IETF YANG Models Inventory, status and observation

QIN WU
Base model vs Model extension

• Base model: Technology independent model or a model providing common building blocks for technology specific models.
  – ietf-routing defined in draft-ietf-netmod-routing-cfg-20
• Model extension: Technology specific model or a model which either augments from a base model or reuses common building blocks defined in a base model.
  – ietf-ospf defined in draft-ietf-ospf-yang-03
  – ietf-ospf is extension of ietf-routing
YANG Model drafts in IETF

• See **Routing Area WG Draft Table in the RTGYANGCoordSummary wiki page:**

  https://trac.tools.ietf.org/area/rtg/trac/wiki/RtgYangCoordSummary

  26 IETF YANG model WG drafts, 5 from OPS area, 1 from Internet Area, the other 20 from Routing area
# YANG Model drafts Statistics in OPS Area and Internet Area

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<td>draft-ietf-l3sm-l3vpn-service-model-01</td>
<td>YANG Data Model for L3VPN service delivery</td>
<td>03/08/15</td>
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<td>A YANG Data Model for Routing Management</td>
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<td>YANG Data Model for DHCPv6 Configuration</td>
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**OPS Area**

We have 6 base models, they are L3VPN service model, ACL model, SYSLOG model, LMAP model, LIME model.
## YANG Model drafts Statistics in Routing Area

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<td>1.YANG Data Model for ISIS protocol</td>
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<td>2.draft-ietf-ospf-yang-00</td>
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<td>5.A YANG Data Model for Routing Information Protocol (RIP)</td>
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<td>6.YANG Data Model for Segment Routing</td>
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<td>7.LISP Configuration YANG Model</td>
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<td>8.Yang Data Model for Bidirectional Forwarding Detection (BFD)</td>
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<td>9.YANG Data Model for TRILL Operations, Administration, and Maintenance (OAM)</td>
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<td>17.draft-ietf-teas-yang-te-topo-01</td>
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<td>19. draft-ietf-l2tpeext-keyed-v6-tunnel-yang-00</td>
<td>19.A YANG Data Model for Keyed IPv6 Tunnels</td>
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### Routing Area

We have 3 trill YANG drafts, 4 i2rs YANG drafts, 3 teas YANG drafts, 2 rtgwg YANG drafts, 7 other YANG drafts in different WGs.

In Routing Area YANG model drafts, we have 7 base models, they are:
- a. Routing policy model
- b. Trill model
- c. TE model
- d. Network topology model
- e. LISP model
- f. BGP model
- g. RSVP model

### In 20 Routing Area YANG model drafts, we have 7 base models, they are:
- a. Routing policy model
- b. Trill model
- c. TE model
- d. Network topology model
- e. LISP model
- f. BGP model
- g. RSVP model

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Interrelation between YANG Models (Routing)

1st layer models
- ietf-routing (draft-ietf-netmod-routing-cfg)
- i2rs-rib (draft-ietf-i2rs-rib-data-model)
- BGP Model (draft-ietf-idr-bgp-model)
- Routing Policy Model (draft-ietf-rtgwg-policy-model)

2nd layer models
- ietf-ipv4-unicast-routing (draft-ietf-netmod-routing-cfg)
- ietf-ipv6-unicast-routing (draft-ietf-netmod-routing-cfg)
- OSPF Model (draft-ietf-ospf-yang)
- RIP Model (draft-ietf-rip-yang)
- Segment Routing Model (draft-ietf-spring-sr-yang)
- BFD Model (draft-ietf-bfd-yang)
- ISIS Model (draft-ietf-isis-yang-isis-cfg)

3rd layer models
- OSPF Segment Routing Model (draft-ietf-ospf-yang)
- OSPF BFD Model (draft-ietf-ospf-yang)
- ISIS Segment Routing Model (draft-ietf-isis-yang-isis-cfg)

Uses
- augment

The model in the left is augmented by other models in the right.
The model in the right uses grouping defined by the model in the left.
Interrelation between YANG Models (OAM)

- LIME Model (draft-ietf-lime-yang-oam-model)
- TRILL Model (draft-ietf-trill-yang)
- BFD Model (draft-ietf-bfd-yang)

1st layer models

- TRILL OAM Model (draft-ietf-trill-yang-oam)
- TRILL PM Model (draft-ietf-trill-yang-pm)
- LIME BFD Model (draft-wang-yang-bfd-oam)

2nd layer models

- Uses
- augment

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Interrelation between YANG Models (Topology)

1st layer models
- ietf-network
  ietf-network-topology (draft-ietf-i2rs-yang-network-topo)

2nd layer models
- l3-unicast-igp-topology
  (draft-ietf-i2rs-yang-l3-topology)
- ietf-l2-topology
  (draft-ietf-i2rs-yang-l2-network-topology)
- TE Topo Model
  (draft-ietf-teas-yang-te-topo)

3rd layer models
- ospf-topology
  (draft-ietf-i2rs-yang-l3-topology)
- isis-topology
  (draft-ietf-i2rs-yang-l3-topology)
- ietf-schedule
  (draft-ietf-teas-yang-te-topo)
Interrelation between YANG Models (TE)

Diagram:
- `ietf-te` (draft-ietf-teas-yang-te)
- `ietf-rsvp` (draft-ietf-teas-yang-rsvp)
- `ietf-rsvp-te` (draft-ietf-teas-yang-rsvp)
- `ietf-rsvp-extension` (draft-ietf-teas-yang-rsvp)

Augment relationships:
- ietf-te \(\rightarrow\) ietf-rsvp-te
- ietf-rsvp-te \(\rightarrow\) ietf-rsvp-extension
- ietf-rsvp \(\rightarrow\) ietf-rsvp-extension
- ietf-rsvp-extension \(\rightarrow\) ietf-te

Layer models:
- 1st layer models
- 2nd layer models

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What is missing?

• Base model for Tunnel
  – draft-ietf-teas-yang-te defines TE tunnel configuration model, TE Tunnel operation model, TE Tunnel RPC model, TE Tunnel Notification model, how TE tunnel is related to base Tunnel model?
  – How TE Tunnel is different from IP Tunnel? How much commonality do they have?

• Base model for QoS
  – DT team uses draft-asechoud-netmod-diffserv-model-03 as starting point and works on expanding Diffserv model to QoS model.
    • The new version will come soon.
  – Do we need base QoS model? Is there commonality among diffserv and inteserv, best effort?
What things overlap

• BGP model is developed as a standalone model and add no dependency on ietf-routing module.
• Should LIME model extension for TRILL try to reuse grouping defined in TRILL model?
• Why TRILL model or LISP model does not augment from ietf-routing model?
What is other problem

• Do we need to model different network Element (e.g., PE, CE, NVE)
• or do we model different protocol, technology, feature, put models for protocol, technology, feature together to create any device we want?
How they build together

• Three options were proposed and ready for discussion.
  – draft-rtgyangdt-rtgwg-device-model
    • Provide static structure to make models to fit together.
  – draft-bierman-netmod-yang-package
    • Provide dynamic structure to make different model work together
  – draft-openconfig-netmod-model-catalog
    • a model catalog for new model to register in
    • Provide consistent name space for each model or a group of models
    • Provide a service bundle to register all the models that are used to deliver the same service
Next Step

• Comments and suggestions are welcome.
• Propose to have a tool that automatically generate relations between models?
  – E.g., analyzes module imports and what is augmented where, which groupings are imported used etc.
• Propose to have a tool that automatically generate the number of YANG models, WGs, I-Ds in the YANG model summary wiki page.
• Propose to have a tool that automatically extracts identity, feature, grouping from YANG models
• Propose to have a tool that automatically generates service catalog?