

Resource Components are ICE Components which contain a grid of visualization resources. These resources can display files from a variety of sources, such as CSV files or VisIt visualizations. Geometry and Mesh editors allow for editing of shapes or meshes. Both can be added to an Item to offer visualization of data.

1 Prerequisites

This tutorial assumes that the class you are writing already has an ICE Form. If you are writing an extension of ICE's Item class, then the work of creating and managing a Form is already done for you.

See the New Item Generation Tutorial, in the docs/newItemGeneration/ folder of the ICE repo for details on how to create an Item.

2 Adding the Components

First, add the necessary imports for the components being added to your Item.

```
import org.eclipse.core.resources.IProject;
import org.eclipse.core.runtime.IAdaptable;
import org.eclipse.ice.datastructures.form.Form;
import org.eclipse.ice.datastructures.form.GeometryComponent;
import org.eclipse.ice.datastructures.form.MeshComponent;
import org.eclipse.ice.datastructures.form.ResourceComponent;
import org.eclipse.ice.datastructures.resource.VizResource;
```

Next, copy and paste the following example code into your class.

```
//Create the resource component
ResourceComponent resourceComponent = new ResourceComponent();

//Set the component's data members
resourceComponent.setName("Resources");
resourceComponent.setDescription("Results");
resourceComponent.setId(2);

//Initialize the resources
VizResource csvResource = null;
VizResource visItResource = null;
```

```

//Open the files
try{
    csvResource = new
        VizResource(project.getFile("fib8.csv").getLocation()
            .toFile());
    visItResource = new
        VizResource(project.getFile("wave.visit").getLocation()
            .toFile());
}
catch(IOException e){
    e.printStackTrace();
}

//Add the resources to the component
resourceComponent.add(csvResource);
resourceComponent.add(visItResource);

//Create the geometry component
ShapeController geometryRoot = new ShapeController(new
    ShapeMesh(), new AbstractView());
GeometryComponent geometryComponent = new
    GeometryComponent();
geometryComponent.setGeometry(geometryRoot);

//Create mesh component
MeshComponent meshComponent = new MeshComponent();

//Add the components to the form
form.addComponent(resourceComponent);
form.addComponent(geometryComponent);
form.addComponent(meshComponent);

```

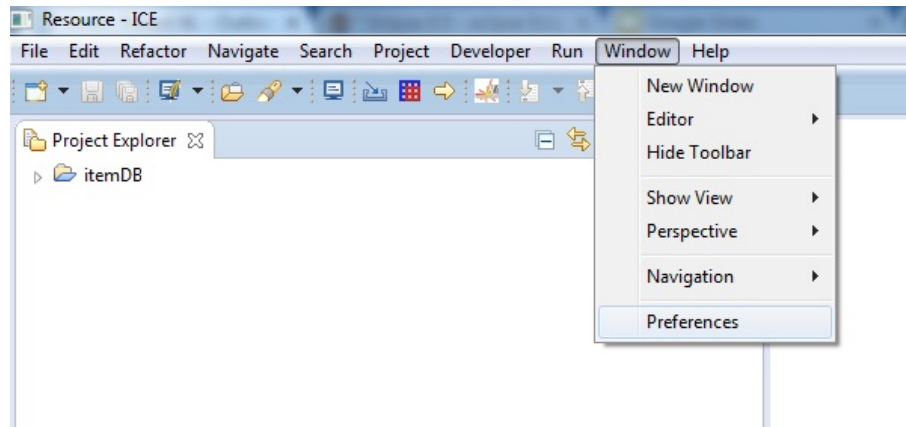
This code will add a Resource Component, Geometry Component, and Mesh Component to your Item and load fib8.csv and wave.visit, which should be in the workspace from your USB drive, into the Resource Component.

3 Using the Resource Component

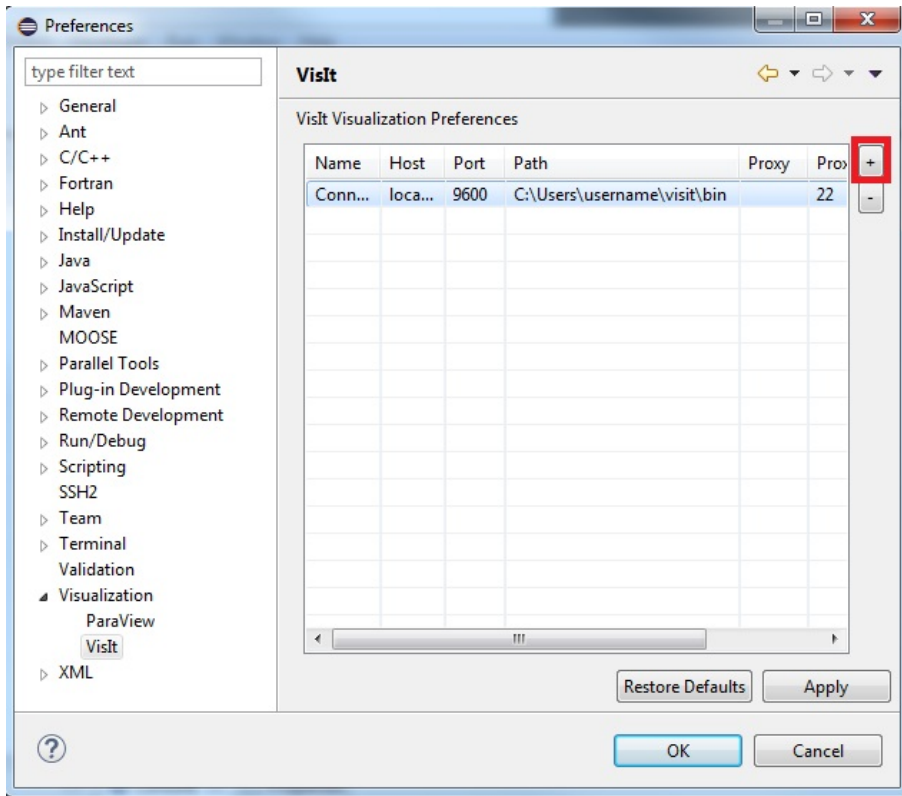
3.1 Establishing a VisIt Connection

In order to visualize resources containing VisIt files, ICE must be connected to a running VisIt installation. To set up this connection, select **Windows** →

Preferences... in ICE's menu bar. (On Mac OS X, Preferences is instead located under Eclipse ICE in the menu bar.)



Select Visualization → VisIt in the tree on the left side of the Preferences window.



Press the button with a "+" symbol in the upper right (highlighted in the image above) to add a new row to the table. Click on the Path cell of the new row and put the path of your installation of VisIt.

Press Apply, then OK, both in the lower right hand corner. ICE will now open and connect to this VisIt installation each time ICE is opened.

3.2 Managing the Resources

Once you open your Item in ICE, you should notice a new tab inside containing your ResourceComponent. Its title will be whatever you set as its description when writing the code for it.

At the top left of the screen will be controls for the component's layout.

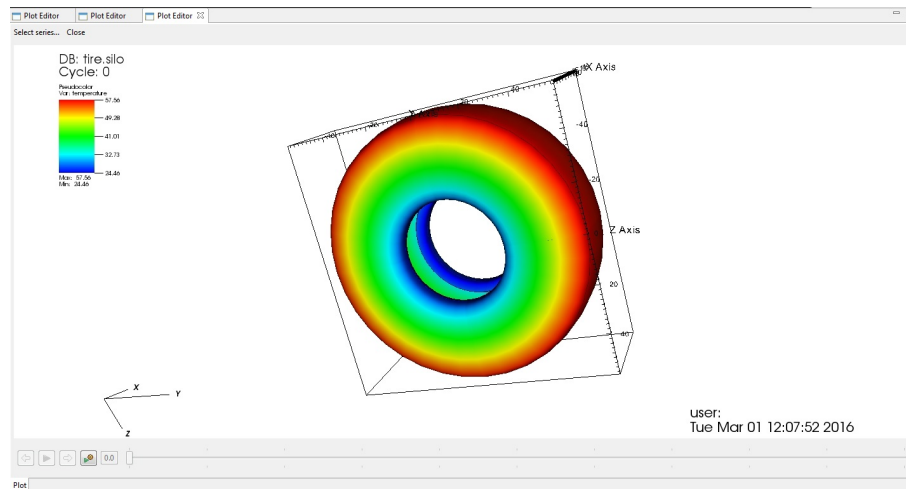
Rows: Columns: | Clear

The **Clear** button will close all plots in the component. The other two controls will allow you to specify the number of rows and columns in the grid. Be careful when reducing them, as any plots which no longer fit in the grid will be closed.

If you hover over a plot, a button will appear in the upper left hand corner. Clicking it will close that plot.



3.3 Interacting with VisIt Plots



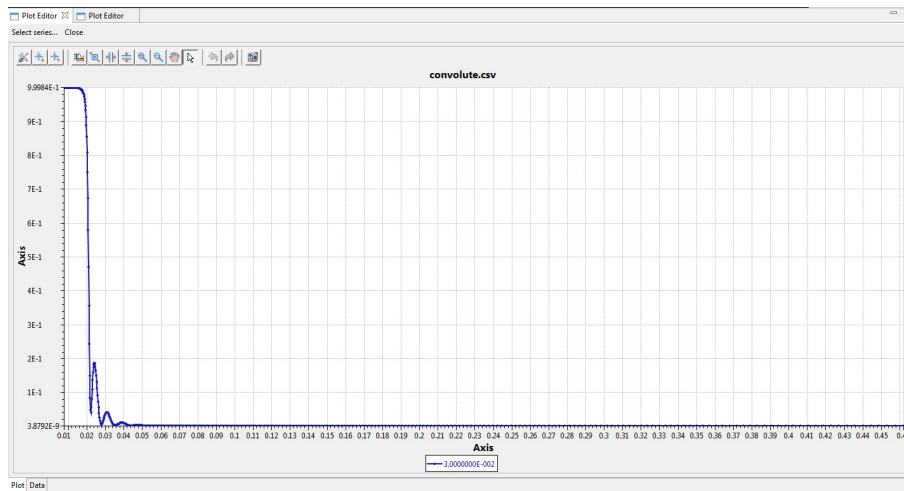
A VisIt plot will contain a 3D visualization of some model. You can click and drag within the plot to rotate the image and zoom by scrolling your mouse wheel. Right clicking in the plot will open a context menu, providing options for how the model will be displayed.

At the bottom of the plot will be a series of controls for animation. If your plot does not have time series data, they will be greyed out.



The plot can be set to display an arbitrary time step by either dragging the slider or by typing a time into the box to its left.

3.4 Interacting with CSV Plots



The top of the CSV plot has a row of buttons which control various aspects of the graph's presentation. Right clicking will open a context menu allowing you to choose which of the available series to plot.

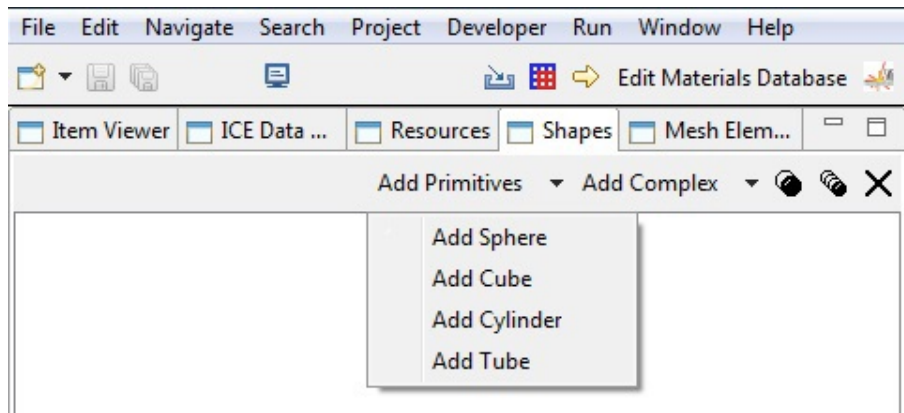
3.5 Editing 3D Structures

ICE also contains capabilities to render graphics with the Geometry Editor and Mesh Editor. Programatically populating these editors with custom input is beyond the scope of this tutorial. However, what follows will be a brief overview of the editors' functionality.

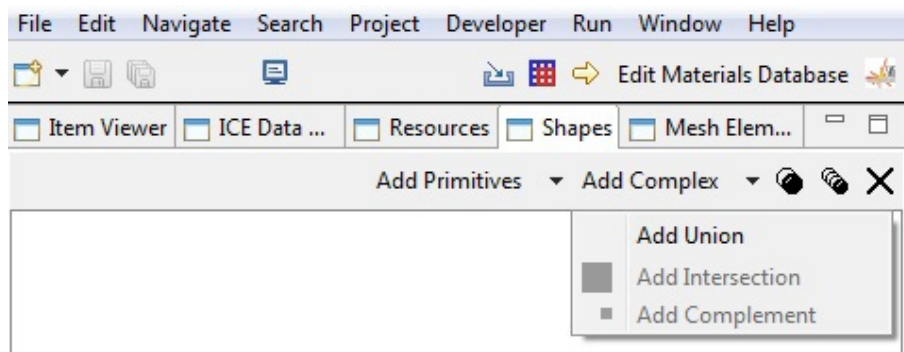
3.5.1 The Geometry Editor

The GeometryComponent you added to the form will create a new tab containing a Geometry Editor. Shapes in the editor are structured as a Constructive Solid Geometry Tree.

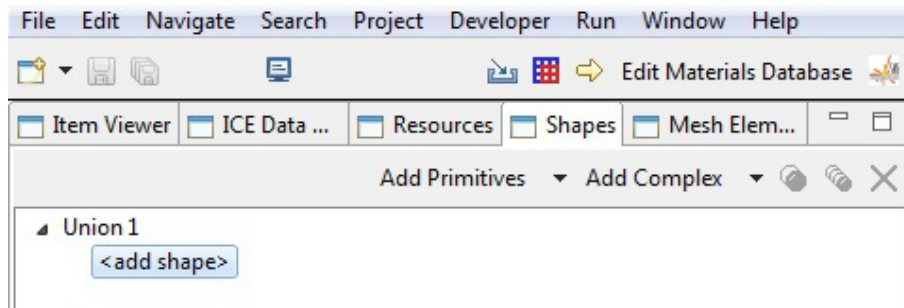
Clicking the **Add Primitives** button will display a drop down of primitive shapes which can be added to the scene.



Complex shapes can similarly be added using the **Add Complex** button.

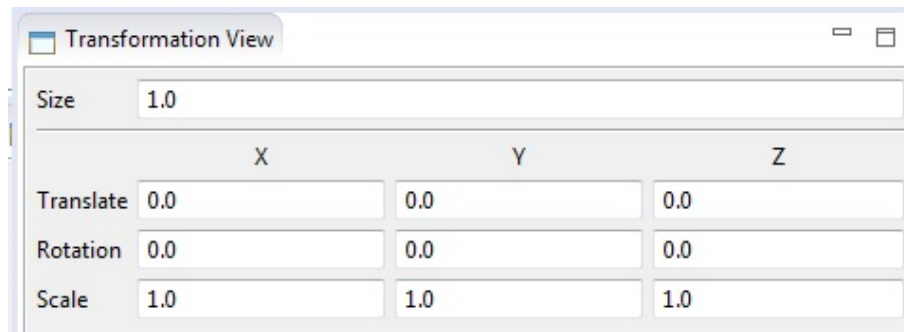


Primitive shapes can be added under complex shapes by selecting anything beneath the desired parent complex shape before adding the new primitive.



The three other buttons are responsible for creating copies of or removing selected shapes from the tree.

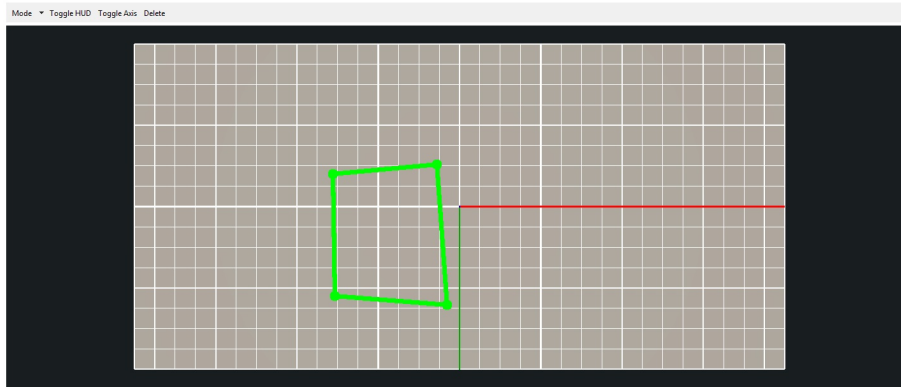
The Transformation View, in the lower left, has spaces to set the rotation, scale, and translation of a selected object.



3.5.2 The Mesh Editor

Like the Geometry Editor, the MeshComponent will create a Mesh Editor in your form.

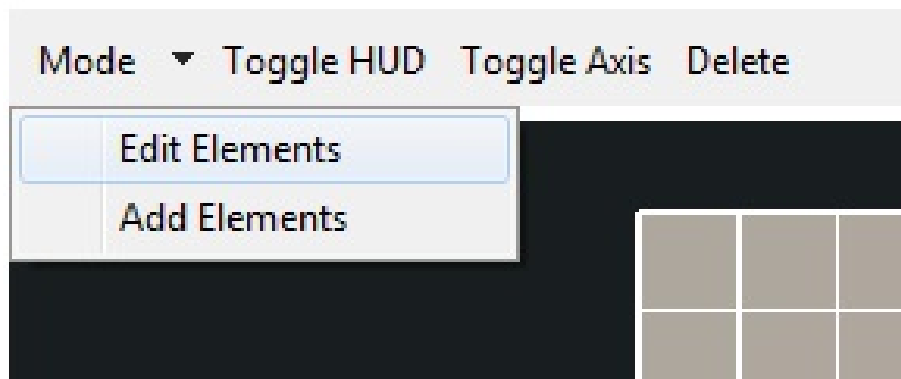
Clicking within the grid will create a vertex, until the fourth completes the polygon.



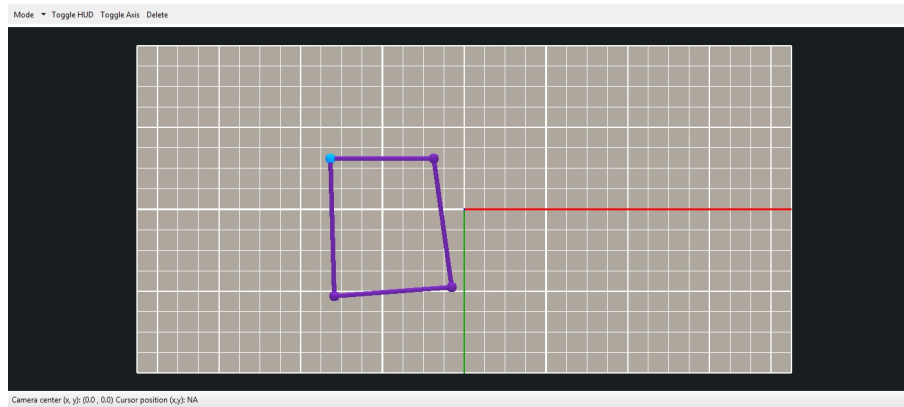
Click again to make the polygon permanent, signified by turning purple, or hit Esc to cancel.



The Mode button in the top left allows you to switch between Add Elements mode, used previously, and Edit Elements mode.



In edit mode, you can click a vertex (or vertices) to select them.



You can click and drag a vertex to move all selected vertices around the grid.

4 Further Reading

This tutorial has only given a brief overview of the ways in which you can use ICE's visualization tools. For more detailed information, look under the `docs` folder in the ICE repository. The `visualization` folder contains a tutorial on the CSV and VisIt plots, while the `geometryEditor` and `meshEditor` folders have tutorials on the geometry and mesh editors, respectively.