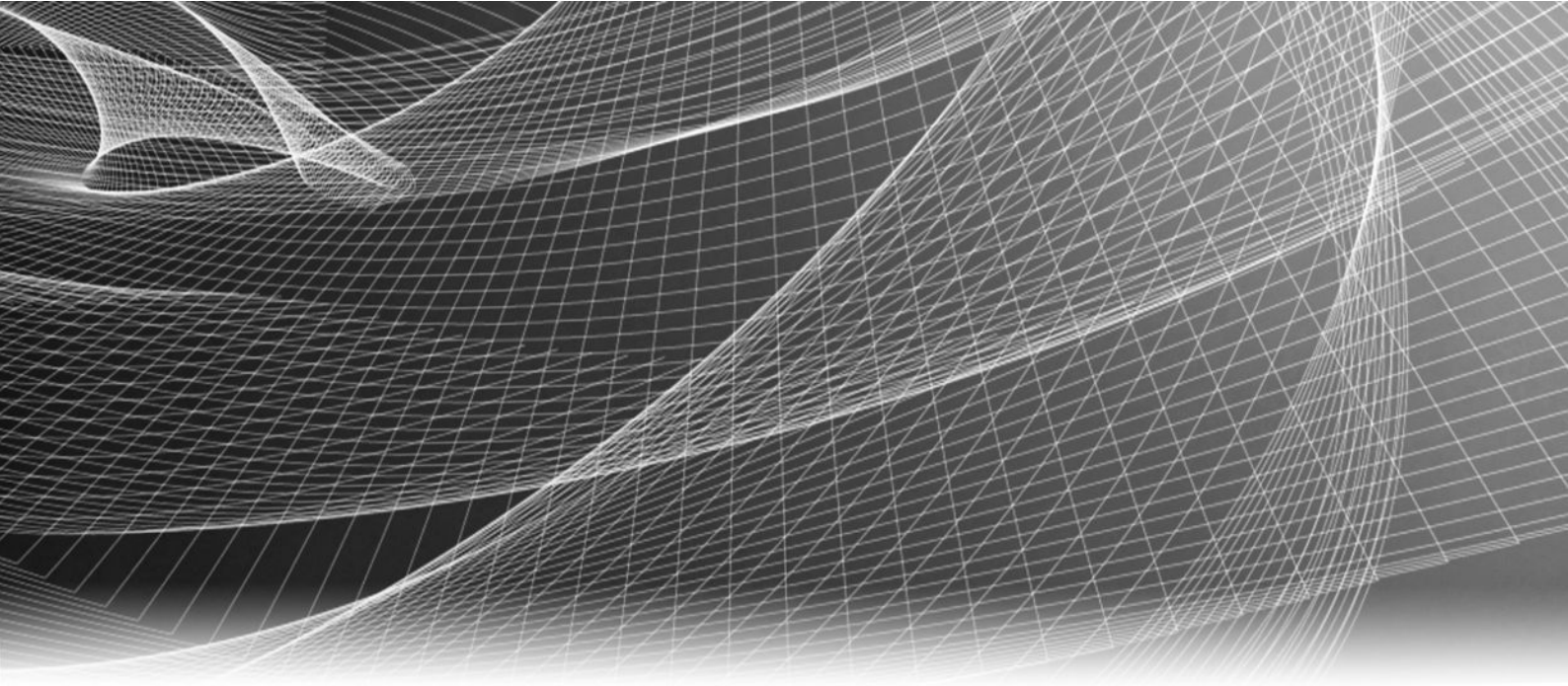

Video Surveillance
EMC Storage with FLIR Latitude

Sizing Guide

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EMC² VS-LAB TESTED

FLIR®

EMC²

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CHAPTER 1

Introduction

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

Solution overview

FLIR provides video management software (VMS) for video surveillance that is scalable and efficiently supports systems of any size. The VMS incorporates forensic-quality imaging and user-friendly operations that consist of dedicated, web-based, and mobile client software.

This solution is ideally coupled with EMC VNX® family block storage including the Video Surveillance Storage (VSS) array. These options provide the customer with exceptional performance and reliability creating a successful implementation.

The purpose of this guide is to help you understand the benefits of using an EMC storage solution with FLIR Latitude for video surveillance that includes both hardware and software elements. Use this guide to determine the requirements for a successful FLIR Latitude installation with EMC storage.

Scope

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

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

The guidelines for sizing FLIR Latitude using EMC storage systems for video storage describe the use of the following platforms:

- EMC VNX®
- EMC VSS®

These guidelines include the following design consideration topics:

- Architectural overview of FLIR Latitude
- EMC storage considerations for FLIR Latitude
- Result summaries for the tests carried out by EMC engineers in a VMware ESXi™ virtualized and physical (bare metal) infrastructure

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

- Number of FLIR Archivers
- Storage using Fibre Channel (FC) and Internet SCSI (iSCSI) on VNX systems
- Load factors that are related to including 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 *EMC Storage with FLIR Latitude: 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 paper are based on tests conducted in the EMC Physical Security lab and actual production implementations.

These are the key objectives of this paper:

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

CHAPTER 2

Configured components

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

EMC surveillance lab test environment

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.

During all the tests, we assumed that the virtual CPU (vCPU), memory, and network are configured according to FLIR best practices.

Our test environment was configured as follows:

- VMware ESXi 6.0 Update 2
- 20-core ESXi host at 2.2 GHz or greater
- 128 GB memory per ESXi host
- Per virtualized FLIR Latitude host:
  - 12 GB memory, 12 Vcpu
  - Network adapter type: VMXNET3, 10 GbE
  - Isolated VLAN for storage if not FC
- Per physical FLIR Latitude host:
  - 12 GB memory Intel Xeon 5520 2*4 CPU
  - Network adapter: 10 GbE
  - Isolated VLAN for storage if not FC

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

VMware ESXi environment

We make sure our test environment host hardware meets the system requirements for an ESXi installation.

The VMware vSphere system requirements are as follows:

- EMC PowerPath for block storage (FC and iSCSI)
- 10 GbE network

For a list of compatible hardware, refer to the *VMware Compatibility Guide* and *FLIR Configuration Guide*.

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.

CHAPTER 3

Solution components

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

EMC storage

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

This guide describes the tests for the following arrays:

- VNX arrays
- VSS arrays

For our testing, we used both single and dual storage processors for the full range of VNX storage arrays.

Storage protocols

EMC uses standard file protocols to allow users and applications to access data consolidated on an EMC storage solution.

This guide provides information about these network protocols:

- FC
- iSCSI

FLIR Latitude

FLIR Latitude is a network-based video monitoring and recording system, which is composed of servers and clients, as well as encoders and decoders, that are connected over a network.

Usually, the system resides on a dedicated network, rather than a corporate network. FLIR recommends that you always consult a network administrator before installing Latitude. A FLIR Latitude installation can consist of a single server or multiple servers in a hierarchical structure. You can further distribute the FLIR Latitude Windows services that provide the primary server functionality to additional Windows servers.

You can configure Latitude installations to handle a few cameras to thousands of cameras.

The following table describes the primary Latitude services.

Table 1 Latitude primary services

Service	Description
Directory	The main server application that is required by the service to provide a centralized catalog for the other Latitude services and applications on the system. From the Directory, applications can review connections, establish connections, and receive centralized configuration information.
Archiver	Latitude records video through the recorder service. The recorder provides dynamic discovery and status polling of units and processes and stores (archives) all video and multimedia streams to storage. "Archiving" is the term used for storing video.
Event Distributor (EDB)	EDB server provides rule-based distribution of events, actions, and messages using Microsoft SQL Server database and Recording of all the event types that are selected by the administrator for logging.

Table 1 Latitude primary services (continued)

Service	Description
Control Center	Control Center enables you to view live, archived, and exported video and audio, side-by-side. Provides synchronized playback and Advanced Workspace Mode control.

The Gateway, EDB, and Directory services may be installed on the same Windows 32-bit or 64-bit system. In our tests, we installed these services on a single virtualized host running Windows Server 2012 64-bit.

CHAPTER 4

Sizing the solution

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

EMC VNX

We conducted the functional tests to determine how FLIR works with VNX storage arrays.

Our testing found the best bandwidth for a single camera server to be 40 MB/s on a physical Archiver and 20 MB/s on a VM Archiver. The test included an overall read bandwidth of 10 percent.

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 events.

All test results are based on multiple servers writing to a single VNX.

Table 2 EMC VNX/VNXe storage array bandwidth (BW) results

Array	RAID	Disks	Array BW (MB/s)	Storage Pools		Maximum (RAW)
				Number	BW (MB/s)	
VNXe1600	6	35	256	1	256	400 TB
		200	256			
VNXe3200	6	120	210	1	210	500 TB
		150	210			
VNX-VSS100 FC	5, 6	90	400	1	400	360 TB
VNX-VSS100 iSCSI		90	340	1	340	360 TB
VSS1600	6	35	256	1	256	400 TB
		200	256			
VNX5200	5, 6	55	340	1	340	500 TB
VNX5400	5, 6	120	391	1	391	1 PB
		250	391			
VNX5600	5, 6	120	450	2	720	2 PB
		240	720			
		500	720			
VNX5800	5, 6	120	517	3	1241	3 PB
		240	827			
		360	1241			
		750	1241			
VNX7600	5, 6	120	595	4	1904	4 PB
		240	952			
		360	1428			
		480	1904			

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

Array	RAID	Disks	Array BW (MB/s)	Storage Pools		Maximum (RAW)
				Number	BW (MB/s)	
		1000	1904			
VNX8000	5, 6	120	684	5	2736	6 PB
		240	1094			
		360	1642			
		480	2189			
		600	2736			
		1000	2736			

CHAPTER 5

Testing and validation

This chapter describes the testing used to validate this solution.

Test objectives

Many factors must be considered when designing your solution.

The EMC lab tests focus on storage-related factors with the following objectives:

- Determine the bandwidth for various EMC storage arrays using FC and iSCSI.
- Determine the configuration parameters for VNX storage options.
- Determine best video storage performance requirements for use with VNX storage arrays.
- Determine the maximum bandwidth with multiple Archivers.
- Determine the previous test results with a lab-controlled failure, such as disabling a storage processor, rebuilding disks, or network path failures.

Test parameters

All test parameters and scenarios reflect standard production behavior for FLIR Latitude 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 FLIR Archiver.

Storage bandwidth and configuration test

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

During these tests, we configured FLIR Latitude using FLIR Latitude's best practices. We operated FLIR Latitude within the recommended bandwidth, camera count, and other FLIR maximum requirements.

Procedure

1. Configured video storage for an EMC storage system.
2. Set up camera simulators (traffic generators) to produce a traffic load to each FLIR Archiver at the recommended bandwidth.
3. Evaluated the network and video storage to ensure an error-free environment at the induced bandwidth.
4. Introduced storage device errors including:
   - Disk failures and rebuilds on VNX and VNXe arrays
   - Use of only one VNX or VNXe storage processor
   - NIC failures with active/active and active/passive configurations
5. Captured the storage system and host statistics.
6. 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

We performed comprehensive testing with FLIR Latitude on many EMC VNX arrays.

Depending on a customer's requirements, you can use EMC VNX storage systems with FLIR Latitude for this solution. The FLIR architecture and product suite enables scaling from a few cameras up to tens of thousands of cameras with this solution.

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.

EMC VNX-VSS arrays

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 arrays

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.