

Need for Yang Model with 802.1Qbv

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Priority queues on each port

- 802.1Q-2014 defines 8 priority queues for each port, and TSN standards map critical flows into these queues and forward flows in bounded latency.

Table 34-1—Recommended priority to traffic class mappings for SR classes A and B

		Number of available traffic classes						
		2	3	4	5	6	7	8
Priority	0 (Default)	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	0
	2	1	1	2	3	4	5	6
	3	1	2	3	4	5	6	7
	4	0	0	1	1	1	1	2
	5	0	0	1	1	1	2	3
	6	0	0	1	2	2	3	4
	7	0	0	1	2	3	4	5

- 2~4 traffic classes are implemented per port in some cases.

Need for more queues for time based scheduling

- In time based scheduling standards, such as 802.1Qbv and 802.1Qch, each time window can be associated to one or multiple queues out of these 8 priority queues.

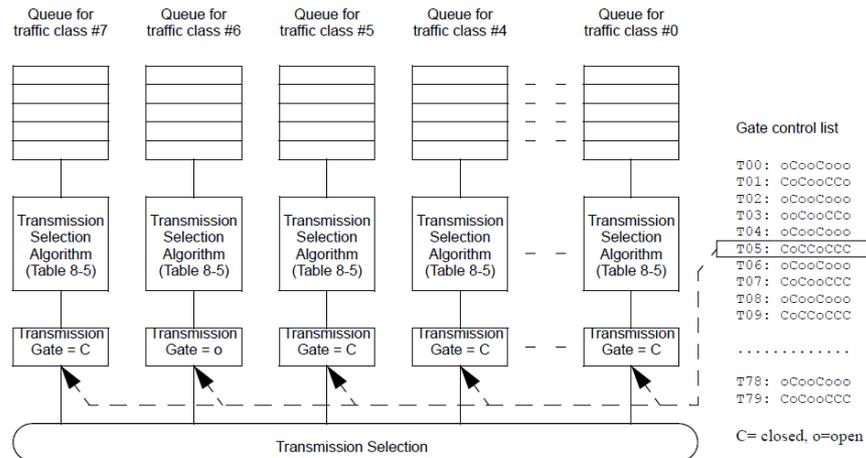


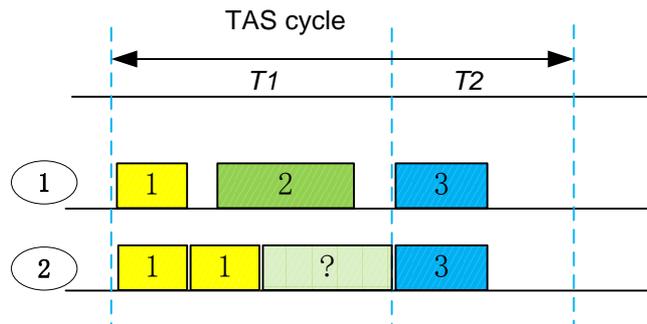
Figure 8-12—Transmission selection with gates

- That means multiple flows have to share same priority queue.

**Refer to IEEE 802.1Qbv*

Multiple Applications/Users in one Time Window

- Multiple users or applications sharing a class/priority queue may interfere each other, like the following timing example shows.



Example description:

3 critical flows exist in TSN and every flow needs bounded latency forwarding. With 802.1Qbv and 2 priority queues , flow 1 & 2 are in Class 0 and flow 3 in Class 1.

Obviously, flow 1 and 2 may affect each other , especially when burst behavior happens. In above diagram, flow 1 has 2 packets in **Class 0 queue and it may cause risk to delay the sub-sequent flow 2 packet .**

User/Application Separation

- We can think of quite a few of approaches to avoid this conflicting risk.
 - Enforce shapers on network edge to control data source, may not reliable due to burstiness inside network. (X)
 - Provide more class queues to enable time based user flow separation.(?)
 - 802.1 Qci (PSFP) or other per flow input shaper on each input port. (?)
 - Device specific scheduling behind priority queues is another way, but, maybe not interoperable between venders. (?)
 - Both last two approaches need a common configuration throughout the whole TSN network, via Yang or MIB. May related to <http://www.ieee802.org/1/files/public/docs2017/as-gutierrez-yang-0317-v01.pdf>

Thank you