Configuring SDM Templates

The Catalyst 3560 and 3650-C switch command reference has command syntax and usage information about the Switch Database Management (SDM) templates. Different platform support different SDM templates.

Understanding the SDM Templates

Note The SDM template used by Catalyst 3560-C Gigabit Ethernet switch is a default template and is not configurable.

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 ond of these SDM templates to optimize features on the Catalyst 3560 switch and on the Catalyst 3560-C Fast Ethernet switch:

- Access—The access template maximizes system resources for access control lists (ACLs) to accommodate a large number of ACLs.
- Default—The default template gives balance to all functions.
- Routing—The routing template maximizes system resources for IPv4 unicast routing, typically required for a router or aggregator in the center of a network.
- VLANs—The VLAN template disables routing and supports the maximum number of unicast MAC addresses. It would typically be selected for a Layer 2 switch.

In addition, the dual IPv4 and IPv6 templates enable a dual stack environment. See the "Dual IPv4 and IPv6 SDM Templates" section on page 7-2.

Table 7-1   Approximate Number of Feature Resources Allowed by Each IPv4 Template

Resource	Access	Default	Routing	VLAN
Unicast MAC addresses	4 K	6 K	3 K	12 K
IGMP groups and multicast routes	1 K	1 K	1 K	1 K
Unicast routes	6 K	8 K	11 K	0
• Directly connected hosts	4 K	6 K	3 K	0
• Indirect routes	2 K	2 K	8 K	0
Policy-based routing ACEs	512	0	512	0
QoS classification ACEs	512	512	512	512
Security ACEs	2 K	1 K	1 K	1 K
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 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 37, "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:

- The dual templates are supported on Catalyst 3560 switches and on Catalyst 3560-C Fast Etherent switches. The Catalyst 3560-C Gigabit Ethernet switch supports only a default template .

- Dual IPv4 and IPv6 VLAN template—supports basic Layer 2, multicast, QoS, and ACLs for IPv4, and basic Layer 2 and ACLs for IPv6.

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 7-2   Approximate Feature Resources Allowed by Dual IPv4-IPv6 Templates[1]

Resource	IPv4-and-IPv6 Default	IPv4-and-IPv6 Routing	IPv4-and-IPv6 VLAN
Unicast MAC addresses	2 K	1536	8 K
IPv4 IGMP groups and multicast routes	1 K	1K	1 K
Total IPv4 unicast routes:	3 K	2816	0
• Directly connected IPv4 hosts	2 K	1536	0
• Indirect IPv4 routes	1 K	1280	0
IPv6 multicast groups	1 K	1152	1 K
Total IPv6 unicast routes:	3 K	2816	0
• Directly connected IPv6 addresses	2 K	1536	0
• Indirect IPv6 unicast routes	1 K	1280	0
IPv4 policy-based routing ACEs	0	256	0
IPv4 or MAC QoS ACEs (total)	512	512	512
IPv4 or MAC security ACEs (total)	1 K	512	1K
IPv6 policy-based routing ACEs[2]	0	255	0
IPv6 QoS ACEs	510	510	510
IPv6 security ACEs	510	510	510

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

Default SDM Template

The default template is the default desktop template.

SDM Template Configuration Guidelines

• You configure multiple SDM templates on Catalyst 3560 switches and on Catalyst 3560-C Fast Ethernet switches. The Catalyst 3560-C Gigabit Ethernet switch supports only a default template.

• 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. 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	**configure terminal**	Enter global configuration mode.

Step 2	**sdm prefer** {**access** | **default** | **dual-ipv4-and-ipv6** {**default** | **routing** | **vlan**} | **routing** | **vlan**}	Specify the SDM template to be used on the switch:
		
		The keywords have these meanings:
		
		• **access**—Maximizes system resources for ACLs.
		
		• **default**—Gives balance to all functions.
		
		• **dual-ipv4-and-ipv6**—Select a template that supports both IPv4 and IPv6 routing.
		
		  – **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.
		
		  – **vlan**—Provide maximum usage for IPv4 and IPv6 VLANs.
		
		• **routing**—Maximizes IPv4 routing on the switch.
		
		• **vlan**—Maximizes VLAN configuration on the switch with no routing supported in hardware.
		
		Use the **no sdm prefer** command to set the switch to the default template.
		
		Note Catalyst 3560-C Gigabit Ethernet switches support only a default template.

Step 3	**end**	Return to privileged EXEC mode.
Step 4	**reload**	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 "desktop 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:        3K
  number of igmp groups + multicast routes:  1K
  number of unicast routes:               11K
    number of directly connected hosts:   3K
    number of indirect routes:            8K
  number of qos aces:                     512
 number of security aces:                 1K


 On next reload, template will be "desktop vlan" 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 desktop 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** [**access** | **default** | **dual-ipv4-and-ipv6** {**default** | **vlan** | **routing**} **vlan**] privileged EXEC command to display the resource numbers supported by the specified template.

Note   The Catalyst 3560-C Gigabit Ethernet switch supports only a default 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 "desktop default" 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:        6K
  number of igmp groups + multicast routes:  1K
  number of unicast routes:               8K
```

```
    number of directly connected hosts:       6K
    number of indirect routes:                2K
 number of policy based routing aces:         0
 number of qos aces:                          512
 number of security aces:                     1K
```

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

```
Switch# show sdm prefer routing
"desktop 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:             3K
 number of igmp groups + multicast routes:    1K
 number of unicast routes:                    11K
    number of directly connected hosts:       3K
    number of indirect routes:                8K
 number of policy based routing aces:         512
 number of qos aces:                          512
 number of security aces:                     1K
```

This is an example of output from the **show sdm prefer dual-ipv4-and-ipv6 default** command:

```
Switch# show sdm prefer dual-ipv4-and-ipv6 default
 "desktop IPv4 and IPv6 default" 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:                   3K
    number of directly-connected IPv4 hosts:      2K
    number of indirect IPv4 routes:               1K
 number of IPv6 multicast groups:                 1K
 number of directly-connected IPv6 addresses:     2K
 number of indirect IPv6 unicast routes:          1K
 number of IPv4 policy based routing aces:        0
 number of IPv4/MAC qos aces:                     512
 number of IPv4/MAC security aces:                1K
 number of IPv6 policy based routing aces:        0
 number of IPv6 qos aces:                         510
 number of IPv6 security aces:                    510
```