

Surveillance

Dell EMC Storage with Qognify NiceVision Net

Sizing Guide

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CONTENTS

Chapter 1	Introduction	5
	Solution overview.....	6
	Scope.....	6
	Key objectives.....	7
Chapter 2	Solution components	9
	Dell EMC storage.....	10
	Storage protocols.....	10
	NiceVision Net.....	10
Chapter 3	Configured components	13
	Dell EMC Surveillance Lab virtual test environment.....	14
	Isilon clustered storage system.....	14
	Data protection.....	14
	Cluster size.....	15
Chapter 4	Sizing the solution	17
	Bandwidth sizing guidelines.....	18
	EMC VNX	18
	Dell EMC Isilon node and cluster (SMB).....	20
Chapter 5	Testing and validation	21
	Test objectives.....	22
	Test parameters.....	22
	Tests conducted.....	22
	Storage bandwidth and configuration test.....	25
Chapter 6	Conclusion	27
	Summary.....	28
	EMC VNX arrays.....	28
	Dell EMC Isilon scale-out storage.....	28

CONTENTS

CHAPTER 1

Introduction

This chapter provides information on the purpose and scope of this solution:

- [Solution overview](#).....6
- [Scope](#).....6
- [Key objectives](#).....7

Solution overview

The purpose of this guide is to help you understand the benefits of using a Dell EMC storage solution with Qognify NiceVision Net. The solution includes both hardware and software elements for video surveillance.

Qognify NiceVision Net is a tiered solution that works well with Dell EMC Isilon™ scale-out storage as well as EMC VNX™ family storage arrays. The first tier of storage, Live DB, can accommodate stored video for the retention period prior to being moved to the second tier of storage or deleted. The best practice retention time is between 2 and 24 hours. The second storage tier is Archive DB, which can accommodate long video retention cycles prior to being deleted from the second tier of storage.

Live DB requires block storage, such as an EMC VNX family array using iSCSI or Fibre Channel (FC), or storage local to the server. In a virtualized environment, the VNX family arrays can serve a dual purpose by providing storage for the LiveDB and VMware datastores. The Archive DB used as the secondary storage for video and surveillance data can be stored either on an Isilon scale-out storage cluster or on a VNX family array.

While the Qognify NiceVision Net tiered storage solution can be deployed within a site, depending on the requirements Qognify NiceVision Net can also provide a solution for distributed to central site architectures.

Use this guide to determine the requirements for a successful Qognify NiceVision Net installation. The storage platforms include VMware ESXi hosts that are running NiceVision Net.

Scope

This guide is intended for use by internal Dell EMC sales and pre-sales personnel, and qualified Dell EMC and Qognify partners.

The guidelines presented are for storage platform positioning and system sizing. The sizing recommendations are based on performance and storage protocol conclusions derived from Dell EMC testing.

The guidelines for sizing this video storage solution describe the use of the following storage platforms:

- Dell EMC Isilon™
- EMC VNX™

These guidelines include the following design considerations:

- Bandwidth recommendations for Qognify NiceVision Net and one or more Dell EMC systems
- Architectural overview of Qognify NiceVision Net
- Dell EMC storage considerations for Qognify NiceVision Net
- Result summaries for the tests carried out by Dell EMC engineers in a VMware ESXi virtualized infrastructure

Use this guide to determine the best configuration for the following:

- Number of Qognify SVRs
- Mix of nodes and Qognify SVRs based on the expected bandwidth in an Isilon implementation

- Storage using Fibre Channel (FC) and Internet SCSI (iSCSI) on VNX systems
 - Storage using Server Message Block (SMB) on Isilon systems
 - Load factors related to the use of Dell EMC storage arrays in the customer's solution
-

Note

All performance data contained in this report was obtained in a rigorously controlled environment. Network topology and system environment variables can have significant impact on performance and stability. Follow the best practices as outlined in the *Dell EMC Storage with Qognify NiceVision Net: Configuration Guide* regarding network and storage array configuration. Server and network hardware can also affect performance. Performance varies depending on the specific hardware and software, and might be different from what is outlined here. Performance results will be similar if your environment uses similar hardware and network topology.

Key objectives

The configurations documented in this guide are based on tests conducted in the Dell EMC Surveillance Lab and actual production implementations.

These are the key objectives of this solution:

- Measure the sizing needs for specific system requirements so that an implementation can be correctly sized and the appropriate Dell EMC products can be matched to a customer's requirements.
- Determine the VNX and VSS LUN bandwidth within the storage pool.
- Recommend an Isilon SMB configuration.
- Calculate array or node maximum bandwidths.
- Recommend disk drive types.
- Confirm the previous test results with lab controlled failures, such as disabled storage processors, disk rebuilds, node removals, and network path failures.

CHAPTER 2

Solution components

This chapter provides information about storage options for video and audio data:

- [Dell EMC storage](#).....10
- [Storage protocols](#)..... 10
- [NiceVision Net](#)..... 10

Dell EMC storage

Dell EMC storage arrays are ideal for storing video and audio data.

This guide describes the tests for the following storage arrays:

- Isilon clusters
- VNX arrays

For our testing, we used both single and dual storage processors for the full range of VNX storage arrays and single- and multi-node performance testing on the Isilon storage array.

Storage protocols

Dell EMC uses standard file protocols to enable users and applications to access data that is consolidated on a Dell EMC storage solution.

This guide provides information about these network protocols:

- FC
- iSCSI
- SMB (CIFS)

NiceVision Net

NiceVision Net The 3.1 architecture can consist of a single SVR server or multiple SVR that are connected to the Application Manager Server (AMS) structure. You can configure AMS to manage a few cameras or thousands of cameras.

The following table describes the primary NiceVision Net services.

Table 1 NiceVision Net primary services

Service	Description
NiceVision Net AMS	<p>AMS is the site administrative and management software that runs on a dedicated server. It is composed of four main entities:</p> <p>SQL DB</p> <p>A central repository for the site configuration (such as SVRs, cameras, and decoders), site administration (users, privileges, passwords), logical entities (imported maps, groups of cameras, page layouts - as configured by privileged users), system maintenance events, and so forth.</p> <p>Alarm management</p> <p>Each workstation registers to the appropriate sensors and manages the</p>

Table 1 NiceVision Net primary services (continued)

Service	Description
	<p>entire lifecycle of every alarm received, according to the rules configured by the system administrator.</p> <p>Application server</p> <p>A middle tier for commands and event routings between the workstations and the recorders at the site (such as start and stop recording, video payback, and alarms) as well as management of PTZ control by privileged users according to predefined user priorities.</p> <p>Licensing manager</p> <p>All the solution licenses are managed as a "pool of licenses" managed by AMS. The Licensing manager allows easy and quick on-the-fly re-allocation of the site resources (channels, users, and so forth).</p>
NiceVision Net SVR	<p>NiceVision SVRs are complete, high-performance network recording, and video management solutions that are designed to fit various environments, including yours. The state-of-the-art video recording, video value-added services, and analytics can turn any channel into a smart one. The SVR family is fully scalable and can simultaneously manage encoders with third-party IP devices while offering a unique migration path from analog to IP.</p>
NiceVision ControlCenter	<p>NiceVision ControlCenter is an enhanced application suite that provides realtime event management, a network-based matrix alternative to a traditional analog matrix, investigation tools, mobile viewing options, and user management tools.</p>

CHAPTER 3

Configured components

This chapter provides information about the components configured in this solution:

- [Dell EMC Surveillance Lab virtual test environment](#)..... 14
- [Isilon clustered storage system](#)..... 14

Dell EMC Surveillance Lab virtual test environment

The Dell EMC Surveillance Lab is constantly being upgraded to the most recent software releases.

The virtualized Qognify NiceVision Net host was configured as follows:

- 8 vCPUs
- 8 GB memory
- Network adapter type: VMXNET3 - 10 GbE
- Isolated VLAN for storage (if not FC)
- Local datastore for SVR virtual machine (VM) (SSD/SAS hard disk)

For all the tests, the virtual CPU (vCPU), memory, and network were configured according to Qognify best practices. The VMware vSphere configuration was in accordance with the VMware Compatibility Guide (www.vmware.com/resources/compatibility/search.php). In addition, Dell EMC PowerPath™ was used for block storage (FC and iSCSI) and is recommended for block storage implementations.

The Dell EMC Surveillance Lab's host hardware met and exceeded the minimum system requirements for an ESXi/ESX Installation. The Qognify SVR VM was running on an ESXi 6.0 host using Cisco UCS B230 Blade Servers with a 20-core ESXi host at 2.2 GHz and 256 memory. For more information about VM configuration, see the General recommendations for storage and sizing section of the *Using EMC VNX storage with VMWare vSphere* guide.

Qognify recommends using local datastores or SAN-based RAID 1-0 datastores on ESXi hosts to place SVR VMs. Configure NAS and SAN storage for video storage.

Isilon clustered storage system

Isilon NAS was designed and developed specifically for storing, managing, and accessing digital content and other unstructured data.

An Isilon clustered storage system is composed of three or more nodes. Each node is a self-contained, rack-mountable device that contains industry-standard hardware such as disk drives, CPUs, memory, and network interfaces. These nodes are integrated with the proprietary Isilon OneFS™ operating system, which is a distributed networked file system that unifies a cluster of nodes into a single shared resource.

Data protection

OneFS does not rely on hardware-based RAID for data protection. The Isilon system uses the Reed-Solomon algorithm for N+M protection with Forward Error Correction (FEC).

Protection is applied at the file level, enabling the cluster to recover data quickly and efficiently. Nodes, directories, and other metadata are protected at the same or a higher level as the data blocks they reference. Since all data, metadata, and FEC blocks are spread across multiple nodes, dedicated parity drives are not required. For more information about Isilon data protection, see *Dell EMC Isilon OneFS: A Technical Overview*.

Although cluster sizes as small as three nodes are possible, for surveillance applications we recommend a minimum of five nodes. Sizing calculations need to include a minimum free space calculation for proper cluster sizing. We recommend a cluster size that enables a node to be removed while retaining a minimum of 10

percent free space in the remaining capacity. This cluster size ensures that node removal and node failures have minimal or no impact on video ingestion.

The Isilon sizing tool provides an accurate calculation. You can find this tool at <https://isilon-sizing-tool.herokuapp.com>. Other sizing tools from video management software (VMS) and camera vendors may also be used for sizing the necessary bandwidth and storage capacity.

Isilon OneFS is a scale-out, single namespace, clustered file system. To maintain coherency, OneFS implements a distributed lock manager that marshals locks across all nodes in the cluster. When a node is added to or removed from the cluster, all operations must be temporarily suspended until all existing locks are rebalanced across the resulting node set. The system must then recalculate the cluster write plan. The time that is required for this group change to occur depends on the size of the cluster, individual node performance, and the cluster workload.

Isilon protection with OneFS

New or upgraded clusters, starting with OneFS 7.2, provide a data protection level that meets Dell EMC Isilon guidelines for mean time to data loss (MTTDL) for large capacity nodes. Current releases of OneFS offer a new protection option, `3d:1n1d`, which means the cluster can survive three simultaneous disk failures or one entire node failure plus one disk. OneFS also provides an option that continually evaluates the cluster and sends an alert if the cluster falls below the suggested protection level.

Cluster size

We recommend a minimum cluster size of five nodes, even if you are not writing to all of them. For example, if you are implementing a four-node SVR solution, implement a five-node cluster. This also meets the recommended best practices for data protection.

To estimate the ideal number of nodes in a cluster, you need to consider cluster bandwidth and capacity.

Sizing by bandwidth

We recommend a cluster size with one or more additional nodes than calculated in bandwidth sizing. This ensures that failover of a node allows for redistribution of NAS connections and avoids any frame loss.

Sizing by aggregate capacity

We recommend a cluster size with enough usable capacity to handle 110 percent of the calculated space requirement, with a minimum added capacity of one full node plus 10 percent. The values are based on camera bit rate.

The Isilon sizing tool can use both the sizing by bandwidth and sizing by aggregate capacity methods when calculating ideal cluster size.

Configured components

CHAPTER 4

Sizing the solution

This chapter provides information to enable you to quickly determine the correct storage array based on your customer's bandwidth requirements:

- [Bandwidth sizing guidelines](#)..... 18
- [EMC VNX](#) 18
- [Dell EMC Isilon node and cluster \(SMB\)](#)..... 20

Bandwidth sizing guidelines

All solution tests were performed in a lab environment. The storage system, cameras, and VLANs in the lab environment were dedicated to these tests.

Connections to the storage system under test conditions were restricted to NiceVision Net SVR, monitoring, and web management stations. Expect some variance between the lab results and a production environment.

EMC VNX

We conducted validation tests to determine how Gognify works with VNX storage arrays.

Our testing found the best bandwidth for a single camera server to be 46 MB/s. The tests included an overall read bandwidth of 20 percent. Maximum per recorder bandwidth may vary based on the configuration of the SVR server used. All testing was conducted using the iSCSI protocol.

Test results are based on a conservative model to ensure that the constant-bandwidth video traffic is unaffected during a single storage pool (SP) maintenance cycle, disk rebuild, or similar performance-intensive event.

Bandwidth information for FC was extrapolated using the iSCSI bandwidth results.

Table 2 EMC VNX/VNXe storage array results

Array	Storage pools				Maximum (RAW)
	RAID	Disks	iSCSI bandwidth (MB/s)	FC bandwidth (MB/s)	
VNXe1600*	6	35	300	330	400 TB
		200	300	330	
VNXe3200*	6	120	210	231	500 TB
		150	210	231	
VNX-VSS100*	5, 6	90	405	446	360 TB
VSS1600*	6	35	300	330	400 TB
		200	300	330	
VNX5200*	5, 6	55	245	269	500 TB
VNX5400	5, 6	120	453	498	1 PB
		250	453	498	
VNX5600*	5, 6	120	517	569	2 PB
		240	828	910	
		500	828	910	
VNX5800*	5, 6	120	621	683	3 PB
		240	993	1093	

Table 2 EMC VNX/VNXe storage array results (continued)

Array	Storage pools				Maximum (RAW)
	RAID	Disks	iSCSI bandwidth (MB/s)	FC bandwidth (MB/s)	
		360	1490	1639	
		750	1490	1639	
VNX7600*	5, 6	120	745	819	4 PB
		240	1192	1311	
		360	1788	1967	
		480	2384	2622	
		1000	2384	2622	
VNX8000*	5, 6	120	894	983	6 PB
		240	1430	1573	
		360	2145	2360	
		480	2860	3146	
		600	3576	3933	
		1000	3576	3933	

* These values are extrapolated from Dell EMC Surveillance Lab test results.

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.

This guide provides details on the total load that was tested in the Dell EMC Surveillance Lab. However, the independent software vendor (ISV) should provide the actual server specification. The test results in this guide set a server bandwidth specification that is based on our lab environment, which can be used in the event the ISV does not provide these specifications.

Dell EMC Isilon node and cluster (SMB)

The test results are based on a model in which the constant-bandwidth surveillance video traffic remained unaffected during a single node maintenance cycle, disk rebuild, SP failure, or non-disruptive upgrade.

We used 10 Gigabit Ethernet (GbE) interfaces. We performed all tests with a per-camera bandwidth of 4 MB/s, so a single SVR that handles 30 MB/s can support 60 such cameras.

We performed all tests with node or drive failures in place in the cluster (for example, with Isilon FlexProtect™ running) to ensure a worst-case scenario for all sizing parameters. Maximum per recorder bandwidth may vary based on the configuration of the SVR server used.

The following table provides bandwidth-sizing guidelines based on our test results.

Table 3 Dell EMC Isilon node and cluster (SMB) test results

Cluster	OneFS version	SVRs per node	Bandwidth (MB/s)		Drive size	Maximum cluster RAW
			Per SVR	Per node		
X410	8.0.0.2	1	35	35	4 TB	20.7 PB
	8.0.0.2	2	35	70	4 TB	
	8.0.0.2	3	35	105	4 TB	
NL410	8.0.0.2	1	35	35	6 TB	30.2 PB
	8.0.0.2	2	35	70	6 TB	
HD400	8.0.0.2	1	35	35	6 TB	30.2 PB
	8.0.0.2	2	35	70	6 TB	

Note

All disk drives are NL-SAS 7200 RPM unless otherwise noted.

This guide provides details on the total load that was tested in the Dell EMC Surveillance Lab. However, the independent software vendor (ISV) should provide the actual server specification. The test results in this guide set a server bandwidth specification that is based on our lab environment, which can be used in the event the ISV does not provide these specifications.

SSD drive strategies

Metadata read/write acceleration writes file data to HDDs and all metadata mirrors to SSDs. This strategy accelerates metadata writes, in addition to reads, but requires about four to five times more SSD storage than metadata read acceleration. If using the metadata read/write mode for the Isilon X410 and NL410, the Dell EMC Surveillance Lab recommends using two 1.6 TB SSDs per node.

CHAPTER 5

Testing and validation

This chapter describes the testing used to validate this solution.

- [Test objectives](#).....22
- [Test parameters](#).....22
- [Tests conducted](#)..... 22
- [Storage bandwidth and configuration test](#)..... 25

Test objectives

Many factors must be considered when designing your solution.

The Dell EMC Surveillance Lab tests focus on storage-related factors with the following objectives:

- Determine the bandwidth for various Dell EMC storage arrays using FC and iSCSI.
- Determine the bandwidth for various Dell EMC storage clusters using SMB.
- Determine the best configuration parameters for Isilon and VNX storage options.
- Determine best video storage performance requirements for use with Isilon scale-out storage clusters and VNX storage arrays.
- Determine the maximum bandwidth with multiple SVRs.
- Determine all factors with a lab-controlled failure, such as disabling a storage processor, rebuilding disks, removing a node, or network path failures.

Test parameters

All test parameters and scenarios reflect standard production behavior for Qognify NiceVision Net under storage-intensive conditions, including typical storage functions and failures. We followed best practices for recovery and break-fix issues for normal situations that might arise in a standard production environment.

We used the following parameters to perform the tests:

- The IP network (Layer 2) is a flat, high-availability network with plenty of capacity, which enabled us to focus on the products we were testing.
- All tests assumed uniform distribution of bandwidth from the Qognify SVR.

Tests conducted

We ran tests with the SmartConnect™ configuration in place and the SMB shares were mounted using the SmartConnect zone name:

Video playback test

As video is being written to the storage and is being viewed live, we recalled or reviewed the video at a rate equal to 20 percent of the write rate.

The review did not affect the write rate, video quality, or result in dropped video.

Disk Failure test

A single disk failure is the most common failure affecting storage systems today. When a disk fails, that disk is removed and replaced. The replacement disk is then reconstructed.

The Isilon cluster was protected using a +2 protection scheme that allows for two simultaneous disk failures. In our test, we failed and recovered two disks. The SmartFail process started and the CPU utilization of the node increased with no observed effect to the write streams or video loss.

NIC Failure test

We performed the hard NIC failure test by removing one NIC cable from the active node that was involved in active recording. After the NIC failure, writing to the same node failed. When the network fails, the server must recognize the

failure, then it must establish a new connection. Also, when the network fails TCP socket connections are left open and remain open on the cluster until Isilon's OneFS forces them closed, which allows the server to continue writing.

We can force the open TCP sockets to close for a duration of less than 2 minutes by reducing the `TCP keep idle` and `TCP keep interval` timeout to the optimum values recommended by Isilon Engineering.

To reduce the video loss duration due to the `TCP Socket Open` condition, set the persistent values in the `sysctl.config` file as follows to reduce the impact duration time significantly:

```
isi_sysctl_cluster
net.inet.tcp.keepidle=61000
isi_sysctl_cluster
net.inet.tcp.keepintvl=5000
```

Refer to the KB article: 000089232 for further information about how to configure these parameters.

Note

NIC failure impact can be overcome by using NIC aggregation in Active/Passive Failure aggregation mode, which is explained in the next test case. Connectivity to the nodes that are not affected by the network outage continues to be available throughout the test scenario and no impact was observed.

NIC Failure test with NIC aggregation in Active/Passive

We did a hard NIC failure test with Active/Passive aggregation by removing the active NIC port cable. After the network failure, writing to the same node continued and the NIC that was passive was immediately changed to the active NIC. The NIC failure caused no apparent loss.

Note

NIC aggregation in Active/Passive mode remedies only a network disconnection/NIC failure that happens on the Isilon node or the corresponding switch port where it is connected.

Node Poweroff Test

In our tests, we could eliminate the global loss of video during high impact cluster interruptions caused by the removal of a node (intentional or failure) or when adding a node to the cluster. The changes also reduced the duration of server reconnections after a node was removed.

We simulate an unexpected single node hard failure, which causes the servers that were writing to that node to reconnect to a new node. In our tests, the servers on the failed node reconnected to a new node, but did not start writing again for an aggregate (reconnect and start writing) duration of up to 52 seconds while waiting for writing to the SMB share to be re-started.

The second issue is that the removal or addition of a node causes an interrupt to the cluster. Therefore, video servers writing to the other nodes might experience a short interruption. The duration of the interruption can be reduced by modifying the OneFS environment variables.

The following code makes the group changes to the cluster that reduce the interruption from 30 seconds to no video loss globally. When video writing to the node failed, the cameras recognized a 50 percent reduction in the recovery duration from 1 minute to 30 seconds. The changes affect the "lazy queue" and other cache related operations on each node.

These changes are required to modify the remove or add node interruption:

```
declare -i COUNT MDS
BASE=10000
COUNT=$((1.01 * $BASE))
MDS=$(( $BASE * 0.75))
isi_sysctl_cluster kern.maxvnodes=$BASE
isi_sysctl_cluster kern.minvnodes=$BASE
isi_sysctl_cluster efs.lin.lock.initiator.lazy_queue_goal=$COUNT
isi_sysctl_cluster efs.ref.initiator.lazy_queue_goal=$COUNT
isi_sysctl_cluster efs.mds.block_lock.initiator.lazy_queue_goal=
$MDS
isi_sysctl_cluster efs.bam.data.lock.initiator.lazy_queue_goal=
$MDS
```

⚠ WARNING

If running a mixed workload, these changes can adversely affect the other workloads that might be present on the cluster.

Node restart test

In our tests, we observed that a manual restart of a node would induce a video loss of 10 sec. This loss can be addressed by moving the SMB client connections on that node across to other nodes before the restart:

1. Suspend the node SmartConnect: Run the following command on the node that must be rebooted.
For example, for node 3 with groupnet0, Subnet0 and pool0, run the following command:

```
isi network pools sc-suspend-nodes groupnet0.subnet0.pool0 3
```

2. Delete the SMB sessions that allow it to reconnect to other nodes.

```
isi smb sessions list
isi smb sessions delete -f <computer name>
```

Note

After the node restart is completed, you can enable SmartConnect using the command `isi network pools sc-resume-nodes groupnet0.subnet0.pool0 3`.

Storage bandwidth and configuration test

The storage bandwidth test evaluated video storage and applications with a number of different Dell EMC storage systems. Additional tests evaluated ESXi host hardware in relationship to vCPU settings and the resulting bandwidths.

These tests assumed that Qognify SVR was configured as described by Qognify best practices and operated within the recommended bandwidth, camera count, and other NiceVision Net maximum requirements.

Procedure

1. Configured video storage for a Dell EMC storage system.
2. Set up camera simulators (traffic generators) to produce a traffic load to each Qognify SVR at the desired bandwidth.
3. Verified that Recording is set to use MPEG4 and the max resolution is set to 30 FPS (352x240).
4. Evaluated the network and video storage to ensure an error-free environment at the induced bandwidth.
5. Introduced storage device errors including:
 - Disk failures and rebuilds on Isilon nodes
 - Initiation of Isilon node failures and recoveries
 - Initiation of Isilon node removals (downsizing a cluster)
 - Initiation of Isilon node SmartFail
6. Captured the storage system and host statistics.
7. Based on the test results:
 - If no issues were detected, incremented the bandwidth.
 - If issues were detected, decreased the bandwidth.

This procedure was repeated until the maximum error-free bandwidth was determined.

CHAPTER 6

Conclusion

This chapter summarizes the testing for this solution:

- [Summary](#)28

Summary

Dell EMC performed comprehensive testing with Gognify NiceVision Net against Dell EMC Isilon clusters. The Gognify architecture and product suite allows extreme scaling, from a few cameras to up to tens of thousands of cameras, by using Dell EMC storage.

NiceVision Net 3.1 delivers complete, end-to-end IP video surveillance that captures, records, analyzes, investigates and visualizes. With an open platform that supports ONVIF standards, Net 3.1 integrates with new and existing edge devices, as well as security management and access control systems. Net 3.1 web and smartphone support allows access to your surveillance system from anywhere, with no additional client download needed.

The Isilon X410 and NL410 performed well with NiceVision Net SRV. Based on our test results we do not recommend using the HD400 node type. Contact the Dell EMC Surveillance Lab team with any questions regarding recommended node types.

EMC VNX arrays

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

Dell EMC Isilon scale-out storage

Dell EMC 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 SVR view of the storage is based on the assigned quota and not the entire file system. We recommend using SmartQuotas with Gognify NiceVision Net as a best practice.