

# Our model company

# Conveyor Solutions AG is a manufacturer of

- components
- equipments
- systems

for sorting and transporting of luggage or packages.

# They

- configure to customers needs (CTO/MTS),
- design customer specific solutions (ETO, CTO+),
- manufacture in large quantities.



# **Conveyor's Challenge**

Senior management would like to

- Become more customer centric and agile
- Reduce cost and workload

So, they engage an external consulting company to propose a new approach.





# **Design-Driven Enterprise**

### AGIL.EFFICIENT.CUSTOMER-CENTRIC

- Increase the level of automation in the process flow from engineering into sales, production, service with model once configure anywhere.
- Use a smart product structure as single central solution to achieve high level of consistency, automation and accuracy across all departments.
- Improve the leverage of their existing investment in the SAP core. Reduce complexity of applications outside of the core.





# **Different Products – Different Value Chains – Different Processes**

# MTS Make-to-Stock



Design

Supply Chain

Manufacturing

Sell

Aftermarket Service

CTO

Configure-to-Order closed



Design

Sell

Supply Chain

Manufacturing

Aftermarket Service

### **ETO**

Engineer-to-Order



Sell

Engineering

**Supply Chain** 

Manufacturing

Aftermarket Service

### CTO+

Configure-to-Order open



Design

Sell

Engineering

Supply Chain

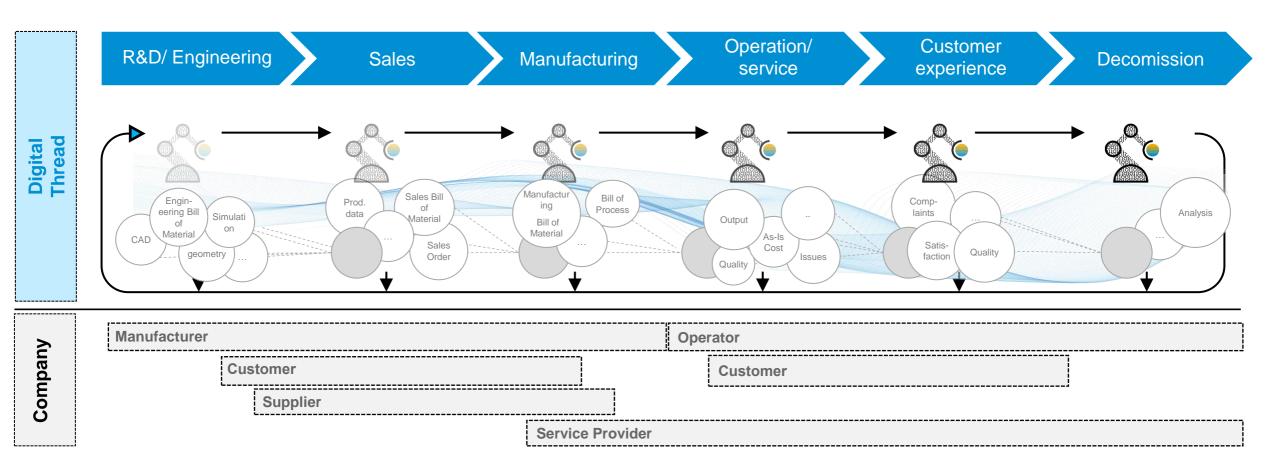
Manufacturing

Aftermarket Service



Since sales, purchasing and planning are deeply embedded in ERP, an ERP-centric approach can provide full flexibility.

# The Digital Thread 4.0 provides engineering knowledge and integration



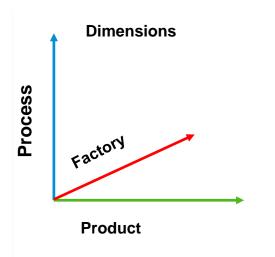


The product data model in ERP needs to include engineering knowledge. Standard integration needs to support the enhanced data model.

# Why is the SAP Product Structure able to solve Conveyors' business challenges?

# The Capabilities of the SAP Product Structure

Powerful Embedded Integrated Data and Business Applications in SAP ERP or S/4HANA



### **Virtual Structure**



Real Documents/Master
Data in any

**SAP Core and Applications** 

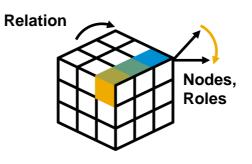
### **Dimensions of PPG**

allow to use configuration to automatically derive a routing, work instructions or any other documents from the product BOM configuration.

### Integration

of business applications is with node types ensures seamless integration between data and business processes. (e.g. publish a configured manufacturing data package for the production order).

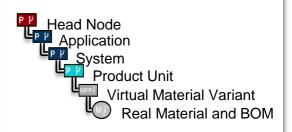
### Structure



### **Relationships and roles**

determine how the dimensions of the product structure are assigned.

### Node type



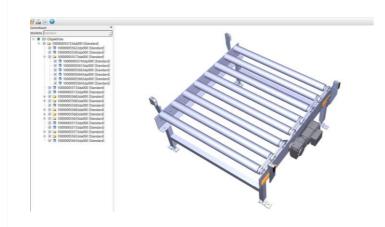
### **Characteristic values**

can be inherited to all subordinate objects with the classification tab of each node.

# Relationship between CAD, Classic BOM and Product Structure

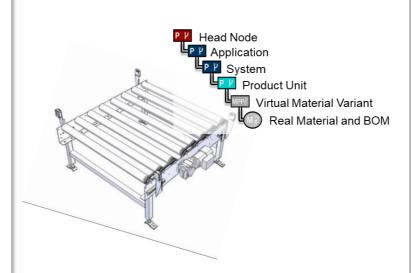
Why can't I use the CAD or Classic BOM instead?

### **CAD Structure**



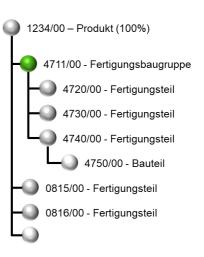
The **CAD Structure** describes the geometrical relationships between the BOM elements. The **variance** therefore is **implicitly described**.

### **Product Structure**



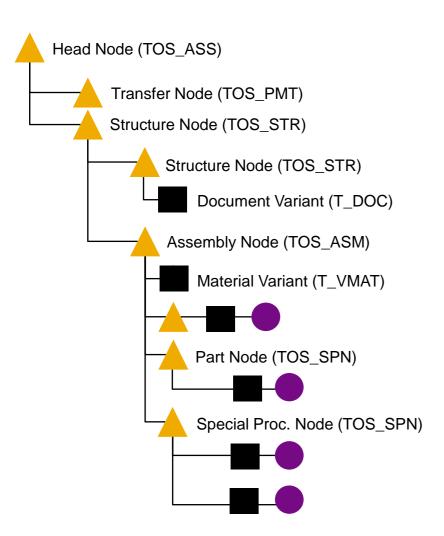
The **Product Structure** models variance structurally and thus is **cable to incorporate variance information directly** and link it to CAD documents.

### Classic BOM



The Classic BOM models variance on a material level and therefore does not scale very well.

# **Node Structure and Types (2D View)**





### Head

- Used for opening the technical order structure.
- All project relevant nodes are linked below.



### Transfer

Used to store ECP information which cannot assigned to a specific part of the product.



### Structure

- Used to divide products in segments. Complex Customer Systems have more segments.
- Can have n Structure nodes or n Assembly nodes below.
- No material master information is stored here.



### **Assembly**

- Used for structure information regarding assemblies.
- Can have n Assembly nodes or n Part nodes below.



### **Part**

- Used for structure information regarding assemblies.
- Lowest Level of an assembly structure. Can not have nodes below.



### **Special Procurement**

Used for long lead items.



### **Material Variant (MPP = Material Planning Position)**

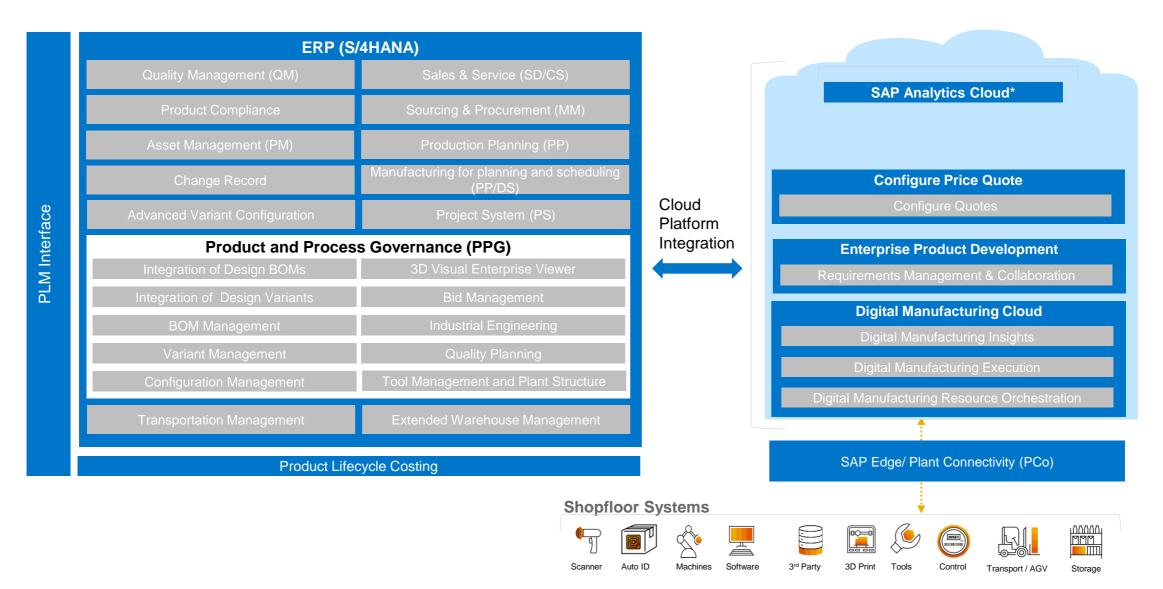
- Used for storing material master information, even without a material master attached.
- Materials can be created from this variant.



### **Document Variant (DPP = Document Planning Position)**

- Used for storing document information.
- Documents can be planned from this variant.

# **Solution Architecture - Component View**





# **DESIGN-DRIVEN ENTERPRISE MTS/CTO**

# **From Design to Sales**

















PRODUCT MANAGEMENT

**DESIGN** 

ENGINEER

SELL

SE

**PLAN** 

**MANUFACTURE** 

PERATE

### **Product**

- Variant Management
- Configuration Management
- Innovation Management
- Requirements Management
- · Systems-Engineering
- Product Validation

### Detailed Engineering

- Material Management
- Component Classification
- E-BOM
- 3D-Model

# Internal/external Collaboration

- Design Collaboration
- Document
   Collaboration
- Systems Engineering

### in Production

- Routing Management
- Integration of MTM
- Work Instruction Management
- Change Mgmt and Integration across and within different SAP BOM-types
- BOM Knowledge Management, Conversion and Configuration
- Configuration of Quality Management

### in Service

 Configuration of services, documents, and service-BON

### in Sales

 Enhancement of configuration with application knowledge

### Modelling

- Life Cycle Management of Product model
- Management of Variant Configuration with Engineering Knowledge

### Customer Order -Configuration

Document Collaboration Supplier Collaboration (only with Ariba) Visual Product Analysis

# Short- to Midtermer Planning and Optimization

- Order network
- Production
   Optimization
   considering product
   configuration
   dependent routing
   capacity, demand, takt
   times, set up times,
   man power and tooling
   while also considering
   material availability.

### Order Management

 Generation and Release of production orders

### **Assembly**

 Configuration specific work Instruction

### Inline Quality Managemen

Collection of configuration specific quality data during each production step.

### Machine Integration

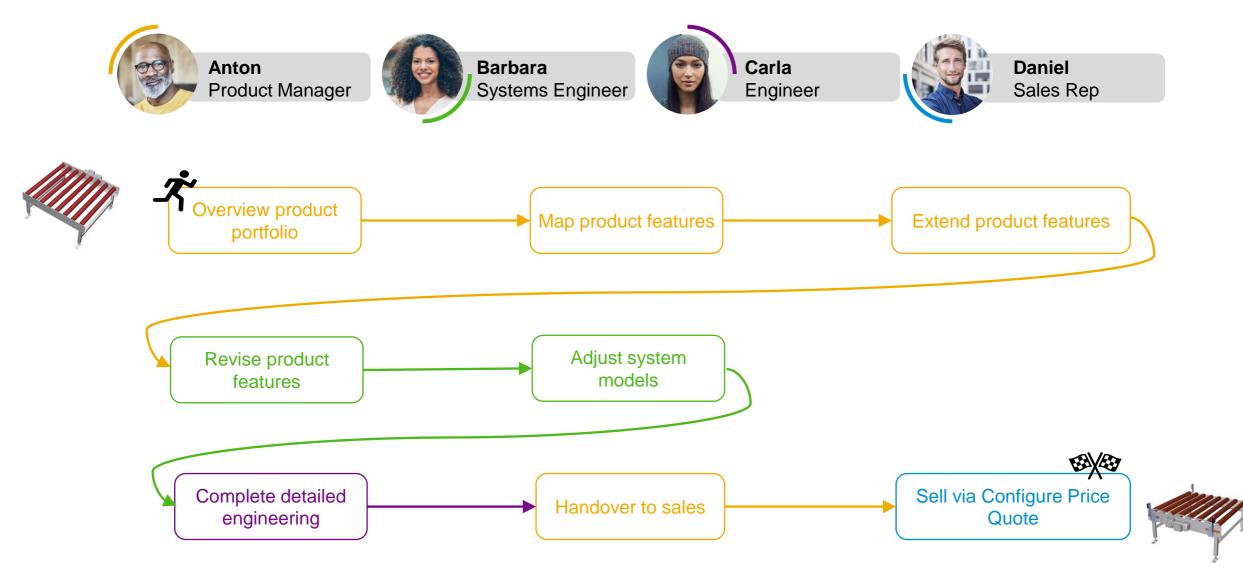
Configuration specific machine control

### Intelligent Asse Management

Providing the digital twin to internal and external collaboration partners IOT services

### Service-Management

- Ticketing
- Service-Order Mgmt.
- Service Order Execution
- Visual Sparepart
- Visual Service-Instructions
- Digital Twin Insight
- Digital Twin Monetarization



# From Design to Sales: What do we want to achieve?



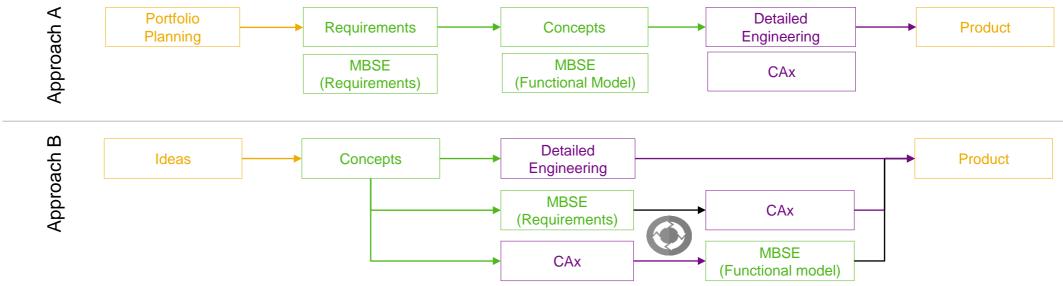
Anton needs a **portfolio structure** which describes the **complete** offering of products and services.

The portfolio structure has to cover the needs of sales, (planning, production, purchasing and service) without creating silos.



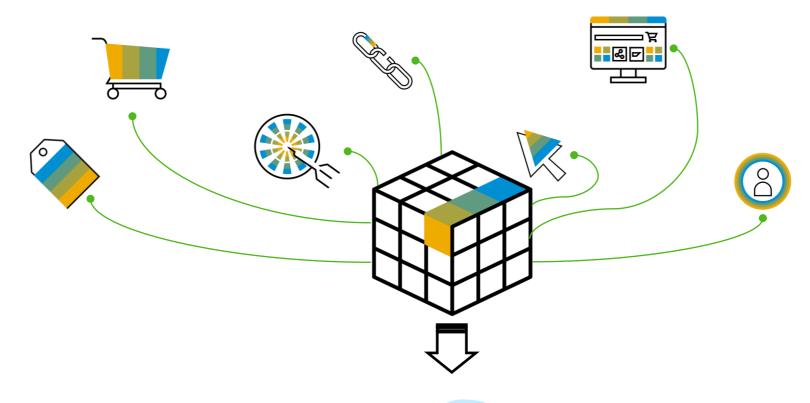


Barabara and Carla work with Anton to create the **product structure** with **embedded knowledge**. to **be able to automate sales (all) business processes**.



# Build up product structure and then leverage in CPQ

**Example for Model once configure anywhere** 



The product structure enhances the standard capabilities of the sales tool.

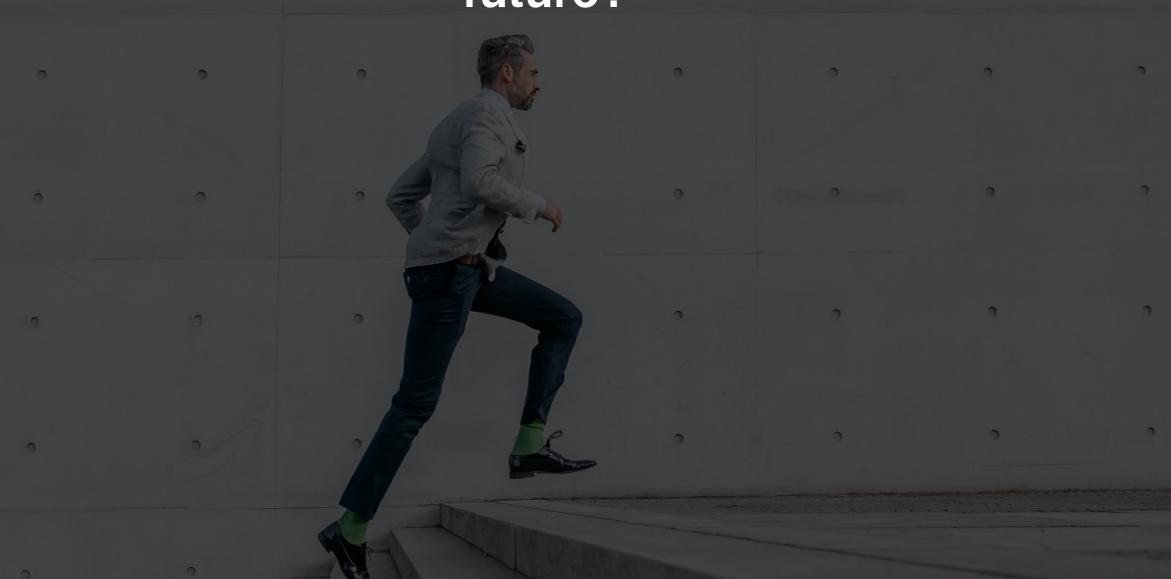
**CPQ** 

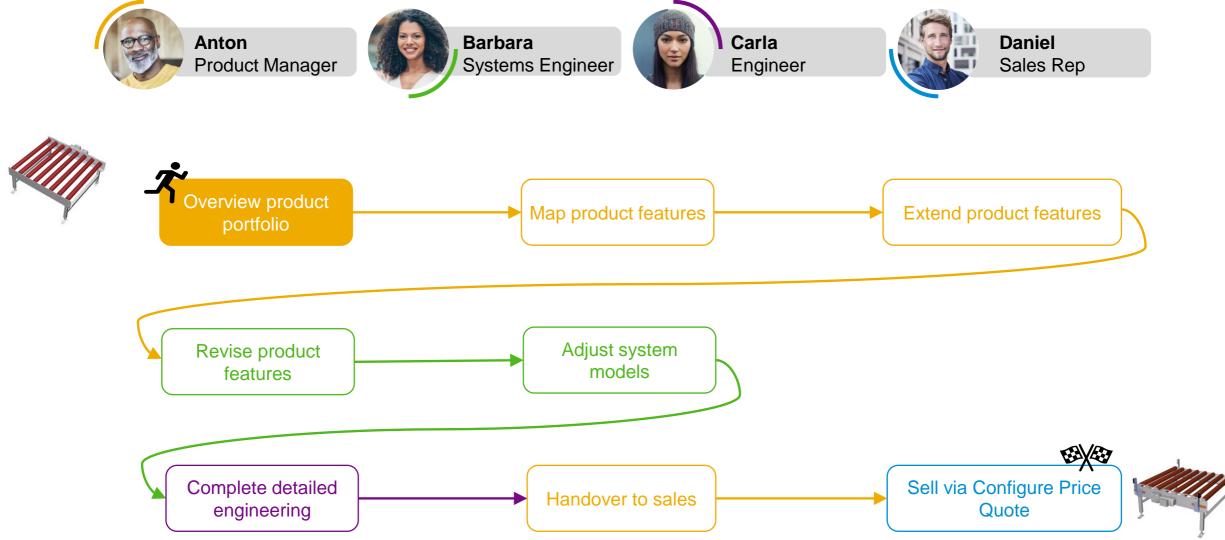
The sales tool is always synchronized with engineering.



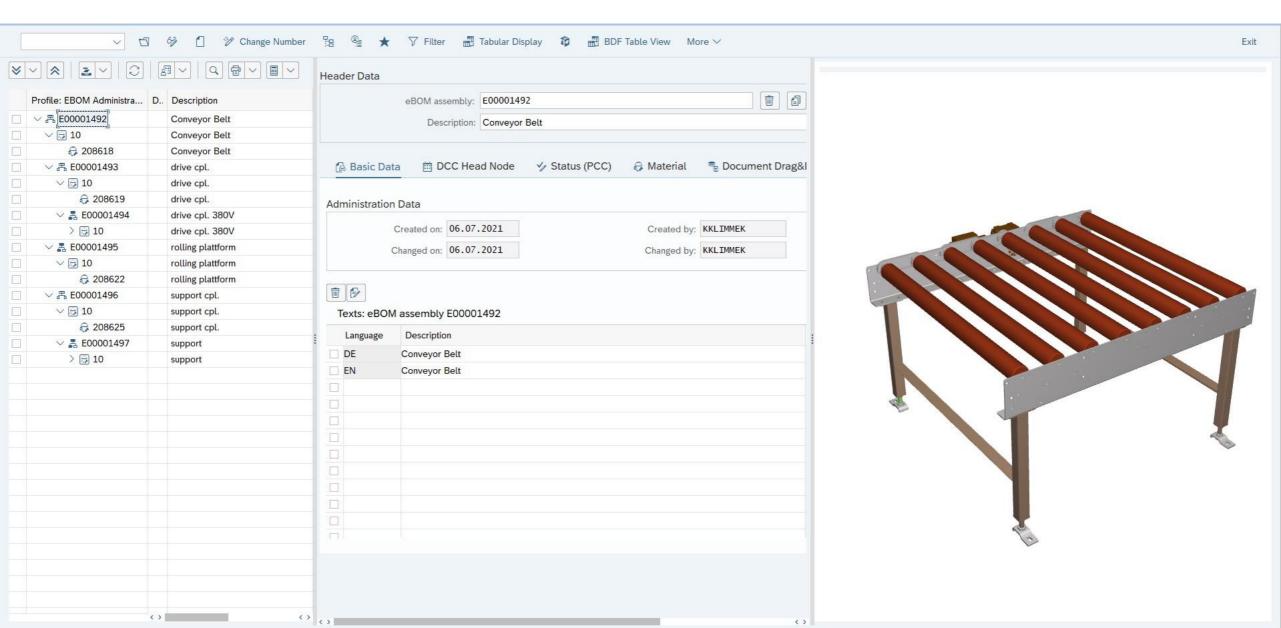
Daniel can now support his customers without having to be a technical expert.

# How will Conveyor work within SAP in the future?

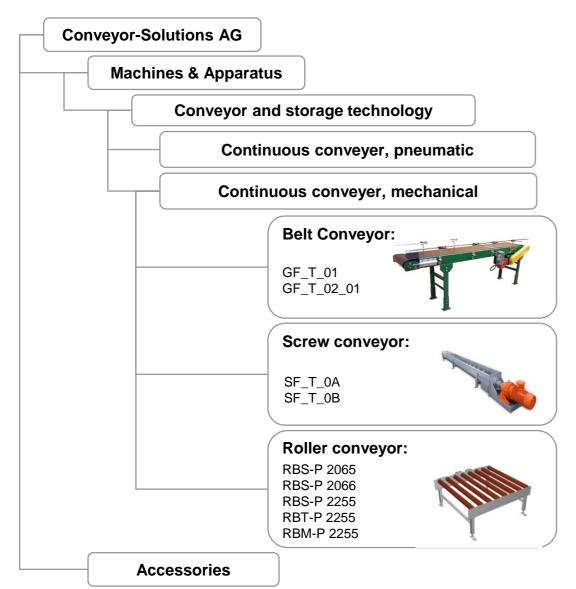




# **SAP PPG User Interface Example**



# **Conveyor Solutions AG's Product Portfolio Structure**



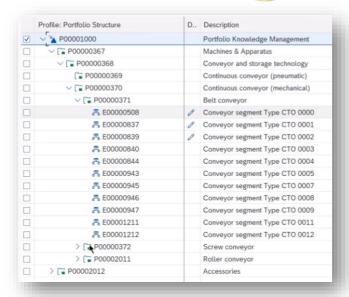
Profile: Portfolio Structure		D.,	Description
V	P00001000		Portfolio Knowledge Management
	∨ [■ P00000367		Machines & Apparatus
	∨ [■ P00000368		Conveyor and storage technology
	P00000369		Continuous conveyor (pneumatic)
	∨ [ P00000370		Continuous conveyor (mechanical)
	∨ [ P00000371		Belt conveyor
	₹ E00000508	0	Conveyor segment Type CTO 0000
	₹ E00000837	0	Conveyor segment Type CTO 0001
	₹ E00000839	0	Conveyor segment Type CTO 0002
	₹ E00000840		Conveyor segment Type CTO 0003
	₹ E00000844		Conveyor segment Type CTO 0004
	₹ E00000943		Conveyor segment Type CTO 0005
	₹ E00000945		Conveyor segment Type CTO 0007
	₹ E00000946		Conveyor segment Type CTO 0008
	₹ E00000947		Conveyor segment Type CTO 0009
	₹ E00001211		Conveyor segment Type CTO 0011
	₹ E00001212		Conveyor segment Type CTO 0012
	> [ P00000372		Screw conveyor
	> [ P00002011		Roller conveyor
	> P00002012		Accessories

# Modelling of product portfolio

### **Business Outcomes**

"As a **Product Manager**, I want to structure my product portfolio such that **all enterprise business units are** covered and all processes can be accelerated."







### **Process Highlights**



Complete and consistent across all products, components and services



Portfolio structure can be exported into online presence



Portfolio structure supports the different needs of services, strategic and tactical planning, production, service, ..

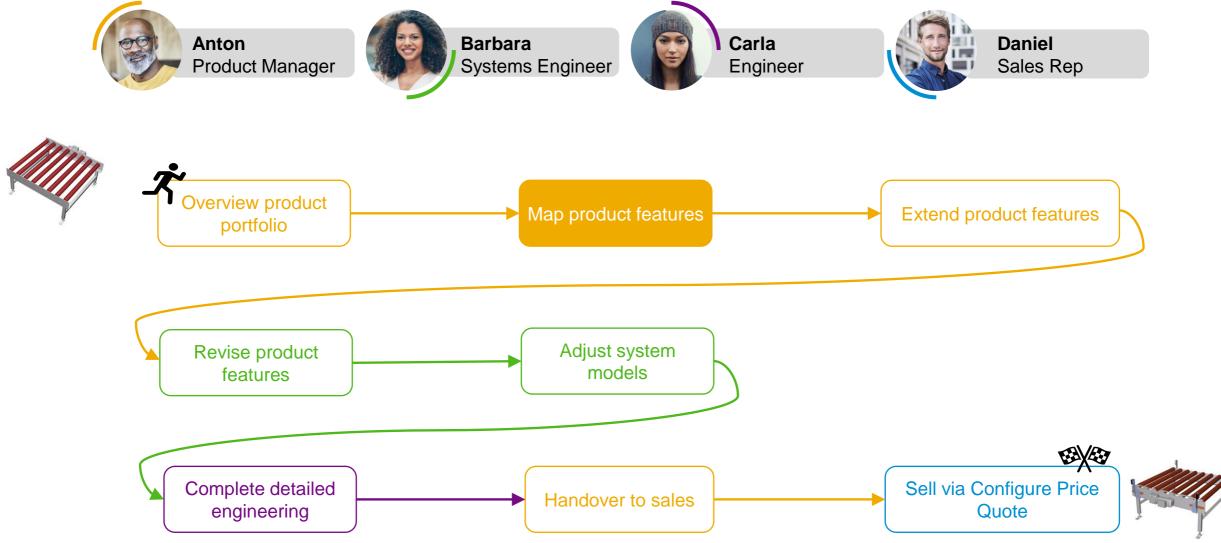


Change Management is complete and consistent across all products, components and services.

Standardization is encouraged



New products can be launched quickly.



# Overview of product variants and customizability

Catalog variant RF17 RF17\_EV01



Photoelectric barrier

Motor power

Height and width

Adaptable to customer requests

no

240V or 380V

1.00 to 2.00 m

no

Catalog variant RF18 RF18\_EV01



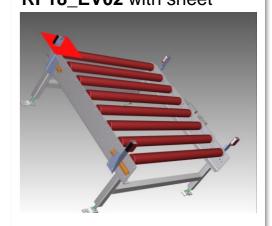
yes

240V or 380V

1.00 to 2.00 m

no

Customer Feature
RF18\_EV02 with sheet



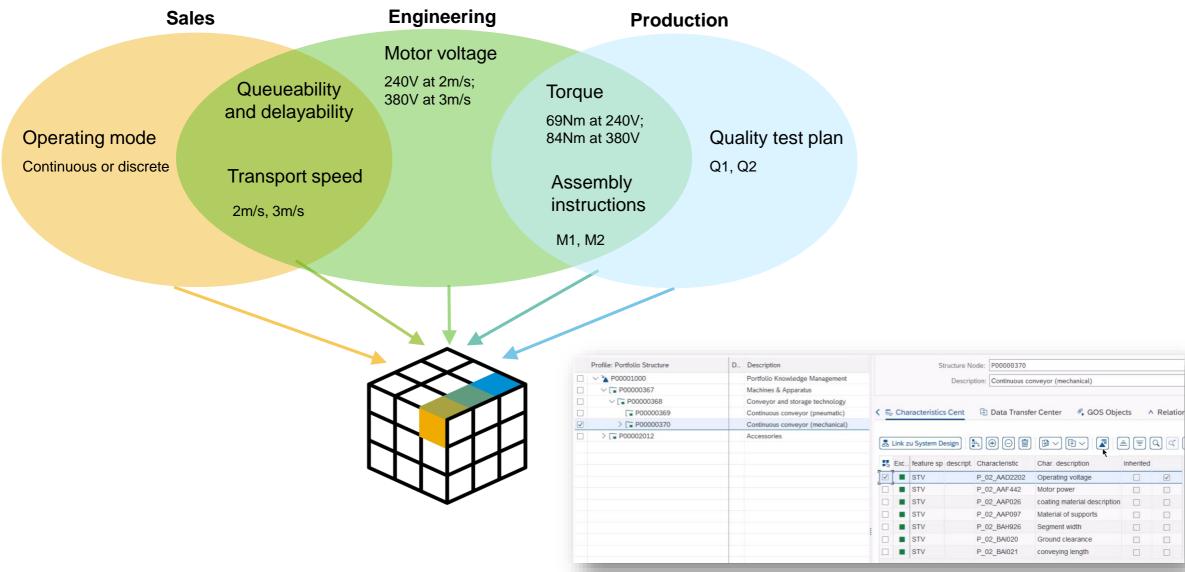
yes

240V or 380V

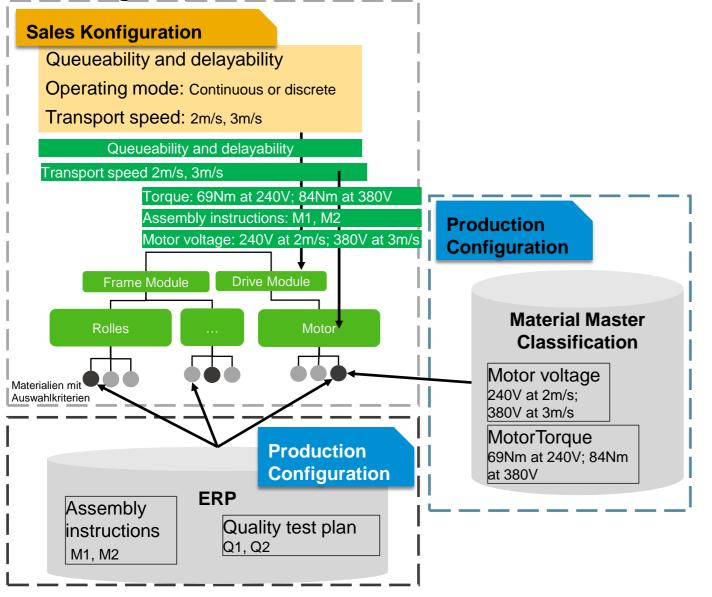
1.00 to 2.00 m

yes

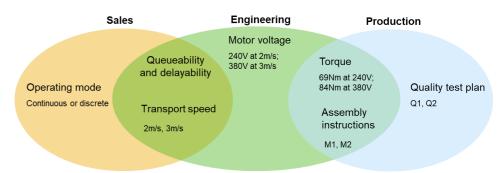
# Mapping of product features to portfolio



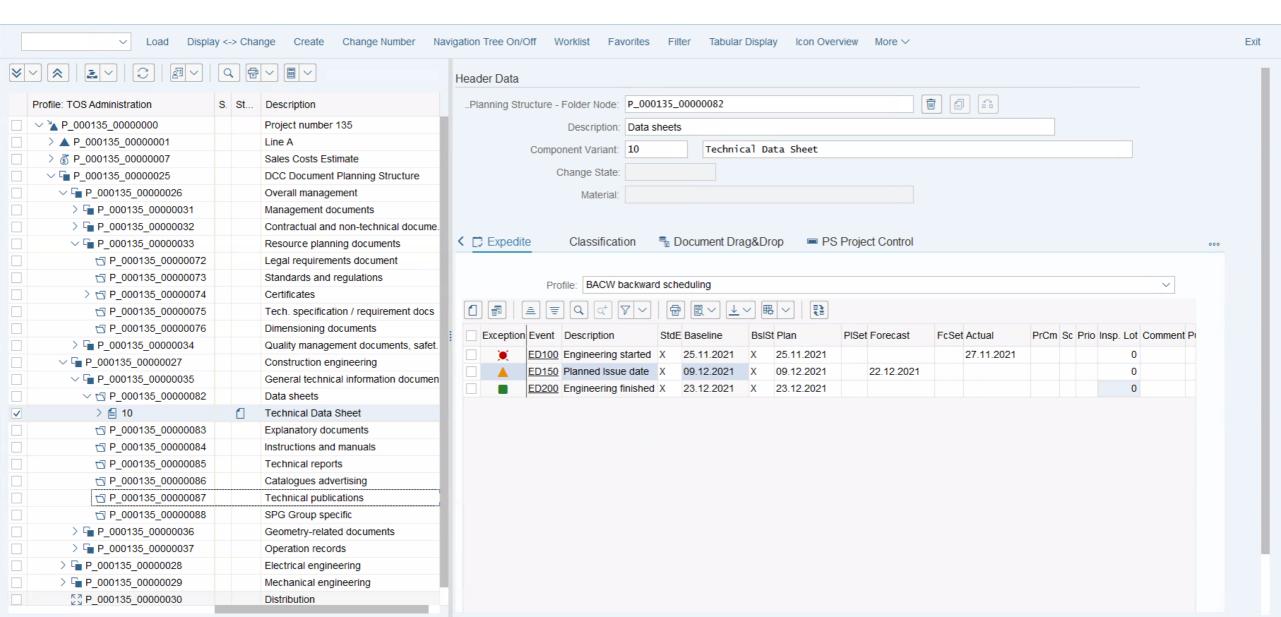
# Mapping of product features and characteristics to product structure



- In order to specify a product sufficiently, special areas of knowledge are necessary
- These areas can be clustered into information types
- An information type therefore provides a compilation of certain information in defined SAP objects
- In this example three basic information areas are to be distinguished



# **SAP PPG User Interface Example**

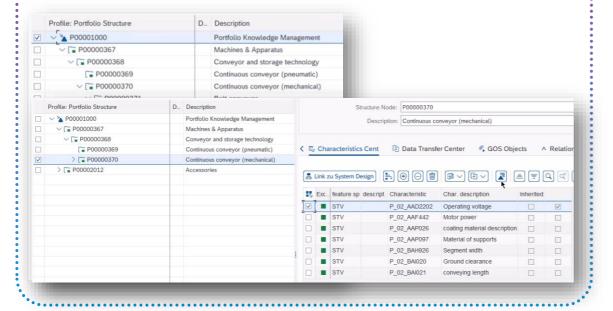


# **Mapping of product features**

### **Business Outcomes**

"As a **Product Manager**, I want to manage the product features such that I capture all business department needs and dependencies."





### **Process Highlights**



**Central management** of product features



Reuse of existing product features



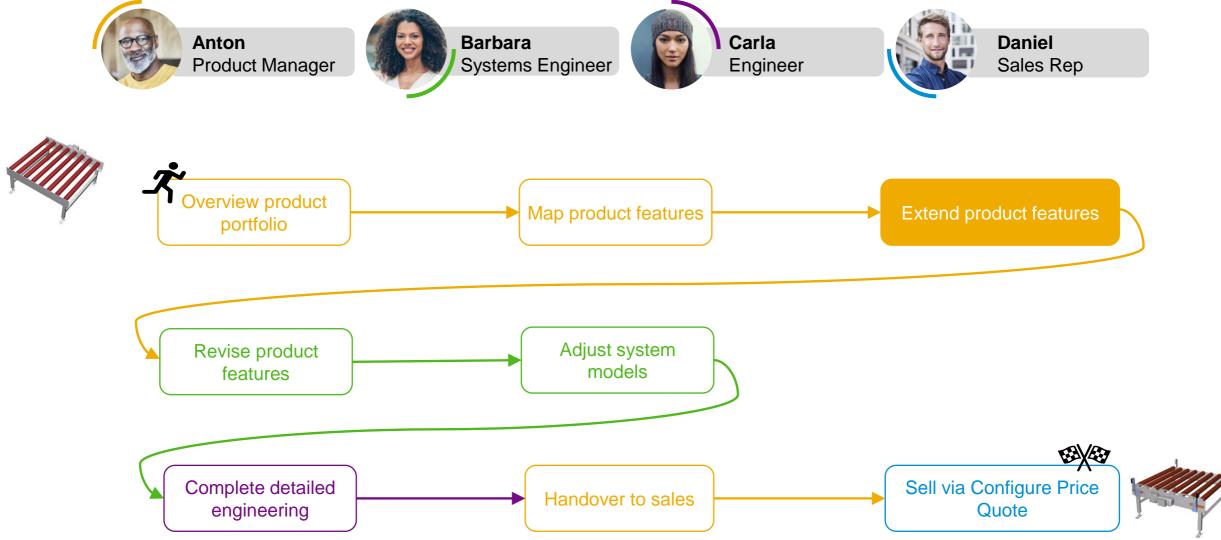
Turning product features into (technical) characteristics



**Structure** product features efficiently.

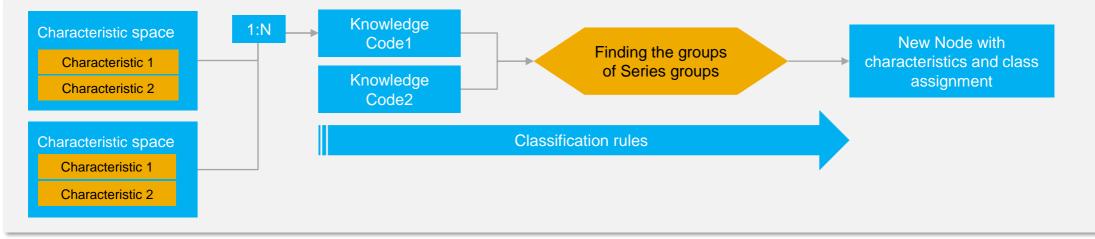


**Speed up** the change management process.



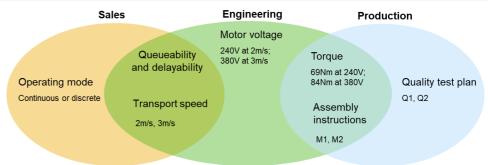
# Overview PPG - Master Data Center for Classification

- Characteristics Center: Management of characteristics and characteristic spaces at the node.
- Class Center: Management of classes at the node
- Structure Center: Used for rule-based node creation
- Knowledge Center: Used to create and manage GenTab and constrains.



### **Application Example PPG structure setup:**

- The characteristic space is assigned to the node type.
- The characteristic name is "inherited".
- And contains an SAP value list (with or without value restriction)

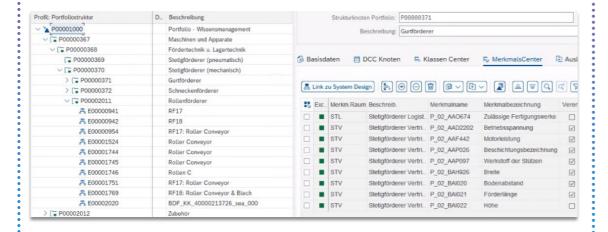


# **Extend product features & classification**

### **Business Outcomes**

"As a Product Manager, I use extend product features to add engineering knowledge to model dependencies beyond classical BOM configuration."





### **Process Highlights**

You can link product features to application knowledge. This allows later CPQ to help sales configure the product application orientated.

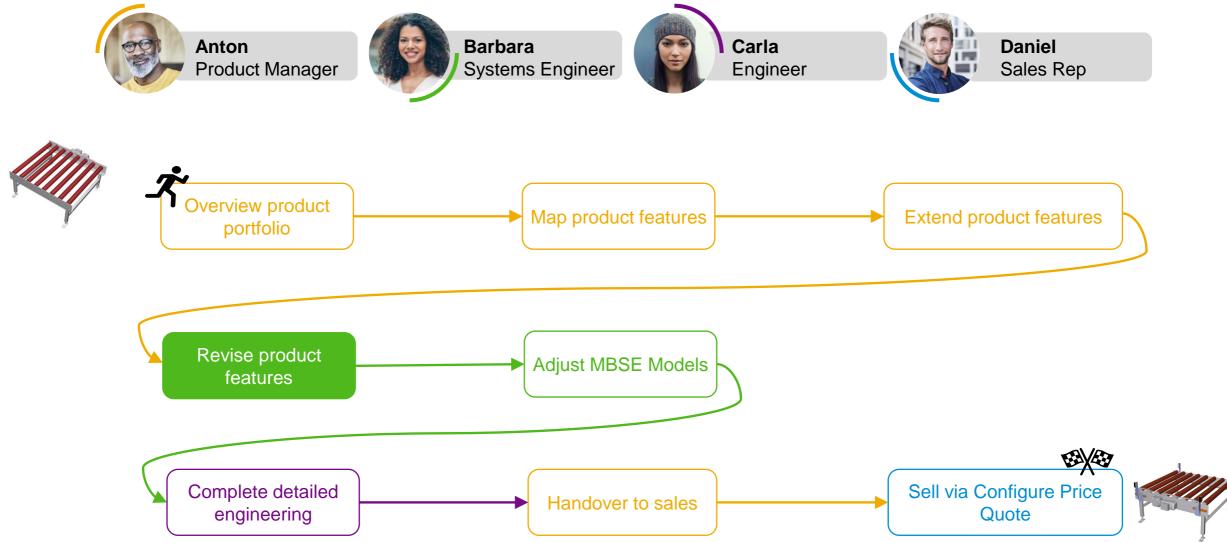


Sales can ask the customer how many luggage pieces do you need to transport per minute? What is the average weight of the luggage? Will you transport non-standard sized luggage? How fast should the luggage arrive at the pick up area? What screening steps do you need to take?



You can link product features to manufacturing, service or any other form of knowlege to link the product features to quality planning, routing, packaging, service planning, ....

This allows for seamless integration with other departments, a high level of automation, seamless change process and optimized manufacturing and service processes.

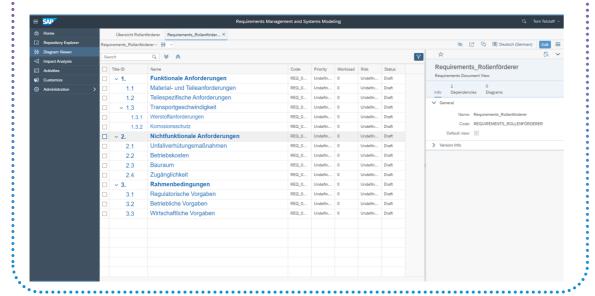


# **Revise product features**

### **Business Outcomes**

"As a **Systems Engineer**, I want to revise product features so that the requirement structure is up to date."





### **Process Highlights**



Manage requirements in a central repository and share requirements with suppliers & business partners



Assess the **quality of requirements** based on defined criteria



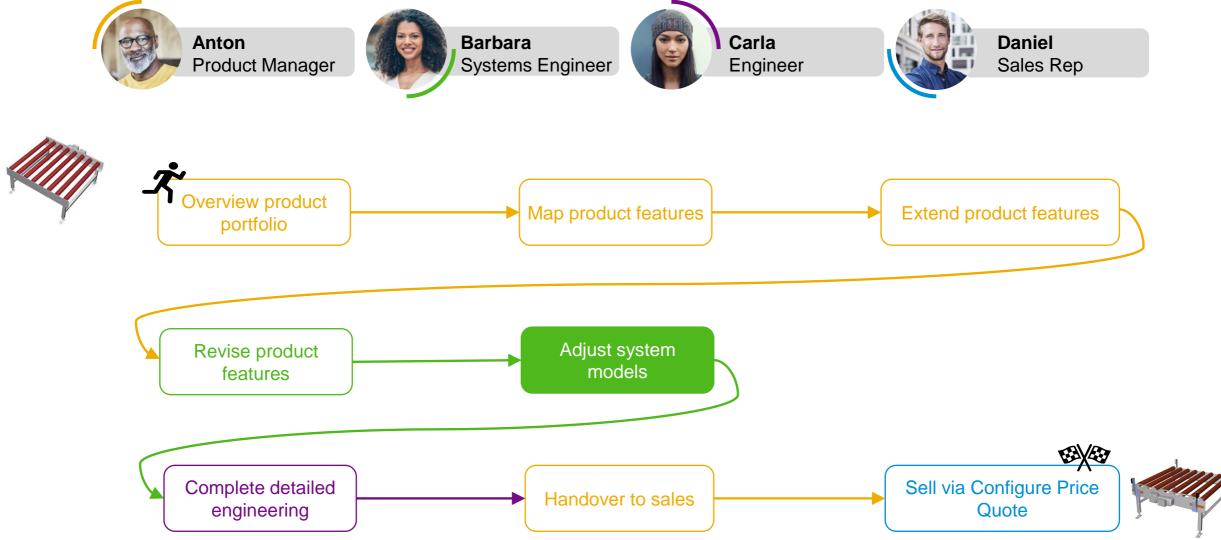
Launch an impact and lineage analysis on requirements, model objects and associated objects



Edit one requirement model concurrently across the extended enterprise



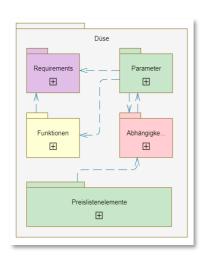
Import and export requirements based on standard formats, like Requirements Interchange Format

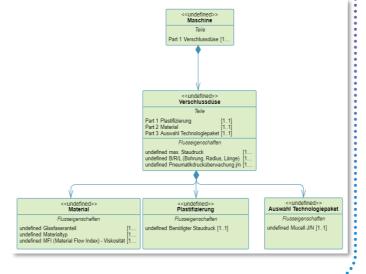


# Adjust system models

### **Business Outcomes**

"As a Systems Engineer, I want to adjust the MBSE artifacts so that I have systematically captured my product."





Barbara

Systems Engineer

### **Process Highlights**



Create and manage system architectures and behavior based on the standard language SysML



**Define and visualize** object links on the objects and in a dependency matrix



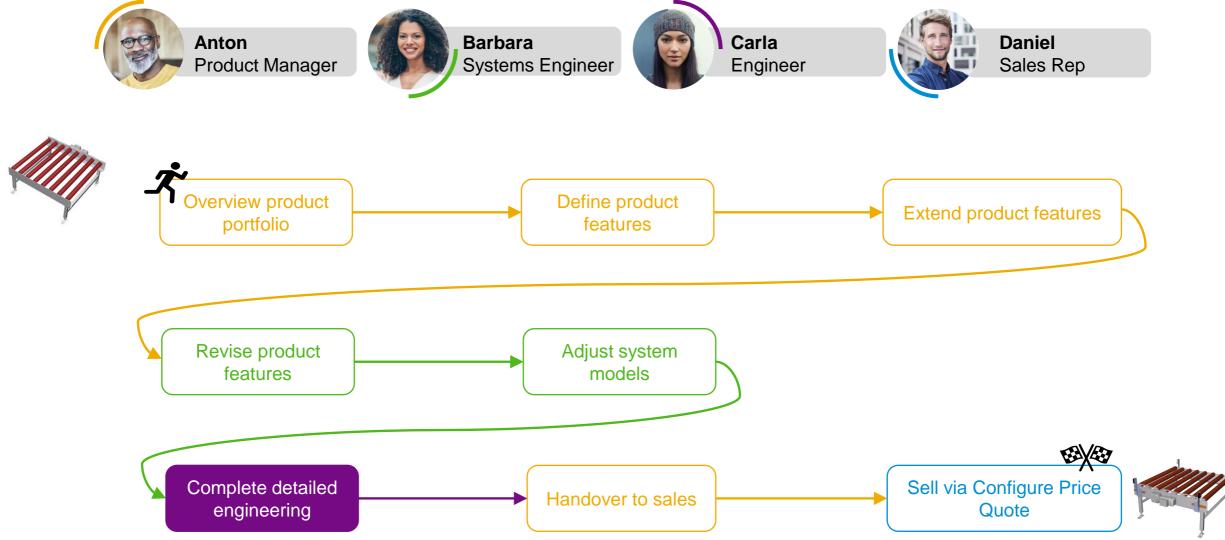
Analyze change impacts on various business objects to boost product quality and lower change costs by identifying potential product flaws early



**Collaborate** with system engineering partners across the extended enterprise



Define product features and variants in an early development phase to make sure your product complies with the original customer demand

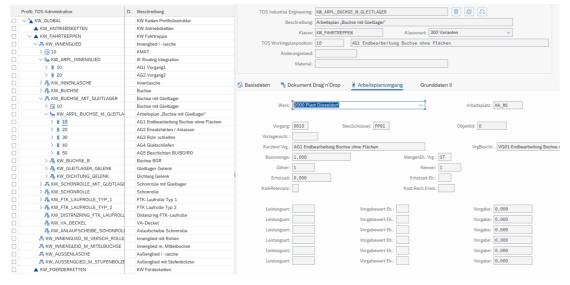


## Complete product data

#### **Business Outcomes**

"As an **Engineer**, I want to complete the product data so that downstream processes can be executed."





#### **Process Highlights & Benefits**



Unify product development disciplines including mechanical, electronic/electrical & software structures into one product definition



Manage detailed mechatronic engineering data on a single platform



**Synchronize** product data, structures, access and documents across the extended enterprise

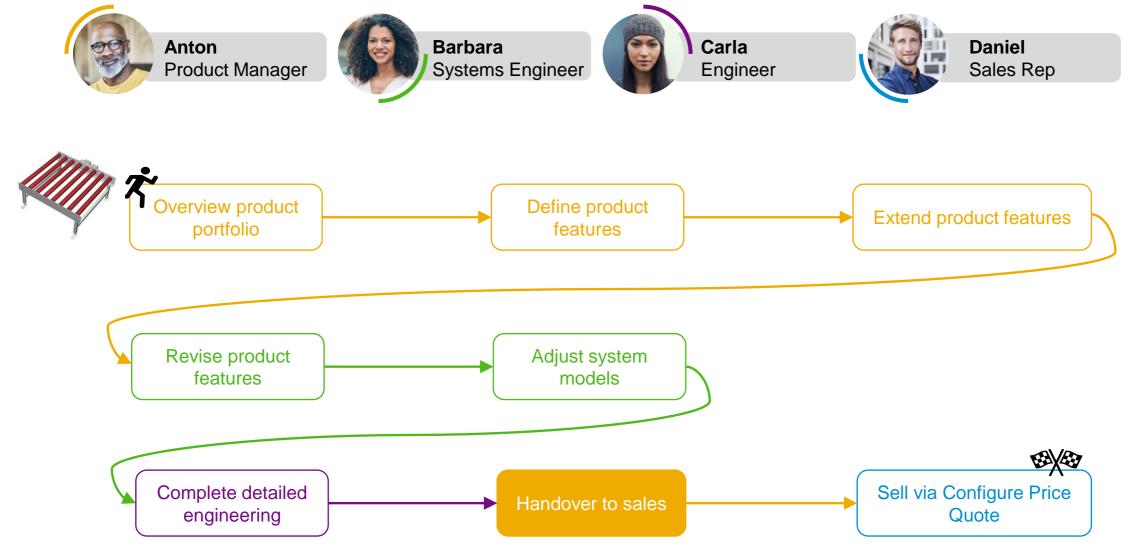


Provide digital twin foundation early in design phase



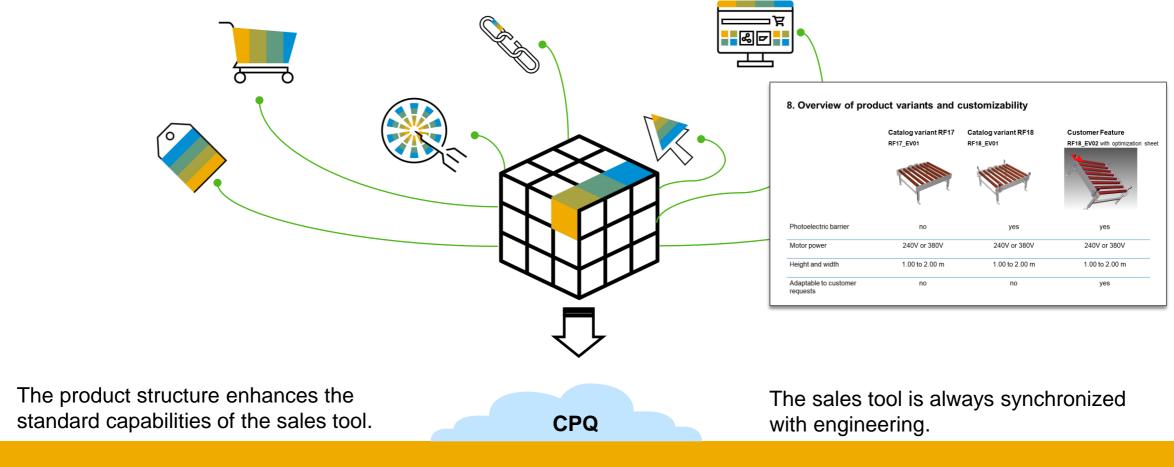
**Better decision-making** due to accurate definition of the product that combines design and business information

# From Design to Sales: Detailed Process Flow



### **Handover to Sales**

**Example for Model once configure anywhere** 



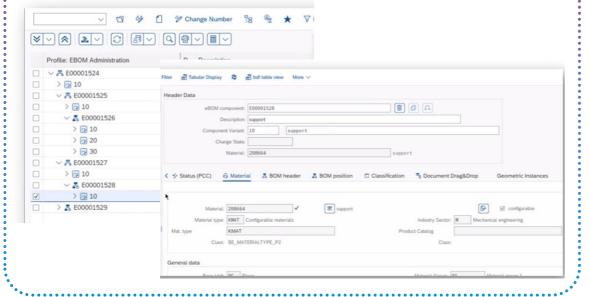


Daniel can now support his customers without having to be a technical expert.

### 8. Handover to Sales

"As a Product Manager, I want to provide data to sales so that the product can be sold."





#### **Process Highlights & Benefits**



Improved configuration capabilities: The configuration data of the different knowledge types are finally maintained and checked.



**Model once** configure anywhere



Support of different variant characteristics (open, closed)

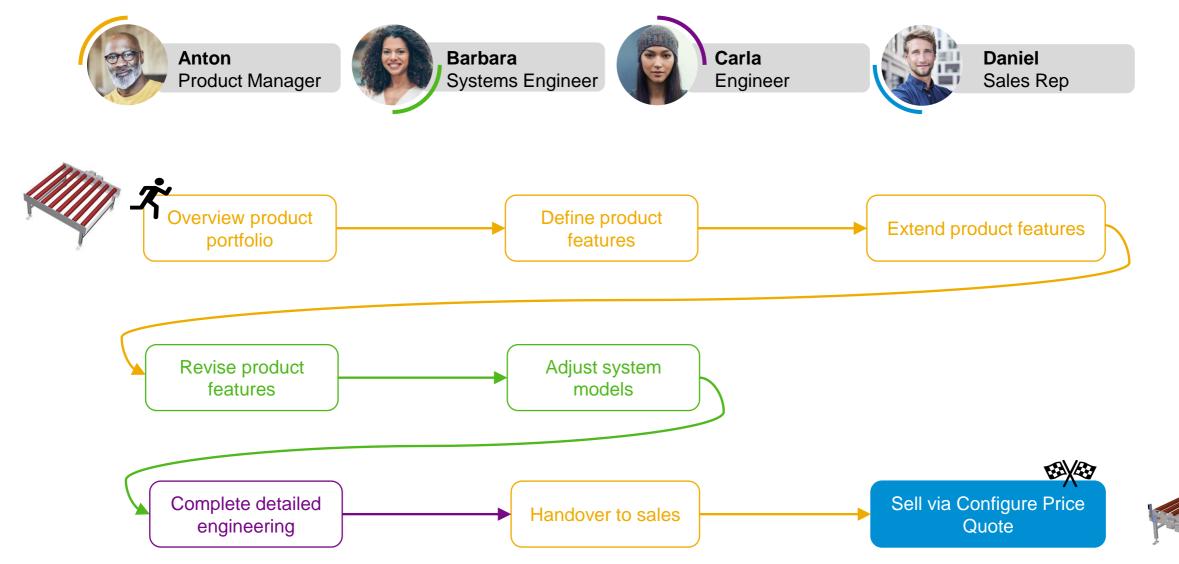


Automated generation of ERP data like material masters and configuration profiles



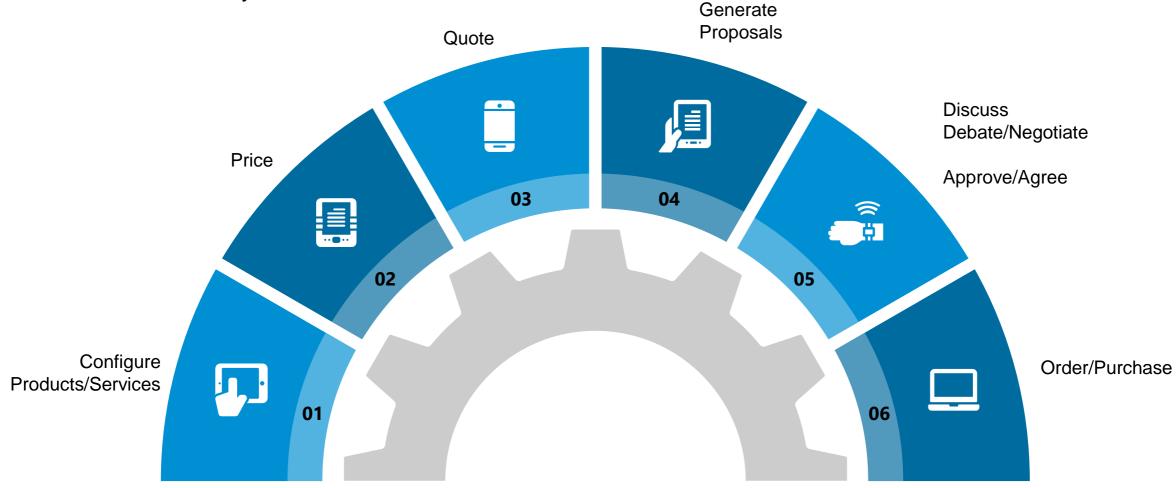
Simulate and visualize configuration

## From Design to Sales: Detailed Process Flow



# Why CPQ?

Configure Price Quote (CPQ) is a powerful sales tool that enables companies to produce accurate and highly configured sales quotes for customers. It allows sales to sell more and faster as it speeds up and automates the sales cycle.

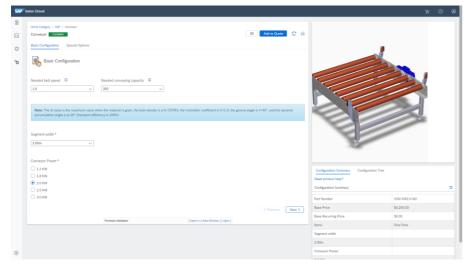


# **Sell via Configure Price Quote**

#### **Business Outcomes**

"As a Sales Rep, I want to be supported in generating a quote, fast and error free."





#### **Process Highlights**



**Reduced** quoting time



**Error free** quotes



**Automated** document generation

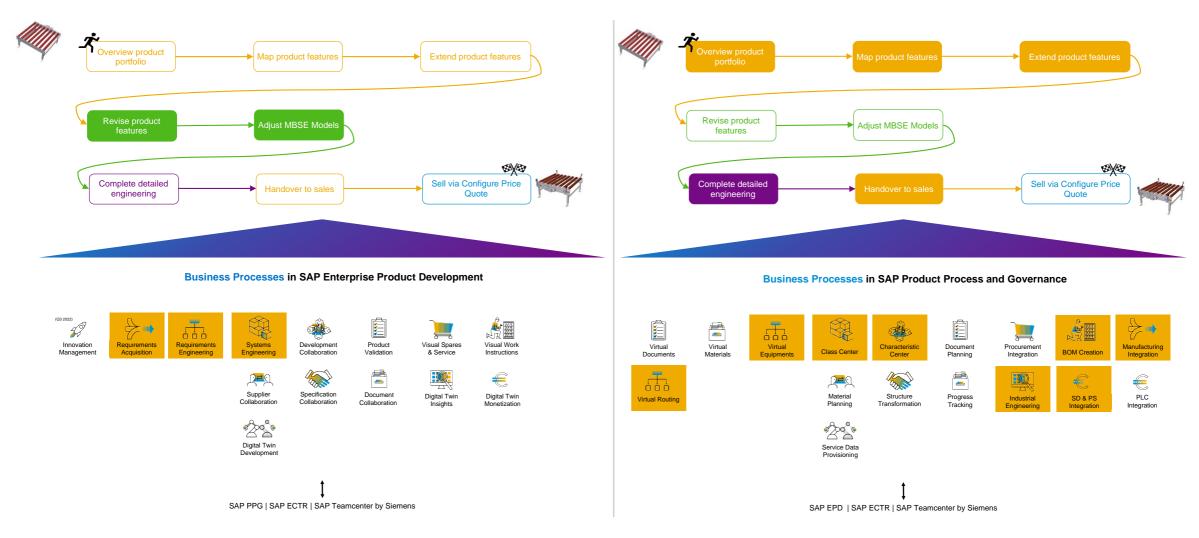


**Al** supported



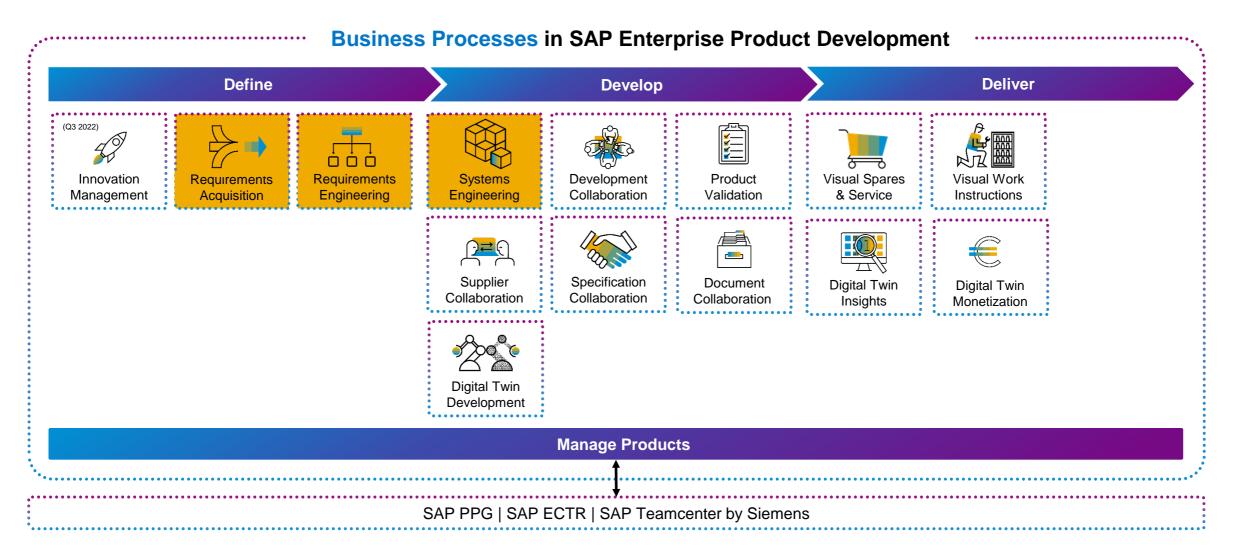
**Integrated** text text text

## **Running Business Processes with SAP**

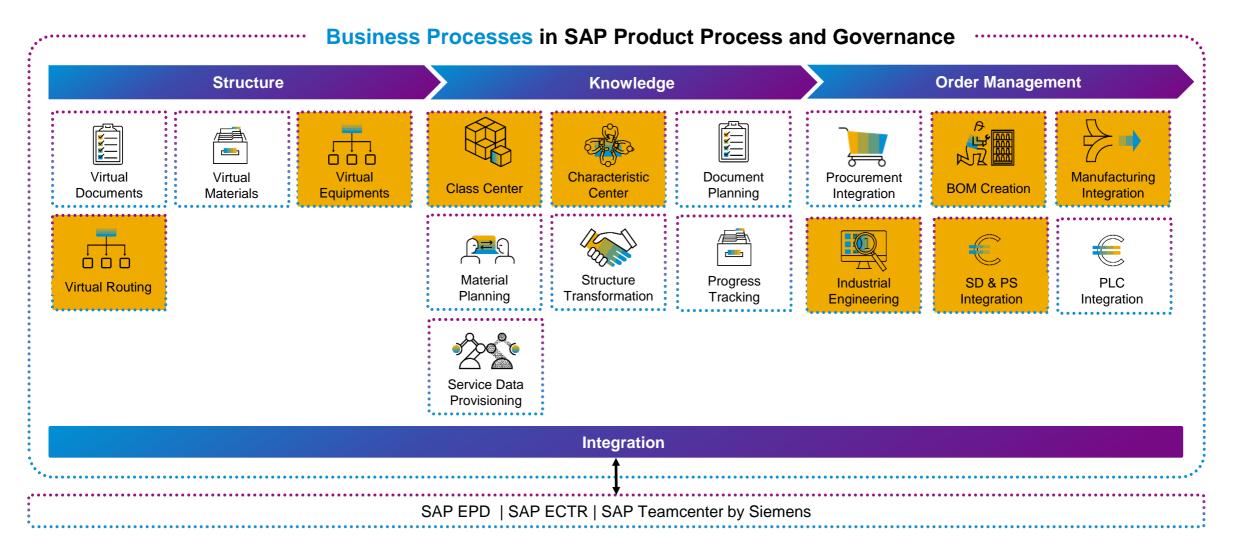




# The business processes in SAP EPD are designed to help our customers address the needs of digital product development organizations.



# The business processes in SAP PPG are designed to help our customers address the needs of design-driven enterprise.



## **Summary**

The Design-Driven Enterprise is AGIL.EFFICIENT.CUSTOMER-CENTRIC

- Increased the level of automation in the process flow from engineering into sales, production, service with model once configure anywhere.
- Using a smart product structure as single central solution to achieve high level of consistency, automation and accuracy across all departments.
- ✓ Improved leverage of their existing investment in the SAP Core. Reduce complexity of applications outside of the core.



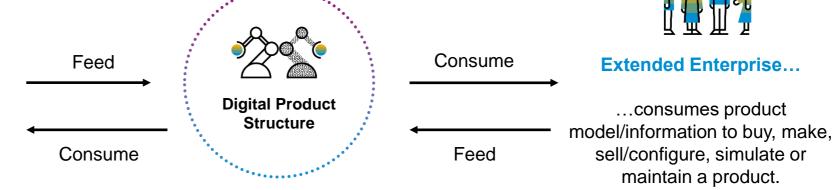
### **Outlook**

#### Our Vision: Digital Thread 4.0 automates all business processes



#### **Product Teams...**

...feed the product model with new iterations and versions, aligned with customer requirements and compatibility



Webinar 1 - Create Portfolio & Product Structure

Webinar 1 – Consume in Sales

**Webinar 2 – Consume in Manufacturing (01.04.2022)** 

**Extended Enterprise...** 

...consumes product

sell/configure, simulate or

maintain a product.

Webinar 3 - Consume in Service (08.04.2022)



# Thank you & see you soon.



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