Routing Area Yang Architecture

Design Team Draft Status

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Wiki: http://trac.tools.ietf.org/area/rtg/trac/wiki/RtgYangArchDT
Repo: https://github.com/ietf-rtg-area-yang-arch-dt/
Design Team Status

• 3 standards track drafts
  • YANG Logical Network Elements – draft-ietf-rtgwg-lne-model-03
  • YANG Network Instances – draft-ietf-rtgwg-ni-model-03
  • Rtg Area Common YANG Data Types – draft-ietf-rtgwg-routing-types-08

• Other drafts
  • Module Tags – draft-rtgyangdt-netmod-module-tags
  • Device Logical Organization – draft-ietf-rtgwg-device-model

• NMDA Next Steps
  • RFC 8022 Re-spin with solely NDMA restructuring will be done
draft-ietf-rtgwg-lne-model and
draft-ietf-rtgwg-ni-model
Status Summary

- Drafts previously blocked by open issues in Schema Mount
  - Previous blocking issues have been settled
  - Drafts use new tree representation for mounts as described in the tree mount presentation
  - Hope to see WG LC soon
  - Schema Mount Limitation - Uses XPath syntax, no filtering based on data, e.g., NI/VRF Name
  - Schema Mount limitation – Design time mounts are currently out of scope though there are cases where it could be useful
- Both drafts have been updated and are ready for Last Call in RTG WG
LNEs and NIs: Reminder

**Logical Network Element**
- Separate management sub-domains
  - Sub-domains can be managed independently and by a top level manager (managed=true)
  - Commonly called logical system or router; or virtual switch, chassis, fabric, or device context
- Can be supported via multiple logical devices and VMs
  - Where only limited top level management of subdomains is supported

**Network Instance**
- Separate routing / switching domains
  - Can represent of an RFC 4364 VRF or a Layer 2 Virtual Switch Instance (VSI) or a bridge/router (i.e., both)
- General virtualized instance implying a separate L2, L3, or L2/L3 context.
  - For L3, this implies a unique IPv4/IPv6 address space.
• Text aligned with the current (and hopefully final) definition of schema mount
• Cleaned up intro an other editorial issues identified in rtg dir review *
• Cleaned up yang layout per YANG DR review
• Added/filled in missing sections
  • e.g., Terminology and Security Consideration
• Added errors and notifications
• Use new tree representation
• Tried to improve narrative based on comments and questions
• Consolidated and expanded examples in new Appendix B.
LNE: Module Tree

module: ietf-logical-network-element
  +--rw logical-network-elements
    +--rw logical-network-element* [name]
      +--rw name string
      +--rw managed? boolean
      +--rw description? string
    +--mp root
augment /if:interfaces/if:interface:
  +--rw bind-lne-name?
    -> /logical-network-elements/logical-network-element/name
      -> /if:interfaces/interface/name
      -> /if:interfaces/interface/lne:bind-lne-name

notifications:
  +---n bind-lne-name-failed
    +--ro name -> /if:interfaces/interface/name
    +--ro bind-lne-name -> /if:interfaces/interface/lne:bind-lne-name
    +--ro error-info? string

New tree representation

Added to cover cases of asynchronous interface NI bind failures
LNE: Module Example

module: ietf-logical-network-element
   +--rw logical-network-elements
   +--rw logical-network-element* [name]
      +--rw managed? boolean
      +--rw name string
      +--mp root
      ...

---

--ro yanglib:modules-state/
   | ...
--rw sys:system/
   | ...
--ro sys:system-state/
   | ...
--ro rt:routing-state/
   | --ro router-id? quad
   | --ro control-plane-protocols
   |   --ro control-plane-protocol* []
   |     --ro ospf:ospf/
   |     | --ro instance* [af]
   |     |   ...
   --rw rt:routing/
   | ...
--rw if:interfaces/
| ...
--ro if:interfaces-state/
LNE Next Steps

- More feedback
- WG LC?
draft-ietf-rtgwg-ni-model-03 Update

- Text aligned with the current (and hopefully final) definition of schema mount, impacts types & roots
- Resolved open policy question by providing a structure for LxVPN-specific augmentations
- Cleaned up intro an other editorial issues identified in rtg dir review
- Cleaned up yang layout per YANG DR review
- Added/filled in missing sections
  - e.g., Terminology and Security Consideration
- Added errors and notifications
- Use new tree representation
- Tried to improve narrative based on comments and questions
- Consolidated and expanded examples in new Appendix B.
LxVPN Support

**Old:**
```
module: ietf-network-instance
   +--rw network-instances
      +--rw network-instance* [name]
         +--rw name string
         +--rw enabled? boolean
         +--rw description? string
         +--rw network-instance-policy
              ...
         +--mp root
              ...
```

**New:**
```
module: ietf-network-instance
   +--rw network-instances
      +--rw network-instance* [name]
         +--rw name string
         +--rw enabled? boolean
         +--rw description? string
         +--rw (ni-type)?
         +--rw (root-type)?
             ...
```

• NI Policy
  • Container for core instance configuration information
  • Place holder, with details pending

• Root
  • Single mount point for use by any NI type

• NI Type
  • Empty choice statement
  • Place holder for LxVPN technology specific augmentation

• Root Type
  • Well known mount point for VRF/VSIs
LxVPN Technology Specific Information

- This is for VRF or VSI related information *in the core instance*
- Differs based on LxVPN technology
  - L2VPN – VPLS, VxLAN, EVPN, ...
  - L3VPN – MPLS, IP tunnels, ...
- Supported via **ni-types** choice statement
  - With technology specific case augmentations
  - Also provides explicit indication of ni-type
- Alternatively, augmentations can be made in other top-level module(s)

```text
module: ietf-network-instance
  +--rw network-instances
     +--rw network-instance* [name]
        +--rw name string
        +--rw enabled? boolean
        +--rw description? string
        +--rw (ni-type)?
         |  +--:(l3vpn) //augmentation
         |     +--rw l3vpn:l3vpn
         |     |  ... // config data
         |     +--ro l3vpn:l3vpn-state
         |     |  ... // state data
```
Well Known Mount Points

- Supported module list within an NI (VRF/VSI) is likely to be determined based on L2 or L3 type and common across different types of L2 or L3 VPN technologies.

- Three types of Nis have been identified:
  1. VRFs for L3VPNs
  2. VSIs for L2VPNs
  3. VSI+VRF for L2+L3VPNs (bridge/routers)

- Schema mount defines the schema (i.e., module list) on a per mount point name basis.
  - So need named mount point per type

```plaintext
module: ietf-network-instance
+--rw network-instances
   +--rw network-instance* [name]
      +--rw name string
      +--rw enabled? boolean
      +--rw description? string
      +--rw (ni-type)?
      +--rw (root-type)?
         +--:(vrf-root)
         |   +--mp vrf-root?
         +--:(vsi-root)
         |   +--mp vsi-root?
         +--:(vv-root)
            +--mp vv-root?
            //one root required per NI
```
Notifications

- Added to cover cases of asynchronous interface `NI` bind failures
- Interface may be bound multiple ways `{base, IPv4 & IPv6}`
  - Failure can occur on one or more

```
notifications:
  +--n bind-ni-name-failed
      +--ro name            -> /if:interfaces/interface/name
      +--ro interface
          |  +--ro bind-ni-name?  -> /if:interfaces/interface/ni:bind-ni-name
          +--ro ipv4
              +--ro ipv6
                  +--ro error-info?   string
```
module: ietf-network-instance
  +--rw network-instances
  +--rw network-instance* [name]
    +--rw name string
    +--rw enabled? boolean
    +--rw description? string
    +--rw (ni-type)?
      |  +--:(l3vpn)
      |    +--rw l3vpn:l3vpn
      |    |  ... // config data
      |    +--ro l3vpn:l3vpn-state
      |  ... // state data
  +--rw (root-type)?
    +--:(vrf-root)
      +--mp vrf-root
      ...
module: ietf-network-instance
  +--rw network-instances
    +--rw network-instance* [name]
    +--rw name string
    +--rw enabled? boolean
    +--rw description? string
    +--rw (ni-type)?
    +--rw (root-type)?
      +--:(vrf-root)
      |  +--mp vrf-root?
      +--:(vsi-root)
      |  +--mp vsi-root?
      +--:(vv-root)
      |   +--mp vv-root?
  augment /if:interfaces/if:interface:
    +--rw bind-ni-name? -> /network-instances/network-instance/name
  augment /if:interfaces/if:interface/ip:ipv4:
    +--rw bind-ni-name? -> /network-instances/network-instance/name
  augment /if:interfaces/if:interface/ip:ipv6:
    +--rw bind-ni-name? -> /network-instances/network-instance/name

notifications:
  +---n bind-ni-name-failed
    +--ro name -> /if:interfaces/interface/name
    +--ro interface
      |  +--ro bind-ni-name? -> /if:interfaces/interface/ni:bind-ni-name
    +--ro ipv4
    +--ro ipv6
    +--ro error-info? string
Open Issues

- Schema mount currently doesn't allow parent-reference filtering on the instance of the mount point, but rather just the schema.
- This means it is not possible to filter based on actual data, e.g., bind-network-instance-name="green".
- Recommended resolution:
  - Accept limitation
  - Implementations may choose to impose a limitation on parent references
    - But not required
NI Next Steps

- More feedback
- WG LC?
Recent Changes and History (1/2)

• February - YANG Doctor Review from Lada Lahotka
• Addition of BGP Subsequent Address family types as per comment from Sue Hares.
• Addition of percentage and timeticks64 types as per comment from Rob Wilton.
  • From OpenConfig types – used in BGP Model
• April - Second YANG Doctor review from Radek Krejčí.
  • Use boilerplate for YANG model headers as per Appendix C of RFC 6087BIS
• Split of IANA based types as per comment from Martin Bjorklund similar to RFC 7224
Recent Changes and History (2/2)

- May – Routing Directorate review from Stewart Bryant
- June 13th – Working Group Last Call
- Add ipv6-route-target, route-origin, and ipv6-route-origin as per comments from Jeff Haas
- Add geo-coordinates type as per comments from Robert Razuk
  - Protocol encodings reviewed and discussed across LISP, OSPF, IS-IS and BGP drafts
  - However, significant risk of change since the protocol drafts are new and it is not clear all the experts have reviewed the encoding
  - Will be moved to a separate ietf-geo-location module in separate draft for further review and independent progression.
  - Should new draft go immediately to WG document?
Routing Types Summary & Next Steps

- Handle a few pending changes and re-issue the draft
  - Remove geo-location
  - Update route-target with flexible type
  - Clarify description of label-stack grouping

- It is time to progress the updated version of the model and limit further comments to the existing types as opposed to suggestions for new types.
  - Exceptions may be made for reviewed YANG types provided as code snippets.

- RTG WG Co-chairs will request publication after IETF and progress the document.