

Technical Requirements of Bounded Latency in Large-scale DetNet Deployment

draft-geng-detnet-requirements-bounded-latency-01

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Background

Common IP/MPLS forwarding has long tail effect that couldn't guarantee bounded latency

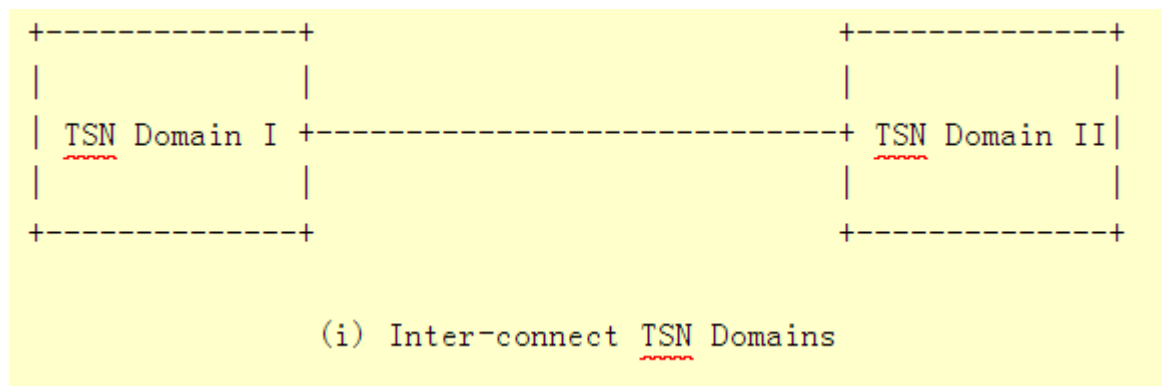
Several schemes are proposed for bounded latency forwarding such as dedicated tunnel,

- light load with per-flow per-hop shaping, Time Aware Shaping[IEEE802.1Qbv]
- Cyclic Queuing and Forwarding[IEEE802.1Qch],
- Scalable Deterministic Forwarding[draft-qiang-detnet-large-scale-detne
- SR based bounded latency[draft-chen-detnet-sr-based-bounded-latency]

•Not to compare and analyze these schemes, but to propose some factors (Layer 3 specific) worth to be considered when selecting Layer 3 bounded latency forwarding scheme

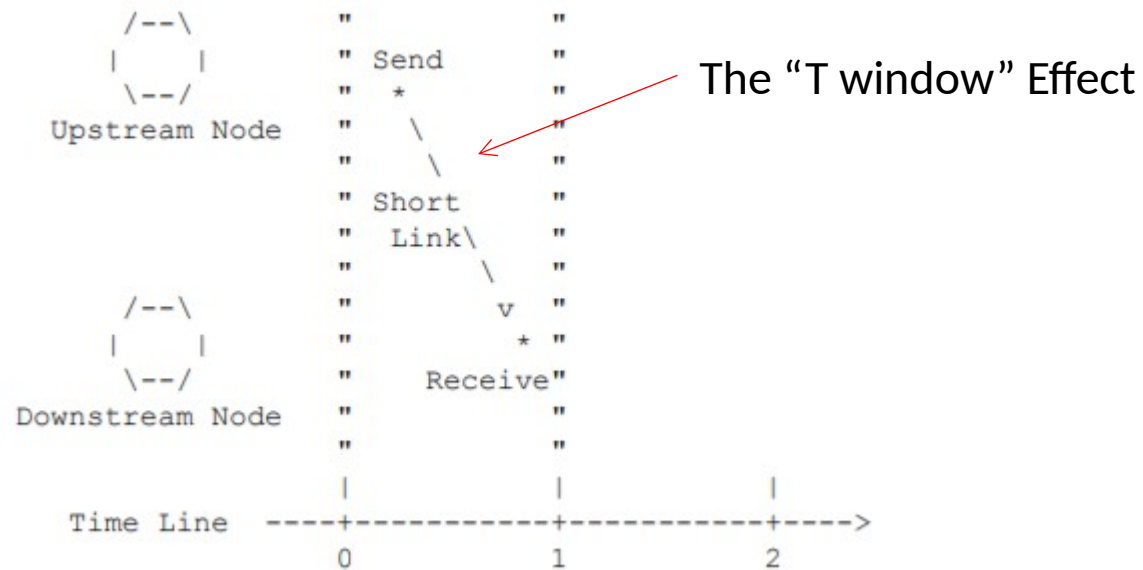
Tolerance of Time Asynchronization

- Stitching TSN domains with bounded latency
 - Two TSN domains have a high probability of being asynchronous
 - DetNet need to keep the bounded latency even under an unsynchronized situation



Long Link Propagation Delay

- Cause troubles in cyclic forwarding schemes
 - Violating the T window requirement
 - Longer T cyclic window can absorb the delay but the jitter will increase



Massive Dynamic Flows

- If we only consider LAN PLC-type application, it's relatively simple
- BUT, Complexity comes in larger-scale deployment (AR/VR, Holographic, Remote e-Health etc.)
 - Frequent connectivity establishment or tear-down
 - Aggregate and backbone layer 3 network serve millions of traffic flows simultaneously.
 - Heavy load of per-flow status and exponential growth of calculations on queuing and scheduling

Next steps

- More requirement to be analyzed on large scale deployment considering new application scenarios
- Off-line discussion with authors of different L3 solutions options in Detnet
- Different options may exist but the requirements have to be met by one or combination of multiples