NX I-deas Master Modeler

Benefits
- Complex parts can be represented digitally, accurately reflecting physical geometry
- Interprets and captures the intended design intent of the user
- Enables quick and easy design modifications

Features
- Hybrid environment for designing both open surface and closed solid geometry using a consistent set of operators
- Wireframe construction tools with sketching and intelligent constraint definition
- Complex three-dimensional geometry definition tools including fillet, shell and draft
- Feature-based geometric modeling tools that capture design intent in a replay-able history structure
- Embedded tools like selection intent that capture a high level of design intelligence and support robust modification and replay
- Interoperability tools to open or share part geometry directly among the NX product family

Summary
NX™ I-deas™ Master Modeler software is the core design module for the NX I-deas product set, providing comprehensive three-dimensional solid modeling capabilities for companies designing complex parts. Master Modeler includes powerful tools for capturing design intent in part features, which are easily edited and updated to support real-time design modification processes. The NX I-deas design environment supports a mix of solid and open-surface geometry using the same set of design-intent driven operations. Three-dimensional models designed in Master Modeler are the basis for all downstream activities in NX I-deas.

Foundation tools for feature-based, variational solid modeling
Master Modeler is a high-performance 3D design system, and is the multi-purpose geometric modeling foundation of NX I-deas. You work with a user interface tuned for productivity to design complex mechanical parts in an intuitive feature-based solid modeling environment. The solids-based approach aids design productivity by simplifying construction of complex geometry, facilitating design changes, automatically removing hidden lines, directly calculating mass properties and providing an accurate part definition for NC machining. In addition to being a design system, Master Modeler is also the common geometric modeling foundation of NX I-deas. Three-dimensional models designed in Master Modeler
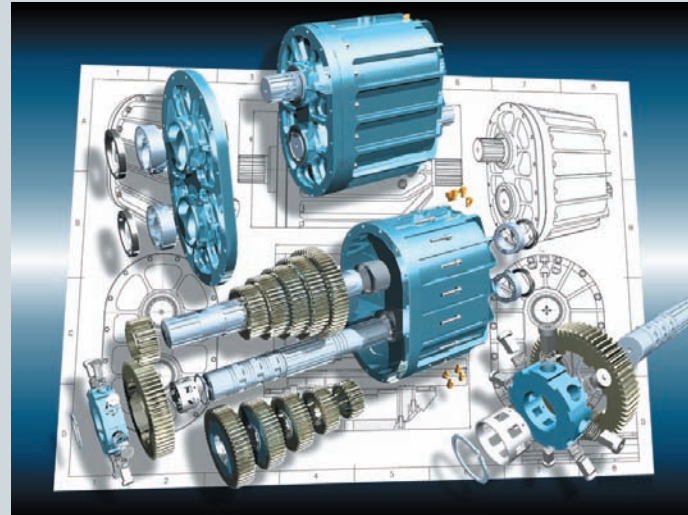
Master Modeler provides a complete suite of feature-based variational solid modeling tools to increase the productivity of designing the manufacturing components of any complexity.

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NX I-deas Master Modeler

are the basis for all downstream activities in NX I-deas, including assembly modeling, advanced digital simulation, digital manufacturing and two- and three-dimensional annotation and documentation.

An integrated data management system provides the foundation for concurrent engineering by maintaining associativity across the master model, assemblies, 2D drawings and finite element models. Just one instance of a part in the master database can drive any number of associative, linked application studies, such as assembly packaging models, layout and detailed drawings, stress calculations and design optimizations.

Part modeling
Master Modeler is the core, feature-based, variational modeler for complex associative geometry creation with options including open part or solid geometry, variational constraints, variational and parametric design features, associative coordinate systems and engineering equations that drive the geometry. Feature geometry may be constructed "in place" or positioned "with relations" to other geometry. The "dynamic navigator" anticipates user intent and pre-highlights geometry and constraints, making part modeling easy and efficient. "Material side" allows construct operations on open parts. Construct operations include the common

operations of add, cut, join and intersect; as well as more advanced operations such as partition, join with partition, merge volumes, stitch surfaces and split surfaces. These operations are supported between discrete parts or within a single part. Advanced features such as variational sweep allow the user to model very complex shapes in a single feature that may be impossible or require many steps to model in other systems.

Part modification
The graphical history tree browser in Master Modeler makes part modification easy. You can change the construct operation type; modify the wireframe sketch; delete, suppress or replace a feature; modify feature parameters; or associatively copy a feature within the part. The person making modifications to a part is often not the same one who originally designed the part. The replayable design history helps others understand how the part was modeled and the original design intent of the part features. Features can be renamed to identify key features in the part history and convey their design intent. Search capabilities allow you to easily find features within a complex part history. You can rollback to an earlier feature in the history, allowing you to insert features at this point, then update the part to include the remaining features.

Part investigation
- Part diagnostic tools allow you to execute a series of checks on a part. If the diagnostics find problems, NX I-deas launches a special browser that lists the problem entities and defines the problems in greater detail. The browser will interact with the part helping you see where the problems lie. You can save these diagnostics to an html or XML file
- Part compare allows you to compare the geometric and topological differences between two parts, or two versions of a part
- Material properties allows you to easily calculate engineering properties such as mass, volume, surface area, moments of inertia, etc.

Part components
Part component features combine the associativity of a "linear" tree structure with the performance advantages of a "bushy" tree structure. Commonly used shapes can be constructed and saved as part components. These components can then be joined to the part as separate history branches and they are also easy to edit or replace. Replacement includes associative source-to-target mapping, insuring accurate part updates. When part components are used with feature copy, much more associativity can be achieved and model complexity significantly reduced.

Standard parts catalog (optional)
- Separately priced, optional module contains solid models of commonly used, international standard fasteners
- The catalog includes thousands of nuts, bolts, washers, screws, rivets, etc. and supports various international standards including ANSI, ISO and JIS
- An intelligent, table-driven user interface allows parts to be selected just like from a manufacturing handbook or catalog
- A graphical previewer shows a detailed drawing of the part and the table of available sizes
- Reference geometry on the standard parts simplifies part positioning within an assembly
- User-defined part attributes allow adding information to the parts to meet company specific standards

Data translators
A variety of data translators are included, or are optionally available within Master Modeler, for both data import and export. Data imported into Master Modeler can serve a wide range of uses. Variational constraints can be applied directly to planar geometry, which can then be used for creating solid models. You can also use 2D and 3D part data for machining operations, for direct meshing of data for finite element analysis or for plastics flow

simulations, and as the basis for solid parts and assemblies. Complete representations of a part defined as trimmed surfaces can even be stitched automatically into solid parts during import. Solid parts in the form of a B-rep can be used directly in the design process as parts in an assembly, as the basis for a finite element mesh or for machining purposes. Additional processing options are available so the system can be configured to meet the changing needs of the data files you encounter.

Available data translators include:

3D IGES data translator
3D IGES data translator provides you with an accurate and flexible mechanism for generating and processing ASCII formatted IGES files. The data translator focuses on importing and exporting 3D graphic data between Master Modeler and other CAD/CAM/CAE systems. This exchange of data provides your organization with a more open and dynamic system to meet the demanding requirements of a concurrent engineering environment.

VDA-FS data translator
VDA-FS data translator provides a mechanism for directly transferring geometric data between the Master Modeler and other applications. Using the translator you can import and export 3D

wireframe and trimmed surface data to and from NX I-deas. This translator provides an interface standard to transfer free form surface data to meet the requirements of the automobile industry. In support of this standard, the translator has proven useful as a means of data transfer among automobile manufacturers and their suppliers and toolmakers.

STEP data translator
The STEP Data Translator imports and exports data in the STEP format. STEP (Standard for the Exchange of Product Data) is an international standard for representing product data established by the ISO (International Standards Organization). Assembly structure and part level information as well as solid, surface and curve geometry is supported. Attribute support includes color, groups, geometric validation properties, coordinate systems and reference geometry. The STEP translator supports two application protocols designed to translate data for certain industries:
- AP203 (configuration control of 3D designs) is based on the config_control_design schema, which is an ISO international specification (IS)
- AP214 (automotive mechanical design process) is based on the automotive_design schema, which is an ISO international specification (IS)

SET data translator
SET data translator provides a comprehensive mechanism for importing and exporting SET (Standard d'Echange et de Transfert) data files. The SET translator provides a broad range of support for many of the standard SET entities. This includes support for wireframe and trimmed surface entities, as well as the B-rep solid entity. For export, SET data translator supports a number of predefined data flavors to facilitate the varying data structures of a wide range of software applications.

Rapid prototyping (STL) data translator
Using Master Modeler solid models as the foundation, geometry is translated to an STL format file (a standard rapid prototyping file format), which can then

be read into most of the industry-leading rapid prototyping machines. The rapid prototyping machines use this STL information to build prototypes one layer at a time from the vat of raw material, providing production prototypes within hours of creating the design.

NX I-deas scalable core modeling options
Siemens offers a scalable range of core, solids-based modeling products that enable you to match price point and collaboration level to your requirements. Three levels are available: NX I-deas Artisan Modeler; NX I-deas Product Design Package; and Master Modeler, NX I-deas Master Assembly and NX I-deas Master Drafting. The modeling, assembly and drafting functionality included in each of these core offerings is the same. These core NX I-deas products are differentiated by the level of NX I-deas Team Data Manager (TDM) functionality provided, and by the packaging of concurrent licensing available for each application task.

Any of the optional modeling or data translation modules may be added to each of these core modeling options.

Artisan Modeler
Artisan Modeler is the entry-level core NX I-deas offering. Artisan Modeler includes all the 3D solid modeling functionality of Master Modeler, all the assembly modeling features of Master Assembly and all the 2D drafting functions of Master Drafting. The NX I-deas Artisan Package contains: Master Modeler; Master Drafting; Master Assembly; 2D and 3D IGES, SET, VDA, DXF and RPT translators; TDM Basic, Material Data System, Plotting; 2D Tolerance Analysis; and AutoCAD Data Translator. The STEP data translator is available as an optional module. Artisan Modeler provides basic Team Data Manager capabilities that allow data sharing among small engineering teams.

Artisan Modeler is secured as a single bundle of tools using a named user licensing methodology.

Recommended system configuration
For information on particular operating systems or graphics cards, please visit: http://support.ugs.com/online_library/certification/

Product Design package
Product Design package includes Master Modeler, Master Assembly and Master Drafting. Product Design package provides full Team Data Manager capabilities to enable collaboration within an engineering team.

Product Design package is licensed as a single bundle of tools using Concurrent Simultaneous User (Floating) methodology.

NX I-deas
NX I-deas provides individually licensed floating tools for each Master Modeler,

Master Assembly and Master Drafting application. Each of these is unbundled for maximum flexibility and the highest level of collaboration. NX I-deas also provides full Team Data Management capabilities, allowing collaboration throughout the entire engineering team.

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