Routing Area Yang Architecture Design Team Update

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Repo: [https://github.com/ietf-rtg-area-yang-arch-dt/](https://github.com/ietf-rtg-area-yang-arch-dt/)
High Level Status

DT identified four “work” topics:

1. YANG Device Model Structure
2. YANG Relationship of Config and Operational State (and intended)
   - Requirements generally accepted by NetMod
3. YANG support for reusable objects (containers) that are augmentable
   - like grouping only augmentable
4. Standard solution to the YANG versioning problem that is compatible with the RFC process and some degree of agility
Topics

• Changes since -00
• Open issues
• Next steps
Changes: /device

- Top level /device was overly contentious → Dropped
- No top level container subsuming entire device
- Interfaces now at top
- Still have representation of logical partitions

```
module: network-device
  +-rw info
    |  +-rw device-type? enumeration
    +-rw hardware
    +-rw qos
    +-rw logical-network-elements
    |  ...
    augment /if:interfaces/if:interface: ...
```
Logical Network Elements

- Separate management sub-domains
  - Sub-domains can be managed independently and by a top level manager (device-view=true)

- Differs from multiple virtual devices and VMs
  - Where top level management of subdomains not supported
Network Instances

- 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.
Changes: Interface Augmentations

Provides linkage of interfaces to:

- **Logical Network Elements**
  - For e.g., physical interfaces
  - References provided by uint8 value

- **Networking Instances**
  - For e.g., logical interfaces on a physical interface
  - References provided by name string

- **Leafref may be a better choice for references**

```
augment /if:interfaces/if:interface:
    +--rw bind-network-element-id?     uint8
augment /if:interfaces/if:interface:
    +--rw bind-networking-instance-name? string
augment /if:interfaces/if:interface/ip:ipv4:
    +--rw bind-networking-instance-name? string
augment /if:interfaces/if:interface/ip:ipv6:
    +--rw bind-networking-instance-name? string
```
Changes: Identities

- Identities for classes of protocols/services rather than attempting to list them all
  - Impacts: oam-protocols, control-plane-protocols, networking-services
- For example, control-plane-protocols:

```
module: network-device
  +--rw logical-network-elements
  +--rw networking-instances
    +--rw networking-instance* [...-name]
    +--rw control-plane-protocols
      +--rw control-plane-protocol* [type]
        +--rw type    identityref
        +--rw policy

Example types = bgp, is-is, ospf, rsvp, segment-routing, ldp, pim, igmp, mld, static-routes
```
Open issues

• Main issue is representation of Logical Network Elements
  – Current approach is formal hierarchy that future models augment

• Alternatives are possible, e.g.:
  – Follow the Interface precedent with lists and references to LNE/NI in all models
  – Local mount based on draft-clemm-netmod-mount
    • With client directed mounts, and new data (sub) store on mount
  – Tools-Based approach?

• Working this off line with DT and mount authors
  – DT open to discussing other alternatives
Organizational Model Impact

• Provides a predictable context for routing/router, bridging/bridge related configuration information

• Ensures support for wide range of possible implementations
  − With and without logical partitions (LNEs)
  − With and without VRF/VSI

• Beneficial for emerging models
  − LNEs and NIs need not be addressed per model

• Beneficial for operational use
  − Straightforward to delineate / reference per LNE/NI information
Impact on ietf-routing

• Need to align draft-ietf-netmod-routing-cfg with draft

• Notably
  – No LNEs
  – Routing vs network instances
    • No L2 / VSI allowed

• Interface references are to routing instances
  – No Ipv4 vs v6 mapping of interfaces to instance

• Leafrefs not strings used for YANG pointers
  – Minor issue, but this may be something to change in meta-model
Design Team Future Plans

• Continue work on organizational model draft
  - Agree on solution to LNEs
  - Align with opstate solution once available
• Better coordination with OpenConfig including draft-openconfig-rtgwg-network-instance-00.
• Dove-tail with draft-ietf-netmod-routing-cfg

• Agree on when organization model draft should become a RTGWG draft
• See if there are other areas of concern for RTG area
Reminder:
Current DT Topics

DT current topic list:

1. YANG Device Model Structure
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