

# Palladium Media Server



LIVE  
PRODUCTION



EDITING



CONTENT  
DELIVERY



NEWS  
PRODUCTION



SPORTS  
ANALYSIS



OEM  
DEVELOPER



Isolated islands. Incompatible formats. Tape-intensive workflows. Broadcasters clamor for better ways to work. From news production to editing to graphics and ingest/payout, only a universal networked platform can provide efficient workflows with minimum headcount.

Pinnacle Systems pioneered IT-based networked media solutions for the broadcaster. Our Emmy® award winning IT media technologies are deployed at hundreds of leading broadcasters on six continents. Isolated islands of graphics or editing or ingest/payout are distant memories. Our customers are demanding more and we are delivering some of the most advanced networked media solutions based on one universal media server infrastructure: Palladium™.

The Palladium Media Server (PAMS) uses a familiar client-server architecture allowing all client-side applications to access high-availability shared storage with guaranteed quality of service. Broadcasters can share content between many applications regardless of format, including SD, HD, MPEG-2, DV, MXF, IMX and more. And since PAMS is media format independent, the storage and networking infrastructure is ready for emerging MPEG-4 formats like H.264 and Windows® Media Services.

The Palladium Media Server was designed for application workflows of all kinds. Pinnacle also offers standalone solutions to meet your requirements. All networked clients work in standalone mode with access to networked file import/export as needed.

## Palladium Media Server Benefits

### Scalable Shared Storage

All attached clients have instant, direct-to-disk access, eliminating tedious file transfers or output to tape. Scale from a few clients to hundreds.

### Choice of Flexible Client Applications

Mix and match ingest/payout, edit and graphics applications to meet your exact workflow needs. PAMS offers unprecedented flexibility to craft compelling media workflows tied to award-winning Pinnacle editing, news, graphics and payout solutions.

### No Single Point of Failure (NSPOF)

Critical components of the storage system, file system, and metadata registry are mirrored. In the rare event a hardware component fails, Pinnacle's exclusive Instant

Failover kicks into gear without glitching of any kind. Competing systems can take several minutes to reconfigure and switchover. Palladium offers bulletproof media delivery and Pinnacle has massive installations worldwide to prove it.

### Universal Media Support with MXF

Palladium is your universal media server, and the first to ship with native MXF support. Compressed MPEG, DV, SD, HD and multi-track audio formats let you select the right codec for the application. High speed file import/export using the Palladium Media Gateway and Palladium Exchange underscores Pinnacle's open systems commitment to interoperability with legacy third-party NLEs and servers that are part of your existing infrastructure. Pinnacle

can even import files from Avid®, Apple QuickTime® and Final Cut Pro® media as well as produce common web media streaming formats like Windows Media 9 for browsing.

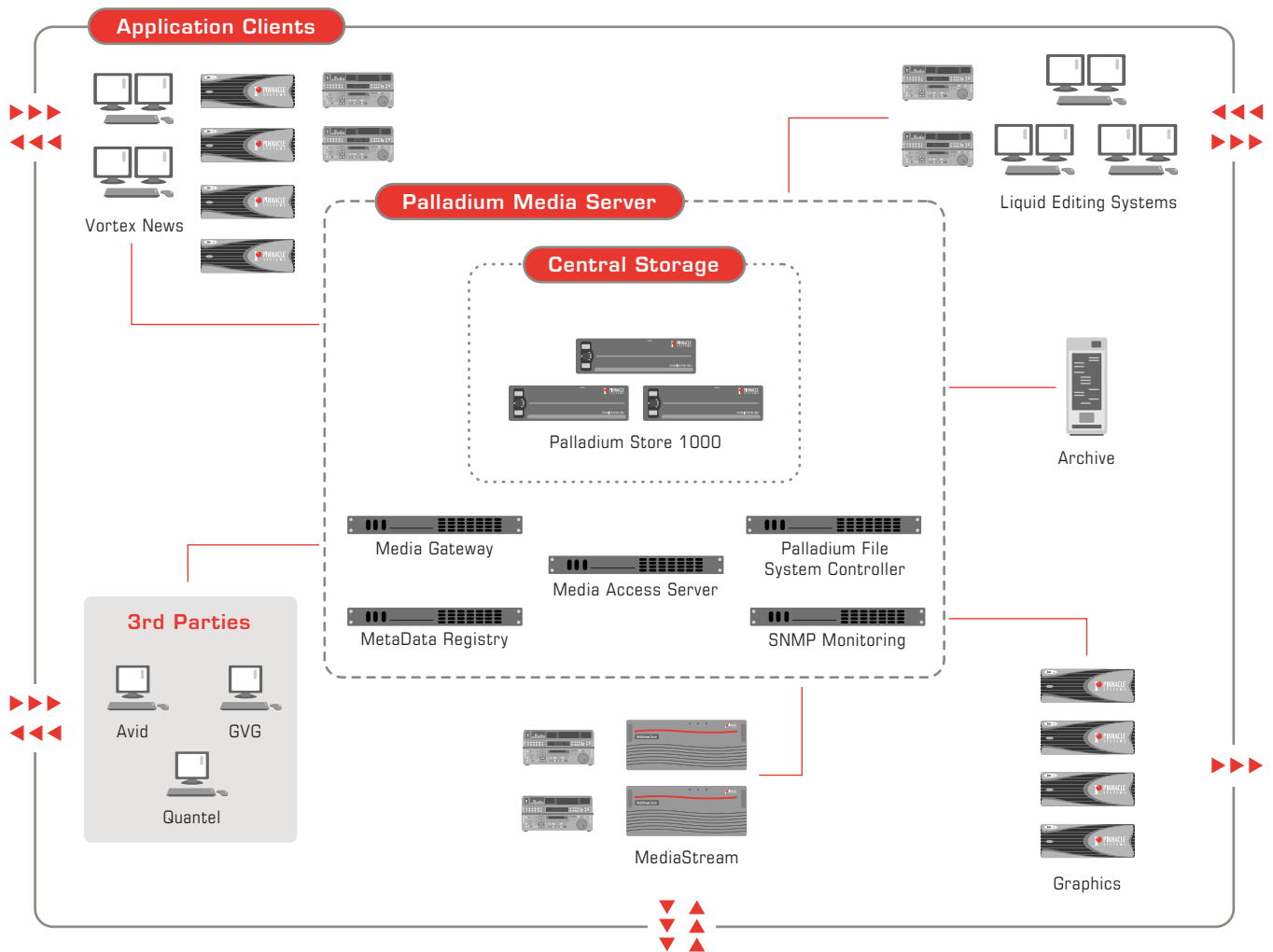
### Content Management and Global Automation Integration

Attached clients have access to Palladium XML metadata. The Palladium Registry has an open and proven API allowing partners such as archive and automation developers to integrate into the Palladium infrastructure.

### Supportability Through System Wide Monitoring

Palladium Works monitors individual components using the Simple Network Management Protocol (SNMP).

## Palladium Media Server Workflow



## Palladium Definitions: Core Storage and Server Components

### Palladium Store

- Fault Tolerant, Robust, Scalable Storage from 1 to 100 TB
- Both NAS and SAN Configurations Available
- Available as PS100, PS1000, and PS5000

### Media Access Server (MAS)

- Ethernet to Fibre Channel Interface with Bandwidth Management for Attached Clients

### Palladium File System

- Fault-Tolerant Windows® Compliant File System Optimized for High-Performance Video and Audio Ingest, Edit, and Playback
- Legendary Reliability for 24/7 Environments with Glitch-free Instant Failover

### Palladium Attach

- Installable Palladium File System for Direct-Attach Third-party Applications

### Metadata Registry

- Central Metadata Library (Used Primarily in News-related Applications)

### Palladium Works

- System-wide Monitoring (SNMP) for Palladium Components

### Palladium Media Gateway

- High Speed FTP Gateway for News, Editing and On-air Applications that Simplifies External Gigabit Ethernet to SAN Storage Configurations

### Palladium Exchange

- Import/Export File Exchange Between Pinnacle and a Wide Range of Third-party Devices, Including Video Servers, NLE's and Archival Tape

# Palladium Store 100, 1000, & 5000



## Palladium Store 100

- Self Contained System
- Built-in Media Access Server
- MAS Protocol for Increased Network Bandwidth
- 144 Hours of DV25 Storage
- 600 Mb/s Bandwidth
- Up to 20 Simultaneous DV25 User Streams
- Up to 100 MPEG-1 Proxy Streams
- RAID 0
- Isolated Loop Disk Control

## Palladium Store 1000

- Scalable from 1 TB to 16 TB
- Up to 2400 Mb/s Bandwidth
- Uses Palladium SAN File System
- Dual RAID 3 Controllers (Hot Swappable)
- Dual Power Supplies (Hot Swappable)
- Dual Fan Module (Hot Swappable)
- Isolated Loop Disk Control
- Media Certified Disks (Hot Swappable)

## Palladium Store 5000

- Scalable from 50 TB to 180 TB
- Up to 6000 Mb/s Bandwidth
- Uses Palladium SAN File System
- High Speed Fibre Channel Disks
- Mirrored Array Configuration
- RAID 3



Image Courtesy of Sveriges UtbildningsRadio AB



Image Courtesy of Sveriges UtbildningsRadio AB

## Palladium Store

Palladium Store is a series of shared storage solutions designed for the demands of video broadcast and production. Pinnacle Systems offers solutions for small post production workgroups all the way to the largest networked news operations. Each system is designed to deliver the highest level of performance and mission-critical reliability at an attractive total cost of ownership.

Palladium Store systems have been qualified with DV25, DV50, MPEG I-Frame 50/IMX, Long GOP MPEG-2, High Definition 1080i/720p 4:2:2 and 4:2:0 MPEG HD, and MXF wrapped files. Media can be imported from the Sony eVTR and optical disk recorders.

## Palladium Store Basic Needs Chart

### Storage Capacity Needs

Total Volume

DV or MPEG (25 Mb)

### Bandwidth Needs

### Redundancy Needs

#### Palladium Store 100

#### Palladium Store 1000

#### Palladium Store 5000

2 TB

5 TB

20 TB

50 TB

150 TB

180 TB

144 Hrs

500 Hrs

1,500 Hrs

5,000 Hrs

10,000 Hrs

600 Mb/s

1,000 Mb/s

2,000 Mb/s

3,000 Mb/s

10,000 Mb/s

RAID

RAID, NSPOF

RAID, NSPOF, Mirrored Storage

### Palladium Store 100

NETWORK ATTACHED STORAGE FOR SMALL MARKET NEWS AND POST

Designed by Pinnacle Systems to deliver the workflow benefits of shared storage to smaller workgroups, Palladium Store 100 provides up to 100 hours of RAID protected DV25 storage for Vortex or Liquid chrome and Edition craft editors. A built-in Media Access Server provides enough bandwidth for access of up to 20 simultaneous full resolution streams. In a Vortex environment, Palladium Store 100 also provides real-time MPEG-1 proxy browsing for up to 100 stations.

This compact, self contained NAS solution is expressly designed for the demanding needs of daily DV editing and news production.

### Palladium Store 1000

SCALABLE STORAGE-AREA NETWORK SYSTEM FOR INGEST, EDIT AND PLAY TO AIR APPLICATIONS

The Palladium Store 1000 system is the foundation for mainstream broadcasters and post-production facilities who demand flawless performance in a 24x7 environment. Scalable from 1 TB to 22 TB with bandwidths up to 2400 Mb/s, Palladium Store 1000 can be configured to meet a majority of applications. With “No Single Point of Failure” (NSPOF) architecture, this system offers full redundancy on all active components (RAID controllers, power supplies, fan modules and fibre channel interfaces). The RAID control system uses independent drive controllers which isolate each disk from the others to increase reliability and protect the array with no loss in performance.

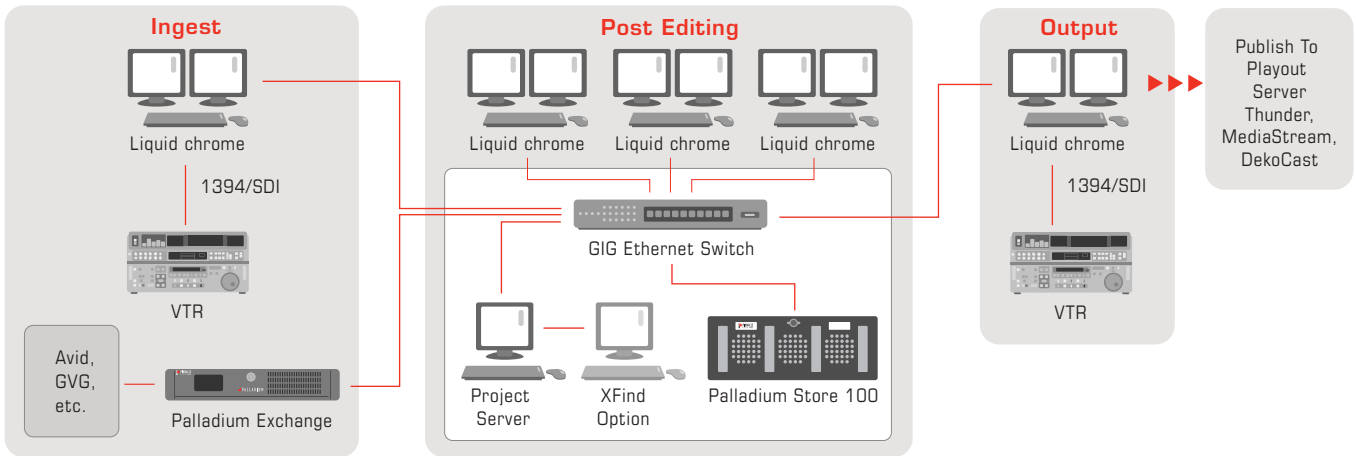
Before going into service, each hard disk for Palladium Store 1000 systems is subjected to a rigorous media certification process to ensure proper block mapping and throughput specifications are met. If it does not meet our specifications, it does not belong in your facility.

### Palladium Store 5000

MASSIVELY SCALABLE FAULT-TOLERANT SAN SOLUTIONS “...WHEN “BIG” JUST ISN’T BIG ENOUGH...”

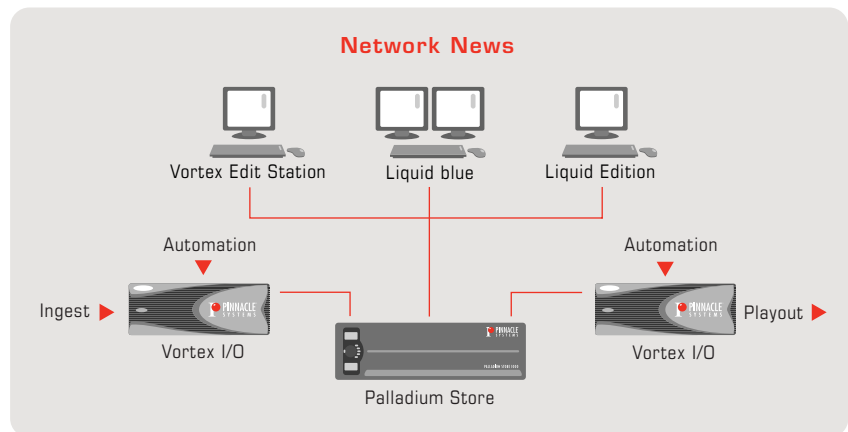
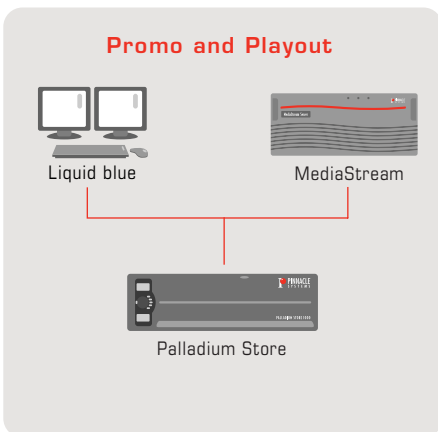
In use today by CNN, the Palladium Store 5000 systems are reserved for applications where hundreds—or even thousands—of streams may be required. The Palladium Store 5000 is Pinnacle’s most fault resilient architecture. It includes RAID 3, NSPOF, and disk mirroring standard. Palladium Store 5000 offers massive scalability to over 180 TB of online storage and up to 6000 Mb/s bandwidth to support the largest installations in the world. A unique fibre channel fabric switching architecture maximizes bandwidth and real-time access for unprecedented video performance. Cost effective for systems starting at 50 TB or larger, Palladium Store 5000 can support over 10,000 hours of DV25, or nearly 30,000 hours of MPEG-2 video at 10 Mb/s.

# Palladium Media Server



## Workgroup Editing

Powerful workgroup editing combines Pinnacle Liquid™ NLEs with the Palladium Media Server foundation. Available in both entry-level and fully fault-tolerant configurations, multiple Liquid clients reside on a high-speed Gigabit-Ethernet network along with central storage and a project server. The project server contains all required project information allowing users to edit projects at any client station with non-blocking access. The media is stored on one or more RAID-protected Palladium Store arrays to deliver a true copyless workflow. Users may optionally fuse finished productions to MediaStream™ or other networked video I/O clients for direct playout to air.



## Playout

For promo and sports highlights packages, Liquid can edit long-form program material into short promos for playout. These promos can be added to an automation rundown and played out through MediaStream. Liquid can also import content from a wide range of acquisition sources including Panasonic® P2 and Sony® XDCam, completing an end-to-end tapeless workflow from ingest to playout.

## Palladium Store Product Comparison

	Palladium Store 100	Palladium Store 1000	Palladium Store 5000
Full Resolution Editing	■	■	■
True Proxy Editing	■	■	■
Maximum Storage	2.88 TB (1.4 TB in RAID 1 mode)	22 TB	180 TB
Total Media at 10 Mb/s	360 Hours	3,750 Hours	29,250 Hours
Total Media at 25 Mb/s	144 Hours	1,500 Hours	11,700 Hours
Total Media at 50 Mb/s	72 Hours	750 Hours	5,850 Hours
Maximum Bandwidth	640 Mb/s	2,880 Mb/s	6,400 Mb/s
RAID Protection	RAID 0, RAID 1	RAID 3	RAID 3
Mirrored Storage Systems	-	-	■
Sustained Performance on Rebuild	-	■	■
Control Loop Configuration	Dedicated Controller & Loop per Drive (This Prevents Any One Drive from Affecting the Performance of Other Drives)	Dedicated Controller & Loop per Drive (This Prevents Any One Drive from Affecting the Performance of Other Drives)	Fibre Channel Loop
Connection	NAS (100 BaseT, Gig-E)	Fibre Channel Interface	Fibre Channel Interface
Storage	Certified ATA (Drives are Qualified for Good Sectors and Sustained Performance)	Certified ATA (Drives are Qualified for Good Sectors and Sustained Performance)	High Speed Fibre Channel Drives
Media Access Server	Built-in	External Due to Multi-Array Configurations	External Due to Multi-Array Configurations
NSPOF Compatible (Redundant Components)	-	Redundant Components	Plus Mirrored Storage Configuration
Redundant Controller	-	■	Internal Plus Mirrored Arrays
Target Market	Small Workgroup Editing: Local News, Small Post Production Craft Editing	Network Play to Air, Medium to Large Workgroup Editing; Major Market News, Medium to Large Post Production	Network Play to Air, Very Large Workgroup Editing; Very Large Network News, Very Large Network Sports
Mission-critical Use	Dual Hot Swap Power Supply Only	Dual Hot Swap - Power Supply, Controller, Fibre Channel Interface Hot Swap Hard Drives	Dual Hot Swap - Power Supply, Controller, Fibre Channel Interface Hot Swap Hard Drives plus Mirrored Storage Configuration

**Key** ■ = Included/Supported

 connecting  
creativity

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