Latency Guarantee with Stateless Fair Queuing (C-SCORE)

draft-joung-detnet-stateless-fair-queuing-05

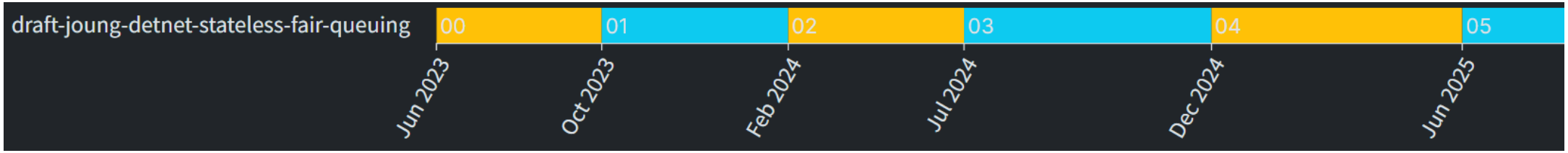
Jinoo Joung	**Jeong-dong Ryoo**	**Tae-sik Cheung**	**Yizhou Li**	**Peng Liu**
Sangmyung University	ETRI	ETRI	Huawei	China Mobile

IETF 124, DetNet WG, Nov. 2025

History of C-SCORE draft

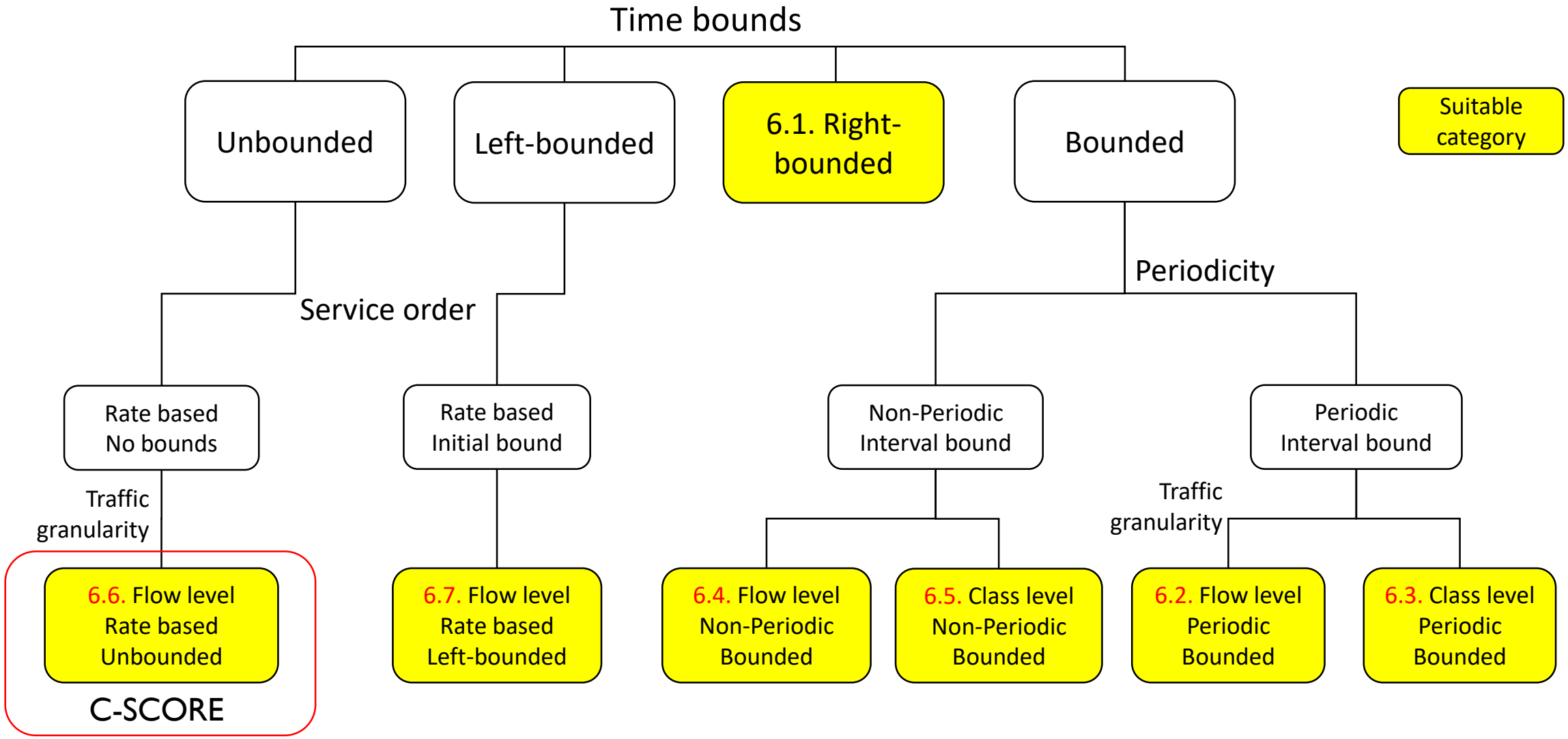
- Included in “Asynchronous Deterministic Networking Framework for Large-Scale Networks” draft-joung-detnet-asynch-detnet-framework
- as one of the async. data plane solutions, from June 2022.

- Separated to an independent draft with the requests from WG, on June 2023.



- Has been through intensive debates, discussions, and revisions.

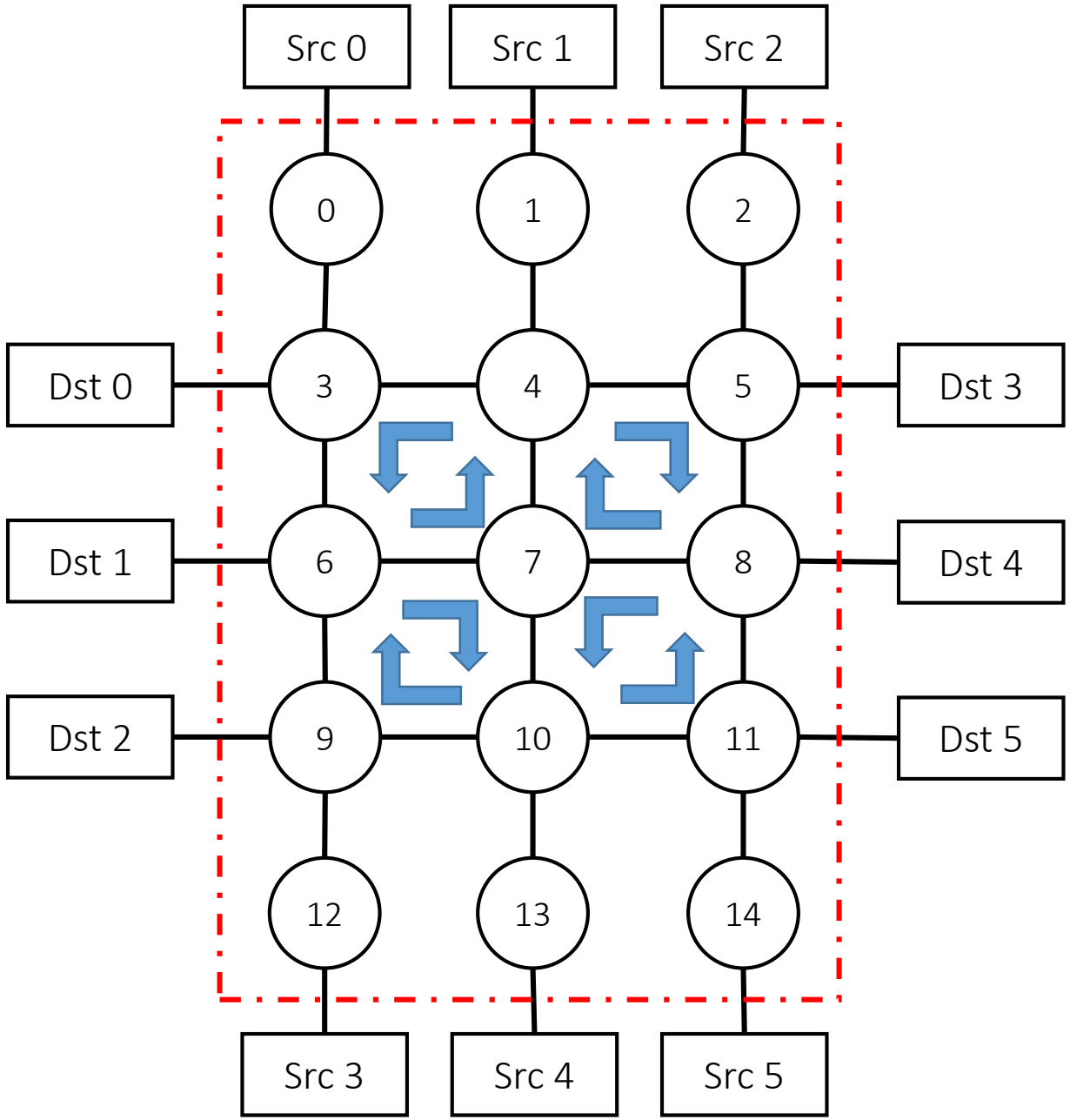
Category of C-SCORE [draft-ietf-detnet-dataplane-taxonomy]



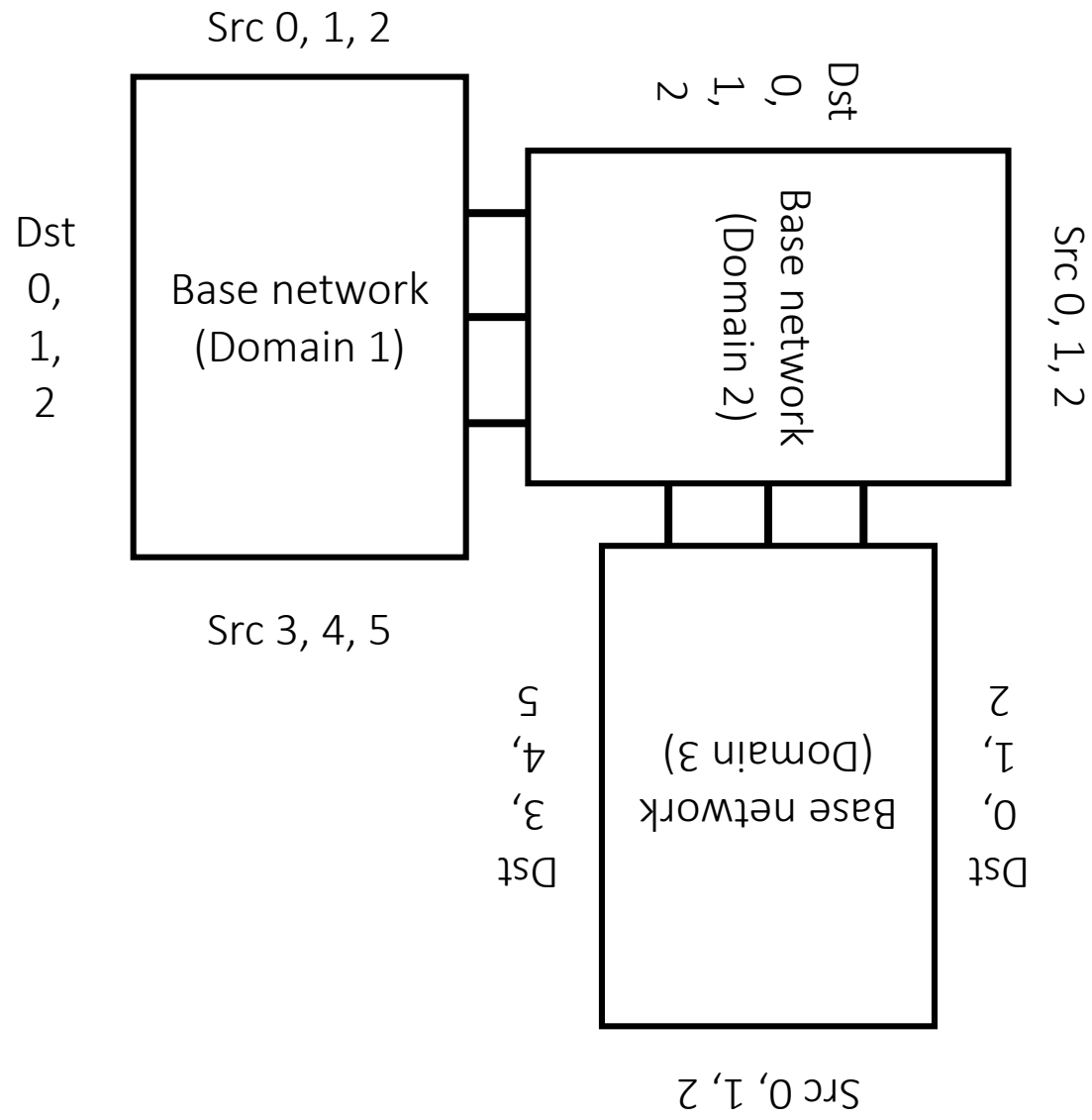
C-SCORE is the only solution currently being suggested in this suitable category.

Simulation for Interoperability test

Base 3x3 network, which appeared in the Topology draft, as the reference topology 1 (RT1)



Simulation Network, which is composed of three base networks



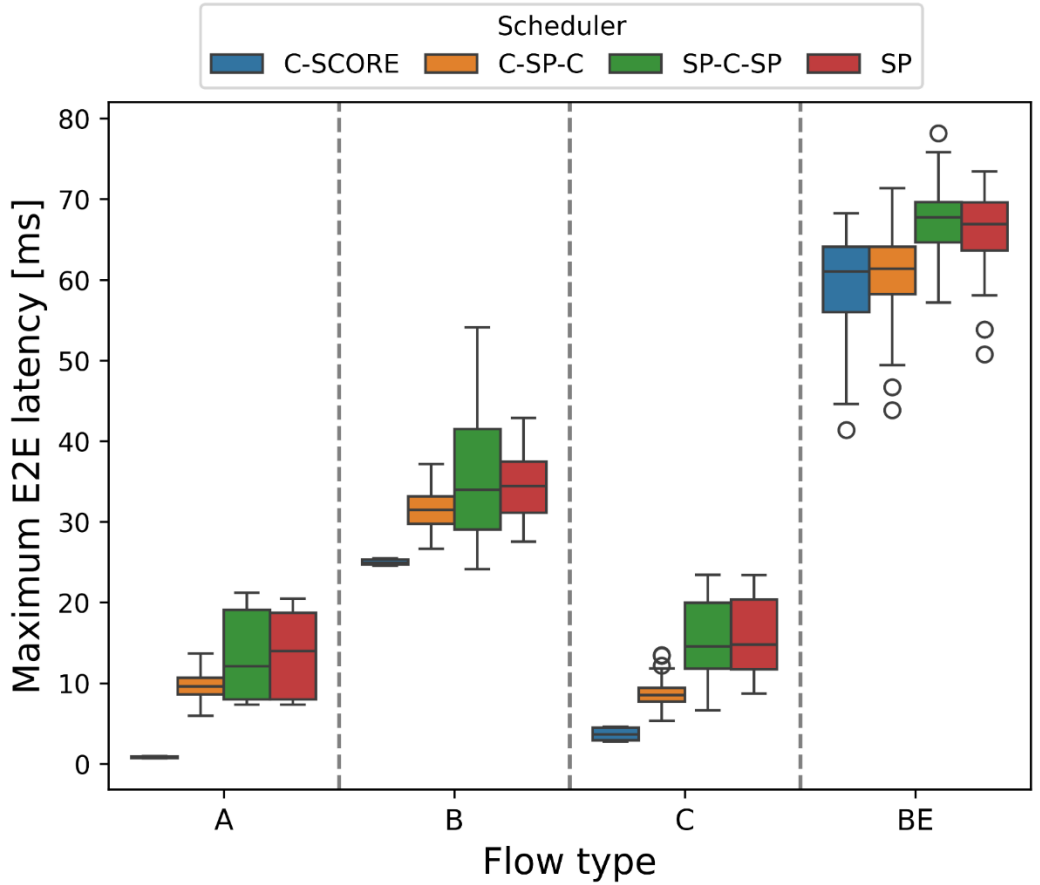
Characteristics of different flows types

Flow type	Service rate	Maximum burst size	Packet length
A	20Mbps	20Kbit	1-2Kbit
B	100Mbps	4Mbit	1-10Kbit
C	5Mbps	20Kbit	1-2Kbit
Best Effort (BE)	20Mbps	200Kbit	10Kbit

Simulation environments

- OMNET++ (https://omnetpp.org/)
- Links with 1Gbps capacity
- Each source generates flows A,B,C,BE for different destinations.
- Flows travel at most 21 hops.
- SP scheduler schedules flows A,B,C as high priority traffic.
- Maximum Utilization without BE traffic: 63%
  - at Domain 2, link 5-8
- Maximum Utilization with BE traffic: 85%
  - at Domain 2, link 7-4

Simulation results



- Total of 1000 packets per flow in a simulation.
- Simulations are repeated 100 times.
- C-SP-C represents the network of C-SCORE, SP, and C-SCORE domains.
- C-SCORE-only network has the smallest E2E latency bounds for A, B, C flows.
- Mixed networks show the performances in between the C-SCORE-only and SP-only networks.

Discussion

- C-SCORE works with SP networks seamlessly, without any additional configuration for the interaction.
- Resource reservation is necessary throughout the E2E paths, but it is already a well established function.
- C-SCORE and Time bounded (TB) solutions can also co-exist,
  - with TBs at small edge sides, e.g. LAN,
  - and a flow shaping function between edge and core networks.

Thank you

- Please take a look at

  https://datatracker.ietf.org/doc/draft-joung-detnet-stateless-fair-queuing/