

Protecting HP StoreAll Storage

With HP StoreEver Tape Libraries using HP Data Protector



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Introduction

Exploding unstructured data growth is creating unprecedented challenges in data centers today. Enterprise customers rely on the most efficient, high performing, and reliable data protection solutions. Customers need to protect increasing levels of data while keeping costs under control. In particular, businesses today are concerned about the costs of backing up and archiving mission-critical data by relying on the most efficient, high performing, and reliable data protection solutions.

HP StoreAll Storage goes beyond traditional NAS storage and allows businesses to reduce the cost, complexity, and time required to store, protect, manage, and extract business value from data. Pairing HP StoreAll Storage with HP StoreEver Tape Storage lowers the cost of long-term retention while increasing data security and integrity.

This technical white paper describes the benefits of backing up HP StoreAll Storage with HP StoreEver Tape Libraries while using HP Data Protector. This document will also provide an overview of the supported topologies for this backup solution, as well as general configuration guidelines.

SAN backup: When performance is the priority, installation of the HP Data Protector Media agent on the gateway servers provides superior backup performance. Backup your HP StoreAll Gateway Storage just as you would for any media server on your SAN, via a Fibre Channel (FC) connection to the HP StoreEver Tape Library.

LAN backup: When simplicity is the priority, installation of the HP Data Protector Client software on the StoreAll Gateway Servers provides an uncomplicated backup solution for your StoreAll Gateway Storage. Backup the StoreAll Gateway Servers via Ethernet connection to a HP Data Protector host that is SAN connected to an HP StoreEver Tape Library.

The integration of the Data Protector Media agent software or Data Protector Client software and the StoreAll Gateway Servers makes backup of NAS to the HP StoreEver Tape Library simple and efficient.

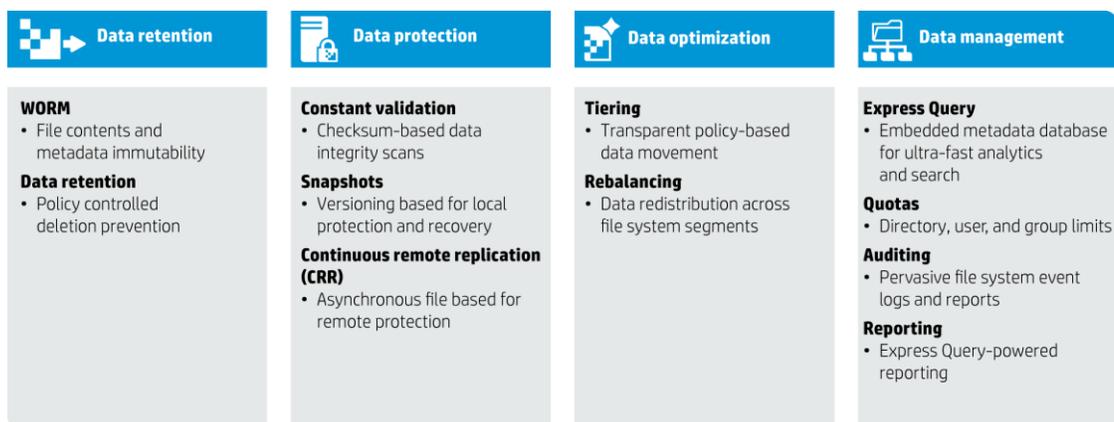
Technology overview

HP StoreAll Storage—key features and benefits

HP StoreAll Storage enables you to streamline backups and mine unstructured data. HP StoreAll Storage is a hyper-scale and economic platform that can store billions of objects and files. Delivering structure for unstructured data, HP StoreAll Storage instantly harnesses the value extraction of your data with custom metadata tagging and ultra-fast search at petabyte scale with HP StoreAll Express Query.

HP StoreAll Storage gives you the flexibility to create either a single file system (namespace) or multiple file systems to host shares that can be made available to clients via file and object modes using a broad portfolio of data access protocols. A rich set of data services for data retention, protection, enhancement, and management are built on its robust and massively scalable foundation.

Figure 1. HP StoreAll Storage features



HP StoreAll Storage features

While StoreAll possesses an extensive array of data services, the data services highlighted below are best leveraged for the HP StoreAll Storage with an independent software vendor (ISV) application-based solution.

Protection

StoreAll enables real-time snapshots for instantaneous point-in-time archive data recovery at a directory or file system level. This means that the enterprise information archival environment retains a local recovery point of the directory or file system to recover the environment within minutes of a point of failure.

To help ensure data integrity within the enterprise information archival environment, HP StoreAll constant validation helps confirm that the file has not been modified through either hardware or software errors or through malicious intent for a retention-enabled file system, and reports on any discrepancies.

Retention

The StoreAll enterprise write once, read many (WORM) and retention capability meets most corporate compliance requirements. With an enterprise WORM-enabled file system, WORM-retained files prevent both inadvertent and deliberate attempts to delete, modify, or manipulate file content or metadata within an enterprise or corporate compliance environment.

StoreAll governs data based on its internal retention policies. Maintaining this strict control enables the application to purge files only after the retention policy has expired. Retention policies in “Enterprise Mode” can be extended, but the retention duration cannot be reduced.

Economical

StoreAll helps optimize your costs throughout the data lifecycle with policy-based tiering, the flexibility to add capacity and performance as your archive expands with pay-as-you-grow architecture. This allows you to leverage the rich set of all inclusive software features for data retention, protection, mobility, and management.

Mobility

StoreAll continuous remote replication (CRR) enables replication of enterprise information archival data for a disaster recovery option. This enables a copy of the archival environment to be protected and maintained at a remote data center in the event of a disaster at the primary site.

Management

StoreAll quota management provides user-level and directory-level granular control over storage consumption to properly manage resource allocation and protect against runaway applications. StoreAll statistical tools can report on StoreAll utilization and performance over time, as archive demand grows. This enables archival environments to plan the growth and resource utilization properly as demands change.

HP StoreAll Storage models

The HP StoreAll Storage family consists of HP StoreAll 8800 Storage models, as well as the HP StoreAll 8200 Gateway HP StoreAll Storage is targeted toward the diverse needs of HP’s archive and backup customers. These StoreAll systems, each of which includes options for multiple disk capacities and geometries, deliver a properly sized, flexible, simple, and powerful hyperscale storage platform for enterprise information archival and backup.

Figure 2. HP StoreAll 8800 Storage



Highest density with flexible options for active archive, tiered archive, or deep archive so you can performance and capacity.

Figure 3. HP StoreAll 8200 Gateway Storage Node



Attached to a HP 3PAR StoreServ Storage, the HP StoreAll Gateway Storage provides hyperscale, instant, and economic storage.

HP StoreEver Storage—key features and benefits

HP StoreEver Storage products protect your data for longer, for less.

As the worldwide leader¹ in tape drives and automation, HP StoreEver Tape provides tape storage that is critical to comprehensive data protection and archiving.

HP StoreEver addresses all your long-term retention needs. With the broadest and most advanced portfolio in the industry, HP StoreEver features support for linear tape—open 6 (LTO-6). HP StoreEver includes tape media, standalone tape drives, and tape libraries that accommodate more than 75 PB in a single system.²

HP StoreEver ESL G3 Tape Library

HP StoreEver ESL G3 Tape Library delivers high scalability to keep pace with unpredictable data growth. Choose from a range of base configurations and scale up to over 12,000 tape cartridges in increments of 100 slots for capacity on demand. Incorporating between 1 and 192 drives, you can consolidate and store up to 75 PB of enterprise data.³

Broad scalability

- Scale horizontally in 100-slot increments, with a range of base library bundles
- Scale from 100 to 12,006 tape cartridges—from 1 to 192 LTO-6 or LTO-5 Ultrium tape drives—and 1 to 16 library frames, with each frame in a standard 19-inch rack form-factor
- Deliver high-density storage of up to 75 PB (with data compression at 2.5:1) by using HP LTO-6 Ultrium tape drives and high-density expansion modules⁴ achieving a 12,006-slot configuration
- Benefit from customer configurable import and export (I/E) slots from 24 to 528 for fast bulk load and unload. Flexible scaling options—scale with expansion modules (provide capacity and performance expansion) or high-density expansion modules (providing capacity expansion only with 780 slots per frame)

High-availability

- Support ongoing host and SAN connectivity under varying conditions with library logical unit number (LUN) control failover
- Achieve near-continuous data access with active dual-robotic capability

Enterprise-class manageability

Using advanced manageability features such as HP StoreEver Tape Assure software and HP Library and Tape Tools, the ESL G3 Tape Library can be managed remotely from a single console. Additional HP StoreEver Tape Libraries that are accessible over the network can also be managed by the same console for easy consolidation.

Verify both media quality and data integrity on tape cartridges throughout the lifecycle using HP Data Verification.

HP StoreEver Tape Assure Advanced software provides an intuitive, easy-to-use dashboard, and advance analytics feature for performance, health, and utilization related to tape drives and cartridges.

Help minimize risk

Federal Information Processing Standard (FIPS) compliant data encryption and secure key management safeguard your data against costly data breach while it's in the tape library, during export and transport, and while data is at rest in an offsite location.

Note:

While this paper is focused on StoreEver Tape Library, other physical and virtual HP tape libraries will work as well. Similarly, other vendor libraries will work with the StoreAll also. Please refer to the appropriate product document for confirmation.

¹ According to the IDC Branded Tape Tracker CQ2 2013, HP is the worldwide market share leader in total branded tape drive units.

^{2,3} Using 2.5:1 compression and a fully populated 16-frame ESL G3 tape library.

⁴ ESL G3 high-density expansion modules allow the storage of almost 5 PB in a single 19-inch rack enabling you to save precious floor space while scaling up to meet demanding capacity growth. A high-density expansion module adds library capacity without sacrificing cartridge access performance.

HP 3PAR StoreServ Disk Array Storage—key features and benefits

HP 3PAR StoreServ Storage products enhance your storage on the fly to help maximize capacity utilization while delivering high service levels.

HP 3PAR StoreServ Storage are storage systems which range from tier 1, mission-critical solutions with the highest performance and scalability that support cloud and IT as a service (ITaaS) environments, to storage solutions with enterprise-class features at a midrange price, designed for the virtualized data center.

HP 3PAR StoreServ 10000 Storage is designed to deliver enterprise IT as a utility service simply, efficiently, and flexibly. The arrays are built from the ground up to enable agile and efficient response to the changing business needs present in today's most demanding data centers.

HP 3PAR StoreServ 7000 Storage stores all of your data on a single system that supports advanced features such as storage federation and automated tiering, and enables you to start small and grow without disruption.

HP 3PAR StoreServ is:

- **Efficient**
Reduce capacity requirements by 50 percent—guaranteed.⁵
- **Autonomic**
Simplify, automate, and expedite storage management by handling storage provisioning, tiering, and change management autonomically—intelligently, at a sub-system level, and without administrator intervention—reducing administration time by up to 90 percent.
- **Federated**
Meet the needs of today's data center with the ability to move data and workloads between arrays without impact to applications, users, or services. Simply and non-disruptively shift data between HP 3PAR StoreServ systems without additional management layers or appliances.

HP Data Protector

HP Data Protector is an enterprise-class data protection application. It is HP's flagship enterprise-class backup and recovery offering, which includes a range of key features to help global organizations more efficiently and effectively protect their information in the age of distributed Big Data. As enterprise data volumes continue to grow each day, organizations face significant challenges in protecting information that is increasingly distributed across physical, virtual, and cloud-based networks.

HP Data Protector delivers:

- Breakthrough scalability and performance to meet the distributed Big Data backup needs
- Support for new HP storage products with integration across a continuum of protection options
- HP StoreOnce deduplication software enhancements with new capabilities and additional platform support
- Enhanced snapshot integration for HP 3PAR StoreServ
- Advanced VMware recovery options including new features and enhancements to simplify the protection of a large VMware environment
- Extended platform coverage

Data Protector Clients can use disk or tape for storage targets.

HP supported topologies with HP Data Protector

SAN backup connectivity and installation

SAN backup refers to backing up the StoreAll gateway or segment servers via a FC connection to the tape library utilizing a SAN. Review the following installation checklist to make sure that SAN connectivity is in place.

Installation checklist

If the answer to each of the following questions is “yes,” then all components on the SAN are logged in and configured properly:

- Are all of the following hardware components at the minimum supported firmware revisions specified in the current HP Storage Enterprise Backup Solution (EBS) Compatibility Matrix servers, host bus adapters (HBAs), FC switches, Command View Tape Library, tape drives, and library robots?

⁵ Requires the use of HP 3PAR Thin Conversion software and HP 3PAR Thin Provisioning software. For details, refer to the Get Thin Guarantee Terms and Conditions. More information is available at: hp.com/storage/getthin.

- Is the minimum patch level support for each OS installed?
- Are the minimum supported drivers specified in the EBS Compatibility Matrix installed (HBAs, tape drives, etc.)?
- Is the HP StoreEver Tape Library or partition(s) online?
- Are all of the host HBAs correctly logged into the FC switch?
- If the FC switches are cascaded or meshed, are all Inter-Switch Link (ISL) ports correctly logged in?
- Are all tape and robotic devices zoned, configured, and presented to each host from the FC switch?
- Are the host(s) HBAs, tape, and robotic devices in the same switch zone(s)? See the below note.
- Do the hosts detect all of the tape and robotic devices intended to be used?
- Are all HP StoreEver storage devices seen by HP Command View Tape Library?
- Has connectivity been verified using HP Library and Tape Tools or OS specific tools (for example, the sg3_utils package in Linux)?

Note:

For certain configurations described later in this document, it will be necessary to create zones containing the gateway servers and the tape library. Refer to the EBS Design Guide for zoning recommendations.

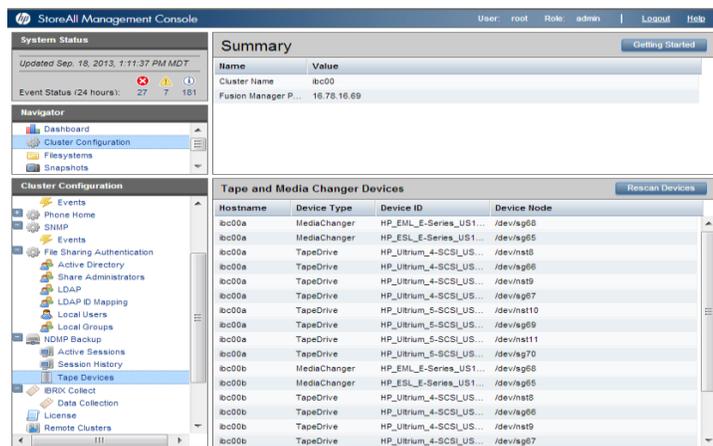
The following section will outline the high-level steps to setup connectivity between the HP StoreAll Gateway and the HP StoreEver Tape Library. Be sure that the installation checklist above for establishing SAN connectivity has been reviewed prior to attempting tape library discovery from the StoreAll Gateway nodes.

Connecting the tape library to the gateway servers

To detect and verify that the tape library is connected to the gateway servers, follow the steps below:

1. Logon to the HP StoreAll Management Console. Enter the administrator user credentials and password.
2. Select **Cluster Configuration** in the navigator list.
3. Select **NDMP Backup** in the list (see figure 4).
 - A. **Note:** Even though the tape devices are listed under the NDMP Backup branch, the device handle needed for running a native backup is supplied here as well.
4. Select **Tape Devices** to verify discovered backup components.
5. Select **Rescan Devices** if newly attached devices have not shown up.

Figure 4. HP StoreAll Management Console



Installation of HP Data Protector Media and Disk Agents

This configuration involves installation of the Data Protector Disk and Media agent software on the gateway/segment servers. Once connectivity between the gateway servers and the tape library is established, the Data Protector Disk and Media agent software can be installed on any gateway server for which the OS it supports. Installation of the software on both gateway/segment servers is recommended.

Install the Data Protector Media agent software directly on the HP StoreAll Gateway nodes. See the following instruction guide for software installation and configuration: [HP Data Protector Manual](#).

LAN backup connectivity and installation

LAN backup refers to backing up the HP StoreAll Gateway via LAN connection to a Data Protector Client that is already connected to the SAN. The movement of the data over the LAN is either NFS or SMB. This configuration does not require that the tape library be accessed by the gateway or segment servers. For information regarding setup and configuration of the tape library in an enterprise SAN environment, refer to the [EBS Design Guide](#).

Installation of Data Protector software

Install the client software on the gateway servers. See the following instruction guide for software installation and configuration: [HP Data Protector support pages](#).

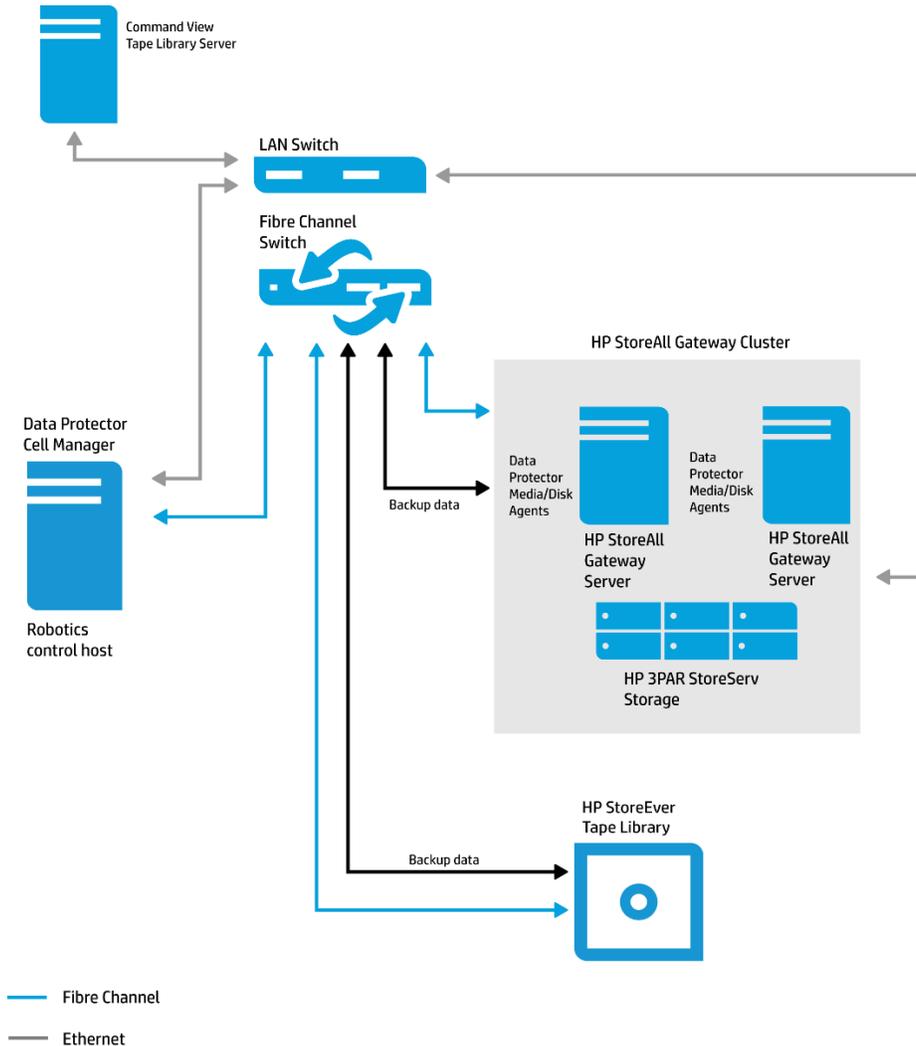
Use case scenarios

SAN backup topology

Figure 5 illustrates a simple configuration, with the Data Protector Cell Manager acting also as the robot control host. This is not the only supported configuration for this topology. The robot could be controlled by another Data Protector Client or by one of the servers in the StoreAll Gateway cluster.

In this topology, backup data flows from the HP 3PAR StoreServ Storage to the HP StoreAll Gateway cluster, and then directly to the StoreEver Tape Library via the FC connection. When a restore is initiated, data flows from the tape library to the StoreAll Gateway Servers and then on to the HP 3PAR StoreServ Storage.

Figure 5. HP StoreAll Gateway Storage connected to StoreEver Tape Library

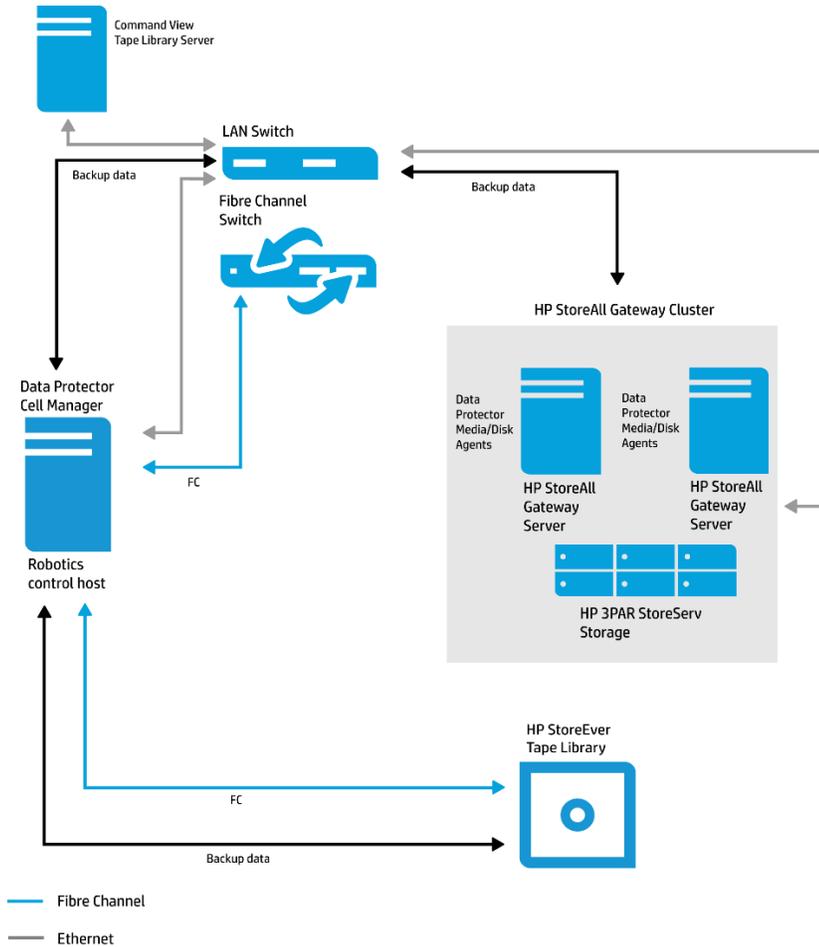


LAN backup topology

Figure 6 illustrates a simple configuration, with the HP Data Protector Cell Manager acting as the robot control host. The robot control host could also be a Data Protector Client.

In this topology, backup data flows from the StoreAll Gateway Cluster over the LAN to the Data Protector master or media server. The backup data then flows to the StoreEver Tape Library utilizing the backup server connection to the Fibre Channel SAN.

Figure 6. HP StoreEver Tape Library is connected to the Data Protector Cell Manager or Client



Test results for the tested scenarios

The following tests were executed for the certification of backup and restore solution.

Table 1. StoreAll test cases

Feature	Checked
Validation of backup/restore of IBRIX file system Common Internet File System (CIFS) share presentation	✓
Validation of backup/restore of IBRIX file system NFS share presentation	✓
Validation of backup/restore of IBRIX file system FTP/HTTP share presentation	✓
Validation of backup/restore after executing data mobility features (rebalancer, migration, and evacuation)	✓
Validation of backup/restore of WORM/retention properties of archived files of different sizes	✓
Validation of backup/restore of deep directory structure up to 100 levels	✓
Validation of backup/restore of StoreAll and HP 3PAR snapshots	✓
Validation of backup/restore of quotas configurations	✓
Data Protector software installed without incurring any issues	✓

Conclusion

This document describes two different topology options for backup of the HP StoreAll Gateway Storage, SAN backup for performance, and LAN backup for simplicity.

The integration of the backup software and the gateway servers allows customers to leverage existing SAN infrastructure and administrator knowledge for backup of HP StoreAll Gateway.

Backup to an HP StoreEver Tape Library provides scalability for unpredictable data growth along with the reliability, economy, and security you've come to expect from HP Tape Storage.

The certification was completed with the above-mentioned use cases while running StoreAll software v6.5 and DP software 8.01. The primary storage was provided by the HP StoreAll 8200 Gateway configured with an HP 3PAR StoreServ Storage. The target device was an HP StoreEver ESL G3 Tape Library.

Disclaimer

The configurations in this document are HP tested configurations. They are provided as a reference only, as configurations vary with specific customer needs. If mentioned, memory, processor count and speed, and I/O storage recommendations should be considered as a minimum recommendation.

Useful links

[HP StoreAll Storage](#)

[HP StoreEver Tape](#)

[HP Data Protector software](#)

[HP 3PAR StoreServ Storage](#)

[HP StoreAll 8200 Gateway Storage](#)

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