Mechatronics process management

Benefits

- Accelerate new product introduction schedules
- Transform disconnected tools and processes into an integrated design solution
- Facilitate environmental compliance and manufacturing standards
- Share data across domains to deliver higher quality products
- Leverage virtual prototyping to increase product reliability
- Identify downstream issues earlier to reduce scrap and rework
- Manage hardware/software dependencies to reduce warranty costs
- Navigate mechatronics relationships to identify all product data impacted by a change

Summary

Teamcenter® software's suite of mechatronics process management solutions enables you to establish a collaborative environment for developing products comprised of mechanical, electronic, software and control (electrical interconnect) technologies. Leveraging best-inclass tools, a common data model that crosses multiple engineering domains and a product lifecycle management (PLM) framework that manages the entire lifecycle process, these solutions enable domain-specific teams to retain their mechanical, electrical, electronic or software focus while working together to meet overall product development goals.

Managing your mechanical, software, electronic and electrical interconnect lifecycles

Complex software-driven electronics play a major role in many products' most advanced features. To address the product development issues that arise from these complexities, Teamcenter's suite of mechatronics process management solutions facilitates a collaborative environment that enables disparate engineering disciplines to work together as they develop products comprised of multiple mechanical, electronic, software and electric interconnect components.

Teamcenter's collaborative framework and common data model enables you to manage all of the design data created by these engineering domains while allowing development groups and suppliers alike to share and exchange this data. Just as importantly, the

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Business challenges
- Managing product development across a global supply chain
- Ensuring that all design teams access accurate information
- Managing product complexity resulting from the increasing use of software-driven electronics
- Meeting environmental regulations
- Integrating design data, tools and processes across domains
- Defining and managing software and hardware dependencies
- Managing thousands of software configuration and calibration parameters
- Facilitating cross-domain collaboration and product optimization
- Improving product quality and reliability
- Reducing rework, scrap and cost
- Tracing design implementation to product requirements

Features
- Secure, single source of product and process knowledge
- Integration with ECAD design tools
- Part library management
- Integration with cross-domain simulation and analysis tools
- Electronics manufacturing assembly/test analysis
- ECAD design data viewing, cross-probing and annotation
- Software lifecycle support
- Hardware/software dependency management
- Manage signals, calibration and configuration parameters, source code, binaries, libraries and build files
- Electrical interconnect lifecycle support

suite supports all of the tools and processes you leverage to develop these complex products across a complete product lifecycle.

Mechatronics data model – a single source of product knowledge
Teamcenter provides your design teams with a secure single source environment that manages product information and development processes across all domains. The common data model and support for industry-standard interface formats enable widely dispersed design teams to view, manage and share data with other members of the product team.

The mechatronics data model enables product manufactures to reduce or eliminate product quality and reliability issues by defining and managing the relationships and dependencies between all of the parts, options and variants in the product structure. These relationships and dependencies enable team members to rapidly identify what cross-domain data and processes are impacted when changes are proposed.

Providing widely dispersed design teams access to the right information at the right time, Teamcenter minimizes development delays caused by lengthy information searches or incorrect data versions.

Best-in-class tools and integrations
In conventional settings, even though product development takes place on a global scale, design teams tend to work in isolation using multiple toolsets from a variety of vendors. By combining your current tools with Teamcenter-provided best-in-class applications, you can transform otherwise disconnected tools and processes into an integrated design solution that enables you to lower costs and improve quality, while increasing design productivity.

Mechanical design integration
Teamcenter supports today's most highly prized MCAD tools including NX™ software, Catia, Pro/Engineer, SolidWorks, Solid Edge® software and Inventor. By facilitating multi-CAD supply chain design, Teamcenter's integrated development environment enables designers to work with model elements from other applications and share data across multiple domains.

Electronics design integration
Teamcenter enables ECAD teams to increase productivity by integrating disconnected design flows, managing all of your design, fabrication and assembly data and enabling you to share data across multiple domains. In addition, it supports ECAD integrations with design tools from Mentor, Cadence, Intercept and Altium. It also provides an integration gateway to enable you to integrate tools that you develop internally or procure from other third parties.

To help reduce product cost and facilitate environmental compliance, Teamcenter enables you to leverage your ECAD part library and make it available for use across multiple ECAD tools. Just as importantly, you can use Teamcenter to manage your parts and modify their attributes – as well as control project access – on an enterprise basis. By managing data in Teamcenter, you can reduce part duplication, prevent the use of obsolete or unapproved parts, assign compliance data attributes and focus procurement from approved vendors.

Software design integration To enable you to manage and control your source code development assets, Teamcenter integrates with IBM Rational ClearCase. Equally important, Teamcenter provides best-in-class support for signal/message management, calibration and configuration parameter management, as well as software design component management (IP libraries, specifications, test, documentation, built files, etc.) and software binary management.

These Teamcenter capabilities allow design teams to view and access the software configuration process, define and track thousands of generated signals, create and account for tens of thousands of software configuration and calibration parameters that control product performance and manage all dependencies that exist between software components, software

to hardware components (processors) and hardware to hardware components. Teamcenter also enables product teams to treat these software components as a "part" in your product definition and configuration processes. By tracking and managing software as a "part," design teams can lower warranty and repair cost.

Wire harness design integration

Teamcenter integrates with third-party solutions such as Mentor Graphics' Capital Harness (CHS). The wire harness physical design process is supported using Siemens PLM Software's NX design system and its NX Electrical Routing solution. The SOA integration framework enables other 3rd party tools to be integrated as well.

Using a data model based on various aspects of STEP AP203, AP214, AP210, AP212 and KBL, Teamcenter transfers, stores and manages all of your logical design, physical design and BOM data. Teamcenter's wire harness data model enables design teams to define and manage wire harnesses employing multiple configuration options and variants from a single wire harness design. This robust data management capability enables design teams to improve design efficiency and reduce scrap.

Cross-domain design collaboration

Teamcenter's mechatronics process management suite facilitates greater collaboration both within and across domains. By leveraging Teamcenter's robust collaboration toolsets and data exchange formats, different domains are better able to communicate and document the specific nature of cross-domain design issues that you need to address.

PCB.Xchange capabilities enable your electronics and mechanical design teams to quickly and easily share data. Mechanical engineers can share printed circuit board (PCB) configuration and design constraint information with electrical engineers. Electrical engineers can pass 2.5D/3D information to mechanical engineers so they can perform various simulation and analysis functions, such as evaluating interferences, thermal, vibration, shock, dust and humidity conditions. By enabling design teams to share analysis data in a virtual world, Teamcenter reduces your need for physical prototypes, shortens your development cycle and cuts your development costs.

Teamcenter provides advanced design-for-assembly/test analysis tools that enable your design teams to analyze PCB layouts against a host of manufacturing rules early in the design process. By providing more than 50 user-configurable rules, Teamcenter enables your design teams to edit rule parameters, as well as selectively turn rules on and off. Teamcenter-generated analysis reports provide detailed insight into potential issues that might otherwise negatively affect manufacturing throughput or cost.

Widely dispersed design teams and their suppliers can employ Teamcenter's ECAD visualization tools to share data and identify design issues even when they use different ECAD toolsets. Team members and suppliers can use Teamcenter's ECAD viewer to browse, highlight and investigate design or manufacturing issues without the use of an expensive authoring tool. Powerful features for cross-probing between the schematic and PCB layout enable electrical engineers and PCB layout designers to communicate design intent and identify potential issues.

In addition to viewing data, designers or suppliers can graphically compare and mark-up the design with notes and annotations. Teamcenter automatically translates and displays many frequently used annotations – such as "traces too narrow for the power they will carry" or "object blocking solder wave" – using the language specified by the user's system. By performing this level of collaboration early in the process, you can reduce scrap and rework.

Leveraging PLM for mechatronics design associativity

Teamcenter's mechatronics process management suite leverages Teamcenter's PLM capabilities to facilitate cross-domain associativity. Teamcenter provides a shared view of the product that breaks down the geographical, organizational and technological barriers between engineering domains while increasing your potential for design re-use. Design associativity enables design teams to define, search, visualize and navigate relationships, interactions and dependencies between data elements across multiple domains.

These connections and dependencies also enable product teams to locate and identify relevant data for any product or variant, as well as identify what other parts of the product and its schedule will be impacted by a proposed change. This level of traceability improves product quality and test coverage while eliminating feature creep and unnecessary rework.

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