MEF Services Common Model & LSO Legato Interface Profile*

In collaboration with ONAP External API project

* Animated slides
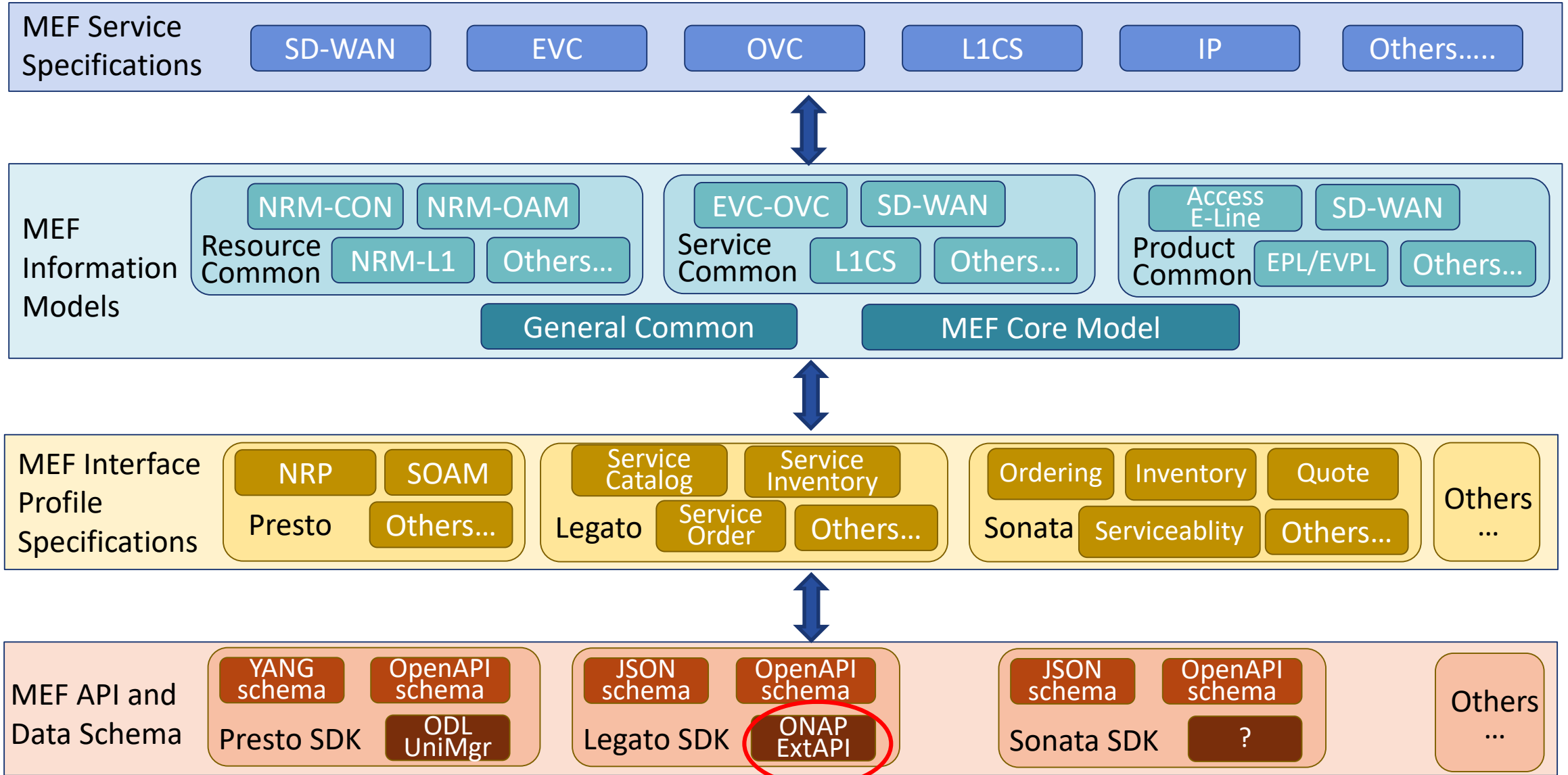
Karthik Sethuraman, NEC

Jack Pugaczewski, CenturyLink

Andy Mayer, AT&T

MEF

Overview: MEF approach to Standardized APIs

MEF Service Specifications

| SD-WAN | EVC | OVC | L1CS | IP | Others..... |

MEF Information Models

Resource Common: NRM-CON, NRM-OAM, NRM-L1, Others...

Service Common: EVC-OVC, SD-WAN, L1CS, Others...

Product Common: Access E-Line, SD-WAN, EPL/EVPL, Others...

General Common | MEF Core Model

MEF Interface Profile Specifications

Presto: NRP, SOAM, Others...

Legato: Service Catalog, Service Inventory, Service Order, Others...

Sonata: Ordering, Inventory, Quote, Serviceablity, Others...

Others...

MEF API and Data Schema

Presto SDK: YANG schema, OpenAPI schema, ODL UniMgr

Legato SDK: JSON schema, OpenAPI schema, ONAP ExtAPI

Sonata SDK: JSON schema, OpenAPI schema, ?

Others...

MEF

MCM – MEF Core Model

- MEF Core Model (MCM) is an "umbrella" information model that provides a base set of object definitions, relationships and reusable patterns supporting the concepts defined in MEF LSO architecture
  - Enables similar concepts to be modeled using the same patterns
  - It is the primary model from which other MEF information models are extended
- MCM's models the LSO concepts and functions from a Service Provider's point-of-view.
  - This includes interactions between the Service Provider and its Partners, as well as interactions between the Service Provider and its Customers.
  - Built from a top-down, bottom-up approach
- MCM is available as a MEF standard (MEF 78)

# MEF Services Common Model Scope within MEF LSO
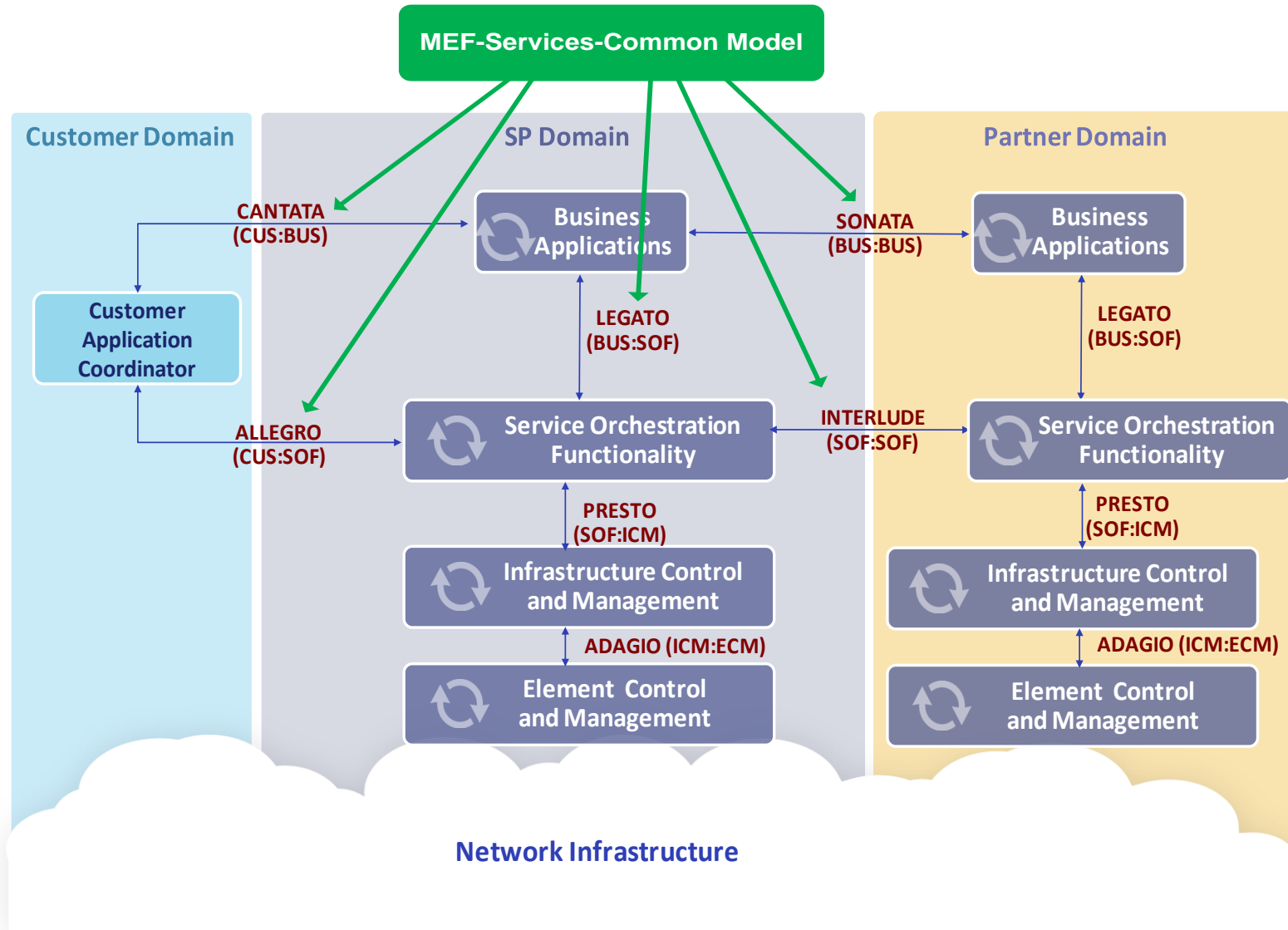
MSCM and other Model Relationships
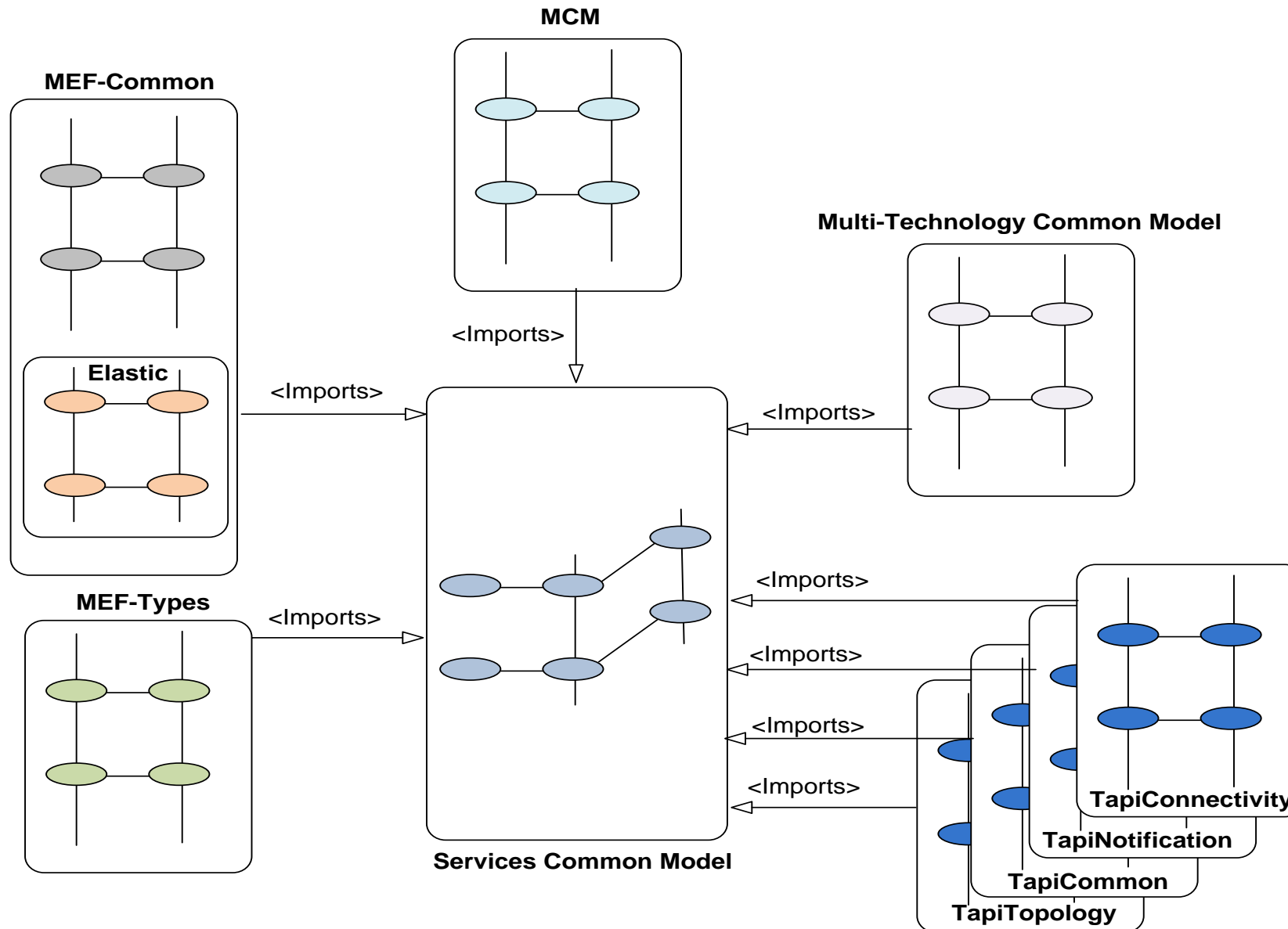
MSCM Information Model

- The MSCM is intended to be leveraged at multiple LSO interfaces for multiple API development efforts.
  - Sonata, Cantata, Allegro, Interlude, Legato, etc
  - Each of these interfaces can leverage the common objects, attributes and relationships defined in the MSCM
- MSCM covers multiple MEF service specifications
  - SD-WAN Services
  - EVC Services (EP-LINE, EVP-LINE, EP-LAN, EVP-LAN, EP-TREE, EVP-TREE)
  - OVC Services (ACCESS-ELINE, TRANSIT-ELINE, ACCESS-ELAN, TRANSIT-ELAN)
  - Others (IP, L1, Cloud, Elastic, etc)
- MSCM is based-on/derived-from MEF Core Model (MCM) constructs
  - MCMServiceInterface, MCMServiceEndPoint, MCMOrderedService, MCMPartnerService, etc
- MSCM consolidates common types and common objects into models that can be imported by other efforts.
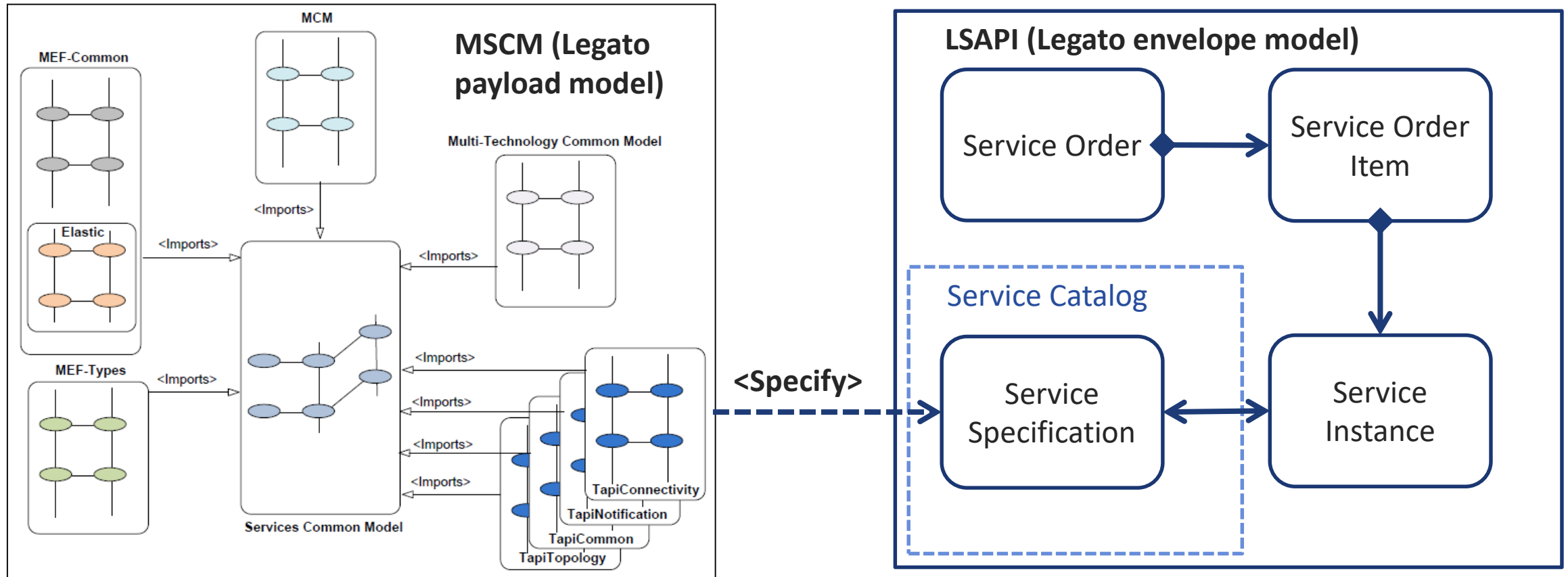- MSCM aims to align with other external SDO models such as ONF Transport API (TAPI)

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MEF Legato IPS Scope within MEF LSO

Figure 2 LSO Reference Architecture
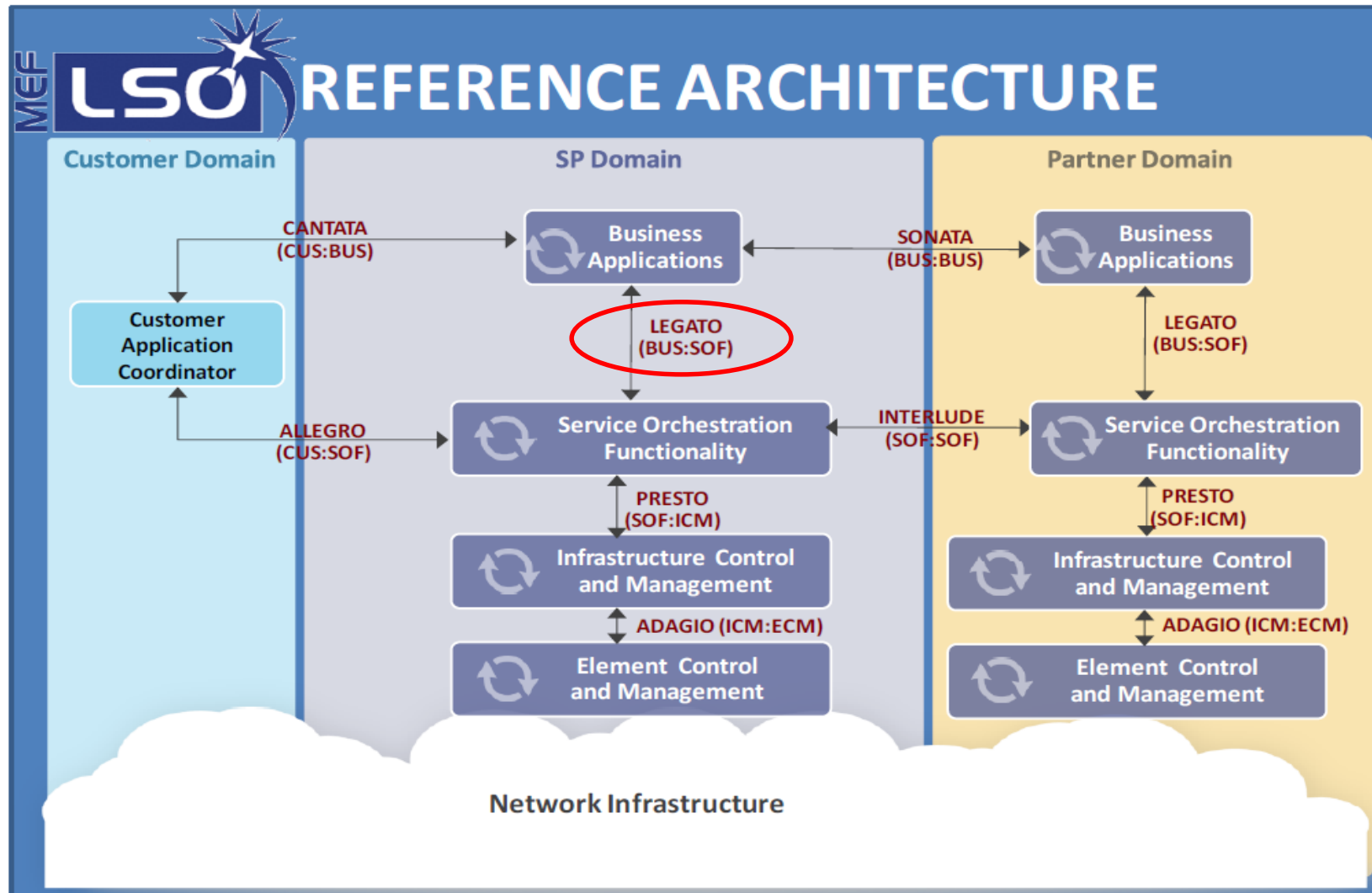
Use Case Actors: BA & SOF
Use cases from the perspective of
Client/Requestor: BA
Server/Provider: SOF

Legato & MSCM Information Models – High Level View

Legato Service API Information Model

- Generic Service Interface Information Model (envelope)
  - Initial draft created from analysis of ONAP External API information model (by reverse engineering ONAP External API documentation)
  - Need to evolve terminology definitions, class details, class associations, state machines, sequences, etc
- MEF Service Specification Models (payload)
  - Current idea is to model MSCM services as Service Specifications that can be retrieved via a Service Catalog API
  - May need to prune MSCM Service classes (create an Legato Interface "Profile")
    - No need to curtail to a specific service spec, but can describe a service in the use cases as an example
  - MSCM sub-classes MCM & hence inherits all MCM attributes
  - Identify mapping between common/similar attributes in MSCM & Legato IM (ONAP ExtAPI based)

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MEF Service Specifications Mapping (from MSCM project)

- ## Mapping MSCM to Legato IPS Envelope model
  - MSCM Service classes planned to be mapped to Legato Service Specification class
    - Using the UML abstraction/specify relationship
- ## Use tooling to generate OpenAPI/JSON Schema
  - Auto populate the meta-data fields and meta-data-like fields (category, sub-category)
    - @schemaLocation → MEF MSCM Git repo public/published location
    - @baseType → MEFServiceSpecification, @type → Specific MEF Service type (e.g. EPL, EVPL, etc)
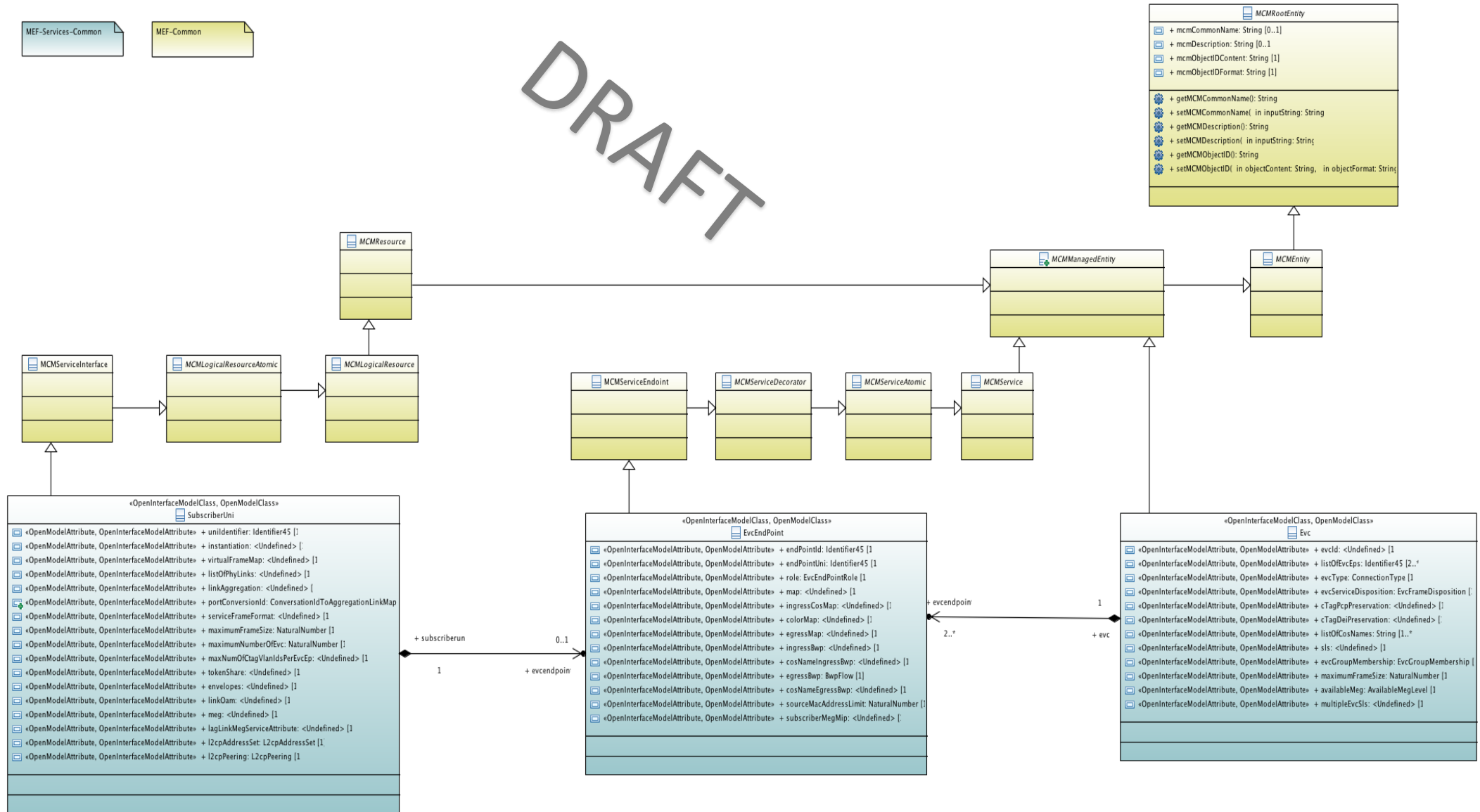 - Generate Service Specification Characteristic/Value for every MSCM Service class-attribute

MSCM Additional Reference

MSCM SD-WAN

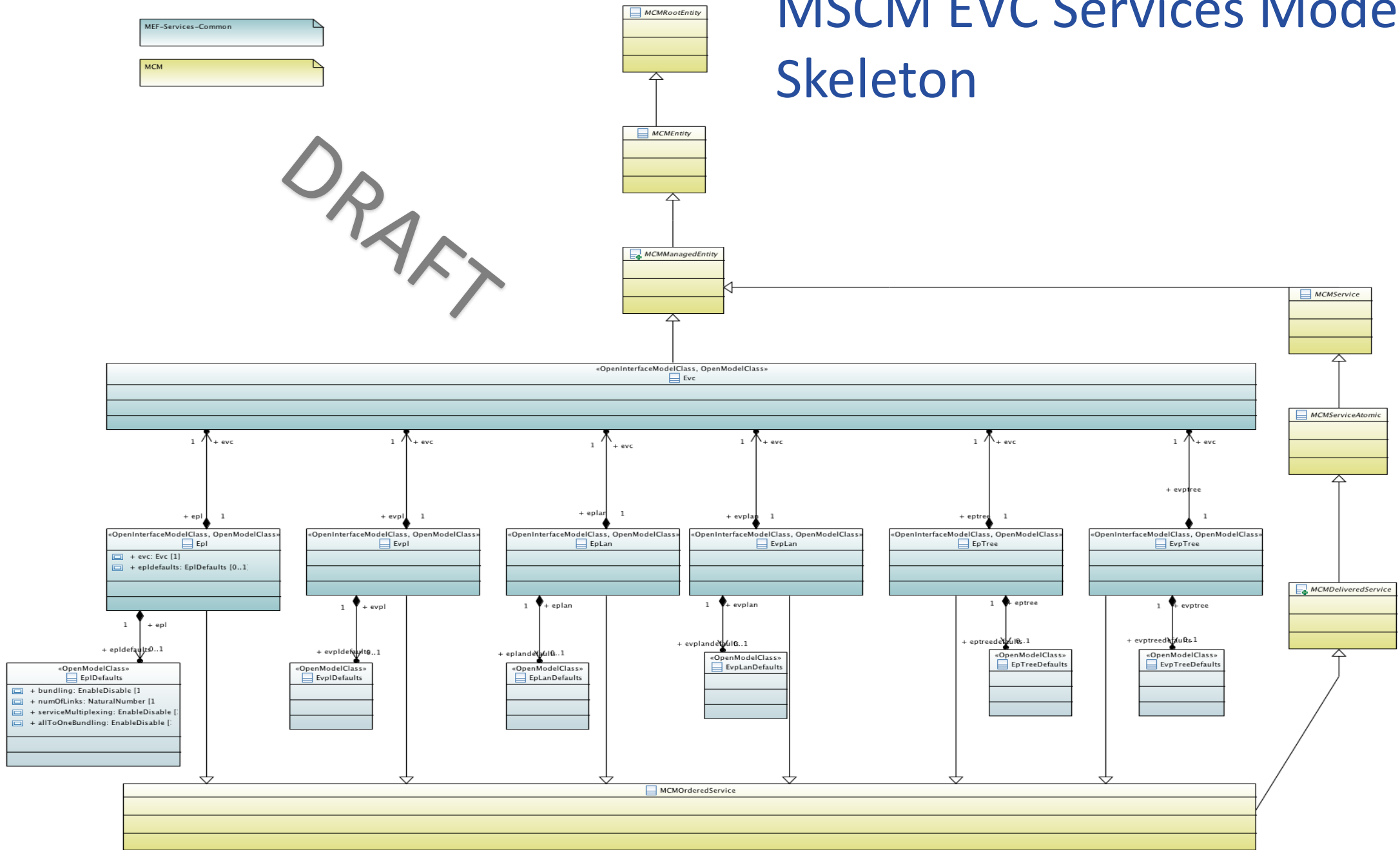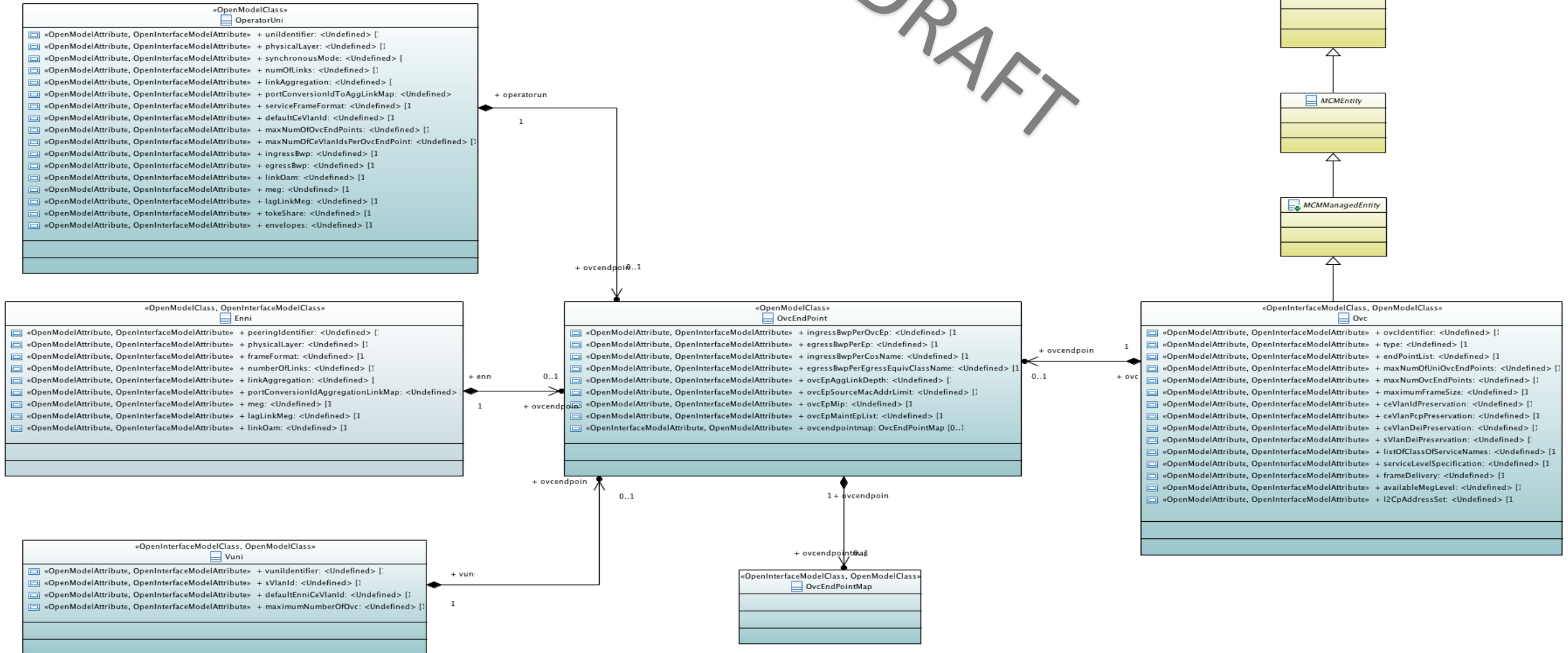# MSCM EVC Model Skeleton

MSCM EVC Services Model Skeleton

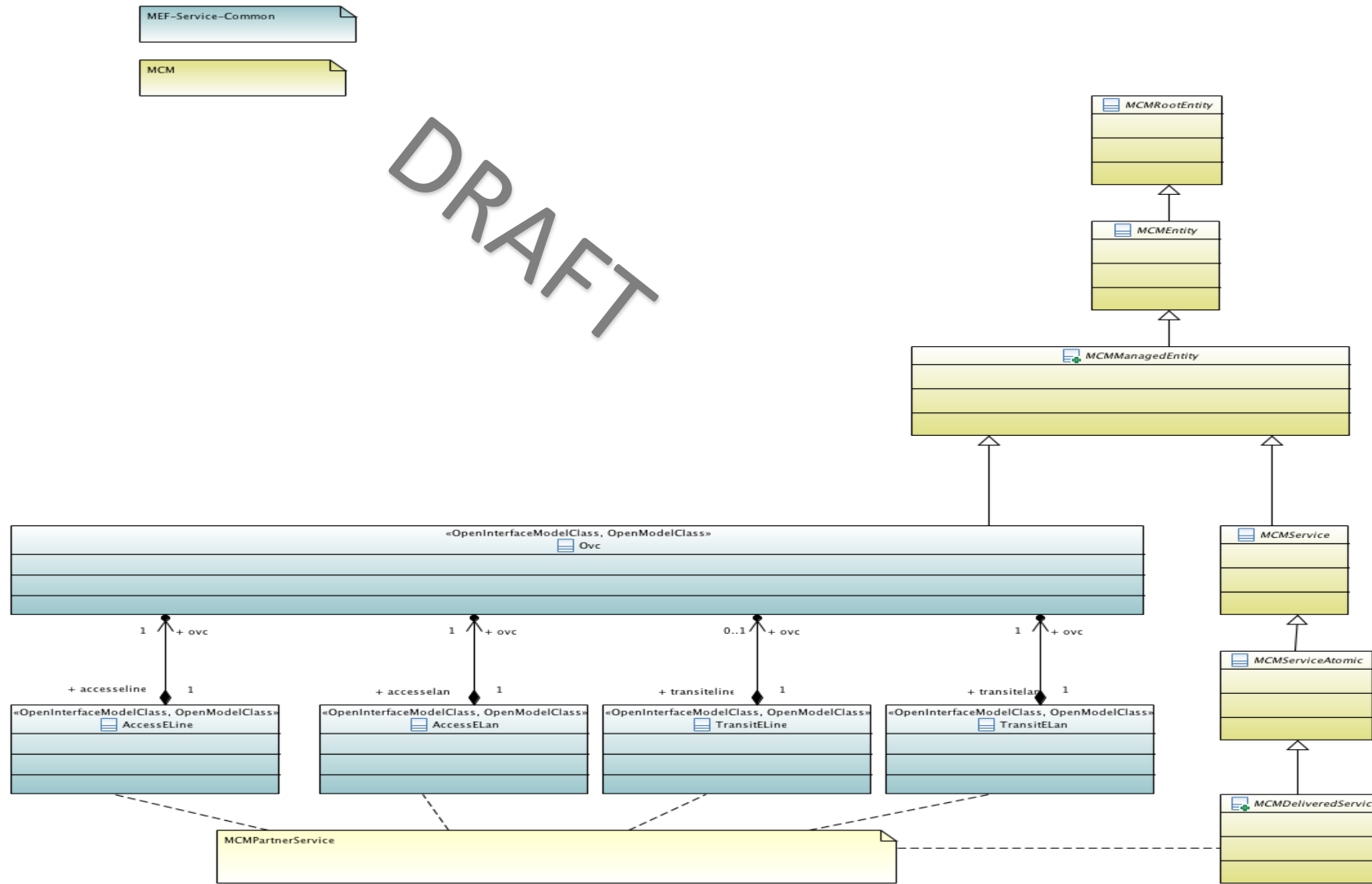# MSCM OVC Model Skeleton

MSCM OVC Services Model Skeleton

LSAPI Additional Reference

Legato IPS Project Scope & Deliverables (all phases)

- [L64001_004] Interface Profile Specification for MEF LSO Legato IRP covering
  - Service Catalog
  - Service Ordering (including Service Instantiation)
  - Service Inventory
  - Service Topology
  - Service Notification
  - License Usage
- Deliverables
  - Interface Profile Specification (IPS)
    - Terminology, Requirements & Use Cases
    - Information Model (Class, State & Sequence diagrams)
  - Interface Implementation Specification (IIS)
    - Project proposal calls out ONAP (ExtAPI)
    - IM – API data-schema mapping
    - Guides & other stuff (plan to follow Sonata template ☺)
  - Software Artifacts
    - Papyrus UML + Gendoc output
    - OpenAPI/JSON schema

* Phase 1 (current) focus items

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Use Cases under scope (all phases)

- In support of MEF 55 Requirements and Operational Threads
- Agile Product/Service design
  - Service Catalog & Specification
  - Technology & Service agnostic framework/mechanism
- Order Fulfillment & Service Control
  - Service Configuration and Activation
  - Service Control
  - Service Inventory and Topology
  - Service change Notification and Reporting
- Service Activation Testing
- Service Problem and Quality Management
- Service Usage measurements & reporting (in support of Billing)

* Phase 1 (current) focus items

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Support of MEF 55 Operational Threads – Phase 1

- ## Designing and Launching a New Product Offering
  - A specification of the Services needed to support Product Instances corresponding to the Product Offering is created and retrieved

- ## Product Ordering and Service Activation Orchestration
  - LSO fulfills the order by selecting, assigning, configuring and activating the appropriate Services and associated resources that support the ordered Product Instance

- ## Controlling a Service
  - The Customer initiates a request to dynamically control a permitted aspect of its Service (e.g., bandwidth change or implementing traffic filtering controls, etc.).
  - LSO uses the defined service constraints and policies to determine if the dynamic control request is permitted.
  - LSO effects the necessary changes within its own domain to service the request.
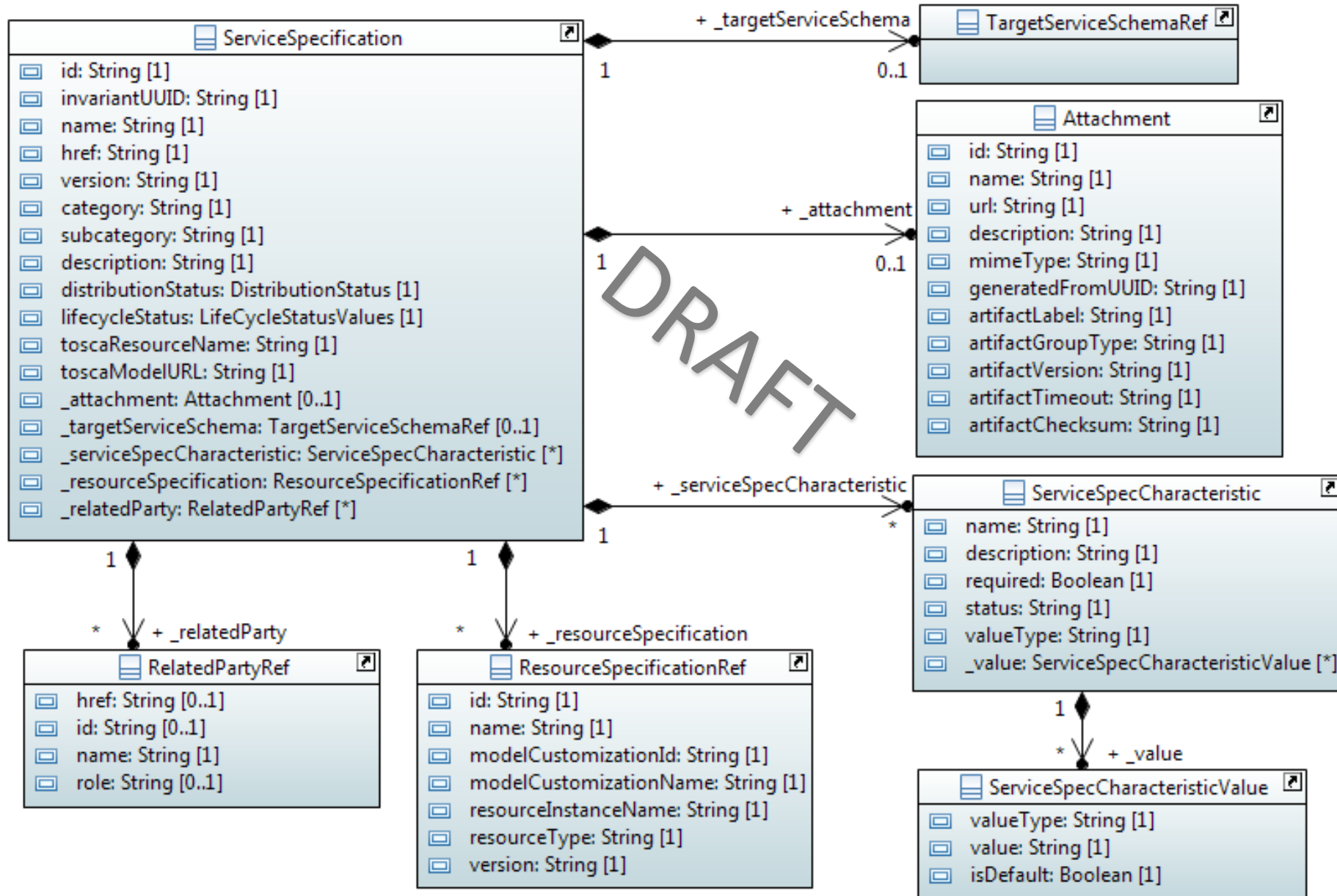
Requirements – Phase 1

- Derived from the use case descriptions

- Interface requirements as opposed to "business" requirements

- English description of interface functions to be supported in implementation-agnostic manner - Includes
    - High-level functional behavior/logic
    - Pre-conditions/Post-conditions
    - Key attributes to be exchanged (input/output), notifications, error/exceptions

- In support of following MEF 55, section 8.2 Business requirements
    - Fulfillment : R-LSO-RA-3, R-LSO-RA-4,
    - Configuration: R-LSO-RA-8, R-LSO-RA-10, R-LSO-RA-11, R-LSO-RA-12
    - Control: [R-LSO-RA-13] to [R-LSO-RA-20]
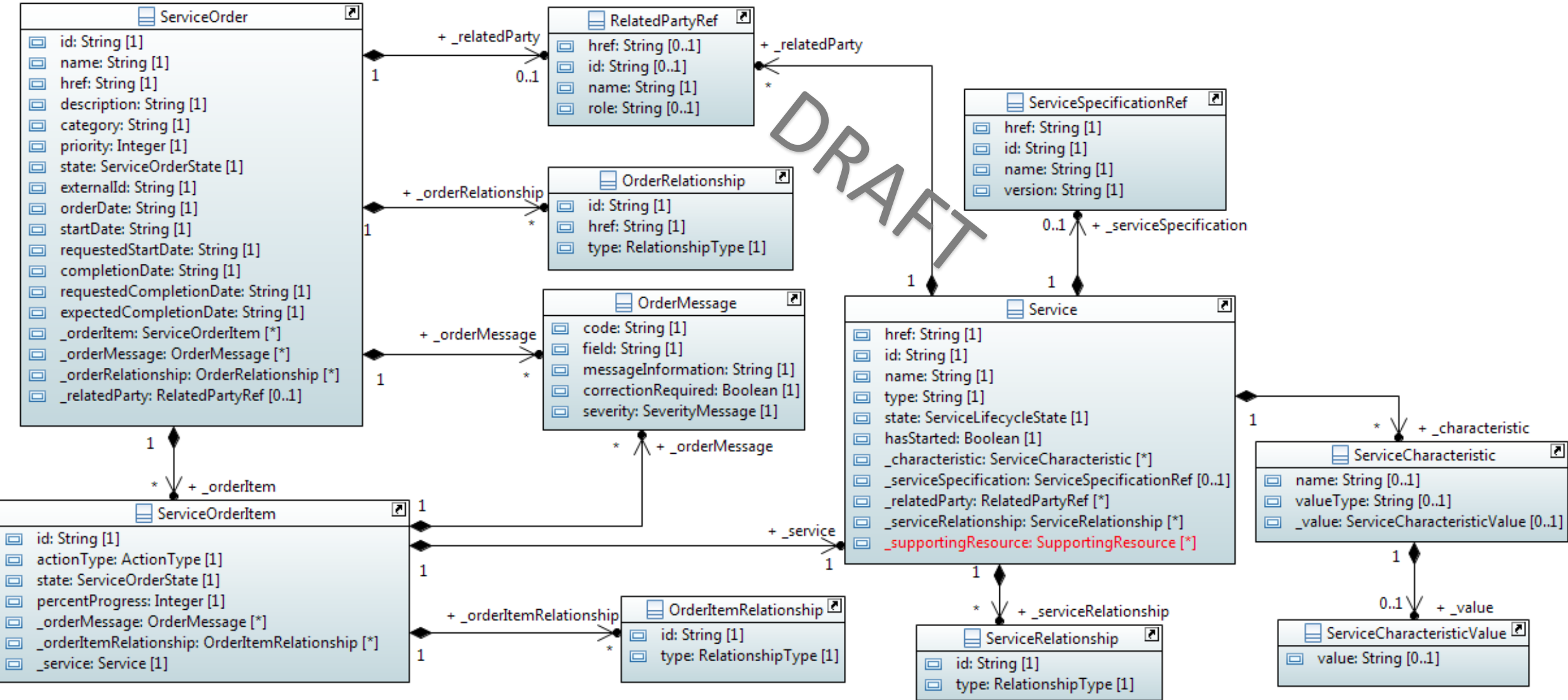
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Key Envelope IM Constructs from ONAP ExtAPI

- Service Catalog
  - Service Specification
  - Service Specification Characteristic/Value (drop/don't -use)
  - Resource Specification
  - Related Party
  - State machines: Lifecycle (Certification) Status & Distribution Status
- Service Ordering
  - Service Order
  - Service Order Item
  - Service
  - Service Characteristic/Value
  - Related Party
  - State machines: Order State & Lifecycle State
- Service Inventory
  - Service
  - Service Characteristic/Value
  - Supporting Resource
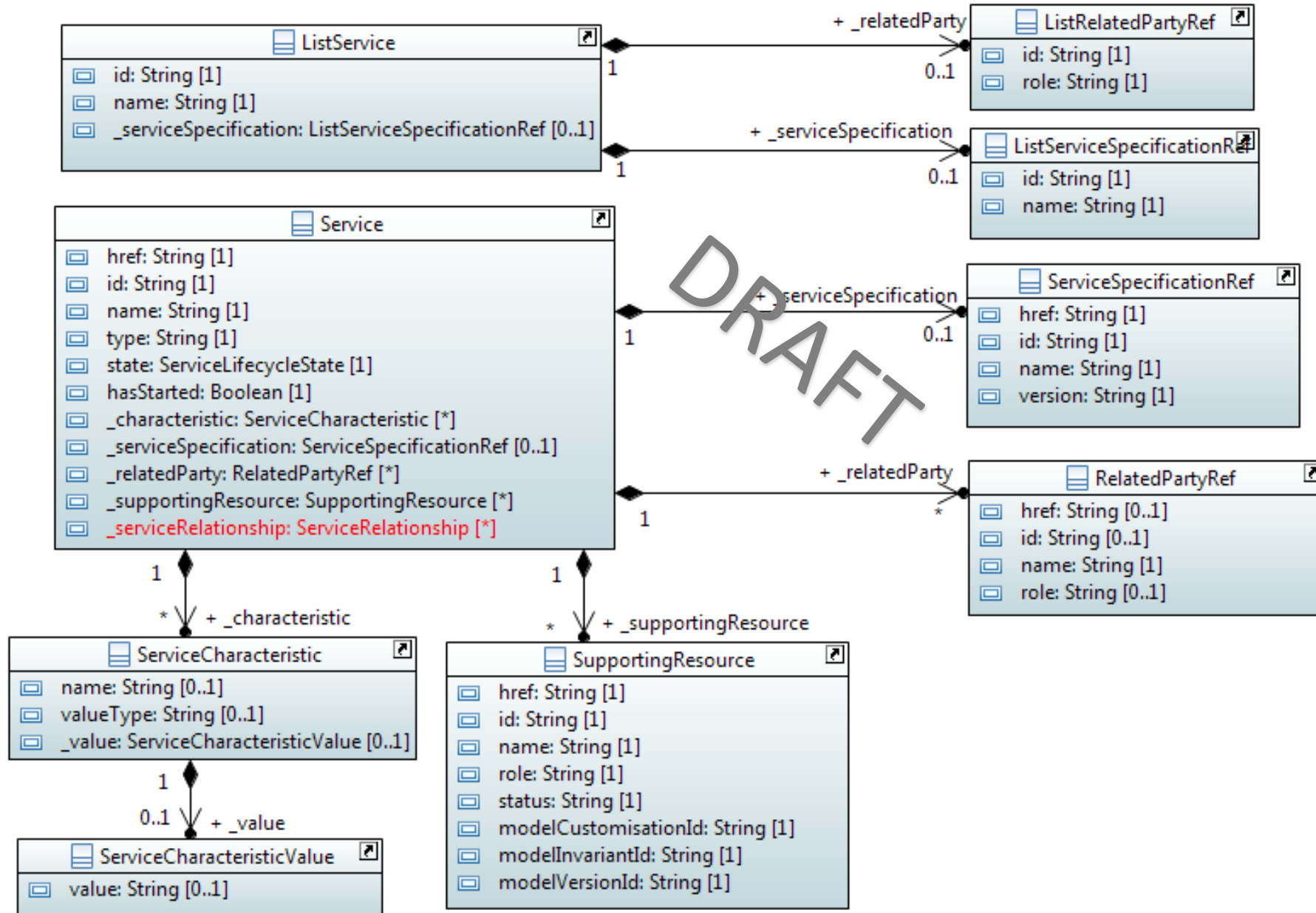 - Related Party
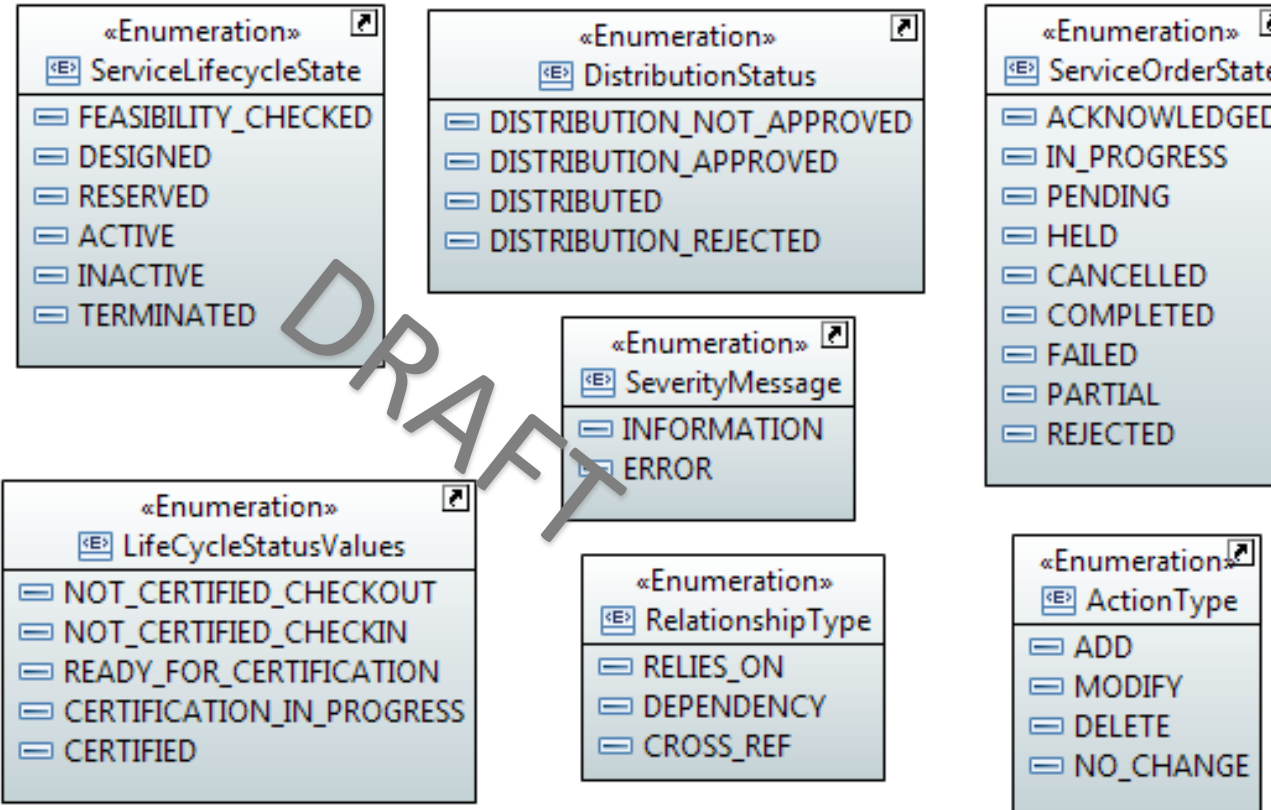 - State Machines: Lifecycle State
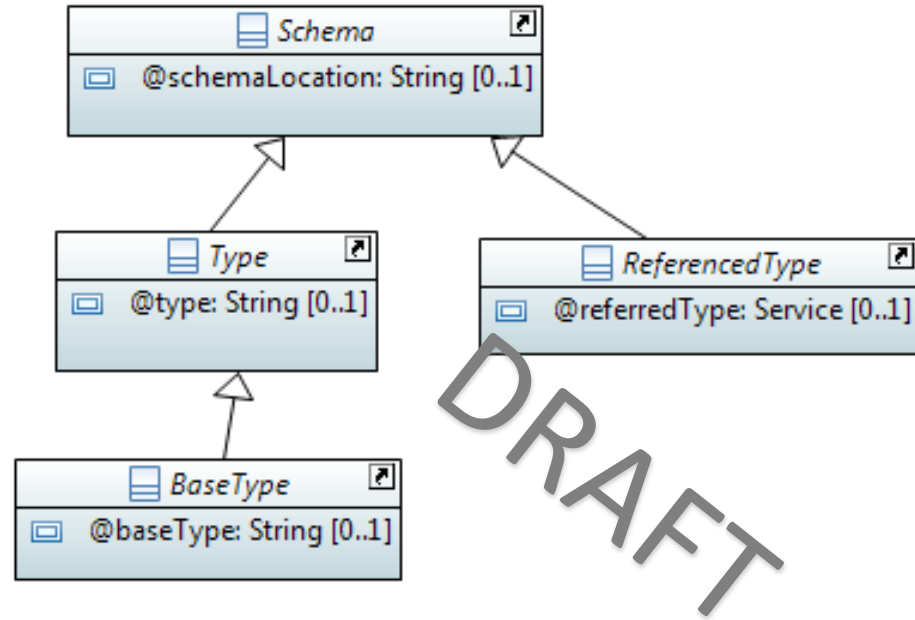
MEF

LSAPI Service Catalog model

LSAPI Service Order model

LSAPI Service Inventory model

LSAPI Data Types

«Enumeration» ServiceLifecycleState
- FEASIBILITY_CHECKED
- DESIGNED
- RESERVED
- ACTIVE
- INACTIVE
- TERMINATED

«Enumeration» DistributionStatus
- DISTRIBUTION_NOT_APPROVED
- DISTRIBUTION_APPROVED
- DISTRIBUTED
- DISTRIBUTION_REJECTED

«Enumeration» ServiceOrderState
- ACKNOWLEDGED
- IN_PROGRESS
- PENDING
- HELD
- CANCELLED
- COMPLETED
- FAILED
- PARTIAL
- REJECTED

«Enumeration» SeverityMessage
- INFORMATION
- ERROR

«Enumeration» LifeCycleStatusValues
- NOT_CERTIFIED_CHECKOUT
- NOT_CERTIFIED_CHECKIN
- READY_FOR_CERTIFICATION
- CERTIFICATION_IN_PROGRESS
- CERTIFIED

«Enumeration» RelationshipType
- RELIES_ON
- DEPENDENCY
- CROSS_REF

«Enumeration» ActionType
- ADD
- MODIFY
- DELETE
- NO_CHANGE

LSAPI Metadata

Project Resources & Meetings

- Project Home is on the MEF Member Wiki
  - https://wiki.mef.net/pages/viewpage.action?pageId=82231371
- Call Details
  - https://wiki.mef.net/display/LSO/Legato+IPS+-+Call+Details
  - Calls on Wednesdays at 12 PM US Eastern Time(EDT)
- Meeting notes are on the wiki:
  - https://wiki.mef.net/display/LSO/Legato+IPS+Call+Notes-2019Q1
- Contributions are on the wiki:
  - https://wiki.mef.net/display/LSO/Legato+IPS+Contributions
- Papyrus UML, API, etc are on MEF Github
  - https://github.com/MEF-GIT/MEF-LSO-Legato-SDK/tree/master/experimental