CONNECT ALL OF YOUR DATA
Cross-Domain Vendor Neutral Integration
Webinar Overview

Integrating your TDM systems (CAD) with your parts (PLM) and your materials (ERP) between different vendor systems. This webinar will cover the following topics:

- Requirements for integrating engineering systems between
  - TDM: Primary document management repository for CAD
  - PLM: Primary system for managing Engineering Parts, BOM, Change data and documents
  - ERP: Resource planning for manufacturing, managing process, materials, supply chain

- Possibilities for design integration strategies beyond native CAD
  - Potential for leveraging design data throughout enterprise outside of engineering formats

- Advice on project planning, timing and business cases
  - Where to start and realize ROI from engineering systems integration

- PROSTEP tools and customer experiences with integrating cross domain systems
  - OpenPDM integration software
  - PROSTEP customer experiences with OpenPDM
Company Overview

A vendor neutral / independent engineering services and software company since 1993

Over 22 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

Shareholders

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# PROSTEP Technology Partners

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Agenda Overview

- Requirements for Integrating Engineering Systems
- Possibilities for Design Integration Strategies Beyond Native CAD
- Advice on Project Planning, Timing and Business Cases
- PROSTEP Tools and Customer Experiences with Integrating Cross Domain Systems
Engineering System Definitions

Overview

- **TDM**: Primary document management repository for CAD.
  - Example could be a system specifically designed for this such as VPM, Pro/Intralink, EPDM, NX Manager or a PDM or PLM system that is used for CAD management (Windchill for CREO, Teamcenter for NX), ECAD manager
  - Would include functionality for CAD document control such as numbering, versioning, revisioning, and state

- **PLM**: Primary system for maintaining all engineering product data.
  - Can typically manage all functionality of the TDM
  - Handles Engineering Change, Release, Part(s), BOM(s), Classification, Requirements, Collaboration

- **ERP**: Resource planning for manufacturing, managing manufacturing process, materials, supply chain, inventory, accounting, logistics.
TDM Design Data Integration with PLM

Common Requirements and Use Cases

- For Metadata -
  - PLM to TDM for initial BOM structure
  - Or TDM to PLM Structure for initial design BOM
  - TDM Revision Control from PLM
  - TDM Status control from PLM
  - TDM Change Control from PLM
  - Synchronize structures and documents
  - Synchronize Configuration Structures

- For CAD data -
  - CAD data natively synchronized on release to PLM
  - CAD derived output generated in TDM synched to PLM
  - CAD Native data exported and derived output generated to be synched to PLM
PLM Integration with ERP

- **PLM to ERP**
  - PLM to ERP of engineering part and BOM structures
  - PLM to ERP of manufacturing part and BOM structures
  - PLM to ERP Engineering Change
  - PLM design record to ERP
  - PLM Planning & Documentation

- **ERP to PLM**
  - ERP to PLM cost visibility
  - ERP to PLM process sync
  - ERP to PLM Manufacturing Change
  - ERP to PLM vendor / supplier information
  - ERP to PLM Support / Manufacturing part and BOM structures
Supplier Collaboration with Engineering Data

- Integration with engineering enterprise can put the right data together to eliminate duplication and manual construction costs of combining this data. For example:
  - Prevent errors and redesigns from changes in CAD from suppliers by integrating existing designs with up to date design space
  - Supplier Parts and BOM product information can be directly input with alignment to manufacturing and design data
  - Data from model based definitions can be used for quote packages
Strategic Decommissioning with Integration

- Build a synchronization from one system to another with the intention of decommissioning that source system after all required data has been synched and users are transitioned for new projects.

Legacy system productive  |  Fixed period of time  |  New system productive

“Big Bang” migration

- Migrate data and users in one step

Incremental migration

- Migrate data and users:
  - Project by project
  - per application
  - ... as your needs dictate

Integration coexistence

Legacy system productive  |  New system productive
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Leveraging Design Throughout the Enterprise

Model Based Enterprise & Digital Thread

- Model based enterprise - MBE is an integrated and collaborative environment, founded on 3D product definition shared across the enterprise, enabling rapid, seamless, and affordable deployment of products from concept to disposal.
  - Consumable 3D Engineering data for all parts of manufacturing and business eliminating drawing prints

- Digital Thread - To collect information in the design, manufacturing, service, supply-chain setup and provide access to and intelligent analytics for industrial manufacturing and performance data, to identify the root cause easier. Such insights can improve not only service and owner/operator productivity, but also provide critical feedback to the design engineering and manufacturing operations teams for continuous improvement.
  - Integration of product data from all systems to get exceptional performance, cost and issues visibility throughout the enterprise.
CAD Derived Outputs

Model Based Enterprise

- Generate derived outputs for intended usage directly from 3D CAD
  - 3DPDF / drawings for non-CAD consumers
  - JT, Creo View, 3DXML for solution integration visualization
  - ISO STEP 10303 - 203, 242 for archiving and collaboration
Synchronizing Native CAD from TDM to PLM

Export CAD in Native Format from TDM and import to PLM

- Why do this?
  - High value for strategically decommissioning the legacy TDM system
  - One solution for supplier collaboration of engineering data
  - Stronger integration into the product lifecycle workflows and system features

- Challenges in this Integration
  - Handling of integrations / version may be different between systems
  - Very suitable for released data as one-per-revision always fits
  - Performance intensive, plan for time and processing power as well as licenses to open CAD
  - Typically only data that opens in the CAD can be moved
  - Data cleanup can be required for CAD that does not open properly
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Advice on Project Planning

- Phase project and build on knowledge and success.
- Initial integrations for Parts, BOM contain mapping and business logic will be re-utilized for other use cases.
- Target 3-5 integration use cases per development period and iterate in a standard software development pattern. Sprints should be between 2 to 4 weeks.
  - Strategy and Requirements Workshop resulting requirements and implementation plan
  - Implementation of integration use cases and unit and integration testing
  - Business and User acceptance testing
  - Production application
- Utilize the same development and business team to build understanding and core competence.
Business Cases for Engineering System Integration

- Manual duplication of data can be quantified by operation synchronization
  - Speed that the data is available
  - Time the manual process takes for the data to be duplicated
  - Accuracy of the duplicated data and costs of failures (wrong production revision?)

- Elimination of software licenses for integrated systems
  - Data is available in the primary system of that user and additional license not needed
  - Duplicate functionality only needs to be utilized in one system
  - Integration can enable migration and eliminate other system entirely

- Data Efficiency from modern practices
  - Model Based Enterprise
  - Digital Thread
  - Data visibility

- Consolidation, Quality, Training, Maintenance, Support and Knowledge
  - Less utilization of different systems means less overhead
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1. Requirements for Integrating Engineering Systems
2. Possibilities for Design Integration Strategies Beyond Native CAD
3. Advice on Project Planning, Timing and Business Cases
4. PROSTEP Tools and Customer Experiences with Integrating Cross Domain Systems
PROSTEP Product Portfolio

YOUR SOLUTION

Communication

Integration

Information

OUR PRODUCTS

Data

Systems

Processes

Partners
OpenPDM – The PLM Integration Platform

OPENPDM INTEGRATES YOUR PRODUCT DATA
- From systems of different vendors
- Between different domains and disciplines
- Across corporate borders

OPENPDM IS THE LEADING PLM INTEGRATION PLATFORM
- Standard connectors for a multiplicity of systems
- Optimized for the process and data synchronization in the background
- Use of standard interfaces and data formats
- Flexible integration into customer processes
OpenPDM Connectivity
Connectors to integrate your PLM World
Challenges in the PLM Environment

One Solution for all Use Cases

**INTEGRATION**
- Synchronization of data of various systems and domains
- Consistent and automated processes

**LINKING**
- Linking of product data of various disciplines
- Traceability of the whole product development process
- Creation of reports and realization of audits

**MIGRATION**
- Controlled migration of huge data volumes
- Minimized risk by parallel operation of old and new system
- Lower complexity by splitting into packages

**COLLABORATION**
- Integration of data from partners, customers and suppliers
- Reliable and transparent processes
- Check of data quality
OpenPDM Principle System Architecture

Example: Teamcenter - SAP Integration

- No customization in PLM Systems to run OpenPDM
- OpenPDM runs independent to 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 logic
OpenPDM Framework Overview

Architectural View

OpenPDM Client

PLM System

Workflow Engine

OpenPDM Activity Manager

OpenPDM Web Services

OpenPDM Federation Layer
  - Process Automation -

Export/Import Worker & Mapping

OpenPDM Connectors

Client Application
  Various systems and tools

OpenPDM Platform
  Standard services, background processing and connectors

PLM Systems
  Variety of connectors for standard systems, proprietary systems and file formats available

Read / Write

TDM

PDM

ERP

Other systems

File formats (XML, ASCII, ...)

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OpenPDM Integration Process

Example: Teamcenter - SAP Integration

1. Configured trigger starts process (only parameter transfer but no datasets or files)
2. Activity starting (Asynchronous background process)
3. Export (metadata and files)
4. Mapping
5. Import (metadata and files)
6. Transaction ending (e.g. send message to user or start workflow)
OpenPDM Customers
Geben Sie Ihren Untertitel ein
Customer Example: Embraer

Current Environment

- VPM 1.7 with Catia V4, Catia V5 R24 and SAP with a highly customized integration between them.
- uBOM – Unique BOM – which is an all-in-one BOM system.

Future Environment

- Background: In 2018 Embraer is launching a new plane called the E2. The design of which will be completely managed using Windchill.
- They are moving to a multi-BOM system (Engineering, Manufacturing, and Service BOMs) in order to increase flexibility and efficiency in managing the different stages of their product’s lifecycle.
- Wants to update their PLM environment by adding Windchill, while still maintaining VPM and SAP in order to reduce impact on current process and workflow.
- VPM, Windchill, and SAP will be highly integrated, with OpenPDM being the backbone of the whole environment.
- VPM will be the master of eBOM data and Windchill will be the master of mBOM data.
- VPM, SAP, and Windchill have been customized to trigger OpenPDM activities during certain phases of the processes, which are used to transfer data between the systems and ensure redundancy and coexistence.
- Go-Live of E2 in August 2016 (Ipanema productive since 2014)
THANK YOU!

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