YANG Data Model for Network Topology
draft-clemm-netmod-yang-network-topo-00.txt

Alexander Clemm, alex@cisco.com
Hariharan Ananthakrishnan, hanantha@juniper.net
Jan Medved, jmedved@cisco.com
Tony Tkacik, ttkacik@cisco.com
Robert Varga, robert.varga@pantheon.sk
Nitin Bahadur, nitinb@juniper.net
Purpose

• YANG Data Model for Network Topologies
• Generic topology model, extensions for specific topologies
  – L3 Unicast IGP, OSPF, IS-IS as part of this draft
  – Can be extended for other topologies
• Applications
  – Data nodes capture and reconcile their understanding of network topology, propagate topology info
  – Network controllers represent controller network topology
• Ask: Adopt as WG item
Data model structure

- Traffic engineering data definitions, used in multiple topologies
  - **ted**
  - **ospf-topology**
  - **isis-topology**
  - **l3-unicast-igp-topology**
  - **network-topology**

- Generic topology model

- Other topologies (future)

- Model allows for multiple levels of refinement

- Additional topologies can be added at any refinement level
Data model structure (contd.)

- Links connect nodes, are terminated by termination points
- Topologies can refer to underlay topologies
- Links can refer to underlay links
- Nodes can refer to underlay nodes
- Unidirectional, point-to-point links represent non-ptp through hierarchies of nodes links
Data model structure (contd.)

- Derive Layer 3 Unicast IGP topology object classes
- Integrity rules ensure links, nodes, topology of matching type
Data model structure (contd.)

- **Topology**
  - **Node**
    - **Prefix**
    - **L3 IGP node**
      - **ISIS node**
      - **OSPF node**
  - **Link**
    - **L3 IGP link**
      - **ISIS link**
      - **OSPF link**

- **L3 Unicast IGP Topology**
  - **OSPF topo**
  - **ISIS topo**

• Pattern recurses
YANG structure

module: network-topology
  +--rw network-topology
    +--rw topology [topology-id]
    |   +--rw topology-id topology-id
    +--rw topology-types
    +--rw underlay-topology [topology-ref]
    |   +--rw topology-ref topology-ref
    +--rw node [node-id]
    |   +--rw node-id node-id
    |   +--rw supporting-node [node-ref]
    |     +--rw node-ref node-ref
    |   +--rw termination-point [tp-id]
    |     +--rw tp-id tp-id
    |     +--ro tp-ref* tp-ref
    +--rw link [link-id]
    |   +--rw link-id link-id
    +--rw source
    |   +--rw source-node node-ref
    |   +--rw source-tp? tp-ref
    +--rw destination
    |   +--rw dest-node node-ref
    |   +--rw dest-tp? tp-ref
    +--rw supporting-link [link-ref]
     +--rw link-ref link-ref
module: network-topology
   +++rw network-topology
   +++rw topology [topology-id]
      +++rw topology-types
         | +++rw l3t:l3-unicast-igp-topology?
      +++rw node [node-id]
         | +++rw termination-point [tp-id]
         | | +++rw l3t:igp-termination-point-attributes
         | | | +++rw (termination-point-type)?
         | | | | |+++:(ip)
         | | | | | | |+++rw l3t:ip-address* inet:ip-address
         | | | | | | |+++:(unnumbered)
         | | | | | | |+++rw l3t:unnumbered-id? uint32
         | +++rw l3t:igp-node-attributes
         | | +++rw l3t:name? inet:domain-name
         | | +++rw l3t:flag* flag-type
         | | +++rw l3t:router-id* inet:ip-address
         | | +++rw l3t:prefix [prefix]
         | | | +++rw l3t:prefix inet:ip-prefix
         | | | +++rw l3t:metric? uint32
         | | | +++rw l3t:flag* flag-type
      +++rw link [link-id]
         | +++rw l3t:igp-link-attributes
         | | +++rw l3t:name? string
         | | +++rw l3t:flag* flag-type
         | | +++rw l3t:metric? uint32
      +++rw l3t:igp-topology-attributes
         | +++rw l3t:name? string
         | +++rw l3t:flag* flag-type
Questions?