

BGP attribute for North-Bound
Distribution of Traffic Engineering
(TE) performance Metric
draft-wu-idr-te-pm-bgp-01

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BGP attributes for NB Distribution of TE performance metrics

- Objective
 - Using BGP to share additional TE performance related information to external components beyond linkstate and TE information contained in [I-D.ietf-idr-ls-distribution]
 - External components can be ALTO server or PCE server.
- Motivation
 - As described in [I-D.ietf-idr-ls-distribution] links state and traffic engineering information (collected from IGP domain) can be distributed using BGP and share with external party (e.g., ALTO server, PCE server)
 - As described in [I-D.ietf-pce-pcep-service-aware], network performance info can be distributed via OSPF or ISIS
 - PCE uses network performance info for end to end path computation
 - However in some cases, PCE participant in the different IGP(e.g.,Inter-AS, Hierarchy PCE)

Why use BGP to distribute network performance info

- Inter-AS PCE computation
 - Cooperating PCEs to compute inter-domain path using BRPC
 - Fall short when PCE in each AS participant in different IGP
- Hierarchy of PCE
 - A child PCE must be configured with the address of its parent PCE[RFC6805]
 - Configuration system is challenged by handling changes in parent PCE identities and coping with failure events
 - parent PCEs to advertise their presence to child PCEs when they are not a part of the same routing domain is unspecified.
- Topology and Cost Info gathering for ALTO server
 - The ALTO Server can aggregate information from multiple systems to provide an abstract and unified view that can be more useful to applications.
 - Examples of other systems include routing protocol
 - ALTO server may be external component for BGP distribution
 - Gather network performance info using BGP and form Map service(i.e.,Cost Map service)

Why use BGP to distribute network performance info

- In the section 3 of [I-D.ietf-pce-pcep-service-aware], PCEP should satisfy 5 requirements regarding network performance constraints
 1. PCE supporting this draft MUST have the capability to compute end-to-end path with latency, latency-variation and packet loss constraints. It MUST also support the combination of network performance constraint (latency, latency-variation, loss...) with existing constraints (cost, hop-limit...)
 2. PCC MUST be able to request for network performance constraint(s) in PCReq message as the key constraint to be optimized or to suggest boundary condition that should not be crossed.
 3. PCEs are not required to support service aware path computation. Therefore, it MUST be possible for a PCE to reject a PCReq message with a reason code that indicates no support for service-aware path computation.
 4. PCEP SHOULD provide a means to return end to end network performance information of the computed path in a PCRep message.
 5. PCEP SHOULD provide mechanism to compute multi-domain (e.g., Inter-AS, Inter-Area or Multi-Layer) service aware paths.

Brief Introduction of New BGP attribute

- [I-D.ietf-idr-ls-distribution] defines new BGP path attribute (BGP-LS attribute) to carry link, node, prefix properties.
- This draft reuses existing BGP-LS attribute and defines 7 new TLVs that can be announced as BGP-LS attribute used with link NLRI.
- These BGP TLVs populate network performance information:
 - Link delay
 - Delay variation
 - Packet loss
 - Residual bandwidth
 - Available bandwidth
 - Link utilization
 - Channel throughput
- These BGP TLVs Applied to PCE server TED and ALTO Server, etc.

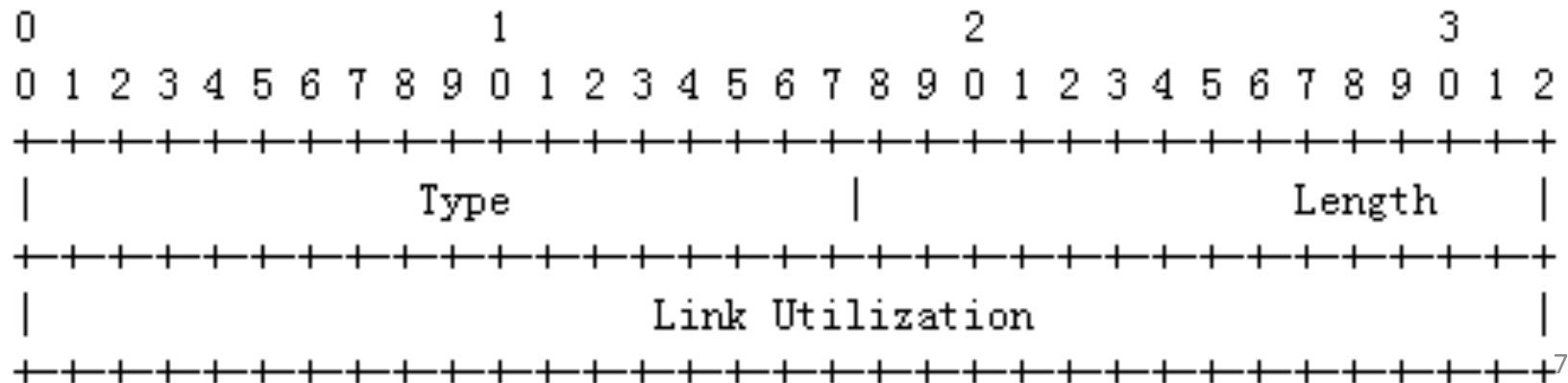
BGP Link Attribute TLVs

TLV Code Point	Description	IS-IS TLV/Sub-TLV	Defined in:
xxxx	Unidirectional Link Delay	22/xx	[ISIS-TE]/4.1
xxxx	Min/Max Unidirectional Link Delay	22/xx	[ISIS-TE]/4.2
xxxx	Unidirectional Delay Variation	22/xx	[ISIS-TE]/4.3
xxxx	Unidirectional Link Loss	22/xx	[ISIS-TE]/4.4
xxxx	Unidirectional Residual Bandwidth	22/xx	[ISIS-TE]/4.5
xxxx	Unidirectional Available Bandwidth	22/xx	[ISIS-TE]/4.6
xxxx	Link Utilization	----	section 5.1
xxxx	Channel Throughput	----	section 5.2

1. [ISIS-TE] is referred to draft-ietf-isis-te-metric-extensions-00.
2. They are all Link attributes used with link NLRI defined in [I.D-ietf-idr-ls-distribution].
3. The first 5 TLVs are from IS-IS Extended IS Reachability sub-TLVs
4. The last 2 link asstribute TLVs are defined in this draft.

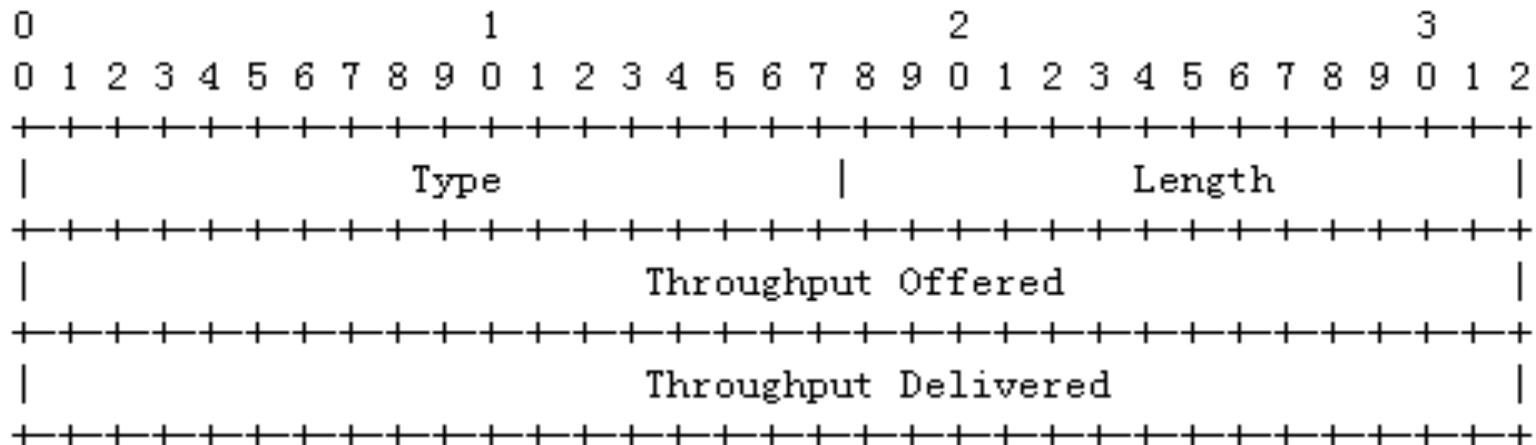
Link Utilization TLV

- Advertise the average link utilization between two directly connected IS-IS neighbors or BGP peers.
- Be the utilization percentage per interval (e.g., 5 minutes) from the local neighbor to the remote one.
- The measurement method is defined in section 6.4 of [RFC6703].
- This TLV carries aggregated link property and is more applicable to best effort network service.



Channel Throughput TLV

- Advertise the average Channel Throughput between two directly connected IS-IS neighbors or BGP peers.
- Be the throughput between the local neighbor and the remote ones over a configurable interval.
- The measurement method is defined in section 2.3 of [RFC6374].
- This TLV carries aggregated link property and is more applicable to best effort network service.



Questions?