

The background of the slide is a photograph of a modern city skyline at dusk. Several skyscrapers are illuminated with blue and white lights. Overlaid on the image are several glowing teal lines that form a network or circuit-like pattern, connecting different parts of the skyline. A semi-transparent white horizontal band is positioned across the middle of the image, containing the main title and subtitle.

Mechanics und Electronics – Two worlds, one target

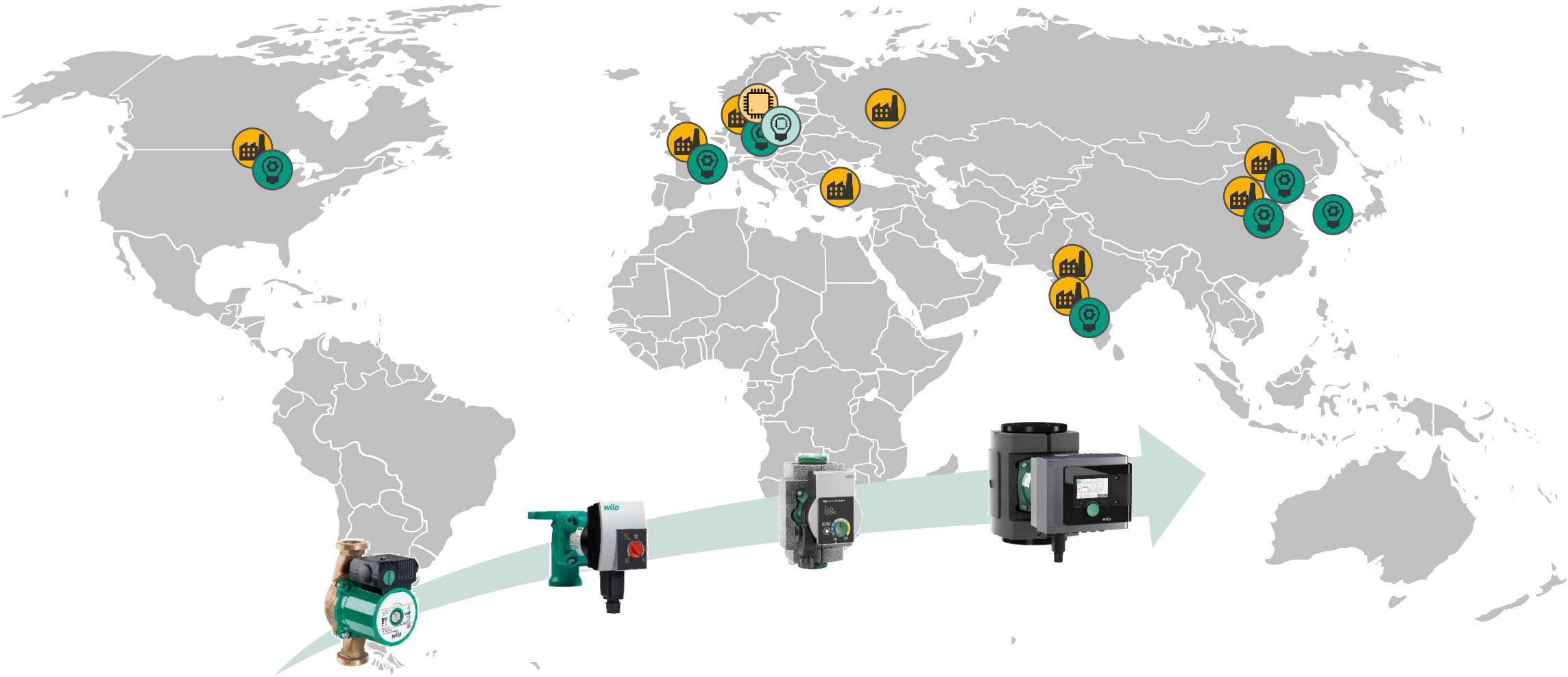
Collaborative development with SAP PLM at Wilco SE

Matthias Reinelt, Dr. Benjamin Eilebrecht, Wilco SE

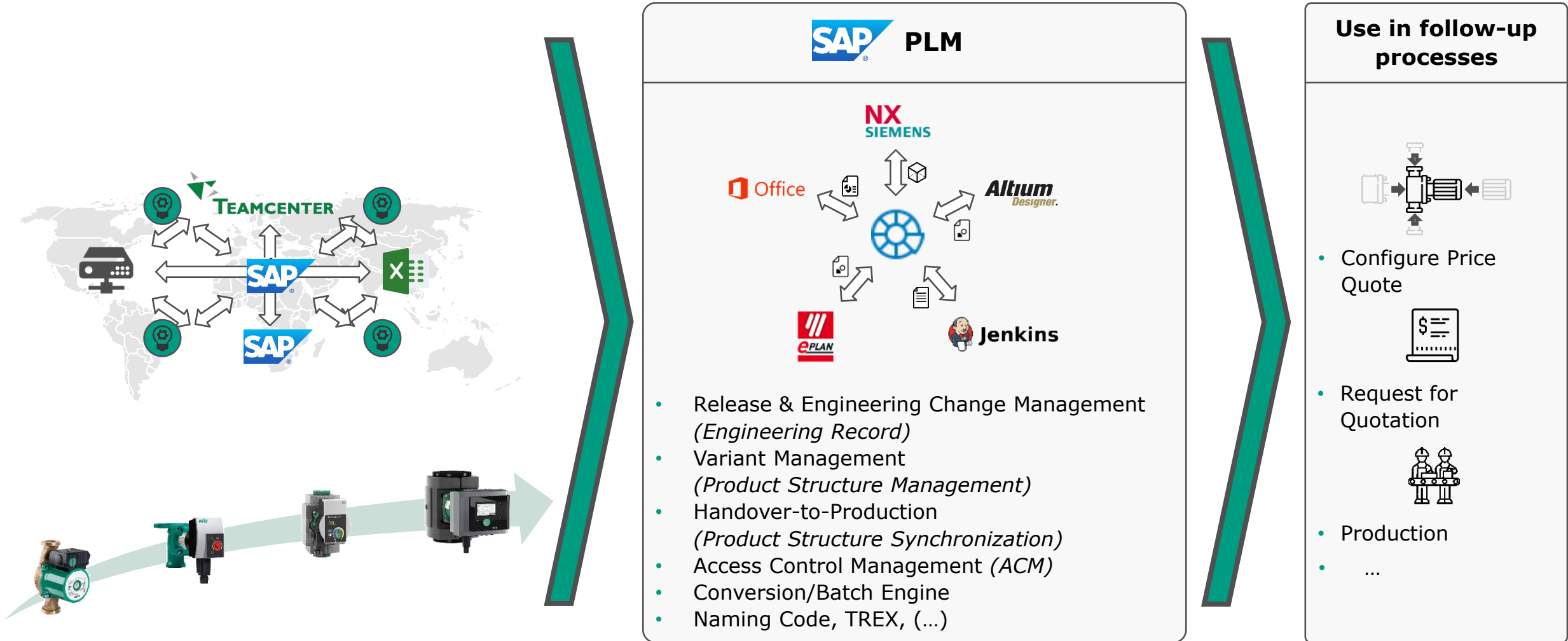


Pioneering for You

Wilo – Development and production distributed all over the world



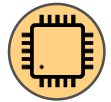
PLM@Wilo



- Release & Engineering Change Management (*Engineering Record*)
- Variant Management (*Product Structure Management*)
- Handover-to-Production (*Product Structure Synchronization*)
- Access Control Management (*ACM*)
- Conversion/Batch Engine
- Naming Code, TREX, (...)

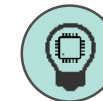
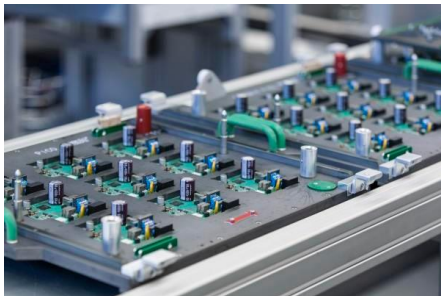
- ### Use in follow-up processes
- Configure Price Quote
 - Request for Quotation
 - Production
 - ...

The development and production of electronics is located in Dortmund



Electronics Production Site Dortmund Oestrich:

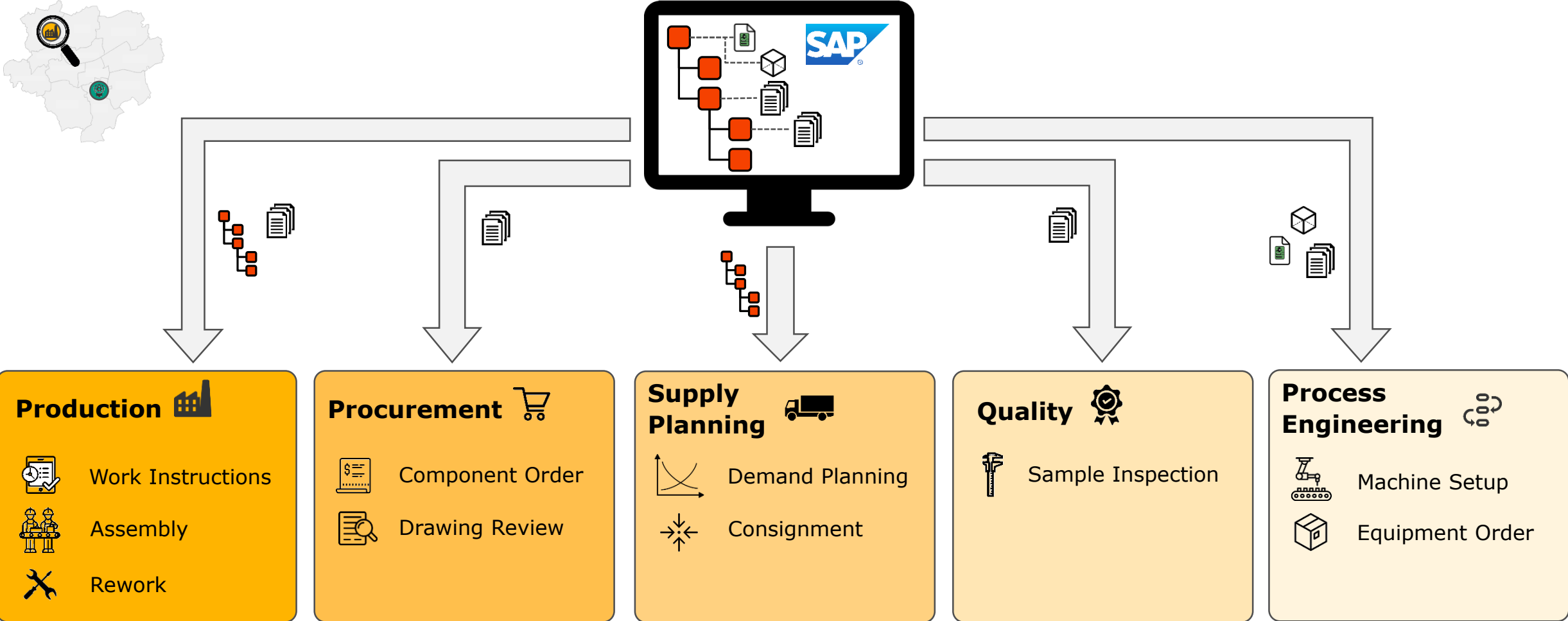
- Production of
 - Electronic Assemblies
 - Electronic Modules
- Operational Departments:
 - Procurement
 - Supply Planning
 - Quality
 - Process Engineering
 - Production



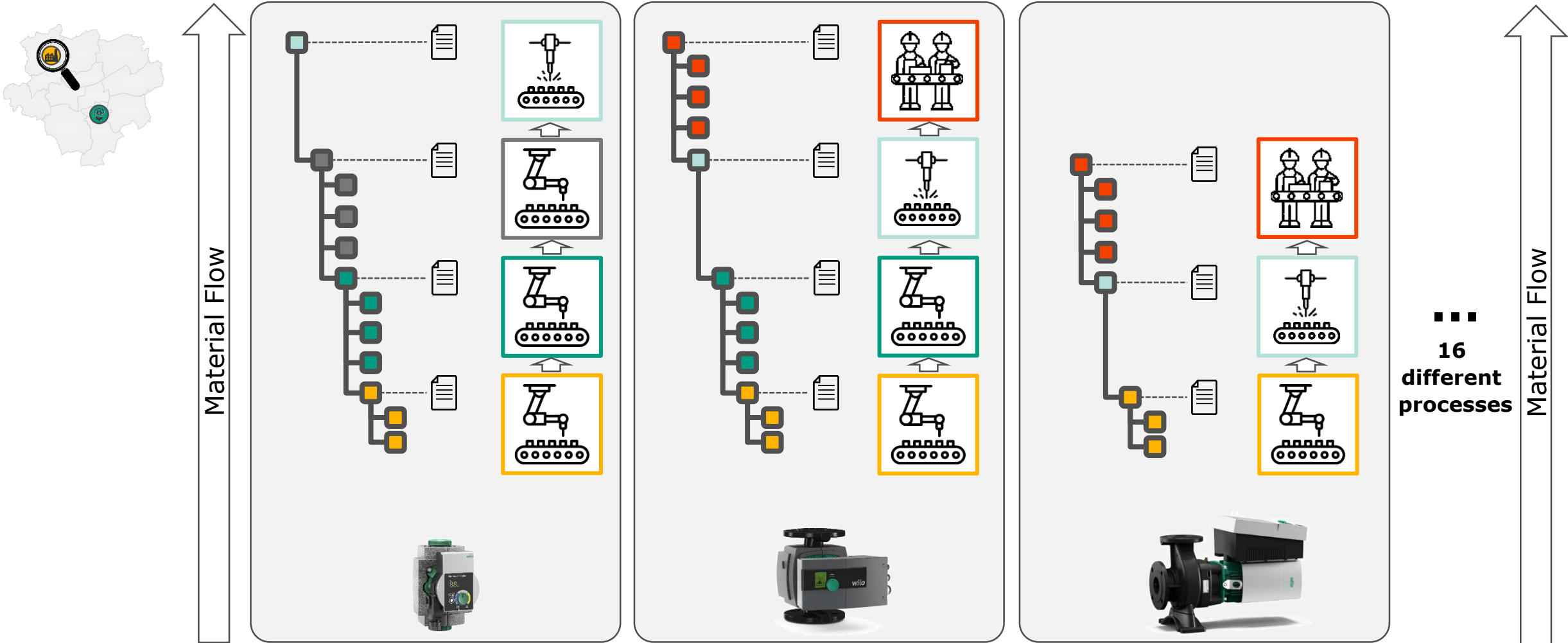
Development Site Dortmund Hörde:

- Electronics Development:
29 Employees
- Mechanics Development:
105 Employees
- Software Development:
32 Employees

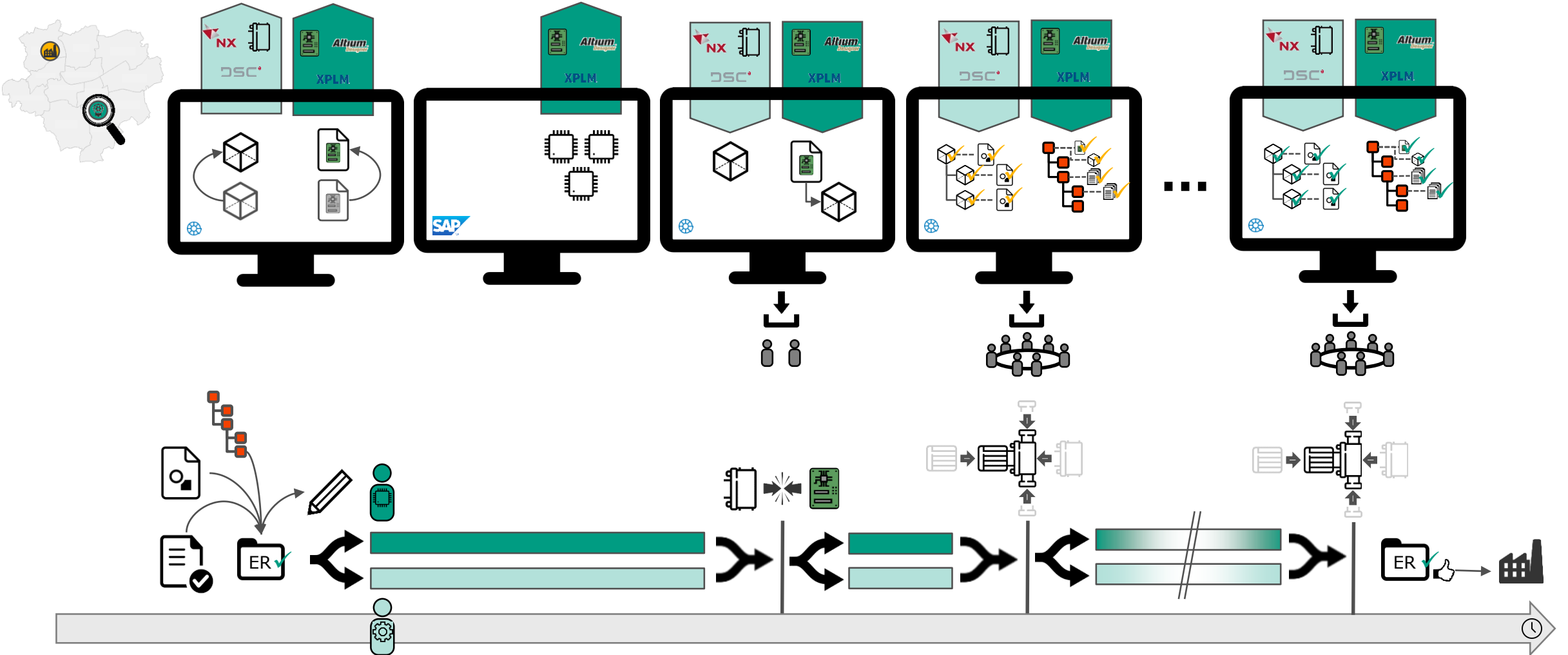
The provided data is used by different departments in the operative sector



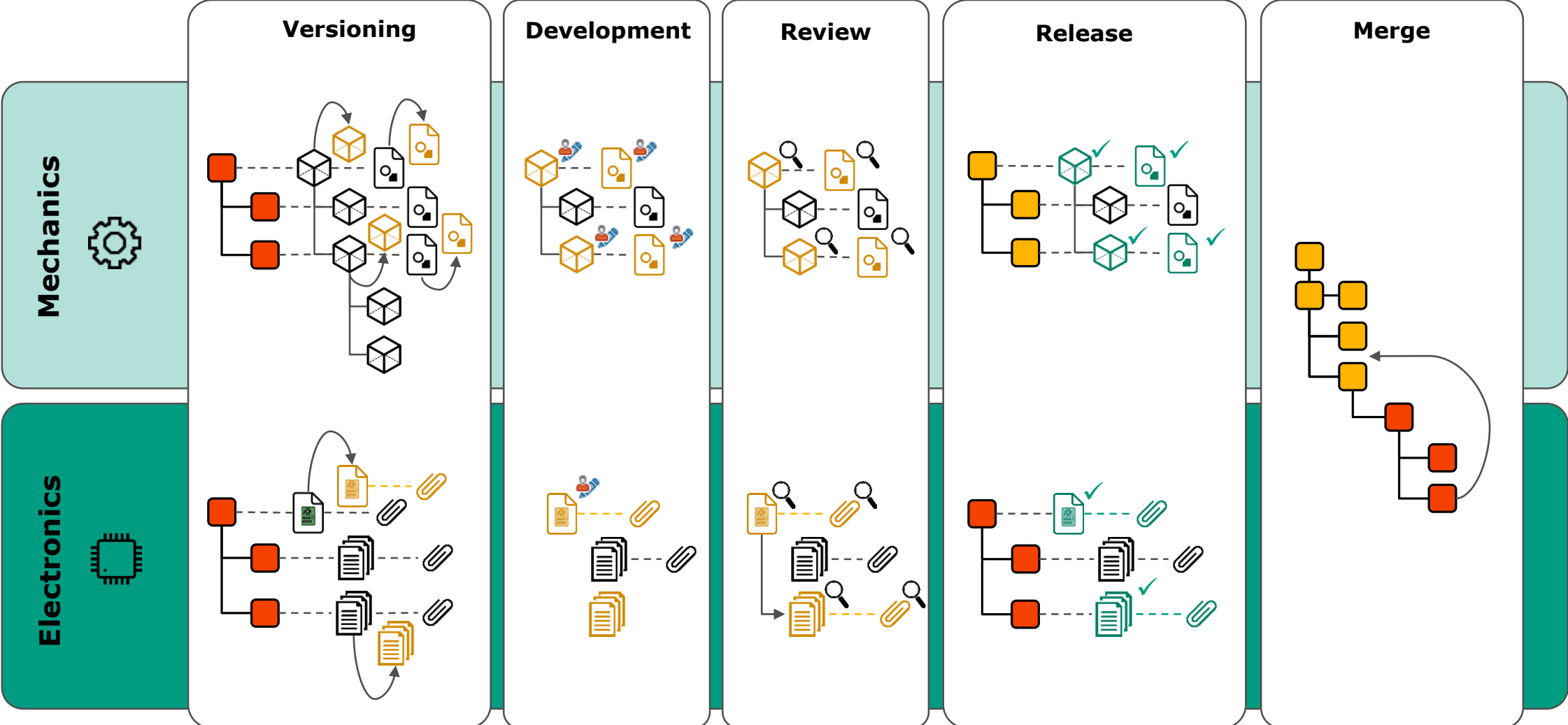
The parts lists have to be tailored to the production process



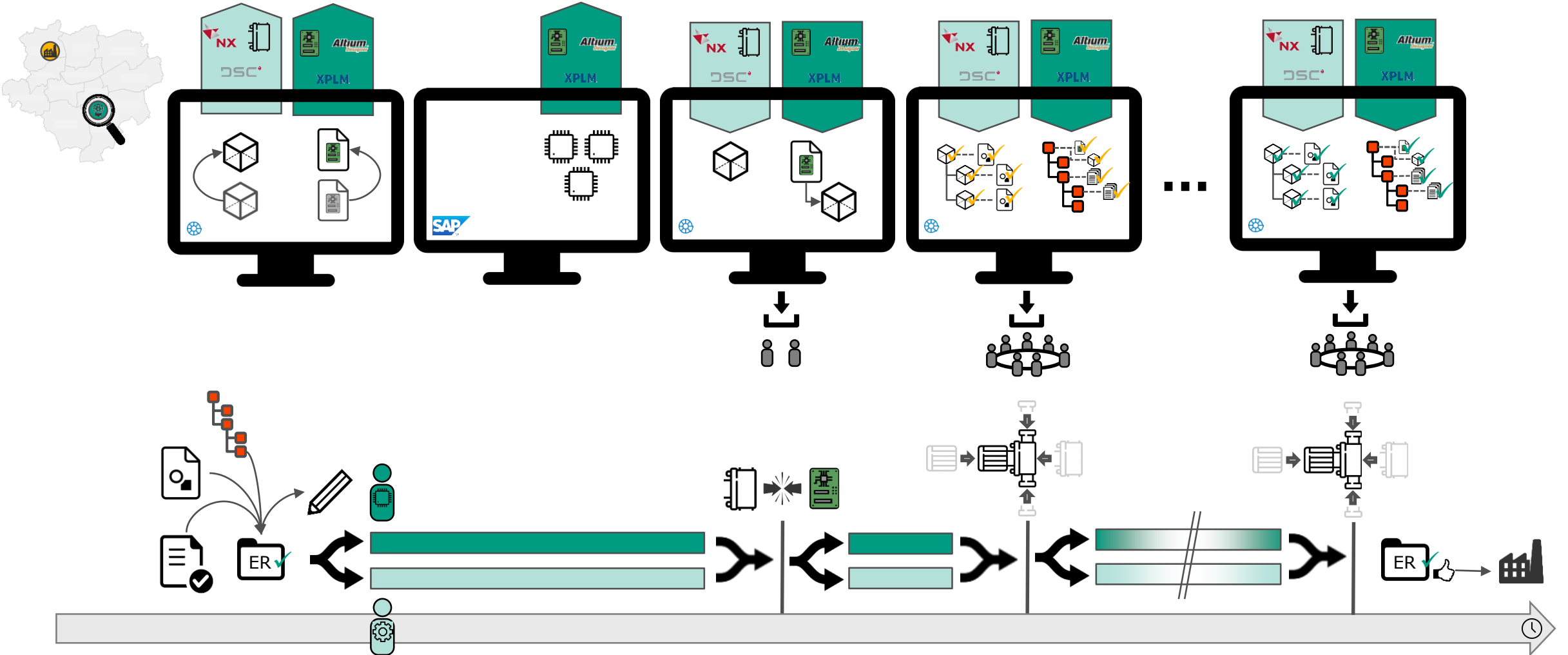
Let us see how the objects get into the PLM system...



What is difference between electronics and mechanics?



Let us see how the objects get into the PLM system...




Parts are synchronized to ECAD system after manual creation in SAP




 Component Request



SAP ERP

Altium Designer



SQL

| | | |
|-----|-----|-----|
| --- | --- | --- |
| --- | --- | --- |
| --- | --- | --- |

XPLM

- Actually manual synchronization
- Batch process considered in the future

Synchronize Parts

Module Items Synchronize Help

2001005

Overview

Library Part (1)

Capacitors (1)

Details

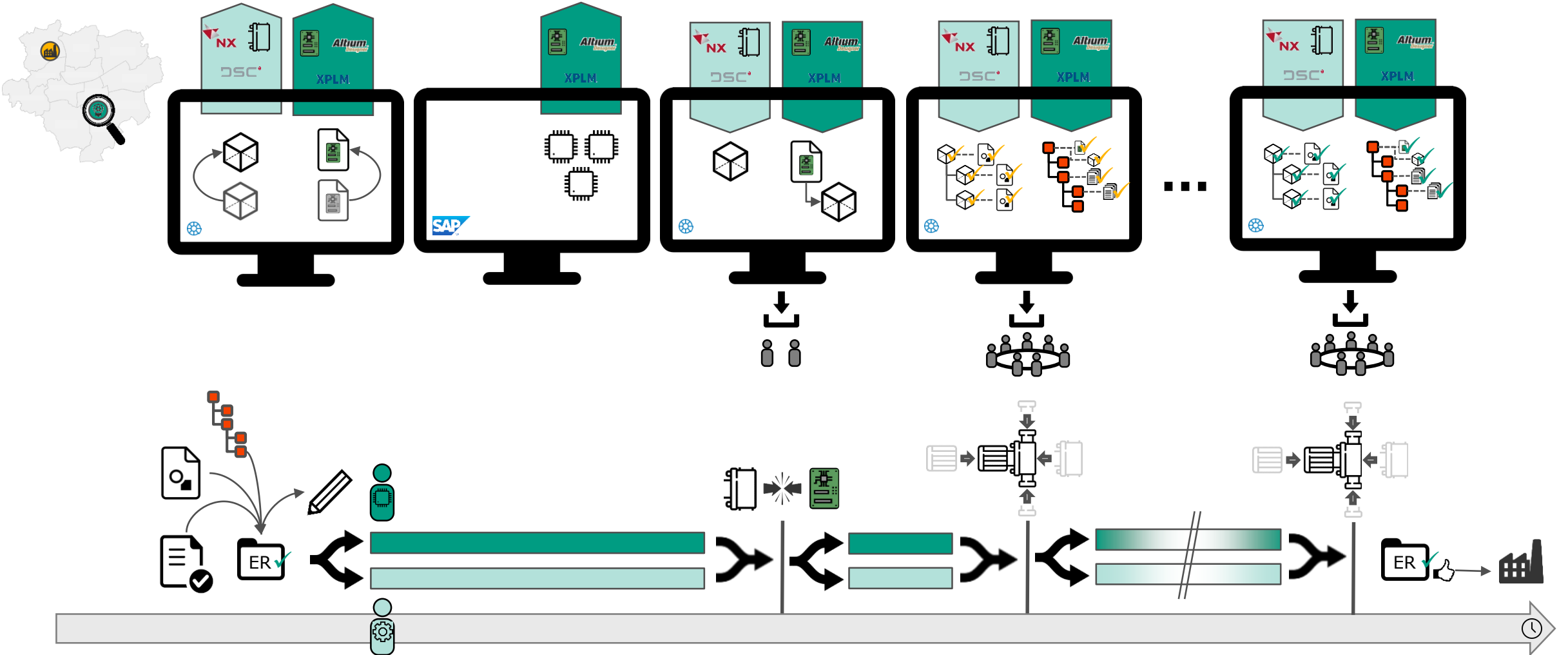
| Attribute | Altium | Action | ECTRS |
|-----------------------|--------------------------|--------|--------------------------|
| ID | 2001005 | = | 2001005 |
| Name | KDS T 10µ 20% 25V 125... | = | KDS T 10µ 20% 25V 125... |
| Status | | ← | AC |
| TRANS_GRP | | = | |
| LOADINGGRP | | ← | |
| PLANT | | = | |
| MATL_TYPE | | = | |
| CHANGE_NUMBER | | ← | |
| Footprint | 6032 | ← | 6032 |
| Symbol | CAP_POL | = | CAP_POL |
| Value | 10µ/25V | ← | 10µ/25V |
| SPANNUNG_ELEKTRON | 25V | ← | 25V |
| TEMPERATUR_ELEKTR... | 125,00 °C | = | 125,00 °C |
| HERSTELLER | | ← | |
| ALTERNATIVE_1 | | = | |
| ALTERNATIVE_2 | | ← | |
| TECHNOLOGIE | SMD | ← | SMD |
| Price | | = | |
| Price Unit | | = | |
| Stock | | ← | |
| Lead Time | | ← | |
| Class | C1010 | = | |
| TEMPERATURKOEFFIZI... | | ← | |
| ALTERNATIVE_3 | | = | |
| ALTERNATIVE_4 | | = | |
| Toleranz | 20,00 % | ← | 20,00 % |
| LEBENSDAUER | | = | |
| ComponentLink1URL | | = | |

Event Log (3/6/19 2:23:10 PM)

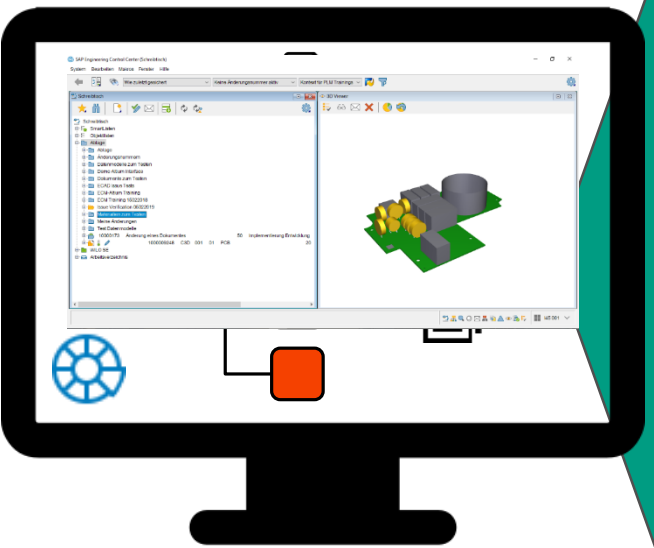
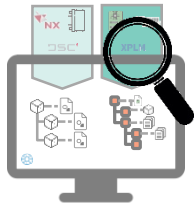
| Task | Count | Status |
|--------------------------------------------------------|-------|--------|
| Integrate initialization 'xad/altiumdesigner_ectrs'... | 0 | ✓ |
| Building class hierarchy... | 0 | ✓ |
| Searching items by text '2001005' Loaded 1 | 3 | ✓ |

Searching items by text '2001005' Loaded 1

Let us see how the objects get into the PLM system...



The Altium-SAP integration fulfills a maximum of flexibility in data storage



XPLM™

Save

Module Help

Changes

ECN: 200094 MCN: 200096

Design

Altium project: 1000000517/HW02 STM SCU QW2

Description: STM SCU QW2

PCB

PCB: 2190671

Name: PCB 6L HLF SCU STM v.1

Panel

PCBP: 2190672

Name: PCBP 6L HLF 2P SCU STM v.1

Assemblies

Default Structure: SMD: Pcb Tech: HAL

| Variant | Structure | Part | Name | BOM | Used in |
|------------------|--------------------------|---------|------------------------|--------------------------|------------------|
| Normalbestückung | Depaneling: After SMD... | | PCBA ICT STM SCU Q... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | 5101011 | PCBA THT 1 STM SCU ... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | 5101012 | PCBA SMD STM SCU Q... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | 5101013 | PCBA SMD 2_2P STM ... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | 5101048 | PCBA SMD 1_2P STM ... | <input type="checkbox"/> | Normalbestückung |
| | | 2190673 | PCBP 6L HLF 2P SCU ... | <input type="checkbox"/> | |

Buttons: Select All, Unselect All, OK, Cancel, Apply

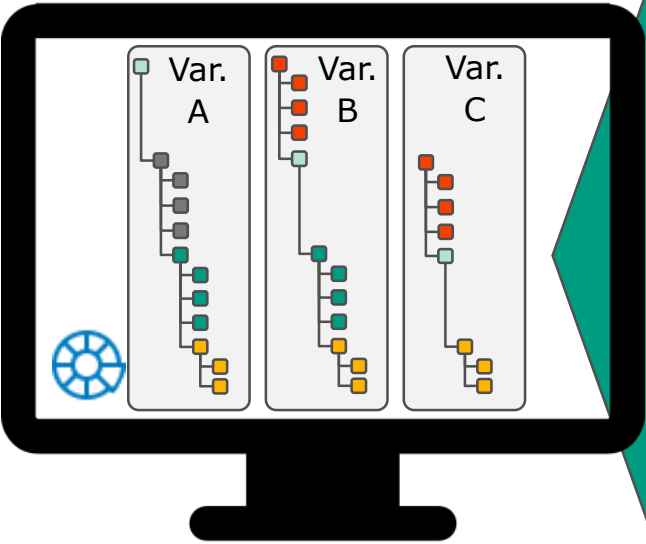
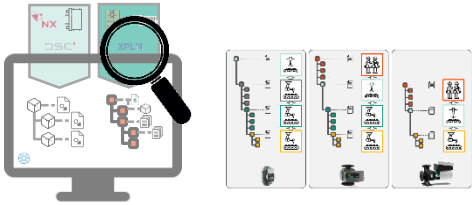
Event Log (1/15/19 1:10:51 PM)

Task

- Integrate initialization 'xad/altiumdesign...
- Identifying active design in EDA... C:\XF...
- Opening design 'C:\XPLM\WorkingDir\...
- Loading design BOM bom_source vari...
- Discovering existing data model... done
- Creating 'SMD PANEL BOTTOM' in ECT...
- Searching for Change in ECTR5... Four...
- Updating data model... done
- Searching used EDA parts in PLM... do...
- Loading 5101048 (pcba_smd_panel_t...
- Updating BOM diffts to PLM... failed
- Updating '1000000517/HW02 STM SC...
- Searching for Change in ECTR5... Four...
- Updating data model... done
- Searching used EDA parts in PLM... do...
- Loading 5101048 (pcba_smd_panel_t...
- Updating BOM diffts to PLM... done
- Updating '1000000517/HW02 STM SC...

Updating '1000000517/HW02 STM SCU QW2'... done

The Altium-SAP integration fulfills a maximum of flexibility in data storage



XPLM

Save

Module Help

Changes

ECN: 200094 MCN: 200096

Design

Altium project

Description:

PCB

PCB:

Name:

Assemblies

Reserved ODB++
 ad Design DXF
 data ASCII

Panel CAM Data
 Panel Plot
 Panel DXF

Default Structure: SMD: Pcb Tech: HAL

Bom Structure

Depaneling THT Components SMD Components Side Order Panel Type Panel Count

After THT Both sides Both sides Bottom first Standard 2

After SMD One side only One side only Top first Mirror

None None None

OK

| Variant | Structure | Part | Name | <input type="checkbox"/> BOM | Used in |
|------------------|--------------------------|--------------------|------------------------|------------------------------|------------------|
| Normalbestückung | Depaneling: After SMD... | PCBA ICT | PCBA ICT STM SCU Q... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | THT TOP | PCBA THT 1 STM SCU ... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | SMD TOP | PCBA SMD STM SCU Q... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | SMD PANEL TOP | PCBA SMD 2_2P STM ... | <input type="checkbox"/> | Normalbestückung |
| Normalbestückung | Depaneling: After SMD... | SMD PANEL | PCBA SMD 1_2P STM ... | <input type="checkbox"/> | Normalbestückung |
| | | PCBP.6L.HLF.2P.SCU | PCBP.6L.HLF.2P.SCU | <input type="checkbox"/> | |

Select All Unselect All

OK Cancel Apply

Event Log (1/15/19 1:10:51 PM)

Task

- Integrate initialization 'xad/altiumdesign...
- Identifying active design in EDA... C:\XF
- Opening design 'C:\XPLM\WorkingDir\...
- Loading design BOM bom_source vari...
- Discovering existing data model... done
- Creating 'SMD PANEL BOTTOM' in ECT...
- Searching for Change in ECTR5... Four
- Updating data model... done
- Searching used EDA parts in PLM... do
- Loading 5101048 (pcba_smd_panel_t...
- Loading design BOM bom_source vari...
- Updating '1000000517/HW02 STM SC...
- Searching for Change in ECTR5... Four
- Updating data model... done
- Searching used EDA parts in PLM... do
- Loading 5101048 (pcba_smd_panel_t...
- Uploading BOM diffs to PLM... failed
- Updating '1000000517/HW02 STM SC...
- Searching for Change in ECTR5... Four
- Updating data model... done
- Searching used EDA parts in PLM... do
- Loading 5101048 (pcba_smd_panel_t...
- Uploading BOM diffs to PLM... done
- Updating '1000000517/HW02 STM SC...

Updating '1000000517/HW02 STM SCU QW2'... done

Résumé



- "Single point of truth" / central management of data inevitable
- Try to avoid third-party PDM systems



- Reserve a lot of time for testing



- Train the people



- Don't underestimate the „Management of Change“ effort



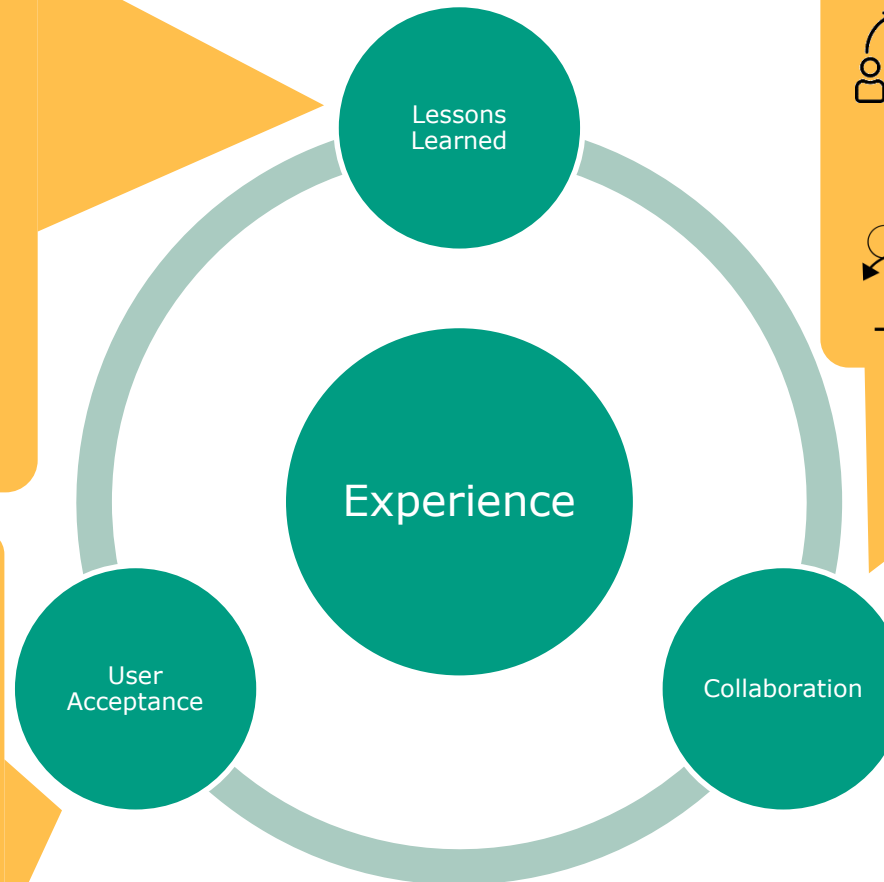
- Requirements fulfilled



- Users reduced workload, higher data quality -> immediate success



- SAP ECTR tremendously increases acceptance in the engineering departments



- Beneficial project for all affected parties
 - Very good cooperation between xPLM & DSC
 - Collaboration with Russian developers



- Combination of classic and agile project management was working effectively

Outlook



Short Term

- Automatic management of electrical components in mechanical BOMs
- Integration of Software into SAP PLM



Mid to long Term

- Management of footprint/3D geometries for electronics components in SAP PLM
- Requirements management in SAP PLM



Future potentials

- Extension to several production sites
- Extension to several development sites
- Use of data for virtual assembly
- Producability analysis for different production lines
- Usability of 3D-Geometries for robot control
- Optical Quality assurance of components based on 3D-geometries
- ...

Thank you for your attention!



Matthias Reinelt
Manager PLM Integration
Group Research & Development -
Product Lifecycle Management



Dr. Benjamin Eilebrecht
Quality Manager Hardware
Group Research & Development -
Technology Lead Engineering
Hardware

