

Stateful PCE for P2MP LSP

draft-palle-pce-stateful-pce-p2mp-04
draft-palle-pce-stateful-pce-initiated-p2mp-lsp-03

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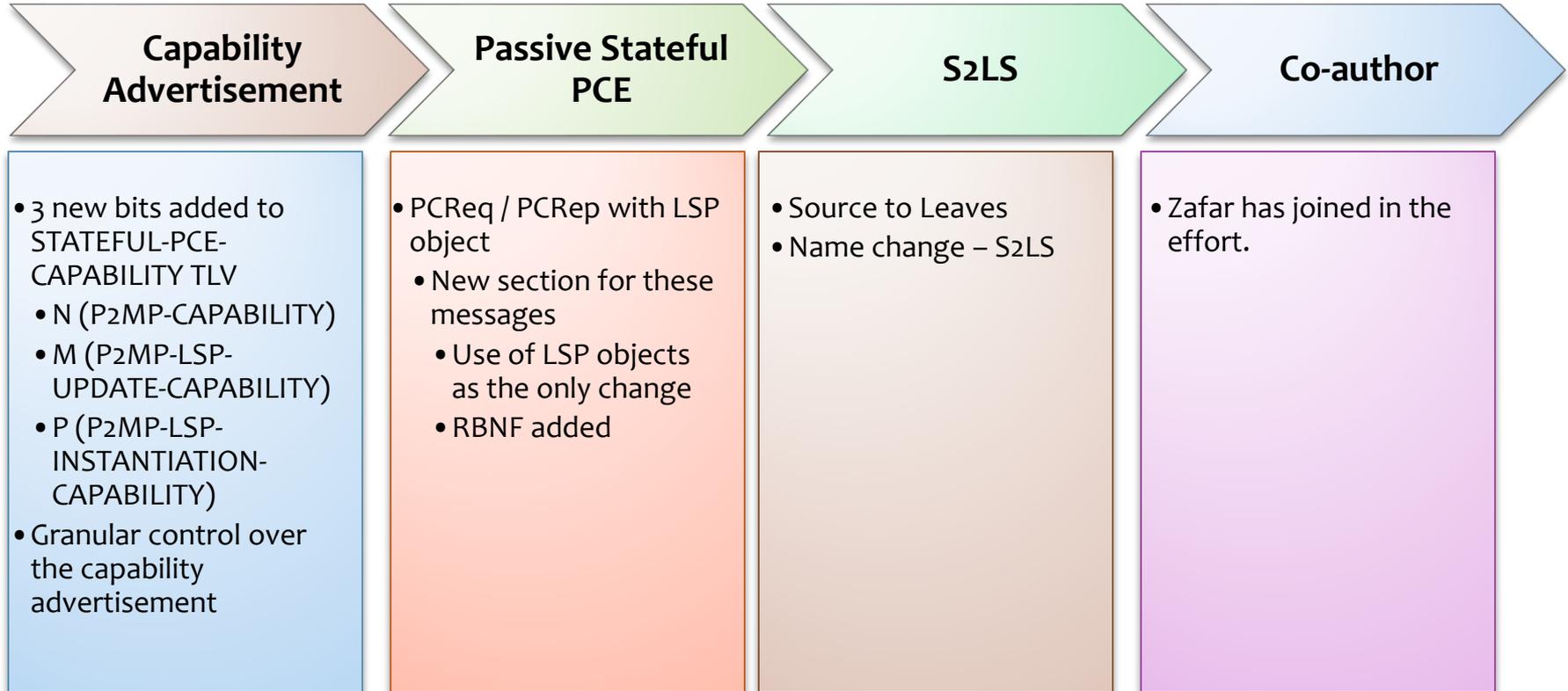
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Updates in the Draft



Next Steps

No pending comments!

Draft(s) can benefit from more feedback and reviews from the WG.

Good base to be worked on by the WG

- WG adoption call?

Backup Slides

Protocol Extension

Capability Advertisement

- New bits in Stateful PCE Capability TLV [I-D.ietf-pce-stateful-pce]
- Also via IGP auto discovery

LSP Object

- New Flags "C P2MP (N) and Fragmentation (F) bits
- PLSP-ID identify a (full) P2MP TE LSP uniquely.

P2MP-LSP-IDENTIFIER TLV

- Identify RSVP signaled P2MP LSP-ID
- IPv4 and IPv6

S2LS (Source to Leaves)

- Report state of one or more leaves encoded within the END-POINTS object.
- O in LSP - operational status of the full P2MP TE LSP & O in S2LS - the operational status of a group of leaves encoded within the END-POINTS object.

No change in operations (from P2P)

LSP state synchronization

LSP delegation

LSP update

PCEP Message Extension

```
<PCRpt Message> ::= <Common Header>  
                    <state-report-list>
```

Where:

```
<state-report-list> ::= <state-report>  
                        [<state-report-list>]
```

```
<state-report> ::= [<SRP>]  
                  <LSP>  
                  <end-point-path-pair-list>  
                  <attribute-list>
```

Where:

```
<end-point-path-pair-list> ::=  
    [<END-POINTS>]  
    [<S2LS>]  
    <path>  
    [<end-point-path-pair-list>]
```

```
<path> ::= (<ERO>|<SERO>)  
           [<RRO>]  
           [<path>]
```

<attribute-list> is defined in [RFC5440] and extended by PCEP extensions.

```
<PCUpd Message> ::= <Common Header>  
                    <update-request-list>
```

Where:

```
<update-request-list> ::= <update-request>  
                          [<update-request-list>]
```

```
<update-request> ::= <SRP>  
                    <LSP>  
                    <end-point-path-pair-list>
```

<attribute-list>

Where:

```
<end-point-path-pair-list> ::=  
    [<END-POINTS>]  
    <path>  
    [<end-point-path-pair-list>]
```

```
<path> ::= (<ERO>|<SERO>)  
           [<path>]
```

<attribute-list> is defined in [RFC5440] and extended by PCEP extensions.

PCEP Message Extension

```
<PCReq Message> ::= <Common Header>  
                    <request>
```

where:

```
<request> ::= <RP>  
             <end-point-rro-pair-list>  
             [<LSP>]  
             [<OF>]  
             [<LSPA>]  
             [<BANDWIDTH>]  
             [<metric-list>]  
             [<IRO>]  
             [<LOAD-BALANCING>]
```

where:

```
<end-point-rro-pair-list> ::= <END-POINTS> [<RRO-List>] [<BANDWIDTH>]  
                             [<end-point-rro-pair-list>]
```

```
<RRO-List> ::= <RRO> [<BANDWIDTH>] [<RRO-List>]
```

```
<metric-list> ::= <METRIC> [<metric-list>]
```

```
<PCRep Message> ::= <Common Header>  
                    <response>
```

```
<response> ::= <RP>  
              [<end-point-path-pair-list>]  
              [<NO-PATH>]  
              [<attribute-list>]
```

where:

```
<end-point-path-pair-list> ::=  
                             [<END-POINTS>] <path> [<end-point-path-pair-list>]
```

```
<path> ::= (<ERO> | <SERO>) [<path>]
```

```
<attribute-list> ::= [<LSP>]  
                    [<OF>]  
                    [<LSPA>]  
                    [<BANDWIDTH>]  
                    [<metric-list>]  
                    [<IRO>]
```

Leaf Type & Operational Status

The P2MP END-POINTS object for specifying address of P2MP leaves are grouped based on leaf types.

New leaves to add (leaf type = 1)

Old leaves to remove (leaf type = 2)

Old leaves whose path can be modified/reoptimized (leaf type = 3)

Old leaves whose path must be left unchanged (leaf type = 4)

When reporting the status of a P2MP TE LSP, the destinations are grouped in END-POINTS object based on the operational status (O field in S2LS object) and leaf type (in END-POINTS). This way the leaves that share the same operational status are grouped together!

- For reporting the status of delegated P2MP TE LSP, leaf-type = 3, where as for non-delegated P2MP TE LSP, leaf-type = 4 is used.
- For delegated P2MP TE LSP configuration changes are reported via PCRpt message. For example, adding of new leaves END-POINTS (leaf-type = 1) is used where as removing of old leaves (leaf-type = 2) is used.

PCE Initiated P2MP LSP

Capability Advertisement

- A new bit in Stateful PCE Capability TLV (I bit)

P2MP LSP Instantiation

- P2MP (N bit)
- Create (C bit)
- When used together indicate PCE-Initiated P2MP LSP

Add/Prune leaves

- PCUpd message with leaf type = 1 for adding of new leaves
- leaf type = 2 for pruning of old leaves

```
<PCInitiate Message> ::= <Common Header>  
                           <PCE-initiated-lsp-list>
```

Where:

```
<PCE-initiated-lsp-list> ::= <PCE-initiated-lsp-request>  
                             [<PCE-initiated-lsp-list>]
```

```
<PCE-initiated-lsp-request> ::=  
(<PCE-initiated-lsp-instantiation>|<PCE-initiated-lsp-deletion>)
```

```
<PCE-initiated-lsp-instantiation> ::= <SRP>  
                                       <LSP>  
                                       <end-point-path-pair-list>  
                                       [<attribute-list>]
```

```
<PCE-initiated-lsp-deletion> ::= <SRP>  
                                  <LSP>
```

Where:

```
<end-point-path-pair-list> ::=  
                             [<END-POINTS>]  
                             <path>  
                             [<end-point-path-pair-list>]
```

```
<path> ::= (<ERO>|<SERO>)  
           [<path>]
```

No change in operations
(from P2P)

LSP
instantiation

LSP deletion

LSP
delegation
and cleanup

Message Fragmentation

P2MP PCRpt, PCUpd and PCIntiate may not fit into a single PCEP message.

The new F-bit is used in the LSP object to signal that it was too large to fit into a single message and will be fragmented into multiple messages.

Each message except the last one, will have the F-bit set in the LSP object to signify it has been fragmented into multiple messages.

Should use the same PLSP-ID and SRP-ID-number for all fragmented message.

Questions
&
Comments?

Thanks!