LevelOne

GNS-4000

4-Bay SATA NAS w/ Gigabit LAN

User Manual

v1.0 - 0706

Notice

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About This Manual

This User Manual describes how to setup, use, and maintain the Network Storage GNS-4000. It also describes how to use the NAS Setup Wizard, SmartSYNC utility, and Advanced Storage Management. This manual includes a full table of contents, chapter task lists, and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:

Note

A Note provides helpful information such as hints or alternative ways of doing a task.

Important

An Important calls attention to an essential step or point required to complete a task. Important items include things often missed.

Caution

A Caution informs you of possible equipment damage or loss of data and how to avoid them.

Warning

A Warning notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

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1. Introduction

LevelOne Network Storage GNS-4000 is a network attached storage (NAS) solution for external storage targeted for small and medium business (SMB) users and small office/home office (SOHO) users. With a NAS product, users can save their work and have access to files over the network without having to carry around a disk drive or memory stick. The Administrator can manage access privileges for greater security. Multiple backup and synchronization functions protect your data.
The Network Storage GNS-4000's architecture is based on the powerful Freescale microprocessor and the hardware based Serial ATA RAID Controller. The Gigabit Ethernet port is used for the data transfer and management. The USB ports are used for a printer, expansion drives, and Uninterrupted Power Supply (UPS).

1.1. Key Feature

- Easy-to-use browser-based management interface
- Data sharing over the network
- One-touch backup of designated file folders on client PC
- Snapshot backup for real-time image of the file system
- Remote NAS-to-NAS synchronization and backup
- Network print server with USB printer
- User, Group, and Quota management
- UPS support with automated shutdown
- Heterogeneous environment: Windows, UNIX, Linux, and Macintosh
- SmartSYNC Backup Utility
- Setup Wizard Utility
- Windows 2000, XP Professional, 2003 Server, and Vista clients through SMB and CIFS protocols
- UNIX and Linux clients through the NFS protocol
- Macintosh clients through the AFP protocol
- FTP clients through the FTP protocol
- DLNA clients through UPnP protocol with an optional plug-in

Specifications

- Disk drive support:
  - Four 1.5 Gb/s or 3 Gb/s SATA 3.5-inch disk drives
  - Conforms to Serial ATA 1.0 specification and Serial ATA II: Extensions to Serial ATA 1.0 specification (SATA II, phase I specification)
  - SATA specification of 3 Gb/s transfers with CRC error-checking
  - Hot-swapping of disk drives
  - Tagged command queuing
  - Native command queuing
  - Drive roaming among channels
  - S.M.A.R.T status polled every 15 minutes
  - Online capacity expansion
  - RAID Level Migration
  - Hot spare drives
  - RAID Volume rebuilding
  - Gigabyte rounding
  - Background rebuilding
- RAID level support: RAID 0, 1, 5, and 10
- Large file support up to 2 TB
- Unicode file name support
- Hardware SATA RAID Controller
- Networking: 10/100/1000 Mb/s Ethernet Port on motherboard
- USB ports: USB 2.0, up to 480 Mb/s, two Type-A connectors
- File protocols: SMB, CIFS, FTP, AFP, NFS
- Flash Memory: 16 MB, 16-bit
- Memory: 128 MB DDR SDRAM
- Power Supply: 200-watt ATX with PFC
- Network Time Protocol (NTP) client
- Error logging
- Phone home capability (email notification) to contact IT staff
- Hardware monitoring of:
  - Fan
  - Temperature
  - Power
  - Disk status
  - One-Touch button
  - Enclosure status

Compatible Backup Software

Network Storage GNS-4000 is compatible with the following backup software products:

- VERITAS® NetBackup/Backup Exec™
- CA BrightStor™ARCserve/Enterprise
- LEGATO® NetWorker™
- Syncsort Backup Express
- Microsoft Backup Software for Windows 95/98/NT/2000/ME/XP
- Dantz Retrospect for Macintosh

Client OS Support

- Microsoft Windows:
  - Vista, Server 2003, XP Professional, 2000
  - Supports Intel IA32, AMD64 and Intel EM64T platforms

- UNIX/Linux:
  - Red Hat Enterprise Linux 3.0 (AS/WS/ES)
  - Red Hat Enterprise Linux 4.0 (AS/WS/ES)
  - SuSe Linux Enterprise 10 (Server/Desktop)

- Apple Macintosh:
  - Mac OS X

Browser Support

Use the latest version of the following browsers to manage the Network Storage GNS-4000:

- Internet Explorer
- Netscape Navigator
- Mozilla
- Firefox
- Safari (Mac OS X)

Caution

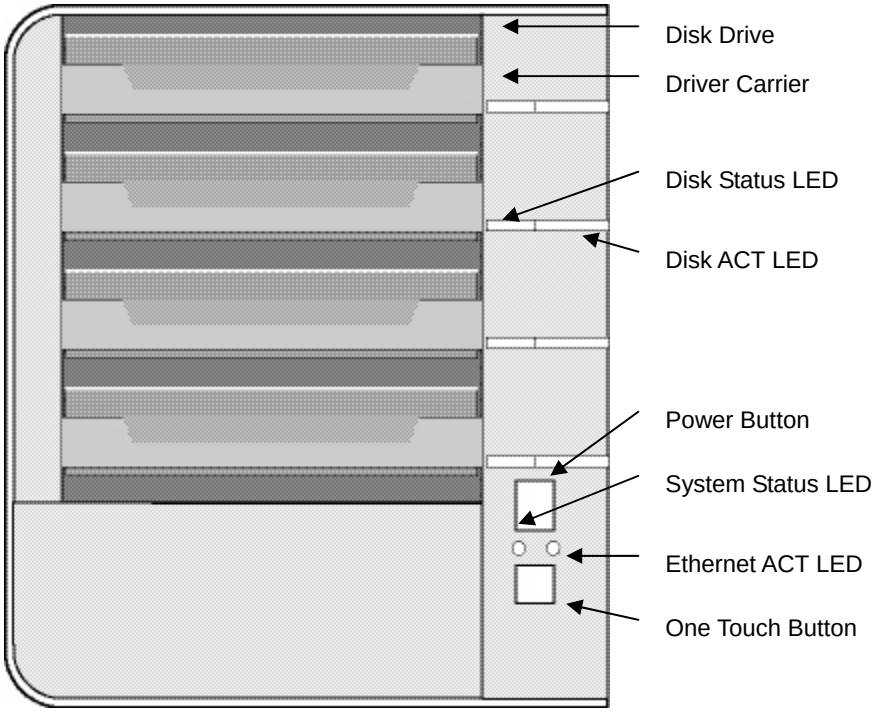
1. Back up your system periodically to avoid any potential data loss. LevelOne disclaims any responsibility of all sorts of data loss or recovery.
2. Should you return any components of Network Storage package for refund or maintenance, make sure they are carefully packed for shipping. Any form of damages due to improper packaging will not be compensated.

1.2. Package Content

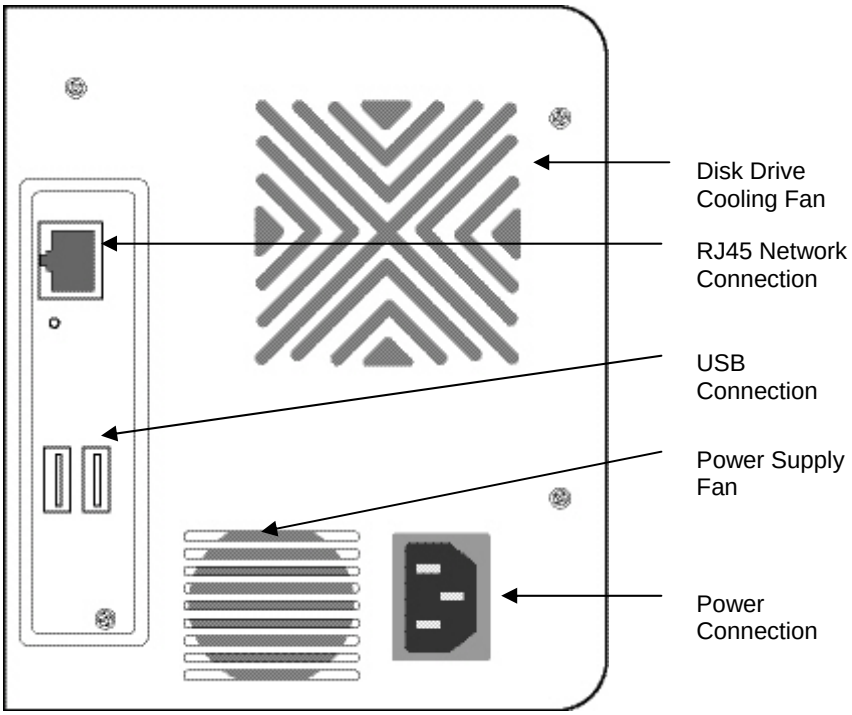
The Network Storage GNS-4000 box contains the following items:

– GNS-4000
– Power Cord
– Ethernet cable
– Screws for disk drives (16, including 4 spares)
– CD with User Manual / NAS Utilities

1.3. Front Panel



1.4. Rear Panel



2. Chapter 2: Installation and Setup

Warning

The electronic components within the Network Storage are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the Network Storage or its subassemblies.

Important

To configure the Network Storage, you must install the software onto a PC running Windows Vista, 2003 Server, XP Professional, or 2000.

2.1. Installing Disk Drives

You can populate the Network Storage GNS-4000 with SATA 1.5 Gb/s or 3.0 Gb/s disk drives. For optimal performance, install disk drives of the same model and capacity. Your disk drives will become a RAID Volume on the Network Storage.

To install disk drives:

1. Open the door on the front of the Network Storage enclosure.
2. Pull a disk drive carrier from the enclosure.
3. Carefully lay the disk drive into the drive carrier, so that the screw holes on the sides of the carrier align with the screw holes in the drive.
4. Insert the screws through the holes in the drive carrier and into the sides of the disk drive.
   - Install only the counter-sink screws supplied with the Network Storage.
   - Install four screws per drive.
   - Snug each screw. Be careful not to over-tighten.
5. Reinstall the drive carrier into the Network Storage enclosure.
   - Repeat steps 2 through 5 until all of your disk drives are installed.
6. Close the door on the front of the Network Storage.

2.2. Connecting to the Network

To connect the Network Storage to your network:

1. Attach one end of the network cable to the RJ45 network connection.
2. Attach the other end of the network cable to your Ethernet hub or switch

Important

If there are multiple networks at your facility, note the network to which you connect the Network Storage. You will need this information during the setup process.

2.3. Connecting the Power

To power the Network Storage:

1. Attach the power cord on the back of the Network Storage enclosure and plug the other end into the power source
2. On the front of the Network Storage, press the power button
   It takes about a minute to boot the Network Storage. When fully booted:
   - The System Status LED turns green
   - The buzzer beeps one time.

2.4. Installing the Software

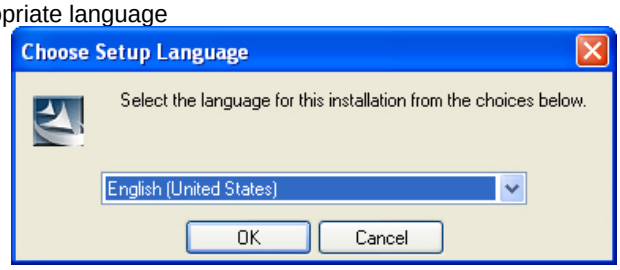
When you install the software onto your Windows PC, three new items are added to the Windows Start menu:

1. NAS Setup Wizard – Sets up the Network Storage
2. SmartSYNC – Connects your PC to the Network Storage, sets up network drives on your PC, and performs backups
3. Configuration Tool – Ensures that the Network Storage, NAS Setup Wizard, and SmartSYNC are all on the same network

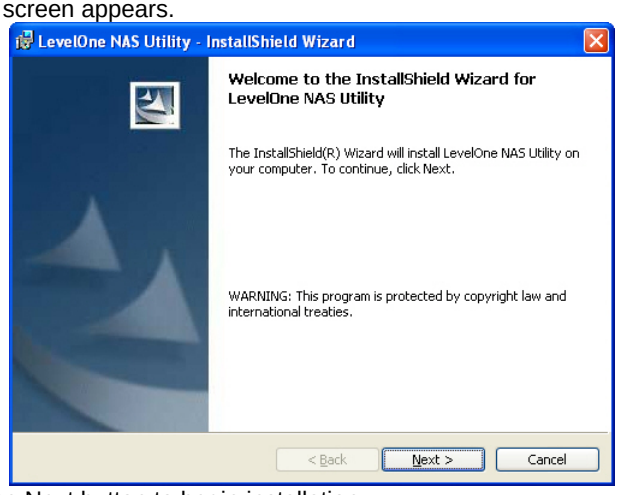
To install the software:

1. Insert the CD into your CDROM.
2. Double-click on NAS Utility Installer icon.

Select appropriate language



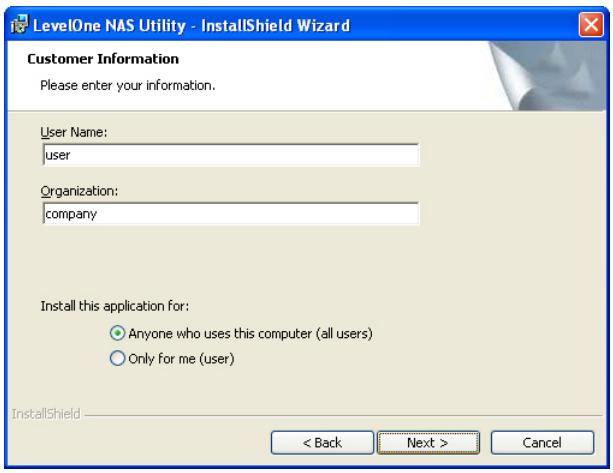
The installer screen appears.



3. Click the Next button to begin installation.

The License Agreement screen appears.

4. Click the “I accept the terms...” option, then click the Next button.
The Customer Information screen appears.



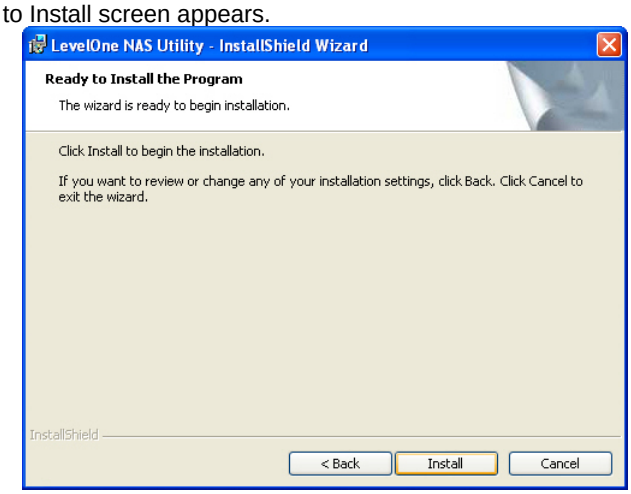
5. Type a user name and organization name into the respective fields or leave them unchanged to accept the default entries.

Click the Install option for:

- Anyone who uses this computer (all users)
- Only for me (the current user)

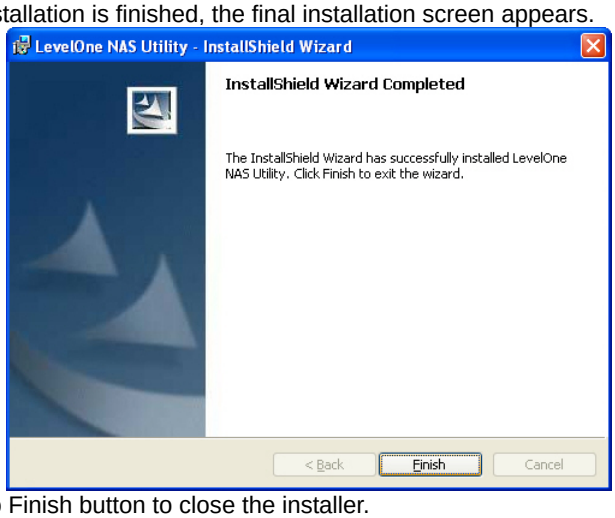
Click the **Next** button.

The Ready to Install screen appears.



6. Click the Install button to proceed with installation.

When the installation is finished, the final installation screen appears.



7. Click to Finish button to close the installer.

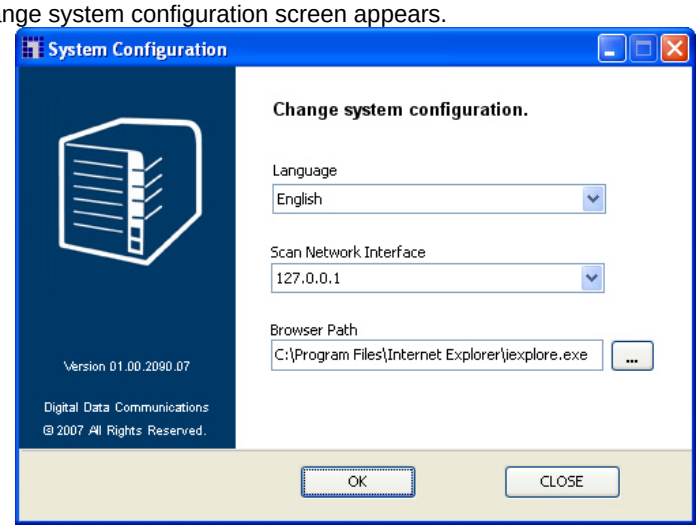
2.5. Selecting Your Network

If your PC has only one network connection, skip to “Setting up the Network Storage”. If your PC has multiple network connections, you must ensure that the Network Storage, NAS Setup Wizard, and SmartSYNC utility are all connected to the same network. The Configuration Tool performs that function.

To make your network selection:

1. From the Windows Start menu, choose Programs, then LevelOne NAS Utility, and then Configuration Tool.

The Change system configuration screen appears.



2. From the language dropdown menu, choose the language you prefer.
3. From the Scan Network Interface dropdown menu, choose the IP address for the network where you installed the Network Storage.
   The IP addresses in this menu belong to the network interface cards (NICs) in your PC. You must select the NIC that is connected to the network where you installed the Network Storage.
4. **Optional.** Click the ... button to navigate to the browser you want to use as with the Network Storage.
   The default browser appears in the Browser Path field. Change this setting only if you want use a different browser.
5. Click the **OK** button.
6. In the System Message, click **OK** to finish your network selection.

2.6. Setting up the Network Storage

Caution

The NAS Setup Wizard will overwrite all existing settings on the Network Storage. In most cases, you should only run the NAS Setup Wizard one time - when you first set up your Network Storage.

The NAS Setup Wizard performs the setup procedures on your Network Storage.

To set up your Network Storage:

1. From the Windows Start menu, choose Programs, then LevelOne NAS Utility, then NAS Setup Wizard.

The NAS Setup Wizard welcome screen appears.

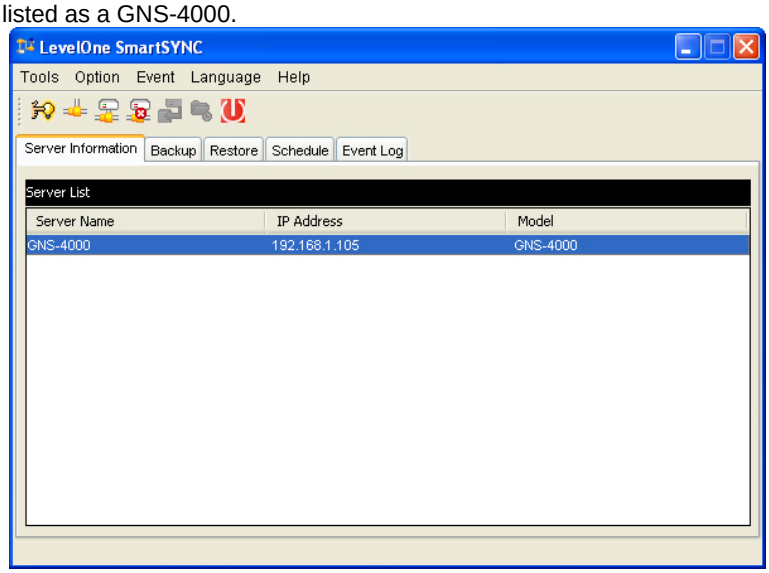
2. From the Choosing a language dropdown menu, choose the language you prefer.
3. Choose an Initiation Mode.
   Click the Express Mode option if ALL of these conditions apply:
   - You have a DHCP server on your network with addresses available.
   - You want data protection for your RAID Volume.
   - You want to use date and time settings from your PC.

Click the Advanced Mode option if one or more of these conditions apply:

- You do not have a DHCP server on your network.
- You have a DHCP server but no addresses are available.
- You want to set the IP address manually.
- You want maximum capacity RAID 0 Volume.
- You want to set date and time manually.

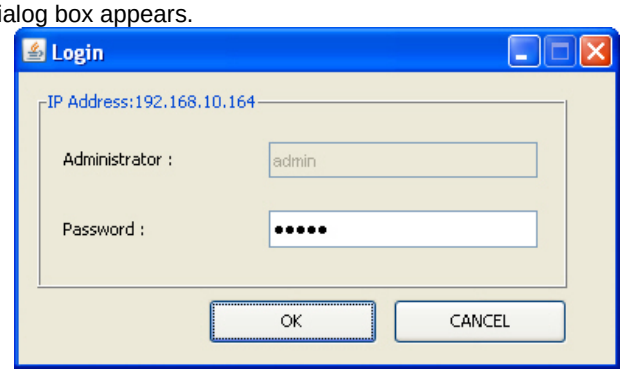
The rest of the setup instructions describe Express mode. For setup instructions using Advanced mode, see “Appendix A: Setup Wizard Advanced Mode”

4. Click **Next >>** to continue.
The Discovering LevelOne NAS screen appears. The Network Storage is listed as a GNS-4000.



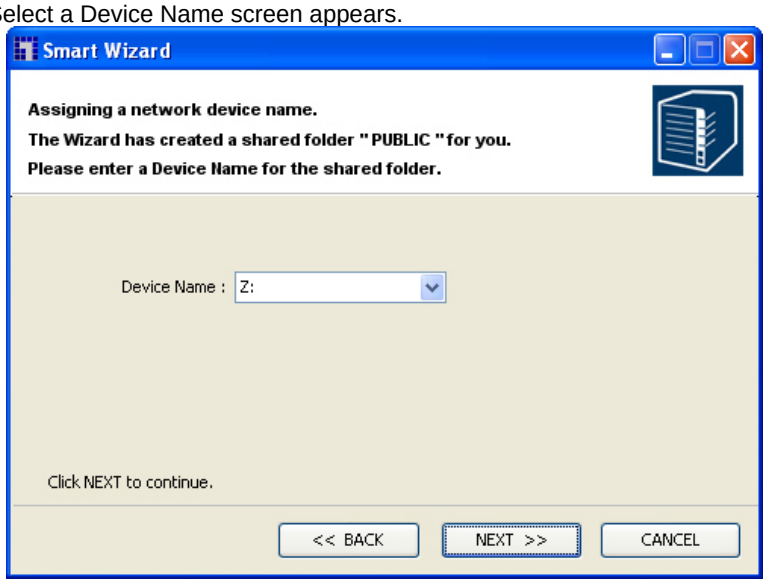
5. Highlight the Network Storage you are initiating, then click **Next >>** to continue.

The Login dialog box appears.



6. Type **admin** into the Password field, then click **OK**
   The password is case sensitive.

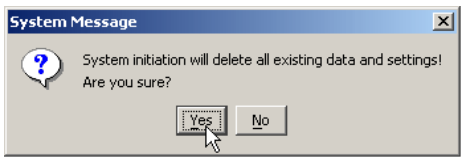
The Select a Device Name screen appears.



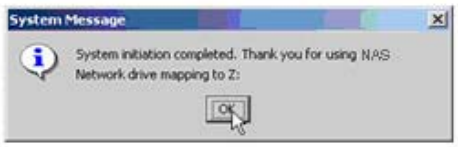
7. Select a Device Name (drive letter) to represent the default folder on the Network Storage as a network drive on your PC. The list begins with **Z** and goes in reverse alphabetical order.

   Click **Next >>** to continue.

The System Message appears.



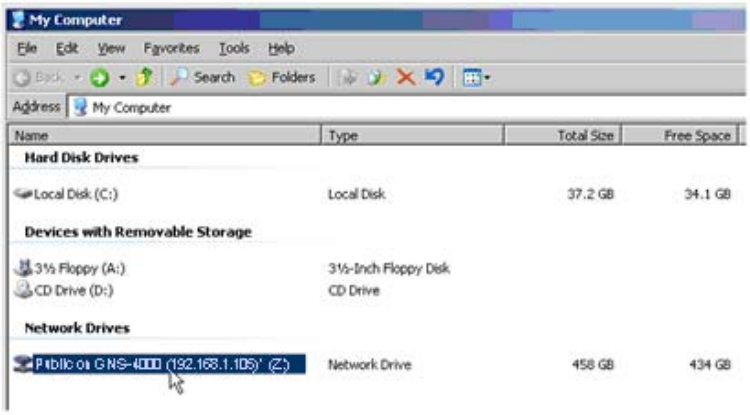
8. Click the **Yes** button to begin the system initiation.
   The Wizard requires several minutes to configure your Network Storage, depending on the size of your disk drives. When the Wizard is done another System Message appears.



9. Click **OK** to finish the system initiation.

The Wizard creates a RAID Volume and a default folder called Public.

If two disk drives are installed in your Network Storage, the Wizard creates a RAID1 Volume. If three or four disk drives are installed, the Wizard creates a RAID5 Volume. The Public folder on the Network Storage appears under My Computer as a network drive.



You can now copy files to and from the folder on the Network Storage.

2.7. Connecting to ASM

The LevelOne Advanced Storage Management (ASM) software is factory-installed on the Network Storage system. ASM runs in the browser on your PC. You can access ASM:

- Directly in your browser.
- Through SmartSYNC.

Browser Support

Choose one of the following browsers to use with ASM:

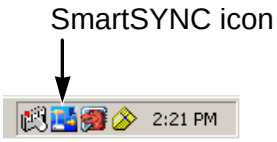
- Internet Explorer
- Mozilla
- Firefox
- Netscape Navigator
- Safari (Mac OS X)

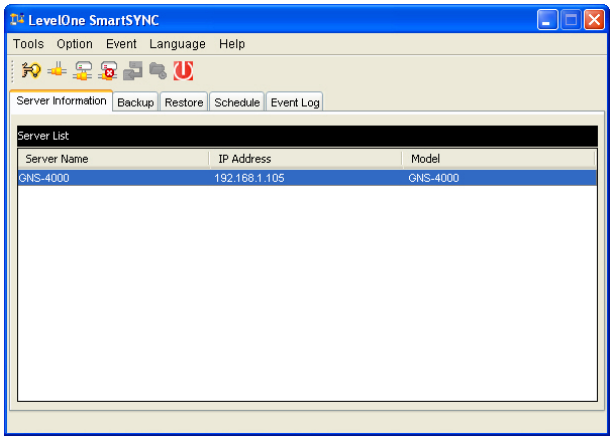
Finding the Network Storage's IP Address

To access the Network Storage in your browser, you must know the Network Storage's IP address. Use SmartSYNC for this purpose.

1. From the Windows Start menu, choose Programs, then LevelOne NAS Utility, and then SmartSYNC.
2. To open the SmartSYNC window, in the Windows application tray (lower right corner of the screen), double-click on the SmartSYNC icon.

   The SmartSYNC screen appears with the Server Information tab displayed. The IP address of the Network Storage shown in the Server List.





ASM in your Browser

To log into ASM in your browser:

1. Start your Browser.
2. In the Browser address field, type in the IP address of the Network Storage.

Note that the IP address shown below is only an example. The IP address you type into your browser will be different.

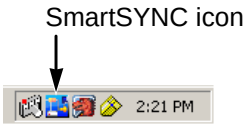
- ASM uses an HTTP connection http://
- Enter the Network Storage's IP address 192.168.1.105

Together, your entry looks like this: **http://192.168.1.105**
The ASM login screen displays

3. Type the user name and password in the respective fields, then click the **Login** button.
   The default user name is **admin**. The default password is **admin**.
   The user name and password are case sensitive.

ASM in SmartSYNC

To log into ASM in SmartSYNC:



1. In the Windows application tray (lower right corner of the screen), double-click on the SmartSYNC icon (right). SmartSYNC opens with the Server Information tab displayed.


Open GUI button

2. Click on the **Open GUI** button (right).
   Your default browser starts and the ASM login screen displays.

3. Type the user name and password in the respective fields, then click the Login button.
   The default user name is **admin**. The default password is **admin**.
   The user name and password are case sensitive.

3. Connecting to the Network Storage

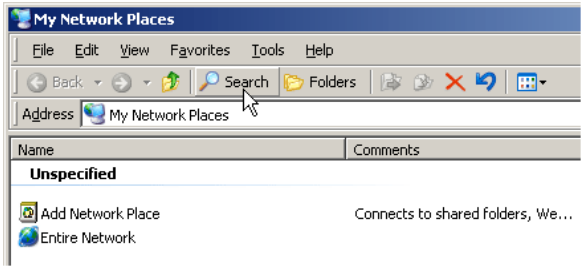
To copy files to and from a folder on the Network Storage, you must make the folder a network drive on your PC. To use the Network Storage as a print server, you must connect the USB printer, enable Network Storage's print server, and set up printing on your PC.

3.1. Setting up a Network Drive on a Windows PC

You can also use SmartSYNC for this purpose, see "Connecting a Network Drive". If your PC does not have SmartSYNC, use the following procedure to setup a Network Drive with My Network Places.

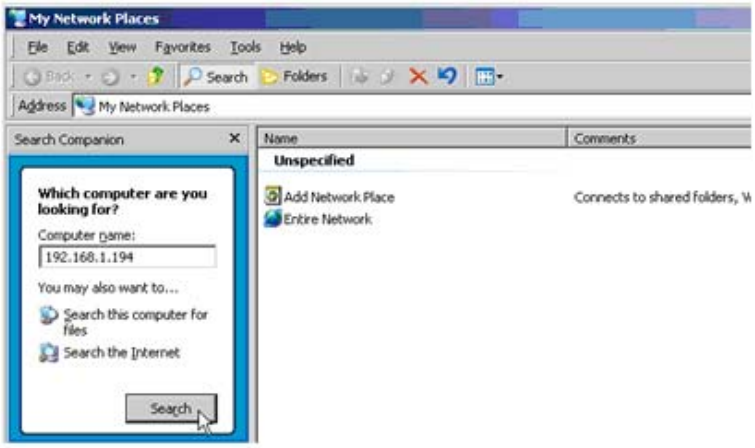
To setup a network drive:

1. On the Windows desktop, double-click on the My Network Places icon.
2. Click the **Search** button in the toolbar.

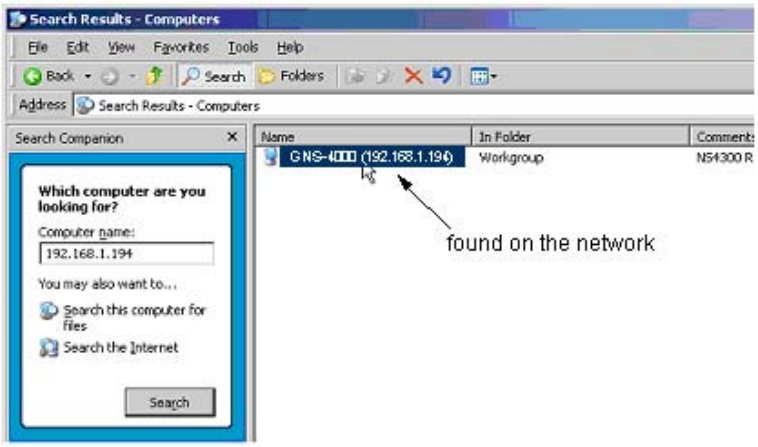


If the Search button is not shown, from the View menu, choose Toolbars, then Standard Buttons.

3. In the Computer name field, type the IP address of the Network Storage and click the **Search** button.

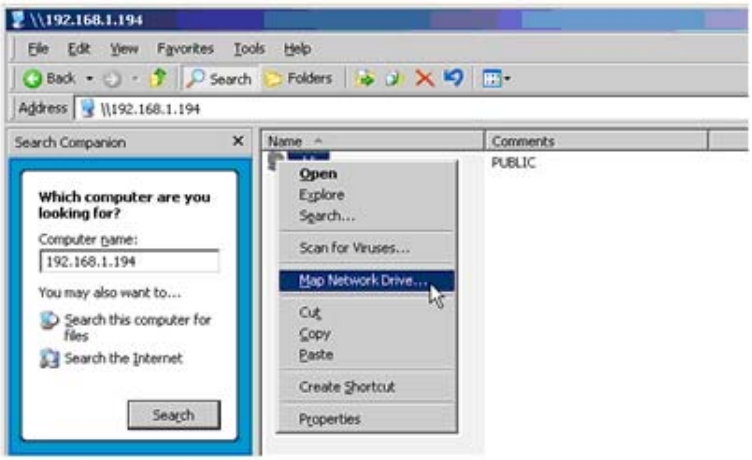


The Network Storage appears in the search results list.



4. Double-click on the Network Storage to show the Public folder and any other folders you have created.

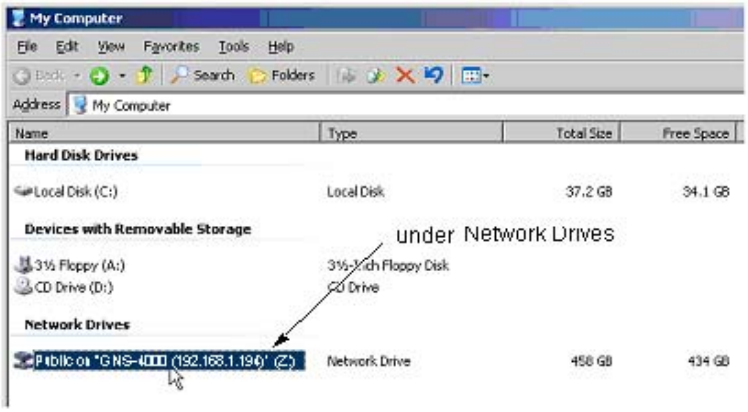
5. Right-click on the folder you want and choose Map Network Drive from the dropdown menu.



The Map Network Drive dialog box appears.

6. In the Map Network Drive dialog box, choose a drive letter and click the **Finish** button.
7. Double-click on the My Computer icon on your Windows desktop.

The folder on the Network Storage appears under My Computer as a network drive.



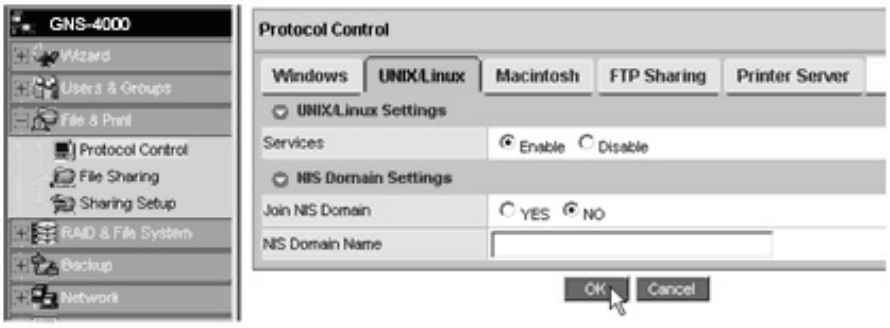
You can now copy files to and from the folder on the Network Storage.

3.2. Setting up a Network Drive on a UNIX or Linux PC

Before you can access the Network Storage from a UNIX or Linux PC, you must configure the Network Storage to communicate with UNIX and Linux.

On the Windows PC

1. Start ASM.
2. In the Tree, click on the + beside the File & Print icon to expand the Tree.
3. Click on the Protocol Control icon, then click on the UNIX/Linux tab.



4. Next to Service, click the Enable option, then click the **OK** button. The UNIX/Linux protocol enables UNIX and Linux PCs to connect to Network Storage.
5. Click on the File Sharing icon in the tree.
6. Click on the Modify tab.

7. Check the Unix/Linux box, then click the **OK** button. The UNIX/Linux file sharing enables UNIX and Linux PCs to access folders on the Network Storage. In this case, access is given for the PUBLIC folder.
8. Click on the Sharing Setup icon in the tree.
9. Click on the UNIX/Linux Sharing tab.

10. In the New IP Address field, type the IP address of the UNIX/Linux PC from which you want to access the Network Storage.
11. Click the **Add** button.

On the UNIX/Linux PC with Command Line Interface

1. Open a terminal window.
2. Create a new folder for the Network Storage. Type mkdir Network Storage and press Enter.
3. Mount the Network Storage. Type **mount 192.168.1.194:/Volume1/Public /Network Storage** and press **Enter**

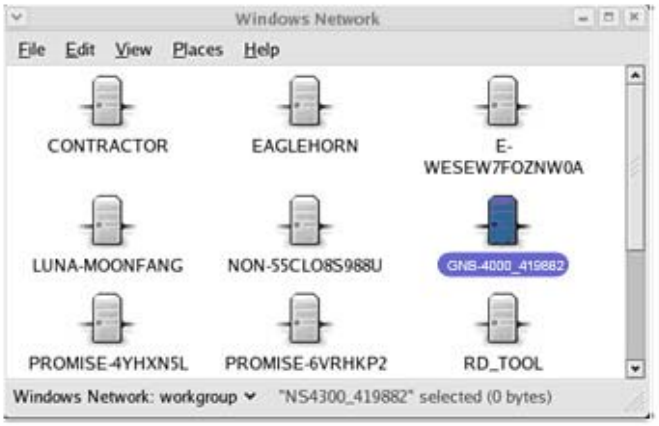
   Note that the IP address shown above is only an example. The IP address you type in your terminal window will be different.
   Volume1 and Public refer to the default Volume and folder created during setup. If you created another volume or folder, use their names.

4. Change to the Network Storage directory. Type **cd /Network Storage** and press Enter.
5. You can now copy files to and from the folder on the Network Storage.
6. When you are done with the Network Storage, type **cd; umount /Network Storage** and press **Enter**

On the Linux PC with Graphic Desktop

This procedure is for a RedHat Enterprise Linux 4 configuration. If you run a different version of Linux, you might have to adapt the procedure. See your OS documentation.

1. From the Applications menu, choose Network Servers.
2. In the Network window, double-click on Windows Network.
3. Double-click on the Network Storage (GNS-4000) on the network.



4. Double-click on the folder you want

If this is the first time you accessed this folder, an Authentication dialog box opens.

5. Type the user name and password in the respective fields, then click the **OK** button.

   The default user name is **admin**. The default password is **admin**
   The user name and password are case sensitive.
   Leave the Domain field blank.
   The folder opens. You can now copy files to and from the folder on the Network Storage.

3.3. Setting up a Network Drive on a Macintosh PC

Before you can access the Network Storage from a Macintosh (Mac OS X) PC, you must configure the Network Storage to communicate with the Mac OS.

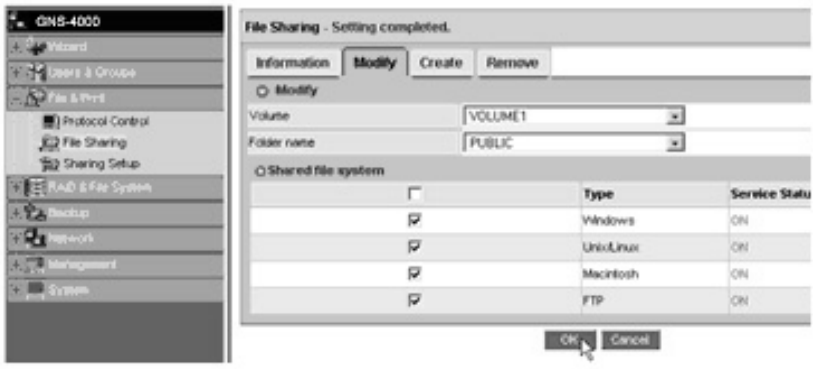
On the Windows PC

1. Start ASM.
2. In the Tree, click on the **+** beside the File & Print icon to expand the Tree.
3. Click on the Protocol Control icon, then click on the Macintosh tab.

4. Next to Service, click the **Enable** option, then click the **OK** button.

   The Macintosh protocol enables Macintosh PCs to connect to Network Storage.
5. Click on the File Sharing icon in the Tree.

Click on the Modify tab.

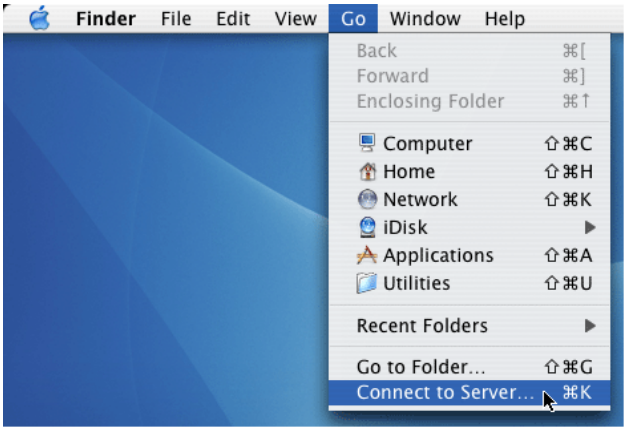


7. Check the Macintosh box, then click the **OK** button.

   The Macintosh file sharing enables Macintosh PCs to access folders on the Network Storage. In this case, access is given for the PUBLIC folder.

On the Macintosh PC

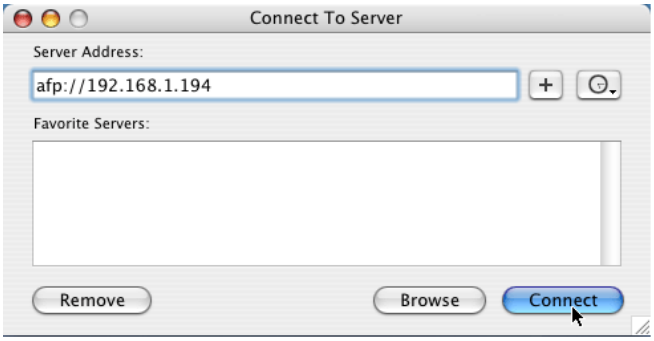
1. From the Go menu, choose Connect to Server.



2. In the Connect to Server dialog box, type **afp://192.168.1.194** and click the **Connect** button.

   Note that the IP address shown below is only an example. The IP address you type in the dialog box on your Macintosh will be different.

   Click the **+** button to add this IP address to the Favorite Servers list.



3. Type the user name and password in the respective fields, then click the **Connect** button.

   The default user name is **admin**. The default password is **admin**.

   The user name and password are case sensitive.

4. In the GNS-4000 dialog box, click on the folder you want, then click the **OK** button.

5. In the GNS-4000 Welcome screen, click the **OK** button.

A window opens on the Macintosh desktop to access the folder on the Network Storage.

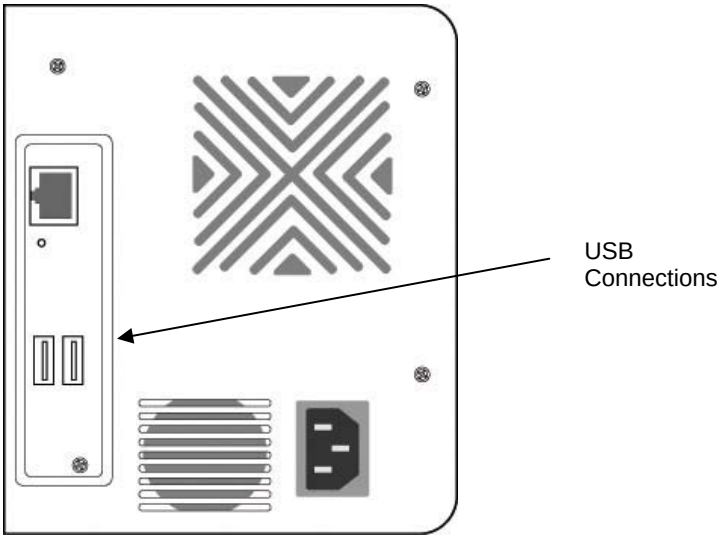
You can now copy files to and from the folder on the Network Storage.

3.4. Connecting a USB Printer

To connect a USB printer to the Network Storage:

1. Set up your printer according to the printer's *Setup Guide* or *User Manual*.
2. Install the printer drivers onto your PC as described in the printer's *Setup Guide* or *User Manual*.

Attach the USB cable from your printer to one of the USB connections on the back of the Network Storage.

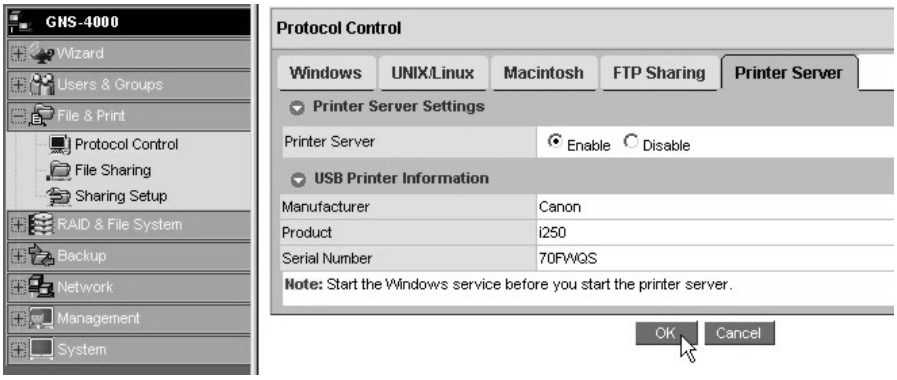


3.5. Setting up the Print Server on Network Storage

To set up the Network Storage's print server:

1. Start ASM.
2. In the Tree, on the left side of the ASM screen, click on the **+** beside the File & Print icon to expand the Tree.
3. Click on the Protocol Control icon, then click on the Windows tab.
4. Click the **Enable** option button beside Services.
5. Click the **OK** button to save your settings.
6. Click on the Printer Server tab.
7. Click the **Enable** option button beside Printer Server.

Click the **OK** button to save your settings.



3.6. Setting up Windows Printing

To set up printing on a Windows PC:

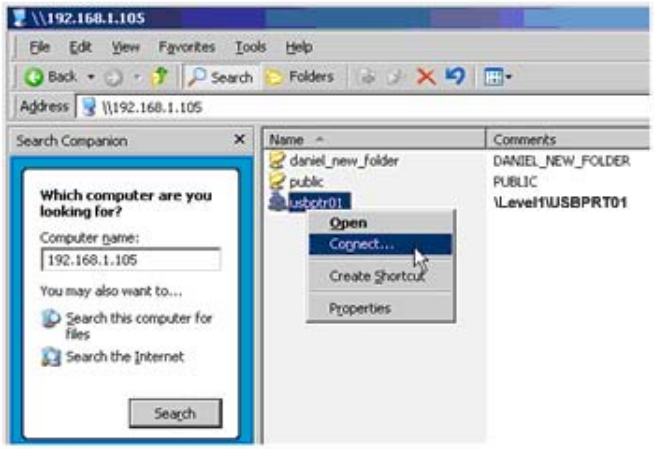
1. On the Windows desktop, double-click on the My Network Places icon.
2. Click the Search button in the toolbar.
   If the Search button is not shown, from the View menu, choose Toolbars, then Standard Buttons.

3. In the Computer name field, type the IP address of the Network Storage and click the Search button in the side bar.
   The Network Storage appears in the search results list.
4. In the computer list, double-click on the Network Storage to open it.
   If the Connect to dialog box appears, type the user name and password in the respective fields, then click the OK button.
   The default user name is admin. The default password is admin.
   The user name and password are case sensitive.

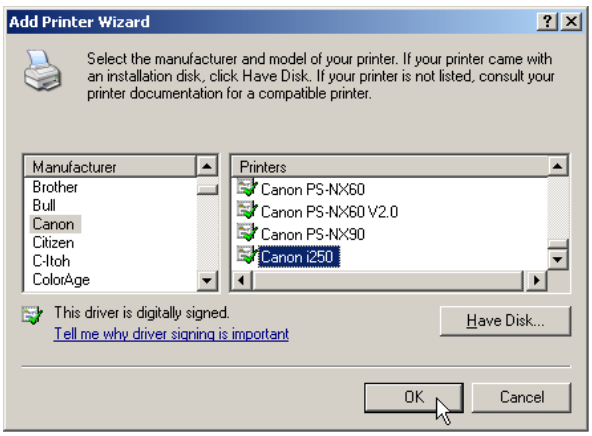
Note

For sharing printer under Microsoft ® Windows Vista OS, the **User name** and **Password** must same as Network Storage's account.

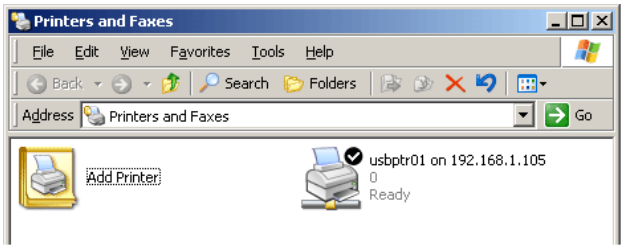
5. Right-click on the **usbptr1** icon folder and choose *Connect...* from the dropdown menu.



6. When the warning message about printer drivers appears, click the OK button to continue.
7. In the Add Printer Wizard, click on the Manufacturer and model name of your USB printer, then click the OK button.



8. In the Add Printer Wizard, click the OK button.
9. To verify printer installation, in the Windows Start menu, choose Settings, then Printers and Faxes.
   The Printers and Faxes screen appears. The usbptr1 is the USB printer on the Network Storage.



3.7. Setting up Linux Printing

This procedure is for a RedHat Enterprise Linux 4 configuration. If you run a different version of Linux, you might have to adapt the procedure. See your OS documentation.

1. From the Applications menu, choose *System Settings*, then *Printing*.

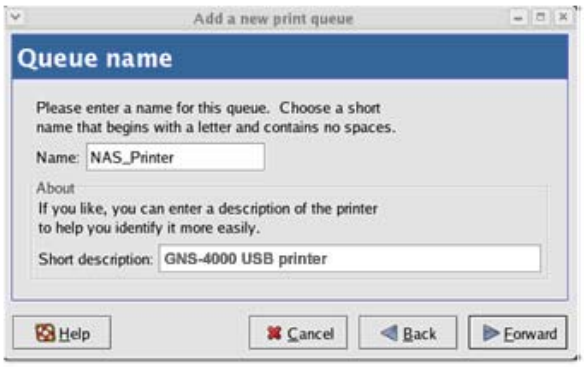
   Printer configuration window opens.

2. Click the **New** button.

   Add a new print queue dialog box opens.

3. Click the **Forward** button.

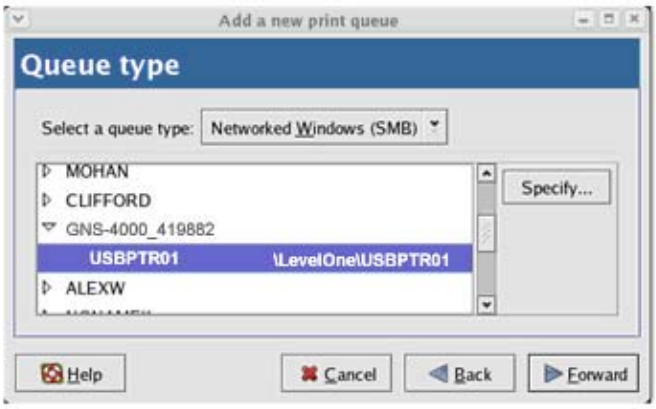
4. In the Name field, type a name for the printer, such as *NAS_printer*, a description, and click the **Forward** button.



5. From the Select a queue type dropdown menu, choose *Network Windows (SMB)*.

6. Scroll the list and click on the triangle icon beside GNS-4000.

USBPTR01 appears below GNS-4000. USBPTR01 represents the USB printer connected to the Network Storage.

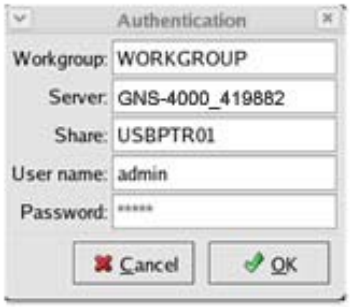


7. Highlight *USBPTR01* and click the **Forward** button.

   The Authentication dialog box opens.

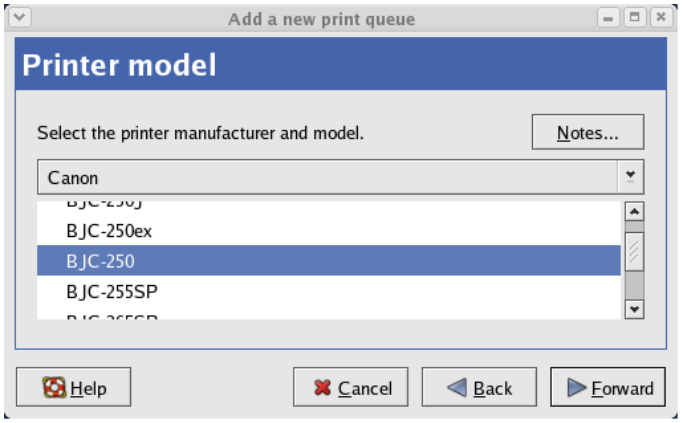
   In the User name and Password fields, type **admin**, then click the **OK** button.

   The user name and password are case sensitive.

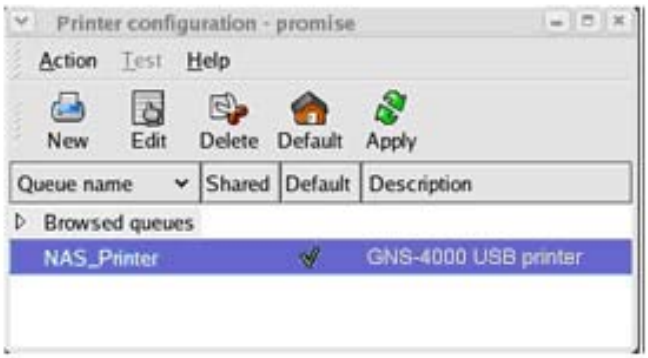


   The Printer Model dialog box opens.

8. From the dropdown menu, choose the manufacturer of your printer.
From the model list, highlight the model of your computer.
Then click the **Forward** button.



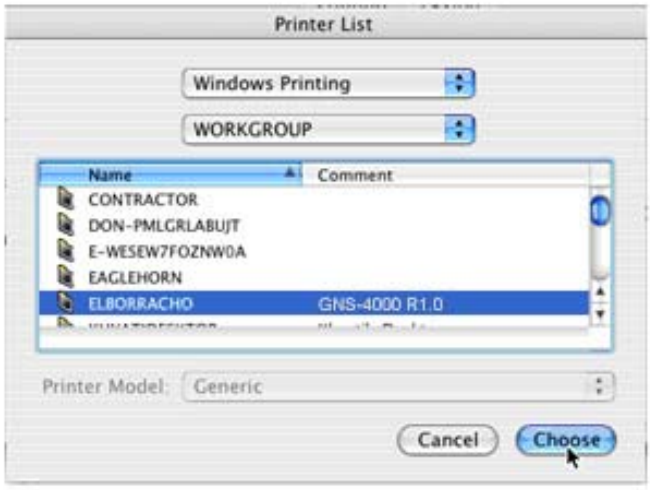
9. Click the **Finish** button.
USBPTR01 is added to your printer list.



3.8. Setting up Macintosh Printing

To set up printing on a Macintosh PC:

1. From the Apple Menu, choose *System Preferences*.
2. Double-click on the **Print & Fax** icon.
3. Click on the **Setup Printers** button.
4. In the Printer List, click on the **Add** icon.
   The Printer List displays a new panel.
5. In the new panel, from the popup menus, choose:
   - Windows Printing
   - Workgroup
6. From the list, highlight the Network Storage, then click the **Choose** button.

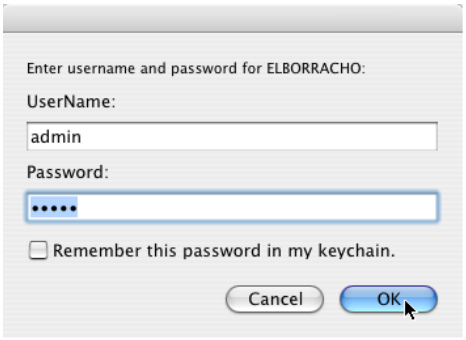


A user name and password dialog box appears.

7. Type the user name and password in the respective fields, then click the **OK** button.

   The default user name is **admin**. The default password is **admin**.

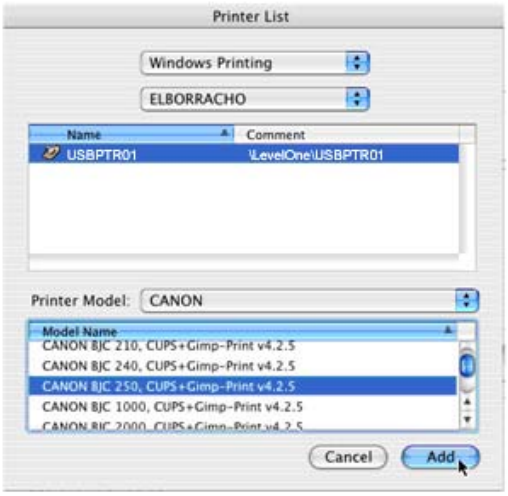
   The user name and password are case sensitive.



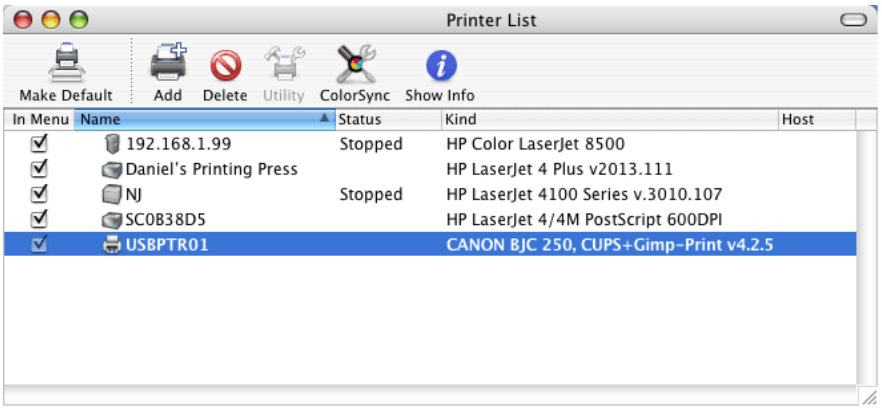
   The printer list displays a new panel.

8. Highlight the *USBPTR01* in the list.

   USBPRT01 represents the USB printer connected to the Network Storage.

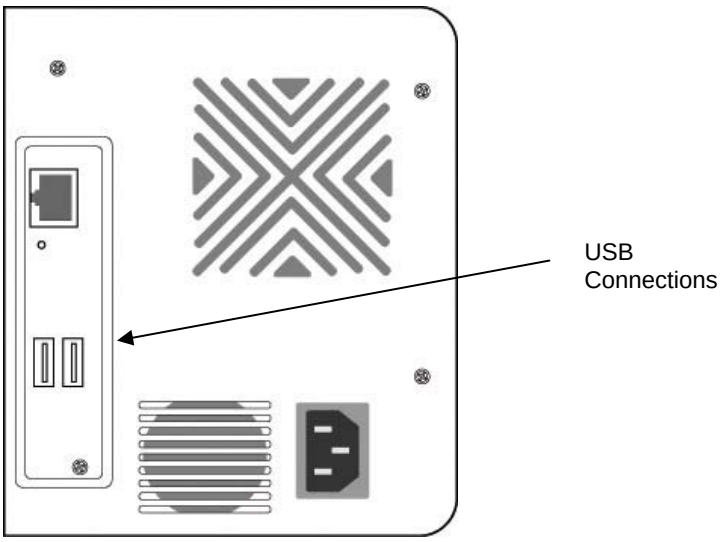


9. In the Printer Model popup menu, choose the make of your printer.
10. In the Model Name list, choose the model of your printer.
11. Click the **Add** button.
    USBPTR01 is added to your printer list.



3.9. Connecting a USB Drive

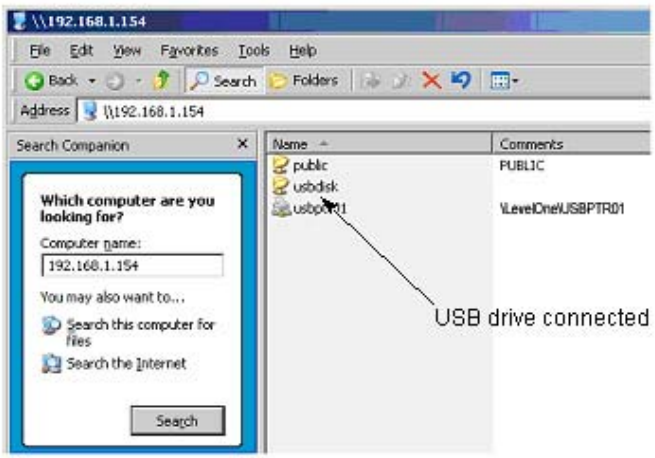
To connect a USB drive to the Network Storage, attach the USB cable from your external drive to one of the USB connections on the back of the Network Storage. If you have a USB memory stick, attach it directly to one of the USB connections or use a USB cable, whichever is more convenient.



The USB drive or memory stick appears as a folder called usbdisk when you create your network drive. See the instructions on the following page.
Network Storage supports USB drives and memory sticks formatted to FAT32 or Ext3 file formats. If the Network Storage does recognize the USB drive or memory stick, the usbdisk folder does not appear.

Windows PC

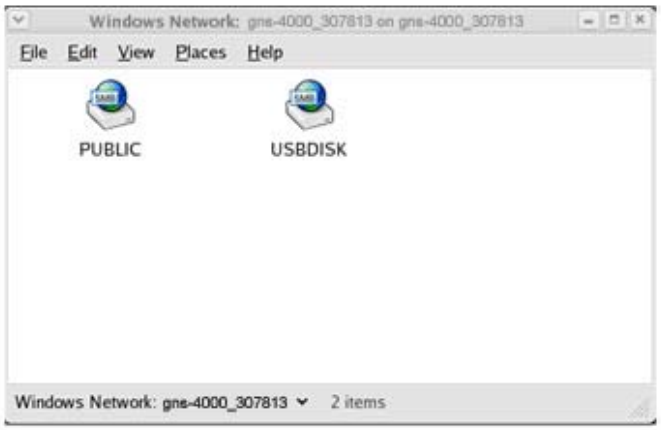
The USB drive appears as a folder on the Network Storage when you create a network drive on a Windows PC.



Follow the procedure “Setting up a Network Drive”, but select the *usbdisk* folder instead of the *public* folder.

Linux PC

The USB drive appears as a folder on the Network Storage when you create a network drive on a Linux PC.



Follow the procedure “Setting up a Network Drive on a UNIX or Linux PC”, but select the USBDISK folder instead of the PUBLIC folder.

Macintosh PC

The USB drive appears as a folder on the Network Storage when you create a network drive on a Macintosh PC.

Follow the procedure “Setting up a Network Drive on a Macintosh PC”, but select the USBDISK folder instead of the PUBLIC folder.

3.10. Disconnecting a USB Drive

To disconnect a USB drive or memory stick from the Network Storage:

1. Be sure that no files on the USB drive or memory stick are still open.
2. Unplug the USB drive or memory stick from the Network Storage.
   The Network Storage automatically unmounts the USB drive or memory stick.

4. One Touch Backup

One Touch Backup enables you to make a quick, automated backup of a selected folder on your PC, at the touch of a button. You can backup the files in a single folder, multiple folders, or your complete hard disk drive. This feature works on the Windows PC where you installed the Network Storage software.

Caution

The Network Storage and One Touch Backup cannot restore a failed boot drive in your PC. However, you can use the Network Storage to save your system backup file. See your Windows documentation for information about system backups.

For One Touch Backup to work, you must:

- Enable One Touch Backup on the Network Storage
- Create a Backup Schedule in SmartSYNC

Notes

- Windows does not allow SmartSYNC to access protected folders and files. If you want to perform a backup, you must first disable protection on your folders and files.
- If you want to run the Windows Backup or Restore Wizard, access the Network Storage as a network drive. See “Setting up a Network Drive on a Windows PC”

4.1. Enabling One Touch Backup

To enable One Touch Backup on the Network Storage:

1. On the Windows PC, start ASM.
2. In the Tree, click on the **+** beside the Backup icon, then click on the Client Backup icon.
3. On the One Touch Backup tab, click the **Enable** button for One Touch Backup Services, then click the **OK** button.

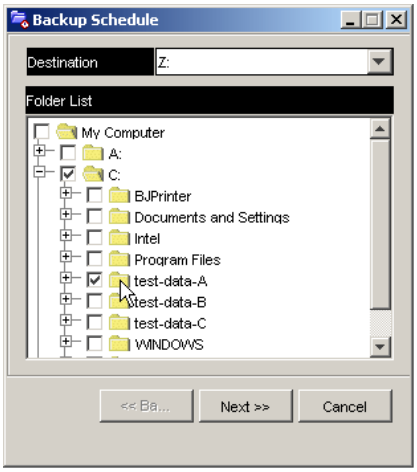
4.2. Creating a Backup Schedule

For each folder you want to backup, you must create a backup schedule.
To create a Backup Schedule in SmartSYNC:

1. On the Windows desktop, double-click on the SmartSYNC icon (right).
2. In SmartSYNC, click on the Schedule tab.
3. Click the **Create** button.
4. In the Backup Schedule window, verify the Destination.

   The destination is a letter, typically Z, Y, or X, which represents a network drive on your PC and a specific folder on the Network Storage.
5. In the folder list, click on the **+** icons to expand the tree.

   The Folder List is a representation of the file structure on your PC.

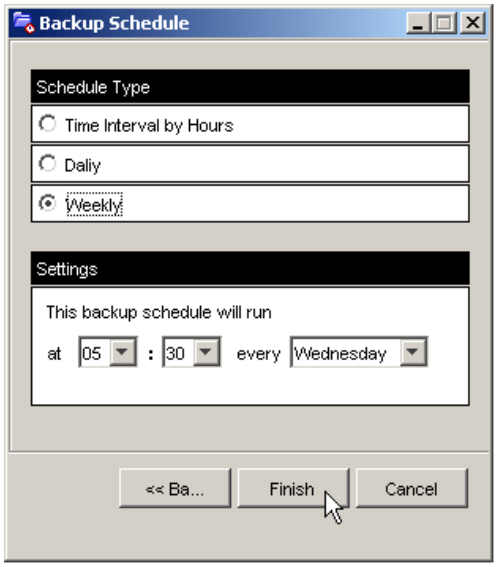


6. Click on the folder you want to backup.

   A checkmark appears beside the selected folder. The backup will include the folder you select and all subfolders.
7. Click the **Next >>** button.
8. Choose a Schedule interval by number of hours, daily, or weekly.

9. Choose a setting:
    - If you chose hours, choose the number of hours from the dropdown menu.
    - If you chose daily, choose the time of day in the hour (24-hour clock) and minutes dropdown menu.

If you chose weekly, choose the time of day and day of the week in the hour (24-hour clock), minutes, and day dropdown menus.

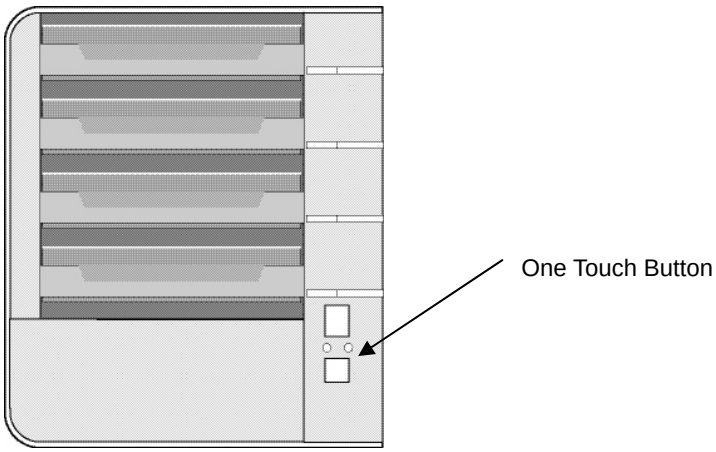


10. Click the **Finish** button.

    Your Backup Schedule appears in the Schedule tab.

4.3. Performing a One Touch Backup

To perform a One Touch Backup, press the One Touch Backup button on the front of the Network Storage.

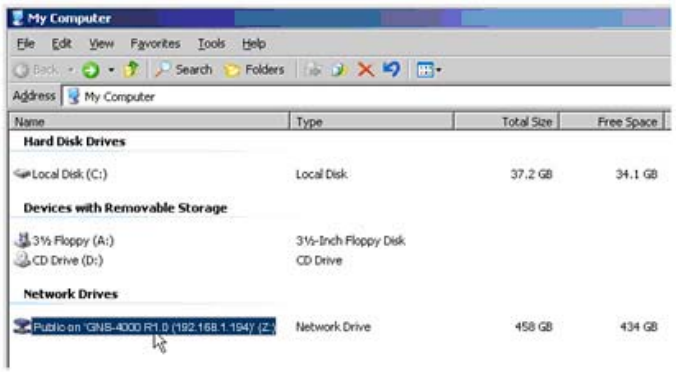


Within moments, the folders you specified are backed up onto the Network Storage. The One Touch Backup function backs up all of the folders on your PC for which you created a backup schedule.

4.4. Viewing Your Backup Files

To view your backup files on the Network Storage:

1. On the Windows PC desktop, double-click on the My Computer icon.
2. Under Network Drives, double-click on the Network Storage.



3. On the Network Storage, find the folder called BACKUPDATA.

The BACKUPDATA folder contains the results of the One Touch Backup from your PC. The subfolders inside the BACKUPDATA folder match the file structure on your PC's hard disk drive.

4.5. Restoring Your Backup Files

Caution

The Restore function will overwrite files in the destination folder on your PC.

If the backup files on the Network Storage match the names of the files in the restore location folder on your PC, the Restore function will overwrite those files on your PC.

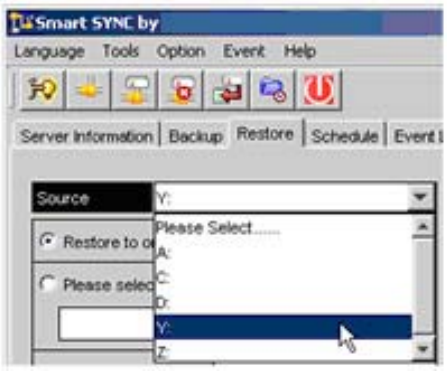
If you do not want to overwrite the files on your PC, take one of the following actions:

- Move the current files to a different folder on your PC.
- Choose a different restore location folder.

To restore backup files from the Network Storage to your PC:

1. On the Windows PC, open SmartSYNC and click on the Restore tab.
2. In the Source field, select the folder that contains the backup files that you want to restore.

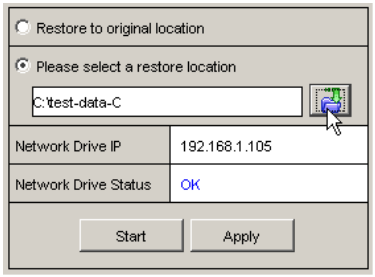
In the Source field, folders are identified by their network drive names, such as Z, Y, or X.



3. In the Folder List, click on the folders that contain the backup files you want to restore.

In the Folder List, folders are identified by their file structure as it was copied from your PC. The lowest folder in the structure is the one that actually contains the files.

4. Choose a restore location:
   - Original location -- The same folder on your PC from which the files were copied for the backup.
   - Select a restore location -- A folder on your PC that you specify.



5. Click the **Start** button.

   The files are copied from the Network Storage to your PC.

   If you selected a restore location on your PC other than the original, the Restore function includes subfolders that match the files structure on your PC's hard disk drive.

5. SmartSYNC

After installation, the SmartSYNC utility starts automatically in the background on your Windows PC. SmartSYNC does not run on UNIX, Linux, or Macintosh PCs.

Opening the SmartSYNC Window

To open the SmartSYNC window, in the Windows application tray (lower right corner of the screen), double-click on the SmartSYNC icon.

The SmartSYNC window opens.

If the SmartSYNC icon does not appear in the Windows application tray, from the Windows Start menu, choose Programs, then LevelOne NAS Utility, and then SmartSYNC.

Selecting a Language

To select a language, click on Language menu and choose the language you prefer.

Closing the SmartSYNC Window

To close the SmartSYNC window, click the X (close) icon at the top right corner of the window.
The SmartSYNC window closes but the utility continues to run.
To open the SmartSYNC window again, double-click on the SmartSYNC icon in the application tray.

Quitting SmartSYNC

To quit SmartSYNC, click the Exit button (right).
The SmartSYNC utility quits.
To restart SmartSYNC, do one of the following actions:


Exit button

- Log out of Windows, then log in again.
- From the Windows Start menu, choose Programs, then LevelOne NAS Utility, and then SmartSYNC.

Displaying the Network Storages on your Network

To display a list of servers (Network Storages on your network), open the SmartSYNC window.

The SmartSYNC window opens with the Server Information tab selected. A list of servers appears in the Server List on the Server Information tab.

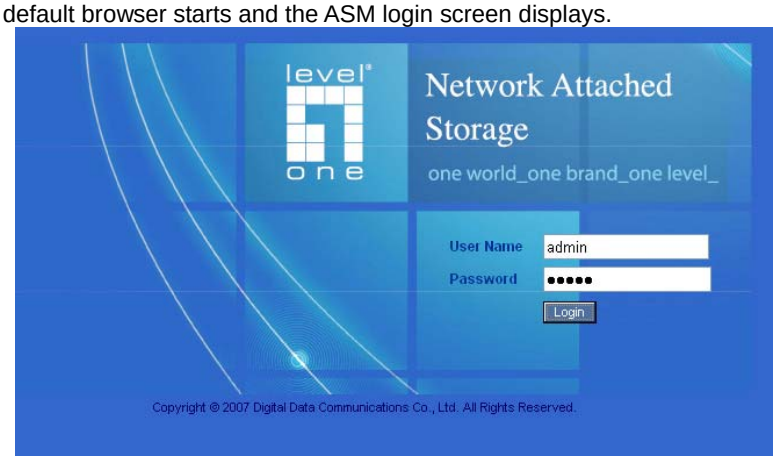
Starting ASM

LevelOne Advanced Storage Management (ASM) displays in the default browser. To start the default browser and display ASM:

1. Open the SmartSYNC window.
2. Click on the Open GUI button (right).

Open GUI button

Your default browser starts and the ASM login screen displays.



3. Type the user name and password in the respective fields, then click the Login button.

Note:
The default user name is **admin**. The default password is **admin**.
The user name and password are case sensitive.

5.1. Changing the Network Settings

To change the Network Storage's network settings:

1. Open the SmartSYNC window.
2. Click on the Server Information tab.
3. Click on the **Assign IP** button (right).


Assign IP button

The Assign IP login dialog box appears.

4. Type the user name and password in the respective fields, then click **OK**.

   The default user name is **admin**. The default password is **admin**.

   The user name and password are case sensitive.

   The New IP Address dialog box appears.

5. Type the following into the fields provided:
   - Computer Name – The Network Storage's Server Name in SmartSYNC
   - IP address
   - Subnet Mask
   - Default Gateway
   - Primary DNS
   - Secondary DNS.

Note

See your Network Administrator for help in making these settings.

6. Click **OK** to save your settings.

   The changes appear in the Server List on the Server Information tab.

   The change of IP address will disconnect the Network Storage as a network drive under My Computer on your Windows PC

   To access your data on the Network Storage, you must create a new network drive in Windows.

5.2. Connecting a Network Drive

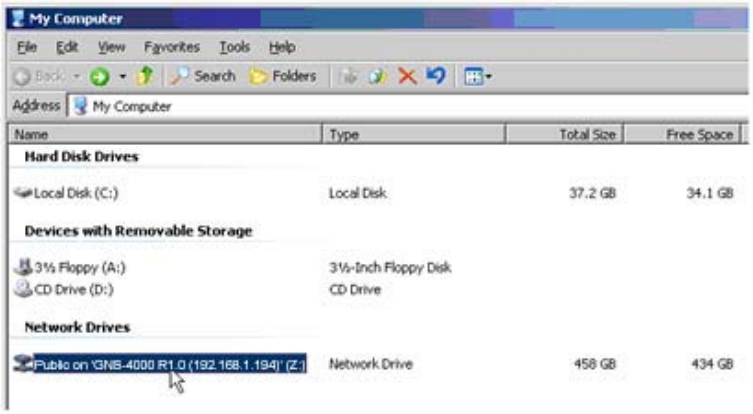
To access the folders you create on the Network Storage, you must make them network drives on your PC.
To connect a folder on the Network Storage as a network drive:

1. Open the SmartSYNC window.
2. Highlight the Network Storage in the server list, then click the **Connect Network Drive** button (right).
   The Connect Network Drive dialog box appears.


Connect Network Drive button

3. Choose the Device Name and Share Folder from the dropdown menus.
   The Device Name list begins with Z and goes in reverse alphabetical order.
   The Share Folder list represents the folders you have created on the Network Storage.

4. Click the **OK** button.
5. On the Windows desktop, double-click on the My Computer icon.
   The Public folder on the Network Storage (GNS-4000) appears under My Computer as a network drive.



5.3. Deleting Device (Network Drive) Records

To delete a drive record only affects SmartSYNC. Deleting a drive record does NOT delete your network drive under My Computer and it does NOT affect the data stored in your Network Storage's folders.

To delete a device record:

1. Open the SmartSYNC window.
2. Highlight a server in the Server List.
3. Click on the Remove Device Record button (right).
   A Device List window appears.

Remove Device Record button

4. Click on the Device Name that you want to delete, then click the Remove button.
   The Device name is removed from the list.

5. Click X or the Cancel button to close the window.

5.4. Performing a Backup

A Backup copies folders from your PC to the Network Storage.

Caution

The Network Storage and SmartSYNC cannot restore a failed boot drive in your PC. However, you can use the Network Storage to save your system backup file. See your Windows documentation for information about system backups.

Note

- Windows does not allow SmartSYNC to access protected folders and files. If you want to perform a backup, you must first disable protection on your folders and files.
- If you want to run the Windows Backup or Restore Wizard, access the Network Storage as a network drive.

To perform a backup of a selected folder:

1. Open the SmartSYNC window.
2. Highlight a server in the Server List.
3. Click on the Backup tab.
4. Select a Destination.
   Destinations are identified by drive letters and correspond to a specific folder on the Network Storage.

5. Click on the folder you want to backup in the Folder List.
   Click the + icon to expand the file tree.
   A checkmark appears beside the selected folder. The backup will include the folder you select and all subfolders.

6. Do one of the following actions:
   To perform the backup now, click **Start** button.
   To perform the backup later, click the **Apply** button to save your settings.
   When you are ready perform the backup, click the **Backup** button (right).

Backup button

5.5. Viewing Your Backup Folders

To view your backup folders on the Network Storage:

1. On the Windows desktop, double-click on the My Computer icon.
2. Under Network Drives, double-click on the Network Storage.
3. On the Network Storage, find the folder called BACKUPDATA.

   The BACKUPDATA folder contains the results of the One Touch Backup from your PC. The subfolders inside the BACKUPDATA folder match the file structure on your PC's hard disk drive.

5.6. Performing a Restore

Caution

The Restore function will overwrite files in the destination folder on your PC.

Note

If you want to run the Windows Backup or Restore Wizard, access the Network Storage as a network drive.

A Restore copies folders from the Network Storage to your PC.
To perform a Restore of a selected folder:

1. Open the SmartSYNC window.
2. Highlight a server in the Server List.
3. Click on the Restore tab.
4. Select a Source.
   Sources are identified by drive letters and correspond to a specific folder on the Network Storage.
5. Choose a restoration location.
   - Restore to original location – The files from the Network Storage will overwrite the files on our PC
   - Select a restore location – The files from the Network Storage are saved in a set of folders that match the original file structure from where they were copied
6. Optional. If you chose a new Restore location, click the **Browse** button (right), navigate to the destination you want, highlight the destination folder, then click the **Open** button to select the folder.
7. In the Folder List, click on the folder you want to restore.
   Click the + icon to expand the file tree.
   A checkmark appears beside the selected folder. The restore will include the folder you select and all subfolders.
8. Do one of the following actions:
   To perform the Restore now, click Start button.
   To perform the Restore later, click the Apply button to save your settings.
   When you are ready perform the backup, click the Tools menu and choose Restore > Start.

5.7. Scheduling a Backup

A Backup copies folders from your PC to the Network Storage.

Caution

The Network Storage and SmartSYNC cannot restore a failed boot drive in your PC. However, you can use the Network Storage to save your system backup file. See your Windows documentation for information about system backups.

Note

- Windows does not allow SmartSYNC to access protected folders and files. If you want to perform a backup, you must first disable protection on your folders and files.
- If you want to run the Windows Backup or Restore Wizard, access the Network Storage as a network drive.

To schedule the backup of a selected folder:

1. Open the SmartSYNC window.
2. Click on the Schedule tab.
3. Click the **Create** button.
4. In the Backup Schedule window, verify the Destination.
   Destinations are identified by drive letters and correspond to a specific folder on the Network Storage.

5. In the folder list, click on the + icons to expand the tree.
   The Folder List is a representation of the file structure on your PC.

6. Click on the folder you want to backup.
   A checkmark appears beside the selected folder. The backup will include the folder you select and all subfolders.

7. Click the **Next >>** button.
8. Choose a Schedule interval by number of hours, daily, or weekly.

9. Choose a setting:
   - If you chose hours, choose the number of hours from the dropdown menu.
   - If you chose daily, choose the time of day in the hour (24-hour clock) and minutes dropdown menu.
   - If you chose weekly, choose the time of day and day of the week in the hour (24-hour clock), minutes, and day dropdown menus.

10. Click the **Finish** button.
    Your Backup Schedule appears in the Schedule tab.

Modifying a Backup Schedule

You can change source folders, time, and day settings for a scheduled Backup.
To modify a Backup Schedule:

1. Open the SmartSYNC window.
2. Click on the Schedule tab.
3. In the Schedule list, highlight the schedule you want to modify.
4. Click the **Modify** button.
5. Select the folders you want to backup from the tree, then click Next >>.
6. Select the Schedule Type (hour, daily, weekly).
7. Select the time and day settings.
8. Click **Finish** to save your Backup settings.

Deleting a Backup Schedule

To delete a Backup Schedule:

1. Open the SmartSYNC window.
2. Click on the Schedule tab.
3. In the Schedule list, highlight the schedule you want to delete.
4. Click the **Delete** button.
5. In the confirmation box, click **Yes**.

5.8. Setting the Default Browser for ASM

To set the default browser for ASM:

1. Open the SmartSYNC window.
2. Click on the Option menu and choose Browser Path...
3. The Setup Browser Path dialog box displays.
4. Click on the ... button, then navigate to the browser's .exe file.
5. Highlight the browser's .exe file, then click the **Open** button.
6. Click the **OK** button to save your setting.

5.9. Viewing the Event Log

To view the Event Log:

1. Open the SmartSYNC window.
2. Click on the Event Log tab.
3. From the Type menu, select the type of events you want to display:
   - All – All events
   - Info – Information events only
   - Error – Error events only

Clearing the Event Log

To clear the Event Log:

1. Open the SmartSYNC window.
2. Click on the Event Log tab.
3. Click on **Clear All**.

Or, click on the Event menu and choose *Clear All*.

6. Advanced Storage Manager

6.1. Connecting to ASM

The LevelOne Advanced Storage Management (ASM) software is factory-installed on the Network Storage system. ASM runs in the browser on your PC. You can access ASM:

- Directly in your browser.
- Through SmartSYNC

ASM in your Browser

To log into ASM in your browser:

1. Start your Browser.
2. In the Browser address field, type in the IP address of the Network Storage.

   Note that the IP address shown below is only an example. The IP address you type into your browser will be different.

   - ASM uses an HTTP connection ..... .http://
   - Enter the Network Storage's IP address 192.168.1.194

   Together, your entry looks like this: **http://192.168.1.194**

The ASM login screen displays

3. Type the user name and password in the respective fields, then click the **Login** button.

   The default user name is **admin**. The default password is **admin**.

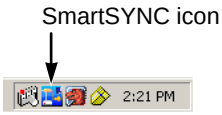
   The user name and password are case sensitive.

ASM in SmartSYNC

To log into ASM through SmartSYNC:

1. In the Windows application tray (lower right corner of the screen), double-click on the SmartSYNC icon (right).

   SmartSYNC opens with the Server Information tab displayed.



2. Click on the **Open GUI** button (right).

Your default browser starts and the ASM login screen displays.


Open GUI button

3. Type the user name and password in the respective fields, then click the **Login** button.

   The default user name is **admin**. The default password is **admin**.

   The user name and password are case sensitive.

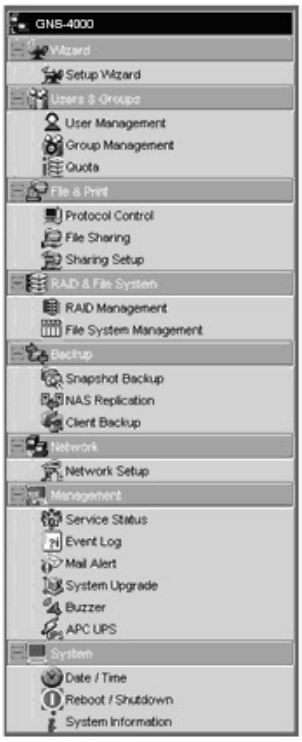
6.2. Selecting a Language

To select a language, click on Language menu in the ASM Header and choose the language you prefer.

6.3. Navigating in ASM

The Tree is the primary navigation tool in ASM. Categories of functions listed with a **+** sign before the icon.

Icons for specific functions are listed under the categories. Click the **+** sign to show the functions.



Click on the function icons to display their information on the screen. Each function has one or more tabs in its screen.

6.4. Setting up Network Storage with the Setup Wizard

If you used the NAS Setup Wizard utility to set up your Network Storage, you do not need to run the Setup Wizard in ASM.

If you have not yet set up your Network Storage:

1. In the Tree, click on the **+** beside the Wizard icon, then on the Setup Wizard icon to display the Setup Wizard screen.
2. Click the **Next** button to start the Setup Wizard.

   The Step 1 screen appears.
3. Optional. In the Computer Name field, enter a name for the Network Storage.

   Use only letters, numbers, and the underscore character for the name.
4. Under network configuration, choose one of the following options:
   - Configure using DHCP – Choose this option if your network has a DCHP server with addresses available
   - Configure using Specify an IP address – Choose this option if you want to set the IP address and other network setting manually
5. If you chose the *Configure using Specify an IP address* option, type the following information in the fields provided:
   - IP Address
   - Subnet Mask
   - Default Gateway IP Address
   - Primary DNS
   - Secondary DNS

   See your Network Administrator for help with these settings.
6. Click the **Next** button to continue.

   The Step 2 screen appears.
7. Optional. Type a new administrator password into the New Password field.

   Retype the new password into the Retype Password field.
8. Optional. To add a user, click the **Add new user** option button.
9. If you clicked the **Add new user** option button, type a user name and password into the fields provided, then click the **Add** button.
10. Click the Next button to continue.

    The Step 3 screen appears.
11. Check the Enable box to the right of the services you plan to use.

- Windows – Enables file access from Windows PCs. Also required to use the Network Storage as a print server.
- Unix/Linux – Enables file access from Unix and Linux PCs
- Macintosh – Enables file access from Macintosh PCs
- FTP – Enables file access from PCs using FTP

12. Optional. Type new names into the Workgroup Name and Computer Description fields.
13. Click the **Next** button to continue.

    The Step 4 screen appears.

    You must add at least one folder, which you will access from your PC as a networked drive.
14. To add a folder, click the **Add new folder** option button.
15. Type a folder name into the field provided, check the boxes of the services you expect to use with this folder, then click the **Add** button.

    Add more folders as required.
16. Click the **Next** button to continue.

    The Step 5 screen appears.

    If a RAID Volume already exists on the Network Storage, information about the RAID Volume is shown. To change the RAID, you must delete it first, then run the Setup Wizard again.
17. From the RAID Level dropdown menu, select the RAID level you prefer for your disk array.

    See for more information.
18. Highlight disk drives in the Free Disks column and click the **>>** button to move them to the Disks in RAID column.
19. Click the **Next** button to continue.

    The Finish screen appears.
20. Click the **Finish** button to set up your Network Storage.

    The setup process takes several minutes, depending on the size of your disk drives.

6.5. Managing Users and Groups

Viewing a List of Users

To view the list of Users:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the User Management icon.

   A list of users appears on the Information tab.

Creating a User

You can create up to 512 Users.

To create or add a new user:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the User Management icon.
3. Click on the Create User tab.
4. Type a user name in the field provided.
5. Type a password into the fields provided.
6. Click the **OK** button.

Changing the Administrator’s Password

To change the Administrator’s password:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the User Management icon.
3. Click on the Change Password tab.
4. Type a new password into the fields provided.
5. Click the **OK** button.

If you forget your new password, you reset the Network Storage to the default Administrator’s password.

Changing a User's Password

To change a user’s password:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the User Management icon.
3. Click on the Change Password tab.
4. From the User Name dropdown menu, select the name of the user whose password you want to change.
5. Type a new password into the fields provided.
6. Click the **OK** button.

Deleting a User

You cannot delete the Administrator or the Guest. To delete any other user:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the User Management icon.
3. Click on the Delete User tab.
4. Click on the option button to the left of the user you want to delete.
5. Click the **OK** button.
6. In the confirmation box, click the **OK** button.

Viewing a List of Groups

Groups are composed of users. You can assign permissions to a group, the same as you would do with individual users.

To view a list of groups:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Group Management icon.

   A list of groups appears on the Information tab.

Creating a Group

Groups are composed of users. You can assign permissions to a group, the same as you would do with individual users. You can create up to 256 groups.

To create a group:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Group Management icon.
3. Click on the Create tab.
4. Type a group name in the field provided.
5. Click the **OK** button.

Adding Members to a Group

You must create a group before you can assign members to it.

To add members to a group:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Group Management icon.
3. Click on the Group Members tab.
4. From the dropdown menu, choose a group to which you want to add members.
5. Highlight users in the Users column and click the **>>** button to move them to the Members column.
6. Click the **OK** button.

Removing Members from a Group

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Group Management icon.
3. Click on the Group Members tab.
4. From the dropdown menu, choose a group from which you want to remove members
5. Highlight users in the Members column and click the **<<** button to move them to the Users column.
6. Click the **OK** button.

Deleting a Group

You must remove all members from the group before you can delete the group.

To delete a group:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Group Management icon.
3. Click on the Delete tab.
4. Click the option button next to the group you want to delete.
5. Click the **OK** button.

Viewing Quotas

Quotas are portions of storage space that you assign to each user or group.

To view a quota:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Quota icon.

   A list of users and groups, and the following data appear on the screen:

   - Currently assigned quotas
   - Free space
   - Used space

Setting Quotas

Quotas are portions of storage space that you assign to each user or group. Assigning quotas enables you to control how much storage space each user or group can access. By default, each user and group is assigned an unlimited quota, meaning that any one user or group can access the entire storage space. In the Quota screen, the names of groups are preceded with a @ symbol.

To set a quota:

1. In the Tree, click on the **+** beside the Users & Groups icon.
2. Click on the Quota icon.
3. Click on the Settings tab.
4. Highlight the user or group whose quota you want to assign.
5. Click on one of the following options:
   - Unlimited
   - Limited Quota
6. If you chose Limited Quota, type a number into the field provided.

   This number represents how many MB of data the user or group can access.
7. Click the **OK** button.

6.6. Managing File & Print Services

Setting up Windows Access

Follow this procedure to set up access from a Windows PC:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Protocol Control icon.
3. Click on the Windows tab.
4. Click the **Enable** option button beside Services.
5. Optional. Type a new Computer Description into the field provided.
6. Choose the option button to make the Network Storage a member of:
   - An Active Directory (AD) Domain
   - A Workgroup

   Note: If you join an AD Domain, you automatically disable your NIS Domain settings.
7. Optional. If you chose an AD Domain, enter the following in the fields provided:
   - Domain Name
   - Kerberos Key Distribution Center
   - Administrator Name
   - Administrator Password

   See your Network Administrator for help with this information.
8. Optional. If you chose an Workgroup, enter the Workgroup name into the field provided:

   See your Network Administrator for help with this information.
9. Click the **OK** button to save your settings.
10. In the Tree, click on the **+** beside the Sharing Setup icon.
11. Click on the Windows Sharing tab.
12. Select a folder from the Folder Name dropdown menu.
13. In the User/Group list, highlight the name of a user or group.

    Group names are preceded by the @ character.
14. Under Permissions, choose a permission level for this user or group:
    - Deny Access
    - Read Only
    - Read and Write
15. Click the **OK** button to save your settings.

    You can now access the folder you selected from a Windows PC.

Setting up UNIX/Linux Access

Follow this procedure to set up access from a UNIX or Linux PC:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Protocol Control icon.
3. Click on the UNIX/Linux tab.
4. Click the **Enable** option button beside Services.
5. Optional. If you want to join a NIS Domain, click the **NIS Domain** option button.

   Note: If you join an NIS Domain, you automatically disable your AD Domain settings.
6. Optional. If you chose to join a NIS Domain, enter the Domain name into the field provided:

   See your Network Administrator for help with this information.
7. Click the **OK** button to save your settings.
8. In the Tree, click on the **+** beside the File Sharing icon.
9. Click on the Modify tab.
10. From the Folder name dropdown menu, choose the folder you want to access.
11. Check the UNIX/Linux box.
12. Click the **OK** button to save your settings.
13. In the Tree, click on the **+** beside the Sharing Setup icon.
14. Click on the UNIX/Linux Sharing tab.
15. Select a folder from the Folder Name dropdown menu.
16. In the New IP Address field, type the IP address of the UNIX or Linux PC from which you will access this folder, then click the **Add** button.

    You must designate the IP addresses for each folder individually. You can have up to 256 IP addresses for all of your folders.
17. Click the **OK** button to save your settings.

    You can now access the folder you selected from a UNIX or Linux PC.

Setting up for Macintosh Access

Follow this procedure to set up access from a Macintosh PC:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Protocol Control icon.
3. Click on the Macintosh tab.
4. Click the **Enable** option button beside Services.
5. Click the **OK** button to save your settings.
6. In the Tree, click on the **+** beside the File Sharing icon.
7. Click on the Modify tab.
8. From the Folder name dropdown menu, choose the folder you want to access.
9. Check the Macintosh box.
10. Click the **OK** button to save your settings.

    You can now access the specified folder from a Macintosh PC.

Setting up for FTP Access

Follow this procedure to set up FTP access for your folders:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Protocol Control icon.
3. Click on the FTP Sharing tab.
4. Click the **Enable** option button beside Services.
5. Click the OK button to save your settings.
6. In the Tree, click on the **+** beside the File Sharing icon.
7. Click on the Modify tab.
8. From the Folder name dropdown menu, choose the folder you want to access.
9. Check the FTP box.
10. Click the **OK** button to save your settings.

    You can now access the specified folder from your PC using FTP.

    If your FTP client does not support Unicode, only use ASCII characters to name your shared folders on Network Storage.

Setting up your Print Server

Follow this procedure to set up the Network Storage as a printer server:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Protocol Control icon.
3. Click on the Windows tab.
4. Click the **Enable** option button beside Services.
5. Click the **OK** button to save your settings.
6. Click on the Printer Server tab.
7. Click the **Enable** option button beside Printer Server.
8. Click the **OK** button to save your settings.

Notes

- The Printer Server tab also verifies that your USB printer is connected and online. If you do not see your printer on the Printer Server tab, take the necessary action to connect and power the printer. See “Connecting a USB Printer to Network Storage”
- The software driver for your printer must be installed on your PC before you can print from the PC. See this *User Manual*.

Setting up your DLNA Server

The Digital Living Network Alliance (DLNA) service enables the Universal Plug-and-Play (UPnP) protocol, so your Network Storage can function as a Digital Media Server (DMS). When your DLNA service is enabled, you can connect your DLNA control unit or UPnP client on the network where the Network Storage is connected, and use the Network Storage to play image, audio, and AV media.

You must install the optional DLNA plug-in before you can make this setting and use the UPnP protocol.

Follow this procedure to set up the Network Storage as a DLNA server:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Protocol Control icon.
3. Click on the DLNA Server tab.
4. Click the **Enable** option button beside Services.
5. Click the **OK** button to save your settings.

Viewing a List of Folders

A folder is the entity that appears as a Network Drive on your PC.

To view the list of folders:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the File Sharing icon.

   A list of current folders appears in the Information tab.

Modifying Folder Services

Services enable different types of PCs to access your folders. Use this function to add or remove a service for a specific folder.

To modify the services on a folder:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the File Sharing icon.
3. Click on the Modify tab
4. From the Volume dropdown menu, select the RAID Volume containing the folder you want to modify.
5. From the Folder Name dropdown menu, select the folder you want to modify.
6. Check the boxes beside the services you want to use.
7. Click the **OK** button.

Adding a Folder

A folder is the entity that appears as a Network Drive on your PC.

To add a folder:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the File Sharing icon.
3. Click on the Create tab.
4. From the Volume dropdown menu, select the RAID Volume in which you want to create a new folder.
5. In the Folder Name field, type a name for your new folder.
6. Check the boxes beside the services you want to use.
7. Click the **OK** button.

.

Deleting a Folder

Caution

When you delete a folder, you delete all the data saved in the folder. Back up any important data before you delete a folder.

To delete a folder:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the File Sharing icon.
3. Click on the Remove tab
4. Click on the option button beside the folder you want to delete.
5. Click the **OK** button.
6. In the confirmation box, click the **OK** button to confirm.

Setting up Windows Sharing for a Folder

Windows sharing assigns user access the folders on your Network Storage. By default all users and groups have read-only access.

To set up Windows sharing for a folder:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Sharing Setup icon.
3. Click on the Windows Sharing tab.
4. From the Volume dropdown menu, select the RAID Volume containing the folder you want to modify.
5. From the Folder Name dropdown menu, select the folder you want to modify.
6. In the User/Group list, highlight the user or group to which you want to assign permissions.
7. In the Permission list, click on the option button for one of the following permissions:
   - Deny Access
   - Read Only
   - Read and Write
8. Click the **OK** button.

   Be sure the Windows service is running for this folder.

Setting up UNIX and Linux Sharing for a Folder

UNIX and Linux sharing designates which UNIX and Linux PCs can access the folders on your Network Storage. You specify a UNIX or Linux PC by its IP address. You can add up to 256 IP addresses for all of your folders.
You must designate the IP addresses for each folder individually.
To set up UNIX and Linux sharing for a folder:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Sharing Setup icon in the tree.
3. Click on the UNIX/Linux Sharing tab.
4. From the Volume dropdown menu, select the RAID Volume containing the folder you want to modify.
5. From the Folder Name dropdown menu, select the folder you want to modify.
6. In the New IP Address field, type the IP address of the UNIX or Linux PC from which you will access this folder.
7. Click the **Add** button.

   Be sure the UNIX/Linux service is running for this folder.

Setting up FTP Sharing for a Folder

FTP sharing assigns user access the folders on your Network Storage. By default all users and groups have read-only access.

To set up FTP sharing for a folder:

1. In the Tree, click on the **+** beside the File & Print icon.
2. Click on the Sharing Setup icon.
3. Click on the FTP Sharing tab.
4. From the Volume dropdown menu, select the RAID Volume containing the folder you want to modify.
5. From the Folder Name dropdown menu, select the folder you want to modify.
6. In the User/Group list, highlight the user or group to which you want to assign permissions.
7. In the Permission list, click on the option button for one of the following permissions:
   - Deny Access
   - Read Only
   - Read and Write
8. Click the **OK** button.

   Be sure the FTP service is running for this folder.

6.7. Managing RAID Volumes

Viewing RAID Volume Status

RAID status refers to the disk drives on your Network Storage and how they are arranged into a RAID Volume.

To view the status of your RAID Volume:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.

   The RAID Status tab displays the current RAID system and its status:

   - RAID Name – The name of your RAID, automatically assigned when it was created
   - RAID Level – RAID 0, 1, 5, or 10, specified when it was created
   - Capacity – Data capacity of the RAID Volume in GB
   - RAID Status – Functional is normal. Critical means a disk drive has failed. Offline means you cannot access your data.

     Critical and offline RAIDs require you to take corrective action.
   - Action Status – Idle is normal. Rebuilding means the RAID Volume is being rebuilt after a disk drive failure. Migrating means the RAID Volume is adding a disk drive or changing RAID levels.
   - Background Activity – None is normal. Running means a background activity is in progress.

Viewing Disk Drive Information

To view information about a disk drive:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.

   The RAID Status tab displays the current RAID system and its status.
3. In the Disk List, double-click on a disk drive icon.

   The disk drive information displays under Disk Status.

Creating a RAID Volume

On Network Storage, the term RAID Volume refers to one or more disk drives working together as a RAID logical drive.

You can also use a USB disk to create a RAID Volume.

You must have unassigned disk drives in your Network Storage to create a new RAID.

To create a new RAID Volume:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.
3. Click on the Create tab.
4. From the RAID Level dropdown menu, select the RAID level you prefer for your disk array.

   See “Choosing a RAID Level” on page 102 for more information.
5. Highlight disk drives in the Free Disks column and click the **>>** button to move them to the Disks in RAID column.
6. Click the **OK** button.

   The RAID Volume is created and formatting begins. Formatting requires several minutes, depending on the size of your disk drives.

   After formatting is done, you must create folders on your RAID Volume.

Designating a Spare Drive

If you have an unassigned disk drive, you can assign it as a spare drive.

For more information, see “Spare Drive” on page 103 and “Automatic Rebuilding” on page 104.

To assign a spare drive:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.
3. Click on the Create tab.
4. From the RAID Level dropdown menu, select Spare Disk.
5. Highlight disk drive in the Free Disks column and click the **>>** button to move it to the Disks in RAID column.
6. Click the **OK** button.

Migrating a RAID Volume

To migrate a RAID Volume means to change its RAID level or to add disk drives. See “RAID Volume Migration” on page 105 for more information.

To migrate a RAID Volume:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.
3. Click on the Modify tab.
4. From the Current Volume dropdown menu, select the RAID Volume which you want to modify.
5. In the Migrate to RAID Level dropdown menu, select the target RAID Level.
6. To add disk drives, highlight disk drives in the Free Disks column and click the **>>** button to move them to the Disks in RAID column.
7. Click the **OK** button.

   The RAID Volume is modified as you directed. Migration requires several minutes, depending on the type of modification taking place and the size of your disk drives.

   During the modification, your RAID Volume and all of the folders on it are fully accessible.

   After the Migration is completed, you must extend the file system in order to use the storage space you have added. You can extend the file system immediately or wait until later.
8. Click on the File System Management icon.
9. In the File System Status tab, click on the **Extend File System** button.

Deleting a RAID Volume

Caution

When you delete a RAID Volume, you delete all the folders in the RAID volume and all the data saved in the folders. Back up any important data before you delete a RAID Volume.

Note

You cannot delete a RAID Volume while a background activity is running, such as Migration or Rebuild. Wait until these activities are completed.

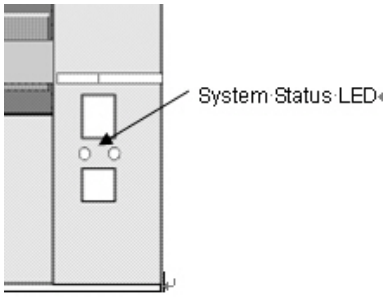
To delete a RAID Volume:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.
3. Click on the Delete tab.
4. Click the option button beside the RAID Volume you want to delete.
5. Click the **OK** button.
6. In the confirmation box, type **yes** into the field provided, then click the **OK** button.

After a RAID Volume is deleted, the Network Storage reboots automatically. When the Network Storage is fully booted:

- The System Status LED turns green (right)
- The buzzer beeps one time (if the buzzer is enabled)

7. Close your browser then restart the browser to access ASM.



Viewing an External USB Drive or Memory Stick

To view a USB drive or memory stick attached to the Network Storage:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.

   The USB drive or memory stick appears as a USB External Disk
3. Click on the File System Management icon.

   The USB drive or memory stick appears as a Volume called USBDISK.

You do NOT create a RAID Volume or folders with the USB drive or memory stick as you would with the disk drives installed in the Network Storage enclosure.

With the USB drive or memory stick connected to the Network Storage, create a network drive on your PC and choose the USB disk as the folder. Then you can access the USB drive or memory stick from your PC.

Formatting an External USB Drive or Memory Stick

This option only appears when Network Storage does not recognize the file system on the USB drive or memory stick.

Caution

When you format a USB drive or memory stick, you delete all the data saved on it. Back up any important data before you format.

To format a USB drive or memory stick:

1. Attach the USB drive or memory stick to one of the USB ports on the back of the Network Storage.
2. In the Tree, click on the **+** beside the RAID & File System icon.
3. Click on the File System Management icon.
4. On the File System Status tab, highlight the USB drive.
5. From the Format File System Type dropdown menu, choose a file system:
   - FAT 32 – Use for Windows, Linux, and Macintosh PCs, and NAS
   - Ext3 – Use for UNIX and Linux PCs, and NAS
6. Click on the **Format USB Disk** button.
7. In the confirmation box, type **yes**, then click the **OK** button.

Formatting requires several minutes, depending on the size of your USB drive or memory stick.

6.8. Managing Backups

Viewing a List of Snapshot Backups

To view the list of Snapshot backups:

1. In the Tree, click on the **+** beside the Backup icon.
2. Click on the Snapshot Backup icon.

   The current list of Snapshots displays on the Information tab.

Setting up a Snapshot Backup

Caution

Setting up a Snapshot will delete all existing snapshots.

To setup a Snapshot Backup:

1. In the Tree, click on the **+** beside the Backup icon.
2. Click on the Snapshot Backup icon.
3. Click on the Setup tab.
4. From the Volume dropdown menu, select the RAID Volume you want to backup.
5. Next to Snapshot Status, click the **Enable** option.
6. In the Reserve Capacity dropdown menu, select a portion in GB of the RAID Volume you want to reserve for snapshots.
7. Click the **OK** button.
8. In the confirmation box, type **yes** into the filed provided than click the **OK** button.

Viewing the NAS Replication Schedule

NAS Replication is a feature that uses one Network Storage to backup the data on another Network Storage. The two Network Storage systems must be on the same network.

To view the NAS Replication schedule:

1. In the Tree, click on the **+** beside the Backup icon.
2. Click on the NAS Replication icon.

   The current schedule displays on the Information tab.

   - Role:

     Standalone – No backup server was specified

     Primary Server – This Network Storage is the primary, the other Network Storage is the backup

     Backup Server – This Network Storage is the backup, the other Network Storage is the primary
   - Primary or Backup Server – The IP address of the other Network Storage on the network.
   - Schedule -- Replication schedule in number of hours, daily or weekly. Appears on the primary server.

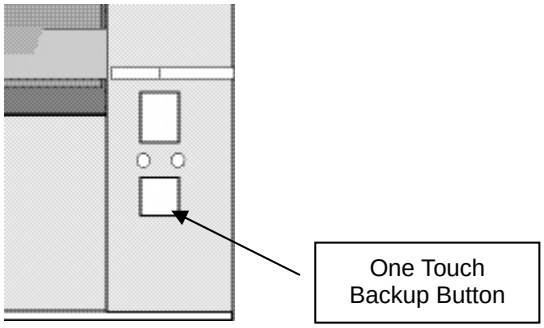
Setting up NAS Replication

To set up NAS replication:

1. In the Tree, click on the **+** beside the Backup icon.
2. Click on the NAS Replication icon.
3. Click on the Setup tab.
4. Under Settings, click the option button to assign a role to this Network Storage:
   - Standalone – Use this option when you only have one Network Storage on your network. This is the default setting and it disables NAS Replication.
   - Primary – This Network Storage is the primary and the other Network Storage is the backup server.
   - Backup Server – The other Network Storage is the primary and this Network Storage is the backup server.
5. Optional. If you chose Primary or Backup Server, type the IP address of the other Network Storage on your network.
6. Under Schedule, click the option button for the schedule type you want:
   - Disable – Disables NAS Replication
   - Do it at once – Performs a NAS Replication when you click the **OK** button.
   - Time interval by hour – Set an hourly interval for NAS Replications to happen.
   - Daily – Sets the time of day when the NAS Replications happen.
   - Weekly – Sets the time of day and day of the week when the NAS Replications happen.
7. Click the **OK** button.

Enabling One Touch Backup

One Touch Backup is a feature that enables you to backup specified folders from your PC to the Network Storage by pressing a button on the front of the Network Storage.



To enable One Touch Backup:

1. In the Tree, click on the **+** beside the Backup icon.
2. Click on the Client Backup icon.
3. In the One Touch Backup tab, click on the **Enable** option.
4. Click the **OK** button.

To disable One Touch Backup, click the **Disable** option, then click the **OK** button.

6.9. Managing the Network Connection

Viewing Network Setup Information

To view network setup information:

1. In the Tree, click on the **+** beside the Network icon.
2. Click on the Network Setup icon.

   The current network setup for this Network Storage displays on the Information tab:

   - Computer Name
   - IP Address
   - Subnet Mask
   - Default Gateway IP Address
   - Primary Domain Name Server IP Address
   - Secondary Domain Name Server IP Address

   To change these settings, click on the Setup tab.

Making Network Settings

To make network settings:

3. In the Tree, click on the **+** beside the Network icon.
4. Click on the Network Setup icon.
5. Click on the Setup tab.
6. Optional. Type a name for the Network Storage in the Computer Name field.
7. Click on an option button to choose an Internet Protocol option:
   - Obtain an IP address automatically – Choose this option to let your DHCP server make the network settings.
   - Specify an IP address – Choose this option if you want to make your network settings manually.
8. Optional. If you chose *Specify an IP address*, enter the following settings in the fields provided:
   - IP Address
   - Subnet Mask
   - Default Gateway IP Address
   - Primary Domain Name Server IP Address
   - Secondary Domain Name Server IP Address

   See your Network Administrator for help in making these settings.
9. Click the **OK** button to save your settings.

Working with Jumbo Frames

The term *jumbo frame* refers to a frame on a local area network that is larger than the standard 1518 byte size. Network Storage supports jumbo frames up to 9000 bytes.

On Network Storage, the frame size setting is called Maximum Transmission Unit (MTU). The default MTU or frame is 1500 bytes. This setting is appropriate for most users. See your Network Administrator before you change this setting.

To make frame size settings:

1. In the Tree, click on the **+** beside the Network icon.
2. Click on the Network Setup icon.
3. Click on the Jumbo Frame tab.
4. From the MTU dropdown menu, select the maximum MTU or frame size:
   - 1500 bytes (default)
   - 4000 bytes
   - 7000 bytes
   - 9000 bytes
5. Click the **OK** button to save your setting.

6.10. Making Management Settings

Viewing Service Status

The Network Storage runs services to enable PCs to access the folders on the Network Storage and to work as a print server.

To view Service Status:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the Service Status icon.

   The status of each service displays on the Information tab.

   - ON – The service is running.
   - OFF – The service is not running.

Viewing the Event Log

The event log keeps a log of the 20 most recent events on the Network Storage. You can use this information to review your actions and to diagnose problems.

To view the Event Log:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the Event Log icon.

   A list of the 20 most recent events displays on the Event Log tab.

   Events are ranked in severity as Information, Warning, and Error.

Setting up SMTP Authentication

In order to set up email alerts over a network, you must enable the SMTP service, specify a SMTP server, and in most cases, supply authentication information. See your Network Administrator for help with these settings.

To set up SMTP authentication:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the Mail Alert icon.
3. Click on the Setup tab.
4. Next to Service, click on the **Enable** option button.
5. In the SMTP Server field, type the IP address or the DNS name of your SMTP server.
6. In the From field, the sender's email address that you want to appear in the alert messages.
7. Next to SMTP Authentication:
   - Click on the **Yes** option button to enable authentication.
   - Click on the **No** option button to disable authentication.

   Note that most SMTP servers require authentication.
8. If you enabled authentication, to the following:
   - In the User Name field, type the mail server account name.
   - In the Password field, type the password of the mailer server account.
9. Click the **OK** button.

Viewing the Email Alert List

The Network Storage will send alerts via email to the recipients you designate.

To view a list of Email Alert recipients:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the Mail Alert icon.

   The list of recipients displays on the Mail List tab.

Adding an Email Alert Recipient

You can have up to 32 Email Alert recipients.

To add an Email Alert recipient:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the Mail Alert icon.
3. Click on the Add tab.
4. In the E-Mail Address field, type the recipient's email address.
5. Click the **OK** button.

Deleting an Email Alert Recipient

To delete an Email Alert recipient:

6. In the Tree, click on the **+** beside the Management icon.
7. Click on the Mail Alert icon.
8. Click on the Delete tab.
9. Click the option button beside the E-Mail Address you want to delete.
10. Click the **OK** button.
11. In the confirmation box, click the **OK** button.

Upgrading the System Firmware

See "Upgrading the Firmware" section

Installing an Application Plug-in

See "Installing Application Plug-ins" section

Enabling and Disabling the Buzzer

The Network Storage has a buzzer that sounds when the Network Storage is finished booting and when a problem is detected. The buzzer is enabled by default.

LevelOne recommends that you leave the buzzer enabled.

To disable the buzzer:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the Buzzer icon.
3. Click on the **Disable** option button.
4. Click the **OK** button.

Click the **Enable** option button, then click the **OK** button to enable the buzzer.

Viewing UPS Status

If you have an APC Uninterruptible Power Supply (UPS) attached to the Network Storage, you can check its status in ASM.

To view UPS status:

1. In the Tree, click on the **+** beside the Management icon.
2. Click on the APC UPS icon.

   The Information tab displays the status of the UPS.

   If there is no UPS connected or recognized, the Status field reports "NO UPS."

Setting up a UPS

To set up a UPS:

1. Attach the APC UPS to one of the Network Storage's USB ports.
2. In the Tree, click on the **+** beside the Management icon.
3. Click on the APC UPS icon.
4. Click on the Setup tab.

   The Setup tab enables you to tell the Network Storage how and when to shutdown after a power failure.

   Click the option button beside the shutdown option you want:

   - Disable. The Network Storage will continue to run until the UPS battery is depleted
   - Shutdown when the UPS reaches a set percentage of reserve power
   - Shutdown when the UPS reaches a set number of minutes of remaining runtime
   - Shutdown after running on the UPS batteries for a set number of minutes
5. Optional. If you selected battery percentage, type a percentage amount in the % field.
6. Optional. If you selected remaining runtime or running on batteries, type the number of minutes into the Mins. field.
7. Click the **OK** button.

6.11. Managing Services

Setting System Date and Time

1. To set the date and time on the Network Storage:

   In the Tree, click on the **+** beside the System icon.
2. Click on the Date / Time icon.
3. Click on the Setup tab.
4. From the dropdown menus, choose the time and date values.
5. Click the **OK** button.

Running the Network Time Protocol

You can use the Network Time Protocol (NTP) to set the system date and time on your Network Storage to synchronize itself with an external Time Server.

To run the Network Time Protocol:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Date / Time icon.
3. Click on the Time Zone tab.
4. From the dropdown menu, select the time zone for your location.
5. Click the OK button.
6. Click on the NTP tab.
7. In the Time Server field, type the URL of the time server you want to use.

   URL *time.nist.gov* is the default.
8. Under Schedule, choose one of the options:
   - Disable – Disables NTP synchronization
   - Do it at once – Performs a synchronization when you click the OK button.
   - Time interval by hour – Set an hourly interval for a synchronization to happen.
   - Daily – Sets the time of day when the synchronization happens.
   - Weekly – Sets the time of day and day of the week when the synchronization happens.
9. Click the **OK** button.

Viewing the Results of NTP Synchronization

To view the results of an NTP synchronization:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Date / Time icon.
3. Click on the NTP tab.

   The results of the latest synchronization are displayed:

   - Last Synchronization Time – Time and date of the last synchronization
   - Last Synchronization Result – OK means success

Rebooting the Network Storage

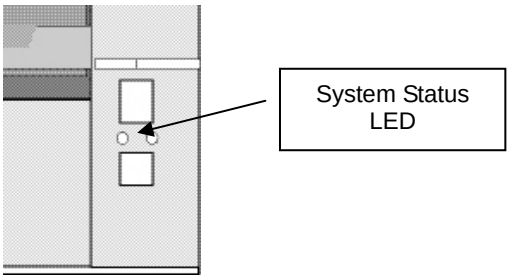
Normally you will only need to reboot the Network Storage is after a firmware upgrade. See “Upgrading the Firmware” on page 141.

During the reboot, none of your folders will be accessible from your networked PCs.

To reboot the Network Storage:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click on the Reboot option.
4. Click the **OK** button.

In the confirmation box, click the **OK** button.



The reboot runs automatically. When the Network Storage is fully booted:

- The System Status LED turns green (right)
- The buzzer beeps one time (if the buzzer is enabled)

Shutting Down the Network Storage

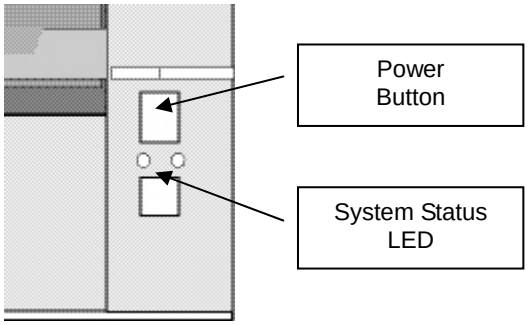
The only time you need to shut down the Network Storage is to replace the disk drive cooling fan or the power supply.

During and after the shutdown, none of your folders will be accessible from your networked PCs.

To shut down the Network Storage:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click on the Shutdown option.
4. Click the **OK** button.
5. In the confirmation box, click the **OK** button.

Restarting the Network Storage



To restart the Network Storage after a shutdown, press the power button on the front of the Network Storage chassis (right).

When the Network Storage is fully booted:

- The System Status LED turns green (right)
- The buzzer beeps one time (if the buzzer is enabled)

Viewing System Information

To view system information:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click on the System Information tab.

   System Information includes:

   - Operating System – Embedded Linux
   - Firmware Version – Changes when you upgrade the firmware.
   - CPU model – MPC 8343
   - Network Adapter – Gigabit Ethernet
   - Network Flow – Inflow and Outflow speeds in bits per second

Viewing Enclosure Information

To view enclosure information:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click on the Enclosure Information tab.

   Enclosure Information includes:

   - CPU temperature
   - System temperature
   - System Fan Speed
   - Power Status 5V
   - Power Status 12V
   - Power Status 3.3V

7. RAID Technology

7.1. Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple disk drives to be combined together into a RAID Volume. You create a RAID Volume on your Network Storage when you perform the setup procedure, either in the NAS Setup Wizard or the ASM Setup Wizard.

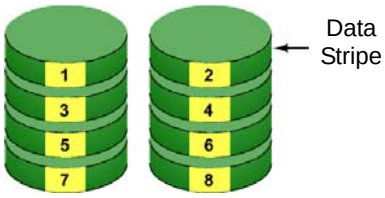
The benefits of a RAID can include:

- Higher data transfer rates for increased server performance
- Increased overall storage capacity for a single Volume
- Data redundancy/fault tolerance for ensuring continuous system operation in the event of a disk drive failure

Different RAID levels use different organizational models and have varying benefits. The following outline breaks down the properties for each RAID level supported on the Network Storage:

RAID 0 – Stripe

When a RAID Volume is striped, the read and write blocks of data are interleaved between the sectors of multiple disk drives. Performance is increased, since the workload is balanced between drives or “members” that form the RAID Volume. Identical drives are recommended for performance as well as data storage efficiency.



disk drives

The RAID Volume’s data capacity equals the capacity of the smallest disk drive times the number of disk drives. For example, one 100 GB and three 120 GB drives will form a 400 GB (4 x 100 GB) RAID Volume instead of 460 GB.
If disk drives of different capacities are used, there will also be unused capacity on the larger drives.

Because RAID 0 does not offer Fault Tolerance, meaning that you cannot recover your data after a disk drive failure, LevelOne does not recommend a RAID 0 Volume for your Network Storage.

RAID 0 Volumes on Network Storage consist of one or more disk drives.

RAID 1 – Mirror

When a RAID Volume is mirrored, identical data is written to a pair of disk drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first.

With RAID 1, if one disk drive fails or has errors, the other mirrored disk drive continues to function. This is called Fault Tolerance. Moreover, if a spare disk drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive.

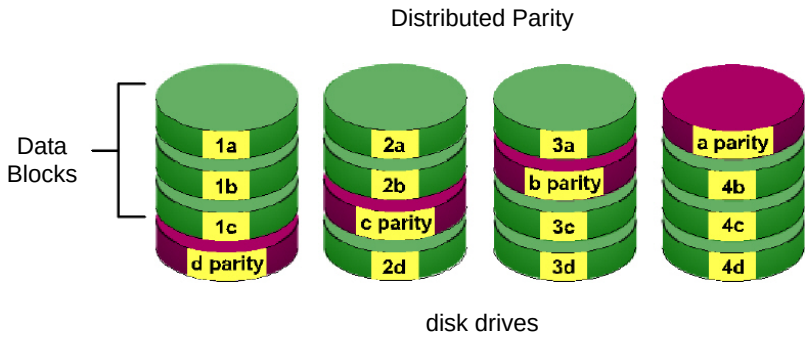
The RAID Volume's data capacity equals the smaller disk drive. For example, a 100 GB disk drive and a 120 GB disk drive have a combined capacity of 100 GB in a mirrored RAID Volume.

If disk drives of different capacities are used, there will also be unused capacity on the larger drive.

RAID 1 Volumes on Network Storage consist of two disk drives.
If you want a mirrored RAID Volume with more than two disk drives, see "RAID 10"

RAID 5 – Block Striping with Distributed Parity

RAID 5 organizes block data and parity data across the disk drives. Generally, RAID level 5 tends to exhibit lower random write performance due to the heavy workload of parity recalculation for each I/O. RAID 5 works well for file, database, application and web servers.



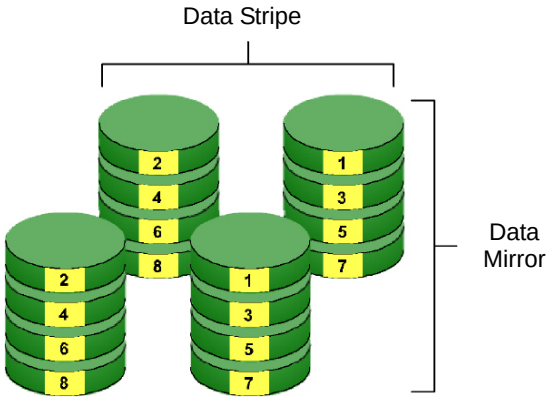
The capacity of a RAID 5 Volume equals the smallest disk drive times the number of disk drives, minus one. Hence, a RAID 5 Volume with four 100 GB disk drives will have a capacity of 300 GB. A RAID Volume with two 120 GB disk drives and one 100 GB disk drive will have a capacity of 200 GB.

RAID 5 is generally considered to be the most versatile RAID level.

RAID 5 requires a minimum of three disk drives.

RAID 10 – Mirror / Stripe

Mirror/Stripe combines both of the RAID 0 and RAID 1 types. RAID 10 can increase performance by reading and writing data in parallel while protecting data with duplication. At least four disk drives are needed for RAID 10 to be installed. With a four-disk-drive RAID Volume, one drive pair is mirrored together then striped over a second drive pair.



The data capacity RAID 10 Volume equals the capacity of the smallest disk drive times the number of disk drives, divided by two.

In some cases, RAID 10 offers double fault tolerance, depending on which disk drives fail.

RAID 10 Volumes on Network Storage consist of four disk drives.

Because all of the available disk drives are used for the RAID Volume, you cannot set up a spare drive with RAID 10.

7.2. Choosing a RAID Level

There are several issues to consider when choosing the RAID level for your Volume. The following discussion summarizes some advantages, disadvantages and applications for each choice.

RAID 0

Advantages	Disadvantages
Implements a striped disk RAID Volume, the data is broken down into blocks and each block is written to a separate disk drive I/O performance is greatly improved by spreading the I/O load across many channels and drives No parity calculation overhead is involved	Not a true RAID because it is not fault-tolerant The failure of just one drive will result in all data in an RAID Volume being lost Should not be used in mission critical environments

Recommended applications for RAID 0:

- Image Editing
- Pre-Press Applications
- Any application requiring high bandwidth

RAID 1

Advantages	Disadvantages
Simplest RAID storage subsystem design Can increase read performance by processing data requests in parallel since the same data resides on two different drives	Very high disk overhead - uses only 50% of total capacity

Recommended applications for RAID 1:

- Accounting/Financial
- Payroll
- Any application requiring very high availability

RAID 5

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate Most versatile RAID level	Disk failure has a medium impact on throughput

Recommended applications for RAID 5:

- File and Application servers
- WWW, E-mail, and News servers
- Intranet servers

RAID 10

Advantages	Disadvantages
Implemented as a mirrored RAID Volume whose segments are RAID 0 RAID Volumes High I/O rates are achieved thanks to multiple stripe segments	Very high disk overhead – uses only 50% of total capacity

Recommended applications for RAID 10:

- Imaging applications
- Database servers
- General fileserver

7.3. 2 TB Limitation

In order to be compatible with different Operating Systems and the files systems that each one supports, the largest RAID Volume you can create on Network Storage is 2 TB.

7.4. Spare Drive

A spare is a disk drive that has been designated to replace a failed disk drive in a RAID Volume. In the event of the failure of a disk drive within a RAID 1 or three-drive RAID 5 Volume, the spare drive is activated as a member of the RAID Volume to replace a disk drive that has failed.

A spare drive cannot replace the failed drive in a RAID 0 Volume because of the way in which data is written to the disk drives under RAID 0.

A spare drive is not available for a RAID 10 Volume because RAID 10 requires all four disk drives in the Network Storage enclosure. However, when you replace the failed disk drive, the Network Storage will automatically rebuild the RAID Volume using the new disk drive.

You must designate a disk drive as a Spare. By default, and unassigned disk drive is Free. Use ASM to designate the Free disk drive as a Spare. See
Maintaining a spare drive is a good precaution to protect your RAID Volume integrity in the event of disk drive failure.

7.5. Automatic Rebuilding

When a disk drive in your RAID 1, 5, or 10 Volume fails, and a replacement disk drive becomes available, the RAID Volume will rebuild itself to the new disk drive automatically.

For RAID 1 and three-drive RAID 5 Volumes, you can designate a spare drive. If a spare drive is present when the RAID Volume experiences a disk drive failure, the rebuild will start automatically using the spare drive.

For RAID 1, RAID 5, and RAID 10 Volumes without a spare drive, the RAID Volume will begin to rebuild itself automatically when you remove the failed disk drive and install a new disk drive.

A RAID 0 Volume cannot be rebuilt because of the way in which data is written to the disk drives under RAID 0. Even if there is a designated spare drive, rebuilding is not possible for RAID 0 Volumes.

7.6. Partition and Format

When you create a RAID Volume on Network Storage, the RAID Volume is automatically partitioned and formatted for you.

To use your RAID Volume, you must create Folders on the RAID Volume and assign services to those Folders according to your requirements. Network Storage provides file services for Windows, UNIX/Linux and Macintosh, so all of those PCs can access the folders on the Network Storage, even though each PC might have a different file system.

7.7. RAID Volume Migration

Migration is the process of:

- Changing the RAID level
- Adding disk drives but keeping the same RAID level

In the migration process, the existing RAID Volume is called the Source. The proposed RAID Volume is called the Target. Each target RAID Volume has certain requirements and they are different for each RAID level. You must meet all of the requirements in order to successfully migrate a RAID Volume.

In most cases, you must add one or more disk drives during the migration process. You can never reduce the number of disk drives.

While the migration is running, you can still access the folders on your RAID Volume and the data they contain.

The tables below shows the migration options for a source RAID Volume according to its RAID level. The available target RAID levels are shown with their requirements.

RAID 0

A RAID 0 source Volume can migrate to the following target RAID levels:

Target	Requirements
RAID 0	Add disk drives.
RAID 1	2 disk drives only. Only a 1-drive RAID 0 can migrate to RAID 1. Add 1 disk drive.
RAID 5	3 disk drives minimum. At least 1 more disk drive than the RAID 0 RAID Volume.

RAID 1

A RAID 1 source Volume can migrate to the following target RAID levels:

Target	Requirements
RAID 0	Can use same number of disk drives.
RAID 5	3 disk drives minimum. At least 1 more disk drive than the RAID 1 RAID Volume.

RAID 5

A RAID 5 source Volume can migrate to the following target RAID levels:

Target	Requirements
RAID 0	Can use same number of disk drives.
RAID 5	Add a disk drive.

RAID 10

A RAID 10 source Volume cannot migrate or add more disk drives.

8. Troubleshooting

This chapter deals problems you might encounter with your Network Storage and how to resolve them.

8.1. Responding to an Audible Alarm

The Network Storage has two beep patterns

- Single beep, not repeated – The Network Storage is online
- Two beeps, continuously repeated – The Network Storage reports a problem

When you boot or reboot the Network Storage, and the buzzer is enabled, the buzzer sounds one time to indicate that the Network Storage is online.

If you hear the two-beep pattern, check the following items:

- System Status LED
- Drive Status LED
- RAID Volume status in ASM
- File System status in ASM
- Enclosure status in ASM
- Event Log in ASM
- Your email inbox

8.2. Checking the System Status LED

The Network Storage system status LED reports the condition of the Enclosure fan and power supply:

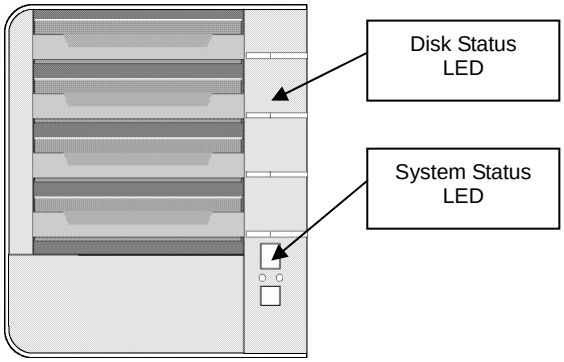
- Green – Normal Enclosure function
- Amber – There is a problem with the fan or power supply
- Red – The fan, power supply, or file system has failed

If your Network Storage is configured to work with a UPS, it will continue to run after a power supply failure.

8.3. Checking Disk Status LEDs

The disk status LEDs report the condition of the disk drives:

- Green – Normal disk drive function
- Amber – Rebuilding to this disk drive
- Red – Failed disk drive
- Dark – No disk drive is installed



If a disk drive fails, the Disk Status LED is red. If the disk drive belongs to a RAID Volume, the Volume goes Critical or Offline.

Replace the failed disk drive with a new disk drive of the same or slightly greater capacity. You do not have to power down the Network Storage.

1. Open the Network Storage's front door.
2. Pull out the drive carrier with the failed drive.
3. Remove the failed disk drive from the drive carrier.
4. Install a new disk drive into the carrier.
5. Place the carrier with the new disk drive back into the open slot in the Network Storage.

If the failed drive belonged to a RAID Volume, the RAID Volume will begin rebuilding as soon as the new drive is installed.

During the Rebuild, the Disk Status LED show amber. When the Rebuild is finished, the Disk Status LED turns green.

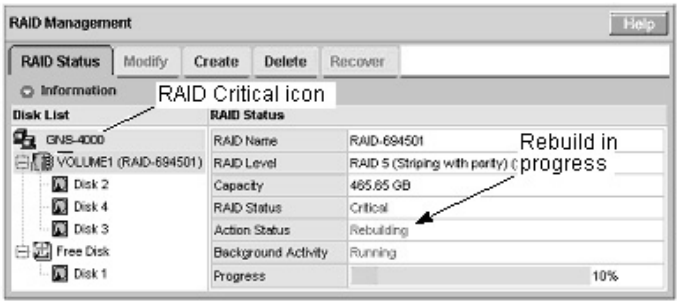
If the replacement drive is free, that is, not assigned to a RAID Volume or as a spare, the Disk Status LED remains dark after you install the new drive.

8.4. Checking RAID Volume Status in ASM

To view RAID Volume status:

1. Start ASM.
2. In the Tree, click on the **+** beside the RAID & File System icon.
3. Click on the RAID Management icon.

   The status is displayed in the RAID Status tab.



Responds to a Critical RAID Volume

How the Network Storage responds to a Critical RAID Volume depends on the RAID level of your Volume and whether you have a spare drive available:

- For a RAID 1 Volume or a three-drive RAID 5 Volume, if a spare drive is available, the RAID Volume begins rebuilding itself automatically.
- For RAID 1, 5, and 10 Volumes, when no spare drive is available, you must replace the failed disk drive. The RAID Volume will begin rebuilding itself when you install the new disk drive.
- RAID 0 Volumes go *offline* after a disk drive failure. A RAID 0 Volume cannot be rebuilt. All data on the Volume is lost.

Additional Details about Rebuilds

- The Rebuild takes several minutes, depending on the size of your disk drives.
- During a rebuild, you can access your folders on the Network Storage.
- When you replace the failed disk drive with a new disk drive, the new disk drive becomes a Free Drive.

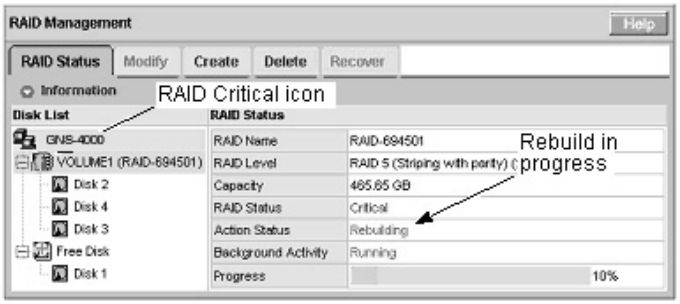
Responding to an Invalid RAID Volume

The Network Storage considers a RAID Volume invalid when the RAID Volume was created by a different Network Storage. However, the RAID Volume itself remains functional and the data on it is safe.

This condition could happen when you:

- Move the disk drives from one Network Storage to a different Network Storage.
- Remove the disk drives in order to send your Network Storage for service.

When the Network Storage's memory does not recognize the RAID Volume, so ASM displays the RAID Volume as invalid. Use the Recover function to validate the RAID Volume. The Recover tab is only active when an invalid RAID Volumes present and can be recovered.



Using the Recover Function

To validate the RAID Volume:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the RAID Management icon.
3. Click on the Recover tab.
4. On the Recover tab, click on the option button beside the invalid RAID Volume.
5. Click on the **OK** button.

   The Network Storage will reboot itself to update its configuration and recognize the RAID Volume.

Important

Running the Recover function might erase some or all of your Network Storage settings. If that condition happens, run the NAS Setup Wizard.

8.5. Checking File System Status in ASM

Typically the first indication of a problem with the Network Storage's file system is when your network drive becomes unavailable.

You might also see the message, "File system contains errors. Please check." when you click on the icons under the File & Print menu.

To view File System status:

1. Start ASM.
2. In the Tree, click on the **+** beside the RAID & File System icon.
3. Click on the File System Management icon.
4. Look for the RAID Volume icon on the File System Status tab.

   If the RAID Volume icon is Critical (has a yellow !), the file system contains errors and you must rebuild the file system. See below.

Rebuilding the File System

Caution

When you rebuild a File System, you delete all the folders in the RAID volume and all the data saved in the folders.

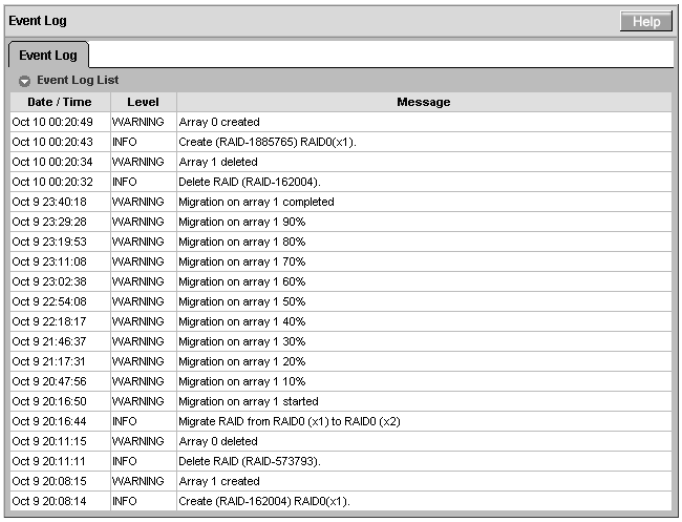
To rebuild a File System:

1. In the Tree, click on the **+** beside the RAID & File System icon.
2. Click on the File System Management icon.
3. In the File System Status tab, click on the RAID Volume Critical icon to display the **Rebuild File System** button.
4. Click on the **Rebuild File System** button.
5. In the confirmation box, type **yes** into the field provided, then click the **OK** button.

8.6. Checking the Event Log in ASM

To view the Event Log in ASM:
To check Enclosure status:

1. Start ASM.
2. In the Tree, click on the + beside the Management icon.
3. Click on the Event Log icon.



Date / Time	Level	Message
Oct 10 00:20:49	WARNING	Array 0 created
Oct 10 00:20:43	INFO	Create (RAID-1885765) RAID0(x1).
Oct 10 00:20:34	WARNING	Array 1 deleted
Oct 10 00:20:32	INFO	Delete RAID (RAID-162004).
Oct 9 23:40:18	WARNING	Migration on array 1 completed
Oct 9 23:29:28	WARNING	Migration on array 1 90%
Oct 9 23:19:53	WARNING	Migration on array 1 80%
Oct 9 23:11:08	WARNING	Migration on array 1 70%
Oct 9 23:02:38	WARNING	Migration on array 1 60%
Oct 9 22:54:08	WARNING	Migration on array 1 50%
Oct 9 22:18:17	WARNING	Migration on array 1 40%
Oct 9 21:46:37	WARNING	Migration on array 1 30%
Oct 9 21:17:31	WARNING	Migration on array 1 20%
Oct 9 20:47:56	WARNING	Migration on array 1 10%
Oct 9 20:16:50	WARNING	Migration on array 1 started
Oct 9 20:16:44	INFO	Migrate RAID from RAID0 (x1) to RAID0 (x2)
Oct 9 20:11:15	WARNING	Array 0 deleted
Oct 9 20:11:11	INFO	Delete RAID (RAID-573793).
Oct 9 20:08:15	WARNING	Array 1 created
Oct 9 20:08:14	INFO	Create (RAID-162004) RAID0(x1).

4. Check the Event Log for reports of disk drive failure or other problems.

Responding to Events

All events are reported in the Event Log. Most events are simply reports that the Network Storage is responding to your commands.

Many events are also reported via email. The Network Storage's buzzer sounds for serious events that require your attention.

A list of event categories is shown below:

File System	System (enclosure)
NAS Replication	Disk Drives
Snapshots	RAID Volumes

Reported Event	Corrective Action
File System	
File system of volume X content errors! Check the system before continuing.	The file system has a problem. Reboot the Network Storage and check file system again. If the event appears again, the file system has crashed. Rebuild the file system.
File system capacity usage of volume X is over 90%.	Reduce the number or size of the files or expand the volume size. See “Migrating a RAID Volume” Section
File system capacity usage of volume X is 100%.	
Rebuilding file system...	The file system is being rebuild by user action.
NAS Replication	
NAS replication is completed.	NAS replication has finished. Normal.
System is busy. NAS replication is abort!	The RAID Volume is currently formatting, rebuilding, or migrating. Wait until this process is done. Then try the replication again.
System is doing another replication. NAS replication is abort!	The NAS is currently doing a replication. Wait until the current replication is done. Then try the second replication again.
NAS replication is failed!	There is a failed network connection between the two Network Storages. Correct the problem and try again.

Reported Event	Corrective Action
Snapshots	
The snapshot capacity usage which timestamp is [date and time] of volume X is over 90%.	Move the snapshot volume to another storage location. Or delete the snapshot and then create a new one.
System is busy. Snapshot creation was aborted!	The RAID Volume is currently formatting, rebuilding, or migrating. Wait until this process is done. Then try the snapshot again.
System is creating another snapshot. Snapshot creation was aborted!	The NAS is currently doing a snapshot. Wait until the current snapshot is done. Then try the second snapshot again.
System (enclosure)	
System is starting to work.	Normal.
System is rebooting.	
System is shutting down.	
System was shut down abnormally.	The Network Storage shut down incorrectly the last time. See “Shutting Down the Network Storage”
CPU temperature is higher than 50ûC/122ûF. System will shut down.	Allow the Network Storage to cool for several minutes. Then restart the Network Storage and check system temperature and fan operation. Be sure there is adequate air circulation around the Network Storage.
System temperature is higher than 50ûC/122ûF. System will shut down.	
System fan speed is lower than 1500 RPM. Check the system before continuing.	Replace the fan.
AC Power failure. System will shut down.	Restore the AC power. Then restart the Network Storage. See “Connecting the Power”

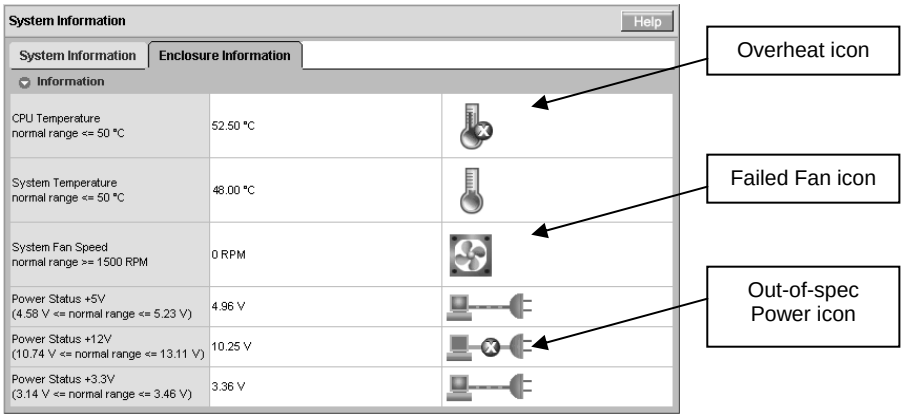
Reported Event	Corrective Action
Disk Drives	
Task X timeout on disk Y at LBA [address]	A LBA error. Check the disk drives. Check the RAID Volume. Replace the disk drive or rebuild the RAID Volume as needed.
Task X disk error on disk Y at LBA [address] with status Z	
S.M.A.R.T threshold exceeded on disk X	Check the disk drives. Replace the failed drive.
BSL update on disk X at LBA [address]	Bad sector on a disk drive. Check the disk drives. Replace the disk drive if it continues to receive BSL updates.
BSL log disk X at LBA [address] cleared	Check the disk drives.
Delete Spare Disk	Delete a spare drive. Normal.

Reported Event	Corrective Action
RAID Volumes	
Create [RAID name, RAID level and X number of disk drives]	Create a RAID Volume. Normal.
Delete RAID X	Delete a RAID Volume. Normal.
Migration or Rebuilding on array X started.	RAID Volume Migration or Rebuild has started. Normal.
Migration or Rebuilding on array X at Y%.	Progress report on RAID Volume Migration or Rebuild. Normal.
Migration or Rebuilding on array X paused at Y%.	RAID Volume Migration or Rebuild was paused temporarily by user action.
Migration or Rebuilding on array X resumed at Y%.	RAID Volume Migration or Rebuild was paused and then resumed by user action.
Migration or Rebuilding on array X completed.	RAID Volume Migration or Rebuild has finished. Normal.
Migration or Rebuilding on array X aborted at Y%	RAID Volume Migration or Rebuild was aborted (stopped) by user action.
Migration or Rebuilding on array X aborted at Y% because of error.	RAID Volume Migration or Rebuild has aborted (stopped) because of an error. Check the disk drives. Check the RAID Volume.
RAID status: "OFFLINE". The GNS-4000 X volume Y is offline.	Check the disk drives. Replace the failed drive. Create a new RAID Volume.
RAID status: "CRITICAL". The GNS-4000 X volume Y is not functioning correctly.	Check the disk drives. Replace the failed drive. The RAID Volume will rebuild automatically.
RAID X had some errors. Formatting was aborted!	Check the disk drives. Replace the failed drive.

8.7. Checking Enclosure Status in ASM

To check Enclosure status:

1. Start ASM.
2. In the Tree, click on the **+** beside the System icon.
3. Click on the System Information icon.
4. Click on the Enclosure Information tab.



The corrective action you take depends on the nature of the problem:

- If CPU or system temperature is above specification:
  - Be sure there is adequate air flow around the Network Storage.
  - Be sure the ambient temperature is below 35ûC (95ûF).
  - Check the fan speed.
- If the fan speed is below specification, replace the Network Storage's disk drive cooling fan.
- If any power status is out-of-specification, replace the Network Storage's power supply.

8.8. Resolving Connections with SmartSYNC

The SmartSYNC utility is designed to detect the Network Storage on your network. If SmartSYNC does not detect your Network Storage, check the following items:

- Be sure the Network Storage is powered up and fully booted.

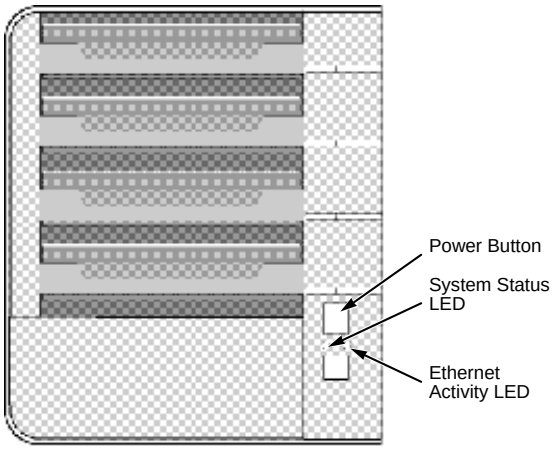
  The Power Button and System Status LED should be green.

- Be sure the Network Storage is properly connected to your network.

  The Ethernet Activity LED should be green or blinking green.

  If the Ethernet Activity LED is dark, check “Solving Network Connection Problems”

- Be sure that SmartSYNC is looking on the same network where you connected the Network Storage.

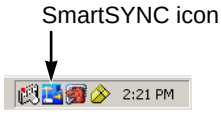


Multiple Network Connections

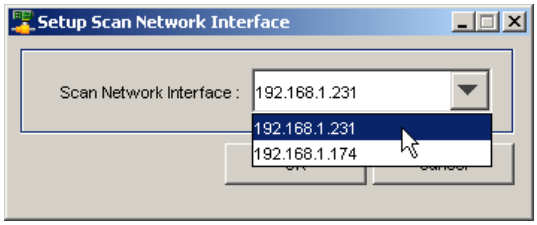
If your PC has multiple network connections, you must verify that SmartSYNC is looking on the network where the Network Storage is installed:

1. Open SmartSYNC.

   In the Windows application tray (lower right corner of the screen), double-click on the SmartSYNC icon.



2. From the Option menu, choose *Scan Network Interface*.
3. In the dropdown menu, choose the IP address of the network interface card connected to the network where you installed the Network Storage.



8.9. Solving Network Connection Problems

Most network connection problems are the result of poor connections.

When the Network Storage is fully booted and connected to the network, the Ethernet Activity LED indicates status and activity:

- Green – Network link is properly connected
- Flashing Green – Network Activity
- Dark – No Connection

If your Network Storage is connected to your network but the Ethernet Activity LED on your Network Storage is dark, check the following items:

- Verify that the switch, hub, or facility network service connection that you are using is operational.

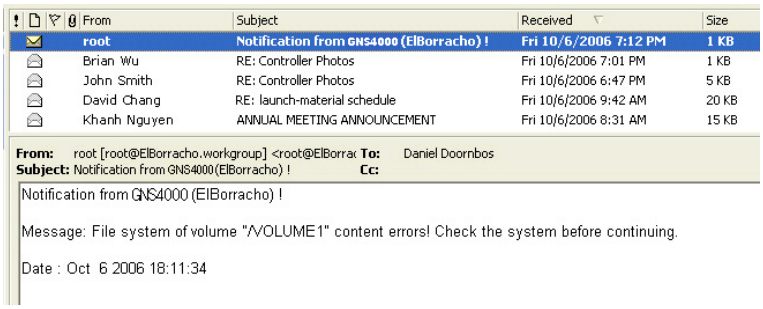
  Switches and hubs have LEDs that light when there is a connection and flash when there is activity.

  Network service connections generally do not have LEDs to verify whether they actually are connected to the network. See your Network Administrator for assistance.
- Be sure the network cable is firmly attached to the Network Storage network connector at one end and to the network switch, hub, or facility network connection at the other.
- If the cable connections are good, remove the existing network cable and install a known-good network cable.

If you know your network devices are working properly and you know that your network cable is good, but the Ethernet Activity LED remains dark, see “Contacting Technical Support”

8.10. Checking Your Email Inbox

If you enabled Mail Alert in ASM, the Network Storage will send you an email message when a problem arises. Look for a message from “root.”



See “Adding an Email Alert Recipient” for more information about email alerts.

8.11. Restoring the Default Password

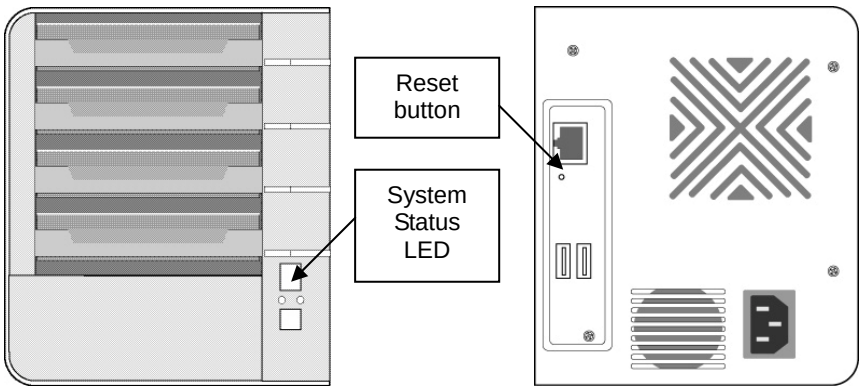
Normally, you change your password in ASM. See “Changing the Administrator’s Password” Section

If you changed the password and then forgot the new password, you can reset the Network Storage to the default password: **admin**. Use a straightened paper clip or the tip of a ball-point pen as a reset tool.

To reset the Administrator’s password:

1. Verify that the Network Storage is fully booted.
2. Insert your reset tool into the reset button hole on the back of the Network Storage.
3. Press and hold the reset button for eight seconds, until the System Status LED flashes three times.

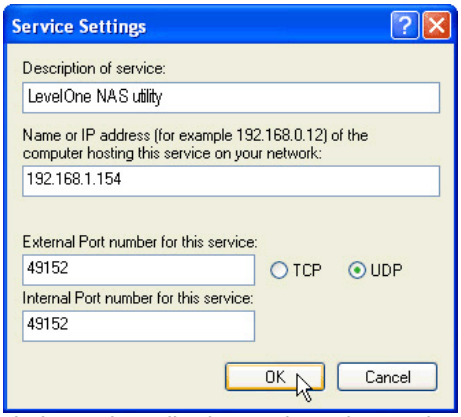
   The Administrator’s password is now reset to **admin**.



8.12. Resolving a Windows Firewall Issue

If you a running a personal firewall on your Windows PC, the firewall might prevent the you from accessing the Network Storage over your network.
Follow this procedure to add an exception for the Network Storage:

1. From the Windows Start menu, choose Settings, then Network Connections.
2. The Network Connections window opens.
3. Right-click on Local Area Connection and choose Properties from the popup menu.
4. The local Area Connection properties dialog box opens.
5. Click on the Advanced tab.
6. Click the Settings button.
7. The Windows Firewall dialog box opens.
8. Click on the Advanced tab.
9. Under Network Connection Setting, click the Settings button.
10. The Advanced Settings dialog box opens.
11. Click the Add button.
12. The Service Settings dialog box opens.
13. In the Description of service field, type LevelOne NAS utility.
14. In the Name or IP address field, type the IP address of the Network Storage.
15. See “Finding the Network Storage’s IP Address”
16. In the External Port field, type 49152.
17. Click on the UDP option button.
18. In the Internal Port field, type 49152.
19. Click the OK button.



Windows Firewall Advanced Service Settings

20. Click the OK buttons in the Advanced Settings, Windows Firewall, and Local Area Connection Properties dialog boxes.

9. Setup Wizard Advanced Mode

The NAS Setup Wizard performs the setup procedures on your Network Storage.

To set up your Network Storage:

1. From the Windows Start menu, choose *Programs*, then *LevelOne NAS Utility*, and then *NAS Setup Wizard*.

   The NAS Setup Wizard welcome screen appears.

2. From the Choosing a language dropdown menu, choose the language you prefer.
3. Choose an Initiation Mode.

   Click the *Express Mode* option if ALL of these conditions apply:

   - You have a DHCP server on your network with addresses available.
   - You want data protection for your disk array.
   - You want to use date and time settings from your PC.

   Express Mode is recommended for most users.

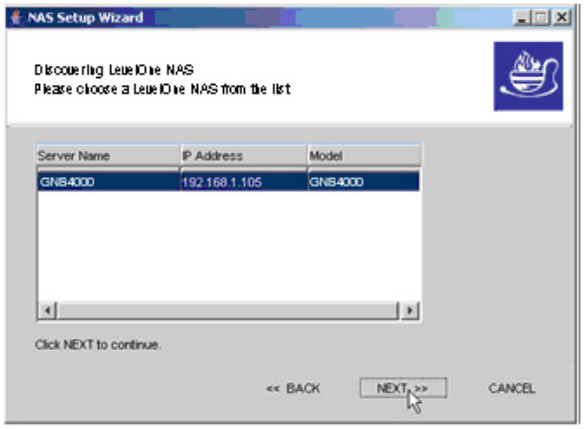
   Click the *Advanced Mode* option if one or more of these conditions apply:

   - You do not have a DHCP server on your network.
   - You have a DHCP server but no addresses are available.
   - You want to set the IP address manually.

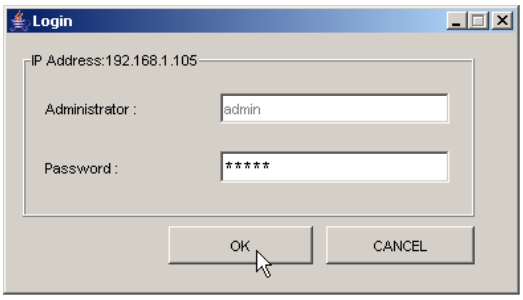
- You want maximum capacity (RAID 0) for your disk array.
- You want to set date and time manually.

The rest of the setup instructions describe Advanced mode. For setup instructions using Express mode, see “Setting up the Network Storage”

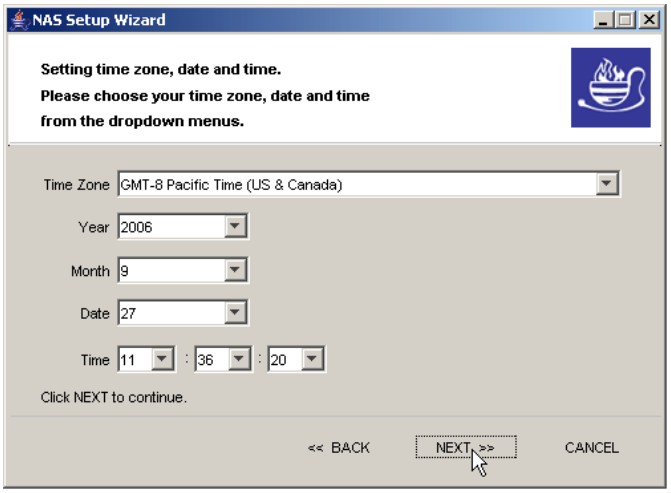
4. Click **Next >>** to continue.
   The Discovering LevelOne NAS screen appears.



5. Highlight the Network Storage you are initiating, then click **Next >>** to continue.
   The Login dialog box appears.



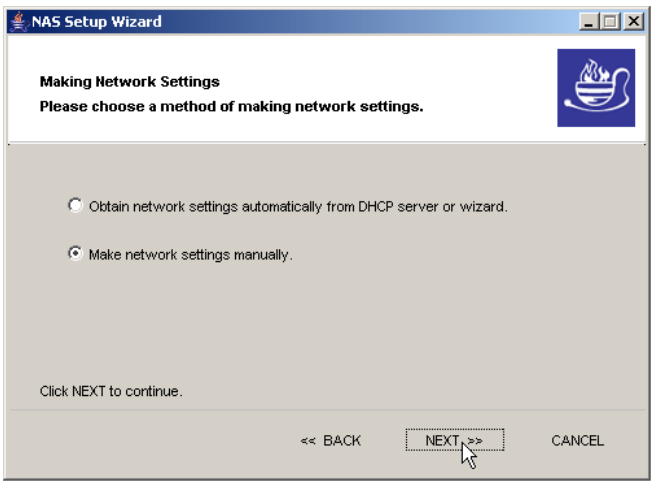
6. Type **admin** into the Password field, then click **OK**.
   The Administrator and password are case sensitive.
   The Time Zone, Date and Time screen appears.



7. From the dropdown menus, choose your:
   - Time Zone
   - Year
   - Month
   - Date
   - Time in hours (24 hour clock), minutes and seconds

   Click **Next >>** to continue.

The Making Network Settings screen appears.



8. In the Making Network Settings screen, choose one of the following:
   - Obtain network settings automatically... – If you have a DHCP server on your network with IP addresses available, and you want the Network Storage to obtain the network settings from the DHCP server, choose this option.
   - Make network settings manually – If you do not have a DHCP server, there are no addresses available, or you prefer to make your own network settings, choose this option

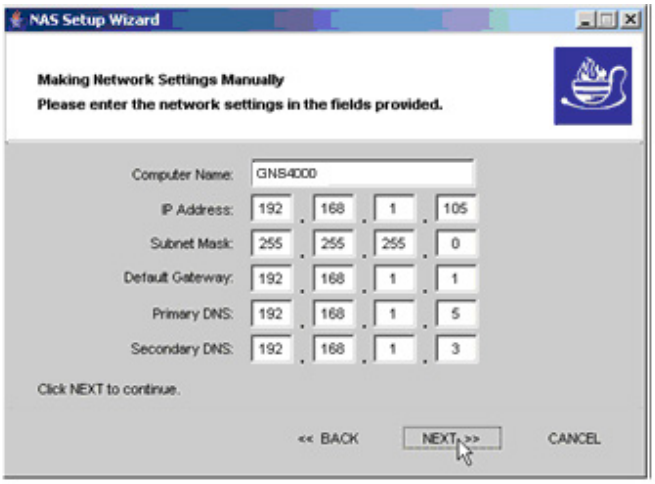
Important

If your DHCP server assigns the IP address to the Network Storage, and you later restart the Network Storage, the DHCP server might assign a different IP address.
If the Network Storage's IP address changes, your existing network drives and printer connections will no longer work. You must create new network drives and printer connections.

Click **Next >>** to continue.

If you chose the automatic option, the Protecting Your Data Screen appears. Skip to Step In the Protecting Your Data screen:

If you chose the manual option, the Making Network Settings Manually screen appears.



9. Type your entries into the fields provided:
   - Computer Name – The Network Storage's Server Name in SmartSYNC
   - IP address
   - Subnet Mask
   - Default Gateway
   - Primary DNS
   - Secondary DNS

Note

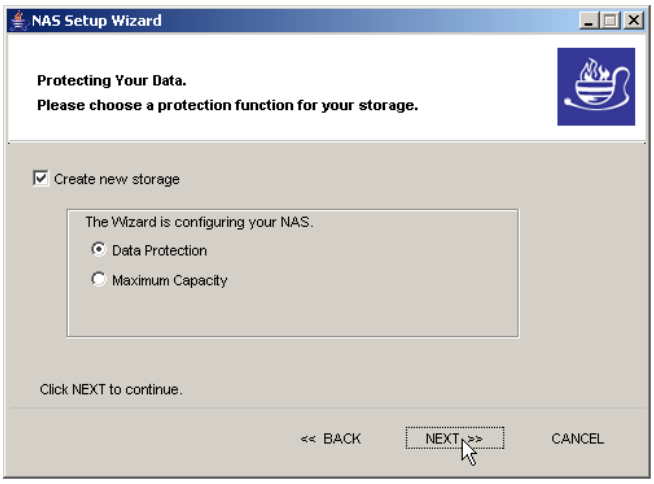
See your Network Administrator for help in making these settings.

LevelOne suggests that you set the first three octets of the Network Storage's IP address to match the first three octets of your PC's IP address.

After initiation, you can change your network settings in SmartSYNC or in ASM.

Click **Next >>** to continue.

The Protecting Your Data Screen appears.



10. In the Protecting Your Data screen:
    - Check the *Create new storage* box if you are setting up the Network Storage for the first time.

      The Wizard creates a RAID array, a default volume, and a default folder called *Public*.
    - Un-check the *Create new storage* box if you already have a RAID and file system on your Network Storage.

      By un-checking the box the Wizard will leave your existing file system intact.

Caution

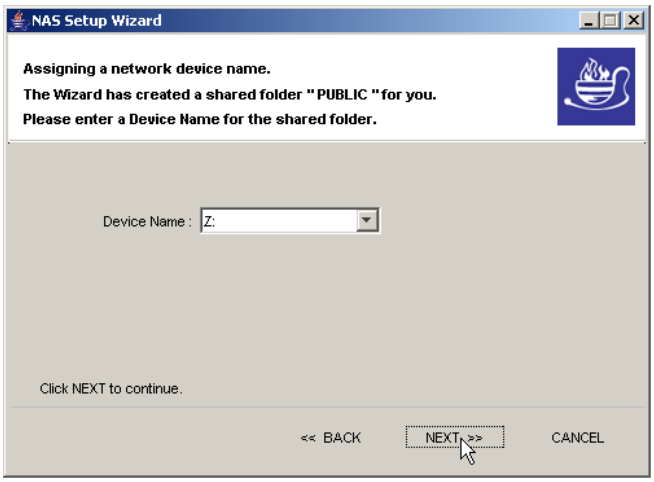
If you check the *Create new storage* box, the Wizard will delete all existing data and folders on the Network Storage.

If you checked the *Create new storage* box, choose one of the following options:

- Data Protection -- Creates a fault-tolerant RAID Volume on your Network Storage. If two disk drives are installed, the Wizard creates a RAID 1 Volume. If three or four disk drives are installed, the Wizard creates a RAID 5 Volume.
- Maximum Capacity – Creates a RAID 0 Volume on your Network Storage. The full combined capacity of the disk drives will be available for data storage but there will be no fault tolerance to protect your data if one of the disk drives fails.

Click **Next >>** to continue.

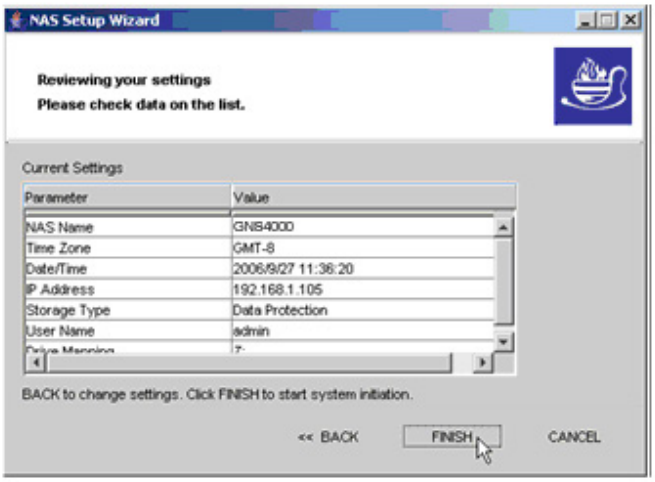
The Assigning a Network Device Name screen appears.



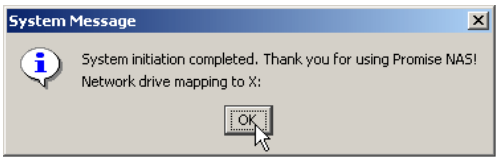
11. Select a Device Name or drive letter to represent the Network Storage as a network drive. The list begins with Z and goes in reverse alphabetical order.

    Click **Next >>** to continue.

The Reviewing Your Settings screen appears.



12. Review your settings and click **Finish** to begin the system initiation.
    A System Message appears.

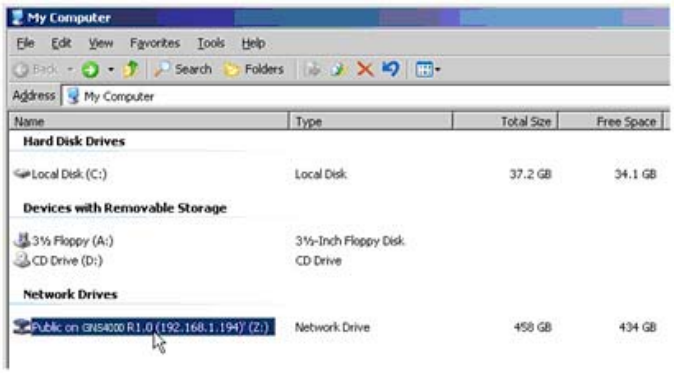


13. In the System Message, click **OK** to finish the system initiation.

    The Wizard creates a RAID Volume and a default folder called *Public*.

    If two disk drives are installed in your Network Storage, the Wizard creates a RAID 1 Volume. If three or four disk drives are installed, the Wizard creates a RAID 5 Volume.

The Public folder on the Network Storage appears under My Computer as a network drive.



You can now copy files to and from the folder on the Network Storage.

To access this folder from other PCs, see “Connecting to the Network Storage”

To create additional RAID Volumes and folders, see “Adding a Folder”

10. Maintenance

10.1. Upgrading the Firmware

Follow this procedure to upgrade the firmware on your Network Storage.

Downloading the Upgrade File

To download the upgrade file:

1. Download the latest firmware upgrade file from the LevelOne website onto your PC.
2. Copy the firmware upgrade file from your PC to a folder on the Network Storage.

Installing the Upgrade File

1. Start the ASM interface.
2. In the Tree, click on the **+** beside the Management icon.
3. Click on the System Upgrade icon.
4. From the Volume dropdown menu, choose the Volume that has the folder with the firmware image file.
5. From the Folder dropdown menu, choose the Folder that contains the firmware upgrade file.
6. In the File Name field, type the name of the firmware upgrade file.
7. Click the **OK** button to begin the upgrade.

   The upgrade take about two to three minutes.

Warning

Do not disconnect the power or shut down the Network Storage while the upgrade is running!

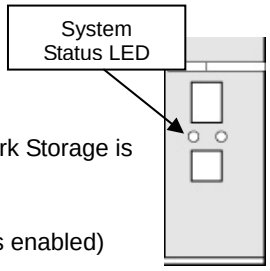
   When the upgrade is done, a system message appears.

8. Click the **OK** button on the system message.

Rebooting the Network Storage

To reboot the Network Storage after a firmware upgrade:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click on the Reboot option.
4. Click the **OK** button.
5. In the confirmation box, click the **OK** button.
   The reboot runs automatically. When the Network Storage is fully booted:
   - The System Status LED turns green (right)
   - The buzzer beeps one time (if the buzzer is enabled)



10.2. Installing Application Plug-ins

Application plug-ins are enhancements to Network Storage's capabilities. The DLNA server, which enables Network Storage to support the UPnP protocol, is one example of an application plug-in.

Follow this procedure to install an application plug-in on your Network Storage.

Downloading the Plug-in File

To download the plug-in file:

1. Download the plug-in file you want from the LevelOne website onto your PC.
2. Copy the plug-in file from your PC to a folder on the Network Storage.

Installing the Plug-in File

1. Start the ASM interface.
2. In the Tree, click on the **+** beside the Management icon.
3. Click on the System Upgrade icon.
4. From the Volume dropdown menu, choose the Volume that has the folder with the plug-in file.
5. From the Folder dropdown menu, choose the Folder that contains the plug-in file.
6. In the File Name field, type the name of the plug-in file.
7. Click the **OK** button to begin the installation.

Warning

Do not disconnect the power or shut down the Network Storage while the installation is running!

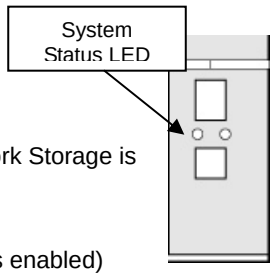
When the installation is done, a system message appears.

8. Click the **OK** button on the system message.

Rebooting the Network Storage

To reboot the Network Storage after a plug-in installation:

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click on the Reboot option.
4. Click the **OK** button.
5. In the confirmation box, click the **OK** button.
   The reboot runs automatically. When the Network Storage is fully booted:
   - The System Status LED turns green (right)
   - The buzzer beeps one time (if the buzzer is enabled)



10.3. Replacing the Fan

Follow this procedure to replace the disk drive cooling fan on the Network Storage:

Shutdown and Disconnect

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click the Shutdown option, then click the **OK** button.
4. In the confirmation box, click the **OK** button.
   Wait until the LEDs on the front of the Network Storage go dark.
5. Disconnect the power cord, network cable, and USB cable.

Remove and Replace the Fan

1. Remove the four screws on the back of the enclosure.
2. Carefully remove the back panel from the enclosure.
3. Disconnect the fan power harness from its connector on the motherboard.
4. Gently pull the two retainer clips away from the cooling fan.
5. Lift the cooling fan off the locating pins.
6. Check the direction arrow on the new fan to be sure it blows outward.
7. Align the new fan with the locating pins on the back panel and gently press the fan into place on the panel.

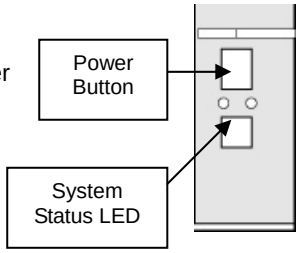
   The fan snaps into place between the retainer clips.
8. Reconnect the fan power harness to its connector on the motherboard.
9. Place the back panel onto the enclosure and install the four screws to attach the back panel to the enclosure.

Reconnect and Power-up

1. Reconnect the power cord, network cable, and USB cable.
2. Press the Power Button on the front of the Network Storage (right).

   When the Network Storage is fully booted:

   - The System Status LED turns green
   - The buzzer beeps one time (if the buzzer is enabled)



Important

See “Connection Problems After Restart”

10.4. Replacing the Power Supply

Follow this procedure to replace the power supply on the Network Storage:

Shutdown and Disconnect

1. In the Tree, click on the **+** beside the System icon.
2. Click on the Reboot / Shutdown icon.
3. Click the Shutdown option, then click the **OK** button.
4. In the confirmation box, click the **OK** button.

   Wait until the LEDs on the front of the Network Storage go dark.
5. Disconnect the power cord, network cable, and USB cable.
6. Open the front door, remove the disk drive carriers, and set aside the carriers.

Disassemble the Enclosure

1. Remove the four screws on the back of the enclosure.
2. Carefully remove the back panel from the enclosure.
3. Disconnect the fan power harness from its connector on the motherboard, then set side the back panel.
4. Pick up the Network Storage and turn the Network Storage upside down.
5. Remove the five screws from the bottom of the enclosure.
6. Gently pull the silver side panel away from the chassis.
7. Gently slide the black side panel forward (toward the disk drive end), then away from the chassis.
8. Lift the bottom panel from the back end, then slide it off the chassis.

Remove and Replace the Power Supply

1. Remove the three screws that attach the power supply at the back panel.

   One screw is beside the power connector, two screws are beside the power supply fan.
2. Remove the screw attaching the power supply to the Network Storage chassis, inside near the wiring harness.
3. Pull the power supply wiring harness from underneath the chassis, then carefully lift the power supply out of the chassis.
4. Disconnect the power supply wiring harness from the power connector on the motherboard.
5. Remove the angle bracket from the old power supply.
6. Attach the angle bracket to the new power supply.

7. Connect the power supply wiring harness to the power connector on the motherboard.
8. Place the power supply onto the chassis.

   Be sure all of the screw holes line up.
9. Gently push the power supply wiring harness into the chassis.

   Be sure to route the wires are away from metal edges.
10. Install the screw attaching the power supply to the Network Storage chassis, inside near the wiring harness.
11. Install the three screws that attach the power supply to the back panel.

    One screw is beside the power connector, two screws are beside the power supply fan.

Reassemble the enclosure

1. Place the bottom panel onto the Network Storage chassis.

   The bottom panel locks under the front (disk drive end) panel.
2. Place the black side panel beside the Network Storage chassis and slide it into place.
3. Place the silver side panel onto the chassis.

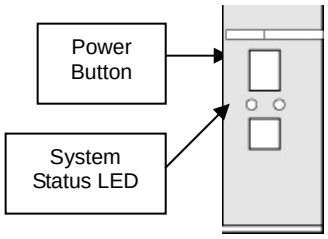
   The silver panel snaps into place.
4. Install the five screws that attach the bottom of the enclosure.
5. Turn the enclosure over and place it on its feet.
6. Reconnect the fan power harness to its connector on the motherboard.
7. Place the back panel onto the enclosure and install the four screws to attach the back panel to the enclosure.

Reconnect and Power-up

1. Reconnect the power cord, network cable, and USB cable.
2. Reinstall the disk drive carriers into the Network Storage and close the front door.
3. Press the power button on the front of the Network Storage (right).

   When the Network Storage is fully booted:

   - The System Status LED turns green
   - The buzzer beeps one time (if the buzzer is enabled)



Important

See “Connection Problems After Restart” below.

10.5. Connection Problems After Restart

If your Network Storage’s network settings were set to *Obtain an IP address automatically*, your DHCP server might assign a different IP address to the Network Storage when you restart the Network Storage after is was shutdown for repairs. This condition does not apply if you assigned your Network Storage’s IP address manually.

If you experience network drive or printer connection failures, check the Network Storage’s current IP address. See “Finding the Network Storage’s IP Address”. If the Network Storage’s IP address has changed, your previous network drives and printer connections will no longer work.

Here are two possible solutions:

- You may be able to reset the Network Storage’s IP address manually. See “Changing the Network Storage’s Network Settings” Section or “Making Network Settings” Section

  Note that changing the Network Storage’s IP address may cause an IP address conflict on your network. Check with your Network Administrator before taking this action.
- If you cannot restore the previous IP address, you must create new network drives and printer connections. See “Connecting to the Network Storage” Section

11. Support

11.1. Frequently Asked Questions

The Network Storage worked OK until I turned it off. When I turned it on again, my Windows network drive connection no longer works.

When you powered up the Network Storage, the DHCP server assigned a different IP address to the Network Storage. Here are two possible solutions:

- You may be able to reset the Network Storage's IP address manually. See "Changing the Network Storage's Network Settings" or "Making Network Settings" Section

  Note that changing the Network Storage's IP address may cause an IP address conflict on your network. Check with your Network Administrator before taking this action.

- If you cannot restore the previous IP address, you must create new network drives and printer connections. See "Connecting to the Network Storage" Section.

When I start Windows, a message displays that says, "Could not reconnect all network drives."

The Network Storage reconnects to your PC shortly after Windows starts. In most cases, the Network Storage network drives will be available by the time you click on them.

The NAS Setup Wizard cannot access the Network Storage over the network.

If you a running a personal firewall on your Windows PC, the firewall might prevent you from accessing folders on the Network Storage. You must do one of the following actions:

- Disable the firewall
- Add an exception for the Network Storage

See "Resolving a Windows Firewall Issue" Section

I tried to connect my Network Storage as a network drive using SmartSYNC, but Windows displayed an error message.

There might be an IP address conflict between the Network Storage and another device on your network. See your Network Administrator for assistance.

I cannot log into the Network Storage with through the AD Domain.

Be sure you use a "domain name¥user name" when you log into the Network Storage using SMB, FTP, or AFP. You must use the "¥" character.

Many FTP clients do not support a space in the domain name or user name.

Also, the Network Storage does not support a user home directory.

How does the Network Storage integrate into an NIS Domain?

If the NIS domain account or group name is the same as the Network Storage, the Network Storage will apply them to its account or group.

If the Network Storage joins a NIS Domain, joining only affects the NFS service and Quota settings. The other services are not affected.

How are non-ASCII folder file names displayed?

The Network Storage supports Unicode, so you can use non-ASCII characters in your folder names. Windows 98 and ME do not support Unicode, so they cannot display your folder names properly. But you can still access your folders.

I tried to copy a Windows shortcut to my network drive, but an error message says there is not enough free disk space.

Normally, you can copy a Windows shortcut to a network drive. However, if the network drive is a USB drive or memory stick with FAT32 file format, the Network Storage might not recognize the shortcut and prevent you from copying it.

If this situation occurs, choose a different folder in which to copy the shortcut.

Does Network Storage support a USB drive or memory stick with FAT16 file format?

No. If you attach the FAT16 USB drive or memory stick to Network Storage, you can see the files on it. But if you attempt to copy files to the drive or memory stick, Windows might display a disk full message.

How do I remove a USB drive or memory stick from the Network Storage?

Be sure that no files on the USB drive or memory stick are still open. Then unplug the USB drive or memory stick from the Network Storage. The Network Storage automatically unmounts the USB drive or memory stick.

Can I do a One Touch Backup or a regular Backup on a protected folder or file on my Windows PC?

No. Windows does not allow SmartSYNC to access protected folders and files. If you want to perform a backup, you must first disable protection on your folders and files.

Which FTP clients are compatible with the Network Storage's FTP server?

LevelOne recommends FTP clients that support Unicode, such as Filezilla or Smart FTP for Windows, Filezilla for Linux, and Transmit v3.5.5 for Macintosh.

If your FTP client does not support Unicode, only use ASCII characters to name your shared folders on Network Storage.

I cannot find the DLNA Server tab under Protocol Control in ASM.

You must download and install the DLNA plug-in on your Network Storage to access this feature. See “Installing Application Plug-ins” Section.

Can I move the disk drives from one Network Storage to a different Network Storage?

Yes. However, to access the RAID Volume on the new Network Storage, you must run the Recover function. When Network Storage’s memory does not match the RAID Volume on the disk drives, the RAID Volume is considered *invalid* and the Recover function becomes available. See “Responding to an Invalid RAID Volume” Section.

I set up email alert recipients but they never receive any messages.

In most cases, you must setup SMTP authentication in order for your alert messages to pass your SMTP server. See “Setting up SMTP Authentication” on page 90.

Can Network Storage handle jumbo frames?

Yes. But you must set the maximum frame size in ASM. See “Working with Jumbo Frames” Section

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Version 2, June 1991

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