

Java-based web-apps with the Rich Ajax Platform (RAP)

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Eclipse Rich Ajax Platform Project (RAP)

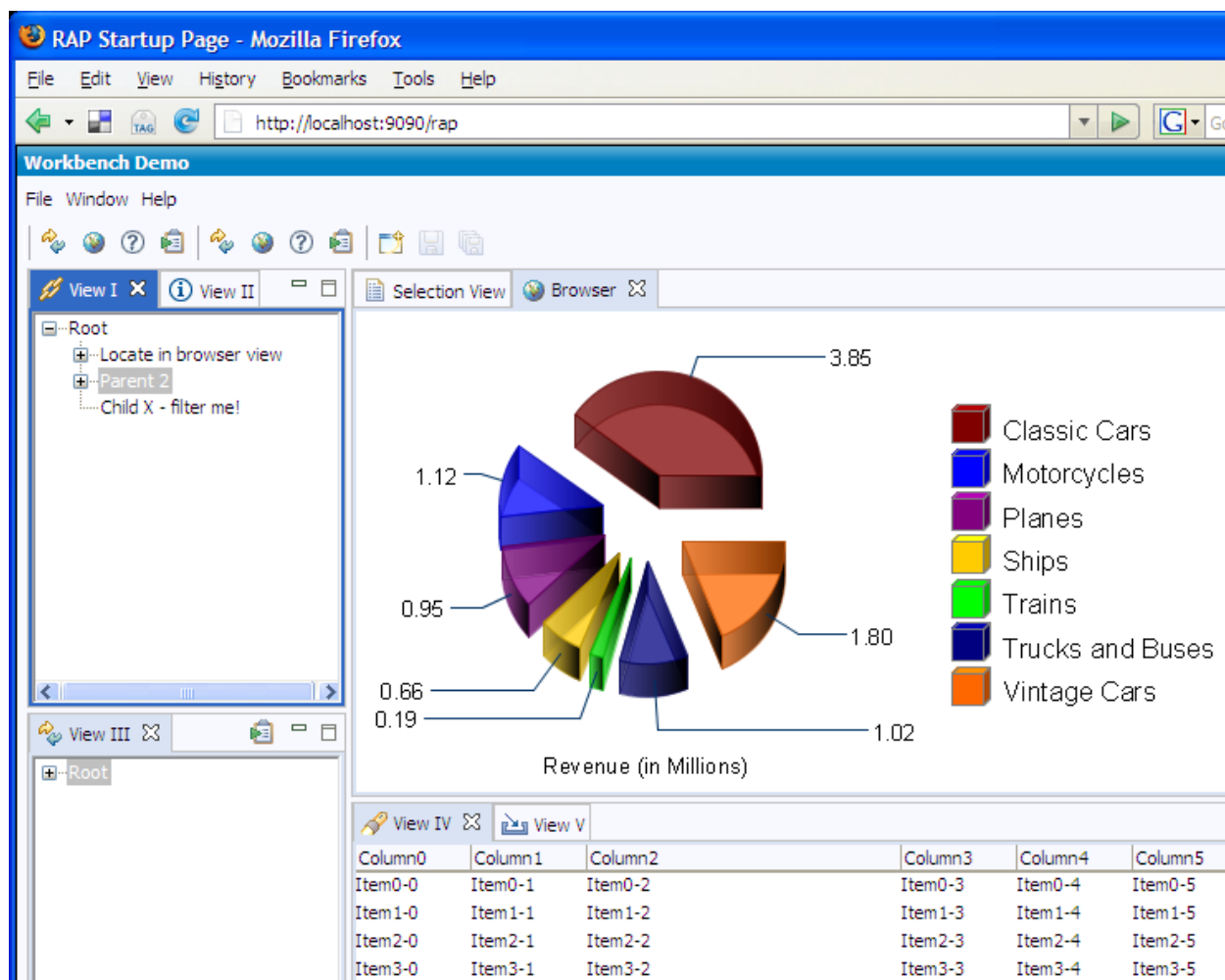
Goal: develop rich Ajax-enabled web applications by:

- coding in Java
 - using the full Java libraries
 - using Java-based Widget Toolkit
 - component-oriented development model (plug-ins / OSGi)
 - extensible (xml-meta info + java-code)
 - without hand-coding Ajax
-
- **skill preservation** – leverage existing Java / Eclipse know-how
 - **single sourcing** of rich client and rich internet applications

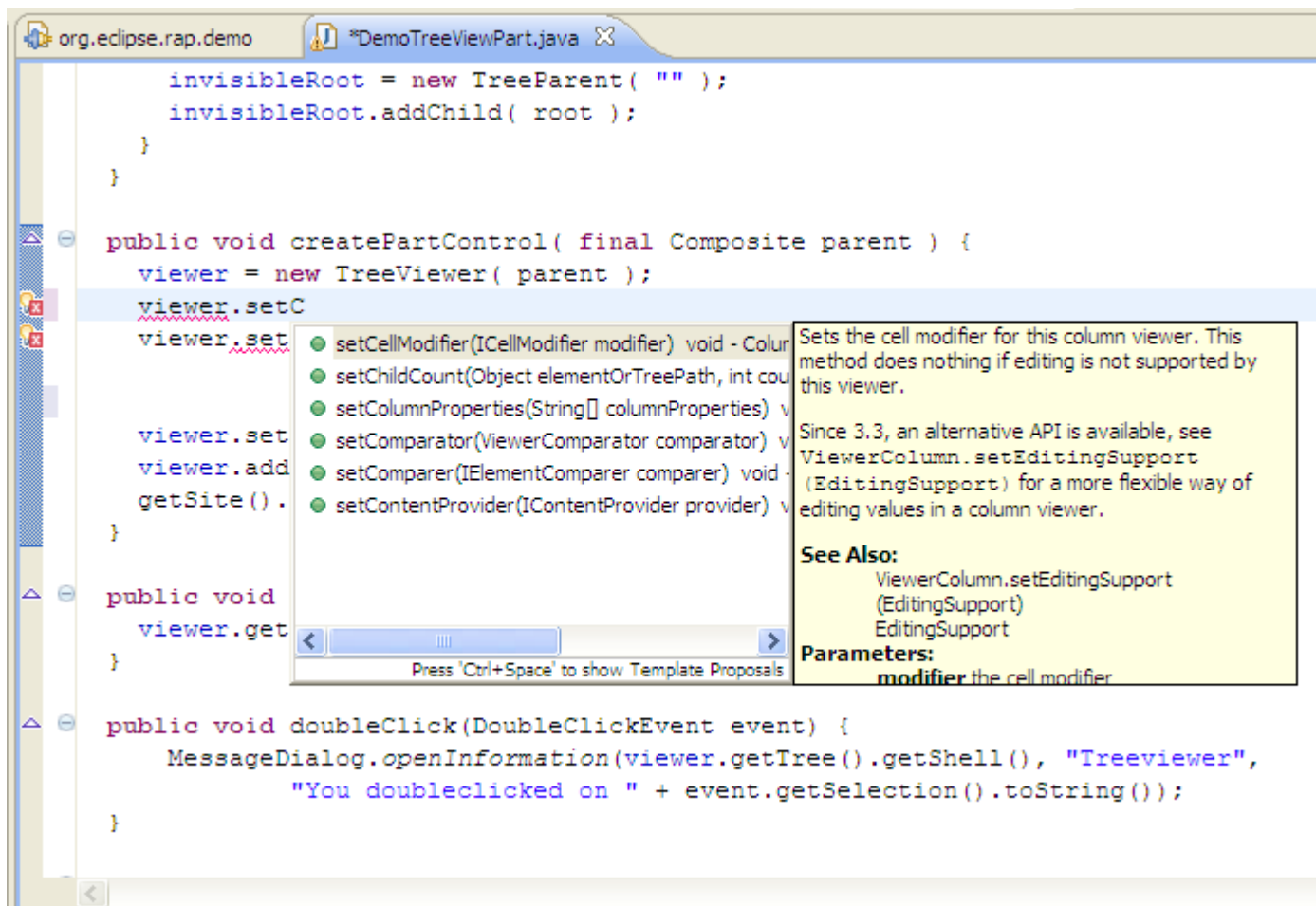
Who is it for?

- Java Developers (willing to learn some Eclipse concepts)
- Eclipse Developers

User's View of a RAP Application



Developer's View of a RAP Application



```

org.eclipse.rap.demo  *DemoTreeViewPart.java X
invisibleRoot = new TreeParent( "" );
invisibleRoot.addChild( root );
}
}

public void createPartControl( final Composite parent ) {
viewer = new TreeViewer( parent );
viewer.setC
viewer.set
viewer.set
viewer.add
getSite().
}

public void
viewer.get
}

public void doubleClick( DoubleClickEvent event ) {
    MessageDialog.openInformation( viewer.getTree().getShell(), "Treeviewer",
        "You doubleclicked on " + event.getSelection().toString() );
}

```

● setCellModifier(ICellModifier modifier) void - Column
 ● setChildCount(Object elementOrTreePath, int count) void
 ● setColumnProperties(String[] columnProperties) void
 ● setComparator(ViewerComparator comparator) void
 ● setComparer(IElementComparer comparer) void
 ● setContentProvider(IContentProvider provider) void

Sets the cell modifier for this column viewer. This method does nothing if editing is not supported by this viewer.

Since 3.3, an alternative API is available, see `ViewerColumn.setEditingSupport(EditingSupport)` for a more flexible way of editing values in a column viewer.

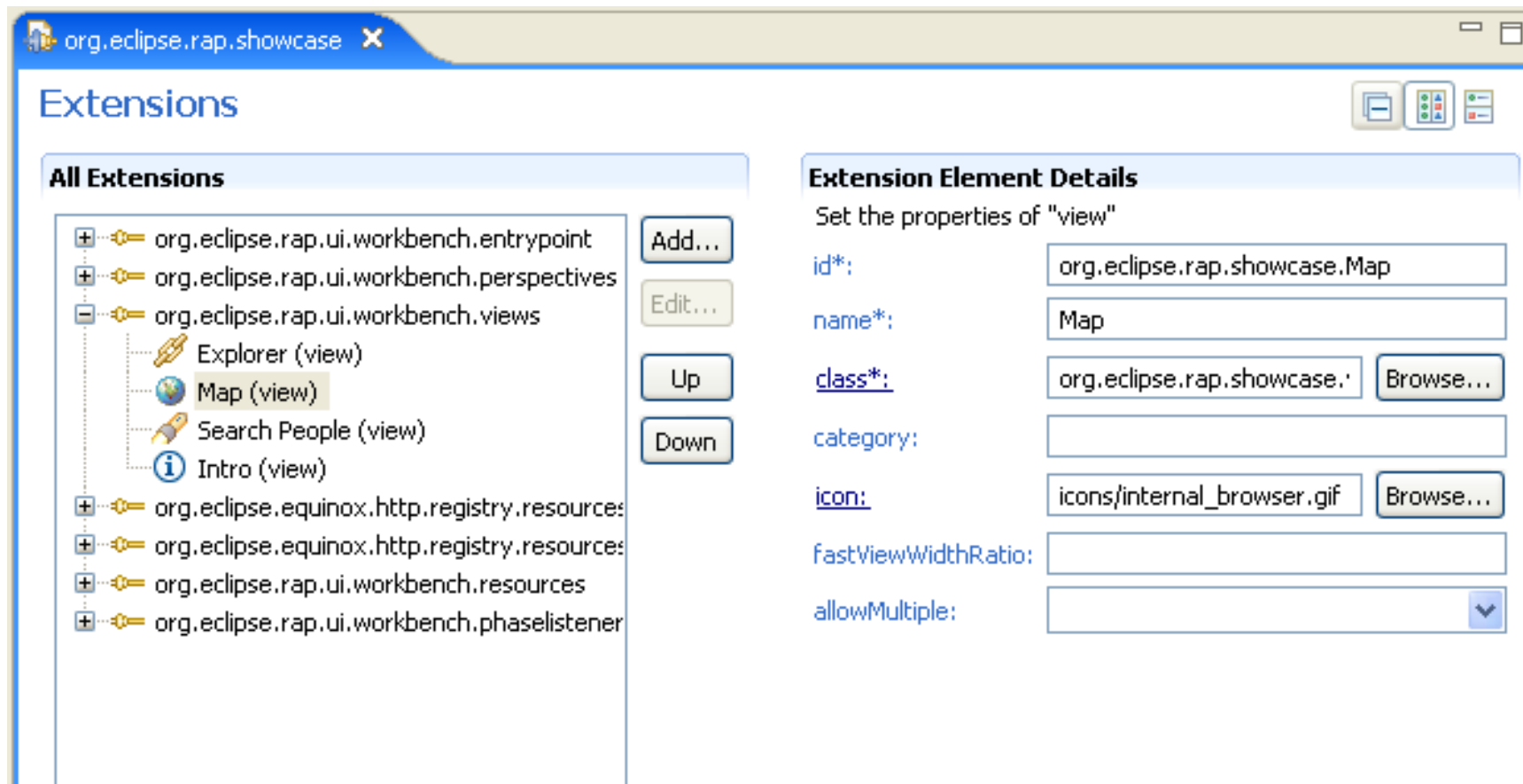
See Also:
 ViewerColumn.setEditingSupport(EditingSupport)
 EditingSupport

Parameters:
modifier the cell modifier

Press 'Ctrl+Space' to show Template Proposals

- developer does not get in touch with Javascript, CSS, HTTP

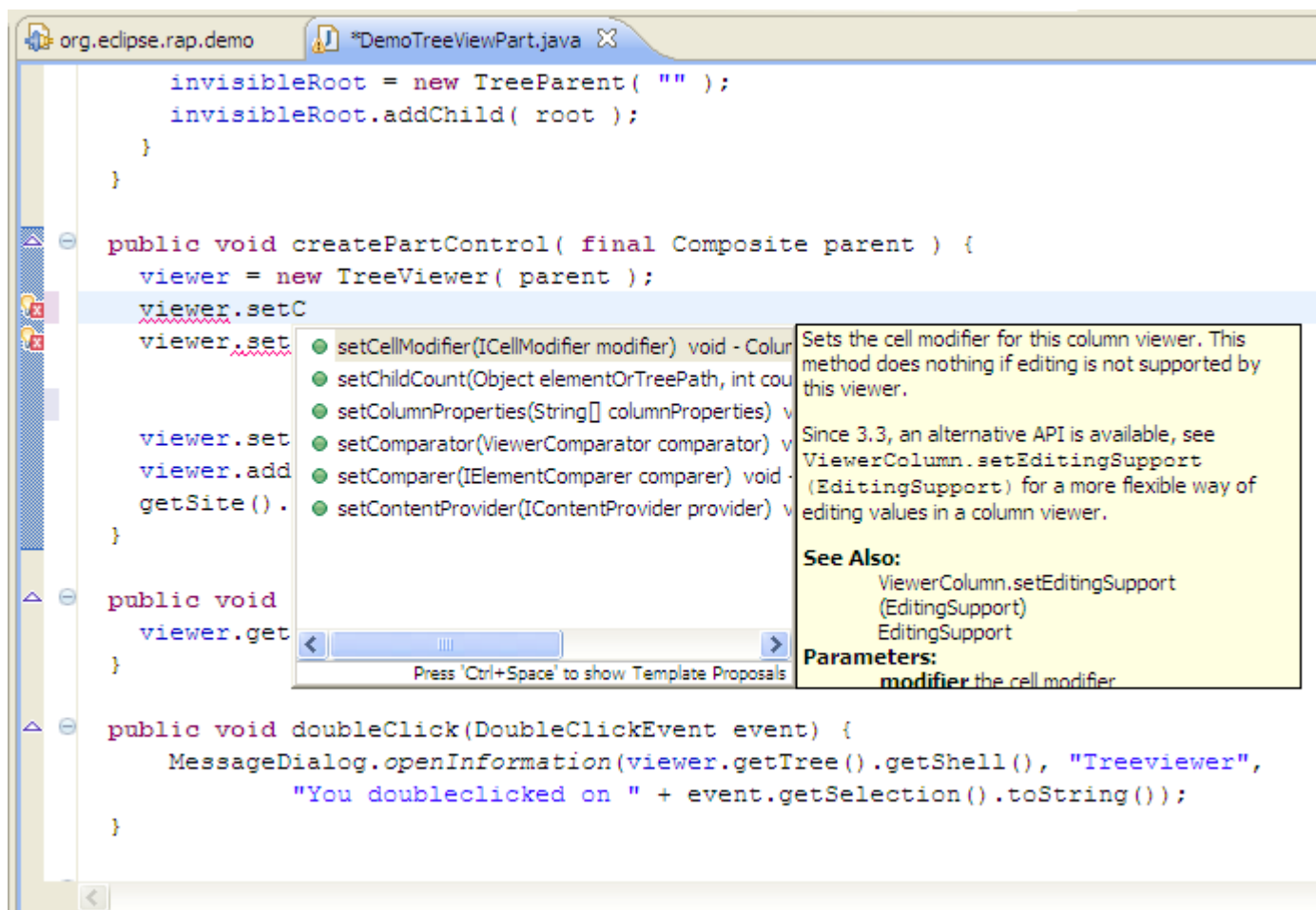
Developer's View of a RAP Application



The screenshot displays the Eclipse IDE's 'Extensions' view for a project named 'org.eclipse.rap.showcase'. The view is split into two main sections:

- All Extensions:** A tree view showing the following extensions:
 - org.eclipse.rap.ui.workbench.entrypoint
 - org.eclipse.rap.ui.workbench.perspectives
 - org.eclipse.rap.ui.workbench.views
 - Explorer (view)
 - Map (view)** (selected)
 - Search People (view)
 - Intro (view)
 - org.eclipse.equinox.http.registry.resources
 - org.eclipse.rap.ui.workbench.resources
 - org.eclipse.rap.ui.workbench.phaselistener
- Extension Element Details:** A form for configuring the selected 'Map (view)' extension. The details are:
 - id*: org.eclipse.rap.showcase.Map
 - name*: Map
 - class*: org.eclipse.rap.showcase. (with a 'Browse...' button)
 - category: (empty field)
 - icon: icons/internal_browser.gif (with a 'Browse...' button)
 - fastViewWidthRatio: (empty field)
 - allowMultiple: (dropdown menu)

Developer's View of a RAP Application



The screenshot shows the Eclipse IDE with a Java editor window titled "DemoTreeViewPart.java". The code in the editor is as follows:

```
invisibleRoot = new TreeParent( "" );
invisibleRoot.addChild( root );
}
}

public void createPartControl( final Composite parent ) {
    viewer = new TreeViewer( parent );
    viewer.setColumnProperties( columnProperties );
    viewer.setComparator( comparator );
    viewer.addSelectionListener( selectionListener );
    getSite().setSelectionProvider( this );
}

public void viewer.getTree() {
}

public void doubleClick( DoubleClickEvent event ) {
    MessageDialog.openInformation( viewer.getTree().getShell(), "Treeviewer",
        "You doubleclicked on " + event.getSelection().toString() );
}
```

A tooltip is displayed over the `viewer.setColumnProperties()` call. The tooltip contains the following information:

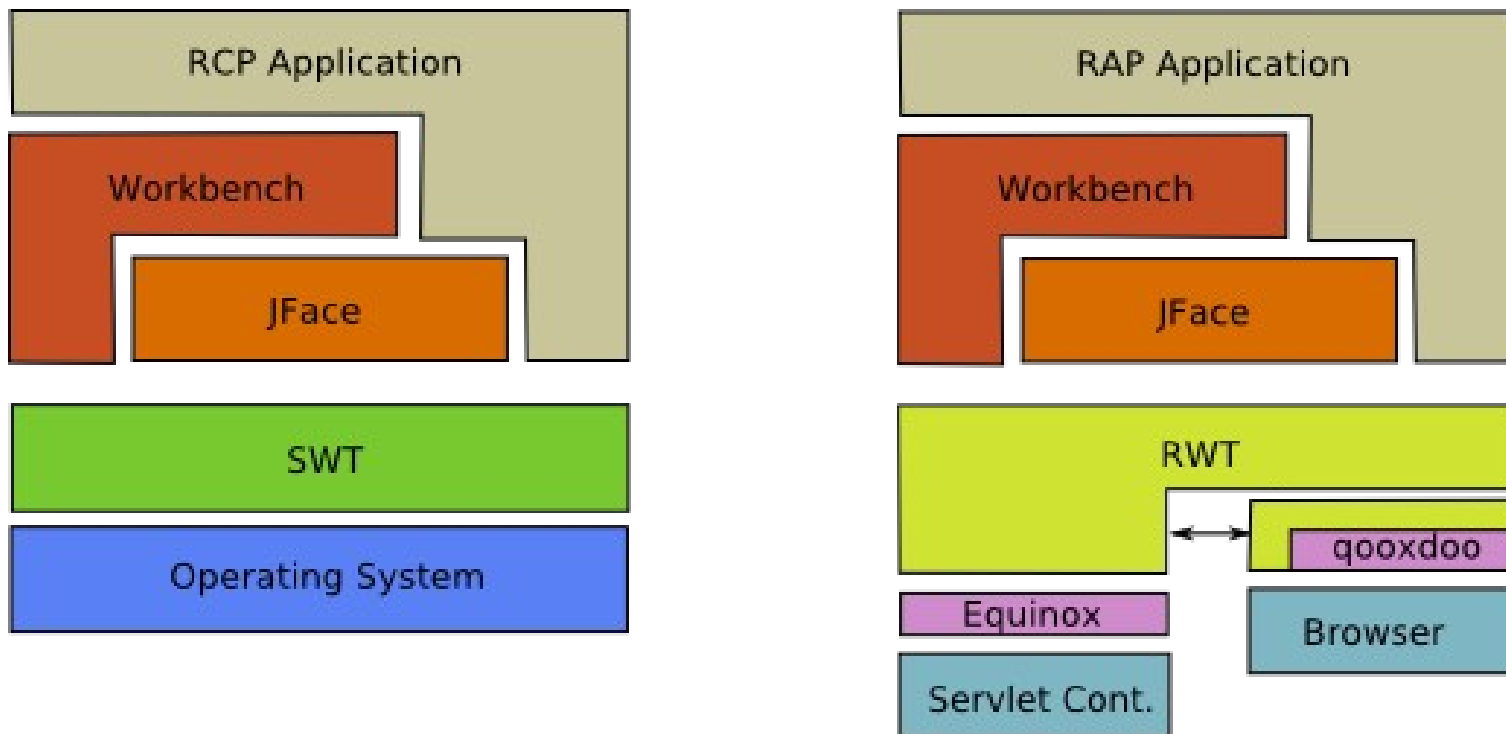
- Method Signature:** `setColumnProperties(String[] columnProperties) void`
- Description:** Sets the cell modifier for this column viewer. This method does nothing if editing is not supported by this viewer.
- See Also:**
 - `ViewerColumn.setEditingSupport(EditingSupport)`
 - `EditingSupport`
- Parameters:**
 - `modifier` the cell modifier

At the bottom of the tooltip, there is a scroll bar and the text: "Press 'Ctrl+Space' to show Template Proposals".

How does it work?

- RAP Widget Toolkit (RWT) - port of the [Standard Widget Toolkit](#) (SWT)
- server-centric - logic resides on the server
- UI is rendered by emitting browser-side JavaScript at run-time
- user action triggers a state-update (example button was clicked)
- state is recomputed on server
- only the “delta” is transmitted (very small)

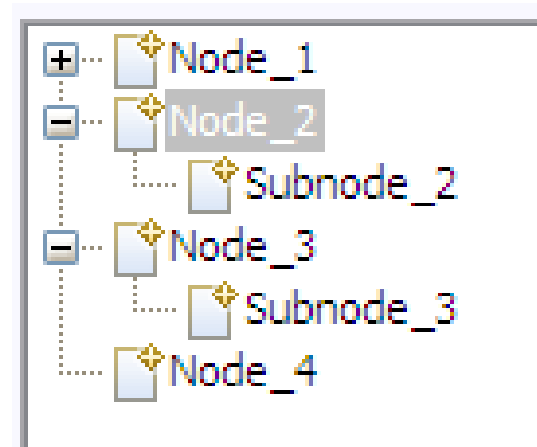
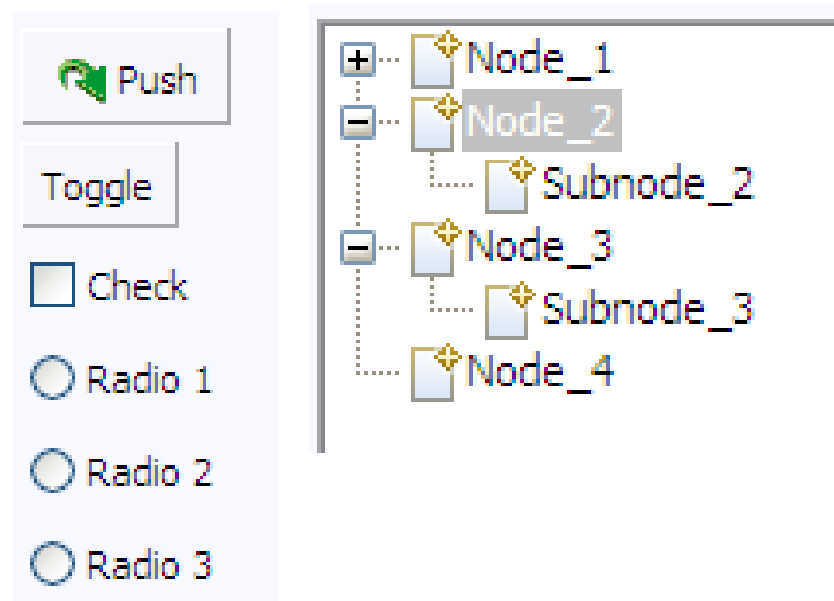
RAP Architecture Overview



- subset of SWT, JFace, Workbench APIs
- RWT uses qooxdoo java script library to render widgets on the client
- differences
 - multi-user environment
 - OSGi bundles are shared between sessions

RWT Controls

- Most basic widgets
- Trees
- Tables

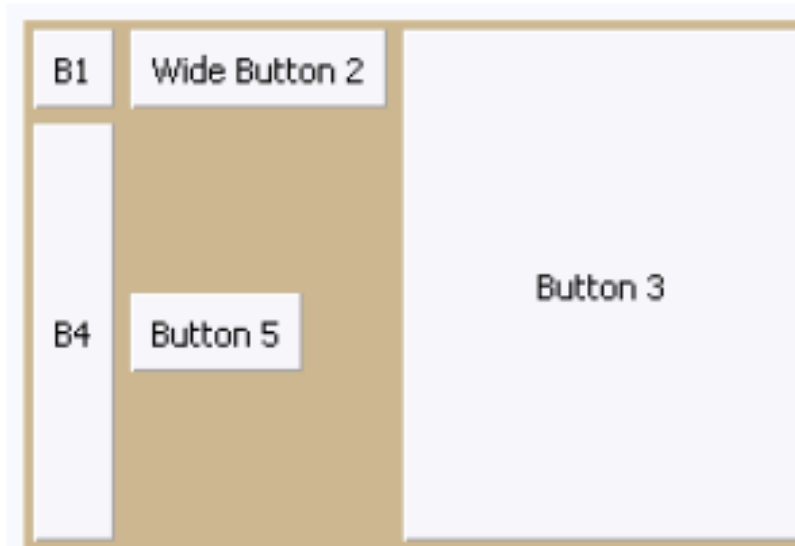


	Col 0	Col 1	Col 2
<input type="checkbox"/>	Item0	Item0-1	Item0-2
<input type="checkbox"/>	Item1	Item1-1	Item1-2
<input type="checkbox"/>	Item2	Item2-1	Item2-2
<input type="checkbox"/>	Item3	Item3-1	Item3-2

- See [Controls Demo](#)

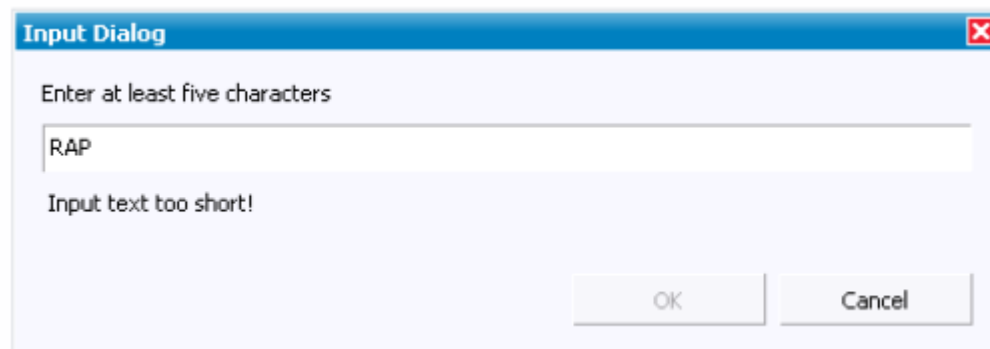
RWT Layouts

- Layouts are computed on the server
- All usual layouts
 - GridLayout
 - RowLayout
 - FillLayout
 - StackLayout
 - ...
- mostly 1:1 copies of SWT
- work exactly as in SWT



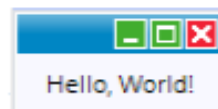
RWT Events and Listeners

- typed and untyped events and listeners
 - SelectionListener
 - ModifyListener
 - VerifyListener
 - MenuListener
 - ...



- some events not possible due to latency limitations of web environment
 - key-up/down, mouse-up/down, mouse-move
- modify events collect consecutive keystrokes

Hello World in RAP



```

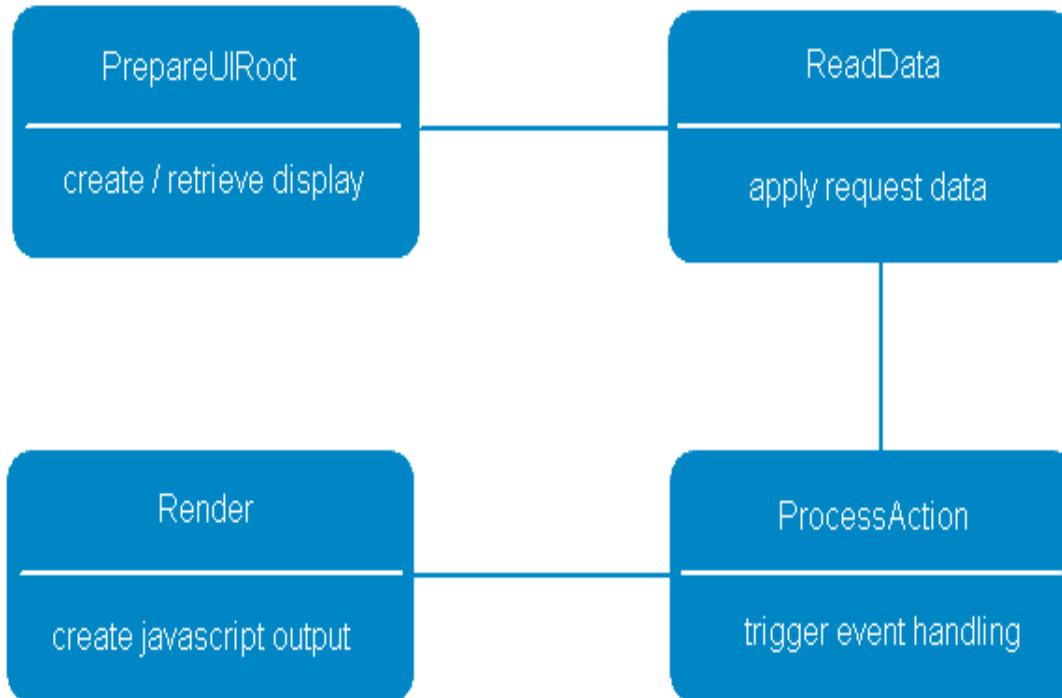
public class RWTHello implements IEntryPoint {

    public Display createUI() {
        Display result = new Display();
        final Shell shell = new Shell( result );
        RowLayout layout = new RowLayout();
        layout.justify = true;
        layout.pack = true;
        shell.setLayout( layout );
        Label label = new Label( shell, SWT.CENTER );
        label.setText( "Hello, World!" );
        shell.pack();
        shell.open();
        return result;
    }
}

<extension
    id="org.eclipse.rap.demo.demoentrypoint"
    point="org.eclipse.rap.ui.workbench.entrypoint">
    <entrypoint
        class="org.eclipse.rap.tutorial.HelloWorld"
        parameter="default"/>
</extension>

```

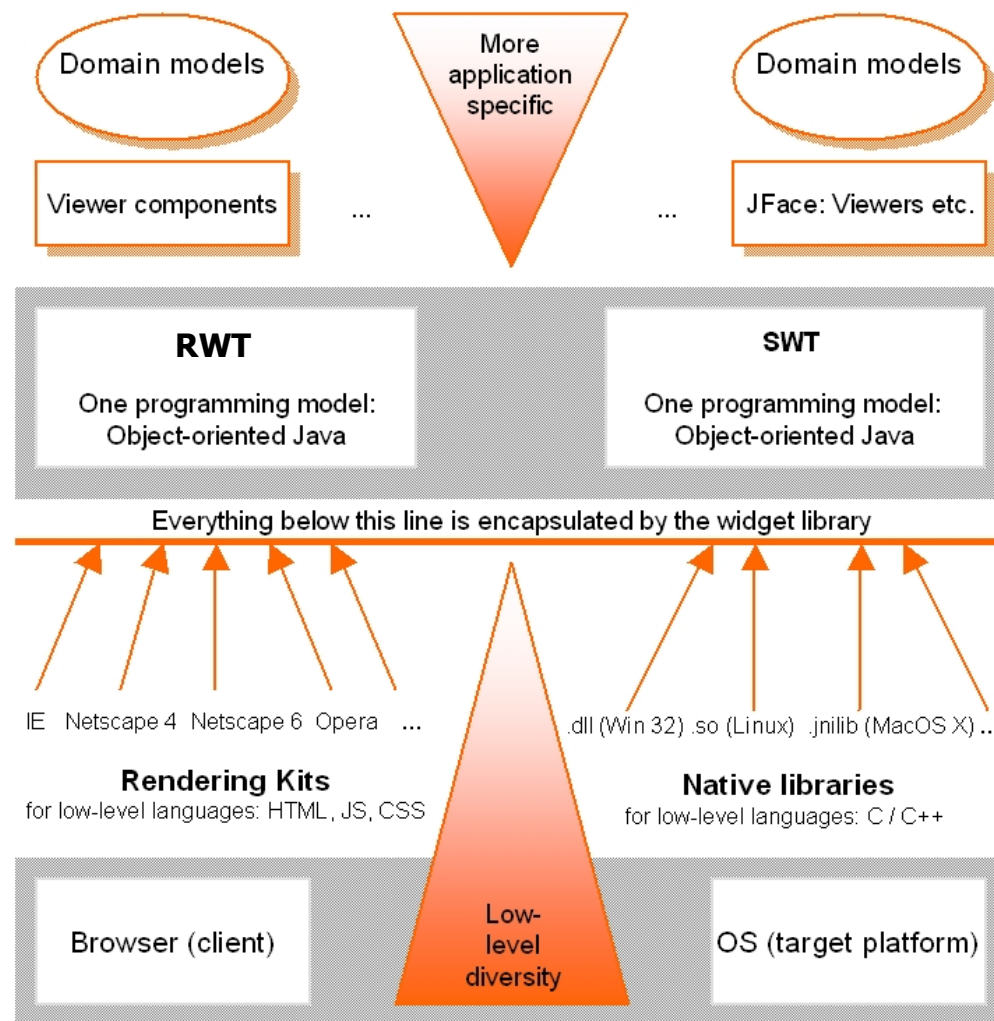
The RWT Lifecycle Phases



- ★ at the end of the *ReadData* phase all widget attributes are in sync with the client
- ★ these attributes are preserved for later comparison
- ★ during the *ProcessAction* phase attribute changes may occur
- ★ the *Render* phase compares the widget attributes with their preserved values and submits only the delta to the client

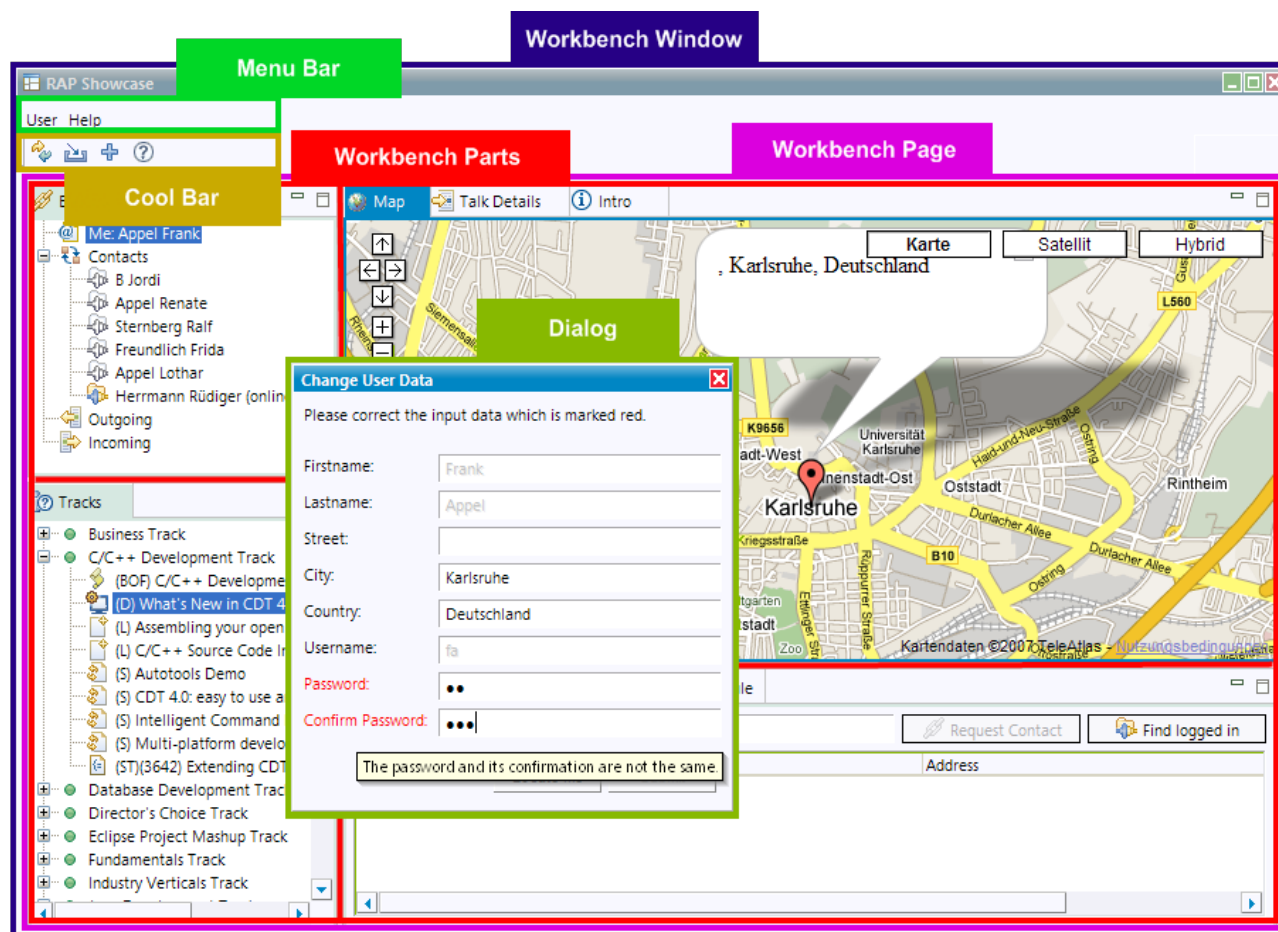
RWT Architecture

- SWT-like API
- composition of widgets into a component tree
- AJAX engine
 - based on qooxdoo
- lifecycle management of the request
- rendering kits (life cycle adapter – LCA)
- user-defined components



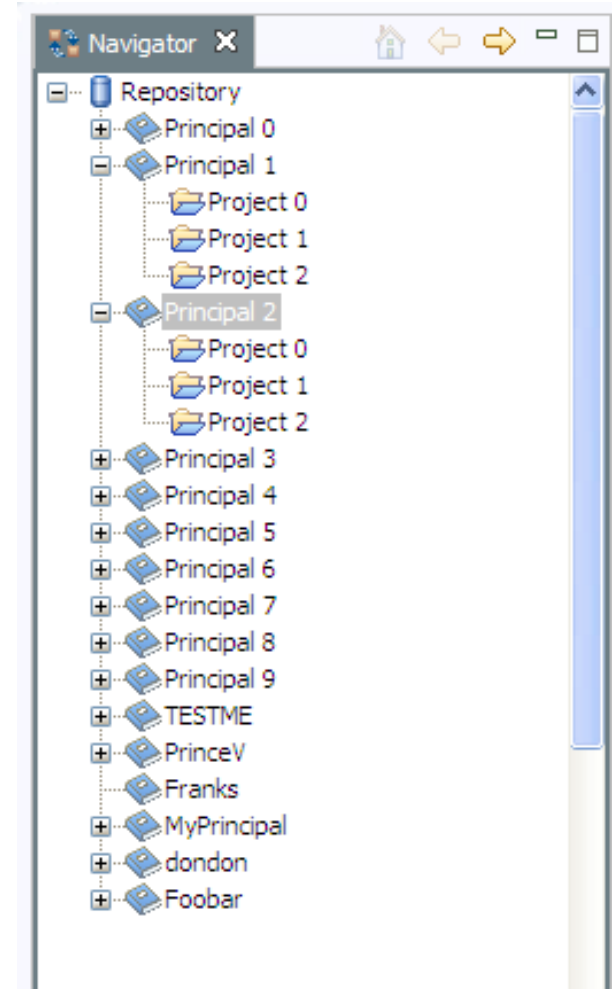
Cool Stuff - Workbench

- Views
 - Outline
 - Properties
- Editors
 - Multi-page
- Perspectives
 - Perspective Switcher
- Menus Framework



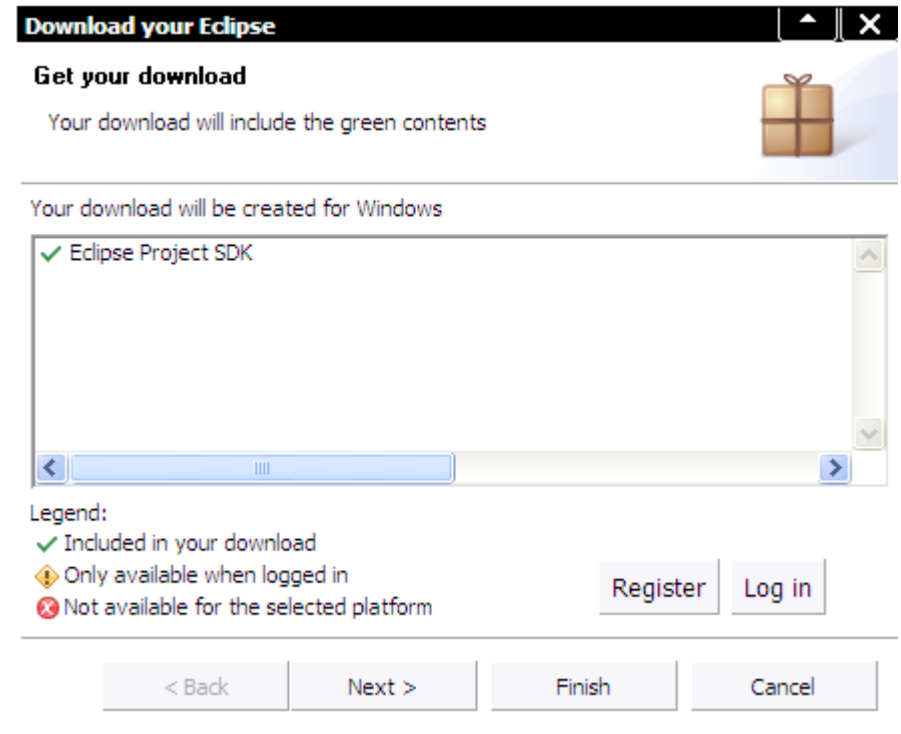
Cool Stuff – Viewers

- MVC like approach for managing Table and Tree Widgets
- Viewer:
 - manages Widget
 - has Input (**your model**)
 - has LabelProvider – generates Strings and Icons
 - has ContentProvider – generates structure



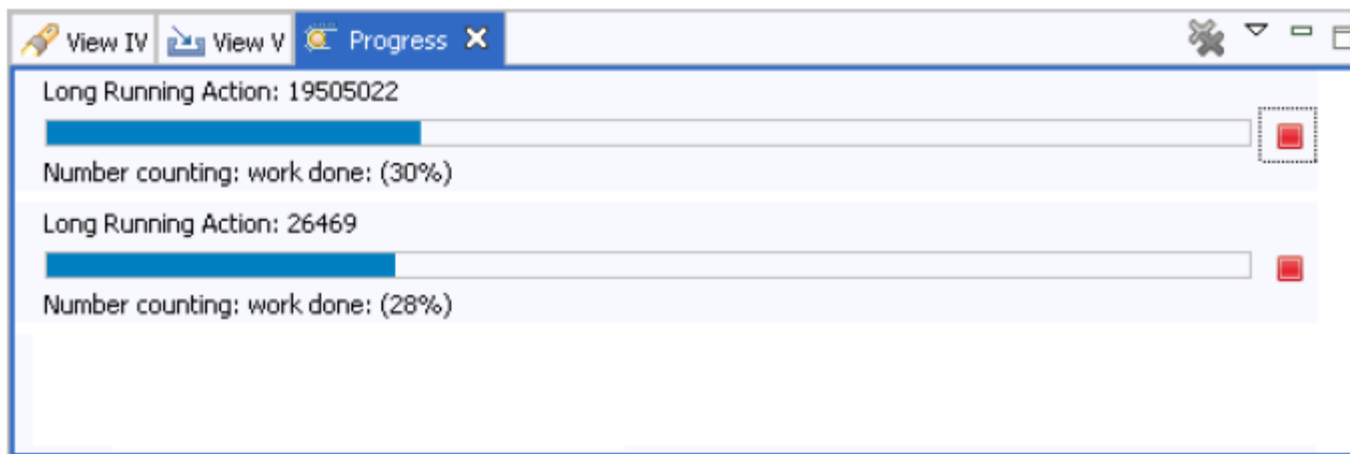
Cool Stuff – Wizard Framework

- WizardDialog shows a Wizard
- Wizard has
 - one to n pages
 - maintains state (current page, can switch, can finish)
- WizardPage
 - UI for one page
 - State for one page (isComplete)



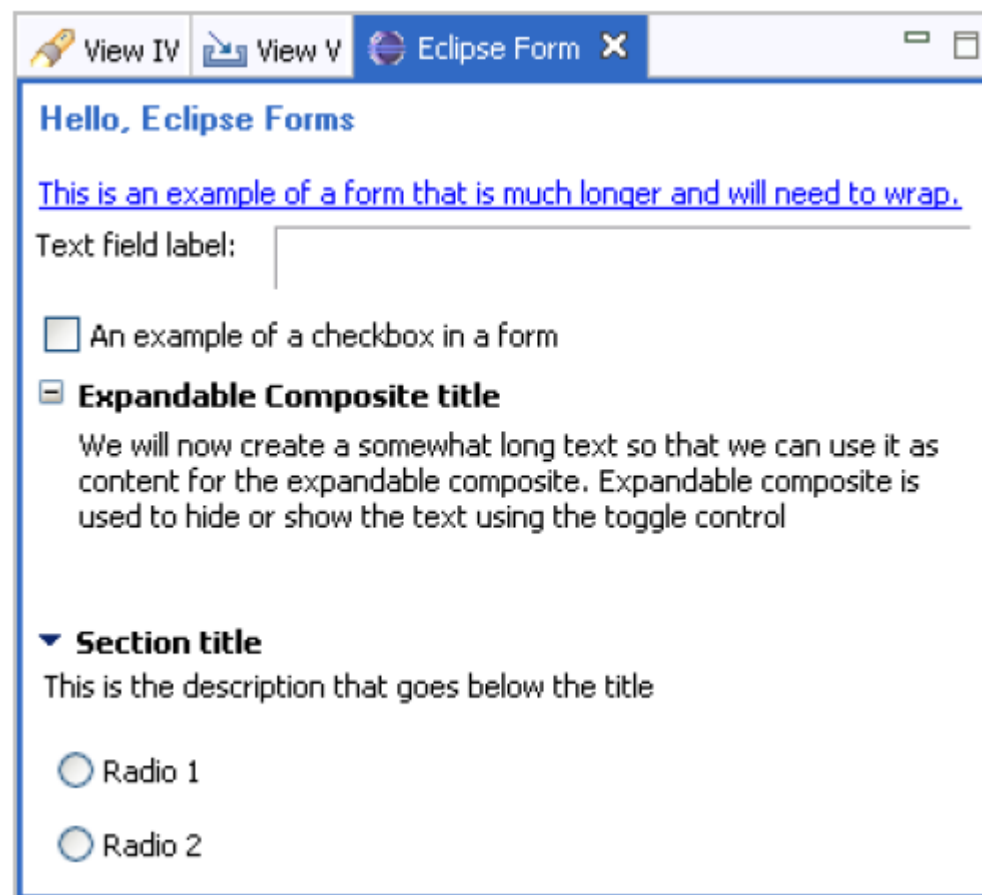
Cool Stuff – Jobs / Progress

- General support of background jobs
- Support for long-running tasks in the UI
- Progress View



Cool Stuff - Forms

- Eclipse UI Forms
 - 2D / flat widgets
 - SWT widgets with customized look and feel
 - RAP does not yet completely mimic original implementation



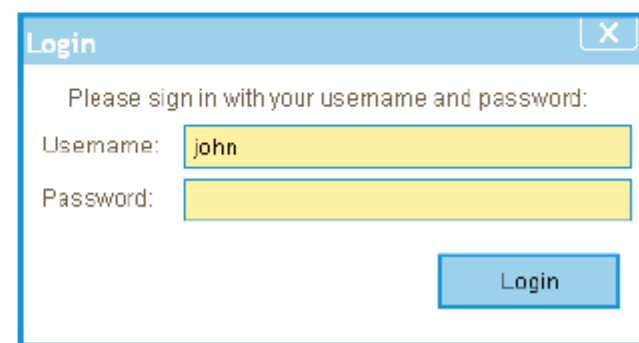
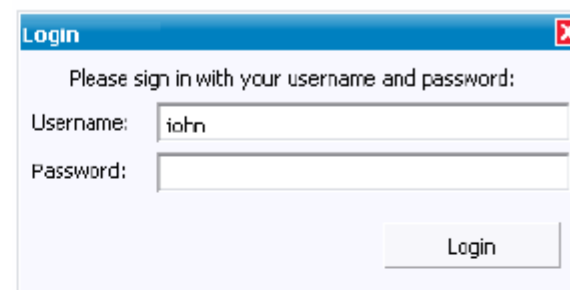
Cool Stuff – Theming

- Allow for a fresh look of web applications
- Predefined widget properties can be customized
- Format: simple Java .properties file

```

shell.BORDER.border:      3px #1695d4
shell.title.background:   #9dd0ea
shell.title.padding:     2px 5px 2px 2px
shell.padding:           5px
shell.button.margin:     0px 2px 8px 0px
...
text.BORDER.border:      1px solid #1695d4
..

```



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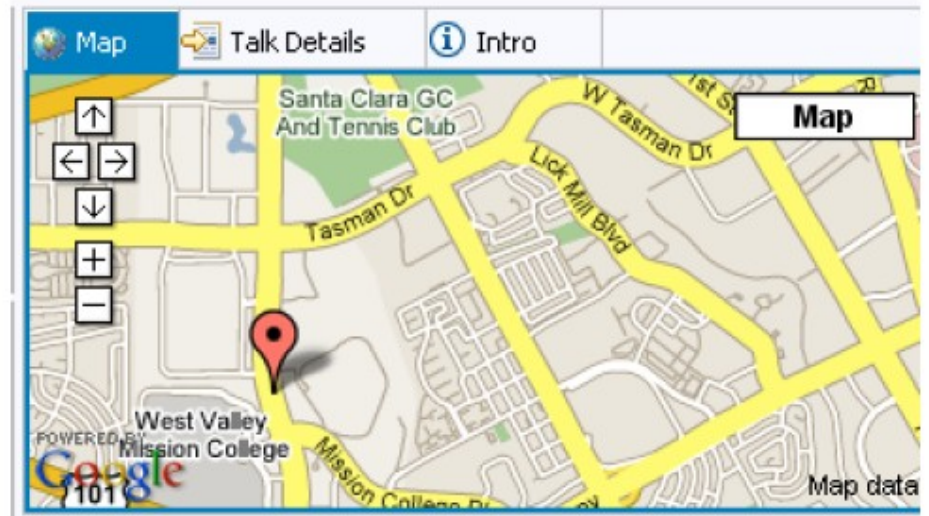
Building your down..... (78%)

Cool Stuff – Custom Widgets

- Like SWT this requires good knowledge of the platform
- Component Developer needs Javascript, Qooxdoo and RAP knowledge
- Application Developer simply uses Java API

```
GMap map = new GMap( shell, SWT.NONE );  
map.setAddress( "..." );
```

- Tutorial in RAP Help



Scalability and Performance

- RAP has a per-session memory requirement on the server
- Based on optimization experience from more than 5 years of working on W4T (RAPs ancestor)

- Web Workbench performance tests
 - Core Duo CPU, 500 MB of heap
 - 500 concurrent users, one request every five seconds
 - average response times below 20ms
 - approx. 100 MB heap space

- W4T-based Yoxos on Demand server several thousand users every day

RAP Deployment

- Complies with JEE servlet standards 2.3, 2.4 and 2.5
- Applications can be deployed as standard web archives (.war)
- Eclipse is running inside a web app
 - Servlet interaction through Equinox “Servlet Bridge”
 - Eclipse runs once per Web-App
- Alternatively a web service (i.e. jetty) can be started as a plug-in

Who's contributing to development?



- **Innoopract**
 - leads RAP development
 - Eclipse specialist – RAP / Eclipse Consulting, Training
 - makers of the Yoxos Eclipse Distribution

- **CAS**
 - leading expert for customer relationship management (CRM) in the SME sector

- **1and1**
 - ISP - world's largest web host by known servers



Releases

- Version 1.0 - released this week
- Version 1.1 - targeting February 2008
 - adding a couple of things that didn't make it into 1.0
 - internalization
 - drag & drop
 - ...
- Version 1.1 - targeting the June 2008 release train

What others are saying...

- RAP is hot...RAP is pretty innovative and definitely scores very high on the “wicked cool” scale. If you haven’t already, you should take a look. - [Wayne Beaton](#)
- Web Development is so 90’s...the Rich Ajax Platform (RAP) project ... is doing stuff that is so 2010 - [Chris Aniszcyk](#)
- "RAP is very easy if you have skills in Eclipse / RCP technology. Even if you have developed Java desktop applications, RAP has a lot of similar concepts" - [Roberto Sanchez Custodio](#), [Autonomind](#)
- “Using the OSGi component architecture for our Browser-based applications allows us to quickly create and deploy customizable applications” - [Ludwig Neer](#), [CAS Software](#)
- See also <http://www.eclipse.org/rap/buzz.php>

RAP Resources

Give it a try!

- Project Homepage - www.eclipse.org/rap/
- Demos - www.eclipse.org/rap/demos.php
- Newsgroup - www.eclipse.org/rap/newsgroup.php
- qooxdoo
JavaScript UI framework - qooxdoo.org

- Getting Started Screencast
<http://www.thescreencast.com/2007/10/first-look-at-eclipse-rich-ajax.html>

Thanks for attending!

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