To reduce time to market, improve quality and lower costs, manufacturers need a total product engineering solution that unites design, engineering, and manufacturing with knowledge-driven automation.
NX is the complete vision
Computer-aided design,
engineering, and manufacturing
are technologies used by
virtually all manufacturing
companies. With a variety
of affordable, accessible
software solutions, companies
can no longer rely on
conventional CAD/CAM/CAE
tools to gain and keep a
competitive advantage.

To gain a competitive edge,
manufacturers must look
beyond isolated tasks,
individual efficiency, and
point solutions to address
the broader issues of product
lifecycle productivity.
Companies must adopt
leading-edge tools and
technologies that leverage
their unique processes,
practices, and knowledge.

EDS is dedicated to helping
manufacturers excel with
Unigraphics NX, a proven
solution for Total Product
Engineering – enabling
companies to model and
validate products and their
production processes in an
integrated digital environment.

Unigraphics NX for Total
Product Engineering delivers
a strategic advantage to
manufacturers by effectively
capturing, applying, and
sharing knowledge throughout
the digital engineering
process.

From the initial concept,
through product design,
simulation, and manufacturing
engineering, Unigraphics NX
provides a comprehensive
product development
solution, built on advanced
technologies that help
you meet your business
objectives.
Unigraphics NX – a better choice

Up to ten-fold improvements in time, cost and quality

Why should companies consider Unigraphics NX? It’s a CAD/CAM/CAE solution founded on a next-generation architecture and technologies that uniquely address the driving business issues in product development.

Unlike “mid range” product development applications, Unigraphics NX supports the full spectrum of product development activities, from concept design through manufacturing engineering, with integrated, best-in-class applications. These tools automate and streamline a broader range of tasks than any other solution, enabling manufacturers to model and validate products and their production processes. As a whole, the applications are fully integrated and associative, working together to yield overall productivity gains that are greater than the sum of the parts. The result is dramatic improvements in development cost, lead time, and product quality.

Compared to other high-end, integrated CAD/CAM/CAE solutions, Unigraphics NX more fully enables companies to capture, leverage, and share knowledge throughout the product development process. Successful manufacturers understand that their core competitive strengths lie in knowledge – the intellectual capital that resides in individual and organizational expertise, the product and process knowledge gained from their manufacturing experience and the collective standards and best practices of their industries and professional disciplines.

Unigraphics NX is built on a next-generation architecture that helps companies use knowledge to its greatest strategic business advantage. Manufacturers can readily bring together and capture knowledge with Unigraphics NX, then apply, manage and re-use it as a corporate resource. With a knowledge engine at its core, Unigraphics NX embeds knowledge in advanced CAD, CAE, and CAM applications to more fully automate tasks and complex processes – in many cases yielding ten-fold gains in time, cost and quality as compared to conventional product development tools.
Unigraphics NX embodies unique technologies that offer unparalleled value for customers. Directly addressing the key business drivers of manufacturing companies, these exclusive technologies clearly distinguish Unigraphics NX from other product development solutions. Total Product Engineering summarizes this value and distinction.

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<th>EXCLUSIVE UNIGRAPHICS NX Technology</th>
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<td>Ensures repeatability of industry best practices and leverages organizational expertise</td>
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Unigraphics NX Total Product Engineering delivers proven strategic advantage by effectively capturing, sharing and leveraging knowledge throughout the digital engineering process.

Knowledge-driven automation

Unigraphics NX has led the way in efforts to bring knowledge-driven technologies to product development, with innovations that make knowledge capture and re-use accessible, practical, and successful. With a knowledge engine at the core of the system architecture, Unigraphics NX enables companies to readily unlock the power of their product and process knowledge and leverage it throughout the development cycle.

Leverage best practices automatically. The dramatic productivity benefits of knowledge capture and re-use are most clearly evident in Unigraphics NX process wizards. These prepackaged applications capture industry-specific process knowledge, structure it in best-practice workflows, and link complex activities and technologies into automated sequences. With built-in expert knowledge, process wizards enable companies to more fully automate complex, specialized processes – simplifying and streamlining such intricate and detailed procedures as stress analysis or injection mold design. In production usage, process wizards have been proven to yield 10-to-1 productivity improvements and more.

Knowledge Fusion technology redefines the category. The enabling technology for process wizards is Knowledge Fusion, which draws on the strengths of both MCAx tools and programming technology. Knowledge Fusion enables companies to easily capture their own design rules, standards, and proprietary process knowledge, and apply and re-use it throughout the digital product development environment. Unlike custom programming approaches to knowledge automation, Knowledge Fusion makes knowledge capture and management practical and accessible, without requiring specialized programming expertise and investments.

Make your competitive advantages work harder. With an advanced knowledge engine at its core, Unigraphics NX unlocks the power of knowledge for design, engineering, and manufacturing processes in many ways. It enables customers to enrich product definition with intelligence that goes far beyond the geometric models of conventional solutions. It enables users of design, engineering, and manufacturing applications to interact with these systems in extremely efficient, process-oriented workflows that directly draw on the company knowledge store. And it enables companies to instantaneously validate designs against company standards and design intent, so that product development can move forward, rather than regress to correct errors.
Unique technologies for Total Product Engineering

With Unigraphics NX WAVE technology, manufacturers can develop products directly from engineering requirements using system-level product templates.

System-based modeling

To respond rapidly to market opportunities, manufacturers need product development tools that help them quickly evaluate design alternatives. The need to swiftly react to changing requirements gave rise to the parametric modeling tools that are pervasive in modern CAD systems. Unigraphics NX extends the principles of parametric modeling beyond component modeling to higher-level system and product design with WAVE technology.

WAVE technology - unprecedented control for complex products. WAVE technology in Unigraphics NX enables manufacturers to create a product control structure representing a system-level design approach. This structured layout is a product definition template, controlled by key engineering criteria and design parameters that establish the interfaces between the subsystems in the product. Special tools are provided to navigate, edit, and control the relationships and design intent. The design parameters drive down through the product to control subassemblies and individual components as well. When changes are made to the criteria and parameters in the product definition template, they are automatically propagated through all affected systems and components in a controlled and automated way.

Do multiple “what-if” studies easily. With Unigraphics NX, system-level modeling can be used to quickly generate and evaluate multiple design concepts, or to create new design variants from a common concept. By capturing product knowledge and design intent at a system level, Unigraphics NX enables companies to readily re-use engineering knowledge across very complex products and to minimize the impacts of change.
Integrated collaboration

Product development normally involves many people, in multiple organizations and locations, both within and outside the manufacturing company. Timely participation in product engineering by all the stakeholders can help reduce lead times, minimize changes and errors, and improve quality. Companies who successfully bring together the extended team can capitalize on the knowledge and innovation of each team member to improve the product and its development process. Effective collaboration enables each functional department to add value simultaneously rather than sequentially.

Get input when it matters most.
Unigraphics NX augments CAD, CAE, and CAM with robust collaboration solutions that help achieve these goals. Users of Unigraphics NX applications can exchange design modifications in shared sessions from different locations over the Internet, even if they are using different platforms. This real-time virtual design review and collaboration goes beyond mere file or display sharing, enabling the team to identify, fix, and verify design solutions instantaneously. It also helps eliminate errors and communication delays and reduces travel costs.

A new standard in integrating stakeholders. EDS is the leading developer of collaboration tools for the extended enterprise and the supply chain. Unigraphics NX customers can take advantage of integrated, scalable solutions that support collaboration objectives of any variety or scope. These include engineering, enterprise, and manufacturing data management; visualization and virtual prototyping; and community tools that allow technical and non-technical users and supply-chain partners to participate in the development process.

Real-time collaboration

Unigraphics NX leverages the innovation of the extended supply chain with integrated collaboration. Manufacturers and suppliers can instantly exchange design modifications over the Internet, while each user verifies the changes in their own engineering context.
Open by design

Frequent exchange of information among manufacturers and supply chain partners is taken for granted in current product development scenarios. Unfortunately, data communication and information exchange are often hampered by differences in the product development systems used by the partners. Translating geometric models of complex products is an imperfect, error-prone process that reduces the content and value of the information to the lowest common denominator. Repairing or recreating product data can impose uncertainties, errors, and delays in progress from concept through manufacturing.

The end of “lowest common denominator” translations. Unigraphics NX was designed from the ground up to facilitate and improve data exchange and systems interoperability in the supply chain. The core modeling capabilities of Unigraphics NX are built on the Parasolid modeling kernel. Developed by EDS, Parasolid is the world’s leading production-proven component geometric modeling software, used as the geometry engine in hundreds of different CAD/CAM/CAE applications. Because of the Parasolid modeling core, users of Unigraphics NX can readily exchange precise 3D geometric model data with more than a million seats of Parasolid-based applications without data translation.

Powerful advantage: interoperability at a higher level. Beyond seamless data change, Unigraphics NX interoperates at a higher level with other EDS product development applications using a technology called NX Gateway. Via NX Gateway, customers using Unigraphics NX can directly open files from I-deas, Solid Edge, Imageware, and MasterFEM applications with full data associativity.

At the architecture level, Unigraphics NX provides a comprehensive application programming interface that opens the system to customization and extension by both customer and third-party partners. The development tools available with Unigraphics NX range from simple-to-use customization utilities to powerful application programming toolkits. These can access more than 4,000 Unigraphics NX functions, including the core knowledge engine capabilities.
Production-proven applications

Unigraphics NX delivers an end-to-end product development solution with the industry’s most comprehensive set of integrated design, engineering, and manufacturing applications. In terms of performance, ease of use, and productivity each Unigraphics NX application provides exceptional value as a point solution. As a fully associative digital product development environment, the Unigraphics NX suite enables manufacturers to integrate the complete product engineering lifecycle, from initial concept to final production.

The best protection for your software investment. Developed in partnership with a large and diverse customer base, Unigraphics NX tackles real-world problems and practical challenges of leading manufacturers worldwide. Research and development starts with detailed analysis of customer requirements and processes, and the technological advances of each release have been introduced to minimize disruption and protect our customers’ investments. Customers often say that there is nothing they cannot accomplish with Unigraphics NX, and they have continuously proven the solution’s value in production for more than two decades.

Use the industry’s most comprehensive set of applications. In the following pages, you will see how Unigraphics NX for Total Product Engineering enhances the full range of product and process development applications:

- Concept engineering
- Product design
- Digital simulation
- Manufacturing engineering
Concept engineering

Industrial design, styling, and conceptual engineering are the genesis of the development process for many products. Industrial designers combine artistic inspiration with marketing requirements, manufacturing considerations, packaging guidelines, and other aspects of form, fit and function to produce innovative designs.

Inspiration to production faster than ever before. The majority of industrial design work is conducted with the assistance of specialized software that is separate from the mechanical CAD/CAM/CAE systems used in product engineering. Such systems provide focused tools for shape creation and manipulation, visualization, and rendering that have not been available in traditional mechanical design systems. Incompatibilities between industrial design tools and mechanical design systems create data translation problems that are difficult to surmount. Most manufacturers accept that concepts developed in industrial design software will need to be converted or re-created before engineering design begins. This extra step extends the overall product development timeline, and often compromises the innovative qualities of the concept.

Smarter design system eliminates steps. Unigraphics NX provides a solution to the translation and re-creation problem with Shape Studio - a complete industrial design system that shares the same geometry platform as Unigraphics NX product engineering applications. More than a mechanical CAD program with an artistic face, Shape Studio provides a comprehensive set of freeform curve and surface modeling and shape exploration tools, along with surface evaluation, high-performance visualization, and photorealistic rendering.

With Shape Studio providing all of the creativity and innovation tools of a specialized industrial design software package, Unigraphics NX helps industrial designers and stylists evaluate a broader range of design concepts more quickly and accurately. It also helps companies get those design concepts into production more quickly, with their innovation and styling intact.
Product design

Geometric modeling is a commodity feature of modern CAD systems. The ability to create a precise solid model of a mechanical component is a fundamental design aid. Manufacturers seeking a strategic advantage look beyond the basics for leading-edge capability that will empower them to design faster and better, and accelerate downstream development processes. With knowledge-enabled design, Unigraphics NX delivers the most comprehensive and productive CAD solution available.

Streamlined design modeling. At the basic level of geometry creation, Unigraphics NX supports an extensive variety of modeling techniques, offering designers the flexibility to choose the most appropriate tools for the design problem. Beyond component design, Unigraphics NX provides the most powerful system-based modeling and assembly design aids that support collaborative, product level design approaches. Leading edge-usability and user interaction innovations streamline model creation, navigation, and editing.

Unigraphics NX part and assembly design is augmented with process-based design tools tailored for specific types of mechanical components and subsystems. Providing specialized modeling commands and process-specific design workflows, these applications surpass general-purpose CAD in speed and efficiency.
Order-of-magnitude gains in productivity. Unigraphics NX process wizards embed expert knowledge to automate and streamline complex design tasks for order-of-magnitude design productivity gains. Unique validation applications complement Unigraphics NX design tools, automatically monitoring design parameters and guiding design decisions to maximize product quality.

More power, greater design flexibility

Unigraphics NX doesn’t limit designers to a single modeling approach, a subset of possible geometries, or inflexible design techniques. With a combined toolkit of parametric and explicit modeling commands, designers can employ whatever tools they need to model anything imaginable.

For parametric, feature-based design Unigraphics NX provides an innovative user interface that accelerates modeling. An advanced sketching environment uses inference logic to automatically infer the designer’s intent from cursor movements, speeding creation of intelligent feature profiles. Dynamic, on-screen controls provide a streamlined alternative to dialog box input that minimizes required interaction and maintains the designer’s focus on the modeling window. Visual, desktop-integrated palettes offer commonly used objects such as model and drawing templates, standard parts, and knowledge features – all facilitating re-use of data.

With user-defined features, Unigraphics NX enables companies to interactively capture and store intelligent part or feature families for re-use. Designers can begin with any Unigraphics NX parametric solid model and add part knowledge in the form of feature variables and relationships between parameters. These intelligent user-defined features can be stored in libraries for easy access in creating families of parts. To create a new standard part or variant, designers simply drag and drop the feature from a library palette into the design window and enter the required parameter values. Unigraphics NX then automatically builds an intelligent solid model based on the stored definition.

Direct modeling extensions - unique technology uses any model. Direct modeling extensions (DMX) in Unigraphics NX enable designers to edit geometric models regardless of their source or the techniques used to create them – native parametric, native non-parametric, or imported. By allowing the immediate use of imported geometry, Unigraphics NX eliminates time wasted on rebuilding or converting data. With direct modeling, designers can work in terms of parametric features without the limitations of a feature history, directly modifying faces and features of any solid topology.

User-defined features in Unigraphics NX enable manufacturers to easily capture and re-use part design knowledge. With simple drag and drop operations, company standard design intent can be applied in new part designs.
Enriched product definition

Design geometry is essential to the development process, but is only a portion of the product information required for engineering and production. Unigraphics NX enables companies to enrich the product definition with other information, both geometric and non-geometric, to benefit downstream development tasks. This includes industry-standard product information, including geometric dimensioning and tolerancing (GD&T), as well as company-specific data. With this “smart model” capability, manufacturers can establish a standard product definition to include items such as surface finishes, weld locations, material properties, notes, process specifications, and even Internet addresses.

By storing product supplementary information directly with the 3D model, Unigraphics NX eliminates the need for searches and makes the information readily accessible for review and re-use. URLs stored with product models can direct users to more extensive product documentation on the Internet or company intranets. Smart models streamline communication of product information between design and manufacturing, and among OEMs and suppliers. The enriched product definition also reduces redundant data entry, and helps eliminate errors attributable to incorrect assumptions or interpretations.
Leading-edge assembly design

Most companies design products, not just individual components. Unigraphics NX supports design in the context of the overall product with the most powerful assembly design solution available. Advanced capabilities include top-down parametric design, unparalleled large assembly capacity and performance, and built-in assembly validation.

Top-down parametric design revolutionizes large-assembly control. The system-level modeling enabled by WAVE technology uses product design parameters for top-down control of large assembly models, from initial conceptual layout through detailed component design. Unigraphics NX captures system-level parameters in templates that control product intent and engineering constraints, such as a vehicle wheel base dimension or the sheet size capacity of a printing press.

With parameterized product templates, companies can quickly create new products or customized variants by re-using knowledge captured in an existing design. Unigraphics NX captures as-built parameters in templates that control product intent and engineering constraints, such as a vehicle wheel base dimension or the sheet size capacity of a printing press.

Integrated assembly analysis - right-first-time. Unigraphics NX provides analysis tools within the assembly design environment that help improve design quality and performance by detecting and resolving problems at their source. Interference and clearance checks detect component and subsystem fit problems at the time they are introduced into the design model. Integrated motion analysis simulates moving parts to reveal functional problems. Designers can also detect problems with weight or centers of gravity with mass properties analysis aids. The built-in analysis tools assure right-first-time design and reduce reliance on downstream mock-up and physical prototyping.

GETTING RESULTS

“WAVE provides us with reusable designs for new engine programs. By initiating and evaluating new engines using these templates, we plan to reduce our overall product development time.”

Mike Bailey
GE Aircraft Engines
Integrated design validation

Manufacturers spend millions of dollars every year firefighting product quality issues and struggling with improper fit, scrap, and rework. A large percentage of build problems and engineering changes are caused by variation and can be avoided by using integrated validation tools. Proactive and interactive validation in Unigraphics NX allows the design process to move forward rather than backtracking to correct errors. Corporate standards and quality initiatives can be maintained through the implementation and assurance of product validation technology.

Tolerance analysis

Quick Stack is a simplified tool targeted at designers who need to perform a quick maximum/minimum tolerance stack-up analysis directly in the CAD design session. Quick Stack directly uses GD&T information applied in Unigraphics NX 3D models and sets them to their maximum and minimum values to perform a simulated worst-case analysis. This analysis estimates overall variation, identifies contributors to variation and provides first-level verification of specified dimensional tolerances. With Quick Stack, companies can improve quality by identifying potential build problems early in the design, and improve productivity with an automated alternative to manual tolerance stack-up calculations.
Validating the integrity of design data

Unigraphics NX uniquely addresses CAD file, geometry, assembly, and drawing data quality with Check-Mate, an innovative validation application that checks CAD files and models for conformance to company, industry, or customer standards. Check-Mate includes tools for creating knowledge-based rules and profiles representing standards for file organization, geometric data types, CAD application settings, and other model and drawing criteria. Management-style reporting provides engineering data quality metrics that support company-wide quality and continuous improvement initiatives.

Quick Check

Unigraphics NX Quick Check provides simple interactive validation as part of the CAD design process. Companies can use Quick Check to monitor mass, weight, critical dimensions and other parameters in part and assembly models, employing automated checks that repeat with each model update. Quick Check provides a simple way to capture engineering expertise in customized checks that warn and guide users with clear messages whenever the checking criteria are not met. With persistent monitoring of key design parameters, Quick Check helps ensure product quality by detecting errors immediately.
Process-specific design applications

Unigraphics NX delivers greater design productivity with process-specific design applications. These special-purpose tools support the workflows, design methodologies and manufacturing processes specific to mechanical components including sheet metal, weldments, composites and routed subsystems. With tailored command environments that embody knowledge of standard engineering practice, Unigraphics NX process-specific applications deliver significant productivity advantages over general-purpose CAD systems.

Accelerated sheet metal design

Unigraphics NX sheet metal design tools significantly reduce the time and effort required to develop components that are fabricated from sheet or plate materials. Feature-based design commands streamline modeling of common formable features for both straight-brake machinery parts, as well as components produced with advanced metal stamping processes. The software uses common fabrication terminology, enabling designers to place flanges, bends, cutouts, beads, corner relief and other sheet metal features.

Using features with built-in process and material information, designers can rapidly design sheet metal parts and evaluate designs in any state of their forming or fabrication sequence. Unigraphics NX embeds intelligence about material thickness and bend allowances to eliminate manual calculations and creates accurate, shop-ready flat patterns for fabrication.

Weld assistant

Unigraphics NX streamlines creation and management of weldments and weld features using knowledge-based technology. With embedded intelligence of industry standards and best practices, Unigraphics NX models common connection features including spot and seam welds and many varieties of arc welds, as well as clinch connectors and joining agents used in typical welding processes. Designers can establish rules and criteria for each weld type to ensure correct placement and modeling of the connection feature.

Weld symbols, annotations, and process notes that are traditionally conveyed from design to downstream processes via drawing annotations can be attached directly to the 3D model for improved communication and re-use. Connection features in the model are read directly by Unigraphics NX structural analysis applications to ensure that welds are appropriately represented in analysis models. Drawings of weldments can be automatically populated with appropriate weld symbols, eliminating manual data re-entry, and drawings dynamically update when the weld specifications are altered. The software supports national and international mechanical design standards including ANSI, ISO, JIS, and DIN.
Designing routed subsystems

Routed subsystems such as wiring and piping are often designed by taking measurements from a physical prototype to determine connections between devices and routes of the connecting parts. Unigraphics NX enables companies to design and optimize routed subsystems based on the digital model earlier in the process, before a physical mock-up is built.

Intelligent, process-aware applications in Unigraphics NX streamline design and manufacturing of the full range of pneumatic, hydraulic, mechanical and electrical subsystems including piping, tubing, conduit, cables, wiring and electrical raceways. Designers can use a combination of interactive and automatic routing techniques to determine the optimal paths. Parametric standard parts libraries speed selection of connecting stock as well as end-connector components.

Unigraphics NX includes interference and clearance analysis tools that automatically highlight problems as the subsystem design progresses, and provides software interfaces to specialized third-party analysis applications. The software automatically calculates component dimensions and Bills of Material, and also prepares process-specific manufacturing documentation and instructions for each type of routed subsystem.

Full associativity between subsystem models and the complete product assembly in Unigraphics NX simplifies design modifications. The subsystem component models automatically adjust in accordance with the design intent when the components they connect are modified or repositioned.

Composites design

The development of advanced composite materials that optimize weight and strength has amplified the demand for composite design tools. Unigraphics NX answers this demand with a knowledge-based system that embodies more than 35 years of composite industry experience. Automating complex laminate design, analysis, and production tasks with embedded engineering rules, Unigraphics NX helps improve design and fabrication quality while lowering engineering and manufacturing costs.

NX ends the grind of ply management. By automating tedious ply management tasks, Unigraphics NX greatly reduces design costs and cumbersome manual documentation of laminate designs. The software automatically produces cross-section drawings and ply-level drawings as well as ply tables, weight reports and other tabular information. Drape analysis and flat patterning are driven by ply material characteristics. Unigraphics NX uses a patented process to optimize producibility, determining the solution for connecting plies among constant thickness regions and sequencing them to minimize manufacturing costs.

Manually producing the resultant finished surface once a part has been cured is extremely time consuming and often inconsistent from one design to the next. Unigraphics NX can predict the shape of the cured surface based on material properties. This feature enables concurrent design of adjacent parts or structures that depend on the finished form of the composite part.
Unigraphics NX includes an Optimization Wizard that finds the optimal design based on multiple engineering variables and constraints.

**Process wizards**

Unigraphics NX includes several process wizards – knowledge-driven applications that capture and apply expert process knowledge to automate and streamline very complicated design tasks. By embodying best practices knowledge in a step-by-step approach, process wizards ensure repeatability, make expert knowledge accessible, and promote the most efficient workflow possible by linking complex technologies and techniques into automated sequences. With process wizards manufacturers can realize order-of-magnitude productivity gains.

**Optimization Wizard**

Unigraphics NX has brought design optimization to the desktop with Optimization Wizard – an automated design exploration tool that helps solve complex engineering problems quicker and with more confidence. Optimization Wizard gives designers a fast and simple method for arriving at an optimal design solution based on multiple engineering variables and constraints. To optimize the design, the wizard automatically iterates through various design alternatives, balancing variables to determine which best meets the specified design objective.

Based on the step-by-step input paradigm, the Optimization Wizard provides an easy, intuitive way to set up an optimization run. First the designer defines the objectives (such as minimized material usage), then identifies design variables (such as feature dimensions) and constraints (such as a constant enclosed volume) that will be used in the optimization. Optimization Wizard can use any variables and expressions associated with Unigraphics NX models, and supports Knowledge Fusion objects as goals, variables or constraints.

Now you can repeat optimization even after changes. Optimization Wizard first determines how the design responds to changes in each variable, then filters, balances and trades off variable values to arrive at a design that best meets the objective within the specified constraints. Once set up, the optimization can be included as a feature within the model's feature tree. This ensures that the model will remain in an optimized state, no matter what detailed design changes need to be made.
Mold Wizard

Unigraphics NX Mold Wizard is the industry’s most powerful tool for streamlining and automating the injection mold design process. Mold Wizard provides expert, highly efficient tools that guide users step-by-step through the mold design process. It captures the process-specific knowledge of mold making, delivering levels of productivity that dramatically outperform conventional mold design tools.

With Mold Wizard companies need not wait until the part design is complete – mold design can begin while the part model is still being developed. Mold Wizard maintains complete associativity between the part model and the mold tooling. Changes made to the nominal part model are automatically propagated to the core and cavity, and any downstream changes are automatically reflected in the mold design. Powerful part comparison and swapping tools help designers quickly assess the impact of part design changes and effortlessly implement them in mold design revisions, regardless of the part model format.

**Moldmakers report 10-to-1 improvements.** Mold Wizard automates the process of examining and defining parting lines and parting surfaces, patching holes and creating the mold core and cavity. Mold Wizard libraries provide quick access to catalogs of mold bases, standard parts and cooling components. Mold makers can easily expand these libraries to accommodate nonstandard components and parametric part definitions.

Unigraphics NX complements Mold Wizard with proven manufacturing technologies, including feature-based machining and high-speed machining that dramatically reduce mold delivery schedules. Through its process knowledge approach Unigraphics NX brings a new dimension in automation and productivity to the mold making industry.
The Progressive Die Wizard in Unigraphics NX streamlines progressive stamping die development with a structured workflow and user interface that embeds expert knowledge and industry best practices.

**Progressive Die Wizard**

The new Unigraphics NX Progressive Die Wizard maximizes productivity through intelligent automation of the stamping die design process. It provides a complete environment that encapsulates die making expert knowledge, providing a user interface that incorporates industry best practices to guide designers through the steps required to build a progressive die.

The Progressive Die Wizard directly uses sheet metal features in part models created with Unigraphics NX and also includes tools for recognizing sheet metal features and rebuilding parametric sheet metal models from imported geometry. The wizard can fold and unfold sheet metal models to help develop the strip layout and assign operation stations in the die, even for complex multiple-row and multiple-part strips.

A new vision in simplicity. Progressive Die Wizard helps ensure quality of the process design as well as the die structure with integrated simulation and analysis tools. Once the strip layout is complete, designers can view a 3D simulation of the strip as it progresses through the process stations until the final part is formed. The wizard automatically calculates stamping operation forces and force centers to ensure die and stamped part quality. The step-by-step approach provides guidance along the way for less experienced die designers.

Customizable libraries of die bases, standard parts and insert groups accelerate die assembly modeling. Progressive Die Wizard automatically produces Bills of Material and associative assembly drawings to expedite die manufacturing.
Integrated digital simulation

Developing exceptional products that meet strict quality and performance criteria cannot be left to chance. Unigraphics NX takes the guesswork and worry out of your product development process with a comprehensive suite of world-class digital simulation solutions. Supporting total performance evaluation – from concept design through prototype testing – Unigraphics NX CAE applications help improve product quality, reduce errors and warranty costs, and eliminate lengthy design/build/change iterations.

Knowledge-driven simulation

Using the Unigraphics NX embedded knowledge engine, companies can readily capture and re-use expert simulation process knowledge to automate engineering analysis tasks. Process assistants can be developed by CAE experts that enable the same process to be executed accurately by new CAE employees or even casual design engineer users in a wizard-like tool. This effectively brings fundamental performance simulation activity into the up-front design process and will support enterprise-wide initiatives to capture in-house knowledge and proven repeatable CAE methods.

Design-analysis associativity

In Unigraphics NX, the CAE digital simulation models are always up to date with the CAD model. Once the design process has started, Unigraphics NX CAE users are advised if the design model is changed, and can update the CAE model automatically to accommodate the changes. This associativity is persistent for individual components as well as assemblies, and ensures that the CAE models and analysis results remain synchronized with the design.

Strength Wizard

The Strength Wizard is a quick, simple-to-use tool within Unigraphics NX that provides fast and easy structural performance indicators of your products. Strength Wizard enables you to use knowledge-based simulation to drive product development from product design through product behavior. Specifically designed for all users of Unigraphics NX, it requires no expertise in the finite element discipline, as full guidance through the simulation process is provided at every step. Solution times are minimized by the use of one of the fastest finite element simulation solvers available today. In addition, web-ready simulation reports are available to distribute results as quickly and as easily as possible.

Fully associative to the design model, the Strength Wizard also ensures that the very latest design information is available for simulation, without the need for any time-consuming geometry translation or data re-creation. Should the design change, the user can simply hit the re-solve button. The original solution will then be updated and the simulation will re-run.
CAD/CAE data management for global design collaboration

CAD/CAE digital prototyping activities create many large data files that need to be managed and shared throughout the enterprise’s engineering organization and even with external suppliers or partners. Within the Unigraphics NX collaborative environments, CAD and CAE models and results files can be easily archived, controlled, shared, updated to reflect design changes, and re-used.

Proven scalability

Unigraphics NX CAE solutions cover the breadth and depth of digital prototyping requirements across a wide range of industry applications and user technical backgrounds – from CAE process wizards for integrated motion simulation for design engineers to advanced finite element modeling and analysis solutions for CAE experts, with links even into the physical testing laboratory environment. Manufacturers can easily configure solutions to best fit the specific digital simulation needs and the skill levels of the product development team.

Unigraphics NX CAE solutions are used to evaluate and optimize products throughout the world by over 30,000 engineers daily in the automotive, aerospace, high-tech electronics, industrial machinery, medical equipment and consumer products industries. These offerings include embedded best-in-class technologies from partners as well as many integrated specialty solutions available directly from a network of over 25 affiliated CAE companies.
Integrated digital manufacturing

While possessing a very comprehensive set of capabilities, Unigraphics NX manufacturing is extremely easy to use. Unigraphics NX manufacturing provides you with process-oriented solutions to optimize speed and production. High-speed machining, multi-axis machining, pre-definable templates and process assistants help you harness all the power of the company’s machine assets, without getting stuck in all the options.

As the world leader in CAM software, Unigraphics NX provides manufacturing tools that meet the changing demands of new processes and new technologies in manufacturing. A wide range of capabilities address the needs of all key manufacturing industries, and focus on process-oriented solutions for industries with requirements that include:

- Planar milling
- 3 axis contour milling
- Multi-axis milling
- Turning and mill/turning applications
- Wire EDM
- Sheet fabrication

Knowledge-driven manufacturing

With Unigraphics NX manufacturing applications, companies capture expert manufacturing process knowledge in templates that can be automatically executed as stored processes. Process assistants can be developed to lead less experienced users step-by-step through complex manufacturing sequences. Knowledge-driven CAM ensures that proven processes can be executed repeatedly, even by non-expert users.
High-speed machining
Unigraphics NX CAM applications pioneered high-speed machining (HSM) technology, working in conjunction with machine tool and controller manufacturers. HSM can dramatically reduce tooling lead time by eliminating EDM and manual polishing process steps.

In-process workpiece
Unigraphics NX includes the automated creation of in-process workpiece geometry. In-process workpiece output saves the evolving workpiece shape from each operation to be used as the stock shape input for the subsequent operation, resulting in much more efficient tool path motion. In-process workpiece also results in more precise visualization of the workpiece.

Feature-based machining
The feature-based hole making leverages Knowledge Fusion rules to relate user-defined features to established tool and machining process information. This capability enables a customer to capture their hole-making best practices and automate the process of creating and optimizing large numbers of hole operations that use similar manufacturing steps and tools. Holes can be automatically selected and machined based on design feature information, significantly reducing tool path creation time. Knowledge-based rules can be established for methods and tooling for automatic generation of optimized tool paths.

CAM Manager
The CAM Manager in Unigraphics NX enables extensive and precise management of all aspects of the manufacturing process. Using CAM Manager, manufacturing setups can be associated with activities in the process plan within a managed environment. When shop documentation, CLS files and postprocessor files are output, they are attached to the appropriate activities and setups in the process plan.
Our experience
Product development in the context of Product Lifecycle Management

EDS offers Unigraphics NX as a comprehensive product development solution within the context of a broad range of software and services offerings that are focused on improving the entire product lifecycle process. EDS’ product lifecycle management (PLM) solutions represent a unified approach to extended enterprise collaboration that enables all participants in your product lifecycle to work in concert as you bring products to market and support your customer base. Product lifecycle management enables you to marshal the skills, expertise, knowledge, and experience of your entire extended enterprise and apply them to every major stage in your product lifecycle to achieve competitive excellence.

In addition to Unigraphics NX, EDS PLM solutions products include the E-factory portfolio of digital manufacturing solutions and the Teamcenter suite of product information management, visualization, and collaboration solutions. These enable manufacturing companies to capture, manage and leverage the huge amount of data generated during a product’s lifecycle and turn that data into information that unifies a company with its suppliers, business partners and customers. Complemented by our world-class Expert team product-driven services, these EDS PLM solutions create a Digital Collaboration environment that ensures our clients will efficiently produce high quality products creating customer value, satisfaction and loyalty.

EDS is the only company capable of providing the complete set of PLM solutions needed to turn your product lifecycle process into a distinct and sustainable competitive advantage.

Contact your EDS sales representative today to learn more about the Unigraphics NX solutions and for information regarding the dramatic productivity gains your company can immediately realize.
About EDS

EDS, the leading global services company, provides strategy, implementation and hosting for clients managing the business and technology complexities of the digital economy. EDS brings together the world’s best technologies to address critical client business imperatives. It helps clients eliminate boundaries, collaborate in new ways, establish their customers’ trust and continuously seek improvement. EDS, with its management consulting subsidiary, A.T. Kearney, serves the world’s leading companies and governments in 60 countries. EDS reported revenues of $21.5 billion in 2001. The company’s stock is traded on the New York Stock Exchange (NYSE: EDS) and the London Stock Exchange. Learn more at eds.com.

About product lifecycle management solutions

EDS is the market leader in product lifecycle management (PLM), providing solutions to the global 1000. Product lifecycle management enables all the people who participate in a manufacturer’s product lifecycle to work in concert to develop, deliver, and support best-in-class products. As the only single-source provider of PLM software and services, EDS can transform the product lifecycle process into true competitive advantage, delivering leadership improvements in product innovation, quality, time to market, and end-customer value.

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