Framework for GMPLS Control of Flexible Gird Network

draft-wang-ccamp-gmpls-flexigrid-framework-01

Qilei Wang (wang.qilei@zte.com.cn)

Xihua Fu (fu.xihua@zte.com.cn)

ZTE

- Show my respect to the authors and contributors of [RFC6163]. This draft evolves from [RFC6163].

Contents of the draft

- Overview of flexible grid
- Modeling of flexible grid characteristics
- GMPLS control of flexible grid

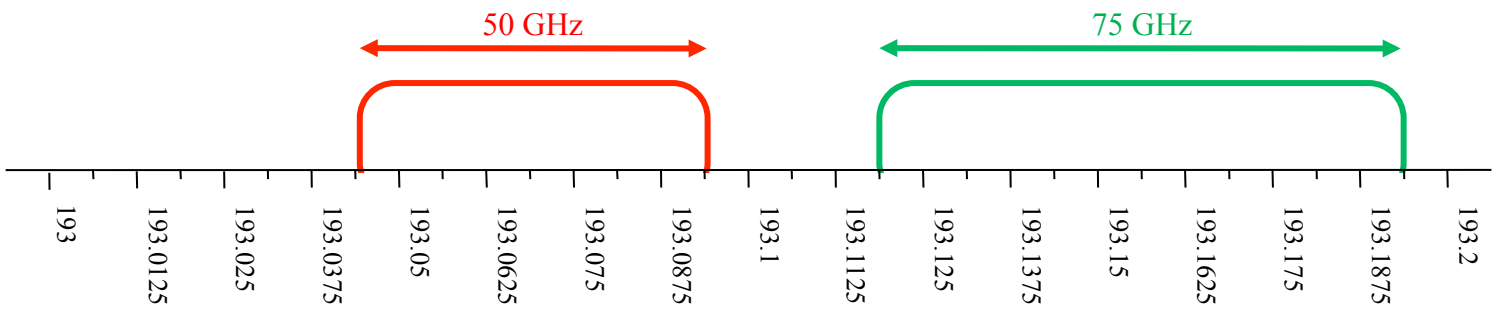
Overview

- For flexible DWDM grid, allowed frequency slots have a nominal frequency defined by:

$$193.1 + n \times 0.00625 \text{ THz } (n = \ldots -1, 0, 1\ldots)$$

- a slot width defined by:

$$12.5 \text{ GHz} \times m \ (m = 1, 2, 3\ldots)$$



Modeling

- Model the flexible grid characteristics base on WSON from control plane perspective.
- WDM links
  - Wavelength range, Channel spacing, Grid type
- Optical Transmitters and Receivers
  - Tunning range, slot width (mainly depend on bitrates and modulation type)
- ROADM/OXC
  - Available wavelength range, Maximum/Minimum slot width that a port support, Wavelength Range Allocation (Optional, but we recommend it.)

Modeling

- Optical Tributary Signals
  - It's characterized by two key parameters: bitrates and modulation type. New modulation type would be used in flexible grid signal.
- Optical Signals
  - (a) Minimum channel spacing
  - (b) Minimum and maximum central frequency
  - (c) Bitrates/Line coding (modulation) of optical tributary signals
  - (d) Minimum and Maximum Slot Width
  - (e) Slot Width

Computation Architecture

- In [RFC6163], three different ways of performing RWA in conjunction with the control plane are shown here:
  - Combined RWA
  - Separate R and WA (R + WA)
  - Routing and Distributed WA (R + WA)

  - These ways can also be applied to flexible grid control plane path computation.

GMPLS Control

- Signaling
  - A mapping between label and wavelength is needed in signaling to reserve the resource along the path.
  - Central frequency and slot width need to be carried.
  - Characterize Modulation, FEC… at every point.
- Routing
- Available wavelength range
- Port label restriction
  - Maximum/Minimum slot width supported on one port
  - Wavelength range allocation
- Signal compatibility information

GMPLS Control

- PCE
  - Similar to WSON, PCReq message that is sent from PCC to PCE should indicate:
    - G-PID type of an LSP
    - Signals attributes at the transmitter and receiver
  - PCRep message reply from PCE to PCC should include:
    - The conformity of the requested optical characteristics associated with the resulting LSP, include central frequency and slot width.
    - Additional LSP attributes
  - Discovery of flexible grid RWA-capable PCEs
  - Avoid the use of GCO

Next steps

- Conform to ITU-T work.

- Refine the document according to the feedback of meeting and mailing list.