Using ANSYS Workbench as a Project Schematic

Fluid Codes FZ LLE
Channel Partner for Middle East

Fluid Codes Technical Team
ANSYS Workbench is a project-management tool. It can be considered as the top-level interface linking all our software tools.

Workbench handles the passing of data between ANSYS Geometry / Mesh / Solver / Postprocessing tools.

This greatly helps project management. You do not need worry about the individual files on disk (geometry, mesh etc). Graphically, you can see at-a-glance how a project has been built.

Because Workbench can manage the individual applications AND pass data between them, it is easy to automatically perform design studies (parametric analyses) for design optimisation.
Streamlined Workflow Strategy
Workbench End-To-End Solutions In a Unified Environment
Complete Analysis Systems

The Analysis Systems group contains a set of pre-defined systems listed by analysis type (and solver).

Drag the desired analysis type onto the Project Schematic.
Guided Workflow

System components guide the user through the analysis process.
Intuitive context menus guide the user to possible actions.
State icons inform the user of progress and suggest where action needs to be taken.
Using ANSYS Workbench “Editors”

Edit operation launches the application associated with the cell to define details.
Using ANSYS Workbench “Editors”

Files are saved automatically
Using ANSYS Workbench "Editors"

Geometry cell icon changes
Automated File and Data Management
Move on to Mesh and Edit to start WB Meshing Application
Meshing at ANSYS Workbench
Working Through the System

Move on to Physics Setup
Working Through the System
Solving in Batch Mode from Project Using Update

Update command on Solution cell runs the solver in batch
Post-Processing the Results
Post-Processing the Results

All cells are now up to date and the simulation is complete.
Icons Show the State of Project Data

What happens if we make a change to the Geometry? State icons clearly indicate upstream changes have been made.
Update Project operation automates batch-mode update of all analysis steps.
Cell States

As each stage in the model-build is completed, the state of the cell changes.

<table>
<thead>
<tr>
<th>Icon Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Checkmark]</td>
<td>Up to Date</td>
</tr>
<tr>
<td>![Warning]</td>
<td>Refresh required. Upstream data has changed</td>
</tr>
<tr>
<td>![Exclamation point]</td>
<td>Update required. Local data has changed</td>
</tr>
<tr>
<td>![Question mark]</td>
<td>Unfulfilled. Upstream data does not exist</td>
</tr>
<tr>
<td>![Attention]</td>
<td>Attention Required</td>
</tr>
<tr>
<td>![Solve]</td>
<td>Solving</td>
</tr>
<tr>
<td>![Error]</td>
<td>Update Failed</td>
</tr>
<tr>
<td>![Interrupt]</td>
<td>Update Interrupted</td>
</tr>
<tr>
<td>![Changes]</td>
<td>Changes pending (was up-to-date, but upstream data has changed)</td>
</tr>
</tbody>
</table>

Status after creating Geometry in A2, not yet opened mesh in A3

Status after model has converged, waiting for post-processing
Workbench can be used to transfer data between solvers. In this 1-way FSI (fluid-structure-interaction) example, we transfer the loads from a Fluent CFD simulation over to a Mechanical system to perform a stress analysis.

The square connector shows that the geometry created in cell A2 (CFD model) is being shared with cell B3 (FEA model).

The round connector shows that the CFD results are being transferred as a Setup (input) condition to be used for FEA stress analysis.
What if the fluid flow interacts with the solid structure?

Fluid Structure Interaction

Geometry

CHT Mesh

CFD CHT Solution

Thermal Loads

Pressure Loads

Thermal Stress Solution
Summary

- **ANSYS Workbench** is a convenient way of managing your simulation projects.

- Workbench is used to launch the individual software components, and used **to transfer data between them**.

- It is easy to see at-a-glance how a model has been built, and determine which files were used for a particular simulation (pairing geometry files to solver runs).

- Workbench also makes it straightforward to perform **parametric analyses** (without the user needing to manually launch each application in turn), and makes it easy to simulate multi-physics scenarios like fluid-structure interaction.