

Streamlining product development with leading-edge technology

eds.com/ideas



NX digital product development solutions

- For companies focused on delivering innovative products with fast time to market, I-deas NX Series delivers measurable productivity gains and immediate NX value.

I-deas® NX Series:
PLM Solutions





Reducing costs, compressing development cycles, and creating innovative products are major challenges facing manufacturers today. As companies embrace global product development and production, the manufacturing enterprise requires expanded virtual engineering teams and fully integrated product development processes.

Success means more than getting there first with the right product. It means designing better products that more precisely meet customer requirements. It means reducing cost while improving quality. It means growing product value with every product release.

To gain a competitive edge, manufacturers must look beyond commodity technologies, isolated tasks, individual efficiency, and point solutions to address the broader issues of product lifecycle productivity.

EDS helps manufacturers excel with I-deas® NX Series, a proven solution that empowers companies to design, simulate, and manufacture products in an integrated digital environment.

Introducing I-deas NX Series

I-deas NX Series gives companies the advantages of a master model-based approach to product development. A comprehensive suite of solutions easily tackles the most complex product designs and encompasses the entire digital product development process. The master model enables manufacturers to design, simulate, optimize, document, build, and test products within an integrated digital environment. As a result companies can maximize innovation and product quality, while minimizing time to market and costs.

Improving productivity throughout product development

I-deas NX Series delivers measurable productivity gains to customers via both new and enhanced technologies. In collaboration with its customers, EDS has delivered improved functions aimed at streamlining the day-to-day practical workflows of customers developing complex and challenging products. For product design, I-deas NX Series delivers a robust suite of tools that address the most complex geometric modeling and editing tasks, for both parts and assemblies. For digital simulation, I-deas NX Series redefines high-performance CAE with extended capabilities for geometry abstraction, finite element modeling, and analysis. For manufacturing, I-deas NX Series offers power and flexibility by providing proven CAM applications within I-deas as well as leveraging NX Gateway to integrate I-deas design tools with the industry-leading NX manufacturing application.



❖ The NX strategy for digital decision making



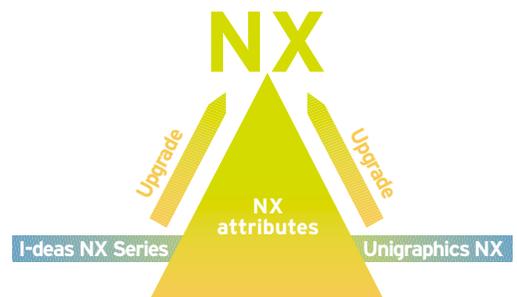
The EDS strategy for NX is to evolve to a next generation product consisting of best-in-class technologies built on a production proven platform. The core of the NX strategy is leveraging the appropriate technology elements of the two production proven, high-end Mechanical Design Automation products from EDS, I-deas and Unigraphics. The end result will be a single, industry-leading product suite that uniquely addresses both current and future product development and manufacturing imperatives.

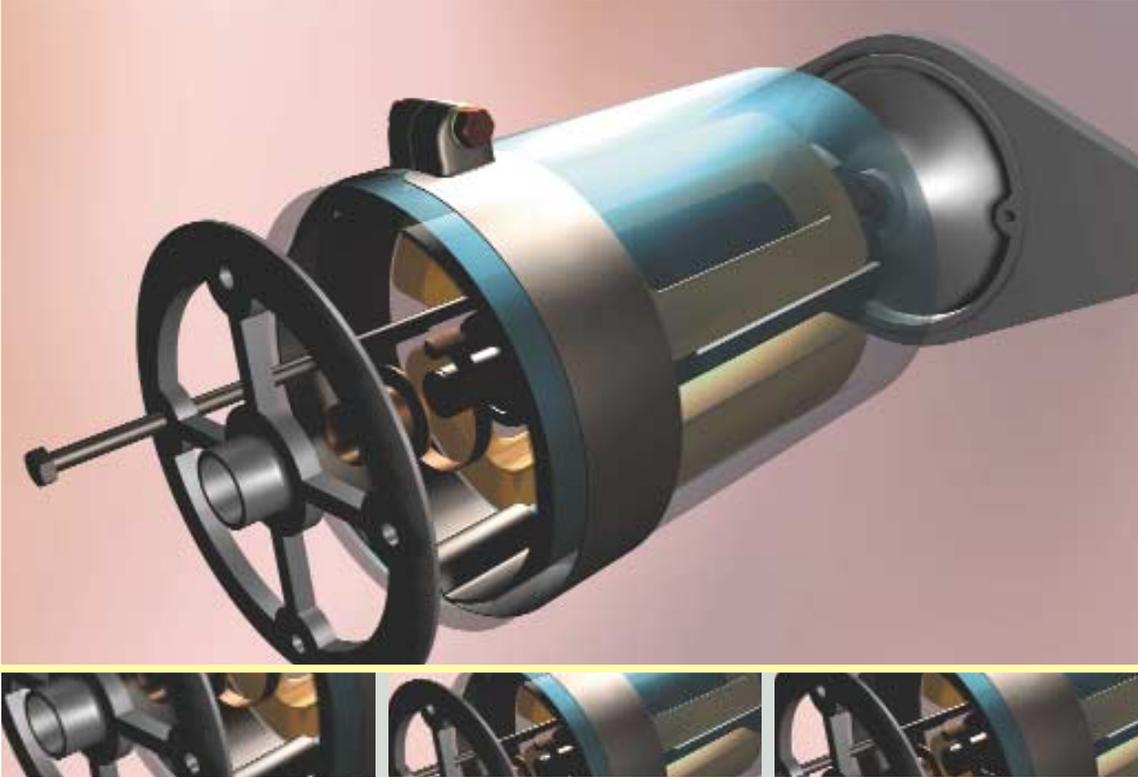
Evolution of excellence approach

The path to NX for existing I-deas and Unigraphics customers is an evolutionary approach, with changes appearing in current products over several releases. EDS believes that this evolutionary approach is better than a revolutionary one, resulting in both fewer disruptions in day-to-day customer processes, as well as a higher long term return on investment in terms of productivity. Existing customers can expect smooth upgrade paths from their current solution to NX.

Preserving customer investments in data, applications, and training

EDS is committed to preserving its customers' current investments, and recognizes that these investments come in many forms – explicit costs of software and hardware, as well as implicit costs of things like organizational learning curves and process optimization. The NX strategy includes the appropriate tools and timeframes to preserve a high level of customer investment while quickly delivering new technologies that will best position your organization for the future.





Data: The NX strategy includes the tools needed to preserve native data items including geometry, assembly information, part-drawing-assembly relationships, features, annotation, and other critical process information.

Applications: Customers active on maintenance have access to equivalent NX software modules as a standard “version up.” Best-in-class applications that customers have become so productive with today in both I-deas and Unigraphics are carried forward into NX.

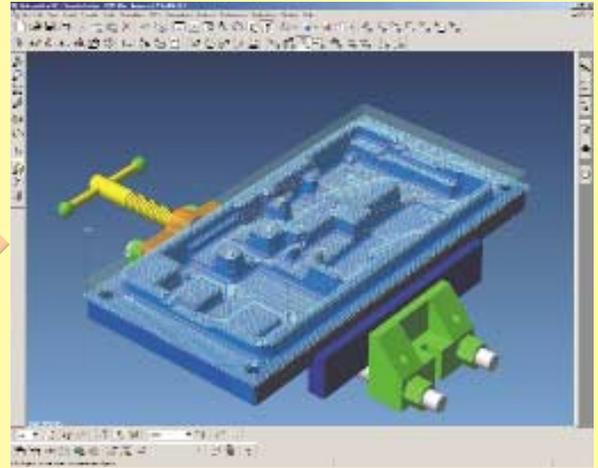
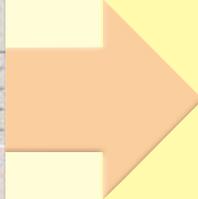
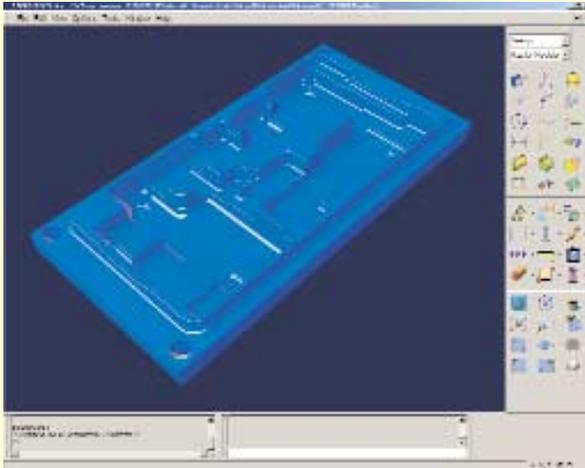
Training: The NX strategy leverages user interface and workflow usability concepts from both I-deas and Unigraphics, such that users productive on current products will preserve much of their current learning curve and productivity while versioning up to NX. Usability changes to the software are occurring over multiple releases, both to lessen the impact of one time changes, as well as to incorporate corresponding technology elements which deliver productivity gains.

NX Gateway lays the foundation for long-term data preservation

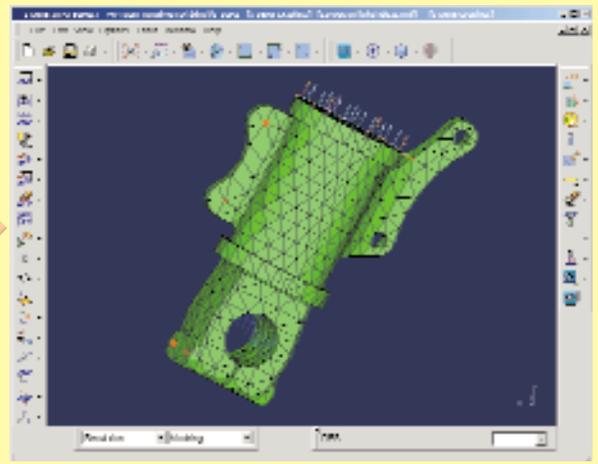
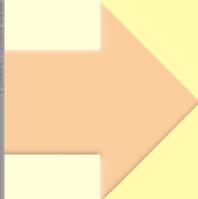
NX Gateway enables a deep level of associative interoperability among EDS products, including I-deas NX Series, Unigraphics NX, Solid Edge®, and Imageware™.

NX Gateway provides an expanded set of capabilities to customers to benefit their current workflows. For example, I-deas design customers can implement industry-leading NX manufacturing capabilities from the Unigraphics NX product in a seamless fashion. Likewise, Unigraphics design customers can augment their processes using industry-leading NX digital simulation capabilities from the I-deas product. In either scenario, a high level of design intent is preserved such that downstream operations are completely associative to design changes. NX Gateway allows the NX product family to work together in a tightly integrated fashion.





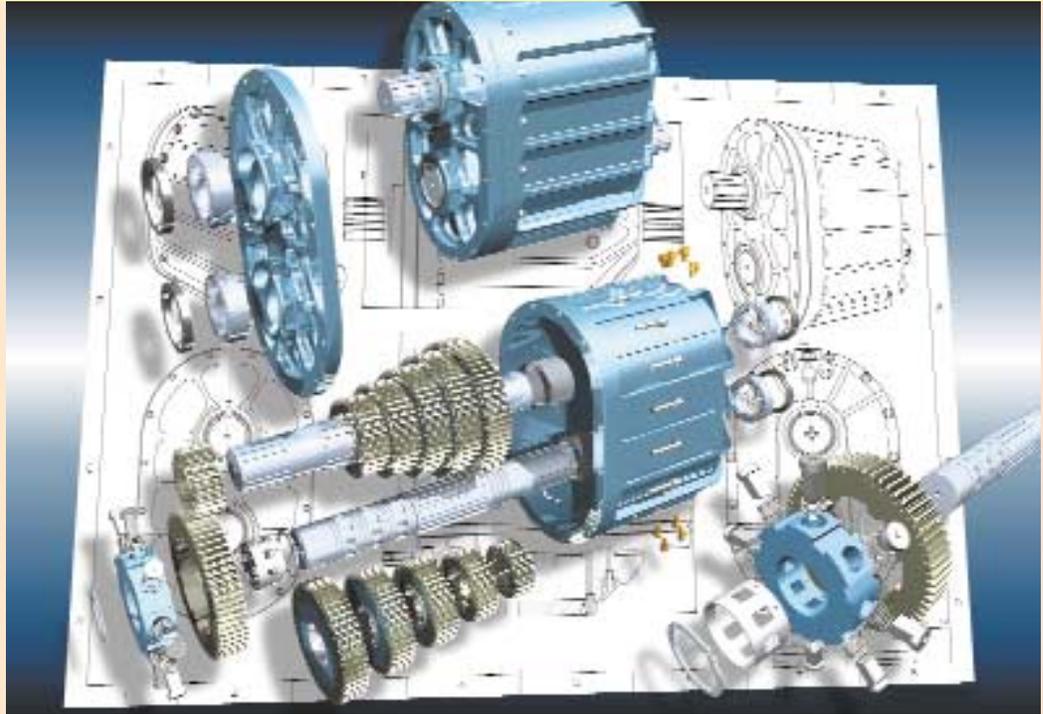
With the NX Gateway technology, customers using I-deas NX Series for design can seamlessly interoperate with industry-leading manufacturing solutions in the NX portfolio.



The NX Gateway technology allows customers using Unigraphics NX for design to seamlessly interoperate with industry-leading I-deas simulation solutions.

NX Gateway is built on the industry-leading Parasolid® modeling kernel and PLM XML – a public format for describing product structure and associated product data and visual representations.

NX Gateway also lays the technology foundation necessary to enable long-term data preservation. By ensuring that native data types from both I-deas and Unigraphics are able to be exchanged seamlessly between the two now, the resulting NX product will also carry forward these capabilities.



The power of master models

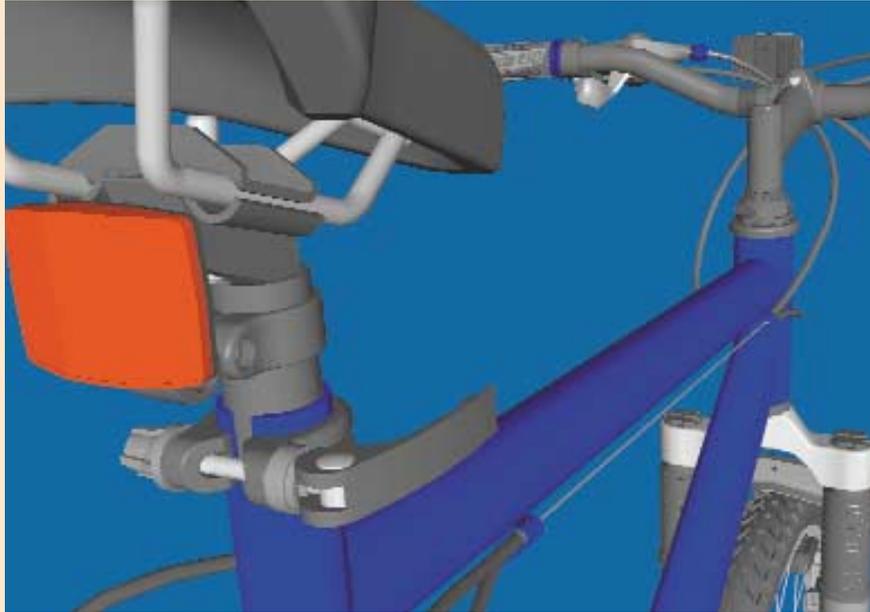
With I-deas NX Series, companies reduce development time and costs and improve quality by building a master model that supports the entire product development process. With powerful geometric modeling, assembly modeling, 3D annotation and 2D drafting functions, customers of I-deas NX Series can fully document and communicate all of a product's attributes in an innovative, interactive, and understandable environment. Associativity built into the master model allows easy update of downstream applications when design modifications are made.

I-deas NX Series delivers a comprehensive suite of design tools – solid modeling, surface design, assembly and mechanism modeling, and special-purpose applications such as sheet metal and harness design – in one versatile, easy-to-use environment. I-deas NX Series also provides unique functionality to document and communicate both 3D models and 2D drawings for the extended enterprise. The 2D and 3D tools can be used together in an integrated process, or in independent activities as your process requires.

Improving the design workflow

I-deas NX Series improves the workflow, process efficiency, and productivity of designers. I-deas NX Series continues to deliver new and enhanced functionality for initial creation, as well as design modification, with more robust tools that handle a broader range of complex geometric modeling cases. Directly responding to the advanced design requirements of customers, enhanced capabilities deliver measurable improvements while maintaining familiar ease of use.





Innovative part components technology within I-deas NX Series provides the user with a new way to address complex designs. Part components enable design teams to quickly substitute design alternatives to facilitate engineering decisions. Complex parts can be divided into logical segments and designed separately by one or more designers in the context of the overall part, with full associativity.

I-deas NX Series improves modeling efficiency with more robust feature creation and editing tools, including advanced filleting and simplified construction operations. Fillet rollover is a significant capability, helping customers to fully define their most complex parts digitally. For greater assembly design productivity, I-deas NX Series includes assembly reflection capabilities that significantly accelerate modeling of symmetrical assemblies with mirror-image and repositioned parts.



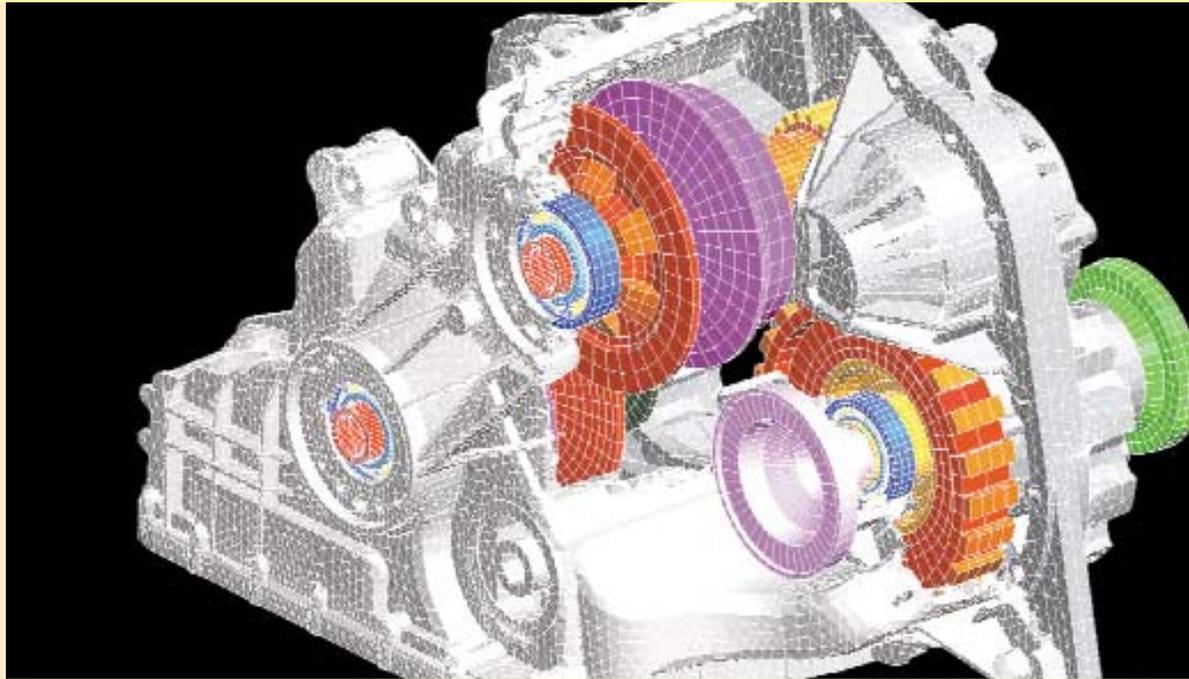


Comprehensive tools for design modeling

I-deas NX Series offers a comprehensive suite of 2D and 3D design solutions:

2D drafting	The powerful drafting tools in I-deas NX Series can be used to document solid models, or as a standalone high-performance 2D drafting system.
Model annotation	I-deas NX Series includes tools for annotating the 3D solid model with additional data, including product manufacturing information. Enriching the model with information for downstream processes enhances communication and supports paperless collaboration.
3D design	I-deas NX Series includes a core high-performance 3D design system and multi-purpose geometric modeling foundation that creates geometry for use in other I-deas applications such as simulation, drafting, and manufacturing.
Advanced surfacing	<p><i>Surfacing</i> – advanced surface modeling features complement the robust solid modeling available in I-deas NX Series, simplifying and accelerating design and modification of products with complex sculptured surfaces.</p> <p><i>Freeform modeling</i> – provides a comprehensive set of tools for freeform product design including rapid surfacing, surface inspection, polygonal modeling, surface healing, and Class-1 surface modeling.</p>
Assembly	I-deas NX Series enables multiple team members to work together to lay out, design, and manage large mechanical assemblies, using a top-down approach. The assembly environment supports packaging and interference studies to shorten design time and improve quality.
Sheet metal design	Sheet metal features automatically incorporate bend tables, stress relief, and shrinkage allowance into solid models, accelerating design and evaluation of sheet metal parts.
Harness design	Harness design provides specific capability for the design, routing, and documentation of cable and wire harnesses.
Mechanism design	Mechanism design provides integrated capability for creating articulated mechanisms and simulating complex motion.

🔗 Digital simulation



Model abstraction and section meshing functions in I-deas NX Series reduce simulation cycle times and enable re-use of simulation data when changes are made to the design.

I-deas NX Series helps ensure the quality and validity of finite element models with a new checking display that provides immediate, dynamic feedback on mesh parameters.

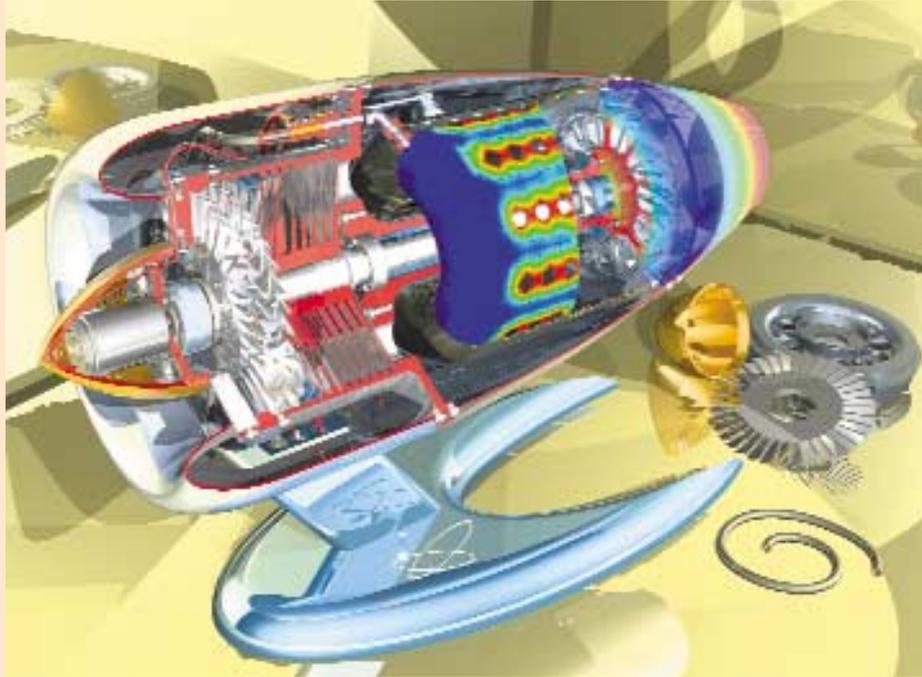


Digital simulation applied early in the development process guides design decisions and directs resources more efficiently. I-deas NX Series suite of simulation solutions leads the industry in helping customers reduce time to market, boost product quality, reduce product failures and warranty costs, and minimize product development expense. I-deas NX Series continues to raise the standard for high-performance CAE, both in breadth and depth of capability, building on a 35-year heritage in the simulation industry and the experience of more than 20,000 simulation engineers worldwide.

Raising the standard for high-performance CAE

NX MasterFEM from I-deas boosts simulation process efficiency by providing best-in-class CAE tools while also improving design/analysis integration and interaction, and by managing simulation data in a CAD-integrated structure. Enhanced tools enable engineers to begin the analysis modeling process earlier in development, and readily re-use analysis data when changes are made to the product design. Improved automated meshing and abstraction tools dramatically reduce finite element model creation time. NX MasterFEM also verifies the validity and quality of analysis models prior to solving to ensure accurate simulation results. In addition to the broad integrated CAE capabilities, NX MasterFEM also supports an extensive range of system-level simulation tools through interfaces to widely used third-party analysis programs.

Built on decades of experience and technology innovation, the I-deas simulation capabilities are the foundation for best-in-class advanced digital prototyping and simulation capabilities within the NX environment – for today and in the future.



Knowledge driven digital simulation and the NX Vision

NX Gateway is your passport to a broad range of advanced-technology CAE solutions. Leveraging the master model concept across both CAD and CAE applications, design engineers and analysts can rapidly evaluate new design concepts as well as validate detailed design prototypes against a wide variety of performance criteria – all in an integrated, CAD-associative and data managed digital environment. This can be accomplished within a homogeneous I-deas CAD/CAE environment or a heterogeneous Unigraphics CAD and I-deas CAE environment.

NX Gateway is your passport to a wide range geometry-based model creation/editing and abstraction capabilities as well as a full range of “bottoms up” 2D and 3D FE modeling capabilities that address virtually any advanced simulation challenge. Reduction in overall FE modeling process time and in understanding the analysis results quickly is an on-going focus of new enhancements to the software, many of which are identified and validated by current I-deas simulation users.

Openness is a key philosophy of the I-deas environment as many customers access CAD data from multiple systems and integrate their CAE processes

around a common modeling tool and data format, while still using other industry-standard solvers such as Abaqus, Ansys, LS-DYNA and Nastran.

Complete CAE toolkit for advanced simulation solutions

I-deas NX Series delivers the broadest range of integrated geometry-associative digital prototyping and simulation capabilities in the industry.

These include:

Structural solutions

- Linear and non-linear finite element structural analysis
- Laminate composites analysis
- Durability, strength and fatigue safety analysis
- Dynamic response analysis
- Variational analysis
- Mechanism dynamics simulation

Fluid and thermal solutions

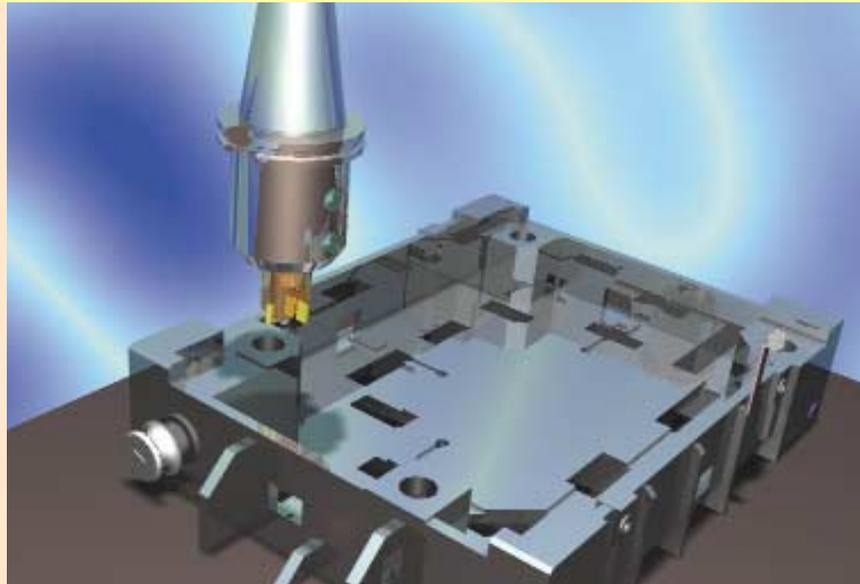
- Coupled thermal/flow analysis for high-tech electronic systems and components
- Thermal analysis for conduction, convection and radiation effects

Plastics solutions

- Flow, cool and warp simulation of injected molded plastic parts

Test and acoustics

- Test data acquisition and analysis
- Test/analysis model correlation and updating
- Vibro-acoustics analysis

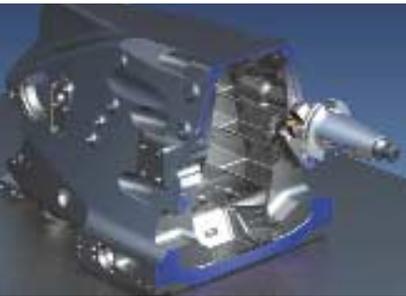
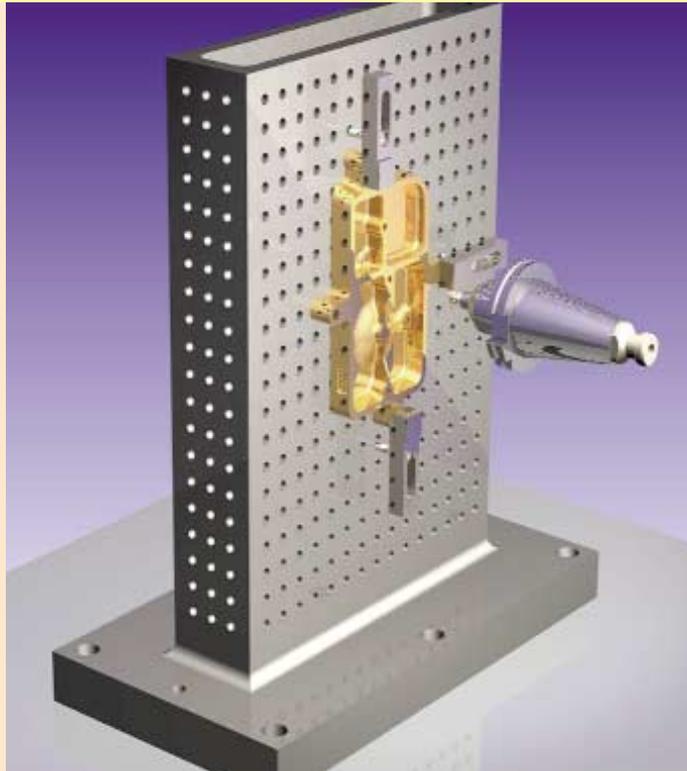


CAM applications in I-deas NX Series provide multi-axis milling and turning capabilities integrated with the same master model as the rest of the I-deas applications. I-deas assemblies are the foundation for the CAM applications, so complex machining environments can be fully assembled and visualized for motion and interference. Clamps and fixture elements are automatically avoided, and user-developed transition moves further ensure that complex motion is performed safely.

The benefits of integration begin with the ready geometry of the master model and compound with every change encountered. Engineering changes, the perennial disruption in manufacturing operations, are easily accommodated since the I-deas parts and assemblies are updated directly in the manufacturing environment. Process changes are also easy to manage with the NC job management functions in I-deas.

Machining needs are met with a complete selection of cutting patterns that include highly automated roughing and finishing approaches as well as curve and edge based machining that lets the user specify motion very explicitly. In-process models allow for efficient multi-stage roughing. Milling patterns include volume roughing, z-level finishing, contour finishing, flowline (interpolated strokes) finishing, and a full complement of curve and edge based patterns. Turning offers rough and finish patterns for outer diameter turning, facing, inner diameter turning, boring, grooving, and threading. A comprehensive hole-making capability can be automated to take advantage of existing design data, or customized with the user cycle to handle unique holemaking needs.





Knowledge driven digital manufacturing and the NX vision

NX Gateway is your passport to a broad range of advanced-technology manufacturing solutions. Using the master model in CAM applications, manufacturing engineers can complete fixture and tooling design and optimize manufacturing processes in an integrated, CAD-associative digital environment.

Founded on decades of experience and global leadership, NX CAM from Unigraphics is the most comprehensive set of manufacturing solutions available, used by more than 22,000 manufacturing engineers worldwide.

NX CAM has a wide range of capabilities that address virtually any manufacturing challenge, with process-oriented solutions for planar milling, 3-axis contour milling, turning and mill/turning, wire EDM, and sheet fabrication. Leveraging advanced technologies like high-speed machining, feature-based hole making, simultaneous multi-axis machining, pre-definable templates, and process assistants, the NX CAM solutions help you harness all the power of your company's machine assets.

Complete toolkit for manufacturing process optimization

NX CAM solutions help manage manufacturing resources with integrated libraries providing comprehensive tool, machine, feed, and speed management. With simplified operation navigation and process assistants you can quickly view and manage manufacturing process relationships including operation sequence, geometry selections, machining methods, and cutting tools. Visualization and simulation of material removal and machine motion enable you to refine manufacturing processes digitally, before committing machine, tool, and material resources. NX CAM also accelerates manufacturing process documentation – including setup sheets, operations sequence information, and tool lists – to get your designs into production in record time.



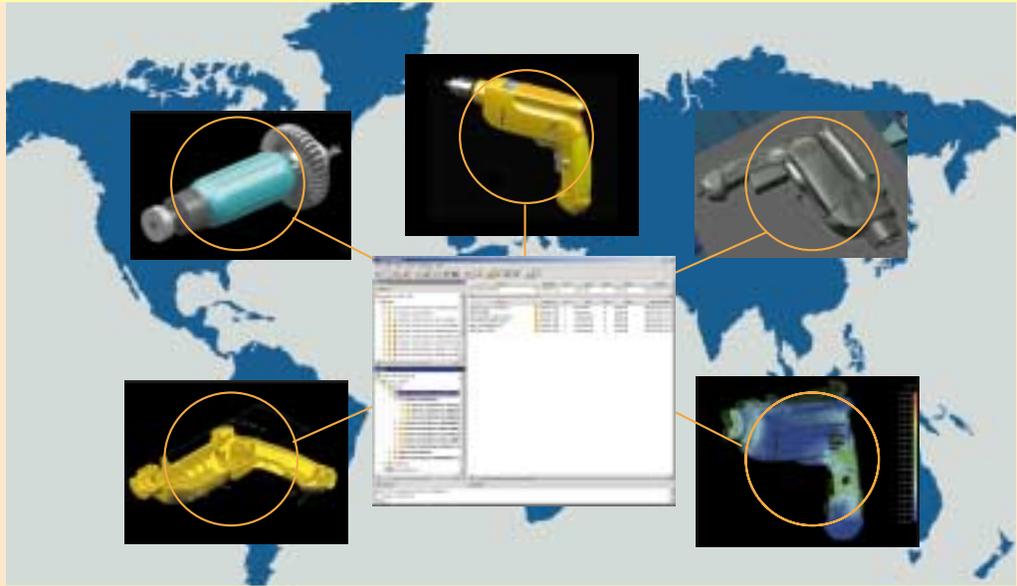
Integrated data management



Integrated data management is essential to collaboration and productivity in product development teams. Effective data management systems control all part and assembly models, drawings, engineering analysis models and results, manufacturing data and other product information so that it can be effectively shared and communicated throughout the development process. Through concurrent associativity, downstream applications such as drawings, CAE results, and NC toolpaths are fully associative to the master model while transparently distributed to design team members.

I-deas NX Series offers a range of scalable data management solutions that enable effective collaboration and communication among small workgroups as well as extended enterprises. Team Data Manager, an integral component of I-deas NX Series, provides the core management tool for I-deas product information in workgroups and departments. It controls parts, assemblies, drawings, analysis models and results, and other application data.

With Team Data Manager, companies using I-deas can readily establish shared workspaces and project databases to structure and control product data. Through shared data, role-based access, check-in and check-out, and revision tracking, Team Data Manager facilitates collaborative, concurrent team work throughout the development process, giving all team members access to the most up-to-date product data. Team Data Manager can also be directly accessed from a Unigraphics NX environment, allowing customers with mixed environments to access and navigate I-deas projects, libraries, and item versions in conjunction with NX Gateway.



Teamcenter™ solutions

Customers looking to move beyond the Team Data Manager capabilities in I-deas and local site data management are served by a scalable set of Teamcenter solutions for CAD/CAM/CAE data management and more. Working in conjunction with I-deas, Teamcenter provides geographically distributed data sharing for multiple site installations, unlimited scalability in terms of data and numbers of users, integrated visualization tools, and multi-CAD collaboration.

Teamcenter delivers enterprise-wide data management that addresses all stages of the product lifecycle. Teamcenter provides enterprise teams with the vaulting, global sharing, and management capabilities they need to capture, manage, and leverage geometry and engineering data created by multiple CAD, CAM, and CAE systems.

Teamcenter also enables customers to augment engineering data with product information derived from other mission-critical systems, including requirements management, project

management, ECAD, software integration, document authoring, document management, ERP, and maintenance, repair, and overhaul (MRO) systems.

Teamcenter solutions are built from the ground up to let you leverage the Internet for product lifecycle management, enabling everyone who works in your global enterprise to share your product knowledge, align their product assumptions, and participate in automated business processes through a secure and protected Web-native environment.



About EDS

EDS, the leading global services company, provides strategy, implementation, business transformation and operational solutions 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 2002. 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. Learn more at eds.com/plm.

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