Applicability of GMPLS User-Network Interface (UNI) AND Overlay Model Use Cases

CCAMP WG, IETF87, Berlin，Germany

draft-zhang-ccamp-gmpls-uni-app-04.txt

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Background – UNI variants

- **User-Network Interface (UNI)**
  - ✓ Signaling alllowed as defined in RFC4208 and inherited by RSVP-TE extensions
  - ✓ Limited routing, "There may, however, be a routing protocol interaction between a core-node and an edge-node for the exchange of reachability information to other edge-nodes." -- from [RFC4208]

  Note: UNI should be generic enough, and UNI concept could be extended to support routing over UNI. Open Discussion later.

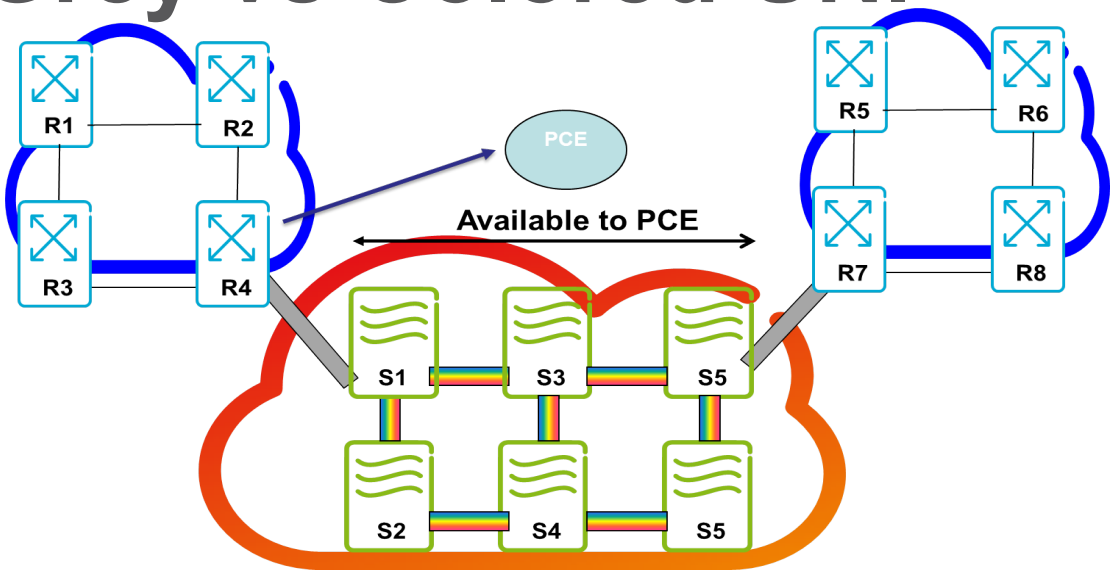
- **Overlay Network Interface (ONI)**
  - ✓ Signaling alllowed: inherited from RFC4208
  - ✓ Routing allowed: Advertisement to the overlay nodes of the potential virtual TE-links between pairs of server layer border nodes

Applicability of GMPLS UNI

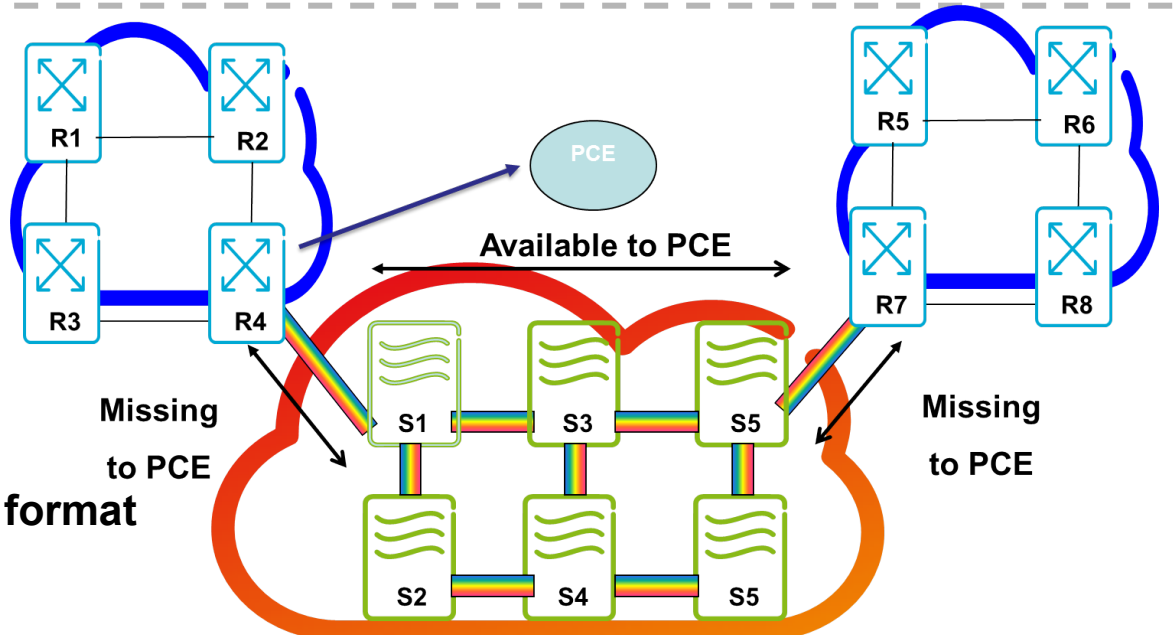
- The contents of <draft-zhang-ccamp-gmpls-uni-app-04>: investigating a number of application scenarios for GMPLS UNI [RFC4208].
- Intention: explain what is possible to do with all the drafts/ protocol extensions post [RFC4208].
- Updates from Version 3:
  - ① Added explanation of supporting LSP initiated by non-edge nodes;
  - ② Added a new section in supporting constrained path computation, such as TE-metrics, SRLG diversity, LSP diversity etc., which is currently discussed in a variety of drafts in extending RSVP-TE;
  - ③ Added a new section in supporting collection of metrics across UNI, such as SRLG, delay etc. ;

Grey vs Colored UNI

Grey Interface:
Fully supported by currently defined UNI



Colored Interface:
New info. required over UNI



Feasibility: e.g. OSNR

Compatibility: e.g. modulation format

Availability: e.g. Lambda 1-3-7

UNI/ONI Use Cases - Path Comp. & Provisioning (1/5)

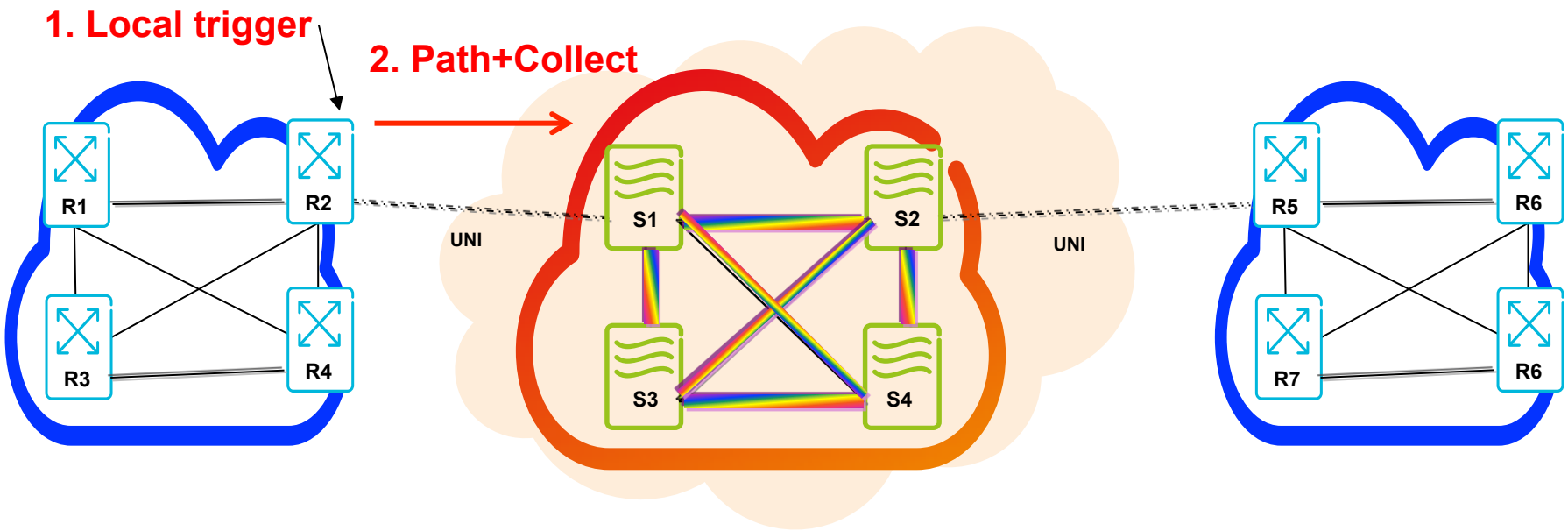
Provisioing with requirements + local trigger

1. Trigger issued by an overlay node (e.g., R2)
2. Path request and path provisioing with constraints (e.g. OF=TE metrics, TE-Metric bound: delay <10ms). Collection request.

   Objective functions: what is the parameter to be minimized

   TE metric bounds: which TE metrics must not be higher than specified in request

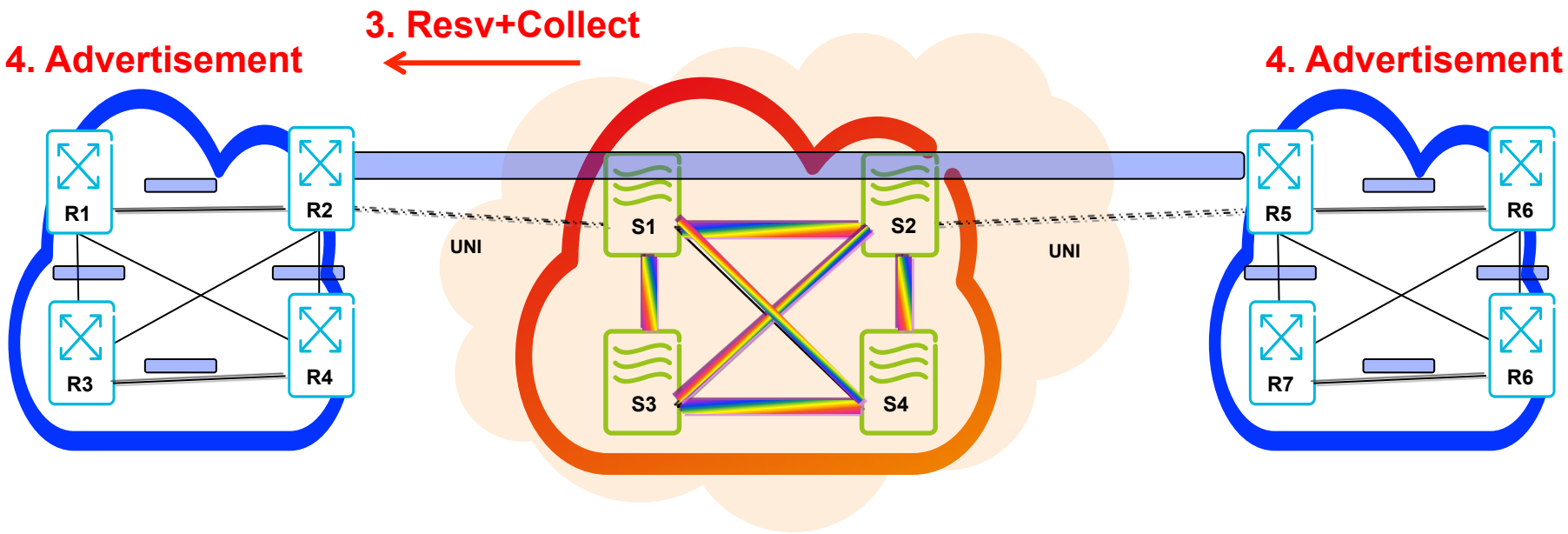
   Diversity: SRLG, include exclude resources



UNI/ONI Use Cases - Path Comp. & Provisioning (2/5)

Provisioing with requirements + local trigger

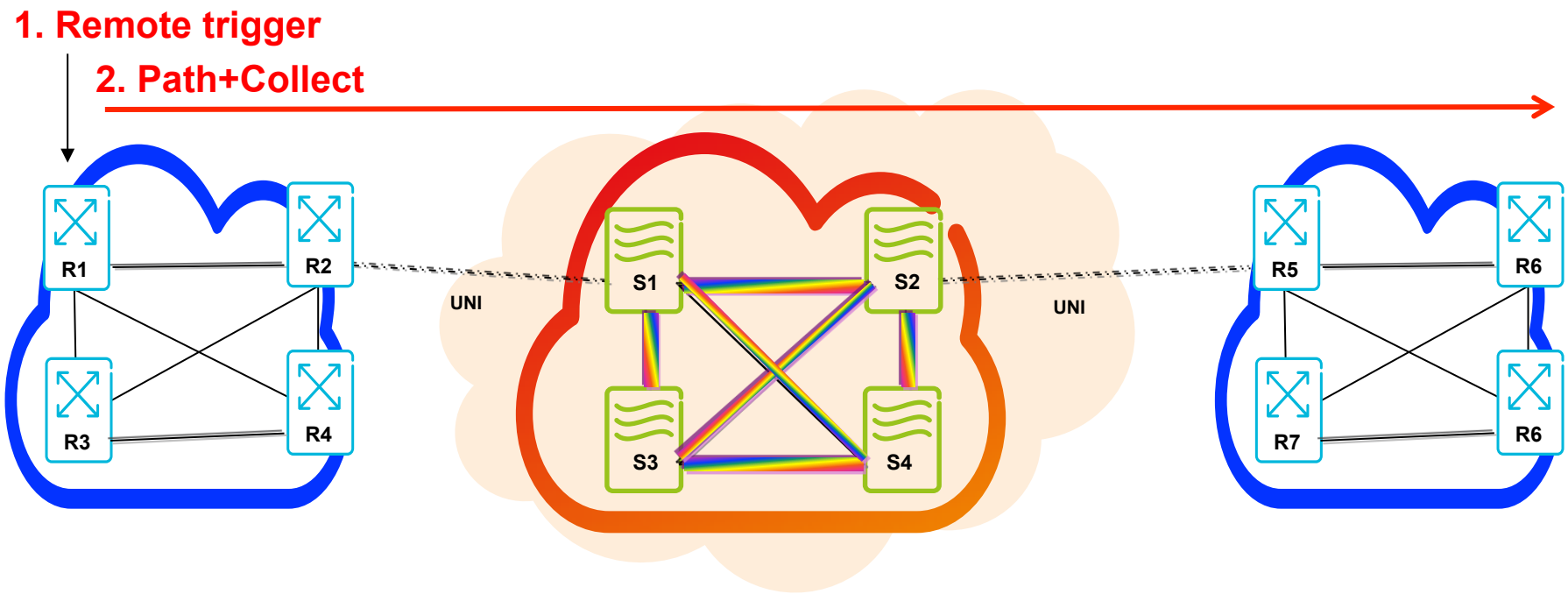
1. Trigger issued by an overlay node (e.g., R2)
2. Path request and path provisioing with constraints (e.g. OF=TE metrics, TE-Metric bound: delay <10ms). Collection request.
3. TE metrics and SRLG collection
4. Client layer link advertised (IGP-TE or BGP-LS)



UNI/ONI Use Cases - Path Comp. & Provisioning (3/5)

Remote trigger

1. Trigger issued on remote node (e.g.R1)
2. End to end RSVP-TE (the model described in [UNI-APP]
   - Flat Model
   - Stitching Model
   - Session Shuffling Model
   - Hierarchal Model

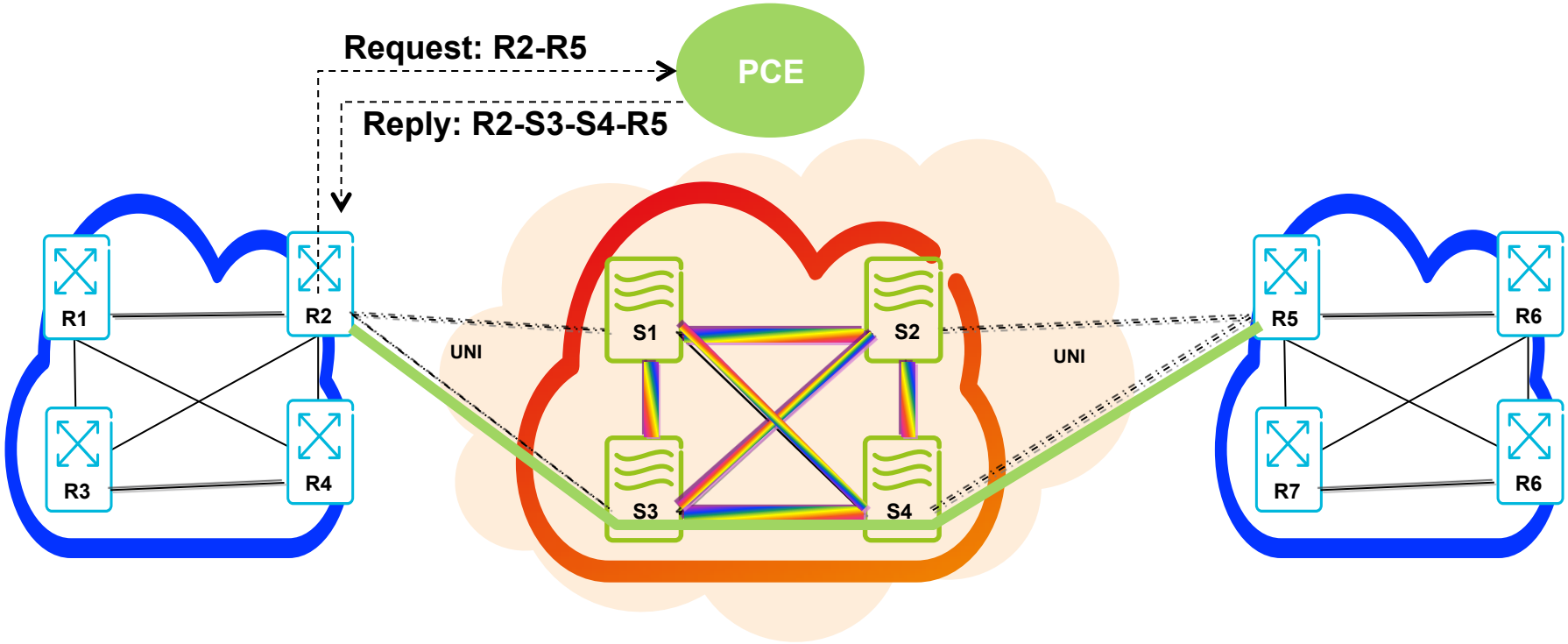


UNI/ONI Use Cases - Path Comp. & Provisioning (4/5)

DUAL HOMING

same as in [UNI-APP]

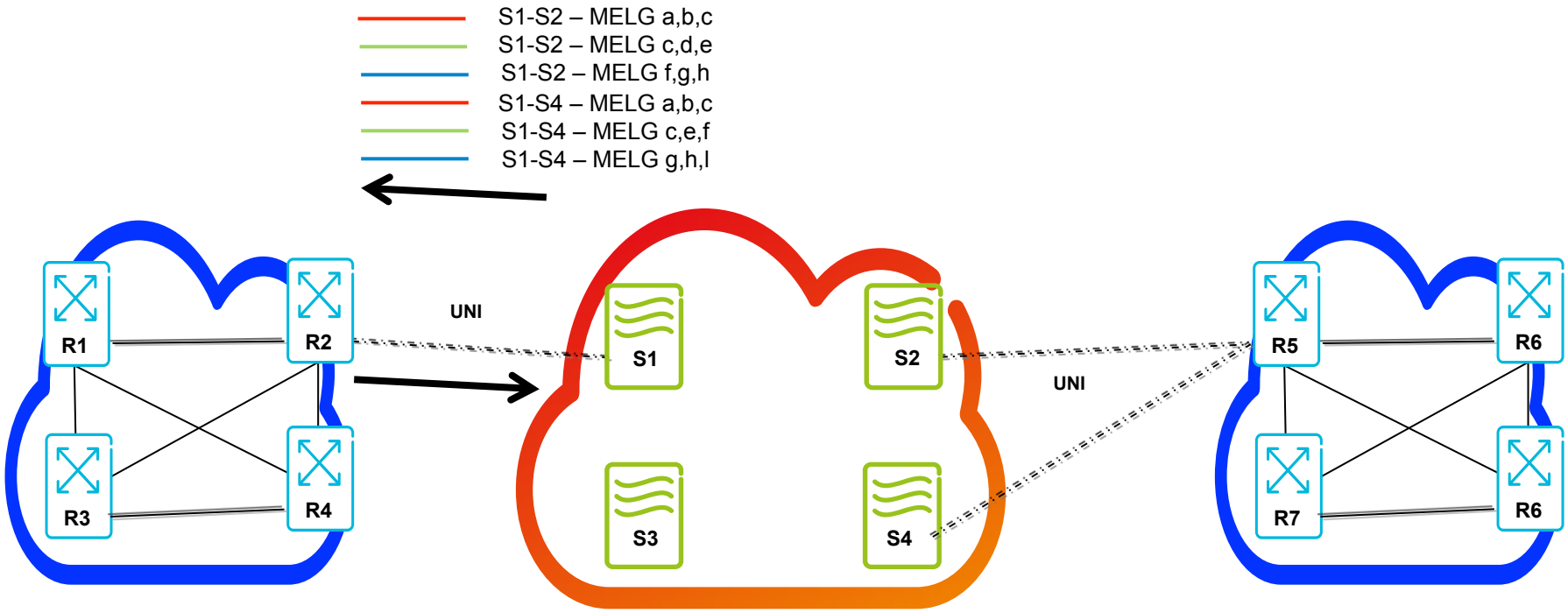
1. RSVP-TE: S1 or PCE computes the path segment inside the core network. No need to select source UNI link in case of single-homing
2. PCE-P: PCE is aware of Rxs and is visible to Rxs. PCE computes the E2E optimal path (by selecting the source and destination UNI TE link)



UNI/ONI Use Cases - Path Comp. & Provisioning (5/5)

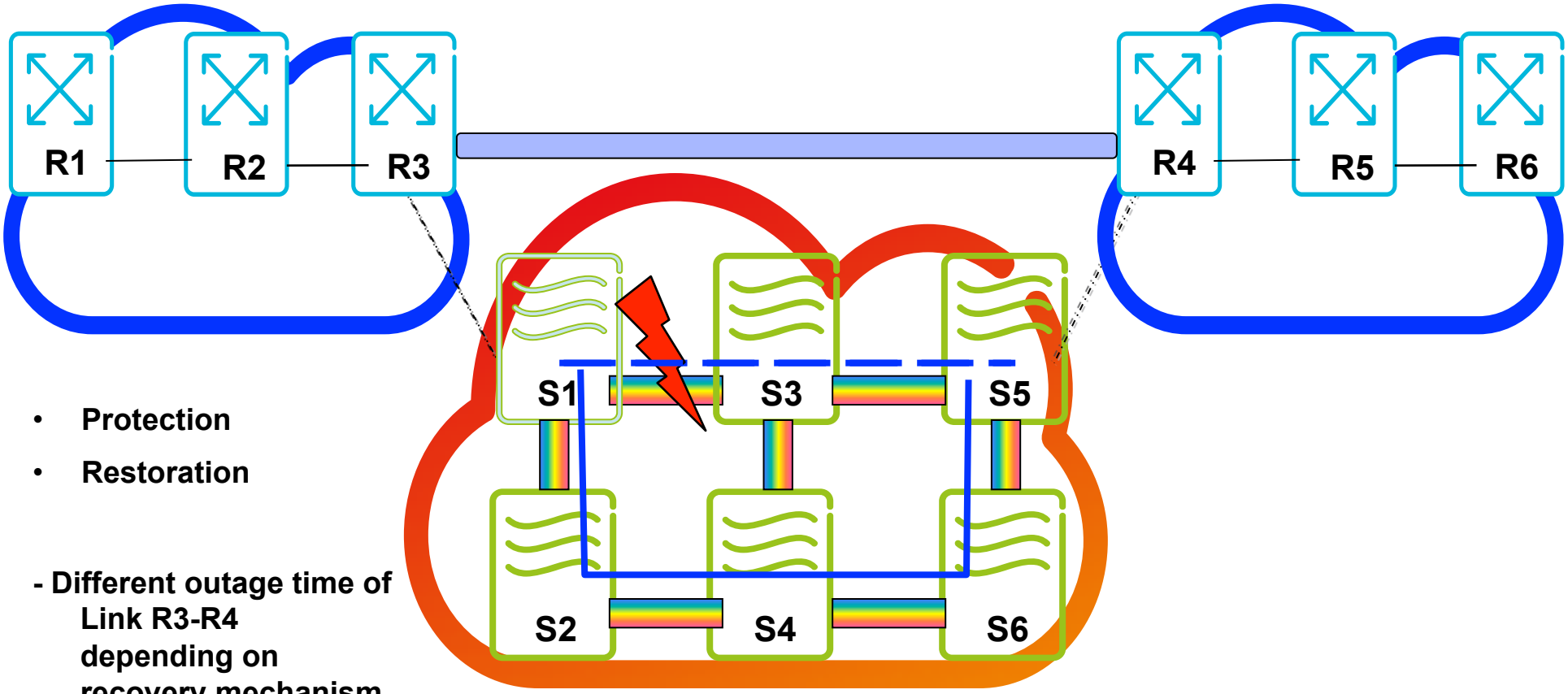
Potential virtual te-links

1. Server layer border nodes advertise the potential virtual TE links towards any destination. I.e. S1 provides R2 with S1-S2 and S1-S4 potential virtual links. Any link is provided with MELGs and with TE metrics
2. R2 chooses the potentiail virtual TE link meeting requirements and asks S1 to signal it.
3. After the potential virtual TE-link turns into a real virtual TE-link it is advertised by R2 and R5 in the client domain



UNI/ONI Use Cases - Server Layer Recovery

single homing

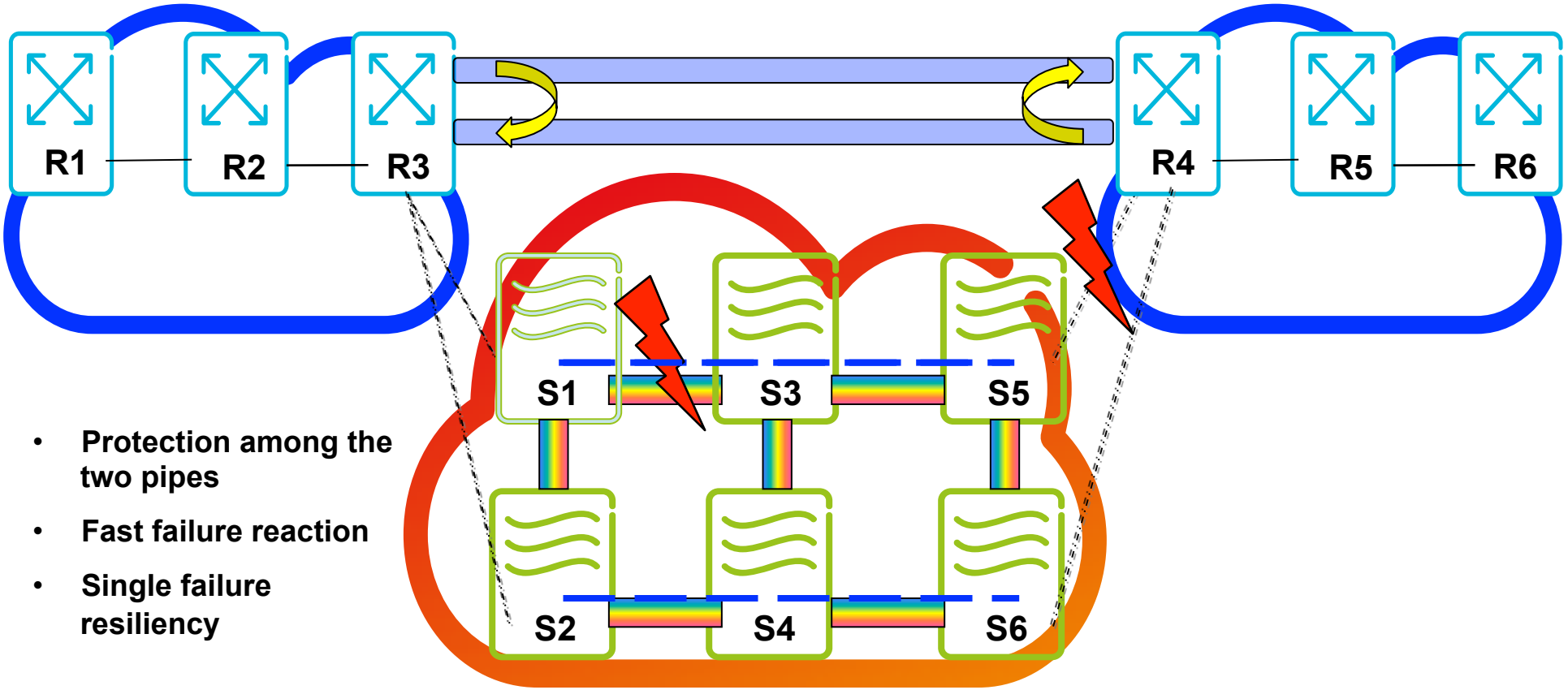


- Protection
- Restoration

- Different outage time of Link R3-R4 depending on recovery mechanism
- R3, S1 and R3-S1 single points of failure

UNI/ONI Use Cases – Client Layer Local Recovery

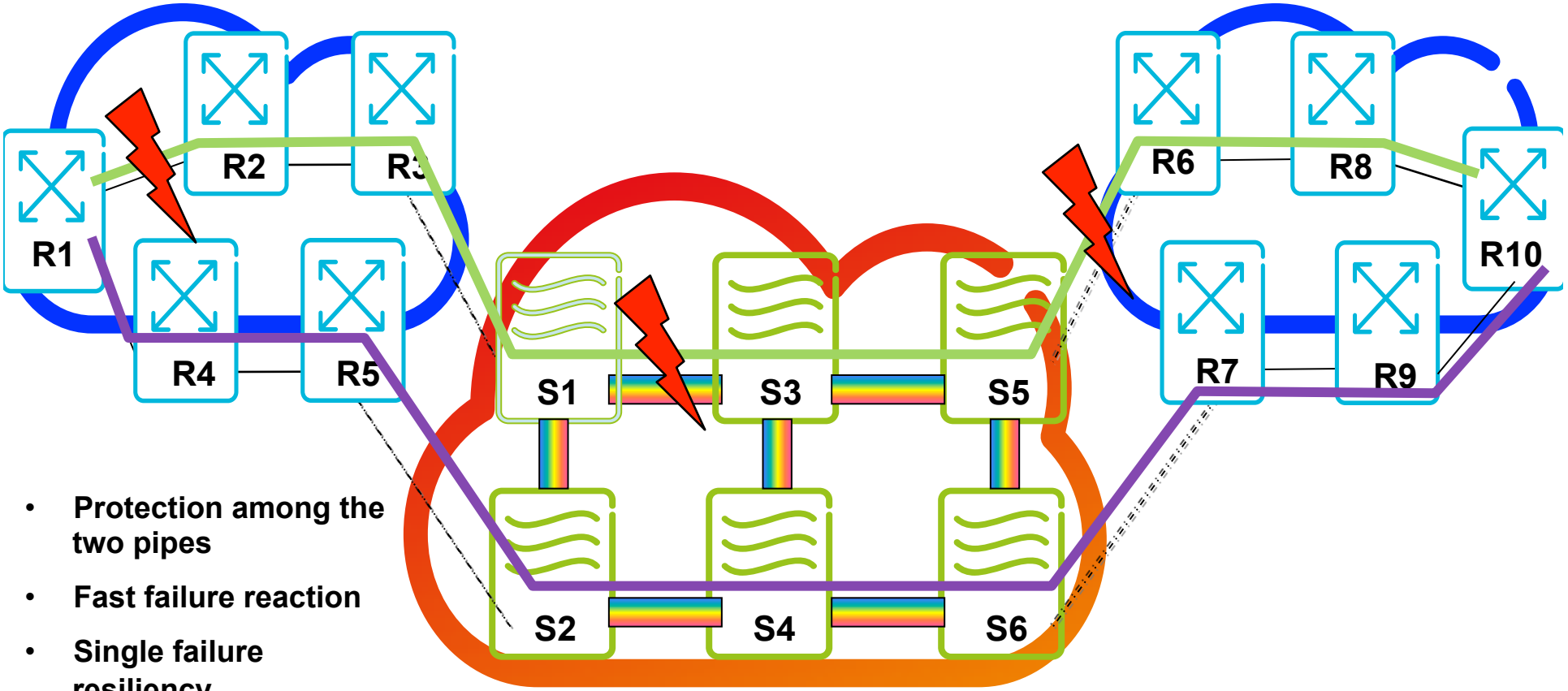
dual homing – single overlay node



- Protection among the two pipes
- Fast failure reaction
- Single failure resiliency

UNI/ONI Use Cases – End-to-end Recovery

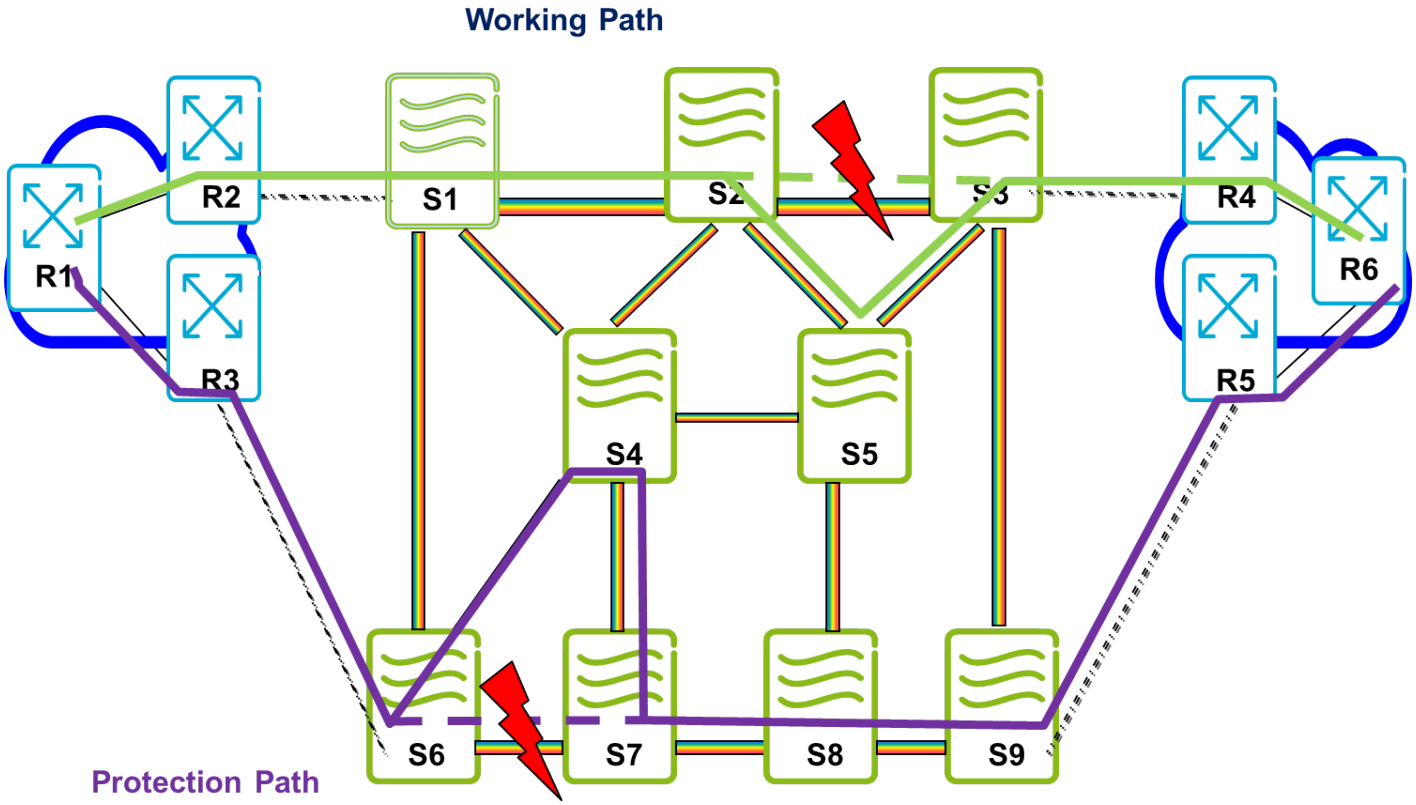
dual homing – double overlay node



- Protection among the two pipes
- Fast failure reaction
- Single failure resiliency
- No single point of failure
- Coordination needed

UNI/ONI Use Cases – Combined Recovery

client protection & server restortion



- Protection among the two client layer paths
- Each of them is independently restored in the server layer
- Multiple failure resiliency (always 50ms)
- No single point of failure
- Coordination needed and SRLG collection performed at each restoration

Discussion

Q1: Terminology: UNI vs ONI?

- Is UNI generic enough to cover both signaling and routing?

Q2: Which option to choose?

Option 1: One Draft

Applicability/Use cases of UNI that covers both signaling and routing

VS

Option 2: Two Separate Drafts

UNI-APP: cover within [RFC4208], and support new features defined for RSVP-TE extensions.
ONI-APP: do not overlap with UNI-APP, cover new features

Next Step

– Following WG suggestion and update the draft(s).