A Network Inventory Topology Model
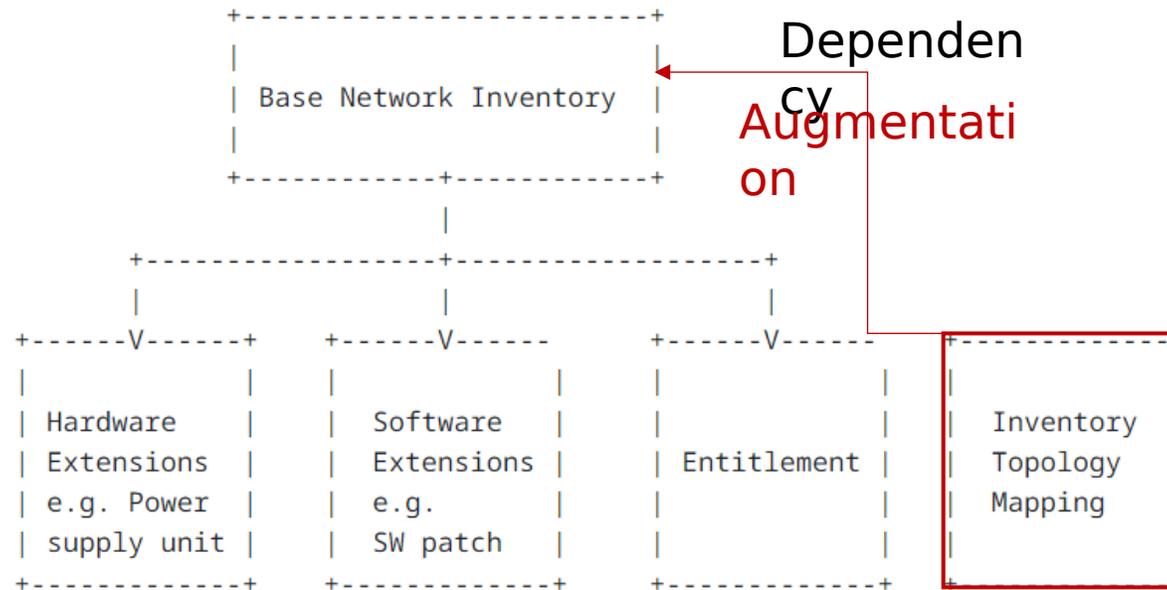
draft-ietf-ivy-network-inventory-topology

IVY WG, IETF#122
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I E T F

IETF#122 : Refreshing the Context

```
+-------------------------+
|                         |
| Base Network Inventory  |  <----- Dependency
|                         |            Augmentation
|                         |
+-----------+-------------+
            |
  +---------+-----------------+-----------------+
  |                    |                |
+------V------+   +------V------   +------V------   +-------------+
|             |   |             |  |             |  |             |
| Hardware    |   | Software    |  |             |  | Inventory   |
| Extensions  |   | Extensions  |  | Entitlement |  | Topology    |
| e.g. Power  |   | e.g.        |  |             |  | Mapping     |
| supply unit |   | SW patch    |  |             |  |             |
+-------------+   +-------------+  +-------------+  +-------------+
```

From draft-ietf-ivy-network-inventory-yang

draft-ietf-ivy-network-inventory-topology was adopted after IETF 120, providing navigation between inventory and topology based on RFC 8345 network model for **network operations**, e.g., port resource availability (Service Attachment Points (SAPs)).

Open issues:
https://github.com/ietf-ivy-wg/network-inventory-topology/issues

Inventory Topology Modelling

- **01 & 02 Updates summary**: Augment **RFC 8345** and the **base inventory model** by two **navigate features** to establishing 1:1 mapping reference with NEs and port components in the inventory, and vice versa. the design allows to operators/implementers to adapt navigation direction per their local needs (by means of features). The design provides the **minimum required navigation** from/to inventory/topology. Specifically, inter-layer navigation are handled natively by topology models.

- Thanks for good discussion from Italo, Oscar, Olga, Sergio, Nigel and all

OLD YANG Tree

```
module: ietf-network-inventory-topology

  augment /nw:networks/nw:network/nw:network-types:
    +--rw network-inventory-mapping!        --① Removed (no new
network type)
  augment /nw:networks/nw:network/nw:node:
    +--rw inventory-mapping-attributes
       +--rw node-name?             String --②Removed
       +--ro ne-ref?                ne-ref
       +--rw system-mount-point         --②Removed

  augment /nw:networks/nw:network/nt:link:
    +--rw inventory-mapping-attributes
       +--rw link-name?    String        --②Removed
       +--ro cable-name?   string
       +--ro link-type?    String

  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +--rw inventory-mapping-attributes
       +--ro tp-name?               String    --②Removed
       +--ro port-component-ref?    leafref
       +--rw interface-name*        string --
       +--rw system-mount-point !           --②Removed
```

New YANG structure

```
module: ietf-network-inventory-topology
  augment /nw:networks/nw:network/nw:node:
    +--rw inventory-mapping-attributes
          {topology-to-inventory-navigate}?     -- ① Feature 1
       +--ro ne-ref?    nwi:ne-ref

  augment /nw:networks/nw:network/nt:link:
    +--rw inventory-mapping-attributes
          {topology-to-inventory-navigate}?     -- ① Feature 1
       +--ro cable-name?   string
       +--ro link-type?    String

  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +--rw inventory-mapping-attributes
          {topology-to-inventory-navigate}?     -- ① Feature 1
       +--rw ne-ref?                    nwi:ne-ref
       +--rw port-ref?                  leafref
       +--ro physical-interface-name?   String

  augment /nwi:network-inventory/nwi:network-element②Base inventory extensio
          /nwi:network-element:
    +--rw node-ref?        leafref {inventory-to-topology-navigate}?-- ① Feature 2
    +--rw network-ref?    -> /nw:networks/network/network-id
          {inventory-to-topology-navigate}?
```

#15 Need to associate a link with a cable

- **Italo: If TP-A is associated with port-X and TP-B is associated with port-Y, do we really need another leafref to know/understand that the link between TP-A and TP-B is associated with the fiber cable between port-X and port-Y?**

```
augment /nw:networks/nw:network/nt:link:
    +--rw inventory-mapping-attributes
            {topology-to-inventory-navigate}?
      +--ro cable-name?   string
      +--ro link-type?    String
```
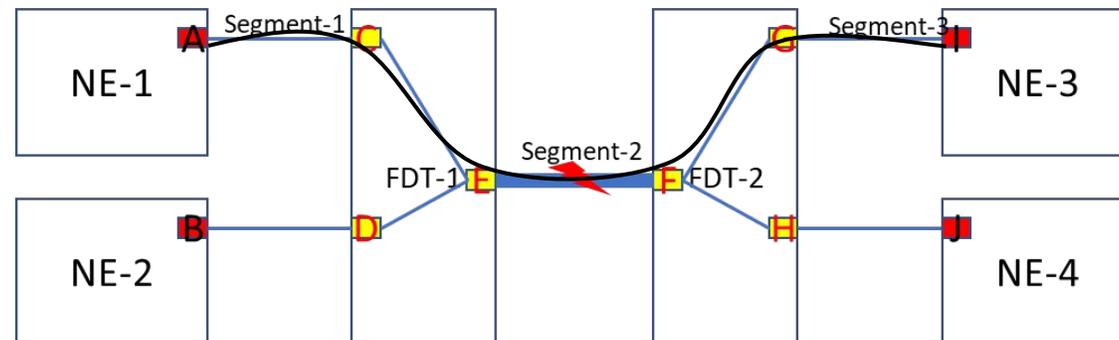
Cable 1: A-Z cable -> direct connect

Cable-name: Applicable to direct connect, e.g.NE-1 direct link to NE-2, not straightforward to the case including FDT

Link-type: Fiber, Cable, Microwave

Proposal: Remove "Cable-name", and draft-ygb-ivy-passive-network-inventory could define "inventory-topology" extensions if necessary

Cable 2 : A-I Cable (one fiber) -> Supported by the Link between the ports A and I

#16 Navigate from topology to interface model?

"interface-name": To achieve **globally unique interface identification** across the management domain, device local interface-name could be combined with device identifiers (e.g., device hostname). For example, interfaces with the same name like "GigabitEthernet0/0/1" on Device A and Device B may cause confusion.

draft-ietf-ccamp-if-ref-topo-yang-01
Augments Traffic Engineering (TE) Topologies (RFC8795)

```
module: ietf-tp-interface-reference-topology

augment
/nw:networks/nw:network/nw:node/
nt:termination-point/
tet:te:
   +--rw tp-to-interface-path?   ->
/if:interfaces/interface/name
```

This model augments Network Topologies (RFC8345)

```
augment
/nw:networks/nw:network/nw:node/nt:termination-point:
    +--rw inventory-mapping-attributes
            {topology-to-inventory-navigate}?
       +--rw ne-ref?                      nwi:ne-ref
       +--rw port-ref?                    leafref
       +--ro physical-interface-name?     String
```

e.g.Layer 3 Topologies Rfc8346

```
augment
/nw:networks/nw:network/nw:node/nt:termination-
point:
       +--rw l3-termination-point-attributes
          +--rw (termination-point-type)?
             +--:(ip)
             |   +--rw ip-address*  inet:ip-address
             +--:(unnumbered)
             |   +--rw unnumbered-id?     uint32
             +--:(interface-name)
                +--rw interface-name?   String
…
```

Layer 2 Topologies (RFC 8944)

```
augment
/nw:networks/nw:network/nw:node/nt:termination-
point:
       +--rw l2-termination-point-attributes
             +--rw interface-name?       string
             +--rw mac-address?      yang:mac-address
…
```

Next Step

- WGLC with the base inventory document
- Welcome reviews and comments

Backup of Network Inventory Topology Model Overview

- The Network Inventory Model is designed to complement the existing topology models to provide inventory information