



# **VIDEO SURVEILLANCE SOLUTION WITH HPE APOLLO 4000 SYSTEMS WITH SCALITY RING SCALABLE STORAGE AND GENETEC SECURITY CENTER**

Solution overview and best practices

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## EXECUTIVE SUMMARY

Digital video surveillance is an integral part of any organization's security plan. Video surveillance helps maintain public safety at arenas, transportation centers, and throughout cities. Video surveillance helps maintain safe and secure public and private facilities, monitoring designated areas for any activity or behavior that is out of place. Incoming video streams can be fed into value-add, automated video analytics providing extended security through access control monitoring, facial recognition, and license plate recognition. Genetec, a leader in video surveillance security, offers Security Center Omnicast (Omnicast) an open, scalable IP video management solution providing video surveillance for organizations of all sizes. Omnicast is one component of Genetec Security Center, a unified security platform providing a single, simplified interface to manage video surveillance, analytics, situational awareness, and command and control operations.

The video management solution must be paired with a storage system that delivers performance, security, availability, and scalability. Live video data is an asset that needs to be protected and properly managed throughout its lifecycle. It is critical that live video streams be recorded quickly and accurately without data loss. Stored video surveillance data can provide valuable evidentiary documentation to security, regulatory, and law enforcement agencies. Longer retention periods increase the probability of building a full picture of criminal activity, including not only the commission of the crime itself, but possible critical activity prior to the incident. The storage system must deliver the write performance demanded by video recording while simultaneously meeting the read performance demanded by video playback. The storage system must easily expand, permitting organizations to take advantage of newer camera technologies supporting higher picture resolutions and higher frame rates, as well as taking advantage of lower camera costs that permit increasing camera count. Hewlett Packard Enterprise (HPE) Apollo 4000 Systems with Scality RING Scalable Storage provides the balanced performance, the scale-out capacity, and the high availability and security demanded from a video management solution such as Genetec Security Center Omnicast.

**Document purpose:** Genetec provides a self-certification program for storage vendors intending to certify their platform with Genetec Security Center. Hewlett Packard Enterprise is already certified as a Genetec technology partner with the HPE 3PAR storage array.<sup>1</sup> This technical white paper highlights Hewlett Packard Enterprise activities to achieve Genetec certification for HPE Apollo 4000 Systems with Scality RING Scalable Storage and Genetec Security Center 8.

**Target audience:** 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.

Designing and implementing a video surveillance management system is a multidisciplinary activity requiring expertise in:

- Video recording technologies and camera hardware
- The features and capabilities of the chosen video management software
- Networking—to configure a secure reliable network meeting the performance demands of continuous video streams
- Server platforms—to handle the processing and I/O demands on the recording and playback systems
- Storage systems—to configure a system providing performance, security, high availability, and scalability

These disciplines must act together with added input from facility and security managers and security operators familiar with corporate and regulatory policies and guidelines.

## INTRODUCTION

Genetec invites storage vendors to be part of the Infrastructure Partner Certification Program. This program is designed to qualify solutions from storage vendors to ensure optimal use with Genetec Security Center and demonstrate seamless integration with Genetec software. Certification requires successful completion of a prescribed certification test plan. The test plan describes four test cases designed to measure the total throughput a storage unit can sustain while the Genetec Archiver (the server that receives and processes incoming data streams) is in file deletion mode. Only 1 TB of storage space is allocated to the Archiver to execute the tests.<sup>2</sup> The Archiver will fill the 1 TB of space and will then delete the oldest video files to make room for incoming files. The test starts when the Archiver log starts recording `file deleted` messages. The test must run for 24 hours after this point. During this time the throughput should remain constant and no `Archiving Queue Full` or `RTP packet lost` messages should be present in the Archiver log file. In addition to recording, each test requires playback activated on a specific number of cameras. Playback starts within the last two hours of the 24-hour test period.

For this certification, Hewlett Packard Enterprise deployed the HPE Apollo 4000 Systems with Scality RING Scalable Storage with the Scality RING SMB interface, providing the storage unit defined for the Genetec Archiver.

<sup>1</sup> See [genetec.com/partners/technology-partners/company-profile?pld=61](https://www.genetec.com/partners/technology-partners/company-profile?pld=61)

<sup>2</sup> Volume quotas were used in the Scality RING to limit the SMB share size to a 1 TB capacity.



## SOLUTION OVERVIEW

A minimum of three physical servers are required to run the certification tests.

**Main Genetec Server**—this is the only server in the system that hosts the Directory role. This server is installed first so other servers can connect to it. The Directory gives each member system its identity. All other servers in the Security Center system must connect to the main server to be part of the same system. There is only one main server in any Genetec Security Center configuration. The main server also acts as the license server for the environment. For the certification tests, two Genetec Security Center Client packages, Security Desk (for playback) and Config Tool (for configuring the Archivers), were installed on the Main Genetec Server.

**Genetec Expansion Server**—to increase the efficiency, availability, and scalability of the Genetec Security Center system, expansion servers are added to provide various functions, referred to as roles. One expansion server is required for the certification test. This expansion server is assigned the Archiver role. Expansion servers may be added to the Security Center system at any time.

**Camera simulator**—Genetec provides a camera simulation utility as part of the certification package. The Genetec Protocol Unit Simulator (GPUS) processes generate the appropriate number of camera data streams (number of cameras times the throughput per camera) required to be sent to the Archiver for each test.

FIGURE 1 provides a high-level architectural view of the server and storage setup deployed in the HPE lab for conducting the certification tests.

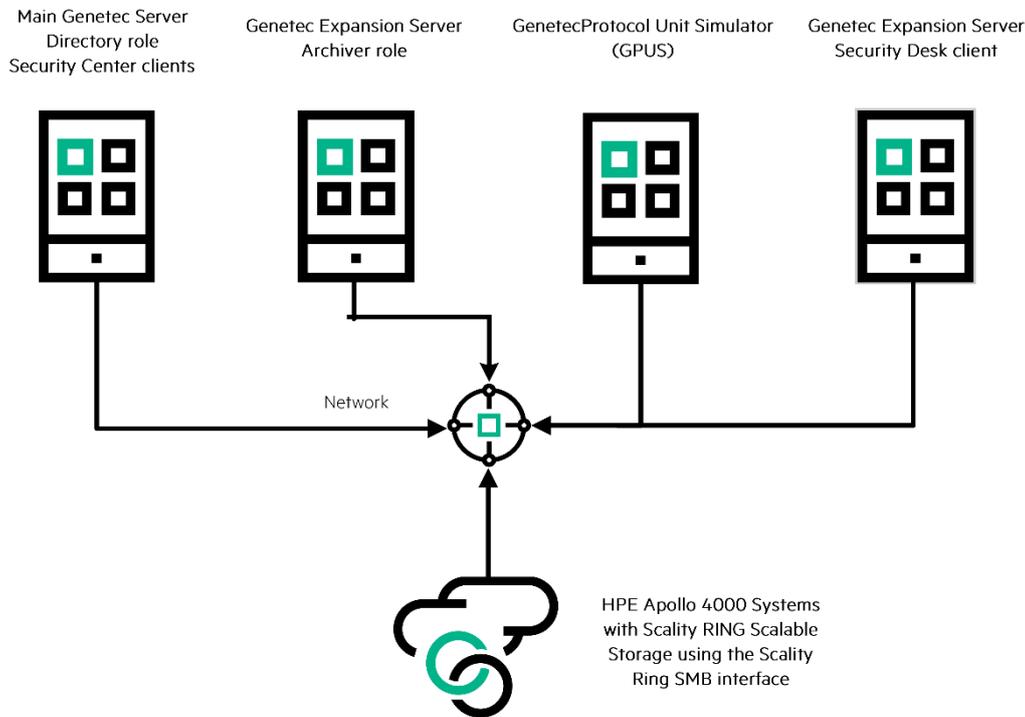
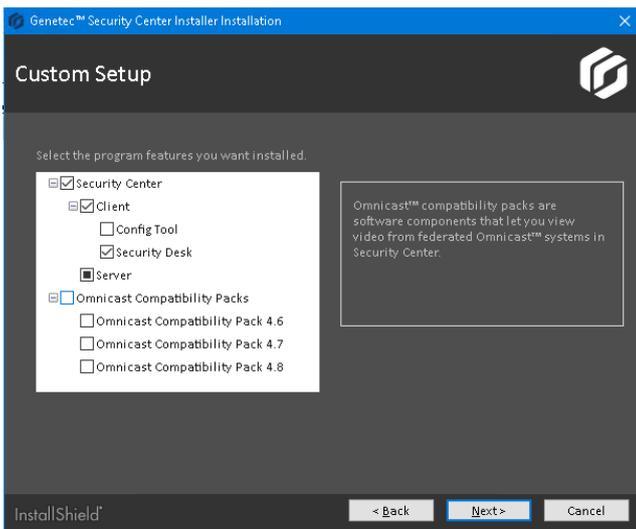


FIGURE 1. Simplified architectural diagram of the Genetec certification testing configuration

The certification test plan permits adding another expansion server to the environment for running the Security Desk client in case the playback goals for the test cases cannot be met by the Directory server alone. A second Security Desk client was added to the HPE certification test lab environment for playback. The Security Center clients are added during the installation of Security Center Server or can be added on later. FIGURE 2 illustrates adding the Security Desk client to an existing Security Center server installation.





**FIGURE 2** Adding the Security Desk client to an existing Security Center server

The Genetec certification test plan specifies using 1 GbE network connections at a minimum between the GPUS and the Archiver servers. However, in the HPE lab, 10 GbE connections were used instead.

In the HPE lab the GPUS server used three 10 GbE ports to send data to the Archiver. The Archiver server used a single 10 GbE port to receive data from the GPUS and send the video data to the Scalify RING SMB share.

## SOLUTION COMPONENTS

### Hardware

#### HPE ProLiant DL380 servers

The Main Genetec Server and the GPUS server in [FIGURE 1](#) are HPE ProLiant DL380 Gen9 servers, each having two physical Intel® Xeon® E5-2699 v3 CPUs with eight cores each and 256 GB of RAM. The Genetec Archiver server and the second Security Desk client server are both HPE ProLiant DL380 Gen10 servers, each with two physical Intel® Xeon® Gold CPUs having 18 cores each and 128 GB of RAM.

Genetec Security Center does not support UNIX®/Linux® operating systems. All servers depicted in [FIGURE 1](#) ran Windows Server 2016 or 2019 Datacenter.

#### HPE Apollo 4000 Systems with Scalify RING Scalable Storage

HPE Apollo 4000 Systems with Scalify RING Scalable Storage is a software-defined storage, petabyte-scale object storage solution that is intended for the software-defined data center. Scalify RING software is designed to create unbounded scale-out storage systems to consolidate and protect data used by multiple applications and workloads, including file and object applications. Scalify RING software provides a set of intelligent services for data access, data protection, and systems management. The top layer of data access services offers native file (SMB/NFS) and S3-compatible cloud object storage interfaces for applications.

Scalify RING's advanced routing capabilities, configurable data management, and software-defined architecture afford full system availability and uptime during planned and unplanned events, including hardware failures, hardware refreshes, capacity upgrades, and software upgrades. HPE Apollo 4000 Systems with Scalify RING Scalable Storage is designed to be self-managing and autonomous, thus freeing administrators to work on other value-added tasks. The software is deployed as a distributed system on a minimum cluster of three storage servers. This system can be seamlessly expanded online to thousands of physical storage servers as the need for storage capacity grows.

Scalify RING supports network speeds of 10 GbE, 40 GbE, and 100 GbE. With multiple fast network ports bonded together and built-in load-balancing feeding multiple SMB connectors at the same time, Scalify RING and the network connections to it should not become a performance bottleneck.

Given proper configuration considerations, HPE Apollo 4000 Systems with Scalify RING Scalable Storage can support NFS file and S3 object interface use cases along with the SMB interface required for Genetec Omnicast.

See [scality.com/products/ring/](https://scality.com/products/ring/) to further explore the features and benefits of Scalify RING.



## Application software

### Genetec Security Center Omnicast

Genetec Security Center 8 is a unified security platform that seamlessly blends Genetec's IP security and safety systems within a single innovative solution designed for large-scale, high-security deployments. Genetec Security Center Omnicast is the IP video surveillance system of the Genetec Security Center platform.<sup>3</sup> Organizations requiring seamless management of digital video, audio, and data across any IP network choose Omnicast for the following reasons:

- Grow the system beyond thousands of cameras
- Freedom to choose from a variety of cameras, encoders, and CCTV equipment
- Customize the system to meet particular corporate and legal requirements
- Decrease the learning curve and reduce training costs with a simplified, integrated management interface
- Ensure live and archived video data is always available and is protected
- Unify the video surveillance system with other security and business systems, such as Genetec Synergis access control and AutoVU automatic license plate recognition
- With Omnicast's open architecture, Security Center deployments can be enhanced with devices and add-on software/analytics to match growing security needs.

Security Center's Archive Transfer feature allows dynamic management regarding where video recordings are stored. Recordings can be moved from one Archiver to another within a local site as well as between remote and federated locations. Transfers can be on-demand or scheduled allowing efficient management of network bandwidth utilization. Filtering can be applied so that archived recordings only retain videos of interest. Older recordings can be transferred to less expensive storage equipment—reducing your hardware investment when your organization has requirements for long-term video retention.

## GENETEC CERTIFICATION TESTING

### Logical data flow

The certification package includes the GPUS camera simulation software package. This software is installed on a dedicated server (see [FIGURE 1](#)). Multiple GPUS processes are executed on the same server. Each GPUS process is associated with the IP address of a network adapter port on the GPUS server. Multiple cameras are created for each GPUS process. Each camera assigned to the GPUS process has a unique HTTP port. Configuring multiple NIC ports on the GPUS server allows the total workload of all the generated camera streams to be spread across multiple interfaces. The defined cameras, initially in a down state, must be manually started before the GPUS process begins sending the video streams out on the network.

The Genetec Config Tool is executed from the Main Genetec Server to add an Archiver role to the expansion server. One of the resources specified for an Archiver is the location of the video archive. When using the Scalify RING SMB interface this entails specifying the IP address of the SMB server along with the name of the SMB share (for example, \\10.10.20.161\share1). The Config Tool is then used to add the individual video units (cameras) to the Archiver. This activity consists of specifying the IP address of the GPUS process associated with the cameras along with the range of HTTP ports assigned to the cameras.

Data is now flowing from the GPUS to the Archiver. The Archiver server processes and indexes the data streams and sends the data to the respective SMB shares for storage.

When playback of archived video is initiated at the Security Desk (running on the Main Genetec Server), the request goes to the Archiver server, which in turn fetches the data from the SMB share. The Archiver then pushes the video data back to the Security Center Client system for display.

At any given point in time the Archiver is receiving camera data from the GPUS—writing that data to the Scalify RING SMB share—and in response to a playback request, reading data from the Scalify RING SMB share and writing that data out to the Security Desk server for display.

### Certification test cases

The certification test plan consists of four test cases. The number of cameras and recording bit rate per camera are specified for each test case. Specifications are given for both recording and playback operations. The total expected throughput to the storage system is determined by multiplying the number of cameras times the bit rate per camera.

<sup>3</sup> For more information on Genetec Security Center see [genetec.com/solutions/all-products/security-center](https://www.genetec.com/solutions/all-products/security-center).



TABLE 1 shows the camera recording and playback parameters Genetec specifies for each of the four test cases. Two test cases focus on recording a continuous video stream (test case 1 and test case 3) and two test cases focus on recording on motion detection only (test case 2 and test case 4). The test specifications required that the number of playback streams be equal to 20% of the incoming throughput divided by the stream bit rate.

**TABLE 1** Genetec certification test case definitions

Mode	Test case 1	Test case 2	Test case 3	Test case 4
<b>Recording</b>				
Recording camera rate	1 Mbps	1 Mbps	5 Mbps	5 Mbps
Number of recording cameras	300	100	60	30
Recording throughput	300 Mbps	100 Mbps	300 Mbps	150 Mbps
Recording stream for all cameras	Continuous	On motion	Continuous	On motion
Motion detection for all cameras	Disabled	Archiver motion detection enabled	Disabled	Archiver motion detection enabled
<b>Playback</b>				
Number of cameras viewed during playback	60	20	12	6

**Certification results**

Hewlett Packard Enterprise submitted the execution results for each of the four test cases to Genetec. The HPE Apollo 4000 Systems with Scalality RING Scalable Storage using the Scalality RING SMB connector met or exceeded the expected throughput requirements of the Genetec performance test plan for each test case.

**EXPANDING THE GENETEC ENVIRONMENT**

The Genetec environment can be expanded in two ways:

- Adding new expansion servers and assigning them the Archiver role
- Modifying an existing expansion server by assigning additional Archiver roles

**IMPORTANT**

Genetec has two rules when configuring an archiver. First, an Archiver is limited to 300 cameras maximum. Secondly, an Archiver is limited to 300 Mbps throughput maximum.

Hewlett Packard Enterprise expanded the certification environment (see FIGURE 1) by adding five expansion servers and assigning each an Archiver role. In addition, a second Archiver was configured on three of the now six expansion servers for a total of nine Archivers. The recording mode for each Archiver was set to *continuous*. Each Archiver generated the maximum 300 Mbps throughput. Seven Archivers were each configured with 60 cameras using the GPUS recording rate of 5 Mbps. Two Archivers were each configured with 150 cameras using the GPUS recording rate of 2 Mbps. Total throughput to the Scalality RING SMB interface for the 720 cameras was 337 MB/s.

The exercise included playback for approximately 10% of the cameras. As with the certification testing, the Archiver logs were monitored for any RTP Packets Lost messages, which if found, meant reducing the number of cameras until no new messages appeared. Warning messages appearing in the Config Tool stating that a given Archiver on a given server was running low on resources served as another trigger for reducing the camera count.

**BEST PRACTICES AND CONFIGURATION GUIDANCE**

**Genetec**

- Each Archiver role requires its own instance of a Microsoft SQL database. Genetec recommends using separate disks for the SQL database server and the Windows page file for best Archiver performance.
- Genetec does not recommend using jumbo frames in the Genetec network.
- Use multiple Security Desk clients as needed to reduce the impact of playback on the network.



- The installation of the Main Genetec Server automatically creates an Archiver role for this server. Delete this Archiver role—do not use the Main Genetec Server as an Archiver.
- Configure no more than 300 cameras per Archiver.
- Archiver maximum bandwidth is 300 Mbps.
- The Security Center installation automatically adds several Genetec specific counters and objects to the Windows Performance Monitor utility, which can be used to monitor the Genetec processes present on the Archiver.
- The Windows Resource Monitor utility is a simple way to observe the workflow in the expansion server. Click the **Network** tab and examine the **Receive (B/sec)** and **Send (B/sec)** columns in the **Processes with Network Activity** panel. Select the **GenetecVideoUnitControl32.exe** (receiver) and **System** (the sender) processes, then review the **Address Column** in the **Network Activity** panel. Data is received by the `GenetecVideoUnitControl32.exe` process (there is one for each Archiver if multiple Archivers are configured on this expansion server) and data is sent through the `System` process to the Scality RING storage node hosting the SMB share.

### Scality RING

- Use one SMB share per Archiver. While it is possible to have multiple Archivers write to the same share, assigning one share per Archiver makes the job of tracking archived video files easier.
- Two options are available when configuring the Scality RING SMB interface. The SMB connector can be deployed directly on one or more of the storage nodes in the Scality RING. In this case, the storage node has the added workload of managing the SMB file system accesses along with the tasks related to Scality RING storage. An alternative is to deploy the SMB interface on a server separate from the Scality RING storage nodes. In this case, the user application connects to the SMB share on the separate server, which then accesses the Scality RING storage over the network. Both options are valid. For example, if the SMB connector is initially deployed on one or more storage nodes and should storage node performance become an issue over time, the SMB interface can then be deployed on a separate server.

### SUMMARY

HPE Apollo 4000 Systems with Scality RING Scalable Storage is an ideal storage platform for Genetec Security Center. This solution delivers the performance, security, availability, and scalability demanded by Genetec Security Center for storage and retrieval of archived video data. Grow the number of cameras and expansion servers in the Genetec environment without fear of running out of capacity. Scaling to hundreds of petabytes, the HPE Apollo 4000 Systems with Scality RING Scalable Storage permits archiving more cameras as well as permitting longer retention times. With the video recordings and archived data on Scality RING SMB shares, it is easy to move cameras from one Archiver to another in the event Archiver maintenance is required.

The Scality RING resources may be available to other applications as well. The Scality RING native file interface supports SMB as well as NFS access. The Scality RING also supports an S3 object interface (AWS S3 API compatible) allowing the addition of on-premises cloud applications.

HPE Apollo 4000 Systems with Scality RING Scalable Storage can be deployed across multiple data centers providing site failover, data consistency, and zero RTO and RPO with automatic failover and failback. In a stretched or geo-distributed Scality RING, archived video data is replicated across sites, eliminating the need to deploy Genetec Auxiliary Archivers.

HPE Apollo 4000 Systems with Scality RING Scalable Storage is certified for use with Genetec Security Center 8.



## RESOURCES AND ADDITIONAL LINKS

HPE Apollo 4000 Systems with Scalify RING Scalable Storage  
[hpe.com/us/en/storage/file-object.html](https://hpe.com/us/en/storage/file-object.html)

HPE Apollo 4000 Systems with Scalify RING Scalable Storage QuickSpecs  
[h20195.www2.hpe.com/v2/GetDocument.aspx?docname=c04434896](https://h20195.www2.hpe.com/v2/GetDocument.aspx?docname=c04434896)

HPE Scalable Object Storage with Scalify RING on HPE Apollo 4510 Gen10 Technical white paper  
[h20195.www2.hpe.com/v2/Getdocument.aspx?docname=a00026022enw](https://h20195.www2.hpe.com/v2/Getdocument.aspx?docname=a00026022enw)

Scalify RING shines bright in Gartner Critical Capabilities for Object Storage report  
[community.hpe.com/t5/Around-the-Storage-Block/Scalify-RING-shines-bright-in-Gartner-Critical-Capabilities-for/ba-p/7000060](https://community.hpe.com/t5/Around-the-Storage-Block/Scalify-RING-shines-bright-in-Gartner-Critical-Capabilities-for/ba-p/7000060)

HPE ProLiant DL servers  
[hpe.com/us/en/servers/proliant-dl-servers.html](https://hpe.com/us/en/servers/proliant-dl-servers.html)

Hewlett Packard Enterprise Technology Consulting Services  
[hpe.com/us/en/services/consulting.html](https://hpe.com/us/en/services/consulting.html)

Scalify RING 8 Scalable Storage  
[scalify.com/products/ring/](https://scalify.com/products/ring/)

Genetec  
[genetec.com](https://genetec.com)

Genetec Security Center  
[genetec.com/solutions/all-products/security-center](https://genetec.com/solutions/all-products/security-center)

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