NX Design

Making Product Design Faster & Easier With NX

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Part Modeling Strategy

Capture and re-use product and processes knowledge through a work environment tailored to the way you design products.

Direction

- Streamlined and efficient workflows
- Usability
  - Ease of use
  - Capability
  - Productivity
- Reusable Design Elements
  - Copy/Paste & User Defined Features
  - Change propagation
  - Embedded product & process knowledge
  - Embedded validation
Topics – NX 4 Design

- Usability
- New features / commands
- Sketching and 2D design
What is Usability?

The three key measures of the ultimate system

- **Ease of use**
  How easily can I learn the system? Is it discoverable? consistent? guiding?

- **Capability**
  Is it capable of doing all of the things I need it to do?

- **Productivity**
  Can it do them in less time?
Usability Factors

Usability = Discoverability + Consistency + Capability + Productivity

The different factors have different importance at different points in time.

Productivity: Can I get my job done quickly.
Capability: Is the system able to do the things I need.
Consistency: Do similar functions work in similar ways.
Discoverability: Can I find the functions I need, and understand them.

Graph showing the importance of usability factors over time.
Gap analysis

**NX Vision**

**Incomplete picture**
Interaction is easily learned and all tasks can be completed

**but...**
lack of productivity means the task cannot be completed efficiently.

**Conclusion**
Easy to use but long term ROI is limited by lack of productivity.

**Mid Range**

**Incomplete picture**
Interaction is easily learned and can be completed efficiently

**but...**
lack of capability means not all tasks are possible.

**Conclusion**
Easy to use but long term ROI is limited by lack of capability.

**Old Unigraphics and I-deas**

**Incomplete picture**
Capability exists to complete all tasks in an efficient and productive manner

**but...**
lack of ease of use means the system is hard to learn and may require expert users.

**Conclusion**
Capable and productive but ROI is affected by lack of usability.
Productivity + Capability + Ease of Use = Ultimate System

Most capability in the least time by the most people

**Complete picture**
- System is easy to learn and use
- Can complete any task
- High levels of efficiency

**Conclusion**
- This is the ultimate solution!
Usability Progress in NX

Start of initiative

NX 1
- UI Simplification
- Resource bar
- Drafting usability
- Templates
- Sketcher improvements

On-screen controls

NX 2
- Snap point tool usage
- Global selection filtering
- WCS tool
- Snap view
- Part Navigator
- UI efficiencies
- SQV Wizard
- Cut/copy/paste
- Materials & textures
- Multiple graphics windows

Command usability

NX 3
- High quality icons
- Menu customization
- Customer Defaults interface
- Radial popup menus
- Global Selection
- Multiple Graphics Windows
- Dynamic view placement
- PMI enhancements
- Design Logic
- Dynamic Extrude
- Dynamic Revolve
- Blending with NXUM
- Associative lines and arcs
- Better UDF and Copy/Paste
- Improved spline creation and editing
- Styling functions with new NXUM
- X-form improvements

Consistency and discoverability

NX 4
- Role based UI layout
- Selection modes consolidation
- Multi-pixel highlight
- Quick Pick
- Edit with rollback
- Text under icons
- NXUM in shell, offset, trim, chamfer, etc.
- Common service for in-line sketching
- Datum Plane
- Consistent dimensioning (drafting/sketcher)
- Sheet metal (Dimple, louver, etc)
- GD&T Editor
- Ordinate dimensions
- PMI – single point of access
- Inferencing during ‘drag’ in sketcher
- Multiple colors in sketcher
- Unconstrained mode in sketcher
- Sketch constraint colors
- Emboss (new function)
- V-Sweep (new function)

Planning in progress
- Dialog consistency
- Help and Guidance
- File & template access
- Command flow
- Etc, etc

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NX 4 - Ease of Use

Goal Projects

Improved Selection
- Combined selection mode

NX Usability Model Propagation
- Upgrade primary NX features to the NX Usability Model

Role Based Layout
- Simplified menu and icon layout
- Improved NX customization

Edit with Rollback
- Option to edit features in the same state as creation

QuickPick

NX Usability Model
Capability in NX 4

- Combines multiple selection modes (faces, features, curves, components, etc.)
- Quick Pick
  - More information about objects
  - Greatly simplifies object selection
- Selection Intent
  - Simplified UI and interaction
  - Persistent selection criteria

Why is it important to you

- Improved selection speed and clarity
- Increased likelihood of selecting desired object the first time
- Preserved selection intent
Capability in NX 4

- Use of NX Usability model
  - On-screen interaction
  - Dynamic preview
- Workflow based interaction
  - Sketches can be created and managed as part of the feature
- Multiple bodies creation as part of one feature

Why is this important to you?

- Workflow based creation and management of features
- Easier to use … simple and consistent approach to create many prismatic features
Role based startup

Templates: Starting new designs from templates provides a way to standardize your design process while at the same time removing a number of manual steps. For example, with templates it is possible to define your standard company drawing frames and views just once and re-use this for every new drawing.

NX provides access to templates from palettes in the Resource Bar. Templates can be dragged into the graphics area to start a new model or onto an existing part to create a new component of a drawing.

If you are using NXManager there will already be a “seed part” palette on the Resource Bar. If not you can click here to add a sample palette of model templates to the Resource Bar, or click here to add a sample drawing template palette.

Contact your system administrator to add your own company’s templates to these palettes.

- Roles can be viewed and defined from the Resource Bar
- Roles can be switched during NX sessions
- New users are not overwhelmed by too many icons and menus
Capability in NX 4

- Ability to edit with rollback for all features
- Edit with Rollback is the default editing behavior when double-clicking a feature
- Edit with Rollback preference can be set using a customer default

Why is this important to you?

- Features are edited in the same state as creation
- Ease of learning and more efficient access to feature definitions for design change
Topics – NX 4 Design

- Usability
- New features / commands
- Sketching and 2D design
Datum CSYS Enhancements
- Parametric and associative coordinate systems

Variational Sweep
- Control the cross section shape along the path

Emboss
- Minimum number of steps required to make complex emboss shapes

Enhance Draft
- Multiple angles
- Enhance Body Taper

Geometric Properties
- Dynamic min/max radius of curvature analysis

Improved Performance
- Reduce time necessary for first update

Change Propagation
- Improve feature robustness
Datum CSYS Enhancements

Project Detail

Capability in NX 4
- Fully Parametric
  - Offset & Rotation
  - Modifiable
  - Redefinable
- Associative
- Display management
- Linked CSYS

Why is this important to you?
- Datums are basics of modeling in all workflows
- A consistent and clear approach will reduce the NX learning curve directly
- Improved manipulation and definition
Variational Sweep

Capability in NX 4
- Sweep a 2D profile and control the cross section shape along the path via sketch constraints
- Leverage Sketch on Path (SOP)
- Support rails and rail intersection with constraints
- Replace Master Section and Path

Why is it important to you?
- Enables streamlined ability to create 3D shapes via 2D cross-sections
- One feature can create geometry that required many features
- Supports BIW workflow
Capability in NX 4
- UI improvement over existing general pad / pocket feature
- Support multi-convexity cases
- Support trimming across free edges

Why is this important to you?
- Align modeling command capability with designer’s language
- Significantly minimize the steps required to make complex emboss shapes
- Support migrating I-deas customers
Capability in NX 4
- Improvements to Subdivide Face
- Improvements to Draft
  - Update interaction similar to Offset Surface
  - Support Multiple angles in a single feature
- Improvements to Body Taper
  - Add Selection Intent to edge and face inputs
  - Support operation on multiple bodies

Why is this important to you?
- Powertrain workflow productivity
- Reduce number of features to define parts
Geometric Properties
Project Detail

Capability in NX 4
- Enhanced Geometric Properties capabilities enable dynamic min/max radius surface analysis
- Capture detailed Min/Max radius dynamically in the Geometric Properties dialog or output point information to the Information window

Why is this important to you?
- Useful diagnostic tool for offset, thicken and shelling operations
- Improved, more intuitive interaction compared to I-deas 10 and NX 3
Improved Performance

Project Detail

Capability in NX 4
- Enhanced monitoring
- Model editing improvements
  - Smarter dependency processing
  - Smarter memory management
  - Smarter display regeneration

Why is this important to you?
- Improved performance working with complex models
- Better feedback

Less Waiting on Complex Models

Better Feedback
Change Propagation

Project Detail

Capability in NX 4
- Enhance Replace Feature
- Enable selection intent to be re-specified
- Provide a mapping tool
- Enable the replacing of curve features
- Enable orientation to be redefined

Why is this important to you?
- Robust editing and re-parenting of features
- Improved Copy/Paste results
Sketch Enhancements

Goal Projects

Sketch on Path
- Sketch plane orientation relative to path
- Create construction geometry within the sketch

Sketch Dimensions
- Add appended text and tolerance limits
- Improved display

Sketch Organization
- Object Display Colors
- Constraint Colors
- Organize curves and dimensions into groups

Large Sketch Layout
- 1000’s of curves within a single sketch
Capability in NX 4

- New in-line datum plane creation with selection intent
  - Control orientation of sketch plane relative to path
  - Automated creation of construction geometry within sketch – intersection point, tangent & normal vectors
- New sketch creation option to create a sketch on a path (SOP)
- Ability to reattach a SOP as a normal sketch

Why is this important to you?

- Supports the variational sweep feature
- Allows easy creation of section type sketches with good associativity
**Capability in NX 4**

- Orienting dimensions normal to the screen
- Fixed dimension text height
- Add appended text and tolerance limits to sketch dimensions

**Why is it important to you**

- Easy to view dimensions when rotating and zooming
- Dimensions created and formatted once
- Flexibility to quickly define drawing level detail using sketches
Capability in NX 4

- Sketch objects in Part Navigator
  - Definition of active group (folder)
  - Easier visibility control of sketch objects
- Constraint & Object Display Colors
  - Improved UI and display of sketch geometry and constraints
  - Geometry color can be constraint-based or user defined
  - Enables user to differentiate and distinguish different areas of a sketch

Why is it important to you

- Simple to understand and use data organization
- Supports more complex sketches
Large Sketch Layout

**Capability in NX 4**
- Enables creation of unconstrained curves
- Improves overall performance of unconstrained and constrained sketches
- Improved user interaction via object-action
- Enables creation of 1000s of curves within a single sketch, enabling creation of large 2D layouts

**Why is it important to you**
- Provides a single environment for 2D geometry construction and editing
- Enables new workflows across many industry segments