



CHAPTER 10

Configuring SDM Templates

The IE 3000 switch command reference has command syntax and usage information.

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Understanding the SDM Templates

You can use SDM templates to configure system resources in the switch to optimize support for specific features, depending on how the switch is used in the network. You can select a template to provide maximum system usage for some functions or use the default template to balance resources.

To allocate ternary content addressable memory (TCAM) resources for different usages, the switch SDM templates prioritize system resources to optimize support for certain features. You can select SDM templates to optimize these features:

- **Default**—The default template gives balance to all Layer 2 functions.
- **QoS**—The QoS template maximizes system resources for quality of service (QoS) access control entries (ACEs).
- **Routing**—The routing template maximizes system resources for IPv4 unicast routing, typically required for a router or aggregator in the center of a network. You must use the routing template on switches running the IP services image for Layer 3 functionality.



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

In addition, the dual IPv4 and IPv6 templates enable a dual stack environment. See the [“Dual IPv4 and IPv6 SDM Templates” section on page 10-2](#).

Table 10-1 Approximate Number of Feature Resources Allowed by Each Template

Resource	Default	QoS	Routing
Unicast MAC addresses	8 K	8 K	2 K
IGMP groups and multicast routes	256	256	1 K
Unicast routes	0		4 K

Table 10-1 Approximate Number of Feature Resources Allowed by Each Template (continued)

Resource	Default	QoS	Routing
• Directly connected hosts	0		2 K
• Indirect routes	0		2 K
Policy-based routing ACEs	0		512
QoS classification ACEs	375	625	625
Security ACEs	375	125	375 K
Layer 2 VLANs	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 impacting 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

You can select SDM templates to support IP Version 6 (IPv6). For more information about IPv6 and how to configure IPv6 routing, see [Chapter 41, “Configuring IP Unicast Routing.”](#)

This software release does not support Policy-Based Routing (PBR) when forwarding IPv6 traffic. The software supports IPv4 PBR only when the **dual-ipv4-and-ipv6 routing** template is configured.

The dual IPv4 and IPv6 templates allow the switch to be used in dual stack environments (supporting both IPv4 and IPv6). Using the dual stack templates results in less TCAM capacity allowed for each resource. Do not use them if you plan to forward only IPv4 traffic.

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 You must use the dual IPv4 and IPv6 routing template on switches running the IP services image for Layer 3 IPv6 functionality. The switch must be running Cisco IOS Release 12.2(52)SE or later to configure the routing template.



Note

An IPv4 route requires only one TCAM entry. Because of the hardware compression scheme used for IPv6, an IPv6 route can take more than one TCAM entry, reducing the number of entries forwarded in hardware. For example, for IPv6 directly connected IP addresses, the desktop template might allow less than two thousand entries.

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	1K
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
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

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- [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 Configuration Guidelines

- When you select and configure SDM templates, you must reload the switch for the configuration to take effect.
- Do not use the routing template if you do not have routing enabled on your switch. The **sdm prefer routing** global configuration command prevents other features from using the memory allocated to unicast routing in the routing template.
- If you try to configure IPv6 features without first selecting a dual IPv4 and IPv6 template, a warning message appears.

- Using the dual stack templates results in less TCAM capacity allowed for each resource, so do not use it if you plan to forward only IPv4 traffic.

Setting the SDM Template

Beginning in privileged EXEC mode, follow these steps to use the SDM template to maximize feature usage:

	Command	Purpose
Step 1	<code>configure terminal</code>	Enter global configuration mode.
Step 2	<code>sdm prefer {default dual-ipv4-and-ipv6 {default routing} qos routing}</code>	Specify the SDM template to be used on the switch: The keywords have these meanings: <ul style="list-style-type: none"> default—Gives balance to all functions. dual-ipv4-and-ipv6—Select a template that supports both IPv4 and IPv6 routing. <ul style="list-style-type: none"> default—Balance IPv4 and IPv6 Layer 2 and Layer 3 functionality. routing—Provide 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. Use the no sdm prefer command to set the switch to the default template. The default template balances the use of system resources.
Step 3	<code>end</code>	Return to privileged EXEC mode.
Step 4	<code>reload</code>	Reload 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 in use and the template that becomes 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** privileged EXEC command with no parameters to display the active template.

Use the **show sdm prefer [default | dual-ipv4-and-ipv6 {default | routing} qos | routing]** privileged EXEC command 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.

```
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
```

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
```

