Customizing a CAE Interface to Pointwise

Would you like to develop a custom interface from Pointwise to your own analysis software that would allow you to export grid and boundary conditions in your own format? What if you could share the interface with others and have it automatically show up as one of the solver choices in Pointwise's CAE menu? Then the new CAE plugin capability in Pointwise is what you need, so keep reading.

The End User Experience

Several CAE interfaces, OpenFOAM, ACUSIM/AcuSolve, and USM3D are already implemented as plugins, and more are on the way. Once a plugin is added, Pointwise will automatically load it at run time, and it will appear as one of the choices in the CAE, Select Solver menu (see Figure 1).

Once a solver is selected, Pointwise lets you set boundary and volume condition regions and export them in that solver's native format. It works the same way for plugins as for the built-in solver interfaces. If your CAE solver has particular boundary condition types, for example inlet, outlet, and wall, they can be specified by the plugin and will show up as choices in the CAE, Set BC panel (see Figure 2).

From the user's perspective, plugin CAE interfaces behave the same as the built-in interfaces. In fact, there is no indication at all that a CAE interface is implemented as a plugin.

The Plugin Author Experience

So how do you write your own CAE plugin for Pointwise? You probably will want to start with a little reading. First, there is an overview of the plugin development process in Appendix II of the Pointwise User Manual, which you can access through the Help menu in Pointwise or by opening the PDF file included with your Pointwise installation. Second, you can download the Pointwise CAE Plugin Software Development Kit (SDK) from www.pointwise.com/plugins. The SDK includes documentation, build instructions for all supported platforms, and templates for the functions you will need to construct for your plugin. It even includes the source code for a fully-functioning example plugin.
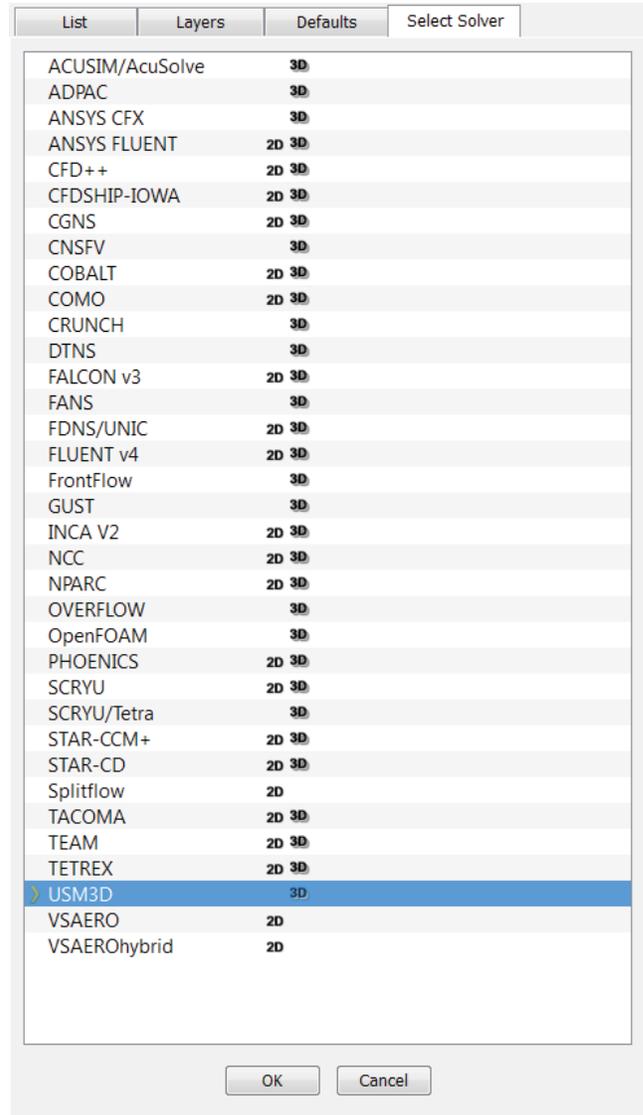

Figure 1: CAE plugins ACUSIM/AcuSolve, OpenFOAM and USM3D appear automatically in the Select Solver panel.

The basic steps for creating a new CAE plugin are
1. Create a new plugin in your project directory. The easy way to do this is with scripts included in the SDK.

2. Edit the runtime header files created in step 1 to include information specific to your plugin, such as available boundary and volume condition types, supported file extensions, and version numbers.
3. Edit the runtimeWrite() function to implement your plugin's export behavior.
4. Compile the plugin.

Once you complete these steps, your plugin dynamic library (.dll or .so) will be ready to use. Copy it to the plugins folder of your Pointwise installation, and it will appear in Pointwise the next time you start it.

While the process is straightforward, there are a couple of caveats. First, CAE plugins only support unstructured grid export formats in Pointwise V16.03 (with support for structured grid export coming soon). You can export hexahedral grids, but only in an unstructured format. Second, if you want to distribute your plugin outside your company, you should contact Pointwise support to obtain a unique identification number for your plugin. This ensures uniqueness with other third-party plugins that may implement the same solver format.

Finally, if you would like worldwide distribution of your plugin, contact our support team to arrange to have it included in the standard Pointwise distribution. We will include it in the plugin directory of our next release so all Pointwise users can write native files for your CAE solver.

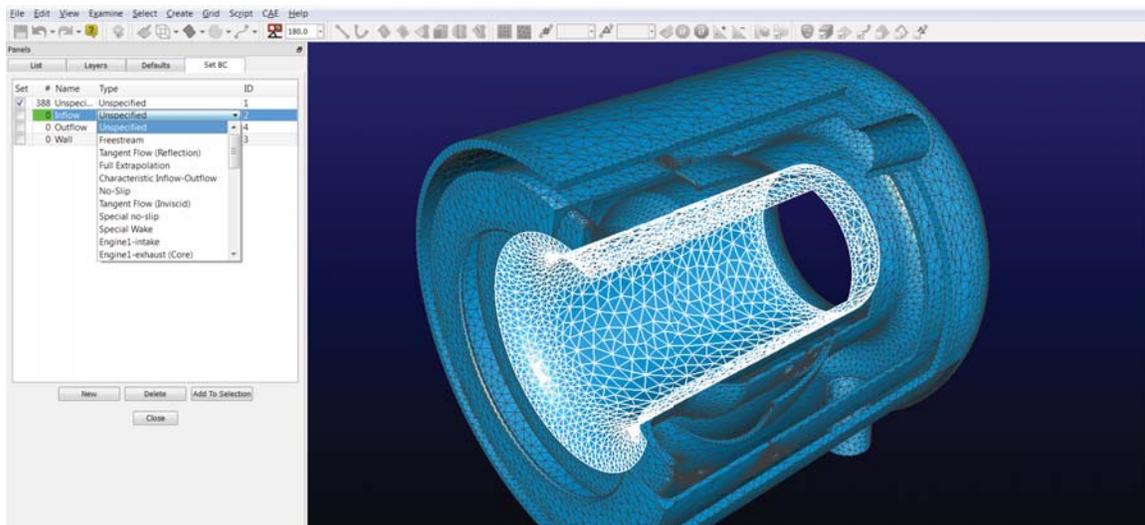**Visit www.pointwise.com/focus to download a PDF of this or a previous issue of "Focus On".**

Figure 2: Boundary condition types specified in a plugin, in this case USM3D, are presented in the Set BC panel.

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