Native PCE TED

draft-chen-pce-pcc-ted-00

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Introduction

- PCE Architecture in RFC 4655
  TED for PCE created using routing protocol

```
| TED |<--------------> Routing Protocol |
|     |                             |
|     |  \
|     | PCE  \
|-----|-----|
```

To remove dependency on routing protocol
To have simple and efficient way to create TED for PCE

- **Extensions to PCEP for**
  - PCC to advertise info on links attached to node running PCC
  - PCE for domain to get info and build TED
Information on Link (no IGP running over it)

- **P2P Link** between node C and D (C's point of view)
  1. **Link Type:** P2P
  2. **Link ID** (i.e., Router ID of neighbor D) since no IGP
  3. **Local IP address:** 10.1.1.1
  4. **Remote IP address:** 10.1.1.2
  5. **TE metric:** 10
  6. **Maximum bandwidth:** 100G
  7. **Maximum reservable bandwidth:** 100G
  8. **Unreserved bandwidth:** …
  9. **Administrative group:** …

- **Broadcast Link** connecting multiple nodes C, E, … (C’s point view)
  a. **Link Type:** Multi-access
  b. **Link ID** (i.e., interface address of DR) since no IGP selects DR

PCC sends PCE info on links
PCE builds TED according to info
Message Extensions

Message Extensions (2 options):

1) **Extensions to NOTIFICATION object in Notification (PCNtf) Message** *(Details below)*

   New NT and NVs, TLVs in NOTIFICATION Object

2) **New Message** *(Details in Appendix)*

NT=8 (TBD): Links
   * NV=1: Updates on Links
   * NV=2: Withdraw Links

TLVs in NOTIFICATION contains information on Links (Link TLV, Router-ID TLV)

NOTIFICATION object body:
New TLVs and Sub-TLVs

Inter-Domain Link TLV:
```
+----------------+----------------+----------------+----------------+
|                |                |                |                |
| 0 1 2 3 4 5 6 7| 8 9 0 1 2 3 4 5| 6 7 8 9 0 1 2 3| 4 5 6 7 8 9 0 1|
+----------------+----------------+----------------+----------------+
|                 |                |                |                |
| +----------------+----------------+----------------+----------------+
| |                |                |                |                |
| +----------------+----------------+----------------+----------------+
```

Sub-TLVs are some of those/equivalents in RFC 3630 + one new below

Router ID TLV:
```
+----------------+----------------+----------------+----------------+
|                |                |                |                |
| 0 1 2 3 4 5 6 7| 8 9 0 1 2 3 4 5| 6 7 8 9 0 1 2 3| 4 5 6 7 8 9 0 1|
+----------------+----------------+----------------+----------------+
|                 |                |                |                |
| +----------------+----------------+----------------+----------------+
| |                |                |                |                |
| +----------------+----------------+----------------+----------------+
```

Local IPv4/6 address with mask Sub-TLV:
```
+----------------+----------------+----------------+----------------+
|                |                |                |                |
| 0 1 2 3 4 5 6 7| 8 9 0 1 2 3 4 5| 6 7 8 9 0 1 2 3| 4 5 6 7 8 9 0 1|
+----------------+----------------+----------------+----------------+
|                 |                |                |                |
| +----------------+----------------+----------------+----------------+
| |                |                |                |                |
| +----------------+----------------+----------------+----------------+
```

Sub-TLVs are some of those/equivalents in RFC 3630 + one new below
Procedures – PCC

After session between PCC and PCE is up, PCC sends PCE message containing all links attached to C with indication of Updates on Links.

For new and changed Links, PCC sends PCE message containing them with indication of Updates on Links.

For Links down, PCC sends PCE message containing them with indication of Withdraw Links.

PCNtf (Updates)
- ID: 3.3.3.3
- Router-ID TLV
- P2P
- 10.1.1.1
- 10.1.1.2
- TE metric: 10
- Link TLV
- Multi-Access
- 10.2.2.1/24
- TE metric: 20
- Link TLV

PCNtf (Withdraw)
- ID: 3.3.3.3
- Router-ID TLV
- P2P
- 10.1.1.1
- 10.1.1.2
- Multi-Access
- 10.2.2.1/24
- Link TLV
- Link TLV
After session between PCC and PCE is up, PCC sends PCE message containing all links attached to C with indication of Updates on Links.

For new and changed Links, PCC sends PCE message containing them with indication of Updates on Links.

For Links down, PCC sends PCE message containing them with indication of Withdraw Links.

NOTIFICATION Object:
- PCNtf (Updates)
  - ID: 3.3.3.3
  - P2P
  - 10.1.1.1
  - 10.1.1.2
  - TE metric: 10
  - Multi-Access
  - 10.2.2.1/24
  - TE metric: 20

PCNtf (Withdraw)
- ID: 3.3.3.3
  - P2P
  - 10.1.1.1
  - 10.1.1.2
  - Multi-Access
  - 10.2.2.1/24
According to messages received, PCE
- builds and maintains TED;
- stores and maintains Links for each of nodes in domain it is responsible;
- when a node is down, removes Links attached to the node.
Summary

Native PCE TED

• **Simple**
  – Extensions to an existing object
  – PCC sends PCE Link Info configured
  – PCE builds TED from Info

• **Efficient**
  – Minimum info is sent from PCC to PCE

• **No dependency** on other routing protocols
Next Step

• Request for comments and suggestions