

# Rich Enterprise Applications

Powered by Oracle Application  
Development Framework  
(Oracle ADF)



**ORACLE®**

## **ADF Binding Internals**

Shaun O'Brien

Principal Product Manager – Oracle Development Tools



# Agenda

- - ADF Model Overview
  - Understanding data controls
  - Bindings at Design Time
  - Bindings at RunTime



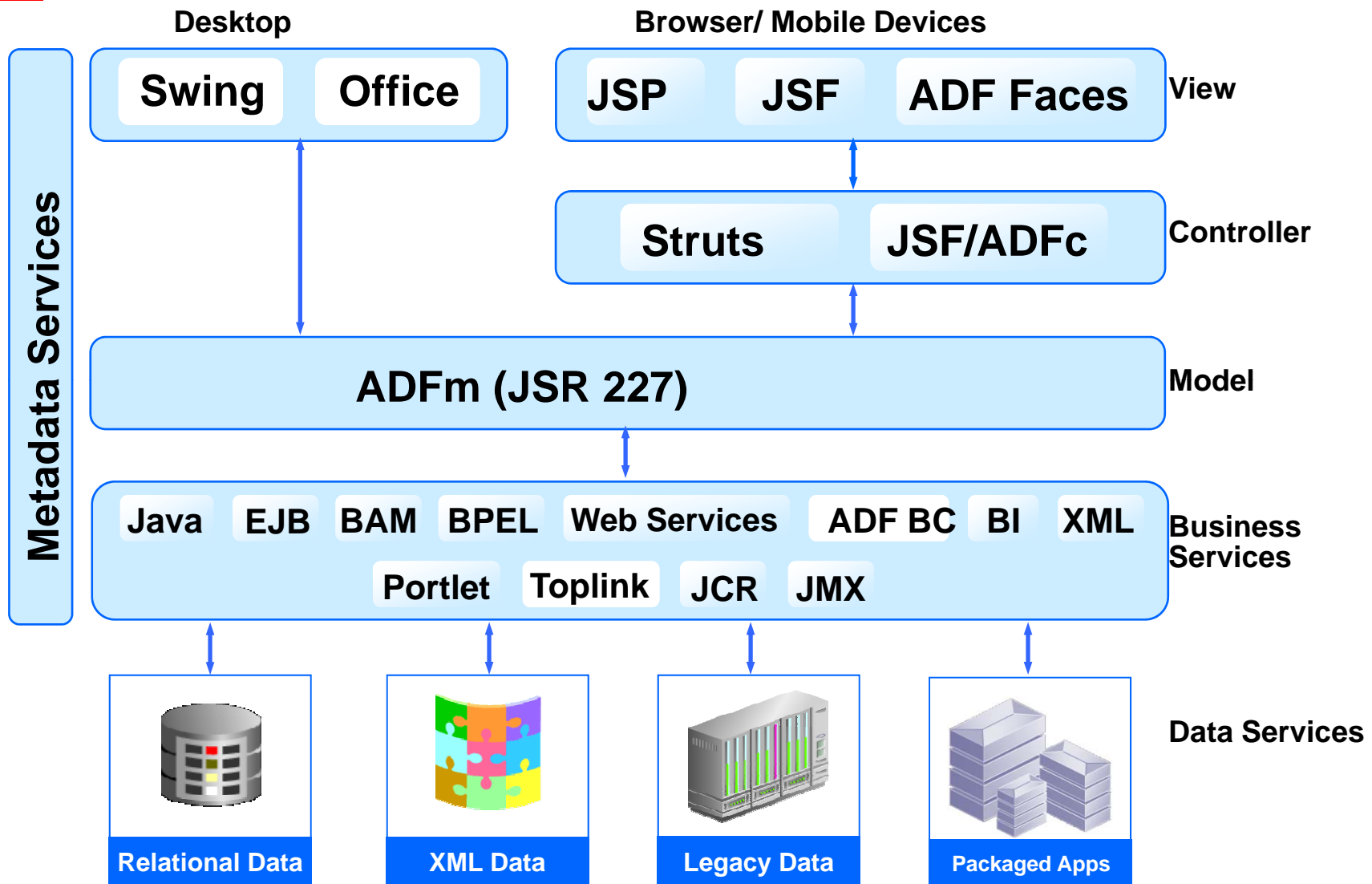
# ADF Model Overview

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# Oracle ADF 11g Architecture



# Overview of ADF Model



JDBC

Database



SOAP

Web Services



Java/RMI

POJO

Marital Status

single
married
widowed
divorced

\* Customer First Name

CustomerId	CustFirstName	CustLastName	CreditLimit	CustEmail	IncomeLevel
115	Geraldine	Schwader	3000	Geraldine.Schwader@GULP.COM	B: 30,000 - 49,999
116	Geraldine	Hartn	1500	Geraldine.Hartn@SCOTER.COM	A: Below 30,000
122	Maurice	Dalbey	1300	Maurice.Dalbey@TEAL.COM	A: Below 30,000
164	Charlotte	Kazan	1200	Charlotte.Kazan@BERGANDER.COM	E: 170,000 - 189,999
165	Charlotte	Konda	1300	Charlotte.Kondapetrovich@KON.COM	J: 140,000 - 149,999
166	Dheeraj	Alexander	1200	Dheeraj.Alexander@ALPHA.TECH.G.O.G.	L: 130,000 - 149,999
167	Gerard	Hershey	1200	Gerard.Hershey@PARULA.COM	D: 70,000 - 89,999
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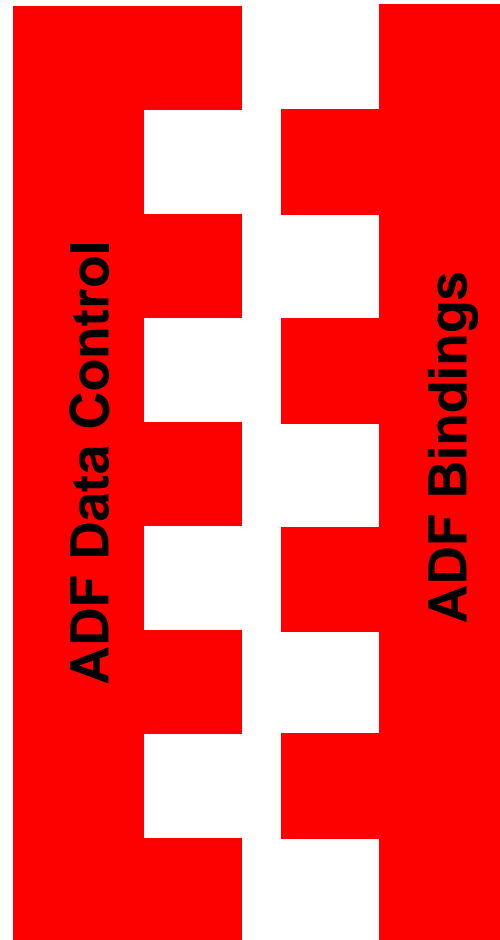
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116	Geraldine	Hatch	1500	Geraldine.Hatch@SCOTER.COM	A: Below 20,000
122	Maurice	Dalbey	1300	Maurice.Dalbey@TEAL.COM	A: Below 30,000
164	Charlotte	Kazan	1200	Charlotte.Kazan@BERGANDER.COM	170,000 - 189,999
165	Charlotte	Kondis	1300	Charlotte.Kondis@PROCKAMEN.COM	140,000 - 149,999
166	Dheeraj	Alexander	1200	Dheeraj.Alexander@BALPHATOL.COM	130,000 - 149,999
167	Gerard	Hershey	1200	Gerard.Hershey@PARULA.COM	D: 70,000 - 89,999
168	Hema	Tyught	1200	Hema.Tyught@PHALARONE.COM	H: 150,000 - 169,999
169	Shewaj	Davis	1200	Dheeraj.Davis@PPPTL.COM	F: 110,000 - 129,999
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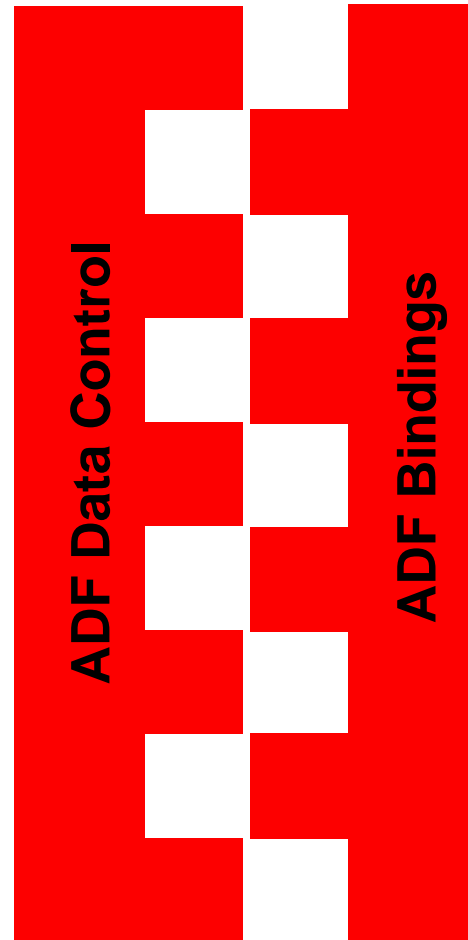
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ADF Bindings

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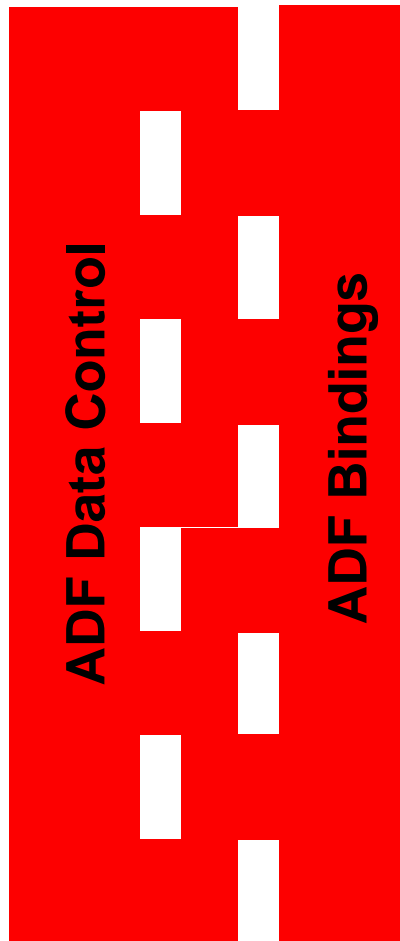
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# Understanding Data Controls

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# Data Control Concepts

- Uses standard metadata interface to describe the services' operations and data collection
- At design time, simplifies binding components to data control operation or data collection
- At run time, wires business service data controls to UI bindings from XML files
- Has the following benefits:
  - You write less code.
  - You work the same way with any UI and Business Service technology.
  - You gain useful run-time features because you do not have to code them yourself.



# ADF 11g Built-in Data Controls

- ADF Business Components
- Java class
- EJB
- URL (XML or CSV)
- Web service
- Placeholder
- Add your own

# ADF BC Data Control

Application Module

View Object

Client Method

Operation

Nested Application Module

The screenshot displays the Oracle ADF BC IDE interface for configuring an application module. The left pane shows a tree view of the application module structure, including a Data Control (HRAppModuleDataControl) with various view objects (e.g., DepartmentsView1, EmployeesView3) and operations (e.g., Create, Delete, Find). The right pane shows the Data Model Components configuration, including available view objects and application module instances. The 'Application Module Instances' section shows 'SalesAppModule1' selected.

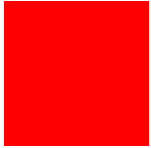


# Demo

## ADF Data Controls







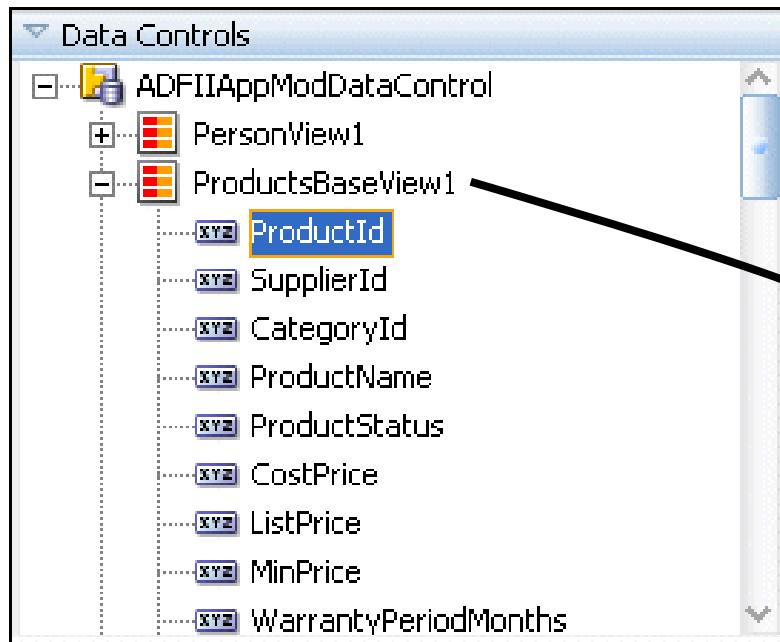
# Binding at Design Time

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# What happens ?



#{...ProductId.label}	#{...ProductName.label}	#{...CostPrice.label}	#{...ListPrice.label}
#{...ProductId}	#{...ProductName}	#{...CostPrice}	#{...ListPrice}
#{...ProductId}	#{...ProductName}#{	#{...CostPrice}	#{...ListPrice}
#{...ProductId}	#{...ProductName}#{.	#{...CostPrice}	#{...ListPrice}

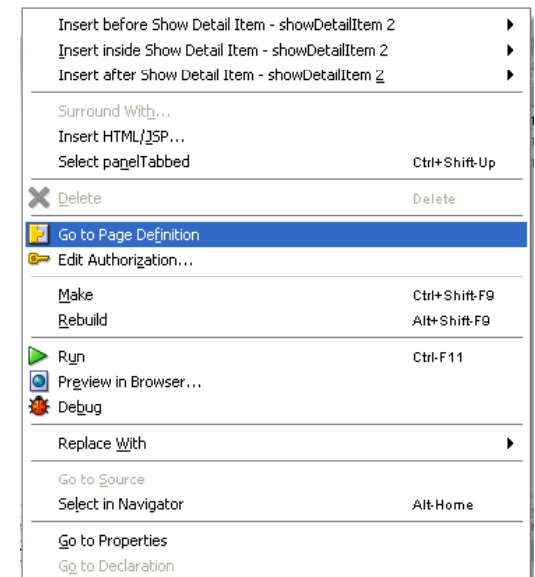


# ADF Data Bindings Concepts

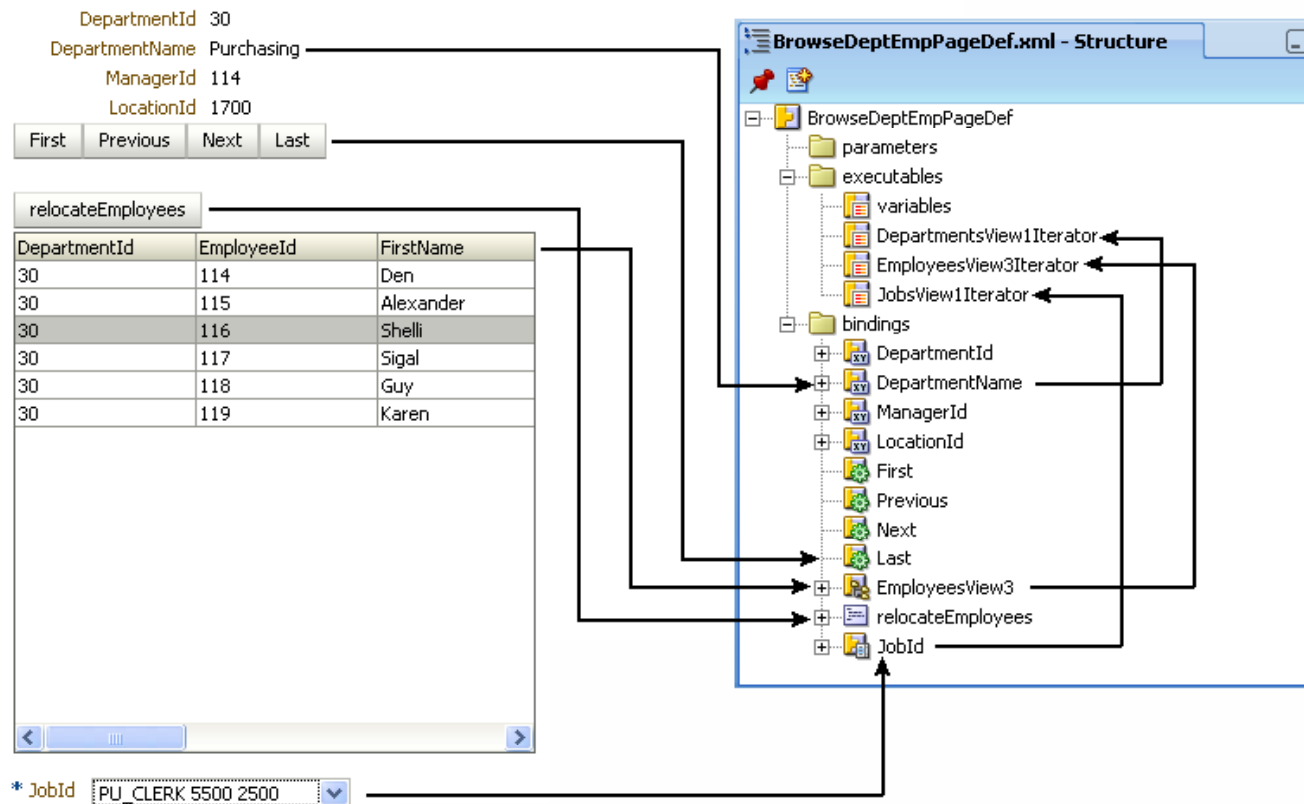
- Bindings abstract the details of accessing data from the data collections and of invoking its operations
- Three kinds of declarative bindings objects:
  - Iterator bindings
    - Tracks current row in a data collection
  - Value bindings
    - Binds UI components to attributes values in a data collection
  - Action bindings
    - Used to invoke customer or built-in operations on data collections

# PageDef.xml File

- The key data binding artifact
  - Accessable via Bindings tab in visual editor or context menu on a page
  - Describes service usage of a particular page
- XML content
  - Default location controlled by ADFm Settings
  - Runtime location determined by DataBindings.cpx



# ADF Binding in the ADF Faces UI



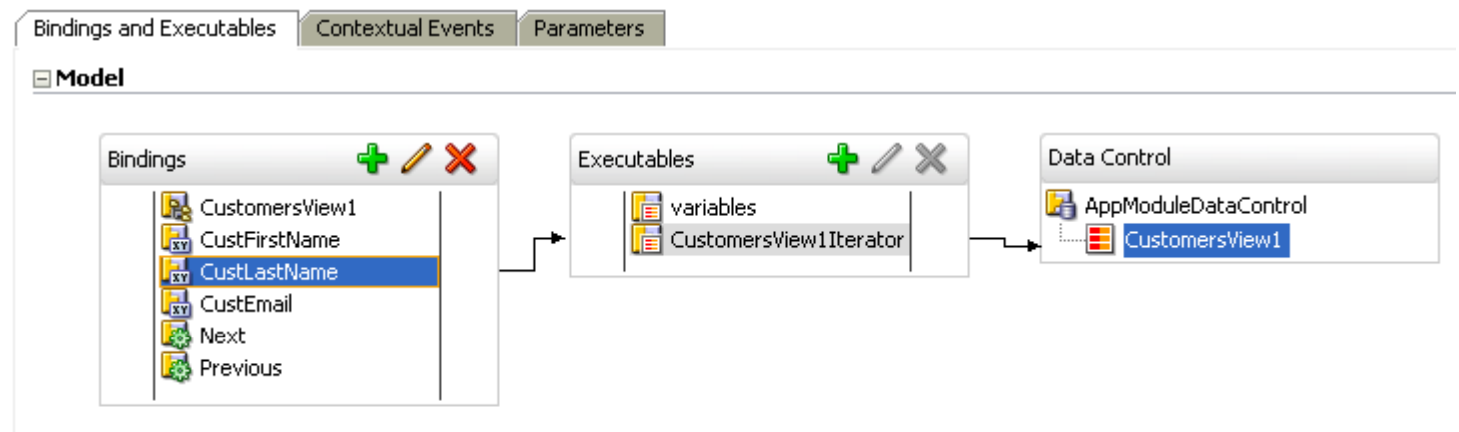


# Types of Bindings

- Attribute binding
  - Input text tem to a String value
- Tree binding
  - Table or tree to a data collection
- List binding
  - Exports a list of legal values, enabling the user to select one
- Action binding
  - Built in operation or custom method

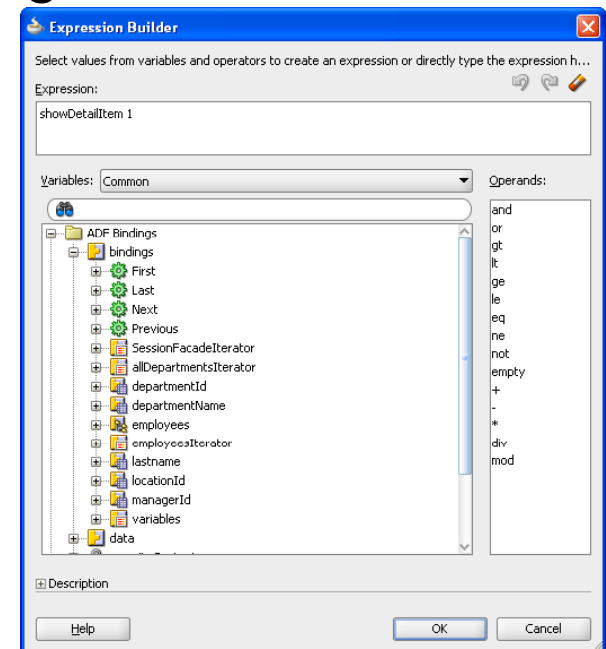
# Executables

- Link bindings to Data Controls
  - Iterator
  - Method iterator
  - Access iterator
  - Variable iterator



# What You Need to Know About Bindings

- The may or may not be used by the UI
- Accessed via the “bindings” object on the HTTP request
  - Conventionally via Expression Language  
`#{bindings.EmpNo}`
  - `#{bindings}` provides access to everything defined in the binding container/PageDef
  - Attributes other than Value
    - `#{bindings.Emps.rangesize}`

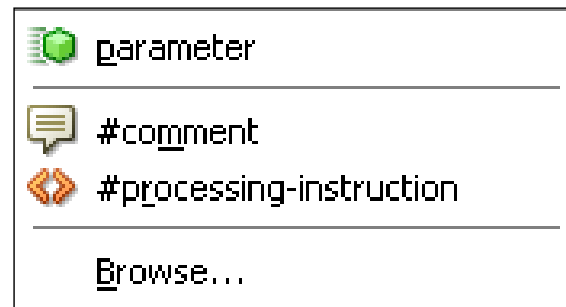




# Binding Objects in the Parameters Section

The parameters element of the page definition file defines the parameters for the page.

- Parameter binding objects declare the parameters that the page evaluates at the beginning of a request.
- Page parameters are evaluated once during the Prepare Model phase.
- Define the value of a parameter in the page definition file using:
  - Static values
  - Binding expressions
  - EL expressions that assigns a static value



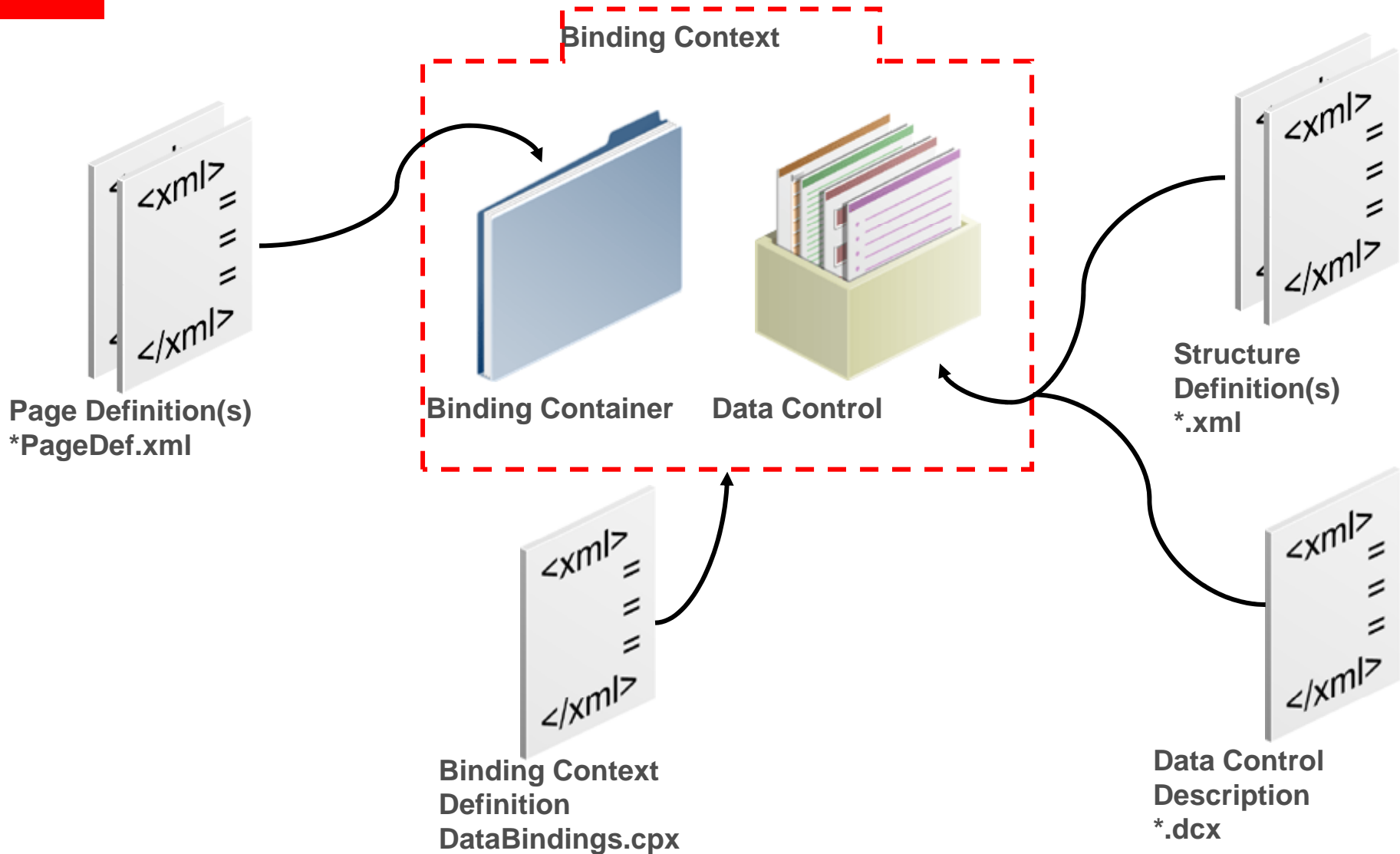


# Demo

## ADF Binding

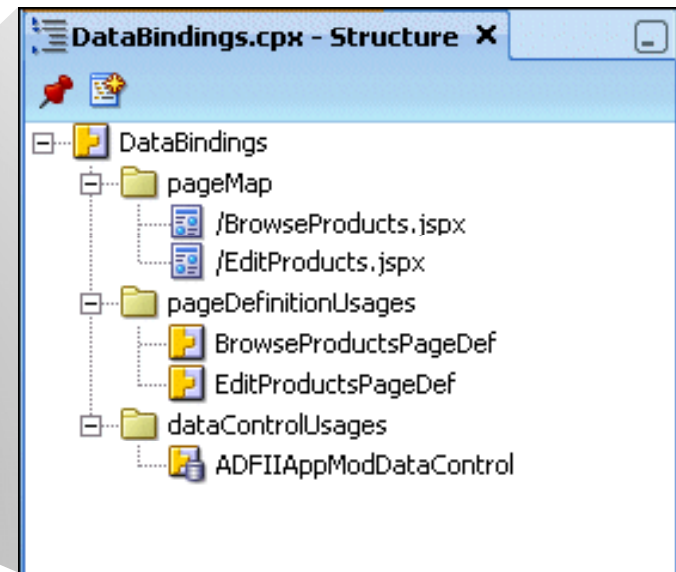
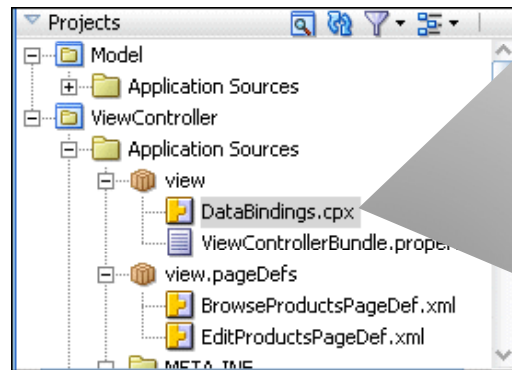


# Bindings MetaData Summary



# DataBindings.cpx File

- Provides the metadata from which the Oracle ADF binding objects are created at run time
- Uses XML syntax
  - `<pageMap>`
  - `<dataControlUsages>`
  - `<pageDefinitionUsages>`



# DataBindings.cpx

```
<?xml version="1.0" encoding="UTF-8" ?>
<Application xmlns="http://xmlns.oracle.com/adfm/application"
  version="..." id="DataBindings" SeparateXMLFiles="false"
  Package="oracle.demo.view" ClientType="Generic">
  <pageMap>
    <page path="/home.jspx" usageId="homePageDef"/>
    <page path="..." />
  </pageMap>
  <pageDefinitionUsages>
    <page id="homePageDef" path="oracle.demo.view.pageDefs.homePageDef"/>
    <page id="..." />
  </pageDefinitionUsages>
  <dataControlUsages>
    <BC4JDataControl id="AppModuleDataControl" Package="oracle.demo.model"
FactoryClass="oracle.adf.model.bc4j.DataControlFactoryImpl"
      SupportsTransactions="true" SupportsFindMode="true"
      SupportsRangesize="true" SupportsResetState="true"
      SupportsSortCollection="true"
      Configuration="AppModuleLocal" syncMode="Immediate"
      xmlns="http://xmlns.oracle.com/adfm/datacontrol"/>
    </dataControlUsages>
  </Application>
```



# Product Demonstration

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## Exploring ADF Data Controls and Binding



# Bindings at Runtime

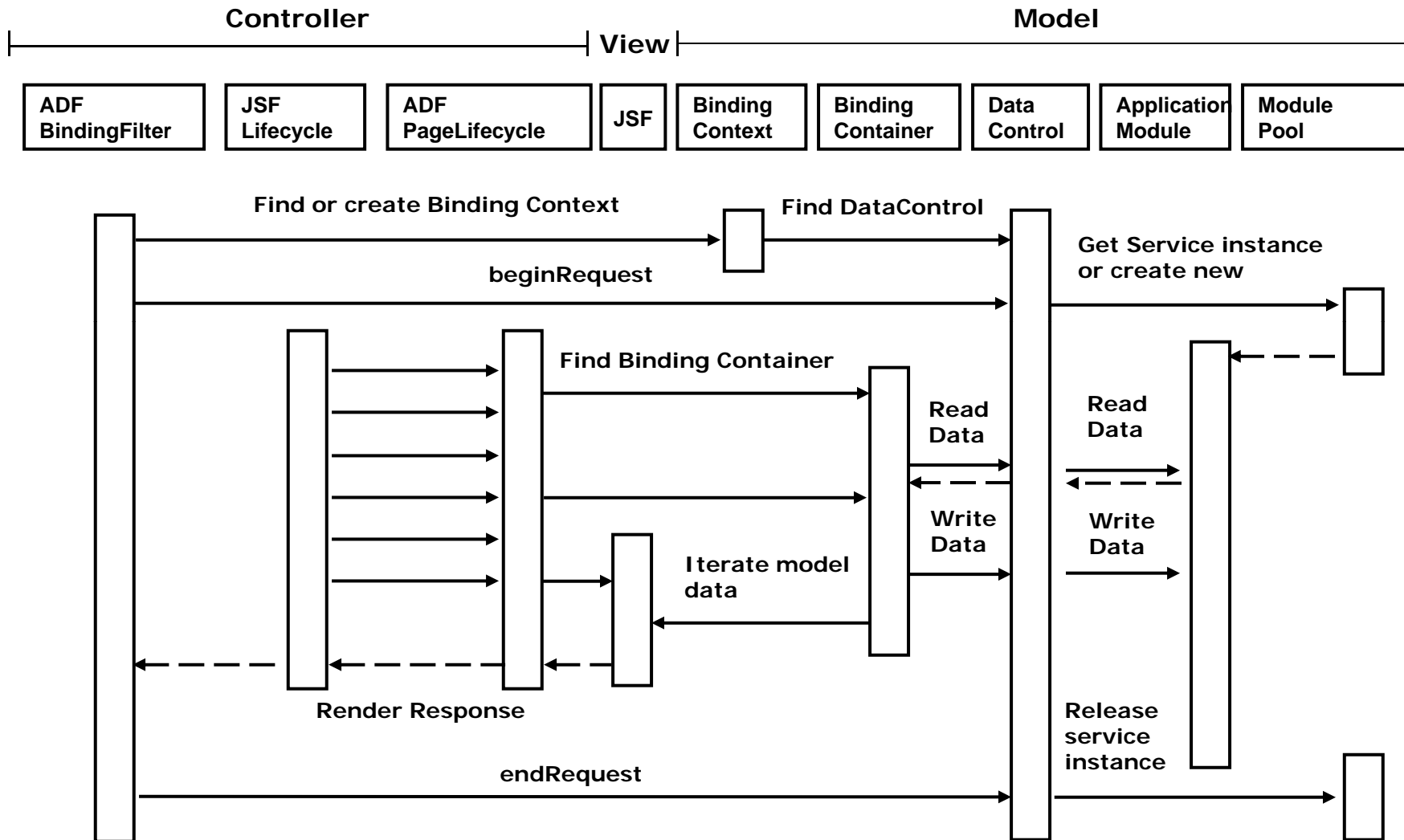


# ADF binding responsibility

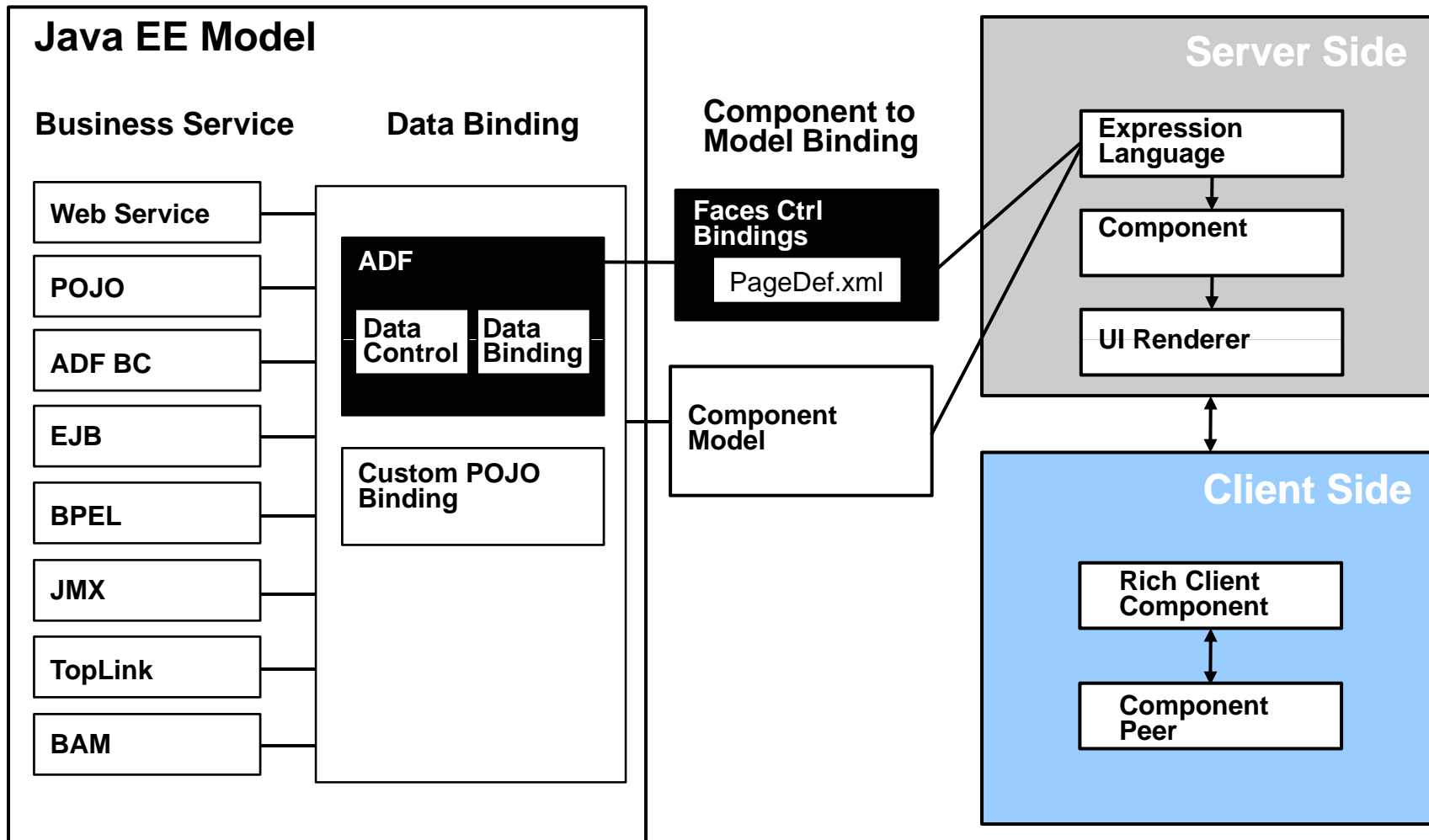
- Prepare model for page request
- Query data
- Insert – Update – Delete
- Execute operations and methods
- Manage row currencies
- Simplify business service access through consistent programming APIs




# ADF Request Lifecycle



# ADF Faces ADF Model Integration









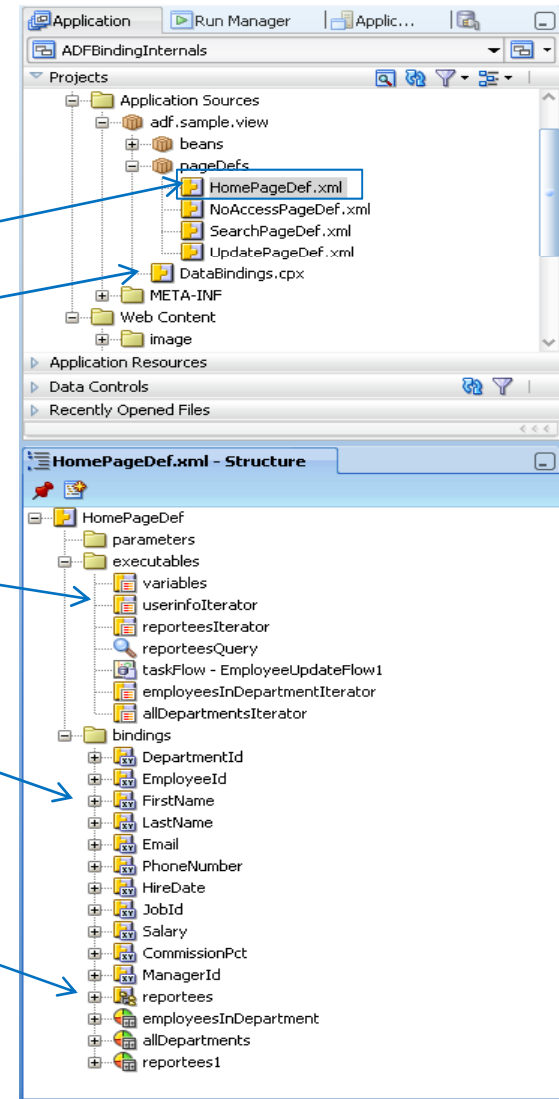


# Binding Classes – The Java in ADF

- Bindings are defined in XML at designtime
- Binding objects are created at Runtime
- Generic Binding classes start with "JUCtrl"
- Specific ADF Faces binding classes start with "FacesCtrl"
  - Adapt the generic binding layer to component model requirements
  - Expose extra methods to be used in action listeners
    - makeCurrent
    - Labels
- Developers usually work with a subset of classes

# Commonly used binding classes

- ADFContext
-  • DCBindingContainer
- BindingContext
-  • DCIteratorBinding
-  • JUCtrlAttrsBinding
-  • JUCtrlListBinding
-  • JUCtrlHierBinding
- JUCtrlHierNodeBinding
-  • OperationBinding





# BindingContainer

- Contains objects for the bindings used in a given view
  - Page
  - Page fragment
  - Defined in <view>Pagedef.xml
- EL accessible `#{bindings}`



# Accessing the Binding Container from Java

```
import oracle.adf.model.BindingContext;  
import oracle.binding.BindingContainer;  
...  
BindingContext bctx = BindingContext.getCurrent();  
BindingContainer bindings = null;  
bindings = bctx.getCurrentBindingsEntry();
```



## For more information

- <http://www.oracle.com/technetwork/jdev>
- Downloads on Oracle Technology Network (OTN)
- Product Documentation
- Data Sheets and Whitepapers
- Blogs
- OTN Discussion Forums
- Books

# Learn More at ODTUG K-Scope 2011

- <http://kscope11.com/>
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