Use Case: Exchange of fundamental PDM capabilities of a Product Assembly Structure

Aim

Assembly structures shall be exchanged together with their master data, 3D positioning and references to 3D geometry and associated documents.
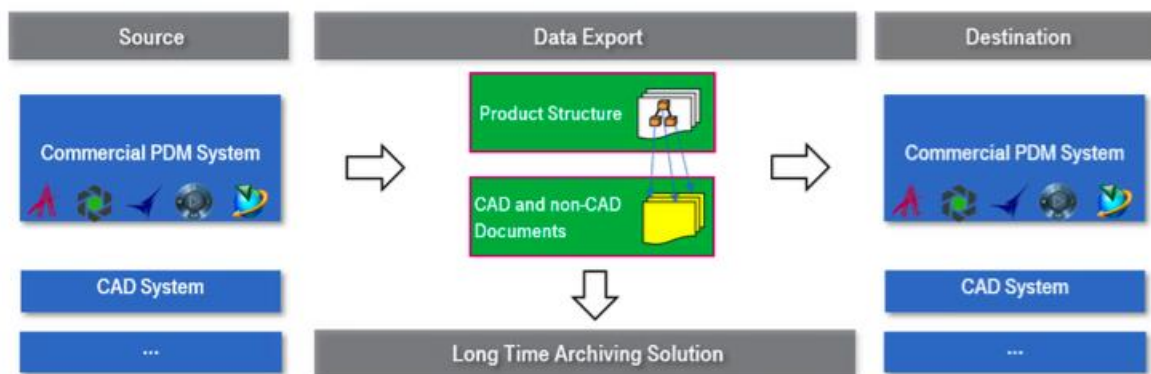
Actors

- One OEM
- Supplier partners dealing with design engineering

Preconditions

OEM can produce a valid technical data package from different applications of its information system, which is essentially its CAD and PDM system. The content of the dataset exported is the multilevel assembly structure, the master data of each assembly/component part, the 3D positioning of each component part and a reference to 3D geometry and associated documents.

First scenario: the supplier can consume the technical data package, by validating and importing the information inside its information system (CAD and possibly PDM). If required, he is also able to produce back to the OEM the same kind of technical data package with his design changes.

Second scenario: the exported data shall be long-term archived and read (even years/decades later, when the source system and the producer/owner of the data are no longer available) by another (now unknown) target CAD/PDM system from the OEM or

from a supplier. Unlike the first scenario where the whole assembly structure is exchanged within one single XML file, here there shall be one XML file per assembly node, plus leaf node documents (so-called "nested" or "full shattered" approach).

Description

The information is extracted from multiples OEM's repositories (CAD, PDM system). The information is organized in directories and files, assembled in a zip file. The information is then checked, encrypted and sent to the suppliers.
The design supplier gets the information, that he has to decrypt, and import to its own repository, using at least a CAD system and possibly a PDM system.
Scope of exchange:
- Based on ISO 10303 STEP AP242 Domain Model (XML) standard:
  - Part definition, optionally with a reference to its 3D definitions and associated documents
  - Part classification
  - involved people (as Part creator/owner/editor/approver/…)
  - approval status
  - dates (who created/edited/released the Part)
  - user defined attributes
  - PDM customization (over classification and properties)
  - validation properties (centre of mass, number of children), especially important for scenario 2
  - 'all in one' XML file (scenario 1) or 'nested' XML files (scenario 2)
- 3D definitions and associated documents in standard or native formats

Out-of-scope of exchange:
- Workflow Management process (changes of the lifecycle state of the parts and documents)

Scope of further use cases:
- Exchange of Configuration Management Data (dictionaries, specification[categories], effectivities, product configurations)
- Exchange of Change Management Data (work requests, work orders, activities)
- Multiple IDs (if OEM and supplier use different part/document numbers)
- Alternate/Substitute parts
- Kinematics (treated within CAx-IF and JT-IF)
- Assembly-level PMIs (treated within CAx-IF and JT-IF)
- Incremental Exchange
- Delta Exchange
- Multiple BoM views
- Mirrored Parts
- External Geometric Element Reference (treated within CAx-IF & EWIS-IF)
- Handling of multiple (alternative) geometries on the same Part, for example in case of Flexible Parts
- Product Structure Validation Properties
- Visual Issue Management
- Version Branch Effectivity
- Property Groups

Alternatives

When assembly structures are exported via a CAD STEP processor, a simpler mapping is allowed (without document/document versions). Both mappings (called 'CAx representation' and 'PDM representation') shall be supported during import.

Postconditions

The supplier is able to interpret the assembly structure, to perform his design process on it and optionally to send his changes back to the OEM.

Diagram

Here a typical activity diagram (under many others):
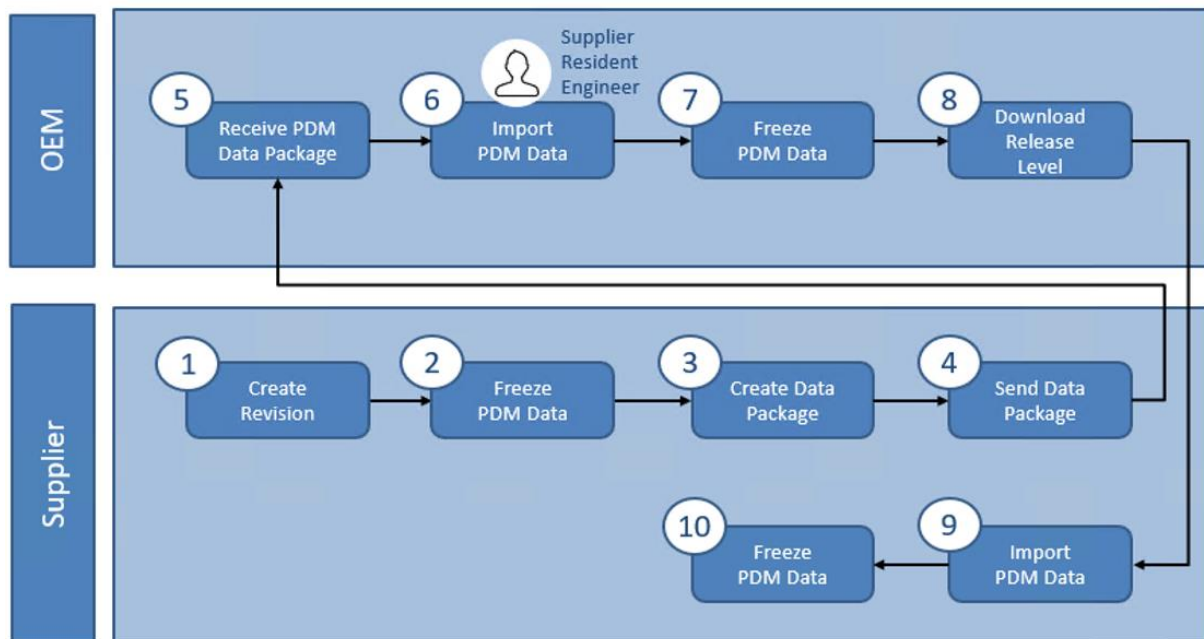
Benefits

Enables a powerful design collaboration across company boundaries. Ability to describe all aspects of the assembly in a semantically accurate way with the associated recommended usage of AP242.