PLM Interoperability

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Geometric Americas
Contents

• Market Drivers

• Geometric Interoperability Offerings

• Solution Concept for External Collaboration

• Summary
Market Drivers

Geometric EDGE Key Sponsors/Drivers

- GAAG (Global Auto Action Group)

- Individual OEMs & JVs
OEM 2 OEM Business Scenarios (from GAAG 2013)

Cross Selling

OEM1  OEM2

Carryover parts/platforms

OEM1  OEM2

Cross Manufacturing

Co-Development Part/Assembly

OEM1  OEM2

Co-Development Platform

OEM1  OEM2

Cross Badging

OEM1  OEM2

Carryover parts/platforms

OEM1  OEM2

Co-Development Part/Assembly

OEM1  OEM2

Co-Development Platform
# OEM 2 OEM Business Scenarios: Scope of Exchange

<table>
<thead>
<tr>
<th>Type of Partnership</th>
<th>Export (OEM-&gt;X)</th>
<th>Import (X-&gt;OEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Product (E-BOM) Data</td>
<td>CAD Data</td>
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</table>

*Native data exchange is required if both OEMs need to modify same geometry.*
OEM and Design Partners: Business Scenarios

OEM-Design Partner: Co-Design
Design Partner supplying design to OEM

OEM-Design Partner: Vehicle Dev
Partner does vehicle development (with inputs from OEM). Mfg is done by OEM
OEM and Suppliers: Business Scenarios

1. **OEM-Supplier: Standard Parts**
   - OEM
   - Supplier
   - OEM-Supplier: Standard Parts

2. **OEM-Supplier: Design in Short loops**
   - OEM
   - Supplier
   - OEM-Supplier: Design in Short loops

3. **OEM-Supplier: Design of complex assembly**
   - OEM
   - Supplier
   - OEM-Supplier: Design of complex assembly

4. **OEM-Supplier: N-1 Tier**
   - OEM
   - Supplier (n)
   - Supplier (n-1)
   - OEM-Supplier: N-1 Tier
PLM Interop Must Support MBSE Topology

Global Product Data Interoperability Summit | 2014
PLM Data Exchange: Current Capabilities & Constraints
• Market Drivers

• Geometric Interoperability Offerings

• Solution Concept for External Collaboration

• Summary
• Products and solution covering all domains of PLM Integration
• Built leveraging OEM’s Integration frameworks and proprietary technology

Legend: Products Custom Solutions

(** Product pre-GA)
xPDM Based Integration Solutions Evolution - “Market drivers....”

**Solution Coverage**

- **Process Integration**
- **Change Management**
- **Configuration/Effectivity**
- **BOM Structure**
- **CAD Structure**

**xPDM Gateway Technology Component**

- **2006**
  - V5 xPDM Gateway (ENOVIA V5-Teamcenter)

- **2007**
  - Custom Integration solution for configuration, Design and Manufacturing for Automotive OEM

- **2008**
  - Manufacturing Gateway (Teamcenter DELIMA V5)

- **2009**
  - ENOVIA V5- (V6) MatrixOne Integration : (Product for Dassault Systemes)

- **2010**
  - V6 xPDM Adapter for Teamcenter

- **2011**
  - Dedicated Point-to-Point
  - PDM-PDM Exchange (eMU, CAD Structure)

- **2012**
  - Asynchronous exchange (On Demand / Batch)

- **2013**
  - Global collaboration Needs (e.g. Automotive OEMs doing global engineering)
  - Secure Hub to support multiple entities
  - Collaboration Distinct

- **2014**

- **2015**
**Solution Coverage**

- Point-to-Point
- DMU Exchange, CAD Structure
- On Demand / Batch

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**xPDM**

- Secure Hubs
- Collaboration Distinct
- BOM Progression

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**V6 xPDM Adapter for Teamcenter**

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**GeometricEDGE**

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**Time**

- 2014
- 2015
Solution Concept: GeometricEDGE

1. Adapters
   - Manages importing and exporting data from or to the OEM PDM system.

2. Collaboration Hub
   - Persists the meta and bulk data
   - Import and export services
   - Partner and project management

3. Process Orchestrator
   - Implements OEM pair specific data exchange process (process templates)
   - Data Transformation Services
   - Administrative Services
Solution Components : Adapters

- **Functionality**
  - Uses native APIs or existing batch utilities to export/import data from OEM PDM in predefined format.

- **Supported Objects**
  - Product Structure
  - Parts – Versions and Revisions
  - Metadata - Attributes
  - Lifecycle Status
  - Effectivity
  - Positional Information
  - Data Sets

- **Formats**
  - Metadata Formats
    - STEP AP214, AP242*
    - PLMXML, XPDMXML
  - Bulk Data
    - Native CAD (e.g. CATIA, NX, Pro/E)
    - Neutral Formats (e.g. STEP)
    - Visual Representations (e.g. JT, CGR)
    - Binary Documents (PDF, TIFF, JPG, Office)

*Alpha release available based AP242 CD Version
Solution Components: Collaboration Hub

- Functionality
  - Export and import in specified formats
  - Persist the metadata and bulk data for distribution
- Program Setup & Definition
  - Organization of partners, projects and task hierarchy
  - Access Controls
- Data Encryption
- Extensible Data Model
- Web, Desktop and API Client Interfaces

- Objects
  - Product Structure
  - Parts – Versions and Revisions
  - Metadata Attributes
  - Effectivity
  - Lifecycle Status
  - Positional Information
  - Data Sets
  - Projects and Tasks

*Based on Partner PDTec Technology Components
Solution Components : BPEL Process Orchestrator

- **Functionality**
  - Process Orchestration
  - Process Templates
  - Data Exchange Processes
  - Transformation Services
  - OEM Pair Specific Processes
- **Transformation Services**
  - Data Filters
  - Data Cleaners (IP Protection)
  - CAD Translation*
  - CAD Quality Checks*
- **Infrastructure Services**
  - Security & Authentication
  - Tracking & Monitoring
  - Reporting
  - Subscription
  - Notification

*Using 3rd Party/ In-house tools
• Market Drivers

• Geometric Interoperability Offerings

• Solution Concept for External Collaboration

• Summary
Solution Overview: Loose-Integration provides Scalability & Security

OEM-1

Process Orchestrator

Process

OEM-2
PDM

Supplier-8

Supplier-5

OEM-6

OEM-3

OEM-4

OEM-7

OEM-8

Collaboration Hub

OEM1 \leftrightarrow x

OEM1 \leftrightarrow OEM2

OEM1 \leftrightarrow OEM3

OEM1 \leftrightarrow OEM4

OEM1 \leftrightarrow OEM5

OEM1 \leftrightarrow OEM6

OEM1 \leftrightarrow OEM7

OEM1 \leftrightarrow OEM8

(Push)

(Pull)

OEM-1
PDM

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Solution Overview: OEMs, Partners, Suppliers, ...

- OEM-1
  - PDM
    - MetaData
    - Bulk Data
  - Adapter
  - (Push)/(Pull)

- Process Orchestrator
  - Collaboration Hub
    - OEM-1 ↔ OEM-2
    - Partner
    - Supplier
    - Operator
    - tbd

- Processes

- Firewall

- OEM-2
  - PDM
    - MetaData
    - Bulk Data
  - Adapter
  - (Push)/(Pull)

- Partner
  - MetaData
  - Bulk Data

- Supplier-5
  - MetaData
  - Bulk Data

- Operator
  - MetaData
  - Bulk Data

- Adapter
Solution Overview: Heterogenous BOM/CAD Interop
GeometricEDGE for Heterogenous BOM/CAD Interop
GeometricEDGE – Ownership Topologies - Examples

One to One (Single Instance)

One to Many (Competitive)

One to One (Multiple Instances)

One to Many (Cooperative)
GeometricEDGE - Hosting Topologies - Examples

One to One (Single Instance)

One to Many (Competitive)

One to One (Multiple Instances)

One to Many (Cooperative)
• Reduced setup time and cost for establishing data exchange with Partners/ Joint Ventures

• Process templates provide flexibility to manage pair specific exchange processes

• Support for industry standards and platform formats

• Secures PDM by persisting “shared” data in the Collaboration Hub thus isolating PDM from external access

• Shared data for each OEM Partner pair is secured via separate data vaults based on access control. (Modes of collaboration like “competitive” Or “cooperative” can be supported)

• Extensible data model to support OEM specific attributes and objects
Thank You