Use Case: Exchange of a Product Assembly with Version Branch Effectivities (also called Product State Effectivity)
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Use Case: Exchange of a Product Assembly with Version Branch Effectivities

Aim

Exchange of a Product Assembly with Version Branch Effectivities (also called Product State Effectivity or Model Version Effectivity) associated to Model Versions.

Actors

- One OEM
- Supplier partners dealing with design engineering

Preconditions

OEM is able to 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, associated to Version Branch Effectivities and the versioning tree (branches) of a Product, including the master data of each assembly/component part, the 3D positioning of each component part and a reference to 3D geometry and associated documents.

The supplier is able to consume the technical data package, by validating and importing the information inside its information system (CAD and PDM).

Description

Version Branch Effectivities are especially powerful for industries that design each serial number of their product (like aerospace): instead of working/maintaining all the time the 150% BoM (like automotive), a branch gets defined for a given serial number or many serial numbers belonging to the same order, the product structure gets pruned to the relevant scope (120%, 110% or even 100% BoM).
Each modification is performed in the context of one or multiple branches (so-called Model version). This generates automatically so-called version branch effectivities in the product structure.

Changes within a new design stage may cause changes to the previously existing effectivities (if a part gets replaced or removed), so that its effectivity gets limited to the

previous design stages. The newly introduced part usages get an effectivity from the new design stage to infinity.

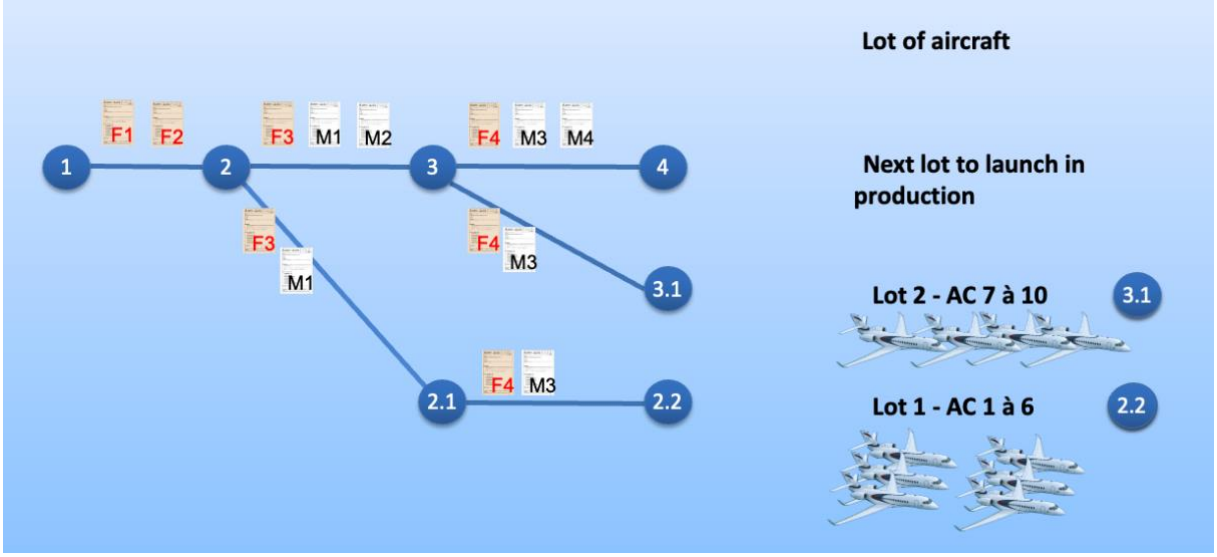
Configured Data exchange of one single branch is not practicable, since introducing a new branch may require updating some effectivities associated to other branches

- Either 150% data exchange including all the branches (the whole tree
- Oder 100% data exchange on single ProductConfiguration (in this case, the effectivities are only for mentioned information)

Postconditions

The supplier is able to interpret the assembly structure, the configuration, the model version, to perform his design process or pre-manufacturing process.

Diagram



The Model Versions (1, 2, 2.1, etc.) and the modifications (F1, M1, etc.) are realized in this order through the time to have at the end the trunk version 4 for future lots, the Lot 2 corresponding to the Model Version 3.1, and the Lot1 corresponding to the Model Version 2.2:

- between the design stages 1 and 2, two modifications (F1 and F2) shall be documented
- between the design stages 2 and 3, three modifications (F3, M1 and M2) shall be documented. A lot composed of aircraft number 1 to 6 gets defined (hat no relationship yet to the version tree).
- For this lot, only the modifications F3 and M1 are relevant => therefore, a branch gets created to the design stage 2.1
- between the design stages 3 and 4 (on the trunk), three modifications (F4, M3 and M4) shall be documented

- A lot composed of aircraft number 7 to 10 gets defined (hat no relationship yet to the version tree).

- For the lot with the aircraft number 1 to 6, only the modifications F4 and M3 are relevant => a design stage 3.1 gets defined on the branch

- For the lot with the aircraft number 7 to 10, only the modifications F4 and M3 are relevant => therefore a branch gets created to the design stage 3.1

- each lot may lead to another branch. If necessary, sub-branches may be defined for subsets of the lots, even for single aircrafts

Benefits

Enable 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.