

Proposed New DSCP: Non Queue Building (NQB)

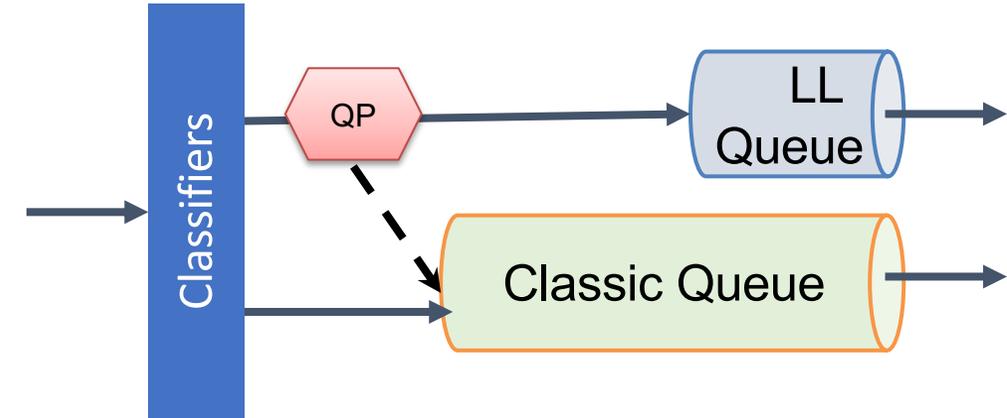
[draft-white-tsvwg-nqb-01](#)

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March 25, 2019

- Goal
 - Low latency **and** low loss for “sparse” traffic flows
 - Code point describes a verifiable behavior, not a value judgement
 - No incentive to mismark packets
- Use Cases
 - Dual-queue L4S link:
 - Identify non-congestion controlled flows that can coexist with L4S traffic in the LL-queue
 - LTE/5G link (?)
 - See draft-fossati-tsvwg-lola
 - fq_codel link
 - Identify non-congestion controlled flows that (in extreme situations) would prefer (?) tail drop rather than CoDel drops

L4S Use Case in DOCSIS 3.1

- Classify to Low Latency Queue based on
 - DSCP == NQB, or
 - ECN == ECT(1), or
 - ECN == CE
- Queue Protection (QP): continually verify that each flow is non-queue-building (NQB)
- If a flow causes queue build up, newly arriving packets are redirected to Classic queue
- No benefit for a QB flow to be marked as NQB
- Protects situations where QB flow is mismarked as NQB or ECT(1) (intentionally or not)



See [draft-white-tsvwg-llq](#) for details

Queue Protection algo defined in Annex P of:

[CM-SP-MULPIv3.1-I17-190121](#)

Non-Queue-Building (NQB) flow definition

- Non-congestion-controlled
- Claims that it will not cause a queue, i.e.
 - Relatively low peak data rate – expects to remain below available capacity in path
- If it does cause queue build-up, will suffer some consequences
 - In L4S with Queue Protection, mismarked packets would get reclassified to Classic Queue
 - May see higher latency, may arrive out of order
 - In LTE/5G, may see higher loss (?)
 - In fq_codel, will suffer from its own queue delay

NQB PHB definition

- Not a guaranteed service
- A node supporting the NQB PHB MUST queue non-queue-building traffic separate from queue-building traffic.
- *This queue SHOULD disable AQM-induced packet drops for NQB marked packets.* * *not yet in the draft
- This queue SHOULD support a latency-based queue protection mechanism that is able to identify QB behavior in flows that are classified into the NQB queue, and to redirect flows causing queue build-up to a QB queue.
 - e.g. as defined in Annex P of [DOCSIS-MULPIv3.1].
 - Not necessary (?) in fq_codel nodes.

Proposal: NQB = 0x2A (42, 101010b)

- A currently unassigned codepoint in DSCP Pool 1 (standards action)
- Some implementations may wish to utilize a single queue for NQB and EF traffic
 - NQB = 0x2A = 101010b
 - EF = 0x2E = 101110b
 - single classifier (101*10b) would match both
- WiFi APs commonly default to mapping DSCP = 10****b to the Video Access Category (AC_VI)

Common Defaults in WMM

DSCP	WiFi Access Category
000*** 011***	Background (AC_BK)
001*** 010***	Best Effort (AC_BE)
10****	Video (AC_VI)
11****	Voice (AC_VO)

Updates (draft 00 -> draft 01)

- Intended Status: Standards Track (was Informational)
- Added requirement statements
- Proposes definition of a new standardized DSCP (NQB = 0x2A)
- Updates in "Comparison to Existing Approaches"
 - updated the discussion of fq_codel
 - added discussion of "Heavy-Hitter-Filter" & Cisco's "Dynamic Packet Prioritization"
- Added IANA Considerations
- Added Security Considerations

Seeking WG adoption