How Dell Accelerates Product Development Worldwide

Using PTC Pro/ENGINEER and Windchill Software

For more than a decade, Dell has designed and developed industry-leading hardware platforms using PTC® Pro/ENGINEER® Wildfire™ computer-aided design (CAD) software running on Dell Precision™ workstations. To advance its worldwide data management and collaboration, Dell recently deployed PTC Windchill® content and process management software on Dell™ PowerEdge™ servers, Dell/EMC storage area networks, and Dell PowerVault™ storage systems. This approach streamlines the global product development process—helping to improve business agility and accelerate time to market.

Dell is no stranger to global product development. In fact, Dell has five globally distributed design centers, eight original design manufacturers (ODMs) in nearly a dozen locations, and numerous remote team members all contributing to the design and development of its industry-leading hardware platforms. Despite the complexity of this worldwide product development effort, Dell has a consistent track record of meeting its product release dates, and Dell products have been regularly hailed as technology leaders.

For more than a decade, Dell has relied on PTC Pro/ENGINEER Wildfire computer-aided design (CAD)
software running on Dell Precision workstations to design complex products and manage product information and development processes effectively. Recently, to advance communication and collaboration across its geographically distributed design centers, Dell deployed PTC Windchill content and process management software on Dell PowerEdge servers, Dell/EMC storage area networks (SANs), and Dell PowerVault storage systems. Windchill facilitates the central management of product data, streamlines and automates processes, and allows expanded yet secure access to product information—all of which contribute to increased efficiency and reduced time to market. In the future, Dell plans to extend its deployment of Windchill to facilitate comprehensive product life-cycle management (PLM) from concept all the way to servicing.

This article describes how Dell uses PTC products and solutions to enhance the product development process throughout its organization—including Pro/ENGINEER Wildfire CAD solutions for product design and Windchill content and process management software for collaboration. By running PTC software on its own standards-based workstations, servers, and storage systems, Dell is laying the foundation for a comprehensive, highly scalable PLM system.

Using PTC Pro/ENGINEER Wildfire for product design

Dell has used PTC Pro/ENGINEER software successfully in regional product design centers for more than a decade. Currently, Dell deploys hundreds of Dell Precision M90, Dell Precision 490, and Dell Precision 690 workstations running the Microsoft® Windows® XP OS and Pro/ENGINEER Wildfire CAD software to design and develop the entire Dell product line—including servers, workstations, desktops, notebooks, printers, and even televisions (see Figure 1). Pro/ENGINEER Wildfire offers several key features, including sophisticated 3-D modeling and simulation capabilities, an integrated architecture that supports the design process all the way from concept to manufacturing, and automated generation of associative tooling design, assembly instructions, and machine code.

By deploying Pro/ENGINEER Wildfire on standards-based Dell Precision workstations running Microsoft Windows, Dell can scale product design and development efforts quickly and cost-effectively in response to changing business requirements around the globe.

Targeting efficiency improvements

Rapid growth required the Dell regional design centers to work together as efficiently as possible to develop new products. However, the legacy system Dell had relied on to manage its product development efforts was not designed to support global collaboration. As a result, communication across design centers and with ODMs had become too time-consuming to keep up with business requirements to reduce both product development cycles and time to market.

In particular, because each design center managed its own data and processes, sharing product information and coordinating management tasks interactively could be challenging. For example, to share CAD data between different design centers, the legacy system relied on nightly FTP or e-mail file transfers from one design center to another—meaning that an FTP or e-mail failure could delay the transfer of critical data. Also, management tasks such as routing, review, and approval were performed on an ad hoc basis, which also had the
potential to result in delays. And because the legacy system did not provide a standard way of managing global access to product information, accessing that information could be slow and cumbersome for partners and non-engineers.

**Implementing PTC Windchill content and process management software**

To help make its overall product design and development efforts as efficient as possible, Dell implemented PTC Windchill 8.0 content and process management software in August 2006. Windchill, a suite of products specifically designed to facilitate product development in a global environment, offers several compelling features and capabilities, including the following:

- **Single product-data repository**: Windchill uses a single repository for all product data, including both electronic and mechanical CAD (ECAD and MCAD) models, software builds, bills of material, configurable product structures, and other related documents—avoiding the need to manually transmit product data using FTP or e-mail from site to site.

- **Comprehensive process management**: Windchill facilitates process management throughout the product life cycle, allowing organizations to streamline key functions such as change management, configuration management, project management, and release management.

- **Sophisticated security and access controls**: Windchill includes comprehensive security and access controls, allowing expanded yet managed access for partners and non-engineers such as product marketing managers.

- **Global scalability**: Windchill is Web based, enabling engineers and non-engineers alike to access product data in a simple, easy-to-use way from anywhere in the world without having to install custom client software.

- **Out-of-the-box integration with PTC Pro/ENGINEER Wildfire**: Windchill software is fully integrated with Pro/ENGINEER Wildfire, helping eliminate the need for manual software integrations.

Dell deployed Windchill at its corporate design center in Austin, Texas; users at remote design centers, ODM facilities, and other locations can access the system through a simple Web-based interface. Although product data is centralized at the corporate design center in Austin, Dell utilizes PTC replication technology within Windchill to push large data sets to its design centers’ cache servers to help increase regional performance.

**Deploying PTC Windchill on Dell PowerEdge servers and a Dell/EMC SAN**

Figure 2 shows an example design center deployment that would help facilitate the global collaboration necessary for a large product development organization such as Dell’s. It comprises a farm of Dell PowerEdge servers running the Red Hat® Enterprise Linux® Server.
Linux® OS and PTC Windchill PDMLink® software for product-data management and PTC Windchill ProjectLink™ software for project management. Supporting the Windchill applications are two additional PowerEdge database servers, each running the Red Hat Enterprise Linux OS and Oracle® database software.

To help maximize system uptime, key elements of the infrastructure are duplicated to facilitate failover in case of system failure. For example, the main Oracle database server is replicated to a backup Oracle database server, also deployed on a PowerEdge server. In addition, load-balancing switches not only optimize the performance of the Windchill application servers, but also help ensure application server availability. Finally, the load-balancing and IP switches themselves are duplicated.

A Dell/EMC CX3 SAN provides a central product-data repository to help manage the several terabytes of CAD data and other product information typically generated by a large product development organization. To support fast and efficient access to product data at remote design centers, product data is cached locally at each design center on PowerEdge servers.

**Accelerating time to market**

Since implementing PTC Windchill, the Dell product development team has reported improvements in efficiency that are expected to help shorten time to market for new products and reduce overall global development costs. Thanks to a centralized product-data repository and streamlined process management, Dell engineers can communicate and collaborate quickly and effectively with colleagues around the world using standardized, automated processes for routing, review, and approval.

Moreover, the advanced security and access features of Windchill enable Dell to extend access to product information beyond the engineering department, facilitating the review of new products earlier in the design cycle and enabling faster creation of prototypes than could be accomplished with the legacy system. Now, non-engineers such as product marketing managers can access product data from a simple, secure, Web-based interface—avoiding the need for engineers to spend time manually extracting information. And Dell partners such as manufacturers and tooling houses have controlled, Web-based access to the product information they need—enabling them to easily and rapidly manufacture product prototypes.

Deploying Windchill on high-performance, industry-standard Dell PowerEdge servers in a centralized location enables the Dell team to simplify operations, improve resource utilization, and scale in cost-effective increments—enhancing productivity while easing administration and maintenance tasks. In this way, Dell anticipates that Windchill will contribute to significant cost savings in the coming years. For example, Windchill uses the Web for client access to centralized resources, so Dell does not have to maintain separate systems at each regional design center and consequently does not have to install and maintain client applications at each regional design center. And because the Windchill architecture is highly scalable, Dell is confident that it will support aggressive growth of the Dell product development organization.

**Enhancing business agility**

Ultimately, Dell plans to expand its deployment of PTC Windchill to facilitate comprehensive PLM from concept all the way to servicing. With PLM, Dell hopes to integrate its entire range of off-the-shelf and custom-built product development applications into a single solution that will enable Dell and its partners to manage global product development more effectively than ever before.

A PLM solution based on PTC Windchill software and Dell hardware allows Dell to quickly and effectively incorporate customer feedback into new products; improve collaboration across departments such as engineering, customer service, and sales; and further streamline processes such as regulatory compliance and prototype creation—all of which Dell expects will lead to improved customer satisfaction and reduced time to market.

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