Surveillance
Dell EMC Storage with Verint Nextiva

Configuration Guide

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DELL EMC

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CHAPTER 1

Introduction

This chapter presents the following topics:

Purpose

This configuration guide aims to help Dell EMC field personnel understand how to configure Dell EMC storage system offerings to simplify the implementation of Verint Enterprise VMS. This document is not a replacement for the Verint implementation guide nor is it a replacement for the *Dell EMC Storage with Verint Enterprise VMS: Sizing Guide*.

Scope

This guide is intended for internal Dell EMC personnel and qualified Dell EMC and Verint partners. It provides configuration instructions for installing the Verint Enterprise VMS video management software using Dell EMC storage platforms.

The following Dell EMC storage systems have been tested:

- Dell EMC Isilon™
- EMC VNX™

This guide supplements the standard *EMC VNX Storage Best Practices with Video Management Systems: Configuration Guide* and *Dell EMC Isilon Storage Best Practices with Video Management Systems: Configuration Guide* and provides configuration information specific to Verint Nextiva.

Note

All performance data in this guide was obtained in a rigorously controlled environment. Performance varies depending on the specific hardware and software used.

Assumptions

This solution assumes that internal Dell EMC personnel and qualified Dell EMC partners are using this guide with an established architecture.

This guide assumes that the Dell EMC partners who intend to deploy this solution are:

- Associated with product implementation
- Verint-certified to install Verint Enterprise VMS services
- Proficient in installing and configuring VNX storage solutions
- Proficient in installing and configuring Isilon storage solutions
- Familiar with installing and configuring VMware hypervisors and the appropriate operating system, such as Microsoft Windows or a Linux distribution
- Able to access the *EMC VNX Storage with Video Management Systems: Configuration Guide* and *Dell EMC Isilon Storage with Video Management Systems: Configuration Guide*

The configurations that are documented in this guide are based on tests that we conducted in the Dell EMC Surveillance Lab using worst-case scenarios to establish a performance baseline. Lab results might differ from individual production implementations.

CHAPTER 2

Configuring the solution

This chapter presents the following topics:

Design concepts

There are many design options for a Verint Nextiva implementation. Verint offers many training courses related to design and implementation. These design details are beyond the scope of this paper.

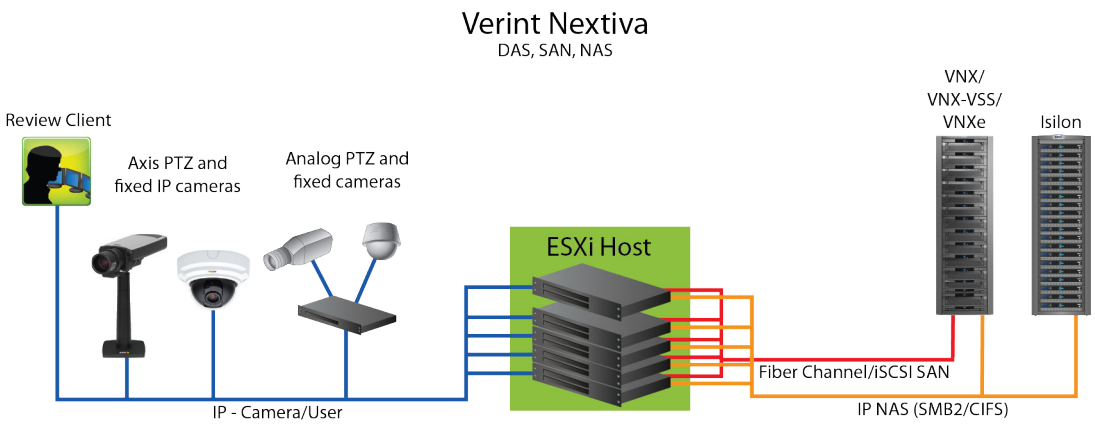
The *Nextiva VMS System Planning Guide* provides the information that you need to plan a Nextiva VMS system and complements the *Nextiva VMS Customer-Furnished Equipment Guide* and the *Nextiva VMS Verint-Supplied Equipment Guide*

These guides are intended for systems integrators and architects, network IT planners, and system administrators. These guides assume that readers know what Nextiva Video Management Software (VMS) does and how it works, and know how to deploy and configure Windows IP networks. These documents are available from a Verint partner or through the Verint Partner network.

In the *Nextiva VMS 6.3 SP2 System Planning Guide*, Verint recommends a segregated implementation. A common segregated implementation example could consist of a user network, a camera network, and a storage network. Other considerations covered in the planning guide include multicast, third-party software, ports used by Nextiva, and other important information. This white paper is not intended to replace or supersede any Verint document.

The following figure represents the basic configuration that was tested in our lab.

Figure 1 Verint Nextiva architecture



EMC VNX

VNX storage is ideal for recording and managing terabytes of video from distributed locations. This section describes best practices for configuring a VNX storage system for this solution.

The VNX family includes the VNX and VNX-VSS series arrays. The VNX series is designed for midtier to enterprise storage environments, is ideal for distributed environments, and can scale to handle large petabyte (PB) environments with block-only requirements at central locations.

Disk drives

Although any supported drive will work, video surveillance systems typically rely on the density of the array. Dell EMC recommends NL-SAS drives of the highest available

density in this solution. In general, we used one-terabyte (TB) or multi-TB NL-SAS drives when performing our tests.

Note

Because of the high percentage of sequential, large block writes, Dell EMC does not recommend using flash drives for video storage within a surveillance application.

Storage pool configuration (recommended)

The tests we conducted show how storage pools that are defined with the maximum allowable number of disks per pool perform as well as, or better than, traditional RAID groups. Therefore, Dell EMC recommends that you use storage pools rather than RAID groups. Storage pools also reduce the required array management tasks.

The VNX family array architecture is optimized for storage pools. A storage pool is a construct that is built over one, or more commonly multiple, RAID groups. LUNs are built on top of the storage pool. The read/write activity is a random distribution across all disks defined to the storage pool. This distribution results in increased and balanced per disk utilization and improved performance when compared to traditional RAID implementations.

The RAID groups underlying storage pools can be either RAID 5 or RAID 6. The default and recommended RAID configuration for a VNXe or VSS1600 array using NL-SAS drives is RAID 6. Either RAID 5 or RAID 6 can be used with VNX arrays. RAID 5 is used for optimizing the array to achieve the maximum amount of storage and RAID 6 is used for enhancing data protection. Our tests using an isolated surveillance infrastructure did not reveal any notable performance variances when using RAID 5 as compared to RAID 6.

Building a storage pool is a straightforward process. You can configure either RAID 5 or RAID 6 pools depending on the VNX storage system restrictions and the level of risk that the customer is willing to accept. When configuring storage pools, use large storage pools with large logical unit number (LUN) sizes, and configure the LUNs as thick. Do not use thin LUN provisioning.

Dell EMC recommends the following RAID configurations for VNX arrays:

- RAID 5 or RAID 10 with SAS drives
- RAID 6 with NL-SAS drives

Procedure

1. In Unisphere, select **Storage** > **Storage Pools** for block.
2. Click **Create** under **Pools** in the **Pools** section.
3. Set the following options for the storage pool:
   - Storage pool name
   - RAID type
   - Number of SAS drives
   - Number of NL SAS drives
4. Choose a method for selecting disks to include in the storage pool:
   - **Automatic**: Provides a list of available disks.
   - **Manual**: Enables you to select specific disks to include in the storage pool from a list of available disks. Be sure to clear the automatic disk recommendation list before you select new disks from the list.

5. Select **Perform a Background verify on the new storage** and set the priority to medium.
6. Click **Apply**, and then click **YES** to create the storage pool.

LUN configuration

A VNX pool LUN is similar to a classic LUN. Pool LUNs comprise a collection of slices. A slice is a unit of capacity that is allocated from the private RAID groups to the pool LUN when it needs additional storage. Pool LUNs can be thin or thick.

Thin LUNs typically have lower performance than thick LUNs because of the indirect addressing. The mapping overhead for a thick LUN is less than for a thin LUN.

Thick LUNs have more predictable performance than thin LUNs because they assign slice allocation at creation. Because thick LUNs do not provide the flexibility of oversubscribing like a thin LUN, use thick LUNs for applications where performance is more important than saving space.

Thick and thin LUNs can share the same pool, enabling them to have the same ease-of-use and benefits of pool-based provisioning.

Procedure

1. In Unisphere, right-click a storage pool and then click **Create LUN**.
2. Type the user capacity for the LUN.
3. Type the starting **LUN ID**, and then select the number of LUNs to create.

   For example, if the selected LUN ID is 50, and the selected number of LUNs to create is 3, the names for the LUNs are 50, 51, and 52.
4. Select **Automatically assign LUN IDs as LUN names**.
5. Click **Apply**.

Fibre Channel configuration

To transfer traffic from the host servers to shared storage, the serial-attached network (SAN) uses the Fibre Channel (FC) protocol that packages SCSI commands into FC frames.

Note

iSCSI is prevalent for video security implementations because it often provides a lower-cost option when compared to FC.

To restrict server access to storage arrays that are not allocated to the server, the SAN uses zoning. Typically, zones are created for each group of servers that access a shared group of storage devices and LUNs. A zone defines which HBAs can connect to specific service providers (SPs). Devices outside a zone are not visible to the devices inside the zone.

Zoning is similar to LUN masking, which is commonly used for permission management. LUN masking is a process that makes a LUN available to some hosts and unavailable to other hosts.

Zoning provides access control in the SAN topology. Zoning defines which HBAs can connect to specific targets. When you use zoning to configure a SAN, the devices outside a zone are not visible to the devices inside the zone.

Zoning has the following effects:

- Reduces the number of targets and LUNs presented to a host
- Controls and isolates paths in a fabric
- Prevents non-ESXi systems from accessing a particular storage system and from possible virtual machine file system (VMFS) data loss
- Optionally, separates different environments, such as test and production environments

With VMware ESXi hosts, use single-initiator zoning or single-initiator-single-target zoning. The latter is the preferred zoning practice because it is more restrictive and prevents problems and misconfigurations that can occur on the SAN.

VNXe RAID configuration

VNXe offers RAID 5, RAID 6, and RAID 10 configurations. Different configurations offer different types of protection against disk failures.

Dell EMC recommends the following RAID configurations:

- RAID 5 or RAID 10 with SAS drives
- RAID 6 with NL-SAS drives

iSCSI initiators

Software or hardware initiators may be used with VMware ESXi server or a non-virtualized server.

Microsoft Internet SCSI (iSCSI) initiators

For both physical servers and VMware ESXi server, the Dell EMC Surveillance Lab uses Microsoft iSCSI initiators with excellent results.

Hardware iSCSI initiators

Hardware iSCSI initiators can be used. There are many iSCSI initiators available on the market, and results might vary.

Recommended cache configuration

EMC VNX generation 2 systems, such as VNX5200 or VNX5400, manage the cache. If the array is shared with other applications, you can use a lower write cache value, but avoid excessive forced flushes.

Dell EMC recommends that you configure the cache as 90 percent write and 10 percent read if the storage array does not automatically adapt to the write characteristics of video surveillance (for example, EMC VNX5500 or EMC VNX-VSS100).

Isilon (NAS)

The Isilon scale-out network-attached storage (NAS) platform combines modular hardware with unified software to harness unstructured data. Powered by the distributed Isilon OneFS™ operating system, an Isilon cluster delivers a scalable pool of storage with a global namespace.

The platform's unified software provides centralized web-based and command-line administration to manage the following features:

- A symmetrical cluster that runs a distributed file system

- Scale-out nodes that add capacity and performance
- Storage options that manage files and tiering
- Flexible data protection and high availability
- Software modules that control costs and optimize resources

Impact policy and priority configuration

The impact policy defines the number of parallel tasks or workers that can run at one time within OneFS. Leave the impact policy as it is, unless Isilon directs you to change one or more policies.

Releases with OneFS 7.0 or greater

Dell EMC recommends using OneFS 7.0 or later to maximize bandwidth and minimize video review response times. You can use the default impact policy with Isilon X400, Isilon X410, Isilon NL410, and greater. For less powerful nodes, such as the Isilon X200 and earlier running OneFS 7.0 or greater, modify all jobs to use an impact policy of **Low**.

Releases prior to OneFS 7.0

For releases prior to OneFS 7.0, the best I/O performance is obtained by configuring all background jobs with the impact policy set to **Low**. To set the impact policy select **Operations** > **Jobs and Impact Policies**.

Priority configuration

Even if the impact policy is modified, for example, by changing the settings of all the jobs to **Low**, the priority of the jobs remains at their default settings.

Volume limits

Implementations greater than 8 TB are common when video is stored on high-end storage, such as Isilon scale-out NAS storage and VNX block storage. The clustered file system OneFS uses enables Isilon to handle these large volumes.

Large file system, small view (SmartQuotas)

Although it is possible to assign the full Isilon cluster file system to a single Verint Recorder, the Dell EMC best practice is to use SmartQuotas™ to segment the single Isilon file system so that each Recorder has a logical subset view of storage.

There are three directory-level quota systems:

Advisory limit

Lets you define a usage limit and configure notifications without subjecting users to strict enforcement.

Soft limit

Lets you define a usage limit, configure notifications, and specify a grace period before subjecting users to strict enforcement.

Hard limit (recommended)

Lets you define a usage limit for strict enforcement and configure notifications. For directory quotas, you can configure storage users' view of space availability as reported through the operating system.

Use the **Hard limit** quota system to set the video storage as a defined value.

If necessary, both Isilon and the Verint Recorder can add or subtract storage, even if a hard quota is set.

Configuring SmartQuotas (recommended)

The SmartQuotas feature enables you to limit the storage that is used for each Verint Recorder. It presents a view of available storage that is based on the assigned quota to the Recorder. SmartQuotas enables each Recorder to calculate its available disk space and react appropriately.

Without SmartQuotas, the Enterprise VMS administrator must anticipate the total write rate to the cluster and adjust the **Min Free Space** on each Recorder accordingly. A miscalculation can result in lost video. SmartQuotas resolves the issues that can be caused by manual calculations.

Configure SmartQuotas when more than one Recorder is writing to the Isilon cluster, or when other users share the cluster. Enable SmartQuotas and define a quota for each share or directory.

Configure the SmartQuotas setup with the following settings:

- Configure a hard share limit threshold to the Recorder video files.
- Define OneFS to show and report the available space as the size of the hard threshold.
- Set the usage calculation method to show the user data only.

Procedure

1. From the OneFS GUI, select **File System Management** > **SmartQuotas**.
2. For each listed share, select **View details**.
3. Under **Usage Limits**, select **Edit usage limits**.
4. Define the SmartQuotas limit and set the threshold:
   a. Select **Specify Usage Limits**.
   b. Select **Set a hard limit**.
   c. Type the hard limit value.
   d. Select the size qualifier, typically **TB**.
   e. Select the size of the hard threshold.
5. Click **Save**.
6. Repeat the process for the remaining shares.

Unique share naming

When working with a single file system, each Recorder uses the time and date as part of its directory and file-naming conventions.

To avoid corruption caused by overwriting or grooming (deleting) files prematurely, create a unique share for each Recorder.

SMB 3.0 MultiChannel

The support for Multichannel feature of SMB 3.0, which establishes a single SMB session over multiple network connections, is introduced in OneFS 7.1.1. SMB

Multichannel enables increased throughput, connection failure tolerance, and automatic discovery.

To take advantage of this new feature, client computers must be configured with Microsoft Windows 8 or later, or Microsoft Windows Server 2012 or later with supported network interface cards (NICs) and SMB3 enabled.

SMB Mutlichannel allows file servers to use multiple network connections simultaneously and provides the following capabilities:

Increased throughput

OneFS can transmit more data to a client through multiple connections over a high speed network adapter or over multiple network adapters.

Connection failure tolerance

When using an SMB Multichannel session over multiple network connections, clients can continue to work uninterrupted despite the loss of a network connection.

Automatic discovery

SMB Multichannel automatically discovers supported hardware configurations on the client that have multiple available network paths and then negotiates and establishes a session over multiple network connections. You are not required to install components, roles, role services, or features.

Configuring SmartConnect (optional)

SmartConnect™ uses the existing Domain Name Service (DNS) Server and provides a layer of intelligence within the OneFS software application.

The resident DNS server forwards the lookup request for the delegated zone to the delegated zone's server of authority, which is the SmartConnect Service IP (SIP) address on the cluster. If the node providing the SmartConnect service becomes unavailable, the SIP address automatically moves to a different node in the pool.

Connections are balanced across the cluster, which ensures optimal resource utilization and performance. If a node goes down, SmartConnect automatically removes the node's IP address from the available list of nodes, ensuring that a connection is not tried with the unavailable node. When the node returns to service, its IP address is added to the list of available nodes.

The delegated server authority is always the node with the lowest ID, unless it has surrendered its authority status, either voluntarily or involuntarily. This node should always be available, but if the status of the node changes and becomes unavailable, it voluntarily surrenders its role as server of authority.

You must add a delegation Name Server (NS) entry to the resident DNS server for the SmartConnect name, which points to the SIP address as the Name Server. In your DNS Manager, create a **New Delegation** using your SmartConnect zone name. In the Microsoft DNS wizard, a New Delegation record is added in the forward lookup zone for the parent domain.

SmartConnect balances connection loads to the Isilon cluster and handles connection failover. With SmartConnect, all Verint Recorders use a single fully qualified domain name (FQDN) or universal naming convention (UNC) path for video storage access. Using this network name provides load balancing when the connection to the cluster is made and simplifies installations.

SmartConnect Basic can use a round-robin-type connection allocation, which is based on DNS load balancing.

SmartConnect Advanced can include multiple pools for each subnet, Dynamic IP addresses for NFS, and the following load-balancing options (Connection policy and Rebalance policy):

Round-robin (recommended)

Sequentially directs a connection to the next Isilon IP address in the cycle. Based on field reports, this option works well with 20 servers or more.

Connection count

Provides uniform distribution of the Verint Recorder servers to specified nodes in the Isilon cluster. Use a unique IP address pool for video recording and Recorder read/write access.

Network throughput

Based on NIC utilization. Use of throughput requires that each Recorder is activated, configured, and recording video after it connects to Isilon.

CPU usage

Uses the node CPU utilization to determine which Isilon IP address to assign to the next connection request.

Ensure that no other service uses the Recorder IP address pool. Define additional pools for management (such as Isilon InsightIQ™ or administrative access), evidence repository, post process, or other use.

Procedure

1. Select **Networking Configuration**.
2. Under **Subnet** > **Settings**, define the SmartConnect service IP (SSIP) address. The SSIP address is the IP address that the DNS uses for the Isilon Authoritative name service.
3. Under **Pool settings**:
   a. Define the SmartConnect zone name, which is the name to which clients connect.
   b. Define the SmartConnect service subnet (the subnet that has the SSIP configured on the DNS server).
   c. Define the connection balancing policy to **Round Robin**.
   d. Set the IP allocation strategy to **Static**.
4. Verify this configuration on the SmartConnect dashboard.

I/O optimization configuration

As of OneFS 7.0.x, no changes are necessary to the I/O profiles for the directories that are used for Verint.

Note

This setting does not require a SmartPool license.

Configuring authentication and access control

We conducted authentication and access control tests to determine the best method for shared access.

The following three tests were conducted:

Full Active Directory (recommended)

Where the Enterprise VMS server and the Isilon cluster are part of the same Windows domain.

Partial Active Directory

Where the Enterprise VMS servers are part of the Windows domain, but the Isilon cluster is administered locally.

Fully locally administered control

Where the Enterprise VMS servers and the Isilon cluster are administered locally.

Alternatives to the previous methods might exist, but the Dell EMC Surveillance Lab team does not plan to derive or support other methods.

Procedure

1. Select **Cluster Management** > **Access Management**.
2. Select **Access zone** and ensure that the **System access zone** has the provider status **Active Directory**, **Local**, and **File** marked with a green dot.
3. Under **Active Directory**, select **Join a domain** and add the Windows domain and appropriate users using one of the following options:
   - When the Isilon cluster and Verint are not part of the same domain, set the shares to **Run as Root**. This setting is not ideal from a security perspective.
   - When the Isilon cluster and Enterprise VMS server are part of the same domain, configure the `DVM Camera` service to use the Domain account with read/write permissions to the Isilon cluster share. During the initial installation of the camera server, use the Enterprise VMS administrator account specification wizard to configure the camera service. Specify the recording location for the camera server using the full UNC path of the Isilon share.

Releases tested

The following tables list the firmware builds and software releases used for our tests.

Table 1 Firmware builds

Model	Firmware
VNXe1600	VNXe 0E 3.1.3.5754151
VNXe3200	VNXe 0E 3.1.3.5754151
VNXe3300	VNXe 0E 2.1.0.14097
VNX-VSS100	VNX OE 5.32.000.5.215
VNX5200	VNX OE 5.33.008.5.119
VNX5400	VNX OE 5.33.000.5.015
VNX5600	VNX OE 5.33.000.5.052

Table 2 OneFS releases

Model	Firmware
NL400	7.0.x
NL410	7.2.1
HD400	7.2.1

Table 3 Verint Enterprise VMS releases

Release	Subrelease
Verint Nextiva	6.4.1591

VMware ESXi requirements and recommendations

During all the tests, we assumed that the vCPU, memory, and network were configured correctly according to Verint's best practices to operate within Enterprise VMS parameters.

The following virtual machine configuration was used for all tests:

- vCPUs (virtual CPUs): 12
- vMemory (virtual memory): 12 GB
- Network Driver:
  - Vmxnet3 with 10 GbE
  - Vmxnet2 with 1 GbE
- Disk Driver: SCSI

This document assumes that the person that performs the configuration is familiar with these basic configuration activities.

CHAPTER 3

Conclusion

This chapter presents the following topics:

Summary

Dell EMC performed comprehensive testing with Verint Enterprise VMS against many EMC VNX and VNXe arrays and Dell EMC Isilon clusters.

EMC VNX
Compared to traditional block-level storage, the use of storage pools to create LUNs within the VNX arrays greatly simplifies the configuration and increases the performance. Either iSCSI or FC can be implemented. FC performs better than iSCSI.

EMC VSS
The VNX Video Surveillance Storage (VSS) is a storage solution that is purpose-built to meet the unique demands of the video surveillance environment. We found that this high-availability, low-cost array performs comparably to other arrays in the VNX family.

EMC VNXe
An iSCSI-connected VNXe array, implemented with storage pools, provides a cost-effective implementation while maintaining the expected performance. Many mid-sized deployments can use VNXe.

Dell EMC Isilon scale-out storage
Isilon scale-out storage is ideal for midtier and enterprise customers. An Isilon cluster is based on independent nodes working seamlessly together to present a single file system to all users.

Licensed SmartQuotas options can be configured so that each Recorder view of the storage is based on the assigned quota and not the entire file system. Dell EMC recommends using SmartQuotas with Verint Enterprise VMS as a best practice.