

GMPLS Signaling Extensions for the Evolving G.709 OTN Control

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draft-zhang-ccamp-gmpls-evolving-g709-07.txt

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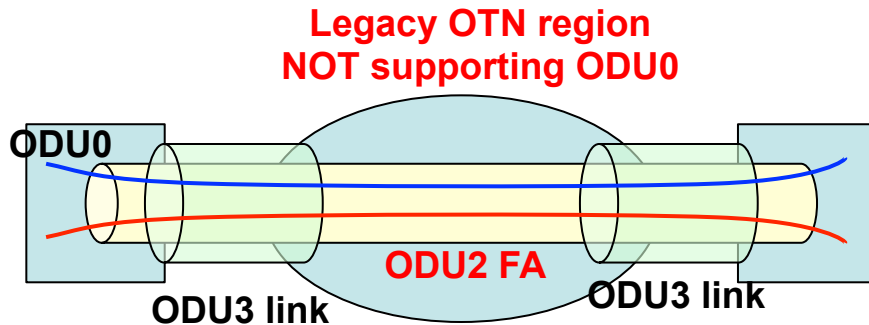
Changes from Version 06

- Changes for Label related
 - Putting TPN into the label object
 - Added error checking for label distribution
- Added some text to support VCAT/LCAS
 - Had the capability to support it originally
- Added a section to describe multiplexing hierarchy (i.e. H-LSP) by FA mechanism

Comparison with [draft-khuzema]

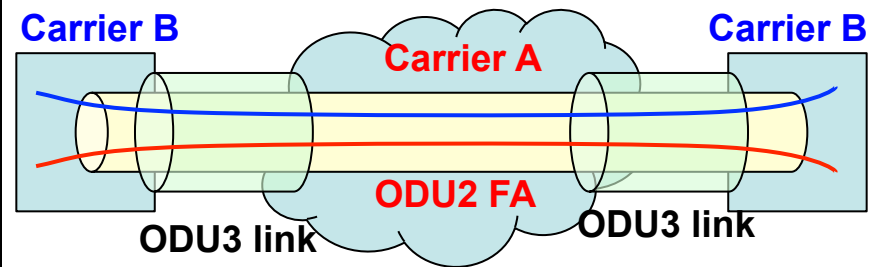
- Alignment: easy to align, because Khuzema draft was inherited from this draft
 - Bit map label format to encode TSs
 - TPN allocation
 - Traffic parameters for ODUflex (Bit rate and tolerance)
 - VCAT support
- One major difference:
 - Multi-stage labels (“non-FA” for convenience)

Discussion: Multi-stage muxing Scenarios



1) Data Plane Compatibility

- The legacy region does not support ODU0 cross-connection
- Creating an ODU2 FA, and then nesting the ODU0 into the ODU2 FA, so that ODU0 can be transmitted transparently through the legacy region



2) Carrier-in-carrier Scenario

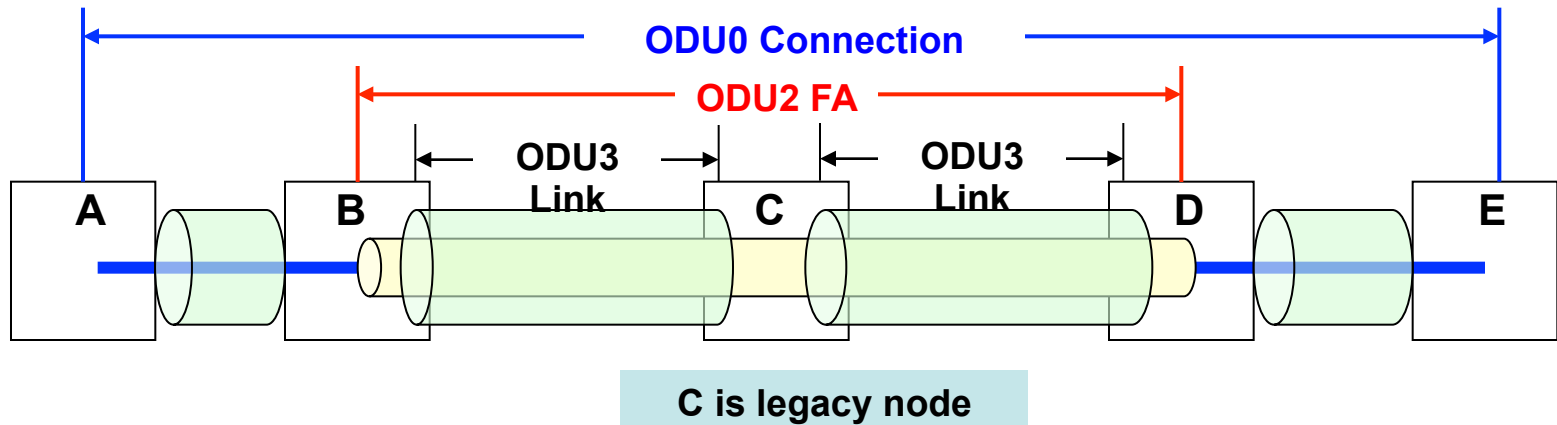
- Carrier A provides ODU2 tunnels for Carrier B
- Carrier B uses the resource of the ODU2 connection to carry LO ODUs

In both cases, the “intermediate layer” ODU2 connection usually spans **multiple hops**. These are the typical scenarios for multiplexing.

Discussion: FA or non-FA?

- **FA**: a well-known and generic approach in GMPLS MLN
 - Standardized approach
 - Generic approach
 - Used universally by the industry in MLN environment
- **Non-FA**(multi-stage label approach): maybe a good idea, but ...
 - What scenarios for non-FA?
 - What are the Pros & Cons of FA and non-FA respectively?
 - Is non-FA a generic approach or not (i.e., is it applicable to other tech, e.g., SDH...)?
 - If yes, does CCAMP need a generic draft to define non-FA approach?

Discussion: What scenarios for non-FA?



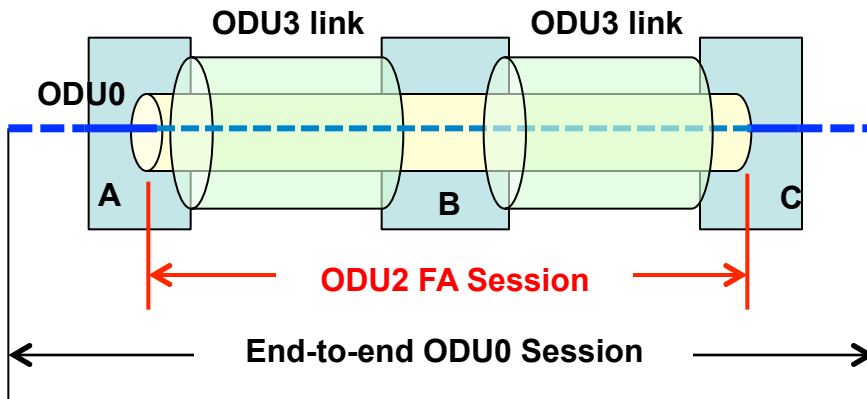
- **Question:** can non-FA (multi-stage labels) support this typical scenario? (or carrier in carrier scenarios)
 - **No**
 - Do people like a solution which can only resolve 1% scenario if there is an existing std solution that can be applicable to 100% scenarios?

Copied from [draft-khuzema-01]:

Note: Multi-stage Label is **NOT** intended to facilitate the creation of FA-LSP or Hierarchical LSP. It is basically used to eliminate the need for FA-LSP in **some obvious scenarios**.

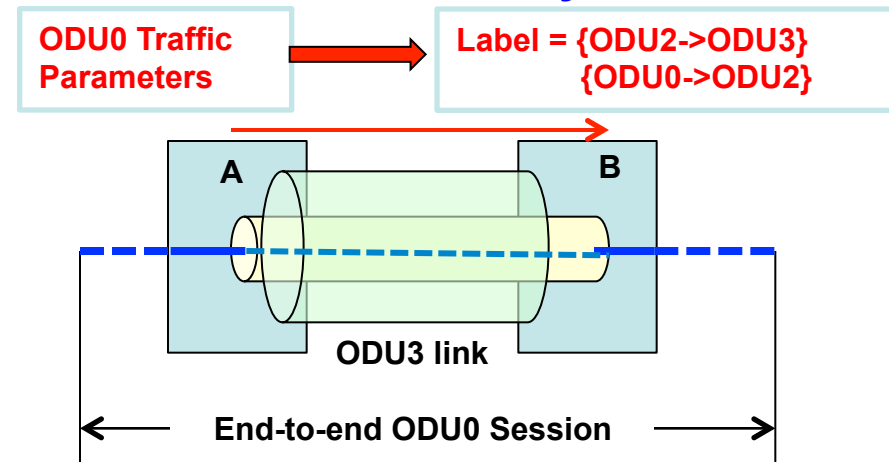
Discussion: Comparison between FA and non-FA?

What is FA style?



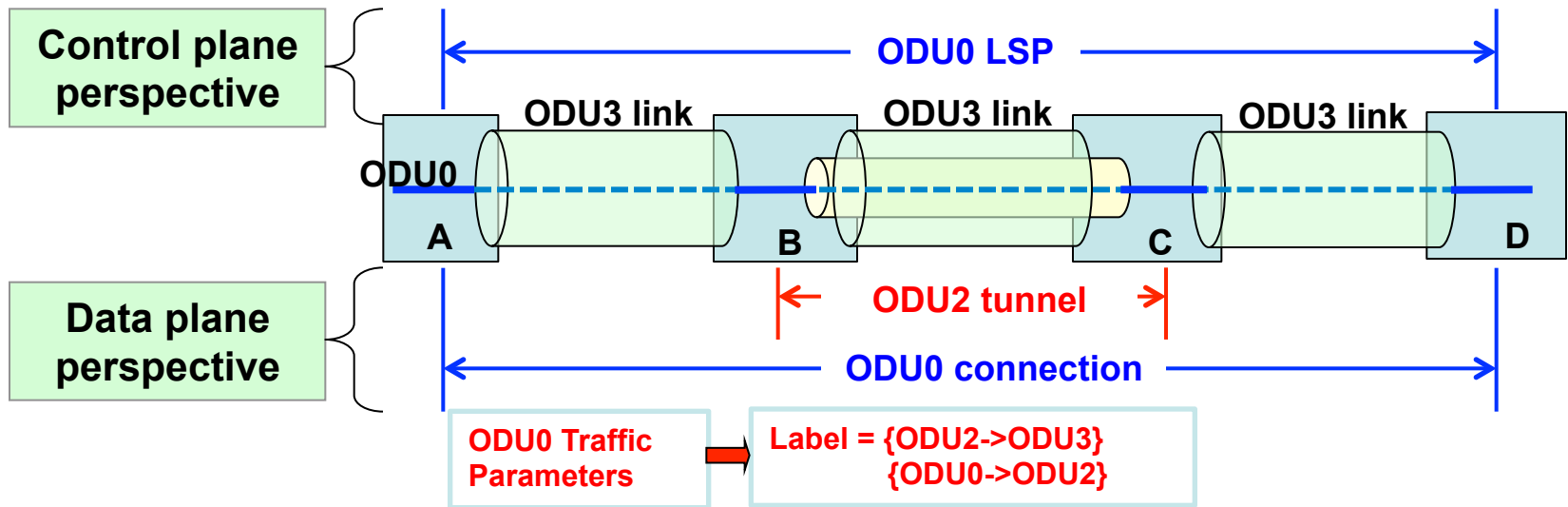
- Using the **existing GMPLS H-LSP** mechanism in [RFC6107] & [RFC4206]
- The **“intermediate ODU2”** is treated as an **H-LSP**
- Can support **any muxing hierarchy scenarios**
- **Generic method** that can be applied not only in OTN but also in other multi-layer network

What is non-FA style?



- Using multi-stage label
- Instantiating the **server Tunnel Span by Span**
- The **“intermediate ODU2”** is **NOT** treated as an LSP and there is **no RSVP session for this ODU2**
- **CANNOT support the case where the “intermediate ODU2” spans multiple ODU3 links** (e.g., the scenario on the left figure)

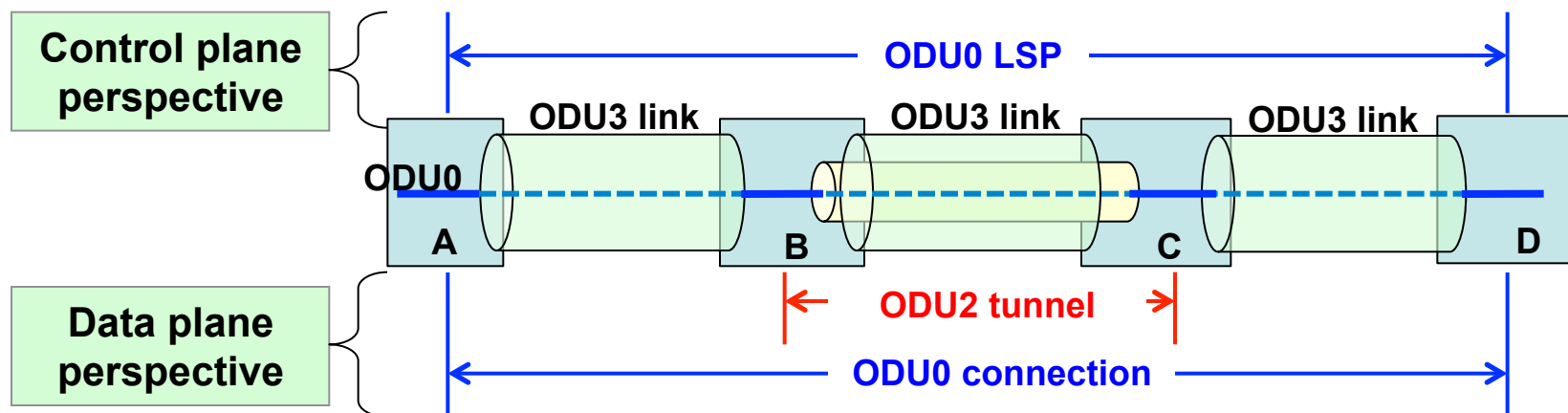
Discussion: More Cons of non-FA



Hi, I want A through CP, but CP returns me A+B, 😊

- **Breaking the principle of GMPLS**
 - While **requesting an ODU0** connection (ODU0 traffic parameters in PATH message), a **data plane ODU2** Tunnel is created between B and C

Discussion: More Cons of non-FA



- **Out of control&mgmt on the “intermediate” ODU2 tunnel**
 - The “intermediate ODU2” is **NOT treated as an LSP** in control plane and there is **no RSVP session for this ODU2 tunnel**
 - No state block for ODU2 tunnel, and the ODU2 is **not visible** in control plane
 - **Can not control and manage** this “intermediate ODU2” tunnel
 - Unaware of ODU2 connection, cannot manage it through control plane
 - How to manage the ODU2 tunnel through MP? (There is no entity identifier for this ODU2 tunnel in the CP and MP)
 - FA (server layer) restoration is better than service restoration (client layer) sometimes, so if there is FA, it can achieve this objective
 - Operators will concern on this issue

Discussion: Pros of non-FA?

- ✓ [draft-khuzema] does not tell the readers about the scenarios and advantages.
 - ✓ Routing scaling issue?
 - ✓ [RFC6107] can make the FA as a component link of an existing link bundle

Summary: FA or non-FA?

FA style

VS

Non-FA style

- Can **support ALL multiplexing hierarchy** scenarios, widely used

- **Fully consistent** with GMPLS MLN control model

- **Explicit control of the “intermediate layer” ODU FA-LSP**

- **Generic method** that can be applied not only in OTN but also in other multi-layer network

:

- **CANNOT be applied in the typical scenarios** (ie., it is only for some special case)

- **Breaking the principle of GMPLS and Conflict** with GMPLS multi-layer mechanism

- The “intermediate layer” ODU is **out of control and management**

- **NOT a general method** and CANNOT be applied in any other network



The overhead is not only 8 bits

Next Steps

- Adopt it as a WG document
 - Agreement on bitmap label format, TPN, tolerance, VCAT
 - The authors think it is the good foundation for this work
- Take a survey through CCAMP list to see whether it is really necessary for the vendors and operators to use non-FA (multi-stage label) approach to manage the OTN networks?
 - Request the experts to examine non-FA carefully
 - We would like to discuss more with the co-authors of the [draft-khuzema] and update the draft if it is necessary for non-FA