PCEP for Enhanced DetNet

draft-zhang-pce-enhanced-detnet-00

Li Zhang, Xuesong Geng, Tianran Zhou @Huawei

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• The Deterministic Networking architecture is described in RFC8655
  • It provides the capability to carry specified data flows with extremely low data loss rates and bounded end-to-end latency within a network domain.

• Path computation element protocol is described in RFC5440
  • It describes how to communicate between a Path Computation Client (PCC) and a Path Computation Element (PCE), or between two PCEs.
  • Defines the interaction and data format of path calculation requests and path computation replies between PCC and PCE.

• The enhanced DetNet data plane is described in draft-yzz-detnet-enhanced-data-plane
  • It introduces the Bounded Latency Information to facilitate DetNet transit nodes to guarantee the bounded latency transmission in data plane.

• The segment routing for enhanced DetNet is described in draft-geng-spring-sr-enhanced-detnet
  • Defines how to leverage Segment Routing (SR) and Segment Routing over IPv6 (SRv6) to implement bounded latency.

• This documents describes the PCEP extensions for bounded latency path computation.
  • Introduces how to transmit bounded latency information between PCC and PCE to guarantee the bounded latency transmission in control plane.
Overview of the Related Drafts

Data Plane

- **IP/MPLS based**
  - draft-yzz-detnet-enhanced-data-plane

- **SRv6/SR based**
  - draft-geng-spring-sr-enhanced-detnet

Control Plane

- **IGP based**
  - draft-geng-lsr-isis-te-extension-enhanced-detnet

- **BGP LS based**
  - draft-geng-idr-bgp-ls-enhanced-detnet

- **BGP SR policy based**
  - draft-zhang-sr-policy-enhanced-detnet

- **PCEP and PCEP SR policy based**
  - draft-zhang-pce-enhanced-detnet
Extensions in this document

• Extensions Summary
  • Open Object
    • Bounded Latency Capability TLV. Newly defined for PCC and PCE to negotiate the capability of bounded latency.
  • RP Object
    • BLI type TLV. Newly defined to specify the type and format of the BLI that PCC desires.
  • Traffic Model Object
    • Newly defined to describe the features of the DetNet flow for which the path is to be calculated.
  • BLI Object
    • Newly defined to indicate the bounded latency information of the candidate path.
    • BLI list TLV, used in the case when all of the nodes in the ERO desire different BLI values.
    • Shared BLI TLV, used in the case when all of the nodes in the ERO desire the same BLI value.
  • SR Policy for BLI
    • Support for SR policy to carry BLI list TLV and shared BLI TLV with the candidate path.
Extensions in this document

- **Objects & TLVs**
  - Bounded latency capability TLV, used to advertise the support of bounded latency features in Open object.

    | 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 |
    |-----------------------------------------------|
    | Type = TBD1                                    |
    | Length = 4                                    |
    | Type Flag                                     |
    | Format Flag                                   |

  - BLI type TLV, may appear in RP object to specify the type and format of the BLI that PCC desires.

    | 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 |
    |-----------------------------------------------|
    | Type = TBD2                                    |
    | Length = 4                                    |
    | BLI Type                                      |
    | BLI Format                                    |
    | Reserved                                      |
Extensions in this document

- **Objects & TLVs**
  - Traffic model object, may appear in the PCReq message to describe the DetNet traffic features for the bounded-latency path computation.

<table>
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<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<table>
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<td>MaxLatencyVariation</td>
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</table>

// Optional TLVs //
Extensions in this document

• Objects & TLVs

  • BLI object, may appear in the PCRep message to indicate the requirement and resource allocation for the bounded latency path.

  • BLI list TLV, may appear in the BLI object to describe the bounded latency information for each node in the explicit route object.
Extensions in this document

• Objects & TLVs
  • Shared BLI TLV, may appear in the BLI object to describe the bounded latency information for all of the nodes in the explicit route object.

    0                   1                   2                   3
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
    +--------------------------------------------------+
    | Type=TBD6 | Length |
    +--------------------------------------------------+
    |                     BLI                           |
    +--------------------------------------------------+

• SR Policy for BLI
  • If all of the nodes/adjacencies in the explicit path indicated by the segment list request different BLI to guarantee bounded latency, a BLI list TLV is need to be carried with SR Policy.
  • When all of the nodes/adjacencies in the explicit path indicated by the segment list request BLI to guarantee bounded latency with the same BLI value, a Shared BLI TLV is need to be carried with SR Policy.
Next Steps

• Discussion on mailing list
• Keep align with progress in DetNet
Thank You