BGP-LS Extensions for PCE Discovery

draft-dong-pce-discovery/proto-bgp-07

Jie Dong, Mach Chen, Dhruv Dhody, Jeff Tantsura, Kenji Kumaki, Tomoki Murai
Motivation

• PCCs & PCEs need to automatically discover the set of PCEs along with their characteristics
• IGP based PCE discovery (RFC 5088, 5089) is applicable when both PCCs and PCEs participate in same IGP
• PCE discovery is also needed in some other scenarios
  • Cooperative Inter-domain path computation
    – Inter-AS scenarios
  • Hierarchical PCEs
    – When child and parent PCE are in different AS or do not run IGP
• As BGP-LS is used for routing information distribution to controller (PCE), the same BGP sessions can be re-used for PCE discovery at the PCCs.
Solution Overview

- PCE discovery info is advertised from PCE to BGP speakers
  - Could be co-located or learned via some means!
- BGP distributes the PCE discovery info on the BGP session
  - According to policy
- BGP speaker may use IGP to re-distribute further in the local IGP domain
Protocol Extensions

• New BGP-LS NLRI
  – NLRI-Type ‘PCE’ to carry PCE address info

• Protocol-ID: can be either direct, or static configuration
  – PCE descriptors: TLV based
    • IPv4 or IPv6 addresses of PCE
Protocol Extensions (Cont.)

• PCE Attribute TLVs
  – Carried in BGP-LS Attribute, only used with PCE NLRI
  – Detailed PCE information used for PCE selection
    • PATH-SCOPE TLV
      – Format and semantics same as IS-IS PCED Sub-TLV
    • PCE Capability TLV
      – Format and semantics same as IS-IS PCED Sub-TLV
    • PCE Domain TLV
      – Specifies PCE-Domains where the PCE has topology visibility and through which the PCE can compute paths
    • Neighbor PCE Domain TLV
      – Specifies neighbor PCE-Domains toward which a PCE can compute paths
Operational Considerations

• PCE information is treated as pure application level data which has no immediate impact on forwarding states on the BGP speakers.

• PCE information SHOULD be advertised only to the domains where such information is allowed to be used
  – Can be achieved by policy control on ASBRs

• PCE information is considered relatively stable and does not change frequently, thus this information will not bring significant impact on the amount of BGP updates in the network
Next Steps

• BGP-LS based PCE discovery is complementary to the IGP discovery mechanisms
• Content of the draft is stable
• Need feedbacks from IDR to further move forward in PCE
Thank You!