



SERVICES & SUPPORT

PROCESSES & INITIATIVES

# Pro|ENGINEER®

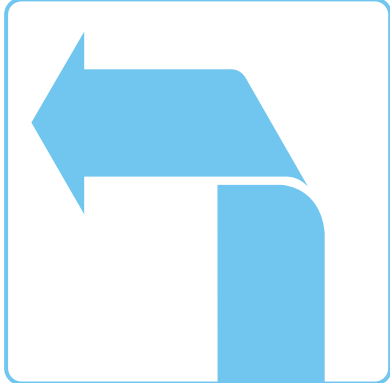
SOFTWARE PRODUCTS

INDUSTRY SOLUTIONS





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# Pro|ENGINEER®

SOFTWARE PRODUCTS


INDUSTRY SOLUTIONS



**Integrated 3D CAD/CAM/CAE Software**  
One Platform. Maximum Power. Any Size Company.

# Pro/ENGINEER®

The most effective way to develop and define digital product models.



The power to quickly deliver the highest quality, most accurate digital models – that’s what Pro/ENGINEER is all about. As the primary design offering within PTC’s Product Development System, Pro/ENGINEER details the form, fit and function of products. With its seamless Web connectivity, product teams have access to the resources, information, and capabilities they need – from conceptual design to tooling development and machining. And, with Pro/ENGINEER, high-fidelity digital models have full associativity, so that product changes made anywhere can update deliverables everywhere. That’s what it takes to achieve the digital product confidence needed before investing significant capital in sourcing, manufacturing capacity, and volume production.

## Where Breakthrough Products Begin

Though most discrete manufacturers invest in computer-aided design and other technologies for product development, their investments do not always generate the returns they expect. Lack of interoperability, capability shortcomings, poor usability, and discontinuities across the concept-design-manufacturing continuum often hamper engineering teams in their search to develop high-quality digital product models more efficiently.

### Pro/ENGINEER can help you optimize:

- › Conceptual Development
- › Detailed Design
- › System Design
- › Verification and Validation
- › Design Outsourcing
- › Variant Design and Generation
- › Manufacturing Tooling and Equipment Design



# Simple. Powerful. Connected.®

Engineering departments face countless challenges as they strive to create breakthrough products. They must manage exacting technical processes, as well as the rapid flow of information across diverse development teams. In the past, companies seeking CAD benefits could opt for tools that focused on ease-of-use, yet lacked depth and process breadth. Or, they could choose broader solutions that fell short on usability. With Pro/ENGINEER, companies get both a simple and powerful solution, to create great products without compromise.

## Simple

**Easy-to-learn and easy-to-use make Pro/ENGINEER the superior choice for speed-to-value.**

Through its flexible workflow and sleek user interface, Pro/ENGINEER drives personal engineering productivity like no other 3D CAD software. The User Model enables direct modeling, provides feature handles and intelligent snapping, and uses geometry previews, so users can see the effects of changes before committing to them. Plus, Pro/ENGINEER is based on familiar Windows® standards – providing immediate user accessibility and extending those standards to the unique challenges of 3D product design.

## Powerful

**Deep and broad capabilities let engineers design to customer needs, not to the limitations of software.**

As the two-time recipient of IndustryWeek's Technology of the Year Award, Pro/ENGINEER remains the most powerful MCAD solution on the market. Pro/ENGINEER creates seamless digital product information throughout all engineering processes, with associative CAD, CAM and CAE applications spanning conceptual design to NC toolpath generation. And since it's built on GRANITE® – PTC's modeling and interoperability kernel – Pro/ENGINEER excels in multi-CAD environments, and guarantees upward compatibility of data from earlier Pro/ENGINEER releases.

## Connected

**Fast, secure collaboration means more productivity and less risk.**

Pro/ENGINEER offers instant connectivity to valuable resources via an embedded Web browser. As part of PTC's integral Product Development System (PDS), Pro/ENGINEER provides a seamless user experience with Windchill.®



# Pro/ENGINEER Optimizes Your Digital Model

## Conceptual and Industrial Design

### Capture Ideas and Forms that Meet Any Aesthetic Requirement.

Pro/ENGINEER is unmatched for developing and communicating stunning product concepts. It's a truly open solution you can use to share ideas or refine concepts using freeform surfacing and reverse engineering tools. Designs can be sent directly to a rapid prototyping machine, or transferred to downstream Pro/ENGINEER applications.

- Easy-to-use tools, blending 2D or 3D, curves and surfaces, and imported sketches for concept exploration and industrial design
- Advanced photo-rendering to create photorealistic images
- Interoperable with other CAD systems

### Realizable Benefits

- Increase the number of product ideas conceptualized and evaluated
- Improve the richness of product collateral
- Bring higher-quality products to market faster

## Detailed Design

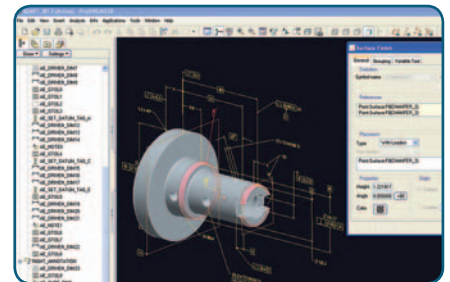
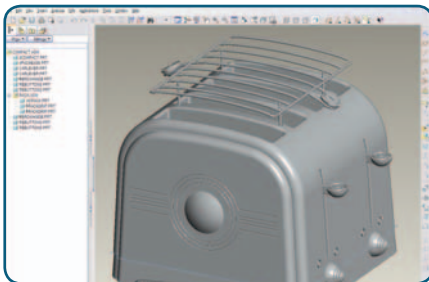
### Refine and Fully Document Any Product, Regardless of Complexity.

Some manufacturers struggle to develop product definitions because of incompatibility across multiple CAD systems or functional shortcomings. With Pro/ENGINEER, design engineers can handle tasks of any complexity, easily connecting and accessing information over the Web – directly from the design environment. Pro/ENGINEER is the scalable choice for small and large companies alike.

- Full geometry capabilities include solid, sheet metal, and assembly modeling, technical and freeform surfacing, weldments, frameworks, and mechanisms
- Fast, intelligent, automated capabilities such as Auto Round™, dimensions in 3D drawings, assembly memory management, and feature recognition
- Product documentation capabilities include production drawings, 3D drawings per ASME 14.41, process plans, photo-renderings, and animations
- Model quality checking, validation, and data reuse
- Interoperability with industry-standard file exchange formats, including STEP, IGES, DXF, DWG, Parasolid®, JT and ASIC import
- Patented technology for associative data exchange with CADD5®, CATIA® V4, CATIA® V5, Unigraphics®

### Realizable Benefits

- Improve productivity and resource allocation by extending software usage
- Standardize design infrastructure
- Improve collaboration across multiple CAD systems
- Reuse legacy 2D/3D data
- Reduce product and development cost with less reliance on engineering drawings and early resolution of design conflict
- Validate products with full digital product mock-up



## Simulation/Analysis

### Validate Product Performance and Optimize Product Design.

To ensure that products meet customer expectations, you must be able to predict and accommodate real-world conditions, optimize your design accordingly, and share the results. Pro/ENGINEER simulation solutions allow engineers to virtually test product performance, drive optimized designs based on customer and engineering requirements, and make results available to both the immediate and extended team.

- Explore structural, vibration, durability, heat, and motion performance
- Simulate advanced conditions such as nonlinear large deformation, hyper-elasticity, assembly connectivity, and friction-added surfaces
- Track model and geometric information against specifications
- Run full tolerance and variation analyses to improve designs for manufacturability
- Generate sensitivity reports to show how changes will impact product performance
- Automatically find the best overall design through optimization
- Predict design performance and drive model parameters and dimensions using the Mathcad® integration
- Capture expert knowledge, and automatically guide users through the analysis process using the Process Guide

### Realizable Benefits

- Lower product, warranty, and development costs
- Enhance engineering creativity by exploring more product designs faster
- Optimize product designs to achieve desired real-world performance

## Routed Systems

### Design and Document Any Electrical or Fluid System.

Designs for complex fluid and electrical systems can be fraught with inaccuracies and miscommunication. Pro/ENGINEER routed systems solutions offer comprehensive and associative capabilities for electrical, cabling, and piping design – as well as manufacturing. Designers, packaging engineers, and manufacturing engineers can quickly design, route, document, and produce complex harness and piping systems.

- Gain full support for a wide range of 2D diagrams, including block, electrical, fluid, and pneumatic schematics
- Create complex 3D electrical harnesses and automated ribbon cables
- Drive 3D harness and 3D pipelines from 2D schematics to ensure accuracy, and verify before manufacturing
- Create associative manufacturing data from 3D harnesses
- Instantly generate annotated, isometric pipeline drawings and output FIF data for CNC pipe bending machines

### Realizable Benefits

- Reduce rework and improve quality by verifying the accuracy of 3D harness and piping systems before manufacturing
- Eliminate or reduce prototyping expense
- Lower development cost by eliminating manual transfer of data between 2D schematics and 3D routing

## Breakthrough Performance for PTC Customers

Manufacturers report significant improvements in product development performance with Pro/ENGINEER.



## NC and Tooling

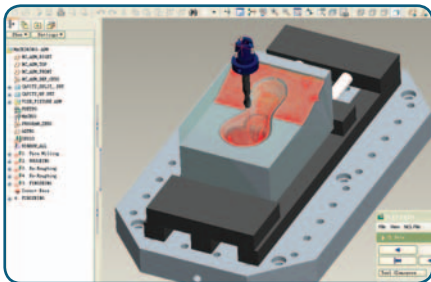
### Leverage Digital Models for Production.

Tooling development and NC machining often trail product design significantly, resulting in lost time and money. Pro/ENGINEER NC and tooling solutions enable manufacturers to create tooling, NC tool paths, and inspection programs in parallel with product design work. By sharing and directly referencing Pro/ENGINEER designs, production and tooling engineers are brought into the process early and are able to influence designs prior to release.

- Tooling design, development, and analysis, including automatic core/cavity splitting, mold base, integral mold filling analysis, and progressive die development
- Fast, automatic tool path generation for toolmaking, prototypes, and production machining applications, including 2-to-5 axis milling, 2-to-4 axis turning and live tooling, 2-to-4 axis wire EDM, laser, and punch press
- Intuitive user interface and process manager for NC toolpath definition streamline tasks and improve productivity
- NC simulation, verification, optimization, and post-processing
- CMM programming and first article inspection

### Realizable Benefits

- Reduce scrap and scrapped tools
- Improve manufacturing productivity
- Improve product quality
- Reduce time-to-market



## Design Collaboration

### Extend Digital Models to the Entire Team.

Efficient collaboration among product teams is key for achieving product development business goals. Yet, software tools have not generally lived up to the challenge. Superior collaboration must support both synchronous and asynchronous information exchange to match the way team members naturally engage.

With Pro/ENGINEER, remote users can share digital product definitions, regardless of their location, for conducting real-time design reviews, collaborative design sessions, or frequent information sharing. Using other PTC products, such as Windchill for content and process management or ProductView™ for visual collaboration capabilities, design data can be communicated from the desktop to multiple, global team members who can then review designs in real time with other design locations, outsourced design partners, and tooling suppliers. These capabilities even extend to team members who may not have or use Pro/ENGINEER.

- Facilitate design collaboration with
  - Portable workspaces in Pro/ENGINEER which allow you to share data with design partners offline, and
  - The unique Shrinkwrap™ tool in Pro/ENGINEER which enables you to easily share lightweight yet fully accurate product representations while protecting the original data – your intellectual property
  - Pro/ENGINEER ECAD-MCAD Collaboration Extension which improves communication between electrical and mechanical engineers for electromechanical product designs
  - Pro/ENGINEER Rights Management Extension which helps you protect Pro/ENGINEER files persistently and dynamically when they are outside the secure PDM/PLM environment
- Connect seamlessly to PTC's Product Development System to enable cross-enterprise communication for design collaboration, supplier collaboration, design reviews, remote training, and technical support

### Realizable Benefits

- Reduce travel expense through virtual, multi-party design reviews
- Increase information exchange through the ability to advance designs and resolve design conflicts in real time
- Decrease time-to-market while ensuring compliance to requirements, by immediately making current information available to all
- Reduce development cost through remote system administration, training, and diagnostic support

# Realize the Most Value from Pro/ENGINEER

Through Services Delivered by PTC and Our Partners

## Realize More Value, Faster

With 20 years of product development consulting and training expertise, PTC Global Services helps leading companies of all sizes realize the full value of Pro/ENGINEER. That's because our focus is on customer value, not just the installation of our software. We provide customers with a blend of process consulting, system implementation services, innovative education solutions, and value management that ensures customers have the right processes in place to fully leverage our technology. We also ensure that customers have the right education program in place to drive adoption.

## Services and Training Solutions for Pro/ENGINEER customers:

### Value Identification and Planning

PTC can help you determine the priority of your business objectives linked to Product Lifecycle Management, create a roadmap for achieving process improvements, and provide the technology, infrastructure and adoption guidance required to support them.

### Implementations

Achieve product development objectives through the effective deployment of one or more components of the PTC Product Development System. Each implementation includes a blend of process consulting, technology deployment, education and value management services that customers need to realize the most value.

### Education

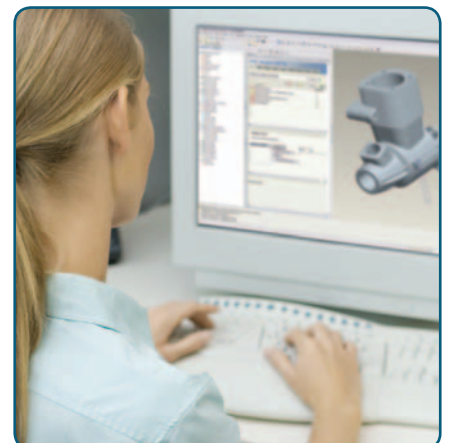
Learn from the experts. PTC University offers the largest variety of Pro/ENGINEER training courses in the world. Each year, over 100,000 people turn to PTC University for their PTC technology training needs. Training is available in over 100 PTC University Training Centers around the globe, or online through our eLearning libraries. Plus, for larger Pro/ENGINEER customers, we offer personalized, corporate learning programs that maximize user productivity, while minimizing training downtime. Visit [www.ptc.com/training](http://www.ptc.com/training) for information about Pro/ENGINEER training options.

### Expansion

A structured methodology to build on an existing PTC technology investment, whether it be upgrading technology, maturing a process, or delivering additional training.

## The Right Team, Tools and Technology – PTC's comprehensive Maintenance Support program that delivers additional productivity benefits:

- A carefully coordinated system that helps your organization reach its full potential, reduce downtime and ensure maximum ROI from its PTC software investment
- Software releases that can include new features, as well as architecture, performance, and infrastructure enhancements
- Access to 240+ ISO-certified technical experts in our worldwide call centers who are all connected to a single database, available 24 hours every business day, with multiple language support
- Award-winning, online, self-service support tools with access to more than 45,000 documents that are updated regularly and can be automatically emailed based on your preferences





# The Power of PTC

PTC provides leading Product Lifecycle Management (PLM), content management and dynamic publishing solutions to more than 50,000 customers worldwide.

## Software Products

- Broadest integral suite of solutions that enable companies to:
  - Create product information
  - Collaborate in a globally distributed environment
  - Control product development processes
  - Configure product content
  - Communicate product information to multiple systems and audiences
- Rigorous testing to ensure that products work together – and work for you
- Designed for incremental deployment to ensure successful adoption

## Product Development Processes and Initiatives

- Unique process-oriented approach to product development to deliver maximum value
- Technology-enabled process optimization to advance defined customer business initiatives
- Product Development System supports end-to-end processes to accelerate deployment time and reduce cost

## Industry Solutions

- Extensive expertise across a broad range of industries
- Demonstrated customer success in providing tailored solutions for specific industry needs
- Solutions support industry-specific business processes both within the enterprise and across the supply chain

## Services & Support

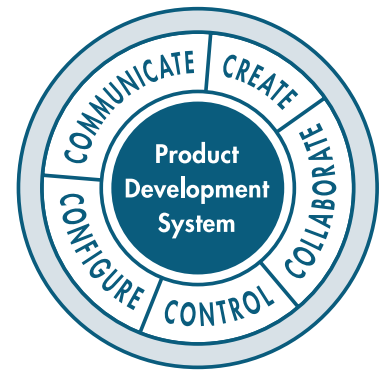
- Product development consulting to define and develop best-in-class processes
- Assessments and implementation services to deploy technology with minimum disruption
- Education curricula to accelerate adoption and boost productivity
- Global maintenance support that delivers the right team, tools and technology – available anytime, anywhere you need them for product development success

To learn how Pro/ENGINEER helps create value for some of the world's most innovative manufacturers, please visit our website at:

[www.PTC.com/go/proengineer](http://www.PTC.com/go/proengineer)

## Complete Product Development System

PTC's integral Product Development System delivers the key capabilities manufacturers need to realize more value from product development. And our proven, incremental implementation approach can help companies of any size accelerate adoption, minimize risk, and speed time-to-value.



## Pro/ENGINEER®

Integrated 3D CAD/CAM/CAE Software

## Windchill®

Content and Process Management Software

## Arbortext®

Dynamic Publishing Software

## Mathcad®

Engineering Calculation Software

## ProductView™

Visual Collaboration Software

## CoCreate®

Explicit CAD, PDM & Collaboration Software





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