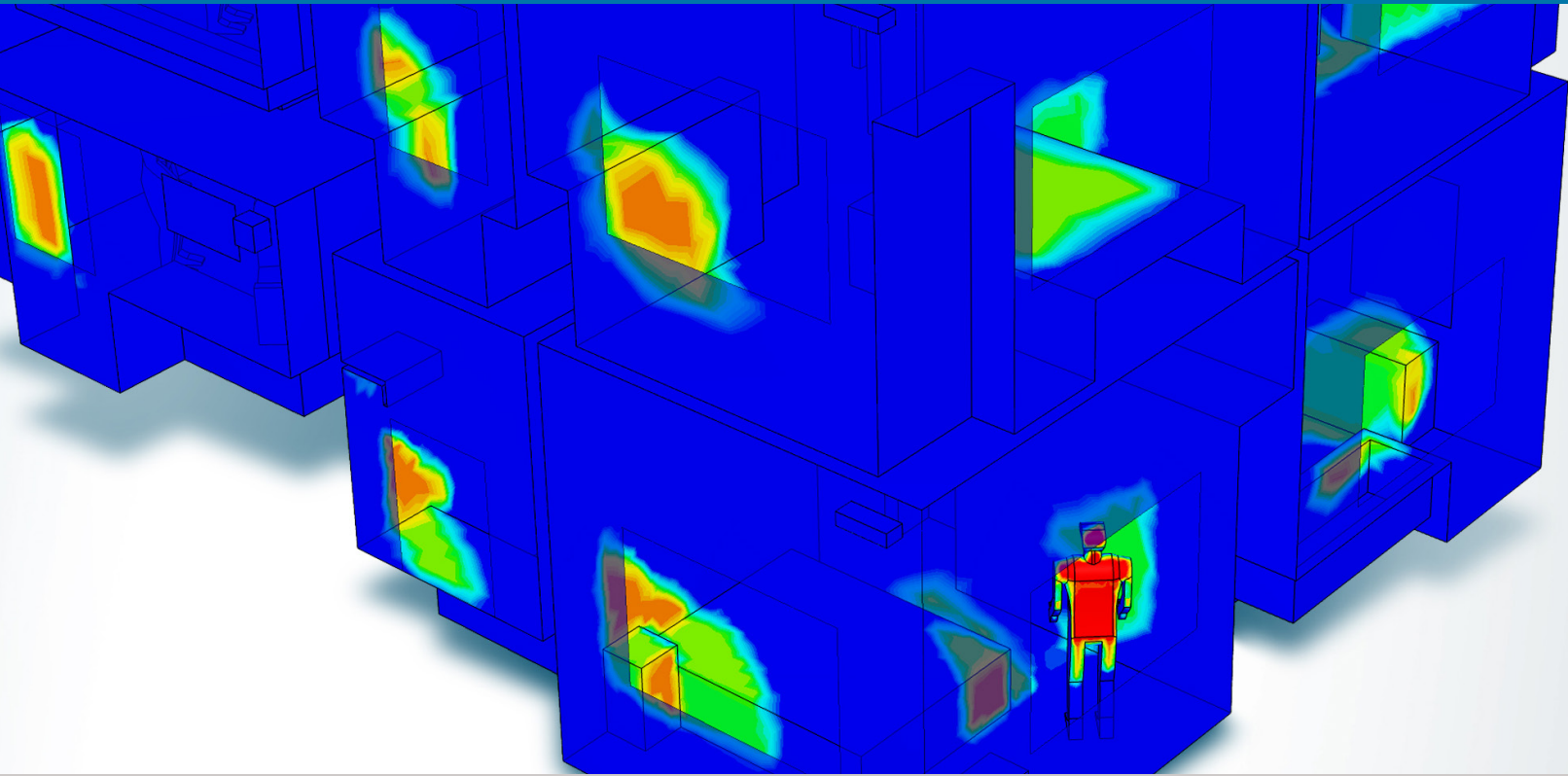


ARCHITECTURE, ENGINEERING AND CONSTRUCTION – INDOOR ENVIRONMENT



Architects and engineers can quickly predict and assess air movement, air quality, HVAC sizing, thermal comfort, and ventilation strategies using high-fidelity engineering simulation powered by the cloud and accessed through a web browser.



FAST

The ability to run multiple design iterations in parallel means that simulating an entire project from CAD preparation to post-processing can be performed with fast turnaround times.



ACCURATE

Proprietary solver technology precisely designed for thermal comfort, air quality and building performance applications that have been validated extensively against industry standards.



ROBUST

Solve for internal and external flows, scale HVAC device level simulation results to the room and building level, and much more.



ACCESSIBLE

Cloud-native deployment makes high-fidelity engineering simulation truly accessible from anywhere you have access to a browser and at any scale.

SIMSCALE AEC | CAPABILITIES

COMPUTATIONAL FLUID DYNAMICS (CFD) OR FLOW ANALYSIS

Incompressible

- Steady-state external and internal flow (airflow and wind)
- Coupling of internal and external environment using wind pressure coefficients from LBM
- Fluid flow (Air/wind, gas)
- Flow velocities of up to 100 m/s
- Assumes negligible density variation

Compressible

- Buoyancy-driven internal flows to simulate stack effects, cross ventilation and wind turrets
- Fluid flow (gas or liquid)
- Mach > 0.3 (100m/s)
- High speed flow

Pedestrian Wind Comfort (PWC)

Wind comfort & safety on ground, balconies, roofs

- Lawson
- Davenport
- NEN8100
- City of London

Incompressible Lattice Boltzmann Method

- Lattice Boltzmann Method (LBM) for transient external flow, building aerodynamics, and outdoor comfort
- Fluid flow (gas or liquid)
- Mach < 0.3 (100m/s)
- Large scale transient
- Negligible density variation

THERMAL ANALYSIS

Convective Heat Transfer

- Natural ventilation, mechanical ventilation
- Thermal comfort studies and outputs including PMV, PPD, room temperatures
- Air quality including CO2 using passive scalar method
- Room and surface temperatures
- Air flow through windows, louvers, grills, and other ventilation equipment
- Air mixing and flow rates
- Solar radiation (direct and diffuse), surface to surface radiation, glazing
- Heat Flux

Conjugate Heat Transfer (CHT v2.0)

- Building fabric performance and energy efficiency
- U-values
- Thermal bridging calculations
- Temperature Distribution
- Heat Flux

CONNECTIVITY (API Integrations)

- Grasshopper®
- Ladybug®
- Rhinoceros®
- Autodesk® Revit®

SIMSCALE AEC | FEATURES

PRE-PROCESSING

CAD Compatibility

- 3D Systems® STL
- Autodesk Inventor®
- Autodesk Revit
- Dassault Systèmes® ACIS®
- Dassault Systèmes CATIA™
- Dassault Systèmes SolidWorks®
- IGES
- PTC® Creo®
- Rhinoceros®
- Siemens® NX™
- Siemens Parasolid®
- Siemens Solid Edge®
- STEP

CAD Plugins

- SimScale Connector App for PTC Onshape®
- SimScale Integration for Autodesk Fusion 360™

CAD Mode

A dedicated environment to interact with your CAD model, delete, extrude, or scale CAD parts, and perform CAD-related operations directly within the platform. Operations being added continuously.

- Edit
- Create - Flow Volume-Internal
- Create - Flow Volume-External
- Close sheet
- Boolean
- Transform
- Simplify
- Fix Interferences
- Tools - Gaps
- Tools - Interferences
- Export

Meshing Tools

Current meshing strategies available on the platform are:

- Standard
- Hex-dominant
- Hex-dominant parametric
- Meshing for subsonic analysis type

Materials Library

Default materials include both solids and fluids according to the analysis type selected or define your own custom material. Users can select common building materials or create their own.

Advanced concepts

SimScale allows its users to model advanced flow characteristics, like porous media and solar radiation, which would otherwise require sophisticated geometries or large meshes leading to expensive simulations. Porous media can be used to simplify modeling of ventilation louvers or blinds, for example. Solar radiation now includes surface to surface radiation for more accurate thermal comfort results.

Boundary Conditions

SimScale offers many boundary condition types for different types of applications.

Fluid:

- Velocity inlet and Velocity outlet
- Pressure inlet and Pressure outlet
- Natural convection inlet-outlet
- Wall
- Custom
- Empty 2D

Thermodynamics:

- Fixed value temperature
- Convective heat flux
- Surface heat flux
- Volume heat flux
- Solar heat gain and radiation

SIMULATION

Processor/Cloud

Run as many simulations in parallel as desired, while continuing to work. That's the power of the cloud.

Collaboration

Share projects with other users, within or outside an organization, and also with the SimScale support team.

Solver Numerics

All numerical settings are made available for users to have full control over the simulation. These settings can be found for Fluid Dynamics (OpenFOAM®) and Solid Mechanics (Code_Aster) analysis types.

POST-PROCESSING

Visualization

SimScale's integrated post-processor offers 3D visualization of the result fields.

- Statistics and Inspect Point
- Visualization and Selection Modes
- Cutting Plane
- Iso Surface and Iso Volume
- Particle Trace
- Animation
- Field Calculator (Beta)
- Custom Camera Position

