



Open-E Data Storage Software V7

Manual (Ver. 7.00 up12) January 20, 2014

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1 Before you get started

Congratulations on purchasing Open-E Data Storage Software V7, 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. After all, you have purchased this solution for your invaluable data.

1.1 System requirements

- x86_64 compatible system,
- 64bit CPU
- CPU 1,6 GHz,
- 2 GB RAM,
- USB port,
- One or several suitable hard drives (SATA, SAS),
- Optionally a hardware RAID controller, Fibre Channel or iSCSI Storage.

Open-E Data Storage Software V7 contains its own operating system and no additional software is required.

NOTE In order to achieve maximum performance, we recommend using a 1Gbit network interface controller (multicards 1Gbit recommended for bonding), as well as a processor with at least 2 GHz. If several computers are accessing the DSS V7 system, we recommend to use 4 GB RAM.

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, UDP
- HTTP
- FTP
- SNMP

1.4 Supported network file protocols

- SMB / CIFS / Samba
- NFS
- 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 the 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 the Open-E Data Storage Software V7, please backup all important data prior to installation. Adding a hard drive to Open-E Data Storage Software V7 will result in a complete format of the hard drive, possibly deleting your existing data.

1.6.3 ESD precautions

In order to avoid damage to your computer or to the Open-E Data Storage Software V7, please ensure you are grounded before opening the PC or the ESD package that contains Open-E Data Storage Software V7. The best way to ensure this safety is by using grounding straps or mats. If you do not have any grounding equipment handy, please make sure you are grounded (e.g. by touching the heater before working with Open-E's Data Storage Software V7).

- Avoid touching the components inside the PC unless necessary,
- Please hold Open-E Data Storage Software V7 only on the edges.

2 Features

Open-E Data Storage Software V7 is an all-in-one IP-Storage Operating System 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 V7

NAS (**Network Attached Storage**) solutions are defined as storage systems that are directly hooked to a network infrastructure. They operate independently and do not have to be connected to a server via a controller or host adapter. In this case, the term "storage" refers to all systems that both provide data storage or actually store and 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 (often on special hardware), which operates independently from the servers on the network. Typically, this operating system is a software that is optimized for providing data (file server).

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

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, WAN or the Internet.

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

iSCSI solutions allow users to quickly add additional disk devices to existing networks.

iSCSI has a client-server architecture. Clients of an iSCSI interface are called "initiators". Initiators give iSCSI "commands" to request services from components or 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 V7 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, virtualization or replication. Open-E Data Storage Software V7 offers excellent price-to-performance ratio, enhanced manageability, and increased productivity.

The flexible design of Open-E Data Storage Software V7 enables organizations of all sizes to create effective NAS and/or IP-SAN/iSCSI solutions that can adapt to and meet the simplest or the most complex storage needs.

Open-E Data Storage Software V7 is built on the proven Open-E DSS V5 and V6, with all of its superior security, stability and management advantages. The software is Open-E's seventh generation of IP-storage platform.

Open-E Data Storage Software V7 brings you extensibility, simplified setup and storage management, and is specially tuned to provide optimal data-throughput and data protection for centralized storage. Open-E DSS V7 increases iSCSI target efficiency by supporting multiple iSCSI initiators on different volumes, without sacrificing NAS performance.

2.2 Open-E Data Storage Software V7 functionality

Open-E Data Storage Software V7 is converting any commodity server into an enterprise data storage appliance. In other words, it is a standalone bootable Storage Operating System.

DSS V7 supports NAS and SAN functionality, enabling data access for heterogeneous clients. DSS V7 NAS supports SMB/CIFS, NFS, FTP, sFTP, AFP, HTTPs and Rsync, and more. The SAN supports iSCSI, Fibre Channel. DSS V7 works with a wide range of 1GB and 10GB Ethernet adapters and also works with Infiniband adapters in IPoIB mode.

DSS V7 can manage locally built-in hardware RAID arrays or SATA, SAS and SSD disks with its software RAID. Also, DSS V7 can manage externally connected SAN arrays via iSCSI or Fibre Channel.

Thanks to the built-in Logical Volume Manager, DSS V7 provides simple and reliable ways to virtualize storage. Data Redundancy can be achieved with synchronous volume replication or with snapshot based asynchronous data (files) replication. Two node clusters can be configured easy with High Availability - Active-Active or Active-Passive iSCSI Failover.

Storage systems powered by DSS V7 assure quality that is confirmed not only with Open-E's QA team (constantly performing tests), but by 3rd party vendor certifications and interoperability tests, including VMware ESXi, Citrix XenServer, Microsoft Windows, Microsoft Hyper-V and Linux. Open-E's Data Storage Software is an ideal storage solution for a wide range of applications, such as Virtual Infrastructure and Cloud Computing.

2.3 Why Open-E Data Storage Software V7?

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 V7, you can:

- add storage to your existing network; which is quick, easy and most important cost-effective,
- use consolidated storage and backups for multiple servers,
- improve data availability and efficiency,
- lower costs by centralizing storage management,
- simplify the installation and management of a SAN by using iSCSI versus Fibre Channel.

Therefore, expensive hardware is no longer necessary. Take any computer – a new rack server or an old desktop PC with USB ports (internal or external) – and exchange the system drive for the Open-E Data Storage Software V7 USB flash module or a CD drive (as the boot media/installer). To store data, Open-E Data Storage Software V7 uses SATA hard drives, connected to ports on your mainboard or hardware RAID controller.

Additionally, Open-E Data Storage Software V7 supports software RAID, so you can create software RAID over single hard drives or over existing hardware RAID5s.

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

Within a few minutes, you will have up to several hundred gigabytes available on your network – without much effort and no 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. Security is enhanced by writing identical data onto more than one drive. 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. RAID 6 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 V7 installation instructions

IMPORTANT

NOTE DSS V7 is a standalone bootable storage OS. The software for the Lite version and the regular version of DSS V7 is the same; however the Lite version has a limited feature set. After installation and boot, DSS V7 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 software license key.

NOTE Starting with both the zip and ISO file you can boot DSS V7 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 bootable media: MegaRAID, Smart Array, 3ware, Adaptec and Areca.

Only 2GB is needed for the DSS V7 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 V7 software has a boot option to install DSS V7 on a writable FAT or FAT32 partition, or on a RAID Logical Unit. The Installer automatically creates a 2GB partition on the selected media and copies the DSS software image onto it.

The entire space of a destination media will be reserved for Open-E DSS V7. You will NOT be able to use the remaining space for storage purposes. Please use the lowest capacity device as you can, but not less than 2GB.

3.1 Preparing a USB flash drive as the boot media/installer with a 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 files: QuickStart.html and 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 the "safe hardware remove" function and sync it 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 V7 from a CD it is not able to save some configuration data, such as the DSS V7 network settings and the product key, so booting and running from a 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 V7 or select to use the installer to install the DSS V7 software on a drive or a Logical Unit in the system.

3.3 Booting DSS V7 Installer

First, 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 the 64 bit architecture to boot DSS V7 or to install DSS V7 on a writable media in your system by using the interactive DSS V7 installer utility. Next, select "Run software installer" to install DSS V7 on a writable media in your system.

- 64bit system (2.6.35)
- Run software installer

When you run the installer, please follow the instructions. Finally, reboot your storage server from the new media (set your 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 V7 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 V7 license product key in the WEB GUI from menu: HELP-> about Data Storage Software V7 -> Extensions keys loader.

4 Configuration Data Storage Server

4.1 First-time operation of Open-E Data Storage Software V7

Now start your system.



After booting is complete, Open-E Data Storage Software V7 will provide you with information on the current software version and the network settings:

```
Welcome to Data Storage Software V7 (Press F1 for Help)
-----
Model: Data Storage Software V7
Version: 7.0up12.9101.7968 64 bit
Release date: 2014-01-20
S/N: TRL00022
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
To change IP address(es) press Left Ctrl + Left Alt + N

HTTPS settings:
port: 443
allow from: all

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

Selftest O.K.
```

If your network has a DHCP server, Open-E Data Storage Software V7 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 V7 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 combination key: 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 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 V7

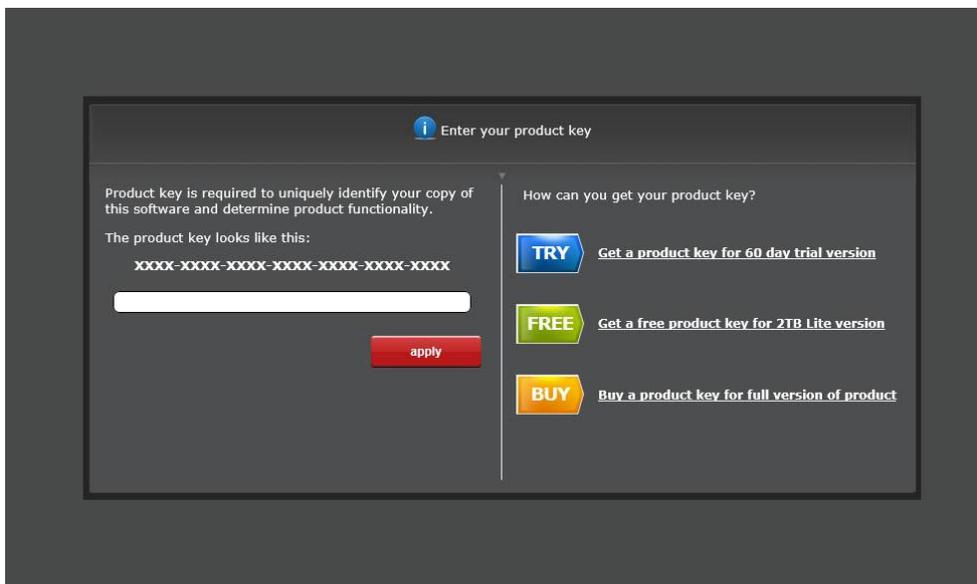
You can establish a connection to Open-E's Data Storage Software V7 from every network computer. To establish this connection, use a browser (e.g. Microsoft Internet Explorer) and enter the IP address or the name of the computer hosting the Data Storage Software V7 into the URL entry line:

- <https://192.168.0.220> (standard address) or
- <https://dss> (this name can be changed in the installation settings Open-E's Data Storage Software V7).

NOTE For security reasons, Open-E Data Storage Software V7 uses the encrypted SSL protocol (https).

You will now be asked to verify the encryption certification. Since Open-E Data Storage Software V7 only allows creating shares on the Intranet, there is no need for global certification by an authorized body. You can accept the certificate for a single session or for all future sessions.

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

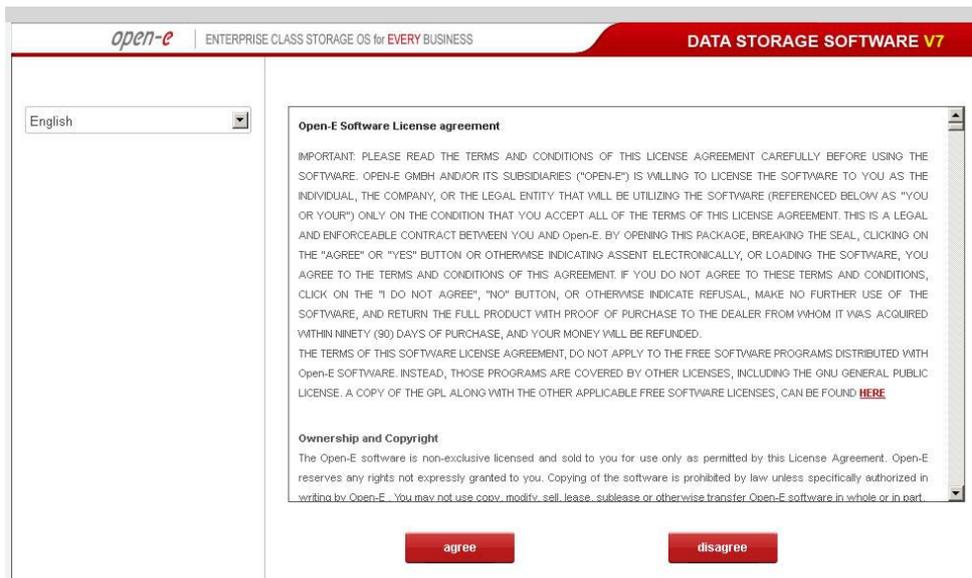


If you already have one, please enter and click the apply button. After restarting, open the WEB GUI with your browser again.

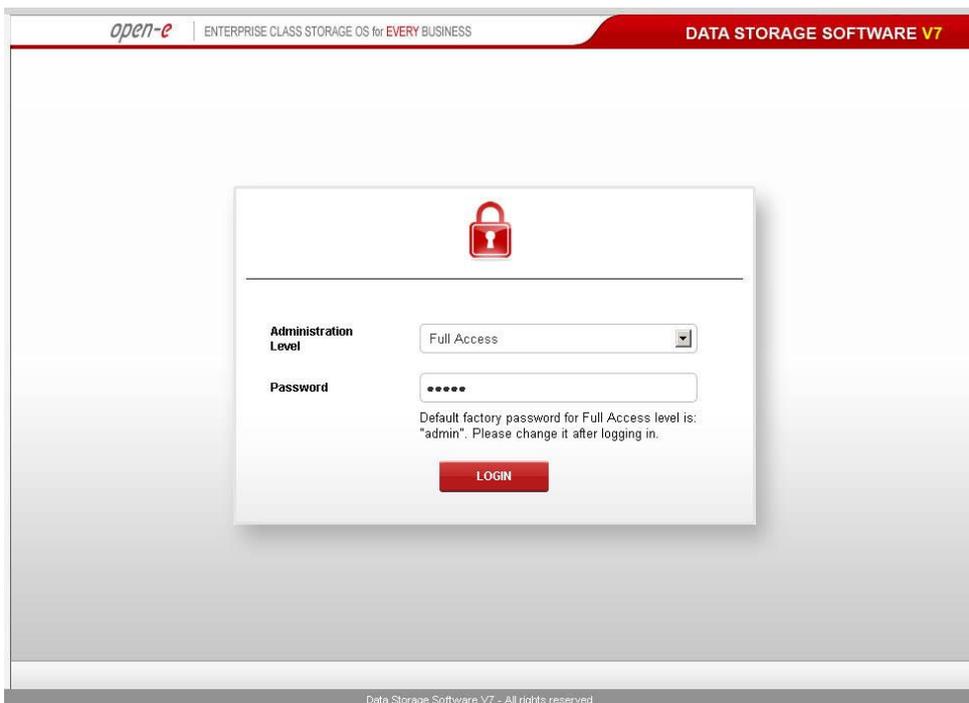
NOTE If you don't have a product key yet you can use one of the three links on the right (60 day trial version, FREE 2TB Lite version or buy the full version of the product).

NOTE In order to convert the trial version into the Lite or full version, please enter your DSS V7 product key in the WEB GUI from the menu: HELP-> about Data Storage Software V7 -> Extensions keys loader.

NOTE After you first launch the Open-E Data Storage Software V7, 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 and are accessible through "Setup".



After accepting the license agreement you can log into Open-E Data Storage Software V7 using the standard password “**admin**” (this can be changed later). In order to start working, you will need to set all the necessary parameters.



NOTE The password is case-sensitive. If you cannot log into your Open-E Data Storage Software V7, please make sure the Shift and Caps Lock keys are not pressed.

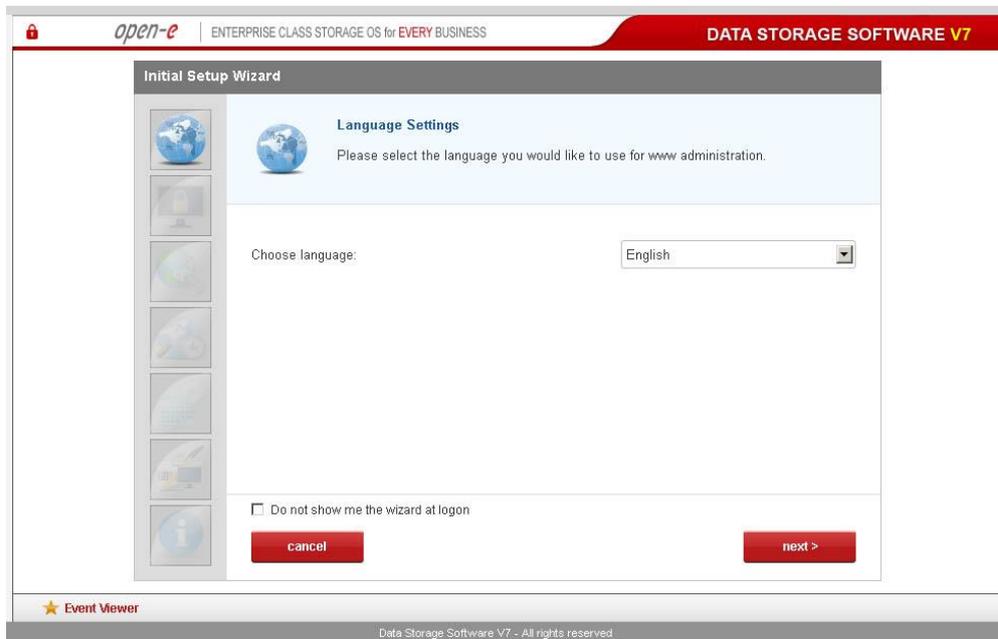
NOTE If your web browser shows something different than expected, please delete the cache and cookies in the menu settings of your web browser.

4.3 Initial Setup Wizard

After logging to the Open-E DSS V7 an Initial Setup Wizard will appear. The six steps Wizard will allow for an initial configuration of your DSS V7

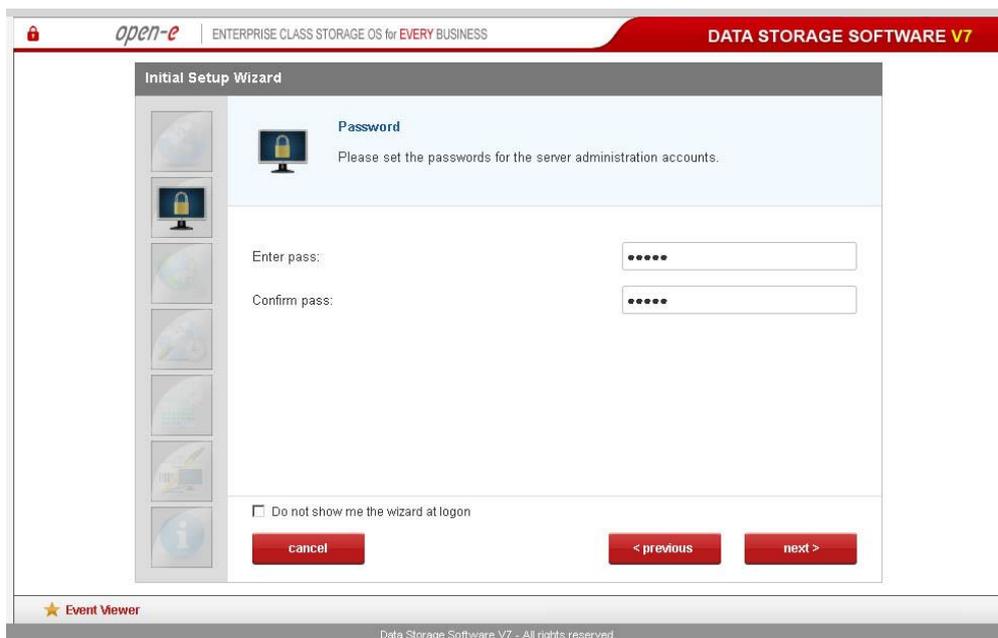
Language settings

In the first step you can choose the language you want to use for www administration.



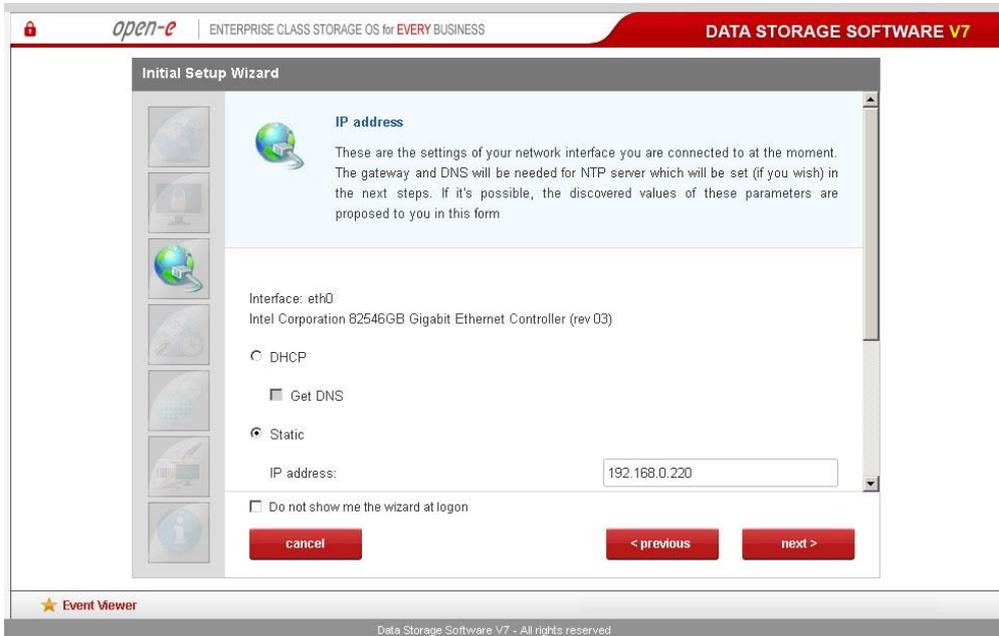
Password

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



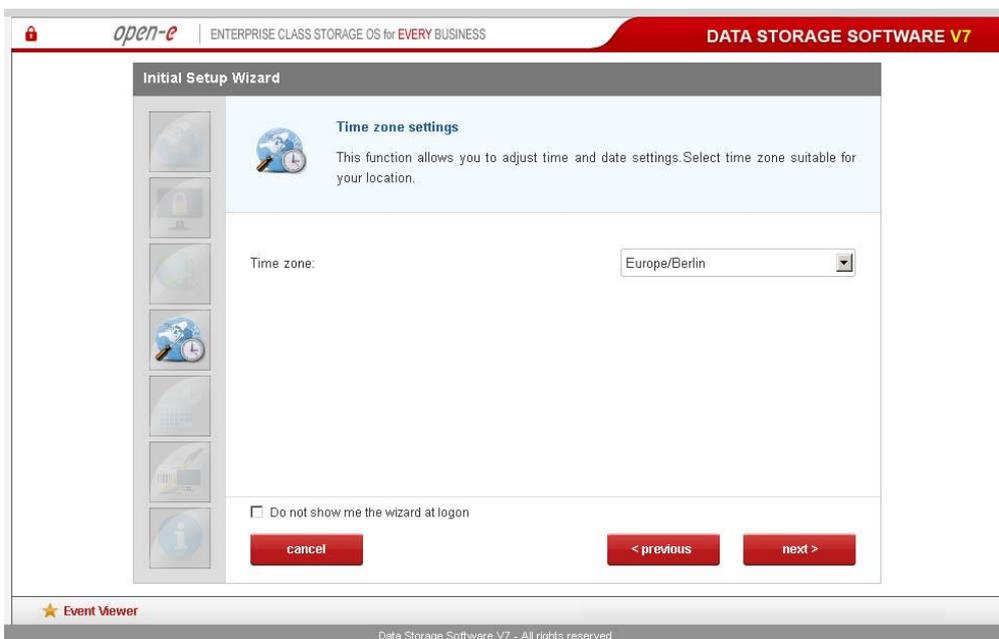
IP address

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.



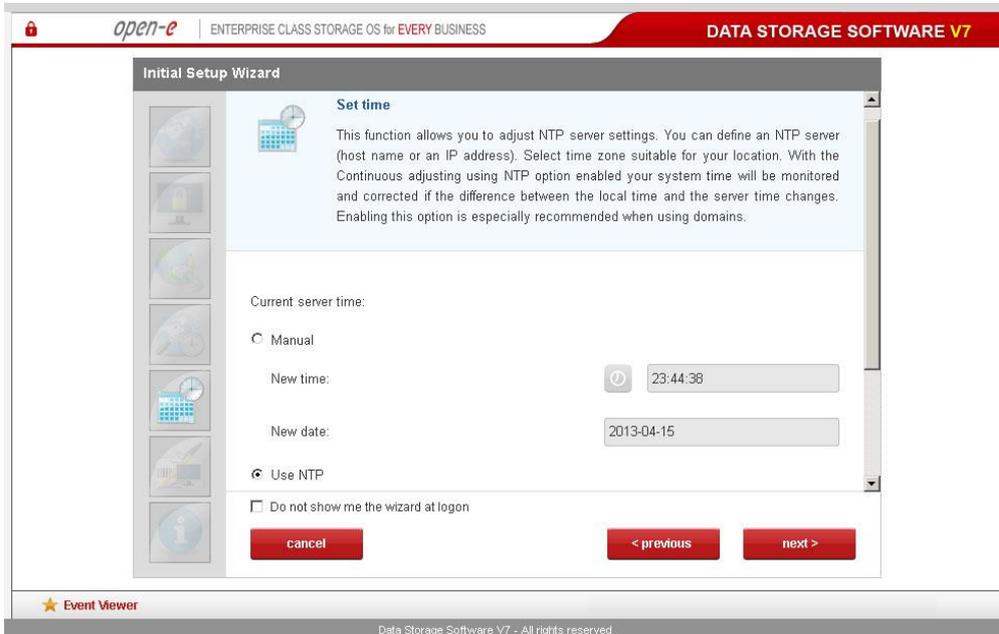
Time zone settings

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



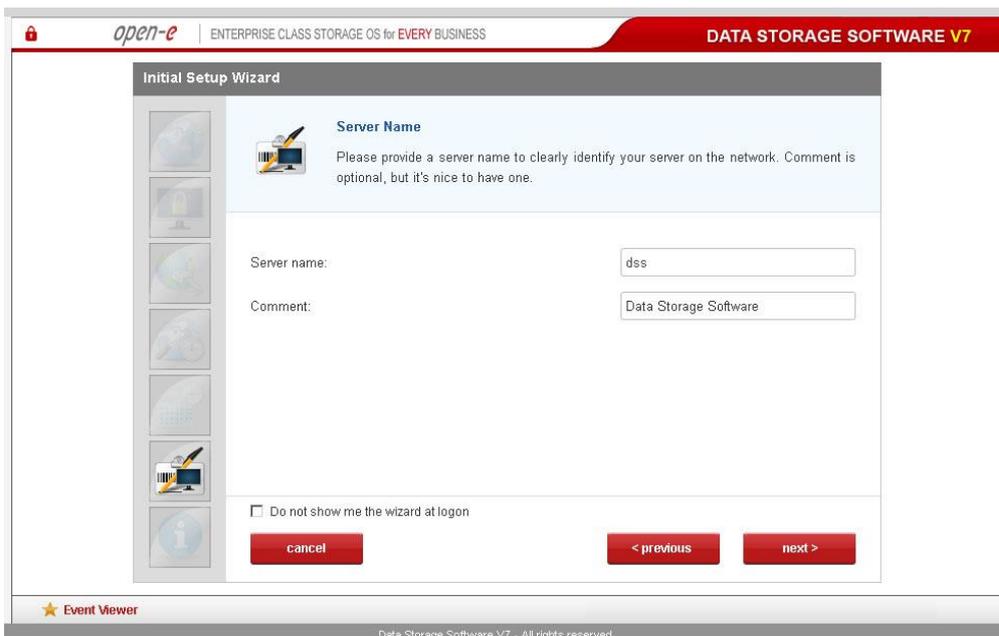
Set time

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.



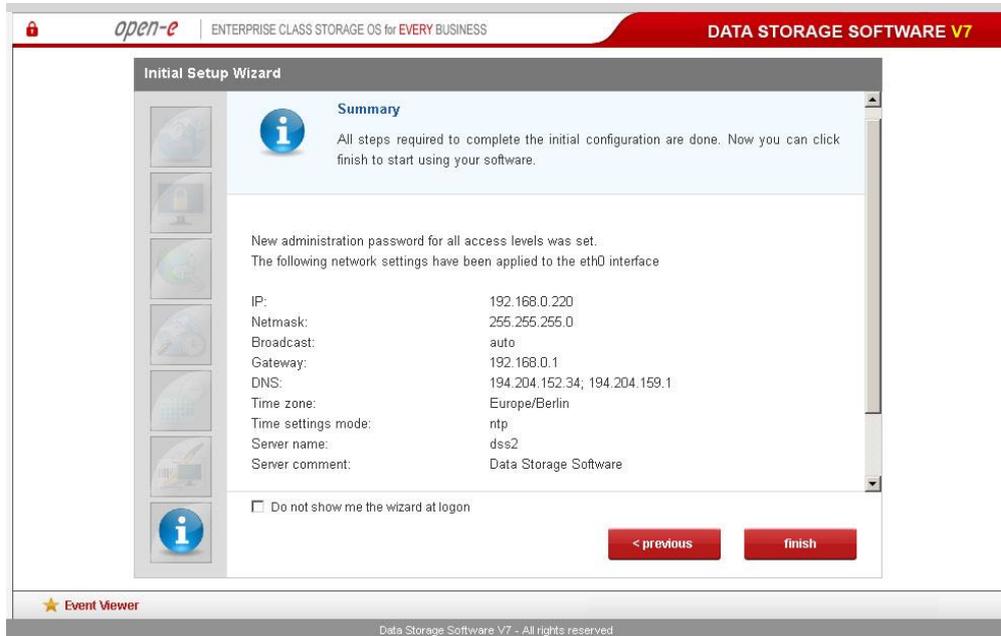
Server name

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



Summary

All steps required to complete the initial configuration are done. Now you can click finish to start using your software.



If you don't want to display quickstart wizard at logon please click the checkbox with “*Do not show me the wizard at logon*”.

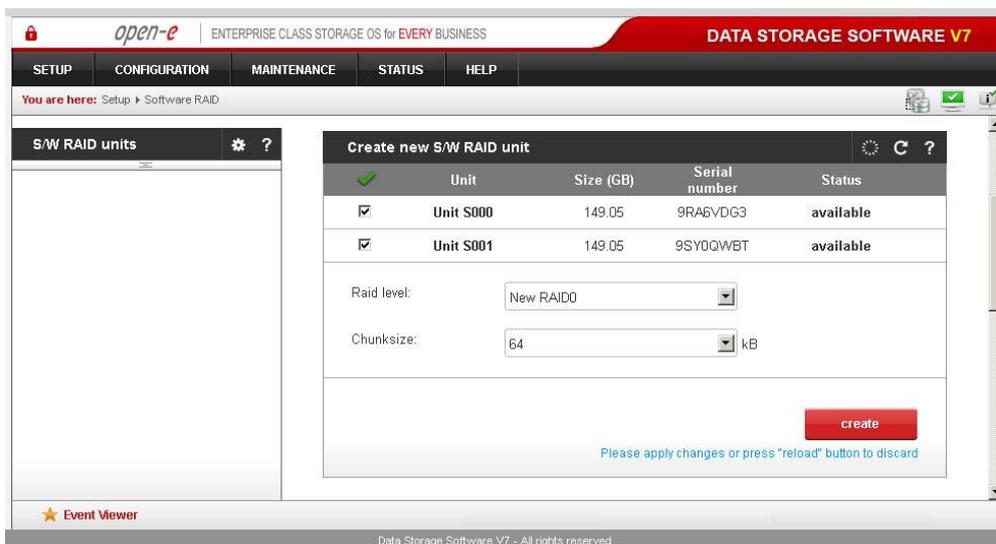
If you end Initial Setup Wizard, click the **finish** button and confirm this action by clicking the **OK** button.

In case you would like to run quickstart wizard again in the future, you can do this by entering 'Help -> help index' position in menu and click “Run Initial Setup Wizard”.

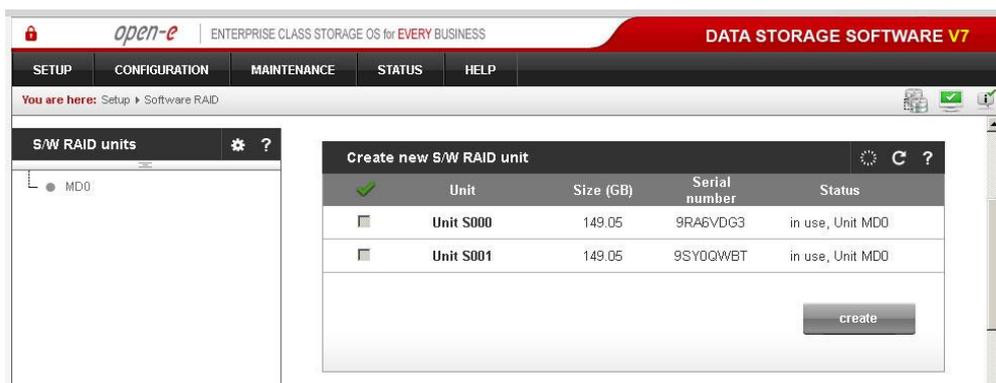
4.4 Create Disk Array

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 first go to the “S/W RAID” tree in the “Setup” menu. 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.

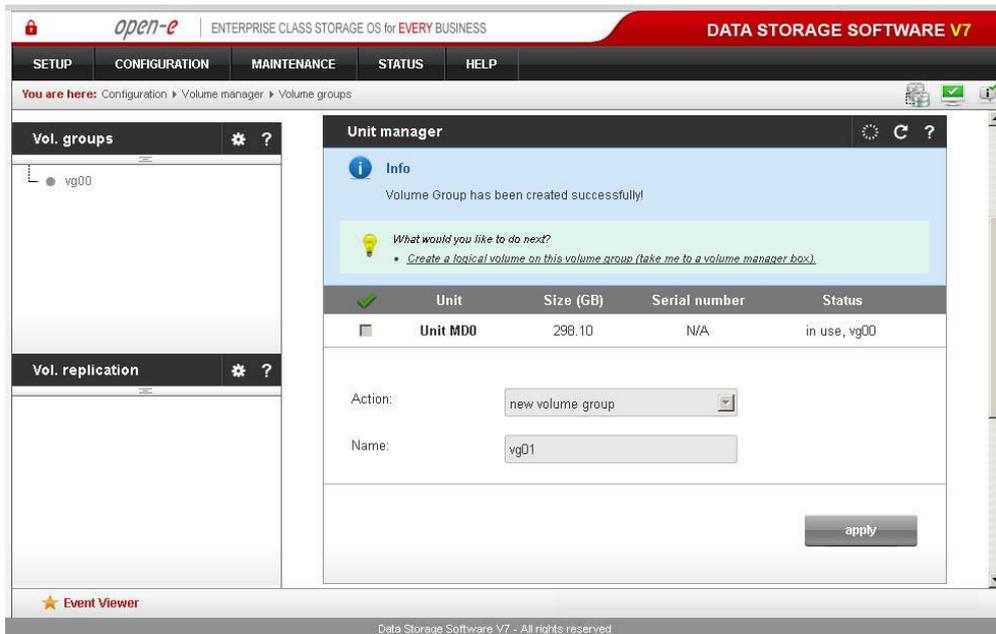


After clicking the “create” button, the status will change to “in use” and additional information describing the kind of disk array (e.g. MD0 is RAID 0) will be displayed.

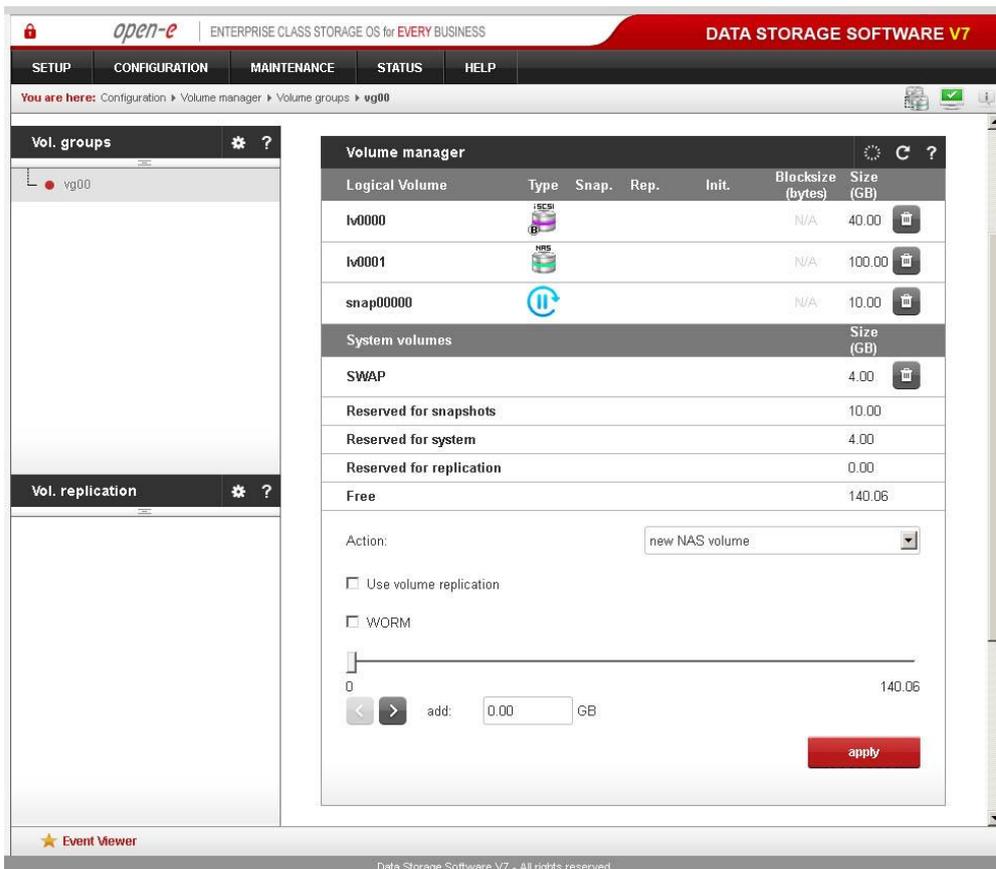


4.5 Adding Disk Array

- In the menu, please select “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 where 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 the scrollbar 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 V7 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 and has to correspond to the workgroup name of the client PC.

Go to “CONFIGURATION” → “NAS Resources” and select “Shares” in the menu on the right-hand side of the tree diagram. Now create the first share.

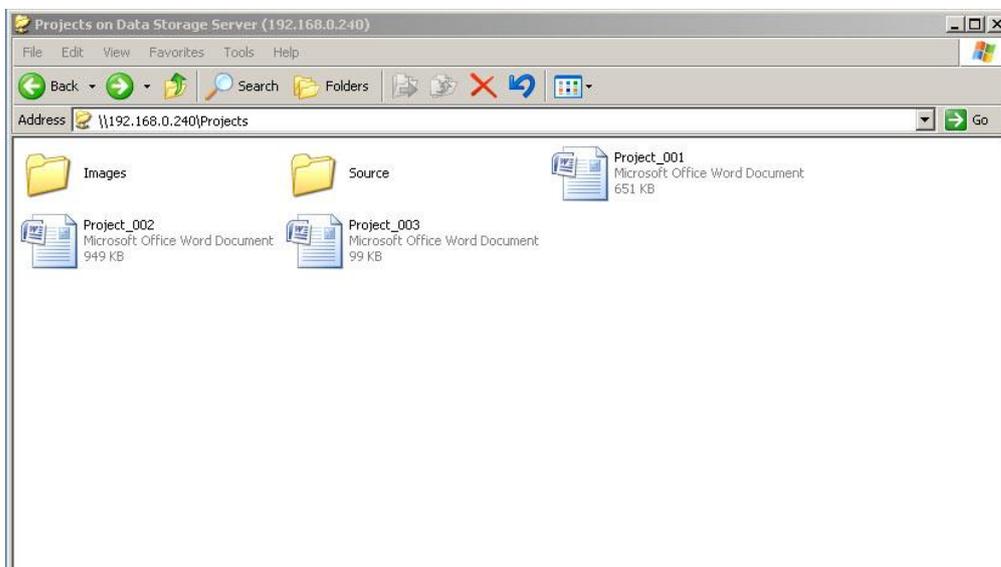
NOTE The workgroup/domain name that was configured in Open-E Data Storage Software V7 has to match the network settings. Otherwise, the configured shares will not be visible in the network environment.

NOTE If you made changes to the workgroup and server name in Open-E's Data Storage Software V7 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 Windows Explorer. All visible shares should be available immediately after entering the IP address of your Open-E Data Storage Software V7 (in this example \\192.168.0.240). Please keep in mind that sometimes it takes a few minutes until new shares or changes 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 "directory properties" and click the right mouse button on the directory, then choose "Properties".
 - c. select 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" button

Now 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 then click OK
 - e. enable Full Control in the "Allow" column
 - f. next, click the "Apply" button.
3. Set "read only" permissions to the file for everyone:
 - a. create a new file (you must be its 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)
 - d. click the "Advanced" button
 - e. select the Owner tab
 - f. click the "Other Users or Groups" button and 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 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. Next, add users to groups (groups Company, Developers, Graphics).

Connection to a Windows domain:

- go to the Open-E DSS V7 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 to the domain.

Creation of shares and set permissions:

- a. Create a Company share (go to the Open-E DSS V7 web interface → Configuration → NAS resources → Shares),
- b. set permissions for all users or select only company groups,
- c. go to the share \\YOUR_NAS_SERVER_NAME\Company,
- d. create folders "WORK", "HOME" and "FORALL",
- e. set permissions for the folder WORK - right mouse click → properties → security.
- f. 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 to 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 permission 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 permissions 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 with 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 also can 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 V7 name.

4.6.2 Accessing Open-E Data Storage Software V7 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 V7 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:

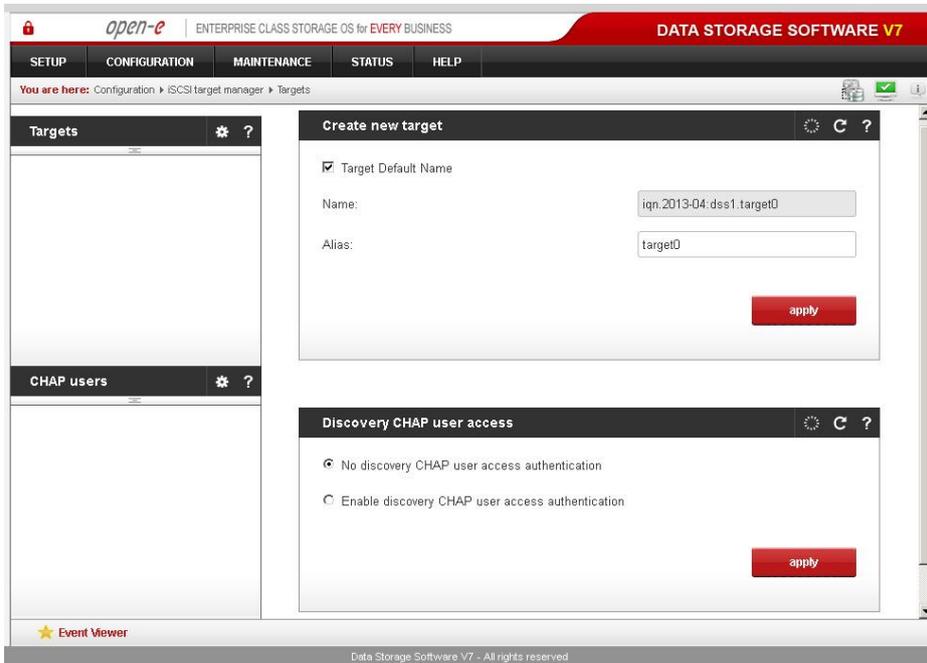
In a shell:

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

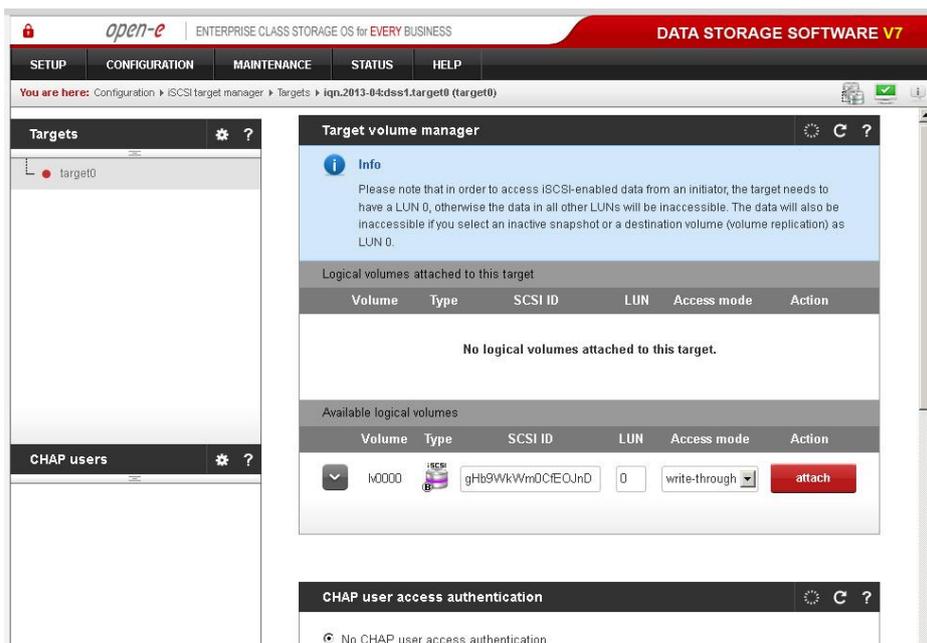
- Smb://root@192.168.0.220/

4.7 Creating Open-E Data Storage Software V7 iSCSI targets volume

After creating an iSCSI volume (see 4.5), please choose “CONFIGURATION” → ” iSCSI target manager” → ”Targets” and 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. “*iqn.2013-04:dss1.target0*”) and within the “Target volume manager” function click “attach” 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 side panel, 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 grant access to this target to specified CHAP users.

NOTE 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

In order for the 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 2008/XP/WIN7:

- 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 the “Discovery” tab, click the “Add” button, then enter your Open-E Data Storage Software V7 IP address,
- d. next click the “Advanced...” button, check “CHAP logon information,” and put in the User name and the Target secret which was given earlier in “Discovery CHAP user access” (in webgui DSS V7) and then click the “OK” button twice,
- e. on the “Targets” tab you will see the name of available iSCSI targets, e.g. “iqn.2010.09:dss.target0”,
- f. click the “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 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 V7 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 V7 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 V7 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 the 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 the 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

With Ctrl + ALT + K the Open-E Data Storage Software V7 host computer will be restarted, while CTRL + ALT + S will shut it down. Please be careful with this option when users are connected.

5.2 Functions of Open-E Data Storage Software V7 via browser access

The following pages will thoroughly describe every function of Open-E Data Storage Software V7. 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 administrator settings, network interfaces, failover, hardware RAID, create disk arrays using software RAID, as well as find Fibre Channel, iSCSI initiator, hardware and Web GUI settings.

5.2.1.1 Administrator settings

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. If 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.

Function: Administrator password

Using this function you can change the passwords for 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 sent.

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

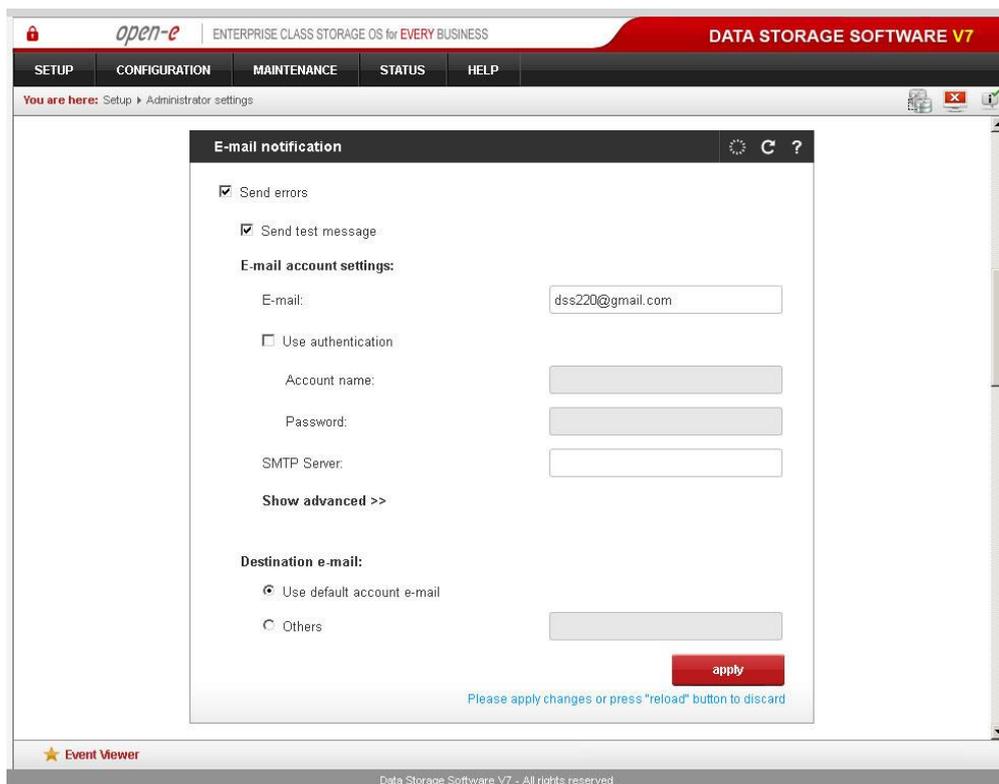
Administrator e-mail address to which notifications will be sent.

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: Remote log server configuration

This option is used to send log events from this server on the remote log server.

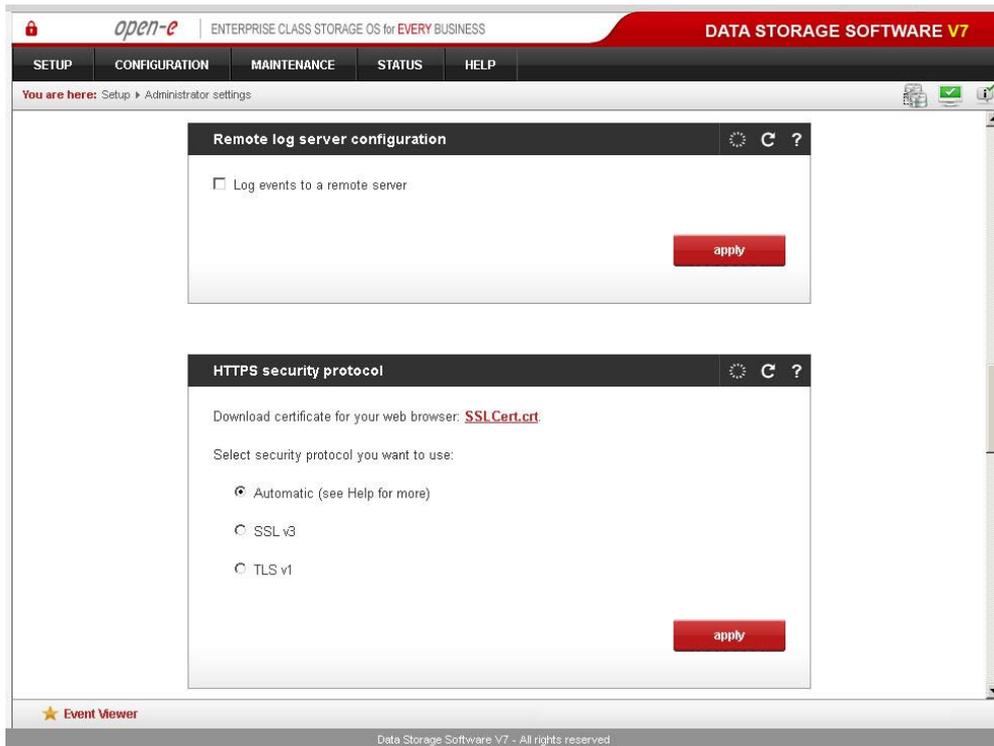
Linux based operating system with installed syslog-ng software is required on the remote side.

To configure this function it is necessary to set the **IP address** of the remote log server and **Port** that will be used for the communication. The **Protocol** used for communication is set by default to TCP but it is also possible to use UDP.

Please note that that a rule to allow the IP address from this server to communicate with the remote server using the defined protocol needs to be added to the firewall on the remote side.

An example of a simple syslog-ng.conf configuration on the server side:

- source server {tcp();};
- destination serverlogs {file("/var/log/server.log");};
- log {source(server); destination(serverlogs);};



Function: HTTPS security protocol

To ensure the identity of your web administration tool (WebGUI), the web browser automatically verifies it every time you connect to the tool. At this point, you may receive warnings that the site's certificate is not trusted.

In order to make your browser trust your SSL certificate, click the [SSLCert.crt](#) link to download and install it into the certificate management system of your web browser.

If your browser does not recognize this file as a CA (Certification Authority) certificate, please save this certificate on your hard disk and follow one of these tutorials to install it manually:

[Tutorial for Google Chrome](#)

[Tutorial for Microsoft Internet Explorer](#)

[Tutorial for Mozilla Firefox](#)

[Tutorial for Opera](#)

As for the security protocol, there are three options to choose from:

- Automatic - the most secure protocol (TLSv1 or SSLv3), supported by the server and the web browser, will be used through the automatic protocol negotiation,
- SSLv3 - forces the use of SSLv3 protocol, supported by all known web browsers,
- TLSv1 - forces the use of TLSv1 protocol, successor to SSLv3, supported by most of the modern web browsers.

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, version 3 has an encrypted transmission feature as well as authentication by username and password.

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

The community string you set 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>

<http://www.manageengine.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

The screenshot shows the 'SNMP settings' configuration window in the Open-E DSS V7 web interface. The window title is 'SNMP settings' and it includes an 'Info' section with the following text: 'SNMP v3 is enabled by default. You can turn it off, or change its configuration. It is used to gather vital server statistics, which you can view under STATUS->statistics.'

The configuration form contains the following elements:

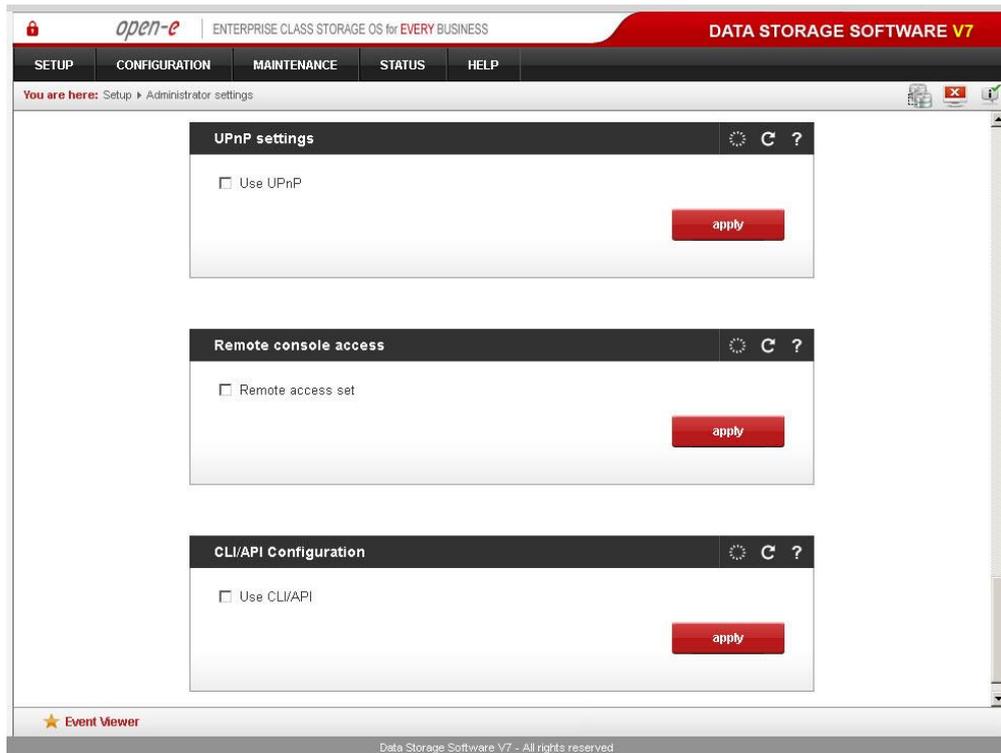
- Use SNMP
- Use SNMP v2
- Use SNMP v3
- Community:
- User Name:
- Password:
- Confirm password:
- Contact:
- Location:
-

At the bottom of the page, there is an 'Event Viewer' icon and a footer that reads 'Data Storage Software V7 - All rights reserved'.

Function: UPnP settings

This function enables UPnP protocol for device notification.

NOTE UPnP only works over a network card which has the default gateway set up.



Function: Remote console access

By 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. However, the password can be changed.

Allow IP

Here you can assign IP addresses (separated by a semicolon) which are granted remote access to the server. If 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 minimum 8 characters. 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, then 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: CLI/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 the 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.

5.2.1.2 Network Interfaces

Here you can find a tree containing network interfaces. Click on the name of an interface to see more information about it.

Function: Server name

Server Name

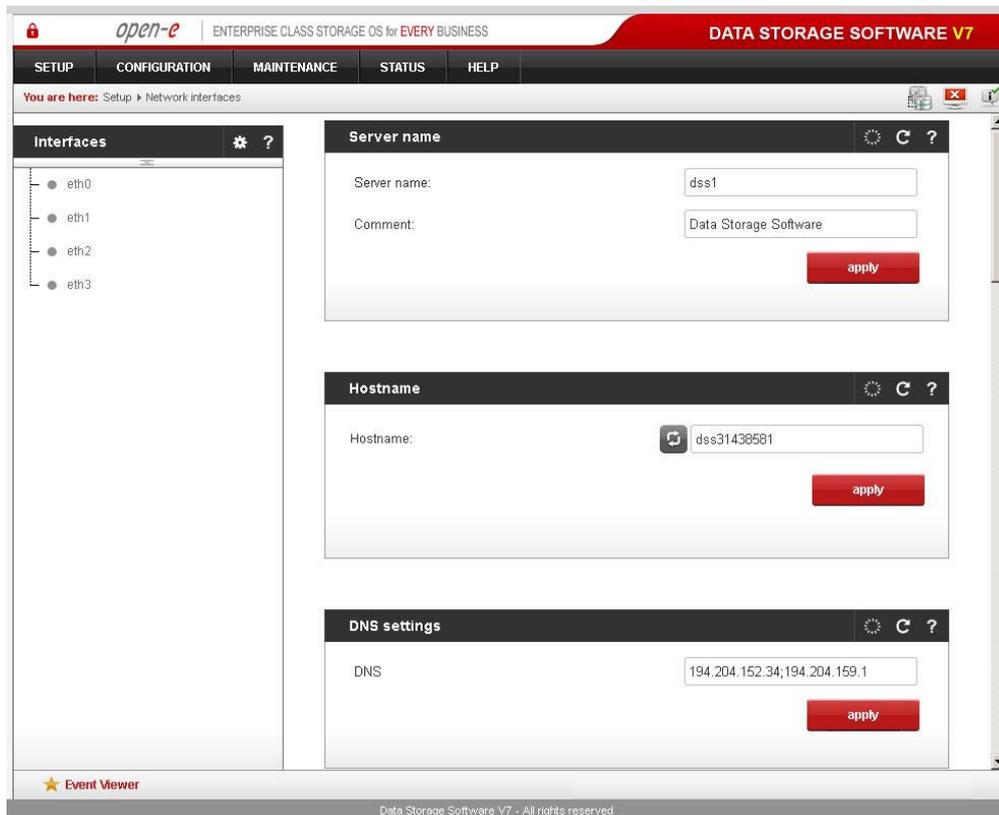
Please enter a server name to clearly identify your server. This name is used primarily for **NAS protocols**, which makes it different from the **hostname**, which is primarily used internally (for **failover** and **volume replication** functions).

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,
- comments are 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**; usually server name is primarily used for **NAS protocols**.

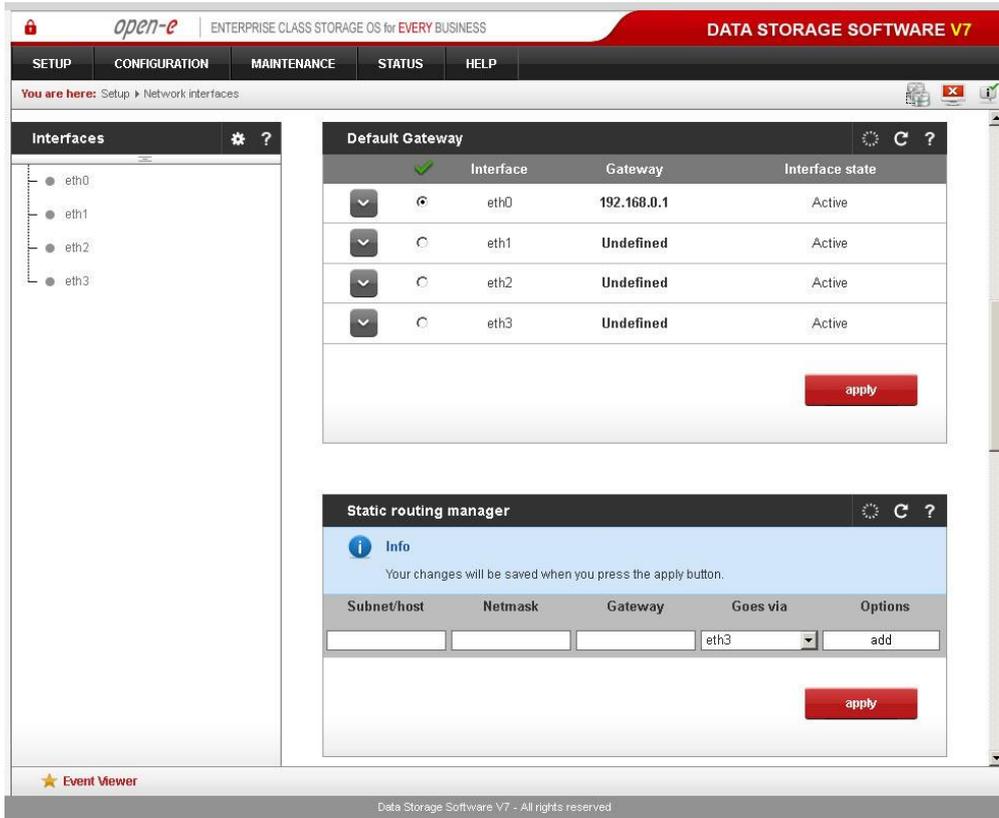
Hostname needs to start with a lowercase letter; the other characters may consist of lowercase letters, digits, minus signs and dots.

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.

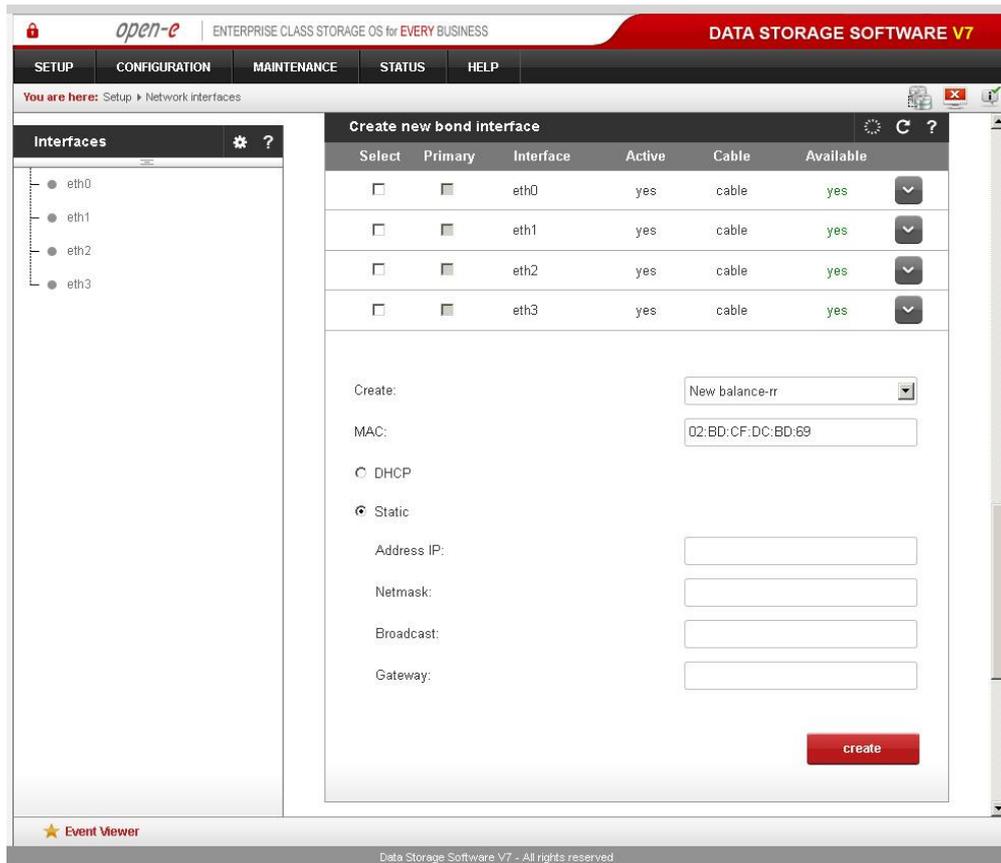
- NOTE** If the interface you are setting the default gateway on does not have any gateway defined (i.e. the Gateway field says Undefined), you will need to define a gateway first (under the text console, please press CTRL+ALT+N and select the interface followed by Gateway).

Function: Static routing manager

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, alternate devices will 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.

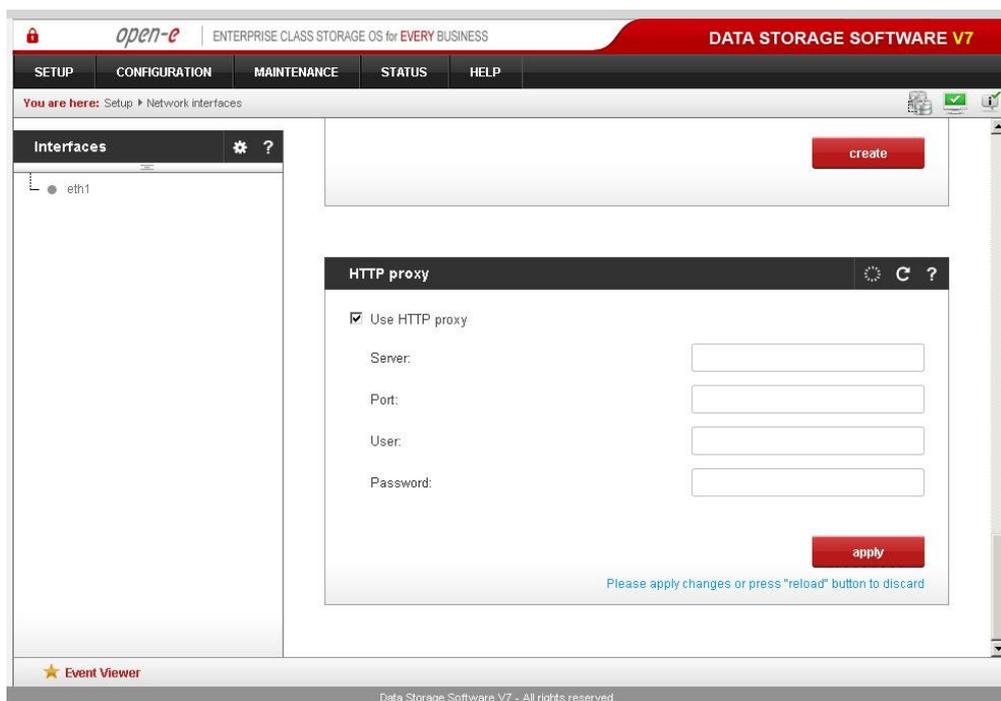
802.3ad

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.



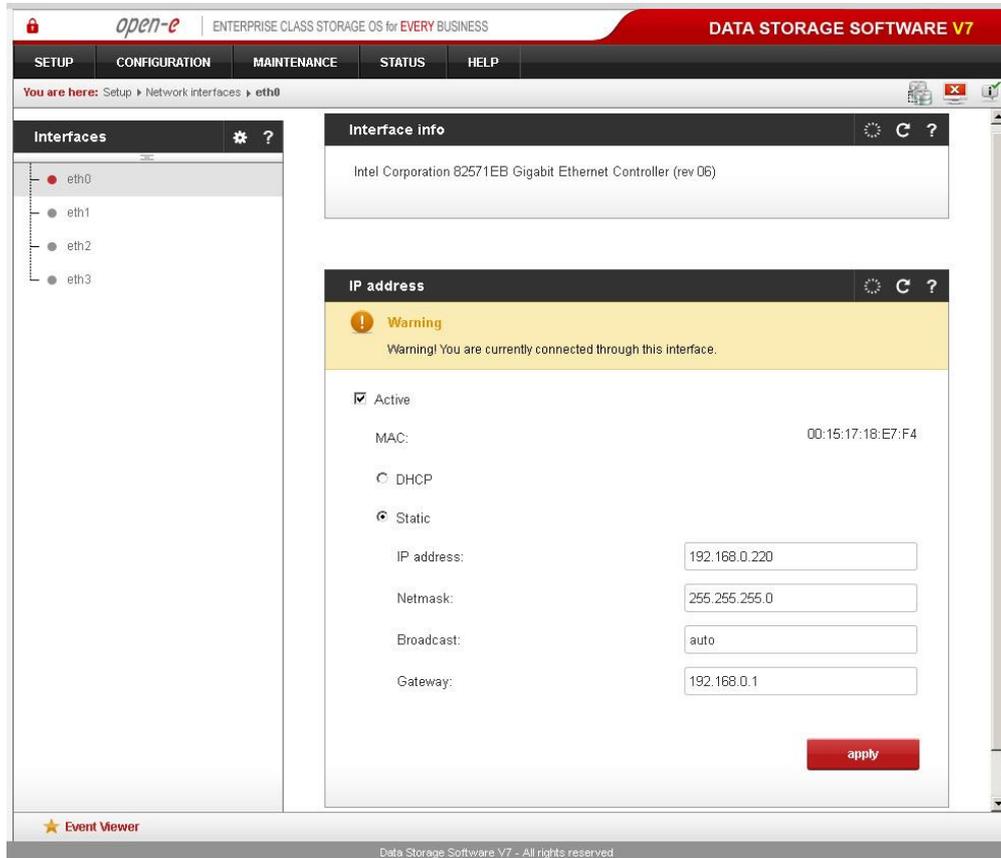
Function: HTTP proxy

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 the "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: 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 DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates 'You are here: Setup > Network interfaces > bond0'. The left sidebar shows a tree view of network interfaces: eth0, eth1, eth2 (bond0), eth3 (bond0), and bond0 (selected). The main content area is titled 'Bond interface settings' and contains a table of bonded interfaces:

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

Below the table, the 'Bonding mode' is set to 'balance-rr'. The 'Active' checkbox is checked. The MAC address is '02:BD:CF:DC:BD:69'. Under the 'Static' configuration section, the following fields are visible:

- Address IP: 192.168.2.220
- Netmask: 255.255.255.0
- Broadcast: auto
- Gateway: (empty field)

An 'apply' button is located at the bottom right of the configuration area.

Function: Bond interface settings

Here you can configure bond interface settings.

To remove a network interface from bonding, click 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, alternate devices will 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:

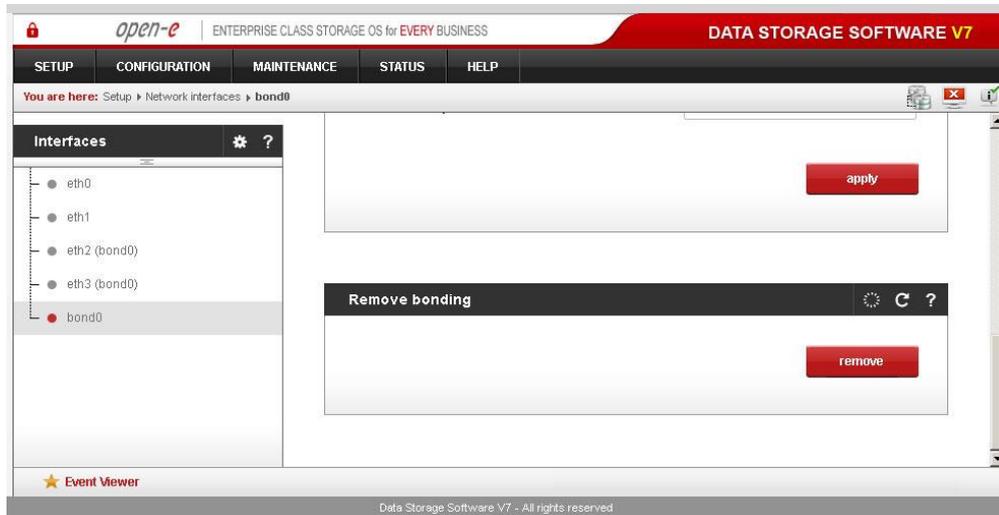
Network interface name.

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.

5.2.1.3 Failover

Function: Failover Manager

The failover manager provides an overview of the cluster configuration and allows starting and stopping the cluster.

start

Start button is shown when the failover hasn't been started. Use it to start the failover process. When the configuration verification mechanism is finished without any errors and the failover is started, the virtual IP addresses are activated and the resources are available through the virtual IP address. After failover is started this button is replaced by the "**stop**" button.

stop

Stop button is shown when the failover is running. By clicking this button you can stop the failover process on both nodes. As a result the virtual IPs will be deactivated. When the failover is stopped resources will be only available using physical IP addresses of the node where the resources are located.

Failover contains three sections: Resource pool, Configuration statuses and the Remote node status. Each of the sections provides a general overview of the cluster configuration and the current state of services which are obligatory for the failover process. Each section contains a link to the part of the DSS V7 Web GUI where the services can be configured.

Resource pool

Displays the status of resources that are on the local and the remote node. It also shows the volume replication task state. The quick link forwards you to the resource pool manager.

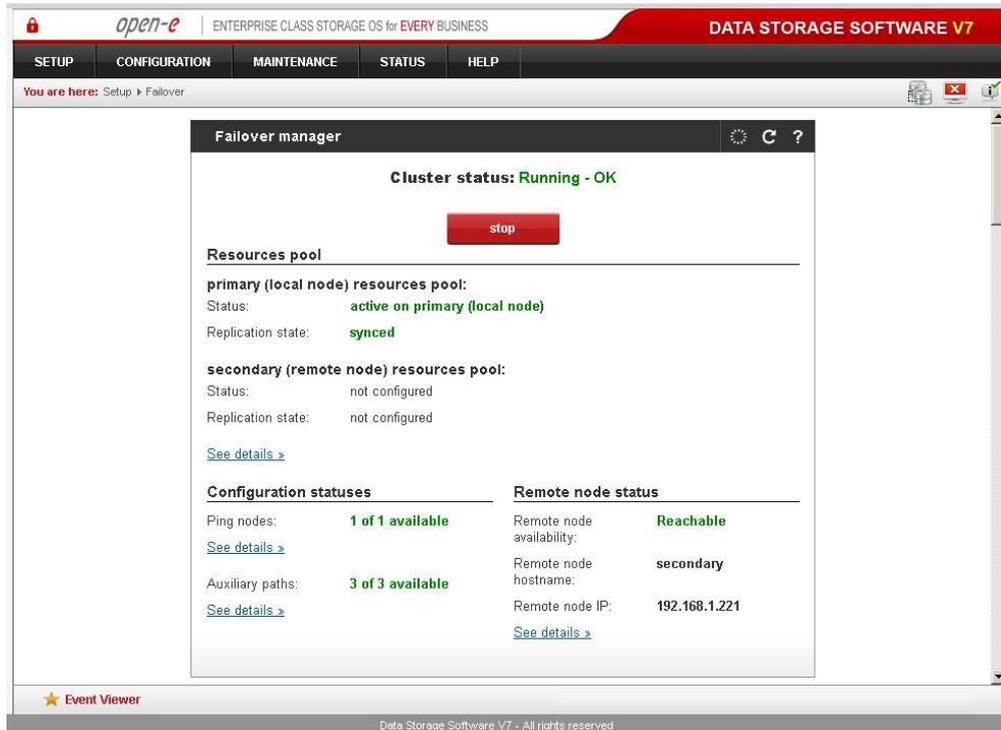
Configuration statuses

Displays information about the amount of configured and available ping nodes and configured auxiliary paths. The quick links will forward you to the ping node configuration and to the auxiliary path configuration.

Remote node status

Displays the host name and the IP address of the remote node as well as information if the connection between the local and the remote node has been established.

The quick link will forward you to "Host binding" in "Configuration -> Volume manager -> Volume replication" on the local nodes.



Function: Auxiliary paths

This option is used to configure the interfaces on which the failover sends UDP unicast traffic. You need to point out to which interface on the remote node the UDP unicast traffic will be send. The auxiliary path will be used to send periodic "heartbeat" packages to the remote node with the interval equal to *keep alive time*, which is set in Failover trigger policy section.

add new auxiliary path

This button will expand the window and show two drop down menus to specify a local and remote network interface that will be used for the auxiliary connection. Use "add" button to save the settings or "cancel" button to minimize the auxiliary path configuration window.

trash bin icon ("delete" button)

Expands the window and shows the key to remove the particular auxiliary path from the list.

NOTE At least two auxiliary paths needs to be specified.

Function: Ping nodes

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 remote node. If this one succeeds, resources are moved from the active node to the remote node. Automatic failover will only take place if all ping nodes become unavailable for one of the active nodes (e.g. the server does not take action when at least one ping node is reachable). The ping node needs to be able to receive and reply to ICMP echo requests.

add new ping node

pressing this button will expand the window and show an empty area to enter an IP address of a ping node. Pressing the button for the second time will add the enter IP address to the ping node list.

When a new IP address of a ping node is entered, the status for the ping nodes is automatically being verified on both nodes. As a result, the status is shown for both the local node and for the remote node.

trash bin icon ("delete" button)

Expands the window and shows the key to remove the particular ping node from the list.

cancel

Is used to hide the expanded view.

NOTE You can indicate up to 10 ping nodes but only one ping node can be entered at once.

The screenshot displays the Open-E Data Storage Software V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The main content area is divided into two sections: 'Auxiliary paths' and 'Ping nodes'.

Auxiliary paths section:

- Info:** While a cluster is running you are not able to change settings. Please stop cluster in order to make changes.
- Table:**

Status	primary interface (local node)	secondary interface (remote node)	
Active	eth1 (192.168.1.220)	eth1 (192.168.1.221)	🗑️
Active	eth3 (192.168.3.220)	eth0 (192.168.0.221)	🗑️
Active	eth2 (192.168.2.220)	eth2 (192.168.2.221)	🗑️
- add new auxiliary path** button

Ping nodes section:

- Info:** While a cluster is running you are not able to change settings. Please stop cluster in order to make changes.
- Table:**

Ping node IP address	primary status (local node)	secondary status (remote node)	
192.168.2.106	Reachable	Reachable	🗑️
- add new ping node** button

The interface also features an 'Event Viewer' at the bottom left and a footer with 'Data Storage Software V7 - All rights reserved'.

Function: Failover triggering

In this section you can choose how the system reacts when I/O errors are detected. There are three modes available:

Ignore I/O errors

Using this mode, DSS V7 will ignore any I/O errors; as a result no action will be taken when such errors are detected.

Trigger failover on I/O errors (any volumes)

If I/O errors are detected on any of the hard drives or bootable medium, the failover will be triggered and will automatically move the resources to the remote node to ensure data availability and safety.

Trigger failover on I/O errors (only volumes configured in failover)

Resources will be moved to the remote node when I/O errors will be detected on hard drives; where logical volumes that are included in failover configuration are located. If I/O errors appear on other hard drives or on the bootable medium, the failover won't be automatically triggered.

Show advanced options

Expands the view and allows adjusting the following failover timers:

Warn time

Specifies how much time (in seconds) should elapse until the failover functionality issues a warning.

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.

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 other node becomes the only active node. If the node becomes available again before the init time runs out, the state of the failover nodes will not change.

Keep alive time

Sets the failover keep-alive interval, i.e. the frequency at which failover state packets are sent between nodes.

Apply

Press to save the new settings

Reset timings to default

Reset timers to the initial values

Hide advanced options

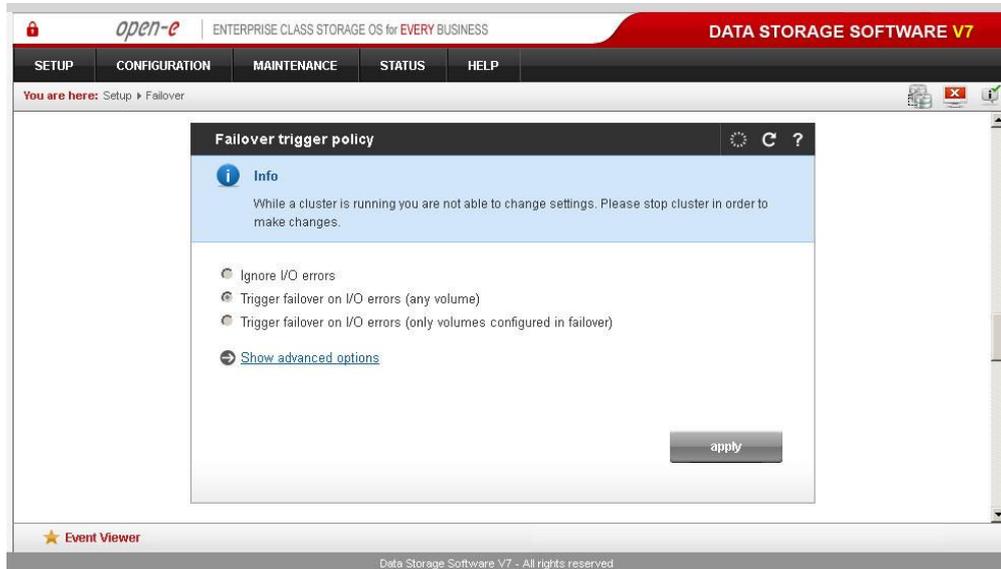
Minimize the view to hide the failover timer settings.

In case of *'service packets not delivered on time'* error notification, please follow this guideline:

1.
 - Set **Dead time** to 60 seconds or higher.
 - Set **Warn time** to 1/4 to 1/2 of **Dead time** value.

If the notification does not appear in future it means **Dead time** value is set in an acceptable range.
2. In case error message appears again please:
 - Double your **Dead time** value.
 - Set **Warn time** to doubled **Keep alive time** value.

3. If notifications are persistent after those changes, the next steps of troubleshooting could be:
 - Verifying network configuration and topology.
 - Limiting workload on the machine.
 - Upgrading CPU and/or adding RAM.



Function: Resource groups manager

This section contains the virtual IP address iSCSI resources configuration. Resource pool manager gives you the ability to complete the configuration for both nodes without the need to go to the remote node webgui. The section is horizontally divided in two groups, where the first half of the section is used to configure the local node and the second section is used to configure the remote node.

In the first section you can also see the status of the resources and the information about the replication task state.

Status

Shows information about the iSCSI target that was configured on the node which you ID you can see above. This tells us if the resources are currently available on the node on which it was configured or on the remote node.

Synchronization status

Provides the details about the replication task state.

move to local node

This button is shown when the resources are active on the remote node. Use this button to move the resources from the remote node to the local node.

move to remote node

This button is shown when the resources are active on the local node. Use this button to move the resources from the local node to the remote node.

synch between nodes

This button is used to manually initialize a synchronization process between nodes.

Virtual IP address

This sub-menu lists the virtual IP address that has been configured. It also gives the detailed information on which interface on the local and the remote node the virtual IP address has been configured.

Add virtual IP

Pressing this button will expand the window and show an empty area to enter the virtual IP address, netmask and broadcast address. It's also needed to specify on which local and remote the virtual IP address will be configured. Use "add" button to confirm the configuration or "cancel" button to minimize the virtual IP configuration window.

trash bin icon ("delete" button)

Expands the window and shows the key to remove the particular virtual IP address from the list.

gear icon ("update" button)

Allows modifying a previously configured virtual IP address, netmask, broadcast address or the local interface or remote interface on which the IP address is configured.

NOTE Only one virtual IP address can be configured per network interface

iSCSI resources

This sub-menu lists the iSCSI targets and the associated volume replication tasks that have been included in the failover configuration. By using the yellow arrow pointing down details are shown about a replication task.

trash bin icon ("delete" button)

Expands the window and shows the key to remove the particular iSCSI target from cluster configuration.

Add or remove targets

Pressing this button will expand the window and show a list of available iSCSI targets on the left side and a list of iSCSI targets included in the cluster configuration on the right. The targets can be added or removed from the cluster configuration using the arrows located between the left and the right list of iSCSI targets. Use the "apply" button to save the changes.

The screenshot displays the 'Resources pool manager' interface. At the top, there is a navigation bar with 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Below this, a breadcrumb trail shows 'You are here: Setup > Failover'. The main content area is divided into sections for 'primary resources (local node)' and 'secondary resources (remote node)'. The primary resources section shows a status of 'active on primary (local node)' and a synchronization status of 'synced'. It includes buttons for 'move to remote node' and 'sync between nodes'. Below this, there are tabs for 'Virtual IP addresses' and 'iSCSI resources'. The 'Add or remove targets' button is visible. The iSCSI target 'target0 (iqn.2012-07:mirror01)' is listed with a replication task 'MirrorTask' and logical volume 'lv0000', showing a state of 'OK'. The secondary resources section shows a status of 'not configured' and a 'move' button. At the bottom, there is an 'Add virtual IP' button and a note stating 'No virtual IPs defined.' The footer includes an 'Event Viewer' icon and the text 'Data Storage Software V7 - All rights reserved'.

5.2.1.3.1 Active/Passive Failover Configuration

- First, go to **SETUP -> Network Interfaces**. In the **Hostname** box only replace the "dss" letters in front of the numbers with *node-a* server

(Example: *node-a10693737*).

Perform the same task on the second server as well - this will require a reboot.

(Example: *node-b54545653*).

The reboot can take a few minutes. Please refresh the Web GUI every minute until the server reboot process is complete.

- Next, on the *node-a* server go to **Configuration -> Volume Manager -> Volume Replication**. You will have to define your remote node *IP address* in the **Host Binding** box.

Please note that the host binding path will be used for **volume replication**. It is recommended to use the fastest available NIC in the system for the volume replication and remain dedicated for the volume replication traffic only. If redundant paths are required, it is recommended to configure the active-backup bonding mode, and then apply the bonding IP address.

- You will need to enter in the remote server's IP address and the password to Web GUI. After applying all the changes, the status should be: *Reachable*.

NOTE The factory default password is: admin

- The next step is to set up the volume replication on the *node-a* server; set the iSCSI volume as **source** and set the *node-b* server's iSCSI volume as **destination**.

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 block I/O mode selected).

- Next, create the replication task on the *node-a* server. Once the task has been created, click the corresponding play button below. You will know the task is complete when you see a date and time. You can verify the replication task status in **Status -> Tasks**.
- Next, go to **Configuration -> iSCSI Target Manager -> Create New Target**: Create exactly the same setup on both systems *node-a* and *node-b*:
 - Target Name (Example: iqn.2012-07:mirror01)
 - SCSI ID (Example: dF5NU3iE8ZAcK2XQ)
 - LUN# (Example: 0)

In order to create the target name different than the default, you need to un-check the **Target Default Name** option and edit the target name. Optionally you can re-name the created target name in **Configuration -> iSCSI target manager -> Targets** and then select the desired target alias in the left panel and then go to the function **Rename Target**.

In case one of the above values are not identical on both nodes, the system will prompt you with an error while starting the cluster service. This will have to be corrected in order to start the cluster service.

After that, assign the failover volume to the LUN by clicking on the "+" (plus) button to enable the LUN.

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 node-a to the node-b system. Make sure that the node-a and node-b servers have identical settings.

- On the node-a server go to **SETUP -> Failover**.
- In the **Auxiliary Paths** box click **add new auxiliary path** and choose on which interface you want to configure the auxiliary path (remote and local). It is required to use one from the volume replication interface and each interface from the virtual IP interface that is the storage access.
- Next, go to the **Ping Nodes** box and define at least 1 ping node. You will be prompted to put in the ping node *IP* address. It is recommended to have at least 2 ping nodes that are on the same physical subnet of the interface that you will use for your virtual IP address. Next, click **add new Ping Node**. You should receive a message that the ping nodes have been created successfully.
- If you wish, you may configure **Failover Trigger Policy**. However, it is recommended that you set it to *Trigger Failover on I/O errors (any volume)*.
- The next step is to go to the **Resources Pool Manager**.

NOTE The Active-Passive option allows configuring a resource pool only on one of the nodes. In such a case, all volumes are active on a single node only. The Active-Active option allows configuring resource pools on both nodes and makes it possible to run some active volumes on node-a and on other active volumes on node-b. The Active-Active option is enabled with the TRIAL mode for 60 days or when purchasing the Active-Active Failover Feature Pack.

In the *Virtual IP address* tab, in the node-a *resources* area click **Add Virtual IP**. You will have to choose a network interface for both nodes. This will make the changes automatically on the remote server. Make sure to match the corresponding NICs for their associated network.

Important note on setting virtual IP addresses

Please note that at least one of the interfaces in each system needs to hold the *virtual IP*. Set the *virtual IP* address in a different sub-network than the physical IP address. If you wish to have more than one pair of iSCSI failover systems, please set each pair in a different sub-network. The virtual IP address will be activated only when the cluster service is started and it will be de-activated when the cluster service has been stopped.

- When you are finished with setting the virtual IP address, go to the *iSCSI Resources* tab (still in primary resources pool) and click Add or remove targets. After moving the target iqn.2012-07:mirror01 from *available targets* to *targets already in cluster* click the Apply button.
- Next, scroll to the top in the **Failover manager** and click the **Start** button. The **Cluster Status** should state *RUNNING - OK* and the **Replication State of Resources pool** should state *SYNCED*.
- Finally, on the storage client connect to the iqn.2012-07:mirror01 target with an iSCSI initiator using the *virtual IP* that was previously assigned.
- Create a partition and format the iSCSI disk.
- Test the failover function by clicking the **Move to remote node** button in the **Resource Pool Manager**.
- In order to test failback click the **Move to local node** button in the **Resource Pool Manager**.
- Next, check the *synchronization status* in the **Resource Pool Manager**. It must state *SYNCED*.

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

5.2.1.3.2 Active/Active Failover Configuration

- First, go to **SETUP -> Network Interfaces**. In the **Hostname** box only replace the "dss" letters in front of the numbers with *node-a* server

(Example: *node-a10693737*).

Perform the same task on the second server as well - this will require a reboot.

(Example: *node-b54545653*).

The reboot can take a few minutes. Please refresh the Web GUI every minute until the server reboot process is complete.

- Next, on the *node-a* server go to **Configuration -> Volume Manager -> Volume Replication**. You will have to define your remote node *IP address* in the **Host Binding** box.

Please note that the host binding path will be used for **volume replication**. It is recommended to use the fastest available NIC in the system for the volume replication and remain dedicated for the volume replication traffic only. If redundant paths are required, it is recommended to configure the active-backup bonding mode and then apply the bonding IP address.

- You will need to enter in the remote server's IP address and the password to Web GUI. After applying the changes, the status should be: *Reachable*.

NOTE The factory default password is: admin

The Active-Active option allows configuring resource pools on both nodes and makes it possible to run some active volumes on *node-a* and other active volumes on *node-b*. This is why we need to create at least the iSCSI logical volumes. The Quick Start describes 2 logical volume setups.

Please set the volume replication for your 2 iSCSI volumes on the *node-a* server. Set the 1st iSCSI volume as **source** and set the 2nd iSCSI volume as **destination**. **Configuration -> Volume Manager -> Volume Replication**

Perform the same procedure on the *node-b* server where the 1st iSCSI volume is in the **destination** mode and the 2nd iSCSI Volume is set to the **source** model (see the example below). **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 block I/O mode selected).

node-a:

- lv0000 is set to source
- lv0001 is set to destination

node-b:

- lv0000 is set to destination
- lv0001 is set to source

- Next on *node-a* create your Volume Replication Task, so that lv0000 is the **source** volume and lv0001 is the **destination** volume. Once the task has been created, click the corresponding play button below. You will know the task is complete when you see a date and time. You can verify the replication task status in **Status -> Tasks**.

- Go to **node-b** and create the new volume replication task where lv0001 is the **source** and lv0001 is the **destination**. Once the task has been created, click the corresponding play button below. You will know the task is complete when you see a date and time.
- Next go to **Configuration -> iSCSI Target Manager -> Create New Target**: On both systems (*node-a* and *node-b*), create two targets with exactly the same settings. See the example below.
 - Target 1
 - Target Name (Example: iqn.2012-07:mirror01)
 - SCSI ID (Example: dF5NU3iE8ZAcK2XQ)
 - LUN# (Example: 0)
 - Target 2
 - Target Name (Example: iqn.2012-07:mirror02)
 - SCSI ID (Example: aeuSBsANvBZQtSaE)
 - LUN# (Example: 0)

In order to create the target name different than the default, you need to un-check the **Target Default Name** option and edit the target name. Optionally you can re-name the created target name in **Configuration -> iSCSI target manager -> Targets** and then select the desired target alias in the left panel and then go to the function **Rename Target**.

In case one of the above values are not identical on both nodes, the system will prompt you with an error while starting the cluster service. This will have to be corrected in order to start the cluster service.

After that, assign the failover volumes to the LUNs by clicking on the "+" (plus) button. Add lv0000 as LUN to iqn.2012-07:mirror01 on both servers and add lv0001 as LUN to iqn.2012-07:mirror02

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. 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 identical settings.

- On the *node-a* server go to **SETUP -> Failover**.
- In the **Auxiliary Paths** box click **add new Auxiliary Path** and choose which interface you want to configure the auxiliary path (*node-a* and *node-b*). At first, the Auxiliary Path is set up automatically while binding nodes and it is recommended to leave this setting. It is also recommended to set up the Auxiliary Path between all interfaces on which the Virtual IP will be set up.
- Next, go to the **Ping Nodes** box and define at least 1 ping node. You will be prompted to input the ping node *IP address*. It is recommended to have at least 2 ping nodes that are on the same physical subnet of the interface that you will use for your virtual IP address. Next, click **add new Ping Node**. You should receive a message that the ping nodes have been created successfully.
- If you wish, you can configure the **Failover Trigger Policy**. However, it is recommended that you set it to *Trigger Failover on I/O errors (any volume)*.
- The next step is to go to the **Resources Pool Manager**.

Set the *Virtual IP* address tab located in the local *node-a resources* section and click the **Add Virtual IP**. You will have to choose which network interface you want to assign to the *node-a* and *node-b* servers, this will make the changes automatically on the *node-b* server. Make sure to match the corresponding NICs for their associated network.

Important note on setting virtual IP addresses:

Please note that in the Active-Active mode at least two of the interfaces in each system needs to hold the virtual IP. Set the virtual IP address in a different subnetwork than the physical IP address. If you wish to have more than one pair of iSCSI failover systems, please set each pair in a different subnetwork.

The virtual IP address will be activated only when the cluster service is started and it will be deactivated when cluster service has been stopped.

When you are finished with setting the *virtual IP* address, go to the *iSCSI Resources* tab (remaining in the in *node-a resources* pool) and click **Add or remove targets**. After moving the target `iqn.2012-07:mirror01` from **available targets** to **targets already in cluster** click the **Apply** button.

Next in *node-a*, setup the *Virtual IP* address of *node-b resources*, while being in the remote node section below *node-a* area, and click **Add Virtual IP**. You will have to choose which network you want to assign to the *node-a* and *node-b* servers. This will make the changes automatically on the *remote* server.

When you are with finished setting the *virtual IP* address (*please remember the important note about the virtual IP addresses*), go to the *iSCSI Resources* tab, still in *node-b resources* area, and click **Add or remove targets**. After moving the target `iqn.2012-07:mirror02` from **available targets** to **targets already in cluster** click the **Apply** button.

- Next, scroll to the top in the **Failover manager** and click the **Start** button. (if the start button is not red, the setup has not been completed) The **Cluster Status** should state *Running - OK* and the **Replication State** of the **Resources pool** should state *syncd* in **node-a (local node) resources pool** and in **node-b (remote node) resources pool**. Status of the resource pools activities should state the following: *active on node-a (local host)* for **node-a (local node) resources pool** and *active on node-b (remote host)* for **node-b (remote node) resources pool**
- Finally, on the storage client connect to the `iqn.2012-07:mirror01` and `iqn.2012-07:mirror02` targets with an iSCSI initiator using the *virtual IPs* that was previously assigned.
- Create the partitions and format the iSCSI disks.
- Test the failover function by clicking the **Move to remote node** button in the **Resources Pool Manager** box for **node-a resources** and confirm this action by clicking the **Move** button. After performing this, the status for **node-a resources** should state *active on node-b (remote node)* and the **Synchronization status** should state *syncd*.
- In order to test failback, click the **Move to local node** button in the **Resources Pool Manager** box for **node-a resources** and confirm this action by clicking the **Move** button. After completing this, the status for **node-a resources** should state *active on node-a (local node)* and the **Synchronization status** should state *syncd*.

- Next, you can apply the same actions for **node-b resources**.

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

NOTE The Active-Active option is enabled with the TRIAL mode for 60 days or when purchasing the Active-Active Feature Pack.

5.2.1.4 Hardware RAID

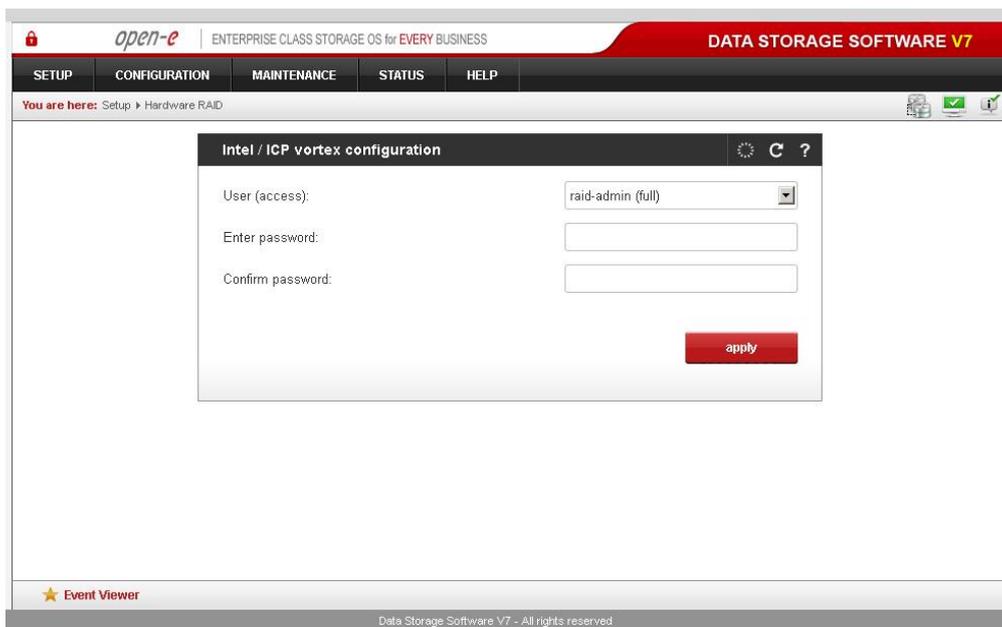
Please note that your RAID controller must be supported by the Open-E Data Storage Software V7 in order to function properly.

Function: Intel / ICP vortex configuration

In order to maintain this RAID controller you can use the console tools (press F1 in the console to list keyboard shortcuts) or use the INTEL/ICP Vortex tool over ethernet.

In this menu you can select users who will be allowed to configure the INTEL / ICP Vortex RAID controller.

Default password for raid-admin(full) is admin. Default password for raid(read-only) is raid.

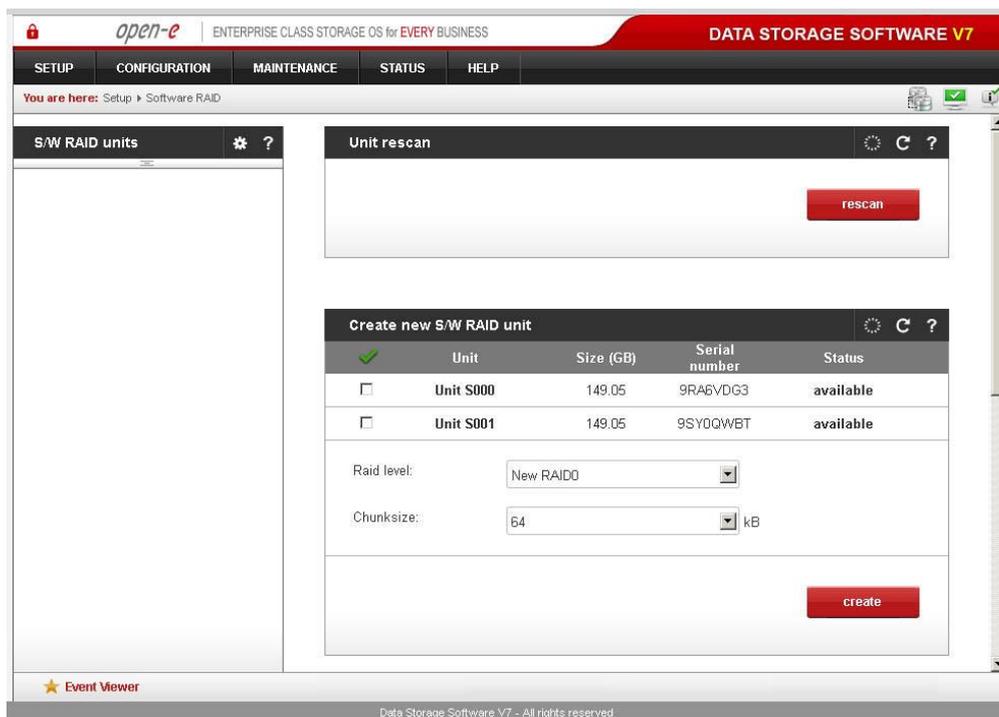


The screenshot displays the web interface for Open-E Data Storage Software V7. The top navigation bar includes 'open-e', 'ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS', and 'DATA STORAGE SOFTWARE V7'. Below this is a menu with 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail shows 'You are here: Setup > Hardware RAID'. The main content area features a modal window titled 'Intel / ICP vortex configuration'. This window contains three input fields: 'User (access):' with a dropdown menu showing 'raid-admin (full)', 'Enter password:', and 'Confirm password:'. A red 'apply' button is located at the bottom right of the modal. The footer of the interface includes an 'Event Viewer' icon and the text 'Data Storage Software V7 - All rights reserved'.

5.2.1.5 Software 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 out of free (unused) units. If you want to create RAIDs from used units which have already been in use, you first need to delete the contents of these units in the console, 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 one time.

Available RAID:

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

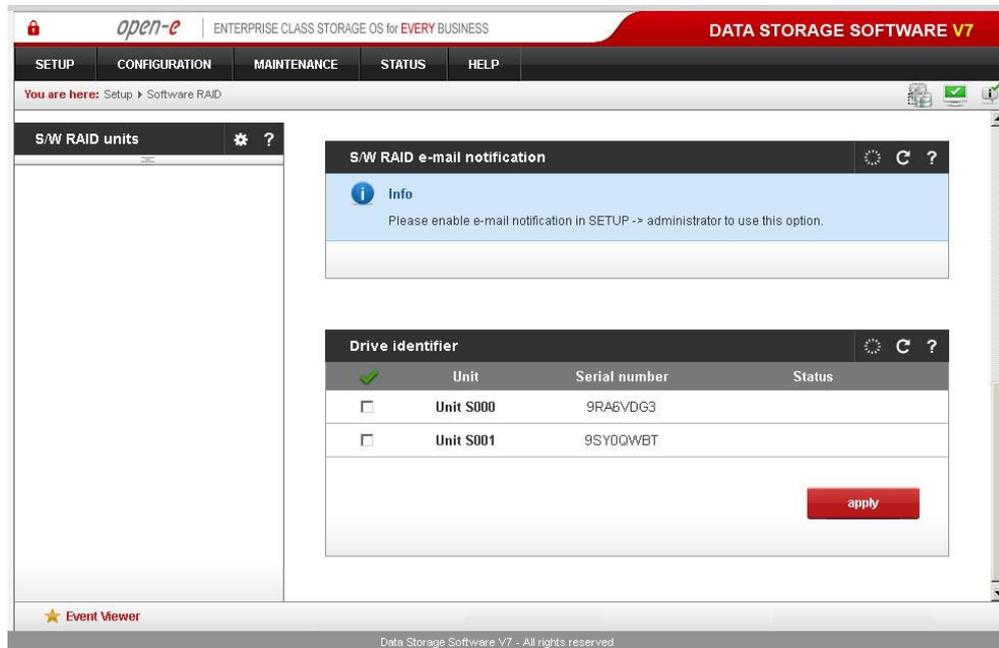
Right-Symmetric Algorithm

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 via 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, providing info that 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 beforehand (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 panel a tree with the available software RAID units will be displayed.

The screenshot displays the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The main content area is titled 'Manager' and shows a table of RAID units for MD0. The table has columns for Unit, PR, F, R, ST, Serial number, and Size (GB). Two units are listed: Unit S000 and Unit S001. Below the table is an 'apply' button. An 'Info' section below the table shows RAID attributes: RAID LEVEL (RAID0), Creation time (Tue Jul 10 22:31:14 2012), Update time (Tue Jul 10 22:31:14 2012), Array size (298.10 GB), Chunk size (64K), and State (clean). At the bottom, there is a 'Remove software RAID unit' section with a 'remove' button.

Unit	PR	F	R	ST	Serial number	Size (GB)
Unit S000	0	<input type="checkbox"/>	<input type="checkbox"/>	A*	9RA6VDG3	149.05
Unit S001	1	<input type="checkbox"/>	<input type="checkbox"/>	A*	9SY0QWBT	149.05

attribute name	value
RAID LEVEL	RAID0
Creation time	Tue Jul 10 22:31:14 2012
Update time	Tue Jul 10 22:31:14 2012
Array size	298.10 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 the proper checkbox (in the column R) and click on the 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 this unit will 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

By 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: Remove software RAID unit

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

NOTE This function is available only when no volume group are 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**

5.2.1.6 Fibre Channel

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

Function: QLOGIC administration

If you have a Qlogic 2, 4 or 8Gbit controller installed, you can use the command line tool in the Console Tools (*press F1 in the console to list keyboard shortcuts*). Please note the command line interface will only work **in initiator mode**. The above-mentioned controllers enable remote administration. This works only **in initiator mode** as well. 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. Make sure you have the essential information handy, i.e., the IP address of your server, username, and password.

The screenshot displays the 'QLOGIC administration' section of the open-e web interface. It includes an information box and a table for managing QLOGIC Target/Initiator configurations.

I	T	NAME	WWN
<input type="radio"/>	<input checked="" type="radio"/>	QLE2562	21:00:00:1b:32:8f:88:5c
<input checked="" type="radio"/>	<input type="radio"/>	QLE2562	21:01:00:1b:32:af:88:5c

Function: QLOGIC Target/Initiator

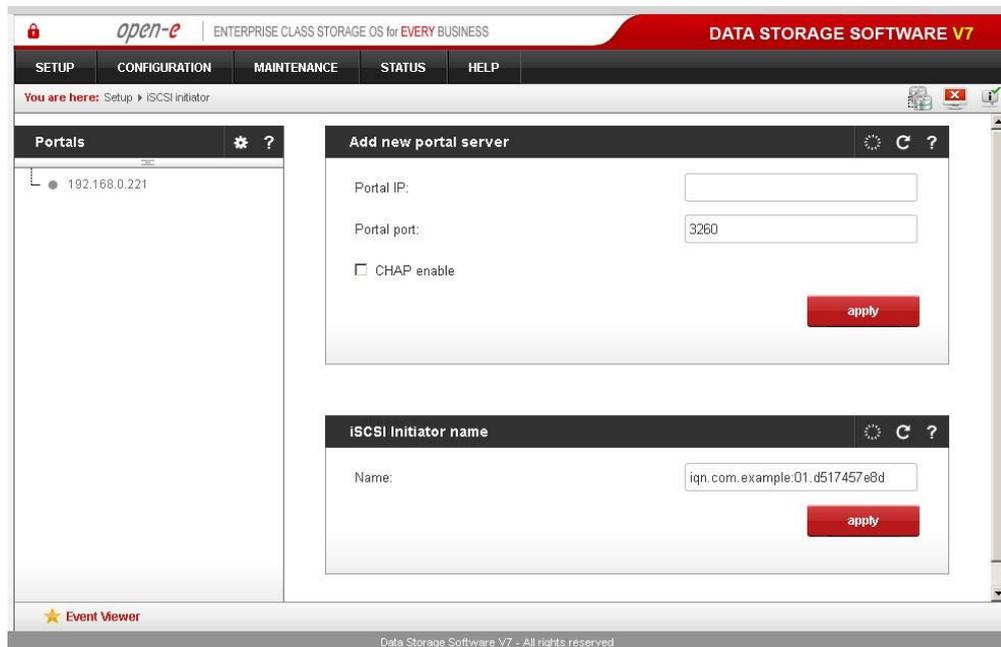
Here you view a list of all connected QLOGIC HBA's.

I / T

This column informs you if the HBAs are working in initiator or target mode.

5.2.1.7 iSCSI Initiator

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

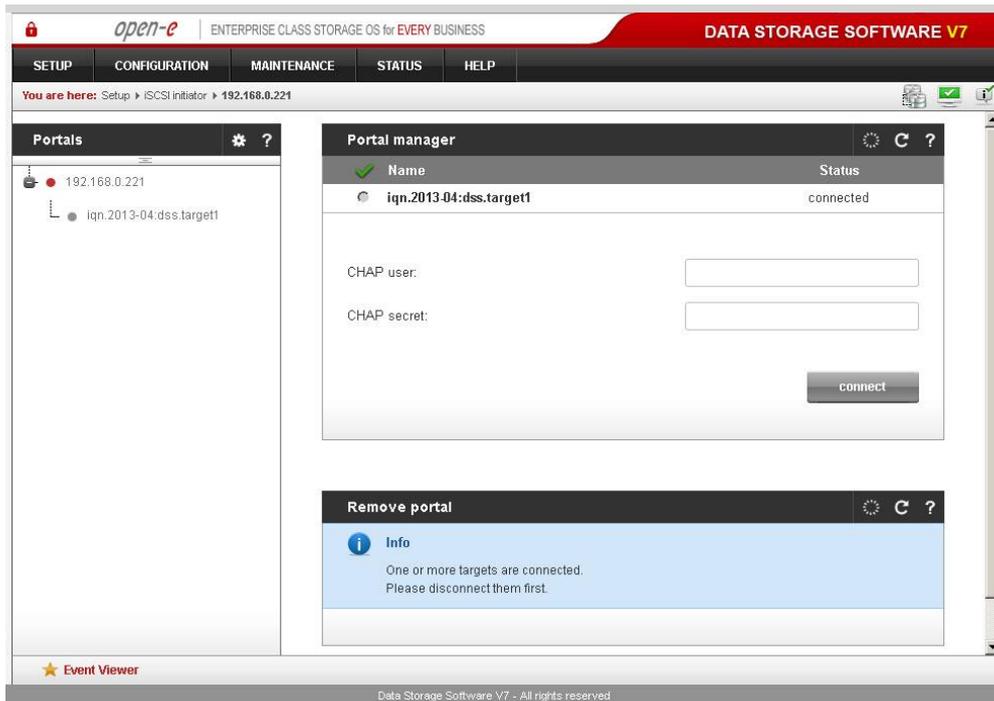
Name

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.

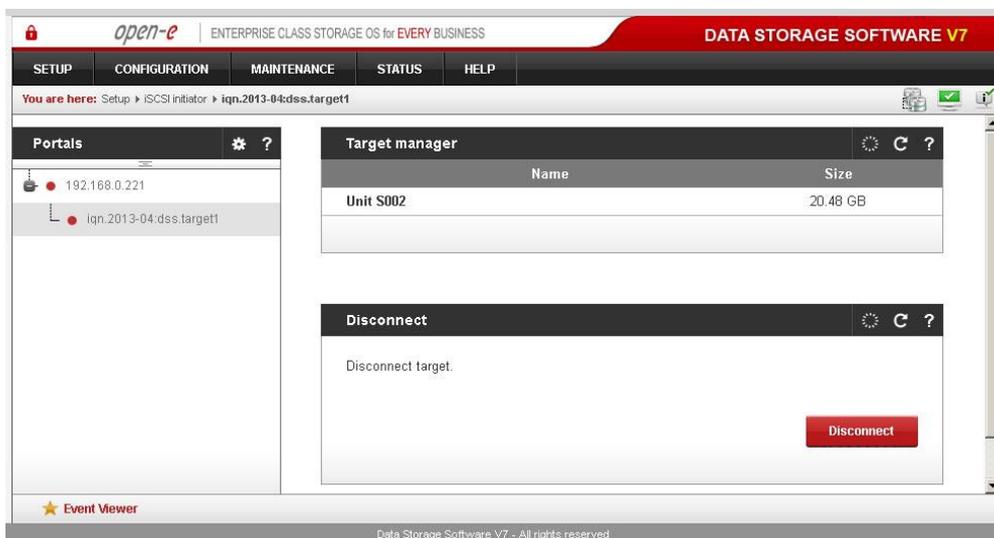
NOTE In order to disconnect from a target, select its name in the iSCSI Initiator tree and click the **Disconnect** button. Before removing an iSCSI portal server, you need to disconnect all targets from it.



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*).

5.2.1.8 Hardware

Function: UPS settings

Here you can configure your UPS device (Uninterrupted Power Supply). In order to use the 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 are no necessary actions 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

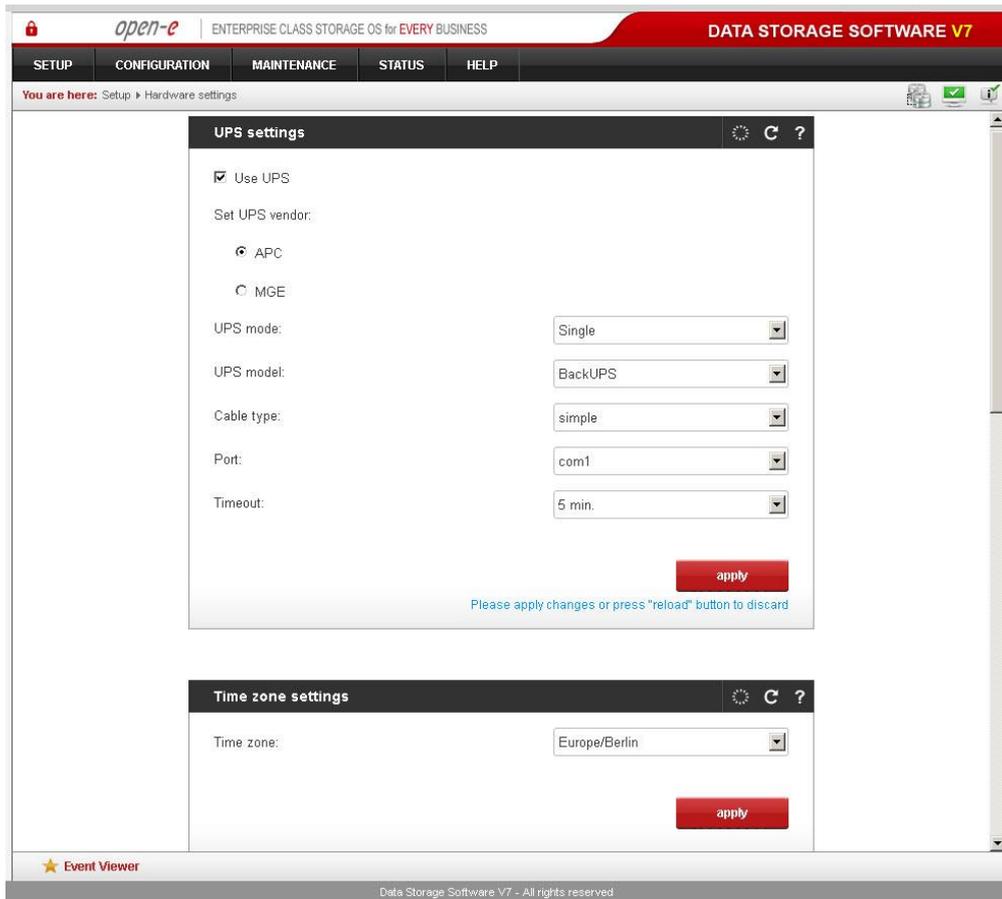
User name which will connect to the master UPS. It needs to be the same as the one on the master UPS.

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

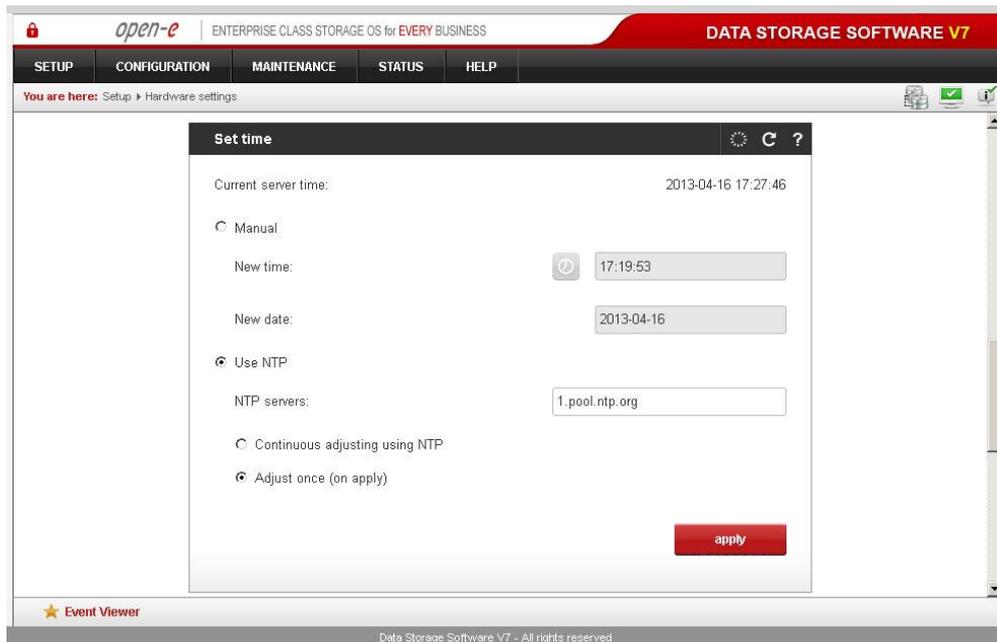
This function allows you to adjust NTP server settings.

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. Next, select the 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 military format, i.e., 00:00 to 23:59.

Use this PC time

The time and date on the PC on which you have your web browser will be used.

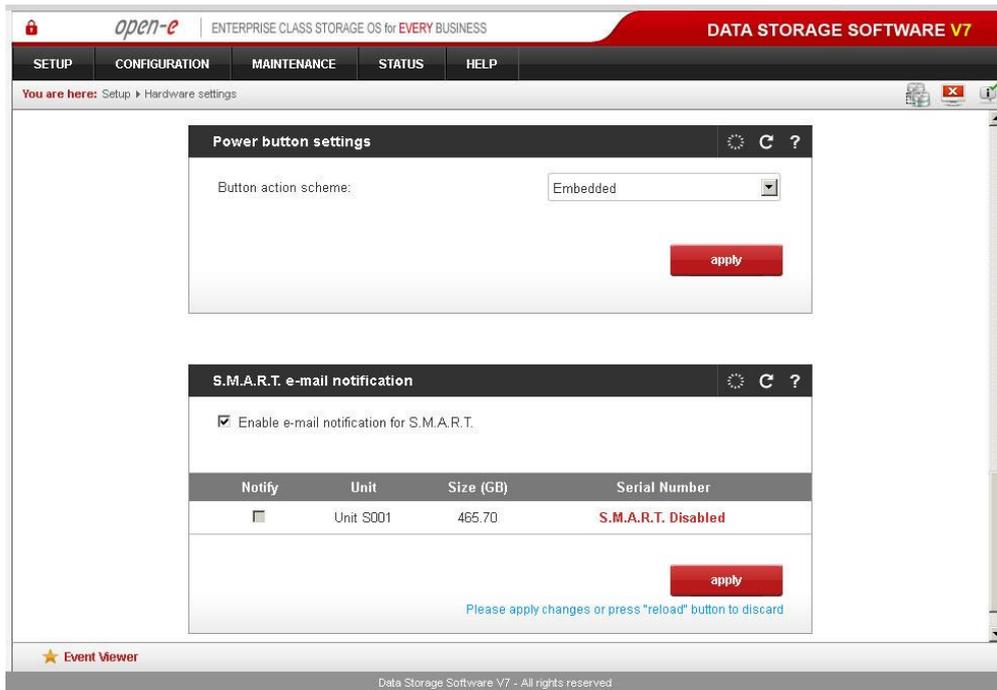
NTP server

This will pick up the time and date from an NTP server. In this case, please make sure that 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 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 the 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.

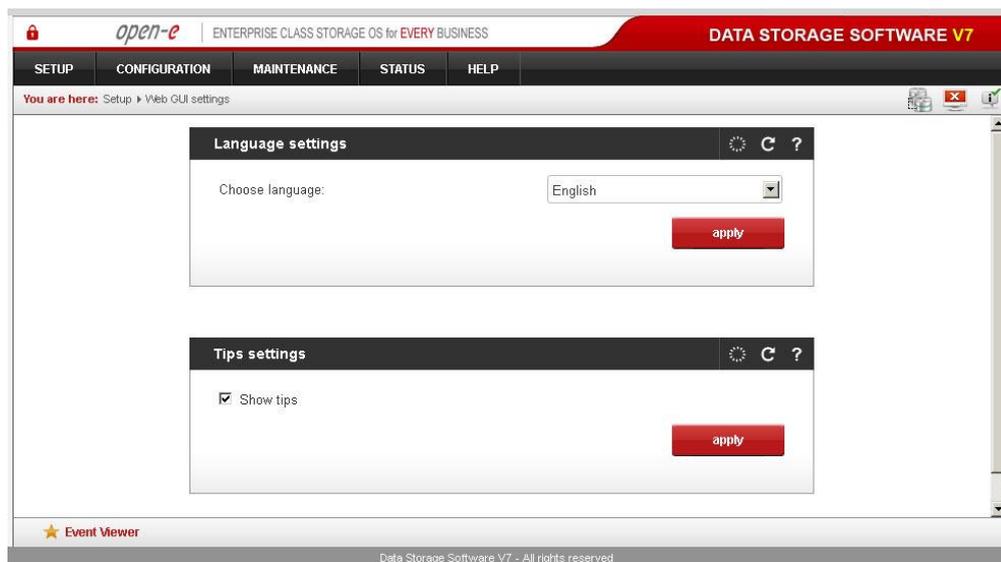
5.2.1.9 GUI

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 ...” and enter 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*.

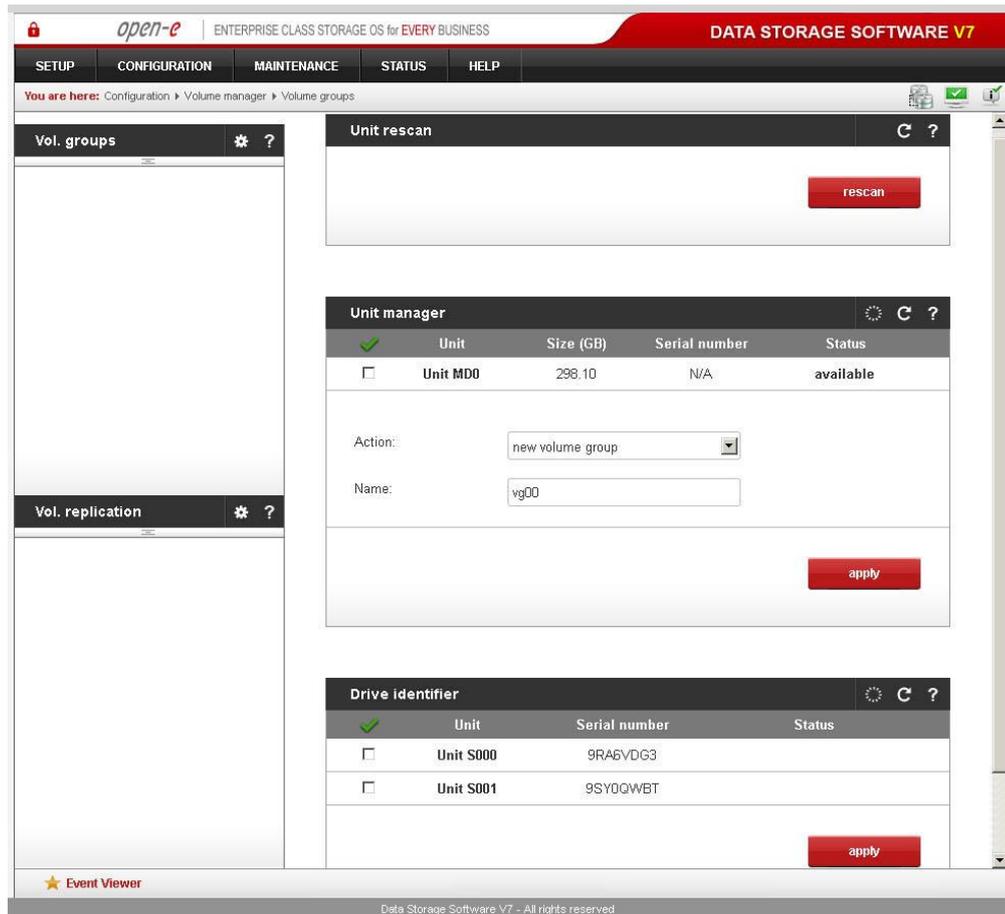
For further volume group management, e.g. logical volume setup, please click on the volume group name in the tree diagram in the left-hand pane. With the **Volume Manager** function you can create a new NAS volume (N) and/or a new iSCSI volume (I).

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.



Function: Drive identifier

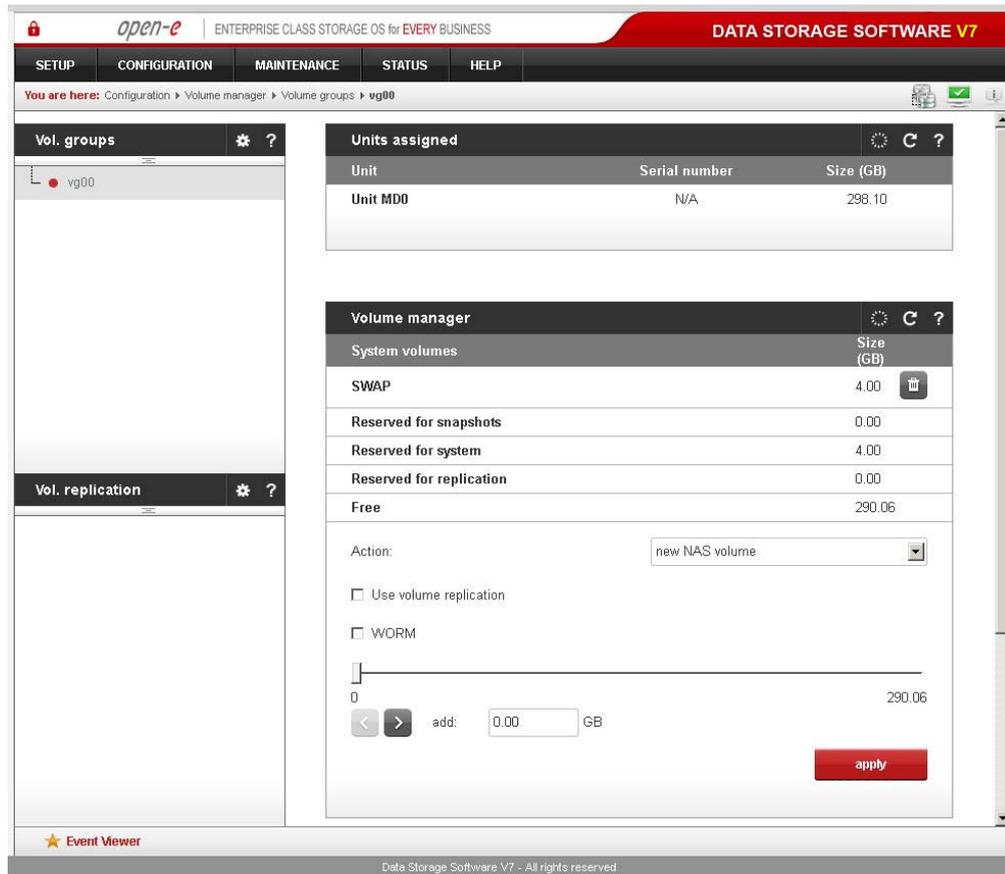
This function has been designated to assist you in finding disks in your NAS server cage. If you have a hardware RAID installed, the whole RAID array is shown as a single drive. So, you may not be able to determine which drive unit represents which disk when using the S.M.A.R.T. tool or a hardware RAID 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 is it 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 unless 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 to create a new target for the volume. The menu items are as follows:

- **Create new target automatically** - this creates a new target and adds 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 panel and add the volume with the green plus (+) sign.

Differences between File I/O and Block I/O

iSCSI or Fibre Channel target is delivering a block device for the iSCSI or Fibre Channel initiator. The block device can be a raw Logical Volume or a file working on formatted Logical Volume.

The Block I/O is exactly a raw Logical Volume which is formatted only by the initiator side. I/O performance should be faster because there is no delay made by the filesystem layer.

The File I/O is delivering file working on formatted Logical Volume. This gives additional benefits of filesystem like caching part of the data. Not initialized, File I/O provides even another benefit "organized writing", which is optimized for current usage.

In most cases File I/O provides better performance because of the caching - but in case of multiple hardware initiators Block I/O gives the highest read/write speed.

- **File I/O no initialization:**
Filesystem uses first free block for saving the data - no need to use "SEEK" command.
High performance while "random write", low performance while sequential read.
- **File I/O with initialization:**
System must perform a real SEEK in order to read/write the data.
Filesystem table has to be read and updated.
More stable than "not initialized" volume.
- **Block I/O:**
System must perform real SEEK operation on disk in order to save/write the data.
Data is stored directly on the hard drive (no memory writes required).

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) since 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 only once written to. 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.

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

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.

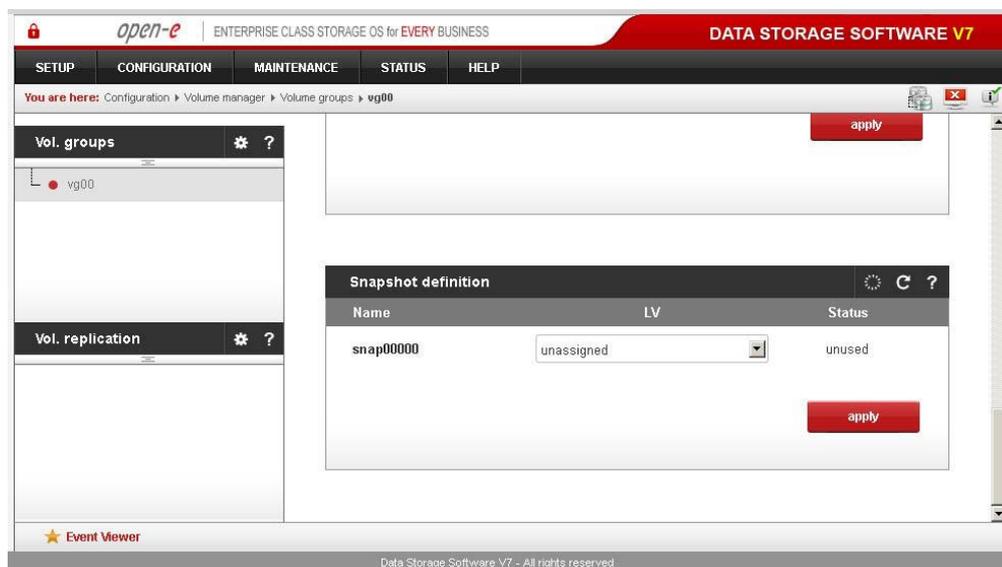
Blocksize

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

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

Blocksize has an influence on performance and space management. The greater the value the better the 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 file system - it takes place on the block level. Snapshots can be created (active state) and 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 snapshots 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 space that 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. This action is not necessary when establishing access to a snapshot for the second time. 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

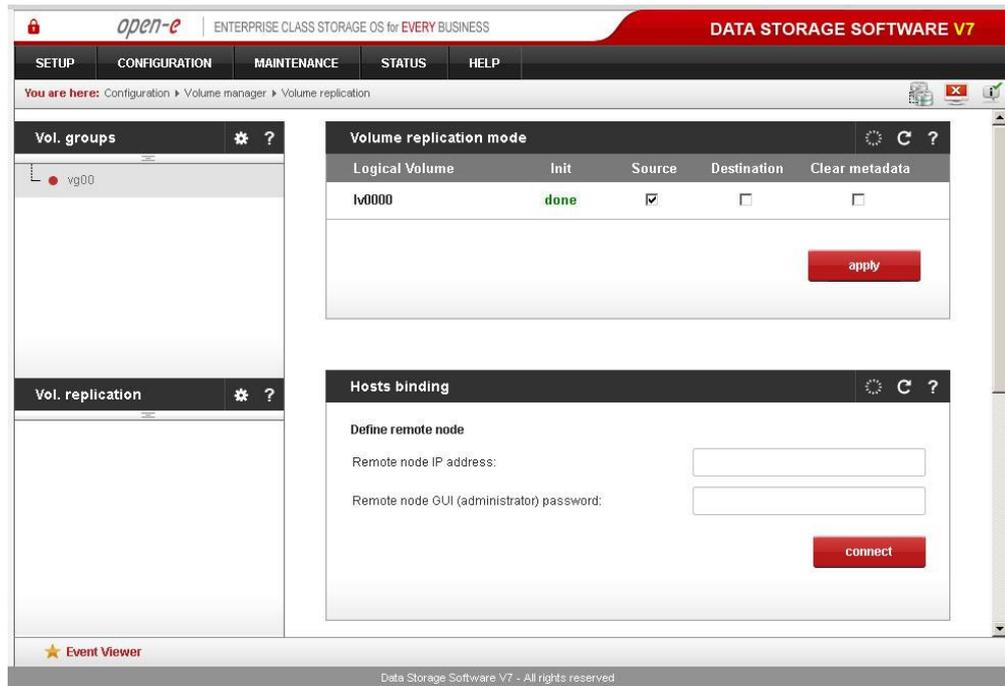
Function: Volume replication mode

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



Function: Hosts binding

Hosts binding allows to combine two servers. After servers have been bound, they can be used for volume replication functionality and for other services (e.g. clustering).

In order to bind to another server you need an IP address and the GUI (administrator) password of the server.

NOTE Binding and unbinding is controlled by an Administrator on one node.

NOTE In the current version you can bind to only one host.

NOTE It is not possible to bind to a server which is bound with another node.

NOTE Removing binding on host works both: locally and remotely. If remote host is unavailable while removing the host, changes are being done only to local host.

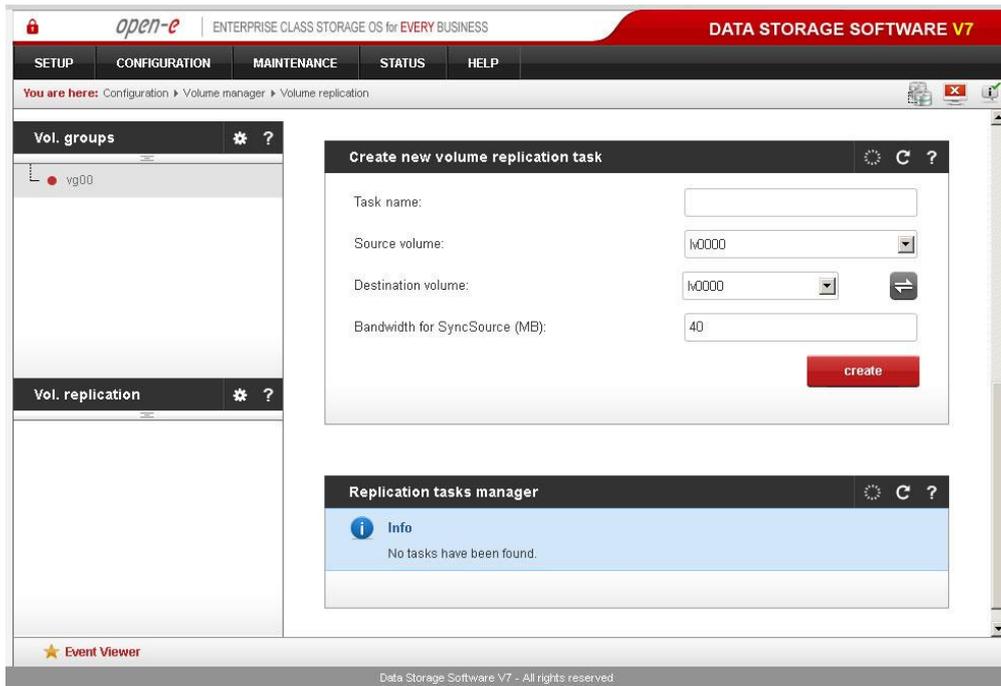
Function: Create new volume replication task

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. For example, this means that if you 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 only allows you 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. First, you need to stop the replication process.

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

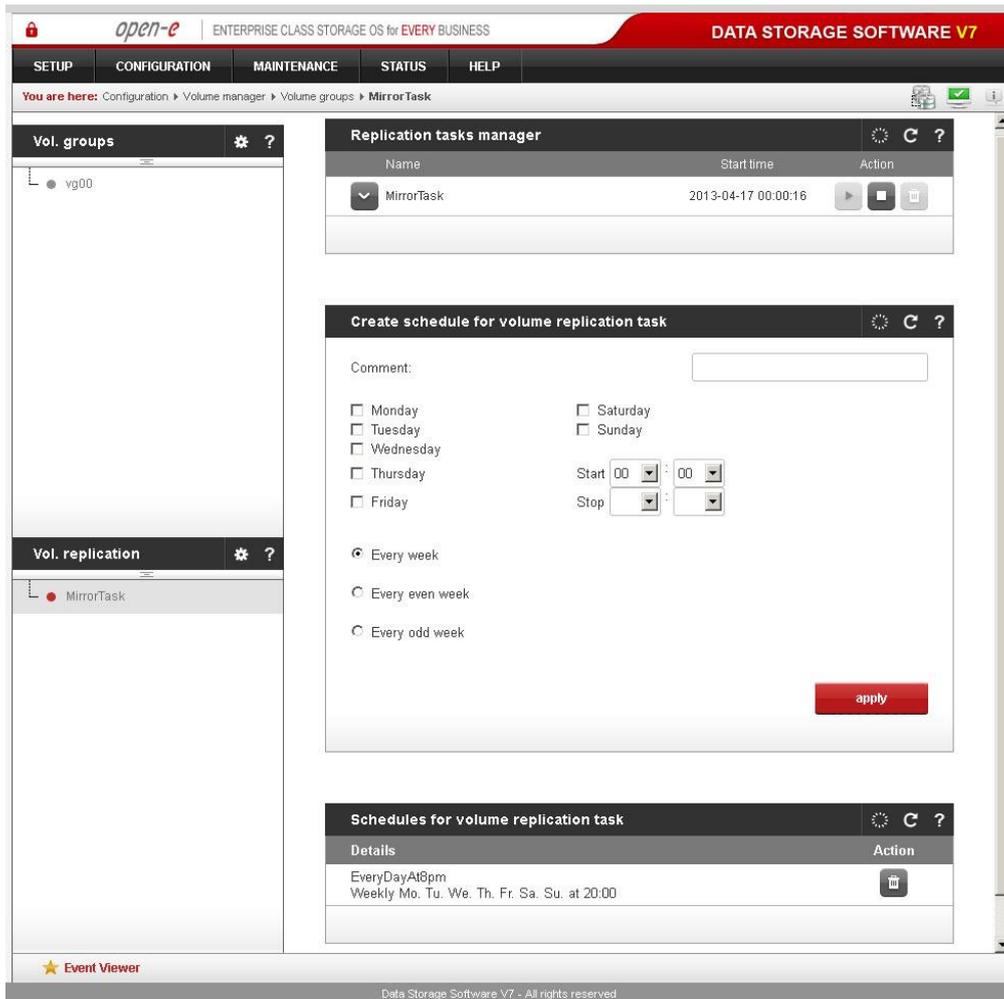
You can start the volume replication immediately by selecting **Now** from the **Time select** drop-down list or schedule it for later.

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.

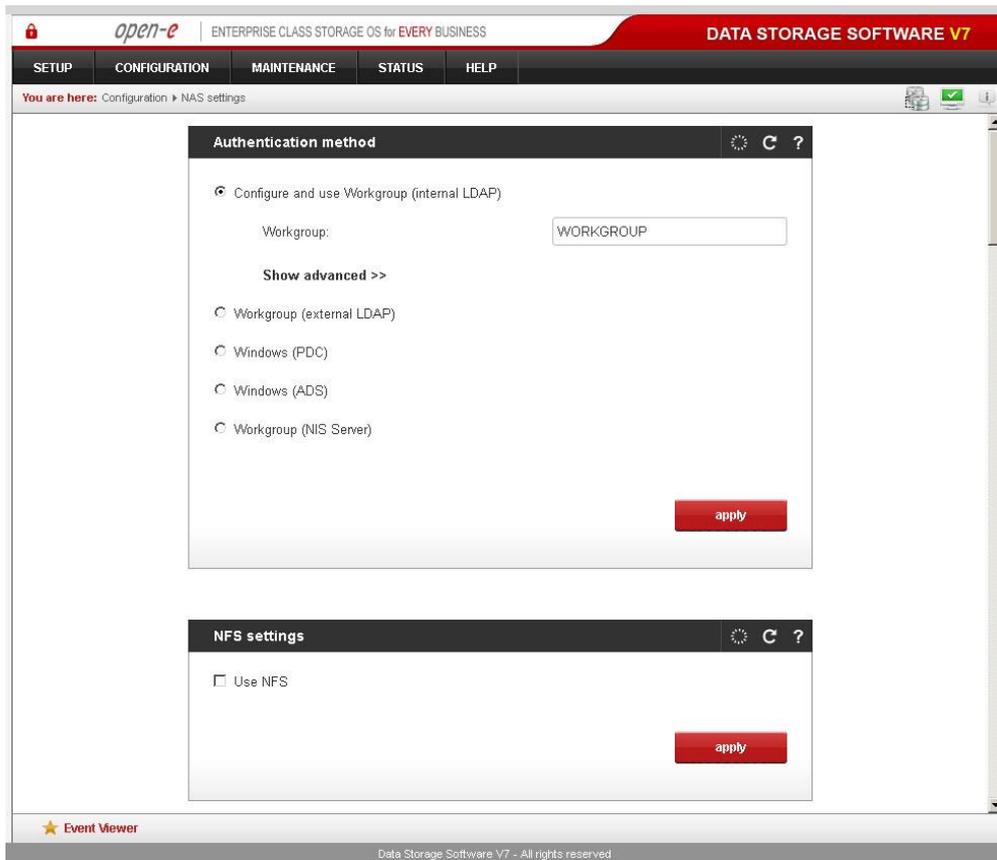
Time select

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

Interval

Select the interval to 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:

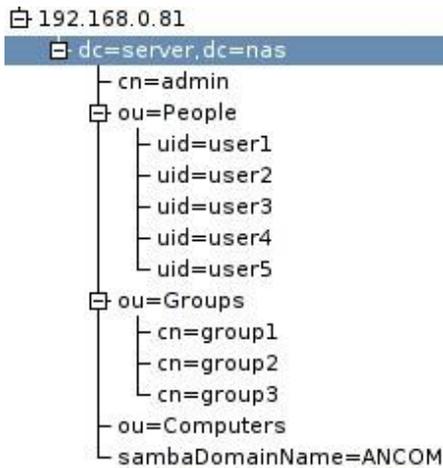
Workgroup (internal LDAP)

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 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 and later) ADS servers:

- Please choose Identity Mapping (IDMAP) backend which is used to map between Windows user and group names and their corresponding local system user identifiers (UIDs) and group identifiers (GIDs):
 - TDB (trivial database) - doesn't include a feature to ensure that Windows user/group is assigned the same UID / GID on different hosts. This limitation can lead to inconsistencies (e.g. ACL settings) because different hosts can map different UIDs / GIDs.
 - RID (relative identifier) - generates unique UIDs and GIDs based on the Relative Identifier (RID) part of a Windows SID. Provides the same mapping of UIDs and GIDs on different hosts.
- Please enter the realm name of your Windows 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. Realm name is the same as the domain name,
- The server IP address must be taken from the same system as the realm name,
- Enter the administrator login and password,
- Choose if you want to keep all existing users (UIDs) and groups (GIDs) information or erase them and replace with new ones.

Please note that when using TDB backend and Access Control Lists (ACL) cleaning operation may change users identifiers and in results their file system rights. Changing backend from TDB to RID or from RID to TDB always requires cleaning database. All operations resulting in changing users identifiers should be followed by reset and new configuration of Access Control Lists (ACL).

- Click **Apply** to connect to the Windows (ADS) domain.

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

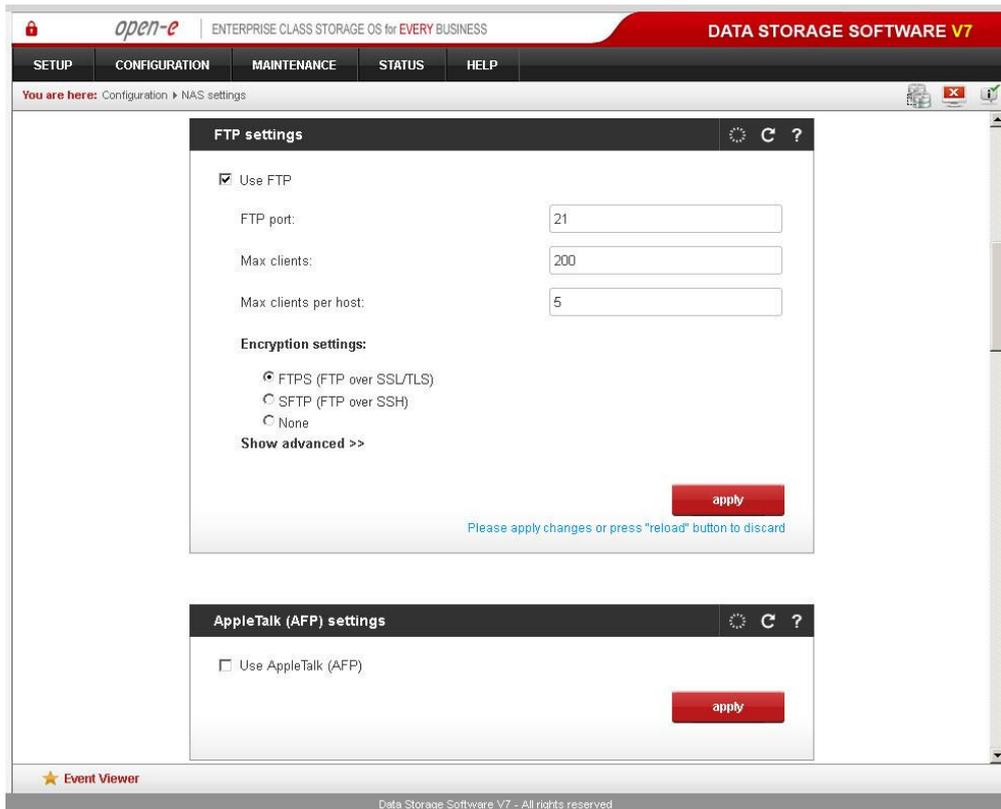
1. Workgroup name cannot begin/end with space and cannot contain special characters such as: ~!@#\$\$%^&()+[]{}*;"',:;%|<>?/\='`
2. When changing the authentication method you run the risk of losing ACLs (Access Control Lists). In this case please set user/group access rights for every share and reset 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)
- IgloFTP (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. Next, proceed to 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 use 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, your user does not have access to those shares and the folder 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 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 a 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 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 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 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

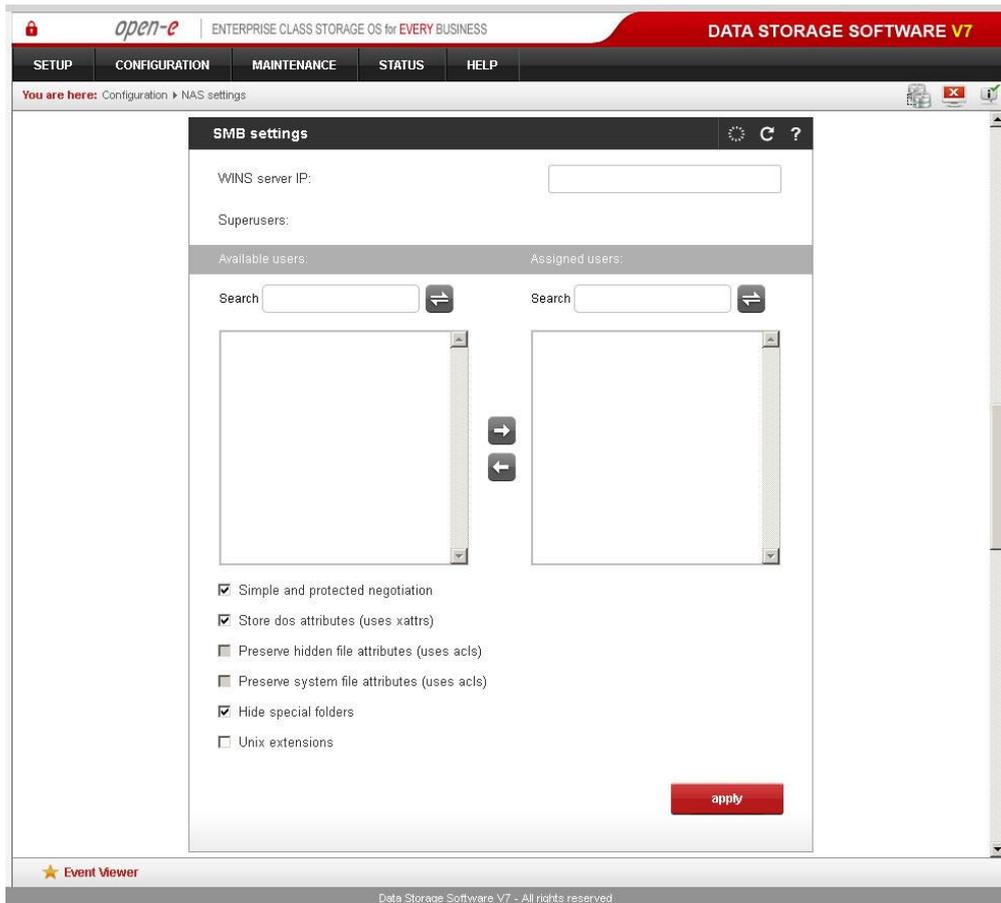
There are many more combinations possible. You can find additional information about IP calculation on the Internet.

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's 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 belonging 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 modifying, removing and adding 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. **Please note:** This also prevents users from creating files and folders with the same names (e.g., it will be impossible to create a file called "Network Trash Folder").

MAC OS/OSX system files:

1. `..DS_Store(:2eDS_Store)`,
2. `.AppleDouble`,
3. `Temporary Items`,
4. `Network Trash Folder`,
5. `TheFindByContentFolder`,
6. `TheVolumeSettingsFolder`,
7. `.AppleDesktop`,
8. `.AppleDB`,
9. `Icon?`
10. `.Volumelcon.icns(:2eVolumelcon.icns)`,
11. `.FBCIndex(:2eFBCIndex)`,
12. `.FBCLockFolder(:2eFBCLockFolder)`,
13. `desktop.ini`,
14. `RECYCLER`.

Unix extensions

This option controls whether Samba implements the CIFS UNIX extensions, as defined by HP. These extensions enable Samba to better serve UNIX CIFS clients by supporting features such as symbolic links, hard links, etc... These extensions require a similarly enabled client and are of no current use to Windows clients.

NOTE Changes to the ACLs and/or xattrs settings need to be confirmed, 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 and no files are 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. This also needs to be accepted by users; the acceptance prompt will only appear if 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.

The screenshot shows the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The main content area is divided into two sections:

UID & GID Synchronization

- Synchronize UID and GID database with NIS server
- NIS server domainname:
- NIS server IP:
- Synchronize interval:
-
- Please apply changes or press "reload" button to discard

HTTP share access setup

- Enable HTTP share browser
- Port:
- Allow access IP:
- Public access
- Password protected access
 - User name:
 - Password:
 - Retype password:
-

At the bottom left, there is an 'Event Viewer' icon. The footer contains the text 'Data Storage Software V7 - All rights reserved.'

Function: UID & GID synchronization

Synchronize UID and GID database with NIS server

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

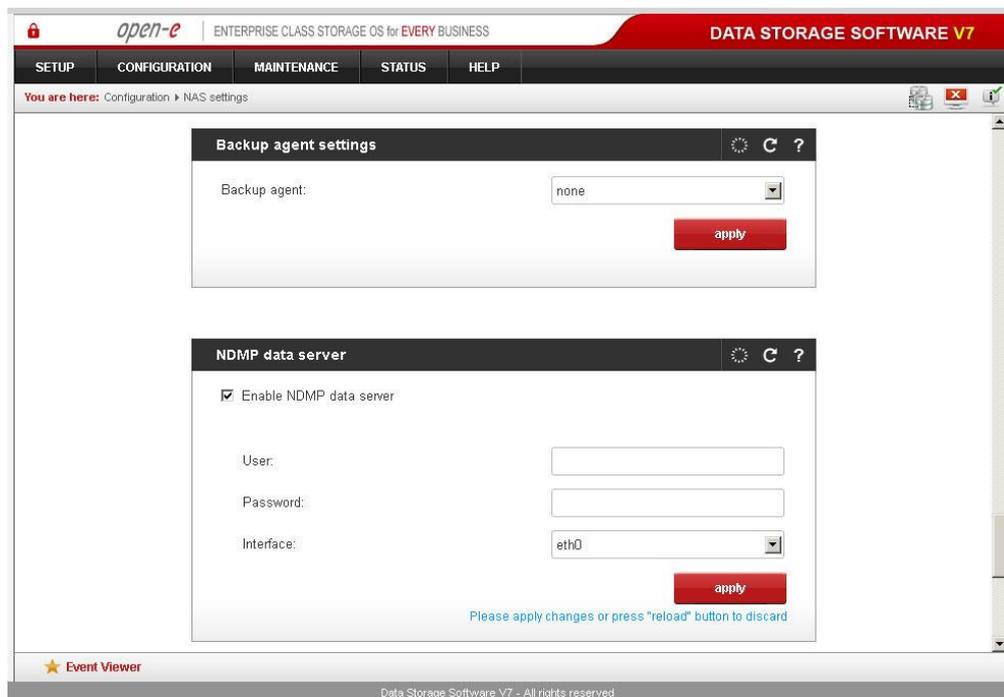
Password

User password.

Retype password

User password confirmation.

NOTE In order to access your share via a Web browser, you need to enable 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**

With this function you can enable one of the pre-installed backup agents (clients). Currently, Dantz - Retroclient and 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.

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 server 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 restore 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 12.5 and higher. 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.

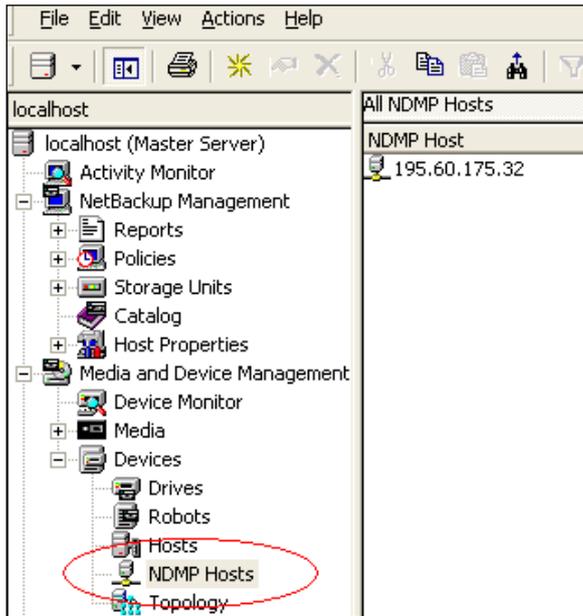
NOTE The built-in Symantec Backup Exec Agent for Linux requires you to purchase the product activation key which must be installed on your Backup Exec server. Please contact your vendor in order to purchase the Symantec product. Without the product activation key, the agent will be fully functional for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

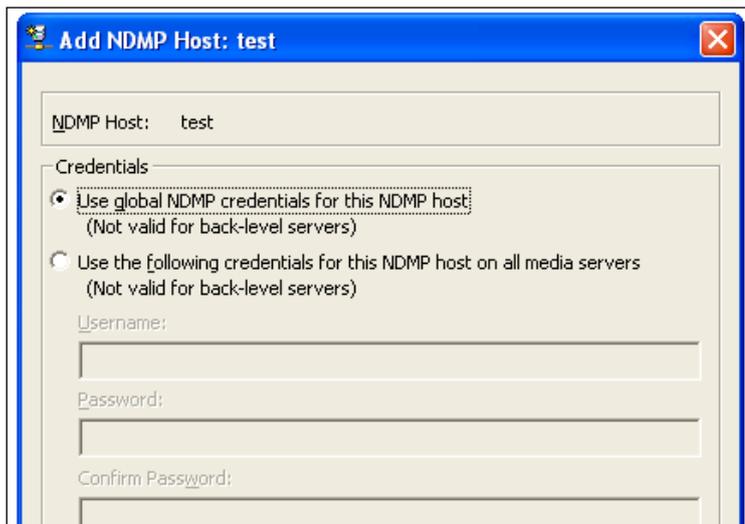
How to configure NDMP in NetBackup

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.

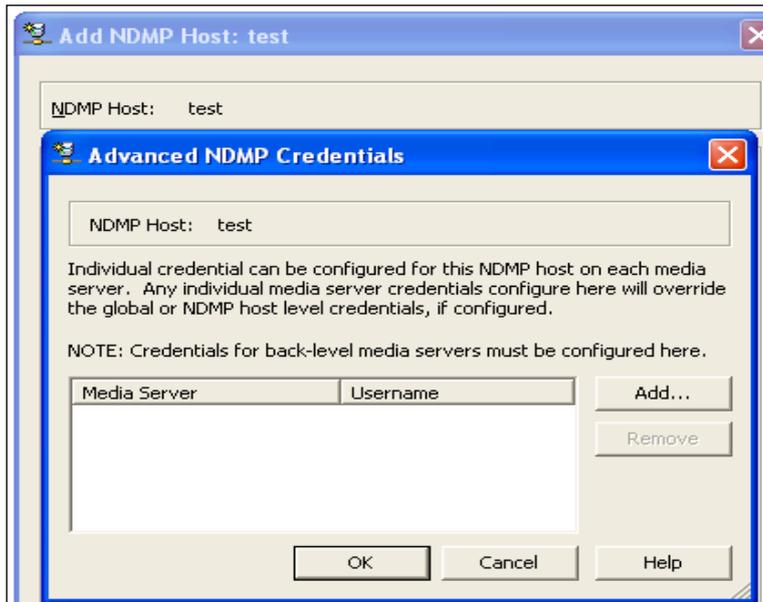


- To add an NDMP host, select **Actions** → **New** → **New NDMP Host**. Specify the NDMP host name. After that, the new NDMP Host dialog appears.



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 by 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 and 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
--------------	----------------	----------------------	-----------------

Robot 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

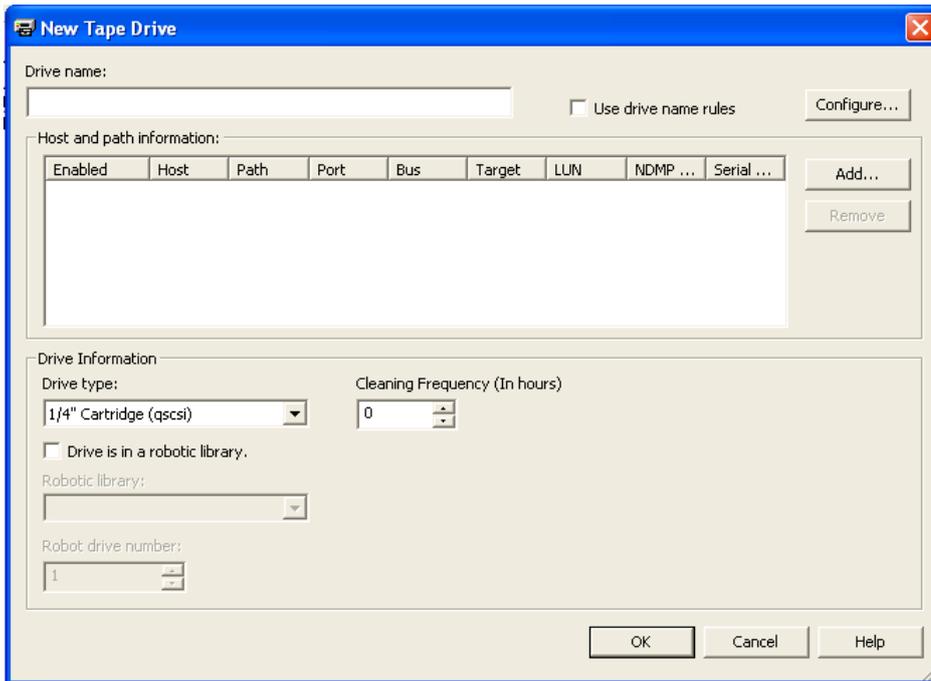
Type of Robot Control	Media Manager Robot Type	Supported Media Server	Platform Information Required for Configuration
Local	TLH	Local UNIX (except HPIA64, AIX, Linux and Linux64) and Windows	Library name
Local	TLH	AIX	LMCP device file
Local	TSH	AIX, Solaris, Linux, and Linux64	Robotic device file
Remote	ACS	All except HPIA64 and Linux64	ACSLs 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 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

Manufacturer	Media type	NetBackup default drive type
	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
	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 the Media Manager.
- The host platform, robot type, and drive support drive cleaning.

If a drive is in the 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 placed on the corner of the drive serial number and the 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 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 in 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.

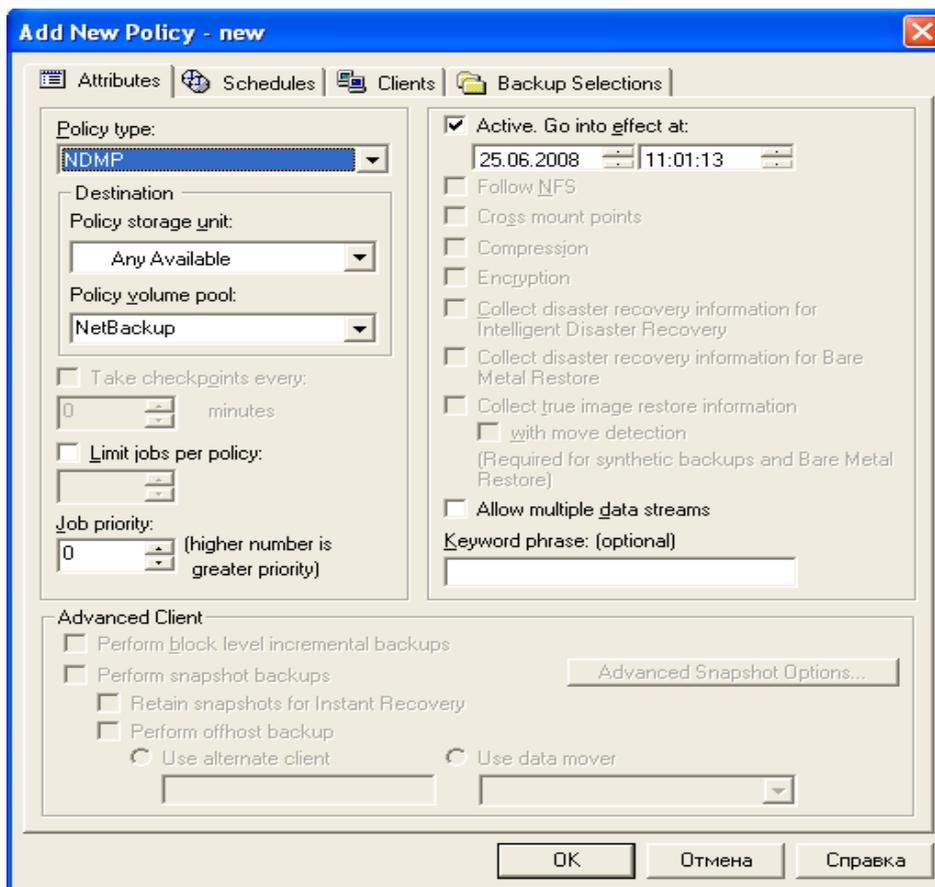
From the list of wizards in the Details pane, click Create a Backup Policy.

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:

- 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).

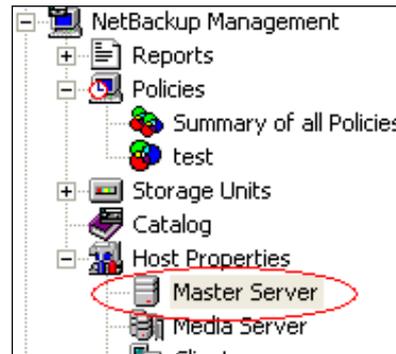
You can specify any of the following backup types in a schedule for an NDMP policy:

- Full
- Cumulative Incremental
- Differential Incremental

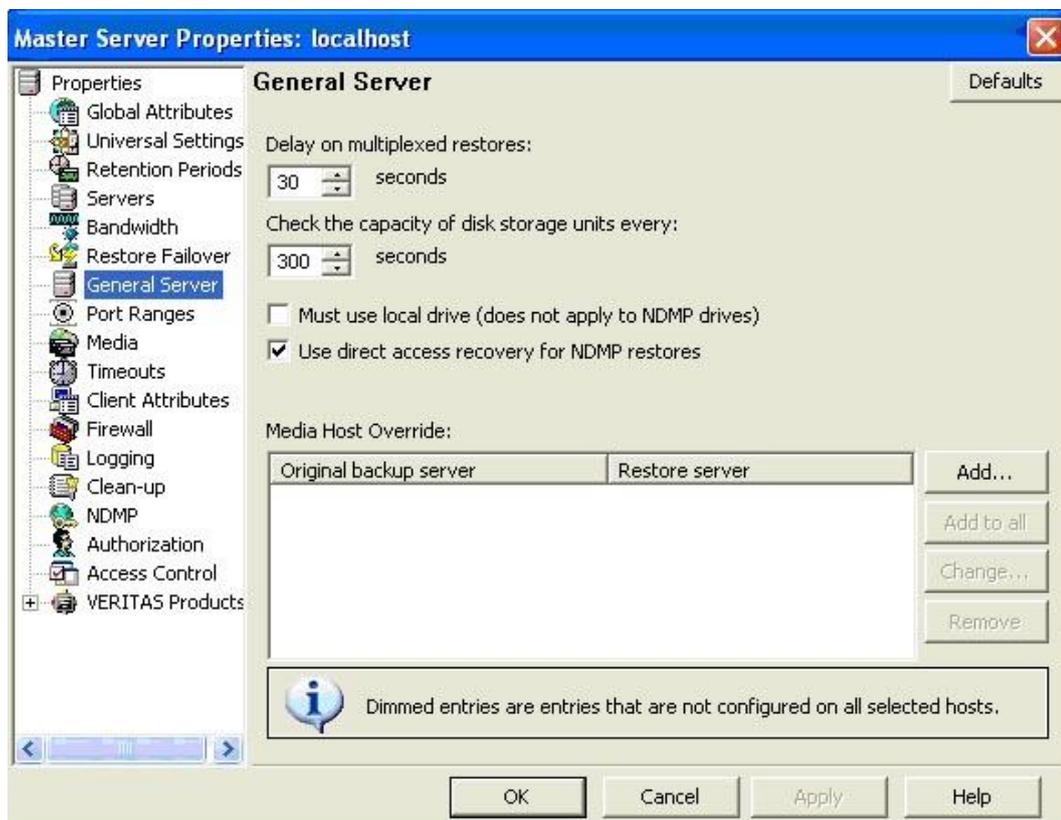
Specify Override policy storage unit only if this client of NetBackup (the NDMP host) has more than one storage unit and you want to use a specific storage unit for this schedule. In this case, the client must be the only client in this NDMP policy.

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. If desired, DAR can be turned off. This may be necessary if you are having problems with DAR and your NDMP host is an older machine or is not running on 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 the “General Server”. Uncheck the Use direct access recovery for NDMP restores box, and click Apply. This disables DAR on all NDMP restores.

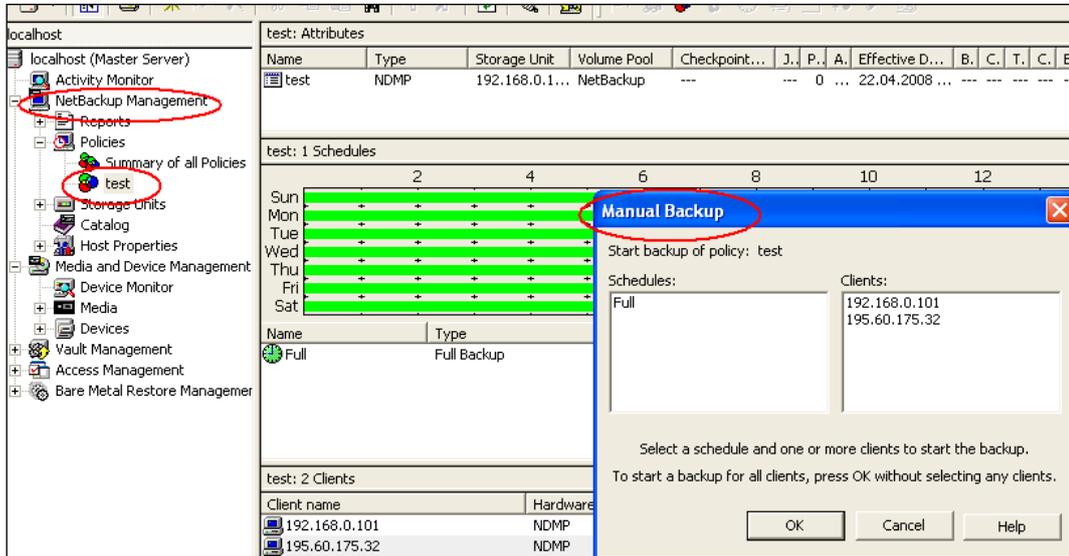
Backup process

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.



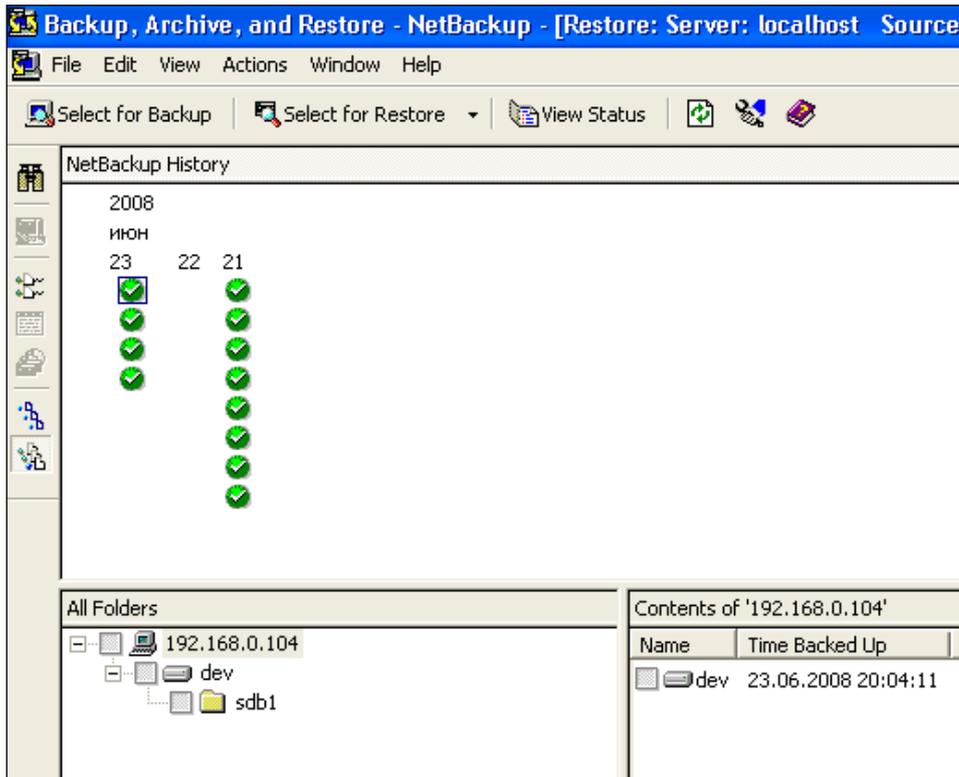
In the Manual Backup dialog select a schedule, then select the clients (NDMP hosts) that you want to back up. If you do not select any schedules, NetBackup uses the schedule with the highest retention level. If you do not select any clients, NetBackup backs up all configured ones.

NDMP hosts. Click OK to start the backup.

Restoration process

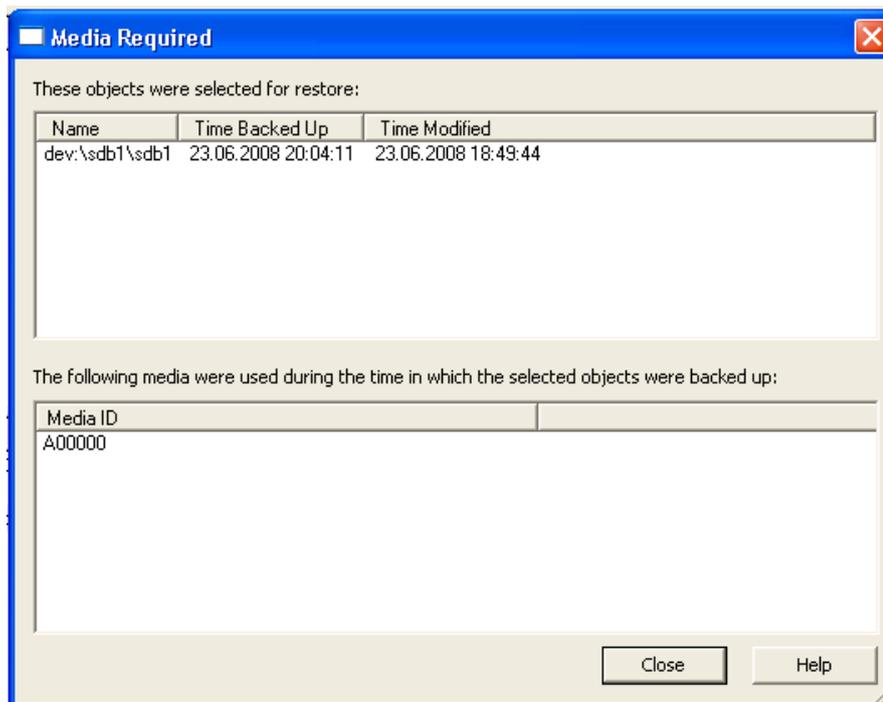
The administrator can use the Backup, Archive, and Restore interface on a NetBackup server (master or media server) to restore files to the NDMP host from which they were backed up, or to a different NDMP host. On the File menu, click Select Files and Folders to Restore, then click either from Normal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

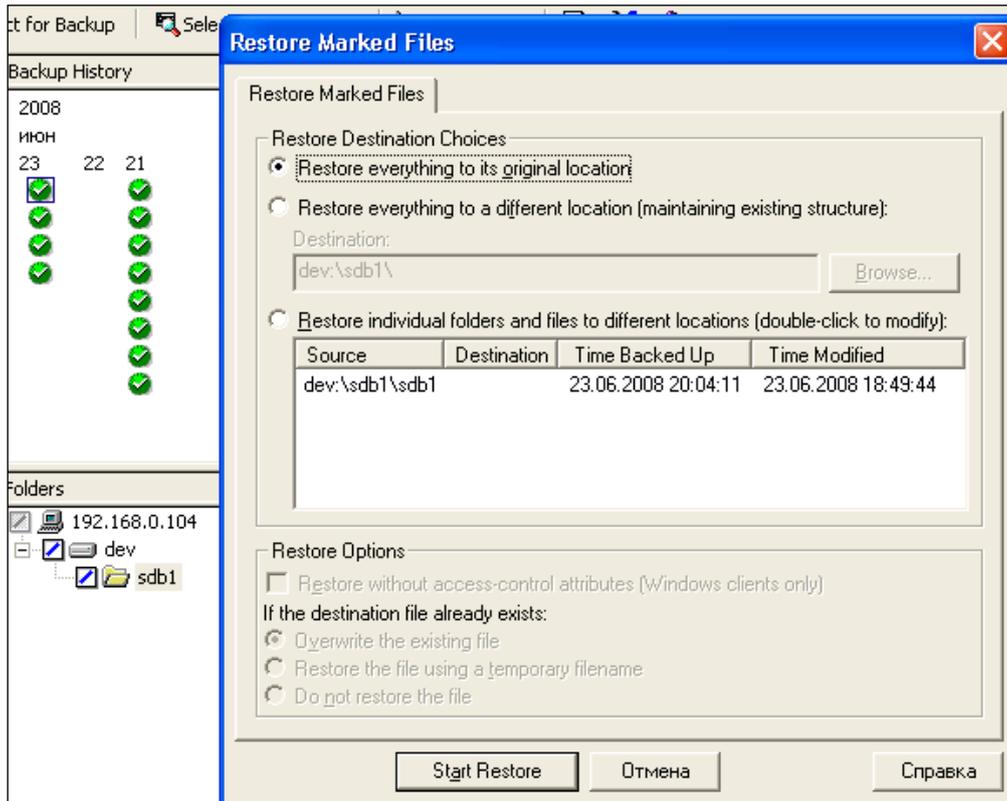


To select an item, click in the check box that is left of the item. A check mark indicates an item is selected; a diagonal slash mark indicates that only some items within a folder are selected. You can select items in the All Folders pane or the Contents pane.

To preview a list of the media required to restore, select Actions → Preview Media. If the backup images required restoring the data on storage disk 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 restoration are listed in the dialog window.

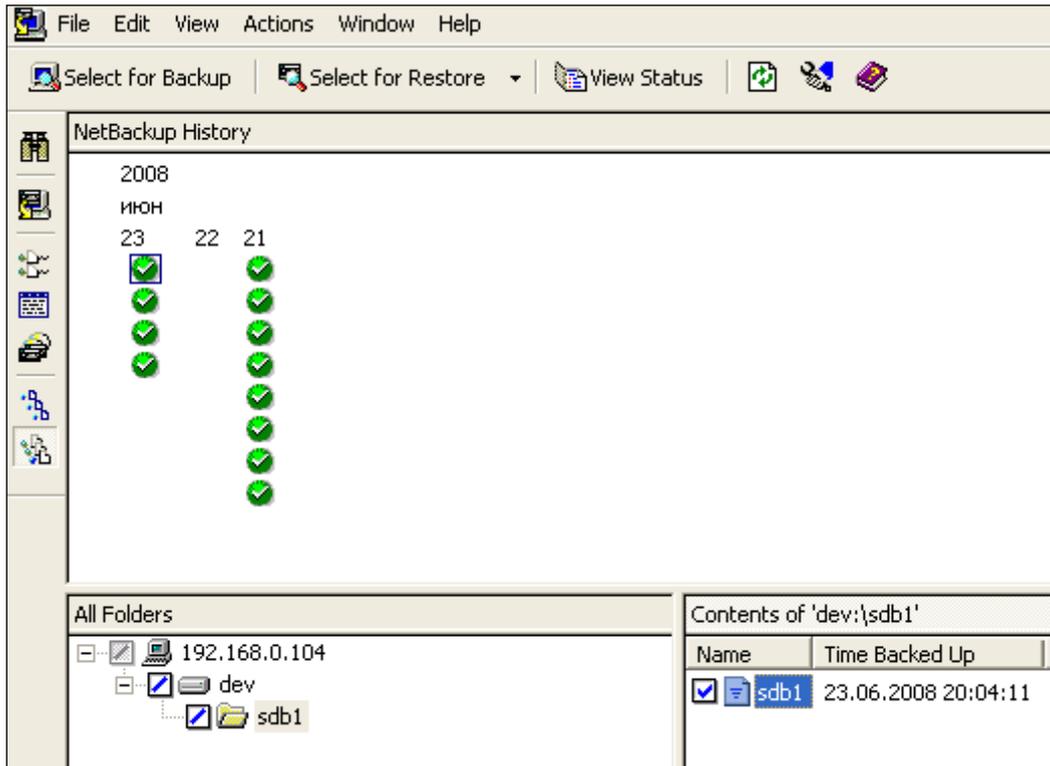


Specify restore parameters and press Start Restore. A dialog appears, indicating that the restore began successfully and asks if you want to view the progress of the operation.

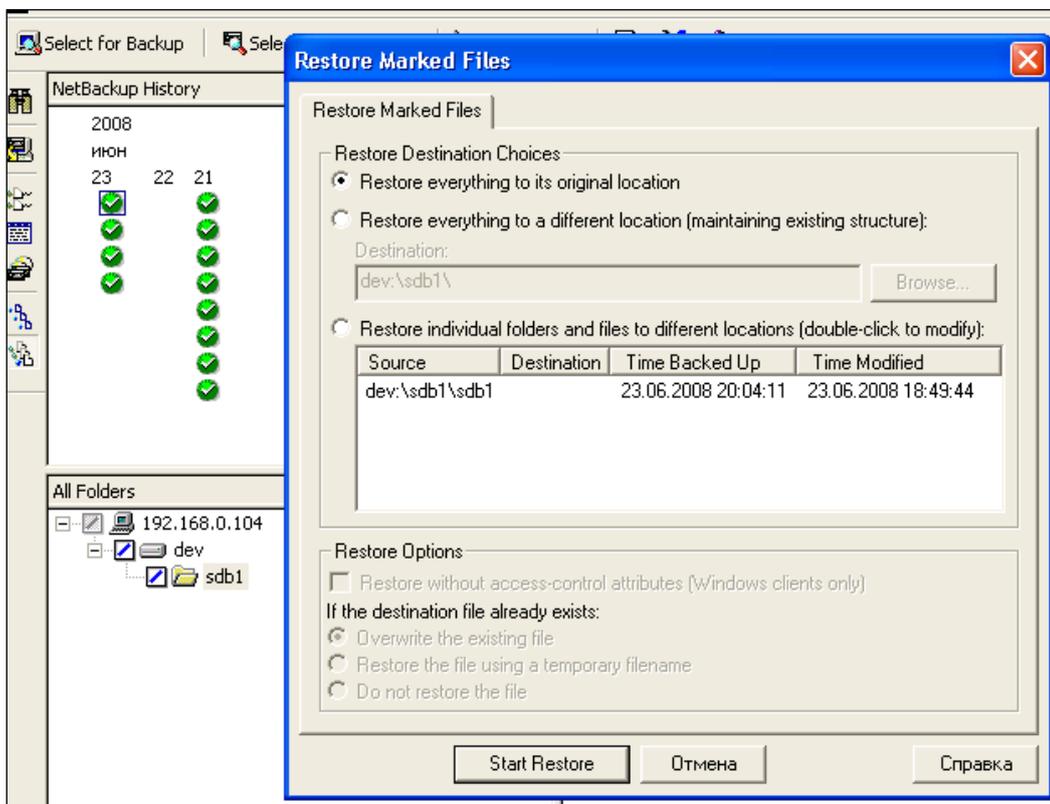
To view the status of the restore, click Yes in the dialog. The View Status dialog appears, from which you can view the progress of the restore. The restore may take a few minutes to complete. After starting a restore operation, you can close Backup, Archive, and Restore and perform other tasks on your computer. NetBackup will continue the restoration 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. Next, in order 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 must 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 shown 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 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|
```

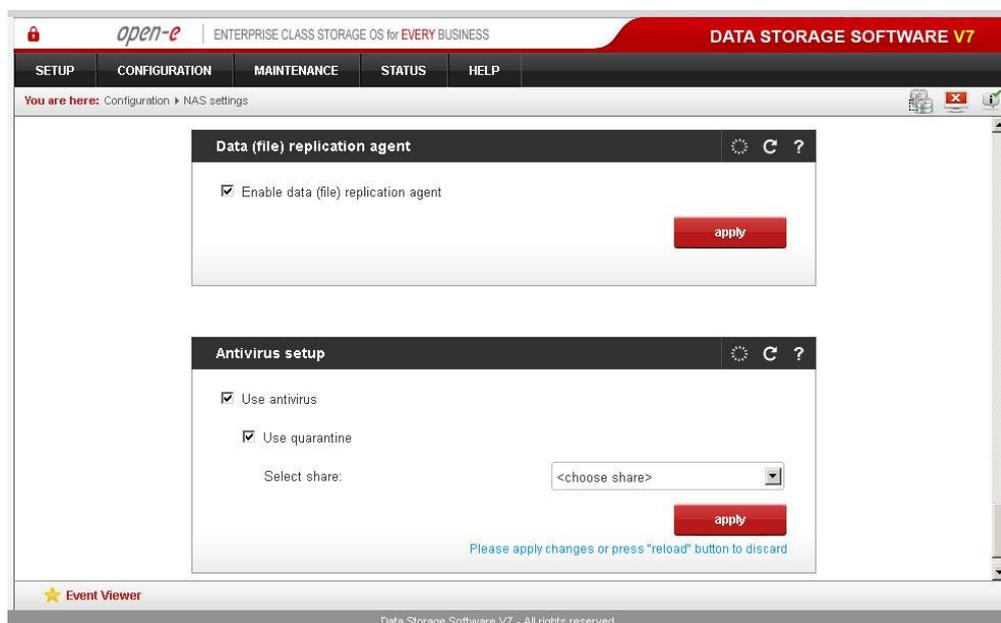
Description:

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,
- executable 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 overall system performance.

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 V7 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 data on the Open-E Data Storage Software V7 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 DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'You are here: Configuration > NAS resources > Shares'. The left sidebar contains a tree view with 'Shares', 'Users', and 'Groups' sections. The main content area is titled 'Create new share' and contains the following fields:

- Name:** Projects
- Comment:** Company Data, Photos, etc.
- Default path:** /lv0000/Projects (checked)
- Specified path:** /

An 'apply' button is located below the path selection. A note below the button reads: 'Please apply changes or press "reload" button to discard'. Below the 'Create new share' form is the 'ACL (Access control list)' section, which includes tabs for 'Browser', 'Users & Groups', and 'Access Permissions'. The 'Browser' tab is active, showing a 'Selection:' field, a 'Filter:' field, and a list of volumes including 'lv0000'.

NOTE Please do not use spaces and special characters 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 with a given name.

Selection

Shows where you are in the browser directory.

Users & Groups

Available Users & Groups

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

Selected Users & Groups

List of selected users and groups that 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 and the permission to execute).

In order to assign ACL permissions:

- select a 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 only directory A 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 directory A. Can enter subdirectory B, but no files will be 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.

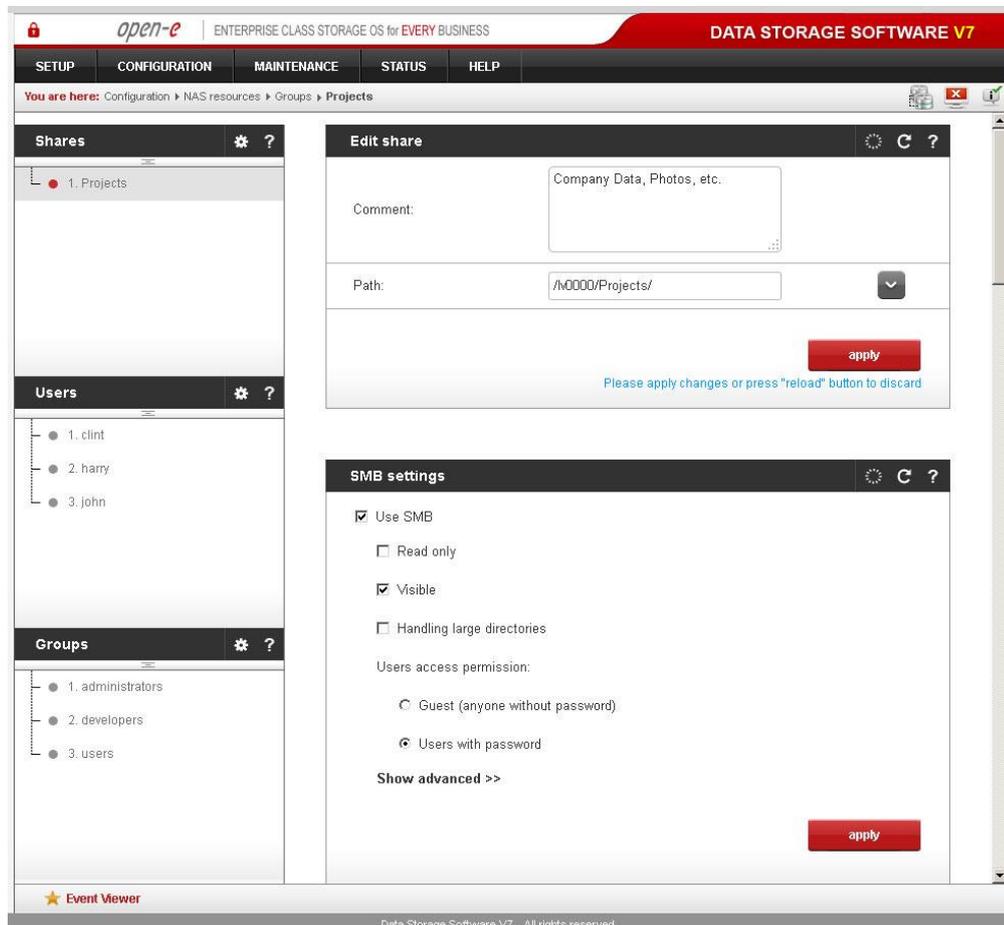
Assigned access permissions will be available under sFTP, FTP and SMB network protocols.

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 clicking on the  button.



The screenshot displays the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail shows 'You are here: Configuration > NAS resources > Groups > Projects'. The left sidebar contains three sections: 'Shares' with a list containing '1. Projects', 'Users' with a list containing '1. clint', '2. harry', and '3. john', and 'Groups' with a list containing '1. administrators', '2. developers', and '3. users'. The main content area is split into two panels. The top panel, 'Edit share', has a 'Comment' field with 'Company Data, Photos, etc.', a 'Path' field with '/M0000/Projects/' and a dropdown arrow, and an 'apply' button. Below it is a message: 'Please apply changes or press "reload" button to discard'. The bottom panel, 'SMB settings', has a 'Use SMB' checkbox (checked), a 'Read only' checkbox (unchecked), a 'Visible' checkbox (checked), and a 'Handling large directories' checkbox (unchecked). Under 'Users access permission', there are two radio buttons: 'Guest (anyone without password)' (unchecked) and 'Users with password' (checked). There is a 'Show advanced >>' link and an 'apply' button at the bottom right.

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 option below.

NOTE You will need to convert your existing file and directory names to lower or upper case before selecting this option, 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. A common scenario 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 when checked, ensures that if default acs exist on parent directories they are always honored when creating a new file or subdirectory (in these parent directories).

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 flexibly used by each user.

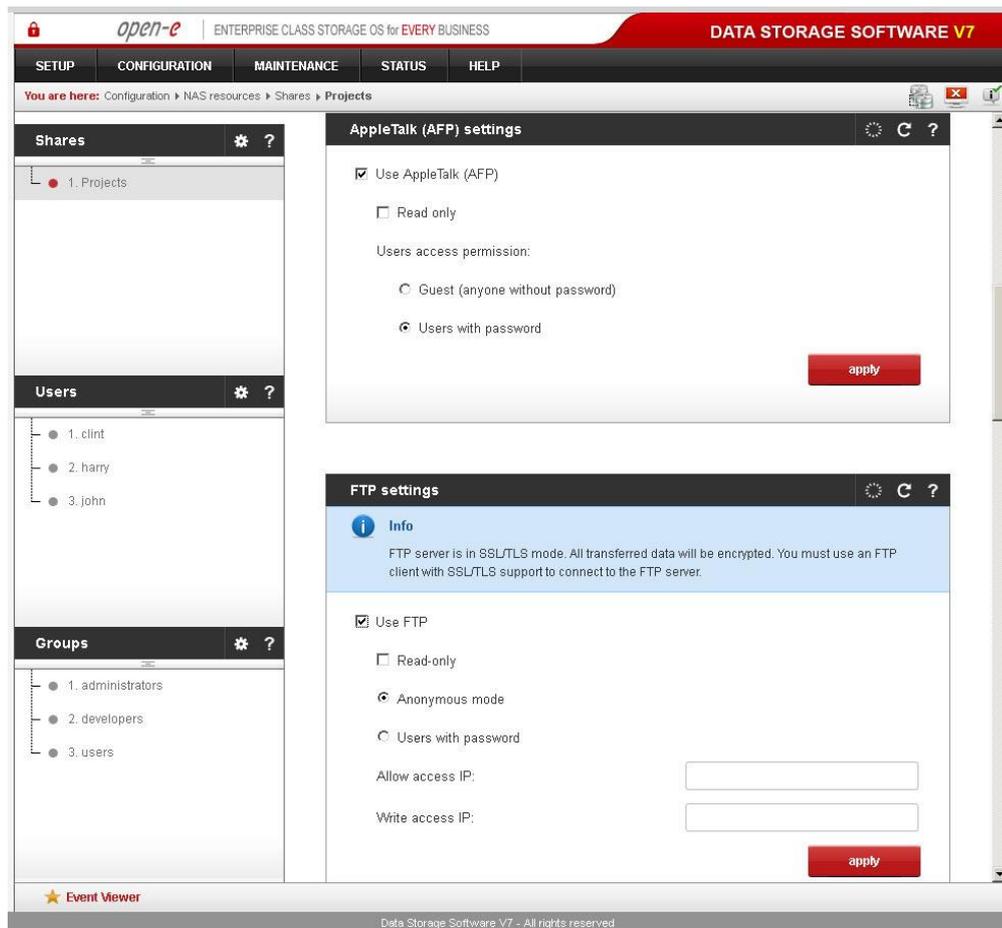
Map ACL inherit

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 the 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 a 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 an email address for the anonymous login password. Only a few FTP clients support SFTP(SSL/TLS).

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

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

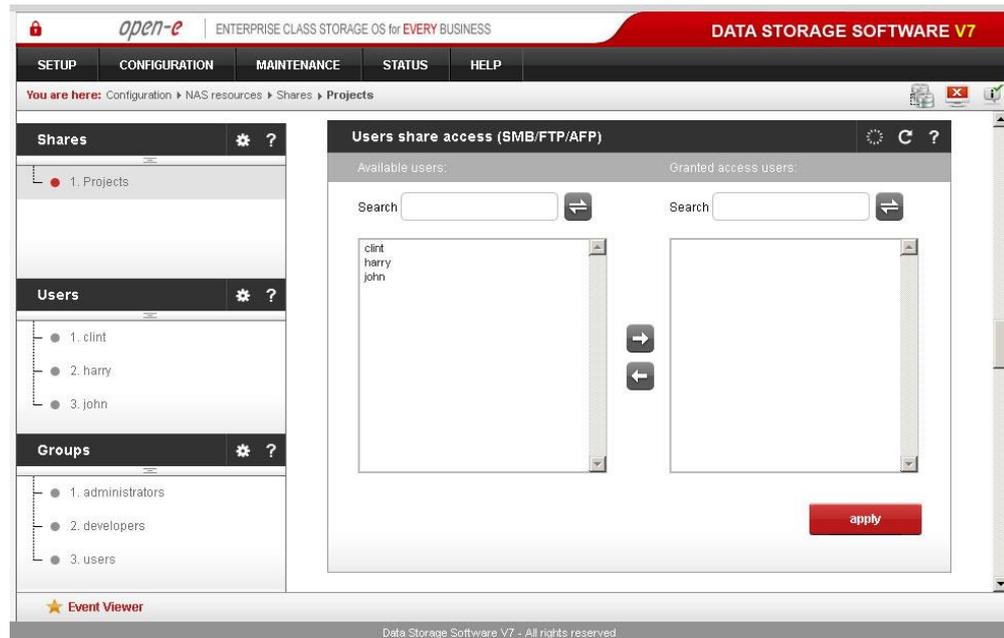
NOTE If the NAS server uses Windows domain authorization, the short domain name along with a plus sign must precede the username, e.g. `DOMAIN+Administrator`.

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 to set up the 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.

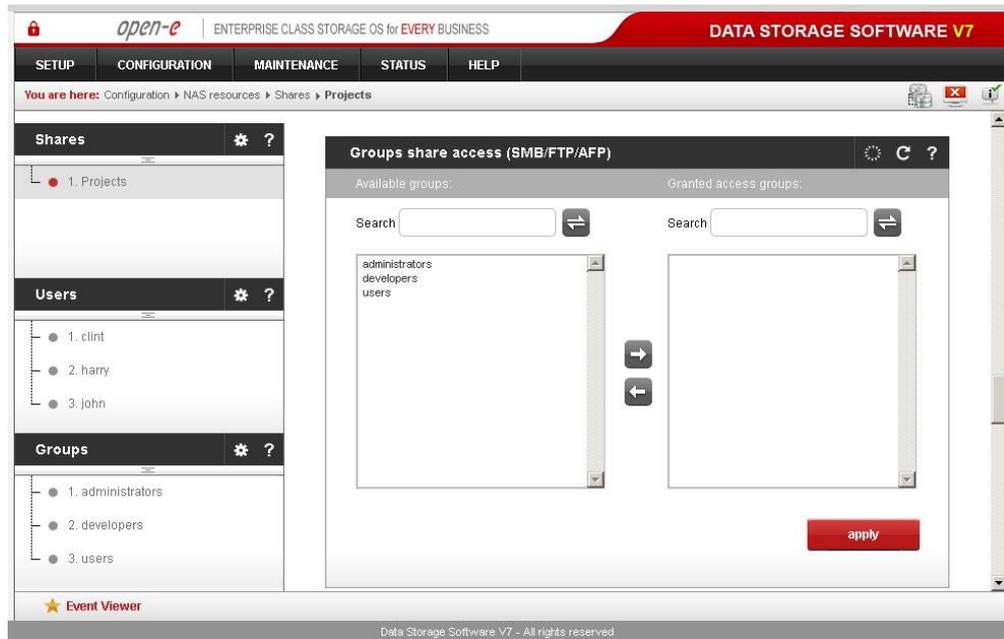


Function: Users share access (SMB/FTP/AFP)

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)

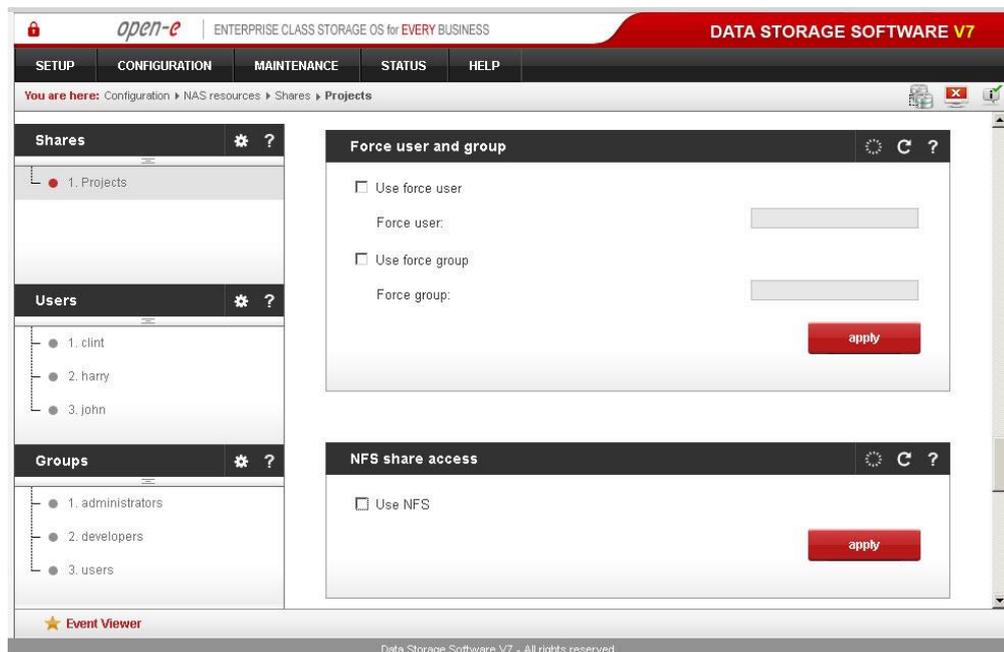
Here you can add groups which are granted access to this share.

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 allows 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 that 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 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 that were 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; therefore they will work incorrectly with secure locks. In this case, you can only lock world-readable files. If you have such clients, 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, 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, specified IPs will have write access and all computers in the subnet will have only read 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 a 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:

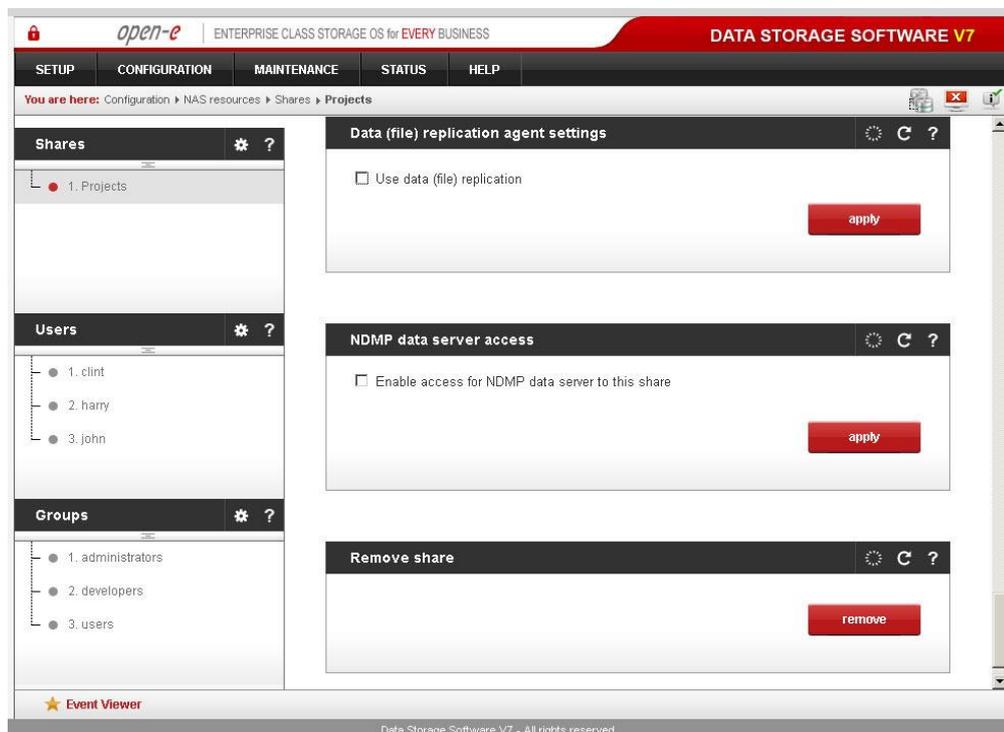
https://192.168.0.220:444

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, 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 the **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 then 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 a data entry mask for user accounts. In principal, the process is the same to when you create shares.

Function: Create new user

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

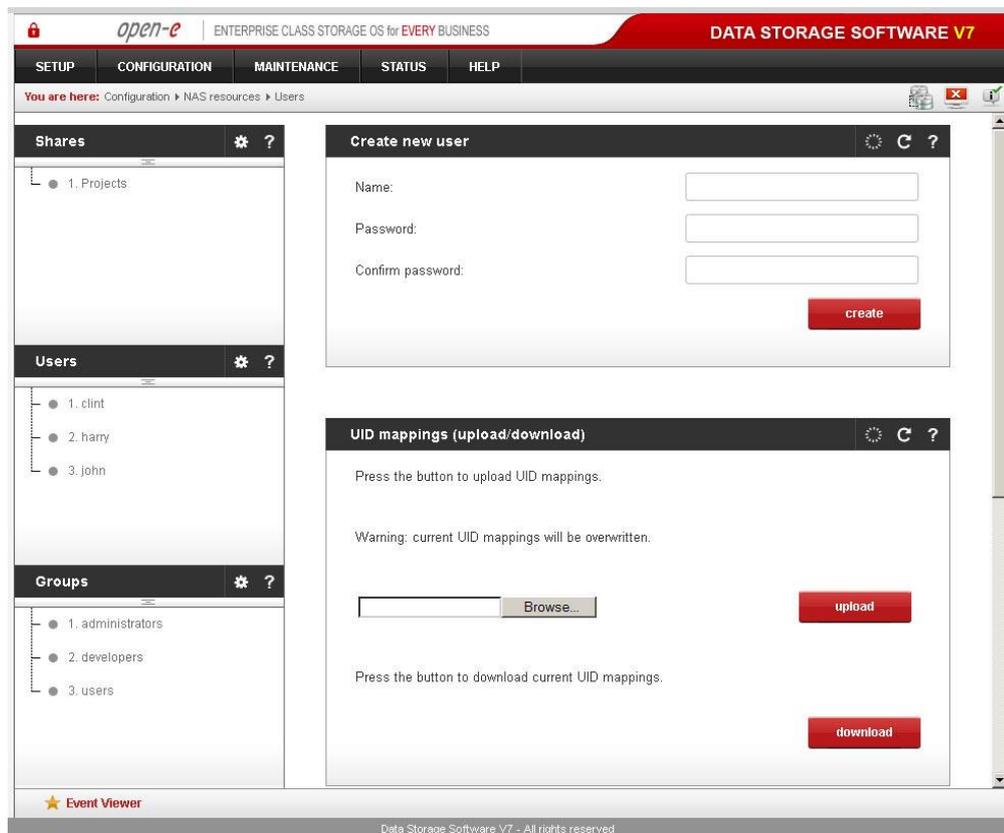
NOTE User name cannot:

- 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). 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 the Download button to download *uid_mappings.csv*.

Function: Quota for users (upload/download)

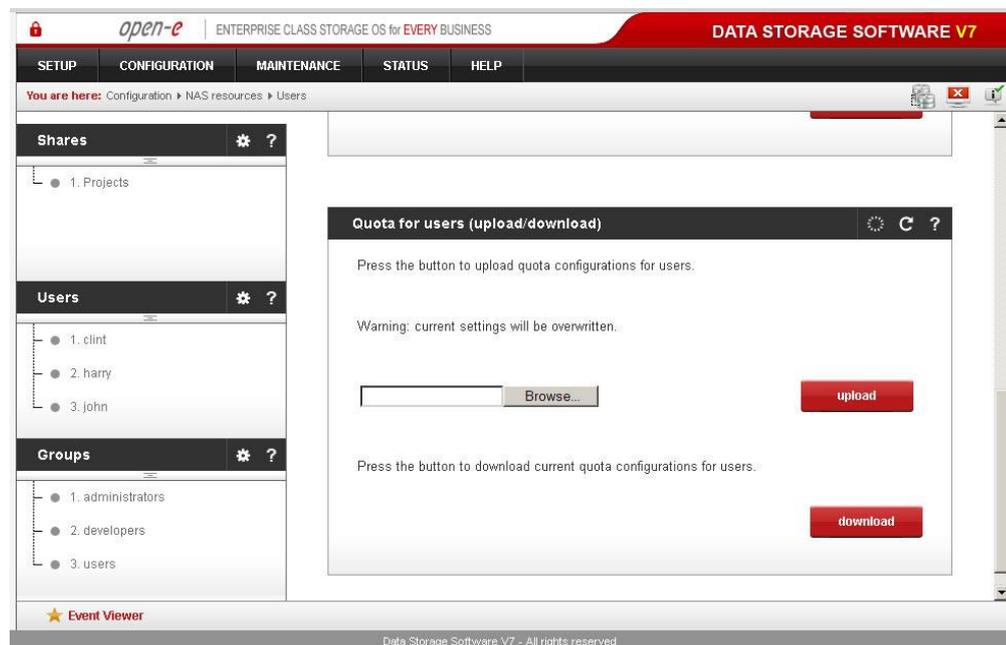
This function allows you to import and export user quota mappings.

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*

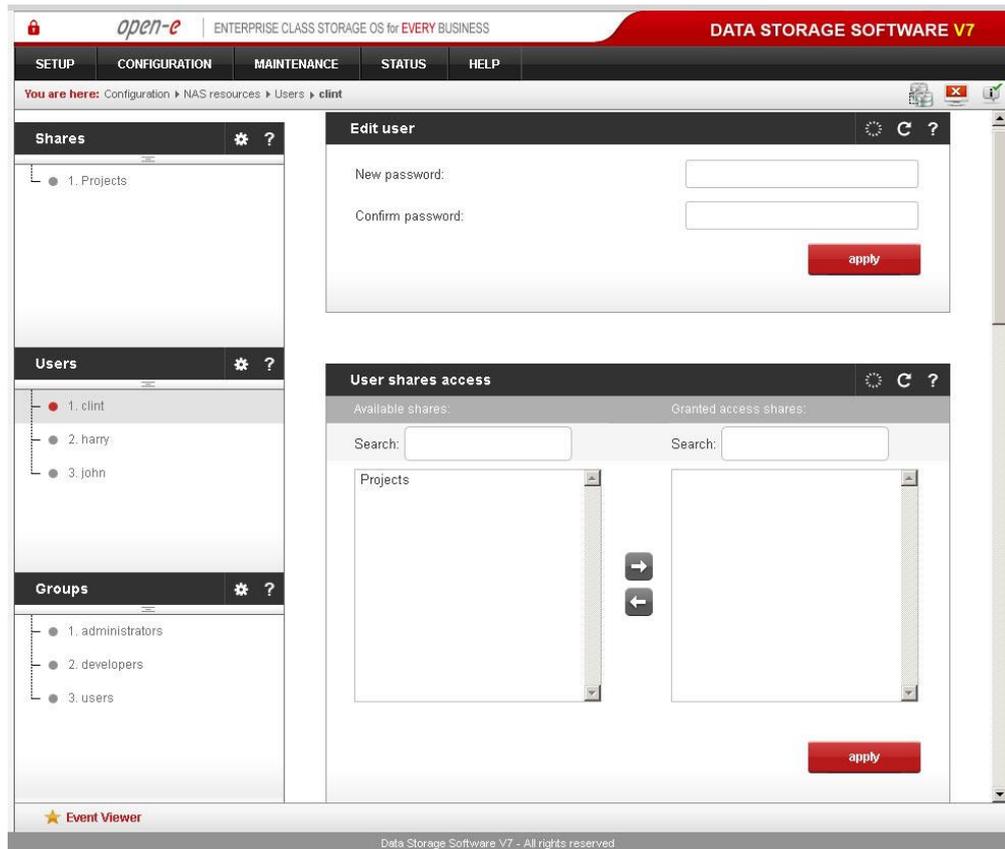
Next, by clicking on the name e.g. “john”, you will see all available functions helpful for setting the user:

**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 the  button. To remove user access to specified shares, select the users and then 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):

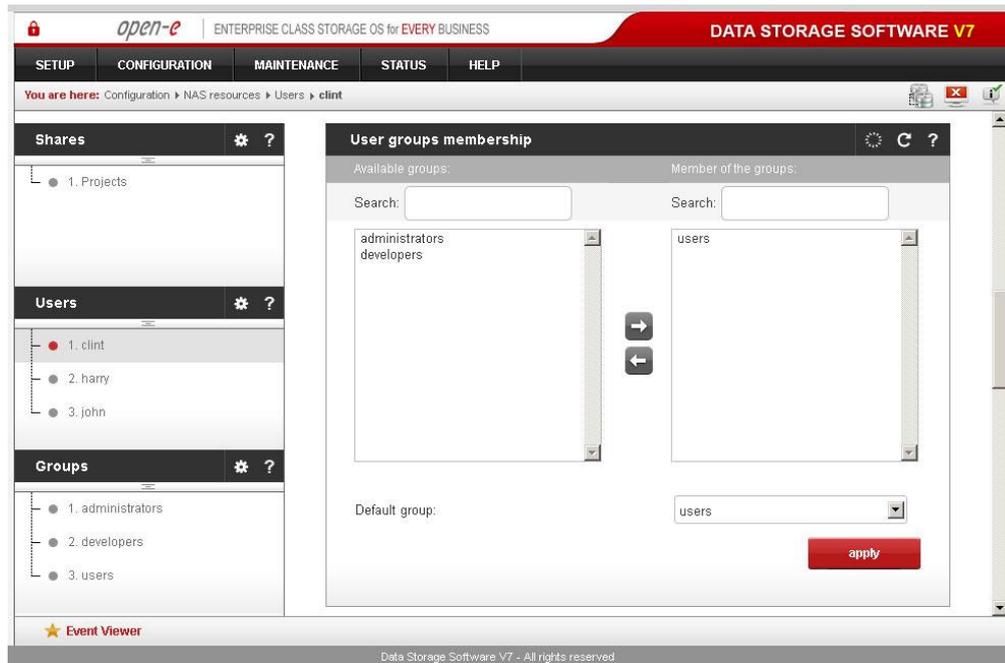
- Home: jump to the first,
- End: jump to the last,
- Shift + arrow key: multi-select,
- letter key: jump to the first position starting with pressed key.

Function: Users group membership

This function allows you to view and change user group memberships 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.

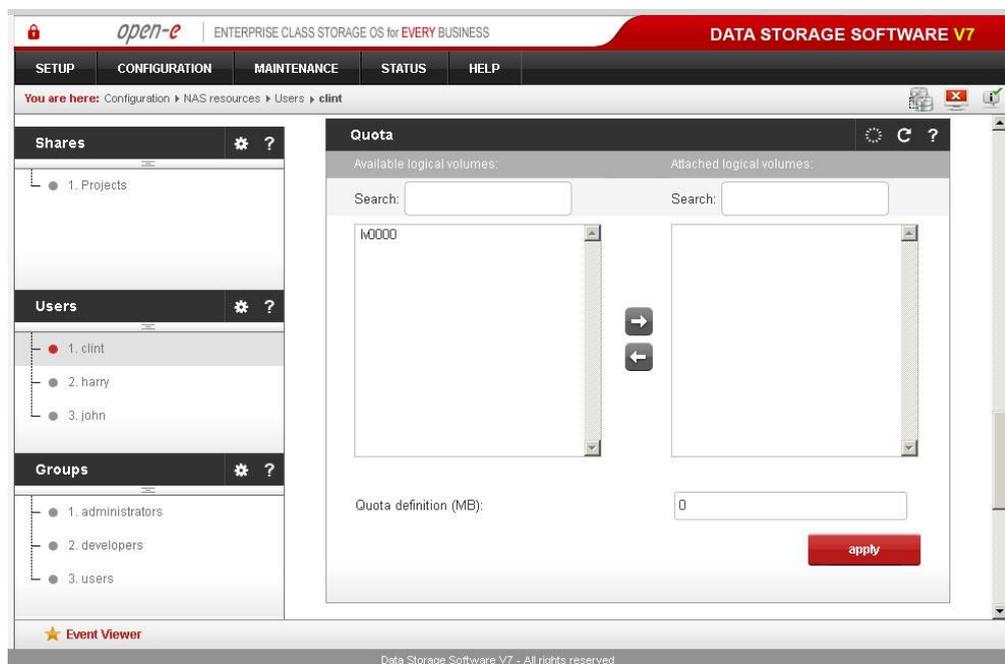


Function: Quota

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.

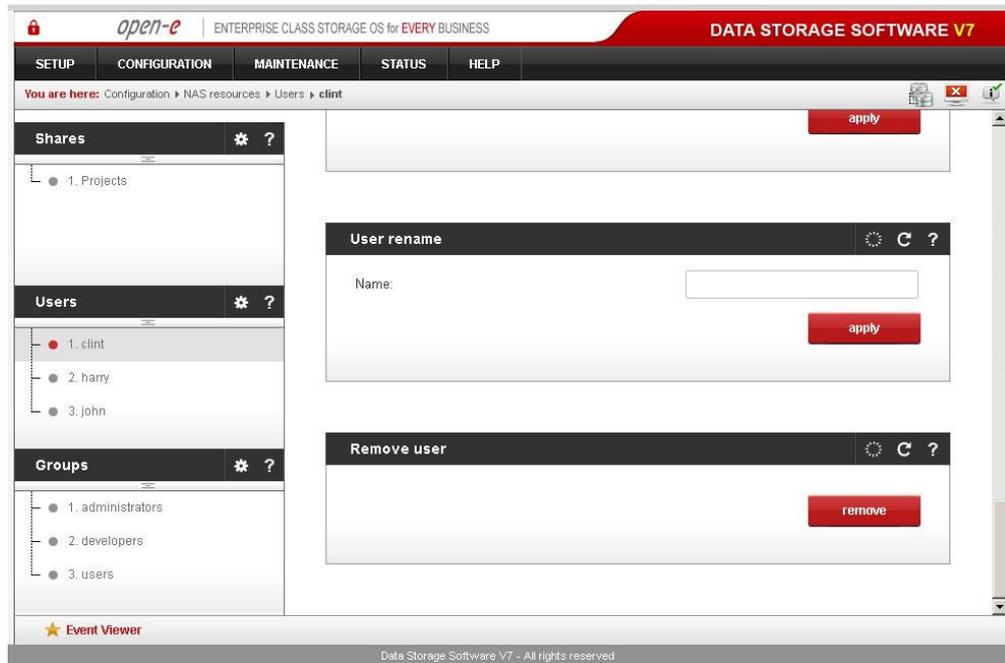
To remove any limitations for a user, you need to set their quota to 0.

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 the **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.

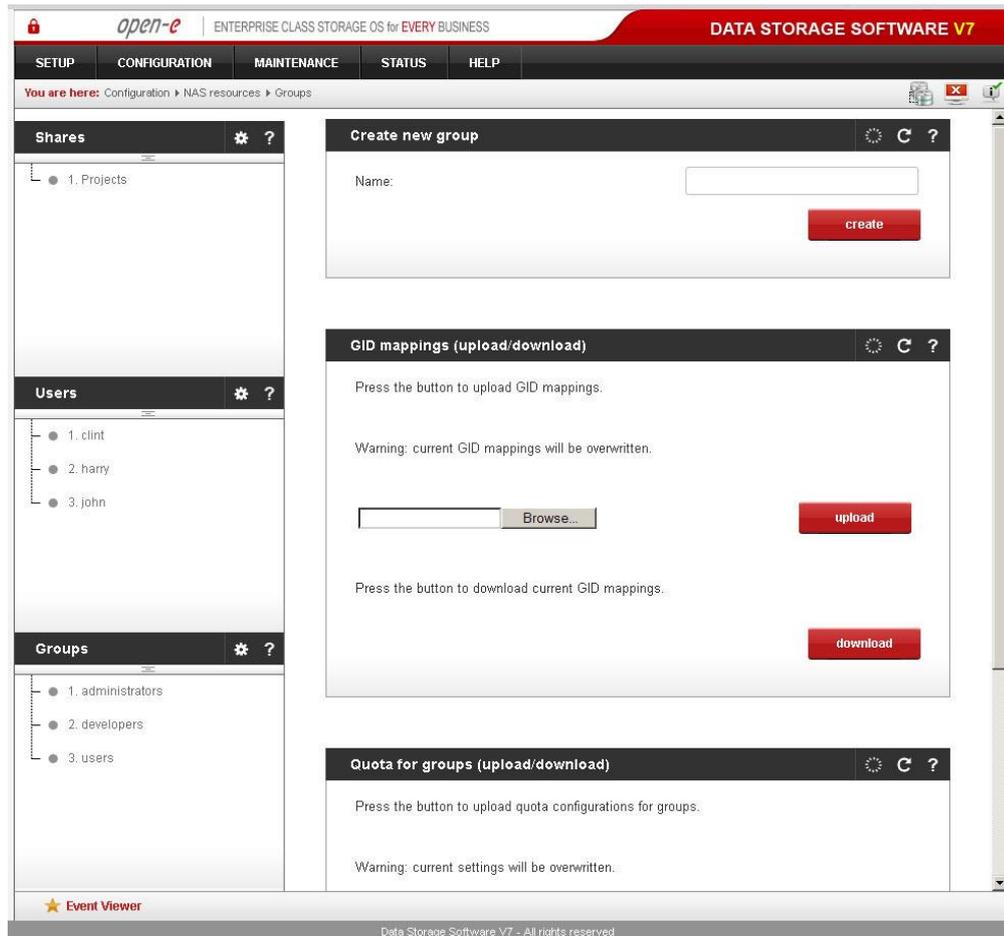
Function: GID mappings (upload/download)

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 allows 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).

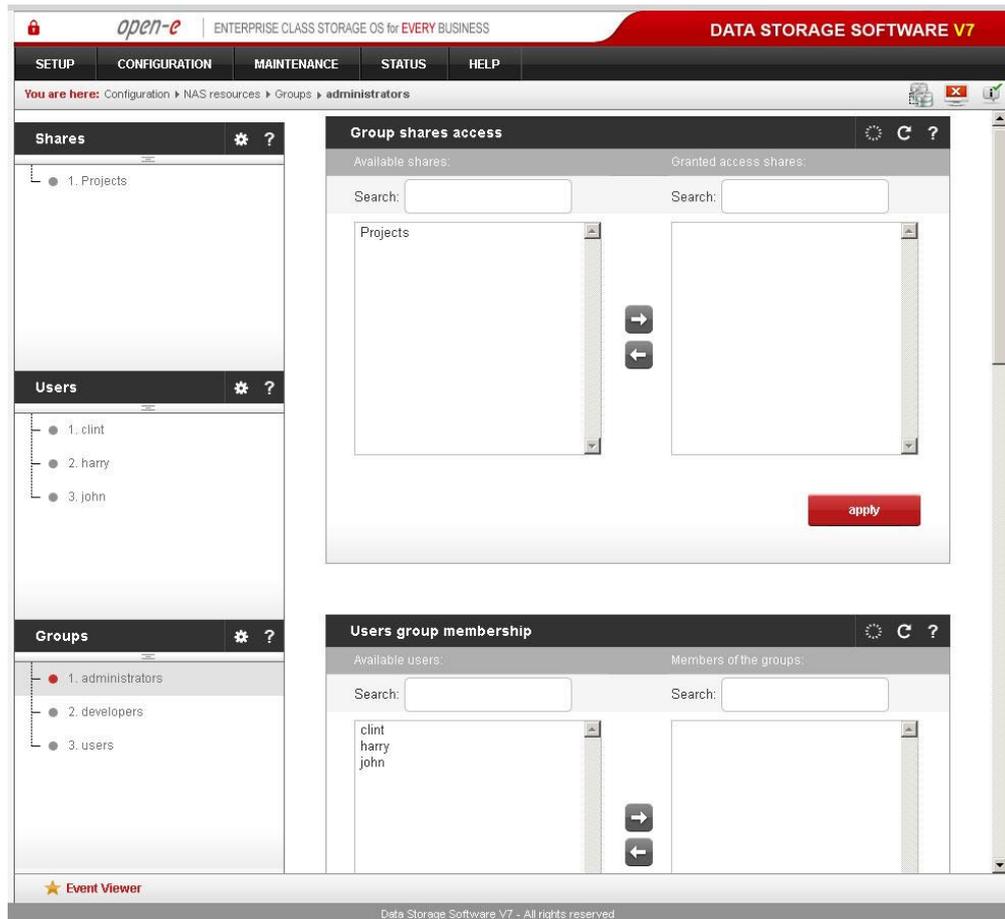
NOTE Warning: Current settings will be overwritten. Press Export to download `quota_groups_import.log`.

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):

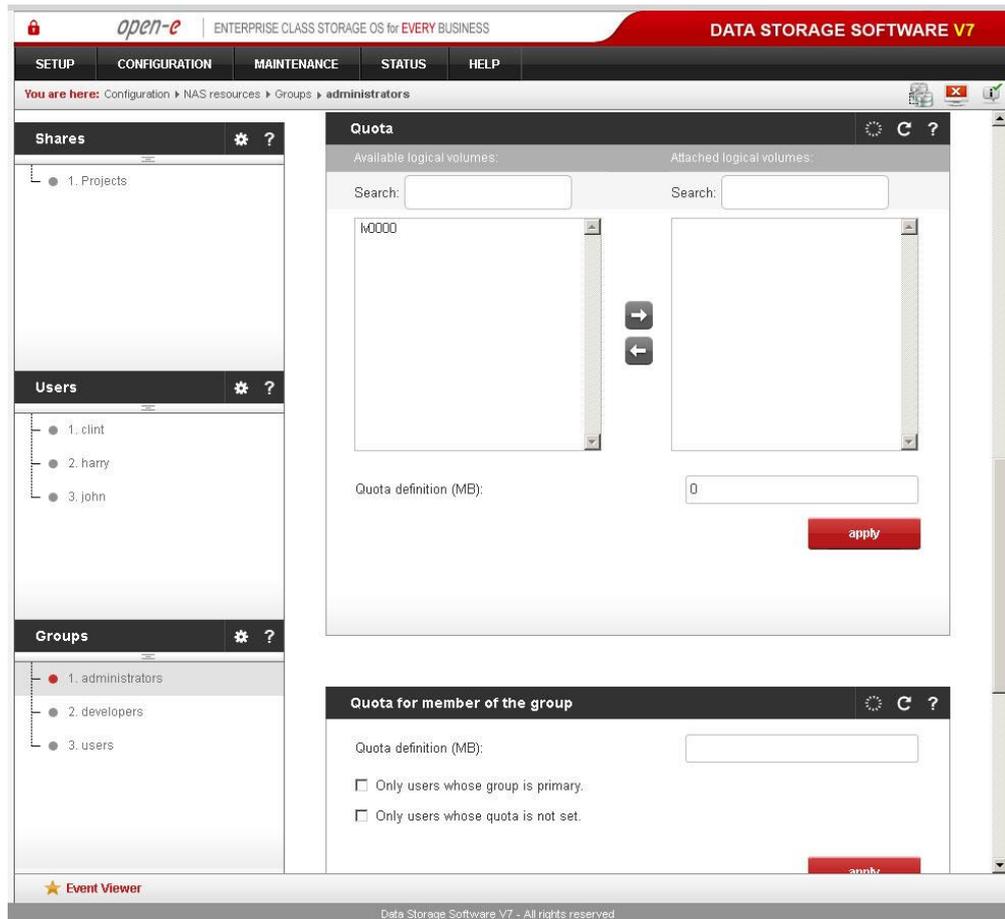
- Home: jump to the first entry,
- End: jump to the last entry,
- Shift + arrow key: multi-select,
- letter key: jump to the first entry starting with the pressed key.

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.

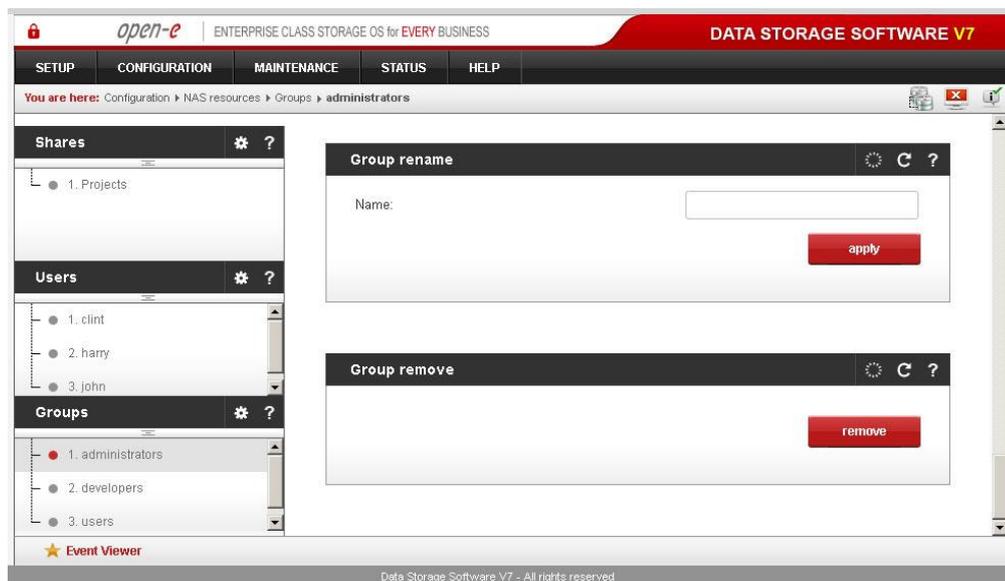
NOTE Max quota value per user/group is 2TB. All greater values will be limited to 2TB.



Function: Quota for member of the 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: Group rename

This option allows renaming an existing group.

Function: Group remove

Click the "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.

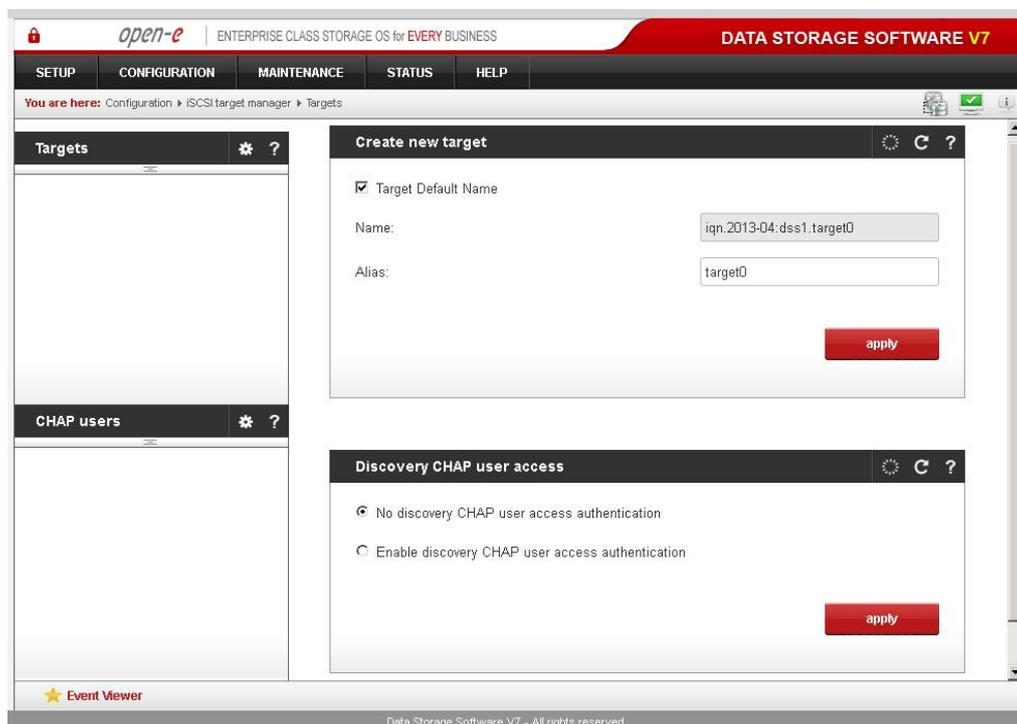
Alias

Alias is a name under which targets will be visible in the Target 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.

The screenshot displays the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'You are here: Configuration > iSCSI target manager > Targets > iqn.2013-04:dss1.target0 (target0)'. The main content area is divided into three sections:

- Targets:** A list showing 'target0'.
- Target volume manager:** Contains an 'Info' box with a warning about LUN 0, a table for 'Logical volumes attached to this target' (currently empty), and a table for 'Available logical volumes'. The available volumes table has columns: Volume, Type, SCSI ID, LUN, Access mode, and Action. One volume is listed: 'lv0000' with SCSI ID 'gHb9WkWm0CiEOJnD', LUN '0', and Access mode 'write-through'. An 'attach' button is next to it.
- CHAP user access authentication:** Two radio buttons: 'No CHAP user access authentication' (selected) and 'Enable CHAP user access authentication'. An 'apply' button is at the bottom right.

The footer includes 'Event Viewer' and 'Data Storage Software V7 - All rights reserved'.

Function: Target volume manager

This function allows you to manage both available and assigned target and snapshot volumes. To attach a volume to a target click the **attach button** associated with that volume. Similarly, to detach an already attached volume from a target click **detach button**. In certain circumstances you may need to adjust the LUN of the volume you are about to attach. Usually, the LUN attachment is taken care of automatically.

The list of targets is shown as a table consisting of following columns:

SCSI ID

In the **SCSI ID** field you can edit the SCSI identifier for a logical volume (logical unit). Every logical unit must have a unique SCSI ID. In case when logical units are configured for failover, their SCSI ID must be identical on the primary and secondary node.

Access mode

- *Write-through* cache. This means that data is not stored in cache. Instead, all data is considered written after it is committed to disk.
- *Write-back* cache. This functionality improves data writing performance. Writing is considered complete as soon as the data is stored in the disk cache. Later the disk cache commits the data to a 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.

- *Read only.* If this is turned on, the LUN will be visible as a write protected disk.

NOTE To change the access mode after a volume has been added to a group, you must first remove the volume from that group and then add it again with the preferred mode.

Function: CHAP user access authentication

Allows access to this target to specified CHAP users.

CHAP (target authenticates host)

This function enables uni-directional authentication. It enables the target to validate the initiator.

Mutual CHAP (host authenticates target)

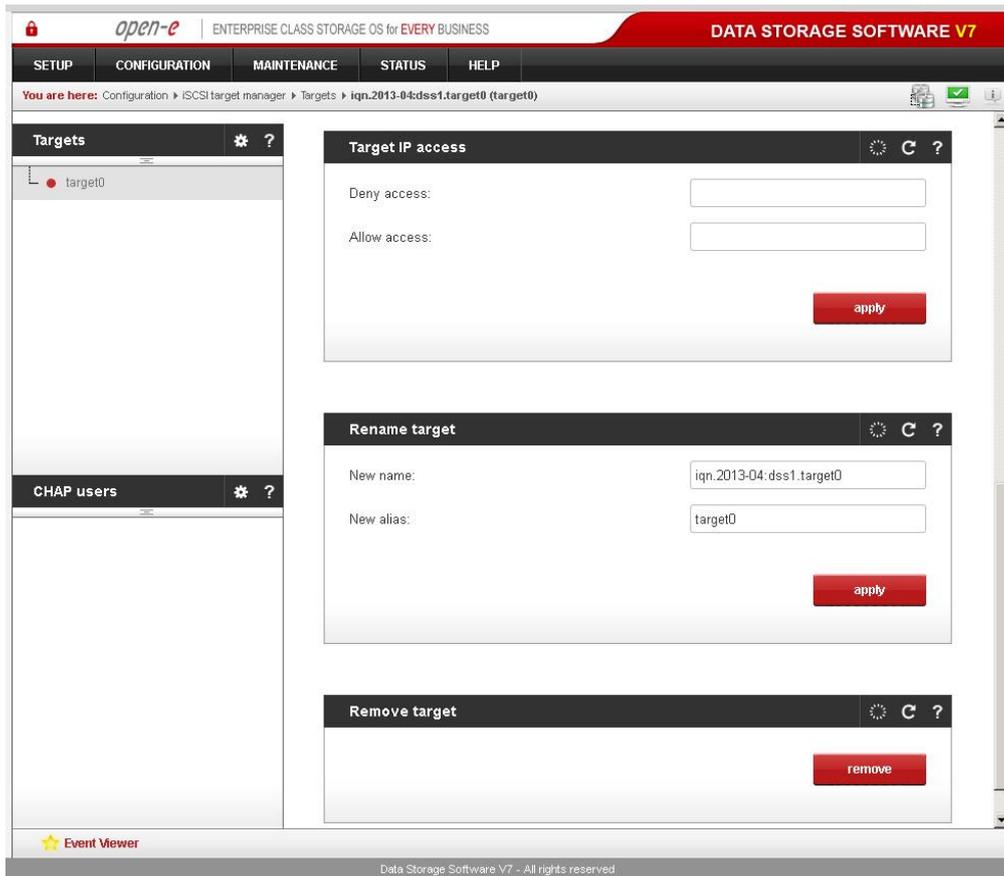
This function enables bi-directional authentication. It additionally enables the initiator to authenticate the target.

NOTE You can only select a CHAP user that has not been added to the granted access CHAP users list and is available in CHAP users' pool.

NOTE Please make sure that the secret of CHAP user selected for mutual target-initiator user authentication is different than the secrets of any other CHAP users selected on the list above.

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 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 the **Deny access** or **Allow access** fields everyone is permitted to access the target. Specifying at least one entry in the **Allow access** field excludes all the clients that do not match it from accessing the target. When you specify at least one entry in the **Deny access** field, every CHAP user or CHAP users from this network class address are denied access to the target. When you specify any IP address in the **Allow access** field, CHAP users from that address are allowed to access the target even if the same address has been specified in the **Deny access** field. If you enter IPs only in the **Allow access** field then the **Deny access** field will be automatically entered with a `0.0.0.0/0` entry.

NOTE Please note, 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 a network class address in normal form, it will be automatically converted to a 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.

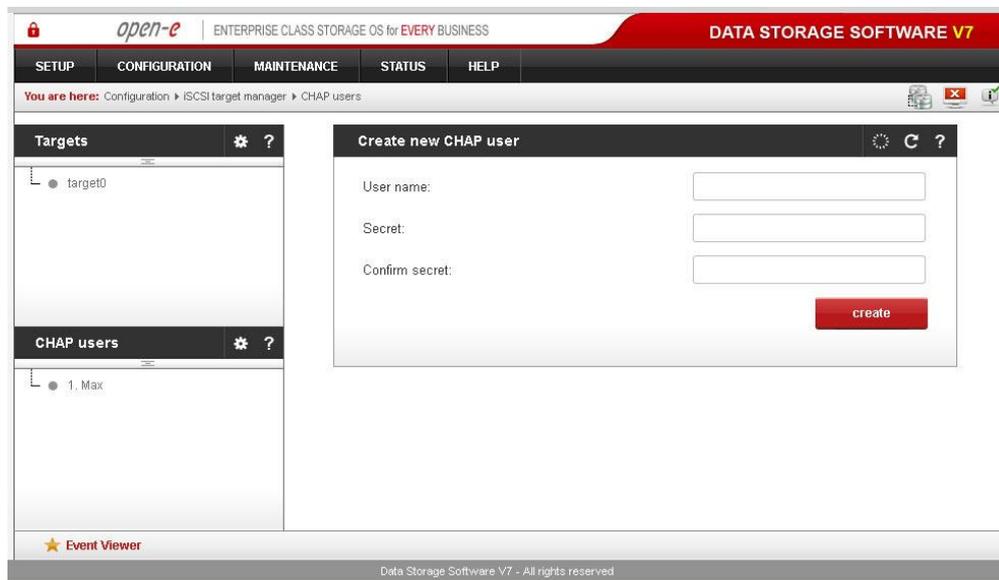
Function: Rename target

Provide a new target name. A target name is considered case-insensitive and 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 the target in order to prevent leakage of sensitive or classified information.



Function: Create new CHAP user

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

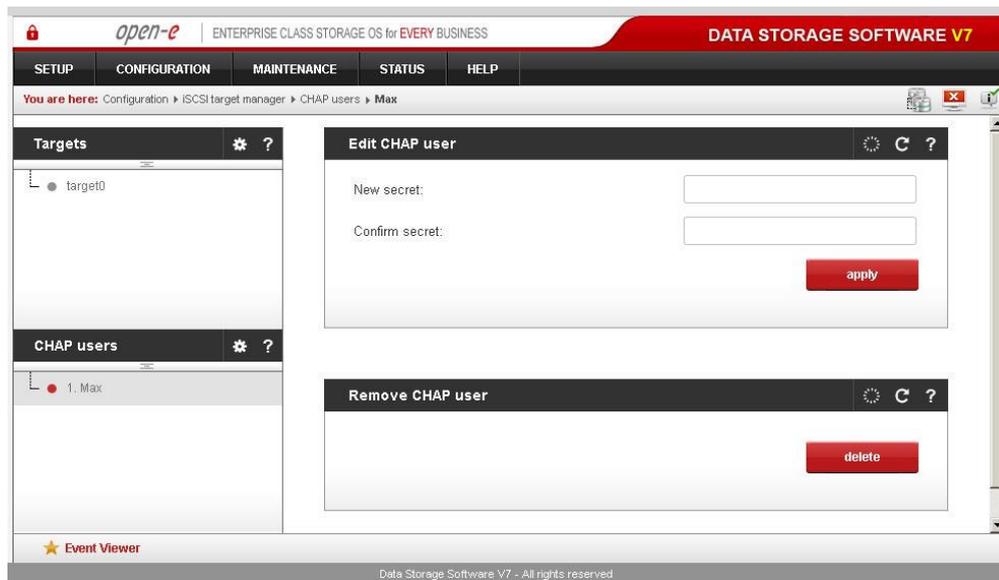
NOTE CHAP usernames cannot:

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

Password cannot contain:

- special characters such as: ' " ` ,
- spaces,
- less than 12 and more than 16 characters.

If a CHAP users forget their password, there is no way to retrieving 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 then click **Apply**.

NOTE Password cannot contain:

- special characters such as ' " ` ^ & \$ # ~ [] \ / | *
- spaces,
- less than 12 and more than 16 characters.

Function: Remove CHAP user

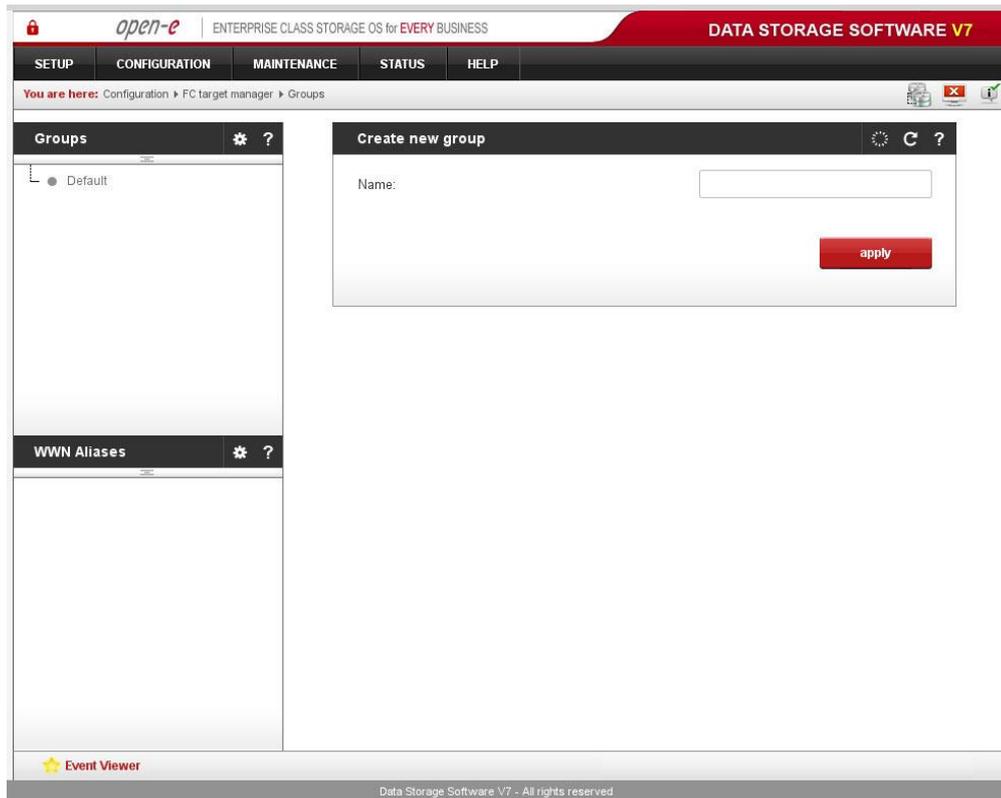
Click **Delete** to remove the CHAP user from the system.

5.2.2.5 FC target manager

5.2.2.5.1 Groups

Here you can view a list of all Fibre Channel Groups.

NOTE Group Default is a public group. If some WWN belongs to a different group than public, then this WWN will not be accessible to the public group and only will have access to the group where it's assigned to.

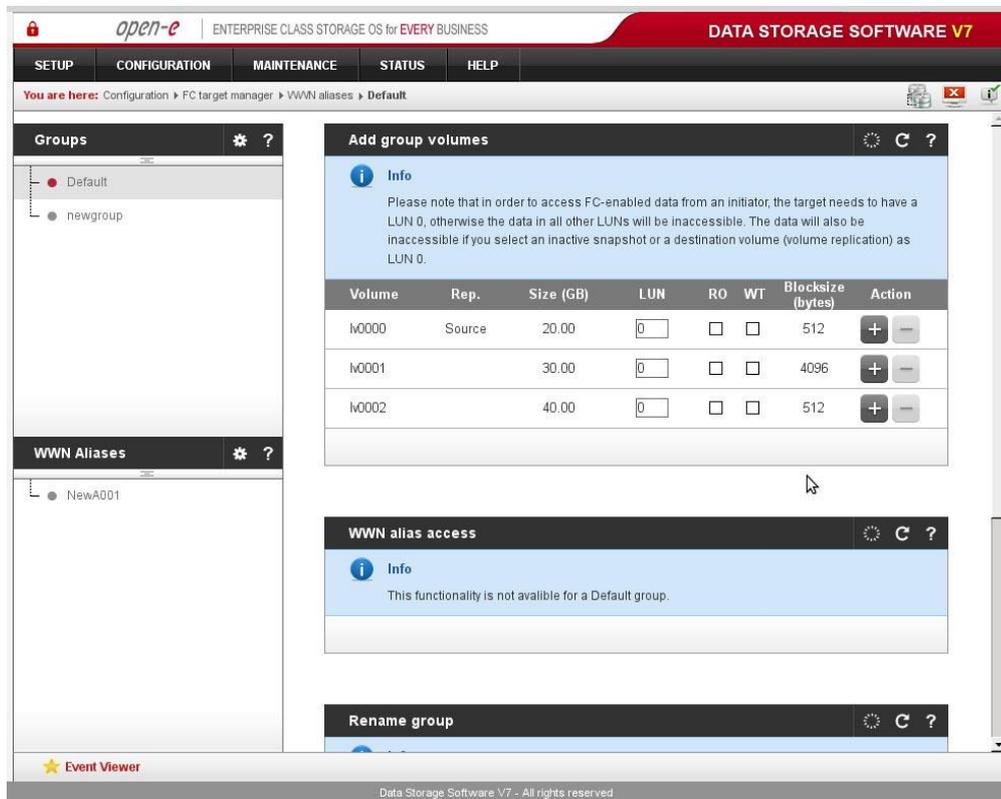


Function: Create new group

To create a group, enter its name and click the 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 : characters are allowed.



Function: Add group volumes

This function lets you 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. However, normally 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 it 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 and set 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 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. Later, 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`.

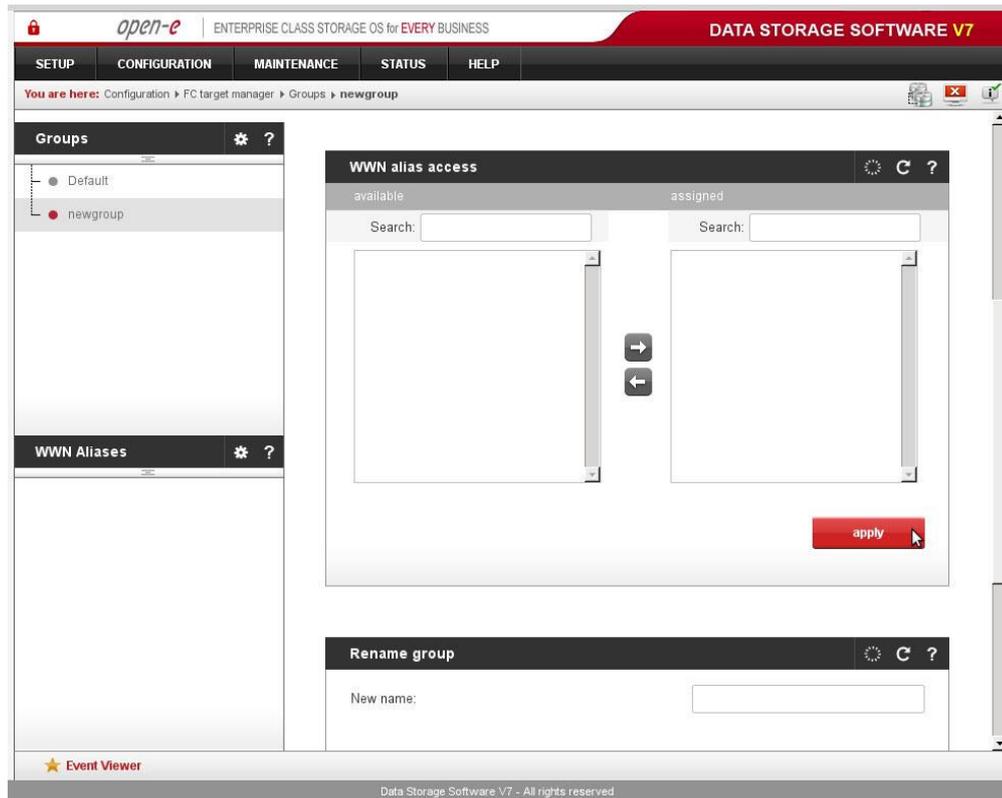
HBA

Host Bus Adapter. HBA connects a host system to network and storage devices. In this case it's referring to devices responsible for connecting Fibre Channel.

NOTE

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

- **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.

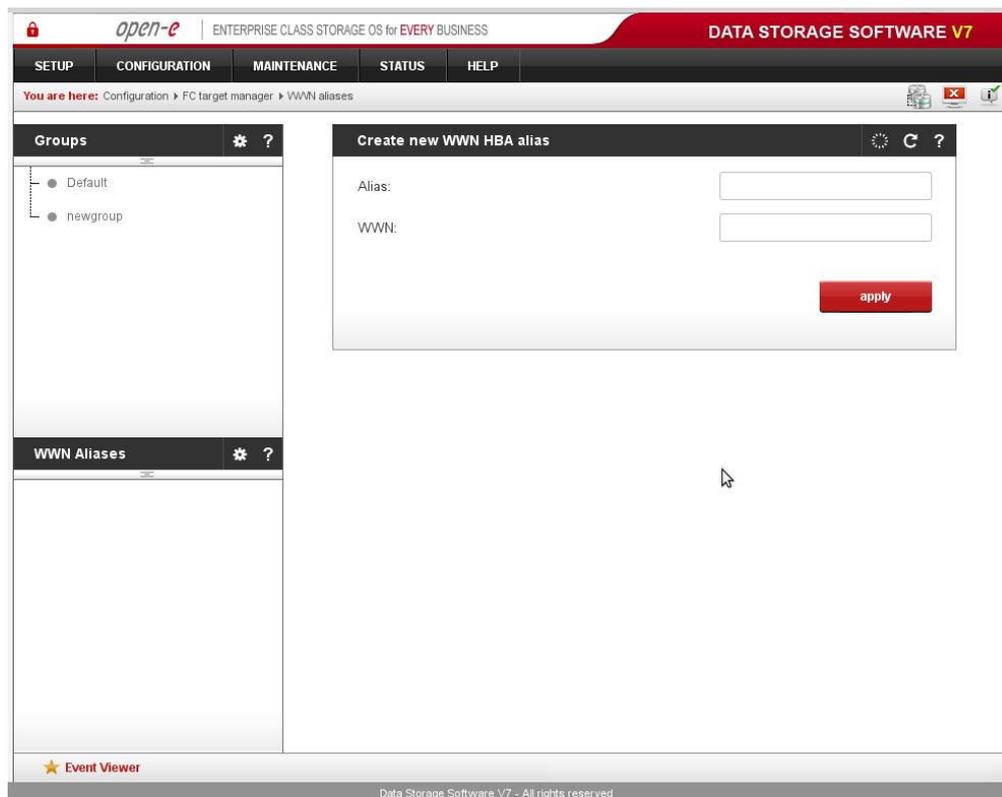


Function: Rename group

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 : characters 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 only include characters from A to F, a to f, digits from 0 to 9 and the : character. 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

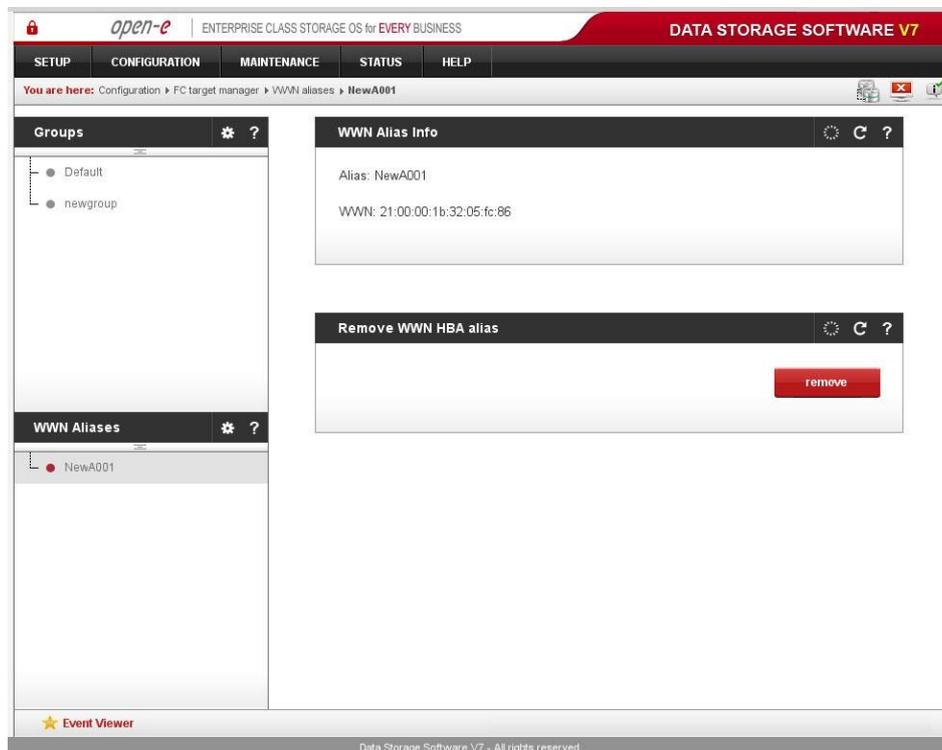
Host Bus Adapter. HBA connects a host system to other network and storage devices. In this case HBA refers to devices responsible for connecting Fibre Channel.

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 only include characters from A to F, a to f, digits from 0 to 9 and the : 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 your 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 the "+" 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 the FC access from one group to the other one, please click on the "-" button of the selected LUN and move the alias from the right panel to the left and click on the apply button.

Then accordingly to the selected group, please click on the "+" button and move the alias from the 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

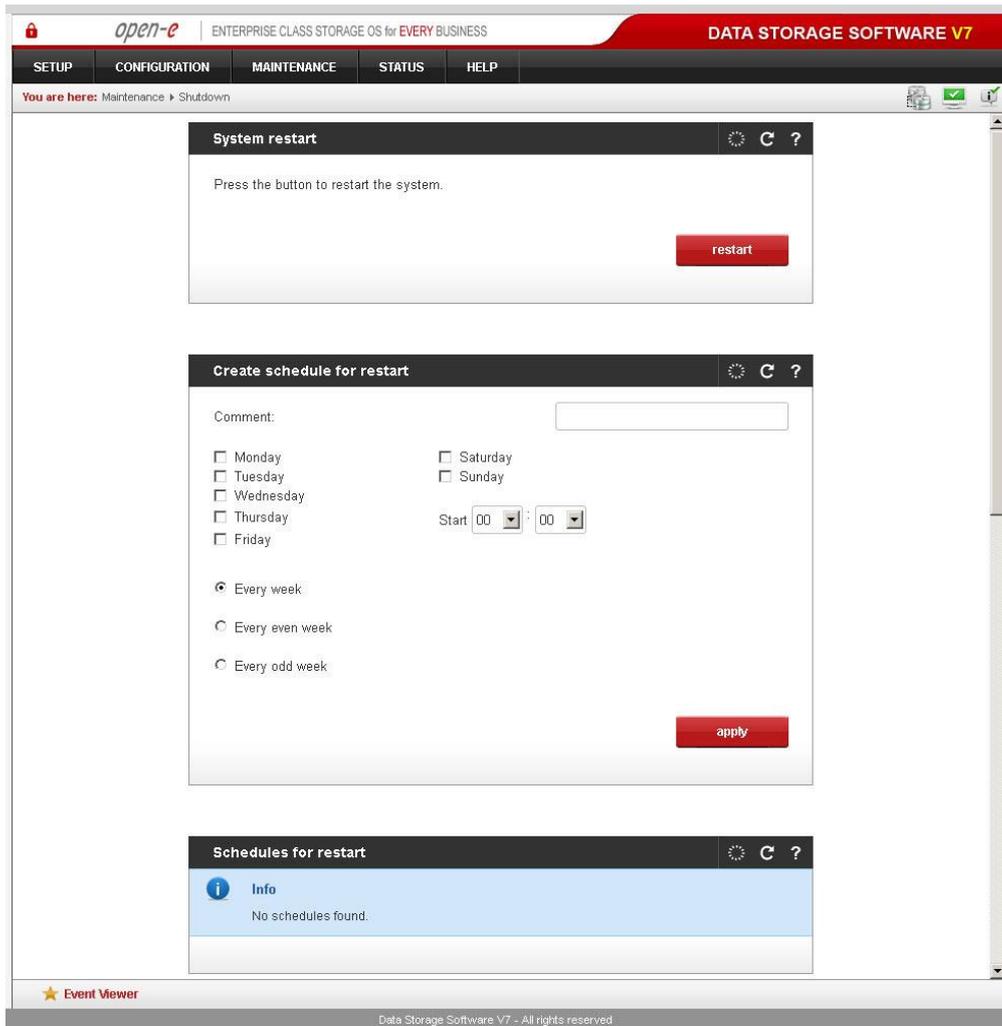
Here you can create new schedule tasks for system restart.

Comment

You can enter a comment for the system restart.

Time select

Selects what time you want the restart task to be started.



Function: Schedules for restart

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

Function „System shutdown“

Using this function, you can shut down the server.

Function: Create schedule for shutdown

Here you can create a new schedule task for a system shutdown.

Comment

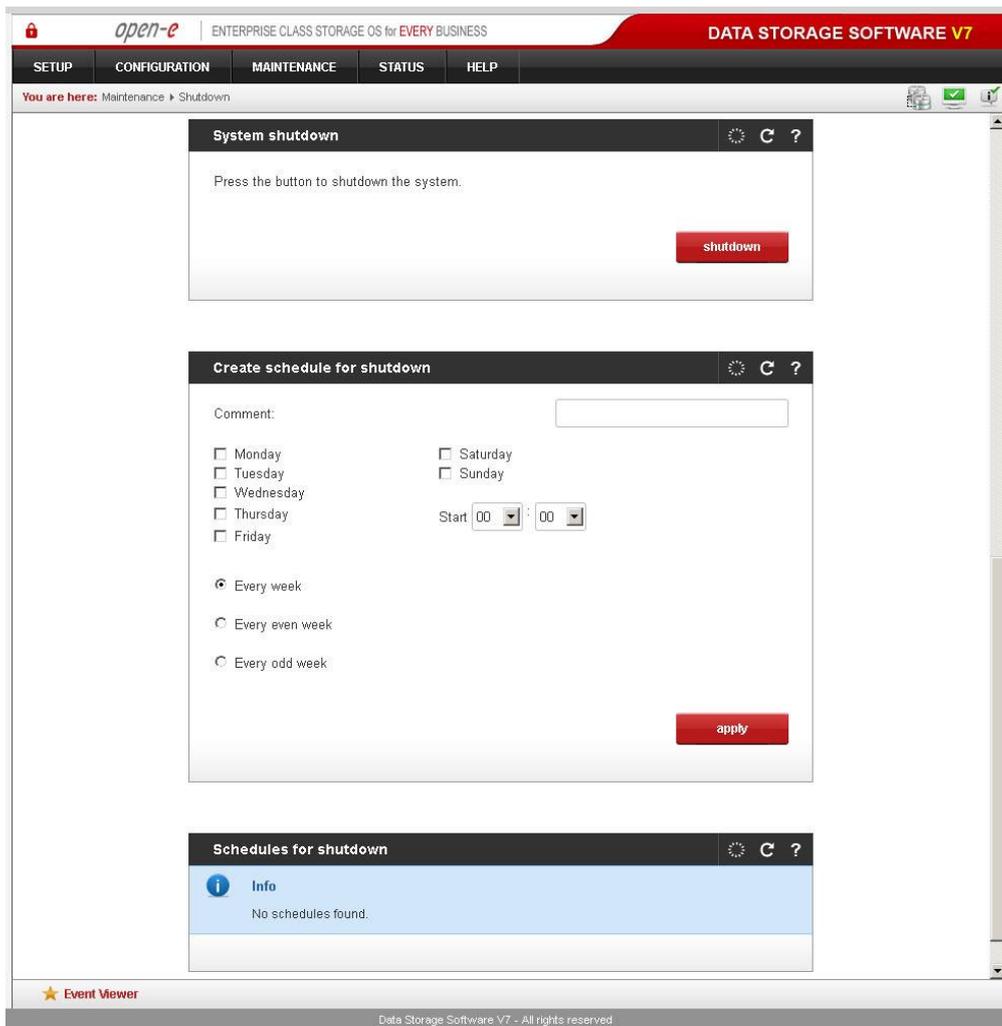
You can enter a comment for the system shutdown.

Time select

Select a time when the 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 the corresponding boxes.

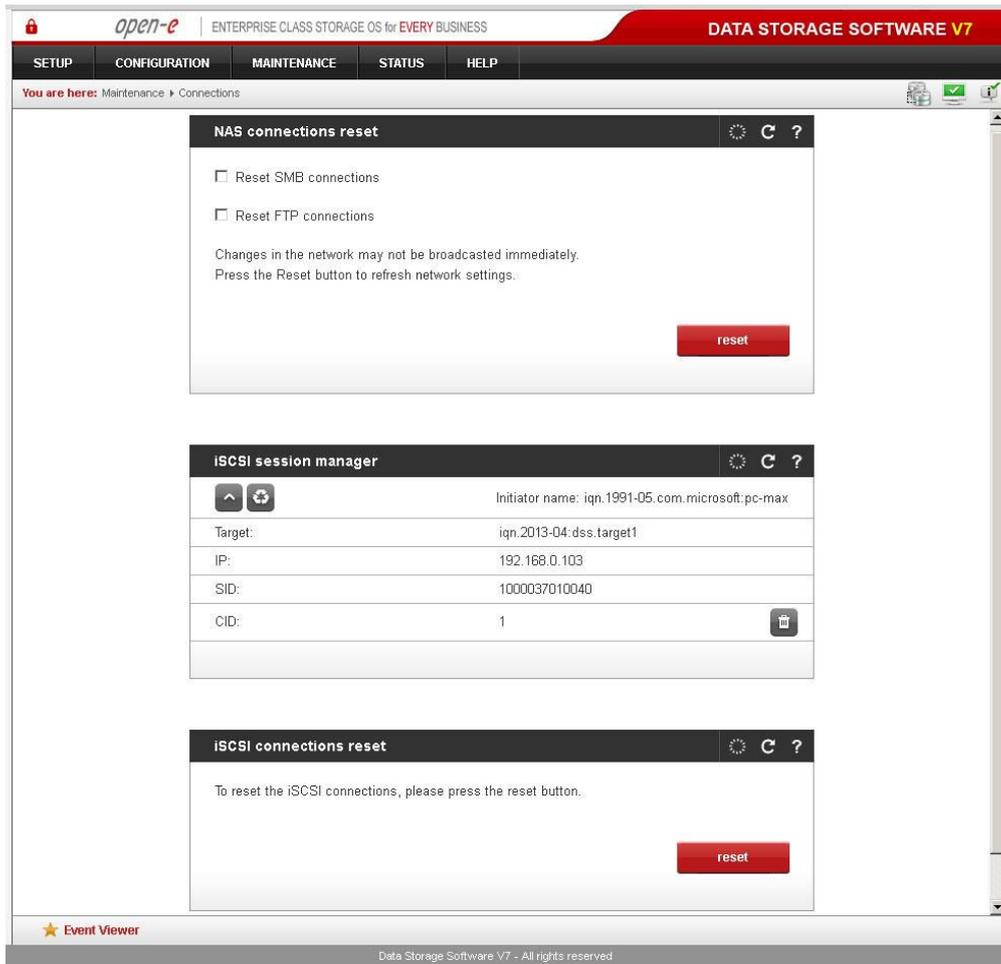
CAUTION This function disconnects all users connected to the shares on a specified protocol, which may lead to data loss, if any files are open.

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 a 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.

CAUTION All current connections with iSCSI initiators will be terminated immediately. This may cause unsaved data loss.

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

In this side you can view a list of all snapshot tasks and volume groups to which snapshots are assigned. Click twice on a volume group, then on the snapshot to manage it.

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

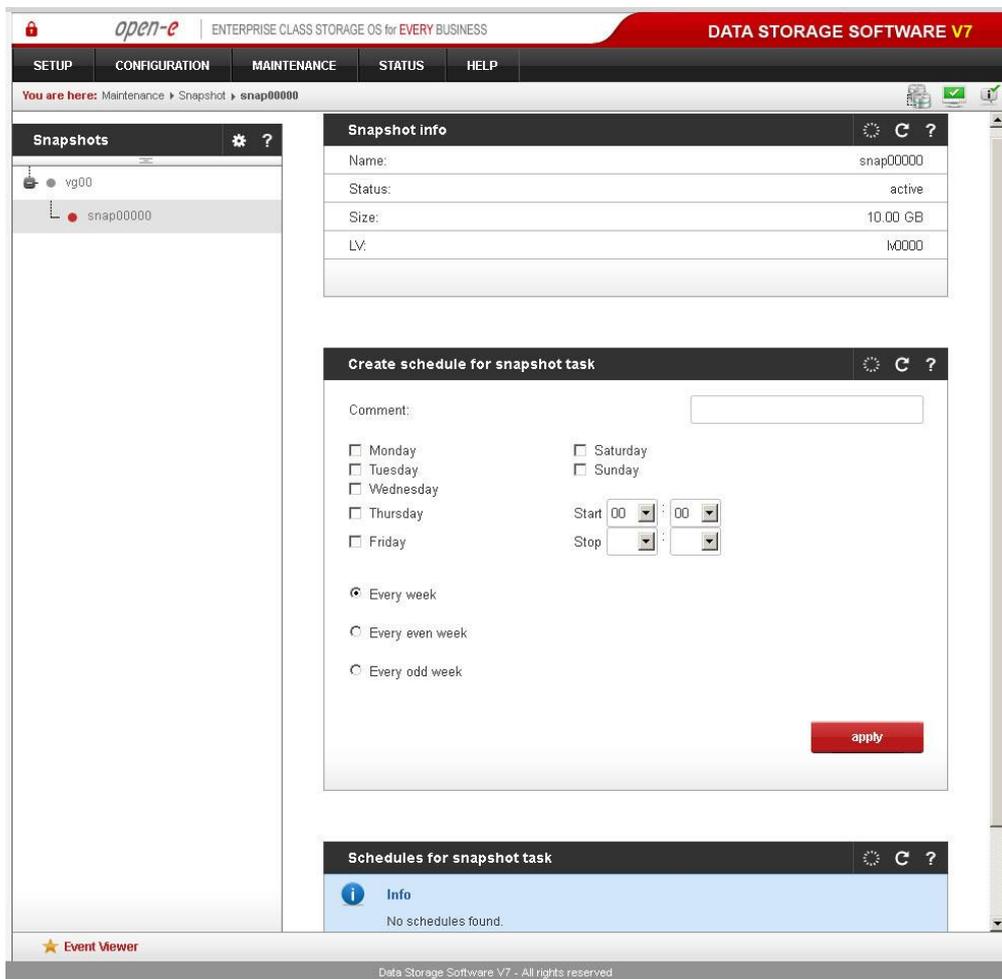
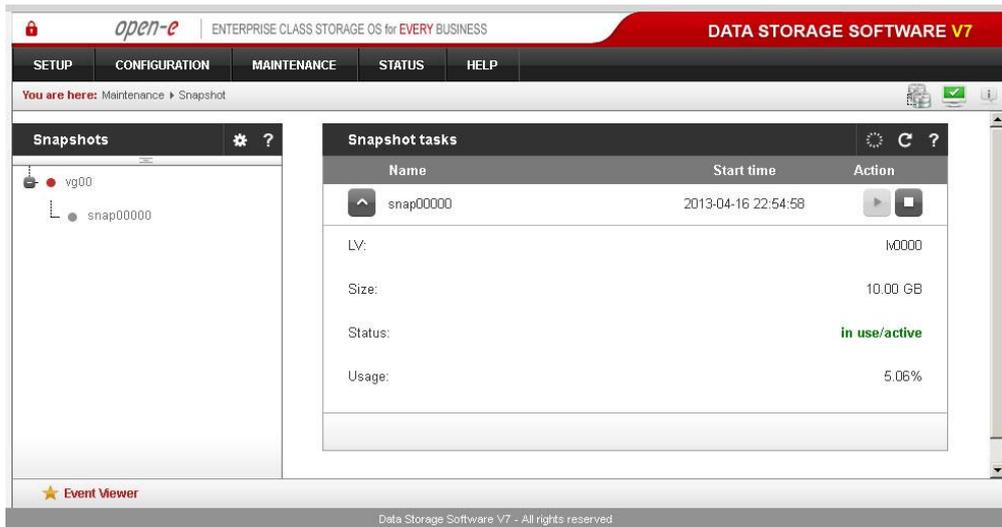
Stop button in order to set the status back to *Unused*.

Usage

Shows the usage of 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 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.
- 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 for the whole 20.
- 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.



Function: Snapshot info

Here you can see information for a selected snapshot.

Name

Snapshot's name.

LV

Logical volume to which the snapshot is assigned to.

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's 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 only run on even or odd weeks. Please note that Monday is considered as 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 **Data (file) Replication**

Here you can view a 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 at the same time replicated as a source or destination.

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 to log replication errors.

Use ACL

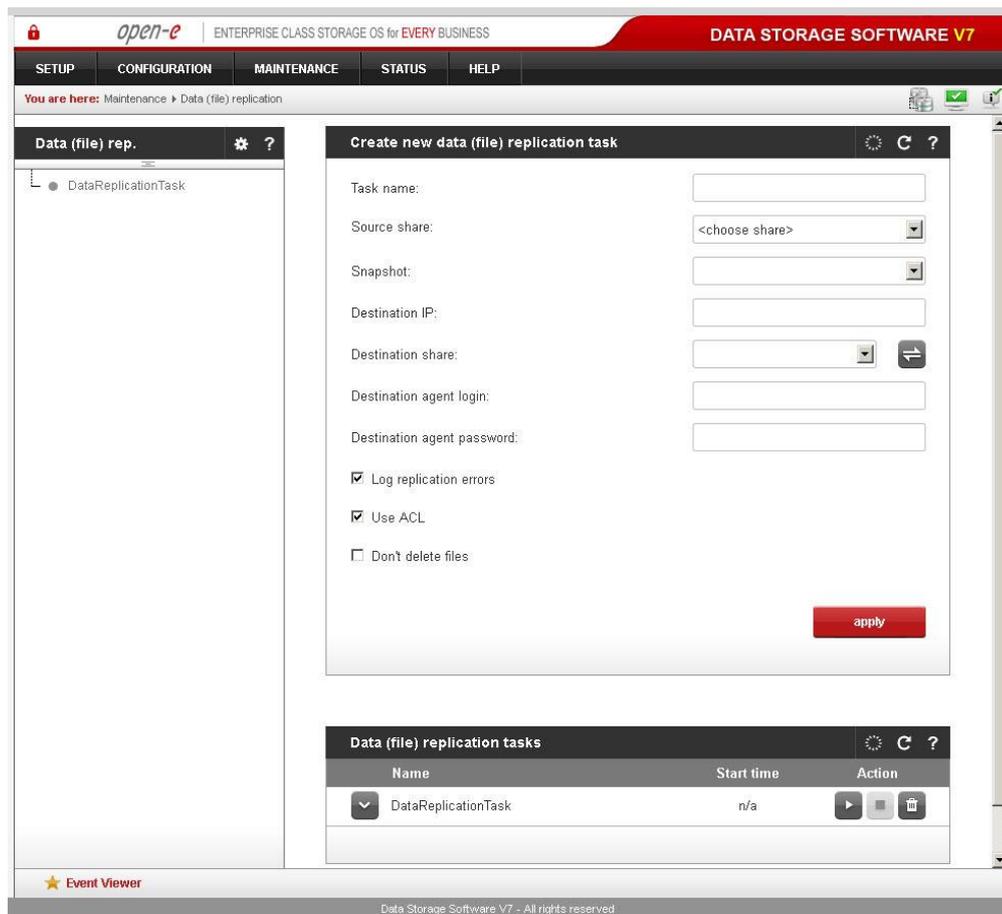
Turn it on to have files replicated with Access Control List permissions.

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.

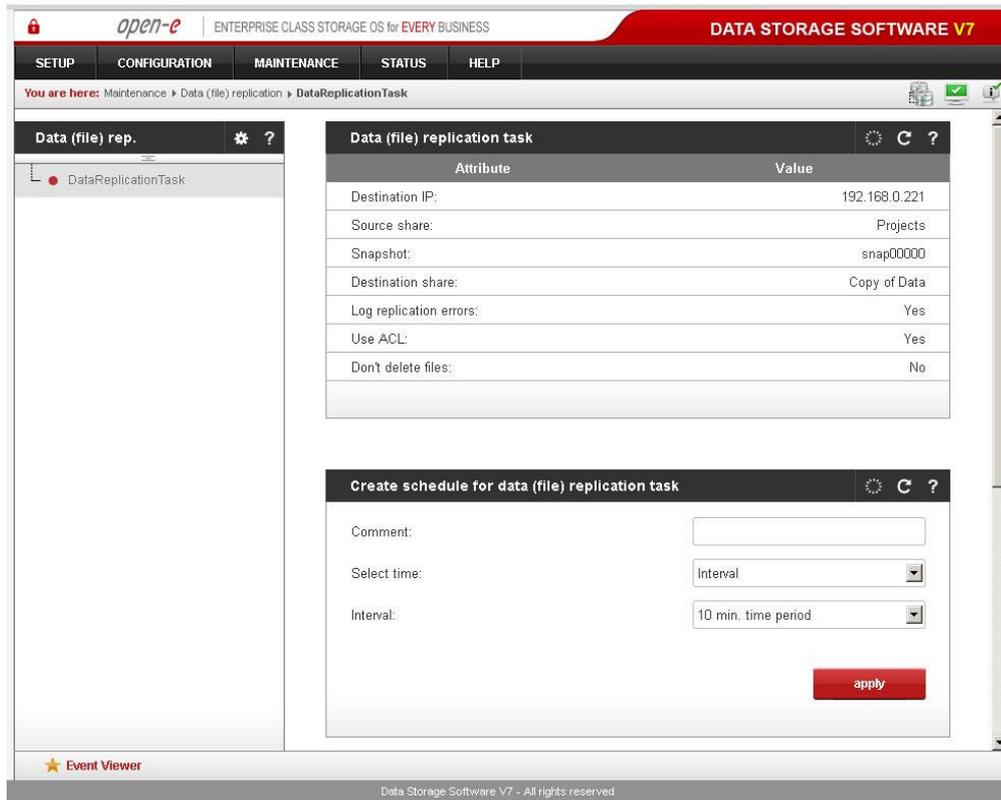
NOTE

- 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 a source only.
- It is not possible to perform data (file) replication and backup at the same time. Backup has higher priority than 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; 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.

**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.



Function: Create schedule for data (file) replication task
 Here you can create a schedule for the selected data (file) replication task.

Comment

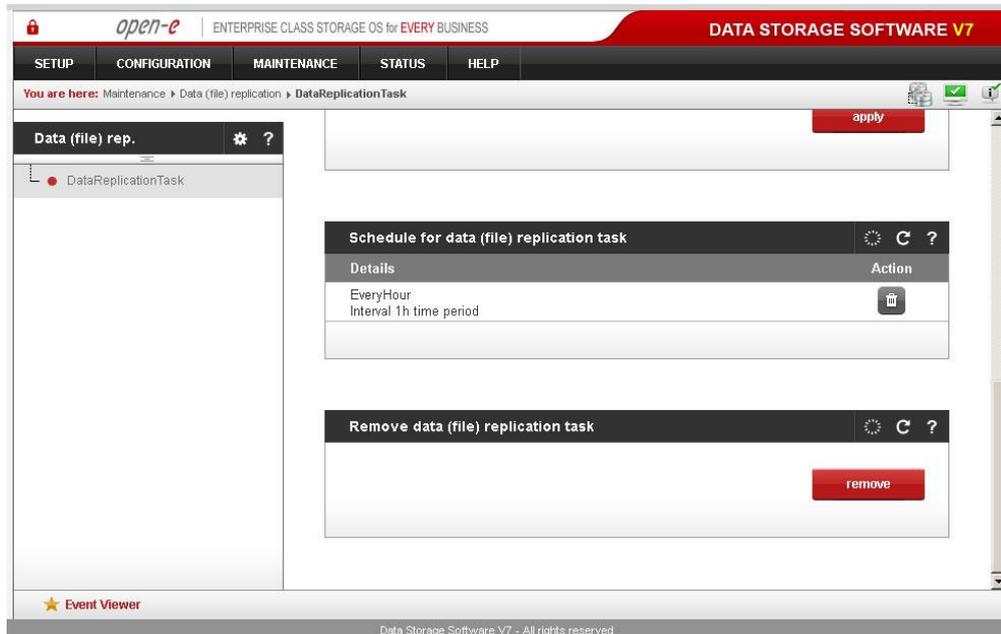
You can enter a comment for the replication schedule.

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 to which the replication will be executed to.



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

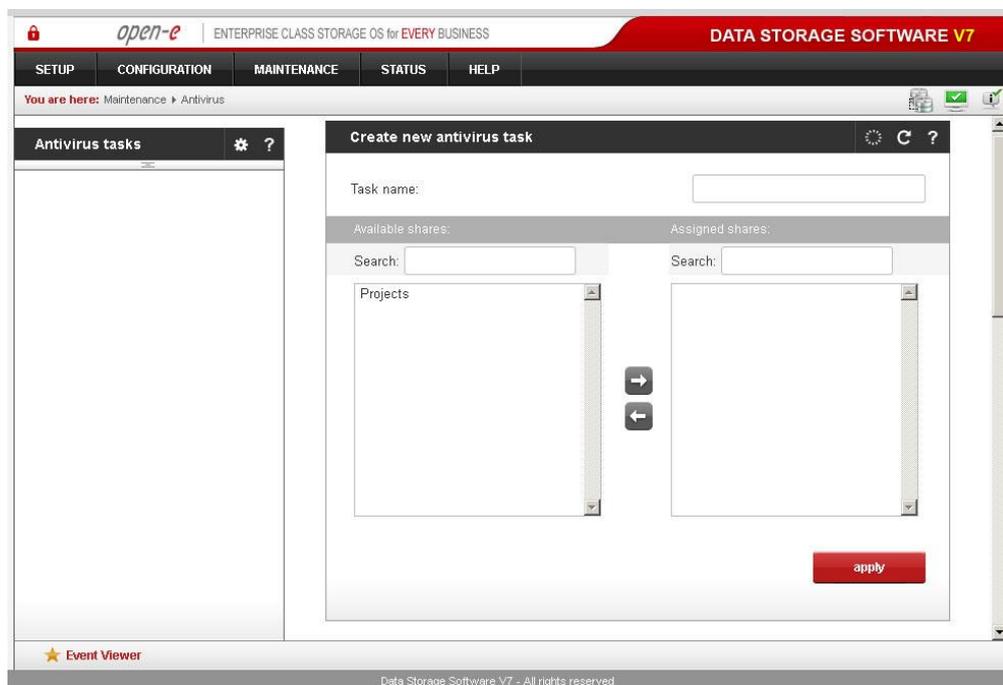
5.2.3.5 Antivirus

Function: Create new antivirus task

Here you can create a new antivirus scan task.

- Enter a task name,
- Select shares to scan,
- Click "apply" to create the task.

NOTE Antivirus does not scan password protected archives.

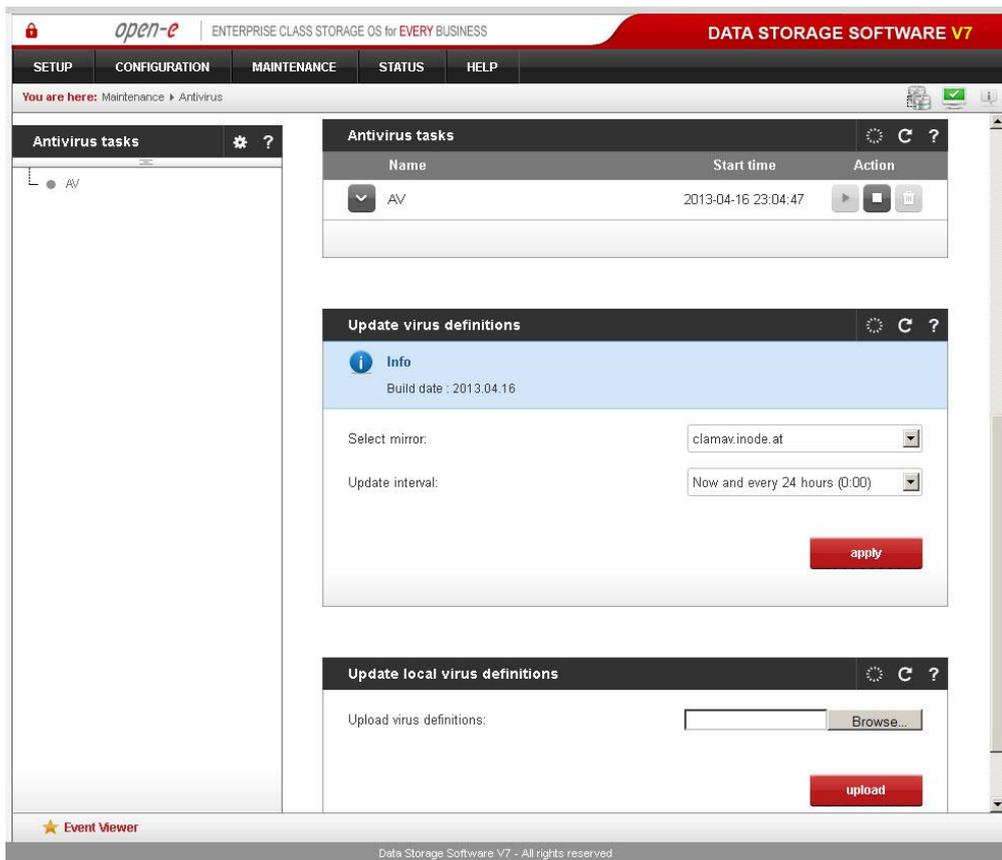


Function: Antivirus tasks

Here you can run, stop or delete the 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.

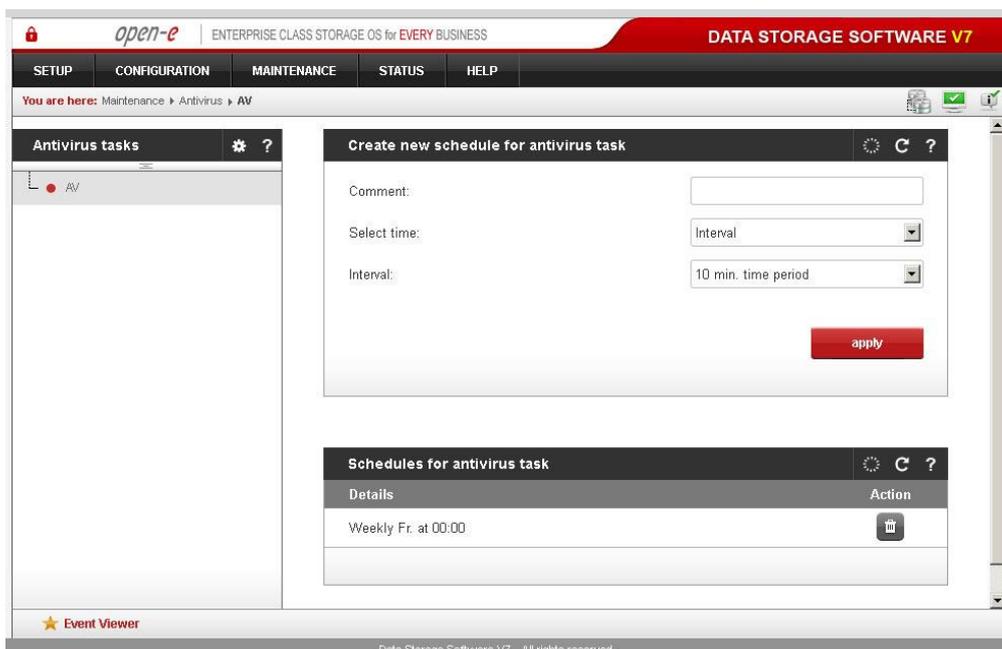


Function: Update local virus definitions

With this function you can upload a virus database. In order to do this:

- Click on the **Browse** button and select a database file, downloaded from <http://clamav.net/>,
- Click the **Upload** button

Two types of database file are supported: "daily" and "main". Database files should have a "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 1h, the share will be scanned every hour.

Function: Schedules for antivirus task

Here you can manage all schedules created for the selected antivirus task.

5.2.3.6 Miscellaneous

Function: Save settings

With this function you can store configuration settings.

Select the settings you want to store and then 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 the settings locally, a new entry will be created and you will be able to select which settings to restore during the restoration process. You can restore settings using the Restore 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*.

The screenshot displays the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The current page is 'Miscellaneous' under 'Maintenance'. Two panels are visible:

Save settings

- Setup
- Configuration
- Save locally
- Download

An 'apply' button is located at the bottom right of this panel.

Restore settings

File	Date	Action
auto_save_last	2013-04-16 17:40:07	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> SETUP <input type="checkbox"/> CONFIGURATION		
auto_save_1	2013-04-15 22:58:05	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> SETUP <input type="checkbox"/> CONFIGURATION		

Free space for update/settings: 599.80MB

A 'Browse...' button and an 'upload' button are located at the bottom of the 'Restore settings' panel.

The footer of the interface includes 'Event Viewer' and 'Data Storage Software V7 - All rights reserved'.

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.

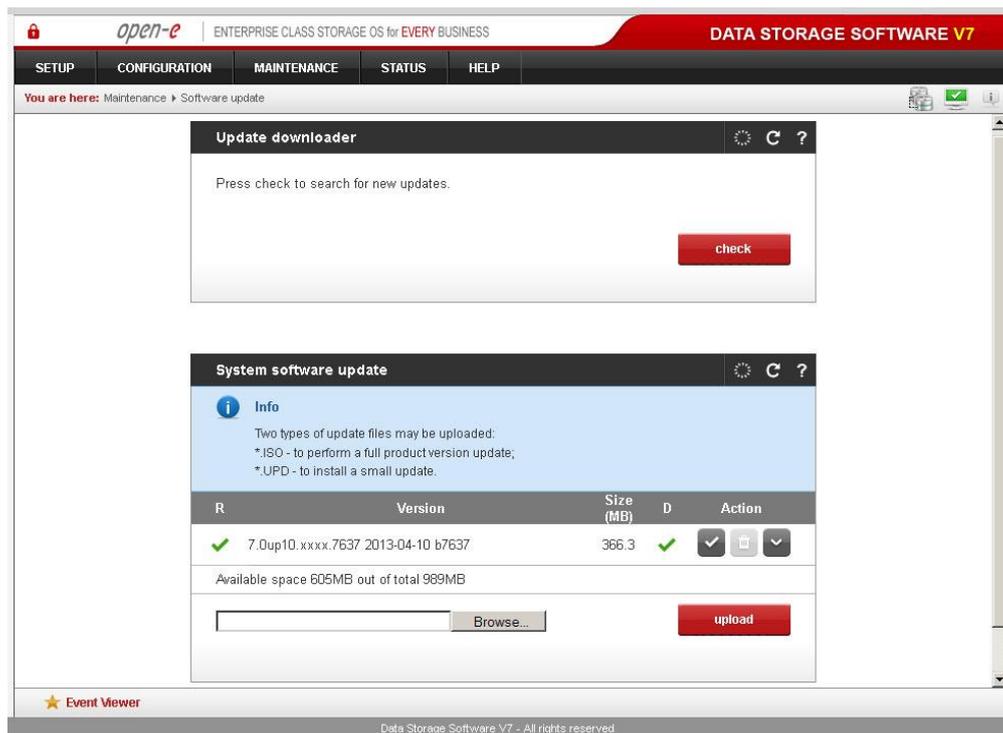
You can delete a configuration settings file by clicking the Delete action button. You can download a configuration settings file by clicking its name. In order to upload a configuration settings file, (provided one has been previously saved), browse for its filename and click the Upload button.

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.

5.2.3.7 Software update

This function allows you to update the system software. There are two ways to update the Open-E DSS V7 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 the 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 changes could take effect.

The option for the default product version ("Boot" unit) means that the version marked with it will be booted automatically, without the need of choosing a version in the menu while the system is starting.

NOTE Small updates are only performed for currently activated product versions

5.2.4 STATUS

This function provides a quick overview of the most important system parameters of your Open-E Data Storage Software V7. The corresponding sub-functions are network, logical volume, connections, hardware, tasks and S.M.A.R.T.

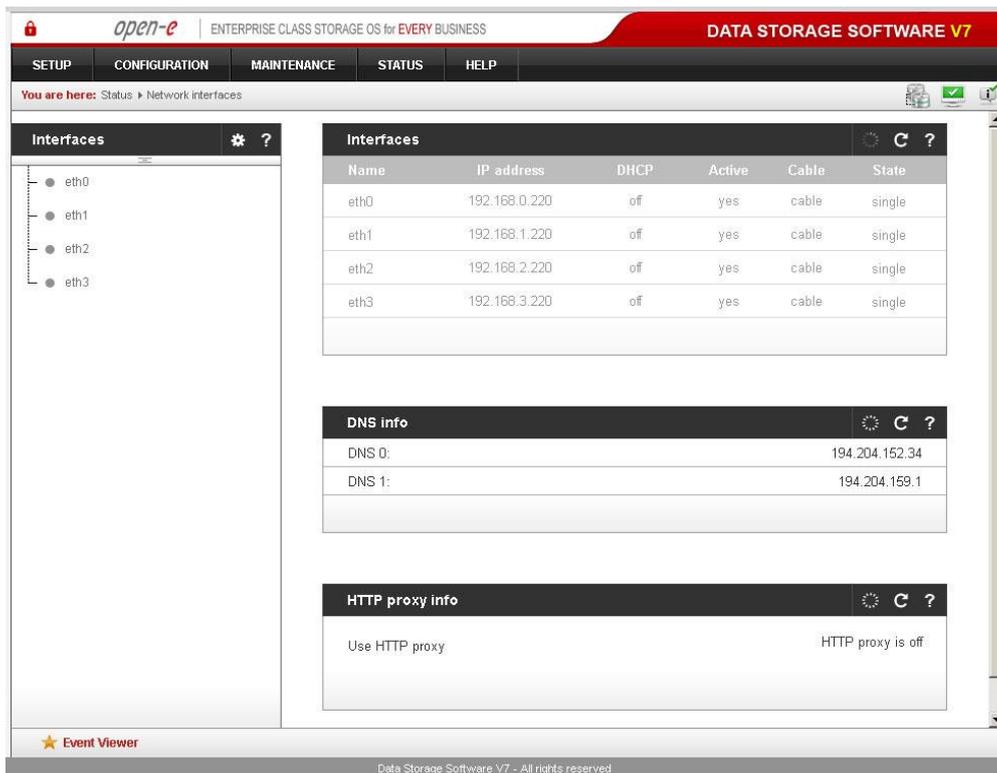
5.2.4.1 Network

Function: Interfaces

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

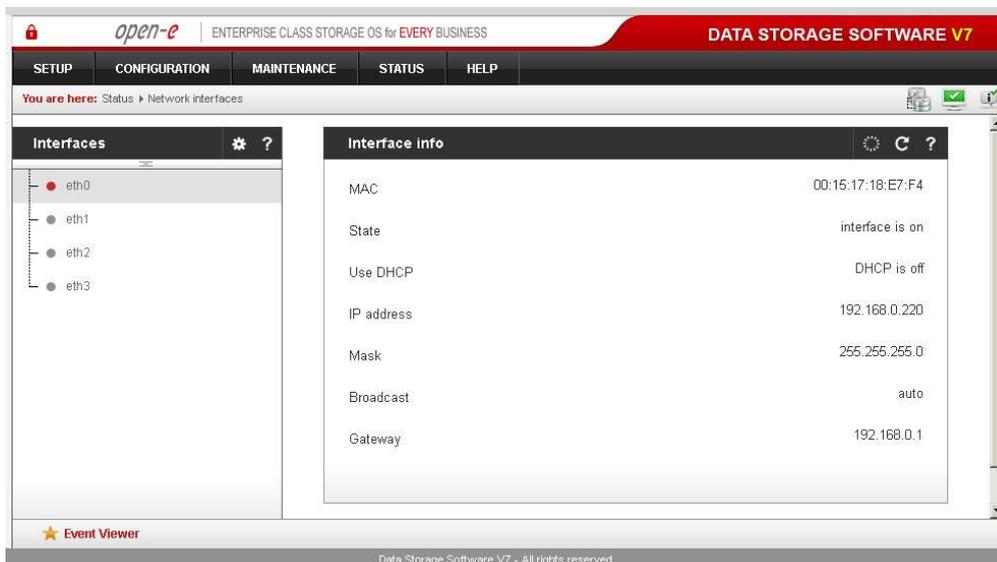
Function: DNS info

Here you can view the 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 displays the following information on the selected network interface:

- 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 (in percent) currently being used by data on the logical volume

The screenshot displays the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The current page is 'Logical volume statistics'. On the left, a sidebar shows 'Vol. groups' with a tree view containing 'vg00'. The main content area features a table titled 'Logical volume statistics' with the following data:

Name	Size (GB)	Used (GB)	Free (GB)	Usage
l0000	20.00	0.03	19.97	0.1%
l0001	No statistics for iSCSI volume available			

The interface also includes an 'Event Viewer' icon at the bottom left and a footer with 'Data Storage Software V7 - All rights reserved'.

Function: Logical volume statistic

This function contains statistical data on the dynamic 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: Logical volume statistics

Here you can see information on selected volume share. This function provides the following information:

Name

Name of the logical volume.

Type

Type of logical volume, can be NAS or iSCSI.

Size

Size of the share volume.

Used

Current date usage of space on share volume.

Free

Available space on share volume.

Snapshots

Number of all snapshots assigned to the logical volume / number of all snapshots in use.

The screenshot shows the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'Status > Logical volume > vg00'. The main content area is divided into two panels. The left panel, titled 'Vol. groups', shows a tree view with 'vg00' selected. The right panel, titled 'Logical volume statistics', displays the following information:

- name: lv0000
- type: NAS
- Size (GB): 20.00 GB
- Used: 0.03 GB (0.15%)
- Available: 19.97 GB (99.85%)

Below this information is a progress bar representing the usage. Further down, it shows 'Snapshots: total 1 / in use 1'. A table lists the snapshots:

name:	Size (GB):	Use:	Status:
lv0001	10.00	0.04%	active

The interface also includes an 'Event Viewer' icon at the bottom left and a footer with 'Data Storage Software V7 - All rights reserved.'

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 to in the right box. Under the boxes you will 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).

The screenshot displays the 'Connections' page in the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail shows 'You are here: Status > Connections'. The main content area is divided into two sections:

- Active SMB user connections:** This section features two large empty boxes for 'User names' and 'Connected resource names', with a double-headed arrow between them. Below these boxes are input fields for 'User:', 'Computer name:', and 'IP address:'.
- Active FTP users connections:** This section features two large empty boxes for 'User name (IP)' and 'Active sessions', with a double-headed arrow between them.

At the bottom left, there is a '★ Event Viewer' link, and at the bottom center, the text 'Data Storage Software V7 - All rights reserved' is displayed.

The screenshot displays the 'Connections' page in the Open-E DSS V7 web interface, showing additional connection types. The top navigation bar and breadcrumb trail are identical to the previous screenshot.

- Active NFS users connections:** This section includes a checked checkbox labeled 'Show UDP connections in the NFS connections status box.' Below it are two large empty boxes for 'IP Address' and 'Connected resource names', with a double-headed arrow between them.
- Active Appletalk users connections:** This section features two large empty boxes for 'User name' and 'IP Address/Host', with a double-headed arrow between them.
- iSCSI status:** This section shows a dropdown menu and the text 'Initiator name: iqn.1991-05.com.microsoft.pc-max'.

At the bottom left, there is a '★ Event Viewer' link, and at the bottom center, the text 'Data Storage Software V7 - All rights reserved' is displayed.

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 DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The main content area is titled 'You are here: Status > System' and contains two tables.

Services Table:

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
UPS APC	OFF	INACTIVE
UPS MGE	OFF	INACTIVE

Added license keys Table:

Key	Evaluation	Type	Amount
008756	Ever	A/A Cluster	N/A

The interface also includes an 'Event Viewer' icon at the bottom left and a footer with the text 'Data Storage Software V7 - All rights reserved'.

5.2.4.5 Hardware settings

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

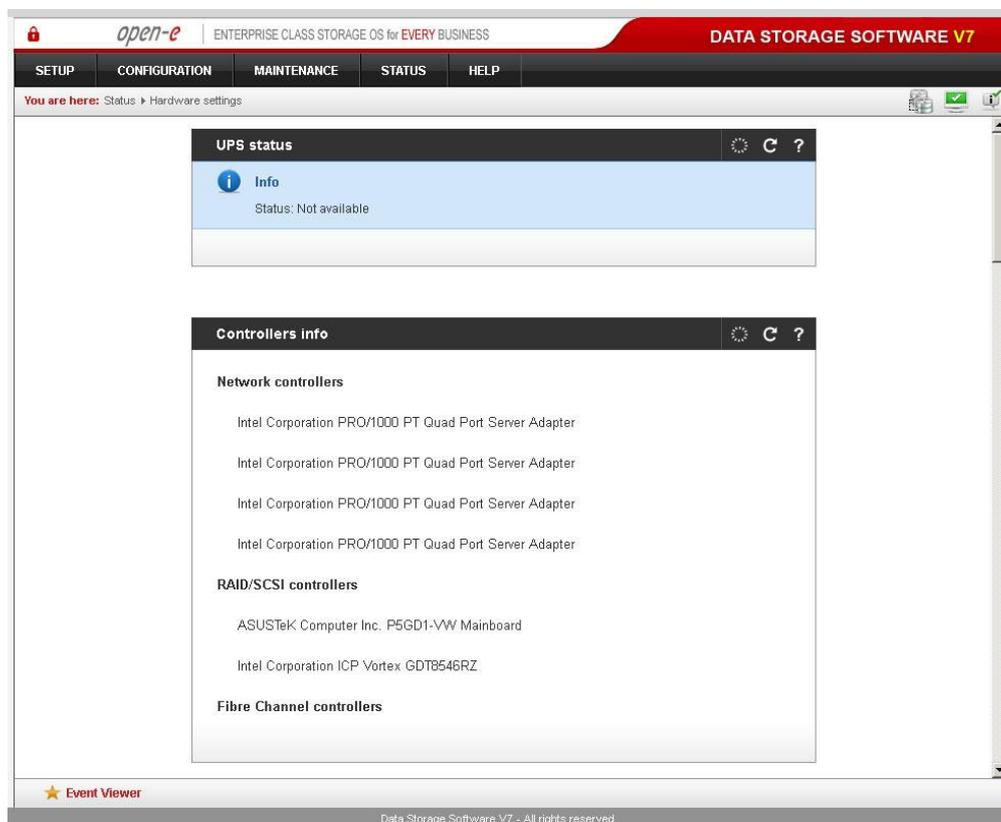
In addition, you may also download the latest Open-E Data Storage Software V7 log files and view specified or all log files without downloading them in a compressed form. Also, you can check the usage of memory (RAM) and (SWAP) and hardware monitoring.

Function: UPS status

The UPS status presents the current status of the ups device.

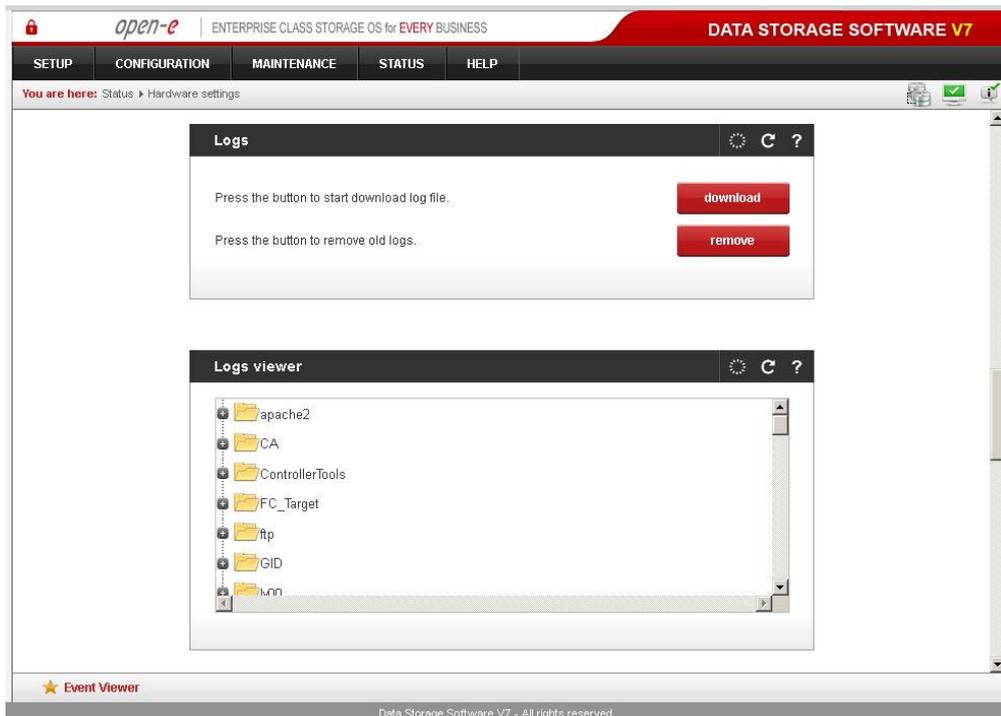
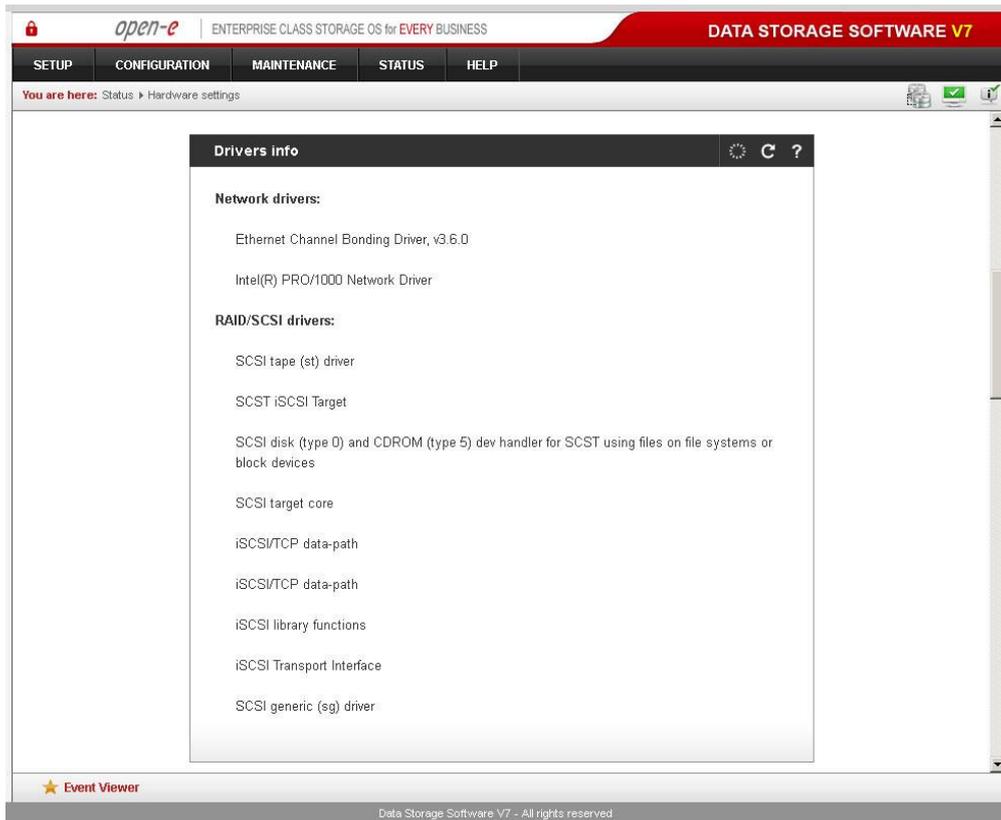
Function: Controllers info

This table lists the components installed in your server.



Function: Drivers info

This table shows active drivers loaded for the hardware that were 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.

Click on the 'Download' button and 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 in case of a critical hardware

failure and to store them in a safe place as a source for the logical volume and volume group recovery.

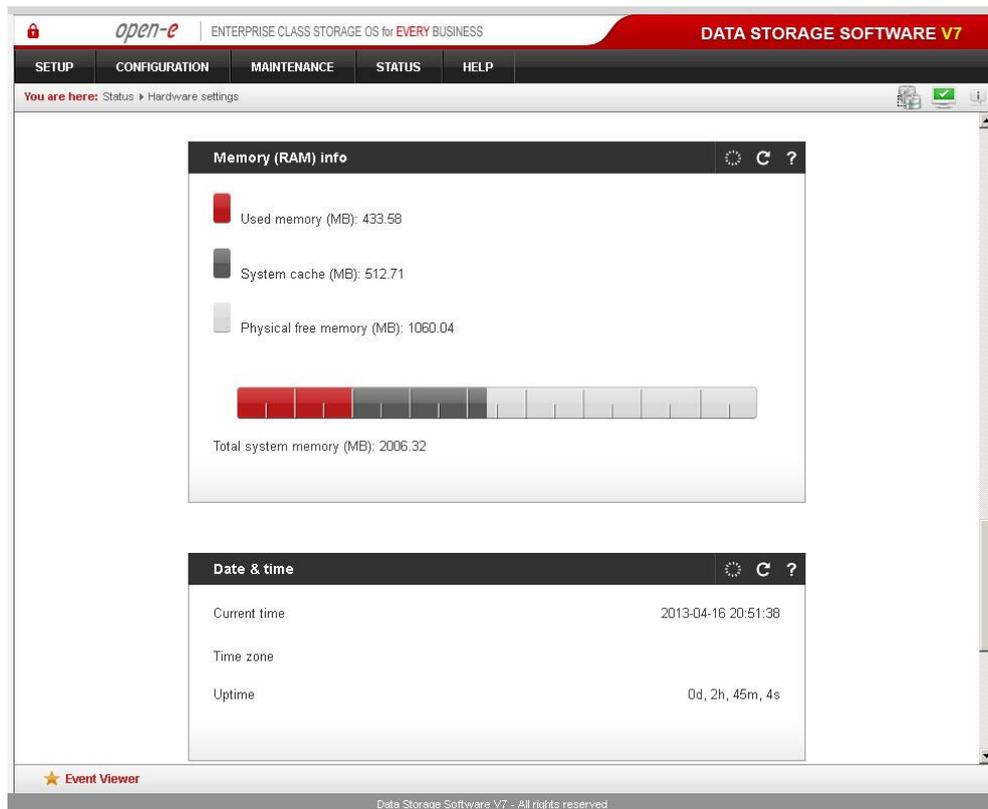
NOTE During log generation, a simple speed test of the disks is performed. When a software RAID is used with a lot of single disks, this may take up to several minutes.

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.



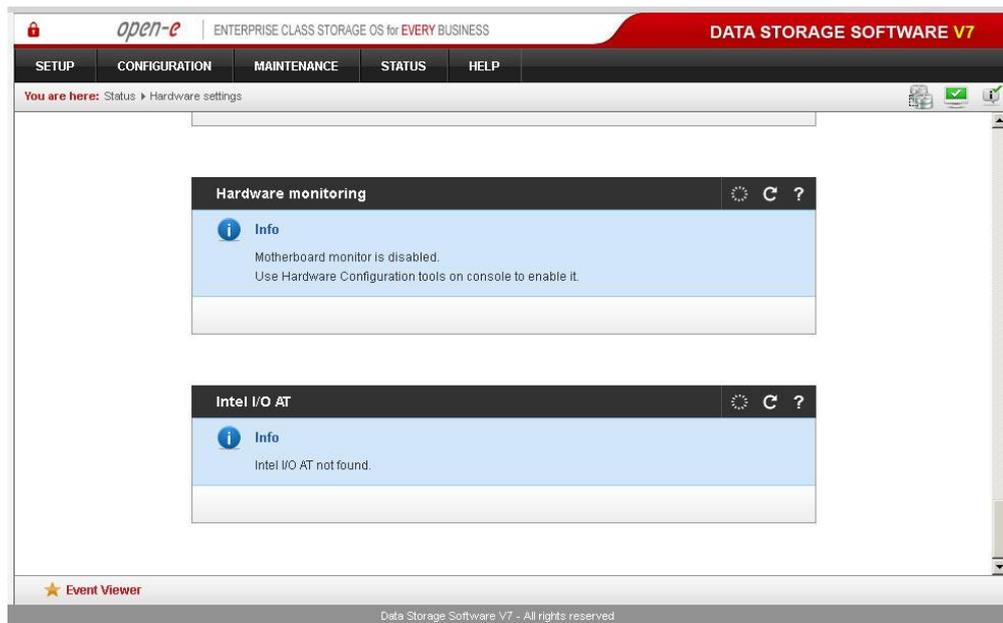
Function: Memory (RAM) info

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, information can be found on the following parameters:

- motherboard temperature,
- CPU temperature,
- chipset temperature,
- Vcore,
- fan rotation speed.

After initializing, a chipset selection window appears, followed by a 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 on the server GUI.
- **Maximum value** - if the current value is larger than the maximum value it will be marked in red on the server GUI.
- **Multiplex** - the actual current value will be multiplied by the multiplex value, the result is shown as the current value.
- **Addition** - the addition value will be added to the actual current value, the result is 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:

- 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:

- disks status,
- fan 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:

- 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:

- 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:

- 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:

- 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 by 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:

- 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 by clicking ? (Help) within the **Running tasks** function.

The screenshot displays the Open-E DSS V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The 'Tasks' section is selected, showing a tree view with 'Data (File) Replication', 'Antivirus', 'Volume Replication', and 'Snapshots'. The 'Running tasks' table shows two tasks: 'AV' (Antivirus) and 'snap00000' (Snapshot). The 'Tasks log' table shows two entries: 'AV' (Antivirus) and 'snap00000' (Snapshot), both with a status of 'OK' and action of '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 by clicking ? (Help) within the **Tasks log** function.

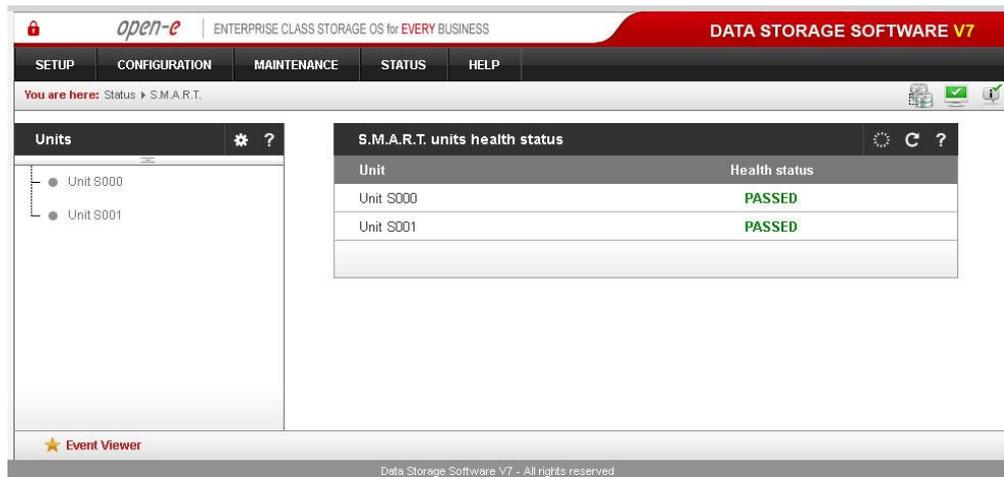
5.2.4.7 S.M.A.R.T.

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 internal operations of a drive and provide an early warning for many types of potential problems. When a potential problem is detected, the drive can be repaired or replaced before any data is lost or damaged.

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

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

To view S.M.A.R.T. information for a hard drive, please click on appropriate drive name. To view the summary, please click on "all units"



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. It detects and reports 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

Ctl-Alt-W

Select **Functionality Options**

Use the spacebar to select '**use S.M.A.R.T.**' and then hit '**Apply**'.

The screenshot shows the S.M.A.R.T. info window for Unit S000. The health status is PASSED. The parameters listed are:

- Device Model: ST3160815AS
- Serial Number: 9RA6VDG3
- Firmware Version: 4.AAB
- ATA Version is: 7
- ATA Standard is: Exact ATA specification draft version not indicated

The S.M.A.R.T. attributes table is as follows:

Attribute name	Min	Current	Worst	Status
Raw Read Error Rate	006	100	253	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	080	060	ok
Power On Hours	000	096	096	ok

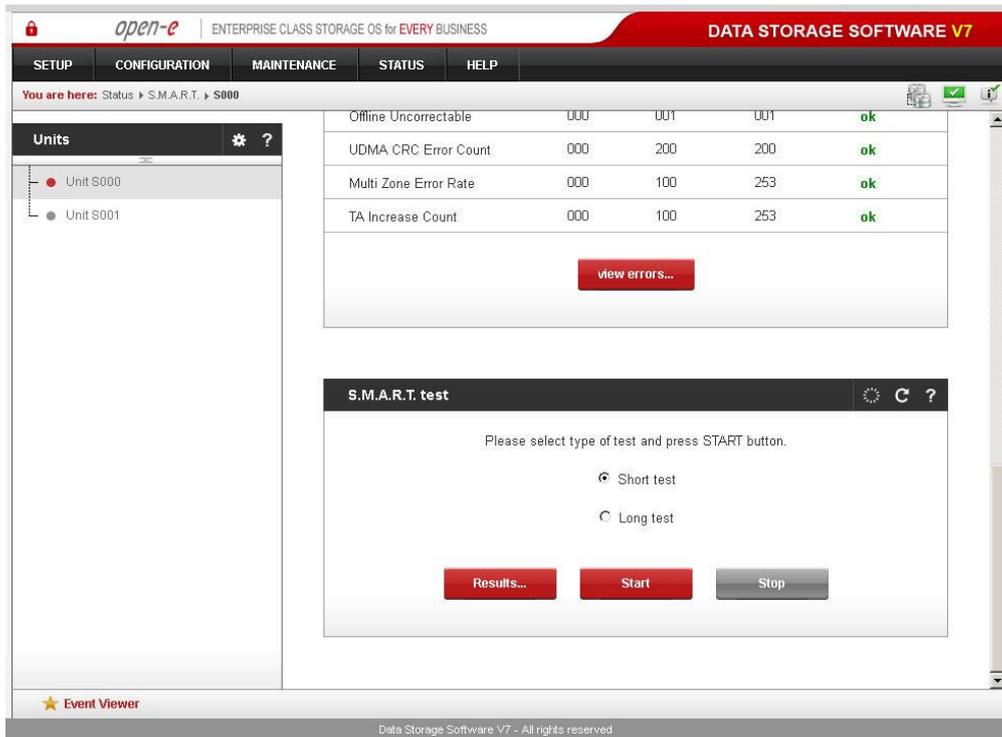
Function: S.M.A.R.T. info

This function allows you to view S.M.A.R.T. parameters which the particular disk is capable of reporting. The first part of the S.M.A.R.T. info window provides 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 is 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 yet supported by our software.

NOTE The View errors button allows you to view an automatically generated S.M.A.R.T. error log for the specific drive

The button "view errors" provides you with the ability to view the S.M.A.R.T. log of that drive and is generated automatically.



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

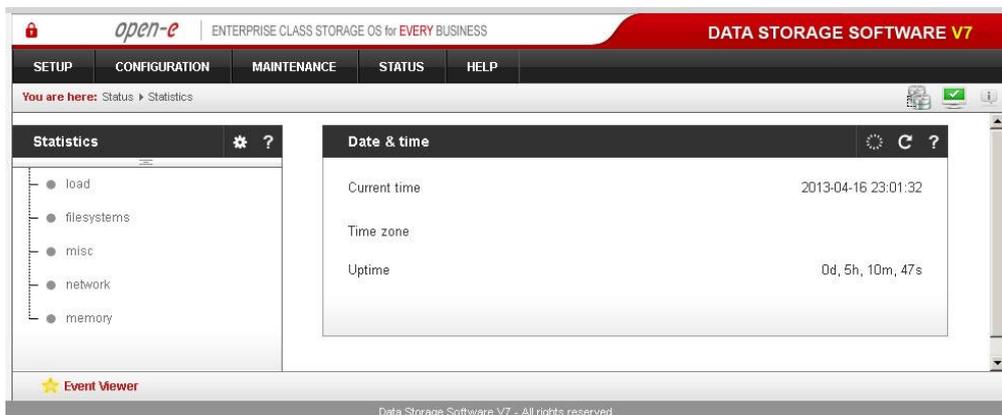
This function allows you to perform short and long tests of hard drives. You will be informed about the progress of the test. After the test has finished, please click on the **Results** button to view the test log.

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 is a list of categories available for server statistics. Clicking on any of them will display graphs for the selected category.



Function: Date & time

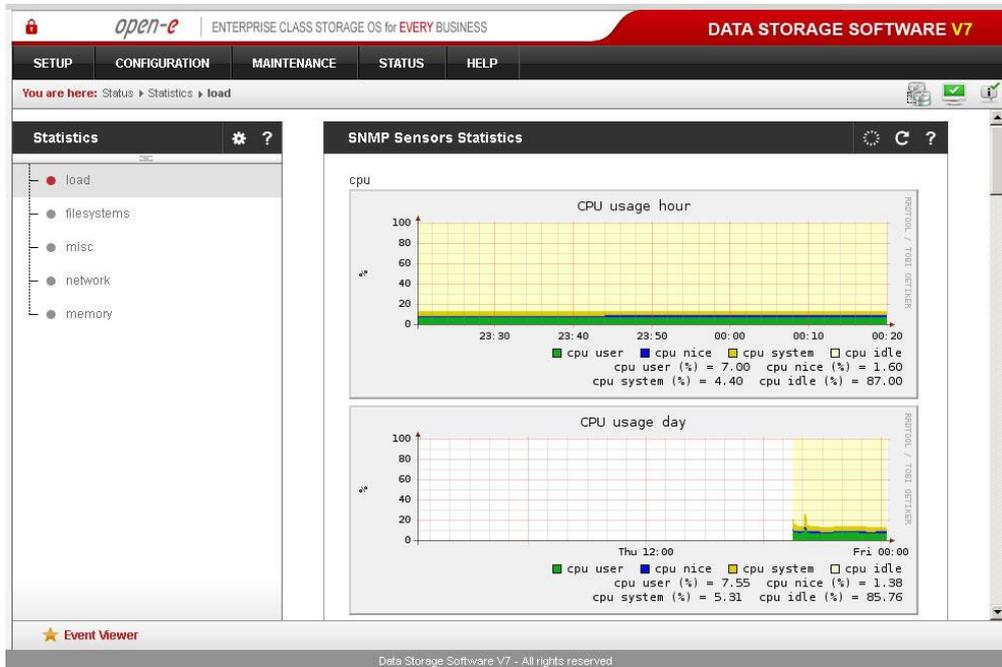
This function displays the current date and time on your server.

Function: SNMP Sensors Statistics

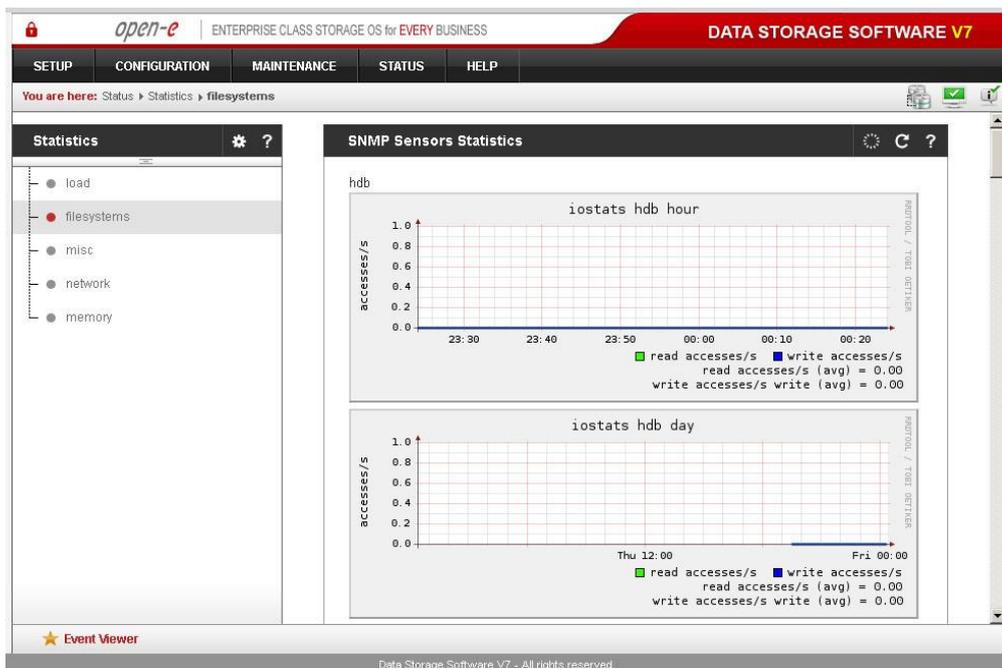
This window contains server statistics. The following statistics are available:

- system load
- filesystems
- misc
- network
- memory

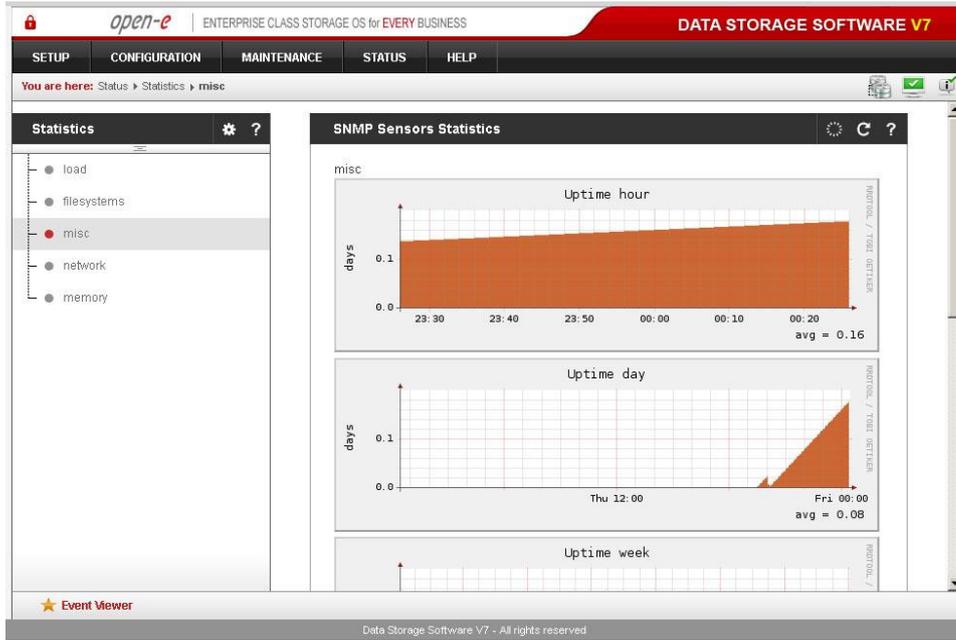
Load



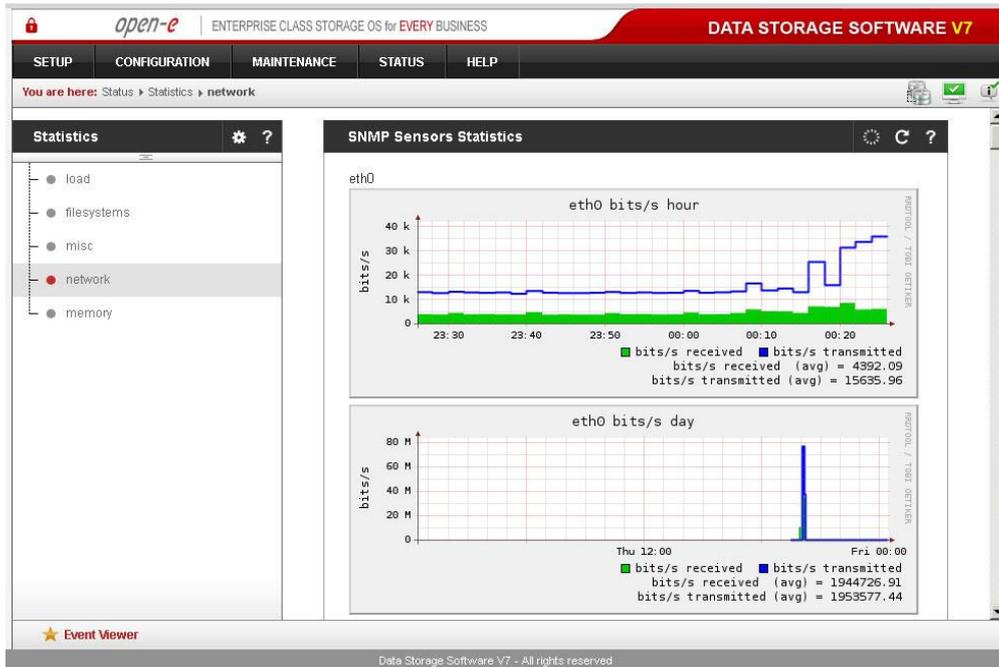
File systems



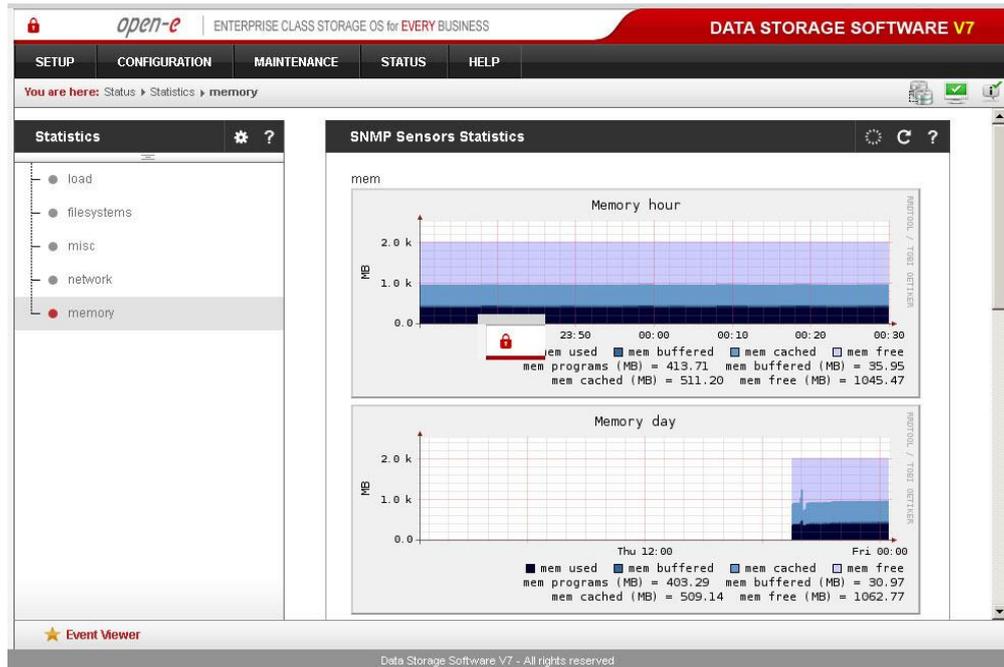
Miscellaneous



Network



Memory



5.2.5 HELP

5.2.5.1 Data Storage Software V7 help

Here you can search through all available help topics in the product.

The screenshot shows the 'Help - Mozilla Firefox' window displaying the 'Welcome to Online Help Index.' page. The page includes a search bar, a list of additional documentation links, and a 'Wizard' section with a link to 'Run Initial Setup Wizard'.

Here you can make a search through all help topics available in the product.

List of additional documentation:

- [How to access iSCSI target snapshot](#)
- [How to access NAS snapshot](#)
- [How to enter IP address](#)
- [Active/Passive failover configuration](#)
- [Active/Active failover configuration](#)

Wizard:

- [Run Initial Setup Wizard](#)

5.2.5.2 About Data Storage Software V7

The screenshot displays the Open-E Data Storage Software V7 web interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The main content area is titled 'DATA STORAGE SOFTWARE V7' and contains the following sections:

- Software Information:** A table listing details for Data Storage Software V7.

Model:	Data Storage Software V7
Version:	7.0up12.9101.9969 64bit
Release date:	2014-01-20
Updates:	N/A
License keys:	k9195
S/N:	A0044602
Product key:	3CTN-C16K-Q5B4-BX7R-W4ED-ZZ4I-UV14
Licensed Storage Capacity:	4 TB
- Extension keys loader:** A form with a 'Key:' input field and an 'apply' button.
- Register:** A section with a message: 'Thank you for buying Open-E software! To get access to software updates and to receive news about changes in our products please register at' followed by a [PRODUCT REGISTRATION](#) link.

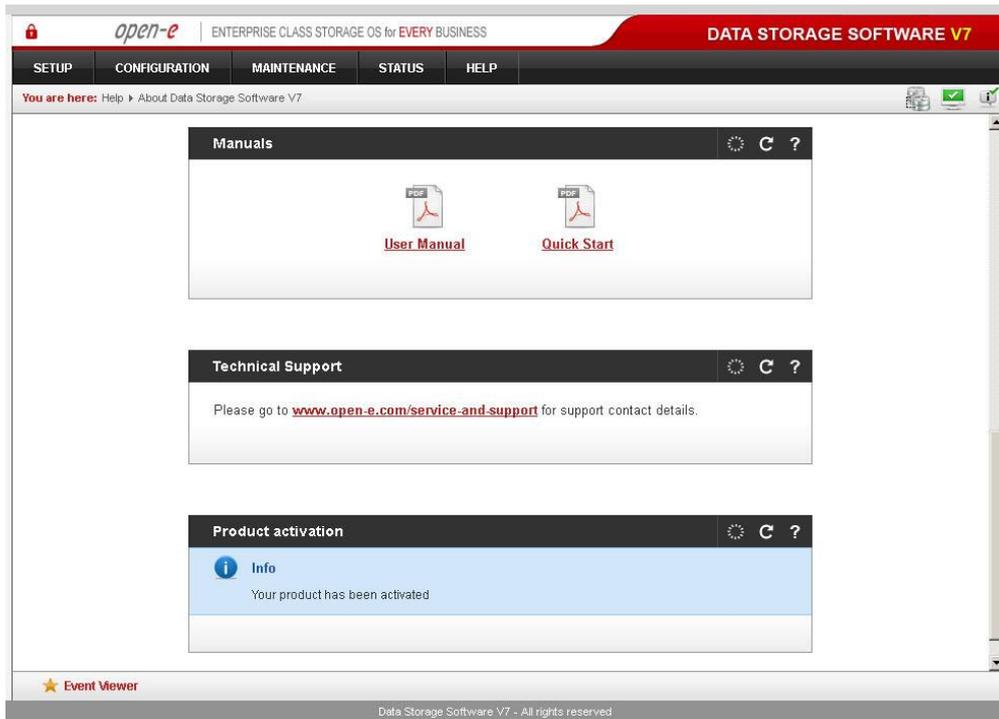
The footer of the interface includes '★ Event Viewer' and 'Data Storage Software V7 - All rights reserved'.

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 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 and gives you an opportunity to receive e-mail notifications on software news.



Function: Manual

You can download the manual in a PDF format here and print it for quick reference.

NOTE In order to read the manual, you need a PDF viewer such as 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**

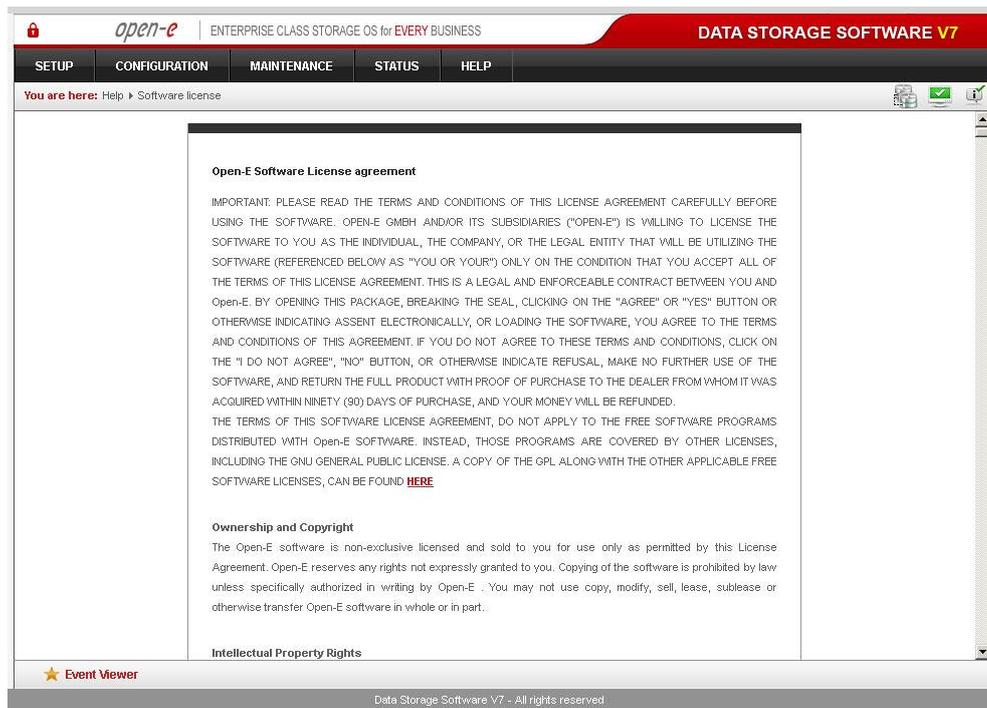
Function: Product activation

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 the 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 the Open-E Data Storage Software V7.



You log out by closing the browser window or by clicking  button.

6 Troubleshooting Guide

Here is a list of common error messages with their significances and 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 to find a solution.

Error: user already exists

There cannot be more than one user with the same name and you cannot create a user twice. Remember, usernames are not case-sensitive. Check your spelling. 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

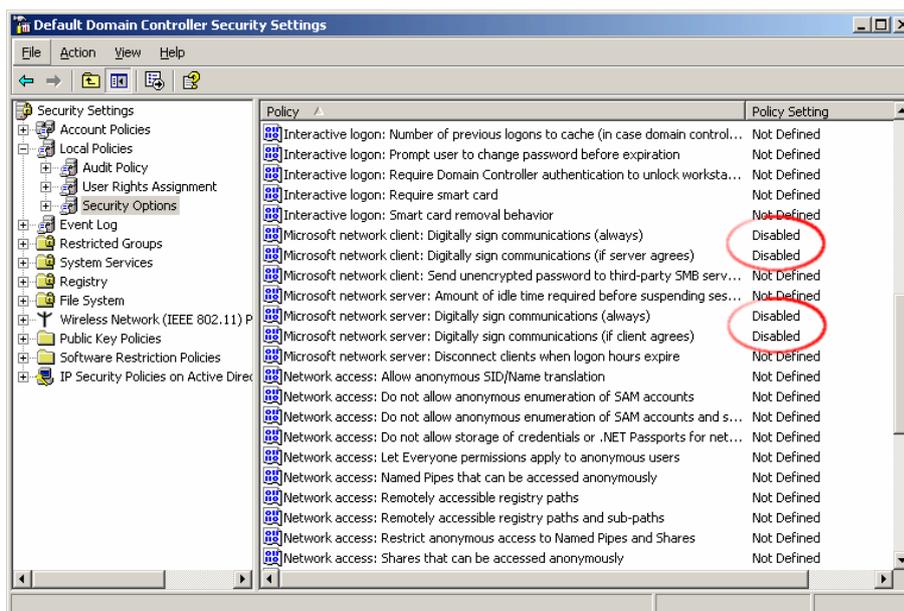
You cannot create more than one resource with the same name. You cannot create a resource twice. Check your spelling. Remember that resource names are not case-sensitive. You can check existing resource names by collapsing the tree diagram on the left.

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 V7 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 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 can 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 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 V7 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.

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Version 2, June 1991

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Version 3, 29 June 2007

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