Get Involved

java-net Project
Request a Project
Project Help Wanted Ads
Publicize your Project
Submit Content

Get Informed

About java.net
Articles
Weblogs
News
Events
Also in Java Today
java.net Online Books
java.net Archives

Get Connected

java.net Forums
Wiki and Javapedia
People, Partners, and Jobs
Java User Groups
RSS Feeds

Search

Web and Projects: »
Online Books: »
Advanced Search

Home | Changes | Index | Search | Go

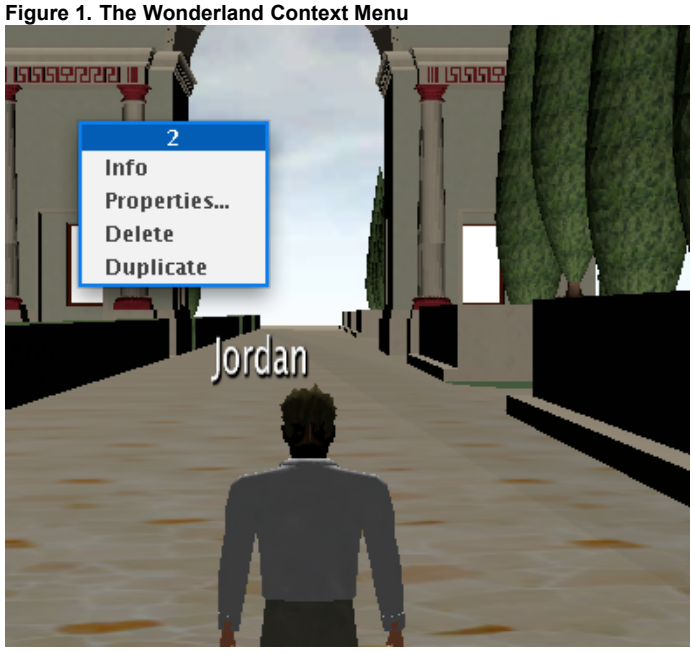
Project Wonderland v0.5: Adding Entries to the Context Menu

DRAFT: Under Construction

Introduction

This tutorial describes how to use the Context Menu in Project Wonderland. The Context Menu appears in your Project Wonderland client when you right-click over a Cell. The figure below shows what the Wonderland Context Menu looks like. The top-most item (in bold) gives the name of the Cell over which the right-click occurred.

Figure 1. The Wonderland Context Menu



The Context Menu in Wonderland is similar in idea to context menus is many other graphical applications. The Context Menu displays a list of menu items that can be selected. Some of these menu items always appear regardless over which Cell you click over; some menu items appear only for specific kinds of Cells. This tutorial describes how to add entries to the Wonderland Context Menu, both for all Cells and for specific Cells. You will extend the Shape Cell that you created in a previous set of tutorials.

This tutorial is designed for Project Wonderland v0.5 User Preview 2.

In this tutorial you will add to the "shape" module. You can find the entire source code for this module, including code for future tutorials in the "unstable" section of the Project Wonderland modules workspace. For instructions on downloading this workspace, see Download, Build and Deploy Project Wonderland v0.5 Modules.

Expected Duration: 30 minutes

Prerequisites

Before completing this tutorial, you should have already successfully completed Part 1, Part 2, Part 3, and Part 4 of this tutorial series. You will be extending the functionality you implemented there.

Adding an Entry to the Context Menu for all Cells

To add an item to the context menu, you will define a new class **InfoContextMenuFactory** and place it in the **org.jdesktop.wonderland.modules.shape.client** package of the Shape Cell tutorial module. The context menu item you will add here will be visible for all Cells. Strictly speaking, it has nothing to do with the Shape Cell itself, but we are using the project infrastructure of this module for this new class.

1. Start the Netbeans IDE
2. Select File -> Open Project... from the Netbeans main menu. Navigate to your Shape Cell tutorial project, after you have completed Part 4 of that tutorial series
3. Right-click on the **org.jdesktop.wonderland.modules.shape.client** icon in the Projects view and select New -> Java

Class... from the Netbeans IDE context menu
4. Enter **InfoContextMenuFactory** in the Class Name field and click Finish

The Netbeans IDE should generate an empty class named **InfoContextMenuFactory**. All classes that insert items into the Context Menu that are not associated with any particular Cell type must do two things:

1. Have the **@ContextMenuFactory** Java annotation
2. Implement the **ContextMenuFactorySPI** interface

Perform the following steps in the source code for the **InfoContextMenuFactory** class:

1. Add the **@ContextMenuFactory** Java annotation right before the class definition (i.e. right before "public class InfoContextMenuItem ....")
2. Add **implements ContextMenuFactorySPI** to the end of your class definition line
3. Select Source -> Fix Imports... from the Netbeans IDE main menu
4. Next, click inside of the **InfoContextMenuFactory** class definition, then right-click and select Insert Code... from the context menu that appears. Select Implement Method from the menu that appears and check **getContextMenuItems()** in the dialog box and click Generate.

Your class definition should appear as follows:

```
package org.jdesktop.wonderland.modules.shape.client;

import org.jdesktop.wonderland.client.contextmenu.ContextMenuItem;
import org.jdesktop.wonderland.client.contextmenu.annotation.ContextMenuFactory;
import org.jdesktop.wonderland.client.contextmenu.spi.ContextMenuFactorySPI;
import org.jdesktop.wonderland.client.scenemanager.event.ContextEvent;

@ContextMenuFactory
public class InfoContextMenuFactory implements ContextMenuFactorySPI {

    public ContextMenuItem[] getContextMenuItems(ContextEvent event) {
        throw new UnsupportedOperationException("Not supported yet.");
    }
}
```

When the client starts-up it queries all modules installed in the system for classes that are annotated with **@ContextMenuFactory** and implement the **ContextMenuFactorySPI** interface. Each factory class is then queried for Context Menu items when their **getContextMenuItems()** methods are invoked. This method returns an array of **ContextMenuItem** classes. The **ContextMenuItem** interface is found in the **org.jdesktop.wonderland.client.contextmenu** package.

Next, you will implement your **getContextMenuItems()** method by returning a single Context Menu item named "Info" that when selected will display some basic information about the Cell in a modal dialog box. Implement your **getContextMenuItems()** method as follows:

```
    public ContextMenuItem[] getContextMenuItems(ContextEvent event) {
        return new ContextMenuItem[] {
            new SimpleContextMenuItem("Info", new ContextMenuActionListener() {
                public void actionPerformed(ContextMenuItemEvent event) {
                    Cell cell = event.getCell();
                    final String msg = "Cell selected has ID " + cell.getCellID();
                    SwingUtilities.invokeLater(new Runnable() {
                        public void run() {
                            JOptionPane.showMessageDialog(null, msg);
                        }
                    });
                }
            })
        };
    }
```

This method returns an array containing a single item: an instance of the **SimpleContextMenuItem** class (package **org.jdesktop.wonderland.client.contextmenu**). This class represents a "simple" Context Menu item that displays a label and an optional icon image. The **SimpleContextMenuItem** class also takes an instance of an object that implements the **ContextMenuActionListener** interface.

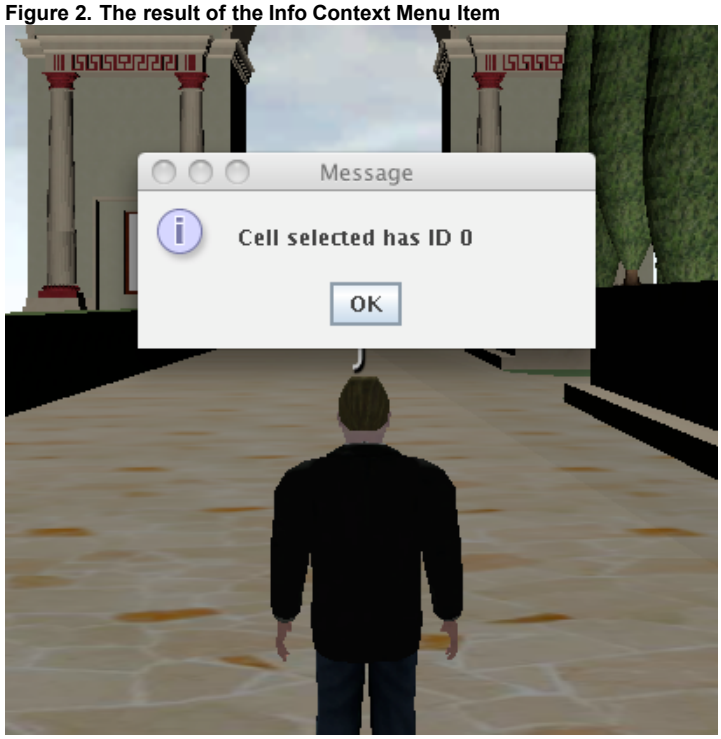
The **ContextMenuActionListener** interface has one method: **actionPerformed()**. The **actionPerformed()** method is invoked when the "Info" item is selected. Here, you simply display a modal dialog box with the Cell ID of the Cell over which the right-click happened.

To compile and run your module:

1. Run your Wonderland server via the "ant run-server" command where you have the Wonderland source code. Wait for the server to finish initializing
2. Do an "ant deploy" in your Shape Cell tutorial example
3. Start the Wonderland client.
4. Right-click over any Cell and select "Info".

You should see the following dialog box after selecting the "Info" dialog box:

Figure 2. The result of the Info Context Menu Item



Adding an Cell-Specific Context Menu Item

In addition to adding Context Menu items for all Cell types, you can also add Context Menu items that appear only for specific kinds of Cells. This is accomplished on the client-side Cell class itself. In this tutorial, you will modify the **ShapeCell.java** class to add a "Change Shape" Context Menu item that will change its shape.

To add a Cell-specific Context Menu item, you will add a **ContextMenuComponent** to your Cell class. In the four-part tutorial series, you were briefly introduced the notion of Cell Components. The **ContextMenuComponent** is another example of a Cell Component, much like **ChannelComponent**. Cell Components contains additional functionality that can be attached to any Cell.

Add the following definitions to the top of your **ShapeCell.java** file:

```
    @UsesCellComponent private ContextMenuComponent contextComp = null;
    private ContextMenuFactorySPI menuFactory = null;
```

Also, add the following import statements:

```
import org.jdesktop.wonderland.client.cell.annotation.UsesCellComponent;
import org.jdesktop.wonderland.client.contextmenu.cell.ContextMenuComponent;
import org.jdesktop.wonderland.client.contextmenu.spi.ContextMenuFactorySPI;
```

The **@UsesCellComponent** annotation is what adds the **ContextMenuComponent** to your **ShapeCell** class using a technique called "dependency injection". When an instance of your **ShapeCell** class is created on the client, the system looks for all **@UsesCellComponent** annotations and creates and adds those Cell Components to your Cell class. It also fills in your **contextComp** variable with the Cell Component object it creates. This dependency injection is guaranteed to happen before your **setStatus()** method is invoked, but no sooner. This means, for example, that you cannot rely on a valid value in **contextComp** until then; you cannot use this method in the **ShapeCell** constructor or in the **setClientState()** method, for example.

Next, you need to add the desired Context Menu items in your **setStatus()** method. Within the **RENDERING** clause of the switch statement, add the following code:

```
                if (menuFactory == null) {
                    final MenuItemListener l = new MenuItemListener();
                    menuFactory = new ContextMenuFactorySPI() {
                        public ContextMenuItem[] getContextMenuItems(ContextEvent event)
                            return new ContextMenuItem[] {
                                new SimpleContextMenuItem("Change Shape", l)
                            };
                        }
                    };
                    contextComp.addContextMenuFactory(menuFactory);
                }
```

This creates a new instance of a factory that creates a single **SimpleContextMenuItem** and adds it to the **ContextMenuComponent** when the Cell becomes active. Next, add the following code within the **INACTIVE** clause of the switch

statement:

```
                if (menuFactory != null) {
                    contextComp.removeContextMenuFactory(menuFactory);
                    menuFactory = null;
                }
```

This removes the menu item when the Cell becomes inactive and is no longer loaded in memory. Strictly speaking, this bit of code has very little affect: if the Cell is not visible, then there is no way to activate its Context Menu. But it is also a good idea to "clean up" references on objects so that garbage collection has an easier time reclaiming unused objects.

The final step is to implement an inner class that implements the **ContextMenuActionListener** interface as follows:

```
    class MenuItemListener implements ContextMenuActionListener {

        public void actionPerformed(ContextMenuItemEvent event) {
            shapeType = (shapeType.equals("BOX") == true) ? "SPHERE" : "BOX";
            renderer.updateShape();

            ShapeCellChangeMessage msg = new ShapeCellChangeMessage(getCellID(), shapeTy
            sendCellMessage(msg);
        }
    }
```

Much like when a single, left-mouse click happens on the Cell, the **actionPerformed()** method changes the shape of the object and sends a message to the server to inform all other clients of the shape change. Finally, make sure the following import statements appear in your **ShapeCell.java** file (although it is a good idea to have your IDE "fix" your import statements for you):

```
import org.jdesktop.wonderland.client.contextmenu.ContextMenuItem;
import org.jdesktop.wonderland.client.contextmenu.ContextMenuItemEvent;
import org.jdesktop.wonderland.client.cell.annotation.UsesCellComponent;
import org.jdesktop.wonderland.client.contextmenu.ContextMenuActionListener;
import org.jdesktop.wonderland.client.contextmenu.SimpleContextMenuItem;
import org.jdesktop.wonderland.client.contextmenu.cell.ContextMenuComponent;
import org.jdesktop.wonderland.client.contextmenu.spi.ContextMenuFactorySPI;
import org.jdesktop.wonderland.client.scenemanager.event.ContextEvent;
```

After you compile and deploy your Shape Cell tutorial module to the Project Wonderland server and re-run your client:

1. Select Tools -> Cell Palette... from the Wonderland main menu
2. Select "Shape Tutorial" from the list and click Create
3. Right-click over the shape that appears in front of you and select "Change Shape". The Shape Cell should change shape

The Context Menu for the Shape Cell should appear as follows. The "Change Shape" option appears at the bottom of the list.

Figure 3. The Context Menu for the Shape Cell

Other Features

There are two other features of the Context Menu not mentioned in this tutorial. First, a ContextMenuComponent can determine whether the "standard" Context Menu items (that is, those items not specific to a particular Cell) appear when the Context Menu is displayed for that Cell. The **setShowStandardMenuItems()** method takes a boolean value: if true (default) the standard Context

Menu item are displayed for that Cell; if false, the standard Context Menu items are not displayed for that Cell.

Second, modules may update the appearance of a Context Menu item after the factory's **getContextMenuItem()** method is invoked. For example, suppose a module wishes to update some aspect of a Context Menu item as a result of a network call (perhaps to the Wonderland server). Since **getContextMenuItems()** should return quickly, the module can spawn a thread with the **SimpleContextMenuItem** it created and set its properties any time in the future. For example, it can change its label, its icon, or its enabled/disabled state. The thread then invokes the **fireMenuItemRepaintListeners()** method to tell the Context Menu to redraw the item.

Conclusion

In this tutorial you learned how to add entries to the Project Wonderland Context Menu applicable to all Cell types and specific to only a single Cell type.

Topic **ProjectWonderlandContextMenu05** . { Edit | Ref-By | Printable | Diffs r1 | More }

java.net RSS

Feedback | FAQ | Terms of Use
Privacy | Trademarks | Site Map