Simcenter STAR-CCM+ geometry handling

Facilitate design processes by easily creating, modifying and preparing geometry

Benefits
• Integrate easily with existing design processes by importing geometry from a broad range of leading CAD and PLM software tools
• Create, modify and repair geometry using the integrated CAD modeler
• Combine CAD originating from various sources in a single simulation
• Improve efficiency with automatic geometry cleanup, search tool, surface repair and surface wrapping
• Enable powerful design exploration with an automated CAD-to-mesh process

Summary
Retaining the geometric fidelity of your product without disproportionately affecting simulation throughput is a major obstacle in performing real-world engineering simulations. As model complexity increases, engineers risk spending too much time performing manual and repetitive tasks, such as:
• Cleaning and defeaturing dirty or incomplete computer-aided design (CAD) geometry
• Combining CAD models originating from various sources using multiple tools
• Preparing scripts to handle updating of design variants

Eliminating these potential bottlenecks is critical to allowing engineers to spend their time doing what they do best: innovating.

Simcenter STAR-CCM+ offers the solution
Siemens Digital Industries Software’s Simcenter™ STAR-CCM+™ software helps you maximize productivity with robust automated workflows that ensure complex geometries are quickly ready to mesh. The single integrated user interface facilitates geometry handling, allowing users to:
• Efficiently handle large, complex models coming from various sources, including external CAD packages as well as an integrated 3D-CAD modeler
• Effortlessly clean up geometry with powerful tools, including automatic defeaturing in 3D CAD, manual surface repair and surface wrapping
  - The pipelined mesh operations process enables a broad range of workflows that can be created for any application
  - Automatic and manual preparation tools allow the user to work on dirty or incomplete geometry
• Seamlessly parameterize and automate design changes enabled by the single integrated user interface and repeatable CAD-to-solution processes
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Capabilities

Geometry handling

**CAD exchange:**
- Import native and neutral formats using the Windows® or Linux® operating systems with high-quality geometry retention and fidelity
- Retain full data structure and organization from your CAD package including parts and assembly history, geometry, features, names, etc.

**CAD clients:**
- Direct transfer of geometry is possible from the CAD environment
- Design parameters can be transferred and modified bi-directionally, along with reference data and coordinate systems for design space exploration
- Multiplatform communication is easy with operation orchestration across resources and operating systems

**3D CAD:**
- Save engineering time by utilizing the integrated CAD environment for CAD creation and design exploration
- Parameterize a model in a few clicks with feature-based geometry modeling and freeform technology
- Easily investigate, prepare and organize the models using the search tool, interactive sections and explode views

- Combine imported models with components created in 3D CAD
- User-controlled model defeaturing and interactive CAD repair tools

Geometry preparation

*Surface wrapping:* fully automatic wrapping with projection to underlying CAD to provide a clean, closed surface ready for volume meshing

- Reduce the geometry preparation time from weeks to hours with the surface wrapping of large complex geometry

*Manual surface repair:* easy-to-use, comprehensive manual repair tool for preparation of CAD or imported tessellated geometries

Import large complex model with thousands of parts easily.

Trimmed volume mesh on a Corvette geometry cleaned up with surface wrapper.
**Pipelined mesh operations:** user-defined and flexible pipeline for sophisticated combinations of operations, which allow automatic preparation of geometries, irrespective of their sources

- Extensive set of operations for geometry preparation, including Booleans, surface wrapping and multipart imprinting

**Design exploration**
Seamlessly deploy design space exploration in a single integrated user environment. With Design Manager built into Simcenter STAR-CCM+, you can:

- Effortlessly execute model updates with a robust, automated workflow
- Automatically manage dirty geometries with the surface wrapper fully within the design exploration process
- Automate exploration of geometric designs by modifying parametric CAD models in the 3D CAD module as part of your study
- Explore designs using native CAD tools via CAD clients

Optimized tractor pipe using parameterization for quick design study.

Combustor simulation with geometry handled using the NX CAD client.