Configuring Profiles

Your router caters to different market segments on the service provider edge space. Your router is capable of supporting a wide range of market segments and features, but to make the software more efficient, you must configure the appropriate profiles to achieve the results you require.

- Different customers have different network architectures, and this puts different scale demands on the router. By configuring the *scale profile*, you can configure your router to accommodate your needs.
- The software supports a wide range of features. To optimize performance, each *feature profile* enables a subset of the total available features for a release. You must configure the appropriate profile to enable the features that you require.

Table 1: Feature History for Configuring Profiles

Release	Modification
Release 3.9.1	The scale profile was introduced
Release 4.0.1	The scale profile configuration was moved to admin mode. The feature profile was introduced.

This model contains the following topics:

- Restrictions of Scale Profiles, on page 1
- Information About Profiles, on page 2
- Configure iTCAM profile, on page 3
- How to Configure Profiles, on page 5
- Additional References, on page 10

Restrictions of Scale Profiles

Video monitoring is not supported with the L3XL scale profile.

Information About Profiles

Information About Scale Profiles

A scale profile is a user-configurable setting that tunes the router to perform more efficiently depending on how the router is being used. You should configure a scale profile before deploying the router to production use.

Your router can be used for different market segments on the service provider edge space. Because different customers have different network architectures, which can place different scale demands on the router, it is important to configure the scale profile so that your router works as efficiently as possible within the architecture that you are using.

Possible scenarios that are taken into account by the scale profile are:

- Use of the router as a Layer 2 transport device, thus requiring the support of high Layer 2 scale numbers.
- Use of the router primarily as a Layer 3 box that provides Layer 3 virtual private network (VPN) services, thus requiring the support of a high number of Layer 3 routes.

There are three scale profiles available on your router:

- The *default scale profile* that supports deployments that require large Layer 2 MAC tables (up to 512,000 entries) and a relatively small number of Layer 3 routes (less than 512,000).
- The *Layer 3 scale profile* that supports deployments that require more Layer 3 routes (up to 1 million) and smaller Layer 2 MAC tables (less than 128,000 entries).
- The *Layer 3 XL scale profile* that supports deployments that require a very large number of Layer 3 routes (up to 1.3 million) and minimal Layer 2 functionality. Note that the support for up to 1.3 million routes is split into IPv4 scaled support and IPv4/IPv6 scaled support. You can configure up to 1.3 million IPv4 routes, or up to 1 million IPv4 routes with 128,000 IPv6 routes. The layer 3 XL scale profile does not support video monitoring.

  You can increase the memory available for BGP by configuring the Layer 3 XL profile on the Cisco ASR9000 Series Router using the **hw-module profile scale l3xl** command. However, this reduces the memory available for some other processes. To activate the new profile, you need to manually reboot the system.

  The memory for BGP and the other processes can be verified by using the following commands before and after the configuration:

  - **show processes memory detail**
  - **show bgp process performance-statistics | include RLIMIT** : This command is available only from Cisco IOS-XR release 6.1.x onwards.

Information About Feature Profiles

To allow sufficient computation capabilities within the router, the available features within the Cisco IOS XR software image are bundled. A feature profile determines which bundle of features is available for you to use.

Although you can always configure a feature, if the feature is not supported by the active feature profile, you cannot use it.

There are two feature profiles available on your router:

- The *default profile* that supports all Cisco IOS XR software features except for IEEE 802.1ah provider backbone bridge (PBB).
- The *Layer 2 profile* that supports all Cisco IOS XR software features including IEEE 802.1ah PBB, but does not support IPv6, reverse-path forwarding (RPF) or netflow.

If the feature profile that you have configured on your router does not support a feature that you have configured, warning messages are displayed on the console, and the feature does not work. A configured feature profile takes affect only after you reload all the line cards on the router.

Relationship Between Scale and Feature Profiles

Although you are not limited in your selection of scale and feature profiles in relation to each other, Cisco recommends using the scale and feature profiles together as indicated here:

Table 2: Interaction between Scale and Feature Profiles

	Default Feature Profile	**Layer 2 Feature Profile**
Default Scale Profile	Up to 512 K Layer 3 CEF[1] scale	PPB[2]
Layer 3 Scale Profile	Up to 1.0 M Layer 3 CEF scale Less than 128 K MAC entries	Not recommended
Layer 3 XL Scale Profile	Up to 1.3 M Layer 3 CEF scale	Not recommended

1 Cisco Express Forwarding
2 provider backbone bridge

Other pairs are not recommended. Note that the Layer 3 XL scale profile does not support video monitoring.

Configure iTCAM profile

Both A99-12X100GE and A99-4X100GE line cards have an internal TCAM of 5MB. You can recarve internal TCAM partition at a Global Configuration level to increase entries on the L2 table and V6 table. Recarving of the TCAM partition helps in the optimal and efficient utilisation of the available memory.

Table 3: Recarving iTCAM profile

Default Limits	**Recarving Limits**
1K entries for L2	4K entries for L2 table
24K limit for V4 entries	Adjusted as required for V4 table
1.75K limit for V6 entries	3.25L entries for V6 table

Restrictions

- This configuration is supported only on A99-12X100GE and A99-4X100GE line cards.
- For 32-bit IOS-XR, perform this configuration in the Admin Configuration mode.
- For 64-bit IOS-XR perform this configuration in the Global Configuration mode.
- Unless you reload the line cards after the configuration of iTCAM profile on the linecards, the configuration does not take effect.

Configuration Example

To configure iTCAM profile of linecards, use the following steps:

1. Enter the Administration Configuration mode.
2. Configure iTCAM profile of line cards as **to-profile-se1** to recarve TCAM partition of line cards and change the entries to accommodate more L2 or V6 entries in the L2 table and V6 table.

Note If you configure the iTCAM profile as **to-default**, it enables default TCAM entries present in the linecards.

3. Reload the A99-12X100GE and A99-4X100GE line cards line cards in the chassis.

Configuration

```
/* Enter the Administration Configuration mode and configure iTCAM profile on an interface
 for line cards as to-profile-se1 or to-default. */
Router(admin-config)# hw-module profile itcam to-profile-se1 location 0/0/CPU0
Sun Mar  3 07:44:23.066 UTC
In order to activate this new internal tcam partition profile, you must manually reload the
 line card.
Router(admin-config)# commit

/* Reload the entire router or all the line cards in the chassis. */
```

Verification

To verify the increase in the limits of L2 and V6 entries in the L2 table and V6 tabl for line cards on an interface, use the **show prm server tcam summary all all detail all location *location*** command. In the output, you can see that L2 entries have increased to 4K in the L2 table, V4 entries have reduced to 1.5K in the V4 table, and V6 entries have increased to 3.5K in the V6 table.

```
 Router# show prm server tcam summary all all detail np3 location 0/0/CPU0
Wed Mar 13 21:37:43.743 UTC

                Node: 0/0/CPU0:
----------------------------------------------------------------

TCAM summary for NP3:

  TCAM Logical Table: TCAM_LT_L2 (1)
    Partition ID: 0, valid entries: 2, free entries: 22
    Partition ID: 1, valid entries: 0, free entries: 24
    Partition ID: 2, valid entries: 0, free entries: 24
    Partition ID: 3, valid entries: 0, free entries: 2012.
```

```
   Partition ID: 4, valid entries: 2, free entries: 2010
 TCAM Logical Table: TCAM_LT_ODS2 (2), max entries: 15360, num free: 15237
   Application ID: NP_APP_ID_IFIB (0).
     VMR ID:    1, used entries:   45, allocated entries:  123
    Total vmr_ids per app id: 1, Total used entries per app id: 45 Total allocated entries:
123
   Application ID: NP_APP_ID_QOS (1)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_ACL (2)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_AFMON (3)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_LI (4)
     VMR ID:    2, used entries:    0, allocated entries:    0
    Total vmr_ids per app id: 1, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_PBR (5)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
 TCAM Logical Table: TCAM_LT_ODS8 (3), max entries: 3328, num free: 3295
   Application ID: NP_APP_ID_IFIB (0).
     VMR ID:    1, used entries:   33, allocated entries:   33
    Total vmr_ids per app id: 1, Total used entries per app id: 33 Total allocated entries:
33
   Application ID: NP_APP_ID_QOS (1)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_ACL (2)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_PBR (5)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0
   Application ID: NP_APP_ID_EDPL (6)
    Total vmr_ids per app id: 0, Total used entries per app id: 0 Total allocated entries:
0

RP/0/RSP1/CPU0:VKG6#
```

How to Configure Profiles

Configuring the Scale Profile

Before you deploy your router, you should configure the scale profile to make the system most efficient for your specific network architecture.

Before you begin

In general, the route switch processor (RSP) with 6 GB of memory is capable of loading 1.3 million IPv4 routes. For large scale routes like 4 million, 12 GB of memory is required.

The RSP440 supports 1.3 million IPv4 routes with the default memory.

Note The scale profile should be configured in the administration configuration. If you previously configured the L3 scale profile in the global configuration, the following limitations apply:

- If the scale profile is set only in the global configuration, the setting takes affect.
- Scale profile settings in the administration configuration override scale profile settings in the global configuration.
- Cisco recommends that you configure all scale profile settings in the administration configuration and remove the global configuration settings. For more information, refer to Removing the Scale Profile from the Global Configuration, on page 9.

SUMMARY STEPS

1. **admin**
2. **configure**
3. **hw-module profile scale**{**default** | **l3** | **l3xl**}
4. Use the **commit** or **end** command.
5. **reload location all**
6. **show running-config**
7. **show hw-module profile**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**admin** **Example:** `RP/0/RSP0/CPU0:router# admin`	Enters administration EXEC mode.
Step 2	**configure** **Example:** `RP/0/RSP0/CPU0:router(admin)# configure`	Enters administration configuration mode.

Step 3	**hw-module profile scale**{**default** | **l3** | **l3xl**}
	Example:
	`RP/0/RSP0/CPU0:router(admin-config)# hw-module profile scale l3xl`
	
	`Sun Nov 14 10:04:27.109 PST`
	`In order to activate this new memory resource profile,`
	`you must manually reboot the system.`
		Specifies the scale profile for the router.
		• **default**—efficient for deployments that require large Layer 2 MAC tables (up to 512,000 entries) and a relatively small number of Layer 3 routes (less than 512,000).
		• **l3**—efficient for deployments that require more Layer 3 routes (up to 1 million) and smaller Layer 2 MAC tables (less than 128,000 entries).
		• **l3xl**—efficient for deployments that require a very large number of Layer 3 routes (up to 1.3 million) and minimal Layer 2 functionality. Note that the support

	Command or Action	Purpose
		for up to 1.3 million routes is split into IPv4 scaled support and IPv4/IPV6 scaled support. You can configure up to 1.3 million IPv4 routes, or up to 1 million IPv4 routes with 128,000 IPv6 routes.
Step 4	Use the **commit** or **end** command.	**commit** —Saves the configuration changes and remains within the configuration session. **end** —Prompts user to take one of these actions: • **Yes** — Saves configuration changes and exits the configuration session. • **No** —Exits the configuration session without committing the configuration changes. • **Cancel** —Remains in the configuration mode, without committing the configuration changes.
Step 5	**reload location all** **Example:** `RP/0/RSP0/CPU0:router(admin)# reload location all`	Reloads the entire router or all line cards in the chassis. If you are changing the scale profile to, or from, one of the Layer 3 scale profile values, you must perform a reload of the entire system before the change is enabled.

Step 6	**show running-config**
	Example:
	`RP/0/RSP0/CPU0:router(admin)# show running-config`
	`hw-module profile scale`
		Displays the configured scale profile.

Step 7	**show hw-module profile** **Example:** `RP/0/RSP0/CPU0:router# show hw-module profile scale`	Displays the active scale profile. If the scale profile is different than the configured profile, the line cards have not been reloaded as required for the scale profile configuration to take place.

Configuring the Feature Profile

Before deploying your router you should determine that the feature profile is consistent with the features that you need to use. If it is not, use this task to configure a different profile.

SUMMARY STEPS

1. **admin**
2. **configure**
3. **hw-module profile feature** {**default** | **l2**}
4. Use the **commit** or **end** command.
5. **reload location** {**all** | *node-id*}
6. **show running-config**
7. **show hw-module profile feature**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**admin** **Example:** `RP/0/RSP0/CPU0:router# admin`	Enters administration EXEC mode.
Step 2	**configure** **Example:** `RP/0/RSP0/CPU0:router(admin)# configure`	Enters administration configuration mode.

Step 3	**hw-module profile feature** {**default** | **l2**}
	Example:
	`RP/0/RSP0/CPU0:router(admin-config)# hw-module profile feature l2`
	
	`Wed Dec 8 08:29:54.053 PST`
	`L2 feature profile does NOT support the following features:`
	`IPv6, RPF, Netflow.`
	`In order to activate this new memory resource profile,`
	`you must manually reboot the line cards.`
		Specifies the feature profile for the router.
		• **default**—supports all features except provider backbone bridge (PBB).
		• **l2**—supports PBB, but does not support IPv6, reverse-path forwarding (RPF) and netflow.

Step 4	Use the **commit** or **end** command.	**commit** —Saves the configuration changes and remains within the configuration session. **end** —Prompts user to take one of these actions: • **Yes** — Saves configuration changes and exits the configuration session. • **No** —Exits the configuration session without committing the configuration changes. • **Cancel** —Remains in the configuration mode, without committing the configuration changes.
Step 5	**reload location** {**all** | *node-id*} **Example:** `RP/0/RSP0/CPU0:router(admin)# reload location 0/0/cpu0`	Reloads a line card. Before the feature profile configuration becomes effective, you must reload all line cards in the router. Use the **reload location** *node-id* command for each line card separately.

Step 6	**show running-config**
	Example:
	`RP/0/RSP0/CPU0:router(admin)# show running-config`
	
	`hw-module profile feature`
		Displays the configured feature profile.

	Command or Action	Purpose
Step 7	**show hw-module profile feature** **Example:** `RP/0/RSP0/CPU0:router# show hw-module profile feature all`	Displays the active feature profile. If the active profile is different from the configured profile, the line cards have not been reloaded as required for the feature profile configuration to take place.

What to do next

If you see warning messages to the console indicating that the active feature profile does not match the configured profile, you must reload the affected line card so that the configured profile matches the active profile.

```
LC/0/1/CPU0:Nov 5 02:50:42.732 : prm_server[236]: Configured 'hw-module
profile feature l2' does not match active 'hw-module profile feature default'.
You must reload this line card in order to activate the configured profile on
this card or you must change the configured profile.
```

If you see warning messages to the console indicating that some features do not match the feature profile, you should either change the feature profile configuration, or remove the non-supported features.

```
LC/0/1/CPU0:Nov 5 02:50:42.732 : prm_server[236]: Active 'hw-module profile
feature l2' does not support IPv6, RPF, or Netflow features. Please remove all
unsupported feature configurations.

*"hw-module profile feature" syntax only applies to Trident based line cards;
therefore the limitations of IPv6, reverse-path forwarding (RPF) and Netflow do
not apply to either Tomahawk or Typhoon based line cards.
```

Removing the Scale Profile from the Global Configuration

If a scale profile is configured in the global configuration, you should duplicate the configuration in the administration configuration, and remove the global configuration as described here.

Note If you do not move the scale profile setting to the administration configuration, the configuration in global configuration mode takes affect.

If the scale profile is configured in both the global configuration and administration configuration, the setting in the administration configuration takes precedence.

SUMMARY STEPS

1. **show running-config | file** *new-config-file*
2. Remove the line with the command **hw-module profile scale** from the file created in the previous step.
3. **configure**
4. **load** *new-config-file*
5. **commit replace**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show running-config | file** *new-config-file* **Example:** `RP/0/RSP0/CPU0:router# show running-config | file new-config-file`	Copies the contents of the running configuration to a file.
Step 2	Remove the line with the command **hw-module profile scale** from the file created in the previous step.	Takes out the profile command that is configured in the global configuration.
Step 3	**configure** **Example:** `RP/0/RSP0/CPU0:router# configure`	Enters global configuration mode.
Step 4	**load** *new-config-file* **Example:** `RP/0/RSP0/CPU0:router(config)# load new-config-file`	Replaces the running configuration with the edited file.
Step 5	**commit replace** **Example:** `RP/0/RSP0/CPU0:router(config)# commit replace`	Commits the changed configuration to the router.

Additional References

Related Documents

Related Topic	Document Title
Profile commands	*Hardware Redundancy and Node Administration on the Cisco ASR 9000 Series Router* module of *System Management Command Reference for Cisco ASR 9000 Series Routers*
Information about user groups and task IDs	*Configuring AAA Services on the Cisco ASR 9000 Series Router* module of *System Security Configuration Guide for Cisco ASR 9000 Series Routers*

Standards and RFCs

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

MIBs

MIB	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

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html