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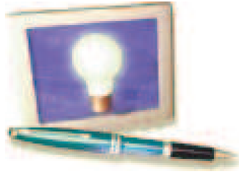
Eclipse Corner Article



Creating an Eclipse View

Summary
In the Eclipse Platform a view is typically used to navigate a hierarchy of information, open an editor, or display properties for the active editor. In this article the design and implementation of a view will be examined in detail. You'll learn how to create a simple view based on SWT, and a more advanced view using the JFace viewer hierarchy. We'll also look at ways to achieve good integration with many of the existing features in the workbench, such as the window menu and toolbar, view linking, workbench persistence and action extension.

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Introduction

In the Eclipse Platform the workbench contains a collection of workbench windows. Each workbench window contains one or more pages, and each page contains a collection of editors and views. An editor is typically used to edit or browse a document or input object. Modifications made in an editor follow an open-save-close lifecycle model. A view is typically used to navigate a hierarchy of information, open an editor, or display properties for the active editor. In contrast to an editor, modifications made in a view are saved immediately. The layout of editors and views within a page is controlled by the active perspective.

The workbench contains a number of standard components which demonstrate the role of a view. For instance, the Navigator view is used to display and navigate through the workspace. If you select a file in the Navigator, you can open an editor on the contents of the file. Once an editor is open, you can navigate the structure in the editor data using the Outline view, or edit the properties of the file contents using the Properties view.

In this article we'll look at how you, as a plug-in developer, can add new views to the workbench. First we'll examine the process through the creation of a simple Label view. This view just displays the words "Hello World". Then we'll design and implement a more comprehensive view, called Word view, which displays a list of words which can be modified through addition and deletion. And finally, we'll look at ways to achieve good integration with many of the existing features in the workbench.

Source Code

To run the example or view the source for code for this article you can unzip viewArticleSrc.zip into your *plugins/* subdirectory.

Adding a New View

A new view is added to the workbench using a simple three step process.

1. Create a plug-in.
2. Add a view extension to the plugin.xml file.
3. Define a view class for the extension within the plug-in.

To illustrate this process we'll define a view called "Label", which just displays the words "Hello World".

Step 1: Create a Plug-in

In step 1 we need to create a new plug-in. The process of plug-in creation is explained in detail in Your First Plugin, by Jim Amsden, so we won't go into the details here. To be brief, we need to create a plugin project, and then define a plugin.xml file (shown below). This file contains a declaration of the plug-in id, name, pre-requisites, etc.

```
<?xml version="1.0" encoding="UTF-8"?>
<plugin
   name="Views Plugin"
   id="org.eclipse.ui.articles.views"
   version="1.0.0"
   provider-name="OTI">

<requires>
        <import plugin="org.eclipse.core.boot"/>
        <import plugin="org.eclipse.core.runtime"/>
        <import plugin="org.eclipse.core.resources"/>
        <import plugin="org.eclipse.swt"/>
        <import plugin="org.eclipse.ui"/>
</requires>

<runtime>
        <library name="views.jar"/>
</runtime>

</plugin>
```

Step 2: Add a View Extension to the plugin.xml file

Once we have a plugin, we can define a view extension. The org.eclipse.ui plug-in defines a single extension point for view contribution: org.eclipse.ui.views. In the XML below, we use this extension point to add the Label view extension. This XML is added to the plugin.xml file, after the runtime element, and contains the basic attributes for the view: id, name, icon and class.

```
<extension point="org.eclipse.ui.views">
        <view id="org.eclipse.ui.articles.views.labelview"
             name="Label View"
A            class="org.eclipse.ui.articles.views.LabelView"
B            icon="icons\view.gif"/>
</extension>
```

A complete description of the view extension point and the syntax are available in the developer documentation for `org.eclipse.ui`. The attributes are described as follows.

- **id** - a unique name that will be used to identify this view
- **name** - a translatable name that will be used in the UI for this view
- **class** - a fully qualified name of the class that implements `org.eclipse.ui.IViewPart`. A common practice is to subclass `org.eclipse.ui.part.ViewPart` in order to inherit the default functionality.
- **icon** - a relative name of the icon that will be associated with the view.

Perhaps the most important attribute is *class* (A). This attribute must contain the fully qualified name of a class that implements `org.eclipse.ui.IViewPart`. The `IViewPart` interface defines the minimal responsibilities of the view, the chief one being to create an SWT Control within the workbench. This provides the presentation for an underlying model. In the XML above, the class for the Label view is defined as `org.eclipse.ui.articles.views.LabelView`. The implementation of `LabelView` will be examined in a few paragraphs.

The *icon* attribute (B) contains the name of an image that will be associated with the view. This image must exist within the plugin directory or one of the sub directories.

Step 3: Define a View Class for the Extension within the Plug-in

Now we need to define the view class. To help us out, the platform contains an abstract class, named `org.eclipse.ui.part.ViewPart`, which implements most of the default behavior for an `IViewPart`. By subclassing this, we inherit all of the behavior. The result is LabelView (shown below). The methods in this class implement the view specific presentation. The `createPartControl` method (B) creates an SWT `Label` object to display the phrase "Hello World". The `setFocus` (A) method gives focus to this control. Both of these methods will be called by the platform.

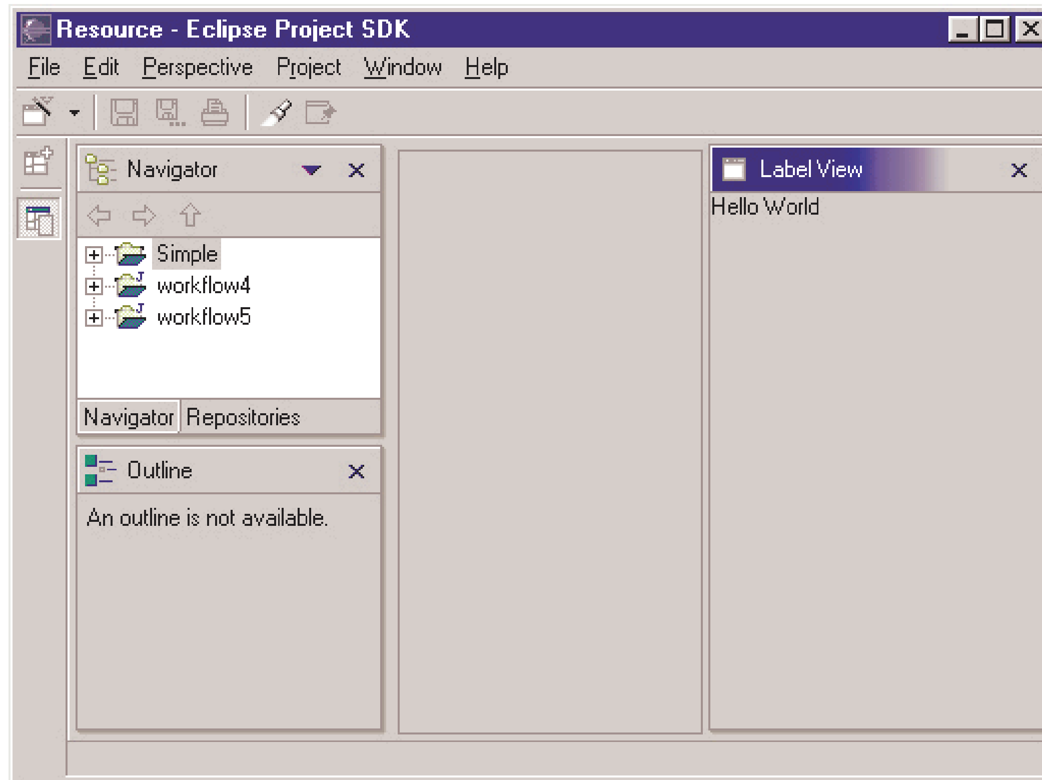
```
package org.eclipse.ui.articles.views;

import org.eclipse.swt.widgets.*;
import org.eclipse.ui.part.ViewPart;

public class LabelView extends ViewPart {
        private Label label;
        public LabelView() {
                super();
        }
A       public void setFocus() {
                label.setFocus();
        }
B       public void createPartControl(Composite parent) {
                label = new Label(parent, 0);
                label.setText("Hello World");
        }

}
```

Once the LabelView class has been declared and compiled, we can test the results. To do this, invoke the Perspective > Show View > Other menu item. A dialog will appear containing all of the view extensions: the Label View item will appear in the Other category. If you select the Label View item and press OK, the view will be instantiated and opened in the current perspective. Here is a screen snapshot of the Label view after it has been opened within the Resource perspective.



View Lifecycle

The lifecycle of a view begins when the view is added to a workbench page. This can occur during the creation of the page, or afterwards, if the user invokes Perspective > Show View. In either case the following lifecycle is performed.

1. An instance of the view class is instantiated. If the view class does not implement `IViewPart` an `PartInitException` is thrown.
2. The `IViewPart.init` method is called to initialize the context for the view. An `IViewSite` object is passed, and contains methods to get the containing page, window, and other services is passed.
3. The `IViewPart.createPartControl` method is called. Within this method the view can create any number of SWT controls within a parent `Composite`. These provide the presentation for some underlying, view specific model.

When the view is closed the lifecycle is completed.

1. The parent `Composite` passed to `createPartControl` is disposed. This children are also implicitly disposed. If you wish to run any code at this time, you must hook the control dispose event.
2. The `IViewPart.dispose` method is called to terminate the part lifecycle. This is the last method which the workbench will call on the part. It is an ideal time to release any fonts, images, etc.

View Position

As we have already seen, the user can open a view by invoking Perspective > Show View. In this scenario, the initial position of the new view is determined by the active perspective within the current page. You can think of a perspective as a layout containing views, folders, and place holders. A *folder* is a stack of views. A *place holder* marks the desired position of a view, should the user open it. When a new view is opened the platform will search the perspective for a place holder with the same `id` as the view. If such a place holder is found, it will be replaced by the new view. Otherwise, the new view will be placed on the right hand side of the page.

As a plugin developer, you may also define a new perspective which contains your view, or add your view to a perspective which has been contributed by another plug-in. In either case, you have greater control over view position. For more information about the use of perspectives see Using Perspectives in the Eclipse UI.

Can I Declare A View Through API?

Every view within the workbench must be declared in XML. There are two reasons for this.

1. Within Eclipse, XML is typically used to declare the presence of an extension and the circumstances under which it should be loaded. This information is used to load the extension and its plugin lazily for better startup performance. For views in particular, the declaration is used to populate the Show View menu item before the plugin is loaded.
2. The view declaration is also used for workbench persistence. When the workbench is closed, the id and position of each view within the workbench is saved to a file. It is possible to save the specific view class. However, the persistence of class names in general is brittle, so view id's are used instead. On startup, the view id is mapped to a view extension within the plugin registry. Then a new instance of the view class is instantiated.

The Word View

In this section we'll implement a more comprehensive view, called Word view, which displays a list of words which can be modified through addition and deletion.

Adding a View Extension to the plugin.xml file

To start out, we add another view extension to the plugin.xml (shown below). This extension has the same format as the Label view: id, name, icon and class. In addition, the extension contains a *category* element (A). A *category* is used to group a set of views within the Show View dialog. A category must be defined using a category element. Once this has been done, we can populate the category by including the category attribute in the Word view declaration (B). The category, and the Word view within it, will both be visible in the Show View dialog.

```
<extension point="org.eclipse.ui.views">
A        <category
            id="org.eclipse.ui.article"
            name="Article">
         </category>
         <view id="org.eclipse.ui.articles.views.wordview"
                  name="Word View"
                  icon="icons\view.gif"
B                 category="org.eclipse.ui.article"
                  class="org.eclipse.ui.articles.views.WordView"/>
</extension>
```

Defining a View Class for the Extension within the Plug-in

Now we need to define a view class for the Word view. For simplicity, we subclass ViewPart to create a WordView class (shown below), and then implement `setFocus` and `createPartControl`. The implementation of this class is discussed after the code.

```
public class WordView extends ViewPart
{
        WordFile input;
        ListViewer viewer;
        Action addItemAction, deleteItemAction, selectAllAction;
        IMemento memento;
```

```
	/**
	 * Constructor
	 */
A▶	public WordView() {
		super();
		input = new WordFile(new File("list.lst"));
	}

	/**
	 * @see IViewPart.init(IViewSite)
	 */
B▶	public void init(IViewSite site) throws PartInitException {
		super.init(site);
		// Normally we might do other stuff here.
	}

	/**
	 * @see IWorkbenchPart#createPartControl(Composite)
	 */
C▶	public void createPartControl(Composite parent) {
		// Create viewer.
D▶		viewer = new ListViewer(parent);
		viewer.setContentProvider(new WordContentProvider());
		viewer.setLabelProvider(new LabelProvider());
		viewer.setInput(input);

		// Create the toolbar.
E▶		createActions();
		createToolbar();

		// Restore state from the previous session.
F▶		restoreState();
	}

	/**
	 * @see WorkbenchPart#setFocus()
	 */
	public void setFocus() {
		viewer.getControl().setFocus();
	}
```

In the `WordView` constructor, the model, a `WordFile`, is created (A▶). The actual shape of the model is somewhat irrelevant, as we wish to focus on the details of view creation, and the appropriate model will vary with the problem domain. To be brief, a `WordFile` is simply a list of words which are stored in a file. The storage location of the `WordFile` is passed to the constructor. If this file exists the `WordFile` will read it. Otherwise it will create the file. The `WordFile` also has simple methods to add, remove, and get all of the words. Each word is stored in a `Word` object, which is just a wrapper for a `String`. The Word and WordFile classes are supplied with the source of this article.

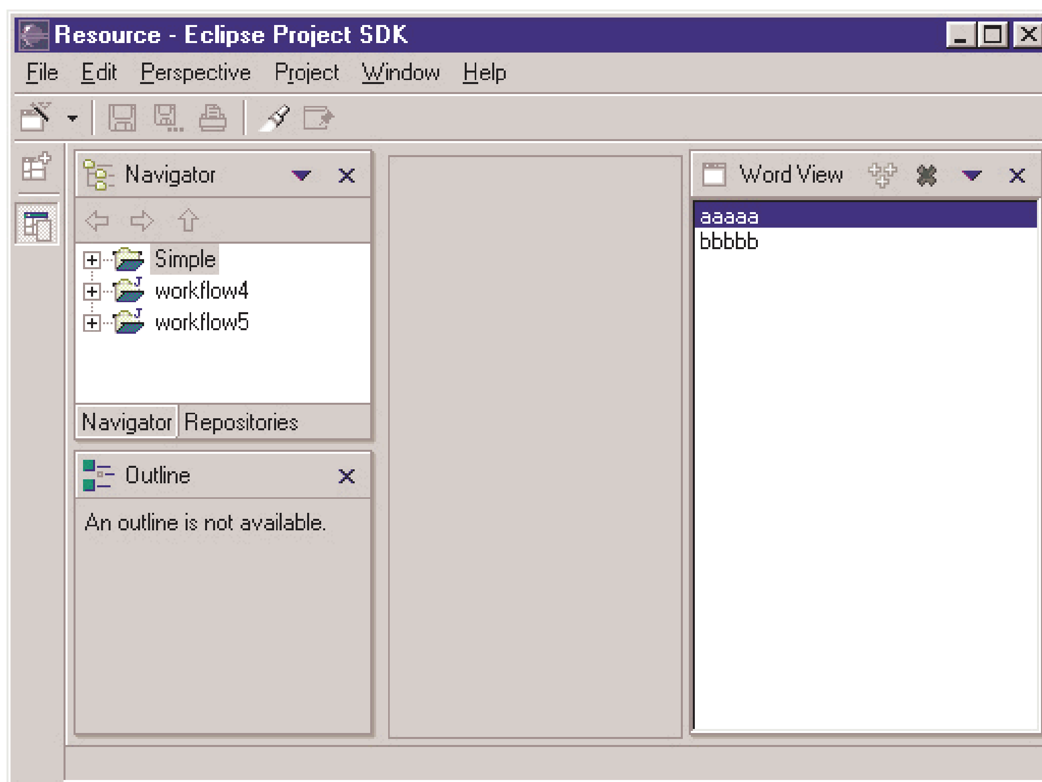
After the view is instantiated, the `IViewPart.init` method is called with an `IViewSite` (B▶). The site is the primary interface between the view part and the outside world. Given the site, you can access the view menu, toolbar, status line, containing page, containing window, shell, etc. In the code above we simply call the superclass, ViewPart, where the site is stored in an instance variable. It can be retrieved at any time by calling getViewSite().

The `createPartControl` method (C▶) is called to create an SWT Control for the `WordFile` model. The creation of this presentation can be done with raw SWT widgets. However, the platform UI contains a class framework, known as JFace, which provides a viewer hierarchy for list, tree, table, and text widgets. A *viewer* is a wrapper for an SWT control, adding a model based interface to it. If you need to display a simple list model, tree model, or table model, use a viewer. Otherwise, it is probably easier to use raw SWT widgets. In the Word view the model is a simple list of words, so a ListViewer is used for the presentation.

On the first line of `createPartControl` the `ListViewer` is created (D). The constructor chosen here automatically creates an SWT List control in the parent. Then a *content provider* is defined. A content provider is an adapter for a domain specific model, wrapping it in an abstract interface which the viewer invokes to get the model root and its children. If the model (the `WordFile`) changes, the content provider will also refresh the state of the `ListViewer` to make the changes visible. A *label provider* is also defined. This serves up a label and image for each object which is supplied by the content provider. And finally, we set the input for the `ListViewer`. The input is just the `WordFile` created in the `WordView` constructor.

The `createPartControl` method also contains a method call for the creation of a toolbar (E). These methods will be examined in later sections. For now, it is sufficient to say that each view has a toolbar which appear in the view title area. The view itself may contribute menu and toolbar items to these areas. The last line (F) relates to state persistence between sessions. We will examine the code for each of these features in later sections.

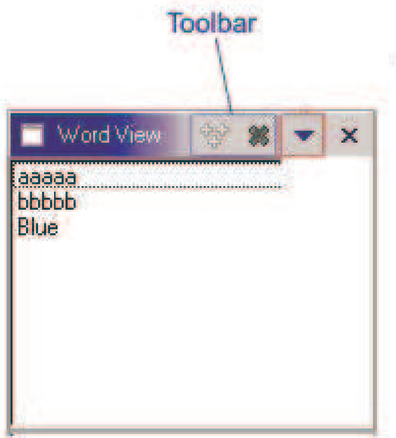
Once the Word view has been declared and compiled we can test the results. To do this, invoke Perspective > Show View > Other, and then select the Word View in the Show View dialog. The Word view will appear in the Resource perspective, as shown below.



Toolbars

As the Word view exists now it isn't very useful. We can browse a list of words, but we can't modify that list. In this section we'll add some toolbar items to the view so the user can add and delete words within the list.

But first, some background information. Each view has a local toolbar. The toolbar is located to the right of the view caption. For instance, here is a snapshot of the Word view with the toolbar we are about to define.



The toolbar controls for a view are initially empty and invisible. As the view adds items to each, the toolbar will become visible. A view can also contribute items to the status line which appears at the bottom of the parent window. Together, the local menu, toolbar and status line are known as the *action bars*.

In code, access to the action bars is provided by the view site. The site is the primary interface between the view part and the outside world. If your view is a subclass of ViewPart, the site can be accessed by calling ViewPart.getViewSite. If not, then you must manage your own storage and retrieval of the site, which is passed to the view in the IViewPart.init method. Given the site, you can call getActionBars().getToolBarManager() to get an IToolBarManager.

The IToolBarManager interface is a JFace abstraction. It wraps an SWT `Toolbar` object so that you, the developer, can think in terms of action and action contribution. An *action* represents a command which can be triggered by the user from a menu or toolbar. It has a run method, plus other methods which return the menu or tool item presentation (text, image, etc.). In JFace, you create a toolbar by adding instances of org.eclipse.jface.action.IAction to an IToolBarManager.

Defining our Actions

We will contribute an "Add..." and "Delete" action to the Word view toolbar. In general, the initial actions within a view are contributed using Java™ code, and other plugin developers extend the toolbars of a view using XML.

In the WordView class, the actions are created in the createActions method (shown below), which is called from createPartControl. For simplicity, each action is defined as anonymous subclass (A) of `org.eclipse.jface.actions.Action`. We override the run method (B) to implement the actual behavior of the action.

```
A       public void createActions() {
B               addItemAction = new Action("Add...") {
                        public void run() {
                                addItem();
                        }
                };
C               addItemAction.setImageDescriptor(getImageDescriptor("add.gif"));

                deleteItemAction = new Action("Delete") {
                        public void run() {
                                deleteItem();
                        }
                };
                deleteItemAction.setImageDescriptor(getImageDescriptor("delete.gif"))

                selectAllAction = new Action("Select All") {
                        public void run() {
```

```
                                selectAll();
                        }
                };

                // Add selection listener.
                viewer.addSelectionChangedListener(new ISelectionChangedListener() {
                        public void selectionChanged(SelectionChangedEvent event) {
                                updateActionEnablement();
                        }
                });
        }
```

The label of each action is defined in the action constructor (A). In addition, an image is defined for the "Add..." and "Delete" actions (C), since they will appear in the toolbar. These images are defined by invoking getImageDescriptor (shown below), a method which returns an image descriptor for a file stored in the plugin directory. Within this method the ViewsPlugin object is retrieved, the install URL (plugin directory) is determined, and then an ImageDescriptor is created for a path based on this URL.

```
        /**
         * Returns the image descriptor with the given relative path.
         */
        private ImageDescriptor getImageDescriptor(String relativePath) {
                String iconPath = "icons/";
                try {
                        ViewsPlugin plugin = ViewsPlugin.getDefault();
                        URL installURL = plugin.getDescriptor().getInstallURL();
                        URL url = new URL(installURL, iconPath + relativePath);
                        return ImageDescriptor.createFromURL(url);
                }
                catch (MalformedURLException e) {
                        // should not happen
                        return ImageDescriptor.getMissingImageDescriptor();
                }
        }
```

On the last line of createActions (D), a selection listener is created and added to the list viewer. In general, the enablement state of a item should reflect the view selection. If a selection occurs in the Word view, the enablement state of each action will be updated in the updateActionEnablement method (shown below).

```
        private void updateActionEnablement() {
                IStructuredSelection sel = 
                        (IStructuredSelection)viewer.getSelection();
                deleteItemAction.setEnabled(sel.size() > 0);
        }
```

The approach taken for action enablement in the Word view is just one way to go. It is also possible to imagine an implementation where each action is a selection listener, and will enable itself to reflect the selection. This approach would make the actions reusable beyond the context of the original view.

Adding our Actions

Once the actions have been created we can add them to the existing toolbar for the view. In the WordView class, this is done in the createToolbar method (shown below), which are called from createPartControl. In each case the view site is used to access the toolbar manager, and then actions are added.

```
        /**
         * Create toolbar.
         */
        private void createToolbar() {
                IToolBarManager mgr = getViewSite().getActionBars().getToolBarManager
```

```
                mgr.add(addItemAction);
                mgr.add(deleteItemAction);
        }
```

At this point the definition of the toolbar is complete. If the Word view is opened in the workbench, the toolbar will be populated with the Add and Delete items.

Integration with Other Views

No view is an island. In most cases, a view co-exists with other views and selection within one view may affect the input of another. In this section we'll create a Listener view, which will listen for the selection of objects in the Word view. If a Word object is selected, the Listener view will display the word attributes. This behavior is similar to the existing Properties view in the workbench standard components.

To start out, we need to create a new Listener view. We've already done this twice, so let's skip the declaration within the plugin.xml and concentrate on the ListenerView class (shown below). This class is very similar to LabelView. In createPartControl we create a simple SWT Label (A), where we will display the word attributes.

```
public class ListenerView extends ViewPart
        implements ISelectionListener
{
        private Label label;
        public ListenerView() {
                super();
        }
        public void setFocus() {
                label.setFocus();
        }
A       public void createPartControl(Composite parent) {
                label = new Label(parent, 0);
                label.setText("Hello World");
B               getViewSite().getPage().addSelectionListener(this);
        }

        /**
         * @see ISelectionListener#selectionChanged(IWorkbenchPart, ISelection)
         */
C       public void selectionChanged(IWorkbenchPart part, ISelection selection) {
                if (selection instanceof IStructuredSelection) {
                        Object first = ((IStructuredSelection)selection).getFirstElem
                        if (first instanceof Word) {
                                label.setText(((Word)first).toString());
                        }
                }
        }
}
```

Things get interesting on the last line of createPartControl (B). The Listener view exists in a page with other views. If a selection is made in any of those views, the platform will forward the selection event to all interested parties. We are an interested party. To register our interest, we get the site, get the page, and add the ListenerView as a selection listener. If a selection occurs within the page, the ListenerView.selectionChanged method will be called (C). Within this method, the selection is examined and, if it is a Word, the label text will be updated to reflect the Word name.

So far so good. The Listener view is ready to receive selection events. However, we have a problem: the Word view doesn't publish any selection events.

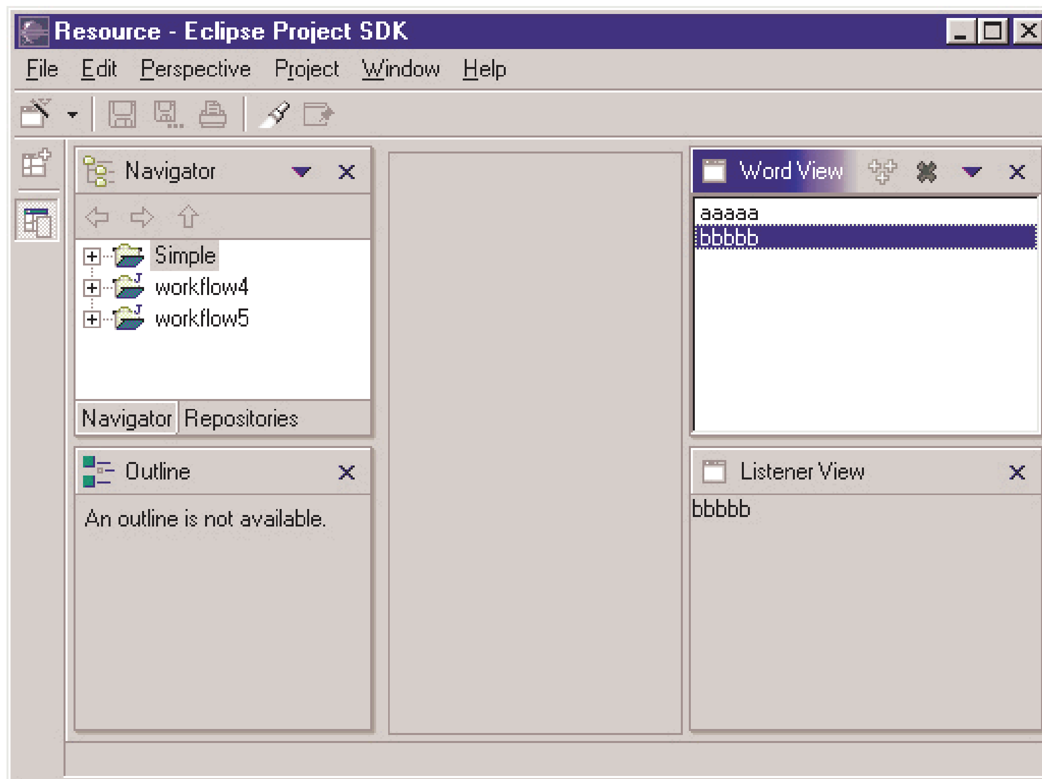
To reconcile our problem we add one line of code to the Word view (D) Within the createPartControl method, a selection provider is passed to the site. Fortunately, the viewer itself is an ISelectionProvider, so it is very easy to define the selection provider for the view. When the Word view is active (as indicated by shading in the title bar) the platform will redirect any selection events fired from viewer to selection listeners within the page.

```
	public void createPartControl(Composite parent) {
		// Create viewer.
		viewer = new ListViewer(parent);
		viewer.setContentProvider(new ListContentProvider());
		viewer.setLabelProvider(new LabelProvider());
		viewer.setInput(input);
		getSite().setSelectionProvider(viewer);

		// Create the toolbar.
		createActions();
		createToolbar();

		// Restore state from the previous session.
		restoreState();
	}
```

Now we can try out the Listener view. Open up the Word view and the Listener view. Add a word to the Word view and then select it. The name of the Word will be displayed in the Listener view. A snapshot of the result is shown below.



The linking approach demonstrated here can be described as *activation linking*. In activation linking, the listener receives selection from the active part. The benefit of this approach is that there is a loose coupling between the Listener view and other views within the same page. If we were to introduce another view, similar to the Word view, which published selection events for objects of type Word, these objects would also appear in the Listener view. This makes it very easy to add, remove, or replace the views in the workbench while maintaining good integration between views.

In contrast to activation linking, a view may also implement *explicit linking*. In explicit linking, the listener tracks selection within a specific source view, which is usually discovered by calling `IWorkbenchPage.findView(String id)`. There are two drawbacks to this approach. First, the listener will be disabled if the specific source view is nonexistent or closed by the user, and second, the listener will never work with additional views added by the user, or another plug-in. For this reason, the use of explicit linking is discouraged.

Integration with the WorkbenchPage Input

In a large, real world project the workspace may contain hundreds or thousands of resources. These resources are split among many projects, containing many folders, containing many files. It's a tree, and each subtree within the whole defines a physical subset of information. To avoid the information overload which can sometimes occur by looking at the whole, the user can "open a perspective" on any resource subtree within the workspace. This is done by selecting a resource in the Navigator view and invoking "Open Perspective". The result is a new workbench page where only the children of the subtree root are visible. This subtree root is known as the *input*.

In practice, the visibility of resources within a page is implemented through collaboration between the page and the views within that page. The page itself is just a visual container for views and editors. It doesn't provide any presentation for resources. That is delegated to the parts within the page. The hand off usually occurs during part creation. In the early stages of part lifecycle a part can obtain a handle to the containing `IWorkbenchPage`, and from this it can call `IWorkbenchPage.getInput`. The result can be used as the initial input for the view. For instance, if a new perspective containing the Navigator is opened, the Navigator will use the page input as its own input. The Packages view does the same.

The strategy should be adopted by any view which displays resources within the workspace. This will ensure a consistent navigational paradigm for users within the platform.

State Persistence

One of the primary goals for the platform UI is to provide efficient interaction with the workspace. In the platform this is promoted by saving the state of the workbench when a session ends. When a new session is started the state of the workbench is recreated. The state of each window, page, view and editor is persisted between sessions, reducing the time required for the user to get back to work. In this section we'll examine how the state of the Word view is saved.

Within any view there are at least two elements of state: the model itself and model presentation (widget state). In our Word view, the model is stored as a file in the file system, so it is a non issue. However, the widget state should be saved. To do this we need to implement the IViewPart.init and IViewPart.saveState methods (shown below) in WordView.

```
public void init(IViewSite site,IMemento memento) throws PartInitException;
public void saveState(IMemento memento);
```

But first, some background info. When the workbench is closed, the IViewPart.saveState method is called on every view. An IMemento is passed to the saveState method. This is a structured, hierarchical object where you can store integers, floats, Strings, and other IMementos. The platform will store the IMemento data in a file called `workbench.xml` within the `org.eclipse.ui` metadata directory. When a new session is started, the platform will read this file, recreate each window, page, and view, and then pass an IMemento to each view in the init method. The view can use this to recreate the state of the previous session.

Now we can do some coding. We will implement the saveState method first (shown below). Within this method a memento is created for the selection (A) and then one item is added to it for every word which is selected (B). In our code, the word string is used to identify the word. This may be an inaccurate way to identify words (two words may have the same string), but this is only an article. You should develop a more accurate strategy which reflects your own model.

```
        public void saveState(IMemento memento){
                IStructuredSelection sel = (IStructuredSelection)viewer.getSelection(
                if (sel.isEmpty())
                        return;
A               memento = memento.createChild("selection");
                Iterator iter = sel.iterator();
                while (iter.hasNext()) {
                        Word word = (Word)iter.next();
B                       memento.createChild("descriptor", word.toString());
                }
```

```
}
```

Next we implement the init method. When a new session is started, the init method will be called just after the part is instantiated, but before the createPartControl method is called. In our code all of the information within the memento must be restored to the control, so we have no choice but to hold on to the memento until createPartControl is called.

```
public void init(IViewSite site,IMemento memento) throws PartInitException {
        init(site);
        this.memento = memento;
}
```

Within createPartControl, the restoreState method is called. Within restoreState the selection memento is retrieved (A), and each descriptor within it is mapped to a real Word (B). The resulting array of words is used to restore the selection for the viewer (C).

```
        private void restoreState() {
                if (memento == null)
                        return;
A               memento = memento.getChild("selection");
                if (memento != null) {
B                       IMemento descriptors [] = memento.getChildren("descriptor");
                        if (descriptors.length > 0) {
                                ArrayList objList = new ArrayList(descriptors.length)
                                for (int nX = 0; nX < descriptors.length; nX ++) {
                                        String id = descriptors[nX].getID();
                                        Word word = input.find(id);
                                        if (word != null)
                                                objList.add(word);
                                }
C                               viewer.setSelection(new StructuredSelection(objList))
                        }
                }
                memento = null;
                updateActionEnablement();
        }
```

You may notice certain limitations in the IMemento interface. For instance, it can only be used to store integers, floats, and Strings. This limitation is a reflection of the persistence requirements in the platform UI.

1. Certain objects need to be saved and restored across platform sessions.
2. When an object is restored, an appropriate class for an object might not be available. It must be possible to skip an object in this case.
3. When an object is restored, the appropriate class for the object may be different from the one when the object was originally saved. If so, the new class should still be able to read the old form of the data.

Java serialization could be used for persistence. However, serialization is only appropriate for RMI and light-weight persistence (the archival of an object for use in a later invocation of the same program). It is not considered robust for long term storage, where class names and structure may change. If any of these occur serialization will throw an exception.

State Inheritance

If we take a close look at the standard components in Eclipse an interesting pattern emerges. Most of them provide some degree of customization. For instance, in the Navigator view there are two actions in the menu, Sort and Filter, which can be used to sort or select the visible resources in the Navigator. Similar functionality exists within the Tasks view. In general, customization is a desirable feature. In this section we're not going to look at customization itself, as customization is very specific to a particular view and the underlying model. Instead, we'll look at some different strategies which you could use to share user preferences between views.

Let's start out with the assumption that the Word view has two sorting algorithms. The user may select one as the preferred algorithm. How do we share this preference with other views of the same type?

Approach #1: We don't.

The initial value of the preference will be hard coded in some way, probably as a constant in the class declaration. If the user changes this preference in one view, it will not be reflected in other views. For instance, the Navigator preference for "Sort" is a local preference, and is not shared with other Navigator views.

Approach #2: We Use a Preference Page

The initial value of the preference will be exposed in a preference page in the Workbench Preferences. If the user changes this preference, the new preference will apply to all instances of the view. For instance, the Navigator preference for "Link Navigator selection to active editor" is controlled by a check box in the Workbench Preferences. This option applies to all Navigator views.

Approach #3: Inheritance.

The initial value of the preference will be defined in the plugin metadata. If a view is opened, it will read the plugin metadata to determine the preference. If the user changes the preference in one view, it will not affect other views, but it will be saved to the plugin metadata, so that any view created in the future will inherit the preference. For instance, if the user changes the sort preference in one Word view, it will have no affect on other Word views. However, if the user opens a new Word view it will inherit the most recent preference.

While each of these is a valid approach, the correct choice should reflect your own view and the underlying model.

Summary

In this article we have examined the design and implementation of two views, a simple Label view and a more comprehensive Word view. The features of your own view will probably vary greatly from what we have created. However, the integration of your view with the workbench will follow the same pattern demonstrated by these views. Further information on view implementation is available in the Platform Plug-in Developer Guide and in the javadoc for `org.eclipse.ui`.

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