user's guide
version 2.2

Zoning

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Format conventions

variable	Indicates that you must supply a value.
`output`	Denotes text displayed on the screen.
[ ]	Indicates that the enclosed element is optional and may be left out.
{ }	Indicates that you must specify one of the listed options.
|	Separates alternatives.
. . .	Indicates a repetition of the preceding parameter.

Tip Denotes ideas for enhanced product usage.

Note Denotes significant concepts or operating instructions.

CAUTION Denotes a hazard that can cause hardware or software damage.

WARNING Denotes a hazard that can cause personal injury or death.

CONTENTS

Revision History

July 2001	First release.

PREFACE

About this Guide

This guide provides information and instructions for using the Zoning feature that is available with the HP Surestore FC Switch 6164 (FC 6164) switches. Zoning is supported by Fabric OS a2.4.1.

The information in this guide is organized as follows:

Chapter 1 Introducing Zoning	An overview of Zoning.
Chapter 2 Using Zoning	Information about using and managing Zoning.
Chapter 3 Using QuickLoop Zones	Information about using Zoning with QuickLoop.
Appendix A Zoning Telnet Commands	Zoning Telnet commands.
Appendix B Zoning Sample Configurations	Zoning sample configurations.
Glossary	Definitions for commonly used terms.

Related Publications

Related product information can be found in the following publications. Those publications with part numbers are provided as printed copies with your product. The HP Surestore FC Switch 6164 Documentation CD contains all publications listed in the table below and is also provided with your product..

Title	Part Number
HP Surestore FC Switch 6164 Documentation CD	A7326-11011
HP Surestore FC Switch 6164 Installation and Reference Guide	A7326-90902
HP Surestore FC Switch 6164 Quick Start Guide	A7326-90901
Distributed Fabrics User's Guide, version 2.2	Available only on CD
Fabric OS Reference Manual, version 2.4	Available only on CD
Fabric Watch User's Guide, version 2.2	Available only on CD
MIB Reference Manual, version 2.3	Available only on CD
QuickLoop User's Guide, version 2.3	Available only on CD
Web Tools User's Guide, version 2.3	Available only on CD

For information about Fibre Channel standards, visit the Fibre Channel Association web site, located at

http://www.fibrechannel.com.

Getting Help

For support information, visit the HP web site located at:

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Getting Software Updates

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New switch firmware can be installed from the following host operating systems:

- UNIX
- Windows NT
- Windows 2000
- Windows 98
- Windows 95

1

INTRODUCING ZONING

Zoning allows you to partition your Storage Area Network (SAN) into logical groupings of devices that can access each other. Using Zoning, you can arrange fabric-connected devices into logical groups, or zones, over the physical configuration of the fabric.

Zones can be configured dynamically. They can vary in size depending on the number of fabric connected devices, and devices can belong to more than one zone. Because zone members can access only other members of the same zone, a device not included in a zone is not available to members of that zone. Therefore, you can use zones to:

- Administer security

  Use zones to provide controlled access to fabric segments and to establish barriers between operating environments. For example, isolate systems with different uses or protect systems in a heterogeneous environment.

- Customize environments

  Use zones to create logical subsets of the fabric to accommodate closed user groups or to create functional areas within the fabric. For example, include selected devices within a zone for the exclusive use of zone members, or create separate test or maintenance areas within the fabric.

- Optimize IT resources

  Use zones to consolidate equipment, logically, for IT efficiency, or to facilitate time-sensitive functions. For example, create a temporary zone to back up non-member devices.

Figure 1 illustrates three zones with some overlap. It also contains devices that are not assigned to a zone, and are thus not active in the fabric if Zoning is enabled.

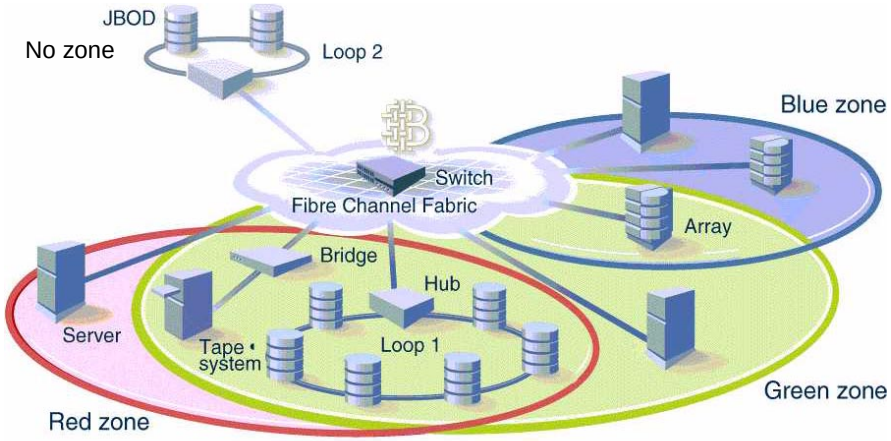

Figure 1. Fabric with Three Zones

Implementing Zoning

Implementing Zoning simplifies the zoning process in several ways:

- Zoning can be administered from any switch in the fabric.

  Changes configured to one switch automatically replicate to all switches in the fabric; if a new switch is added to an existing fabric, all zone characteristics are automatically applied to the new switch. Because each switch stores zoning information, Zoning ensures a high level of reliability and redundancy.

- Zones can be configured dynamically.

  Configuring new zones does not interrupt traffic on unaffected ports or devices. Further these zones do not affect data traffic across interswitch links (ISLs) in cascaded switch configurations.

- Zoning uses policy-based administration.

  Because Zoning uses policy-based administration, separating zone specification from zone enforcement, you can manage multiple zone configurations and easily enable a specific configuration when it is required. A fabric can store any number of zone configurations; however, only one configuration is active at a time. But, because the configurations are predetermined and stored, a new configuration can be easily enabled.

- Zoning can be configured and administered using Telnet commands or the optional Web Tools.

  For information on Telnet commands, see the *Fabric OS Reference Manual*. For information on Web Tools, see the *Web Tools User's Guide*.

2

USING ZONING

This chapter explains both the concept of zoning and how to use Zoning to partition a fabric into logical groupings of devices.

Understanding Zoning

A zone is a group of fabric-connected devices arranged into a specified grouping. Any device connected to a fabric can be included in one or more zones. Devices within a zone possess an awareness of other devices within the same zone; they are not aware of devices outside of their zone. Therefore, if zoning is enabled, any device not in a zone cannot communicate with any other device.

Zone members (ports, WWNs, or aliases) are grouped into a zone; in turn, zones are grouped in a zone configuration (a collection of zones). Zones can overlap; that is, a device can belong to more than one zone, and a fabric can consist of multiple zones. A zone configuration can include both hard and soft zones and there can be any number of zone configurations resident on a switch; however only one configuration can be active, that is enabled, at a time. Because the number of zones allowable is limited only by memory usage, the maximum number is virtually limitless.

Zone Types

Zones can be hard (hardware enforced) or soft (advisory). In a hard zone, sometimes referred to as a port zone, zone members are specified by physical port number. In a soft zone, at least one zone member is specified logically by worldwide name (WWN).

Hard Zones

In a hard zone, all zone members are specified as switch ports; any number of ports in the fabric can be configured to the zone. When a zone member is specified by port number, only the individual device port specified is included in the zone.

Hard zones are position-dependent, that is, a device is identified by the physical port to which it is connected. Switch hardware ensures that there is no data transfer between unauthorized zone members. However, devices can transfer data between ports within the same zone. Consequently, hard zoning provides the greatest security possible; you can use it where security must be rigidly enforced.

Soft Zones

In a soft zone, at least one zone member is specified by WWN. A device is included in a zone if either the node WWN or port WWN specified matches an entry in the name server table.

When a device logs in, it queries the name server for devices within the fabric. If zoning is in effect, only the devices in the same zone (or zones) are returned. Other devices are hidden from the name server query reply. When a WWN is specified, all ports on the specified device are included in the zone.

Soft zones are name server-dependent and therefore provide more flexibility - new devices can be attached without regard to physical location. However, the switch does not control data transfer, so there is no guarantee against data transfer from unauthorized zone members. You can use soft zoning where flexibility is important and security can be ensured by the cooperating hosts.

In addition to hard and soft zones, a third type of zone is available.

Broadcast Zone

Only one broadcast zone can exist within a fabric. This zone is named “broadcast” and is used to specify those nodes that are to receive broadcast traffic.

This type of zone is hardware enforced; the switch controls data transfer to a port.

Zone Enforcement

When zoning is disabled, the fabric is in a nonzoning state and devices can communicate without regard to zone restrictions. When zoning is enabled, zoning is enforced throughout the fabric and devices can communicate only within their zones.

A switch can maintain any number of zone configurations; however, only one zone configuration can be enabled, or enforced, at a time. Because multiple configurations reside in the switch, you can switch from one configuration to another as events dictate. For example, you can set up a pre-specified zone configuration to be enabled at certain times of the day; or, in the event of a disaster, you can quickly enable a defined configuration to implement your disaster policy.

Zone configurations can be defined, enabled, or saved.

Defined

This is the complete set of all zone objects that have been defined in the fabric. When zone objects are defined, the information initially resides on RAM; this must be saved to ensure that it is saved to Flash memory, and is not lost during power down or when a new zone configuration is enabled.

Changes replicate to all switches in the fabric whenever the zone information is changed. However, changes must be saved to Flash memory to be committed to persistent store (that is, to remain across reboot).

Enabled

This is the zone configuration that is enabled (active). This configuration resides on RAM and must be saved to ensure that it is not lost when a new configuration is enabled or during power down. Any changes replicate to all switches in the fabric when the configuration is enabled or saved.

Saved

This is the zone configuration that was last saved. This configuration resides in Flash memory and is persistent.

In Figure 2, Config5 is defined (created). When this configuration is defined, it resides only in RAM. To transfer it to Flash memory, to be permanently stored and accessible across reboots, it must be saved. This can be accomplished in one of two ways:

- Save the configuration directly to Flash (the recommended method).
- Enable the configuration first, then save it to Flash.

But, until the configuration has been saved to Flash, it is not permanently stored and available across reboots.

Note Only the enabled configuration (in the shaded area) is enforced.

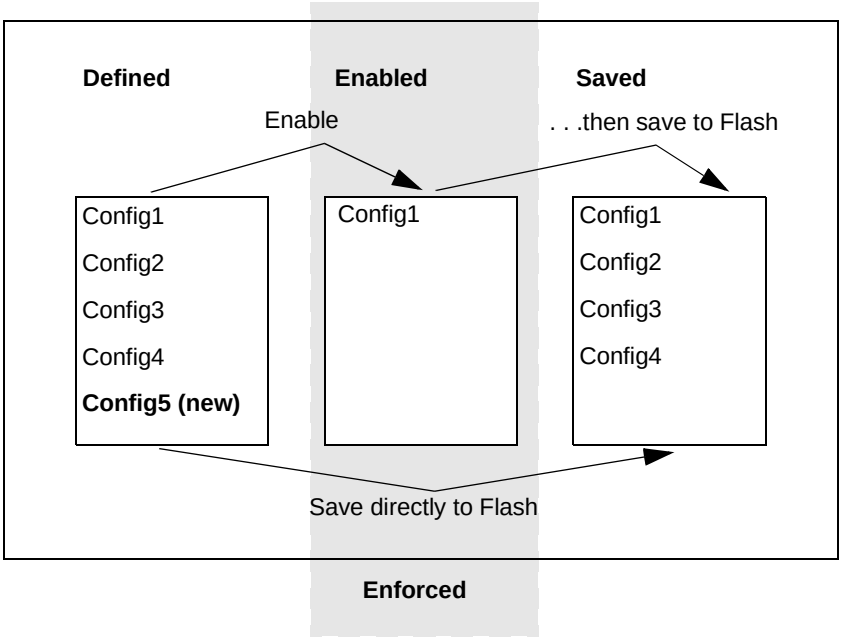

Figure 2. Saving a Zone Configuration

Enabling a Zone Configuration

When a zone configuration is enabled, all zones within the configuration are enabled. All devices within an enabled zone are visible to each other; however, they cannot communicate outside their zone. Zones can overlap within a zone configuration.

When a zone configuration is enabled, the following sequence occurs:

1. All aliases are expanded.
2. Inconsistencies are checked.

   If any inconsistencies are discovered, an error occurs and the previous state of the fabric is preserved. (For example, if zoning was disabled, it remains disabled; if an existing configuration was enabled, it remains enabled.)

3. Switch hardware is loaded with the zoning information.
4. Zone members are loaded.
5. Registered state change notifications (RSCNs) are generated.

Implementing Zoning

Zoning can be implemented and administered from any switch in the fabric. Changes made to one switch are automatically distributed to all switches in the fabric.

Zoning can be administered in one of two ways:

- Through the Telnet command interface - see Appendix A, “Zoning Telnet Commands”.
- Through the Web Tools web interface - see the *Web Tools User’s Guide*.

Configuring Zoning

Zoning is implemented by the following steps:

1. *(Optional)* Create an alias.
2. Define the zone.
3. Define the zone configuration.
4. Enable the zone configuration.

Each zone object defined (alias, zone, and zone configuration) must have a unique name; that is, an alias cannot have the same name as another alias, and it cannot have the same name as a zone or a zone configuration.

Note During the following configuration process, changes should be saved periodically to ensure that they are stored in flash memory and protected against loss due to power outage, etc.

Steps to Implement Zoning

1. *(Optional)* Create an alias.

   An alias is a name assigned to a device or group of devices. By creating an alias you can assign a familiar name to a device, or you can group multiple devices into a single name. This can simplify cumbersome entries, and it can allow an intuitive naming structure such as using `NT_Hosts` to define all NT hosts in the fabric.

   An alias must be a unique alpha-numeric string beginning with an alpha character. The underscore character (_) is allowed and alias names are case sensitive. For example, `nt_hosts` is not the same name as `NT_Hosts`.

   Aliases can greatly simplify the administrative process; however, they are not required to define zones.

2. Define the zone.

   A zone is a group of devices that can communicate with each other. Zone membership can include ports, WWNs, or aliases, or any combination of these. Further, a device can be included in more than one zone.

   To define a zone, specify the list of members to be included and assign a unique zone name; the zone name must be a unique alpha-numeric string beginning with an alpha character. The underscore character (_) is allowed and zone names are case sensitive. For example, `green_zone` is not the same name as `Green_Zone`.

   Specify zone members by port number, WWN, alias, or any combination of these.

   To specify by port number, you must specify switch domain ID and port number, for example, 2,12 indicates switch domain ID 2, port number 12. When a member is specified by port number, all devices connected to the port are included in the zone.

   To specify by WWN, specify node name or port/device as an 8- hex number separated by colons, for example, `10:00:00:60:69:00:8a`. These eight numbers are compared to the node and port name presented in a login frame (`FLOGI or PLOGI`). When a zone member is specified by node name, all ports on the device are included in the zone. When a

zone member is specified by port name, only that port on the device (node) is included in the zone.

To specify by alias, specify the alias name.

Zone members can also be designated by a combination of these methods. For example, the zone definition

```
2,12; 2,14; 10:00:00:60:69:00:00:8a; nt_hosts
```

contains any devices connected to switch 2, ports 12 and 14, the device with a node name or port name of `10:00:00:60:69:00:00:8a,` and the devices associated with the alias `nt_hosts`.

3. Define the zone configuration.

   A zone configuration is a group of zones that are enforced whenever that zone configuration is enabled. Further, a zone can be included in more than one zone configuration.

   To define a zone configuration, specify the list of zones to be included and assign a zone configuration name; the zone configuration name must be a unique alpha-numeric string beginning with an alpha character. The underscore character (_) is allowed and zone names are case sensitive. For example, `configuration1` is not the same name as `Configuration1`.

4. Enable the zone configuration.

   To enable a zone configuration, select the zone configuration to be enabled. The configuration is downloaded to the switch hardware. RSCNs are sent to all fabric devices registered for state changes, notifying these devices to re-query the name server to discover available devices that can be accessed.

Modifying Configurations

To make changes to an existing configuration, either add or remove individual elements to create the desired configuration. When the changes have been made, save the configuration. This ensures the configuration is permanently saved in the switch, and it also ensures that the configuration is replicated throughout the fabric.

The switch configuration file can also be uploaded to the host for archiving, and it can be downloaded from the host to all switches in the fabric.

Adding a Switch

When a new switch is added to the fabric, it automatically takes on the zone configuration information from the fabric. To add the new switch, attach the E_ports; the new switch is incorporated into the fabric and the enabled zone configuration.

Merging Fabrics

When a new fabric (with no zone configuration information) is added to an existing zoned fabric, all switches in the new fabric take on the zoning characteristics present in the existing fabric.

If two fabrics that both contain zone configuration information are joined, the fabrics attempt to merge the two sets of zone configuration data.

In the simplest case, where both fabrics have identical zone configuration data and the same configuration enabled, the fabrics join to make one larger fabric with the same zone configuration enabled across the new fabric.

If the fabrics have different zone configuration data, the two sets of zone configuration data are merged, if possible. If not possible, the interswitch link (ISL) is segmented. A merge is not possible if any of the following exist:

Configuration mismatch	Zoning is enabled in both fabrics, and the zone configurations that are enabled are different in each fabric.
Type mismatch	The name of a zone object in one fabric is used for a different type of zone object in the other fabric.
Content mismatch	The definition of a zone object in one fabric is different from the definition of a zone object with the same name in the other fabric.

3

USING QUICKLOOP ZONES

In addition to zoning fabrics, covered in Chapter 3, Zoning also allows you to zone QuickLoops. By partitioning selected devices within a QuickLoop into a QuickLoop zone you can enhance management of a Fibre Channel Arbitrated Loop (FC-AL) in a legacy environment.

In QuickLoop zoning, devices within a QuickLoop can be partitioned off within that QuickLoop to form QuickLoop zones; in other words, a QuickLoop Zone is a subset of a QuickLoop and can include only QuickLoop devices.

Fabric zones and QuickLoop zones are independent of each other; both types of zones can co-exist in the same zone configuration, and QuickLoop devices can be included within a fabric zone configuration. Although devices within a QuickLoop can be seen by a public host, devices within each QuickLoop are only visible to devices within their own QuickLoop.

QuickLoop Zoning Advantages

In addition to all the advantages of fabric zoning, security, customization of environments, and optimization of IT resources, QuickLoop zoning can protect devices from disruption by unrelated devices during a critical process, for example, during a tape backup session.

In a QuickLoop with zoning enabled, transmission of the loop initialization primitive (LIP) signal and loop initialization are controlled by the switch. The LIP is transmitted only to looplets within the affected zone; other looplets on the QuickLoop are not affected. In this way, unwanted disruption to devices can be controlled.

QuickLoop Zones

QuickLoop zones are hardware enforced; switch hardware prevents unauthorized data transfer between ports within the zone, allowing devices to be partitioned into zones to restrict system access to selected devices. When devices are included in a zone, they are visible only to other devices within that zone.

QuickLoop zone members are designated by looplet (port number), or by Arbitrated Loop Physical Address (AL_PA). There are 126 unique AL_PAs per QuickLoop; therefore, a QuickLoop zone can contain no more than 126 devices.

Configuring QuickLoop Zones

Configure QuickLoop Zoning:

1. Create a QuickLoop.

   A QuickLoop is comprised of FL_Ports on one or two switches within the fabric. To create a QuickLoop, specify a QuickLoop name (referred to as a qloop name for zoning), followed by a list of AL_PAs to be included. QuickLoop names define the switch (or pair of switches) that make up the QuickLoop.

A QuickLoop name must be a unique alpha-numeric string beginning with an alpha character. The underscore character (_) is allowed and names are case sensitive. For example, `Qloop1` is not the same name as `qloop1`.

2. Define a QuickLoop zone.

   A QuickLoop zone is a group of FL_Ports or AL_PAs that can communicate with each other. These ports and AL_PAs must reside within the same QuickLoop. To be a QuickLoop zone, every member must be either a looplet (FL_Port) or an AL_PA within a single QuickLoop. QuickLoop zones can overlap looplets, but they must be confined to a single QuickLoop. QuickLoop zones are hardware enforced, but zones within a single looplet are not enforceable; therefore it is recommended that you do not partition devices within a looplet into different zones.

   To define a QuickLoop zone, specify the list of members to be included and assign a unique zone name. A QuickLoop zone name must be a unique alpha-numeric string beginning with an alpha character. The underscore character (_) is allowed and zone names are case sensitive. For example, `Zone1` is not the same name as `zone1`.

   To create a QuickLoop zone, specify QuickLoop zone members by looplet, by AL_PA, or by a combination of the two.

   To specify by looplet, specify the QuickLoop zone name, in quotes, and the physical ports to be included, in quotes. For example:

   ```
   “QLZoneName”, “0,0; 0,1; 2,6; 2.7; 2,8”
   ```

   To specify by AL_PA, specify the QuickLoop zone name, in quotes, with the QuickLoop name, and desired AL_PAs in quotes. All AL_PAs must be associated with a QuickLoop name. For example:

   ```
   “QLZoneName”, “qloop1[01,02,04,e0,e1,e2]”
   ```

   To specify a combination of looplet and AL_PA, for example:

   ```
   “QLZoneName”, “0,2; 0,3; qloop1[ca,cb,e1,e2]”
   ```

3. Define a QuickLoop zone configuration.

   A QuickLoop zone configuration is a group of QuickLoop zones that are enforced whenever that zone configuration is enabled.

   To define a QuickLoop zone configuration, assign a zone configuration name and specify the QuickLoop zones to be included, by zone name. The QuickLoop names of the QuickLoop zones must also be included in the zone configuration. A QuickLoop zone configuration name must be a unique alpha-numeric string beginning with an alpha character. The underscore character (_) is allowed and zone configuration names are case sensitive. For example, `QLConfig_1` is not the same name as `qlconfig_1.`

4. Enable a QuickLoop zone configuration.

   To enable a QuickLoop zone configuration, select the configuration to be enabled.

A

ZONING TELNET COMMANDS

To use a Telnet command, log in with administrative privileges to any switch in the fabric, enter the command with required operands, if any, and press Enter. Changes made to the zoning configuration on one switch are replicated through all switches within the fabric.

Note When accessing the switch using simultaneous multiple connections (Telnet and Web Tools), it is possible that a change resulting from one connection might not transfer to another connection. Also, it is possible that a change from one connection could over-write a change from another connection. Therefore, use care when making changes using simultaneous sessions.

Table 1 lists the Telnet commands used to administer Zoning. The commands are grouped by function.

Table 1. Telnet Commands Used to Administer Zoning

Command	Description	See Page
Zone Alias		
`aliAdd`	Add a member to a zone alias.	32
`aliCreate`	Create a zone alias.	33
`aliDelete`	Delete a zone alias.	34
`aliRemove`	Remove a member from a zone alias.	35
`aliShow`	Show zone alias definition.	36
Zoning		
`zoneAdd`	Add a member to a zone.	53
`zoneCreate`	Create a zone.	54
`zoneDelete`	Delete a zone.	56
`zoneRemove`	Remove a member from a zone.	57
`zoneShow`	Show zone information.	58
QuickLoop Zoning		
`qloopAdd`	Add a member to a QuickLoop.	48
`qloopCreate`	Create a QuickLoop.	49
`qloopDelete`	Delete a QuickLoop.	50
`qloopRemove`	Remove a member from a QuickLoop.	51
`qloopShow`	Show QuickLoop information.	52
Zone Configuration		
`cfgAdd`	Add a zone to a zone configuration.	37
`cfgCreate`	Create a zone configuration.	39
`cfgDelete`	Delete a zone configuration.	40
`cfgRemove`	Remove a zone from a zone configuration.	43
`cfgShow`	Show zone configuration definition.	45

Table 1. Telnet Commands Used to Administer Zoning (continued)

Command	Description	See Page
Configuration Management		
`cfgClear`	Clear all zone configurations.	38
`cfgDisable`	Disable a zone configuration.	41
`cfgEnable`	Enable a zone configuration.	42
`cfgSave`	Save zone configurations in Flash memory.	44
`cfgShow`	Show zone configuration definition.	45

aliAdd

Add a member to a zone alias.

Synopsis `aliAdd aliName, aliMemberList`

Availability Administrator

Description Use this command to add one or more members to an existing zone alias.

The alias member list cannot contain another zone alias.

Operands The following operands are required:

`aliName`	Name for the zone alias, in quotes.
`aliMemberList`	List of members to be added to alias, in quotes, separated by semi-colons. Can be one or more of the following: • Physical fabric port numbers • Worldwide names • QuickLoop AL_PAs

Example To add worldwide names to the following aliases:

```
sw5:admin> aliAdd "array1", "21:00:00:20:37:0c:72:51"
sw5:admin> aliAdd "array2", "21:00:00:20:37:0c:9c:6b"
sw5:admin> aliAdd "loop1", "21:00:00:20:37:0c:6a:40"
```

See Also
`aliCreate`
`aliDelete`
`aliRemove`
`aliShow`

aliCreate

Create a zone alias.

Synopsis `aliCreate aliName, aliMemberList`

Availability Administrator

Description Use this command to create a new zone alias.

A zone alias name is a C-style name beginning with a letter and followed by any number of letters, digits, and underscore characters. Names are case sensitive, for example “Ali_1” and “ali_1” are different zone aliases. Blank spaces are ignored.

The zone alias member list must have at least one member (empty lists are not allowed). The alias member list cannot contain another zone alias.

Operands The following operands are required:

`aliName`	Name for new zone alias, in quotes. This name cannot be used for another zone object.
`aliMemberList`	List of members to be included in alias, in quotes, separated by semi-colons. Can be one or more of the following: • Physical fabric port numbers • Worldwide names • QuickLoop AL_PAs

Example To create three zone aliases using worldwide names:

```
sw5:admin> aliCreate "array1", "21:00:00:20:37:0c:72:8c"
sw5:admin> aliCreate "array2", "21:00:00:20:37:0c:66:23"
sw5:admin> aliCreate "loop1", "21:00:00:20:37:0c:67:e3"
```

See Also

```
aliAdd
aliDelete
aliRemove
aliShow
```

aliDelete

Delete a zone alias.

Synopsis

```
aliDelete aliName
```

Availability

Administrator

Description

Use this command to delete a zone alias.

Operands

The following operand is required:

`aliName`	Name of zone alias to be deleted, in quotes.

Example

To delete the zone alias “array2”:

```
sw5:admin> aliDelete "array2"
```

See Also

```
aliAdd
aliCreate
aliRemove
aliShow
```

aliRemove

Remove a member from a zone alias.

Synopsis `aliRemove aliName, aliMemberList`

Availability Administrator

Description Use this command to remove one or more members from an existing zone alias.

The member list is located by an exact string match, therefore, it is important to maintain the order when removing multiple members. For example, if a zone alias contains “1,2; 1,3; 1,4”, removing“1,3; 1,4” succeeds, but removing “1,4; 1,3” fails.

If all members are removed, the zone alias is deleted.

Operands The following operands are required:

`aliName`	Name of zone alias, in quotes.
`aliMemberList`	List of members to be removed from alias, in quotes, separated by semi-colons. Can be one or more of the following: • Physical fabric port numbers • Worldwide names • QuickLoop AL_PAs

Example To remove a worldwide name from “array1”:

```
sw5:admin> aliRemove "array1", "21:00:00:20:37:0c:71:d2"
```

See Also
`aliAdd`
`aliCreate`
`aliDelete`
`aliShow`

aliShow

Display zone alias information.

Synopsis `aliShow [pattern]`

Availability All users

Description Use this command to display zone configuration information.

If no parameters are specified, all zone configuration information (both defined and enabled) is displayed. See `cfgShow` for a description of this display.

If a parameter is specified, it is used as a pattern to match zone alias names; those that match in the defined configuration are displayed.

Operands The following operand is optional:

`pattern` A POSIX-style regular expression used to match zone alias names.

Patterns can contain:

- Question mark "?" that matches any single character
- Asterisk "*" that matches any string of characters
- Ranges "[0-9a-f]" that match any character within the range

Example To show all zone aliases beginning with "arr":

```
sw5:admin> aliShow "arr*"
 alias: array1 21:00:00:20:37:0c:76:8c
 alias: array2 21:00:00:20:37:0c:66:23
```

See Also

`aliAdd`
`aliCreate`
`aliDelete`
`aliRemove`

cfgAdd

Add a member to a zone configuration.

Synopsis `cfgAdd cfgName, cfgMemberList`

Availability Administrator

Description Use this command to add one or more members to an existing zone configuration.

Operands The following operands are required:

`cfgName`	Name for the zone configuration, in quotes.
`cfgMemberList`	List of members to be added to zone configuration, in quotes, separated by semi-colons. Can be one or more of the following: • Zone names • QuickLoop names

Example To add a new zone to the configuration “USA_cfg”:

```
sw5:admin> cfgAdd "USA_cfg", "Green_zone"
```

See Also

`cfgClear`
`cfgCreate`
`cfgDelete`
`cfgDisable`
`cfgEnable`
`cfgRemove`
`cfgSave`
`cfgShow`

cfgClear

Clear all zone configurations.

Synopsis `cfgClear`

Availability Administrator

Description Use this command to clear all zone configuration information from the fabric. If a zone configuration is enabled, it is first disabled. All defined zone objects are then deleted.

Note `cfgClear` does not affect the zone configuration information in nonvolatile memory.

Operands None

Example To clear all zones, clear nonvolatile memory:

```
sw5:admin> cfgClear
sw5:admin> cfgSave
```

See Also
`cfgDisable`
`cfgEnable`
`cfgSave`

cfgCreate

Create a zone configuration.

Synopsis `cfgCreate cfgName, cfgMemberList`

Availability Administrator

Description Use this command to create a new zone configuration.

A zone configuration name is a C-style name beginning with a letter and followed by any number of letters, digits, and underscore characters. Names are case sensitive, for example “Cfg_1” and “cfg_1” are different zone configurations. Blank spaces are ignored.

The zone configuration member list must have at least one member (empty lists are not allowed).

Operands The following operands are required:

`cfgName`	Name for the zone configuration to be created, in quotes. This name cannot be used for another zone object.
`cfgMemberList`	List of members to be included, in quotes, separated by semi-colons. Can be one or more of the following: • Zone names • QuickLoop names

Example To create a configuration containing three zones:

```
sw5:admin> cfgCreate "USA_cfg", "Red_zone;
Blue_zone; Green_zone"
```

See Also

```
cfgAdd
cfgClear
cfgDelete
cfgDisable
cfgEnable
cfgRemove
cfgSave
cfgShow
```

cfgDelete

Delete a zone configuration.

Synopsis

```
cfgDelete cfgName
```

Availability

Administrator

Description

Use this command to delete a zone configuration.

The `cfgName` operand is the name of an existing zone configuration.

Operands

The following operand is required:

`cfgName`	Name of zone configuration to be deleted, in quotes.

Example

To delete the zone configuration “USA_cfg”:

```
sw5:admin> cfgDelete "USA_cfg"
```

See Also

```
cfgAdd
cfgClear
cfgCreate
cfgDisable
cfgEnable
cfgRemove
cfgSave
cfgShow
```

cfgDisable

Disable a zone configuration.

Synopsis `cfgDisable`

Availability Administrator

Description Use this command to disable the enabled zone configuration. The fabric returns to nonzoning mode.

Operands None

Example To disable the current zone configuration:

```
sw5:admin> cfgDisable
```

See Also
`cfgClear`
`cfgEnable`
`cfgSave`

cfgEnable

Enable a zone configuration.

Synopsis `cfgEnable cfgName`

Availability Administrator

Description Use this command to enable a zone configuration.

The configuration to be enabled is built when a specified zone configuration is enabled. The configuration is built by checking for undefined zone names, zone alias names, or other inconsistencies, and then expanding zone aliases, removing duplicate entries, and installing the enabled configuration.

If the build fails, the previous state is preserved (zoning remains disabled, or the previous enabled configuration remains in effect). If the build succeeds, the new configuration replaces the previous configuration.

See `cfgShow` for a description of defined and enabled configurations.

Operands The following operand is required:

`cfgName`	Name of zone configuration to be enabled, in quotes.

Example To enable the zone configuration “USA_cfg”:

```
sw5:admin> cfgEnable "USA_cfg"
zone config "USA_cfg" is in effect
```

See Also

```
cfgClear
cfgDisable
cfgSave
cfgShow
```

cfgRemove

Remove a member from a zone configuration.

Synopsis `cfgRemove cfgName, cfgMemberList`

Availability Administrator

Description Use this command to remove a member from an existing zone configuration.

The member list is located by an exact string match, therefore, it is important to maintain the order when removing multiple members. For example, if a zone configuration contains “cfg2; cfg3; cfg4”, removing “cfg3; cfg4” succeeds, but removing “cfg4; cfg3” fails.

If all members are removed, the zone configuration is deleted.

Operands The following operands are required:

`cfgName`	Name of zone configuration, in quotes.
`cfgMemberList`	List of zone configuration members to be removed, in quotes, separated by semi-colons. Can be one or more of the following: • Zone names • QuickLoop names

Example To remove “Green_zone” from “USA_cfg”:

```
sw5:admin> cfgRemove "USA_cfg", "Green_zone"
```

See Also

```
cfgAdd
cfgClear
cfgCreate
cfgDelete
```

```
cfgDisable
cfgEnable
cfgSave
cfgShow
```

cfgSave

Save a zone configuration to nonvolatile memory.

Synopsis `cfgSave`

Availability Administrator

Description Use this command to save the current zone configuration. The defined configuration and the name of the enabled configuration are written to nonvolatile memory in all switches in the fabric.

The saved configuration is automatically reloaded by the switch on power up and, if a configuration was enabled at the time it was saved, the same configuration is re-installed with an automatic `cfgEnable` command.

Because the saved configuration is reloaded at power on, only valid configurations are saved. The `cfgSave` command verifies that the enabled configuration is valid by performing the same tests as `cfgEnable`. If the tests fail, an error is displayed and the configuration is not saved. Tests can fail if a configuration has been modified since the last `cfgEnable`.

Operands None

Example To save a zone configuration enable it, and then save it:

```
sw5:admin> cfgEnable "USA_cfg"
zone config "USA_cfg" is in effect

sw5:admin> cfgSave
Updating flash...
```

See Also

```
cfgClear
cfgDisable
cfgEnable
cfgShow
```

cfgShow

Display zone configuration information.

Synopsis

```
cfgShow [pattern]
```

Availability

All users

Description

Use this command to display zone configuration information.

If no parameters are specified, all zone configuration information (both defined and enabled) is displayed.

If a parameter is specified, it is used as a pattern to match zone configuration names with the zone configurations that are in the defined configuration; those that match the pattern are displayed.

The defined configuration is the complete set of all zone objects that have been defined in the fabric. There can be multiple zone configurations defined, but only one can be enabled at a time. There can be inconsistencies in the definitions, zones, or aliases that are referenced but not defined, or there can be duplicate members.

The enabled configuration is the zone configuration that is currently enabled. The devices that an initiator sees are based on this configuration. The enabled configuration is built when a specified zone configuration is enabled.

Operands The following operand is optional:

`pattern` A POSIX-style regular expression used to match zone configuration names.

Patterns can contain:

- Question mark “?” that matches any single character
- Asterisk “*” that matches any string of characters
- Ranges “[0-9a-f]” that match any character within the range

Example To show all defined configurations:

```
sw5:admin> cfgShow "*"
    cfg:   USA1    Blue_zone
    cfg:   USA_cfg Red_zone; Blue_zone
```

To show all configuration information:

```
sw5:admin> cfgShow
Defined configuration:
     cfg:   USA1     Blue_zone
     cfg:   USA_cfg  Red_zone; Blue_zone
     zone:  Blue_zone
                     1,1; array1; 1,2; array2
     zone:  Red_zone
                     1,0; loop1
     alias: array1   21:00:00:20:37:0c:76:8c;
                     21:00:00:20:37:0c:71:02
     alias: array2   21:00:00:20:37:0c:76:22;
                     21:00:00:20:37:0c:76:28
     alias: loop1    21:00:00:20:37:0c:76:85;
                     21:00:00:20:37:0c:71:df

    Enabled configuration:
     cfg:   USA_cfg
     zone:  Blue_zone
                     1,1
                     21:00:00:20:37:0c:76:8c
                     21:00:00:20:37:0c:71:02
                     1,2
                     21:00:00:20:37:0c:76:22
                     21:00:00:20:37:0c:76:28
     zone:  Red_zone
                     1,0
                     21:00:00:20:37:0c:76:85
                     21:00:00:20:37:0c:71:df
```

See Also

cfgAdd
cfgClear
cfgCreate
cfgDelete
cfgDisable
cfgEnable
cfgRemove
cfgSave

qloopAdd

Add a member to a QuickLoop.

Synopsis `qloopAdd qloopName, qloopMemberList`

Availability Administrator

Description Use this command to add one or more members to an existing QuickLoop.

When a configuration is enabled, all QuickLoops defined in the configuration must resolve to one or two switch worldwide names.

Operands The following operands are required:

`qloopName`	Name of QuickLoop, in quotes.
`qloopMemberList`	List of QuickLoop members, in quotes, separated by semi-colons. Can include one or more of the following: • Worldwide names • Zone alias names

Example To add an alias for a second worldwide name to “qlp1”:

```
sw5:admin> qloopAdd "qlp1","wwn2"
```

See Also
`qloopCreate`
`qloopDelete`
`qloopRemove`
`qloopShow`

qloopCreate

Create a QuickLoop.

Synopsis `qloopCreate qloopName, qloopMemberList`

Availability Administrator

Description Use this command to create a QuickLoop.

A QuickLoop name is a C-style name beginning with a letter and followed by any number of letters, digits, and underscore characters. Names are case sensitive, for example “Qloop_1” indicates a different QuickLoop than “qloop_1”. Blank spaces are ignored.

The QuickLoop member list must have one or two members; an empty list is not allowed.

When a configuration is enabled, all QuickLoops defined in the configuration must resolve to a maximum of two switch worldwide names.

Operands The following operands are required:

`qloopName`	Name of QuickLoop to be created, in quotes. Name cannot be used for another zone object.
`qloopMemberList`	List of members to be added to QuickLoop, in quotes, separated by semi-colons. Can be one or more of the following: • Worldwide names • Zone alias names

Example To create two QuickLoops, a single switch and one dual switch:

```
sw5:admin> qloopCreate "qlp1", "10:00:00:60:69:00:60:11"
sw5:admin> qloopCreate "qlp2", "wwn2; wwn3"
```

See Also

```
qloopAdd
qloopDelete
qloopRemove
qloopShow
```

qloopDelete

Delete a QuickLoop.

Synopsis

```
qloopDelete qloopName
```

Availability

Administrator

Description

Use this command to delete a QuickLoop.

When a configuration is enabled, all QuickLoops defined in the configuration must resolve to a maximum of two switch worldwide names.

Operands

The following operand is required:

`qloopName` Name of QuickLoop, in quotes.

Example

To delete QuickLoop “qlp2”:

```
sw5:admin> qloopDelete "qlp2"
```

See Also

```
qloopAdd
qloopCreate
qloopRemove
qloopShow
```

qloopRemove

Remove a member from a QuickLoop.

Synopsis `qloopRemove qloopName, qloopMemberList`

Availability Administrator

Description Use this command to remove one or more members from a QuickLoop.

The member list is identified through an exact string match; therefore, when removing multiple members, order is important. For example, if a QuickLoop contains “wwn2; wwn3; wwn4”, removing “wwn3; wwn4” succeeds, but removing “wwn4; wwn3” fails.

If all members are removed, the QuickLoop is deleted.

When a configuration is enabled, all QuickLoops defined in the configuration must resolve to one or two switch worldwide names.

Operands The following operands are required:

`qloopName`	Name of QuickLoop, in quotes.
`qloopMemberList`	List of QuickLoop members to be removed, in quotes, separated by semi-colons. Can be one or more of the following: • Worldwide names • Zone alias names

Example To remove member “wwn2” from “qlp1”:

```
sw5:admin> qloopRemove "qlp1", "wwn2"
```

See Also
`qloopAdd`
`qloopCreate`
`qloopDelete`
`qloopShow`

qloopShow

Display QuickLoop information.

Synopsis `qloopShow [pattern]`

Availability All users

Description Use this command to display QuickLoop configuration information.

If no parameters are specified, all zone configuration information (defined and enabled) is displayed. See `cfgShow` for a description of this display.

If a parameter is specified, it is used as a pattern to match QuickLoop names; those that match in the defined configuration are displayed.

Operands The following operand is optional:

`pattern` A POSIX-style regular expression used to match QuickLoop names.

Patterns can contain:

- Question mark “?” that matches any single character
- Asterisk “*” that matches any string of characters
- Ranges “[0-9a-f]” that match any character within the range

Example To display all QuickLoops beginning with the letter “q”:

```
sw5:admin> qloopShow "q*"
 qloop: qlp1       10:00:00:60:69:00:60:11
                   10:00:00:60:69:00:30:02
 qloop: qlp2       10:00:00:60:69:00:60:13
```

See Also

`qloopAdd`
`qloopCreate`
`qloopDelete`
`qloopRemove`

zoneAdd

Add a member to the zone.

Synopsis `zoneAdd zoneName, zoneMemberList`

Availability Administrator

Description Use this command to add one or more members to an existing zone.

Operands The following operands are required:

`zoneName`	Name for the existing zone, in quotes.
`zoneMemberList`	List of members to be added, in quotes, separated by semi-colons. Can be one or more, of the following: • Physical fabric port number • Worldwide name • QuickLoop AL_PA • Zone alias name

Example To add aliases for three disk arrays to “Blue_zone”:

```
sw5:admin> zoneAdd "Blue_Zone", "array3; array4; array5"
```

See Also

```
zoneCreate
zoneDelete
zoneRemove
zoneShow
```

zoneCreate

Create a zone.

Synopsis `zoneCreate zoneName, zoneMemberList`

Availability Administrator

Description Use this command to create a new zone.

A zone name is a C-style name beginning with a letter and followed by any number of letters, digits, and underscore characters. Names are case sensitive, for example “Zone_1” indicates a different zone than “zone_1”. Blank spaces are ignored.

The zone member list must have at least one member (empty lists are not allowed). The members are described by a list of member definitions separated by semi-colons.

Specify a physical fabric port number as a pair of decimal numbers “s,p” where “s” is the switch number (domain ID) and “p” is the port number on that switch. For example, “2,12” specifies port 12 on switch number 2. When a zone member is specified by physical fabric port number, all devices connected to that port are in the zone. If this port is an arbitrated loop, all devices on the loop are in the zone.

Specify a worldwide name as eight hex numbers separated by colons, for example “10:00:00:60:69:00:00:8a”. Zoning has no knowledge of the fields within a worldwide name; the eight bytes are simply compared with the node and port names presented by a device in a login frame (FLOGI or PLOGI). When a zone member is specified by node name, all ports on that device are in the zone. When a zone member is specified by port name, only that single device port is in the zone.

Specify a QuickLoop AL_PA as a QuickLoop name followed by a list of AL_PAs, for example “qloop1[01,02]”. QuickLoop names have the same format as zone names, and are created with the `qloopCreate` command to define a switch or pair of switches that form the QuickLoop.

Specify a zone alias name using the same format as a zone name; it is created with the `aliCreate` command. The alias must resolve to a list of one or more of the following:

- Physical fabric port numbers
- Worldwide names
- QuickLoop AL_PAs

The types of zone members used to define a zone can be mixed. For example, a zone defined with the following members: “2,12; 2,14; 10:00:00:60:69:00:00:8a” contains all devices connected to switch 2, ports 12 and 14, and to the device with the worldwide name “10:00:00:60:69:00:00:8a” (either node name or port name), at the port in the fabric to which it is connected.

Operands The following operands are required:

`zoneName`	Name for a zone to be created, in quotes. This name cannot be used for any other zone object.
`zoneMemberList`	List of members to be included in zone, in quotes, separated by semi-colons. Can be one or more of the following: • Physical fabric port numbers • Worldwide names • QuickLoop AL_PAs • Zone alias names

Example To create three zones using a combination of port numbers and zone aliases:

```
sw5:admin> zoneCreate "Red_zone", "1,0; loop1"
sw5:admin> zoneCreate "Blue_zone", "1,1; array1; 1,2; array2"
sw5:admin> zoneCreate "Green_zone", "1,0; loop1; 1,2; array2"
```

See Also

```
zoneAdd
zoneDelete
zoneRemove
zoneShow
```

zoneDelete

Delete a zone.

Synopsis `zoneDelete zoneName`

Availability Administrator

Description Use this command to delete a zone.

Operands The following operand is required:

`zoneName`	Name of the zone to be deleted, in quotes.

Example To delete the zone “Blue_zone”:

```
sw5:admin> zoneDelete "Blue_zone"
```

See Also

```
zoneAdd
zoneCreate
zoneRemove
zoneShow
```

zoneRemove

Remove a member from a zone.

Synopsis `zoneRemove zoneName, zoneMemberList`

Availability Administrator

Description Use this command to remove one or more members from an existing zone.

The member list is located by an exact string match, therefore, it is important to maintain the order when removing multiple members. For example, if a zone contains “array2; array3; array4”, removing “array3; array4” succeeds, but removing “array4; array3” fails.

If all members are removed, the zone is deleted.

Operands The following operands are required:

`zoneName`	Name of the zone, in quotes.
`zoneMemberList`	List of members to be removed from zone, in quotes, separated by semi-colons. Can be one or more of the following: • Physical fabric port numbers • Worldwide names • QuickLoop AL_PAs • Zone alias names

Example To remove “array2” from “Blue_zone”:

```
sw5:admin> zoneRemove "Blue_zone", "array2"
```

See Also
`zoneAdd`
`zoneCreate`
`zoneDelete`
`zoneShow`

zoneShow

Display zone information.

Synopsis `zoneShow [pattern]`

Availability All users

Description Use this command to display zone configuration information.

If no parameters are specified, all zone configuration information (both defined and enabled) is displayed. See `cfgShow` for a description of this display.

If a parameter is specified, it is used as a pattern to match zone configuration names, and those that match in the defined configuration are displayed.

Operands The following operand is optional:

`pattern` A POSIX-style regular expression used to match zone configuration names.

Patterns can contain:

- Question mark “?” that matches any single character
- Asterisk “*” that matches any string of characters
- Ranges “[0-9a-f]” that match any character within the range

Example To show all zones beginning with the letters “A” through “C”:

```
sw5:admin> zoneShow "[A-C]*"
zone: Blue_zone 1,1; array1; 1,2; array2
```

See Also

```
zoneAdd
zoneCreate
zoneDelete
zoneRemove
```

B

ZONING SAMPLE CONFIGURATIONS

The following sample configurations illustrate setting up a zone configuration. Note that changes have been saved periodically. In addition to the periodic saves, the `cfgshow` command has been issued to display current status to verify that changes have been processed.

Setting Up a Fabric Zone Configuration

```
switch187:admin> cfgShow
Defined configuration:
 no configuration defined

Effective configuration:
 no configuration in effect
```

To create aliases:

```
switch187:admin> aliCreate "array1",
"21:00:00:20:37:0c:72:8c"
switch187:admin> aliCreate "array2",
"21:00:00:20:37:0c:66:23"
switch187:admin> aliCreate "array3",
"21:00:00:20:37:0c:67:e3"
switch187:admin> aliCreate "tape1", "1,7"
switch187:admin> aliCreate "jbod1",
"21:00:00:20:37:1b:12:04"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 alias: array1  21:00:00:20:37:0c:72:8c
 alias: array2  21:00:00:20:37:0c:66:23
 alias: array3  21:00:00:20:37:0c:67:e3
 alias: jbod1   21:00:00:20:37:1b:12:04
 alias: tape1   1,7

Effective configuration:
 no configuration in effect
```

To add members to aliases:

```
switch187:admin> aliAdd "array1",
"21:00:00:20:37:0c:72:51"
switch187:admin> aliAdd "array2",
"21:00:00:20:37:0c:9c:6b"
switch187:admin> aliAdd "array3",
"21:00:00:20:37:0c:6a:40"
switch187:admin> aliAdd "jbod1",
"21:00:00:20:37:1b:12:08;21:00:00:20:37:1b:12
:e4;21:00:00:20:37:1b:12:e8"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 alias: array1
21:00:00:20:37:0c:72:8c;21:00:00:20:37:0c:72:51
 alias: array2
21:00:00:20:37:0c:66:23;21:00:00:20:37:0c:9c:6b
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                 21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape   1,7

Effective configuration:
 no configuration in effect
```

To delete aliases:

```
switch187:admin> aliDelete "array2"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 alias: array1
21:00:00:20:37:0c:72:8c;21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
```

```
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape   1,7

Effective configuration:
 no configuration in effect
```

To remove members from aliases:

```
switch187:admin> aliRemove "array1",
"21:00:00:20:37:0c:72:8c"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7

Effective configuration:
 no configuration in effect

switch187:admin> aliShow "arr*"
 alias: array1  21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
```

To create zones:

```
switch187:admin> zoneCreate "red", "1,1; array1"
switch187:admin> zoneCreate "white", "1,2; array3"
switch187:admin> zoneCreate "blue", "1,3; array3;
jbod1"
switch187:admin> zoneCreate "red_bu", "1,1; array1;
tape1"
switch187:admin> zoneCreate "white_bu", "1,2; array3;
```

```
tape1"
switch187:admin> zoneCreate "blue_bu", "1,3; array3;
jbod1;
  tape1"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7

Effective configuration:
 no configuration in effect

switch187:admin> zoneShow "*bu"
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red_bu  1,1; array1; tape1
 zone:  white_bu
                1,2; array3; tape1

switch187:admin> zoneShow "*"
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
```

To create zone configurations:

```
switch187:admin> cfgCreate "USA", "red;white"
switch187:admin> cfgCreate "backup", "red_bu;
white_bu;blue_bu"
switch187:admin> cfgCreate "backup_red", "red_bu;
white; blue"
switch187:admin> cfgCreate "backup_white", "red;
white_bu;blue"
switch187:admin> cfgCreate "backup_blue",
"red;white;blue_bu"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white
 cfg:   backup  red_bu; white_bu; blue_bu
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8

 alias: tape   1,7

Effective configuration:
 no configuration in effect
```

To add members to a zone configuration:

```
switch187:admin> cfgAdd "USA", "blue"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup  red_bu; white_bu; blue_bu
 cfg:   backup_blue
                red; white; blue_bu

 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7

Effective configuration:
 no configuration in effect
```

To delete zone configurations:

```
switch187:admin> cfgDelete "backup"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7

Effective configuration:
 no configuration in effect

switch187:admin> cfgShow "backup_red"
 cfg:   backup_red
                red_bu; white; blue
```

To enable zone configurations:

```
switch187:admin> cfgEnable "USA"
zone config "USA" is in effect

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1   1,7

Effective configuration:
 cfg:   USA
 zone:  blue    1,3
                21:00:00:20:37:0c:67:e3
                21:00:00:20:37:0c:6a:40
                21:00:00:20:37:1b:12:04
                21:00:00:20:37:1b:12:08
                21:00:00:20:37:1b:12:e4
                21:00:00:20:37:1b:12:e8
 zone:  red     1,1
                21:00:00:20:37:0c:72:51
 zone:  white   1,2
                21:00:00:20:37:0c:67:e3
               21:00:00:20:37:0c:6a:40

switch187:admin> cfgEnable "backup_white"
zone config "backup_white" is in effect
```

```
switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7

Effective configuration:
 cfg:   backup_white
 zone:  blue    1,3
                21:00:00:20:37:0c:67:e3
                21:00:00:20:37:0c:6a:40
                21:00:00:20:37:1b:12:04
                21:00:00:20:37:1b:12:08
                21:00:00:20:37:1b:12:e4
                21:00:00:20:37:1b:12:e8
 zone:  red     1,1
                21:00:00:20:37:0c:72:51
 zone:  white_bu
                1,2
                21:00:00:20:37:0c:67:e3
                21:00:00:20:37:0c:6a:40
               1,7
```

To disable zone configurations:

```
switch187:admin> cfgDisable

switch187:admin> cfgShow

Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1  21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod121
00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                 21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7

Effective configuration:
 no configuration in effect
```

Adding a QuickLoop and QuickLoop Zone to Zone Configuration

To create QuickLoops:

```
switch187:admin> qloopCreate "qlp1",
"10:00:00:60:69:00:00:01"
switch187:admin> qloopCreate "qlp2", "wwn2;wwn3"
```

To create aliases:

```
switch187:admin> aliCreate "wwn2",
"10:00:00:60:69:00:00:02"
switch187:admin> aliCreate "wwn3",
"10:00:00:60:69:00:00:03"
switch187:admin> aliCreate "wwn4",
"10:00:00:60:69:00:00:04"

switch187:admin> qloopCreate "qlp3", "wwn4"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
                 21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
```

```
 alias: tape    1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias: wwn4   10:00:00:60:69:00:00:04
 qloop: qlp1   10:00:00:60:69:00:00:01
 qloop: qlp2   wwn2; wwn3
 qloop: qlp3     wwn4

Effective configuration:
 no configuration in effect
```

To add a switch to a QuickLoop:

```
switch187:admin> qloopAdd "qlp1", "wwn2"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array  21:00:00:20:37:0c:72:51
 alias: array
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias: wwn4   10:00:00:60:69:00:00:04
```

```
 qloop: qlp1   10:00:00:60:69:00:00:01; wwn2
 qloop: qlp2   wwn2; wwn3
 qloop: qlp3     wwn4

Effective configuration:
 no configuration in effect
```

To remove a switch from a QuickLoop:

```
switch187:admin> qloopRemove "qlp2", "wwn2"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias: wwn4   10:00:00:60:69:00:00:04
 qloop: qlp1   10:00:00:60:69:00:00:01; wwn2
 qloop: qlp2   wwn3
 qloop: qlp3     wwn4

Effective configuration:
 no configuration in effect
```

To delete QuickLoops:

```
switch187:admin> qloopDelete "qlp3"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue
 cfg:   backup_blue
                red; white; blue_bu
 cfg:   backup_red
                red_bu; white; blue
 cfg:   backup_white
                red; white_bu; blue
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 alias: array  21:00:00:20:37:0c:72:51
 alias: array
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias: wwn4   10:00:00:60:69:00:00:04
 qloop: qlp1   10:00:00:60:69:00:00:01; wwn2
 qloop: qlp2     wwn3

Effective configuration:
 no configuration in effect

switch187:admin> qloopShow "qlp*"
 qloop: qlp1    10:00:00:60:69:00:00:01; wwn2
 qloop: qlp2    wwn3
```

To add QuickLoops to configurations:

```
switch187:admin> cfgAdd "USA", "qlp1;qlp2"
switch187:admin> cfgAdd "backup_red", "qlp1;qlp2"
switch187:admin> cfgAdd "backup_white", "qlp1;qlp2"
switch187:admin> cfgAdd "backup_blue", "qlp1;qlp2"
```

To create aliases using AL_PAs:

```
switch187:admin> aliCreate "host1", "qlp1[01]"
switch187:admin> aliCreate "host2", "qlp1[04]"
switch187:admin> aliCreate "host3", "qlp2[01]"
switch187:admin> aliCreate "host4", "qlp2[02]"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> aliShow "*"
 alias: array1  21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: host1   qlp1[01]
 alias: host2   qlp1[04]
 alias: host3   qlp2[01]
 alias: host4   qlp2[02]
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: tape1  1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias:  wwn4    10:00:00:60:69:00:00:04

switch187:admin> aliCreate "jbod2"
    "qlp1[45,4d,4e,51,52,53,54,55]"
switch187:admin> aliCreate "jbod3a",
"qlp1[5a,6a,6b,75]"
switch187:admin> aliCreate "jbod3b",
"qlp1[7a,7c,80,81]"
switch187:admin> aliCreate "jbod4",
     "qlp1[c6,c7,c9,ca,cb,cc,cd,d2,dc,e2]"
switch187:admin> aliCreate "jbod5",
     "qlp2[80,81,82,84,88,8f,90]"
switch187:admin> aliCreate "jbod6",
     "qlp2[ca,cb,cc,cd,d2,d4,e2,e4,e8,ef]"
```

```
switch187:admin> cfgSave
Updating flash ...

switch187:admin> aliShow "jbod*"
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: jbod2   qlp1[45,4d,4e,51,52,53,54,55]
 alias: jbod3a  qlp1[5a,6a,6b,75]
 alias: jbod3b  qlp1[7a,7c,80,81]
 alias: jbod4   qlp1[c6,c7,c9,ca,cb,cc,cd,d2,dc,e2]
 alias: jbod5   qlp2[80,81,82,84,88,8f,90]
 alias: jbod6   qlp2[ca,cb,cc,cd,d2,d4,e2,e4,e8,ef]
```

To create zones:

```
switch187:admin> zoneCreate "yellow", "host1;
jbod2;jbod3a"
switch187:admin> zoneCreate "green", "host2;
jbod3b;jbod4"
switch187:admin> zoneCreate "orange", "host3;jbod5"
switch187:admin> zoneCreate "purple", "host4; jbod6"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> zoneShow "*"
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  green   host2; jbod3b; jbod4
 zone:  orange  host3; jbod5
 zone:  purple  host4; jbod6
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 zone:  yellow  host1; jbod2; jbod3a

switch187:admin> cfgShow "*"
 cfg:   USA     red; white; blue; qlp1; qlp2
 cfg:   backup_blue
                red; white; blue_bu; qlp1; qlp2
```

```
 cfg:   backup_red
                red_bu; white; blue; qlp1; qlp2
 cfg:   backup_white
                red; white_bu; blue; qlp1; qlp2
```

To add members to a zone configuration:

```
switch187:admin> cfgAdd "USA",
"yellow;green;orange;purple"
switch187:admin> cfgAdd "backup_red",
        "yellow;green;orange;purple"
switch187:admin> cfgAdd "backup_white",
        "yellow;green;orange;purple"
switch187:admin> cfgAdd "backup_blue",
         "yellow;green;orange;purple"

switch187:admin> cfgSave
Updating flash ...

switch187:admin> cfgShow “*”
 cfg:   USA     red; white; blue; qlp1; qlp2; yellow;
green;
                orange; purple
 cfg   backup_blue
        red; white; blue_bu; qlp1; qlp2; yellow; green;
orange;
                purple
 cfg:  backup_red
        red_bu; white; blue; qlp1; qlp2; yellow; green;
orange;
                purple
 cfg   backup_white
        red; white_bu; blue; qlp1; qlp2; yellow; green;
orange;
                   purple

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue; qlp1; qlp2; yellow;
green;
                orange; purple
 cfg:   backup_blue
                  red; white; blue_bu; qlp1; qlp2;
yellow; green;
                 orange;purple
 cfg:   backup_red
```

```
                red_bu; white; blue; qlp1; qlp2; yellow;
                 green; orange; purple
 cfg:   backup_white
                  red; white_bu; blue; qlp1; qlp2;
yellow;
                  green; orange; purple
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  green   host2; jbod3b; jbod4
 zone:  orange  host3; jbod5
 zone:  purple  host4; jbod6
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 zone:  yellow  host1; jbod2; jbod3a
 alias: array1  21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: host1   qlp1[01]
 alias: host2   qlp1[04]
 alias: host3   qlp2[01]
 alias: host4  qlp2[02]
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: jbod2  qlp1[45,4d,4e,51,52,53,54,55]
 alias: jbod3a qlp1[5a,6a,6b,75]
 alias: jbod3b qlp1[7a,7c,80,81]
 alias: jbod4  qlp1[c6,c7,c9,ca,cb,cc,cd,d2,dc,e2]
 alias: jbod5  qlp2[80,81,82,84,88,8f,90]
 alias: jbod6  qlp2[ca,cb,cc,cd,d2,d4,e2,e4,e8,ef]
 alias: tape1  1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias: wwn4   10:00:00:60:69:00:00:04
 qloop: qlp1   10:00:00:60:69:00:00:01; wwn2
 qloop: qlp2     wwn3

Effective configuration:
 no configuration in effect
```

To enable zone configurations:

```
switch187:admin> cfgEnable "USA"
zone config "USA" is in effect

switch187:admin> cfgShow
Defined configuration:
 cfg:   USA     red; white; blue; qlp1; qlp2; yellow;
green;
                orange; purple
 cfg:   backup_blue
                  red; white; blue_bu; qlp1; qlp2;
yellow; green;
                 orange; purple
 cfg:   backup_red
                red_bu; white; blue; qlp1; qlp2; yellow;
                 green; orange; purple
 cfg:   backup_white
                red; white_bu; blue; qlp1; qlp2; yellow;
                 green; orange; purple
 zone:  blue    1,3; array3; jbod1
 zone:  blue_bu 1,3; array3; jbod1; tape1
 zone:  green   host2; jbod3b; jbod4
 zone:  orange  host3; jbod5
 zone:  purple  host4; jbod6
 zone:  red     1,1; array1
 zone:  red_bu  1,1; array1; tape1
 zone:  white   1,2; array3
 zone:  white_bu
                1,2; array3; tape1
 zone:  yellow host1; jbod2; jbod3a
 alias: array1 21:00:00:20:37:0c:72:51
 alias: array3
21:00:00:20:37:0c:67:e3;21:00:00:20:37:0c:6a:40
 alias: host1  qlp1[01]
 alias: host2  qlp1[04]
 alias: host3  qlp2[01]
 alias: host4  qlp2[02]
 alias: jbod1
21:00:00:20:37:1b:12:04;21:00:00:20:37:1b:12:08;
               21:00:00:20:37:1b:12:e4;
21:00:00:20:37:1b:12:e8
 alias: jbod2  qlp1[45,4d,4e,51,52,53,54,55]
 alias: jbod3a qlp1[5a,6a,6b,75]
 alias: jbod3b qlp1[7a,7c,80,81]
 alias: jbod4  qlp1[c6,c7,c9,ca,cb,cc,cd,d2,dc,e2]
 alias: jbod5  qlp2[80,81,82,84,88,8f,90]
```

```
 alias: jbod6  qlp2[ca,cb,cc,cd,d2,d4,e2,e4,e8,ef]
 alias: tape1  1,7
 alias: wwn2   10:00:00:60:69:00:00:02
 alias: wwn3   10:00:00:60:69:00:00:03
 alias: wwn4   10:00:00:60:69:00:00:04
 qloop: qlp1   10:00:00:60:69:00:00:01; wwn2
 qloop: qlp2     wwn3

Effective configuration:
 cfg:   USA
 zone:  blue    1,3
                21:00:00:20:37:0c:67:e3
                21:00:00:20:37:0c:6a:40
                21:00:00:20:37:1b:12:04
                21:00:00:20:37:1b:12:08
                21:00:00:20:37:1b:12:e4
                21:00:00:20:37:1b:12:e8
 zone:  green   qlp1[04]
                qlp1[7a,7c,80,81]
                qlp1[c6,c7,c9,ca,cb,cc,cd,d2,dc,e2]
 zone:  orange  qlp2[01]
                qlp2[80,81,82,84,88,8f,90]
 zone:  purple  qlp2[02]
                qlp2[ca,cb,cc,cd,d2,d4,e2,e4,e8,ef]
 zone:  red     1,1
                21:00:00:20:37:0c:72:51
 zone:  white   1,2
                21:00:00:20:37:0c:67:e3
                21:00:00:20:37:0c:6a:40
 zone:  yellow  qlp1[01]qlp1[45,4d,4e,51,52,53,54,55]
                qlp1[5a,6a,6b,75]
 qloop: qlp1    10:00:00:60:69:00:00:01
                10:00:00:60:69:00:00:02
 qloop:  qlp2     10:00:00:60:69:00:00:03
```

GLOSSARY

Alias server	A Fabric software facility that supports multicast group management.
AL_PA	Arbitrated Loop Physical Address. The address of an individual port in a loop. A loop can have one or multiple AL_PAs.
Arbitrated loop	A fibre channel transport structured as a loop. Allows communication between ports without using a switch. Requires successful arbitration by a port before a circuit is established. Supports up to 126 devices and 1 fabric attachment. Similar to a “shared bandwidth ring” on a network.
ATM	Asynchronous Transfer Mode. A broadband technology for transmitting data over LANs or WANs, based on relaying cells of a fixed size. Provides any-to-any connectivity, and nodes can transmit simultaneously.
Class F	A class of service used for interswitch control traffic. Provides connectionless service with notification of delivery or nondelivery between two E_Ports.
Class 2	Connectionless service between ports with notification of delivery or nondelivery. The transmission and routing of Class 2 and Class 3 frames is the same.
Class 3	Connectionless service between ports without notification of delivery. The transmission and routing of Class 2 and Class 3 frames is the same.
Community (SNMP)	A relationship between an SNMP agent and a set of SNMP managers that defines authentication, access control, and proxy characteristics.
Credit	When applied to a switch, the maximum number of receive buffers provided by an F_Port or FL_Port to its attached N_Port or NL_Port, respectively, such that the N_Port or NL_Port can transmit frames without over-running the F_Port or FL_Port.

Defined configuration	The complete set of all zone objects that are defined in the fabric. Can consist of multiple zone configurations.
Domain_ID	Unique identifier for the switch in a fabric. Usually automatically assigned by the switch, but can also be assigned manually. Can be any value between 1 and 239.
E_D_TOV	Error Detect Time-out Value. The time that the switch waits for an expected response before declaring an error condition. The error detect time-out value is adjustable in 1 microsecond increments from 2 to 10 seconds.
Effective configuration	The zone configuration that is currently in effect. Only one configuration can be in effect at once. The effective configuration is built when a specified zone configuration is enabled.
E_Port	An expansion port. A port is designated an E_Port when it is used as an interswitch expansion port to connect to the E_Port of another switch, to build a larger switch fabric.
Fabric	A network that uses high-speed fibre connections to connect switches, hosts, and devices. A fabric is an active, intelligent, nonshared interconnect scheme for nodes.
FC-AL	Fibre Channel Arbitrated Loop. A standard defined on top of the FC-PH standard. Defines the arbitration on a loop where several FC nodes share a common medium.
FC-PH	Fibre Channel Physical and Signalling standard.
FLA	Fabric Loop Attach.
FLOGI	Fabric Login.
F_Port	Fabric Port. Used to connect an N_Port to a switch.
FL_Port	Fabric Loop Port. Used to connect NL_Ports to the switch in a loop configuration.
FSPF	Fibre-Channel Shortest Path First.
G_Port	A generic port that can operate as either an E_Port or an F_Port. A port is defined as a G_Port when it is not yet connected, or has not yet assumed a specific function in the fabric.

Gateway	Hardware that connects incompatible networks by providing the necessary translation for both hardware and software.
Hardwaret Translative mode	Method for achieving address translation. Two hardware translative modes are available to a QuickLoop enabled switch: • Standard Translative Mode: Allows public devices to communicate with private devices across the fabric. • QuickLoop Mode: Allows private devices to communicate with other private devices across the fabric.
ISL	Interswitch Link. A fiber link between two switches.
Isolated E_Port	A port that is online but not operational between switches, due to overlapping domain ID or nonidentical parameters such as E_D_TOVs.
LIP	Loop Initialization Primitive.
L_Port	Loop Port.
Multicast	Multicast is used when multiple copies of data need to be sent to designated multiple destinations.
N_Port	Node Port. An equipment port connected to the fabric.
NL_Port	Node Loop Port. An equipment port connected to the fabric in a loop configuration using an FL_Port.
PLDA	Private Loop Direct Attach.
POST	Power On Self Test. A series of self-tests that run each time the unit is booted or reset.
R_A_TOV	Resource Allocation Time-out Value. Used to time out operations that depend on the maximum possible time that a frame can be delayed in a fabric and still be delivered. The value of R_A_TOV is adjustable in 1 microsecond increments over a range from 10 to 120 seconds.
RAID	Redundant Array of Independent Disks. Collection of disk drives that appear as a single volume to the server, and are fault-tolerant through mirroring or parity checking. See also *JBOD*.

Remote Switch	Product that enables two switches to connect over an ATM connection. Requires compatible fibre channel-to-ATM gateways. Can be up to 10 kilometers distance between each switch and respective gateway.
Request Rate	The rate at which requests arrive at a servicing entity. See also *Service Rate*.
Route	As applies to fabric, a communication path between two switches.Routing is the assignment of Class 2 or 3 frames to the most appropriate switch ports for the intended destinations. See also *FSPF.*
RR_TOV	Resource Recovery Timeout Value. The minimum time a target device in a private loop must wait after a LIP before logging out a SCSI initiator. See also *E_D_TOV, R_A_TOV.*
RSCN	Registered State Change Notification. Switch function that sends notification of fabric changes from the switch to specified nodes.
SAN	Storage Area Network. Network of systems and storage devices that usually communicate using fibre channel protocols. See also *Fabric*.
Sequence	A fibre channel structure containing one or more frames transmitted in a unidirectional manner between N_Ports. See also *Exchange*, *Frame*.
Service Rate	The rate at which an entity can service requests. See also *Request Rate*.
SI	Sequence Initiative.
Single mode	Fibre-optic cabling standard that provides for distances of up to 10 kilometers between devices.
SNMP	Simple Network Management Protocol. Internet management protocol that does not rely on underlying communication protocols and can therefore be made available over other protocols, such as UDP/IP. Uses IP for network layer functions and UDP for transport layer functions, or TCP/IP for both. See also *Community (SNMP)*.
SNMPv1	The original standard for SNMP, now labeled v1.
SNS	Simple Name Server. See *Name server.*
Switch	A combination of hardware and firmware that routes frames according to fibre channel protocol. Switches can have G_Ports, E_Ports, F_Ports, and FL_Ports.

Switch Domain_ID	Unique identifier for a switch, used in routing frames. Usually automatically assigned by the switch, but can be manually assigned by administrator.
Switch name	Arbitrary name assigned to switch by administrator. See also *Switch Domain_ID*.
Switch Port	Port on a switch. Switch ports can be E_Ports, F_Ports, or FL_Ports.
SWL	Short wavelength fiber-optic cable. Based on 850 nm lasers supporting 1.0625 Gbps link speeds. Connectors are color-coded black. See also *LWL*.
Target	Storage device that receives communications from a server or workstation over a fibre channel network. See also *Initiator.*
Tenancy	The time from when a port wins arbitration in a loop until the same port returns to the monitoring state. Also referred to as loop tenancy.
Throughput	The rate of data flow achieved within a cable, link, or system. See also *Bandwidth*.
Topology	As applies to fibre channel, the structure of the fibre channel network and the resulting possible communication paths. There are three fibre channel topologies: point-to-point, fabric, and arbitrated loop.
Transfer State	A state in which a port can establish circuits with multiple ports without reentering the arbitration cycle for each circuit. This state can only be accessed by an L_Port in the Open state.
Translative mode	Mode in which public devices can communicate with private devices across fabric.Translates 8-bit to 24-bit addresses.
Transmission Character	A 10-bit character encoded according to the rules of the 8b/10b algorithm. See also *8b/10b encoding, Transmission word*.
Transmission Word	Group of four transmission characters, totaling 40 bits. Two types: data words and ordered sets. See also *Data word*, *Ordered set, Transmission character.*
Trap (SNMP)	Message sent by SNMP agent to inform SNMP management station of critical error. See also *SNMP.*
Tunneling	Technique for enabling source and destination hosts to communicate when on same type of network but connected by a different type of network.

U_Port	Universal Port. Switch port that can operate as G_Port, E_Port, F_Port, or FL_Port. A port is defined as a U_Port if not connected or if it has not assumed a specific function in the fabric.
UDP	User Datagram Protocol. A protocol that runs on top of IP and provides port multiplexing for higher layer protocols.
ULP	Upper Layer Protocol. Protocol that runs on top of fibre channel. Typical upper layer protocols: SCSI, IP, HIPPI, IPI.
ULP_TOV	Upper Level Timeout Value.The minimum time that a SCSI ULP process waits for SCSI status before initiating ULP recovery.
Unicast	Transmission of data from a single source to single destination. See also *Broadcast, Multicast*.
Web Tools	Product that provides a graphical interface for monitoring and managing individual switches or entire fabrics from standard workstations.
Well-known address	As applies to fibre channel, a logical address stored on the switch and defined by fibre channel standards as being assigned to a specific function.
WWN	World Wide Name. Identifier that is unique world-wide. Each entity in a fabric has a separate WWN.
Xmitted Close State	The state in which an L_Port cannot send messages, but can retransmit messages within the loop. A port in the XMITTED CLOSE state cannot attempt to arbitrate.
Zone	Set of hosts and devices attached to same fabric and having access permission, including RSCNs and user data, to each other. Entities inside a zone are not visible to entities outside the same zone, even if the outside entities are in another zone. Equivalent to network term “virtual LAN”.
Zone configuration	A specified set of zones. Enabling a zone configuration enables all zones in that configuration. See also *Defined configuration*, *Enabled configuration*.
Zoning	Product that allows partitioning of fabric into logical groupings of devices. See also *Zone*.