C H A P T E R **41**

Configuring Static IP Unicast Routing

This chapter describes how to configure IP Version 4 (IPv4) static IP unicast routing on the switch. Static routing is supported only on switched virtual interfaces (SVIs) and not on physical interfaces. The switch does not support routing protocols.

Finding Feature Information

Your software release may not support all the features documented in this chapter. For the latest feature information and caveats, see the release notes for your platform and software release.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions for Static IP Unicast Routing

- By default, static IP routing is disabled on the switch unless the SDM template is modified to support static routing.
- To use this feature, the switch must be running the LAN Base image.

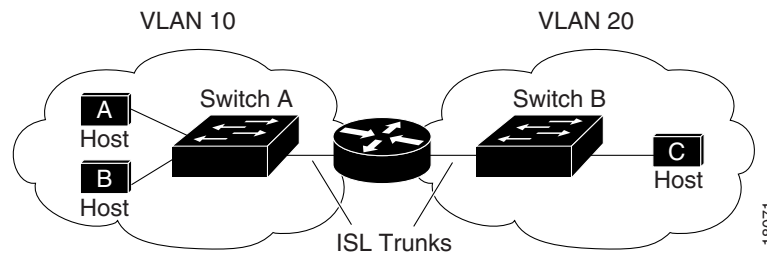## Information About Configuring Static IP Unicast Routing

Note When configuring routing parameters on the switch and to allocate system resources to maximize the number of unicast routes allowed, use the **sdm prefer lanbase-routing** global configuration command to set the Switch Database Management (SDM) feature to the routing template. For more information on the SDM templates, see Chapter 11, "Configuring SDM Templates" or see the **sdm prefer** command in the command reference for this release.

IP Routing

In some network environments, VLANs are associated with individual networks or subnetworks. In an IP network, each subnetwork is mapped to an individual VLAN. Configuring VLANs helps control the size of the broadcast domain and keeps local traffic local. However, network devices in different VLANs cannot communicate with one another without a Layer 3 device to route traffic between the VLANs, referred to as inter-VLAN routing. You configure one or more routers to route traffic to the appropriate destination VLAN.

Figure 41-1 shows a basic routing topology. Switch A is in VLAN 10, and Switch B is in VLAN 20. The router has an interface in each VLAN.

Figure 41-1   Routing Topology Example

When Host A in VLAN 10 needs to communicate with Host B in VLAN 10, it sends a packet addressed to that host. Switch A forwards the packet directly to Host B, without sending it to the router.

When Host A sends a packet to Host C in VLAN 20, Switch A forwards the packet to the router, which receives the traffic on the VLAN 10 interface. The router uses the routing table to finds the correct outgoing interface, and forwards the packet on the VLAN 20 interface to Switch B. Switch B receives the packet and forwards it to Host C.

When static routing is enabled on Switch A and B, the router device is no longer needed to route packets.

Types of Routing

Routers and Layer 3 switches can route packets in these ways:

- Using default routing to send traffic with a destination unknown to the router to a default outlet or destination
- Using static routes to forward packets from predetermined ports through a single path into and out of a network
- Dynamically calculating routes by using a routing protocol

The switch supports static routes and default routes. It does not support routing protocols.

How to Configure Static IP Unicast Routing

Steps for Configuring Routing

In these procedures, the specified interface must be a switch virtual interface (SVI)—a VLAN interface created by using the **interface vlan** *vlan_id* global configuration command and by default a Layer 3 interface. All Layer 3 interfaces on which routing will occur must have IP addresses assigned to them. See the "Assigning IP Addresses to SVIs" section on page 41-3.

> **Note** The switch supports 16 static routes (including user-configured routes and the default route) and any directly connected routes and default routes for the management interface. The switch can have an IP address assigned to each SVI. Before enabling routing, enter the **sdm prefer lanbase-routing** global configuration command and reload the switch.

Procedures for configuring routing:

- To support VLAN interfaces, create and configure VLANs on the switch, and assign VLAN membership to Layer 2 interfaces. For more information, see Chapter 17, "Configuring VLANs."
- Configure Layer 3 interfaces (SVIs) and physical routed port (no switchport).
- Assign IP addresses to the Layer 3 interfaces.
- Configure static routes

Enabling IP Unicast Routing

By default, the switch is in Layer 2 switching mode, and IP routing is disabled. To use the Layer 3 capabilities of the switch, enable IP routing.

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**ip routing**	Enables IP routing.
Step 3	**end**	Returns to privileged EXEC mode.

Assigning IP Addresses to SVIs

To configure IP routing, you need to assign IP addresses to Layer 3 network interfaces. This enables communication with the hosts on those interfaces that use IP. IP routing is disabled by default, and no IP addresses are assigned to SVIs.

An IP address identifies a destination for IP packets. Some IP addresses are reserved for special uses and cannot be used for host, subnet, or network addresses. RFC 1166, "Internet Numbers," contains the official description of these IP addresses.

An interface can have one primary IP address. A a subnet mask identifies the bits that denote the network number in an IP address.

This task explains how to assign an IP address and a network mask to an SVI

	Command	Purpose
Step 1	configure terminal	Enters global configuration mode.
Step 2	interface vlan *vlan_id*	Enters interface configuration mode, and specifies the Layer 3 VLAN to configure.
Step 3	ip address *ip-address subnet-mask*	Configures the IP address and IP subnet mask.
Step 4	end	Returns to privileged EXEC mode.

Configuring Static Unicast Routes

Static unicast routes are user-defined routes that cause packets moving between a source and a destination to take a specified path. Static routes can be important if the router cannot build a route to a particular destination and are useful for specifying a gateway of last resort to which all unroutable packets are sent.

Use the **no ip route** *prefix mask* {*address | interface*} global configuration command to remove a static route. The switch retains static routes until you remove them.

When an interface goes down, all static routes through that interface are removed from the IP routing table. When the software can no longer find a valid next hop for the address specified as the forwarding router's address in a static route, the static route is also removed from the IP routing table.

	Command	Purpose
Step 1	configure terminal	Enters global configuration mode.
Step 2	ip route *prefix mask* {*address	interface*} [*distance*]	Establishs a static route.
Step 3	end	Returns to privileged EXEC mode.

Monitoring and Maintaining the IP Network

Command	Description
show interfaces [*interface-id*]	Displays the administrative and operational status of all interfaces o specified interface.

Additional References for Configuring IP Unicast Routing

The following sections provide references related to switch administration:

Related Documents

Related Topic	Document Title
Cisco IE 2000 commands	*Cisco IE 2000 Switch Command Reference*, Release 15.0(1)EY
Cisco IOS basic commands	*Cisco IOS Configuration Fundamentals Command Reference*
Cisco IOS IP address commands	*Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services, Release 15.0*
Cisco IP routing configuration	*Cisco IOS IP Routing Configuration Guides, Release 15.0*
SDM template configuration	Chapter 11, "Configuring SDM Templates"

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport