

Use Case: Exchange of a Product Assembly with Mating information

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Mentor: PDM-IF

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Aim

Exchange of a Product Assembly with Mating information

Actors

- One OEM
- Supplier partners dealing with design and manufacturing engineering or with simulation

Preconditions

OEM is able to produce a valid data package from different applications, which is essentially its CAD, PDM and Mating 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, to associated documents and to a file that describes the mating definition.

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

Description

- Mating holds the information about:
 - Type of mating (screwing, welding, riveting, clips, gluing, ...)
 - Which parts are mated together (so-called linked parts)
 - Which fasteners (defined by parameters + by geometry) are involved
 - In which order (stacking)
 - Direction of the fasteners and 3D positioning
 - Mating attributes, for example tightening torque
 - In case of 150% BoM: configuration of the involved fasteners and of their 3D positioning

- Having a stable Id of the Mating object in case of geometrical changes
- Used in the same way for all types of mating (same methods and functions, with different parameters)

Alternative 1:

- A bundle object describes all the fasteners needed for a given set of linked parts.
- Each fastener may have a different mating type and definition.
- The fasteners may be reused in one or in several bundles
- Especially usefull in case of products having large number of identical fasteners within the same bundle (for example hundreds of rivets to link the same parts)

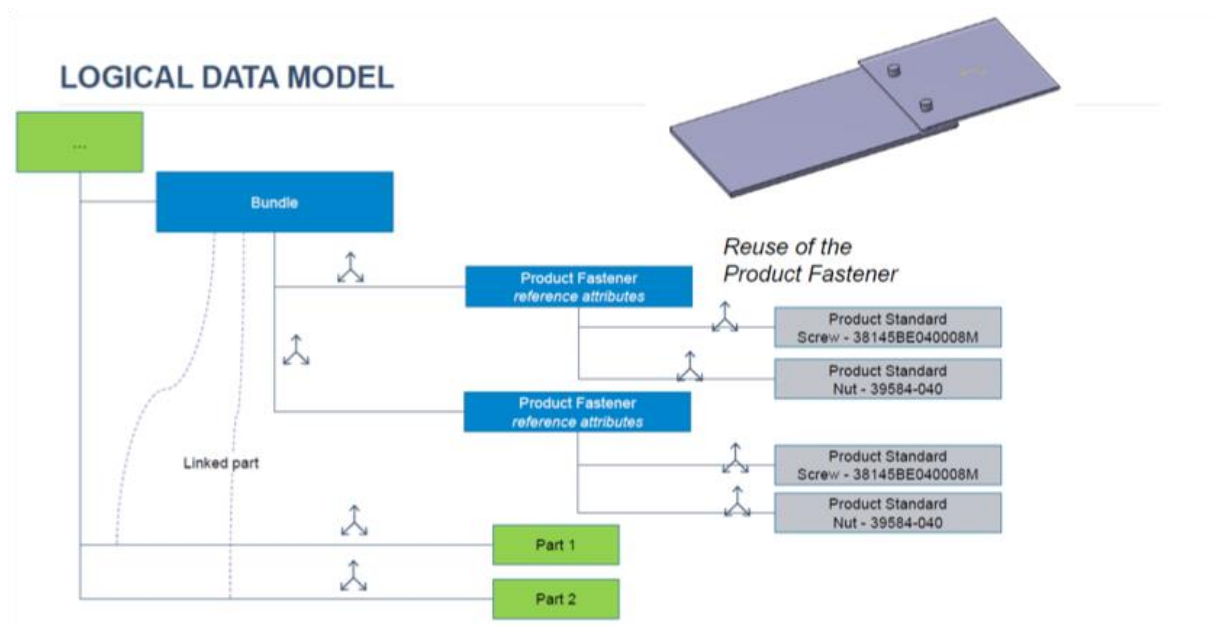
Alternative 2:

- Each fastener is managed individually (composition, position and linked parts)
- Mapped as bundles with only one fastener.
- Sufficient in case of products that have few fasteners (no long lines of rivets)

Postconditions

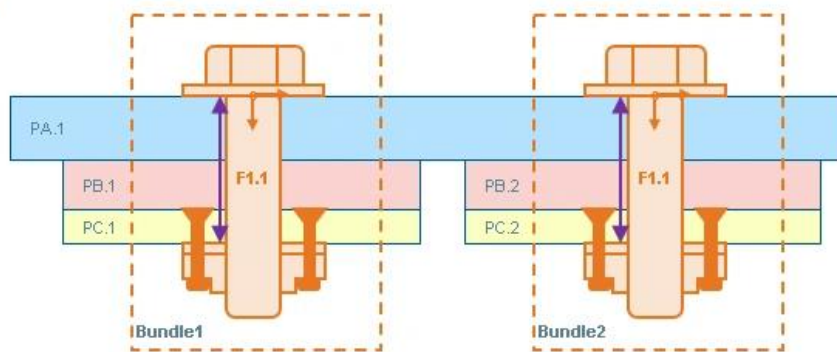
The supplier is able to interpret the mating data to perform his design, manufacturing or simulation process.

Diagram



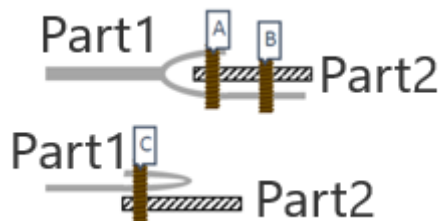
Example of nested fasteners

The lower washer and the nut are riveted to the lower part (PC occurrences 1 and 2) prior to being screwed together with PA and PB.

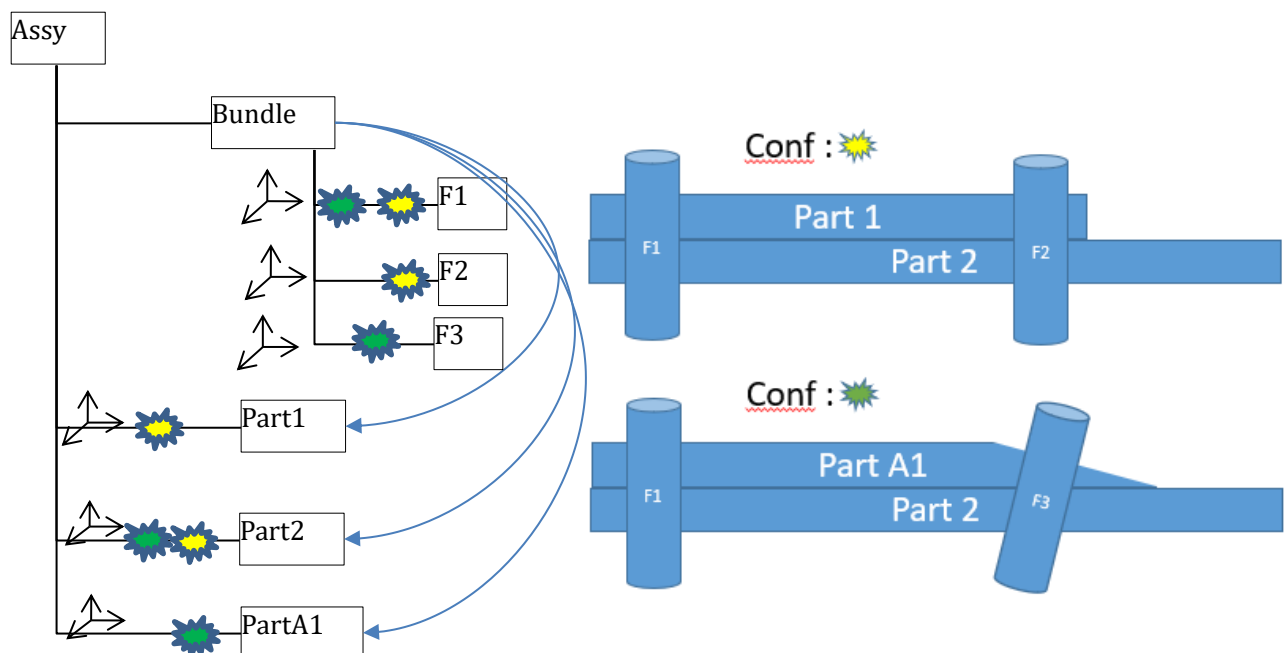


Example of deviating stacking for each fastener

Sometimes, within one bundle, the order of the stacking may deviate from one fastener to the other. In this example, the stacking for fastener A is Part1/Part2/Part1, for fastener B it is Part2/Part1 and for fastener C it is Part1/Part1/Part2



Example of configured mating definition



The Bundle may contain 150% of the parts, together with all possible fasteners depending on the configuration.

Additional aspect of the example above: the part holes do not belong to the CAD geometry, but are defined as feature, depending on the location/orientation of the fasteners (here F2 or F3)

Out-of-scope of exchange:

- Geometric level stacking (which geometric faces are involved). This is in scope of the CAX-IF
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Benefits

Enable a powerful Mating management across company boundaries. Ability to describe complex Mating in a semantically accurate way, relying on appropriate collaboration patterns.