

# Asset Lifecycle Management and Operations (ALMO)

draft-palmero-ivy-ps-almo-00

draft-palmero-ivy-dmalmo-00

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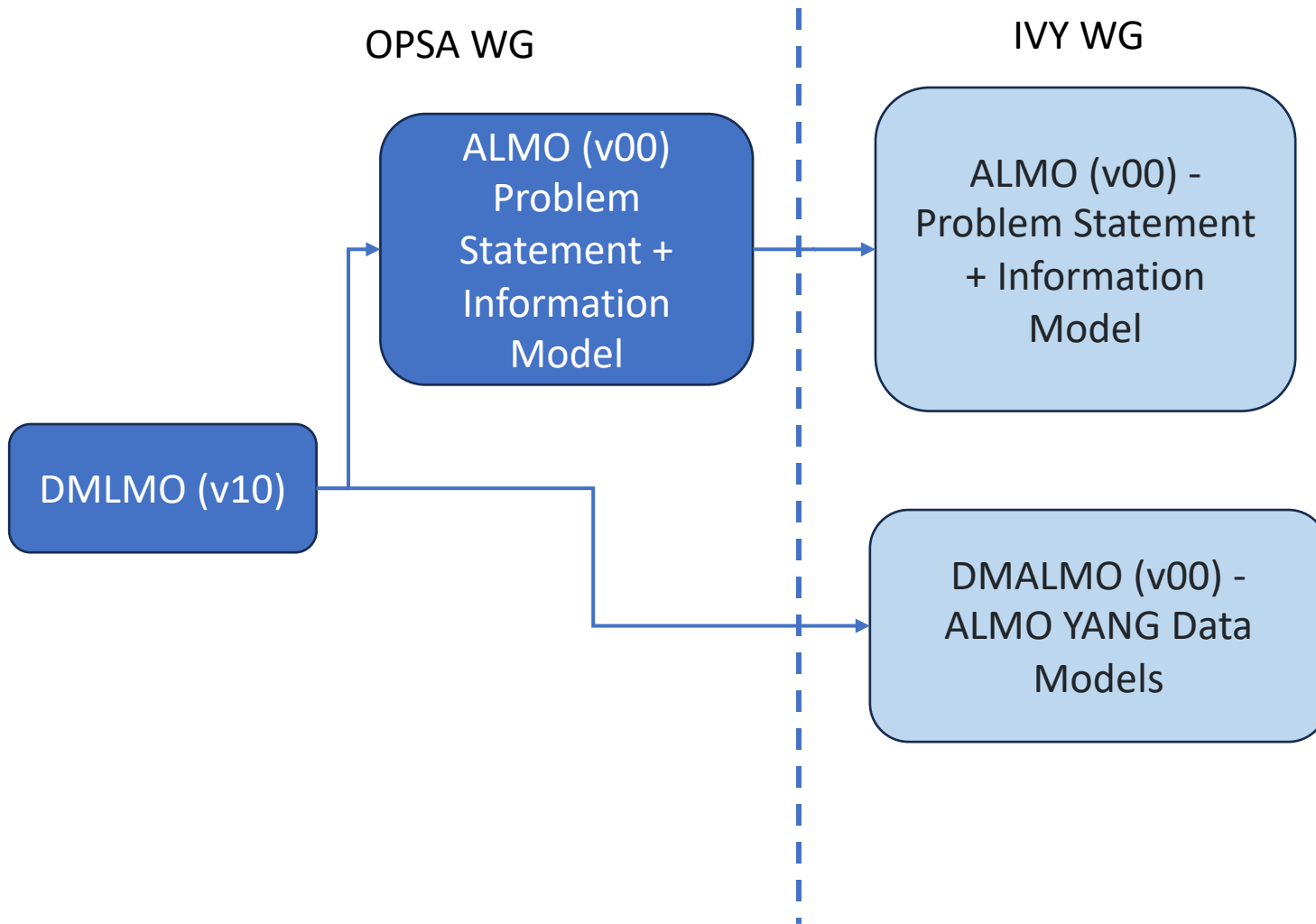
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# Restructuring the LMO Proposal – ALMO

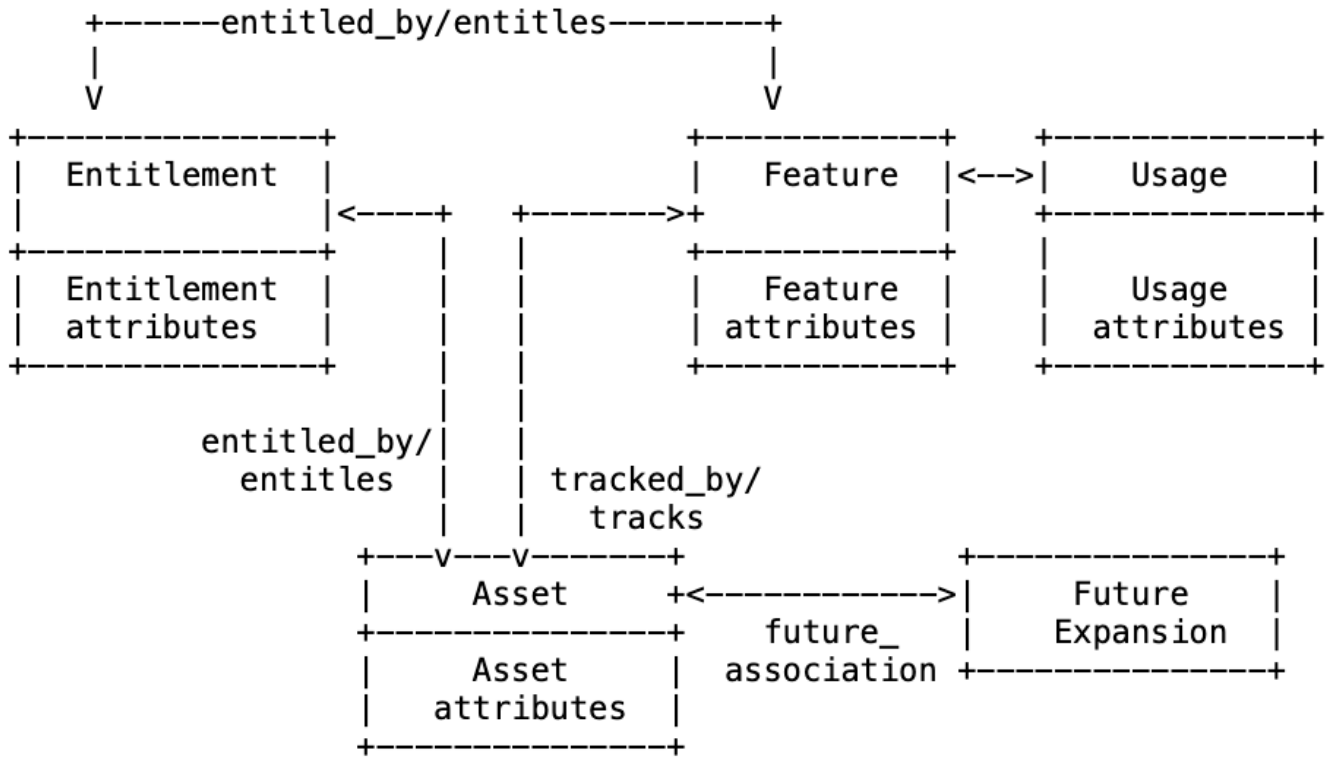


- Identified goals
- Decouple LMO concepts and specific models
- Facilitate adoption
  - Concepts
  - Models as they evolve
- Enable collaboration
  - Other WGs and programs: OPSA WG, e-impact, ...
  - Research groups: NMRG
  - Even beyond IETF

# ALMO & DMALMO in IVY

- Avoid duplication and inconsistencies
  - Inventory: what you have
  - Lifecycle: how you use it
- Common ground on essential concepts and models
  - Align terminology
  - Assets brings together the core models defined by IVY WG: software and hardware entities, including component of combination of any.
  - Entitlements
  - ...
- Identify synergies
  - The ALMO authors rely on IVY inventory models
  - Continuing being active reviewers and contributors to the WG evolution

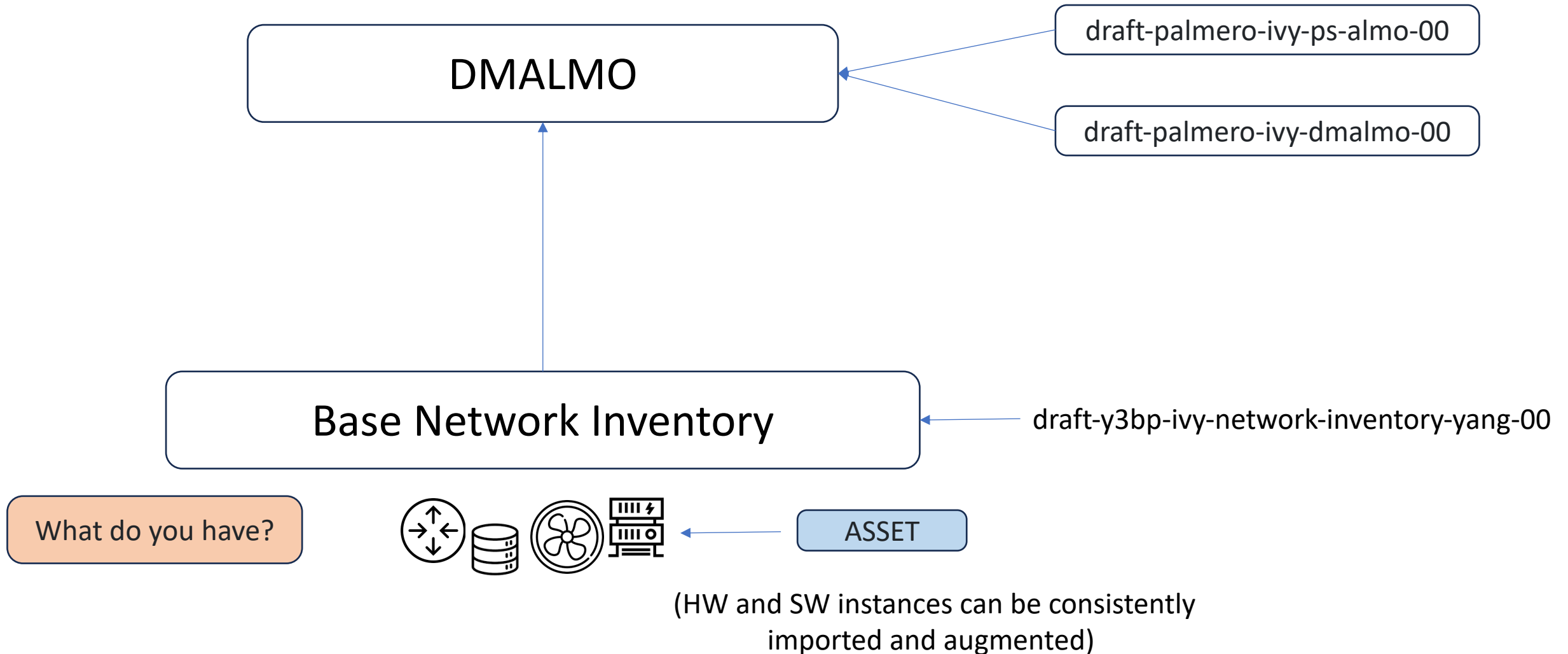
# ALMO Information Model



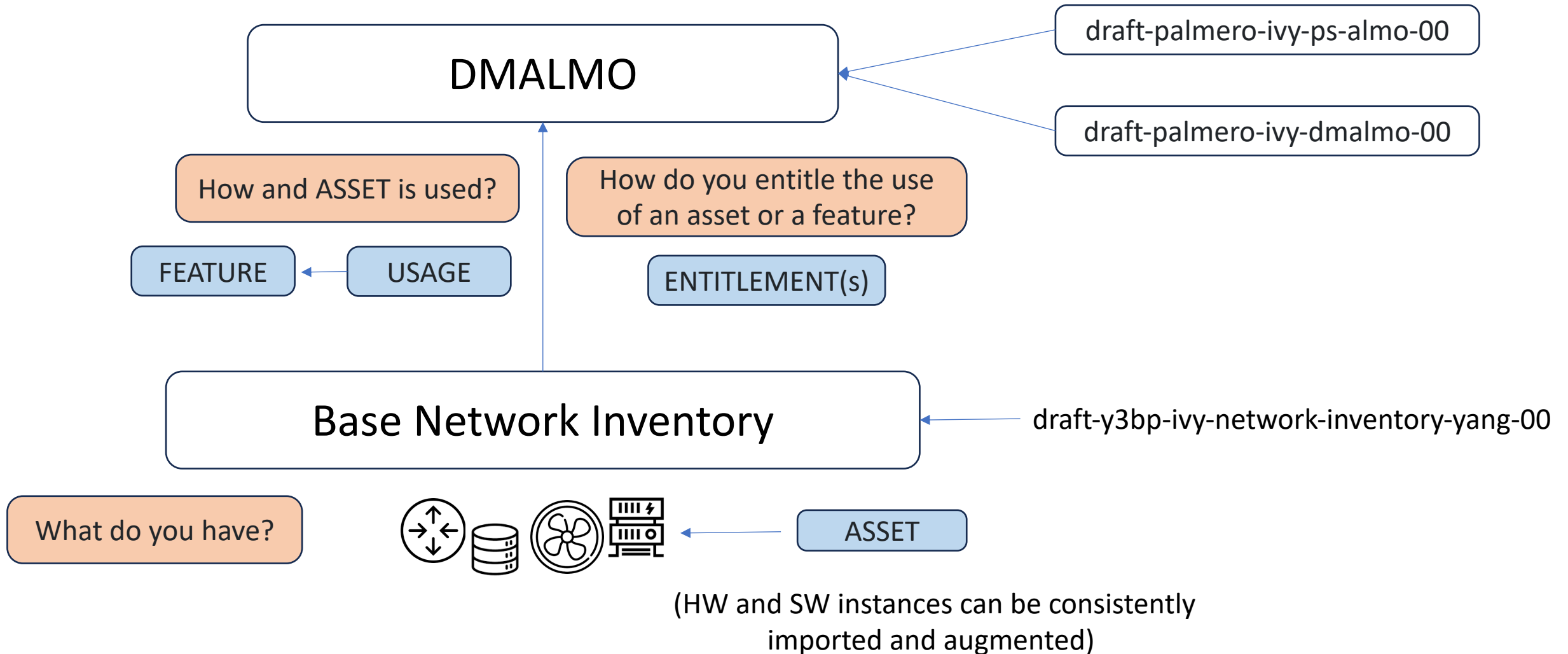
**Note:**

Under **future expansion/association**, DMALMO considers Event Report, Customer and Organization YANG Data Models.

# Aligning Terminology



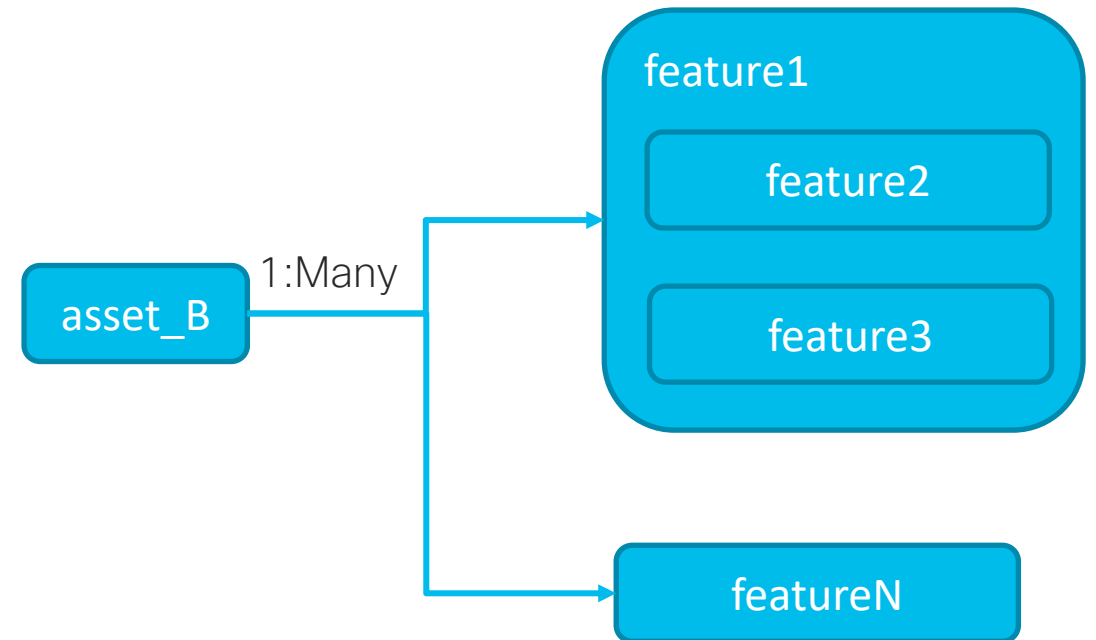
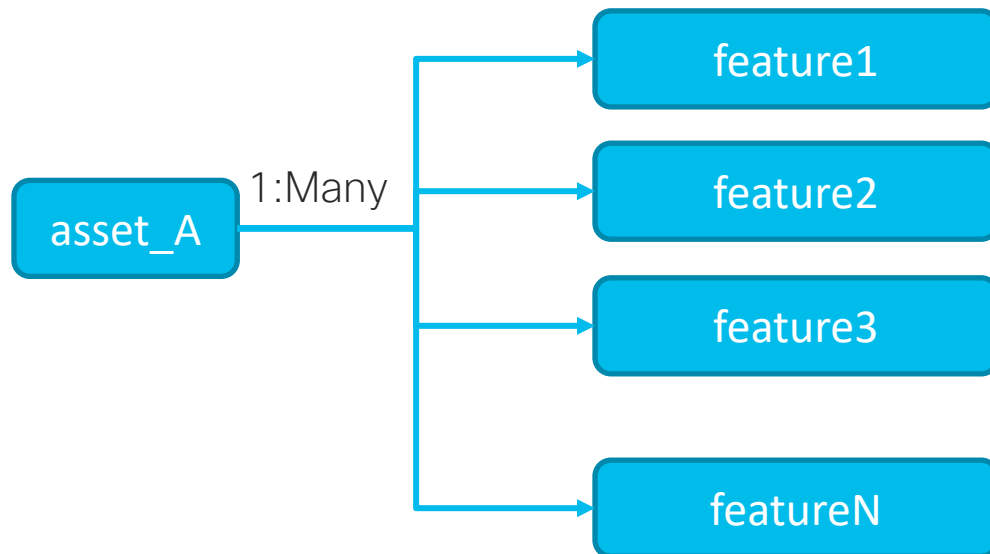
# Aligning Terminology



# Changes in DLMO v04

## Flexibility and consistency to the YANG modules structure

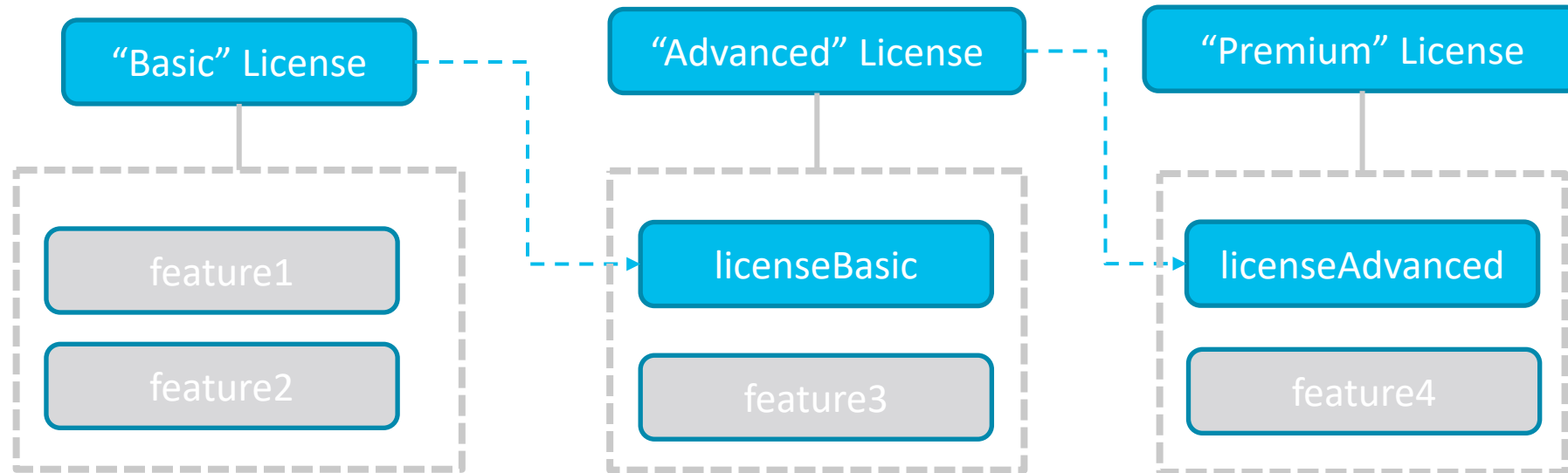
- Cross-reference between instances:
  - instances: asset, feature, license, event report, organization, user, etc
  - Relation can be “1:Many” or “1:1”



# Changes in DMLMO v04

Flexibility and consistency to the YANG modules structure

- “Combo” options have been considered for licenses to include features





# Scope of Entitlements and Feature Usage

- The model does not provide a catalogue of features/entitlement, but an inventory of features/entitlement used
- Entitlements are also connected to feature usage
- Entitlement provide an upper bound of feature usage
  - Multiple limits can be provided, but they cannot correlate with each other
  - E.g. “Entitlement covers up to N CPUs if you have more than X users, if not then M CPUs” is not supported
  - E.g. “Entitlement covers up to N CPUs, up to X users” is supported

# ALMO Draft

Work in progress moved to IVY

## Focus on *framework*

- ALMO deals with managing the lifecycle of an asset
- ALMO introduces a *\*neutral asset\** entity
- Asset is subject and central point of the lifecycle.
- The lifecycle is defined by (“the records”):
  - the entitlements for using the asset during its lifecycle, and
  - the reports of the events associated with the usage and corresponding lifecycle of the asset.

## Focus on *Use Case* definition

- **Usage** and **dynamic** view of what the base inventory model should offer for an asset.
- Dynamic issues, from DevOps to supply chain verifications.

# DMALMO Draft

Work in progress moved to IVY

Focus on asset management (the ALMO approach)

- Assets
- *Features*
- *Entitlements*
- *Usage*
- *Event reports*

ALMO YANG data models

Agnostic to base inventory approaches

Support integration and extension to address specific use cases

Note: process is explained in DMALMO - Appendix A

# Questions to the WG & What's Next

- ALMO – Seeking for adoption (v00, in reality is v11)
- DMALMO - Collaboration to identify meaningful use cases to test and improve YANG models

In the DLMO models, we worked on covering a good number of cases regarding entitlements, should we follow this approach or just cover more simple cases?

Backup slides

# Changes that are part of ALMO/DMLMO currently and important to consider in IVY work

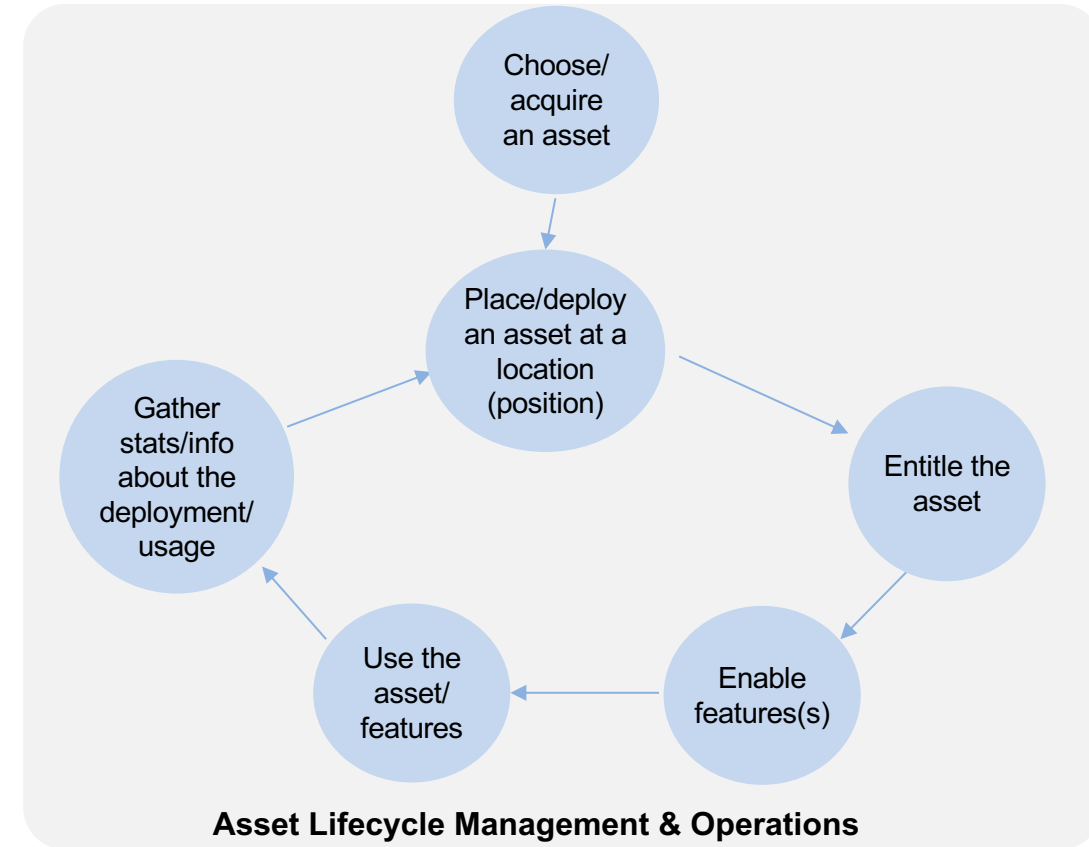
- “asset” considers:
  - hardware, software (virtual and physical), and service
  - easy extension of attributes, and consumption/import of inventory related modules that will be required for the implementation of the use cases
- ietf-lmo-assets supports the integration and extension to be harmonized with the different inventory approaches on how to address inventory use cases.

The process is explained in Appendix A: ietf-lmo-example-mapping-XXX YANG modules accommodates the ietf-lmo-assets YANG module to any other inventory that will be required in the future to be referenced.
- rename "license" to "entitlement".

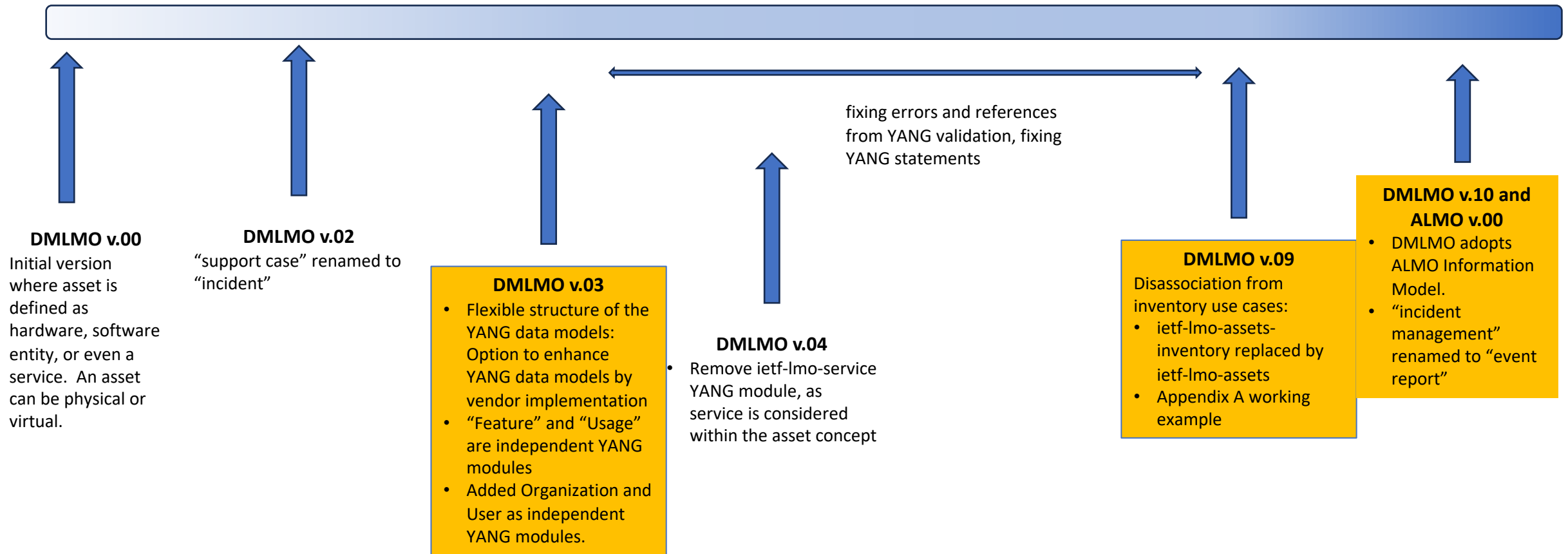
# The ALMO Problem Statement

- Describes the framework, motivation and requirements for the lifecycle management of an asset to improve operational practice
  - Initial asset selection and positioning
  - Management of entitlements and feature enablement
  - Usage and reports
  - Asset renewal
- ALMO data measure asset-centric lifecycle metrics including
  - Asset adoption and usability
  - Use entitlements and metrics
  - Supported and enabled features and capabilities
  - Reported events and/or issues
  - . . .

(Not limited to the above...)



# DMLMO (v10)





# Entitlements

- Entitlements are complex to model
- Some of them are simple. Covering all features of hardware/software. They might have a time limit.
- Some entitlements work over features, not on software or hardware:
  - E.g. Feature super-nice-MPLS-EVPN requires the advanced license or an additional license
  - Tables with entitlements vs features covered are common in the industry
- Some entitlements limit the usage of a feature:
  - E.g. With this license, you can use the feature up to 10 users.
  - E.g. License X covers 32 CPUs.