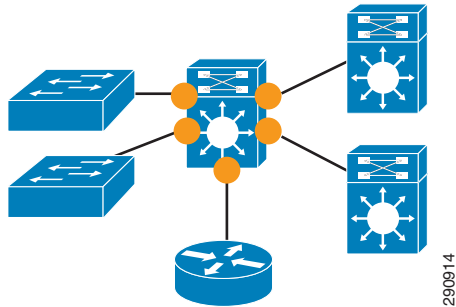


## Role in Campus Network

The Cisco Catalyst 6500 Series switches with Sup720s are well-suited to the role of distribution- or core-layer switches in campus networks. As such, these switches typically connect directly to other switches or routers, as shown in Figure 1.

To simplify design, this document assumes the use of WS-X6716-10GE linecards.

**Figure 1 Cisco Catalyst 6500 Switches in a Campus Network**



## QoS Design Steps

There are four main steps to configure QoS on Cisco Catalyst 6500 series switches:

1. Enable QoS
2. Configure DSCP-Trust
3. Configure Ingress Queuing
4. Configure Egress Queuing

### Step 1: Globally Enable QoS

QoS is globally enabled on the Cisco Catalyst 6500 with the `mls qos` command.

### Step 2: Configure DSCP-Trust

DSCP trust is configured with the `mls qos trust dscp` interface-configuration command.

Switch ports that can be set to trust DSCP are shown as yellow circles in Figure 1.

### Step 3: Configure Ingress Queuing

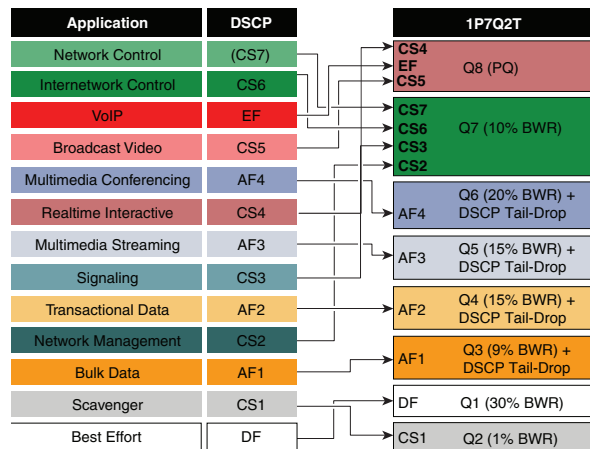
Three considerations need to be taken into account when determining if ingress queuing configuration is required on the Cisco Catalyst 6500 linecard:

- Is the linecard oversubscribed?
- Is the linecard operating in the distribution or core layers of the campus network?
- Does the linecard support DSCP-to-Queue mapping?

Ingress queuing is only recommended when the answer to all three questions is Yes.

The ingress queuing model for the Cisco Catalyst 6500 (with 6716 linecards) in oversubscription mode is shown in Figure 2.

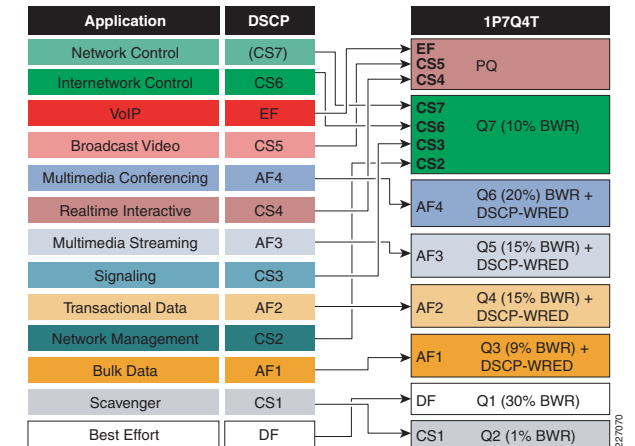
**Figure 2 Catalyst 6500 (6716) Ingress Queuing Model**



### Step 4: Configure Egress Queuing

The egress queuing model for the Cisco Catalyst 6500 (with 6708 or 6716 linecards) is shown in Figure 3.

**Figure 3 Catalyst 6500 (6716) Egress Queuing Model**



## EtherChannel QoS

Ingress classification & marking QoS policies on the Cisco Catalyst 6500 are configured on the logical Port-Channel interface (typically these are simply to enable DSCP trust). Ingress and egress queuing QoS policies are configured on the physical port-member interfaces.

## Cisco Validated Design (CVD)

The Cisco Validated Design for Cisco Catalyst 6500 series switches with WS-X6716-10GE linecards in the role of a distribution- or core-layer switch in a campus network is presented on the reverse.

**Step 1: Enable QoS**  
`mls qos`

**Step 2: Configure DSCP-Trust**  
`mls qos trust dscp`

**Step 3: Configure Ingress Queuing**  
`mls qos queue-mode mode-dscp` } Enables DSCP-based Queue/Threshold Mapping

```

rcv-queue bandwidth 30 1 9 15 15 20 10
rcv-queue queue-limit 25 10 10 15 15 15 10 } Ingress Queue Tuning

rcv-queue threshold 1 100 100
rcv-queue threshold 2 100 100
rcv-queue threshold 3 80 100
rcv-queue threshold 4 80 100
rcv-queue threshold 5 80 100
rcv-queue threshold 6 80 100
rcv-queue threshold 7 100 100 } Ingress Threshold Tuning

rcv-queue dscp-map 1 2 0
rcv-queue dscp-map 2 2 8
rcv-queue dscp-map 3 1 12 14
rcv-queue dscp-map 3 2 10
rcv-queue dscp-map 4 1 20 22
rcv-queue dscp-map 4 2 18
rcv-queue dscp-map 5 1 28 30
rcv-queue dscp-map 5 2 26
rcv-queue dscp-map 6 1 36 38
rcv-queue dscp-map 6 2 34
rcv-queue dscp-map 7 1 16 24 48 56
rcv-queue dscp-map 7 2 48 56
priority-queue dscp-map 1 32 40 46
priority-queue queue-limit 15 } Ingress DSCP-to-Queue/Threshold Mapping
    
```

**Step 4: Configure Egress Queuing**  
`wrr-queue queue-limit 25 10 10 10 10 10` } Egress Queue Tuning  
`wrr-queue bandwidth 30 1 9 15 15 20 10`  
`priority-queue queue-limit 15`

**Step 4: Configure Egress Queuing (continued)**

```

wrr-queue random-detect 1
wrr-queue random-detect 2
wrr-queue random-detect 3
wrr-queue random-detect 4
wrr-queue random-detect 5
wrr-queue random-detect 6
wrr-queue random-detect 7 } Enables WRED on Egress Queues 1 and 3-6

wrr-queue random-detect max-threshold 1 100 100 100 100
wrr-queue random-detect min-threshold 1 80 100 100 100
wrr-queue random-detect max-threshold 3 100 100 100 100
wrr-queue random-detect min-threshold 3 60 70 80 100
wrr-queue random-detect min-threshold 4 100 100 100 100
wrr-queue random-detect max-threshold 4 60 70 80 100
wrr-queue random-detect min-threshold 5 100 100 100 100
wrr-queue random-detect max-threshold 5 60 70 80 100
wrr-queue random-detect min-threshold 6 100 100 100 100
wrr-queue random-detect max-threshold 6 60 70 80 100 } Tunes WRED on Egress Queues

wrr-queue dscp-map 1 1 0
wrr-queue dscp-map 2 1 8
wrr-queue dscp-map 3 1 14
wrr-queue dscp-map 3 2 12
wrr-queue dscp-map 3 3 10
wrr-queue dscp-map 4 1 22
wrr-queue dscp-map 4 2 20
wrr-queue dscp-map 4 3 18
wrr-queue dscp-map 5 1 30
wrr-queue dscp-map 5 2 28
wrr-queue dscp-map 5 3 26
wrr-queue dscp-map 6 1 38
wrr-queue dscp-map 6 2 36
wrr-queue dscp-map 6 3 34
wrr-queue dscp-map 7 1 16 24 48 56
priority-queue dscp-map 1 32 40 46 } Egress DSCP-to-Queue/Threshold Mapping
    
```

290915

Note: Highlighted commands are global; otherwise these are interface specific.

For more details, see Campus QoS Design 4.0:

[http://www.cisco.com/en/US/docs/solutions/Enterprise/WAN\\_and\\_MAN/QoS\\_SRND\\_40/QoS\\_Campus\\_40.html](http://www.cisco.com/en/US/docs/solutions/Enterprise/WAN_and_MAN/QoS_SRND_40/QoS_Campus_40.html).