



Knowledge Fusion Update and CIP Review

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Agenda

- ▶ NX 4 Review (with examples...)
 - ▶ Knowledge Fusion
 - ▶ DesignLogic
 - ▶ Validation
- ▶ NX 5 Sneak Peek: ICE
- ▶ CIP Review



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Appearance KF Navigator

NX 4

Add Attribute

Name: test

Type: Number Length: mm

Formula

Input Parameter
 Modifiable
 Uncached
 Method
 Evaluate It

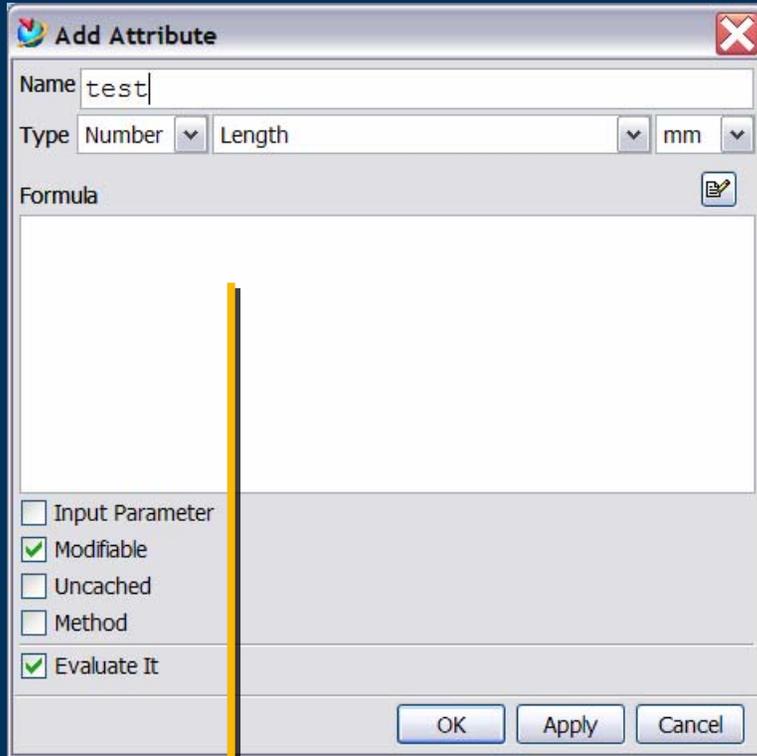
OK Apply Cancel

- ▶ Additional units provided for the KF “Add Attribute to Root” which allow you to set dimensionality of the KF attribute;
- ▶ Extra functions to support set and ask units of KF attributes:
 - ▶ Ug_units_askMeasure
 - ▶ Ug_units_setMeasure
 - ▶ Ug_units_askBaseUnit
- ▶ KF attributes have the same behavior as new DL expressions – they are full aware of dimensionality:
 - ▶ \$kg << \$lbf / 9.80665[m/sec^2]
 - ▶ (Number [mm]) unit: 10;

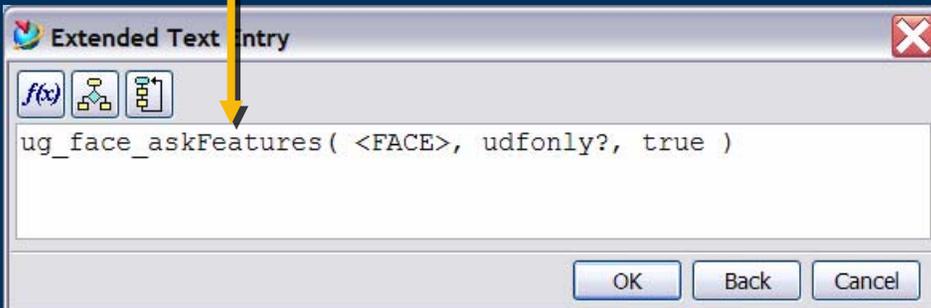


KF Function Enhancements

NX 4



The 'Add Attribute' dialog box is shown. The 'Name' field contains 'test'. The 'Type' is set to 'Number' and the 'Length' is set to 'mm'. The 'Formula' field is empty. The 'Evaluate It' checkbox is checked. The 'OK', 'Apply', and 'Cancel' buttons are at the bottom.



The 'Extended Text Entry' dialog box is shown. The text entry field contains the formula: `ug_face_askFeatures(<FACE>, udfonly?, true)`. The 'OK', 'Back', and 'Cancel' buttons are at the bottom.

- ▶ Two new KF functions provided as part of this project:
- ▶ Given a NX face (Host pointer or Instance) as an argument **ug_face_askFeatures()** will return a List of Features of the face;
- ▶ Given a NX object (Host pointer or Instance) as an argument **ug_askObjectName()** will return a String which describes the name of the NX object - if no name exists it will return an empty String.



%nx_application class

NX 4

- ▶ **KF feature** has been requested by several Customers, however since it is very complex to create a full blown Knowledge Fusion feature, we have not made this capability available to our customers in the form of a product;
- ▶ Due to the necessity for it's capabilities and the power of an offering like this, we have provided a services approach to make it available to our customers;
- ▶ This however is not satisfying to customers who want to implement Knowledge Fusion features themselves;

```
#! UG/KF 19.0
#
DefClass: %nx_application(%nx_application_base);
# -----
# - -      KF application attributes that can be overwritten based on subclass inheritance      - -
# -----
#+
The name of the icon that will be used in the part navigator.
Can be changed based on inheritance by subclass - by default it will display the "rule" icon.
#-
(String) icon_name: "rule";
#+
The name of the feature that will show up in the part navigator.
Can be changed based on inheritance by subclass - by default it will display "KF application"
being the feature name.
#-
(String) application_name: "KF application";
```



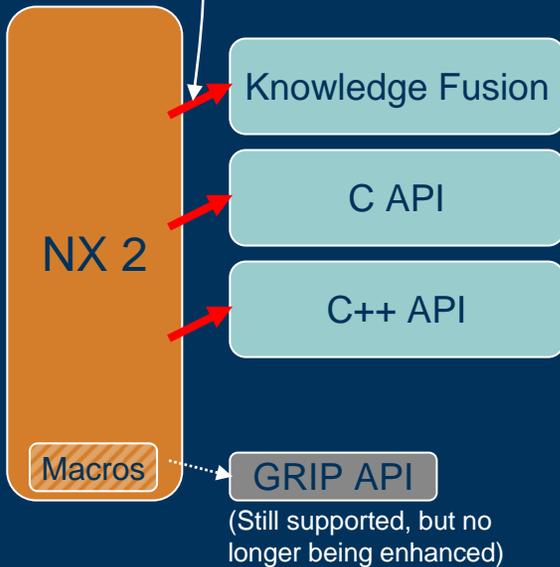
NX Automation Evolution

up to **NX 2**

Duplicate development effort was required to update or enhance each API.

As a result, some APIs had better coverage than others.

The effort required to keep all of the APIs up to date limited the set of languages supported.

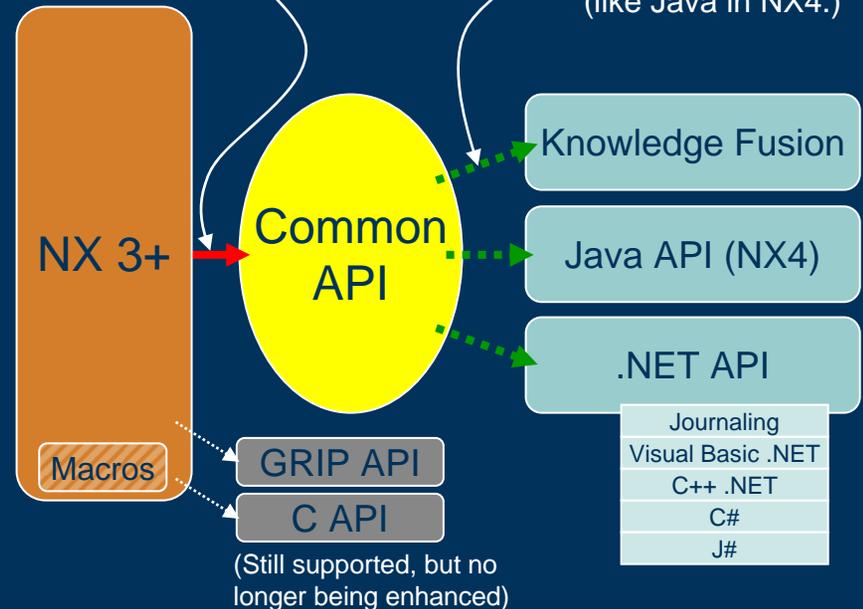


NX 3+

Development updates the common API once.

Automatically updated APIs provide parallel coverage in all languages.

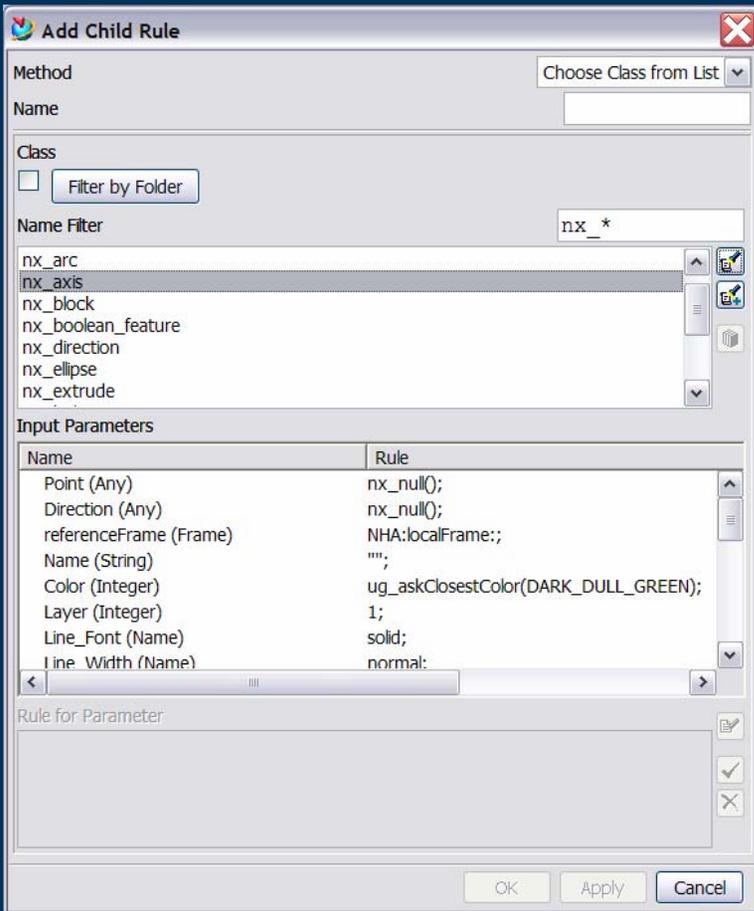
Minimal effort required to add new languages (like Java in NX4.)





New NX_ classes from Common API

NX 4

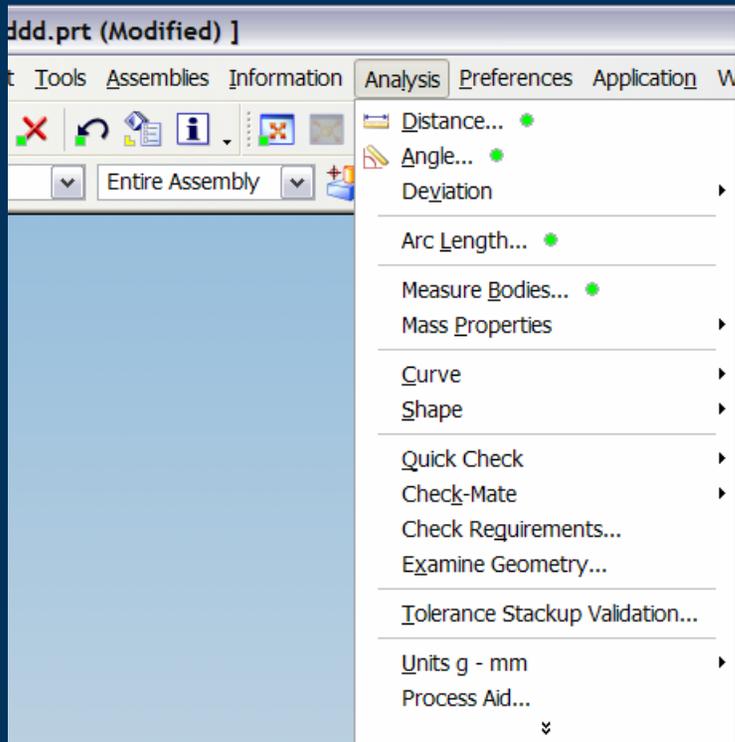


- ▶ Automatically generate Knowledge Fusion (KF) classes and supporting code to make the classes operational in NX through Common API;
- ▶ For this specific project, specific, representative NX objects will be chosen for wrapping so the project has specific KF class/function deliverables and not leave the project “open ended”.
- ▶ nx_line, nx_arc, nx_point, nx_datum_plane, nx_block, nx_hole, etc.



Measurement Journamation

NX 4

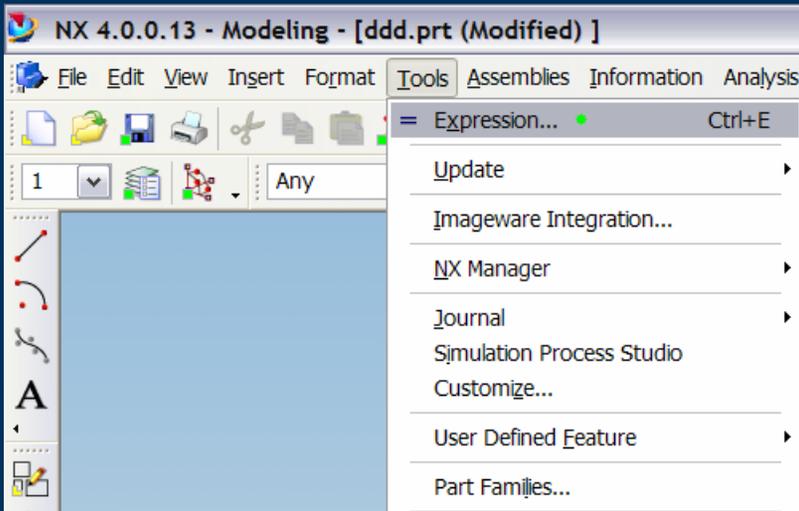


- ▶ This project involves the specification of functions that may be used to access measurement functionality from Journamation scripts.
- ▶ This will include most of the measurement functionality available from the NX User Interface for:
 - ▶ Analysis->Distance
 - ▶ Analysis->Angle
 - ▶ Analysis->Arc Length,
 - ▶ Analysis->Measure Faces
 - ▶ Analysis->Measure Bodies.



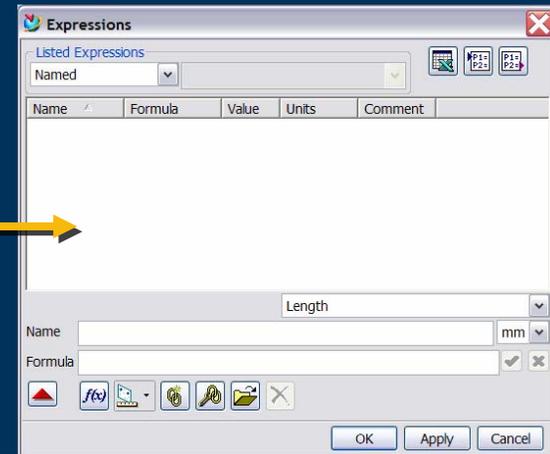
Expression Journamation

NX 4



- ▶ The project will complete the coverage of interaction using all options from the Tools -> Expression dialog of NX, and all functions in the NX/Open API for expressions;
- ▶ The table aside contains all the operations which are supported in the current NX4 phase [13];

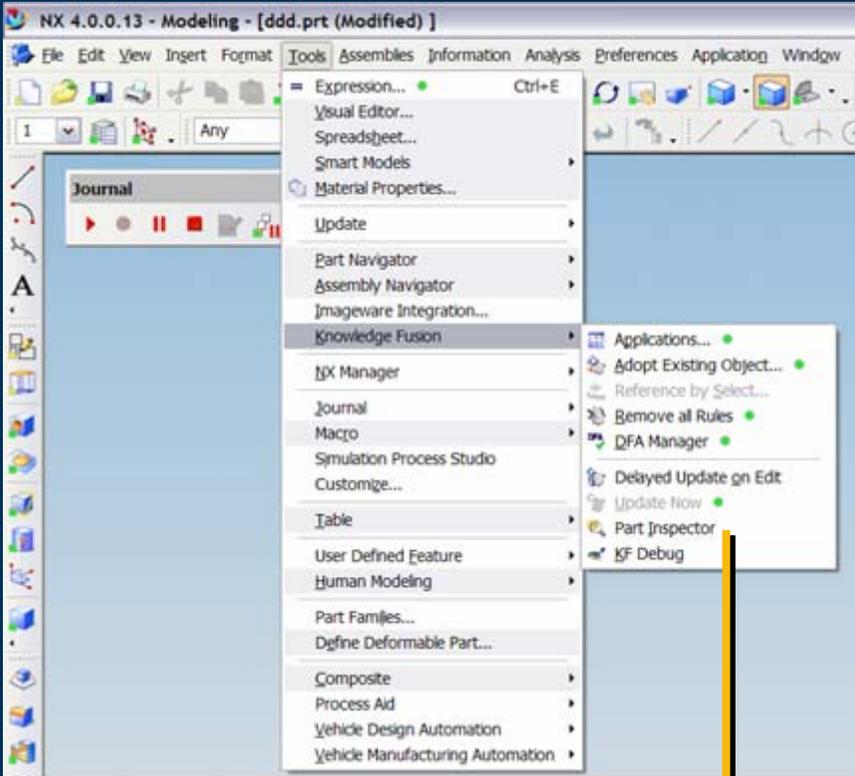
Create expression with units
Create system expression with units
Edit expression with units
Get expression unit type
Import expressions
Export expressions
Edit (or create) expression comment
Get/set whether expression is "user locked"
Remove interpart references
Change interpart references
Get all visible expressions
Get using features
Get owning feature
Get descriptor
Get whether expression is a geometric expression



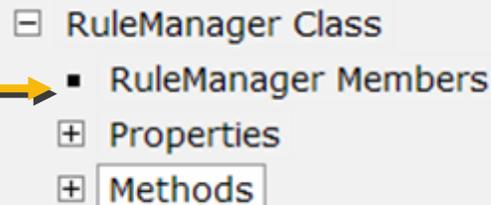


KF Journamation – KF Remoting

NX 4



- ▶ The project will complete the coverage of interaction using all Knowledge Fusion options from the NX User Interface.
- ▶ The project will also cover most of the functions available today from NX/Open API for Knowledge Fusion and the functions available from the Knowledge Pipeline.





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Engineering Equations in Design Logic

Project Detail

NX 4

ARCHITECTURE

Capability in NX 4

- ▶ Initial set of Engineering equations added to the OOTB Design Logic function set
- ▶ Capabilities expanded beyond basic math to include beams, gears, materials, mechanics, o-rings, plates, springs and vibration

Why is this important to you?

- ▶ Standard engineering calculations are more readily available to users, reducing dependence on external data sources
- ▶ Automatic Units management in Design Logic reduces potential for calculation errors
- ▶ Associativity to model promotes the ability to persistently evaluate designs, finding design errors automatically

The image shows two overlapping dialog boxes from the NX software interface. The top dialog is titled "Insert Function" and contains a search bar with the text "Enter Keywords to Search for a Function" and a "Find" button. Below the search bar is a dropdown menu labeled "Or Choose a Category" with a list of categories including materials, beams, fluid, gear, geometry, materials (highlighted), math, mechanics, misc, o_rings, and adsheet. The bottom dialog is titled "Function Arguments" and displays the function name "ug_symmetricLoadDisplacementMaximum". It includes a description: "Calculates the maximum displacement under two symmetric loads. The return dimensionality is Length." Below the description are several input fields with units: "Length of Beam" (mm), "Load on Beam" (N), "Location of Load" (mm), "Young's Modulus" (N/mm^2(MPa)), and "Moment of Inertia" (mm^4). Both dialog boxes have "OK", "Back", and "Cancel" buttons at the bottom.



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Check-Mate Filter Option

Project Detail

NX 4

VALIDATION

Capability in NX 4

- ▶ Architectural change and UI to support a filter option which limits the entities checks are performed on based on the nature of the checker

Why is this important to you?

- ▶ Allows users to choose what is important to them
- ▶ Reduces time filtering and reviewing results that are of no interest to the user





Quality Dashboard Enhancements P1

Project Detail

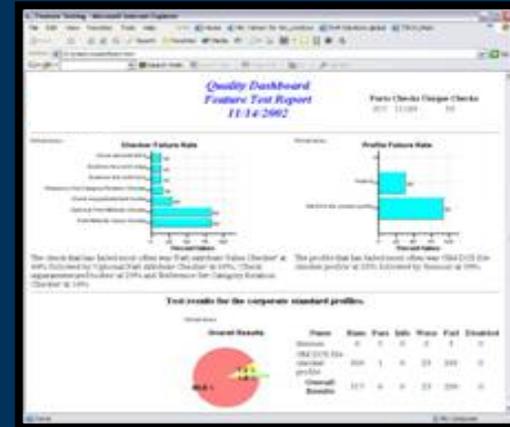
NX 4

VALIDATION

Capability in NX 4

- ▶ Consolidation of two validation reporting tools: Check-Mate viewer and Check-Mate Dashboard
- ▶ Java-based program connecting Quality Dashboard and Teamcenter Engineering

Quality dashboard



Why is this important to you?

- ▶ Collects Check-mate results from part files stored in the Teamcenter Engineering database
- ▶ Creates easy-to-read result summary in the Quality Dashboard reporting tool



Support TcEng Validation Object

Project Detail

NX 4

VALIDATION

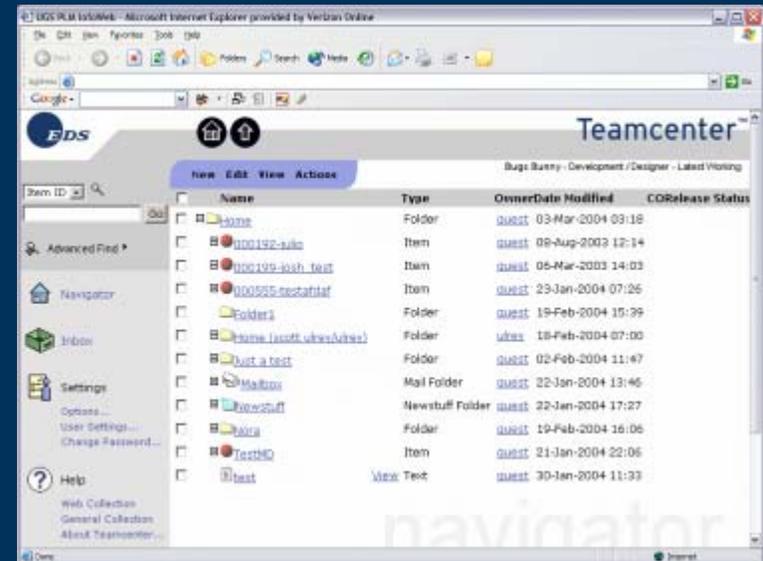
Capability in NX 4

- ▶ Provide ability to store validation rules in Teamcenter Engineering
- ▶ Initializing validation operations from within Teamcenter Engineering
- ▶ Stores validation results back to Teamcenter Engineering within the validation object

Why is this important to you?

- ▶ Improves the ability to effectively validate products through the development process up to product release
- ▶ Provides centralized repository for validation data
- ▶ Facilitates reuse of validation rules

Validation object in Teamcenter Engineering





Validation Object Architecture

Project Detail

NX 4

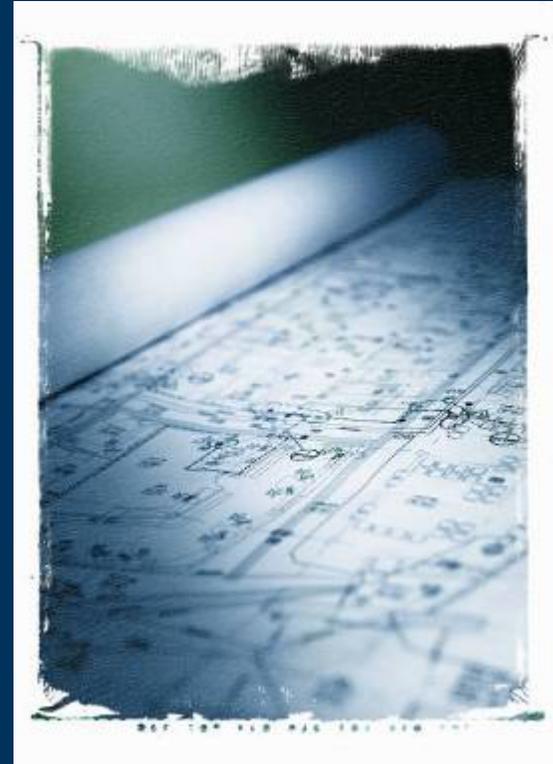
VALIDATION

Capability in NX 4

- ▶ Establish a relationship between the validation rules and the product
- ▶ Provide associativity to let the user know when a rule or product change requires the product to be revalidated

Why is this important to you?

- ▶ Improved communication and response time when revalidating product due to changes
- ▶ Cut revalidation response time by as much as 50%





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ICE

Project Detail

NX 5

AUTOMATION

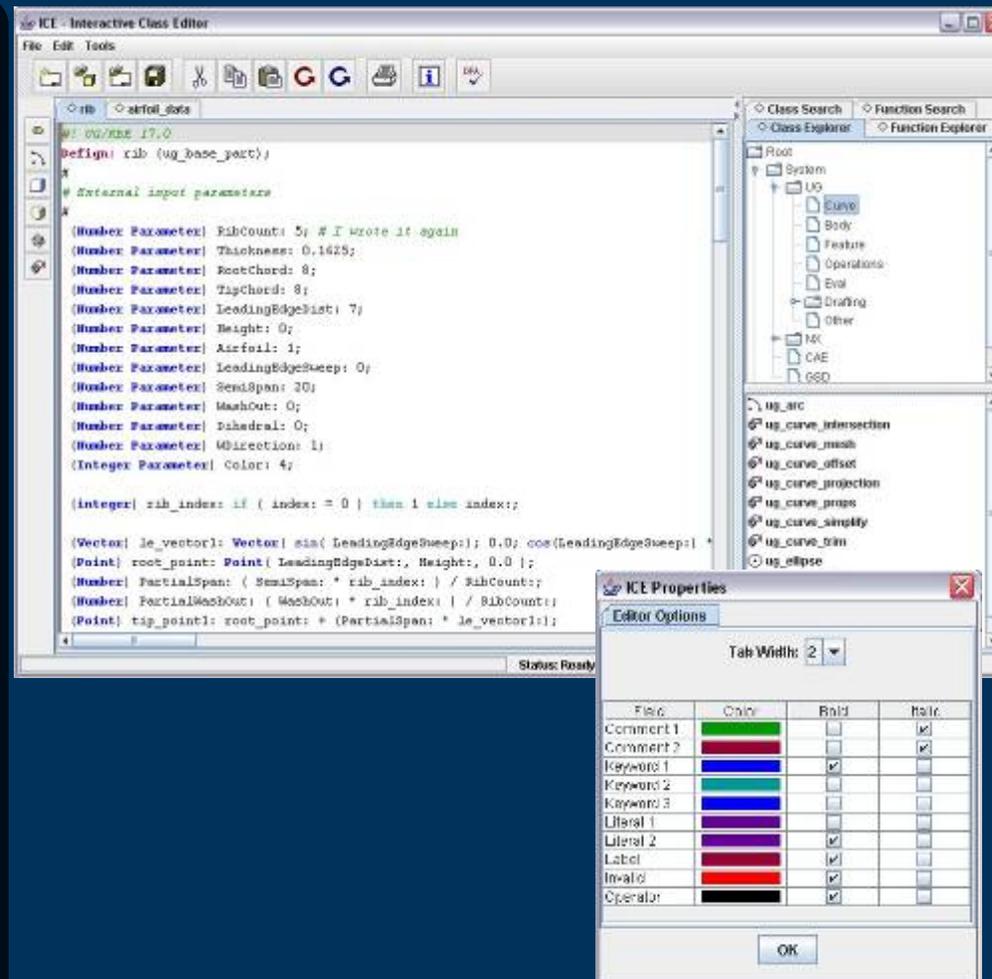
Capability in NX 5

Use the Interactive Class Editor as a prototype for KF Studio

- ▶ Drag and drop classes, functions and attributes into the editor
- ▶ Context sensitive text editor
- ▶ Created using the JA interface in Java

Why is this important to you?

- ▶ Improved usability for creation of KF application
- ▶ Syntax coloring will reduce errors because the code is easier to read.
- ▶ Tighter integration with NX than development with a standard text editor





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2005 CIP Voting Results

- ▶ #1 requested KF enhancement:

Create Chart in Excel Spreadsheet using KF

Results Summary

2005 CIP Results

Product Area	Ballots Returned	Top ER Number	Effort Category	Top ER Title
Drafting & PMI	777	5122288	X-Large	Auto-placement for Dimensions
I-deas NX Design	288	4843407	X-Large	Fillet Creation
Knowledge Fusion	114	4967698	Large	Create chart in Excel spreadsheet using KF
Manufacturing	245	433093	X-Large	Non Cutting Consolidation
NX Design	744	5115426	Medium	Associative sketcher dimensions
Programming Tools	134	N/A	Large	Journaling coverage for Insert > Symbol > Custom Symbol
Simulation	213		Large	General operators based on CAE geometry
Teamcenter Engineering	328	5105432	Medium	Create PDF files
Teamcenter Enterprise	117	4970698	Large	Generic Complex Query through UI

Commitment is to allocate one person-year of effort towards top ER(s).

The one-person year commitment should, in general, mean we will work on more than the #1 ER, but it depends on the size of the #1 ER and subsequent highly-ranked ERs.



Efforts toward 2005 CIP Projects

- ▶ NX 5 will contain not just the #1 request, but also #2.

 Add extra method(s) to KF spreadsheet class to support Excel graphs Project Issue Report KDA150156 Samir Kar 5.0,10 Commercial A	 Project-01/05/06 Add/Edit Project Issue Samir.Kar(D) ✓ 05-Jan-06	 DSR-01/25/06 Add/Edit DSR Issue Samir.Kar(D) ✓ 20-Jan-06 Raymond.Kok(D) ✓ 25-Jan-06 Taylor.Anderson(D) ✓ 17-Jan-06	 FS-02/13/06 Add/Edit FS Issue Palwinder.Singh(D) ✓ 07-Feb-06 Taylor.Anderson(D) ✓ 09-Feb-06 Raymond.Kok(D) ✓ 13-Feb-06
 Create Function to predict outcome of boolean operations Project Issue Report KDA150161 Craig Nordholm 5.0,10 Commercial A	 Project-01/04/06 Add/Edit Project Issue Craig.Nordholm(D) ✓ 04-Jan-06	 DSR-02/22/06 Add/Edit DSR Issue Palwinder.Singh(D) ✓ 16-Jan-06 Craig.Nordholm(D) ✓ 17-Jan-06 Taylor.Anderson(D) ✓ 25-Jan-06	 FS-04/05/06 Add/Edit FS Issue Palwinder.Singh(D) ✓ 29-Mar-06 Taylor.Anderson(D) ✓ 05-Apr-06 Raymond.Kok(D) ✓ 29-Mar-06



Thank You!

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