802.1Qci - Thoughts on Blocking

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<table>
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<tr>
<th>Traffic Type</th>
<th>Description</th>
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<td><strong>Strict Priority (802.1Q)</strong></td>
<td>Asynchronous, FIFO per Class, Work-Conserving, Best-Effort, Network-Management, etc.</td>
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<tr>
<td><strong>Credit-Based Shaper (802.1Q)</strong></td>
<td>Asynchronous, FIFO per Class, Non-Work Conserving, AVB-Gen1 Real-Time Traffic</td>
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<tr>
<td><strong>Asynchronous Traffic Shaping (802.1Qcr)</strong></td>
<td>Asynchronous FIFOs, Non-Work Conserving, Real-Time Traffic</td>
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<tr>
<td><strong>Cyclic Queing and Forwarding (802.1Qch)</strong></td>
<td>gPTP Synchronized FIFO-Pairs, Non-Work Conserving, Real-Time Traffic</td>
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<tr>
<td><strong>Time-Aware Shaper (802.1Qbv)</strong></td>
<td>gPTP Synchronized FIFO per Class, Non-Work Conserving, Real-Time Traffic with tough Latency Requirements</td>
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Error Detection Mechanisms in 802.1Qci

- **Token Bucket Meters**
  - Asynchronous
  - Enforce Traffic Envelope of a Single or Dual Token Bucket
  - Red Marking if Envelope Exceeded
  - Optional Yellow Marking - “hope it does not get dropped”

- **Frame Length Checks**
  - Asynchronous
  - Drop Oversized Frames (=Red Marking)

- **Octet Limiters**
  - gPTP Synchronized
  - Drop if Octet Limit within a Time Window is Exceeded

- **Input Gates**
  - gPTP Synchronized
  - Drop Frames out of Time Window
Handling Options under Discussion

- **Temporary Reaction**
  - Drop a Malicious Frame
  - Treat consecutive Frames independently

- **Permanently Block**
  - a Stream after Detection of a Malicious Frame
  - Block consecutive Frames of this Stream

- **Permanently Block**
  - a group of Streams after Detection of a Malicious Frame from this Group
  - Block consecutive Frames of this Group of Stream

- **Block offending Port**
  - Permanently Block a Port after Detection of a Malicious Frame from this Port
  - Block consecutive Frames from this Port
The Big Picture – Putting Things Together

Strict Priority (802.1Q) – Credit-Based Shaper (802.1Q) – Asynchronous Traffic Shaping (802.1Qcr) – Cyclic Queing and Forwarding (802.1Qch) – Time-Aware Shaper (802.1Qbv)

Token Bucket Meters – Frame Length Checks – Octet Limiters – Input Gates

Drop offending Frame – Block offending Stream – Block offending Stream + others – Block offending Port
Observation #1: Meter vs. Blocking Assignment

The Criteria to assign Streams to Token Bucket Meters are different than to Blocking Groups

- Streams-to-Meters:
  - Keep Configured Burstiness Low (CBS and CIR vs. Link Speed vs. Max. Burst of Stream Aggregates)
    - Coarse Grained: \{S1,S2,S3,S4\}
  - Avoid late detection downstream after (non-CB) splitting Stream Aggregates, while error occurred earlier
    - Fine Grained: \{S1,S2\} \{S3,S4\}
- Streams-to-Blocking Group:
  - 802.1CB block all streams on path A once an error was observed
    - Precedence for replicas on path B
  - Consistently block all streams of a distributed application
Observation #2: Missing Arrows

No blocking at all for:
- Frame Length Checks (Detection)
- Octet Limiters (Detection)
- ...
- Time-Aware Shaper (Traffic Type)
- Cyclic Queueing and Forwarding (Traffic Type)
Thank You for Your Attention!

Questions, Opinions, Ideas?

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