

PCEP-LS : Distribution of Link-State and TE Information via PCEP.

draft-dhodylee-pce-pcep-ls-01	draft-kondreddy-pce-pcep-ls-sync-optimizations-00	draft-wu-pce-pcep-ls-sr-extension-00
PCEP Extension for Distribution of Link-State and TE Information.	Optimizations of PCEP Link-State(LS) Synchronization Procedures	PCEP Link-State Extensions for Segment Routing
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Reincarnation!

In the past life, known as “*draft-dhodylee-pcep-pcep-te-data-extn*”.

Generalized to LS (link-state)!

- Which includes TE of course!

Introduction



[I-D.leedhody-teas-pcep-ls] (on agenda in TEAS) proposes PCEP based approach for learning and maintaining the Link-State and TE information.

- Architectural considerations and options
- And its impact



This document list

- The requirements
- The extensions for PCEP-LS.

Applicability

When no IGP or BGP-LS running

- in the network
- at the PCE

IGP or BGP-LS running, but

- Receive partial information from PCEP for faster convergence
- Only Incremental update from PCEP
- Or receive from both

Hierarchy of PCE / ACTN

Requirements for PCEP extension

Capability Advertisement

- Remote (learned) state

Capability to report the link-state (and TE) information

- Local and remote
- Support for initial sync

Mechanism to link information learned via IGP and BGP-LS

Encode only the exact changes in link-state (and TE) properties

Support MPLS-TE, GMPLS, optical and impairment aware properties.

PCE-PCE synchronization

All architecture options

LSRpt Message

PCC MUST report any changes in the link-state (and TE) information to the PCE by sending a LS Report carried on a LSRpt message to the PCE.

Each node and Link would be uniquely identified by a PCEP LS identifier (LS-ID).

- remains constant for the lifetime of a PCEP session

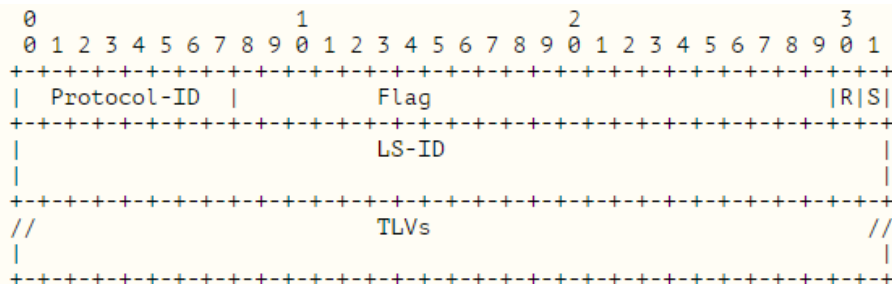
The LS reports may carry local as well as remote link-state (and TE) information

The format of the LSRpt message is as follows:

```
<LSRpt Message> ::= <Common Header>  
                    <ls-report-list>
```

Where:

```
<ls-report-list> ::= <LS>[<ls-report-list>]
```



Initial Sync

Initial Link-State (and TE) data base synchronization immediately after PCEP session initialization.

PCC takes a snapshot of the DB in a series of LSRpt message.

Sync Flag in LS object

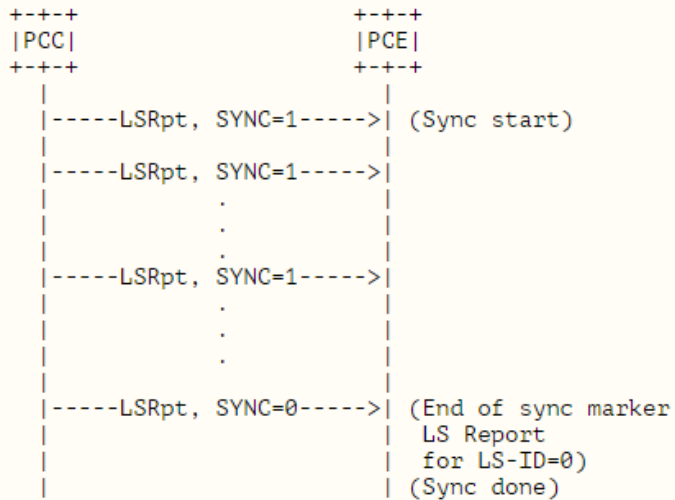


Figure 1: Successful LS synchronization

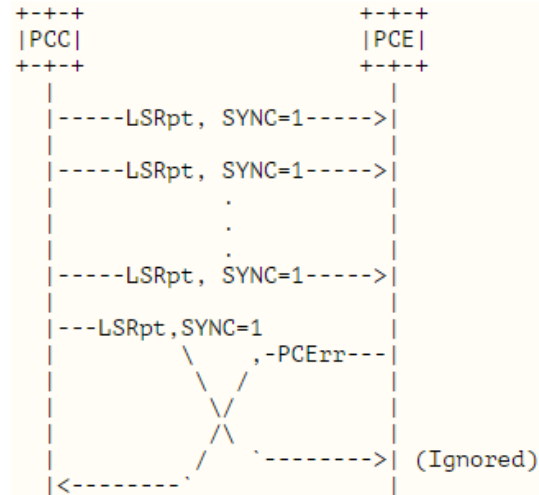


Figure 2: Failed LS synchronization (PCE failure)

Optimizations

LS Synchronization Avoidance

To skip Link-State (and TE) synchronization if the state has survived and not changed during session restart.

Using Link-State DB Version to find if the no change in the DB

Incremental LS Synchronization

To do incremental (delta) Link-State (and TE) Synchronization when possible

Synchronize only the changes, since session down.

PCE-triggered Initial Synchronization

To let PCE control the timing of the initial Link-State (and TE) Synchronization.

PCE trigger by sending LSRpt from PCE to PCC with LS-ID=0 and SYNC=1

PCE-triggered Re-synchronization

To let PCE re-synchronize the Link-State (and TE) information for sanity check.

PCE trigger by sending LSRpt from PCE to PCC

TLV & Sub-TLV

Routing- Universe TLV

Local and Remote Node Descriptor TLV

Autonomous System

BGP-LS Identifier

OSPF Area ID

IGP Router ID

MT ID

Link Descriptors TLV

Local / remote ID

IP (v4/v6) interface
address

IP (v4/v6) neighbor
address

MT ID

Prefix Descriptor TLV

MT ID

OSPF Route Type

IP reach ability
information

Node Attribute TLV

MT ID

Node flags

Opaque node
properties

Node Name

IS-IS area ID

IP (v4/v6) local
router-id

Link Attribute TLV

IP (v4/v6) local
/remote router-id

Link Local/remote ID

Administration
group

Max BW

Max Resv BW

Un resv BW

....

PCEP-LS and SR

Use PCEP-LS to carry the SR information via PCEP

- Instead of IGP or BGP-LS

New sub-TLV for Node Attribute TLV

- SID/Label Binding
- SR-Capability
- SR-Algorithm

New sub-TLV for Link Attribute TLVs

- Adjacency Segment
- LAN Adjacency Segment
- Peer Segment
- Peer-Set Segment

New sub-TLV for Prefix TLVs

- Prefix Segment

Next Steps

Agree with the current approach?

Comments?

Thanks!