Configuring Network QoS

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About Network QoS

The network QoS policy defines the characteristics of QoS properties network wide. With a network QoS policy, you can configure the following:

- Pause behavior—You can decide whether a QoS group requires the lossless behavior. The lossless behavior is provided by using a priority flow control (PFC) mechanism that prevents packet loss during congestion. You can configure drop (frames with this value that can be dropped) and no drop (frames with this value that cannot be dropped). For the drop and no drop configuration, you also need to enable PFC per port. For more information about PFC, see the "Configuring Priority Flow Control" section.

Licensing Requirements for Network QoS

The following table shows the licensing requirements for this feature:

<table>
<thead>
<tr>
<th>Product</th>
<th>License Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS</td>
<td>The QoS feature does not require a license. Any feature not included in a license package is bundled with the NX-OS image and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the Cisco NX-OS Licensing Guide.</td>
</tr>
</tbody>
</table>
Prerequisites for Network QoS

The network QoS policy has the following prerequisites:

• You must be familiar with using modular QoS CLI.
• You are logged on to the device.

Guidelines and Limitations for Network QoS

The network QoS policy has the following guidelines and limitations:

• `show` commands with the `internal` keyword are not supported.

• Changing the network QoS policy is a disruptive operation, and it can cause traffic drops on any or all ports.

• When enabling jumbo MTU, the default network QoS policy can support jumbo frames. Under the network QoS policy, the MTU is used only for buffer carving when no-drop classes are configured. No additional MTU adjustments are required under the network QoS policy to support jumbo MTU.

• Network QoS is not supported on the Cisco Nexus 9508 switch.

• Beginning with NX-OS 7.0(3)17(4), you can enable a network QoS pause configuration per QoS class with the `pause pfc-cos cos-list receive` command for the receive-only PFC option. When specifying this option, PFC pause frame generation is disabled for a particular queueing policy class or queue.

A network QoS policy can have a maximum combined total of six asymmetric PFC (APFC) and PFC classes.

Note: PFC is required to be enabled on a port to support APFC on that port.

• The following section describes the guidelines and limitations for Dynamic Packet Prioritization:

Dynamic Packet Prioritization

Dynamic Packet Prioritization (DPP) prioritizes a configured number of packets of every new flow in a particular class of traffic is prioritized and sent through a configured class of traffic that DPP is mapped to.

When the number of packets in a flow reaches a specific threshold, prioritization ends and the subsequent packets in the flow go to the normal class.

Note: Default number of packets is 120.

• Maximum number of packets:
  • Application Spine Engine (ASE2) enabled switches — 256
DPP uses an age-out timer to evict idle flows.

Default age-period is 5 msec.

The DPP feature is enabled on a queue using the `dpp set-qos-group` command under a network QoS policy configuration.

A DPP enabled queue cannot be a no-drop queue (For example, both pause pfc-cos and dpp cannot be enabled on the same queue.)

Configuring and applying the policy are as follows:

```
switch(config)# policy-map type network-qos dpp
switch(config-pmap-nqos)# class type network-qos c-8q-nq1
switch(config-pmap-nqos-c)# dpp set-qos-group 7

switch(config)# system qos
switch(config-sys-qos)# service-policy type network-qos dpp
```

Configuring the age-period and the max-num-packets are as follows:

```
switch(config)# hardware qos dynamic-packet-prioritization age-period 5000 usec
switch(config)# hardware qos dynamic-packet-prioritization max-num-pkts 120
```

### Configuring Network QoS Policies

You can configure a network QoS policy by following one of these methods:

- Predefined policies—You can apply a predefined network QoS policy that fits your requirement. By default, default-nq-policy is configured.

- User-defined policy—You can create a network QoS policy that conforms to one of the system-defined policies.

### Copying a Predefined Network QoS Policy

**SUMMARY STEPS**

1. `qos copy policy-map type network-qos default-nq-policy {prefix prefix | suffix suffix}`
2. `show policy-map type network-qos my_nq`
### Configuring a User-Defined Network QoS Policy

#### SUMMARY STEPS

1. configure terminal
2. class-map type network-qos match-any class-name
3. match qos-group group
4. exit
5. policy-map type network-qos policy-map-name
6. class type network-qos {class-name | class-default}
7. pause group

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> class-map type network-qos match-any class-name</td>
<td>Configures the class map of the type network-qos and enters class-map mode. Class network-qos names are listed in previous System-Defined Type network-qos Class Maps table.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config)# class-map type network-qos match-any c-nq2</td>
<td></td>
</tr>
<tr>
<td>switch(config-cmap-nqos)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> match qos-group group</td>
<td>Specifies the QoS group to match. The range is from 0 to 3.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config-cmap-nqos)# match qos-group 2</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> exit</td>
<td>Exits class-map mode and enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
</tbody>
</table>
Applying a Network QoS Policy on a System

You apply a network QoS policy globally on a system. Applying a network QoS policy also automatically applies the corresponding queuing policies.

**SUMMARY STEPS**

1. configure terminal
2. system qos
3. service-policy type network-qos \{policy-map-name | default-nq-policy\}

**DETAILED STEPS**

<table>
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<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> switch# configure terminal switch (config)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> system qos</td>
<td>Enters system qos mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> switch (config)# system qos switch (config-sys-qos)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> service-policy type network-qos {policy-map-name</td>
<td>default-nq-policy}</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Note** To restore the system to the default network QoS service policy, use the no form of this command.
Verifying the Network QoS

To display the policing configuration information, perform one of the following tasks:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>show class-map type network-qos</td>
<td>Displays the type network-qos class maps.</td>
</tr>
<tr>
<td>show policy-map type network-qos</td>
<td>Displays the type network-qos policy maps.</td>
</tr>
<tr>
<td>show policy-map system type network-qos</td>
<td>Displays the active type network-qos class maps.</td>
</tr>
</tbody>
</table>

**Note**

All Layer 4 class-maps under the network-qos policy-map must be configured before applying it under the system qos level.