YANG Data Models for TE and RSVP

draft-ietf-teas-yang-te-14

draft-ietf-teas-yang-rsvp-08

draft-ietf-teas-yang-rsvp-te-02

Latest YANG code @ https://github.com/ietf-mpls-yang/te

Tarek Saad (Presenter) and Rakesh Gandhi, Cisco Systems
Vishnu Pavan Beeram, Juniper Networks
Xufeng Liu, Jabil
Igor Bryskin, Huawei
Himanshu Shah, Ciena

Agenda

• Updates to I-Ds (since IETF-100)

• Open issues

• Next steps
YANG Modules and Document Organization

- **draft-ietf-teas-yang-te**
  - ietf-te.yang
  - ietf-te-types.yang
  - ietf-te-device.yang
  - ietf-te-sr-mpls.yang
  - ietf-te-mpls.yang

- **draft-ietf-teas-yang-te-mpls**
  - ietf-te.yang
  - ietf-te-types.yang
  - ietf-te-device.yang
  - ietf-te-sr-mpls.yang
  - ietf-te-mpls-types.yang

- **draft-ietf-teas-rsvp**
  - ietf-rsvp.yang
  - ietf-rsvp-ext.yang

- **draft-ietf-teas-yang-te-rsvp-te**
  - ietf-te-rsvp.yang
  - ietf-te-rsvp-mpls.yang
I-D: draft-ietf-teas-yang-te-14
Summary of Changes

• Credits:
  Thanks to all the multi-vendor team for their continued contributions and feedback on the model

• High-level model changes:
  – Added RFC references to modelled objects
  – Updates to the TE tunnel model
  – Editorial updates to RSVP and RSVP-TE models
Update # 1
Added TE link direction in ERO

`typedef te-link-direction {
    type enumeration {
        enum INCOMING {
            description "explicit route represents an incoming link on a node";
        }
        enum OUTGOING {
            description "explicit route represents an outgoing link on a node";
        }
        description "enumerated type for specifying direction of link on a node";
    }
}

rw explicit-route-objects

|--rw index uint32
  |--rw (type)?
    |--rw numbered-hop
    |    |--rw address? te-types:te-tp-id
    |    |--rw hop-type? te-hop-type
    |    |--rw direction? te-link-direction
    |--rw as-number-hop
    |    |--rw as-number? binary
    |    |--rw hop-type? te-hop-type
    |--rw unnumbered-hop
    |    |--rw node-id? te-types:te-node-id
    |    |--rw link-id? te-types:te-tp-id
    |    |--rw hop-type? te-hop-type
    |    |--rw direction? te-link-direction

• Set in the explicit route for loose per link ERO hops
• Specifies whether:
  – INCOMING: path selected by path computation must enter the node specified by the sub-object link/hop
  – OUTGOING: path selected by path computation must exit the node specified by the sub-object link/hop
Update # 2
Added TE Label direction

```
typedef te-label-direction {
  type enumeration {
    enum FORWARD {
      description "Label allocated for the forward LSP direction";
    }
    enum REVERSE {
      description "Label allocated for the reverse LSP direction";
    }
  }
  description "enumerated type for specifying the forward or reverse label";
}
```

- Used in the explicit route defining a bidirectional path
- For a specific hop, indicates whether label is
  - FORWARD LSP (or downstream) label
  - REVERSE LSP (or upstream) label
Update # 3  
Added Tunnel protection external commands

- Action commands to externally control the state of the tunnel under protection
Update # 4
Added support for external actions

Tunnel action input includes:
- Type of action
- Location where action is applied
- An optional reference to the specific path that action applies to
- The traffic type that action applies to
- The extra traffic tunnel sharing secondary resources that action applies to
Update # 5

Added Support for relaxable include/exclude constraints

- Used to allow a fallback when failure due to strict exclusion/inclusion is not acceptable
- New identity for optimizing number of include or exclude resources
- List of include/exclude resources to optimize number of inclusions/exclusions
  - higher number of resource inclusion/exclusion the preferable the path
  - order for exclude list is not significant
  - order for include is significant

```plaintext
identity path-metric-optimize-includes {
    base path-metric-type;
    description "A metric that optimizes the number of included resources specified in a set";
}

identity path-metric-optimize-excludes {
    base path-metric-type;
    description "A metric that optimizes the number of excluded resources specified in a set";
}

grouping optimizations_config {
    description "Optimization metrics configuration grouping";
    leaf metric-type {
        type identityref {
            base te-types:path-metric-type;
        };
        description "TE path metric type";
    }
    leaf weight {
        type uint8;
        description "TE path metric normalization weight";
    }
    container explicit-route-exclude-objects {
        when "./metric-type = " + "te-types:path-metric-optimize-excludes"; 
        description "Container for the exclude route object list";
        uses path-route-exclude-objects;
    }
    container explicit-route-include-objects {
        when "./metric-type = " + "te-types:path-metric-optimize-includes"; 
        description "Container for the include route object list";
        uses path-route-include-objects;
    }
}
```
Summary of Changes

• Changes mostly editorial to add references and align with target augmentation path in TE model
Next Steps

• Update to the TE tunnel tutorial <draft-ietf-teas-te-topo-and-tunnel-modeling> to include:
  – Examples and use-cases for using the TE Tunnel model(s)
  – Detailed definitions for actions and how to use them

• TE tunnel model I-Ds will be ready for WGLC after the draft split

• RSVP base/extended in I-D is ready for WGLC
Thank You