Problem Statement

Signaling extensions for Media Channel sub-carriers configuration in Spectrum Switched Optical Networks (SSON) in Lambda Switch Capable (LSC) Optical Line Systems.

draft-ggalimbe-ccamp-flexigrid-carrier-label-01

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Motivation

• Generalised Multiprotocol Label Switched (GMPLS) is widely used in Wavelength Switched Optical Network (WSON) to support the optical circuits set-up through the signalling between Core Nodes and Edge Nodes.

• Spectrum Switched Optical Networks (sson) are in advanced development phase or even ready to be deployed.

• No information is available in signalling to support the sub-carriers definition / reservation in sson

• RFC7698 Ch.3.3 defines the concept of Media Channel and the associated carriers set needed for Spectrum Switched Optical Network (SSON).

• The new labels are related to the Media Channel and the carriers routed with it and keep the backward compatibility with the WSON signalling. In particular this informational memo wants do address the use cases where the SSON LSP (the Media Channel in RFC7698) carries multiple carrier (OTSi) containing same Payload. The set of the carriers can be seen as single Logical circuit.
Document Scope

- This document proposes the experimental results from the GMPLS implementation supporting the Spectrum Switched Optical Network
- This memo can be considered as the ”companion” of [RFC7699] The contents and the parameters reflect the experimental activity on IP over SSON recently done.
- Or can be an extension of [RFC7792] (TSPEC/FLOW_SPEC)
Changes from the previous version

- Fixed typos
- Modify some description text
- Modify the TLV reflecting the RFC7699 and RFC7792
The application

Multiple carrier are mapped into a Media Channel. A set of parameters must be shared on the UNI to allow the GMPLS to do the proper routing and Spectrum Assignment and decide the carrier position.

E.N. = Edge Node - UNI Client
C.N. = Core Node - UNI Network
ROADM = Lambda/Spectrum switch
Media Channel = the optical circuit
OTSi = Carriers belonging to the same Network Media Channel (or Super Channel)
UNI = Signalling interface
Model proposal

New LSP set-up parameters

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *S* | *B* | Number of Carriers | Client bandwidth |
|     |     |                       |                  |
|     |     | Subcarrier frequency tunability (optional) |

Sub-Transponder Mod Format: In the Value Field (96 bits) it is specified

*S* strict number of subcarrier (No = 0, Yes = 1)
*B* strict client bandwidth (No = 0, Yes = 1)
Num Carriers
Client bandwidth (100Gb, 150Gb, 200Gb, 400Gb, 1Tb, etc)
Subcarrier frequency tunability (optional)
Model proposal

Extension to LSP set-up reservation:

COMMON to all carriers

<table>
<thead>
<tr>
<th></th>
<th>Modulation ID</th>
<th>FEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid</td>
<td>carrier Identifier</td>
<td>j</td>
</tr>
<tr>
<td></td>
<td>sub-carrier power</td>
<td>k</td>
</tr>
</tbody>
</table>

SPECIFIC to each carrier
Model Proposal cont’

- m Media Channel width

- n Media channel central frequency

- Sub carrier identifier field: sub-carrier identifier inside the Media Channel

- J field: granularity of the channel spacing, can be a multiple of 0.01GHz. default value is 0.1GHz.

- K field: positive or negative integer (including 0) to multiply by J and identify the S.C. Position inside the Media Channel, J can be set at default value = 0.1GHz.

\[
\text{SC-1} = \text{MC-CF} + k_1 \times 0.1 \text{GHz. (GHz)} \\
\text{SC-2} = \text{MC-CF} + k_2 \times 0.1 \text{GHz. (GHz)}
\]

\[
\text{Media Channel CF = 193.1 + n \ast 0.00625 (THz)}
\]

\[
\text{Media Channel Width = m \ast 0.0125 (THz)}
\]
Next steps

• Collect feedbacks on the proposal
• Address feedbacks and comments
• Start discussion how to progress with the adoption of the new objects