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Open-Minded

802.1Qci - Thoughts on Blocking

Johannes Specht (University of Duisburg-Essen)

Traffic Types by Shaper/Scheduler

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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)
• Asynchronous • FIFO per Class • Work-Conserving • Best-Effort, Network-Management, etc.	• Asynchronous • FIFO per Class • Non-Work Conserving • AVB-Gen1 Real-Time Traffic	• Asynchronous FIFOs • Non-Work Conserving • Real-Time Traffic	• gPTP Synchronized FIFO-Pairs • Non-Work Conserving • Real-Time Traffic	• gPTP Synchronized FIFO per Class • Non-Work Conserving • Real-Time Traffic with tough Latency Requirements

Error Detection Mechanisms in 802.1Qci

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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

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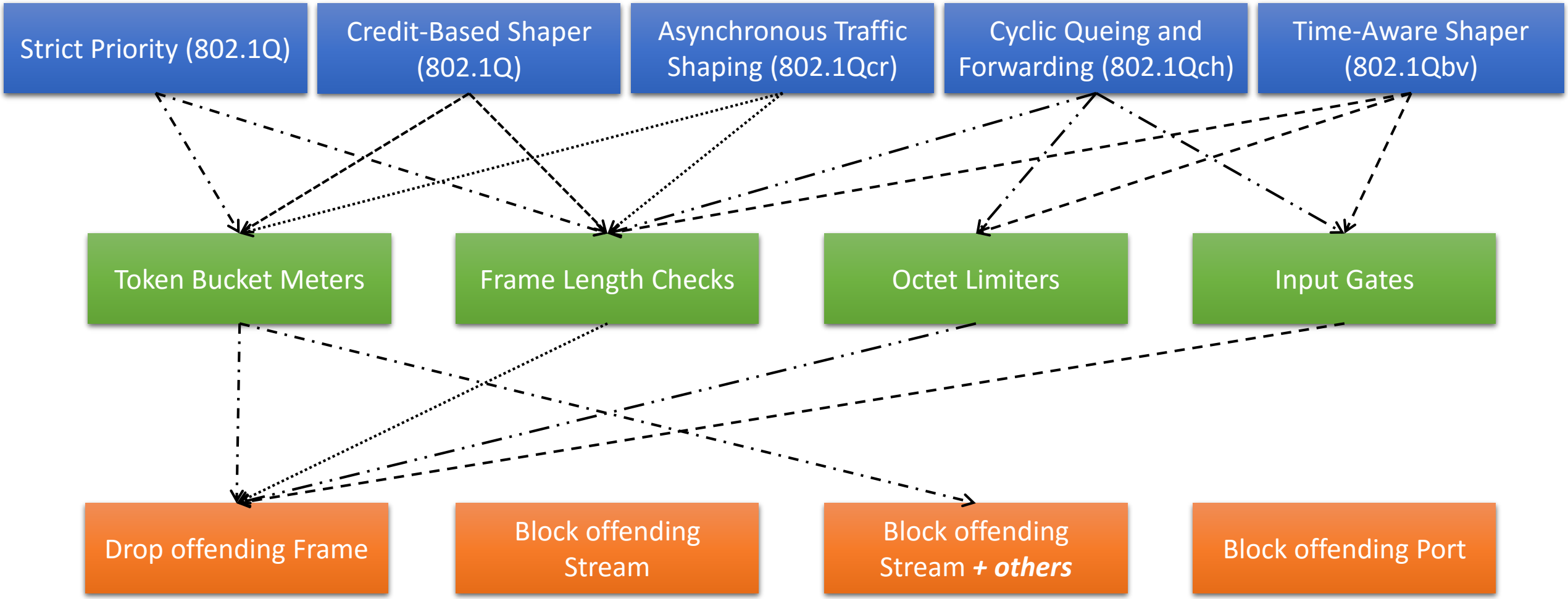
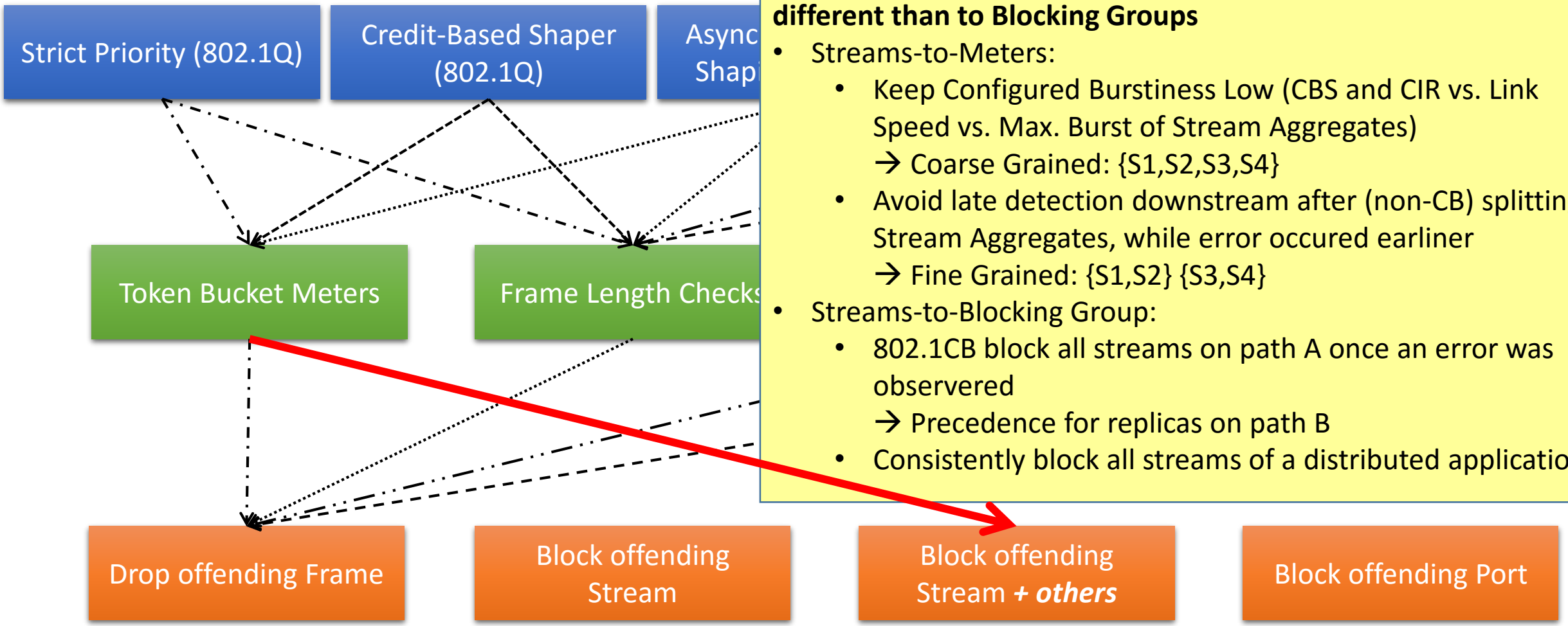
Drop offending Frame	Block offending Stream	Block offending Stream ***+ others***	Block offending Port
• Temporary Reaction - Drop a Malicious Frame • Treat consecutive Frames independently	• Permanently Block a Stream after Detection of a Malicious Frame • Block consecutive Frames of this Stream	• Permanently Block a group of Streams after Detection of a Malicious Frame from this Group • Block consecutive Frames of this Group of Stream	• 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



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 occured earliner
    → Fine Grained: {S1,S2} {S3,S4}
- Streams-to-Blocking Group:
  - 802.1CB block all streams on path A once an error was observered
    → Precedence for replicas on path B
  - Consistently block all streams of a distributed application

Observation #2: Missing Arrows

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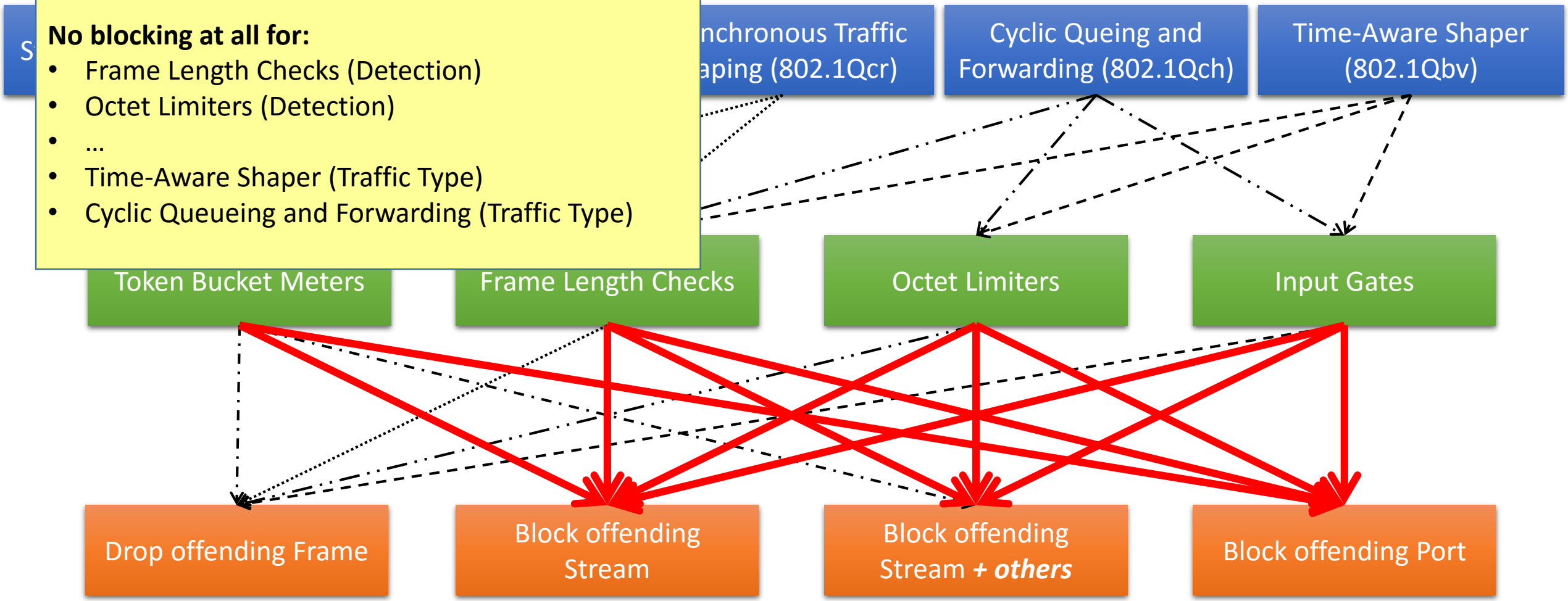
No blocking at all for:
- Frame Length Checks (Detection)
- Octet Limiters (Detection)
- …
- Time-Aware Shaper (Traffic Type)
- Cyclic Queueing and Forwarding (Traffic Type)



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Thank You for Your Attention!

Questions, Opinions, Ideas?

Johannes Specht

Dipl.-Inform. (FH)

Dependability of Computing Systems
Institute for Computer Science and
Business Information Systems (ICB)
Faculty of Economics and
Business Administration
University of Duisburg-Essen

Schuetzenbahn 70
Room SH 502
45127 Essen
GERMANY
T +49 (0)201 183-3914
F +49 (0)201 183-4573

Johannes.Specht@uni-due.de
http://dc.uni-due.de