Network Topology Models
draft-ietf-i2rs-yang-network-topo-01.txt*
draft-ietf-i2rs-yang-l3-topo-00.txt^

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Updates

- New WG drafts posted
- draft-ietf-i2rs-yang-network-topo-01.txt
  - Very minor editorial updates
  - Model unchanged
- draft-ietf-i2rs-yang-l3-topo-00.txt
  - Minor editorial updates
  - Augmentation changes to reflect earlier updates in yang-network-topo that had not been tracked (related to differentiation between network.yang – network-topology.yang)
  - All TE references have been removed (TE is handled by TEAS)

Data model architecture / alignment

draft-ietf-i2rs-yang-network-topo

Result of discussions of topology design subteam
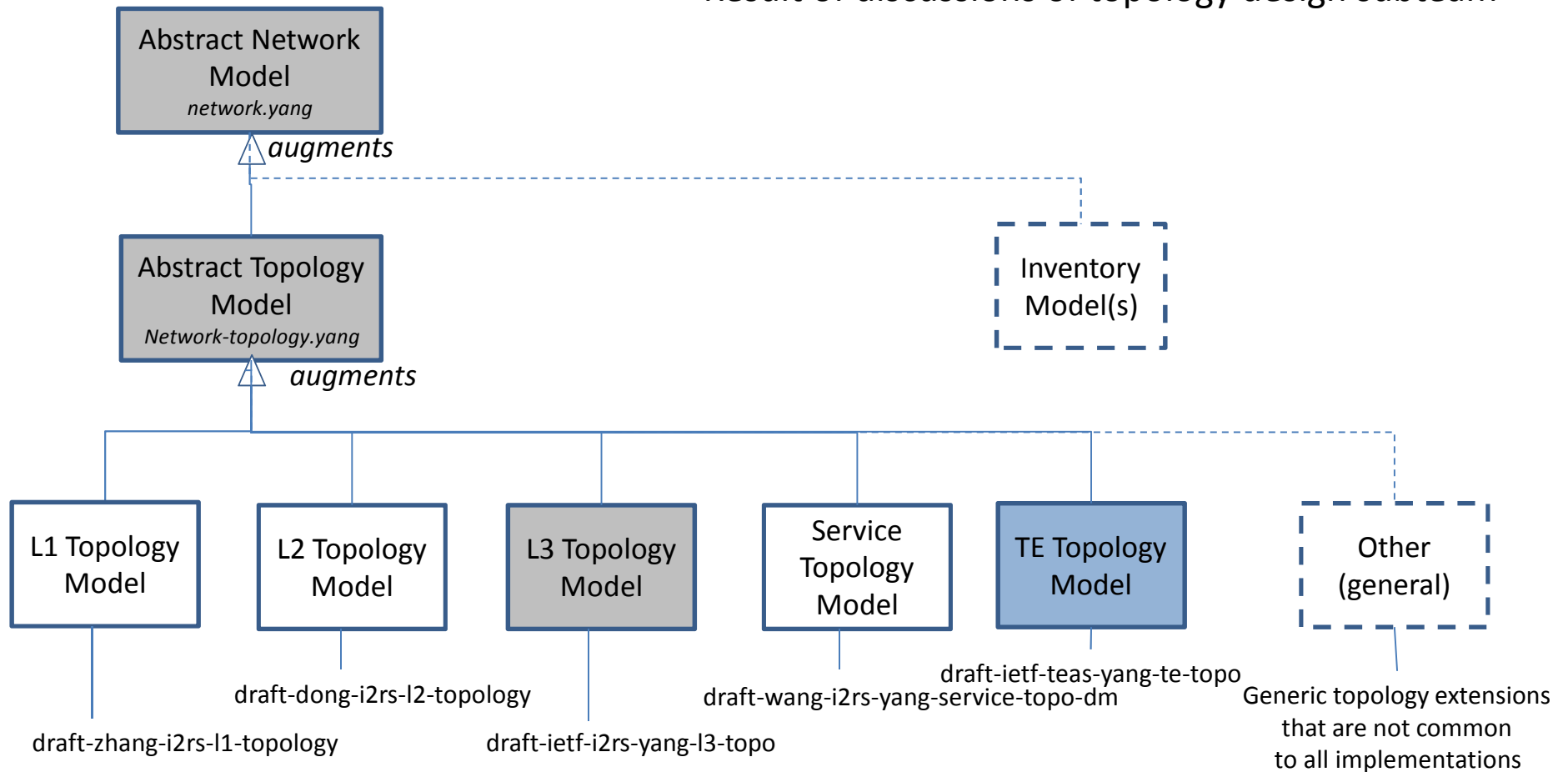
Backup (previous slides)

Purpose

- Provide YANG data models to represent topology
  - Represent horizontal and vertical layering
  - Extract commonalities between different topology types
  - Allow for easy extension, derivation of additional topology types
- Applications
  - draft-ietf-i2rs-architecture-09 (Topology Management, section 5.1)
  - Data nodes capture and reconcile their understanding of network topology, propagate topology info
  - Network controllers represent controller network topology
- Changes since -02
  - Minor model updates
    - Split between "network" (with node inventory) and "network-topology" (adding links + termination points)
  - Minor editorial updates
    - Section on how to extend and "use" the model
    - Section on how to represent the same device in multiple networks
    - Other minor updates

Horizontal and vertical layering

Data model structure

Topology

Node

Link

TP
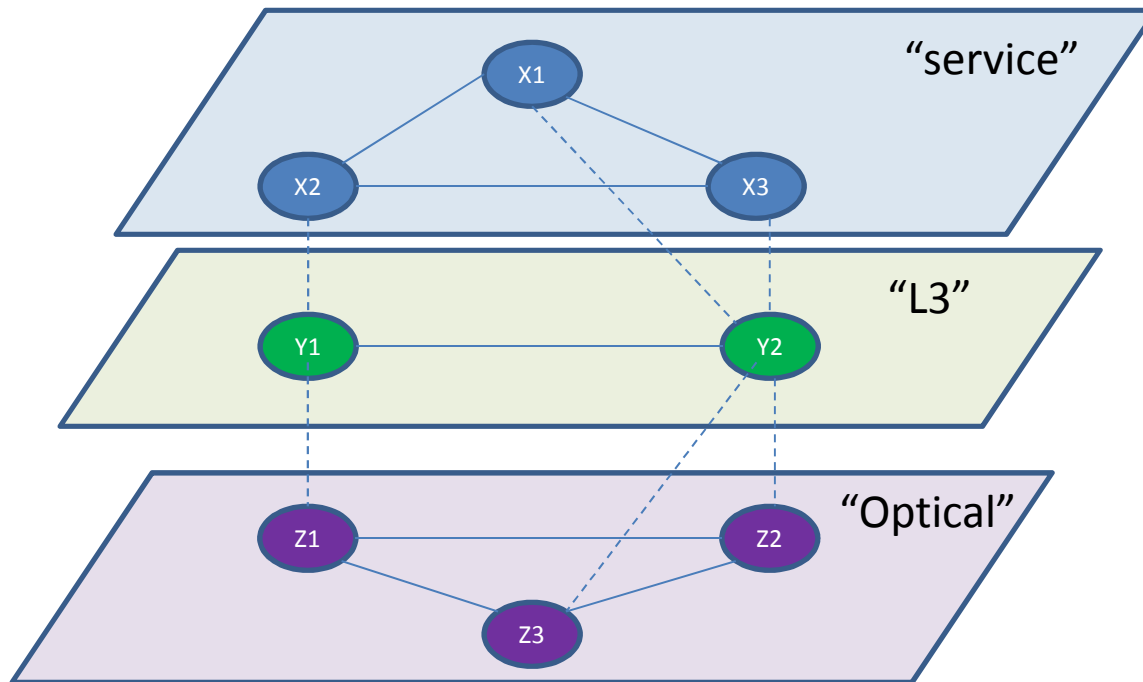
Information model underlying
base "network topology" YANG module
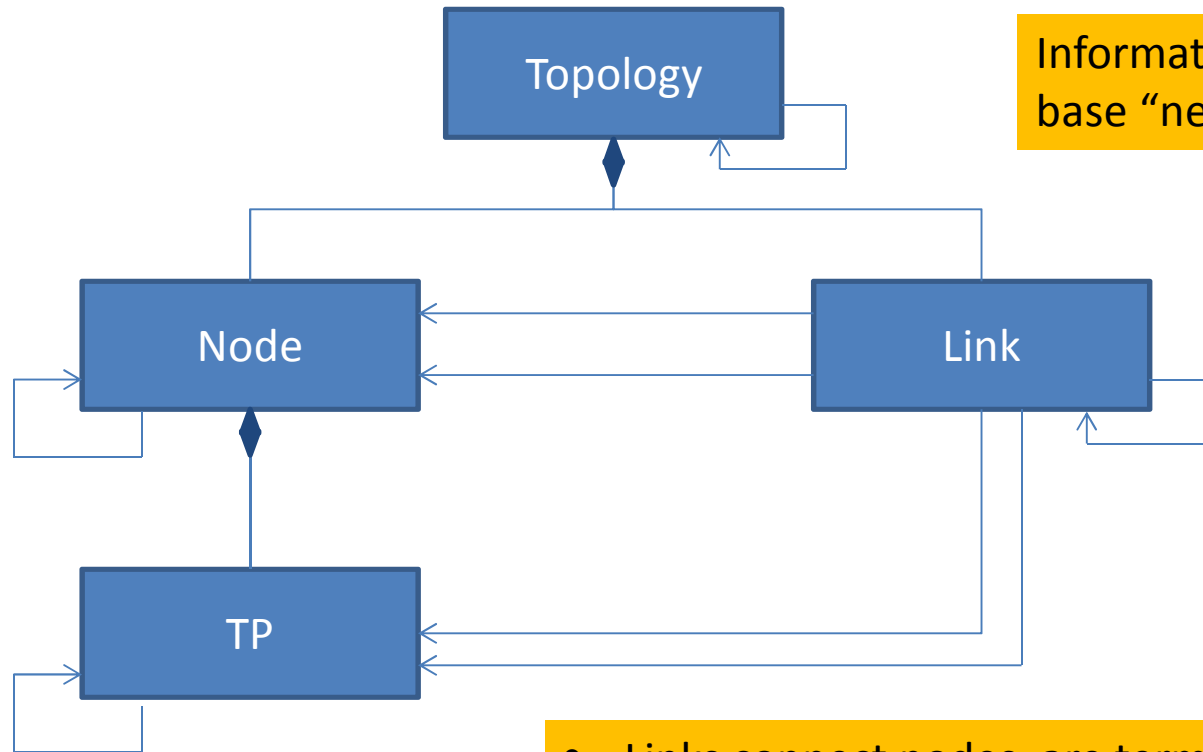
- Links connect nodes, are terminated by termination points
- Topologies can refer to underlay topologies
- Links can refer to underlay links
- Nodes can refer to underlay nodes
- Unidirectional, point-to-point links
  represent non-ptp through hierarchies of nodes, links

```
module: network
    +--rw network* [network-id]
        +--rw network-id              network-id
        +--ro server-provided?        boolean
        +--rw network-types
        +--rw supporting-network* [network-ref]
        |   +--rw network-ref     leafref
        +--rw node* [node-id]
        |   +--rw node-id                      node-id
        |   +--rw supporting-node* [network-ref node-ref]
        |   |   +--rw network-ref     leafref
        |   |   +--rw node-ref        leafref
        |   +--rw lnk:termination-point* [tp-id]
        |       +--rw lnk:tp-id                        tp-id
        |       +--rw lnk:supporting-termination-point*
        |                       [network-ref node-ref tp-ref]
        |           +--rw lnk:network-ref     leafref
        |           +--rw lnk:node-ref        leafref
        |           +--rw lnk:tp-ref          leafref
        +--rw lnk:link* [link-id]
            +--rw lnk:link-id              link-id
            +--rw lnk:source
            |   +--rw lnk:source-node     leafref
            |   +--rw lnk:source-tp?      leafref
            +--rw lnk:destination
            |   +--rw lnk:dest-node     leafref
            |   +--rw lnk:dest-tp?      leafref
            +--rw lnk:supporting-link* [network-ref link-ref]
                +--rw lnk:network-ref     leafref
                +--rw lnk:link-ref        leafref
```
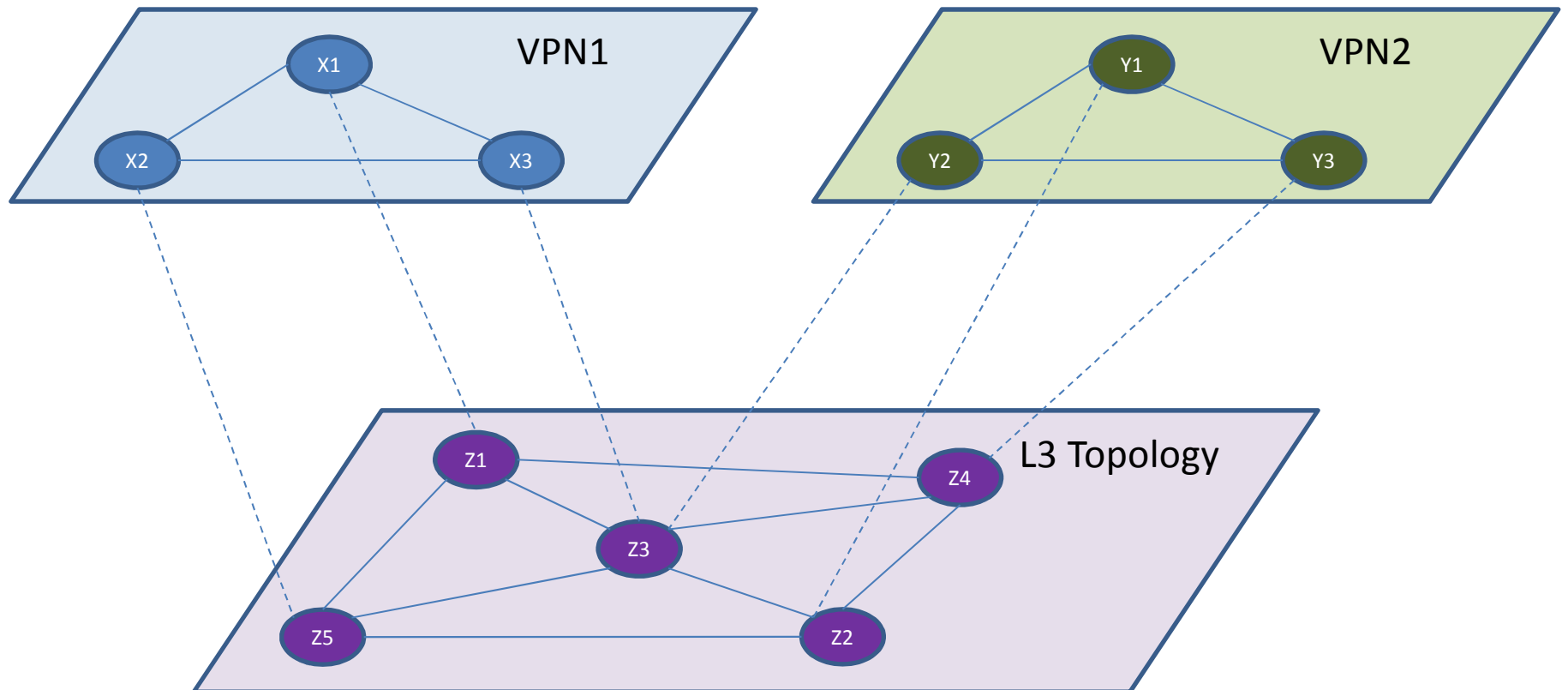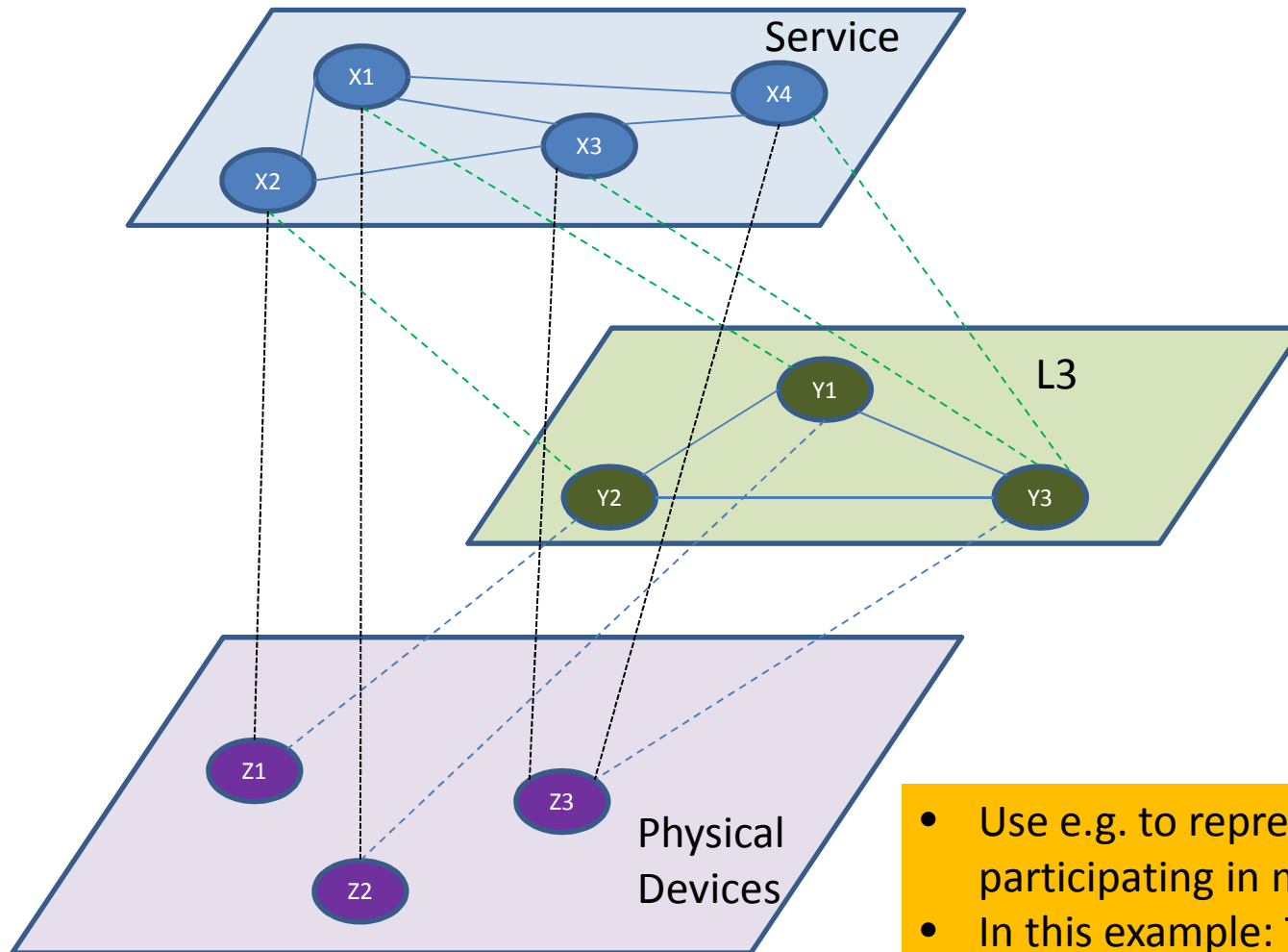
network.yang

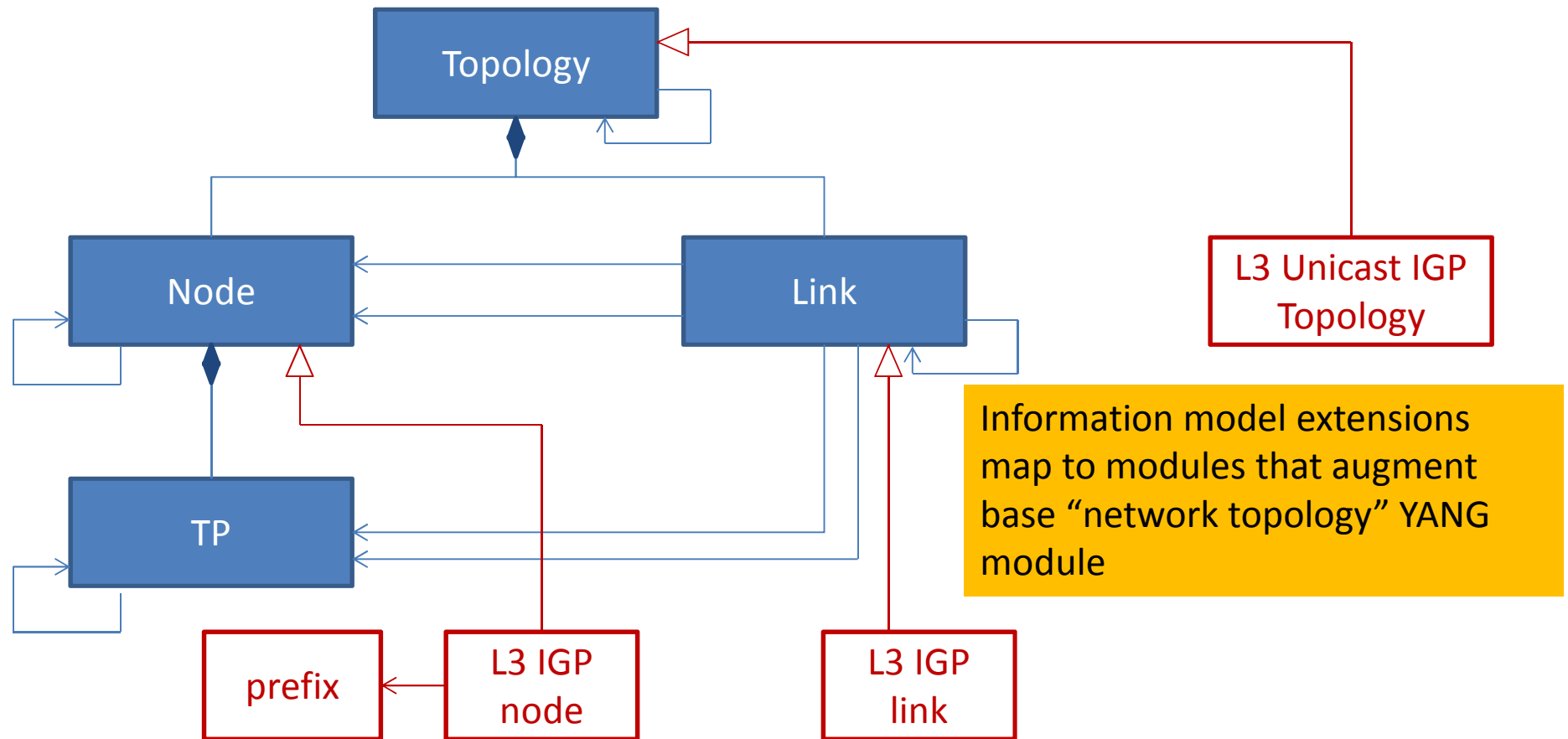network-topology.yang

Topology hierarchies
Multiple overlays

Topology hierarchies
Multiple underlays

Service

L3

Physical Devices

- Use e.g. to represent same devices participating in multiple topologies
- In this example: TPs can analogously refer to interfaces/ports at the physical layer
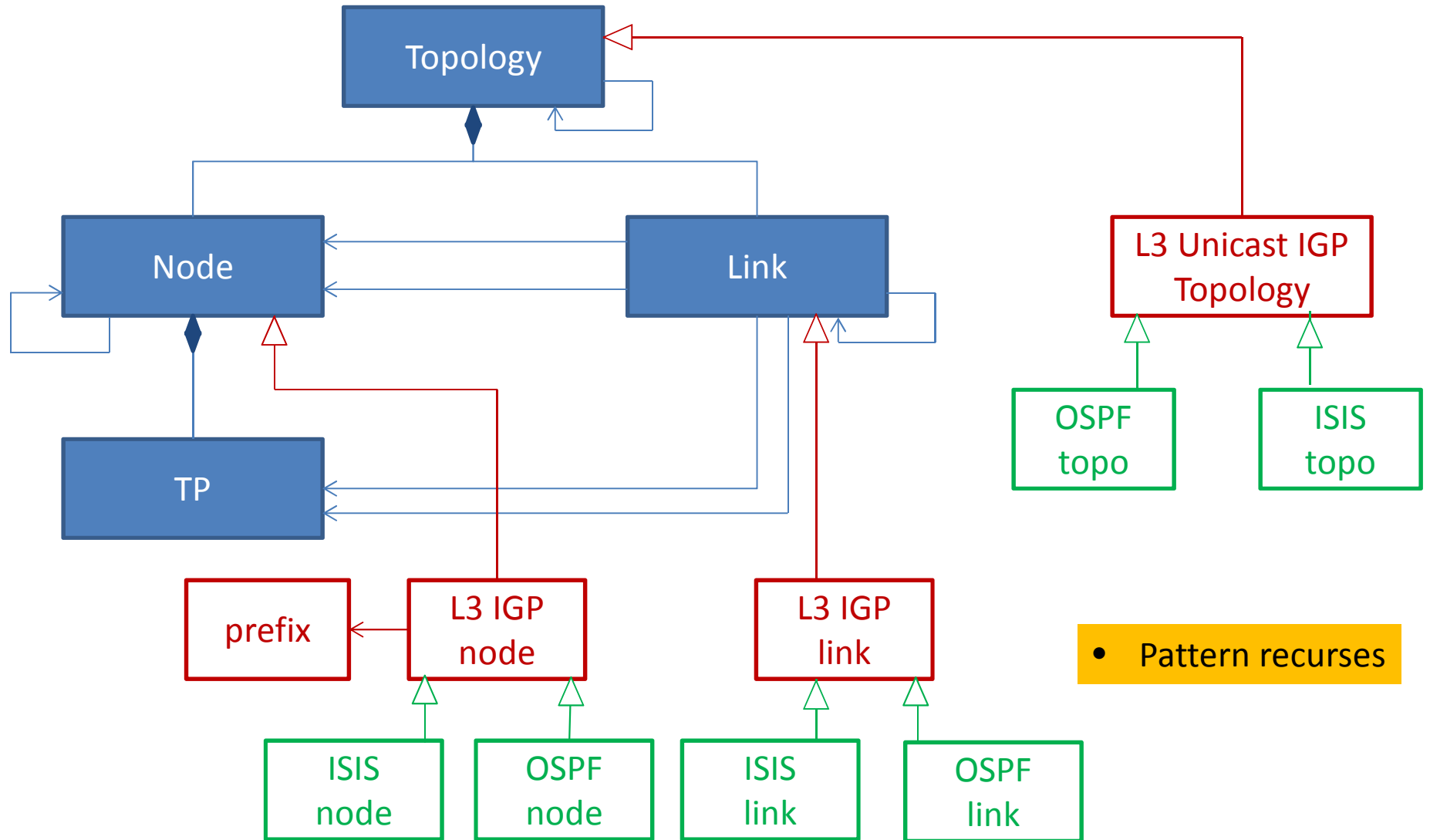
Extending the model – e.g. L3

Topology

Node

Link

TP

prefix

L3 Unicast IGP Topology

L3 IGP node

L3 IGP link

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

Extending the model – e.g. L3 (contd.)

- Pattern recurses

```
module: l3-unicast-igp-topology
   augment /nw:network/nw:network-types:
      +--rw l3-unicast-igp-topology!
   augment /nw:network:
      +--rw igp-topology-attributes
         +--rw name?    string
         +--rw flag*    flag-type
   augment /nw:network/nw:node:
      +--rw igp-node-attributes
         +--rw name?         inet:domain-name
         +--rw flag*         flag-type
         +--rw router-id*    inet:ip-address
         +--rw prefix* [prefix]
            +--rw prefix     inet:ip-prefix
            +--rw metric?    uint32
            +--rw flag*      flag-type
   augment /nw:network/nt:link:
      +--rw igp-link-attributes
         +--rw name?     string
         +--rw flag*     flag-type
         +--rw metric?    uint32
   augment /nw:network/nw:node/nt:termination-point:
      +--rw igp-termination-point-attributes
         +--rw (termination-point-type)?
            +--:(ip)
            |  +--rw ip-address*        inet:ip-address
            +--:(unnumbered)
               +--rw unnumbered-id?    uint32
```

Note: L3 model draft needs to be updated shortly to reflect generic model updates