

FEX QoS Configuration

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FEX QoS Configuration Information

Note FEX QoS is not supported on the Cisco Nexus 9508 switch (NX-OS 7.0(3)F3(3).

Note Only 4Q queuing policy model is supported on FEX. When you try to bring up FEX in 8Q queuing policy mode you will get an error message.

- Classification (system type qos policy)

Type	**System Level** **Action**	**Hardware Implementation** Direction: IN	
		FEX	Switch
match	cos	Yes	No
	ip access list	No	No
	dscp	No	No
	ip	No	No
	precedence	No	No
	protocol	No	No
set	qos-group	Yes	No

FEX QoS Configuration

	precedence	No	No
	dscp	No	No
	cos	No	No
Type	**Interface Level** **Action**	**Hardware Implementation** Direction: IN	
		FEX	Switch
match	cos	No	Yes
	ip access list	No	Yes
	dscp	No	Yes
	ip	No	Yes
	precedence	No	Yes
	protocol	No	Yes
set	dscp	No	Yes
	precedence	No	Yes
	qos-group	No	Yes
	cos	No	Yes

- Input queuing

System Level **Action**	**Hardware Implementation** Direction: IN	
	FEX	Switch
Bandwidth	Yes	No
Bandwidth Remaining	Yes	No
Priority (only level 1)	Yes	No
Interface Level **Action**	**Hardware Implementation** Direction: IN	
	FEX	Switch
Bandwidth	No	No
Bandwidth Remaining	No	No
Priority	No	No

- Output queuing

System Level **Action**	**Hardware Implementation** Direction: OUT	
	FEX	Switch
Bandwidth	Yes	Yes
Bandwidth Remaining	Yes	Yes
Priority (only level 1 on FEX, 3 levels on switch)	Yes	Yes

Interface Level **Action**	**Hardware Implementation** Direction: OUT	
	FEX	Switch
Bandwidth	No	Yes
Bandwidth Remaining	No	Yes
Priority	No	Yes

TCAM Carving for FEX QoS

You must free up unused TCAM space to accommodate TCAM carving for FEX QoS.

Note FEX QoS is not supported on the Cisco Nexus 9508 switch (NX-OS 7.0(3)F3(3).

- For FEX QoS TCAM carving for IPv4 traffic, you can use the **hardware access-list tcam region fex-qos 256** command.

  As a best practice, you can use the **hardware access-list tcam region fex-qos-lite 256** command when policers are not used.

Note The fex-qos-lite region does not have conformed policer statistics support for IPv4.

- For IPv6 QoS TCAM carving support, you can use the **hardware access-list tcam region fex-ipv6-qos 256** command.
- For MAC based QoS TCAM carving support, you can use the **hardware access-list tcam region fex-mac-qos 256** command.

- When configuring end to end queuing from the HIF to the front panel port, the QoS classification policy needs to be applied to both system and HIF. This allows the FEX to queue on ingress appropriately (system) and allows the egress front panel port to queue appropriately (HIF).

  Example:

```
system qos
  service-policy type qos input LAN-QOS-FEX

interface Ethernet101/1/12
  service-policy type qos input LAN-QOS-FEX
```

Example of a FEX QoS Marking Policy Configuration

The following example is to configure set cos when the incoming traffic is untagged on the Layer 3 uplink port with DSCP values. In this way, it carries cos values to the FEX ports when traffic comes on the Layer 3 port and egress out on the FEX HIF port.

```
class-map type qos match-all DSCP8
       match dscp 8
class-map type qos match-all DSCP16
       match dscp 16
class-map type qos match-all DSCP32
       match dscp 32
policy-map type qos-remark
      class  DSCP8
           set qos-group 1
           set cos 0
      class  DSCP16
           set qos-group 2
           set cos 1
      class  DSCP32
           set qos-group 3
           set cos 3
     class  class-default
```

For configuring the uplink Layer 3 ports:

```
Int ethx/y
     Service-policy type qos input qos-remark
```

FEX QoS Configuration Example

Note FEX QoS is not supported on the Cisco Nexus 9508 switch (NX-OS 7.0(3)F3(3).

The following are examples of the aspects of a FEX QoS configuration.

Classification (system type qos policy)

Policies of type qos are applied to classify incoming packets.

- Class map configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.

switch(config)# class-map type qos match-all cos0
switch(config-cmap-qos)# match cos 0
switch(config-cmap-qos)#
switch(config-cmap-qos)# class-map type qos match-all cos1
switch(config-cmap-qos)# match cos 1
switch(config-cmap-qos)#
switch(config-cmap-qos)# class-map type qos match-all cos2
switch(config-cmap-qos)# match cos 2
switch(config-cmap-qos)#
switch(config-cmap-qos)# class-map type qos match-all cos3
switch(config-cmap-qos)# match cos 3
switch(config-cmap-qos)#
```

- Policy map configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.

switch(config)# policy-map type qos setpol
switch(config-pmap-qos)# class  cos0
switch(config-pmap-c-qos)# set qos-group 1
switch(config-pmap-c-qos)# class  cos1
switch(config-pmap-c-qos)# set qos-group 2
switch(config-pmap-c-qos)# class  cos3
switch(config-pmap-c-qos)# set qos-group 3
switch(config-pmap-c-qos)# class  class-default
switch(config-pmap-c-qos)#
```

- Attach service policy to system target configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.

switch(config)# system qos
switch(config-sys-qos)# service-policy type qos input setpol
```

- Verifying classification:

```
switch# show policy-map system type qos

          Service-policy (qos) input:   setpol
            policy statistics status:   disabled (current status: disabled)

            Class-map (qos):   cos0 (match-all)
              Match: cos 0
              set qos-group 1

            Class-map (qos):   cos1 (match-all)
              Match: cos 1
              set qos-group 2

            Class-map (qos):   cos23 (match-all)
              Match: cos 2-3
              set qos-group 3

            Class-map (qos):   class-default (match-any)
```

FEX QoS Configuration

```
switch# show queuing interface ethernet 101/1/1

slot  1
=======
Ethernet101/1/1 queuing information:
  Input buffer allocation:
  Qos-group: ctrl
  frh: 0
  drop-type: drop
  cos: 7
  xon       xoff      buffer-size
  ---------+---------+-----------
  2560      7680      10240
  Qos-group: 0  1  2  3  (shared)
  frh: 2
  drop-type: drop
  cos: 0 1 2 3 4 5 6
  xon       xoff      buffer-size
  ---------+---------+-----------
  19200     24320     48640
  Queueing:
  queue    qos-group    cos            priority  bandwidth mtu
  --------+------------+--------------+---------+---------+----
  ctrl-hi  n/a          7               PRI         0      2400
  ctrl-lo  n/a          7               PRI         0      2400
  2        0            4 5 6           WRR        10      9280
  3        1            0               WRR        20      9280
  4        2            1               WRR        30      9280
  5        3            2 3             WRR        40      9280
  Queue limit: 66560 bytes

Queue Statistics:
  queue  rx              tx              flags
  ------+---------------+---------------+-----
  0      0               68719476760      ctrl
  1      1               1                ctrl
  2      0               0                data
  3      1               109453           data
  4      0               0                data
  5      0               0                data

  Port Statistics:
  rx drop         rx mcast drop   rx error        tx drop         mux ovflow
  ---------------+---------------+---------------+---------------+--------------
  0               0               0               0               InActive

  Priority-flow-control enabled: no
  Flow-control status: rx 0x0, tx 0x0, rx_mask 0x0
  cos     qos-group   rx pause  tx pause  masked rx pause
  -------+-----------+---------+---------+---------------
  0              1    xon       xon       xon
  1              2    xon       xon       xon
  2              3    xon       xon       xon
  3              3    xon       xon       xon
  4              0    xon       xon       xon
  5              0    xon       xon       xon
  6              0    xon       xon       xon
  7            n/a    xon       xon       xon

  DSCP to Queue mapping on FEX
 ----+--+-----+-------+--+---

 DSCP to Queue map disabled
```

```
 FEX TCAM programmed successfully

switch#


switch# attach fex 101

fex-101# show platform software qosctrl port 0 0 hif 1
number of arguments 6: show port 0 0 3 1
-------------------------------------------------------
QoSCtrl internal info {mod 0x0 asic 0 type 3 port 1}

PI mod 0 front port 0 if_index 0x00000000
   ups 0 downs 0 binds 0
Media type 0
Port speed 0
MAC addr b0:00:b4:32:05:e2
Port state: , Down

Untagged COS config valid: no
Untagged COS dump:
rx_cos_def[0]=0, tx_cos_def[0]=0
rx_cos_def[1]=3, tx_cos_def[1]=3
Last queueing config recvd from supId: 0
-----SUP 0  start -----

Queuing config per qos_group
Interface queueing config valid: no

 Queueing per qos_group: 00006|
    |id|bw%|bw_unit|priority
grp |00|100|0000000|00000000
grp |01|000|0000000|00000000
grp |02|000|0000000|00000000
grp |03|000|0000000|00000000
grp |04|000|0000000|00000000
grp |05|000|0000000|00000000


Scheduling Classes 00008|
      |id|cbmp|qid|bw%|nor_bw%|bw_unit|prio|dir |q2cos|class_grp|wk_gmap
class |00|0x01|000|000|0000000|0000007|0001|  TX| 0x80|000000000|0000000
class |01|0x02|001|000|0000000|0000007|0001|  TX| 0x00|000000000|0000000
class |02|0x04|002|000|0000000|0000007|0000|  TX| 0x08|000000002|0000000
class |03|0x08|003|100|0000100|0000007|0000|  TX| 0xf7|000000003|0000000
class |04|0x10|004|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |05|0x20|005|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |06|0x40|006|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |07|0x80|007|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000

-----SUP 0  end -----

-----SUP 1  start -----

Queuing config per qos_group
Interface queueing config valid: no

 Queueing per qos_group: 00006|
    |id|bw%|bw_unit|priority
grp |00|100|0000000|00000000
grp |01|000|0000000|00000000
grp |02|000|0000000|00000000
grp |03|000|0000000|00000000
```

```
grp |04|000|0000000|00000000
grp |05|000|0000000|00000000

 Scheduling Classes 00008|
      |id|cbmp|qid|bw%|nor_bw%|bw_unit|prio|dir |q2cos|class_grp|wk_gmap
class |00|0x01|000|000|0000000|0000007|0001|  TX| 0x80|000000000|0000000
class |01|0x02|001|000|0000000|0000007|0001|  TX| 0x00|000000000|0000000
class |02|0x04|002|000|0000000|0000007|0000|  TX| 0x08|000000002|0000000
class |03|0x08|003|100|0000100|0000007|0000|  TX| 0xf7|000000003|0000000
class |04|0x10|004|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |05|0x20|005|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |06|0x40|006|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |07|0x80|007|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000

-----SUP 1  end -----

PFC 0 (disabled), net_port 0x0
END of PI SECTION
HIF0/0/1


Default CoS: 0
CoS  Rx-Remap  Tx-Remap  Class
----+---------+---------+-----
0    0         0         3
1    1         1         4
2    2         2         5
3    3         3         5
4    4         4         2
5    5         5         2
6    6         6         2
7    7         7         1

Class  FRH  CT-En  MTU-Cells [Bytes]
------+----+------+-----------------
0      0    0      30  [2400 ]
1      0    0      30  [2400 ]
2      2    0      116 [9280 ]
3      2    0      116 [9280 ]
4      2    0      116 [9280 ]
5      2    0      116 [9280 ]
6      2    0      127 [10160]
7      2    0      127 [10160]

FRH configuration:
  Port En: 1, Tail Drop En: 0, Emergency Stop En: 1, Err Discard En: 1

FRH  Xon  Xoff  Total  Pause  u-Pause  Class-Map
----+----+-----+------+------+--------+---------
0    2    6     8      1      0        0x03
1    0    0     0      0      0        0x00
2    15   19    38     1      0        0x3c
3    0    0     0      0      0        0x00
4    0    0     0      0      0        0x00
5    0    0     0      0      0        0x00
6    0    0     0      0      0        0x00
7    0    0     0      0      0        0x00

Global FRH:
  FRH Map: 0x00, Pause Class Map: 0x00
  Xoff Threshold: 0, Total Credits: 0

Pause configuration:
```

```
  PFC disabled
  Rx PFC CoS map: 0x00, Tx PFC CoS map: 0x00


Index  CoS-to-Class  Class-to-CoS------+-------------+------------
0      0x00          0xff
1      0x00          0xff
2      0x00          0xff
3      0x00          0xff
4      0x00          0xff
5      0x00          0xff
6      0x00          0xff
7      0x00          0xff

OQ configuration:
  Credit Quanta: 1, IPG Adjustment: 0
  PQ0 En: 0, PQ0 Class: 0
  PQ1 En: 0, PQ1 Class: 0

Class  XoffToMap  TD  HD  DP  Grp  LSP  GSP  CrDec  bw
------+----------+---+---+---+----+----+----+-----+----
0      0 0        1   0   0   0    1    0    0       0
1      0 0        1   0   0   1    0    1    0       0
2      0 0        1   0   0   2    0    0    50     10
3      0 0        1   0   0   2    0    0    24     20
4      0 0        1   0   0   2    0    0    16     30
5      0 0        1   0   0   2    0    0    12     40
6      0 0        1   0   0   2    0    0    0       0
7      0 0        1   0   0   2    0    0    0       0

SS statistics:
Class  Rx (WR_RCVD)            Tx (RD_SENT)
------+-----------------------+----------------------
0      0                       0
1      0                       0
2      0                       0
3      0                       0
4      0                       0
5      0                       0
6      0                       0
7      0                       0
Rx Discard (WR_DISC):               0
Rx Multicast Discard (WR_DISC_MC):  0
Rx Error (WR_RCV_ERR):              0

OQ statistics:
Packets flushed:   0
Packets timed out: 0


Pause statistics:
CoS    Rx PFC Xoff             Tx PFC Xoff
------+-----------------------+----------------------
0      0                       0
1      0                       0
2      0                       0
3      0                       0
4      0                       0
5      0                       0
6      0                       0
7      0                       0
Rx Xoff:           0
Rx Xon:            0
Tx Xoff:           0
Tx Xon:            0
```

```
Rx PFC:            0
Tx PFC:            0
Rx Xoff Status:    0x00
Tx Xoff Status:    0x00

SS  RdPort  Class  Head   Tail   QCount  RealQCountRx
---+-------+------+------+------+-------+------------
0   1       0      3113   9348   0       0
0   1       1      11057  4864   0       0
0   1       2      5356   4257   0       0
0   1       3      12304  10048  0       0
0   1       4      11346  2368   0       0
0   1       5      162    165    0       0
0   1       6      14500  112    0       0
0   1       7      12314  9602   0       0
fex-101#
```

Input queuing (system type queuing input policy)

Note System input queuing is applied on NIF Ports for HIF to NIF traffic.

- Class map (system defined class map) configuration:

```
switch# show class-map type queuing
  Type queuing class-maps
  ========================
    class-map type queuing match-any c-out-q3
      Description: Classifier for Egress queue 3
      match qos-group 3

    class-map type queuing match-any c-out-q2
      Description: Classifier for Egress queue 2
      match qos-group 2

    class-map type queuing match-any c-out-q1
      Description: Classifier for Egress queue 1
      match qos-group 1

    class-map type queuing match-any c-out-q-default
      Description: Classifier for Egress default queue
      match qos-group 0

    class-map type queuing match-any c-in-q3
      Description: Classifier for Ingress queue 3
      match qos-group 3

    class-map type queuing match-any c-in-q2
      Description: Classifier for Ingress queue 2
      match qos-group 2

    class-map type queuing match-any c-in-q1
      Description: Classifier for Ingress queue 1
      match qos-group 1

    class-map type queuing match-any c-in-q-default
      Description: Classifier for Ingress default queue
      match qos-group 0
switch#
```

- Policy map configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# policy-map type queuing inq_pri
switch(config-pmap-que)# class type queuing c-in-q3
switch(config-pmap-c-que)# priority level 1
switch(config-pmap-c-que)# class type queuing c-in-q2
switch(config-pmap-c-que)# bandwidth remaining percent 50
switch(config-pmap-c-que)# class type queuing c-in-q1
switch(config-pmap-c-que)# bandwidth remaining percent 30
switch(config-pmap-c-que)# class type queuing c-in-q-default
switch(config-pmap-c-que)# bandwidth remaining percent 20
switch(config-pmap-c-que)#
```

- Attach service policy to system target configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.

switch(config)# system qos
switch(config-sys-qos)# service-policy type queuing input inq_pri
```

- Verifying input queuing:

```
switch# show policy-map system type queuing input

          Service-policy (queuing) input:   inq_pri
            policy statistics status:   disabled (current status: disabled)

            Class-map (queuing):   c-in-q3 (match-any)
              priority level 1

            Class-map (queuing):   c-in-q2 (match-any)
              bandwidth remaining percent 50

            Class-map (queuing):   c-in-q1 (match-any)
              bandwidth remaining percent 30

            Class-map (queuing):   c-in-q-default (match-any)
              bandwidth remaining percent 20


switch# attach fex 101

fex-101# show platform software qosctrl port 0 0 nif 1
number of arguments 6: show port 0 0 2 1
----------------------------------------------------------
QoSCtrl internal info {mod 0x0 asic 0 type 2 port 1}

PI mod 0 front port 0 if_index 0x00000000
   ups 0 downs 0 binds 0
Media type 3
Port speed 10000
MAC addr 00:00:00:00:00:00
Port state: , Down

fabric_num 0, ctrl_vntag 0
ctrl_vlan 0, vntag_etype 0

Untagged COS config valid: no
Untagged COS dump:
```

```
rx_cos_def[0]=0, tx_cos_def[0]=0
rx_cos_def[1]=3, tx_cos_def[1]=3

Last queueing config recvd from supId: 0

-----SUP 0  start -----

Queuing config per qos_group
Interface queueing config valid: no


Queueing per qos_group: 00006|
    |id|bw%|bw_unit|priority
grp |00|100|0000000|00000000
grp |01|000|0000000|00000000
grp |02|000|0000000|00000000
grp |03|000|0000000|00000000
grp |04|000|0000000|00000000
grp |05|000|0000000|00000000

 Scheduling Classes 00008|
      |id|cbmp|qid|bw%|nor_bw%|bw_unit|prio|dir |q2cos|class_grp|wk_gmap
class |00|0x01|000|000|0000000|0000007|0001|  TX| 0x80|000000000|0000004
class |01|0x02|001|000|0000000|0000007|0001|  TX| 0x00|000000000|0000005
class |02|0x04|002|000|0000000|0000007|0000|  TX| 0x08|000000002|0000000
class |03|0x08|003|100|0000100|0000007|0000|  TX| 0xf7|000000003|0000000
class |04|0x10|004|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |05|0x20|005|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |06|0x40|006|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |07|0x80|007|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000

-----SUP 0  end -----

-----SUP 1  start -----

Queuing config per qos_group
Interface queueing config valid: no

 Queueing per qos_group: 00006|
    |id|bw%|bw_unit|priority
grp |00|100|0000000|00000000
grp |01|000|0000000|00000000
grp |02|000|0000000|00000000
grp |03|000|0000000|00000000
grp |04|000|0000000|00000000
grp |05|000|0000000|00000000

 Scheduling Classes 00008|
      |id|cbmp|qid|bw%|nor_bw%|bw_unit|prio|dir |q2cos|class_grp|wk_gmap
class |00|0x01|000|000|0000000|0000007|0001|  TX| 0x80|000000000|0000004
class |01|0x02|001|000|0000000|0000007|0001|  TX| 0x00|000000000|0000005
class |02|0x04|002|000|0000000|0000007|0000|  TX| 0x08|000000002|0000000
class |03|0x08|003|100|0000100|0000007|0000|  TX| 0xf7|000000003|0000000
class |04|0x10|004|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |05|0x20|005|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |06|0x40|006|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |07|0x80|007|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000

-----SUP 1  end -----


PFC 1 (enabled), net_port 0x0
END of PI SECTION
NIF0/0/1
```

```
Default CoS: 0
CoS  Rx-Remap  Tx-Remap  Class
----+---------+---------+-----
0    0         0         3
1    1         1         4
2    2         2         5
3    3         3         5
4    4         4         2
5    5         5         2
6    6         6         2
7    7         7         1

Class  FRH  CT-En  MTU-Cells [Bytes]
------+----+------+-----------------
0      0    1      30  [2400 ]
1      0    1      30  [2400 ]
2      2    1      116 [9280 ]
3      3    1      116 [9280 ]
4      4    1      116 [9280 ]
5      5    1      116 [9280 ]
6      2    1      127 [10160]
7      2    1      127 [10160]

FRH configuration:
  Port En: 1, Tail Drop En: 1, Emergency Stop En: 1, Err Discard En: 1

FRH  Xon  Xoff  Total  Pause  u-Pause  Class-Map
----+----+-----+------+------+--------+---------
0    2    6     16     1      0        0x03
1    0    0     0      0      0        0x00
2    0    0     0      0      0        0x04
3    0    0     0      0      0        0x08
4    0    0     0      0      0        0x10
5    0    0     0      0      0        0x20
6    0    0     0      0      0        0x00
7    0    0     0      0      0        0x00

Global FRH:
  FRH Map: 0x3c, Pause Class Map: 0x3c
  Xoff Threshold: 0, Total Credits: 0


Pause configuration:
  PFC disabled
  Rx PFC CoS map: 0x00, Tx PFC CoS map: 0x00

Index  CoS-to-Class  Class-to-CoS
------+-------------+------------
0      0x00          0xff
1      0x00          0xff
2      0x00          0xff
3      0x00          0xff
4      0x00          0xff
5      0x00          0xff
6      0x00          0xff
7      0x00          0xff

OQ configuration:
  Credit Quanta: 1, IPG Adjustment: 0
  PQ0 En: 0, PQ0 Class: 0
  PQ1 En: 0, PQ1 Class: 0

Class  XoffToMap  TD  HD  DP  Grp  LSP  GSP  CrDec  bw
------+----------+---+---+---+----+----+----+-----+----
```

```
0      0 0        0   0   1   0    1    0    0       0
1      0 0        0   0   1   1    0    1    0       0
2      0 0        0   0   1   2    0    0    24     20
3      0 0        0   0   1   2    0    0    16     30
4      0 0        0   0   1   2    0    0    10     50
5      0 0        0   0   1   2    0    1    255     0
6      0 0        0   0   1   2    0    0    0       0
7      0 0        0   0   1   2    0    0    0       0

SS statistics:
Class  Rx (WR_RCVD)            Tx (RD_SENT)
------+-----------------------+----------------------
0      0                       68719476736
1      0                       0
2      0                       0
3      0                       0
4      0                       0
5      0                       0
6      0                       0
7      0                       0
Rx Discard (WR_DISC):               0
Rx Multicast Discard (WR_DISC_MC):  0
Rx Error (WR_RCV_ERR):              0

OQ statistics:
Packets flushed:   0
Packets timed out: 0

Pause statistics:
CoS    Rx PFC Xoff             Tx PFC Xoff
------+-----------------------+----------------------
0      0                       0
1      0                       0
2      0                       0
3      0                       0
4      0                       0
5      0                       0
6      0                       0
7      0                       0
Rx Xoff:           0
Rx Xon:            0
Tx Xoff:           0
Tx Xon:            0
Rx PFC:            0
Tx PFC:            0
Rx Xoff Status:    0x00
Tx Xoff Status:    0x00

fex-101#
```

Output queuing (system type queuing output policy)

Note System Output queuing is applied on HIF Ports for NIF to HIF traffic.

- Policy map (system defined policy map):

```
switch# show policy-map type queuing default-out-policy
```

```
Type queuing policy-maps
========================

policy-map type queuing default-out-policy
  class type queuing c-out-q3
    priority level 1
  class type queuing c-out-q2
    bandwidth remaining percent 0
  class type queuing c-out-q1
    bandwidth remaining percent 0
  class type queuing c-out-q-default
    bandwidth remaining percent 100
```

- Policy map (user defined policy map) configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# policy-map type queuing outq
switch(config-pmap-que)# class type queuing c-out-q3
switch(config-pmap-c-que)# bandwidth percent 40
switch(config-pmap-c-que)# class type queuing c-out-q2
switch(config-pmap-c-que)# bandwidth percent 30
switch(config-pmap-c-que)# class type queuing c-out-q1
switch(config-pmap-c-que)# bandwidth percent 20
switch(config-pmap-c-que)# class type queuing c-out-q-default
switch(config-pmap-c-que)# bandwidth percent 10
switch(config-pmap-c-que)#
```

- Attach service policy to system target configuration:

```
switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.

switch(config)# system qos
switch(config-sys-qos)# service-policy type queuing output outq
```

- Verifying output queuing:

```
switch# show policy-map system type queuing output

          Service-policy (queuing) output:   outq
            policy statistics status:   disabled (current status: disabled)

            Class-map (queuing):   c-out-q3 (match-any)
              bandwidth percent 40

            Class-map (queuing):   c-out-q2 (match-any)
              bandwidth percent 30

            Class-map (queuing):   c-out-q1 (match-any)
              bandwidth percent 20

            Class-map (queuing):   c-out-q-default (match-any)
              bandwidth percent 10


switch# show queuing interface ethernet 101/1/1

slot  1
=======
Ethernet101/1/1 queuing information:
  Input buffer allocation:
  Qos-group: ctrl
```

```
  frh: 0
  drop-type: drop
  cos: 7
  xon       xoff      buffer-size
  ---------+---------+-----------
  2560      7680      10240
  Qos-group: 0  1  2  3  (shared)
  frh: 2
  drop-type: drop
  cos: 0 1 2 3 4 5 6
  xon       xoff      buffer-size
  ---------+---------+-----------
  19200     24320     48640
  Queueing:
  queue    qos-group    cos            priority  bandwidth mtu
  --------+------------+--------------+---------+---------+----
  ctrl-hi  n/a          7               PRI         0      2400
  ctrl-lo  n/a          7               PRI         0      2400
  2        0            4 5 6           WRR        10      9280
  3        1            0               WRR        20      9280
  4        2            1               WRR        30      9280
  5        3            2 3             WRR        40      9280
  Queue limit: 66560 bytes

Queue Statistics:
  queue  rx              tx              flags
  ------+---------------+---------------+-----
  0      0               68719476760     ctrl
  1      1               1               ctrl
  2      0               0               data
  3      1               109453          data
  4      0               0               data
  5      0               0               data

  Port Statistics:
  rx drop         rx mcast drop   rx error        tx drop         mux ovflow
  ---------------+---------------+---------------+---------------+--------------
  0               0               0               0               InActive

  Priority-flow-control enabled: no
  Flow-control status: rx 0x0, tx 0x0, rx_mask 0x0
  cos     qos-group   rx pause  tx pause  masked rx pause
  -------+-----------+---------+---------+---------------
  0              1    xon       xon       xon
  1              2    xon       xon       xon
  2              3    xon       xon       xon
  3              3    xon       xon       xon
  4              0    xon       xon       xon
  5              0    xon       xon       xon
  6              0    xon       xon       xon
  7            n/a    xon       xon       xon

  DSCP to Queue mapping on FEX
 ----+--+-----+-------+--+---

 DSCP to Queue map disabled

 FEX TCAM programmed successfully

switch#


switch# attach fex 101
fex-101# show platform software qosctrl port 0 0 hif 1
```

```
number of arguments 6: show port 0 0 3 1
------------------------------------------------------
QoSCtrl internal info {mod 0x0 asic 0 type 3 port 1}

PI mod 0 front port 0 if_index 0x00000000
   ups 0 downs 0 binds 0
Media type 0
Port speed 0
MAC addr b0:00:b4:32:05:e2
Port state: , Down

Untagged COS config valid: no
Untagged COS dump:
rx_cos_def[0]=0, tx_cos_def[0]=0
rx_cos_def[1]=3, tx_cos_def[1]=3
Last queueing config recvd from supId: 0
-----SUP 0  start -----

Queuing config per qos_group
Interface queueing config valid: no

 Queueing per qos_group: 00006|
    |id|bw%|bw_unit|priority
grp |00|100|0000000|00000000
grp |01|000|0000000|00000000
grp |02|000|0000000|00000000
grp |03|000|0000000|00000000
grp |04|000|0000000|00000000
grp |05|000|0000000|00000000


Scheduling Classes 00008|
      |id|cbmp|qid|bw%|nor_bw%|bw_unit|prio|dir |q2cos|class_grp|wk_gmap
class |00|0x01|000|000|0000000|0000007|0001|  TX| 0x80|000000000|0000000
class |01|0x02|001|000|0000000|0000007|0001|  TX| 0x00|000000000|0000000
class |02|0x04|002|000|0000000|0000007|0000|  TX| 0x08|000000002|0000000
class |03|0x08|003|100|0000100|0000007|0000|  TX| 0xf7|000000003|0000000
class |04|0x10|004|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |05|0x20|005|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |06|0x40|006|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |07|0x80|007|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000

-----SUP 0  end -----

-----SUP 1  start -----

Queuing config per qos_group
Interface queueing config valid: no

 Queueing per qos_group: 00006|
    |id|bw%|bw_unit|priority
grp |00|100|0000000|00000000
grp |01|000|0000000|00000000
grp |02|000|0000000|00000000
grp |03|000|0000000|00000000
grp |04|000|0000000|00000000
grp |05|000|0000000|00000000

 Scheduling Classes 00008|
      |id|cbmp|qid|bw%|nor_bw%|bw_unit|prio|dir |q2cos|class_grp|wk_gmap
class |00|0x01|000|000|0000000|0000007|0001|  TX| 0x80|000000000|0000000
class |01|0x02|001|000|0000000|0000007|0001|  TX| 0x00|000000000|0000000
class |02|0x04|002|000|0000000|0000007|0000|  TX| 0x08|000000002|0000000
class |03|0x08|003|100|0000100|0000007|0000|  TX| 0xf7|000000003|0000000
class |04|0x10|004|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
```

```
class |05|0x20|005|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |06|0x40|006|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000
class |07|0x80|007|000|0000000|0000007|0000|  TX| 0x00|000000003|0000000

-----SUP 1  end -----

PFC 0 (disabled), net_port 0x0
END of PI SECTION
HIF0/0/1


Default CoS: 0
CoS  Rx-Remap  Tx-Remap  Class
----+---------+---------+-----
0    0         0         3
1    1         1         4
2    2         2         5
3    3         3         5
4    4         4         2
5    5         5         2
6    6         6         2
7    7         7         1

Class  FRH  CT-En  MTU-Cells [Bytes]
------+----+------+-----------------
0      0    0      30  [2400 ]
1      0    0      30  [2400 ]
2      2    0      116 [9280 ]
3      2    0      116 [9280 ]
4      2    0      116 [9280 ]
5      2    0      116 [9280 ]
6      2    0      127 [10160]
7      2    0      127 [10160]

FRH configuration:
  Port En: 1, Tail Drop En: 0, Emergency Stop En: 1, Err Discard En: 1

FRH  Xon  Xoff  Total  Pause  u-Pause  Class-Map
----+----+-----+------+------+--------+---------
0    2    6     8      1      0        0x03
1    0    0     0      0      0        0x00
2    15   19    38     1      0        0x3c
3    0    0     0      0      0        0x00
4    0    0     0      0      0        0x00
5    0    0     0      0      0        0x00
6    0    0     0      0      0        0x00
7    0    0     0      0      0        0x00

Global FRH:
  FRH Map: 0x00, Pause Class Map: 0x00
  Xoff Threshold: 0, Total Credits: 0

Pause configuration:
  PFC disabled
  Rx PFC CoS map: 0x00, Tx PFC CoS map: 0x00


Index  CoS-to-Class  Class-to-CoS------+-------------+------------
0      0x00          0xff
1      0x00          0xff
2      0x00          0xff
3      0x00          0xff
4      0x00          0xff
5      0x00          0xff
```

```
6      0x00          0xff
7      0x00          0xff

OQ configuration:
  Credit Quanta: 1, IPG Adjustment: 0
  PQ0 En: 0, PQ0 Class: 0
  PQ1 En: 0, PQ1 Class: 0

Class  XoffToMap  TD  HD  DP  Grp  LSP  GSP  CrDec  bw
------+----------+---+---+---+----+----+----+-----+----
0      0 0        1   0   0   0    1    0    0       0
1      0 0        1   0   0   1    0    1    0       0
2      0 0        1   0   0   2    0    0    50     10
3      0 0        1   0   0   2    0    0    24     20
4      0 0        1   0   0   2    0    0    16     30
5      0 0        1   0   0   2    0    0    12     40
6      0 0        1   0   0   2    0    0    0       0
7      0 0        1   0   0   2    0    0    0       0

SS statistics:
Class  Rx (WR_RCVD)            Tx (RD_SENT)
------+-----------------------+----------------------
0      0                       0
1      0                       0
2      0                       0
3      0                       0
4      0                       0
5      0                       0
6      0                       0
7      0                       0
Rx Discard (WR_DISC):                0
Rx Multicast Discard (WR_DISC_MC):  0
Rx Error (WR_RCV_ERR):               0

OQ statistics:
Packets flushed:   0
Packets timed out: 0


Pause statistics:
CoS    Rx PFC Xoff             Tx PFC Xoff
------+-----------------------+----------------------
0      0                       0
1      0                       0
2      0                       0
3      0                       0
4      0                       0
5      0                       0
6      0                       0
7      0                       0
Rx Xoff:           0
Rx Xon:            0
Tx Xoff:           0
Tx Xon:            0
Rx PFC:            0
Tx PFC:            0
Rx Xoff Status:    0x00
Tx Xoff Status:    0x00

SS  RdPort  Class  Head   Tail   QCount  RealQCountRx
---+-------+------+------+------+-------+------------
0   1       0      3113   9348   0       0
0   1       1      11057  4864   0       0
0   1       2      5356   4257   0       0
```

```
0   1       3       12304  10048  0       0
0   1       4       11346  2368   0       0
0   1       5       162    165    0       0
0   1       6       14500  112    0       0
0   1       7       12314  9602   0       0
fex-101#
```

Verifying the FEX QoS Configuration

Use the following commands to verify the FEX QoS configuration:

Command	Purpose
show class-map type [**qos** | **queuing**]	Displays information about configured class maps of type qos or queuing.
show policy-map type [**qos** | **queueing**]	Displays information about configured policy maps of type qos or queuing.
show policy-map system type [**qos** | **queuing**]	Displays information about all configured policy maps of type qos or queuing on the system.
show queuing interface ethernet	Displays information about queuing on the ethernet interface.