Technical Report

Configuring Milestone XProtect Corporate Video Management System with NetApp E-Series Storage
Proof-of-Concept Implementation Guide

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Abstract

This document provides a brief overview of setting up NetApp® E-Series storage for a video surveillance proof-of-concept test with Milestone XProtect Corporate video management software.

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1   Purpose

This document provides an overview for use by NetApp sales engineers (SEs) to perform a proof-of-concept (POC) test with the video surveillance application Milestone XProtect Corporate configured with NetApp E-Series storage. This document provides a brief outline of the basic steps necessary to configure such a test environment.

This document provides a brief overview of:

- The topology of a simple Milestone XProtect Corporate implementation that includes E-Series storage
- Steps to configure an E-Series storage array for use in a Milestone POC testing environment
- Steps to install and configure XProtect Corporate as part of a video surveillance POC test including configuring XProtect Corporate to utilize volumes on the E-Series storage array

1.1   Intended Audience

This document is intended for NetApp SEs responsible for performing POC tests with Milestone XProtect Corporate video management software (VMS). The document outlines only a basic configuration of E-Series with this VMS for POC testing.

1.2   Document Scope

This document is intended specifically for conducting a basic proof-of-concept test with Milestone XProtect Corporate video management software running on servers connected to NetApp E-Series storage arrays. It provides a brief outline to help the SE set up such a test environment. For more information, see References" section list.

1.3   Out of Scope

This document **does not** include or address the following:

- Overview of video surveillance systems
- System design
- System sizing
- Networking for video surveillance
- Advanced testing such as the testing of failure scenarios, multipath I/O testing, or performance characterization testing
- Camera-side video surveillance physical deployment guide (installing or working with cameras)
- Use of virtualized (hypervisor) test environment
- Full deployment guide for customer production video surveillance environments

1.4   Training Offerings

There are a number of web-based and instructor-led training opportunities to help with a successful configuration process for the NetApp E-Series storage array. The classes listed in the NetApp University Customer Learning Map under Storage Systems are recommended end-user training classes.

Table 1 lists the trainings offered, their duration, and the mode of delivery.

Table 1) Training offerings.

Class Description	Duration in Hours	Delivery
E-Series E5400 Technical Overview	01:00	Web-based

Class Description	Duration in Hours	Delivery
E-Series E2600 Technical Overview	01:00	Web-based
NetApp E-Series Hardware Architecture and Configuration	00:45	Web-based
Configuring NetApp E-Series Storage Systems	24:00	Instructor-led
Maintaining NetApp E-Series Storage Systems	16:00	Instructor-led

2 Prerequisites

The following prerequisites and items should be complete or in place before proceeding with the steps outlined in this document.

- The reader has an understanding of the basics of video surveillance using IP cameras, VMS, and video surveillance system design.
- The POC system to be tested must be sized and designed. Check to see if a design overview or topology diagram exists.
- Milestone XProtect Corporate is the chosen VMS to be tested in a proof of concept with E-Series storage.
- Servers and systems meet or exceed Milestone's minimum hardware requirements (management server, recording server, and viewing client workstation) for each system type to be configured and tested.
- All physical components needed are on site, including all cabling, servers running Windows Server® 2008 R2, client workstation, switches, racks, and so on, to be used as part of the test.
- The video surveillance system (switches, servers, client workstation, and E-Series storage) has been physically installed at the POC test site, cables have been run, servers have been configured and are running, the network has been configured and is running, the E-Series unit is in place, and power has been applied.
- All network customizations needed to integrate servers running Milestone XProtect Corporate and E-Series storage arrays into the POC test environment are complete and required IP addresses are known.
- Cameras are installed and the camera network is in place.
- The Milestone XProtect Corporate version 5 (or later) software installation package is available.
- The Milestone XProtect Corporate version 5 (or later) installation documentation from the Milestone website is available.
- The Milestone XProtect Corporate version 5 (or later) application and camera licenses are available.
- Access to Milestone XProtect Corporate expertise exists (through the integrator, partner, reseller, and so on).
- A computer workstation or laptop running the Microsoft® Windows® operating system is available to connect to the network for the Milestone POC test installation. This workstation must be on the same network as the servers and storage to be used in the test. Use of a laptop is suggested for this function.

3 Application Overview

XProtect Corporate is Milestone's flagship IP video surveillance and security product. Milestone is a well-established supplier of VMS in the video surveillance and physical security industry.

For a general introduction to video surveillance, see the following internal document: NetApp Video Storage Solution—Sales Quick Reference Guide

NetApp has extensively tested the Milestone XProtect Corporate application with E-Series storage. This testing included basic functionality, recording with hundreds of simulated and real cameras, failover testing, multipath testing, and performance analysis. For details about this testing, refer to TR-4136: Milestone XProtect Corporate on NetApp Video Surveillance Storage Solution Application Test Report.

For technical details on the Milestone product set, features, and options, refer to the Milestone web site. Milestone XProtect Corporate uses the following components as part of its workflow.

- **Management Server**. Includes an SQL database, and handles administration, event logging and user authentication.
- **One or more Recording Servers**. Handles camera configuration and recording.
- **One or more Failover Recording Servers.** Handles recording when a Recording Server fails.
- **XProtect Smart Client**. Video client application for viewing live video streams or browsing previously recorded video.
- **Management Client (software)**. The software user interface used for managing the application. Can be installed on a dedicated server or on any system connected to the network.

Figure 1 describes the video surveillance solution high-level topology with Milestone XProtect Corporate and NetApp E-Series.

Figure 1) Video surveillance solution high-level topology with Milestone XProtect Corporate and NetApp E-Series.
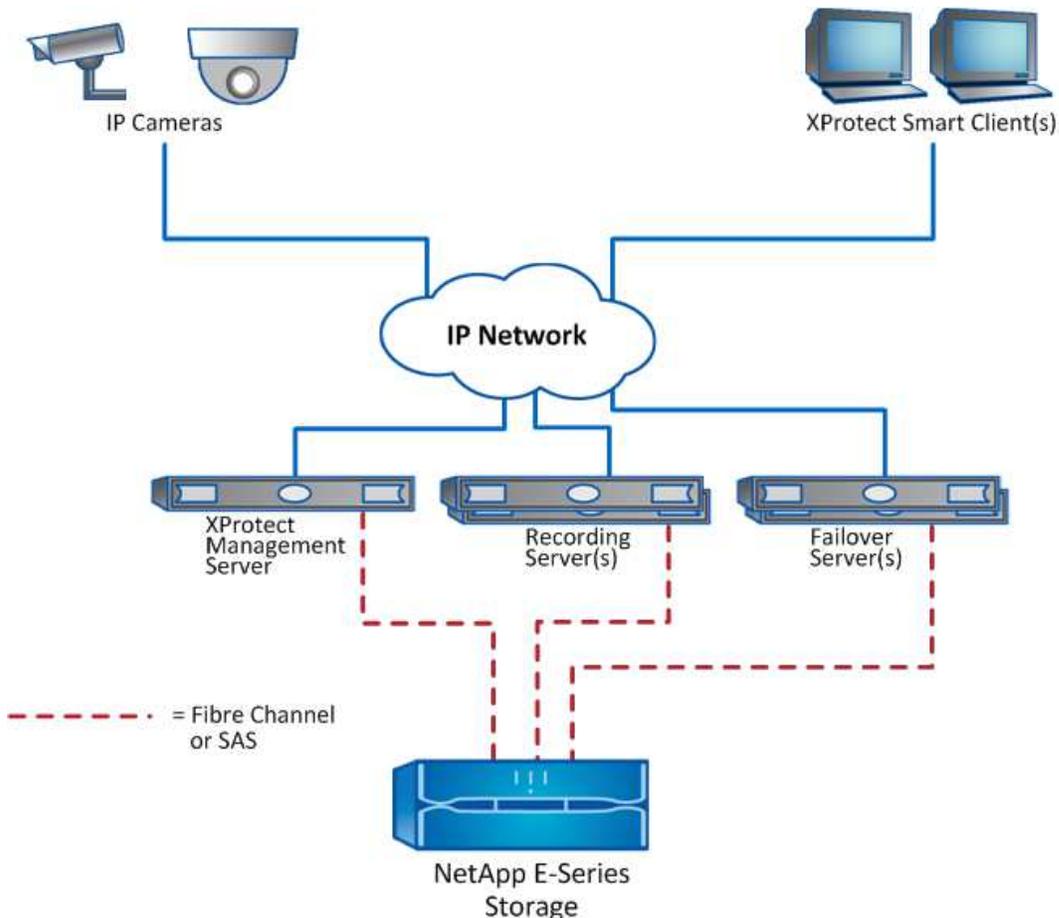
4   Sample Configuration

The following sections describe the basic steps to prepare a POC test system for Milestone XProtect Corporate with NetApp E-Series storage.

The following tasks are described:

- E-Series configuration
- Server configuration
- XProtect Corporate installation
- XProtect Corporate configuration

For illustration purposes, a simple example of a Milestone XProtect Corporate video surveillance configuration is used throughout this document. The configuration consists of three servers, one client workstation, and one storage array. Here is a summary of the parts of such a POC test system.

- XProtect Corporate Management server
- One XProtect Corporate Recording server (more servers can be configured if desired)
- One XProtect Corporate client workstation (for viewing live and archived video)
- One NetApp E2660 or E5460 storage array with at least 20 3TB drives
- Appropriate connectivity (camera IP network, SAN connections, management IP connections)

This configuration is only intended as an example and is used in configuration examples later in this document. It is intended for simple POC testing; it is not intended for actual customer production use. It does not include advanced features such as application failover servers, use of alternative disk drive types, or multipath connectivity. These advanced features can be configured and tested as part of a POC, but they are beyond the scope of this document.

Table 2 lists the sample system configuration including functions and suggested system names.

Table 2) Function and system names used in sample configuration.

Function	System Name
XProtect Management Server	SVR-1
Recording Server 1	SVR-2
Client workstation (video viewer)	Client

The Milestone XProtect Corporate application design typically uses one group of volumes, presented to servers as Logical Unit Numbers (LUNs), for recording live video. Another group of LUNs is used for the archive database. Each recording server therefore has two LUNs mapped to it. The recording server is configured to record live video to one LUN that holds about 24 hours of video. The application is configured to periodically copy recorded data to the archive LUN. The archive LUN is sized for the desired retention time, such as 30 days. Table 3 shows the volume group (VG) and volume (V) layout for this sample configuration for one recording server. Information is presented later regarding how to configure XProtect Corporate to record and archive video using these two LUNs.

In this example, one volume group (per recording server) is for the archive database (video) and one volume group is used for live video recording for one or several recording servers. The design of an actual customer deployment may build on this concept but will be different in detail. This is a sample for POC testing only.

Table 3) Sample volume group and volume layout.

Volume Group	Volume	RAID Layout	Volume Size	Preferred Controller / LUN #	Map to Server
VG_ARCHIVE_1	VOL_ARCHIVE_1	RAID 6, 14 drives (12+2)	32.74TB	A / 0	SVR-2
VG_LIVE_1	VOL_LIVE_1	RAID 10 with 4 drives (2+2)	2TB	B / 1	SVR-2

5   E-Series Configuration

5.1   Preparation

The application used to configure and manage an E-Series array is called SANtricity® ES Storage Manager. This tool will be referred to as SANtricity ES throughout this document. Perform these steps to configure the E-Series storage array.

1. Obtain the appropriate SANtricity ES installer for the laptop or workstation to be used for E-Series configuration (such as Windows 64-bit or 32-bit). SANtricity ES is available in the software section at the NetApp Support site.

2. Install the SANtricity ES Management Station option on a laptop or workstation. If asked about automatic start of a monitor agent, specify No; do not configure autostart of the monitor agent.


Each E-Series controller has two Ethernet ports per controller: Port 1 for management (left port) and Port 2 for service (right port). A few minutes after the storage array is powered on, the ports will default to:

```
Controller A: 192.168.128.101  and 192.168.129.101
Controller B: 192.168.128.102  and 192.168.129.102
```

Figure 2 depicts the location of the management ports on the E-Series controllers. The top controller is the A controller and the controller at the bottom is the B controller. The green lines point to the management port (Port 1). For initial configuration, connect a laptop to one of the service ports (Port 2).

Figure 2) E-Series controllers and management ports.
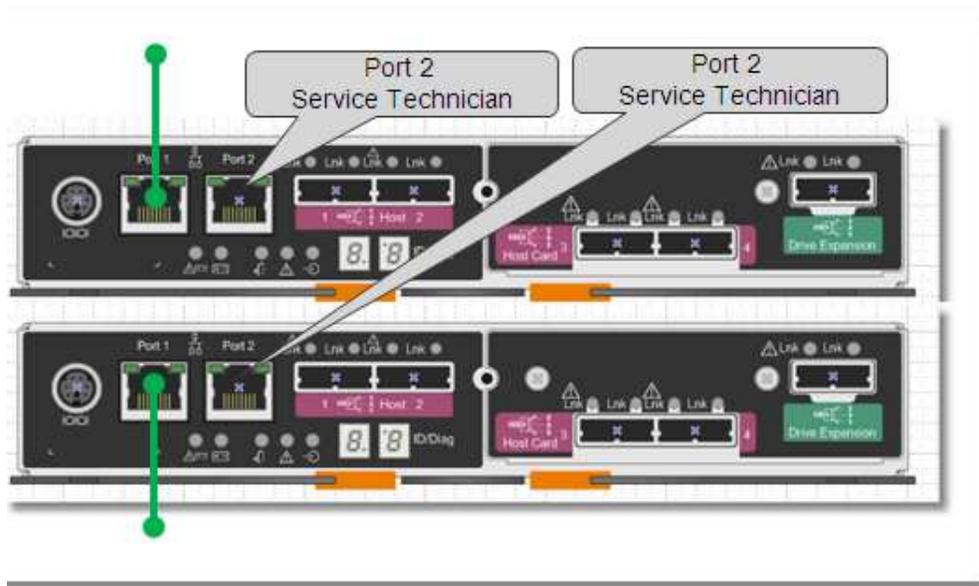

Best Practice
Leave Port 2 with the default values for a service technician to use locally. When the initial configuration is done, connect each of the Port 1s on both controllers to a network switch in the test environment topology.

3. The IP address of the first port can be changed using SANtricity ES from a laptop, on the same subnet as the default IP address on Port 2. Run the SANtricity ES application. The Enterprise Management window (EMW) appears. For initial configuration, do the following:

    a. Click Edit > Add Storage Array and select Out of Band Management and enter the IP address for one management IP port (for example, 192.168.129.101).

    b. Once you have connected to the controller, click the SANtricity ES Setup tab and select Configure Ethernet Management Ports to change the IP address of Port 1 on each controller.

    Note: After configuring the IP addresses management Port 1 on both controllers, detach the laptop from Port 2 (the service technician port) and then remove the storage array from the SANtricity EMW. Connect the laptop to an available port on the appropriate network switch and create a static IP address on the laptop using an available service technician IP address (for example, 198.18.7.200). Use the SANtricity ES EMW to manually add the storage array using the IP addresses assigned to Port 1 of controller A and B.

4. Once the array is added, the SANtricity ES EMW will appear similar to the way it does in the following screenshot.

5. Double-click the array to be managed to open the Array Management window (AMW). Use the Summary and Hardware tabs to verify that the status of the array is Optimal (green) and that all expected drives and controllers are seen. If it is not Optimal and if not all the expected drives are shown, rectify these conditions before proceeding to the next step. (The details in the screenshot shown here may not exactly match your test environment.) The AMW is shown here.
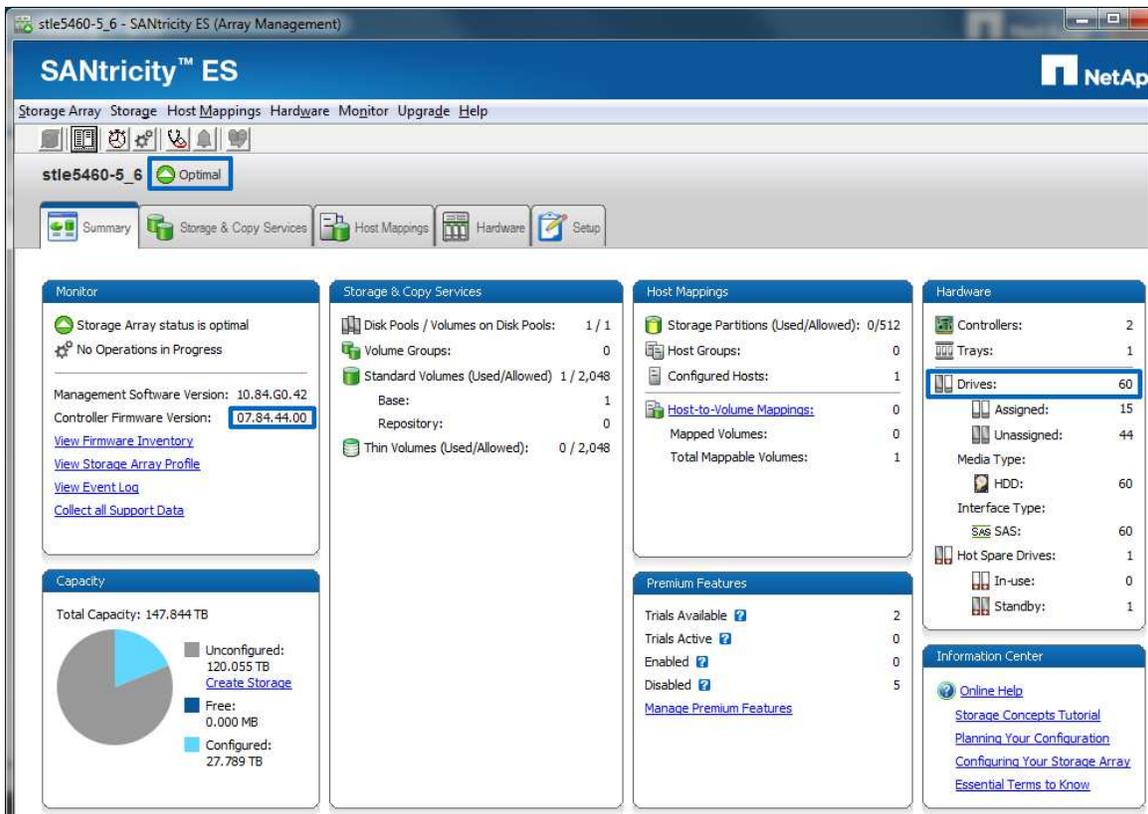
6. Examine the Summary tab to verify the Controller Firmware Version of the array (at the time of this writing, this firmware version should be .84 or higher and look similar to this version [07.84.xx.xx]).

7. If necessary, obtain the newest firmware files and upgrade E-Series firmware at the [NetApp Support site.](#)

8. E-Series arrays are delivered from the factory with two provisioned LUNs. The first LUN (LUN 0) is an unnamed LUN mapped to the default group. This LUN mapping and the associated volume must be removed and deleted before creating customer-specific volumes and hosts. The second LUN is the Access LUN (LUN 7), used to enable in-band management of the E-Series array. For NetApp E-Series solutions, NetApp recommends only out-of-band management. As a result, the Access volume is not required and the associated mapping to the default group should be removed.

5.2   Create Volume Groups and Volumes

Create E-Series volume groups as shown in Table 3 (or as needed for the specific POC test being conducted). Perform the following steps using the SANtricity ES AMW.

1. Select Storage > Volume Group > Create.

2. Select Automatic for the Drive Selection choice.

3. Select the appropriate RAID level (see Table 3).

4. Select the capacity by selecting the number of drives.

5. After a volume group has been created, SANtricity ES automatically provides the option to create a volume in that volume group. Use this window to create the volume in the newly created volume group.

6. In the New Volume dialog box, uncheck (do not enable) data assurance (DA). Change the New volume capacity appropriately (see Table 3). Select defaults for other settings as shown in this example.

Note: Volumes take significant time to initialize. The volumes specified in this example can take up to 24 hours to initialize. It is OK to continue test system configuration and initial testing while a volume initializes, but any performance testing should wait until initialization is complete. Use the SANtricity ES Operations in Progress icon or link to view the initialization status.

5.3 Set E-Series Parameters

NetApp has recommended settings for various parameters for optimal performance of video surveillance applications on E-Series storage. Set global parameters for the storage array as shown in Table 4. To verify or change these values, use the SANtricity AMW. Right-click the storage array and select Change, then select and set the values as shown in Table 4.

Table 4) Storage array global parameters.

Parameter	Recommended Value
Start cache flushing at (percentage)	80%
Stop cache flushing at (percentage)	80%
Cache block size (KB)	32KB
Media scan frequency (days)	30 days
Failover alert delay	5 minutes

After creating all volume groups and volumes, set volume parameters according to Table 5. Some parameters are easier to change for all volumes at once. To make changes, right-click a volume and select the Change option desired. To change a parameter for all volumes at once, click the Select All checkbox in the change dialog box before making the change. Set values as shown here and in Table 5.
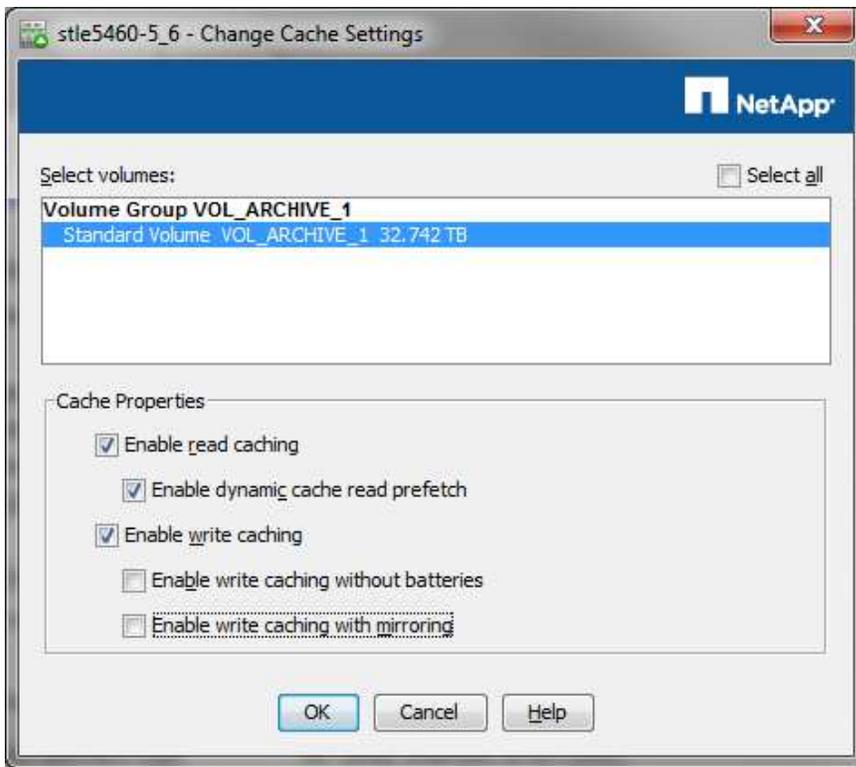
Table 5) Volume- and volume group–specific parameters.

Parameter	Recommended Value
Data assurance (DA) enabled	No
Segment size	128KB
Modification priority	Lowest
Read cache	Enabled
Write cache	Enabled
Write cache without batteries	Disabled
Write cache with mirroring	Disabled
Flush write cache after (seconds)	10 seconds
Dynamic cache read prefetch	Enabled
Enable background media scan	Enabled
Preread redundancy check	Disabled

5.4   Map LUNs to Servers

Use the SANtricity ES AMW to map the LUNs to the appropriate servers, as shown in Table 3. The use of host groups is optional and is not required for a small POC test.

In order to map LUNs to host servers, perform these three steps.

1.   Define hosts (using SANtricity ES).
2.   Map volumes as LUNs to hosts (using SANtricity ES).
3.   On the server, map Windows drives to the LUNs (described in a later section of this document).

Define Hosts

1.   Use the SANtricity ES Host Mappings menu to define hosts on the E-Series storage array. This is only needed for recording servers, which will later be configured with Windows driver letters for E-Series volumes (LUNs). Appropriate connection IDs for all host ports are needed. These are SAS IDs for SAS ports, or World-Wide Port Names (WWPNs) for Fibre Channel (FC) ports.

2.   Select No when prompted with the storage partition question. Select the port identifier for the server under the Known unassociated host port identifier drop-down menu. Create one alias (name) for each port on a host (usually two, if the host server has at least two cables connecting it to the controllers).

3.   After a host is defined, select the Host Mappings tab and right-click a host name to view its properties. Two examples are shown here. One shows two SAS connections from a host; the other shows two FC connections to a different host.
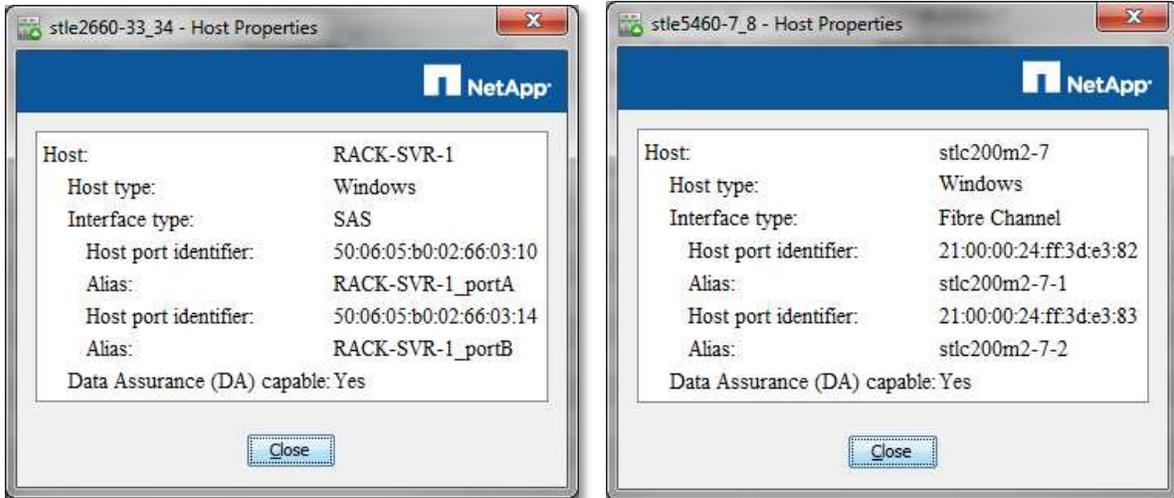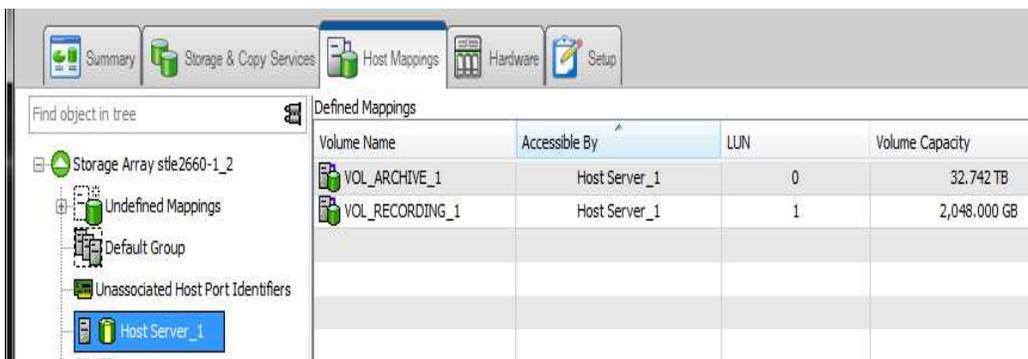
The following screenshot shows two servers defined as hosts to an E-Series array.
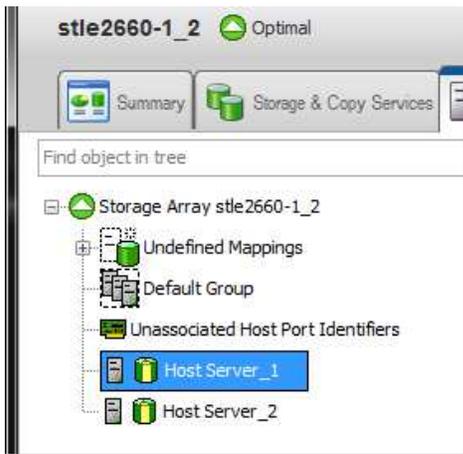
Map Volumes as LUNs to Hosts

Next, use the SANtricity ES Host Mappings menu (the Add LUN Mapping option) to map all volumes as LUNs to host servers. Refer to Table 3. An example of two LUNs mapped to a host is shown here.

6 Server Configuration

Once the E-Series configuration is complete, the following steps are required to be taken on the Windows Server 2008 R2-based servers.

1. Install SANtricity ES on the host(s) to which LUNs are to be mapped.
2. Map E-Series LUNs to the Windows drive letters.

6.1 Install SANtricity ES Device-Specific Module (DSM) and Utilities

SANtricity ES must be installed on each host server that will perform I/O to volumes on the E-Series array. Use these steps to install the necessary SANtricity ES components.

Obtain the appropriate SANtricity ES Storage Manager installer for the servers (such as Windows 64-bit), available in the software section at the NetApp Support site. When installing SANtricity ES, use the Custom install option and then select the items shown in the following screenshot. This installs the host multipath I/O (MPIO) DSM and the Utilities files. If asked to start a background Monitor process or Agent, do not select this option, or select No.

Figure 3) SANtricity ES Storage Manager custom installation selection.
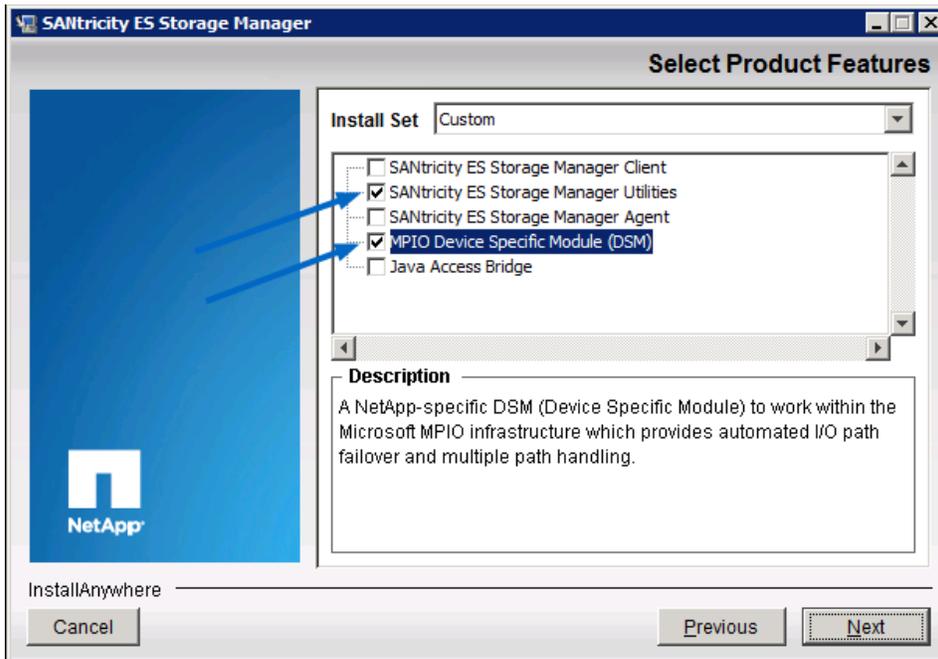
6.2 Map E-Series LUNs to Windows Drive Letters

The Windows Server 2008 R2 operating system requires mapping a drive (LUN) to a drive letter and completing other configuration steps before the drive is usable. The procedure for mapping a drive to a drive letter is a common Windows system management process, which is standard and well documented in Microsoft's documentation and help files.

1. Navigate to:

```
C:\Program Files (x86)\Storage Manager\util
```

2. Run the command `SMdevices`; it should list all E-Series volumes mapped to that server and display various information, including current and preferred controllers for each volume mapped to the server.

3. Use the information reported by `SMdevices` to aid in mapping E-Series LUNs to drive letters in Windows.

   The Windows Disk Management tool identifies an E-Series LUN as a drive that must be initialized, formatted, and mapped to a drive letter in Windows Server 2008 before I/O can be issued to that drive. The Disk Management tool is used to view and set details, such as the configuration of drive type, volume name, and allocation unit size. Only use the globally unique identifier partition table (GPT) disk type. For video surveillance implementation, NetApp recommends an allocation unit size of 64k.

   For more information about how to use the Disk Management tool, refer to: http://technet.microsoft.com/en-us/library/cc754936.aspx.

4. Map LUNs to Windows servers as shown in Table 6.

Table 6) Sample LUN assignment.

Volume Name	Mapped to Server	LUN	Drive Letter on Windows Server
VOL_ARCHIVE_1	SVR-2	0	E:\
VOL_LIVE_1	SVR-2	1	L:\

7 Milestone XProtect Corporate Installation

Use Table 7 as a guide for installing Milestone XProtect Corporate components on various systems.

Table 7) System names and functions.

Function	Server Name
XProtect Corporate Management Server	SVR-1
Recording Server 1	SVR-2
Client Workstation (video viewer)	Client

To install XProtect Corporate, complete the following steps. Refer to Figure 1 as a guide.

1. Locate the installation document on the Milestone website. This document is referred to as the Milestone documentation.

   Note: The Milestone document describes how to install and license the application. The details are not duplicated here because they are included in the Milestone documentation. An outline is provided in these steps.

2. Install the Milestone XProtect Corporate Management Server software on SVR-1.

3. Use the Milestone documentation to license XProtect Corporate.

4. Install the XProtect Management Client software on the server or optionally on a laptop.

5. Install the XProtect recording component software on all recording servers.

6. Install XProtect Smart Client software on the client workstation to be used for viewing video.

The Management Client application is used to perform most of the configuration. The graphical user interface (GUI) is shown in Figure 4. The details shown here will differ from your test environment; for example, no cameras will be seen until they are added later. This screenshot simply shows the major sections of the GUI.

Figure 4) Milestone XProtect Corporate Management GUI.
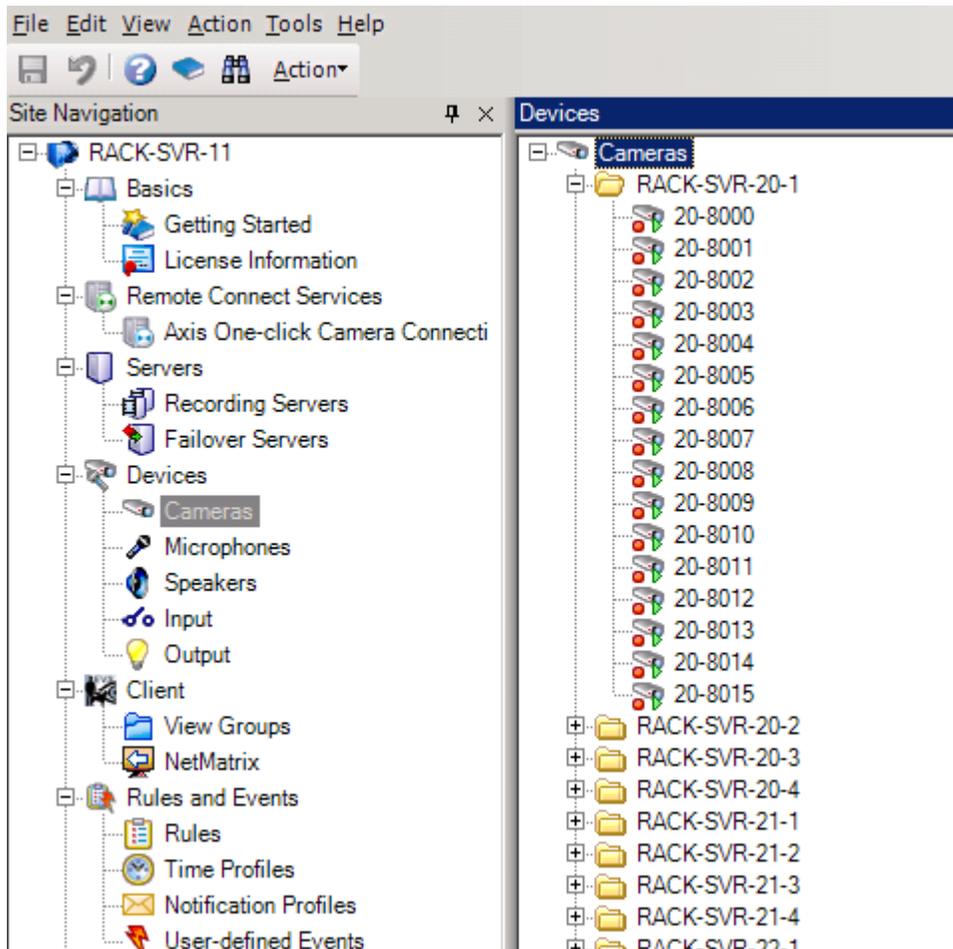
8 Milestone XProtect Corporate Configuration

8.1 Domain Name System (DNS) Considerations

The XProtect Corporate application uses the domain name system (DNS) for IP address and name resolution. For test environments that do not use DNS, an entry must be made in a specific XProtect Corporate XML file to map the IP address of a recording server (host) to a host name. This should be done on all servers that have an XProtect recording software component installed. For each recording server, open the following file:

```
C:\Program Data\Milestone\XProtect Corporate Recording
Server\RecorderConfig.XML
```

Edit this file by adding a host line that contains the IP address of the recording server at the location shown using the syntax shown at the bottom of this example:

```
  <!--
        It is optional to specify a host name / IP. If no host is specified, then the recorder
will automatically
        resolve a host name that will be used for generating the LiveFeedUri that is published to
clients.
        Examples of valid host values are:
```

Proof of Concept Implementation Guide: Configuring Milestone XProtect Corporate Video Management System with NetApp E-Series Storage
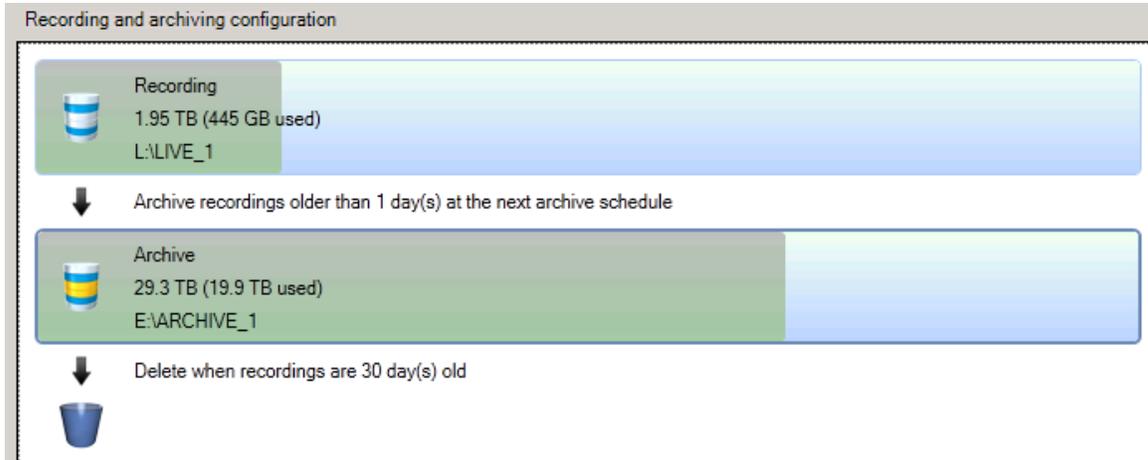
```
        127.0.0.1
        ServerName
        www.domain.com
    -->
 <host>198.18.6.25</host>
```

8.2   Configure for Recording

Use the XProtect Corporate documentation to configure one (or more) recording servers. Select the recording server under Servers, and then use the Storage tab to configure the application to use the E-Series LUNs that were mapped to Windows drive letters. The following screenshots show some sample configurations to record (live video) and archive storage within the XProtect Corporate application.
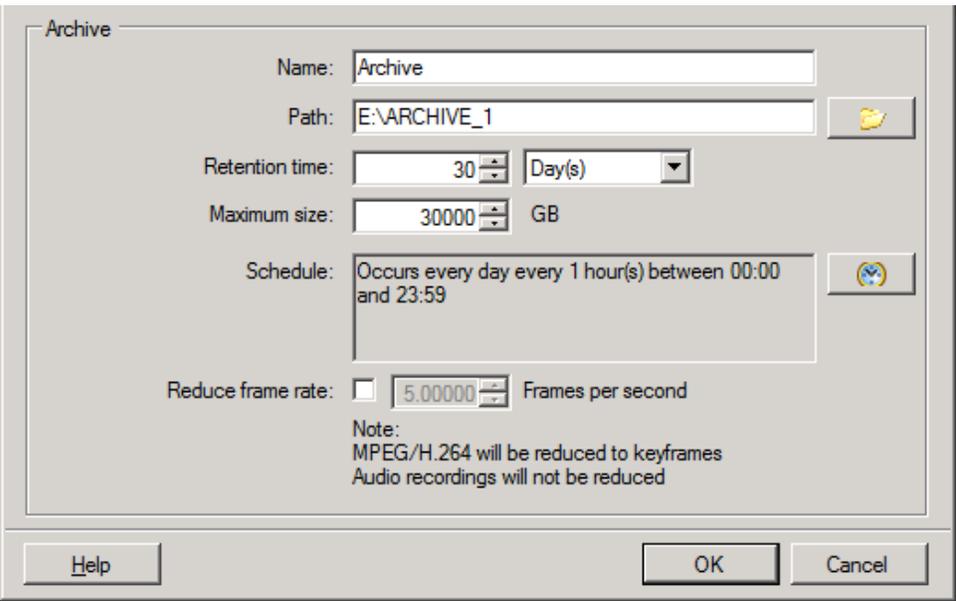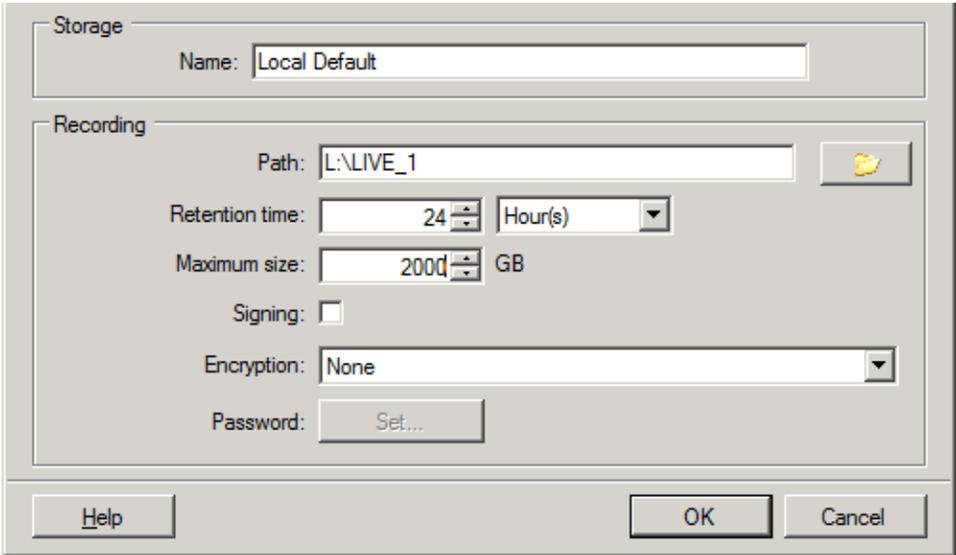
The resulting Storage tab view will look similar to this screenshot:

Recording and archiving configuration

Recording
1.95 TB (445 GB used)
L:\LIVE_1

Archive recordings older than 1 day(s) at the next archive schedule

Archive
29.3 TB (19.9 TB used)
E:\ARCHIVE_1

Delete when recordings are 30 day(s) old

This configuration uses the XProtect Corporate feature for live video recording to one volume called `Live_1`, followed by hourly archive operations in which data is copied from the `Live_1` recording volume to an archive volume, `Archive_1`. Live recording is typically done for 12 to 24 hours, depending on the total data rate handled by a given recording server. The time should be set so that the `Live_1` volume has sufficient space for the data rate of all cameras on a given recording server.

8.3   Add Cameras

Cameras can now be added and configured. Use the Add Hardware wizard, or add cameras manually to the recording server(s). Configure the cameras for recording parameters to be tested, such as resolution, frame rate, and codec. The specifics will depend on the cameras used. Configure for continuous recording or record on motion as desired for testing. Appropriate camera licenses will be required.

8.4   Monitor E-Series

Once cameras are added, licensed, configured, and set to record, the E-Series volumes should begin to see activity. In addition, after the first 24 hours have passed, each hour the Archive process executes to copy video files from the Recording database to the Archive database. A simple way to verify activity on the E-Series volumes is to use the SANtricity ES performance monitor. Selecting and using the performance monitor is illustrated in these screenshots.
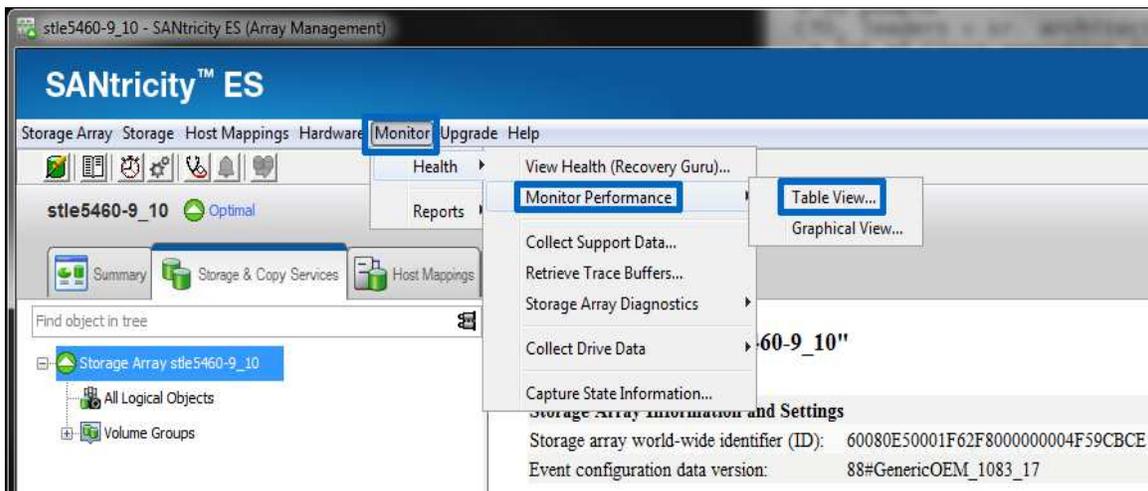
Click the Start button to begin monitoring. It should look similar to this screenshot:
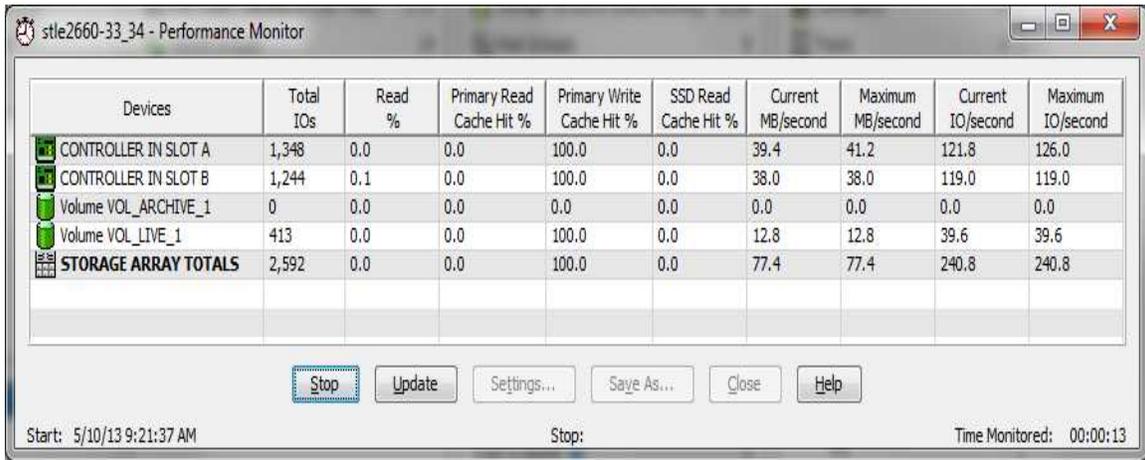
References

The following references were used in this report:

- Milestone Product and Installation Information
  http://www.Milestone.com/
- NetApp Video Storage Solution – Sales Quick Reference Guide
  https://fieldportal.netapp.com/DirectLink.aspx?documentID=71343&contentID=74856
- Milestone XProtect Corporate on NetApp Video Surveillance Storage Solution Application Test Report
  https://fieldportal.netapp.com/Core/DownloadDoc.aspx?documentID=91541&contentID=122258
- SANtricity ES Storage Manager Installation
  http://support.netapp.com/NOW/cgi-bin/software/
- Microsoft Disk Management
  http://technet.microsoft.com/en-us/library/cc754936.aspx
- Milestone XProtect Installation and Licensing Guide
  http://www.Milestone.com/downloads/manuals/XProtect_3.5/XProtect_Installation_and_Licensing_Guide.pdf

Version History

Version	Date	Document Version History
Version 1.0	July 2013	Initial release

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

www.netapp.com