SCALING FROM ENGINEERING TO MANUFACTURING - CLAAS´ END-TO-END PROCESS USING DELMIA

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3DEXPERIENCE Conference 2024

Scaling from Engineering to Manufacturing – CLAAS End to End Process using DELMIA

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Scaling from Engineering to Manufacturing

Manufacturing Engineering as an agriculture machinery manufacturer is challenging.

In the case of CLAAS we face a broad portfolio with two main business units named
Self-propelled Harvesters and Tractors & Implements.
In each product family are several types as well as sub-types and in combination with variant configuration there are a lot of common and reused components resulting in enormous complexity.
The target of this activity at CLAAS is the change-driven MBOM creation and Process Planning on **3D**EXPERIENCE in a Multi-Model situation. But where to start?

This session shows how expanding the scope from Engineering to Manufacturing is a key initiative for a digital thread from the first planning of a product to its later production using virtual twin experience.

In this context Kai Korthals, VP Systems & Product Engineering, Tobias Berhorn, VP Service Function Release & Product Data Management and Hans-Jürgen Falk, Head of Engineering Solutions, share insights on how Dassault Systèmes and CLAAS work together to identify and plan the most valuable path to make this a reality.”

CLAAS presenter Team

Dr. Kai Korthals

System & Product Engineering

Tobias Berhorn

Release and Product Data Management

Hans-Jürgen Falk

Engineering Solutions

CLAAS 2023 at a glance

It is our mission to make farmers more successful through our technology.

XERION

12,131
employees

Digital

Locations

21
Countries

38
Locations

Innovation

EVION

6.145 bn
euros in sales

Autonomy

CLAAS Product family
Type – Variant Configuration

AXION 900
TERRA TRAC

Max. output ECE R 120
355 - 445 hp

AXION 900
up to stage V

Max. output ECE R 120
445 hp

AXION 800
up to stage V

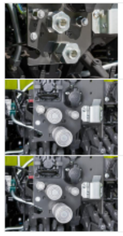
Max. output ECE R 120
205 - 295 hp

ARION 600

Max. output ECE R 120
145 - 205 hp

20 years in Le Mans

Hydraulics

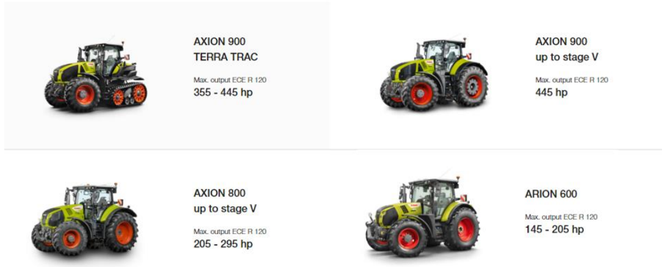
	5 spool valves, electrohydraulic proportional		Standard ●
	6 spool valves, electrohydraulic proportional		○
	5 + 2 spool valves, electrohydraulic proportional		○
	6 + 2 spool valves, electrohydraulic proportional		○
	Power Beyond, load-sensing connections without flat face couplers	ⓘ	Standard ●
	Power Beyond, load-sensing connections with flat face couplers	ⓘ	○
	Power Beyond - Flat face couplers with LS booster		○

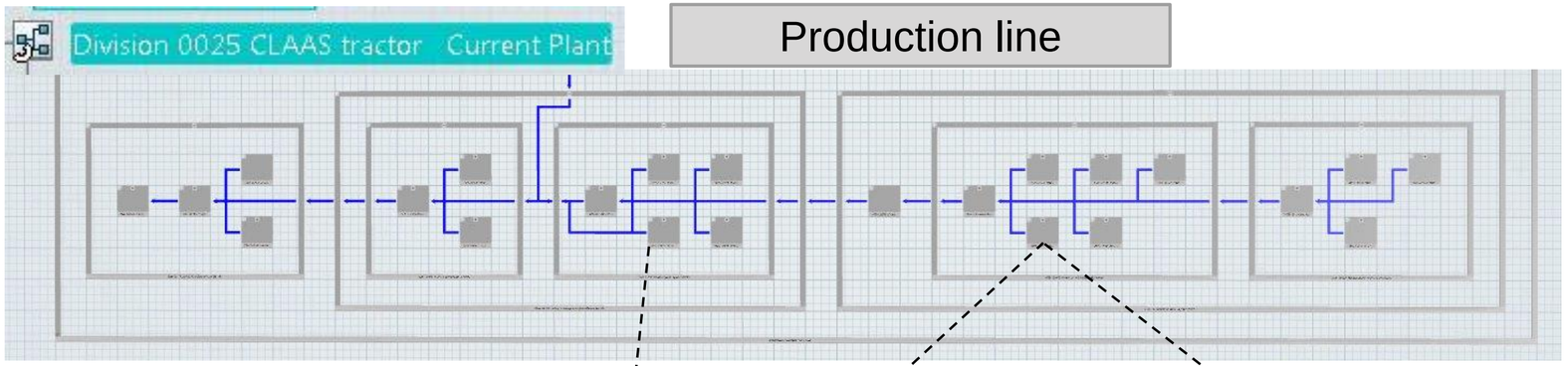
Cabin & Comfort

	Comfort seat, fabric, semi-active suspension, heated, swivelling	ⓘ	Standard ●
	Premium seat, leather, semi-act. susp., heated, vent., swivelling	ⓘ	○
	Comfort seat, fabric, semi-active long./horiz. suspension	ⓘ	○

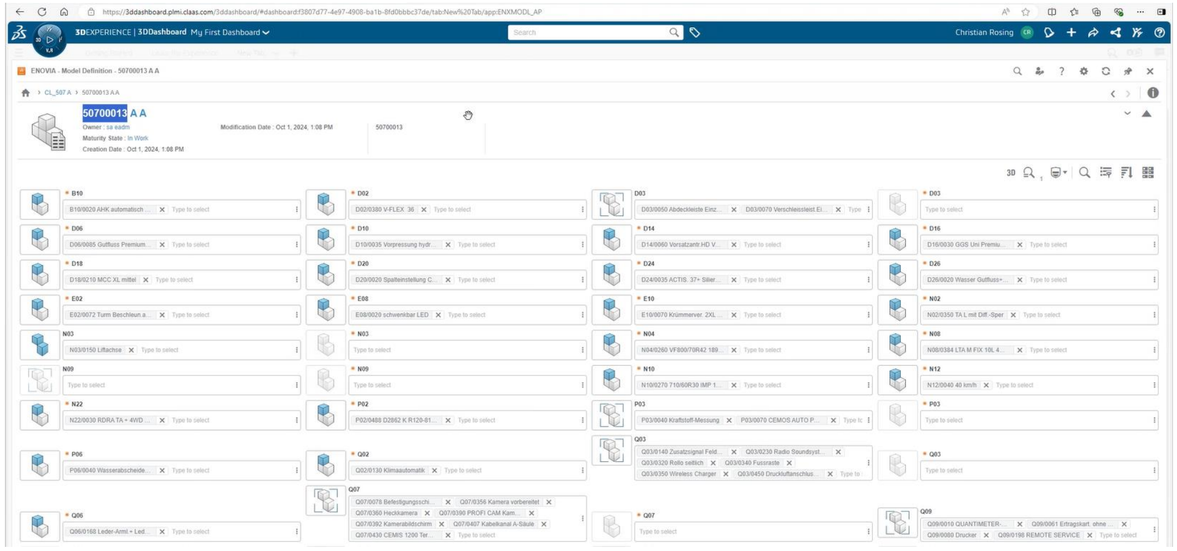
CLAAS Product family

Type – Variant Configuration – Process Planning





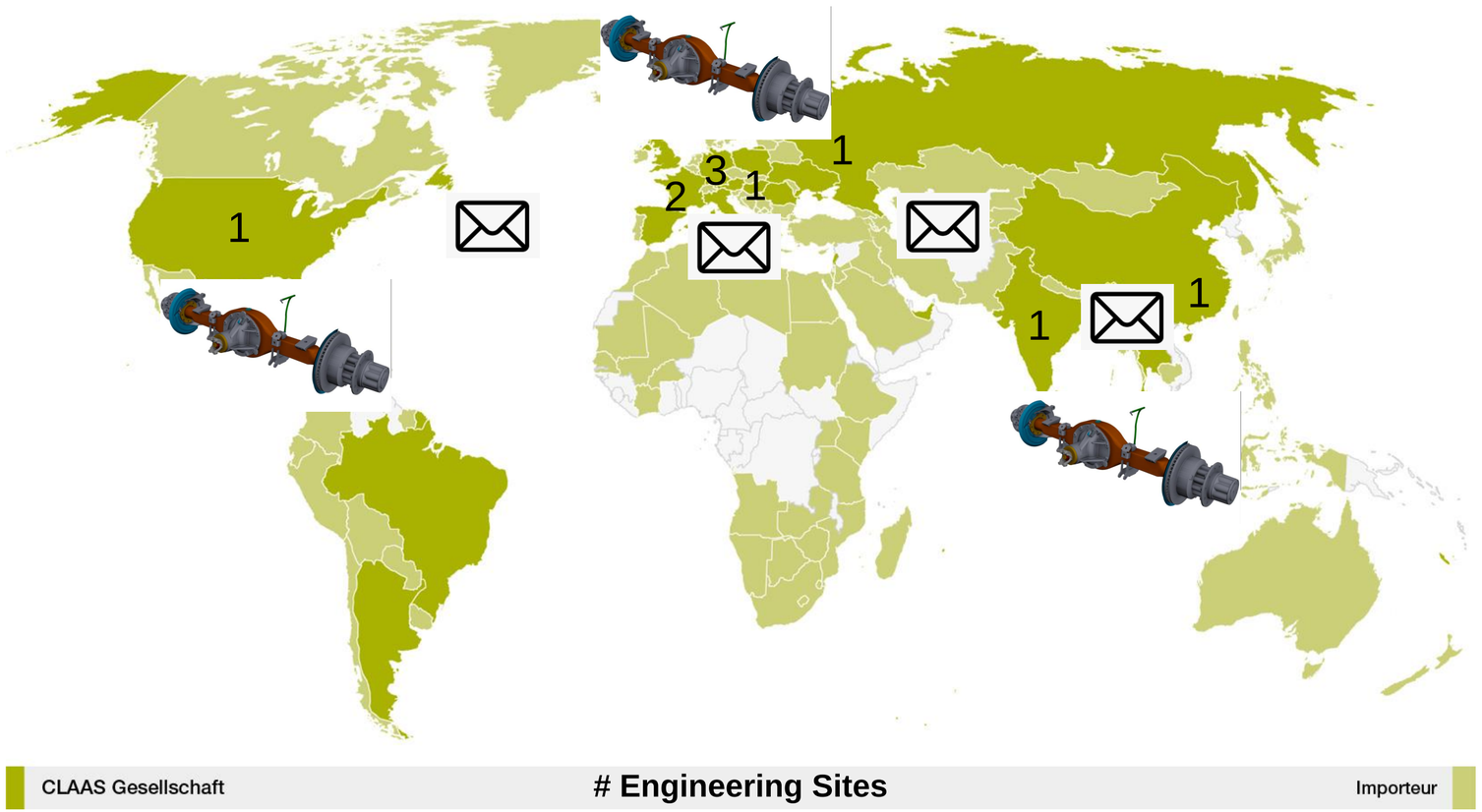
Production line



Variant A1 | Variant A2 | Variant B1 | Variant B2

Type A | Type B

CLAAS Engineering
From where we come



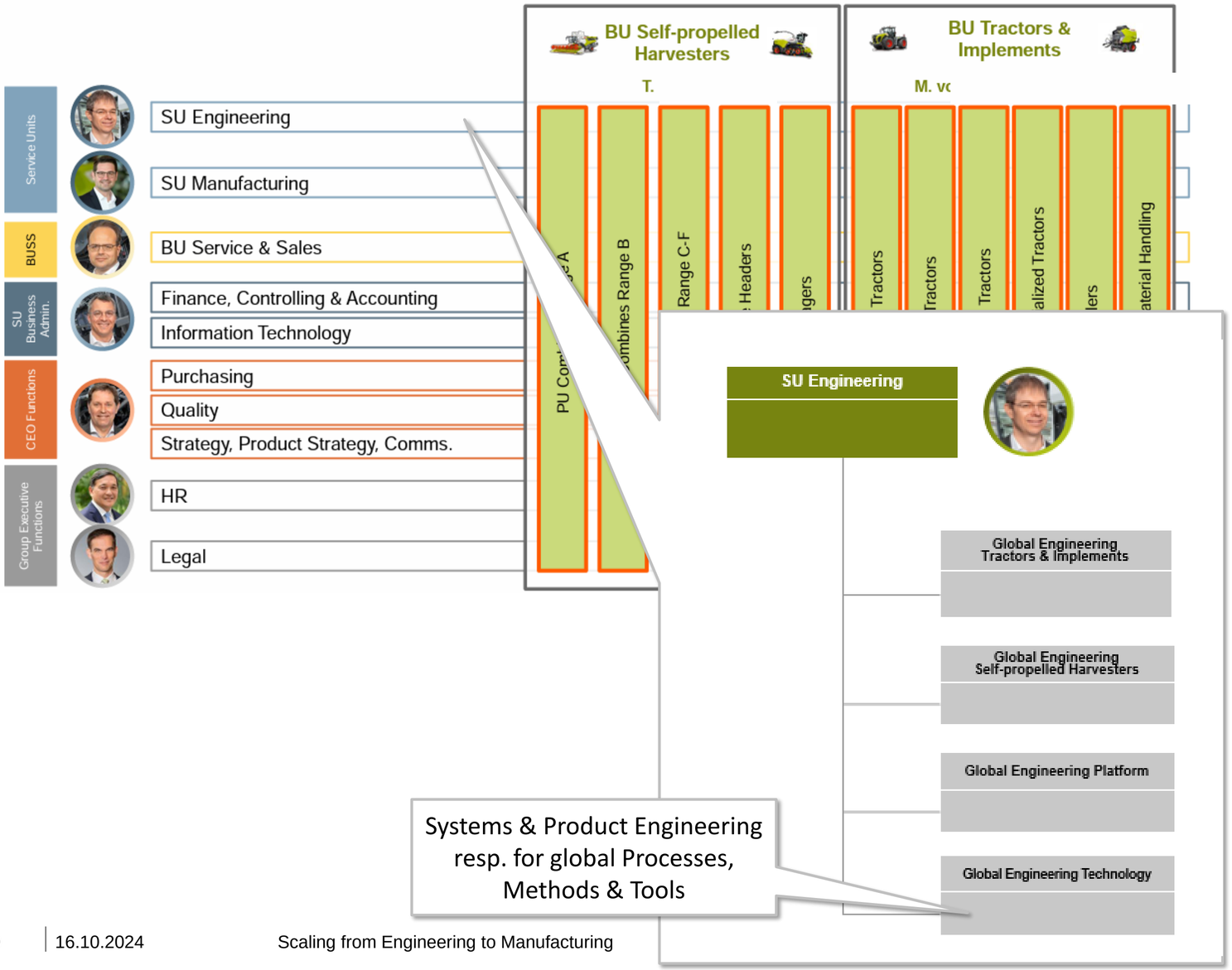
Organisation:
independent local RnD Organizations

- Things were developed twice or more
- difficult to develop products following the CLAAS Standard
- no global Ressource Optimization

IT:
Every Engineering location had its own, independent VPM-Server

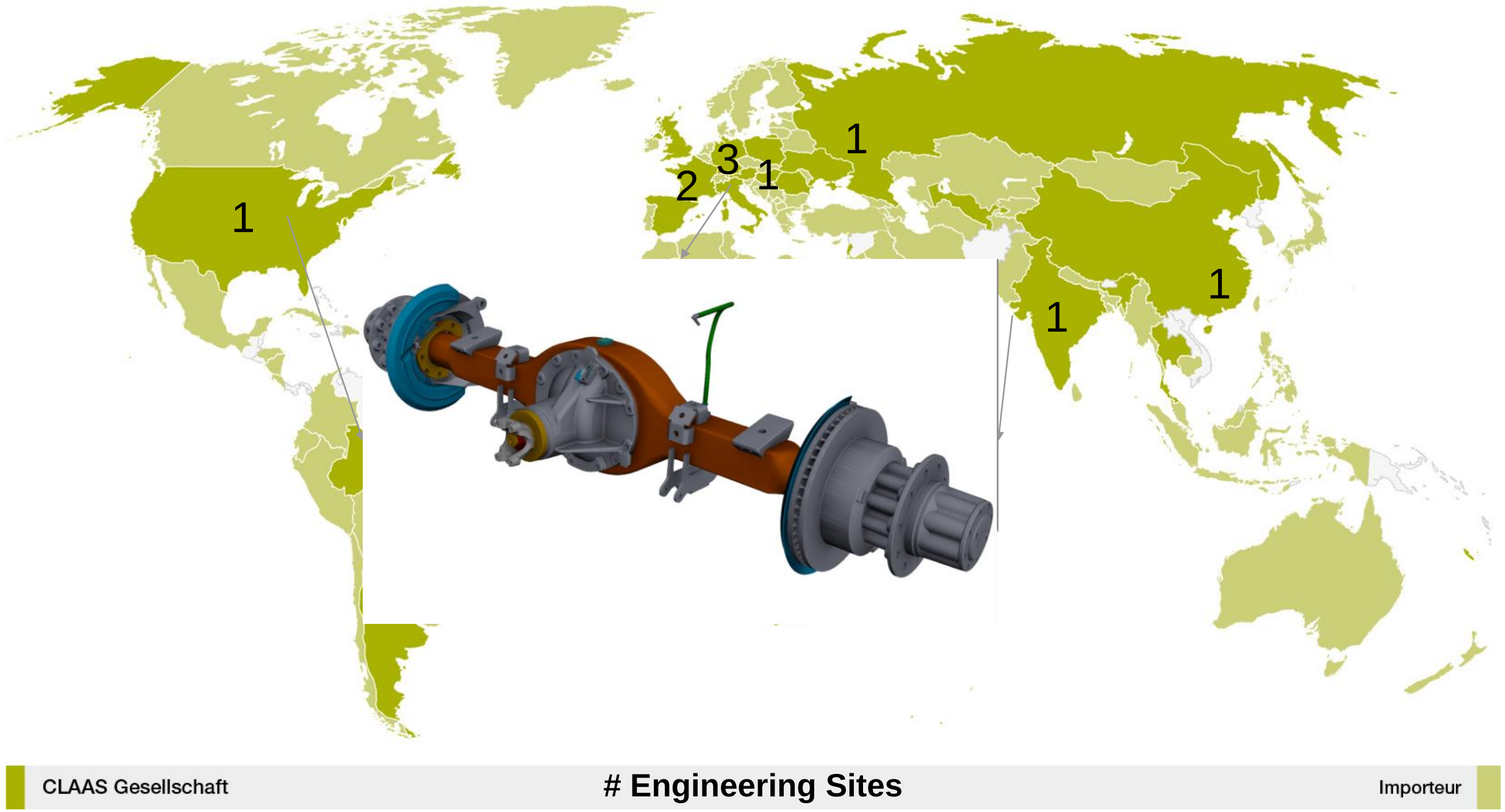
- only sequentiel Collaboration possible („Site after Site“)
- difficult Management of Data Access
- Update only once per day

CLAAS Engineering
How we currently work



Organisation:
central Service Unit Engineering

CLAAS Engineering
How we currently work



Organisation:
central Service Unit Egineering

- Things were developed once
- Development following one Standard
- global Ressource Optimization acoording to Business Needs

IT:
Using global 3Dx 24x instance

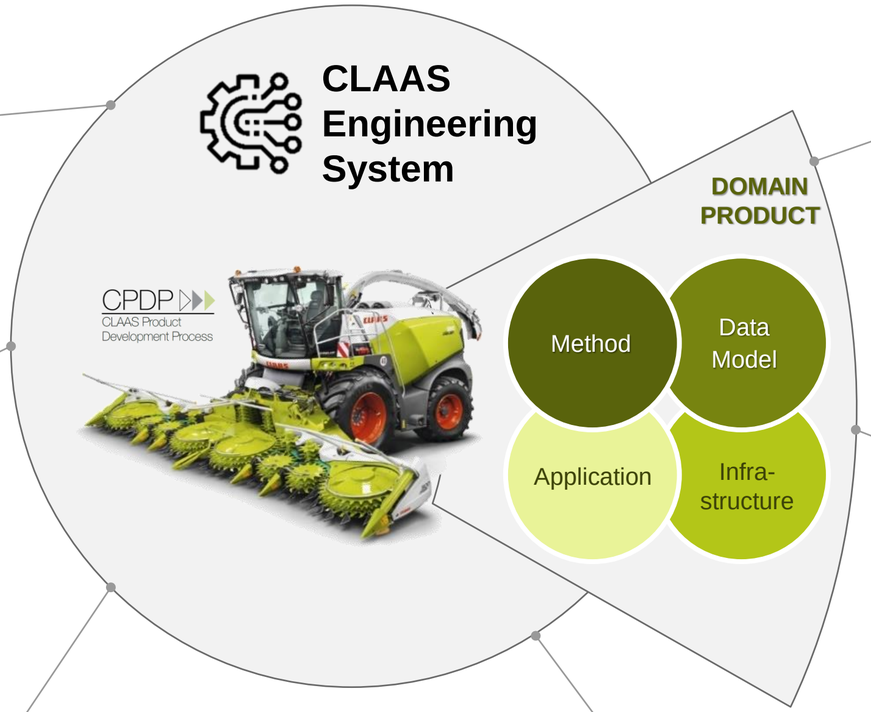
- live Collaboration across all Sites and Service Units (e.g. Industrialization)
- easy Management of Data Access

CLAAS Engineering
Where we aim at

Product Manager
Johan

System Engineer
Frank

Mechanical Designer
Max



Validation Engineer
Vincent

Validation Coordinator
Victor

Software Designer
Susi

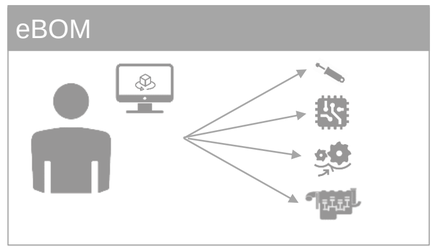
CLAAS manufacturing
Main drivers for manufacturing

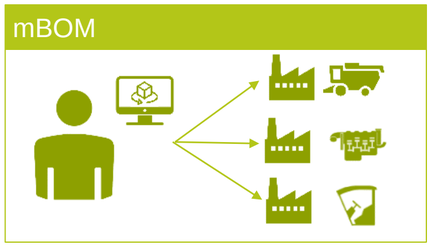
Worldwide engineering and manufacturing network

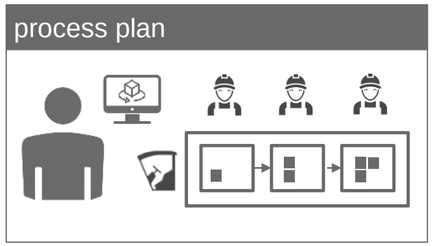
Frontloading and simultaneous engineering

Product complexity increase with higher need for worker guidance

CLAAS manufacturing
Metadata in use







CLAAS manufacturing
Starting situation

MES

PLM

3D eBOM

CATIA

ERP

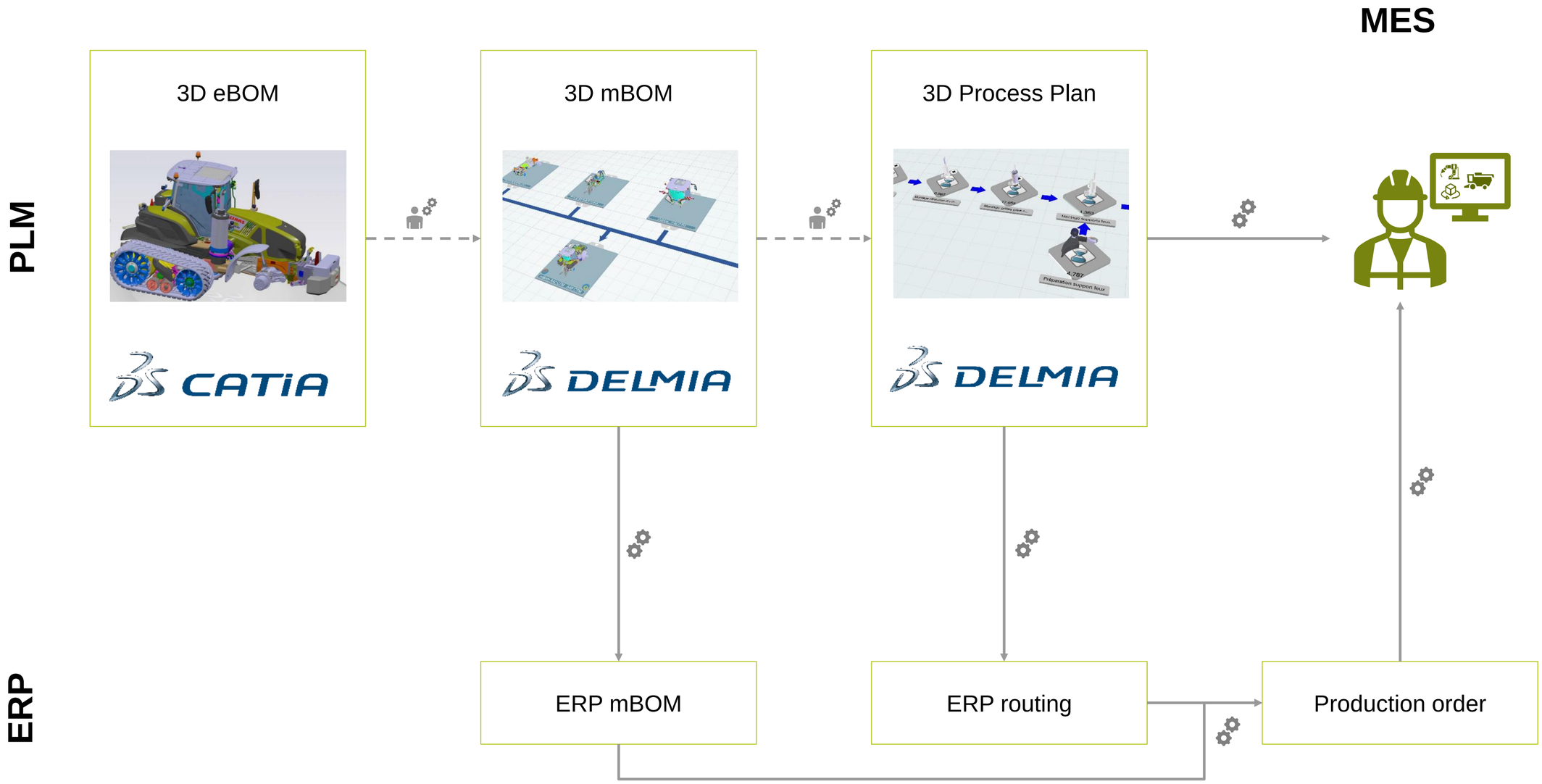
ERP eBOM

ERP mBOM

ERP routing

Production order

CLAAS manufacturing
Next target scenario



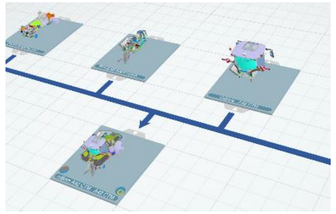
CLAAS manufacturing
Current status

PLM

3D eBOM

CATIA

3D mBOM



DELMIA

ERP

ERP mBOM

DELMIA

ERP routing

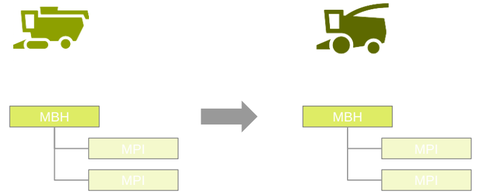
Production order

Current Focus:

- Management of 3D mBOM
- Interface 3D mBOM to ERP system
- Processing of technical changes
- Reusage of manufactured items

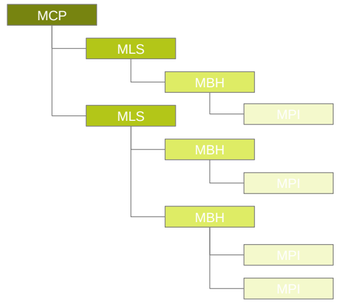
CLAAS manufacturing
Key learnings

Efficiency gain by reusage of manufactured items across multiple products



Structural rules for product mBOM & change management by introduction of manufacturing data types

- ….change management by instance evolve & evolution effectivity (valid from….valid to…)
- ….change management by revisioning
- ….configuration management
- ….scope to physical products (eBOM)

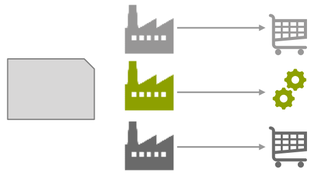


Optimized session building user defined open procedures

CLAAS manufacturing
Challenges

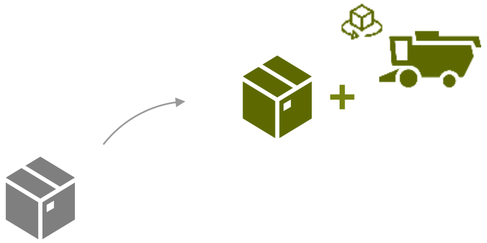
Implementation of plant specific attributes on mBOM

- Make or buy attributes in multi plant scenarios (Plant A → buy / Plant B → make)
- Impacts on process planning for DELMIA & ERP (synchronization of make or buy attributes)



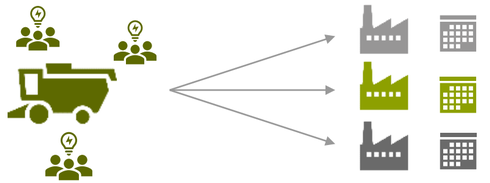
Higher maintenance need for mBOM by including 3D geometry

- Current state: Logistical mBOM (parts)
- Target state: 3D mBOM (parts + position?)
- Impact: Synchronisation eBOM → mBOM also for changes in parts position in assembly

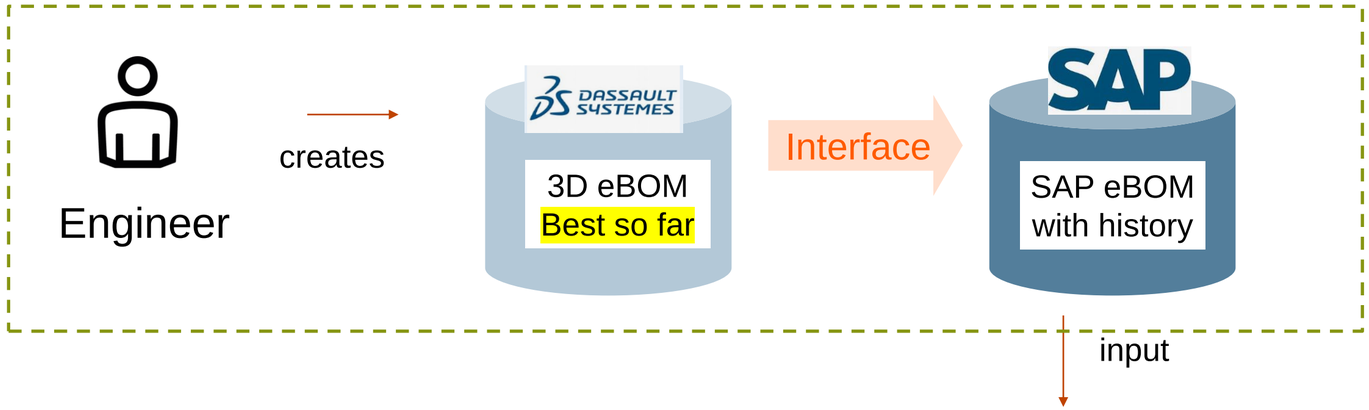


Consistent change process from engineering to manufacturing (running changes)

- Synchronizing of parallel engineering changes to mBOM
- In multi plant scenarios with individual application dates



CLAAS Engineering
Key Enabler: eBOM with History

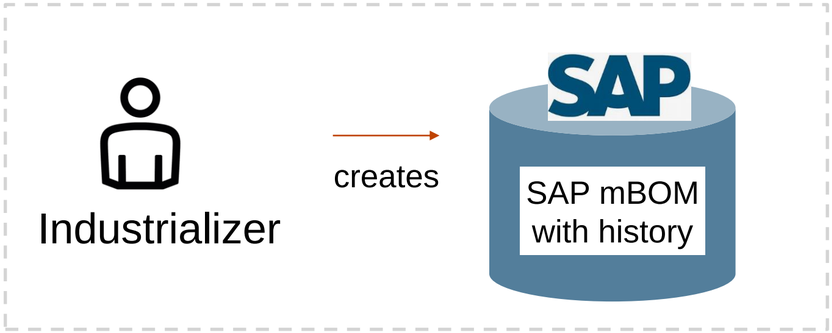


Current 3D eBOM process

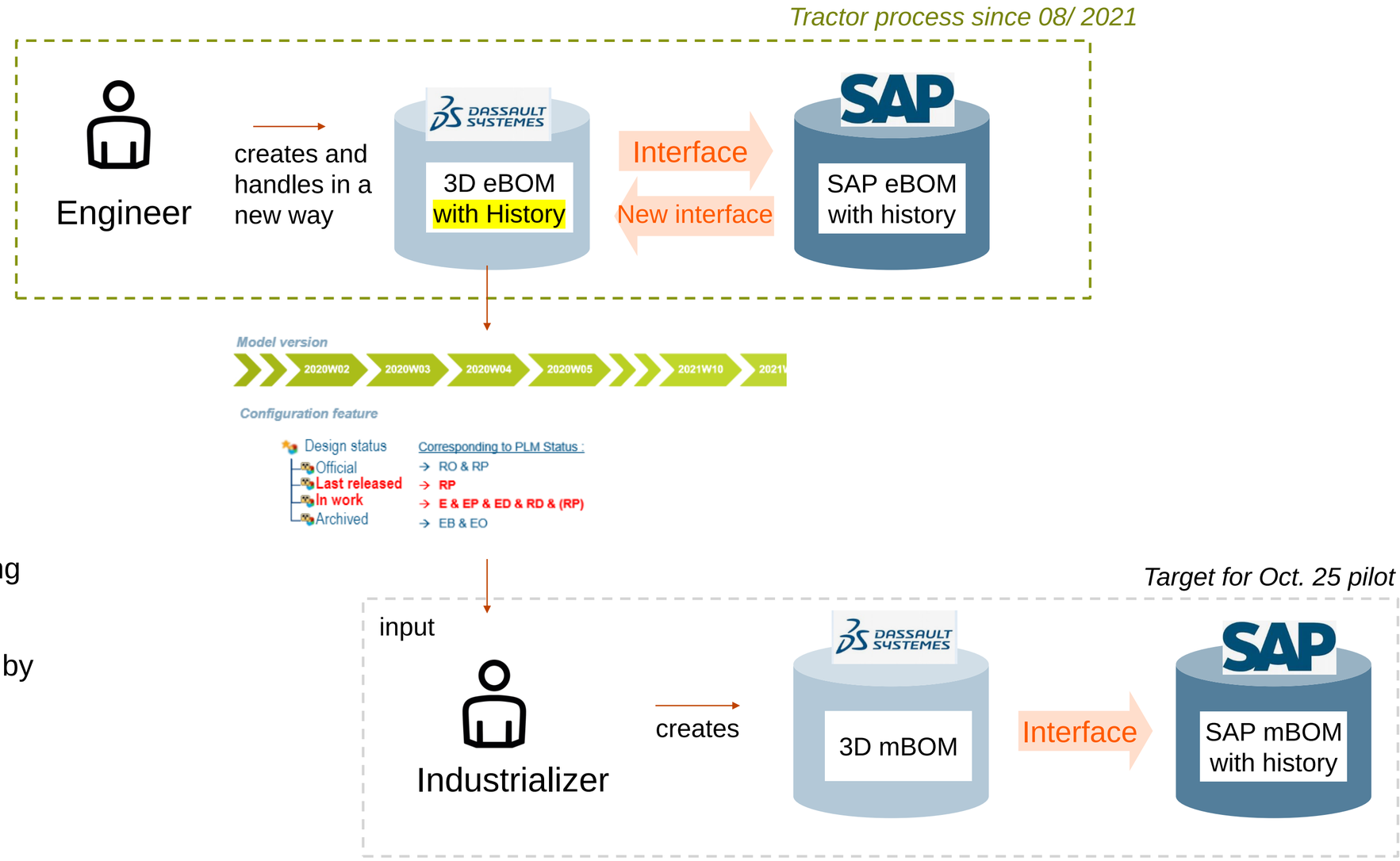
- Best so Far means: only the last released Engineering contents are available in the 3D eBOM structure
- Last released Engineering =
  last released Production contents

Challenge:

- No stable input for DELMIA mBOM process in 3D
- No correct 3D representation for any visualization



CLAAS Engineering
Key Enabler: eBOM with History

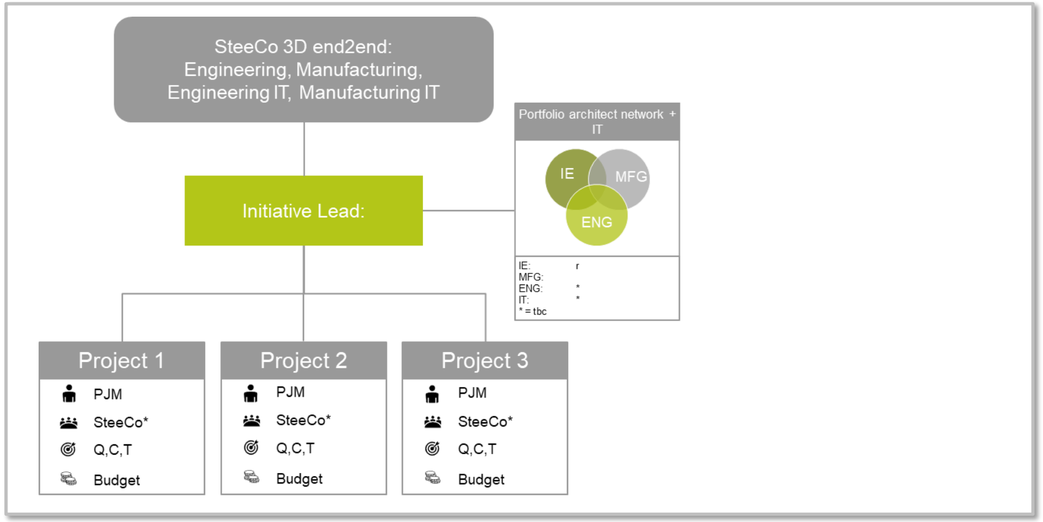


Future global 3D eBoM Process:

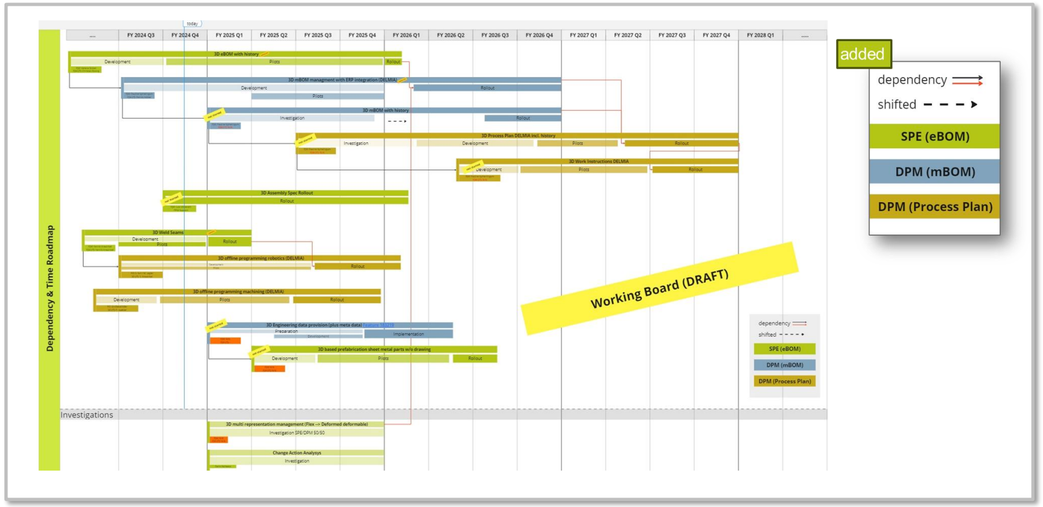
- will enable simultaneous engineering based on defined baselines
- 3D eBOM with history to be filtered by
  - Model Version / CW
  - Design Status

CLAAS Engineering
Enabler: Steeco & Roadmap „3D End to End“

3D End to End Steeco



3D End to End Roadmap

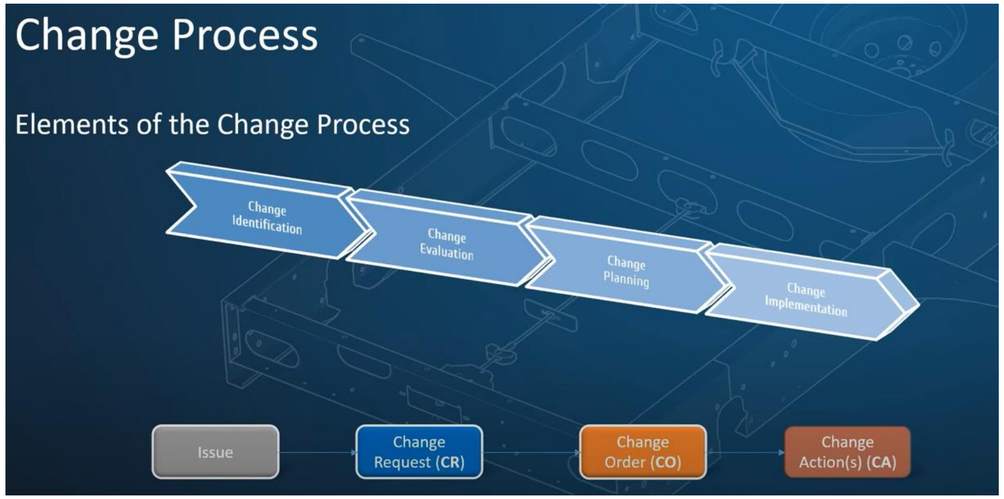


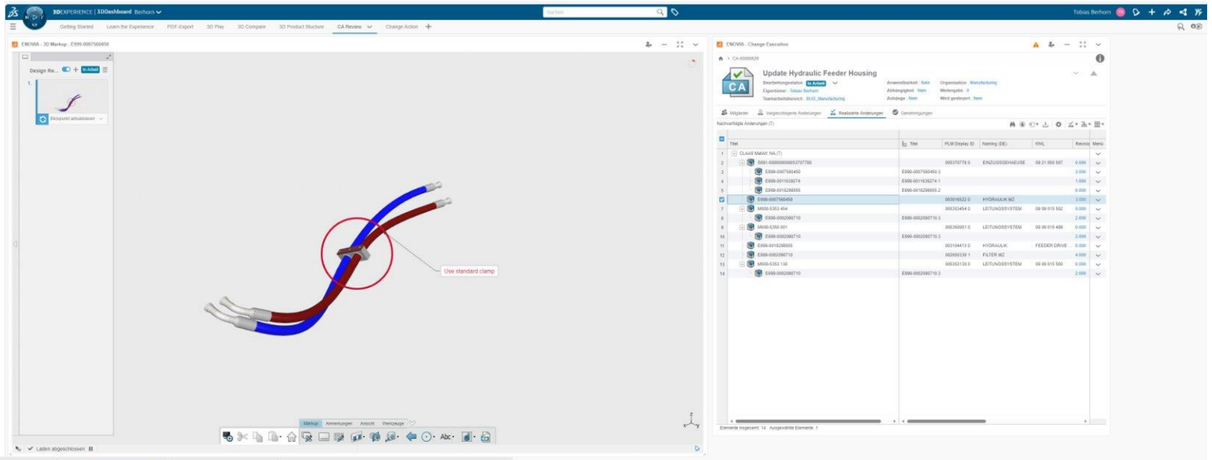
Key-aspects of initiative

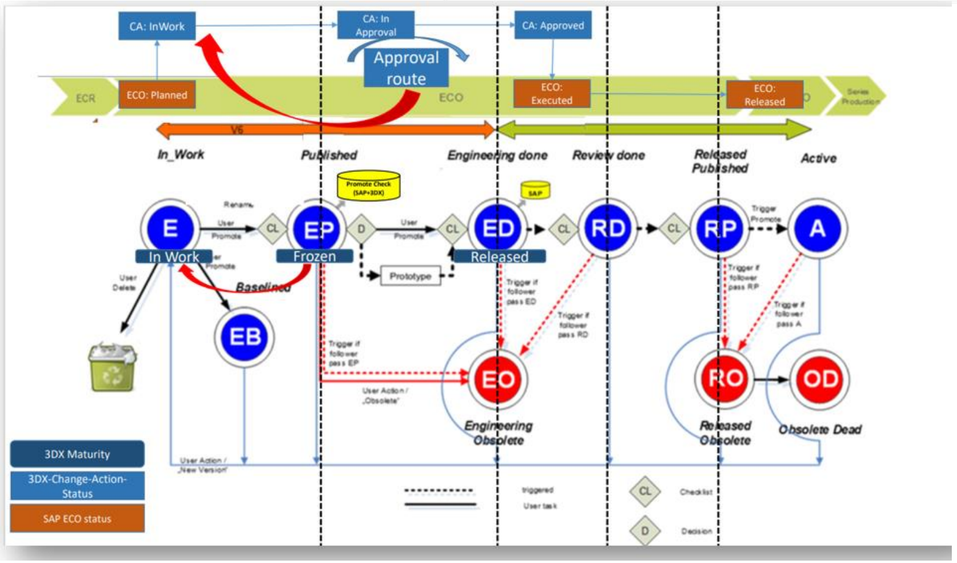
- Gather **use cases** from former Business Units initiatives and local organizations
- Analyze **prerequisites** for use cases
- Analyze **dependencies** between use-cases and prerequisites
- Cross portfolio **collaboration** via portfolio architect network
- Propose **roadmap** and **projects** to SteeCo 3D end2end
- Tracking of **projects** and **evaluation** of project progress towards 3D end2end

Outlook, next steps

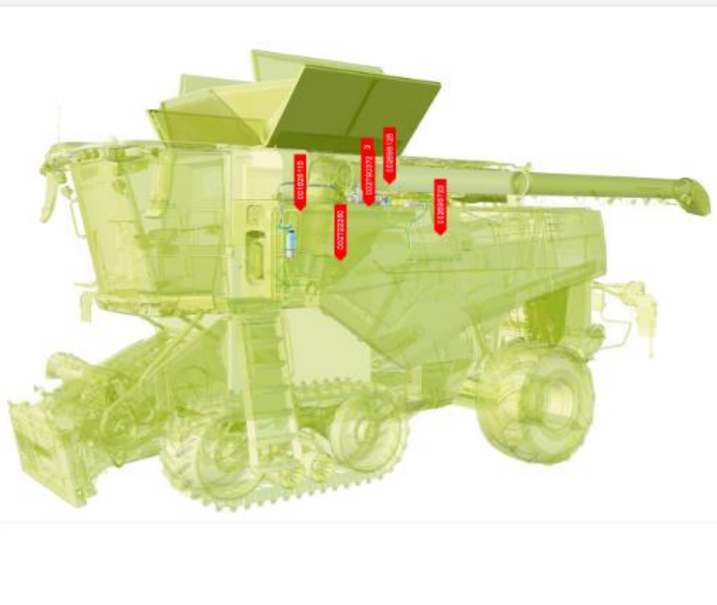
To be become compatible with OOTB

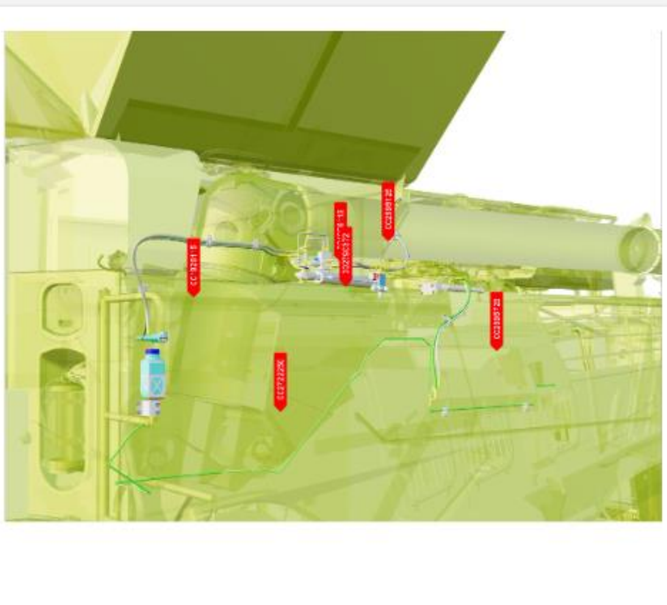






Outlook, next steps
3D digital twin





Reduce data amount to have loadable data in seconds open the door to many processes

- Assembly process in manufacturing
- Service process to found faster system issues
- Simulation in logistics

→ to be automated in a workflow process


CLAAS

DASSAULT SYSTEMES

Virtual Worlds for Real Life

THANK YOU FOR YOUR INTEREST