Avid Unity™ MediaNet

System Overview

Release 2.0

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Using This Guide

Congratulations on your purchase of MediaNet, the high-performance, high-capacity shared media storage platform for a workgroup of connected Avid® clients.

Who Should Use This Guide

This overview guide is intended for administrators responsible for the operation and management of a MediaNet workgroup.

About This Guide

This book provides a high-level overview of MediaNet:

- Chapter 1 introduces MediaNet architecture, dataflow and software.
- Chapter 2 provides hardware details for the MediaNet components.

Symbols and Conventions

The MediaNet documentation uses the following special symbols and conventions:

1. Numbered lists, when order is important.
    a. Alphabetical lists, when the order of secondary items is important.

- Bulleted lists, when the order of the items is unimportant.
    - Indented dashed lists, when the order of subtopics is unimportant.

A note provides important related information, reminders, recommendations, and strong suggestions.

A caution means that a specific action you take could cause harm to your computer or cause you to lose data.

If You Need Help

If you are having trouble using MediaNet, you should:

1. Retry the action, carefully following the instructions given for that task in your MediaNet documentation.
2. Check the Avid Unity MediaNet Troubleshooting Guide for common MediaNet issues.
3. Check the documentation that came with your hardware for maintenance or hardware-related issues.

4. Check the release notes supplied with your Avid application for information on accessing the Avid Web site and the Avid Knowledge Center.
5. For customer support, contact your local Avid Reseller, or contact Avid Customer Support directly:
    - Broadcast customers — call 800-NEWS-DNG (639-7364).
    - Postproduction customers — call 800-800-AVID (2843).

Related Information

The following documents provide more information about MediaNet:

- *Avid Unity MediaNet Management Guide*
- *Avid Unity MediaNet Troubleshooting Guide*
- *Avid Unity MediaNet Supported Configurations Guide*
- *Avid Unity MediaNet Setup Guide*
- *Avid Unity MediaNet for Windows Clients Setup Guide*
- *Avid Unity MediaNet for Windows Clients Quick Start Card*
- *Avid Unity MediaNet for Macintosh Clients Setup Guide*
- *Avid Unity MediaNet for Macintosh Clients Quick Start Card*
- *Avid Unity MediaNet Upgrade Notes*
- *Avid Unity MediaNet Release Notes*

MediaNet also has online Help systems that provide complete information about using the Setup Manager, the Administration Tool, and the Monitor Tool.

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CHAPTER 1

System Overview

MediaNet is a high-performance, high-capacity shared media storage platform for a workgroup of connected MediaNet clients.

This chapter provides an overview of MediaNet, including:

- MediaNet Architecture
- MediaNet Storage Overview
- Typical Dataflow
- MediaNet Software

MediaNet Architecture

The MediaNet components enable multiple MediaNet clients to:

- Connect to a set of shared drives (collectively called the MediaNet Storage *drive set*)
- Record, play, and edit video and audio media

Multiple clients can access the data stored on the MediaNet drive set simultaneously.

Figure 1-1 shows the MediaNet components.

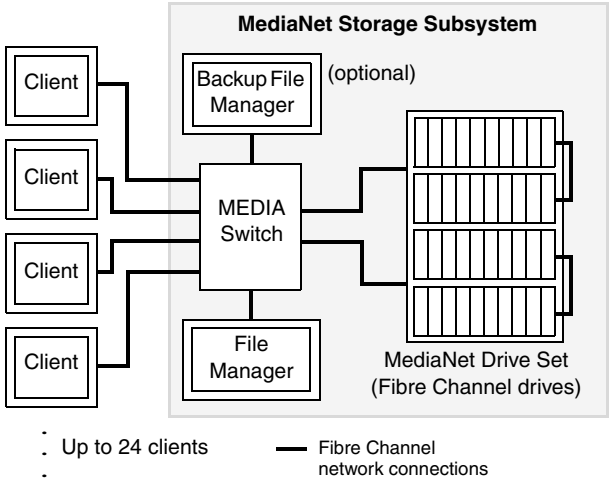


Figure 1-1 MediaNet Architecture

The following sections describe the functions of each MediaNet component. Hardware specifics for each of the components are covered in Chapter 2.

MediaNet Clients

A MediaNet workgroup supports up to 24 MediaNet clients connected to the File Manager through the Fibre Channel network. Clients may be Macintosh®, Windows NT®, or Windows® 2000 systems.

Accessing Data on the Drive Set

To access data on the drive set, a MediaNet client passes a file request to the File Manager. The File Manager returns the requested file's location information to the client, enabling the client to access the data from the drive set directly. This process avoids creating a bottleneck at the File Manager.

Avid Composer Products Software

MediaNet clients run any of a variety of Avid applications, collectively called the "Avid Composer Products software." Avid Composer Products software on Macintosh systems may include Media Composer®, Film Composer®, Avid Media Station, Avid Xpress™, and Digidesign® Pro Tools®.

Avid Composer Products software on Windows NT and Windows 2000 operating systems may include Avid Symphony™, Media Composer, Film Composer, Avid Xpress, and NewsCutter® XP.

In addition to these software products, MediaNet clients also support MediaManager, TransferManager, and other Avid-supplied utilities. MediaManager allows you to search, catalog and manage the assets currently stored on MediaNet. TransferManager allows you to package the elements of an Avid sequence and send them to another client system, another MediaNet system or a playback device.

MediaNet Storage Subsystem

The MediaNet storage subsystem is responsible for storing, retrieving, and managing all data, and consists of the following three components:

- MEDIASwitch and Fibre Channel network
- File Manager and an optional second File Manager
- MediaNet drive set

MEDIASwitch and Fibre Channel Network

The Fibre Channel network is a high-bandwidth network that supports the high throughput required to allow multiple MediaNet clients to share video and audio files simultaneously. The MEDIASwitch provides the backbone for the network and directs communications among the MediaNet clients, the File Manager, and the MediaNet drive set.

File Manager and Backup File Manager

The File Manager is an X86-compatible computer running the Windows NT Workstation operating system. The File Manager controls all data access to the MediaNet drive set. It handles requests from MediaNet clients by directing the clients to the appropriate storage locations on the drive set. The File Manager accomplishes this task by caching a complete set of file system metadata in memory.

Once the File Manager provides a MediaNet client with a storage location, the actual data transfer operation occurs directly between the client and the storage, so the File Manager does not form a bottleneck.

In addition to the active File Manager, another computer can be set up as a second File Manager to provide system redundancy. The second File Manager automatically replaces the active File Manager if it goes offline for any reason.

MediaNet Drive Set

The MediaNet drive set consists of a collection of Fibre Channel disk drives enclosed in one or more rack-mountable MEDIArray™ enclosures. MEDIArray enclosures can be connected to the MEDIASwitch individually or they can be daisy-chained in sets of two to four enclosures to reduce the number of connections they require to the switch.

The MediaNet drive set is managed as a single virtual unit by the File Manager, which greatly simplifies storage management. For more details on the physical and logical organization of the MediaNet drive set, see "MediaNet Storage Overview" on page 1-5.

MediaNet Storage Overview

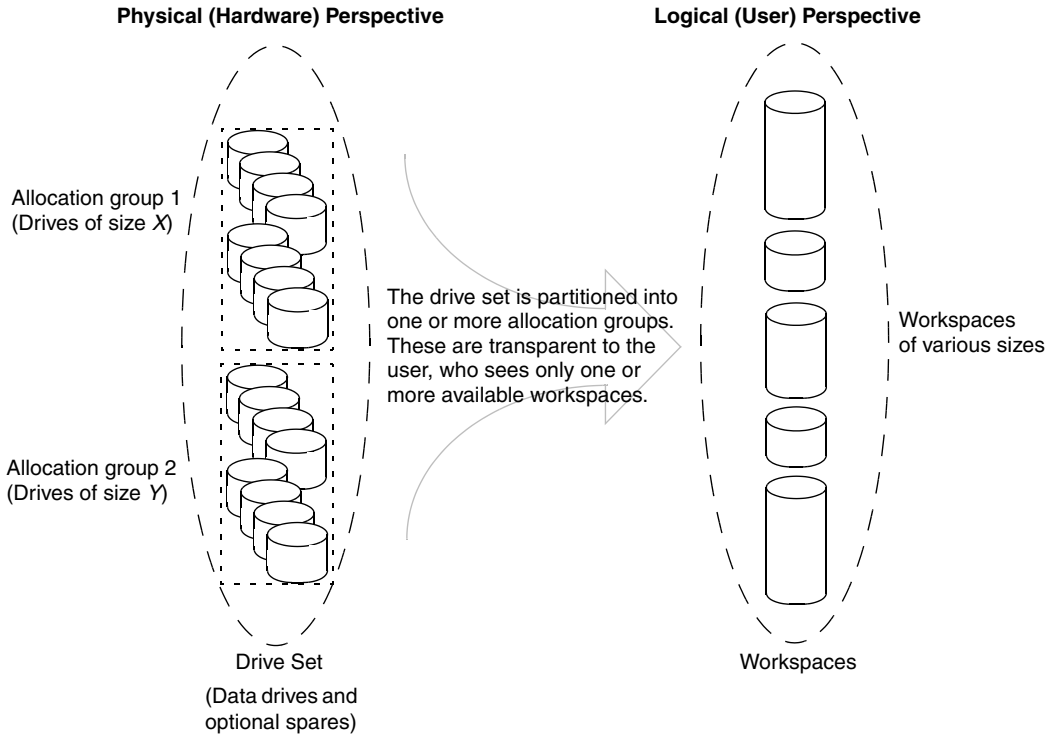
MediaNet organizes the management of your storage hardware by combining all of your physical data drives into a *drive set* that provides a single, large file system.

To use the MediaNet file system, you must first assign all data drives in the drive set into *allocation groups* —individually managed file system partitions that span multiple physical drives. Allocation groups must contain a minimum of four data drives, all of the same size. You can use multiple allocation groups to accommodate drives of different sizes, to optimize performance, or to improve data security.

Each allocation group is subdivided into one or more virtual volumes, or *workspaces*. These workspaces are similar to network drives and are made available to MediaNet clients for mounting (the drive set and allocation groups are transparent to client users). Access to MediaNet storage is controlled by means of user accounts with read access, write access, or both that are specified for each workspace.

Workspaces can be resized at any time, within certain limitations (see the *Avid Unity MediaNet Management Guide* for information on resizing workspaces).

The following diagram illustrates the relationship among drive sets, allocation groups, and workspaces.



Protection

Data integrity can be ensured by optionally *protecting* workspaces. Protection involves a redundant configuration in which files written to protected workspaces are duplicated on more than one drive. This allows a protected workspace to be quickly repaired with no data loss if a drive fails. A protected workspace uses twice as much storage space as an unprotected workspace.

Spare Drives

The MediaNet drive set may also include spare drives that can be swapped for bad data drives in the event of a drive failure.

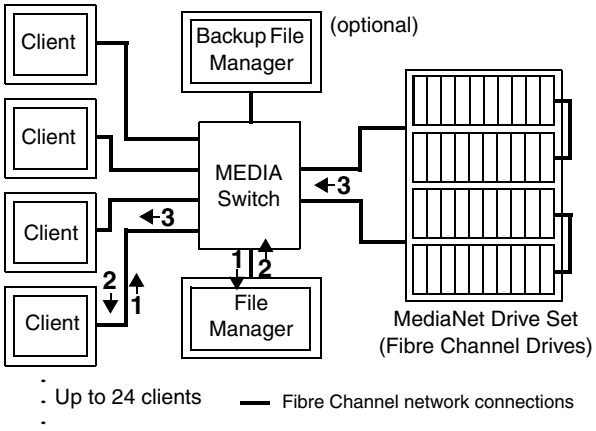
MediaNet from the User's Perspective

MediaNet clients mount workspaces through the Network Neighborhood, in Windows clients, or the Chooser, on Macintosh clients.

Multiple MediaNet clients can be connected to the same workspace concurrently. This allows multiple clients to access the same media and to start using it after it has been written to a workspace.

Typical Dataflow

The following diagram traces the flow of data from a MediaNet client request through to data retrieval. Each of the numbered steps in the diagram is described in more detail following the illustration.



1. The MediaNet client issues a request to the File Manager through the MEDIASwitch.
2. The File Manager locates the requested file in its cached copy of the file system metadata and passes its location information back to the MediaNet client.
3. Using the location information it received from the File Manager, the client retrieves the data it needs from the drive set, through the MEDIASwitch.

After the MediaNet client has received the location information, the File Manager is no longer involved and the client retrieves the data directly from the drive set. This process avoids creating a bottleneck at the File Manager.

All requests and responses between the MediaNet clients and the File Manager are handled through a messaging mechanism. When a client makes a request, the request is stored as a message on the File Manager. The File Manager polls for request messages at regular intervals. When the File Manager finds a request, it processes a response and stores it as a message. MediaNet clients poll for response messages and retrieve the message information accordingly. Unlike the File Manager, MediaNet clients only poll when they are expecting responses. The entire process of data retrieval takes less than one second.

MediaNet Software

MediaNet provides three tools to help you set up and manage your MediaNet workgroup.

Setup Manager

You use the Setup Manager to perform storage hardware management tasks such as creating and managing a drive set, starting and stopping the File Manager service, and performing drive maintenance. The Setup Manager runs only on the File Manager computer.

Administration Tool

The Administration Tool is the primary tool for initial setup and day-to-day administration of allocation groups, workspaces, and users. It also allows you to monitor storage activity.

You can run the Administration Tool from the File Manager or from any MediaNet client, in which case it communicates with the File Manager through the Fibre Channel network. You should run only one instance of the Administration Tool at any given time.

Monitor Tool

The Monitor Tool provides low-level performance-monitoring functions. You can also use the Monitor Tool to start and stop the File Manager service and to set some advanced MediaNet features, such as resetting the administrator's password. The Monitor Tool runs only on the File Manager computer.

The Avid Unity MediaNet Management Guide *provides detailed information on using each of these tools. In addition, each tool has its own help system.*

CHAPTER 2

MediaNet Hardware

This chapter provides hardware details for the MediaNet components. For more information on component functionality, see Chapter 1, "System Overview."

This chapter includes:

- Hardware Overview
- File Manager and Backup File Manager
- MediaNet Clients
- Fibre Channel Adapter Boards
- MEDIASwitch
- MEDIArray Drive Enclosures
- Keyboard/Monitor/Mouse Assembly (Optional)
- Keyboard/Video/Mouse Switch (Optional)
- Ethernet Hub (Optional)
- Uninterruptible Power Supplies (Optional)

Hardware Overview

A MediaNet workgroup contains a number of interconnected components, customized to the needs of the organization using it. A typical MediaNet workgroup contains:

- One Windows NT system that functions as the File Manager
- An optional second Windows NT system that functions as a backup to the active File Manager
- One Fibre Channel adapter board each for the File Manager and the backup File Manager
- One MediaNet client kit for each client, containing a Fibre Channel adapter board, client software, and user documentation
- One or two MEDIASwitches for connecting the File Manager and the MediaNet clients to the storage subsystem
- One or more MEDIArray drive enclosures that contain the disk drives
- One keyboard/monitor/mouse unit to control the File Manager and the clients (optional)
- One keyboard/video/mouse switch (optional)
- An Ethernet hub (optional) to connect the File Manager to the MEDIASwitch
- Several uninterruptible power supplies (UPS) to manage power to the File Manager and the MediaNet storage (optional)

Be careful not to lose the application key that came with your Avid Composer Products software. Your MediaNet clients will not function without it. If you lose the application key, you must purchase another one from Avid.

Client systems are not supplied as part of the MediaNet package. They must be purchased separately.

File Manager and Backup File Manager

The File Manager is a rack-mountable, dual-processor computer running the Windows NT Workstation operating system.

The File Manager maintains the storage location information for the drive set by caching a complete set of file system metadata in memory. To ensure the integrity of this metadata, the File Manager uses error-correcting (ECC) memory and periodically writes three complete copies of the metadata to multiple drives in the storage subsystem. The metadata is also written to the drive set when the File Manager service is shut down.

In addition to the active File Manager, another computer can be set up as a second File Manager to automatically pick up for the active File Manager if it goes offline for any reason.

MediaNet Clients

A MediaNet workgroup supports up to 24 MediaNet clients. Clients may be Macintosh, Windows NT or Windows 2000 systems. MediaNet clients run a variety of Avid applications, collectively known as the *Avid Composer Products software*.

Avid Composer Products software for Windows NT requires Windows NT Workstation Version 4.0 with Service Pack 5 or 6a. Avid Composer Products software for Windows 2000 requires Windows 2000 Professional with Service Pack 1.

Macintosh clients have a greater variety of configurations than Windows clients. Each version of Avid Composer Products software has a specific Macintosh configuration that it runs on. These configurations use either a Power Macintosh® 9500, 9600, G3, or G4. Processor speeds and Mac OS versions are also dictated by the version of Avid Composer Products software you are running.

For complete details on the Macintosh configuration requirements for each version of Avid Composer Products software, see the *Avid Unity MediaNet Release Notes* for the products you have.

Fibre Channel Adapter Boards

The File Manager and each MediaNet client are each equipped with a Fibre Channel adapter board to connect to the Fibre Channel network.

The File Manager's Fibre Channel adapter board allows it to connect to the storage subsystem, access the Fibre Channel drives, and manage and maintain the file system on the drives through the MEDIASwitch. The MediaNet clients' adapter boards allows them access to the storage subsystem and the File Manager through the MEDIASwitch.

MEDIASwitch

The heart of a MediaNet workgroup is the MEDIASwitch. The switch allows you to connect the File Manager, multiple MediaNet clients, and up to ten drive enclosures (either individually or in groups of two to four daisy-chained enclosures) together. MEDIASwitches can have either eight ports or sixteen ports, and MediaNet workgroups can have one or two switches.

Each MEDIASwitch isolates its ports, treating each port as an individual Fibre Channel Arbitrated Loop (FC-AL). This isolation localizes loop initialization events (adding or removing clients, or client restarts) to a particular port. This isolation also increases the stability of the Fibre Channel environment.

All of the connections and indicators are on the back of the MEDIASwitch. Figure 2-1 and Figure 2-2 show the back panel connectors and status indicators for the 8-port and 16-port MEDIASwitches, respectively.

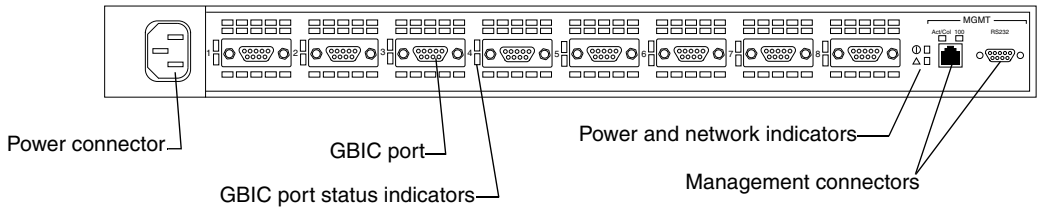


Figure 2-1 8-Port MEDIASwitch

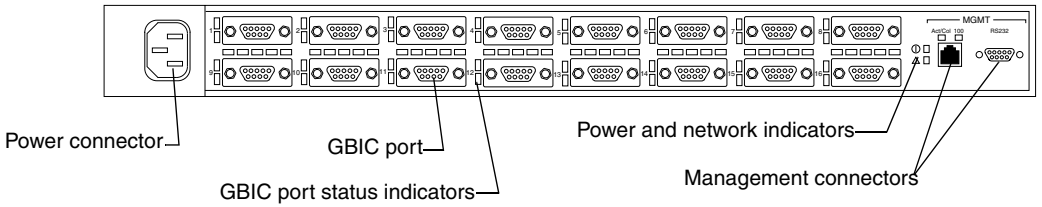


Figure 2-2 16-Port MEDIASwitch

Each MEDIASwitch port uses a Gigabit Interface Converter (GBIC) to connect either copper cable or optical cable to the MEDIASwitch (see Figure 2-3). The GBICs are removable so that your MEDIASwitch can be quickly reconfigured to support any combination of copper and optical cable connections. The front of the copper GBIC has a 9-pin connector. The front of the optical GBIC has two square connectors, one for the transmit cable and one for the receive cable.

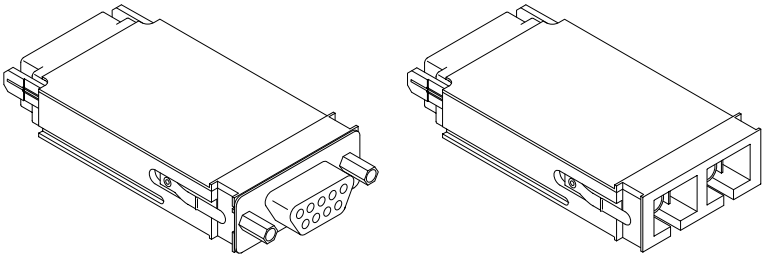


Figure 2-3 Gigabit Interface Connectors

MEDIArray Drive Enclosures

The MEDIArray drive enclosures hold the drives in the MediaNet drive set. Each storage subsystem has at least one drive enclosure. You can connect up to ten drive enclosures together to expand the capacity of the storage subsystem. Each enclosure contains:

- Up to ten drives.

Drives can be reserved as spares to use for replacements if drive problems arise.

- One link control card (LCC). The LCC supports and controls the Fibre Channel Arbitrated Loop (FC-AL), and monitors the enclosure environment. A second LCC is available, and may be required, to support some configurations.
- Two power supplies. Each power supply can support a fully configured drive enclosure. The two power supplies provide automatic power redundancy should one of the power supplies fail.

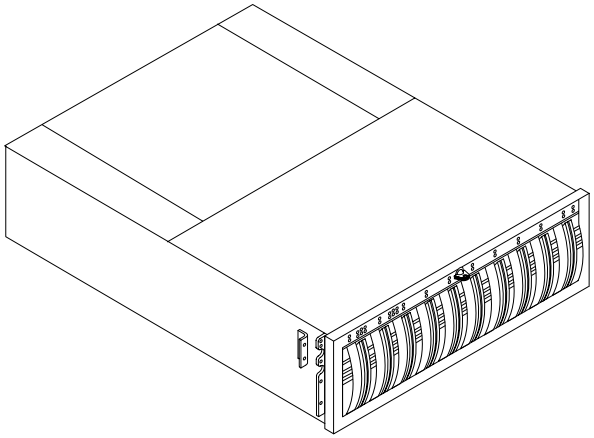


Figure 2-4 10-Slot Rack-Mount Drive Enclosure

Keyboard/Monitor/Mouse Assembly (Optional)

The keyboard/monitor/mouse assembly provides a convenient 1U keyboard, monitor, and mouse control for whichever computer is currently selected by the keyboard/video/mouse switch. This assembly eliminates the need for multiple keyboards, monitors, and mice and allows you to save on rack space.

Keyboard/Video/Mouse Switch (Optional)

The keyboard/video/mouse switch allows you to control the File Manager and any other computers racked with the File Manager using one keyboard, monitor, and mouse. You can switch from computer to computer using the touchpad on the front of the keyboard/video/mouse switch or from a keyboard.

Ethernet Hub (Optional)

You use the Ethernet hub to connect the File Manager, the second File Manager, and the MEDIASwitch together. This allows you to manage the switches from either File Manager. The cables used are standard Category 5 Ethernet cables.

Uninterruptible Power Supplies (Optional)

Uninterruptible power supplies (UPSs) provide power protection when there is a brownout, a power dip or spike, or a power outage. They shut down the File Manager software and the MediaNet storage after approximately one minute of power interruption.

Avid recommends the use of UPSs to protect the clients from potential data loss if a brownout or power outage occurs. UPSs must be purchased separately.