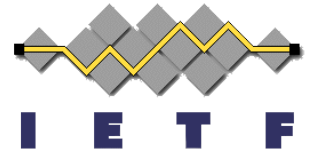# Routing Area Yang Architecture Design Team Update

Members: Acee Lindem, Anees Shaikh, Christian Hopps,
        Dean Bogdanovic, Lou Berger, Qin Wu,
        Rob Shakir, Stephane Litkowski, Yan Gang

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

I E T F

High Level Status

DT identified four "work" topics:

1. YANG Device Model Structure ← Discussion Focus

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
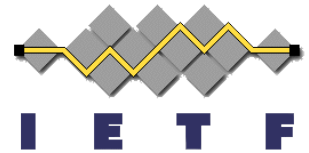
DT not recommending a specific solution

Network Device YANG Organizational Model
draft-rtgyangdt-rtgwg-device-model-01

Authors:　　　　Acee Lindem, Christian Hopps, Dean Bogdanovic,
Lou Berger (Ed.)

Contributors: Anees Shaikh, Kevin D'Souza, Luyuan Fang, Qin Wu,
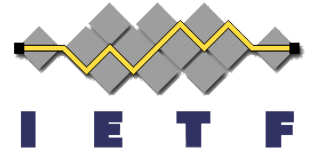Rob Shakir, Stephane Litkowski, Yan Gang

Repo:　　　https://github.com/ietf-rtg-area-yang-arch-dt/meta-model/

I E T F

Topics

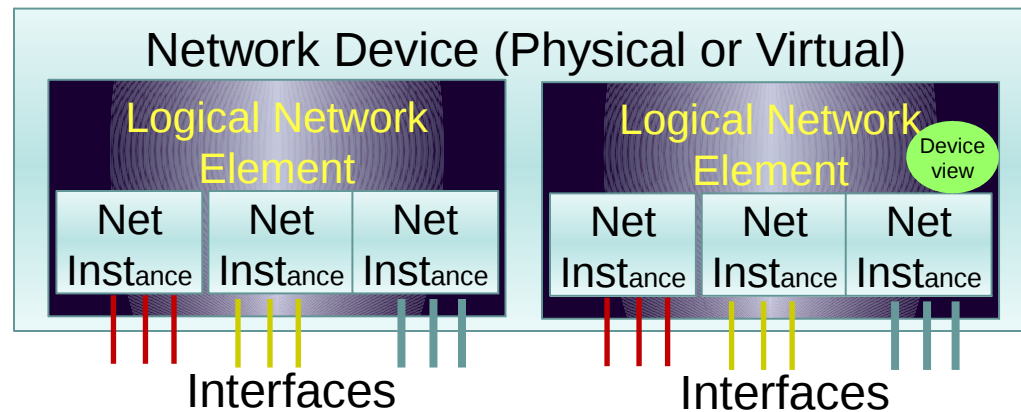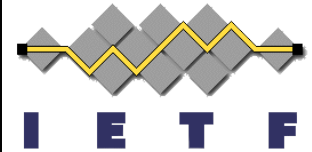- Changes since -00
- Open issues
- Next steps

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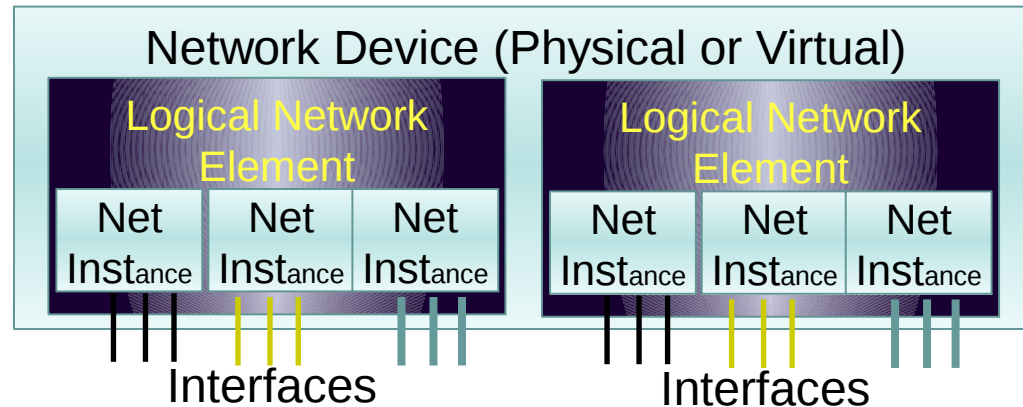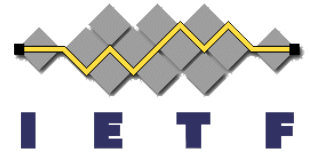
```
module: network-device
    +--rw info
    |   +--rw device-type?    enumeration
    +--rw hardware
    +--rw qos
    +--rw logical-network-elements
    |      ...
    augment /if:interfaces/if:interface:
          ...
```

Logical Network Elements

Network Device (Physical or Virtual)

Logical Network Element — Net Instance / Net Instance / Net Instance — Interfaces

Logical Network Element (Device view) — Net Instance / Net Instance / Net Instance — Interfaces

- 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

Network Device (Physical or Virtual)

Logical Network Element			Logical Network Element		
Net Instance	Net Instance	Net Instance	Net Instance	Net Instance	Net Instance

Interfaces   Interfaces

- 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
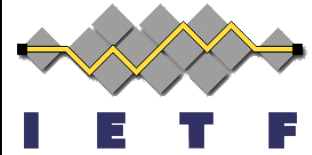
Provides linkage of interfaces to:

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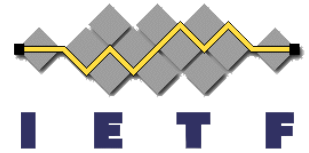
- Identities for classes of protocols/services rather than attempting to list them all
  - Impacts: oam-protocols, control-plane-protocols, networking-services
- For example, control-plane-protocols:

```
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
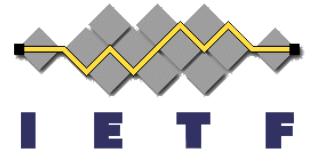
- Main issue is representation of Logical Network Elements
  - Current approach is formal hierarchy that future models augment
- Alternatives are possible, e.g.:
  - Follow the Interface precedent with lists and references to LNE/NI in *all* models
  - Local mount based on draft-clemm-netmod-mount
    - 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
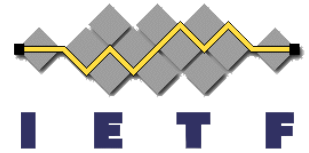
Organizational Model Impact
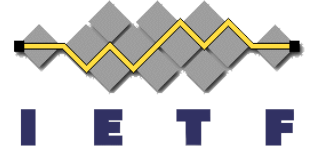
- Provides a predictable context for routing/router, bridging/bridge related configuration information
- Ensures support for wide range of possible implementations
  - With and without logical partitions (LNEs)
  - With and without VRF/VSI
- Beneficial for emerging models
  - LNEs and NIs need not be addressed per model
- Beneficial for operational use
  - Straightforward to delineate / reference per LNE/NI information

Impact on ietf-routing
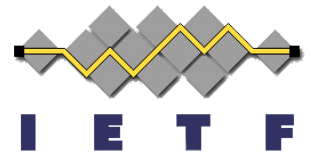
- Need to align draft-ietf-netmod-routing-cfg with draft
- Notably
  - No LNEs
  - Routing vs network instances
    - No L2 / VSI allowed
- Interface references are to routing instances
  - No Ipv4 vs v6 mapping of interfaces to instance
- Leafrefs not strings used for YANG *pointers*
 - Minor issue, 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
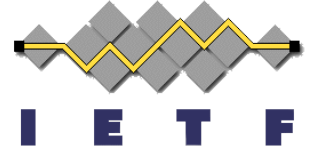
DT current topic list:

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