

DET

Hints on QoS in Ethernet

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QoS in Ethernet

- Class based QoS model
- Defined in IEEE 802.1p
- Assume Ethernet switched VLAN
- 8 priority levels
- Although named priorities, they may not be in a strict hierarchical relationship
- A label in the packet header of IEEE 802.1q packet format (VLAN) identifies the priority level coded over 3 bits
- Switches are supposed to use a given number of queues, logically separated per priority
 - Minimum number of queues to be supported = 2
 - Maximum number of queues to be supported = 8

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IEEE 802.1Q

- 802.3 Packet format (legacy) e 802.1Q

| | | | | | | | | |
|--------|---------------------|----------------|--------|--------|------|-----|-----------|-----------|
| 802.3 | Destination address | Source address | Length | Data | | Pad | Check-sum | |
| 802.1Q | Destination address | Source address | Tag | Length | Data | | Pad | Check-sum |

VLAN protocol ID (0x8100)

| | | | | |
|-----|---|---|---|-----------------|
| Pri | C | F | I | VLAN Identifier |
|-----|---|---|---|-----------------|

- TCI: Tag Control Information
 - PCP (Priority Code Point) 3 bit of priority
 - DEI (Drop Eligibility Indicator): 1 bit of discarding
 - VID (VLAN Identifier): 12 bit

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Ethernet: priority assignment

- MAC card in the source node may insert the tag on the packet header
 - The switch interface connected to the node must support packets with tags
- The switch interface may assign a priority to a packet
 - Normally tagging is executed by the switch to which the source node is connected

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Ethernet: priority assignment

| User priority | Acronym | Traffic type |
|---------------|---------|------------------|
| 0 (default) | BE | Best effort |
| 1 | BK | Background |
| 2 | - | Undefined |
| 3 | EE | Excellent effort |
| 4 | CL | Controlled load |
| 5 | VI | Video <100ms |
| 6 | VO | Voce < 10ms |
| 7 | NC | Network control |

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Ethernet: recommended aggregation

| Number of queues | Traffic type | | | | | | | |
|------------------|----------------------|----|----|----|----------|----|----|----|
| 1 | BE BK EE CL VI VO NC | | | | | | | |
| 2 | NC VO VI CL | | | | EE BK BE | | | |
| 3 | NC | VO | VI | CL | EE BK BE | | | |
| 4 | NC | VO | VI | CL | EE | BK | BE | |
| 5 | NC | VO | VI | CL | EE | BK | BE | |
| 6 | NC | VO | VI | CL | EE | BK | BE | |
| 7 | NC | VO | VI | CL | EE | BK | BE | |
| 8 | NC | VO | VI | CL | EE | -- | BK | BE |

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Ethernet: scheduling

- The suggested scheduler is a strict priority following the recommended aggregation policies
- More sophisticated algorithms can be used
 - Round Robin, WRR, WFQ
- Different algorithms are provided depending on device quality and cost
- Management and console commands permit to
 - Map priority levels (user priority) to queues
 - Choose the scheduling algorithm to be used
