SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF MECHANICAL ENGINEERING

19MEE403 - Industrial Digitalization

IV YEAR / VII SEM

UNIT – 2
SMART FACTORY AND PRODUCT LIFE CYCLE MANAGEMENT

Product Information Models (PIM) are structured frameworks that organize and manage all the data related to a product throughout its lifecycle. These models serve as the foundation for storing, accessing, and sharing product information across various departments, systems, and stakeholders. By standardizing product data, PIM ensures consistency, accuracy, and accessibility, which are critical for effective product development, marketing, and customer service.

Entities: These are the foundational building blocks of the data model, encompassing products, attributes, media, and more. Entities represent the core objects in your product catalog, which is crucial for master data management.

Attributes: Specific details describing the entities, such as product descriptions, specifications, dimensions, and other unique product characteristics. Attributes provide the necessary granularity and detail, ensuring accurate product information.

Categories and relationships: The organizational structure that defines how entities are interconnected and grouped. This includes hierarchical categorization and the establishment of relationships between different products and attributes, a key aspect of data governance.

Media: Visual and textual content that enhances product representation, including images, videos, and documents that engage customers and bring products to life.

Languages: The range of languages in which the product data is available, ensuring global reach and accessibility. This component is vital for businesses operating in multiple regions and needing to cater to diverse audiences and enhance customer experience.

Naming conventions and data rules: Guidelines and protocols for consistent, accurate data entry and management. These rules ensure data integrity and uniformity as product catalogs scale.

Customizations: Tailored features and functionalities, uniquely designed to align with your organization's specific processes and needs. Customization allows for a personalized approach to data management and integrating knowledge base resources.

FUNCTIONALITY OF THE PLM SYSTEMS

• Bill of Materials (BOM) Management

• Change Management

• Design Management

• Document Management

• Program Planning and Project Management

• Quality and Compliance Management

• Recipe Management

• Reporting

• Requirements Management

1. Centralized Data Management
•**Description**: PLM systems provide a single source of truth for all product-related data, ensuring that all stakeholders have access to the most up-to-date information.

2. Document and Content Management
•**Description**: This feature allows for the storage, organization, and management of all documents and content related to the product, including design files, specifications, manuals, and regulatory documents.

3. Product Data Management (PDM)
•**Description**: PDM within a PLM system manages the creation, change, and archival of product-related data, such as CAD models, bills of materials (BOMs), and part lists.

4. Bill of Materials (BOM) Management
•**Description**: BOM management allows users to create, manage, and share detailed lists of materials, components, and assemblies required to build a product.

5. Change Management
•**Description**: Change management features track and manage changes to product designs, processes, and documentation throughout the product lifecycle.

6. Collaboration and Workflow Management
•**Description**: PLM systems provide tools for collaboration among cross-functional teams, including designers, engineers, suppliers, and manufacturers. Workflow management features help automate and streamline processes.

7. Project Management
•**Description**: Project management features allow users to plan, track, and manage product development projects, including timelines, milestones, resources, and budgets.

8. Regulatory Compliance Management
•**Description**: PLM systems help organizations manage and comply with industry standards and regulatory requirements by integrating compliance checks and documentation into the product development process.

9. Supplier and Manufacturing Collaboration
•**Description**: This feature enables collaboration with suppliers and manufacturers, including sharing designs, specifications, and requirements.

10. Product Portfolio Management
•**Description**: PLM systems allow organizations to manage their entire product portfolio, including tracking the performance, costs, and profitability of each product.

ELEMENTS OF SYSTEM ARCHITECTURE

Key Elements of System Architecture
Components:
Description: These are the individual parts or modules that make up the system. Components can include software modules, hardware devices, databases, user interfaces, and external services.
Examples: In a web application, components may include the user interface, backend server, database, and API services.

Layers:
Description: System architecture often organizes components into layers, each with a specific responsibility. This layering helps in managing complexity and promoting separation of concerns.
Common Layers:
Presentation Layer: Handles the user interface and user interaction.
Application Layer: Contains the business logic and rules.
Data Layer: Manages data storage, retrieval, and persistence.
Infrastructure Layer: Supports the underlying system, including network, servers, and databases.

Interfaces:
Description: Interfaces define how different components of the system communicate with each other. They include APIs, protocols, and data formats.
Examples: RESTful APIs, GraphQL interfaces, and SOAP protocols are common interfaces used in web services.

Data Flow:
Description: Data flow refers to the movement of data between components within the system. It defines how data is input, processed, stored, and output by the system.
Examples: In an e-commerce application, data flows from the user interface (e.g., adding items to a cart), to the business logic (e.g., processing orders), and finally to the data layer (e.g., storing order details).

Integration Points:
Description: These are specific points where the system integrates with external systems or services, such as third-party APIs, databases, or legacy systems.
Examples: A payment gateway integration in an e-commerce platform or a CRM system connecting to an email marketing service.

Thank You