IBM System Storage N series

Gateway Implementation Guide For Third-Party Storage

GA32-1050-02

Contents

Preface

Supported features

IBM System Storage N series storage systems are driven by NetApp Data ONTAP software. Some features described in the product software documentation are neither offered nor supported by IBM. Please contact your local IBM representative or reseller for further details.

Information about supported features can also be found on the N series support website (accessed and navigated as described in *Websites* on page 7).

Websites

IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. The following web pages provide N series information:

- A listing of currently available N series products and features can be found at the following web page:
  www.ibm.com/storage/nas/
- The IBM System Storage N series support website requires users to register in order to obtain access to N series support content on the web. To understand how the N series support web content is organized and navigated, and to access the N series support website, refer to the following publicly accessible web page:
  www.ibm.com/storage/support/nseries/
  This web page also provides links to AutoSupport information as well as other important N series product resources.
- IBM System Storage N series products attach to a variety of servers and operating systems. To determine the latest supported attachments, go to the IBM N series interoperability matrix at the following web page:
  www.ibm.com/systems/storage/network/interophome.html
- For the latest N series hardware product documentation, including planning, installation and setup, and hardware monitoring, service and diagnostics, see the IBM N series Information Center at the following web page:
  publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains

information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your IBM N series product, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure they are connected.
- Check the power switches to make sure the system is turned on.
- Use the troubleshooting information in your system documentation and use the diagnostic tools that come with your system.
- Refer to the N series support website (accessed and navigated as described in *Websites* on page 7) for information on known problems and limitations.

Using the documentation

The latest versions of N series software documentation, including Data ONTAP and other software products, are available on the N series support website (accessed and navigated as described in *Websites* on page 7).

Current N series hardware product documentation is shipped with your hardware product in printed documents or as PDF files on a documentation CD. For the latest N series hardware product documentation PDFs, go to the N series support website.

Hardware documentation, including planning, installation and setup, and hardware monitoring, service, and diagnostics, is also provided in an IBM N series Information Center at the following web page:

publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services. Visit the following web page for support telephone numbers:

www.ibm.com/planetwide/

Firmware updates

IBM N series product firmware is embedded in Data ONTAP. As with all devices, ensure that you run the latest level of firmware. Any firmware updates are posted to the N series support website (accessed and navigated as described in *Websites* on page 7).

Note: If you do not see new firmware updates on the N series support website, you are running the latest level of firmware.

Verify that the latest level of firmware is installed on your machine before contacting IBM for technical support.

How to send your comments

Your feedback helps us to provide the most accurate and high-quality information. If you have comments or suggestions for improving this document, please send them by email to *starpubs@us.ibm.com*.

Be sure to include the following:

- Exact publication title
- Publication form number (for example, GC26-1234-02)
- Page, table, or illustration numbers
- A detailed description of any information that should be changed

Understanding gateway and third-party storage implementation

Gateways can be deployed with a variety of third-party storage arrays. Each supported storage array has different configuration requirements and supports only certain configurations.

Array configuration requirements

Each third-party storage array has configuration requirements that must be met in order for the array to work with the gateway. These configuration requirements could include the following:

- Identifying the host name of the gateway.
- Defining the initiators to which the array is connecting.
- Setting failover modes.
- Setting host and LUN group information.
- Defining the array port configuration.

Supported configurations

Each gateway deployment with a third-party array is limited to the types of configuration that it supports. When determining the configuration to implement, you need to answer the following questions:

- Which configurations are supported for my third-party array?
- Will this be a fabric-attached configuration?
- Will this be a direct-attached configuration?
- How much storage will be available to the gateway?
- Will the configuration include a stand-alone gateway, a High Availability (HA) pair, or a MetroCluster configuration?

Qualification of components in your deployment

The *Gateway Interoperability Matrix* provides the latest information on hardware models and firmware versions of switch and storage array products that are currently qualified for use with gateways. Not all Data ONTAP releases support the same features, configurations, storage array models, and gateways.

The following information in the matrix helps you during the system configuration:

- Whether your gateway is supported in the Data ONTAP release that you plan to run.
- The maximum and minimum system capacity limits for your gateway.
- If you want to deploy a MetroCluster, whether MetroCluster is supported for your storage array.
- Whether multiple LUN groups are supported for your storage array.

- Which storage array firmware versions are supported.
- Whether your storage array supports non-disruptive (live) upgrade of the controller firmware.

Use of advanced features with storage arrays

The gateway does not support third-party array advanced features unless otherwise specified in the *Gateway Interoperability Matrix*.

Detailed information about the planning and installation process

The *Gateway Installation Requirements and Reference Guide* provides an overview of the gateway technology and a detailed description of planning and requirements, including information about the following:

- Supported methods of connection
- Pathing requirements and examples
- Array LUN provisioning
- LUN security methods
- Zoning recommendations
- Installation and configuration examples
- Installation verification examples

Related information

IBM N series support website: www.ibm.com/storage/support/nseries

EMC CLARiiON and VNX storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring EMC CLARiiON and VNX arrays with gateways

Each EMC CLARiiON and VNX storage array has required configuration parameters that must be set in order to work successfully with gateways.

Required host configuration parameters

There are configuration parameters that must be set in order for the array to communicate with the gateway.

Host configuration parameters that must be set on the storage array are listed in the following table.

Parameter	Setting
Initiator type	CLARiiON Open
Array Com Path	Enabled
Failover mode	1
Unit serial number	LUN
Host Name	User-supplied host name and port number.
IP address	Unique fake IP address. Be sure that you have not entered this IP address anywhere else in the storage array configuration, and that it is not an IP address that is present on the network.

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

How EMC CLARiiON and VNX storage arrays control access to data

EMC CLARiiON and VNX arrays use storage groups to control access to data. A storage group is one or more LUNs within the storage array that can be accessed only by the host or hosts that you associate with the array LUNs. A host cannot access or modify data in array LUNs that are not part of its storage group.

Gateways support multiple storage groups with the following requirements:

- Switch zoning must define which target ports the gateway initiator ports use to access each array LUN group.
- Use LUN masking to restrict host access to array LUNs.
- Storage groups must define which array LUN groups are presented to each the gateway initiator port.
- One initiator port pair on each of the gateway system is required for each array LUN group.
- All target ports on a storage array accessing an individual array LUN group must be accessed through the same switch.

When you are using neighborhoods, the gateways in the same neighborhood must be in the same storage group.

Requirement for 8 Gb array port initialization

In a typical FC fabric, array ports initialize as N-Ports (node ports) and their corresponding switch ports initialize as F-Ports (fabric ports). In some cases, N-Ports may go offline and resume operation as L-Ports (loop ports), resulting in fabric errors. This behavior is caused by topology auto-negotiation issues in the Brocade switch.

To ensure that switch ports always initialize as F-ports, run the `portcfggport <portnumber> 1` command on Brocade switch ports in the configuration. Run this command when you start configuring the system to avoid this problem, or to fix the problem if it occurs.

To promote efficiency on the fabric as a whole, use this workaround on any Brocade ports attached to the gateway initiator ports.

EMC CLARiiON storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families.

The following list shows CLARiiON storage arrays organized by family:

- Family 1
  - CX300
  - CX500

    - CX700
- Family 2
    - CX3-20
    - CX3-40
    - CX3-80
- Family 3
    - CX4-120
    - CX4-240
    - CX4-480
    - CX4-960

EMC VNX storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families.

The supported VNX storage arrays are all members of the same family:

- Family 1
    - VNX5100
    - VNX5300
    - VNX5500
    - VNX5700
    - VNX7500

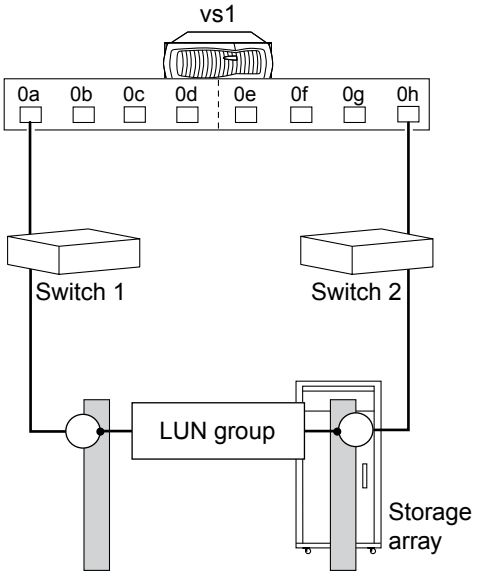
Supported configurations for EMC CLARiiON and VNX arrays

Only specific configurations of EMC CLARiiON and VNX storage arrays deployed with gateways are supported.

Stand-alone basic configuration

The stand-alone basic gateway configuration is a simple fabric-attached configuration with a single port pair access a single LUN group.

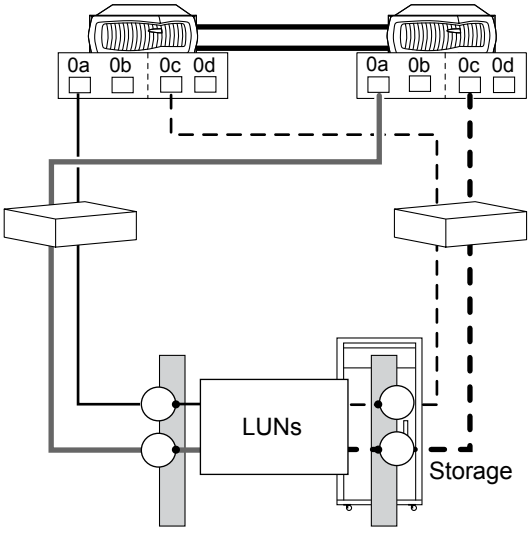
The following illustration shows this configuration.



Single 4-port array LUN group

This configuration contains a single 4-port LUN group with each target port accessed by a single gateway FC initiator port from the HA pair. Zoning ensures that there are only two paths to a specific array LUN.

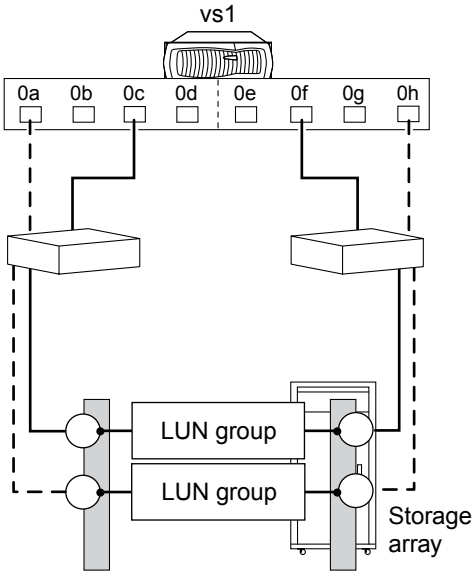
The following illustration shows this configuration.



Stand-alone with two 2-port LUN groups

This is a stand-alone gateway in a fabric-attached simple configuration. In this configuration, each FC initiator port pair accesses a separate array LUN group.

The following illustration shows this configuration.



EMC Symmetrix storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring EMC Symmetrix arrays with gateways

Each EMC Symmetrix storage array has required configuration parameters that must be set in order to work successfully with gateways.

Required host channel director port configuration parameters

There are configuration parameters that must be set in order for the array to communicate with the gateway.

Host channel director port configuration parameters that must be set on the storage array are listed in the following table.

Parameter (names may differ between GUI and CLI)	**Setting**
Common SN (Common Serial Number or C-bit parameter)	Enable
PP (Point-to-Point parameter)	Enable
SC3 (SCSI-3)	Enable
SPC-2 (SCS2_Protocol_version, SCSI Primary Command 2 parameter, or "Allow inquiry data to be compiled to the standard")	Enable (Contains the second-generation definition of the basic commands for all SCSI devices.)
UWN (Unique Worldwide Name)	Enable
Volume Set Addressing	Disable

Required host configuration parameters

There are configuration parameters that must be set in order for the array to communicate with the gateway.

Host configuration requirements are provided in the following table:

Parameter	Setting
Host Type Format	Server
SCSI3_persist_reserv (Persistent Reservations)	On

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

Requirements for implementing LUN security

You use LUN security to eliminate the possibility of a host writing data to a LUN that is not owned by that host.

To eliminate the possibility of a non gateway overwriting DMX array LUNs owned by a gateway, or the reverse, you must present the DMX logical devices through the host (channel) director ports in either of the following ways:

- Present only the DMX logical devices for the gateway on specific DMX host (channel) director ports that are dedicated to gateway use.
- Use LUN masking to associate all DMX logical devices to all host (channel) director ports, but allow only the gateway FC initiator ports to see the LUNs for the gateway.

  Attention:

  Do not present the VCMDB to all hosts by default. Configure the global setting to restrict visibility to the VCMDB unless it has been specifically made visible to a particular host.

  If you are setting up a configuration in which you are using multiple array LUN groups for the gateway, set up a separate "host group" for each group of LUNs for the gateway.

Caution about using the VCMDB LUN

For the Volume Configuration Management Database (VCMDB) to be enabled, the VCMDB LUN must exist. The VCMDB LUN is a `command` type LUN, not a storage LUN. The VCMDB is typically mapped to LUN 0, but can be an array LUN other than LUN 0.

If you map the VCMDB LUN to the gateway, the gateway periodically logs a message that the VCMDB LUN is less than the minimum size required, and it marks the VCMDB LUN as failed. The gateway continues to function normally after logging this error message.

Caution about using the ACLX LUN

On VMAX arrays, the Access Control Logix (ACLX) LUN is automatically created and mapped to LUN0 on each port. The ACLX LUN is not a storage LUN.

When the ACLX LUN is mapped to the gateway, Data ONTAP logs a message that the ACLX LUN is less than the minimum size required, and it marks the LUN as failed. Data ONTAP continues to function normally after logging this error message.

Restriction on using a gatekeeper LUN

If a gatekeeper LUN is presented, do not map it to the gateway. Gateways cannot use a gatekeeper LUN. A gatekeeper is a Symmetrix logical device through which SYMAPI or the ControlCenter agent communicates with the storage array.

EMC Symmetrix storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families.

The following list shows the supported arrays organized by families:

- Family1
  - VMAX SE
  - VMAX
- Family 2
  - DMX 3
  - DMX 4

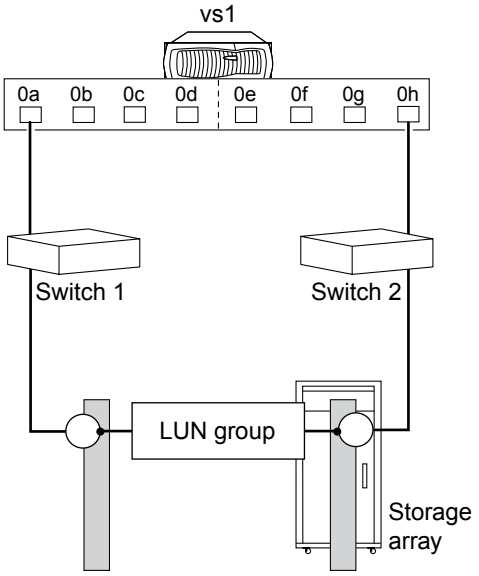
Supported configurations for EMC Symmetrix arrays

Only specific configurations of EMC Symmetrix storage arrays deployed with gateways are supported.

Stand-alone basic configuration

The stand-alone basic gateway configuration is a simple fabric-attached configuration with a single port pair access a single LUN group.

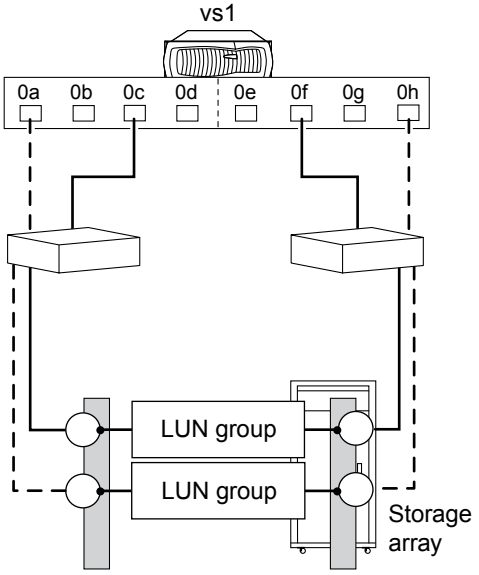
The following illustration shows this configuration.



Stand-alone with two 2-port LUN groups

This is a stand-alone gateway in a fabric-attached simple configuration. In this configuration, each FC initiator port pair accesses a separate array LUN group.

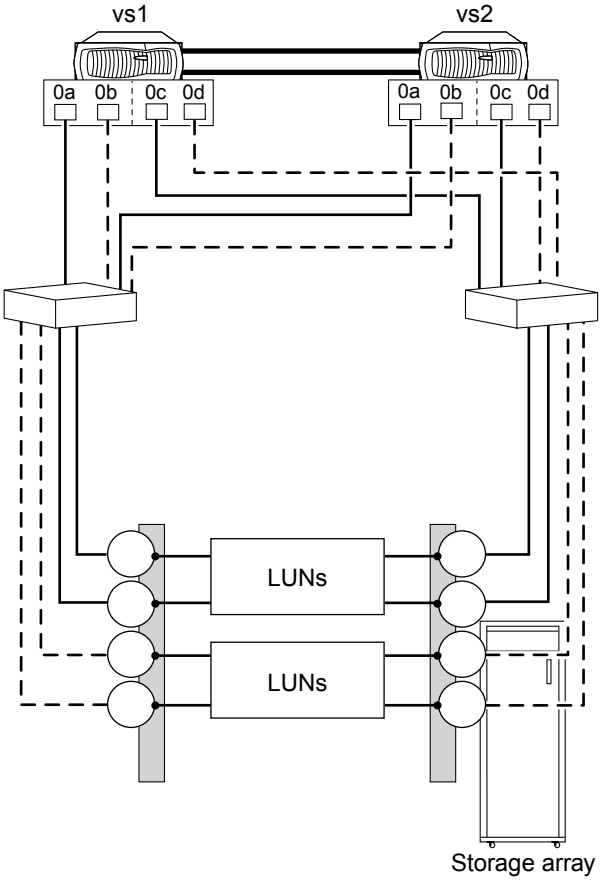
The following illustration shows this configuration.



Two 4-port array LUN groups

In this configuration, each the gateway port pair accesses a separate array LUN group. Zoning is single the gateway FC initiator to single array target port.

The following illustration shows a block diagram of this configuration.



Fujitsu ETERNUS storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring Fujitsu ETERNUS arrays with gateways

Each Fujitsu ETERNUS storage array has configuration parameters that must be set in order to successfully work with gateways.

Requirement for creating a host response pattern for Fujitsu storage arrays

For the gateway to work with Fujitsu storage arrays, you need to create a new host response pattern and set the parameters required by the gateway.

Fujitsu provides host response pattern #00, which is a read-only version of the specification that you edit to match the requirements of your storage array model.

Required host configuration parameters for DX8xxx arrays

There are configuration parameters that must be set in order for the array to communicate with the gateway.

Host configuration parameters that must be set on the storage array are listed in the following table.

Parameter	Setting
Host Response Name	Name (Gateway name)
Command Time-out Interval	Standard (25 seconds)
Data Transfer Timer	10 Seconds (default)
Load Balance Response	Unit Attention
Byte-0 Inquiry Response	No Conversions (default)
Inquiry VPD ID Type	Type1 + Type3 (default)
Inquiry Standard Data Version	Version 05 (default)
Reservation Conflict Response for Test Unit Ready	Normal Response (default)
Asymmetric / Symmetric Logical Unit Access	Active/Active (default)

Parameter	Setting
Host Specific Mode	Normal Mode (default)
LUN Mapping Changes	No Report (default)
LUN Capacity Expansion	No Report (default)
Vendor Unique Sense Code	No report (default)
Sense Code Conversion Pattern	No Conversion (default)

Required host configuration parameters for DX4xx arrays

There are configuration parameters that must be set in order for the array to communicate with the gateway.

Host configuration parameters that must be set on the storage array are listed in the following table.

Parameter	Setting
Host Response Name	Name (Gateway name)
Byte-0 of Inquiry response	No Conversion (default)
Inquiry VPD ID Type	Type 1 + Type 3
Inquiry Standard Data Version	Version 05 (default)
Command Timeout Interval	25 sec (default)
Load Balance Response	Unit Attention (default)
Reservation Conflict Response for Test Unit Ready	Normal (default)
Change Volume Mapping	No Report (default)
Volume Capacity Expansion	No Report (default)
Vendor Unique Sense Code	No Report (default)
Host Specific Mode	Normal (default)
Asymmetric/Symmetric Logical Unit Access	Active/Active (default)
Sense Data Conversion	No Conversion (default)

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

Fujitsu ETERNUS storage array families

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 8-GB HBAs.

All of the supported Fujitsu ETERNUS arrays are in the same family.

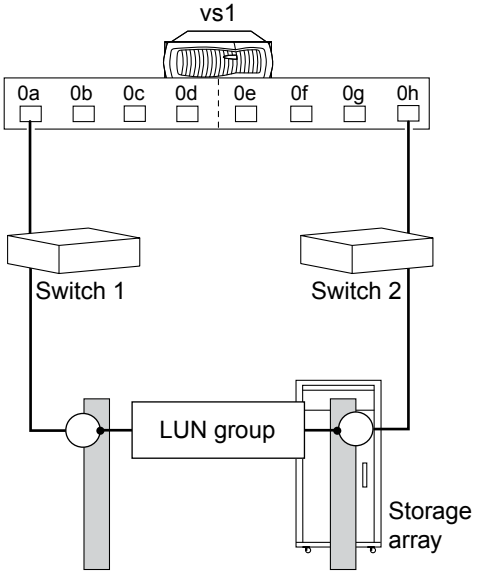
Supported configurations for Fujitsu ETERNUS arrays

Only specific configurations of Fujitsu ETERNUS storage arrays deployed with gateways are supported.

Stand-alone basic configuration

The stand-alone basic gateway configuration is a simple fabric-attached configuration with a single port pair access a single LUN group.

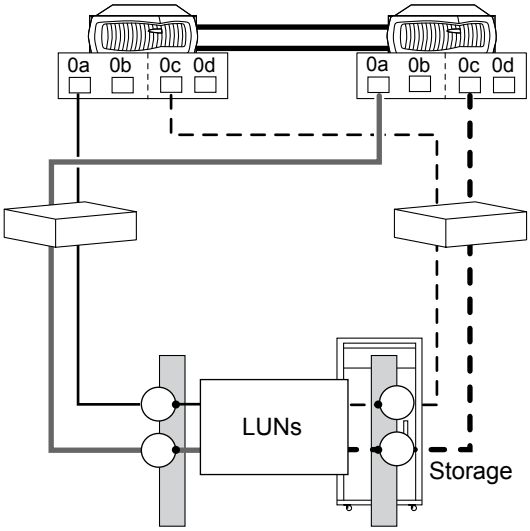
The following illustration shows this configuration.



Single 4-port array LUN group

This configuration contains a single 4-port LUN group with each target port accessed by a single gateway FC initiator port from the HA pair. Zoning ensures that there are only two paths to a specific array LUN.

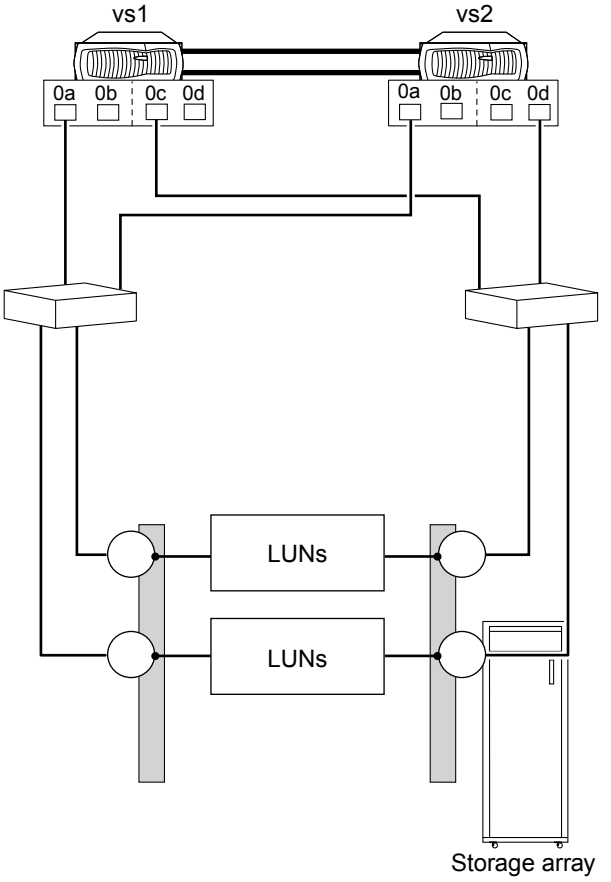
The following illustration shows this configuration.



Two 2-port array LUN groups

This configuration consists of a fabric-attached HA pair in which the gateway nodes access array LUNs through four ports on the storage array with each LUN group accessed through two ports.

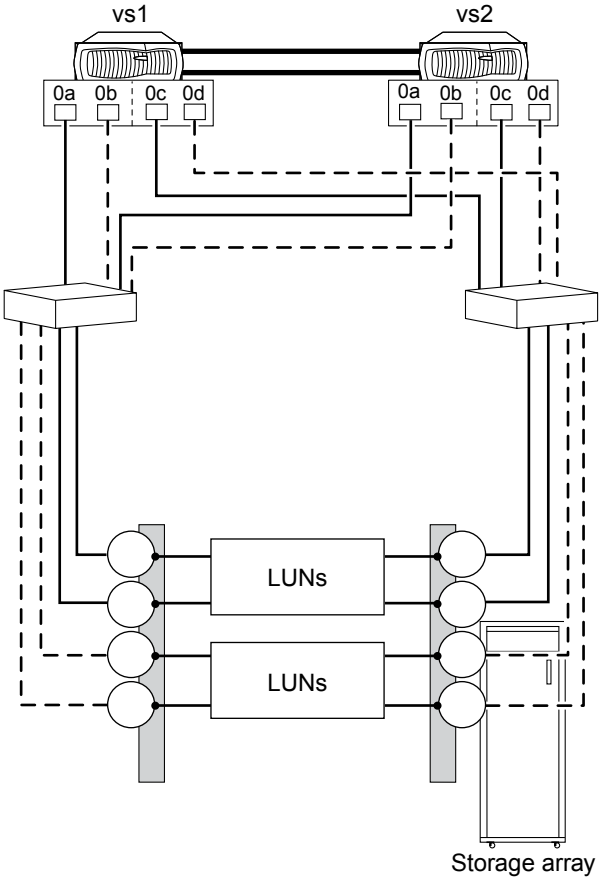
The following illustration shows this configuration.



Two 4-port array LUN groups

In this configuration, each the gateway port pair accesses a separate array LUN group. Zoning is single the gateway FC initiator to single array target port.

The following illustration shows a block diagram of this configuration.


vs1
vs2
0a
0b
0c
0d
0a
0b
0c
0d
LUNs
LUNs
Storage array

Hitachi Data Systems storage arrays

There are requirements that must be met when configuring Hitachi Data Systems storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring Hitachi Data Systems arrays with gateways

There are system parameters that you must set and considerations to keep in mind when configuring a storage array to work with a gateway.

Required system parameter for NSC55, USP, and VSP arrays

The host type parameters must be set in order for the array to communicate with the gateway.

The required parameter setting is shown in the following table.

Parameter	Setting
Host type	Standard or 00

Required system parameters for AMS arrays

There are parameters on the storage array that must be set in order for the array to communicate with the gateway.

The parameters that must be set in the AMS arrays are listed in the following table.

Parameter	Setting
Mapping mode	Enabled
Host group security	Enabled
Product ID	DF600F
Platform	Not Specified
Middleware	Not Specified

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

Requirements for creating LUNs in dynamic pools

When creating LUNs in the dynamic pools, do not over-provision the pool capacity.

Requirements for formatting array LUNs on Hitachi arrays

There are different types of array LUN formatting that can be performed. Each type has a an impact on the availability of LUNs or the entire storage array.

The following information and recommendations apply when formatting array LUNs:

- Use quick formatting.
- Online formatting takes the array LUN that is being formatted completely offline, and the array LUN does not respond to any SCSI commands.

  Formatting is performed on one array LUN at a time until all array LUNs are formatted.
- Offline formatting takes the entire storage array offline and the storage array does not respond to any SCSI commands.

  The array LUNs are formatted six at a time per controller until the formatting is complete.

  The storage array does not respond until all formatting is complete.
- If you are creating array LUNs (for any host) after initial gateway setup and you are using offline formatting, the gateway will panic.

  Any array LUNs that are mapped to the gateway, including array LUNs in the root volume, become unavailable until formatting is complete.
- Online and quick formatting of LUNs for other hosts do not impact the gateway.

Requirements for using disks external to the array

The gateway supports the same disks behind the arrays that the vendor supports (that is, disks external to the array). The gateway assumes that the configuration between the storage array and the external disks behind it is correct.

Restrictions and best practices recommendations for a deployment with storage arrays using external disks are provided in the following list:

- Root volumes and spare core LUNs are not supported on external disks.
- Do not mix array LUNs from external and internal disks in the same Data ONTAP aggregate.
- Do not mix SATA and FC drives in the same aggregate.
- There cannot be more than two paths to an array LUN on the external disks from the gateway through the storage array to the external disks.
- Only block checksum is supported on external disks.

Hitachi Data Systems storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families.

The following list shows the arrays organized by family:

- Family 1
  - USP-V
  - USP-VM
- Family 2
  - VSP
- Family 3
  - AMS 200
  - AMS 500
  - AMD 1000
- Family 4
  - AMS 2100
  - AMS 2300
  - AMS 2500
- Family 5
  - USP 1100
  - USP 600
  - USP 100
  - NSC55

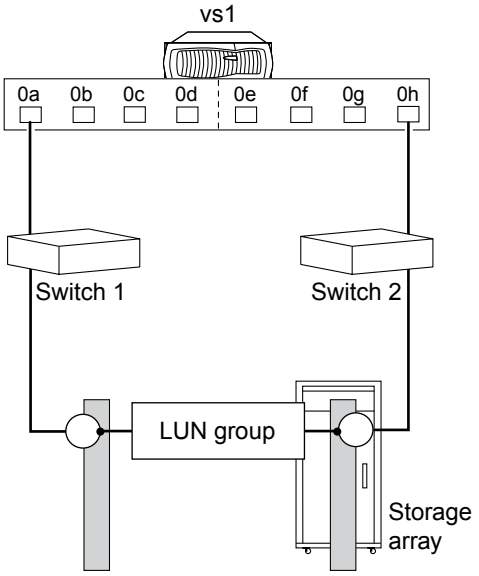
Supported configurations for Hitachi Data Systems storage arrays

Only a specific number of configurations of Hitachi Data Systems storage arrays deployed with gateways are supported.

Stand-alone basic configuration

The stand-alone basic gateway configuration is a simple fabric-attached configuration with a single port pair access a single LUN group.

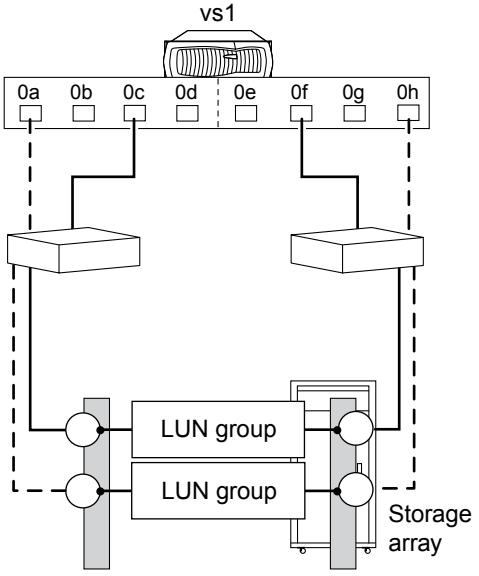
The following illustration shows this configuration.



Stand-alone with two 2-port LUN groups

This is a stand-alone gateway in a fabric-attached simple configuration. In this configuration, each FC initiator port pair accesses a separate array LUN group.

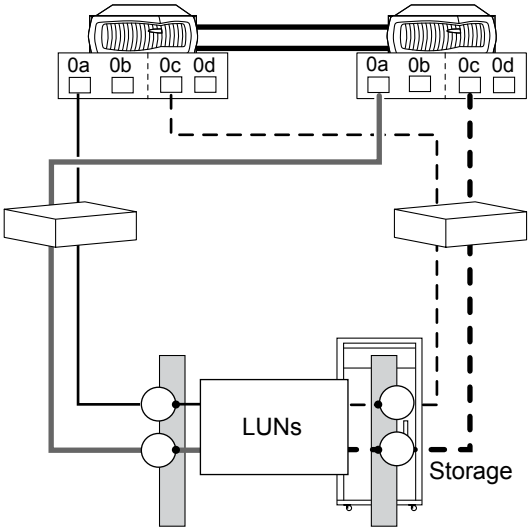
The following illustration shows this configuration.



Single 4-port array LUN group

This configuration contains a single 4-port LUN group with each target port accessed by a single gateway FC initiator port from the HA pair. Zoning ensures that there are only two paths to a specific array LUN.

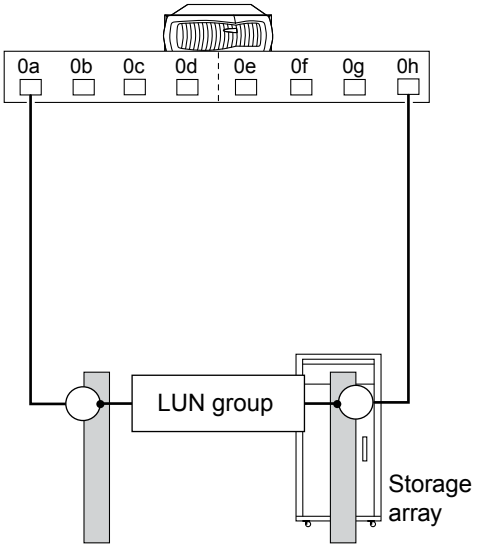
The following illustration shows this configuration.



Two-port direct-attached stand-alone configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

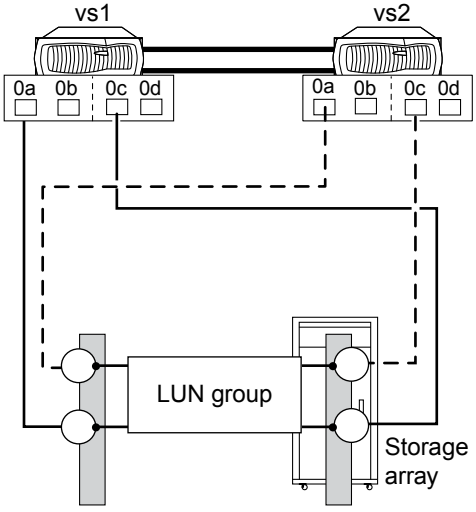
The following illustration shows a direct-attached configuration for a stand-alone gateway. Two ports provide access to array LUNs on the storage array.



Four-port direct-attached HA pair configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

The following illustration shows a direct-attached HA pair with four ports providing access to array LUNs on the storage array.



HP EVA storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring HP EVA arrays with gateways

There are system parameters that you must set and considerations to keep in mind when configuring a storage array to work with a gateway.

Required system parameters for HP EVA arrays

There are parameters on the storage array that must be set in order for the array to communicate with the gateway.

System parameter settings are provided in the following table:

Parameter	Setting
Redundancy	Any raid level except VRAID0
Preferred path/mode	No preference (default)
Host type	SUN Solaris

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

Requirements for configuring multiple LUN groups

The requirements for configuring multiple LUN groups for an HP EVA storage array are as follows:

- Switch zoning must define which target ports the gateway initiator ports use to access each array LUN group.
- Hosts must define which array LUN groups are presented to each gateway initiator port.
- Each array LUN group requires one initiator port pair for each gateway.

Requirements for configuring the HP EVA Storage Management Server

Sharing the gateway initiator ports and HP EVA Storage Management Server initiator ports with common EVA target ports causes compatibility issues in gateways.

These issues are seen due to the different host settings for the gateway and the EVA Storage Management Server initiator ports.

HP recommends that any EVA Storage Management Server that resides in a fabric be configured in a separate zone from all operating systems.

HP EVA storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families. The following list shows arrays organized by family:

- Family 1
  - P6300
  - P6500
- Family 2
  - EVA 4100
  - EVA 6100
  - EVA 8100
- Family 3
  - EVA 4000
  - EVA 6000
  - EVA 8000
- Family 4
  - EVA 4400
  - EVA 6400
  - EVA 8400

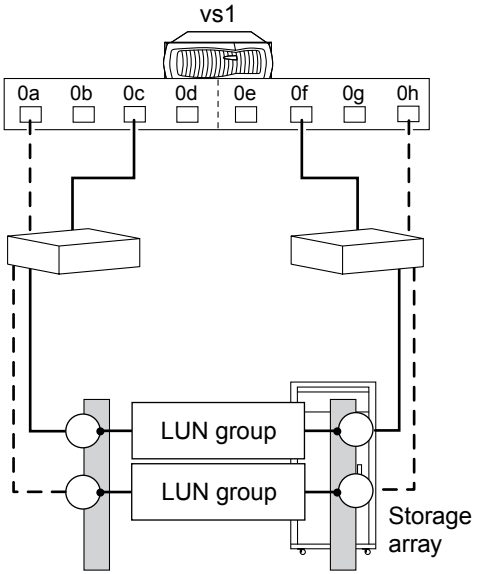
Supported configurations for HP EVA arrays

Only a specific number of configurations of HP EVA storage arrays deployed with gateways are supported.

Stand-alone with two 2-port LUN groups

This is a stand-alone gateway in a fabric-attached simple configuration. In this configuration, each FC initiator port pair accesses a separate array LUN group.

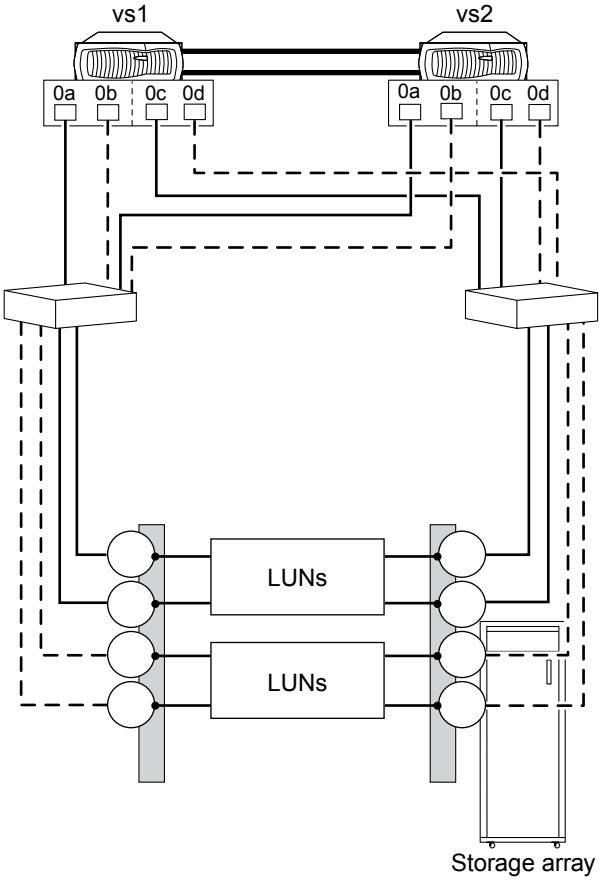
The following illustration shows this configuration.



Two 4-port array LUN groups

In this configuration, each the gateway port pair accesses a separate array LUN group. Zoning is single the gateway FC initiator to single array target port.

The following illustration shows a block diagram of this configuration.


vs1
vs2
0a
0b
0c
0d
0a
0b
0c
0d
LUNs
LUNs
Storage array

HP XP storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring HP XP arrays with gateways

Each HP XP storage array has configuration parameters that must be set in order to successfully work with gateways.

Required system parameter for all HP XP models

The host type parameters must be set in order for the array to communicate with the gateway.

The required parameter setting is shown in the following table.

Parameter	Setting
Host type	Standard or 00

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

Requirements for using disks external to the array

The gateway supports the same disks behind the arrays that the vendor supports (that is, disks external to the array). The gateway assumes that the configuration between the storage array and the external disks behind it is correct.

Restrictions and best practices recommendations for a deployment with storage arrays using external disks are provided in the following list:

- Root volumes and spare core LUNs are not supported on external disks.
- Do not mix array LUNs from external and internal disks in the same Data ONTAP aggregate.
- Do not mix SATA and FC drives in the same aggregate.
- There cannot be more than two paths to an array LUN on the external disks from the gateway through the storage array to the external disks.
- Only block checksum is supported on external disks.

Requirements for configuring ports

There are requirements that must be met when configuring ports on HP XP arrays.

The following list describes the requirements for configuring ports.

- Only one host group per port is supported.
- A host group must include all ports of the gateways in a gateway neighborhood.

HP XP storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families. The following list shows arrays organized by family:

- Family 1
  - P9500
- Family 2
  - XP24000
  - XP20000
  - XP12000
  - XP10000

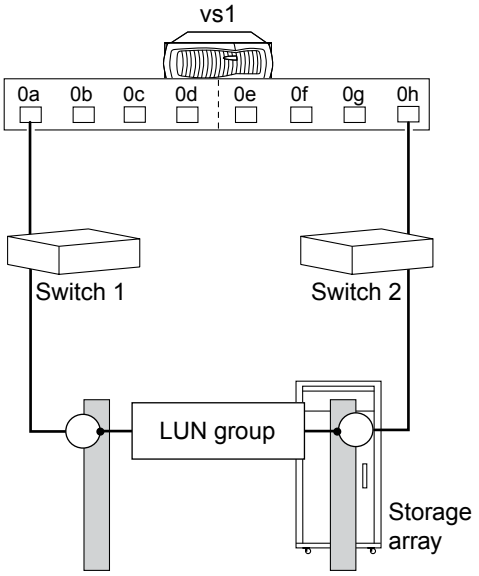
Supported configurations for HP XP arrays

Only a specific number of configurations of HP XP storage arrays deployed with gateways are supported.

Stand-alone basic configuration

The stand-alone basic gateway configuration is a simple fabric-attached configuration with a single port pair access a single LUN group.

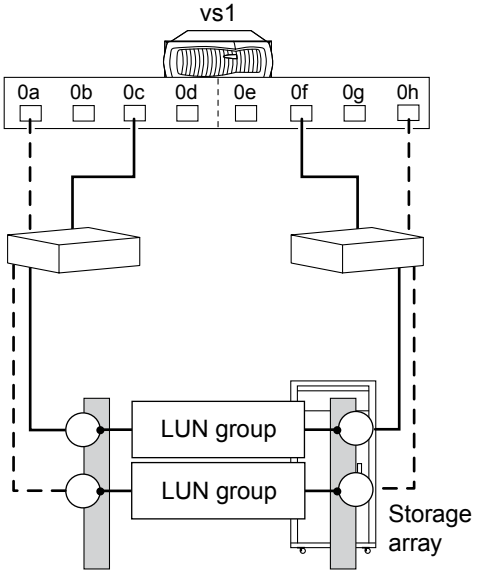
The following illustration shows this configuration.



Stand-alone with two 2-port LUN groups

This is a stand-alone gateway in a fabric-attached simple configuration. In this configuration, each FC initiator port pair accesses a separate array LUN group.

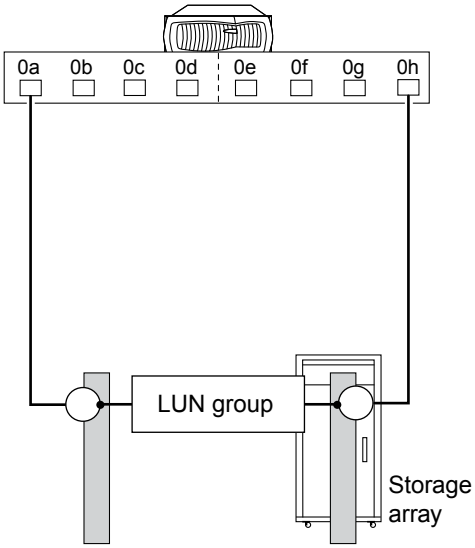
The following illustration shows this configuration.



Two-port direct-attached stand-alone configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

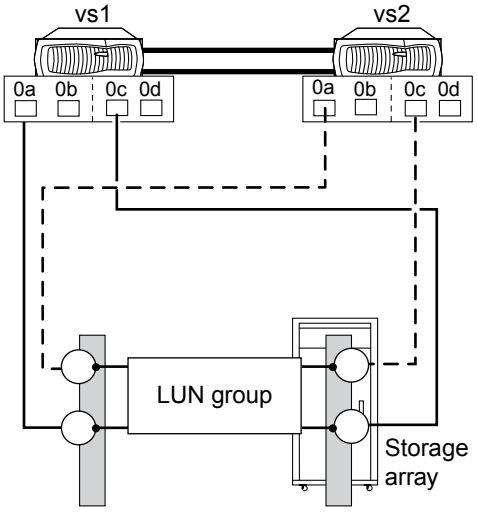
The following illustration shows a direct-attached configuration for a stand-alone gateway. Two ports provide access to array LUNs on the storage array.



Four-port direct-attached HA pair configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

The following illustration shows a direct-attached HA pair with four ports providing access to array LUNs on the storage array.


vs1
vs2
0a
0b
0c
0d
0a
0b
0c
0d
LUN group
Storage
array

IBM DS storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring IBM DS arrays with the gateway

There are system parameters that you must set and considerations to keep in mind when configuring a storage array to work with a gateway.

Required host type for DS8xxx arrays

The host type parameter must be set in order for the array to communicate with the gateway.

The required host type setting is shown in the following table.

Parameter	Setting
Host type	nseries

Required host type for DS3950 DS4xxx and DS5xxx arrays

The host type parameter must be set in order for the array to communicate with the gateway.

The required host type setting is shown in the following table.

Parameter	Setting
Host type	AIX

Requirements for configuring DS8300 9A2 LPAR models

When setting up the DS8300 9A2 LPAR (system logical partition) model to interact with gateways, ensure that you set up access to each array LUN so that the redundant paths are both accessing the same LPAR.

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

Requirements for volume groups on DS8xxx storage arrays

There are limitations on the number of volume groups you can use with a LUN group when configuring DS8xxx arrays.

Use a single volume group for each LUN group on a DS8xxx storage array to guarantee the DS8xxx array LUNs are consistently presented to all gateway initiators that access them.

Attention: If array LUNs are not consistently presented there is a potential for data corruption.

Requirements for multiple LUN groups on all IBM DS arrays

There are requirements that must be met when configuring multiple LUN groups on IBM DS arrays.

These requirements are provided in the following list.

- Switch zoning must define which target ports the gateway FC initiator ports use to access each LUN group.
- Volume groups must define which LUN groups are presented to each gateway initiator port.
- One initiator port pair for each gateway is required for each LUN group.

Requirements for direct-attached configurations with all IBM DS arrays

There are requirements that must be met in order for gateway to communicate with IBM DS arrays in a direct-attached configuration.

The following list describes the requirements that must be met when configuring direct-attached IBM DS arrays.

- Create Host Attachment files for the array ports.
- Set the Host Attachment Port type to FcAL (Fibre Channel Arbitrated Loop).
- Set the Storage Image I/O port to FcAL.

Note: Direct-attached configurations are no longer recommended for new deployments. This information is provided as a reference for configurations that may already exist in the field.

IBM DS storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families.

The following list shows arrays organized by family:

- Family 1
  - DS4800
  - DS4700

    - DS4200
- Family 2
    - DS5100
    - DS5300
- Family 3
    - DS8300
    - DS8100
- Family 4
    - DS5020
    - DS3950
- Family 5
    - DS8800 model 951
- Family 6
    - DS8700 models 941, 94E

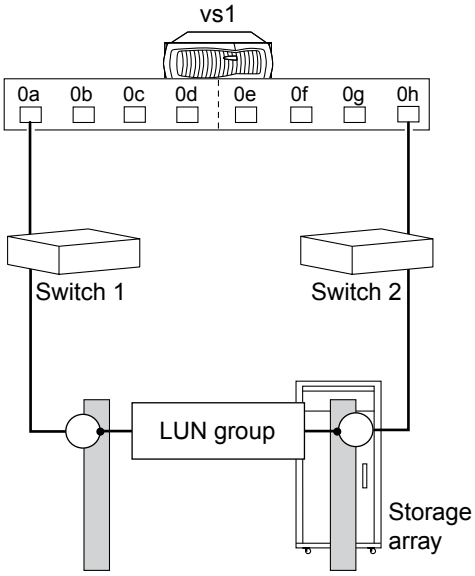
Supported configurations for IBM DS arrays

Only a specific number of configurations of IBM storage arrays deployed with gateways are supported.

Stand-alone basic configuration

The stand-alone basic gateway configuration is a simple fabric-attached configuration with a single port pair access a single LUN group.

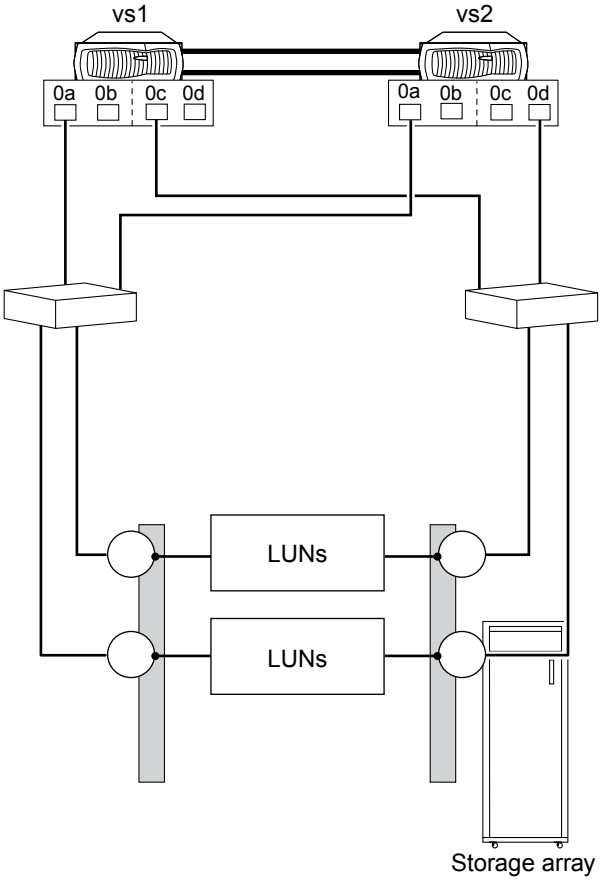
The following illustration shows this configuration.



Two 2-port array LUN groups

This configuration consists of a fabric-attached HA pair in which the gateway nodes access array LUNs through four ports on the storage array with each LUN group accessed through two ports.

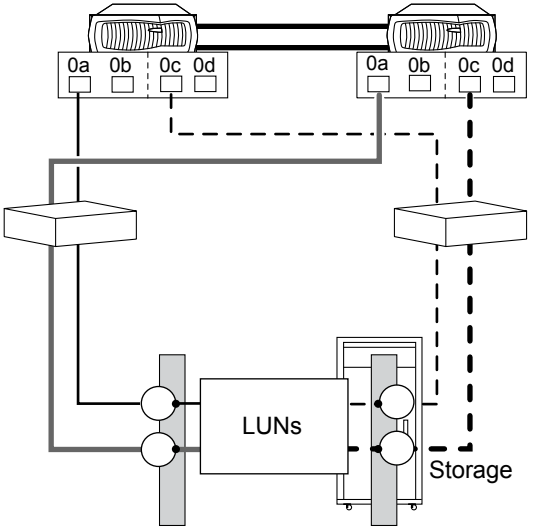
The following illustration shows this configuration.



Single 4-port array LUN group

This configuration contains a single 4-port LUN group with each target port accessed by a single gateway FC initiator port from the HA pair. Zoning ensures that there are only two paths to a specific array LUN.

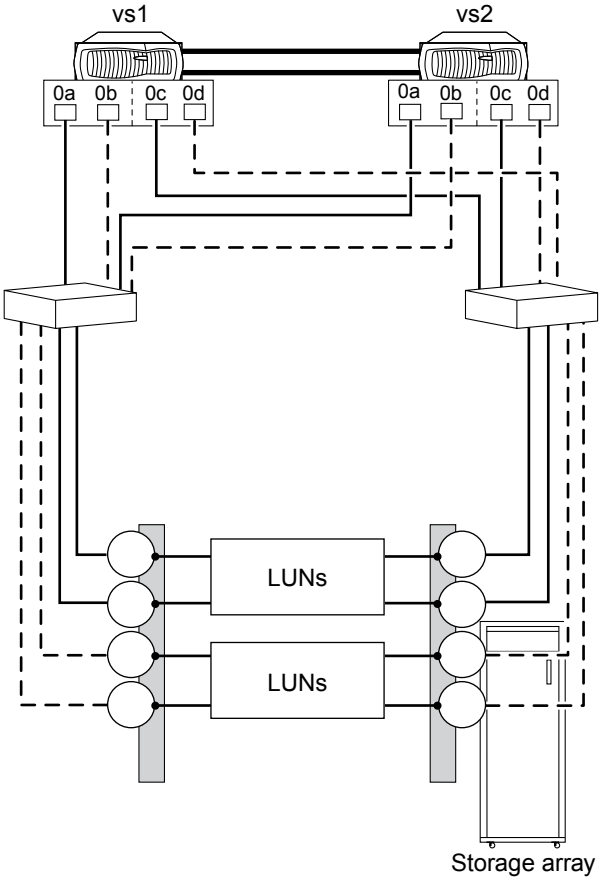
The following illustration shows this configuration.



Two 4-port array LUN groups

In this configuration, each the gateway port pair accesses a separate array LUN group. Zoning is single the gateway FC initiator to single array target port.

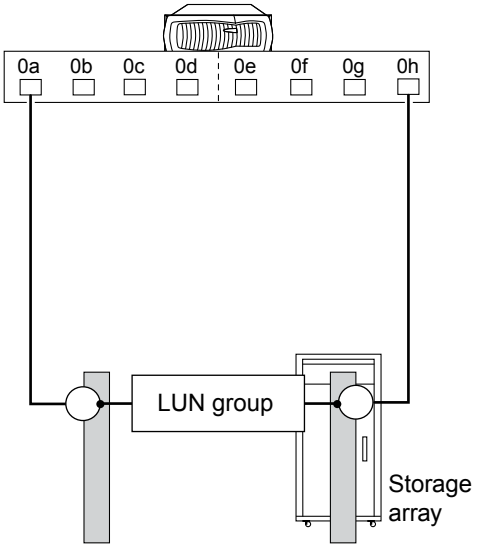
The following illustration shows a block diagram of this configuration.



Two-port direct-attached stand-alone configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

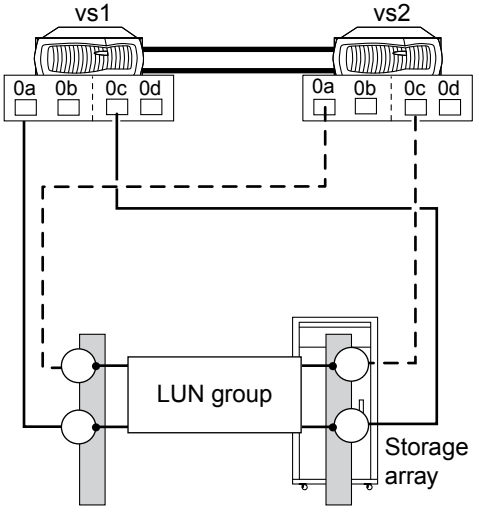
The following illustration shows a direct-attached configuration for a stand-alone gateway. Two ports provide access to array LUNs on the storage array.



Four-port direct-attached HA pair configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

The following illustration shows a direct-attached HA pair with four ports providing access to array LUNs on the storage array.



IBM XIV storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring IBM XIV arrays with gateways

There are system parameters that you must set and considerations to keep in mind when configuring an XIV storage array to work with a gateway.

Required system parameters for IBM XIV arrays

There are parameters on the storage array that must be set in order for the array to communicate with the gateway.

System parameter settings for IBM XIV Gen2 and Gen3 arrays are provided in the following table.

Parameter	Setting
Type	Default
Host	User-supplied host name
Cluster	User-supplied cluster name

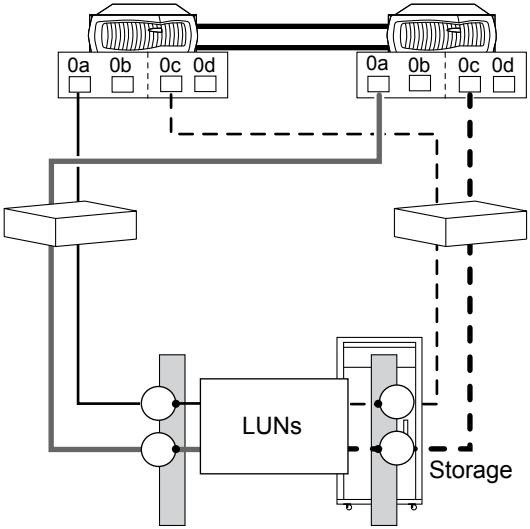
Supported configurations for IBM XIV arrays

Only a specific number of configurations of IBM XIV storage arrays deployed with gateways is supported.

Single 4-port array LUN group

This configuration contains a single 4-port LUN group with each target port accessed by a single gateway FC initiator port from the HA pair. Zoning ensures that there are only two paths to a specific array LUN.

The following illustration shows this configuration.


0a
0b
0c
0d
0a
0b
0c
0d
LUNs
Storage

3PAR storage arrays

There are requirements that must be met when configuring storage arrays to work with gateways. These requirements include setting configuration parameters on storage arrays and deploying only supported configurations.

Requirements for configuring 3PAR arrays with gateways

There are system parameters that you must set and considerations to keep in mind when configuring a storage array to work with a gateway.

Required system parameters for 3PAR arrays

There are parameters on the storage array that must be set in order for the array to communicate with the gateway.

For 3PAR arrays with firmware version 2.3.1 and later, the required host persona values must be set as shown in the following table.

Connection type	Host persona
Direct Connect	10
Fabric attached	10

For 3PAR arrays with firmware version 2.2.x, the required port persona values must be set as shown in the following table.

Connection type	Port persona
Direct Connect	18
Fabric attached	19

General configuration guidelines

Information in this section includes cautions, restrictions, special requirements, and information about array characteristics that you might need to consider when configuring or using the storage array.

3PAR storage array families

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 8-GB HBAs.

When creating aggregates, you cannot mix array LUNs from arrays that are in different families.

The following list shows arrays organized by family:

- Family 1
  - E200
- Family 2
  - S400
  - S800
- Family 3
  - T400
  - T800
- Family 4
  - F200
  - F400
- Family 5
  - P10000 - V400
  - P10000 - V800

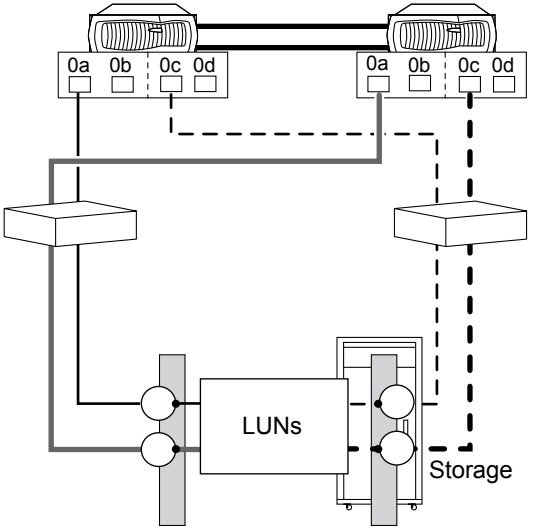
Supported configurations for 3PAR arrays

Only a specific number of configurations of 3PAR storage arrays deployed with gateways are supported.

Single 4-port array LUN group

This configuration contains a single 4-port LUN group with each target port accessed by a single gateway FC initiator port from the HA pair. Zoning ensures that there are only two paths to a specific array LUN.

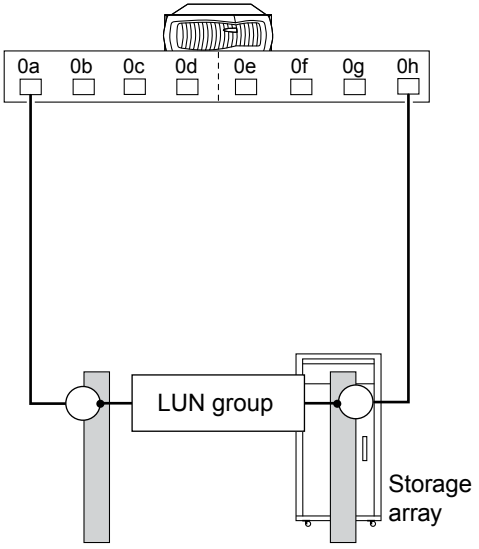
The following illustration shows this configuration.



Two-port direct-attached stand-alone configuration

Direct-attached configurations are no longer recommended for new deployments. This configuration is shown as a reference for configurations that may already exist in the field.

The following illustration shows a direct-attached configuration for a stand-alone gateway. Two ports provide access to array LUNs on the storage array.



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