Cyclic Queuing and Forwarding with tagging for Deterministic Forwarding

draft-eckert-detnet-tcqf-02
draft-yizhou-detnet-ipv6-options-for-cqf-variant-01

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https://github.com/toerless/detnet/blob/main/tcqf-slides.pptx

Draft work -02 (IETF116) to -03

- Detailled presentation of mechanism from draft-eckert-detnet-tcqf-02 and draft-yizhou-detnet-ipv6-options-for-cqf-variant-01 at DetNet interim
  - Slides, recording see DetNet interim Wiki: https://wiki.ietf.org/en/group/detnet/wmosq
  - David raised question / possibility to merge.
- -03 performed merge of content/authors
- Detailed explanation of evolution from CQF to TCQF
  - CQF model, timing, challenges: buffer ambiguity upon reception
  - Solution with TCQF (tagging of packet), timing, summary of TCQF benefits
  - Appendix: Discuss of IEEE “Multiple Buffer CQF” (without tagging) and how it (in our option) does not meet our requirements
- Made forwarding specification independent of encap
  - Separate sections now for (non-exhaustive) encap options:
  - From -02: MPLS/TC, IP/IPv6 with DSCP
  - New IPv6 option header for TCQF “Deterministic IP” (DIP) option via 2 possible extension header alternatives), IANA considerations for it.

Draft independent

- Translation of CENI “Deterministic IP” (DIP = TCQF) high-speed/large-scale network validation test report
  - We used slides from mandarin version in our IETF116 presentation
- Now available with permission from CENI at:
  - https://github.com/network2030/publications/blob/main/CENI_DIP_Networking_Test_Report.pdf
- Also referenced in current draft.

Draft work -03 to -04

- Following presentation of CSQF at DetNet interim
  - Draft-chen-detnet-sr-based-bounded-latency, See Detnet wiki for recording/slides
- Added appendix comparing TCQF/CSQF
  - CSQF moves hop-by-hop cycle mapping to packet metadata (Segment Routing SIDs).
  - Mostly subtle pro/cons for either option – best explored through deployment experience.
  - Any hardware can easily support both TCQF and CSQF.
  - Operator preference will be most important: CSQF is “SR version of TCQF”.
  - CSQF key additional functional benefit (not well quantified yet) in “frame-interleaving”. Discussed in new draft. (“better burst management”).
- After another review of CQF in IEEE spec:
  - CQF could support multiple independent instances of cycle buffers
    - selected by e.g.: packet priority.
  - Same could be done in TCQF
  - No evidence that we need this (CSQF for example is simpler), but want to make sure IEEE experts understand that – if needed - TCQF solution could support all options that CQF could.

Status / Open issues ?

- Draft is quite complete, has received significant review/validation.

- Other desirable DetNet components, such as “gates” would be beneficial in conjunction with TCQF:
  - See draft-eckert-detnet-frame-interleaving
- But should be considered independent from hop-by-hop-forwarding
  - Same as e.g.: PREOF functions are also complementary to hop-by-hop forwarding but kept architecturally separate.