PCEP Extension for WSON Routing and Wavelength Assignment

<draft-lee-pce-wson-rwa-ext-01.txt>

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Background

- This is a solution draft for <draft-ietf-pce-wson-routing-wavelength-04.txt>
- Other related CCAMP drafts:
  - WSON RWA Framework:
    - draft-ietf-ccamp-rwa-wson-framework
  - Label switching constraints:
    - draft-ietf-ccamp-general-constraint-encode
    - draft-ietf-ccamp-rwa-wson-encode
    - draft-ietf-ccamp-rwa-info
  - Signal processing capabilities:
    - draft-ietf-ccamp-wson-signal-compatibility-ospf

Wavelength Assignment (WA) Object/TLV

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Flags                                     |E|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
//                          Optional TLVs                      //
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

o E (Explicit - 1 bit): When E bit is set to 1, this indicates that the label assigned by the PCE must be explicit. That is, the selected way to convey the allocated wavelength is by means of Explicit Label Control (ELC) [RFC4003] for each hop of a computed LSP. Otherwise, the label assigned by the PCE needs not be explicit (i.e., in the form of label sets). This is to allow the distributed WA.

- Will determine whether WA Object/TLV will be a part of the RP Object as a TLV or a standalone Object in parallel with the RP Object.
- Will determine if more detailed options for an non-explicit case are necessary in the revision.
- WA Preference (e.g., Allow FF, LF, Random, vendor-specific) option will be included in the revision.

Wavelength Range Constraint TLV (Suggested)

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                              Format                           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Link Identifier                      |
|                               . . .                           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Wavelength [1]                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
//                             . . . .                          //
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Wavelength [N]                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- This constraint is an ability to restrict wavelengths to be used (e.g., tunability on the transmitter or any other case).
- Format identifies the link identifier format
  - 0 -- Reserved
  - 1 -- Local Interface IPv4 Address
  - 2 -- Local Interface IPv6 Address
  - 4 –- Unnumbered Interface ID
- Wavelength encoding per <draft-ietf-ccamp-gmpls-g-694-lambda-labels>
- Will Explore Label Set Representation for compact encoding for the wavelength range.

Signal processing capability restrictions

- A PCC should be able to indicate additional restrictions for signal compatibility, either on the endpoint or any given link.
- The END-POINTS type generalized endpoint is extended as follow:

<endpoint-restrictions> ::= <VENDOR-ENDPOINT-RESTRICTION> |
<***signal-compatibility-restriction***> |
<LABEL-REQUEST><label-restriction>
[<endpoint-restrictions>]

Where <***signal-compatibility-restriction>*** ::= <MODULATION-FORMAT |
<FEC>

Modulation Format TLV

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|S|I|          Modulation ID        |     Reserved                |X|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Modulation ID/S bit dependent body                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

FEC TLV

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|S|I|          FEC ID               |     Reserved                |X|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    FEC ID/S bit dependent body                    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- This encoding is based on <draft-ietf-ccamp-rwa-wson-encode >
  - o S bit - 1: Standard format; 0: vendor-specific format
  - o I bit - 1: Input; 0: output
  - o X bit - 1: exclude; 0: include

Next Steps

- Adopt to be a WG document ☺
- Refine and resolve open issues in the revision