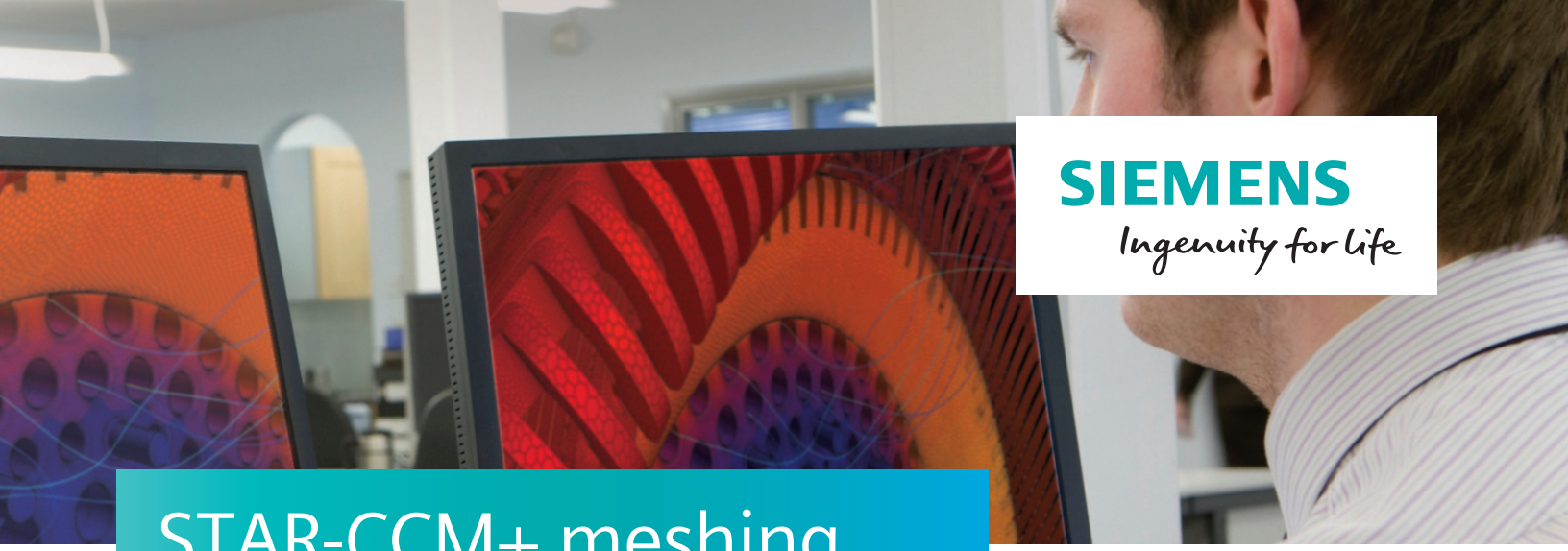


SIEMENS
Ingenuity for life

STAR-CCM+ meshing solutions

Facilitating design exploration with an automated CAD-to-mesh process

Benefits

- Enables design exploration with an automated CAD-to-mesh process
- Reduces meshing time with local surface and parallel meshing
- Provides flexibility with structured/unstructured meshing
- Delivers specialized tools to provide mesh control for specific applications
- Supports optimal accuracy with fewer cells using fully conformal meshing for multi-domain studies

Summary

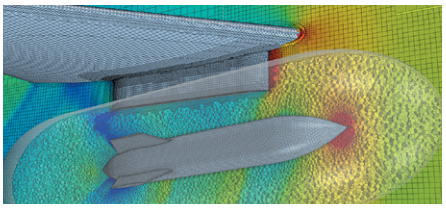
There is a continual drive to incorporate greater realism in engineering simulations to better understand product behavior earlier in the design cycle. To achieve this, geometric complexity is increasing and more engineering disciplines must be accounted for in the analysis. Both of these requirements have a direct impact on, and are facilitated by, effective generation of the computational mesh. To quickly build high-quality, run-ready meshes, you must address how to:

- Mesh geometries that have thousands of complicated parts
- Cut down meshing time
- Address the meshing requirements unique to specific applications
- Easily incorporate design changes in the meshing process

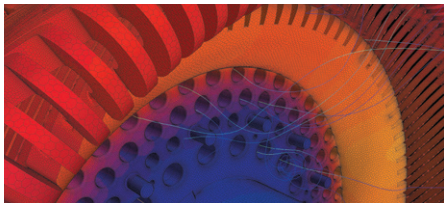
Offering comprehensive solutions

STAR-CCM+ software offers comprehensive meshing solutions to address engineering analysis challenges. It allows you to easily and efficiently prepare and generate meshes on the most complex geometries and offers the ultimate balance between user control and automation. STAR-CCM+ provides:

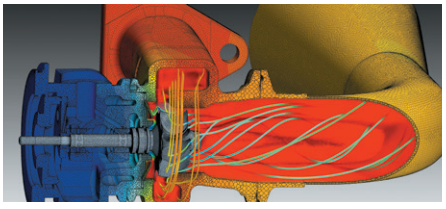
- Productivity: Reduced engineering and meshing time with an easy-to-use pipelined workflow delivered from a single-integrated user interface
- Accuracy: Geometric fidelity and accurate solutions due to no-compromise meshing of complex geometries
- Mesh control: Optimal cell count and solution accuracy with specialized meshing tools and mesh refinement



Store separation using trimmed and polyhedral mesh types combined with overset mesh.



AC induction motor core. (Courtesy: Ward Leonard, Connecticut).



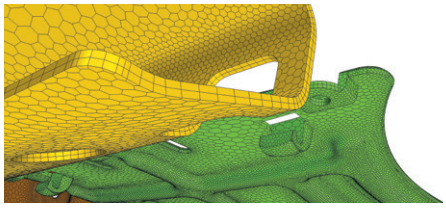
Micro gas turbine conjugate heat transfer. (Courtesy: B&B-AGEMA)

Productivity
Using STAR-CCM+ enables you to take a flexible approach to mesh generation with a user-definable pipeline of operations:

- Robust and automatic process from initial geometry preparation to volume mesh generation
- Capabilities accessed through an easy-to-use, single-integrated user interface
- Executed in sequence or independently with a common set of parameters
- Ideal for automatic parameter studies and intelligent design exploration
- Meshing time reduced by orders of magnitude with automatic local surface re-meshing
- Efficient deployment of cluster resources and reduced meshing time with parallel and concurrent multipart meshing
- Built-in diagnostic tools to ensure mesh quality

Accuracy
Use the right mesh for the right application:

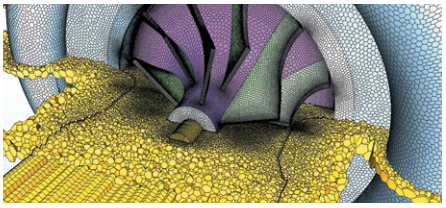
- Polyhedral meshing: Unstructured, general-purpose mesh for complex multipart geometries
- Trimmed meshing: Predominantly hexahedral mesh for general purpose meshing
- Tetrahedral meshing: Used for computational solid mechanics (CSM) and computational rheology
- Prism layer meshing: Used with core volume mesh to create prismatic cells next to wall surfaces to accurately capture the boundary layer
- Ensure optimal accuracy with fewer cells in multi-domain studies using fully conformal meshing for polyhedral and tetrahedral mesh types

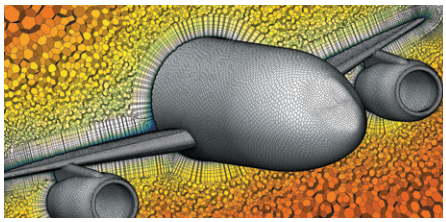

Thin mesh on an automotive component.

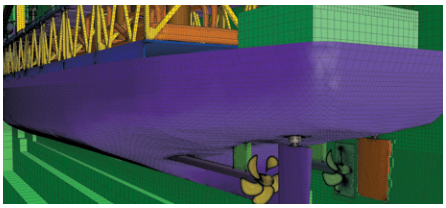

Directed mesh in an electric motor.

Mesh control
Application-specific meshing:

- Thin mesher: Automatic creation of prismatic elements for thin geometries
- Generalized cylinder: Automatic creation of prismatic elements for cylindrical geometries
- Extruder: Extend the volume mesh by offsetting user-specified boundaries
- Advancing-layer mesher: For generation of thick prism layers targeted at external dynamics applications
- Directed mesher: Structured meshing for swept geometries
- 2D mesher: For simple, upfront simulations
- Global and local control of mesh sizing with refinement based on volume, surface, curvature and boundary wakes


Extruder mesh in turbocharger.


Advancing layer mesh on an airplane.


Parallel trimmed mesh on a floating production storage and offloading (FPSO) unit.

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