

The Eclipse 4.x Rendering Concept: Separation of Application Model and UI Toolkit

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Who am I?

- Software Architect/Engineer at Siemens Corporate Technology
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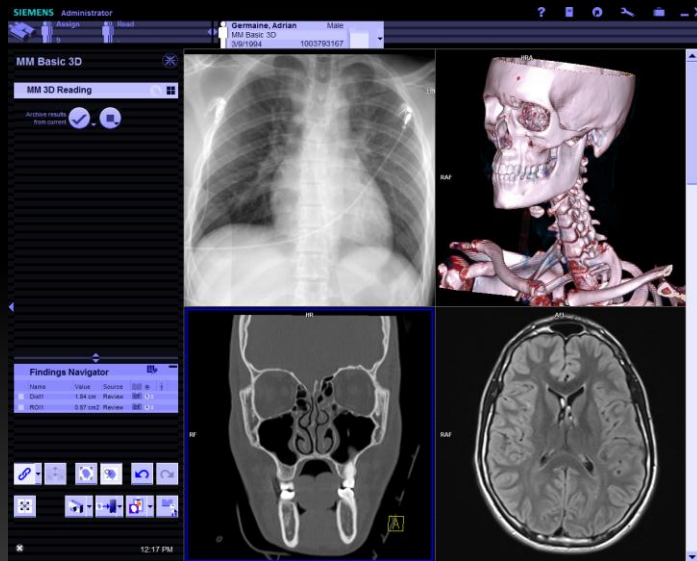
Outline

- Why is UI Design important?
- Application Model
- Rendering Engines
- Demo
- UI Styling with CSS
 - SWT
 - JavaFX

Why is UI Design important?

- Great UI Design
 - improves Usability
 - motivates Users
 - is great for Product Branding

Siemens Syngo Via

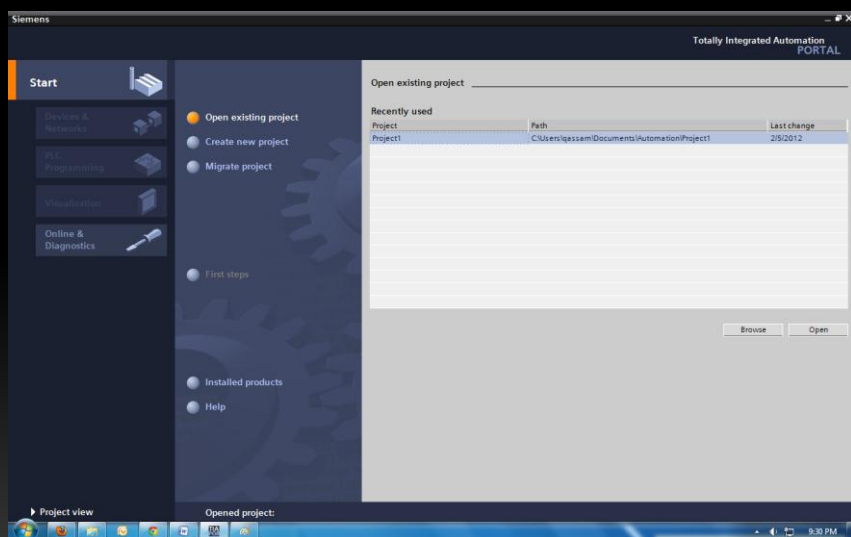


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Siemens TIA Portal Front Page



Picture from <http://www.ibudweb.com/simatic-step7-basic-10-5-sp2-download.html/tia-portal-front-page>

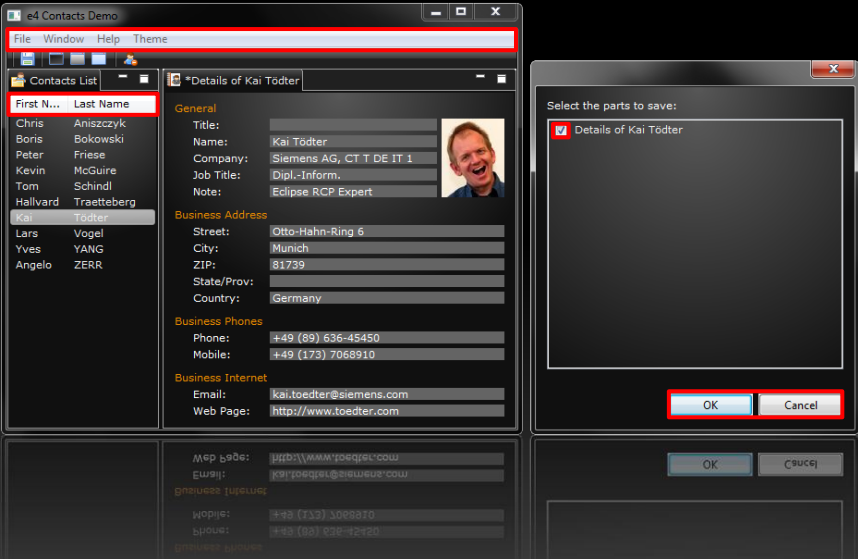
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UI Design Capabilities

UI Technology	Active Dev.?	Pixel-Perfect UI Design possible?
SWT	Yes	No (only partly)
Swing	No	Yes (Look & Feels)
JavaFX 2.x	Yes	Yes (CSS)

SWT CSS Styling Issues

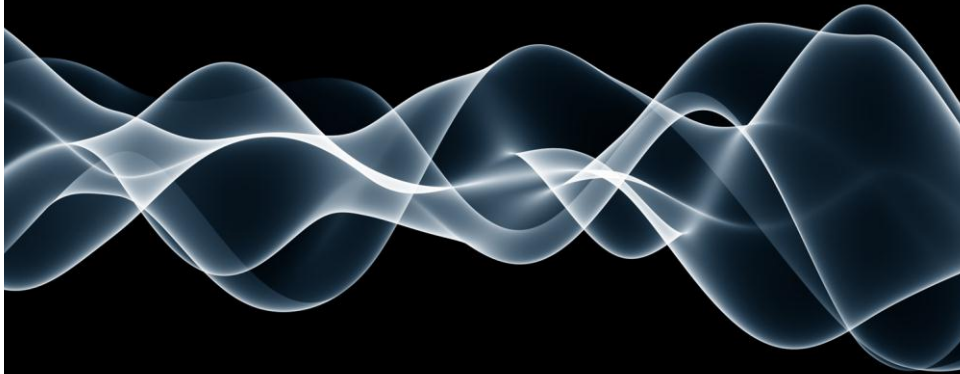




Eclipse 4 Application Model

- Uses EMF (Eclipse Modeling Framework)
- Contains graphical elements, like
 - part stacks, parts, menu bar and toolbar
- Contains non-graphical element, like
 - commands, handlers, key bindings
- Can be modified at runtime
- Can be edited using tools like the e4 WorkbenchModel Editor

Rendering



Picture from
<http://www.sxc.hu/photo/1263022>

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Multiple Renderers

One model element type (e.g. a Part Stack)
could have different renderers

Part Stack

CTabRenderer

PShelfRenderer

...

CTabRenderer

PShelfRenderer

...

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Application Model and Rendering

The Application model has no dependencies to a specific UI toolkit!

As a proof of concept, I implemented JavaFX 2.1 and Swing based rendering engines

Current SWT Rendering Workflow

- Product defines E4Application
 - o.e = org.eclipse
 - o.e.e4.ui.internal.workbench.swt.E4Application
- E4 SWT Application loads application model
- E4 SWT Application creates E4 SWT Workbench
 - o.e.e4.ui.internal.workbench.E4Workbench
- E4 SWT Workbench creates SWT Rendering Engine
- SWT Rendering Engine creates SWT Renderers

Prototype Rendering Workflow

- Product defines E4Application
 - Either SWT, JavaFX or Swing
 - All are derived from **Generic** E4 Application
- **Generic** E4 Application loads application model
- UI specific E4 Application creates UI specific Workbench
 - All specific Workbenches are derived from **Generic** Workbench and only provide Rendering Engine URI
- **Generic** Workbench creates UI specific Rendering Engine
- UI specific Rendering Engine create UI specific Renderers

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Advantages

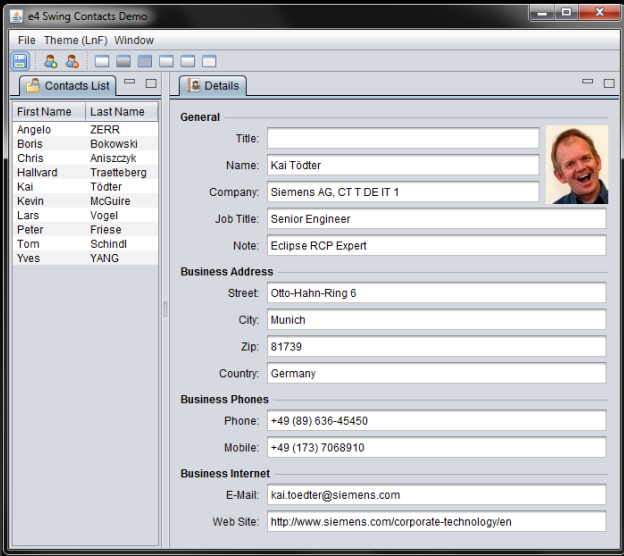
- All application model related code is shared by all UI toolkit specific implementations
- Same idea also works for Addons
- ➔ This could be the base for product-quality rendering engines based on SWT, JavaFX and Swing

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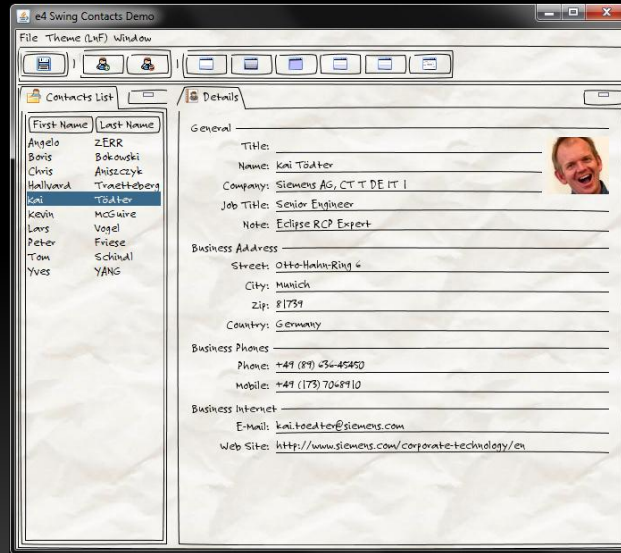
e4 Contacts Demo with JavaFX 2.1 Renderer



e4 Contacts Demo with Swing Renderer



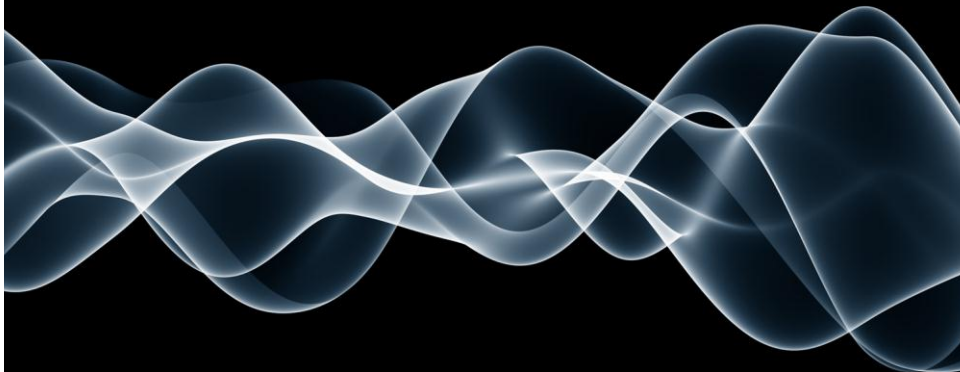
e4 Contacts Demo with Swing Renderer (2)



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Rendering Engines Demo



Picture from
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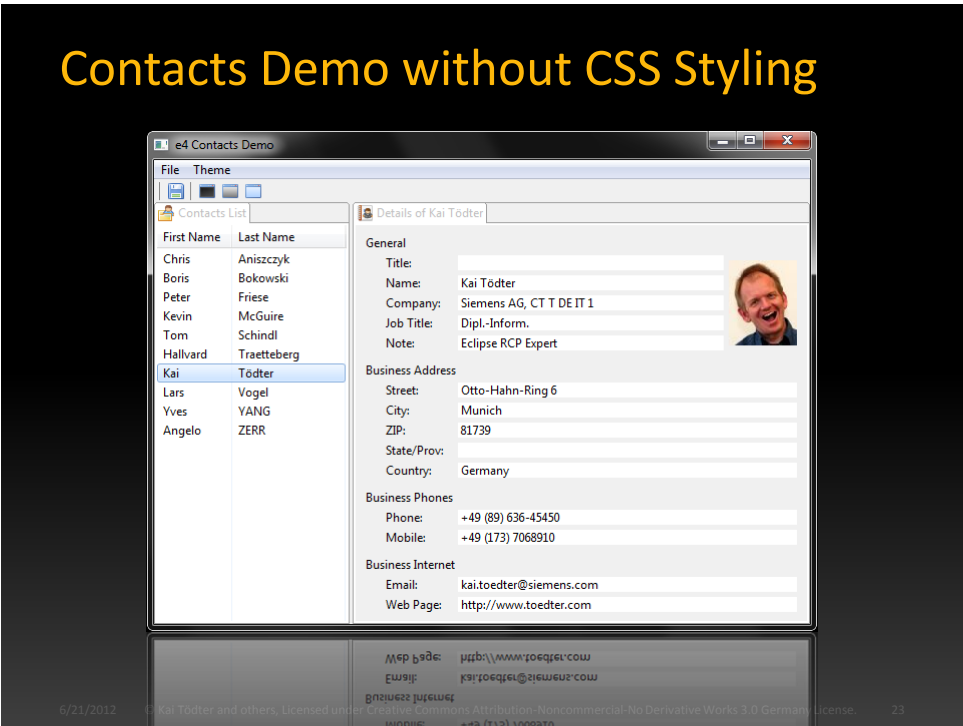
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UI Styling with SWT

- In Eclipse 3.x, UI styling can be done using
 - The Presentation API
 - Custom Widgets
- These mechanisms are very limited
- It is not possible to implement a specific UI design, created by a designer
- e4 provides a CSS based UI styling that addresses many of the above issues

Contacts Demo without CSS Styling



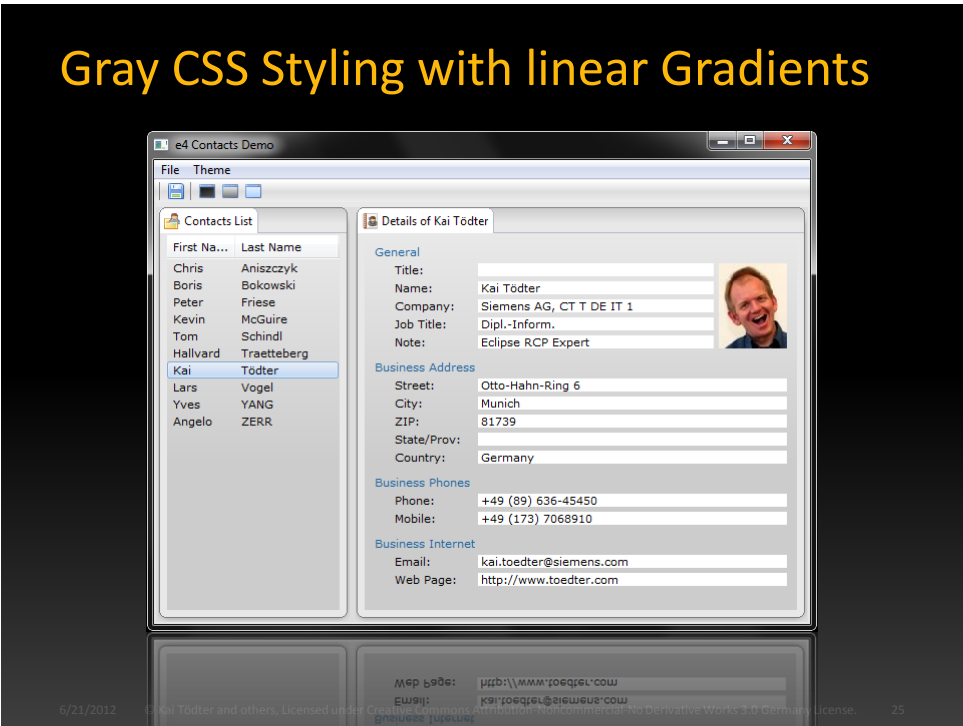
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Dark CSS Styling with radial Gradients

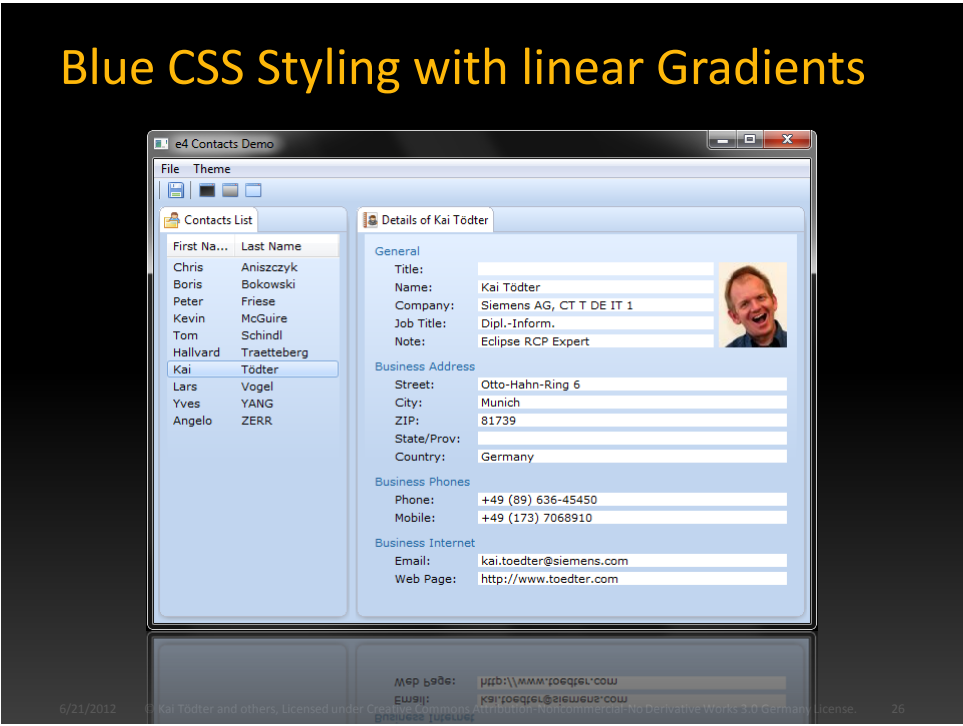


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Gray CSS Styling with linear Gradients



Blue CSS Styling with linear Gradients



How does the CSS look like?

```
Label {
  font: Verdana 8px;
  color: rgb(240, 240, 240);
}

Table {
  background-color: gradient radial #575757 #101010 100%;
  color: rgb(240, 240, 240);
  font: Verdana 8px;
}

.MTrimBar {
  background-color: #777777 #373737 #202020 50% 50%;
  color: white;
  font: Verdana 8px;
}
```

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Some Things you cannot style (yet?)

- Menu bar background
- Table headers
- Buttons
- Scrollbars
- ...

Rudimentary implemented:

- Gradients

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How to enable CSS Styling

- Create a contribution to the extension point `org.eclipse.core.runtime.products`
- In the product tag add a property
 - with name `applicationCSS`
 - And value `platform:/plugin/<bundle id>/<path to css>`
- Use this mechanism if you only want to provide one CSS theme

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CSS Themes

Create a contribution to the extension point
`org.eclipse.e4.ui.css.swt.theme`

```
<extension
  point="org.eclipse.e4.ui.css.swt.theme">
  <theme
    basestylesheeturi="css/blue.css"
    id="org.eclipse.e4.tutorial.contacts.themes.blue"
    label="Blue Theme">
  </theme>
</extension>
```

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How to enable CSS Styling with Theme

Create a contribution to the extension point
org.eclipse.core.runtime.products

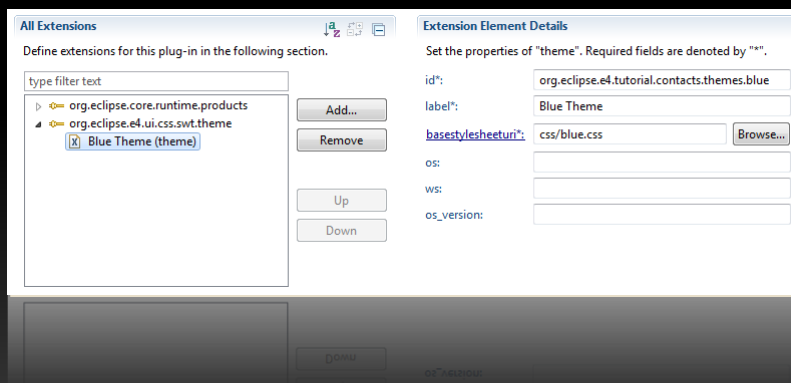
```
<extension
  id="product"
  point="org.eclipse.core.runtime.products">
  <product
    application="org.eclipse.e4.ui.workbench.swt.application"
    name="e4 Contacts">
    <property
      name="cssTheme"
      value="org.eclipse.e4.tutorial.contacts.themes.blue">
    </property>
  </product>
</extension>
```

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How to enable CSS Styling (3)

- Extension point
org.eclipse.ui.css.swt.theme



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How to use custom attributes?

- Java:

```
Label label = new Label(parent, SWT.NONE);
label.setData("org.eclipse.e4.ui.css.id", "SeparatorLabel");
```

- Application Model: Give the element an **id**

- CSS:

```
#SeparatorLabel {
    color: #f08d00;
}
```

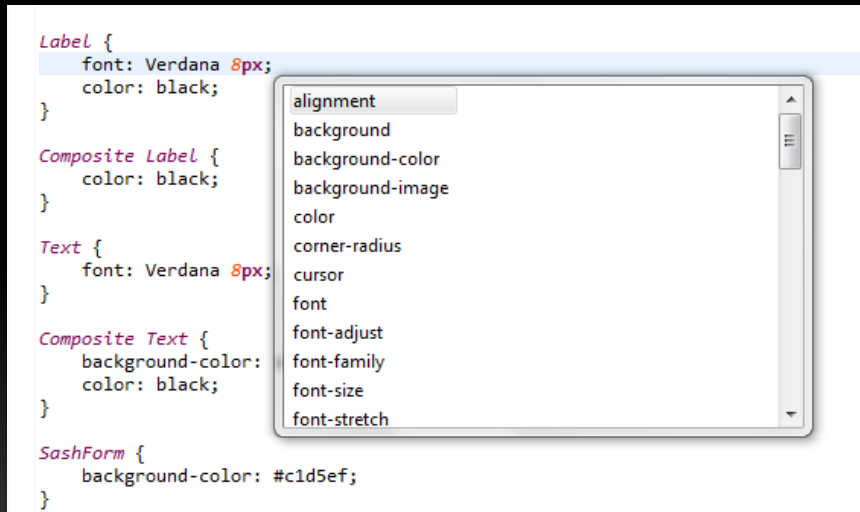
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e4 CSS Editor

- CSS has a well known syntax
- But which UI elements can be styled?
- Which CSS attributes does a specific element support?
- Eclipse 4.x tooling includes an Xtext based CSS editor with syntax highlighting and content assist
- You find it under **E4 Tools/E4 CSS editor** in the e4 p2 repository

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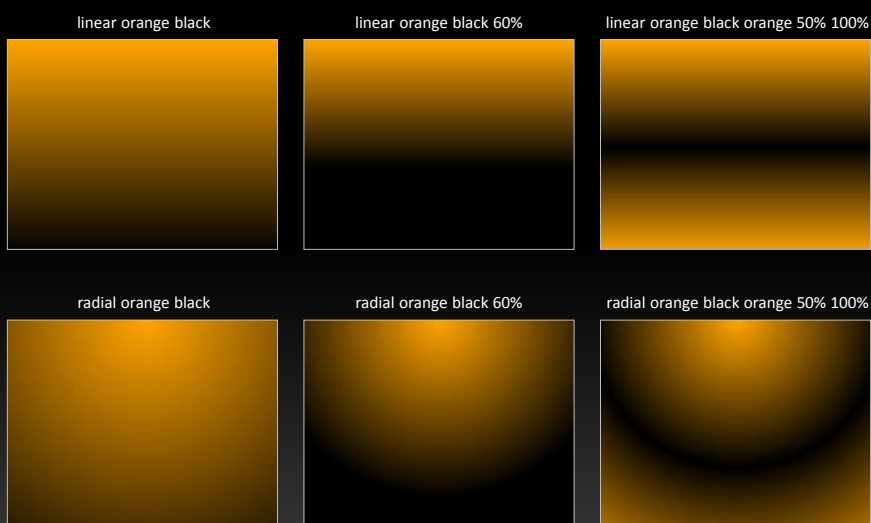
e4 SWT CSS Editor (2)



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Gradient Examples



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CSS Styling for JavaFX 2.x



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JavaFX CSS Examples

```
.root {
    -fx-base: rgb(50, 50, 50);
    -fx-background: rgb(50, 50, 50);
    -fx-control-inner-background: rgb(50, 50, 50);
}

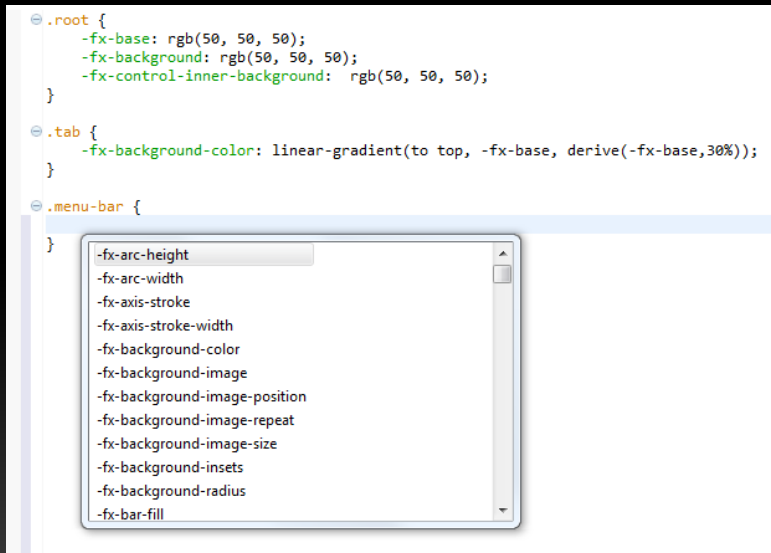
.tab {
    -fx-background-color:
        linear-gradient(to top, -fx-base, derive(-fx-base,30%));
}

.menu-bar {
    -fx-background-color:
        linear-gradient(to bottom, -fx-base, derive(-fx-base,30%));
}
```

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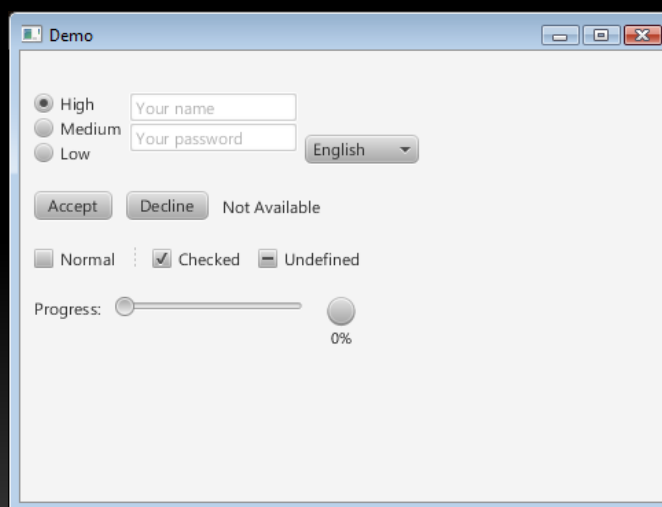
e(fx)clipse JavaFX CSS Editor



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JavaFX 2.x CSS Styling (Default Style)

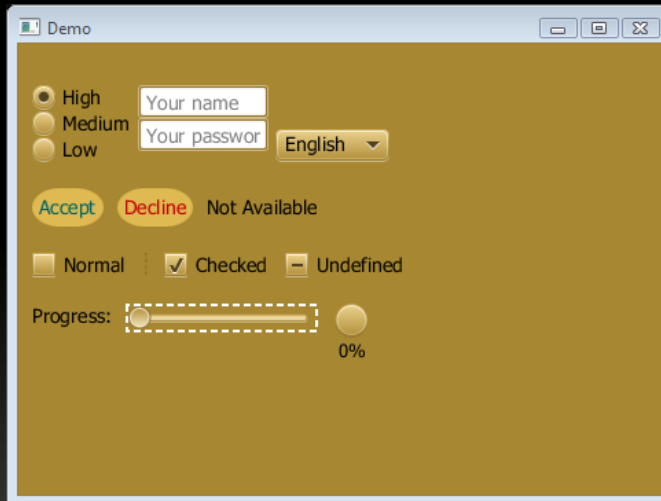


Picture taken from http://docs.oracle.com/javafx/2/css_tutorial/img/default_style.png

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JavaFX 2.x CSS Styling Example 1

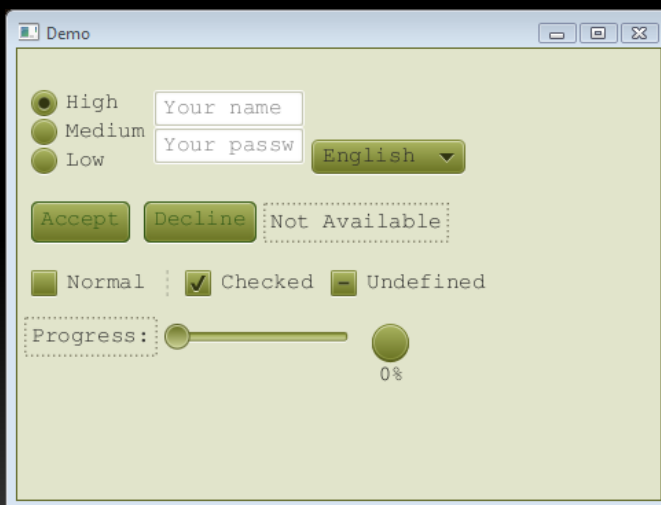


Picture taken from http://docs.oracle.com/javafx/2/css_tutorial/img/style1.png

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JavaFX 2.x CSS Styling Example 2



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Links & Downloads

- e(fx)clipse
 - Needed for JavaFX e4 Rendering
 - <http://efxclipse.org>
- e4 Rendering Proof of Concept
 - <https://github.com/toedter/e4-rendering>
- JavaFX CSS Styling
 - http://docs.oracle.com/javafx/2/css_tutorial/jfxpu-b-css_tutorial.htm

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Picture Index

Many thanks to the authors of the following pictures:

- Slide “Application Model”: <http://www.sxc.hu/photo/1168590>
- Slide “Rendering”: <http://www.sxc.hu/photo/1263022>
- Slide “UI Styling”: <http://www.sxc.hu/photo/1089931>
- Slide “Discussion”: <http://www.sxc.hu/photo/922004>