Autodesk®
Lustre® 2010
A Discreet® systems product

Installation and Configuration Guide for Linux® Workstations

Autodesk®

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Introduction 1

Topics in this chapter:

- About This Guide on page 1
- Intended Audience on page 1
- Related Documentation on page 2
- Notation Conventions on page 2
- Contacting Customer Support on page 2
- Safety Guidelines on page 2

About This Guide

This guide provides information about installing the current version of Autodesk® Lustre® software on the hardware components in your Lustre system. Use this guide in conjunction with the *Hardware Setup Guide* for your platform to install and configure the hardware and software components of your Lustre system.

NOTE In most cases, both hardware setup and application installation is done on delivery by an authorized technician, so you may not need to perform all of the procedures in these guides.

Intended Audience

This guide assumes you have knowledge of the Linux® operating system, preferably a distribution from Red Hat® Linux. It also assumes familiarity with Linux networking terms, tools, and procedures.

If you plan to reconfigure your workstation or your storage, knowledge of computer hardware, storage and networking in a professional video/film production environment is recommended.

Do not attempt to carry out the procedures in this guide if you are not familiar with the concepts they present. Contact Autodesk Media and Entertainment Customer Support if you require further assistance.

If you are upgrading an existing workstation without reinstalling the operating system, this document assumes you have *root* access to your system. If you do not have *root* access, contact your system administrator. The default root account password on an Autodesk workstation is *password*.

Related Documentation

The complete documentation set is available in PDF (Portable Document Format). You can access the PDF files from the *Documentation* folder of the Lustre software disc, or from *http://www.autodesk.com/lustre-documentation*.

NOTE For the best results viewing and printing PDF files, use Adobe® Acrobat® Reader™ 6 or later. You can download a free copy of Acrobat Reader from the Adobe Web site (*http://www.adobe.com*).

Notation Conventions

A number of style conventions are used throughout your documentation. These conventions and examples of their use are shown as follows.

Convention	Example
Text that you enter in a command line or shell appears in Courier bold. Press the Enter key after each command.	**`install rpm -qa`**
Variable names appear in Courier, enclosed in angle brackets.	`<filename>`
Feedback from the command line or shell appears in Courier.	`limit coredumpsize`
Directory names, filenames, URLs, and command line utilities appear in italics.	*/usr/discreet*

Contacting Customer Support

For Autodesk Media and Entertainment Customer Support, visit *http://www.autodesk.com/support*.

Customer support is also available through your Autodesk reseller. To find a reseller near you, consult the reseller look-up database at *http://www.autodesk.com/resellers*.

Safety Guidelines

Consider the following environmental and safety guidelines when working with hardware components:

- When you receive your shipment, check all the boxes for dents or other markings that may indicate damage during transport. If you suspect a component is damaged, carefully inspect it before setting up the system. If you receive a damaged component, call Customer Support.

  NOTE Use the enclosed packing checklist to ensure that you received all of the parts.

- Place all components in an air-conditioned environment. All hardware components generate heat and must be kept cool.

- Make sure the rack on which hardware components are mounted is open or well ventilated. Follow the ventilation specifications that apply to your system.
- Keep all hardware components in a clean, dust-free location.
- Minimize vibration and humidity.
- Do not block the vents on the component housing.
- Do not drape anything, such as a jacket or a blanket, over hardware components.
- Make sure power is turned off on the components you are working on. It is a good idea to unplug components until all other connections are configured.
- Read and observe warning labels on hardware components, enclosures and drives.
- Always wear a grounded static wrist strap. Attach the strap's alligator clip to any grounded metal surface on the component's chassis that you are working on. Place the wristband around your wrist. Is is also recommended to wear a heel strap or boot strap.
- Do not handle any components unnecessarily, particularly cards that slide in and out of PCI slots on their parent hardware components.
- Properly ground your audio components. Otherwise, you may have ground loops, or humming in the system. To ensure audio components are properly grounded, use the XLR-3 cables shipped with your system. Using any other cables may cause humming in the system.
- Minimize electromagnetic noise by separating digital data and power cables from analog audio cables and running them in different cable ducts.

Installation Workflows 2

Topics in this chapter:

- Overview on page 5
- Workflow for Upgrading the Software on page 5
- Workflow for Installing from Scratch or Upgrading Linux on page 6
- Workflow for Connecting New Stone Direct Storage on page 8

Overview

Your system is shipped with the operating system and the software already installed.

This chapter highlights three common installation workflows that you may need to perform.

- Workflow for Upgrading the Software on page 5
- Workflow for Installing from Scratch or Upgrading Linux on page 6
- Workflow for Connecting New Stone Direct Storage on page 8

For details on the workstation hardware setup, it is recommended that you visit *www.autodesk.com/lustre-documentation*, select your application and version, and download the *Hardware Setup Guide* for your workstation model.

Workflow for Upgrading the Software

Follow this workflow to upgrade your software to a new version, service pack, or extension without reconfiguring your hardware or reinstalling your operating system.

To determine whether you need to install a new version of Linux for a new software version or hardware platform, see Do I Need to Reinstall Linux? on page 29. If you do need to upgrade Linux, follow the steps in the Workflow for Installing from Scratch or Upgrading Linux on page 6 rather than this workflow.

To upgrade the software:

1. Gather the following materials and documentation for your installation:
   - The *Discreet Kernel Utilities* (DKU) installation package. For major releases, the DKU is available on the application DVD. If you are installing a service pack or an extension, download the DKU *tar* file from the link provided in the Release Announcement you received from Autodesk. The DKU also contain the files needed to upgrade your system BIOS and the firmware of the AJA OEM-2K card.
   - The Lustre software installation package. For major releases, the application is available on DVD. If you are installing a service pack or an extension, download the application *tar* file from the link provided in the Release Announcement you received from Autodesk.
   - The Release Notes for the software version or service pack you plan to install. The Release Notes contain important procedures that you might need to perform **before** upgrading your software, as well as information on supported hardware, required system memory, BIOS version, Linux distribution, DKU version and AJA OEM-2K firmware version.
     To download the latest Release Notes, go to *www.autodesk.com/lustre-documentation*, then select the version or service pack you plan to install.
2. Make sure the hardware still meets all the system requirements for the new software version or service pack, as specified in the Release Notes for the version you plan to install.
3. Upgrade the Discreet® Kernel Utilities (DKU) to the required version. Refer to the latest Release Notes for the required DKU version and for update instructions. DKU update instructions are also available in Installing the DKU on page 33.
4. Update the AJA OEM-2K card firmware if necessary. Refer to the latest Release Notes for the required firmware version and for update instructions. Firmware update instructions are also available in Upgrading the AJA OEM-2K Firmware on page 34.
5. Install the software. See Installing Lustre on the Linux Workstation on page 49.
6. License your software, and start it for the first time. See Licensing and Starting the Application on page 51.

NOTE Re-licensing is not necessary if you are upgrading to a service pack of the same software version or to a service pack of the same extension.

Workflow for Installing from Scratch or Upgrading Linux

Follow this workflow when you need to completely rebuild your system: from connecting the hardware peripherals and storage arrays, to installing the operating system, and installing, licensing, and configuring the software components.

Most of this workflow also applies when you need to reinstall or upgrade the operating system without changing your hardware or storage setup. A new distribution of Linux may sometimes be required for a new version or service pack of the software, or for newer hardware platforms. To determine whether you need to upgrade Linux for a new application version or hardware platform, see Do I Need to Reinstall Linux? on page 29.

To install your system from scratch or upgrade Linux:

1. Gather the following materials and documentation for your installation:
   - The installation disc of the Red Hat Enterprise Linux operating system. Visual Effects, Finishing and Colour Grading workstations ship with the custom Autodesk distribution of Red Hat Enterprise Linux on DVD. For information on the version of Linux required for your hardware platform, see Do I Need to Reinstall Linux? on page 29.
   - The *Discreet Kernel Utilities* (DKU) installation package. For major releases, the DKU is available on the application DVD. If you are installing a service pack or an extension, download the DKU *tar* file from the link provided in the Release Announcement you received from Autodesk. The DKU also contain the files needed to upgrade your workstation BIOS and the firmware of the AJA OEM-2K card.
   - The Lustre software installation package. For major releases, the application is available on DVD. If you are installing a service pack or an extension, download the application *tar* file from the link provided in the Release Announcement you received from Autodesk.
   - The Release Notes for the software version or service pack you plan to install. The Release Notes contain important procedures that you might need to perform **before** upgrading your software, as well as information on supported hardware, required system memory, BIOS version, Linux distribution, DKU version and AJA OEM-2K firmware version.
   - The Hardware Setup Guide for your workstation. This document contains detailed information on setting up your workstation.

   To download documentation, go to *www.autodesk.com/lustre-documentation*, then select the version or service pack you plan to install.
2. Make sure the hardware meets all the system requirements specified in the Release Notes for the version you plan to install.
3. If you are installing your hardware perform the following tasks:

   NOTE Instructions and wiring diagrams for each of these steps can be found in Setting Up Your Workstation Hardware on page 9.

   - Verify your hardware shipment, and make sure your facility meets the documented power and air conditioning requirements for the hardware components.
   - Connect all peripherals (mouse, keyboard, graphics monitor, house network) to the proper ports on the workstation.
   - Connect the Control Surface to the proper ethernet and USB ports on the workstation.
   - Connect a VTR and a broadcast monitor to your workstation.
   - Connect and configure the audio hardware for your workstation.
   - Connect your storage arrays to the workstation, but **DO NOT** power them on before having installed Linux, to prevent the Linux installer from attempting to format the arrays and use them as system drives.
4. If necessary, update and configure the BIOS of your workstation. See Configuring your System BIOS on page 26.

   NOTE The BIOS settings must be properly configured **before** installing Linux.
5. Install the required Autodesk distribution of Red Hat® Enterprise Linux. See Installing Red Hat Enterprise Linux on page 29.

6 Perform the tasks in Linux Post-Installation Tasks on page 32 to configure your operating system.

7 Install the required version of the Discreet Kernel Utility (DKU). Refer to the latest Release Notes for the required version and for update instructions. DKU update instructions are also available in Installing the DKU on page 33.

8 Update the AJA OEM-2K card firmware on your workstation if necessary. Refer to the latest Release Notes for the required firmware version and for update instructions. Firmware update instructions are also available in Upgrading the AJA OEM-2K Firmware on page 34.

9 If you are using a new Stone® Direct storage array, configure the RAID volumes, mount the storage, and format it. See Configuring Storage on page 37 for LUN creation instructions and XFS filesystem creation instructions.

10 Install the software. See Installing Lustre on the Linux Workstation on page 49.

11 License your software, and start it for the first time. See Licensing and Starting the Application on page 51.

NOTE Re-licensing is not necessary if you are upgrading to a service pack of the same software version or to a service pack of the same extension.

Workflow for Connecting New Stone Direct Storage

Follow this workflow when you need to rebuild your Stone Direct storage array. For instance, this may be required when you purchase supplementary storage enclosures to expand available disk space.

NOTE You do not need to reinstall or re-license the software after changing your storage configuration.

To connect new or expanded Stone Direct storage:

1 Connect your storage enclosures to the workstation. See Overview on page 18.

2 Configure the RAID volumes and mount the storage. See Configuring Storage on page 37 .

3 Your new storage is now ready to use.

Setting Up Your Workstation Hardware

3

Topics in this chapter:

- Overview on page 9
- Lustre Hardware and Software Components on page 11
- Connecting Peripherals on page 14
- Connecting the Autodesk Control Surface on page 15
- Connecting Video Components on page 16
- Connecting Audio Components on page 17
- Connecting Media Storage on page 18
- Connecting the Slave Renderer on page 25
- Configuring your System BIOS on page 26

Overview

This section contains peripherals, video, and storage wiring diagrams, as well as BIOS settings for the HP® Z800 workstation.

NOTE This section does not contain information and diagrams for the older workstations supported in this version. For detailed information about setting up each workstation, see the Hardware Setup Guide for the respective workstation.

If you are only upgrading an existing application, you do not need to reconfigure your workstation. In most cases, hardware integration and application installation were done on delivery by an authorized technician.

Still, it is a good idea to familiarize yourself with the configuration procedures for the following reasons:

- To make sure your workstation BIOS settings correspond to the recommended settings.

- Many suspected problems with your system may be due to loosened connections or improperly configured devices.
- If you need to call Customer Support, familiarity with the hardware setup helps you assist in diagnosing problems.
- If you want to move your system at any time, or upgrade certain components, this chapter contains crucial information.

Power and Air Conditioning Requirements

The values for power consumption and heat output were recorded on an Autodesk certified system with all of the required peripherals and certified components.

The following table summarizes the peak (at startup) power consumed by the HP Z800 system and the heat it generates under the maximum processing load produced by a Visual Effects, Finishing, and Colour Grading application.

Component	Quantity	Startup Amps (120V / 240V)	Cont. Amps (120V / 240V)	Watts	Heat (BTUs)
HP Z800 (with cards)	1	4.0 / 2.0	3.8 / 1.9	456	1556
Lucid ADA 88192	1	0.5 / 0.25	0.5 / 0.25	60	205
Stone® Direct XR storage chassis	1	3.8 / 1.9	2.78 / 1.39	334	1140
Stone Direct XE expansion chassis	1	3.75 / 1.88	2.3 / 1.15	276	942
Stone Direct XR + Stone Direct XE	1	6.41 / 3.2	5.2 / 2.6	624	2130
Autodesk® Control Surface	1	1 / 0.5	1 / 0.5	120	410

You must be able to meet the startup power requirements and have a climate control system with the capacity to maintain the temperature of these components under the maximum processing load. For each Watt of power consumed by the system, you must provide 3.413 BTU of air conditioning.

Rack Mount Requirements

You can rack mount your system. Plan for sufficient space in your rack mount chassis to install the following components:

- The workstation (required rack space: 5U)
- An AJA OEM-2K breakout box (required rack space: 1U)
- A Stone® Direct storage chassis (XR model) (required rack space: 5U)
- Additional Stone Direct expansion chassis (XE model), as required (required rack space: 5U each)

Lustre Hardware and Software Components

A Lustre system consists of a number of different hardware and software components. This section describes each of the hardware components in a Lustre installation, and the software associated with each component. You may or may not have all of the components listed here in your Lustre installation. The type of workgroup, as well as the feature set you purchase for each of the workstations in that workgroup, determine the components in your installation.

Lustre Workstations

There are three kinds of Lustre workstations: the Master Station, the HD Station, and the Lustre Station. Every Lustre installation is built around either a Master Station or an HD Station. The optional Lustre Station offers a way to improve the efficiency and cost-effectiveness of a pipeline by offloading tasks that do not require the full feature set of the Master Station or HD Station.

Master Station

The Master Station is designed for GPU-accelerated sessions where the colorist works together with the cinematographer. It includes an extensive creative toolset for elaborate visual design and grading, using up to 4K resolution and 16-bit files and for completing tasks like dust busting, conforming, rotoscoping, and capture/playout. It also includes SD and HD I/O, dual link and HSDL video formats, and the film workflow features, which consist of infrared channel dust removal and support for all standard input and output resolutions and bit-depths.

The Master Station can support up to three panels of the Autodesk Control Surface and, with an additional license, a Slave Renderer.

HD Station

The HD Station is a cost-effective GPU workstation for conforming, preparing, grading, and mastering short-form and long-form HDTV projects, as well as HD film projects, and mastering to different formats. It does not include the film workflow features. File input is limited to 10-bit 2K resolution, and file output is limited to SD and 10-bit HD resolution.

The HD Station can support up to three panels of the Autodesk Control Surface and, with an additional license, a Slave Renderer. Dual link and HSDL video formats are available with the purchase of a separate video I/O license.

Lustre Station

Tasks that do not require the direct intervention or supervision of the colorist can be efficiently handled by a Lustre Station. Multiple Lustre Stations can work in parallel to increase throughput and can be used for tasks such as dust-busting, preparatory work, fine-tuning creative sessions, conforming data from EDLs, updating editorial changes, and mastering to different formats using the real-time deliverables function. The Lustre Station includes the film workflow features, and the ability to create geometries and masks.

Primary colour grading on the Lustre Station requires a separate license. The following features also require an additional license: SD and HD I/O, dual link and HSDL video formats.

The Lustre Station does not support the Slave Renderer.

Other Components

You can expand the features of your Lustre system and improve the efficiency of your workflow by adding any of the following components.

Control Surface The Autodesk Control Surface provides improved interactivity when colour grading film and video footage. You can perform many of the same tasks you do in the Lustre user interface using the Control Surface.

You connect the Autodesk Control Surface to a Master Station or HD Station, and configure the Control Surface on the workstation to which it is connected.

Video I/O Card and Breakout Box On the HP Z800 workstation, video I/O is provided by the AJA card. The video card consists of an HD/SD card and a breakout box. This configuration provides real-time SDI input and output of uncompressed 8- or 10-bit HD or SD video in both YUV (4:2:2) and RGB formats (4:4:4 or 4:2:2). For a list of supported video formats, see the *Autodesk Lustre User Guide*.

The drivers for the video card and breakout box are installed by the Discreet® Kernel Utility (DKU).

Slave Renderer The Slave Renderer is a rack-mounted server that frees system resources by automatically off-loading render tasks, thus ensuring real-time interaction on the Lustre system.

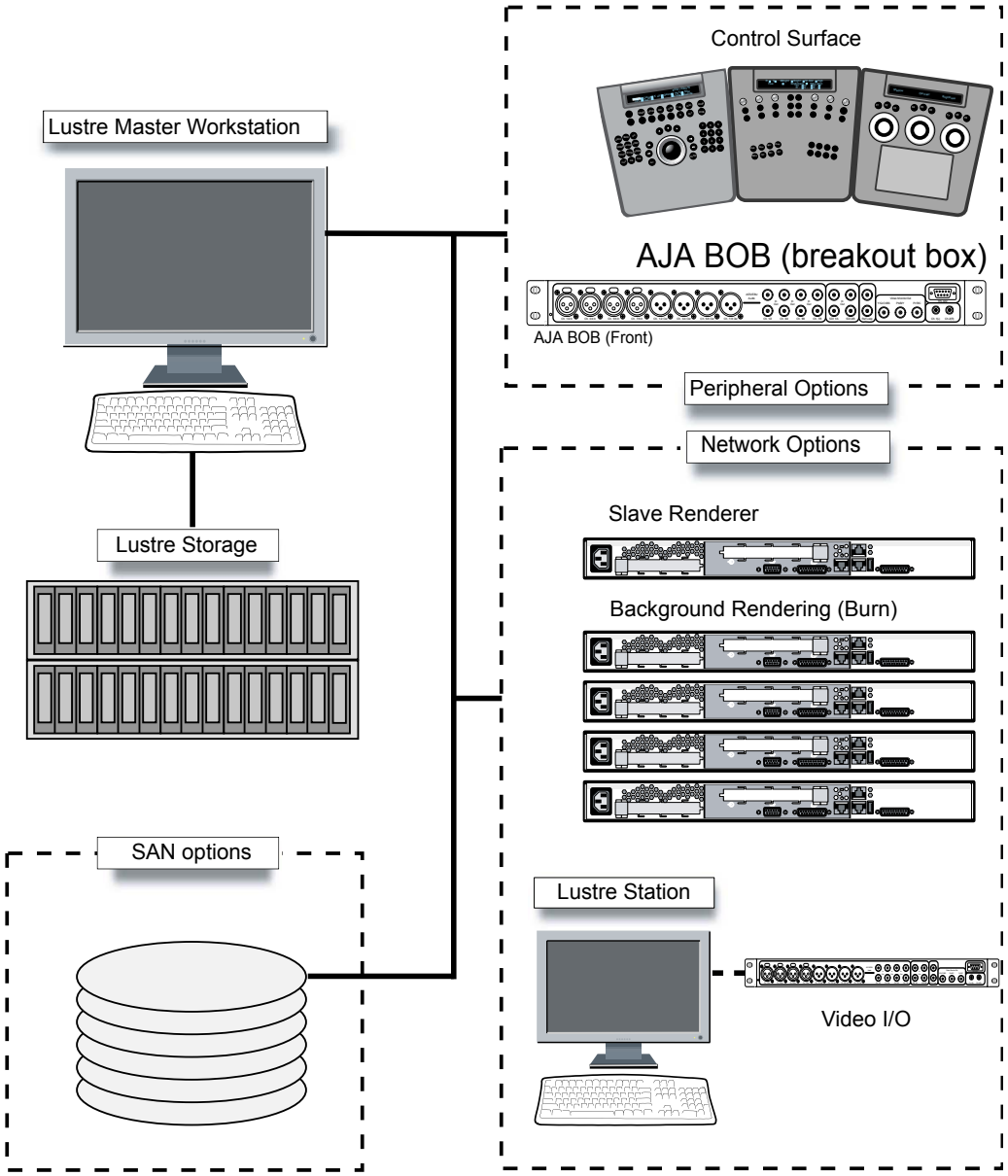
Connect the Slave Renderer to a switch on your house network. Note that only one Lustre Master station or HD station can use it.

You install the Slave Renderer software package on the Slave Renderer.

Background Renderer Background rendering frees up Lustre workstations for colour grading. You can use up to eight background rendering machines to process your final frames.

You install background rendering software on each background render node.

The following illustration shows a typical Lustre workgroup configuration built around a Master Station. It includes a Lustre Station, and other optional components.

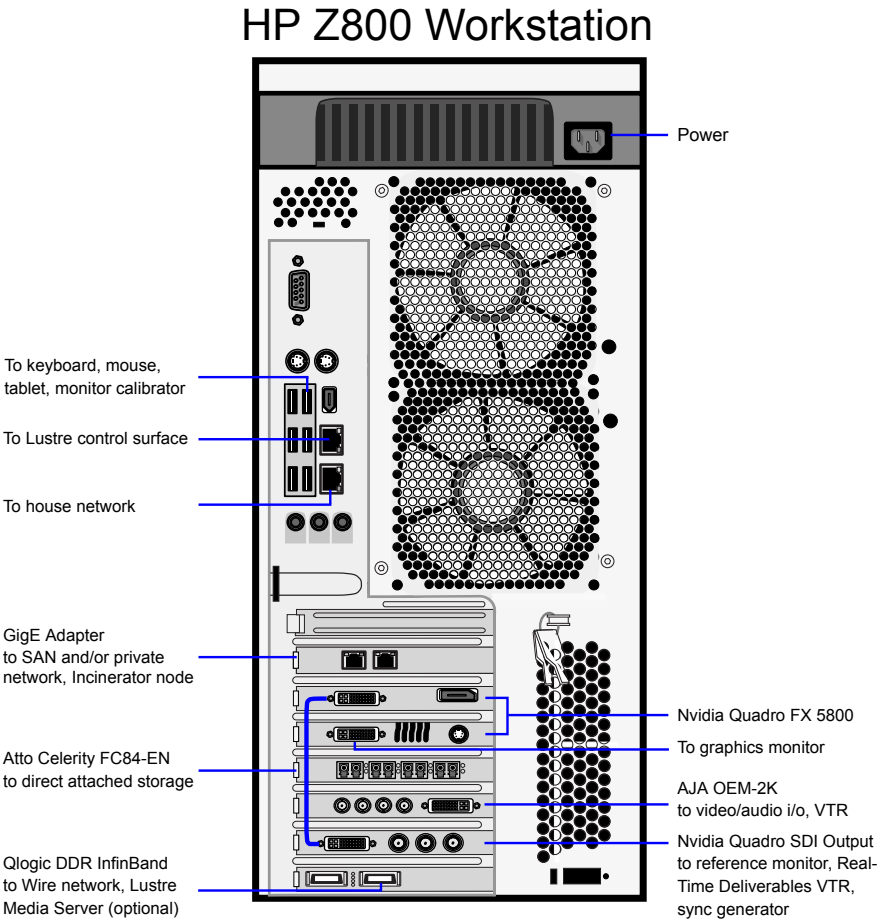


Connecting Peripherals

The following diagram illustrates how to connect peripherals, such as the graphics monitor, keyboard, mouse, Autodesk Control Surface, and house network, to the HP Z800 workstation.

It is recommended you connect all hardware peripherals as instructed in this section before booting the workstation for the first time.

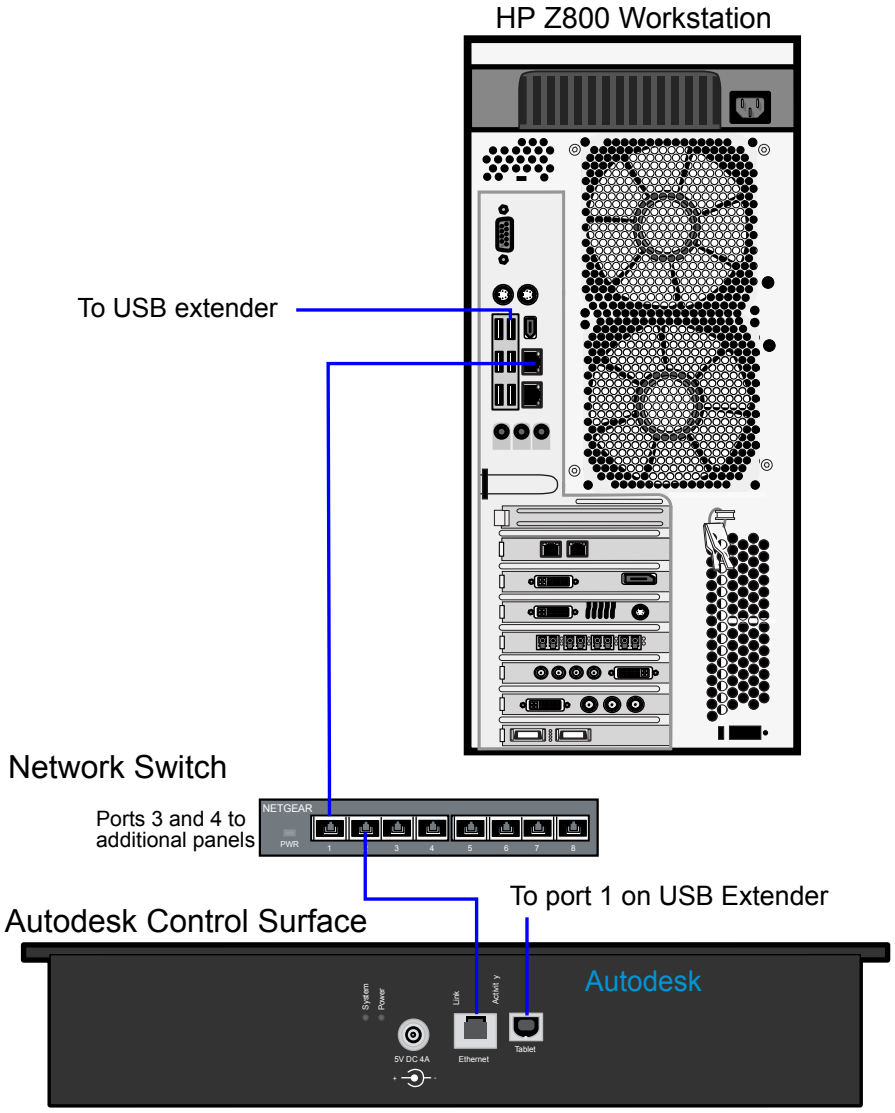
NOTE This diagram depicts the workstation with a 2-port GigE adapter in slot 1 (top to bottom), and a Qlogic DDR InfiniBand adapter in slot 7. Optionally, your workstation can be set up with a 10-GigE adapter in slot 1 or in slot 7, or a second ATTO Fibre Channel adapter in slot 1. Note also that a number of HP Z800 workstations shipped with a 4-port GigE adapter instead of the 2-port adapter.



Connecting the Autodesk Control Surface

The following diagram illustrates the physical connections needed to operate the Autodesk Control Surface.

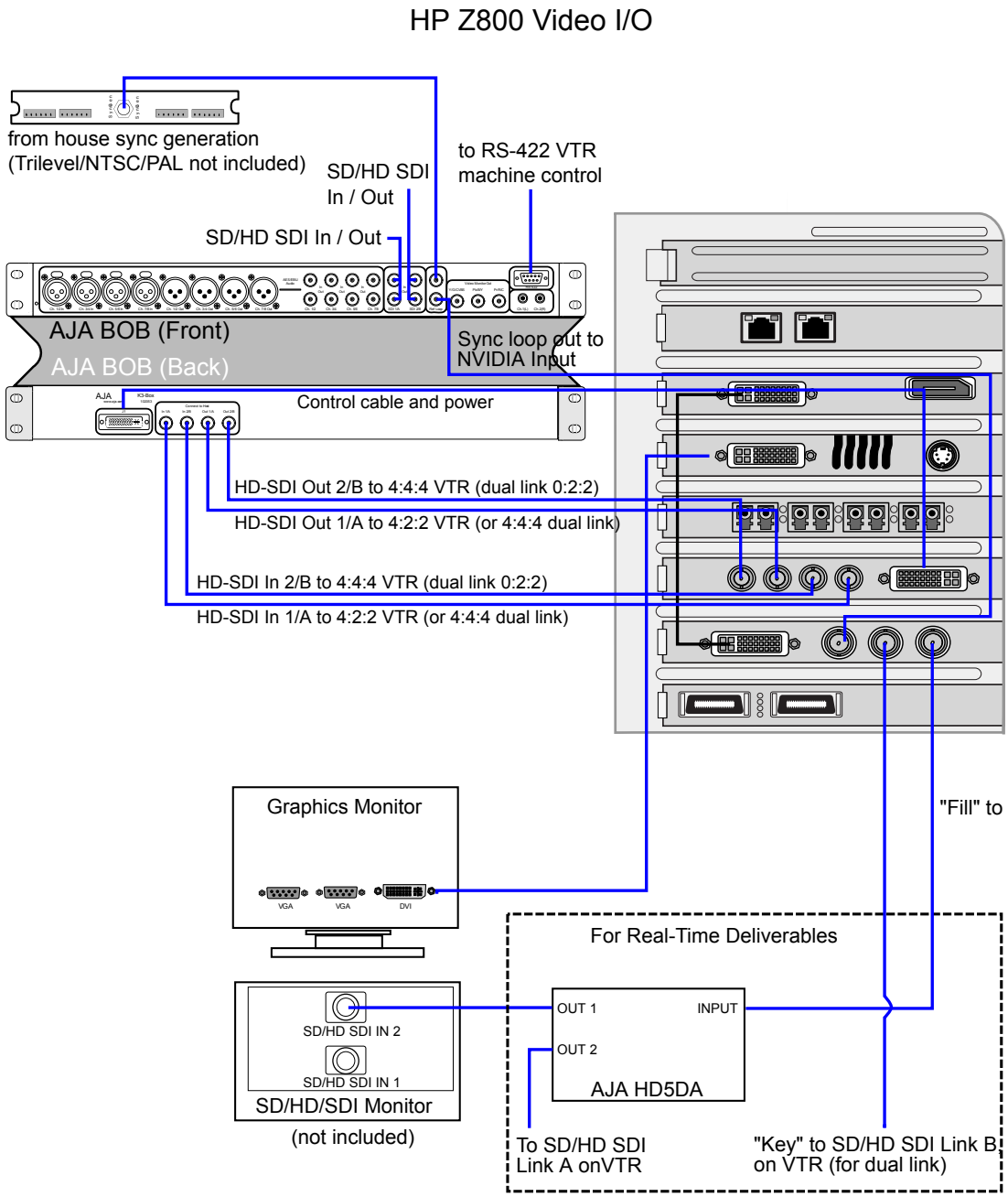
The Autodesk Control Surface consists of three panels connected to one of the workstation's on-board GigE ports by way of the supplied network switch. The central panel requires an additional connection to the remote unit of the USB extender kit.



Connecting Video Components

The following diagram illustrates how to set up video I/O by connecting the hardware components included in your shipment. The only video hardware you must provide are a sync generator, VTR, HD/SDI-ready broadcast monitor and patch panel (if desired).

NOTE Do not use an SD (NTSC or PAL) sync generator for HD projects. Always use a tri-level sync generator for HD projects. Using the wrong sync generator for a project may impact the stability of your workstation.



Connecting Audio Components

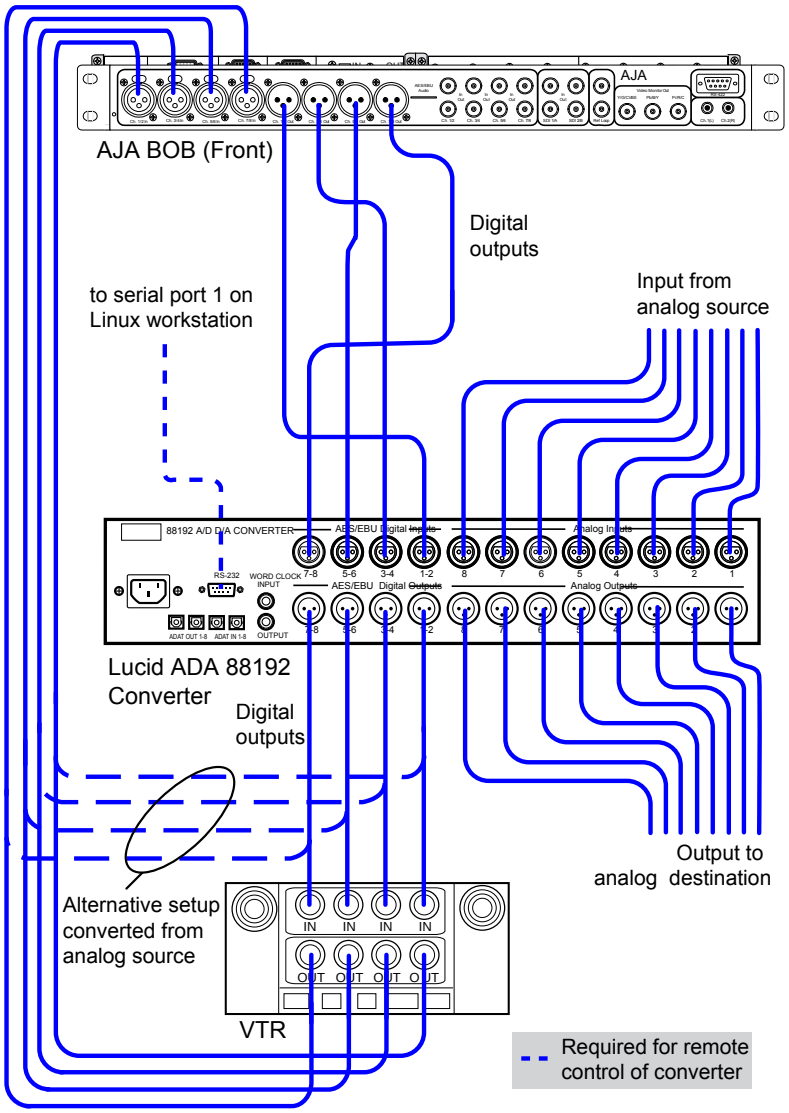
Your application uses the Discreet Native Audio subsystem. Discreet Native Audio uses the following hardware components.

Lucid ADA 88192 Audio Converter Converts signals between the workstation and all digital or analog audio I/O devices.

NOTE You can control the converter either locally or remotely through the audio preferences of the application (recommended).

AJA Balanced Audio breakout box and AJA OEM-2K card The Balanced Audio breakout box connects to the AJA OEM-2K card on your workstation. The card provides audio data at 24-bit and handles balanced AES/EBU audio signals from the breakout box. The card supports up to 8 tracks of embedded audio.

To connect the Discreet Native Audio hardware components to the AJA breakout box, refer to the following diagram.



Connecting Media Storage

Overview

The workstation can be connected to two types of media storage.

- **Stone Direct XR-series disk arrays** Autodesk's high-performance direct-attached storage (DAS) solution designed to address the different real-time playback requirements of various workflows. Direct attached storage devices provide storage to individual workstations.

  NOTE A Lustre workstation equipped with Incinerator does not use DAS storage. Incinerator storage is attached to the Lustre Media Server, accessed by way of the InfiniBand network.

- **A SAN** A storage infrastructure that allows multiple workstations to share simultaneous access to a central storage enclosure.

About Autodesk Stone Direct Storage

Autodesk Stone Direct XR-series disk arrays provide two types of enclosures: a RAID enclosure (also called an XR enclosure), and an EBOD enclosure (also called an XE enclosure). XR RAID enclosures contain two RAID controllers.

Autodesk Stone Direct uses hardware RAID to provide high performance, reliability, and protection against data loss.

The following table outlines the drive sizes and maximum number of enclosures supported by each model of Autodesk Stone Direct XR-series storage arrays.

Storage model	Max number of XE enclosures per XR enclosure	Disk size
XR 5402	4	146GB
XR 5412	4	146 GB or 300 GB
XR 6412	7	300 GB or 450 GB
XR 6500	7	450 GB

XR 6500 and XR 6412 arrays require a single XR RAID enclosure for 2-loop or 4-loop hardware RAID storage configurations .

XR 5412 and XR 5402 arrays require a single XR RAID enclosure for 2-loop configurations, or two RAID enclosures for 4-loop configurations.

These configurations may include additional XE expansion enclosures, up to the maximum number supported. You can increase storage capacity by adding disk arrays.

A number of Stone Direct configurations will ensure optimal playback of the most demanding formats.

Storage Configuration	Loops	Expected Peformance
Stone Direct XR	One 2-loop connection	■ One stream SD/HD 10-bit (32 channel/8-bits per channel audio), or ■ One stream 2K 12-bit unpacked (8 channel/8-bits per channel audio)

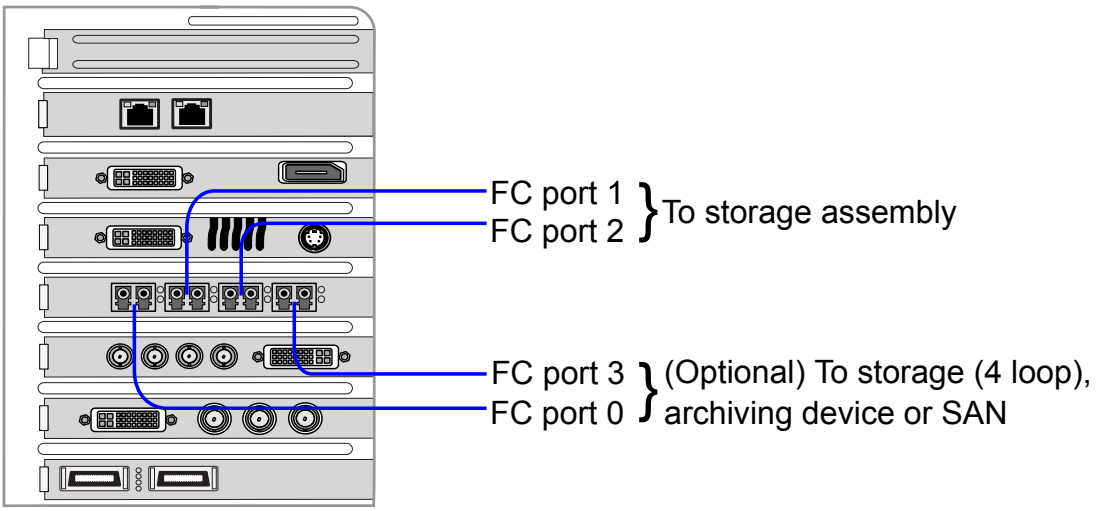
Storage Configuration	Loops	Expected Peformance
Stone Direct XR plus Stone Direct XE	Two 2-loop connections (if permitted by chassis) – or – One 2-loop connection	■ Two streams SD/HD 10-bit (32 channel/8-bits per channel audio), or ■ One stream 2K 12-bit unpacked (8 channel/8-bits per channel audio)
2 x Stone Direct XR	Two 2-loop connections (one per enclosure)	■ Two streams SD/HD 10-bit (32 channel/8-bits per channel audio), or ■ One stream 2K 12-bit unpacked (8 channel/8-bits per channel audio)

Connecting the HP Z800 ATTO Fibre Channel Adapter

On HP Z800 workstations, connections to media storage are made using the ATTO Celerity FC84-EN fibre channel adapter, located in slot five (top to bottom).

NOTE If you need more storage connections, you can also have your HP Z800 workstation configured with a second ATTO fibre channel adapter in slot 1, instead of the GigE adapter.

The fibre channel adapter is equipped with four ports, called *loops*. You can connect your storage enclosure to the fibre channel cards using either 2 loops or 4 loops. A 2-loop device can be connected to either the inner pair of ports or the outer pair of ports. A 4-loop device requires both the inner pair and the outer pair.



NOTE If you are not using all the ports of a fibre channel adapter, terminate the two unused ports with the FC loopback couplers that shipped with your system. Terminating these ports significantly decreases the time required to boot the system.

Connecting Storage Enclosures

The following diagrams illustrate how to cable XR-series hardware RAID storage enclosures. Cable your storage exactly as illustrated to ensure proper functionality.

Note that the XR 6500 series and XR 6412 series storage assemblies do not support configurations with two XR RAID enclosures.

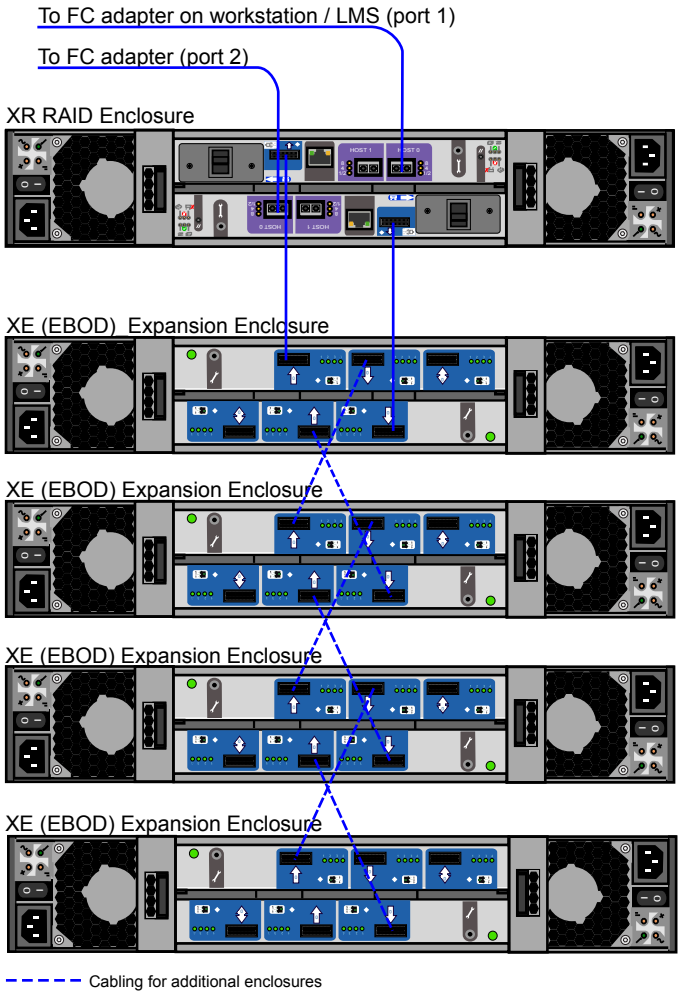
WARNING Do not power on your storage before installing Linux, otherwise the Red Hat installer might attempt to format the storage array and use it as the system disk.

XR 6500 Wiring Diagrams

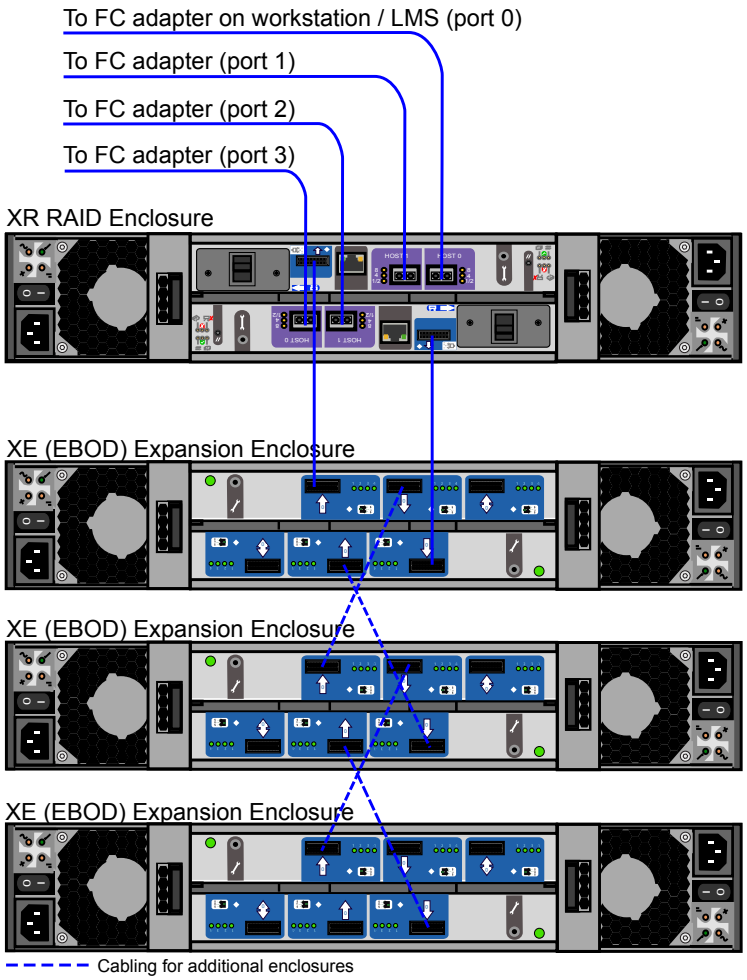
The following diagrams illustrate 2-loop and 4-loops connections for XR 6500 series storage assemblies.

A XR 6500 RAID enclosure supports a maximum of seven XE expansion enclosures.

Single XR 6500 RAID enclosure, 2 loops



Single XR 6500 RAID enclosure, 4 loops



NOTES:

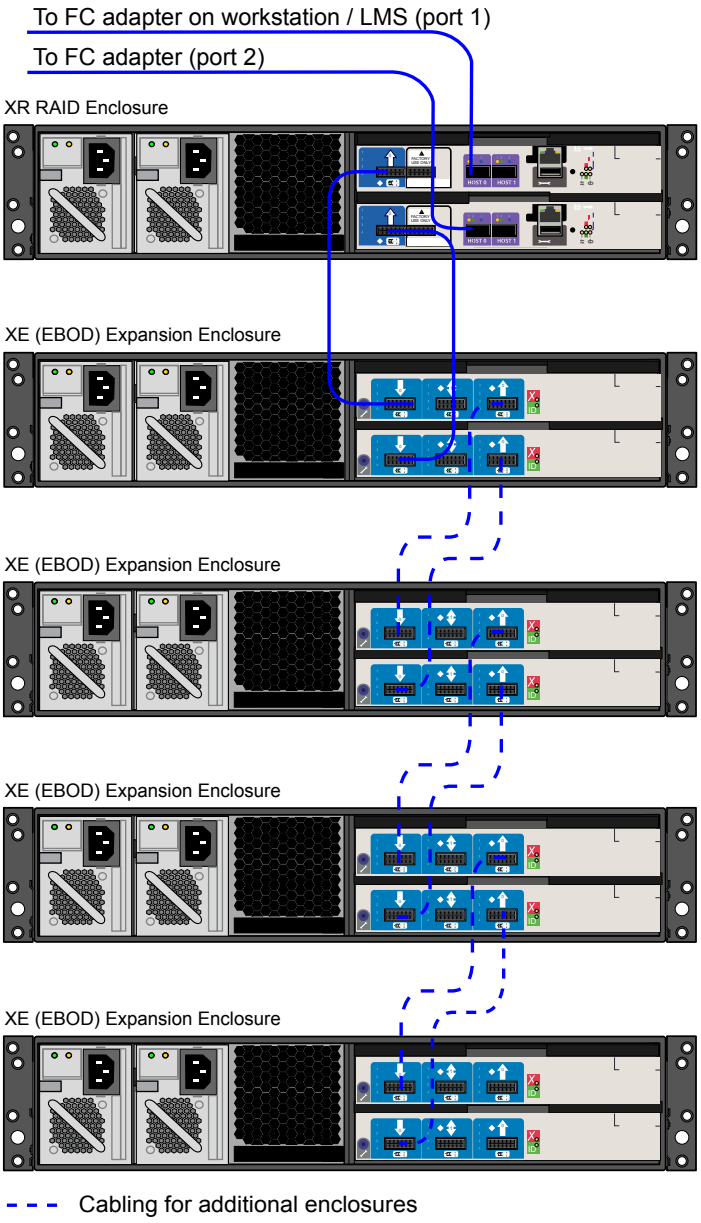
- In a 4-loop configuration, you need a minimum of one XE expansion enclosure attached to the XR 6500 RAID enclosure.
- The total number of enlcosures must be an even number.

XR 6412 Wiring Diagrams

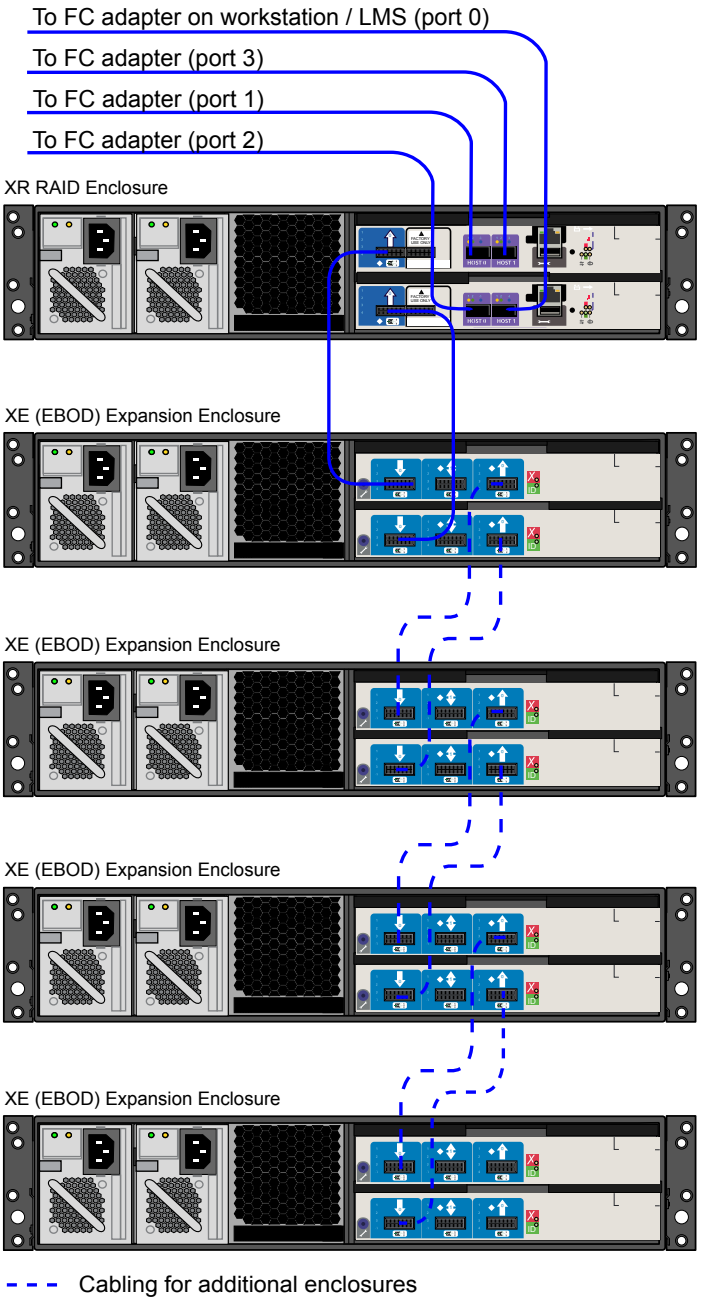
The following diagrams illustrate 2-loop and 4-loops connections for XR 6412 series storage assemblies.

NOTE A XR 6412 RAID enclosure supports a maximum of seven XE expansion enclosures.

Single XR 6412 RAID enclosure, 2 loops



Single XR 6412 RAID enclosure, 4 loops



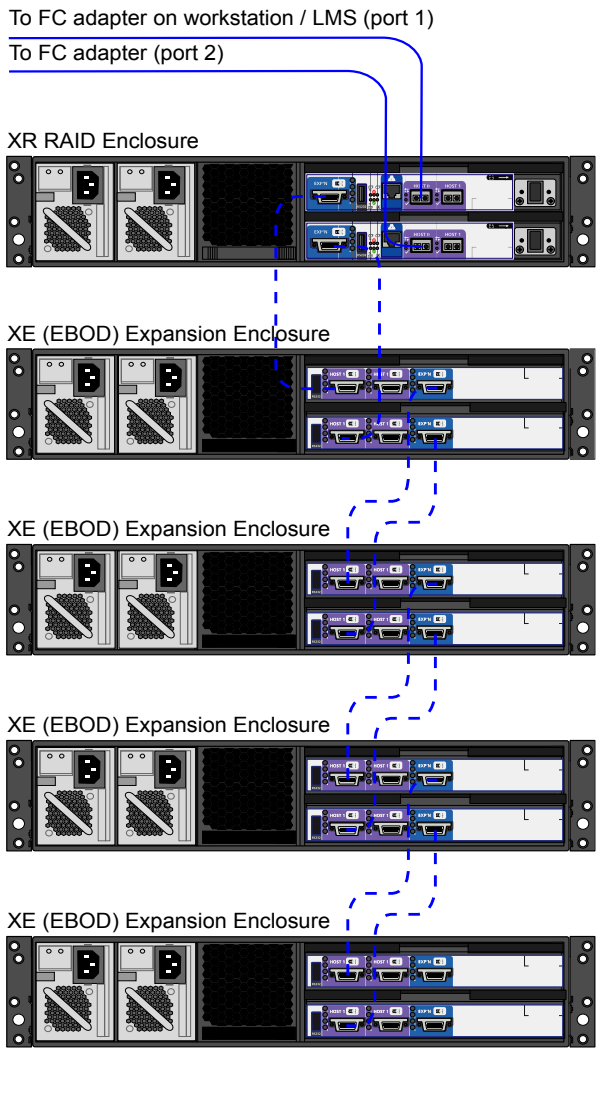
NOTE In a 4-loop configuration with a XR 6412 RAID enclosure, you need a minimum of one XE expansion enclosure attached to the XR RAID enclosure.

XR 5402 and XR 5412 Wiring Diagrams

The following digrams illustrate 2-loop and 4-loop connections for XR 5402 and XR 5412 series storage assemblies.

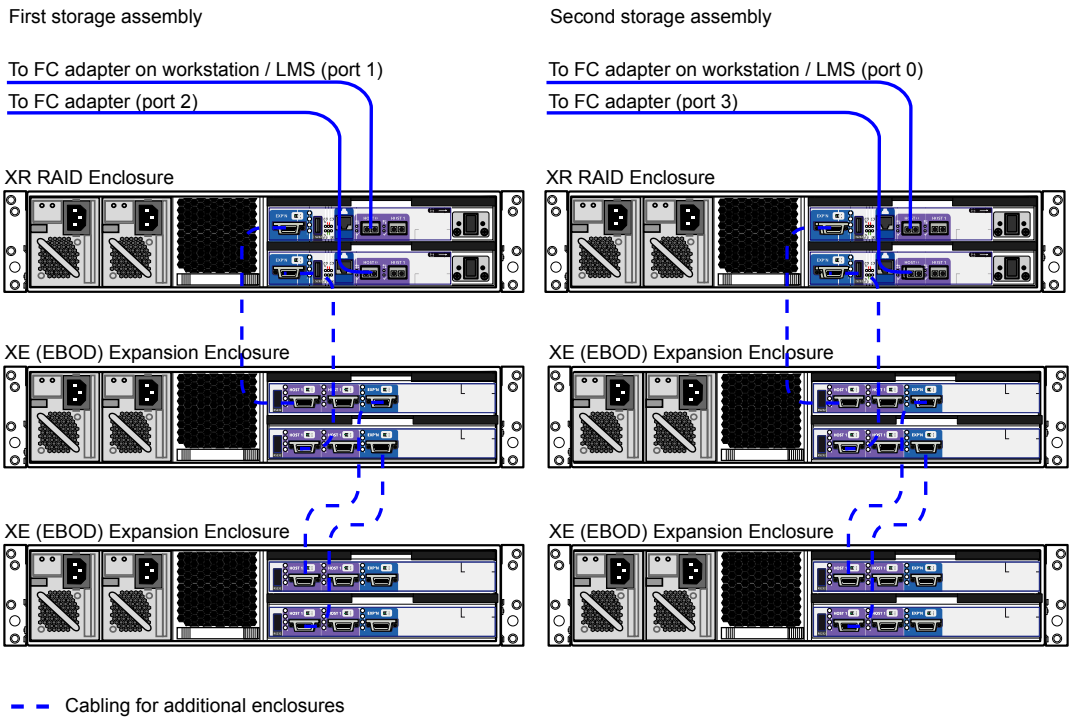
XR 5402 and XR 5412 series storage assemblies support 2-loop configurations with one XR RAID enclosure, and 4-loop configurations with two XR RAID enclosures.

Single XR 5402 / 5412 RAID enclosure, 2 loops



NOTE The XR 5402 and XR 5412 RAID enclosures support a maximum of four XE expansion enclosures.

Two XR 5402 / 5412 RAID enclosures, 4 loops



NOTE In a configuration with two XR RAID enclosures, the number of XE extension enclosures per XR RAID enclosure must be the same. The total number of enclosures in the storage assembly must be an even number.

Connecting the Slave Renderer

The Lustre Slave Renderer is a single render node that provides automatic background rendering on a shot-by-shot basis. It is available for the Lustre Master Station, and the HD Station.

Connect one of the on-board GigE ports of the Slave Renderer machine to an available GigE port on a switch in your house network. Note that a Slave Renderer can only be used by one Lustre Master Station or HD Station.

NOTE Although the Lustre Slave Renderer uses a standard GigE network connection, it requires a higher-bandwidth Cat-6 cable to accommodate the increased data that is transmitted.

Configuring your System BIOS

This section contains information on the certified BIOS version and settings for your workstation, as well as instructions on updating your BIOS and restoring it to the default factory settings.

NOTE The BIOS of your workstation is correctly configured prior to shipping, so you normally do not need to perform the procedures in this section.

HP Z800 BIOS Settings

After wiring the workstation and **before** installing Linux, turn the workstation on and check the BIOS version and BIOS settings.

WARNING If BIOS settings are not set up correctly before installing Linux, you will need to reinstall the OS.

The certified BIOS version for your workstation is **1.06**.

Make sure the BIOS version number that appears on screen while booting the workstation matches the certified version. If the versions do not match, update the BIOS to the certified version, after configuring BIOS settings. BIOS update instructions are at the end of this chapter.

To adjust system BIOS settings, press **F10** while booting the workstation.

The following table lists the Autodesk certified BIOS settings. Items not listed are set to their default factory settings. See Restoring BIOS to Default Factory Settings on page 27 for instructions on restoring your BIOS settings to factory defaults.

BIOS Menu	Submenu	Item	Value
Storage	Storage Options	SATA Emulation	RAID+AHCI
	Boot Order	Optical Drive	
		USB Device	
		Hard Drive	<hard drive model>
			Integrated SATA
Power	OS Power Management	Runtime Power Management	Disable
		Idle Power Saving	Normal
		MWAIT Aware OS	Disable
		ACPI S3 Hard Disk Reset	Disable
	Hardware Power Management	SATA Power Management	Disable
		Intel Turbo Boost Technology	Disable
Advanced	Processors	Hyper-Threading	Enable
	Chipset/Memory	Memory Node Interleave	Enable
		NUMA Split Mode	Disable

BIOS Menu	Submenu	Item	Value
	Device Options	S5 Wake on LAN	Disable
		Internal Speaker	Disable
		NIC PXE Option ROM Download	Disable
	Slot 1 PCIe2 x8(4)	Option ROM Download	Disable
	Slot 3 PCIe2 x8(4)	Option ROM Download	Disable
	Slot 4 PCIe2 x16(8)	Option ROM Download	Disable
	Slot 6 PCI32	Option ROM Download	Disable

Restoring BIOS to Default Factory Settings

If necessary, perform the following procedure to restore the BIOS settings to factory defaults.

To restore default factory BIOS settings:

1. Press **F10** while booting the workstation to enter the system BIOS.
2. In the File menu, select Default setup, then Restore Factory Settings as Default.
3. Press **F10** to accept the changes.
4. In the File menu, select Apply Defaults and Exit, then press **F10** to confirm.
   The factory system defaults are restored.
5. When the workstation reboots, press **F10** again to re-enter the BIOS, and configure the recommended Autodesk settings.

Updating your System BIOS

The BIOS version installed on your system appears on the screen while booting the workstation. The following procedure describes how to update a workstation to the certified BIOS version required by your application.

NOTE Before attempting to update the system BIOS, make sure the SATA Emulation option is properly set, otherwise your optical drive is not detected.

To update the BIOS on your workstation:

1. Download the latest version of the DKU from Autodesk and extract the *tar* file into a temporary directory.
2. Go to the */Utils/BIOS* subdirectory of the DKU directory.
   In the *BIOS* directory there is a subdirectory for each platform supported by the current version of your Visual Effects, Finishing, and Colour Grading application.
3. Go to the directory that corresponds to your hardware platform.
   The directory contains an *.iso* disc image file for each supported BIOS version, as well as a *README* text file that describes each file, and provides information on updating the BIOS.
4. Burn the correct *.iso* file to a CD and place it in the DVD-ROM drive on the workstation.
5. Reboot your workstation and press **F10** to enter the system BIOS.

6 Optional: Press **F8** to select a language.

7 In the Storage menu, select Storage Options, and set SATA Emulation to IDE. This option allows the BIOS to be updated from a CD.

8 Press **F10** to confirm the change.

9 In the File menu, select Save Changes and Exit.
The workstation reboots.

10 Press **F10** to enter the BIOS again.

11 In the File menu, select Flash System ROM.
A dialog box prompts you to select between USB and CD-ROM.

NOTE If the CD-ROM option does not appear, SATA emulation was not set correctly. Reboot your machine and redo this procedure from step 4.

---

12 Select CD-ROM and press **F10** to confirm.

13 Select the *.bin* file.
A confirmation dialog box appears.

14 Press **F10** to confirm.

15 Press any key.
A message stating that the system ROM flash was successful appears.

16 In the Storage menu, select Storage Options and set SATA Emulation back to the value documented in the previous table. This setting is required for Linux to work properly.

17 Press **F10** to confirm the change.

18 Verify all the BIOS settings again to make sure they correspond to the recommended settings.

19 In the File menu, select Save Changes and Exit.
The workstation reboots.

Installing Red Hat Enterprise Linux

4

Topics in this chapter:

- Do I Need to Reinstall Linux? on page 29
- Linux Installation Workflow on page 30
- Linux Post-Installation Tasks on page 32

Do I Need to Reinstall Linux?

Visual Effects, Finishing and Colour Grading workstations ship with the correct Autodesk distribution of Red Hat Enterprise Linux already installed and configured. Thus, you should only need to install Linux in the following situations:

- You plan to upgrade your software on an older supported hardware platform running a version of Red Hat Enterprise Linux no longer supported by the current version of the software. In this case, you must perform a fresh install of the required Red Hat Enterprise Linux version.
- Your system experienced an unrecoverable hard disk failure and you had to replace the system disk.

NOTE If you must replace the hard disk of your workstation, you need to obtain a new license. Contact Customer Support for assistance.

Use the following table to determine the correct version of Red Hat Enterprise Linux required for your hardware platform for the current version.

Hardware Platform	Linux Version
HP Z800	Custom Autodesk distribution of Red Hat Enterprise Linux Desktop 5.3 with Workstation Option

Hardware Platform	Linux Version
HP xw8400, HP xw8600	Custom Autodesk distribution of Red Hat Enterprise Linux WS 4, Update 3

To determine the version of Red Hat Enterprise Linux your system is currently running, open a terminal and type:

`cat /etc/redhat-release`

The Linux version appears. For example:

```
Red Hat Enterprise Linux Client release 5.3 (Tikanga)
```

If your system is not currently running the correct version of Red Hat Enterprise Linux, install the required version of the operating system.

Linux Installation Workflow

Perform the following procedure to prepare your system and perform a fresh install of the customized distribution of Red Hat Enterprise Linux.

To install Linux:

1. Locate the installation media.

   The DVD containing the customized Autodesk distribution of Red Hat Enterprise Linux is included with your shipment. The customized Autodesk distribution installs certain Linux packages that are required by Autodesk applications but are not installed by the commercial distribution of Red Hat Enterprise Linux.

   WARNING Even though your shipment may also include the disc set for the commercial distribution of Red Hat Enterprise Linux, **DO NOT** install the commercial distribution. Autodesk Visual Effects, Finishing and Colour Grading software only works on the custom Autodesk distribution of Red Hat Enterprise Linux.

2. Power off all storage enclosures connected to the system, to prevent the Red Hat installer from attempting to reformat them as part of the installation process.

   WARNING Do not skip this step. Failure to power off or disconnect your storage before installing Linux may result in data loss.

   NOTE Turn off the XR RAID controllers first, then the XE expansion enclosures.

3. If you are reinstalling Linux on an existing system, back up all user settings, project settings, and media from the system to another system or to a removable drive. The Linux installation erases and formats the system disk, so this information is lost if it is not backed up. In addition, back up the following directories:
   - **`/usr/autodesk`** (for software setup and configuration files)
   - **`/etc`** (for Linux configuration files, networking, etc)
   - **`/usr/lib/DPS`** (for fonts)
   - **`/usr/local/flexlm/licenses`** (for the license file)

4. Make sure your system is in the following state:
   - Mouse, keyboard and graphics monitor are connected, and the graphics monitor is powered on.

- Other peripherals, such as the tablet and video breakout box are connected and powered on.
- If you are using a KVM switch, it is switched to the system on which you want to install Linux.
- The storage array is powered off.
- The Lustre control surface is disconnected from the workstation.

5 Insert the DVD of the custom Autodesk distribution of Red Hat Enterprise Linux in the DVD-ROM drive, and power off the system.

WARNING If your system is equipped with internal media storage, after turning the system off, open the side panel and disconnect the main connector for the internal storage drives. Make sure you do not disconnect the system drive!

6 Restart the system.

7 When the system starts to boot, press **F10** to enter the BIOS and make sure the BIOS settings reflect the recommended values in Setting Up Your Workstation Hardware on page 9. The BIOS must be correctly configured **before** installing Linux.

NOTE If the keyboard is connected to the system through a KVM switch, you may have to press **F10** repeatedly or hold it down to enter the BIOS.

8 Save the correct BIOS settings and reboot the system.

The system should boot to the Linux installation disc. If it does not, review your BIOS settings to make sure the DVD / CDROM drive is set as the primary boot device.

9 When the Red Hat Linux installation screen appears, press **F8** to display the Autodesk Red Hat Linux installation menu.

10 At the boot prompt in the Red Hat Linux installation menu, type one of the following commands and then press **Enter** to launch the Linux installation.

Type:	To install on:
`lustrews`	A Lustre workstation.
`lustreslave`	A Lustre Slave Renderer.
`burnlustre`	A Burn for Lustre node using the Autodesk custom DVD of Red Hat Enterprise Linux.
`linux ks=cdrom`	A Burn for Lustre node using the commercial CD/DVD of Red Hat Enterprise Linux with the Autodesk kickstart file.

WARNING You must use this exact command to start the Linux installation. If you use the default options presented by the Linux installation prompt, the installation proceeds, but some important packages required by Autodesk software are not installed.

The command launches the Linux installation. The system spends several minutes loading drivers. The installer guides you through the rest of the process.

11 The installation process may ask you to initialize the system disk. Follow the prompts to initialize the disk, if necessary.

12 The remainder of the installation process is automated.

When the installation completes, you are prompted with “Congratulations, the installation is complete”.

13 Eject the disc and click Reboot to reboot the system. After the system reboots, perform the post-installation tasks in the following section.

NOTE After the system reboots, you may be prompted by the Kudzu hardware setup utility to set up new hardware detected for your system. You can ignore these prompts and allow the utility's count-down to expire since the hardware for the system is unchanged.

Linux Post-Installation Tasks

After booting into your new Linux installation, perform the following post-installation tasks:

1 Change the default root password to secure the system. The automated Autodesk installation sets the password for the root account to *password*.

2 Configure the time zone for your geographic location. The automated Autodesk installation sets the time zone to North American Eastern Standard Time (EST) by default.

3 Configure the network settings for your system to match the ones used in your facility. The automated Linux installation sets a default IP address for your system, which may not be suitable for your facility network. See Configuring Basic Network Settings on page 32.

4 Install the Discreet Kernel Utilities (DKU), and upgrade the firmware of your AJA OEM-2K card. See Installing the DKU and the AJA OEM-2K Firmware on page 33.

Configuring Basic Network Settings

The following files contain the network settings of your Linux system. Open each of these files in a text editor and change the network settings to match your facility network.

NOTE Contact your network administrator for the correct settings for your network.

Networking Configuration File	Description
/etc/hosts	Contains IP/host name pairs for host name resolution.
/etc/sysconfig/network	Contains global networking settings, such as the system host name, system IP address, subnet mask, Gateway IP address.
/etc/sysconfig/network-scripts/ifcfg-<xxx>, where <xxx> specifies your ethernet adapter	Contains interface-specific configuration.
/etc/resolv.conf	Contains DNS server information.

Installing the DKU and the AJA OEM-2K Firmware

5

Topics in this chapter:

- Installing the DKU on page 33
- Upgrading the AJA OEM-2K Firmware on page 34

Installing the DKU

Before installing your software, you must install the required version of the DKU. See the Release Notes for the required DKU version for this version.

For major releases, the DKU is available on optical media or as a download from Autodesk. For extensions and service packs, the DKU is only available for download. The download link is provided in the release announcement you received from Autodesk.

To install the DKU:

1. Open a terminal and log in as root.
2. If you are upgrading an existing application, check the currently installed DKU version by typing:

   `head -n1 /etc/DKUversion`

   If the DKU version output by the command does not match the version required for the new application version, perform the remaining steps in this procedure.
3. Access your DKU installation package:
   - If you are installing from an application disc, insert and mount the disc using the command:
     `mount /dev/cdrom`

The disc mounts on the */mnt/cdrom* directory. The DKU installation directory is located in the *Linux* directory.

- Otherwise, download the latest DKU *tar* file from the download link provided in the release announcement, then go to the directory where the *tar* file was downloaded, and unpack it by typing:
  `tar -zxvf DKU_``<version_number>`**`.tar.gz`**

  The DKU *tar* file is unpacked into a new directory.

4 Go to the DKU installation directory (*/mnt/cdrom/Linux/DKU-<version>*, if you are installing from the application DVD) and launch the DKU installation script:

```
./INSTALL_DKU
```

WARNING If you attempt to install the DKU on an unsupported platform, the installation script only installs a generic configuration. Such a configuration can render your operating system unusable. Never attempt to install the current version of the DKU on unsupported platforms, including older Visual Effects and Finishing or Colour Grading systems that are no longer supported in the current version.

When the DKU installation script completes, a warning to update the AJA card firmware may appear and you are returned to the command prompt. See the following section for information on updating your AJA card firmware.

5 If you installed from a disc, return to the root directory, and eject the disc by typing:

```
eject
```

6 If storage devices (external disk arrays or internal storage) were previously disconnected or turned off as part of an operating system installation, reconnect them and power them up.

NOTE Power on the XE expansion enclosures first and the XR RAID controller units last. This ensures the RAID controllers detect the other units in the Stone Direct storage.

Wait for all the disks in the storage devices to fully power up before rebooting the system. The green light for each disk stops flashing once it is fully powered up.

7 Reboot the system. Type:

```
reboot
```

Upgrading the AJA OEM-2K Firmware

The firmware on your AJA OEM-2K card must correspond to the certified version required by your application version. Refer to the Release Notes for the required AJA OEM-2K firmware version.

The AJA firmware update utilities required to check your firmware version are included with the DKU version for your application.

The following procedure describes how to verify and update the firmware version of the AJA OEM-2K card.

To verify and upgrade the AJA OEM-2K firmware:

1 Open a terminal and type:

```
cat /proc/driver/aja
```

If the `PCI version` line in the output lists a different version than the required one, perform the following steps to upgrade the firmware.

NOTE Before upgrading the AJA firmware, make sure you have upgraded the DKU, and that you have restarted the system.

2 Go to the */usr/discreet/DKU/current/Utils/AJA_firmwareUpdate* directory.

3 Run the *AJAfw_update* utility to scan the AJA current firmware and, if required, update to the latest firmware version. Type:

```
./AJAfw_update
```

If the utility detects that the firmware and drivers need to be updated, it prompts you to start the update.

4 Start the firmware update by typing **Y** and then pressing **Enter**.

While the AJA firmware and drivers are being updated, your workstation appears to be frozen and your mouse and keyboard do not work. This is normal and indicates that the firmware is being updated. Once the firmware update is complete, you are returned to the terminal.

5 Shut down your workstation by typing:

```
shutdown -g0
```

If your workstation does not prompt you to power down, press the power button for 10 seconds to force a power down.

6 Disconnect the power cord.

7 Wait 10 seconds, reconnect the power cord, then restart your workstation.

NOTE For more details about the AJA firmware procedures, consult the *README* file located in the current directory.

Configuring Storage

6

Topics in this chapter:

- Overview on page 37
- Powering Up Your Storage on page 38
- Partitioning the Storage and Creating the XFS Filesystem on page 38
- Manual Storage Configuration on page 41

Overview

This chapter describes how to configure a direct-attached storage array connected to the workstation.

If you are also configuring a Storage Area Network (SAN), it is recommended that you configure the SAN prior to configuring a direct-attached storage.

Before you can configure the storage, the workstation must be up and running the custom Autodesk distribution of Red Hat Enterprise Linux, as well as the version of the DKU required for your application version.

WARNING When configuring a storage array, it is strongly recommended to disconnect any other storage device (DAS or SAN) connected to the workstation.

Do I Need to Perform these Procedures?

If you are reinstalling your system from scratch, or adding new storage devices, refer to the procedures in this section for information on partitioning the storage and setting up the XFS filesystem.

If you are only upgrading an existing application installation without adding new storage, skip to the next chapter for instructions on installing the software.

Powering Up Your Storage

Powering your system and storage up or down should be done in a proper sequence. This ensures that the system functions properly.

WARNING An incorrect power up sequence can mean your system does not recognize all drives.

NOTE If you are configuring a storage array with two sets of enclosures, connect only one set of enclosures at this point, and then perform the filesystem creation procedures in the next section. Then disconnect the storage, and repeat the entire process for the second set of enclosures.

To power up your system:

1. Make sure your workstation is shut down.
2. Power up the XE expansion enclosures.
3. Power up the XR RAID controller enclosures.
4. Wait about 90 seconds for all the drives to spin up. Their lights are solid green when they are spun up.
5. Power up your workstation.

To power down your system, shut down your workstation first, then the XR RAID controller enclosures, and finally the XE expansion enclosures.

Partitioning the Storage and Creating the XFS Filesystem

Before you can use a new storage array, you need to create logical units (LUNs) on it, partition them, group the partitions into a logical volume, and then create the XFS filesystem on the logical volume.

All these operations can be easily performed using version 1.5 of the *XR Configuration Utility* from Autodesk. This version of the *XR Configuration Utility* is available in versions 4.5.1 and newer of the *Discreet Kernel Utilities* (DKU).

If your workstation is using an older version of the DKU that does not have the latest *XR Configuration Utility*, or if you prefer to manually partition your storage array and configure the filesystem, refer to Manual Storage Configuration on page 41.

Perform one of the following procedures to configure your storage using the *XR Configuration Utility*. The procedures are different for storage arrays with a single set of enclosure, and for arrays with two sets of enclosures.

Note that the *XR Configuration Utility* exits without configuring your storage if any of the following issues are detected:

- The total number of disks is not a multiple of 12.
- One of more of the enclosures do not have the correct firmware.
- When using two sets of enclosures, the number of expansion chassis attached to each XR RAID enclosure is not the same.
- An odd number of enclosures in a 4-loop configuration. Only even numbers of enclosures are supported.

To configure arrays with a single set of enclosure:

1. Open a terminal and log in as root.

2 Go to the */usr/discreet/DKU/current/Utils/Storage/current/* directory, and run the *XR Configuration Utility* by typing:

`./XR_config.pl`

The script displays information on the storage, such as: enclosure type, RAID controller firmware version, number of enclosures, number of loops.

3 If a LUN configuration already exists on the storage, you are prompted for confirmation to overwrite that configuration.

WARNING LUN configuration is destructive. Make sure you want to overwrite an existing configuration before you confirm.

4 After the utility detects the number of enclosures and drives, it presents you with a list of options.

5 Type **2** and press **Enter**.

This option instructs the configuration utility to create LUNs with a sector size of 512 bytes. This is the optimal sector size for XFS DAS (direct-attached) storage of Visual Effects, Finishing and Colour Grading applications.

6 When asked if you have a 2-loop or a 4-loop configuration, select the option that applies to your storage. Note that 4-loop configurations are only supported for XR 6412 and XR 6500 storage.

The utility creates LUNs on your storage. This process might take a few minutes.

When the LUN creation process completes, the configuration utility asks you if you want to create the XFS filesystem on the storage array.

7 Type **`Y`** (the default answer).

The configuration utility partitions the storage array, groups the partitions into a logical volume, creates the XFS filesystem on the volume, and mounts the volume to */mnt/StorageMedia* on HP Z800 workstations, or */mnt/stoneMedia* on older workstations.

NOTE If the storage driver does not reinitialize quickly enough after LUN creation, the filesystem creation step may fail, and the *XR Configuration Utility* gives you an error message similar to the following:

```
Can't open /dev/sdb1 exclusively. Mounted filesystem?
```

In such cases, reboot your workstation, and perform the steps in Performing only the filesystem creation operations on page 40.

8 Type **`x`** to exit the configuration utility.

NOTE Even though your storage array is usable at this point, the drives are still initializing following the LUN creation. Your storage operates at reduced performance until the initialization process completes. This might take a few hours. To check the progress of the initialization type:

`./XR_config.pl --arrayStatus`

9 Once the initialization process completes, create a back-up of the storage configuration by typing:

`./XR_config.pl --saveConfig`

A back-up of the storage configuration is saved.

To configure arrays with two XR enclosures:

1 Open a terminal and log in as root.

2 Make sure only one set of enclosures is connected to the workstation.

3 Go to the */usr/discreet/DKU/current/Utils/Storage/current/* directory, and run the *XR Configuration Utility* by typing:

`./XR_config.pl`

The script displays information on the storage, such as: enclosure type, RAID controller firmware version, number of enclosures, number of loops.

4 If a LUN configuration already exists on the storage, you are prompted for confirmation to overwrite that configuration.

WARNING LUN configuration is destructive. Make sure you want to overwrite an existing configuration before you confirm.

5 After the utility detects the number of enclosures and drives, it presents you with a list of options.

6 Type **2** and press **Enter**.

This option instructs the configuration utility to create LUNs with a sector size of 512 bytes. This is the optimal sector size for XFS DAS (direct-attached) storage of Visual Effects, Finishing and Colour Grading applications.

7 When asked if you have a 2-loop or a 4-loop configuration, select the option that applies to your storage. Note that 4-loop configurations are only supported for XR 6412 and XR 6500 series storage.

The utility creates LUNs on your storage. This process might take a few minutes.

When the LUN creation process completes, the configuration utility asks you if you want to create the XFS filesystem on the storage array.

8 Type **`N`**.

NOTE If you answered *Y* by mistake (the defalt answer), you get another chance to answer *no* after the system rescans the disks. It is very important that you do not create the filesystem at this point.

9 Type **`x`** to exit the configuration utility.

10 Once the initialization process completes, create a back-up of the configuration for this set of enclosures by typing:

`./XR_config.pl --saveConfig`

A back-up of the configuration is saved. Note that you can only save the configuration for one set of enclosures at a time.

11 Power off the workstation, disconnect the storage enclosures, and connect the second set of enclosures.

12 Power the workstation back on.

13 Perform steps 3 through 10 in this procedure on the second set of enclosures.

14 Power off the workstation again, connect both sets of enclosures to the workstation.

15 Power the workstation back on and perform the tasks in the following procedure.

Use the following procedure if you need to perfrom just the partitioning and filesystem creation operations on a storage array where LUNs have already been created.

To perform only the filesystem creation operations:

1 Open a terminal and log in as root.

2 Go to */usr/discreet/DKU/current/Utils/Storage/current/*, and type:

`./XR_config.pl --createFS`

The configuration utility partitions the storage array, groups the partitions into a logical volume, creates the XFS filesystem on the volume, and mounts the volume.

NOTE Using this parameter has the same effect as running the *XR Configuration Utility* with no parameter, and choosing option *4* from the main menu.

3 Create a back-up of the storage configuration by typing:

```
./XR_config.pl --saveConfig
```

NOTE You can only back-up your storage configuration after the drives have finished initializing. This process might take a few hours. To check the progress of the initialization type:

```
./XR_config.pl --arrayStatus
```

To get a complete list of the command-line parameters available for the *XR_config.pl* script, type:

```
./XR_config.pl --help
```

Manual Storage Configuration

This section provides advanced instructions for manually configuring a storage array. Normally, you do not need to perform any of these tasks, as they are all automatically performed by the *XR Configuration Utility*.

Creating Hardware LUNs

LUNs, also referred to as Logical Units or Logical Drives, are groups of disk drives that are striped together to provide optimal performance and RAID protection. Once configured, LUNs are seen by the Linux operating system as if they were single disk drives.

To create the LUNs on your XR-series storage, use the *XR Configuration Utility* supplied by Autodesk. This utility is installed with the DKU and automates the LUN creation process.

NOTE For systems having two sets of enclosures, you have to configure one set at a time with the *XR Configuration Utility*. Connect the first set of enclosures, and use the utility to configure it. When done, disconnect the first set and connect the second set. When the second set of enclosures is configured, re-connect both sets.

To configure LUNs on XR-series storage:

1 Open a terminal and log in as root.

2 Go to the directory */usr/discreet/DKU/current/Utils/Storage/current/*, and run the *XR Configuration Utility* by typing:

```
./XR_config.pl
```

The utility detects whether a LUN configuration exists on the storage attached to that workstation.

3 If a LUN configuration already exists on the storage, you are prompted for confirmation to overwrite that configuration.

WARNING LUN configuration is destructive. Make sure you want to overwrite an existing configuration before you confirm.

4 After the script detects the number of enclosures and drives, it prompts you to indicate the filesystem your storage uses.

Type **2**

5 When asked if you have a 2-loop or a 4-loop configuration, select the option that applies to your storage.
The *XR Configuration Utility* configures your storage.

6 Type **x** to exit the *XR Configuration Utility*.

7 Reboot your workstation, so that the newly-created LUNs are rescanned by the operating system.

Note that the *XR Configuration Utility* exits without configuring your storage if any of the following issues are detected:

- An incorrect number of disks. The total number of disks must be a multiple of 12.
- One of more of the enclosures do not have the correct firmware.
- In a dual RAID enclosure environment, the number of expansion chassis on each RAID enclosure is not the same.
- An odd number of enclosures in a 4-loop configuration. Only even numbers of enclosures are supported.

Partitioning Disks or LUN devices as Primary Partitions

To achieve optimal performance, each disk or LUN in the array should be partitioned as a single primary partition.

On storage arrays with 450 GB drives, use the *parted* utility to create GPT (GUID Partition Table) type partitions. On arrays with smaller drives, use the *fdisk* utility to create Linux LVM type partitions.

NOTE Make sure you do not re-partition the system drive or any other disks that you want to preserve as they are. Partitioning destroys all data on the disks.

To partition disk or LUN devices with 450 GB drives or larger:

1 Reboot your system to reload the fibre channel adapter drivers.

2 Open a terminal, and log in as root.

3 View a list of disks or LUN devices detected by the operating system, using the following command:
`fdisk -l | grep dev`
Identify the disk or LUN devices that are part of the storage array to be configured with a standard filesystem. These devices will be re-partitioned.

4 Use the *parted* command to re-partition each disk device identified in the previous step. Type:
`/sbin/parted -s --` `<disk name>` **`mklabel gpt mkpart primary 0 -1`**
where `<disk name>` is the name of a disk device identified in step 1, without a partition number, such as */dev/sdb*. For example:
`/sbin/parted -s -- /dev/sdb mklabel gpt mkpart primary 0 -1`

5 Repeat the command for each disk.

To partition disk or LUN devices with drives smaller than 450 GB:

1 Reboot your system to reload the fibre channel adapter drivers.

2 Open a terminal, and log in as root.

3 If you are repurposing a Stone FS storage

4 View a list of disks or LUN devices detected by the operating system, using the following command:

`fdisk -l | grep dev`

Identify the disk or LUN devices that are part of the storage array to be configured with a standard filesystem. These devices will be re-partitioned.

5 If you plan to configure a standard filesystem on a former Stone FS storage array, delete the volume label and volume table on each LUN device that is part of the storage array. Type the following command for each LUN device:

`dd if=/dev/zero of=``<LUN device>` **`count=4096`**

Where `<LUN device>` is the device name of a LUN in your storage array, such as */dev/sdc*.

WARNING When using the *dd* command, be very careful to not delete your system drive (usually */dev/sda*) or any other drive aside from the LUNs in your storage array.

---

6 Use the *fdisk* command to re-partition each disk device identified in the previous step.

Start the *fdisk* utility for the LUN. Type:

`fdisk` `<disk name>`

where `<disk name>` is a disk device name without a partition number, such as */dev/sdf*.

The *fdisk* utility starts, checks the disk device, and then displays its prompt.

NOTE When *fdisk* starts, a warning about the number of disk cylinders may appear. You can disregard this warning.

---

7 Type **`n`** to display the New partition creation menu.

fdisk displays the type of partitions you can create (primary or extended).

8 Create a primary partition on the disk device by typing **`p`** at the prompt.

9 When prompted to enter a partition number, type **`1`** to make the primary partition the first one on the LUN.

NOTE You may have to delete pre-existing partitions by entering **`d`** when prompted, and repeating step 3.

---

10 When prompted to set the starting cylinder number, press **Enter** twice to accept the defaults, which are the first and last cylinder on the device.

The *fdisk* prompt reappears.

11 Type **`t`** to set the partition type.

You are prompted to enter the hexadecimal code of the partition type to be created on the LUN.

12 Type **`8e`** to set the partition type to Linux LVM.

fdisk sets the partition as Linux LVM and the following output appears:

```
Changed system type of partition 1 to 8e (Linux LVM)
```

13 Type **`w`** to save the new partition table.

14 Repeat steps 2 through 9 for each disk or LUN device identified in step 1.

Assembling the Disk or LUN Devices into a Logical Volume

After you have formatted each disk or LUN device as a partition, you must assemble the LUNs into a single logical volume on which you create the XFS filesystem.

This procedure does not cover creating fault-tolerance and assumes that the LUNs are RAID-protected, as is the case with Stone Direct XR-series arrays.

To assemble a logical volume:

1. Verify that the disk or LUN devices are detected by the operating system. Type:

   `fdisk -l | grep dev`

   All devices appear in a list similar to the following example (your values may vary):

   ```
   /dev/sdb1 1 180482 1449713663+ ee EFI GPT
   /dev/sdc1 1 180482 1449713663+ ee EFI GPT
   /dev/sdd1 1 180482 1449713663+ ee EFI GPT
   /dev/sde1 1 180482 1449713663+ ee EFI GPT
   ```

   Partitions created with the *parted* command for arrays with 450 GB disks are marked "EFI GPT".

   Partitions created in *fdisk* for arrays with smaller capacity disks are marked "Linux LVM".

   NOTE Other devices of different types may be listed before and after the GPT or LVM devices.

2. Create a physical volume on each of the devices using the following command:

   `pvcreate` `<list of devices>`

   where `<list of devices>` is a list of all the devices in the storage array. For example, if you have four devices, ranging from */dev/sdb1* to */dev/sde1*, you would type:

   `pvcreate /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1`

   The physical volumes are created, and the command output should be similar to the following example:

   ```
   Physical volume "/dev/sdb1" successfully created
   Physical volume "/dev/sdc1" successfully created
   Physical volume "/dev/sdd1" successfully created
   Physical volume "/dev/sde1" successfully created
   ```

   TIP You can use the command *pvremove* to delete any erroneously entered devices.

3. Verify that the physical volumes were initialized correctly. Type:

   `pvscan -v`

   A list of all of the physical volumes you created appears. The following sample output is for the previous example of 4 physical volumes created on devices */dev/sdb1* through */dev/sde1*:

   ```
   Walking through all physical volumes
   PV /dev/sdb1 lvm2 [2.03 TB / 2.03 TB free]
   PV /dev/sdc1 lvm2 [2.03 TB / 2.03 TB free]
   PV /dev/sdd1 lvm2 [2.03 TB / 2.03 TB free]
   PV /dev/sde1 lvm2 [2.03 TB / 2.03 TB free]
   Total: 4 [8.10 TB] / in use: 0 [0 ] / in no VG: 4 [8.10 TB]
   ```

4. Create the volume group "vg00" from the physical volumes you created in the preceding step, using the following command:

   `vgcreate vg00` `<list of volumes>`

   where `<list of volumes>` is the list of physical volumes you created in the preceding step. For example:

   `vgcreate vg00 /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1`

TIP You can use the command *vgremove* to delete any erroneously entered volume.

5 Verify the volume was created and obtain the value of the "Free PE / Size" field. Type:

vgdisplay -v

In the output, find the line that contains the "Free PE / Size" field and write down the value of the "Free PE". For example, in the following example output the "Free PE" value is 2124556.

```
Free PE / Size 2124556 / 8.10 TB
```

6 Create a new logical volume on "vg00", using the following command:

lvcreate -l <Free_PE_value> **-i** <#_of_physical_volumes> **-I 32 -n lvol1 vg00**

where <Free_PE_value> is the "Free PE" value you noted in the preceding step and <#_of_physical_volumes> is the number of physical volumes. If we continue with the example used in the previous steps, you would type:

lvcreate -l 2124556 -i 4 -I 32 -n lvol1 vg00

The output confirms the creation of the logical volume:

```
Logical volume "lvol1" created
```

NOTE If the command outputs several lines about a file descriptor leaked on lvdisplay invocation, ignore them.

7 Check if the *adsk_lvm* startup script has been installed by the DKU to enable automatic logical volume reassembly upon reboot:

chkconfig --list | grep adsk_lvm

If the script is properly configured, the command output is the following:

```
adsk_lvm 0:off 1:off 2:on 3:on 4:on 5:on 6:off
```

If the command output is different, enable the script by typing:

chkconfig --add adsk_lvm

chkconfig adsk_lvm on

Creating the XFS Filesystem on the Logical Volume

After having created the logical volume, you are now ready to create and mount the XFS filesystem.

To create and mount an XFS filesystem:

1 Identify the optimal *agsize* value for your array by running the *mkfs.xfs* command. Type:

mkfs.xfs -d agcount=128 -f /dev/vg00/lvol1

This command displays diagnostics information similar to the following (your values may differ):

```
meta-data=/dev/vg00/lvol1  agcount=128, agsize=1066667 blks
         =                 sectsz=512 attr=0
data        =                 bsize=4096 blocks=134400000, imaxpct=25
         =                 sunit=16   swidth=64 blks, unwritten=1...
```

2 From the diagnostic information printed in the previous step, note the following values:

- *agsize* on the first line
- *sunit* and *swidth* on the fourth line

3 Depending on the values of *sunit* and *swidth*, calculate a new *agsize* value using one of the following three methods:

- If the values of *sunit* and *swidth* are both equal to 0, multiply the *agsize* value by 4096. For example (your values will differ):
  1066667 * 4096 = 4369068032

  Proceed to step 4 using the value calculated above as the new *agsize* value.

- If the command displays a warning message about the *agsize* being a multiple of the stripe width, multiply the *agsize* value by 4096, and subtract the *sunit* value multiplied by 4096. For example (your values will differ):
  1066667 * 4096 = 4369068032

  16 * 4096= 65536

  4369068032 - 65536 = 4369002496

  Proceed to step 4 using the value calculated above as the new *agsize* value.

- If the values of *sunit* and *swidth* are not equal to 0, and no warning message appears, proceed to step 4 using the *agsize* value displayed by the *mkfs.xfs* command in step 1.

4 Run the *mkfs.xfs* command again to create the XFS filesystem on the device */dev/vg00/lvol1* using the value calculated in one of the previous steps. Type:

mkfs.xfs -d agsize=<new agsize> **-f /dev/vg00/lvol1**

For example (your values will vary):

mkfs.xfs -d agsize=4369068032 -f /dev/vg00/lvol1

The filesystem is created on the storage array.

NOTE If the command fails, redo your calculations starting from step 1.

5 Verify that the storage can be mounted by typing one of the following commands:

- For HP Z800 systems: **mount /mnt/StorageMedia**
- For older systems: **mount /mnt/stoneMedia**

The storage should mount, as the DKU installation script should have created the mount point directory for your storage (*/mnt/StorageMedia* on HP Z800 workstations, or */mnt/stoneMedia* on older workstations), as well as the corresponding entry in the */etc/fstab* file.

If you receive an error message and the storage does not mount, follow the instructions in the next section to manually mount the storage.

Manually Creating a Mount Point and Mounting the Storage

If the mount point directory for your storage was not created automatically by the DKU, or if the storage does not mount, perform the following procedure to create the mount point and mount the storage manually.

To create a mount point and mount the storage:

1 Create the directory that will serve as the mount point for the filesystem, if it does not exist. For example:

mkdir /mnt/StorageMedia

2 Mount the XFS filesystem from the logical volume */dev/vg00/lvol1* on the directory you created in the previous step. For example:

mount -av -t xfs -o rw,noatime,inode64 /dev/vg00/lvol1 /mnt/StorageMedia

The filesystem is mounted as */mnt/StorageMedia*.

3 Confirm that the storage is now mounted. Type:

`df -h`

The output should list */dev/mapper/vg00-lvol1* mounted on your mount point directory. For example:

```
/dev/mapper/vg00-lvol1
 814G 547G 267G 68% /mnt/StorageMedia
```

4 Using a text editor, add an entry in the */etc/fstab* file so that the filesystem gets mounted automatically at startup. For example:

```
/dev/vg00/lvol1 /mnt/StorageMedia xfs rw,noatime,inode64
```

5 Optional: Confirm that the filesystem can mount automatically by rebooting the workstation and using the command *df -h* again.

Installing Lustre on the Linux Workstation

7

Topics in this chapter:

- Overview on page 49
- Installation Requirements Checklist on page 49
- Installing Lustre on page 50

Overview

This chapter describes the Lustre software installation process. If you received a new system with this release, the software is already installed, and you do not have to perform the procedures in this chapter. Use these procedures if you are upgrading from the previous release of Lustre, or if you must reinstall the software at any point.

Installation Requirements Checklist

Before you install or upgrade Lustre, you must ensure your system meets the following installation requirements.

Hardware It is a fully integrated system with all the appropriate hardware properly installed. See the *Hardware Setup Guide* for your platform.

Operating System It is running the correct version of Red Hat Enterprise Linux, and the correct version of the Discreet Kernel Utilities (DKU). See the latest Release Notes for the required DKU version, and Do I Need to Reinstall Linux? on page 29 for information on the required Red Hat Linux distribution.

NOTE To guarantee optimal performance, it is mandatory that only Autodesk Visual Effects, Finishing and Colour Grading applications, and the required Red Hat Enterprise Linux packages be installed on the workstation.

Permissions You have *root* access to your system. Many hardware and software configuration and installation procedures require *root* access to your Linux workstation. If you cannot log in as *root*, contact your system administrator. The default *root* account password on Linux workstations with Autodesk software installed is *password*.

Installation Media You have downloaded the Lustre installation package from the Autodesk FTP site. The download links are provided in the release announcement you received from Autodesk.

Installing Lustre

Use the following procedure to install Lustre.

To install Lustre:

1. As *root*, open a Linux terminal.
2. If you are not installing from an application disc, download the application *tar* file from Autodesk.

   The download link is provided in the release announcement you received from Autodesk.

   TIP After downloading the *tar* file, verify the its integrity using the Linux md5 checksum provided. In the directory where you saved the *tar* file and the checksum file, type **`md5sum`** `<filename.tar.gz>`, and make sure the checksum displayed matches the Linux md5sum listed in the checksum file.
3. If you need to change your system date or time, do it **before** installing the application.
4. Access your installation package:
   - If you are installing from an application disc, mount the disc, then go to the *Linux/Applications* directory on the mounted disc:

     `mount /mnt/cdrom`

     `cd /mnt/cdrom/Linux/Applications/`
   - If you are installing from a downloaded application *tar* file, unpack the *tar* file:

     `tar -zxvf` `<filename.tar.gz>`

     The file is uncompressed and an installation directory is created on your system.
5. Navigate to the installation directory and start the Lustre software installer by typing:

   `./INSTALL_LUSTRE`
6. If prompted with a message asking if you would like to automatically run Backburner Server on this machine, click Yes.

   The Lustre package is installed. A new user account is created for the version of Lustre you just installed. Read the following chapter for information on licensing and starting your application for the first time.

   NOTE If you are upgrading to a service pack of the same release or extension, you do not need to re-license your software.

Licensing and Starting the Application

8

Topics in this chapter:

- Licensing Workflow on page 51
- Determining the Licenses You Require on page 52
- Obtaining the Host ID on page 52
- Requesting License Codes on page 53
- Entering License Codes on page 53
- Starting the Application for the First Time on page 54

Licensing Workflow

If you have purchased subscription and are upgrading to a new release, your new license is sent to you by the Autodesk Media and Entertainment department. After receiving your license, perform the following tasks:

1. Install the new license. See Entering License Codes on page 53.
2. Start the application and accept the license agreement. See Starting the Application for the First Time on page 54.

If you are installing the application for the first time, use the following steps to obtain and install license codes.

To obtain and install license codes for the application:

1. Determine which license codes you require. See Determining the Licenses You Require on page 52.
2. Obtain the host ID of the workstation. See Obtaining the Host ID on page 52.

3 Request temporary license codes. See Requesting License Codes on page 53.

4 Install the temporary license codes. See Entering License Codes on page 53.

5 Start the application and accept the license agreement. See Starting the Application for the First Time on page 54.

6 When you receive permanent license codes, install those codes. See Entering License Codes on page 53.

Determining the Licenses You Require

There are two license type categories: main components and optional components.

The main component license types are as follows:

- Lustre Master Station
- Lustre HD Station
- Lustre Station with Primary Grading
- Lustre Station
- Slave Renderer
- Background Renderer

The optional component license types are as follows:

- HD Video I/O
- HD Dual Link and HDSL

License codes must be requested for each main and optional Lustre component.

Obtaining the Host ID

To request a license code, you must provide the unique host ID of your workstation. The host ID is used to authenticate your registration.

To obtain the host ID:

1 Open a terminal and run the *dlhostid* script by typing:

`dlhostid`

A message similar to the following one appears, containing the host ID:

```
dlhostid — Copyright © 2005 by Autodesk, Inc./Autodesk Canada Co. All rights reserved.

The lmhost ID of this machine is "00110910DA2E" (eth0)

The Discreet host ID of this machine is
"DLHOST01=25231AEF83AD9D5E9B2FA270DF4F20B1"
```

2 Send the Discreet host ID to the Autodesk Licensing Department to receive your application license code. When you record the Discreet host ID, make sure you include the `DLHOST01=` string as well as the code; for example, `DLHOST01=25231AEF83AD9D5E9B2FA270DF4F20B1`

NOTE Make sure you obtain a host ID for each workstation on which you install the application.

Requesting License Codes

You can obtain application license codes by registering the application with the Autodesk Media and Entertainment Licensing Department by e-mail or telephone.

NOTE For emergencies, you can acquire an immediate temporary emergency license using the emergency license generator at *http://melicensing.autodesk.com/templicensing/*. A 4-day license code is e-mailed to the address you provide.

To obtain license codes by e-mail:

1. Gather the following information:
   - Company name
   - Contact name (with e-mail and phone contact information)
   - *dlhostid* for every workstation on which Lustre is installed
   - Required license type for every workstation (see Determining the Licenses You Require on page 52)
   - Requested term
2. Send the form by e-mail to *me.support@autodesk.com*.
   You will receive your temporary license code within eight business hours.

To obtain license codes by telephone:

➤ Speak to a licensing representative by calling the Autodesk Licensing Department toll-free in North America at 1-800-925-6442 between 8 AM and 8 PM eastern standard time (EST). Outside of North America, call 1-514-954-7199.

Entering License Codes

Once you receive a license code, it needs to be installed and recognized by Lustre.

To install a license:

1. If the directory */usr/local/flexlm/licenses/* does not already exist, create it. Type:
   `mkdir -p /usr/local/flexlm/licenses/`
2. Create a file called *DL_license.dat* in the */usr/local/flexlm/licenses/* and open it in a text editor, such as nedit:
   `nedit /usr/local/flexlm/licenses/DL_license.dat`

   NOTE The license directory and filename are case-sensitive and must be created and named exactly as specified.
3. Copy the license code you received from Autodesk into the *DL_license.dat* file.

Starting the Application for the First Time

Once you have installed Lustre and obtained your license codes, you are ready to start the software.

To start Lustre log into the application's Linux user account and double-click the Lustre icon on the KDE desktop.

Lustre starts. The license you installed determines the type of station you are using (Lustre Master Station, Lustre HD Station or Lustre Station).

When the Lustre UI appears, you can begin working. For a new project, this includes:

- Creating the project and setting its parameters (such as logarithmic or linear colour space).
- Specifying the location of footage.
- Setting up user profiles.

NOTE For information on creating projects and users, see the chapter "Project Management" in the *Lustre User Guide*.

Configuring Slave Rendering

9

Topics in this chapter:

- Workflow for Configuring Slave Rendering on page 55
- Configuring the Slave Renderer Network Address on page 56
- Installing the Slave Renderer Software and License on page 56
- Configuring Read/Write Access to Storage from the Slave Renderer on page 57
- Mounting the Storage on the Slave Renderer on page 58
- Setting Up Lustre Projects to Use Slave Rendering on page 59

Workflow for Configuring Slave Rendering

The Slave Renderer renders modified frames when the artist moves to the next shot on the timeline from the Master Station or HD Station. With slave rendering, playback is enabled without compromising the interactivity of the Master Station or HD Station during creative sessions.

Connect the Slave Renderer to a switch on your GigE or 10-GigE house network. You can configure it to access media through NFS mount points, or using the *BrowseD* service. Using *BrowseD* is the recommended approach, as it is much faster than NFS.

See the following table for a summary of the steps necessary to configure slave rendering.

Step:	Refer to:
1. Install Linux and the Discreet Kernel Utility (DKU) on the Slave Renderer.	Installing Red Hat Enterprise Linux and Installing the DKU on page 33.
2. Connect the Slave Renderer to a switch on your house network.	The Slave Renderer section in Setting Up Your Workstation Hardware on page 9, or in the *Hardware Setup Guide* for your workstation.

Step:	Refer to:
3. Configure the network address that the Slave Renderer uses to communicate to the workstation.	Configuring the Slave Renderer Network Address on page 56.
4. Install the slave rendering software and license.	Installing the Slave Renderer Software and License on page 56.
5. If you are not using *BrowseD*, configure read/write access to storage attached to the Master or HD Station from the Slave Renderer.	Configuring Read/Write Access to Storage from the Slave Renderer on page 57.
6. If you are not using *BrowseD*, mount the storage attached to the Master or HD Station on the Slave Renderer.	Mounting the Storage on the Slave Renderer on page 58.
7. Set up the configuration file so that Lustre projects can use slave rendering.	Setting Up Lustre Projects to Use Slave Rendering on page 59.
8. Render shots as you work.	The *Autodesk Lustre User Guide*.

Configuring the Slave Renderer Network Address

After installing Linux on the Slave Render, you must configure the IP of the ethernet port that connects the Slave Render to your house network.

NOTE The address you choose must not conflict with any of the other IP addresses on the network.

In a Lustre installation in which you have not altered any of the IP addresses used by default, you can use 193.1.1.2 as the Slave Renderer IP address.

To configure the network address:

1. Start the Slave Renderer and log in as *root*.
2. Assign an IP address to the ethernet port that connects the Slave Renderer to the network switch. The IP address must be in the same IP class as your network.

   TIP Typically, your Linux workstation's TCP/IP settings are configured in the file */etc/sysconfig/network-scripts/ifcfg-eth*<port#> , where <port#> is the port used to connect the Slave Renderer to the network, or directly to the Master or HD Station. For example, if the connection is on port 0 of the onboard network card, the file you would edit would be */etc/sysconfig/network-scripts/ifcfg-eth0*.

Installing the Slave Renderer Software and License

Use the following procedures to install the Slave Renderer software and license.

To install the Slave Renderer software:

1. Start the Slave Renderer and log in as *root*.
2. If you are installing from a DVD, insert the DVD, and type the following commands to mount the disc, and to navigate to the Lustre installer directory:

   ```
   mount /mnt/cdrom
   cd /mnt/cdrom/Linux/Applications/
   ```

3. If you are installing from a downloaded *tar* file, unpack the tar file by typing:

tar zxvf <file_name>**.tar.gz**

The installation package is unpacked into a new directory. Navigate to the new directory.

4 Start the installation script by typing:

./INSTALL_LUSTRE_SLAVE

The Slave Renderer is installed.

To install the Slave Renderer license:

1 If you have not already done so, obtain a license for the Slave Renderer. You will need the *dlhostid* of the Slave Renderer. Refer to Obtaining the Host ID on page 52 and Requesting License Codes on page 53.

2 Log in to the Slave Renderer as root.

3 Create the directory for the license file. Type:

mkdir -p /usr/local/flexlm/licenses/

4 Create a file called *DL_license.dat* using a text editor such as *nedit*, and save it to the new directory. Type:

nedit /usr/local/flexlm/licenses/DL_license.dat

NOTE The license directory and filename are case-sensitive and must be created and named exactly as specified.

5 Copy the license code you received for the Slave Renderer from Autodesk to the *DL_license.dat* file.

Configuring Read/Write Access to Storage from the Slave Renderer

The storage must be exported from the Master or HD Station in order to allow read/write access. This, in turn, makes it possible for the Slave Renderer to remotely mount the storage system.

NOTE You do not need to perform the tasks in this section if you are using the *BrowseD* service with the Slave Renderer. See Using BrowseD with the Slave Renderer on page 76.

To export the storage attached to the Master or HD Station:

1 Log in to the Master Station as *root*. The storage filesystem is mounted as */mnt/StorageMedia* (for HP Z800 stations), or */mnt/md0* (for older systems).

2 Open the */etc/exports* file in *vi* by typing:

vi /etc/exports

The contents of the *exports* file appears, listing the available network shares (filesystems mountable over the network). Next, add a new line for the mount point of the storage filesystem.

3 Scroll to the end of the *exports* file using the arrow keys.

4 Press **Insert** to enter insert mode.

5 Add a new line for the mount point. For example:

/mnt/StorageMedia *(rw,no_subtree_check,async)

or

/mnt/md0 *(rw,no_subtree_check,async)

This line creates a network share for the mount point for the storage filesystem. Other users on the network will access the storage devices by mounting its network share.

6 Press **Esc** to enter command mode.

7 Save and close the file by pressing **Esc** to enter command mode, then **Shift** + **zz**.

The file is saved and you are returned to the command prompt.

8 Activate the new network share for the storage device. Type:

```
exportfs -a
```

The list of network shares is refreshed from the *exports* file.

9 Confirm the storage devices are available to be mounted by typing:

```
exportfs
```

The network shares of the Lustre Frame server appears in a list similar to the following:

```
/mnt/StorageMedia <world>
...
```

Mounting the Storage on the Slave Renderer

After you configure read and write access on the storage filesystem, you create a mount point on the Slave Renderer and configure the Slave Renderer to automatically mount that filesystem.

NOTE You do not need to perform the tasks in this section if you are using the *BrowseD* service with the Slave Renderer. See Using BrowseD with the Slave Renderer on page 76.

To create a mount point on the Slave Renderer:

1 On the Slave Renderer, log in as *root*.

2 To go to the top level directory, in a terminal, type:

```
cd /
```

3 Create a directory for the mount point. For example, type:

```
mkdir /mnt/StorageMedia
```

4 Change the permissions on this directory to allow read/write access. For example, type:

```
chmod 666 /mnt/StorageMedia
```

5 Mount the storage exported from the Master Station. For example, if the storage on the Master Station is mounted under */mnt/StorageMedia* type:

mount <Master Station>:/mnt/StorageMedia/ /mnt/StorageMedia

To configure the Slave Renderer to automatically mount the storage filesystem:

1 In a terminal, type:

```
vi /etc/fstab
```

2 Press **Insert** on the keyboard, and then add a line for the mount point you just created:

```
<IP address>:/<exported filesystem> /<mount point> nfs rw,bg,hard,intr
0 0
```

For example, type:

```
172.16.60.226:/mnt/StorageMedia /mnt/StorageMedia nfs rw,bg,hard,intr 0
0
```

NOTE Both examples are single lines.

3 Save and close the file by pressing **Esc** to enter command mode, then **Shift** + **zz**.
The file is saved and you are returned to the command prompt.

4 Restart the Slave Renderer machine.
When you restart your system, the storage filesystem mounts automatically.

Setting Up Lustre Projects to Use Slave Rendering

After you have configured the Master or HD Station and the slave rendering machine to communicate, you must:

- Configure the "HostName string=" keyword with the slave rendering machine IP address in the Slave Renderer section of the *init.config* file. See Software, Project, and User Configuration Files on page 79.
- Enable slave rendering for the project. See the Project Management chapter in the user guide.

Configuring Background Rendering

10

Topics in this chapter:

- About Background Rendering on page 61
- Background Rendering Components on page 62
- Workflow for Setting Up Background Rendering on page 63
- Sharing the Storage for Read/Write Access from Background Render Nodes on page 63
- Installing Backburner Manager and Backburner Web Monitor on page 64
- Setting Up Render Nodes on page 65
- Configuring Lustre to Detect Backburner Manager on page 71
- Specifying the Background Rendering Path in Lustre on page 71

About Background Rendering

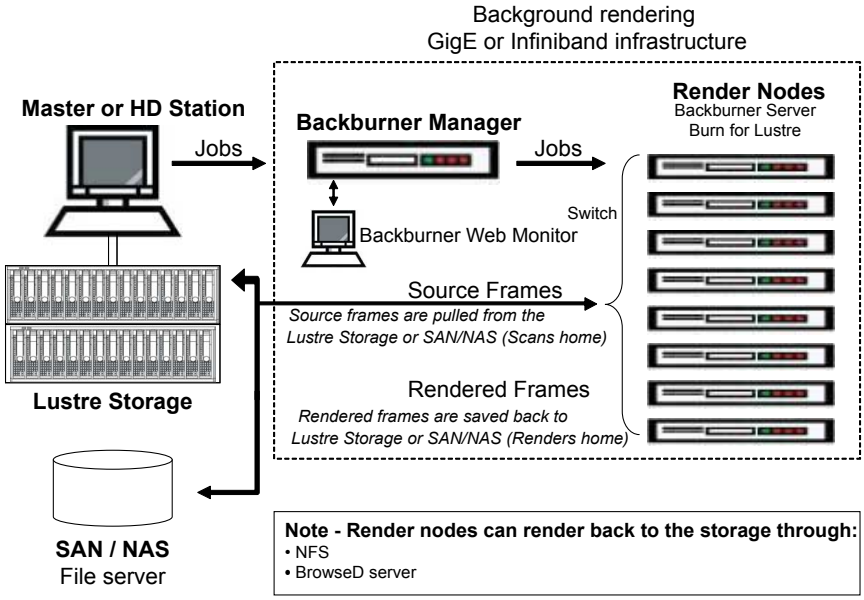
During background rendering, a shot on the timeline is rendered by a background rendering network. This is different from the Slave Renderer, which renders shots on a shot-by-shot basis as they are colour graded to enable improved playback performance.

Background rendering in Lustre is performed using Burn™ for Lustre, also known as the Lustre Background Renderer. This application is specific to Lustre and provides asynchronous background processing of Lustre render jobs. By off-loading rendering activities to remote Linux® servers, Lustre stations are freed up for interactive colour grading, while background rendering is sped up by splitting the task amongst multiple hosts.

Background Rendering Components

The components of the basic background rendering package include Lustre, a background management and monitoring application (such as Backburner™ Web Monitor, or the Backburner Monitor in Autodesk WiretapCentral™), and several render nodes running on Linux servers. The Lustre system and all background rendering nodes are connected over a dedicated background TCP/IP network. Render nodes can access media through NFS mount points, or by using the faster *BrowseD* service. Using *BrowseD* is the recommended approach. See Configuring BrowseD on page 73.

The background rendering components are illustrated as follows.



NOTE You can have up to eight render nodes on the background rendering network.

The other background rendering components are described as follows.

Lustre application This is the client application. Running on a Linux workstation, Lustre rendering jobs are submitted for background rendering through the Render | Backburner menu.

Backburner Manager This is the hub of the background rendering workgroup. Backburner Manager can reside on a Master Station or Lustre station, or can be installed on a dedicated machine in your network. When jobs are submitted from Lustre to Backburner Manager, Backburner Manager breaks each submitted job into tasks and distributes the tasks to the rendering servers on the network. To view the progress of the tasks, use Backburner Monitor.

Backburner Web Monitor This is the user interface for the Backburner rendering network. It is automatically installed with Backburner Manager, and can be accessed through a Web browser from any workstation on the network. It allows you to view and control jobs currently being processed. You can stop, restart, reorder or remove jobs completely using the Monitor. You also use Backburner Web Monitor to identify any render nodes that are not working and check the overall status of the rendering network.

Backburner Server This is a server that runs on render nodes, and is automatically installed with Burn for Lustre. Backburner Server accepts commands from Backburner Manager to start and stop rendering tasks. Backburner Server communicates through a plug-in to execute rendering tasks.

NOTE Consult the latest *Autodesk Backburner Installation Guide* and *Autodesk Backburner User Guide* for detailed information on Backburner. Use the guides to obtain Backburner information that does not relate directly to Lustre background rendering, such as details on setting up Web monitoring and troubleshooting tips.

Burn for Lustre This is the Linux rendering engine that renders one or more frames from Lustre render jobs.

Shared storage mount point This is the mount point on each Linux server that allows Burn for Lustre to transfer rendered frames/files to the Lustre storage system.

NOTE The storage does not have to be mounted on the render nodes if you are using *BrowseD* for background rendering.See Using BrowseD for Rendering with Burn for Lustre on page 76 .

Workflow for Setting Up Background Rendering

The following table outlines the general workflow for installing and configuring background rendering.

Step:	Refer to:
1. If you are not using *BrowseD*, enable sharing on the system storing the Lustre project and render files.	Sharing the Storage for Read/Write Access from Background Render Nodes on page 63.
2. Install and configure Backburner Manager and Backburner Web Monitor.	Installing Backburner Manager and Backburner Web Monitor on page 64.
3. Configure the Lustre workstation to connect to Backburner Manager.	Configuring Lustre to Detect Backburner Manager on page 71.
4. Set up the background render nodes.	Setting Up Render Nodes on page 65.
5. Specify the mount point of the background render nodes in the Lustre application.	Specifying the Background Rendering Path in Lustre on page 71.

Sharing the Storage for Read/Write Access from Background Render Nodes

In order to allow read and write access, the storage must be exported from the system to which it is connected. This makes it possible for the background rendering components on the network to remotely mount the storage system.

NOTE Skip this section if you are using the *BrowseD* service.

To make the storage system visible over the network:

1. Log in to the Lustre system (or the central storage system) as *root*. The storage filesystem is mounted as */mnt/StorageMedia*(on HP Z800 workstations) or */mnt/md0*(on older workstations).
2. Open the */etc/exports* file in a text editor, such as *vi*.

   The contents of the *exports* file appears, listing the available network shares (filesystems mountable over the network).
3. At the end of the file, add a new line for the mount point of the storage filesystem:

   `/mnt/StorageMedia *(rw,no_subtree_check,async)`

   or

   `/mnt/md0 *(rw,no_subtree_check,async)`

   This line creates a network share for the mount point of the storage filesystem. Other users on the network will access the storage devices by mounting its network share.

4 Save and close the file.

5 Activate the new network share for the storage device. Type:

exportfs -a

The list of network shares is refreshed from the *exports* file.

6 Verify the storage devices are available to be mounted by typing:

exportfs

Make sure the storage filesystem mount points are listed in the command output.

Installing Backburner Manager and Backburner Web Monitor

On Lustre stations, Backburner components are automatically installed with the Lustre software. The installer asks you if you want to run Backburner components on the station.

To avoid performance degradation, it is recommended to avoid running Backburner components on your Lustre stations, and to relocate Backburner Manager on a dedicated Linux machine in your network. Render jobs handled by Backburner can be viewed and managed in Backburner Web Monitor from any workstation on the network.

To install Backburner Manager and Backburner Web Monitor on a Linux system:

1 Open a terminal and log in as root.

2 Access the Autodesk Lustre software installation package (from a downloaded *tar* file or on DVD).

3 Install Backburner by typing:

rpm -Uvh backburner*

The Backburner components (Server, Manager and Web Monitor) are installed on the system.

4 If the system on which you are installing Backburner runs Linux in graphical mode, you are asked if you want to automatically run Backburner Manager and Backburner Server on the machine. Answer Yes to the question about the Manager, and No to the question about the Server.

5 Run the Backburner Web Monitor configuration script:

/usr/discreet/backburner/backburnerConfigWeb

The script automatically configures Backburner Web Monitor.

To verify that Backburner components are running properly:

1 On the system on which you installed Backburner Manager, as root, type:

ps -ef | grep -i backburner

The output of the command should include a line containing the path to the Backburner Manager application, similar to the following:

```
root  14989  10 Nov29 ?  00:02:36
/usr/discreet/backburner/backburnerManager
```

NOTE If Backburner Manager is not running, the Backburner log file */usr/discreet/backburner/Network/backburner.log* may be a useful source of information for troubleshooting.

2 To test that Backburner Web Monitor is installed and configured properly, open a Web browser on the Manager machine and point it to *http://localhost/backburner*.

Backburner Web Monitor opens. If you are asked for a user name and password, use *backburner* for both.

Refer to the *Autodesk Backburner Installation Guide* for detailed information on configuring Backburner.

Setting Up Render Nodes

You can set up as many as eight render nodes for background rendering with Lustre. On each system intended for background rendering, you must do the following.

Step:	Refer to:
1. Verify that the render nodes meet the minimum system requirements.	Render Node Hardware and Software Requirements on page 65.
2. Install the appropriate Red Hat operating system.	Installing Linux on Render Nodes on page 65.
3. If you are not using *BrowseD*, configure each node to mount the storage that contains the project render files.	Mounting the Storage on the Render Nodes on page 66.
4. Install Burn for Lustre.	Installing Burn for Lustre on Render Nodes on page 68.
5. Connect the render nodes to Backburner Manager.	Configuring Backburner Server to Detect Backburner Manager on page 70.
6. Start the Backburner Server on each render node.	Starting Backburner Server on page 70.

Render Node Hardware and Software Requirements

Render nodes purchased from Autodesk come with all the necessary hardware and software components preinstalled.

To use Burn for Lustre on nodes that were not purchased from Autodesk, the nodes must meet the minimum hardware and OS requirements listed in the following table.

Processor:	1 or 2 Xeon® Intel® Processor DP
Memory:	2 GB
Hard drive:	20 GB
Ethernet:	100/1000 Mbps
OS:	Red Hat Enterprise Linux 5.3 with Workstation option, customized with the Autodesk kickstart file

Installing Linux on Render Nodes

Autodesk Burn for Lustre runs under the custom 64-bit Autodesk distribution of Red Hat Enterprise Linux.

Render nodes purchased from Autodesk ship with the correct Autodesk distribution of Red Hat Enterprise Linux on DVD.

If you did not purchase your render node from Autodesk, you must get your own 64-bit distribution of Red Hat Enterprise Linux Desktop 5.3 with Workstation option, and customize it using the Autodesk kickstart file.

The kickstart is used to automatically install the packages required for Burn, some of which are not installed as part of a general installation.

This file is availabe in the Lustre installation directory. You must copy it to the DVD of your Linux distribution.

TIP The kickstart file can be used to automate the Linux installation process for multiple render nodes.

To copy the Autodesk kickstart file to the DVD of your Linux distribution:

1. On a computer running Linux and with a DVD burner, log in as root.
2. Insert the DVD of your Linux distribution into the drive. You do not need to mount it at this time.
3. In a terminal, extract an ISO image of the disc by typing:

   dd if=/dev/<optical_disc_device> **of=/**<destination path for the extracted ISO image>

   For example:

   dd if=/dev/cdrom of=/tmp/RHEL5.3.iso

   Depending on the speed of your disc drive, this command may take several minutes to complete.
4. Eject the disc.
5. Access the *dist* subdirectory of the Lustre installation package.

   The directory contains a kickstart file, *ks_centos5_rh5.cfg*, as well as a script that adds the kickstart file to an ISO image.
6. Run the *build_kickstart_cd* script to add the kickstart file to the ISO image of your Linux distribution DVD:

   ./build_kickstart_cd ks_centos5_rh5.cfg <original ISO image name> <new ISO image name>

   For example, if the ISO image you created is called */tmp/RHEL5.3.iso* and you want the new ISO image to be called */tmp/RHEL5.3_KS.iso*, type:

   ./build_kickstart_cd ks_centos5_rh5.cfg /tmp/RHEL5.3.iso /tmp/RHEL5.3_KS.iso
7. Once the new ISO image of the Linux distribution DVD is created, burn it to a blank disc using a tool such as **cdrecord**.

   NOTE Type **man cdrecord** for information about this utility.

   The new disc that you burn contains the Autodesk kickstart file and replaces the DVD in the Linux distribution.

You are now ready to install Linux on the render node. See Linux Installation Workflow on page 30.

Mounting the Storage on the Render Nodes

After Red Hat Linux is installed, you must mount the media storage on each render node using an NFS mount point.

NOTE The *BrowseD* service can also be used to allow background render nodes to access the workstation's storage. *BrowseD* allows for fast access and requires a separate license. If you are using *BrowseD* for background rendering, skip this section. See Configuring BrowseD on page 73.

Mounting the storage involves identifying the IP address of the system that manages the storage and setting a mount point on each render node that points to the correct path on the storage. Also, for this mount point to be available when you restart the system, you must add an entry in the *fstab* file.

If the system that stores the render files is different from the system that stores the Project Home directories, you need two (or more) mount points. For example, if, in the Project Setup menu, the Project Home path is **/mnt/md0/SCENES** and the Renders Full Home path is */sanserver:/RENDERS*, located on a central storage system, you must define a mount point for each path.

To mount the storage on a render node:

1. Determine the IP address of the computer that manages the storage.

   If you are using direct attached storage only, this is the IP address of the Lustre Master Station or Lustre HD Station. You must also determine the IP address of your centralized file server if you are also using a server area network (SAN) or network attached storage (NAS).

2. On the render node, log in as *root*.

3. Go to the root directory. In a terminal, type:

   ```
   cd /
   ```

4. Create a directory for the mount point. For example, type:

   ```
   mkdir /mnt/md0
   ```

   NOTE The directory name must be the same for the mount point on each node. Also, the directory should not be created in the */root* directory, but in the */mnt* directory.

5. Change the permissions on this directory to allow read/write access. For example, type:

   ```
   chmod 666 /mnt/md0
   ```

6. Set up the mount point to access the Lustre system storage or the central system storage. You must use the mount point as defined in the *Project_home* setting in the Lustre Project Setup menu. For example, if the Project Home is */mnt/md0/SCENES*, and the Linux mount point directory is named */mnt/md0*, the mount command will be:

   ```
   mount <hostname>:/mnt/md0/SCENES /mnt/md0
   ```

To add an entry in the *fstab* file:

1. Open the file */etc/fstab* in a text editor and then add a line for your new mount point:

   ```
   <IP address>:/<exported filesystem> /<mount point> nfs
   rw,bg,hard,intr,nfsvers=3 0 0
   ```

   For example, type:

   ```
   172.16.60.226:/mnt/md0 /mnt/md0 nfs rw,bg,hard,intr,nfsvers=3 0 0
   ```

   NOTE The example is a single line.

2. Save and close the file.

   The file is saved and you are returned to the command prompt.

3. Restart the render node.

   When you restart your system, this remote location will mount automatically.

Installing and Configuring Burn for Lustre on Render Nodes

Install and configure Burn for Lustre on each render node. To install and configure Burn for Lustre, you must:

- Install Burn for Lustre.
- Add the IP address of the machine where Backburner Manager is installed to the *manager.host* file on each render node.
- Start the Backburner Server on each render node.
- License Burn for Lustre.

Installing Burn for Lustre on Render Nodes

Perform the following procedure to install the Burn for Lustre software on each node.

NOTE When you install Burn for Lustre, the necessary Backburner components are also installed on the render node.

To install Burn for Lustre on a render node:

1. Open a terminal to the render node, and log in as *root*.
2. If you are installing from a Lustre DVD, insert the DVD, and type the following commands to mount the disc, and to navigate to the Lustre installer directory:

   ```
   mount /mnt/cdrom
   cd /mnt/cdrom/Linux/Applications/
   ```

3. If you are installing from a downloaded *tar* file, unpack the tar file by typing:

   ```
   tar zxvf <file_name>.tar.gz
   ```

   The installation package is unpacked into a new directory. Navigate to the new directory.
4. Start the Burn installation script by typing:

   ```
   ./INSTALL_LUSTRE_BURN
   ```

   The Burn for Lustre package is installed. For instructions on obtaining and installing a Burn license, see Licensing Burn for Lustre on page 68.
5. Repeat this procedure on all render nodes.

Licensing Burn for Lustre

You need a license for your render nodes. Burn uses a floating license scheme, which means that licenses are centralized on a license server.

The license server automatically provides a license to all registered machines.

The license server can be any of the render nodes on the rendering network.

Perform the following tasks to obtain a license code for background rendering, install the license server, and configure the license server to distribute licenses to burn nodes.

To license a Burn for Lustre network:

1. Open a terminal on the license server machine and log in as root.
2. Run the *dlhostid* utility to obtain the unique host ID of the machine. Type:

   ```
   dlhostid
   ```

A message appears that includes a line indicating the *dlhostid* of the machine. For example:

```
The Discreet host ID of this machine is
"DLHOST01=25231AEF83AD9D5E9B2FA270DF4F20B1"
```

3 Write down the *dlhostid* (including the "DLHOST01=" part).

4 Request license codes for background rendering from the Autodesk Media and Entertainment Licensing Department. See Requesting License Codes on page 53.

5 If you are installing from a Lustre DVD, insert the DVD, mount it, and navigate to the Lustre installer directory. Type:

```
mount /mnt/cdrom
cd /mnt/cdrom/Linux/Applications/
```

6 If you are installing from a downloaded *tar* file, unpack the tar file by typing:

```
tar zxvf <file_name>.tar.gz
```

The installation package is unpacked into a new directory. Navigate to the new directory.

7 Run the license server installation script by typing:

```
./INSTALL_LICSERV
```

The license server is installed.

8 Once you have received the license codes, go to the */usr/discreet/licserv/licenses/* directory, and open the *DL_license.dat* file in a text editor.

NOTE If the file does not exist, create it by typing:

```
touch /usr/discreet/licserv/licenses/DL_license.dat
```

---

9 In this file, enter all the information submitted to you by the Licensing Department upon your registration.

10 Save and close the file.

11 Start the license server by running the following command:

```
/etc/init.d/license_server start
```

NOTE The license server starts/stops automatically when the machine is booted/shut down. You can stop and restart the server manually by running one of the following commands:

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

Now that the license server is set up, configure each node to contact the server and retrieve its license. Perform the following procedure on each node.

To enable render nodes to contact the license server:

1 Log in to each render node as root.

2 Navigate to the license directory. Type:

```
cd /usr/local/flexlm/licenses/
```

3 Open the *DL_license.dat* file in a text editor.

4 In this file, copy the first three lines of the information submitted to you by the Autodesk Licensing Department upon your registration. For example:

```
SERVER burn-01 DLHOST01=25231AEF83AD9D5E9B2FA270DF4F20B1
VENDOR lustre
USE_SERVER
```

5 Save and close the file.

NOTE Each render node must be able to contact the license server. Use *ping* from each node to the license server to confirm that the machines can communicate.

Configuring Backburner Server to Detect Backburner Manager

Backburner Server needs to be able to detect the location of Backburner Manager in order to provide status information concerning the render jobs. Set the IP address of the Backburner Manager machine in the */usr/discreet/backburner/cfg/manager.host* configuration file on each render node.

NOTE You can also use the hostname of the Backburner Manager machine, if it has been properly defined in the */etc/hosts* file.

To configure Backburner Server to detect Backburner Manager:

1 On the Backburner Manager system, open a terminal and log in as root.

2 Determine which IP address the Backburner Manager workstation uses to connect to the network. Type:

```
ifconfig
```

Information about all the network adapters is displayed. The second line of the output for each adapter contains the IP address (listed as "inet addr"). For example:

```
inet addr:172.16.129.152 Bcast:172.16.135.255 Mask:255.255.248.0
```

Write down the IP address of the network adapter. If the machine has several network adapters, make sure you write down the address of the one connected to your render network.

3 On each render node, open a terminal and log in as *root*.

4 Type:

```
cd /usr/discreet/backburner/cfg
```

5 Use a text editor to edit the *manager.host* file.

6 Enter the IP address of the Backburner Manager machine. For example:

```
10.10.10.1
```

7 Save and close the file.

The file is saved and you are returned to the command prompt.

Starting Backburner Server

You must start the Backburner Server daemon on each Linux system for the first time. Once it is started the first time, the daemon will start automatically.

To start Backburner Server:

1 Log in to your Linux system as *root*.

2 In a terminal, type:

```
service backburner_server start
```

3 You can verify that Backburner Server is properly configured by checking the log file *usr/discreet/backburner/Network/backburnerServer.log*. Type:

```
tail -f /usr/discreet/backburner/Network/backburnerServer.log
```

The file should contain lines similar to the following:

```
<INF>: Loading plugin: Lustre renderer plugin
```

4 To stop viewing the file, press **Ctrl+C**.

5 Repeat these steps to start Backburner Server on each node in the background rendering network.

If you cannot start the Backburner Server, contact Autodesk Customer Support.

NOTE If you need to stop or restart Backburner Server, use one of these commands:

```
/etc/init.d/backburner_server stop
```

```
/etc/init.d/backburner_server restart
```

Configuring Lustre to Detect Backburner Manager

For Backburner Manager to receive render jobs, you must set up the Lustre application to connect to the system on which Backburner Manager is running.

To configure new projects to use background rendering, you must set the IP address of the Backburner Manager workstation in the *init.config* file.

To configure the Lustre application to detect Backburner Manager:

1 Locate the `Backburner` keyword.

2 In the `HostName` line, set the `string` parameter to the hostname or IP address of the system where Backburner Manager is installed. For example:

```
<HostName string="172.19.23.161" />
```

NOTE Do not forget the quotes.

---

3 Save and close the configuration file.

For more information on the configuration file keywords, see Software, Project, and User Configuration Files on page 79.

Specifying the Background Rendering Path in Lustre

The last step in setting up background rendering is to specify the correct mount points in the settings of each project that uses background rendering.

To add the storage path in Lustre:

1 Start Lustre.

2 In the Setup menu, click Settings.

3 Select your project in the Project drop-down list, and click Edit.

The Project Settings menu appears.

4 Click Network Rendering, then click Backburner in the Configuration section.

5 Type the location of the Project Home, Scans Full Home, Scans Half Home, Renders Full Home and Renders Half Home, as seen from the Linux render nodes. You only need to enter those locations that are defined for the project in the local project setup, located in the Setup | Project menu.

The path required in these fields is comprised of the directory defined for the mount point and the actual storage folder. For example, if the Project Home on the Lustre workstation is */mnt/md0/SCENES* in the Project Setup menu, and the mount point for the Lustre workstation storage on the Linux render nodes is */mnt/Lustre_storage*, the Project Home path to enter in this menu is:

/mnt/Lustre_storage/SCENES

6 Press **Enter**.

7 To verify that you have entered the proper path for each project, look at the project configuration file in */usr/autodesk/lustre*<application_version>*/project/*<project name>*/project.config*. The value in the burn_project_home line is sent to the render node. This value must match a mount point on the background render nodes.

For help setting up and managing projects, refer to the Lustre Help.

Configuring BrowseD

11

Topics in this chapter:

- About BrowseD on page 73
- Workflow for Configuring BrowseD on page 74
- Starting and Stopping the BrowseD Service on page 74
- Configuring Workstations to Use the BrowseD Server on page 74
- Making BrowseD Directories Accessible from the Lustre Browser on page 75
- Using BrowseD for Rendering with Burn for Lustre on page 76
- Using BrowseD with the Slave Renderer on page 76

About BrowseD

BrowseD is a Lustre file server with its own high level protocols that optimize network transfers. BrowseD provides Lustre workstations, Slave Renderers, and background render nodes with high-speed access to centralized storage.

Consider using BrowseD if your facility uses a storage area network (SAN), network attached storage (NAS), or a network file server. In these configurations, you install and configure BrowseD on the computer that is connected to the centralized storage and configure all workstations to use the BrowseD server to access Lustre project files.

The recommended Lustre configuration in a digital film or high-resolution workflow is to store the full-resolution images on a SAN, NAS, or file server, and the proxies locally. For information on configuring your projects, see the *Autodesk Lustre User Guide*.

NOTE You can run BrowseD on the Lustre Master Station or Lustre HD Station to provide render nodes or Slave Renderers high-speed access to local storage for background rendering. However, this is not recommended. The BrowseD process requires extra bandwidth from the storage and adds extra load on the host system's CPU. Real-time functionality cannot be guaranteed with this setup—2K playback speed and video input and output will not function correctly when BrowseD is running on the Lustre workstation, and is serving client requests.

Workflow for Configuring BrowseD

See the following table for a summary of the steps necessary to configure BrowseD.

Step:	Refer to:
1. Install and license BrowseD on the computer that is connected to the storage.	Installing Lustre on the Linux Workstation on page 49.
2. Start the BrowseD server.	Starting and Stopping the BrowseD Service on page 74.
3. On all machines (like the Lustre Master Station, the Lustre HD Station, the Slave Renderer, and background render nodes), configure the *init.config* file to connect to the BrowseD server.	Configuring Workstations to Use the BrowseD Server on page 74.
4. Make the remote storage accessible from the file browser on the Lustre workstations.	Making BrowseD Directories Accessible from the Lustre Browser on page 75.
5. Configure background rendering to use the BrowseD server.	Using BrowseD for Rendering with Burn for Lustre on page 76.
6. Configure the Slave Renderer to use the BrowseD server.	Using BrowseD with the Slave Renderer on page 76.

Starting and Stopping the BrowseD Service

The BrowseD service starts automatically after you install it. You can manually start the service using the command line interface. The service starts automatically whenever the computer running BrowseD restarts.

For instructions on installing and licensing BrowseD, see Installing Lustre on the Linux Workstation on page 49.

To start or stop BrowseD:

➤ In a terminal, type one of the following.

Command	Description
/etc/init.d/browsed_<version>**stop**	Stops BrowseD.
/etc/init.d/browsed_<version>**start**	Starts BrowseD.
/etc/init.d/browsed_<version>**restart**	Restarts BrowseD if it is not currently running.
/etc/init.d/browsed_<version>**condre-start**	Restarts BrowseD if it is already running.

Configuring Workstations to Use the BrowseD Server

You must configure the *init.config* file for all machines that will use the BrowseD server to access centralized storage, such as Lustre workstations, slave renderers, or Burn render nodes.

Use a text editor to edit the *init.config* file, located at */usr/autodesk/<version>*.

Use the following table as a reference when configuring the *init.config* file.

Keyword	Required values
`Username`	Enter the administrative user on the BrowseD server, for example, *root* on Linux.
`Password`	Enter the password for the administrative user as defined above.
`Port`	All computers on the BrowseD network must use the same port to communicate. Set to 1055, the default. If configuring a render node or a workstation running on a GigE network, set this as 1044. If configuring a render node or a workstation running on a high-speed InfiniBand network with the Lustre Media Server (i.e. Incinerator), set this as 1055.
`BrowsedServer`	Defines the IP address or DNS host name for a specific BrowseD Server.
`UseInfi`	Select if the networking procotol to use with Browsed is InfiniBand.

Making BrowseD Directories Accessible from the Lustre Browser

When using centralized storage, you must make the directories on the BrowseD server accessible to all Lustre workstations through the browser. You do this by configuring the `BrowsedServerGroup` keyword in the *init.config* file.

The mapped directory will appear in the Lustre browser.

Using BrowseD for Rendering with Burn for Lustre

You must configure the Lustre Render Backburner paths with the IP address of the BrowseD server to use BrowseD to render with Burn for Lustre.

For information on configuring background rendering for Lustre, see Configuring Background Rendering on page 61.

To use BrowseD for rendering with Burn for Lustre:

1. In Lustre, open the Setup menu, and select Settings.
2. Select your project from the Project list, and click Edit.
3. Click Project, and set the local project paths. For information on configuring your projects, see the *Autodesk Lustre User Guide*.
4. Click Network Rendering, and then click the Backburner tab.
5. Enter the IP address of the BrowseD server to each path, or click the ellipsis button to browse to the BrowseD path you want to use.

   For example, if your Project_Home is set to the *bernice* directory on mount point */mnt/StorageMedia* of a station that has an IP address of *172.17.20.146*, the Project_Home path in the Render > Backburner menu should read *172.17.20.146:/mnt/StorageMedia/project/bernice*.

   NOTE These path examples are specific to the Linux environment, and imply that the media frames are located on either a Lustre workstation, or on a file server which is running the Linux operating system. If you are configuring the BrowseD path to connect to a Windows system, the paths are different.

Using BrowseD with the Slave Renderer

You must configure the Lustre Slave Render paths with the IP address of the BrowseD server in order to use BrowseD with the Slave Renderer.

To use BrowseD with the Slave Renderer:

1. In Lustre, open the Setup menu, and select Settings.
2. Select your project from the Project list, and click Edit.
3. Click Project, and set the local project paths. For information on configuring your projects, see the *Autodesk Lustre User Guide*.
4. Click Network Rendering, and then click the Slave Render tab.
5. Enter the IP address of the BrowseD server to each path, or click the ellipsis button to browse to the BrowseD path you want to use.

   For example, if your Project_Home is set to the *bernice* directory on mount point */mnt/StorageMedia* of a station that has an IP address of *172.17.20.146*, the Project_Home path in the Render > Backburner menu should read *172.17.20.146:/mnt/StorageMedia/project/bernice*.

   NOTE These path examples are specific to the Linux environment, and imply that the media frames are located on either a Lustre workstation, or on a file server which is running the Linux operating system. If you are configuring the BrowseD path to connect to a Windows system, the paths are different.

Uninstalling the Application

A

Topics in this chapter:

- Using rmsoft to Uninstall your Application on page 77

Using rmsoft to Uninstall your Application

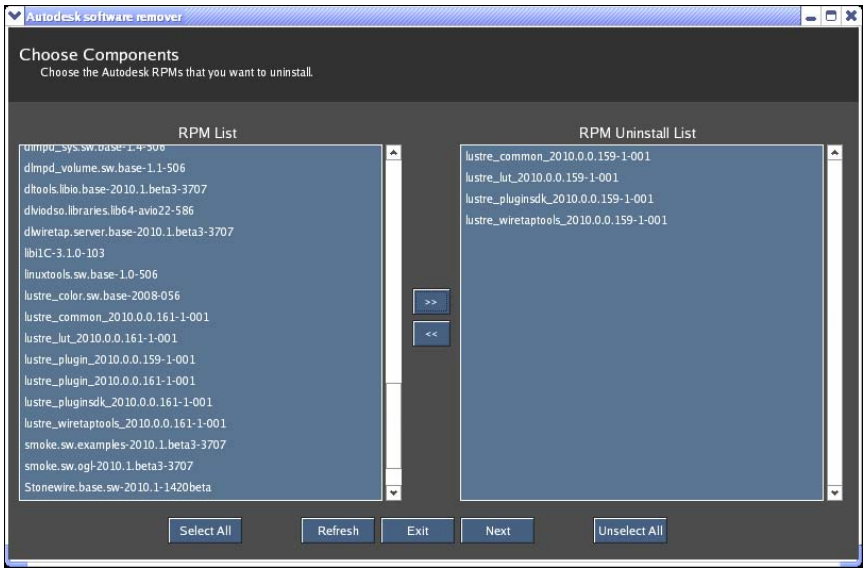
The *rmsoft* utility enables you to easily uninstall Autodesk Visual Effects and Finishing or Colour Grading applications from your workstation.

To uninstall your application using *rmsoft*:

1. If you are logged in as the application user in KDE, log out and log back into KDE as root.
2. As root, open a terminal, and type:

   `rmsoft`

   The *rmsoft* user interface appears.



3 Select the RPM packages you want to uninstall in the RPM list on the left (click Select All to select all the packages), then click  to move them to the RPM uninstall list on the right.

4 Click Next.

5 Click Uninstall & Remove to confirm the removal of the selected packages and directories.
The uninstallation starts and *rmsoft* displays details on the process.

6 When the operation completes, click Exit to close *rmsoft*.

7 Optional: You can also delete the log files associated with a given application version in the */var/log/* directory.

Software, Project, and User Configuration Files

B

Topics in this chapter:

- Configuration File Overview on page 79
- System Settings on page 80

Configuration File Overview

The configuration files define all the necessary settings Lustre needs to recognize various hardware and software settings on the Master Station or Lustre HD Station, and on the dedicated render station.

Before doing any colour correction in Lustre, you must first log into a project with a valid user profile. See the “Project Management” chapter in the *Autodesk Lustre User Guide*. When you create a user profile and project in Lustre, you are indirectly creating the *user.config*, *project.config*, and *<user>Context.config* files. However, aside from the initial system configuration in the *init.config* file that you must set before you begin working, there is no need for you to manually create or modify any of the other configuration files. All of the configuration settings are set within Lustre's user interface (refer to “System Settings” in the “Project Management” chapter of the *Autodesk Lustre User Guide*).

When you log into a particular project in Lustre for the first time, Lustre creates the *<user>Context.config* file, where *<user>* represents the user name associated with the user profile. The context file is found in the *.../projects/<project>/* directory. The context keywords include some attributes not defined in the Project or User configuration settings. They are saved and reloaded each time the context (same user and project) applies. The context settings include:

- Last scene
- Last shot
- Resolution

- Crop value
- Assemble frame rate/drop frame mode
- State of the surface control
- Audio file

The following is a list of the Lustre configuration files.

Configuration file	Default Location	Description
init.config	*/usr/autodesk/lustre2010/*	This file stores system settings as well as Wiretap servers, Slave Renderer settings, and film stock information.
login.config	*/usr/autodesk/lustre2010/*	This file records the last user and last project used so at the next session, the user and project login defaults will reflect these values.
project.config	*/usr/autodesk/projects/<project>/project.config*	This file stores project-level information including project settings, calibration, rendering, engineering, and Backburner and Wiretap settings specific to the project.
user.config	*/usr/autodesk/users/<user>/user.config*	This file stores user settings specific to a particular user, such as Autosave, printer light, GUI background/gain/gamma.
<user>Context.config	*/usr/autodesk/projects/<project>/<user>Context.config*	This file stores several settings relevant to the context of a particular user working on a particular project. The purpose of storing context-specific information is that there are some parameter settings that, by their nature, are more likely to be needed in the next session, but that are not configurable in the Project Management pages.

System Settings

Before you first log into Lustre, you must configure the system settings in the *init.config* file (refer to "Configuring System Settings" in the "Project Management" chapter of the *Autodesk Lustre User Guide*). If these system settings are not configured, Lustre uses the default system settings. The following table describes the relevant system settings that should be configured before the first login.

NOTE All keyword values are case-sensitive.

Parameter	Data type	Default	Function
<Locations>			
<MainProjectHome>	String		Location of the Project configuration settings folder.
<MainUserHome>	String		Location of the User configuration settings folder.

Parameter	Data type	Default	Function
<Wiretap>			
<ServerAuto>	State	On	Specifies whether Lustre automatically scans for Wiretap servers.
<WiretapServer> (within <WiretapServer Group>)	String	0.0.0.0	The IP address or DNS host name for a specific Wiretap server. If one or more <WiretapServer> keywords are set to valid Wiretap server addresses, Lustre lists the content of these servers in the browser before the results of the auto scan. If <ServerAuto> is set to OFF, only the specified Wiretap servers are listed in the browser.
<MonitoringAndCalibration>			
<DisplayType>	Enumerated (abstract data)	LCD	Specifies the monitor display type (e.g., LCD or CRT).
<Calibration_Steps>	Integer	10	Specifies the number of monitor calibration steps performed.
<ControlSurface>			
<AutodeskPanels>	State	On	When ON, this keyword enables the Autodesk Control Surface (ACS). When OFF, Lustre enables the Tangent CP100 control surface (if applicable). You must also set the path for the control surface rules file in the Panel Setup File field (refer to "System & Menu Settings" in the "Project Management" chapter of the *Autodesk Lustre User Guide*).
<PanelIDs>		function="0" grading="0" navigation="0"	The ID numbers for the Function, Navigation, and Grading panels of the ACS. You must manually configure these keywords. If your control surface is a Tangent CP100, Lustre does not use these keywords.
<PanelIPTags>		function="101" grading="100" navigation="102"	
<Browsed>			
<Port>	Integer	1055	All computers on the *BrowseD* network must use the same port to communicate. **NOTE** For Linux over IP, set the port value to 1044.
<Username>	String	root	Administrative user on the *BrowseD* server.

Parameter	Data type	Default	Function
<Password>	String	xxx	Password for the administrative user. **NOTE** To encrypt the password, set the attribute `toEncrypt` to *yes*. The next time the application starts, the password string is encrypted in the configuration file.
<UseInfi>	State	Off	Switch to ON if the networking protocol to use with *BrowseD* is the InfiniBand.
<ReadCacheBuffer Num>	Integer	0	
<ReadCacheThread Num>	Integer	0	
<BrowsedServer> (within <BrowsedServer Group>)	String	0.0.0.0	Defines the IP address or DNS host name for a specific *BrowseD* server.
<SlaveRenderer>			
<HostName>	String		The IP address or DNS host name for a specific Slave Renderer machine.
<Timeout>	Integer	5000	Sets the timeout duration (in milli-seconds) of the automatic Slave Renderer detection.
<Backburner>			
<Hostname>	String		The IP address or DNS host name for a specific Backburner Manager machine.
<MatchCustomGroup>			
<MatchCustom>	Name	"AliasName" type="s"	Specifies the XML metadata field to be used by the Custom match option selected from the Browse menu. "s" represents string.
<MatchCustom>	Name	"DPXTimeCode" type="tc"	"tc" represents timecode.
<MatchCustom>	Name	"DPXkeycode" type="kk"	"kk" represents keycode.
<MatchCustom>	Name	"DPXTapeNAME" type="s"	"s" represents string.
<MatchCustom>	Name	"EDLReelName" type="s"	"s" represents string.
<MatchCustom>	Name	"DL_EDLClip_ name" type="s"	"s" represents string.
<MatchCustom>	Name	"DL_edlFrameID" type="i"	"i" represents integer.
<MatchCustom>	Name	"DLEDL_startTC" type="tc"	"tc" represents timecode.

Parameter	Data type	Default	Function
<AVIO>			
<PlayoutHighSpeed>	State	Off	When OFF, it refreshes the Player as you are performing a playout. When ON, the Player is no longer refreshed and therefore the performance of the playout improves.
<WTTFirstSDLeadIn Correction>	Integer	1	Sets the delay for the SD first lead-in.
<WTTSubsequentSD LeadInCorrection>	Integer	2	Delays all the lead-ins following the SD first shot.
<WTTSDLeadIn Increment>	Integer	0	Corrects the delay after the SD third shot.
<WTTFirstHDLeadIn Correction>	Integer	0	Sets the delay for the HD first lead-in.
<WTTSubsequentHD LeadInCorrection>	Integer	0	Delays all the lead-ins following the HD first shot.
<WTTHDLeadIn Increment>	Integer	0	Corrects the delay after the HD third shot.
<VtrTCTD>	Integer	10	The TimeCode Transition Delay specifies the number of milliseconds the application waits before asking for timecode from the VTR. The default value of 10ms works for most decks. For HDCAM-SR decks use the following values: ■ 14, for 1080/59i/60 or 720/50/59/60 ■ 21 for other timings
<Miscellaneous>			
<DisablePanScan Frame>	State	On	
<NVidiaSDISync>	State	Off	
<NVidiaPlayoutDelay>	Integer	0	
<BlockSize>	Integer	2048	
<AudioResyncTime>	Float	-1	
<LoadingSetup>	Integer	0	
<EnableKeykode Sending>	Enumerated (abstract data)	Off	
<LoginGUIGain>	Float	1.0	
<LoginGUIGamma>	Float	1.0	
<ClusterPlayDelay>	Integer	0	Available for Incinerator only.
<ClusterSmooth Playback>	State	Off	Available for Incinerator only.

Parameter	Data type	Default	Function
<ChangeCutOffset>	State	On	Allows the change cut or match grade feature to preserve the keyframe animations based on therecord timecode whenever a shothas been replaced or moved withina timeline. **NOTE** Be sure to enable only the Record button within the Match Option when performing a change cut or match grade.
<AnimCopy_UsingTrimOffset_Off>	State	On	
<PreallocEnable>	State	Off	Allows Burn rendering from a Lustre Windows workstation to use CXFS SAN preallocation.
<FirstFrameNumber>	Integer	On	
<StartShotFrameNumber>	Integer	On	
<DefaultDelivrablePanScanFilter>	Enumerated (abstract data)	Fast	Possible values are: ■ **Fast** (Lanczos2 filter) ■ **Quality** (Lanczos2 filter) ■ **Custom** (BSpline filter)
<Debug>			
<DumpDLEDLPath>	String		Path to place the contents of a DLEDL when it is loaded in the timeline or Shot bin.
<DumpWiretapCreate Clip>	State	Off	When ON, the attributes of a Wiretap clip are placed into a log file each time a clip is created on a Wiretap server. The file *WiretapClipDump.log* is located in the Lustre home folder. Use this keyword for debugging only.
<FilmTypeGroup>			
<FilmType>	Name		Various film types for AGFA, Kodak™, Eastman, and Fuji emulsions. It defines the relationship between the DPX film emulsion code and the DPX film code number.

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