YANG Data Model for Network Topology

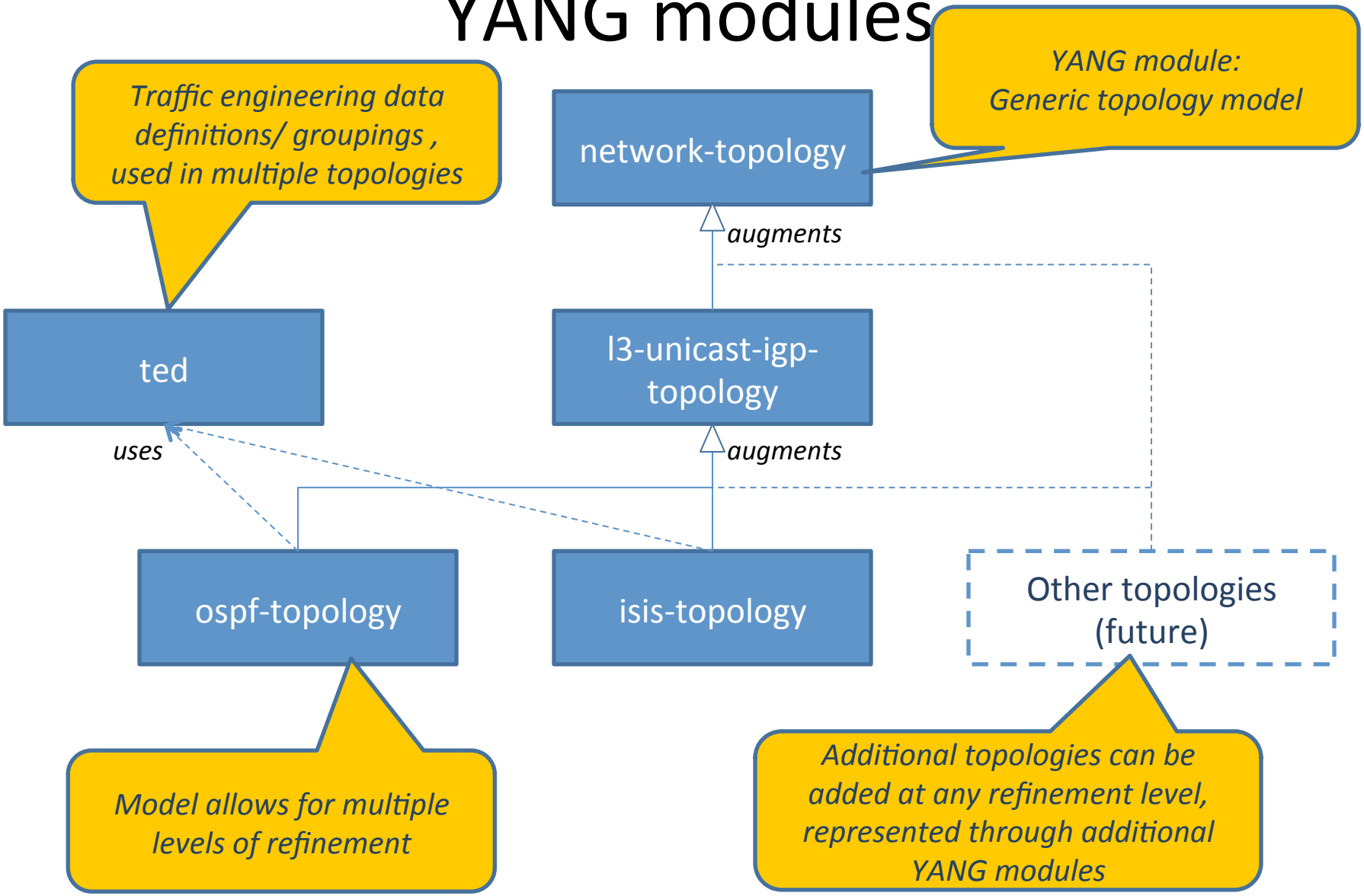
draft-clemm-netmod-yang-network-topo-01.txt

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

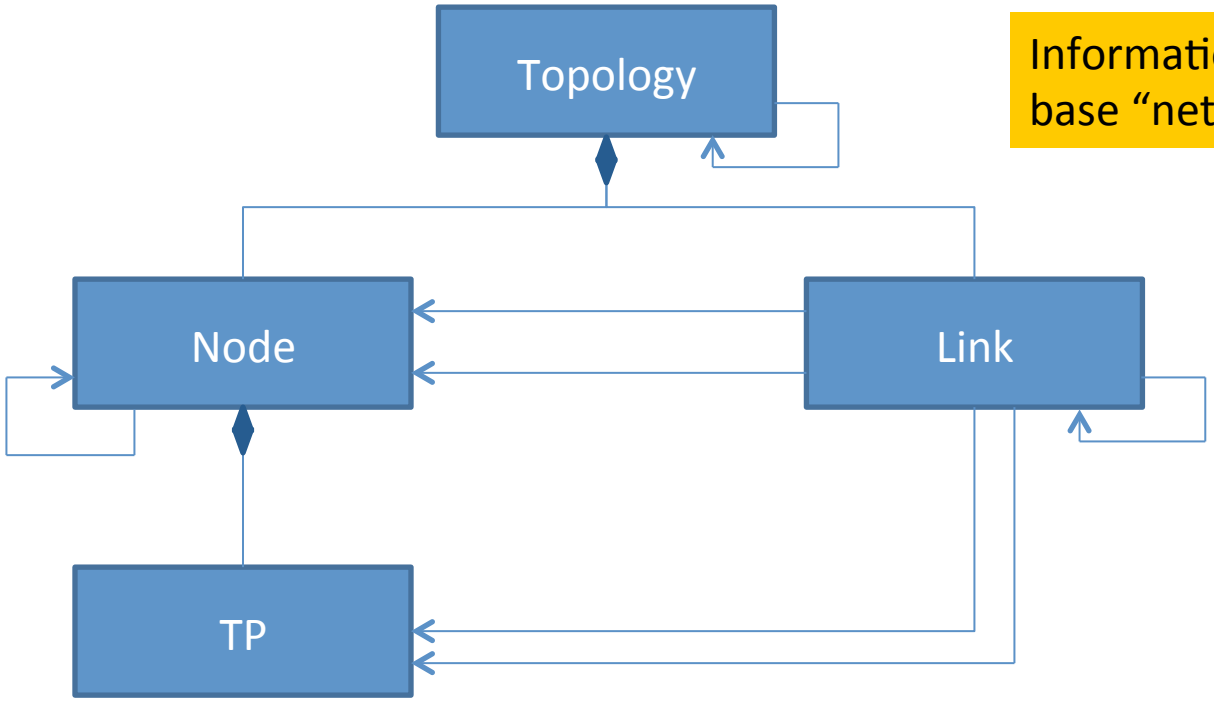
Purpose

- 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 (e.g. Open Daylight)
- Ask: Adopt as WG item
  - Presented in Berlin
  - Positive feedback received so far

Recap: Data model structure
YANG modules



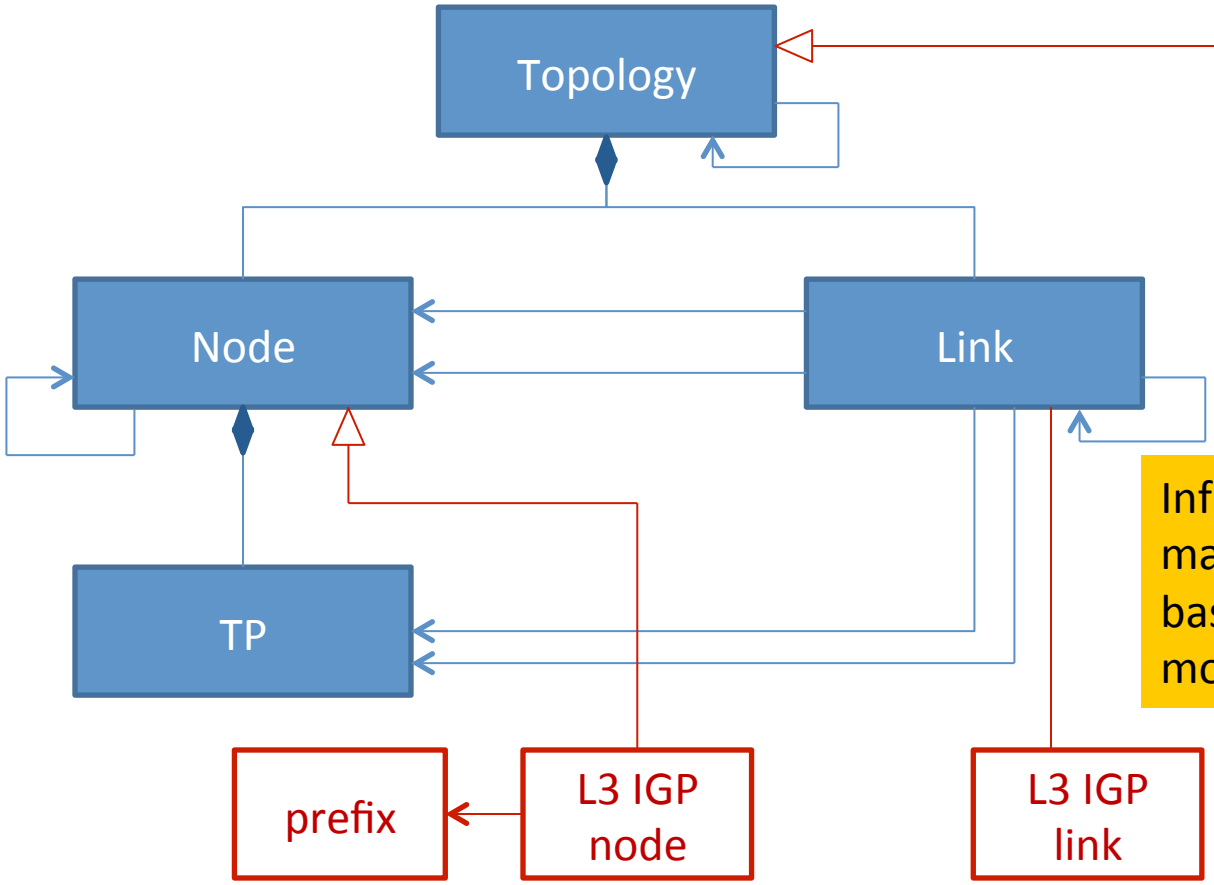
Recap: Data model structure (contd.)



Information model underlying
base “network topology” YANG module

- 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

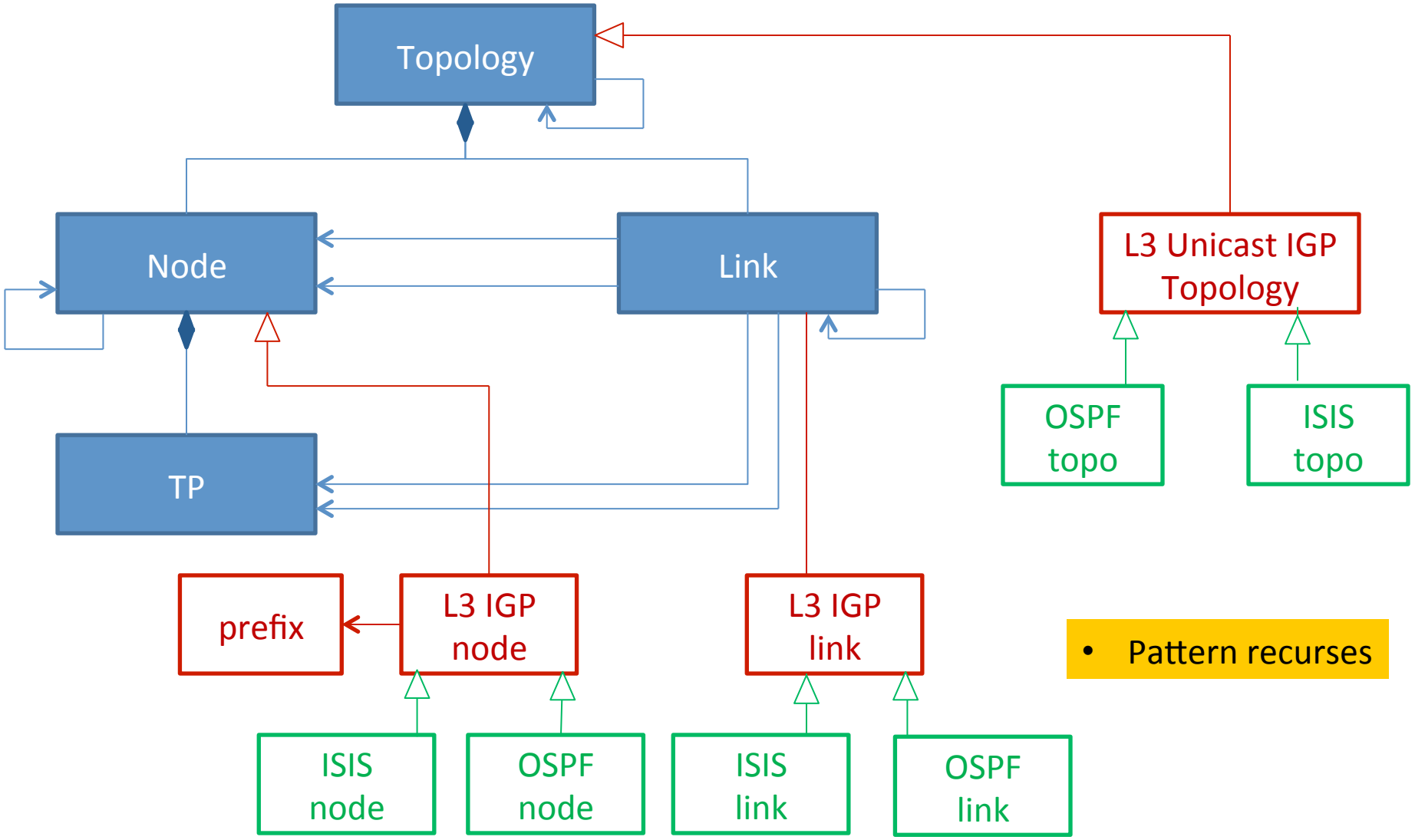
Recap: Data model structure (contd.)



Information model extensions map to modules that augment base “network topology” YANG module

- Derive Layer 3 Unicast IGP topology object classes
- Integrity rules ensure links, nodes, topology of matching type

Recap: Data model structure (contd.)



Recap: YANG structure

```
module: network-topology
               +--rw network-topology
                  +--rw topology [topology-id]
                     +--rw topology-id          topology-id
                     +--ro server-provided?     boolean         // ro flag, to be discussed
                     +--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
```

Recap: YANG structure (contd.)

```
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
```

Open issues

- Read-write or read-only
  - Mixed hierarchies conceivable, e.g. configurable overlay topology versus discovered L2/underlay
  - Alternative 1 (current option): read-write with “flag”
  - Alternative 2:
    - read-only
    - additional configuration “sand box” mirrored by main topology

Questions?