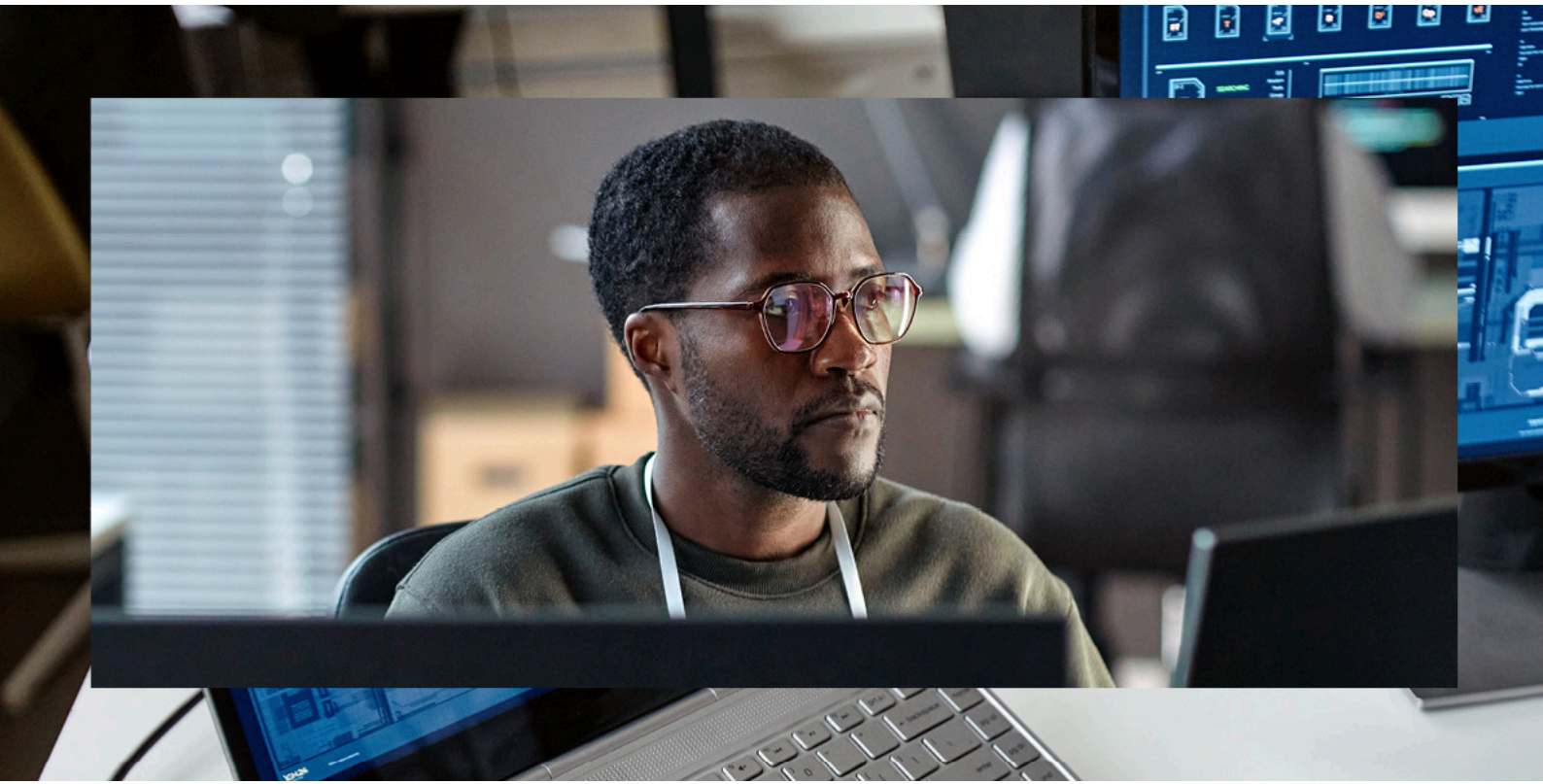
Hewlett Packard Enterprise

Technical white paper

Video surveillance verification with HPE MSA Gen7 Storage and Milestone XProtect

milestone



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Executive summary

This technical white paper provides guidance and best practice information for implementing HPE MSA Gen7 Storage in Milestone XProtect video management solutions. The information and recommendations shared in this paper are result of experience with XProtect software installed in a Hewlett Packard Enterprise 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 globally leading video management software (VMS). XProtect serves as the foundation of a video surveillance solution, offering you the freedom to build the entire system according to your preferences. Built on open-platform architecture, XProtect allows you to customize your surveillance system and integrate other business applications for enhanced usability and performance.

The HPE MSA portfolio of hybrid and all-flash storage solutions provides the essential shared storage infrastructure in Milestone XProtect VMS, balancing the trade-offs among budget, performance, and simplicity. Now in its seventh generation, the HPE MSA Storage portfolio has remained one of the leading entry-level shared storage solutions for HPE servers for nearly three decades.

Hewlett Packard Enterprise aims to continue the momentum and success achieved with previous generations of HPE MSA Storage in video surveillance. This has led HPE to verify HPE MSA Gen7 Storage with Milestone XProtect.

HPE MSA Gen7 Storage for Milestone XProtect

The HPE MSA Gen7 Storage portfolio provides three key advantages for customers looking to deploy entry-level shared storage, including:

The shared storage system anyone can use
HPE MSA Storage is easy to set up and deploy in minutes, requiring minimal technical knowledge. Designed for simplicity, it suits small businesses, remote offices, and departments with limited resources and expertise. No extensive training or manuals are needed to use it effectively.

Real performance you can see and feel
HPE MSA Storage is a leading entry-level storage array, providing excellent performance for various business use cases. It is optimized for multiple workloads, offering high performance read and write access for applications such as databases, virtualization, video surveillance, and backup and recovery.

Big or small, it's a great value
HPE MSA Storage offers affordability without compromising performance. It provides consistent, high performance through innovative design rather than expensive components. You can configure it as one of the market's most cost-effective storage systems or as a high performance or high-capacity option at a reasonable price. Whatever the configuration, HPE MSA Storage delivers great value, ensuring you don't have to compromise on performance or overspend.

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
The solution described in this technical white paper uses the hardware components described in this section.

HPE MSA 2070 Storage array

An HPE MSA 2070 iSCSI large form factor (LFF) storage array was used for storing live video data. HPE MSA 2070 Storage array configuration:

- HPE MSA 2070 10/25GbE iSCSI LFF Storage array model
  - Dual controller
- 3 HPE MSA 2U 12-drive LFF Drive Enclosure
- 48 HPE MSA 8TB SAS 12G Midline 7.2K LFF hard disk drives (HDD)

For the verification, 48 LFF drives were used and configured in a single MSA-DP+ RAID disk group owned by controller A. One storage volume per recording server was created and assigned.

Explore the features and benefits of HPE MSA Storage.

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 10Gb 2-port network card

Four HPE ProLiant DL380 Gen10 Servers were used as the Milestone XProtect Recording Servers. Configuration per server:

- Two CPUs having twenty cores each
- 384 GB of RAM
- HPE FlexFabric 10Gb 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. The second network shows the camera network with connected cameras and the Milestone XProtect Recording server. A short description of each component follows. A full description of the XProtect components is available at the Milestone documentation website.

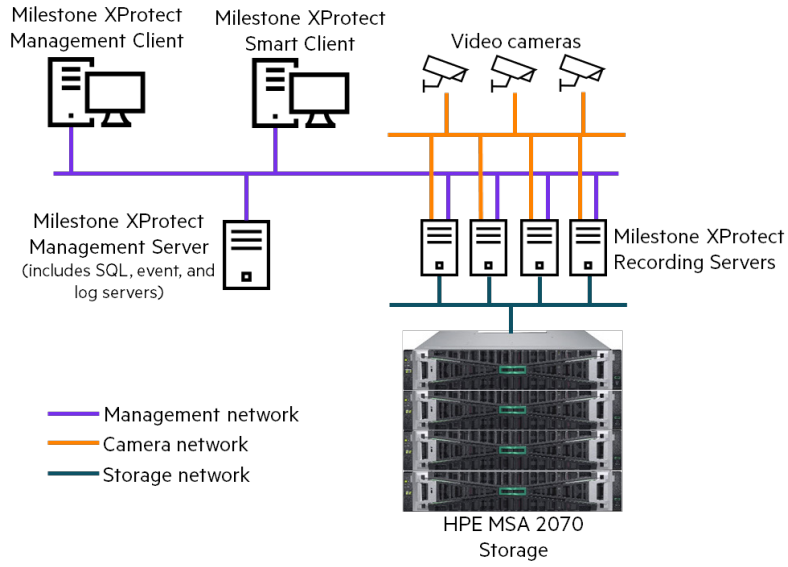

Figure 1. Milestone XProtect Corporate core components

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 Milestone XProtect Recording Server is often used.

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 XProtect Management Server system configuration database. It is typically installed on the same server as the Milestone XProtect Management Server. However, it can be installed on a separate server if the XProtect Management Server or XProtect 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 Edition 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 Milestone StableFPS device driver developed by Milestone Systems was used to generate network and storage load.

Verification testing

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

- Camera emulation Milestone StableFPS device driver Door_1920x1080_8Mbit
- H.264 video codec
- 30 frames per second (FPS)
- Motion detection enabled
- Overall test duration of seven days
- The limits expected from a stable system:
  - Network loads, both receiving and sending, should not exceed 70%[1] of available bandwidth
  - Percent committed bytes should not exceed 70%[2]
  - Disk latency, reading, or writing should not exceed 200 milliseconds[3]
  - Media lost/sec should not exceed 1%[4]

[1, 2, 3, 4] The limits shall never be exceeded, measured as an average value over any one-hour period during the full test period of seven days.

Verification environment

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

Four Milestone XProtect Recording Servers were deployed, each on an HPE ProLiant DL380 Gen10 Server running Microsoft Windows Server 2022 Standard Edition. The servers were configured with one dual port 10GbE network interface card. Each port was assigned a static IP address. These connections supported access to the four volumes presented from the HPE MSA 2060 Storage array through the iSCSI connections. These connections also supported management functions between this server and the Milestone XProtect Management Server.

Figure 2 provides a high-level architectural view of the server and storage setup deployed in the HPE lab for conducting the verification test.

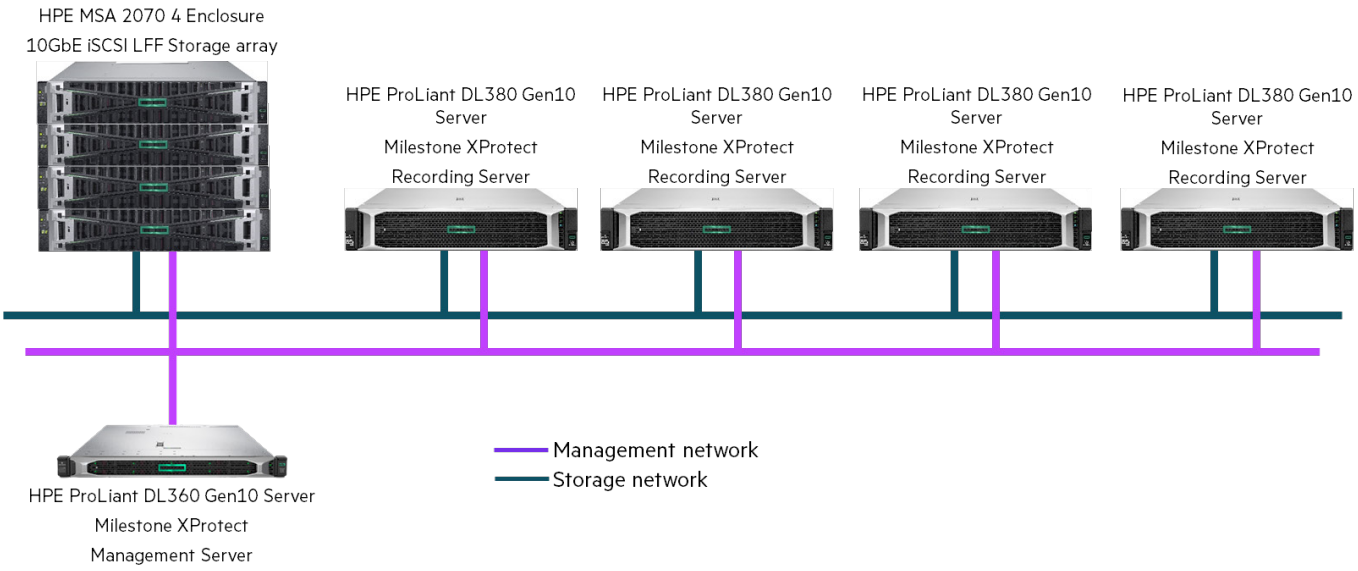

Figure 2. High-level architectural view of the verification setup

Verification result

Milestone confirmed that the HPE MSA 2070 Storage array is compatible with Milestone XProtect Corporate 2024 R1 as live recording storage. The verification test was performed using 300 cameras (1920x1080_Stripes_8Mbit, continuous streaming)—in other words, a total storage bandwidth of 2400 Mbit/s.

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.

Note

If the same drive is used for both the Windows OS and XProtect VMS media data, at times Windows will perform various operations that require a large percentage of disk access. This will potentially impact the XProtect VMS recording performance and lead to lost recordings.

RAID levels

HPE MSA Gen7 Storage features support multiple levels of RAID-based data protection, see Table 1.

RAID refers to disk groups in which part of the storage capacity may be used to achieve fault tolerance by storing redundant data. The redundant data enables the system to reconstruct data if a disk in the disk group fails.

In the HPE MSA Storage Management Utility, it is possible to create MSA-DP+, RAID-1, RAID-5, RAID-6, and RAID-10 disk groups.

Table 1. RAID level description

RAID level	Min. disks	Description
1	2	Disk mirroring
5	3	Block-level data striping with distributed parity
6	4	Block-level data striping with double-distributed parity
10 (1+0)	4	Stripes data across multiple RAID-1 subgroups
MSA-DP+	12	Distributed erasure coding with dual disk failure protection using an 8+2 stripe width

A more comprehensive description of RAID level is available in the **HPE MSA 2070/2072 Storage Management Guide** at Support Center of HPE.

HPE recommends using MSA-DP+ RAID level. MSA-DP+ offers improved performance, availability, and very fast rebuild times compared to traditional parity RAID by utilizing erasure coding technology. MSA-DP+ includes distributed spare capacity (default is equal to 2x the largest drive) and does not use traditional spare drives.

When having less than 12 disks in a RAID group, the recommendation is to use a RAID 6 for a higher data redundancy, especially with higher-capacity disk drives. However, if data redundancy is a lower concern RAID 5 can be used.

Summary

To complete a video surveillance solution with shared storage, a scalable, simple-to-manage, secure, and affordable storage solution is a must. The HPE MSA 2070 Storage is an excellent storage platform for use with Milestone XProtect software. It delivers the performance, availability, and scalability demanded by Milestone XProtect.

For dynamic workloads, the HPE MSA 2070 Storage array provides the flexibility to scale both performance and capacity to meet video surveillance workloads. Start small and scale as needed.

The HPE MSA 2070 Storage is an ideal infrastructure for shared storage in a Milestone XProtect solution.

References

HPE MSA Gen7 Storage

HPE ProLiant servers

HPE GreenLake

HPE at Milestone technology partner finder

Learn more at

HPE.com/Storage/MSA

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