

A YANG Network Data Model of Network Inventory Software Extensions

[draft-wzwb-ivy-network-inventory-software](#)

IVY WG, IETF#121

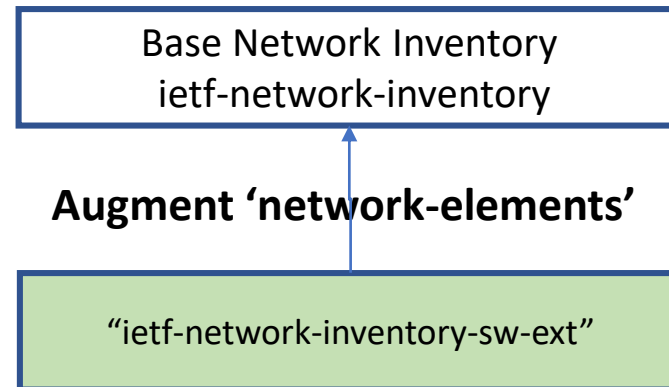
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Bo Wu (Presenting), Qin Wu, Chen Zhou, Mohamed Boucadair



Recap

- The draft was presented in IETF #118 and #120
- -03 addressed the comments received so far
 - Thanks to Prasenjit, Phil, Diego, Italo, and Aihua for all the helpful comments
- This model complements the base inventory with non-physical NE (e.g., virtual devices or network controllers) and software components (e.g., platform-os, software patches)



Overview

- **Software Network Element** and **software components** specific attributes are defined:
 - Non-physical NEs: Include software NEs, virtual NEs, and container NEs
 - Software components: Include “platform-version”, “software-patch”, “bios”, “boot-loader”, “software-module”, which are similar to the management of hardware and firmware

```
module: ietf-network-inventory-sw-ext
  augment /nwi:network-inventory/nwi:network-elements
    /nwi:network-element:
      +--ro software-ne-attributes
        +--ro current-revision?    string
        +--ro previous-revision?  string
        +--ro installation-time?   yang:date-and-time
        +--ro activation-time?    yang:date-and-time

  augment /nwi:network-inventory/nwi:network-elements
    /nwi:network-element/nwi:components/nwi:component:
      +--ro software-module-specific-info
        +--ro current-revision?    string
        +--ro previous-revision?  string
        +--ro installation-time?   yang:date-and-time
        +--ro activation-time?    yang:date-and-time
```



```
module: ietf-network-inventory-sw-ext
  augment /nwi:network-inventory/nwi:network-elements
    /nwi:network-element:
      +--ro software-attributes
        +--ro status?              identityref
        +--ro installation-time?   yang:date-and-time
        +--ro activation-time?    yang:date-and-time

  augment /nwi:network-inventory/nwi:network-elements
    /nwi:network-
    element/nwi:components/nwi:component:
      +--ro software-module-attributes
        +--ro status?              identityref
        +--ro installation-time?   yang:date-and-time
        +--ro activation-time?    yang:date-and-time
```

1. Removed the duplicated "current-revision" to reuse "software-rev" from the base inventory


2. Added YANG node of “software-status”:
“installed/activated”

Add Non-physical NE and Software NE, Virtual NE, and Container NE

Base network inventory model defines “ne-type” of “**ne-physical**”

```
+--rw network-elements
  +--rw network-element* [ne-id]
    +--rw ne-id          string
    +--rw ne-type?      identityref
    +--rw uuid?          yang:uuid
    +--rw name?          string
    +--rw description?   string
    +--rw alias?         string
    ...
  +--rw components
    +--rw component* [component-id]
      +--rw component-id string
      +--rw uuid?        yang:uuid
      +--rw name?        string
      +--rw description? string
      +--rw alias?       string
      +--rw class         union
      ...
```

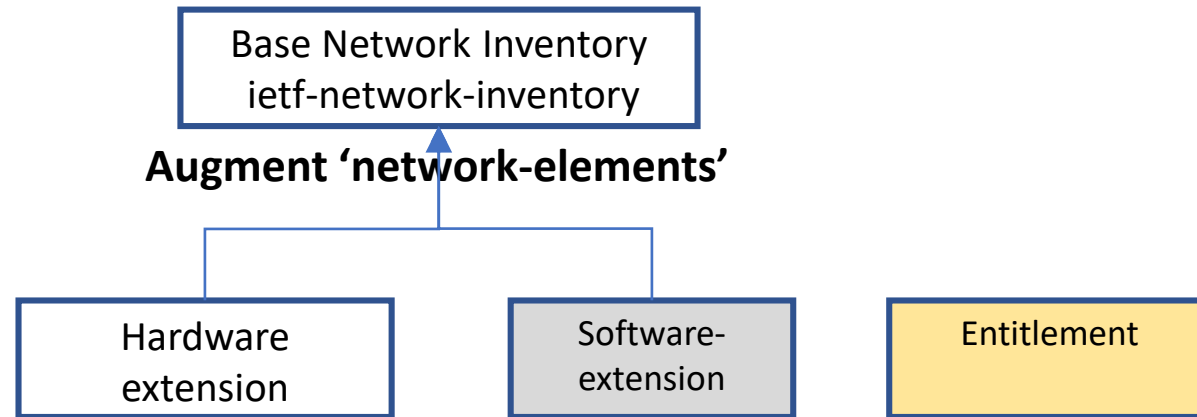
SW adds non-physical NE and distinguish software NE, virtual NE, and container NE



```
identity ne-nonphysical {
  base nwi:ne-type;
  description
    "A non-physical network element (NE) is a network device that
    support network protocols and functions, e.g., router,
    firewall, and controller, which can reside in any network or
    compute devices, such as a server in Data Center (DC),
    server-based virtual machine (VM), or server-based container.";
}
identity ne-software {
  base ne-nonphysical;
  description
    "A software NE refers to a a network device residing in any
    network or compute devices, such as a physical server
    (or 'bare metal') in DC. Examples of software NEs are
    network controllers.";
}
identity ne-virtual {
  base ne-nonphysical;
  description
    "A virtual NE refers to a network device residing within
    server-based Virtual Machine (VM) implementing a virtual
    network function (VNF). Examples of virtual NEs are
    virtual routers, virtual firewalls.";
}
identity ne-container {
  base ne-nonphysical;
  description
    "A container NE refers to a network device residing within
    server-based container implementing a Containerized
    network function (CNF).";
}
```

Relationship vs. Other Inventory Models

- Updated the draft to show the relationship of entitlement as a standalone model rather than augmentation of the base inventory per the comments from Italo



IVY Charter

The following activities will be used to help achieve this goal. It is expected that many of these items will not lead to the publication of RFCs, although Internet-Drafts may be used to track discussions and establish consensus:

A. Terminology and Scope: ...

B. Hardware/*Software components* including licenses: Hardware and Software component management to allow network operators to keep track of which physical/virtual devices are deployed in the network, *including software* and hardware versions as well as licenses/entitlement..

C. Physical locations: ...

D. Multi-domain and multi-layer: ...

E. *Mapping and correlation semantics: ...*

Next Steps

- Request WG adoption