



SERVICES & SUPPORT



PROCESSES & INITIATIVES

creo™ elements/direct™

SOFTWARE PRODUCTS

INDUSTRY SOLUTIONS



Direct CAD & PDM Software  
Lightweight. Flexible. Fast. Connected.

# Creo Elements/Direct\*

The fastest, easiest way to develop products using a direct 3D design process.



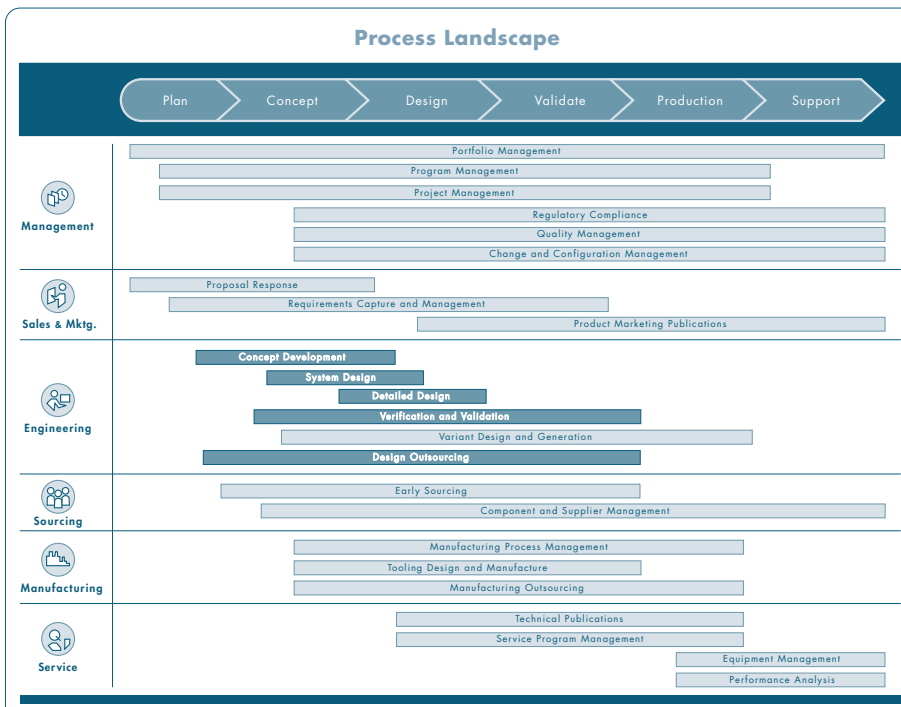
Creo Elements/Direct is for innovative leaders in discrete manufacturing and other industries who are facing intense time-to-market pressure. Many of the world's best-known product development companies depend on the Creo Elements/Direct product family for a direct 3D product development process in order to meet shorter design cycles, create one-off product designs quickly, and respond to unpredictable design requirement changes.

If you are looking for maximum ease and flexibility in creating one-off designs or radically repurposing designs, a "direct modeling" approach to 3D design is the right choice. Most companies add 3D modeling to their product design process to overcome increased pressures in manufacturing, such as shortened time-to-market, customer demand for new products, and increasingly complex customer requirements. Creo Elements/Direct addresses these challenges with direct 3D CAD, CAE and product data management that provide the optimal level of design flexibility. The combination of Creo Elements/Direct with PTC's other software solutions delivers an integral Product Development System (PDS) – which enables manufacturers to optimize their product development processes.

## Direct Modeling – the ultimate in flexibility

Creo Elements/Direct Modeling™, the world's #1 direct 3D CAD system, is the easiest 3D CAD system to learn and use. The Creo Elements/Direct product family provides a lightweight 3D design approach that can help you advance many of your engineering processes, including:

- > Concept development
- > System design
- > Detailed design
- > Verification and validation
- > Design outsourcing



PTC's Process Landscape: A Comprehensive View of Critical Development Processes

\*Formerly CoCreate®

## Lightweight. Flexible. Fast. Connected.

Creo Elements/Direct delivers speed, flexibility and responsiveness-to-change for customers pursuing a lightweight design strategy. As the pioneer and leading provider of direct modeling, PTC and Creo Elements/Direct provide you with unique flexibility throughout your entire product development process. When designing in 3D with Creo Elements/Direct, your models stay lightweight and flexible through direct, “on-the-fly” geometry interactions. This allows you to quickly incorporate downstream 3D design changes and radically repurpose designs using Windows®-like characteristics—including cutting, copying and pasting geometry—which makes the initial training and overall learning curve on Creo Elements/Direct products fast and easy.

### Lightweight.

#### Intuitively design products using direct, on-the-fly interactions with model geometry

Creo Elements/Direct uniquely captures less model definition information, for a genuinely lightweight and flexible product design process. You intuitively interact with model geometry in real time through direct, on-the-fly interactions. Product designs evolve freely without designers needing to anticipate downstream design changes or maintain embedded design logic such as tangency conditions. As a result, lightweight model geometry is central to the flexibility of your Creo Elements/Direct 3D CAD system. Consequently, your direct modeling files are, on average, one-third the size of parametric modeling files, which makes your models easier to access, modify, archive and share.

### Flexible.

#### Easily address unexpected and radical product design changes

Since you’re creating and modifying model geometry using direct, on-the-fly interactions, your initial training and ramp-up on the software are much easier. But it also means that when you’re working with the Creo Elements/Direct 3D CAD system, you can easily pick up a design where others left off—much like the way you can open up and immediately continue working on an existing Microsoft Word® document. Creo Elements/Direct Modeling provides flexibility in several other ways, by giving you the ability to address unexpected and radical changes to product designs, respond to changes in design team composition, and work easily with design data from any 3D or 2D CAD system as if it were native design data.

### Fast.

#### Easy to learn and easy to use, Creo Elements/Direct lets engineers shave weeks – even months – from project schedules

Creo Elements/Direct Modeling, with its direct approach to 3D design, is faster and easier to learn and use than other 3D CAD systems. Existing 2D designers can transfer their skills and quickly adopt 3D direct modeling in a matter of weeks. Creo Elements/Direct offers the simplicity of 2D with the power of 3D. Creo Elements/Direct customer Carl Zeiss® Meditec explains: “We just don’t have time to spend worrying about our design tools, and with Creo Elements/Direct Modeling, we don’t have to. Anybody can pick it up and run with it.” The speed of 3D design and the short learning curve of Creo Elements/Direct Modeling enable Carl Zeiss Meditec to stay ahead of its competition and cut weeks—even months—from project schedules.

### Connected.

#### Realize more value from Product Development with PTC’s integral Product Development System

As part of PTC’s integral Product Development System (PDS), Creo Elements/Direct gives you a seamless user experience with other PTC product families, including Creo Elements/View™, Arbortext®, Mathcad®, Creo Elements/Pro™, and Windchill®

In a 2006 Aberdeen Group® study, companies that typically develop large, complex designs responded with their top five concerns or problems with their current CAD technology:

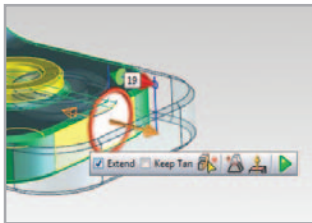
1. Learning unfamiliar software (63%)
2. Can’t clearly identify the benefits of 3D modeling (50%)
3. Concerned about what to do with legacy 2D data after the adoption of 3D CAD (44%)
4. Difficulty in managing the complex CAD relationships associated with their large assemblies (39%)
5. Slow application performance (31%)

Creo Elements/Direct and a direct modeling approach can address these concerns for many organizations.

# Creo Elements/Direct Modeling – the world's #1 direct 3D CAD system

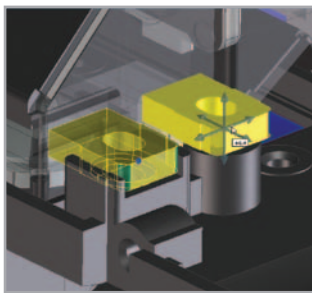
Creo Elements/Direct Modeling, based on the direct approach to 3D design, makes creating and modifying 3D designs fast, easy and flexible. Creo Elements/Direct Modeling is packed with an extensive list of features for innovative customers who demand speed, flexibility and responsiveness-to-change.

## Concept design and 3D modeling



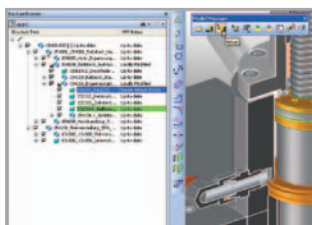
### Real-time direct modeling

Quickly and easily create 3D designs through direct, real-time, on-the-fly interactions with model geometry. The direct approach is flexible and easy to use, so it's ideal for companies that create one-off or highly customized products.



### Easy-to-use 3D and 2D copilots

Graphically drive 2D and 3D design creation, modification and positioning commands with ease. Copilots intuitively calculate snap conditions and geometric relationships on-the-fly, while users manage an adaptive, on-screen grid and quickly key in values independent of menus.



### Drag-and-drop assembly management

Manage parts and assemblies with Microsoft Windows Explorer®-like capabilities. Simply drag and drop parts and assemblies to match the product structure of the bill-of-materials.

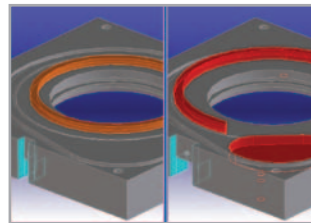
## Assembly handling

Easily design in context of the assembly—even with products containing hundreds of thousands of parts. Expand physical memory and boost performance with 64-bit computing and lightweight graphic representations on the Microsoft Windows operating system.

## Annotation

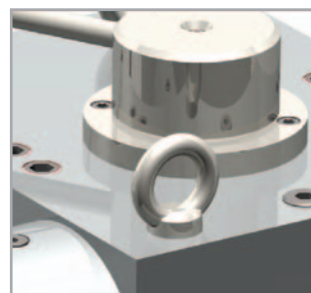
Create 3D-to-2D associative drawings that are synchronized with the master 3D part or assembly. 3D modifications automatically carry over to dimensioned drawings, eliminating common 2D drafting errors.

## 3D design



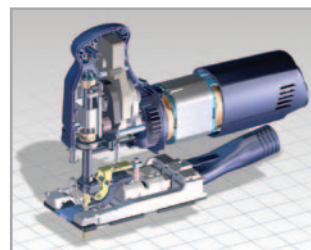
### Clash and part comparison analysis

Reduce time and cost by using digital product development capabilities. Locate assembly conflicts in advance of physical prototypes and understand the differences between two similar parts by using color-coded visual analysis.



### Photorealistic rendering

Create photorealistic-rendered images of your product designs with a complete catalogue of real-world materials, textures, light sources, and rendering schemes.



### Real-time rendering

You'll work in absolute clarity and realism through all stages of product design through high-performance, real-time rendering of the 3D design, including materials, realistic shadows, and a mirror plane.

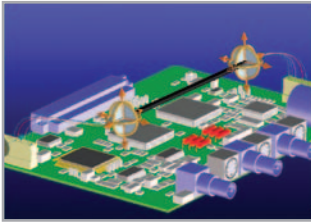
## Design in cross-section

Dive into the heart of a design, especially for symmetrical assemblies. Drive 3D cross-sectional modifications as if you were designing in 2D.

## GD&T and product manufacturing information (PMI)

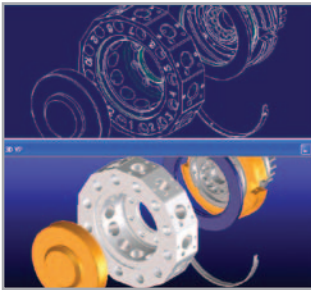
Capture and pass design intent and PMI through complete 3D geometric dimensions and tolerances (GD&T), manufacturing symbols, notes and tool containers for parts and assemblies.

## Extend 3D to the entire design team



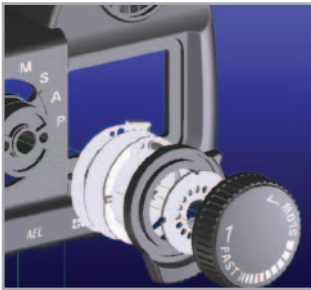
### MCAD-ECAD collaboration

Improve collaboration between mechanical and electronic designers with a two-way interface between Creo Elements/Direct Modeling, Mentor Graphics®, Cadence® and other ECAD systems.



### Standard data exchange and 3D viewing formats

Share data with other departments and suppliers using industry standard data exchange formats such as STEP, IGES, DXF, DWG, and ASIC®. 3D viewing formats include 3D PDF and VRML, as well as optionally available eDrawings and XVL.



### Native and neutral CAM formats

Save manufacturing time by exporting native CAM data to third-party partners GoElan®, OPEN MIND HyperFact® and HyperMill®. Export CAM-neutral data files that can be easily loaded into Creo Elements/Pro TOOLMAKER™, GibbsCAM®, or Mastercam® software.

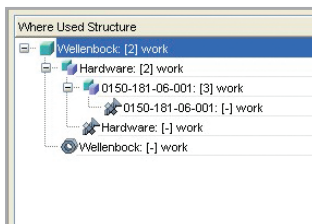
## Key benefits of Creo Elements/Direct Modeling

- Optimize concept development, detailed design, and system design processes
  - Quickly create and modify 3D parts and assemblies
  - Shave time off design cycles by repurposing—or radically transforming—existing designs into new and completely different products
  - Accommodate major, unexpected design changes at any stage of development, while keeping the transition to manufacturing on schedule
- Increase engineering productivity by eliminating resource bottlenecks and project delays via flexible design teams and better support for design outsourcing processes
- Directly leverage multi-source CAD data from suppliers and subcontractors in the design process
- Easily move from 2D to 3D, and easily switch from other 3D CAD systems, confident in knowing that all legacy 2D and 3D CAD data carries forward in Creo Elements/Direct Modeling

# Creo Elements/Direct Model Manager and Drawing Manager – integrated 3D and 2D product data management

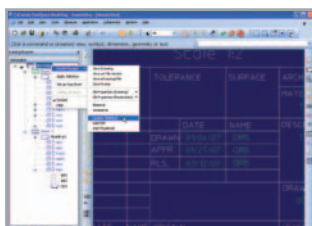
Integrating your 3D and 2D product data management (PDM) is simple with Creo Elements/Direct Model Manager and Creo Elements/Direct Drawing Manager. You can effectively orchestrate team design processes and manage associated product design data within a central database. Plus, with a fast, intuitive installation, you can immediately benefit from a preconfigured, best-practice data management solution.

## Team productivity



### Search where-used, load and store

Quickly find and reuse design data, using where-used or database attribute criteria. Save the “search” and watch it dynamically update with the latest results.



### Ownership, revision and state control

Manage data and provide increasing levels of control to ensure design data integrity throughout each phase of the design process.

## Status updates and notifications

Never work on the wrong revision of design data again. With real-time status alerts and pop-up notifications, you instantly know about updates and new revisions in the database.

## Manage product design data

Orchestrate teamwork with effective management of part comparisons, engineering-related documents for co-located or distributed teams, and 3D-to-2D associativity, specifically for Creo Elements/Direct Modeling.

## Assembly management

Type	Revision	Modeled Qty	Desc
Modified	1	0	0150-
	1	1	0150-
	1	1	0150-
Deleted	1	2	2105S
	1	1	BG_H
Added	1	1	Hardv
Added	1	2	2105S
Added	1	6	Welle
Deleted	1	6	Welle

### Compare product assembly structures

Compare different revisions of product assembly structures in the same way you compare different versions of a Microsoft Word document, by clearly highlighting the additions, deletions and modifications.

## Lightweight graphics

Free-up computing resources in the design of large and complex products, including partial assembly structures. Automatically switch parts and assemblies from lightweight graphics to full geometry modeling in Creo Elements/Direct Modeling.

## Database administration

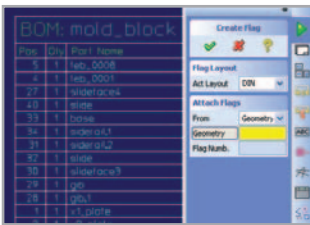
### Company standards

Adhere to company standards with automated, time-saving database options, such as rolling part number generators, drawing title block attribute updates, and associative 2D drawing Adobe PDF documents (with optional watermarks).

### The new standard for “out-of-the-box” implementations

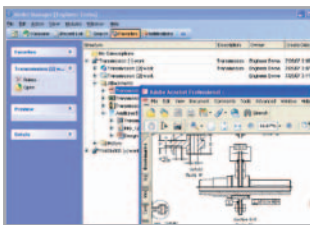
Install Creo Elements/Direct in 15 minutes, using just six button clicks and zero consultants – for a solution that’s already preconfigured with industry best practices.

## Add-on productivity



### Creo Elements/Direct BOM editor

Reuse 3D and 2D design data and assembly structures from Creo Elements/Direct Modeling and Creo Elements/Direct Drafting to accelerate the process of creating manufacturing BOM reports. BOM reports stay up to date as designs change, ensuring accurate information for downstream applications.



### Creo Elements/Direct task agent

Automate your daily tasks without disrupting your daily design work. Creo Elements/Direct Task Agent provides the capabilities to schedule both one-time and recurring processes. Clash analysis, drawing translations, and print/plot tasks are automated to run in the background on assigned hardware.

## Stand-alone client

Extend the access of product design data well beyond 3D and 2D CAD software users, using the stand-alone client. Product managers, CAD designers, and non-engineering departments all gain controlled access to the most up-to-date product design and BOM manufacturing information.

## Creo Elements/Direct 3D and 2D access

Share and edit both 2D and 3D design data with other team members in native, neutral, or other 3D CAD system formats. Provide 2D and 3D CAD visualization for both the design team and extended supply chains.

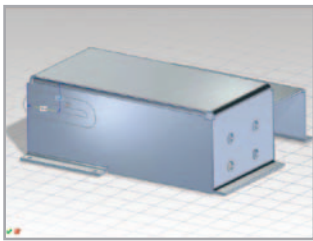
## Key benefits for 3D and 2D product data management

- **Speed development and cut costs** – Cut engineering time and drive down manufacturing costs by managing multiple product configurations with high cross-leverage and by reusing shared parts and assemblies across product platforms.
- **System of record** – Use Creo Elements/Direct Model Manager as your centralized workgroup database and share released design data with other enterprise systems (such as ERP). This flexibility can support a broad range of enterprise data management strategies and systems.
- **Data management you will not outgrow** – Creo Elements/Direct Model Manager scales from the global enterprise down to the single-person shop. Any size company can easily move beyond 3D CAD into an orchestrated 3D product development and lifecycle management process.
- **Streamline processes** – Eliminate the time and expense of manual data management processes. Ensure design integrity and work with up-to-date revisions of design data across the development team, with safeguards against accidental data loss.

# Extended capabilities for 3D productivity

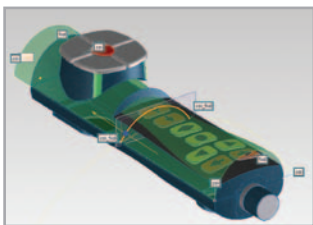
The Creo Elements/Direct product family provides key 3D productivity-enhancing capabilities for users in specific lines of business and industries. Easily extend the use of 3D throughout your design projects and organization with these fully integrated capabilities, as you quickly develop products from concept to manufacturing.

## Design productivity



### Sheet metal design

Satisfy the needs of even the most demanding sheet metal designer. With Creo Elements/Direct Sheet Metal, build design and manufacturing advice into sheet metal parts and simulate design and manufacturing behaviors.



### Industrial design

Designed for companies and industrial designers who want to create appealing and ergonomic products, Creo Elements/Direct Surfacing provides the perfect combination of freeform surfacing and solid modeling in one environment. It offers unlimited flexibility to use a mix of core surfacing and 3D functionality to produce innovative product designs.

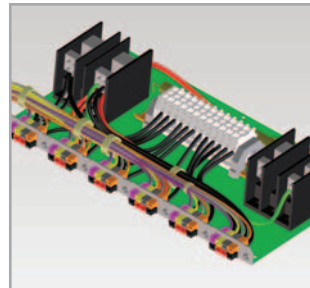
## Plastic design

Speed up the design of plastic parts by using streamlined, parameter-driven features and core and cavity commands. Automatically create mold cavities and cores, and use digital prototyping to detect undercuts and constant wall thickness.

## Parametric capabilities

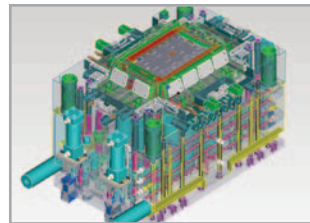
Generate and drive part and assembly design variants with parametric relationships and constraints on top of a direct 3D model inside Creo Elements/Direct Modeling.

## Manufacturing productivity



### Cable and harness design

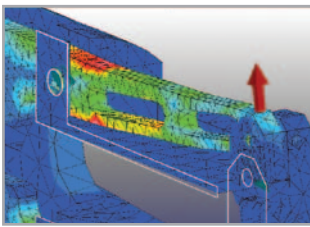
Unite your electrical and mechanical disciplines to automate the design and manufacture of routed wiring and cable harnesses. Create cables, harnesses and bill-of-materials documentation with Creo Elements/Direct Cabling, including drawings for electrical cables, harness routes, and nail boards.



### Mold base design

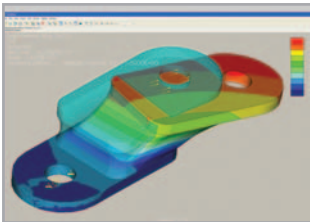
Simplify the tedious tasks necessary to create mold bases and injection components. Fully integrated with Creo Elements/Direct Modeling, Creo Elements/Direct Mold Base reduces the effort of designing plastic injection molds through its highly interactive and intelligent tooling.

## Simulation and verification productivity



### Structural and thermal analysis

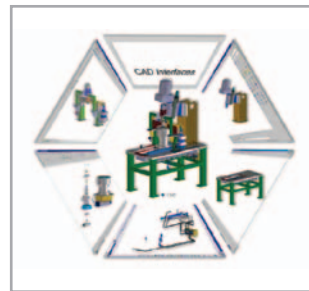
Analyze real-world design conditions to deliver higher-quality products at lower cost. With the simulation and digital prototyping capabilities of Creo Elements/Direct Finite Element Analysis, you can validate your product designs to meet your customers' physical demands and streamline your verification and validation processes.



### Advanced analysis

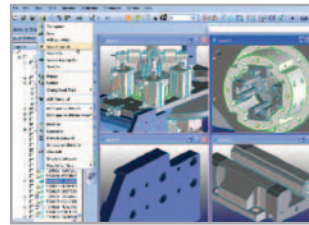
Fully evaluate and optimize your design, improving product quality while reducing physical prototyping expense, with Creo Elements/Direct Advanced Mechanica®. Analyze a broad range of cases, including nonlinear large displacement, pre-stress, dynamic and transient thermal analyses. Simulate advanced materials behaviors such as hyper-elasticity, anisotropic, orthotropic and composite laminates.

## Extend 3D design to external teams



### Data exchange interfaces

Improve the quality of transferring design data between 3D CAD systems in ways not previously possible using neutral 3D IGES or STEP. Interfaces include CATIA®, I-deas®, Inventor®, NX™, Creo Elements/Pro®, Solid Edge, and SolidWorks®.



### Third-party applications

Combine Creo Elements/Direct products with the latest applications in diverse sectors, including CAM, CAE and Mechatronics. Easily add to and customize your 3D design solution to meet your specific product development process needs.

## Key benefits of extending Creo Elements/Direct Modeling

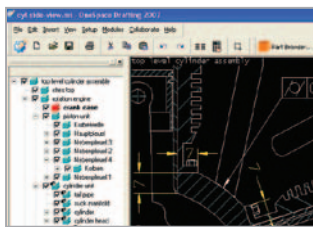
Customers that have chosen Creo Elements/Direct Modeling, the world's #1 direct 3D CAD system, can easily build upon its core 3D modeling capabilities through additional modules within the Creo Elements/Direct product family. The numerous, specialized add-on design modules provide an unparalleled breadth of advanced direct modeling and analysis capabilities to help you:

- **Accelerate time-to-market** – Creo Elements/Direct add-on modules give you more capabilities to:
  - Increase the number of product ideas conceptualized
  - Enable you to build robust, appealing products faster
  - Reduce engineering change order frequency
  - Streamline design and manufacturing outsourcing processes
- **Reduce Cost** – Leverage an expanded, direct modeling platform to:
  - Eliminate physical prototypes
  - Minimize component and tooling costs

# Creo Elements/Direct Drafting – for professional 2D CAD design and drafting

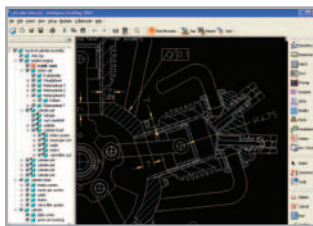
Companies that use a 2D CAD system for conceptual, visual and detailed design processes can leverage Creo Elements/Direct Drafting. Exclusively developed for mechanical engineers and designers, Creo Elements/Direct Drafting helps you achieve new levels of productivity with innovative part and assembly capabilities and powerful 2D commands.

## Concept and 2D design



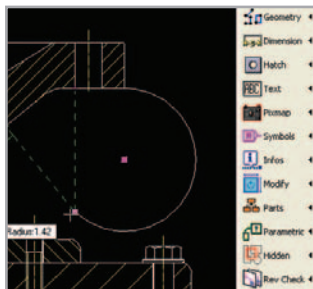
### Part and assembly structure

Design the way mechanical engineers think, with an innovative part and assembly structure for managing your bill-of-materials (BOM) the correct way.



### Drag-and-drop assembly management

Manage parts and assemblies with Microsoft Windows Explorer-like capabilities. Simply drag and drop parts and assemblies to match the product structure of the bill-of-materials.



### Intuitive drawing creation with 2D copilot

Improve speed and accuracy during creation and modification commands with 2D copilot snap points, lines and handles. Easily create and modify geometry using industry-standard drawing creation and modification capabilities.

## Parametric capabilities in 2D

Capture powerful parametric relationships and constraint features within the 2D drawings. Use numerical values to modify drawings, or specify geometric properties and relationships between drawing entities.

## Compare drawings

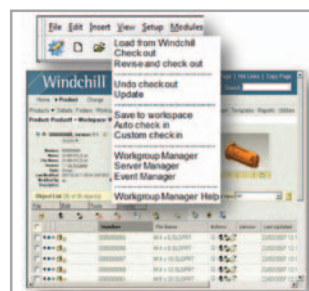
Compare different versions of drawings in the same way you compare different versions of a Microsoft Word document, by clearly highlighting the additions, deletions and modifications.

## Extend 2D to the entire design team



### Industry 2D data exchange

Import and export 2D data using Autodesk® DWG™ and DXF™ formats (including both modelspace and paperspace) in addition to 2D IGES. Additional export options are available for Adobe® PDF, TIFF, JPG, PNG or BMP file formats.



### Extend 2D across the enterprise

The Windchill Workgroup Manager for Creo Elements/Direct Drafting enables your company to optimize product development processes, including gaining greater control over Creo Elements/Direct drawings across your enterprise.

## Key benefits of Creo Elements/Direct Drafting

- Satisfies the 2D needs of designers and mechanical engineers in product development
- Applies an innovative part and assembly structure that matches how engineers design and manufacture products – making 2D product development fast and easy
- Automates development processes and is customizable and programmable, so it can be tailored to fit company-specific needs
- Offers an easy migration path to Creo Elements/Direct Modeling, the industry's #1 direct 3D modeling software

## Direct CAD & PDM software

The Creo Elements/Direct product family is a complete design environment, offering 3D CAD and 2D CAD, integrated CAE and product data management (PDM).

For more information on the major capabilities of Creo Elements/Direct, please visit:

[PTC.com/products/Creo-Elements-Direct/modeling](https://www.ptc.com/products/Creo-Elements-Direct/modeling)

[PTC.com/products/Creo-Elements-Direct/drafting](https://www.ptc.com/products/Creo-Elements-Direct/drafting)

# The Power of PTC

PTC provides leading product development solutions to more than 25,000 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 utilizes best practices to deliver maximum value
- Product Development System supports end-to-end processes out of the box, to enable achievement of business initiatives

## 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

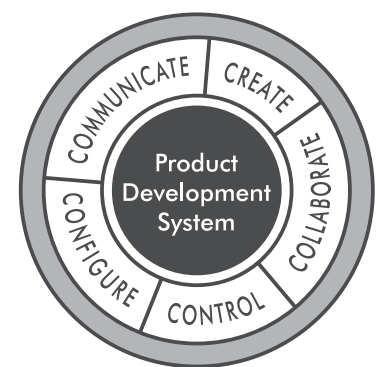
- Product development consulting to define and develop best-in-class processes
- Assessments and implementation services to deploy technology with minimum disruption
- Education curricula to accelerate adoption and boost productivity
- Global maintenance support that delivers the right team, tools and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

To learn how Creo Elements/Direct helps generate value for some of the world's most innovative manufacturers, please visit our website at:

[PTC.com/go/creo-elements-direct](http://PTC.com/go/creo-elements-direct)

## 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.



### Creo Elements/Direct

Direct CAD & PDM Software

### Creo Elements/Pro™

Integrated 3D CAD/CAM/CAE Software

### Windchill®

Product Lifecycle Management (PLM) Software

### Arbortext®

Dynamic Information Delivery Software

### Mathcad®

Engineering Calculation Software

### Creo Elements/View™

Visual Collaboration Software

### InSight™

Product Analytics Software

### Relex®

Quality Management Software

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