Hewlett Packard Enterprise

Technical white paper

Video surveillance verification with HPE Alletra Storage Server 4140 for Milestone XProtect

Verification overview

milestone

Contents

Executive summary

This technical white paper provides guidance and best practice information for implementing HPE Alletra Storage Server 4140 in Milestone XProtect video management solutions. The information and recommendations shared in this paper result from experience with XProtect Corporate software installed in a Hewlett Packard Lab.

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

Introduction

Milestone XProtect is a global market-leading video management software (VMS). 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.

HPE Alletra Storage Server 4140 is a density-optimized, high-throughput, bulk capacity platform in a 4U chassis ideal for video surveillance environments.

These characteristics led Hewlett Packard Enterprise to verify the HPE Alletra Storage Server 4140 as a Milestone XProtect Recording Server, ideal for environments that require high storage capacity and have limited space in the data center. Finally, it can be simply integrated into any XProtect environment.

HPE Alletra Storage Server 4140 for video surveillance

The HPE Alletra Storage Server 4140 is specifically designed to provide high throughput for the largest storage-centric workloads to power your data-driven initiatives.

Benefits of HPE Alletra Storage Server 4140

Built for data applications

Optimized for your data-driven initiatives that demand bulk economic capacity with high throughput, the HPE Alletra Storage Server 4140 delivers exceptional data capacity with the right mix of data throughput and processing in a seamless to deploy and service 4U rackmount form factor. Flexible configuration with up to 68/92 LFF drives.

Table 1. HPE Alletra Storage Server 4140 maximum raw capacity with different disk sizes

Disk sizes	10 TB	12 TB	14 TB	16 TB	18 TB	20 TB	24 TB
68 LFF HDDs	680 TB	816 TB	952 TB	1.08 PB	1.22 PB	1.36 PB	1.63 PB
92 LFF HDDs	920 TB	1.1 PB	1.28 PB	1.47 PB	1.65 PB	1.84 PB	2.2 PB

Secured end to end by design

From silicon to software and factory to cloud, the HPE Alletra Storage Server 4140 is designed with Zero Trust security at its uncompromising core. Protect your customers, your organization, and your data from increasingly sophisticated and dangerous threats.

Physical drawer locks, logical configuration lock, secure boot, FIPS 140-2 Smart Encryption and self-encrypting drives, and secure erase that meets NIST guidelines for media sanitization protect your data throughout the lifecycle of your infrastructure till the way to end-of-life decommissioning.

HPE iLO 6 extends the hardware root of trust from protecting server firmware to now also protecting select storage and network controller firmware. Support for the DMTF Security Protection Data Model provides certificate-based controller authentication.

Delivered with an intuitive cloud experience

Simplify and transform your data infrastructure operations with the cloud experience for your HPE Alletra Storage Server 4140. Whether purchased or consumed as a service, you can now monitor and operate through intuitive HPE GreenLake for Cloud Ops Management SaaS and rich REST APIs.

Shift from owning and maintaining your server-based data infrastructure to simply consuming it as a service through HPE GreenLake, freeing up precious financial and people resources to accelerate other aspects of your data-driven initiatives.

HPE GreenLake for Compute Ops Management
HPE is intelligently transforming compute management with a completely new as a service experience that delivers greater security, simplicity, and efficiency. Discover a completely modernized compute management experience delivered through HPE GreenLake that securely streamlines operations from edge to cloud, and automates key lifecycle tasks (onboard, update, manage, and monitor HPE servers), bringing agility and greater efficiencies to wherever compute devices reside through a unified single browser-based interface.

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 designed for large-scale and high-security installations.

Milestone XProtect

XProtect Corporate 2024 R1 running on Windows Server 2022 Standard Edition uses the following components:

- Milestone XProtect Management Server
- Milestone XProtect Recording Server
- Milestone XProtect Management Client
- Milestone StableFPS device driver

Hardware

This solution uses the hardware components described in this section.

HPE Alletra Storage Server 4140

Four XProtect Recording Server virtual machines running on an HPE Alletra Storage Server 4140 and store live video data on internal disks.

- HPE Alletra Storage Server 4140
  - Dual Intel® Xeon® Gold 6438Y+ processors
  - 256 GB total memory
  - Two HPE SR932i-p Gen11 x32 Lanes 8GB Wide Cache PCI SPDM Plug-in Storage Controller smart array controller
  - One 10/25 Gb 2-port SFP28 BCM57414 OCP3 network adapter
  - Sixty-eight HPE 20 TB SAS 12G Business Critical 7.2K LFF HDDs
  - One HPE NS204i-u Gen11 NVMe Hot Plug Boot Optimized Storage Device

The HPE Alletra Storage Server 4140 has two pull-out drawers at the front for up to 68 LFF drives (34 disk slots per drawer) and the extended model with up to 92 LFF drives (46 disk slots per drawer). For verification, the model with 68 drives slots was used and 34 drives were configured per disk group in RAID 6 (32+2). A disk group was managed by one HPE SR932i-p Gen11 smart array controller. The RAID 6 was used to provide an improved fault tolerance at a higher disk count and high disk capacity.

The HPE NS204i-u Gen11 NVMe Hot Plug Boot Optimized Storage Device was used for the hypervisor as well as the virtual machine boot partitions.

Multiple storage volumes of equal size were created so that the same number of storage volumes were assigned to each recording server. For a consistent performance distribution, the storage volumes were evenly distributed across both disk groups.

Explore the features and benefits of HPE Alletra Storage Server 4140

HPE ProLiant DL Servers

One HPE ProLiant DL360 Gen10 Server was used as the Milestone XProtect Management Server:

- Two CPUs having four cores each
- 96 GB of RAM
- HPE FlexFabric 10 Gb 2-port network card

One HPE ProLiant DL360 Gen10 Server was used as the Milestone feed server:

- Two CPUs having four cores each
- 96 GB of RAM
- HPE FlexFabric 10 Gb 2-port network card

Explore the features and benefits of HPE ProLiant DL Servers.

Milestone XProtect Corporate components

Figure 1 illustrates XProtect Corporate components. It shows two networks, the management network with the connected components of Milestone XProtect Management Server, Milestone XProtect Management Client, Milestone XProtect Smart Client, and Milestone XProtect Recording Server. And the camera network with connected cameras and Milestone XProtect Recording server. A short description of each component follows. A full description of the XProtect Corporate components is available at the Milestone documentation website.

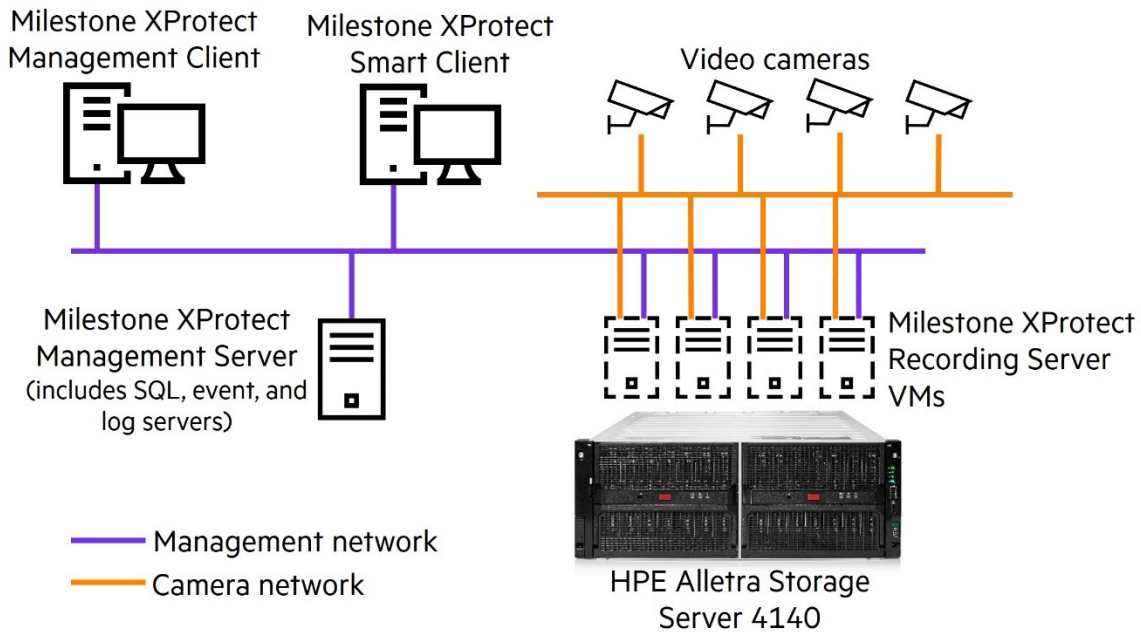

Figure 1. Milestone XProtect Corporate core components

Milestone XProtect Management Server

The Milestone XProtect Management Server is the central component of the Milestone XProtect video management software. It manages the overall system configuration, user permissions, camera settings, and event handling. It coordinates the various components of the XProtect system, ensuring seamless operation, scalability, and efficient management of video surveillance networks. The configuration of the surveillance system is stored in an SQL database. The SQL database can run on the Milestone XProtect Management Server or a separate SQL Server on the network.

Milestone XProtect Recording Server

The Milestone XProtect Recording Server is a core component, responsible for capturing, processing, and storing video and audio data from connected cameras as well as providing client access to both live and recorded audio and video. 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 integrations.

Milestone XProtect Log Server

The Milestone XProtect Log Server is responsible for storing log messages for the entire system. The server uses the same SQL Server as the management server system configuration database and is typically installed on the same server as the Milestone XProtect 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, the log server, and other components use an SQL database to store, among others, the system 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 Microsoft SQL Server Standard or Microsoft 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 drive improves the performance of the entire system.

Milestone XProtect Management Client

The Milestone XProtect Management Client is a feature-rich administration client for configuration and day-to-day management of parts included in 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 Milestone 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. Using the MIP SDK, users can integrate various types of security and business systems and video analytics applications, which you manage through XProtect Smart Client.

Verification environment overview

The Milestone verification process was used by running XProtect software with a given number of simulated cameras. To generate the appropriate camera workload, the StableFPS device driver developed by Milestone Systems was leveraged and a feed server was used by the StableFPS device driver to generate network load on the recording servers.

Verification testing

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

- Camera emulation Milestone StableFPS device driver Door_1920x1080_4Mbit_20_Motion
- H.264 video codec
- 30 frames per second (FPS)
- Motion detection enabled
- Live retention time set: three days
- Overall test duration of seven days
- The limits expected from a stable system: 4140
  - Network loads, both receiving and sending should not exceed 70% of available bandwidth
  - 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

The Milestone XProtect Management Server was installed on a dedicated HPE ProLiant DL360 Gen10 Server.

VMware ESXi™ version 7.0.3 was installed on the HPE Alletra Storage Server 4140. Four Milestone XProtect Recording Server virtual machines were deployed running Microsoft Windows Server 2022 Standard Edition. Each virtual machine had the following configuration:

- 15 vCPUs
- 16 GB of memory
- One network for management
- One network for cameras traffic
- Guest OS: Windows 2022 Server Standard Edition 64-bit
- Storage for video data

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

Verification result

Milestone confirmed that the HPE Alletra Storage Server 4140 is compatible with XProtect Corporate 2024 R1 for live recording. The verification test was performed using 680 cameras (Door_1920x1080_4Mbit_20_Motion); in other words, the total ingress bandwidth of 2720 Mbit/sec. Per virtual machine 170 cameras and an ingress bandwidth of 680 Mbit/sec.

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 is expected to be followed.

Camera throughput and storage capacity

Camera throughput is the key 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 requirements.

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

Separate OS and XProtect VMS volumes

With the Milestone XProtect Recording Server, it is important to use separate physical volumes (different partitions on the same disk are not good enough) for the OS and the XProtect VMS recordings.

HPE recommends using the HPE NS204i-u Gen11 NVMe Hot Plug Boot Optimized Storage Device for the operating system or hypervisor. The HPE NS204i-u Gen11 NVMe Hot Plug Boot Optimized Storage Device is a universal installation hot plug OS boot device that includes two 480 GB M.2 NVMe SSDs. This device doesn't take up a PCIe slot and auto-creates RAID 1 volume.

The XProtect VMS media database is stored on storage volumes that were created from a group of selected physical drives. As the HPE Alletra Storage Server 4140 is designed for high-density bulk storage it is good advice to use two HPE SR932i-p Gen11 storage controllers for a more balanced performance to capacity ratio. This configuration was used in the verification process, a single storage controller handled 34 drives.

To provide data redundancy, especially with higher capacity disk drives and higher drive count in a single RAID set, the recommendation is to use a RAID 6; however, if this is not desired, a RAID 5 can be used.

Summary

With Milestone XProtect as the foundation of your video surveillance, you can design an entire solution just the way you like it. Built on an open-platform architecture, Milestone XProtect enables you to customize your surveillance system and integrate other business applications for increased usability and performance. No more reason for compromise; now is the time to store video data in high resolution and high frames per second (FPS) for its entire long lifecycle in a performance and high-capacity optimized server. Benefit the HPE Alletra Storage Server 4140 and its server-based architecture as an XProtect recording server. It can be simply integrated into any existing or new Milestone XProtect environment. Based on its design for high-density bulk storage supporting up to 2.2 PB of storage in 4U, it fits perfectly into environments with very long video data retention time and limited rack space in the data center.

References

HPE GreenLake

HPE Alletra Storage Server 4140

HPE ProLiant DL Servers

Hewlett Packard Enterprise at Milestone MarketPlace

Learn more at

HPE.com/us/en/Storage/Alletra-4000.html

Visit **HPE.com**

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