

Chapter 20

Configuring QoS for Gigabit Ethernet Interfaces and VLAN Subinterfaces

This chapter provides information for configuring QoS for Gigabit Ethernet interfaces and VLAN subinterfaces.

QoS topics are discussed in the following sections:

- Providing QoS for Ethernet Overview on page 185
- QoS Shaping Mode for Ethernet Interfaces Overview on page 186
- Configuring the QoS Shaping Mode for Ethernet Interfaces on the ES2 4G LM on page 187
- Creating a QoS Interface Hierarchy for Bulk-Configured VLAN Subinterfaces with RADIUS on page 188
- Monitoring QoS Configurations for Ethernet on page 191

Providing QoS for Ethernet Overview

Managing the bandwidth of downstream ATM traffic to Ethernet interfaces is difficult because of different layer 2 encapsulations and the ATM cell pad, trailer, and header.

The SAR scheduler is not available for Ethernet interfaces. However, you can still configure the operational shaping mode to shape downstream ATM traffic based on either frames or cells. Configuring cell-based shaping enables you to reduce packet drops in the Ethernet network by adjusting shaping for the ATM cell pad, trailer, and header.

You can also use RADIUS to provide QoS on bulk-configured VLAN subinterfaces.

Related Topics

- QoS Shaping Mode for Ethernet Interfaces Overview on page 186
- Creating a QoS Interface Hierarchy for Bulk-Configured VLAN Subinterfaces with RADIUS on page 188
- To configure subscriber-based QoS for 802.3ad link aggregation interfaces, see *QoS for 802.3ad Link Aggregation Interfaces Overview* on page 194

QoS Shaping Mode for Ethernet Interfaces Overview

The SAR scheduler is not available for Ethernet interfaces. However, you can still configure the operational shaping mode to shape ATM traffic based on either frames or cells by issuing the **qos-shaping-mode** command.

Frame is the default shaping mode for Ethernet interfaces on all E-series routers. You can configure the cell shaping mode only for Gigabit Ethernet and 10-Gigabit Ethernet interfaces configured on the ES2 4G LM on the E120 router and the E320 router.

When you use cell shaping mode to configure the shaping or policing rate, the resulting traffic stream conforms exactly to the policing rates configured in downstream ATM switches. Using cell shaping also reduces the number of packet drops in the Ethernet network.

The setting for port 0 provides the default shaping mode for all ports on the same I/O module or IOA. Individual ports can have a specific shaping mode setting that overrides the setting for port 0.

If you do not configure the QoS shaping mode for a port, the shaping mode is calculated using the value for port 0 on the same I/O module or IOA. If the port's shaping mode is configured, the system uses the port's shaping mode.

Table 19 lists the possible combinations of the **qos-shaping-mode** command and the resultant operational shaping mode.

Table 19: Operational Shaping Modes

qos-shaping-mode for Port 0	qos-shaping-mode for Other Ports	Operational Shaping Mode
Cell	Cell	Cell
Frame	Frame	Frame
Cell	Frame	Frame
Frame	Cell	Cell
Frame	No shaping mode	Frame
Cell	No shaping mode	Cell
No shaping mode	No shaping mode	Frame

To account for different layer 2 encapsulations, you can configure the byte adjustment application using QoS parameters. The byte adjustment is calculated differently for frame shaping mode than cell shaping mode.



NOTE: You can also use the QoS cell mode application with QoS parameters to configure the shaping mode for a port.

Related Topics

- Configuring the QoS Shaping Mode for Ethernet Interfaces on the ES2 4G LM on page 187
- Byte Adjustment for Shaping Overview on page 287
- Cell Shaping Mode Using QoS Parameters Overview on page 275

Configuring the QoS Shaping Mode for Ethernet Interfaces on the ES2 4G LM

You can configure the shaping mode for an Ethernet interface.

In frame mode, traffic shaping is controlled by the system. Shaping is based on the number of bytes in the frame, without regard to cell encapsulation or padding overhead; this is the default mode for all E-series routers.

In cell mode, shaping is controlled by the QoS application. Shaping is based on the number of bytes in cells, and accounts for the ATM cell encapsulation and padding overhead. This option is available only for Gigabit Ethernet and 10-Gigabit Ethernet interfaces configured on the ES2 4G LM on the E120 router and the E320 router.

1. Configure the Ethernet interface.

```
host1(config)#interface gigabitEthernet 6/0/0
```

2. Configure the shaping mode and specify frame or cell.

```
host1(config)#qos-shaping-mode cell
```



BEST PRACTICE: We recommend that you clear the statistics counters whenever you change the QoS shaping mode. Otherwise, the statistics contain a mixture of frame-based and cell-based values.

Related Topics

- QoS Shaping Mode for Ethernet Interfaces Overview on page 186
- **interface gigabitEthernet** command
- **qos-shaping-mode** command

Creating a QoS Interface Hierarchy for Bulk-Configured VLAN Subinterfaces with RADIUS

Bulk-configured VLAN subinterfaces are created dynamically, so you cannot apply a QoS profile directly to a VLAN subinterface. Instead, you can use subscriber service profiles and RADIUS to apply QoS profiles.

To create an interface hierarchy for bulk-configured VLAN subinterfaces:

1. Configure the bulk-configured VLAN subinterface.

```
host1(config)#interface gigabitEthernet 6/0/0
host1(config-if)#encapsulation vlan
host1(config-if)#auto-configure vlan
host1(config-if)#vlan bulk-config BulkConfig
host1(config-if)#profile vlan bulk-config BulkConfig vlanBulkProfile
host1(config-if)#vlan bulk-config BulkConfig vlan-range 1 3600
```

2. Configure the profiles and service profile for the bulk-configured VLAN subinterfaces and the IP upper-layer encapsulation.

```
host1(config-if)#profile vlanBulkProfile
host1(config-profile)#vlan auto-configure ip
host1(config-profile)#vlan profile ip ipProfile
host1(config-profile)#vlan service-profile vlanServiceProfile
host1(config-profile)#exit
host1(config-profile)#profile ipProfile
host1(config-profile)#ip unnumbered loopback 0
host1(config-profile)#exit
```

3. Configure an IP service profile.

```
host1(config)#ip service-profile vlanServiceProfile
host1(config-service-profile)#user-name "vlan@test"
host1(config-service-profile)#password 56789
host1(config-service-profile)#exit
```



TIP: Configure the service profile in the default virtual router or the virtual router in which RADIUS is configured.

4. Access the RADIUS server and assign values for the RADIUS attributes necessary for creating a QoS interface hierarchy, including the QoS profile name. For example:

- Juniper VSA Qos-Profile-Name [26-26]—QoS profile name
- (Optional) Juniper VSA Virtual-Router [26-1]—Virtual router name
- (Optional) IETF VSA [22]—Framed-Route

5. Verify that the attributes are being used by RADIUS.

The highlighted output from this debug log message shows the QoS profile, virtual router, and framed route attributes configured through RADIUS.

```

DEBUG 06/17/2007 14:50:19 radiusSendAttributes: ACCESS-REQUEST attributes (default)
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      username attr added: vlan@test
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      acct-session-id attr added: erx GigabitEthernet
2/1.100:100:0004194348
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      user-password attr added: <value withheld>
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      calling-station-id attr added: #ananke#E21#100
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      nas-port-type attr added: 15
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      nas-port attr added: 553648228
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      nas-port-id attr added: GigabitEthernet
2/1.100:100
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      nas-ip-address attr added: 172.26.27.50
DEBUG 06/17/2007 14:50:19 radiusSendAttributes:      nas-identifier attr added: ananke
DEBUG 06/17/2007 14:50:19 radiusAttributes: USER ATTRIBUTES: (vlan@test)
DEBUG 06/17/2007 14:50:19 radiusAttributes:      class attr: (binary data)
DEBUG 06/17/2007 14:50:19 radiusAttributes: total eap message attr length = 0
DEBUG 06/17/2007 14:50:19 radiusAttributes:      framed route attr: 40.40.41.0/30 0.0.0.0
DEBUG 06/17/2007 14:50:19 radiusAttributes:      ingress policy name (vsa) attr: test
DEBUG 06/17/2007 14:50:19 radiusAttributes:      ingress policy stats (vsa) attr: 1
DEBUG 06/17/2007 14:50:19 radiusAttributes:      egress policy name (vsa) attr: test
DEBUG 06/17/2007 14:50:19 radiusAttributes:      egress policy stats (vsa) attr: 1
DEBUG 06/17/2007 14:50:19 radiusAttributes:      qos profile name (vsa) attr: test
DEBUG 06/17/2007 14:50:19 radiusAttributes:      virtual router name (vsa) attr: server

```

6. Verify that the interface was created in the default virtual router.

host1:server#show ip interface brief

Interface	IP-Address	Status	Protocol	Description
-----	-----	-----	-----	-----
null0	255.255.255.255/32	up	up	
loopback0	10.1.0.1/24	up	up	
GigabitEthernet6/0.100	Unnumbered	up	up	

7. Verify that the framed route is installed.

host1:server#show ip route

Prefix/Length	Type	Next Hop	Dst/Met	Interface
-----	-----	-----	-----	-----
10.1.0.0/24	Connect	10.1.0.1	0/0	loopback0
40.40.41.0/30	Access	0.0.0.0	3/2	GigabitEthernet6/0/0.100



TIP: When you initially create the user record for dynamic IP interfaces using VSA [22], you might not know the next hop. In this case, specify the value 0.0.0.0 for the next hop. The E-series router then assigns the subinterface associated with the user as the next hop in the routing table.

8. Verify that the correct QoS profile is attached to the VLAN subinterface.

```

host1:server#show qos interface-hierarchy interface gigabitEthernet
6/0/0.100
attachment@ ip GigabitEthernet6/0/0.100:
      qos profile      t-class interface rule  traffic scheduler  queue
      qos profile      group   type   type   class  profile  profile
-----
test@GigabitEthernet6/0/0.100      vlan      node  default  default

```

Related Topics

- For information about bulk-configured VLAN subinterfaces, see *JUNOS Link Layer Configuration Guide, Chapter 13, Configuring Dynamic Interfaces Using Bulk Configuration*
- For information about service profiles, see *JUNOS Broadband Access Configuration Guide, Chapter 23, Configuring Subscriber Management*
- For information about RADIUS VSAs, see *JUNOS Broadband Access Configuration Guide, Chapter 3, Configuring RADIUS Attributes*
- **auto-configure vlan** command
- **encapsulation vlan** command
- **interface gigabitEthernet** command
- **ip service-profile** command
- **profile** command
- **profile vlan bulk-config** command
- **vlan auto-configure** command
- **vlan bulk-config** command
- **vlan profile** command
- **vlan service-profile** command
- **show ip interface** command
- **show ip route** command
- **show qos interface-hierarchy** command

Monitoring QoS Configurations for Ethernet

To monitor Ethernet configurations for QoS:

- Monitoring the QoS Configuration of Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet Interfaces on page 338
- Monitoring the QoS Configuration of IP Interfaces on page 337
- Monitoring the QoS Profiles Attached to an Interface on page 331
- Monitoring the Configuration of QoS Port-Type Profiles on page 333
- Monitoring the Configuration of QoS Profiles on page 333
- Monitoring the QoS Scheduler Hierarchy on page 318
- Monitoring Shared Shapers on page 323

