HPE Storage

Technical white paper

HPE MSA Storage configuration for Bosch Video Management System

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Contents

Executive summary

Bosch Video Management System (BVMS) is an IP video security solution that provides seamless management of digital video, audio, and data across any IP network. It offers the best video management system to support Bosch video surveillance devices, leveraging the unique capabilities of Bosch cameras and recording solutions. The vast amounts of data generated require a powerful storage solution, and HPE MSA Storage arrays provide the answer.

Target audience

The audience for this paper includes solution architects, system integrators, project managers, storage administrators, and system support personnel who are involved in planning, designing, and configuring a BVMS solution.

Document purpose

This technical white paper provides guidance and best practice information for implementing HPE MSA 2060 Storage arrays in BVMS environments. The information and recommendations shared in this paper result from experience with BVMS installed in Hewlett Packard Labs.

Introduction

The HPE MSA Storage solution for BVMS was tested on the HPE MSA 2060 Storage array, a flash-ready hybrid storage system designed to deliver hands-free, affordable application acceleration. This array offers a combination of simplicity, flexibility, and advanced features. It is best suited for small-to-medium BVMS deployments and is now certified for BVMS installations in which IP cameras record their video data directly through the iSCSI protocol to the HPE MSA Storage array.

Solution overview

This section describes the hardware and software components that were used during certification testing for the BVMS with HPE Aruba Networking and HPE MSA Storage arrays solution.

Software

BVMS is a powerful video software that is specialized for managing and analyzing video data to provide better situational awareness. It is designed to scale from small to large installations.

Bosch Video Management System

BVMS version 12 running on Windows Server 2022 Standard edition has the following components:

- **A single BVMS Management Server** running on an HPE ProLiant DL380 Gen11 server, providing management, monitoring, and control of the complete solution
- **A BVMS Operator Client** running on a workstation and used for replays of videos during testing

Figure 1 shows the main components of the system.

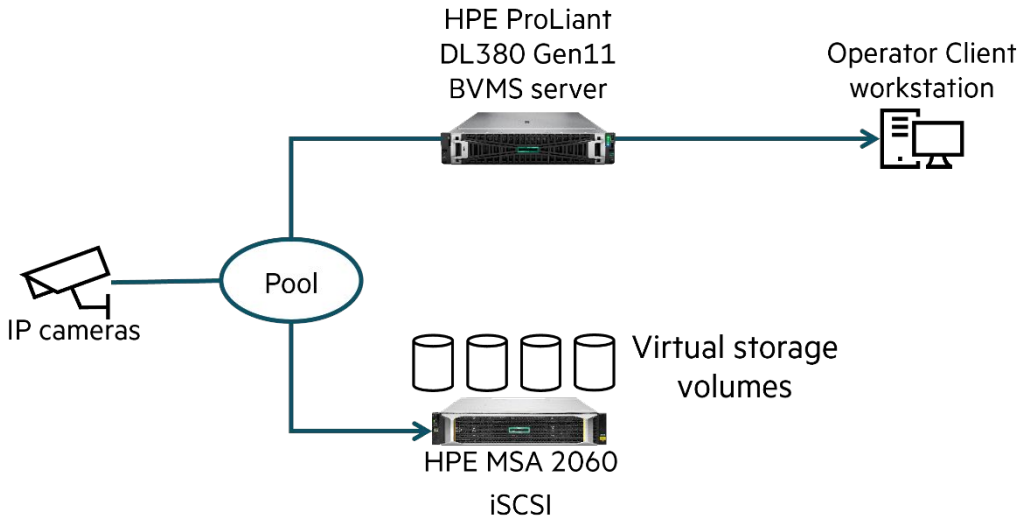

Figure 1. BVMS architecture

Hardware

Key hardware components of the solution include the storage array, the server, and the network.

HPE MSA 2060 Storage array

An HPE MSA 2060 10GbE iSCSI large form factor (LFF) Storage array was used for storing live video data.

The HPE MSA 2060 Storage configuration included the following components:

- **Chassis:** HPE MSA 2060 10GbE iSCSI LFF Storage array
  - **HPE MSA 2060 Storage, FW bundle:** IN210R004
- **Storage controllers:** Dual hot-swappable active-active 10 Gb iSCSI storage controllers
- **Disk drives:** Twelve HPE MSA 8 TB SAS 12 Gb Midline 7.2K LFF hard disk drives (HDD)
- **Disk group:** All twelve disks in a single disk group were configured in RAID level HPE MSA-DP+.
- **Volumes:** Four 19.4 TB volumes were created, presenting the complete usable capacity.

HPE ProLiant DL380 Gen11 server

During testing, one HPE ProLiant DL380 server was used for the BVMS management, and a workstation was used for the Operator Client.

The server had the following configuration:

- Two CPUs, with 20 cores each
- 384 GB of RAM
- HPE FlexFabric 10 Gb 2-port network card

Network

Typically, all components of a BVMS solution are connected to one network. It is important to size the network appropriately to provide sufficient bandwidth everywhere.

Cameras are commonly connected to Power over Ethernet (PoE) network switches. The advantage of PoE switches is that they simultaneously power the IP cameras and send video and audio over a single Ethernet cable, which simplifies deployments.

Note

For more information about the portfolio of HPE Aruba Networking switches, including PoE switches, see HPE Aruba Networking.

Bosch certification process

The Bosch certification testing was conducted in Hewlett Packard Labs. The focus was on verifying the capabilities of the HPE MSA 2060 Storage array in a BVMS environment. In this setup, every IP camera had written its video data directly through iSCSI to the HPE MSA Storage array.

The final certification test of the HPE MSA Storage array ran over a period of seven days and at 100% capacity utilization.

The certification test was carried out under the following conditions:

- A maximum camera throughput of 730 Mbps
- 240 parallel iSCSI camera streams distributed over two HPE MSA Storage iSCSI ports
- Eight concurrent replays
- A simulated disk failure that triggered a disk group reconstruction and rebalancing

The camera streams had the following specifications:

- **Camera:** Camera device simulator from Bosch
- **Codec:** H.264
- **Camera bitrate:** A mix of 2 Mb/s, 5 Mb/s, and 7.5 Mb/s
- **Frame rate:** 30 FPS
- **Resolution:** 1920 x 1080p

The HPE MSA 2060 Storage array met the system requirements specified by BVMS.

Best practices and configuration guidance

The configuration guidance provided in this section complements the guidance in BVMS and HPE MSA Storage documentation. The assumption is that those instructions have been understood and followed.

Design considerations

For the sizing and configuration of the HPE MSA Storage array in a BVMS environment, it is important to have the following information available:

- Number of cameras
- Total camera throughput
- Total required or estimated storage capacity

HPE MSA Storage capacity

Ensure that the HPE MSA Storage array provides sufficient storage capacity to store the all-video data and fulfill the required retention time.

When creating a disk group, Hewlett Packard Enterprise recommends using the HPE MSA-DP+ protection level. HPE MSA-DP+ is a RAID type that offers superior performance, availability, flexibility, and rebuild times as compared to other disk groups, especially those that employ parity-based RAID schemes. HPE MSA-DP+ uses distributed RAID to allow disk groups to grow from 12 to 128 drives incrementally and to feature integrated sparing.

HPE MSA Storage preparation

When using the HPE MSA Storage array in a BVMS environment, Hewlett Packard Enterprise recommends that you enable the **default mapping** feature, which allows multiple initiators (cameras) to access the volume. If volumes are added through the iSCSI protocol as LUNs to a Bosch VRM Video Recording Manager (VRM) pool, the VRM distributes storage capacities of LUNs to the encoders, while handling load balancing between multiple LUNs.

The default mapping feature is available in HPE MSA Storage firmware bundle version IN210R004. If you are running an earlier version, Hewlett Packard Enterprise highly recommends that you update to version IN210R004.

The default mapping setting is disabled by default. To enable it, enter the CLI command `# set advanced-settings default-mapping enabled`.

By default, BVMS accepts LUNs up to a size of 2 TB. In a BVMS deployment, it is typical for multiple 2 TB LUNs to a be assigned to a VRM pool. There is also an option to allow LUNS larger than 2 TB, up to a maximum of 64 TB. To avoid running into limitations, Hewlett Packard Enterprise recommends that you select a LUN size between 2 TB and 64 TB (for example, 8–16 TB per LUN).

The HPE MSA 2060 Storage models come with dual hot-swappable active-active controllers, which enables users with a balanced configuration to continue recording if one iSCSI port fails or if one controller reboots or fails.

Note
In this context, a balanced configuration means that the same number of LUNs are mapped through the ports of controller A as through those of controller B.

Hewlett Packard Enterprise recommends using, in total, a minimum of 8 LUNs—and all of the same size. Mapping four LUNs through a port of controller A and the other four LUNs through a port of controller B helps to ensure that sufficient resources are available at one controller if the other fails or reboots or if the active iSCSI port becomes unavailable.

If one of the failure scenarios happens, and the cameras that are connected through the port or controller cannot continue to record, the VRM service recognizes the situation and reconnects the cameras to the available LUNs so that they can continue recording. Although the LUNs that are mapped through the failed port or controller become inaccessible in the moment, they remain valid. After the iSCSI port or controller becomes available again, all data can be accessed.

Figure 2 shows the design of HPE MSA Storage configuration in a BVMS solution. It is necessary to create a disk group that is owned by a single controller, and as part of creating a disk group, you must select the RAID level. If 12 or more disks are involved, Hewlett Packard Enterprise recommends using RAID level HPE MSA-DP+, a RAID type that offers better performance, availability, flexibility, and rebuild times as compared to other disk groups, especially those that employ parity-based RAID schemes.

After the disk group becomes available, the next task is to create the LUNs that should be used. The CLI command `# create volume` is used to create volumes for default mapping. The syntax must specify the HPE MSA Storage virtual pool in which to create the volume, the size, the controller ports by which the host can access the volume, the usage-type (select **others**), the LUN number, and the volume name.

Note
Each LUN number should be used only once.

For example, the following command creates a 4000 GB volume with the name `vol_1` in pool A and maps it with LUN 1 through port A1:

```
# create volume pool A size 4000 GB ports a1 usage-type other lun 1 vol_1
```

When specifying the port, it is important to specify the controller ID and the port number. A volume should be mapped through a single port only. BVMS with HPE MSA Storage does not support multipath I/O (MPIO).

After the volumes are created, you can continue adding the storage LUNs to the VRM pool.

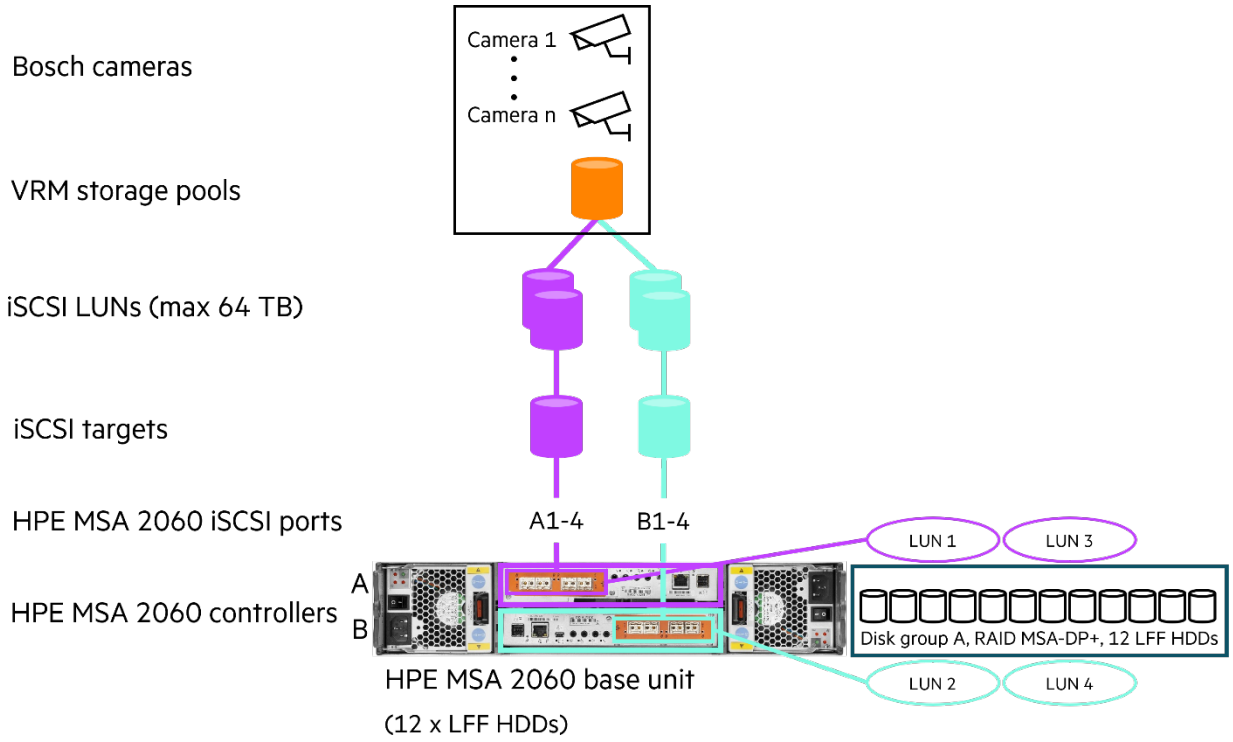

Figure 2. BVMS design with HPE MSA Storage configuration

Adding HPE MSA Storage LUNs to BVMS

The Pool dialog box in BVMS, shown in Figure 3, is where you specify all the information required to configure an HPE MSA Storage array as an iSCSI device to BVMS.

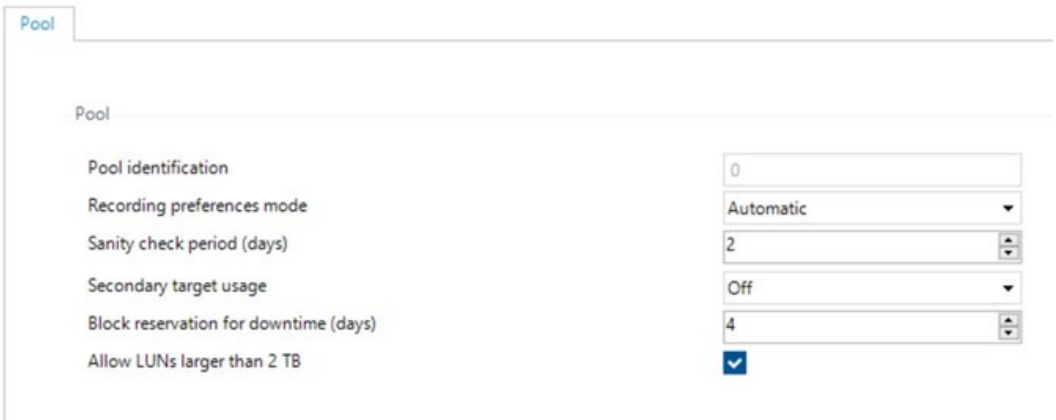

Figure 3. Pool dialog box in BVMS

Note

When using LUNs larger than 2 TB, be sure to set the checkmark in this dialog box to allow LUNs larger than 2 TB.

Adding an iSCSI device manually

An iSCSI device must be added to each HPE MSA Storage iSCSI port. The procedure for adding an iSCSI device includes the following steps:

1. In the **Add iSCSI Device** dialog box, specify the required information:
   - **Name:** Name of the HPE MSA Storage array

     Choose a simple name that also includes the used iSCSI port.
   - **Network address:** The network address of the HPE MSA Storage iSCSI port that will be used to access the storage volume
   - **iSCSI device type:** Select **Other**.
   - **User name:** Not required
   - **Password:** Not required

Figure 4. BVMS Add iSCSI Device dialog box

2. Add the HPE MSA Storage LUNs to the BVMS pool manually by opening the menu of the previously added iSCSI device and selecting **Add Target**.

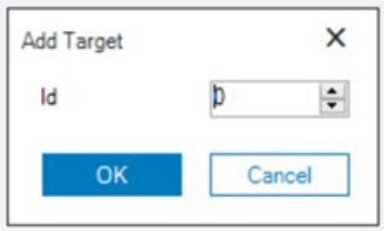

Figure 5. BVMS Add Target dialog box

3. In the **Add LUN** dialog box, enter the LUN ID of the HPE MSA Storage LUN to be added to the BVMS pool.

   Use the same LUN ID that is used as the LUN ID in the HPE MSA Storage array.

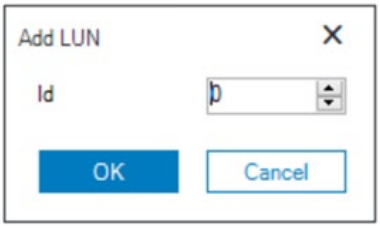

Figure 6. BVMS Add LUN dialog box

4. After all the LUNs have been added, select all of them and click **Format LUN** to format them.

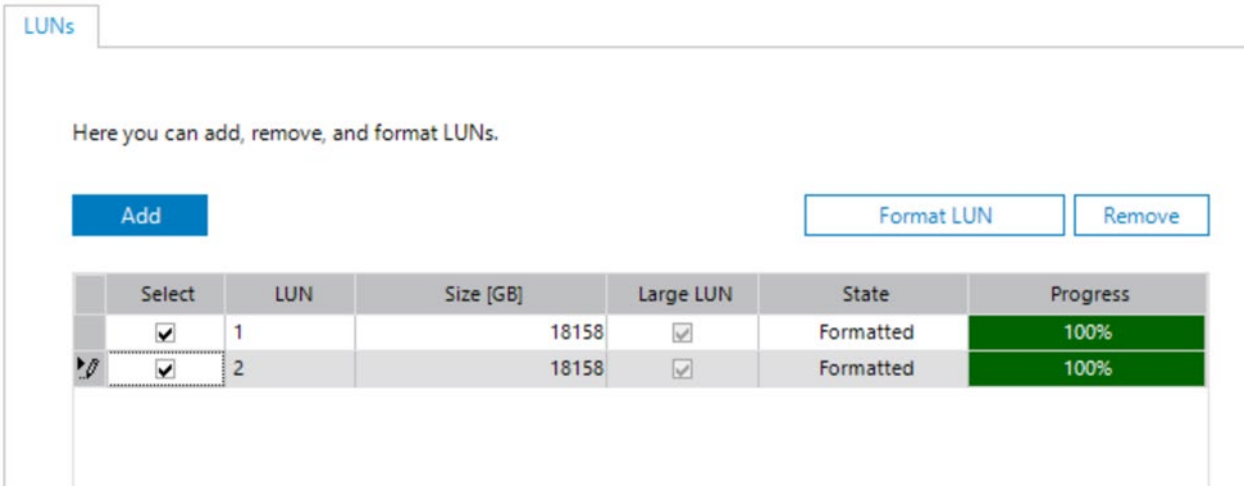

Figure 7. BVMS LUN dialog box

Load Balancing dialog box

In the Load Balancing dialog box, you can set the upper limits for the permitted bit rate and the appropriate number of simultaneous iSCSI connections for each iSCSI system:

- **Maximum bit rate (Mbps):** 730
- **Maximum number of iSCSI sessions:** 241

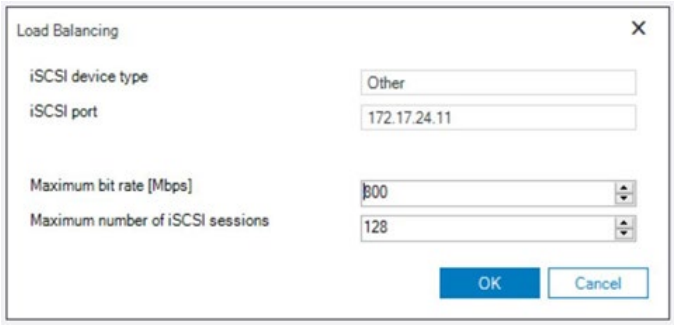

Figure 8. BVMS Load balancing dialog box

HPE MSA Storage periodic health checks

The HPE MSA Storage Health Check tool provides a free and easy way to check both an array's health and its conformity to best practices that maximize its availability. HPE MSA Storage Health Check is especially helpful for environments in which an array does not have access to the internet and for which a local manifest is not maintained because it provides a list of available firmware updates. Hewlett Packard Enterprise recommends that you implement a regular schedule for uploading logs securely to HPE MSA Storage Health Check and reviewing the subsequent reports.

For more information about the HPE MSA Storage Health Check tool, visit MSA Storage Health Check.

Summary

Hewlett Packard Enterprise offers a broad portfolio of servers, storage, and networking to meet the infrastructure needs of BVMS solutions.

To complete a video surveillance solution, a scalable, simple-to-manage, secure, and affordable storage solution is a must. The HPE MSA 2060 Storage array is an excellent storage platform for use with small and medium BVMS deployments. It delivers the performance, availability, and scalability demanded by BVMS. The HPE MSA 2060 10GbE iSCSI LFF Storage array has successfully completed the certification process for use with BVMS.

Resources

Bosch Security and Safety Systems
boschsecurity.com/us/en/

HPE MSA 1060/2060/2062 Storage Management Guide
support.hpe.com/hpesc/public/docDisplay?docLocale=en_US&docId=a00128580en_us

HPE MSA Health Check User Guide
support.hpe.com/hpesc/public/docDisplay?docLocale=en_US&docId=a00105289en_us

HPE MSA GEN6 Virtual Storage
hpe.com/psnow/doc/a00103247enw

HPE MSA 1060/2060/2062 CLI Reference Guide
support.hpe.com/hpesc/public/docDisplay?docId=a00105313en_us&docLocale=en_US

HPE MSA 1060/2060/2062 Storage Arrays — Best practices
hpe.com/psnow/doc/a00105260enw

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