Changing the Radiator and Fan in Star CCM+

Caleb Kopitsky

How the Radiator/Fan are Modeled

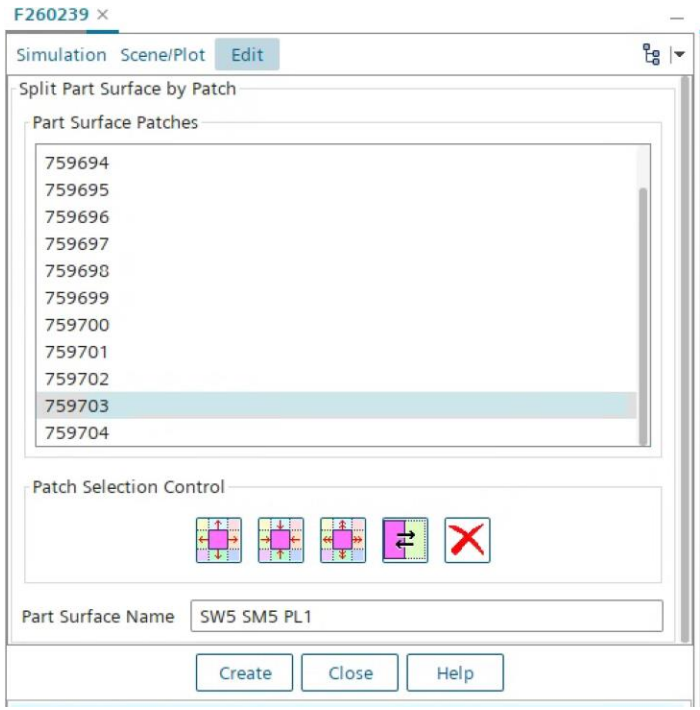
The fan and radiator are each define as their own volumetric (3D) enclosed regions, with a common interface.

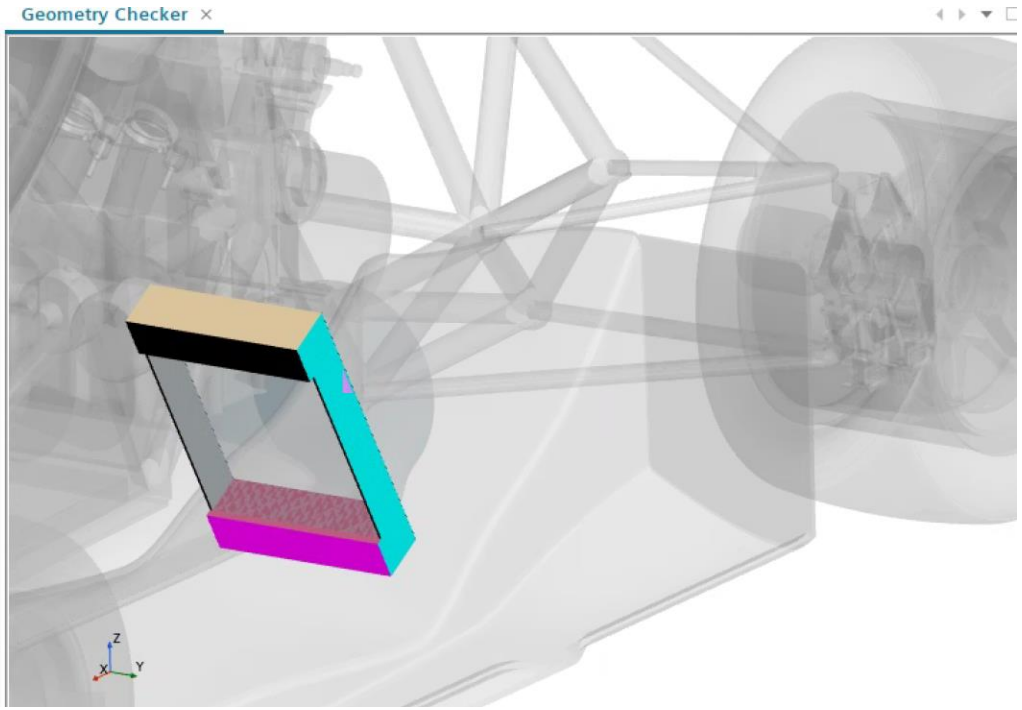
To model the radiator and fan in CAD, create either solid bodies or fully enclosed surface bodies and import them into Star as you would any other part.

Creating Surfaces From Imported CAD

Whether imported as a solid body or enclosed surface body, the surfaces making up these bodies must be split to define the boundaries of the regions.

To do this, right-click the body in the Geometry Checker and hit "Split by Patch". Select a boundary, such as the upstream face, and name it "Upstream", then hit Create. Do this for the remaining boundaries. Surfaces not created this way will be saved as a single surface. For example, if the imported radiator body is a rectangle, and the inlet and outlet faces are created, the remaining surfaces which make up the walls which be saved as a single surface.



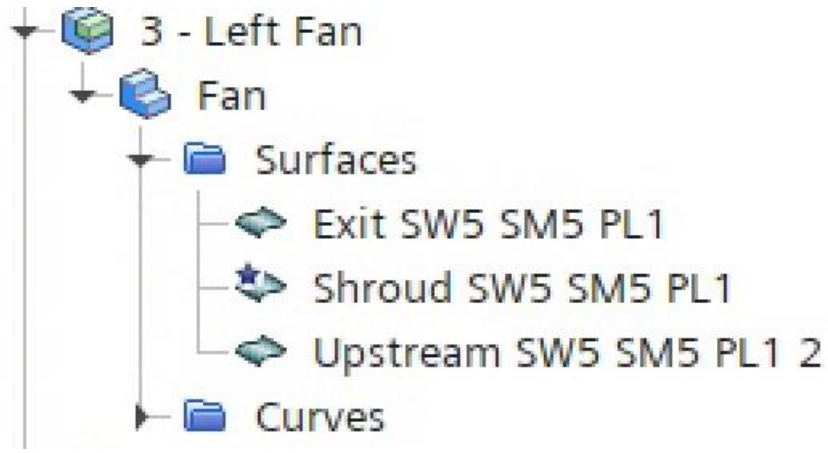


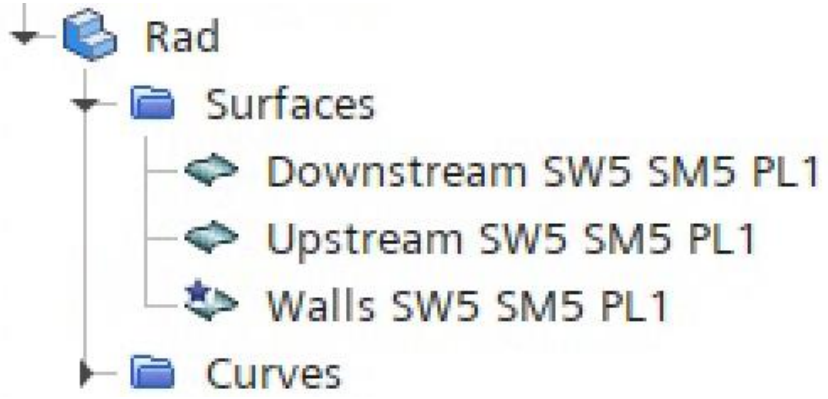
Defining Surfaces in Star

Surfaces must be named appropriately for Star to define the region.

In the left plane, under Geometry -> Parts -> Radiators, ensure the radiator and fans have the names as shown.

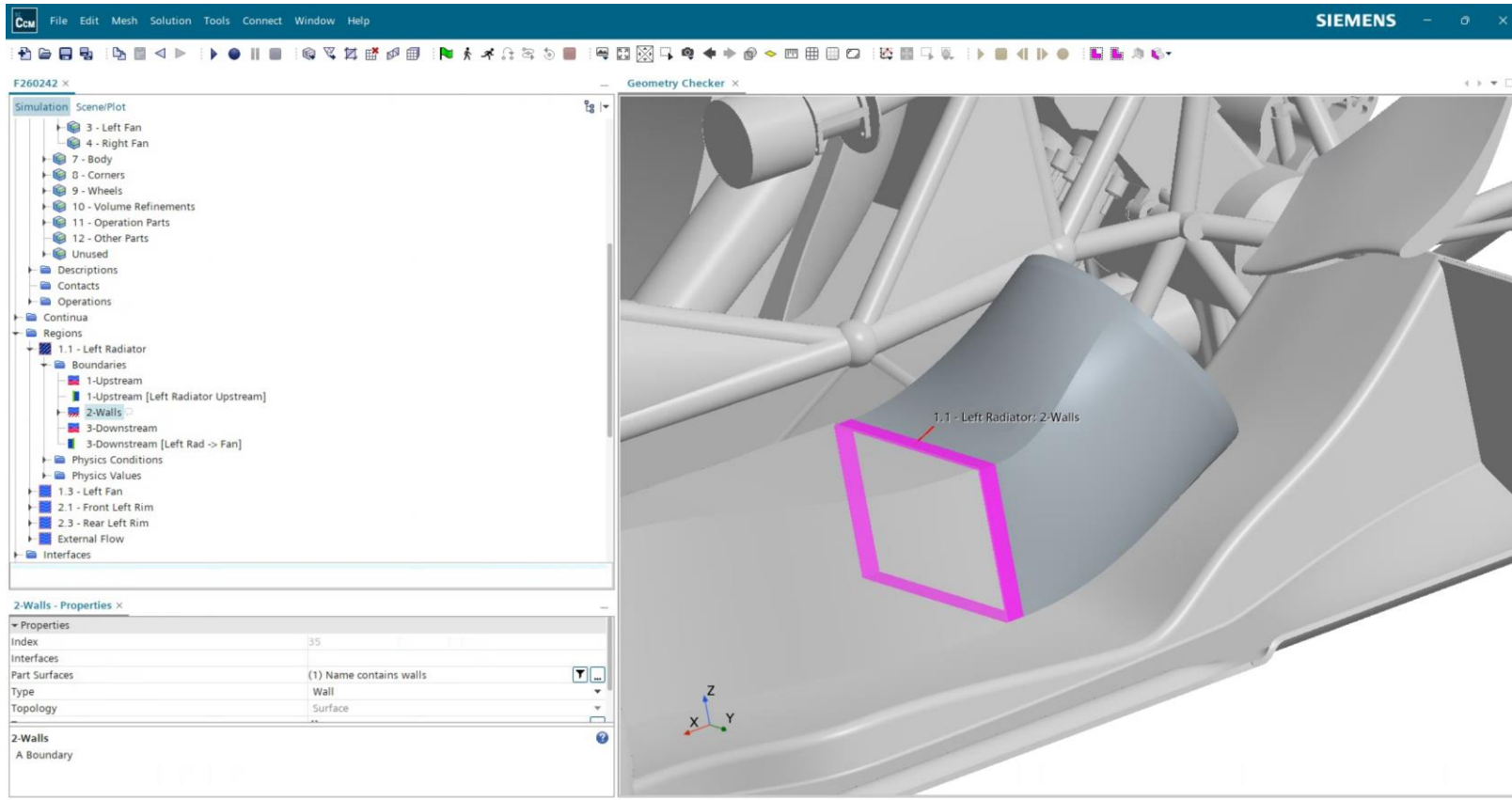
Star automatically will select surfaces with these names, from these parts, for the necessary Regions. This means the mesh settings may be changed.





Checking Boundaries

To check whether the boundaries have been defined correctly, click on them in the left-panel tree. The surface should be highlighted pink.

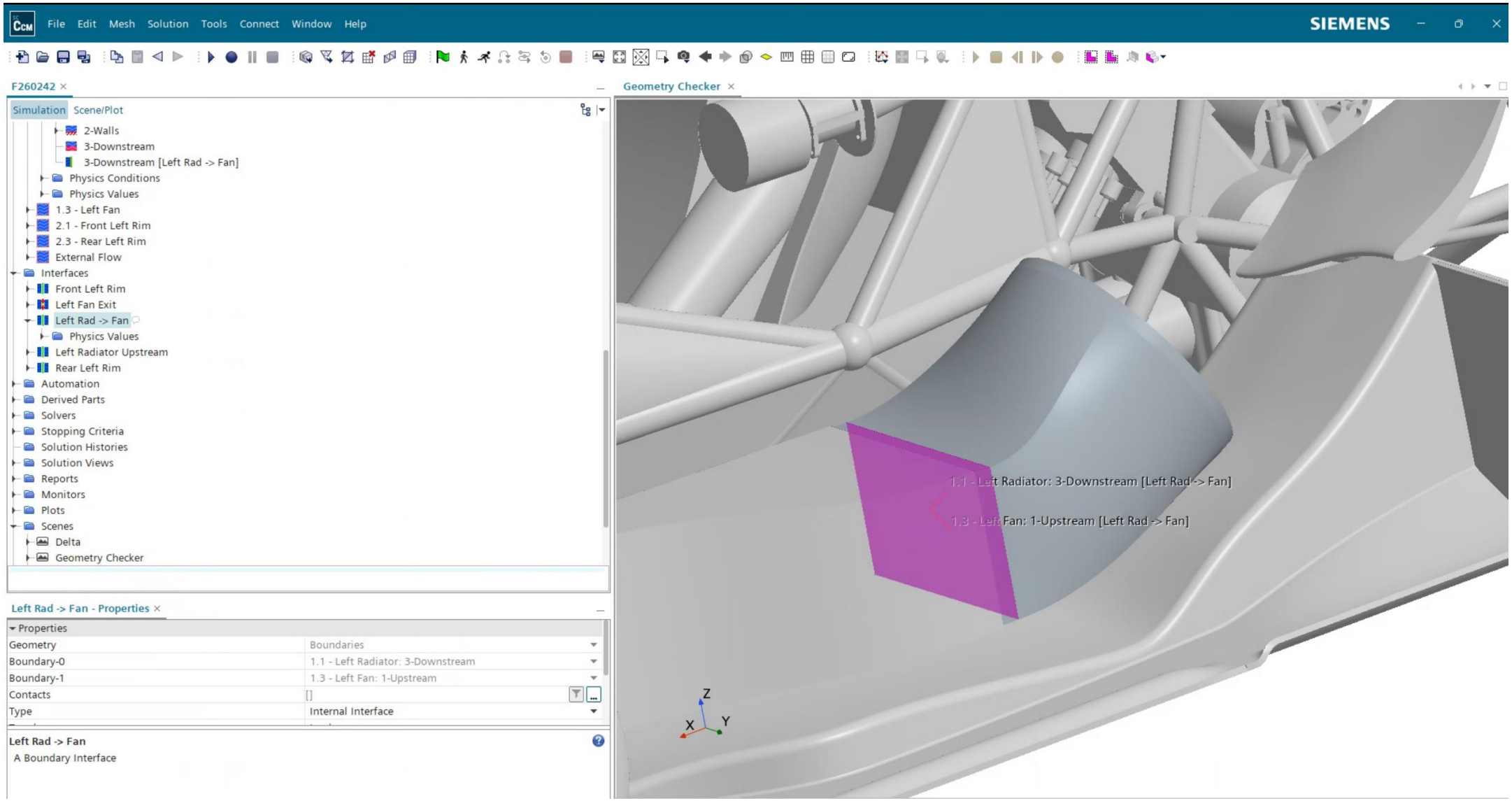


Defining Interfaces

Without an interface, the Mesher will have two coincident surfaces and will fail. The interface may be defined by selecting the Rad Downstream boundary and Fan Upstream boundary, right-clicking, and selecting "Create Interface."

The interface should now appear in the left-panel tree under the interfaces folder. Rename it to "Left Rad -> Fan" for consistency. If another interface already exists of the same name, delete it.

To check whether it has been defined properly, click it and the surface should highlight in yellow.


File Edit Mesh Solution Tools Connect Window Help
SIEMENS
F260242
Simulation Scene/Plot
2-Walls
3-Downstream
3-Downstream [Left Rad -> Fan]
Physics Conditions
Physics Values
1.3 - Left Fan
2.1 - Front Left Rim
2.3 - Rear Left Rim
External Flow
Interfaces
Front Left Rim
Left Fan Exit
Left Rad -> Fan
Physics Values
Left Radiator Upstream
Rear Left Rim
Automation
Derived Parts
Solvers
Stopping Criteria
Solution Histories
Solution Views
Reports
Monitors
Plots
Scenes
Delta
Geometry Checker
Left Rad -> Fan - Properties
Properties
Geometry Boundaries
Boundary-0 1.1 - Left Radiator: 3-Downstream
Boundary-1 1.3 - Left Fan: 1-Upstream
Contacts []
Type Internal Interface
Left Rad -> Fan
A Boundary Interface
Geometry Checker
1.1 - Left Radiator: 3-Downstream [Left Rad -> Fan]
1.3 - Left Fan: 1-Upstream [Left Rad -> Fan]
Z
X
Y

Congratulations!!!

You've defined a new radiator-fan combo in Star CCM+