

A Network Inventory Topology Model

[draft-ietf-ivy-network-inventory-topology](#)

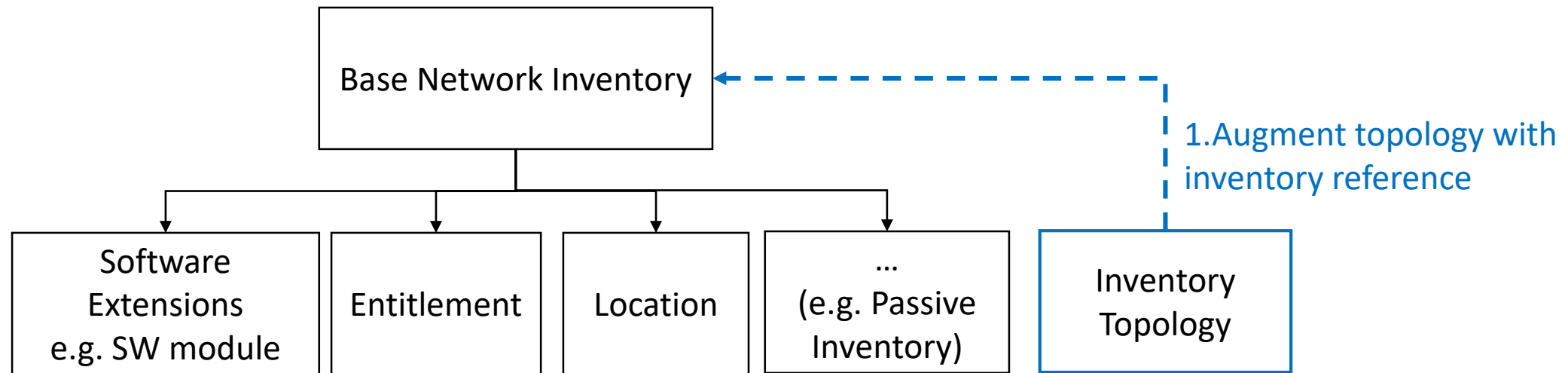
IVY WG, IETF#125

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IETF#125 : Refreshing the Context



draft-ietf-ivy-network-inventory-topology provides **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>

Summary of Key Changes -06

Issues identified:

1. **Read-Only → Configurable Attributes**
 - Support manual configuration for non-discoverable resources (e.g. CE-PE interface , leased lines)
2. **Add section "Operational Considerations"**

Open issues:

1. **#14 Remove Reverse Navigation (Inventory-to-Topology)**
 - Focus on core topology-to-inventory use case
2. **#15 Remove "cable-name" Leaf**
 - Eliminate overlap with passive inventory model

Inventory Topology Modelling

- Thanks for comments from Italo, Oscar, Aihua, Olga
- **The design provides the minimum required navigation from topology to inventory**

OLD YANG Tree

```
module: ietf-network-inventory-topology
  augment /nw:networks/nw:network/nw:node:
    +--ro inventory-mapping-attributes
      {topology-to-inventory-navigate}?
    +--ro ne-ref? nwi:ne-ref
  augment /nw:networks/nw:network/nt:link:
    +--ro inventory-mapping-attributes
      {topology-to-inventory-navigate}?
    +--ro cable-name? string
    +--ro link-type? string
  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +--ro inventory-mapping-attributes
      {topology-to-inventory-navigate}?
    +--ro ne-ref? nwi:ne-ref
    +--ro port-ref? leafref
    +--ro port-breakout!
      +--ro breakout-channel* [channel-id]
      +--ro channel-id uint16
```

② Remove cable-name

```
augment /nwi:network-inventory/nwi:network-elements
  /nwi:network-element:
  +--ro node-ref? leafref {inventory-to-topology-navigate}?
  +--ro network-ref? -> /nw:networks/network/network-id
  {inventory-to-topology-navigate}?
```

③ Remove bi-directional navigation

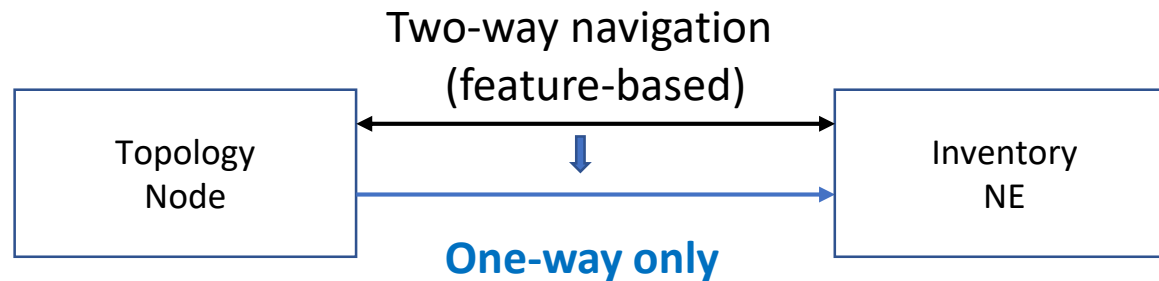
New YANG structure

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

  augment /nw:networks/nw:network/nw:node:
    +--rw inventory-mapping-attributes
    ①RW +--rw ne-ref? nwi:ne-ref
  augment /nw:networks/nw:network/nt:link:
    +--rw inventory-mapping-attributes
    +--rw link-type? string
  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +--rw inventory-mapping-attributes
    +--rw ne-ref? nwi:ne-ref
    +--rw port-ref? leafref
    +--ro port-breakout!
      +--ro breakout-channel* [channel-id]
      +--ro channel-id uint16
```

#14 bidirectional navigation between topology and inventory

- **Change:** Eliminated the augmentation to ietf-network-inventory that added node-ref and network-ref to network-element, removing inventory-to-topology navigation feature capability.
- **Rationale:** Bidirectional navigation raised deployment questions (I2T/T2I feature interoperability, inconsistent reference risk).
- **Impact:** Model is now strictly unidirectional (topology → inventory), simplifying both structure and implementation. Controllers can maintain internal indexes if reverse lookup is needed operationally.



Proposal: "This document intentionally defines **unidirectional mapping** from topology to inventory to eliminate the possibility of inconsistent bidirectional references. Reverse correlation (inventory-to-topology) is left as an implementation detail."

#15 Remove “cable-name”

- **Change:** Removed cable-name leaf from topology link augmentation. Topology layer provides lightweight media classification (link-type); detailed cable asset tracking is delegated to future passive inventory model.
- **Italo’s Question:** 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?

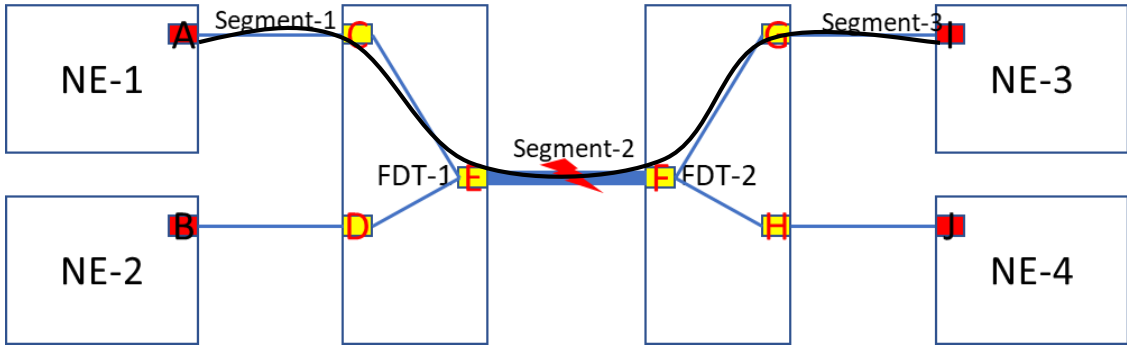
Link-type: Fiber, Cable, Microwave, Leased lines etc.

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

Proposal: Remove “Cable-name”. Passive inventory model retains cable tracking authority; topology layer provides lightweight media classification only.



Cable 1: A-Z cable -> direct connect
Cable-name is Applicable to direct connect

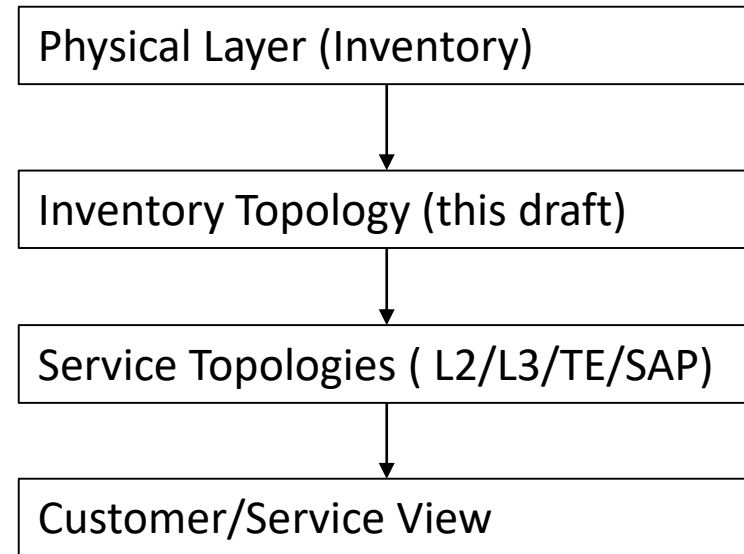


Cable 2: A-I Cable (one fiber) -> Supported by the Link between the ports A and I

#17 Nodes and NEs 1:1 Mapping?

- YANG model defines 1:1 mapping in the module description
- If we keep 1:1, what breaks? Can it be solved at a different layer?
- **Question:** What are the physical constraints that might enforce or violate 1:1 mapping?
- **Question:** Does the operational benefit of many-to-many in inventory justify the complexity, given that service topologies already handle abstraction?

Proposal: Keep 1:1 in model
Add explicit text: **"This document specifies 1:1 mapping. Many-to-many abstractions are intentionally excluded as they are handled by other layers topology models (L2/L3/TE/SAP)."**



<https://github.com/ietf-ivy-wg/network-inventory-topology/issues/17>

Next Step

- All major issues have been resolved in -06
- WGLC

Open issues

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

Inventory Topology Modelling

- 05 Updates summary:
- Thanks for good discussion from Italo, Sergio, Phil, Nigel and all
- The design provides the minimum required navigation from/to inventory/topology.

OLD YANG Tree

```

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

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

  augment /nwi:network-inventory/nwi:network-elements
    /nwi:network-element:
    +--rw node-ref?   leafref {inventory-to-topology-navigate}?
    +--rw network-ref? -> /nw:networks/network/network-id -- ① RW-> RO
       {inventory-to-topology-navigate}?
  
```

New YANG structure

```

module: ietf-network-inventory-topology
  augment /nw:networks/nw:network/nw:node:
    +--ro inventory-mapping-attributes
       {topology-to-inventory-navigate}?
    +--ro ne-ref?   nwi:ne-ref
    +--ro link-type?   string
    -- ② Minimum cable/fabric mapping

  augment /nw:networks/nw:network/nt:link:
    +--ro inventory-mapping-attributes
       {topology-to-inventory-navigate}?
    +--ro ne-ref?      nwi:ne-ref
    +--ro port-ref?   leafref
    +--ro port-breakout!
    +--ro breakout-channel* [channel-id]
    +--ro channel-id   uint16
    -- ③ Move from base inventory

  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +--ro inventory-mapping-attributes
       {topology-to-inventory-navigate}?
    +--ro ne-ref?      nwi:ne-ref
    +--ro port-ref?   leafref
    +--ro port-breakout!
    +--ro breakout-channel* [channel-id]
    +--ro channel-id   uint16

  augment /nwi:network-inventory/nwi:network-elements
    /nwi:network-element:
    +--ro node-ref?   leafref {inventory-to-topology-navigate}?
    +--ro network-ref? -> /nw:networks/network/network-id
       {inventory-to-topology-navigate}?
  
```