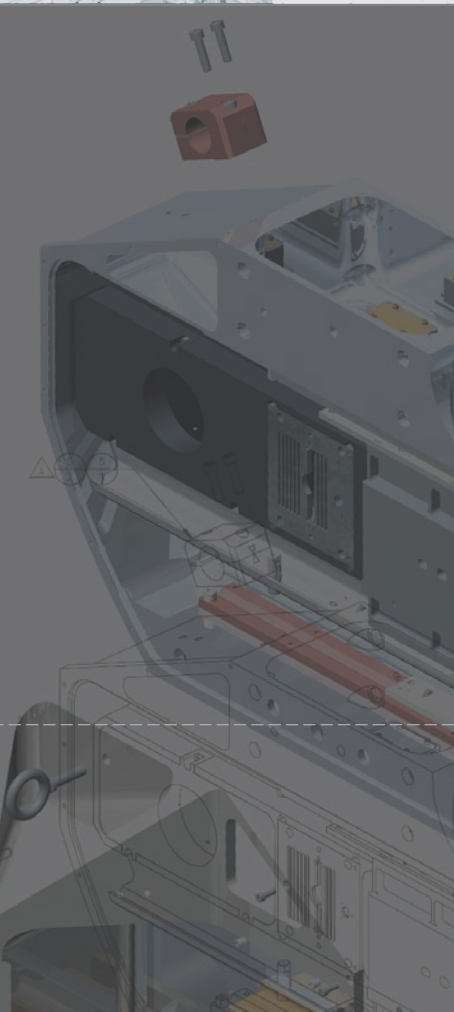


# PDM Made Easy for the Mainstream Enterprise



## SUMMARY

SolidWorks® Enterprise PDM software helps today's information-rich, 3D product development organizations control, manage, and share the growing volume of diverse product design data they generate through the use of better, more automated CAD tools. This effective product data management (PDM) solution was specifically designed to be easy to implement, simple to use, and affordable for small and midsize manufacturers. With SolidWorks Enterprise PDM, mainstream companies can better meet their product development goals.

## Introduction

Most product developers know that implementing modern computer-aided design (CAD) tools not only improves productivity, but also helps achieve their goals of accelerating time-to-market, shortening design cycles, reducing development costs, and improving product quality. From the earliest application of 2D design tools to the growing use of 3D solid modeling systems, CAD technology has made a dramatic impact on product development, improving efficiency, quality, and innovation. Along with the greater productivity that CAD automation provides, product development organizations face a whole new set of challenges. These include managing, controlling, and sharing the incredible influx in the volume and diversity of product design data that engineers now create through the use of better and more automated design tools.

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An effective PDM system does more than simply fulfill the role that documentation management systems played in the past. It also represents a critically important next step for maximizing the productivity benefits of CAD automation across product development stages and throughout the extended enterprise.

Designing products in the digital age demands an easy-to-use, efficient, and cost-effective product data management (PDM) solution. This PDM system not only must support the creation and control of increasing amounts of diverse types of 3D product design data, but also must foster collaboration across design teams and with external partners. An effective PDM system does more than simply fulfill the role that documentation management systems played in the past. It also represents a critically important next step for maximizing the productivity benefits of CAD automation across product development stages and throughout the extended enterprise.

In the old days, when designers created 2D engineering drawings of product designs on drafting tables, managing product design data was a fairly straightforward process of collecting, cataloging, and safeguarding paper drawings in storage cabinets. Most manufacturers devised systems for organizing and controlling engineering drawings for documentation, design reuse, and collaborative purposes, generally by categorizing drawings by number. Larger companies even had formal “drawing cages,” which a documentation manager or an administrator would staff and operate. These paper document management systems typically used request cards, or sign-out sheets, along with a paper index system to keep track of a drawing’s physical location as well as its status regarding revisions, errors, release for production, and approvals.

In many ways, the differences between using a paper document management system and working with a Windows®-based PDM system—such as SolidWorks Enterprise PDM software—are analogous to locating library materials with a card catalog versus finding the information via an online search engine. Paper document management systems are time- and labor-intensive, as well as prone to error since drawings can end up missing or misfiled. In addition, they discourage collaboration and design reuse because only one person at a time can sign out a drawing. Plus, sharing the information with colleagues or partners requires copying prints, mailing drawing tubes, or sending hard-to-read faxes.

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Managing assemblies, parts, and drawings requires careful adherence to procedures for file naming and an elaborate process for creating new folders.

While some product development organizations continue to use a paper system, others take advantage of the Windows operating system to create “project folders” and “shared drives” to manage drawings and revisions. Although this type of drawing management system improves access to design data, it also creates additional control problems. Knowing who is working on a file, what the design status is, what the correct revision is, or whether someone has overwritten or accidentally deleted a file are not issues that any product developer wants to face. To avoid these types of problems, some companies have implemented electronic drawing management systems. While that approach to data management may suffice for the management of flat 2D drawing files, it is woefully insufficient for managing the expansive, information-rich world of 3D design.

Besides providing a wealth of productivity-enhancing benefits, 3D design and analysis tools create unique data management challenges. Unlike flat, distinct, and autonomous drawing files, 3D files contain many references, associations, and interrelationships that link them to other files. These parts, drawings, bills of materials (BOMs), multiple configurations, analysis results, and assemblies need to be managed, preserved, and safeguarded.

Revising a 3D file or collaborating with other engineers on different parts of a 3D assembly involves much more than updating a single file. It demands an effective PDM system for controlling access to data, recording design changes to files, and managing the ramifications of those changes on other linked files. Working in 3D, a PDM system is virtually mandatory. When a change to a file is made, the PDM system helps to ensure that the resulting ripples created throughout the associated design data are necessary and desired, rather than haphazard and costly.

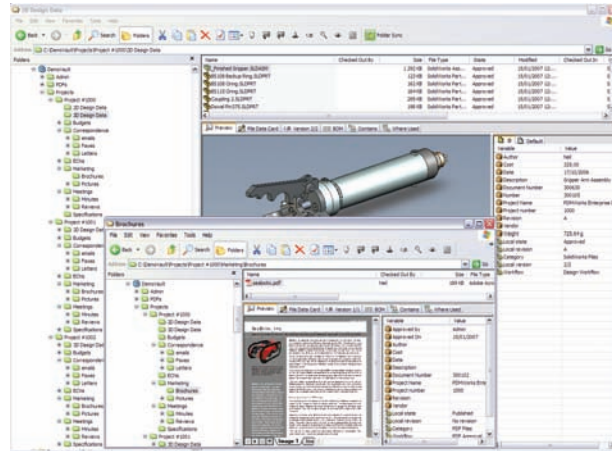
In design environments larger than a single user, it is nearly impossible—and definitely impractical—to manage 3D design data effectively with the “project folder” and “shared drives” approach. Managing assemblies, parts, and drawings requires careful adherence to procedures for file naming and an elaborate process for creating new folders. For a manufacturing company to maximize the power of 3D CAD technology, boost productivity, foster collaboration, and utilize valuable 3D design data to its fullest extent, product developers need a simple, easy-to-use solution like SolidWorks Enterprise PDM.

### **Managing product design data simply, securely**

While the need for a simple, secure PDM solution for managing the diversity of 3D product design data within a workgroup or across the enterprise is apparent, the right PDM solution eluded many manufacturers until the introduction of SolidWorks Enterprise PDM software. Many of the early PDM systems were expensive, inflexible, poorly designed, and training-intensive, or they required an army of consultants and months or years of work to implement. Companies that tried to institute other PDM applications often

had bad experiences, leading to negative perceptions and real barriers to the widespread adoption of valid PDM solutions. As a result, some product developers still believe, incorrectly, that PDM takes too long to implement, carries a steep learning curve, requires huge investments in customization and infrastructure, forces companies to work according to the software's process instead of their own, and ushers in a range of CAD compatibility issues.

With the introduction of SolidWorks Enterprise PDM software, SolidWorks Corporation has completely changed the PDM paradigm by creating a simple, efficient, affordable solution to meet the PDM needs of any mainstream product development organization.



THE SOLIDWORKS ENTERPRISE PDM INTERFACE IS INTUITIVE, PROVIDING UNMATCHED INTEGRATION WITH WINDOWS EXPLORER.

With the introduction of SolidWorks Enterprise PDM software, SolidWorks Corporation has completely changed the PDM paradigm by creating a simple, efficient, affordable solution to meet the PDM needs of any mainstream product development organization. Manufacturers need technology to manage product design data, not another piece of software that requires significant training or extensive implementation schemes. They need a PDM solution that can be quickly implemented, easily administered, and successfully deployed as an accessory function to their existing product development platform. SolidWorks Enterprise PDM software differs from previous PDM applications because the software was developed with these mainstream requirements in mind.

SolidWorks Enterprise PDM is the first and only commercial PDM system that is completely integrated within Windows Explorer. Because designers, engineers, and other business professionals already know how to access and manage files using Windows Explorer on their own computers, SolidWorks Enterprise PDM was designed to take advantage of this existing familiarity. Users perform all functions within SolidWorks Enterprise PDM either through Windows Explorer or, in the case of engineers, from within the SolidWorks CAD system. As a result, SolidWorks Enterprise PDM software has no proprietary user interface to learn—it provides the easiest, fastest, and least expensive solution for implementing PDM.

Throughout the product development lifecycle, SolidWorks Enterprise PDM software tracks and records every event, each design stage, and every version that impacts a specific set of design data. In addition to managing

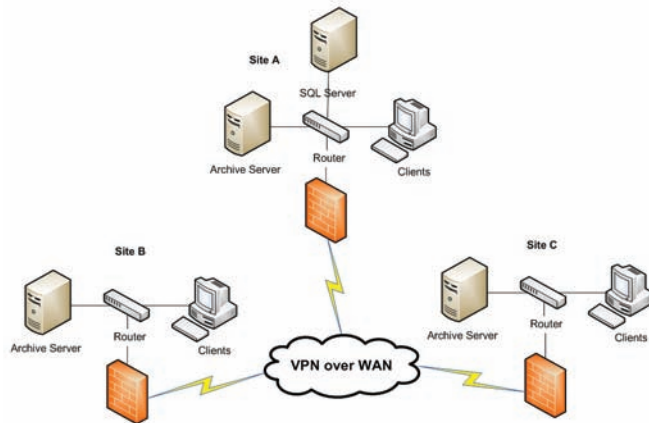
CAD files of parts, assemblies, and drawings, the system also manages any other pieces of related SolidWorks and AutoCAD® design data, such as Excel spreadsheets of photorealistic renderings, SolidWorks eDrawings® files (compact, self-extracting drawings for email delivery), SolidWorks Simulation analysis results, Microsoft® Word documents, emails, and graphics files. SolidWorks Enterprise PDM allows product developers to securely manage product design data, effectively control access, and virtually eliminate the potential for PDM-related errors or loss of data.

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### Managing collaboration around the world, across the enterprise

Supporting and encouraging design collaboration, design reuse, and increased cooperation among previously isolated departments, customers, and external partners are important components of an effective, mainstream PDM system. SolidWorks Enterprise PDM allows manufacturers to set up, administer, and adjust the characteristics of their vaults to meet their unique development requirements. Replicating portions of the SolidWorks Enterprise PDM vault to different servers, or providing secure web access to design data at the user level, enables product development organizations to support collaboration anywhere in the world.



WITH SOLIDWORKS ENTERPRISE PDM, COLLABORATION TAKES PLACE ON A GLOBAL SCALE.

A group of designers in the United States, for example, can access and reuse designs developed by engineers at a European sister company to create a product for the American market. With SolidWorks Enterprise PDM in place, design engineers anywhere in the world can safely collaborate on the same design simultaneously, or can make derivations from previous designs, without the risk of overwriting, deleting, or otherwise damaging valuable design data. As a result, distributed global design teams are becoming more commonplace among multisite, multinational companies. SolidWorks Enterprise PDM supports this distributed design environment, eliminating the shortcomings inherent to moving large amounts of data over a WAN (wide area network).

Through the Windows Explorer-based interface, SolidWorks Enterprise PDM provides manufacturers with the flexibility and ability to manage access to design data by other departments—such as marketing, purchasing, and manufacturing. Processes that once occurred sequentially can now take place in parallel, further boosting productivity and speeding time-to-market. Marketing can access photorealistic renderings to conduct field research, produce brochures, and create webpages much earlier in the process. Purchasing can access drawing files to solicit quotes for components, materials, and services more quickly, while manufacturing can access BOMs and complete production planning more efficiently.

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SolidWorks Enterprise PDM also provides the opportunity to open up portions of a design vault to customers and external partners. In many industries, customer input is a vital part of the product development process. Providing controlled customer access to specific pieces of design data can contribute to moving the development process forward. Manufacturers can also make select portions of the vault available to contractors, suppliers, and external partners to further improve communications and collaboration. With the proper permissions, production specialists in China, for example, can access design data from vaults located anywhere in the world to resolve manufacturing issues.

### **Streamlining development via automated workflow, systems integration**

Every manufacturer has its own distinct business processes for developing products, which an effective PDM system can help to automate. Specific protocols for handling design reviews, issuing release-for-production approvals, and processing engineering change orders (ECOs) are examples of the important business processes that constitute a product development organization's "workflow."

While many PDM solutions attempt to impose a standardized workflow process on all manufacturers, SolidWorks Corporation recognizes that the series of business processes a product development effort follows can differ as greatly as the types of products under development. Instead of forcing a product development organization to adopt workflow processes based on some standard protocol, SolidWorks Enterprise PDM is flexible enough to document and enforce a manufacturer's specific and unique approach to developing products. Because SolidWorks Enterprise PDM is fully configurable, it provides the ability to automate an organization's workflow and approval processes today and to adapt and keep pace as procedures evolve over time.

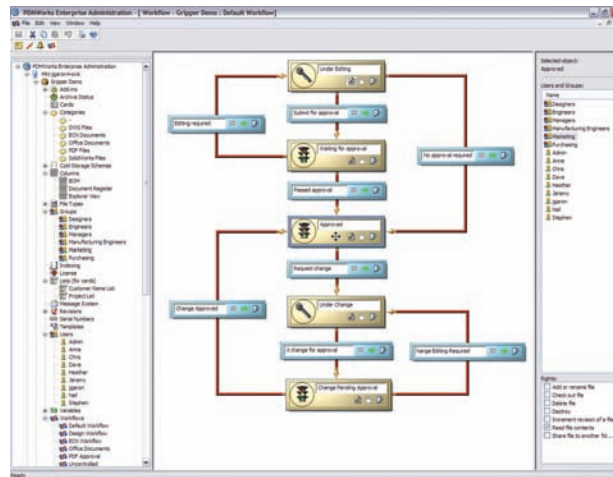
With a mainstream PDM system like SolidWorks Enterprise PDM, manufacturers can automate workflow. The system ensures that all employees adhere to a company's own designated processes, and SolidWorks Enterprise PDM provides the tools for defining and formalizing the organization's approach to developing products. Well-defined processes, combined with the system's built-in notification capabilities, ensure that the right people review and approve product designs and changes, as well as release designs for production, at the right time. The workflow functions of SolidWorks Enterprise PDM enable users

and personnel at local and distributed locations to become active participants in product development, design reviews, engineering change orders, quote approvals, and other product development-related processes.

SolidWorks Enterprise PDM contains customizable workflow diagrams that define the path which product design-related information must follow through the various stages of a manufacturer's specific development process. It also specifies the responsible individuals and the data access rights—such as read, modify, and approve—that they need to perform their specific functions. Automatic notifications prompt personnel to perform required actions at a specific stage. Furthermore, overall company workflow status reports can show key metrics about the number of workflows in process, the state of progress for each workflow, who is responsible, and more.

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SOLIDWORKS ENTERPRISE PDM PROVIDES TOOLS FOR CUSTOMIZING WORKFLOW DIAGRAMS TO DEFINE AN ORGANIZATION'S SPECIFIC, UNIQUE PROCESSES.

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A mainstream PDM system like SolidWorks Enterprise PDM gives product development organizations the tools they need to manage workflows, automate critical cycles, streamline operations, drive innovation, increase overall effectiveness, integrate systems, and accelerate time-to-market.

Connecting SolidWorks Enterprise PDM with existing business applications, such as material resource planning (MRP) and enterprise resource planning (ERP) systems, can provide additional operational efficiencies, eliminate duplicated efforts, and further reduce the potential for errors. The open system architecture of SolidWorks Enterprise PDM, utilizing Microsoft SQL Server™ and its own standards-based, comprehensive (COM, Visual Basic®, C+®) application programming interface (API), enables manufacturers to integrate with other business systems, such as SAP and Microsoft Dynamics.

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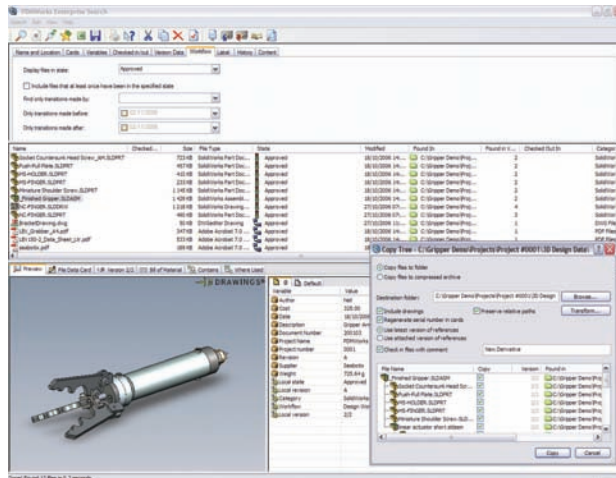
## Intelligent use, search, and audit capabilities

While securing, managing, and safeguarding 3D product design data are important functions of any PDM application, finding and reusing product designs or documenting specific product development processes are equally important requirements for an effective mainstream PDM system. From a design engineer's perspective, having the ability to find and view design-related documents, models, and files quickly and effortlessly may even be the most immediately recognizable benefit of implementing a PDM system.

The robust, intelligent search capabilities of SolidWorks Enterprise PDM make it easy to find design information based on file names, contained data, attached metadata, workflow state, or other predefined search characteristics. SolidWorks Enterprise PDM facilitates design reuse by enabling manufacturers to classify, organize, and group design information for quick search and retrieval. By assigning specific searchable attributes for every file, project, and product design on individual system data cards, manufacturers ensure that design engineers and other product development personnel can always find and access any piece of design information they may need.

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ROBUST, INTELLIGENT SEARCH TOOLS ENABLE USERS TO FIND ANY PIECE OF DESIGN INFORMATION THEY NEED.

To make finding the required file even easier, SolidWorks Enterprise PDM employs the same thumbnail-viewing capability employed in Windows Explorer, providing a quick eDrawings-enabled preview of models, drawings, and images. With this capability, users do not have to open and close a whole list of files to find the specific piece of information they need. Instead, they can quickly scan the SolidWorks Enterprise PDM search window to locate the exact file.

Moreover, SolidWorks Enterprise PDM automatically captures a complete, accurate, and detailed audit trail—from start to finish—for every product, assembly, and component an organization develops. Creating an audit trail also helps manufacturers governed by special regulations, such as the International Standards Organization (ISO) and US Food and Drug Administration (FDA) requirements, to achieve compliance more efficiently.

## Conclusion

Implementing modern, information-rich 3D design and analysis tools can produce significant productivity gains that can help product development organizations achieve their goals of shortening design cycles, decreasing development costs, improving product quality, and accelerating time-to-market. However, to maximize the power of 3D CAD technology, foster collaboration, and utilize valuable 3D design data to its fullest extent throughout a manufacturing organization, product developers need a simple, easy-to-use PDM solution.

With the introduction of SolidWorks Enterprise PDM software, SolidWorks Corporation has completely changed the PDM paradigm by creating an easy-to-use, efficient, and affordable solution to meet the PDM needs of any mainstream product development organization. In addition to managing CAD files of parts, assemblies, and drawings, the system manages any other pieces of related design data, while supporting collaboration around the world and throughout the extended enterprise. With SolidWorks Enterprise PDM, product developers can securely manage product design data, effectively control access, and virtually eliminate the potential for PDM-related errors or loss of data.

A mainstream PDM system like SolidWorks Enterprise PDM also gives product development organizations the tools they need to manage workflows, automate critical cycles, streamline operations, drive innovation, increase overall effectiveness, integrate systems, and accelerate time-to-market. The system facilitates design reuse by enabling manufacturers to classify, organize, and group design information for quick search and retrieval.

SolidWorks Enterprise PDM software automatically captures a complete, accurate, and detailed audit trail—from start to finish—for every product, assembly, and component an organization develops. The system's auditing capability automates the process of making design modifications, adding new features, or identifying design errors or potential issues. It can also help medical device manufacturers decrease the overhead associated with meeting their regulatory documentation compliance obligations, while reducing the risk of noncompliance at the same time.

Managing product design data efficiently has become an important requirement for gaining a competitive edge. SolidWorks Enterprise PDM software provides the easiest, fastest, and least expensive solution for effectively implementing an information-rich PDM system.



SolidWorks Corporation  
300 Baker Avenue  
Concord, MA 01742 USA  
Phone: 1 800 693 9000  
Outside the US: +1 978 371 5011  
Email: [info@solidworks.com](mailto:info@solidworks.com)

[www.solidworks.com](http://www.solidworks.com)