

Product Data Management

PDM – The Foundation for PLM



CIMdata's Differentiation

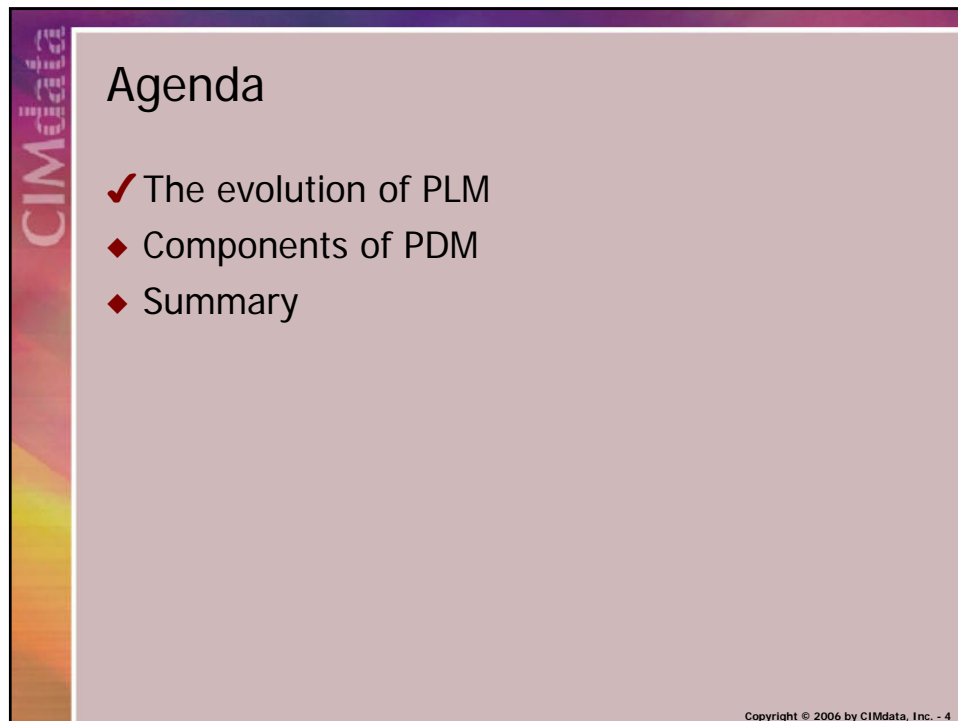
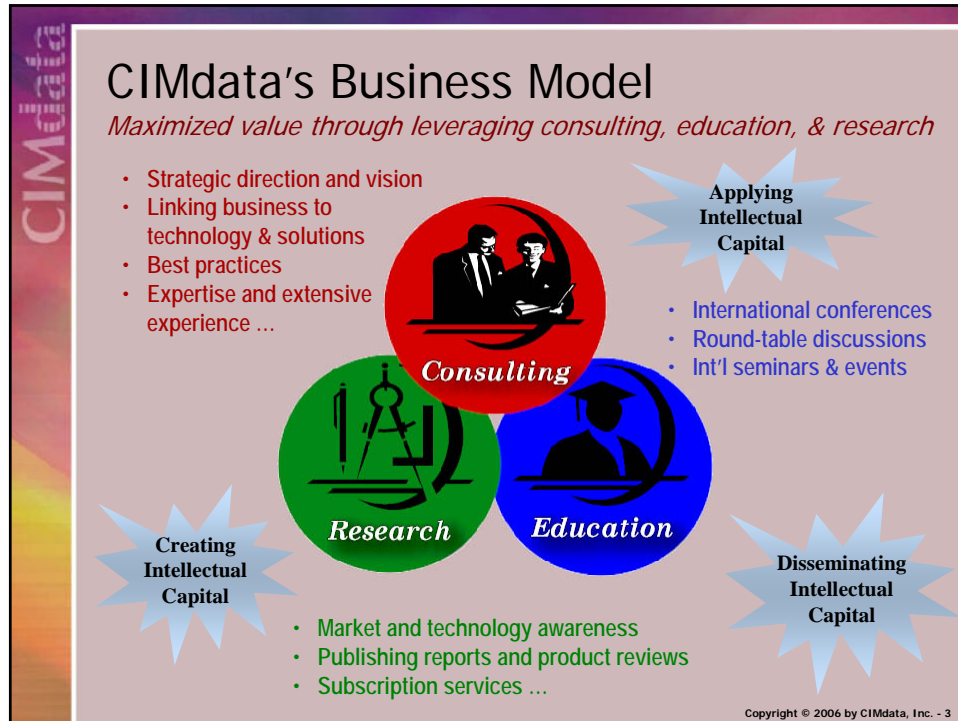
Why CIMdata is your best choice

- ◆ *Worldwide* reputation since 1983
- ◆ Focused on the *full* product definition lifecycle throughout an extended enterprise - *PLM*
- ◆ Services to *suppliers* & *industrial* organizations
- ◆ *Non-biased* and *independent*
- ◆ *Global* strategic consulting operation
- ◆ Experienced senior consulting *resources*
- ◆ Access to *additional resources* & *support services*, e.g., research, publications, etc.
- ◆ *Extensive experience* in multiple industries

Copyright © 2006 by CIMdata, Inc. - 2

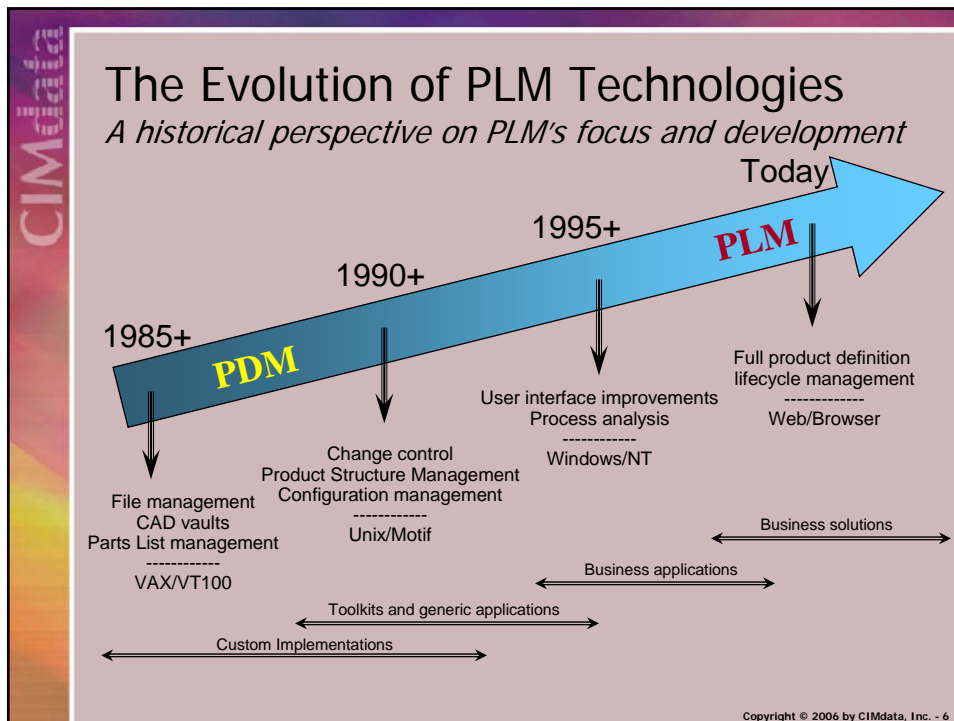
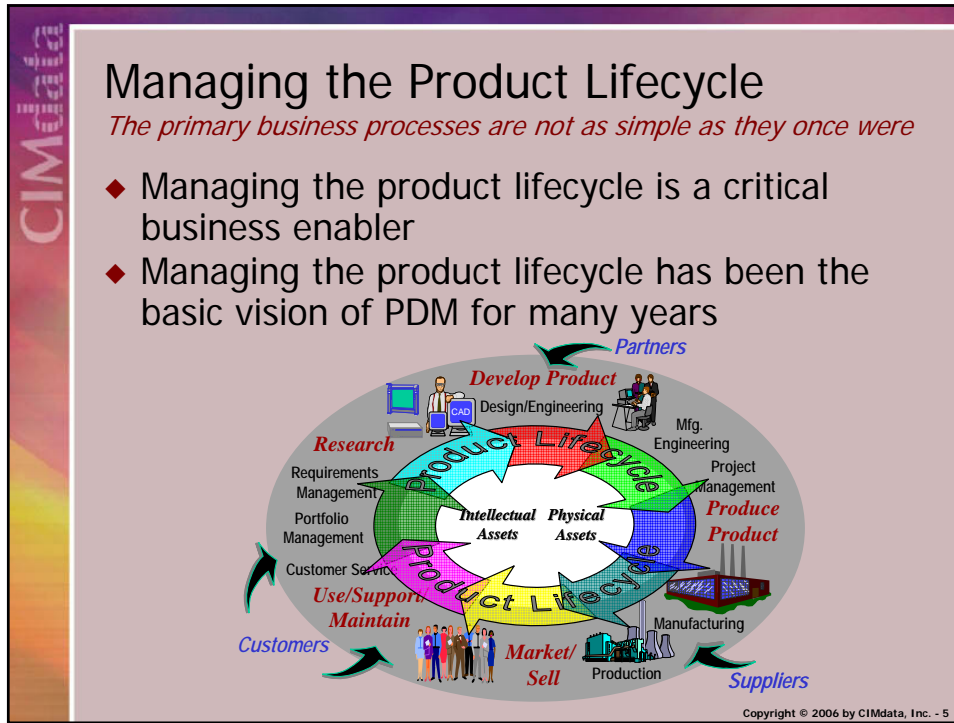
Product Data Management

PDM – The Foundation for PLM



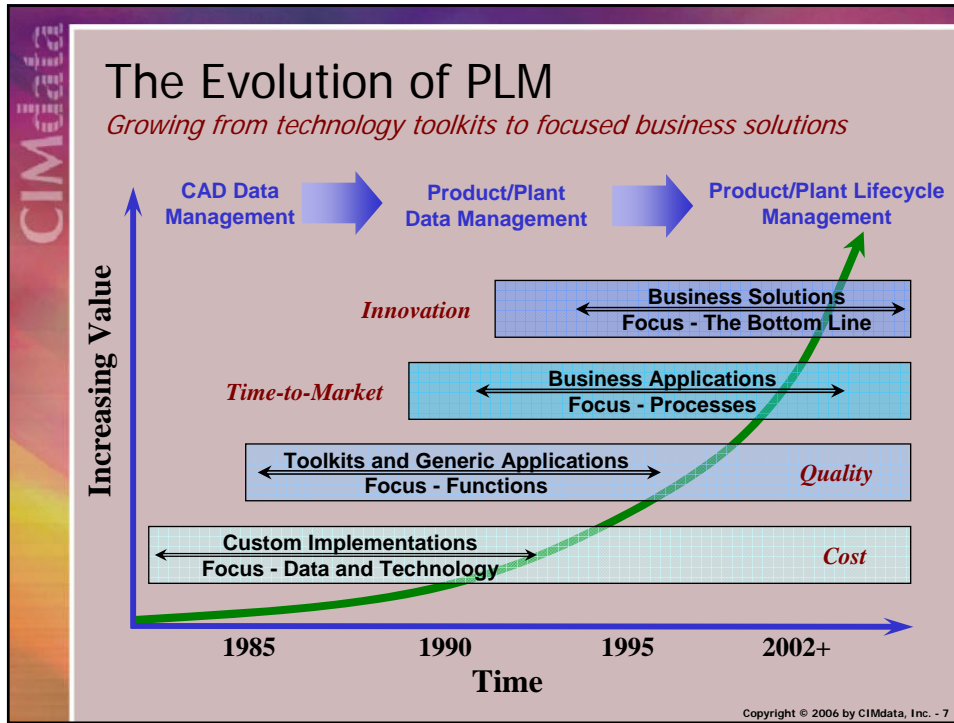
Product Data Management

PDM – The Foundation for PLM



Product Data Management

PDM – The Foundation for PLM



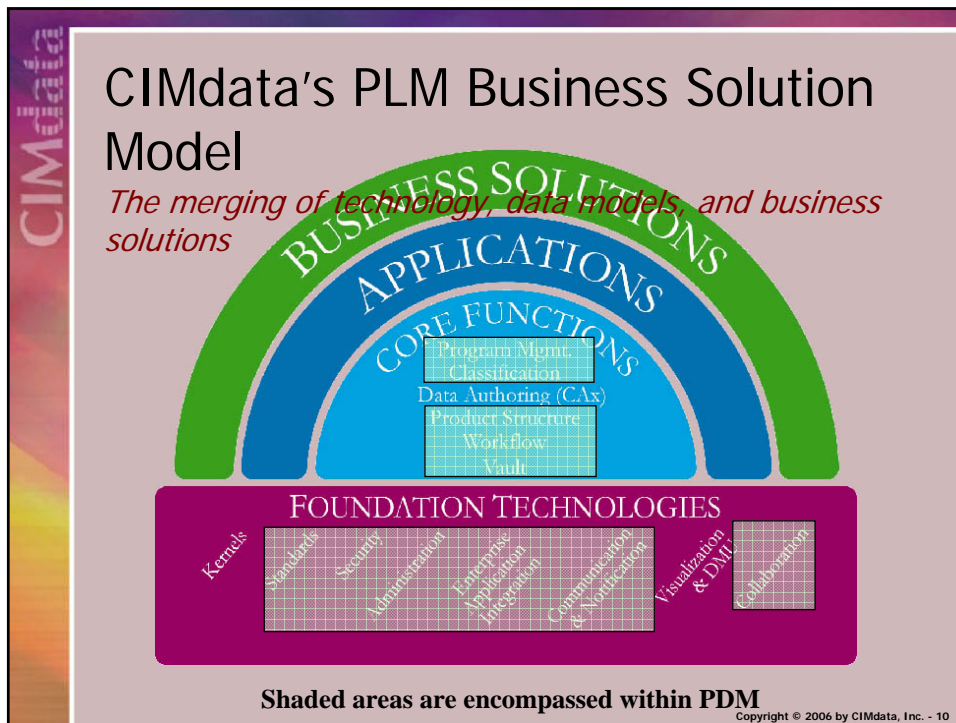
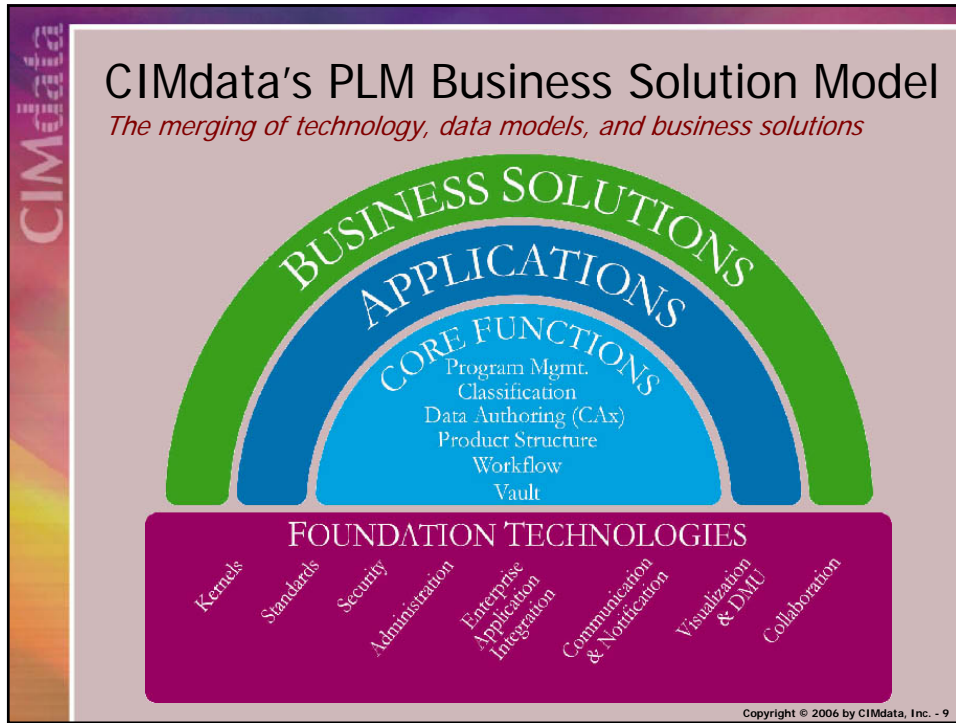
Managing the Product Definition
Focused on providing data integrity and collaborative controlled access

- ◆ Managing all product-related information (including digital files & database records)
 - Examples of products:
 - Manufactured products—automobile, computer
 - Projects—building, bridge, highway
 - Plants—oil refinery, offshore platform
 - Facilities—airport, railway system
 - Assets—utility distribution network—electricity, telecoms, water, gas
 - Others...

Copyright © 2006 by CIMdata, Inc. - 8

Product Data Management

PDM – The Foundation for PLM



Product Data Management

PDM – The Foundation for PLM



PLM is Not Technology
PLM is a business approach that incorporates technology

PLM is focused on

***How* a business works**


As well as

***What* is being created**

And

***How* it will be used**

Copyright © 2006 by CIMdata, Inc. - 11




The Core of PLM
Three fundamental PLM concepts

- ◆ Universal, secure, managed access to the definition of a product or plant
 - Information that “shapes” the product or plant
 - Information that is “derived” from the product or plant definition
- ◆ Maintaining the integrity of the product definition and related information throughout the life of the product or plant
- ◆ Managing and maintaining business processes used to create, manage, disseminate, share and use the information

Copyright © 2006 by CIMdata, Inc. - 12

Product Data Management

PDM – The Foundation for PLM




“Shaping” Information

Examples of information used to define what a product will “be”

- ◆ Requirements
 - Functional
 - Performance
 - Quality
 - Cost
 - Physical
 - Interoperability
- ◆ Standards
- ◆ Regulations
- ◆ Technology
- ◆ Aesthetics

Copyright © 2006 by CIMdata, Inc. - 13



“Derived” Information


Examples of information used to describe what a product “is”

- ◆ Models, drawings and documents that describe the product or plant
- ◆ Analysis and test input and results
- ◆ Configurations and variation – structures and views
- ◆ Manufacturing and assembly instructions and processes
- ◆ Material and component requirements
- ◆ Maintenance and operations documentation
- ◆ Training documentation
- ◆ User guides and instruction
- ◆ Sales - options, variations
- ◆ Marketing collateral

Copyright © 2006 by CIMdata, Inc. - 14

Product Data Management

PDM – The Foundation for PLM




Process Focus

PLM manages processes across the extended enterprise

- ◆ Program and project management
- ◆ Processes required to manufacture the product or plant
- ◆ Operational processes
- ◆ Disposal or decommissioning processes
- ◆ PLM process management ensures complete digital feedback to both users and other business systems throughout each lifecycle stage

Copyright © 2006 by CIMdata, Inc. - 15



Components of PLM


What is included within PLM

- ◆ *Product Data Management - PDM*
- ◆ Collaborative Product Management
- ◆ Requirements management
- ◆ Portfolio management
- ◆ Product analysis
- ◆ Digital manufacturing
- ◆ Asset Management
- ◆ In-service data management to support MRO
- ◆ Product definition authoring
- ◆ Documentation authoring

Copyright © 2006 by CIMdata, Inc. - 16

Product Data Management


PDM – The Foundation for PLM



Agenda

- ◆ The evolution of PLM
- ✓ Components of PDM
- ◆ Summary

Copyright © 2006 by CIMdata, Inc. - 17



Product Data Management

Creating the foundation of PLM

- ◆ A set of technologies and capabilities that support information management throughout the product lifecycle
- ◆ Provides many of the critical core functions and foundation technologies within a comprehensive PLM solution
- ◆ PDM includes:
 - Information and document vaulting
 - Content and document management
 - Workflow and process management
 - Product structure management
 - Configuration management
 - Classification management

Copyright © 2006 by CIMdata, Inc. - 18

Product Data Management

PDM – The Foundation for PLM

Core PDM Functions
Providing key elements for product definition management

The diagram illustrates five core PDM functions:

- Data Vault & Document Management:** Shows a central vault icon connected to 3D models, documents, and a bottle.
- Product Structure Management:** Shows a hierarchical tree structure with a 3D model at the bottom.
- Workflow & Process Management:** Shows a flowchart with four green boxes connected by red arrows in a loop.
- Classification Management:** Shows a tree structure for fasteners, including categories like Screws (Round, Flat, Hex), Bolts, etc., Bolts, Nuts, and Washers.
- Program & Project Management:** Shows a Gantt chart titled "New Product Development Project" with tasks from Week 1 to Week 6.

Copyright © 2006 by CIMdata, Inc. - 19

Why is PDM Fundamental to PLM?
PDM has always focused on data and configuration management

- ◆ PDM provides the infrastructure required to deliver the three fundamental characteristics of PLM
 1. Universal, managed access
 - Information vaults
 - Document and content management
 - Security
 2. Maintaining definition integrity
 - Product structure management
 - Configuration management
 3. Managing business processes
 - Workflow
 - Change management
 - Review and approval

Copyright © 2006 by CIMdata, Inc. - 20

Product Data Management

PDM – The Foundation for PLM

Data Vault & Document Management
Definition

- ◆ Data Vault and Document control
 - Secure data vault for all product information
 - Files (drawings, documents, etc.) managed as “objects”
 - Check-out and check-in control to ensure data integrity
 - File & hardcopy locations maintained and managed
- ◆ Part to Data relationships are managed
- ◆ Multiple release levels supported
 - Release states maintained
 - Versions and revisions
- ◆ Browsing and interrogation
 - By attribute
 - By full text retrieval (FTR)

The digital equivalent of the Drawing Vault or Technical Library

Copyright © 2006 by CIMdata, Inc. - 21

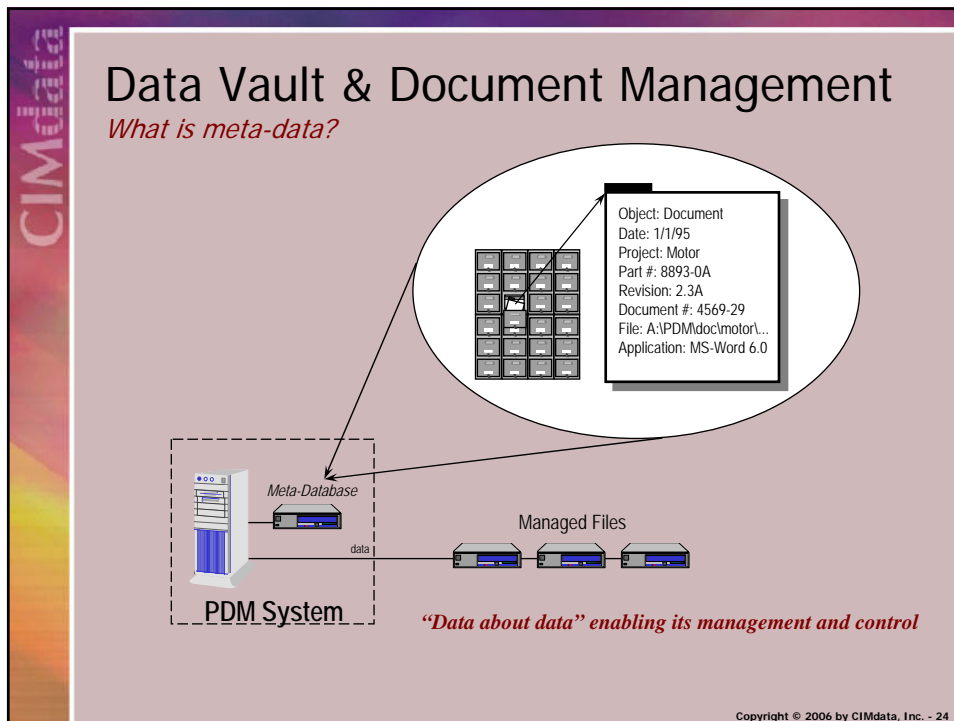
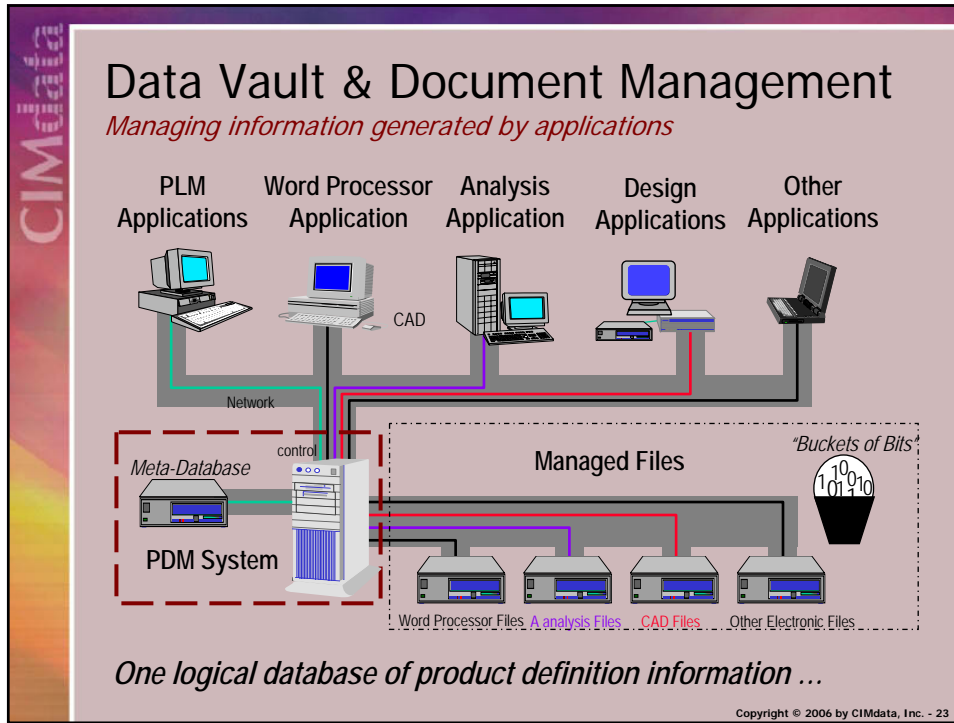
Data Vault & Document Management
Products have many associated parts, documents, and files

- ◆ Identification must be consistent & recognizable
- ◆ Many files may represent one logical object

Copyright © 2006 by CIMdata, Inc. - 22

Product Data Management

PDM – The Foundation for PLM



Product Data Management

PDM – The Foundation for PLM

Workflow & Process Management
Definition

- ◆ Approved and automated workflow & processes
 - By project, status level, product type, ...
 - Sequential, parallel, conditional steps
 - Voting rules and time-outs
 - Folder/package maintenance
 - Notification and distribution
 - Audit processes and actions "triggers"
 - Notes and comments collected
- ◆ Process integration and change control
 - ECO definition and management
 - Change orders associated to product structures
- ◆ Ad-hoc workflow management
- ◆ Browsing and reporting

Allows the embodiment of your quality procedures & processes

Work Packet

Copyright © 2006 by CIMdata, Inc. - 25

Workflow & Process Management
Example: Engineering change orders (ECO) include many disciplines

Engineering Supervisor

Purchasing

Suppliers

Manufacturing

Design

ECO

ECO

Customers

Customer Service

Project Management

Copyright © 2006 by CIMdata, Inc. - 26

Product Data Management

PDM – The Foundation for PLM

Workflow & Process Management
Examples of Workflow

- ◆ Document Production Cycle
- ◆ Engineering Change Requests (ECRs)
- ◆ Engineering Change Orders (ECOs)
- ◆ Design Release Management
- ◆ Problem Tracking and Resolution
- ◆ Bid Preparation
- ◆ Engineering Reviews
- ◆ Purchasing Cycle
- ◆ Contracts Management
- ◆ Update of Quality Plans & Procedures

Distribution of data for use or comment/annotation with automated control

Supports collaboration and concurrent activities

Copyright © 2006 by CIMdata, Inc. - 27

Product Structure Management
Definition

- ◆ Create and maintain:
 - Part-to-part, part-to-document, document-to-document ...
 - Compound document component relationships
 - Product components—including material, mechanical/structural, electronic/electrical, software, & documentation
- ◆ Create and maintain configuration variations
 - Versions and effectivities
 - Options, alternates, substitutions
 - Multiple product structure views
- ◆ Browsing and reporting
 - Where-used
 - BOM explosions
 - Selective queries ...

More than a bill of materials!


Copyright © 2006 by CIMdata, Inc. - 28

Product Data Management

PDM – The Foundation for PLM

Product Structure Management
Integrate with other functions & business systems

- ◆ Configuration control supported by change processes
- ◆ BOM synchronization with ERP/MRP production systems
- ◆ Integrated with assembly models in CAD
- ◆ Analysis tools (cost roll-ups, ...)
- ◆ Other PDM systems



Copyright © 2006 by CIMdata, Inc. - 29

Program and Project Management
Managing the resources needed to perform the work

- ◆ *Balances* the three key elements
 - Time, cost, and quality
- ◆ Functions include:
 - Task definition
 - Deliverables management
 - Milestone and progress reporting
 - Coordination and notification between individuals, teams and projects
- ◆ Aggregates and manages the multiple projects involved in a product's lifecycle

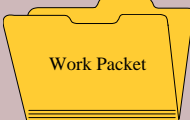
Copyright © 2006 by CIMdata, Inc. - 30

Product Data Management

PDM – The Foundation for PLM

Program & Project Management
Definition

- ◆ Model work breakdown structures (WBS)
- ◆ Assign WBS tasks with product structure
- ◆ Define WBS task schedules
- ◆ Allocate resources to WBS tasks
- ◆ Perform program analysis
- ◆ WBS browse/reporting

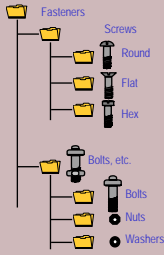
A network diagram with nodes 10, 20, 30, 40, 50, 60, 70, and 80. Node 10 is the start. Node 20 is connected to 10 with label (4, 1). Node 30 is connected to 20 with label (3, 1). Node 40 is connected to 10 with label (4, 1). Node 50 is connected to 40 with label (2, 1). Node 60 is connected to 40 with label (3, 9) and to 50 with label (1, 2). Node 70 is connected to 30 with label (6, 2) and to 60 with label (5, 1). Node 80 is connected to 70 with label (2, 0).

Project tracking is simplified by linking tasks with deliverables (via work packages & workflows)

Copyright © 2006 by CIMdata, Inc. - 31

Classification Management
Definition

- ◆ Maximize use of existing parts/assemblies
- ◆ Easy retrieve of standard parts/objects
- ◆ Location of similar parts/objects
- ◆ Industry & company-defined attributes
- ◆ Create/maintain classification schemes, attributes, codes, structures ...
- ◆ Allocation of parts & components to classes & groups




Are You Re-Inventing the Wheel?
“Up to 80% of the work done in an engineering department is identical or very similar to work done previously.”
From research by: Arthur D. Little

Copyright © 2006 by CIMdata, Inc. - 32

Product Data Management

PDM – The Foundation for PLM




Classification Management

Business drivers and usage

- ◆ External parts and raw materials management
 - Reduce purchased part count and consolidate Suppliers
 - Use of standard classification systems, DIN 4000
- ◆ In-house parts design management
 - Part/process standardization and consolidation
 - Form, fit, and function classification
- ◆ Sales configurator and options management
 - Maximize variety
 - Minimize number of parts
 - Features and options with configuration rules
- ◆ Service and operations
 - Locate replacements and substitutes

Copyright © 2006 by CIMdata, Inc. - 33



Visualization and Collaboration


PDM is the foundation required for collaboration

- ◆ PDM provides an application neutral environment for visualization and collaboration
- ◆ Visualization facilities
 - Enable personnel without access to, or knowledge of, authoring tools to view, comment on, and use product information created by those tools
 - Expand the use and value of core product information
- ◆ Collaboration enables groups of users to work together in interactive work sessions or via shared information

Copyright © 2006 by CIMdata, Inc. - 34

Product Data Management

PDM – The Foundation for PLM




PDM and Collaboration

PDM is an organized source for information

- ◆ PDM provides data and process management
- ◆ PDM manages:
 - Viewable versions of product information
 - These must be kept up-to-date when the data changes
 - PDM can trigger their creation upon data change
 - Reviews, markups and decisions
 - Product configurations
 - Release of product information to manufacturing
- ◆ PDM enforces data access control
- ◆ PDM defines and executes workflow
- ◆ PDM coordinates/integrates with other apps

Copyright © 2006 by CIMdata, Inc. - 35



Agenda


- ◆ The evolution of PDM
- ◆ Components of PDM
- ✓ Summary

Copyright © 2006 by CIMdata, Inc. - 36

Product Data Management

PDM – The Foundation for PLM

Benefits of PLM
Benefits for all areas of the business

- 1** For Business Performance and Opportunities 
- 2** For the Organization 
- 3** For the Users 
- 4** For the Product or Service 
- 5** For Process Performance 

Copyright © 2006 by CIMdata, Inc. - 37

Business Performance Impact
Real life results from various companies

- ◆ ~40% improvement in product change cycle times
- ◆ 15 - 30% reduction in prototypes and 40% reduction in lead times
- ◆ 25% productivity increase in design engineering
- ◆ Reduced development time by 75%
 - From 18 months to 4 months for a household product
- ◆ Reduced time to cost a product from 5 days to 5 minutes
- ◆ Reduced an engineering review process by 83%
 - From 12 day to 2 days

Copyright © 2006 by CIMdata, Inc. - 38

Product Data Management

PDM – The Foundation for PLM




Impacting Business Performance

PDM and PLM help improve:

- ◆ The *top* line
 - Operational efficiency and flexibility
 - Organizational capability
 - Product development
- ◆ The *bottom* line
 - Revenue and profits
 - Customer satisfaction and loyalty

Copyright © 2006 by CIMdata, Inc. - 39



Summary


PDM provides the foundation for creating effective PLM solutions

- ◆ PLM is a business necessity
- ◆ PDM was the genesis for PLM
- ◆ PDM provides the core functions that are the foundation for creating and deploying PLM solutions
 - Information access and sharing
 - Configuration and information integrity
 - Process management

Copyright © 2006 by CIMdata, Inc. - 40

Product Data Management

PDM – The Foundation for PLM



CIMdata
Strategic consulting for competitive advantage in global markets

World Headquarters
3909 Research Park Drive
Ann Arbor, MI 48108, USA
Tel: +1.734.668.9922
Fax: +1.734.668.1957

Primary European Office
Siriusdreef 17-27
2132 WT Hoofddorp, NL
Tel: +31 (0)23.568.9385
Fax: +31 (0)23.568.9111

Japan Office
Takegahana-Nishimachi 310-31
Matsudo, Chiba 271-0071 JAPAN
Tel: +81.47.361.5850
Fax: +81.47.362.0472

www.CIMdata.com

Serving clients from offices in the U.S., Europe, and Japan

Copyright © 2006 by CIMdata, Inc. - 41