



Windchill® ProjectLink™ : Collaborative Project Management

Introduction

Over the next five years, global manufacturing is expected to invest upwards of \$6 billion dollars to improve product development processes. Why? Because, after making massive investments in manufacturing infrastructure and the physical supply chain during the last decade with mixed results, leading manufacturing companies are re-discovering “what matters most” for business success in the 21st century: superior products.

Within the context of a new global economy, product development processes are now being elevated to become the leading weapon in many companies’ competitive strategy. In addition, information technology solutions are now available to automate these re-defined processes. The opportunity to get closer to customers and gain competitive advantage by optimizing product development is the foundation for this new category of software called Product Lifecycle Management (PLM).

In this paper, you will learn about the new product development environment as well as the critical issues related to managing product development projects and collaborating with customers, partners, and internal functional groups. The paper introduces Windchill® ProjectLink™, a solution that enables globally dispersed product development teams to:

- Work seamlessly together on projects through Web-based workspaces
- More effortlessly manage critical business processes such as quality management, program management, and portfolio management.

Windchill ProjectLink extends traditional project management solutions, and simple collaboration tools that do not understand how to manage product information, to provide a comprehensive project and product development business process execution solution. On average, Windchill ProjectLink customers have: accelerated time to market by 15%; eliminated 70% of physical prototypes; reduced data proliferation by 30%; and saved hundreds of thousands of dollars in travel expenses. Leading companies around the world – such as Cannondale, Harman/Becker, ITT, Playtex, and more – already recognize the importance of enterprise project management and collaboration and have turned to Windchill ProjectLink.

This paper is intended primarily for business and IT managers who want to understand PLM and the role of project management and collaboration and learn the specifics of PTC's Windchill ProjectLink offering.

Product First: What Matters Most

Today, more and more manufacturers are realizing that success begins with – and is sustained by – great products. Great products not only define great companies, they define markets, drive revenue growth, generate profitability, create powerful brands, and delight customers, employees, and shareholders alike.

‘Product First’ companies – those who now realize that success is rooted in great products – view their product development process as their greatest competitive advantage. By refocusing on the importance of products and their product development process, manufacturers realize they have a new weapon to dramatically impact every aspect of their business: customer satisfaction,

product differentiation, quality, predictability, time-to-market, manufacturability, serviceability, and cost.

To consistently deliver great products, companies need a product development process that is, by itself, a competitive differentiator. While some see product development as synonymous with engineering, a truly effective product development process must engage a variety of cross-functional participants from marketing, engineering, procurement, manufacturing, sales, and service departments. Ever-increasing levels of outsourcing have driven suppliers and manufacturing partners into direct roles in the product development process; at the same time a strong customer focus has necessitated the customer's direct involvement as well.

During the product development process, this cross-functional value chain works collaboratively to generate the intellectual property that represents a new product or product variant. This intellectual property, when captured digitally via software applications, begins to form a digital representation of the product. This "digital product" is typically a manufacturing company's most strategic asset; it defines at a minimum what products are, how they perform and differentiate, the cost envelope, the suppliers that will be involved, and the manufacturing processes that will be used. Because the release of the digital product is a prerequisite to production, the digital product must be complete, compelling, stable, and agreed to by all stakeholders before any serious manufacturing work can begin.

Developing digital product in a value chain environment –under intense time and cost pressure – is certainly not easy. Most companies will admit that their processes are rife with problems:

- Poor communication among functional organizations – leading to delays in product release and poor quality
- Incorrect prototypes being produced due to the inability to share the latest design iterations – wasting time and money
- Inability to share the right information with customers – reducing customer satisfaction
- Paper based processes without the proper tools to assist – causing poor adherence to company standards and best practices

Simply put, most manufacturing companies currently lack a suitable enterprise infrastructure to effectively collaborate with an extended product development team and to manage critical business processes across the product lifecycle. Given the strategic imperative of product development, its time to think about ways to improve this critical process.

PLM and Collaborative Project Management

This recognition of the need to optimize product development processes has given rise to a new category of software solutions known as product lifecycle management (PLM), of which collaborative project management is a key ingredient. As a critical ingredient of any comprehensive PLM solution, a collaborative project management solution is more than traditional project management solutions or simple collaboration tools. It addresses the need to:

- Manage cross functional business processes such as new product introduction (NPI), program / project management, quality (ISO 9000, APQP, Six Sigma), and portfolio management
- Facilitate cross-enterprise product development collaborations such as design collaboration, supplier collaboration, business reviews, and proposal responses
- Create Web-based, self-administered virtual collaboration workspaces
- Provide distributed teams--inside and outside the firewall--with 24x7, real-time access to all project-related information, including both CAD and office documents (with check-in/ check-out capabilities and change histories), and project plan details

- Automate project scheduling, status reporting, task assignments, and deliverable and milestone tracking (with bi-directional Microsoft® Project integration)
- Conduct real-time design reviews with advanced viewing and mark-up technology and peer-to-peer meeting capabilities by utilizing both WebEx and peer-to-peer meeting capabilities.

The business benefits of this type of collaborative product development are numerous, including enhanced innovation, higher productivity, streamlined business processes, improved quality, and significantly faster time to market. Because of this, manufacturers worldwide are discovering the power of PLM. International Data Corp. (IDC) predicts the PLM market will exceed \$5 billion by 2005, up from \$1 billion in 2000. AMR Research reports that within manufacturing environments, PLM was the leading category of IT spending growth in 2002, bucking the overall downturn in IT spending.

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The Product Development Environment

What's the secret to manufacturing success? In a word, products. Superior products drive top-line revenue, bottom-line profitability, and shareholder value. In this competitive economy, CEOs are increasingly realizing that their company's viability and future success lies in their ability to establish and maintain product leadership.

Across all industries, companies are embarking on back-to-basics programs that refocus their energies on critical core competencies, with product development at the top of everybody's list. In the automotive world, you see it happening in the development of new and innovative cars, while in high-tech, it is the design of new devices that combine voice and data connectivity. Everywhere, manufacturers are scrambling to bring new, innovative products to market faster, and at better cost and quality levels. As Yankee Group has observed, the sheer diversity of products hitting the market each year is astounding, greatly exceeding the variety of products available 25 years ago.

The genesis of any new product can be traced to a periodic alignment that occurs between the needs of customers and the assets of a manufacturing company. The most critical of all company assets are intellectual, as a company must first decide carefully how to apply its know-how, technologies, and capabilities to respond to the opportunity at hand in a manner that provides differentiation and competitive advantage. New product development efforts are initiated for just this purpose; a cross-functional team is formed to work together to determine the exact requirements of the marketplace, the design of a product that meets those requirements, the suppliers who will contribute to the design and manufacture of the product, how the product will be physically produced and distributed to customers, and the service and support offerings that complete the customer solution.

Product development is obviously not the sole responsibility of the product design and engineering group. Instead, it's a collaborative effort involving marketing, engineering, purchasing, manufacturing, sales, and support. Yankee Group states that: "Collaborative product lifecycle management across business functions and among partner companies can reduce costs and drive revenue growth." The manufacturers that win in this new game are those that can efficiently develop, manage, and leverage product-related intellectual property throughout their enterprise.



Figure 1: Product Development is an Enterprise Process

As Figure 1 shows, different groups contribute to the product development and introduction

process at different points in the product lifecycle. The product lifecycle—plan, design, source, make, sell, service—uses and reuses product-related intellectual property at each stage as participants strive to implement key features, reduce costs, optimize manufacturing, explain the product to customers, and identify future upgrades or enhancements.

Each stage of the product lifecycle involves different types of digitized product information, generated by different people using different tools:

- Plan – relies on market research and analysis based on information from a variety of sources and synthesizes that information into a set of product requirements that conceptually describe the features and functions of the new product.
- Design – takes the requirements and turns them into actual product designs captured in mechanical and electrical representations of the product, which can take a variety of digital forms along which provide the precise descriptions necessary to actually build the product.
- Source – influences critical make/buy decisions governing which components will be designed by, or purchased from, an external source, and helps identify manufacturing partners. Without the latest accurate design data, the organization is hampered in its ability to source components strategically and receive the best prices and delivery terms.
- Make – guides design decisions to ensure effective manufacturing, and plans fabrication and assembly processes. This step requires detailed information both from the design phase for in-house manufacturing, and from the source phase to ensure manufacturing has the necessary components and raw materials on hand.
- Sell – utilizes digital product data from all previous phases to engage prospective customers, to forecast demand, and develop sales campaigns. In addition, the sales function is a critical source for understanding evolving customer needs, and provides important information to the planning group regarding enhancements and follow-on product opportunities.
- Service – uses digital product information to create associated service and support offerings that complete the solution; relies on fast access to accurate up-to-date product data to understand the current product configuration and ensure effective support once the product is deployed in the field.

The complete “digital product” is a comprehensive collection of electronic information including: mechanical and electrical CAD files; design, quality and manufacturing specifications; market and technical product requirements; software modules; and documentation and other media used to define and communicate the product and test its behavior electronically. Given the absence of a physical product at this stage of product development, it is the existence of the “digital product” that makes it possible for these organizations to engage effectively in the product development process.

Managing the Digital Product Value Chain

Product development is neither as sequential nor as enterprise-centric as the preceding discussion might suggest. Since the decisions made by various departments are interdependent, it is critical that various constituents communicate effectively and work in parallel. Furthermore, participants in product development are usually not limited to internal organizations. Today, companies are becoming increasingly specialized, creating narrowly focused, yet highly effective entities that work together in value chains to create the final product. In many industries, suppliers contribute more than 70% of the final product design, and in some cases the perceived “manufacturer” is essentially just a systems integrator. In effect, companies have created a “digital product value chain” comprised of various organizations that contribute value to the digital

product; many of the value chain “links” are represented by the contributions of various internal company departments, while others represent the value contributed by external suppliers, manufacturing partners, and even customers. The ability of a company’s digital product value chain to effectively work together to produce great products is becoming the key measure of competitive advantage.

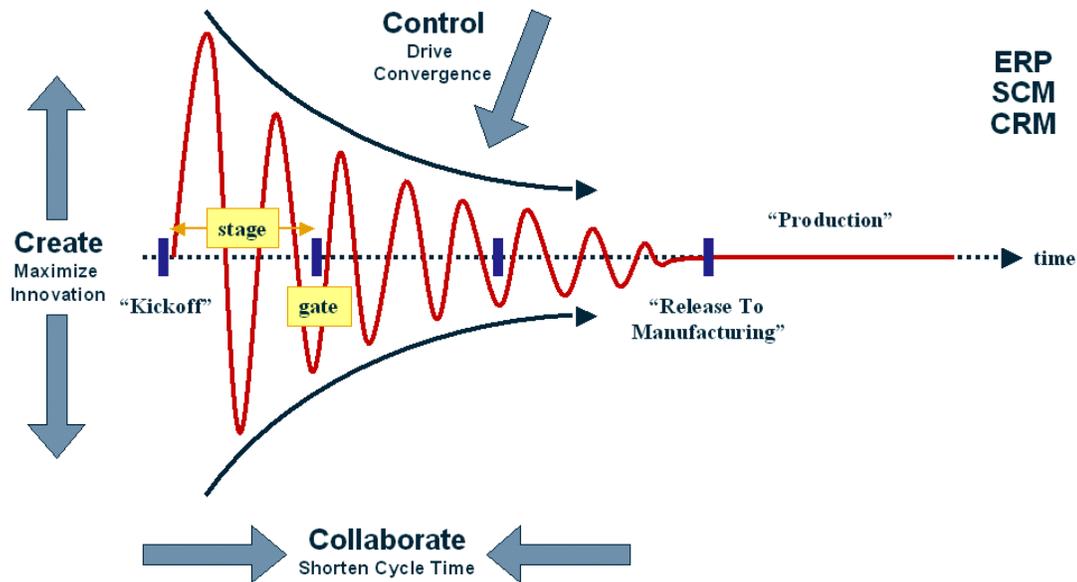


Figure 2: Optimizing the Digital Product Value Chain

Enter the new world of PLM, which, in its most efficient application, uses Internet technology to manage information and facilitate communication and collaboration across the entire product lifecycle. This includes all lifecycles from product concept and planning to final retirement of the product and every process contained therein. As shown in Figure 2, an effective, comprehensive PLM solution enables companies to create detailed, intuitive, and realistic digital product information; to collaborate to incorporate early input from the various participants to identify and resolve critical issues; and to control and automate critical processes such as release to production, change control, and configuration management. Without an integrated infrastructure to drive synergy between these three interdependent capabilities – create, collaborate, control – manufacturers cannot effectively optimize their product development processes.

At PTC, the critical requirements of manufacturing companies have been translated into a comprehensive suite of software solutions that allow companies to focus on product superiority and to manage their product development process for maximum advantage. With an integrated solution footprint spanning its flagship Pro/ENGINEER® and Windchill® product families, PTC is the only vendor able to assist manufacturers in each of these three critical dimensions of product development.

Windchill ProjectLink, the subject of this paper, is primarily focused on the “collaborate” dimension of optimizing the digital product value chain. With the rise of the Internet and the resulting connectivity to the extended enterprise, product development is becoming a team activity involving design engineering, manufacturing, marketing, sales, customer support and a host of outside parties -- all contributing to the final result. Collaborative project management plays a critical role in the product development process by integrating the contributions of cross-functional team members, and significantly shortening cycle time through early identification and resolution of product issues.

In many ways, collaboration is an overused term, but to leading manufacturing companies, effective project management and collaboration are invariably recognized as critical core competencies. Simply put, collaborative project management is the process of facilitating the collective work of a group of people to produce one or more deliverables that contribute to the digital product, within a specific timeframe and cost budget. Managing project collaboration in the manufacturing environment requires the ability to organize and coordinate people and their activities, control the information surrounding the product development process and effectively track the progress and cost of key deliverables and the project as a whole. As Gartner Group observes in a recent research note titled 'What is Collaboration?' "Collaboration in all of its manifestations is becoming the primary style of work in the connected economy."

Product Development Collaboration Challenges

Faced with short timeframes and increased pressure to complete development projects quickly, managers need effective ways to facilitate, expedite, and manage project collaboration. When the team members are organizationally and geographically dispersed across the extended enterprise and using different systems and tools, collaboration becomes far more difficult.

	Frequency of Use	Ease of Collaboration
	% respondents that work together with these types of organizations "Regularly, Frequently or Constantly" for product development	% Reporting difficulty in their experience working with these organizations
Customers	90%	55%
Component suppliers	81%	68%
Service suppliers	67%	63%
Non-competing suppliers of same customer	45%	75%
Competitors	23%	87%

Source: PTC Market Study, April 2002

Figure 3: Collaboration: Part of Everyday Business, But Very Difficult

A recent PTC study asked manufacturing managers across North America, China and Europe to describe how their product development processes could be improved and the top unaided response for each was improved collaboration across departments and with customers and suppliers. Figure 3 shows that while collaboration with customers and component suppliers is important and occurs frequently, organizations still find it very difficult. At many manufacturing companies, the tools used to manage projects and facilitate collaboration are rudimentary. Team members may email, FTP, fax, "snail mail" information to each other, or exchange information via a shared Web page. These forms of project collaboration are cumbersome and inefficient; telephone tag is frustrating and unproductive; fax limits the content; e-mail is haphazard; FTP is not secure; and Web sites are static, unable to respond proactively to dynamic situations. Worst of all, the current approaches to managing project collaboration are slow, at a time when pressure to complete projects faster is greater than ever.

Managers in this situation find themselves scrambling to coordinate activity, ensure follow through, update everyone to changes, and ensure that all team members have the latest information. Critical elements, such as missing an interim milestone, may go unnoticed or a key hand off may be dropped. Some people may find themselves working with outdated or inaccurate

information. Or, team members may not have the necessary tools to view important designs and documents and miss key details as a result.

Companies who attempt to drive project collaboration using the rudimentary tools described above often suffer from typical challenges like:

- Creating and maintaining the project plan – establishing the project schedule with key milestones and task assignments, then adjusting to changes and interdependencies and monitoring and communicating actual progress and cost.
- Intelligent sharing of information – creating a master repository to store, manage, view, modify, and mark-up project documents information and to track version history and associated discussion.
- Managing rich digital content– accommodating the wide variety of software applications (e.g., MCAD, ECAD, others) used by various team members to generate digital information and to providing visualization capabilities that allow this rich content to be disseminated to team members so that they may view and markup designs and documents without requiring access to the original authoring tools.
- Maintaining change awareness – detecting important changes and proactively notifying project members of changes and the availability of new information.
- Managing complex business processes – formalizing, modeling, automating, and managing repeatable processes such as those associated with design review, proposal generation and quoting, and quality.
- Managing large programs – providing the ability to plan and monitor large programs comprised of various interdependent sub-projects within an overall program structure.

Where companies have attempted to address the digital product value chain with typical project planning and management tools, they have encountered additional challenges:

- Lack of visibility – Today’s most popular project planning tools are great for establishing a theoretical view of how the project should work, but they lack visibility into what is actually happening. Many project managers grow frustrated with the level of manual effort required to continually research progress and update project plan actuals.
- Single user architecture – Most currently deployed project planning tools are designed for a single user to create and maintain a “personal” view of the project. However, complex projects often involve dozens of participants who need a common view of the project plan and actual progress.
- Conflicting work cultures and styles – Projects managed in the digital product value chain extend across company and geographic boundaries, and require the flexibility to allow individual contributors to work independently to generate digital product content, then periodically share that content to gain alignment and to serve as a means to track progress.
- Long learning curves – Many project planning tools are complex to use and lack a simple, Web-based interface necessary to accommodate diverse project teams.
- Costly implementation and deployment – Many project planning tools lack standardized implementation methodologies and templates preconfigured to solve the needs of product developers.
- Inability to assure consistency and repeatability when executing business processes.

Collectively, these challenges force manufacturers to shift focus and divert valuable resources from product development to the task of trying to collaborate, share, and manage project-related product information.

To overcome these challenges, organizations need a comprehensive collaborative project management tool that can handle large, dispersed teams; establish a schedule, budget, and responsibilities; centrally manage all the information surrounding the project and the deliverable; establish and manage workflow; automate processes; proactively notify team members of changes and the availability of new information; enable all team members to easily access and view information, and more. Until the introduction of Windchill ProjectLink, an integrated collaborative project management tool with rich digital content simply wasn't available to manufacturing companies.

Windchill ProjectLink: The Collaborative Project Management Center Of Your PLM Strategy

Collaboration isn't new. Leading manufacturers have been collaborating during the product development process for years, but there is tremendous room for improvement. Effective collaborative project management in the manufacturing environment requires the ability to organize and coordinate people and their activities and control all the information surrounding the product development process and the deliverables, as well as track the progress and cost.

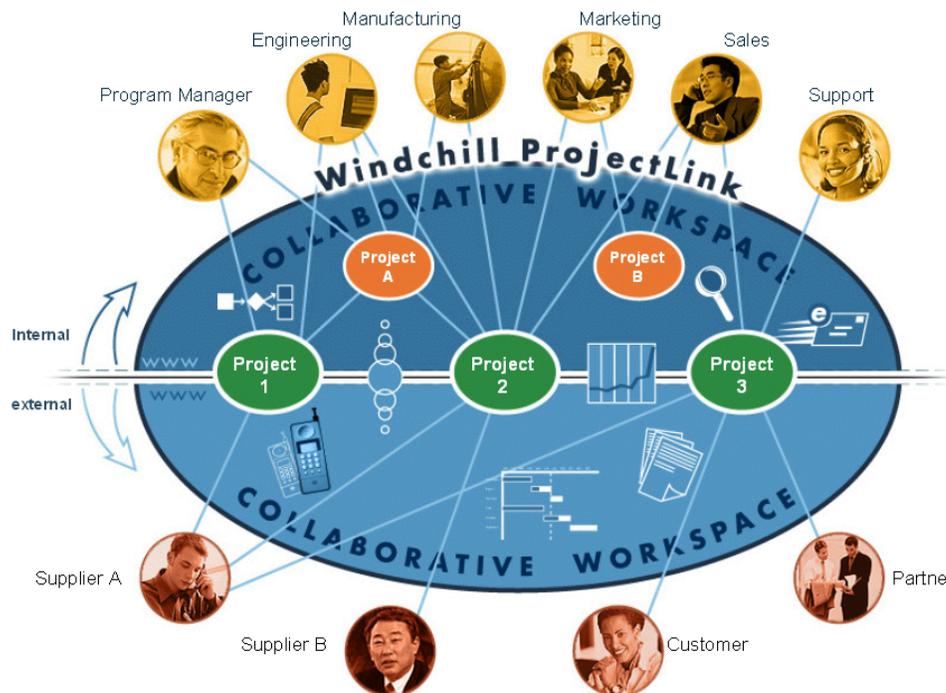


Figure 4: Windchill ProjectLink: Collaborative Project Management Across Extended Product Teams

Windchill ProjectLink solves the problems that have prevented manufacturers from effectively collaborating around product data on a cross-functional and value chain basis by providing enterprise-class capabilities without enterprise complexity. It avoids the difficulties that plagued earlier generation collaboration and project management tools. Windchill ProjectLink makes it simple for executives, managers, marketing, manufacturing, sales, and support people as well as

product developers to easily access and interact with the organization's digital product and addresses the entire product development lifecycle, not just design and engineering. Windchill ProjectLink simplifies enterprise collaboration and project management as shown in Figure 4 by making it:

- **Easy to Buy** – By directly addressing the critical product development challenges outlined above within the context of a fixed price, fixed timeframe implementation, Windchill ProjectLink presents a very compelling and low-risk business case.
- **Easy to Implement** – By pre-integrating all of the critical technology ingredients, then incorporating industry-proven best practices, PTC has been able to create a highly prescriptive Quick Start implementation package. Consequently, Windchill ProjectLink can be implemented to a production level at the customer site with a fixed cost in as little as two weeks. Additionally, PTC and its Enterprise Consulting Partners (ECP's) offer a supplemental value-added service to help companies create product development strategies, realign business processes, and manage organizational change. This service helps drive faster application adoption across the enterprise and an even greater return-on-investment (ROI).
- **Easy to Use** – By building around a highly visual and interactive view of digital products, by optimizing the functionality and user interface around industry best practices, and by including self help tutorials directly into the application browser, Windchill ProjectLink sets new standards for ease of use.

Designed with a pure Internet architecture, Windchill ProjectLink is the first collaboration system fundamentally designed to address the needs of the digital product development value chain. Windchill ProjectLink accommodates cross-functional teams and the extended enterprise value chain with:

- **Simple, yet secure Web access** – Powered by proven Windchill technology, Windchill ProjectLink allows users running nothing more than a Web browser to access any form of digital product information and participate in critical product development processes and decisions. Windchill ProjectLink dovetails into your existing Intranet or Extranet, and supports corporate IT standards such as single login and security. Windchill ProjectLink can be easily extended throughout the value chain, as it requires no specialized software or training. Interacting with Windchill ProjectLink is as simple and familiar as "surfing the Web."
- **Self-service project administration** – An intuitive user interface and configurable templates, accessible via a Web browser, make Windchill ProjectLink simple to learn and use, requiring minimal IT support. Any user can readily define new projects, interactively configuring teams, repositories, tasks, milestones, and workflow-driven business processes.
- **Secure project repositories** – For each project, Windchill ProjectLink provides a private online space accessible to all project team members. Project teams can share information in real time via the project repository, which provides check-in/check-out capabilities and version management services.
- **Personalized project workspaces** – Because many individuals may be engaged in multiple product development projects, all information for a given user is organized in a personal workspace that helps participants locate information and functionality related to their active projects and current work. Actions, capabilities and features needed to use and manipulate this information are presented in an intuitive, easy to use format.
- **Project planning and task scheduling** – Windchill ProjectLink enables managers to identify project tasks and deliverables and assign them to project members. This plan can be automatically executed with Windchill's workflow capability so that the plan activities (with complete dependency and hierarchical structure) are delivered to the task owners

- for action at the right time with no project manager manual intervention or follow-up. Additionally, with Windchill ProjectLink's bi-directional integration with Microsoft® Project, managers can create project schedules and plans in Microsoft Project and manage the end-to-end execution of those project plans through Windchill ProjectLink, and automatically update Microsoft Project Gantt and Pert charts to report actual progress.
- Automation and management of key processes – Windchill ProjectLink includes robust workflow automation tools that enable standard routing and review flows, as well as automation of even the most complex business processes such as new product introduction (NPI), program management, quality (ISO 9000, APQP, Six Sigma), project / program management, and portfolio management.
 - Direct CAD integration – To facilitate the exchange of rich digital product content created by mechanical and electronic design automation tools, Windchill ProjectLink includes a direct integration to major MCAD packages, including Pro/ENGINEER®, AutoCAD®, CATIA®, Unigraphics®, I-DEAS® and SolidWorks®, and to major ECAD packages, including Mentor® and Cadence®. This interface allows CAD users to “save to” and download directly from project repositories from their application session.
 - Universal Visualization – Independent of who created the information or what application they used in the process, Windchill ProjectLink includes an embedded visualization engine that enables any member of the value chain to interactively view, mock up, manipulate, and mark up (annotate) digital product information created by external applications. Windchill ProjectLink visualization supports literally hundreds of applications-- and no special software or training is required.
 - Collaboration tools – To facilitate synchronous collaboration, Windchill ProjectLink supports online, real-time meetings using WebEx® and ProjectLink's own peer-to-peer capabilities. Windchill ProjectLink assists with the scheduling of online meetings, distributes important supporting information, and captures results and action items for future referral.
 - Communication and notification – To facilitate communication among project members, Windchill ProjectLink provides automated notification, and publish and subscribe services, as well as online discussion forums.
 - Automated status reporting – To facilitate status reporting, Windchill ProjectLink automatically generates a series of reports that can be printed or shared electronically as a means to rapidly facilitate project management review sessions.

In its out-of-the-box form, Windchill ProjectLink provides a comprehensive set of robust project management and collaboration capabilities and templates. These tools simplify the communications and management challenges involved in controlling dispersed teams and fostering effective collaboration.

A comprehensive solution, Windchill ProjectLink's integrated capabilities result in a more effective solution than is possible with any combination of point tools cobbled together. Specifically, it ensures all project information is easily accessible through a single portal as shown in Figure 5, which provides a consistent view for each individual across all projects. It enables efficient online meetings from invitation through easy dissemination of the most current data to maintaining markups to data in real time along with iteration history, meeting minutes, and the tracking of action items – all in a single collaborative workspace.

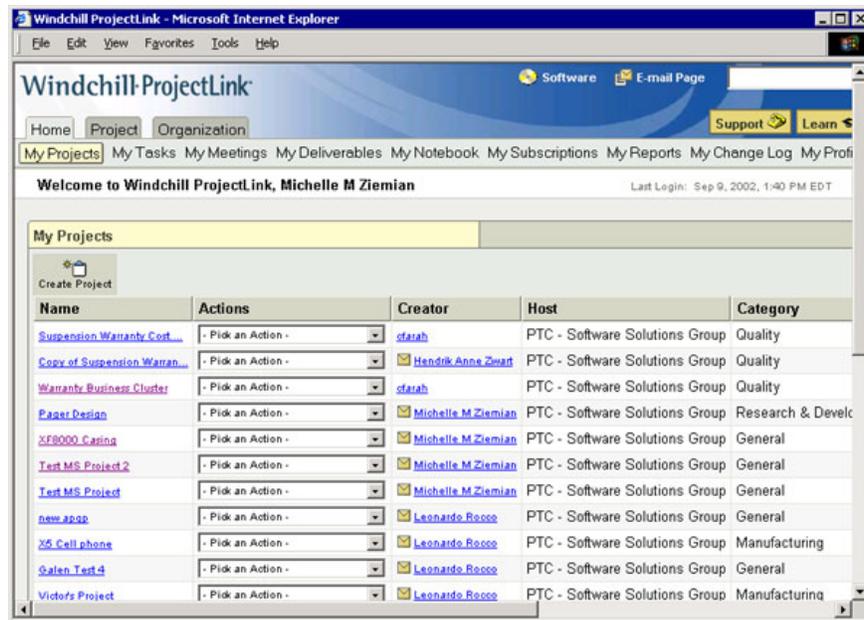
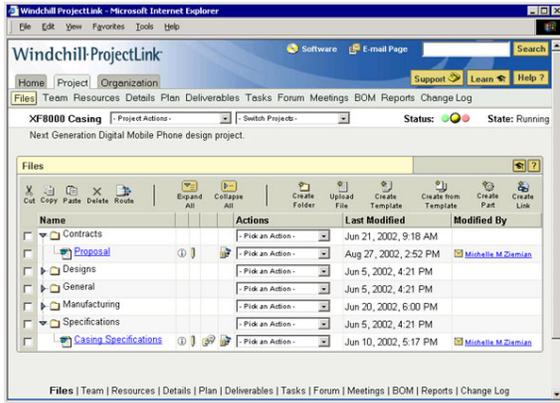


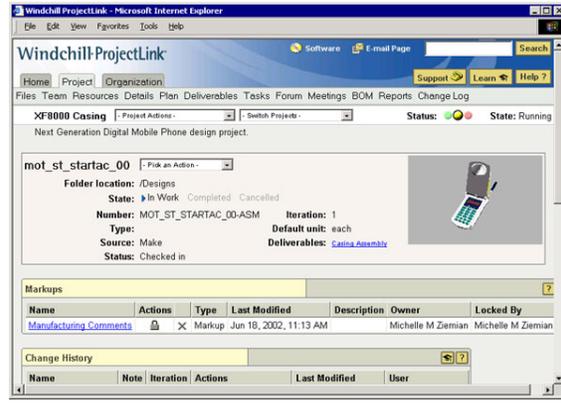
Figure 5: Home Page: your projects, current work, and other important information

Project teams can proactively access and share data and files, as well as view drawings, schematics, and models, even if some team members do not use the tools that initially created the data, files, or models. In short, Windchill ProjectLink tears down the boundaries of organization and geographical separation and allows dispersed team members to work together as if they were in the same room. Figure 6 provides sample screen shots of the intuitive Windchill ProjectLink user interface.

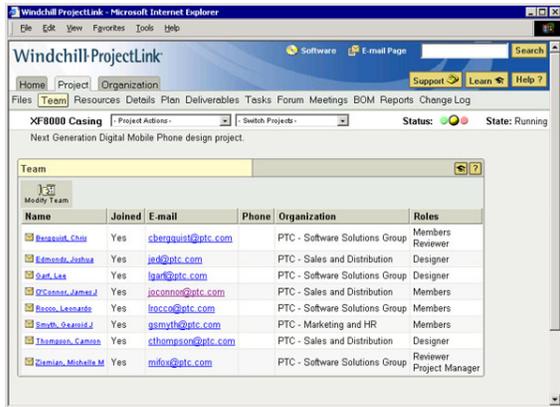
Windchill ProjectLink is pioneering this new class of comprehensive collaborative project management solutions with an easy-to-deploy, easy-to-use enterprise solution designed for the needs of manufacturers who rely on collaborative project teams for critical product development.



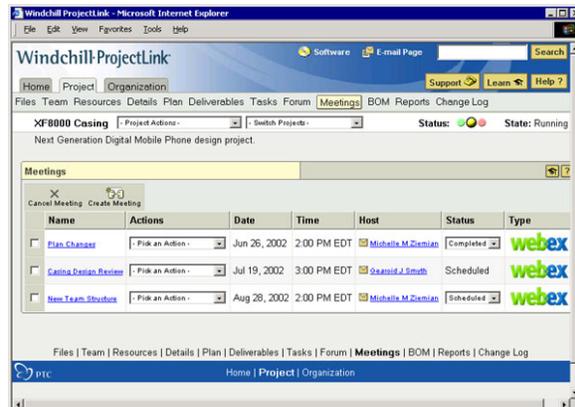
Inside a project, team members will see the project description and status, and have access to project files



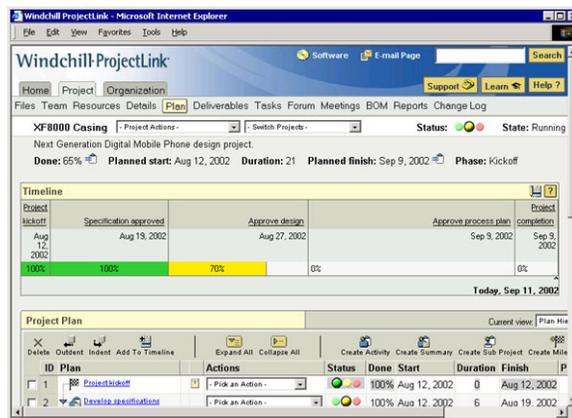
Team members can easily view, explode, and mark up designs.



View important team information including how to contact individuals and what role(s) they play in the project.



Team members can easily schedule and host both standard and online meetings, as well as conduct discussion forums.



The plan view allows team members to quickly see the project schedule and status. Project milestones are highlighted in the timeline.

Figure 6: Robust Out-of-the-box Best Practices and Easy-to-use Interfaces

Collaborating Across The Extended Product Development Team

To be effective, product development organizations must work efficiently across functional and organizational boundaries. Product development projects include not only internal cross-functional teams comprised of Sales, Marketing, Engineering, Manufacturing, and Customer Service representatives, but typically involve external suppliers, manufacturing partners, and customers. The ability to involve the right people at the optimal time drives product development efficiency, spurs innovation, and enhances quality.

Windchill ProjectLink supports these and other critical collaboration processes:

- Design collaboration – Enables cross-functional design teams to share work-in-progress design possibilities and to identify and resolve potential issues early in the design process when changes are relatively easy and inexpensive to make. The heterogeneous CAD viewing capability enables team members with diverse CAD tools, or none at all, to review the same product information and to accept input and mark-ups from all appropriate functions and organizations.
- Customer collaboration – Enables companies to work more closely with customers in design-to-order and custom product development projects. Customers are better able to communicate their needs and to understand, in real-time, the progress of their development efforts. With the ability to collaborate on initial designs and manage iterations of requirements, Windchill ProjectLink enables companies to work much more closely and efficiently with customers.
- Supplier collaboration – Enables companies to directly include their suppliers in the product development project so that supplier contributions can be integrated into the design early and often. With the ability to restrict access to project information based on organization and/or role in the project, Windchill ProjectLink enables complete control over external party access.
- Business reviews – Provides current information to all the functional managers involved in decision-making processes that occur at important project milestones, eliminating the need to print thick binders of information that are immediately out-of-date. Windchill ProjectLink enables reviews to be conducted either live, or via a Web-based conference. In either case, decisions can be tracked and action items assigned.
- Proposal response – Allows companies to quickly assemble cross-functional proposal response teams and ultimately differentiate themselves by providing more complete and accurate responses to proposal requests, in a much shorter time. It facilitates the proposal response process by providing project templates and routing information to all the functions that need to be involved. It improves internal project communication and allows companies to incorporate the customer more directly in the response process.

Automating Critical Product Development Business Processes

The most effective product development organizations have well-defined business processes, which they execute consistently. While many manufacturers approach product development in a more ad hoc manner, leading companies work collaboratively and predictably to define new products and product variants.

Windchill ProjectLink supports these and other critical business processes:

- New Product Introduction (NPI) – Many manufacturers utilize business processes such as PACE® or Stage-Gate® to manage their overall product introduction process. Windchill ProjectLink automates and streamlines this cross-functional process, by

providing best practice project and document templates that jump-start a product development project. Business and technical reviews are facilitated. Plus, enterprise-class workflow drives the process by delivering tasks and activities at just the right time.

- **Quality (ISO 9000, APQP, Six Sigma)** – Manufacturers who have embraced quality initiatives have realized tremendous financial and customer benefits. With shrinking margins and greater customer demand, the cost of quality can make the difference between profitability and loss. Windchill ProjectLink provides best practice quality templates that enable companies to more effectively execute cross-functional quality programs with consistency and repeatability.
- **Project/ program management** – Companies need the ability to effectively manage projects and programs in order to improve predictability and manage resources. Windchill ProjectLink provides the ability to both plan and execute projects by setting up Web-based workspaces with all the tools necessary for remote teams to work together. It utilizes a workflow engine to automate delivery and updates to project tasks, milestones, risks, etc. in order to move the project along and provide accurate real-time status to all levels of the project team. It manages hierarchical projects and programs, and provides real-time tracking of costs and resources.
- **Portfolio management** – Companies that are proficient at project and program management often seek to optimize the mix of projects across their enterprise, in order to invest resources in the most profitable and strategic projects. Windchill ProjectLink provides different views of the project, enabling managers and executives to view the entire group of projects in the pipeline. Resources can then be applied to the most appropriate projects to be efficiently executed – all within Windchill ProjectLink.

Valuable Business Benefits

Windchill ProjectLink makes it easy for a manufacturer to improve project collaboration and management within its product development process, which in turn can dramatically impact both the top-line revenue and bottom-line profitability. Given that new products are the primary drivers of revenue growth, and that an estimated 70-85% of product cost is committed during the product development process, it is essential that companies prioritize product development optimization initiatives and commit to driving excellence across their digital product value chain.

Giga Information Group recently completed a detailed study of the payback from collaborative product development projects, titled “Total Economic Impact of Collaborative Product Development”. Such collaborative solutions, Giga found, can help reduce travel-related expenses by 50-80% and document production and shipping costs by 90%. Most importantly, Giga found that collaborative solutions can reduce errors by as much as 50% and product development cycle times by a dramatic 40%.

Specifically, Windchill ProjectLink delivers a number of benefits:

- **Greater project team efficiency** – Streamlines project collaboration regardless of location, organization, and individual work style by providing easy access to project information, automating key processes, managing workflow, and proactively alerting team members to changes. Reduces rework costs and improves quality by avoiding the miscommunication and misunderstanding that frequently leads to mistakes. Customers have reduced data proliferation by 30%.
- **Faster time-to-market** – Enables product development teams to work faster by streamlining communication, making the latest information immediately available to all project participants, and eliminating time-consuming efforts to track down necessary information; allows for parallel processing and brings downstream people into the process for early issue identification and resolution; streamlines prototyping and

automates key business processes such as review. Customers have accelerated time-to-market by 15%.

- Lower project overhead costs – Reduces the need for “in-person” project status review meetings by providing an online, dynamic, and visible project schedule; saves travel expenses, overnight delivery expenses, and traditional project management administrative costs. Customers have saved hundreds of thousands of dollars in travel expenses.
- Greater innovation – Enables project teams to generate more ideas faster through real-time collaborative interaction with the extended product team, including customers, suppliers and partners, using tools such as discussion forums, and online visualization. Customers have eliminated 70% of physical prototypes.
- Shorter path to payback – Enables organizations to get up and running fast, and to capture the benefits and payback sooner, using Windchill ProjectLink’s Quick Start implementation and comprehensive out-of-the-box functionality.
- Investment protection – Works with existing tools that organizations may already have or will deploy, including CAD tools and Microsoft Project.
- Improved project visibility – Empowers all project team members to know who is doing what, when that work is scheduled for completion or review, what the current status is, and what is scheduled to come next.

Collaborative Project Management for Any Manufacturer

At one time, only the very largest manufacturers dared embark on IT initiatives designed to promote collaborative product development. Today, Windchill ProjectLink offers a quick, affordable and comprehensive solution for manufacturers of any size and delivers the comprehensive functionality every manufacturer needs to optimize its digital product value chain in an out-of-the-box fashion. With a new Quick Start program offered by PTC’s Global Services Organization (GSO), Windchill ProjectLink can be installed and configured for production usage via a predefined, fixed price implementation package. The Windchill ProjectLink Quick Start enables manufacturers to get Windchill ProjectLink up-and-running and delivering benefits in as little as two weeks.

PTC, along with its Enterprise Consulting Partners (ECP’s), offers additional value-added services to help companies create product development strategies, realign business processes, integrate legacy systems, and manage organizational change. These services help drive quicker application adoption and larger and faster ROI.

Windchill ProjectLink leverages PTC’s extensive product development experience. It is tightly integrated with Pro/ENGINEER, PTC’s industry-leading design solution. Windchill ProjectLink itself is powered by the proven Windchill Foundation architecture. Windchill ProjectLink is part of a complete suite of product lifecycle management solutions comprised of Web-based software with document management, visualization, workflow-driven best practice business processes, and pre-defined services and support packages. Offering “turnkey” functionality with minimal implementation effort required, these solutions blend PTC’s Pro/ENGINEER and Windchill technologies and are uniquely positioned to help manufacturers create, collaborate, and control product information throughout the development lifecycle. PTC’s solutions are built on a common platform offering tight interoperability around a single database and common services. The power of PTC’s solutions lies in their ability to work with one another to solve business problems throughout the value chain.

Having built its entire business on assisting manufacturers with product development challenges, no other company knows more, does more, or cares more than PTC when it comes to helping

companies win through product development.

Windchill ProjectLink Customer Examples

With several years of commercial availability under its belt, Windchill ProjectLink has proven its ability to dramatically improve collaborative project management at a variety of manufacturing companies worldwide. Here are some examples:

Design Collaboration:

Cannondale, a leading bicycle manufacturer, utilizes Windchill ProjectLink to collaborate with its remote design and manufacturing facilities. In the past, designs and specifications resided in local systems. It was difficult to locate the latest version and communicate design issues. Windchill ProjectLink provides a central repository for the most current design and manufacturing information. If an issue arises in manufacturing, for example, the manufacturing engineer can review and markup the latest drawing and submit it to the engineering team for rapid resolution. In addition, the design team can conduct a real-time, cross-functional Web meeting to discuss options and agree on the required changes. They can also include suppliers, if needed, to develop the solution. Results: the time to implement changes is reduced by 75%, and overall time-to-market has been reduced by 15%.

Business Process Automation:

Harman/Becker, a global leader in automotive sound systems, utilizes Windchill ProjectLink to automate their complete stage/gate new product introduction (NPI) process. In the past NPI was managed as a manual process, but Windchill ProjectLink enabled the company to automate and streamline the overall cross-functional process. In addition, the central project repository and discussion forums significantly improved communication among team members. The ability to route parts and documents for review and approval, and the ability to conduct real-time Web-based design and stage reviews, saved significant time and improved meeting attendance. Results: 30% reduction in email exchanges, and a 15% reduction in time-to-market.

"Windchill ProjectLink enables us to take control of our projects for developing automotive communication systems," said Joachim Kobinger, Vice President Product Engineering, Harman/Becker Automotive Systems. "We anticipate to improve communication with a significant reduction in email data exchange and data redundancy by implementing Windchill ProjectLink for more efficient team collaboration. Each project member – both internally and externally – has up-to-the-minute access to the most current project data. This improvement helps us avoid costly delays in product development, and has enabled us to get our products to market faster."

Manufacturers Need Help With Effective Collaborative Project Management

If you are a manufacturer, your customers probably know you best through your products. Accordingly, your most strategic and valuable assets are not your factories and production process, but your product development processes and the digital product content that determines what your products are, how they operate, what they cost, whether they'll be competitive, and ultimately what the customer thinks of your company. How well you master this critical asset will determine your success.

The value of product-related intellectual property increases exponentially when it is shared collaboratively for the purpose of enhancing the product innovation and product development process. The more effectively and efficiently it is shared and managed, the more valuable it becomes. As a manufacturer you are effectively in the IP (intellectual property) management business with your success riding on how well you create, collaborate, control, and leverage this

invaluable asset.

Successful product development today, indeed, is a team activity. Though it isn't easy, the companies that win are those that can assemble and effectively manage collaborative project teams across their own enterprises and beyond. Still, organizational boundaries, information silos, system incompatibilities, and communication delays threaten the best intentions of project teams at every turn. Manual solutions and piecemeal automation simply are not sufficient.

Leading companies around the world, recognizing the importance of enterprise collaborative project management, have turned to Windchill ProjectLink. They use Windchill ProjectLink to extend the efforts of their product development teams across the enterprise; to work jointly with suppliers, OEMs, and other partners; and even collaborate with customers. Collaborative project management is becoming the way that today's most successful organizations work.

Although optimizing the digital product value chain is not usually considered a manufacturer's core competency, it is a core competency of PTC. Our comprehensive PLM solutions enable companies to create detailed, intuitive, and realistic digital product information; to collaborate so as to incorporate early input from various participants to identify and resolve critical issues; and to control and automate critical processes such as release to production, change control, and configuration management. With more than 17 years of experience and tens of thousands of successful customers, PTC is a leader in helping manufacturing companies achieve maximum value from their product development activities.

For More Information

For more information about Product First or PTC's PLM solution set, please visit PTC on the Web at <http://www.ptc.com>.

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