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General requirements for product lifecycle management (PLM) systems

产品生命周期管理（PLM）系统通用要求

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5 Reference Architecture

5.1 Architecture Composition A PLM system should include a resource layer, platform layer, data layer, business layer, front-end application layer, and integration layer to provide industry application services. The task is shown in Figure 1.

5.2 Resource Layer The PLM system should be based on hardware and software resource layers and run in a local area network or Internet environment. The resource layer consists of the following components.

a) Hardware resources. including networks, storage, computing, terminals, etc., providing physical support for system operation and data processing, transmission, storage, and applications. support.

b) Software resources. including operating systems, databases, middleware, runtime frameworks, etc., providing the basic software environment for system operation.

5.3 Platform Layer The platform layer should consist of the following.

a) Basic Support. Provides basic engine services, including business modeling engine, visualization engine, message engine, process engine, and transaction management. The system includes a management framework, rules engine, AI engine, log management, and integration interfaces to support the operation of system business functions and to standardize PLM (Product Lifecycle Management). The definition of various objects and business functions in the system ensures the stable operation of the system.

b) General Components. Provides basic management component services, including code management, part management, document management, BOM management, and category management. It includes functions such as data management, product portfolio management, change management, WBS management, task management, process management, and report management to support system data management. And business function applications.

Note. "Part" is a collective term for product components, which can be a single unit or a combination of any complexity, including but not limited to. finished products, semi-finished products, components, parts, and raw materials. Materials, molds, software, services, middleware, virtual components.

5.4 Data Layer The data layer provides system data definition and state management, including data models and data management.

a) Data Model. Defines different elements of the product lifecycle, including demand data, product data, part data, BOM data, and documents. Data, process data, quality data, cost data, change data, test data, simulation data, maintenance data, and resource libraries, etc., are used for... The system provides data support for business operations.

b) Data Management. Provides system business data function services.

5.5 Business Layer Based on the enterprise's product lifecycle planning and demonstration, core businesses such as R&D design, production planning, testing and verification, manufacturing, and maintenance services are included. To meet management needs, the business layer consists of business management and project management.

5.6 Front-end Application Layer The front-end application layer provides entry points for different roles to access the system, mainly including desktop applications, web applications, and mobile applications.

5.7 Integration Layer The integration layer consists of the following components.

6 Business Function Requirements

6.1 Requirements Management Requirements management should include the following functions.

a) Structured definition management;

b) Categorized management;

c) Hierarchical management;

d) Market-oriented and product-oriented demand package management;

e) Status and version management of requirements and requirement packages;

f) Traceability management;

g) Verify closed-loop management;

h) Change management;

i) Distribution and collaborative management;

j) Statistical analysis;

k) Import/Export.

6.2 Product Architecture Management

6.2.1 General Requirements General product architecture management should include the following functions.

a) Classification and management of architectural models;

b) Structured management of architectural models such as functional models, logical models, and physical models;

c) Integration with architecture design tools to support collaborative architecture design;

d) Architecture model check-in and check-out;

e) Electronic approval and management of architectural models;

f) Architecture model change management and impact analysis;

g) Architecture model lifecycle status and version management.

6.2.2 Extended Functionality Product architecture management should be expanded to include the following functionalities.

a) Management of the relationship between the architecture model and the upstream requirements model and downstream design model;

b) Management of the general metamodel and standard model of the architecture;

c) Architecture model review and release.

6.3 Product Management Product management should include the following functions.

a) Product definition management;

6.4 Design Management

6.4.1 General Requirements General design management should include the following functions.

a) EBOM management;

b) Design document management;

c) Management of the association between EBOM and design changes and design model data;

d) Integrates with ECAD and MCAD design systems to support design model management;

e) Visual management of design models;

f) Electronic approval and management of design models;

g) Design data model changes and impact analysis;

h) Structural design collaboration;

i) Collaborative design of electromechanical and software systems;

j) Design data status and version management, including documents, models, and EBOM;

k) Design data import and export;

l) Management of upstream and downstream data relationships;

m) Product configuration management.

6.5 Process Management

6.5.1 General Requirements General process management should include the following functions.

a) PBOM management;

b) Integration with 3D process design and simulation tools to support process model management;

c) Process document management;

d) PBOM management in conjunction with process changes, process models, and process documents;

e) Structured process management;

f) Process changes and impact analysis;

g) Status and version management of process data (including documents, models, PBOM);

h) Visualized work instruction generation and management;

i) Management of the relationship between upstream design and downstream production data;

j) Importing and exporting process documents.

6.5.2 Extended Functionality Process management should be expanded to include the following functions.