PLM & ERP: What is the Difference, and Why Should you Care?

*CIMdata PLM Leadership Webinar Series*

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#cimdatawebinar

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Our Mission...

Strategic management consulting for competitive advantage in global markets

CIMdata is the leading independent global strategic management consulting and research authority focused exclusively on the PLM market.

We are dedicated to maximizing our clients’ ability to design and deliver innovative products and services through the application of PLM.
Presenters’ Profile

*Your presenters’ professional background*

- Jim McKinney, PLM Leadership Practice Manager
  - 30+ years of experience in almost all areas of PLM
  - Has held positions in MCAD support, PDM implementations, product marketing, training, competitive intelligence, and consulting to companies large and small around the globe
  - Holds a B.S. in Design Engineering Technology from BYU
Topics to Discuss

- What is PLM
- What is ERP
- Engineering-centric vs. Manufacturing-centric
- Key Integration Points
- How to Leverage PLM and ERP Integration to Improve Innovation
- Concluding Remarks
CIMdata’s Definition of PLM...

PLM – integrating people, processes, information, and business systems

- Strategic business approach
  - **NOT** just technologies
  - Consistent set of business solutions

- Collaborative creation, use, management & dissemination of product related *intellectual assets*
  - All product/plant definition information – the virtual *product*
    - MCAD, AEC, EDA, CASE, analysis, formulas, specifications, portfolio, docs, ...
  - All product/plant process definitions – the virtual *processes*
    - Processes that plan, design, produce, operate, support, decommission, recycle, ...

- Supports the extended enterprise

- Spans full product/plant lifecycle, from concept to end of life
What Products Are We Talking About?

Companies can’t afford to only think about traditional discrete products!

- PLM spans the life of any “product”
  - Manufactured products—automobile, computer, pill, soda, hat
  - Projects—building, bridge, highway
  - Plants—oil refinery, offshore platform
  - Assets & Facilities—airport, railway system, utility distribution network (e.g., electricity, telecoms, water, gas)
  - Others...
PLM Supports the Complete Lifecycle

Every part of the product lifecycle provides PLM innovation opportunities

PLM Solutions—Information Management across Media, Process, Time, Geography, & Enterprise
What is ERP?

*Enterprise Resource Planning*

- Transaction-based activity to create real products
- Includes planning, manufacturing, and logistics
- Manages all processes that manufacture products
- Controls all aspects of manufacturing including inventory, purchasing, process planning, production scheduling, warehousing and delivery, human resources, finance, configurations, effectivity status, and others
What is ERP?

*Enterprise Resource Planning*

- Financials
- Human Resources
- Sales & Distribution
- Data
- Supplier Relationship
- Customer Relationship
- Administration
- Inventory & Warehouse

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Intellectual Asset are at the Core

Intellectual assets are the organization’s product/process definitions


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PLM’s Position in the Enterprise

PLM and an enterprise’s information management environment

Partners
Suppliers
Customers
Product/ Process Definition
People, Finances, & Facilities
Research
Requirements Management
Portfolio Management
Customer Service
Use/Support/Maintenance

PLM

Product Lifecycle

Develop
Design/Engineering
Mfg. Engineering
Project Management
Mfg. Engineering

ERP

SCM

CRMM

Manufacturing
Production

Produce

Customer Service
Mfg. Engineering
Portfolio Management

Maintain

Product Lifecycle

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Major IT Enterprise Domains Evolve

*Intellectual vs. deliverable asset management – Today*

Customers

Intellectual Assets

Virtual Product

Orders/Service Forecasting

Portfolio/Rqmts. Management

Design Chain Collaboration

Supply Chain Logistics

Deliverable Assets

Physical Product

CRM

PLM

ERP

SCM
Major IT Domains Emerge

*Intellectual vs. deliverable asset management*

**Intellectual Assets**
- Virtual Product
- Design Chain Collaboration

**Deliverable Assets**
- Physical Product
- Supply Chain Logistics
- Orders/Service Forecasting
- Portfolio/Rqmts. Management

**Major IT Domains**
- ERP
- PLM

**Concepts**
- Customers
- Partners
Major IT Domains Emerge

Intellectual vs. deliverable asset management

- Intellectual Assets
  - Virtual Product
  - Design Chain Collaboration
  - Manufacturing Control
  - Manufacturing Operations
- Deliverable Assets
  - Physical Product
  - Supply Chain Logistics
  - Orders/Service Forecasting
- Customers
  - Portfolio/Rqmts. Management

ERP
PLM
MES
Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

Plan | Define | Build | Service

Virtual Product

PLM

Intellectual Assets

Physical Product

ERP

Deliverable Assets
Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

Plan
- Product & Project Portfolio Management
- Lifecycle Process Management
- Product Structure
- Part/Data Management

Define
- Authoring Tools

Build
- Digital Production & Automation
- Supplier / Partner Management

Service
- Services Management
Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

EDA Tools
CASE Tools
Office & Technical Publications Tools

Services Management
Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

- Tool & Fixture Definition & Mgt
- Work Instruction Definition
- Facility Planning & Design
- Office & Technical Publications Tools
- S/W Design & Validate
- Product Structure Management
- Supplier / Partner Management
- Routing Mgmt & Process Devel
- Production Simulation & Analysis
- NC, PLC, & Robotics
- Quality Engin
- MDA & Industrial Design Tools
- EDA Tools
- CASE Tools
- Lifecycle Process Management
- Part/Data Management
- Product & Project Portfolio Management
- Plan
- Define
- Build
- Service

Plan
- Case
- Office & Technical Publications Tools
- Production Simulation & Analysis
- NC, PLC, & Robotics
- Routing Mgmt & Process Devel
- EDA Tools
- MDA & Industrial Design Tools
- Quality Engin
- Lifecycle Process Management
- Plan

Define
- EDA Tools
- MDA & Industrial Design Tools
- Routing Mgmt & Process Devel
- NC, PLC, & Robotics
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- Define

Build
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- Office & Technical Publications Tools
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Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

ERP

Virtual Product

PLM

Plan
Define
Build
Service

Physical Product

ERP
Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

**Plan**
- Idea Mgt & Concept Development
- Strategic Product Planning
- Mgt & Sys Engin
- Mgt Requirements
- Product Catalog
- Product Conceptual
- Structure Mgt
- Specification Mgt
- Project Portfolio Mgt
- Other Mgt
- Delivered Mgt
- Content Mgt
- Project Mgt
- Options, Variants
- & Config Mgt
- Multiple BOM Mgt
- Supplier Mgt
- Sales Forecasting
- Inventory & Warehouse Mgt
- Procurement
- Financial Reporting & Mgt
- Human Resources

**Define**
- EDA Tools
- CASE Tools
- MDA & Industrial Design Tools
- Mgt Development Tools
- Routing Mgmt & Process Devel
- Cost Quotation
- Mgt Formulation, Recipe
- & Ingredient Mgt
- Compliance Mgt
- Visualization
- Strategic Product Mgt
- Definition & Mgt

**Build**
- Office & Technical Publications Tools
- Classification Mgt
- Packaging, Artwork & Labeling
- Mgt Production Simulation & Analysis
- Test & Validation Mgt
- Strategic Sourcing
- Tool & Fixture Mgt
- Tooling & Mgt
- NC, PLC, & Robotics
- S/W Design & Validate
- Work Instruction Mgt
- Work Instruction Definition

**Service**
- Claims & Warranty Mgt
- Asset Mgt
- Maintenance Process Mgt
- Def & Validate
- Logistics & Distribution
- Customer Relationship Mgt
- Maintenance Feedback
- Compliance Mgt
- Production Product Costing
- Manufacturing Change Mgt
- Supply Chain Mgt
- Production Scheduling
- Human Resources
- Capacity Planning
- Production Planning
- Production Rampup
- Production Mgmt
- Portal Mgt
- Sales Forecasting
- Inventory & Warehouse Mgt
- Procurement
- Financial Reporting & Mgt
- Human Resources
- Capacity Planning
- Production Planning
- Production Rampup
- Production Mgmt
- Portal Mgt
- Sales Forecasting
Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives
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Major IT Domains Emerge

PLM footprint overlaps and integrates with other major enterprise initiatives

Plan  | Define  | Build  | Service
---|---|---|---
Virtual Product  | PLM  | Execution  | ERP
Physical Product  |   |   |  
A PLM-ERP Model to Consider

Where does your company fit?

Is the dominant contributor to product cost, quality, delivery time, etc.—development or manufacturing?

<table>
<thead>
<tr>
<th>Manufacturing Impact Dominance</th>
<th>Product Design Impact Dominance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>PLM</td>
<td>ERP + PLM</td>
</tr>
<tr>
<td>High</td>
<td>ERP</td>
</tr>
<tr>
<td>ERP + PLM</td>
<td>ERP + PLM</td>
</tr>
</tbody>
</table>

Manufacturing-Centric

Engineering-Centric

Manufacturing Impact Dominance
Engineering-Centric Characteristics

Companies that focus on the definition of product

- Resources focus on product design, engineering functions, and processes
- View design and engineering of their product as a competitive advantage
- Develop products with high engineering content
- High investment in design process improvements
- Tend to design complex and innovative products
- Focus on systems rather than parts and components
- High investments in skilled engineering resources
- Iterative, rapid design process
Manufacturing-Centric Characteristics

*Companies that focus on the product production*

- Resources focus on manufacturing functions & processes ... flexible, agile, etc.
- Focus on improving purchasing, assembly, and distribution mechanisms
- View their manufacturing capabilities as their competitive advantage
- Engineering and design resources are often contract employees
- Engineering and design activities are frequently out-sourced
How Industries Align

Mapping industries onto the PLM-ERP Model

- **Engineering-Centric**
  - Software
  - Computers
  - Telephones

- **Manufacturing Impact Dominance**
  - Low
  - High

- **Product Design Impact Dominance**
  - Low
  - High

- **Manufacturing-Centric**
  - Fasteners
  - Consumer Products
  - Aircraft
  - Automobiles
  - Machine Tools
  - Major Appliances
  - Auto Parts
  - Consumer Products

Industries mapped:
- Satellites
- Computers
- Consumer Products
- Telephones
- Auto Parts
- Major Appliances
- Aircraft
- Fasteners
- Consumer Products
- Automobiles
- Machine Tools
PLM solutions provide a solid support infrastructure for engineering-centric companies.

PLM’s designed-in flexibility allows them to be customized to support ever-changing product definition environments.

PLM solutions leverage the use of engineering methodologies, such as concurrent engineering and IPD.

New technologies pushing the need for product design focused solutions: IoT, mobility, MBD, Systems Eng, Servicability, etc.
PLM Integration Vision

*An enterprise vision encompasses multiple technology integrations*

Enterprise PLM Program

Enterprise PLM Solution

- Integration of Local Data Manager with Application A
- Integration of Local Data Manager with Application B
- Integration of Local Data Manager with Application C
- Integration of Local Data Manager with Application n
Types of Integrations

*CIMdata defines three levels*

- **Encapsulation $**
  - Application files are recognized and the application can be launched by PDM

- **Interface $$**
  - PLM and the application can exchange files and some metadata automatically (without user intervention)
  - PLM functions are provided via the application’s menus
  - Data is passed one-way to PDM structures by CAD applications

- **Integration $$$**
  - Provides full, automatic exchange of all types of product data and metadata
  - Application-specific data (such as product structures) are 2-way associative and managed by the PDM solution
  - All PLM functions are available in the application
  - The user works in a consistent environment
Levels of Integration Scope

An integration continuum

- Encapsulation
- Interface
- Integration

- Menus
  - Menus and Functions

- File Capture and Control
  - Data Element Management

- Unidirectional Metadata & BOM
  - Bi-Directional Metadata & BOM
Generic Enterprise PLM Architecture

Turning vision and strategy into an enterprise solution

- Legacy Systems
- Scanning
- CSM
- V&M
- PDM
- Output & Archival
- EMail
- Web Servers
- Remote Sites
- Extra-company
- Distributed Sites
- SneakerNet
- BYOD
- Extra-company
- Distributed Sites
- Remote Sites
- BYOD
- EMail
- Web Servers
- PDM
- CSM
- V&M
- Scanning
- Legacy Systems
PLM & ERP: A Key Integration

PLM and ERP must coexist

- Many users see an overlap and are confused
- As PLM and ERP implementations expand, the overlap of users and capabilities increases
- PLM and ERP offer a major opportunity for improved enterprise integration
Information Portal Approach

Data interfacing providing information aggregation through the Web

- Provides much of the value of integration, but at lower cost and more quickly (e.g., using MS SharePoint as a portal)
- Browser is used to present information from multiple enterprise systems and repositories
  - E.g., stock or cost information from ERP, viewing drawings from PLM
- Provides limited data control, limited data integrity, and no integration for processes
- A potentially cost-effective starting point for integration
Integration Approach

Various approaches to integration may be used successfully

- PLM integrations to enterprise systems may be accomplished with different levels of “tightness”
  - Some integrations are merely one-way transfers of information (e.g., from design to production)
  - More extensive integrations support two-way information flows (e.g., product design data to ERP)

- Establishing clear operational processes is critical to success

- Requires integration of information & processes
There are six primary enterprise integration scenarios:

1. CAx
2. CAx, LDM
3. CAx, PDM
4. CAx
5. CAx, LDM
6. CAx, PDM

CAx = Computer-Aided “x”
ERP = Enterprise Resource Planning
LDM = Local Data Mgt.
PDM = Product Data Mgt.
PLM = Product Lifecycle Mgt.

Cost, Time & Complexity Increases

Possible Integration Area
How to Leverage PLM + ERP for Innovation

Integration planning supports innovation

- Product design information can be used to prepare and inform early process planning activities
- Early detection of product design issues can lead to more innovative ideas and higher quality products
- Past changes/fixes in ERP can guide PLM activities and produce more customer-centric innovation
- Warranty and claims information can lead to innovative ideas that support product design and services
- Changes can be moved earlier in the design process with linkages to ERP
- New technologies require integration
Concluding Remarks

*Integrating PLM & ERP presents many opportunities for innovation*

- Understanding the difference roles of PLM and ERP can lead to a beneficial linkage between them
- Choose the best areas for integration to gain the advantage in your business; you can’t do everything
- Integrated PLM and ERP solutions lead to more innovative products with fewer late changes and higher quality
- Focus on the overlapping areas and provide automatic integrations whenever possible
- Use the proper level of integration
- Learn more about PLM!
CIMdata’s Services...

Creating, disseminating, and applying our intellectual capital

**Research**
- Market research & analysis
- Technology research & analysis
- Reports & publications
- Market news
- Member services...

**Education**
- Executive seminars
- PLM Certificate Programs
- Technology seminars
- Int’l conferences & workshops
- Best practices training...

**Consulting**
- Strategy & vision
- Needs assessment
- Solution evaluation
- Best practices
- Quality assurance
- Program management
- Market planning...

Delivering strategic advice and counsel through a comprehensive, integrated set of research, education, and consulting services
CIMdata’s PLM Transformation Services

Services for Industrial Organizations—improving your PLM-related processes

CIMdata’s PLM consulting methodology—transforming your business for a competitive advantage!

A comprehensive set of services tailored to fit your specific needs...
Our PLM Transformation Clients...

A sampling of CIMdata’s international industrial clients (1 of 2)
Our PLM Transformation Clients...

A sampling of CIMdata's international industrial clients (2 of 2)
This CIMdata offering is primarily comprised of a set of well defined, assessment-based PLM education and training certificate programs. These certificate programs are available to industrial companies who are considering and/or implementing PLM, and to PLM technology and service solution providers.
PLM Certificate Program Outline

5-day, 9-session outline for PLM Leadership offering

- **Day 1:** Session 1: Introduction to PLM
- **Day 2:** Session 2: PLM Benefits & Potential Value
  Session 3: PLM Strategy & Solution Definition
- **Day 3:** Session 4: PLM Solution Evaluation & Selection
  Session 5: PLM Implementation, Monitoring & Continuous Improvement
- **Day 4:** Session 6: PLM Process Development & Testing
  Session 7: Integrating PLM within the Enterprise
- **Day 5:** Session 8: Expanding PLM Across the Value Chain
  Session 9: Configuration Management’s Role in PLM

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What Others Are Saying
A sampling of feedback received from past certificate program participants

“A must attend program for anyone that is planning to participate in PLM selection or implementation activities at their organization.”
—Shinod Kumar, Edwards Lifesciences, USA

“An excellent overview of all PLM and it’s fit to companies. Good insights that can avoid many troubles in implementation.”
—Paulo C L Villaca, Embraer, Brazil

“I wish we had done this before we started our PLM effort...”
—Jeff Burk, Whirlpool, USA

“Hazy about PLM? Come to CIMdata and clarify.”
—Mrs. B. Uma Prasad, Bharat Heavy Electricals Ltd., India
2015 PLM Certificate Class Schedule*

*Join us, and get educated about PLM*

- March 16-20 – Amsterdam, The Netherlands
- May 4-8 – Ann Arbor, MI USA
- September 21-25 – Boston, MA USA
- December 7-11 – Cypress, CA USA

- Custom & on-site programs by request

**Special Discount:** 15% off!

*Sign up and pay by February 15th 2015*

*Dates may be subject to change*
Questions?

*Please use the GoToMeeting chat panel*

- We’re hoping that the anonymity of the chat window might help participants ask more questions
- If you want to ask a question on the record, we’ll certainly let everyone know you’re asking
- The most important thing is interaction – let us hear from you on the call
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