DetNet

Bounded Latency-03

draft-finn-detnet-bounded-latency-03

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IETF 104 DetNet WG

Prague, 27 March, 2019

A reminder to new attendees …

- DetNet is about an **upper bound** on end-to-end latency – **not** low average latency.
- Bounded latency leads to the ability to compute exactly how many buffers are required to achieve zero congestion loss.
- **Feedback** that slows down flows to avoid congestion is **not an option** for the application space of interest to DetNet.
- Mathematically sound assurances can be given on latency and congestion loss.

Major changes from -02 to -03

- The draft has been made Informational.
- Section 3.1 is added to address the dynamic and static flow creations.
- Section 6.4 is updated for delay bound calculation in TSN with ATS.
  - Flow admission control is added in Section 6.4.1.
- Section 6.5 is simplified to address IntServ end-to-end delay bound calculation.

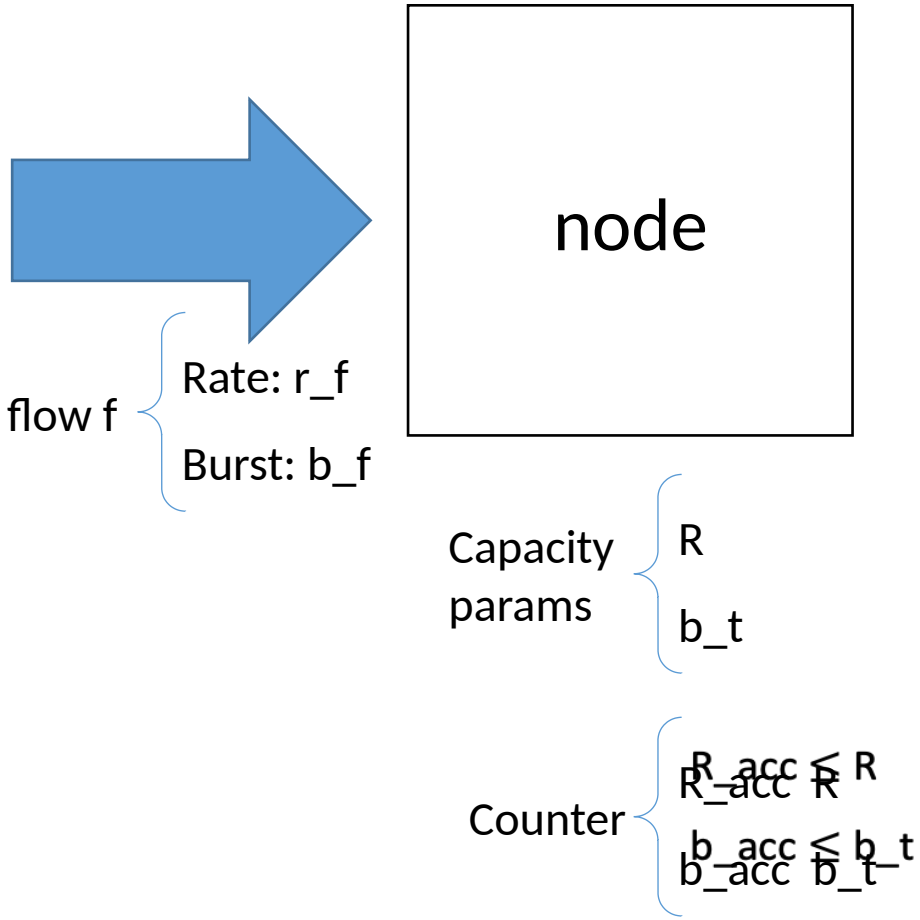
Section 3.1: Static and Dynamic flow creations

- The **Static** flow admission was already described in bounded-latency-02.
  - All the flows information is available.

- The **Dynamic** flow admission is added for the per-class scheduling with regulators in Section 6.4.1.
  - A flow can be added and removed.

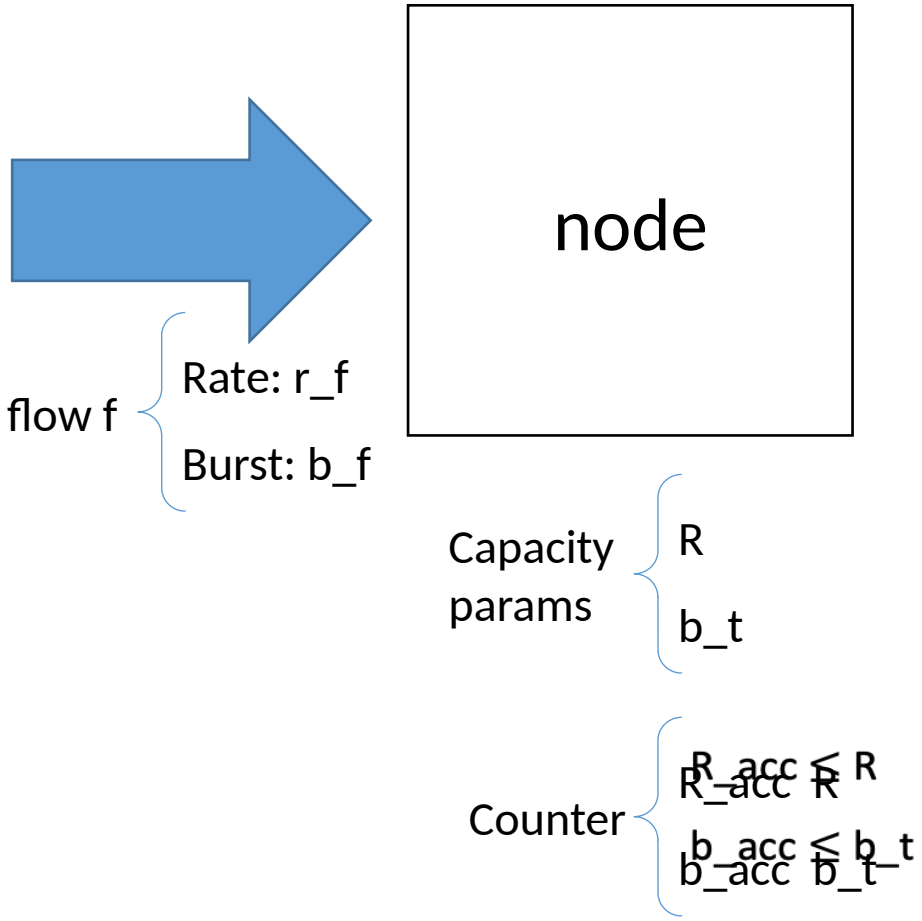
Per-class dynamic flow admission decision

- A flow is admitted if at all the nodes it traverses, the following conditions hold:
  - r_f + R_acc ≤ R
  - b_f + b_acc ≤ b_t
- If one of the above equations does not hold at any of the nodes flow f is traversing, the flow is rejected.



Counter updates for per-class dynamic flow admission

- When a flow is admitted, the counters are updated:
  - R_acc = R_acc + r_f
  - b_acc = b_acc + b_f
- When a flow leaves, the counters are updated:
  - R_acc = R_acc - r_f
  - b_acc = b_acc - b_f

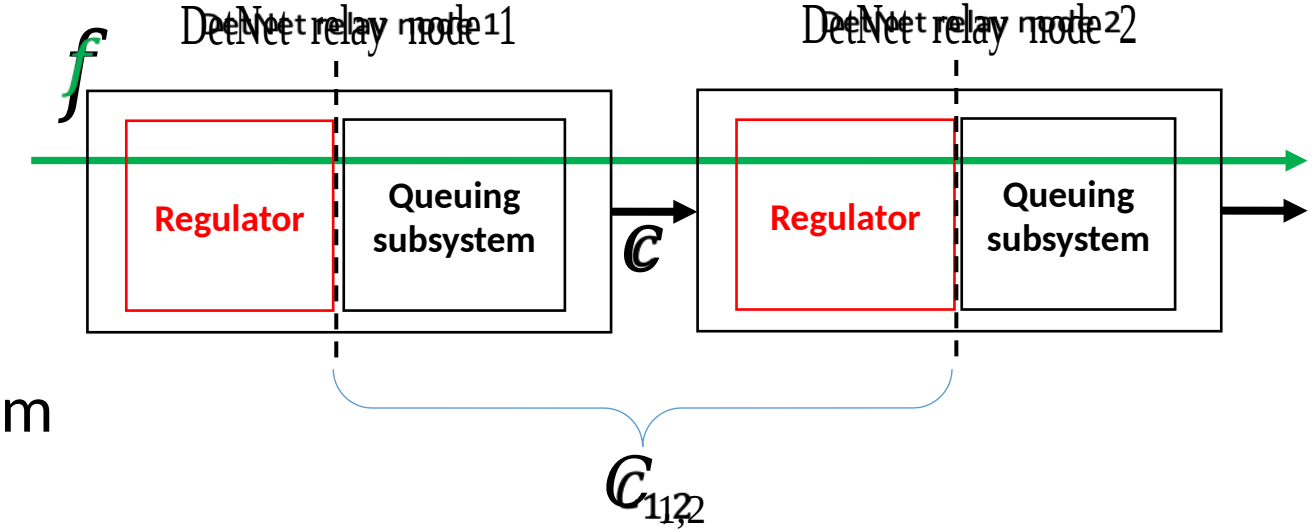


Per-class one hop delay bound calculation

One hop delay bound for flow f:

$$C_{1,2} = \sup_{f'}\{d_{f'}\}$$

$$d_f = T + \frac{b\_t - L^f_{min}}{R} + \frac{L^f_{min}}{c}$$



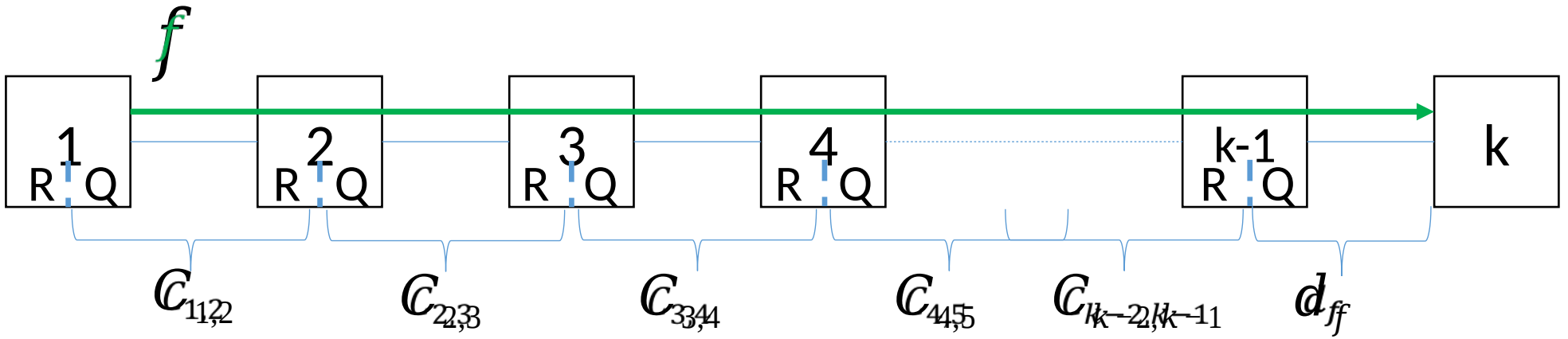
R: Regulator

Q: Queuing Subsystem

Per-class end-to-end delay calculation

End-to-end delay bound for flow f:

$$D = C_{1,2} + C_{2,3} + \cdots + C_{k-2,k-1} + d_f$$



R: Regulator

Q: Queuing Subsystem

Ref: [Mohammadpour, Stai, Mohiuddin, Le boudec, 2018]

Further updates planned

- Improvement of the delay bound calculation (both dynamic and static).
- Formal delay analysis of CQF.
- Per-node buffer size calculation.

Next step

- Call for WG adoption?

Thank you