

Quality of Service

- Quality of service, on page 1
- Configure QoS using CLI, on page 2
- Verify QoS configuration using CLI, on page 3
- Configure 802.1p VLAN priority preference using CLI, on page 3
- Verify 802.1p VLAN priority preference configuration using CLI, on page 4
- Configure CoS remapping using CLI, on page 4
- Verify CoS remapping using CLI, on page 5
- Configure QoS shaping using CLI, on page 5
- Verify QoS shaping using CLI, on page 6

Quality of service

Quality of Service (QoS) is a network management framework that

- prioritizes certain types of network traffic over others
- maintains the quality and performance of critical applications, safety protocols such as voice and video, which are sensitive to delays and packet loss, and
- involves classifying, marking, and managing data packets to provide different levels of service quality.

Traffic classification based on QoS

Traffic classification is the process of distinguishing different types of traffic by examining packet fields. During classification, the device performs a lookup and assigns a QoS label to the packet. This label indicates all QoS actions to be performed on the packet and identifies the queue from which the packet is sent. When QoS is enabled, the device can classify the priority of the packet. URWB devices do not apply QoS labels for incoming or outgoing data traffic on the URWB network. Instead, it recognizes existing QoS markings assigned by the traffic source or at other points in the network. URWB devices accept the markings applied at Layer 2 (PCP/VLAN) or Layer 3 (DSCP).

Advantages of QoS

QoS provides these advantages:

- Prioritization: Manages traffic according to the QoS priority marked in the packet IP header.

- Bandwidth Management: Allocates network resources to ensure that high-priority applications have sufficient bandwidth.
- Latency Management: Minimizes delays in packet arrival time to maintain quality for time-sensitive applications.

QoS marking

QoS marking enables network devices to identify and handle packets according to their assigned priority. This process ensures that high-priority traffic is transmitted promptly and efficiently. QoS marking often uses the Differentiated Services Code Point (DSCP) or type of service (ToS) field in the IP header or the Priority Code Point (PCP) field in the VLAN header of an ethernet packet. These fields provide various priority levels. IW devices support eight priority levels, with 0 being the lowest priority and 7 being the highest. These 0 to 7 range is extracted from bits B5-B7 of the ToS value. ToS is the name for the complete 8-bit value found in an IP packet.

B7	B6	B5	B4	B3	B2	B1	B0
Priority			X	X	X	X	X

802.1p

802.1p is a standard developed by the IEEE as part of the broader 802.1Q specification. It addresses network traffic prioritization and QoS in Ethernet networks. This standard uses a 3-bit Priority Code Point (PCP) in the 802.1Q VLAN header to prioritize traffic.

QoS shaping

QoS shaping, also known as traffic shaping, is a network management technique used to control the flow of data across a network. It involves regulating the bandwidth available to different types of network traffic. This ensures that critical applications receive the necessary resources and prevents network congestion.

Configure QoS using CLI

Enable or disable Quality of Service (QoS) processing on the device to control network traffic flow and prioritization.

By default, QoS feature is disabled on the device. You can enable or disable QoS processing as needed for your network configuration requirements.

Procedure

Use the **configure qos status enabled** command to enable the QoS processing on the device.

Example:

```
Device# configure qos status enabled
```

Note

Use the **configure qos status disabled** command to disable the QoS configuration on the device.

Verify QoS configuration using CLI

Use the **show qos** command to verify the QoS configuration on the device.

QoS Enabled Output

```
Device# show qos
QoS: enabled
CoS map:
  0 1 2 3 4 5 6 7
  | | | | | | | |
[ 0 1 2 3 4 5 6 7 ]
qos-shaping disabled
qos-8021p disabled
```

QoS Disabled Output

```
Device# show qos
QoS: disabled
```

Configure 802.1p VLAN priority preference using CLI

This task enables or disables 802.1p VLAN priority preference over DSCP for IP packets on URWB devices, controlling how the device processes QoS markings.

When configuring QoS on URWB devices, you can control whether the device prioritizes Layer 2 VLAN CoS markings over Layer 3 DSCP markings. This configuration affects how the device examines and processes Quality of Service markings in packet headers.

Procedure

Use the **configure qos 8021p enabled** command to enable the 802.1p VLAN priority preference over DSCP for IP packets.

Example:

```
Device# configure qos 8021p enabled
```

Note
Use the **configure qos 8021p disabled** command to disable the 802.1p on the device.

- If QoS 802.1p option is disabled, a URWB device first examines the QoS marking in the L3 header. If no marking is found there, it then checks the L2-VLAN header.
- If the QoS 802.1p option is enabled, an URWB device only considers the CoS value in the PCP field of the VLAN tag.

Verify 802.1p VLAN priority preference configuration using CLI

Use the **show qos** command to verify the QoS 802.1p configuration on the device.

```
Device# show qos
QoS: enabled
CoS map:
  0 1 2 3 4 5 6 7
  | | | | | | | |
[ 0 1 2 3 4 5 6 7 ]
qos-shaping disabled
qos-8021p enabled
```

Configure CoS remapping using CLI

Configure CoS remapping to adjust QoS priority marks according to the network administrator's design and to change priorities for one or more CoS values.

The URWB system allows remapping of the QoS priority marks based on a network administrator's design. This configuration helps in managing bandwidth and ensuring that higher priority traffic is delivered more efficiently.

Procedure

Use the **configure qos cos-map** *values* command to map CoS values of incoming packets to different CoS values.

Example:

```
Device# configure qos cos-map 0 1 2 3 4 4 4 4
```

In the example, CoS remapping is done as follows:

- CoS 0 remains 0
- CoS 1 remains 1
- CoS 2 remains 2
- CoS 3 remains 3
- CoS 4 remains 4
- CoS 5, 6 7 is remapped to 4

Here the packets with CoS values of 5, 6, and 7 are remapped to 4, effectively giving them the same priority as packets originally marked with CoS 4.

Important
The URWB system manages the remapping process without altering the original marking. The remapped QoS priorities are significant and valid only within the URWB network.

Verify CoS remapping using CLI

Use the **show qos** command to verify the CoS remapping configuration on the device.

```
Device# show qos
QoS: enabled
CoS map:
  0 1 2 3 4 5 6 7
  | | | | | | | |
[ 0 1 2 3 4 4 4 4 ]
qos-shaping disabled
qos-8021p disabled
```

Configure QoS shaping using CLI

Configure QoS shaping to allocate and control bandwidth for different classes of service (CoS) on a network device, ensuring proper traffic management and bandwidth utilization.

QoS shaping allows you to manage network traffic by setting bandwidth limits for different CoS values, helping to prioritize critical traffic and control network congestion.

Procedure

Step 1 Use the **configure qos shaper-rates** *bandwidths* command to allocate bandwidth for different CoS on the device.

Example:

```
Device#configure qos shaper-rates 30000 50000 50000 50000 0 0 0 0
```

Note
All eight bandwidths cannot be with zero.

In this example, configure bandwidth for each CoS value.

- CoS 0 is assigned with a rate of 30,000 kbps,
- CoS 1 to 3 is assigned with a rate of 50,000 kbps, and
- CoS 4 to 7 are set to 0 kbps, 0 means unlimited rate (no bandwidth restriction).

Step 2 Use the **configure qos shaping enabled** command to enable QoS shaping.

Example:

```
Device#configure qos shaping enabled
```

Note

- Use the **configure qos shaping disabled** command to disable the QoS Shaping on the device.
- If the network is running a throughput-restricted license, the sum of the bandwidths of all classes must not exceed the licensed throughput limit.

Verify QoS shaping using CLI

Use the **show qos** command to verify the QoS shaping configuration on the device.

```
Device# show qos
QoS: enabled
CoS map:
  0 1 2 3 4 5 6 7
  | | | | | | | |
[ 0 1 2 3 4 5 6 7 ]
qos-shaping enabled
Shaper rates (Kbps): 30000 50000 50000 50000 0 0 0 0
qos-8021p disabled
```