

# 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

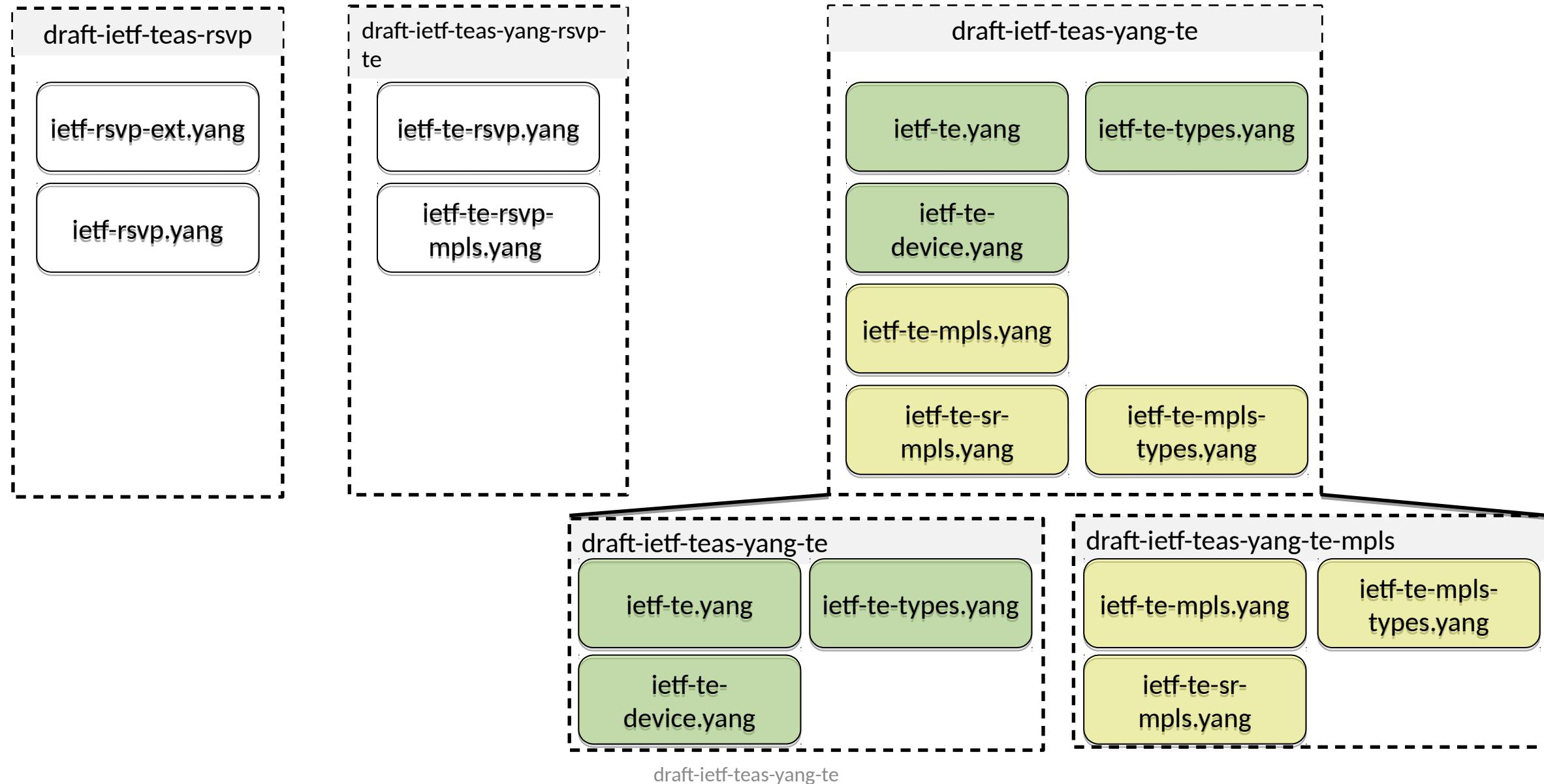
Igor Bryskin, Huawei

Himanshu Shah, Ciena

# Agenda

- Updates to I-Ds (since IETF-100)
- Open issues
- Next steps

# YANG Modules and Document Organization



# 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

<draft-ietf-teas-yang-te-14>

## 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)?
|   +-:(numbered)
|     +-+rw numbered-hop
|       +-+rw address?      te-types:te-tp-id
|       +-+rw hop-type?    te-hop-type
|       +-+rw direction?   te-link-direction
|   +-:(as-number)
|     +-+rw as-number-hop
|       +-+rw as-number?    binary
|       +-+rw hop-type?    te-hop-type
|   +-:(unnumbered)
|     +-+rw unnumbered-hop
|       +-+rw node-id?      te-types:te-node-id
|       +-+rw link-tp-id?   te-types:te-tp-id
|       +-+rw hop-type?    te-hop-type
|       +-+rw direction?   te-link-direction
|   +-:(label)
```

- 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";
}
```

<draft-ietf-teas-yang-te-14>

- 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

```
-rw explicit-route-objects
|   +-rw label-hop
|   |   +-rw te-label
|   |   |   +-rw (technology)?
|   |   |   |   +-:(generic)
|   |   |   |   +-rw generic?      rt-types:generalized-label
|   |   |   +-rw direction?    te-label-direction
```

# Update # 3

<draft-ietf-teas-yang-te-14>

## Added Tunnel protection external commands

```
identity protection-external-commands {
    description
        "Protection external commands for trouble shooting
         purposes.";
}

identity action-freeze {
    base protection-external-commands;
    description
        "A temporary configuration action initiated by an operator
         command to prevent any switch action to be taken and as such
         freezes the current state.";
    reference
        "ITU-T G.808, RFC 4427";
}

identity clear-freeze {
    base protection-external-commands;
    description
        "An action that clears the active freeze state.";
    reference
        "ITU-T G.808, RFC 4427";
}

identity action-lockout-of-normal {
    base protection-external-commands;
    description
        "A temporary configuration action initiated by an operator
         command to ensure that the normal traffic is not allowed
         to use the protection transport entity.";
    reference
        "ITU-T G.808, RFC 4427";
}

identity clear-lockout-of-normal {
    base protection-external-commands;
    description
        "An action that clears the active lockout of normal state.";
    reference
        "ITU-T G.808, RFC 4427";
}
```

```
identity action-lockout-of-protection {
    base protection-external-commands;
    description
        "A temporary configuration action initiated by an operator
         command to ensure that the protection transport entity is
         temporarily not available to transport a traffic signal
         (either normal or extra traffic).";
    reference
        "ITU-T G.808, RFC 4427";
}

identity action-forced-switch {
    base protection-external-commands;
    description
        "A switch action initiated by an operator command to switch
         the extra traffic signal, the normal traffic signal, or the
         null signal to the protection transport entity, unless an
         equal or higher priority switch command is in effect.";
    reference
        "ITU-T G.808, RFC 4427";
}

identity action-manual-switch {
    base protection-external-commands;
    description
        "A switch action initiated by an operator command to switch
         the extra traffic signal, the normal traffic signal #i, or
         the null signal to the protection transport entity, unless
         a fault condition exists on other transport entities or an
         equal or higher priority switch command is in effect.";
    reference
        "ITU-T G.808, RFC 4427";
}

identity action-exercise {
    base protection-external-commands;
    description
        "An action to start testing if the APS communication is
         operating correctly. It is lower priority than any other
         state or command.";
    reference
        "ITU-T G.808, RFC 4427";
}
```

- Action commands to externally control the state of the tunnel under protection



# Update # 4

<draft-ietf-teas-yang-te-14>

## Added support for external actions

```
action protection-external-commands {
    input {
        leaf protection-external-command {
            type identityref {
                base te-types:protection-external-commands;
            }
            description
                "Protection external command";
        }
        leaf protection-group-ingress-node-id {
            type te-types:te-node-id;
            description
                "When specified, indicates whether the action is
                 applied on ingress node.
                 By default, if neither ingress nor egress node-id
                 is set, the the action applies to ingress node only."
        }
        leaf protection-group-egress-node-id {
            type te-types:te-node-id;
            description
                "When specified, indicates whether the action is
                 applied on egress node.
                 By default, if neither ingress nor egress node-id
                 is set, the the action applies to ingress node only."
        }
        leaf path-ref {
            type path-ref;
            description
                "Indicates to which path the external command applies to.";
        }
        leaf traffic-type {
            type enumeration {
                enum normal-traffic {
                    description
                        "The manual-switch or forced-switch command applies to
                         the normal traffic (this Tunnel).";
                }
                enum null-traffic {
                    description
                        "The manual-switch or forced-switch command applies to
                         the null traffic.";
                }
                enum extra-traffic {
                    description
                        "The manual-switch or forced-switch command applies to
                         the extra traffic (the extra-traffic Tunnel sharing
                         protection bandwidth with this Tunnel).";
                }
            }
        }
    }
}
```

- 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

<draft-ietf-teas-yang-te-14>

## Added Support for relaxable include/exclude constraints

```

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;
  }
}

```

- 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

I-D: draft-ietf-teas-yang-rsvp-08  
I-D: draft-ietf-teas-yang-rsvp-te-02

# Summary of Changes

<draft-ietf-teas-yang-rsvp-08>  
< draft-ietf-teas-yang-rsvp-te-02>

- 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