V-Series Systems

Implementation Guide for 3PAR InServ® Storage

Network Appliance, Inc.
495 East Java Drive
Sunnyvale, CA 94089 U.S.A.
Telephone: +1 (408) 822-6000
Fax: +1 (408) 822-4501
Support telephone: +1 (888) 4-NETAPP
Documentation comments: doccomments@netapp.com
Information Web: http://www.netapp.com

Part number 210-04007_A0
Febraury 2008

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Preface

About this guide

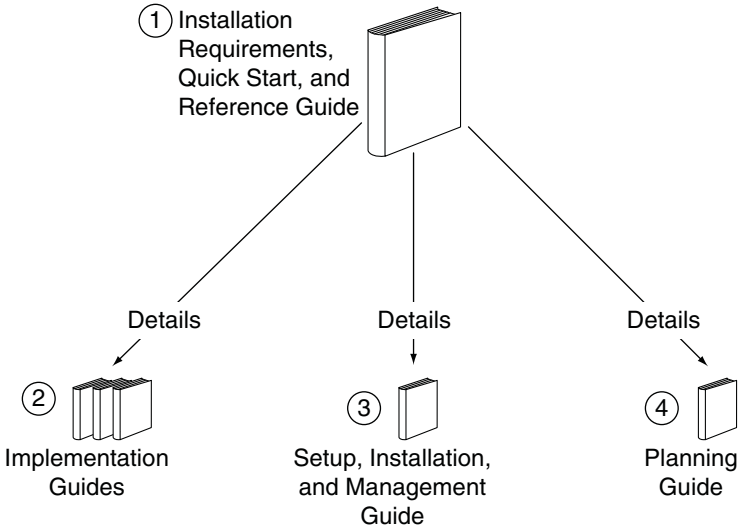
This guide provides information about how to set up your storage array to work with a V-Series system running Data ONTAP® software, including configuration guidelines and sample configurations. The information in this guide pertains to all supported V-Series platforms.

Note

Data ONTAP software runs on multiple hardware platforms. This documentation describes features that are not necessarily supported on your platform.

Relationship of this guide to other guides

This guide is intended to be used in conjunction with other information in the V-Series library.



The following table describes the relationship between this guide and other V-Series documentation.

	Guide name	Information includes...
1	*Installation Quickstart Guide*	◆ General guidelines for creating and making array LUNs available to V-Series systems. ◆ Quickstart installation instructions ◆ Reference information
2	*Implementation Guides*	◆ Vendor-specific details ◆ More detailed configuration examples than are provided in the *Installation Quickstart Guide*.
3	*Setup, Installation, and Management Guide*	Detailed steps for setting up the V-Series system and installing Data ONTAP software (for installers new to Data ONTAP setup and installation).
4	*Planning Guide*	Detailed background information, for example, about aggregate and volume use, array LUN size and layout in aggregates, and checksums

Audience

This guide is for users who are familiar with operating systems, such as UNIX®, Windows® 95, Windows NT®, Windows 2000, and Windows XP and who will be installing V-Series systems. This guide does not discuss basic system or network administration topics, such as IP addressing, routing, and network topology; it emphasizes the characteristics of the V-Series system.

Terminology

An *active/active configuration* is a pair of V-Series systems configured to serve data for each other if one of the two systems becomes impaired. In V-Series documentation, Data ONTAP documentation, and other information resources, active/active configurations are sometimes also referred to as *clusters*.

Special messages

This guide contains special messages that are described as follows:

Note

A note contains important information that helps you install or operate the system efficiently.

Attention

Attention contains instructions that you must follow to avoid damage to the equipment, a system crash, or loss of data.

Implementation Overview 1

About this chapter

This chapter provides an overview of how to integrate V-Series systems with 3PAR InServ Storage arrays. Use this guide in conjunction with the V-Series *Planning Guide:* V-Series *Requirements, Quick Start, and Reference Guide,* and the V-Series *Software Setup, Installation, and Management Guide*.

For the most recent information about supported microcode versions and switch support, see the V-Series *Support Matrix* at http://now.netapp.com. The *Support Matrix* is the final authority on the storage array models and firmware controller versions that V-Series supports.

Topics in this chapter

This chapter discusses the following topics:

Additional information to read

This guide is intended to be used in conjunction with other information in the V-Series library. In particular, refer to the additional documents in the following table.

For information about...	See...
Data ONTAP releases that support V-Series, supported switches, supported firmware, capacity, and maximum array LUN count	V-Series *Support Matrix* at http://now.netapp.com **Note** The *Support Matrix* is the final authority on the storage array models and license code and firmware controller versions and configurations that V-Series supports.
Creating LUNs for V-Series systems on the storage array and setting up access (generic information for all vendors and arrays)	V-Series *Installation Requirements, Quick Start, and Reference Guide*

For information about...	See...
How to configure the V-Series system	V-Series *Installation Requirements, Quick Start, and Reference Guide* (quickstart procedure) V-Series *Setup, Installation, and Management Guide* (detailed procedures)
How the V-Series system operates and what you need to plan for a successful deployment with the V-Series	V-Series *Planning Guide*

3PAR InServ Storage array terminology

controller node An individual device that works together with other controller nodes to cache and manage data in a storage server and to provide hosts with a coherent, virtualized view of the storage.

host A logical representation of one or more initiator World Wide Port Names (WWPNs) visible to storage.

logical disk An arrangement of rows of RAID sets. Logical disks are mapped to virtual volumes.

LUN A Virtual Volume is exported as a LUN by creating VLUNs

A LUN looks like an individual disk to the V-Series system. A V-Series system or non V-Series host reads data from or writes data to a LUN.

V-Series documentation uses the term array LUN to refer to LUNs on the storage array.

target, target port The 3PAR InServ Storage array port that is connected to and receives commands from a V-Series system.

virtual volume A virtual storage unit created by mapping data from one or more logical disks. 3PAR InServ Storage array virtual volumes are not the same as Data ONTAP volumes. A Data ONTAP volume is a logical entity that holds user data that is accessible through one or more of the access protocols supported by Data ONTAP, including Network File System (NFS), Common Internet File System (CIFS), HyperText Transfer Protocol (HTTP), Fibre Channel Protocol (FCP), and Internet SCSI (iSCSI). V-Series treats a 3PAR InServ Storage array virtual volume as a disk.

VLUN

A virtual volume-LUN pairing expressed as either an active VLUN or as a VLUN template. There is one VLUN for each path to a LUN.

Supported 3PAR InServ Storage arrays

Finding out which Data ONTAP release supports which storage arrays

This guide provides information about all vendors and storage arrays that V-Series supports at the time of publication. Not all vendors and models described in this guide are supported in all Data ONTAP releases. See the V-Series *Support Matrix* at http://now.netapp.com to determine which vendors and storage array models are supported in a particular Data ONTAP release.

Note

The V-Series *Support Matrix* is the final authority about which storage arrays and configurations that V-Series systems support.

Supported storage arrays

V-Series systems support the following 3PAR InServ Storage array platforms:

- E200
- S400
- S800

V-Series systems consider the S400 and S800 models to be a separate family from the E200 model.

Note

In the context of this discussion, storage arrays in the same *family* share the same performance and failover characteristics. For example, members of the same family all perform active-active failover or they all perform active-passive failover. Storage arrays with 4 GB HBAs are not considered to be in the same family as storage arrays with 2 GB HBAs When you set up a Data ONTAP aggregate, you cannot assign array LUNs from different storage array families or different vendors to the same aggregate.

Firmware versions

See the V-Series *Support Matrix* for information about supported firmware versions. The *Support Matrix* is the final authority on the firmware versions that V-Series supports.

Guidelines for array LUN sizing

V-Series minimum and maximum array LUN sizes

The size of the array LUNs that you can create on the storage array is limited by the minimum and maximum array LUN sizes that V-Series supports. The Data ONTAP definition of a gigabyte GB might not match the definition of a GB for your storage array.

The Data ONTAP definition of a GB is that one GB is equal to 1000 x 1024 x 1024 bytes.

Attention

The minimum array LUN size shown in the following table does not apply to the array LUN for the root volume. It is strongly recommended that you do not set the size of a root volume below the minimum root volume size shown in the V-Series *Installation Requirements, Quick Start, and Reference Guide*. The reason is that you want to ensure that there is sufficient space in the root volume for system files, log files, and core files. If a system problem occurs, you need to provide these files to technical support.

The following table shows the V-Series minimum and maximum array LUN sizes.

Data ONTAP release	Minimum array LUN size	Maximum array LUN size
7.2.4 and later	1 GB	1 TB Calculated as: 1000 x 1000 x 1024 x 1024 = 1,048,576,000,000 bytes
7.2.3	1 GB	750 GB Calculated as: 750 x1000 x1024 x1024 = 786,432,000,000 bytes
7.2.2 and earlier	1 GB	500 GB Calculated as: 500 x 1000 x 1024 x 1024 = 524,288,000,000 bytes

Minimum and maximum array LUN sizes

The 3PAR InServ Storage arrays support larger and smaller LUN sizes than the V-Series systems support. The maximum usable values shown in this section are based on the assumption that the units of measurement for your storage array are calculated as follows.

Unit	Formula for calculating...
GB	1024 x 1024 x 1024 bytes
MB	1024 x 1024 bytes
KB	1024 bytes

If you plan to use a large-sized array LUN that is close to the maximum capacity that Data ONTAP supports, ensure that the size you specify does not exceed the size shown in the "Maximum usable value" column in the following tables.

Note

Storage arrays vary as to how you can specify array LUN size (that is, in GB, MB, or 512-byte blocks).

See the V-Series *Planning Guide* for guidelines about the implications of different size array LUNs on Data ONTAP storage.

Values for Data ONTAP 7.2.4 and later:

If you are specifying in...	Then the maximum usable value is...
GB	976 GB
MB	975,000 MB
512-byte blocks	2,047,500,000 512-user blocks

Values for Data ONTAP 7.2.3:

If you are specifying in...	Then the maximum usable value is...
GB	732 GB
MB	749000 MB
512-byte blocks	1,535,500,000 512-byte blocks

Values for Data ONTAP 7.2.2 and earlier:

If you are specifying an...	Then the maximum usable value is...
GB	488 GB
MB	500000 MB
512-byte blocks	1,024,000,000 512-byte blocks

Configurations Supported with 3PAR Systems 2

About this chapter

This chapter discusses the supported configurations for all supported 3PAR storage arrays.

Use the configurations in this chapter as guidelines when you connect your V-Series system to your storage array. You can also refer to the configurations when you determine desired capacity usage, create array LUNs initially, and add array LUNs to your V-Series system.

Note

The V-Series *Support Matrix* is the final authority about which configurations that V-Series systems support.

Topics in this chapter

This chapter discusses the following topics:

Your guide to interpreting the illustrations

Variation in the maximum number of array LUNs supported

The maximum number of array LUNs supported for a configuration is limited by the maximum number of array LUNs that a particular V-Series model supports or by the maximum number of array LUNs that a storage array model supports, whichever is less.

See the V-Series *Support Matrix* for information about the number of array LUNs supported by different V-Series models. See "Supported 3PAR InServ Storage arrays" on page 5 for information about the number of array LUNs that different storage array models support per port.

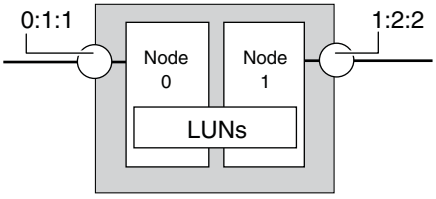
Number of ports shown

The illustrations show the minimum number of ports that you can use per configuration. You might choose to use more port pairs than are shown.

How redundant paths and port pairs are shown

As you look through the illustrations, notice that on the V-Series system the FC initiator ports are set up for redundancy.

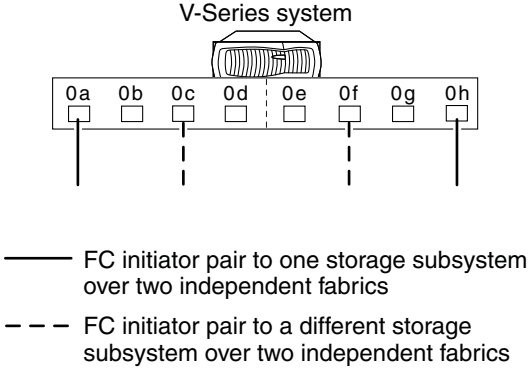
Illustration of redundant paths and port pairs for storage arrays: In each illustration in this chapter, the port pairs on the storage array are shown in relation to the LUNs on the port, with the ports on alternate nodes. (The hardware component on which host adapters and ports are located varies on different storage arrays.) Different storage array models, even those from the same vendor, might label the ports differently from those shown in the examples.



See the V-Series *Planning Guide* for rules for setting up redundant ports and examples of valid and invalid configurations.

Illustration of redundant paths and port pairs for the V-Series systems: On some V-Series models, the FC initiator ports are on cards. On other models, the FC initiator ports are onboard ports and are labeled 0a, 0b, and so on. Redundancy is achieved on the V-Series system because each port in a pair is on a different bus. (For more information about selecting redundant ports on the different V-Series models with onboard FC initiator ports, see the V-Series guide *Connecting Your V-Series System*.)

The following illustration shows a V6000 system model. In this example, two different redundant port pairs are used.



To use multiple V-Series port pairs as the illustration shows, each port in a V-Series port pair must access a different fabric.

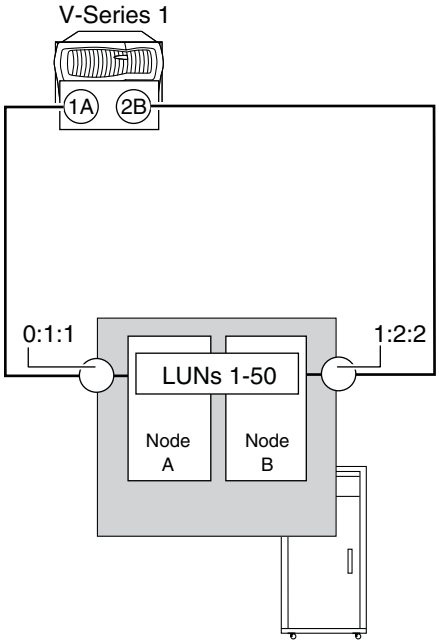
About switch zoning

Use single initiator zoning for a V-Series system because the V-Series FC initiator ports do not need to and should not see each other.

Direct-attached stand-alone configuration

Direct-attached stand-alone configuration

The following illustration shows a direct-attached stand-alone configuration with a single V-Series system directly attached to a single 3PAR storage array with one set of array LUNs.



For this configuration only one port pair is required. For availability it is required that port pairs be on adjacent nodes (0,1 or 2,3 or 4,5 or 6,7). The 3PAR port locations are shown in the node:slot:port (N:S:P) format.

Note

The maximum number of FC initiator ports on a V-Series system is determined by model. See the V-Series *Support Matrix* for information about how many array LUNs each V-Series model supports.

Direct-attached stand-alone configuration—additional array LUNs

Newer V-Series models are supporting an increasingly larger number of array LUNs. (See the V-Series *Support Matrix* for the numbers of array LUNs supported per V-Series model.)

Switch-attached active/active configuration

About this section

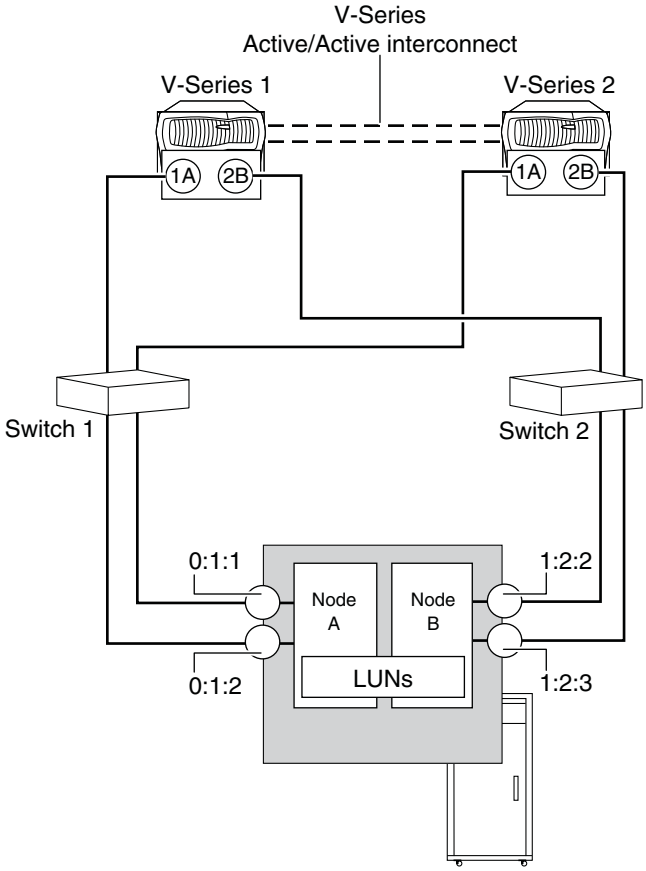
This section provides an example of a configuration a switch-attached active/active configuration.

Switch-attached active/active configuration

The following illustration shows an example in which two V-Series systems are clustered in an active/active configuration and attached through switches to a single 3PAR storage array. This configuration requires two port pairs. For availability it is required that port pairs be on adjacent nodes (0,1 or 2,3 or 4,5 or 6,7).

See the V-Series *Support Matrix* for the numbers of LUNs supported per V-Series model.

In a V-Series active/active configuration, one port pair *per node* is required. The limit is two port pairs from the V-Series systems for each LUN set. You can avoid a single point of failure by creating a redundant port pair. Then, if one path from a V-Series node fails, the other path from the node is used; takeover does not occur. (The way you create a redundant port pair differs according to V-Series model.) For models with onboard ports, choose one port from each bus. See the guide *Connecting Your V-Series System* for more information.



Note

The maximum number of FC initiator ports on a V-Series system is determined by model.

Zoning: The following table shows single-initiator zoning for this example with a V-Series system with cards. Single-initiator zoning is the recommended zoning strategy. Each LUN set requires a port pair.

Zone	V-Series system and port	Storage array port
Switch 1		
z1	V-Series 1 1A	0:1:1
z2	V-Series 2 1A	0:1:2

Zone	V-Series system and port	Storage array port
Switch 2		
z3	V-Series 1 2B	1:2:2
z4	V-Series 2 2B	1:2:3

Configuring 3PAR Storage for V-Series 3

About this chapter

This chapter contains an overview of the steps required to integrate a 3PAR InServ Storage array with a V-Series system. For details about how to set up and configure 3PAR InServ Storage arrays, see your 3PAR InServ Storage array documentation.

Topics in this chapter

This chapter contains the following topics:

Configuration overview

3PAR user interfaces

You configure 3PAR InServ Storage Server system using one or both of the two user interfaces that are offered as part of the 3PAR InForm operating system:

- 3PAR InForm Command Line Interface (CLI)
- 3PAR InForm Graphical User Interface (GUI)

Required system parameters

3PAR port persona: The 3PAR port persona represents a profile of the host system to which the target port is attached. Setting the port persona to one of the Data ONTAP port personas changes the 3PAR port persona pair from initiator to V-Series persona target ports. The port persona must be set before assigning LUNs to the V-Series.

To work with the V-Series you must set the 3PAR port persona value to one of the two preset Data ONTAP personas shown in the following table.

Configuration	Port persona
Direct Connect	18
Fabric Attached	19

The 3PAR person profile information includes the following:

- The vendor and model of its Fibre Channel adapter
- Its operating system
- A Level setting, which is reserved for future use

Attention

Once the 3PAR InServ Storage Server port persona pair is changed to 18 or 19, the V-Series persona target port, you can only assign additional V-Series initiators to that port. You cannot assign any other 3rd party initiators to that port.

Configuration overview

The following table provides the high-level steps for setting up a 3PAR storage array, switches, and V-Series systems to communicate with each other. These steps use the 3PAR InForm Command Line Interface (CLI). Consult the 3PAR documentation for more details.

Attention

Thin provisioning and virtual copies are not supported. You must use base volumes.

Step	Action
1	Determine the storage capacity you need for the V-Series systems.
2	Plan the number and size of the LUNs for the V-Series systems. See "Guidelines for array LUN sizing" on page 6 and the V-Series *Planning Guide* for recommendations about LUN size.
3	Install each V-Series system. **a.** Rack mount the V-Series system. **b.** Make sure the power is connected to the V-Series system and that the console is set up. See the V-Series guide *Connecting Your V-Series System* for detailed instructions. **c.** Power on the V-Series system. **d.** Interrupt the boot process by pressing Ctrl-C when you see the following message on the console: `Starting Press CTRL-C for special boot menu` **e.** Select option 5, "Maintenance mode boot" on the floppy boot menu. Do not proceed any further with V-Series system installation and setup at this time.
4	Install the Fibre Channel cables to connect the V-Series system to storage. ◆ For a switch-attached configuration, connect the cables between the storage array and switches and between the switches and the V-Series systems. ◆ For a direct-attached configuration, connect the cables between the storage array and the V-Series systems.

Step	Action
5	If your deployment includes switches, zone the switches. Then verify that the communications between the storage array and the switch and the switch and the V-Series systems are working. If you are setting up zoning using Worldwide Port Names (WWPNs), the V-Series systems and storage array must be powered on and running Data ONTAP (either in maintenance mode or in normal mode) for the WWPNs to be automatically discovered by the switch. Although you can obtain WWNs manually, automatic discovery of the WWNs for the ports reduces the likelihood of errors.
6	Confirm that the InServ OS on the 3PAR storage array meets the version level required by the V-Series systems. See the V-Series *Support Matrix* for information about supported firmware versions.

7	Change the 3PAR InServ Storage Server control port-persona pair from initiator to one of the Data ONTAP persona target ports:
	
	For direct connect:
	
	`controlport persona 18 <port>`
	
	For fabric:
	
	`controlport persona 19 <port>`
	
	Attention
	After the 3PAR InServ Storage Server control port-persona pair is changed to Data ONTAP persona target port you can only assign additional Data ONTAP initiators to that port. You cannot assign any other third-party initiators to that port.

Step	Action
8	Create logical host names on the 3PAR InServ Storage Server and add V-Series WWPNs to logical host names. When creating hosts, WWPN pairs should be chosen from adjacent nodes. Use only two WWPNs for each logical host name. To create a logical host name and add WWPNs: **`createhost <hostname> [WWPN1] [WWPN2]`** To add V-Series WWPNs to a logical host name: **`createhost –add <hostname> [WWPN3]`** To view the logical hosts you created: **`showhost`** It is recommended that you use 3PAR logical host names that conform to your V-Series systems naming conventions.
9	Create Virtual Volumes on the 3PAR InServ Storage Server. **`createaldvv [options] <vv_name> size`** **Attention** The V-Series system does not support RAID 0 Virtual Volumes on 3PAR InServ Storage arrays.
10	Export Virtual Volumes to 3PAR InServ Storage array logical host names created in Step 8. **`createvlun <vv_name> <LUN> <hostname>`** **Attention** V-Series systems do not support exporting a single Virtual volume to the same V-Series system as more than one LUN.

Step	Action
11	On the V-Series system, verify that the 3PAR InServ Storage Server LUN allocated for the V-Series systems is visible to the V-Series system. **a.** Enter the following command: `disk show -v` **b.** Verify that all the LUNs that were allocated for the V-Series systems are displayed. If you do not see all the LUNs you expect, wait a short time then enter the command again. There can be a short delay before the LUNs are visible over the network.

When you are ready to set up and configure Data ONTAP

You can begin Data ONTAP setup and configuration any time after assigning LUNs to the V-Series systems and connecting the storage array and the V-Series system together. The V-Series *Software Setup, Installation, and Management Guide* describes how to set up and configure Data ONTAP.

If the V-Series system is...	Then...
Powered on	To start the setup program, enter `bye` at the boot prompt (CFE or LOADER, depending on the V-Series model).
Not powered on	See the instructions in the V-Series *Software Setup, Installation, and Management Guide* for how to power up the V-Series system.

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