

# ADF On-Ramp: What You Need to Know to Use the ADF Fusion Technology Stack

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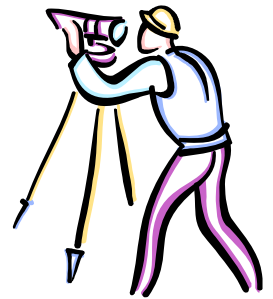


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## Survey

- Job responsibilities?
  - DBA, developer
- Languages?
  - PL/SQL
  - Java
  - C++
  - Other
- Tools?
  - Developer Forms/Reports
  - JDeveloper
  - Other



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## Raffle at the End



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## Agenda

- What is ADF and Fusion?
- ADF Business Components
- JSF and ADF Faces
- ADF Model
- ADF Controller
- Required languages

Part 1

Part 2

Slides will be available on the NYOUG and Quovera websites. White paper will be published in the NYOUG Tech Journal.



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## On the Positive Side...

If we do not find  
anything pleasant, at least  
we shall find something new.

Si nous ne trouvons pas des choses  
agréables, nous trouverons du  
moins des choses nouvelles.

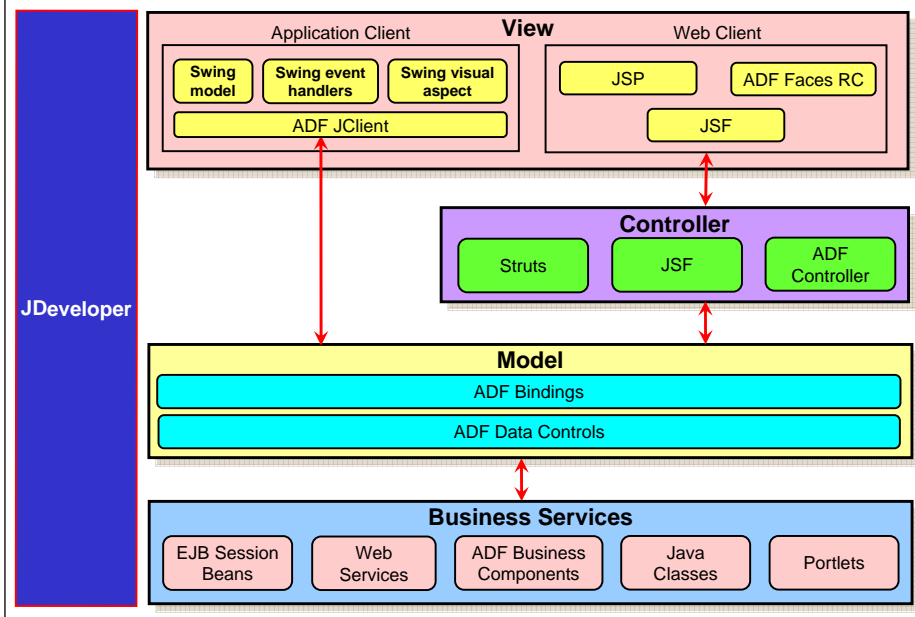
—Voltaire (1694-1778), *Candide*

## Oracle Application Development Framework (ADF)

- A *framework* is a prebuilt service for solving a particular problem – like access to the database
  - Code libraries and standards support the framework
  - Implements code reuse and best practices
  - An architecture with code libraries
- ADF is a *meta-framework*
  - A wrapper for other frameworks
  - Available starting in JDeveloper 10g
  - Provides the “plumbing”
- Pre-ADF available in OAF
- Based on Model-View-Controller Java EE design pattern



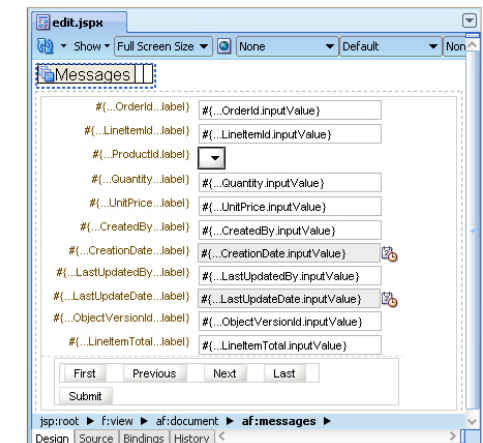
## ADF Architecture



## ADF Development Experience

### • Visual

- Visual editors (WYSIKOWYG)
- UML diagrams
  - Class diagram
  - Activity diagram
  - Use Case diagram
  - Sequence diagram



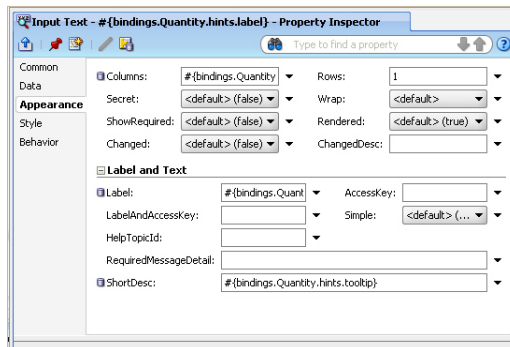
Visual Editor



# ADF Development Experience

## • Declarative

- Property Inspector
- Structure window
- Expression Builder
- Binding editors
- Property editors
  - For example, ADF BC



Property Inspector



# The Con-fusion

"Fusion", Star Trek Enterprise, Season 1 Episode 17



# Where Do Fusion Developers Live?

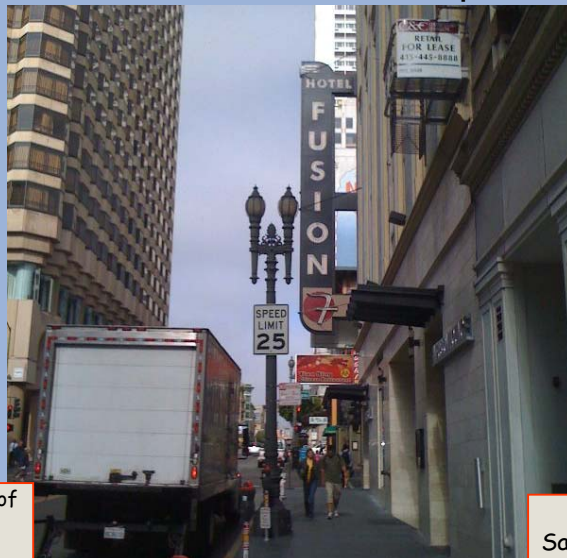


Photo courtesy of Sten Vesterli (vesterli.com)

140 Ellis St,  
San Francisco, CA

# What is Fusion?

- "It's a **floor wax** and a **dessert topping!**"
- Fusion **Applications**
  - Next version of E-Business Suite (Apps)
- Fusion **Middleware**
  - Tools for building and running the applications (and your custom apps)
- Fusion **Architecture**
  - How to assemble various technologies to build FA
  - How to connect FM pieces

SNL Shimmer commercial, 1/10/76



## Which Fusion Technologies to Use?

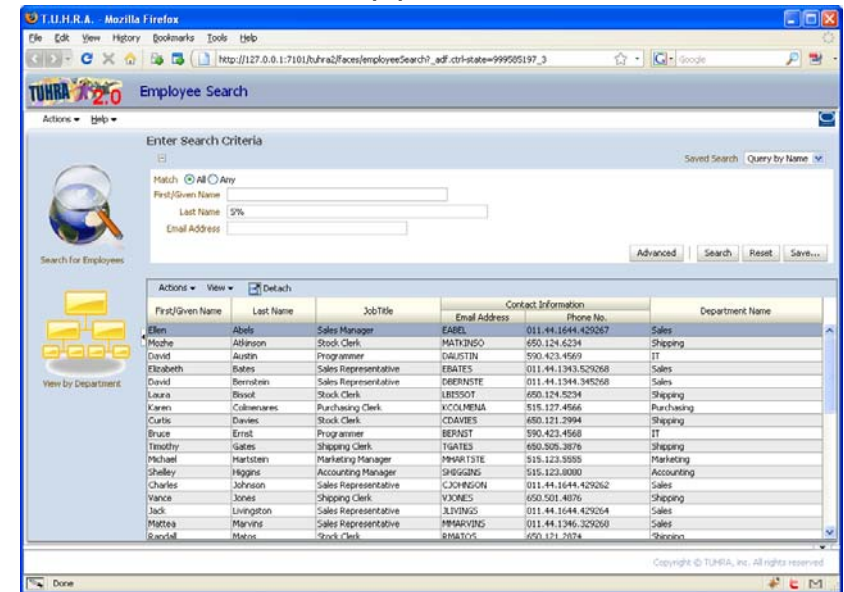
- Core technologies used to create Fusion Applications
  - ADF Business Components
  - ADF Faces Rich Client
  - ADF Controller
- Other high-level technologies or strategies also used
  - SOA, ESB, Business Rules, WebCenter
  - Need to look into those, too, at the architecture level



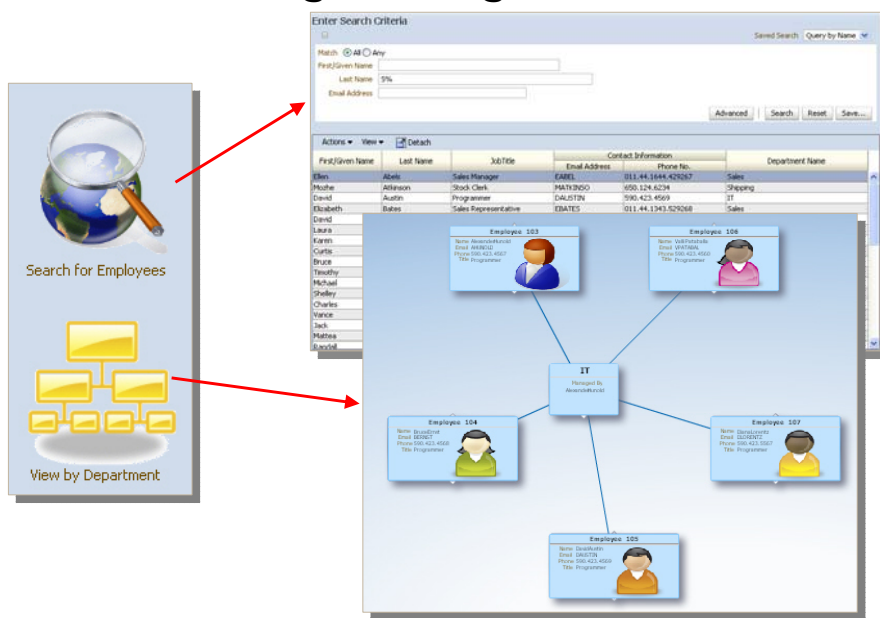
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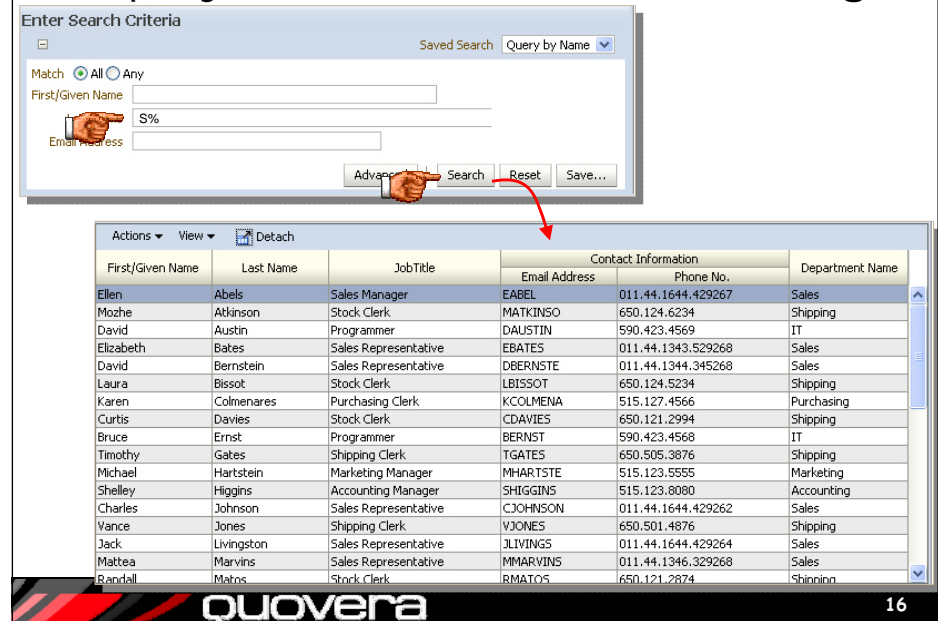
## Sample App: The Ultimate Human Resources Application (TUHRA)



## Page Navigation



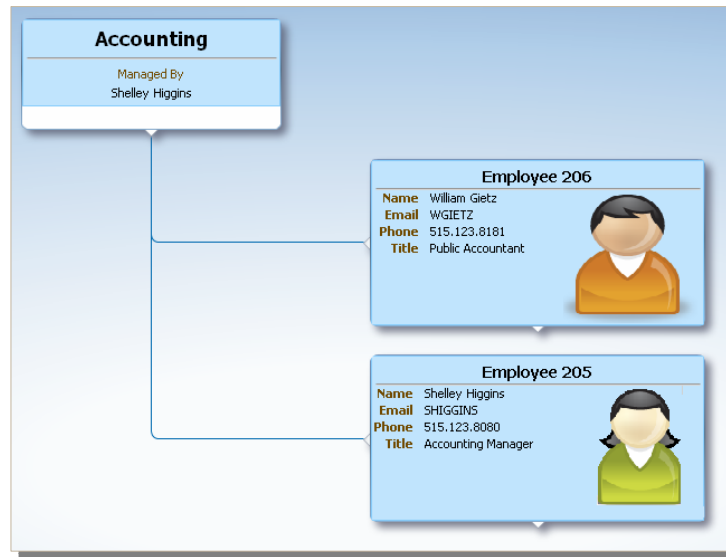
## Employee Search and Results Page



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## Hierarchy Viewer Page



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## Edit Page

Employee No 174

First/Given Name: Ellen  
\* Last Name/Surname: Abel  
\* Email Address: EABEL  
Phone No.: 011.44.1644.429267

Line Manager: 149  
Eleni Zlotkey  
Current Job: Finance Manager  
\* Date Joined: 5/11/1996  
Salary: \$10000.00  
Sales Commission: 30%

Department: Sales

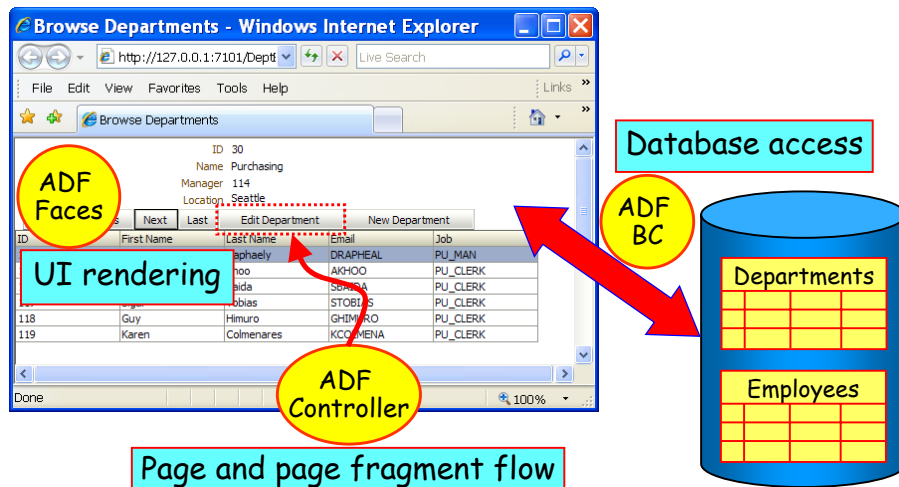
First Previous Next Last  
Submit

**Biography**  
Create  
Tahoma  
Ellen started work in 1996 and has just about mastered all of the functions on the following office equipment:

- Photocopier
- Coffee Machine
- Shredder
- Stapler

**Audit Information**  
Entry date: 1/1/1980  
Record entered by: HR  
Last change date: 12/31/2008  
Record last changed by: anonymous

## Where Do The Fusion Technologies Show Up?



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## Sample Page Flow

**Browse Departments - Windows Internet Explorer**  
http://127.0.0.1:7101/Dept/

**Edit Department - Windows Internet Explorer**  
http://127.0.0.1:7101/Dept/

**Edit Department**  
\* ID: 30  
Name: Purchasing  
Manager: 114  
Location: Seattle

Save Browse Departments

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## Agenda

- What is ADF and Fusion?
- **ADF Business Components**
- JSF and ADF Faces
- ADF Model
- ADF Controller
- Required languages



## The World View

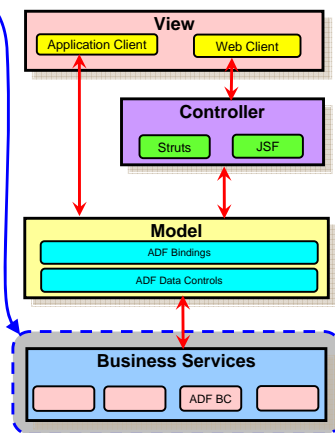
In this best of all  
possible worlds ...  
everything is for the best.

Dans ce meilleur  
des mondes possibles ...  
tout est au mieux.

—Voltaire (1694-1778), *Candide*

## Review: ADF Business Services

- A layer of ADF
  - ADF Business Components is one option
  - Formerly known as Business Components for Java (BC4J)
- Provides access to database objects in an OO way
  - Uses JDBC to communicate with database
    - Java Database Connectivity
  - No SQL\*Net needed



## ADF Business Components

- ADF BC
- Persistence
  - Storing data in and retrieving data from a database
- O/R mapping
  - Translating relational database things to object-oriented (Java) whatsits
- Handles mechanics of creating SQL statements and of communicating with the database



## More About ADF BC

- Bridges the gap between OO code and a relational database
- Objects that define queries
- Objects that define insert-update-delete
- Objects that link queries
- Objects that link “DML”
- ADF BC forms SQL statements
  - Uses XML definitions of specific database objects
- It does not create user interfaces



## Sample ADF BC Development

The screenshot shows the ADF BC development environment. On the left, the 'Departments.xml' file is open, displaying a table of attributes for the 'DepartmentId' entity. The table has columns for Name, Type, Column, and Column ID. The attributes listed are DepartmentId (Number), DepartmentName (String), ManagerId (Number), and LocationId (Number). Below the table, there are sections for Validation Rules, Custom Properties, and Security, all associated with 'DepartmentId'.

On the right, the 'DepartmentId - Property Inspector' is open, showing various properties for the 'DepartmentId' entity. The 'Name' is 'DepartmentId', the 'Display Name' is 'Department Id', and the 'Type' is 'Number'. Other properties like 'Description', 'Property Set', 'Discriminator', 'Date Effectivity', 'Start Date', 'End Date', 'Sequence', and 'Sequence Flag' are also visible.

**Note: All screenshots show JDev 11g.**

## View Object Editor

The screenshot shows the 'AllEmployees.xml' file in the View Object Editor. The 'Query' tab is selected, displaying the following SQL query:

```
SELECT Employees.EMPLOYEE_ID,
       Employees.FIRST_NAME,
       Employees.LAST_NAME,
       Employees.JOB_ID,
       Employees.EMAIL,
       Employees.HIRE_DATE,
       Departments.DEPARTMENT_NAME,
       Departments.DEPARTMENT_ID,
       Departments.LOCATION_ID
FROM DEPARTMENTS Departments, EMPLOYEES Employees
WHERE Departments.MANAGER_ID = Employees.EMPLOYEE_ID
```

Below the query, there is a section for 'Bind Variables' with a note: 'Named bind variables can be used in the SQL query of this view object.'

## SELECT = View Objects

- Retrieve data from the database
- Manage caches of data
- *View object definitions*
  - Contain SQL queries
  - Act as templates for *view object instances*
- *View object instances*
  - The “thing” used in code
  - Technically, an object of the class



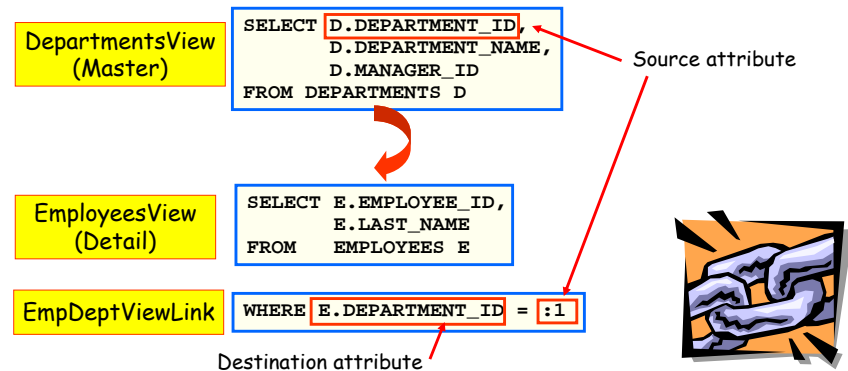
## View Object Code

```
<ViewObject
  xmlns="http://xmlns.oracle.com/bc4j"
  Name="AllEmployees"
  Version="11.1.1.53.41"
  SelectList="Employees.EMPLOYEE_ID,
    Employees.FIRST_NAME,
    Employees.LAST_NAME,
    Employees.JOB_ID,
    Employees.EMAIL,
    Employees.HIRE_DATE,
    Departments.DEPARTMENT_NAME,
    Departments.DEPARTMENT_ID,
    Departments.LOCATION_ID"
  FromList="DEPARTMENTS Departments,
    EMPLOYEES Employees"
  Where="Departments.MANAGER_ID =
    Employees.EMPLOYEE_ID"
  BindingStyle="OracleName"
  CustomQuery="false"
  PageIterMode="Full"
  UseGlueCode="false">
  ...
</ViewObject>
```

```
<ViewAttribute
  Name="EmployeeId"
  IsUpdateable="false"
  IsNotNull="true"
  PrecisionRule="true"
  EntityAttrName="EmployeeId"
  EntityUsage="Employees"
  AliasName="EMPLOYEE_ID"/>
```

## ADF View Links

- A view link definition adds an additional WHERE clause to the detail
  - Source is the master; destination is the detail
- For example, a department and its employees



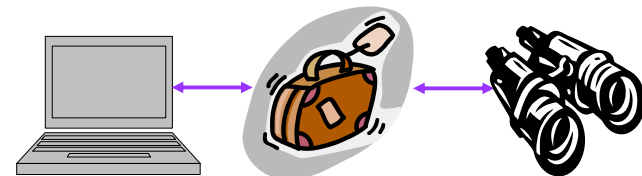
## View Link Code

```
<ViewLink
  xmlns="http://xmlns.oracle.com/bc4j"
  Name="EmpDeptFkLink"
  Version="11.1.1.53.41"
  EntityAssociation="hr.model.EmpDeptFkAssoc">
  <DesignTime>
    <Attr Name="_isCodegen"
      Value="true"/>
  </DesignTime>
  <ViewLinkDefEnd
    Name="DepartmentsView"
    Cardinality="1"
    Owner="hr.model.DepartmentsView"
    Source="true">
    <DesignTime>
      <Attr Name="_finderName"
        Value="DepartmentsView"/>
      <Attr Name="_isUpdateable"
        Value="true"/>
    </DesignTime>
    <AttrArray Name="Attributes">
      <Item
        Value="hr.model.DepartmentsView.DepartmentId"/>
    </AttrArray>
  </ViewLinkDefEnd>
```

```
<ViewLinkDefEnd
  Name="EmployeesView"
  Cardinality="-1"
  Owner="hr.model.EmployeesView">
  <DesignTime>
    <Attr Name="_finderName"
      Value="EmployeesView"/>
    <Attr Name="_isUpdateable"
      Value="true"/>
  </DesignTime>
  <AttrArray Name="Attributes">
    <Item
      Value="hr.model.EmployeesView.DepartmentId"/>
    </AttrArray>
  </ViewLinkDefEnd>
```

## Application Modules

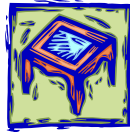
- Application modules represent the interface from business components to the application
  - The application always references the application module for data
  - Each instance (user) of the application will get its own application module instance
- The application module instance contains *the data model*
  - View object instances
  - View link instances for master-detail relationships





## INSERT, UPDATE, DELETE = Entity Objects

- *Entity object definitions*
  - Correspond to database tables (or views)
  - Templates for *entity object instances*, which correspond to table rows
- *Entity object instances*
  - Write data to the database
  - Validate data before updates and inserts
  - Supply default values



## Entity Object Code

```
<Entity
xmlns="http://xmlns.oracle.com/bc4j"
Name="Departments"
Version="11.1.1.53.41"
DBObjectType="table"
DBObjectName="DEPARTMENTS"
AliasName="Departments"
BindingStyle="OracleName"
UseGlueCode="false">
  <DesignTime>
    <Attr Name="_codegenFlag2"
    Value="Access"/>
    <AttrArray
    Name="_publishEvents"/>
  </DesignTime>
  <Attribute
    Name="DepartmentId"
    IsNotNull="true"
    Precision="4"
    Scale="0"
    ColumnName="DEPARTMENT_ID"
    SQLType="NUMERIC"
    Type="oracle.jbo.domain.Number"
    ColumnType="NUMBER"
    TableName="DEPARTMENTS"
    PrimaryKey="true">
```

```
<DesignTime>
  <Attr Name="_DisplaySize"
  Value="22"/>
</DesignTime>
<Properties>
  <SchemaBasedProperties>
    <LABEL
    ResId="hr.model.Departments.
    DepartmentId_LABEL"/>
  </SchemaBasedProperties>
</Properties>
</Attribute>
```

## Why Declarative?

- Arguably more productive
- Leverages native strengths of the frameworks
  - All frameworks can be extended
  - The less you extend the better
  - You can blame the framework for problems
- Version upgrades are potentially easier
  - You take advantage of framework bug fixes automatically
  - Same concept as database upgrades



## Agenda

- What is ADF and Fusion?
- ADF Business Components
- JSF and ADF Faces
- ADF Model
- ADF Controller
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## Now, a Word from Our Sponsor

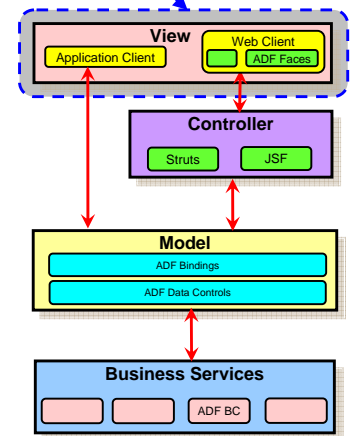
The superfluous, a very  
necessary thing.

Le superflu, chose très  
nécessaire.

—Voltaire (1694-1778), *Le Mondian*

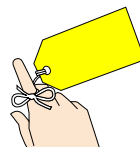
## Review: ADF View

- A layer of ADF
  - Web client is one option
  - JSF is web client code
- The code that constructs the user interface
  - ADF Faces Rich Client is a set of JSF components used to render the UI
  - View layer receives data from and updates data to the Model layer, through the Controller layer



## JSF Overview

- JavaServer Faces
  - Java EE standard
- Simplifies web development
  - No embedded Java inside tag language
  - High-level tags
- XML-like
  - Start and end tag required
  - Elements, commonly called “components”
  - Attributes



## ADF Faces Rich Client Overview

- Evolution:
  - ADF UIX → ADF Faces → Apache Trinidad
  - ADF Faces → ADF Faces RC
- Built on top of JSF APIs
- Deployable on any 1.2 implementation of JSF
- Rich feature set for customizing applications
- Fully declarative AJAX support (more later)
- Support for pop-ups and dialogs
- ADF model support out-of-the-box
- Data Visualization Tools (DVT) components
  - Charts, Gantt, Pivot, Maps, Hierarchy

Really  
rich!



## JSF Snippet

```
<jsp:root xmlns:jsp="http://java.sun.com/JSP/Page" version="2.0"
  xmlns:f="http://java.sun.com/jsf/core"
  xmlns:af="http://xmlns.oracle.com/adf/faces/rich">
...
<af:panelStretchLayout styleClass="AFVisualRoot" topHeight="105px"
  bottomHeight="20px">
  <f:facet name="top">
    <af:panelBorderLayout>
      <f:facet name="start">
        <af:image source="/images/tuhra.gif" shortDesc="TUHRA Logo"/>
      </f:facet>
      <f:facet name="end">
        <af:panelGroupLayout layout="horizontal" halign="right"
          valign="bottom">
          <af:commandImageLink text="Logon" shortDesc="Logout from TUHRA"
            depressedIcon="/images/groupdisconnect_dwn.png"
            disabledIcon="/images/groupdisconnect_dis.png"
            hoverIcon="/images/groupdisconnect_ovr.png"
            icon="/images/groupdisconnect_ena.png"
            disabled="true"
            rendered="#{attrs.anonymous}"/>
          <af:commandImageLink text="Logoff" shortDesc="Logout from TUHRA"
            depressedIcon="/images/groupdisconnect_dwn.png"
            disabledIcon="/images/groupdisconnect_dis.png"
            hoverIcon="/images/groupdisconnect_ovr.png"
            icon="/images/groupdisconnect_ena.png"
            disabled="true"
            rendered="#{!attrs.anonymous}"/>
        </af:panelGroupLayout>
      </f:facet>
    </af:panelBorderLayout>
  </f:facet>
</af:panelStretchLayout>
```

## ADF Faces RC Features

- Solid development support in JDeveloper
- Changeable “skins”
  - Look-and-feel characteristics
  - Can be changed with one config property
- Layout management features
- Extensive set of properties
  - Supports declarative programming techniques
  - Property Inspector, Visual Editor



## Some ADF Faces Components

\* ID 198

af:inputText

Department 50

af:inputListOfValues

Help

Using the application

About TUHRA

af:menu

\* Hire Date 6/21/1999

af:selectInputDate

af:selectBooleanCheckbox

I Love JDev 11g

af:commandButton

af:commandImageLink

af:selectOneChoice

Search and Select: Department

DepartmentId

DepartmentName

ManagerId

LocationId

Search

Reset

DepartmentName

Administration

Marketing

Accounting

Treasury

Corporate Tax

Control And Credit

Shareholder Services

Benefits

Manufacturing

Construction

OK

Cancel

\* Job Shipping Clerk

President

Administration Vice President

Administration Assistant

Purchasing Clerk

Stock Manager

Stock Clerk

Shipping Clerk

Programmer

Marketing Manager

Marketing Representative

Human Resources Representative

Public Relations Representative

<Select A Job>

af:selectOneChoice

Chex

Chex

Chex

## AJAX

- Asynchronous JavaScript and XML
  - In ADF Faces: Partial Page Rendering (PPR)
- Update the page without refreshing the entire page
  - Smoother user experience
- Common Examples
  - Sorting a results table
  - Scrolling through a results table
  - Expanding a tree control

AJAX provides a cleaner user interface!



## Using AJAX in ADF Faces RC

- Much AJAX in ADF Faces is transparent
  - Expanding a tree node / scrolling a table
  - Nothing special needs to be done
- Explicit AJAX attributes:
  - *partialSubmit* – Used by command items
  - *autoSubmit* – used by input items / lists etc.
  - *partialTriggers* – all components
- Example
  - Update line total when quantity or price change



## AJAX Interactions – A Calculated Field

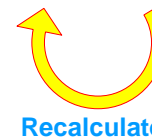
Price:

\$100



Tax:

\$17.50

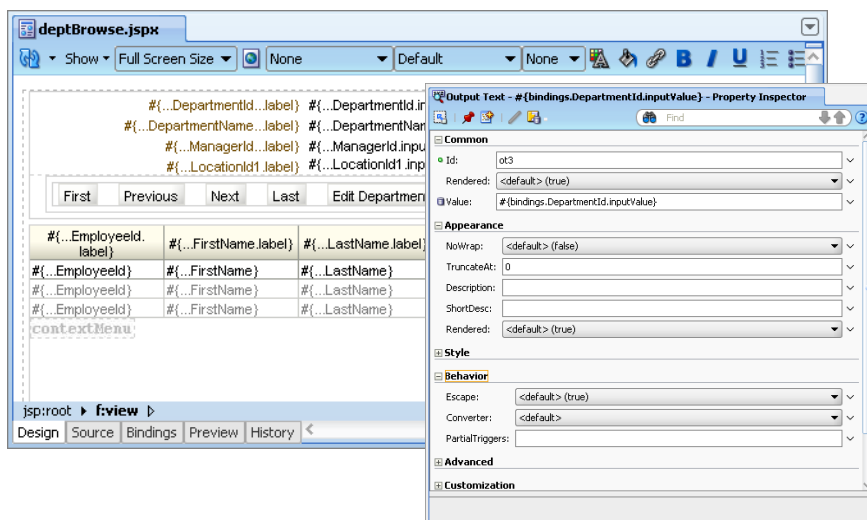


Recalculate

<b>Id</b>	Price
<b>Value</b>	<code>#bindings.listPrice.inputValue</code>
<b>AutoSubmit</b>	true
<b>partialTriggers</b>	

<b>Id</b>	Tax
<b>Value</b>	<code>#bindings.listPrice.inputValue * 0.175</code>
<b>AutoSubmit</b>	false
<b>partialTriggers</b>	Price

## Sample ADF Faces Development



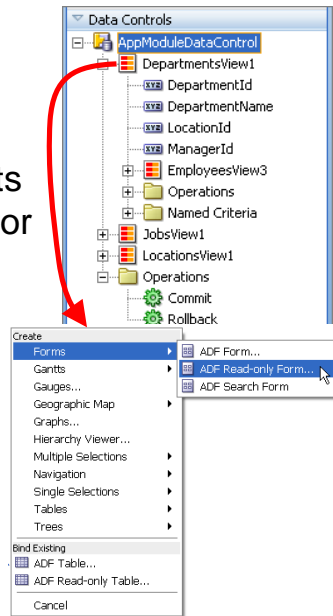
## Agenda

- What is ADF and Fusion?
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## ADF Model

- ADF Data Controls
  - Provides list of components or groups of components for a node in the data model
  - “Drop as” options
- ADF Bindings
  - Prebuilt connection from the ADF BC to the UI
  - Drag and drop action above does the work



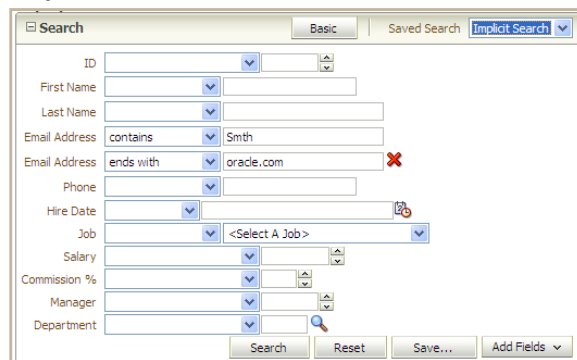
## Data Controls' “Drop As” Options

- Available options are offered for the data control type being dropped
  - **Collections** can include more than one attribute
  - **Nested collections** offer master-detail options (including master)
  - **Attributes** offer data UI items (text fields, list items, etc.)
  - **Methods** offer forms with a field for each parameter and a submit button
  - **Operations** offer buttons or links

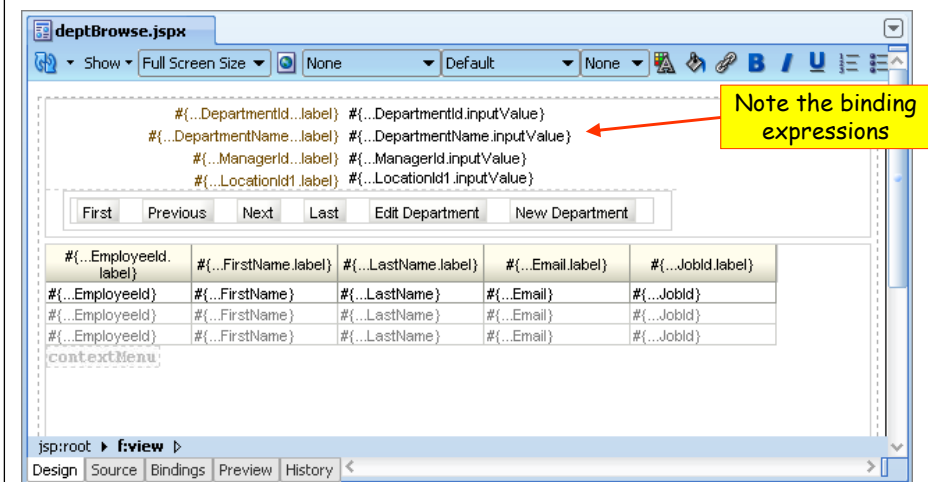


## Example: ADF Query Component

- Named Criteria “drop as” option
- Creates a component with Find mode capabilities
  - Allows pre-seeded and saved searches
  - Basic and advanced modes
  - Much more powerful than Forms QBE



## Examples: Form and Table





## Bindings Code

### In the JSF page file

```
<af:inputText value="#{bindings.DepartmentId.inputValue}"
  label="#{bindings.DepartmentId.hints.label}"
  required="#{bindings.DepartmentId.hints.mandatory}"
  columns="#{bindings.DepartmentId.hints.displayWidth}"
  maximumLength="#{bindings.DepartmentId.hints.precision}"
  shortDesc="#{bindings.DepartmentId.hints.tooltip}"
  id="it1">
</af:inputText>
```

### In the bindings Page Def file

```
<bindings>
  <attributeValues IterBinding="DepartmentsView1Iterator"
    id="DepartmentId">
    <AttrNames>
      <Item Value="DepartmentId"/>
    </AttrNames>
  </attributeValues>
</bindings>
```

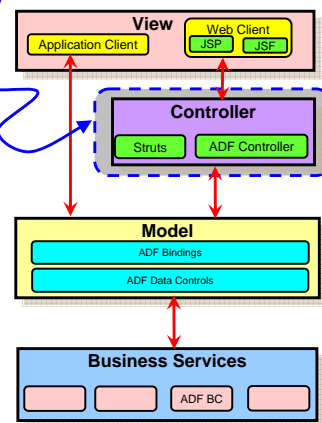
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## Review: Controller Layer

- A layer of ADF
  - Used only for web client code
  - JSF controller is one option
  - ADF Task Flow Controller is another
- Determines which page or task loads next
- Transfers data from the View to the Model layer



## ADF Controller

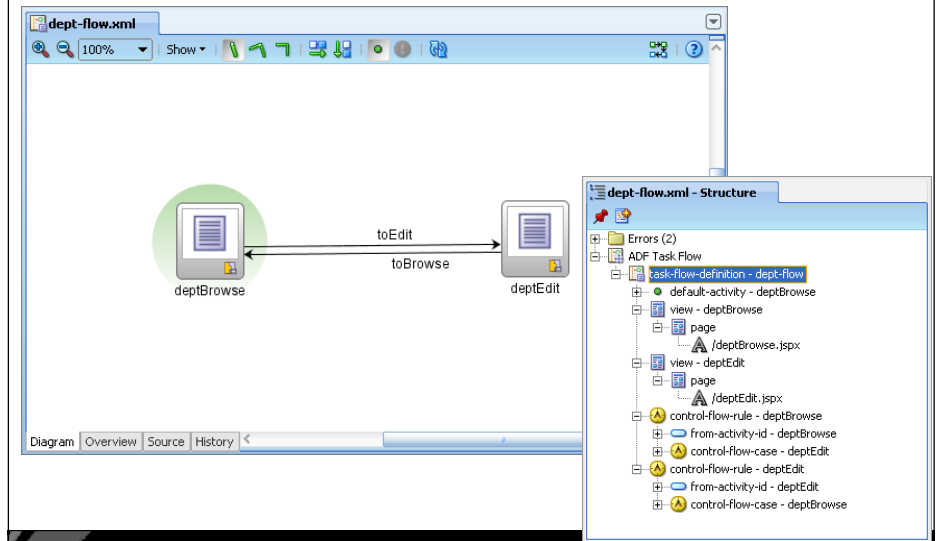
- Supplement to standard JSF Controller functionality
  - Declares which page to display next
    - Can be based on a condition
- Treats part of a page in the same way as a full page in normal JSF work
  - Only part of a page is rendered, the rest stays put
- Speeds up page processing
- Allows reuse of page parts
- Allows logic to be added to the flow
  - For example, conditional display of a page



## Task Flow Code

```
<task-flow-definition id="dept-flow">
<default-activity>deptBrowse</default-activity>
<view id="deptBrowse">
  <page>/deptBrowse.jsp</page>
</view>
<view id="deptEdit">
  <page>/deptEdit.jsp</page>
</view>
<control-flow-rule>
  <from-activity-id>deptBrowse</from-activity-id>
  <control-flow-case>
    <from-outcome>toEdit</from-outcome>
    <to-activity-id>deptEdit</to-activity-id>
  </control-flow-case>
</control-flow-rule>
<control-flow-rule>
  <from-activity-id>deptEdit</from-activity-id>
  <control-flow-case>
    <from-outcome>toBrowse</from-outcome>
    <to-activity-id>deptBrowse</to-activity-id>
  </control-flow-case>
</control-flow-rule>
</task-flow-definition>
```

## Sample ADF Controller Development



## Agenda

- What is ADF and Fusion?
- ADF Business Components
- JSF and ADF Faces
- ADF Model
- ADF Controller
- Required languages



## The Laundry List

1. Java
  - All important programmatic code
  - Think “trigger code” as in Forms
2. HTML and XML
  - Tag languages
  - The components rely on XML
    - Property editors create it for you
3. JavaScript and Cascading Style Sheets
  - Add functionality to HTML pages
  - Usually the components do this work for you
4. Expression Language
  - Used in JSF binding properties
5. Groovy
  - ADF BC scripting



## How Much of Each Do You Need?

Language (Use)	Level Needed	Primary Use
<b>Java</b> (frameworks such as ADF Faces)	Basic	Business components code for validation and special handling of model objects, as well as coding conditional page flow.
<b>Java</b> (extending framework features)	Expert	Supplementing or replacing functionality supplied by the framework. This requires research into the framework's capabilities and architecture.
<b>HTML and XML</b>	Basic	The JSF tags and the HTML renderer take care of the HTML for you, but knowledge of HTML helps you understand the HTML they generate. XML is used for JSF JSP files (same idea)
<b>JavaScript</b>	Basic/None	Providing customized user interaction functionality, for example, special handling of a checkbox selection.
<b>Cascading Style Sheets</b>	Basic/None	For ensuring a consistent look and feel. If you use prebuilt look-and-feel templates, no CSS coding is needed.
<b>Expression Language</b>	Basic/Intermediate	Supplying data to components from properties or methods in the application.
<b>Groovy</b>	Basic	Expressions for ADF Business Components

## Final Voltaire Wisdom

The secret of being a bore  
is to tell everything.

Le secret d'ennuyer  
est celui de tout dire.

—Voltaire (1694-1778), *Sept Discours en Vers sur l'Homme*

## Summary

- Fusion is Oracle's effort to merge application products and technologies
- Oracle is using the "Fusion Technology Stack" and ADF to build the next EBS – Fusion Applications
- ADF offers a consistent developer experience regardless of the technologies
- ADF Business Components provide access to the database and other data sources
- ADF Faces provide 150+, feature-rich item and container components for JSF JSP pages
- ADF Model connects ADF BC to ADF Faces
- ADF Controller manages page flow



- Please fill out the evals
- Books co-authored with Dr. Paul Dorsey, Avrom Roy-Faderman, & Duncan Mills
- Personal web site:  
[http://ourworld.compuserve.com/homepages/Peter\\_Koletzke](http://ourworld.compuserve.com/homepages/Peter_Koletzke)



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