Data plane Enhancement Taxonomy

draft-ietf-detnet-dataplane-taxonomy-04

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History of the Taxonomy draft

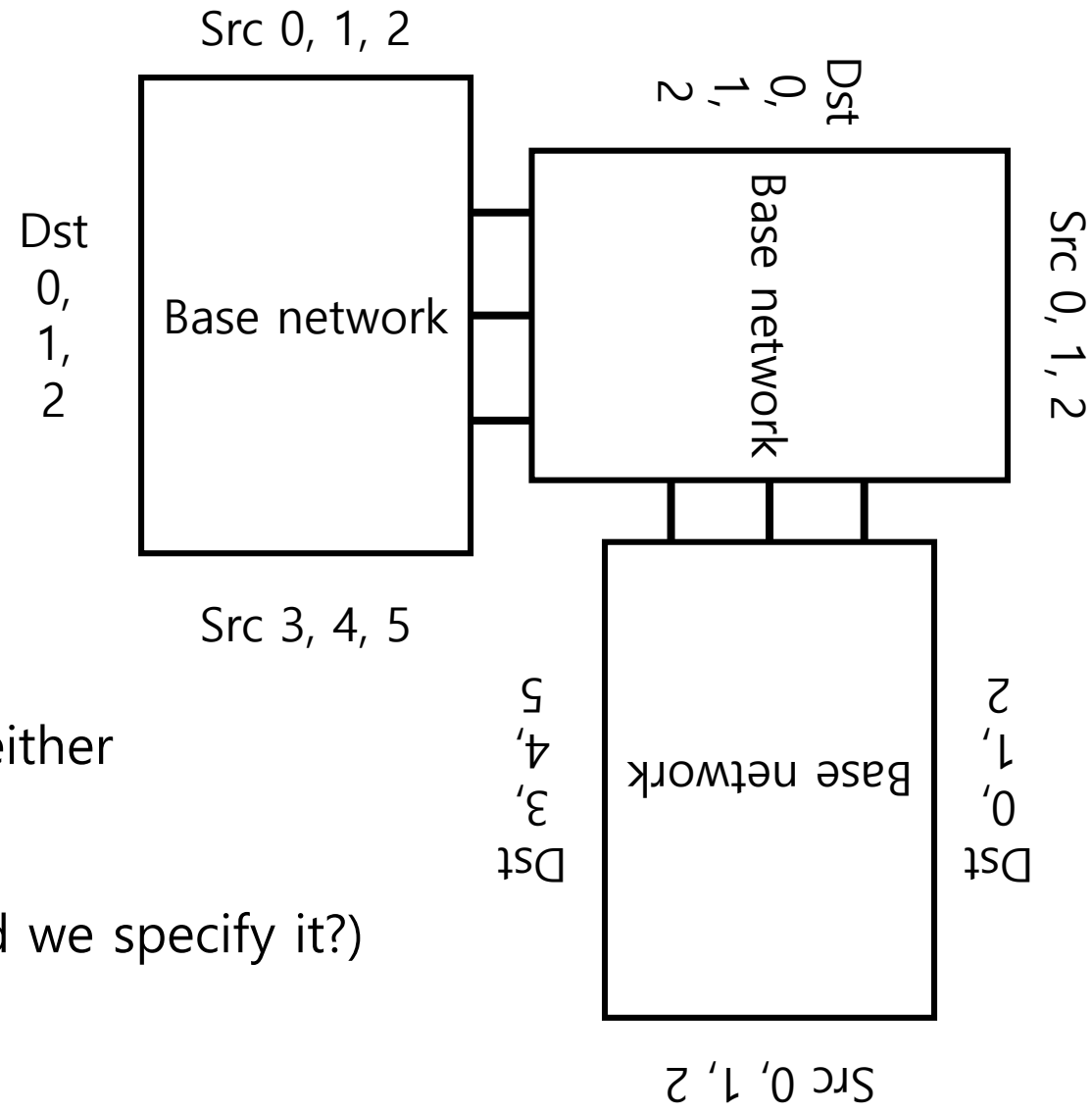
- Started as the Chair’s request.
- Defined One performance-related categorization & Six functional categorizations.
- Specified two Reference topologies.
- Specified seven Suitable categories.
- The draft has not been updated since the last 123 meeting.

Proposed Revision to the 05 draft (1/2)

- Chair's request: Considerations for interoperability & compatibility (I&C)
- Proposal: Try to cover both
  1. I&C of a solution with existing legacy networks
     - e.g. Evaluate performance degradation with mixed domains of the solution and DiffServ (Legacy network).
  2. I&C among heterogeneous solution domains
     - e.g. Evaluate performance degradation with mixed domains of different solutions.
- Proposal: Add of a reference topology for I&C evaluations (next slide)

Example: RT of a network of three domains

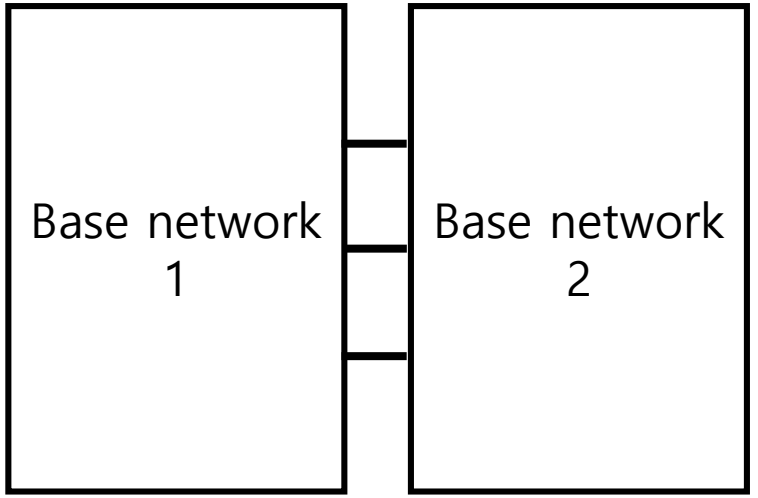
7. Reference Topologies
   7.3. Network for interoperability test
      7.3.1. Network topology
      7.3.2. Flow characteristics
      7.3.3. Flow paths
      7.3.4. Utilization



Base network can be a domain of either
- a target solution,
- strict priority schedulers, or
- another possible solution (should we specify it?)

Considerations on interoperability with other solutions

- Rate-based (RB) solutions go well with each other, because pay-burst-only-once property holds over the E2E paths.
  - C-SCORE & N-SCORE are rate-based.
  - FIFO and SP are also RB (rate-guaranteeing) if total service rate is less than the link capacity, in every link.
- RB → Time bounded (TB) is tricky.
  - TB solutions need to decide the time bounds for a packet.
  - They require the time slot long enough to accommodate the total bursts from all the input flows [1]. The slot length determines the E2E latency.
  - Due to the burst accumulation in the RB domain, it is hard to calculate the input bursts of flows. Shaping at the boundary is complex.
- TB → RB can go well. TB does not accumulate bursts.



Proposed Revision to the 05 draft (2/2)

- Revised terminology for clarification

2. Terminology

2.1. Terms Used in This Document

The following terms are used in the context of deterministic networking in this document:

time bound

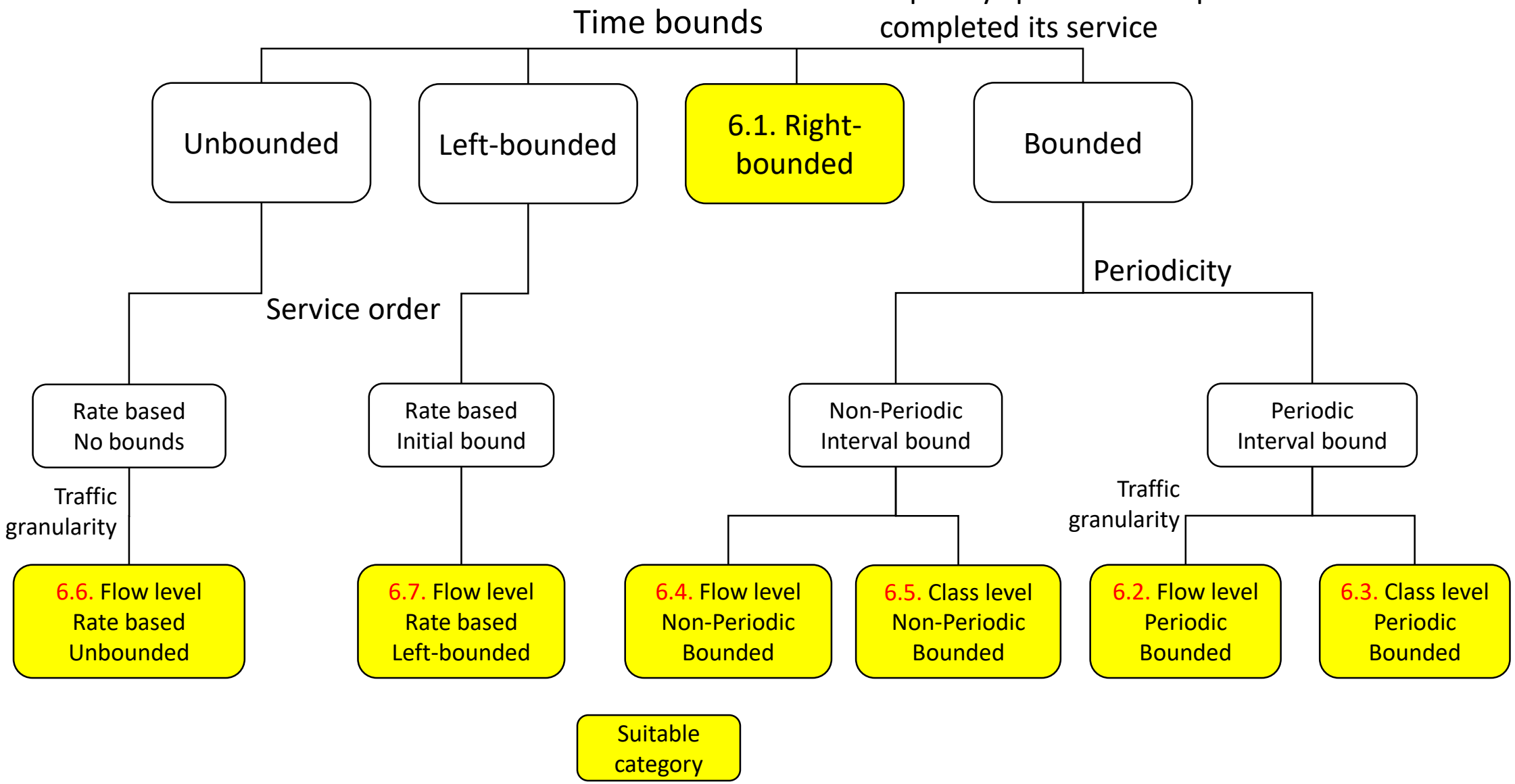
The earliest or latest transmission completion time explicitly specified for a packet

Recap: Current definitions of terminologies

- Solution
  - “A set of data plane functional entities, such as queue, scheduler, and regulator; which can guarantee a certain level of latency and jitter performance to a flow”
- Time bounds
  - “A solution can schedule a packet such that its transmission is completed within a specified interval of time. That interval can be either bounded, left-bounded, right-bounded, or unbounded.”
  - “Note that unbounded solutions can also guarantee an E2E and a nodal latency bounds. They just do not have an explicitly specified nodal time bound.”

Recap: Seven suitable categories

* Time bound: An earliest or latest time that is explicitly specified for a packet to be completed its service



Future plan

- Stabilize the document
- Start the approval process

- Note: This draft is to facilitate the understanding of the data plane enhancement solutions, which are suggested currently or can be suggested in the future, for deterministic networking.

Thank you

- Please take a look at

  https://datatracker.ietf.org/doc/draft-ietf-detnet-dataplane-taxonomy/

- [1] Damien GUIDOLIN-PINA, Marc BOYER, and Jean-Yves Le BOUDEC, "Configuration of Cycle Duration in Cyclic Queuing and Forwarding" Submitted to IEEE Transactions on Networking, Preprint, 2025.