GMPLS Signaling Extensions for the Evolving G.709 OTN Control

draft-zhang-ccamp-gmpls-evolving-g709-08.txt

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Requirement for multi-stage labels?

Discussion led by chairs

Does it need Multi-stage labels approach for one-hop multi-stage muxing?

Changes from Version 07

- Merged <draft-khuzema-ccamp-gmpls-signaling-g709> and introducing the multi-stage label solution

Section 3.1

- Requirements of ODU multiplexing (the reqs would be moved to <draft-ietf-ccamp-gmpls-g709-framework> after agreement)

Section 5.1
- Definition of Generalized Label
- Description of H-LSP using Generalized Label
- Introducing optional multi-stage label object (New)
- Description of multi-stage label solution using Generalized Label + multi-stage label (New)
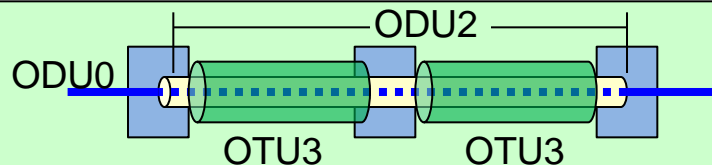
Section 5.2
- From <draft-khuzema>
- Definition of multi-stage Generalized Label
- Description of multi-stage label solution using multi-stage Generalized Label

Requirements of ODU Multiplexing

[**R1**]: Single-stage multiplexing (e.g., ODUj->ODUk, or ODUj->OTUj)

[**R2**]: Multi-hops multi-stage multiplexing

ODU0 ODU2 OTU3 OTU3

[**R2.1**]: Pre-provisioned of intermediate ODU2

[**R2.2**]: Dynamic creation of intermediate ODU2

[**R3**]: One-hop multi-stage multiplexing

ODU0->ODU2->ODU3
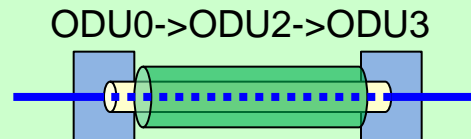
[**R3.1**]: Pre-provisioned of intermediate ODU2

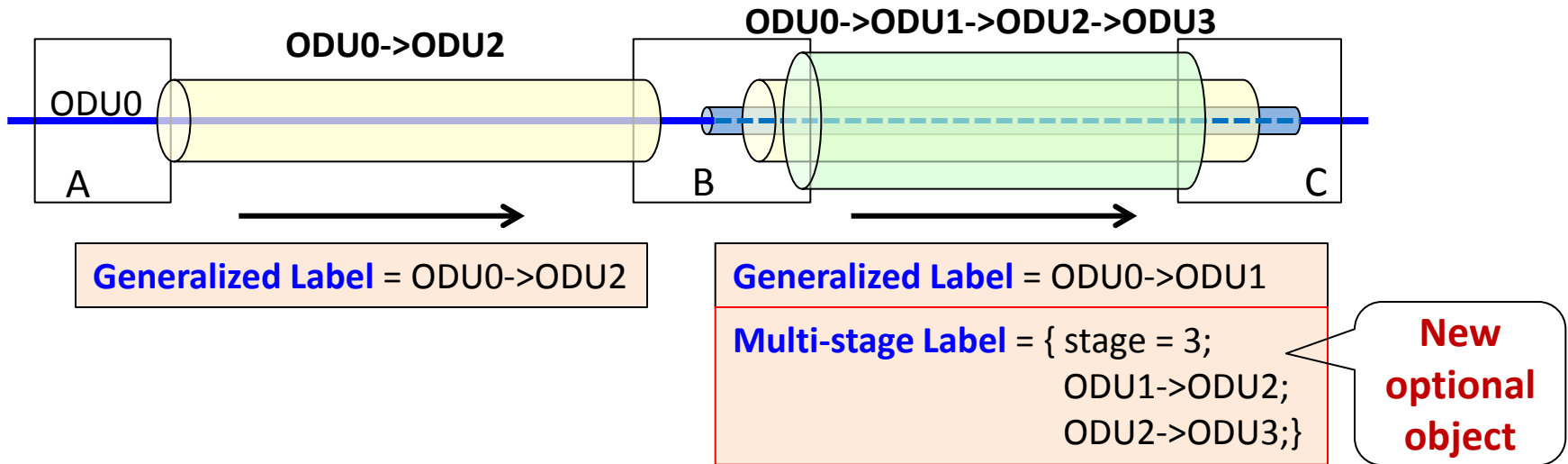[**R3.2**]: Dynamic creation of intermediate ODU2

[**R4**]: Control & management of intermediate ODU layer

[**R5**]: Creating ODUj service involving various mux hierarchies on each hop

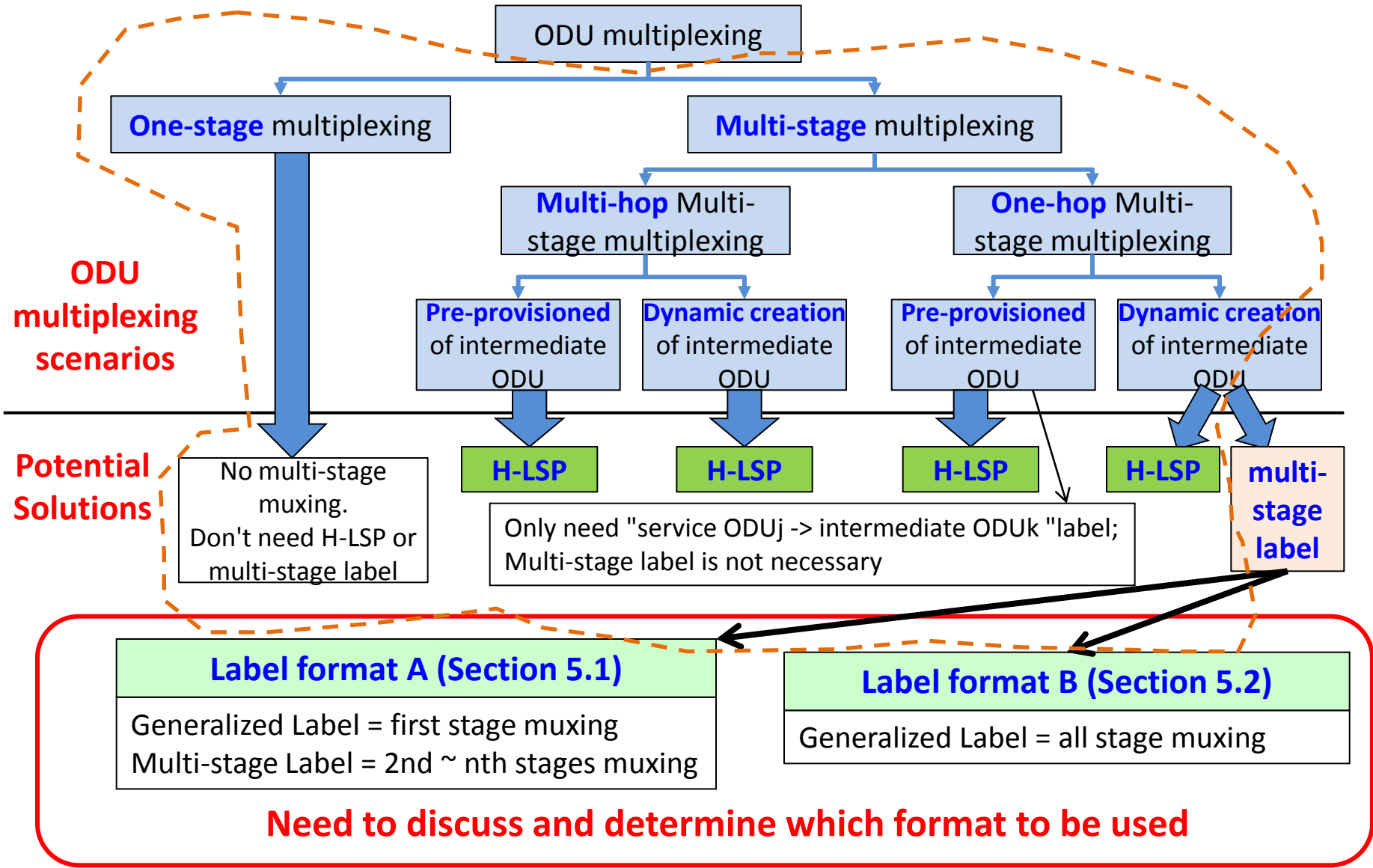[**R6**]: Egress control of OTN interface

New Multi-stage Label Object

ODU0->ODU1->ODU2->ODU3

ODU0->ODU2

ODU0

A   B   C

Generalized Label = ODU0->ODU2

Generalized Label = ODU0->ODU1

Multi-stage Label = { stage = 3;
                          ODU1->ODU2;
                          ODU2->ODU3;}

New optional object

- **Multi-stage Label object: OPTIONAL, separated from Generalized Label object**
  - **Generalized Label** indicates the **first stage multiplexing**
    - RFC3471: <u>A Generalized Label only carries a single level of label, i.e., it is non-hierarchical</u>
  - **Multi-stage label** indicates the **2nd ~ nth stages multiplexing**
- **Usage of Multi-stage Label object**
  - **One-stage multiplexing** & **H-LSP** scenarios: Only use existing Generalized Label, and all the process is the same as existing technologies
  - If operators choose **multi-stage label solution** for one-hop multi-stage muxing: add the multi-stage label object, without changing the Generalized Label

Two Candidate Multi-stage Labels

ODU multiplexing

One-stage multiplexing

Multi-stage multiplexing

Multi-hop Multi-stage multiplexing

One-hop Multi-stage multiplexing

ODU multiplexing scenarios

Pre-provisioned of intermediate ODU

Dynamic creation of intermediate ODU

Pre-provisioned of intermediate ODU

Dynamic creation of intermediate ODU

Potential Solutions

No multi-stage muxing.
Don't need H-LSP or multi-stage label

H-LSP

H-LSP

H-LSP

H-LSP

multi-stage label

Only need "service ODUj -> intermediate ODUk "label;
Multi-stage label is not necessary

Label format A (Section 5.1)

Generalized Label = first stage muxing
Multi-stage Label = 2nd ~ nth stages muxing

Label format B (Section 5.2)

Generalized Label = all stage muxing

Need to discuss and determine which format to be used

Next Steps

- To discuss and decide whether we need the multi-stage label solution
  - "Yes Optional" or "No, unnecessary"?

- To discuss and decide which format to be used if we really need multi-stage label solution
  - Label format A ("G-Label + multi-stage label") or Label format B ("multi-stage G-label")?

- WG document adoption?