Enabling Next Generation PLM Strategies for the Digital Enterprise

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Auto industry going through a major transformation

Increasing collaboration between traditional automotive OEMs and software outfits

A new era of personal transportation – Ownership to Sharing

Disruptive technologies redefining the way currently cars are manufactured

Changing business models – On-demand mobility and data driven services

Stricter regulations – Reduce CO2 emissions and road-traffic fatalities
How We Got Here... We Built Against Semantic Axes...

Product Development
- Requirements
- BOM
- PDM
- CAD
- CAE

Manufacturing
- Sourcing
- Process Planning
- Quality
- ERP
- Scheduling
- MES

Service & After Sales
- Warranty
- DMS
- Compliance
- Service

Semantic Axes:
- Requirements
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Axes:
- Product Development
- Manufacturing
- Service & After Sales

Text
- Transactional
- Multi-User
- 3D
- Interactive
- Single-User

Processes:
- Authoring
- Visibility
- Latency
- Consuming
How We Got Here... We Built Against Semantic Axes... with Constraints
.... Improving “Latency/Context/Visibility” thru Digital Thread
Digital Thread – Empowering Next Generation Digital Enterprises

SMART ENGINEERING
PRODUCT DEVELOPMENT

SMART MANUFACTURING
MANUFACTURING

SMART SERVICE
SERVICES & AFTER SALES

SMART PRODUCT
IN-USE

Digital Threads ↔ Digital Twins
Digital Thread - Smart Engineering

Model Based Systems Engineering
- Requirements Driven Bi-Directional Traceability
- Focus on Performance Attributes
- Formalized Simulation Tools & Processes

Knowledge Based Design Rules & Standards
- Capture & Manage Best Practices
- Share across Design Partners (Cloud Based DFx)
- Promote Continuous Improvement
  - Links to Manufacturing
  - Links to IOT Products

Engineering Organizational Efficiency
- PLM Analytics
  - Engineering Changes
  - Part Reuse & Commonality
- Product Program Metrics Analysis
  - Design Intent vs Actuals (cost, quality, compliance)
Digital Thread - Smart Manufacturing

Model Based Manufacturing Engineering
- Requirements Driven Bi-Directional Traceability
- Linked with Product Design Models
- Simulation of Processes, Resources, Scheduling....

Manufacturing Operations & Intelligence
- Capture & analyze Operational Efficiencies
  - Execution
  - Safety
  - Quality
  - Time/Attendance
  - Operators Collaboration
  - Predictive Maintenance
  - Energy Management: Production
- Remote Asset Management (e.g., running dark)
- Access across Manufacturing Partners (Cloud Based)
Digital Thread – Smart Services & Smart Products

Smart Services
• Condition History
• Remote Diagnostics
• Preventive Service
• Location based services

Smart Products
• Capture In-Use telemetry
• Focus on Performance Attributes per Design Intent
• Promote Continuous Improvement
  • Higher Fidelity Usage Models
    • Owner Profiles
    • Geographies
• Enable Content Integrity
  • Cyber-Security
  • Genealogy based
What can be done today…. Phased Value based Deployments
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