OSPF Extended Link Attributes

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OSPF Link Attributes

- Many link attributes have been define in OSPF in the context of the MPLS TE and GMPLS
- RFC3630, RFC6827, RFC4203, RFC6827, RFC4203, RFC4124, RFC5329, RFC5330, RFC5392, RFC6001, RFC7308, RFC7471
- All these link attributes are advertised in the sub-TLVs of TE Link TLV of Traffic Engineering LSA (RFC3630)

TE Opaque LSA

- RFC 3630
  - “The extensions provide a way of describing the traffic engineering topology (including bandwidth and administrative constraints) and distributing this information within a given OSPF area. This topology does not necessarily match the regular routed topology”
- A link described in TE Opaque LSA becomes part of the TE topology

Extended Link LSA

- draft-ietf-ospf-prefix-link-attr-06.txt
  - “OSPFv2 Extended Link Opaque LSA - allows advertisement of additional attributes for links advertised in Router-LSAs.”
- Generic container for advertising link specific attributes

Link Attributes Usage

- Some of the link attributes defined for MPLS TE and GMPLS are useful outside of TE/GMPLS
- Examples:
  - Remote interface IP address, Link Local/Remote Identifiers
    - Improved two way connectivity check
    - SR traffic engineering
  - Shared Risk Link Group
    - LFA
  - Unidirectional Link Delay, Unidirectional Available Bandwidth
    - Path Computation

Link Attributes Advertisement

- How do we advertise link attributes originally defined for TE/GMPLS if the usage is outside of TE/GMPLS
- Option 1:
  - Use TE Opaque LSA
- Option 2:
  - Use the Extended Link LSA and define code-points for the existing link attributes

Option 1 – TE Opaque LSA

- Advantages:
  - every link attribute is only advertised once in a single LSA - no duplication of data possible
  - no additional standardization requirement

Option 1 – TE Opaque LSA (cont.)

- Disadvantages:
  - Link becomes part of the TE topology, even though TE is not enabled on it
    - Problem with backward compatibility (RFC3630)
  - TE Opaque LSA could carry data that is not used by TE. There is no mechanism to indicate which attribute is to be passed to TE and which one not
  - Link attributes used for non-TE purposes spread across multiple LSA (i.e. Adj-SID is advertised in ELL)

Option 2 – Extended Link LSA

- Use exiting format of the TE link attributes
- Allocate code points from the OSPF Extended Link TLV Sub-TLV Registry
  - Defined in draft-ietf-ospf-prefix-link-attr
- Code pints allocated on a case by case bases together with the use-case

Option 2 – Extended Link LSA (cont.)

- Advantages:
  - Advertisement does not make the link part of the TE topology
  - TE Opaque LSA keeps to be truly opaque to OSPF. Its content is not inspected by OSPF, it is passed to TE. OSPF acts as a pure transport.
  - Clear distinction between TE and IGP data. It avoids any conflicts and is fully compatible with the RFC3630.
  - All link attributes that are used by IGPs are advertised inside the single LSA (Extended Link LSA)

Option 2 – Extended Link LSA (cont.)

- Disadvantages
  - in rare case, the same link attribute can be advertised in both the TE Opaque and Extended Link Attribute LSAs
  - additional standardization effort
    - advantage - non-TE use cases for the TE link attributes are documented and validated by the OSPF working group

Proposal

- Proposal is to use Option 2
- Keep TE Opaque LSA to be used for TE only purposes
- For those link attributes defined for TE originally that are useful outside of TE
  - keep the existing format
  - allocate new code-point from the OSPF Extended Link Opaque LSA TLVs IANA registry

Next Steps

- Looking for the input from the OSPF WG