CHAPTER 3

Configuring the Cisco SRE Service Module Interfaces

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This chapter provides information about how to configure the Cisco SRE Service Module interfaces to run the Cisco SRE-V system software.

Cisco SRE Service Module Interfaces Overview

The host router and the Cisco SRE Service Module use several interfaces for internal and external communication. Use the Cisco IOS CLI commands to configure each of the interfaces on the router.

The Cisco SRE Service Module communicates with the host router through the following three interfaces:

- MGF interface
- Console interface
- External service module interface

See Table 3-1 for more information about the interfaces.

Table 3-1 Cisco SRE Service Module Interfaces

Interface	Purpose	Accessed from	Additional Information
MGF interface	Enables the Cisco SRE Service Module to communicate over a high-speed backplane switch.	Within the host router.	Provides an internal Layer 2 Gigabit Ethernet link between the router and the Cisco SRE Service Module. You configure the MGF interface through the Cisco IOS CLI. For more information about configuring MGF, see the "*Multi-Gigabit Fabric on the Router*" chapter in the *Cisco 3900 Series, 2900 Series, and 1900 Series Integrated Services Routers Software Configuration Guide*.
Console interface	Provides access to the VMware vSphere Hypervisor Direct Console User Interface (DCUI), for performing Cisco SRE-V configuration.	Within the host router.	Provides an internal Layer 3 Gigabit Ethernet link between the router and the Cisco SRE Service Module. You configure and manage the console interface through the Cisco IOS CLI.
External service module interface	Used by VMware vSphere Hypervisor or virtual machines as a primary interface or as a backup interface.	Primarily controlled and managed by the VMware vSphere Hypervisor.	Traffic does not go into the router unless the VMware vSphere Hypervisor is configured to forward the traffic into the router through the MGF interface or the console interface.

Prerequisites for Configuring the Cisco SRE Service Module Interfaces

Cisco Router Prerequisites

Ensure that your Cisco router is running the appropriate Cisco IOS software version and recognizes the Cisco SRE Service Module.

See the "Verifying the Router, Cisco SRE Service Module, and Cisco IOS Software Version Compatibility" section on page 2-1 and the "Verifying the Cisco SRE Service Module Installation" section on page 2-2.

Cisco SRE Service Module Prerequisites

Note In most cases, the routers are shipped with the Cisco SRE Service Module already installed in them.

Before configuring the interfaces, make sure that you have the following information for entering the Cisco SRE Service Module command environment:

- IP address of the Cisco router that contains the Cisco SRE Service Module.
- Username and password for logging into the router.
- Cisco SRE Service Module slot and port location in the host router:
  - *slot*—ID of the host router chassis slot in which the Cisco SRE Service Module resides. After you install the service module, you can obtain this information by using the Cisco IOS software CLI **show running-config** command.
  - *port*—ID of the Network Interface Card (NIC) on the Cisco SRE Service Module. The value is 0 for the console interface and 1 for the MGF interface.

Configuring the Cisco SRE Service Module Interfaces on the Router

Configure the internal interfaces between the Cisco SRE Service Module and the host router. This initial configuration allows you to access the service module to install and configure the Cisco SRE-V application.

Cisco SRE-V provides the following configuration options:

- MGF Layer 2 Switched Configuration—This configuration option provides faster performance and has no impact on the router CPU because the traffic goes through the EtherSwitch rather than the router. It supports all Layer 2 functions, such as broadcasting. You must purchase an EtherSwitch EHWIC or EtherSwitch Service Module to use this configuration option. See the "MGF Layer 2 Switched Configuration—Recommended" section on page 3-4.
- Cisco IOS Layer 3 Routed Configuration—Choose one of the following options:
  - Cisco IOS Layer 3 Routed Configuration with Devices in Different Subnets—Choose this configuration option if you want to add the VMware vSphere Hypervisor and the virtual servers in one branch subnet and the client PCs in another branch subnet. This configuration option does not require additional equipment; however, it has an impact on the router CPU. See the "Cisco IOS Layer 3 Routed Configuration—Devices in Different Branch Subnets" section on page 3-11.
  - Cisco IOS Layer 3 Routed Configuration with Devices in the Same Subnet—Choose this configuration option if you want to add the VMware vSphere Hypervisor and the virtual servers in the same branch subnet as the client PCs. This configuration option does not require additional equipment; however, it has an impact on the router CPU. This option is complex, and some of the Layer 2 functions, such as broadcasting, are not supported. See the "Cisco IOS Layer 3 Routed Configuration—Devices in the Same Branch Subnet" section on page 3-16.
- External Interface Configuration—This configuration option is simple to configure and low in cost, and has no impact on the router CPU. However, it requires extra cabling and an extra Gigabit Ethernet switchport on the external switch. In addition, you cannot use Cisco IOS features on the

VMware vSphere Hypervisor networks (for example, you cannot put a virtual machine into a DMZ), and you cannot take advantage of the hardware TCP/IP/UDP/iSCSI off load features that are available on the internal interfaces. See the "External Interface Configuration" section on page 3-22.

Note For the Cisco IOS **service-module** commands to take effect, make sure that the **Management Network** VMkernel port group is configured to use the vSwitch that has the PCIe interface as the uplink. We recommend that you do not change the default VMkernel port group name, which is Management Network.

MGF Layer 2 Switched Configuration—Recommended

Figure 3-1 shows the traffic flow in the MGF Layer 2 switched configuration. The MGF backplane switch connects the virtual network across multiple hypervisors and allows direct access to the LAN through Cisco EtherSwitch EHWICs or EtherSwitch Service Modules, without sending the traffic through the router CPU. For supported Cisco EtherSwitch EHWICs and EtherSwitch Service Modules, see Table 1-2.

Figure 3-1 Traffic Flow in the MGF Layer 2 Switched Configuration

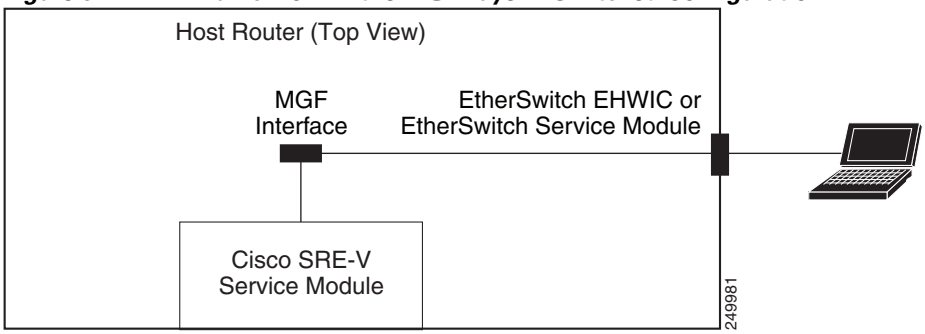
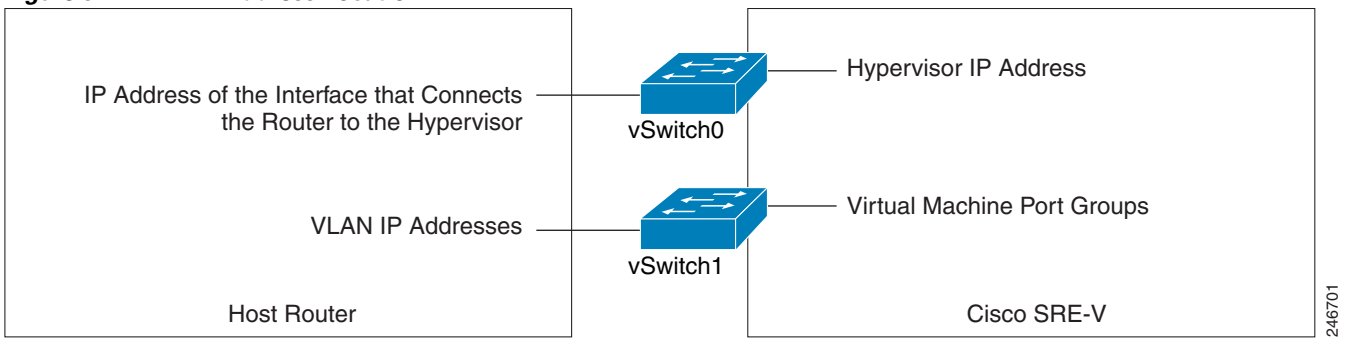


Figure 3-2 shows the location of the IP addresses.

To access the VMware vSphere Hypervisor through the ISR G2, you must provide two IP addresses: one IP address is of the interface that connects the router to the VMware vSphere Hypervisor and the other IP address is of the VMware vSphere Hypervisor.

The virtual machines are accessed through the MGF interface. The port groups on a vSwitch in the VMware vSphere Hypervisor can be assigned to corresponding VLAN interfaces in Cisco IOS. For example, port group 50 in the VMware vSphere Hypervisor can be assigned to VLAN 50 in Cisco IOS.

Figure 3-2 IP Address Location



SUMMARY STEPS

From the Host-Router CLI, enter:

1. **enable**
2. **configure terminal**

Configure *slot*/0 of the VMware vSphere Hypervisor

1. **interface sm** *slot*/**0**
2. **ip address** *router-to-hypervisor-interface-IP-address subnet-mask*
   or
   [ip unnumbered *type number*]
3. **service-module ip address** *hypervisor-ip-address subnet-mask*
4. **service-module ip default-gateway** *hypervisor-gateway-ip-address*
5. **no shut**
6. **exit**
7. **[ip route** *hypervisor-ip-address subnet-mask* **sm** *slot*/**0]**

Configure *slot*/1 of the VMware vSphere Hypervisor

1. **interface sm** *slot*/**1**
2. **switchport mode trunk**
3. **[switchport trunk allowed vlan** *vlan_numbers*]
4. **exit**

Configure VLANs

1. **configure terminal**
2. **interface vlan** *vlan_number*
3. **ip address** *vlan-ip-address subnet mask*
4. **no shut**
5. **end**

Save Configuration

1. **copy running-config startup-config**

2. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
	From the Host-Router CLI	
Step 1	**enable** *<password>* **Example:** `Router> enable` `Router> <password>` `Router#`	Enters privileged EXEC mode on the host router. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
	Configure *slot*/0 of the VMware vSphere Hypervisor	
Step 1	**interface sm** *slot*/**0** **Example:** `Router(config)# interface sm 1/0`	Enters interface configuration mode for the slot and port where the Cisco SRE Service Module resides.

	Command or Action	Purpose
Step 2	**ip address** *router-to-hypervisor-interface-IP-address subnet-mask* or **[ip unnumbered** *type number***]** **Example:** `Router(config-if)# ip address 10.0.0.100 255.255.255.0` or `Router(config-if)# ip unnumbered gigabitethernet 1/0`	Specifies the IP address of the interface that connects the router to the VMware vSphere Hypervisor. See Figure 3-2. • *router-to-hypervisor-interface-IP-address*—IP address of the interface that connects the router to the VMware vSphere Hypervisor. • *subnet-mask*—Subnet mask to append to the IP address. or (Optional) The **ip unnumbered** command enables IP processing on an interface without assigning an explicit IP address to that interface. • *type*—Type of interface on which the router has an assigned IP address. • *number*—Number of the interface on which the router has an assigned IP address. **Note** The unnumbered interface must be unique. It cannot be another unnumbered interface. ⚠ **Caution** The **ip unnumbered** command creates a point-to-point interface between devices. Broadcasting is not supported. **Note** If you use the **ip unnumbered** command, you must use the **ip route** *hypervisor-ip-address subnet-mask* **sm** *slot*/**0** command to create a static route. See Step 7.
Step 3	**service-module ip address** *hypervisor-ip-address subnet-mask* **Example:** `Router(config-if)# service-module ip address 10.0.0.1 255.255.255.0`	Specifies the IP address of the VMware vSphere Hypervisor. • *hypervisor-ip-address*—IP address of the VMware vSphere Hypervisor. See Figure 3-2. • *subnet-mask*—Subnet mask to append to the IP address; must be in the same subnet as the host router.
Step 4	**service-module ip default-gateway** *hypervisor-gateway-ip-address* **Example:** `Router(config-if)# service-module ip default-gateway 10.0.0.100`	Specifies the IP address of the default gateway for the VMware vSphere Hypervisor. • *hypervisor-gateway-ip-address*—IP address for the default gateway router.
Step 5	**no shut** **Example:** `Router(config-if)# no shut`	Causes the interface to be administratively up.

	Command or Action	Purpose
Step 6	**exit** **Example:** `Router(config)# exit`	Returns to global configuration mode on the host router.
Step 7	**[ip route** *hypervisor-ip-address subnet-mask* **sm** *slot*/**0]** **Example:** `Router(config)# ip route 10.0.0.1 255.255.255.255 SM1/0`	Creates a static route. If you used the **ip unnumbered** command in Step 2, you must use the **ip route** *hypervisor-ip-address subnet-mask* **sm** *slot*/**0** command to create a static route. • *hypervisor-ip-address subnet-mask*—IP address and subnet mask of the VMware vSphere Hypervisor. • *slot/0*—slot and port where the Cisco SRE Service Module resides.
	Configure *slot*/**1 of the VMware vSphere Hypervisor**	
Step 1	**interface sm** *slot*/**1** **Example:** `Router(config)# interface sm 1/1`	Enters interface configuration mode for the slot and port where the Cisco SRE Service Module resides.
Step 2	**switchport mode trunk** **Example:** `Router(config-if)# switchport mode trunk`	Puts the port into permanent trunking mode. The default configuration is access mode.
Step 3	**[switchport trunk allowed vlan** *vlan_numbers***]** **Example:** `Router(config-if)# switchport mode trunk` `Router(config-if)# switchport trunk allowed vlan 1-2,40,60,1002-1005`	(Optional) Allows trunking on the specified VLANs. • *vlan_numbers*—VLAN numbers on which you want to allow trunking.
Step 4	**exit** **Example:** `Router(config)# exit`	Returns to global configuration mode on the host router.
	Configure VLANs	
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
Step 2	**interface vlan** *vlan_number* **Example:** `Router(config)# interface vlan 40`	Enters VLAN configuration mode for the specified VLAN number.

	Command or Action	Purpose
Step 3	**ip address** *vlan-ip-address subnet-mask* **Example:** `Router(config-if)# ip address 40.0.0.100 255.255.255.0`	Specifies the IP address for the VLAN. • *vlan-ip-address*—IP address for the VLAN. • *subnet-mask*—Subnet mask to append to the IP address.
Step 4	**no shut** **Example:** `Router(config-if)# no shut`	Causes the interface to be administratively up.
Step 5	**end** **Example:** `Router(config)# end`	Returns to global configuration mode on the host router.
	Save Configuration	
Step 1	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`	Saves the new running configuration of the router as the startup configuration.
Step 2	**show running-config** **Example:** `Router# show running-config`	Displays the running configuration of the router so that you can verify the address configurations.

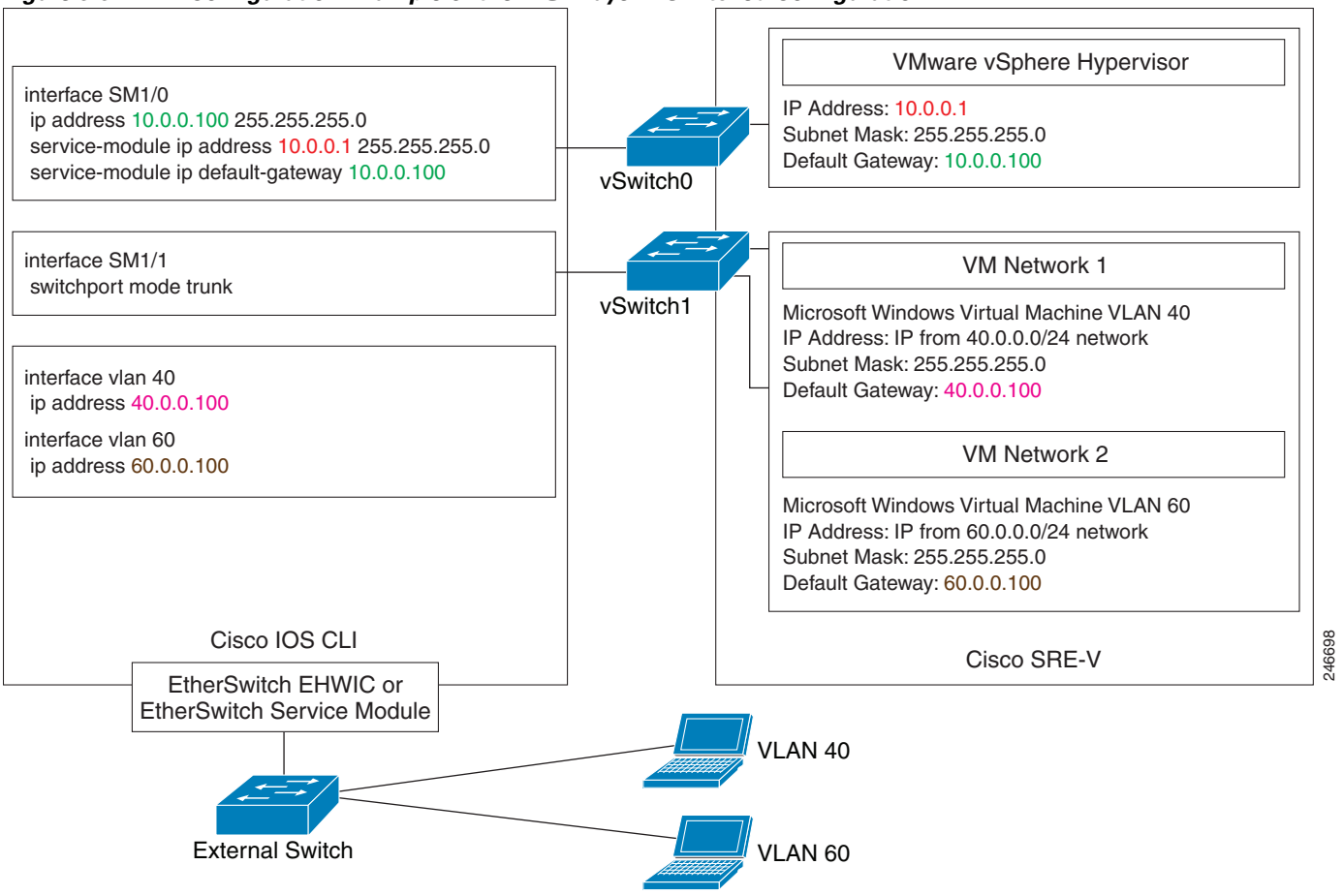
Example

Figure 3-3 shows an example of the MGF Layer 2 switched configuration.

- The left pane shows an example of the Cisco IOS commands that you configure in the sm 1/0, sm 1/1, and VLAN interfaces.
- The right pane shows that the configuration is applied to the VMware vSphere Hypervisor. The bottom area in the right pane shows the configuration for the Microsoft Windows Servers that are configured using the standard Microsoft Windows network configuration setup process. These Microsoft Windows Serves run as virtual machines.

Note The IP addresses in the configuration example are for reference only and might not be valid.

Figure 3-3 Configuration Example of the MGF Layer 2 Switched Configuration



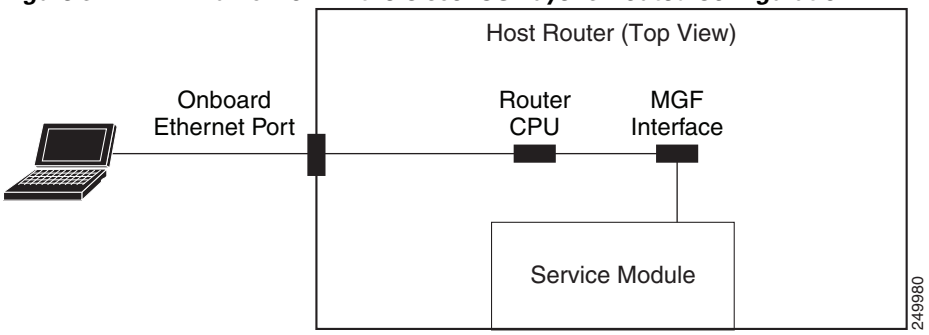
Related Topic

- Downloading the Cisco SRE-V Software, page 4-4

Cisco IOS Layer 3 Routed Configuration Options

Figure 3-4 shows the traffic flow in the Cisco IOS Layer 3 routed configuration. The MGF backplane switch forwards the traffic to the router CPU.

Figure 3-4 Traffic Flow in the Cisco IOS Layer 3 Routed Configuration



You can either add the VMware vSphere Hypervisor and the virtual servers in one branch subnet, and the client PCs in another branch subnet; or you can add all of the devices in the same branch subnet. Depending on which branch subnet you choose to add the devices, the configuration commands that you must use vary. See the following sections for the Cisco IOS Layer 3 routed configuration options:

- Cisco IOS Layer 3 Routed Configuration—Devices in Different Branch Subnets, page 3-11
- Cisco IOS Layer 3 Routed Configuration—Devices in the Same Branch Subnet, page 3-16

Cisco IOS Layer 3 Routed Configuration—Devices in Different Branch Subnets

Use this configuration option if you want to add the VMware vSphere Hypervisor and the virtual servers in one branch subnet; and the client PCs in another branch subnet.

When you assign a subnet to the VMware vSphere Hypervisor and to the virtual servers, that subnet is automatically added to the routing table as a directly connected route. As long as the client PCs are on a subnet that is reachable from the router, no additional routing configuration is necessary. Typically, the client PCs are on a subnet of the onboard Ethernet interface, which is also automatically added to the routing table as a directly connected route. Therefore, the router sends traffic between the subnet of the VMware vSphere Hypervisorand the virtual server, and the subnet of the client PCs without any static route or routing protocol configuration.

SUMMARY STEPS

From the Host-Router CLI, enter:

1. **enable**
2. **configure terminal**

Configure *slot*/0 of the VMware vSphere Hypervisor

1. **interface sm** *slot*/**0**
2. **ip address** *router-to-hypervisor-interface-IP-address subnet-mask*
3. **service-module ip address** *hypervisor-ip-address subnet-mask*
4. **service-module ip default-gateway** *hypervisor-gateway-ip-address*
5. **no shut**
6. **exit**

Configure *slot*/1 of the VMware vSphere Hypervisor

1. **interface sm** *slot*/**1**

2. **switchport mode trunk**
3. **[switchport trunk allowed vlan** *vlan_numbers***]**
4. **exit**

Configure VLANs

1. **configure terminal**
2. **interface vlan** *vlan_number*
3. **ip address** *vlan-ip-address subnet mask*
4. **no shut**
5. **exit**

Configure Gigabit Ethernet *slot/port*

1. **interface gigabitethernet** *slot/port sub-interface*
2. **ip address** *branch-VLAN-ip-address subnet-mask*
3. **encapsulation dot1q** *vlan-id*
4. **exit**

Save Configuration

1. **copy running-config startup-config**
2. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
	From the Host-Router CLI	
Step 1	**enable** *<password>* **Example:** `Router> enable` `Router> <password>` `Router#`	Enters privileged EXEC mode on the host router. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
	Configure *slot*/0 of the VMware vSphere Hypervisor	
Step 1	**interface sm** *slot*/0 **Example:** `Router(config)# interface sm 1/0`	Enters interface configuration mode for the slot and port where the Cisco SRE Service Module resides.

	Command or Action	Purpose
Step 2	**ip address** *router-to-hypervisor-interface-IP-address subnet-mask* **Example:** `Router(config-if)# ip address 10.0.0.100 255.255.255.0`	Specifies the IP address of the interface that connects the router to the VMware vSphere Hypervisor. See Figure 3-2. • *router-to-hypervisor-interface-IP-address*—IP address of the interface that connects the router to the VMware vSphere Hypervisor. • *subnet-mask*—Subnet mask to append to the IP address.
Step 3	**service-module ip address** *hypervisor-ip-address subnet-mask* **Example:** `Router(config-if)# service-module ip address 10.0.0.1 255.255.255.0`	Specifies the IP address of the VMware vSphere Hypervisor. • *hypervisor-ip-address*—IP address of the VMware vSphere Hypervisor. See Figure 3-2. • *subnet-mask*—Subnet mask to append to the IP address; must be in the same subnet as the host router.
Step 4	**service-module ip default-gateway** *hypervisor-gateway-ip-address* **Example:** `Router(config-if)# service-module ip default-gateway 10.0.0.100`	Specifies the IP address of the default gateway for the VMware vSphere Hypervisor. • *hypervisor-gateway-ip-address*—IP address for the default gateway router.
Step 5	**no shut** **Example:** `Router(config-if)# no shut`	Causes the interface to be administratively up.
Step 6	**exit** **Example:** `Router(config)# exit`	Returns to global configuration mode on the host router.
	Configure *slot*/**1 of the VMware vSphere Hypervisor**	
Step 1	**interface sm** *slot*/**1** **Example:** `Router(config)# interface sm 1/1`	Enters interface configuration mode for the slot and port where the Cisco SRE Service Module resides.
Step 2	**switchport mode trunk** **Example:** `Router(config-if)# switchport mode trunk`	Puts the port into permanent trunking mode. The default configuration is access mode. Access mode works with native VLAN, which is VLAN 1 for the Cisco SRE Service Modules.
Step 3	**[switchport trunk allowed vlan** *vlan_numbers***]** **Example:** `Router(config-if)# switchport mode trunk` `Router(config-if)# switchport trunk allowed vlan 1-2,40,60,1002-1005`	(Optional) Allows trunking on the specified VLANs. • *vlan_numbers*—VLAN numbers on which you want to allow trunking.

	Command or Action	Purpose
Step 4	**exit** **Example:** `Router(config)# exit`	Returns to global configuration mode on the host router.
	Configure VLANs	
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
Step 2	**interface vlan** *vlan_number* **Example:** `Router(config)# interface vlan 40`	Enters VLAN configuration mode for the specified VLAN number.
Step 3	**ip address** *vlan-ip-address subnet-mask* **Example:** `Router(config-if)# ip address 40.0.0.100 255.255.255.0`	Specifies the IP address for the VLAN. • *vlan-ip-address*—IP address for the VLAN. • *subnet-mask*—Subnet mask to append to the IP address.
Step 4	**no shut** **Example:** `Router(config-if)# no shut`	Causes the interface to be administratively up.
Step 5	**exit** **Example:** `Router(config)# exit`	Returns to global configuration mode on the host router.
	Configure Gigabit Ethernet *slot/port*	
Step 1	**interface gigabitethernet** *slot/port sub-interface* **Example:** `Router(config)# interface gigabitethernet 0/1.120`	Enters Gigabit Ethernet configuration mode for the specified sub interface. • *slot/port*—Position of the Gigabit Ethernet interface in the router chassis. • *sub-interface*—Number of the Gigabit Ethernet interface on which the router has an assigned IP address.
Step 2	**ip address** *branch-VLAN-ip-address subnet-mask* **Example:** `Router(config-if)# ip address 80.80.120.1 255.255.255.0`	Configures the IP address for the specific branch VLAN. • *branch-VLAN-ip-address*—IP address for the specific branch VLAN. • *subnet-mask*—Subnet mask to append to the IP address.
Step 3	**encapsulation dot1q** *vlan-id* **Example:** `Router(config-if)# encapsulation dot1q 120`	Enables IEEE 802.1Q encapsulation of traffic on the specified subinterface in VLANs. • *vlan-id*—Virtual LAN identifier. The allowed range is from 1 to 1000.

	Command or Action	Purpose
Step 4	**exit**	Exits interface mode.
	Save Configuration	
Step 1	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`	Saves the new running configuration of the router as the startup configuration.
Step 2	**show running-config** **Example:** `Router# show running-config`	Displays the running configuration of the router so that you can verify the address configurations.

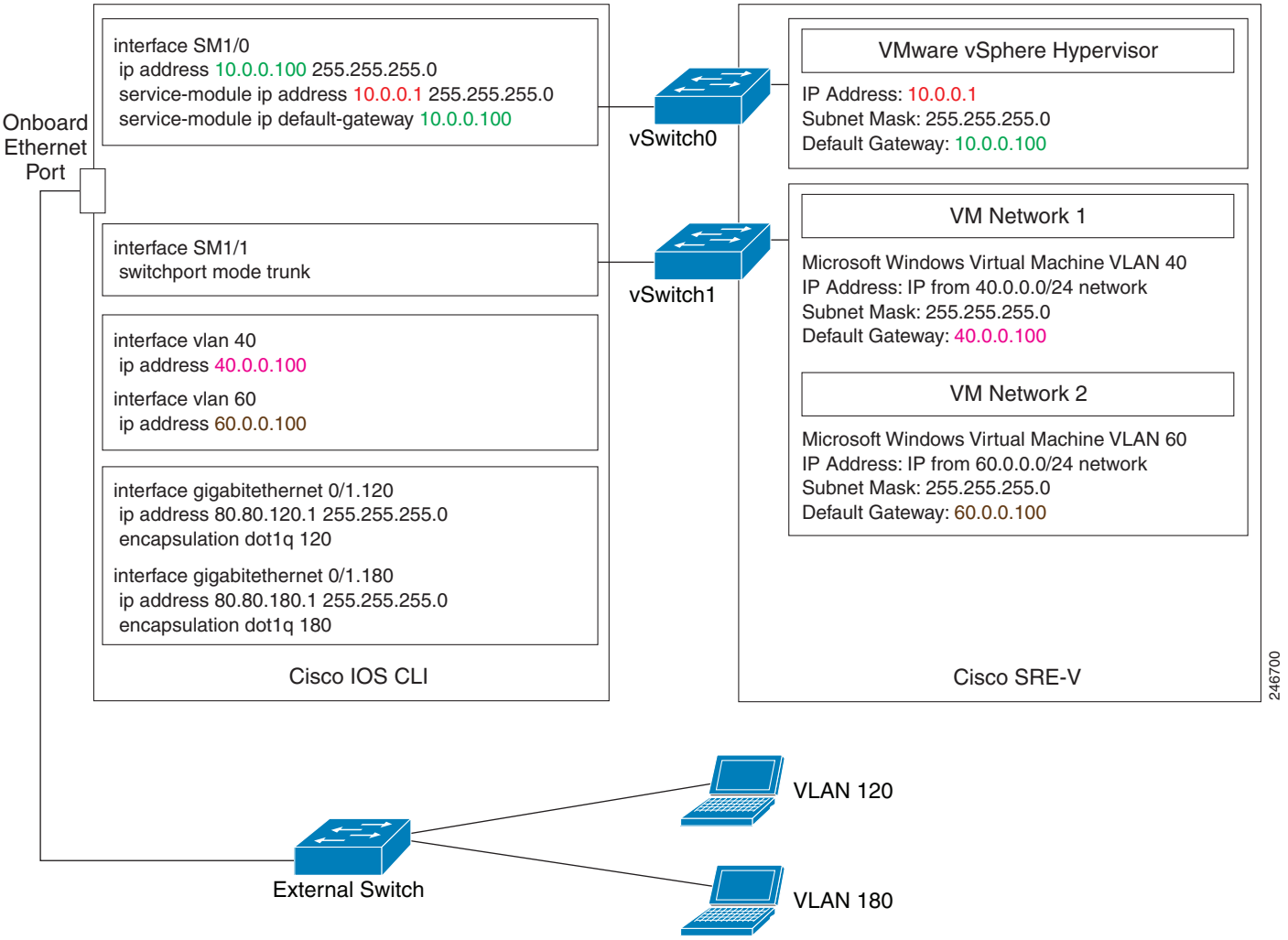
Example

shows an example of the Cisco IOS Layer 3 routed configuration in which the VMware vSphere Hypervisor and the virtual servers are in one branch subnet; and the client PCs are in another branch subnet.

- The left pane shows an example of the Cisco IOS commands that you configure in the sm 1/0, sm 1/1, and VLAN interfaces.
- The right pane shows that the configuration is applied to the VMware vSphere Hypervisor. The bottom area in the right pane shows the configuration for the Microsoft Windows Servers that are configured using the standard Microsoft Windows network configuration setup process. These Microsoft Windows Serves run as virtual machines.

Note The IP addresses in the configuration example are for reference only and might not be valid.

Cisco IOS Layer 3 Routed Configuration—Devices in Different Subnets



Related Topics

- Downloading the Cisco SRE-V Software, page 4-4

Cisco IOS Layer 3 Routed Configuration—Devices in the Same Branch Subnet

Use this configuration option if you want to add the VMware vSphere Hypervisor and the virtual servers in the same branch subnet as the client PCs.

Use the **ip unnumbered** interface configuration to place the VMware vSphere Hypervisor and the virtual servers on the same subnet as the client PCs. Because the **ip unnumbered** interface configuration creates two interfaces with the same subnet in Cisco IOS, you must also configure static routes for the VMware vSphere Hypervisor and the virtual servers.

SUMMARY STEPS

From the Host-Router CLI, enter:

1. **enable**
2. **configure terminal**

Configure *slot*/0 of the VMware vSphere Hypervisor

1. **interface sm** *slot*/**0**
2. **ip unnumbered gigabitethernet** *slot/port sub-interface*
3. **service-module ip address** *hypervisor-ip-address subnet-mask*
4. **service-module ip default-gateway** *hypervisor-gateway-ip-address*
5. **exit**

Configure *slot*/1 of the VMware vSphere Hypervisor

1. **interface sm** *slot*/**1**
2. **switchport mode trunk**
3. [**switchport trunk allowed vlan** *vlan_numbers*]
4. **exit**

Configure VLANs

1. **configure terminal**
2. **interface vlan** *vlan_number*
3. **ip unnumbered gigabitethernet** *slot/port sub-interface*
4. **exit**

Configure GE *slot/port*

1. **interface gigabitethernet** *slot/port sub-interface*
2. **ip address** *branch-VLAN-ip-address subnet-mask*
3. **encapsulation dot1q** *vlan-id*
4. **exit**
5. **ip route** *virtual-machine-ip-address subnet-mask* **vlan** *vlan_number*
6. **ip route** *hypervisor-ip-address subnet-mask* **sm** *slot*/**0**
7. **exit**

Save Configuration

1. **copy running-config startup-config**
2. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
	From the Host-Router CLI	
Step 1	**enable** *<password>* **Example:** `Router> enable` `Router> <password>` `Router#`	Enters privileged EXEC mode on the host router. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
	Configure *slot*/0 of the VMware vSphere Hypervisor	
Step 1	**interface sm** *slot*/0 **Example:** `Router(config)# interface sm 1/0`	Enters interface configuration mode for the slot and port where the Cisco SRE Service Module resides.
Step 2	**ip unnumbered gigabitethernet** *slot/port sub-interface* **Example:** `Router(config-if)# ip unnumbered gigabitethernet 0/0.1`	Enables IP processing on an interface without assigning an explicit IP address to that interface. The traffic is forwarded to and from a Gigabit Ethernet sub-interface. • *slot/port*—Position of the Gigabit Ethernet interface in the router chassis. • *sub-interface*—Number of the Gigabit Ethernet sub-interface on which the router has an assigned IP address. **Note** The unnumbered interface must be unique. It cannot be another unnumbered interface. ⚠ **Caution** The **ip unnumbered** command creates a point-to-point interface between devices. Broadcasting is not supported.
Step 3	**service-module ip address** *hypervisor-ip-address subnet-mask* **Example:** `Router(config-if)# service-module ip address 10.0.0.1 255.255.255.0`	Specifies the IP address of the VMware vSphere Hypervisor. • *hypervisor-ip-address*—IP address of the VMware vSphere Hypervisor. See Figure 3-2. • *subnet-mask*—Subnet mask to append to the IP address; must be in the same subnet as the host router.

	Command or Action	Purpose
Step 4	**service-module ip default-gateway** *hypervisor-gateway-ip-address* **Example:** `Router(config-if)# service-module ip default-gateway 10.0.0.100`	Specifies the IP address of the default gateway for the VMware vSphere Hypervisor. • *hypervisor-gateway-ip-address*—IP address for the default gateway router.
Step 5	**exit**	Exits interface mode.
	Configure *slot*/**1 of the VMware vSphere Hypervisor**	
Step 1	**interface sm** *slot*/**1** **Example:** `Router(config)# interface sm 1/1`	Enters interface configuration mode for the slot and port where the Cisco SRE Service Module resides.
Step 2	**switchport mode trunk** **Example:** `Router(config-if)# switchport mode trunk`	Puts the port into permanent trunking mode. The default configuration is access mode. Access mode works with native VLAN, which is VLAN 1 for the Cisco SRE Service Modules.
Step 3	**[switchport trunk allowed vlan** *vlan_numbers***]** **Example:** `Router(config-if)# switchport mode trunk` `Router(config-if)# switchport trunk allowed vlan 1-2,40,60,1002-1005`	(Optional) Allows trunking on the specified VLANs. • *vlan_numbers*—VLAN numbers on which you want to allow trunking.
Step 4	**exit** **Example:** `Router(config)# exit`	Returns to global configuration mode on the host router.
	Configure VLANs	
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode on the host router.
Step 2	**interface vlan** *vlan_number* **Example:** `Router(config)# interface vlan 40`	Enters VLAN configuration mode for the specified VLAN number.

	Command or Action	Purpose
Step 3	**ip unnumbered gigabitethernet** *slot/port sub-interface* **Example:** `Router(config-if)# ip unnumbered gigabitethernet 0/0.40`	Enables IP processing on an interface without assigning an explicit IP address to that interface. The traffic is forwarded to and from a Gigabit Ethernet sub-interface. • *slot/port*—Position of the Gigabit Ethernet interface in the router chassis. • *sub-interface*—Number of the Gigabit Ethernet sub interface on which the router has an assigned IP address. **Note** The unnumbered interface must be unique. It cannot be another unnumbered interface. **Caution** The **ip unnumbered** command creates a point-to-point interface between devices. Broadcasting is not supported.
Step 4	**exit**	Exits interface mode.
	Configure Gigabit Ethernet *slot/port*	
Step 1	**interface gigabitethernet** *slot/port sub-interface* **Example:** `Router(config)# interface gigabitethernet 0/0.40`	Enters Gigabit Ethernet configuration mode for the specified sub interface. • *slot/port*—Position of the Gigabit Ethernet interface in the router chassis. • *sub-interface*—Number of the Gigabit Ethernet interface on which the router has an assigned IP address.
Step 2	**ip address** *branch-VLAN-ip-address subnet-mask* **Example:** `Router(config-if)# ip address 40.0.0.100 255.255.255.0`	Configures the IP address for the specific branch VLAN. • *branch-VLAN-ip-address subnet-mask*—IP address for the specific branch VLAN. This IP address can be used as the default gateway for virtual machines in the VLAN defined in Step 5.
Step 3	**encapsulation dot1q** *vlan-id* **Example:** `Router(config-if)# encapsulation dot1q 40`	Enables IEEE 802.1Q encapsulation of traffic on the specified subinterface in VLANs. • *vlan-id*—Virtual LAN identifier. The allowed range is from 1 to 1000.
Step 4	**exit**	Exits interface mode.
Step 5	**ip route** *virtual-machine-ip-address subnet-mask* **vlan** *vlan_number* *Example:* `Router(config)# ip route 40.0.0.2 255.255.255.0 vlan 40`	Creates a static route entry for the virtual machine. • *virtual-machine-ip-address subnet-mask*—IP address and subnet mask for the virtual machine.

	Command or Action	Purpose
Step 6	**ip route** *hypervisor-ip-address subnet-mask* **sm** *slot*/**0** **Example:** `Router(config)# ip route 10.0.0.1 255.255.255.255 SM1/0`	Creates a static route. • *hypervisor-ip-address subnet-mask*—IP address and subnet mask of the VMware vSphere Hypervisor. • *slot/0*—slot and port where the Cisco SRE Service Module resides.
Step 7	**exit**	Exits interface mode.
	Save Configuration	
Step 1	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`	Saves the new running configuration of the router as the startup configuration.
Step 2	**show running-config** **Example:** `Router# show running-config`	Displays the running configuration of the router so that you can verify the address configurations.

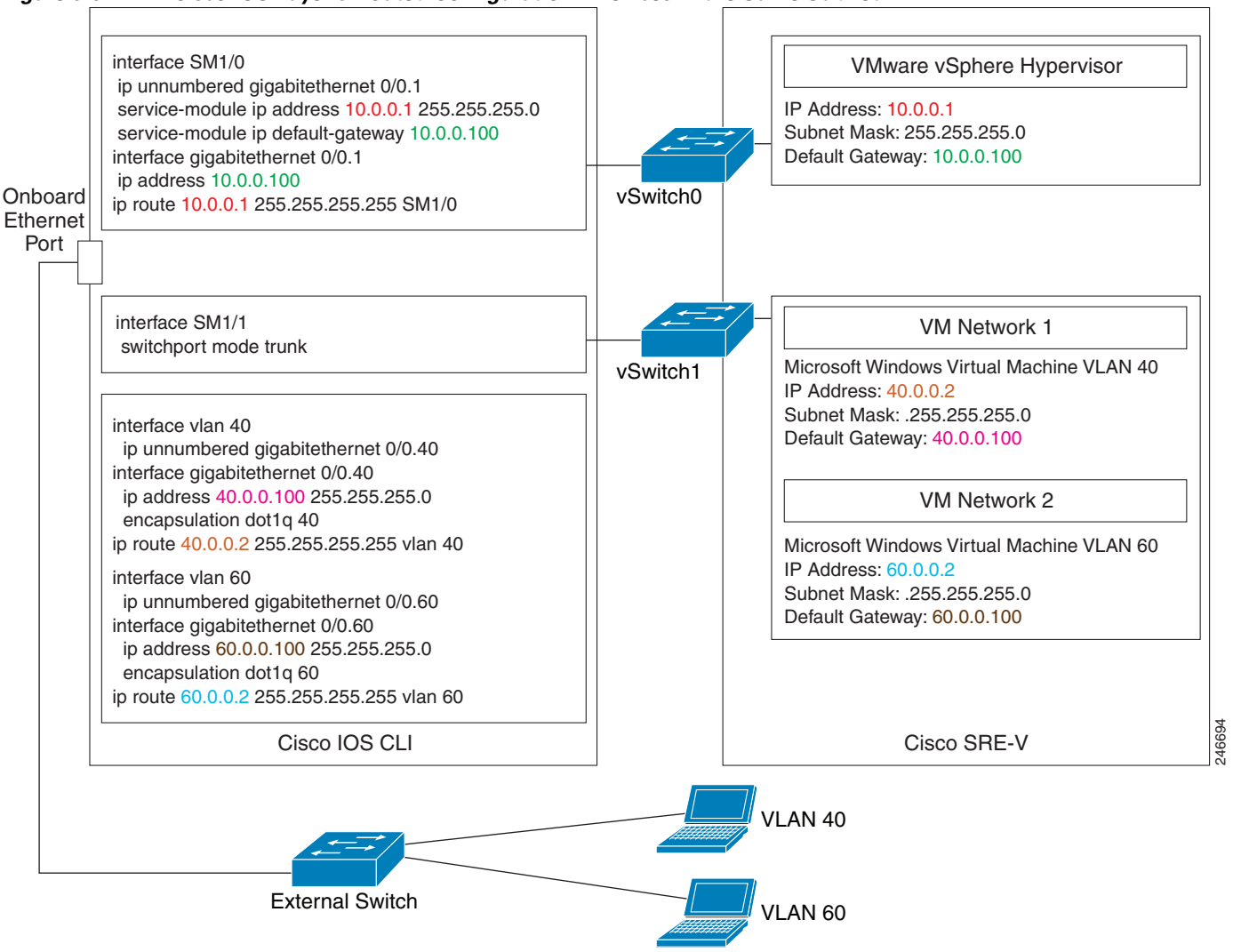
Example

Figure 3-5 shows an example of the Cisco IOS Layer 3 routed configuration where the VMware vSphere Hypervisor and the virtual servers are in the same branch subnet as the client PCs.

- The left pane shows an example of the Cisco IOS commands that you configure in the sm 1/0, sm 1/1, VLAN, and Gigabit Ethernet interfaces.
- The right pane shows that the configuration is applied to the VMware vSphere Hypervisor. The bottom area in the right pane shows the configuration for the Microsoft Windows Servers that are configured using the standard Microsoft Windows network configuration setup process. These Microsoft Windows Serves run as virtual machines.

Note The IP addresses in the configuration example are for reference only and might not be valid.

Figure 3-5 Cisco IOS Layer 3 Routed Configuration—Devices in the Same Subnet



Related Topic

- Downloading the Cisco SRE-V Software, page 4-4

External Interface Configuration

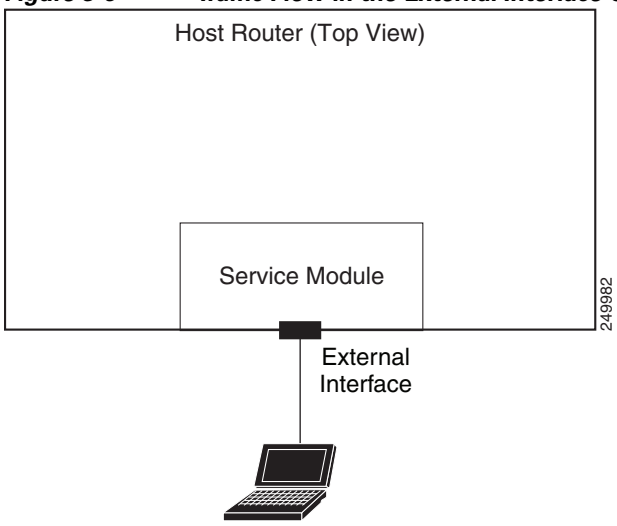
There are two steps to configuring the external interface. First you use Cisco IOS commands and then you use the vSphere client GUI.

The Cisco IOS commands for this configuration are the same as the commands for the "MGF Layer 2 Switched Configuration—Recommended" section on page 3-4 or the "Cisco IOS Layer 3 Routed Configuration Options" section on page 3-10, except for the following:

- The IP address of the virtual machine is on a network that is connected to the external interface.
- The virtual machine default gateway points to the external interface.
- The static route entry for the virtual machine, which is configured in the Cisco IOS Layer 3 Routed Configuration, is not required.

Figure 3-6 shows the traffic flow in the external interface configuration. The service module sends the traffic through the external interface.

Figure 3-6 Traffic Flow in the External Interface Configuration



To configure the external interface, complete the following steps.

Procedure

Step 1 To configure access to the VMware vSphere Hypervisor, use the configuration commands provided in one of the following sections:

- "MGF Layer 2 Switched Configuration—Recommended" section on page 3-4

  or

- "Cisco IOS Layer 3 Routed Configuration Options" section on page 3-10

Step 2 To configure access to the virtual machine through the external interface, use the vSphere client GUI. In the vSphere client GUI, create a new virtual machine port group with the attributes shown in the Standard Switch: vSwitch2 portion of Figure 3-8. For instructions, see the *Services Ready Engine Virtualization (SRE-V) Self Training Guide*.

Example

Figure 3-7 shows an example of step 1, the Cisco IOS external interface configuration.

Note The IP addresses in the configuration example are for reference only and might not be valid.

Figure 3-7 External Interface Configuration—Step 1: Cisco IOS Configuration

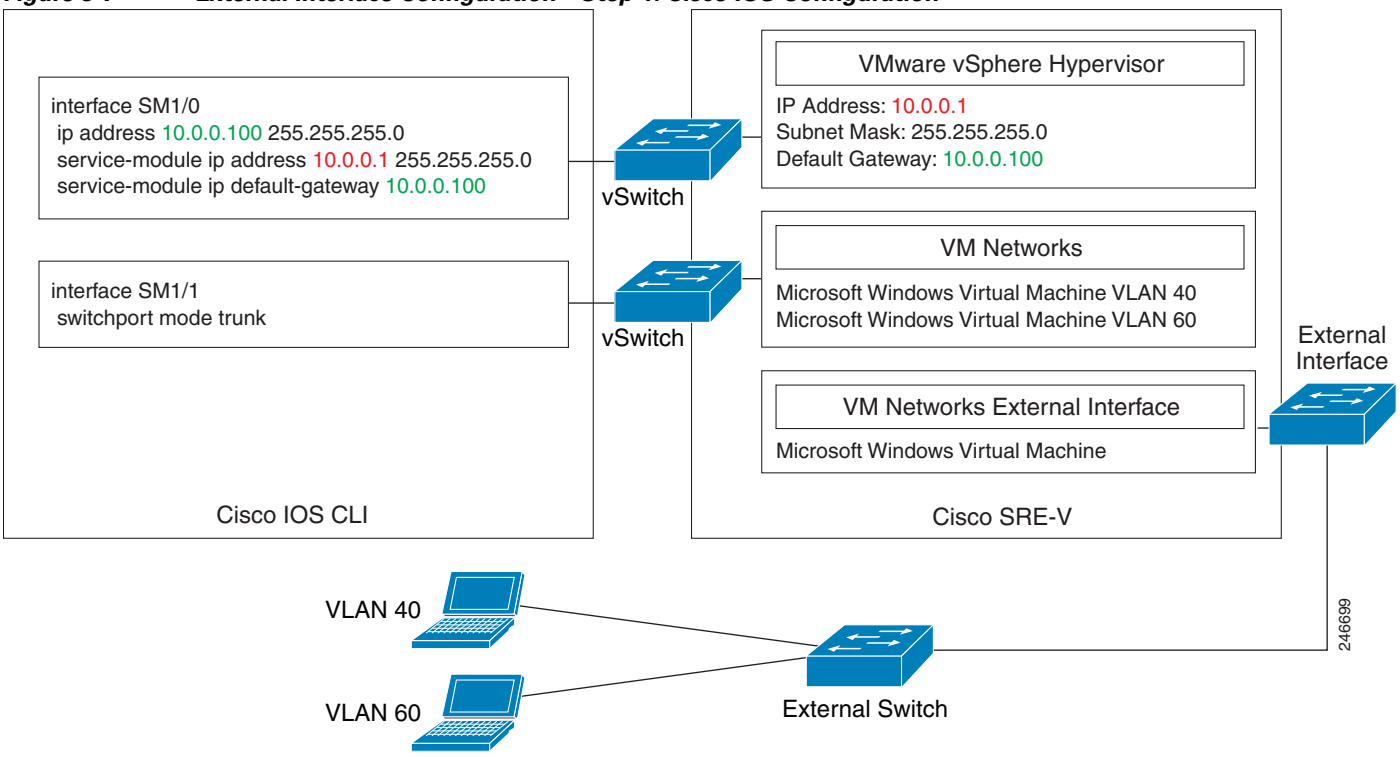
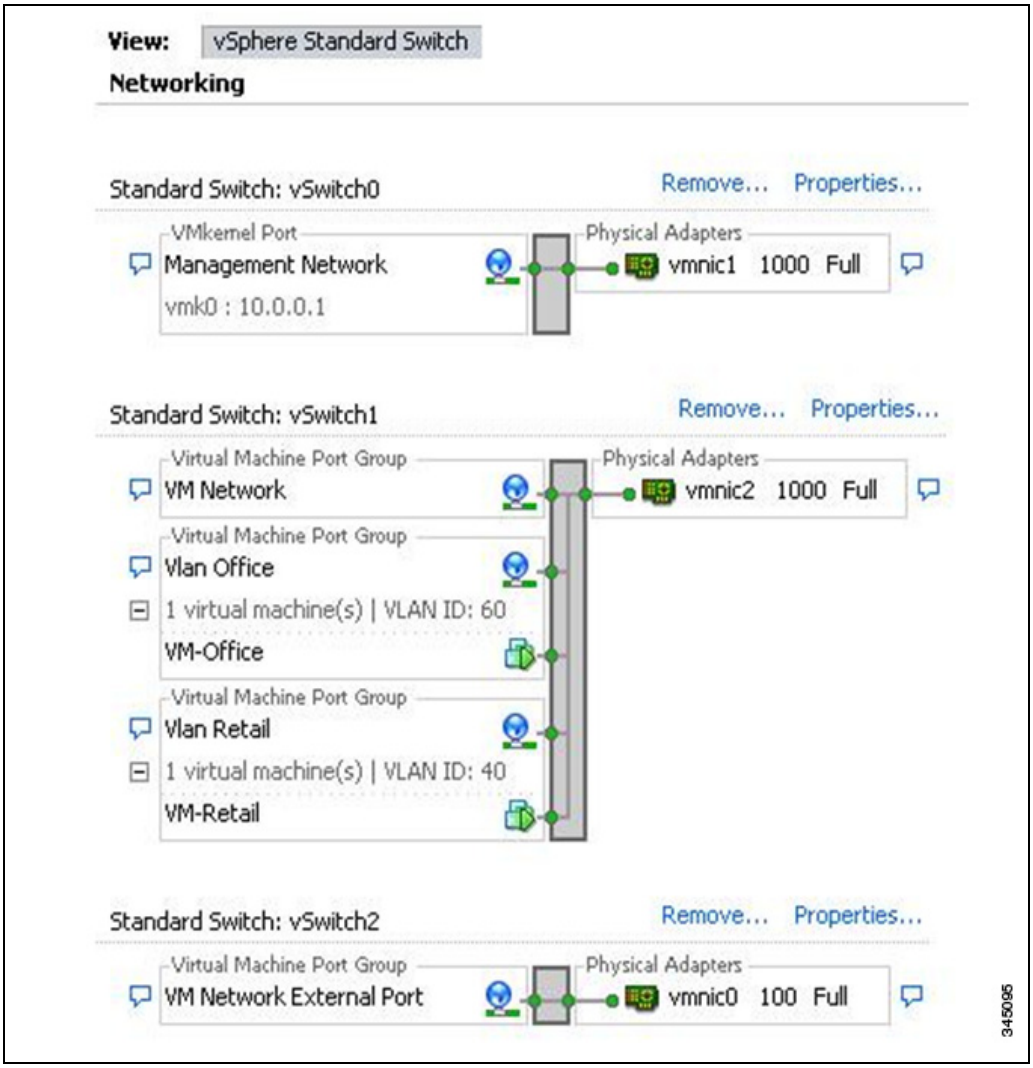


Figure 3-8 shows an example of step 2, the attributes for the new virtual machine port group that was created with the vSphere client GUI.

Figure 3-8 External Interface Configuration—Step 2: VMware vSphere Client GUI Configuration



Related Topic

- Downloading the Cisco SRE-V Software, page 4-4

Reloading, Resetting, and Shutting Down the Cisco SRE Service Module

- Using CLI Commands to Reload, Reset, or Shut Down the Service Module, page 3-26
- Using the Hardware to Shut Down the Cisco SRE Service Module, page 3-27

Using CLI Commands to Reload, Reset, or Shut Down the Service Module

To reload, reset, or shut down the Cisco SRE Service Module, choose the common router commands listed in Table 3-2. You might choose to shut down the Cisco SRE Service Module for service reasons or to save energy when it is not being used.

Note

- For these Cisco IOS **service-module** commands to take effect, make sure that the **Management Network** VMkernel port group is configured to use the vSwitch that has the vmnic1 interface as the uplink.
- Some shutdown commands can potentially disrupt service. If the command output for such a command displays a confirmation prompt, press **Enter** to confirm; or type **n** to cancel, and then press **Enter**. You can prevent the prompt from being displayed by using the **no-confirm** keyword.
- Some commands shut down the module or application, and then immediately restart it.

Table 3-2 Common Shutdown and Startup Commands

Configuration Mode	Command	Purpose
`Router#`	**service-module sm** *slot*/**0 reload**	Gracefully shuts down the Cisco SRE Service Module and then powers it on.
`Router#`	**service-module sm** *slot*/**0 reset**	Resets the hardware on the Cisco SRE Service Module. Use this command only to recover from a shutdown or failed state. **Caution** Using this command does *not* provide an orderly software shutdown and may impact file operations that are in progress.

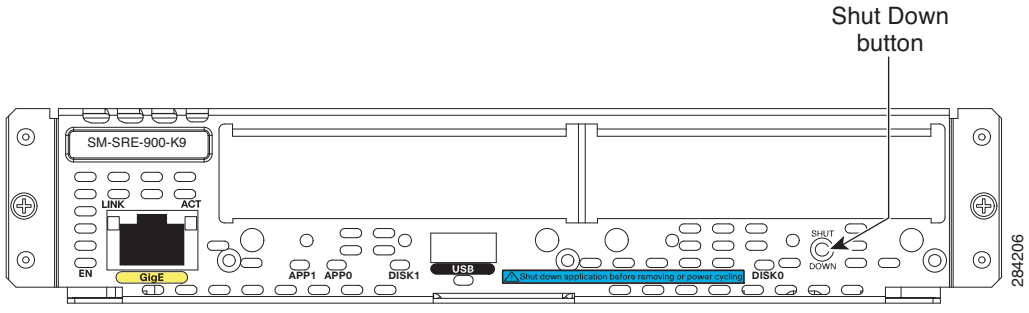
Table 3-2 Common Shutdown and Startup Commands (continued)

Configuration Mode	Command	Purpose
`Router#`	**service-module sm** *slot*/**0 shutdown**	Shuts down the Cisco SRE Service Module system gracefully. Use this command when removing or replacing a hot-swappable module during online insertion and removal (OIR). See the "Online Insertion and Removal of the Cisco SRE Service Module" section on page 2-3. If the virtual machines on the VMware vSphere Hypervisor have VMware tools installed on them, and you issue this command, the virtual machines shut down first, and then the Cisco SRE Service Module shuts down. If the virtual machines do not have VMware tools installed on them, and you issue this command, the virtual machines get powered off first, and then the shutdown signal is sent to the service module. After about two minutes, the Cisco SRE Service Module shuts down. **Note** If you enter the **service-module sm** *slot*/**0 shutdown** command when the VMware vSphere Hypervisor is in lockdown mode, the system shuts down the Cisco SRE Service Module but not the VMware vSphere Hypervisor. In addition, the system cannot process any subsequent **service-module sm** *slot*/**0** commands. For more information about lockdown mode, see the "About Lockdown Mode" section on page 6-5.

Using the Hardware to Shut Down the Cisco SRE Service Module

You can shut down the software by pressing the shut down button on the Cisco SRE Service Module. Figure 3-9 shows the location of the shut down button on the Cisco SRE 900 Service Module. The button is in the same location for the Cisco SRE 700, 710, and 910 Service Modules.

Figure 3-9 Shut Down Button on the Cisco SRE 900 Service Module



To perform a graceful shutdown of the software, follow these steps.

Note You can only perform this procedure after you have installed the software.

Procedure

Step 1 Locate the shut down button. Refer to Figure 3-9.

Step 2 Stick a pin into the recessed hole to press the button.

The system gracefully shuts down.

After you shut down the Cisco SRE Service Module, disable the heartbeat reset function to prevent the system from restarting. To disable the heartbeat reset function, use the **service-module sm** *slot*/**0 heartbeat-reset disable** command. See the "VMware vSphere Hypervisor Does Not Remain in a Shutdown State" section on page 6-10.