



EtherneTV-NXG1/2 Video on Demand Server

NXG1/2 v3.0.0 VoD Server Quick Start Guide



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VBrick is an active participant in the development of industry standards and continues to play an influential role in the Internet Streaming Media Alliance (ISMA), the MPEG Industry Forum, and Internet2. In 1998 VBrick invented and shipped the world's first MPEG Video Network Appliance designed to provide affordable DVD-quality video across the network. Since then, VBrick's video solutions have grown to include Video on Demand, Management, Security and Access Control, Scheduling, and Rich Media Integration. VBrick solutions are successfully supporting a broad variety of applications including distance learning and training, conferencing and remote office communications, security, process monitoring, traffic monitoring, business and news feeds to the desktop, webcasting, corporate communications, collaboration, command and control, and telemedicine. VBrick serves customers in education, government, healthcare, and financial services markets among others.

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Preface

This Quick Start Guide is written for anyone who will be using a VBrick EtherneTV NXG1 or NXG2 VoD Server. This includes system administrators, network technicians, and others. This document explains how to set up and configure the NXG server, how to perform initial admin tasks, and how to add storage. For most common tasks like ingesting content, use the ETV Portal Server and refer to the *ETV Portal Server Administrator Guide* for details. You can perform most admin tasks using the Portal Server and it is unlikely you will ever need to access the Kasenna interface. However, for specific details about the using the Kasenna interface, see [Viewing the Kasenna Documentation](#) on page 8.

EtherneTV-NXG servers are a key component in VBrick's EtherneTV Media Distribution System. The EtherneTV-NXG Video-on-Demand Server provides all standard video-on-demand (VoD) features including support for MPEG-1, MPEG-2, MPEG-4, and Windows Media for maximum flexibility.

Organization

[Getting Started](#) – explains how to unpack and install the server. This includes setup, configuration, verification, and other tasks.

[Administration](#) – explains administrator tasks common to both NXG1 and NXG2. These include content ingestion, file backup, password changes, etc.

[Adding Storage - NXG1](#) – explains how to add storage to NXG1 servers. NXG1 uses software RAID for additional storage.

[Adding Storage - NXG2](#) – explains how to add storage to NXG2 servers. NXG2 uses hardware RAID for additional storage.

[Ingesting Content](#) – provides detailed information on best practices and how content ingestion works on NXG1 and NXG2 servers.

Font Conventions

Arial bold is used to describe dialog boxes and menu choices, for example: **Start > All Programs > VBrick**

`Courier fixed-width font` is used for code elements (C++, HTML) as well as filenames, directories, etc.

Bold Courier fixed-width font is used to indicate user input in keyboard commands, scripts, etc.

Web addresses are displayed as hyperlinks in the format: <http://www.VBrick.com>

Italics are used to emphasize specific words or phrases.

Printer-Friendly

Click on a link to print a hard copy of the document. For best viewing, open and resize the document using the magnification box at the bottom of the Acrobat Reader window.

NXG1/2 VoD Server Quick Start Guide

▼ **To save or print a PDF document:**

1. Click once to open the PDF document in Acrobat Reader.
2. On the **Acrobat Reader** toolbar, click **Save** or **Print**.



Getting Started

Topics in this chapter

- [1. Unpack the Server](#)
- [2. Set up the Server](#)
- [3. Configure the Server](#)
- [4. Verify Server Operation](#)

1. Unpack the Server

Each shipment comes with:

- An introductory letter explaining how to get started.
- Product documentation located on a CD-ROM.
- A complete EtherneTV-NXG system.
- All power cords and cables.
- Rack mount kit (Kit-type must be specified at time of purchase).
- Recovery CDs and a floppy disk with NXG license. (Keep in a safe place—do not lose.)
- This NXG Quick Start Guide.

Note The server comes pre-loaded with the operating system and VOD application software. After the system is powered up, a networking wizard will guide you through the initial setup.

Before You Begin

Make sure that there is a separate PC running Internet Explorer, a PS/2 mouse, a keyboard, and a monitor or console. Please obtain the following information for the EtherneTV-NXG before applying power to the unit. Note that Unix commands are case sensitive and should be entered exactly as shown.

Note If you have purchased an external storage device such as a SCSI attached DAS it must be connected prior to powering up the NXG system.

Table 1. Configuration Information

Information Required	Example	Write Here
Hostname (that will be assigned to EtherneTV VOD)	vbvodnxg	

Information Required	Example	Write Here
EtherneTV VOD IP address	172.17.6.55	
Default gateway (router)	172.17.1.5	
System network netmask	255.255.0.0	
Broadcast IP address (NXG1 only)	172.17.255.255	
Hostname (that will be assigned to EtherneTV VOD)	vbvodnxg	
Default network IP address (NXG1 only)	172.17.0.0	
Domain name	vb.loc	
DNS IP address	64.80.0.162	

2. Set up the Server

▼ To set up the NXG server:

1. Connect the monitor, keyboard, mouse and network cables as described below.

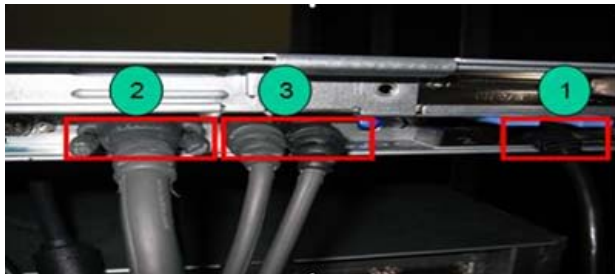


Figure 1. NXG1



Figure 2. NXG2

2. If rack mounting the unit, mount the EtherneTV-NXG server in the rack, using the rack mount kit provided.
3. Connect the EtherneTV-NXG server to the network by plugging the 10/100/1000 Base-T Ethernet cable into the Ethernet port 1 (1) on the rear of the unit.
4. Connect the monitor cable to the video port at the back of the EtherneTV-NXG server (2) Turn the monitor on.

5. Connect a mouse and keyboard to the appropriate ports at the back of the EtherneTV-NXG (3)
6. Plug the EtherneTV-NXG server into a power source, using the power cord provided.
7. Turn the EtherneTV-NXG server's main power on by pressing the power switch at the front of the unit. (4)



Figure 3. NXG1

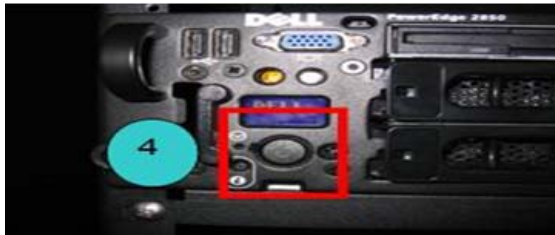


Figure 4. NXG2

8. The EtherneTV-NXG server will boot and automatically load using the default settings. Wait 5–8 minutes for the unit to fully power up. As new hardware is attached (keyboard and mouse) the operating systems will automatically find and install the drivers.
9. When booting is complete, type **Y** and press **Enter** to continue. Make sure the information from Table 1 [Configuration Information](#) is available, then press **Enter** to continue.

3. Configure the Server

You will be prompted for the following information. Be sure you have all of the information in Table 1 [Configuration Information](#) before you continue. When prompted, enter an appropriate value for each item and press **Enter**. Then press **y** and press **Enter** again to continue. Remember that Unix commands are all lower case and can contain no spaces.; use an underscore `_` as a separator.

You will be prompted for the following information:

1. The system hostname
 2. The system ip address
 3. The default gateway ip-address
 4. The system netmask
 5. The default network ip-address (**NXG1 only**)
 6. The system broadcast address (**NXG1 only**)
 7. The system domain
 8. The dns server ip-address
- Quit now, if you do not have this information.
Continue?

Please enter y or n

Verify the Entries

▼ To verify the entries you just made:

1. Review the information you entered. If everything is correct, type **Y** and press **Enter** to continue. Otherwise, type **N** and repeat the setup process.
2. When done the EtherneTV-NXG server displays the configuration files it will update. Type **Y** then press **Enter** to continue. The changes will be displayed for each of the following files. Review each, type **Y** to accept and **Enter** to continue.

```
/etc/sysconfig/network
/etc/sysconfig/network-scripts
/etc/resolve.conf
ServerName in httpd.conf
```

3. When asked if you have completed reviewing the files to be updated, type **Y** then press **Enter** to continue.
4. Wait several minutes until setup is complete and the following message is displayed:

```
Done
Omnibase setup is complete; press enter to continue to login prompt
```

5. Press **Enter** and enter the login name and password:
 - a. At the login prompt, type **root** and press **Enter**.
 - b. At the password prompt, type **omnibase** and press **Enter**.

If you encounter an error at any time during set-up, or if the server is moved to another network, you must perform the following operation:

6. Rename the setup file as follows:

```
root# mv /opt/vbricksetup/.vbrickmbase_is_setup /opt/vbricksetup/
.vbrickmbase_is_not_setup
```

7. Reboot the server.

```
root# reboot
```

4. Verify Server Operation

▼ To verify that the server is properly installed:

1. Verify that there is an amber link light on the EtherneTV-NXG server's Ethernet port.
2. *From the Linux Administrator command line:* Ping the local gateway IP address.

Example: **ping 172.17.1.5** (Use your appropriate local gateway IP address.)

3. *From a separate PC:* Ping the EtherneTV-NXG server from a PC using the EtherneTV-NXG1 IP address. For example:

ping 172.17.6.55 (Use the IP address of your EtherneTV-NXG server.)

Changing the Domain Name

The IP address of the EtherneTV-NXG server must be entered as a hostname entry in the DNS server in order for the NXG server to be recognized by desktop clients through its

domain name (e.g. `http://vb.loc`) rather than the IP address (e.g. `http://172.17.6.55`). For test purposes, an administrator can change the necessary DNS (host) entry in the local PC `hosts` file. Modify the `hosts` file on the local PC to resolve the EtherneTV-NXG IP address with the actual hostname:

▼ To modify the `hosts` file:

1. Search for the file named `hosts` on the local PC. If there is more than one file named `hosts` select the one located in the `Windows\System` or `Windows\system32` folder.
2. Modify the file by using the right mouse button to choose **Open** or **Open With** and use Wordpad or Notepad to make the necessary entry highlighted below in bold.

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
# For example:
#
#       102.54.94.97       rhino.acme.com           # source server
#       38.25.63.10      x.acme.com             # x client host

172.17.6.55                vbvodnxg1
```

Changing the Server Name

NXG1 only. If you are running a network without DNS or if there is no DNS entry for your NXG server, then MediaBase XMP web pages will require a '/' character at the end of the url in order to load properly.

▼ To correct this, perform the following steps:

1. Edit `/usr/kasenna/apache/conf/httpd.conf`
2. Find the line that starts with "ServerName"
3. After the "ServerName" token you will see the hostname of the NXG server. Change this to the IP address of the server.

For example, if your NXG has a hostname of `myNXG2` and an IP address of `192.168.1.100`, your `httpd.conf` file will have the following: `ServerName myNXG2`. Change this to: `ServerName 192.168.1.100`

4. After editing `httpd.conf` restart the MediaBase XMP web server with the following commands:

```
/etc/init.d/Kasenna_Apache stop
/etc/init.d/Kasenna_Apache start
```

Changing the Time and Time Zone

When the EtherneTV-NXG is working in conjunction with the EtherneTV Portal Server in order for the time to appear correctly, it is necessary to set the time zone to match that of the EtherneTV Portal Server.

Using the GUI Interface

Follow the directions below to edit the `/etc/sysconfig/clock` file and then make a new soft link to:

```
/etc/localtime
```

▼ To set the time and time zone with the GUI:

1. From the Linux prompt, type `startx` and press **Enter** to launch the Red Hat graphical user interface.
2. Open a command line interface from the GUI and type:

```
/etc/init.d/mediabase stop
```
3. At the lower right corner of the screen, right-click on the time and select **Adjust Date & Time**.
4. From the pull-down menu, select the time zone you are in. For example, **America/Detroit**, then click **Apply** and **OK** to close the window. Adjust the time as necessary.
5. Return to the command line interface and type `/etc/init.d/mediabase start`
6. At the lower left corner of the screen, right-click on the Red Hat icon, select **logout**, and then click on the **Logout** button to return to the Linux prompt.

Using the Command Prompt

▼ To set the time and time zone from a Command Prompt:

1. Review the list of time zones in `/usr/share/zoneinfo`. Find the time zone you want, and then enter:

```
ln -sf /etc/localtime /usr/share/zoneinfo/desiredtimezone
```
2. For example, to set the time for U.S. East Coast, type:

```
ln -sf /etc/localtime /usr/share/zoneinfo/EST5EDT
```

Administration

VBrick's EtherneTV-NXG Server has been integrated with the EtherneTV family of products including the EtherneTV Portal Server, MPEG-1/2/4 streaming encoders, Windows-based desktop computers, and the EtherneTV-STB. The EtherneTV-NXG delivers stored MPEG assets as unicast streams (with full VCR-like functionality such as Stop/Pause/Play/FF/Rew) across an Ethernet network. The EtherneTV-NXG is built on a Dell hardware platform. (See Table 1 below for complete details.) Other features include the ability to schedule asset playback, asset searching, user and system statistics, and more. The EtherneTV Portal Server is required to gain the full benefits of the EtherneTV-NXG server and is sold separately.

In order to set up the EtherneTV Portal Server, please follow the directions in the *EtherneTV Portal Server Administrator Guide*. Once the ETV portal server is setup and configured, you can access video on the EtherneTV-NXG server through the ETV Portal Server web interface. VBrick uses its own software-based components to decode streams on the desktop. There is no client-side software to install. The EtherneTV Portal Server automatically downloads components to the desktop PC upon the user's initial access to the system. The following table shows all currently supported models.

Table 1. NXG VoD Server Specifications – All Models

Dell PowerEdge Hardware	Kasenna MediaBase Software	Operating System	Operating System Drives	Internal Content Drives	External Content Drives†
NXG1 1750	7.0.1	Red Hat 8	1 Drive	2 Drive Software RAID0	7 Drive Software RAID0
NXG1 1850††	7.2.1	Red Hat 8	1 Drive	1 Drive	7 Drive Software RAID0
NXG1 1850†† (with Fiber NIC)	7.2.1	Red Hat 8	1 Drive	1 Drive	7 Drive Software RAID0
NXG2 2650	7.2.0	Red Hat 8	1 Drive	4 Drive Hardware RAID5	7 Drive Hardware RAID5
NXG2 2850††	7.2.1	Red Hat Enterprise Linux 3	2 Drive Hardware RAID1	4 Drive Hardware RAID5	7 Drive Hardware RAID5

† Up to 4 logical volumes.

†† Denotes current VBrick product.

Topics in this chapter

[Viewing the Kasenna Documentation](#)

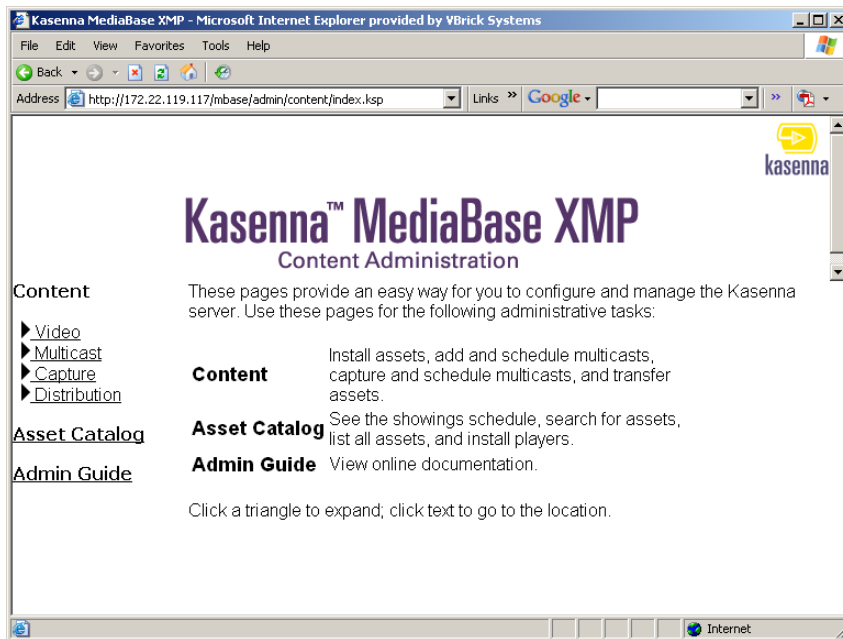
[Ingesting Content](#)

[Automatic File Backup](#)

-
- [Re-Installing the License Key](#)
 - [Changing the Default Passwords](#)
 - [Best Practices](#)

Viewing the Kasenna Documentation

- ▼ To access the Kasenna documentation:
 1. Open a web browser on the VOD administrators PC and type the following URL:
<http://vbvodnxg1/mbase/admin/> (In this example `vbvodnxg1` is the name or IP address of the VoD server. Be sure to include the final slash.)
 2. Login with the following credentials:
User Name = `admin`
Password = `admin`
 3. Once logged in, create a "favorite" or "bookmark" this page.



4. To access the online documentation, select the link **Admin Guide**. From here you can access the *Kasenna MediaBase XMP Installation and Configuration Guide* and the *Kasenna MediaBase XMP Administrator's Guide*. Follow the instructions in these two manuals for system administration and video content management.

Ingesting Content

VBrick strongly recommends that you use the EtherneTV Portal Server exclusively to ingest all NXG content. You can FTP pre-recorded content or copy pre-recorded content to the ETV Portal Server for easy ingestion to the NXG server. The ETV server periodically (every 5 minutes) polls certain folders for presence of content and if found ingests the content onto multiple NXG servers. This process is called Automatic Content Ingestion or Auto-ingestion. The content is placed in a pre-defined sub-folder under the FTP root folder. This pre-defined

folder is called the auto-ingest root folder. See [Ingesting Content](#) on page 31 for more information. See also the *ETV Portal Server Administrator Guide*.

Automatic File Backup

Note This section describes Automatic File Backup. **This procedure backs up the database only; it does not backup content.** To backup content, use industry-standard methods keeping in mind that compressed video files will still consume considerable resources on disk.

VBrick VoD servers have separate storage for different content. The operating system, the application software, and the database are on dedicated filesystems. The use of dedicated drive storage for the operating system and VoD software benefits customers in two ways. Firstly, operating system patches or new VoD software updates leave all the content drives untouched. Secondly, both VoD servers use a MySQL database to index and manage all video content and VoD configuration information. While this database is stored on the operating system filesystem, each evening the system automatically backs up the database onto the RAID drives. Should the operating system drive fail, the database restore procedure uses this backup copy to rebuild the database. The Auto Backup feature is on by default and it is recommended that it be left on. However if for some reason it is not required the following procedure should be used to turn this feature off. If you get lost during editing press Esc twice to exit edit mode. Press ":" to return to command mode.

▼ To turn Auto Backup off:

1. Go to the NXG command line.
2. Type `crontab -e` at the command line. This puts you into an editor for the crontab (the cron table). The editor is the "vi" editor.
3. Using the down arrow key, scroll down to the bottom of the file. A couple of lines up from the bottom you will see two lines:

```
0      4      *      * /opt/vbricksetup/backup_mediabase_database
0      3      *      * /opt/vbricksetup/clear_old_mbdump_files
```

4. Cursor up to these lines and comment this section out as follows:
 - a. Press the **i** key to go to Insert mode.
 - b. Type the **#** key in front of both lines to comment them out.
5. Press **Esc**, then **:** to go into command mode. Then enter **wq** to save the changes and exit the editor.

Caution Even with Auto Backup enabled, there are situations where the backup may not take place soon enough after file ingestion. Therefore it is highly recommended that a separate copy of the original content after ingestion be maintained for at least two days until the auto backups are made.

Re-Installing the License Key

The license is pre-installed on the server from the factory. You do not have to re-install this license except for system restoration. Should you need to re-install the license, use the

following steps. A floppy disk is included that contains the license key for the EtherneTV-NXG server. The key should be added to the `/var/kasenna/license.dat` file. If this file does not exist then the file should be created in the specified path (`/var/kasenna`).

- ▼ To make the floppy disk available to the Linux operating system:
 1. From the root type: `mkdir /floppy` and press **Enter**.
 2. Type: `mount -t vfat /dev/fd0 /floppy` and press **Enter**.
 3. Type `cd /floppy`. You will now be able to copy the license file from the floppy with the following command:

```
cp /floppy/license.txt /var/kasenna/license.dat
```

Changing the Default Passwords

There are five accounts with default passwords that you should change for security. These include three linux accounts and two web accounts as summarized in the following table:

Account Type	User Name	Default Password
Linux	<code>root</code>	<code>omnibase</code>
Linux	<code>vbrickuser</code>	<code>vbrickuser</code>
Linux	<code>admin</code>	<code>admin</code>
Web Account	<code>mbase</code>	<code>mbase-admin</code>
Web Account	<code>admin</code>	<code>admin</code>

- ▼ To change the password for the root, admin, or vbrickuser linux accounts:
 1. Login as `root`, `admin`, or `vbrickuser` from the console or a telnet session.
 2. Type the command `passwd`. Respond to prompts for old and new password.
- ▼ To change the password for the mbase and admin Mediabase XMP web accounts:
 1. Type the command:

```
/usr/kasenna/apache/bin/htpasswd /usr/mbase/etc/webserver-apache/.htpasswd mbase
```

or

```
/usr/kasenna/apache/bin/htpasswd /usr/mbase/etc/webserver-apache/.htpasswd admin
```
 2. Respond to prompts for the new password.

Best Practices

- All assets that are installed into the server should have backup copies available in the event of disk corruption. This will allow for an easy restoration of the system.
- StreamPlayerPlus allows the recording of live streams to MPEG-1, MPEG-2 and MPEG-4 files. Once saved the files can then be installed on the EtherneTV-NXG1 server for playback. Make sure the "hinting" option is checked when recording MPEG-4 files.

- When recording MPEG-4 and MPEG-2 files using StreamPlayer Plus software, it is advisable to keep the length of the record to under 50 minutes to facilitate creating playlists and keep viewing time manageable.
- The controls for MPEG-4 Fast Forward and Rewind are not currently supported; however, slide bars are supported and provide the same functionality.
- As the disks become full, the performance of head seek times diminishes and streaming performance may be affected. Purge unnecessary files as appropriate.
- Do not use spaces in filenames. Use underscores; for example: `my_history_class.mp4`.
- Apple QuickTime 6.5, containing native MPEG-4 support, is the recommended MAC desktop player for accessing MPEG-4 files from the EtherneTV VOD NXG. QuickTime supports the Seek feature (accessed through a slider-bar) for MPEG-4 streams. Make sure **Edit > Preferences > QuickTime Preferences > Streaming Transport** option is set to Automatically determine the best protocol and port ID or "use: UDP, RTSP Port ID 554".



Adding Storage - NXG1

Topics in this chapter

[Overview](#)

[Installation](#)

[Configuration](#)

[Best Practices](#)

[Troubleshooting](#)

Overview

VBrick's SCSI-attached ES3 and ES4 external storage arrays are available to NXG1 customers to increase video storage or to backup existing content. This section explains the steps needed to install, configure, and upgrade an ES3 or ES4 storage array on the NXG1 VoD server. (The NXG2 VoD server uses a hardware rather than software RAID controller; see [Adding Storage - NXG2](#) on page 21 for more about NXG2.) (If the VoD server you purchased from VBrick included external storage, the storage array has already been installed *and* configured, and the information in this chapter does not apply. Be sure to connect the external storage to the server *before* powering on. After the system is powered up, a networking wizard will guide you through the initial setup.)

Table 1. NXG1 Drive Configuration

Dell PowerEdge Hardware	Operating System Drives	Internal Content Drives	External Content Drives†
NXG1 1850††	1 Drive	1 Drive	7 Drive Software RAID0
NXG1 1850†† (with Fiber NIC)	1 Drive	1 Drive	7 Drive Software RAID0

† Up to 4 logical volumes.

†† Denotes current VBrick product.

The NXG1 Video on Demand server is equipped with three internal SCSI drives. Drive 0 has a capacity of 36GB and is dedicated for the Linux operating system and the VoD software and database. Drive 1 has 300GB and is used for video content storage. The ES3 and ES4 external storage systems are available in two different versions as shown below:

Total Storage Capacity	Drive Layout
1.022 TB	Seven 146GB drives

Total Storage Capacity	Drive Layout
2.044 TB	Fourteen 146GB drives

The ES3 and ES4 attach directly to the back of the NXG1 via an Ultra320 SCSI cable and use the NXG1's internal RAID software. When connected to the NXG1, the ES3 and ES4's drives are striped in a RAID 0 configuration to improve performance. However, RAID 0 does not provide any drive redundancy in the event of a drive failure. For ease of administration, the drives on the ES3 and ES4 storage arrays are configured into 1 TB logical volumes and show up under the NXG1 directory structure as `/content2` and `/content3`.

Installation

To ensure a successful ES3 and ES4 installation and avoid unwanted results, it is critical that users follow the exact syntax and order of these steps. As video streaming is interrupted during this installation process, users are advised to perform this procedure during non-business hours.

▼ To install a new array:

1. Unpack the ES3 or ES4 storage unit and install it in a rack in close proximity to the NXG1 VoD server. Do not connect the power cords or SCSI cable. Verify that the slide switch above the SCSI connector on the back of the storage array is in the "up" position.
2. Connect the supplied SCSI cable to the blue connector labeled Ultra 320 SCSI on the back of the ES3 or ES4 storage unit as shown.
3. Connect the other end of SCSI cable to the SCSI connector marked with a symbol on the back of the NXG1 server (Dell 1850).
4. Plug in both power cords to the ES3 or ES4 unit and turn on both power switches on the storage array. Wait several minutes before proceeding to the next section of this document.



Configuration

▼ To configured the installed array:

1. Hit the power button on the front of the NXG1 server and wait several minutes for it to completely power up.
2. Logon to the system as the `root` user. The root password is `omnibase`.
3. To create `raidtab`, type: `touch /etc/raidtab`
4. At the system prompt, type `startx` to launch the Red Hat graphical user interface. Wait for the Red Hat GUI to appear.
5. Click on the Red Hat menu icon on the lower left corner of the screen and move up to the **System Tools > Terminal** icon and left click it to launch a terminal window.

6. Partition the external drives. This procedure contains details for an ES3 or ES4 storage array with seven or fourteen external drives, respectively.
 - a. For an ES3 storage array, the seven external drives are named by the Linux operating system on the NXG as follows. (If you are installing a fourteen drive ES4 array, the drive naming follows the same convention and goes from `/dev/sdc` through `/dev/sdp`.)
`/dev/sdc, /dev/sdd, /dev/sde, /dev/sdf, /dev/sdg, /dev/sdh, and /dev/sdi.`
 - b. Partition each external drive using the `fdisk` utility. (See <http://www.tldp.org/howto/partition/partition-5.html> for more about `fdisk`.) The following example is for `/dev/sdc`.
 - Type `fdisk /dev/sdc`
 - Type `p` to view existing partitions. (There should be none. Use the `d` command to delete any that exist.)
 - Type `n` to create a new partition.
 - Type `p` to specify a primary partition.
 - Type `1` (the number one) to create the first partition on this device.
 - Accept the default first cylinder. It should be cylinder 1. (Press enter for default.)
 - Accept the default last cylinder. It should be the last cylinder on the disk.
 - Type `t` to change the partition type.
 - Type `1` (the number one) to change the type for the first partition on this device.
 - Type `fd` to specify a type of `linux RAID auto`.
 - Type `w` to write the changes to the partition table.
 - c. Repeat the steps above for all remaining external drives (`/dev/sdd` through `/dev/sdi` for the ES3 or `/dev/sdd` through `/dev/sdp` for the ES4) and then close the terminal window.
7. Click on the Red Hat menu icon on the lower left corner of the screen and move up to the **Accessories > Kate** icon and left click it to launch the Kate text editor.
 - a. Within the Kate application, click on **File > Open** and type the string `/etc` in the Location window and click the **OK** button. This will display the contents of the `/etc` directory.
 - b. Move the horizontal scrollbar, locate the `raidtab` file and left click on it to edit it and click the **OK** button.
 - c. **If installing a 1TB ES3 storage array**, edit this file by appending the following lines, exactly as shown below, to the end of the file. The section below is added at the bottom of the `raidtab` file. Then skip Step d and jump to Step e.

```
raiddev/dev/md0
raid-level0
nr-raid-disks7
chunk-size512k
persistent-superblock0
nr-spare-disks0
  device/dev/sdc1
  raid-disk0
  device/dev/sdd1
  raid-disk1
  device/dev/sde1
  raid-disk2
  device/dev/sdf1
```

```
raid-disk 3
device/dev/sdg1
raid-disk4
device/dev/sdh1
raid-disk5
device/dev/sdi1
raid-disk6
```

d. **If installing a 2TB ES3 storage array**, edit this file by appending the following lines, exactly as shown below, to the end of the file. The section below is added at the bottom of the `raidtab` file.

```
raiddev/dev/md0
raid-level 0
nr-raid-disks 7
chunk-size 512k
persistent-superblock 0
nr-spare-disks 0
  device /dev/sdc1
  raid-disk 0
  device /dev/sdd1
  raid-disk 1
  device /dev/sde1
  raid-disk 2
  device /dev/sdf1
  raid-disk 3
  device /dev/sdg1
  raid-disk 4
  device /dev/sdh1
  raid-disk 5
  device /dev/sdi1
  raid-disk 6
raiddev /dev/md1
raid-level 0
nr-raid-disks7
chunk-size 512k
persistent-superblock 0
nr-spare-disks 0
  device /dev/sdj1
  raid-disk0
  device/dev/sdk1
  raid-disk1
  device/dev/sdl1
  raid-disk2
  device/dev/sdm1
  raid-disk3
  device/dev/sdn1
  raid-disk4
  device/dev/sdo1
  raid-disk5
  device/dev/sdp1
  raid-disk6
```

- e. Click on **File > Save** icon to save your changes. The click on **File > Quit** to exit the Kate editor.
- f. Log out of the Red Hat GUI by clicking on the Red Hat icon on the lower left and selecting logout, then click on the **logout** button.
- g. At the command line prompt, type `reboot`

8. Wait for the system to reboot and logon as root. Then, depending if you are installing an ES3 or ES4 storage array, create one or two filesystem(s) on the new RAID array(s) as follows.
 - a. Temporarily halt the RAID array by typing: `/sbin/raidstop -a /dev/md0`. (Do the same for `md1` if you have a 2TB array.)
 - b. Type `mkraid /dev/md0` to initialize the RAID array. This will take some time. You should see output on the console with status such as `handling md device /dev/md0`, `analyzing super-block`, etc. Note: if the external disks already contain a valid filesystem, `mkraid` will refuse to destroy it. Instead, you will see various warnings and advice on commands to enter. If you are certain you are willing to destroy the contents of the external disks, type `mkraid -R /dev/md0` to re-initialize the external raid array. (*This “reinitialize” step is usually not necessary.*)
 - c. Format the filesystem by typing the following as appropriate. It may take a few minutes to finish (for a 7 drive array).
`mkfs.xfs -f /dev/md0` (for a 1TB array)
 - d. Skip to Step g if you are installing an ES3 1 TB array; if installing a ES4 2TB array, proceed to Step e.
 - e. type `mkraid /dev/md1` to initialize the second RAID array. This will take some time. You should see output on the console with status such as `handling md device /dev/md1`, `analyzing super-block`, etc. Note: if the external disks already contain a valid filesystem, `mkraid` will refuse to destroy it. Instead, you will see various warnings and advice on commands to enter. If you are certain you are willing to destroy the contents of the external disks, type `mkraid -R /dev/md1` to reinitialize the external raid array. (*This “reinitialize” step is usually not necessary.*)
 - f. Format the filesystem by typing `mkfs.xfs -f /dev/md1` This may take a few minutes to finish (for a 7 drive array).
 - g. Launch the Red Hat GUI and Kate editor as in Step 7 above. Use Kate to edit the file `/etc/fstab` and add the following line at the bottom of the file, then save the file and exit the Kate editor.
`/dev/md0 /content2 xfs defaults 1 2<cr>`
It is important to put a carriage return `<cr>` at the end of this line by hitting the **Enter** key. If installing a ES4 2TB system, add the following two lines to the bottom of the `/etc/fstab` file, then save the file and exit the Kate editor.
`/dev/md0 /content2 xfs defaults 1 2 <cr>`
`/dev/md1 /content3 xfs defaults 1 2 <cr>`
 - h. Log out of the Red Hat GUI and return to the command prompt.
9. Type `cd /` to go to the root directory. Type the following to create a mount point for the ES3 or ES4 external file system.
`mkdir /content2`
If installing a ES4 2 Terabyte system, type the following to create two mount points for the ES4 external file system.
`mkdir /content2`
`mkdir /content3`
10. Mount the new file system by typing `mount -a`. (Per the `/etc/fstab` configuration).
11. Verify that you can see the new RAID filesystem(s) on `/dev/md0` (and `/dev/md1`) by typing:

`df -h`

Examine at the `Size` of `md0` (and `md1`) to verify that each is approximately 1TB.

12. From a separate Windows PC, go to the Kasenna service admin web page
13. Go to **Configure > Filesystems**.
14. In the **Filesystems** box, highlight `/content2`, then click the **Add** button which bring up the Filesystem Change Required page. Then click on the **Change Now**, then click **OK**.
15. You should now see `(MB) /content2` under the Filesystems listing. This tells you that the `/content2` filesystem is now managed by MediaBase.
16. If using an ES4, in the Filesystems Box, highlight `/content3`, then click **Add** to bring up the Filesystem Change Required page. Then click on **Change Now** and **OK**.
17. You should now see `(MB) /content3` under the Filesystems listing. This tells you that the `/content3` filesystem is now managed by MediaBase.
18. You are done. Your ES3 or ES4 installation is now complete.

Note The NXG1 will use any available disk space to store files, so that new content may be added to either the internal or external file systems.

Best Practices

- The system bootup messages (including SCSI and RAID related messages) can be viewed by typing `more /var/log/dmesg`
- You can find where video content is stored by going directly to the Kasenna Content Administration web page and clicking on the **Video Find/Modify** link. Then click on the **Find** button to bring up a listing of all the stored video content. If you then click on the underlined video name, it will show you where the video files are stored, either under `/content` (internal storage), `/content2` (external storage)
or
`/content3` (external storage).

Troubleshooting

Problem

If the NXG1 server is configured properly and a reboot occurs BUT the power on the ES3 or ES4 is left OFF the server bootup will fail with the following message:

```
***Error occurred during the RAID startup
***Dropping you to a shell: the system will reboot when you leave the shell.
Give root password for maintenance (or type Control-D for normal startup)
```

Solution

Power on the ES3 or ES4 before powering on the NXG1 VoD server.

Problem

If the server is started without the cable connected to the ES3 or ES4 storage unit the failure message displayed will be:

```
Starting up RAID devices: md1 md0 /dev/md2:invalid argument /dev/md2 must be
a nonpersistent RAID0 or LINEAR array!
***Error occurred during the RAID startup
***Dropping you to a shell: the system will reboot when you leave the shell.
Give root password for maintenance (or type Control-D for normal startup)
```

Solution

Make sure the SCSI cable to the ES3 or ES4 is connected before powering on the NXG1.

Problem

If the NXG1 server is not configured properly and you reboot the system, the server bootup will fail with the following message:

```
***Error occurred during the RAID startup
***Dropping you to a shell: the system will reboot when you leave the shell.
Give root password for maintenance (or type Control-D for normal startup)
```

Solution

Enter the **root** password. Use **vi** to confirm `/etc/fstab` and `/etc/raidtab` were set up properly. Confirm `/content2` (and `/content3`) were created. When done type **exit** to reboot. If you still have problems, contact VBrick Support Services.



Adding Storage - NXG2

Topics in this chapter

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[Best Practices](#)

[ES3/4 Status LEDs](#)

Overview

VBrick's SCSI-attached ES3 and ES4 external storage arrays are available to NXG2 customers to increase video storage or to backup existing content. This section explains the steps needed to install, configure, and upgrade these storage systems on the NXG2 Video on Demand server. The NXG2 VoD server is equipped with 6 internal SCSI drives. Drives 0 and 1 have a capacity of 146GB each and are dedicated for the Linux operating system and the VoD software and database. This combination gives the NXG2 876GB of total internal storage. (If the VoD server you purchased from VBrick included external storage, the storage array has already been installed *and* configured, and the information in this chapter does not apply. Be sure to connect the external storage to the server *before* powering on. After the system is powered up, a networking wizard will guide you through the initial setup.)

Table 1. NXG2 Drive Configuration

Dell PowerEdge Hardware	Operating System Drives	Internal Content Drives	External Content Drives†
NXG2 2650	1 Drive	4 Drive Hardware RAID5	7 Drive Hardware RAID5
NXG2 2850††	2 Drive Hardware RAID1	4 Drive Hardware RAID5	7 Drive Hardware RAID5

† Up to 4 logical volumes.

†† Denotes current VBrick product.

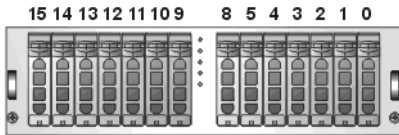
VBrick offers the two different versions of the ES storage array, the 1 TB ES3 and the 2 TB ES4. These products are based on Dell's PowerVault 220S storage system. To improve streaming performance and video storage flexibility, the 2TB ES4 storage array is configured as two separate 1TB logical volumes. The capacity and drive layout of the ES3 and ES4 external storage systems are shown below:

Model	Total Storage Capacity	Drive Layout
ES3	1.022 TB	Seven 146GB drives
ES4	2.044 TB divided into two 1.022 TB logical volumes	Fourteen 146GB drives

The ES3 and ES4 attach directly to the back of the NXG2 via an Ultra320 SCSI cable. The use of a software RAID 5 array provides excellent performance for streaming video while also protecting against data loss if a single drive in the RAID 5 array fails. In the case of a single drive failure, video streaming will continue, although total streaming bandwidth and throughput will be slightly reduced.

Drive Layout

The following diagram shows the SCSI ID numbers and their associated hard drives. For the 2TB ES4 storage unit, Vbrick has logically divided the chassis into two separate 1TB RAID 5 arrays, the first comprised of drives 0 through 5 + 8, and the second drives 9 through 15. The SCSI ID information will be used in the Configuration section of this document.



Installation

To ensure a successful ES3/ES4 installation, it is critical that users follow the exact syntax and order of these steps. As video streaming is interrupted during this installation process, users are advised to perform this procedure during non-business hours.

▼ To install an ES3 or ES4 device:

1. Unpack the ES3 or ES4 storage unit, attach the rack mount kit and install it in a rack in close proximity to the NXG2 VoD server. Do not connect the power cords. Connect the supplied SCSI cable to the connector labeled "Ultra320 SCSI" located near the middle of the ES3/4 storage unit. Verify that the slide switch is in the "up" position on the module next the SCSI card.



2. Connect the other end of SCSI cable to the top right SCSI connector (Port 2) on the four port SCSI card in the back of the NXG2 server. If connecting a second ES3/4 storage unit, use the top left SCSI connector (Port3).



3. Plug in both power cords and turn on both power switches on the ES3/ES4. Wait several minutes before proceeding to the next step.

Configuration

This procedure explains how to configure external storage on the Dell 2850 with software RAID.

- ▼ To configure software RAID on a Dell 2850:
 1. Power on the 2850 server.
 2. Allow the system to boot up completely.
 3. Login as root.
 4. Run software RAID configuration scripts as followed:
 - a. For 1TB of external storage, run `/opt/vbricksetup/configure_external1`
 - b. For 2TB of external storage, run `/opt/vbricksetup/configure_external1`, follow the prompts, and then `/opt/vbricksetup/configure_external2`
 - c. For 3TB of external storage, run `/opt/vbricksetup/configure_external1` then `/opt/vbricksetup/configure_external2` and then `/opt/vbricksetup/configure_external3`
 - d. For 4TB of external storage, run `/opt/vbricksetup/configure_external1` then `/opt/vbricksetup/configure_external2`, then `/opt/vbricksetup/configure_external3` and then `/opt/vbricksetup/configure_external4`.
 5. After running the external storage configuration scripts, the system will build the RAID5 arrays. *This can take up to 3 hours.* To monitor progress, type `cat /proc/mdstat`. The output will indicate the percent complete for each RAID array.
 6. After all the RAID arrays have been built, type `init 6` to reboot the server.
 7. Open a MediaBase management web page by going to the following URL from a browser:


```
http://serverIPorHostname/mbase/admin/
```
 8. Go to the file system configuration page by clicking **Configure > Filesystem**.
 9. A new filesystem will be listed in the **Filesystems** list for each terabyte of storage that has been added. These filesystems are named `external1`, `external2`, `external3`, and `external4`. For each Terabyte of storage added:
 - a. Select an unmanaged content filesystem from the list.
 - b. Click the **Add** button.

-
- c. "(MB)" should now appear before the filesystem to indicate that it is now being managed by the VOD system.
 10. The external storage is now available for new asset storage.
 11. Finish by verifying that the `external1` and `/external2` (if used) directories are listed on the Kasenna Monitor > Storage page by highlighting the **System Asset Group** field and seeing these filesystems appear under the Storage List.

Note The MediaBase VoD software automatically determines the best storage placement for any new video asset added to the system. This means that internal NXG2 storage may be used first before the external ES3 or ES4 storage is utilized.

Detecting a Failed Drive

Example 1 – Status Shows Healthy Arrays

To monitor the health of drives in the RAID array, look at the file `/proc/mdstat`. Here is an example of five healthy RAID arrays:

```
[admin@NXG2-2850 etc]$ cat /proc/mdstat
Personalities : [raid1] [raid5]
md7 : active raid5 sdt[6] sds[5] sdr[4] sdq[3] sdp[2] sdo[1] sdn[0]
      860247552 blocks level 5, 128k chunk, algorithm 2 [7/7] [UUUUUUU]
md6 : active raid5 sdm[6] sdl[5] sdk[4] sdj[3] sdi[2] sdh[1] sdg[0]
      860247552 blocks level 5, 128k chunk, algorithm 2 [7/7] [UUUUUUU]
md5 : active raid5 sdc[0] sdf[3] sde[2] sdd[1]
      430123776 blocks level 5, 256k chunk, algorithm 2 [4/4] [UUUU]
md1 : active raid1 sdb3[1] sda3[0]
      123828928 blocks [2/2] [UU]
md0 : active raid1 sdb1[1] sda1[0]
      152512 blocks [2/2] [UU]
unused devices: <none>
```

Example 2 – Status Shows Failed Drive in RAID5 Array

Here is an example with a failed drive in the RAID5 array `md5`. Note that `sdd` is missing from `md5`; `3/4` is shown rather than `4/4`; and `U_UU` is shown rather than `UUUU`. A similar output would appear for a failed RAID1 drive in `md0` or `md1`.

```
[admin@NXG2-2850 admin]$ cat /proc/mdstat
Personalities : [raid1] [raid5]
md7 : active raid5 sdn[0] sdt[6] sds[5] sdr[4] sdq[3] sdp[2] sdo[1]
      860247552 blocks level 5, 128k chunk, algorithm 2 [7/7] [UUUUUUU]
md6 : active raid5 sdg[0] sdm[6] sdl[5] sdk[4] sdj[3] sdi[2] sdh[1]
      860247552 blocks level 5, 128k chunk, algorithm 2 [7/7] [UUUUUUU]
md5 : active raid5 sdc[0] sdf[3] sde[2]
      430123776 blocks level 5, 256k chunk, algorithm 2 [3/4] [U_UU]
md1 : active raid1 sdb3[1] sda3[0]
      123828928 blocks [2/2] [UU]
md0 : active raid1 sdb1[1] sda1[0]
      152512 blocks [2/2] [UU]
unused devices: <none>
```

Replacing a Failed RAID1 Drive

There are two drives in the array, and the exact commands you enter depend on which drive is being replaced. Use care when partitioning the array. A failure to partition the drive correctly may require a complete re-install. When partitioning the array, type a question mark (?) at the `fdisk` prompt to see a list of commands. Type `man fdisk` at the Linux prompt for help using the `fdisk` disk partitioning utility. For more about `fdisk` see <http://www.tldp.org/howto/partition/partition-5.html>. Contact VBrick Support Services if you need help. While running the following procedure, you can safely ignore the following informational message:

```
The number of cylinders for this disk is set to 36472. There is nothing wrong
with that, but this is larger than 1024, and could in certain setups cause
problems with: 1) software that runs at boot time (e.g., old versions of
LILO) 2) booting and partitioning software from other OSs (e.g., DOS FDISK, OS/
2 FDISK)
```

Replacing Failed Drive1

- ▼ To replace a failed drive in a RAID1 array:
 1. Power down (type `init 0` and wait for the system to shut down).
 2. Remove failed drive from the system
 3. Add a replacement drive.
 4. Power up and login as `root`.
 5. Copy the partition table from the good drive to the replacement as follows:
 - a. Type `fdisk /dev/sdb` to view the partition table.
 - b. Type `p` to print the partition table for `/dev/sdb`.
 - c. Type `q` to quit `fdisk`.
 - d. Type `fdisk /dev/sda` to write the partition table on the new drive.
 - e. Type `p` to print the partition table for `/dev/sda`.
 6. At the prompt, type `d` to delete existing partitions (up to 4).


```
Command: d
Partition number (1-4): 1
Command: d
Partition number (1-4): 2
Command: d
Partition number (1-4): 3
Command: d
Partition number (1-4): 4
```
 7. At the prompt, type `n` to create the first new partition.


```
Command: n
   e   extended
   p   primary partition (1-4): p
Partition number (1-4): 1
First cylinder: 1 (Start cylinder for first partition.)
Last cylinder: 19 (End cylinder for first partition. Must agree with /dev/sdb above.)
Command: t (Set partition type.)
```

```

Partition number (1-4): 1
Hex code: fd (Linux RAID filesystem.)
Command: n (Create second new partition.)
systemprompt: p
systemprompt: 2
systemprompt: 20 (Start cylinder for second partition.)
systemprompt: 2018 (End cylinder for second partition. Must agree with Step 5 above.)
Command: t (Set the partition type.)
systemprompt: 2
systemprompt: 82 (Linux swap partition.)
Command: n (Create third new partition.)
systemprompt: p
systemprompt: 3
systemprompt: (Enter start cylinder for third partition or use default.)
systemprompt: (Enter end cylinder for third partition. Use remaining space on disk.)
Command: t (Set the partition type.)
systemprompt: 3
systemprompt: fd
Command: p (Print partition table. Must agree with good drive from Step 5 above.)
Command: w (Write new partition table.)
Command: q

```

8. Create the RAID array. Type:

```

mdadm /dev/md0 -a /dev/sda1
mdadm /dev/md1 -a /dev/sda3

```

9. Type `cat /proc/mdstat` to monitor the progress. Repeat this step until RAID reconstruction is complete. The output will include a percent complete and estimated time to completion. Note the percent complete and estimated time to completion for `md0` and `md1`. If you wish to continue streaming from the VOD server while the RAID rebuilds, leave the build rate as is (about 30 hours in this example). If the system is offline and you wish to hasten the RAID rebuild, type:

```
echo "30000" > /proc/sys/dev/raid/speed_limit_min
```

Note that doing this on a system that is being actively used can affect streaming performance. After the rebuild is complete, type the following or reboot the VOD server to restore the default rebuild rate:

```
echo "1000" >/proc/sys/dev/raid/speed_limit_min
```

10. Create the boot partition in the newly installed drive.

```

[root@NXG1 root]# grub
grub> root (hd0, 0)
grub> setup (hd0)
grub> quit

```


Replacing Failed Drive2

Replacing a failed Drive2 is basically an identical procedure. The only difference is that the drive letters are reversed. For example, instead of typing:

```
fdisk /dev/sdb (See Step 5a in Replacing Failed Drive1.)
```

```
fdisk /dev/sda (See Step 5d in Replacing Failed Drive1.)
```

you would type:

```
fdisk /dev/sda
```

```
fdisk /dev/sdb
```

Similarly, for the `mdadm` commands (See Step 8 in [Replacing Failed Drive1](#)), instead of typing:

```
mdadm /dev/md0 -a /dev/sda1
```

```
mdadm /dev/md1 -a /dev/sda3
```

you would type:

```
mdadm /dev/md1 -a /dev/sda3
```

```
mdadm /dev/md0 -a /dev/sda1
```

Similarly, for the `grub` commands (See Step 10 in [Replacing Failed Drive1](#)), instead of typing:

```
grub> root (hd0, 0)
```

```
grub> setup (hd0)
```

you would type:

```
grub> root (hd1, 0)
```

```
grub> setup (hd1)
```

Replacing a Failed RAID5 Drive

▼ To replace a failed drive in a RAID5 array:

1. Power down. Type `init 0` and wait for the system to shut down.
2. Remove failed drive from the system.
3. Add a replacement drive.
4. Power up and login as `root`.
5. Add the new drive to the array as follows: `mdadm raid-device -a <drive>`. For example, to add `/dev/sdd` back to the raid device `/dev/md5`, type

```
mdadm /dev/md5 -a /dev/sdd.
```
6. Type `cat /proc/mdstat` to observe the state of the RAID rebuild. For example:

```
[root@NXG2-2850 root]# mdadm /dev/md5 -a /dev/sdd
mdadm: hot added /dev/sdd
[root@NXG2-2850 root]# cat /proc/mdstat
Personalities : [raid1] [raid5]
md7 : active raid5 sdn[0] sdt[6] sds[5] sdr[4] sdq[3] sdp[2] sdo[1]
      860247552 blocks level 5, 128k chunk, algorithm 2 [7/7] [UUUUUUU]
md6 : active raid5 sdg[0] sdm[6] sdl[5] sdk[4] sdj[3] sdi[2] sdh[1]
      860247552 blocks level 5, 128k chunk, algorithm 2 [7/7] [UUUUUUU]
md5 : active raid5 sdd[4] sdc[0] sdf[3] sde[2]
      430123776 blocks level 5, 256k chunk, algorithm 2 [3/4] [USUU]
      [>.....] recovery = 0.0% (5376/143374592)
finish=1769.9min speed=1344K/sec
```

```
md1 : active raid1 sdb3[1] sda3[0]
      123828928 blocks [2/2] [UU]
md0 : active raid1 sdb1[1] sda1[0]
      152512 blocks [2/2] [UU]
unused devices: <none>
[root@NXG2-2850 root]#
```

Note the percent complete and estimated time to completion for md5. If you wish to continue streaming from the VOD server while the RAID rebuilds, leave the build rate as is (about 30 hours in this example). If the system is offline and you wish to hasten the RAID rebuild, type:

```
echo "30000" > /proc/sys/dev/raid/speed_limit_min
```

Note that doing this on a system that is being actively used can affect streaming performance. After the rebuild is complete, type the following (or reboot the VOD server to restore the default rebuild rate):

```
echo "1000" > /proc/sys/dev/raid/speed_limit_min
```

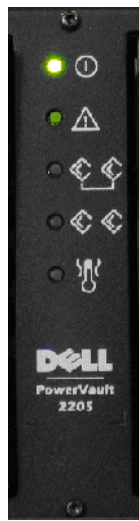
Best Practices

- The system bootup messages (including SCSI and RAID related messages) can be viewed by typing more `/var/log/dmesg`
- You can find where video content is stored by going directly to the Kasenna Content Administration web page and clicking on the **Video Find/Modify** link. Then click on the **Find** button to bring up a listing of all the stored video content. If you then click on the underlined video name, it will show you where the video files are stored, either under `/content` (internal storage) or `/external1` or `/external2` (external storage).

ES3/4 Status LEDs

Front Panel LEDs

The LEDs on the front panel on the ES3/4 provide useful information to indicate how the system is operating.



- Power LED indicator: At least one power supply is supplying power to the system.
- Shelf-fault LED indicator: One of the following conditions has occurred: power-supply failure, EMM failure, cooling-module failure, over-temperature condition.
- Cluster LED indicator. *Not used by VBrick.*
- Split-bus LED indicator. *Not used by VBrick.*
- Over-temperature LED indicator. An over-temperature condition has occurred (the system will shut down when the temperature inside the box exceeds 122 °F).

Hard Drive LEDs

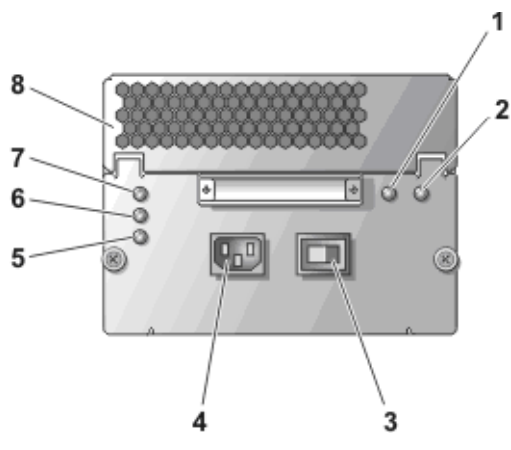
Each hard drive has two LED indicators. A red busy indicator indicates the hard drive is active on the SCSI bus. The green and amber status indicator indicates the drive is not active.

Table 2. LED Patterns

Condition	Pattern
Slot empty, ready for insert/remove	Off.
Drive online, prepare for operation	Steady green.
Drive identify	Flashes green four times per second.
Prepare for removal	Flashes green twice per second at equal intervals.
Drive rebuild	Flashes green twice per second at unequal intervals.
Drive failure	Flashes amber four times per second.
Predicted failure	Flashes green, then amber, then off, repeating this sequence every two seconds. Predicted Failures are based on industry standard SMART (Self Monitoring Analysis and Reporting Technology) monitoring software which is built into every drive in the array.








Power Supply LEDs

The Power Supply and Cooling Module LED Features and Indicators are shown below.



1. Blower A fault LED indicator.
2. Blower B fault LED indicator.
3. On/Off switch.
4. AC connector.
5. AC status LED indicator.
6. Fault LED indicator.
7. Power-on LED. indicator.
8. Cooling module.

Table 3. Power Supply and Cooling Module LED Indicators

Module Icon	LED Indicator	LED Icon	Function
	Power on (green)		DC output voltages are within specifications.
	Fault (amber)		One of the DC output voltages is not within specifications.
	AC status (green)		AC input voltage is within specifications regardless of the position of the power switch.
	Blower A fault (amber)		Cooling module blower A has failed.
	Blower B fault (amber)		Cooling module blower B has failed.

Ingesting Content

Video content added to a NXG1 or NXG2 VoD server goes through a transformation process known as ingestion. This process takes the original source MPEG video file and generates additional "trick" files which are used for indexing, fast forward, and rewind. These files are managed by an internal SQL database on the NXG which is used to keep track of all the trick files associated with a single piece of video content. This chapter describes the process of ingestion and its impact on data storage, content backup and recovery.

Topics in this chapter

[Content Ingestion](#)

[Best Practices](#)

Content Ingestion

Before the ingestion process begins, the video content must physically reside on the NXG server. In most cases, this file transfer is handled automatically by the EtherneTV Portal Server, although users may also opt to manually upload content to the NXG. In a typical scenario, after recording a piece of video content, the Portal Server automatically FTPs the video to a temporary staging area on the NXG and kicks off the ingestion process. Ingestion is a software process that runs in the background on the NXG server and may take place even while the NXG is serving up a large number of simultaneous video streams. Depending on the size of the video asset and overall NXG server load, the ingestion process may only take a few minutes or more than an hour. Once the Portal Server driven ingestion is complete, the original source video file held in the NXG's disk staging area is deleted.

For MPEG-1 or MPEG-2 content, a total of 8 or 11 supplemental trick files (respectively) are generated in addition to the main or original video asset. During normal playback, the actual file streamed by the VoD server is the main MPEG asset. However, when the remote client hits the Fast Forward (or Rewind) button on his player or Set Top Box, the VoD server gets the FF command and uses the accompanying Fast Forward index, map, and main files to locate the proper position in the video and begin a Fast Forward stream. Rewind works in a similar fashion. Without these supplement trick files, viewers would be limited to basic play, pause, and stop commands.

All ingested video content on the NXG is stored in a special `/content` directory on the server which is managed by the MediaBase VoD software application. When additional external storage is added to the NXG, MediaBase can manage content residing here as well, under the directory names of `/content2` and `/content3` (NXG1) or `/external1`, `/external2`, `/external3`, or `/external4` (NXG2). The table below shows the actual MediaBase trick files created under the `/content` directory for a single MPEG-2 video asset, `Sample1.mpg`.

File Type	File Name and Location
Main Asset	/content/00/00/00/af
MPEG Index	/content/00/00/00/b0
MPEG MAP	/content/00/00/00/b1
MPEG FF	/content/00/00/00/b2
MPEG FF Index	/content/00/00/00/b3
MPEG FF MAP	/content/00/00/00/b4
MPEG REW	/content/00/00/00/b5
MPEG REW Index	/content/00/00/00/b6
MPEG REW MAP	/content/00/00/00/b7
MPEG SEQ Header	/content/00/00/00/b8
MPEG PAT	/content/00/00/00/b9
MPEG PMT	/content/00/00/00/ba

In this example, the Main Asset, [Sample1.mpg](#) is stored in the [/content/00/00/00](#) directory under the file name "af", with the associated trick files named "b0" through "ba". Note that for MPEG-1 and MPEG-2 assets, the Main Asset file is an identical copy of the original source video MPEG file. For MPEG-4 content, however, this is not the case as the Main Asset gets modified by MediaBase and the original source video MPEG-4 file cannot be derived from that file. If desired, the NXG administrator may get a listing of all the trick files for a video asset by going directly to the Kasenna MediaBase Content Administration web page, selecting the Video, Find/Modify link, and clicking on the video asset hyperlink **Name**. Some additional storage overhead is incurred by the file ingestion process, although the net increase is nominal. The following table shows the total number of stored files and added overhead for each type of MPEG video asset.

MPEG Type	Total File	Disk Storage Overhead
MPEG-1	8	17%
MPEG-2	12	17%
MPEG-4	3	Negligible (less than .1%)

A small percentage of users may not need the NXG's Fast Forward or Rewind capabilities and may wish to trade this capability for an increase in disk space. In this case, the administrator can add content via the Kasenna MediaBase web interface instead of using the more convenient Portal Server approach. On the MediaBase Content Administration web page, the administrator can go to the Add Video page, click on the **Detail** button and select the **Add Support for Play Only** option (in comparison with the default **Play, Fast Forward, Rewind and Positioning** option) to choose this method.

Content Backup and Recovery

The ingestion process has some implications related to content backup and recovery that system administrators need to keep in mind. VBrick strongly recommends that all stored NXG video content get backed up onto an external storage system, typically an external disk array like a Vbrick ES3 or ES4 storage array, a Storage Area Network (SAN) or a tape backup system. Backing up the ingested video content onto an external system is insurance against the failure of one of the NXG1 or NXG2 internal disk drives. Since the backed up content is stored in "post-ingested" form (the main asset plus all associated trick files), content recovery is rapid and straightforward. Both the NXG1 and NXG2 also automatically backup the MediaBase SQL database each evening, so that recovery from disk failure is a relatively straightforward process of replacing the failed disk, rebuilding the Linux file system, and restoring the SQL database and video content.

If a system administrator does not have a disk backup system in place, however, then video content restoration is a more time consuming and labor intensive process. Each piece of video content must first be FTPed or copied onto the NXG server and then re-ingested from its original source file. If a customer has loaded several hundred hours of video content on their NXG system over the course of a year, then this manual recovery process could take many hours or even days to complete.

As described in the section above, it is possible to replicate the original piece of MPEG-1 or MPEG-2 video content from the stored Main Asset, although locating and copying the proper file can be time consuming if more than a few files are involved. Due to the file format used with MPEG-4, however, this replication is not possible. VBrick also recommends that administrators keep a copy of their original MPEG content in digital form on some archival media like CD-ROM or DVD, especially if they don't have a robust backup system in place.

Best Practices

- If problems are encountered during file ingestion, the likely cause is a faulty or corrupted source file. All MPEG-2 source files must be recorded and saved as transport streams—not program streams. Suspected problem files can be checked with a standalone player like StreamPlayer for verification.
- The NXG server maintains a log file of all successful or attempted file ingestions. If a file ingestion fails, the `/usr/ocs/logs/mbase-log.local` file can be examined for hints as to why the file ingestion failed.
- After adding a new video to the EtherneTV system using the Portal Server, it may take up to 30 minutes after ingestion before the new video appears in the Portal Server content directory. This is normal behavior.
- If adding new video content to the NXG using the MediaBase interface, make sure you select the proper MPEG encoding (MPEG-1, 2, or 4) to match your source file, otherwise ingestion will fail.
- MediaBase provides a built-in Video Access utility to verify if a video asset can successfully accessed. This utility is found under the Kasenna MediaBase web page, Service Administration, Test, Video link. To use this utility, browse to or type in the fully qualified name of the ingested video asset and click on the "test" button. A successful test will return the video duration, movie Type (MPEG type), and the message "able to open the video for playing".

-
- You can find where video content is stored by going directly to the Kasenna Content Administration web page and clicking on the Video **Find/Modify** link. Then click on the **Find** button to bring up a listing of all the stored video content. If you then click on the underlined video name, it will show you where the video files are stored, either under `/content` (internal storage) or `/content2` (external storage).

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