ANSA

Latest Developments in v14.x.x

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BETA CAE Systems S.A.

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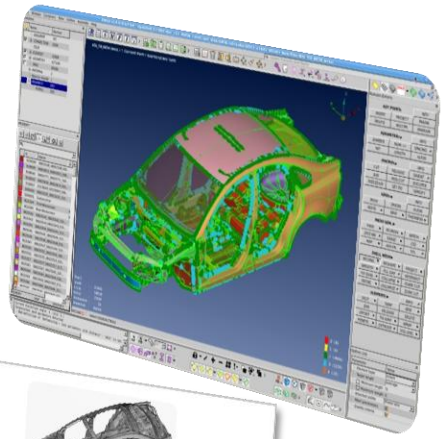
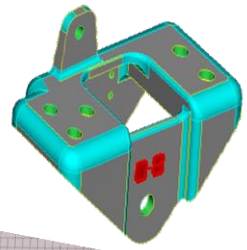
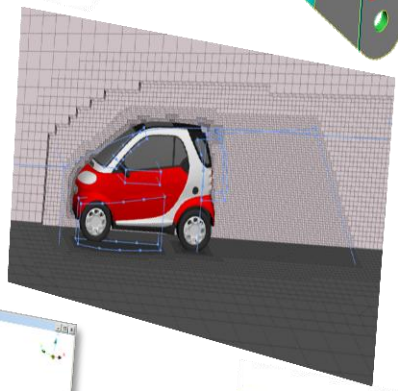
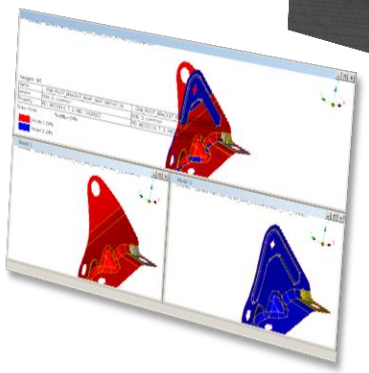
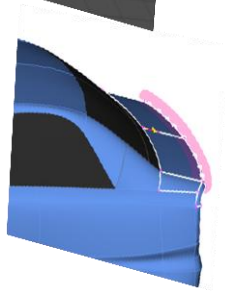
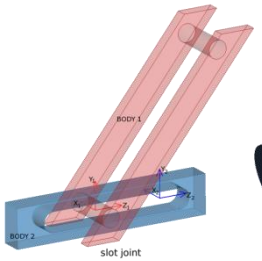
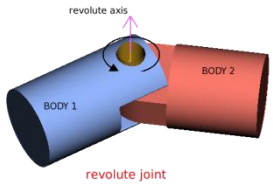
Latest Developments: v14.x.x

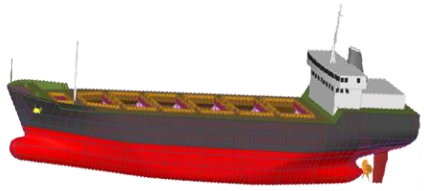
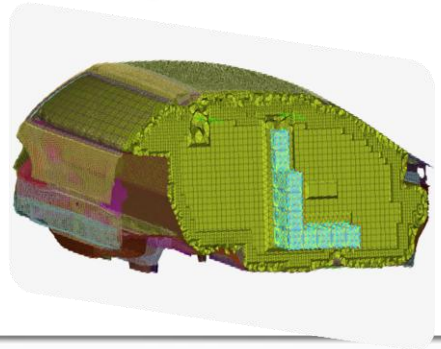
- User Interface
- Automation
- Geometry handling
- Meshing
- Model management
- Analysis tools
- Interface with solvers





User interface

Toolbars/Layout

- Color coded
  - Eye catcher buttons
- Lighter menu
  - Larger graphic area
- Customization

Selections

- New & enhanced options
- On screen context menus
  - Isolation
  - Direct & Quick access to functions
  - Settings Configuration

Performance

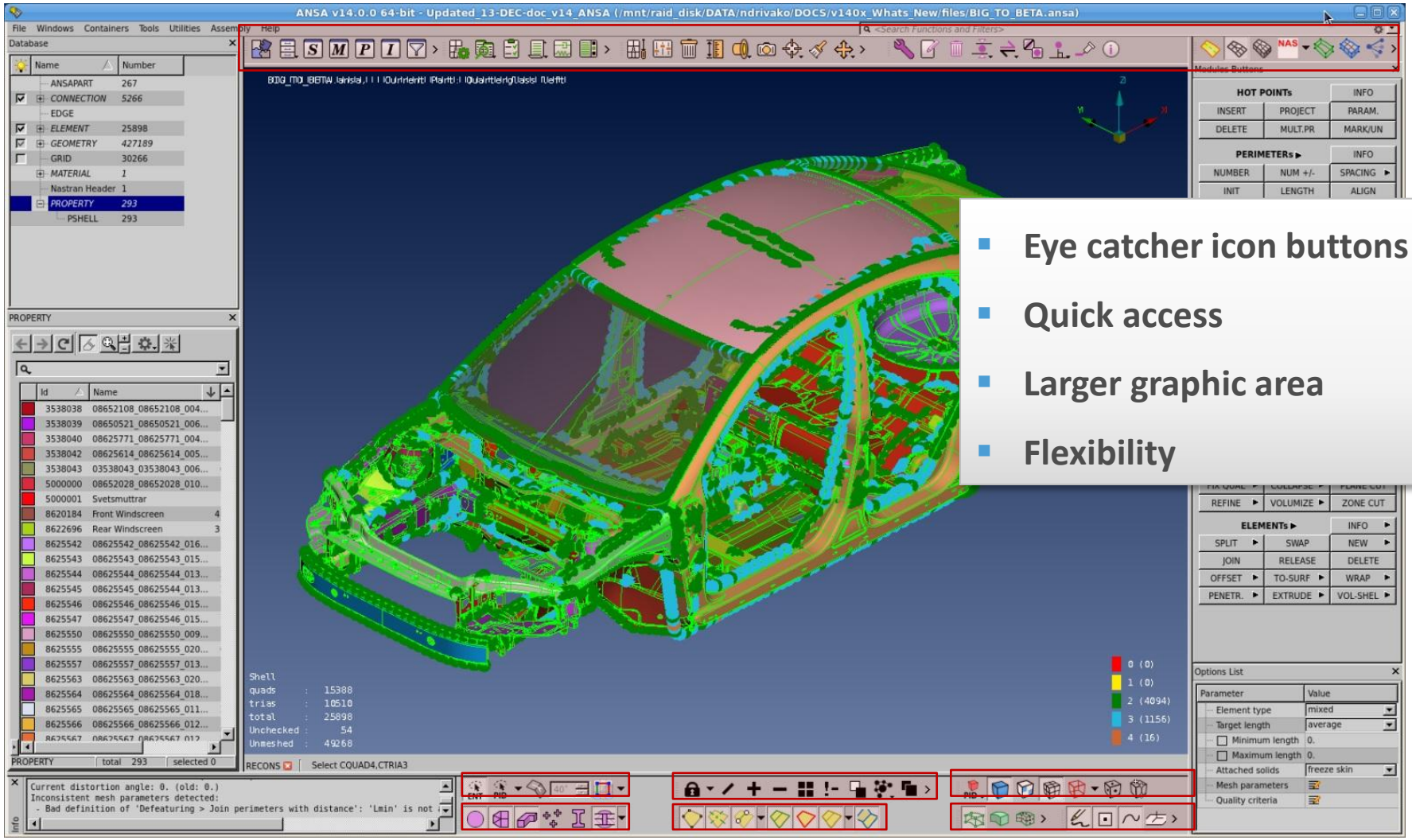
- Larger model handlings
- Quick response

Ergonomics

Productivity

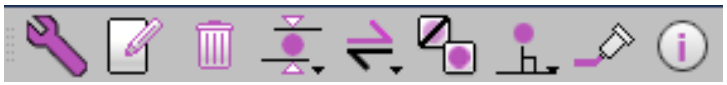
Reliability

New Toolbars



- Eye catcher icon buttons
- Quick access
- Larger graphic area
- Flexibility

Color coded Toolbars



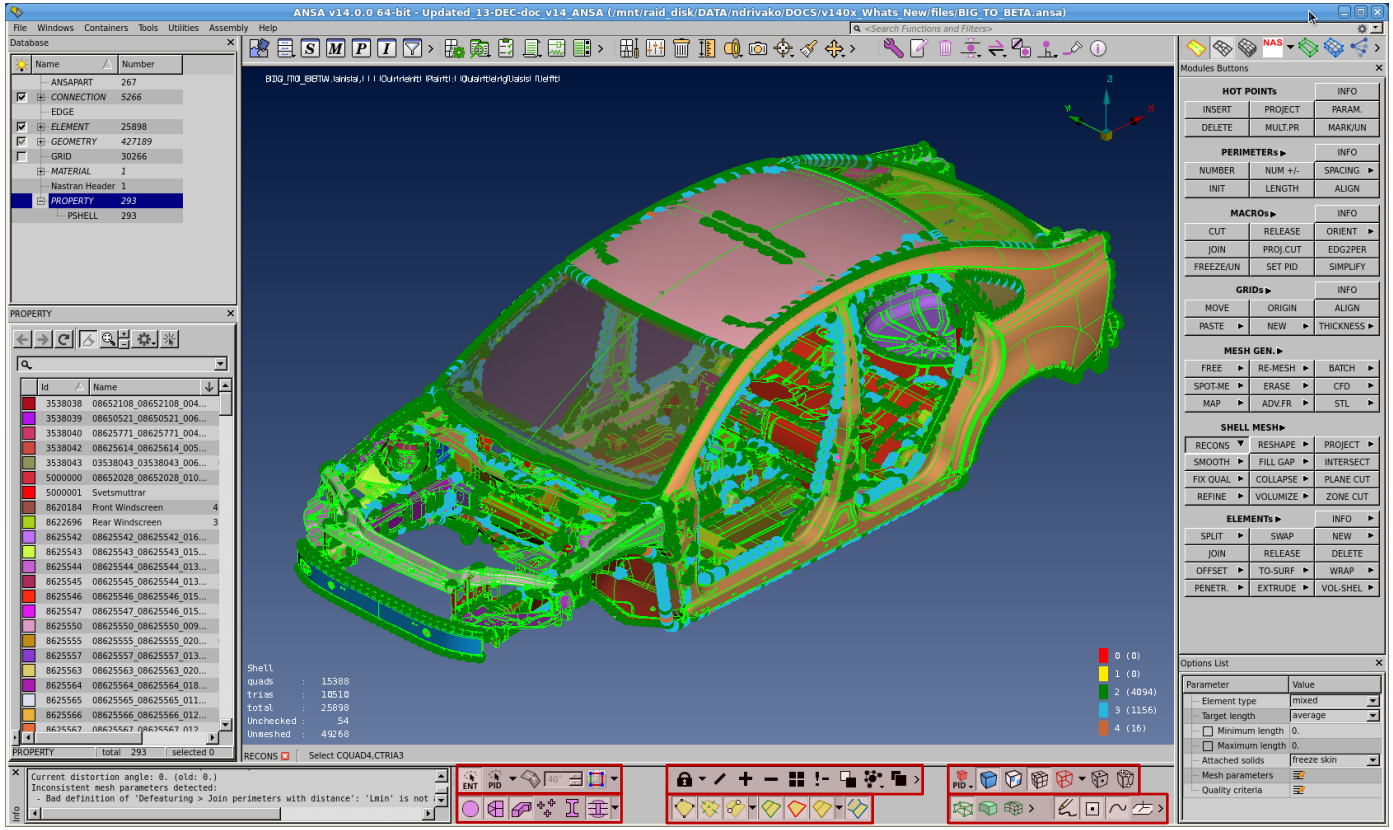
Containers
- Part Manager
- DM functionalities
- SET / PID /MID lists
- Includes lists
- Filters
- Database Browser

Tools
- Batch Mesh
- Compare
- Task Manager
- Scripts
- NVH Console
- Includes Manager
- Checks

Utilities
- Mesh Parameters
- Quality criteria
- Delete
- Measure
- Isolate
- TRANSF.
- Deck Info
- Renumber

Assembly
- Connection manager
- Con. Template
- Erase
- Define Connections
- Convert
- Remove Double

Eye catcher Toolbars



Selection Assistant

Focus Functions

Drawing Styles

Feature Vis.

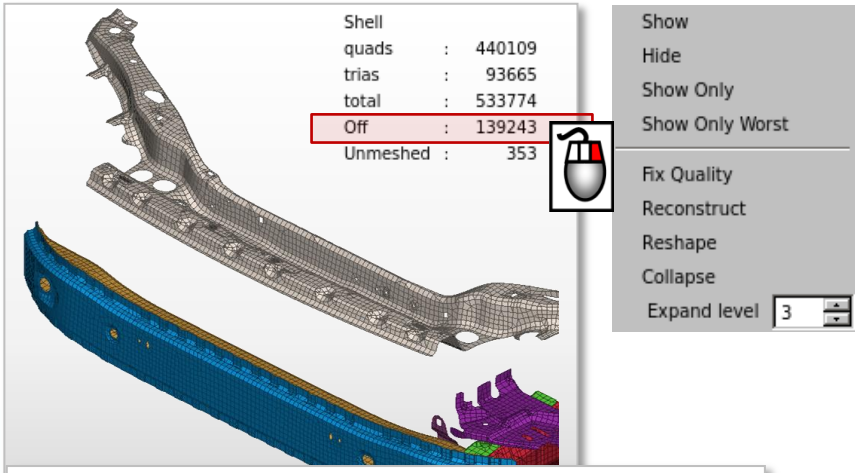
Faces Draw

Morph - Auxiliaries

Selections

Selections

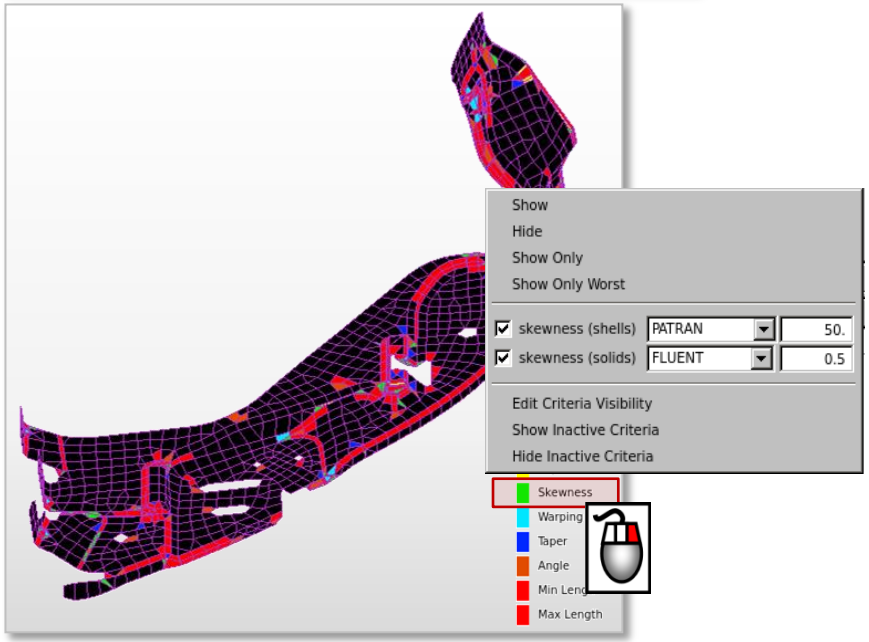
- New & enhanced options
- On screen context menus
  - Isolation
  - Direct & Quick access to functions
  - Settings Configuration



Handling of visibility and improvement

- Mesh improvement
- Unchecked
- Unmeshed

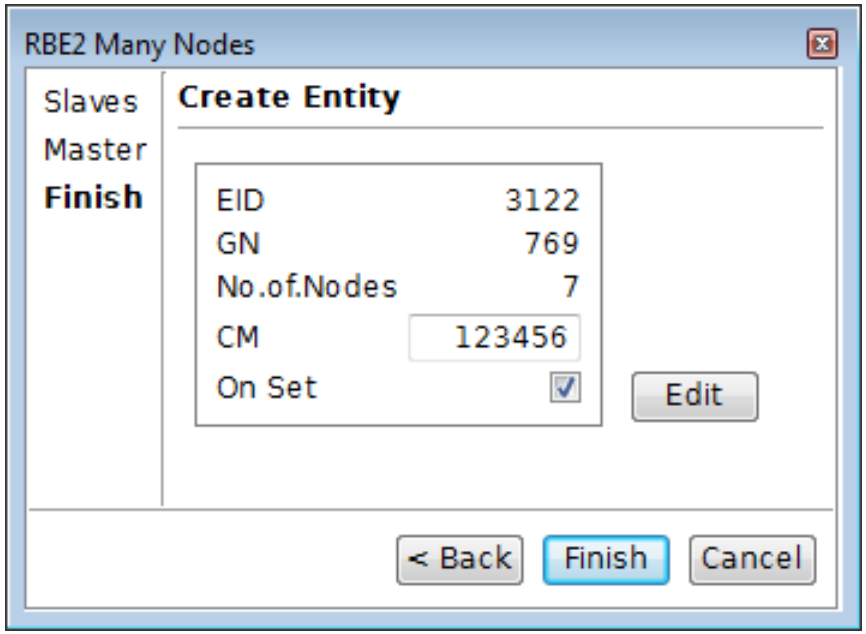
On screen context menu



Selection Assistant

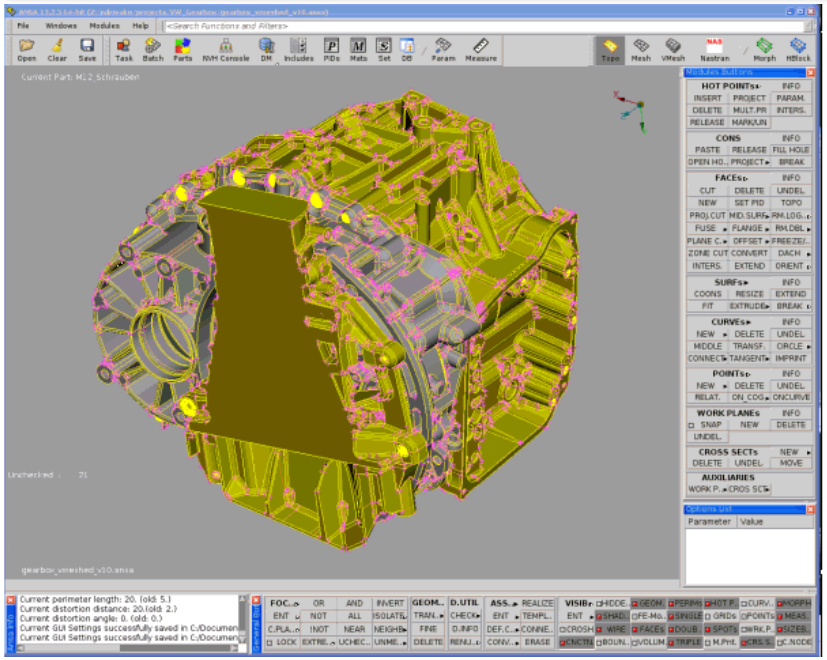
Wizard interface

- Intuitive
- Step-by-step
- Instructions
- Backward-Forward

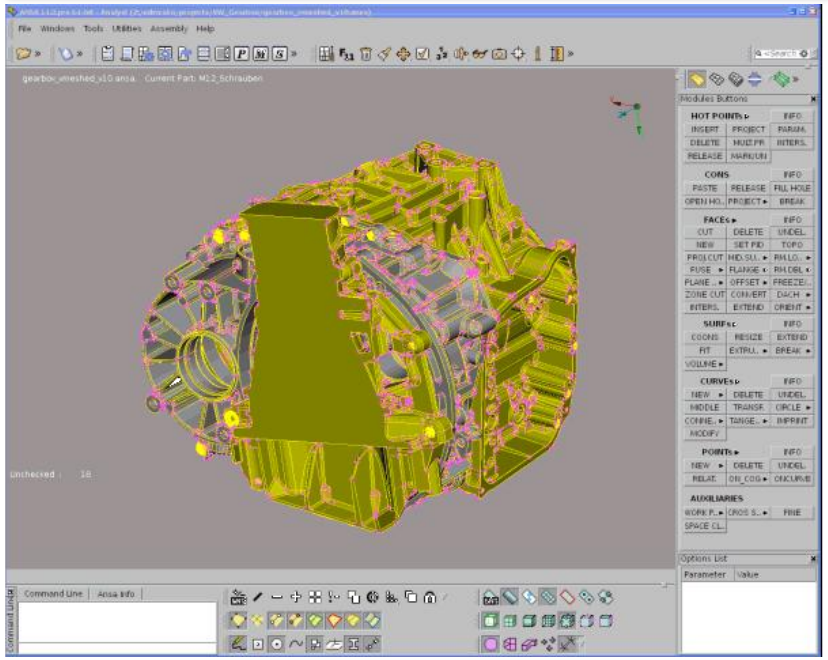


Performance

v13.2.x



v14.0.0



- Improvement in rotation speed of geometry
- Use of graphical card capabilities
- Larger model handlings
- Quick response

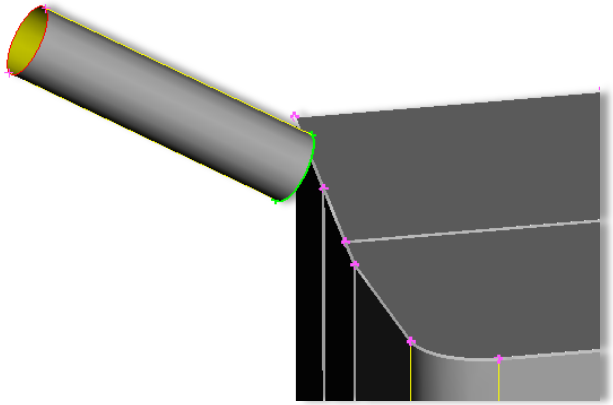
Automation

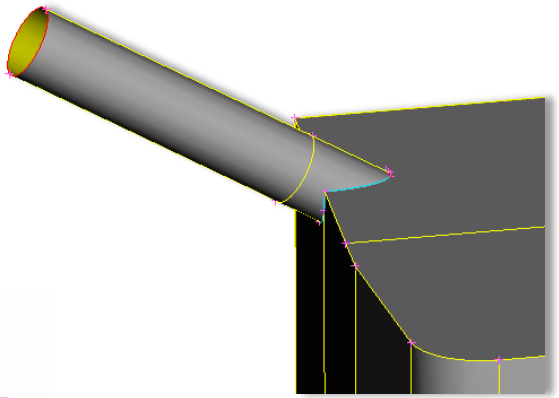
Python programming language in scripting

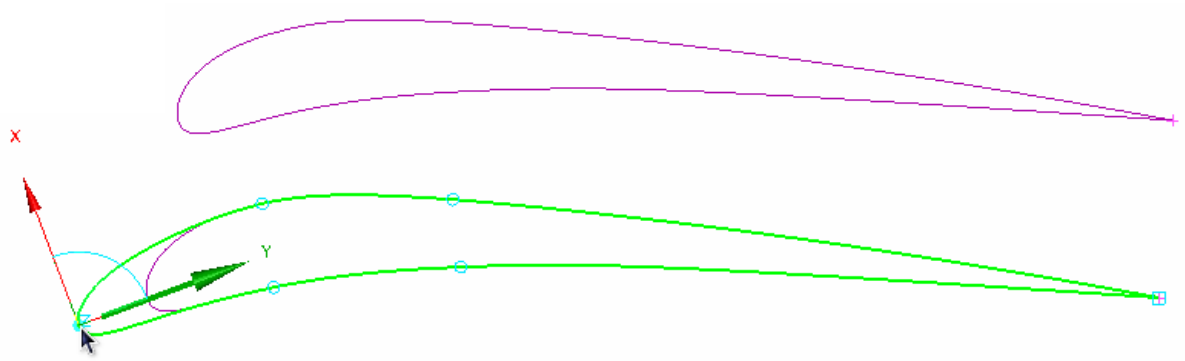
- High level object oriented programming language
- Clean and expressive syntax
- Large standard library
- Large selection of third party scientific libraries
- Language of choice for computation science and engineering
- The new ANSA API in an extension of Python
- Python v3.3

Geometry

- Open native CAD files
- Curves manipulation
- Primitive volume shape creation
- Enhanced Intersections
- Bridge with SpaceClaim
- Middle Surface Extraction

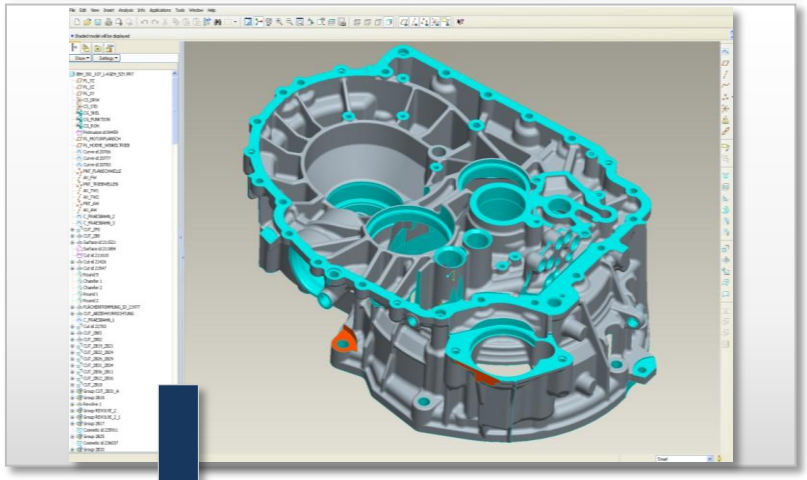




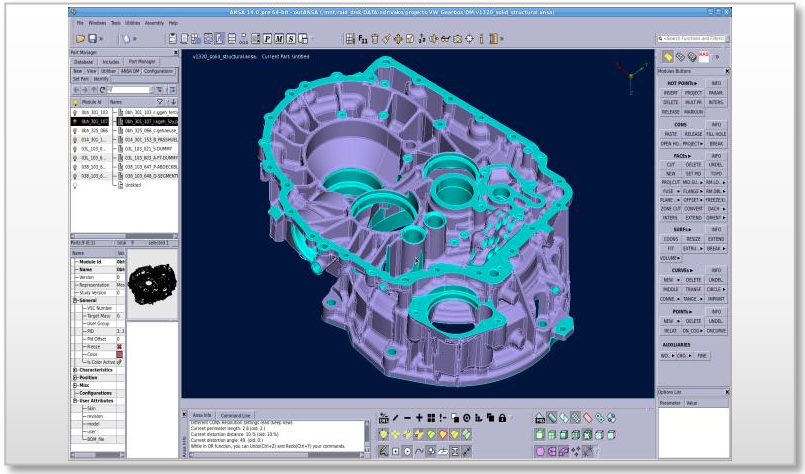


Geometry

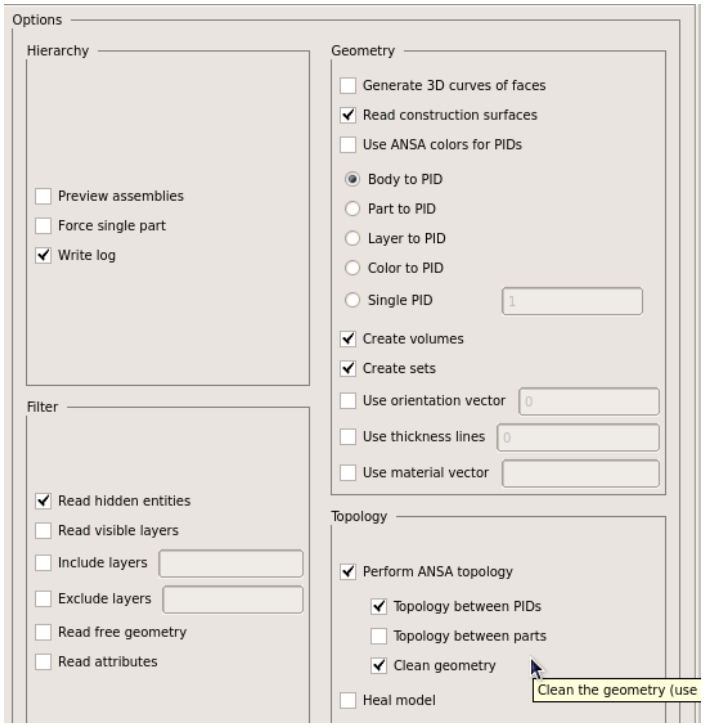
From CAD …



… directly to ANSA



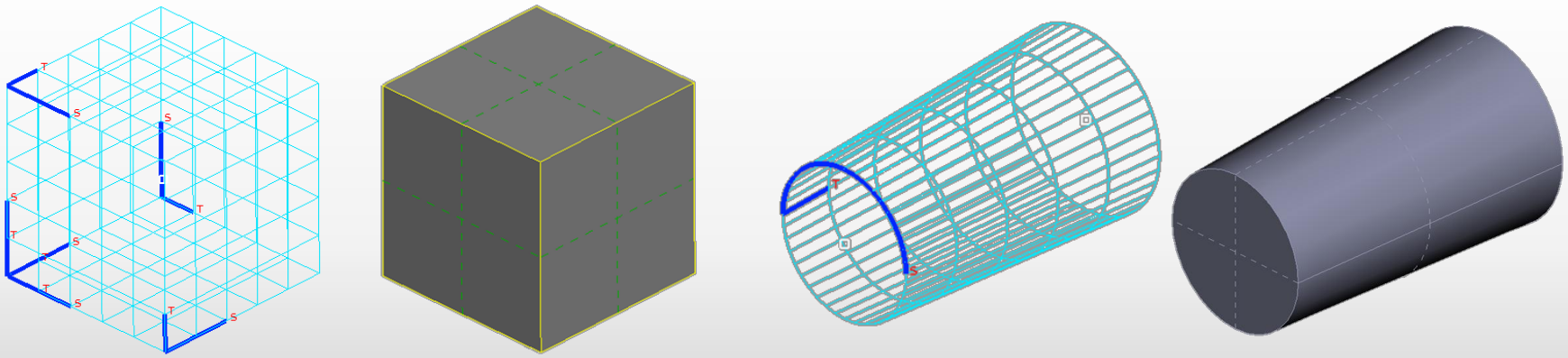
- Open native CAD files in ANSA
- Catia, NX, ProEngineer, SolidWorks, Inventor and Parasolid files



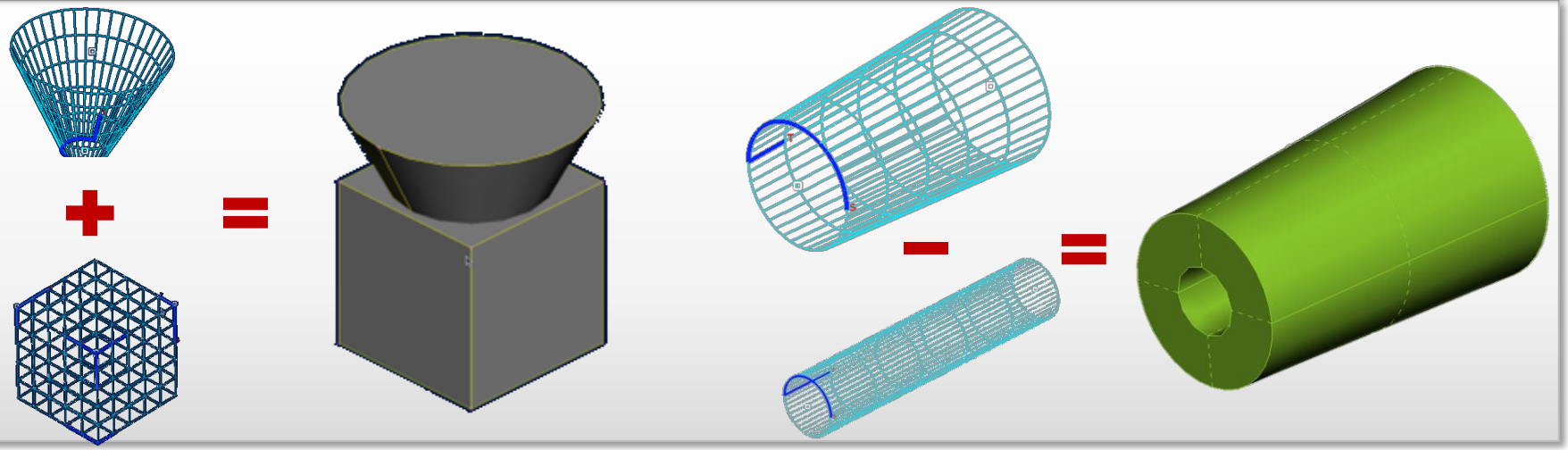
Quick and direct access !

Geometry - Volume handling

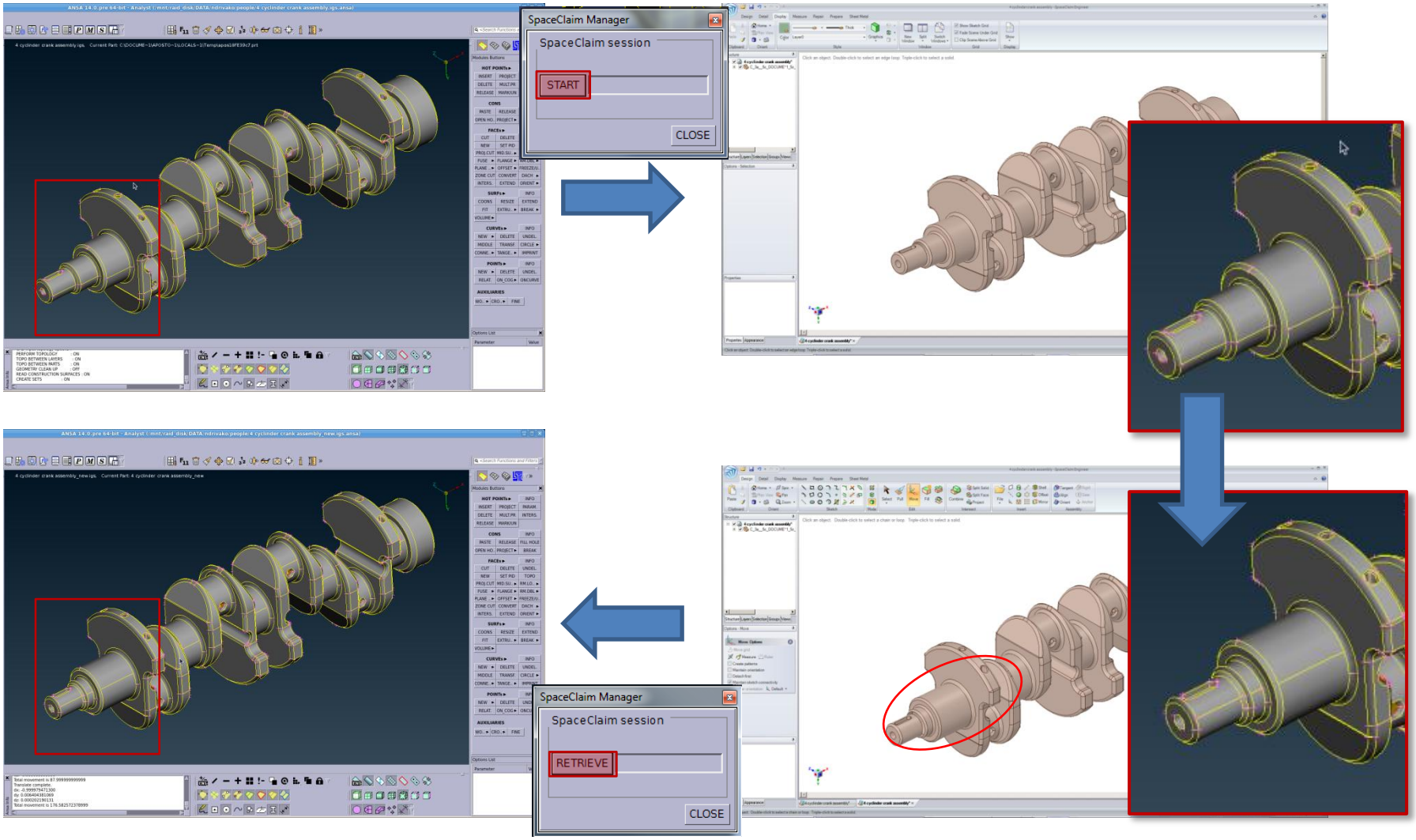
Easy primitive volume creation



Boolean Operations between volumes

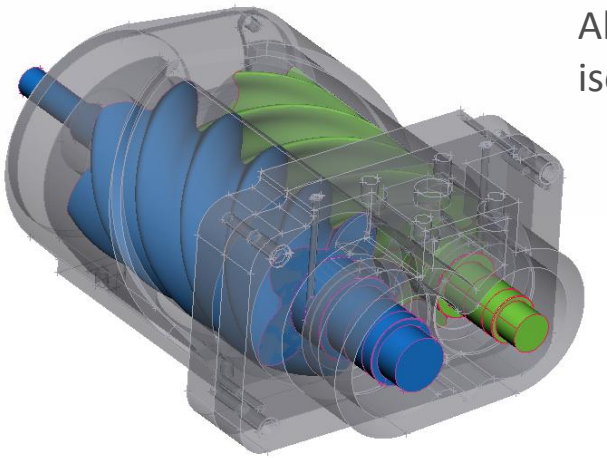


ANSA - SpaceClaim interaction

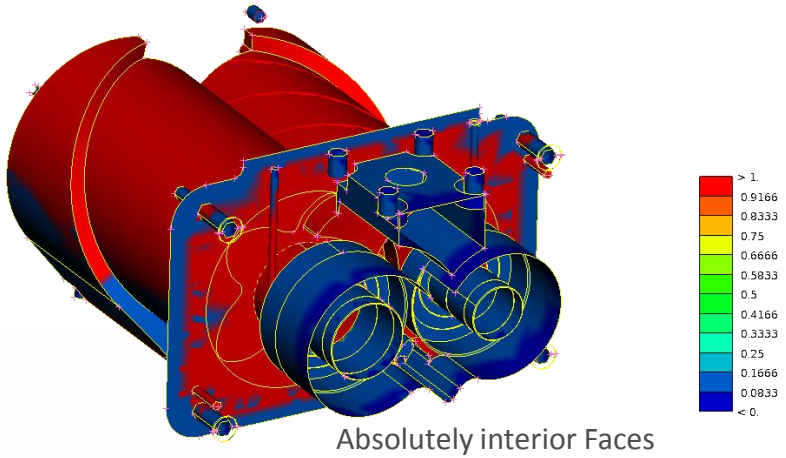


- Direct access to SpaceClaim (Windows OS)

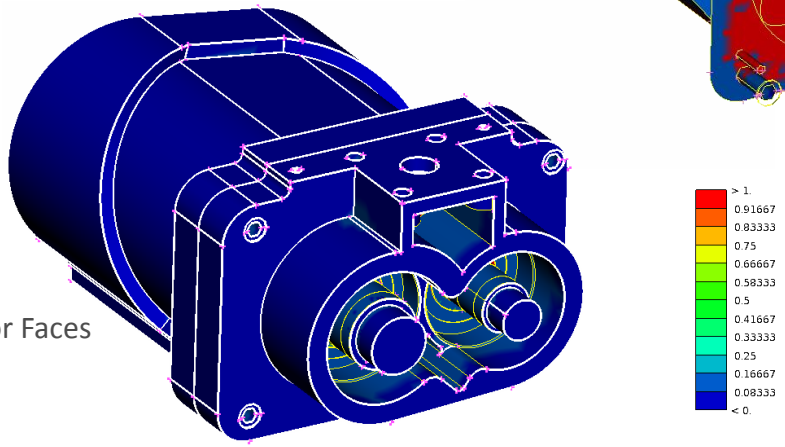
Isolation techniques: Exterior - Interior



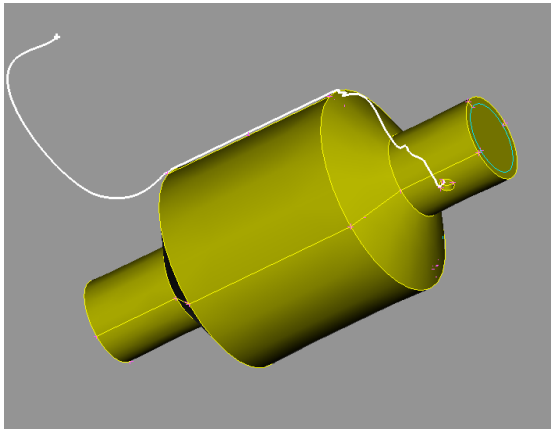
Alternative functionality for identification and isolation of outer or inner surfaces



Absolutely interior Faces

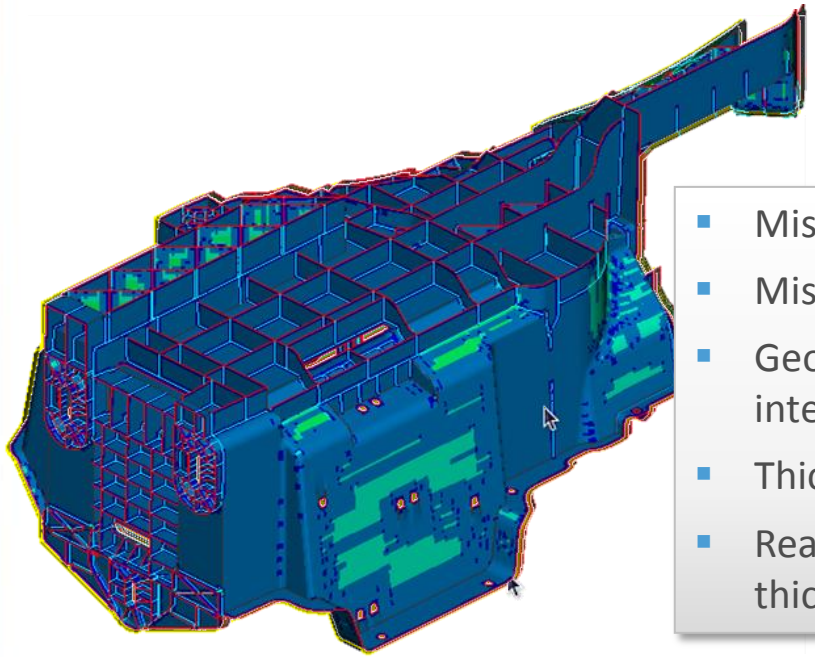


Absolutely exterior Faces



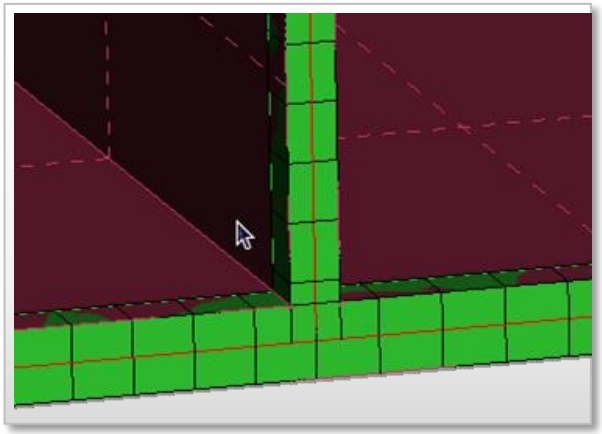
Inner/Outer “Skin”: leak check & “seed” points control

Middle Surface Creation for Cast Parts

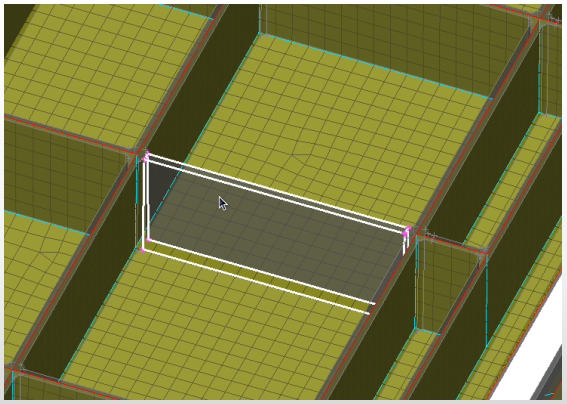


- Missing middle FE
- Missing Initial Geometry
- Geometry - FE intersection
- Thickness Penetration
- Reassignment of nodal thickness

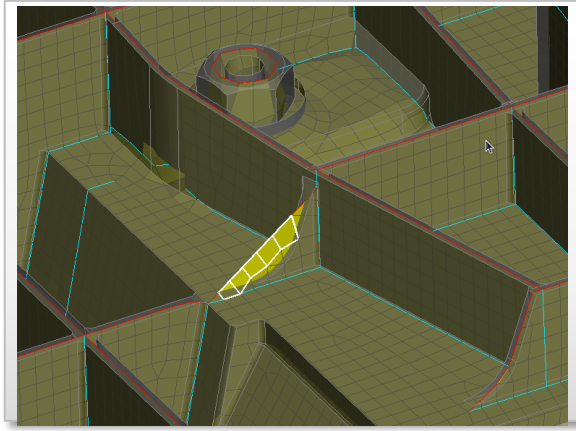
Nodal Thickness



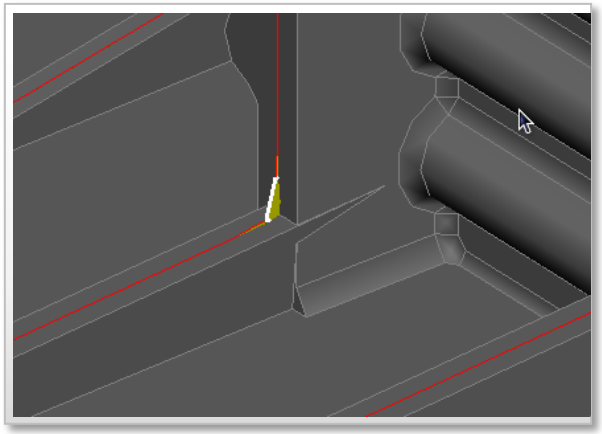
Missing Middle



Missing Initial Geometry

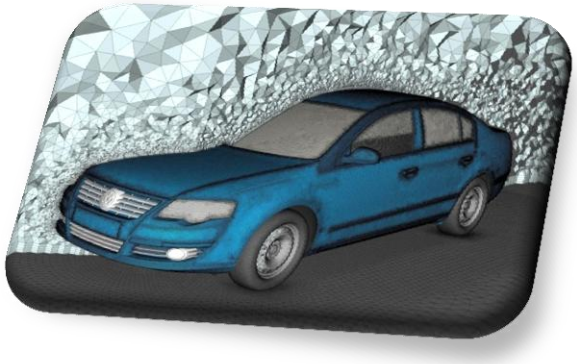


Intersections



Meshing

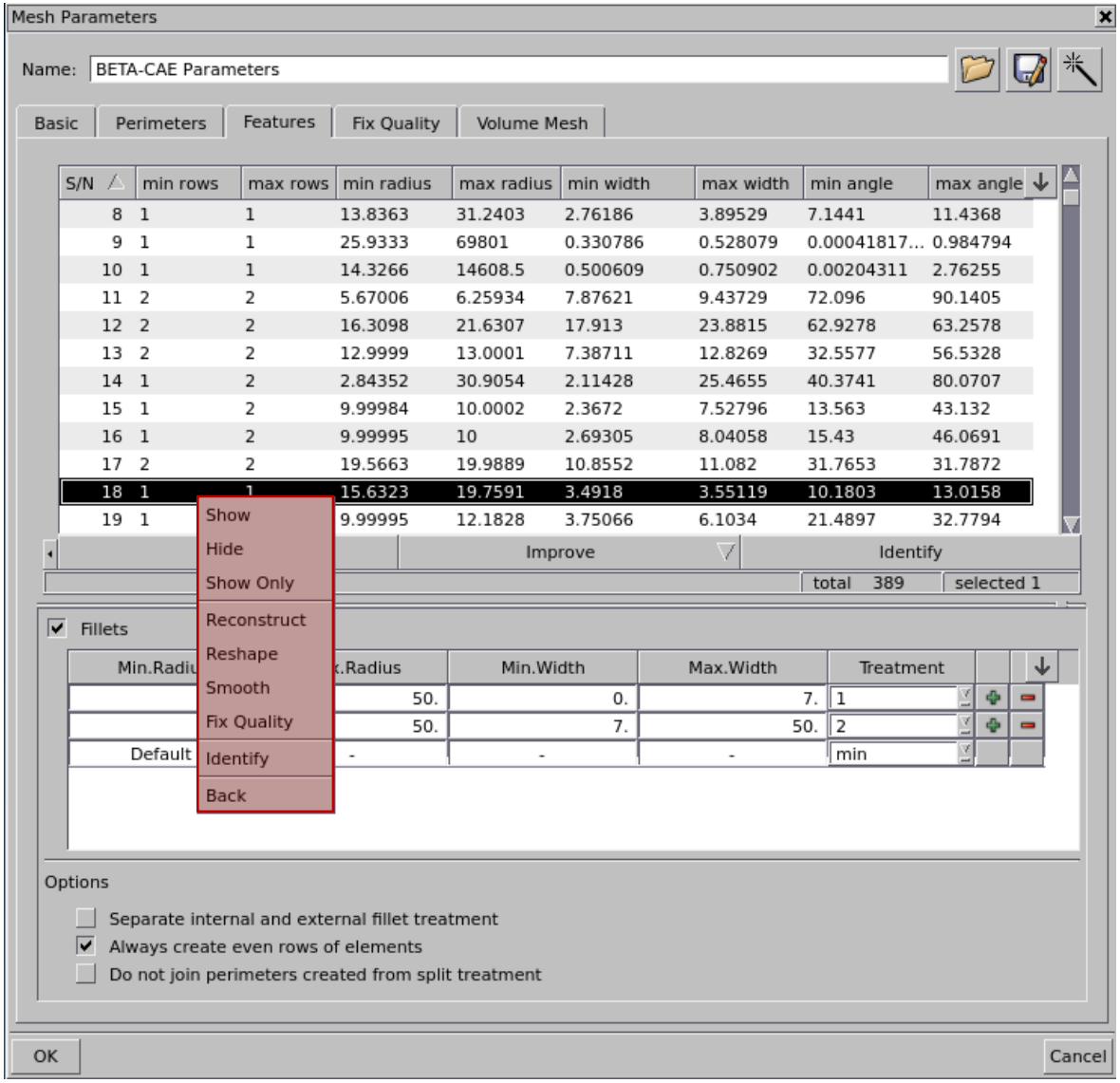
- De-featuring
- Features treatment
- Mesh healing tools
  - Watertight model creation functions
- Volume meshing
  - Hexa-mesh



Robustness and quality improvement of Surface Meshing tools

Full robustness and fewer elements with Tetra Rapid, HexaInterior and HexaPoly

Treatment per feature



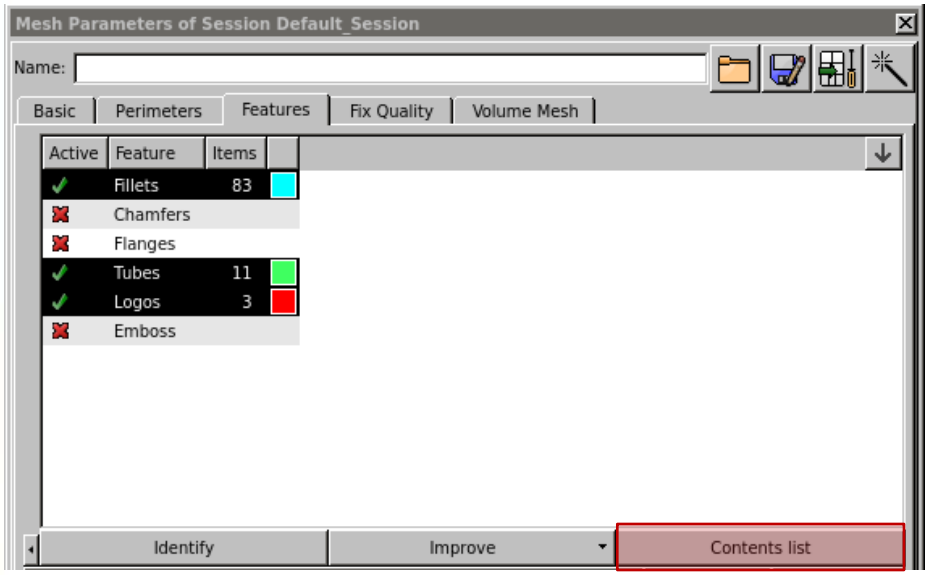
Feature Oriented Meshing

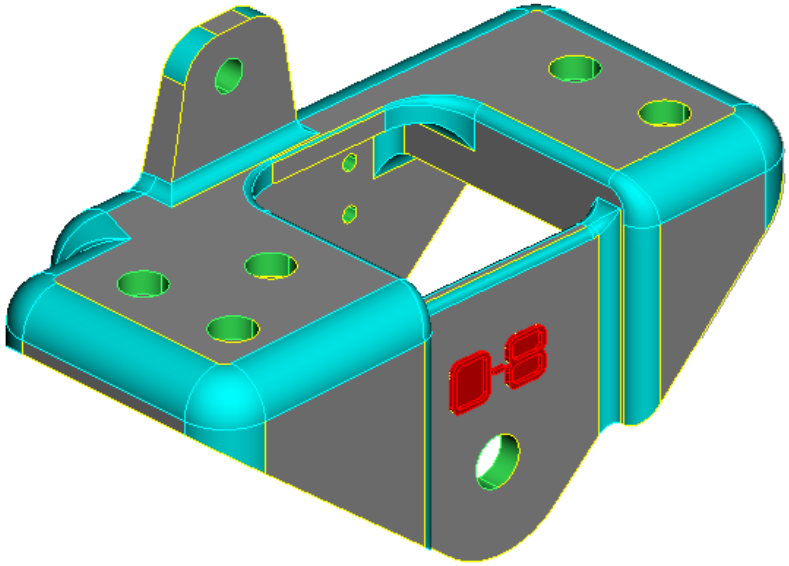
- Fillets
- Chamfers
- Flanges
- Holes
- Tubes
- Logos
- Emboss

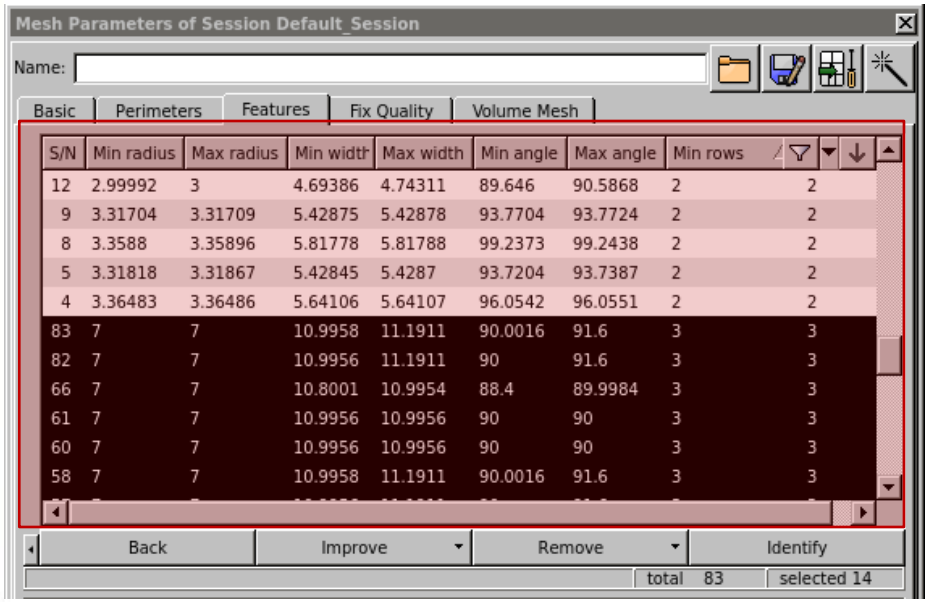
Actions

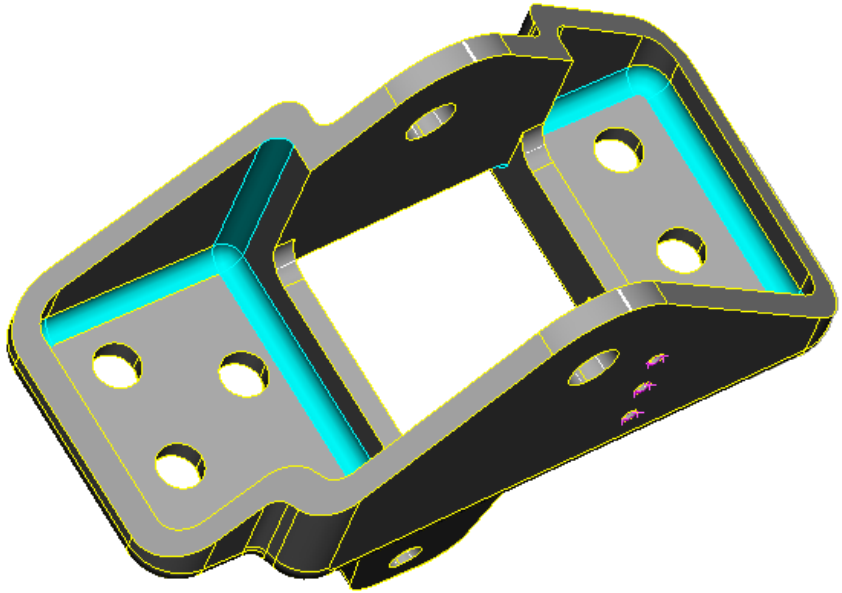
- Identify
- Overview
- De-feature
- Improve
- Isolate

Treatment per feature



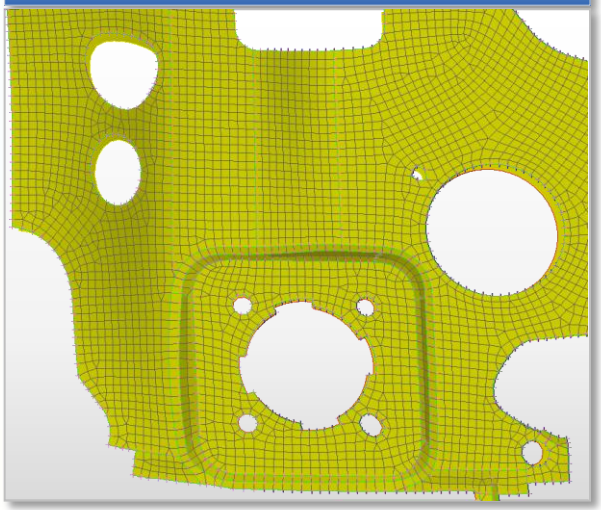




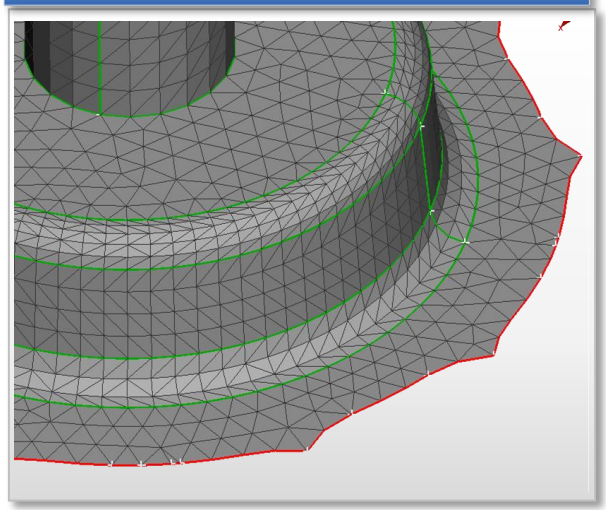


Treatment per feature

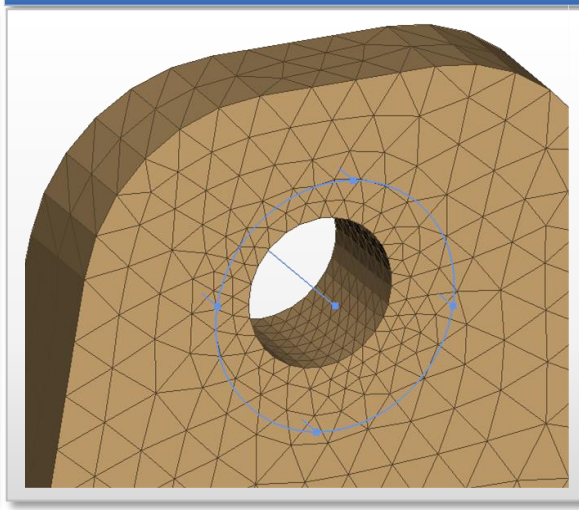
Holes Orientation



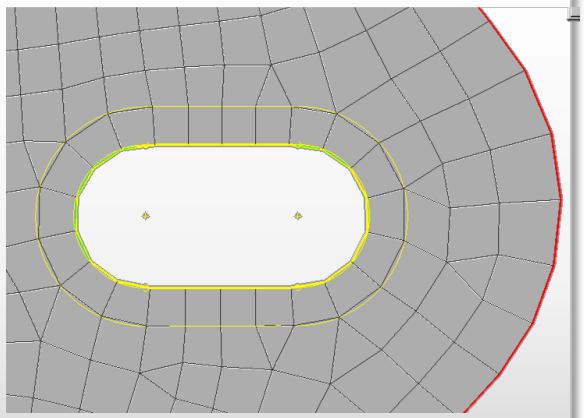
Inner / Outer Fillet



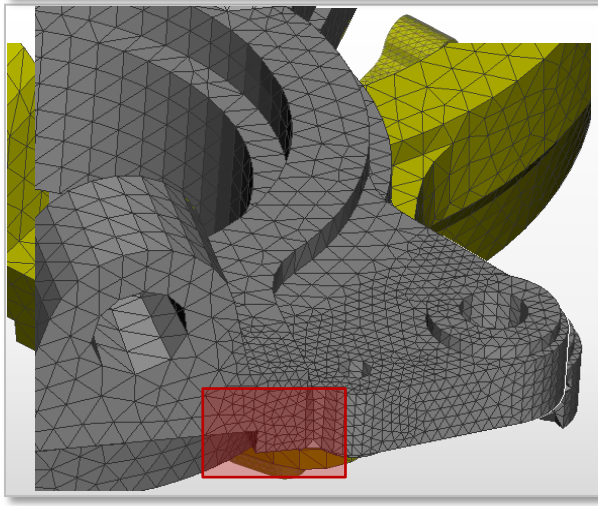
Size boxes



Oblong Holes



Shell - Solid Improvement



Automatic re-mesh for:

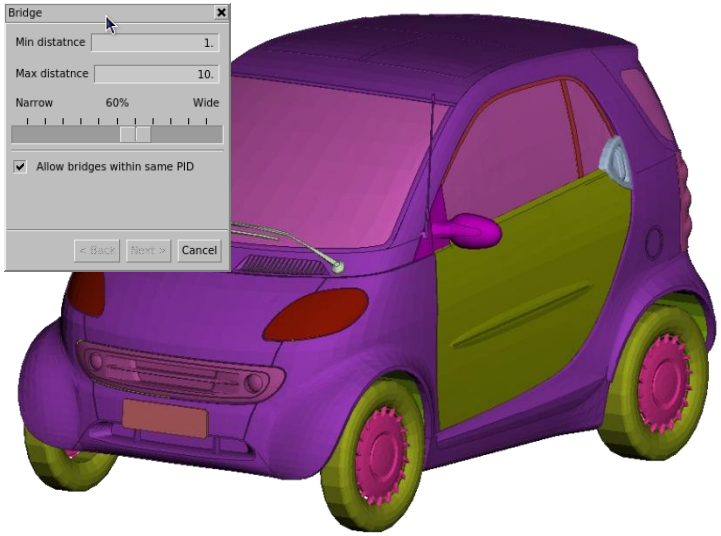
- Shell / Shell & Solid / Solid
- Boundary Layers

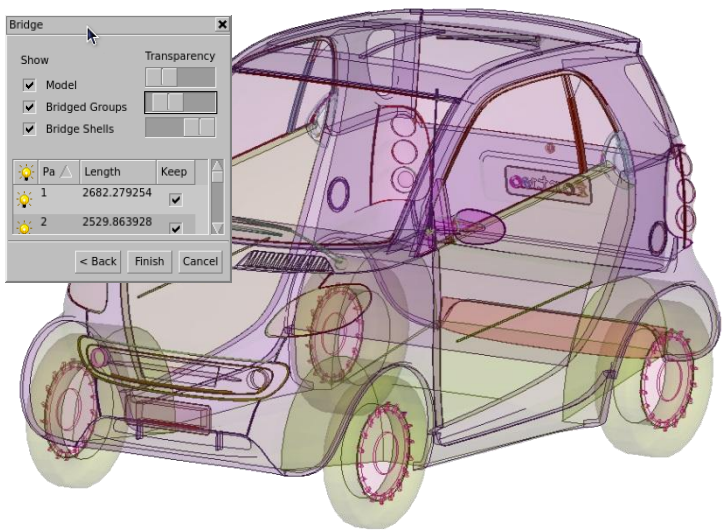
Any function:

- Recons / Reshape / Fix -Qual
- Split / Swap / Join
- Layers

Closing gaps – watertight model

FILL GAP [Seal] function accelerates creation of watertight models for surface wrapping

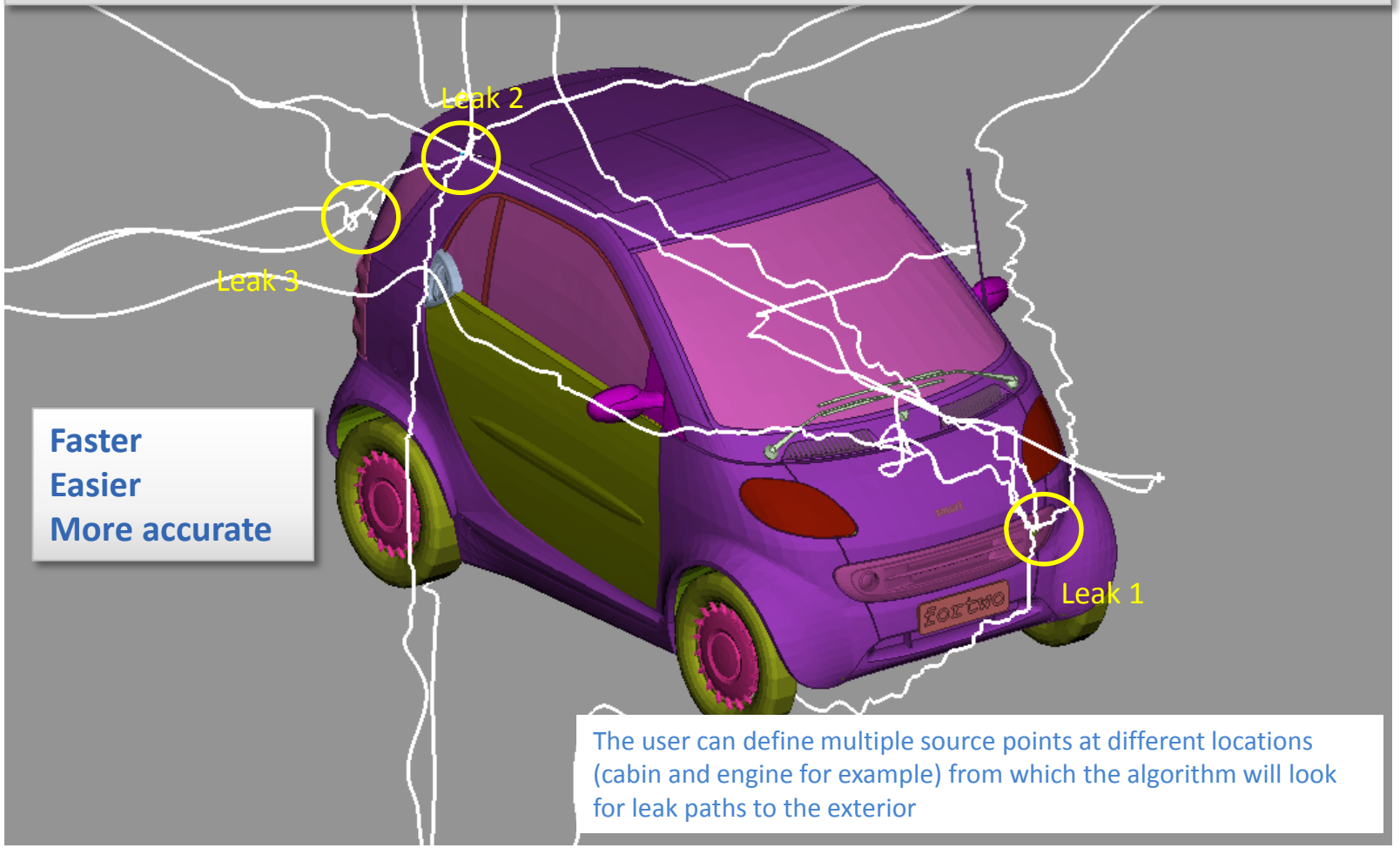




CFD watertight model tools

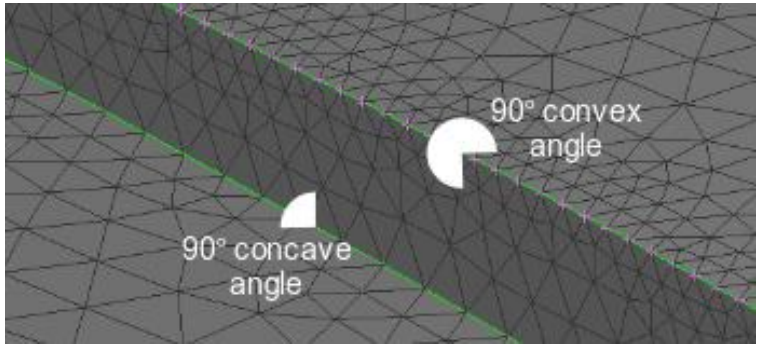
Surface wrapping – leak check enhancements

Ability to track multiple leaking paths to the exterior from multiple interior source points, making it easier to identify several leak areas simultaneously

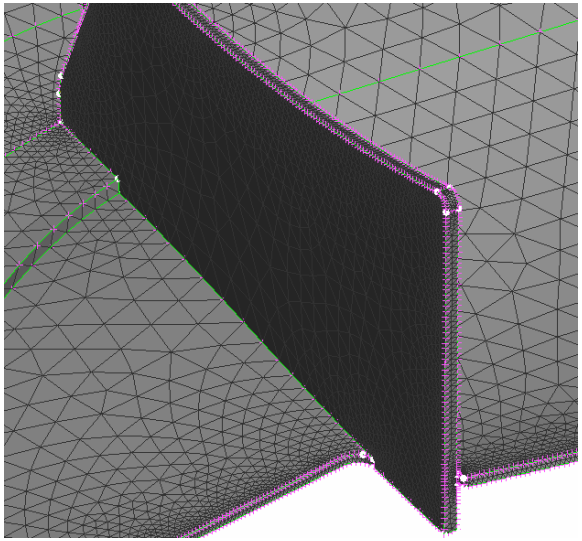


CFD Meshing enhancements

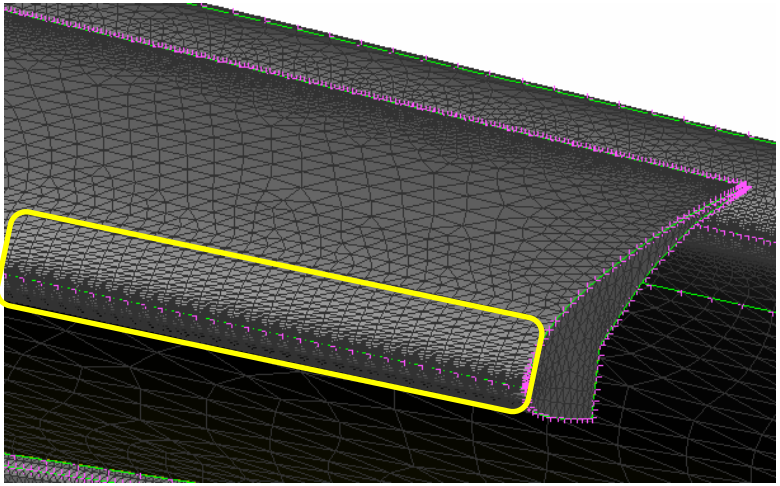
Control convex and concave sharp angle length independently



Automatic Trailing edge identification, element length as a factor of trailing edge width



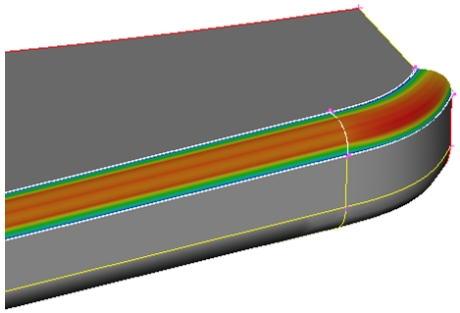
Anisotropic meshing of leading edges

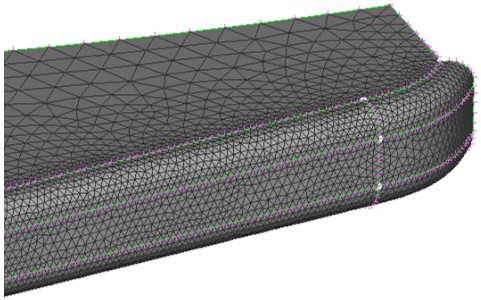


CFD Meshing enhancements

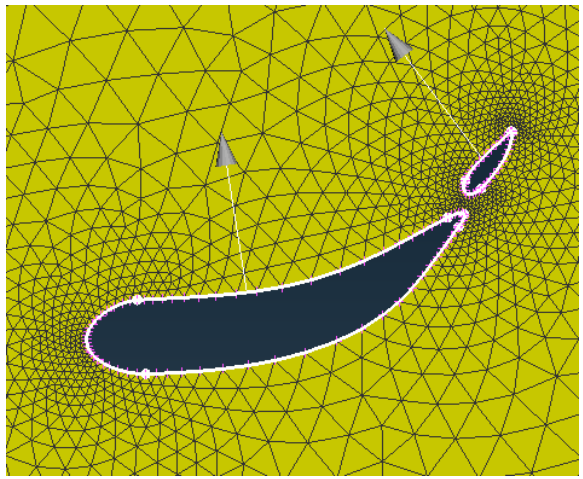
Better refinement of fillets with zero curvature at the ends and “peak” in the middle

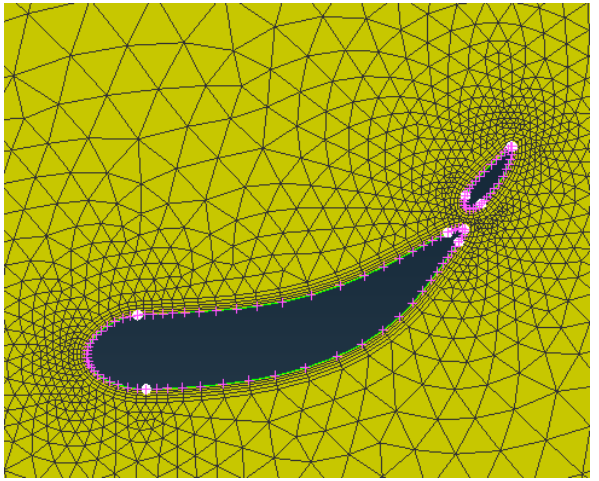
Curvature contour plot showing peak along the middle of the fillet





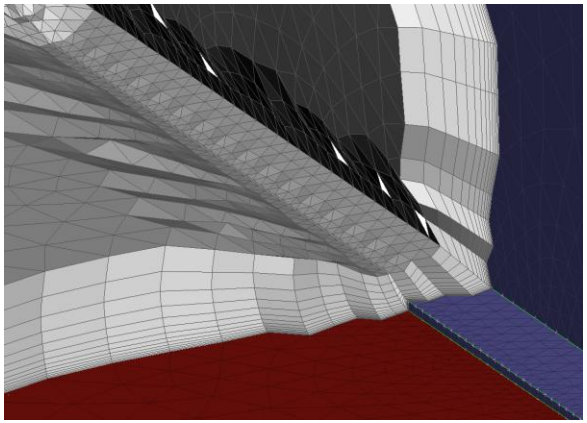
Generation of 2D layers from selected Perimeters



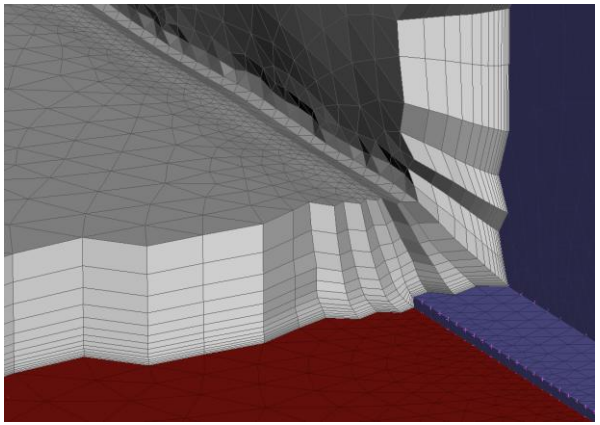


Layer generation improvements

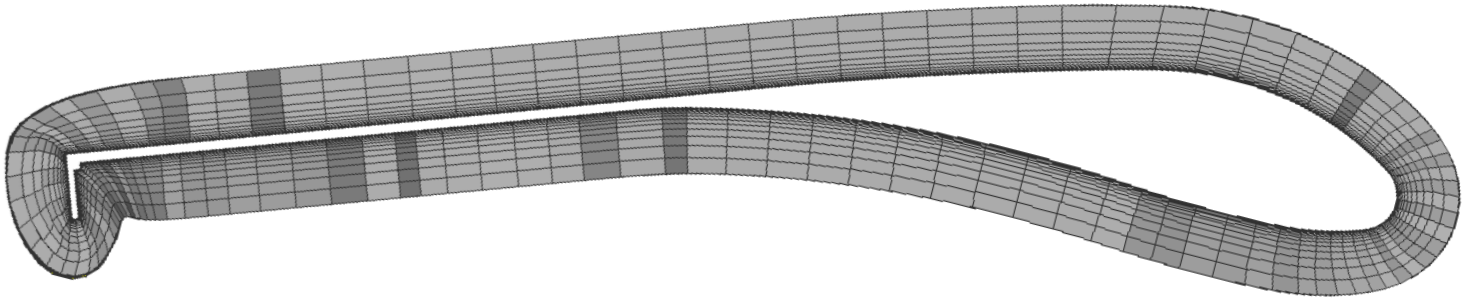
- Improved algorithm performance at high angles
- Better othogonality near the wall
- Better layer top cap quality
- Less layers squeezing required



Layer squeezing at high angles



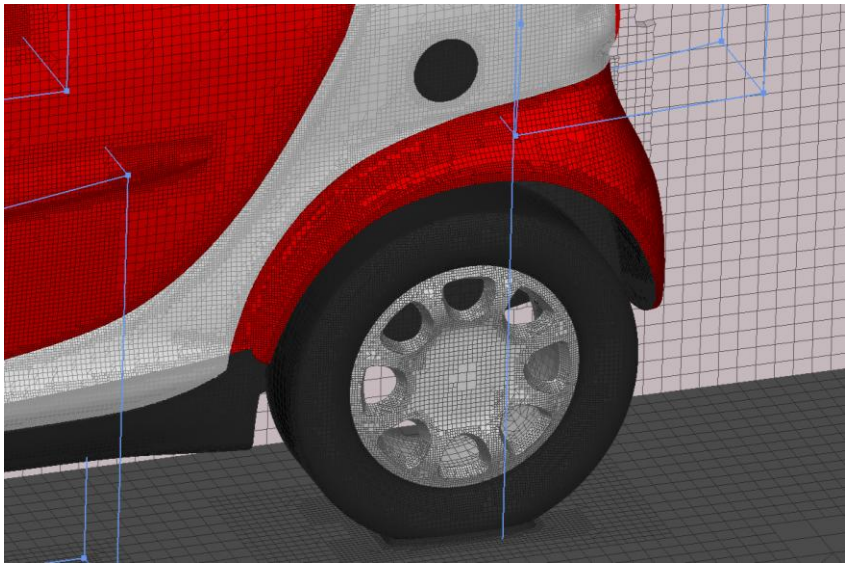
NEW vector smoothing for full height at extreme angles

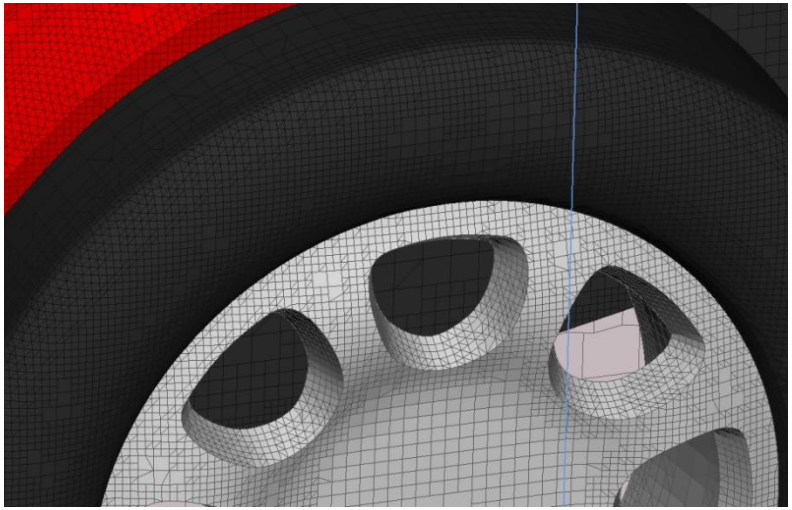


CFD: Volume Meshing

HEXTREME (hexa -polyhedral)

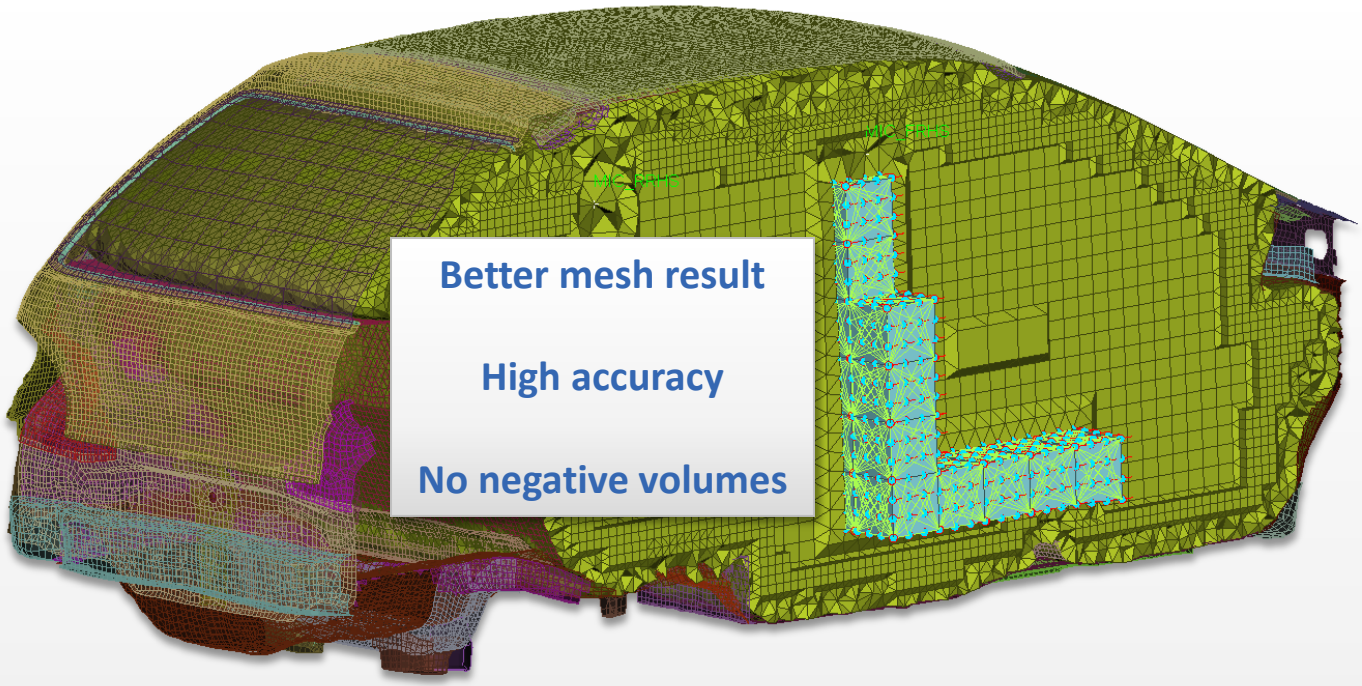
- HEXTREME: new volume meshing algorith
- Multi-core operation
- Fully automated and highly controllable
- Hexa-dominant and polyhedral mesh
- No need of watertight volume definitions





NVH : Volume Meshing

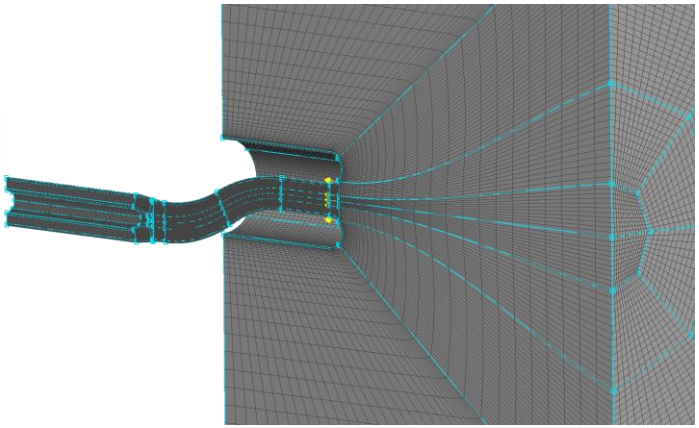
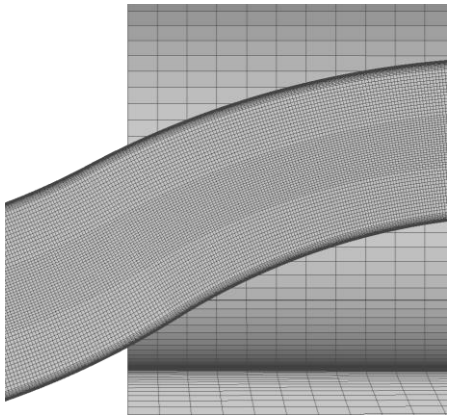
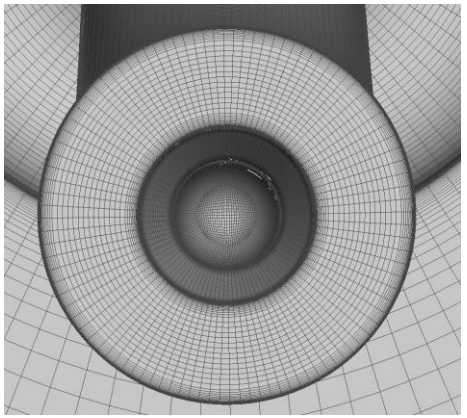
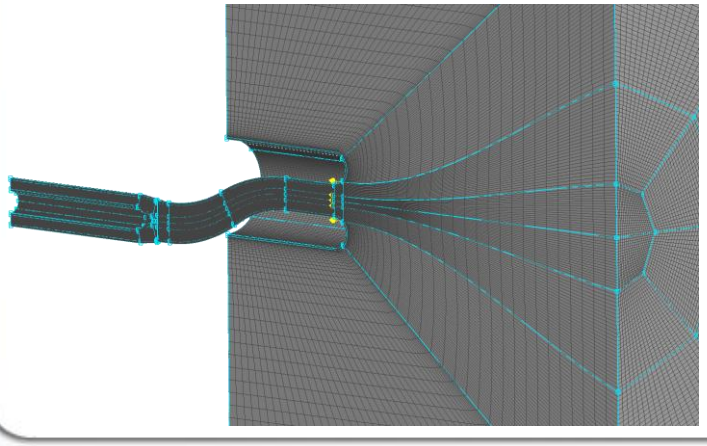
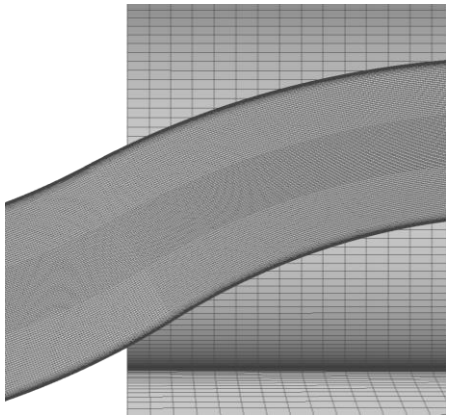
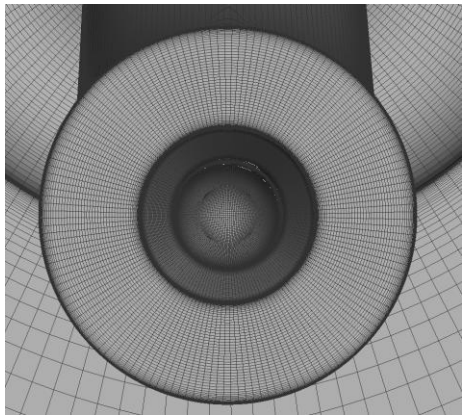
New Cavity Wizard



- Wizard functionality allowing backward steps and re-setting
- Two types of volume mesh generators for pure tetra and hexa-dominant mesh
- High accuracy during boundary recognition of the structural wetted surface
- Interactive recognition of intermediate steps regarding opening recognition

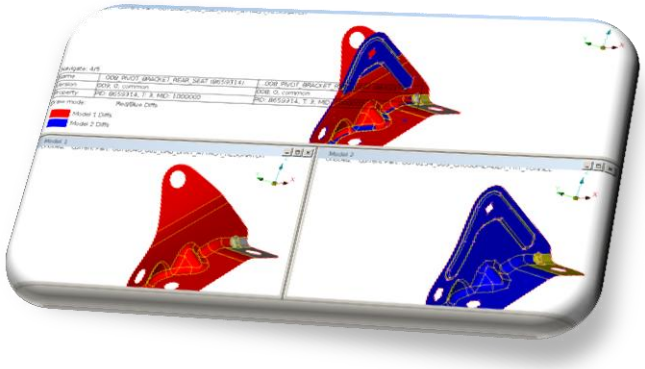
HEXABLOCK enhancements

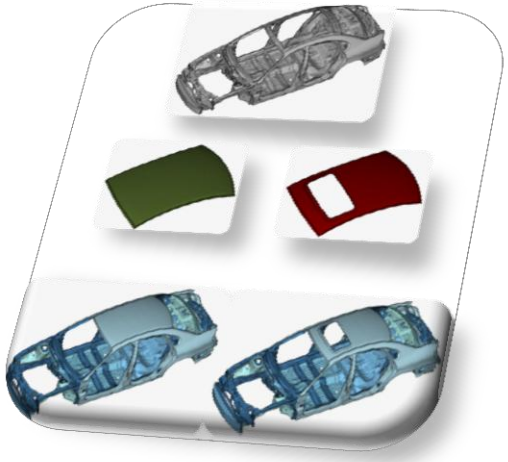
- Menu re-organization
- Functions for box creation and meshing of surface and volume mesh with different algorithms (MAP QUAD, FREE etc)
- Support of degenerate Boxes

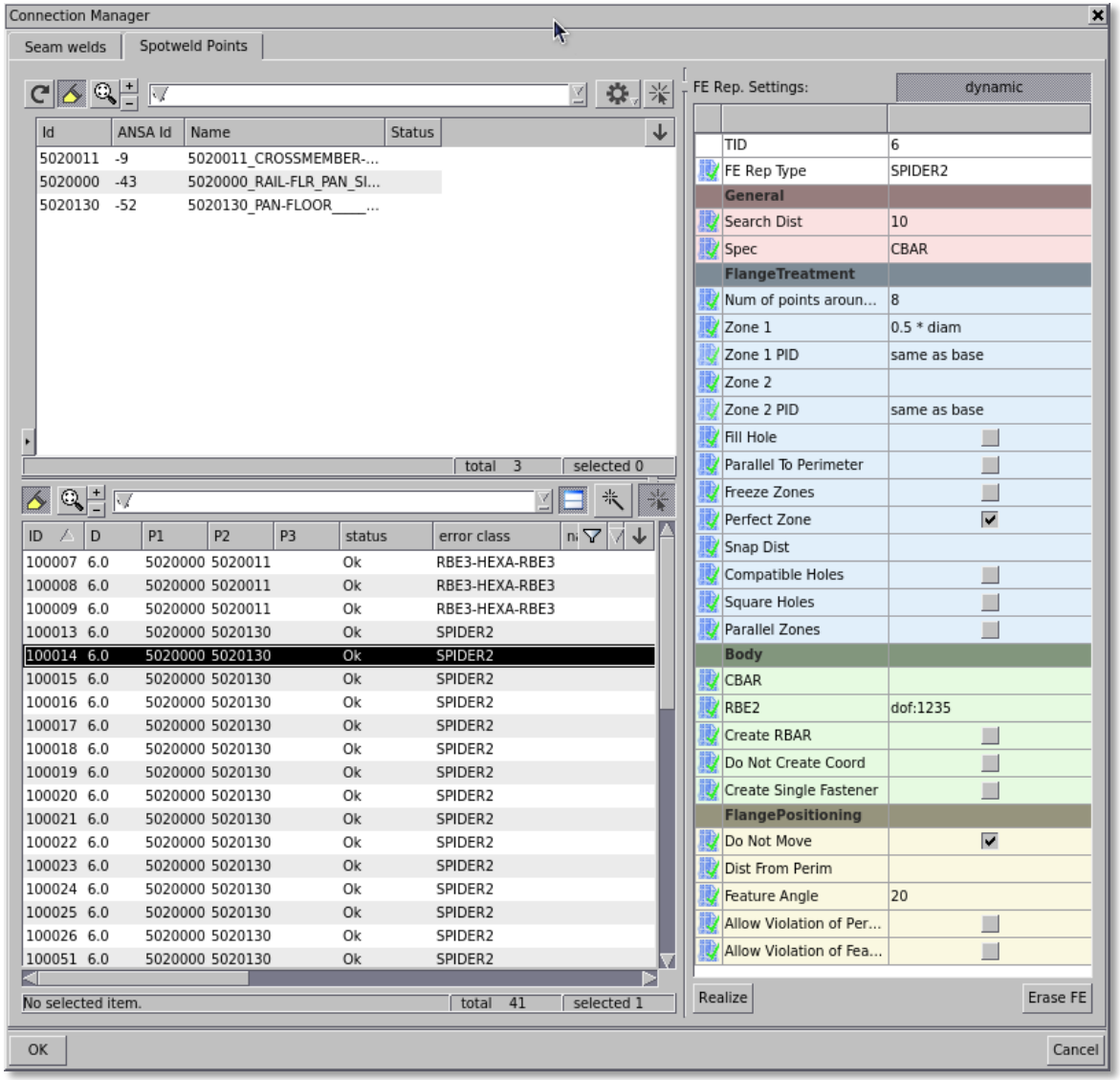
Model Management

- Connections management
- Model Comparison
- Variants Configuration
- Connectivity – Similarity detection
- ANSA DM - Interface with SPDRM





Assembly - New Connection Manager



General

- Always open
- Standard list functionality

Parts section

- “Identify” functionality

Connections section

- Easy filtering

FE representation section

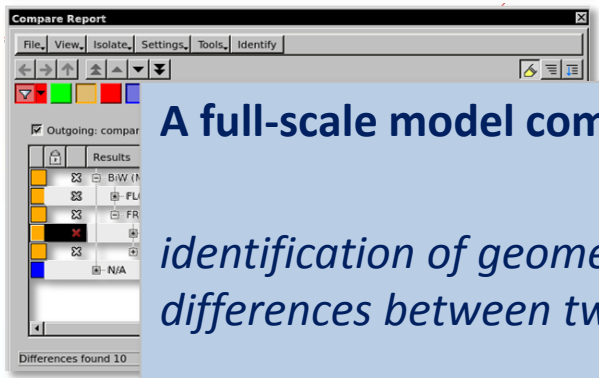
- Rational grouping of settings
- Direct preview of FE-rep settings of selected
- Indication of setting compliance with template

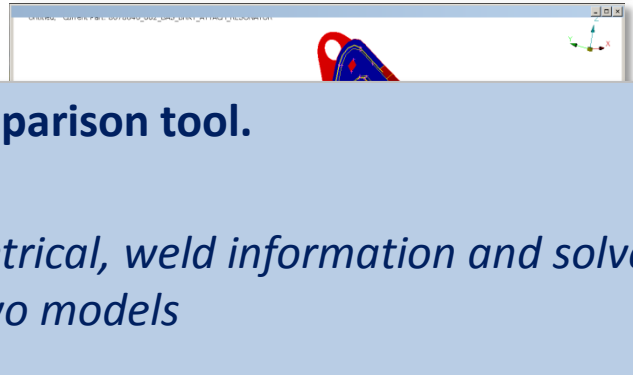
Connection templates

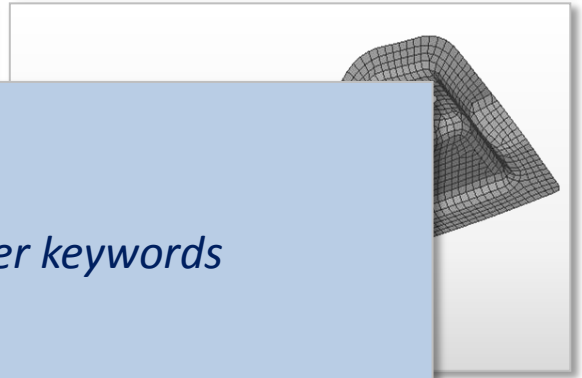
- Definition of mandatory and insignificant settings

Models Comparison

Interface	Smart Navigation	Matching







A full-scale model comparison tool.

identification of geometrical, weld information and solver keywords differences between two models

significantly speeds-up the model pre-processing time

- re-use of existing meshes from previous model versions
- mapping of laminate information from one model to another
- instant update of the an assembly when the new versions of several components become available

Ge

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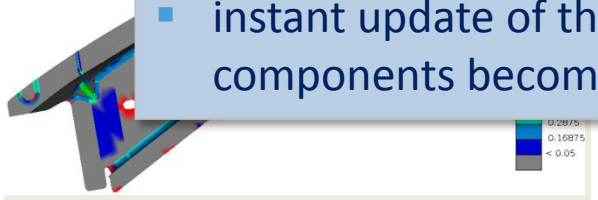
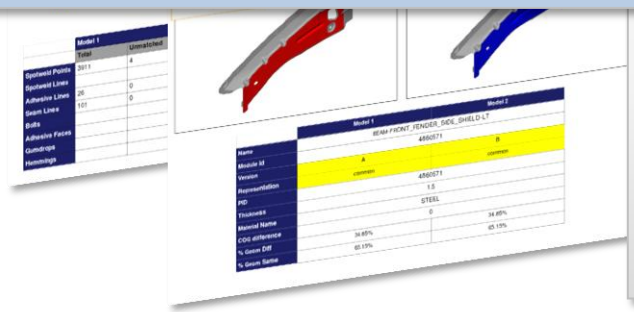




- Geometry matching between solid description and mid-surface
- New, enhanced PPTX report

Models Comparison

Interface	Smart Navigation	Matching
Geometric differences	Reporting	

A full-scale model comparison tool.

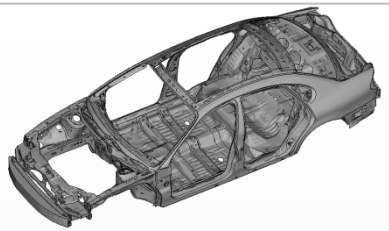
identification of geometrical, weld information and solver keywords differences between two models

significantly speeds-up the model pre-processing time

- re-use of existing meshes from previous model versions
- mapping of laminate information from one model to another
- instant update of the an assembly when the new versions of several components become available

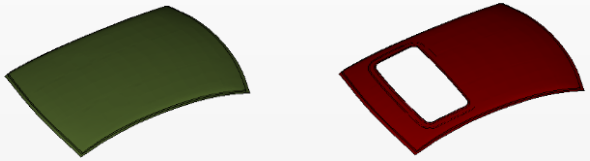
Model Variants Management

Configurations



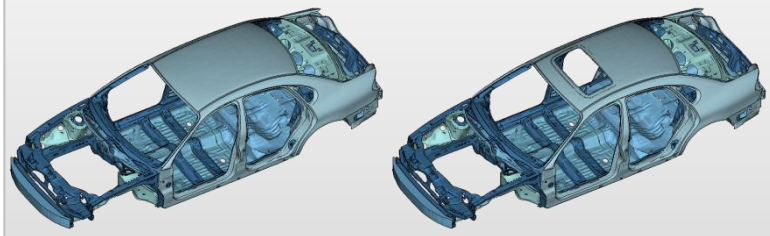
Common parts

+

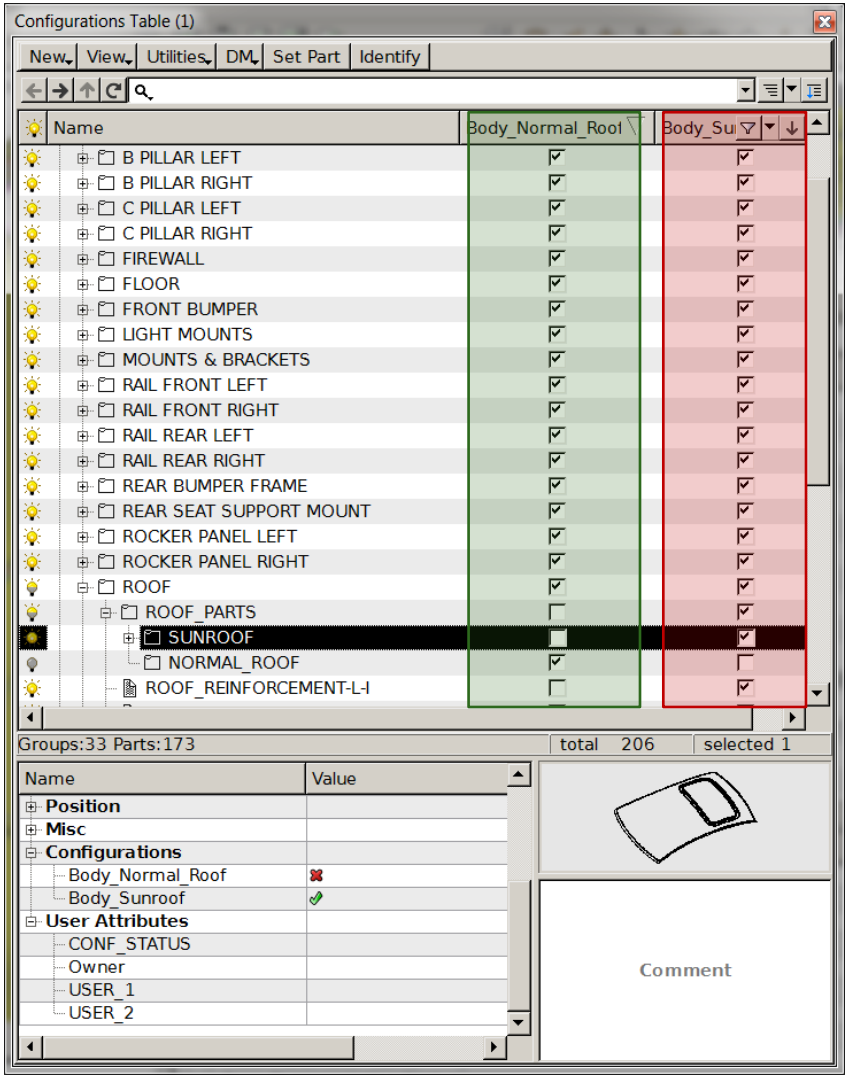


Mutually exclusive parts

=

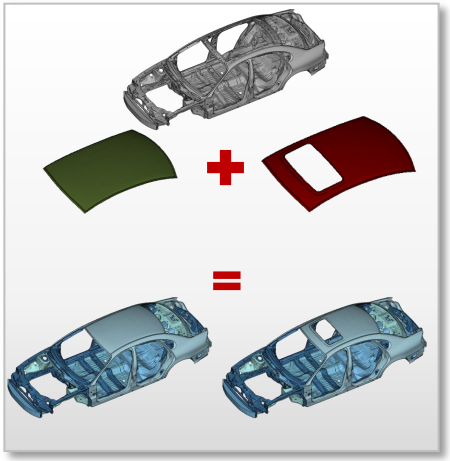


Body_Normal_Roof Body_Sun_Roof



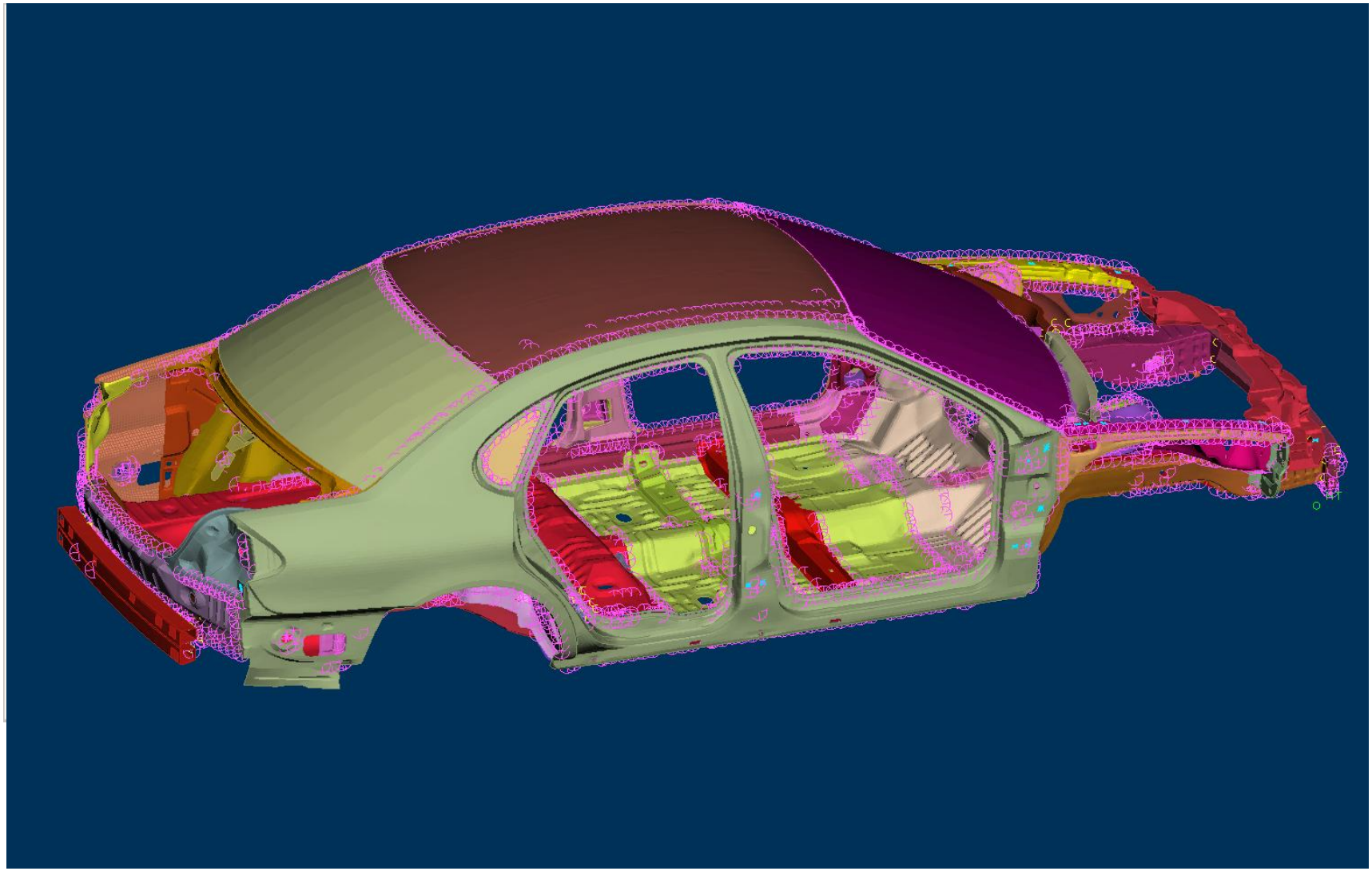
Model Variants Management

Configurations

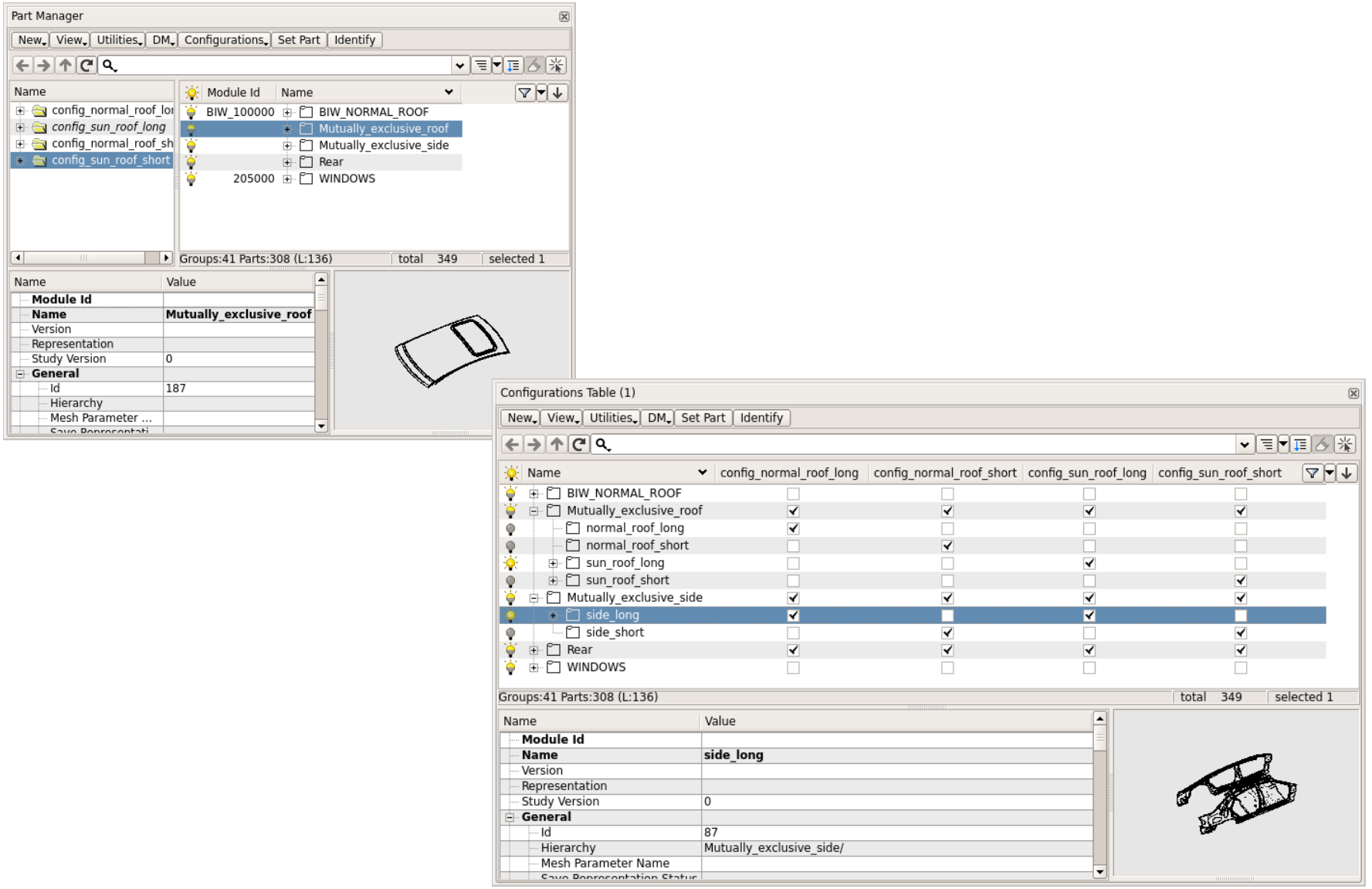


- One ANSA file with all possible variants
- Simple procedure for model variants creation
- Centralized creation, maintenance and update of several model variants
- Great time and effort savings

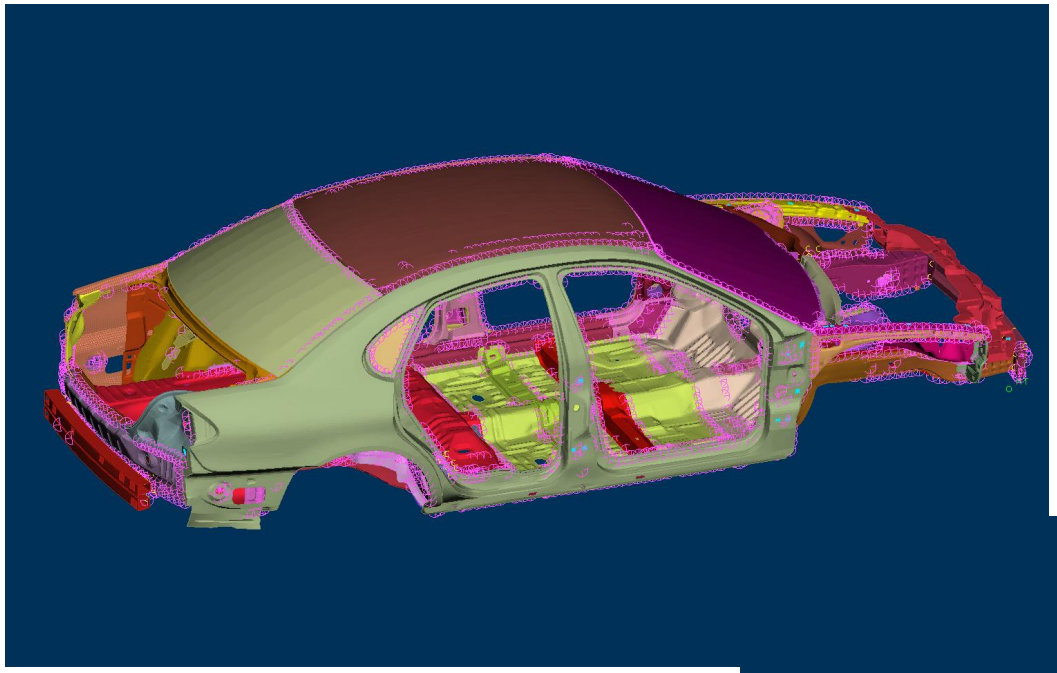
Variants Configuration

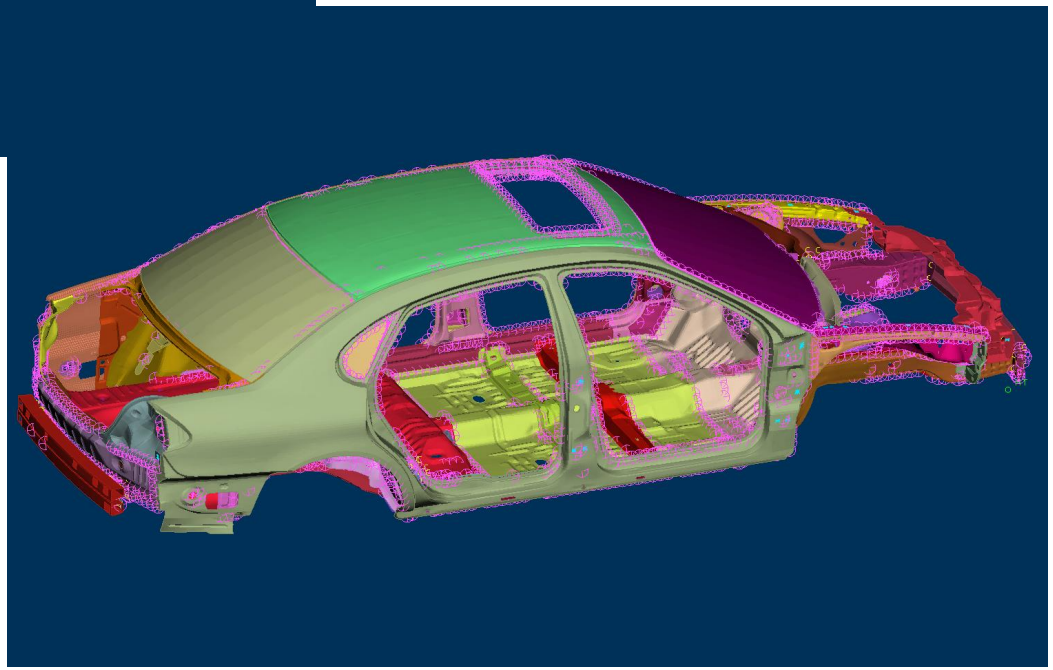


Variants Configuration

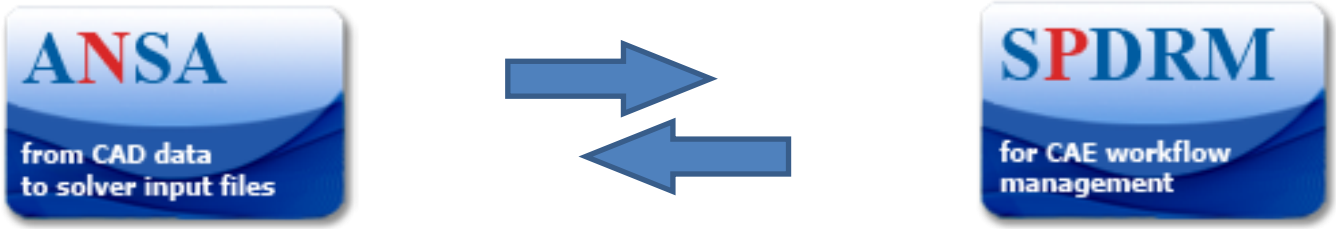


Variants Configuration





Use of the SPDRM as a data vault by ANSA



ANSA Data Management pool acquires the standard features of a database

ANSA can directly store and retrieve files from the SPDRM database

- Library files, part, group, include representations, connection files … …

✓**Configurable and controllable data access**

✓**Secure data and processes**

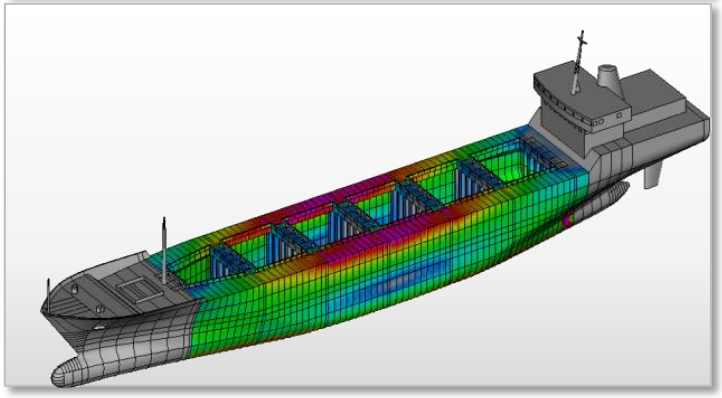
✓**Data recovery**

✓**Connectivity (external access) is facilitated**

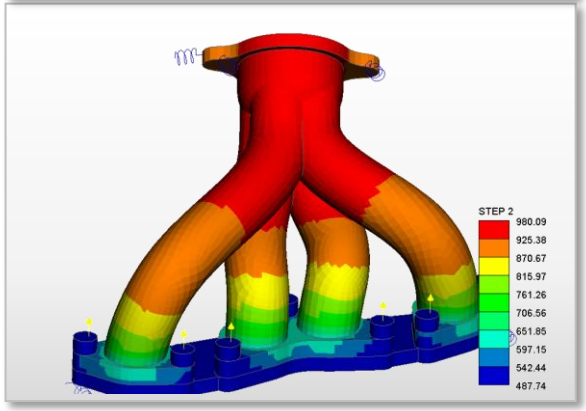
The database is handled in a centralized manner at an Enterprise level

Pre - Processing Interfaces

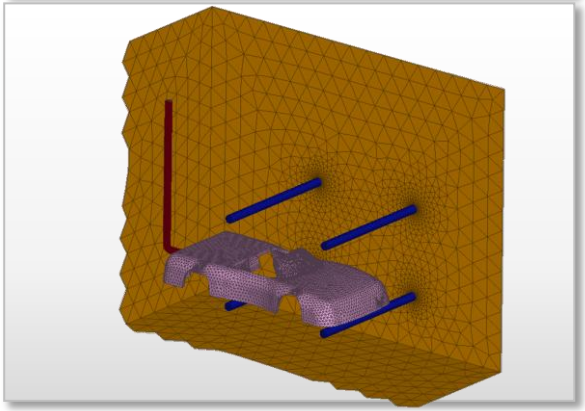
SESTRA



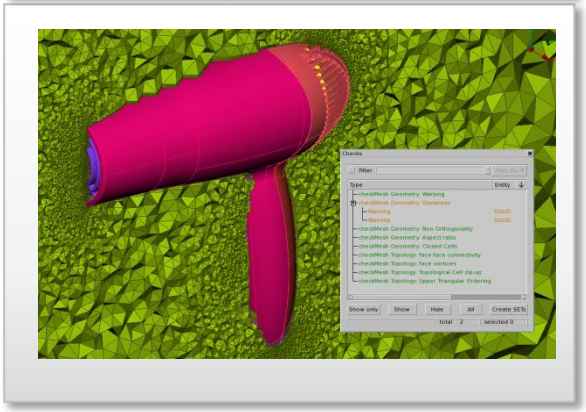
THESEUS - FE



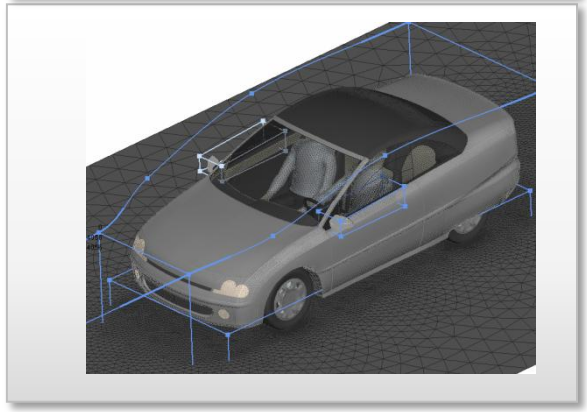
MOLDEX 3D



OpenFOAM



SC/Tetra



Pre - Processing Enhancements

NASTRAN

- SOL 400 - SOL 600
- Super elements / sub-structuring support
- Bolts pre-tension
- New Case Control Management (Header) interface

ABAQUS

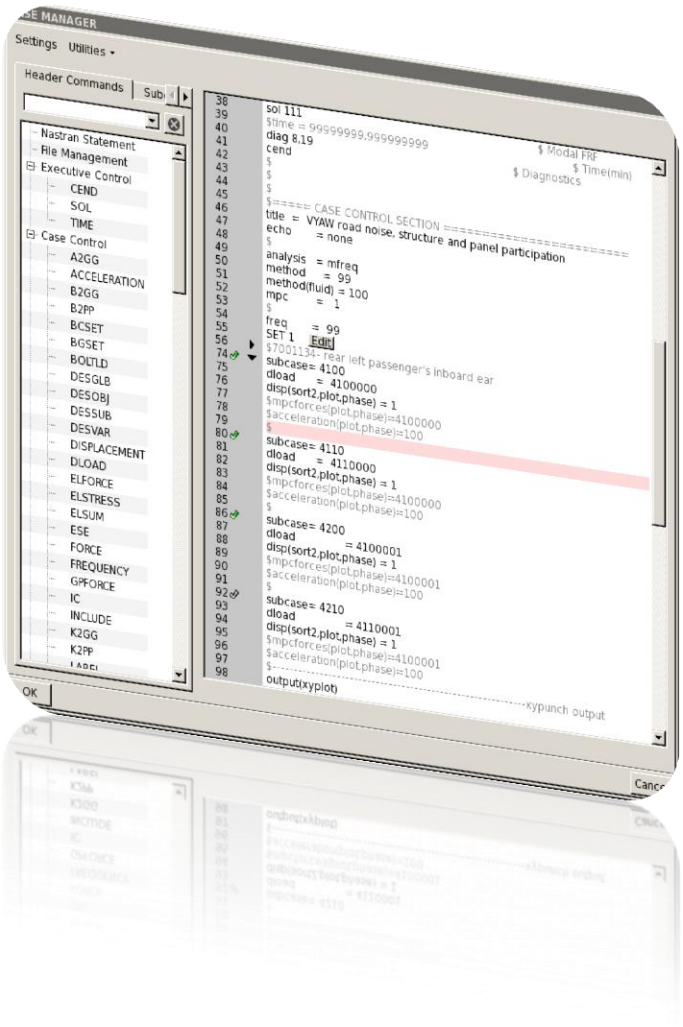
- Co-Simulation

LS-DYNA

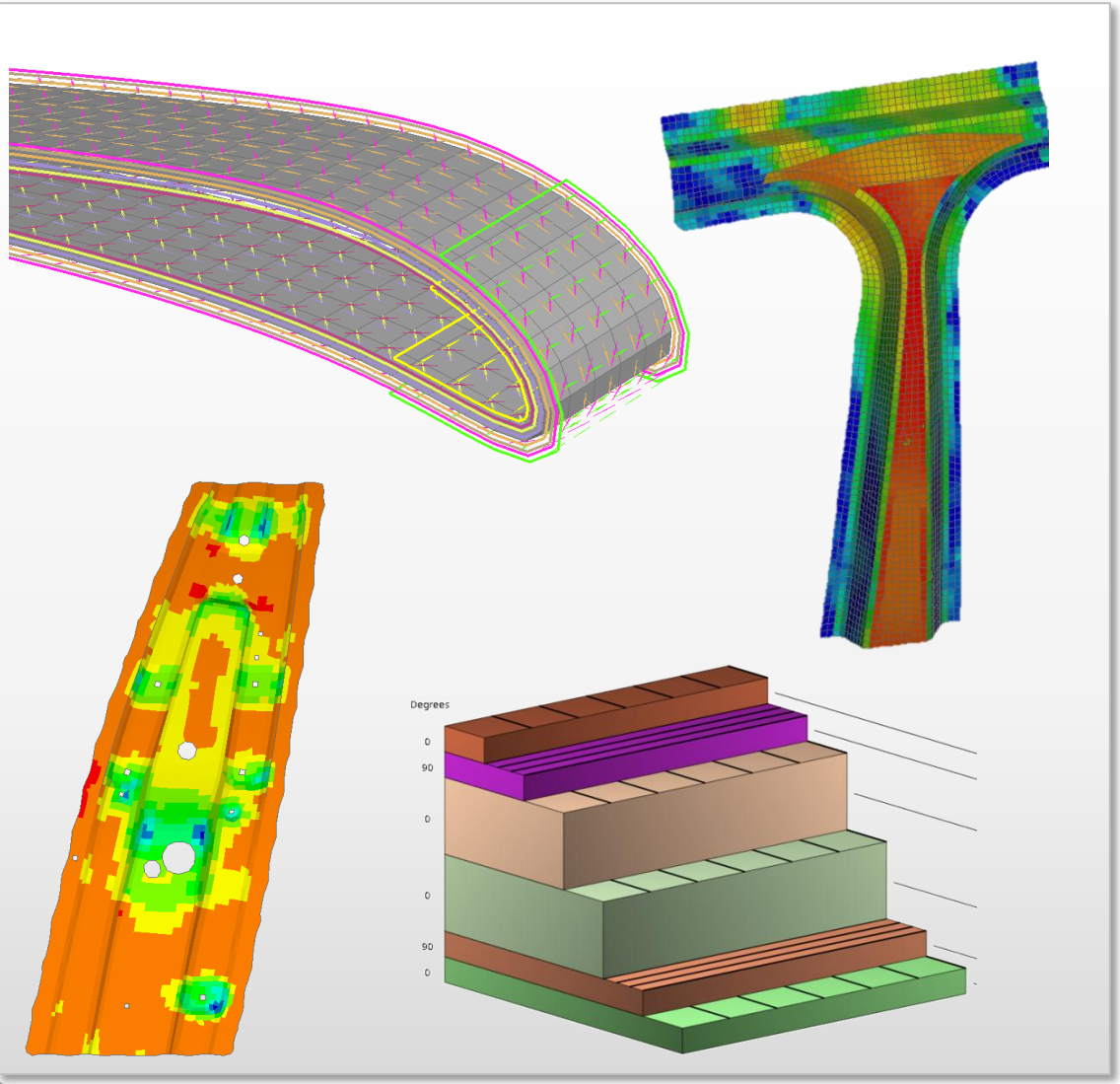
- ALE keywords

LS-DYNA, ABAQUS, PAM-CRASH

- *PARAMETER, VARDEF_/ keywords



Laminate - Results Mapping



Composites

- Redistribution / redefinition wizard for layers
- Generation of output request
- ELEMENT_SHELL_COMPOSITE
- Composites for TSHELL

Results Mapping

- PAMSTAMP Laminate
- Integrated in Compare
- Automation via scripting

Analysis Tools - Kinetics Module

Multibody Dynamics “in-house solver” embedded in ANSA

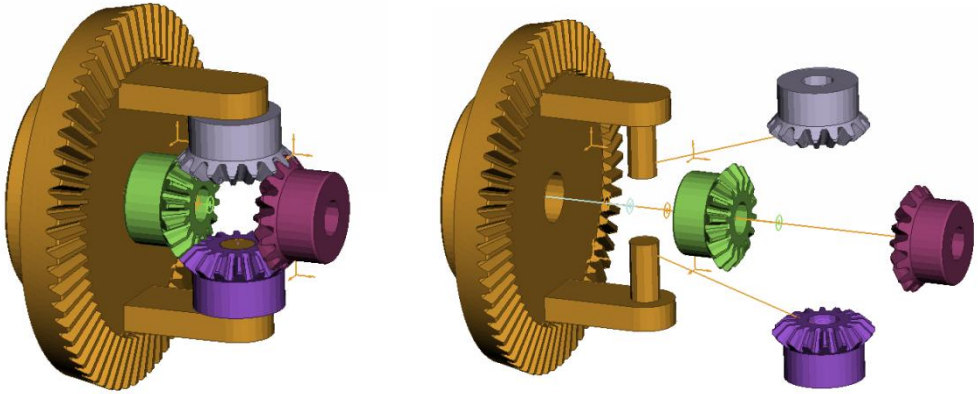
- Positioning of mechanisms
  - No need to create a kinematic configuration
  - Easy to set up and use
- Run Multibody dynamic simulations
  - Support of contacts
  - non-smooth dynamic approach for contacts
- Run Multibody simulations providing results as input for another analysis
  - reduce drastically the total simulation time

Loads

- Force / time
- Force / displacement
- Damp / Bush entities
- Prescribed Motion

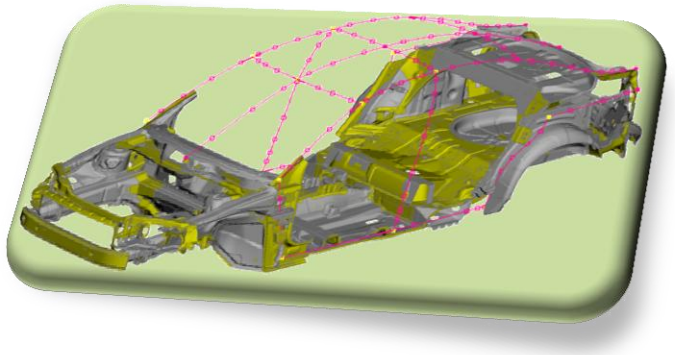
Results

- Reaction force / moment
- Velocity / acceleration
- Displacements
- Plot of measurement
- Export of results



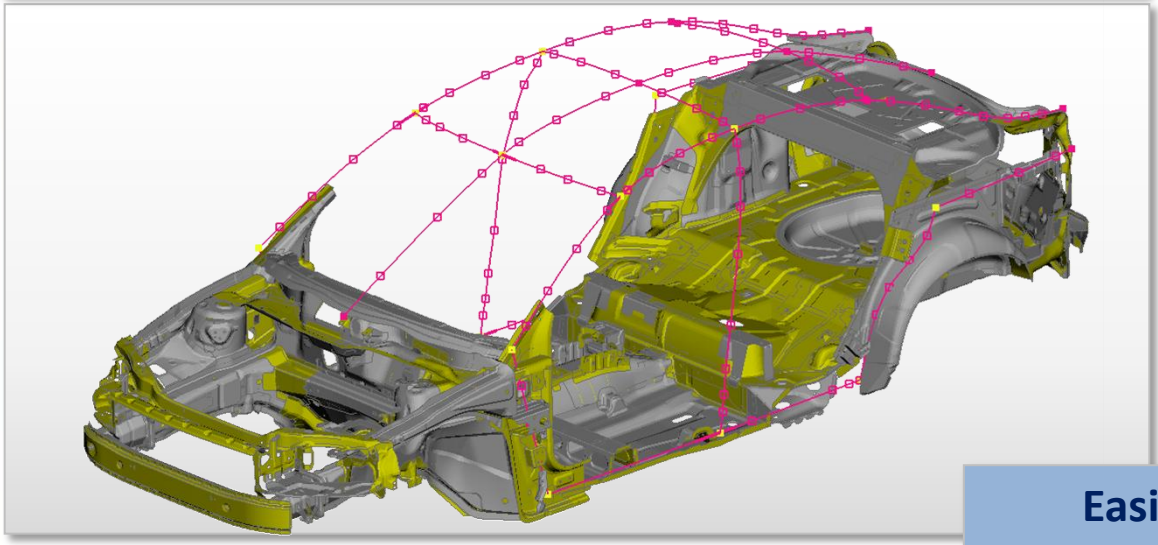
Morphing & Optimization

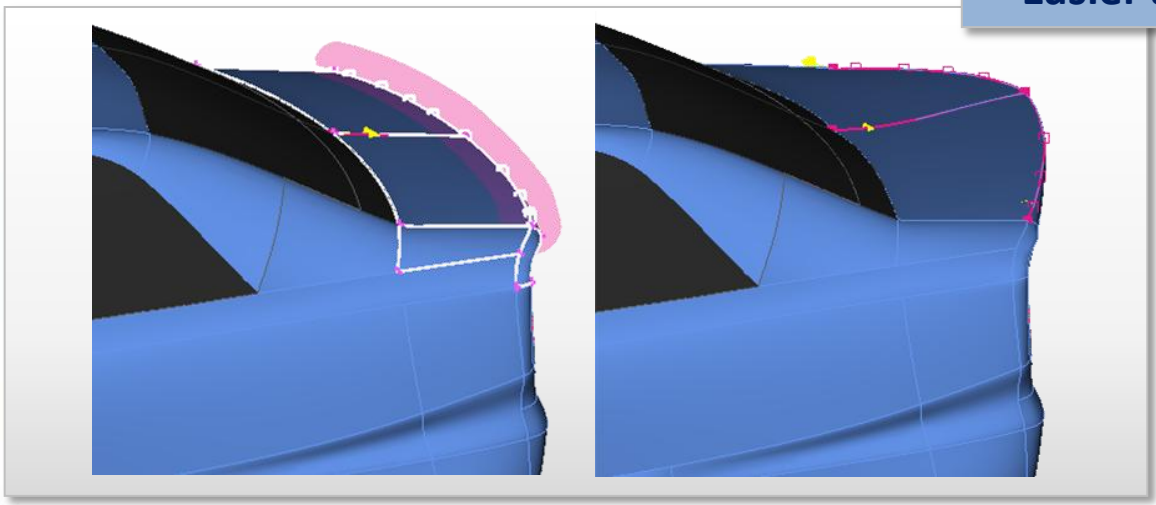
- **New Morphing entities**
- **New Morphing "boxes" shape**
  - Easier definition and handling
- **Direct "boxless" morphing**
  - Easier and more flexible application
- **DOE optimization interface**



Morphing

1-D MORPH



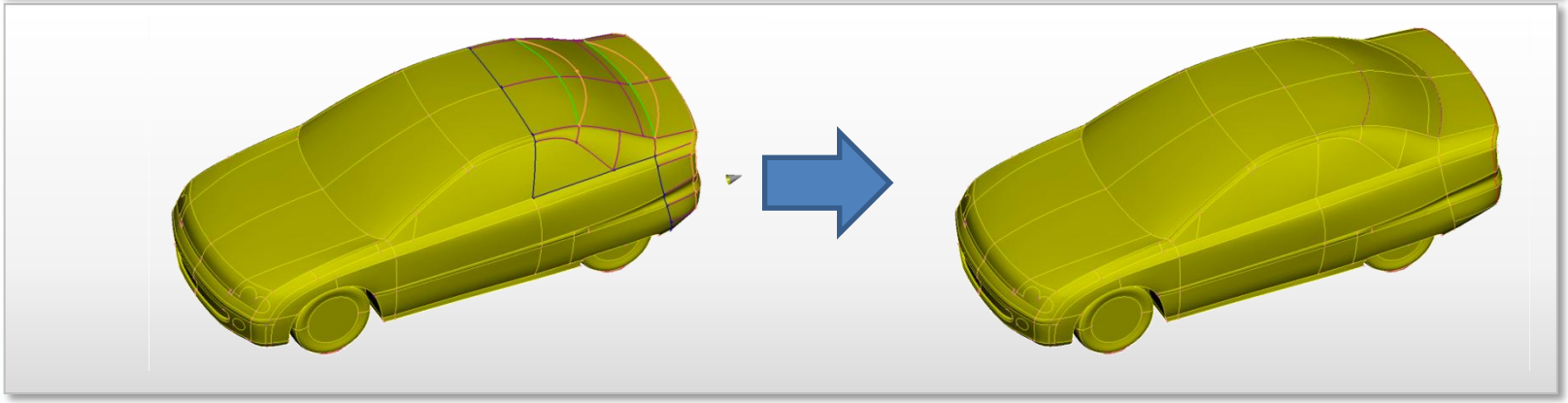


Easier definition and handling

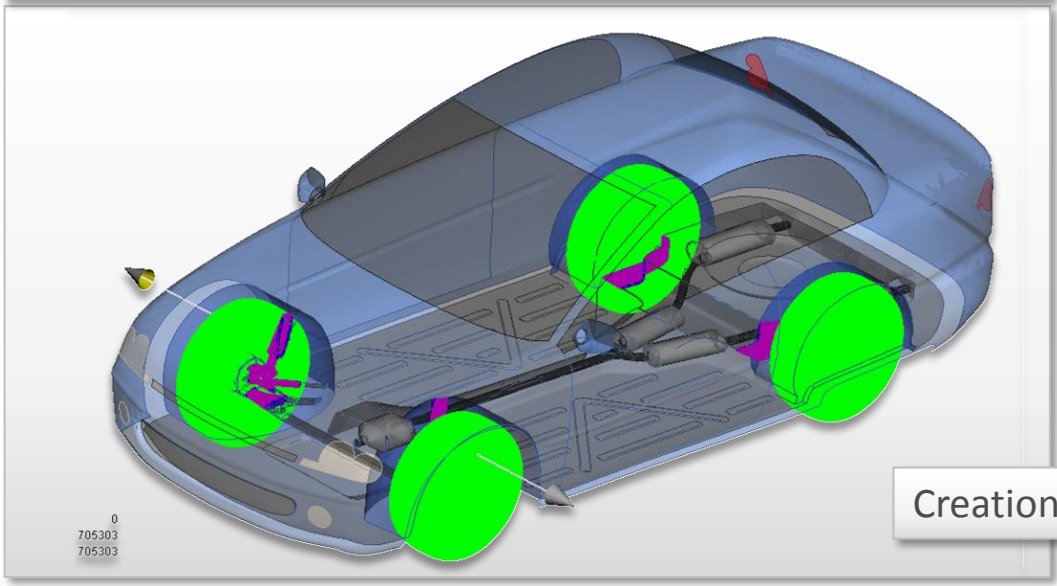
Easier and more flexible application

Morphing

Direct - ”boxless” - morphing



DFM



GPU technology

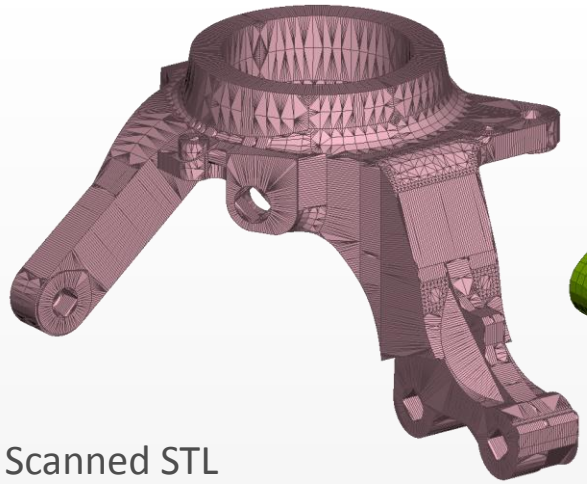
Increased speed and usability

Increased accuracy

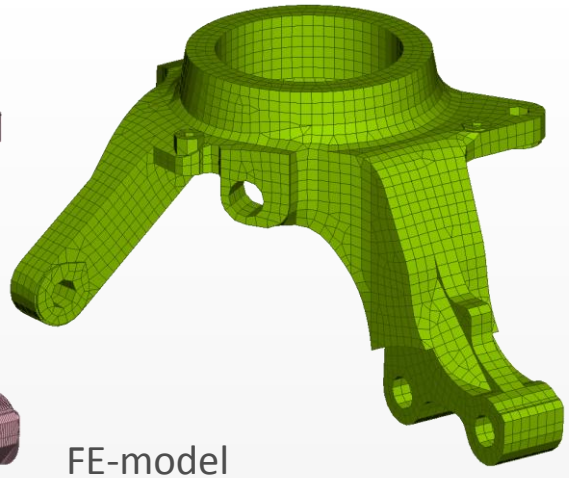
Creation of surface fitting parameters

Morphing

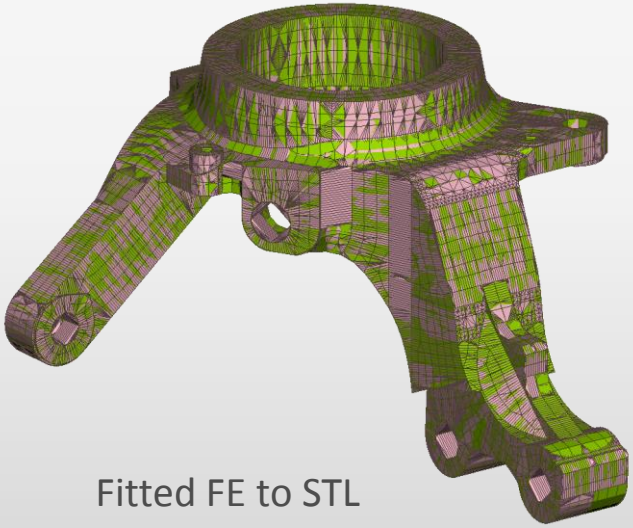
Nominal to Real



Scanned STL



FE-model

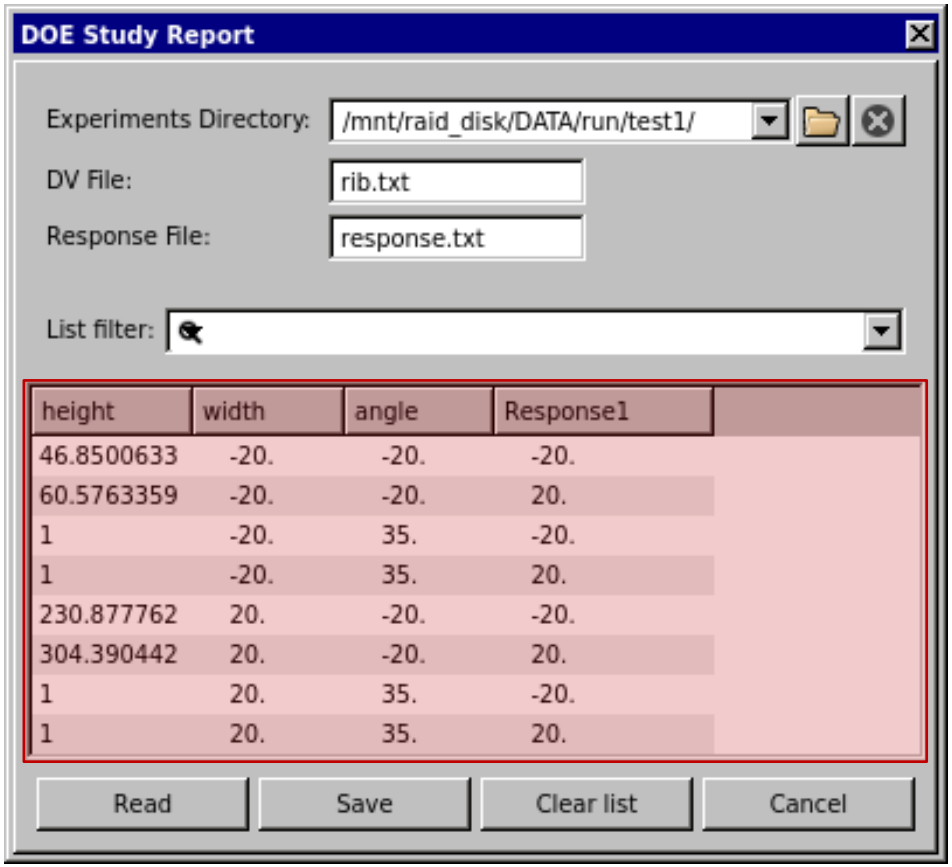


Fitted FE to STL

Nominal to Real

- Fit and match FE-model to scanned (STL) prototype
- Create a CAE model exactly the same to the manufactured one

Optimization

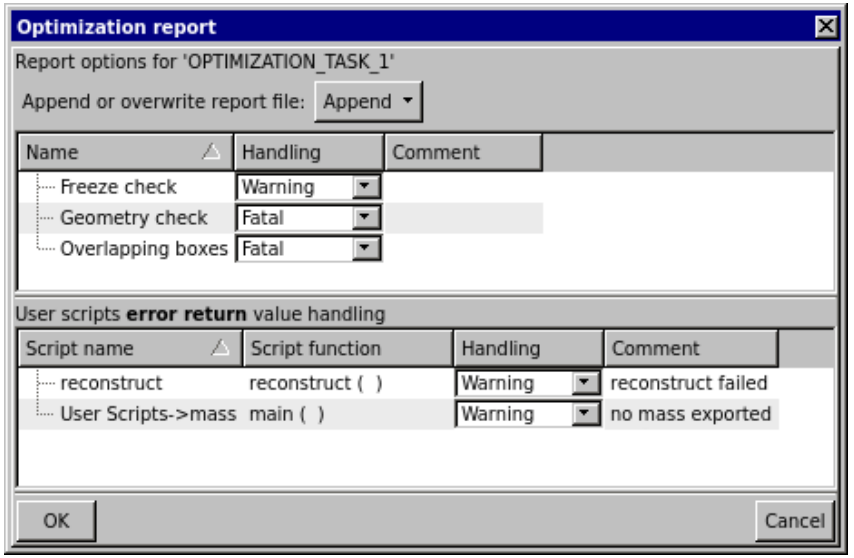


DOE Study

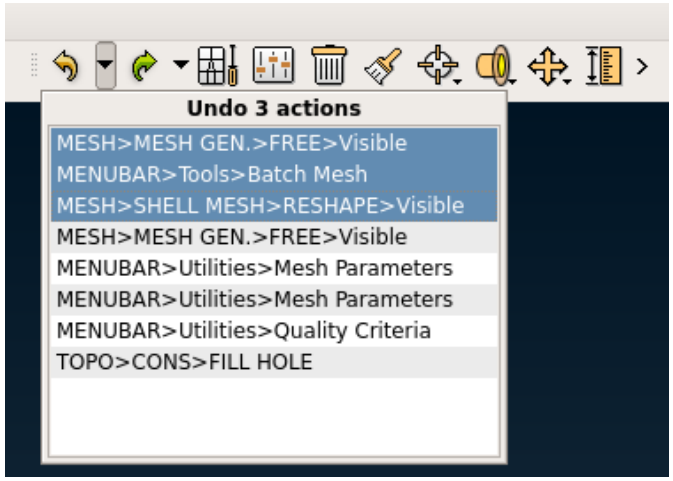
- New set up interface
- Solver initiation
- μETA initiation
- New Study report functionality (Design table)

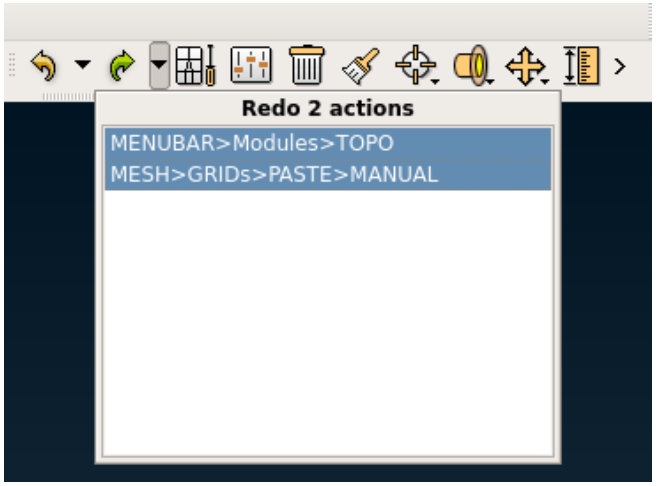
Optimization Report

- Information, warnings, errors



ANSA v.14.2.0 : User interface





Thank you

Stay connected

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Latest Developments

5th ANSA & μETA INTERNATIONAL CONFERENCE

5-7 June 2013
THE MET HOTEL
Thessaloniki, Greece