

Implementation of a closed-loop product definition process using Teamcenter Enterprise Product Configuration

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Implementation of a closed-loop product definition process and Product Configuration

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Presentation of Siemens Industrial Turbomachinery

Siemens group

Power



Information and Communications



Automation and Control



Transportation



Medical



Lighting



Power Generation

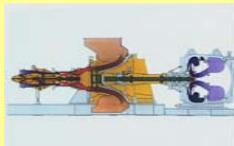
Industrial Turbomachinery

Electric drive and Compressors

Large turbines

Power Transmission and Distribution

Compressor train



Turbines / Drives

Steam Turbine



Electric Drive



Gas Turbine



Industrial power plants



Combined Cycle Power Plants



Presentation of Siemens Industrial Turbomachinery

Siemens Industrial Turbomachinery

- **Finspong, (Sweden)** Research & development, design, marketing & sales, project management, manufacturing, delivery and service of steam & gas turbines and complete power plants
- **Lincoln, (UK)** Design, manufacture, installation and service of small gas turbines for the Oil & Gas and Power Generation industries
- **Duisburg, (Ger)** Headquarter Siemens Power Generation Industrial Applications, competence center for compressor manufacturing, service and the Oil & Gas business
- **Goerlitz, (Ger)** Headquarter industrial steam turbine business, competence center manufacturing for turbosets, compressors and pump drives
- **Brno, (CZ)** Competence center for industrial steam turbines incl. design, production, assembly, project management and service
- **Nuremberg, (Ger)** Competence center steam turbine service and production
- **Houston (USA)** New machine business (esp. gas turbines) incl. engineering, marketing, packaging & testing
- **Trenton (USA)** Competence center service for North America
- **Hengelo (NL)** Manufacturing and support location for service and Oil & Gas
- **Erlangen (GER)** Provider of turnkey solutions for industrial cogeneration of heat and power with output up to 150 MW

In total 9000 employee. Finspong have 2000 employee and covers the complete product range except compressors. Finspong, Duisburg and Lincoln are about same size in number of employee.

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Background and objective

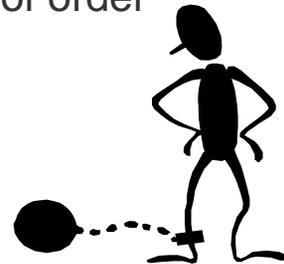
There are a number of barriers hindering our ability to reach our goals

Goals and strategic context

- Reduction of lead time
- Reduction of capital employed
- Ability to establish operation at other sites / local supply chain
- Reduce non conformance cost
- Improved ability to provide service to our customers

Current barriers

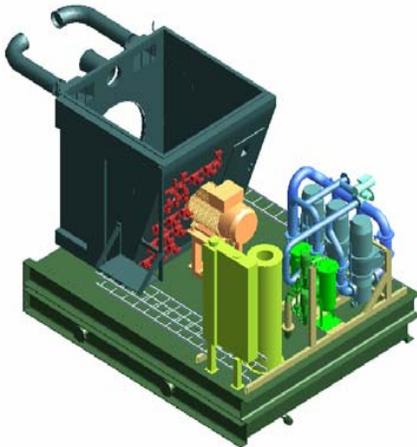
- Number of variants
- Limited reuse of standard products / solutions in order projects
- Degree of customization
- The way of managing Product data creates a lot of administration
- Not afford to hire new people just to be able to increase the number of order projects



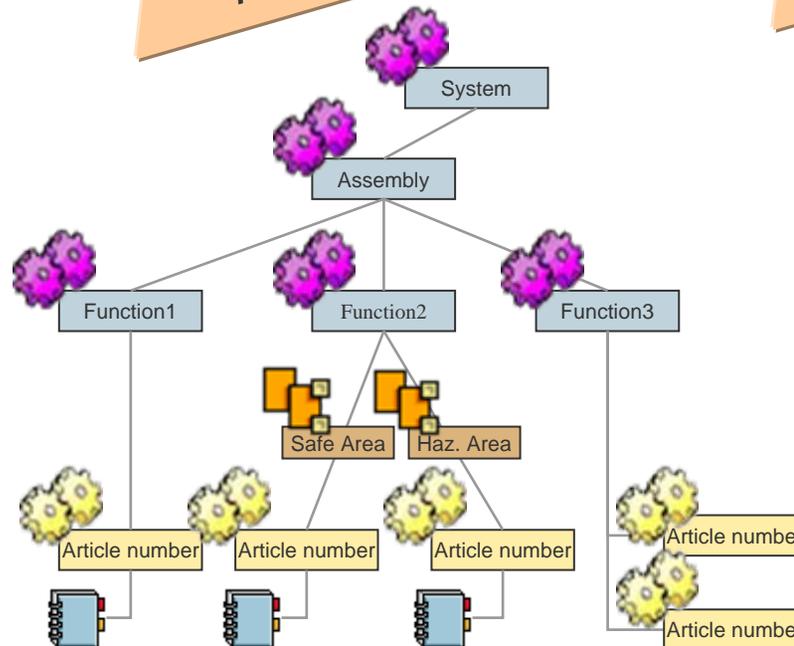
Background and objective

In order to address the issue three initiatives have been started

MODULARIZATION/
STANDARDIZATION



NEW WAY OF MANAGING
PRODUCT DATA



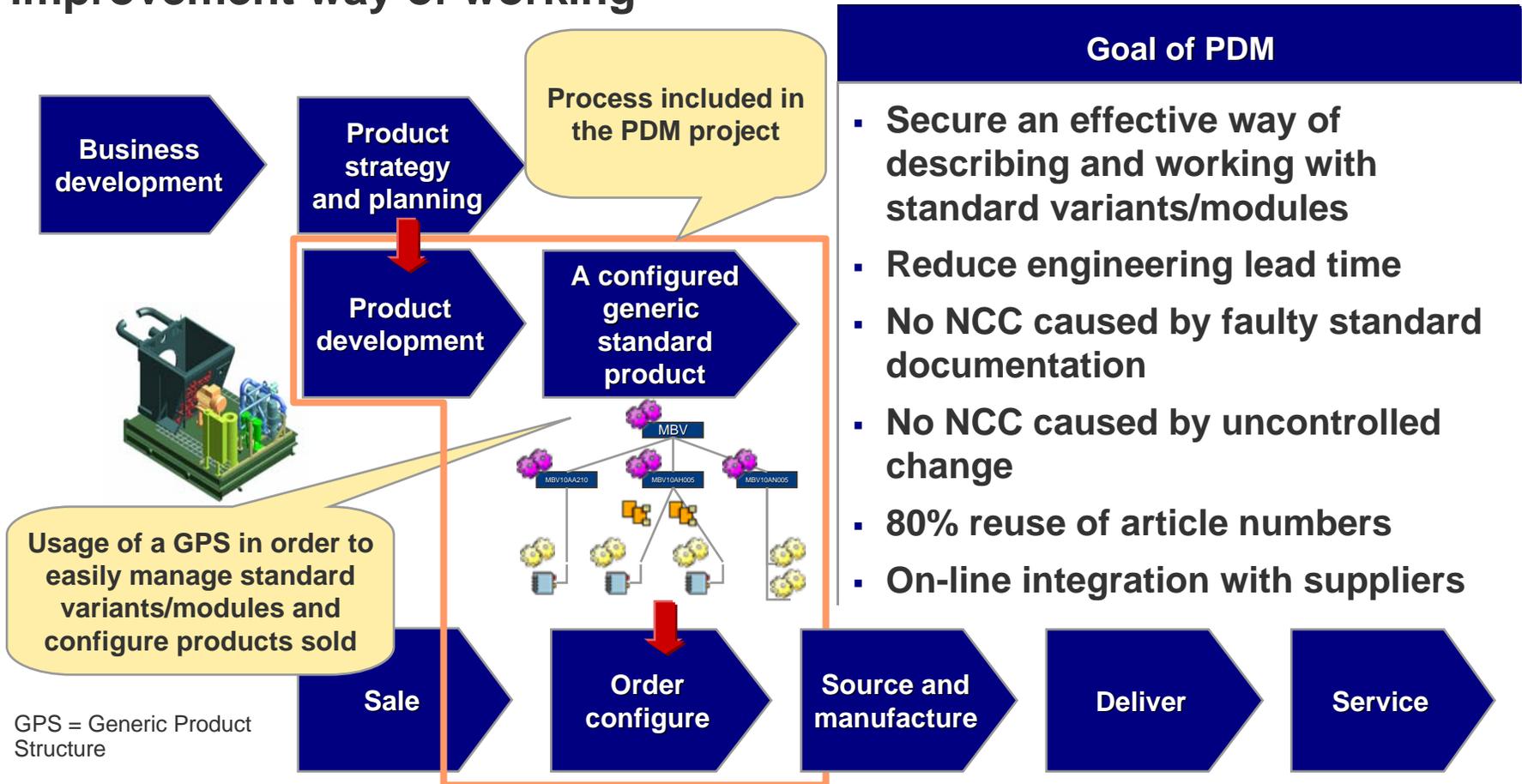
CLARIFY RESPONSIBILITY
Between departments

Development:
Manage, Develop and
Maintain Generic
Product Standard

Order design:
Use Standard in order
Projects, when needed
order develop

Background and objective

The PDM project objective is to create prerequisites for an improvement way of working



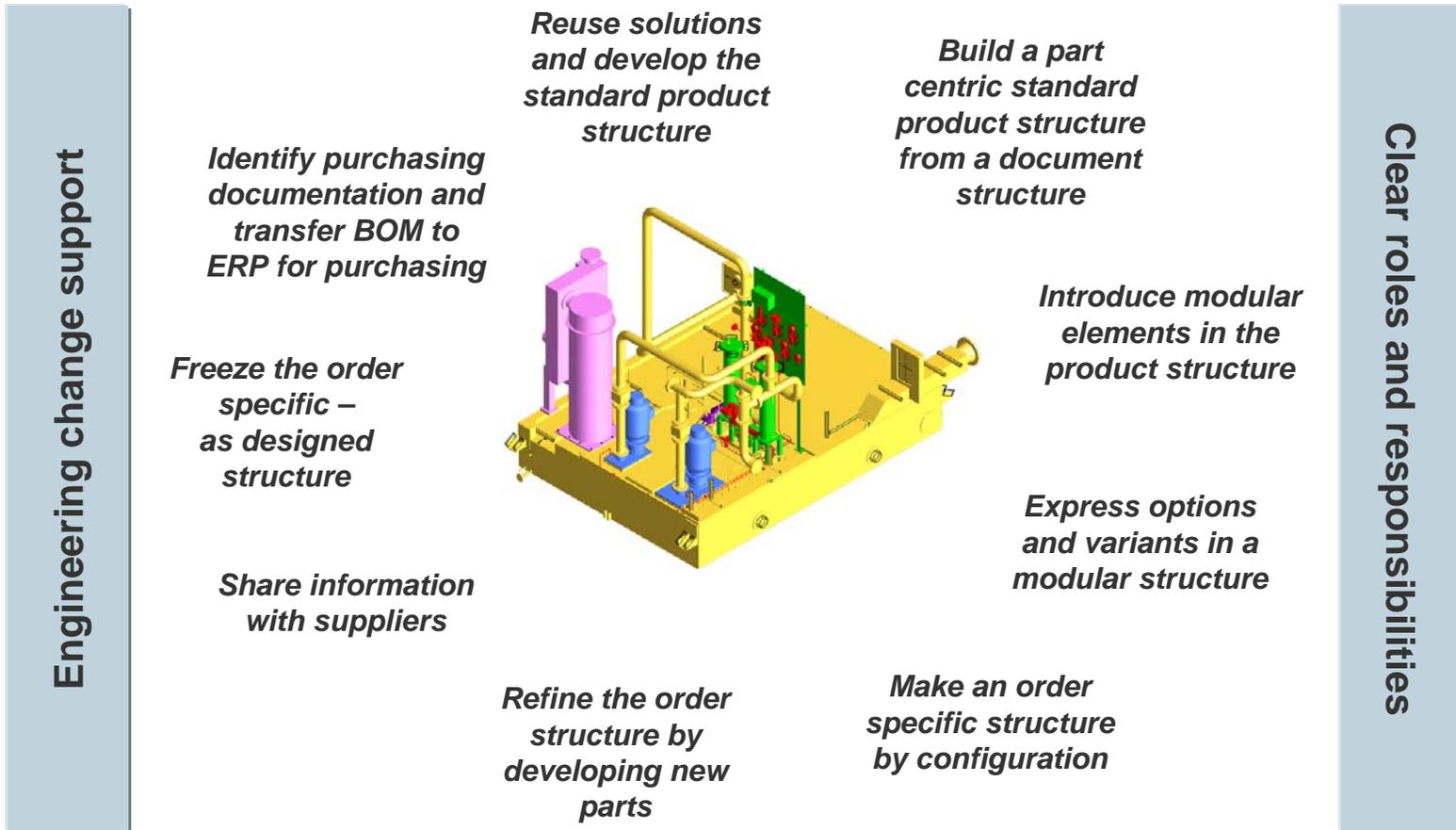
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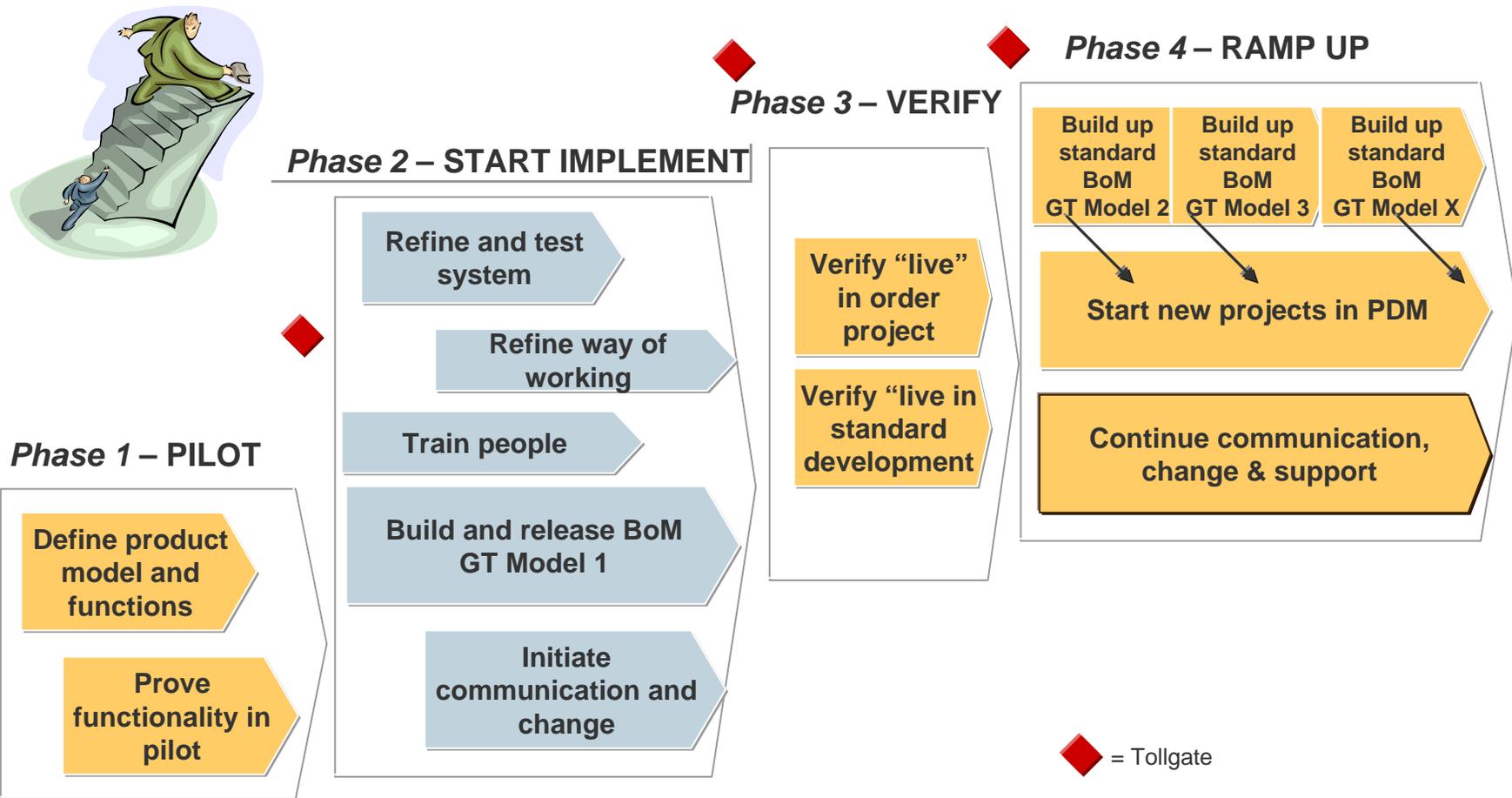
The PDM project and it's benefits

The way of working to go from a document centric to a part centric product description



The PDM project and its benefits

The whole PDM project follows a four phase approach



The PDM project and its benefits

The key objects in PDM in order to manage the product standard

I am an article

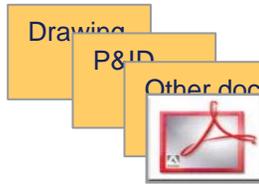
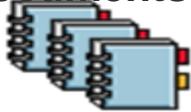


Part

- Article number
- Revision
- Name
- Development status

*I describe how the article/
product looks like*

Documents



I am what you tell me to be

Module



- Module ID
- Description
- Development status

I decide which article the module should use

Option family

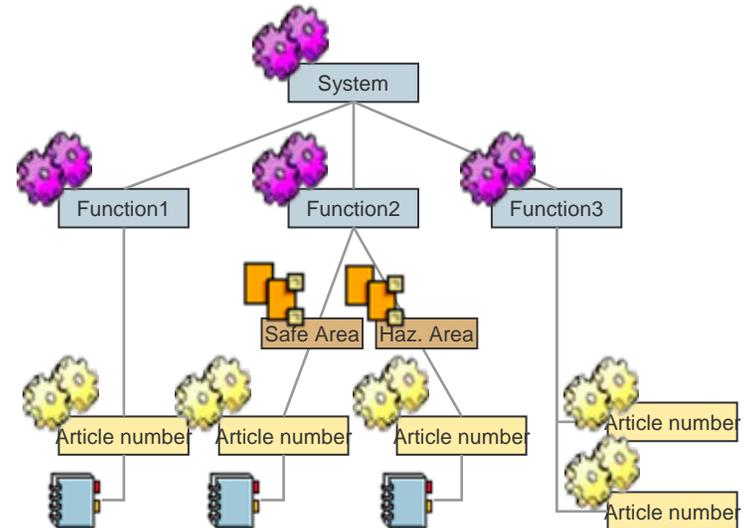


Area Classification

Option values

Haz. area

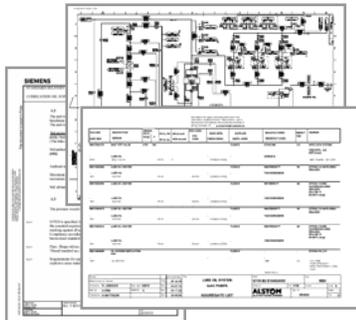
Safe area



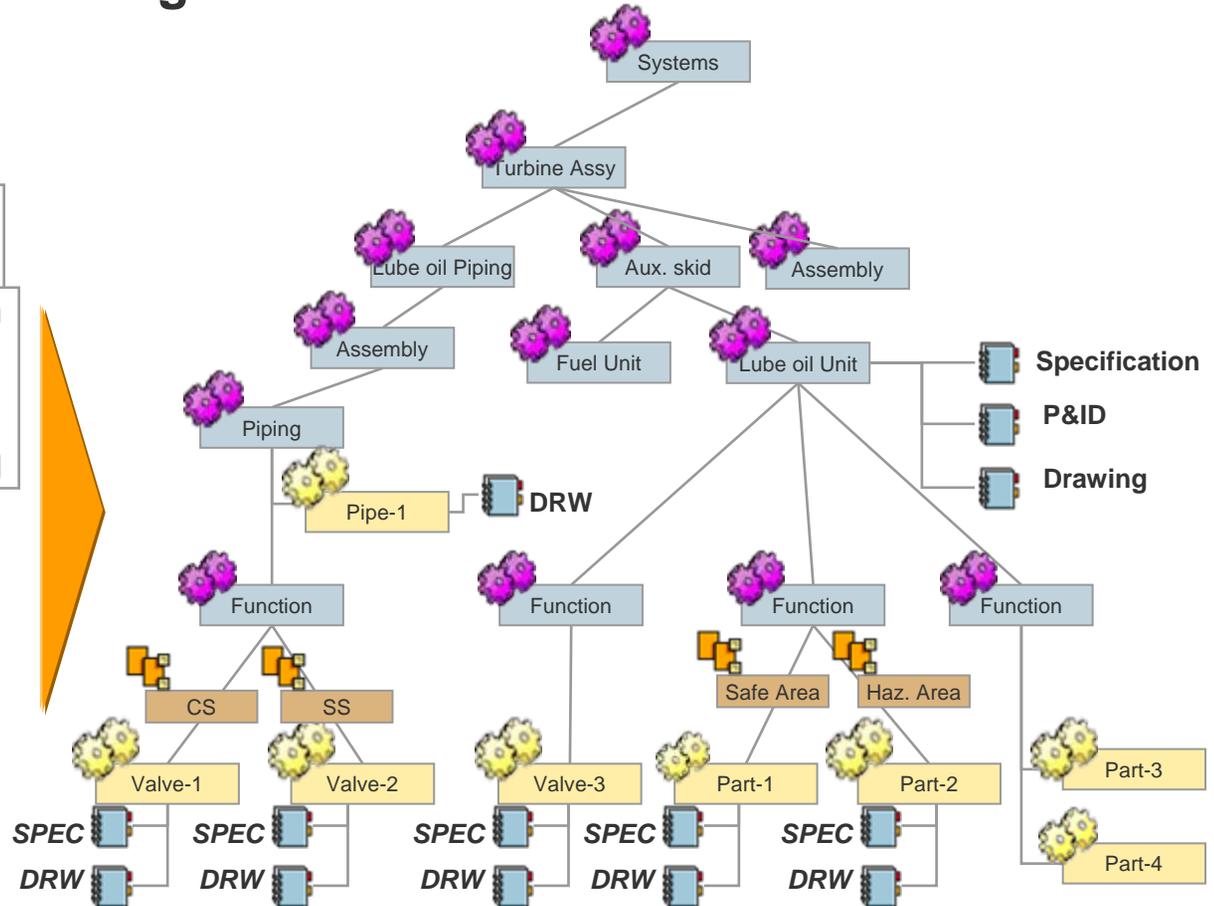
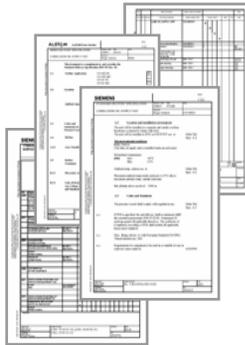
The PDM project and its benefits

By linking our current documents to the product structure we get an article centric way of working

P&ID Lists
System req..
System descr.

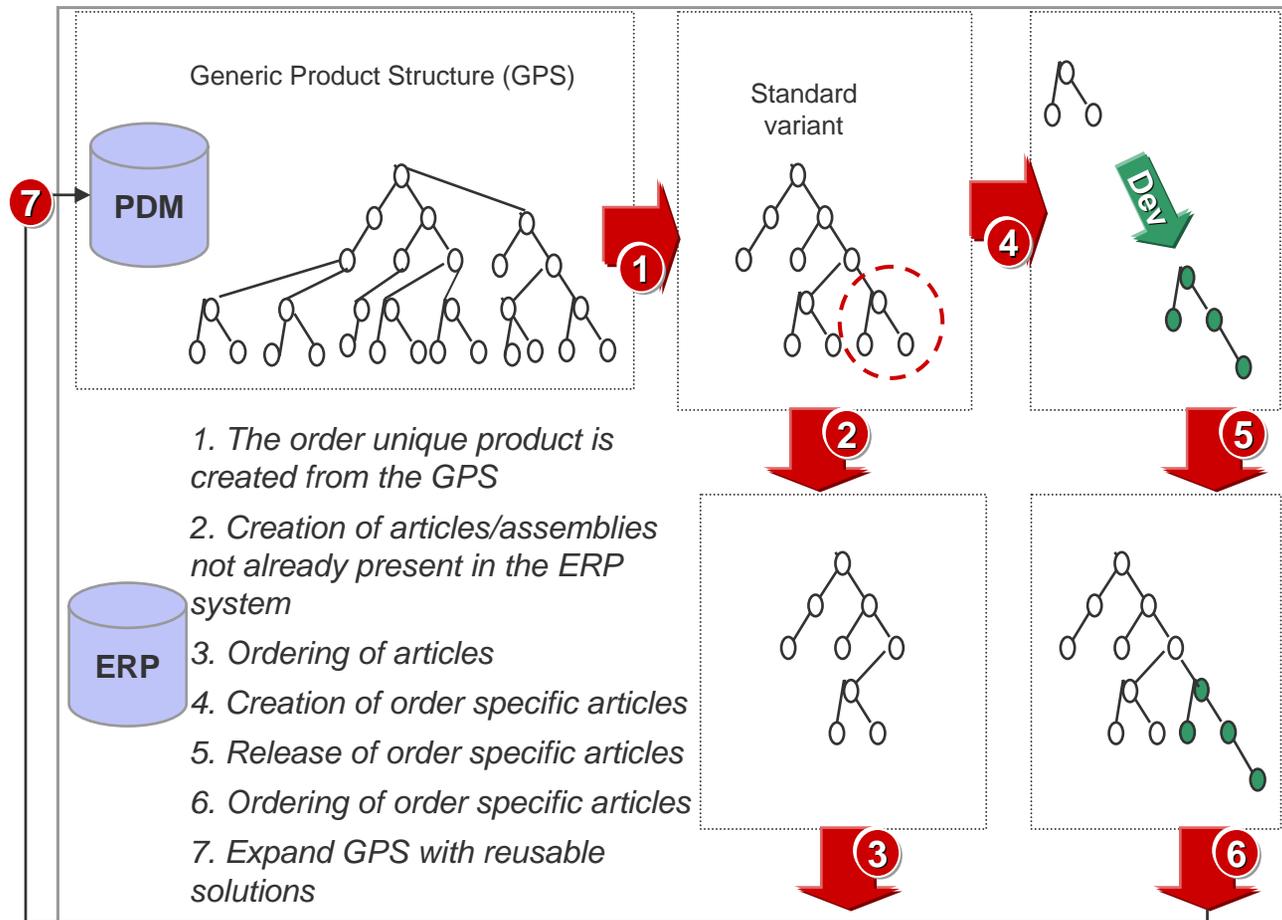


Main group
Specifying
Documents
Principle drw



The PDM project and its benefits

The PDM system will contain the generic product structure which is the starting point for order specific configuration



Comments

- The solution uses ERP as a system handling order projects only and no generic structures or variants
- Generic product structure is placed in PDM

Pros and cons

Pros

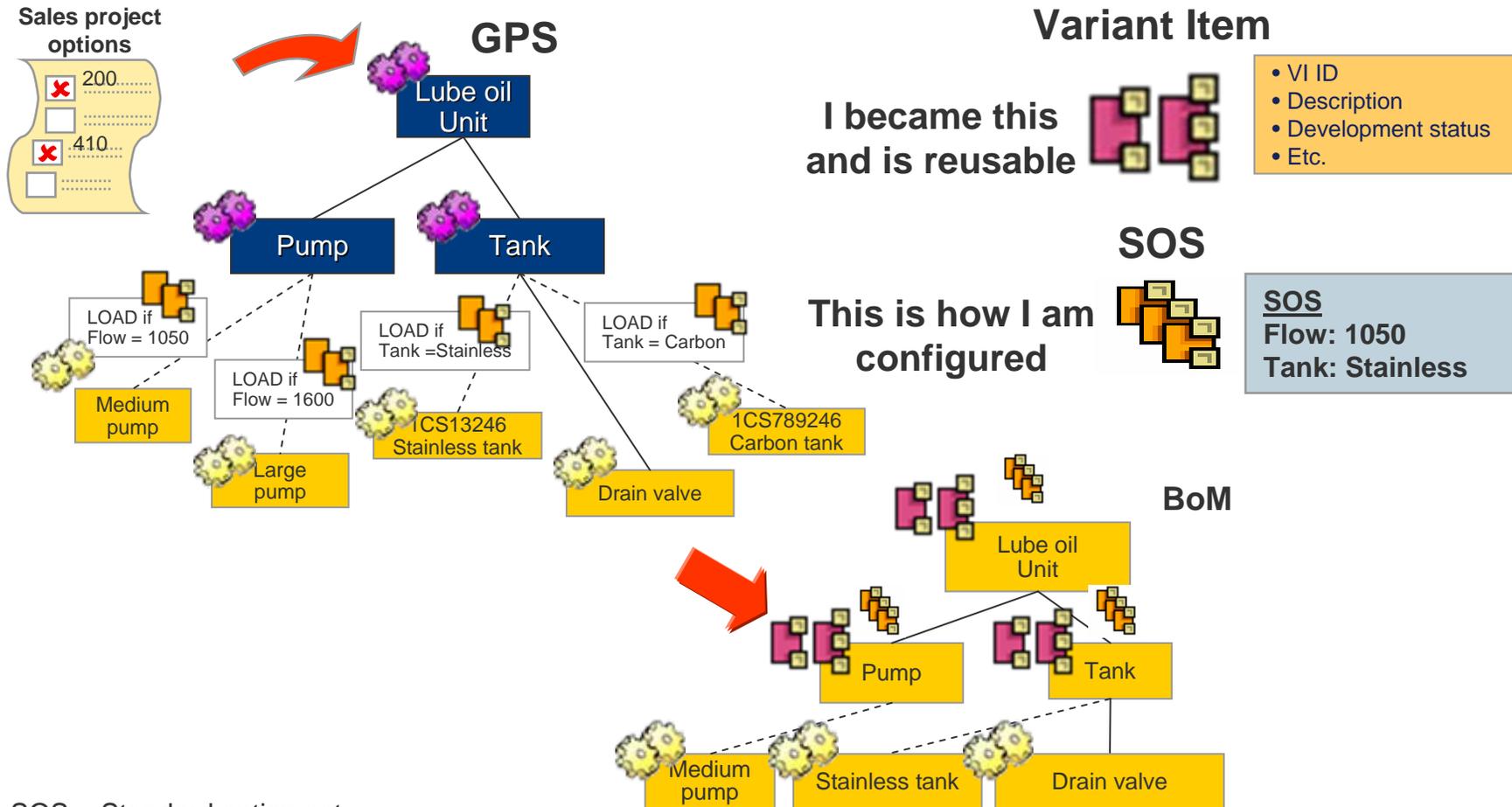
- Configuration takes place only in one place
- Changes in ERP have limited impact on the solution
- Uses “standard” PDM functionality

Cons

- No pre-defined structures in ERP

The PDM project and its benefits

Variant item and SOS describes the configured GPS as a BoM



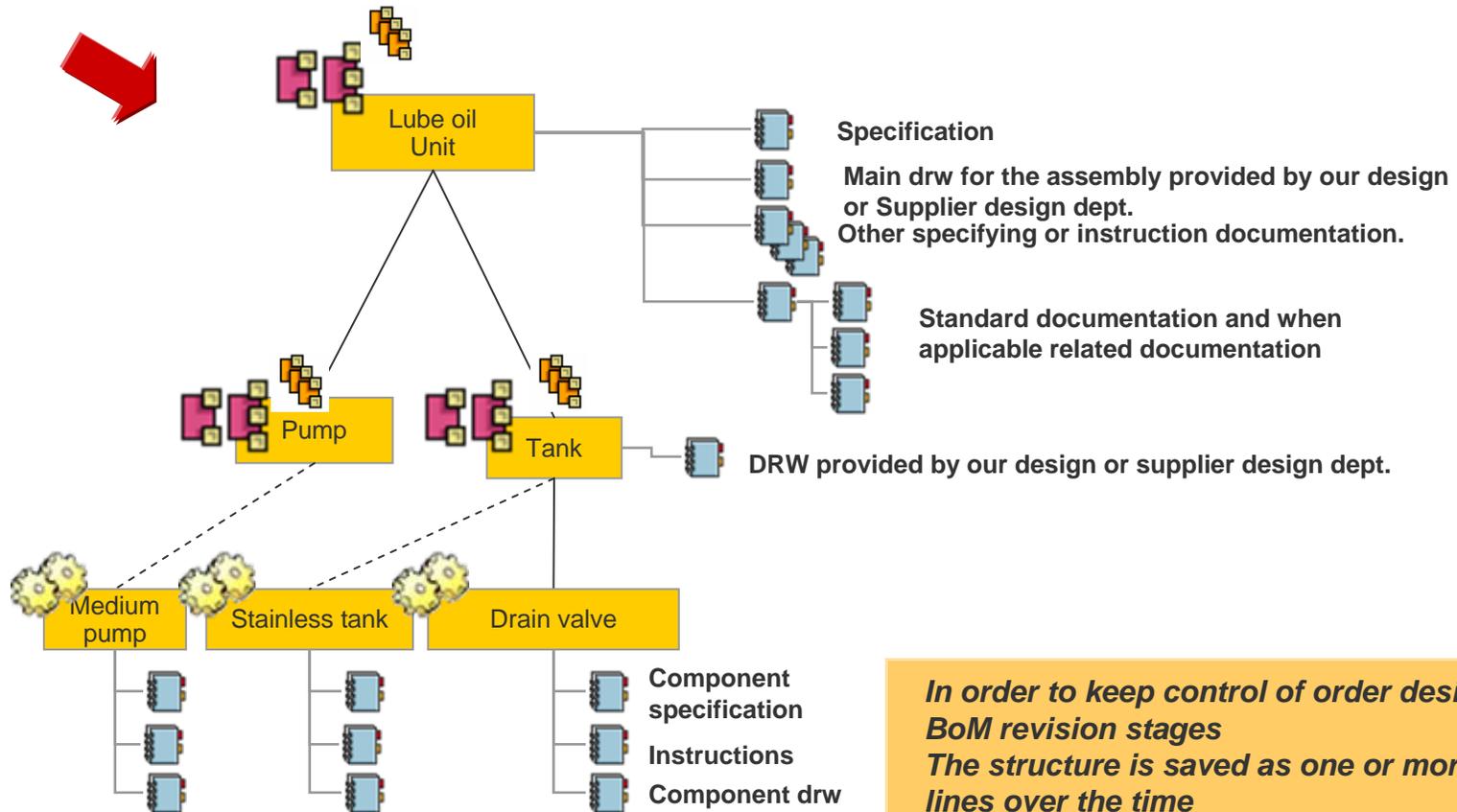
SOS = Standard option set

The PDM project and its benefits

Documentation is linked to the Variant Item structure

GPS

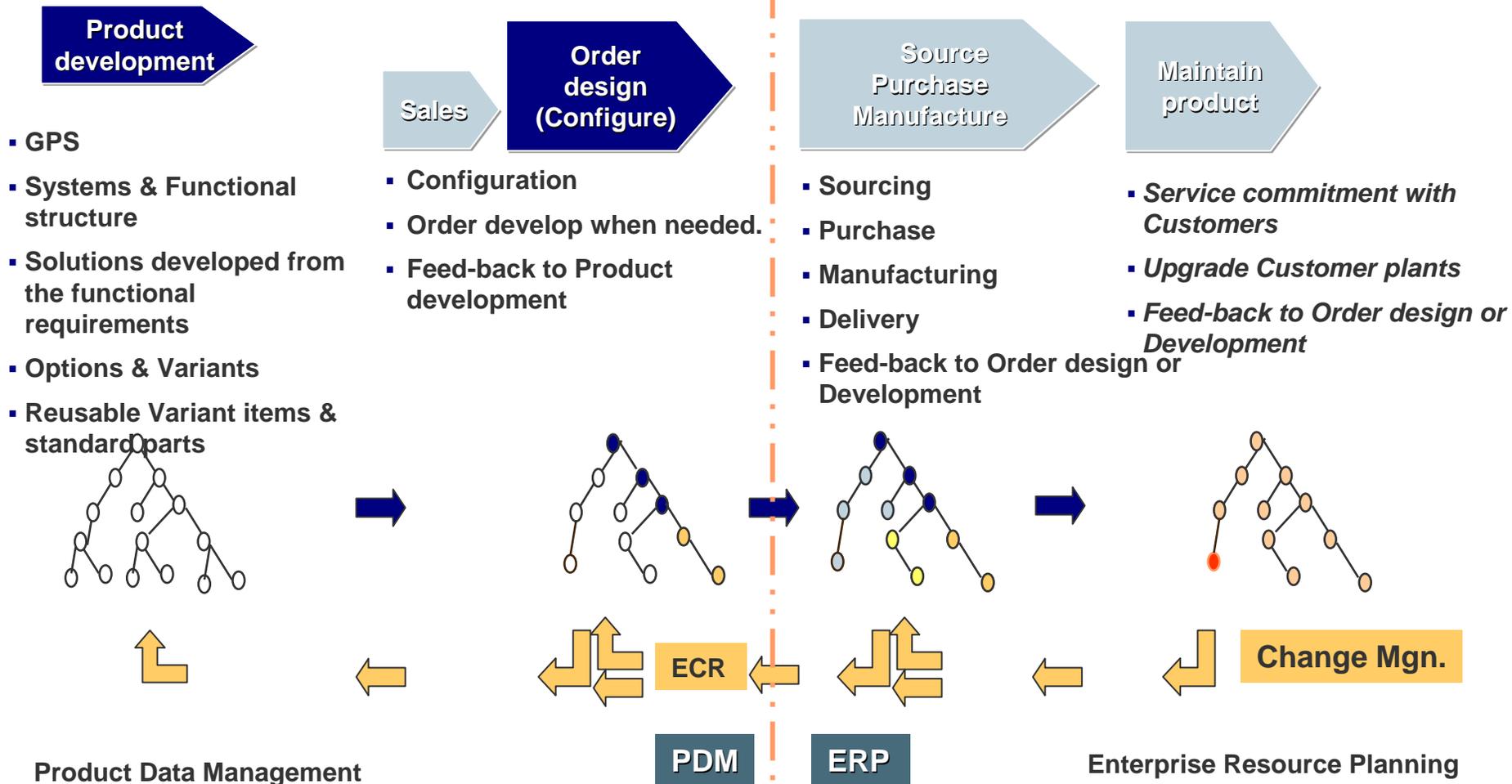
Variant Item



*In order to keep control of order designed BoM revision stages
The structure is saved as one or more base lines over the time*

The PDM project and its benefits

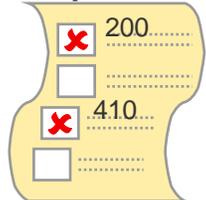
Development and Order design is included in the scope of PDM



The PDM project and its benefits

Standard Variants can be generated from a configured GPS (either proactively by Development dept. or in an order project) – a standard variant (VI) is generated

Sales project
Options"



GPS

Lube oil Unit

Selected option set
Flow: 1050
Tank: Stainless

Pump

Tank

LOAD if
Flow = 1050

LOAD if
Flow = 1600

LOAD if
Tank =Stainless

LOAD if
Tank = Carbon

Medium pump

Large pump

1CS13246
Stainless tank

1CS789246
Carbon tank

Drain valve

Configure GPS

Configured
STANDARD variant

Main activities

- Apply selected option sets according to Sales option list
- Reuse** standard solutions and create variant items (VI) that represent the order specific structure

The VI is set to **REUSABLE** = Standard is always reused

Lube oil Unit

Pump

Tank

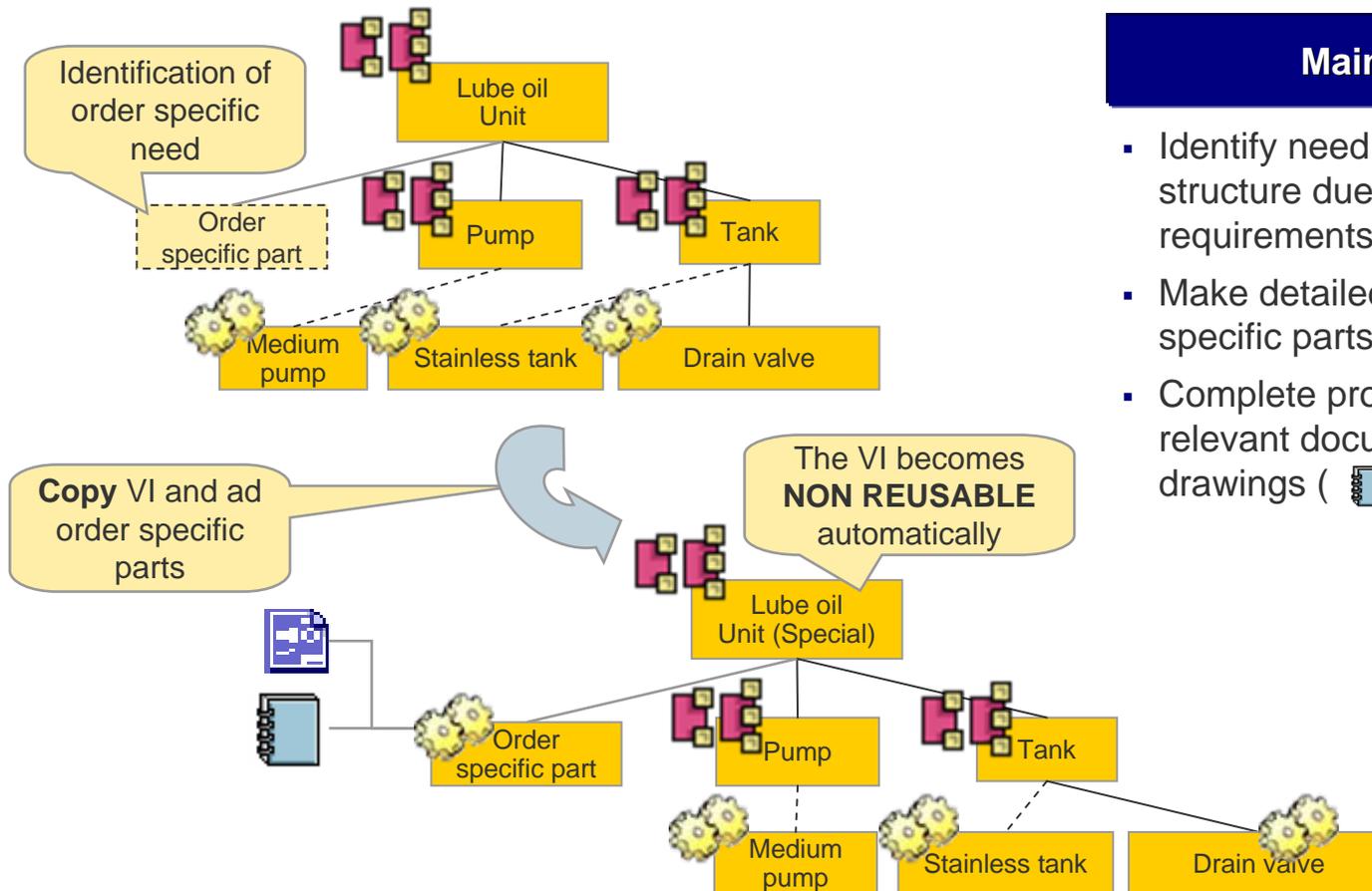
Medium pump

Stainless tank

Drain valve

The PDM project and its benefits

If needed, the product structure to include order specific parts – VI can be copied to an order specific (Non Reusable) variant.



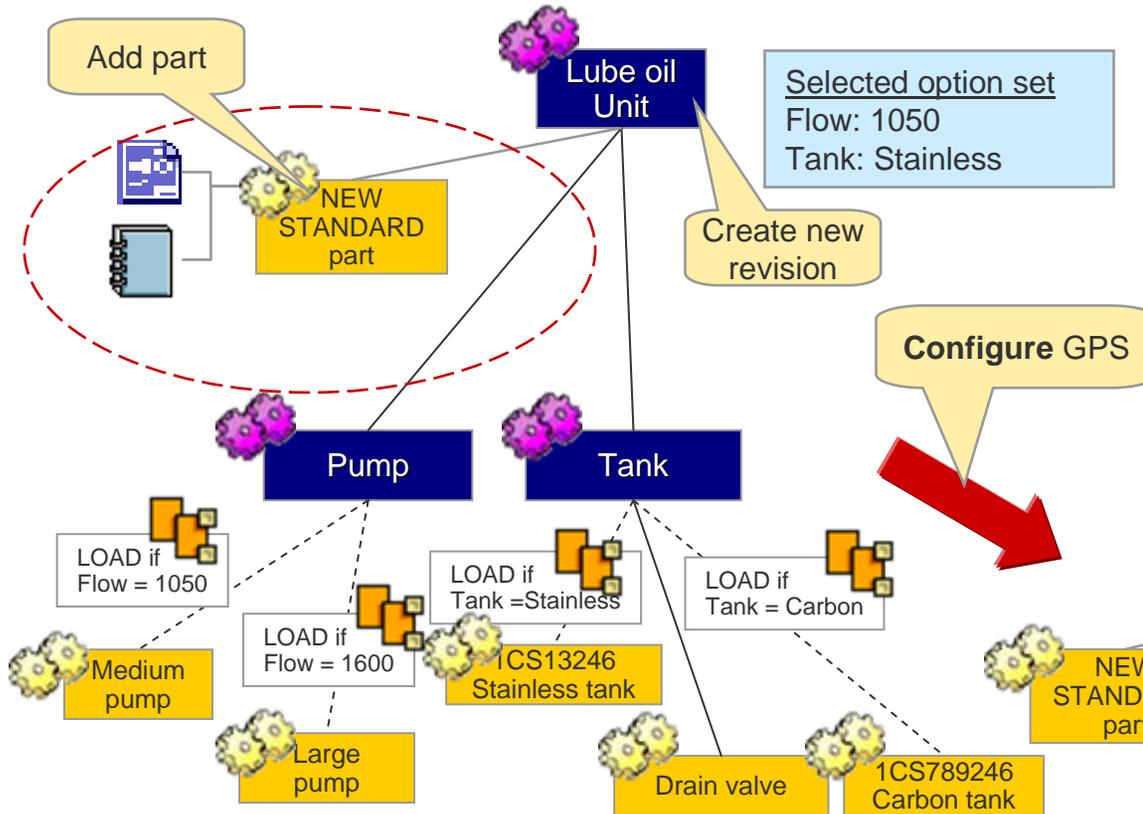
Main activities

- Identify need for modifying the structure due to customer requirements
- Make detailed design of order specific parts
- Complete product structure with relevant documentation and drawings (📁)

The PDM project and its benefits

If the “order specific VI” should be used as the new standard, the GPS is updated and a new reusable Standard VI can be configured

Revised GPS

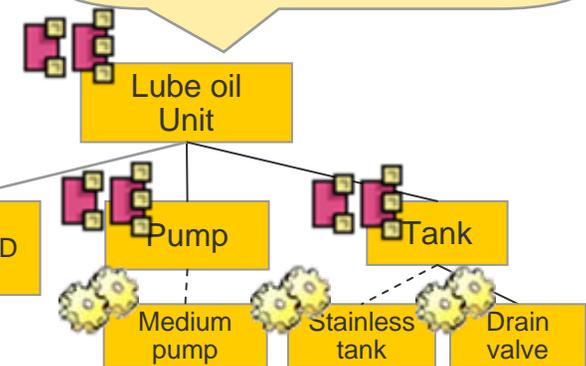


Main activities

- Update the GPS
- Configure a new standard VI

New configured standard variant

The VI is set to **REUSABLE** = Standard is always reused

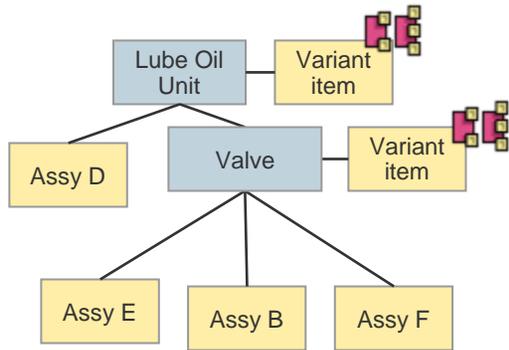


The PDM project and its benefits

Articles can be delivered to ERP with full depth

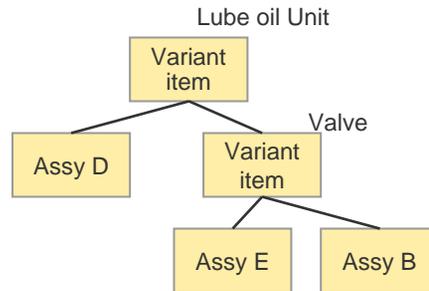
ERP hand-over

**Configuration
Standard or Order**

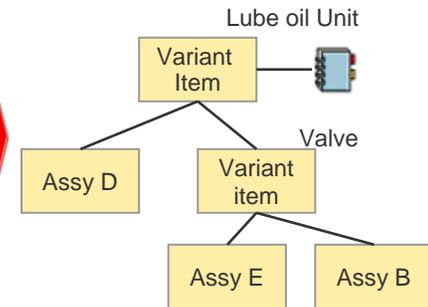


PDM

**Standard or Order
design in progress**



**Release associated
documentation**

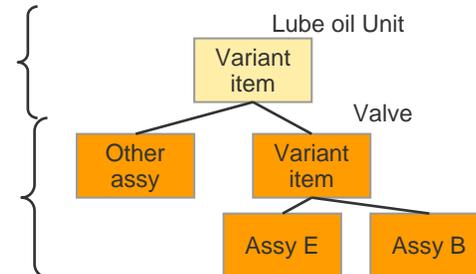


ERP

Production Planning
Sourcing
Purchasing
Manufacturing
Service

Purchase article
Assembly article

Included articles



The PDM project and its benefits

The PDM project will create significant benefits

Benefits

- Complete control of our standard with maximum reusability
- A product that is documented in a part centric way.
- A significant improved way of developing products
- A standard that is “always” updated
- Ability to easy configure a MAS (Market Adapted Standard) variant (including all parts, documents etc.) in order project.
- Easy to find information

...which will give us

- Reduction in Non Conformance Cost (NCC)
- Reduce non value added work
- Reduced lead-times
- Prerequisites to handle e.g. individuals (improvements for service)