Systems engineering

A whole system approach to improving product development

fact sheet

Siemens PLM Software

www.siemens.com/teamcenter

Summary

Teamcenter® software's systems engineering solution provides a first-of-its-kind environment that companies can use to apply systems engineering concepts to product development. By combining Teamcenter's holistic systems engineering approach with its knowledge and process management capabilities, you can understand your products in their entirety and optimize the tradeoffs that have to be made throughout a decision-intensive development cycle.

Benefits

Achieve right-to-market – by ensuring that your products meet customer value perceptions, time-to-market windows of opportunity and quality-related objectives

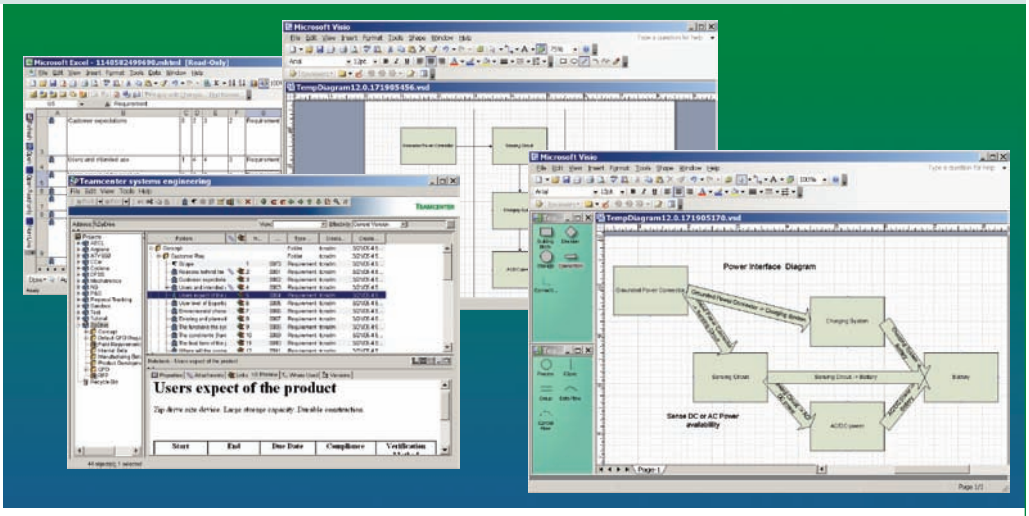
Accelerate time-to-market – by enabling your development teams to understand the entire impact of their design decisions as early in the product lifecycle as possible, thereby minimizing unnecessary rework

Meet customer expectations – by making certain that every aspect of your product complies with its related customer and regulatory requirements

Ensure compliance – by enabling program managers to measure and track design items that must comply with specific requirements and flagging instances when a requirement is in danger of being violated

Master product change – by enabling development teams to see the impact that design changes and product decisions will have across all views of a system – as well as enabling managers to monitor product development as it takes place

Optimize the whole product – by using high-level product abstractions to interrelate and optimize complex, interdependent product constraints and subject them to tradeoff analysis before detailed design begins



Users can capture conceptual designs, perform tradeoffs by using Excel in a multi-user engineering database (for example, to directly manipulate physical parameters such as cost or power), then capture logic and other diagrams and output the results to standard documents by using Visio.

Using interdisciplinary understanding to make better product decisions

Teamcenter's systems engineering solution provides an interdisciplinary environment that you can use to fully understand your products, improve crucial processes in your product development cycle and drive your company's systems engineering initiatives. By facilitating whole-product understanding, Teamcenter enables you to optimize the tradeoffs associated with making various take-to-market decisions.

Teamcenter delivers a variety of web-based groupware collaboration and information-linking capabilities to facilitate these strategic objectives:

- Teamcenter's graphical building blocks enable development teams to quickly describe complex products from a systems-oriented perspective – as well as to break down these high-level product hierarchies into fine-grain design elements, program constraints and project notes. Linked design elements enable developers to align design content with customer requirements. Program constraints enable development teams to manage the product's cost, performance and other

Features

An *intuitive user interface*, that looks and acts like Windows file Explorer and Outlook, enables developers to graphically represent complex products and their related systems

The ability to *reach all* objects in Teamcenter *via unique web addresses* allows you to manipulate and access those objects as simply as clicking on a URL hyperlink

"Live" Microsoft Office integrations allow users to interact with requirements information directly from their desktop, thereby effectively integrating isolated desktops with an enterprise product repository

Teamcenter enables you to *capture product decompositions* from a variety of perspectives – such as functions, safety and maintenance – and interrelate these views for cross-view optimization

You can capture inputs, outputs and logic of each view using *standard diagramming tools* to effectively integrate various diagrams (for example, logic, functional, control and UML diagrams) with your requirements and enterprise product repository, as well as to ensure that your diagrams always reflect your current design state

An *automatic tracing* mechanism links the summary requirement in the retained database to the specific paragraph in the source document from which it was extracted

A *natural-language report writer* enables users to query the database and respond with tabular, document or diagrammatic results in user-defined formats

A *robust document generator* enables users to create finished form documents

Activators enable development teams to capture, automate and enforce processes using standard scripting

Security protections control user access, information access and modification privileges, as well as enabling you to monitor change histories and perform baseline comparisons

related variables. Project notes enable developers to explain their design intent, record their concerns and raise appropriate issues of interest

- Teamcenter's groupware capabilities enable widely dispersed members of a development team to collaborate on a real-time basis
- Because Teamcenter's systems engineering solution is seamlessly integrated with its requirements management capabilities, your enterprise can capture requirements documents from multiple sources, parse these documents for individual requirements and retain those requirements in the same environment you use for product lifecycle management (PLM). In turn, this integration enables you to incorporate these requirements into the workflow-driven processes you use to drive your engineering, sourcing, manufacturing planning, total quality and change-related decisions
- Teamcenter's document-generation capabilities allow you to capture, manage and re-use documents as a living by-product of your development process

Functional capabilities

Companies that provide discretely manufactured products can use Teamcenter's graphical building blocks to create multiple high-level system views called hierarchies. You can create hierarchies to represent various product views, including product structures, organizational assignments, cost analyses, manufacturing views, project management perspectives and documentation views. Once captured, these views can be interrelated, giving you whole product visibility for cross-product/cross-view optimization.

For example, automotive companies can create graphical hierarchies to represent product structures for cars, trucks and other kinds of vehicles that are comprised of many assemblies, parts and components. The product structure connects the vehicle's parts to each other and links customer requirements and program constraints to each part and assembly. Other views, such as safety, reliability, supplier, materials, function and manufacturing views, can also be connected to one another, as well as to the product structure – thereby allowing you to see how, for example, a requirements change ripples across all views.

Besides being able to capture these views, developers are able to "hook up" these views logically. For example, a functional hierarchy can represent the functional elements for a functional block diagram. Teamcenter uses Visio, the same diagramming tool that many of your users already employ.

However, with Teamcenter, Visio acts as the user interface to a multi-user systems architecting database that effectively elevates your diagrams to a multi-user interface into an architecting database. A variety of diagramming notations are supported using standard Visio stencils, including functional block diagrams, system block diagrams, UML diagrams, IDEF diagrams, network diagrams and flowcharts (to name a few examples). In addition, users can create and extend their own stencils using standard Visio stencil mapping via XML.

Development teams can attach notes to any object to document their design decisions, explain their rationale, express supplier concerns and/or record other issues of interest. In addition, notes can be used in exported documents and "live" interfaces.

Project administrators can attach activators to individual design components to automate and enforce various processes. Activators contain behaviors and triggers on events. For example, team leaders can specify that Teamcenter send a message to all review team members whenever a crucial requirement is changed and initiate a procedure that asks them to review and approve each proposed change. Similarly, team leaders can create an activator that is triggered at the beginning of every new workweek and shows team members what design elements were changed during the previous week.

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