



IVR Topology

- [Information About IVR Without NAT or Autotopology, on page 1](#)
- [Guidelines for Manual IVR Topology, on page 2](#)
- [Default Settings, on page 3](#)
- [Configuring Manual Topology, on page 3](#)
- [Verifying IVR Configuration, on page 6](#)
- [Feature History, on page 7](#)

Information About IVR Without NAT or Autotopology

Before configuring an IVR SAN fabric without IVR in NAT mode or IVR auto topology mode, consider the following general guidelines:

- If you change an FSPF link cost, ensure that the FSPF path distance (the sum of the link costs on the path) of any IVR path is less than 30,000.
- IVR-enabled VSANs can be configured when an interop mode is enabled or disabled.

Domain ID Guidelines

Before configuring domain IDs, consider the following guidelines:

- Configure unique domain IDs across all VSANs and switches participating in IVR operations if you are not using IVR NAT. The following switches participate in IVR operations:
 - All edge switches in the edge VSANs (source and destination)
 - All switches in transit VSANs
- Minimize the number of switches that require a domain ID assignment. This ensures minimum traffic disruption.
- Minimize the coordination between interconnected VSANs when configuring the SAN for the first time as well as when you add each new switch.

You can configure domain IDs using one of two options:

- Configure the allowed-domains list so that the domains in different VSANs are non-overlapping on all participating switches and VSANs.

- Configure static, non-overlapping domains for each participating switch and VSAN.



Note In a configuration involving IVR without NAT, if one VSAN in the IVR topology is configured with static domain IDs, then the other VSANs (edge or transit) in the topology must be configured with static domain IDs.

Transit VSAN Guidelines

Before configuring transit VSANS, consider the following guidelines:

- Traffic between the edge VSANs only traverses through the shortest IVR path.
- Transit VSAN information is common to all IVR zone sets. Sometimes, a transit VSAN can also act as an edge VSAN in another IVR zone.

Besides defining the IVR zone membership, you can choose to specify a set of transit VSANs to provide connectivity between two edge VSANs:

- If two edge VSANs in an IVR zone overlap, then a transit VSAN is not required (though, not prohibited) to provide connectivity.
- If two edge VSANs in an IVR zone do not overlap, you may need one or more transit VSANs to provide connectivity. Two edge VSANs in an IVR zone will not overlap if IVR is not enabled on a switch that is a member of both the source and destination edge VSANs.

Border Switch Guidelines

Before configuring border switches, consider the following guidelines:

- Configure IVR only in the relevant border switches.
- Border switches require Cisco MDS SAN-OS Release 1.3(1) or later.
- A border switch must be a member of two or more VSANs.
- A border switch that facilitates IVR communications must be IVR enabled.
- IVR can also be enabled on additional border switches to provide redundant paths between active IVR zone members.
- The VSAN topology configuration must be updated before a border switch is added or removed.

Guidelines for Manual IVR Topology

You must create the IVR topology on every IVR-enabled switch in the fabric if you have not enabled IVR auto topology mode. To use IVR manual topology mode, follow the instructions in this section.

Consider the following guidelines when using IVR manual topology mode:

- You can configure a maximum of 128 IVR-enabled switches and 128 distinct VSANs in an IVR topology.

- If two VSANs in an IVR topology have the same VSAN ID and different AFIDs, they count as two VSANs for the 128-VSAN limit for IVR.
- The use of a single AFID does not allow for segmented VSANs in an inter-VSAN routing topology.

You will need to specify the IVR topology using the following information:

- The switch WWNs of the IVR-enabled switches.
- A minimum of two VSANs to which the IVR-enabled switch belongs.
- The AFID, which distinguishes two VSANs that are logically and physically separate, but have the same VSAN number. You can specify up to 64 AFIDs.

Default Settings

Parameters	Default
IVR feature	Disabled
IVR NAT	Disabled
IVR distribution	Disabled
IVR Autotopology	Disabled
IVR VSANs	Not added to virtual domains
QoS for IVR Zones	Low

Configuring Manual Topology

Manually Configuring an IVR Topology

You can manually add a switch or VSANs to an IVR topology.

Before you begin

Use the **show wwn switch** command to obtain the switch WWNs of the IVR-enabled switches.

SUMMARY STEPS

1. **ivr vsan-topology database**
2. **autonomous-fabric-id *f-id* switch *switch-id* vsan-ranges *range***
3. Repeat on all IVR-enabled switches or distribute with CFS.
4. **ivr vsan-topology activate**
5. (Optional) **show ivr vsan-topology**

DETAILED STEPS

	Command or Action	Purpose
Step 1	ivr vsan-topology database Example: switch(config)# ivr vsan-topology database switch(config-ivr-topology-db)#	Enters the VSAN topology database configuration mode for the IVR feature.
Step 2	autonomous-fabric-id <i>f-id</i> switch <i>switch-id</i> vsan-ranges <i>range</i> Example: switch(config-ivr-topology-db)# autonomous-fabric-id 1 switch 20:00:00:05:30:01:1b:b8 vsan-ranges 1-2,6	Configures the VSANS that participate in IVR for this switch.
Step 3	Repeat on all IVR-enabled switches or distribute with CFS.	Ensures all IVR-enabled switches have the updated IVR topology.
Step 4	ivr vsan-topology activate Example: switch(config)# ivr vsan-topology activate	Activates the IVR topology. Note Active IVR topologies cannot be deactivated. You can only switch to IVR auto topology mode.
Step 5	(Optional) show ivr vsan-topology Example:	switch(config)# show ivr vsan-topology Displays the IVR topology.

Example

In the following example output, VSAN 2 is the transit VSAN between VSANs 1, 5, and 6.

```
switch# show ivr vsan-topology
AFID  SWITCH WWN                Active   Cfg. VSANS
-----
  1  20:00:00:05:30:01:1b:c2 *  yes     yes  1-2
  1  20:02:00:44:22:00:4a:05  yes     yes  1-2,6
  1  20:02:00:44:22:00:4a:07  yes     yes  2-5
```

Total: 3 entries in active and configured IVR VSAN-Topology

Current Status: Inter-VSAN topology is ACTIVE
Last activation time: Mon Mar 24 07:19:53 2011

What to do next

Tip Transit VSANs are deduced based on your configuration. The IVR feature does not have an explicit transit-VSAN configuration.

Copying the Active Topology to the Configure Topology

You can edit a manually configured IVR topology; however, you cannot edit an active IVR topology.

SUMMARY STEPS

1. `ivr copy active-topology user-configured-topology`

DETAILED STEPS

	Command or Action	Purpose
Step 1	ivr copy active-topology user-configured-topology Example: <pre>switch# ivr copy active-topology user-configured-topology</pre>	Copies the active database to the configure database so that you can edit the topology.

Clearing the Manual Topology

SUMMARY STEPS

1. `no ivr vsan-topology database`

DETAILED STEPS

	Command or Action	Purpose
Step 1	no ivr vsan-topology database Example: <pre>switch(config)# no ivr vsan-topology database</pre>	Clears the manually added IVR topology.

Migrating from Autotopology to Manual Topology

If you want to migrate from IVR auto topology mode to IVR manual topology mode, copy the active IVR VSAN topology database to the user-configured IVR VSAN topology database before switching modes.

SUMMARY STEPS

1. `ivr copy auto-topology user-configured-topology`
2. `configure terminal`
3. `ivr vsan-topology activate`

DETAILED STEPS

	Command or Action	Purpose
Step 1	ivr copy auto-topology user-configured-topology Example:	Copies the automatic IVR topology database to the user-configured IVR topology.

	Command or Action	Purpose
	switch# ivr copy auto-topology user-configured-topology	
Step 2	configure terminal Example: switch# configure terminal switch(config)#	Enters configuration mode.
Step 3	ivr vsan-topology activate Example: switch(config)# ivr vsan-topology activate	Activates the IVR topology. Note Active IVR topologies cannot be deactivated. You can only switch to IVR auto topology mode.

This task disables IVR auto topology mode for the IVR topology database and enables IVR manual topology mode.

Verifying IVR Configuration

To display the IVR configuration, perform one of the following tasks:

Command	Purpose
show ivr	Displays the status for the IVR configuration.
show ivr diagnostics	Displays information about IVR diagnostics.
show ivr merge status	Displays information the last IVR merge event.
show ivr pending	Displays information about the IVR pending database.
show ivr pending-diff	Displays the differences between the pending database and the config database.
show ivr vsan-topology [active configured]	Displays the IVR VSAN topology.
show ivr session status	Displays information about IVR CFS session.
show ivr virtual-domains	Displays information about IVR virtual domains for all local VSANs.
show ivr zone	Displays information about IVR zones.

Command	Purpose
show ivr zoneset	Displays information about IVR zone sets.
show ivr service-group active	Displays information about the active service group.
show ivr service-group configured	Displays information about the configured service group.
show autonomous-fabric-id database	Displays information about the AFIDs.
show ivr virtual-fcdomain-add-status	Displays the status of the IVR virtual domain configuration.

Related Topics

[Information about IVR Zones and Zonesets](#)

[Configuring IVR Zones](#)

[Configuring IVR Zone Sets](#)

Feature History

Table 1: Feature History IVR

Feature Name	Releases	Feature Information
IVR	5.2(1)	This feature was introduced.

