Advanced Eclipse RCP

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Download the Tutorial Material from
http://max-server.myftp.org/mp3m/download/mp3m-downloads.html

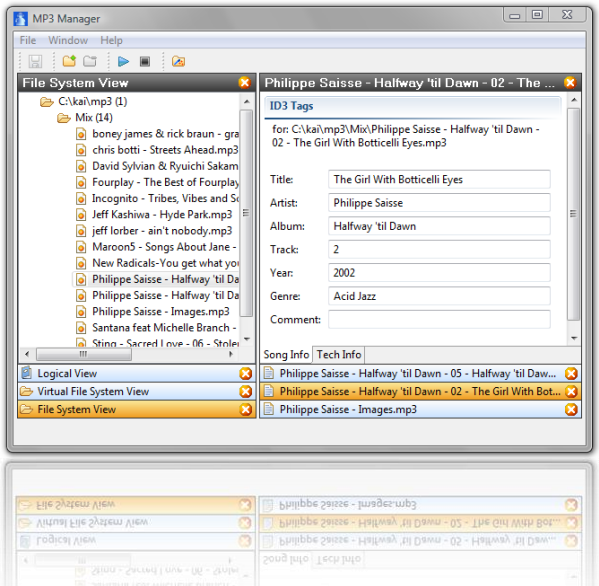
Outline

- Demo: MP3 Manager
- A modular component architecture
- Loose coupling of views and editors
- Internationalization
- Adapter factories
- Virtual trees and tables
- Product & feature branding
- Presentation API
- p2, the new provisioning
- Headless build

MP3 Manager Project

- Open Source
- Licensed under EPL
- Project Goal
  - Provide show cases and best practices for many common use cases in RCP based applications
- Project Homepage
  - http://max-server.myftp.org/trac/mp3m
  - Anonymous svn access
  - Trac wiki and issue tracking

MP3 Manager Demo

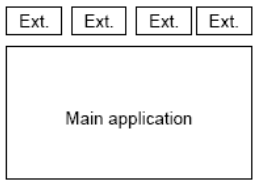


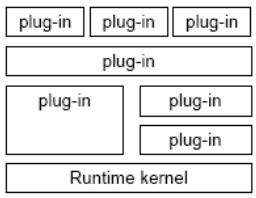
The case for extensibility

- Every complicated application has to be open for extension
  - Generally good practice
  - Better integration with other technologies
  - More business opportunities
  - Way to avoid "proprietary closed application" FUD (Fear, Uncertainty & Doubt)

Extensible vs. Extension based

- Two approaches:
  - Extensible applications
    - E.g. Photoshop, MS Office, Mozilla
    - Full size application core with extension interface
  - Extension based platforms
    - i.e. Emacs, Auto CAD, Eclipse
    - Minimalistic runtime, that includes extension mechanism
      - High level language
      - Extension points mechanism





Extension Based Platforms

- Application core acts as a container for extensions
- All functionality is implemented inside extension modules
  - In case of Eclipse those are Plug-ins (Bundles)
- Advantages
  - More open and transparent
    - Core functionality developers and those who extend applications share same programming approach
    - Easy to replace functionality

Implementing Extensions

- Two ways for Eclipse based applications:
  - Extension registry
  - OSGi Services (whiteboard pattern)
- First one is standard in case of Eclipse
- What to choose depends on actual requirements and use cases

Practical Hints / Advice

- Do not hesitate to define own application specific extension points
- Use your own extension points
  - Avoid "backdoors"
- Put some effort into documenting extension points
  - This will help contributors a lot!
- Take care of compatibility
  - Extension point definitions are contracts between you and those who extend. Respect them!

Modular Component Architecture

- OSGi => modules for the Java platform
  - Highly dynamic and flexible
  - Loose coupling of Java modules
- Modular Component Architecture, based on:
  - OSGi Bundles (= Eclipse Plug-ins)
  - Eclipse Features
    - For deployment options
    - For product lines
    - For different customer brandings
    - For different platforms

Bundle Granularity

- Open questions:
  - What should be the size of a Bundle?
  - What functionality should be provided by a Bundle?
  - When to separate functionality into different Bundles?
  - How to organize Features?

What should be the size of a Bundle?

- It depends…
- If you don't have much experience:
  - Start monolithic, then
  - Separate functionality into different Bundles
    - If it is a self-contained block
      - e.g. domain model, Help, Views, Editors
    - If it has the potential of reuse
      - e.g. Update, Views, Editors
    - If it should be updated separately
  - Separate core and UI functionality into different Bundles

How to organize Features?

- These suggestions are not always the best solution, but might help to get started:
  - Plug-ins which are providing the basic functionality of your RCP application should be grouped in their own Feature
  - Plug-ins with additional / optional functionality should be grouped into separate Features
    - E.g. create a separate Help Feature (see bug 202160, resolved in Eclipse 3.4 ☺)
  - Create different Features for different product brandings
    - Create the .product configuration in the Feature project

Benefits of Eclipse's Plug-in Philosophy

- Through its Plug-in architecture RCP lets you:
  - Decompose your code into loosely coupled units
  - Extend (and update) your product incrementally
  - Enforce contracts between groups in your organization
  - Play nicely with components from other vendors
  - Allow even customers to extend your product

MP3Manager Structure Example

- Feature: com.siemens.ct.mp3m.feature.base
  - Plug-in: com.siemens.ct.mp3m
  - Plug-in: com.siemens.ct.mp3m.model
  - Plug-in: com.siemens.ct.mp3m.ui.views.physical
  - Plug-in: com.siemens.ct.mp3m.ui.views.logical
  - Plug-in: com.siemens.ct.mp3m.ui.editors.id3.databinding
  - Plug-in: de.ueberdosis.mp3info (third party ID3 tag library)
- Feature: com.siemens.ct.mp3m.feature.branding.blue
  - Plug-in: com.siemens.ct.mp3m.branding.bue
- Feature: com.siemens.ct.mp3m.feature.player
  - Plug-in: net.javazoom.jlayer (third party MP3 player library)
  - Plug-in: com.siemens.ct.mp3m.ui.player

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Loose Coupling of Views (1)

- Let JFace viewers be SelectionProvider, so other views can deal with selections not knowing the selection origin
- Example:

```
treeViewer = new TreeViewer(parent, SWT.BORDER |
                                    SWT.V_SCROLL);
getSite().setSelectionProvider(treeViewer);
```


Loose Coupling of Views (2)

- ViewParts that should react on selections just
  - Implement ISelectionListener:

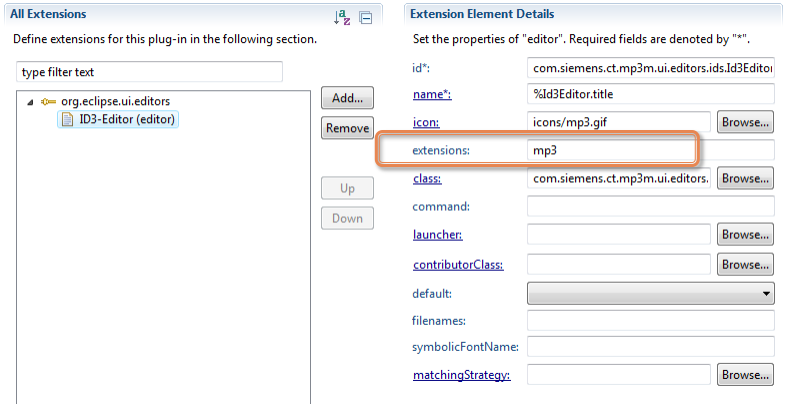
```
public void selectionChanged(IWorkbenchPart sourcePart,
                             ISelection selection) {
    // we ignore our own selections
    if (sourcePart != this) {
        // do something with the selection
    }
}
```

  - Register themselves as selection listener:

```
getSite().getWorkbenchWindow().getSelectionService().
    addSelectionListener(this);
```

Loose Coupling of Views and Editors

- If you reuse the org.eclipse.ui.editors extension point, use the "extension" attribute



Getting Editors by "extensions"

```
static public IEditorPart[] getMp3Editors() {
    IConfigurationElement[] editors = Platform.getExtensionRegistry()
        .getConfigurationElementsFor("org.eclipse.ui", "editors");
    ArrayList<IEditorPart> editorParts =
            new ArrayList<IEditorPart>();

    for (IConfigurationElement editor : editors) {
      try {
        String extensions = editor.getAttribute("extensions");
        if ("mp3".equals(extensions)) {
          IEditorPart editorPart = (IEditorPart) editor
                .createExecutableExtension("class");
          // ...
        }
      } catch (CoreException e) {
...
```


Opening Editor in View

```
class Mp3DoubleclickListener implements IDoubleClickListener {
      public void doubleClick(DoubleClickEvent event) {
         // ...
         if (path != null) {
            PathEditorInput pathEditorInput =
                  new PathEditorInput(path);
            String editorId = EditorFactory.getDefaultMp3EditorId();
            try {
               getViewSite().getWorkbenchWindow().getActivePage().
                     openEditor(pathEditorInput, editorId);
            } catch (Exception e) {
               LogUtil.logError("com.siemens.ct.mp3m.ui.views.physical",
                     "cannot open editor with id: " + editorId);
            }
         }
      }
   }
```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Internationalization

- Language specific strings
- Layout of data, like numbers, dates, etc.
- Colors
- Symbols, pictures, icons

- We focus on language specific strings and images

RCP Internationalization

- Strings in application code
- Strings in plug-in XML contributions
- Strings/images in feature brandings
- Strings/images in product brandings

Strings in Application Code

- Eclipse provides two mechanisms for string externalization:
  - Standard Java ResourceBundles
  - Eclipse way
    - Only present in the wizard if the project build path contains the **org.eclipse.osgi.util.NLS** class
    - Usually available in all plug-ins that have a dependency to org.eclipse.core.runtime

Example Java Source

```
package com.siemens.ct.test.internationalization;

public class Test {
   public Test() {
      String color = "Color";
      String help = "Help";
   }
}
```


Messages.java Standard Way

```
public class Messages {
    private static final String BUNDLE_NAME =
        "test.internationalization.messages"; //$NON-NLS-1$

    private static final ResourceBundle RESOURCE_BUNDLE =
        ResourceBundle.getBundle(BUNDLE_NAME);

    private Messages() {}

    public static String getString(String key) {
        try {
            return RESOURCE_BUNDLE.getString(key);
        } catch (MissingResourceException e) {
            return '!' + key + '!';
        }
    }
}
```


Messages.java Eclipse Way

```
import org.eclipse.osgi.util.NLS;

public class Messages extends NLS {
    private static final String BUNDLE_NAME =
        "test.internationalization.messages"; //$NON-NLS-1$
    public static String Test_color;
    public static String Test_help;
    static {
        // initialize resource bundle
        NLS.initializeMessages(BUNDLE_NAME, Messages.class);
    }

    private Messages() {
    }
}
```


After String Externalization

- Standard way:

```
public class Test {
    public Test() {
        String color = Messages.getString("Test.color"); //$NON-NLS-1$
        String help = Messages.getString("Test.help"); //$NON-NLS-1$
    }
}
```

- Eclipse way:

```
public class Test {
    public Test() {
        String color = Messages.Test_color;
        String help = Messages.Test_help;
    }
}
```


Messages.properties

- Standard way:

```
Test.color=Color
Test.help=Help
```

- Eclipse way:

```
Test_color=Color
Test_help=Help
```


Benefits of Eclipse Way

- Faster access and initialization
- Better memory footprint
- Easy detection of
  - Missing or unused keys
  - Typos in keys
- Drawback
  - There are now 2 files to maintain and to keep in sync (messages.properties and the Java file)
- More info at
  http://help.eclipse.org/help31/index.jsp?topic=/org.eclipse.jdt.doc.user/reference/ref-wizard-externalize-strings.htm

Strings in XML contributions

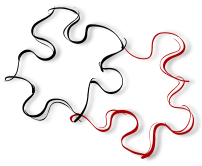
- In plugin.xml
  - Use localized strings for every attribute that is presented to the end user
  - Use the notion "%key" as attribute value
    - E.g. name="%FileSystemView.title"
- Provide plugin_<locale>.properties for every locale you want to support
  - E.g. plugin_de.properties
- Use the keys and provide translations
  - E.g. FileSystemView.title=Datei-System View

Localized Product/Feature Branding

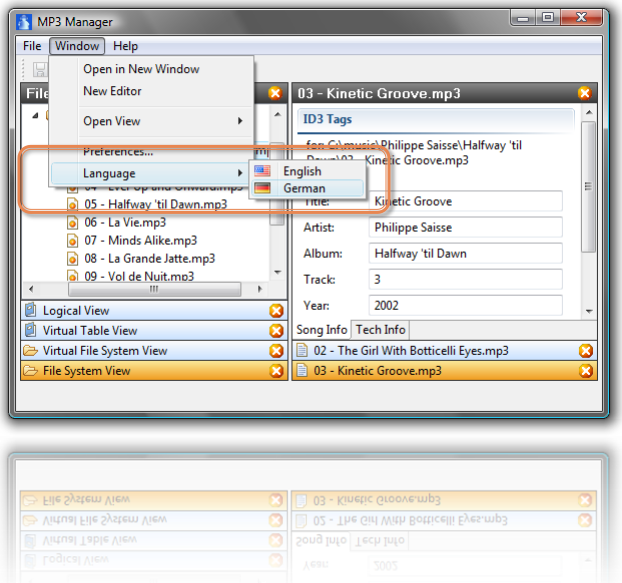
- … will be covered later in the Branding part

Fragments for I18N

- You could use a plug-in fragment to separate all localization files from the "English" plug-in
- At runtime, all the files will be merged with the host plug-in



Dynamic Languague Change



Implement dynamic Lang. Change

- Restart the workbench via PlatformUI.getWorkbench().restart()
  - No API to specify parameters*, some issues with EXIT.RELAUNCH and "eclipse.exitdata" property
- Workaround:
  - Modify <product>.ini file: Add/modify two lines:
    - -nl
    - <locale>, e.g. de
  - Benefit: Makes the language change persistent
  - Drawback: Does not work with IDE launcher

*See Bug 222023

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Adapters

What is an Adapter?

- In object-oriented software systems, an adapter simply adapts (converts) an object of type A to another object of relevant type B
- Eclipse provides the interface `IAdaptable` to address the adaption of an object:

```
public interface IAdaptable {
   public Object getAdapter(Class adapter);
}
```

- Since model objects should not depend on Eclipse, `Adapter-Factories` can adapt all objects. They don' have to implement `IAdaptable`...
- How does this work?

Label & ContentProviders

- Every JFace viewer relies on
  - A LabelProvider
  - A ContentProvider
- Example: Tree
  - A class implementing ITreeContentProvider
  - A class extending LabelProvider

ITreeContentProvider Example

```
private final Object[] EMPTY = new Object[] {};

public Object[] getChildren(Object parent) {
   if (parent instanceof Artist) {
        return ((Artist) parent).getAlbums().toArray();
   } else if (parent instanceof Album) {
        return ((Album) parent).getSongs().toArray();
   }

   // Songs have no children
   return EMPTY;
}
```

A ContentProvider has to deal with all kinds of domain objects that built up the tree structure

AdapterFactory

- An AdapterFactory can be registered with the platform
- The factory provides adapters for a given base class
  - This base class does NOT have to implement IAdaptable
- Often, domain specific classes could be handled by IWorkBenchAdapters
- IWorkbenchAdapter is a combination of Label & ContentProvider

AdapterFactory in TreeViewer

```
treeViewer = new TreeViewer(parent, SWT.BORDER |
  SWT.MULTI | SWT.V_SCROLL);

IAdapterFactory adapterFactory = new AdapterFactory();
Platform.getAdapterManager().registerAdapters(
  adapterFactory, Mp3File.class);

treeViewer.setLabelProvider(
  new WorkbenchLabelProvider());

treeViewer.setContentProvider(
  new BaseWorkbenchContentProvider());
```


IWorkbenchAdapter Example

```
private IWorkbenchAdapter entryAdapter = new IWorkbenchAdapter() {
    public Object getParent(Object o) {
        return ((Mp3File) o).getDirectory();
    }
    public String getLabel(Object o) {
        Mp3File entry = ((Mp3File) o);
        return entry.getName();
    }
    public ImageDescriptor getImageDescriptor(Object object) {
        return AbstractUIPlugin.imageDescriptorFromPlugin(ID,
                                                IImageKeys.MP3);
    }
    public Object[] getChildren(Object o) {
        return new Object[0];
    }
};
```


Getting the Adapters

```
public Object getAdapter(Object adaptableObject, Class adapterType) {
      if (adapterType == IWorkbenchAdapter.class
         && adaptableObject instanceof Mp3Directory)
            return directoryAdapter;
      if (adapterType == IWorkbenchAdapter.class
        && adaptableObject instanceof Mp3File)
            return entryAdapter;
      if (adapterType == IPropertySource.class
        && adaptableObject instanceof Mp3File)
            return new Mp3PropertySource((Mp3File)adaptableObject);
      return null;
}

public Class[] getAdapterList() {
      return new Class[] { IWorkbenchAdapter.class, IPropertySource.class
   };
}
```


Benefits

- Loose coupling of domain objects with UI related objects
- No need to explicitly write ContentProviders and LabelProviders
- Reuse of
  - WorkbenchLabelProvider
  - BaseWorkbenchContentProvider
- AdapterFactory might provide several different adapters like IWorkbenchAdapter or IPropertySource

Lab Tasks

- Create a new project `com.siemens.ct.mp3m.mytreeview`
- Reuse the tree model from the project `com.siemens.ct.mp3m.model`
- Implement a `Mp3AdapterFactory` with adapters for all tree model elements
- Create a JFace TreeViewer and test both the `AdapterFactory` approach vs. the standard `Label-` and `ContentProvider` mechanism

Optional Tasks

- Create a `IPropertySource` implementation for Mp3File
  - Hint: Take a look at `Mp3PropertySource`
- Add an adapter for `IPropertySource` and `Mp3File` to your `Mp3AdapterFactory`
- Add the standard Properties View to the contacts manager application
  - Hint: Add the project `org.eclipse.ui.views` to your mp3m.product launch configuration

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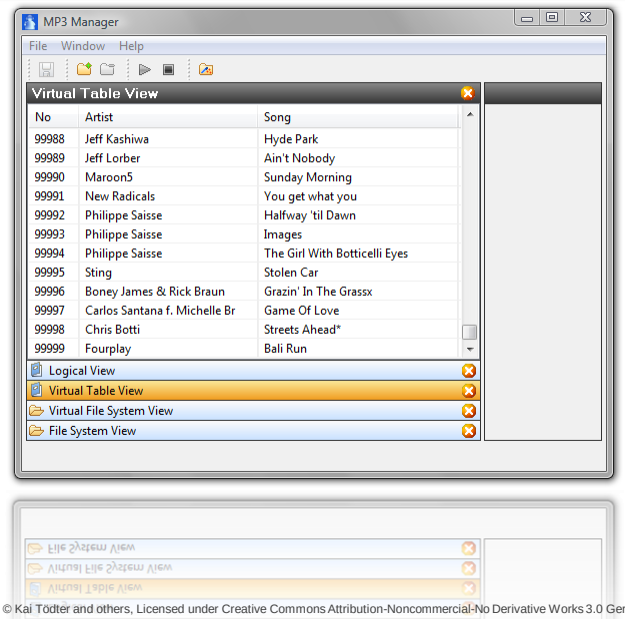
Virtual Trees and Tables (1)

- Challenges in many applications:
  - Huge amount of domain specific data has to be displayed in a tree or table
  - Data for the whole tree or table needs either too much memory or takes too much time to create upfront (or even both)

Virtual Trees and Tables (2)

- Solution:
  - Create model data and tree/table items only when they are really needed (e.g. displayed)
  - Keep only the part of the data in memory that is currently displayed
  - Free model data und tree/table items if they are no longer displayed

A Virtual Table



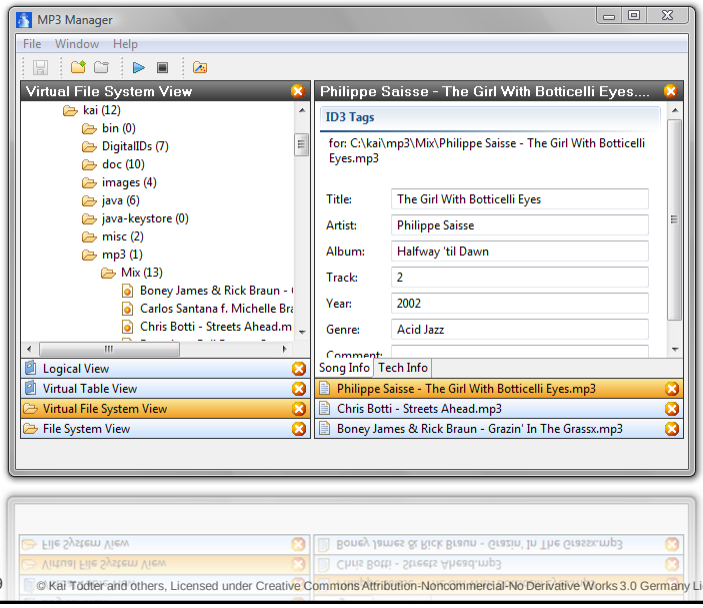
Virtual TableViewer

```
public void createPartControl(Composite parent) {
   TableViewer tableViewer =
      new TableViewer(parent, SWT.VIRTUAL | SWT.BORDER |
                              SWT.V_SCROLL);
   Table table = tableViewer.getTable();
   // ...
   TableColumn column = new TableColumn(table, SWT.NONE, 0);
   column.setText("No");
   column.setWidth(50);

   tableViewer.setItemCount(100000);
   tableViewer.setContentProvider(new LazyContentProvider());
   tableViewer.setLabelProvider(new TableLabelProvider());

   tableViewer.setUseHashlookup(true);
   tableViewer.setInput(null);
}
```


LazyContentProvider

```
class LazyContentProvider implements ILazyContentProvider {
   public void inputChanged(Viewer viewer, Object oldInput,
                            Object newInput) {
      this.viewer = (TableViewer) viewer;
      this.viewer.getTable().addListener(SWT.SetData, new Listener() {
         public void handleEvent(Event event) {
            TableItem item = (TableItem) event.item;
            // compute top and bottom index and clear portions
            // of the table to clean up memory
         }
      }
   }
   public void updateElement(int index) {
      // get mp3Info from domain model
      viewer.replace(new Song(index, mp3Info), index);
   }
}
```

Virtual Trees



Virtual TreeViewer Initialization

```
public void createPartControl(Composite parent) {

    treeViewer = new TreeViewer(parent, SWT.VIRTUAL);

    treeViewer.setLabelProvider(new WorkbenchLabelProvider());
    treeViewer.setContentProvider(
          new TreeContentProvider(treeViewer));
    treeViewer.setUseHashlookup(true);

    Mp3Directory root = new Mp3Directory("root");
    // Some initializations...

    treeViewer.setInput(root);
    treeViewer.setChildCount(root, roots.length);
}
```


ILazyContentProvider

```
class TreeContentProvider implements ILazyTreeContentProvider {

   public void updateElement(Object parent, int index) {
      Mp3Directory parentDir = (Mp3Directory) parent;
      Mp3File mp3File = parentDir.getMp3Files()[index];

      if (mp3File instanceof Mp3Directory) {
         PrefetchModelJob job = new PrefetchModelJob(
               "Update Model", parentDir, index,
               (Mp3Directory) mp3File);
          job.schedule();
      }
      treeViewer.replace(parent, index, mp3File);
      treeViewer.setChildCount(mp3File, 0);
   }
}
```


Lab Tasks

- Create a virtual table to display a huge list of mp3 files
  - Hint: replicate the existing mp3s in the table
- Implement a Content Provider that implements ILazyContent-Provider
- Implement the updateElement() method properly

Optional Tasks

- Implement the handleEvent() method in your LazyContent-Provider to clean up table elements that are no longer needed
  - Hint: Take a look at the class VirtualTableView in project com.siemens.ct.mp3m.ui.views.logical.

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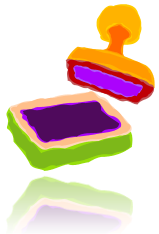
What is Product Branding?

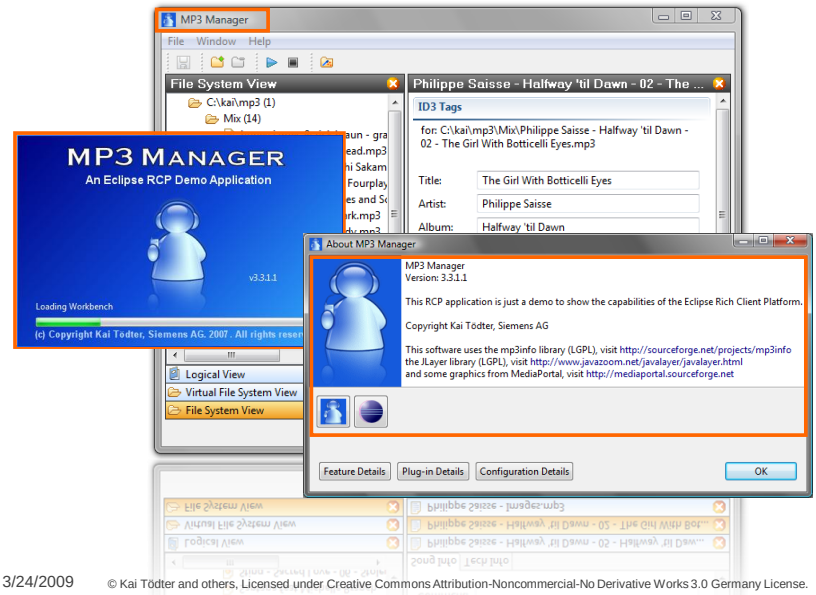
- Product branding gives your application a specific high-level visual appearance
- Can be used for
  - Vendor-specific appearance
  - Product families
  - Various different editions of the same software basis



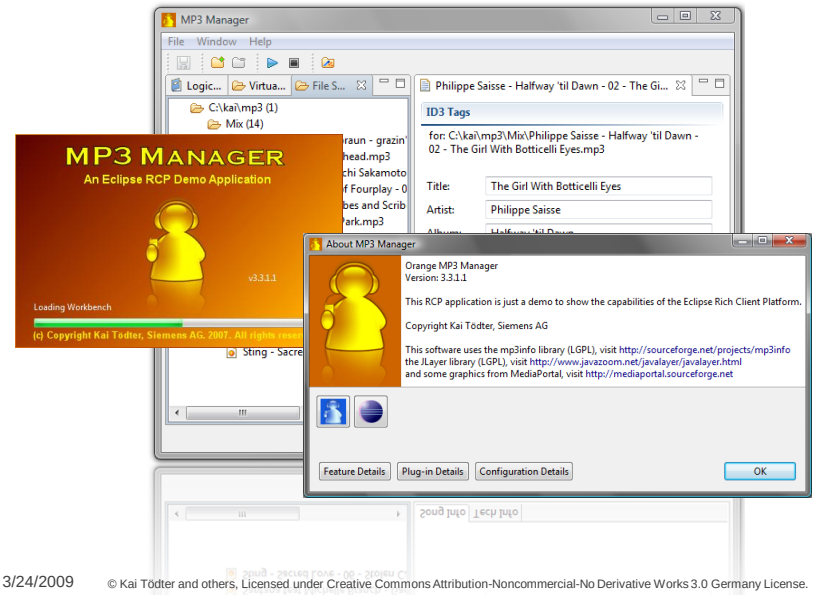
What can be branded in RCP apps?

- Launcher's icon
- Splash screen with progress bar
- Title bar text
- The image the operating system associates with the product
- About dialog image
- About dialog text
- UI presentation style (see Presentation part)

Example Blue Branding

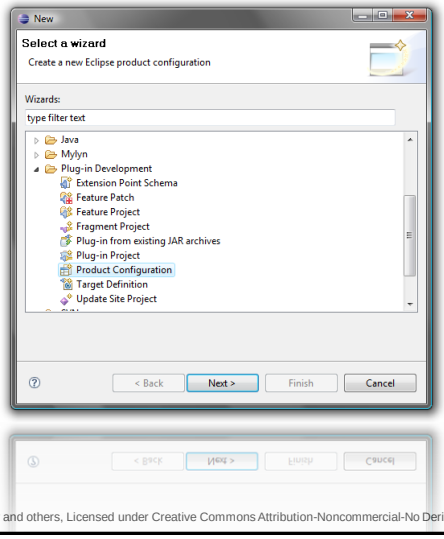


Example Orange Branding



How to create a Branding?

- Create a new product configuration



Separate Branding Plug-ins

- You can create separate branding plug-ins
  - Including product configuration
  - Including all branding resources and information

Blue Branding

- com.siemens.ct.mp3m.branding.blue
  - JRE System Library [jdk1.6.0_04]
  - Plug-in Dependencies
  - META-INF
  - about.ini
  - about.properties
  - build.properties
  - icon16x16.gif
  - icon32x32.gif
  - mp3m.ico
  - plugin_customization.ini
  - plugin.properties
  - plugin.xml
  - product_lg.gif
  - splash.bmp

Orange Branding

- com.siemens.ct.mp3m.branding.orange
  - JRE System Library [jdk1.6.0_04]
  - META-INF
  - build.properties
  - icon16x16.gif
  - icon32x32.gif
  - mp3m.ico
  - plugin_customization.ini
  - plugin.properties
  - plugin.xml
  - product_lg.gif
  - splash.bmp

Product Branding & Features (1)

Approach 1:

1. Create a feature for each branding
2. Include all plug-ins, that define your product in that feature
3. Place the product configuration in that feature
4. In the product configuration include only the branding feature!

Product Branding & Features (2)

Approach 2:

1. Create a base feature with your application base plug-ins
2. Create a separate feature that contains only the specific branding plug-in
3. Include the application feature in your branding feature
   - Use the "Included Features" tab in the feature.xml editor
4. In the product configuration include only the branding feature!

Internationalized Brandings

- Useful for internationalize product versions
  - Splash screen, images and "about text"
- Can easily be implemented using plug-in fragments

Localize Splash Screens (1)

- Create a file structure in your localized branding plug-in:
  - nl/<locale>/splash.bmp
- When deploying, use a customized config.ini file, and modify:
  - osgi.splashPath= platform:/base/plugins/<original branding plug-in> , platform:/base/plugins/<localized branding plug-in>
  - Then both plug-ins are in the splash screen search path at startup

Using a custom Splash Handler

- Since Eclipse 3.3 there is a new extension point org.eclipse.ui.splashHandlers
  - Available templates
    - A simulated log-in session
    - An embedded HTML browser
    - A dynamic set of image contributions
- Create a SplashHandler Java class
  - Extend BasicSplashHandler
  - Take a Look at org.eclipse.ui.internal.splash.EclipseSplashHandler

Custom SplashHandler Example

Internationalized Feature Branding

- Every feature can refer to a branding plug-in
  - The feature's branding data are in the files about.ini and about.properties
- For internationalized feature brandings create plug-in fragments of the branding plug-in
  - Provide the directory structure nl/<locale>
    - E.g. nl/de
  - Provide both about.ini and about.properties for each locale

Example: English Plug-in

- about.ini:

```
aboutText=%blurb
featureImage=icon32x32.gif
```

- about.properties:

```
blurb=MP3 Manager (English)\n\
\n\
Version: {featureVersion} \n\
\n\
(c) Copyright Siemens AG 2008.  All rights reserved.
```


Example: German Fragment

- nl/de/about.ini:

  aboutText=%blurb

  featureImage=icon32x32_de.gif

- nl/de/about.properties:

  blurb=MP3 Manager (Deutsch)\n\

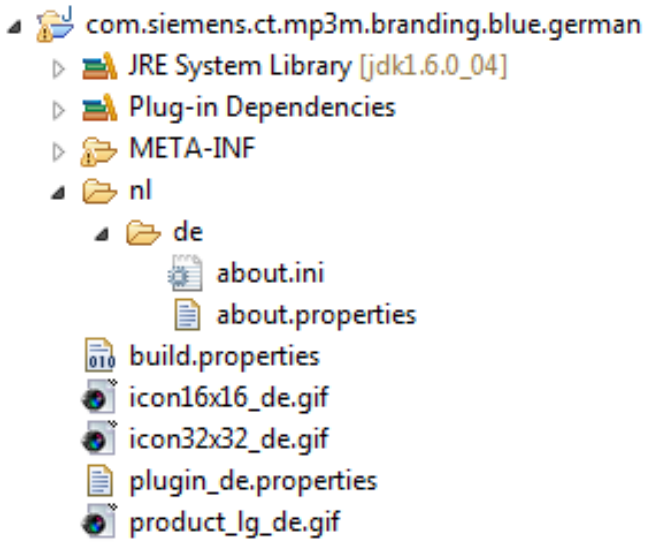
  \n\

  Version: {featureVersion}\n\

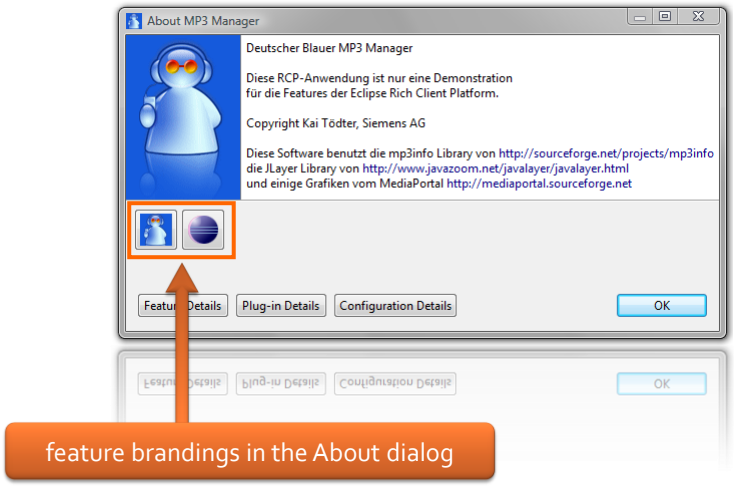
  \n\

  (c) Copyright Siemens AG 2008. Alle Rechte vorbehalten.

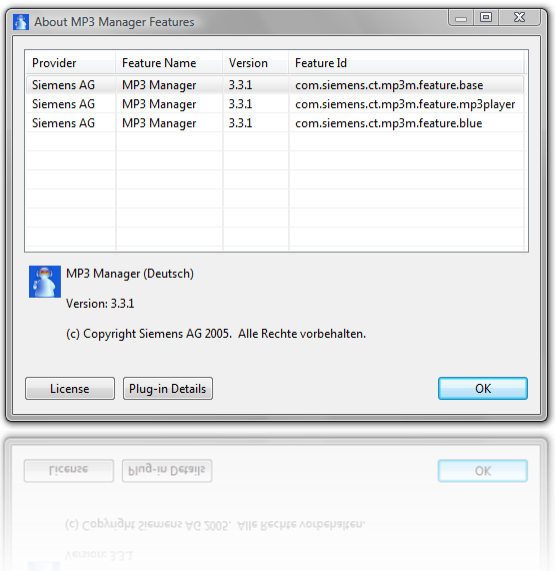
Branding Fragment Structure



German About Dialog



German Feature Branding



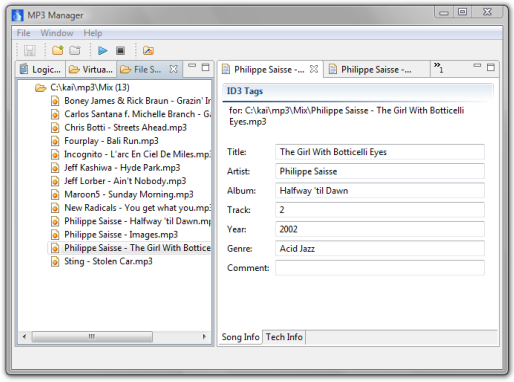
Lab Task

- Launch the MP3 manager with
  - Blue branding
  - Orange branding
  - Blue branding in German

Outline

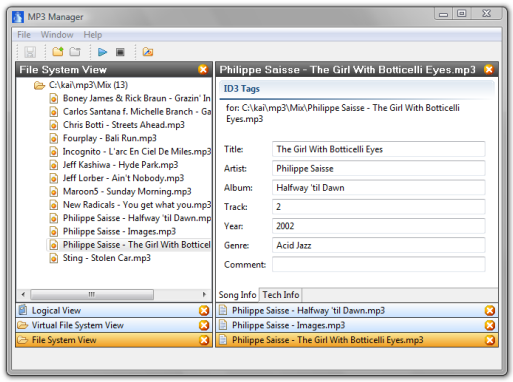
- Demo: MP3 Manager
- A modular component architecture
- Loose coupling of views and editors
- Internationalization
- Adapter factories
- Virtual trees and tables
- Product & feature branding
- Presentation API
- p2, the new provisioning
- Headless build

MP3Manager Sample Application



- Looks great ☺
- But: Looks a bit like the Eclipse IDE

MP3Manager Custom Presentation



- Looks differently compared to the Eclipse IDE
- Customized for better application usability

What is a Presentation?

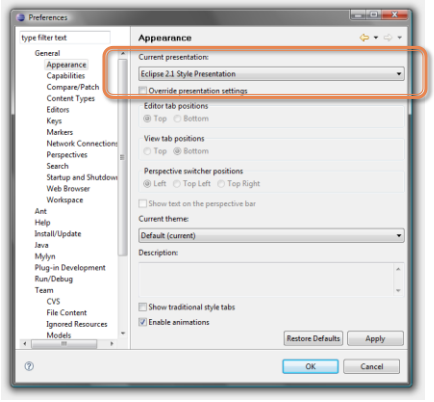
- Usually RCP apps contain views and editors
- These views and editors are called parts
- The presentation customizes the layout and Look&Feel of areas containing one or more parts
  - Drawback: Not the whole application's look & feel can be customized with the Presentations API
  - No Look & Feel skinning like in Swing
  - Presentation can provide custom widgets and behavior

Presentation responsibilities

- Control layout and visibility of
  - Parts
  - Menus & Toolbars
  - Drag&Drop regions
- Create the Look & Feel for part stacks
  - Tabs
  - Title
  - Buttons (Close, Maximize, Minimize)
  - Borders

Presentation Activation (Eclipse IDE)

- Go to "General/Appearance" in the Preferences
- Choose a presentation (e.g. "2.1 Style")
- Restart Eclipse

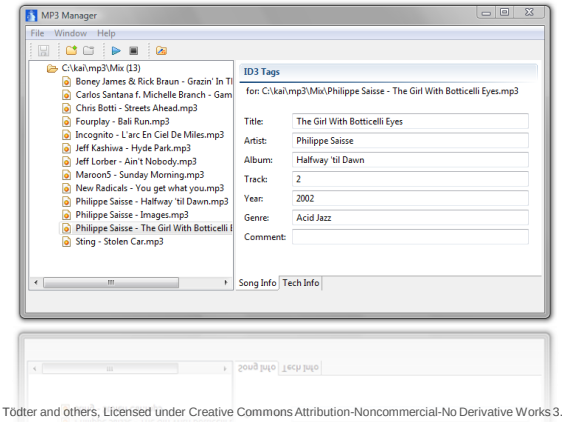


Activation with Preference

- Create .ini file with content:
  org.eclipse.ui/presentationFactoryId=<ID>
- ID is the presentation id, e.g.:
  org.eclipse.ui.internal.r21presentationFactory
- Specify program arguments:
  -plugincustomization <presentation.ini file>
- Or create default .ini file:
  plugin_customization.ini
  - Advantage: Will be detected by the launcher automatically

A Minimal Presentation

- A presentation that only displays a part
  - No Borders, Tabs, Menus
  - Only the top part of the stack is shown



Creating a "Minimal Presentation"

- Create a presentation factory
- Extend org.eclipse.ui.presentationFactories
- Provide class, id and name of your presentation

```
<extension
   point= "org.eclipse.ui.presentationFactories" >
    <factory
        class="presentation.MinimalPresentationFactory"
        id="presentation.MinimalPresentationFactory"
        name="Minimal Presentation"/>
</extension>
```


AbstractPresentationFactory

```
public abstract class AbstractPresentationFactory {

   public abstract StackPresentation createEditorPresentation(
         Composite parent, IStackPresentationSite site);

   public abstract StackPresentation createViewPresentation(
         Composite parent, IStackPresentationSite site);

   public abstract StackPresentation createStandaloneViewPresentation(
         Composite parent, IStackPresentationSite site,
         boolean showTitle);

    // ...
}
```


MinimalPresentationFactory

```
public class MinimalPresentationFactory
                              extends AbstractPresentationFactory {

   public StackPresentation createEditorPresentation(
         Composite parent,  IStackPresentationSite site) {
      return new MinimalPresentation(parent, site);
   }
   public StackPresentation createViewPresentation(
         Composite parent, IStackPresentationSite site) {
      return new MinimalPresentation(parent, site);
   }
   public StackPresentation createStandaloneViewPresentation(
         Composite parent, IStackPresentationSite site,
         boolean showTitle) {
      return new MinimalPresentation(parent, site);
   }
}
```

Widget Issues

- Widget hierarchy
  - The parts are not children of the presentation!
  - Parts and part toolbars are parented by the workbench
  - ➔Allows moving parts between stacks
- A presentation should not use the part's control
  - It should use instead: IPresentablePart.setBounds() and IPresentablePart.setVisible()

Presentation Examples

- For details, checkout:
  - Eclipse CVS repository
  - Host: dev.eclipse.org
  - CVS-Root: /cvsroot/eclipse
  - Server: pserver
  - Project: org.eclipse.ui.examples.presentation
  - User: anonymous
  - eclipsecon2005-presentationsAPI.ppt slides are included ☺

Creating a real Presentation

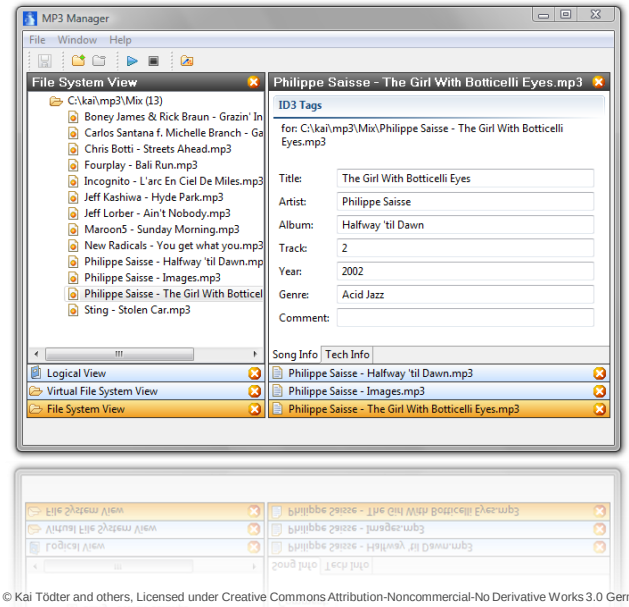
- Useful for:
  - Corporate design or Look&Feel
  - Product branding & product families
  - Application usability
- Think of
  - Drawing borders, visible focus
  - Buttons (Close, Minimize, Maximize)
  - Tab Look & Feel
  - Menus (System, View and Part)

MP3 Manager Presentation (1)

Design Goals:

- Title area with no icons, but gradient fill
- Image-based close button for closable parts
- Button-like tabs, with whole part width
  - Different gradient fills for selections
  - Roll-over effect
  - Better usability for MP3 Manager application
  - Since we have a title area, tabs should only be visible if there's more than one tab

MP3 Manager Presentation Demo



Lab Task

- Start the MP3 Manager with
  - Default presentation
    - Hint: presentation id = org.eclipse.ui.presentations.default
  - MP3M presentation
  - Eclipse 3.0 presentation
    - Hint: presentation id = org.eclipse.ui.presentations.r30

Outline

- Demo: MP3 Manager
- A modular component architecture
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- Adapter factories
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- Presentation API
- p2, the new provisioning
- Headless build

New Eclipse Provisioning: p2

- P2 is the new Eclipse provisioning system
- Introduced with version 3.4
- Replaced the old update manager
- Fixes many of the update manager's flaws
- Has many new features (see next slides)

P2 Features (1)

- Cleaner end-user workflows
- Faster downloads through multi-threadding
- Installers can be run as a regular Java application or using Java Web Start
- Can manage complete installation (.exe, .ini, etc.)
- Can manage and update an Eclipse/RCP instance without running it

P2 Features (2)

- Automatically picks the best available mirror
- Automatic retry of downloads
- Sharing of plug-ins across multiple eclipse instances (bundle pooling)
- Easy creation of headless and custom update user interfaces
- Validates plug-in inter-dependencies

P2 and RCP

- Common Use Cases:
  - Install an RCP application from a p2 repository
  - An RCP application uses p2 metadata and artifact repositories to update itself

RCP p2 Self-Update

Recipe for p2-enabling the mail demo:

1. Create the mail demo (project p2-maildemo)
2. Create a product configuration p2-maildemo.product
3. Add 3 plug-ins to both launcher and product configuration (and added required plug-ins)
   - org.eclipse.equinox.p2.exemplarysetup
   - org.eclipse.equinox.p2.ui.sdk
   - org.eclipse.equinox.simpleconfigurator.manipulator

RCP P2 Self-Update (2)

5. To get the final update work in the installed product, it is also necessary to include the following 3 plug-ins with dependencies in the product configuration:
   - org.eclipse.ecf.provider.filetransfer
   - org.eclipse.equinox.p2.touchpoint.eclipse
   - org.eclipse.equinox.p2.touchpoint.natives
6. Export the product and the metadata/artifact repositories to c:/java/RCP/p2-maildemo

RCP P2 Self-Update (3)

7. Use the director app to install the mail demo from the repository, with the following Program arguments:

```
-application org.eclipse.equinox.p2.director.app.application
-metadataRepository file:c:/java/RCP/p2-maildemo/repository
-artifactRepository file:c:/java/RCP/p2-maildemo/repository
-installIU p2_maildemo.product
-version 1.0.0
-destination c:/java/RCP/p2-maildemo/install
-profile MaildemoProfile
-bundlepool c:/java/RCP/p2-maildemo/install
-profileProperties org.eclipse.update.install.features=true
-p2.os win32
-p2.ws win32
-p2.arch x86
-roaming
-consoleLog
```

   VM arguments:

```
-Declipse.p2.data.area=c:/java/RCP/p2-maildemo/install/p2
```

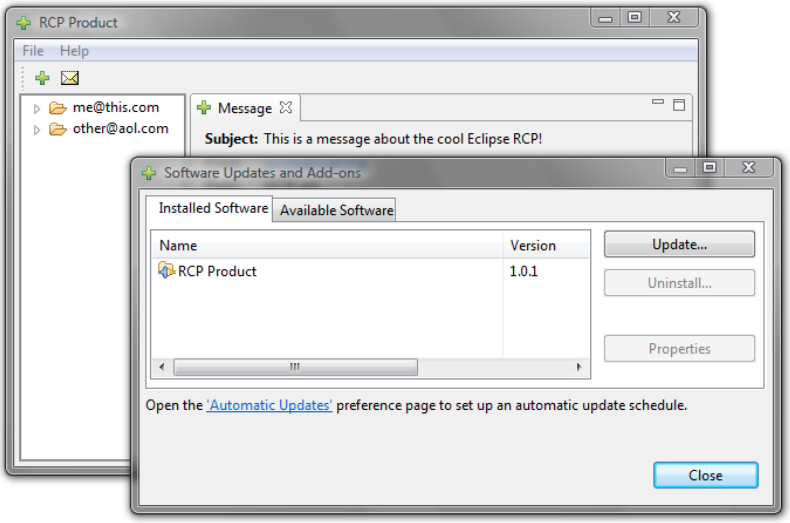

RCP P2 Self-Update (4)

8. Start the installed mail demo in c:/java/RCP/p2-maildemo/install
9. Select Help/Software Updates…:
   Shows the P2 UI with installed product in version 1.0.0
10. Now you want to create a new version 1.0.1 of the product and update the installed version 1.0.0:
11. Update main mail demo plug-in to version 1.0.1
12. Update product version to 1.0.1
13. Export the new product version 1.0.1 in the SAME location, to update the metadata/artifact repositories

RCP P2 Self-Update (4)

14. But, the installed app 1.0.0 does not find any updates… So, add the repository c:/java/RCP/p2-maildemo/repository manually as a new site => the new version 1.0.1 is displayed and ready for update.
15. When you want to install the update, the P2 dialog tells you correctly: "RCP Product is already installed, so an update will be performed instead."
16. And now, when you click finish, the new version will be installed properly!!!

P2 Mail Demo



Further Information

- P2 Eclipse Wiki: http://wiki.eclipse.org/Equinox_p2
- Equinox/p2/Adding Self-Update to an RCP Application: http://wiki.eclipse.org/Equinox/p2/Adding_Self-Update_to_an_RCP_Application
- Kai Tödter's blog about p2-enabling of an RCP application: http://toedter.com/blog/?p=27

Lab Task

- Take a look at the mp3m.product in the project com.siemens.ct.mp3m.feature.blue regarding the dependencies
- Deploy the product and create p2 repositories
- Install the MP3 Manager product using the director application
  - Hint: Use the preconfigured launcher "MP3 Manager Director"
- Add a local p2 repository for update

Optional Lab Task

- Implement new functionality
  - Update bundle version
  - Update feature version
  - Update product version
- Re-deploy the product to the same location
- Update your previously installed MP3 Manager

Outline

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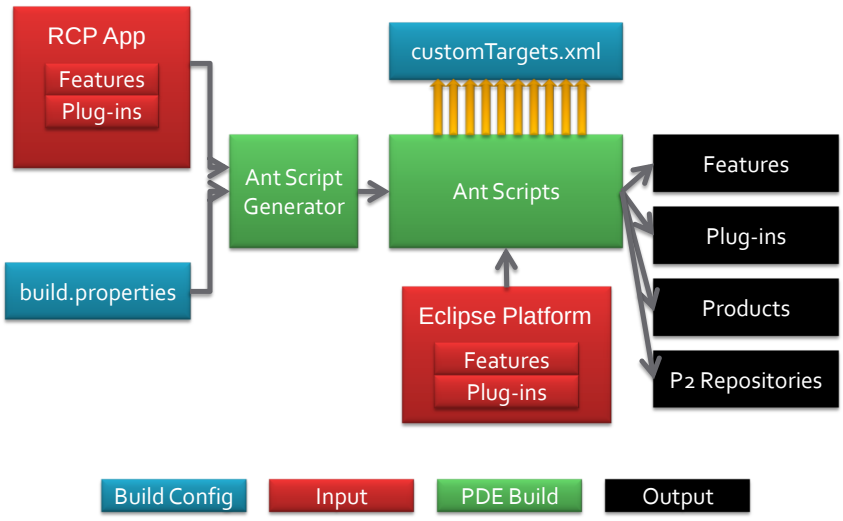
Headless RCP build

- PDE build provides the infrastructure for a headless RCP build
- Many templates and scripts of PDE build can be re-used for your own headless RCP build
- Unfortunately, setting up an headless RCP build is not trivial

PDE Build



build.properties

- The build.properties file specifies common properties needed for the build:
  - **product**: the location of the product configuration file
  - **baseLocation**: the location of an eclipse install containing all the pre-built features and plug-ins that the product requires in features/ and plugins/ subdirectories. The RCP delta pack is mandatory!
  - **buildDirectory**: directory the build will take place in
  - **configs**: list the configurations for which you want your product to be built
  - **archivePrefix**: the name of the directory of your product once installed on disk

customTargets.xml

- The custom targets are hooks that are invoked during the build by the main script.
- Examples are:
  - clean
  - prefetch, postfetch
  - preGenerate, postGenerate
  - preProcess, postProcess
  - preAssemble, postAssemble
  - prePackage, postPackage
  - test

PDE Build for a RCP Product

- Create a new plug-in <namespace>.build for the build configuration files
- Copy the files build.properties and customTargets.xml from plugins/org.eclipse.pde.build\<version>/templates/headless-build/ into build/
- Edit build/build.properties.
  - product
  - archivePrefix
  - buildDirectory
  - baseLocation
  - baseos, basews and basearch

Running the Build (1)

- Precondition for the build: If plug-ins are not fetched from CVS/Subversion, source plug-ins and features must be located in the following structure.

```
buildDirectory/
  features/
    feature-1/
    feature-2/
    ...
  plugins/
    plugin-1/
    plugin-2/
    ...
```


Running the Build (2)

- To run the build, execute

```
java -jar <eclipse>/plugins/\
    org.eclipse.equinox.launcher_<version>.jar

-application org.eclipse.ant.core.antRunner

-buildfile <eclipse>/plugins/org.eclipse.pde.build_\
    <version>/scripts/productBuild/productBuild.xml
```

Enabling p2 (1)

- Add the following properties to the build.properties:

  generate.p2.metadata = true
  p2.metadata.repo=file:${buildDirectory}/repo
  p2.artifact.repo=file:${buildDirectory}/repo
  p2.flavor=tooling
  p2.publish.artifacts=true
  mp3mVersion=3.4.1

Enabling p2 (2)

- Edit/Add the following targets to the customTargets.xml:
  - postBuild
  - runDirector

postBuild

```
<target name="postBuild">
    <antcall target="gatherLogs" />
    <property file="${buildDirectory}/product.version"/>
    <mkdir dir="${buildDirectory}/result/tmp" />
    <antcall target="run.director">
      <param name="p2.director.install.path"
             value="${buildDirectory}/result/tmp/eclipse"/>
      <param name="p2.os" value="win32"/>
      <param name="p2.ws" value="win32"/>
      <param name="p2.arch" value="x86"/>
      <param name="p2.IU"
             value="com.siemens.ct.mp3m.branding.blue.product" />
      <param name="p2.version" value="${mp3mVersion}"/>
    </antcall>
    <zip destfile="${buildDirectory}/result/MP3M-p2-RCP-win32-${mp3mVersion}.zip"
      basedir="${buildDirectory}/result/tmp" />
    <delete dir="${buildDirectory}/result/tmp" />
</target>
```


runDirector

```
<target name="run.director">
  <exec executable="${eclipseLocation}/eclipsec" failonerror="false" timeout="900000">
    <arg line="-application org.eclipse.equinox.p2.director.app.application" />
    <arg line="-nosplash" />
    <arg line="--launcher.suppressErrors" />
    <arg line="-consoleLog" />
    <arg line="-flavor ${p2.flavor}" />
    <arg line="-installIU ${p2.IU}" />
    <arg line="-version ${p2.version}" />
    <arg line="-p2.os ${p2.os}" />
    <arg line="-p2.ws ${p2.ws}" />
    <arg line="-p2.arch ${p2.arch}" />
    <arg line="-roaming" />
    <arg line="-profile MP3MProfile" />
    <arg line="${p2.director.extraArgs}" />
    <arg line="-metadataRepository ${p2.metadata.repo}" />
    <arg line="-artifactRepository ${p2.artifact.repo}" />
    <arg line="-destination ${p2.director.install.path}" />
    <arg line="-bundlepool ${p2.director.install.path}" />
    <arg line="-profileProperties org.eclipse.update.install.features=true" />
    <arg line="-vmargs" />
    <arg line="-Declipse.p2.data.area=${p2.director.install.path}/p2" />
  </exec>

  <!-- delete the metadata cache as well as the artifacts for unzipped bundles -->
  <delete failonerror="false" includeEmptyDirs="true"
     dir="${p2.director.install.path}/p2/org.eclipse.equinox.p2.core/cache" />
</target>
```

Lab Task

- Install the RCP delta pack to your target platform
- Create a new project com.siemens.ct.mp3m.mybuild
- Create copy the files build.properties, customtargets.xml and build.xml from com.siemens.ct.mp3m.build
- Adopt build.properties to your environment
- Run the headless build
- Unzip and run the p2-ed MP3 Manager

Further Information

- http://help.eclipse.org/help32/index.jsp?topic=/org.eclipse.pde.doc.user/guide/tasks/pde_product_build.htm
- Andrew Niefer's blog how to integrate p2 into the build of an RCP application: http://aniefer.blogspot.com/2008/06/example-headless-build-for-rcp-product.html

Discussion

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