

A Framework for Traffic Engineering in Enhanced DetNet

draft-xiong-detnet-te-framework-00

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Recap

- The co-authors would like to thank the comments and suggestions from Adrian Farrel, Lou Berger, János Farkas et al.
- The draft has been presented at IETF 118 meeting and we also had a side meeting for detailed discussion, thanks for your attention.
- The updates are like following shown.
 - Modifies draft name/title
 - Changes status to informational
 - Clarifies the purpose of the draft
 - Editorial updates

Problems

- As per RFC9522, DetNet is described:
 - “DetNet can be seen as a specialized branch of TE”
 - “since it sets up explicit optimized paths with allocation of resources as requested. ”
 - “A DetNet application can express its QoS attributes or traffic behavior using any combination of DetNet functions described in sub-layers.”
 - “They are then distributed and provisioned using well-established control and provisioning mechanisms adopted for traffic engineering.”
- As per RFC9522, the scalability concerns for DetNet:
 - “In DetNet, a considerable amount of state information is required to maintain per-flow queuing disciplines and resource reservation for a large number of individual flows. ”
 - “This can be quite challenging for network operations during network events such as faults, change in traffic volume or re-provisioning.”
 - “DetNet recommends support for aggregated flows, however, it still requires a large amount of control signaling to establish and maintain DetNet flows”

Motivation

- DetNet can be seen as a specialized branch of Traffic Engineering (TE) and needs to resolve the scalability issues . There is a requirement to use Enhanced DetNet to provide Quality of Service (QoS) in large-scale networks. TE can be a valuable tool to help scale DetNet.
- This document provides a framework for traffic engineering to achieve DetNet QoS in enhanced DetNet.
- [I-D.ietf-detnet-controller-plane-framework] provides a framework for the DetNet controller plane. This document also describes the enhancement considerations for control plane to deliver DetNet traffic engineering.

TE Framework for Enhanced DetNet

- Policy
 - The routing policy including bounded latency constraint-based routing can be considered when selecting and distributing the candidate paths.
- Path Steering
 - Provide path steering to forward packet with deterministic behaviors for data plane to achieve deterministic latency.
 - The deterministic latency information may be provided to forward packets for path steering in IPv6/SRv6/MPLS.
 - Class-based aggregation should be considered for differentiated DetNet QoS.
- Resource Management
 - Provide fine-grained resource scheduling and management to meet the bounded latency requirements, rational utilization of resources, improvement of network performance.
 - Time-based resource-aware control and forwarding should be considered based on the queuing mechanisms and different classes.

Considerations for Control Plane of DetNet TE

- This document also describes the enhancement considerations for control plane to deliver DetNet TE.

- 1. Information advertisement by IGP such as time-based resources and deterministic links.
- 2. The controller may collect the resources and topology information by BGP-LS.
- 3. The controller receives the service request from users or northbound interface.
- 4. The controller performs the deterministic paths planning based on the service requirements.
- 5. The controller distributes the results to the DetNet domain by PCEP or NETCONF.
- 6. The DetNet nodes will establish the deterministic path and related time-based resource allocation based on the configuration from the controller.
- 7. The controller may set the admission control and policy for traffic scheduling.

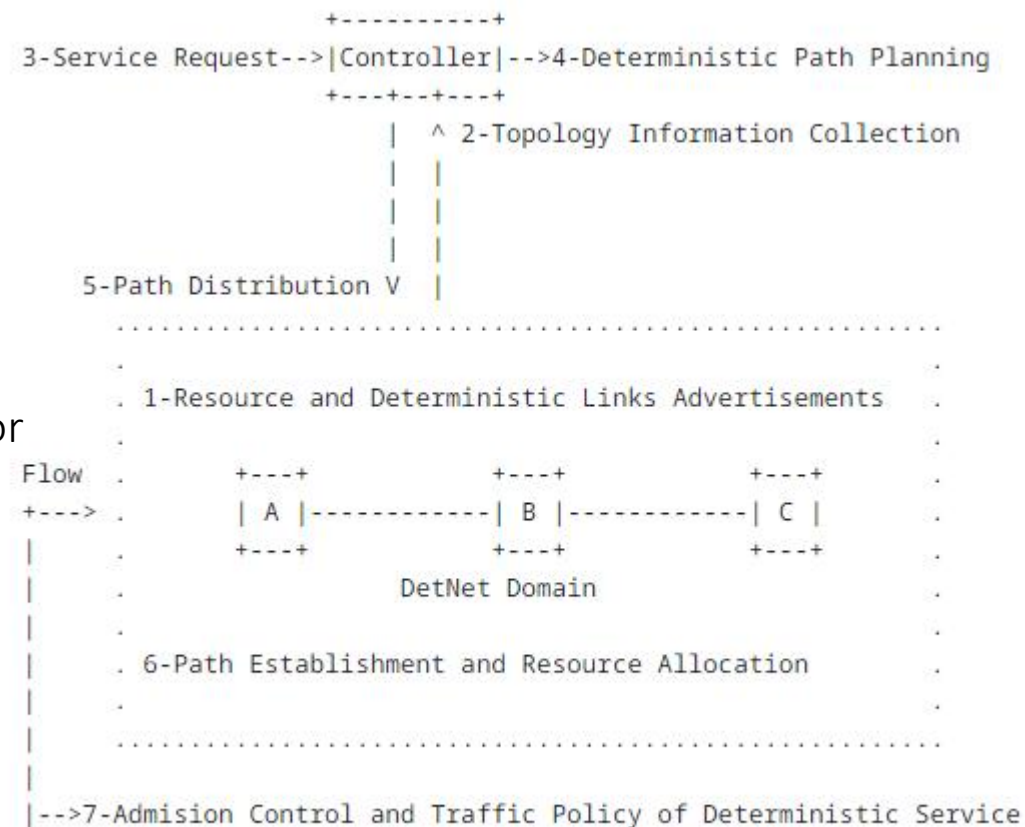


Figure 2: The Control Plane for DD-TE

Next Steps

- Seek feedback from TEAS WG.
- Ask for WG reviews and comments.
- Comments and discussions are very welcome!

Thank you!