Carrying SID Algorithm information in PCE-based Networks

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Motivation

• A PCE can compute SR-TE paths using prefix SIDs with different Algorithms depending on the use-case, constraints, etc. While this information is available on the PCE, there is no method of conveying this information to the headend router.

• The headend can also compute SR-TE paths using different Algorithms, and this information also needs to be conveyed to the PCE for collection or troubleshooting purposes.

• An operator may also want to constrain the path computed by the PCE to a specific SID Algorithm. For example, in order to only use SID Algorithms for a low-latency path.
Prefix-SID Algorithm

• Described in Segment Routing Architecture RFC
  • RFC 8402 - Section 3.1.1
  • Two algorithms defined
    • Shortest Path First (SPF)
    • Strict Shortest Path First (Strict-SPF)

• IGP Algorithm Types in IANA registry
  • Two existing algorithms and Flexible Algorithms range
New NAI types for SR-ERO subobject

• SR-ERO subobject encoding is extended with additional NAI types

NAI for IPv4 Node SID with Algorithm

+---------------------------------+---------------------------------+
|                                  |                                  |
| Node IPv4 address                |                                  |
|                                  |                                  |
|                                  |                                  |
|                                  |                                  |
|                                  |                                  |

NAI for IPv6 Node SID with Algorithm

+---------------------------------+---------------------------------+
|                                  |                                  |
| Node IPv6 address (16 octets)    |                                  |
|                                  |                                  |
|                                  |                                  |
|                                  |                                  |
|                                  |                                  |

Reserved           | Algorithm
TLV for the LSPA Object

• Introduced new TLV to carry the SID Algorithm constraint

   +-----------------------------------------------------------+
   |             Type=TBD                    |            Length=4           |
   +-----------------------------------------------------------+
   | Reserved           | Flags   |L|F|   Algorithm   |
   +-----------------------------------------------------------+

• F (Fallback): If set to 1 and the PCE is unable to compute a path using only prefix SIDs with the specified Algorithm, the PCE MAY compute an alternate fallback path without constraining to the specified Algorithm.

• L (Loose): If set to 1, the PCE MAY insert prefix SIDs with a different Algorithm, but it MUST prefer the specified Algorithm whenever possible.
Next steps

• Comments and discussion are welcome
• Request WG adoption