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APR 10-13, 2022

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COMMUNITY OF EXPERTS
OF DASSAULT SYSTEMES SOLUTIONS

Founding Partner
DASSAULT
SYSTEMES



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Founding Partner
DS DASSAULT
SYSTEMES

Collaborative Supplier Integration for 3DX and Other Vendor Systems

Brian Schouten – PROSTEP Inc

Abstract

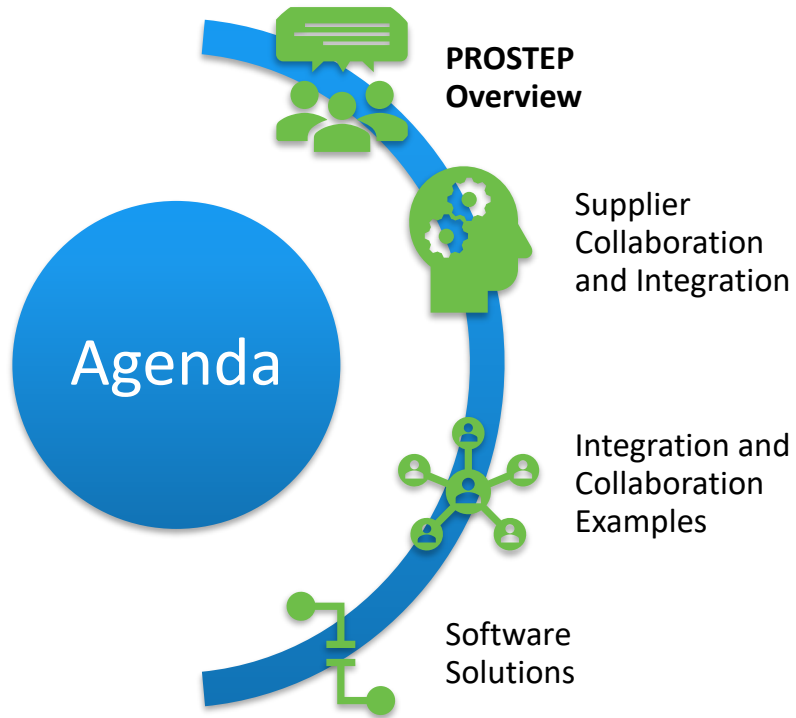
Companies have historically stored data in information silos which become a bottleneck for real-time data collaboration, monitoring, and processing. PROSTEP, working with partnerships between aerospace OEMs and suppliers, faced this challenge when choosing to integrate their manufacturing or ERP systems with the 3DExperience platform.

Join the discussion as PROSTEP outlines the challenges, risks, and outcomes for integration using a microservices approach for scalability and agility.

From previous success stories you'll discover:

- A viable solution for 3DExperience integration with multiple systems within your organization or within partners
- Effective requirements planning and framing the effort for a successful integration
- Risks, challenges, and outcomes for a successful integration

Agenda



Company Overview

PROSTEP

A vendor neutral / independent engineering solutions and PLM software company since 1993

OPENPDM[®]

Integration / Migration

OPENCLM

Integrated Configuration Management

OPENDXM[®]
GLOBAL X

Secure Data Exchange
Block Chain / Additive Mfg



3D Transformation
TDP, DRM, Web-based

Over 25 years experience

with engineering interoperability, migration, intelligent documents, benchmarking, more

Approximately 250 employees and consultants

based from international locations throughout Europe and in North America

More than 500 Customers

that are leading companies across most industries

We are an independent company specializing in PLM consultancy services and engineering solutions.

experts in providing leading global manufacturing companies with the support they require for designing and optimizing their internal and cross-enterprise development processes.

the specialist for distributed engineering processes involving heterogeneous IT systems.

Shareholders

infocenter@prostep.com / 8-PROSTEP01



BOSCH



DAIMLER

• APTIV •



SIEMENS

Volkswagen





Application projects

3D Messdatenmanagement
Workflow Forum

Cross-Discipline Lifecycle
Collaboration

Code of PLM Openness

JT Workflow Forum

Vehicle Electric Systems
Workflow Forum (VES-WF)

Project Schedule Management

Smart Systems Engineering

ReqIF Workflow Forum

Standardization Strategy Board

Production Lifecycle Information
Management (PLIM)

Additive Manufacturing
Interfaces (AMI)

Functional Data Exchange (FDX)

Implementor forums

3D Messdatenmanagement
Implementor Forum

PDM Implementor Forum

ECAD Implementor Forum

ECAD/MCAD Collaboration
Implementor Forum

JT Implementor Forum

CAx Implementor Forum

ReqIF Implementor Forum

JT Standardization

Standardization

ReqIF Benchmark

STEP Benchmark

STEP AP 242 Maintenance

Long-term Archiving and
Retrieval

JT Benchmark

ISO 14306	Industrial automation systems and integration - JT file format specification for 3D visualization
ISO 10303 Part 11	ISO Standard - Description methods: The EXPRESS language reference manual
ISO 10303 Part 21	ISO Standard - Implementation methods: Clear text encoding of the exchange structure
ISO 10303 Part 22	ISO Standard - Implementation methods: Standard data access via interface
ISO 10303 Part 28	ISO Standard - Implementation methods: XML representations of EXPRESS schema and data, using XML schemas
ISO 10303 Part 203	ISO Standard, STEP AP203 - Application Protocol: Configuration controlled design

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PROSTEP Technology Partners



PROSTEP – Dassault Systèmes



A long history of technology partnership



CAA 3DX/V6 PARTNER 3DX/V6 COMMUNITY PARTNER

Products to integrate systems: Teamcenter, SAP, SimManager, GlobalX

Developing customer specific solutions on base of 3DX/V6 CAA2 API



3DX ENOVIA PARTNER

Products for integration and federation of meta data and CAD data with 3DX ENOVIA

Since MatrixOne 10



CAA V5 ADOPTER

Products and extensions on base of V5 CAA API



V5 DEVELOPMENT SERVICE PROVIDER

Developing customer specific solutions on base of V5 CAA API

PROSTEP - 100% PLM

Consulting and Solution Portfolio

Strategy	Concepts & Solution Architecture	Implementation of IT & Process
PLM Implementation Strategy	PLM Architecture & Processes Benchmark & ROI-Analysis PLM Landscape & Complexity Management PLM-Process- & -Systemintegration	PLM Migration & Integration OPENPDM® OPENCLM OPENDXM® GLOBAL X
		PLM Realization and Roll-out Agile PLM Implementation & Introduction (Main Focus: TC, WT, 3D Exp.) PLM Process & Method Individual-Software Development
PLM for Digital Transformation	PLM for IoT/I 4.0 Solutions Digital Master / Digital Twin	Technical Data Package ZLP, Maintenance & Repair, 3D PDF LZA, TDP, 3D Master
	Model Based Enterprise 3D Master / Systems-Engineering	
PLM for Collaboration	Cross-company PLM PLM for Merger & Acquisitions PLM for Joint Ventures Partner & Supply Chain Integration	PLM Collaboration Automated PLM Data Supply PDM & CAx Data Exchange OPENPDM® OPENCLM OPENDXM® GLOBAL X

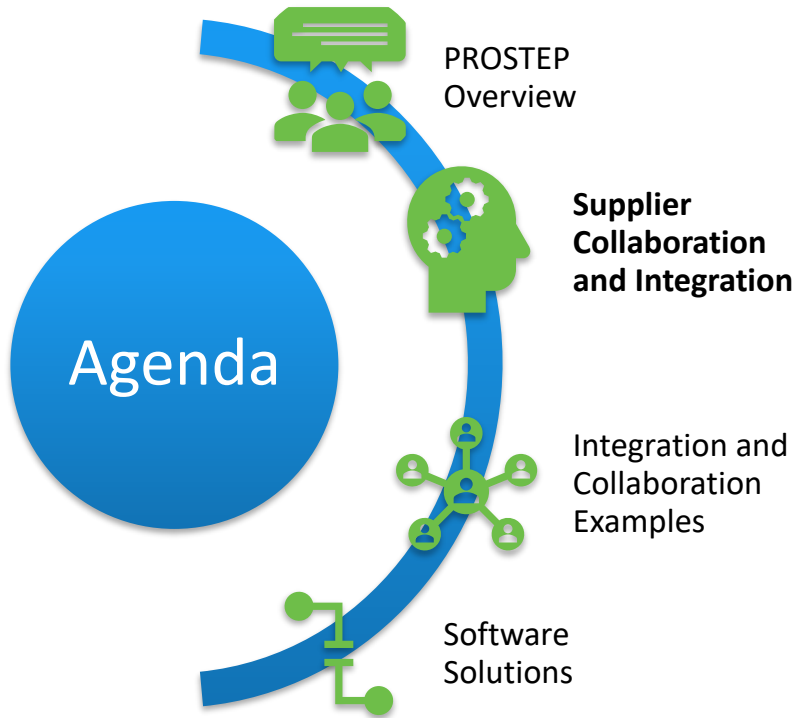
PROSTEP

- PLM System Selection
- PLM Implementation
- PLM Process Optimization

- Digitalization
- Industry 4.0
- IoT

- Merger & Acquisitions
- Joint Venture
- Project Consortia

Agenda



Supplier Collaboration Case Examples

Reasons

- Engineering Collaborations
 - Requirements Exchange
 - Design Partnership
- Manufacturing Collaborations
 - Manufacturing Engineering
 - Build Responsibility

Methods

- Suppliers use OEM 3DX
 - Data Ownership and Control Issues
- Direct System to System Integrations
 - “API” based integration
- Secure Payload Exchange
 - Save to File and Transfer

Engineering Collaboration

- Systems Engineering (3DX / ReqIF / Standards)
 - Requirements Integration
 - MBSE Exchange
- Mechanical Design (External PLM & 3DX)
 - Design Collaboration
 - Change Management
- ECAD and Software (3DX / external ALM)
 - ALM Integration
 - Cross Domain Dependencies
- Validation and Verification (3DX / SPLM)
 - Analysis
 - System Integration

Manufacturing Partnership

- Process Planning (PLM to Delmia)
 - Require EBOM and Product Data
 - Creation of Process Planning
- Manufacturing Instructions (PLM to Apriso)
 - Creation of 3D Work Instructions
- Execution and Configuration (3DX, ERP, & MES)
 - Assembly Effectivity Support
 - As Built Configuration

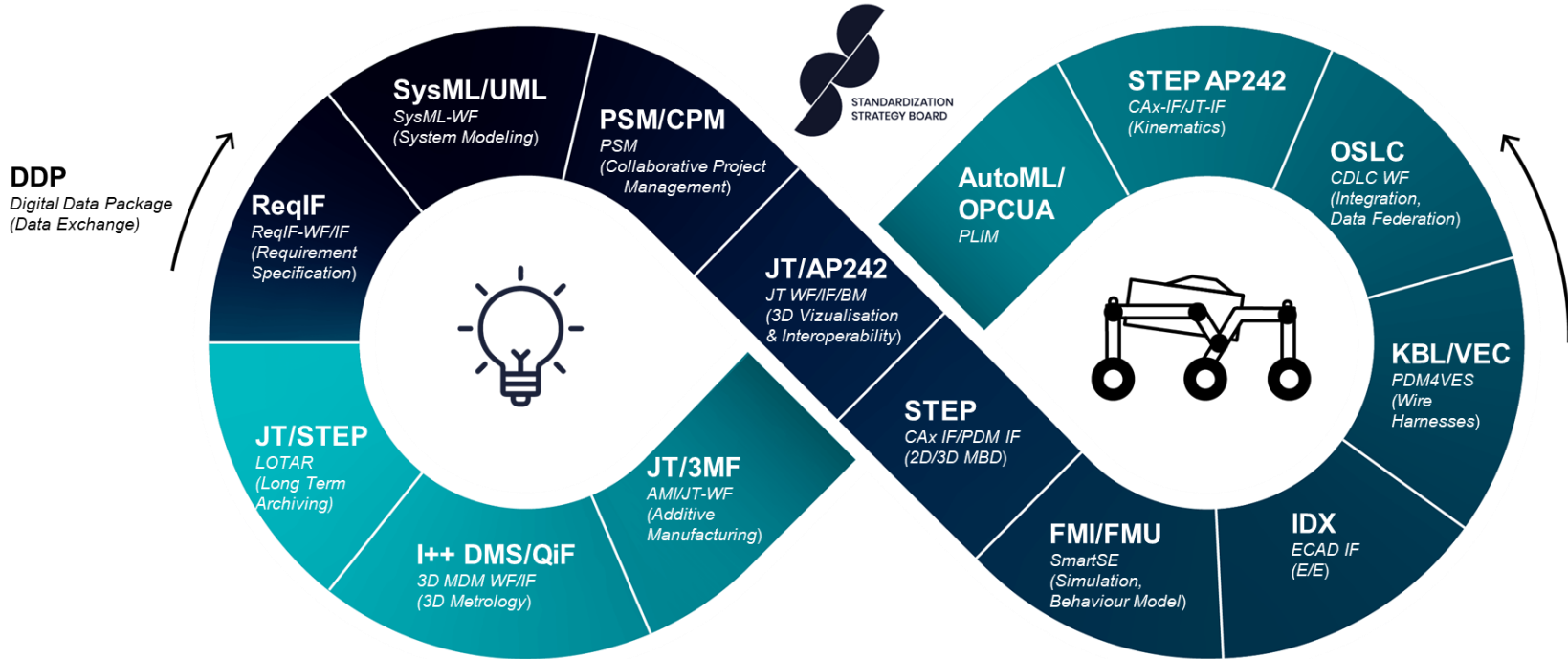
Supplier Collaboration Challenges

- Three Company Agreements are Difficult (OEM, Supplier, Integrator)
 - Strong Executive Sponsorship
 - Early Strategy and Scope Agreement
- Organizational Alignment is Far Apart
 - Existing Methods
 - Systems and Technology
- Data Alignment
 - Inter-company standards for data organization needed

Multi-Organization Strategy

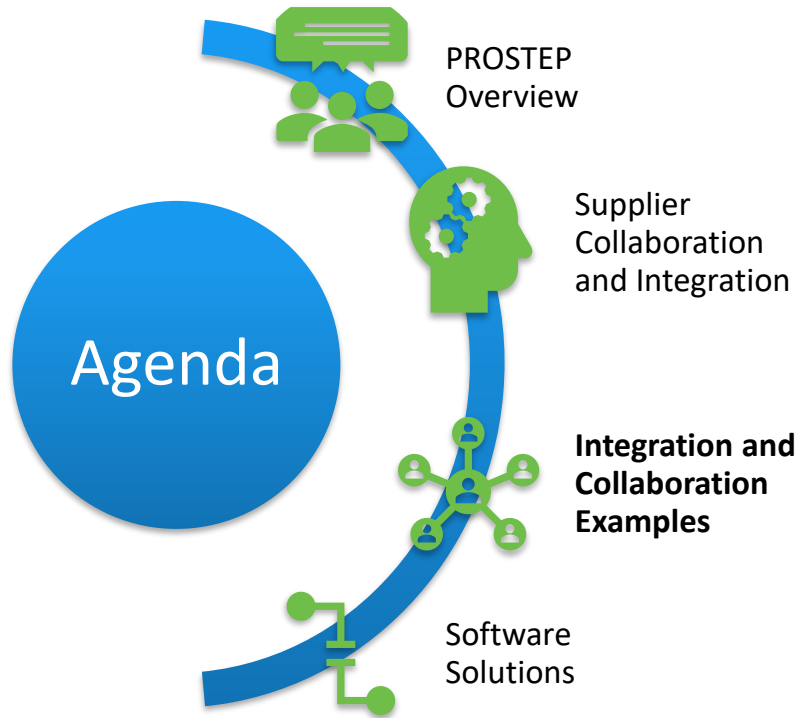
- Process Driven Integration
 - Follow the Product Lifecycle
- Use Standards
 - Common agreed upon data model
- Use System Experts
 - Business Needs
 - Technical Process Limitations
- Collaborate on Information Requirements
 - External Corporate Processes Differ in Subtle Ways
- System Usage
 - Understand the best practice for Data Creation in 3DX and other Systems.
- Data Ownership
 - Define Ownership and Systems of Record. This may have significant crossover.

The concept of a minimum digital thread based on standards and collaborative Systems Engineering



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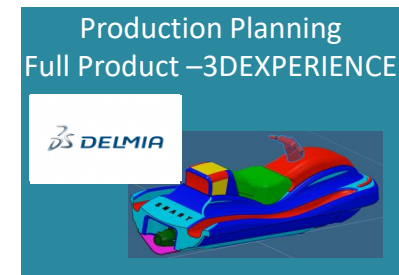
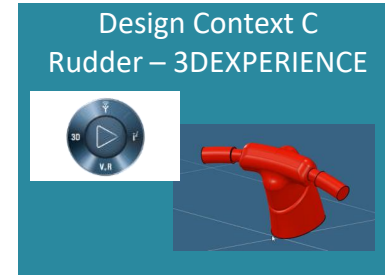
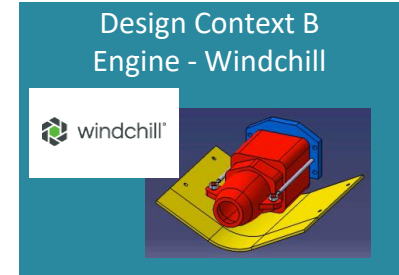
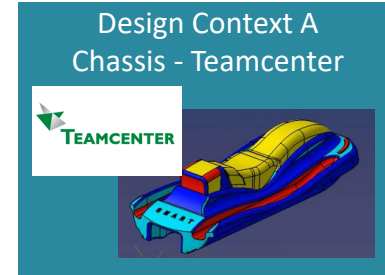
Agenda



Scenario – Initial Situation

Product development across multiple systems

- Multiple Team Data Management Systems of different Vendors managing the design context CAD data of different product components
- 3DEXPERIENCE platform to combine the different product components (for demonstration)
- Provide combined product to 3DExperience
- Use combined product to new domains and processes like SIMULIA analysis and DELMIA production planning

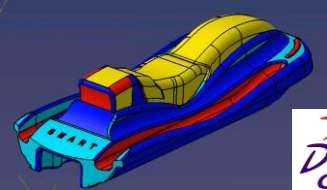


Assemble mixed source product

Principle Architecture

Design Context Body

TEAMCENTER



3DS CATIA

Design Context Engine

windchill®



3DS CATIA

Design Context Rudder

3DEXPERIENCE

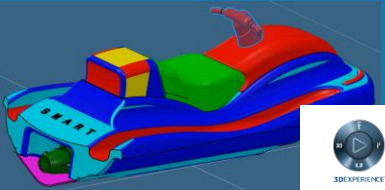


3DEXPERIENCE CATIA



Complete Product

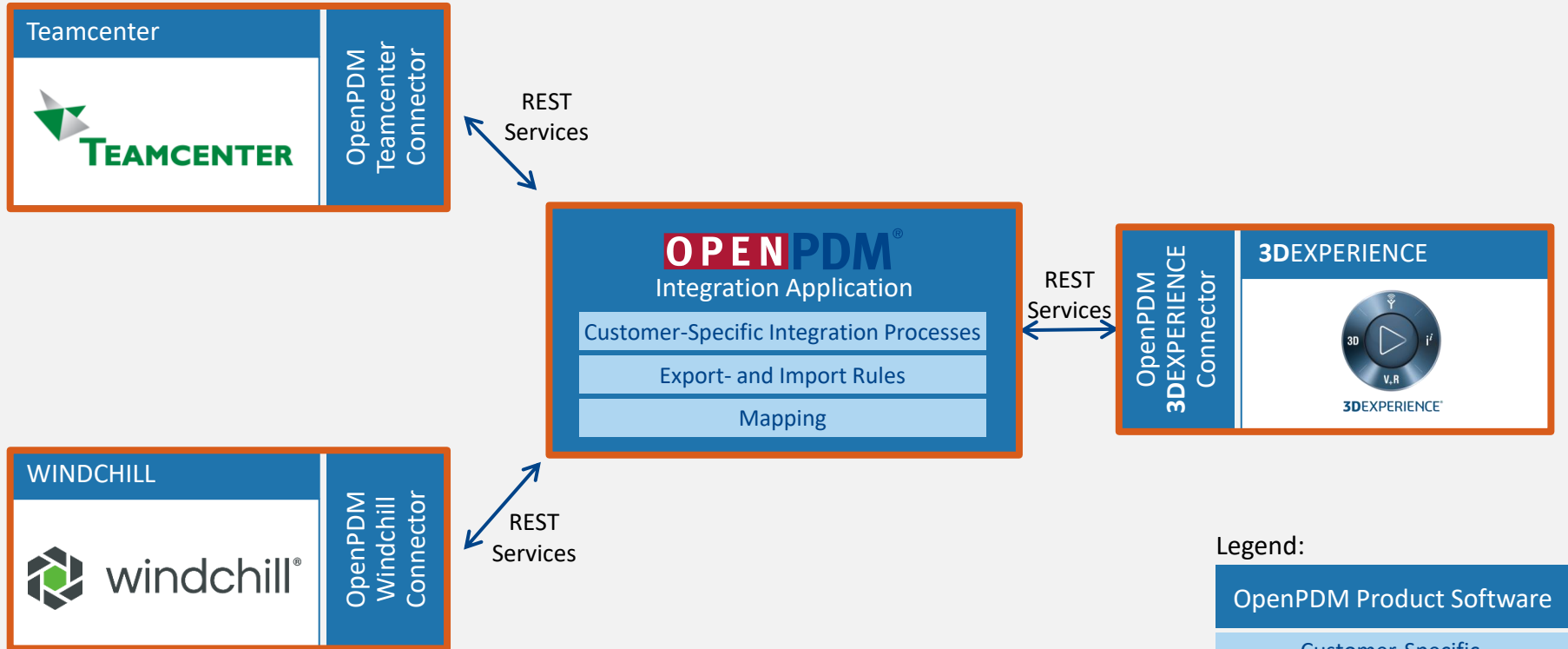
3DEXPERIENCE



3DEXPERIENCE

Architecture for Showcase

How to work with PDM/TDM interface from Teamcenter and Windchill to 3DEXPERIENCE



Legend:

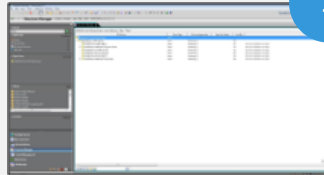
- OpenPDM Product Software
- Customer-Specific Adaption or Configuration

Demo Scenario

Step by Step

Design Context Body

Provided by Teamcenter



1

Design Context Engine

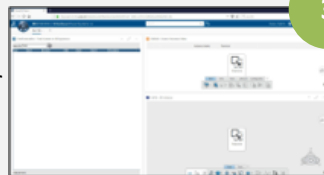
Provided by Windchill



2

Remote Search and Data Transfer

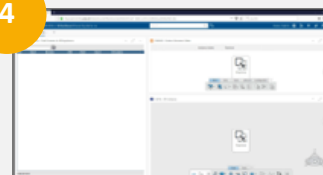
Search in Teamcenter from 3DEXPERIENCE and transfer data with OpenPDM



3

Remote Search and Data Transfer

Search in Windchill from 3DEXPERIENCE and transfer data with OpenPDM



4

Assemble product & 3DEXP usage

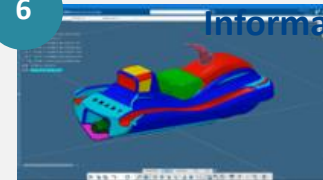
Create a product based on transferred data with 3DExperience Power'By Strategy



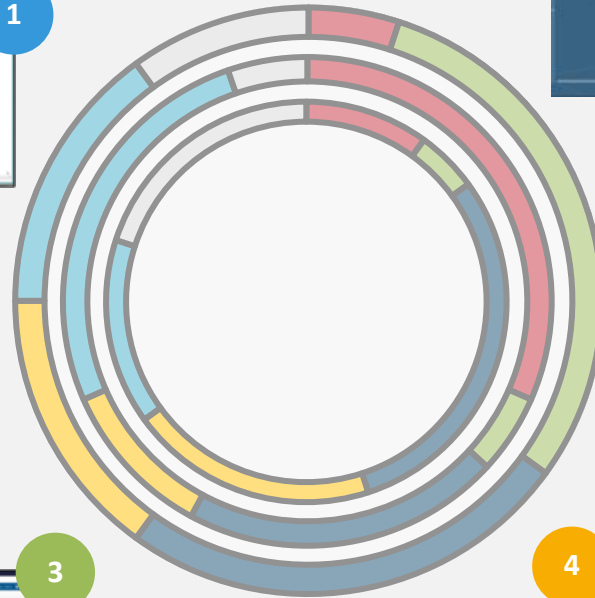
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Processing & Return Information

Use the mixed source assembly in 3DX for analysis and product planning and re-transfer the result to Teamcenter



6

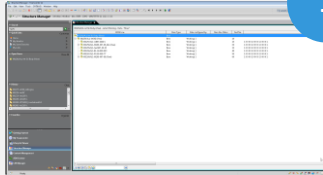


Demo Scenario

Step 1

Design Context Body

Provided by Teamcenter



1

Design Context Engine

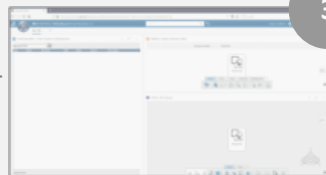
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2

Remote Search and Data Transfer

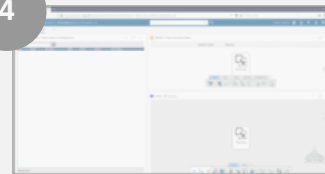
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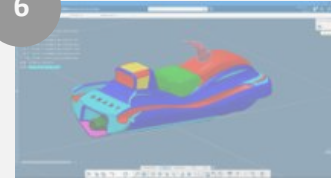
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Processing & Return

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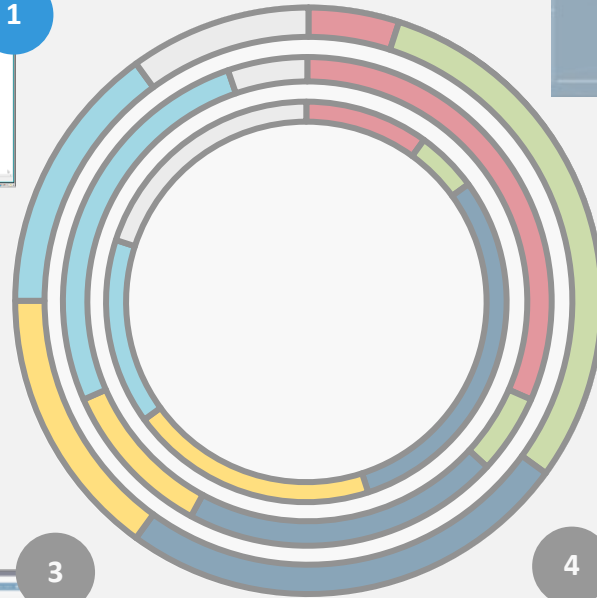
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Assemble product & 3DEXP usage

Create a product based on transferred data with 3DEXperience Power'By Strategy



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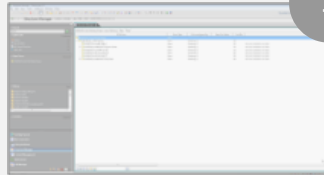


Demo Scenario

Step 2

Design Context Body

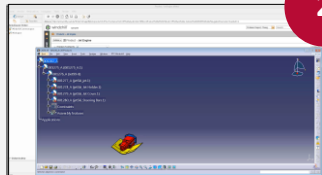
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1

Design Context Engine

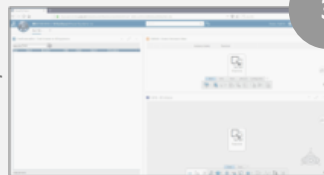
Provided by Windchill



2

Remote Search and Data Transfer

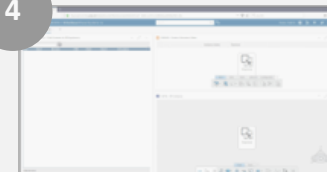
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Remote Search and Data Transfer

Search in Windchill from 3DEXPERIENCE and transfer data with OpenPDM

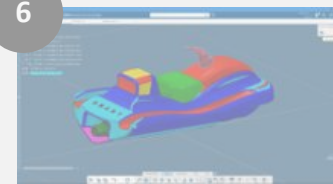


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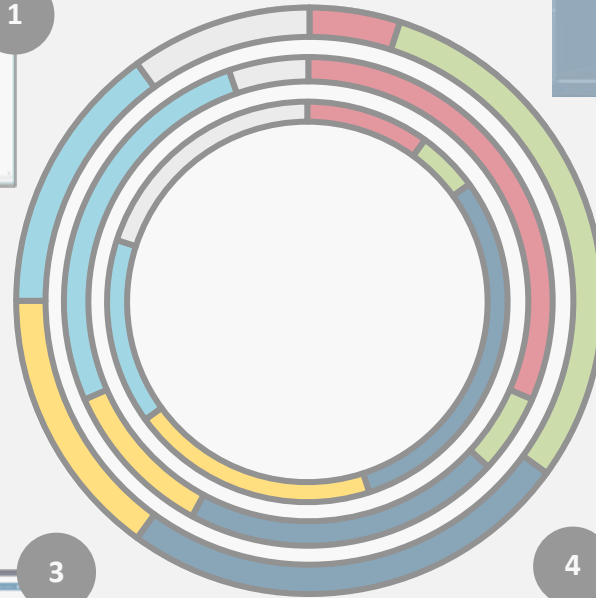
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Assemble product & 3DEXP usage

Create a product based on transferred data with 3DEXperience Power'By Strategy



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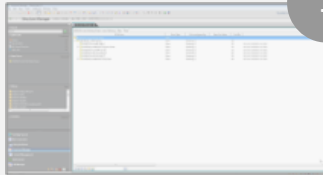


Demo Scenario

Step 3

Design Context Body

Provided by Teamcenter



1

Design Context Engine

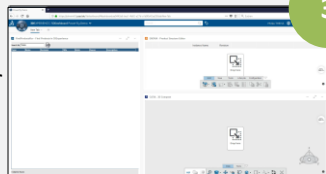
Provided by Windchill



2

Remote Search and Data Transfer

Search in Teamcenter from 3DEXPERIENCE and transfer data with OpenPDM

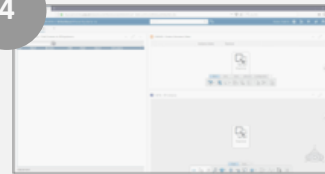


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Remote Search and Data Transfer

Search in Windchill from 3DEXPERIENCE and transfer data with OpenPDM

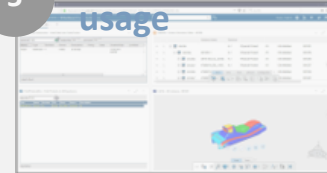
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Assemble product & 3DEXP usage

Create a product based on transferred data with 3DExperience Power'By Strategy

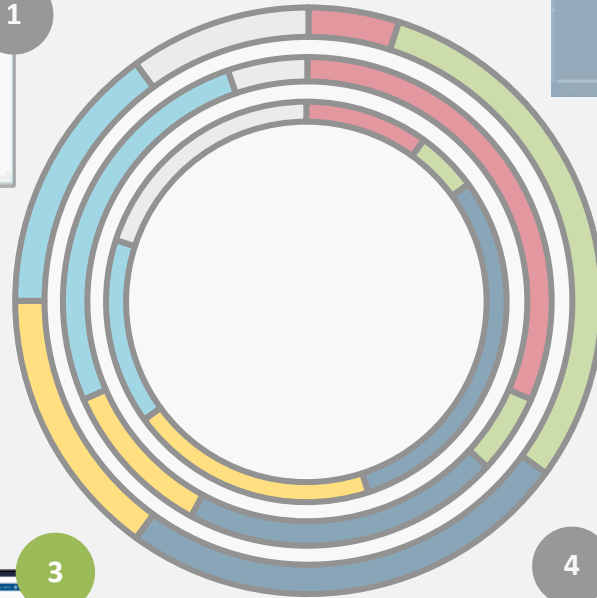
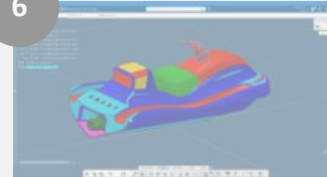
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Processing & Return

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6

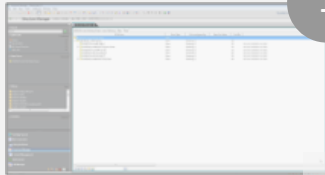


Demo Scenario

Step 4

Design Context Body

Provided by Teamcenter



1

Design Context Engine

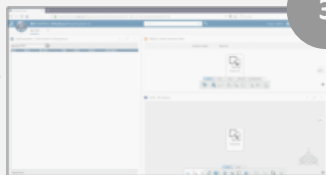
Provided by Windchill



2

Remote Search and Data Transfer

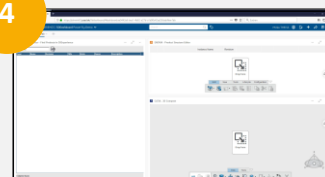
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Remote Search and Data Transfer

Search in Windchill from 3DEXPERIENCE and transfer data with OpenPDM

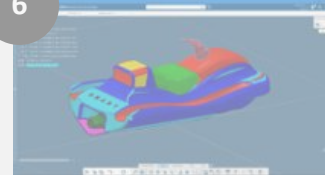


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Processing & Return

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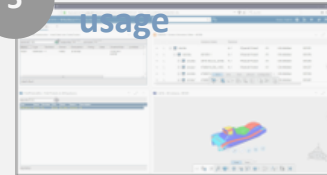
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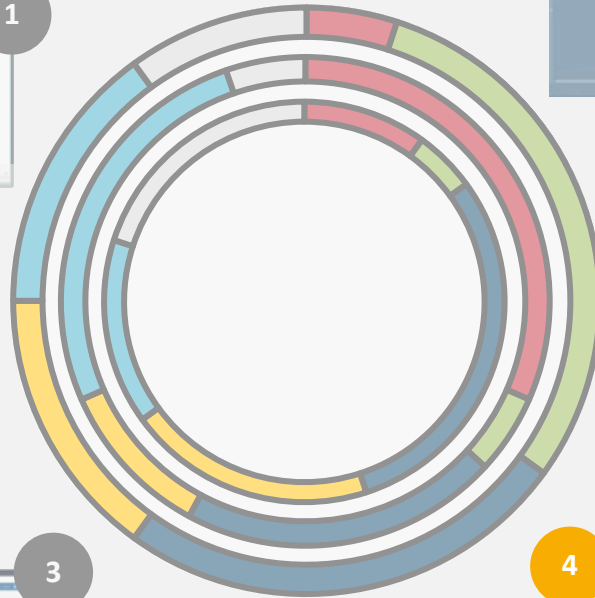
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Assemble product & 3DEX usage

Create a product based on transferred data with 3DExperience Power'By Strategy



5

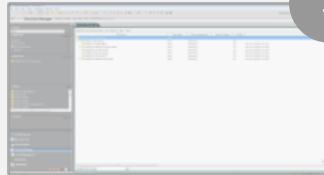


Demo Scenario

Step 5

Design Context Body

Provided by Teamcenter



1

Design Context Engine

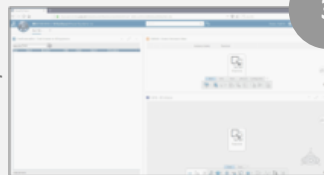
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Remote Search and Data Transfer

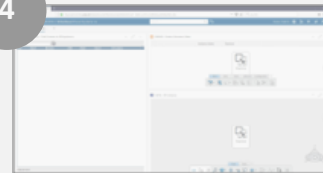
Search in Teamcenter from 3DEXPERIENCE and transfer data with OpenPDM



3

Remote Search and Data Transfer

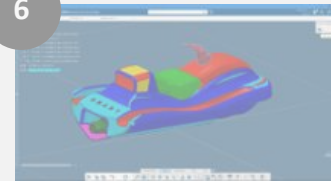
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4

Processing & Return

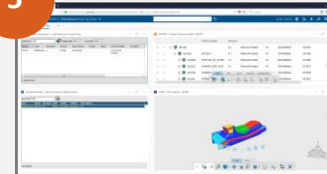
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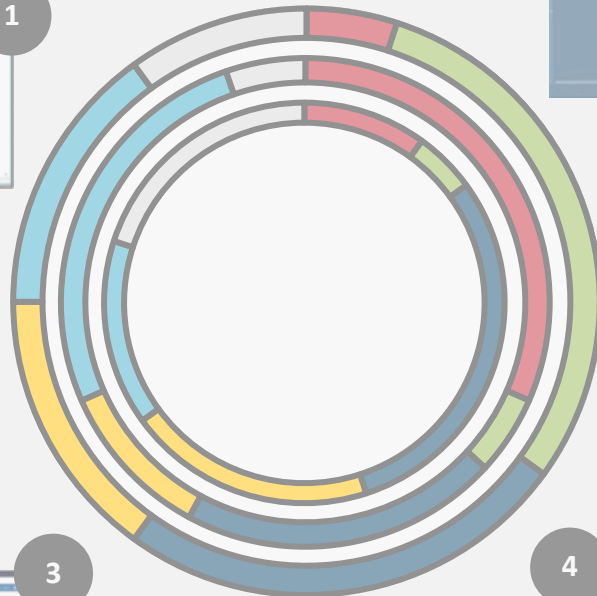
6

Assemble product & 3DEXP

Create a product based on transferred data with 3DExperience Power'By Strategy



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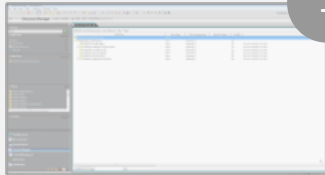


Demo Scenario

Step 6

Design Context Body

Provided by Teamcenter



1

Design Context Engine

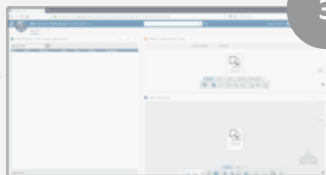
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Remote Search and Data Transfer

Search in Teamcenter from 3DEXPERIENCE and transfer data with OpenPDM



3

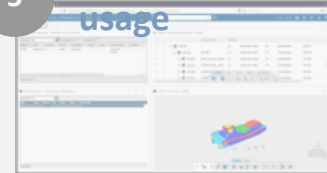
Remote Search and Data Transfer

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4

Assemble product & 3DEXP usage

Create a product based on transferred data with 3DEXperience Power'By Strategy

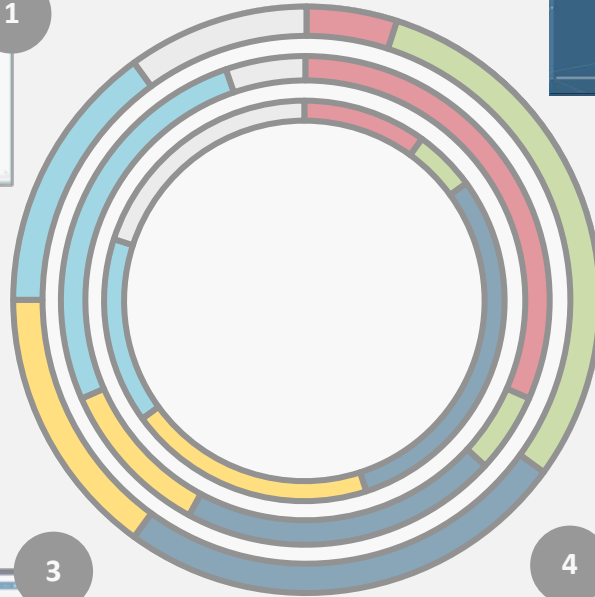
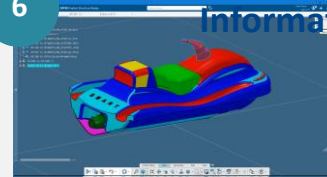


5

Processing & Return Information

Use the mixed source assembly in 3DX for analysis and product planning and re-transfer the result to Teamcenter

6



Example: Filtered Integration PSA – CAPSA

Joint Car Development with Chinese Joint Venture

Customer's objectives

Joint Car Development with Chinese Joint Venture. Highly automated and secure bi-directional provision of data from PLM to PLM environment.

Background

CAPSA is a 50:50 Joint Venture of PSA and Changan Automobile

CAPSA is producer DS branded automobiles for the Chinese market

Bidirectional transfer of full car PDM data

Reuse of released data in china

PROSTEP Solution

Automatic PDM data synchronization triggered by the PSA and CAPSA processes

Management of CATIA V4/V5, structure elements and transformation matrix

Data amount: Several car projects in parallel (heavy data traffic)



France

Data Transfer

PROSTEP Integration Solution

OPENPDM[®]

Mapping, Filtering, Monitoring

Data Transfer



3DX

China



Example: Engineering to ERP at Benteler

3DEXperience Introduction and Interface to SAP

Customer Use Case

Build a future orientated PLM architecture based on 3DEXperience and SAP.

Introduce 3DEXperience as TDM system to manage the Multi-CAD strategy.

Future usage of CATIA 3DX.

PROSTEP Solution

Establishing the automatic connection from ENOVIA 3DX to SAP.

Synchronization of structures, status and several lightweight geometry formats.

Establish the data exchange with partners.



3DEXPERIENCE



PROSTEP PLM Integration Solution



Example: BMW / Dassault Systèmes

Smart Planning Logistics

Customer's objectives

Replacement of home developed solution by 3DEXperience platform and DELMIA. Integration of 26 existing data management systems to planning platform.

Customer's process

Introduce 3DEXPERIENCE as BMW's new logistic tool

Develop planning functions to support logisticians

Enable generation of meaningful reports

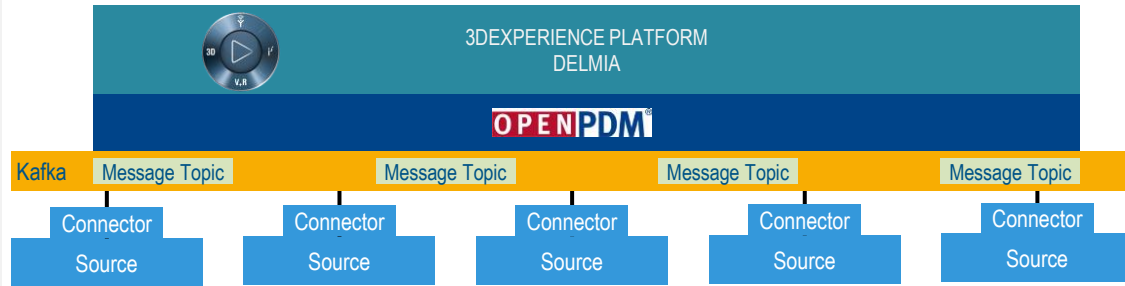
PROSTEP Solution

Introduce OpenPDM as data exchange tool

Introduce OpenPDM with Apache Kafka as an high performance interface

Receive and transform all relevant source data (> 5 Mio objects per transfer) into 3DEXP

Continuous supply of 3DEXP with data





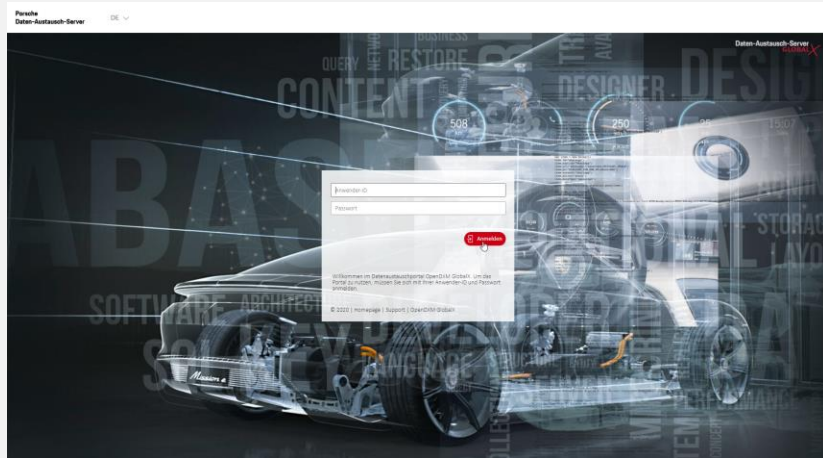
PROSTEP
integrate the future

OpenDXM GlobalX

Dassault 3DExperience Integration

Example: Secure Data Exchange at Porsche

3D Experience integration, portal & OFTP communication, CAD conversion



KEY FIGURES

13,500
overall
users

2,500 CAD
users



CUSTOMER'S DEMAND

Secure providing engineering data stored in P-DMU (3DEXPERIENCE)

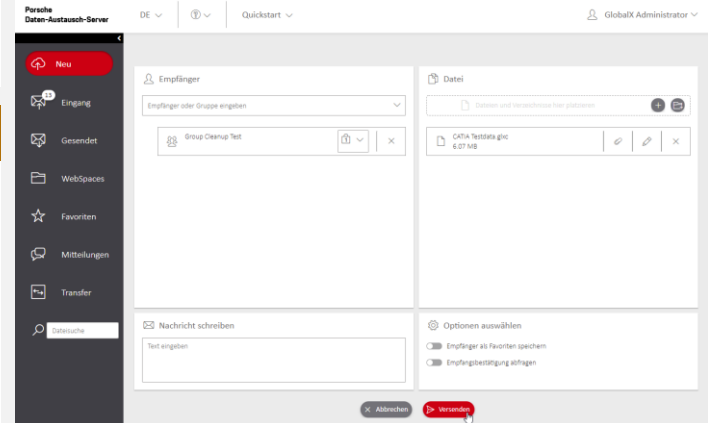
Integrate partners by web portal and asynchronous transfer (OFTP2)

Fully integrated to PPN (Porsche Partner Network)

Convert CAD data (for internal and external use) by PCS (Porsche Conversion Service)

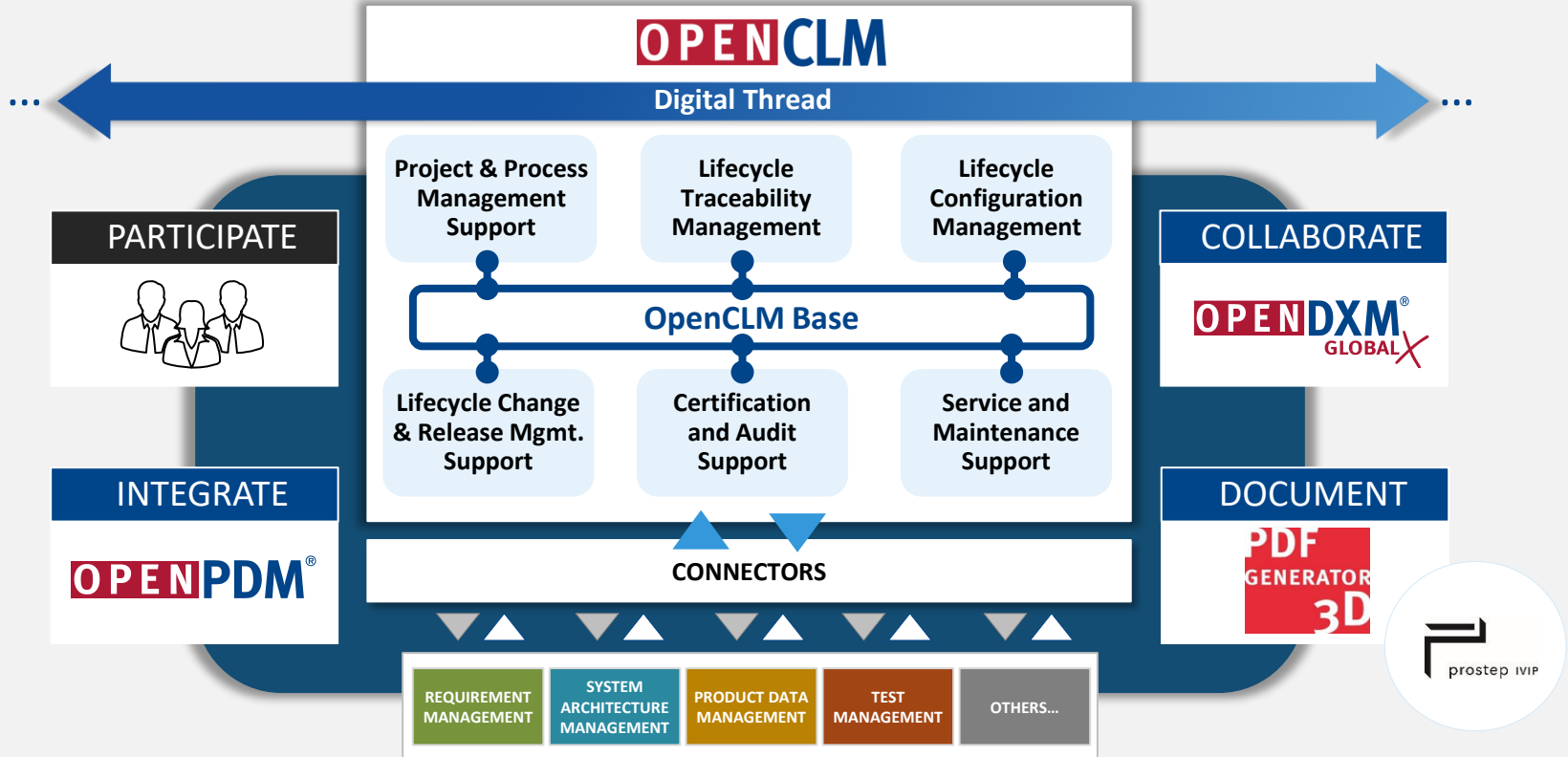
PROSTEP SOLUTION

- Secure web portal integrated with Porsche internal and external user management based on OpenDXM GlobalX
- Setup of individual processes based on PROSTEP toolbox for conversion, PDM Exports and OFTP transmission
- Usage of Windows Explorer Integration to initiate data exchange processes by drag-and-drop



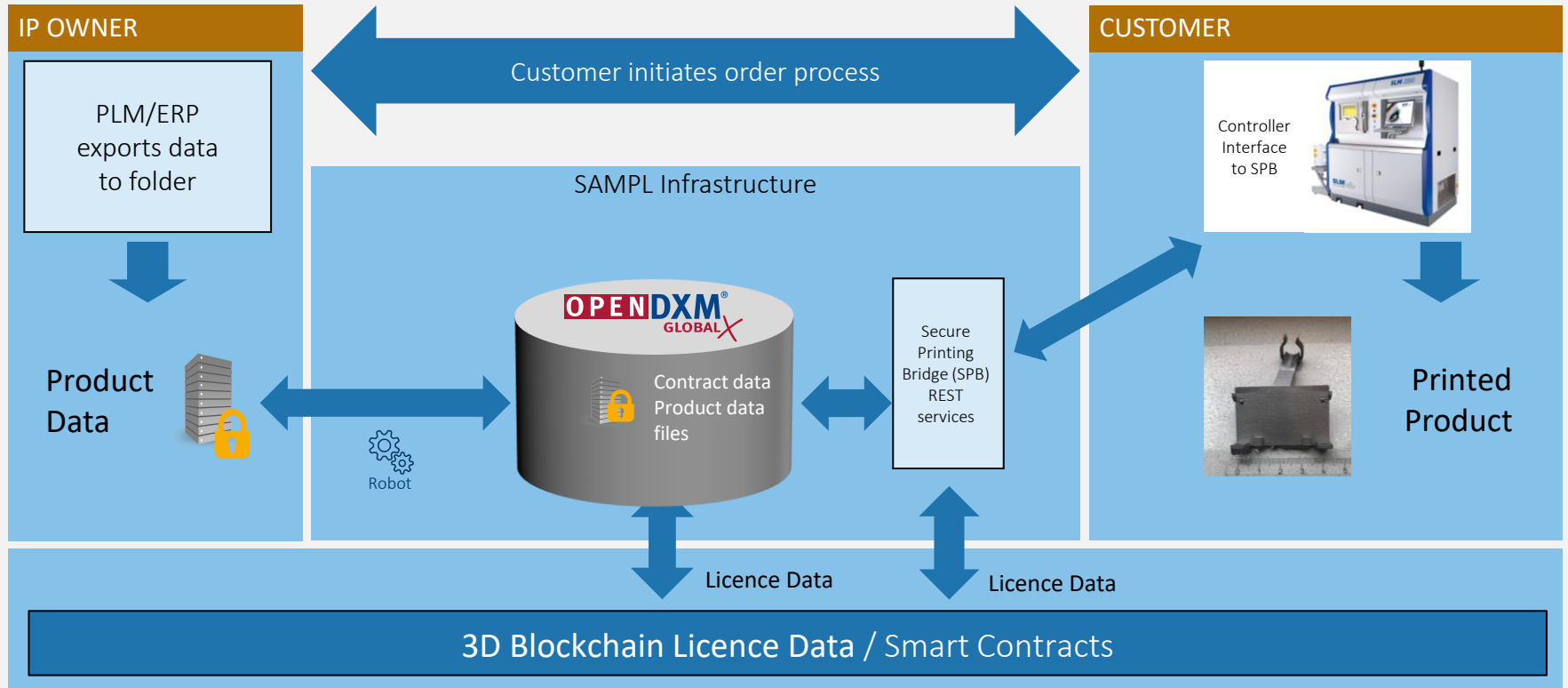
OpenCLM – People, Process & Data Integration

OpenCLM leverages more than 25 years of PROSTEP expertise

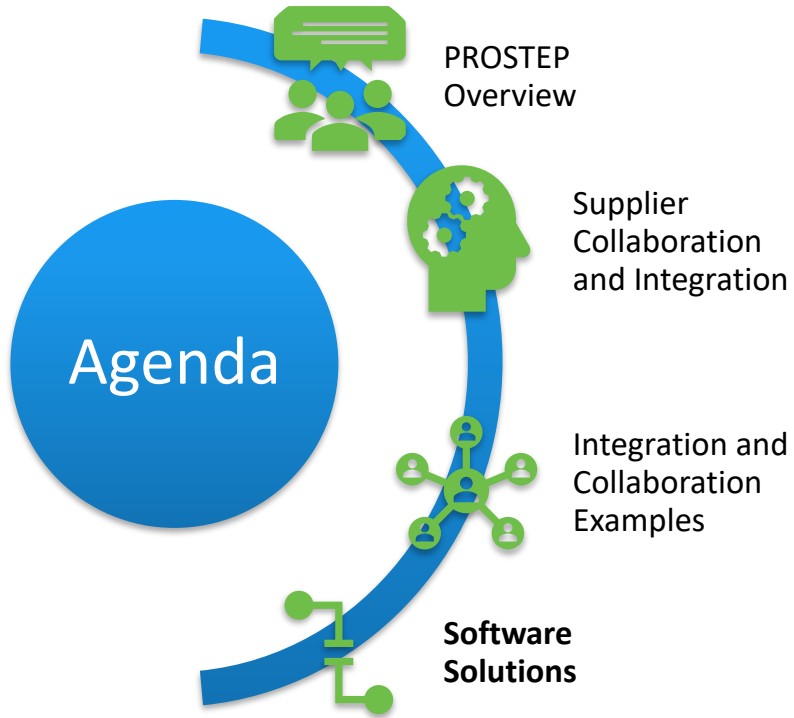


Example: Additive Manufacturing

Secure Additive Manufacturing Platform Licenced with Blockchain



Agenda



API For The Digital Thread

A Complete Platform for Transforming an Enterprise Utilizing the Existing Systems

Replicate

- Share required data - CAD data is required for CAE, BOM for manufacturing
- Automatic synchronization of shared data between systems



Federate

- Provide intelligent traceable links between systems
- Real time system access of data managed in another system



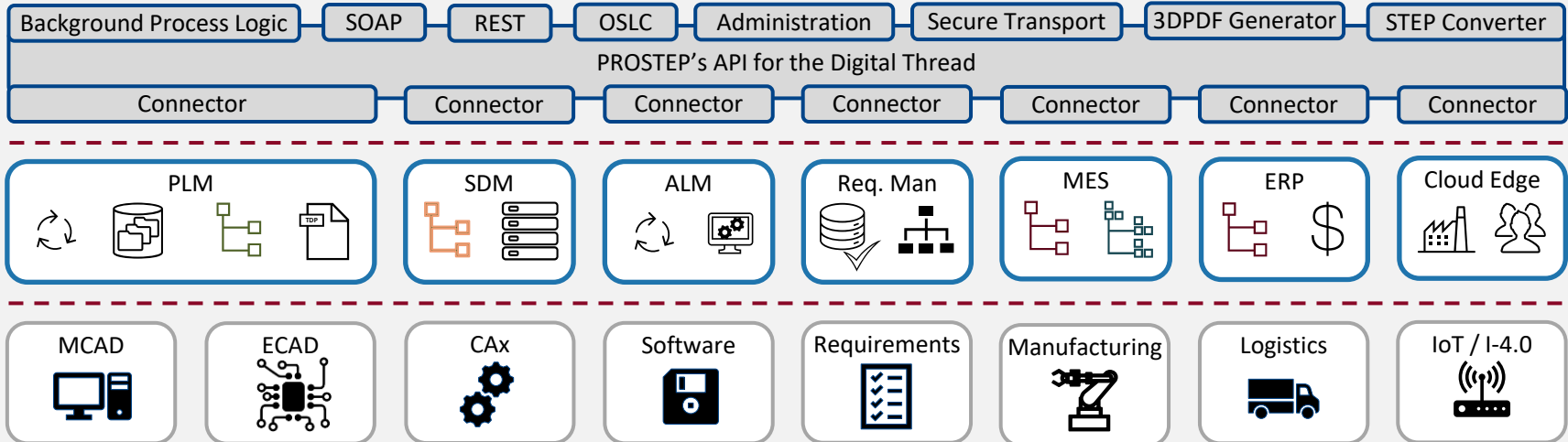
Collaborate

- Automatically share with suppliers and customers
- Secure IP with encrypted transport and DRM



Communicate

- Generate 3DPDF Manuals and TDP's that contain the combine intelligence of all systems



PROSTEP PLM Products



Single source solution for all PLM integration and collaboration use cases

BUSINESS PROCESS



Collaboration



Integration



Information



Traceability



POWERED BY



SHARED PROSTEP CONNECTIVITY & AUTOMATION LAYER

Data

Systems

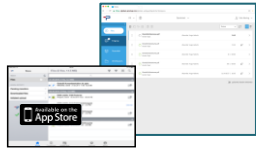
Processes

Partners

GlobalX Secure Data Exchange

OpenDXM GlobalX allows Data to Be Securely and Easily Exchanged Across Corporate Borders

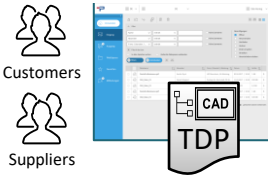
Web and Mobile applications allow for easy accessibility



Off the shelf support for exchange protocols, remote file vaults and automated partner integration

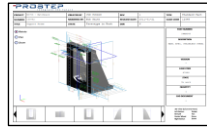


Email notifies partner when data is uploaded or downloaded



Customers
Suppliers

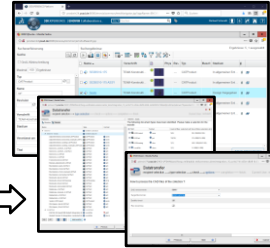
Off the shelf components for the most common means of exchanging data like Email, Windows Folder Integration, Send-to integration and other PLM integrations



Transform data to purpose driven formats such as 3DPDF, STEP and JT. Remove unnecessary IP such as CAD history or PMI



Built in integration to 3DX empowers users to select what to send and where to send it



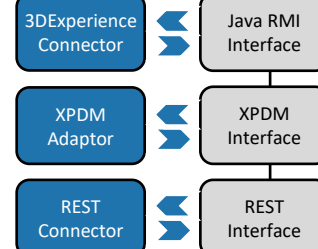
Globalx Integration to 3DExperience



3DEXPERIENCE



CAD translation and quality check workflow engine tailors delivery process workflow automatically to each recipient ensuring acceptance and provides a gateway to ensure consistent data is received



Comprehensive interfaces supporting a variety of use cases and CAD solutions

OpenPDM – The PLM Integration Platform

One Solution for all Integration Tasks

OpenPDM integrates your product data

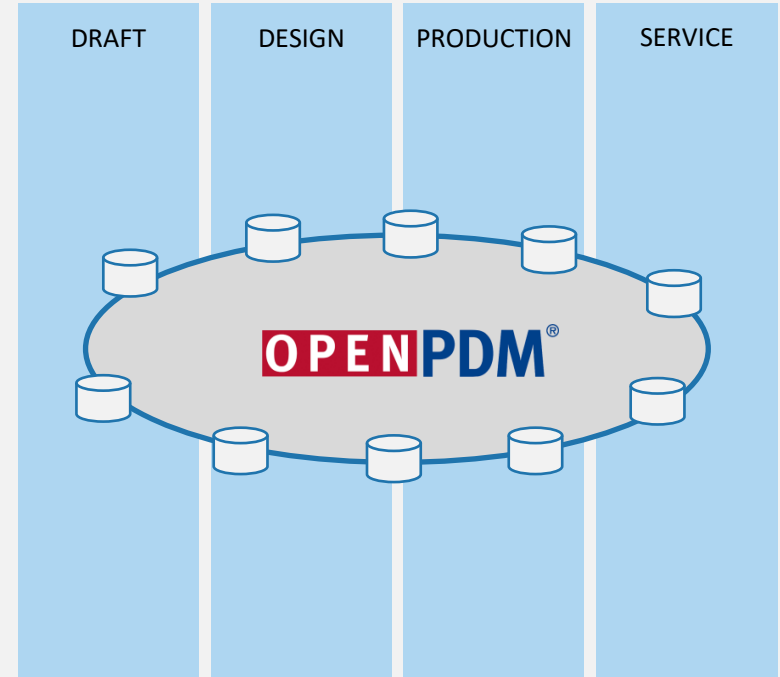
- From systems of different vendors
- Between different domains and disciplines
- Across corporate borders

OpenPDM is optimized for the PLM process

- Standard connectors for a multiplicity of systems
- Connectors provide optimized interfaces for PLM semantic
- Enhancements on proven business workflow engine

Expand your integration landscape

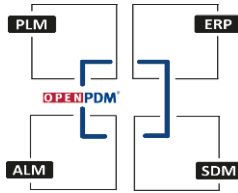
- Develop and deploy your own business processes
- Create own systems connectors based on OpenPDM template
- Adapt and create own data mappings



OpenPDM – Engagement Levels

OpenPDM standard product suite

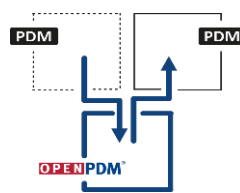
OPENPDM® INTEGRATE



Enterprise solution

- full flexibility
- no limit in number of connected systems
- no limit in number of implemented processes
- within and across company borders

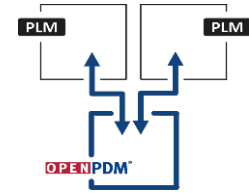
OPENPDM® MIGRATE



Migration solution

- analysis tools for checking the source data
- flexible structuring of the data to be migrated
- transfer of CAD models and structures
- process monitoring

OPENPDM® COLLABORATE

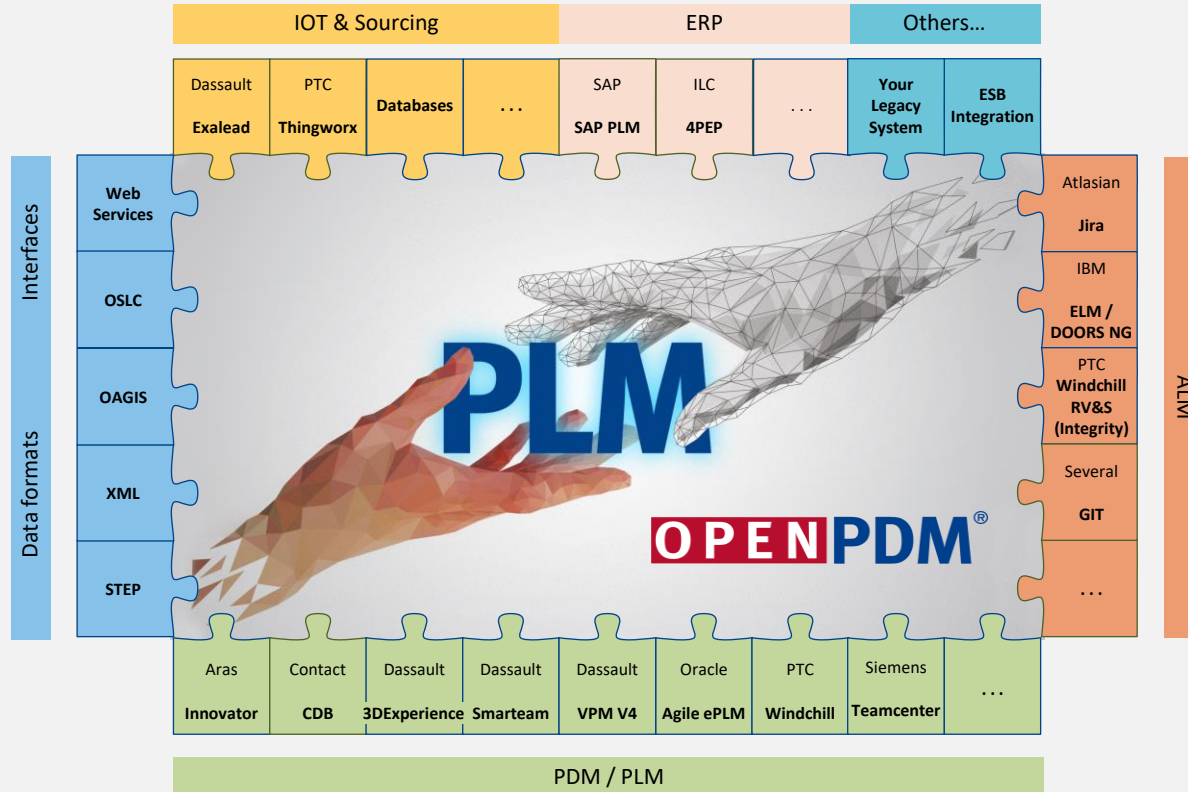


Partner solution

- automatic PLM to PLM provision
- import prognosis for PLM and CAD structures
- delta synchronization
- generation of partner-specific data formats

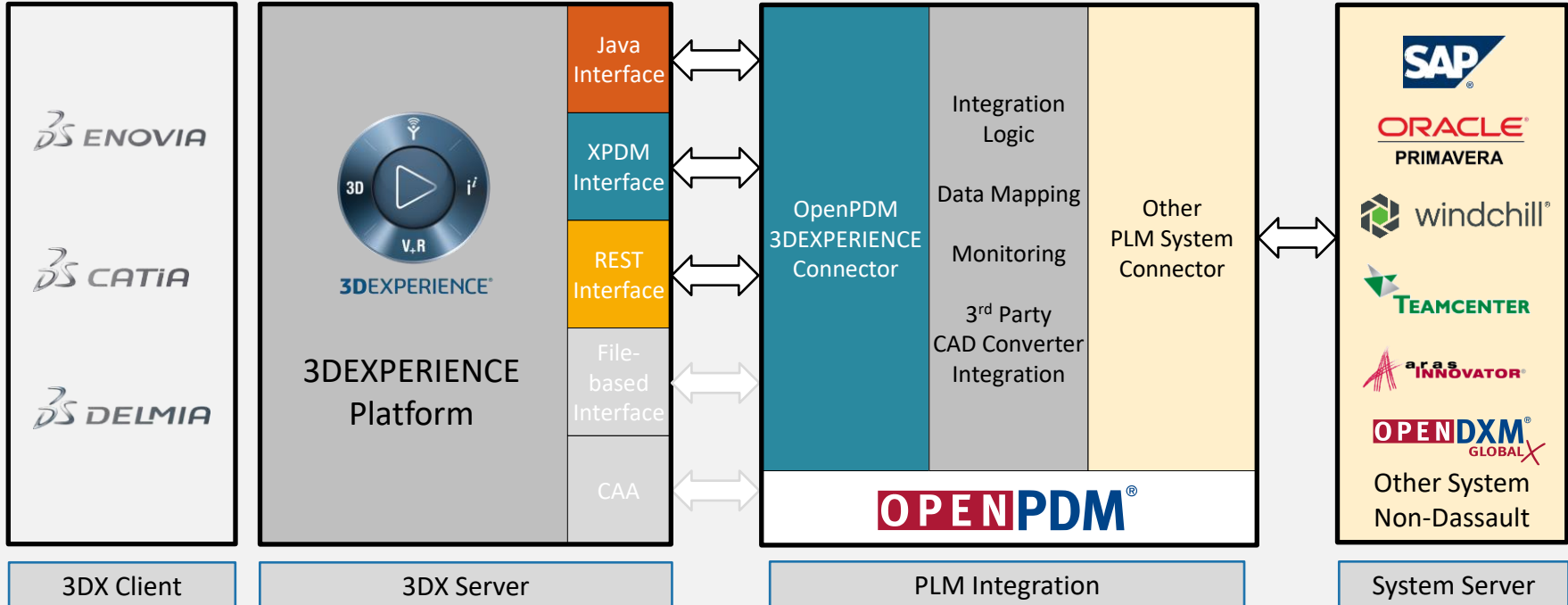
OpenPDM System Connectivity

Connectors to integrate your complete PLM world



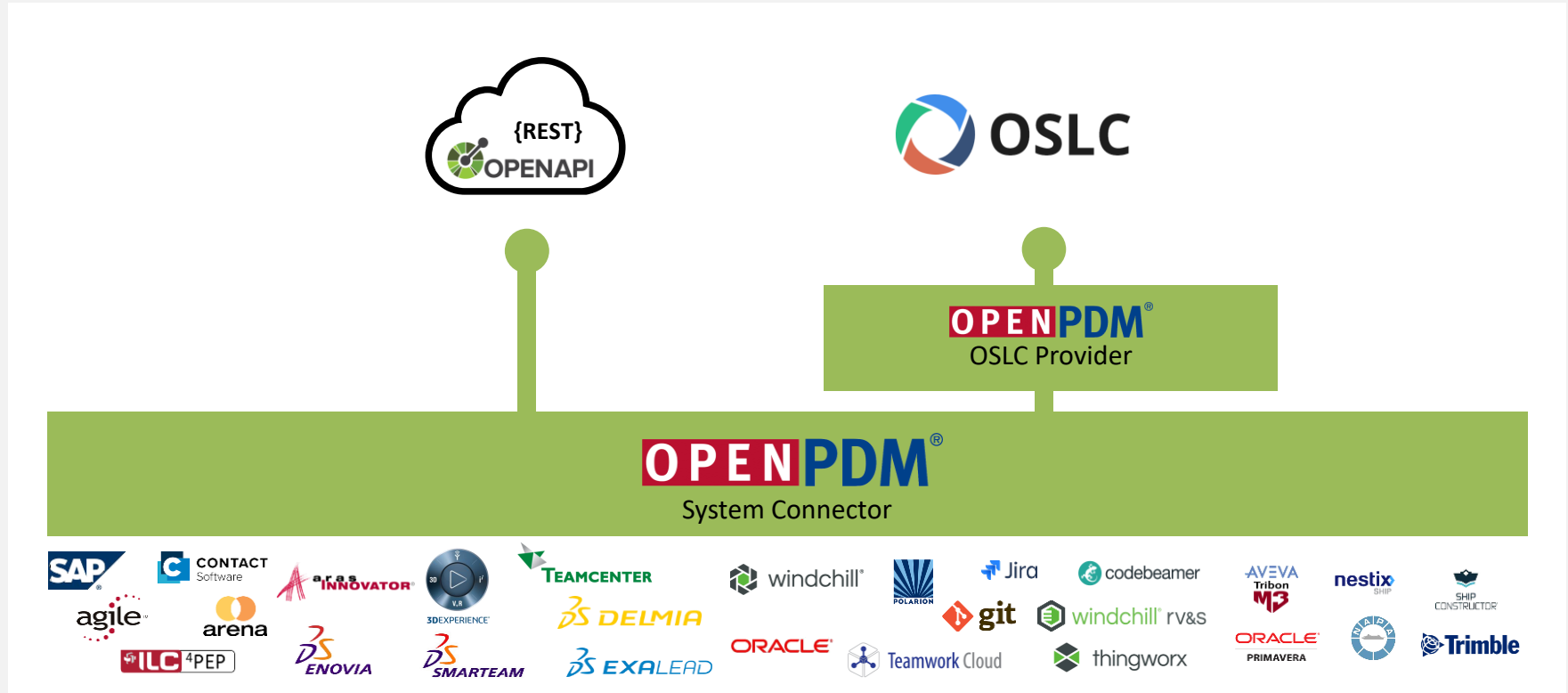
3DEXPERIENCE Interface

Architecture to integrate 3DEXPERIENCE with other PLM systems



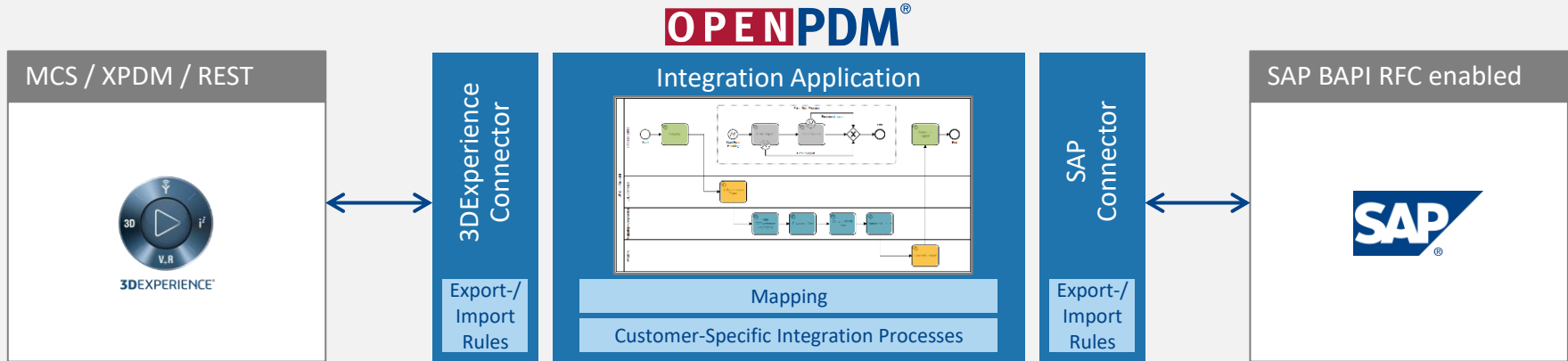
OpenPDM Connector Connectivity

One interface to access all systems



OpenPDM PLM Integrations

High Level System Architecture



- No customization in PLM Systems to run OpenPDM
- OpenPDM operates independently from PLM Systems
- OpenPDM provides a wide range of out-of-the-box features and functionalities
- OpenPDM is designed to adapt to the customer specific integration requirements and processes

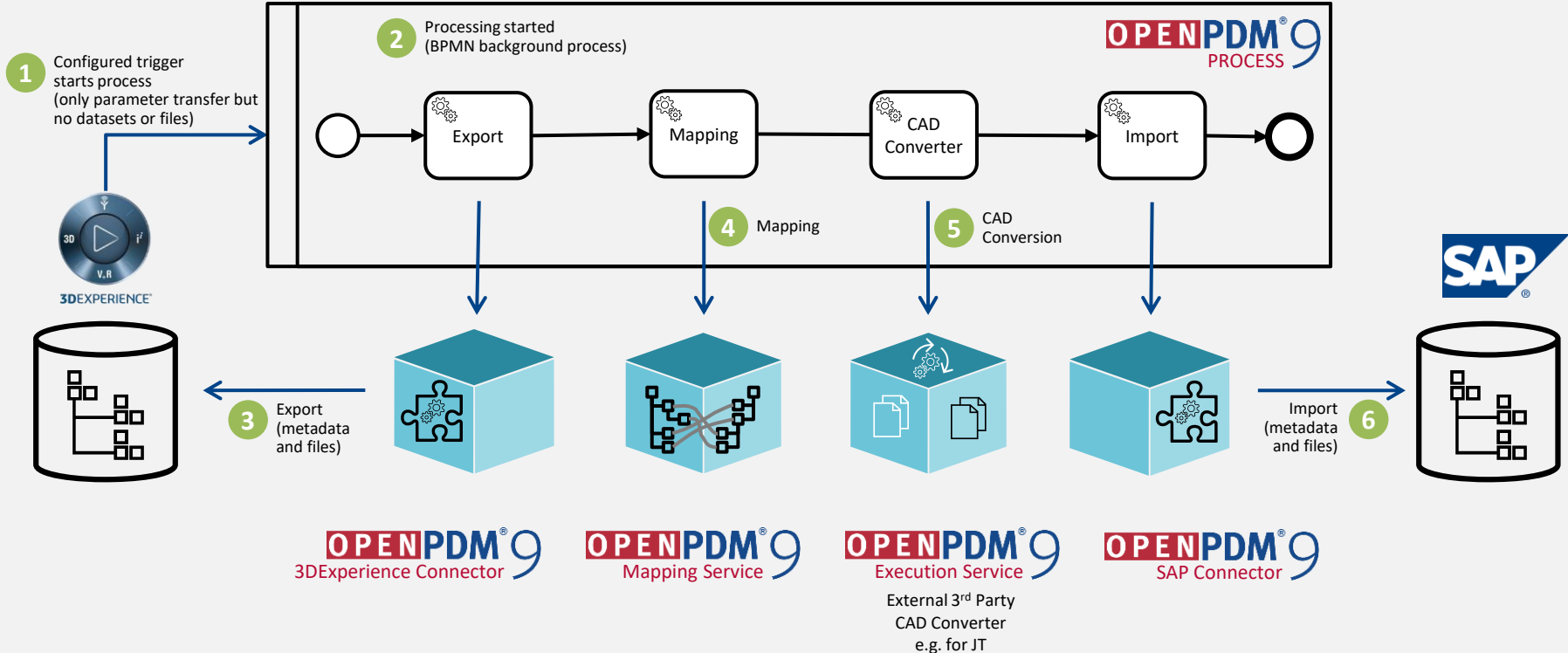
Legend:

OpenPDM Product Software

Customer-Specific
Adaption or Configuration

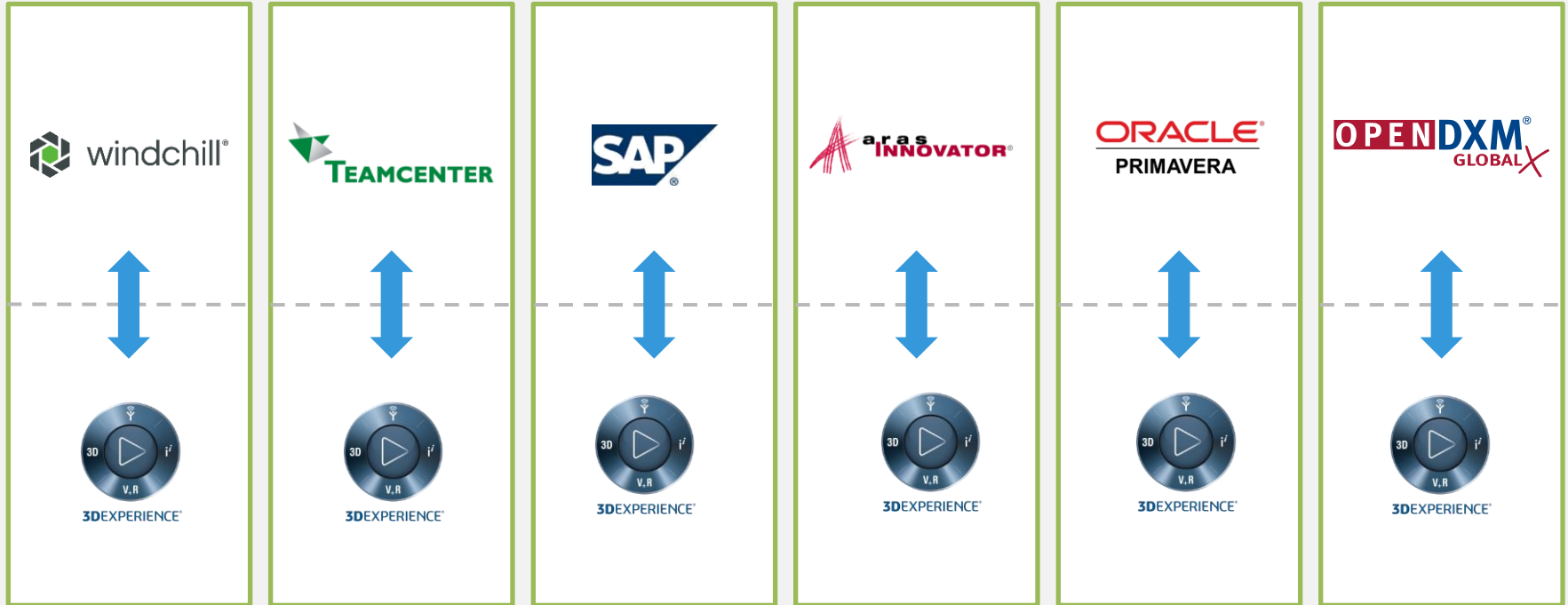
OpenPDM Process Engine

Export – Mapping – Import Process based on BPMN 2.0 standard



PROSTEP – 3DEXPERIENCE Solutions

Integrations based on official Dassault/PROSTEP PIDs



OpenPDM is the official certified solution by Dassault Systèmes to integrate 3DEXPERIENCE with Non-DS Systems

Selected OpenPDM Customers



PROSTEP is Here to Help



- 100's of skilled PLM and CAD consultants
- More than 25 years of experience since 1993
- Global Reach
- Part of the ProSTEP iViP nonprofit consortium

- Standards based software
- Best in class processes methodologies
- Field Tested Commercial grade Software
- Flexible Rental or Purchase Options
- Certified and Maintained Connectors to most popular systems



Questions?





THANK
YOU!

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