HPE GreenLake

Technical white paper

Video surveillance with HPE Alletra 5000 and Milestone XProtect Corporate

Contents

Executive summary

This technical white paper provides guidance and best practice information for implementing HPE Alletra 5000 storage in Milestone XProtect video management solutions. The information and recommendations shared in this paper result from experience with XProtect Corporate software installed in an HPE lab.

This document is intended for solution architects, project managers, storage administrators, and system support personnel involved in planning, designing, and configuring a video surveillance management solution.

Introduction

XProtect is the foundation of a video surveillance solution, offering you the freedom to build the entire system the way you like it. Built on open-platform architecture, XProtect enables you to customize your surveillance system and integrate other business applications for increased usability and performance.

By choosing HPE Alletra 5000 for the storage component of XProtect, you can benefit from a partner solution that is easy, affordable, and reliable. HPE Alletra 5000 has been verified by Milestone, so you can count on its reliability. Its compatibility with XProtect Corporate software provides a seamless integration.

HPE Alletra 5000 for video surveillance

Built from the DNA of HPE Nimble Storage Adaptive Flash Array, HPE Alletra 5000 delivers simple, reliable, and cost-efficient hybrid storage. HPE Alletra 5000 brings the cloud experience to your on-premises storage while simplifying operations across its lifecycle.

Eliminate app disruptions with HPE InfoSight, the industry's most advanced artificial intelligence for IT operations (AIOps) for infrastructure, along with high resiliency and guaranteed six nines data availability[1] and simple hybrid cloud data protection.

You can harness the flash performance and disk economics that HPE Alletra 5000 enables through its ultra-efficient architecture while delivering fast, consistent performance, and industry-leading data efficiency.

With the benefits of the HPE GreenLake edge-to-cloud platform, you can consume everything as-a-service, enabling a shift from owning and maintaining data infrastructure to simply accessing and using it.

Benefits of HPE Alletra 5000

With an HPE Alletra 5000 solution, you can:

- **Rely on six nines availability—guaranteed:** Forget the anxiety and disruption of unexpected downtime. HPE Alletra 5000 leverages a proven AI-driven platform to guarantee resilient six nines data availability for every customer and every array.[1]
- **Scale easily and without disruption:** Grow the capacity and performance of running a system independently and nondisruptively with an HPE Alletra 5000 scale-to-fit solution. You can also scale out to four arrays with transparent volume mobility across the arrays, achieving linear performance and capacity scaling.
- **Consume as-a-service, on-demand:**[2] Shift from owning and maintaining data infrastructure to simply accessing and using it. Avoid over- and under-provisioning concerns, CapEx budget constraints, and complex procurement cycles by choosing a flexible, as-a-service consumption model with the HPE GreenLake edge-to-cloud platform. Access the storage resources you need through workload-optimized storage tiers that are delivered in days. Scale on-demand as necessary, rely on buffer capacity for unexpected workload or usage demands, and leave behind heavy upfront costs for a transparent monthly subscription.
- **Automate your storage with an AI-managed service:** Say goodbye to endless emergency responses, thanks to HPE InfoSight, the industry-leading AIOps for infrastructure that drives autonomous operations and helps ensure your apps are always-on and always fast. You can predict and prevent disruptions before they occur across the stack, pinpoint issues between storage and VMs, and identify underutilized virtual resources. AI-driven recommendations take the guesswork out of managing data infrastructure and leverage predictive support automation and direct access to experts to help eliminate time-consuming escalations.
- **Depend on extreme data integrity and no-compromise durability:** Do not accept trade-offs between data resilience and performance. HPE Alletra 5000 delivers Triple+ Parity RAID as standard with zero performance impact. Triple+ Parity RAID can handle three simultaneous drive failures without data loss and provides additional protection through intra-drive parity.

[1] HPE Storage Substantiation: https://www.hpe.com/psnow/doc/A00058506ENW?from=app&section=search&isFutureVersion=true
[2] Consume HPE Alletra 5000 your way with a choice of CapEx/subscription or pay-per-use models.

Solution overview

This section describes the hardware and software components used in the verification.

Software

Milestone XProtect Corporate software is an IP video management software (VMS) designed for large-scale and high-security installations.

Milestone XProtect

XProtect Corporate 2022 R1 running on Windows Server 2019 Standard edition uses the following components:

- Milestone XProtect management server
- Milestone XProtect recording server (four instances)
- Milestone XProtect Management Client
- Milestone XProtect Smart Client
- Milestone StableFPS device driver

Hardware

This solution uses the hardware components described in this section.

HPE Alletra 5030

HPE Alletra 5000 is a hybrid flash array with dual active/standby storage controllers. It is used as storage for live recording video data.

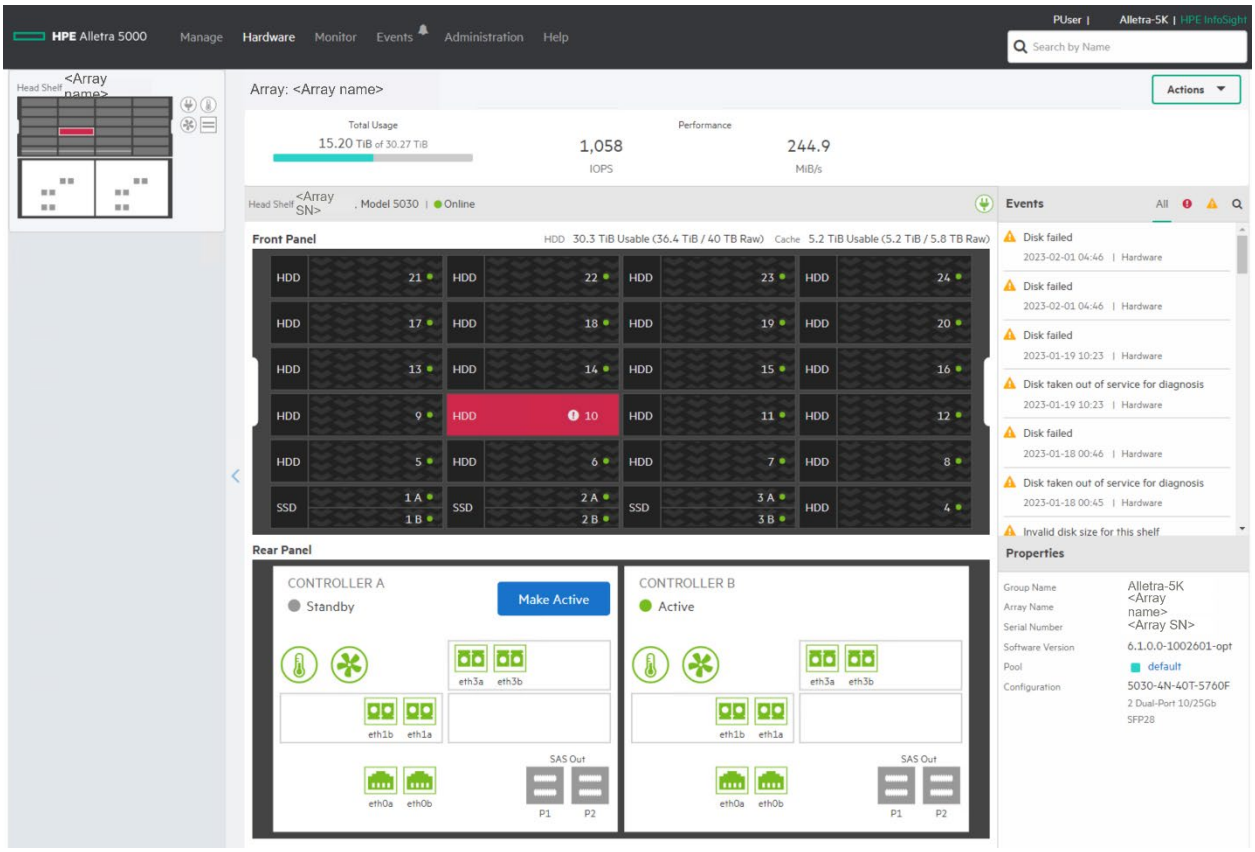

Figure 1: HPE Alletra 5000 array overview

Configuration of an HPE Alletra 5030 solution includes the following components:

- HPE Alletra 5030 Adaptive Flash Array Dual Controller Configure-to-order Base Array
- 21 HDD LFF

- Six SFF SSDs cache capacity
- Two 25GbE 2-port SFP28 FIO Adapter Kit (iSCSI) per controller
- 1/10Gbs onboard Ethernet adapters for management access
- HPE Alletra 5000 OS 6.1.0.0

Table 1. HPE Alletra 5000 system specifications

HPE Alletra 5000 array[3]	5030	5050	Scale-out 4x 5050
Raw capacity (TB/TiB)[4, 5]	42–504 / 458	42–1260 / 1146	5040 / 4584
Usable capacity (TB/TiB)[4]	33–406 / 369	33–1016 / 924	4065 / 3697
Effective capacity[6] **(TB/TiB)**	165–2030/1846	165–5080/4621	660–20324 / 18484
Max. # of expansion shelves	6	6	24
Flash capacity (TB/TiB)[4, 5]	1.4–48/1.3–43	1.4–156/1.3–142	624/567
Onboard iSCSI/Management 1 Gb/10 Gb ports per array[7, 8]	4	4	16
Optional iSCSI 1 Gb ports per array[8]	4, 8, 12, 16, 20, 24	4, 8, 12, 16, 20, 24	96
Optional iSCSI 10 Gb ports per array[6]	4, 8, 12, 16, 20, 24	4, 8, 12, 16, 20, 24	96
Optional iSCSI 25 Gb ports per array[6]	4, 8, 12	4, 8, 12	48
Optional Fibre Channel 16 Gb (8 Gb) ports per array[6]	4, 8, 12, 16, 20, 24	4, 8, 12, 16, 20, 24	96
Optional Fibre Channel 32 Gb (16 Gb) ports per array[6]	4, 8, 12	4, 8, 12	48

Note

For the latest specifications, see HPE Alletra 5000 QuickSpecs.

Table 2. ES3 expansion shelves for HPE Alletra 5000

Capacity type	Value
Raw capacity (TB/TiB)[4, 9]	42-210 / up to 190
Usable capacity (TB/TiB)[4]	33-169 / up to 154
Effective capacity (TB/TiB)[4, 10]	Up to 337 / up to 308
Flash capacity (TB/TiB)[4]	1.44-108/ up to 98

Note

Specifications are subject to change without notice.

[3] HPE Alletra 5010, 5030, and 5050 arrays support scale-up to any model within the family.
[4] Raw, usable, and effective capacities are shown in TB (10^{12} bytes) and TiB (2^{40} bytes). Usable and effective capacities take into account space used for parity, spares, SSD cache, and system overhead.
[5] The total max raw capacity/flash capacity per system is limited by the architecture of the system and is not to be exceeded, even if it may be possible to configure a system that exceeds this limit.
[6] Effective capacity is the capacity of the base array and maximum number of expansion shelves. Assumes data reduction of five to one (5:1) from deduplication and compression. Deduplication is currently supported on all models.
[7] Each array controller has two 10GbaseT ports built in. Optional ports are 1GbaseT, 10GbaseT, 10GbE SFP+, 25GbE SFP28, 16 Gb (8 Gb) Fibre Channel, and 32 Gb (16 Gb) Fibre Channel.
[8] Array port counts shown include both active and standby controllers; active ports are half of the value shown.
[9] The total max raw capacity per system is limited by the architecture of the system and is not to be exceeded, even if it may be possible to configure a system that exceeds this limit.
[10] Scale-out configuration consists of four HPE Alletra 5050 Adaptive Flash arrays, each with maximum supported capacity.

HPE ProLiant server

Configuration of an HPE ProLiant DL380 Gen10 server includes two HPE ProLiant DL380 Gen10 servers used to host the four XProtect recording server instances. Components include:

- Dual Intel® Xeon® Gold 6230 CPUs
- 384 GB memory
- HPE Ethernet 25Gb 2p 640FLR-SFP28 Adapter

Configuration of an HPE ProLiant DL3x0 Gen9 server includes one HPE ProLiant DL3x0 Gen9 server used to host the XProtect management server as well as the log server, event server, and Microsoft SQL Server. Components include:

- Dual Xeon E5-268 v3 CPUs
- 393 GB memory
- HPE Ethernet 25Gb 2p 640FLR-SFP28 Adapter

Network

The general recommendation in this type of environment is to have separate networks for camera traffic, storage traffic, and management configured. Make sure that the network is sized appropriately to have sufficient bandwidth available everywhere. For simplification, because the focus of this testing was on the HPE Alletra 5000 only, a single network was used.

Currently for the camera network it is common to use Power over Ethernet (PoE) switches for IP cameras. The advantage of PoE switches is that they simultaneously power the IP cameras and send video and audio over one Ethernet cable, which simplifies deployments.

Note

A choice of Aruba (a Hewlett Packard Enterprise company) PoE switches can be found here: https://www.arubanetworks.com/products/switches/.

For the iSCSI and network connection in the HPE lab, an Aruba CX 8325-48Y8C switch with 25G SFPs was used.

Milestone XProtect Corporate components overview

Figure 2 illustrates XProtect Corporate components. A short description of each component follows. A full description of all XProtect Corporate components is available at the Milestone documentation website.

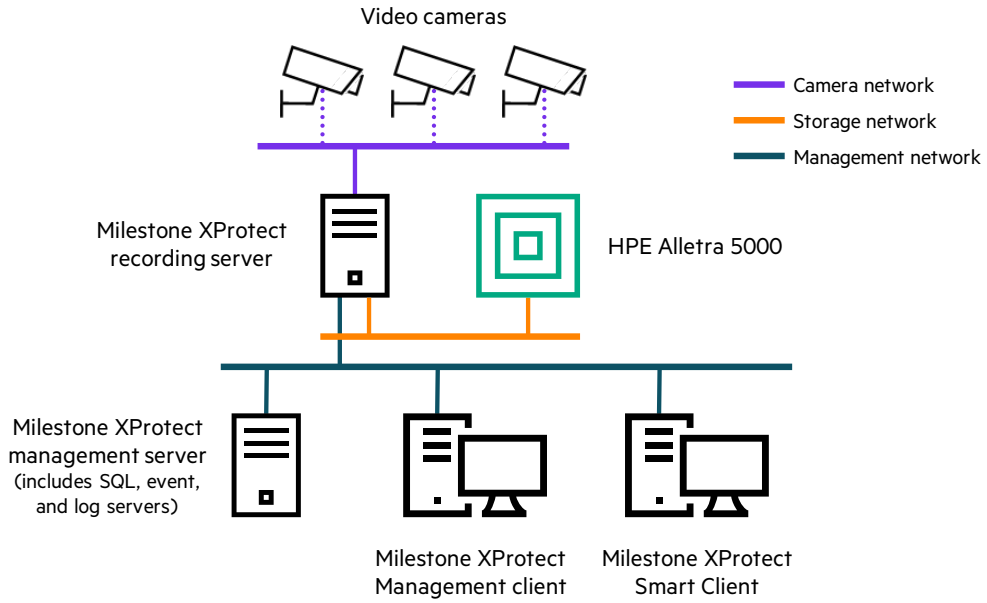

Figure 2: XProtect Corporate components

Management server

The management server is a central component. The configuration of the surveillance system is stored in an SQL database. The SQL database can run on the management server or on a separate SQL Server on the network. The management server also handles user authentication and user rights.

Recording server

The recording server is responsible for recording videos and for communicating with cameras and other devices. In large installations, more than one recording server is often used.

Event server

The event server handles tasks related to events, alarms, maps, and any third-party plug-ins that need to access system events. All data handled by the event server is stored in the same SQL database the management server uses.

Log server

The log server is responsible for storing all log messages for the entire system. The system supports three types of logs:

- System log—Log errors, warnings, and information or a combination of these
- Audit log—Client user activity as well as login and administration logs
- Rule log—Logs created based on specific events

The log server uses the same SQL database as the management server. It is typically installed on the same server as the management server but can be installed on a separate server if the management or log server performance needs to be improved.

Microsoft SQL Server

The management server, the event server, and the log server use an SQL database to store configuration, alarms, events, and log messages. The XProtect installer includes Microsoft SQL Server Express, which is a free edition of SQL Server. For very large systems or systems with many transactions to and from the SQL databases, Milestone recommends that you use a SQL Server Standard or SQL Server Enterprise edition of SQL Server on a dedicated computer on the network and on a dedicated hard disk drive that is not used for other purposes. Installing the SQL Server on its own drive improves the performance of the entire system.

Milestone XProtect Management Client

The XProtect Management Client is a feature-rich administration client for configuration and day-to-day management of all parts of the system. It is designed to run remotely and is typically installed on the surveillance system administrator's workstation. It is available in several languages.

Milestone XProtect Smart Client

The XProtect Smart Client enables operator access to live and recorded video as well as other key surveillance system features, such as the export of recordings for use as evidence. The feature-rich XProtect Smart Client is the main client for the VMS, offering a full set of advanced features. It is designed for day-to-day use by dedicated operators and is installed on each operator's computer. The XProtect Smart Client has tabs dedicated to different tasks—live monitoring, playback, and investigation; Sequence Explorer for investigation; alarms for alarm management; and system monitor for monitoring the state of the system servers, cameras, and storage. Add-on products and third-party integrations can incorporate additional tabs, providing a dedicated user interface for their functions.

Milestone verification process

The Milestone verification process was used running XProtect software with a given number of simulated cameras. To generate the appropriate camera workload, the StableFPS driver was leveraged.

Verification testing

The targets and limits for the test to pass the verification are:

- Camera 1920x1080 8Mbit
- H.264 video codec
- 30 frames per second (FPS)
- Constant video recording—no motion detection

- Overall test duration of seven days
- The limits expected from a stable system:
  - Network loads, both receiving and sending, should not exceed 70% of available bandwidth
  - Processor load should not exceed 70%
  - Percent committed bytes should not exceed 70%
  - Disk latency, reading or writing, should not exceed 200 milliseconds
  - Medias lost/sec should not exceed 1%

Verification environment overview

The XProtect management server was installed on a dedicated HPE ProLiant DL380 Gen9 server. Two HPE ProLiant DL380 Gen10 servers were used to host four XProtect recording server instances. An HPE Alletra 5030 with iSCSI interfaces was used to present a dedicated storage volume for the Milestone media database to each XProtect recording server instance.

The Stable FPS device driver was installed on each XProtect recording server to emulate system, network, and storage load.

Verification results

Milestone confirmed that the HPE Alletra 5030 is compatible with XProtect Corporate 2022 R1 for live recording storage. The verification test was performed using 360 cameras (1920x1080 8Mbit); in other words, the total data ingress of 381 MBytes/sec.

The findings were that HPE Alletra 5030 meets the recording storage performance requirements for live recording of video data. It preserves the integrity of video data and can be configured to provide video retention for an established period of time—meeting organizational, legal, and regulatory requirements.

Best practices and configuration guidance

In this section, it is assumed that setup and configuration guidance provided by the Milestone documentation website has been understood and will be followed.

Camera throughput and storage capacity

Camera throughput is the crucial factor when sizing a video surveillance solution. Look at the camera vendor specifications to get an average understanding of the image size, bandwidth, and storage.

Usually, camera vendors provide required information in a camera data sheet or offer a sizing tool that will simplify and help to determine an estimation of the required values.

After doing the math and knowing the bandwidth that will be required, make sure to use an adequate network adapter and number of ports. Also consider port bonding and network path redundancy to make sure it is still possible to access the storage in case of a single port or cable failure.

Creating an HPE Alletra 5000 storage volume

The HPE Alletra 5000 offers different interfaces to manage the array's features—Data Services Cloud Console (DSCC), GUI, CLI, and REST API. Use the interface that suits you best.

When creating a storage volume for storing video data, select **No protection** at the protection policy. The protection policy offers two levels of protection—native replication-based remote protection and snapshot-based local protection. Neither option was the focus of the verification and therefore they were not considered in the verification process.

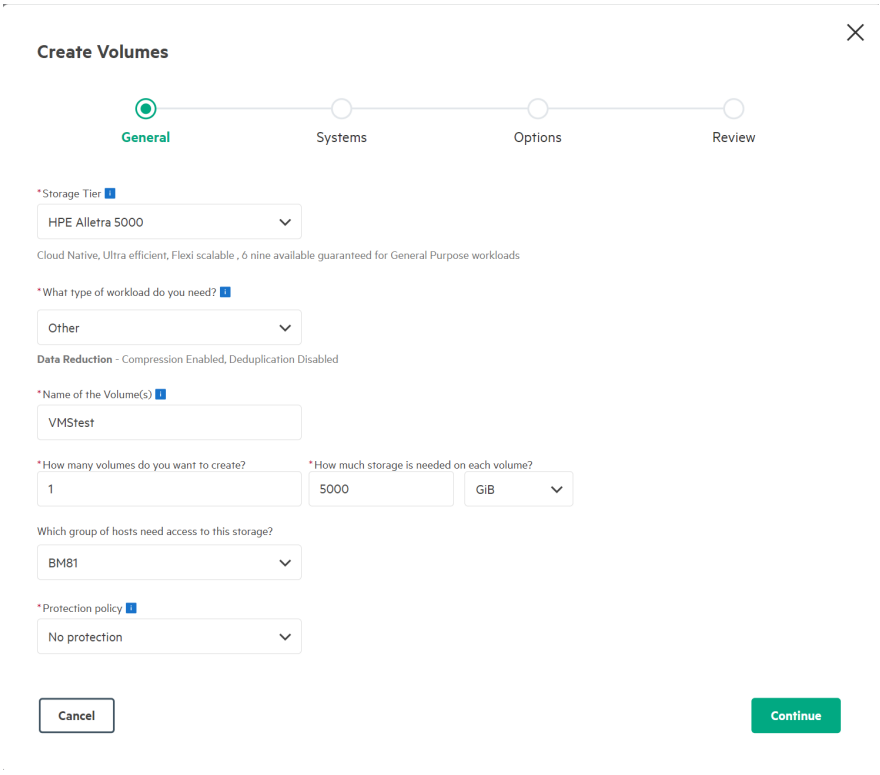

Figure 3: DSCC storage creation window

After the storage volume has been created, go to the **Storage** menu and select the newly created volume. Under Action, select **Update Volume** and disable deduplication. By default, deduplication is enabled at the time of volume creation. Based on the nature of live video data, deduplication has little to no benefit, so disabling it is recommended.

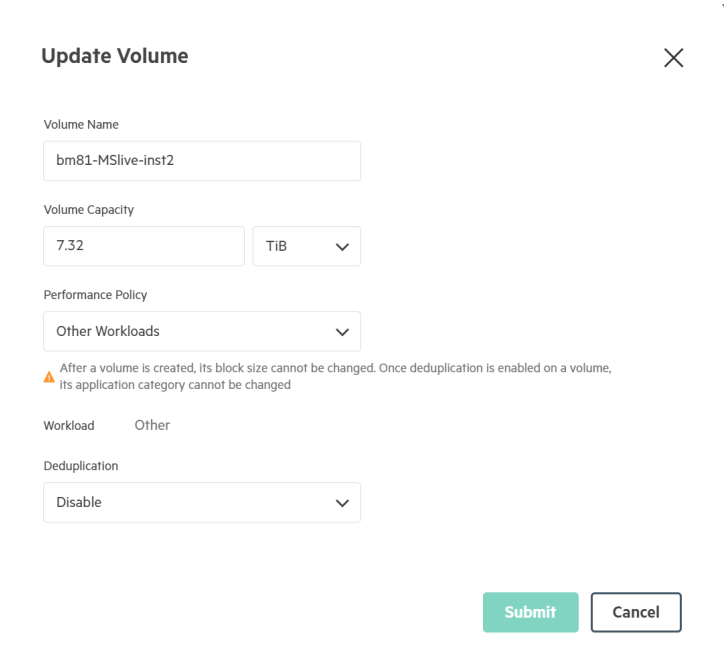

Figure 4: DSCC update volume window

Storage Volume iSCSI connection to Windows host

The HPE Storage Connection Manager for Microsoft Windows manages iSCSI connections from the host to HPE Alletra 5000 volumes. It is designed to simplify making and maintaining the optimal number of iSCSI connections (also known as "iSCSI sessions") between the Windows server and the array.

To connect the storage volumes from HPE Alletra 5000 to the XProtect recording server running on Windows Server 2019 use the HPE Storage Connection Management for iSCSI. It helps you make an iSCSI connection between the Windows host and the HPE Alletra 5000 array and will monitor changes over time and adjust the number of connections as needed.

There is no need to make manual connections to the appropriate interfaces or worry about how many connections an array hosting a volume has.

The HPE Storage Connection Manager for Windows and the Windows Integration Guide are available at HPE InfoSight.

Summary

Hewlett Packard Enterprise has a broad portfolio of servers, storage, and networking that meets the infrastructure needs of XProtect video surveillance solutions. With the latest addition of HPE Alletra 5000 arrays to the storage portfolio for video surveillance, this solution combines a flash-enhanced architecture with HPE InfoSight predictive analytics for fast, reliable access to data and 99.9999% measured data availability. Consume as-a-service with HPE GreenLake, so you can shift from buying and maintaining data infrastructure to simply accessing and using it.

Resources or additional links

HPE Alletra 5000 storage for Milestone XProtect Solution Brief
www.hpe.com/psnow/doc/a00130242enw

Hewlett Packard Enterprise at Milestone MarketPlace
www.milestonesys.com/marketplace/hewlett-packard-enterprise

HPE ProLiant DL servers
www.hpe.com/us/en/servers/proliant-dl-servers.html

HPE Pointnext Services
www.hpe.com/us/en/services/pointnext.html

Learn more at

https://www.hpe.com/storage/alletra

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