

IETF 115 – CCAMP Meeting

draft-ggalimbe-ccamp-flexigrid-carrier-label-13

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Motivation



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

- Generalised Multiprotocol Label Switched (GMPLS) is widely used in Wavelength Switched Optical Network (WSO) 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 WSO signalling. In particular this informational memo wants to 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 and extension of [RFC7792] (TSPEC/FLOW_SPEC)
- Goal to address the new model definition coming from ITU-T (G.media) and ONF.

Changes from the previous version

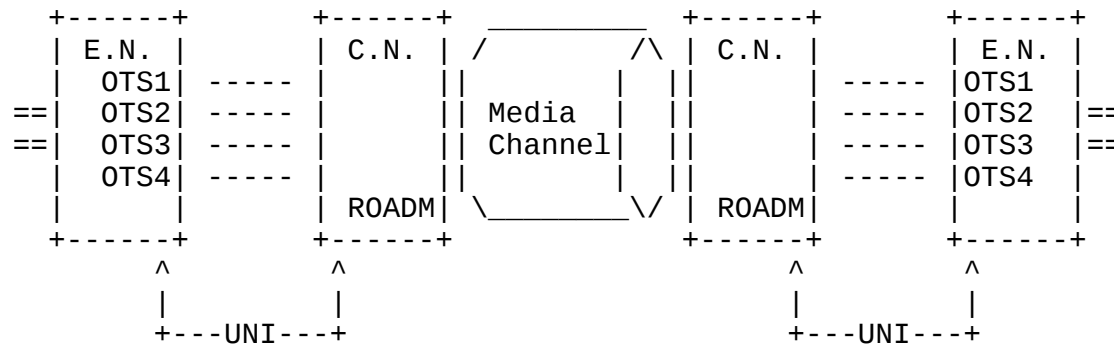


- Fixed typos
- Fixed some description text
 - Reshaped chapters/paragraphs (4.2.1 and 4.2.2)
 - TLV – figures description
- TLVs changes
 - Splitted Port Identifier into Source Port Identifier and Destination Port Identifier

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

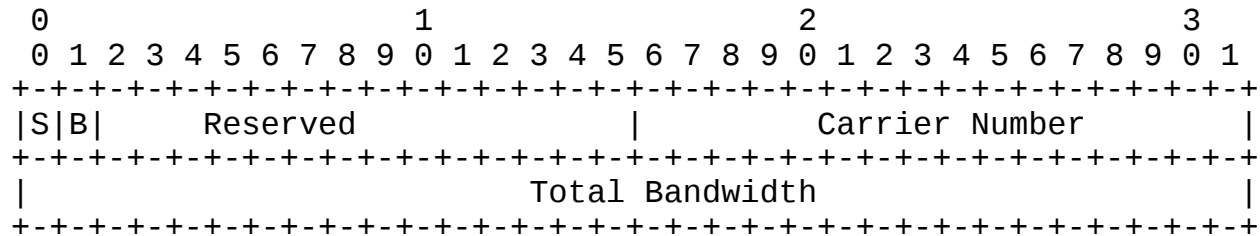
OTS_i = Carriers belonging to the same Network Media Channel (or Super Channel)

UNI = Signalig interface

Model proposal



New LSP set-up parameters: SSON LSP set-up request



Carrier Number: number of carrier to be allocated for the requested channel (16-bit unsigned integer)

If Carrier Number == 0 no constraint set on the number of carriers to be used

S strict number of subcarrier

- S = 0 the number of requested carriers is the maximum number that can be allocated (a lower value can be allocated if the requested bandwidth is satisfied)
- S = 1 the number of requested carriers is strict (must be > 0)

Total Bandwidth: the requested total bandwidth to be supported by the Media Channel (32-bit IEEE float, bytes/s)

If Total Bandwidth == 0: no bandwidth constraint is defined (B must be 0) B Bandwidth constraints

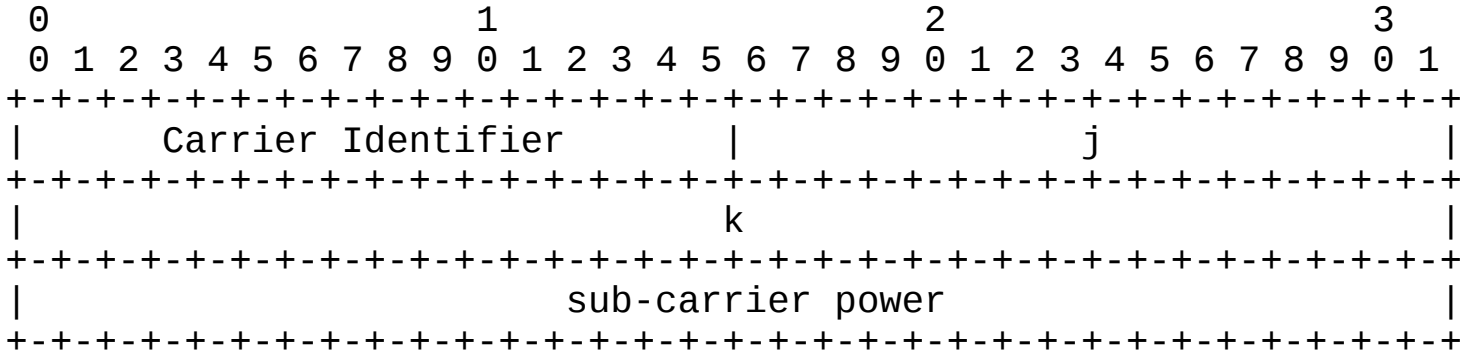
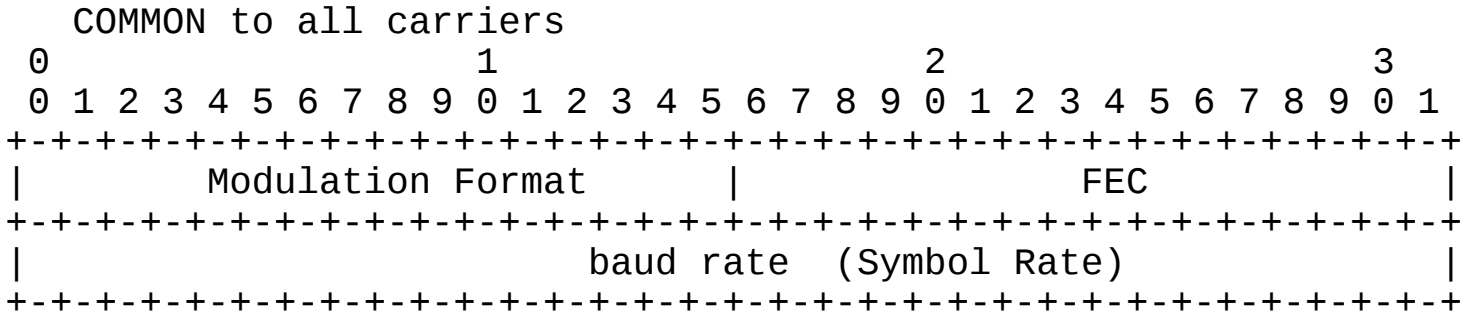
- B = 0: the value is the maximum requested bandwidth (a lower value can be allocated if resources are not available)
- B = 1: the requested bandwidth is the minimum value to be allocated (a higher value can be allocated if requested by the physical constraints of the ports)

Reserved: unused bit (for future use, should be 0)

Model proposal



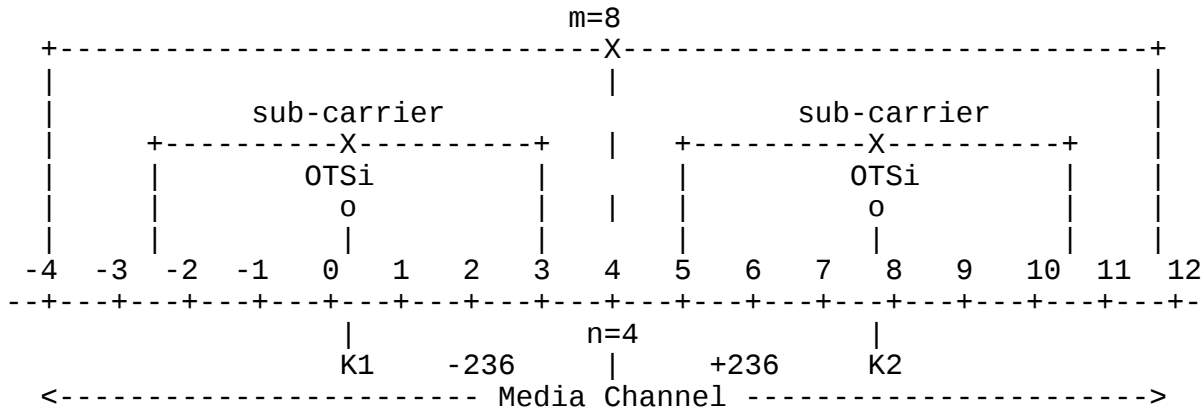
Extension to LSP set-up reservation:



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.



$$\text{Media Channel CF} = 193.1 + n * 0.00625 \text{ (THz)}$$

$$\text{Media Channel Width} = m * 0.0125 \text{ (THz)}$$

$$\text{SC-1} = \text{MC-CF} + k1 * 0.1 \text{ GHz. (j) (GHz)}$$

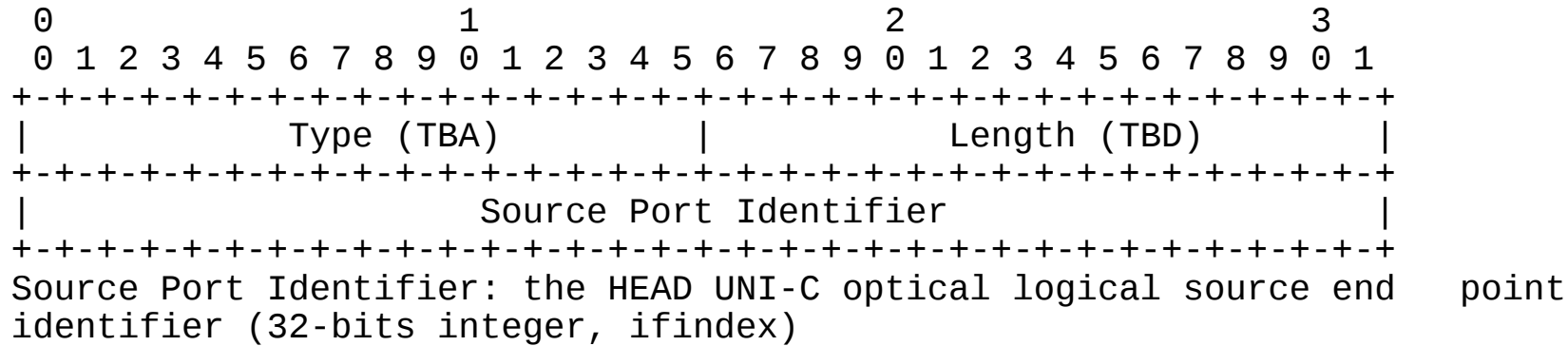
$$\text{SC-2} = \text{MC-CF} + k2 * 0.1 \text{ GHz. (j) (GHz)}$$

Model proposal

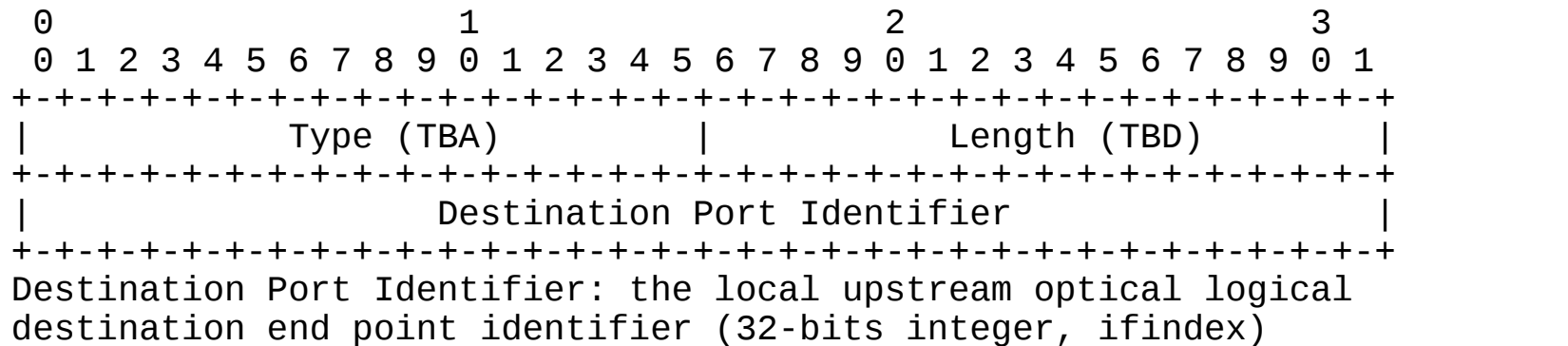


The defined sub-TLVs are:

Source Port Identifier



Destination Port Identifier

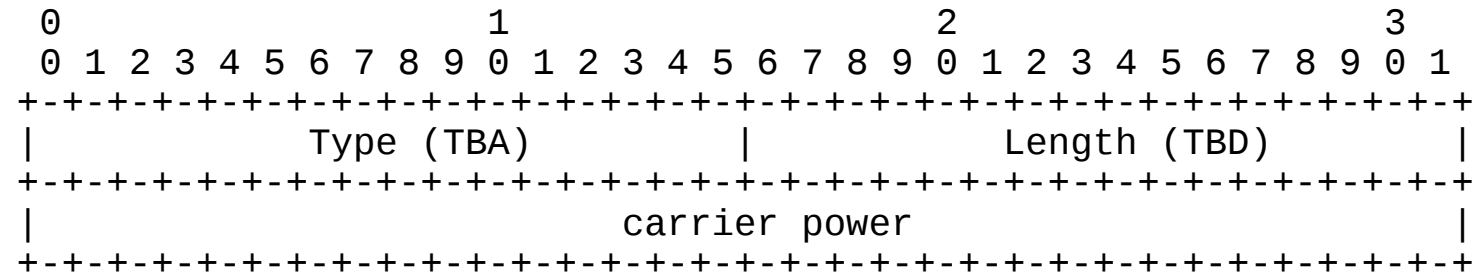


Model proposal



The defined sub-TLVs are:

Carrier Power:



Next steps



- Check the proposal against the new ITU-T and ONF models
- Add the AppID from draft-ietf-ccamp-dwdm-if-Imp
- Keep alignment on:
 - draft-meuric-ccamp-tsvmode-signaling
 - draft-ietf-ccamp-optical-impairment-topology-yang
 - draft-ietf-ccamp-dwdm-if-param-yang (aka RFC9093-bis)
- Address feedbacks and comments
- Start discussion how to progress to a WG adoption