

Dell Computer Streamlines Its Vital PLM Processes

Dell has achieved dramatic success streamlining its product data management activities to product life cycle management. Its ability to keep the project focused on core business processes has yielded short time to value.

Core Topic

ERP II, HR, Supply Chain and Manufacturing: Engineering and Manufacturing — Strategies, Applications and Technologies

Key Issue

How will successful enterprises select, deploy and manage plant operations and engineering solutions to minimize risk and achieve optimum ROI?

This case study demonstrates that careful selection of the scope and focus of IT projects is critical to delivering timely business value. Deploying a focused application across an enterprise can quickly reduce the effort needed to improve a vital business process; however, it can also exacerbate data-sharing problems and increase the strain of workflow between multiple business processes enabled by different applications that depend on each other. On the other hand, a broad IT initiative can address long-term issues of data sharing and workflow, but the extra time and cost required to deploy it might make an enterprise suffer more than the potential benefit of broader integration is worth. This is particularly true if the enterprise faces time pressure to improve a vital business process.

In 2000, Dell Computer faced these trade-offs as part of its constant efforts to improve its supply chain processes. In this case, it improved its product data management (PDM) capabilities, most notably its engineering change management (ECM) processes, internally and across the supply chain. In addition to streamlining the engineering workflow, this IT effort was key to building a foundation that can enable more-efficient product life cycle management (PLM). The goal of PLM is to manage the stages of a product's life to improve business performance. PLM depends on PDM for timely and accurate information about the status of a product definition.

Problem: Dell determined that it needed to reduce costs associated with managing product data and improve its engineering change workflow — internally and across the supply chain — as part of its ongoing efforts to improve business performance. The established infrastructure and processes were supported by internally developed applications to define products and manage bills of material (BOMs), manage related documentation and support ECM. As the enterprise continued to

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grow, it was becoming harder to monitor and control product development and production startup. Dell sought to address these issues before they became widespread.

Objective: As a cornerstone of Dell's strategy, engineering management recognized the importance of adopting standard software and processes for the workflow from design through manufacturing implementation. The scope of the effort required the inclusion of suppliers and manufacturing sites; otherwise, Dell would face increasing challenges with the timeliness and accuracy of product data. These problems could, in turn, create product quality problems, as well as unacceptable levels of scrap, rework and material shortages, resulting in inefficiencies in a highly competitive market.

By improving these processes, Dell hoped to discover opportunities to further reduce material costs. For a company that ships more than 4 million PCs per quarter, small material savings per PC can improve the bottom line significantly. Key objectives included:

- Enabling consistent engineering change workflow globally across Dell and suppliers
- Improving data integrity, as well as the timeliness and accuracy of product data
- Reducing engineering change cycle times
- Increasing the automatic reuse of product data across multiple applications, while eliminating the need for data re-entry.
- Reducing the workload required for product configuration management
- Detecting product data errors before they reach manufacturing
- Integrating with established applications, such as Dell's sales configuration tool for servers and storage devices in the United States
- Reducing system downtime
- Improving user acceptance and use of enterprise-standard software

Dell was concerned about the time and cost for such an effort. Based on its own knowledge and anecdotal evidence, the company was aware that such large-scale initiatives typically require more than a year to accomplish. On occasion, they may take many years, at great expense, and with the risk of

unsatisfactory results. In the fast-paced PC industry, failure could have hurt the company's ability to compete.

Approach: Dell decided to replace its internally developed infrastructure for PDM with a commercial, Web-based software that would support product definition, configuration management, and ECM across the enterprise and the supply chain. During 2000, the stewards of product data, Dell's Product Group Configuration Management (PGCM) team, drove this effort in conjunction with the engineering services project team. Meetings with senior executives reaffirmed the need for the project, reinforced corporate commitment, and confirmed the goals, scope and expected results from this initiative. Enterprisewide awareness of this support from senior executives encouraged cooperation from all affected groups.

Central to this strategy was Dell's decision to focus on the IT capabilities that would be useful to improving its infrastructure. It focused on secure document and file management, BOM creation, product configuration management, ECM, and the Web-based ability to coordinate these activities across Dell's global operations and with suppliers. Although Dell recognized that supporting multiple types of workflow could be valuable, it decided to streamline workflow options during the initial deployment of software.

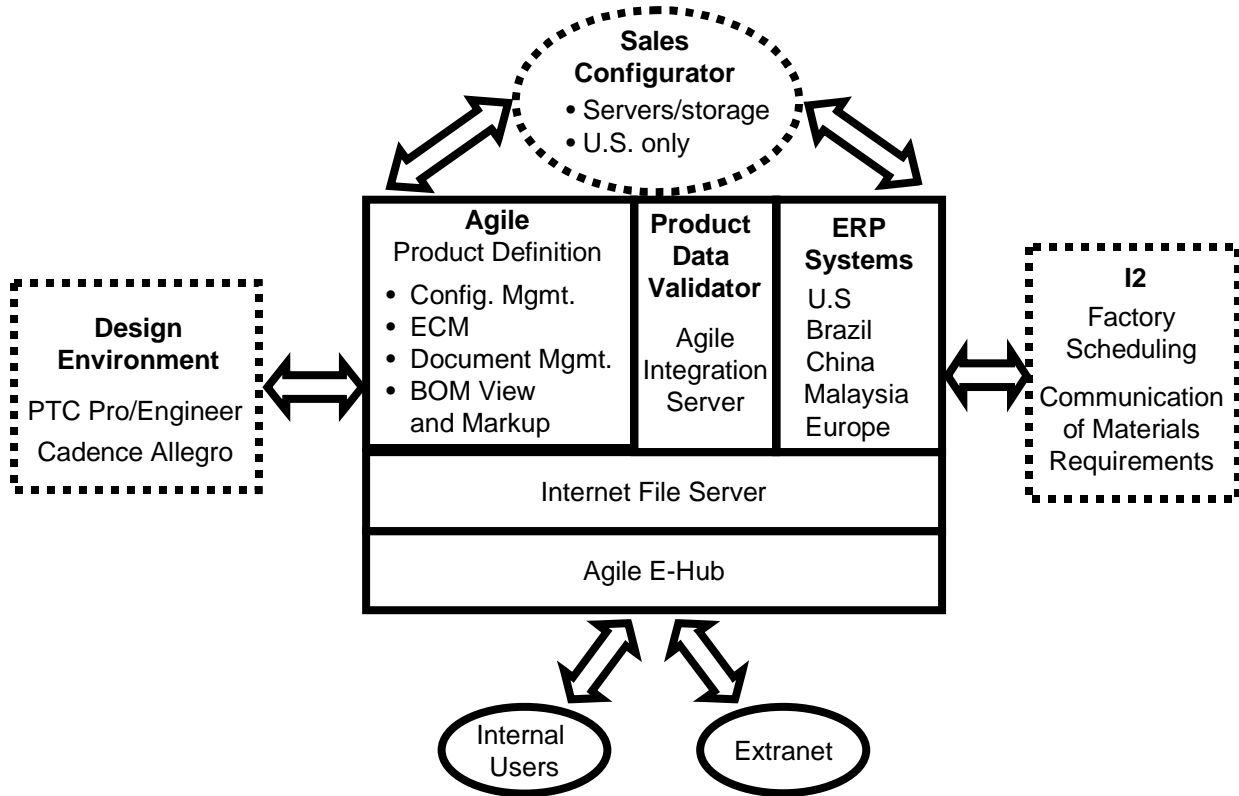
After exploring options with major systems integrators (SIs) and suppliers of PDM applications, Dell decided to partner with Agile Software and to support the effort with an internal team dedicated to the deployment. Dell adopted this approach because:

- Agile addressed the major focus points of this initiative
- During the evaluation process, Agile instilled the greatest confidence that Dell could work with it to deploy in the Dell environment
- Given their knowledge of engineering processes and software, an internal deployment team from Dell would deliver a more-economical and timely solution than those proposed by SIs

Figure 1 depicts the upgraded infrastructure. At the core, the e-hub and the Internet file server provide the backbone for archiving and sharing electronic files securely across the Internet. The product data validator and the Agile integration server provide the interface between Agile and Dell's enterprise resource planning (ERP) environments worldwide, as well as to its sales configurator for complex servers and storage devices in the United States. By integrating Agile with its sales configuration validation tool, Dell enabled its U.S.-based sales department to

automatically validate server and storage device configurations based on engineering technical attribute data housed in the Agile tool.

Figure 1
Dell's IT Environment to Manage Product Definition and Configuration Data



Source: Gartner Research

Dell executed the bulk of the deployment in two phases. The first enabled Agile as the system of record for 2,500 internal users and 37 of Dell's top 50 suppliers. More than 250,000 part numbers and 20,000 documents were converted from the legacy database into Agile's software environment. This phase lasted seven months (from March 2000 through October 2000) and cost between 200 percent and 250 percent of the software's purchase price. Nonsoftware costs comprised Agile's consulting services, the time of internal team members, travel and ancillary software support for the Web-based environment, including extranet support. On 1 October 2000, Dell went live on Agile as the product change system of record to manage all product platforms.

During the second phase of the deployment (from October 2000 to June 2001), Dell added 800 users and 63 suppliers to the system. It improved interfaces with ERP systems and developed the data validator with Agile's Software Development Kit. The data validator checks product data accuracy, compliance with local manufacturing conditions and the compatibility of translated

data with local ERP data formats. Further steps in this effort will involve refinement of the workflow internally and with suppliers.

Results: The initiative reduced the product development cost structure by improving the timeliness and accuracy of product data and ECM processes across Dell and its supplier network. Dell achieved most of these benefits during late product design stage (just before manufacturing begins). This is the point in the product life cycle with the greatest volume of engineering change to manage internally — it is the point in time at which suppliers have the greatest risk of error. Dell reduced the resources necessary to process engineering changes by more than 30 percent. The average time to process an engineering change dropped by 50 percent. Thirty percent fewer people are needed for configuration management globally, since employees are able to process four times as many engineering changes as they had done previously. This enabled personnel to be redeployed to other critical tasks throughout the product's life cycle.

Improvements in the accuracy and timeliness of data reduced unnecessary scrap and rework. On average, Dell processes more than 4,000 changes monthly on more than 20,000 parts. The data validator traps more than 8,500 errors each month. This has substantially reduced the amount of personnel required to intervene on the translation of product data to ERP systems.

Critical Success Factors/Lessons Learned: An enterprisewide IT project does not have to be broad to deliver value. Such an initiative should focus on the business processes with the greatest impact. Dell achieved a rapid time to value seen across the enterprise because it focused the effort on a vital business process.

Software tools with the greatest breadth of off-the-shelf functionality do not necessarily offer the best solution for the enterprise. Dell compared Agile's Product Collaboration module to applications with greater scope and selected Agile because it was the best fit for the business processes to be addressed.

The user and vendor must coordinate the quality assurance effort. More regression testing and greater quality assurance effort would have saved additional time and money.

Standard, but imperfect, workflow is more-efficient than attempting to implement ideal, but complex, workflow. Agile supported much of what Dell wanted in workflow as part of its packaged software; however, it was not ideal across the enterprise. This standard, but imperfect, workflow support significantly contributed to the success of this effort.

Acronym Key

BOM	Bill of material
ECM	Engineering change management
ERP	Enterprise resource planning
PDM	Product data management
PGCM	Product Group Configuration Management
PLM	Product life cycle management
ROI	Return on investment
SI	Systems integrator

The PGCM and project teams had the support of Dell's senior management before beginning this project. The project would have encountered greater resistance without the corporate sanction.

Bottom Line: Manufacturers should carefully define the scope of their enterprisewide PDM and collaboration software deployments to achieve fast time-to-value. Dell achieved clear business benefits on time and on budget because it stayed focused on the vital business processes that needed to be improved and avoided expansion of the project.