Asset Lifecycle Management and Operations (ALMO)

draft-palmero-ivy-ps-almo-00

draft-palmero-ivy-dmalmo-00

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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
Aligning Terminology

What do you have?

Base Network Inventory

DMALMO

draft-palmero-ivy-qs-almo-00

draft-palmero-ivy-dmalmo-00

draft-y3bp-ivy-network-inventory.yang-00

ASSET

(HW and SW instances can be consistently imported and augmented)
Aligning Terminology

How and ASSET is used?

How do you entitle the use of an asset or a feature?

What do you have?

Base Network Inventory

DMALMO

FEATURE

USAGE

ENTITLEMENT(s)

ASSET

HW and SW instances can be consistently imported and augmented

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draft-y3bp-ivy-network-inventory-yang-00
Changes in DLMO v04
Flexibility and consistency to the YANG modules structure

• Cross-reference between instances:
  o instances: asset, feature, license, event report, organization, user, etc
  o 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.
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...)

Asset Lifecycle Management & Operations
DMLMO (v10)

- **DMLMO v.00**
  Initial version where asset is defined as hardware, software entity, or even a service. An asset can be physical or virtual.

- **DMLMO v.02**
  “Support case” renamed to “incident”

- **DMLMO v.03**
  - Flexible structure of the YANG data models: Option to enhance YANG data models by vendor implementation
  - “Feature” and “Usage” are independent YANG modules
  - Added Organization and User as independent YANG modules.

- **DMLMO v.04**
  Remove ietf-lmo-service YANG module, as service is considered within the asset concept

- **DMLMO v.09**
  Disassociation from inventory use cases:
  - ietf-lmo-assets-inventory replaced by ietf-lmo-assets
  - Appendix A working example

- **DMLMO v.10 and ALMO v.00**
  - DMLMO adopts ALMO Information Model.
  - “Incident management” renamed to “event report”

- **DMLMO v.10**
  Fixing errors and references from YANG validation, fixing YANG statements

DMLMO v.03

- Flexible structure of the YANG data models:
  - Option to enhance YANG data models by vendor implementation
  - “Feature” and “Usage” are independent YANG modules
  - Added Organization and User as independent YANG modules.

DMLMO v.04

- Remove ietf-lmo-service YANG module, as service is considered within the asset concept

DMLMO v.09

- Disassociation from inventory use cases:
  - ietf-lmo-assets-inventory replaced by ietf-lmo-assets
  - Appendix A working example

DMLMO v.10 and ALMO v.00

- DMLMO adopts ALMO Information Model.
  - “Incident management” renamed to “event report”

DMLMO v.00

- Initial version where asset is defined as hardware, software entity, or even a service. An asset can be physical or virtual.
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.