OIIE Scenario 4 – Publish As-Built Engineering Asset data from ENG, CONSTRUCT to REG-ASSET

This scenario details the batch handover of asset and installation information at the Approved for Commissioning & Closeout gate. The information originates from the Construction Management System or Commissioning Management System depending on availability and ease of extraction of asset data and is sent to the O&M Asset Registry.

Actors

Construction or Commissioning Management System	Send constructed asset and installation data
Asset Registry	Receive and register O&M-related serialized equipment asset data

Data Content

The physical, serialized assets that are installed in the plant are obtained from an engineering or construction system. The asset has identification properties (ID, tag, name), categorical properties, data sheet properties that describe the capabilities of the equipment, and associated metadata. A relationship between an asset and its product model can be established at this point in time, however the associated product model data (including data sheet and bill of material) is exchanged in Use Case 4. As-Built asset information also includes installation information, that is, an association between an asset and the segment that it is installed on. An asset can be installed and removed from various segments so that lifecycle asset information tracking is established for subsequent Use Cases.

MIMOSA CCOM Reference Types

For the purposes of reference data management, the following MIMOSA CCOM types may be referenced:

- AssetType
- PropertySetType/PropertySetDefinition (for Data Sheets)
- PropertyType/PropertyDefinition
- EventType
    - Asset installations are represented by the ‘Installation of Asset on Segment’ EventType UUID: `ecc99353-412b-4995-bd71-1cbc6fc16c7c`
    - Asset removals may also be included in the asset installation information. Removals are represented by the ‘Removal of Asset on Segment’ EventType UUID: `3a45e126-b234-42a0-b3b1-07c29522d02d`
- SegmentType
- UnitType

NOTE For versions of MIMOSA CCOM prior to 4.1, the types referring to ‘Property’ use the term ‘Attribute’ instead.

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System Interoperability Events

This scenario the requires the sending/receipt of the following Events:

- Publish ISO 15926 Engineering Asset Data
- Publish Serialized Asset Data
- Publish Asset Configuration Change

Data Formats

The data published from and sent by the Construction or Commissioning Management System must comply with ISO 15926 standardized templates and reference data.

The data published to and received by the Asset Registry must conform to MIMOSA CCOM BODs.

Infrastructural Components

Transform Engine

Data transformation is required for this scenario and the OpenO&M-ISO 15926 Transform Engine converts the necessary data from an ISO 15926 format in the Reference Environment to the MIMOSA CCOM format in the Execution Environment. A one-way mapping from ISO 15926 to MIMOSA CCOM is required. Identifier transformation is only required for updates to data already sent from the Reference Environment to the Execution Environment.

Transformation Rules

The following is a general set of rules describing the required transformation of ISO 15926 data to MIMOSA CCOM format:

- Plant Items become Segments with the identifier placed in the IDInInfoSource field (with a corresponding RegistrationInfoSource); tag placed in the Tag field and classification mapped to a SegmentType.
- Attributes/properties for a functional location need to be placed on an Engineering Data Sheet. Where possible, the data sheet will conform to a specified ISDD; otherwise, the data sheet can have a single top-level parameter group with all Attributes contained within that group.
- For instruments that are allocated a range, these are placed on an Engineering Data Sheet.
- Transmitters have a corresponding Measurement Location created. Any OPC tag properties are placed in the MeasurementSourceAddress field.
- Nozzles become Measurement Location Ports on the Plant Item Segment identified in the assembly relationship.
- Topological connections become PortConnections within a PortMesh. For connections without a corresponding port, a port of a suitable type (e.g. directed fluid, electrical, mechanical) should be created and connected.
- X, Y coordinates and canvas dimensions are placed on a P&ID Data Sheet attached to the respective Plant Item Segment or Document Asset.

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SDAIR

In this scenario, an SDAIR may participate as an explicit actor in the Asset Registry role.

ISBM

The communication between all systems occurs via the ISBM using publish-subscribe services.

Due to the large volume of data output from these source systems, data may be sent to the Asset Register incrementally. The ISBM may also provide alternative transfer mechanisms for performance and scalability purposes.

Implementation Requirements

The Construction or Commissioning Management System must implement a client for the ISBM Provider Publication and Channel Management (only the GetChannel operation) Services.

The Asset Registry must implement a client for the ISBM Consumer Publication and Channel Management (only the GetChannel operation) Services. The Structural Registry may implement the ISBM Notify Listener Service for message notification.

The Transform Engine must implement a client for the ISBM Provider Publication, Consumer Publication and Channel Management (only the GetChannel operation) Services. The Transform Engine may implement the ISBM Notify Listener Services for message notification.

Suggested Channel/Topic Configuration

A channel should be created for the handover of asset definition and as-constructed asset data and should conform to the following format:

```
/Enterprise/Enterprise Subdivision/.../ISO18435:D0.2/Publication
```

For example:

```
/Enterprise/Refinery A/Area A/Light Ends Area/ISO18435:D0.2/Publication
```

As outlined in the document ISBM Guidelines, topics should match the message content. Correspondingly, the following topic format should be used:

```
OIIE:S4:V2.1/StandardSchemaName{:Version}
```

For example:

```
OIIE:S4:V2.1/CCOM-XML:SyncAssets:V1.0
OIIE:S4:V2.1/CCOM-XML:SyncAssetSegmentEvents:V1.0
```

Event Sequence

The following diagram represents a simplified set of exemplar interactions between the systems required to achieve this Scenario. The system actors are assumed to have OIIE/ISBM adaptors implemented as required, with services according to the ISBM Implementation Requirements described above. For simplicity, it is assumed that each system/adaptor implements the optional Notify Listener service.

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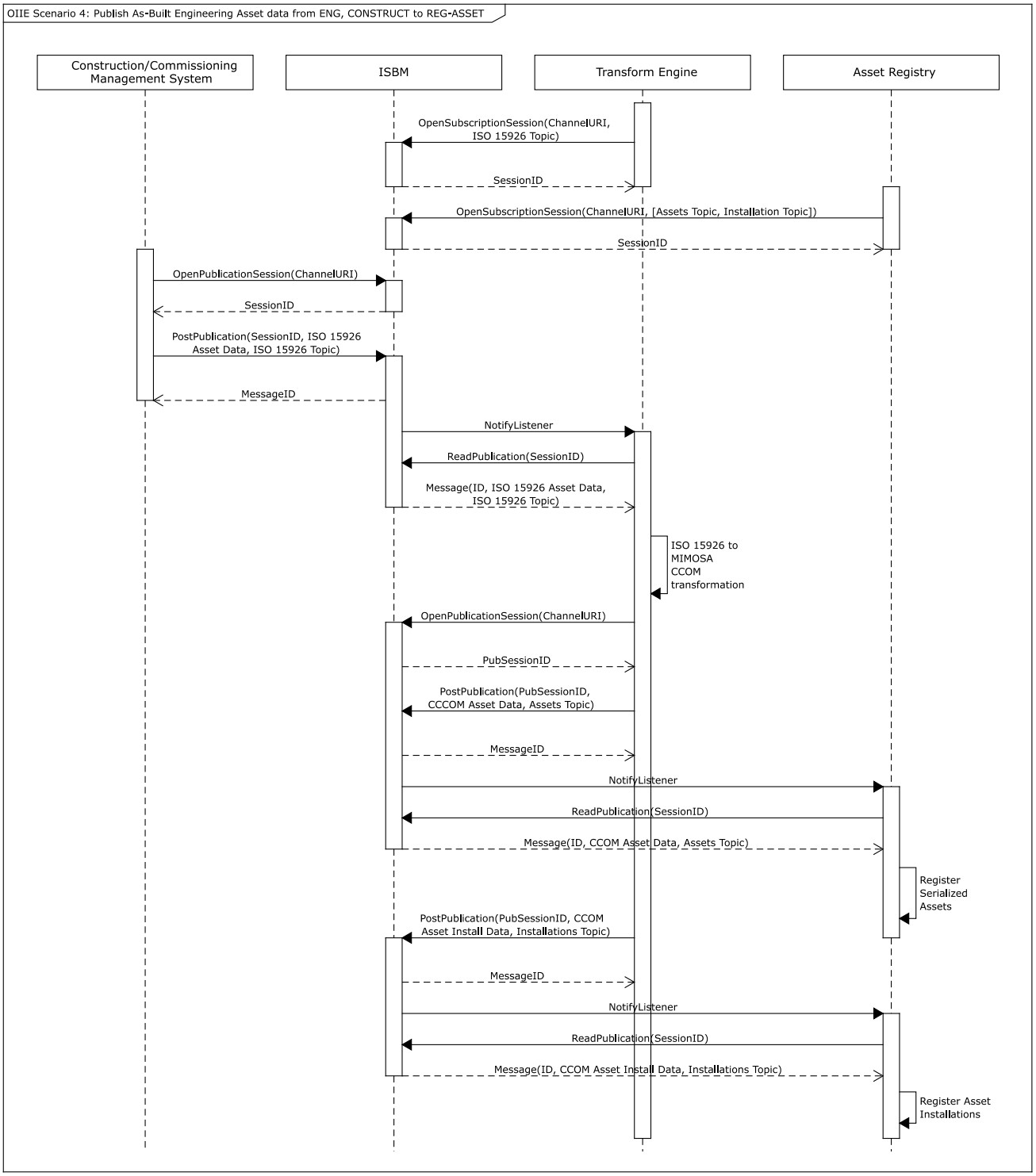

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Version Applicability/Alignment

Scenarios describe general data requirements and, hence, they are aligned to specific versions of CCOM and/or other MIMOSA standards. For example, older versions of CCOM may not include the data elements required by newer Scenarios, while older Scenarios may become obsolete or have their data requirements change over time.

This Scenario is applicable to the following versions of CCOM:

- CCOM 4.x

NOTE The data content requirements and transformation rules have been updated to reflect CCOM 4.x and are ***no longer applicable*** to CCOM 3.2.3 (part of OSA-EAI 3.2.3).

NOTE Use of 'x' in the version number indicates a variable version. For example, "4.x" indicates applicability to all versions of CCOM with the MAJOR version '4', regardless of MINOR and PATCH versions.

Document Versioning

Version	Date	Major Changes
2.1	2020-06-29	Updated to use OpenO&M template
2.0	2019-01-20	Updated for new Use Case Architecture and CCOM 4.x alignment
1.0	2019-01-03	Initial import of documentation from Website

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