If you want to set up a frequency-based cleaning schedule for the drive, set the number of mount hours between each drive cleaning. When you add a drive or reset the mount time to zero, Media Manager starts recording the amount of time that volumes have been mounted in that drive. If the drive is in a robotic library that supports drive cleaning and a cleaning cartridge is defined in that robotic library, cleaning occurs when the accumulated mount time exceeds the time you specify for cleaning frequency. The mount time is reset when the drive is cleaned. If you do not specify a cleaning frequency (the default frequency is zero), you can still use automated drive cleaning with the TapeAlert feature, provided the following conditions have been met:

- The drive supports TapeAlert.
- A cleaning volume has been defined in Media Manager.
- The host platform, robot type, and drive support drive cleaning.

If drive is robotic library specify option Drive is in robotic library and specify library parameters.

Robotic Library

This dialog box allows you to select any currently configured robotic library that can control the drive.

Robot Drive Number

Robot drive number specifies the physical location in the robot of the drive that you are adding. When adding more than one drive to a robot, you can add the physical drives in any order. For example, in a TL8 robot you can add drive 2 before drive 1. If you assign the wrong number Media Manager does not detect it initially, but an error will occur when the robotic control attempts to mount media on the wrong drive. Configuration of drives using the correct Robot Drive Number is important to the proper mounting and utilization of media. The Robot Drive Number, commonly set based on correlation of the drive serial number with drive serial number information from the robotic library, should be determined and validated before the device configuration is considered complete.

Configuration of media used.

Media Manager volumes are logical units of data storage or cleaning capability on media that have been assigned media IDs and other attributes, which are recorded in the EMM database. The attributes in the database include information to show the robotic location. This residence information for a volume includes the robot host, robot type, robot number, and slot location.

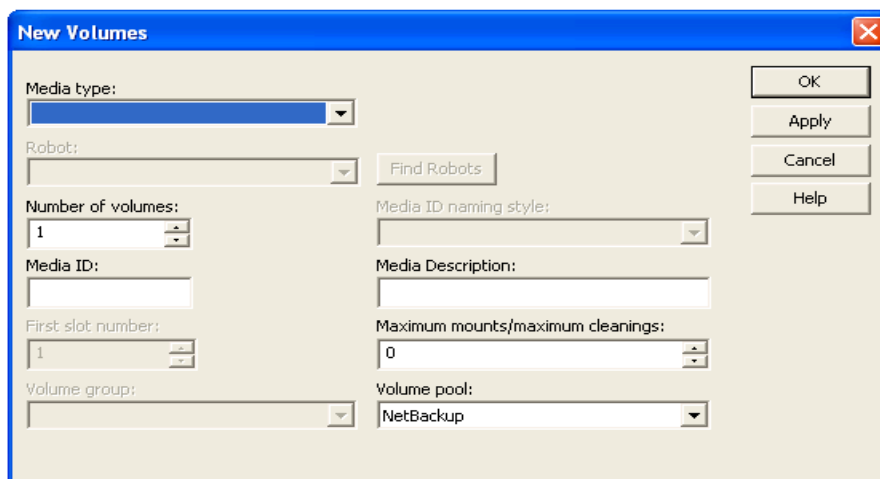
In the NetBackup Administration Console, select Media and Device Management → Media. A media management window similar to the following appears.



To add a volume, the Volume Configuration wizard can be used.

To use robot inventory to add robotic volumes, perform the Update Volume Configuration procedure. During the update, Media Manager assigns the media IDs and other attributes. You can also configure volumes automatically by inserting the media into a standalone drive. For an unused volume, NetBackup assigns a media ID, labels the volume, and uses it (if it needs a volume of that type for a backup). Media Manager adds the media ID (designated by NetBackup) and other attributes for the volume.

To add volume manually use Action → New → New Volumes.



Configuration of NDMP storage units

1. On the NetBackup master server, add an NDMP-type storage unit for the devices that will contain the backup data. In the NetBackup Administration Console, select NetBackup Management → Storage Units.
2. To create a new Storage Unit use Actions → New → Storage Unit . The New Storage Unit dialog appears.

For Storage unit name, enter a unique name for the storage unit.

For Storage unit type, select NDMP.

For On demand only: This specifies whether the storage unit is available only when a policy or schedule specifically requests it. If this option is not used, the storage unit is available to any NDMP policy or schedule.

For Storage device, select the type of device for this storage unit.

For NDMP host, specify the NDMP host where the tape drive is physically attached.

Configuration of NDMP policies.

Backup policies define the rules that NetBackup follows when backing up clients. A backup policy can apply to one or more clients. Every client must be covered by at least one backup policy. The best approach to configuring backup policies is to divide clients into groups according to any backup and archiving requirements, then create a policy for each group.

To display information about all policies on the current master server, click Summary of All Policies. A summary of all policies appears in the Details pane, subdivided into panes displaying Policies, Schedules, Clients, and Selections. To display the general attributes for a specific policy, select that policy in the left pane. The Details pane shows the general attributes for that policy only. Double-click on a policy to display the attributes in tabs, available for editing.

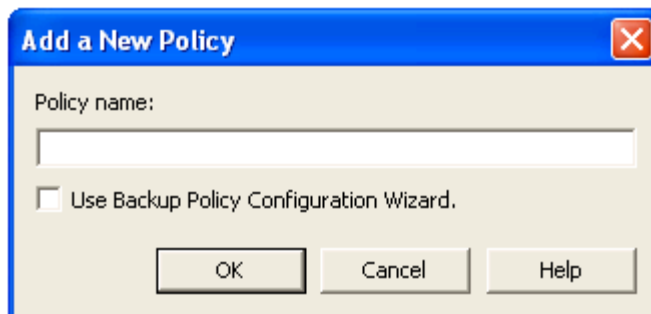
The easiest way to set up a backup policy is to use the Backup Policy Configuration Wizard. This wizard guides you through the setup process, simplifying the process by automatically choosing default values that are good for most configurations.

In the NetBackup Administration Console, select Master Server or NetBackup Management.

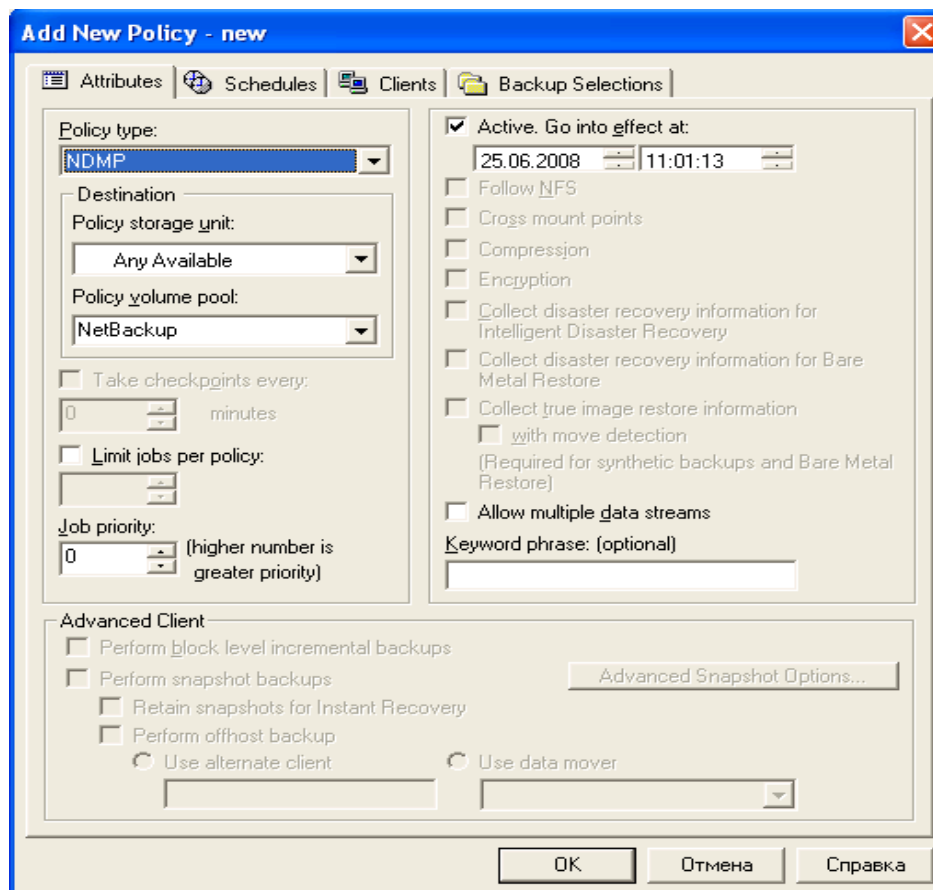
From the list of wizards in the Details pane, click Create a Backup Policy.

To create a policy rules without wizard.

1. In the NetBackup Administration Console, expand NetBackup Management → Policies. Select Actions → New → New Policy.



2. Type a unique name for the new policy in the dialog. Then a new dialog “Add New Policy – policy name” appears:



It is necessary to specify the following policy attributes in it:

- a. Policy Type: NDMP
- b. Policy Storage Unit:
 - If the NDMP host has more than one storage unit and you want to direct backups for this policy to a specific storage unit, specify the name of that storage unit.
 - For a three-way backup, specify a storage unit that was defined for the target NDMP host with attached tape.

- For NDMP backup to Media Manager devices, specify a Media Manager storage unit defined for a device connected to a NetBackup media server.

Specify the following parameters for every client in NDMP policy:

Hostname: Name of the NDMP host

Hardware and operating system: NDMP NDMP

Files:

The Backup Selections list must specify directories from the perspective of the NDMP host. Two examples:

/home/dir1/

/vol1

The following Backup Selections capabilities are NOT supported for an NDMP policy:

- Wildcards in pathnames. For example, /home/* is an invalid entry.
- Individual file names. Only directory or volume names are allowed.
- Exclude list (because client software is not installed on the NDMP host).

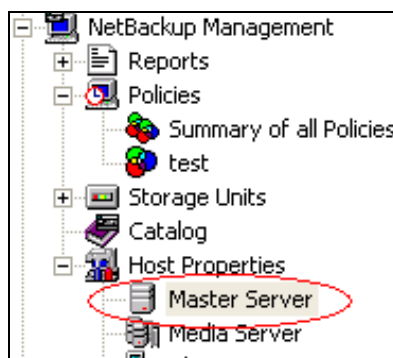
You can specify any of the following backup types in a schedule for an NDMP policy:

- Full
- Cumulative Incremental
- Differential Incremental

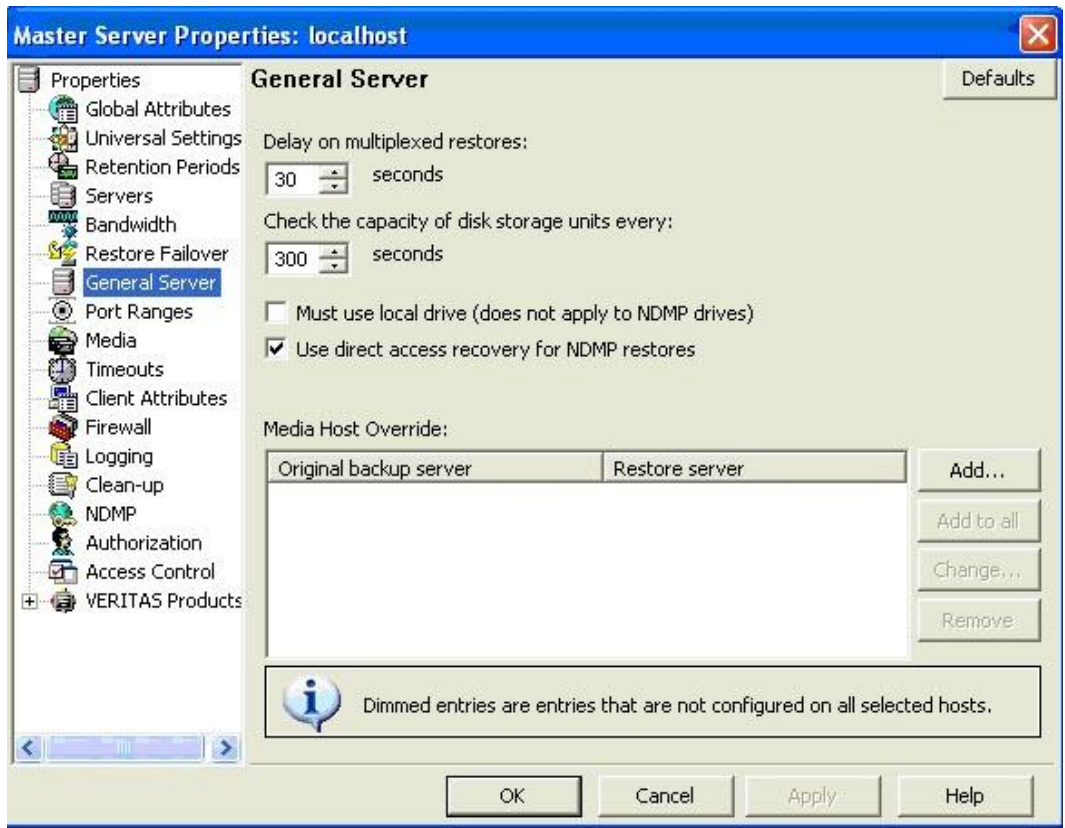
Specify Override policy storage unit only if this client of NetBackup (the NDMP host) has more than one storage unit and you want to use a specific storage unit for this schedule. In this case, the client must be the only client in this NDMP policy.

Customize server preferences.

By default NetBackup for NDMP is configured to use Direct Access Recovery (DAR). For each restore, NetBackup automatically determines if the use of DAR will speed up the restore. NetBackup uses DAR only when it will result in a faster restore. DAR can be turned off if desired. This may be necessary if you are having problems with DAR and your NDMP host is an older machine or is not running the latest NAS OS version. NetBackup restricts maximum files with DAR to 1024.



To change DAR setting in the NetBackup Administration Console, expand Host Properties and click on Master Servers or Media Servers. Right-click on the name of the server and select Properties.



Click on "General Server". Uncheck the Use direct access recovery for NDMP restores box, and click Apply. This disables DAR on all NDMP restores.

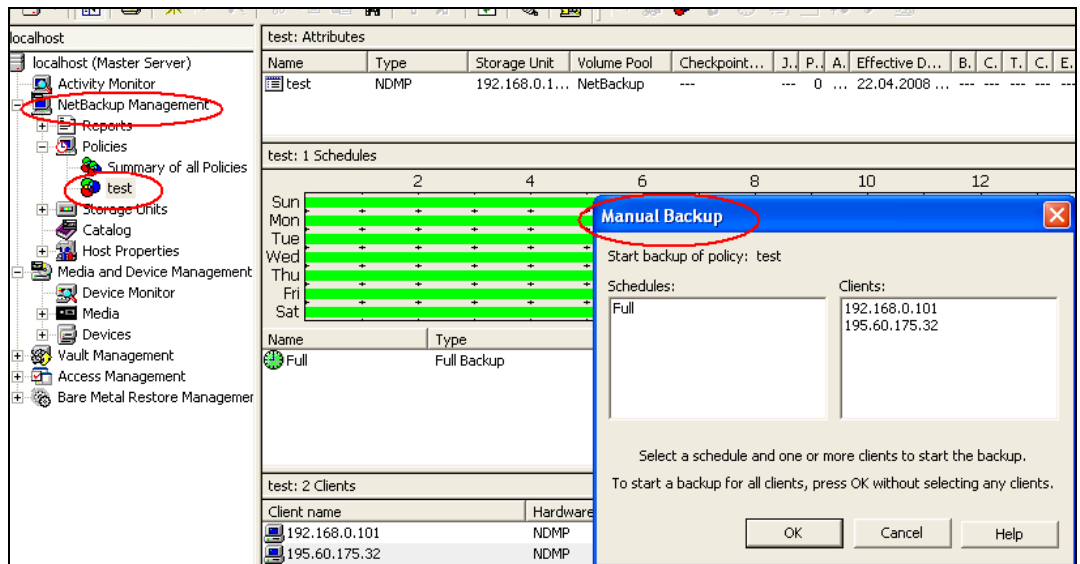
Backup process

Automatic Backup of an NDMP Policy

Use this item with properly configured NDMP policy scheduling.

Manual Backup of an NDMP Policy

Click on Policies. Right click on the NDMP policy name and select Manual Backup from the pop-up menu. This opens the Manual Backup dialog.

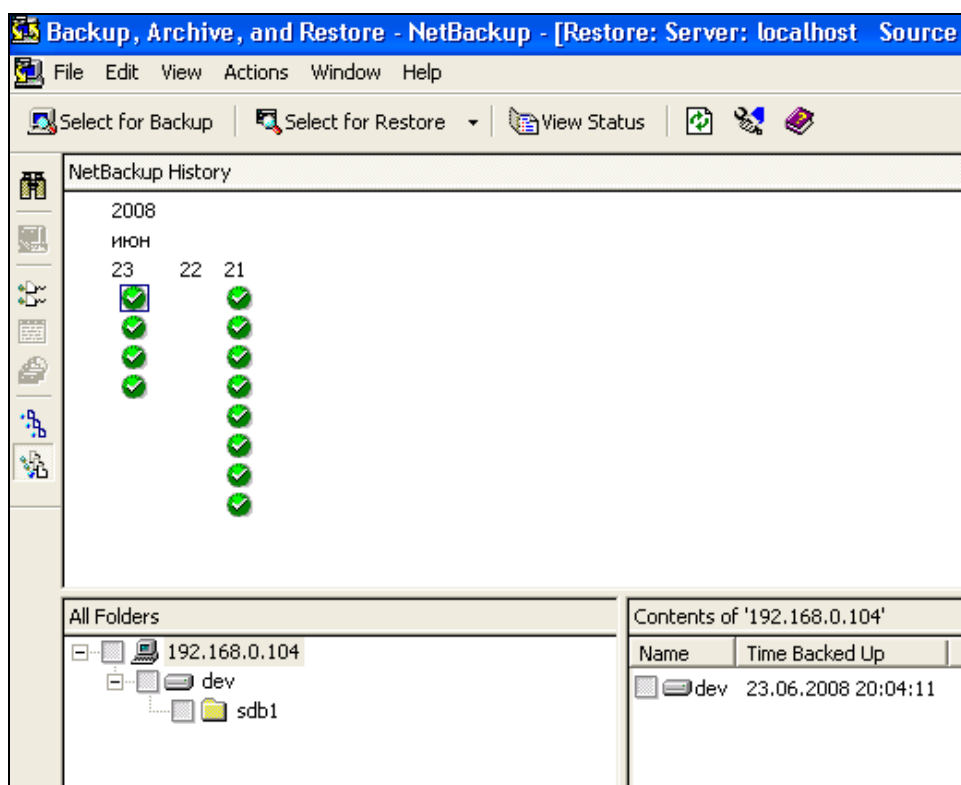


In the Manual Backup dialog, select a schedule, then select the clients (NDMP hosts) that you want to back up. If you do not select any schedules, NetBackup uses the schedule with the highest retention level. If you do not select any clients, NetBackup backs up all configured NDMP hosts. Click OK to start the backup.

Restoration process

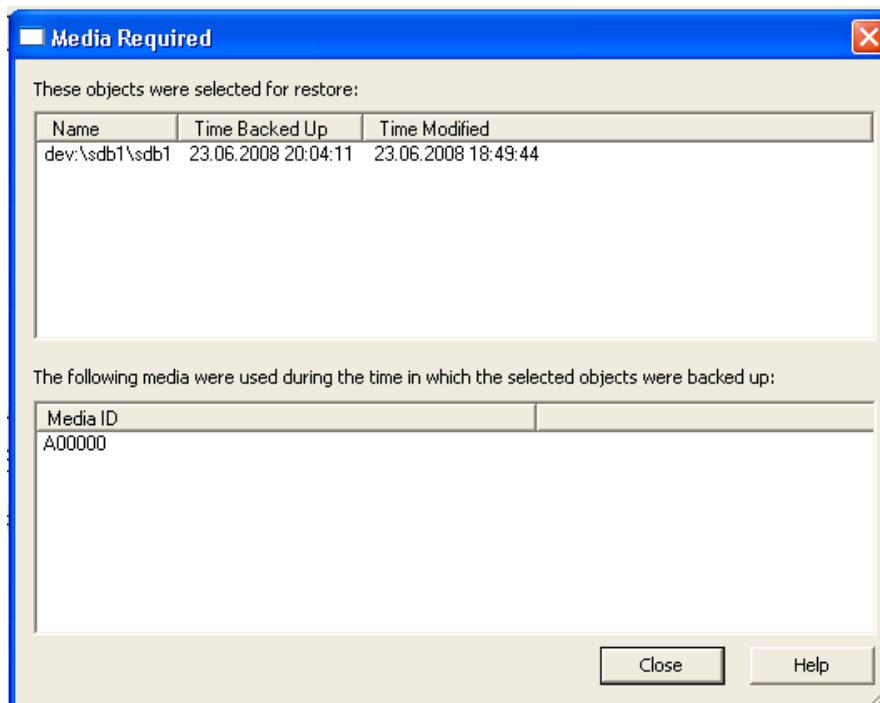
The administrator can use the Backup, Archive, and Restore interface on a NetBackup server (master or media server) to restore files to the NDMP host from which they were backed up, or to a different NDMP host. On the File menu, click Select Files and Folders to Restore, then click either from Normal Backup or from Archived Backup (depending on whether you are restoring from a normal backup or an archive).

There may be a delay while NetBackup reads information about the backups and builds the list of files you can restore. The title bar of the window displays the names of the server and client used for the operation.

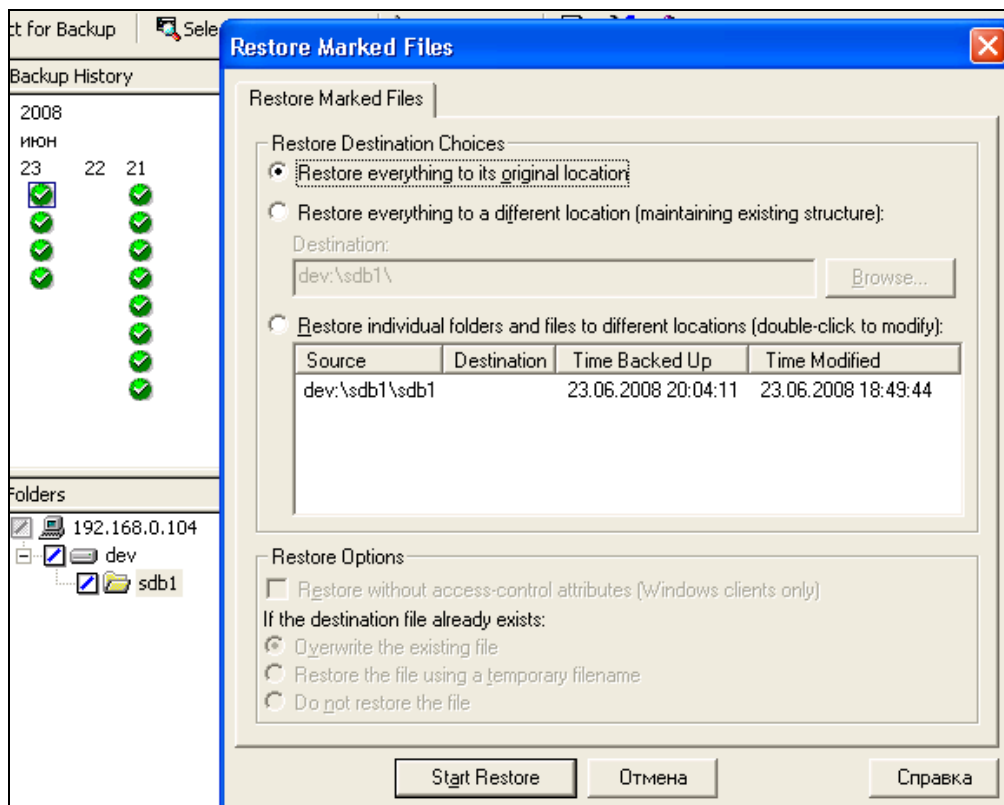


To select an item, click in the check box to the left of the item. A check mark indicates an item is selected; a diagonal slash mark indicates that only some items within a folder are selected. You can select items in the All Folders pane or the Contents pane.

To preview a list of the media required for restore, select Actions → Preview Media. If the backup images required to restore the data are on disk storage units rather than removable media such as tape, no media will be listed if you try to preview media.



On the Actions menu, click Start Restore of Marked Files. The Restore Marked Files dialog appears. The items marked for restore are listed in the dialog window.



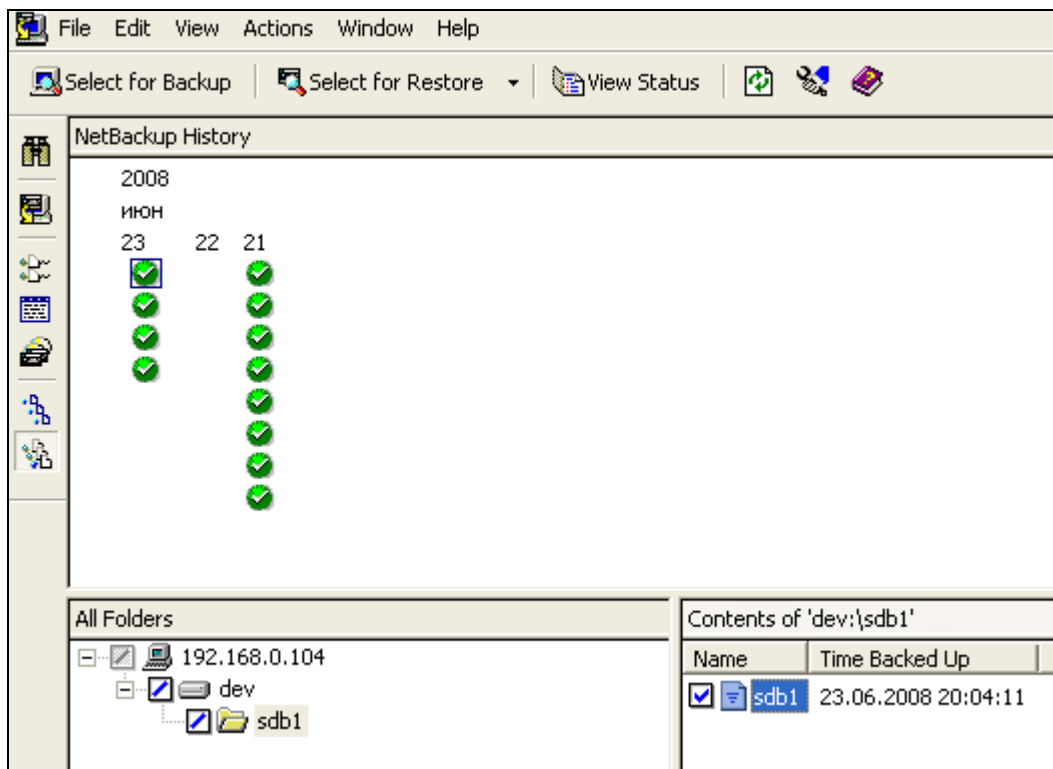
Specify restore parameters and press Start Restore. A dialog appears, indicating that the restore began successfully and asking if you want to view the progress of the operation.

To view the status of the restore, click Yes in the dialog. The View Status dialog appears, from which you can view the progress of the restore. The restore may take a few minutes to complete.

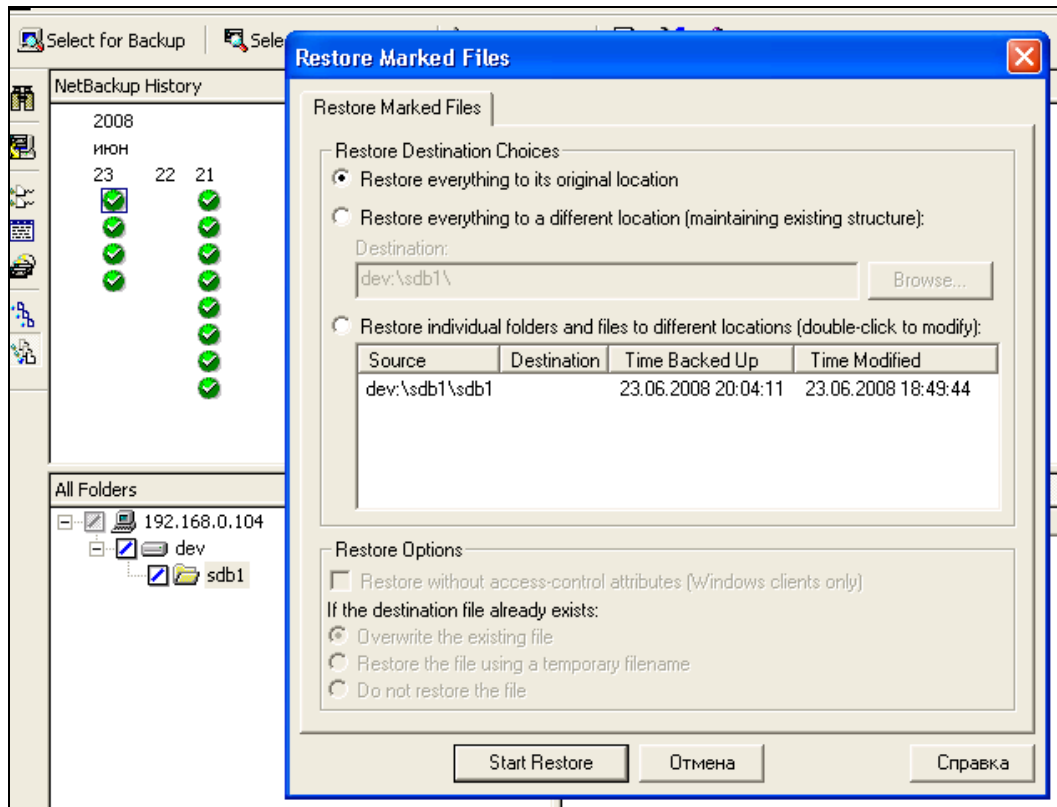
After starting a restore operation, you can close Backup, Archive, and Restore and perform other tasks on your computer. NetBackup will continue the restore operation in the background.

Using NetBackup to backup and restore special device files through NDMPD

As described before in this guide, NetBackup does not allow you to add files in the Policies backup selection path. But to perform a backup of a single file (or group of files), you can add the path with a file name. Backup id: Treat it as a directory, but NDMPD handles this case properly and creates a correct backup image. Then to restore these files in the Backup, Archive, and Restore application, you need to select the image and check the desired file. Because NetBackup treats all as directories, you have a folder which consists of a path and the name of a file. All parts of this path must be checked with a slash, not a check, as described in the picture.



On this picture, we can see the backup of a special file /dev/sdb1. This image looks like we're doing a backup of the directory /dev/sdb1/. After selecting Start Restore, the Restore Marked Files dialog appears.



You can see that NetBackup tries to restore to the /dev/sdb1 file sdb1 – but this is ok. NDMPD handles this case and restores the file /dev/sdb1.

Function: Data (file) replication agent

This function enables the data (file) replication agent.

NOTE It is mandatory to enable this function in order to replicate to the destination share.

NOTE Data (file) replication is performed by the rsync application.

NOTE In order to perform rsync over WAN please follow a schema for topology:

```
|server 1|----|internet|----|router/firewall|----|server 2|
```

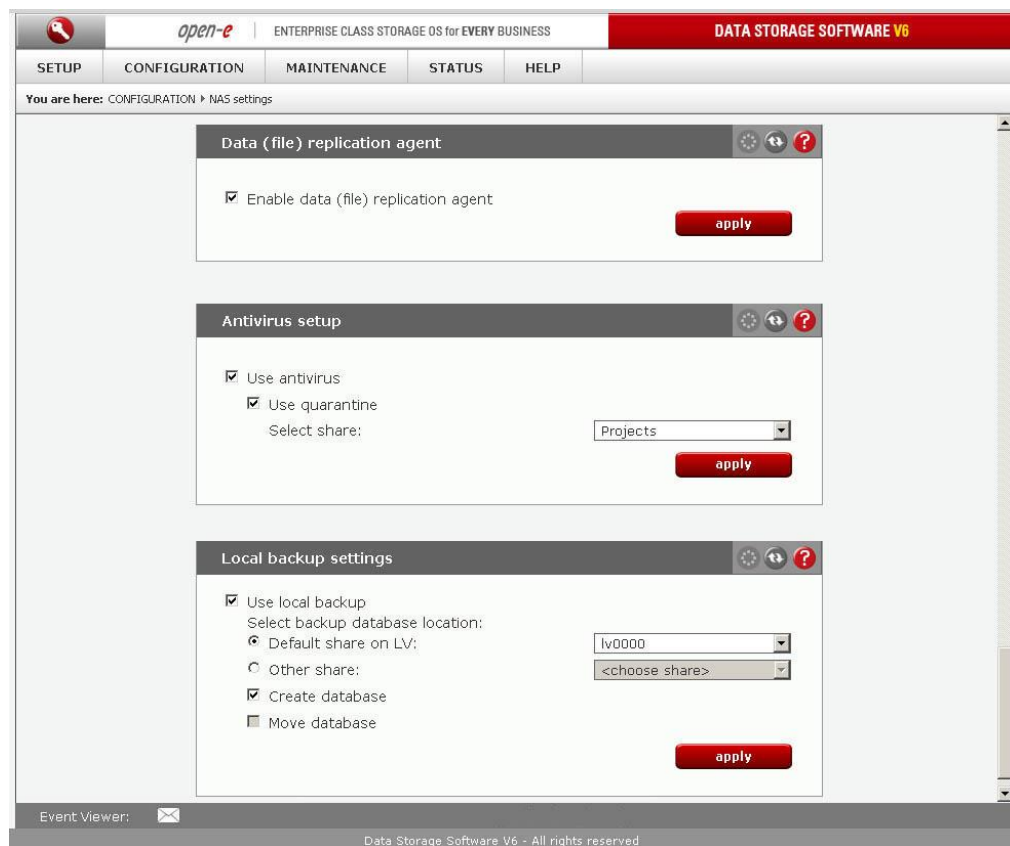
Description:

server 1 - server with internet IP

router/firewall - forwarding port 873 from server 2 to local IP

server 2 - machine with local IP behind the NAT

Rsync works both ways.



Function: Antivirus setup

This function provides antivirus protection for your data.

Antivirus scans the following file types:

- Archives and compressed files:
 - Zip,
 - RAR (2.0),
 - Tar,
 - Gzip,
 - Bzip2,
 - MS OLE2,

- MS Cabinet Files,
 - MS CHM (Compiled HTML),
 - MS SZDD compression format,
 - UPX (all versions),
 - FSG (1.3, 1.31, 1.33, 2.0),
 - Petite (2.x).
- mail files,
 - MS Office document files,
 - executables files.

The Use quarantine feature allows you to choose whether you want to move infected files to the default folder (quarantine_dir), which is automatically created on shares, or manually choose the quarantine directory on a previously created share.

To get to know more about the infected files examine the logs (you can download them in **MAINTENANCE** -> **Hardware**). The relevant logs are the following:

- scan_shares_ANTIVIRUS_[antivirus_task_name].log for regular antivirus scanning,
- clamd.log for SMB online scanning.

NOTE If the Use quarantine option is disabled you will only be informed about the infected file.

Please note that antivirus scanning may decrease the overall system performance

Function: Local backup settings

This function enables local backup functionality.

Use default share on LV

With this option you can store a database of all backups on the default share within the selected logical volume.

Use other share

With this option you can store database of all backups on selected share.

Create database

Use this option to create a backup database on the selected share.

Move database

If this option is checked then existing backup database will be moved to selected share.

NOTE It will not be possible to create a backup database on a share if it contains any files other than backup database files. If you want to create a backup database on such a share, you have to first delete all files from it..

5.2.2.3 NAS resources

Here you can configure NAS resource operations. All you need to do is use the tree diagrams on the left hand pane, which will allow you to manage all shares, users and user groups in a structured manner.

5.2.2.3.1 Shares

Here you can find a list of all your Open-E Data Storage Software V6 shares. After clicking on "Shares," the "Create new share" function allows you to define a new share, set up a comment for it (optional) or set its path. You will find all existing shares organized below. You can edit them with a simple click. All parameters except the name are modifiable. If you need change the name, delete it and assign a new name.

Windows users will see the name of the share in their network environment folders when they click on the icon for the Open-E DSS server. Comments are only visible if the users take a look at the share properties, or if shares are listed in detail.

The path represents the physical location of the data on the Open-E Data Storage Software V6 share volume. The user does not have access to this information. In order to simplify the navigation through the directories, you can use the browser function.

Function: Create new share

To create a share, enter the share name, a comment (optional) and set its path. To use the default share path, leave the Default path box checked. If you want to use a specific path, please check the Specified path box and select path to the share.

The screenshot displays the Open-E Data Storage Software V6 web interface. The top navigation bar includes 'open-e', 'ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS', and 'DATA STORAGE SOFTWARE V6'. The main menu has 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail shows 'You are here: CONFIGURATION > NAS resources > Shares'. The left sidebar contains 'Shares', 'Users', and 'Groups' sections. The 'Shares' section is active, showing a 'Create new share' form with the following fields: 'Name' (Projects), 'Comment' (Company Data, Photos, etc.), 'Default path' (checked, /v0000/Projects), and 'Specified path' (unchecked, /). An 'apply' button is visible. Below the form is the 'ACL (Access control list)' section, which includes a 'Browser' tab, 'Users & Groups', and 'Access Permissions' sub-tabs. The 'Selection' and 'Filter' fields are empty. A tree view shows a folder named 'v0000'. The bottom status bar indicates 'Event Viewer' and 'Data Storage Software V6 - All rights reserved'.

NOTE Please do not use spaces and special such as: ~!@#%^&()+[]{}*;,:".,%|<>?/\='

NOTE The workgroup/domain name configured in the NAS settings tab has to match the network settings. Otherwise, the configured shares will not be visible in the network environment. If you have made changes to the workgroup and server name in the NAS configuration, it can take some time before each workstation computer in the Windows network detects the new name.

Function: ACL (Access control list)

With this function you can assign ACL permissions to your folders or files.

Browser

Filter

Allows to show only folders or files from given name.

Selection

Shows where you are in directory's browser.

Users & Groups

Available Users & Groups

List of available users and groups which can have access permissions assigned to them.

Selected Users & Groups

List of selected users and groups which will have access permissions assigned to them.

Access Permissions

Recursive

If this option is checked the ACL permissions will be assigned to all folders and files within the selected folder.

Set owner

If this option is selected the designated user(s) or group(s) will be owner(s) of the selected folders or files.

Access Permissions:

- read,
- write,
- execute (for folders this means the permission to open, while for files, the permission to execute).

In order to assign ACL permissions:

- select folder or file,
- click tab Users & Groups,
- select which users or groups will be available to assigned access permissions,
- click the access permissions,
- select user ([U]) or group ([G]) or User(owner) or Group(owner),
- check the appropriate boxes under Access Permissions,
- click Apply.

Examples:

Example 1.

This example presents a situation in which User1 has read access permissions for directory A only and does not have access permissions for subdirectory B at all.

A User1 r-x

B User1 ---

Example 2.

User1 has access permission only for reading for directory A. Can enter sub directory B, but no files are visible.

A User1 r-x

B User1 --x

Example 3.

User1 can enter the subdirectory C and can read and write files within that subdirectory.

A User1 r-x

B User1 --x

C User1 rwx


NOTE Designating the user as a superuser within the SMB settings function will automatically assign all access permissions to that user.

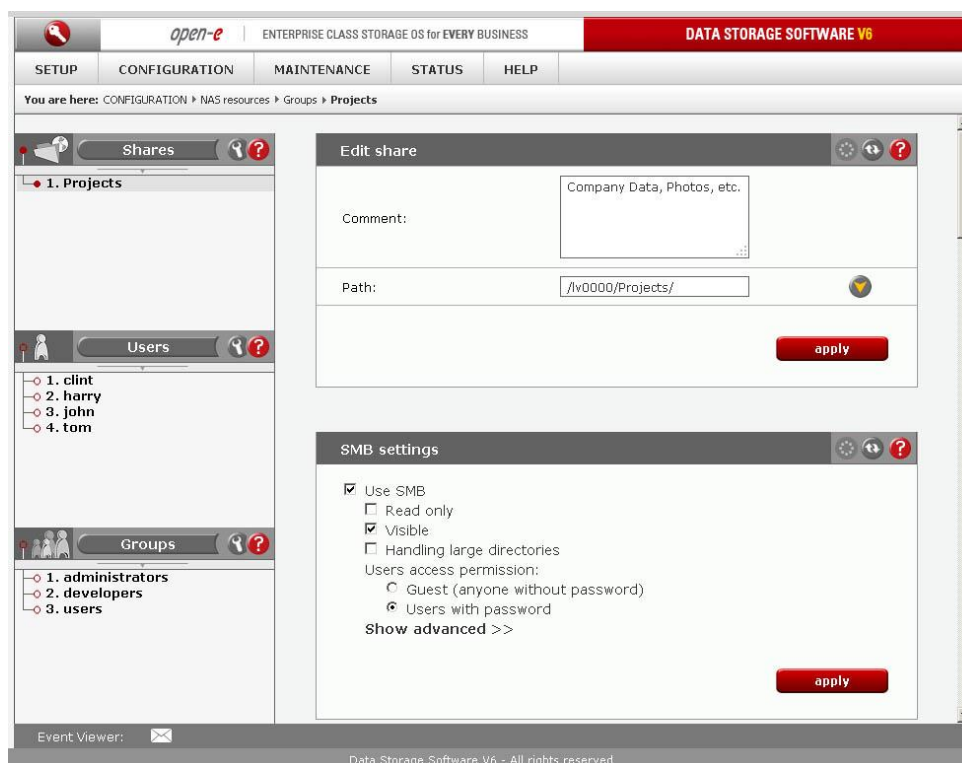
Assigned access permissions will be available under sFTP, FTP and SMB network protocols.

User(owner) or Group(owner) can also have access permissions assigned. These permissions may be different from the ones assigned to the same user in the Users/Groups list.

After clicking the “Create” button on the left pane, the name of an earlier established share will appear, in this case “Projects”. By clicking on that name, you will see all available options for setting up the share:

Function: Edit share

Here you can edit the share path and add or delete directories by click on  button.



The screenshot displays the open-e web interface for configuring shares. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'You are here: CONFIGURATION > NAS resources > Groups > Projects'. The left sidebar shows three main sections: 'Shares' (with '1. Projects' selected), 'Users' (listing '1. clint', '2. harry', '3. john', '4. tom'), and 'Groups' (listing '1. administrators', '2. developers', '3. users'). The main content area is split into two panels. The top panel, 'Edit share', contains a 'Comment' text area with 'Company Data, Photos, etc.', a 'Path' text field with '/lv0000/Projects/' and a dropdown arrow, and an 'apply' button. The bottom panel, 'SMB settings', includes checkboxes for 'Use SMB', 'Read only', and 'Visible', and radio buttons for 'Guest (anyone without password)' and 'Users with password', with a 'Show advanced >>' link and an 'apply' button. The footer shows 'Event Viewer: [icon]' and 'Data Storage Software V6 - All rights reserved'.

Function “SMB Settings”

This function allows you to change the SMB protocol settings for this share. To restrict access to read-only, make sure the **Read-only** box is checked. Uncheck the **Visible** box to hide the share from the browse list. Select **Guest** to allow anonymous access to the share. Select **Users with password** to enforce user authentication.

Handling large directories

This option allows you to significantly speed up file listing. The prerequisite is to convert all file and directory names to lower or upper case exclusively. Please select your preferred choice below.

NOTE You will need to convert your existing file and directory names to lower or upper case before selecting this option, as otherwise they will become inaccessible.

NOTE Please note that due to case sensitivity issues the operations above may have negative impact on Unix-like systems. Please prepare accordingly beforehand. Windows is not affected.

Inherit owner

The ownership of new files and directories is normally governed by effective uid of the connected user. If this option is checked, the ownership for new files and directories is taken from the ownership of the parent directory.

Common scenarios where this behavior is useful is in implementing drop-boxes where users can create and edit files but not delete them.

Inherit ACL's

This option can be used to ensure that if default acls exist on parent directories, they are always honored when creating a new file or subdirectory in these parent directories if the option is checked.

Inherit permissions

If this option is checked, new directories inherit the mode of the parent directory and new files inherit their read/write permissions from the parent directory.

This option can be particularly useful on large systems with many users to allow a single [homes] share to be used flexibly by each user.

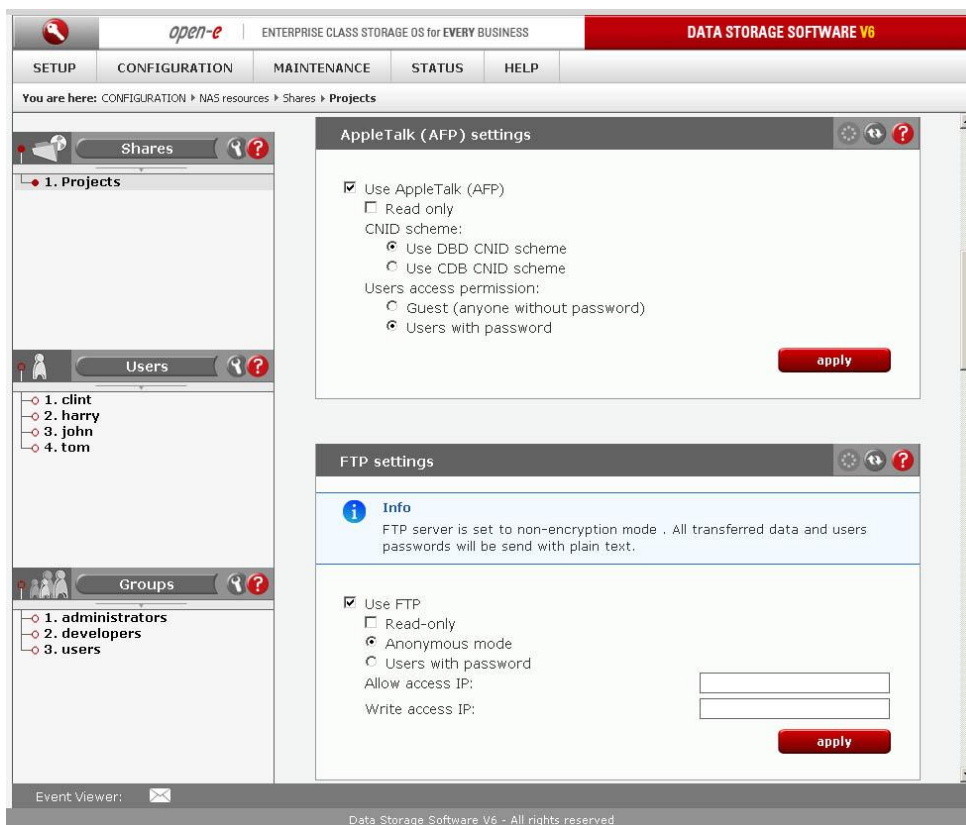
Map ACL inherit

This option controls whether SAMBA will attempt to map the 'inherit' and 'protected' access control entry flags stored in Windows ACLs into an extended attribute. This option allows the Windows ACL editor to correctly use inheritance with the Samba POSIX ACL mapping code.

Locking

This option controls whether or not locking will be performed by the server in response to lock requests from the client.

NOTE Be careful about disabling locking as lack of locking may result in data corruption. You should never need to disable this option.



Function: AppleTalk (AFP) Settings

With this function you can activate the AppleTalk protocol in the network to access shares on the NAS Server.

How to use AppleTalk with the NAS server:

- enable AppleTalk in the **CONFIGURATION → NAS settings** menu,
- select the share to be made accessible via AppleTalk in the **CONFIGURATION → NAS resources** menu,
- enable AppleTalk for this share.

How to connect to the NAS AppleTalk server:"

In MAC OS 9:

- open the Chooser (**APPLE MENU → Chooser**),
- click on **AppleShare**,
- if the NAS server does not appear on the fileserver list, click on **Server IP address** and enter the NAS server IP,
- click **OK** and choose the login type. Enter a username and password if you want to log in as a specified user,
- from the available options select the shares you would like to mount,
- the icons of the mounted shares will appear on the desktop,
- to open the share click on its icon,
- to unmount the share drop its icon into the trash bin.

In MAC OSX 10.3:

- click on the MAC HD, then **Applications** followed by **Utilities**,
- check if AppleTalk is active from the Directory Access; if not, activate it,

- if the NAS server does not appear on the Network list, open a Web browser and enter the IP address of the AppleTalk server. `afp://192.168.1.3` ("`afp://`" is crucial here),
- choose the login type. Enter a username and password if you want to log in as a specific user,
- if you cannot log in, click on **Directory Access/Authentication** and change the searching path for authentication information,
- from the list of available shares select all those you want to mount,
- the icons of the mounted shares will appear on the desktop.

Alternative method:

- click on **Connect to server** from the Finder (GO submenu),
- enter: `afp://ip_address`,
- you can add a link to the AFP server by clicking on the + sign. This adds a link in the Favorite Servers field,
- choose the login type and enter a password if you want to log in as a specific user,
- from the list of available shares select all you want to mount,
- the icons of the mounted shares will appear on the desktop.

Function: "FTP Settings"

You can enable FTP services for each share separately. Your choices here include:

- Anonymous mode,
- Users with password (with optional encryption to be set up under **CONFIGURATION** -> **NAS settings** -> **FTP settings**).

Selecting Anonymous mode will enable FTP sharing with anonymous users. The access is set to READ+WRITE by default for all IPs. To change that, activate the **Allow access IP** and **Write access IP** options. Clicking **Apply** will make the share available over FTP.

To connect to this share FTP client software is required – e.g. Internet Explorer has FTP support. To connect with IE when using the Anonymous mode, please enter the following in the address line: `ftp://<Server IP>/pub/` (e.g. `ftp://192.168.0.220/pub/`). When using an SFTP client, please type in the following: `ftp://<Server IP>/share/` (e.g. `ftp://192.168.0.220/share/`). *Share* is a keyword. Many FTP client programs need a username and a password to establish connection. In the Anonymous mode the username is **anonymous** and there is no password (i.e. the password field should remain empty). All anonymous shares are in the folder called *share*. Any user connecting from an IP which has not been granted full access will see all the shares but will be unable to see any restricted directories.

It is good practice to use email address for anonymous login password. Only few FTP clients support SFTP(SSL/TLS).

NOTE An anonymous user will see only files and directories owned by them.

When the **Users with password** option is enabled, users have access to the share after inputting the authorized username and password.

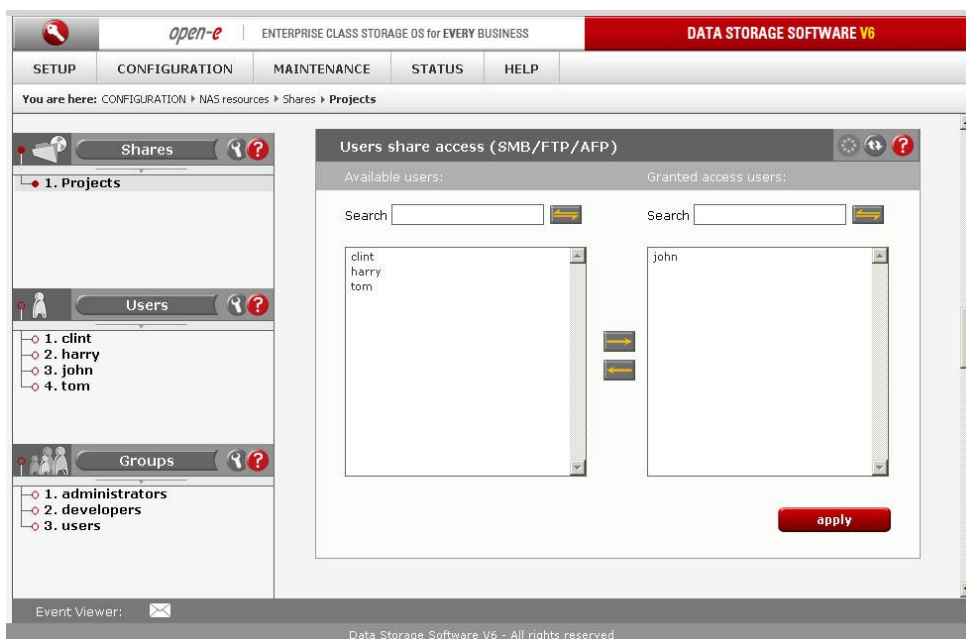
NOTE If the NAS server uses Windows domain authorization the short domain name along with a plus sign must precede the username, e.g. **DOMAIN+Administrator**.

To connect to a share via the Users with password mode, switch the encryption type in your SFTP client to SSL or TLS. All Users with password shares are in the *shares* folder. Users see only the authorized shares.

NOTE If you are unable to see any directories when connected to the FTP server please make sure that you have the rights to access any shares over FTP. If you still cannot see any directories please switch your FTP client to passive mode.

NOTE Most FTP clients have bookmarks which allow for setting up IP, a port home folder, etc. Suggested home folder for the Anonymous mode users is *pub* while for the Password mode users it is *shares*.

In functions “Users share access (SMB/FTP/AFP)” and “Groups share access (SMB/FTP/ASP)” you can grant access to the shares to available users and/or groups.

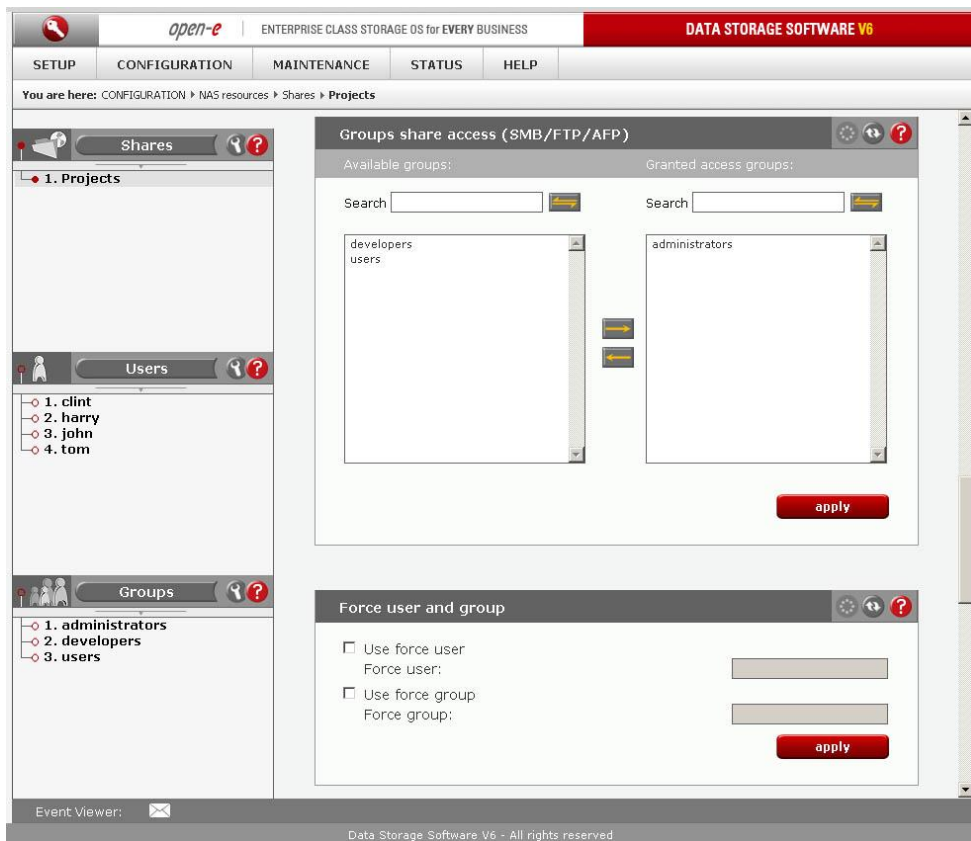


Function: Users share access (SMB/FTP/AFP)

Add the users access to the shares by selecting the users and clicking the button . To remove access for users to the specified shares, select the users and click the appropriate arrow button to remove them from the Granted access users list.

NOTE You can use the following keyboard keys in the lists (you need to first set the focus on the preferred list):

- Home: jump to the first,
- End: jump to the last,
- Shift + arrow key: multi-select,
- letter key: jump to the first entry starting with the pressed key.



Function: Groups share access (SMB/FTP/AFP)

Here you can add groups which are granted access to this share.

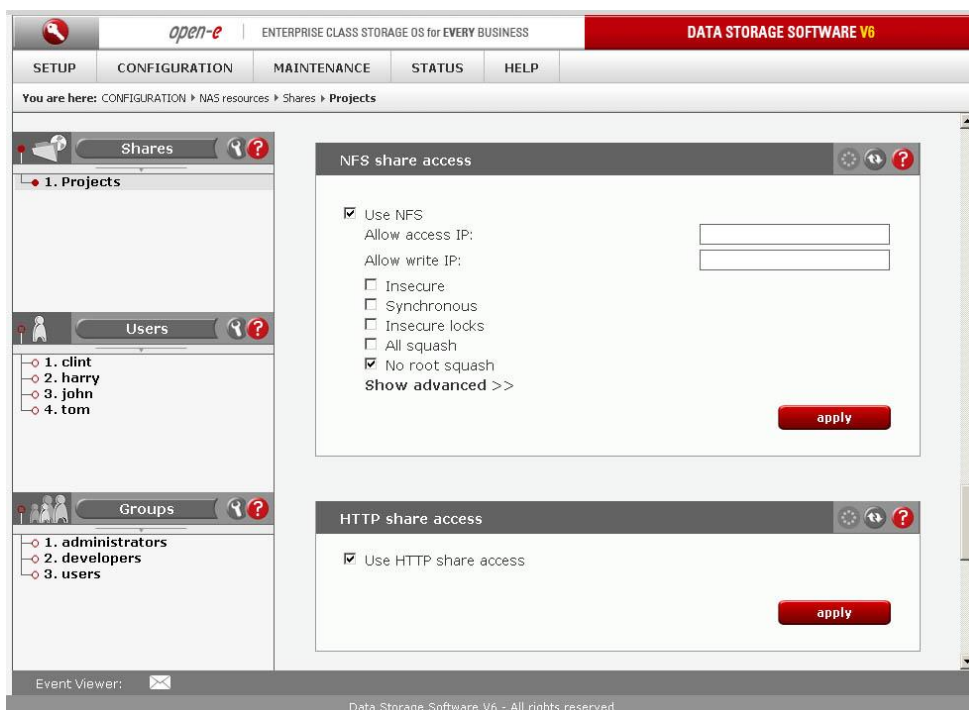
NOTE You can use the following keyboard keys in the lists (you need to first set the focus on the preferred list):

- Home: jump to the first,
- End: jump to the last,
- Shift + arrow key: multi-select,
- letter key: jump to the first entry starting with the pressed key.

Function: Force user and group

This function allow you to force the selected user/group to be the owner(s) of all objects created from this point on. Also, all users logging in will receive the same permissions as the selected user and group. Please note this means they will lose their rights to objects for which the forced user and group does not have similar rights to.

This option applies only to the SMB protocol.



Function: “NFS share access”

Please click **Use NFS** to activate access to this share via NFS.

NOTE In order to mount this share via NFS, please use the following syntax:
`mount -t nfs IP_addr:/share_name /local_mount_point.`

In order to mount a share in synchronous mode please use:
`mount -t nfs IP_addr:/share_name /local_mount_point -o sync`

In order to mount a share in asynchronous mode please use:
`mount -t nfs IP_addr:/share_name /local_mount_point -o async`

When using synchronous mode, data is not stored in a buffer, but transferred at once. In asynchronous mode, the data is first stored in a buffer and then transferred.

The name of the share is case sensitive in the mount syntax. It is important to exercise due caution in this respect, as otherwise you might not be able to access the share.

You can use the following NFS option fields:

Allow access IP

Please enter an IP address or an address range which should be allowed to access NFS. You can enter a single IP, multiple IPs separated by a semicolon, or an IP address range. IP addresses not added to the Allow write IP list will have read only access.

Allow write IP

Please enter an IP address or an address range which should be allowed to write to NFS. You can enter a single IP, multiple IPs separated by a semicolon, or an IP address range.

Insecure

Allows incoming connections to originate from ports greater than 1024.

Synchronous

When this option is enabled, the local file system will wait for the data to be written to the NAS server. NFS performance will be lowered. However, this will ensure that the data will be written directly to the NAS server and will not be stored in the system cache.

Insecure locks

Disables authorization of locking requests. Some NFS clients do not send credentials with lock requests, and will, therefore, work incorrectly with secure locks. In this case, you can

only lock world-readable files. If you have such clients, you can use the Insecure locks option.

All squash

Maps all user IDs to the user `nobody` and all group IDs to the group `nogroup`.

No root squash

Select this option to grant the client machine's root user the root access level to the files on the NAS server. Otherwise the client root will be mapped to the user `nobody` on the NAS server.

NOTE When you leave the Allow access IP and Allow write IP fields blank, all computers in the subnet will have write access to NFS. When you set the Allow access IP field and leave the Allow write IP field blank, the specified computers will have read only access and none will have write access. When you set the Allow write IP field without setting the Allow access IP field, the specified IPs will have write access and all computers in the subnet will have read only access.

- `xxx.xxx.xxx.xxx`,
- `xxx.xxx.xxx.xxx;xxx.xxx.xxx.xxx; ...`,
- `xxx.xxx.xxx.xxx/network_prefix_length`.

NOTE Some Linux distributions have UDP as the default protocol for NFS. In case of problems, it is recommended to switch to TCP by using the following syntax: `mount -t nfs -o tcp ip_address:/share_name /mnt/point`.

If the host has an entry in the DNS field but does not have a reverse DNS entry, the connection to NFS will fail.

Function: Http share access

With this option you can enable http access for selected share.

In order to access https-enabled shares via Web browser, please enter the following in the address line of your browser:

```
https://SERVER_IP_ADDR:PORT  
https://SERVER_NAME:PORT
```

For example:

```
https://192.168.0.220:444
```

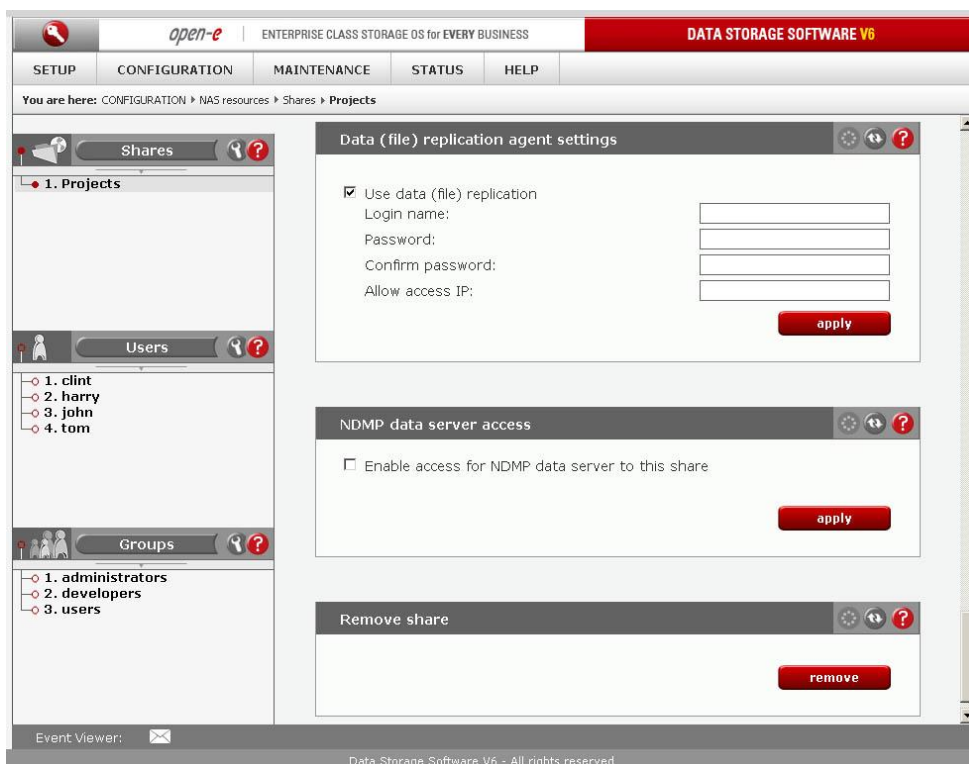
NOTE In order to access your share via a Web browser, you need to turn on the Enable http share browser option in the CONFIGURATION → NAS settings → Http share access setup function.

Function: Data (file) replication agent settings

This function allows you to configure data (file) replication for a share.

In order to enable it, check the Use data (file) replication box.

NOTE It is recommended to set a login name, a password and an Allow access IPs list, as otherwise everyone will have access to the share.



Function: NDMP data server access

This option enables NDMP for this share. Please make sure you have checked the **Enable NDMP data server** in **CONFIGURATION → NAS Settings → NDMP data server** beforehand.

Function: Remove share

Click **Remove** button to remove the share.

NOTE No data (directories or files) will be deleted on the logical volume. You can recreate a deleted share at any time. Just go to the NAS resources menu, click on Shares (as if you were creating a new share), scroll down to the ACL window, and browse the directory structure to find the folder you want to assign to the share. Finally, scroll back up to the Function: Create new share, and in the Name field, please enter your share name and click Apply. Now you can find the deleted share again in your network neighborhood.

5.2.2.3.2 Users

In the mode "Workgroup internal LDAP" the category "Users" serves as data entry mask for user accounts. In principal, the process is the same as when you create shares.

Function: Create new user

To create a user, enter their username and password, retype the password and press **Create**.

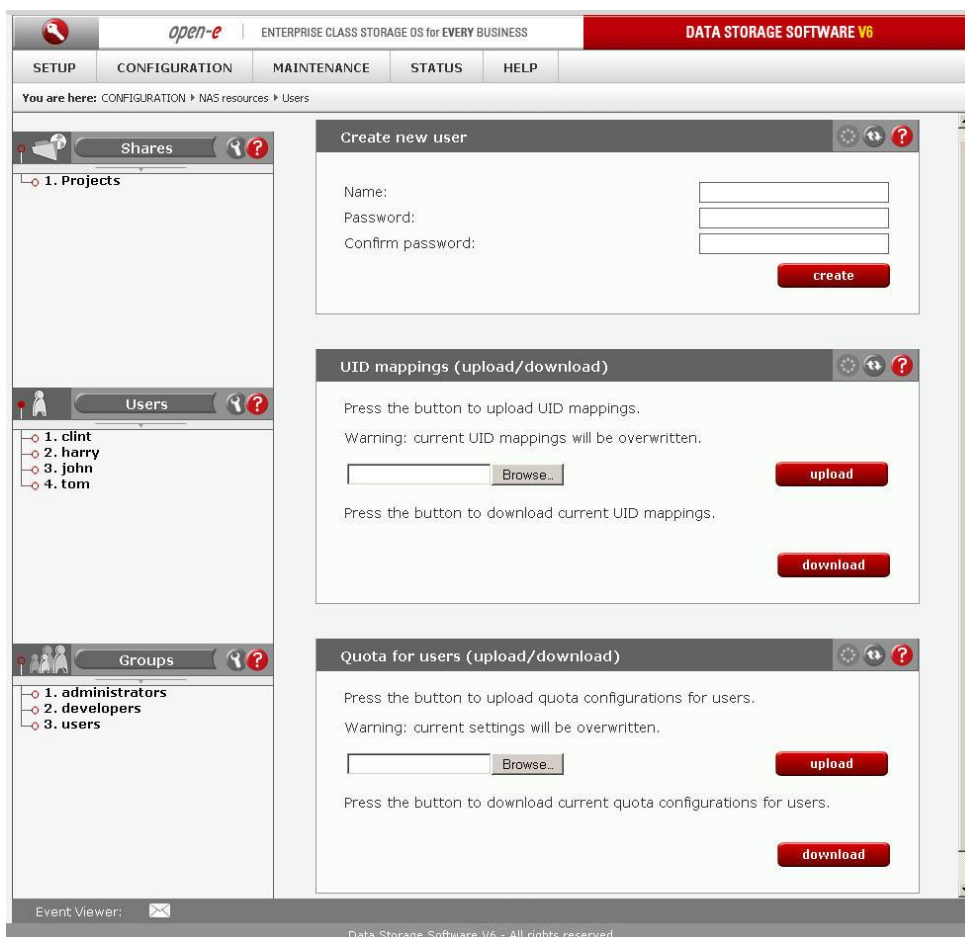
NOTE User name cannot:

- contain characters: ~ ! @ # \$ ^ & () + [] { } * ; : ' " . , ; % | < > ? / \ = ` ,
- begin or end with a space.

Password cannot:

- contain the following special characters: ' " ` ,
- contain spaces.

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



Function: UID mappings (upload/download)

This function allows you to upload and download UIDs (user IDs).
With it you will be able to modify multiple user IDs at the same time.

To upload UID:

- locate the configuration file *uid_mappings.csv* (format: *user_name;uid*) by clicking the **Browse** button. This file should be encoded in UTF-8,
- press the **Upload** button to import UID mappings,
- If there are any errors while importing UIDs please examine the *uid_mappings_import.log* file in the log package.

NOTE Warning: current UID mappings will be overwritten. Press **Download** button to download *uid_mappings.csv*.

Function: Quota for users (upload/download)

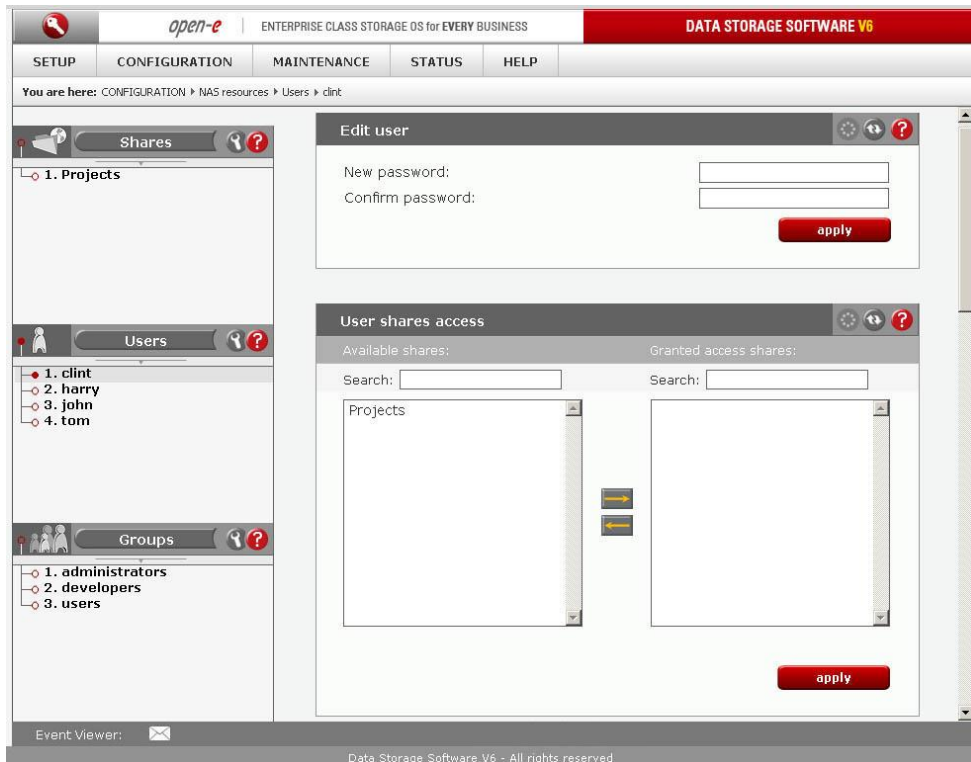
This function allows you to import and export user quota mappings.

To upload quota:

- locate the configuration file *quota_users.csv* (encoding: UTF-8; format: *user_name; hard_quota-in kbytes*) by pressing **Browse**,
- press the button to upload quota configurations for users,
- if you encounter errors while uploading the quota please examine the *quota_users_import.log* file in the log package (available via **STATUS** → **Hardware** → **Function: Logs**).

NOTE Warning: current settings will be overwritten. Press Export to download quota_users.csv

Then by clicking on name e.g. "john", you will see all available functions helpful for setting the user:





Function: Edit user

To change the password for a user enter and confirm the new password and click **Apply**.

NOTE Password cannot contain:

- special characters such as: ' " ` ,
- spaces.

Function: Users share access



Add user access to shares by selecting shares and clicking on  button. To remove user access to specified shares, select the users and click the appropriate arrow button  to remove them from the **Granted access** users list.

NOTE You can use following keyboard keys in the lists (first set focus to desired list):

- Home: jump to the first,
- End: jump to the last,
- Shift + arrow key: multi-select,
- letter key: jump to the first position starting with pressed key.

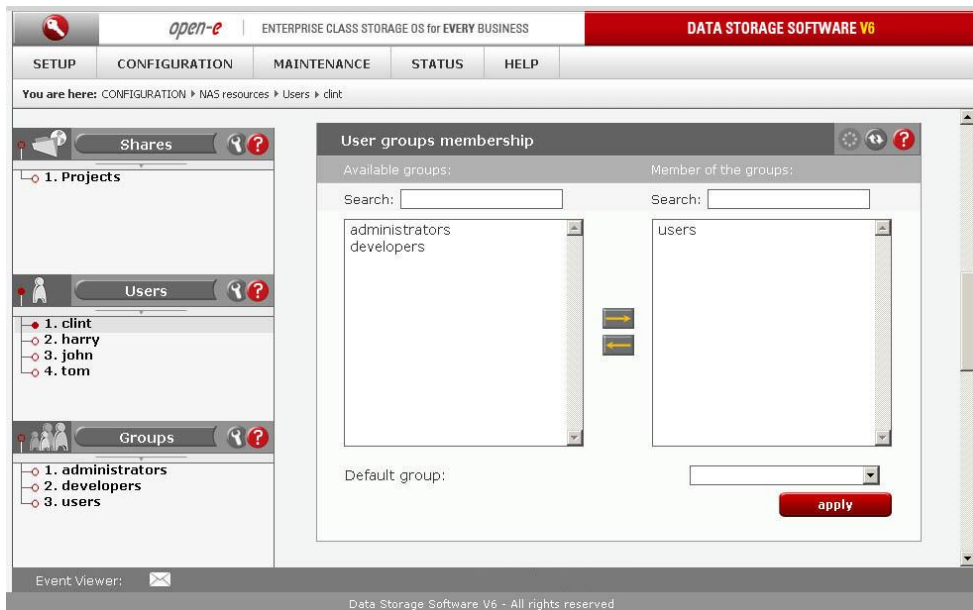
Function: Users group membership

This function allows you to view and change user group membership when connected to the local LDAP users and groups database.

To assign this user to a group, select its name from the **Available groups** list and click on  button. To remove group membership, select the group from the **Member of the groups** list and click on  button.

NOTE You can use following keyboard keys in the lists (first set focus to desired list):

- Home: jump to the first,
- End: jump to the last,
- Shift + arrow key: for multi-select,
- letter key: jump to the first position starting with pressed key.

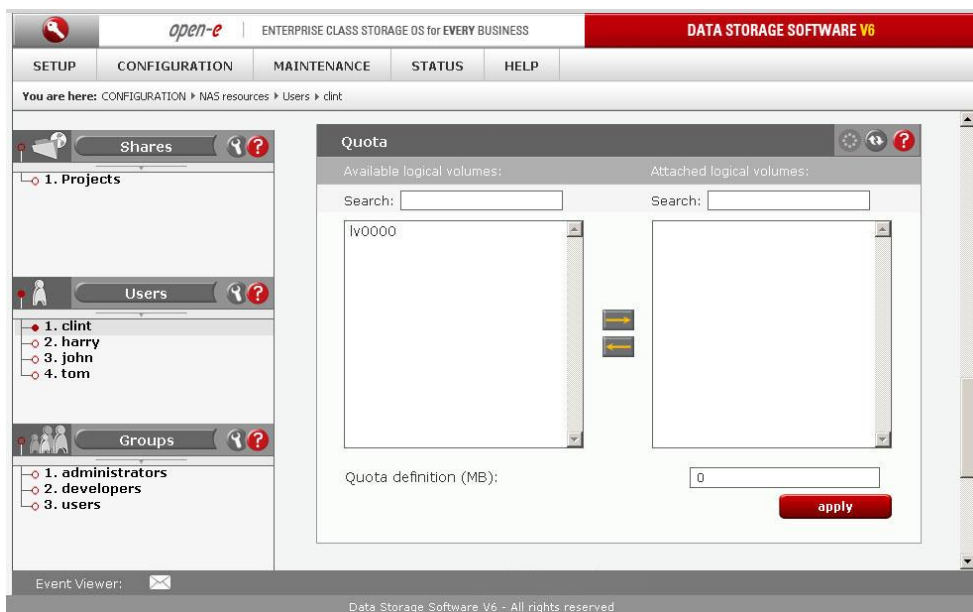


Function: Quota

You can assign a quota (a limit) on the amount of space a user is allowed to allocate on the shares to which they have access.

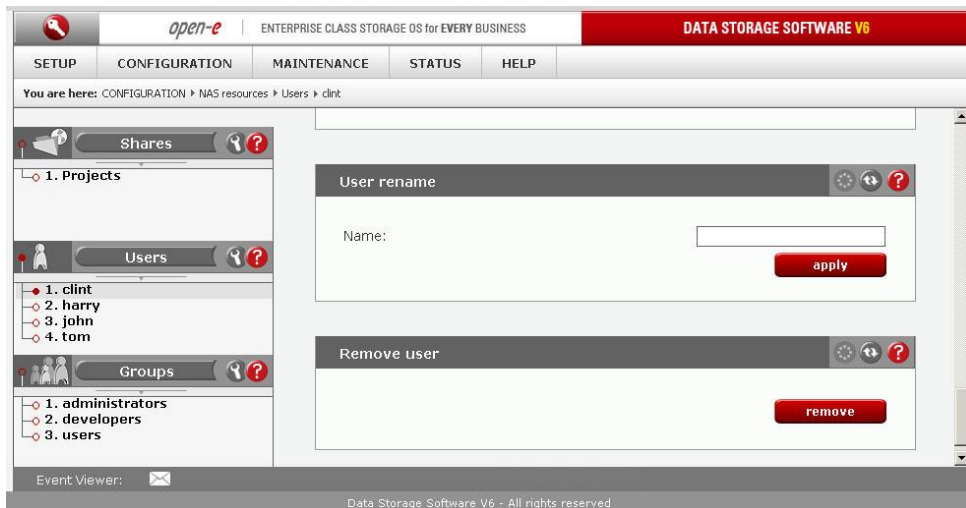
To remove any limitations for a user, you need to set their quota to 0.

NOTE Max quota value per user/group is 2TB. All greater values will be limited to 2TB



Function: User rename

This option allows you to rename an existing user.



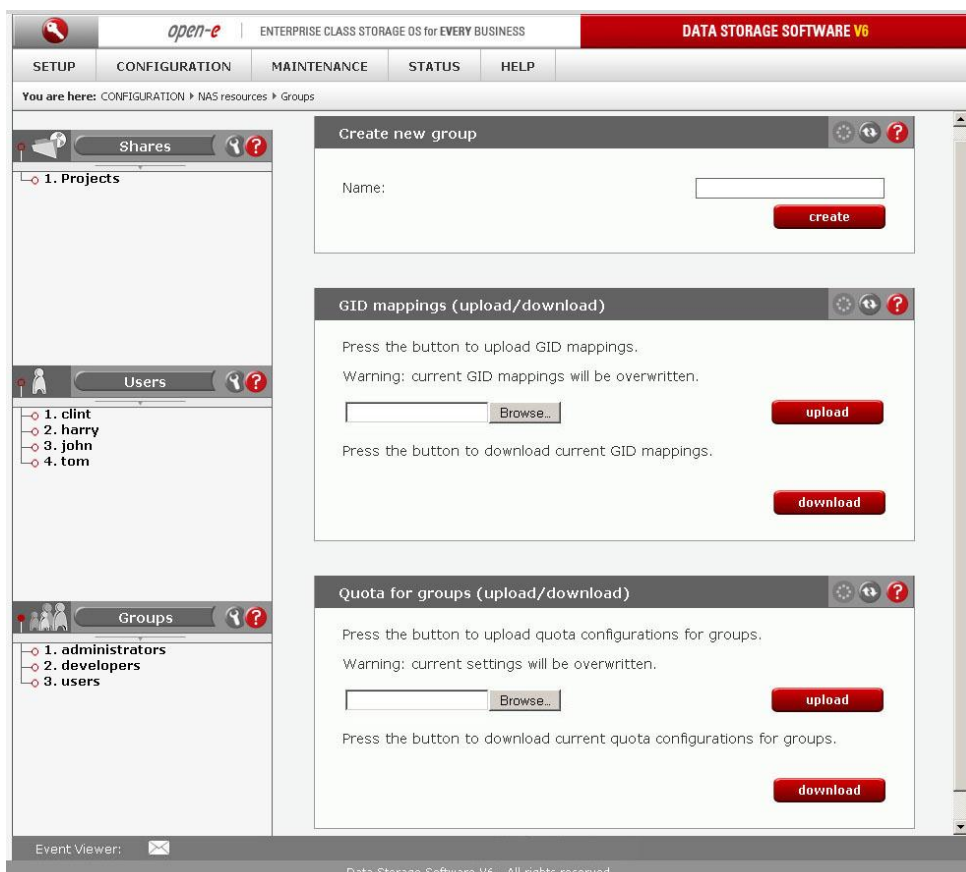
Function: Remove user

Click **Remove** button to remove the user from the system. All the files the user has ownership of will be preserved.

5.2.2.3.3 Groups

In the mode “Workgroup internal LDAP,” you can define entire groups consisting of different users. In addition, you can assign these groups certain access rights. By clicking on “Groups,” a data entry mask opens up, allowing you to create a new group. Assigning the access rights is done the same way as for users (see 5.2.2.3.2).

In the modes “Workgroup (external LDAP)” and “Windows (PDC)” and “Windows (ADS)” the groups are automatically synchronized with the external server.



Function: Create new group

To create a group, enter its name and press **Create**.

NOTE

Group name cannot:

- contain special characters such as: ~ ! @ # \$ ^ & () + [] { } * ; : ' " . , % | < > ? / \ = ` ,
- begin or end with a space.

Function: GID mappings (upload/download)

This function allows you to upload and download GIDs (group IDs).

Using this function you will be able to modify multiple group IDs at the same time.

To upload GIDs:

1. find the configuration file *gid_mappings.csv* (format:group_name;gid) by pressing the **Browse** button. This file should be encoded in UTF-8,,
2. press the **Upload** button to upload GID mappings,,
3. if you encounter errors while importing GIDs please examine the *gid_mappings_import.log* file in the log package (available via STATUS → Hardware → Function: Logs).

NOTE

Warning: current GID mappings will be overwritten.

Press "download" button to download *gid_mappings.csv*.

Then by clicking on group name e.g. "administrators", you will see all available functions helpful for setting the groups:

Function: Quota for groups (upload/download)

This function allow you to import and export group quota mappings.



To upload a quota:

- locate the configuration file *quota_groups.csv* (encoding: UTF-8; format: group;quota - in kbytes) by pressing **Browse**
- press the button to upload quota configurations for groups
- if you encounter errors while uploading the quota, please examine the *quota_groups_import.log* file in the log package (available via STATUS -> Hardware -> Function: Logs).

NOTE

Warning: Current settings will be overwritten. Press **Export** to download *quota_groups_import.log*.

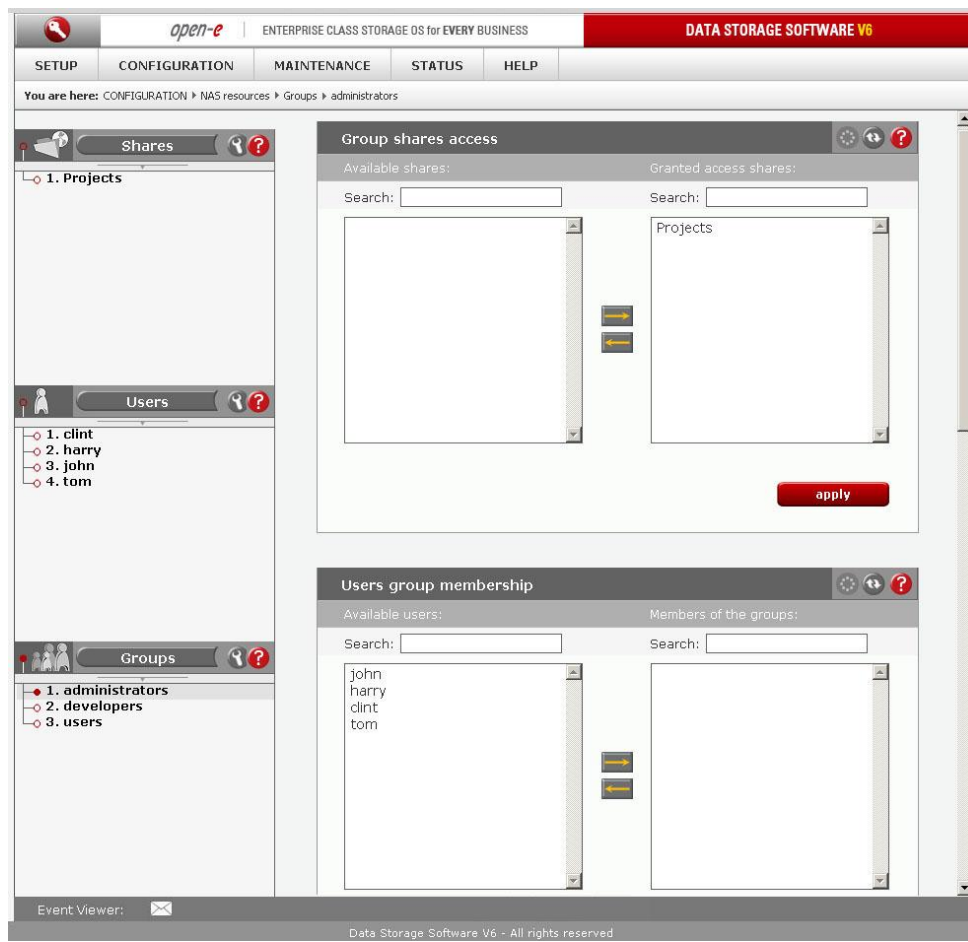
Function: Group shares access

Here you can add the shares for this group, that has access to, by selecting the shares and clicking the button . To remove the access from this group, that has the specified shares, select the shares and click the button .

NOTE


You can use following keyboard keys in the lists (first set focus to desired list):


- "Home": jump to the first,
- "End": jump to the last,
- "Shift" + arrow key: for multi-select,
- "letter key": jump to the first position starting with pressed key.



Function: Users group membership

This function allows you to view and change user group membership when connected to the local LDAP users and groups database.

To assign users to this group, select the users from the Available users list and click on .

To remove user membership, select users from the Members list and click on .

When connected to an external users and groups database you can check which users are members of this group.

NOTE You can use the following keyboard keys in the lists (you need to set the focus on the preferred list first):

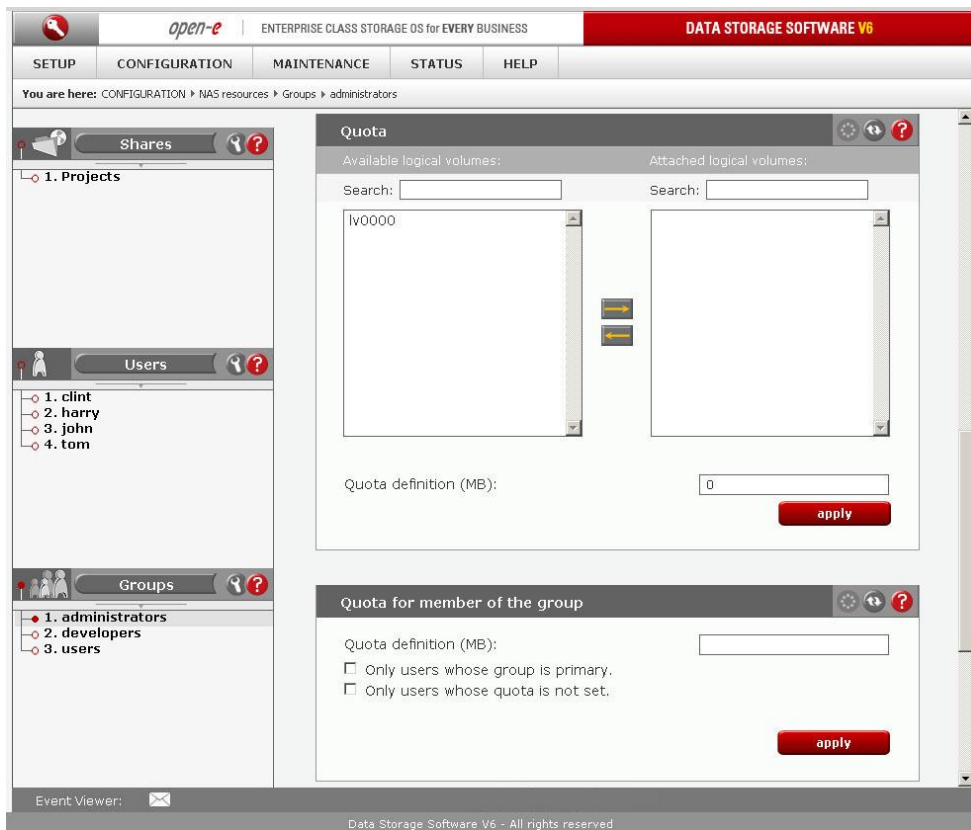
- Home: jump to the first entry,
- End: jump to the last entry,
- Shift + arrow key: multi-select,
- letter key: jump to the first entry starting with the pressed key.

Function: Quota

You can assign a quota (a limit) on the amount of space a user is allowed to allocate on the shares to which they have access.

To remove any limitations for a user, you need to set their quota to 0.

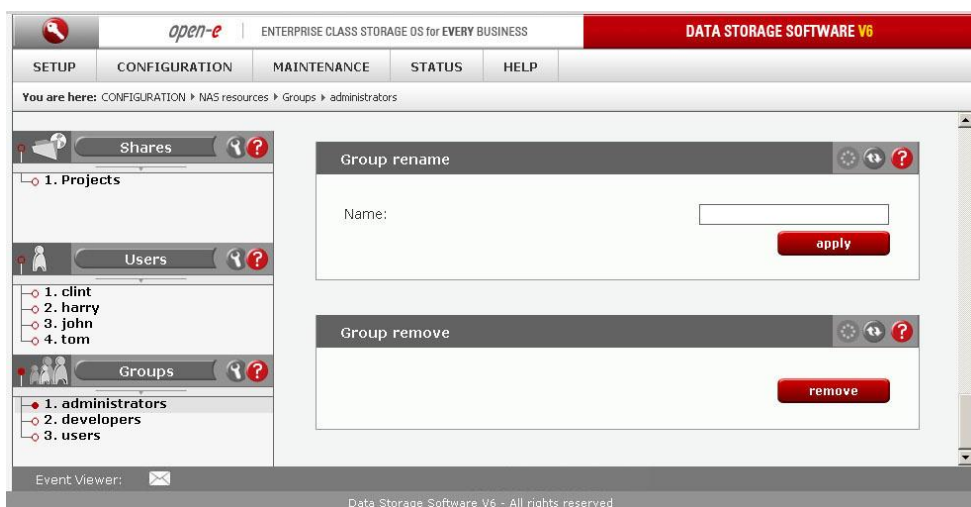
NOTE Max quota value per user/group is 2TB. All greater values will be limited to 2TB.



Function: Quota for member of a group

You can assign a quota (limit) on the amount of space the members of a group are allowed to allocate on the shares to which they have access. You can also make the quota relevant only to those users for whom the given group is the primary, or only for those users who do not have individual quotas set up. To remove any limits, set the quota to 0.

NOTE Max quota value per user is 2TB. All greater values will be limited to 2TB.



Function: Remove group

This option allows to rename an existing group.

Function: Remove group

Click "remove" button to remove the group.

5.2.2.4 iSCSI target manager

Function: Create new target

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

Name

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

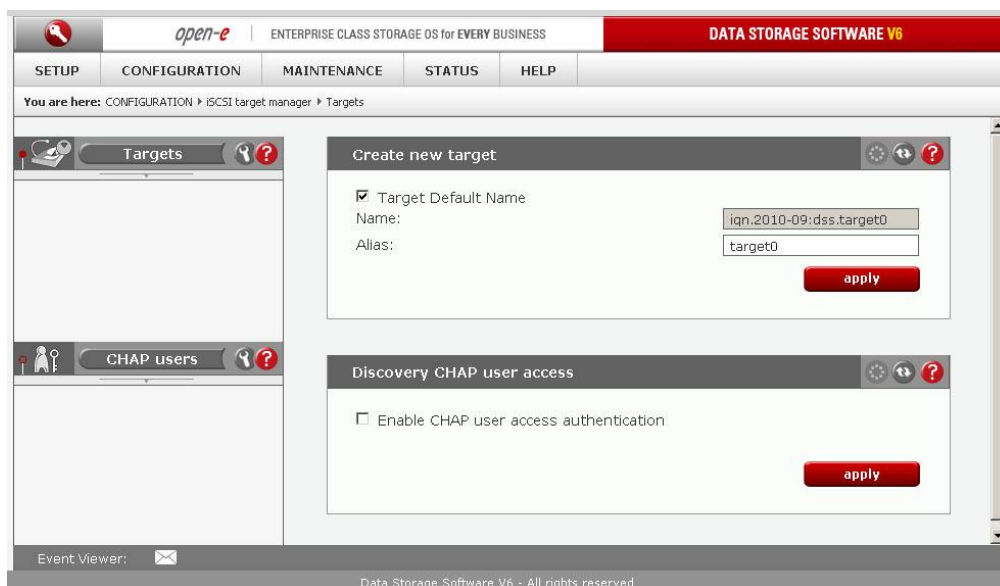
Alias

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

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

IMPORTANT

NOTE Please note that before using the target you need to add at least one LUN to it by clicking the target alias in the left hand pane and selecting LUNs in the Target volume manager box



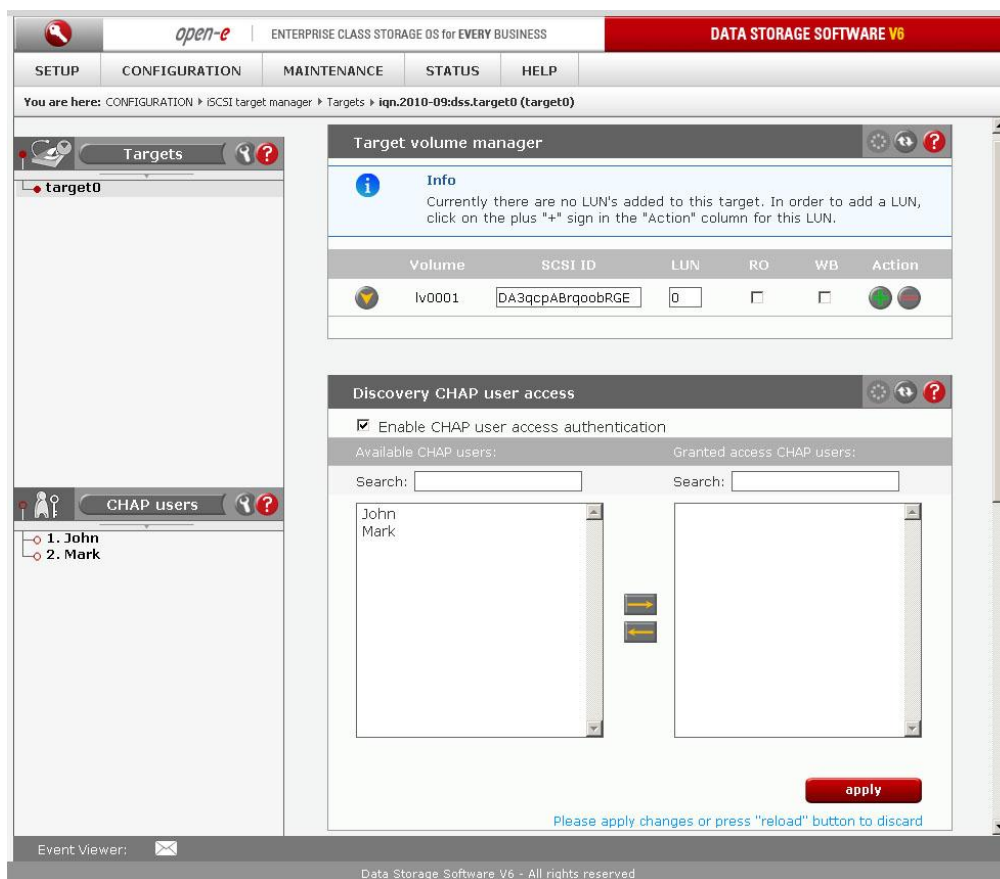
Function: Discovery CHAP user access

Allows access to this target to specified CHAP users.

NOTE You can use the following keyboard keys in the lists (you need to set the focus on the preferred list first):

- "Home": jump to the first,
- "End": jump to the last,
- "Shift" + arrow key: for multi-select,
- "letter key": jump to the first position starting with pressed key.

If you enable CHAP user access authentication but do not select any users, nobody will have access to the target.



Function: Target volume manager

This function allows you to manage both free and assigned target and snapshot volumes. To assign a volume to a target click the Add button associated with that volume. Similarly, to remove an already assigned volume from a 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 automatically. You should leave the default values.

In SCSI ID field you can edit SCSI identifier for logical volume (logical unit). Every logical unit must have unique SCSI ID. In case of logical units are configured for failover their SCSI ID must be identical on the primary and secondary nodes.

RO

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.

WB

Write-back cache. This functionality improves performance of data write. Write is acknowledged as completed as soon as the data is stored in the disk cache. In later time the disk cache commits the write to disk.

NOTE

Please note enabling write-back cache may cause data corruption in case of a system crash (e.g. after power failure). Corruption may also appear during failover processing. We strongly recommend using write-through cache if you are transmitting very important data.

If **RO** and **WB** are disabled (**RO** and **WB** - unchecked) then Write-through cache is used by default. This means that writes are not stored in cache. Instead, all writes are acknowledged after they are committed to disk.

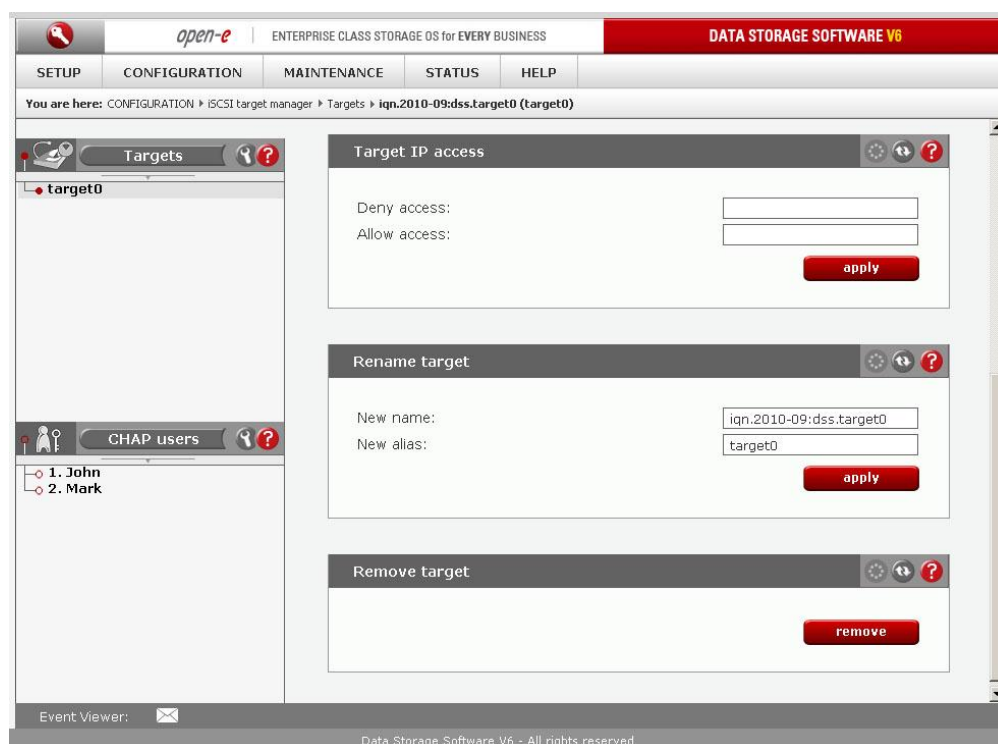
Function: Discovery CHAP user access

Allows access to this target to specified CHAP users.

NOTE You can use the following storage keyboard keys in the lists (you need to set the focus on the preferred list first):

- “Home”: jump to the first,
- “End”: jump to the last,
- “Shift” + arrow key: for multi-select,
- “letter key”: jump to the first position starting with pressed key.

If you enable CHAP user access authentication but do not select any users, nobody will have access to the target



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 semicolons. When no entries are present in Denied access or Allowed access fields everyone is permitted to access the target. Specifying at least one entry in Allowed access field excludes all the clients that do not match it from accessing the target. When you specify at least one entry in Denied access field, every CHAP user or CHAP users from network class address are denied from accessing the target. When you specify any IP address in Allowed access field, CHAP users from that address are allowed to access the target even if the same address has been specified in Denied access field. If you enter only Allowed access field then Denied access field will be automatically entered with 0.0.0.0/0 entry.

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

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

Examples:

Deny access: 0.0.0.0/0

Allow access: 192.168.2.30/0;192.168.3.45

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

Deny access: 192.168.0.0/16

Allow access: 192.168.2.30;192.168.10.230;192.168.30.0/24

These settings deny access to any IP addresses from the 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 the Deny access field.

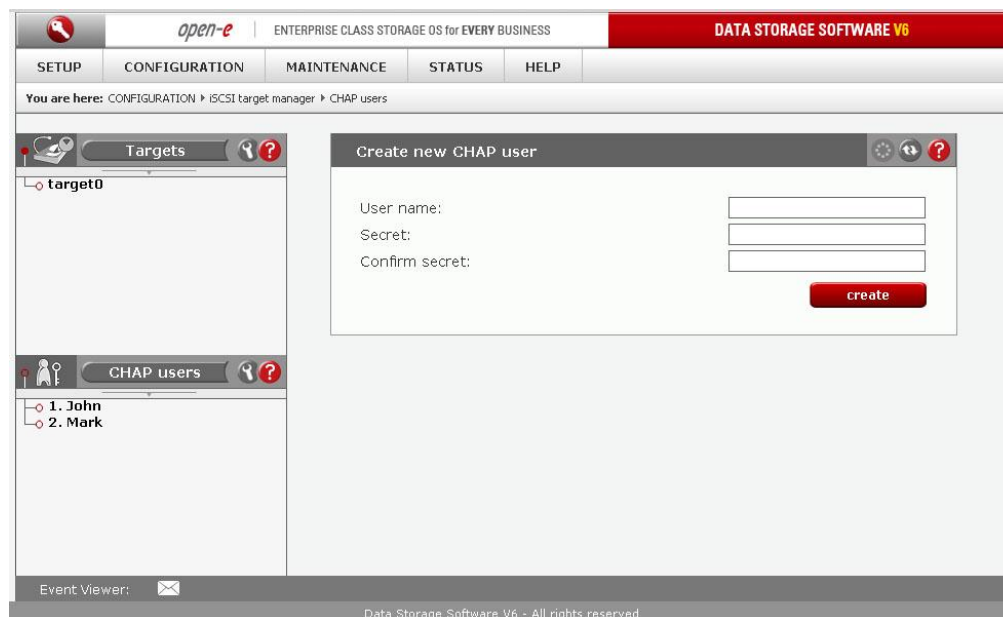
Function: Rename target

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

Function: Remove target

This function removes all volumes from the target.

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



Function: Create new CHAP user

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

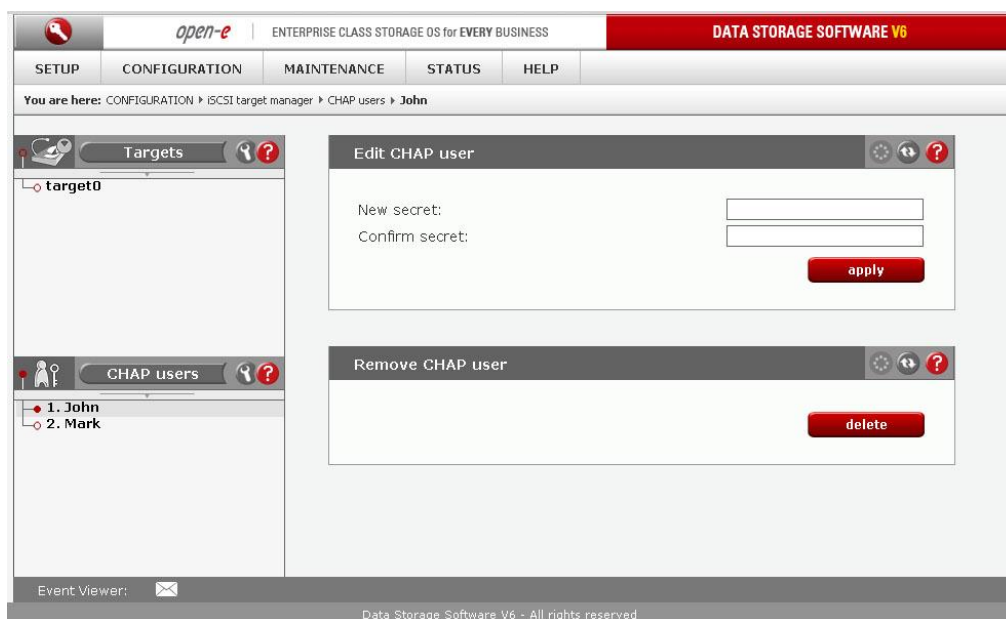
NOTE CHAP user name cannot:

- contain characters: ~ ! @ # \$ ^ & () + [] { } * ; : ' " . , % | < > ? / \ = ` ,
- begin or end with a space.

Password cannot:

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

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



Function: Edit CHAP user

In order to change the password for a CHAP user, enter and confirm the new password and click **Apply**.

NOTE Password cannot contain:

- special characters such as ' " ` ^ & \$ # ~ [] \ / | * ,
- spaces,
- less than 12 and more than 16 characters.

Function: Remove CHAP user

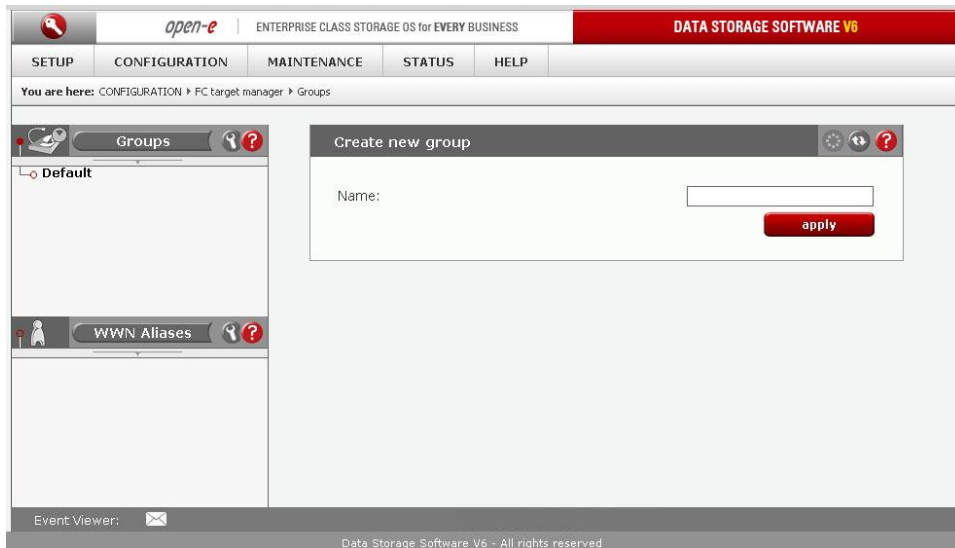
Click **Delete** to remove the CHAP user from the system.

5.2.2.5 FC target manager

5.2.2.5.1 Groups

Here you can view list of all Fibre Channel Groups.

NOTE Group Default is a public group. If some WWN belongs to another group than public, then this WWN will not have access to this public group and only will have access to the group where it's assigned to.

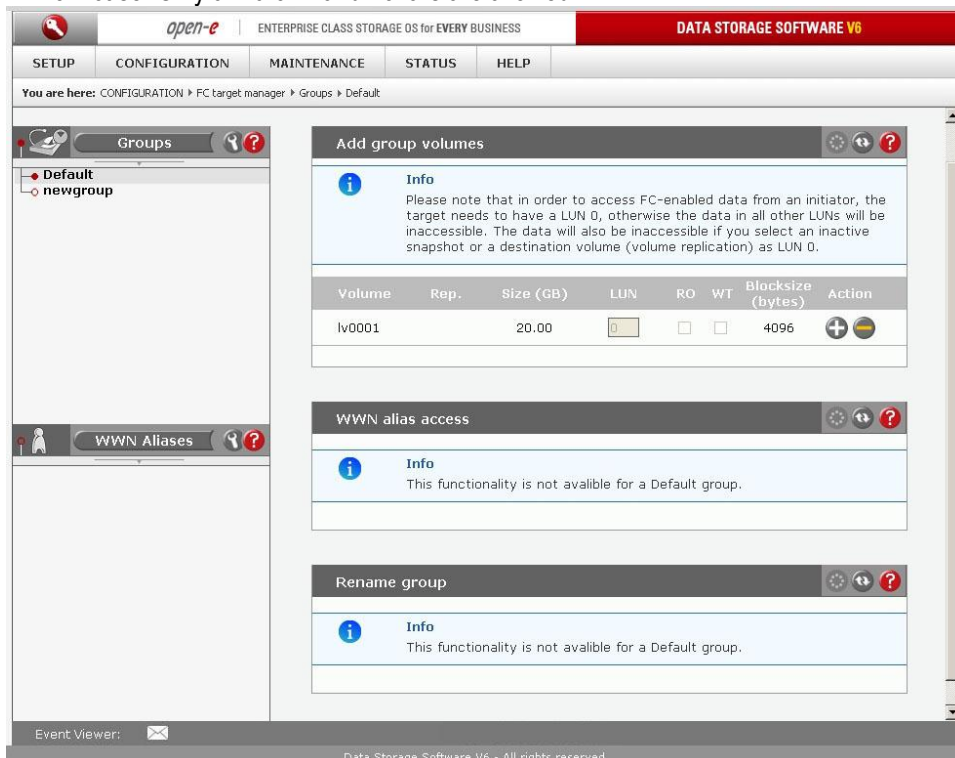


Function: Create new group

To create a group enter its name and click button apply.

Name

A group name is considered case-insensitive. Every character entered will be converted to low-case. Only a-z 0-9 . - and : chars are allowed.



Function: Add group volumes

This function lets manage free and already assigned FC logical volumes. To assign a volume to the group click the "Add" button associated with that volume. Similarly to remove already assigned volume from the group 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.

RO

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 group and then add it again setting the flag as desired. FC logical volumes are not read only (RO -unchecked) by default.

WT

Write-through cache. Data is written to logical volume at the same time as it is cached. This type of caching provides the advantage of internal consistency, because the cache is never out of sync with the logical volume.

If **RO** and **WT** are disabled (**RO** and **WT** - unchecked) then Write-back cache is used by default. This means that write is acknowledged as completed as soon as the data is stored in the disk cache. In later time the disk cache commits the write to disk.

If **RO** and **WT** are disabled, (**RO** and **WT** are unchecked), Write-back cache is used by default. This means that writing is considered completed as soon as the data is stored in the disk cache. The disk cache commits the data to disk at a later time.

Blocksize

This field shows the current FC volume blocksize.

Function: WWN alias access

Here you can add WWN aliases which are granted access to this group.

WWN

Worldwide name, it's a unique identifier in a Fibre Channel storage network. Each WWN is has a fixed 64-bit name assigned by the manufacturer and registered with the IEEE to ensure it is globally unique. It can include only chars from A to F, a to f, digits from 0 to 9 and a : char. You can find it in manual of your HBA card, bios or directly on label of your HBA card. Example of WWN: *1A:FF:AC:4D:00:1F:99:F3*.

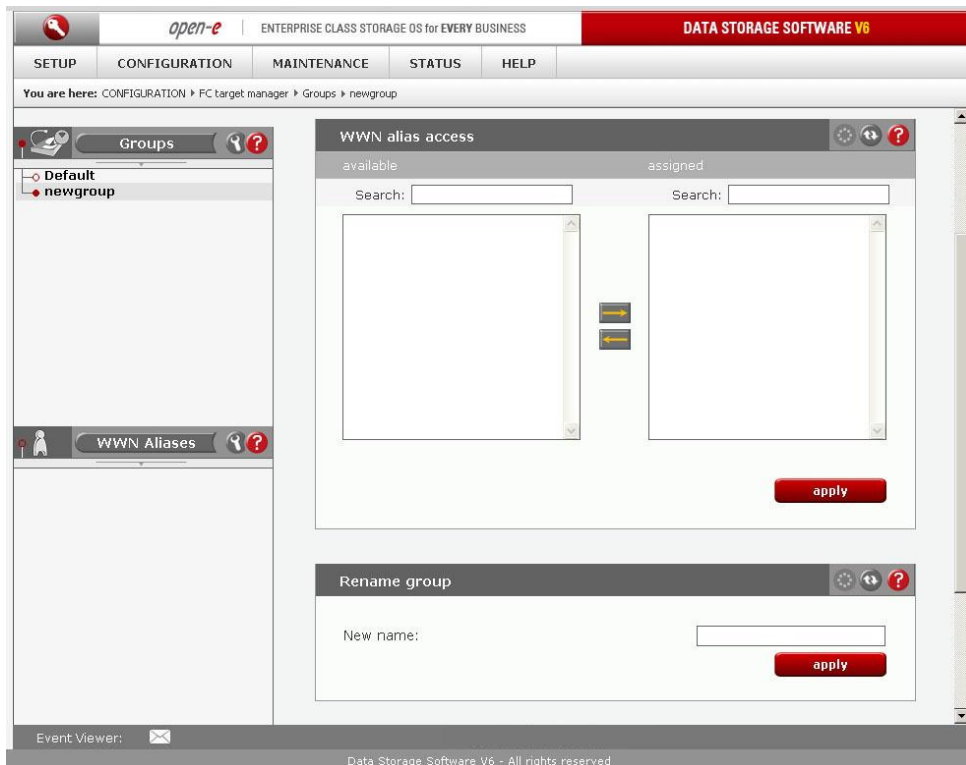
HBA

Host Bus Adapter. HBA connects a host system to other network and storage devices. In this case it's referring to devices for connecting Fibre Channel.

NOTE

You can use the following keyboard keys in the lists (you need to set the focus on the preferred list first):

- **Home**: jump to the first entry,
- **End**: jump to the last entry,
- **Shift + arrow key**: multi-select,
- **letter key**: jump to the first entry starting with the pressed key.

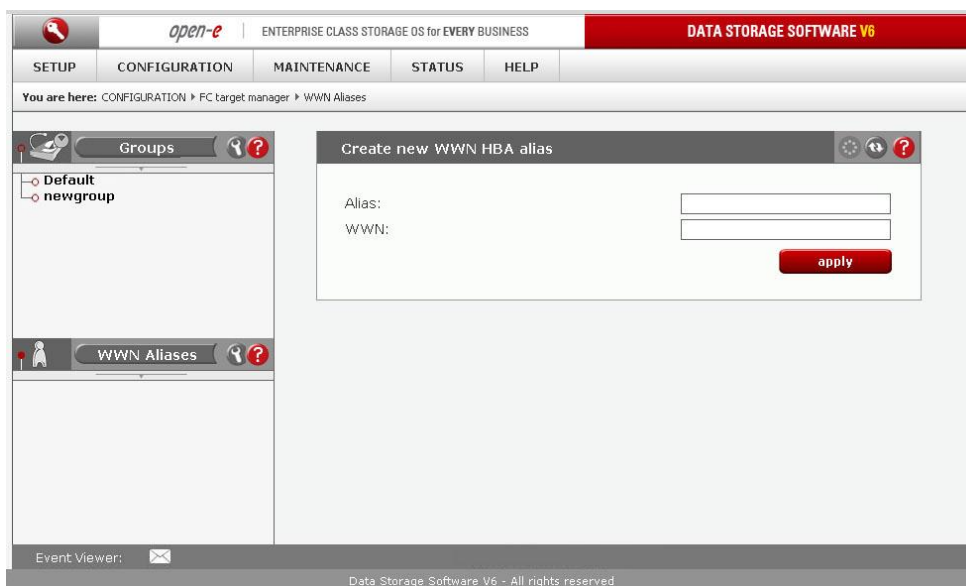


Function: Rename group

Provide a new group name. A group name is considered case-insensitive. Every character entered will be converted to low-case. Only a-z 0-9 . - and : chars are allowed.

5.2.2.5.2 *WWN Aliases*

Here you can view list of all Fibre Channel WWN Aliases.



Function: Create new WWN HBA alias

To create new WWN (Worldwide name) alias for HBA (Host Bus Adapter):

- enter the alias and WWN to which its referring,
- press create.

WWN

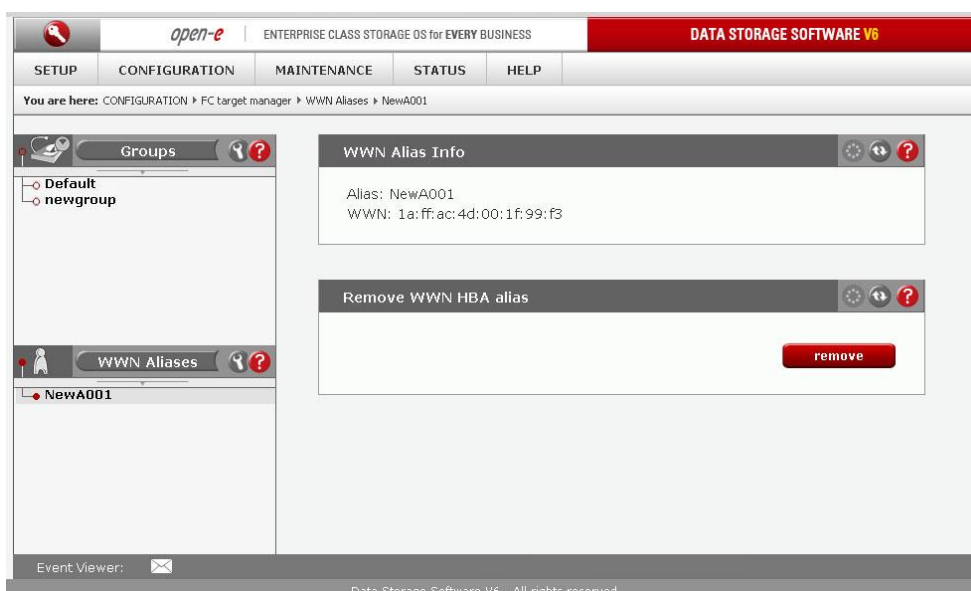
Worldwide name, this is a unique identifier in a Fibre Channel storage network. Each WWN has a fixed 64-bit name assigned by the manufacturer and registered with the IEEE to ensure that it is globally unique. It may include characters from A to F, a to f, digits from 0 to 9 and an : character only. You can find the WWN in your HBA card manual, BIOS or directly on the HBA card label. Example of WWN: 1A:FF:AC:4D:00:1F:99:F3

Alias

Short text name for a WWN. May only include characters from A to Z, a to z and digits from 0 to 9.

HBA

Host Bus Adapter. HBA connects a host system to other network and storage devices. In this case HBA refers to devices for connecting Fibre Channel.



Function: WWN Alias info

Here you can view the WWN and the alias of the FC HBA.

Function: Remove WWN HBA alias

Here you can remove the selected WWN HBA alias.

WWN

Worldwide name: This is a unique identifier in a Fibre Channel storage network. Each WWN is a fixed 64-bit name assigned by the manufacturer and registered with the IEEE to ensure it is globally unique. It can include only characters from A to F, a to f, digits from 0 to 9 and a : character. You can find it in the manual of your HBA card, Bios, or directly on the label of your HBA card. An example of a WWN: 1A:FF:AC:4D:00:1F:99:F3.

HBA

Host Bus Adapter. HBA connects a host system to other network and storage devices. In this case it's referring to devices for connecting Fibre Channel.

Fibre Channel Configuration

In order to assign traffic from a FC initiator over wanted FC port on the target side, please :

1. In menu: CONFIGURATION-> FC target manager -> WWN Aliases, create an alias for every FC Initiator WWN. If the FC Initiator show 2 WWN number starting with 20:xx:xx:xx:xx:xx:xx:xx and 10:xx:xx:xx:xx:xx:xx:xx, please select the one starting with 10.
2. In menu CONFIGURATION-> FC target manager -> Groups, please create a group. For every group you can assign LUNs clicking on "+" button and you can assign the alias of the initiator which will be allowed to access selected LUNs in this group. In order to do it, please move the alias from the left panel to the right and click on apply button.
3. Please create a group for every FC target port present in the system.

If you want to reassign FC access from one group to other one, please click on "-" button of selected LUN and move the alias from right panel to the left and click on the apply button.

Then accordingly in selected group, please click on the "+" button and move the alias from left side to the right and click on the apply button.

5.2.3. MAINTENANCE

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

5.2.3.1 Shutdown

Function: System restart

This function allows you to restart your system.

Function: Create schedule for restart

Here you can create new schedule task for system restart.

Comment

You can enter comment for system restart.

Time select

Select time when restart task will be started.

Function: Schedules for restart

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

The screenshot displays the 'open-e' web interface for 'DATA STORAGE SOFTWARE V6'. The navigation menu includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The current page is 'shutdown' under the 'MAINTENANCE' tab. The interface is divided into three main sections:

- System restart:** A panel with the instruction 'Press the button to restart the system.' and a red 'restart' button.
- Create schedule for restart:** A panel for configuring a restart schedule. It includes a 'Comment:' text input field, checkboxes for days of the week (Monday through Sunday), a 'Start' time selector (00:00), and radio buttons for frequency: 'Every week' (selected), 'Every even week', and 'Every odd week'. An 'apply' button is at the bottom right.
- Schedules for restart:** A table listing existing schedules. The table has columns for 'Details' and 'Action'. One schedule is listed: 'Weekly Su. at 08:00' with a red 'X' icon in the 'Action' column.

At the bottom, there is an 'Event Viewer' icon and a footer: 'Data Storage Software V6 - All rights reserved'.

Function „System shutdown“

Using this function, you can shut down the server.

Function: Create schedule for shutdown

Here you can create new schedule task for system shutdown.

Comment

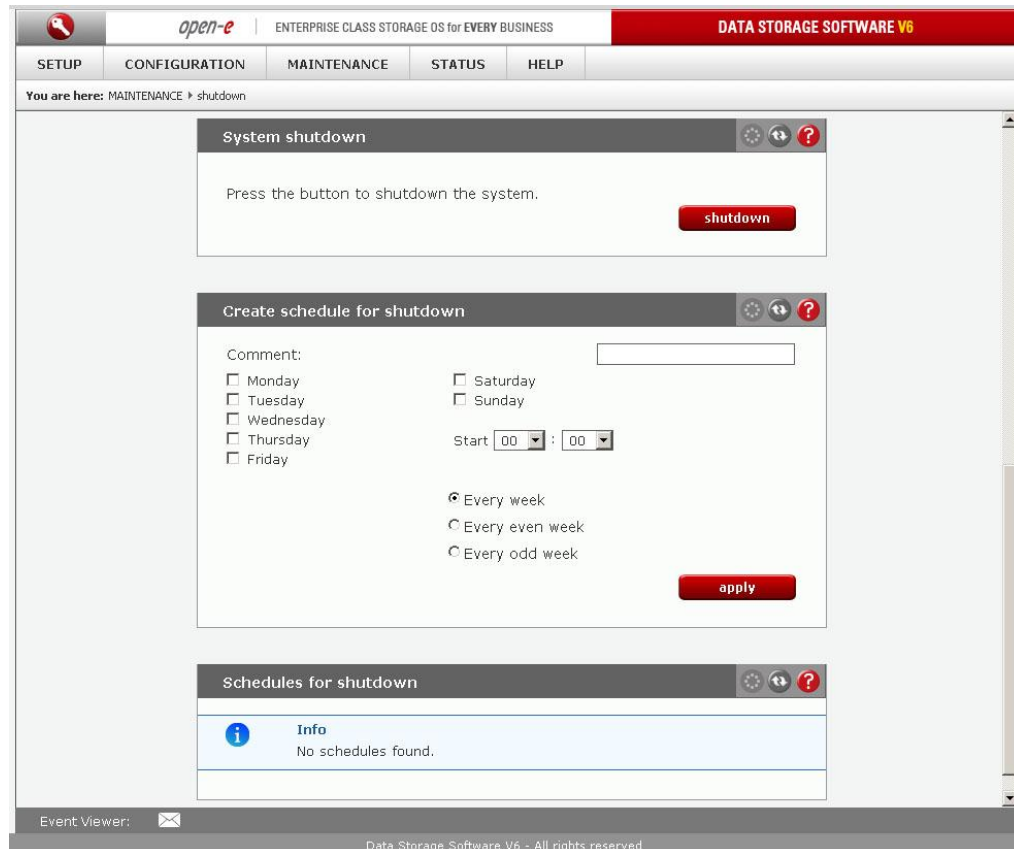
You can enter comment for system shutdown.

Time select

Select time when shutdown task will be started.

Function: Schedules for shutdown

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



5.2.3.2 Connections

Function: NAS connections reset

This function resets existing connections to force the connecting users to follow the changes you have made to share access rights.

The function is dedicated to SMB and FTP connections. You can check or uncheck corresponding boxes.

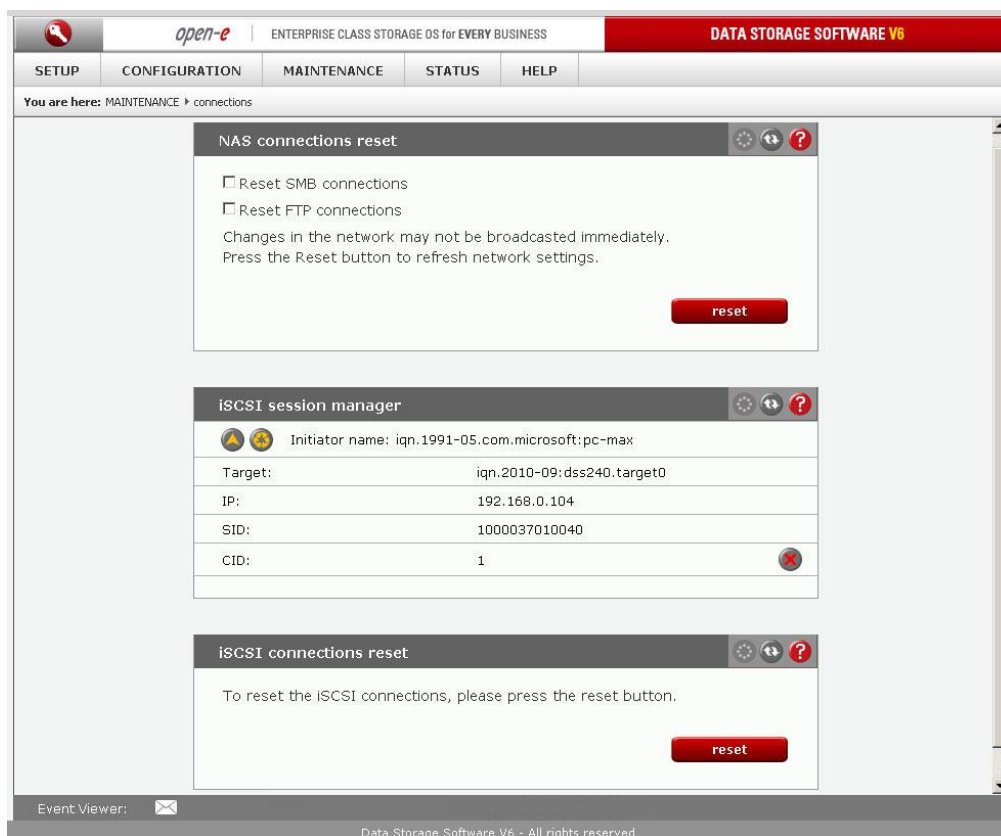
CAUTION This function disconnects all users connected to the shares on the specified protocol, which may lead to data loss, if any files are open.

Function: iSCSI session manager

This function displays current connections to iSCSI targets.

You can find the following information here: target name, IP address, CID (connection ID) and SID (session ID).

NOTE You can cancel connections to iSCSI targets, but the initiator may automatically reestablish connection if this is enabled on the initiator side. In order to block an initiator from reconnecting to the target you need to block the corresponding IP address in SETUP -> iSCSI target manager -> Targets -> target[nr] -> Function: Target IP access.



Function: iSCSI Connection reset

It may be necessary to restart the iSCSI daemon to send information on specific setting changes, e.g. volume resize, to the client.

It may be necessary to restart the iSCSI daemon to send information on specific setting changes, e.g. volume resize, to the client.

CAUTION All current connections with iSCSI initiators will be terminated immediately. This may cause loss of unsaved data.

NOTE If your client does not reestablish the connection automatically you may have to do it manually from the client side.

5.2.3.3 Snapshot

Here you can view a list of all snapshot tasks and volume groups to which snapshots are assigned.

Function: Snapshot tasks

With this function you can manually activate (start) or deactivate (stop) snapshots. In order to define a time schedule to activate the snapshot, click on the snapshot alias in the left-side pane.

To view snapshot details click on the down arrow button:

LV

Logical volume the snapshot is assigned to.

Size

Space reserved for the snapshot (point-in-time) data in GB.

Status

Snapshot status; contains the following combinations:

In use

Snapshot is:

- currently used by an active backup or replication task,
- created manually or via a time schedule.

Unused

Snapshot is available for backup or replication tasks as well as for time schedules or manual start.

Active

Snapshot has been activated by a backup task, a replication task, a time schedule or has been created manually. If the snapshot has been created by a backup or a replication task, the point-in-time data is available for that task. If the snapshot has been created via a time schedule or manually, the point-in-time data can be accessed through:

- NAS share (if the snapshot has been assigned to an NAS volume),
- iSCSI target (if the snapshot has been assigned to an iSCSI volume),
- FC group (if the snapshot has been assigned to an FC volume).

Inactive

Snapshot becomes inactive when the reserved space usage reaches 100%. Be aware that this will prevent access to the point-in-time data! Please click on the **Stop** button in order to set the status back to *Unused*.

Usage

Shows the usage of the reserved space in percentages. The usage percentage is equal to the amount of user data changes on the volume. Once this reaches 100%, the snapshot status switches to In use/Inactive and the point-in-time data cannot be accessed any more. In this situation, click on the Stop button in order to remove the inactive snapshot.

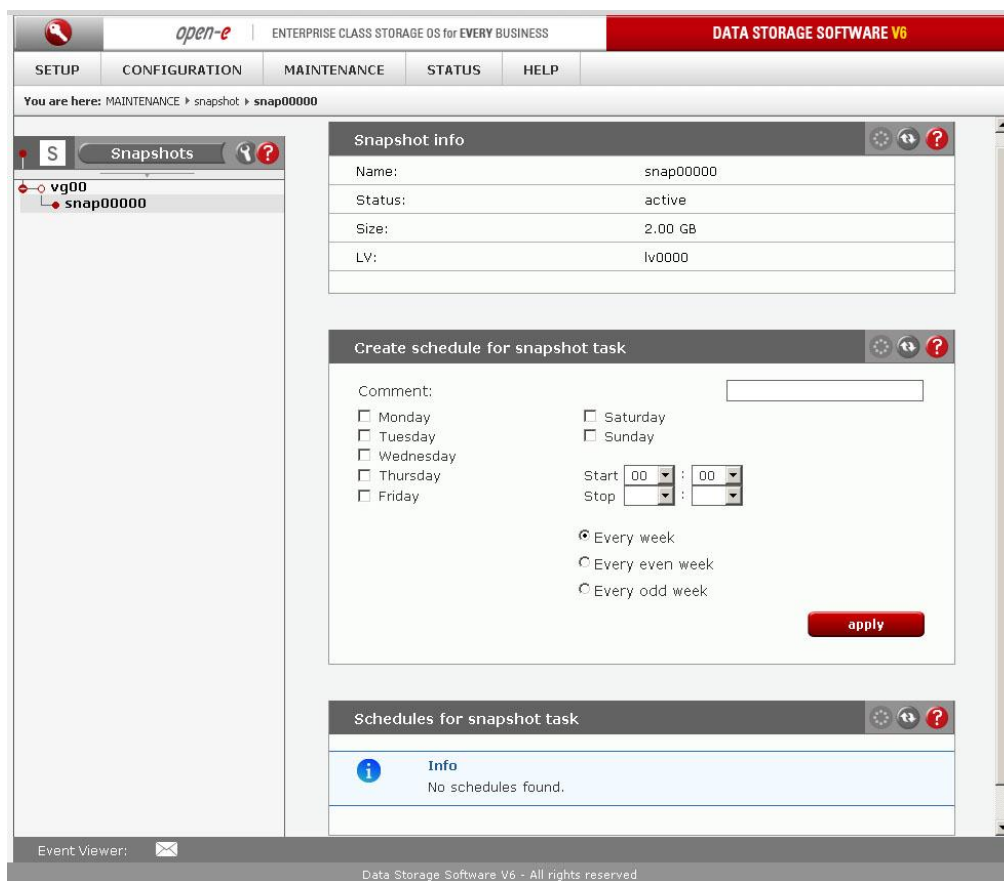
NOTE Please do not manually start or create a time schedule for a snapshot which is already assigned to backups or replication tasks. This will block the backup or replication tasks as they are specifically assigned to activate the snapshot during the process.

NOTE The snapshot utilizes copy-on-write technology. The more active snapshots you have, the lower write performance of the volume will be. It is recommended to have no more than 2-3 active snapshots per volume. Maximum number of active snapshots per volume is 10 and 20 for the whole.

NOTE Snapshots cannot be activated on an inconsistent volume. Volumes become inconsistent when volume replication is initializing. Once initialization is complete, the inconsistent volume will be consistent again and snapshots can be activated.

Name	Start time	Action
snap00000	2010-09-20 20:59:41	

LV: lv0000
Size: 2.00 GB
Status: **in use/active**
Usage: 0.20%



Function: Snapshot info

Here you can see information for selected snapshot.

Name

Name snapshot.

LV

Logical volume to which the snapshot is assigned.

Status

Status snapshot. Can be one of the following:

Active

Snapshot is active.

Inactive

Snapshot is inactive, probable reason: overflow.

Unused

Snapshot is currently unused.

Size

Snapshot size.

Function: Create schedule for snapshot task

Here you can create a schedule for the selected snapshot task.

Comment

You can enter a comment for the snapshot schedule.

Time select

Click **Every even week** or **Every odd week** if you would like the snapshot to be run only on even or odd weeks. Please note that Monday is considered the first day of the week..

Function: Schedules for snapshot task

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

5.2.3.4 Backup

5.2.3.4.1 Backup pools

Function: Create new pool

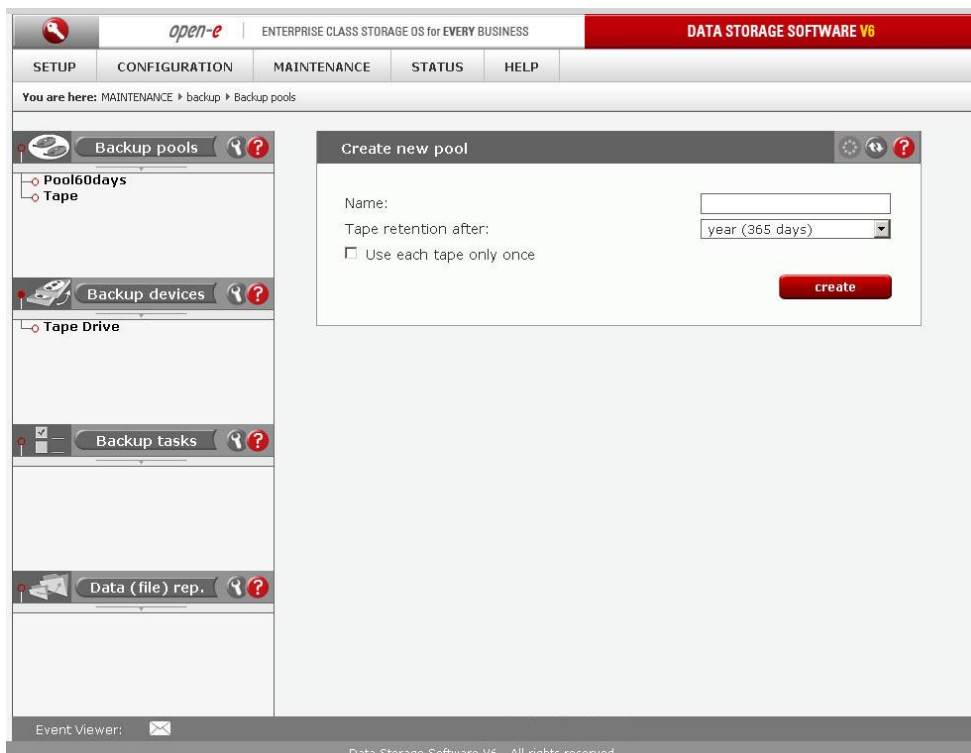
This function allows you to create pools. Pools are used for grouping tapes that belong to storages.

Available options:

1. Name - the name of the pool,
2. Tape retention after - time period after which the tapes in the pool will be ready to be rewritten,
3. Preserve tape until end of retention time - each tape will store only one backup until the retention time is over. It will not be possible to append data to these tapes.

To create a pool:

- enter its name,
- set the retention time,
- optionally you can enable the **Preserve tape until end of retention time** option.



Function: Pool settings

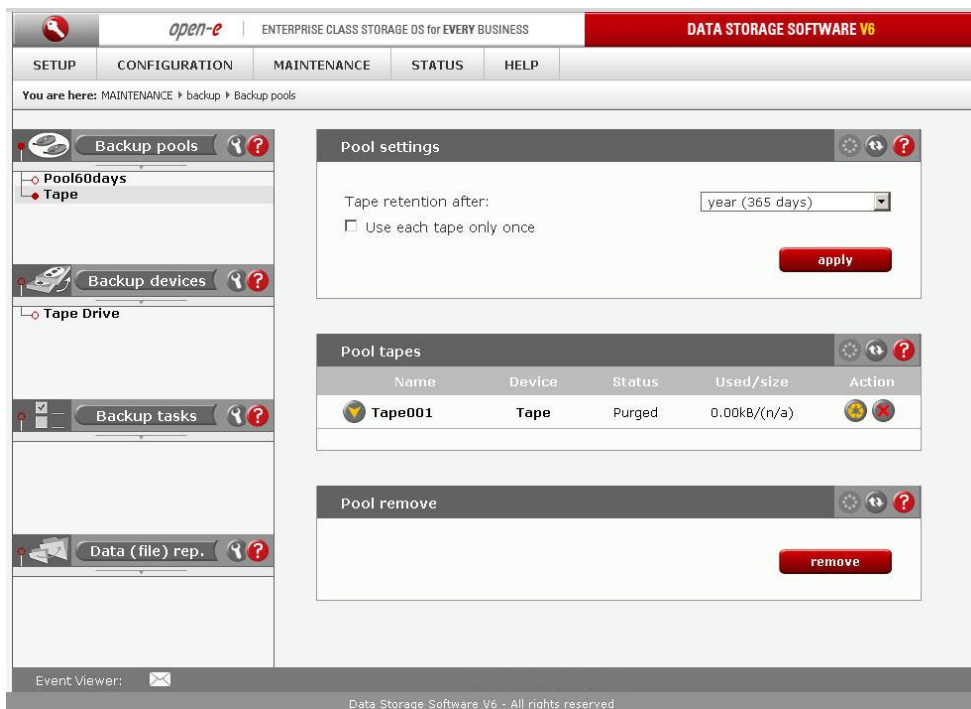
This function allow you to change the pool settings.

Possible options:

1. **Name:** The name of the pool

2. **Tape retention after:** Time period after the tapes in the pool are ready to be rewritten
3. **Preserve tape until retention time:** Each tape will store only one backup until the retention time is over. It will not be possible to append data to these tapes.

NOTE The value in the Tape retention after field is applicable only to new tapes added to the pool. Older tapes preserve their retention time.



Function: Pool tapes

Here you can view information about the tapes and manage all tapes used with the selected pool.

The function provides the following information:

Name

Name of the tape

Device

Name of the device to which the tape belongs

Status

Status of the tape. This field can have one of the following values:

- Full - the tape is full and will not be used for backup until the retention time is over
- Append - new backups will be written at the end of the tape
- Recycle - the tape will be set to this state when the tape status has been set to purged and there are no other appendable tapes available. The tape will be completely rewritten (old data will be deleted)
- Purged - this status will appear when the tape retention time is over (old data is still on the tape)
- Error - the tape will not be used because of errors on the tape
- Used - tape mode **Preserve tape until retention time** has been enabled and no data can be appended to it
- Busy - the tape is currently being used for backup

Used/size

Shows how many MBs of data have been written to the tape and how many MBs of data can be written to the tape.

Action

Actions that can be performed on the tape:

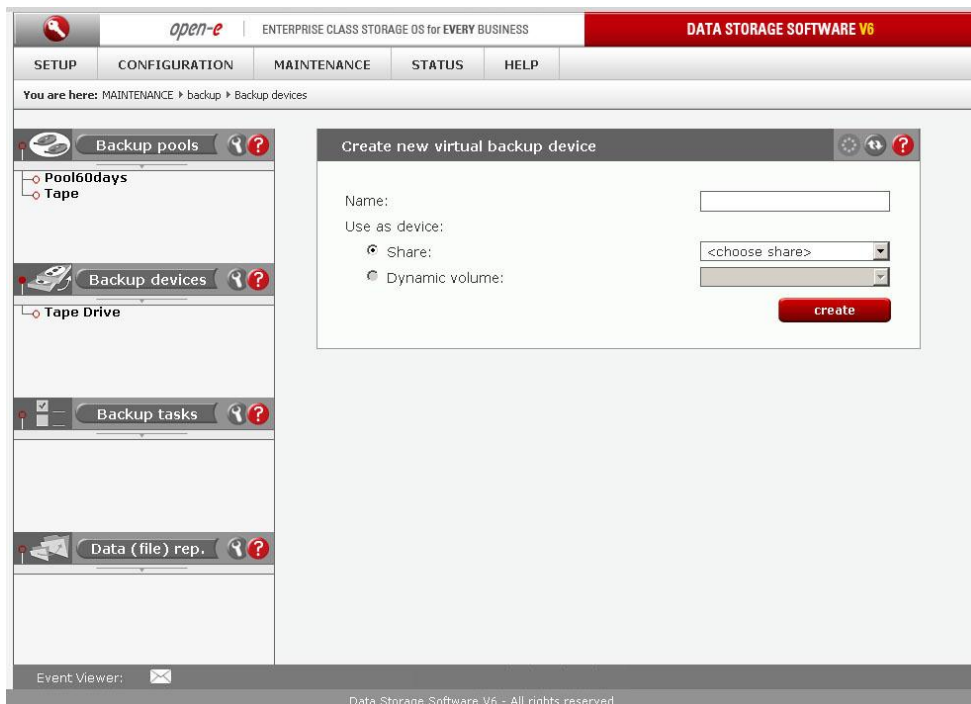
- show more information about the tape,
- manually set the tape to purged status,
- remove the tape.

Function: Pool remove

This function allow you to remove the selected pool.

5.2.3.4.2 Backup devices

Here you can view list of all backup devices. Click on device name to edit device settings, create new tape for the device, manage tapes or remove the device. In case when tape backup device (physical device) is connected, "Tape Drive" entry will appear on backup devices tree.



Function: Create new virtual backup device

In order to store data backup on virtual tapes please create a virtual backup device.

This device will be used as a backup destination in the backup task setup.

Please provide:

- a name for the device,
- a share for storing the virtual backup device,

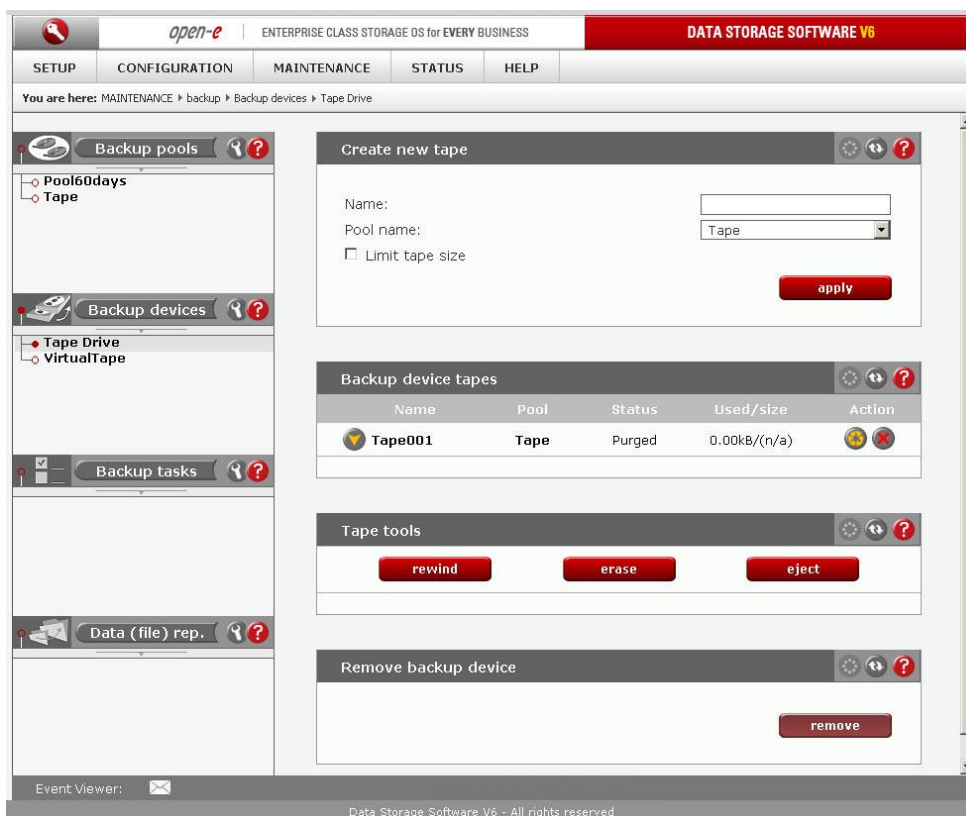
NOTE It is recommended to create a dedicated share for each virtual backup device.

- retention time for the tape,
- if you would like to store one backup only on each tape, select the **Preserve tape until end of retention time** option.

Click the **Create** button to create a new backup device.

Next steps:

- once the new virtual backup device has been created, click on its alias in the left pane and create virtual tapes using the **Create new tape** function,
- afterwards create a new backup task.



Function: Backup device tapes

You can view information on and manage all tapes used with the selected backup device. The function provides the following information:

Name

Name of the tape.

Pool

Name of the pool.

Status

Status of the tape. The field can have one of the following values:

- **Full** - tape is full and will not be used for backup until the retention time is over,
- **Append** - new backups will be written at the end of the tape,
- **Recycle** - the tape will be set to this state when the tape status has been set to purged and there are no other appendable tapes available. The tape will be completely rewritten (old data will be deleted),
- **Purged** - this status will show up when the tape retention time is over (old data is still on tape),
- **Error** - the tape will not be used because of errors on tape,
- **Used /-** tape mode Use each tape only once has been enabled and the tape cannot be appended to anymore,
- **Busy** - the tape is currently being used for backup.

Used/size

Shows how many MBs of data have been written to the tape and how many MBs of data can be written to the tape.

Action

Actions that can be performed on the tape:

- show more info on the tape,
- manually set the tape to purged status,
- remove the tape.

Function: Tape tools

This function provides tools to manage your tape device.

Tape tools include:

- tape rewind,
- tape erase,
- tape unload / eject,
- tape load.

Select tape from

Here you can select which drive or slot should the system read for a tape. If the tape is in a drive then it will be described in the following way: *Drive drive_nr:slot_nr:bar_code_name*, for example: *Drive 0:1:Tape 1*. If the tape is in a slot then it will be described in the following way: *Slot slot_nr:bar_code_name*, for example: *Slot 1:Tape 1*.

NOTE When a tape library device is connected, a tape unload tool will appear. If a streamer device is connected, a tape eject tool will appear.

Function: Remove backup device

This function removes the selected backup device.

5.2.3.4.3 Backup tasks

Here you can view list of all created backup tasks. Click on backup task name to see more information about it.

Function: Backup tasks

Here you can run, stop or delete desired backup task. All previously created tasks will be visible

Function: Create new backup task

Here you can create a new backup task.

In order to create a backup task:

- enter a name for the task,
- select the logical volume,
- select the shares for the backup,
- select the snapshot from which the backup will be made,
- select the pool on which the backup will be made,
- select the backup level,
- to compress the data during backup, select the **Compress data** option.

Backup levels:

Full

This will back up all your data.

Incremental

This will back up only new data.

Differential

This will back up all new data since the last full backup.

The screenshot shows the 'Backup tasks' configuration window. The breadcrumb path is 'You are here: MAINTENANCE > backup > Backup tasks'. The left sidebar contains sections for 'Backup pools' (Pool60days, Tape), 'Backup devices' (Tape Drive, VirtualTape), 'Backup tasks', and 'Data (file) rep.'. The main area has a 'Backup tasks' header with an 'Info' message: 'No tasks have been found.' Below this is the 'Create new backup task' form. Fields include 'Name', 'Logical volume' (lv0001), and 'Shares for backup'. There are two search boxes for 'Available shares' and 'Assigned shares'. The 'Available shares' list contains 'Backup of Data', 'Projects', and 'backup_db_lv0001'. Below the lists are 'Snapshot' and 'Store on pool' (Tape) dropdowns. The 'Level' section has radio buttons for 'full', 'incremental' (selected), and 'differential', along with checkboxes for 'Compress data' and 'Make full backup every:'. An 'apply' button is at the bottom right.

The screenshot shows the configuration window for a specific backup task named 'BackupTask001'. The breadcrumb path is 'You are here: MAINTENANCE > backup > Backup tasks > BackupTask001'. The left sidebar is similar to the previous screenshot, but 'BackupTask001' is selected under 'Backup tasks'. The main area features a 'Backup task' table with the following data:

Attribute	Value
Shares:	Projects
Pool:	Tape
LV:	lv0001
Snapshot:	snap00000
Level:	incremental
Compression:	normal
Full backup every:	off

Below the table is the 'Create new schedule for backup task' form. It includes a 'Comment' field, a 'Select time:' dropdown set to 'Interval', and an 'Interval:' dropdown set to '10 min. time period'. An 'apply' button is at the bottom right.

Function: Backup task

Here you can view information on the selected task.

Shares

List of shares which are used for backup.

Pool

Pool to which the backup task is assigned.

LV

Logical volume which is used for the backup device.

Snapshot

Snapshot which is used for the backup task.

Level

Backup level employed.

Compression

Compression info.

Function: Create new schedule for backup task

Here you can create a new schedule for the selected backup task.

Comment

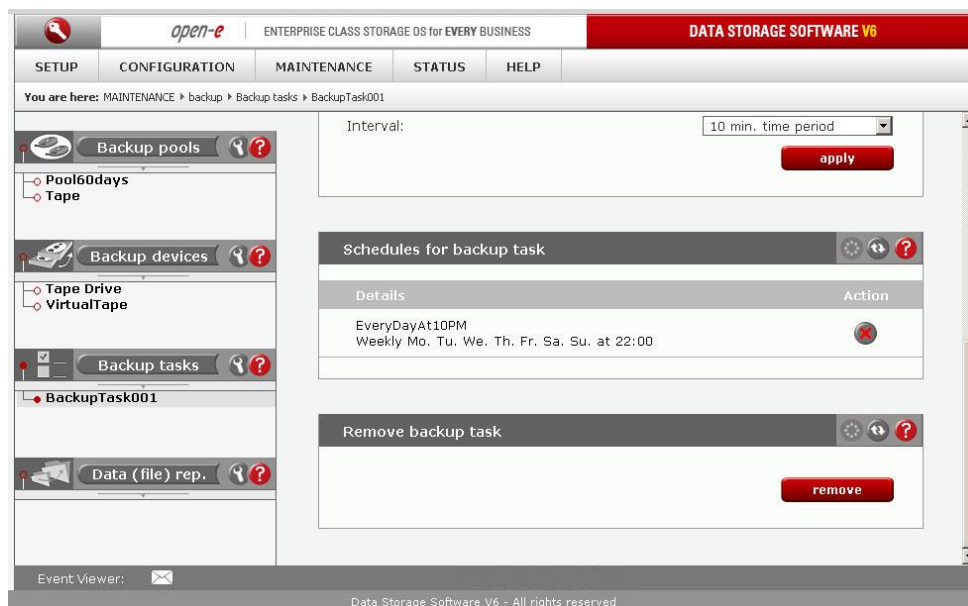
You can enter a comment for backup schedule.

Time select

The option allows you to select the time for task execution. In order to start the task immediately, please go to MAINTENACE -> Backup -> Backup Tasks -> Function: Backup Tasks and click the Play button next to the given task.

Interval

Select the time period at which the backup will be run.



Function: Schedules for backup task

Here you can see information on all schedules created for selected backup task. You can also delete any schedule by clicking **Delete schedule** action button.

Function: Backup task remove

Here you can remove the selected backup task.

5.2.3.4.4 Data (file) Replication

Here you can view list of all data (file) replication tasks.

Function: Create new data (file) replication task

This function allows you to create a new data (file) replication task. Data can be replicated as source or destination at the same time.

Task name

Please enter a task name.

Source share

In order to set a share as the source, select it from the drop-down list and enter the destination IP, i.e. where the share will be replicated.

Snapshot

Snapshot assigned for data (file) replication.

Destination share

Select the destination share from the drop-down list and enter the destination agent login and password.

Dest. agent login

Enter the destination agent login.

Dest. agent password

Destination agent password.

Log replication errors

Turn this on if you want to log replication errors.

Use ACL

Turn it on if you want to have files replicated with Access Control List permissions.

Don't delete files

If this option is disabled, all destination files not found on the source will be deleted. If you want to keep these files you need to enable this option.

NOTE In order to set a share as a destination share, you should enable the data (file) replication agent in the Configuration -> NAS settings menu, next enable the Replication option for each share. There is no need to enable the data (file) replication agent if replication is set as source only.

It is not possible to perform data (file) replication and backup at the sometime. Backup has higher priority then data (file) replication. When scheduled concurrently with backup and using snapshots from the same logical volume, data (file) replication will be stopped. You will see a snapshot error in the data (file) replication status field, because snapshots cannot be used twice at the same time if they are set to the same logical volume.

In order to perform data (file) replication over the Internet you have to configure the firewall port to 873.

You are here: MAINTENANCE > backup > Data (file) replication

Create new data (file) replication task

Task name:

Source share:

Snapshot:

Destination IP:

Destination share:

Destination agent login:

Destination agent password:

Log replication errors

Use ACL

Don't delete files

apply

Data (file) replication tasks

Name	Start time	Action
Replication_D01	n/a	

Event Viewer:

Data Storage Software V6 - All rights reserved

Function: Data (file) replication task

Here you can run, stop and delete existing data (file) replication tasks.

You can view the following details for each task:

- destination IP,
- source share,
- snapshot,
- destination share,
- destination agent login,
- information on whether replication errors are being logged.

You are here: MAINTENANCE > backup > Data (file) replication > Replication_D01

Data (file) replication task

Attribute	Value
Destination IP:	192.168.0.220
Source share:	Projects
Snapshot:	snap00000
Destination share:	Copy of Data
Log replication errors:	Yes
Use ACL:	Yes
Don't delete files:	No

Create schedule for data (file) replication task

Comment:

Select time:

Interval:

apply

Event Viewer:

Data Storage Software V6 - All rights reserved

Function: Create schedule for data (file) replication task

Here you can create a schedule for the selected data (file) replication task.

Comment

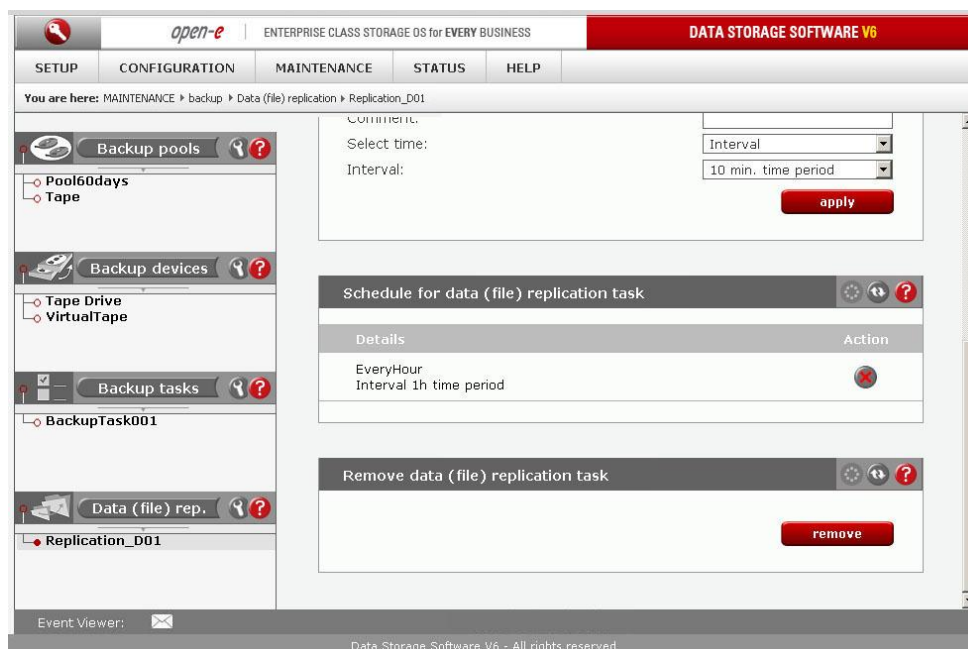
You can enter a comment for the replication schedule.

Time select

You can start the replication immediately by selecting Now from the Time select drop-down list or schedule it for a later date.

Interval

Select the interval at which the replication will be executed.



Function: Schedule for data (file) replication task

Here you can manage all schedules created for selected data (file) replication task.

Function: Remove schedule for data (file) replication task

Here you can remove the data (file) replication task

5.2.3.5 Restore

Here you can view a list of all restore tasks

Function: Backup restore tasks

With this function you can run, stop or delete backup restore tasks.

Every task is characterized by the following fields:

Name

Name of restore task.

Start time

Time when the restore task has been started.

Action

Action that can be performed on restore task.

Additional task info:

Last log

Shows action logs.

Short description

Device

Shows if the task is running on a virtual drive or a tape drive device.

Destination share

Name of the share where the data will be restored.

Jobs

Number of running jobs for this task.

The screenshot displays the 'open-e' web interface for 'DATA STORAGE SOFTWARE V6'. The main navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The current page is 'restore' under 'MAINTENANCE'. The 'Restore tasks' sidebar shows a tree view with 'RestoreTask' selected. The main content area features a 'Backup Restore tasks' table with columns for Name, Start time, and Action. A single task, 'RestoreTask', is listed with a start time of '2009-06-20 23:04:39'. Below this is a 'Create new restore task' form with search criteria: Task, Device, File name contain, From date, and To date. The form also includes radio buttons for 'Overwrite files' (always, if newer, if older, never) and a checked box for 'run imediate after create'. An 'apply' button is at the bottom of the form.

Name	Start time	Action
RestoreTask	2009-06-20 23:04:39	● ● ●

Name	Date	Device
<input type="checkbox"/> BackupTask001	2009-06-20 22:03:09	Tape
<input type="checkbox"/> BackupTask001	2009-06-20 21:50:46	Tape

Function: Create new restore task

With this function you can search for backup tasks and create new restore tasks for the selected backup tasks. You can search according to the following criteria:

Task

Task name.

Device

Backup device name.

File name contain

This will show only those backup tasks which contain files whose names follow the search criteria. Wildcards are permitted with filenames. For example, if you put in 'M???'', all backup

tasks will be shown containing filenames which start with the letter M and are 4 characters long. If you put in 'M*' all backup tasks containing filenames which start with the letter M will be shown /- length is not a factor. The filename cannot start or end with space or contain special characters such as ` / ; " \$ % ! ~ @ > < = + ^ # & \ ' ; ,

From date, To date

Date range for the backup task. The date in the From date field should be earlier or the same as the one in the To date field. Both dates need to be in full format.

If you do not select any search options all backup tasks will be shown. Every backup task found is described by the following fields:

Name

Backup task name.

Date

Date of backup task creation.

Device

Backup device name.

Details

Additional details.

Files

Number of backed up files.

Size

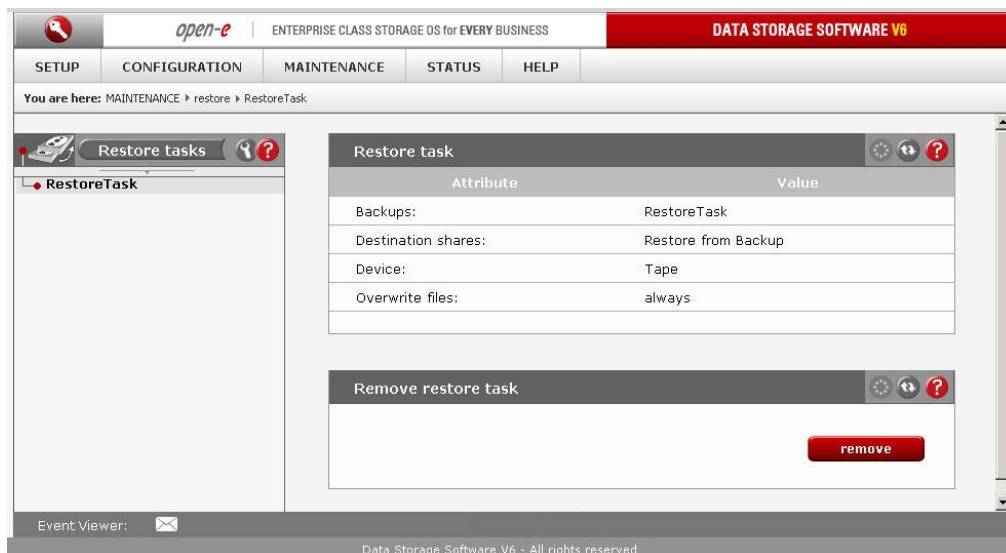
Size of backup.

Required tape(s)

Tapes on which the backup is stored.

In order to create a new restore task:

- select backup task(s),
- enter a name for the restore task,
- select the share to which the backup will be restored (**restore to**),
- choose the overwrite options,
- select the option **Run immediately after creation** if you want to run the restore task immediately after the task has been created task creation.
- click **apply**.



Function: Restore task

Here you can view the details for the selected restore task.

Backups

Names of backup tasks that are assigned to this restore task

Destination shares

Shares to which the restore will be made

Device

Backup device type

Overwrite files

Overwrite options

Function: Remove restore task

Here you can remove the selected restore task.

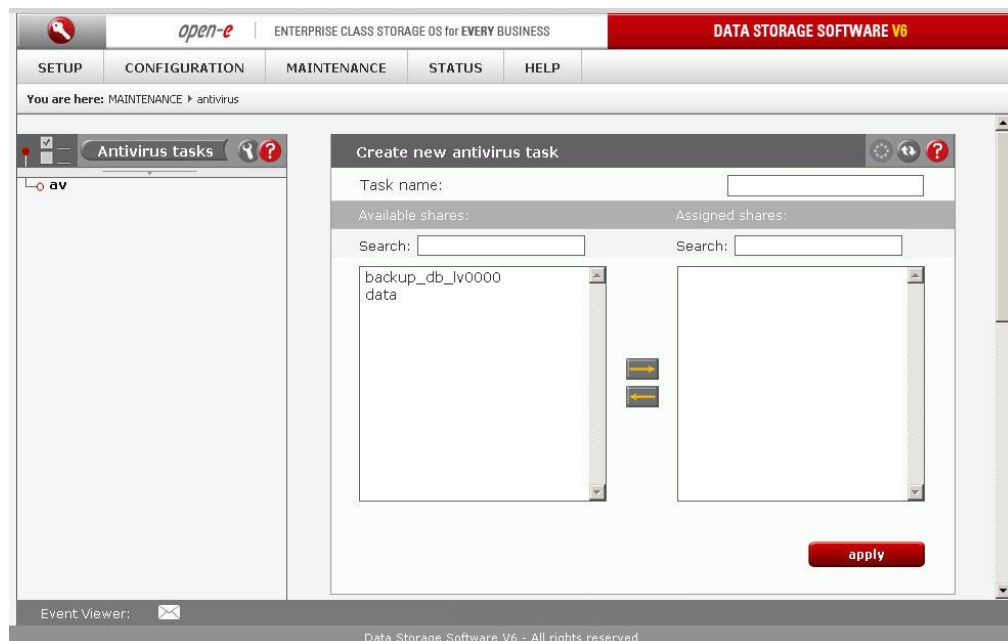
5.2.3.6 Antivirus

Function: Create new antivirus task

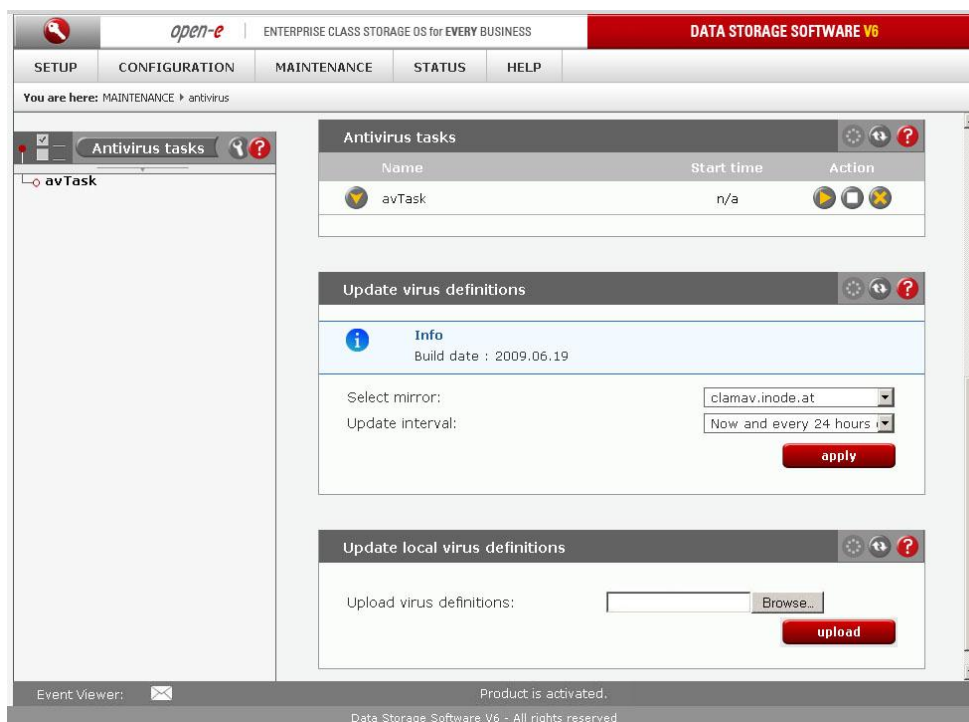
Here you can create a new antivirus scan task.

- Enter task name,
- Select shares for scan,
- Click "apply" to create the task.

NOTE Antivirus does not scan password protected archives.

**Function: Antivirus tasks**

Here you can run, stop or delete desired antivirus task. All previously created tasks will be visible here.



Function: Update virus definitions

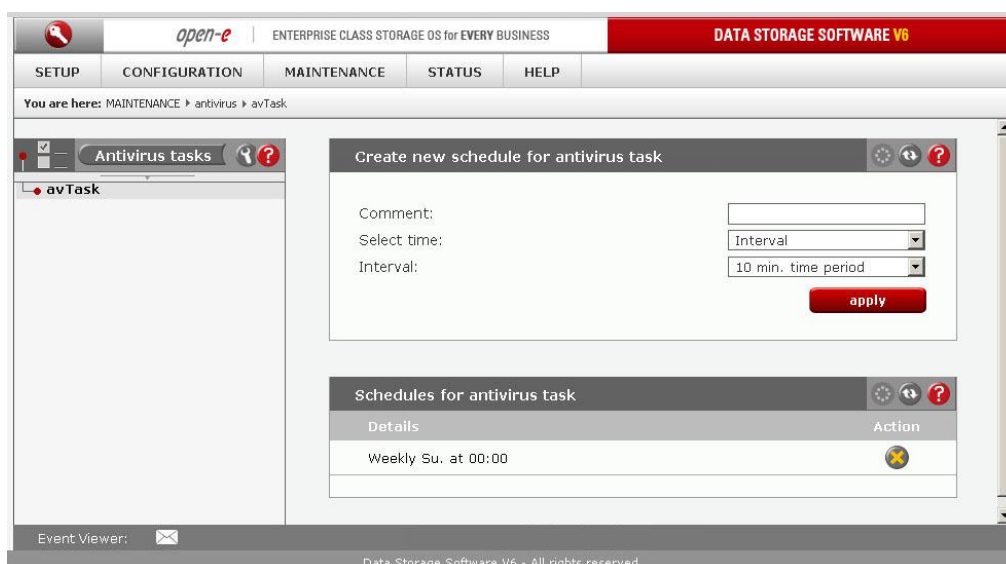
With this function you can update virus definitions. Select the mirror from which the definitions will be downloaded. Select when update should be made. If you select **Now**, the update will be made instantly. Otherwise the update will be made now and then cyclically according to the interval value.

Function: Update local virus definitions

With this function you can upload virus database. In order to do this:

- Click on button "browse" and select database file, downloaded from <http://clamav.net/>,
- Click button "upload"

Two types of database file is supported: "daily" and "main". Database file should have "cvd" extension.



Function: Create new schedule for antivirus task

Here you can create a new schedule for the selected antivirus task.

Comment

You can enter a comment for the antivirus schedule.

Time select

You can start an antivirus task immediately by selecting Now from the Time select drop-down list or schedule it for a later date.

Interval

Scan will be performed cyclically according to the interval value, e.g. if you select an interval of 1 h the share will be scanned every hour.

Function: Schedules for antivirus task

Here you can manage all schedules created for the selected antivirus task.

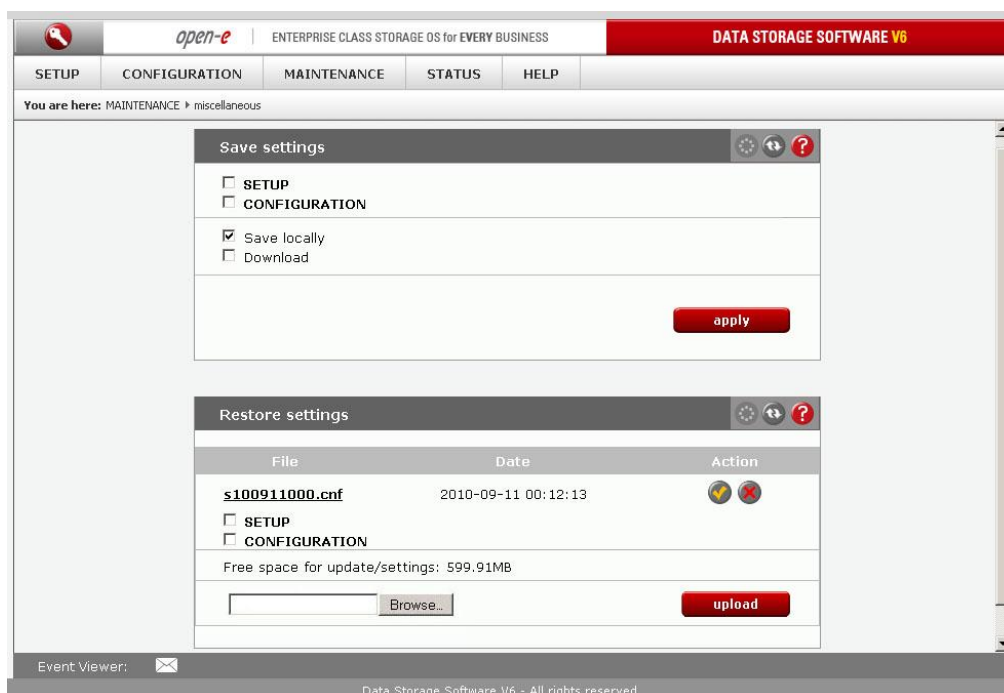
5.2.3.7 Miscellaneous**Function: Save settings**

With this function you can store configuration settings.

Select the settings you want to store and click Apply. Settings can be saved locally on the server (they will be visible in the Restore settings function) and/or as a downloadable file. Each time you save settings locally, a new entry will be created and you will be able to select which settings to restore during the restore process.

You can restore settings using the Restore settings function.

NOTE Settings will also be saved automatically every time the server is restarted or shut down. These are stored in files following the naming convention *auto_save_X / auto_save_last*.

**Function: Restore settings**

With this function, you can restore configuration settings, (provided they have been previously saved). You can restore settings from files saved locally, or upload a configuration settings file, (provided one has been previously downloaded). For each entry, you can view the configuration file

name, the creation date, and applicable actions. By clicking the appropriate checkboxes you can select which settings to restore. To restore settings, click on the Restore action button.

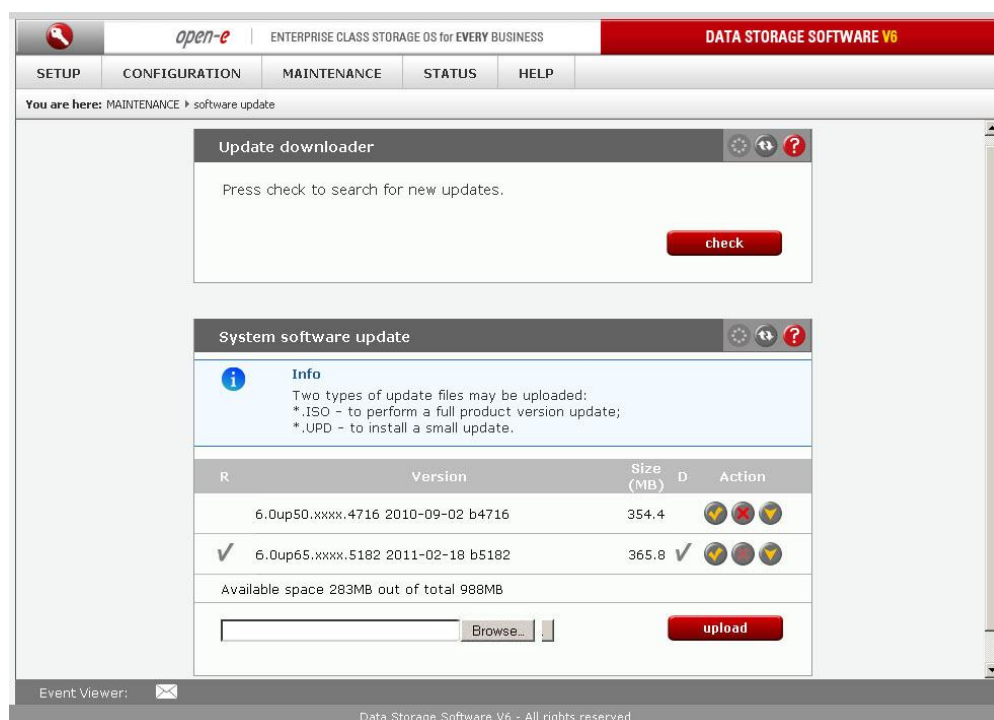
You can delete a configuration settings file by clicking the Delete action button. You can download a configuration settings file by clicking its name. In order to upload a configuration settings file, (provided one has been previously saved), browse for its filename and click the Upload button.

You can save settings using the Save settings function.

NOTE Settings will be saved automatically every time the server is restarted or shut down. They are stored in files following the naming convention `auto_save_X / auto_save_last`. You will be able to view and access these files in the Restore settings box.

5.2.3.8 Software update

This function allows you to update the system software. There are two ways of updating Open-E DSS V6 software.



Function: Update downloader

With this function you can check if there is a new update available and download it.

Please remember to set up correct DNS and gateway addresses in the **SETUP** -> **Network** menu beforehand.

Function: System software update

This function allows you to update the system software. Two types of updates are available:

- full product version update
 - small update
- The function allows you to:
- have several product versions
 - delete updates (full and small) (the X button)
 - default setting of product version activated (button V)
 - having a constant insight into release notes (full and small updates) when unrolling a scrollbar with a particular product version

Description of a product version: first three digits are related to product version number

- next two digits are related to "up" with a number
- product release date
- name of a directory with a product
- size of a directory with a product version

While performing each update file upload release notes are introduced and update accepting or rejecting is possible. After accepting please click the **reboot** button so that the changes could take effect.

Option of default product version ("Boot" unit) means that the version marked will be booted automatically without a need of choosing a version in menu while system starting.

NOTE Small update is performed only for currently activated product version

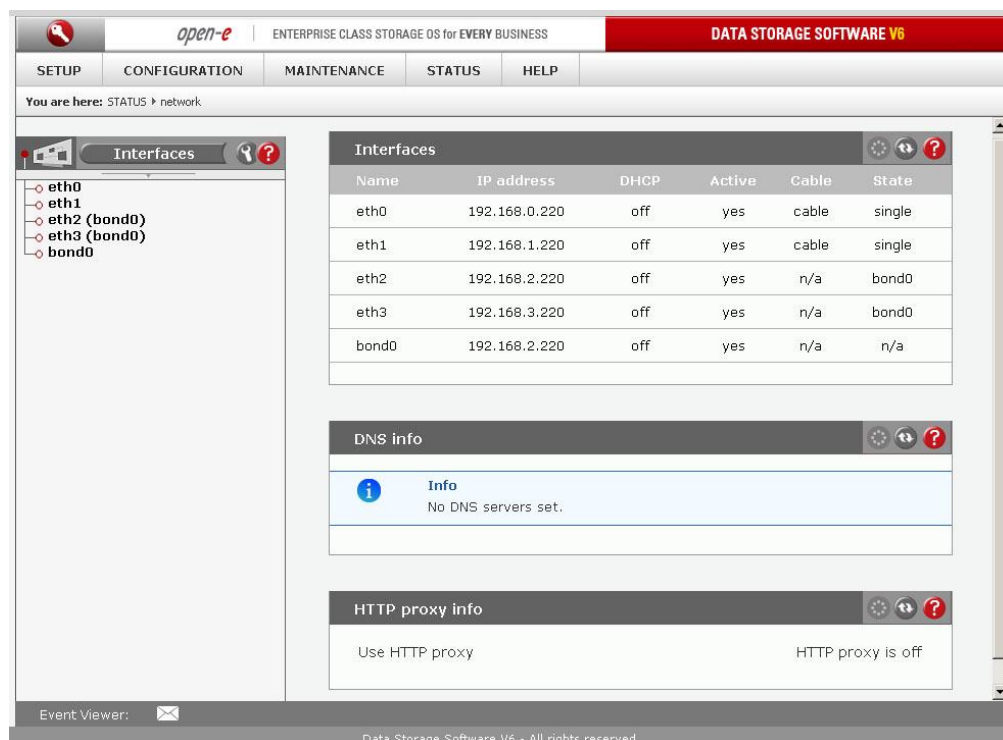
5.2.4. STATUS

This function provides a quick overview of the most important system parameters of your Open-E Data Storage Software V6. The corresponding sub-functions are network, logical volume, connections, hardware, tasks and S.M.A.R.T.

5.2.4.1 Network

Function: Interfaces

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



The screenshot shows the Open-E Data Storage Software V6 web interface. The top navigation bar includes 'open-e', 'ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS', and 'DATA STORAGE SOFTWARE V6'. The main menu has 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The current page is 'STATUS' > 'network'. The 'Interfaces' section is active, showing a table of network interfaces.

Name	IP address	DHCP	Active	Cable	State
eth0	192.168.0.220	off	yes	cable	single
eth1	192.168.1.220	off	yes	cable	single
eth2	192.168.2.220	off	yes	n/a	bond0
eth3	192.168.3.220	off	yes	n/a	bond0
bond0	192.168.2.220	off	yes	n/a	n/a

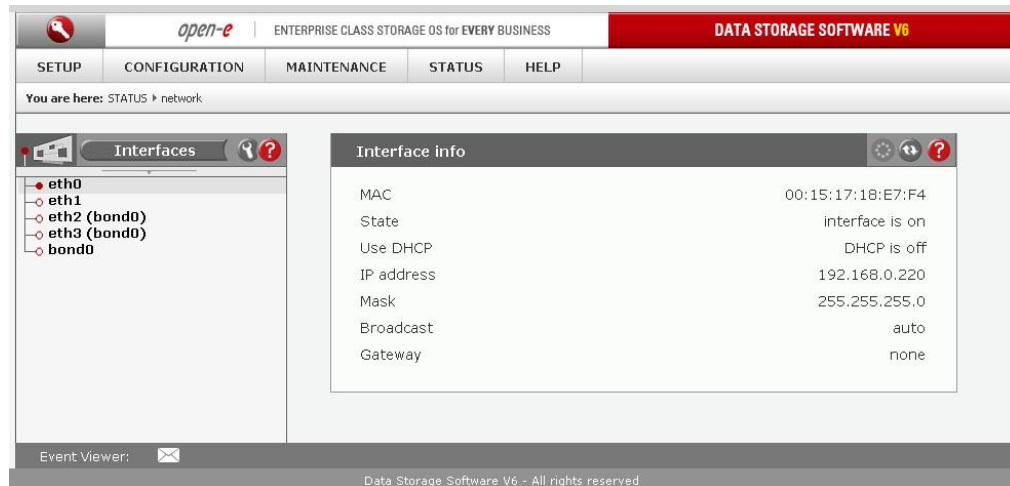
Below the table, there are sections for 'DNS info' and 'HTTP proxy info'. The 'DNS info' section shows 'No DNS servers set.' and the 'HTTP proxy info' section shows 'Use HTTP proxy' and 'HTTP proxy is off'.

Function: DNS info

Here you can view network interfaces DNS information.

Function: HTTP proxy info

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



Function: Interfaces info

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

- MAC address,
- state,
- DHCP status,
- IP address,
- mask,
- broadcast address,
- gateway address.

5.2.4.2 Logical volume

Function: Logical volume statistics

This function contains statistical data on the logical volume.

Name

Name of the logical volume

Size

Size of the logical volume

Used

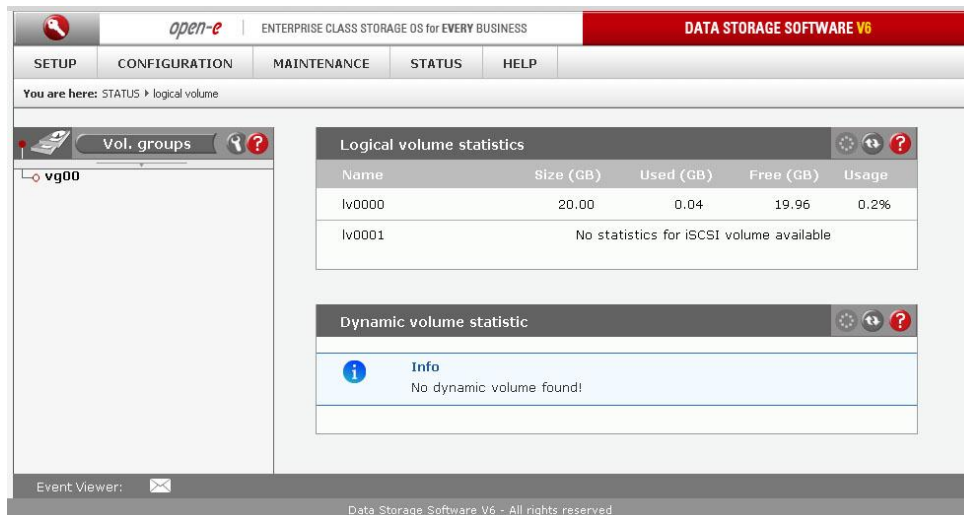
Amount of space currently being used by data on the logical volume

Free

Space available on the logical volume

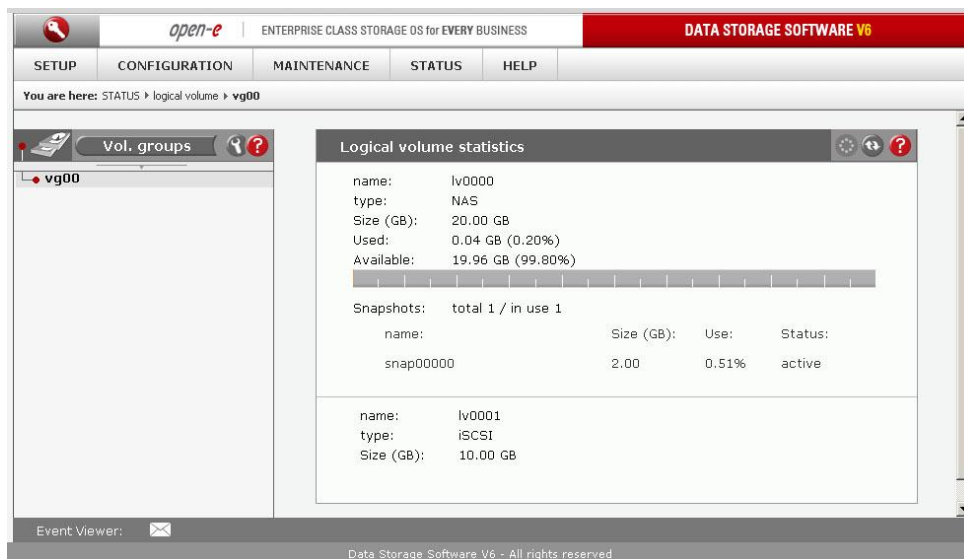
Usage

Amount of space currently being used by data on the logical volume, in percent



Function: Dynamic volume statistic

This function contains statistical data on the dynamic volume.



Function: Logical volume statistics

Here you can see information on selected share volume.

Function provides following information:

Name

Name of logical volume.

Type

Type of logical volume, can be NAS or iSCSI.

Size

Size of share volume.

Used

Current date usage of space on share volume.

Free

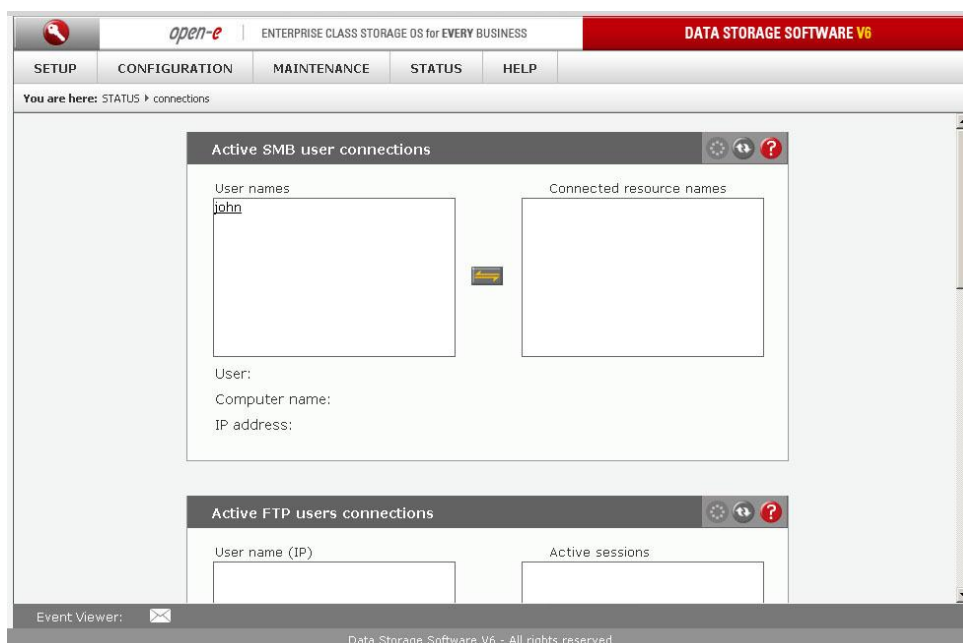
Available space on share volume.

Snapshots

Number of all snapshots assigned to logical volume / number of all snapshots in use.

5.2.4.3 Connections

This function displays what user connections are currently active.



Function: Active SMB users connections

With this function you can view which users and IP addresses are currently connected to specific SMB shares.

After clicking on a specific username in the left box, you will see a list of shares to which that user is connected in the right box. Under the boxes you will also see the username, computer name and IP address for this user.

Function: Active FTP users connections

With this function you can view which users and IP addresses are currently connected to specific FTP shares

Function: Active NFS users connections

With this function you can view which users and IP addresses are currently connected to specific NFS shares.

Function: Active Appletalk users connections

With this function you can view which users and IP addresses are currently connected to specific Appletalk shares.

Function: iSCSI status

Here you can check who is currently using iSCSI targets. Here you can get: target name, end-user IP address, CID (connection ID) and SID (session ID).

5.2.4.4 System

Function: Services

Here you can view service statistics.

Service

Service name.

State

Indicates the state of the service, can be either **On** or **Off**.

Status

Indicates if the service is currently running (**Active**) or not running (**Inactive**).

After clicking the **Details** button next to the service name, the following information on the selected service will be displayed:

Name

Name of the process which belongs to the service.

Description

Information about the process.

Count

Count of processes.

Function: Added license keys

With this function you can view all added license keys.

Key

License key.

Type

License key type (either storage limit or MRCP).

Amount

Detailed amount for the license key type.

The screenshot displays the open-e web interface. At the top, there is a navigation bar with the open-e logo, the text 'ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS', and a red header 'DATA STORAGE SOFTWARE V6'. Below the navigation bar are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The 'STATUS' tab is selected, and the breadcrumb 'You are here: STATUS > system' is visible.

The main content area is divided into two sections:

- Services:** A table listing various services with their states and statuses.

Service	State	Status
SMB Transfer Protocol	ON	ACTIVE
SMB Naming service	ON	ACTIVE
FTP service	ON	ACTIVE
NFS service	ON	ACTIVE
Apple Talk	ON	ACTIVE
Data file replication service	ON	ACTIVE
SNMP service	ON	ACTIVE
NDMP data server	ON	ACTIVE
Local Backup service	ON	ACTIVE
UPS APC	OFF	INACTIVE
UPS MGE	OFF	INACTIVE
- Added license keys:** A section showing an information message: 'Factory default license key present.'

At the bottom of the interface, there is an 'Event Viewer' icon and a footer that reads 'Data Storage Software V6 - All rights reserved.'

5.2.4.5 Hardware

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

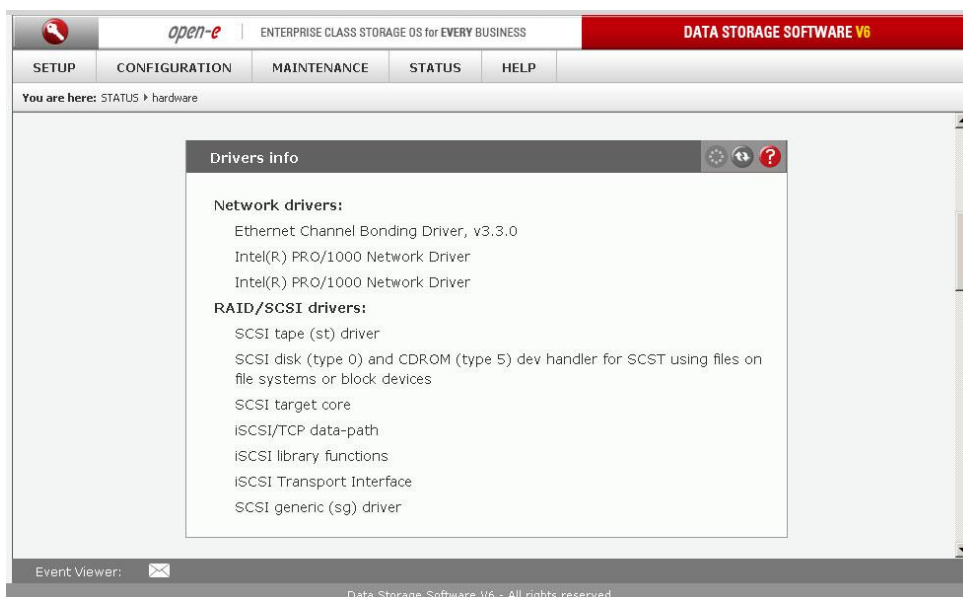
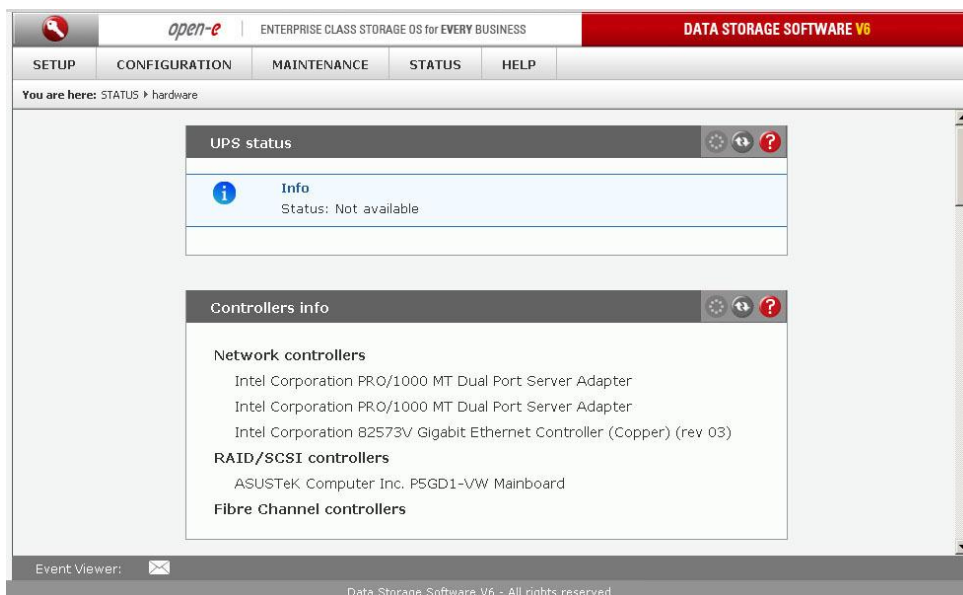
In addition, you may also download the latest Open-E Data Storage Software V6 log files or view specified or all log files without downloading in compressed form. You can also check usage of memory (RAM) and (SWAP) and also hardware monitoring.

Function: UPS status

The UPS status presents the current status of ups device.

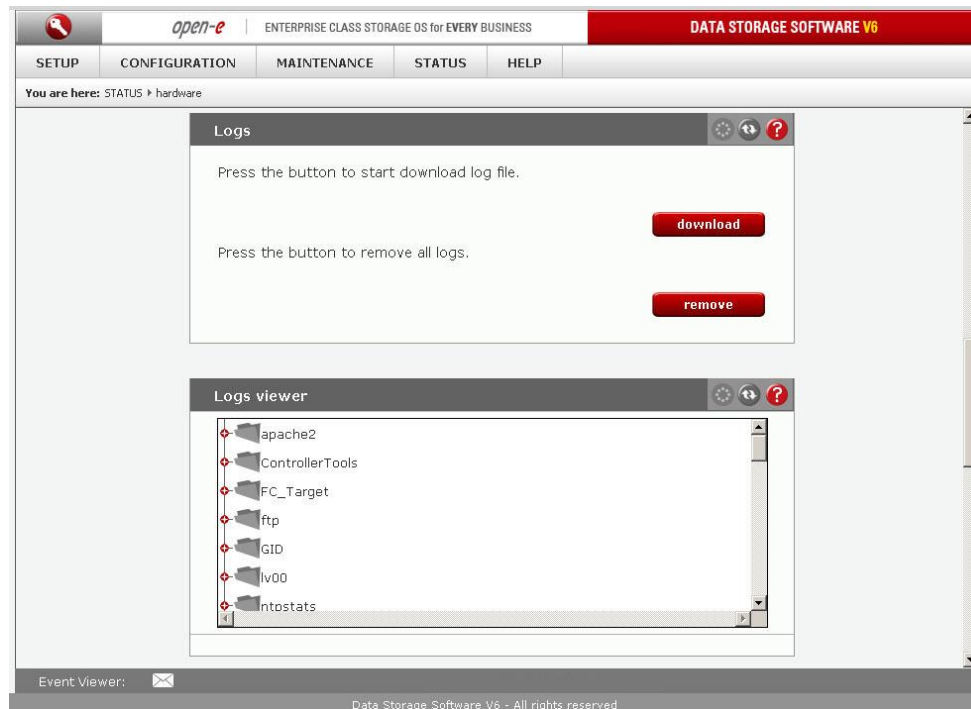
Function: Controllers info

This table lists the components installed in your server.



Function: Drivers info

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



Function: Logs

This function allows you to download or remove the logs gathered during server operation. In the logs, you can find all system information relevant to troubleshooting, in case there are any problems.

Click on the 'Download' button. When the Download Logs window appears, you can open the file, or save it to your hard disk..

NOTE Recovery information for the Logical Volume Manager is also stored in the logs. It is recommended to download the logs after creating logical volumes and to store them in a safe place as a source for the logical volume and volume group recovery in case of a critical hardware failure.

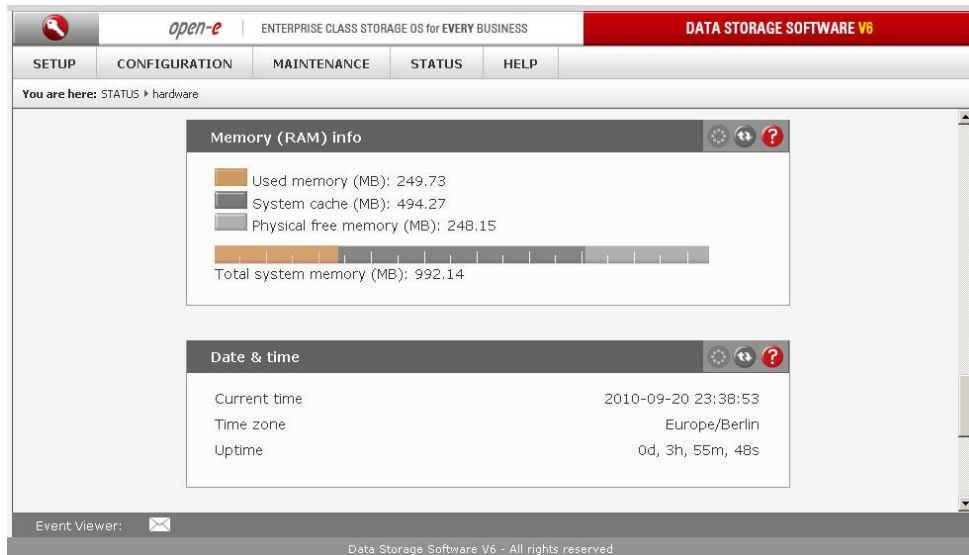
NOTE During log generation, a simple speed test of the disks is performed. When a software RAID is used with a lot of single disks, this may take up to several minutes.

Function: Logs viewer

This function allows you to view one specific log file without downloading all the log files in compressed form.

To view a log file, just click on the name of the file. Depending on which Web browser you use, you may be asked to select an appropriate application to view the file.

To view the contents of a folder, just click on its name.



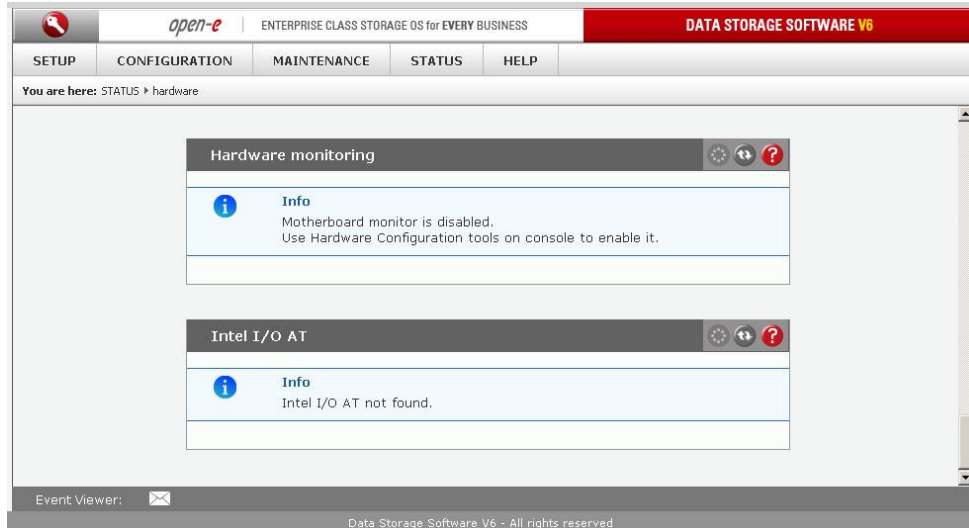
Function: Memory (RAM) info

This function presents the current memory usage.

NOTE Memory allocated by the system cache will be released when an application requires additional memory. If there is almost no free memory, you can install more memory modules.

Function: Date & Time

This function displays the current date and time on your server.



Function: Hardware monitoring

This function monitors hardware. To enable it, you need to access the **Hardware Configuration** tool in the console followed by **Hardware options** (press *F1* in the console to list keyboard shortcuts).

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

- motherboard temperature,
- CPU temperature,

- chipset temperature,
- Vcore,
- fan rotation speed.

After initializing, a chipset selection window appears, followed by sensor selection.

The sensor selection screen comprises of three columns. The first column displays the sensor name as indicated by lmsensors; the second displays the sensor name as indicated by the user; the third displays the ideal value for the given sensor.

After a sensor has been selected you will be presented with its configuration window. The state of the sensor is indicated at the top. Configurable values are divided between two columns.

- **Label** - the user-modifiable sensor name.
- **Ideal value**.
- **Minimal value** - if the current value is smaller than the minimal value it will be marked in red in the server GUI.
- **Maximum value** - if the current value is larger than the maximum value it will be marked in red in the server GUI.
- **Multiplex** - the actual current value will be multiplied by the multiplex value, the result being shown as the current value.
- **Addition** - the addition value will be added to the actual current value, the result being shown as the current value.
- **Ignore** - when this option is enabled, the sensor in question will not be displayed in the server GUI.

When using the **mbmon** (motherboard monitor) hardware mode you can find information on the following parameters here:

- motherboard temperature,
- CPU temperature,
- chipset temperature,
- Vcore.

Supported chipset family

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

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

- disks status,
- fans speed,
- fan PWM,
- power status,
- fan status,
- temperature.

When using the **IPMI (sensors)** mode the information displayed depends on your motherboard. To enable this mode you need to have a motherboard with a sensor management component which supports access via IPMI.

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

- power status,
- memory voltage,
- voltage levels,
- box Temperature,
- CPU Temperature,
- fan speed.
- disk status.

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

- power status,
- memory voltage,
- voltage levels,
- box temperature,
- CPU temperature,
- fan speed,
- disk status.

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

- Unit - displays the unit name,
- Bay - number of the bay into which the unit is inserted,
- Serial Number - unit serial number.

When using the **Intel SSR212MC2** mode you can find information on the following parameters here:

- Disc status - displays disk status,
- BBU status - displays backup battery unit status,
- BBU Capacity Info - displays backup battery unit capacity stats,
- BBU Properties - displays backup battery unit properties,
- BBU Design Info - displays backup battery unit design parameters,
- IPMI Sensors - IPMI Sensors stats.

Function: Intel I/O AT

Here you can view the status of Intel I/O AT. The primary benefit of Intel I/O AT is its ability to significantly reduce CPU overhead, freeing resources for more critical tasks. Intel I/O AT uses the server's processors more efficiently by leveraging architectural improvements within the CPU, chipset, network controller, and firmware to minimize performance-limiting bottlenecks. Intel I/O AT accelerates TCP/IP processing, delivers data-movement efficiencies across the entire server platform, and minimizes system overhead. Intel I/O AT provides network acceleration that scales seamlessly across multiple Gigabit Ethernet (GbE) ports.

DMA status

In this section you can view which of the four DMA channels are used.

Bytes transferred

Shows a count of bytes transferred through each DMA channel

5.2.4.6 Tasks

Here you can view statistical information on tasks from backup, data (file0 replication, volume replication, antivirus and snapshots.

Function: Running tasks

This function displays information about all currently running tasks.

You can view the follow tasks here:

- volume replication,
- snapshots.

Every running task is characterized by the following fields:

- name,
- type,
- start time,
- details.

In order to view the details of a running task click on the **Show details** button.

More information can be found by clicking on the relevant task type in the Tasks tree and clicking ? (Help) within the **Running tasks** function.

The screenshot shows the 'Running tasks' function in the open-e Data Storage Software V6 interface. The interface includes a navigation menu on the left with options like Backup, Restore from backup, Data (File) Replication, Antivirus, Volume Replication, and Snapshots. The main area displays a table of running tasks and a tasks log.

Name	Type	Start time
snap00000	Snapshot	2010-09-20 20:59:41

LV: lv0000
 Status: **in use/active**
 Size: 2.00 GB
 Usage: 0.51%

Time	Name	Type	Status	Action
2010-09-20 20:59:57	snap00000	Snapshot	OK	Started

Function: Tasks log

Every task log is supplemented with the following fields:

Time

Task start time.

Name

Task name.

Type

Task type; can be one of following:

- backup,
- data (file) replication,
- volume replication,
- antivirus,
- snapshots.

Status

If an action has been successful, its status will be *OK*, otherwise its will be *FAILED*.

Action

Displays the following states:

- Started,
- Stopped,
- Finished.

Details

Task log details.

In order to view task log details click on the **Show details** button.

More information on task logs can be found by selecting the relevant task type in the **Tasks** tree and clicking ? (Help) within the **Tasks log** function.

5.2.4.7 S.M.A.R.T.

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

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

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

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

To view summary please click on "all units"

The screenshot shows the open-e web interface. The top navigation bar includes 'open-e', 'ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS', and 'DATA STORAGE SOFTWARE V6'. Below the navigation bar are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates 'You are here: STATUS > S.M.A.R.T.'. The main content area is divided into two sections. On the left, under the 'Units' heading, there is a tree view showing 'Unit S001' and 'Unit S000'. On the right, the 'S.M.A.R.T. units health status' window displays a table with the following data:

Unit	Health status
Unit S001	PASSED
Unit S000	PASSED

At the bottom of the interface, there is an 'Event Viewer' icon and a footer that reads 'Data Storage Software V6 - All rights reserved'.

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

This function allows you to check the 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.

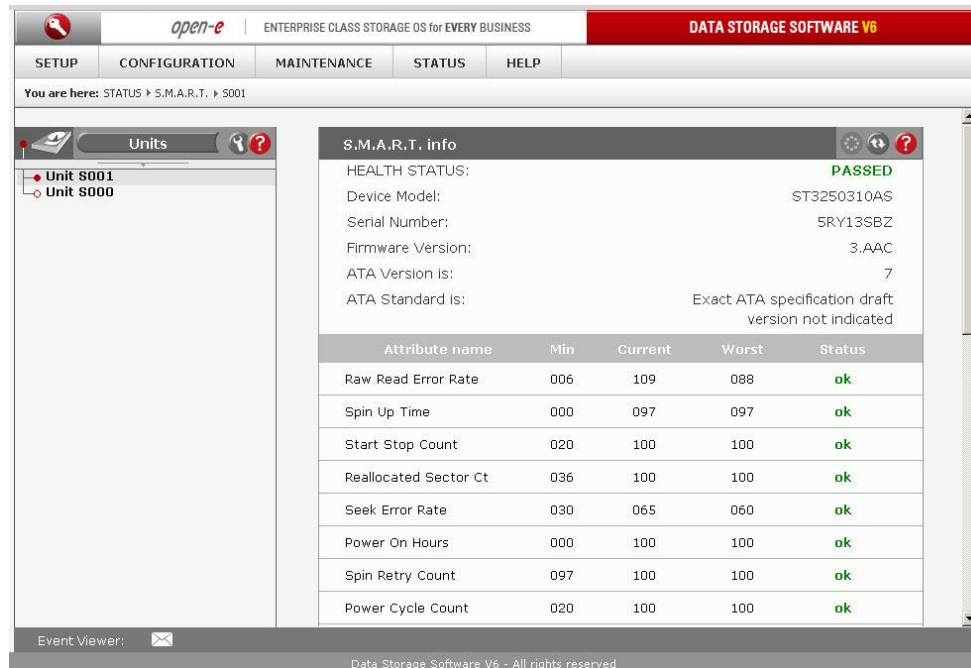
To enable S.M.A.R.T. checks, do the following steps:

Go to the Console
Ctrl-Alt-W

Select Functionality Options

Use the spacebar to select 'use S.M.A.R.T.'

Hit 'Apply'.



The screenshot shows the open-e Data Storage Software V6 interface. The main window is titled "S.M.A.R.T. info" and displays the following information:

HEALTH STATUS: **PASSED**

Device Model: ST3250310AS

Serial Number: 5RY138BZ

Firmware Version: 3.AAC

ATA Version Is: 7

ATA Standard Is: Exact ATA specification draft version not indicated

Attribute name	Min	Current	Worst	Status
Raw Read Error Rate	006	109	088	ok
Spin Up Time	000	097	097	ok
Start Stop Count	020	100	100	ok
Reallocated Sector Ct	036	100	100	ok
Seek Error Rate	030	065	060	ok
Power On Hours	000	100	100	ok
Spin Retry Count	097	100	100	ok
Power Cycle Count	020	100	100	ok

The interface also shows a "Units" sidebar with "Unit S001" selected and an "Event Viewer" at the bottom.

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

This function allows you to view S.M.A.R.T. parameters which this particular disk is capable of reporting.

The first part of the S.M.A.R.T. info window returns elementary hard drive parameters such as the device model or serial number. Below you can find a table with S.M.A.R.T. attributes. The first column displays the attribute name, the second - the minimum threshold value of this parameter, the third - the current value, the fourth - the worst value and the last displays the status.

NOTE If an attribute value ever exceeds the worst value, the status will switch to Failed. If an attribute value nears the worst value, the status will switch to Pre-failed. With certain hard drives some of the attributes may be displayed as Unknown_Attribute - this indicates that the hard drive producer has introduced S.M.A.R.T. modifications which are not supported by our software yet.

NOTE The View errors button allows you to view an automatically generated S.M.A.R.T. error log for the specific drive

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

The screenshot shows the S.M.A.R.T. test interface. The main window displays a table of S.M.A.R.T. attributes and their values:

Hardware ECC Recovered	000	079	048	ok
Current Pending Sector	000	100	100	ok
Offline Uncorrectable	000	100	100	ok
UDMA_CRC Error Count	000	200	200	ok
Multi Zone Error Rate	000	100	253	ok
TA Increase Count	000	100	253	ok

Below the table is a red button labeled "view errors...". A modal window titled "S.M.A.R.T. test" is open, showing the following options:

Please select type of test and press START button.

- Short test
- Long test

Buttons: Results..., Start, Stop

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

This function allows you to perform short and long tests of hard drives.

You will be informed about the progress of the test.

After the test has finished please click on the **Results** button to view the test log.

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

NOTE S.M.A.R.T. tests may not work on some motherboards and controllers.

5.2.4.8 Statistic

Here it a list of categories for available server statistics. Clicking on any of them will display graphs for the selected category.

The screenshot shows the Statistics interface. The main window displays the following information:

Date & time

Current time	2010-09-20 23:52:18
Time zone	Europe/Berlin
Uptime	0d, 4h, 9m, 13s

Function: Date & time

This function displays the current date and time on your server.

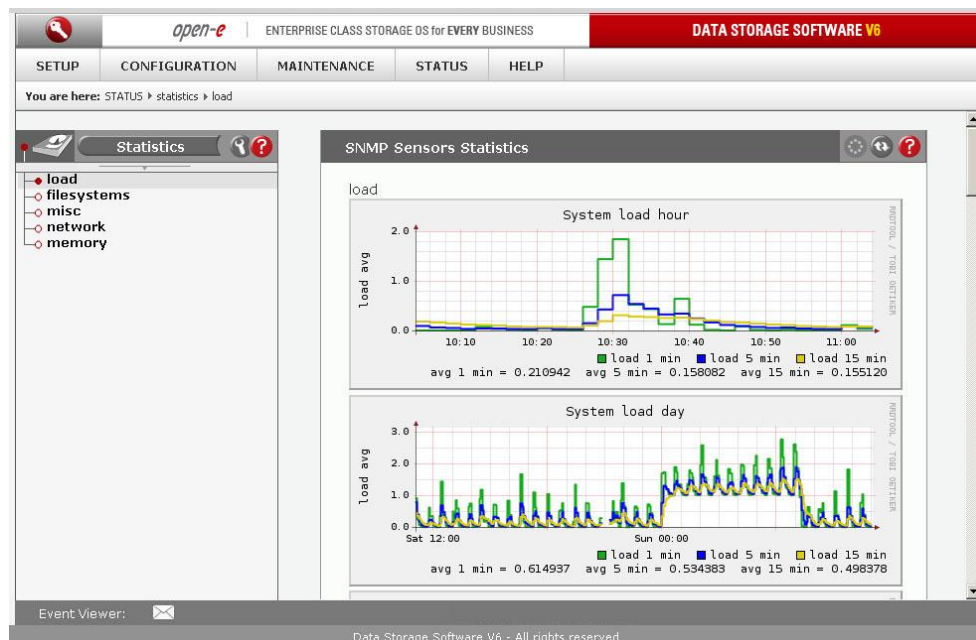
Function: SNMP Sensors Statistics

This window contains server statistics.

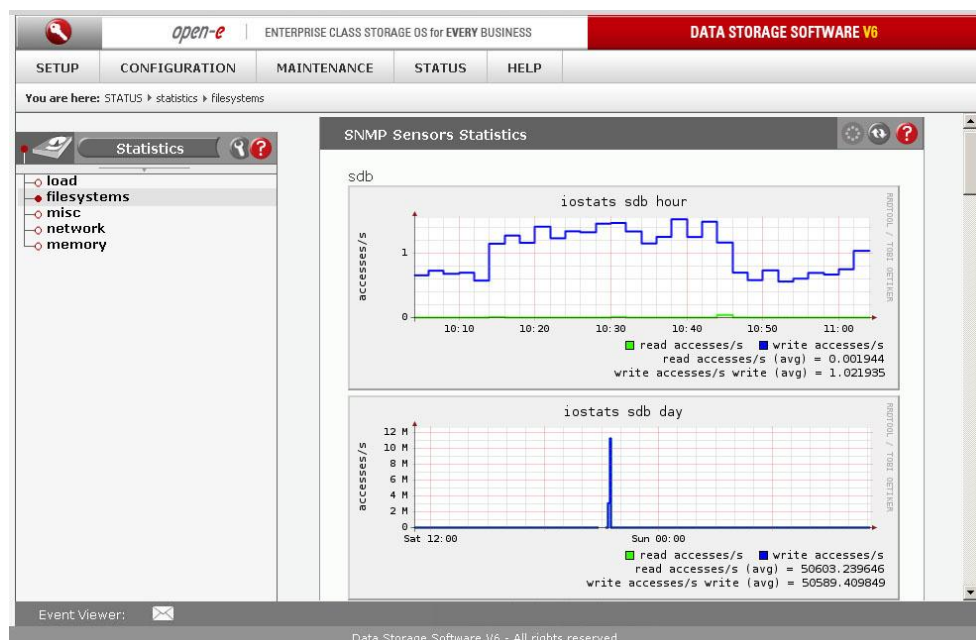
The following statistics are available:

- system load
- filesystems
- misc
- network
- memory

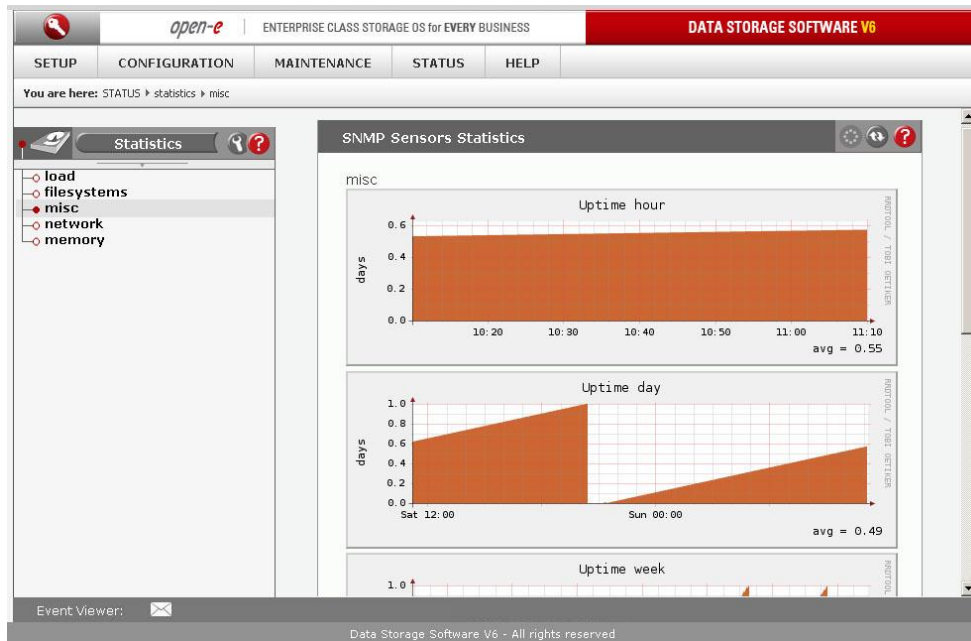
Load



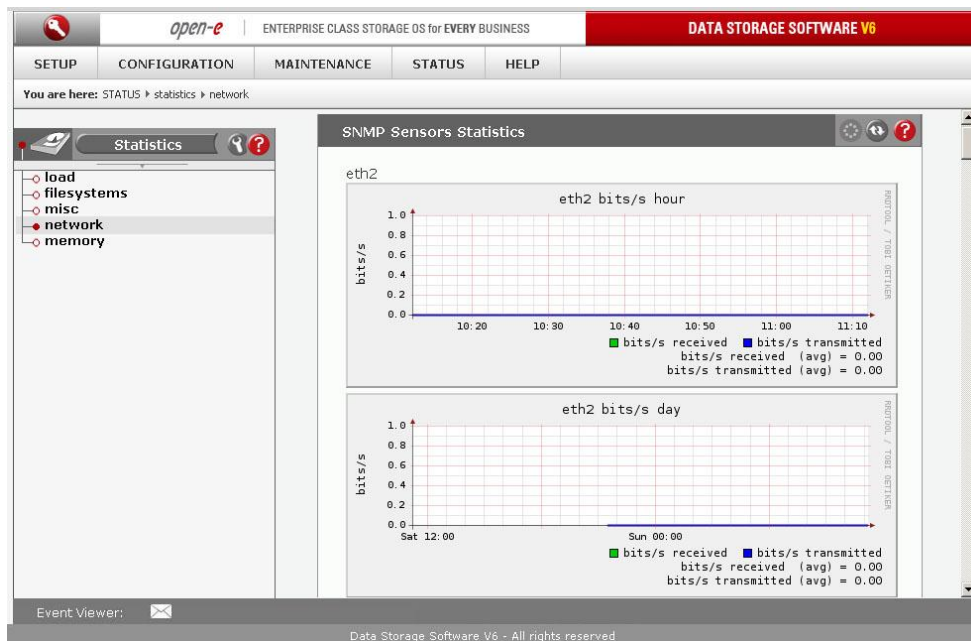
File systems



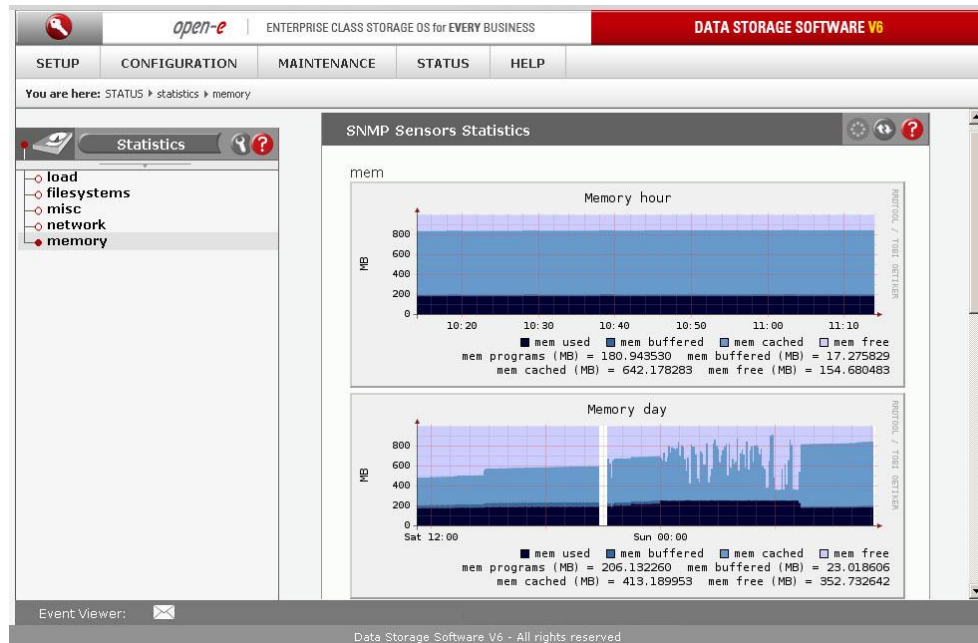
Miscellaneous



Network



Memory



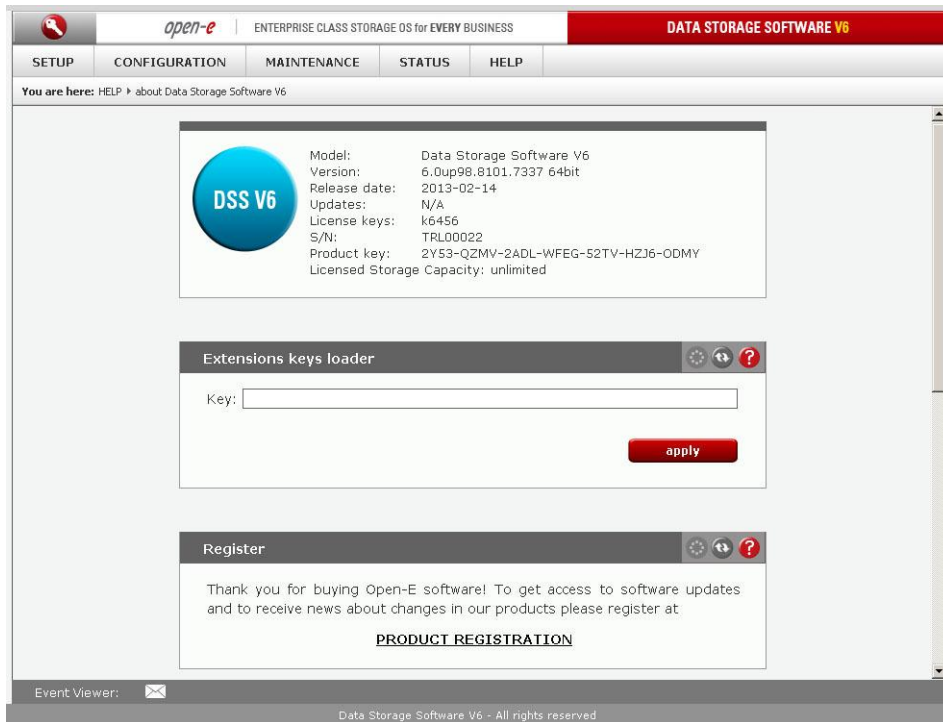
5.2.5. HELP

5.2.5.1 Data Storage Software V6 help

Here you can make a search through all help topics available in the product.

The screenshot shows the 'Online Help Index' page. It features a search bar at the top left. Below the search bar is a list of help topics, including: Antivirus tasks, Backup devices, Backup tasks, CHAP Users, Data replication, Failover quick start guide, Function: Group remove, Function: 3ware administrations, Function: 3ware manager, Function: ACL (Access control list), Function: Active Appletalk users connections, Function: Active FTP users connections, Function: Active NFS users connections, Function: Active SMB users connections, Function: Adaptec administration, Function: Adaptec Zero Channel administration, Function: Added license keys, Function: Add group volumes, Function: Add license key, Function: Add new portal server, Function: Administrator access, Function: Administrator password, Function: Antivirus online, Function: Antivirus setup, Function: Antivirus tasks, Function: API configuration, Function: AppleTalk (AFP) Settings, Function: Areca administration, Function: ATTO administration, Function: Authentication method, Function: Auxiliary connection, Function: Backup agent settings, Function: Backup device settings, Function: Backup device tapes, Function: Backup pools, Function: Backup restore tasks, Function: Backup task, Function: Backup task remove, Function: Backup tasks, Function: Battery Status, and Function: Bonding Info. Below the list of help topics is a section titled 'List of additional documentation:' which includes: How to access iSCSI target snapshot, How to access NAS snapshot, and How to enter IP address. Below this is a section titled 'Wizard:' which includes: Run Initial Setup Wizard.

5.2.5.2 About Data Storage Software V6

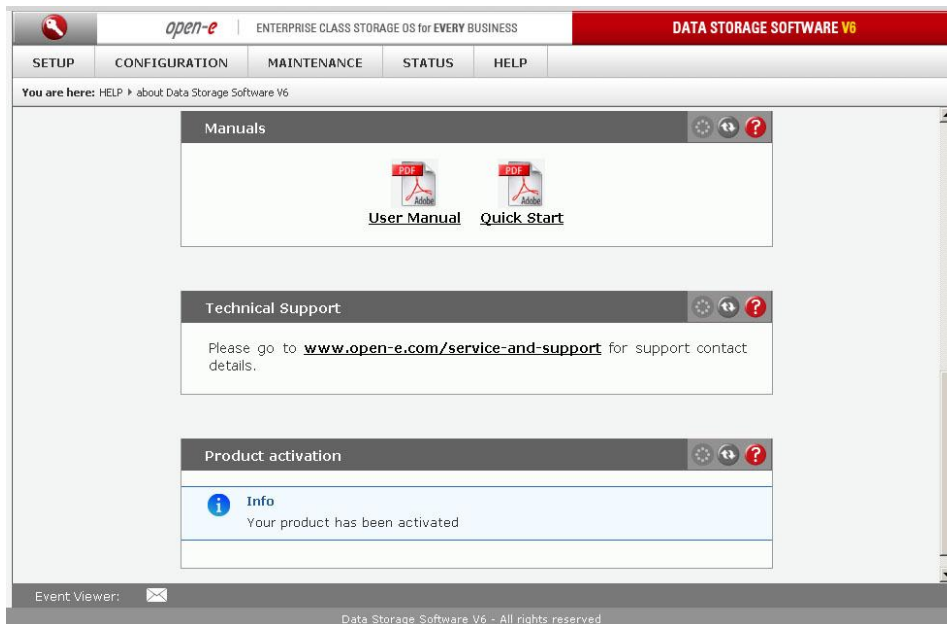


Function: Extensions keys loader

You can enter a license key to expand the functionality of your server. For example, you can add a license key for a greater storage capacity.

Function: Register

Here you can find a link to our registration form. Note that registration is required to receive updates and new versions. Registration also gives you an opportunity to receive e-mail notifications on software news.



Function: Manual

You can download the manual in PDF format here and print it for quick reference.

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

Function: Technical Support

Please have the following information available before contacting the technical support team:

- logs, which you can download via **Status -> Hardware -> Logs**
- your software version, which you can find in **Help -> About**

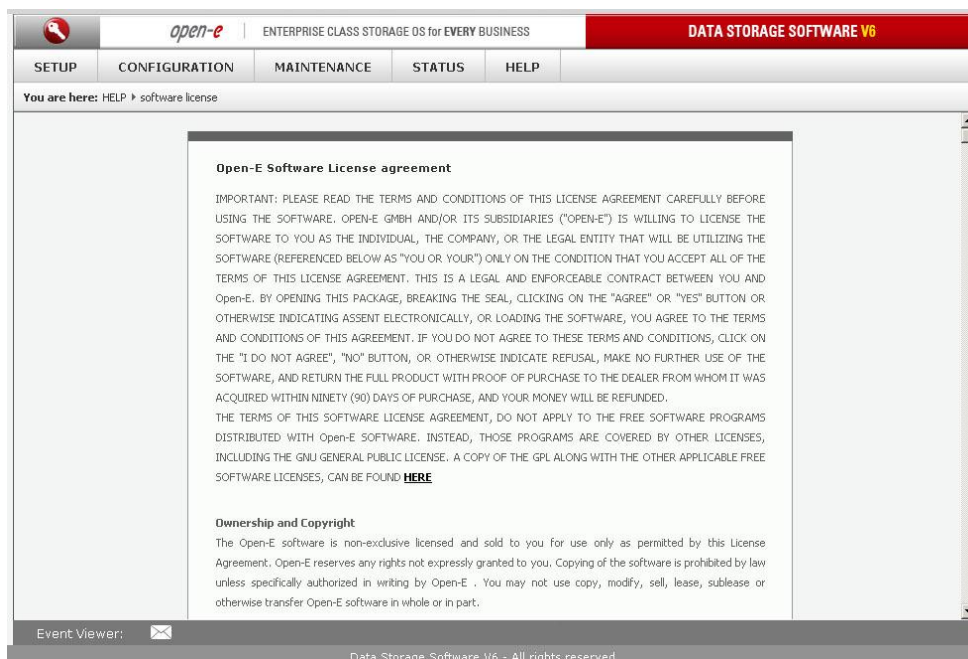
Function: Product activation


This function allows you to activate your product. **Please note that if you have restricted Internet access set up for this server on your firewall or router you will need to allow TCP connections to activation-key.com. Please open outgoing port 25 or 10444 for this domain to continue with the activation process.**

After activation, the product becomes linked to your hardware (the system drive and the mainboard. Should you remove or exchange the mainboard or the system drive on the server, you will need to activate the product again.

5.2.5.3 Software License

When accessing Help - "software License" you can read the license for software included in Open-E Data Storage Software V6.



You log out by closing the browser window or by clicking  button.

6. Troubleshooting Guide

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

Error: user already exists

There cannot be more than one user with the same name. You cannot create a user twice. Check your spelling. Remember, usernames are not case-sensitive. You can check existing usernames by collapsing the tree diagram on the left.

Error: values are not valid

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

Error: resource already exists

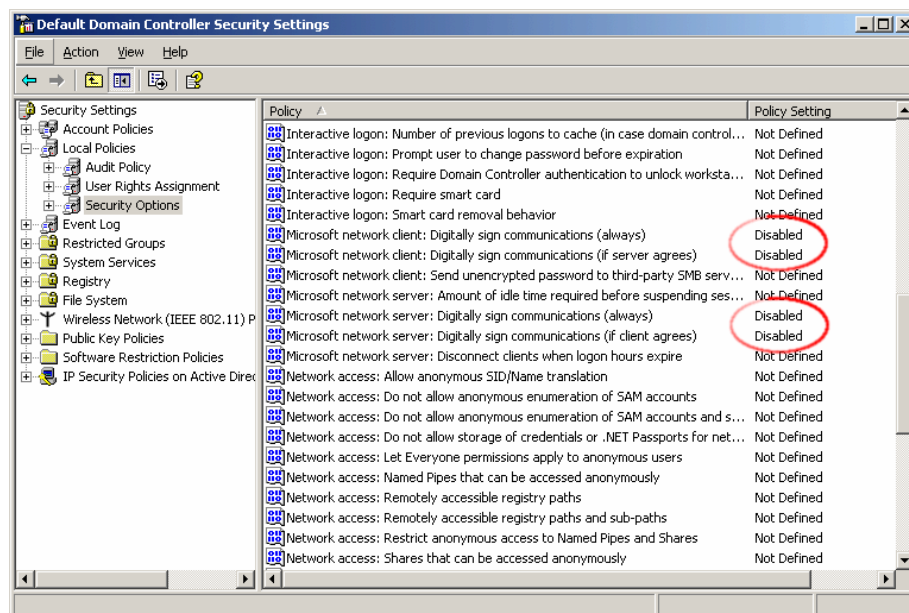
You cannot create more than one resource with the same name. You cannot create a resource twice. Check your spelling. Remember that resource names are not case-sensitive. You can check existing resource names by collapsing the tree diagram on the left.

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 that the Shift, Caps Lock, Control, and Alt keys are not pressed.

Error: Open-E Data Storage Software V6 cannot import the user database from a Windows Server 2003 domain.

In this case the following setting within the local security guideline may solve this problem:



Error: Update file not found

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

Error: No share volume

You must create a volume for file sharing before you can create any resource shares or search for shares. Consult this manual's "Getting Started" section for instructions on creating a share volume.

Error: No share volume to browse

You must create a volume for file sharing before you can create any resource shares or search for shares. Consult this manual's "Getting Started" section for instructions on creating a share volume

Error: Invalid user name

Usernames cannot:

- (1) Contain characters such as ~ ! @ # \$ ^ & () + [] { } * ; : " . , % | < > ? / \ = `
- (2) Begin or end with a space

The use of the Windows SMB (Server Message Block) protocol, also known as CIFS or Samba, places some restrictions on the use of special characters. These restrictions have historical reasons, but are still binding today. Usernames must not contain any of the above mentioned characters.

Error: invalid user password

A user 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. Please reenter your password.

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.

Error: invalid resource name

Resource name cannot:

- (1) contain characters such as * : " | < > ? / \ ` # \$ & () + ; ' .
- (2) begin or end with a space.

The use of the Windows SMB (Server Message Block) protocol, also known as CIFS or Samba, places some restrictions on the use of special characters. These restrictions have historical reasons, but are still binding today. Resource names cannot contain any of the above mentioned characters. Note that the list of invalid characters is slightly different than the ones for other name fields.

Error: invalid workgroup name

- (1) contain characters such as ~ ! @ # \$ ^ & () + [] { } * ; : " . , % | < > ? / \ = `
- (2) Begin or end with a space

The use of the Windows SMB (Server Message Block) protocol, also known as CIFS or Samba, places some restrictions on the use of special characters. These restrictions have historical reasons, but are still binding today. Workgroup names cannot contain any of the characters listed above. Note that the list of invalid characters is slightly different than the ones for other name fields.

NOTE Invalid characters for workgroup names are different than the ones for other fields.

Error: invalid server name

Server name cannot contain:

- (1) Characters: ~ ! @ # \$ ^ & () + [] { } * ; : " . , % | < > ? / \ = `

- (2) Spaces
- (3) Digits only

The use of the Windows SMB (Server Message Block) protocol, also known as CIFS or Samba, places some restrictions on the use of special characters. These restrictions have historical reasons, but are still binding today. Server names cannot contain any of the above mentioned characters. Note that the list of invalid characters is slightly different than the ones for other name fields. In addition, server names cannot be constructed from numbers only, they must contain alpha characters.

Error: invalid resource comment

Resource comment cannot be longer than 256 characters,
Resource comments have a limit of 256 characters which cannot be exceeded,
Use a shorter comment.

Error: invalid directory name

Directory name cannot:

- (1) contain characters such as: * : " | < > ? / \ ` # \$ & () + ; ' .
- (2) Begin or end with a space

The Open-E DSS V6 internal operating system does not allow certain characters to be used for directories. The above mentioned characters are invalid, just as trailing or leading spaces. Choose a different name.

7. Software Licenses

7.1. Open-E Software License agreement

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