MEF Services Common Model & LSO
Legato Interface Profile*

In collaboration with ONAP External API project

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* Animated slides
Overview: MEF approach to Standardized APIs

MEF Service Specifications
- SD-WAN
- EVC
- OVC
- L1CS
- IP
- Others....

MEF Information Models
- NRM-CON
- NRM-OAM
- NRM-L1
- EVC-OVC
- SD-WAN
- Access E-Line
- EPL/EVPL
- Others...

MEF Core Model
- General Common
- MEF Core Model

MEF Interface Profile Specifications
- NRP
- SOAM
- Service Catalog
- Service Inventory
- Ordering
- Inventory
- Quote
- Others...

MEF API and Data Schema
- YANG schema
- OpenAPI schema
- JSON schema
- OpenAPI schema
- JSON schema
- OpenAPI schema
- Others...

Other Tools
- Presto SDK
- Legato SDK
- ODL UniMgr
- ONAP ExtAPI
- Sonata SDK
- Others...
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
  - 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)
MEF Legato IPS Scope within MEF LSO

Use Case Actors: BA & SOF
Use cases from the perspective of
Client/Requestor: BA
Server/Provider: SOF
Legato & MSCM Information Models – High Level View

MSCM (Legato payload model)

LSAPI (Legato envelope model)

- Service Order
- Service Order Item
- Service Catalog
- Service Specification
- Service Instance

MEF-COMMON

MEF-TYPES
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)
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
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
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
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]
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
LSAPI Service Order model
LSAPI Service Inventory model
LSAPI Data Types

- **ServiceLifecycleState**
  - FEASIBILITY_CHECKED
  - DESIGNED
  - RESERVED
  - ACTIVE
  - INACTIVE
  - TERMINATED

- **DistributionStatus**
  - DISTRIBUTION_NOT_APPROVED
  - DISTRIBUTION_APPROVED
  - DISTRIBUTED
  - DISTRIBUTION_REJECTED

- **SeverityMessage**
  - INFORMATION
  - ERROR

- **LifeCycleStatusValues**
  - NOT_CERTIFIED_CHECKOUT
  - NOT_CERTIFIED_CHECKIN
  - READY_FOR_CERTIFICATION
  - CERTIFICATION_IN_PROGRESS
  - CERTIFIED

- **RelationshipType**
  - RELIES_ON
  - DEPENDENCY
  - CROSS_REF

- **ActionType**
  - ADD
  - MODIFY
  - DELETE
  - NO_CHANGE
Project Resources & Meetings

• Project Home is on the MEF Member Wiki
  – [https://wiki.mef.net/pages/viewpage.action?pageId=82231371](https://wiki.mef.net/pages/viewpage.action?pageId=82231371)

• Call Details
  – [https://wiki.mef.net/display/LSO/Legato+IPS+-+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](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](https://wiki.mef.net/display/LSO/Legato+IPS+Contributions)

• Papyrus UML, API, etc are on MEF Github