



Inter-VSAN Routing

Inter-VSAN routing (IVR) facilitates the communication between a target and initiator in different VSANs, using IVR zones and IVR zone sets.

Cross VSAN communication is not permitted by default on a Cisco MDS 9000 switch. If there are two VSANs on a single switch, and one or more of the initiators in one VSAN needs to communicate with one or more of the targets in the other VSAN, IVR enables this communication.

This chapter describes how to configure IVR and includes the following sections:

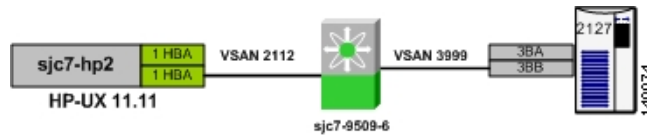
- [Configuring IVR on One Switch Between Two VSANs, page 6-2](#)
- [Configuring IVR Between Two Switches Using a Transit VSAN, page 6-9](#)
- [IVR with Brocade and McData Switches Using Interop Mode, page 6-17](#)

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Configuring IVR on One Switch Between Two VSANs

The following recipe provides the steps to configure IVR on a single switch. The example uses both VSANs 2112 and 3999. Before configuring IVR, you need to enable it. (See [Figure 6-1](#).)

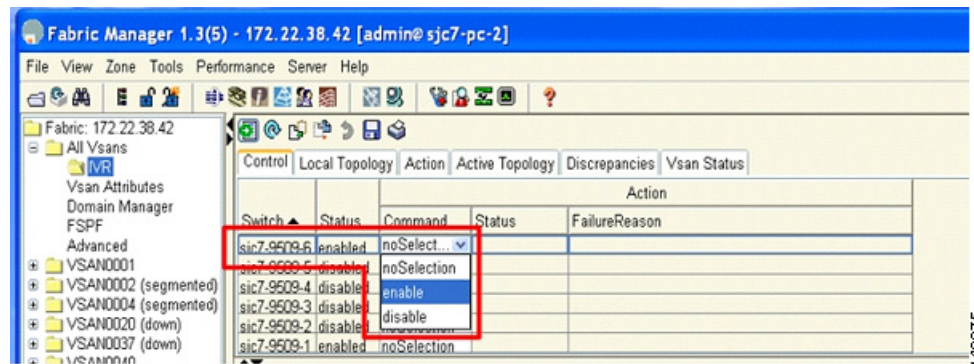
Figure 6-1 Single Switch IVR Topology



To configure IVR on one switch between two VSANs, follow these steps:

- Step 1** In Fabric Manager, choose **All Vsans > IVR** as shown in [Figure 6-2](#).

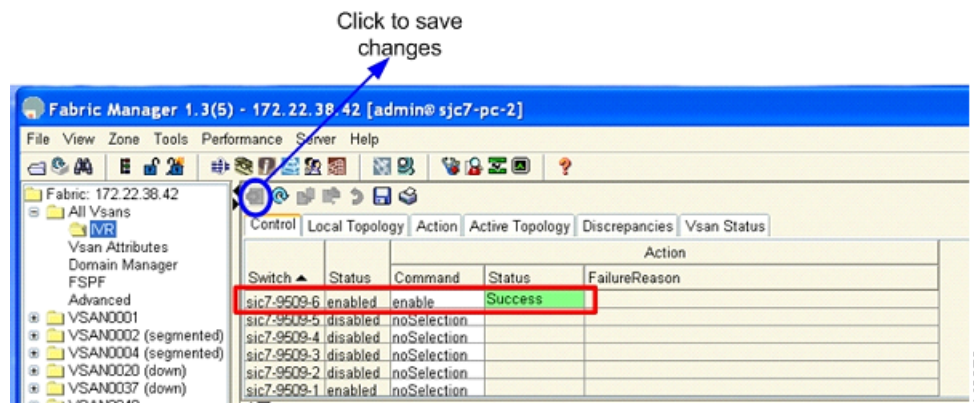
Figure 6-2 Enabling IVR on the Switch



- Step 2** Choose the switch where you want to enable IVR and then enable it.

- Step 3** Click the **Apply Changes** icon to save the changes as shown in [Figure 6-3](#).

Figure 6-3 IVR Enable Status on the Switch



Alternatively, you can enable IVR from the switch by using the **enable IVR** command.

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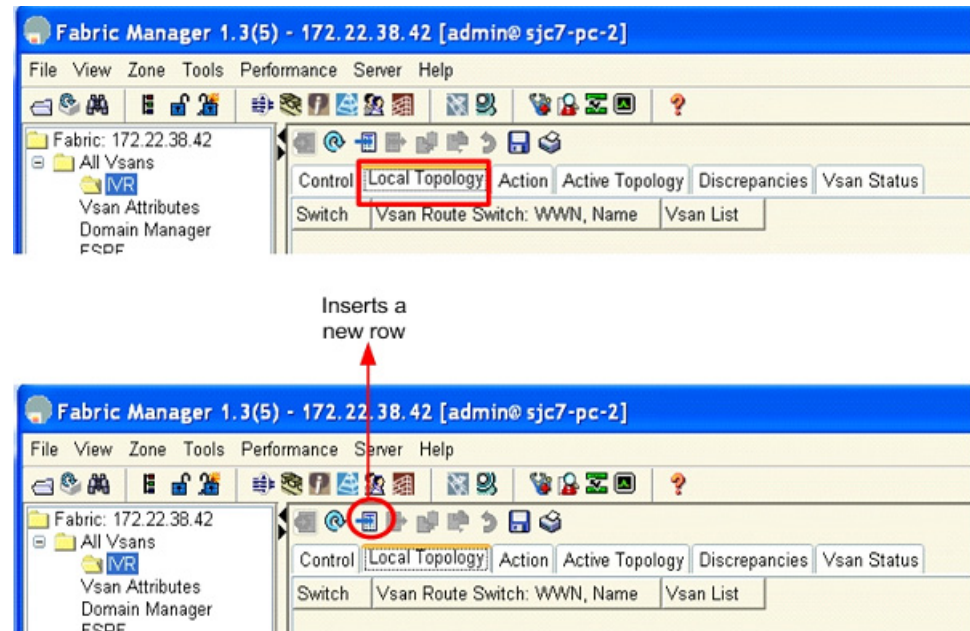
```

sjc7-9509-6# conf t
Enter configuration commands, one per line. End with CNTL/Z.
Sjc7-9509-6(config)# ivr enable
sjc7-9509-6(config)#^Z
sjc7-9509-6#

```

- Step 4** Choose the **Local Topology** tab in Fabric Manager to configure the local IVR topology.
- Step 5** Click the **Create Row** icon as shown in Figure 6-4. You see a window that lists all the switches that have IVR enabled in the topology.

Figure 6-4 Inserting IVR Topology

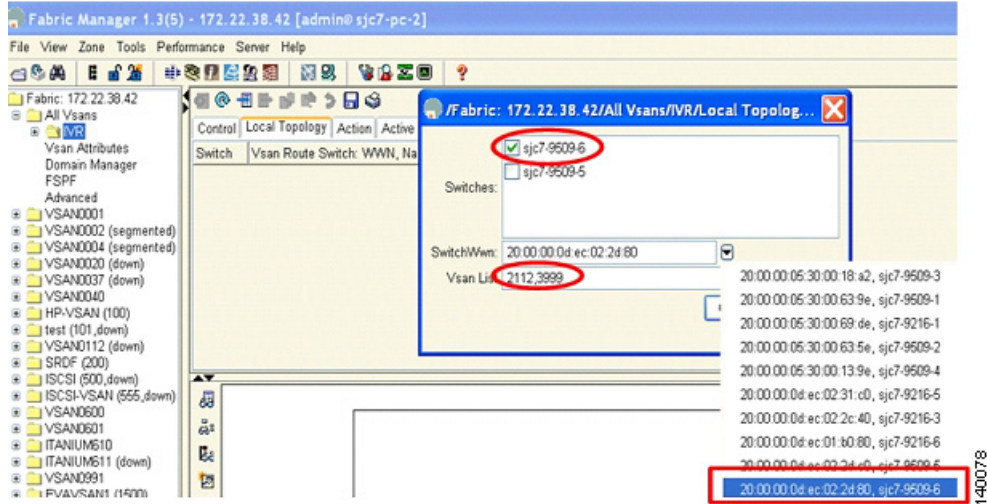


- Step 6** Click the **Switch WWN** tab.
- Step 7** Choose the switch WWN where you want to configure IVR.
- Step 8** Choose the VSANs to add to this IVR configuration.

Figure 6-5 shows the switch sjc7-9509-6 selected, its switch WWN, and the VSANs (2112 and 3999) involved in the IVR configuration.

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Figure 6-5 Adding Switch WWN and VSANs to Create the IVR Topology

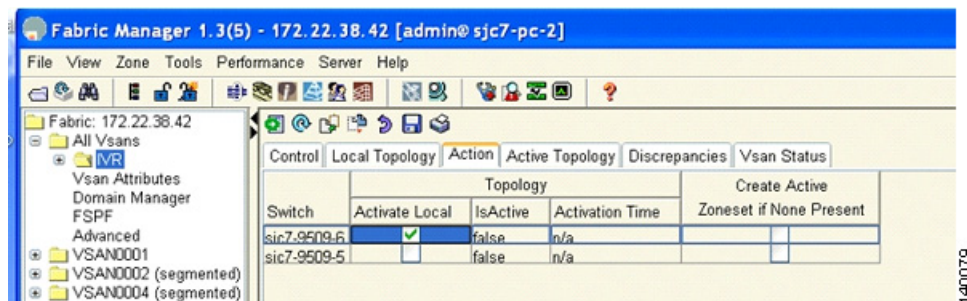


After making these selections, the configuration is updated. You now need to activate the IVR topology.

Step 9 Activate the created IVR topology by clicking the **Action** tab.

Step 10 Check **Activate Local** to activate the created IVR topology for the switch. (See Figure 6-6.)

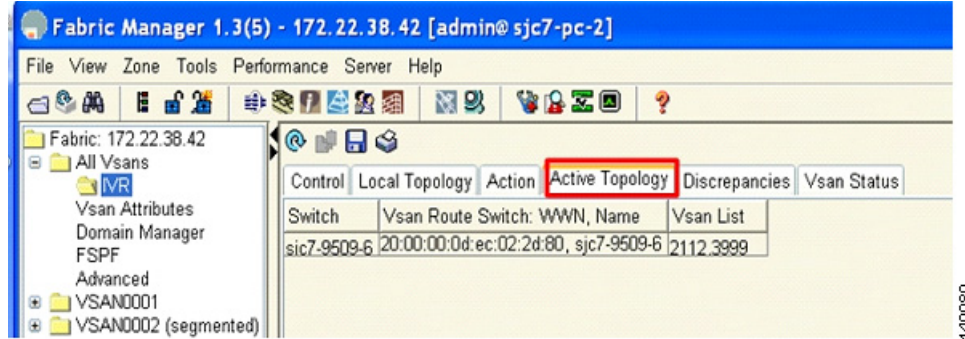
Figure 6-6 Activating IVR Topology



By selecting the **Active Topology** tab you can see the active topology. The **Discrepancies** tab shows the discrepancies, if any, that need to be fixed for IVR to function properly. Ideally the discrepancies tab should not have any entries. Figure 6-7 shows the **Active Topology** tab.

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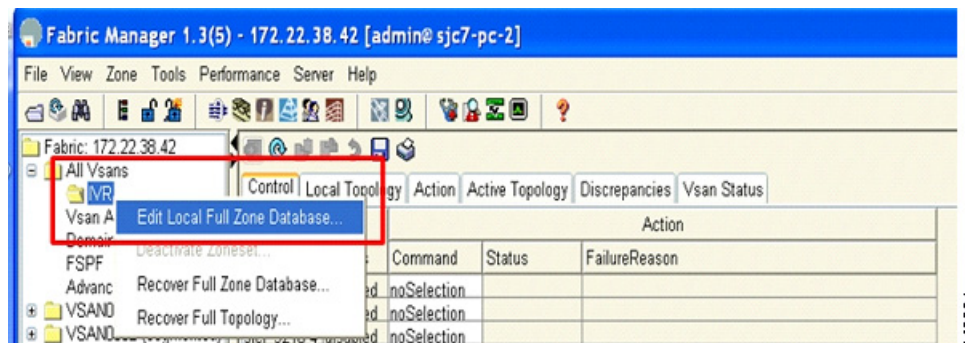
Figure 6-7 Active Topology Tab



The next step is to create an IVR zone set and zones so that the initiator and the target can communicate with each other.

- Step 11** Choose **IVR > Edit Local Full Zone Database** as shown in Figure 6-8. You see the Zone Creation window.

Figure 6-8 Edit the IVR Zone on the Switch

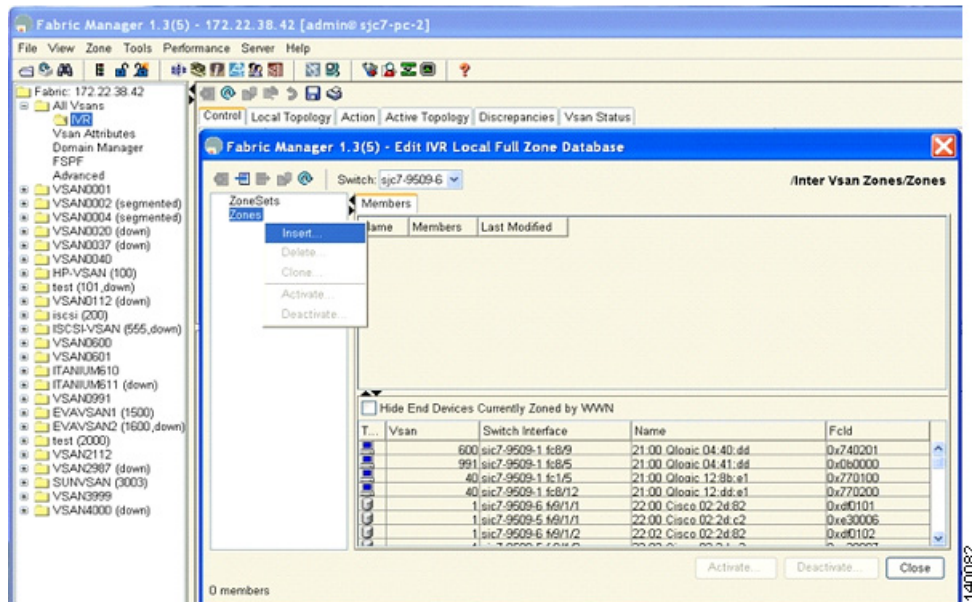


Your next step is to create a zone and assign the required members to the zone.

- Step 12** Right click **Zone** and choose **Insert** as shown in Figure 6-9. You see the IVR Zone Name dialog box.

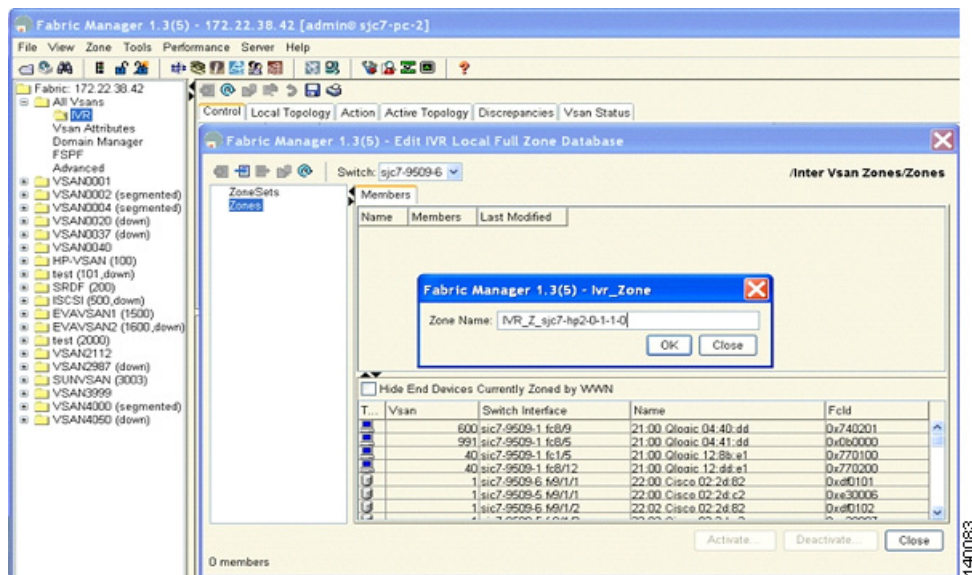
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Figure 6-9 Insert IVR Zones



Step 13 Enter a name for the zone, making sure you keep the prefix IVR at the beginning of the zone name. In this example, the name is IVR_Z_sjc7-hp2-0-1-1-0. (See Figure 6-10.)

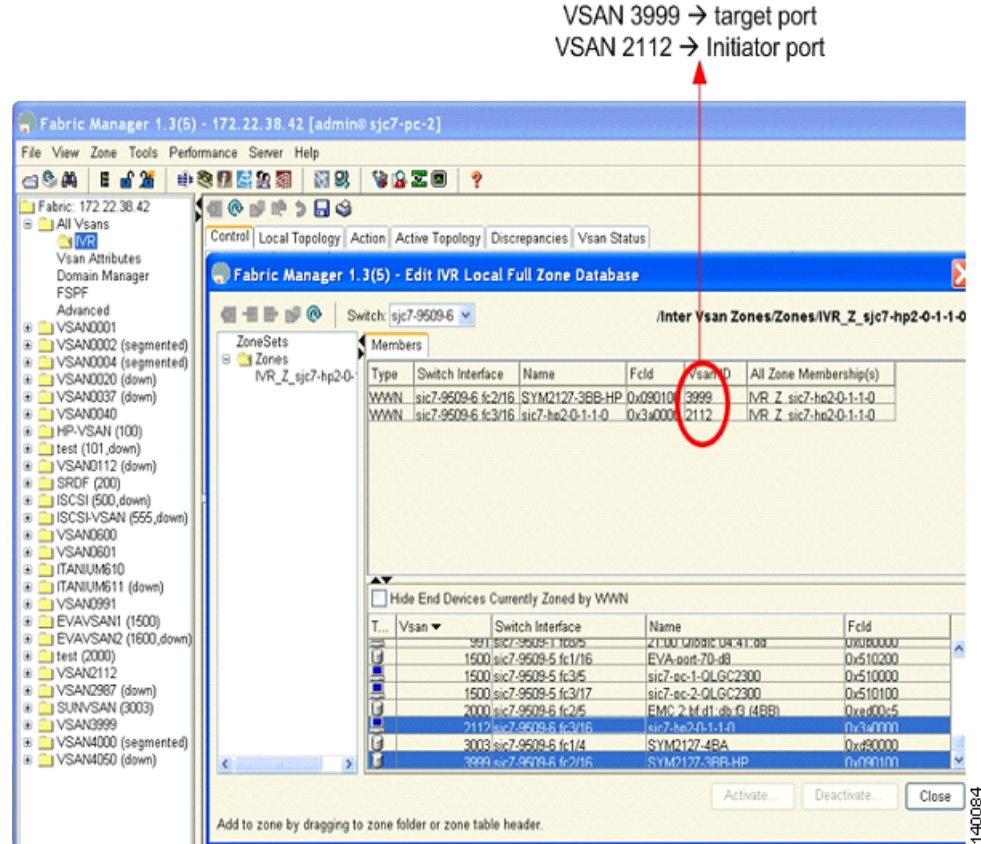
Figure 6-10 Naming an IVR Zone



Step 14 Add the member ports into zone IVR_Z_sjc7-hp2-0-1-1-0. The target port is in VSAN 3999 and the initiator port is in VSAN 2112. (See Figure 6-11.)

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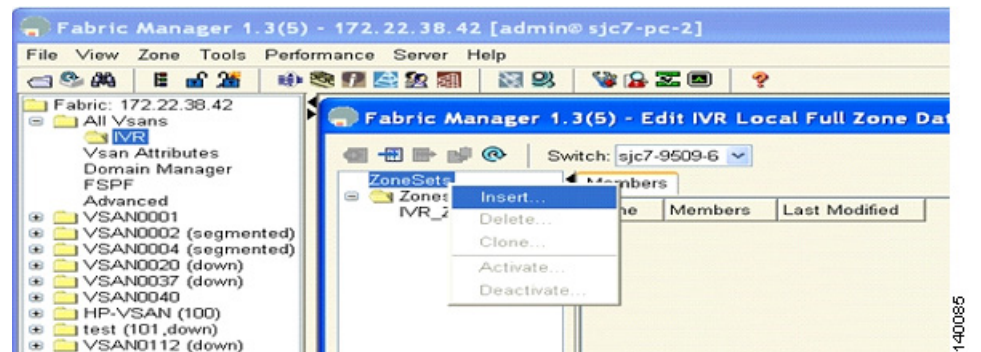
Figure 6-11 Members of the IVR Zone



The next step is to create a IVR zone set and add the above zone to the zone set.

- Step 15** In the **Edit IVR Local Full Database** window, choose **ZoneSets > Insert**. (See [Figure 6-12](#).)

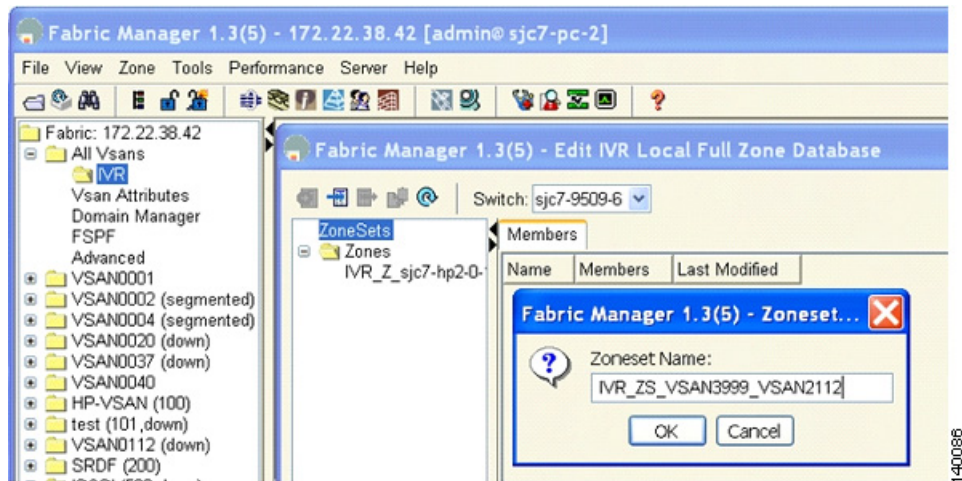
Figure 6-12 Inserting IVR Zone Sets



- Step 16** Name the zone set, making sure to retain the IVR prefix to designate it as an IVR zone set, as shown in [Figure 6-13](#).

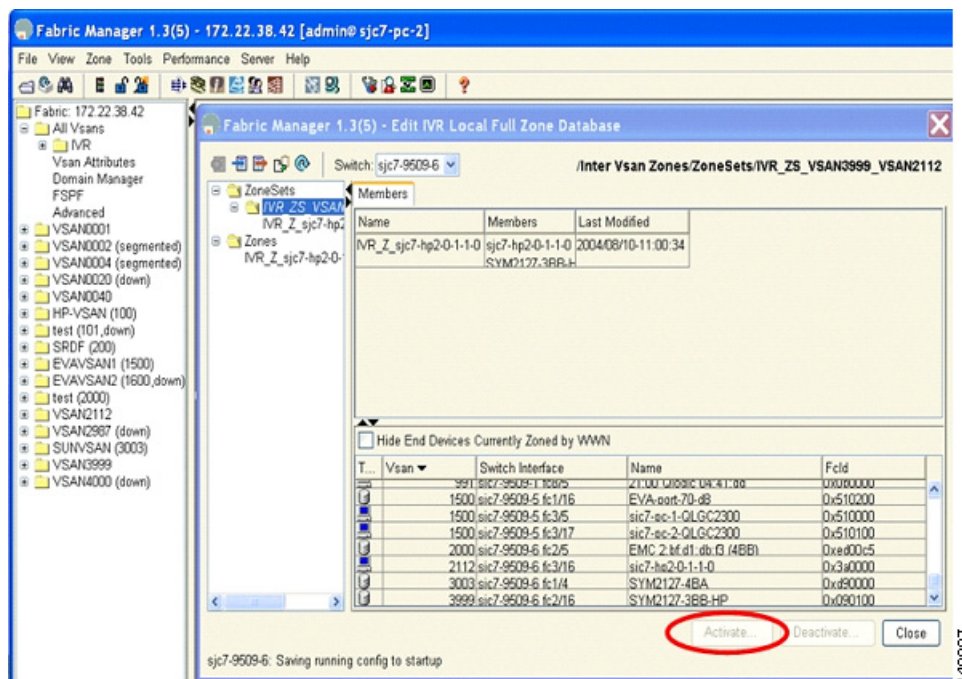
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Figure 6-13 Naming an IVR



Step 17 Activate the zone set by clicking **Activate**, as shown in Figure 6-14.

Figure 6-14 Activating an IVR



Step 18 Verify that the target and initiator can see each other by running the appropriate host commands to check that the host can see the LUNs through the target.

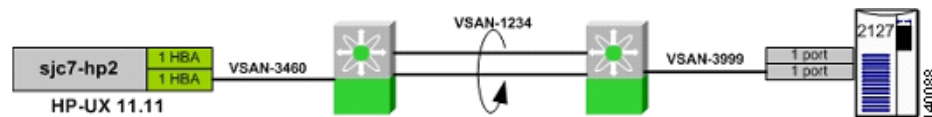
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Configuring IVR Between Two Switches Using a Transit VSAN

When two or more switches are involved in an IVR configuration, one or more transit VSANs may be required to support IVR.

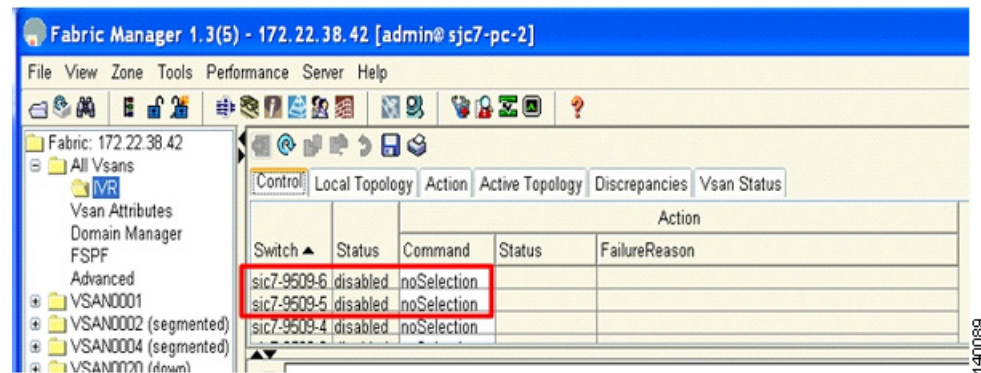
The following recipe uses switches sjc7-9509-6 and sjc7-9509-5. The target (storage) port is on switch sjc7-9509-6 in VSAN 3999 and the initiator is an HP-UX server on switch sjc7-9509-5 in VSAN 3460. VSAN 3999 is only available on switch sjc7-9509-6 and VSAN 3460 is only available on switch sjc7-9509-5. The transit VSAN used is 1234. The topology appears in [Figure 6-15](#).

Figure 6-15 IVR Topology with Two MDS Switches



As with any IVR configuration, the switches involved must have IVR enabled on them. In this case, switches sjc7-9509-5 and sjc7-9509-6 need to have IVR enabled. [Figure 6-16](#) shows that IVR is currently disabled on both switches

Figure 6-16 Switches with IVR Disabled



To configure IVR on two switches, follow these steps:

- Step 1** In Fabric Manager, choose **All VSANs > IVR**, as shown in [Figure 6-17](#).
- Step 2** From the **command** pull-down menu, choose **enable** to enable IVR for a given switch.

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Figure 6-17 Enabling IVR in sjc7-9509-6

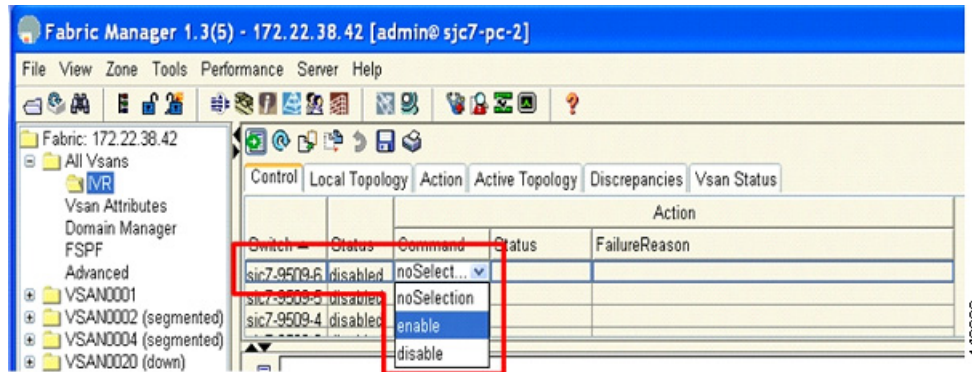
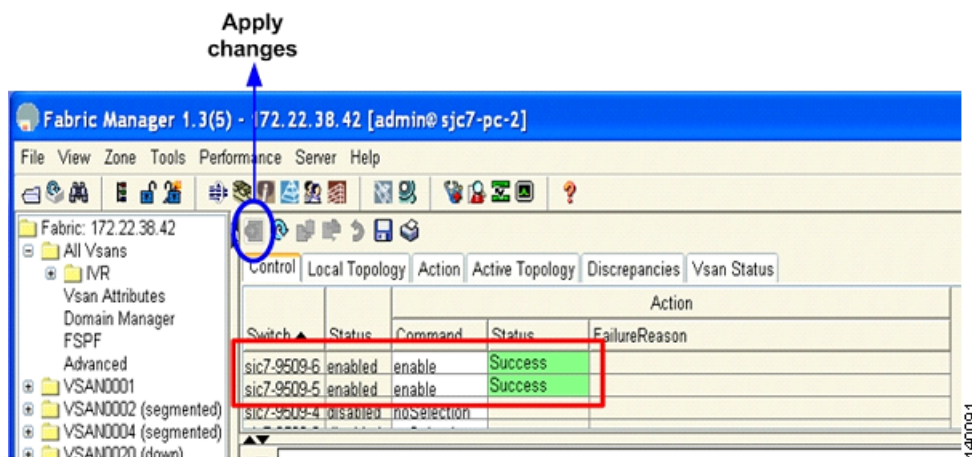


Figure 6-17 shows IVR being enabled for switch sjc7-9509-6. Follow the same procedure to enable IVR for switch sjc7-9509-5.

- Step 3** Click the **Apply Changes** icon to save the changes. (See Figure 6-18.)

Figure 6-18 Saving IVR Changes

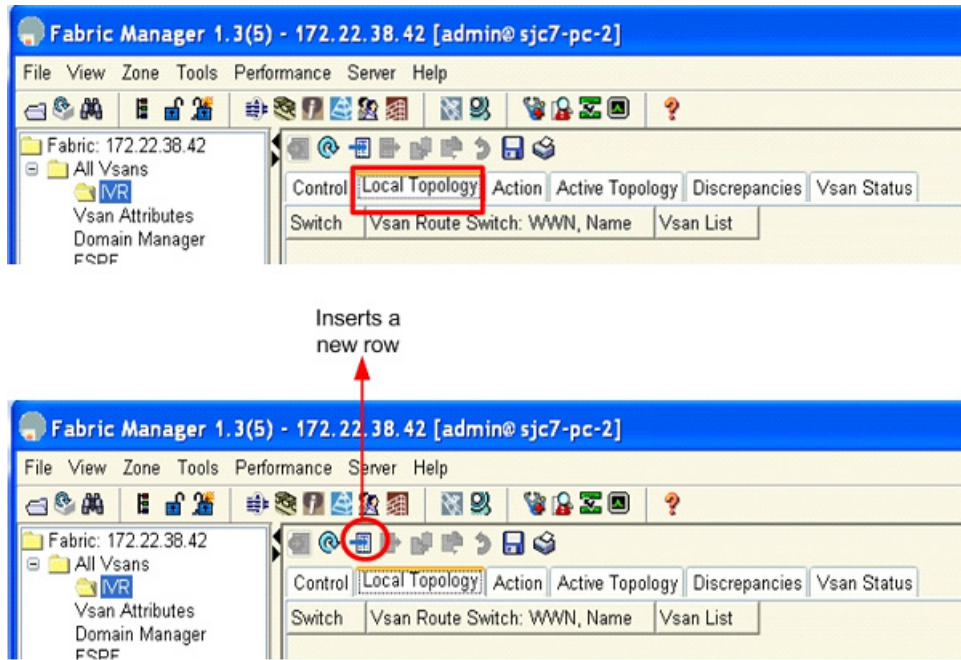


The next step is to create the IVR topology.

- Step 4** Click the **Local Topology** tab in Fabric Manager.
- Step 5** Click the **Create Row** icon, as shown in Figure 6-19. You see a window that lists all the switches that have IVR enabled in the topology

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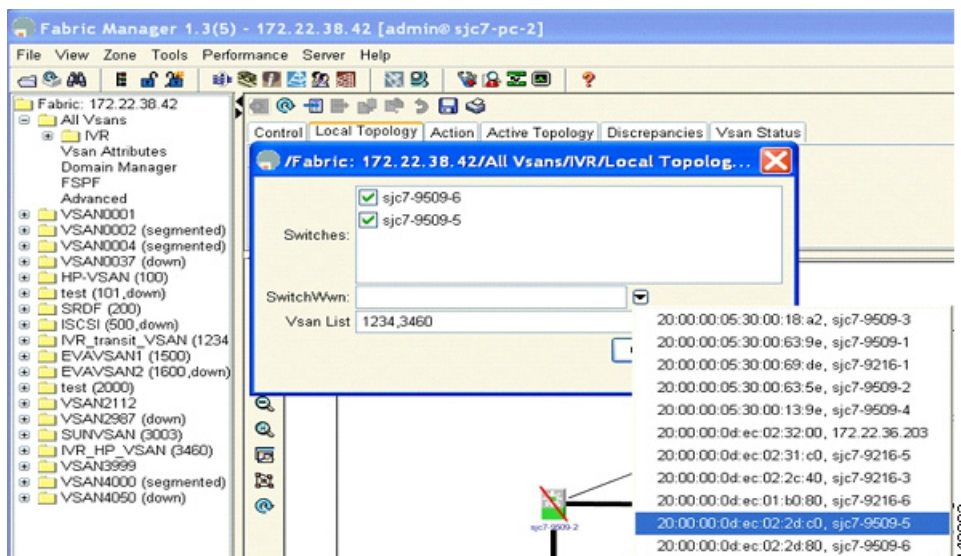
Figure 6-19 Create IVR Topology



- Step 6** Click the **Switch WWN** tab.
- Step 7** Choose the switch WWN where you want to configure IVR.

Figure 6-20 shows that the switches sjc7-9509-5 and sjc7-9509-6 are both selected in the Switches dialog box. In the Switch WWN dialog box, the WWN of switch sjc7-9509-5 is selected. In the VSAN list, the VSANs that need to be added to complete the IVR topology are shown. In this case it is VSAN 1234 (transit VSAN) and 3460 (host VSAN). This will create the first half of the topology required to make IVR work.

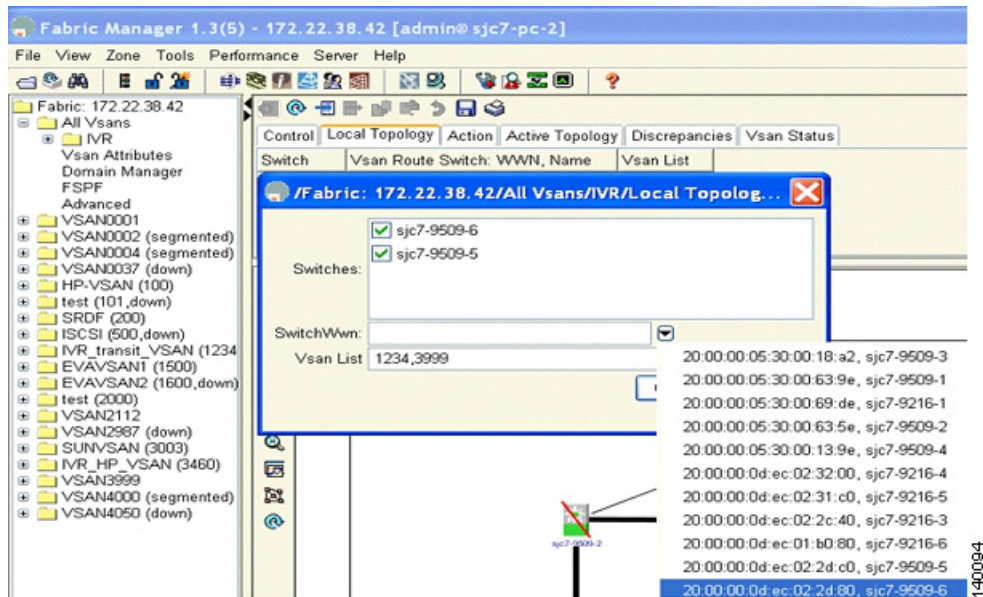
Figure 6-20 Phase One of the IVR Topology Configuration



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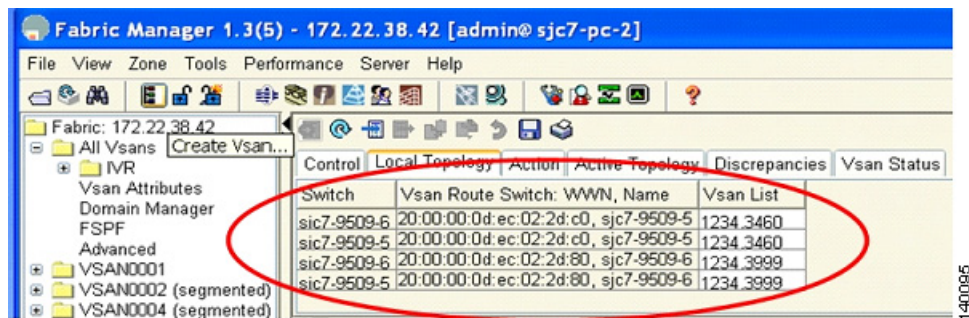
- Step 8** Add the VSANs on switch sjc7-9509-6 to the topology to enable IVR. This action adds both switches, the WWN of sjc7-9509-6 and VSANs 1234 (transit VSAN) and 3999 (storage VSAN) to the topology. [Figure 6-21](#) shows the second phase of the IVR topology configuration.

Figure 6-21 Phase Two of the IVR Topology Configuration



After the configuration, the local topology is shown in [Figure 6-22](#). As can be seen, both switches have knowledge of all the VSANs involved in the IVR configuration.

Figure 6-22 Configured IVR Local Topology

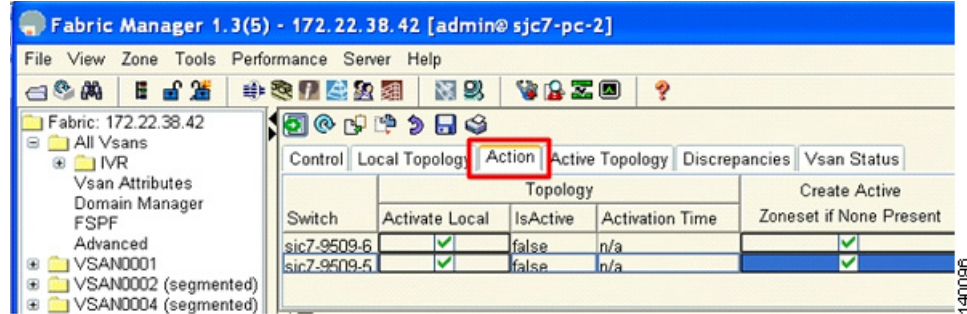


The next step is to activate the configured IVR topology.

- Step 9** In Fabric Manager, click the **Action** tab.
- Step 10** Check the **Create Active Zone Set if None Present** check boxes for both switches, as shown in [Figure 6-23](#).

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Figure 6-23 Activating IVR Topology



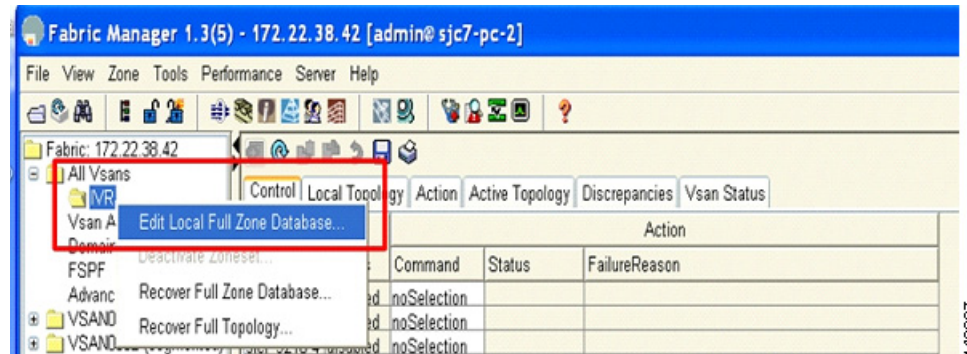
Tip

If any of the VSANs does not have an active zone set, then the IVR zone set activation will fail if the **Create Active Zone Set if None Present** check box is not checked.

The next step is to create a IVR zone set and zones so that the initiator and the target can communicate with each other.

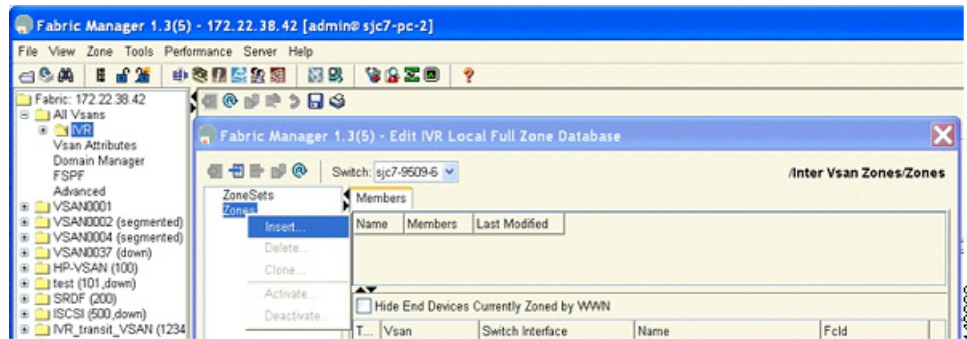
- Step 11** Choose **IVR > Edit Local Full Zone Database**. You can see the zone creation window. From this window, you can create a zone and add the required members to the zone. (See [Figure 6-24](#).)

Figure 6-24 Edit IVR Zone Set on the Switch



- Step 12** To add a zone, right click **Zone > Insert**. You can see the IVR zone name dialog box. (See [Figure 6-25](#).)

Figure 6-25 Insert IVR Zones

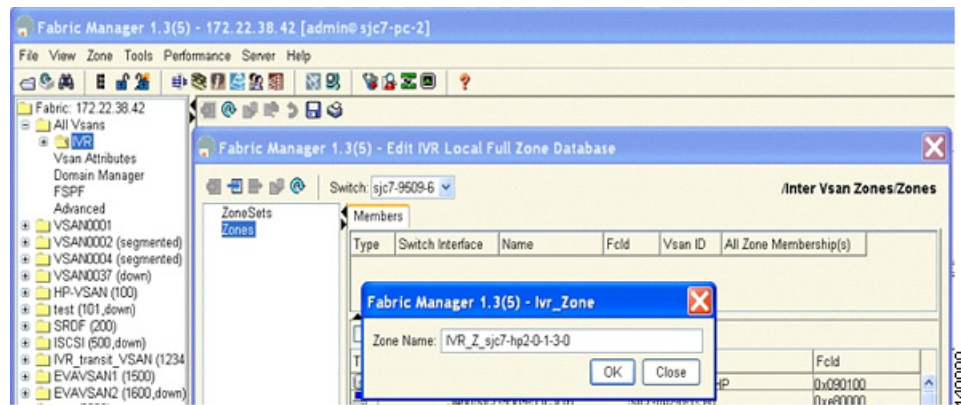


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The next step is to give the zone a name.

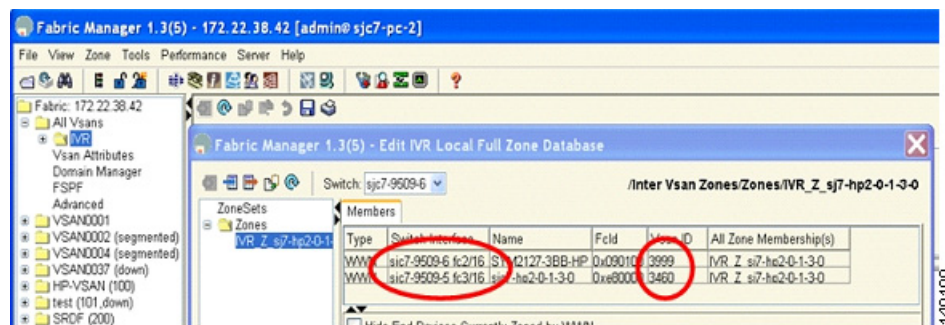
- Step 13** Enter the name IVR_Z_sjc7-hp2-0-1-3-0 for this IVR zone. The IVR prefix at the beginning of the name helps to identify the zone as an IVR zone. The name also contains the host name and the HBA hardware location of the system. (See Figure 6-26.)

Figure 6-26 Naming an IVR Zone



- Step 14** Add the initiator and the target to the zone. This action enables them to communicate with each other. (See Figure 6-27.)

Figure 6-27 Members of the IVR Zone

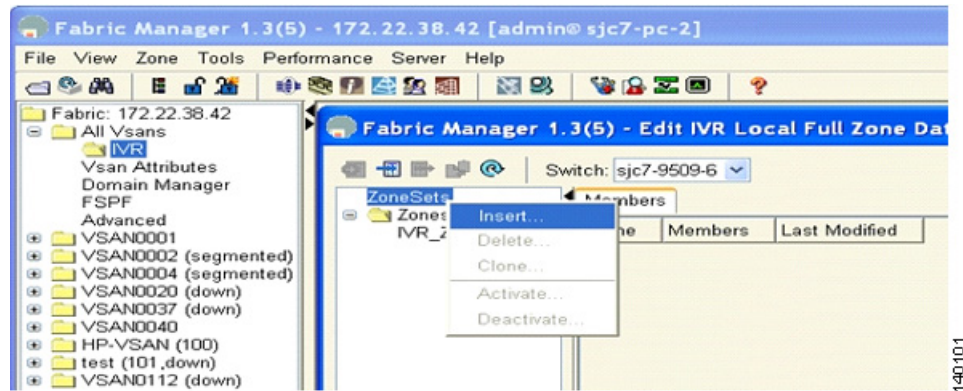


The next step is to create the IVR zone set and activate the zone set to complete the IVR configuration.

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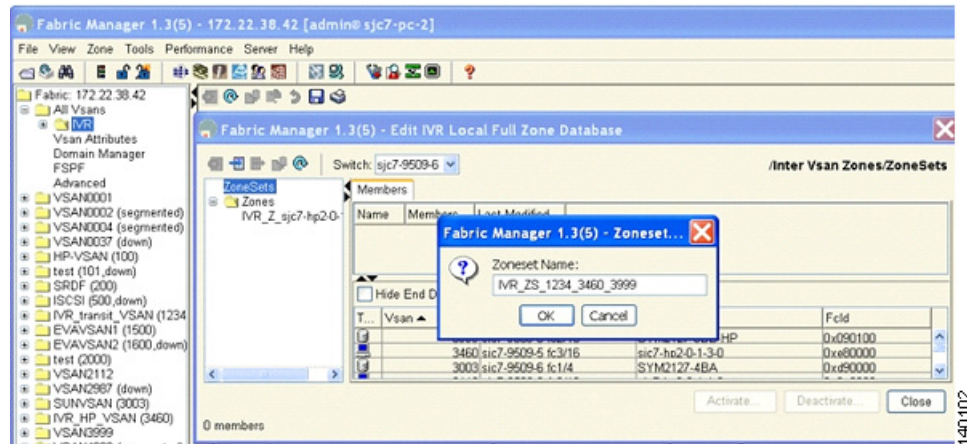
Step 15 In the Edit IVR Local Full Database window, choose **zone sets > Insert**. (See Figure 6-28.)

Figure 6-28 Inserting IVR Zone Sets



Step 16 Add the name IVR_ZS_1234_3460_3999 for the zone set. The name IVR classifies it as an IVR zone set and contains the VSAN number to show what VSANs are involved in the configuration. (See Figure 6-29.)

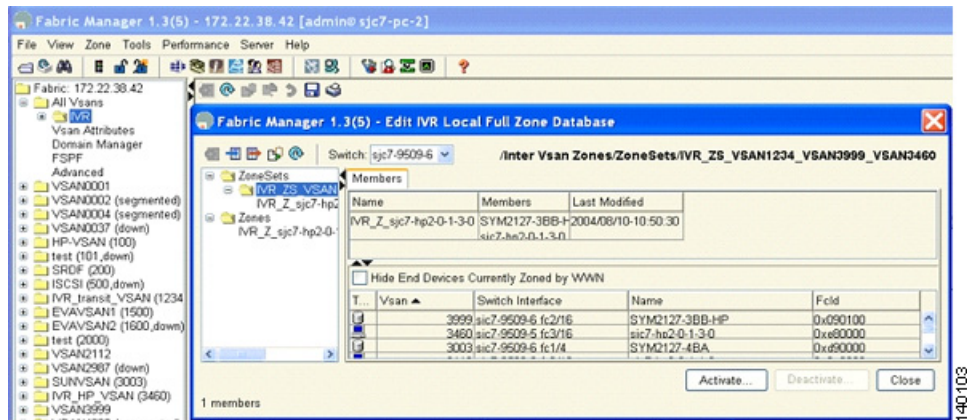
Figure 6-29 IVR Zone Set



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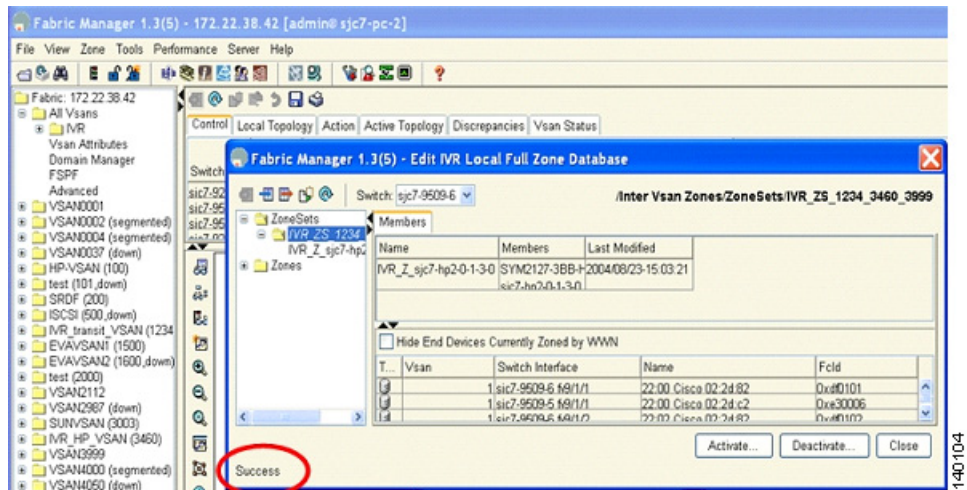
Step 17 Add the zone `IVR_Z_sjc7-hp2-0-1-3-0` to the zone set. (See [Figure 6-30](#).)

Figure 6-30 Adding an IVR Zone to an IVR Zone Set



Step 18 Activate the zone set by clicking **Activate**, as shown in [Figure 6-31](#).

Figure 6-31 Activating an IVR Zone Set



Step 19 Verify that the target and initiator can see each other by running the appropriate host commands to check that the host can see the LUNs from the target.

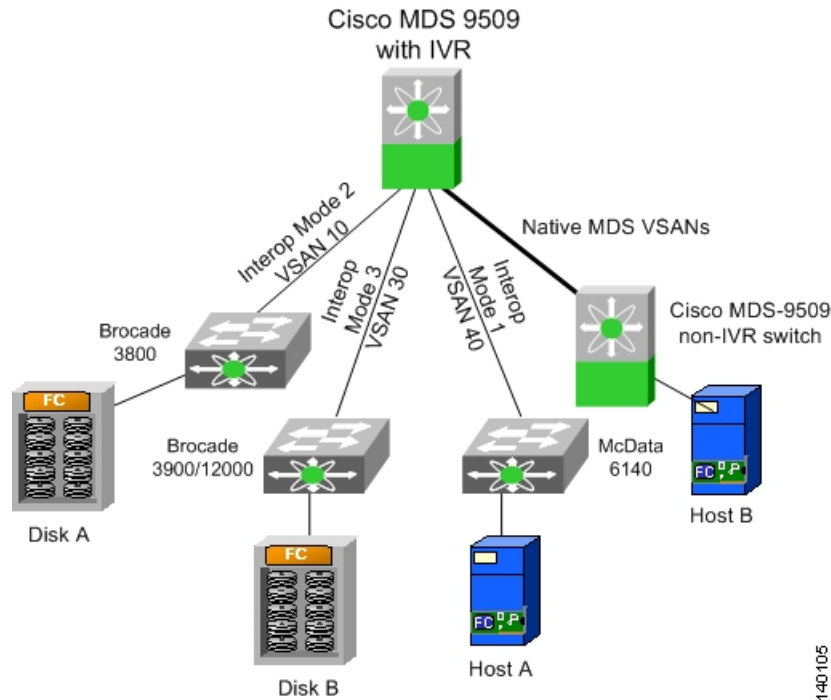
The two-switch IVR configuration is now complete.

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IVR with Brocade and McData Switches Using Interop Mode

The procedure to configure IVR in interop mode with third-party switches is the same as described in the preceding recipes. You can use IVR in conjunction with Brocade and McData switches. When a third-party switch is present in the topology, they can be located either in the transit VSAN or as an edge switch connecting to an MDS 9000 switch enabled for IVR. Third-party switches cannot be used as IVR gateways. [Figure 6-32](#) shows topologies such as these.

Figure 6-32 Sample IVR Topology with Interop Modes



For the third-party switches to function properly in an IVR configuration, they must be configured in a VSAN interop mode. IVR works with all three interop modes (1, 2, and 3). For more details on interoperability, refer to the *MDS Switch to Switch Interoperability Configuration Guide* located on http://www.cisco.com/en/US/partner/products/hw/ps4159/ps4358/products_mds_integration_list.html.

When a McData switch is present, the domain ID of the destination switch needs to be in the interop range. That is, the domain ID of the switch in a VSAN has to be between 97 and 127 for IVR to function properly. This means that a device on a McData switch cannot send a frame to a device in another VSAN, regardless of the interop mode, that is outside of the 97 to 127 domain ID range.

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