# draft-ali-ccamp-te-metric-recording-02.txt

## CCAMP – IETF 84 – Vancouver

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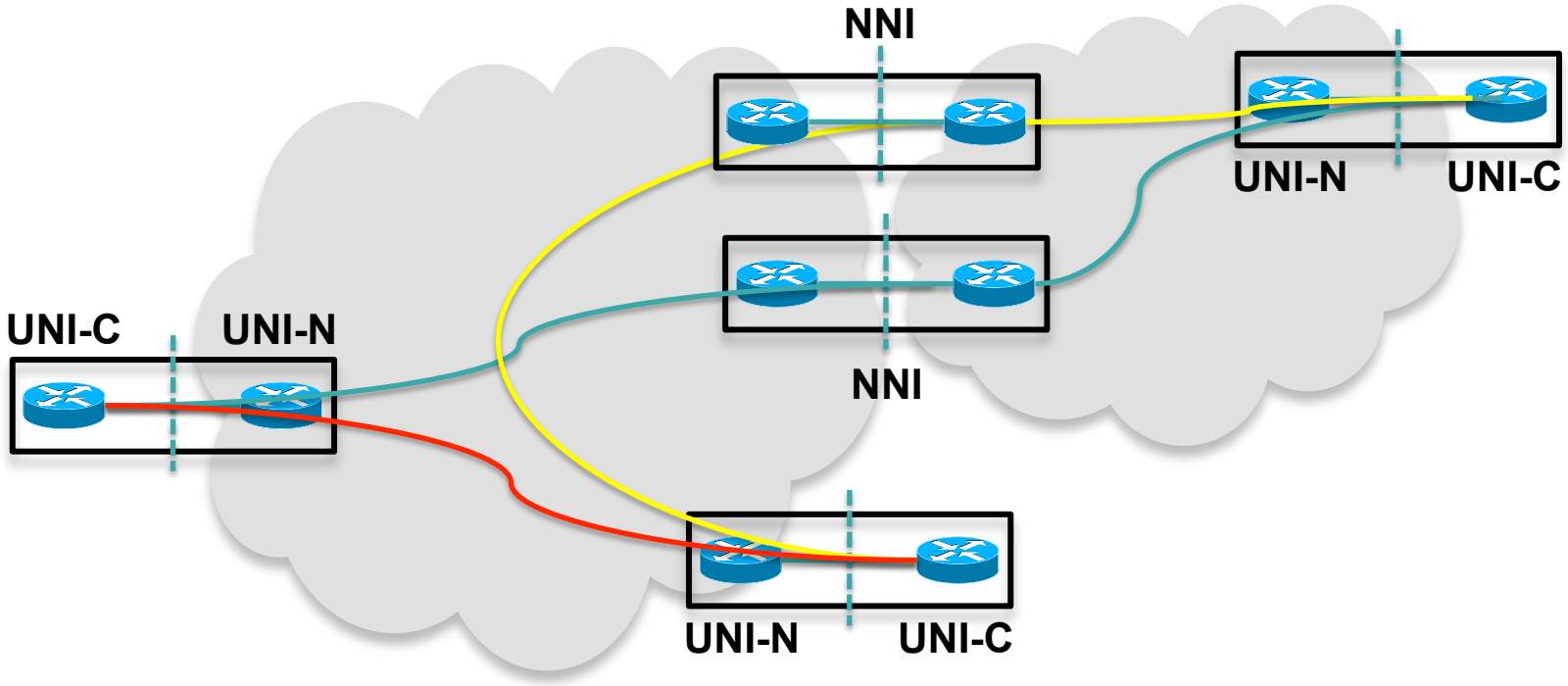
# Overall Problem Space

- The GMPLS UNI-C  or NNI is blind to valuable metric information that a network may be willing to supply
- The aim is to allow increased information flow across such boundaries, while respecting that not everything can or will be shared

# Overall Problem Space (2)




- The “NNI” could as well be an inter-area or interdomain TE link
- A TE headend has loss of visibility across these links

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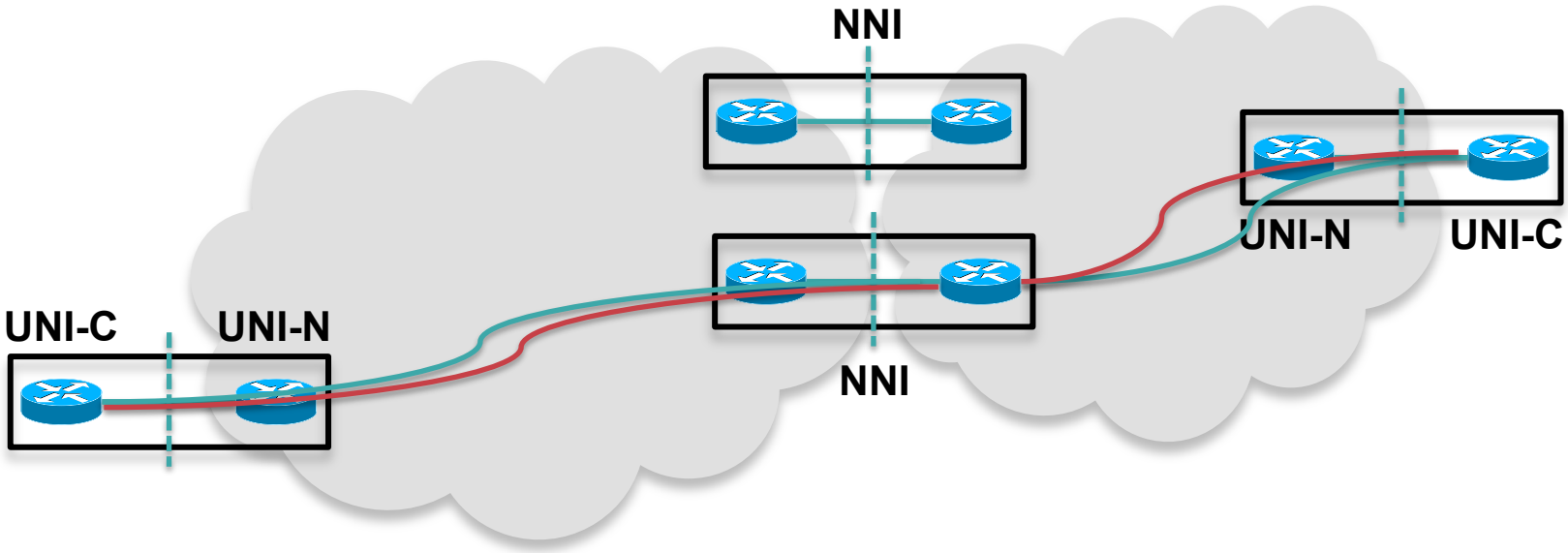


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# Metric Recording

- Latency and latency variation have been identified as critical metrics

  e.g. in financial networks [draft-ietf-ospf-te-metric-extensions], [draft-previdi-isis-te-metric-extensions].

- In inter-domain or GMPLS overlay networks,
  - Ingress node may not know route of a uni-directional (FA) LSP.
  - Ingress and egress nodes may not know route of a bi-directional (RA) LSP.
- Endpoints of an FA or RA need to advertise these in client layer IGP

# draft-ali-ccamp-te-metric-recording: Next Steps

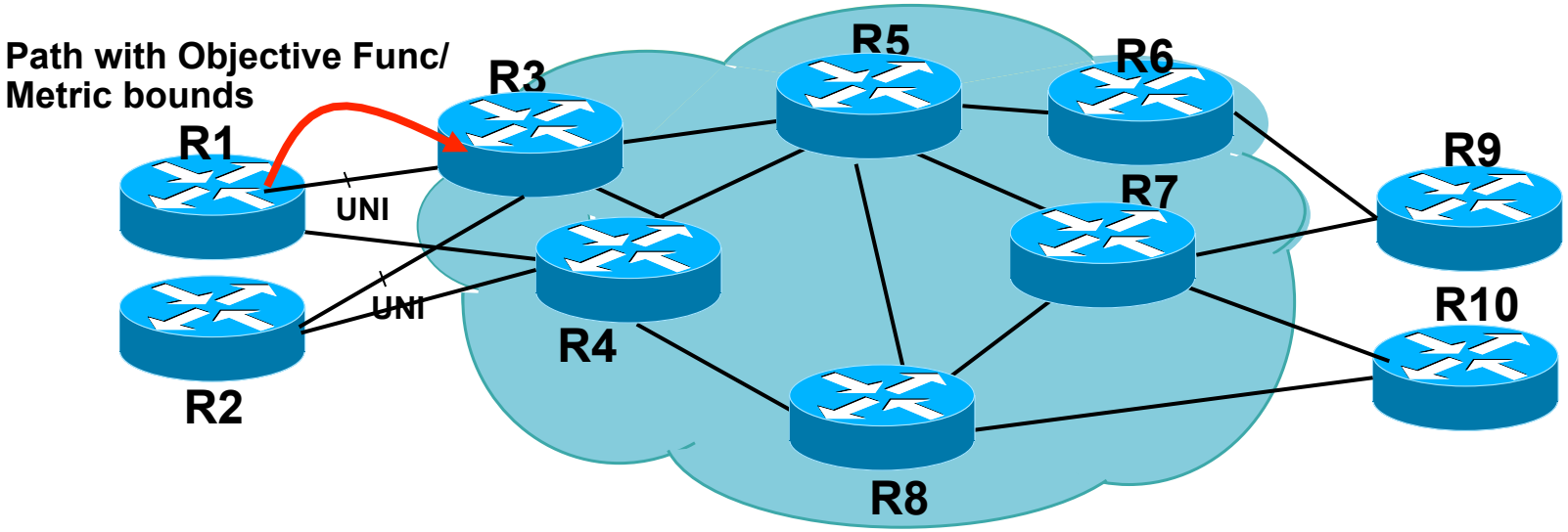
- Problem and Solution space very similar to draft-zhang-ccamp-srlg-fa-configuration.
- Authors of these drafts have already been in contact about possibly merging

# Objective Function

## draft-ali-ccamp-rc-objective-function-metric-bound

- Network performance criteria (e.g. latency) are becoming critical to path selection (e.g., in financial networks).
- Providers are interested in paths that meet multiple constraints
- For example,
  - a financial customer wants a path that meets a certain delay
  - The service provider is interested in the minimum cost path that meets that requirement
- Extensions to the PCE have already been made to express objective functions

# Objective Function at a UNI




- At a UNI
  - The UNI-C may not have access to a PCE
  - Or the UNI-N is fully capable of performing the calculations and thus no PCE has been deployed
- When ERO contains loose hops, e.g., in inter-domain and GMPLS overlay cases, there is a need to carry objective function and/ or metric bounds.

# Expressing the Objective Function

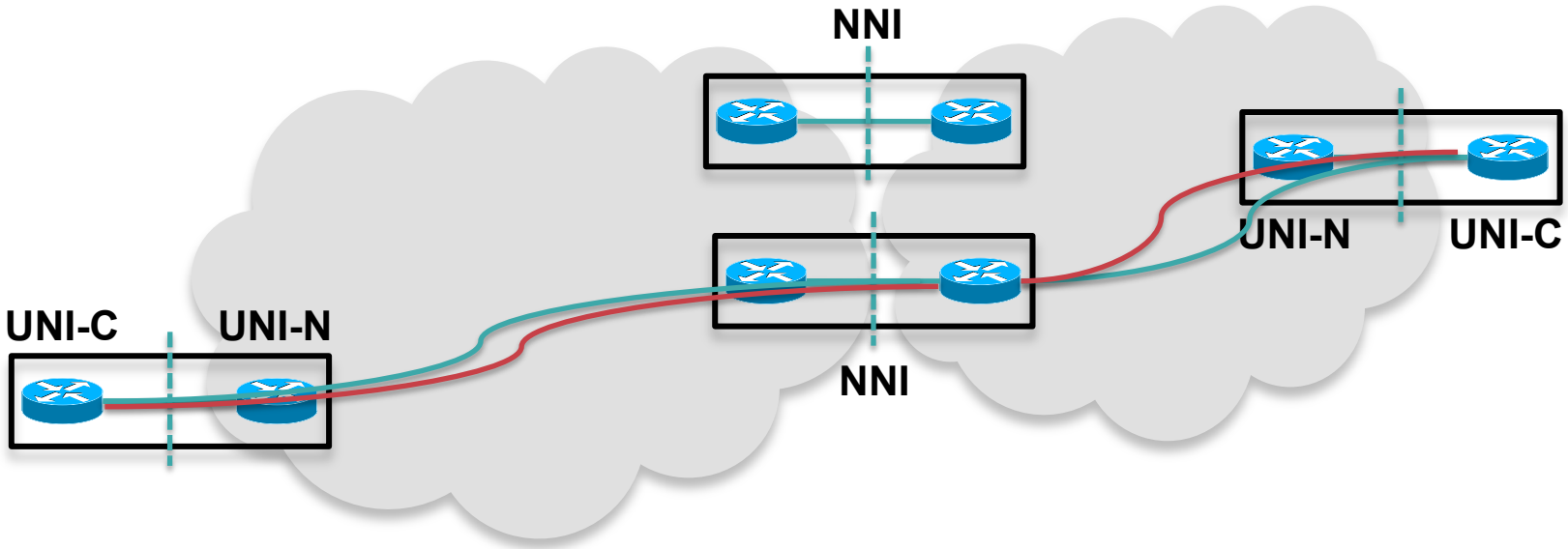
- Objective Function is tied to a loose hop
- Two new ERO subobject types, Objective Function (OF) and Metric, are defined.
  - OF subobject conveys a set of one or more specific optimization criteria that MUST be followed in expanding route of a TE-LSP.
  - Metric subobject indicates the bound on the path metric that MUST NOT be exceeded for the loose segment
- Note: Draft needs to be updated for the case where a loose hop expansion results in the insertion of a new loose hop

# Homogeneity and Fate-sharing

**draft-ali-ccamp-rsvp-te-include-route**

- Requirement is to have two LPSs to follow same route:
  - Fate Sharing.
  - Homogeneous Attributes: E.g., when FA/RA-LSPs are bundled together, it is often required that the LSPs to have same delay and DV characteristics.
- The ingress node requires certain SLRGs to be explicitly “included” when the loose hop is expanded.
  - This derives, for instance, from an overall link diversity plan

# Homogeneity and Fate-sharing(2)




- Ingress node may lack sufficient topological knowledge
- It there must form an ERO with loose hop(s)
- It cannot divide those loose hop(s) into a proper sequence of strict or a sequence of finer-grained loose hops (e.g., in inter-domain and GMPLS overlay networks).

# Homogeneity and Fate-sharing: Solution

- Explicit Inclusion Route Subobject (EIRS)
  - A new ERO subobject type
  - Indicates an inclusion between a pair of explicit or abstract nodes
- Encoding and processing rules are similar to Explicit Exclusion Route Subobject (EXRS) subobject of ERO defined in [RFC4874],

  (the exception being include vs. exclude semantics)
- Subobjects supported by XRO/ EXRS are supported

  i.e., inclusion of links, nodes, SRLGs, tunnel/ LSP, unnumbered interfaces, etc.

# Route Diversity using Exclude Routes

## draft-ali-ccamp-xro-lsp-subobject

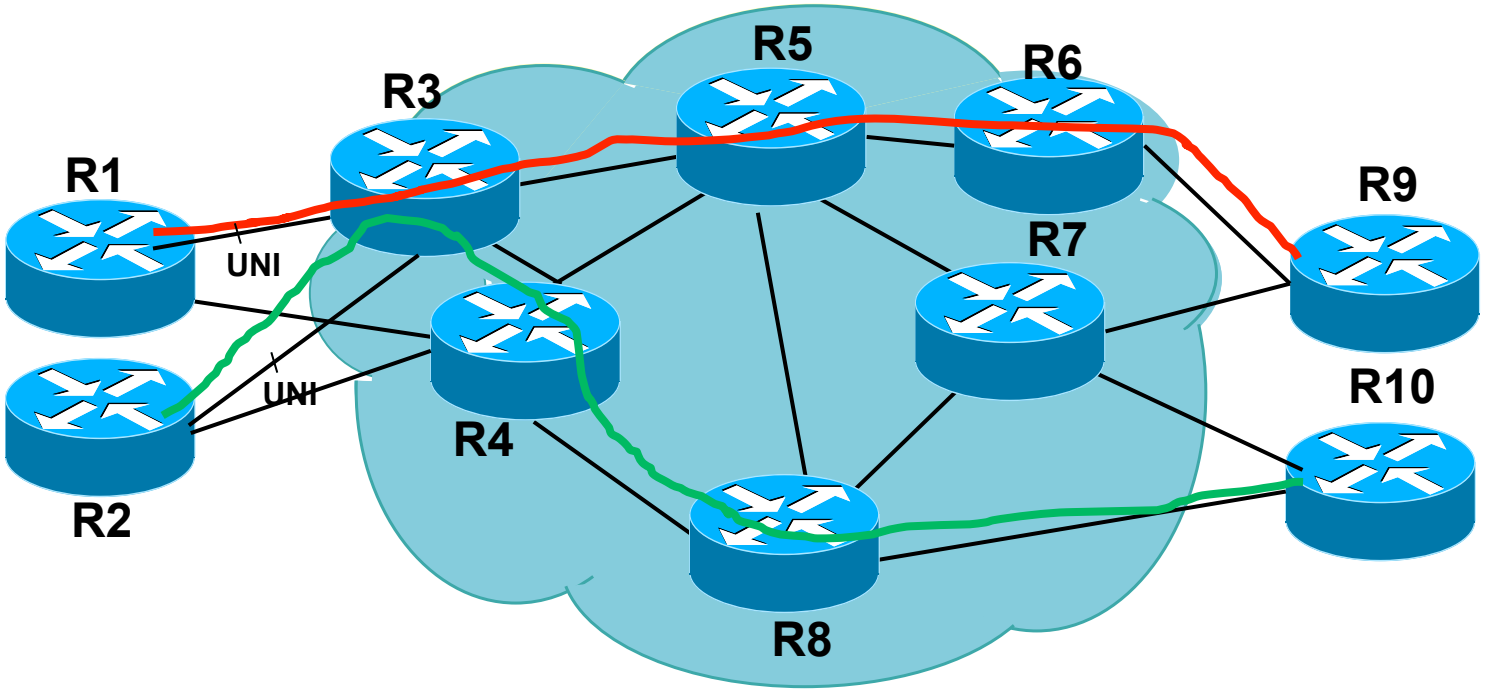
- Not all use-cases are covered with the existing XRO subobjects
  - Exclusion of the route of an LSP

    Where the ingress node is denied RRO by policy

    Which does not involve the node signaling the diverse LSP
  - LSP diversity is a responsibility of the server layer

    Permits client layer to broadly express diversity requirements

# Processing node exception




- Optical UNI interface
- Optical node has extremely high dataplane availability
- Processing node is an acceptable exception

# LSP Subobject

- New LSP subobject of Exclude Route (XRO) Object and Explicit Exclusion Route Subobject (EXRS) defined in [RFC4874].
- Carries FEC of the LSP or Tunnel from which diversity is desired
- Defines flags:
  - Exclusion-Flags: SRLG, Node, & Link exclusion.
  - Attribute Flags:

    LSP ID ignored (Tunnel Exclusion)

    Destination node exception

    Processing node exception

    Penultimate node exception
  - Last 3 are oriented toward UNI interface

# Next Steps

- Solicit consideration and input from the WG
- Intention is that drafts become WG Documents