PfR Scaling Improvement for Application Traffic Class

The PfR Scaling Improvement for Application Traffic Class feature introduces scaling enhancements to the number of application traffic classes (TCs) that are supported on each Performance Routing (PfR) border router (BR). New PfR and dynamic route-map scaling improvements allow BRs to support a maximum of 20,000 application traffic classes (TC) with a maximum of 500 dynamic route-map sequences. Currently only 5000 application traffic classes and 32 route map entries are allowed. On a Route Processor 2 (RP2)/ESP40 Cisco recommends a maximum of 500 branches with 20,000 application traffic classes. On a Route Processor 1 (RP1)/ESP10 Cisco recommends a maximum of 500 branches with 10,000 application traffic classes.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

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

Information About PfR Scaling Improvement for Application Traffic Class

PfR and PBR Scaling Enhancements

The PfR Scaling Improvement for Application Traffic Class feature introduces scaling enhancements to the number of application traffic classes (TCs) that are supported on each Performance Routing (PfR) border router (BR) for the Cisco ASR 1000 Series Router. New PfR and dynamic route-map scaling improvements allow BRs to support a maximum of 20,000 application traffic classes (TC) with a maximum of 500 dynamic route-map sequences. Currently only 5000 application traffic classes and 32 route map entries are allowed. The following table displays the new maximum limits by route processor.

Table 1: PfR and PBR Scaling by Route Processor

Route Processor	Max no. of Application TCs	Max no. of Route Map Entries
RP2/ESP40	20,000	500
RP1/ESP10	10,000	500

To configure a higher maximum number of prefixes that a Performance Routing (PfR) master controller will monitor or learn, use the **max prefix (PfR)** command. The defaults are set at 5000 prefixes to be monitored, and up to 2500 prefixes to be learned, but both these values can be set to 20,000 depending on the type of route processor as shown in the table above.

How to Configure PfR Scaling Improvement for Application Traffic Class

Configuring PfR Application Traffic Class Scaling

Perform this task on a master controller to increase the maximum number of application traffic classes that Performance Routing (PfR) monitors or learns. Larger networks demand scalable solutions and the PfR Scaling Improvement for Application Traffic Class feature introduces scaling enhancements to the number of application traffic classes that are supported on each PfR border router (BR) for the Cisco ASR 1000 Series Router. New PfR and dynamic route-map scaling improvements allow BRs to support a maximum of 20,000 application traffic classes with a maximum of 500 dynamic route-map sequences.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **pfr master**
4. **max prefix total** *number* [**learn** *number*]
5. **end**
6. **show platform hardware qpf active feature pbr class-group** [*cg-id*] [**class** [*class-id*]]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**pfr master** **Example:** `Device(config)# pfr master`	Enters PfR master controller configuration mode to configure a router as a master controller and to configure global operations and policies.
Step 4	**max prefix total** *number* [**learn** *number*] **Example:** `Device(config-pfr-mc)# max prefix total 15000 learn 12000`	Sets the maximum number of prefixes that a PfR master controller will monitor or learn. • In this example, PfR is set to monitor 15,000 prefixes (application traffic classes) and learn a maximum of 12,000 prefixes.
Step 5	**end** **Example:** `Device(config-pfr-mc)# end`	Exits PfR master controller configuration mode and returns to privileged EXEC mode.
Step 6	**show platform hardware qpf active feature pbr class-group** [*cg-id*] [**class** [*class-id*]] **Example:** `Device# show platform hardware qpf active feature pbr class-group 2 class 6`	(Optional) Displays policy-based routing (PBR) class group information in the active Cisco Quantum Flow Processor (QFP).

Examples

The following example output from the **show platform hardware qpf active feature pbr** command is used to display the policy-based routing (PBR) class group information in the active Cisco Quantum Flow Processor (QFP). In this example, information about class-group 2 and the class ID of 6 is displayed.

```
Device# show platform hardware qpf active feature pbr class-group 2 class 6

Class ID: 6
  hw flags enabled: action, prec
  hw flags value: (0x0000000a)
  tos: 0
  precedence: 160
  nexthop: 0.0.0.0
  adj_id: 0
  table_id: 0
  extra_action_size: 0
  cpp_num: 0
  extra_ppe_addr: 0x00000000
  stats_ppe_addr: 0x8bc6a090
```

Displaying and Verifying PfR and PBR Scaling Improvements

Perform this task to display platform-specific configuration and statistics information about Performance Routing (PfR) and policy-based routing (PBR) application traffic classes. These modified and existing commands can be entered on a master controller after learn lists are configured and traffic classes are automatically learned, or when traffic classes are manually configured using a PfR map. The commands can be entered in any order and all the commands are optional.

SUMMARY STEPS

1. **enable**
2. **show platform software pbr** *slot* {**active** {**class-group** {**all** | *cg-id* | **interface** {**all** | **name** *intf-name*} | **route-map** {**all** | **name** *rmap-name* | **sequence** *cgm-class-id*} | **statistics**} | **standby statistics**}
3. **show platform software route-map** {**client** | **counters** | *slot*} {**active** | **standby**} {**cgm-filter** | **feature-references** | **map** | **stats** | **summary**}
4. **show platform hardware qpf active feature pbr class-group** [*cg-id*] [**class** [*class-id*]]

DETAILED STEPS

Step 1 **enable**

Enables privileged EXEC mode. Enter your password if prompted.

Example:

```
Router> enable
```

Step 2 **show platform software pbr** *slot* {**active** {**class-group** {**all** | *cg-id* | **interface** {**all** | **name** *intf-name*} | **route-map** {**all** | **name** *rmap-name* | **sequence** *cgm-class-id*} | **statistics**} | **standby statistics**}

This command is used to display information about Policy-Based Routing (PBR) information. The following example output is for an embedded services processor and shows information for all the active route maps.

Example:

```
Device# show platform software pbr fp active route-map all

Route-map: rtmap-test
CG_id: 1, AOM obj id: 278
Sequence      CGM class ID    AOM ID    Action AOM ID
10            1               327       328
Interface                          AOM id
GigabitEthernet0/0/2                 281
Route-map: test
CG_id: 2, AOM obj id: 608
Sequence      CGM class ID    AOM ID    Action AOM ID
10            2               609       610
20            3               611       612
30            4               613       614
40            5               615       616
50            6               617       618
60            7               619       620
70            8               621       622
Interface                          AOM id
GigabitEthernet0/0/0.773           630
```

Step 3 **show platform software route-map** {**client** | **counters** | *slot*} {**active** | **standby**} {**cgm-filter** | **feature-references** | **map** | **stats** | **summary**}

This command is used to display platform-specific configuration and statistics related to route map information on Cisco ASR 1000 Series Routers. In this example, the information about active route map feature references for the embedded service processor is displayed.

Example:

```
Device# show platform software route-map fp active feature-references

Name                   Feature     Class-group      Class       VRF id
-------------------------------------------------------------------------
test                   PBR         2                0           0
rtmap-test             PBR         1                0           0
```

Step 4 **show platform hardware qpf active feature pbr class-group** [*cg-id*] [**class** [*class-id*]]

This command is used to display the policy-based routing (PBR) class group information in the active Cisco Quantum Flow Processor (QFP). The following example output display information about class-group 2 and the class ID of 6.

Example:

```
Device# show platform hardware qfp active feature pbr class-group 2 class 6

Class ID: 6
  hw flags enabled: action, prec
  hw flags value: (0x0000000a)
  tos: 0
  precedence: 160
  nexthop: 0.0.0.0
  adj_id: 0
  table_id: 0
  extra_action_size: 0
  cpp_num: 0
```

```
extra_ppe_addr: 0x00000000
stats_ppe_addr: 0x8bc6a090
```

Configuration Examples for PfR Scaling Improvement for Application Traffic Class

Example: Configuring PfR Application Traffic Class Scaling

The following example shows how to set PfR to monitor 15,000 prefixes (application traffic classes) and learn a maximum of 2500 prefixes:

```
Device> enable
Device# configure terminal
Device(config)# pfr master
Device(config)# max prefix total 20000 learn 2500
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
Cisco IOS PfR commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	Cisco IOS Performance Routing Command Reference
Basic PfR configuration for Cisco IOS XE releases	“Configuring Basic Performance Routing” module
Information about configuration for the border router only functionality for Cisco IOS XE Releases 3.1 and 3.2	“Performance Routing Border Router Only Functionality” module
Concepts required to understand the Performance Routing operational phases for Cisco IOS XE releases	“Understanding Performance Routing” module
Advanced PfR configuration for Cisco IOS XE releases	“Configuring Advanced Performance Routing” module
IP SLAs overview	“Cisco IOS IP SLAs Overview” module

Related Topic	Document Title
PfR home page with links to PfR-related content on our DocWiki collaborative environment	PfR:Home

MIBs

MIB	MIBs Link
• CISCO-PFR-MIB • CISCO-PFR-TRAPS-MIB	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for PfR Scaling Improvement for Application Traffic Class

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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Table 2: Feature Information for PfR Scaling Improvement for Application Traffic Class

Feature Name	Releases	Feature Information
PfR Scaling Improvement for Application Traffic Class	Cisco IOS XE Release 3.8S	The PfR Scaling Improvement for Application Traffic Class feature introduces scaling enhancements to the number of application traffic classes that are supported on each Performance Routing (PfR) border router. The following commands were introduced or modified: **max prefix (PfR)**, **show platform software route-map**, **show platform software pbr**, **show platform hardware qfp active feature pbr**.