



CHAPTER 10

Configuring SDM Templates

Understanding the SDM Templates

Switch Database Management (SDM) templates allocate system hardware resources in order to support specific features on the switch. You can select an SDM template to provide maximum system usage for specific functions; for example, you can use the default template to balance system resources and use the LAN base routing template to maximize the number of static routes on switch virtual interfaces (SVIs).

You can select SDM templates to best support these features:

- Default—Gives balance to all Layer 2 functions.
- LAN base routing—Supports IPv4 unicast routes for configuring static routing SVIs.
- Dual IPv4 and IPv6—Allows the switch to be used in dual stack environments; that is, supporting both IPv4 and IPv6 traffic. You should not use this template if you plan to forward only IPv4 traffic. See the “[Dual IPv4 and IPv6 SDM Templates](#)” section on page 10-2.
- QoS—Maximizes system resources for quality of service (QoS) access control entries (ACEs).
- Routing—The routing template maximizes system resources for IPv4 unicast routing, which is typically required for a router or aggregator in the center of a network. To configure the routing template, the switch must be running the IP services image.



Note

The switch must be running Cisco IOS Release 12.2(52)SE or later to configure the routing template.

Table 10-1 Approximate Number of Feature Resources Allowed by IPv4 Templates

Resource	Default	LAN Base	QoS	Routing
Unicast MAC addresses	8 K	8 K	8 K	2 K
IGMP groups and multicast routes	256	256	256	1 K
Unicast routes	0	750		4 K
• Directly connected hosts	0	750		2 K
• Indirect routes	0	16		2 K
Policy-based routing ACEs	0	0		512
QoS classification ACEs	375	375	625	625

Table 10-1 Approximate Number of Feature Resources Allowed by IPv4 Templates (continued)

Resource	Default	LAN Base	QoS	Routing
Security ACEs	375	375	125	375
Layer 2 VLANs	1 K	1 K	1 K	1 K

The first eight rows in the tables (unicast MAC addresses through security ACEs) represent approximate hardware boundaries set when a template is selected. If a section of a hardware resource is full, all processing overflow is sent to the CPU, seriously degrading switch performance. The last row is a guideline used to calculate hardware resource consumption related to the number of Layer 2 VLANs on the switch.

Dual IPv4 and IPv6 SDM Templates

These SDM templates support IPv4 and IPv6 environments:

- Dual IPv4 and IPv6 default template—supports Layer 2, QoS, and ACLs for IPv4 and Layer 2, IPv6 host, and ACLs for IPv6.
- Dual IPv4 and IPv6 routing template—supports Layer 2, multicast, routing (including policy-based routing), QoS, and ACLs for IPv4 and Layer 2, routing, and ACLs for IPv6.


Note

The dual IPv4 and IPv6 templates are available only on switches running the IP services image.


Note

This software release supports IPv4 policy-based routing (PBR) only; it does not support PBR when forwarding IPv6 traffic.

Table 10-2 Approximate Feature Resources Allowed by Dual IPv4-IPv6 Templates¹

Resource	IPv4-and-IPv6 Default	IPv4-and-IPv6 Routing
Unicast MAC addresses	8 K	1 K
IPv4 IGMP groups and multicast routes	0.25 K	0.5 K
Total IPv4 unicast routes	0	2 K
• Directly connected IPv4 hosts	0	1 K
• Indirect IPv4 routes	0	1 K
IPv6 multicast groups	0.375 K	0.625 K
Total IPv6 unicast routes	0	1.375 K
• Directly connected IPv6 addresses	0	1 K
• Indirect IPv6 unicast routes	0	0.375 K
IPv4 policy-based routing ACEs	0	0.125 K
IPv4 or MAC QoS ACEs (total)	0.375 K	0.375 K

Table 10-2 Approximate Feature Resources Allowed by Dual IPv4-IPv6 Templates¹ (continued)

Resource	IPv4-and-IPv6 Default	IPv4-and-IPv6 Routing
IPv4 or MAC security ACEs (total)	0.375 K	0.125 K
IPv6 policy-based routing ACEs ²	0	0.125 K
IPv6 QoS ACEs	0	0.125 K
IPv6 security ACEs	0.125 K	0.125 K

1. Template estimates are based on a switch with 8 routed interfaces and approximately 1000 VLANs.
2. IPv6 policy-based routing is not supported.

Configuring the Switch SDM Template

These sections contain this configuration information:

- [Default SDM Template, page 10-3](#)
- [SDM Template Configuration Guidelines, page 10-3](#)
- [Setting the SDM Template, page 10-4](#)

Default SDM Template

The default template is the default SDM template.

SDM Template Configuration Guidelines

Follow these guidelines when selecting and configuring SDM templates:

- When you select and configure SDM templates, you must reload the switch for the configuration to take effect.
- Use the **sdm prefer vlan** global configuration command only on switches intended for Layer 2 switching with no routing. When you use the VLAN template, no system resources are reserved for routing entries, and any routing is done through software. This overloads the CPU and severely degrades routing performance.
- Do not use the routing template if you do not have routing enabled on your switch. Use the **sdm prefer routing** global configuration command to prevent other features from using the memory allocated to unicast routing in the routing template.
- If you download the IP services image and plan to use Layer 3 functionality, you must use the routing SDM template.
- If you try to configure IPv6 features without first selecting a dual IPv4 and IPv6 template, a warning message is generated.
- The dual IPv4 and IPv6 templates can result in less ternary content addressable memory (TCAM) being allocated to each resource, which reduces the number of entries forwarded in hardware. You should not use these templates if you plan to forward only IPv4 traffic.

Setting the SDM Template

Beginning in privileged EXEC mode, follow these steps to configure an SDM template:

	Command	Purpose
Step 1	configure terminal	Enters global configuration mode.
Step 2	sdm prefer {default lanbase-routing dual-ipv4-and-ipv6 {default routing} qos routing}	<p>Specifies the SDM template to be used on the switch.</p> <p>The keywords have these meanings:</p> <ul style="list-style-type: none"> • default—Provides balance to all functions. • lanbase-routing—Maximizes system resources for configuring IPv4 static routing on SVIs. • dual-ipv4-and-ipv6—Selects a template that supports both IPv4 and IPv6 routing. <ul style="list-style-type: none"> – default—Balances IPv4 and IPv6 Layer 2 and Layer 3 functionality. – routing—Provides maximum usage for IPv4 and IPv6 routing, including IPv4 policy-based routing. • qos—Maximizes system resources for QoS ACEs. • routing—Maximizes IPv4 routing on the switch. <p>Use the no sdm prefer command to set the switch to the default template.</p>
Step 3	end	Returns to privileged EXEC mode.
Step 4	reload	Reloads the operating system.

After the system reboots, you can use the **show sdm prefer** privileged EXEC command to verify the new template configuration. If you enter the **show sdm prefer** command before you enter the **reload** privileged EXEC command, the **show sdm prefer** command shows the template currently in use and the template that will become active after a reload.

This is an example of an output display when you have changed the template and have not reloaded the switch:

```
Switch# show sdm prefer
The current template is "default" template.
The selected template optimizes the resources in
the switch to support this level of features for
0 routed interfaces and 1024 VLANs.
number of unicast mac addresses:                8K
  number of IPv4 IGMP groups:                   0.25K
  number of IPv4/MAC qos aces:                  0.375k
  number of IPv4/MAC security aces:            0.375k
On next reload, template will be "routing" template.
```

To return to the default template, use the **no sdm prefer** global configuration command.

This example shows how to configure a switch with the routing template.

```
Switch(config)# sdm prefer routing
Switch(config)# end
Switch# reload
```

```
Proceed with reload? [confirm]
```

This example shows how to configure the IPv4-and-IPv6 default template on a switch:

```
Switch(config)# sdm prefer dual-ipv4-and-ipv6 default
Switch(config)# exit
Switch# reload
Proceed with reload? [confirm]
```

Displaying the SDM Templates

Use the **show sdm prefer** command in privileged EXEC mode to display the active template.

Use the **show sdm prefer [default | dual-ipv4-and-ipv6 {default | routing} | qos | routing]** command in privileged EXEC mode to display the resource numbers supported by the specified template.

This is an example of output from the **show sdm prefer** command, displaying the template in use.

This is an example of output from the **show sdm prefer routing** command:

```
Switch# show sdm prefer routing
"routing" template:
The selected template optimizes the resources in
the switch to support this level of features for
8 routed interfaces and 1024 VLANs.

number of unicast mac addresses:          2K
number of IPv4 IGMP groups + multicast routes: 1K
number of IPv4 unicast routes:          4K
  number of directly-connected IPv4 hosts: 2K
  number of indirect IPv4 routes:       2K
number of IPv4 policy based routing aces: 0.5K
number of IPv4/MAC qos aces:            0.625k
number of IPv4/MAC security aces:       0.375k
```

