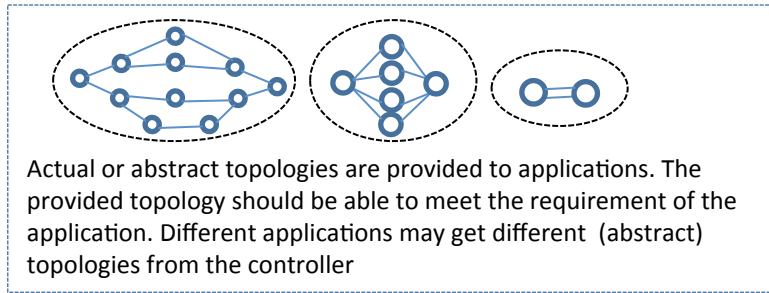


SUPA/YMCA (Yang Models for Configuration and topology Abstraction)

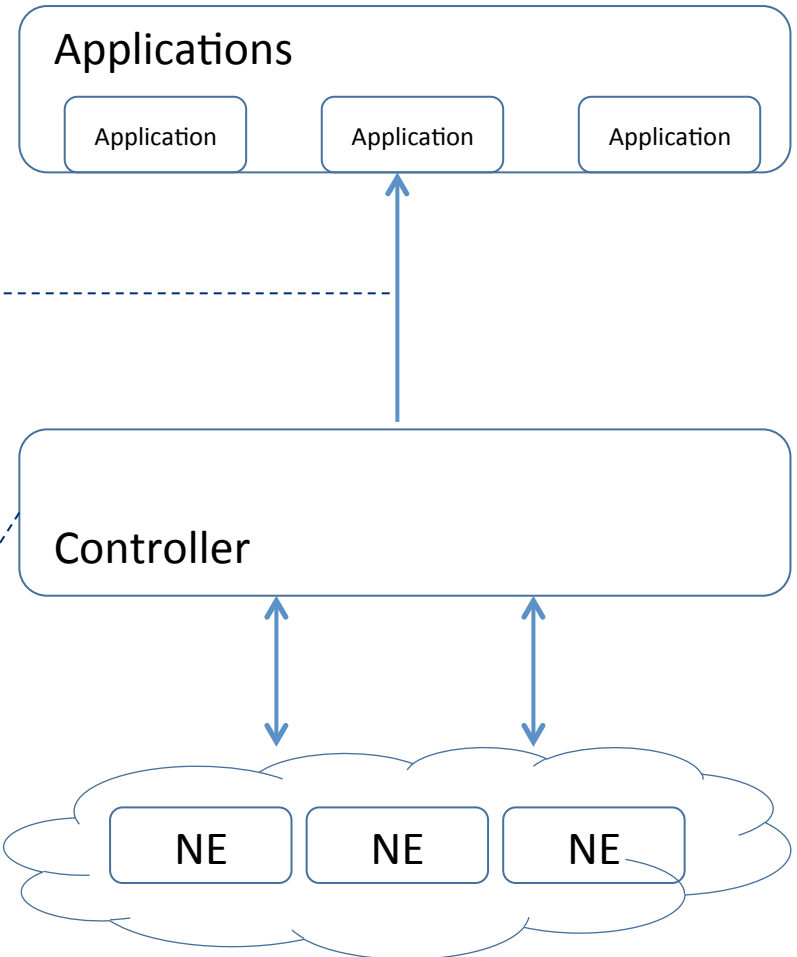
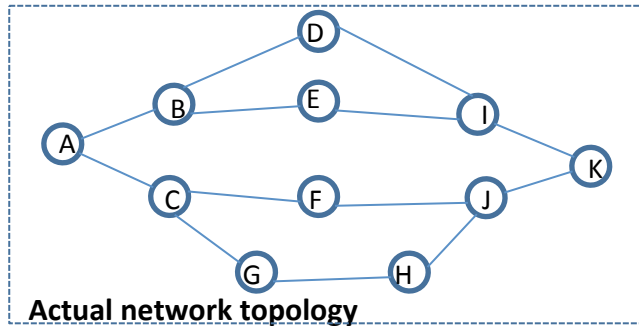
SUPA/YMCA

- Problem statement
- Architecture
- Three milestones
 - Topology: A Yang model of the unified network topology abstraction
 - Configuration: Define some service configuration model
 - Mapping: Describe how to map the service into device configuration using the topology model
- Use cases
 - DDC: Distributed data center applications
 - VPN: L3 VPN applications

Topology provided to applications



↑ abstraction



Network Topology Abstraction

- An unified topology model at multiple levels
- Information model
 - Hierarchy of the topology information
 - Different topology types
- Data model
 - Topology at different level

Information model

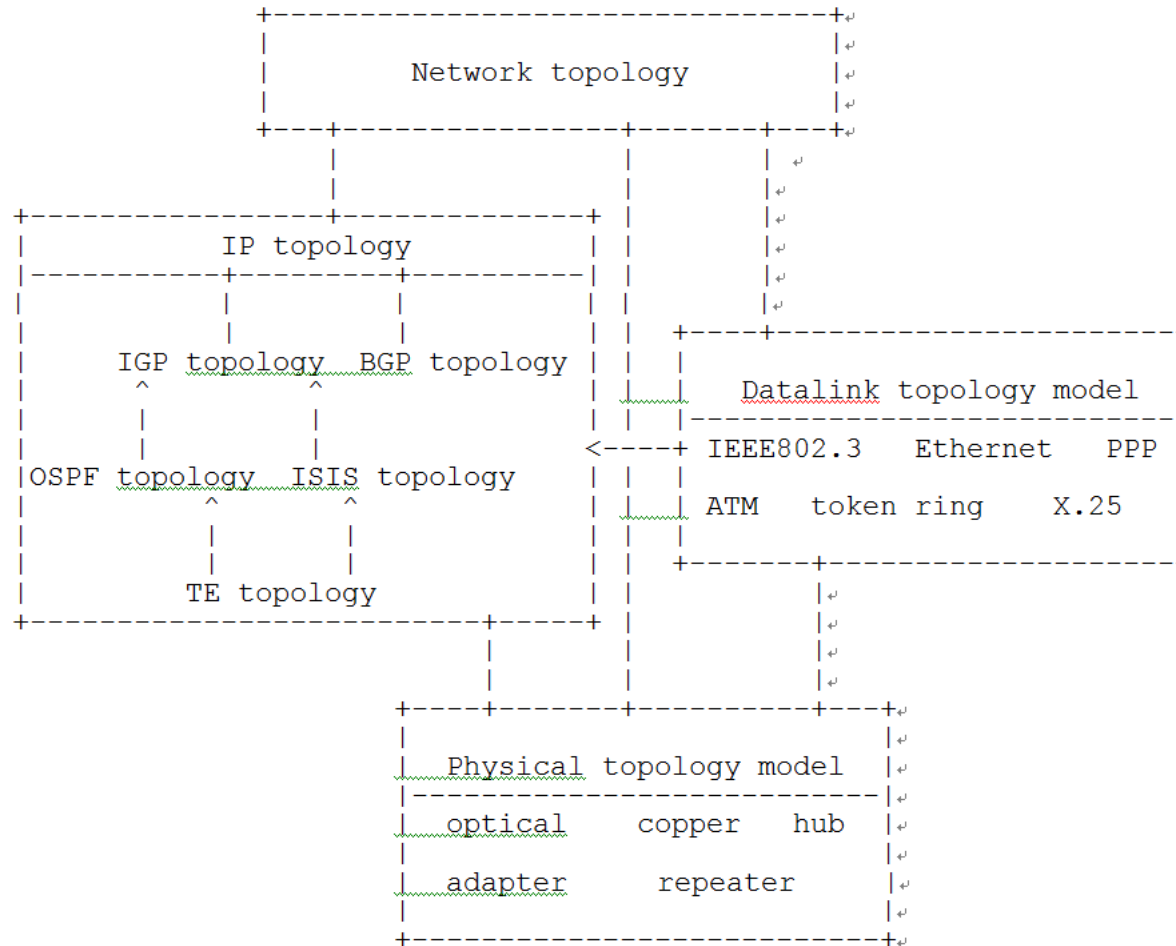


Figure 2 Topology information model structure

Information model

- Physical topology: This type of topology consists of physical devices and the transmission medium among them.
- Data-link topology: This type of topology focuses on network elements that are visible with the help of different data-link protocols and their characteristics.
- Network topology: This type of topology emphasizes network elements and connections that can be discovered by protocols in network stack.

Data model

- A Yang data model for multiple layers.

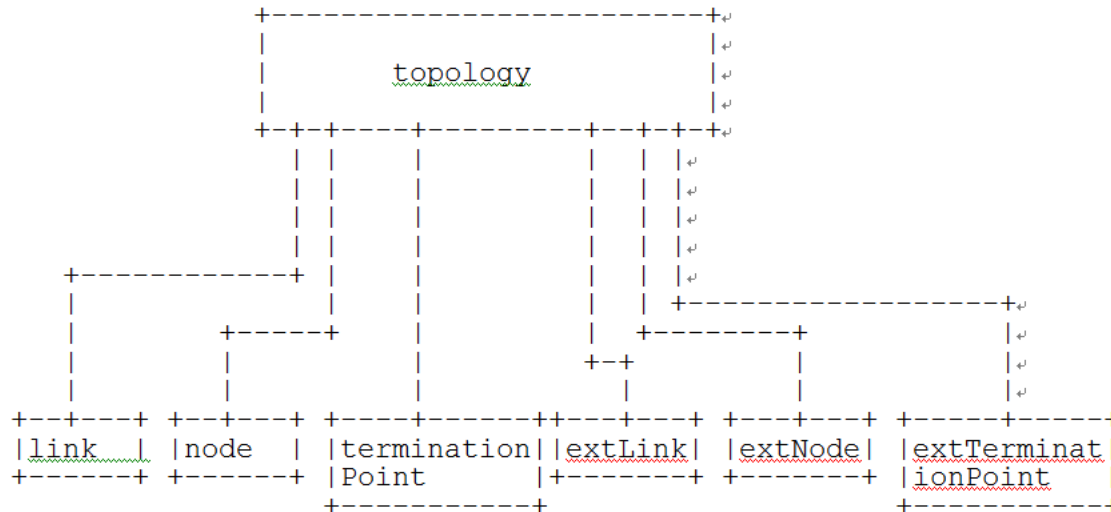


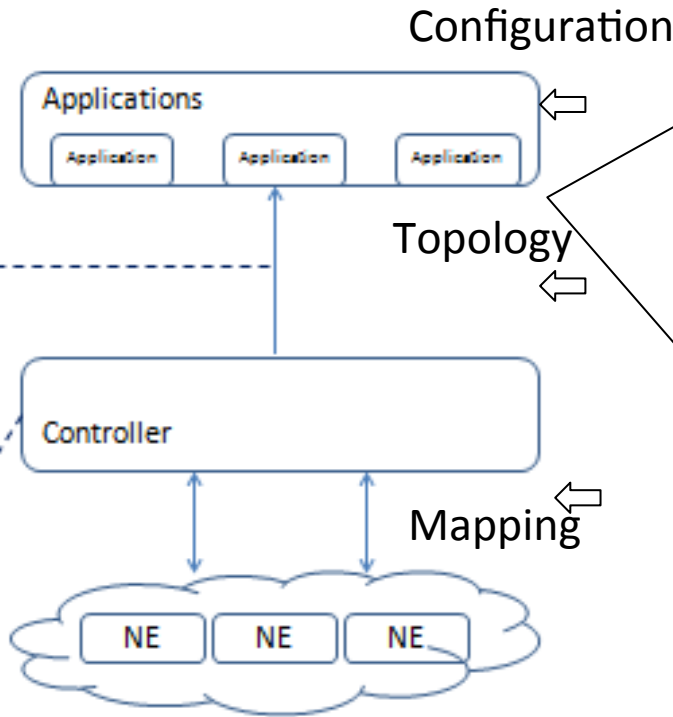
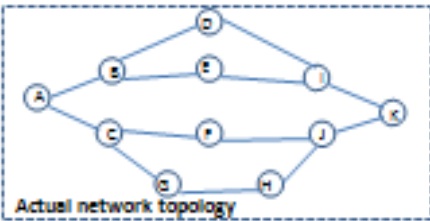
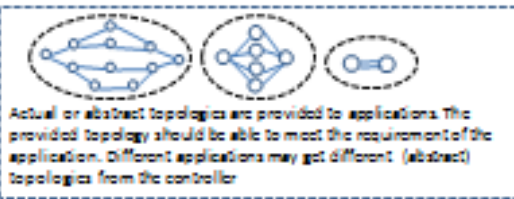
Figure 3 Topology information model structure

Data model

- A network at any layer can contain multiple topologies.
- Topology: Usually a topology may contain different nodes, links and termination points. A network can be represented by several different topologies which may be organized into hierarchical manners.
- Node: A node represent one network entity either physical or logical. According to the controller scope that the nodes belong to, they can be referred as (internal) nodes or external nodes respectively.
- Link: A link is a demonstration of the point-to-point connectivity between two nodes. Similarly as nodes, links can be subcategorized into (internal) links or external links according to their controller scope.
- Termination point: A termination point is used to describe the attachment relationship between a node and one of its links. One node may contain multiple termination points but one termination point only associates one link to the node.

Topology data model

Topology provided to applications



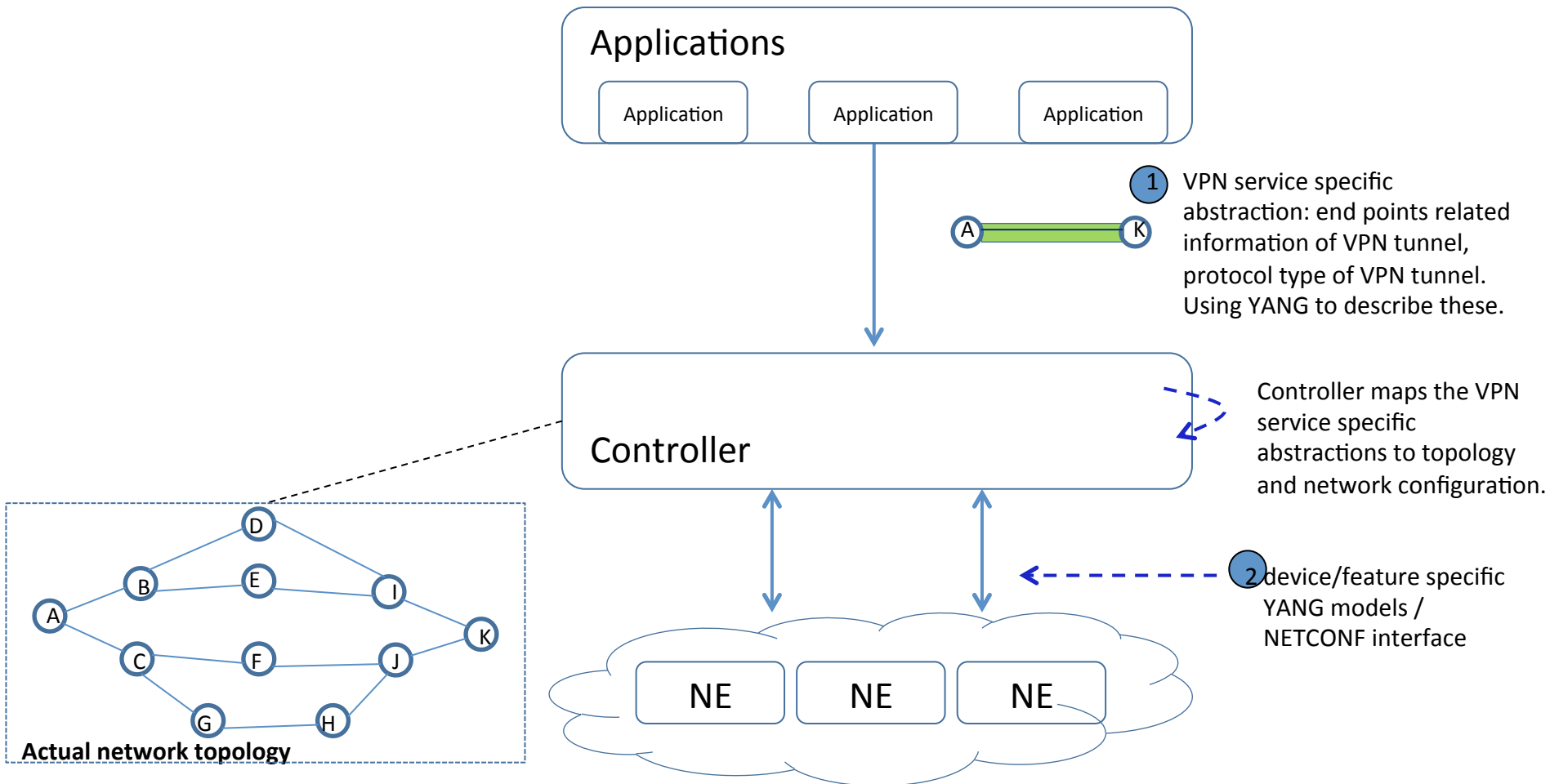
```

+--rw topologies*
|   +--rw topology* [topoId]
|   |   +--rw topoId      string
|   |   +--rw topoName?  string
|   |   +--rw layer      enumeration
|   +--rw nodes*
|   |   +--rw node* [nodeId]
|   |   |   +--rw nodeId      string
|   |   |   +--rw nodeName?  string
|   |   |   +--rw nodeType?  enumeration
|   |   |   +--rw parentTopoID? string
|   +--rw extnodes*
|   |   +--rw extnode* [nodeId]
|   |   |   +--rw nodeId      string
|   |   |   +--rw nodeName?  string
|   |   |   +--rw nodeType?  enumeration
|   |   |   +--rw parentTopoID? string
|   +--rw terminationpoints*
|   |   +--rw terminationpoint* [tpId]
|   |   |   +--rw tpId      string
|   |   |   +--rw tpName?  string
|   |   |   +--rw nodeId?  string
|   +--rw extterminationpoints*
|   |   +--rw extterminationpoint* [tpId]
|   |   |   +--rw tpId      string
|   |   |   +--rw tpName?  string
|   |   |   +--rw nodeId?  string
|   |   |   +--rw parentTopoID? string
|   +--rw links*
|   |   +--rw link* [linkId]
|   |   |   +--rw linkId      string
|   |   |   +--rw linkName?  string
|   |   |   +--rw linkType?  enumeration
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|   |   |   +--rw sourceTpId  string
|   |   |   +--rw destinationNodeId string
|   |   |   +--rw destinationTpId string
|   |   |   +--rw parentTopoID? string
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|   |   |   +--rw linkName?  string
|   |   |   +--rw linkType?  enumeration
|   |   |   +--rw sourceNodeId string
|   |   |   +--rw sourceTpId  string
|   |   |   +--rw destinationNodeId string
|   |   |   +--rw destinationTpId string

```

SUPA/YMCA architecture

How to use topology model: service configuration-VPN service



① The attributes including: Local and remote interface (IP and name), protocol type, etc.

② The configurations of NEs for implementing the VPN in the network.

Thank you!