

Oracle Application Express Workshop I

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Contents

1 Course Overview

- Course Objectives 1-2
- Agenda: Day 1 1-3
- Agenda: Day 2 1-4
- Agenda: Day 3 1-5
- Agenda: Day 4 1-6
- Agenda: Day 5 1-7
- Order Management Database Application 1-8
- Course Environment 1-9
- Workspace Details 1-10
- Accessing the labs Directory 1-11

2 Introducing Oracle Application Express

- Objectives 2-2
- Lesson Agenda 2-3
- What Is Oracle Application Express? 2-4
- Why Use Oracle Application Express? 2-5
- Types of Applications 2-6
- Applications Developed by Using Oracle Application Express 2-7
- High-Level Architecture 2-8
- Types of Installations 2-10
- Quiz 2-11
- Lesson Agenda 2-12
- What Is a Workspace? 2-13
- What Is an Internal Workspace? 2-14
- Defining Roles 2-15
- Quiz 2-17
- Lesson Agenda 2-18
- Logging In to a Workspace 2-19
- Creating a Developer User 2-20
- Workshop 2-1 Overview: Using Oracle Application Express as a Workspace
 - Administrator 2-21
- Workspace Home Page 2-22
- What Is SQL Workshop? 2-23
- Accessing SQL Workshop 2-24

Running SQL Commands	2-25
Importing and Running a SQL Script	2-26
What Is Application Builder?	2-27
Types of Applications	2-28
Accessing a Packaged Application	2-29
Selecting a Packaged Application	2-30
Installing a Packaged Application	2-31
Running an Installed Packaged Application	2-32
Unlocking an Installed Productivity Application	2-33
Exporting an Application	2-34
Importing an Application	2-35
Workshop 2-2 Overview: Using Oracle Application Express as a Developer	2-36
Lesson Agenda	2-37
Oracle Database Cloud Service	2-38
Using Oracle Application Express in Oracle Database Cloud Service	2-40
Summary	2-41
3 Creating a Database Application	
Objectives	3-2
Lesson Agenda	3-3
Accessing Application Builder	3-4
Application Builder Home Page	3-5
Lesson Agenda	3-7
Database Application Home Page	3-8
Database Application User Interfaces	3-10
Themes	3-11
Components of a Database Application	3-12
Page Definition: Overview	3-13
Different Views of a Page	3-14
Switching Between Pages and View Types	3-16
Quiz	3-17
Lesson Agenda	3-19
Create Application Wizard	3-20
Accessing the Create Application Wizard	3-21
Different Ways of Creating a Database Application	3-22
Creating a Database Application Based on a Table, Query, or Drill-Down	
Query	3-23
Page Wizard for Desktop User Interface	3-24
Page Wizard for Mobile User Interface	3-25
Creating a Database Application from a Spreadsheet	3-26
Running an Application	3-27

Using the Developer Toolbar	3-28
Summary	3-30
Workshop 3 Overview: Creating Database Applications	3-31

4 Using and Creating Interactive Reports

Objectives	4-2
Lesson Agenda	4-3
Accessing the Create Report Wizard	4-4
Types of Reports	4-5
Selecting the Appropriate Report Type	4-6
Quiz	4-7
Lesson Agenda	4-8
Interactive Report Components	4-9
Searching for Information	4-10
Selecting Columns	4-11
Adding a Column Filter	4-12
Adding a Row Filter	4-13
Sorting Columns	4-14
Creating Control Breaks	4-15
Highlighting a Row or Cell	4-16
Adding Computed Columns	4-17
Aggregating Columns	4-18
Creating a Chart	4-19
Creating a Group By Report	4-20
Creating a Group By Sort Order	4-21
Quiz	4-22
Performing a Flashback Query	4-23
Saving a Report	4-24
Resetting Reports	4-25
Downloading Reports	4-26
Subscribing to a Report	4-27
Manipulating the Interactive Report by Using a Column Header	4-28
Quiz	4-29
Lesson Agenda	4-30
Creating an Interactive Report	4-31
Accessing the Report Attributes Page	4-32
Editing Report Attributes	4-33
Customizing the Search Bar	4-34
Specifying the Download Formats	4-35
Using the Link Column	4-36
Icon and Detail Views	4-37

Modifying the Interactive Report Query	4-38
Quiz	4-39
Summary	4-41
Workshop 4-1 Overview: Building and Manipulating an Interactive Report	4-42
Workshop 4-2 Overview: Customizing an Interactive Report	4-43

5 Creating Classic Reports, Wizard Reports, and Reports for Mobile Applications

Objectives	5-2
Lesson Agenda	5-3
Classic (SQL) Report	5-4
Creating a Classic (SQL) Report	5-5
Lesson Agenda	5-6
Wizard Reports	5-7
Creating a Wizard Report	5-8
Workshop 5-1 Overview: Creating Classic Reports	5-9
Lesson Agenda	5-10
Creating List View for Mobile Applications	5-11
Creating a List View	5-12
Modifying a List View	5-13
Workshop 5-2 Overview: Creating a List View	5-14
Summary	5-15

6 Creating Forms

Objectives	6-2
Lesson Agenda	6-3
Introducing Forms	6-4
Types of Forms	6-5
Accessing the Create Form Wizards	6-7
ROWID Versus Primary Key	6-8
Lesson Agenda	6-9
Example: Form on a Table	6-10
Creating a Form on a Table	6-11
Example: Form on a Table with Report	6-12
Creating a Form on a Table with a Report	6-13
Workshop 6-1 Overview: Creating a Form on a Table	6-14
Example: Master Detail Form	6-15
Creating a Master Detail Form	6-16
Workshop 6-2 Overview: Creating a Master Detail Form	6-17
Example: Tabular Form	6-18
Creating a Tabular Form	6-19
Workshop 6-3 Overview: Creating a Tabular Form	6-20

Quiz 6-21
Lesson Agenda 6-23
Using Show/Hide Edit Links 6-24
Linking a Report to a Form 6-25
Reordering Items 6-26
Editing Form Items by Using “Edit All” 6-27
Changing Item Display Type 6-28
Customizing Forms 6-29
Quiz 6-30
Lesson Agenda 6-31
Form on a Table with List View 6-32
Creating a Form on a Table with List View 6-33
Creating a Form on a Table 6-34
Linking to a Form on a Table from an Existing List View 6-35
Workshop 6-4 Overview: Create a Form on a Table for Mobile Applications 6-36
Summary 6-37

7 Working with Pages and Regions

Objectives 7-2
Lesson Agenda 7-3
What Is a Page? (Review) 7-4
Accessing a Page Definition 7-5
Page Definition Interface 7-6
Page Definition Interface: Component View 7-8
Editing Page Attributes 7-9
Lesson Agenda 7-11
Accessing the Create Region Wizard 7-12
About Region Types 7-13
Positioning the Region 7-15
Conditional Display of Regions 7-16
Viewing the Regions Page 7-17
Editing a Region 7-18
Specifying a Region Header and Footer 7-19
Enabling Region Display Selection 7-20
Creating a Region Display Selector 7-21
Copying Regions 7-22
Creating a Subregion 7-23
Workspace 7-1 Overview: Creating and Modifying Pages and Regions 7-24
Lesson Agenda 7-25
Global Page 7-26
Creating a Global Page 7-27

Workshop 7-2 Overview: Creating a Global Page and Adding a Region	7-28
Common Pages for Different User Interfaces	7-29
Auto-detection of Application Pages	7-30
Viewing jQuery Mobile Smartphone Pages	7-31
Workshop 7-3 Overview: Modify the Mobile Home page	7-32
Creating a Page Group	7-33
Copying a Page	7-34
Quiz	7-35
Summary	7-37

8 Adding Items and Buttons

Objectives	8-2
Lesson Agenda	8-3
Items	8-4
Page Items: Examples	8-5
What Are Application Items?	8-6
Accessing the Create Page Item Wizard	8-7
Types of Page Items	8-8
Lesson Agenda	8-10
Creating a Date Picker Item	8-11
Creating Multiple Items by Using the Tabular Form	8-12
Editing an Item	8-13
Creating Quick Picks	8-14
Finding Items by Using the Item Finder	8-15
Adding Subtypes on Mobile Item Types	8-17
Quiz	8-18
Workshop 8-1 Overview: Adding Items and Buttons	8-19
Lesson Agenda	8-20
What Is an LOV?	8-21
Accessing the “Lists of Values” Page	8-22
Creating a Static LOV	8-23
Creating a Dynamic LOV	8-24
Associating an LOV with an Item	8-25
Creating a Select List Item	8-26
Converting an LOV	8-27
Creating a Cascading LOV	8-28
Lesson Agenda	8-30
What Is a Button?	8-31
Creating an Item Button	8-32
Creating a Region Button	8-33
Accessing the Create Multiple Buttons Option	8-34

Creating Multiple Buttons	8-35
Editing Button Attributes	8-36
Modifying a Region Button to Redirect to a URL	8-37
Quiz	8-38
Workshop 8-2 Overview: Manipulating Items on Your Desktop Pages	8-39
Summary	8-40

9 Understanding Session State

Objectives	9-2
Lesson Agenda	9-3
What Is a Session State?	9-4
Session ID	9-5
Session Timeout	9-6
Setting Session Timeout	9-7
How Does Oracle Application Express Implement Session State?	9-8
Identifying the Parts of an Oracle Application Express URL	9-10
Quiz	9-12
Lesson Agenda	9-13
Viewing Session State	9-14
Referencing Session State	9-15
Referencing Session State by Using Bind Variables: Example	9-16
Referencing Session State in Static Text: Example	9-17
Clearing the Cache	9-18
Quiz	9-19
Summary	9-20
Workshop 9 Overview: Understanding Session State	9-21

10 Adding Page Processing

Objectives	10-2
Lesson Agenda	10-3
Page Rendering Versus Page Processing	10-4
Types of Logic	10-5
Scenario 1: Page Rendering	10-6
Scenario 2: Page Processes	10-7
Scenario 3: Page Processes	10-8
Scenario 4: Page Validation	10-9
Lesson Agenda	10-10
What Is a Computation?	10-11
Computation Examples	10-12
Creating Computations	10-13
Creating a Page-Rendering Computation	10-14

Creating a Page-Processing Computation 10-15
Quiz 10-16
Lesson Agenda 10-17
What Is a Page Process? 10-18
Automatic Processing Processes 10-19
Reviewing an Automated Row Fetch Process 10-20
Reviewing an Automatic Row (DML) Processing Process 10-21
Creating an On Submit Process 10-22
Creating an On Load Process 10-23
Options to Populate Items in a Form 10-24
Creating a Tabular Form Process 10-25
Lesson Agenda 10-26
What Are Validations? 10-27
Using the Create Validation Wizard 10-28
SQL Validation: Example 10-29
Creating a SQL Validation 10-30
PL/SQL Validation: Example 10-31
Creating a PL/SQL Validation 10-32
Item String Comparison Validation: Example 10-33
Creating an Item String Comparison Validation 10-34
Regular Expression Validation: Example 10-35
Creating a Regular Expression Validation 10-36
Tabular Form Validation: Example 10-37
Creating a Tabular Form Validation 10-38
Quiz 10-39
Lesson Agenda 10-40
What Is Branching? 10-41
Creating a Branch 10-42
Summary 10-44
Workshop 10 Overview: Creating and Manipulating Computations, Processes and Validations 10-45

11 Validating and Debugging Your Application

Objectives 11-2
Lesson Agenda 11-3
Using the Advisor 11-4
Resolving Advisor Errors/Warnings 11-6
Quiz 11-7
Workshop 11-1 Overview: Using the Advisor 11-8
Lesson Agenda 11-9
Managing Your Attribute Dictionary 11-10

Reviewing Items and Report Columns	11-11
Modifying Attributes in the Dictionary	11-12
Quiz	11-14
Workshop 11-2 Overview: Managing Your Attribute Dictionary	11-15
Lesson Agenda	11-16
What Is the Debug Option?	11-17
Enabling and Disabling Debug Mode	11-18
Debugging an Application	11-19
Viewing the Debug Messages: SHOW Application	11-20
Viewing the Debug Messages: ACCEPT Request	11-21
Troubleshooting Issues	11-22
Workshop 11-3 Overview: Debugging Your Application	11-23
Summary	11-24

12 Adding Shared Components That Aid Navigation

Objectives	12-2
Lesson Agenda	12-3
What Are Shared Components?	12-4
Navigational Shared Components	12-5
Lesson Agenda	12-6
Types of Tabs	12-7
Accessing the Tabs Page	12-8
Managing Tabs	12-9
Creating Parent Tabs	12-10
Creating Standard Tabs	12-11
Reassigning a Standard Tab	12-12
Lesson Agenda	12-13
Accessing the Lists Page	12-14
Creating a Static List	12-15
Creating List Entries	12-16
Creating a Dynamic List	12-17
Creating a List Region	12-18
Creating a List Region on the Global Page	12-19
Lesson Agenda	12-20
Viewing a Breadcrumb	12-21
Creating Breadcrumb Entries	12-22
Reparenting Breadcrumbs	12-23
Creating a Breadcrumb Region	12-24
Lesson Agenda	12-25
Accessing the Navigation Bar Entries Page	12-26
Creating a Help Page	12-27

Creating a Navigation Bar Entry	12-28
Quiz	12-29
Summary	12-30
Workshop 12 Overview: Adding Shared Components That Aid Navigation	12-31

13 Working with Themes, Templates, and Files

Objectives	13-2
Lesson Agenda	13-3
What Is a Theme?	13-4
Accessing the Themes Page	13-5
Creating a New Theme from the Repository	13-6
Switching Between Themes	13-7
Creating a Copy of an Existing Theme	13-8
Editing a Theme	13-9
Quiz	13-10
Lesson Agenda	13-11
What Are Templates?	13-12
Types of Templates	13-13
Accessing the Templates Page	13-14
Copying a Template	13-15
Editing a Template	13-16
Applying a Template	13-17
Applying a Template: Output	13-18
Using Substitution Strings in Templates	13-19
Changing Default Templates in a Theme	13-20
Overriding Application Defaults at the Page Level	13-21
Lesson Agenda	13-22
Uploading a Cascading Style Sheet	13-23
Referencing a Cascading Style Sheet	13-24
Uploading an Image	13-25
Using an Uploaded Image	13-26
Quiz	13-27
Summary	13-28
Workshop 13 Overview: Working with Themes, Templates, and Files	13-29

14 Implementing Security

Objectives	14-2
Lesson Agenda	14-3
Securing an Application: Overview	14-4
Accessing Security Tasks	14-5
Lesson Agenda	14-6

Authentication Schemes Page	14-7
Implementing Authentication	14-8
Preconfigured Authentication Schemes	14-9
Creating Authentication Based on Preconfigured Schemes	14-11
Copying an Authentication Scheme	14-12
Quiz	14-13
Workshop 14-1 Overview: Creating an Authentication Scheme	14-14
Lesson Agenda	14-15
Where Can You Implement Authorization?	14-16
Methods to Implement Authorization	14-17
Creating an Authorization Scheme from Scratch	14-18
Creating an Access Control Page	14-19
Configuring the Access Control Page	14-20
Applying an Authorization Scheme to an Application	14-21
Applying an Authorization Scheme to a Page	14-22
Applying an Authorization Scheme to a Column in a Report	14-23
Quiz	14-24
Workshop 14-2 Overview: Restricting Users By Using Access Control	14-25
Lesson Agenda	14-26
What Is Session State Protection?	14-27
Enabling Session State Protection from the Edit Application Page	14-28
Enabling Session State Protection from the Session State Protection Page	14-29
Configuring Session State Protection	14-30
Identifying Security Attributes	14-31
Configuring Session State Protection by Using a Wizard	14-33
Configuring Session State Protection for Pages and Items	14-34
Configuring Session State Protection for Application Items	14-35
Summary	14-36

15 Managing Application Navigation

Objectives	15-2
Lesson Agenda	15-3
Building a Hierarchical List with Images	15-4
Workshop 15-1 Overview: Building a Hierarchical List with Images	15-11
Lesson Agenda	15-12
Building a Database-Driven Navigation Report	15-13
Quiz	15-16
Workshop 15-2 Overview: Building a Database-Driven Report	15-17
Lesson Agenda	15-18
Building a Site Map	15-19
Adding a Navigation Bar Entry	15-24

Quiz 15-26

Workshop 15-3 Overview: Building a Site Map 15-27

Lesson Agenda 15-28

Enforcing Authorization on Your Site Map 15-29

Workshop 15-4 Overview: Enforcing Authorization on the Site Map 15-30

Summary 15-31

16 Extending Your Application

Objectives 16-2

Lesson Agenda 16-3

Data Load Wizard 16-4

Creating Data Load Wizard Pages 16-5

Data Load Wizard Pages 16-6

Workshop 16-1 Overview: Adding a Data Upload Wizard 16-7

Lesson Agenda 16-8

Creating an Upload and Download Page 16-9

Workshop 16-2 Overview: Creating an Upload and Download Page 16-10

Lesson Agenda 16-11

Adding BLOB Data to an Existing Application 16-12

Adding BLOB Data 16-13

Example: Creating a Form with a Report 16-14

Modifying the BLOB Format in the Report 16-15

SQL Query for BLOB Data in Report 16-16

Modifying the BLOB Format in the Form 16-17

Adding a Delete Image Region 16-18

Adding a Delete Image Region: Creating an Item 16-19

Adding a Delete Image Region: Creating a Process 16-20

Quiz 16-21

Workshop 16-3 Overview: Using BLOB Data in a Report and Form 16-22

Lesson Agenda 16-23

Contact Us Page 16-24

Creating a Send E-Mail Process 16-25

Summary 16-26

17 Creating and Editing Charts

Objectives 17-2

Lesson Agenda 17-3

Building Charts 17-4

Creating SQL Queries for Charts 17-5

Creating a Flash Chart 17-6

Viewing and Editing Chart Attributes 17-8

Workshop 17-1 Overview: Creating and Editing Charts	17-9
Creating an HTML5 Chart for Mobile Applications	17-10
Workshop 17-2 Overview: Creating an HTML5 Chart for Mobile Applications	17-11
Lesson Agenda	17-12
Creating a Combined Chart	17-13
Quiz	17-16
Creating a Project Gantt	17-17
Quiz	17-20
Creating a Circular Gauge Chart	17-21
Workshop 17-3 Overview: Enhanced Charting Examples	17-23
Summary	17-24

18 Adding Calendars and Trees

Objectives	18-2
Lesson Agenda	18-3
Creating a Calendar	18-4
Editing Calendar Attributes	18-7
Dragging and Dropping Calendar Entries	18-9
Linking to the Calendar from a Button	18-11
Calendars for Mobile Applications	18-13
Creating a Calendar for Mobile Applications	18-14
Workshop 18-1 Overview: Creating a Calendar	18-17
Lesson Agenda	18-18
What Is a Tree?	18-19
Creating a Tree	18-20
Manipulating a Tree	18-23
Workshop 18-2 Overview: Creating a Tree Whose Nodes Link to a Different Page	18-25
Summary	18-26

19 Using Dynamic Actions and Plug-Ins

Objectives	19-2
Lesson Agenda	19-3
What Is a Dynamic Action?	19-4
General Steps to Create a Dynamic Action	19-5
Enabling and Disabling an Item: Overview	19-6
Creating and Using Dynamic Actions: Examples	19-7
Changing the Class When an Item Is Null	19-8
Changing the Class When an Item Is Null: Overview	19-9
Setting the Value of an Item When Another Item Changes	19-10
Submitting the Page When Button Is Clicked	19-12

Disabling a Button When Clicked: Overview	19-13
Refreshing the Data in a Report Using Custom Filters	19-14
Refreshing the Data in a Report Using Custom Filters: Overview	19-15
Refreshing the Data in a Report Using Custom Filters	19-16
Refreshing the Data in a Report Using Custom Filters: Overview	19-17
Quiz	19-19
Workshop 19-1 Overview: Creating and Using Dynamic Actions	19-21
Lesson Agenda	19-22
What Is a Plug-In?	19-23
Steps to Use a Plug-in in Your Application	19-24
Accessing the Plug-in Repository	19-25
Importing a Plug-In	19-26
Installing a Plug-In	19-27
Reviewing a Plug-in Definition	19-28
Using an Item Plug-in on a Page	19-30
Quiz	19-31
Additional Plug-in Examples	19-32
Adding a Checkbox Item	19-33
Displaying a Notification Message When an Item is Clicked	19-34
Changing and Highlighting an Item When Another Item Changes	19-35
Changing and Highlighting an Item When Another Item Changes: Overview	19-36
Creating a Cascading LOV	19-37
Creating a Dynamic Action that Uses the Highlight Plug-In	19-38
Setting the Value of an Item When Other Item(s) Change	19-40
Setting the Value of an Item When Another Item Changes: Overview	19-41
Workshop 19-2 Overview: Importing and Using Plug-Ins	19-44
Summary	19-45

20 Using Application Express Printing

Objectives	20-2
Lesson Agenda	20-3
Report-Printing Configuration Options	20-4
Producing Reports in Oracle Application Express	20-5
Lesson Agenda	20-6
Standard Report, Print Enabled	20-7
Standard Report, with Derived Output	20-8
Quiz	20-9
Workshop 20-1 Overview: Printing a Standard Report with Derived Output	20-10
Lesson Agenda	20-11
Report Queries	20-12
Report Layouts	20-13

Creating a Report for Download	20-15
Creating a Report Query	20-16
Creating the Report Layout	20-17
Linking the Report to Your Application	20-18
Workshop 20-2 Overview: Creating a PDF Report with Multiple Queries	20-20
Summary	20-21

21 Managing Application Feedback

Objectives	21-2
Lesson Agenda	21-3
What Is Team Development?	21-4
Tracking the Progress of Your Application Development Project	21-5
Creating Features	21-6
Creating Milestones	21-7
Creating Bugs	21-8
Creating To Dos	21-9
Quiz	21-10
Lesson Agenda	21-13
Review the Progress of Your Milestones and Features	21-14
Enabling Feedback for an Application	21-15
Step 1: Enabling Feedback in Application Properties	21-16
Step 2: Creating a Feedback Page	21-17
Step 3: Submitting Feedback	21-18
Step 4: Accessing Submitted Feedback in Team Development	21-19
Quiz	21-20
Summary	21-21
Workshop 21 Overview: Adding and Monitoring Feedback in Your Application	21-22

Appendix A: Additional Resources

Additional Resources	A-2
Application Express Page on OTN	A-3
Documentation and Tutorials	A-5
Oracle Learning Library	A-6
Blogs	A-7
Forum: Application Express	A-8
Hosted Online Help	A-9
Learn More	A-10
Oracle Application Express Developer Certified Expert Examination	A-11

Appendix B: More Information About Application Development

Lessons	B-2
Objectives	B-4
Lesson Agenda Create a Websheet Application	B-5
What Is a Websheet?	B-6
Websheets Versus Database Applications	B-7
Default Websheet Interface	B-8
Creating and Running a Websheet	B-9
Lesson Agenda Create a Websheet Application	B-10
Types of Sections	B-11
Creating a Text Section	B-12
Adding Annotations to a Page	B-13
Copying a Page	B-14
Editing Page Sections	B-15
Viewing the Page Directory	B-16
Displaying an Image	B-17
Using Markup Syntax	B-18
Quiz	B-19
Lesson Agenda Create a Websheet Application	B-20
What Are Data Grids?	B-21
Creating a Data Grid from Scratch	B-22
Creating a Data Grid from a Spreadsheet	B-23
Creating a Data Section	B-24
Creating a Chart Section	B-26
Quiz	B-28
Lesson Agenda Create a Websheet Application	B-29
Overview	B-30
Adding a Column	B-31
Creating a List of Values	B-32
Editing Column Properties	B-33
Creating a Validation	B-34
Toggling Check Boxes	B-35
Setting Multiple Column Values	B-36
Replacing Values	B-37
Adding Annotations to a Data Grid	B-38
Summary	B-39
Manipulate and Administer a Websheet Application	B-40
Objectives	B-41
Lesson Agenda Manipulate and Administer a Websheet Application	B-42
Editing Websheet Properties	B-43
Reports	B-44

Creating a Report	B-45
Editing the Report Query	B-46
Using SQL Markup	B-47
Creating a PL/SQL Section	B-48
Quiz	B-49
Lesson Agenda Manipulate and Administer a Websheet Application	B-50
Creating Navigation Sections	B-51
Linking Pages	B-52
Moving a Section to a Different Page	B-53
Viewing Page History	B-54
Viewing a Page in Presentation Mode	B-55
Lesson Agenda Manipulate and Administer a Websheet Application	B-56
Viewing the Websheet Dashboard	B-57
Monitoring Activity in a Websheet	B-58
Sharing Websheets with Users	B-59
1. View the Current Websheet Authentication Method	B-60
2. Create Users in Application Express Administration	B-61
3. Create an ACL in Your Websheet	B-62
4. Change Websheet Authorization to Use a Custom ACL	B-63
5. Test User Access to the Websheet	B-64
Quiz	B-65
Summary	B-66

Appendix C: Developing Applications in Oracle Application Express for Oracle Database Cloud Service

Objectives	C-2
Lesson Agenda	C-3
What Is Oracle Cloud?	C-4
Oracle Database Cloud Service: Currently Available Features	C-5
Oracle Cloud Terminology	C-6
Oracle Cloud Roles	C-8
Lesson Agenda	C-9
Types of Services	C-10
Lesson Agenda	C-11
Creating a Database Cloud Trial Service	C-12
Lesson Agenda	C-14
About the My Services Page	C-15
Accessing the My Services Page	C-16
Launching a Database Cloud Service APEX Environment	C-17
Lesson Agenda	C-18
Creating a Database Application	C-19

Lesson Agenda C-20
Administering a Database Cloud Service C-21
Summary C-22

Appendix D: About Deploying an Application

Objectives D-2
Lesson Agenda Deploy an Application D-3
Steps to Deploy an Application D-4
What Is a Packaged Application? D-5
What Are Supporting Objects? D-6
Lesson Agenda Deploy an Application D-7
Identifying the Supporting Objects for an Application D-8
Creating Installation Scripts D-9
Specifying Prerequisites and Other Options D-10
Specifying Build Options D-11
Creating an Installation Script D-12
Creating Upgrade Scripts D-13
Creating Deinstallation Scripts D-14
Accessing the Export Page D-15
Exporting an Application D-16
Quiz D-17
Lesson Agenda Deploy an Application D-18
Importing an Application D-19
Installing the Application D-20
Publishing the Application URL D-21
Quiz D-22
Summary D-23

1

Course Overview

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Course Objectives

After completing this course, you should be able to do the following:

- Create a database application
- Develop and manage application components in a database application
- Create processes and validations within an application
- Use and manage shared components
- Implement security in an application
- Navigate within an application
- Extend and enhance your application by using some built-in wizards



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This course introduces you to Oracle Application Express, a rapid web application development tool for the Oracle database. In this course, you learn about its features and benefits, and you also learn how to log in and use its various components to build complete and secure web applications.

Agenda: Day 1

1. Course Overview
2. Introducing Oracle Application Express
3. Creating a Database Application
4. Using and Creating Interactive Reports
5. Creating Classic Reports, Wizard Reports, and Reports for Mobile Applications



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This agenda is a suggested list of lessons to be covered on each day of the five-day course.

Agenda: Day 2

- 6. Creating Forms
- 7. Working with Pages and Regions
- 8. Adding Items and Buttons
- 9. Understanding Session State



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Agenda: Day 3

- 10. Adding Page Processing**
- 11. Validating and Debugging Your Application**
- 12. Adding Shared Components That Aid Navigation**
- 13. Working with Themes, Templates and Files**



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Agenda: Day 4

- 14. Implementing Security**
- 15. Managing Application Navigation**
- 16. Extending Your Application**
- 17. Creating and Editing Charts**



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Agenda: Day 5

- 18. Using Dynamic Actions and Plug-ins**
- 19. Adding Calendars and Trees**
- 20. Utilizing Application Express Printing**
- 21. Managing Application Feedback**



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Order Management Database Application

The screenshot shows a web-based application interface. At the top, there is a navigation bar with links: Home, Products, Orders, Customers, Employees (which is the active tab), Help, and Admin. To the right of the navigation bar, it says "Welcome: TEACH Logout". Below the navigation bar, there is a search bar labeled "Employees" with a "Search" button, a "Display" dropdown set to 15, and a "Go" button. There is also a "Reset" and a "Create" button. The main content area displays a table titled "Employees" with columns: First Name, Last Name, Email, Phone Number, Hire Date, Job Id, Salary, Commission Pct, Manager Id, and Department Id. The table contains 14 rows of employee data. To the right of the table, there is a chart titled "Employees by Department" showing the number of employees per department. The chart has a y-axis labeled "Numbers of Employees" ranging from 0 to 50 and an x-axis with categories: Administration, Accounting, Purchasing, Human Resources, and Public Relations. The data is represented by colored bars: Administration (blue, 1), Accounting (orange, 2), Purchasing (green, 4), Human Resources (yellow, 1), and Public Relations (brown, 1).

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In this course, you create an order management database application. You create reports, forms, master-detail forms, charts, lists, and calendars.

Course Environment

- Operating system: Linux
- Installed products:
 - Oracle Database 11g R2
 - Oracle BI Publisher
 - Oracle Application Express 4.2
 - Embedded PL/SQL Gateway



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The classroom setup uses a client/server architecture. The instructor machine is set up with Oracle Database and the required software to run Oracle Application Express. You will log on to the student machine that is assigned to you by using NX client. From the student machine, you access the Oracle Application Express workspace that is assigned to you by using a web browser.

Workspace Details

- An Oracle Application Express workspace is assigned to you.
 - Workspace name: ora<n>
 - Username: ora<n>_admin
 - Password: ora<n>
- Log in to your workspace to complete the practice tasks in the Activity Guide.



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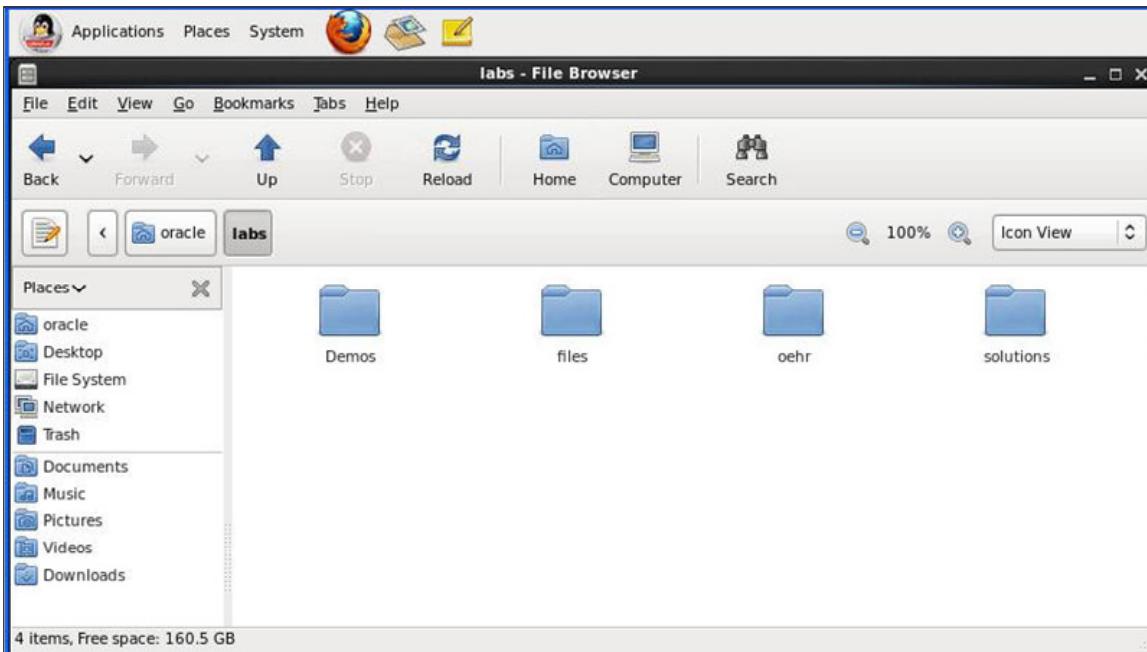
Your instructor assigns a workspace to you. The workspace name, username, and password details are listed in the slide. Replace <n> with the number assigned to you by your instructor, which ranges from 01 through 22. You need to log in to this workspace to complete all the practices in the Activity Guide for this course.

To access the Oracle Application Express development instance, open a web browser and enter the following URL in the address bar:

`http://<hostname>:8080/apex`

hostname is the IP address of the instructor machine.

Accessing the `labs` Directory



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All the files that are required to complete the practices are available in the `labs` directory. To access the `labs` directory, from the Applications menu, select System Tools > File Browser. From the `oracle` directory, open the `labs` directory. You will see four folders and their contents:

- **Demos:** The demos referenced in the lesson notes
- **files:** All the files that you need to complete the practices. You can use this location to save the files while performing the practices, if required.
- **oehr:** The packaged application that you must import to install the database objects required for the practices
- **solutions:** The solution scripts given in the Activity Guide. This folder also contains the catch-up applications that you can import in case you were not able to complete a practice.

Introducing Oracle Application Express

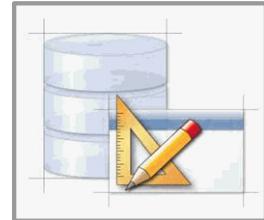
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Objectives

After completing this lesson, you should be able to:

- Describe Oracle Application Express
- Explain Oracle Application Express concepts
- Identify the components of Oracle Application Express
- Run a sample application
- Install a packaged application
- Export and import applications
- Use Oracle Application Express in Oracle Database Cloud Service



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This lesson introduces you to Oracle Application Express. You identify the key features, benefits, and components of Oracle Application Express. You understand how Oracle Application Express works by learning about its architecture. You get started with Oracle Application Express by setting up the users and the environment used in this course. You are also introduced to Oracle Database Cloud Service that uses Oracle Application Express.

Lesson Agenda

- Oracle Application Express Overview
 - What Is It?
 - Why Use It?
 - Types of Applications
 - Examples
 - High-Level Architecture
 - Types of Installation
- Oracle Application Express Concepts
- Using Oracle Application Express
- Using Oracle Application Express in Oracle Database Cloud Service



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What Is Oracle Application Express?

Oracle Application Express is a web application development, deployment, and maintenance tool.

Oracle Application Express Home Page

The Home Page displays four main menu items:

- Application Builder**: Represented by a ruler and pencil icon.
- SQL Workshop**: Represented by a SQL prompt and gear icon.
- Team Development**: Represented by a ladybug, lightbulb, and speech bubble icon.
- Administration**: Represented by a gauge and user icon.

Key Features

Report	Theme and Template
Form	Navigation
Chart	Logic
Calendar	Security

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Oracle Application Express is a web-based development and deployment tool that is available with the Oracle database. It enables you to create database-centric web applications that are reliable, scalable, and secure. It has several built-in features and wizards that quicken your development process. Some of the key features are listed in the slide.

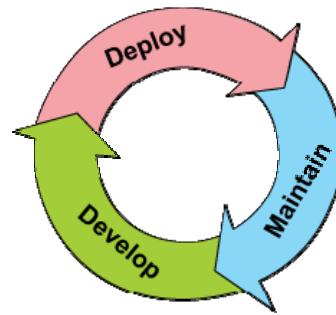
The tool has a user-friendly graphical interface. Using Oracle Application Express requires minimal programming knowledge.

The application definition is stored as metadata in the Oracle database tables. When you run your application, the Oracle Application Express engine assembles the pages from the database and displays them in your browser.

Oracle Application Express was first released in 2004 and was then called HTML DB.

Why Use Oracle Application Express?

- Enables rapid application development
- Creates applications that are reliable, secure, and scalable
- Offers a user-friendly development environment
- Provides flexible look-and-feel options by using themes and templates
- Uses declarative programming
- Features a simple, self-contained architecture
- Provides a platform-independent environment
- Offers individual or shared workspaces for developers



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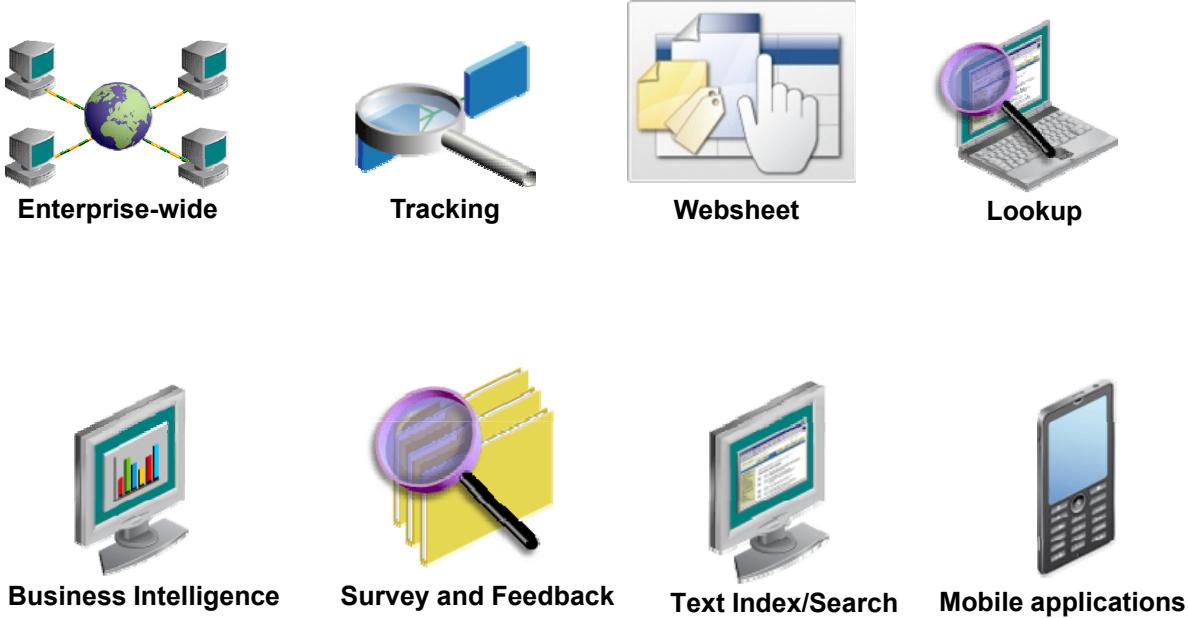
Using Oracle Application Express, you can develop web-based, database-centric applications that are reliable and fast, as well as secure and scalable. It has a user-friendly interface, which enables you to create and deploy applications in a short span of time. You can use the available themes and templates to provide a consistent look-and-feel across your web pages.

Oracle Application Express uses a declarative framework for web application development. This means that you specify what to do rather than how to do it. No code is generated or compiled. You interact with wizards and property sheets to define your application.

Oracle Application Express enables organizations to capitalize on their existing investment in SQL and PL/SQL skills. Few programming skills are required, and anyone can quickly learn to develop applications. With Oracle Application Express, applications are built faster, with fewer developers.

Oracle Application Express can be installed on a single workstation, or on a server that can support multiple developers. An administrator centrally manages and administers the development environment and creates a shared workspace in a single installation. The definition of an entire application can be easily packaged and exported for deployment and installation into another Oracle Application Express instance.

Types of Applications



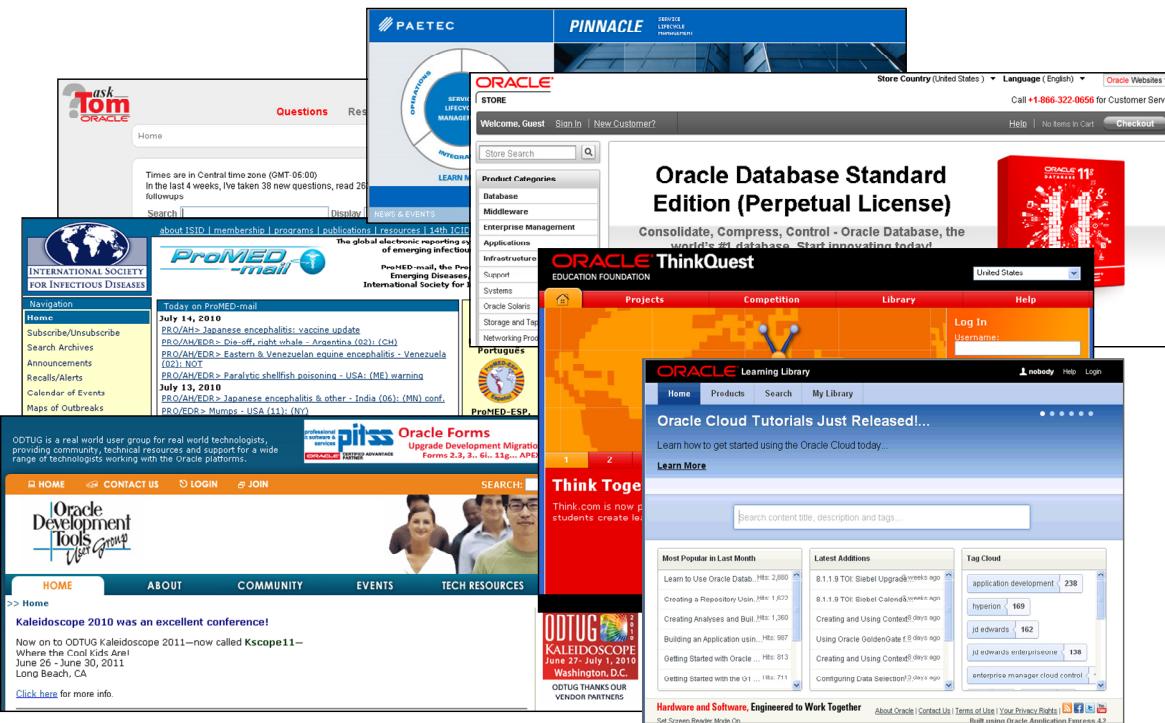
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Examples of the types of applications that are developed by using Oracle Application Express are as follows:

- Enterprisewide applications
- Web-based applications to track projects, contacts, customers, leads, and assets
- Websheet applications that enable end users to manage structured and unstructured data without developer assistance
- Applications to look up people and catalog items
- Lightweight business intelligence (BI) applications with reports, bar charts, line charts, and pie charts. These applications may be based on summarized data copied from a live database, or operate on live transaction data. The charts and reports enable drilling down and cross-referencing of information.
- Web-based applications that use the text indexing and search capability of the Oracle database
- Applications that must be built in a very short span of time (usually a week)
- Mobile applications

Applications Developed by Using Oracle Application Express



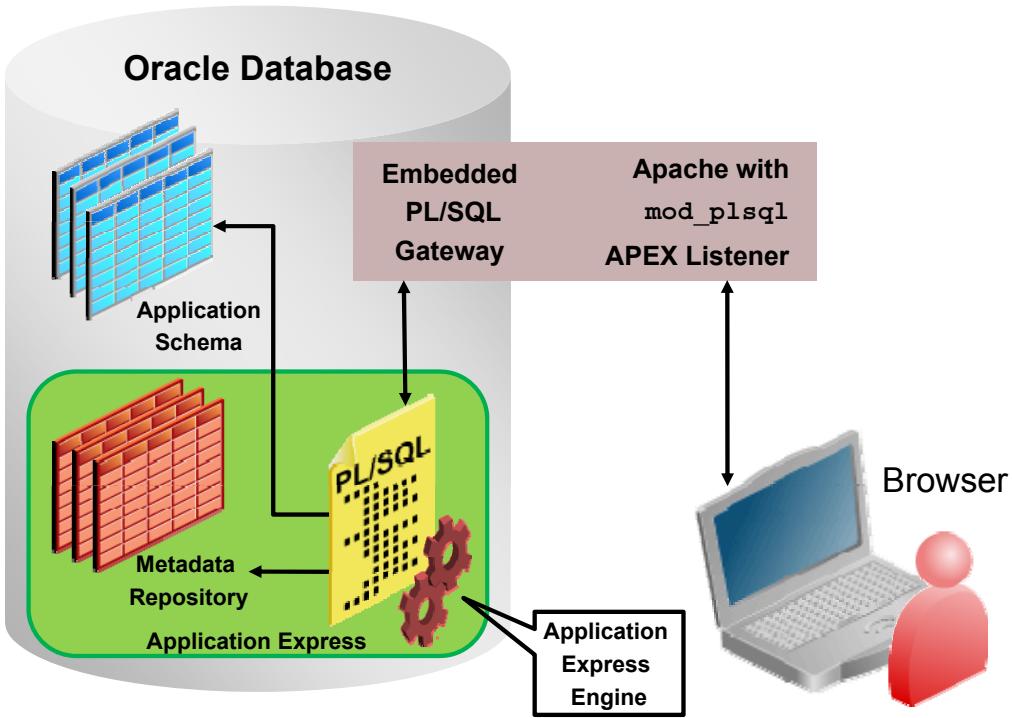
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This slide shows a variety of applications that have been developed by using Oracle Application Express.

Note: Oracle Application Express itself is developed by using Oracle Application Express.

High-Level Architecture



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Oracle Application Express resides in your Oracle database. It consists of:

- Metadata stored in database tables
- The Application Express engine, which is written by using PL/SQL code

When you create an application, its definition is stored in the metadata repository. At every stage of application development, metadata is created or modified and stored in the repository tables. The Application Express engine assembles the application pages by accessing the metadata repository.

When you run your application from the browser, calls are made to the Application Express engine. The engine then processes and renders the application components in real time, based on the data in the metadata repository and the schema against which the application is running.

To enable your web browser to interact with the Application Express engine, you need a PL/SQL gateway. A PL/SQL gateway enables you to build PL/SQL-based applications for the web. In Oracle Application Express, you have three options to configure the gateway:

- Oracle HTTP Server (Apache) with `mod_plsql`
- Oracle APEX Listener
- Embedded PL/SQL gateway

The Oracle HTTP Server is an HTTP-compliant web server. `mod_plsql` is an Oracle HTTP Server plug-in that enables the web browser to communicate with the database. It maps browser requests to procedure calls, which are stored in the database, over an Oracle Net Services connection. It is generally indicated by a `/pls` virtual path. When you access a page in the application, the browser sends a URL request to Apache with `mod_plsql`. Apache then translates the URL to the appropriate PL/SQL stored procedure call in the Application Express engine. The engine processes the request and renders the page that you requested.

Oracle Application Express Listener is another option that can be used. Oracle Application Express Listener communicates directly with the Oracle Application Express engine, thus eliminating the need for the `mod_plsql` plug-in.

Starting with Oracle Database 11g Release 1, you can use the embedded PL/SQL gateway. The embedded PL/SQL gateway installs with Oracle Database 11g and does not require the Oracle HTTP Server. It provides the Oracle database with a web server and the necessary infrastructure to create dynamic applications. The embedded PL/SQL gateway runs in the Oracle XML DB HTTP server in the Oracle database. It includes the core features of `mod_plsql`.

The practice environment for this course uses the embedded PL/SQL gateway.

Types of Installations

Oracle Application Express supports two types of installations:

Full Development Environment



Complete access to develop applications

Runtime Environment



Access only to run production applications

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Based on your requirements, you can install Oracle Application Express in one of the following ways:

- **Full development environment:** This installation provides complete access to the Application Builder environment to develop applications.
- **Runtime environment:** This installation is an appropriate choice for production implementations in which you want to run applications that cannot be modified.

An Oracle Application Express runtime environment enables you to run production applications. But it does not provide a web interface for administration. The runtime environment installation option minimizes the installed footprint and privileges. In a runtime instance, developers cannot inadvertently update a production application. Therefore, the runtime environment improves application security.

Quiz

Which of the following is responsible for processing and rendering the web application pages?

- a. Oracle database
- b. Metadata repository
- c. Application Express engine
- d. PL/SQL gateway



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Answer: c

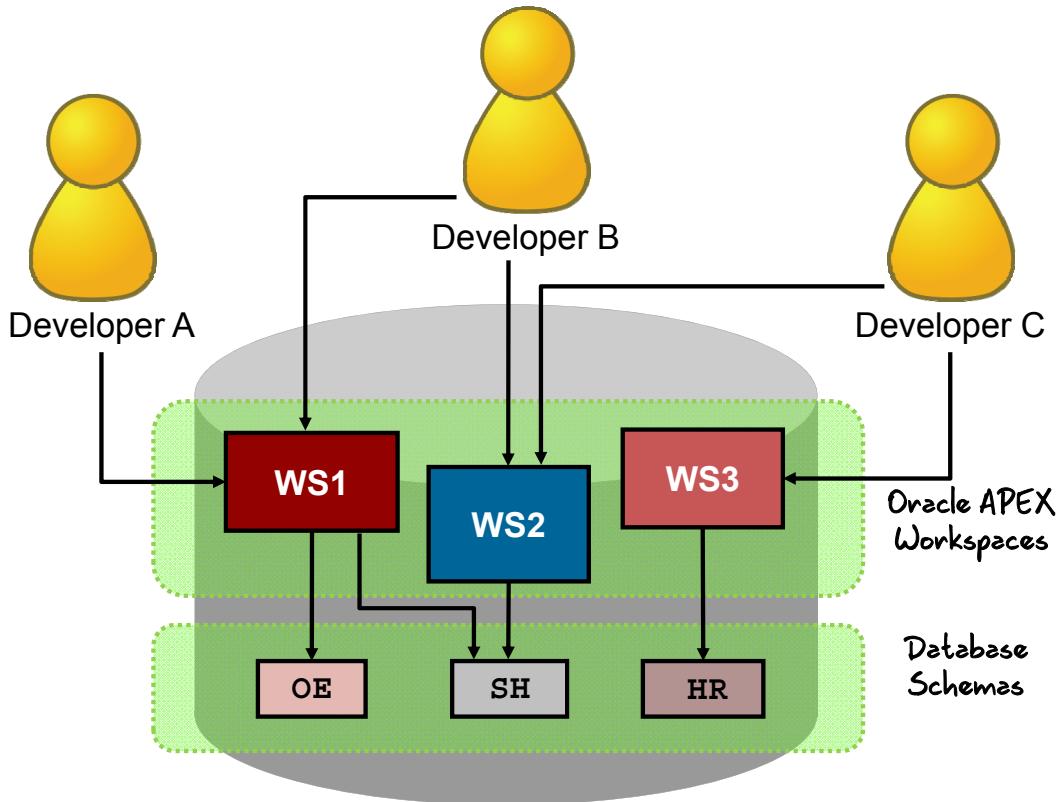
Lesson Agenda

- Oracle Application Express Overview
- Oracle Application Express Concepts
 - Workspace
 - Internal Workspace
 - Roles
 - Components
- Using Oracle Application Express
- Using Oracle Application Express in Oracle Database Cloud Service



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What Is a Workspace?



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A workspace is an area within Oracle Application Express where you create your applications. To create an application, you must first create or have access to a workspace. Each workspace is associated with one or more schemas. By associating a workspace with a schema, you can:

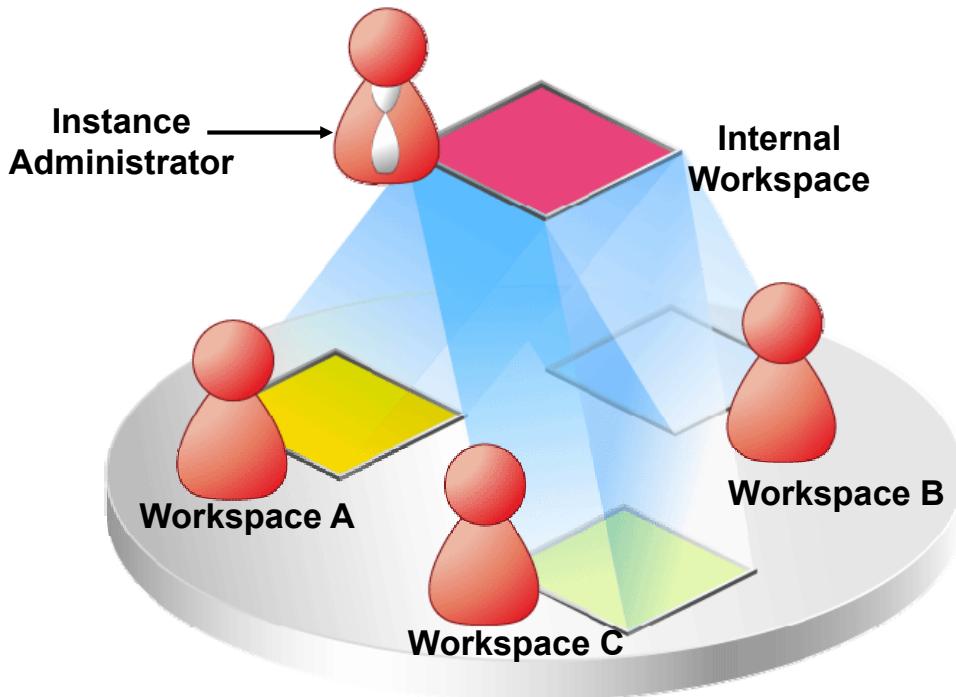
- Build applications that interact with the database objects in that schema
- Create new database objects in that schema

One or more developers or end users can access a workspace.

As shown in the graphic in the slide, a single Oracle database can contain multiple Oracle Application Express workspaces. In this example, you see three developers (A, B, and C) and three different workspaces (WS1, WS2, and WS3). A and B have access to WS1. In addition, B also has access to WS2. C has access to WS2 and WS3. Each workspace has access to one or more database schemas. For example, WS1 has access to OE and SH schemas, WS2 has access to SH, and WS3 has access to HR. Multiple developers can work by using the same database instance from different workspaces or the same workspace with access to the same or different schema.

Thus, Oracle Application Express turns a single Oracle database into a shared workgroup database service. This service can be accessed through a browser with no installation required on the desktop for the developer and the end user.

What Is an Internal Workspace?



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An Internal workspace is:

- A special workspace that is created by default when Oracle Application Express is installed
- Accessible only to instance administrators
- Used to create and manage workspaces in the Oracle Application Express instance

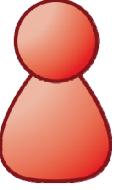
To log in to the Internal workspace, enter the following URL in the address bar:

`http://<hostname>:<port>/apex/apex_admin`

The login page appears. Enter `Admin` for Username, and for Password enter the password that was set during installation.

You can learn more about how to perform administration tasks by using the Internal workspace in the *Oracle Application Express: Administration* course.

Defining Roles

Instance Administrator	Workspace Administrator	Developer	End User
			
Creates workspace and workspace administrator	Creates developers and users	Creates and modifies applications and database objects	Runs the application
Manages services and session state	Views workspace usage reports	Performs all tasks of developer	



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Four roles are defined in Oracle Application Express.

- Instance administrator
- Workspace administrator
- Developer
- End user

Instance Administrator

An instance administrator manages the entire Oracle Application Express instance, including service administration and workspace administration. The instance administrator manages the workspaces of all the users, and is also responsible for managing session state and monitoring usage as a whole. The default Oracle Application Express administration privileged user is `admin`.

The instance administrator performs the following tasks:

1. Logs in to Oracle Application Express Administration
2. Creates a workspace and a workspace administrator. Both can be done at the same time by using the Create Workspace Wizard.

Workspace Administrator

When a user is assigned administrative privileges for a workspace, that user becomes the workspace administrator. The workspace administrator can add new users to the workspace, create new user groups, and view usage reports of the workspace.

The workspace administrator performs the following tasks:

1. Logs in to Oracle Application Express by using the workspace that has been assigned by the instance administrator
2. Creates developer users for the workspace so that development can occur
3. Installs sample applications
4. Installs a packaged application with supporting objects

Developer

Multiple users can log in to the same Oracle Application Express instance to develop and edit applications. Each of these users is called a *developer*.

Developers have access to a workspace through which they can access their own database objects. In addition to having private workspaces, users can also share a workspace to develop applications.

End User

The end user is a user without development and administration privileges. This user has only the basic privileges needed to run an application.

Quiz

Which of the following statements are true about Oracle Application Express workspaces? (Choose all that apply.)

- a. It is a private database shipped with the Oracle database.
- b. It enables multiple developers to create multiple applications simultaneously.
- c. It can be created by any Application Express user.
- d. It can access more than one database schema.



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Answer: b, d

Lesson Agenda

- Oracle Application Express Overview
- Oracle Application Express Concepts
- Using Oracle Application Express
 - Logging In to a Workspace
 - Creating Users
 - About Workspace Home Page
 - SQL Workshop
 - Application Builder
 - Types of Applications
 - Installing and Using a Packaged Application
 - Exporting and Importing Applications
- Using Oracle Application Express in Oracle Database Cloud Service

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Logging In to a Workspace

To log in to an Oracle Application Express workspace:

1. Enter the correct URL in your browser address bar.
2. Enter the workspace name.
3. Enter the username and password. Then click Login.

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To log in to Oracle Application Express, you need a workspace name and the username and password created for that workspace. You can log in to Oracle Application Express as a workspace administrator or as a developer. You can access the Oracle Application Express application with the following URL:

`http://<hostname>:<port>/apex`

The login page appears. Enter the workspace name, username, and password. Click Login. You may be prompted to change your workspace password the first time you log in. This option is set when your username and password are created by the Oracle Application Express administrator. You can set your new password to be the same as your old password.

Note

If your setup uses Oracle HTTP Server with `mod_plsql`, use:

`http://<hostname>:<port>/pls/apex`

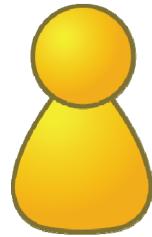
If your setup uses embedded PL/SQL gateway or Apex Listener, use:

`http://<hostname>:<port>/apex`

Creating a Developer User

To create a developer user, perform the following steps:

- On the Oracle Application Express home page, click the down arrow on the Administration tab.
- Select “Manage Users and Groups” from the drop-down menu.
- Click the Create User button.
- Enter the username and email address for the user.
- Review the account privileges for the user.
- Enter the password for the user.
- Click the Create User button.



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Workspace administrators create the developer users who build applications. You can access the Create User button by performing one of the following:

- Select “Manage Users and Groups” from the Administration tab drop-down menu.
- Click the “Manage Users and Groups” icon on the Administration page.
- From the Tasks menu on the Administration page, select Create User.

On the Create User page, enter the details for the user. In the Account Privileges section, you can set the default schema for the user. You can restrict access to a specific set of schemas in a workspace or allow access to all schemas. You have an option to give the developer administrator privileges. You can also restrict access to the components of Oracle Application Express. The slide provides an overview of the steps to create a developer user. You can view a demonstration of this task by opening the

`/home/oracle/labs/demos/les02_create_user.html` file.

Workshop 2-1 Overview: Using Oracle Application Express as a Workspace Administrator

The practices for this lesson cover the following topics:

- Logging in to a workspace
- Creating a developer user



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Workspace Home Page

Oracle Application Express consists of the following components:



Application Builder



SQL Workshop



Team Development



Administration

Create database applications, worksheet applications and packaged applications.

Browse and create database objects.
Execute SQL commands and scripts.

Track new features, bugs, milestones, to-do tasks, and feedback.

Create users.
Request service.
Monitor activity.

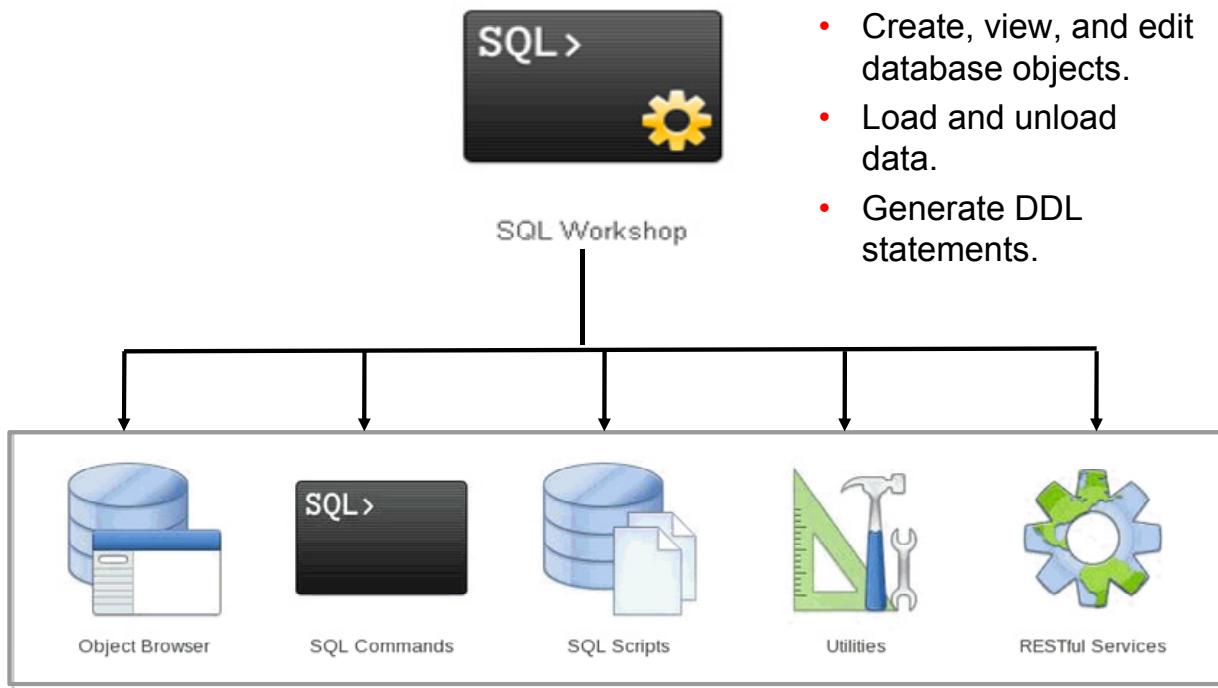


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When you log in to Oracle Application Express, the Workspace home page appears. The Oracle Application Express development environment consists of four components:

- **Application Builder:** Is used to create an application, composed of a set of HTML pages, based on database objects. You can create application pages and use the built-in features to add reports, forms, charts, calendars, and so on to an application. Using Application Builder, you can build database applications and worksheet applications. You learn to create a database application in the lesson titled “Creating a Database Application.”
- **SQL Workshop:** Is used to access and manage database objects of an application. You can browse the objects in your application schema. You can create database objects, such as tables, views, sequences, and so on. You can execute SQL commands and run SQL scripts.
- **Team Development:** Provides a development management tool that enables you to track new features, bugs, milestones, to-do tasks, and feedbacks
- **Administration:** Is used to manage workspace users and services

What Is SQL Workshop?



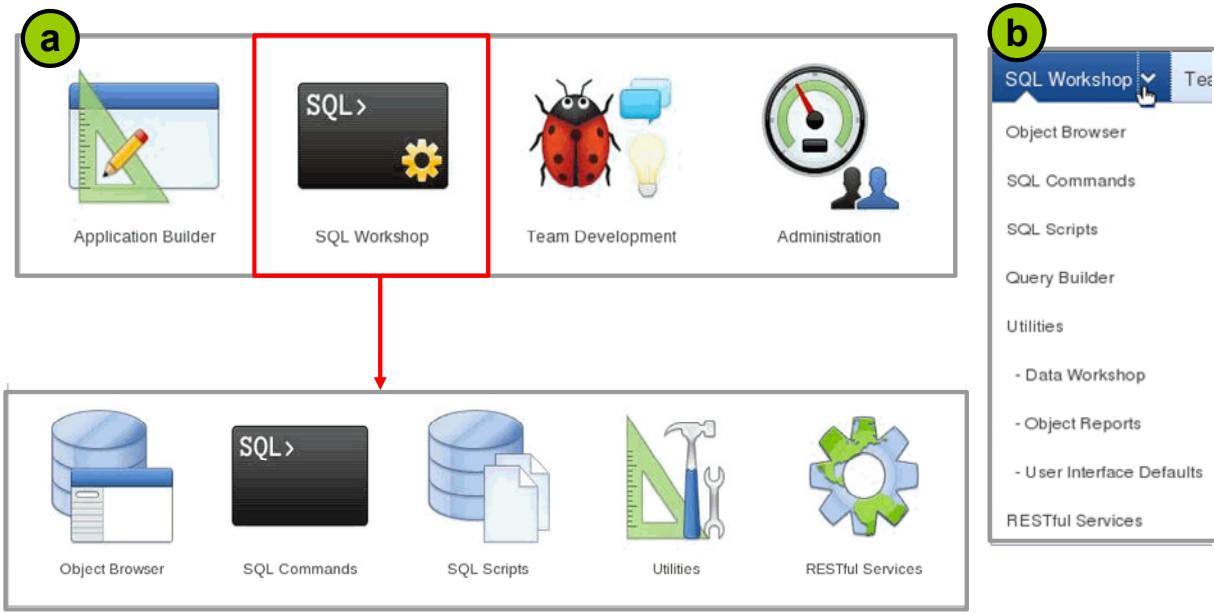
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SQL Workshop is a tool in Application Express that you use to interact with the database objects. You can create, view, and edit database objects. You can also perform tasks, such as loading and unloading data to and from database tables, generating data definition language (DDL) statements, and viewing reports. SQL Workshop consists of five components:

- **Object Browser:** Enables you to browse, create, and edit objects in a database
- **SQL Commands:** Enables you to create, edit, view, run, and delete database objects
- **SQL Scripts:** Is a set of SQL commands saved as a file in SQL Scripts. A SQL script can contain one or more SQL statements or PL/SQL blocks. You can use SQL Scripts to create, edit, view, run, and delete database objects.
- **Utilities:** Enables you to build SQL queries, load and unload data from an Oracle database, generate DDL, view object reports, manage User Interface defaults, restore dropped database objects, compare schemas, monitor the database, and view database details
- **RESTful Services:** Enables the declarative specification of RESTful Web Services used to access the database. These services work in conjunction with the Oracle Application Express Listener to enable the consumption of these services.

Accessing SQL Workshop

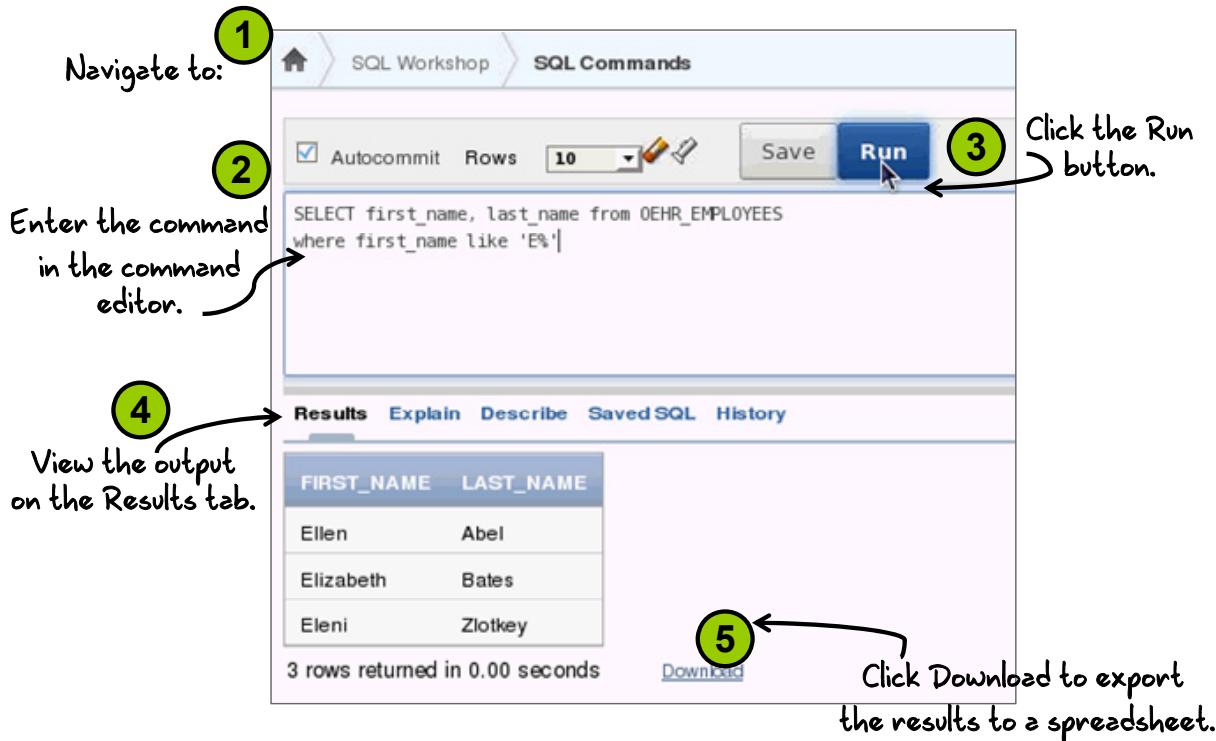


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From the Oracle Application Express home page, you can access the SQL Workshop tool in two ways:

- Click the SQL Workshop icon or the SQL Workshop tab, and then select the component that you want to access.
- Click the down arrow on the SQL Workshop tab, and then select the component that you want to access from the drop-down menu.

Running SQL Commands



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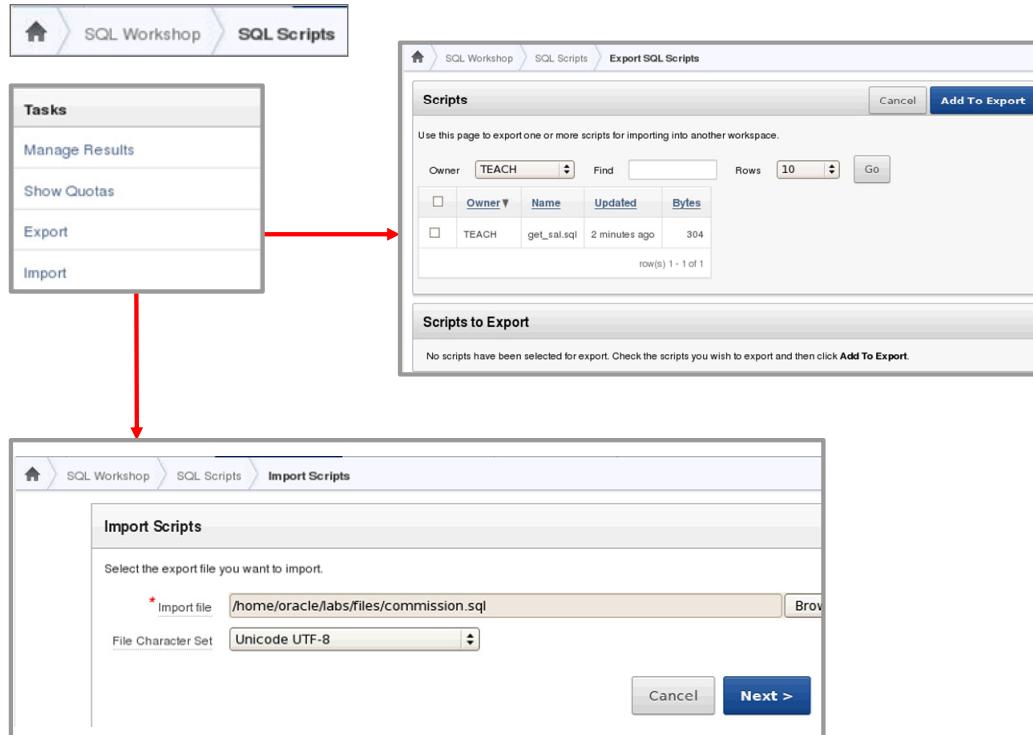
To execute SQL code with SQL Commands, perform the following steps:

1. Navigate to the SQL Commands page by selecting **SQL Commands** from the drop-down menu on the SQL Workshop tab.
2. Enter the SQL or PL/SQL statement in the command editor.
3. Click the **Run** button.
4. View the output on the Results tab of the display pane.
5. (Optional) Click the **Download** link to export the results of the query to a spreadsheet in Microsoft Excel.

Note

- If you have multiple commands in the command editor, you can run only one command at a time. Select the command and click Run. Only the command that was selected is executed.
- SQL commands that are created and saved by using Query Builder can be executed from the SQL Commands page.

Importing and Running a SQL Script



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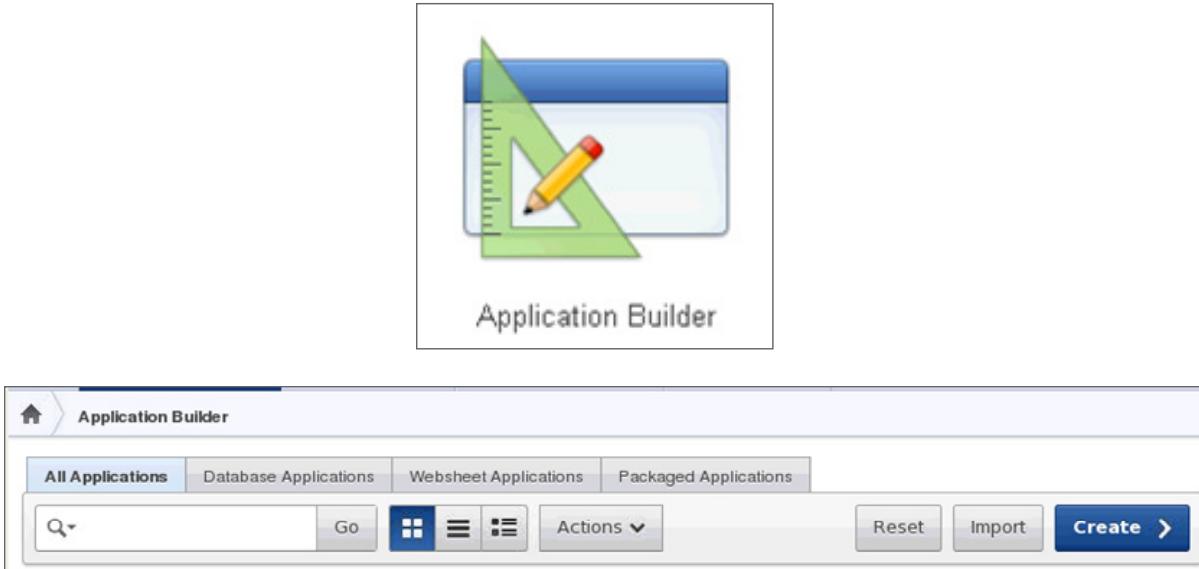
The Export and Import tasks enable you to transfer scripts between workspaces.

Using Export, you can export multiple scripts from your current workspace to another workspace. All the scripts that you select to export are encoded into a single script file. You can save this file to your local file system and import it to another workspace.

To export scripts, click the Export link. The scripts available in the script repository are listed in the Scripts pane. Select the scripts that you want to export and click the Add To Export button. The selected scripts are listed in the “Scripts to Export” pane. You can finalize the scripts that you want to export by removing or adding scripts. To export all the scripts, click the Export All button. The scripts are exported as a single export file, which you can save to your local file system.

Using Import, you can import a script file exported from a different workspace into your current workspace. To import a script file, click the Import link. Click the Browse button and locate the file to import from your local file system. Click Next and click Import Scripts to confirm. Only script files exported from the scripts repository can be imported. If you try to import any other script, you get a “script not compatible” error.

What Is Application Builder?



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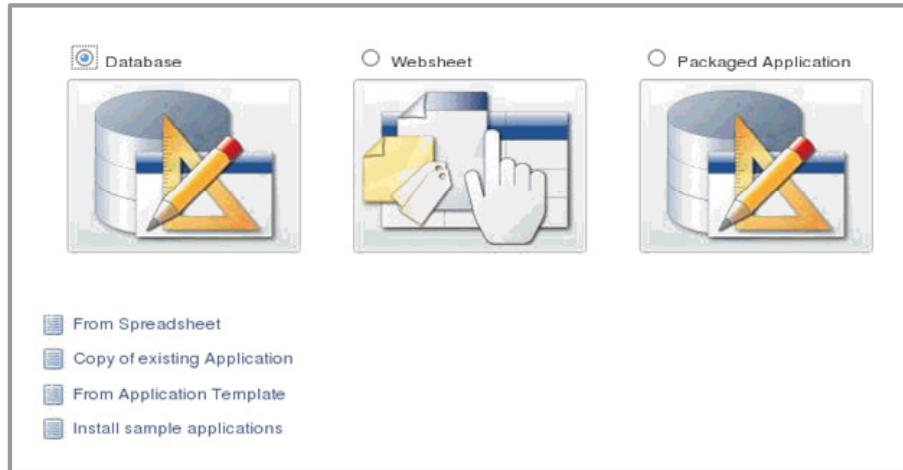
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An Oracle Application Express application enables you to manage and display data from an Oracle database. You build an application using Application Builder. Using Application Builder you can create two types of applications: database applications and websheet applications.

Note: When you log in to Oracle Application Express and select Application Builder, you will find that a Sample Database Application, which is a packaged application, is already installed for you.

Types of Applications

- Database
- Websheet
- Packaged Application



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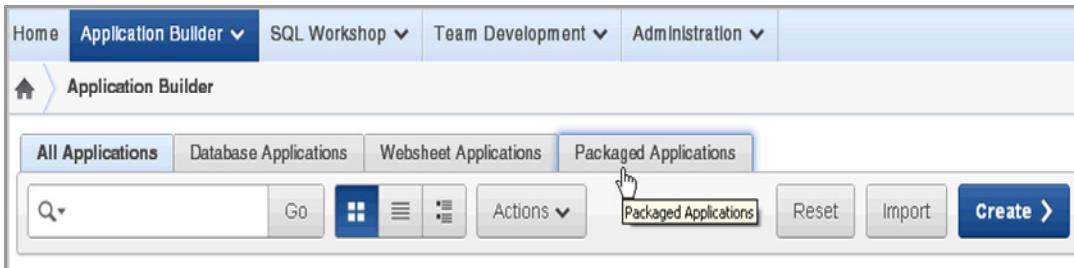
When you run the Create Application Wizard, the wizard prompts you to choose the type of application that you want to create. The options include:

- **Database:** A database application is a collection of pages that share a common session state and authentication. Database applications enable developers to have full control on all aspects of the development process. With database applications, developers can directly leverage their SQL and PL/SQL programming skills. You can manually add and customize components (reports, charts, or forms), page controls (buttons, items, or lists of values), and shared components (breadcrumbs, lists, or tabs).
- **Websheet:** A websheet application is geared toward the business user and requires no prior development experience. Each websheet application is a collection of pages designed for web-based data entry and reporting. Websheet applications are simplified and support pages, data grids, and reports. When you create a websheet application, Application Builder automatically handles the creation of tables, triggers, and sequences. Websheets offer an easy, declarative approach to report and form layout, as well as to the creation of lists of values and validations. For more details on websheet applications, see “Appendix B: More Information on Application Development.”
- **Packaged Application:** Packaged applications are fully functional applications that have been designed to address a specific business need. You can install, run, and use packaged applications as they are, or unlock productivity applications to customize the solution provided or analyze them to better understand how to use Application Builder to build specific types of functionality.

Accessing a Packaged Application

To access the Packaged Applications page:

- Log in to Oracle Application Express. The Workspace home page appears.
- Click the Application Builder icon. The Application Builder home page appears.
- Click the Packaged Applications tab.



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Selecting a Packaged Application

Category

Type

Category	Type	Application Name	Description
Productivity applications	All Applications	Customer Tracker	Tracking, Marketing
		Group Calendar	Team Productivity
Sample applications	Packaged Applications	Sample Calendar	Sample Application
		Sample Dialog	Sample Application
		Sample Search	Sample Application
		Artwork Catalog	Team Productivity, Tracking
		Decision Manager	Team Productivity, Tracking
Incident Tracking	Software Development, IT Management		
Sample Charts	Sample Application		
Sample Collections	Sample Application		
Sample Dynamic Actions	Sample Application		
Sample File Upload and Download	Sample Application		
Sample Tabular Form	Sample Application		
Sample Trees	Sample Application		

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Oracle Application Express includes two types of packaged applications:

- Sample applications
- Productivity applications

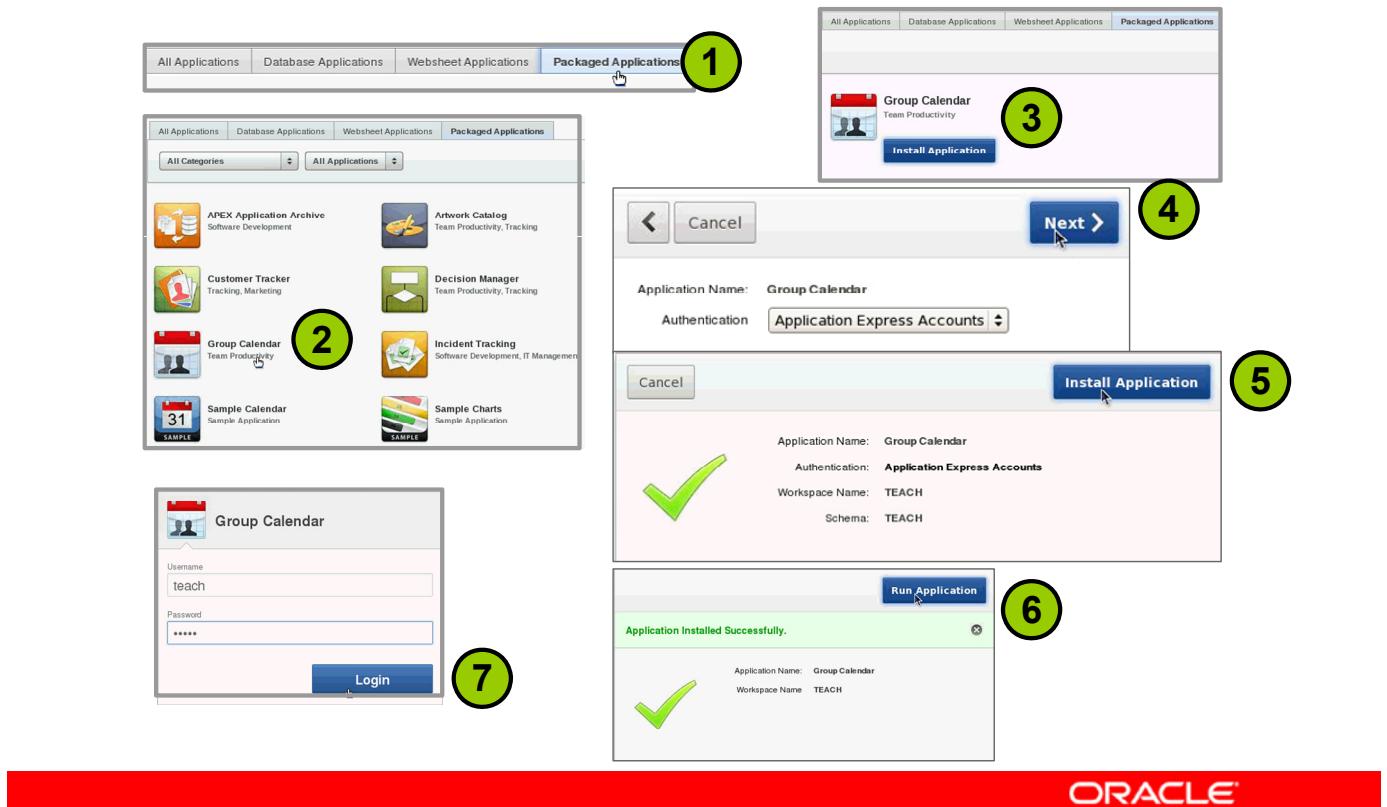
Both sample and productivity applications are fully functional applications that have been designed to address a specific business need. You can install, run, and use packaged applications as they are, or analyze them to better understand how to use Application Builder to build specific types of functionality.

The main difference between a sample application and a productivity application is the level of support. By default, sample applications are fully editable. In contrast, you must unlock productivity applications before you can edit them. Unlocking a productivity application makes it ineligible for future upgrades or support by Oracle support.

You can use the following lists at the top of the page to filter the display:

- **Category:** Is used to sort by application category. Options include: Community, IT management, Knowledge Management, Marketing, Project Management, Sample, Software Development, Team Productivity, and so on.
- **Type:** Is used to sort by application type. Options include: All Applications, Only Installed, Not Installed, Database Applications, or Websheets.

Installing a Packaged Application



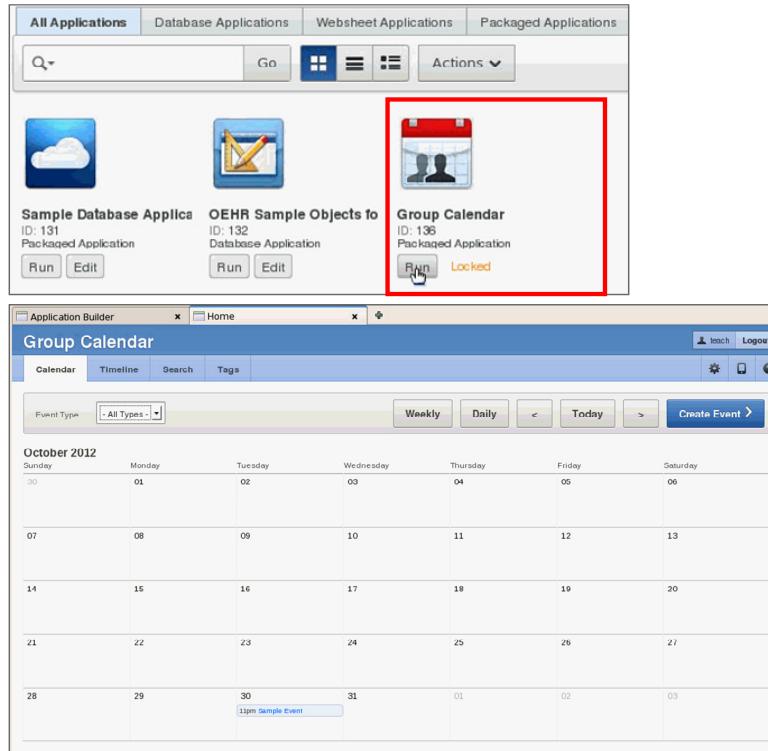
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To install a packaged application:

1. On the Application Builder Home Page, click the Packaged Applications tab. The Packaged Applications page appears.
2. Locate the application to be installed. In the example in the slide, the Sample Charts application is selected.
3. Click the application image. A summary page appears. Click Install Application.
4. Select an Authentication scheme and click Next.
5. Click Install Application again. A success message appears.
6. To run the application, click the Run Application icon.
7. Enter the appropriate login credentials and click Login.
8. The application has been installed.

Running an Installed Packaged Application



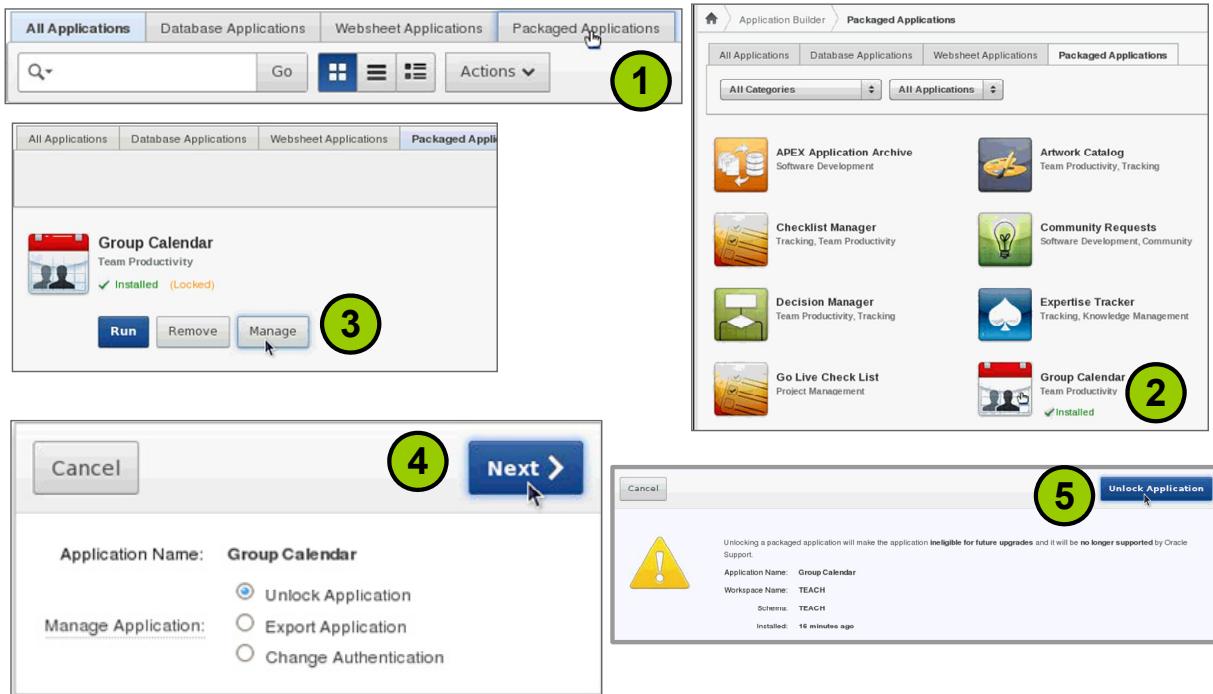
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To run an installed packaged application:

1. Click the Packaged Applications tab. The Packaged Applications page appears.
2. Locate the application.
 - a. Click the application image.
 - b. Click Run.
3. Enter the appropriate login credentials to view the application.

Unlocking an Installed Productivity Application



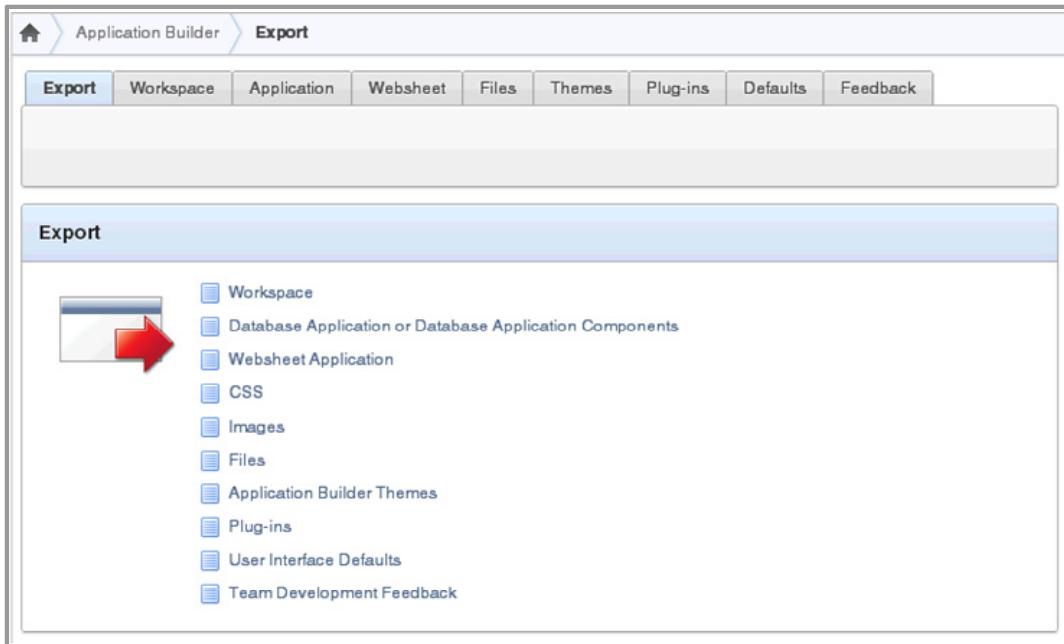
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After a productivity application is installed, you must unlock it before you can edit it. To unlock an installed productivity application:

1. Click the Packaged Applications tab. The Packaged Applications page appears.
2. Locate the application to be unlocked. Click the application image.
3. Click Manage.
4. Select Unlock Application and click Next.
5. When prompted, click Unlock Application.

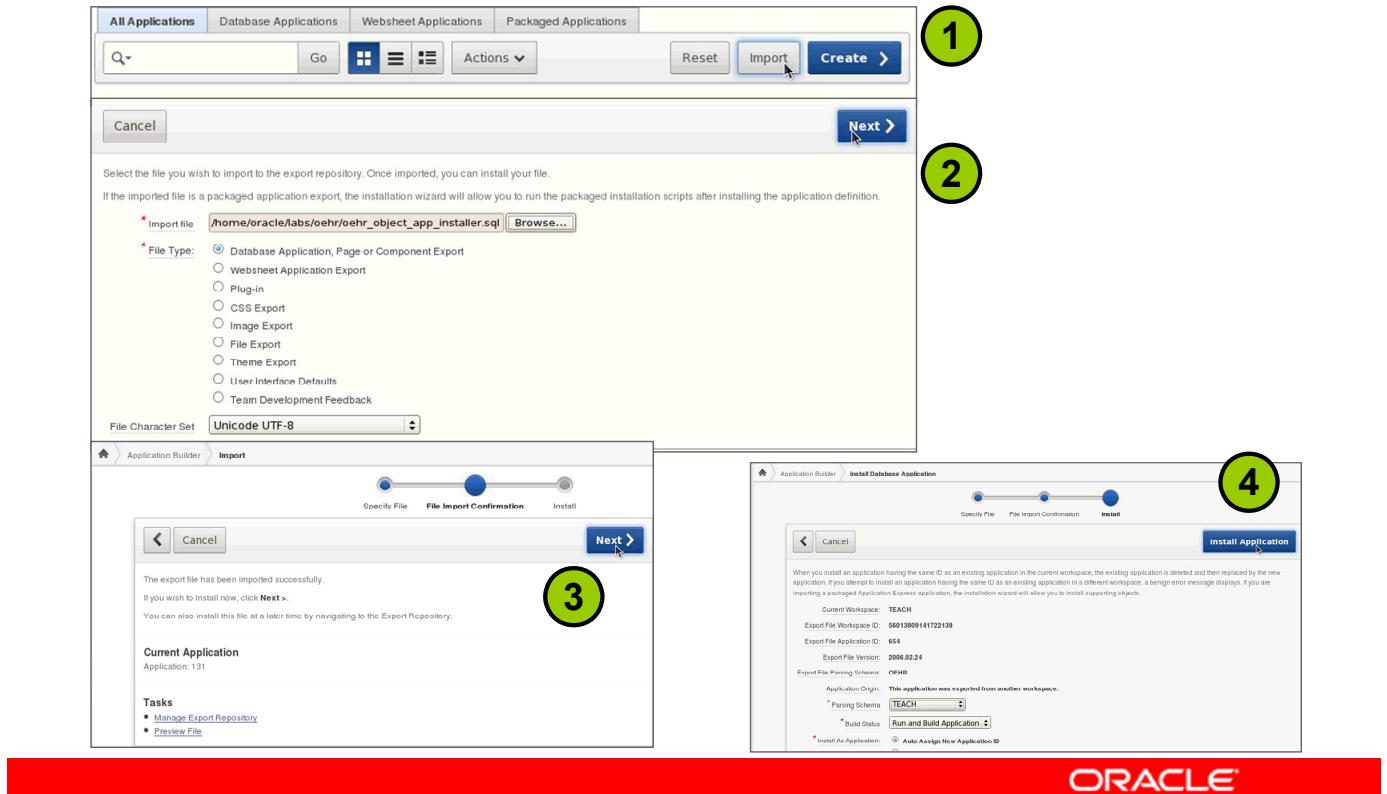
Exporting an Application

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Sometimes you may want to take a back up of your application or move it to a different workspace. You can do this by exporting your application. You export application definitions and all associated files using the Export, Workspace, Application, Websheet, Files, Themes, Plug-ins, Defaults, and Feedback tabs located at the top of the Export page.

Importing an Application



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After you export an application and any related files, you may import them into the target Oracle Application Express instance, and then install them. As a general rule, always import the application first and then the related files. To import an Application, Page, or Component Export into a target Oracle Application Express instance:

1. Navigate to the Import page by clicking the Application Builder icon on the Workspace home page. Click Import on the Application Builder home page.
2. To specify the file, navigate to the file and select the file type. Verify that the File Character Set is correct and click Next. After you import a file, you have the option to install it.
3. Click Next to install the file. The Install Database Application Wizard appears.
4. On the Install page, select the schema and select the build status of the application. You can select Run Application Only or Run and Build Application. In the Run Application Only status, users can only run an application, whereas in the Run and Build Application status, users can run an application and developers can both run and edit an application.
5. Click Install Application to install the application.

Workshop 2-2 Overview: Using Oracle Application Express as a Developer

The practices for this lesson cover the following topics:

- Log in to Oracle Application Express as a Developer
- Run the sample database application
- Install a packaged application and use it
- Import the OEHR database application and its supporting objects



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Lesson Agenda

- Oracle Application Express Overview
- Oracle Application Express Concepts
- Using Oracle Application Express
- Using Oracle Application Express in Oracle Database Cloud Service



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Oracle Database Cloud Service

- Is built on Oracle Database technology running on the Oracle Exadata Database machine
- Is accessible from any supported browser on any platform
- Includes a wide variety of tools and utilities



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The Database Cloud Service is built on Oracle Database technology, running on the Oracle Exadata Database machine. The Database Cloud Service has four main components:

- Oracle Database 11g R2 Enterprise Edition
- Oracle Application Express, which is used to create and deploy all varieties of applications in a browser-based environment
- RESTful Web Services, which allows access to the data in your Database Cloud Service through simple URIs
- Packaged Applications and Sample Code, which is a set of business productivity applications that are installed easily

The Oracle Database Cloud Service delivers the following advantages:

- You can access your Database Cloud Service from any supported browser on any platform.
- It comes in several sizes, based on a simple storage and transfer metrics.
- It has a simple monthly subscription cost, which includes all standard maintenance operations and Oracle Support.

- You can provision a complete Database Cloud Service environment in a few minutes and immediately start to be productive. The Database Cloud Service includes simple administrative tools that enable you to monitor usage, and add and drop user access. The Oracle Store allows you to modify your subscription package with a simple interface.
- The Database Cloud Service includes a variety of tools and utilities, including development wizards and flexible interactive reporting. Most importantly, the Database Cloud Service offers rapid application development and instant deployment, which enable developers and users to work together in real time to create optimal solutions for business needs.

Using Oracle Application Express in Oracle Database Cloud Service

Oracle Application Express:

- Is offered as a platform for rapid application development
- Resides within the Oracle Database Cloud Service
- Contains features that enable secure application development



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Oracle Application Express is used to create cloud-based applications in your Database Cloud Service. Oracle Application Express is provided as a platform for rapid application development on the Oracle Database Cloud Service. Oracle Application Express includes several features that help develop secure applications in Oracle Database Cloud service. Because Oracle Application Express and applications developed on it reside in an Oracle Database instance, you can develop and deploy applications using Oracle Application Express running on Oracle Database Cloud service.

You can log in to cloud.oracle.com for a free trial.

For more details about using Oracle Application Express in Oracle Database Cloud Service, refer to Appendix C of this course.

Summary

In this lesson, you should have learned how to:

- Describe Oracle Application Express and its concepts
- Explain the Oracle Application Express architecture
- Identify the components of Oracle Application Express
- Identify the different types of applications available
- Install, run, and unlock a packaged productivity application
- Export and import applications



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Oracle Application Express is a rapid application development tool that is available in Oracle database. In this lesson, you were introduced to Oracle Application Express, the advantages of using Oracle Application Express to build applications, and the Oracle Application Express features that you use when building your application. You also learned about the architecture and the components of Oracle Application Express, as well as the steps to get started.

Creating a Database Application

3

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Objectives

After completing this lesson, you should be able to do the following:

- Identify the components of a database application
- Describe the database application user interfaces
- Explain the various ways of creating a database application



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This lesson introduces you to Application Builder. In this lesson, you learn about the different components of a database application and the concepts associated with building a database application from the beginning, from a spreadsheet, and instantly.

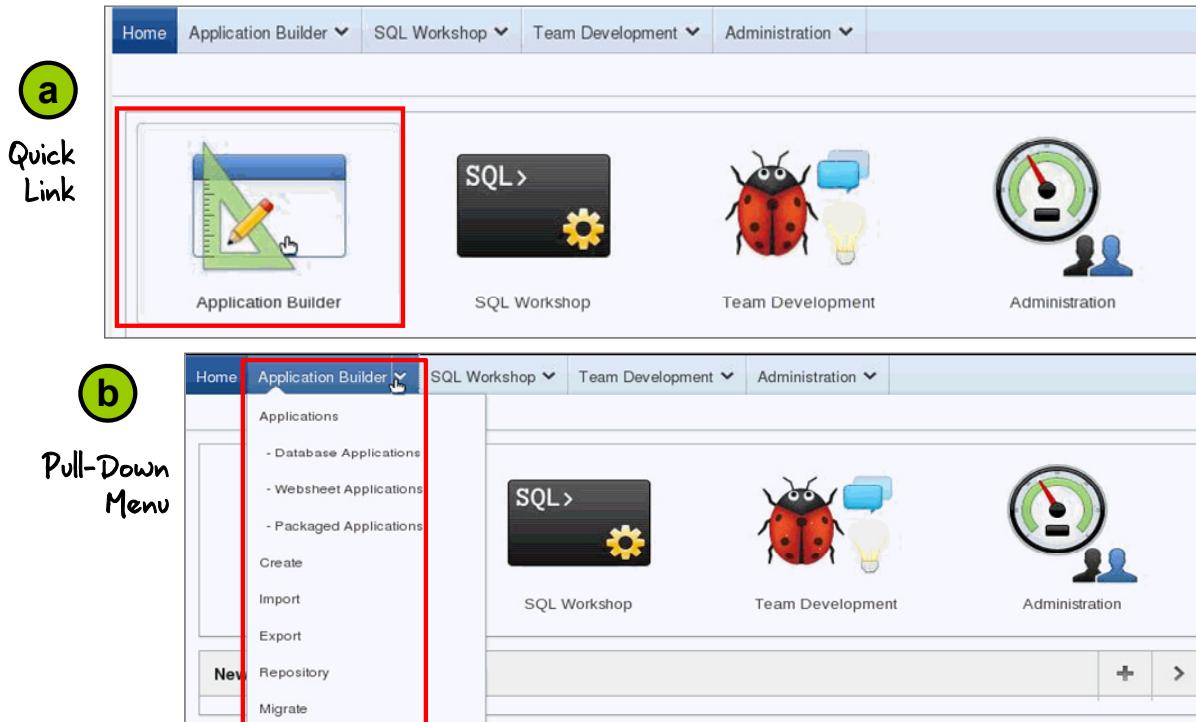
Lesson Agenda

- Application Builder Overview
 - Accessing Application Builder
 - Application Builder Interface
- Introducing Database Applications
- Creating a Database Application



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Accessing Application Builder



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When you log in to Oracle Application Express, the Workspace home page appears.

To view the Application Builder home page, you can choose one of the following options:

- Click the Application Builder icon to drill down to the Application Builder home page.
- Click the down arrow next to Application Builder to view the pull-down menu. You can then select the appropriate menu option.

Application Builder Home Page

From the Application Builder home page, you can:

- Click an application tab
- Search for an application
- Change the page view
- Use the Actions menu
- Reset the application report
- Import or export an application
- Create an application
- View an application



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The Application Builder home page displays the currently installed applications. From the Application Builder home page, you can:

- **Click an application tab:** To narrow the list of applications displayed, click the applications tab.
- **Search for an application:** To search for a particular application, enter the name of the application in the Search area and click Go. You can also search a particular column by clicking the magnifying glass icon and selecting a column to search on. If no column is selected, all the columns are searched.
- **Change the page view:** You can change the appearance of a page by making a selection from the three View icons next to the Go button. These icons consist of:
 - **View Icons** (the default): Displays each application as an icon and identifies it by the application name
 - **View Report:** Displays a list of the applications in a report
 - **View Details:** Displays each application as a line in a report

- **Use the Actions menu:** The Actions menu enables you to perform different tasks for the data that is displayed.
- **Reset the application report:** This returns you to the default display.
- **Import or export an application:** Click Export to export an application file and click Import to import an exported application file.
- **Create an application:** Click Create to create a new application or to install a sample application.
- **View an application:** Click the application icon or application name to view a specific application. This opens the home page of that application.

Lesson Agenda

- Using Application Builder
- Introducing Database Applications
 - Database Application Home Page
 - Themes
 - Components of a Database Application
 - What Is a Page?
 - Different Views of a Page
 - Switching Between Pages and View Types
- Creating a Database Application

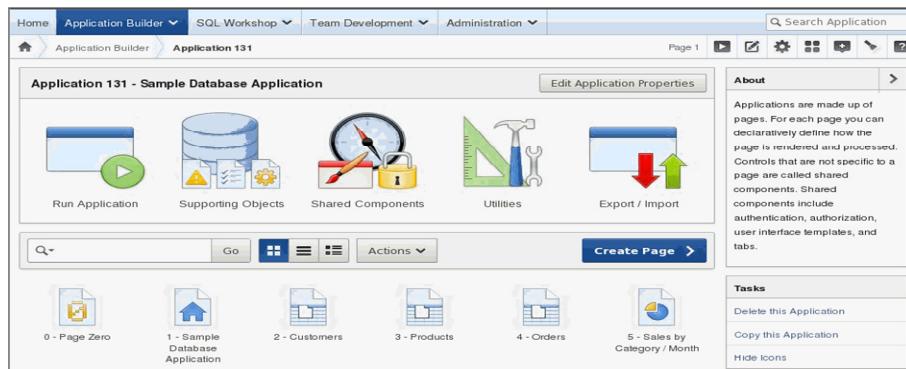
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Database Application Home Page

From an application home page, you can:

- Run the application
- Use the Supporting Objects utility
- Create shared components
- Examine application utilities
- Export and import applications
- Edit application properties
- Create a page



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When you click the application icon or application name, the application home page appears. You can see the application ID and the name of the application at the top of the page.

From the application home page, you can:

- **Run the application:** Click the Run Application icon to submit the pages to the Oracle Application Express engine to render a viewable HTML page.
- **Use the Supporting Objects utility:** Click Supporting Objects to access the utility to define the database object definitions, images, and seed data to be included in your application export for your packaged application.
- **Create shared components:** Click Shared Components to build shared application components and user interface controls.
- **Examine application utilities:** Click Utilities to monitor developer activity, view dashboards, run the Advisor, and view numerous other reports.
- **Export and import an application:** Click the Export/Import icon to export or import an entire application or its components, such as cascading style sheets, images, static files, themes, and user interface defaults.

- **Edit application properties:** Click Edit Application Properties to edit the application name and availability, and to define static substitution strings. Additionally, the Edit Application page displays the defined build options, the associated theme, template defaults, and component defaults.
- **Create a page:** Click Create Page to add a page to your application.

On the application home page, you also see a list of icons for each page. To open a page, click one of the page icons.

Database Application User Interfaces

Select the user interface.

Desktop User Interface

Mobile User Interface

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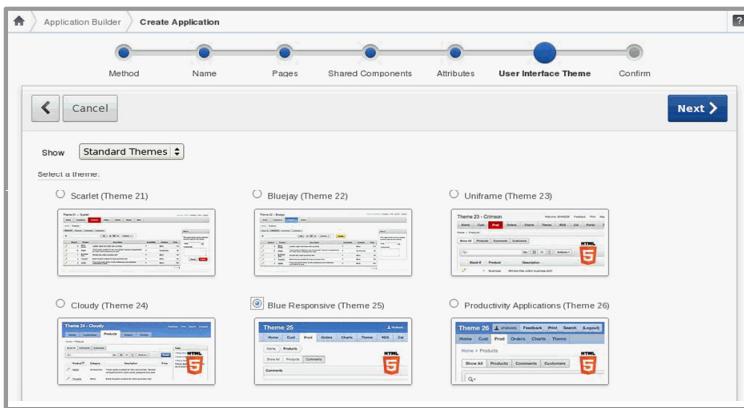
At the time of creating a database application, you have the option to choose the type of user interface that you can develop your application for.

Oracle Application Express supports two user interface models for database applications:

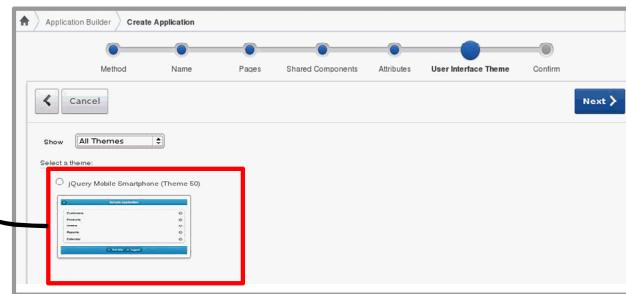
- **Desktop:** Used for applications that are primarily used on a desktop
- **jQuery Mobile Smartphone:** Used for applications that are developed for smartphones or tablets

Themes

Desktop user interface



Mobile user interface



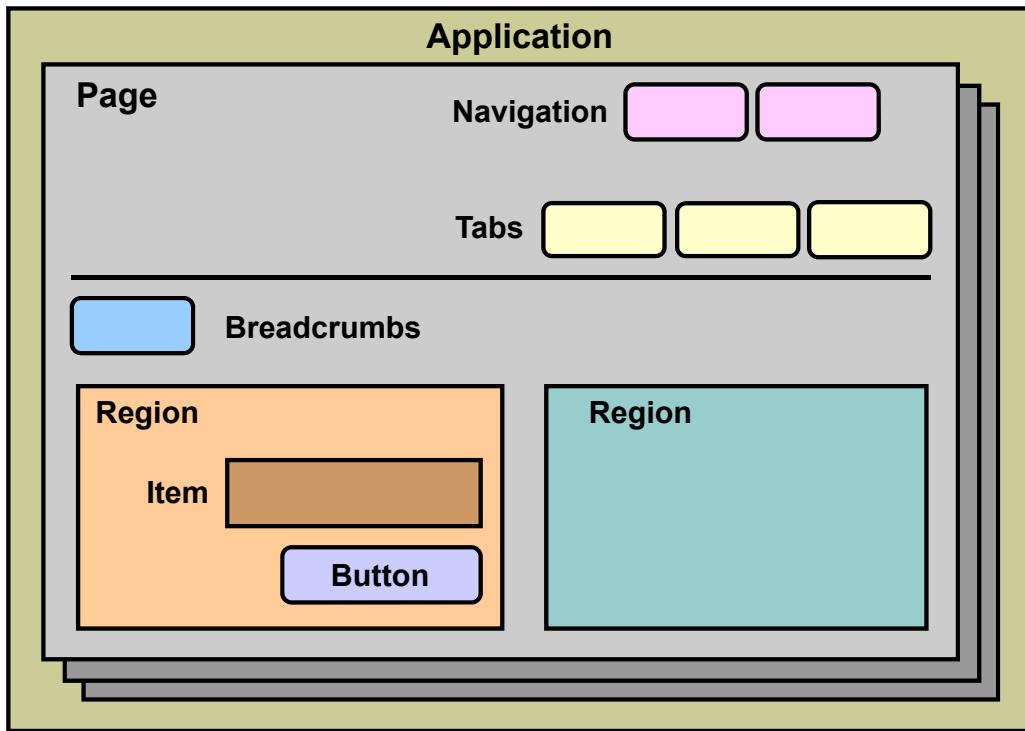
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Themes are used to define the layout and style of an entire application. Themes provide a set of templates that accommodate every User Interface pattern that may be needed in an application. Oracle Application Express supports three types of user interface themes for database applications built using the desktop user interface: Standard, Custom, and Legacy.

Standard themes are provided by Application Express. For example, the Blue Responsive theme (theme 25) is a standard theme that can be used to develop responsive web applications that can be used on desktop, smartphones, and tablets. Custom themes are additional themes available for use. These are themes that are built by the user and then made available for other workspaces in the same installation. Therefore, if an organization wants to create a company-specific theme, they can create it and then make it available to other workspaces. This topic is discussed in more detail in *Oracle Application Express: Workshop II* course. Legacy themes are themes developed prior to HTML5 and have an older look and feel. For nondesktop applications, jQuery Mobile Smartphone (theme 50) is used.

Components of a Database Application



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A database application is a collection of database-driven web pages that are linked by navigational controls, such as tabs, buttons, and hypertext links.

A page is the basic element of an application. A page is divided into regions; a region is a section of a page that contains content. The content of the region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static HTML.

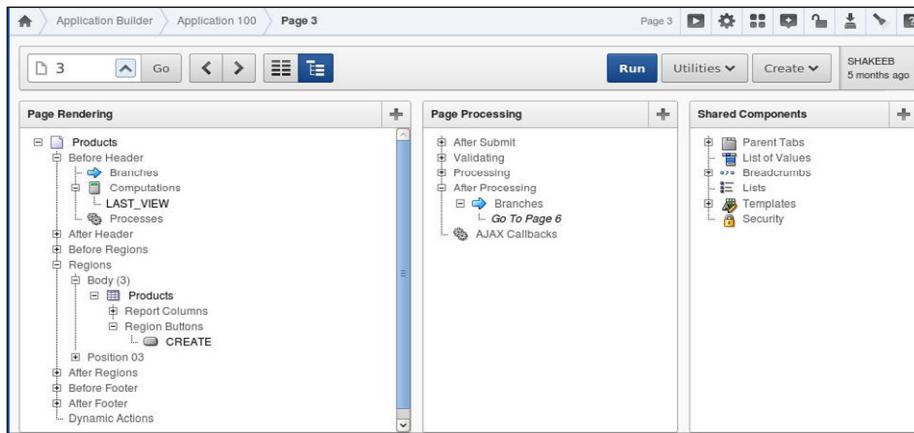
A region can also contain the following:

- Items such as a text field, text area, select list, and check box
- Buttons to direct users to a specific page or URL, and also to post and process information
- Breadcrumbs (locator links) to provide hierarchical navigation

Navigation entries are placed outside regions to enable users to navigate between the pages of an application.

Page Definition: Overview

- A page is the basic building block of an application.
- The Page Definition is divided into three sections:
 - Page Rendering
 - Page Processing
 - Shared Components



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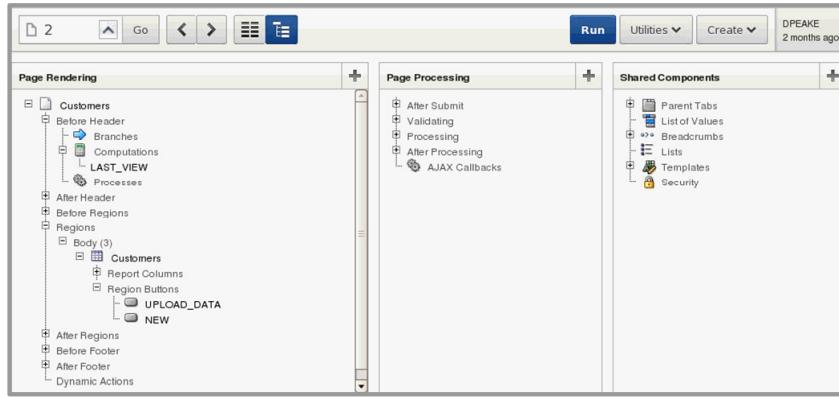
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You build an application by using pages. The Page Definition is divided into:

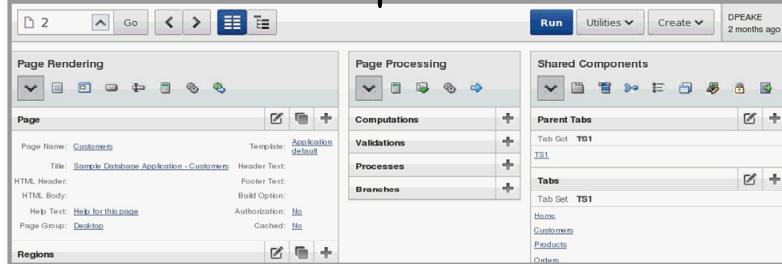
- **Page Rendering:** The process of generating a page from the database. You can use the Page Rendering section to modify the controls that impact the rendering of a page, including the page definition, regions, buttons, items, page-rendering computations, and page processes.
- **Page Processing:** The process of submitting a page. A page is typically submitted when a user clicks a button. You can use the Page Processing section of the Page Definition to specify application logic, such as computations, validations, processes, and branches. In general, the Application Express engine runs the logic of specific applications in the order in which they appear on the Page Definition.
- **Shared Components:** List of the common components that can be displayed or applied on every page within an application. Some of the shared components include tabs, lists of values, breadcrumbs, lists, and navigation bars.

Different Views of a Page

Tree View



Component View



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There are two ways to view a page: Tree view and Component view.

The Tree view displays regions, page items, and application logic as nodes in a tree. The tree groups components based on an event sequence or on the way that Oracle Application Express processes them when rendering a page. This organization enables you to better understand when a component is processed. The key features of this view include:

- **Context menus:** Each tree node features a custom context menu. To access a context menu, right-click a tree node.
- **Quick access to attributes pages:** To edit attributes, double-click a node or select a node and press Enter. If available, an attribute page appears.
- **Easy reorder of components:** You can reorder page items, report columns, processes, validations, branches, or computations by dragging them to another display, processing point, or region.
- **Tool tips:** Each tree node features a tool tip, which displays basic information about the component, such as item type, condition, and authorization.
- **Identification of conditions, authorizations, and build options:** If a component has a condition, authorization, or build option, the tree node label is displayed in italic.

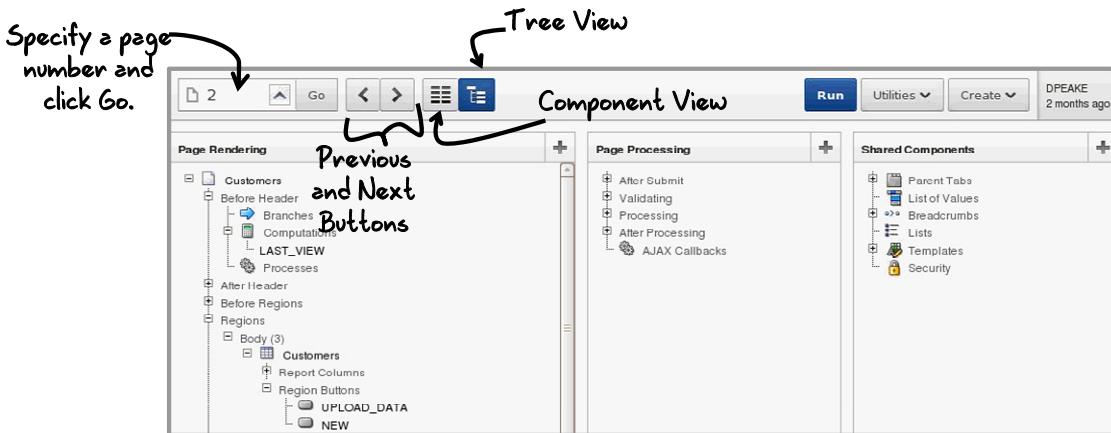
- **Inline Edit:** Tree nodes that have Rename in the context menu can be directly modified within the tree without having to go to the edit page. Pressing F2 enables inline edit. Use Show Names and Show Labels from the Utilities/Switch To menu to show component names or labels.
- **Direct access to default wizards:** Each context menu includes actions that link to default wizards. For example, selecting Create Validation for an item displays the Create Validation Wizard.

The Component view groups user interface elements and application logic by component type.

Switching Between Pages and View Types

The navigation bar enables you to:

- Specify a specific page
- Select the previous or next page
- Change view types



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The following are the three ways to switch from one page to another:

1. Enter a page number in the Page field, and then click Go.
2. Click the up arrow next to the Page field, and then select a page from the list.
3. Click the Previous and Next buttons to the right of the Go button.

To switch from the Tree view (which is the default) to the Component view, click the Component View icon on the navigation bar. To switch to the Tree view, click the Tree View icon on the navigation bar.

Quiz

Application Builder enables you to create both database and websheet applications.

- a. True
- b. False



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Answer: a

Quiz

Which of the following steps would you perform to navigate from one page to another? (Choose all that apply.)

- a. Click the Component View icon.
- b. Enter a page number in the Page field and click Go.
- c. Use the Previous and Next buttons.
- d. Click the Detail View icon on the application home page.



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Answer: b, c

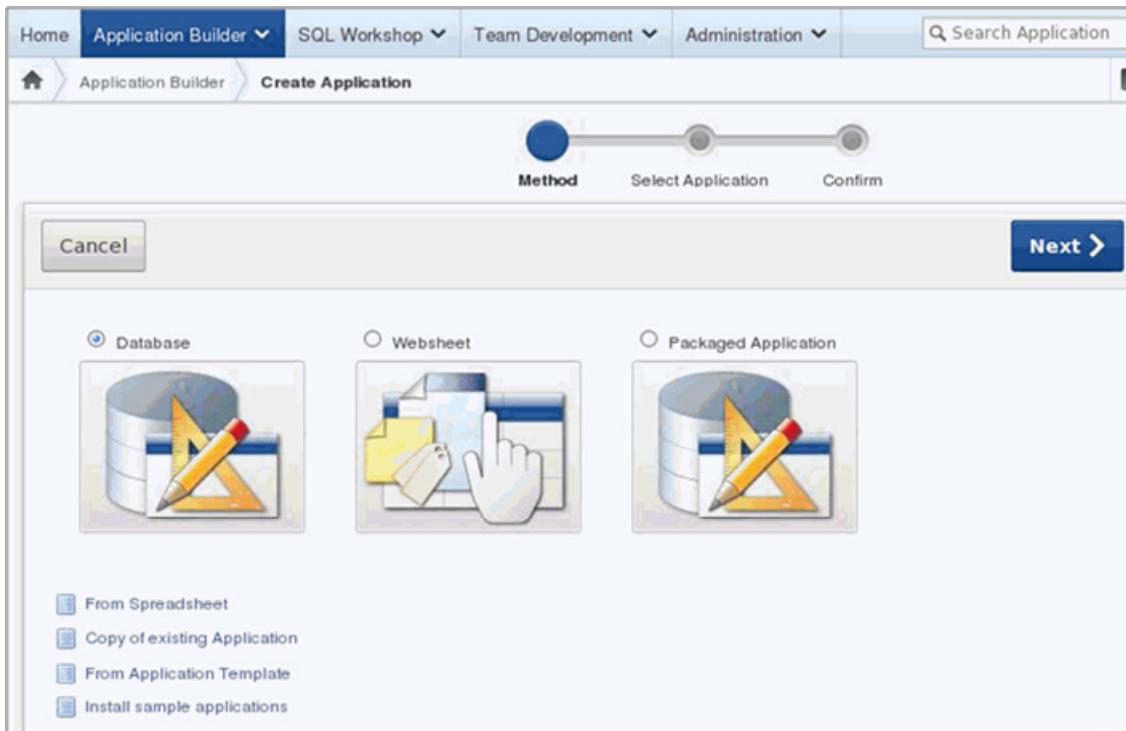
Lesson Agenda

- Using Application Builder
- Introducing Database Applications
- Creating a Database Application
 - Accessing the Create Application Wizard
 - Different ways of Creating an Application
 - Using User Interface Types
 - Running an Application
 - Using the Developer Toolbar



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Create Application Wizard

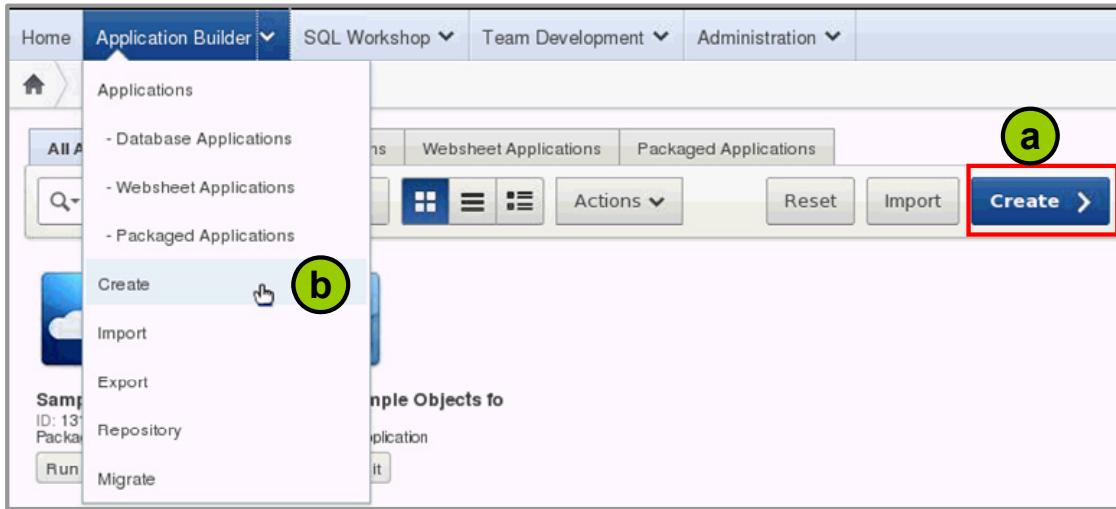
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You create an Oracle Application Express application by running the Create Application Wizard. To run the Create Application Wizard, click the Create button on the Application Builder home page.

While stepping through the wizard, there are some decisions that you have to take to choose the type of application you want to create. These options include Database, Websheet, and Packaged Application.

Accessing the Create Application Wizard



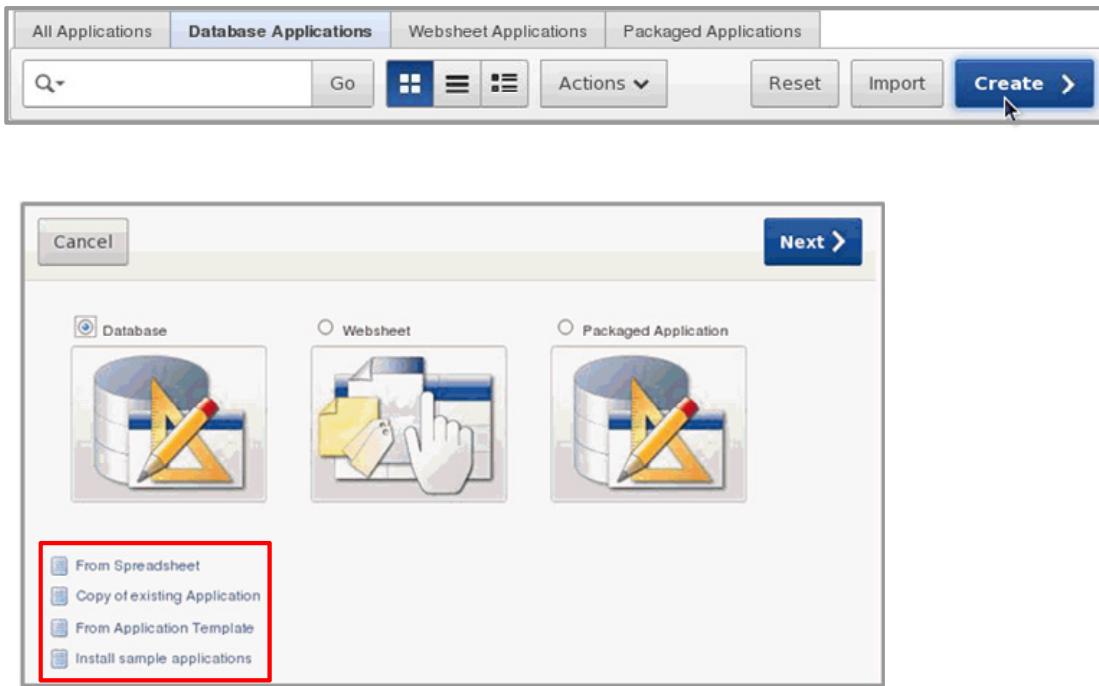
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To access the Create Application Wizard, perform either of the following steps:

1. Navigate to the Application Builder home page and click the Create button.
2. Select Create from the Application Builder menu.

Different Ways of Creating a Database Application



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To create a database application, select Database for the application type, and then click Next. You have four options to create a database application:

- **From Spreadsheet:** You can create an application based on spreadsheet data. You first upload or paste the spreadsheet data to create a table. Then you select a default appearance. The resulting application enables end users to query, insert, or update records, or analyze the data.
- **Copy of existing Application:** You can create a copy of an existing application by running the Create Application Wizard or by selecting the application and then copying the application on the Application home page.
- **From Application Template:** You can create applications based on template applications stored in the template application repository.
- **Install sample applications:** Oracle Application Express includes several sample applications. You can install, run, and use sample applications as they are, or analyze them to better understand how to use Application Builder to build specific types of functionality.

You can also create a database application based on a table, query, or drill-down query.

Creating a Database Application Based on a Table, Query, or Drill-Down Query



In the Create Application Wizard, after selecting Database, perform the following steps:

1. Specify an application name.
2. Select the type of page you want to add.
3. Specify whether you want to copy shared components from another application.
4. Specify the authentication scheme and date format.
5. Select a theme.
6. Confirm your selections to create the application.

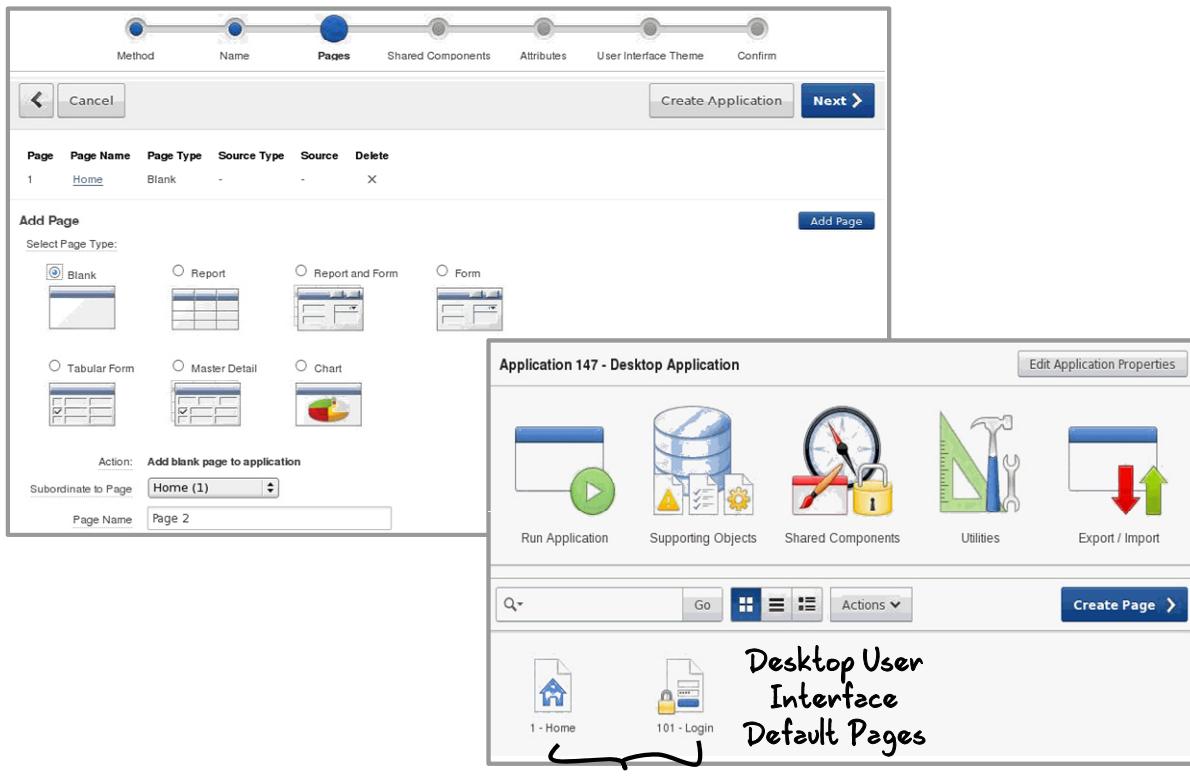


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You can create a database application based on a table, query, or drill-down query. When running the Create Application Wizard, you must choose a target user interface based on which the wizard is optimized to display the appropriate page types, attributes, and themes. The slide provides an overview of the steps to create a database application based on a table, query, or a drill-down query.

You can view the demonstration of creating a database application by opening the `/home/oracle/labs/demos/les03_create_database_application.html` file.

Page Wizard for Desktop User Interface



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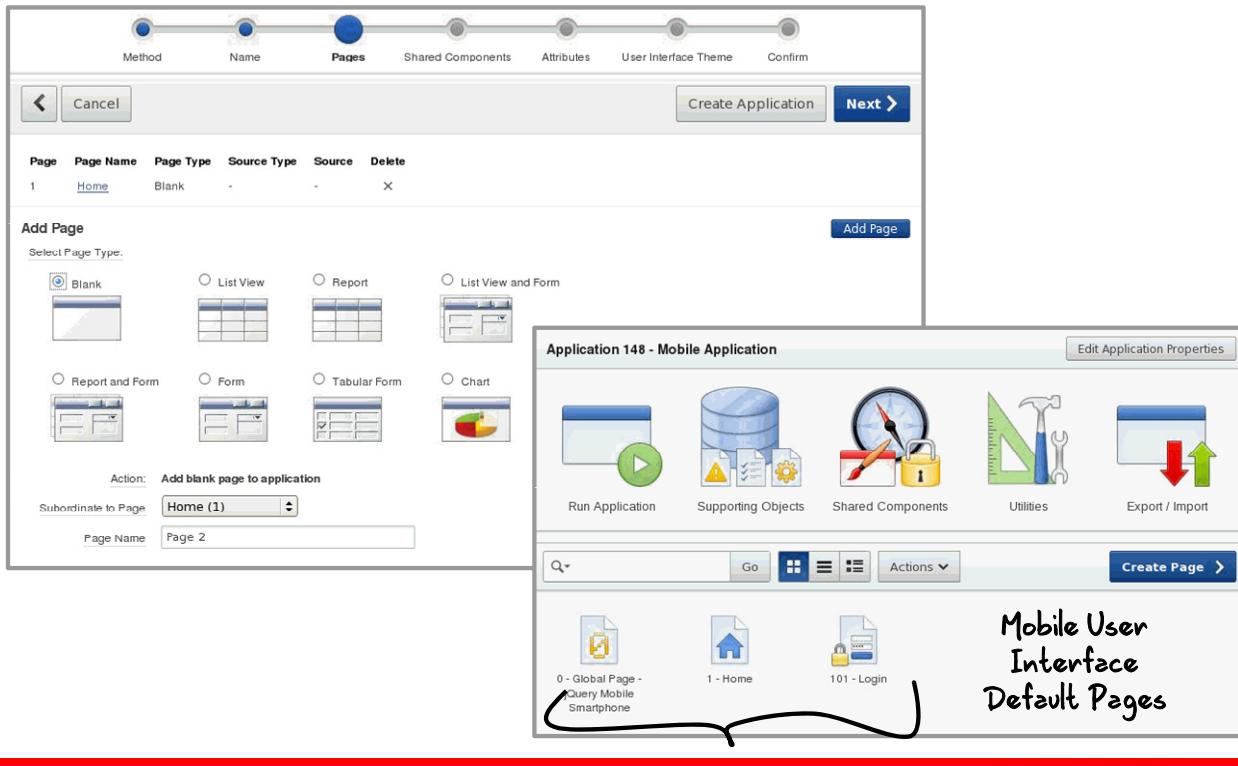
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The slide shows the page wizard for a database application using the desktop user interface. The page wizard displays the various page types available based on the type of user interface.

When you create an application using the desktop user interface, a blank page called the Home page is automatically created. The Home page acts as the parent of any new pages added to the application. The page number for the Home page is always 1.

A Login page also gets created at the time of creating an application. This page is used to enter the login credentials of the application. The page number for the Login page is 101.

Page Wizard for Mobile User Interface



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The slide shows the page wizard for a database application using the mobile user interface. When you create an application using the mobile user interface, a blank page called the Home page, Login page, and Global Page are created. The Global page functions as the master page. The Global page renders all components you add to it on every page in your application.

You can view the demonstration of creating a database mobile application by opening the `/home/oracle/labs/demos/les03_create_database_application_mobile.html` file.

Creating a Database Application from a Spreadsheet



In the Create Application Wizard, after clicking From Spreadsheet, perform the following steps:

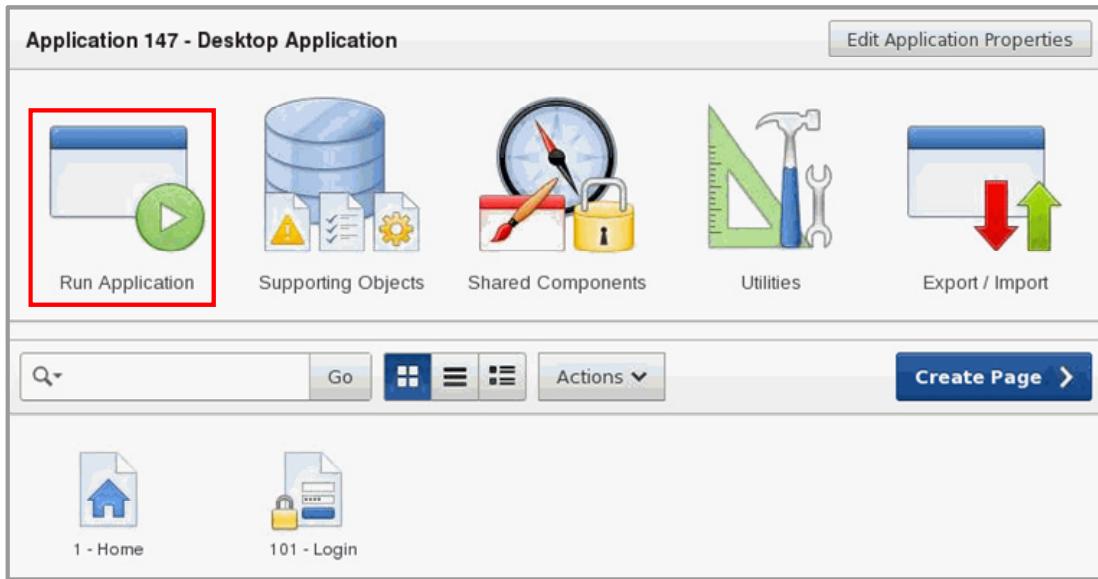
1. Specify how the data will be loaded.
2. Select a file, or copy and paste the data.
3. Specify the table name and column specifications.
4. Specify user interface defaults.
5. Enter the application name.
6. Select a theme.
7. Specify whether you want the data to be summarized, as well as which columns to use.



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You can create an application based on a spreadsheet by clicking From Spreadsheet in the Create Application Wizard. The slide provides an overview of the steps that are necessary to create a database application from a spreadsheet.

Running an Application



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Regardless of the application that you create, you can run the application by clicking the Run Application icon.

Note: If you have chosen the Application Express authentication scheme, the Login page appears. Enter your workspace username and password, and click Login to log in to your application.

Using the Developer Toolbar

The screenshot shows the home page of a sample database application. At the top, there's a navigation bar with links for Home, Customers, Products, Orders, and Reports. Below the navigation bar is a search bar with the placeholder "Search customers, orders and product data". The main content area contains several reports:

- Sales for this Month:** Displays a gauge chart showing "No sales found for current user".
- Top Customers:** A list of customers with their total order amount:

Bradley, Eugene - 2 Order(s)	\$2,760.00
Logan, Edward - 2 Order(s)	\$2,420.00
Dulles, John - 1 Order(s)	\$2,380.00
Hartsfield, William - 2 Order(s)	\$2,370.00
LaGuardia, Fiorello - 1 Order(s)	\$1,090.00
- Top Products:** A list of products with their total sales amount:

Jacket - 18 x \$1.50	\$2,700.00
Bag - 16 x \$1.25	\$2,000.00
Trousers - 21 x \$80	\$1,680.00
- Top Orders by Date:** A list of orders by date and amount:

November 28, 2012	2,380
November 14, 2012	1,890
December 09, 2012	1,640

At the bottom of the page is a navigation bar with links: Home, Application 100, Edit Page 1, Create, Session, Caching, View Debug, Debug, Show Edit Links, and Show Grid. This bar is highlighted with a red box and labeled "Developer Toolbar" with an arrow pointing to it.

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Users who log in to Oracle Application Express with developer privileges have access to the Developer toolbar. The Developer toolbar offers a quick way to accomplish the following:

- Edit the currently running page
- Create a new page, control, or component
- View session state
- Toggle the edit links on and off

Note: The Developer toolbar is displayed for applications with desktop user interface only.

The page displayed in this slide is the home page of the Sample Application in Oracle Application Express. The Developer toolbar is displayed at the bottom of every page in a running application, and has the following options:

- **Home:** Opens the Workspace home page
- **Application <n>:** Opens the application home page
- **Edit Page <n>:** Accesses the Page Definition for the current page
- **Create:** Opens a wizard for creating a new blank page, region, page control (branch, process, button, or item), or shared component (breadcrumb, list, or tab)
- **Session:** Displays a new window that contains session state information for the current page. You learn more about sessions in the lesson titled "Understanding Session State."

- **Caching:** Displays reports that offer details about the pages that are cached in the application
- **View Debug:** Displays another window with debug information by session
- **Debug:** Toggles the page between Debug and No Debug mode. To view the debug information after Debug is selected, click View Debug.
- **Show Edit Links:** Toggles between Show Edit Links and Hide Edit Links. Clicking Show Edit Links displays a small orange icon next to each editable object on the page. Each icon is orange and contains a triangle with two rules beneath it. Clicking the link displays another window in which to edit the object.
- **Show Grid:** Enables you to see how regions and page items are positioned on a page if a grid layout is used

Summary

In this lesson, you should have learned how to:

- Identify the components of a database application
- Describe the database application user interfaces
- Explain the various ways of creating a database application



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This lesson introduced you to Application Builder. You learned about the different types of applications that you can build and the various components of an application. You also learned how to create different types of database applications.

Workshop 3 Overview: Creating Database Applications

This practice covers the following:

- Creating a database application by using a spreadsheet
- Creating a desktop database application
- Adding a mobile user interface to the application



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Using and Creating Interactive Reports

4

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Objectives

After completing this lesson, you should be able to do the following:

- Identify the types of reports that you can create in Oracle Application Express
- Manipulate interactive reports
- Create and customize interactive reports



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This lesson introduces you to reports in Oracle Application Express. You are introduced to the various built-in wizards that help you create reports. This lesson focuses on interactive reports. You learn how to create and manipulate interactive reports. You also learn how to change the way an interactive report is rendered to users.

Lesson Agenda

- Overview
 - Accessing the Create Report Wizard
 - Types of Reports
 - Selecting the Appropriate Report Type
- Using Interactive Reports
- Creating and Customizing an Interactive Report

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Accessing the Create Report Wizard

To access the Create Report Wizard by creating a new page:

1. Navigate to the Application home page and click Create Page.
2. From the “Select a page type” options, select the Report option.

To access the Create Report Wizard by creating a new region on an existing page:

1. From the page definition, right-click the Regions node and select Create.
2. From the “Select a page type” options, select the Report option.



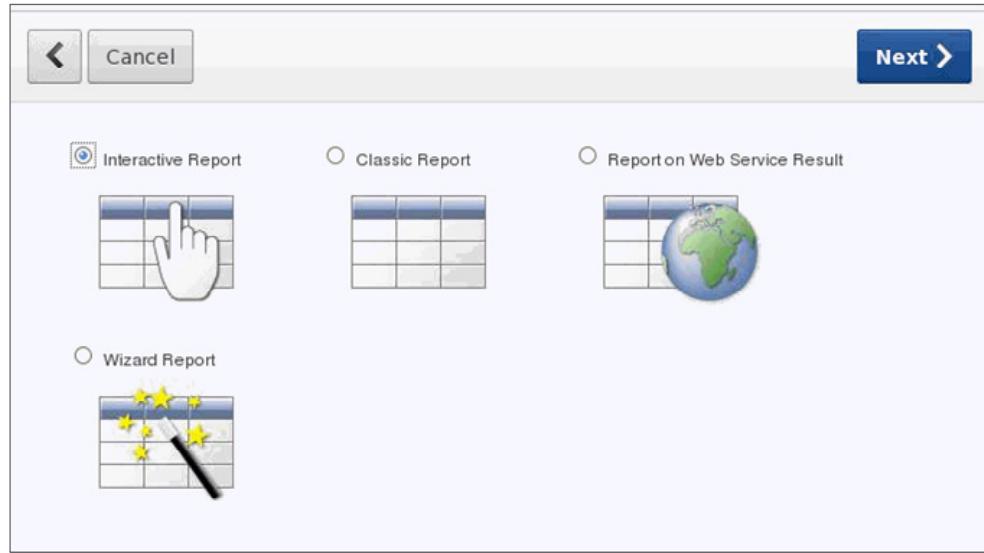
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You can access the Create Report Wizard in two ways:

- By creating a new page in the application
- By creating a new region on an existing page

You can view the demonstration of creating an interactive report by opening the `/home/oracle/labs/demos/les04_create_interactive_report.html` file.

Types of Reports



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There are two basic types of reports: an interactive report and a classic (SQL or wizard) report. The interactive report is the default type when you create an application, convert forms, create regions, and create pages.

When you create a report by using the Create Page Wizard, you can select different report types:

- **Interactive Report:** Creates an interactive report based on a custom SQL SELECT statement that you provide. End users can customize the layout of their data by selecting the options from the Actions menu.
- **Classic (or SQL) Report:** Creates a report based on a custom SQL SELECT statement or a PL/SQL function that returns a SQL SELECT statement
- **Report on Web Service Result:** Creates a report based on a web service result
- **Wizard Report:** Creates a report without requiring any manual SQL coding. The report is created based on your specifications of the schema owner, table, columns in the table, and the result set display.

Selecting the Appropriate Report Type

Interactive Report

An interactive report interface showing a list of employees from the OEHR_EMPLOYEES table. The columns are Employee Id, First Name, Last Name, Email, and Hire Date. A context menu is open over the last row, showing options like 'Select Columns', 'Filter', 'Rows Per Page', 'Format', 'Flashback', 'Save Report', and 'Reset'. There are also links for 'Help' and 'Download'.

Classic Report

A classic report interface showing the same employee data in a standard tabular format. The columns are labeled EMPLOYEE_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, and HIRE_DATE. The data rows are identical to the interactive report.

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The slide examples show the classic and interactive reports. Both these reports are created by the Create Page Wizard. The classic report queries the same columns in the OEHR_EMPLOYEES table as the interactive report.

- **Interactive report:** Notice the automatically built-in search bar, column heading menu links, and icons in the first column of each row. These options allow you to drill down to view row details. With interactive reports, you can provide end-user customizations, such as searching, filtering, and sorting.
- **Classic report:** The SQL and Wizard report types are considered as classic reports. Notice that there is no search bar, no column heading links, and no drill-down capability. A classic report does not, by default, include any of the interactive report features.

An interactive report has many options available to the user for report customization. Therefore, if you want built-in customization capability, select interactive reports. If your report needs no such controls, a classic report is a better option. You can create only one interactive report on a page. Therefore, if you want multiple reports on a single page, you must create some classic reports.

Quiz

Which of the following report types would be appropriate if you want to include end-user customization?

- a. Report based on a SQL query
- b. Interactive report
- c. Wizard report
- d. End-user report

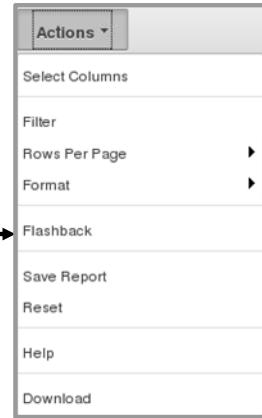


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Answer: b

Lesson Agenda

- Overview
- Using Interactive Reports
 - Interactive Report Interface
 - Searching for Information
 - Using the Actions Menu
 - Manipulating the Report by Using Column Headers
 - Different Views of the Interactive Report
- Creating and Customizing an Interactive Report



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Interactive Report Components

The screenshot shows an Oracle Application Express interface for managing orders. At the top, there's a navigation bar with tabs for Home, Customers, Products, Orders, Reports, and Saved Reports. Below the navigation bar is a search bar and a column heading menu. The main area displays a table of order data. A context menu is open over the table, showing options like Format, Sort, Control Break, Highlight, Compute, Aggregate, Chart, and Group By. Numbered callouts point to specific features:

- 1 Search Bar:** Points to the search bar at the top.
- 2 Column Heading Menu:** Points to the column heading menu icon in the table header.
- 3 Saved Reports:** Points to the 'Saved Reports' link in the top navigation bar.
- 4 Actions Menu:** Points to the 'Actions' button in the top right corner, which opens a context menu.
- 5 Link Column:** Points to a yellow button labeled '0007' in the 'Customer Name' column, which is highlighted in blue to indicate it's a link.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0008	Bradley, Eugene		4	\$1,060.00	-	10/17/20
0007	Dulles, John		7	\$905.00	-	10/9/2011
0006	Hartsfield, William		4	\$1,515.00	-	10/4/2011
0005	LaGuardia, Fiorello		5	\$950.00	-	9/29/2011
0004	Lambert, Albert		5	\$1,090.00	-	9/19/2011
0009	Logan, Edward		3	\$730.00	-	10/23/2010
0003	O'Hare, Frank		5	\$1,640.00	-	9/17/2012
0002	Hartsfield, William	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012
	Dulles, John	DEMO				September 2012

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In an interactive report, you can customize the layout of the data by selecting the columns that you are interested in, applying filters, highlighting, and sorting. You can also define control breaks, aggregations, and computed columns, and include a chart of the query results. You can create multiple variations of the report and save them as named reports, output to comma-delimited files, and print as PDF documents.

The following components are, by default, included on an interactive report page:

- Search bar:** The search bar is at the top of an interactive report and provides features such as the Select Columns icon, Text Area, Go button, and Actions menu button.
- Column heading menu:** Click any column heading to see a column heading menu. This menu allows you to change the sort order, hide columns, create break groups on a column, view Help about the column, and create a filter.
- Saved reports:** You can create and save alternative views of a report.
- Actions menu:** This menu is used to customize the display of your interactive report.
- Link to custom target:** You can link to another page in your application.

In the next few slides, you learn about each of these components in detail.

Searching for Information

The diagram illustrates two scenarios for searching information in Oracle Application Express:

Scenario 1: Shows a search interface where a user enters "ed" into a search field and clicks "Go". A filter is applied, resulting in two rows being displayed.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

Scenario 2: Shows a search interface where a user selects the "Order Items" column, enters "4", and clicks "Go". A filter is applied, resulting in one row being displayed.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

Annotations:

- 1**: Points to the search criteria input field.
- 2**: Points to the search results table.
- 3**: Points to the search results table.
- Filter Applied**: An annotation pointing to the search results table.
- Remove and enable or disable filter options**: An annotation pointing to the filter configuration area.

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You can perform a non-case-sensitive search on the entire report or on a specific column.

To search in the entire report, enter the search criteria in the text area and click the Go button. A filter is applied on the report and all the rows that contain the search criteria are displayed. (Scenario 1).

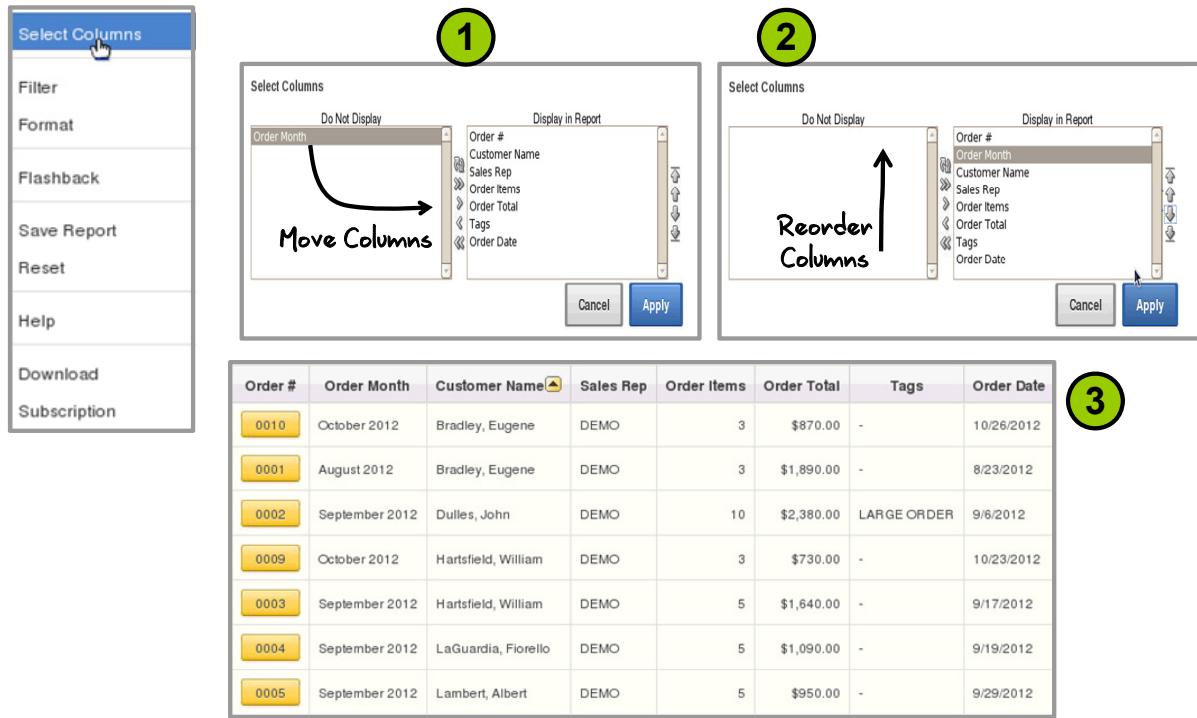
To search within a specific column, perform the following steps: (Scenario 2)

1. Click the icon before the text area and select the column to search on.
2. Enter the search criteria and click the Go button.
3. The search is applied and the results are displayed.

You can create multiple filters on a report. For the row to be displayed, the row must satisfy all the filters (an AND condition is implied).

You can remove a filter by clicking the Remove Filter icon (it looks like a filter with a red X over it) next to the filter that you want to remove. Alternatively, you can enable or disable the filter by using the Enable/Disable check box.

Selecting Columns



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The Actions menu contains many tasks that are useful for manipulating an interactive report. Using the Select Columns option, you can specify which columns to display and in what order. To specify the columns to be displayed in a report, from the Actions menu, select **Select Columns**. Then perform the following steps:

1. To show a column in the report display, select a column and click the right arrow (>) to move the column to the “Display in Report” region. In the example in the slide, **Order Month** from the Do Not Display region is moved to the “Display in Report” region.
2. To reorder the columns, select the column and click the up or down arrow. In the example in the slide, Order Month is placed directly above Customer Name. Click Apply. The report is displayed, showing the changes made.

Adding a Column Filter

The screenshot illustrates the steps to add a column filter:

- Actions Menu:** Shows the 'Select Columns' menu open, with the 'Filter' option highlighted.
- Filter Dialog:** A modal window titled 'Filter' is displayed. It shows a 'Filter Type' section with 'Column' selected. Below it, the 'Column' dropdown is set to 'Order Date', the 'Operator' dropdown is set to '>', and the 'Expression' input field contains '9/1/2012'. There is also a calendar icon next to the expression field.
- Report Grid:** The main area shows a report grid for orders. The grid has columns: Order #, Customer Name, Sales Rep, Order Items, Order Total, Tags, Order Date, and Order Month. Eight rows of data are listed, corresponding to order IDs 0010 through 0017. An arrow points from the 'Filter' dialog to the grid, indicating the results of the applied filter.

Only rows that meet the filter criteria are displayed.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	October 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	September 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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As you previously saw, you can create a filter by using the search bar. You can also use the Filter option from the Actions menu to add or modify a filter. There are two types of filters: column and row. A column filter shows the rows that match the criteria from all the filters (an AND condition is implied) applied together. A row filter contains an expression (shown in the next slide). Note that a filter adjusts the WHERE clause on the query. To add a column filter by using the Actions menu, perform the following steps:

1. Click the Actions menu button and select Filter.
2. Select a column (which does not have to be the one that is displayed).
3. Select from a list of standard Oracle operators (=, !=, not in, between).
4. Enter an expression to compare against. The expression is case-sensitive and you can use % as a wildcard (for example, STATE_NAME like A%).
5. Click Apply.

You can have multiple filters for a report. If you decide that you want to disable a particular filter, select the Remove Filter check box.

The example in the slide shows a filter created on the ORDER_DATE column.

Adding a Row Filter

A row filter allows for more than one search criterion, without an implied AND condition.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/6/2012	October 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	September 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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A row filter allows you to specify multiple column filters, by using an expression. In the example in the slide, the filter selects rows where order date is after August OR where the number of items is greater than or equal to 7. If two column filters were created rather than one row filter, the rows satisfying both the conditions will be displayed. To add a row filter by using the Actions menu, perform the following steps:

1. From the Actions menu, select Filter.
2. Select the Row Filter type.
3. Specify the expression by using the Columns and Functions/Operators values, or simply type in the Filter Expression field.
4. Click Apply.

Sorting Columns

The screenshot shows the Oracle Application Express interface. On the left, a sidebar menu includes 'Select Columns', 'Filter', 'Format' (which is highlighted), 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A context menu is open over the 'Format' item, with 'Sort' selected. To the right is a 'Sort' dialog box with six entries. The first entry, 'Order Items', has a sort icon (an upward arrow) next to it. Arrows point from the text 'Column 1 shows the sort icon in the report.' to both the sort icon in the dialog and the sort icon in the report preview below. The report preview shows a table with columns: Order #, Order Month, Customer Name, Sales Rep, Order Items (with a sort icon), Order Total, Tags, and Order Date. The data consists of 10 rows of order information.

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012
0008	October 2012	O'Hare, Frank	DEMO	4	\$1,060.00	-	10/17/2012
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012
0007	October 2012	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012
0002	September 2012	Duiles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012

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The sort action is used to specify which columns to sort on and whether to sort in ascending or descending order. You can also specify how to handle nulls (use the default setting, display them first, or display them last). The sort icon is displayed to the right of the column heading in the report for the column specified in the 1 slot. In the example in the slide, Order Items is sorted first, so it has the sort icon.

To sort columns, perform the following steps:

1. Click the Actions menu button and select Format > Sort.
2. Select a column from the Column drop-down list. In the slide example, Order Items is selected.
3. Specify whether to sort the report in Ascending or Descending order.
4. Specify how null values should be displayed in the sort column. If this is set to Default, nulls will default to the value set in the Direction field for this sort entry.
5. Click Apply.

Another way to sort is by using the column header, which is discussed later in this lesson.

Creating Control Breaks

The screenshot shows the Oracle Application Express interface. On the left, the Actions menu is open, and 'Control Break' is highlighted. To the right, a 'Control Break' dialog box is displayed, showing a list of columns with their status. The 'Order Month' column is selected and has 'Enabled' status. Below the dialog is a report grid showing sales data for three months: August 2012, September 2012, and October 2012. The report includes columns for Order #, Customer Name, Sales Rep, Order Items, Order Total, Tags, and Order Date.

Order Month	Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
August 2012	0001	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012
September 2012	0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012
	0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012
	0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012
	0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012
October 2012	0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012
	0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012

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You can use the Control Break option to create a break group on one or several columns. This pulls the columns out of the interactive report and displays them as a master record.

To create a break group, perform the following steps:

1. Click the Actions menu button and select Format > Control Break.
2. Select a column from the Column drop-down list.
3. Click Apply.

The example in the slide creates a control break on Order Month. Notice that the Order Month column is extracted from the report and displayed as a master record.

You can also break a particular column from the column header, which is discussed later in this lesson.

Highlighting a Row or Cell

The screenshot shows three windows related to highlighting rows in a table:

- Actions Menu:** Shows the "Highlight" option selected under the "Format" menu.
- Highlight Dialog:** A configuration dialog with the following settings:
 - Name: Order Items Greater than 5
 - Sequence: 10
 - Enabled: Yes
 - Highlight Type: Row
 - Background Color: #99CCFF
 - Text Color: #FF7755
 - Highlight Condition: Order Items > 5
- Table Preview:** A grid of 10 rows from a table. Rows 7 and 8 are highlighted with a blue background and orange text, corresponding to the condition "Order Items > 5".

A handwritten note on the right side of the table preview area reads: "These rows are highlighted because the condition is true." with an arrow pointing to the highlighted rows.

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You can highlight specific rows or cells based on a filter. The rows or cells that meet the condition are highlighted by using the characteristics associated with the highlight.

To highlight a row or cell, perform the following steps:

1. Click the **Actions** menu button and select **Format > Highlight**.
2. Enter a name, and select either a row or cell for Highlight Type. You can select any color from the palette for the background and text.
3. Under Highlight Condition, select a column from the drop-down list. Then select an operator and an expression to be evaluated.
4. Click **Apply**.

The example in the slide shows that the rows are highlighted when Order Items is set to greater than 5.

Adding Computed Columns

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Price with Tax
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	913.5
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	766.5
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012	1984.5
0008	October 2012	O'Hare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	1113
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	1590.75
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	997.5
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	1144.5
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	1722
0007	October 2012	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	950.25
0002	September 2012	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	2499

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You can use the Compute option to add computed columns to a report. These can be mathematical computations (for example, NBR_HOURS/24) or standard Oracle functions that are applied to existing columns (some columns have been displayed; other columns, such as TO_DATE, can also be used).

To add a computed column to your report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Compute**.
2. Enter a name for Column Heading. In the slide example, **Price with Tax** is entered.
3. Select a value for Format Mask. In the slide example, **\$5234.10** is selected.
4. Place your cursor in the Computation field and click a column from the list of columns. A column alias appears in the Computations area.
5. Use numbers and symbols from the Keypad. For example, to specify multiplication, click *. If required, use functions displayed in the table. In the slide example, ***1.05** is specified.
6. Click **Apply**. The new computed column now appears in the report.

The example in the slide shows a computed column that has the calculation Price*1.05. The "Price with Tax" computed column is displayed in the report. Notice that the format mask \$5,234.10 is applied to the report.

Aggregating Columns

The screenshot shows the Oracle Application Express interface. On the left, there's a sidebar with various options like 'Select Columns', 'Filter', 'Format' (which is currently selected), 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A context menu is open over the 'Format' option, with 'Aggregate' highlighted. To the right of the sidebar is a 'Aggregate' dialog box. It has three dropdown menus: 'Aggregation' set to '- New Aggregation -', 'Function' set to 'Sum', and 'Column' set to '**Price with Tax'. Below these are 'Cancel' and 'Apply' buttons, with 'Apply' being the one currently being clicked. At the bottom of the screen is a red banner with the 'ORACLE' logo. The main area displays a report table with columns: Order #, Order Month, Customer Name, Sales Rep, Order Items, Order Total, Tags, Order Date, and Price with Tax. The last row of the table is highlighted with a red box and contains the value '13681.5'.

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Price with Tax
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	913.5
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	766.5
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012	1984.5
0008	October 2012	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	1113
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	1590.75
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	997.5
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	1144.5
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	1722
0007	October 2012	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	950.25
0002	September 2012	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	2499
								13681.5

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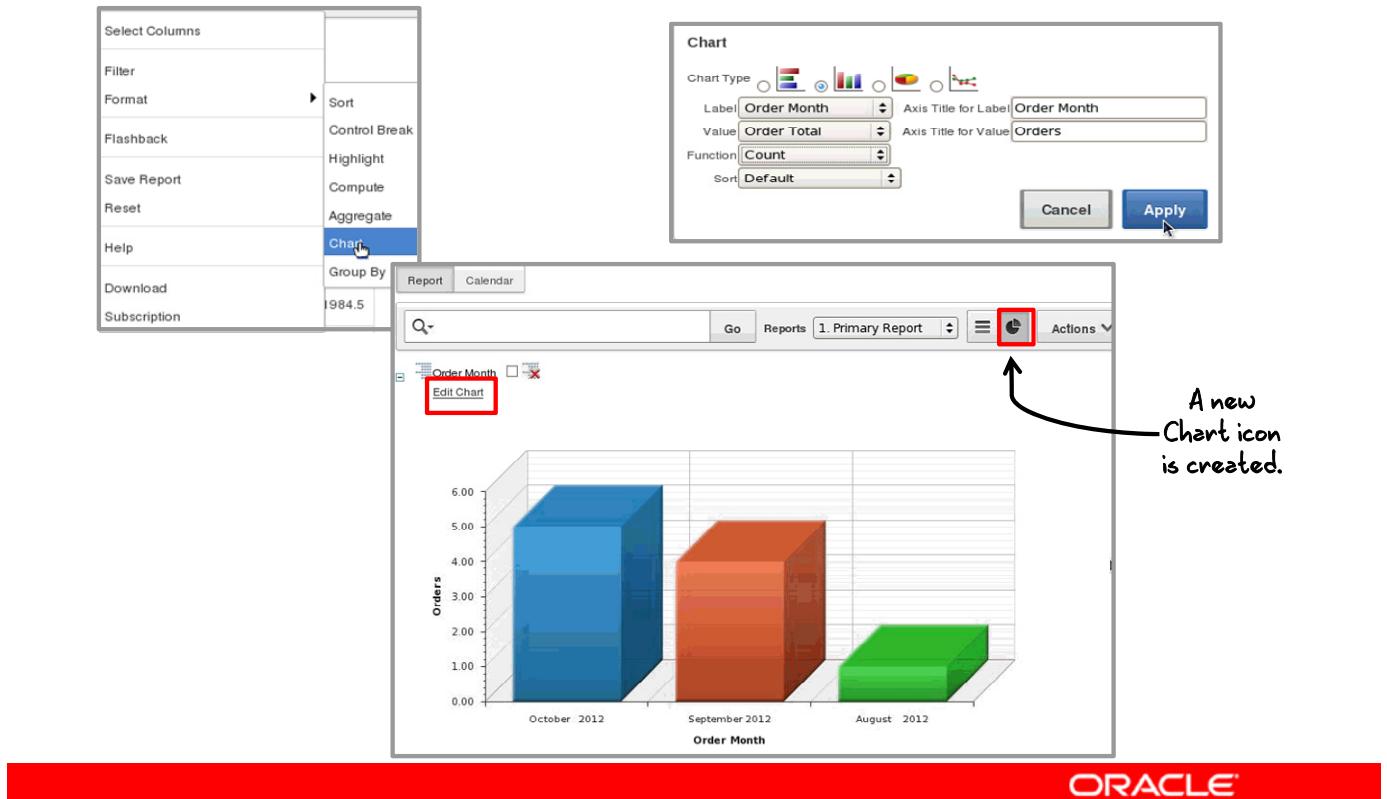
You can use the Aggregate option to perform mathematical computations against a column in your report. Aggregates are displayed after each control break and at the end of the report within the column for which they are defined.

To aggregate columns in your report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Aggregate**.
2. Select a function from the Function drop-down list. The following functions are available in the Function drop-down list: Sum, Average, Count, Minimum, Maximum, and Median. In the example in the slide, **Sum** is selected.
3. Select a column from the list of columns. Only base columns can be used in aggregates, and not computed columns. In the example in the slide, **Price with Tax** is selected.
4. Click **Apply**.

The slide example shows an aggregate that is a sum of "Price with Tax."

Creating a Chart



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You can create a chart based on the data contained in the report. You can include only one chart per interactive report. After a chart is defined, you can change the definition of the chart by clicking the Edit Chart link below the search bar. You can return to the detailed report by clicking the desired icon on the search bar.

To create a chart, perform the following steps:

1. Click the **Actions** menu button and select **Format > Chart**.
2. Specify the chart type.
3. Select a column for Label.
4. Select a column for Value.
5. Select a function.
6. Select a sort value.
7. Click **Apply**. You can edit the chart or switch back to the report.

The slide example creates a horizontal bar chart that shows the number of orders per month.

Creating a Group By Report

The screenshot illustrates the process of creating a Group By report in Oracle Application Express. At the top, a sidebar menu includes 'Select Columns', 'Filter', 'Format' (which is currently selected), 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. Below the menu, a 'Group By' dialog box is open, showing 'Order Month' as the group by column. The 'Functions' section contains three rows: 1. Sum (Order Items) labeled 'Total Order', 2. Sum (Order Total) labeled 'Total Order Price', and 3. Select Function (Select Column). A 'Format Mask' section is also visible. At the bottom of the dialog are 'Cancel' and 'Apply' buttons. In the main workspace, a report titled '1. Primary Report' displays data grouped by 'Order Month'. The columns are 'Order Month', 'Total Order', and 'Total Order Price'. The data shows three months: October 2012 (21 total orders, 5,080 total price), August 2012 (3 total orders, 1,890 total price), and September 2012 (25 total orders, 6,060 total price). An annotation with an arrow points to a grid icon in the toolbar above the report, which is highlighted with a red box. A handwritten-style note next to the icon says 'A Group By icon is created.'

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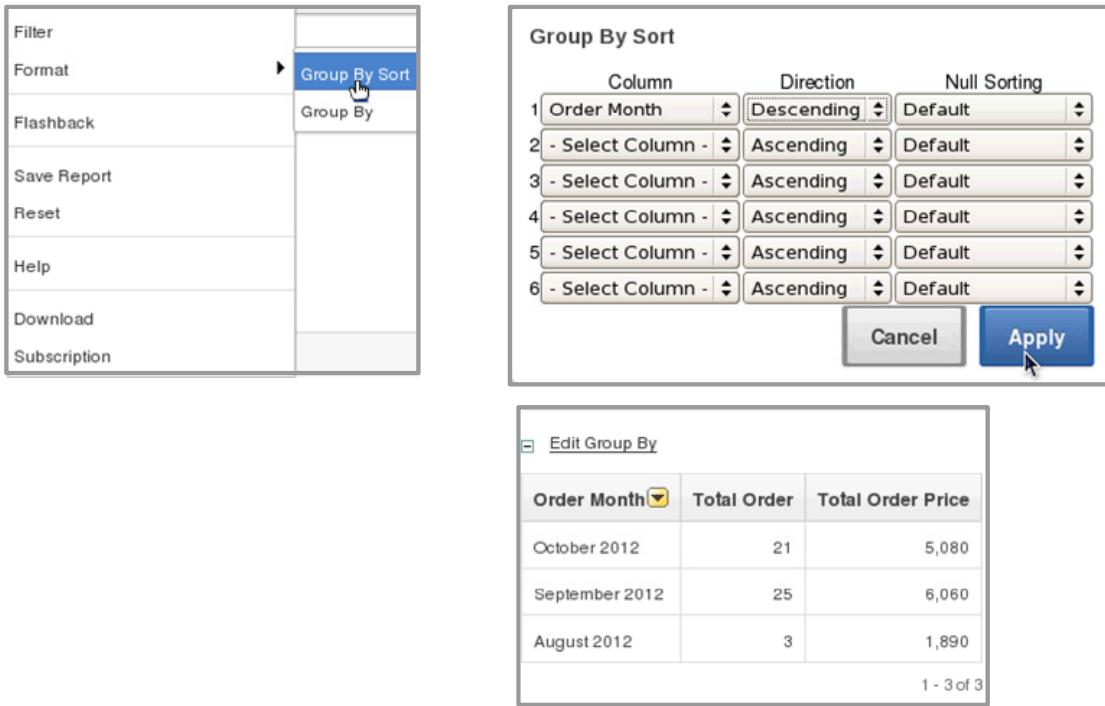
You can create a Group By report for multiple columns based on multiple functions. You can include only one Group By report per interactive report. After a Group By report is defined, you can change the definition of the Group By report by clicking the Edit Group By link below the search bar. You can return to the detailed report by clicking the desired icon on the search bar.

To create a Group By report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Group By**.
2. Select at least one Group By column.
3. Select at least one function and column to base the function on. Enter a label and format mask.
4. Click **Apply**. You can edit the Group By report or switch back to the report (by using the icon on the search bar).

The slide example creates a Group By report that shows the total order and the total order price for each month.

Creating a Group By Sort Order



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You can specify group by column sort order (ascending or descending) by either clicking the group by column heading or selecting Group By Sort from the Format submenu. You can also specify how to handle NULL values. Using the default setting always displays NULL values last or always displays them first.

To sort a group by column, perform the following steps:

1. Access a Group By view as shown in the previous slide.
2. Click the **Actions** menu, and select **Format** and then **Group By Sort**. The Group By Sort region appears.
3. Select a column, the sort direction (ascending or descending), and Null Sorting behavior.
4. Click **Apply**.

The slide example creates a Group By report with the Order Month in descending order. Note that the Group By Sort menu is only visible when you are using the Group By view.

Quiz

Which of the following actions would you choose from the Actions menu if you want to pull a column from an interactive report and display it as a master record?

- a. Select Columns
- b. Compute
- c. Control Break
- d. Highlight



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Answer: c

Performing a Flashback Query

The screenshot shows a report interface for an order table. On the left, a sidebar menu includes 'Flashback' which is highlighted. A callout points from this menu to a 'Flashback' dialog box. The dialog box contains the text: 'A flashback query allows you to view the data as it existed at a previous point in time.' Below this is a field labeled 'As of' with a dropdown menu showing '10' minutes ago, and an 'Apply' button. A callout from the 'Flashback' text points to the 'As of' field. Another callout from the 'Apply' button points to the order table below. The order table has a row for order # 0010 with an order total of \$620.00, which is highlighted with a red box. A handwritten note above this row says 'An order is edited.' The table also shows other orders with their details.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO		\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
						10/4/2012	October 2012
						9/29/2012	September 2012
						9/19/2012	September 2012

Flashback
A flashback query allows you to view the data as it existed at a previous point in time.
As of minutes ago.

Cancel Apply

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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You can use the Flashback option to perform a flashback query. This allows you to view the data as it existed at a previous point in time. The default amount of time that you can flashback is three hours (or 180 minutes), but the actual amount differs per database.

To perform a flashback on a report, perform the following steps:

1. Click the **Actions** menu button and select **Flashback**.
2. Enter a value in the "As of" field.
3. Click **Apply**. The flashback query is applied and you view the data as it existed at a previous point in time.

In the example in the slide, an order is edited. After the flashback query is applied, you see the order details before the edit was made.

Saving a Report

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You can save a customized report for future use. While navigating between pages in an application, if you select the report from the list in the Reports drop-down list, your changes (filters, control breaks, and so on) will still be available. If you log out, however, your changes will not be saved unless you have saved the report. You can save multiple versions of a report and each will appear as a separate report.

You can save a report as private or public. Private reports are accessible only to the creator. Public reports are available to all authenticated users. There are two types of public reports: a primary and an alternative. The Primary Report is the default view. If a developer wants certain changes to be made to the Primary Report, the developer must save the changes as Default Report Settings. You can have only one primary report but multiple alternative reports. To save a report, perform the following steps:

1. From the **Actions** menu, select **Save Report**.
2. In the Save Report dialog box, specify the following:
 - **Save:** Select the As Named Report option.
 - **Name:** Enter a name for the report. If you do not select the Public check box, the report will be a private report.
 - **Description:** Enter an optional description.
3. Click **Apply**. Your report is added to the list of reports in the drop-down list.

Resetting Reports

Before reset

The screenshot shows a report interface with a sidebar containing 'Actions' buttons: 'Select Columns', 'Filter', 'Format', 'Flashback', 'Save Report', 'Reset' (highlighted with a blue box), 'Help', 'Download', and 'Subscription'. The main area displays a table of orders for October 2012. A 'Report data as of 10 minutes ago.' message is visible at the top. The table has columns: Order #, Customer Name, Sales Rep, Order Items, Order Total, Tags, Order Date, and Order Month. The last two columns have dropdown arrows. The data includes rows for Bradley, Eugene, Hartsfield, William, OHare, Frank, Logan, Edward, and Lambert, Albert.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012

A modal dialog titled 'Reset' contains the message 'Restore report to the default settings.' with 'Cancel' and 'Apply' buttons. The 'Apply' button is highlighted with a blue box.

After reset

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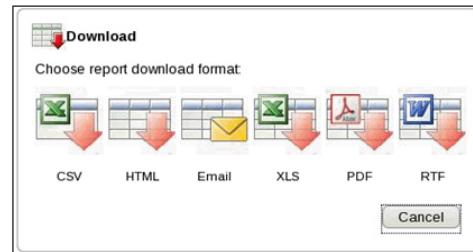
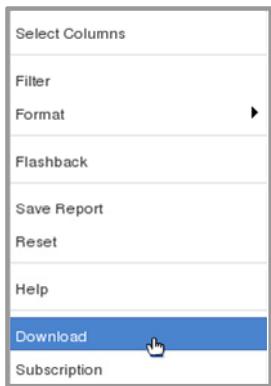
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You can reset an interactive report back to the default settings and remove any customizations that you have made. To reset the defaults, perform the following steps:

1. Click the **Actions** menu button and select **Reset**.
2. Click **Apply** to confirm that you want the reset to be performed.

Note: Each saved report can be reset to its own default settings.

Downloading Reports



HTML Format

A screenshot of an APEX report page displaying a table of order data. The table has columns for Order #, Customer Name, Sales Rep, Order Items, Order Total, Tags, Order Date, and Order Month. The data shows ten orders from October 2012, with the first few rows being: Order # 0010, Customer Name Bradley, Eugene, Sales Rep DEMO, Order Items 2, Order Total \$620.00, Tags -, Order Date 10/26/2012, Order Month October 2012; and Order # 0009, Customer Name Hartsfield, William, Sales Rep DEMO, Order Items 3, Order Total \$730.00, Tags -, Order Date 10/23/2012, Order Month October 2012.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	September 2012
0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012
0001	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012	August 2012

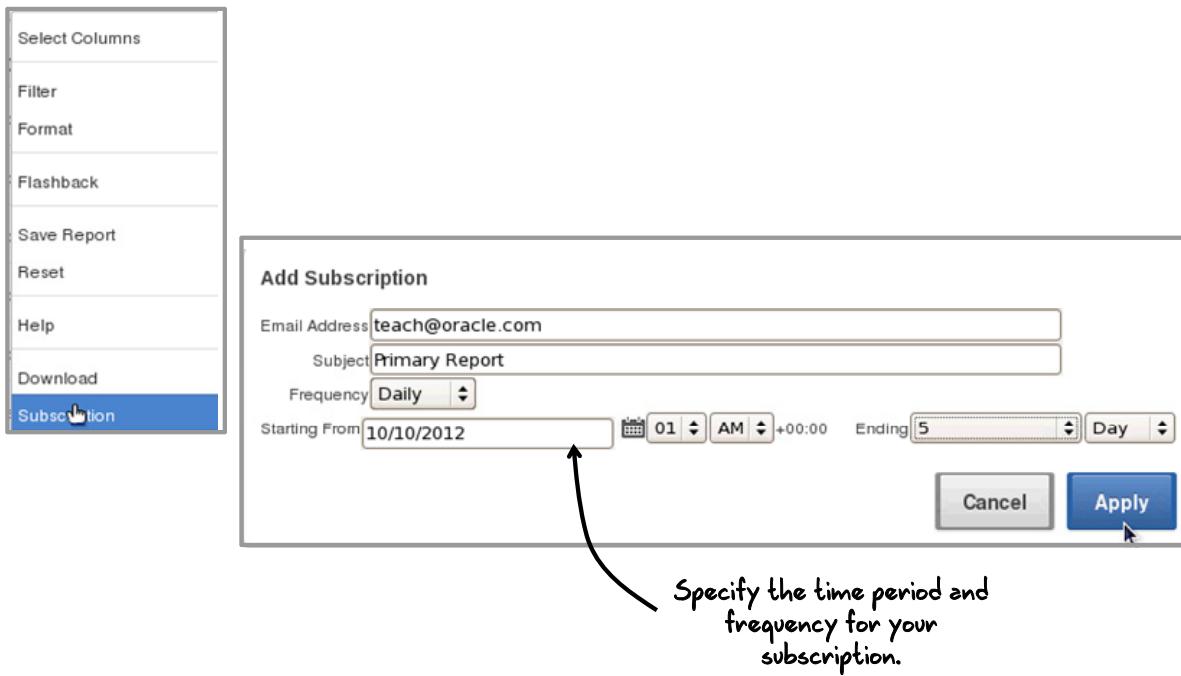
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You can use the Download option to download the current result set. The download formats differ depending on your installation and report definition but may include CSV, HTML, XLS, PDF, or RTF. You can also email the HTML file by using the Email option.

The example in the slide shows the HTML format of the report data.

Subscribing to a Report



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You may want to subscribe to a report where the email address that you enter will receive an email of the report for a specified length of time and frequency. Note that you can subscribe to a report only when the report is contained on an authenticated page.

In the slide example, the report will be emailed on a daily basis for five days. The report that is emailed is contained in HTML format.

Manipulating the Interactive Report by Using a Column Header

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	
0003	Hartfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012

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You can click any column heading to display the Column Heading menu. You can also perform all the functions in the Column Heading menu by using the Actions menu. The Column Heading menu contains the following functions:

- Sorting columns
- Hiding a column
- Creating a control break on a column
- Displaying column information
- Creating a filter

The Column Information icon appears only if there is Help defined for the column. The help text is defined by the developer who created the report.

The slide example shows the Column Heading menu on the Order Month column. Notice that the list of values for that column is displayed.

You can break a particular column from the column header. When control break is created, the column becomes a master record for the report.

When you add some text in the text field, a filter is created on the column.

You can view the demonstration of using and customizing and interactive report by opening the

/home/oracle/labs/demos/les04_using_and_customizing_interactive_report.html file.

Quiz

Which of the following functions in the Column Heading menu can also be performed by using the Actions menu?
(Choose all that apply.)

- a. Sorting columns
- b. Creating a control break
- c. Hiding a column
- d. Creating a filter



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Answer: a, b, c, d

Note that you can also hide a column by using Select Columns.

Lesson Agenda

- Overview
- Using Interactive Reports
- Creating and Customizing an Interactive Report
 - Creating an Interactive Report
 - Accessing the Report Attributes Page
 - Editing Report Attributes
 - Customizing the Search Bar
 - Specifying the Download Formats
 - Specifying Detail View and Icon View
 - Using Link Column
 - Modifying Interactive Report Query

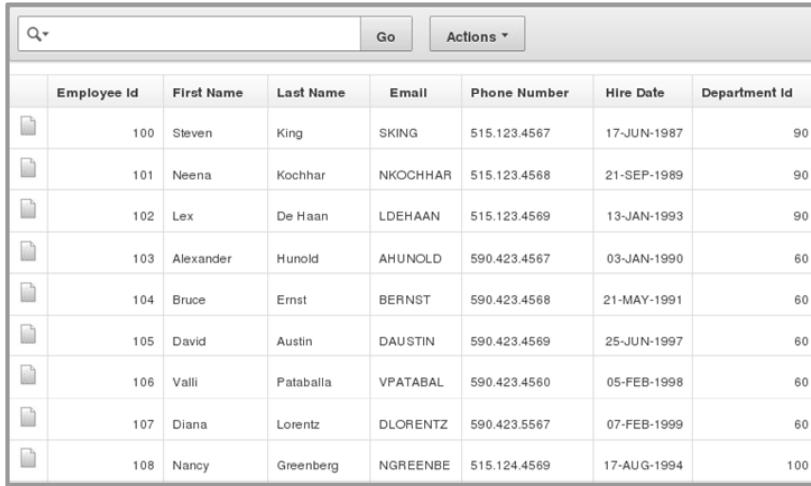


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Creating an Interactive Report

Ways to create an interactive report:

- When creating a new database application
- By creating a new page in an existing database application
- By creating a new region on an existing page



The screenshot shows a table of employee data with the following columns: Employee Id, First Name, Last Name, Email, Phone Number, Hire Date, and Department Id. The data includes rows for Steven King, Neena Kochhar, Lex De Haan, Alexander Hunold, Bruce Ernst, David Austin, Valli Pataballa, Diana Lorentz, and Nancy Greenberg.

Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	Department Id
100	Steven	King	SKING	515.123.4567	17-JUN-1987	90
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	90
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	60
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	100

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There are numerous ways to create an interactive report. You can create the report when you create the following:

- A new database application
- A new page in an existing database application
- A new region on an existing page in a database application

How to access the Create Report Wizard has already been covered in the Overview topic of this lesson. An interactive report is based on a SQL query that can be entered or created by using the Query Builder.

Accessing the Report Attributes Page

To access the Report Attributes page:

1. Access the page definition where the interactive report is created.
2. Under Regions > Body, right-click the interactive report.
3. Select Edit Report attributes. The Report Attributes page is displayed.



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As a developer, you can change the way an interactive report is rendered to users by editing the Report Attributes page. The steps to access the Report Attributes page is shown in the slide.

There are various tabs on the Report Attributes page where you can edit information to modify the interactive report properties. The next few slides explain the tabs in detail.

Editing Report Attributes

The screenshot shows the 'Column Attributes' tab of the Oracle Application Express report configuration interface. It displays a table of columns with their properties and several tabs for editing report attributes:

- Column Groups**: A tab showing 'No groups defined.' with an 'Add Group >' button.
- Pagination**: Set to 'Row Ranges X to Y' and 'Bottom - Right' position.
- Sorting**: Options for ascending and descending sort images and attributes.

	Heading	Type	Link	Display Text As
	EMPLOYEE_ID	NUMBER		Display as Text (escape special characters)
	FIRST_NAME	STRING		Display as Text (escape special characters)
	LAST_NAME	STRING		
	EMAIL	STRING		
	PHONE_NUMBER	STRING		
	HIRE_DATE			
	JOB_ID			
	SALARY			

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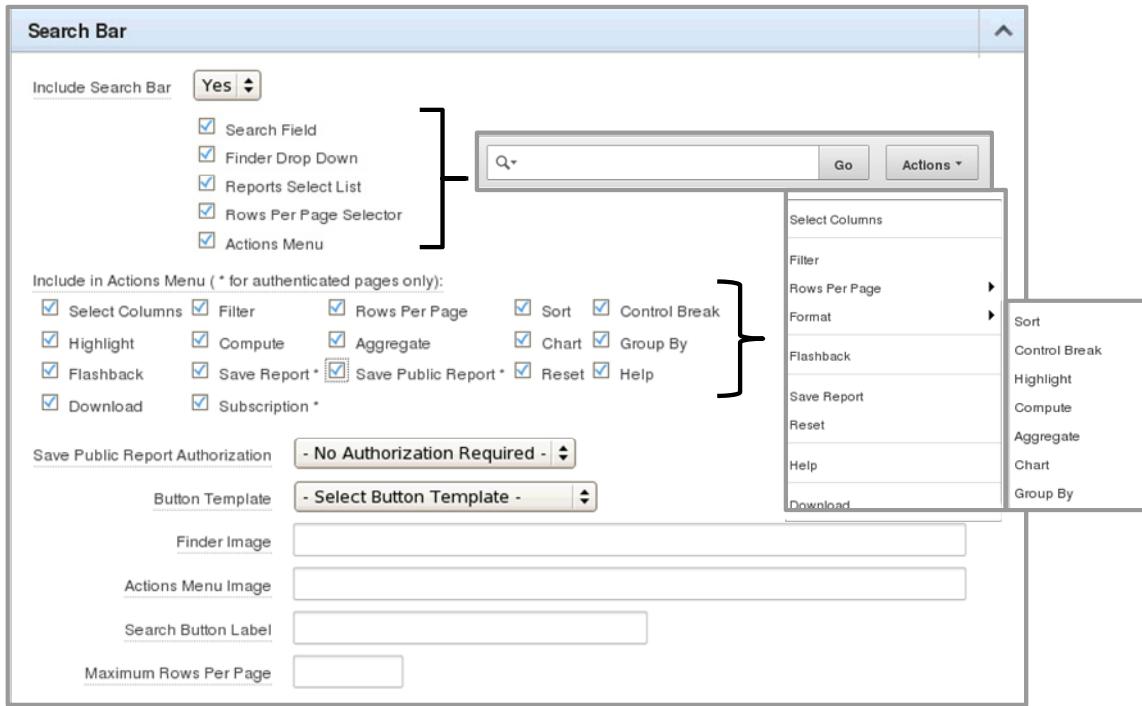
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You can modify various interactive report properties from the tabs on the Report Attributes page as follows:

- **Column Attributes tab:** Edit the properties of individual columns in the report. You can alter column heading text, change column positioning, or hide a column. If you select Hidden in the Display Text As field, the column will no longer appear in the Do Not Display area under Select Columns of the Actions menu. Click the pencil icon next to a column name to edit the column properties.
- **Column Groups tab:** Group columns into groups. If you create a single-row view in the report, the grouped columns are displayed together under the group name. To create a group, click the Add Group button. Then from the Column Attributes tab, you can add columns to the group.
- **Pagination tab:** Specify if you want to use pagination, and where and how it should appear.
- **Sorting tab:** Specify the image to be used next to the column name in the column heading when the sort is applied. Click the **set defaults** link to accept the default images.

Click **Apply Changes** to save the changes that you made to the report attributes.

Customizing the Search Bar



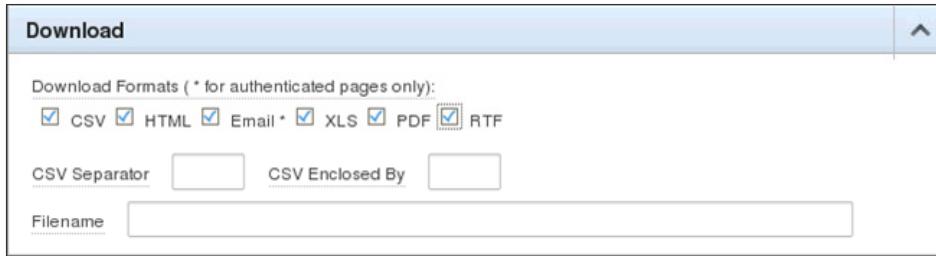
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You can choose whether or not to include a search bar in an interactive report. By default, a search bar is included in an interactive report. If you set Include Search Bar to No, the search bar and all its components are removed from the interactive report. You can specify which components of the search bar should be displayed. You can also control the options that are displayed under the Actions menu. All the actions are selected by default. Deselect the option that you do not want in the Actions menu of the report.

Click **Apply Changes** to save the changes that you made to the report attributes.

Specifying the Download Formats



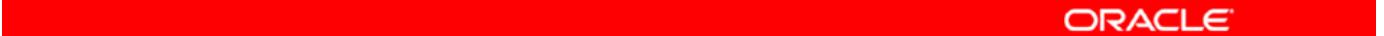
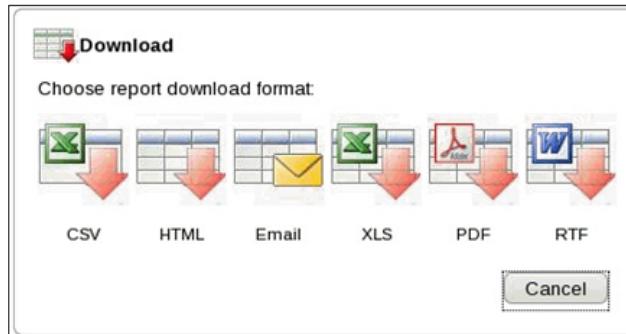
Download

Download Formats (* for authenticated pages only):

CSV HTML Email * XLS PDF RTF

CSV Separator CSV Enclosed By

Filename

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On the Download tab, you can specify the formats in which users can download the report data. The available formats are CSV, HTML, Email, XLS, PDF, and RTF.

Click **Apply Changes** to save the changes that you made to the report attributes.

Using the Link Column

Link Column

Link Column
Single Row View
Link to Single Row View
Link to Custom Target
Exclude Link Column

Uniquely Identify Rows by: ROWID

Link Icon:

[Icon 1] [Icon 2] [Icon 3] [Icon 4] [Icon 5] [Icon 6] [Icon 7] [Icon 8]

Link Attributes:

Target: Page in this Application Page: 1 Reset Pagination

Request: Clear Cache

Name	Value
Item 1	
Item 2	
Item 3	

Page Checksum: Use default

Condition Type: - No Condition -

Report View: Employee Id 101, First Name Neena, Last Name Kochhar, Email NKOCHHAR, Phone Number 515.123.4568, Hire Date 21-SEP-1989, Job Id AD_VP, Salary 17000, Commission Pct -, Manager Id 100, Department Id 90

Row 2 of 107 Exclude Null Values Displayed Columns

Single-row view of the report →

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For an interactive report, you can specify a link column. You can create a column link to a single-row view or to another page in the application.

The single-row view is used by default when you create an interactive report. The single-row view is a display-only view of all the columns in the report. If you have a column in your query but it is hidden in Column Attributes, it will not be displayed in the single-row view. If you have a column that you have hidden in the report by using Select Columns in the Actions menu, it will appear in the single-row view. From the single-row view, you can navigate through all the rows by clicking the Previous and Next buttons. To return to the report, you can click the Review View button.

If you choose to link to a custom page, you can pass item session state values. Linking to a custom page is explained in detail in the lesson titled “Creating Forms.”

You can also completely remove the link column from the report. A link column cannot be sorted, hidden, or moved by an end user.

Click **Apply Changes** to save the changes that you made to the report attributes.

Icon and Detail Views

The screenshot displays four panels related to report views:

- Icon View Configuration:** A configuration screen with fields like "Icon View Enabled" (Yes), "Link Column" (ICON_LINK), and "Image Source Column" (DETAIL_IMG_NO_STYLE).
- Detail View Configuration:** A configuration screen with fields like "Detail View Enabled" (Yes) and a large text area showing HTML code for defining the layout of detail rows.
- Icon View Preview:** A preview of the report search bar showing icons for various products (Bag, Belt, Blouse, Business Shirt, Jacket, Ladies Shoes, Mens Shoes, Skirt, Trousers, Wallet) with a red box highlighting the icon button.
- Detail View Preview:** A preview of the report search bar showing detailed product information for a Bag and a Belt, with a red box highlighting the detail view button.

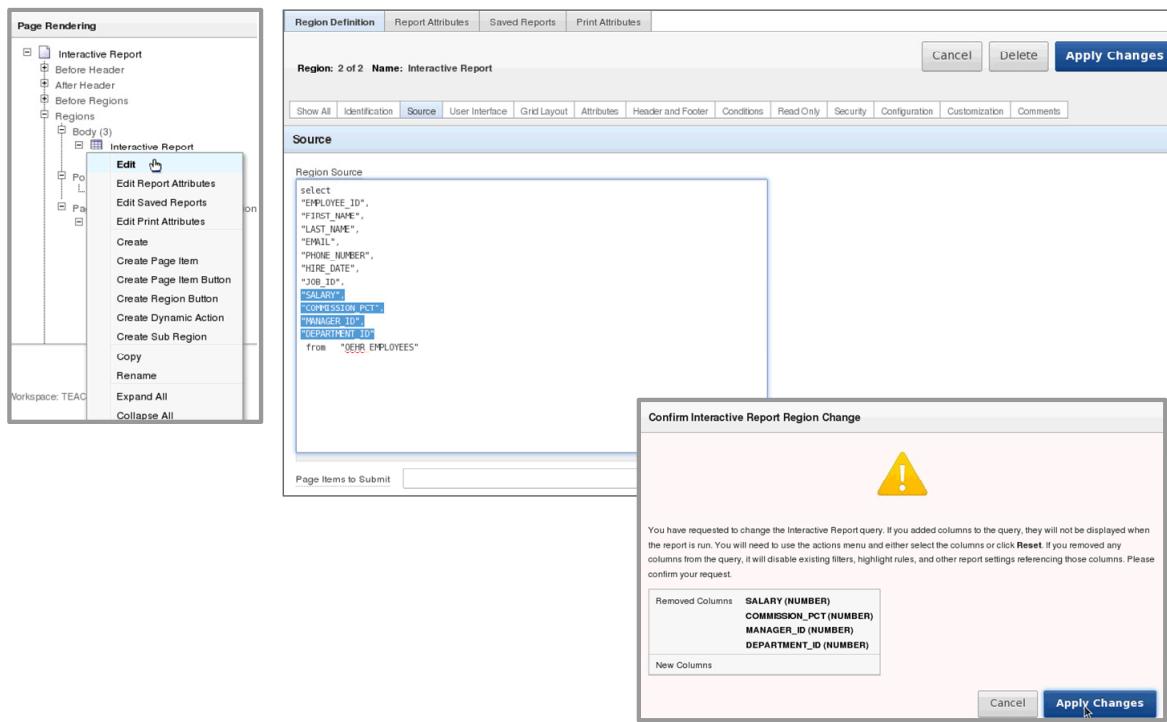
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On the Icon View and Detail View tabs, you can define Icon and Detail views for an interactive report. When you enable each of these views, an icon is created on the search bar of the interactive report.

Icon View is ideal when you have an image column in your report. Detail View enables you to display the report data by using HTML formatting. Examples of these views (shown in the screenshot in the slide) are included on the Products tab in the Sample Database application that is installed in each Application Express workspace by default.

Modifying the Interactive Report Query



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You can change the query that is executed when the report is run. To do this, perform the following steps:

1. From the page definition, right-click the interactive report and select **Edit**.
2. Under Region Definition, click **Source**.
3. Modify the report query.
4. Click **Apply Changes**.
5. In the confirmation window, click **Apply Changes**.

If you add columns to the query, they are not displayed when the report is run. In this case, to see the changes in your report, you must reset the report.

Quiz

Which of the following must you define when creating an interactive report?

- a. A SQL query
- b. A control break
- c. Page and region names
- d. A filter



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Answer: a

Quiz

Which of the following must you do to hide a column so that it is not shown in the report but allows the value to be passed to another page?

- a. Make sure that it is not displayed in Select Columns.
- b. Hide the column in the report and make sure that it is saved.
- c. Hide the column in Column Attributes.
- d. Delete the column from the SQL query.



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Answer: c

Summary

In this lesson, you should have learned how to:

- Identify the types of reports that you can create in Oracle Application Express
- Manipulate interactive reports
- Create and customize interactive reports



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Workshop 4-1 Overview: Building and Manipulating an Interactive Report

This practice covers creating and manipulating two interactive reports.



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Workshop 4-2 Overview: Customizing an Interactive Report

This practice covers customizing the interactive reports.



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Creating Classic Reports, Wizard Reports, and Reports for Mobile Applications

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Objectives

After completing this lesson, you should be able to create the following reports:

- Classic
- Wizard
- List View



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This lesson introduces you to SQL reports in Oracle Application Express. It focuses on Classic and Wizard reports. In this lesson, you also learn how to create reports for mobile applications.

Lesson Agenda

- Creating Classic Reports
 - Classic SQL Report
 - Creating a Classic SQL Report
- Creating Wizard Reports
- Creating List View for Mobile Applications



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Classic (SQL) Report

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
100	Steven	King	SKING	515.123.4567	17-JUN-1987	AD_PRES	24000		90	
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	AD_VP	17000		100	90
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	AD_VP	17000		100	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	IT_PROG	9000		102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	IT_PROG	6000		103	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	IT_PROG	4800		103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	IT_PROG	4800		103	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	IT_PROG	4200		103	60
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	FI_MGR	12000		101	100
109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994	FI_ACCOUNT	9000		108	100
110	John	Chen	JCHEN	515.124.4269	28-SEP-1997	FI_ACCOUNT	8200		108	100
111	Ismael	Sclarra	ISCIARRA	515.124.4369	30-SEP-1997	FI_ACCOUNT	7700		108	100
112	Jose Manuel	Urman	JMURMAN	515.124.4469	07-MAR-1998	FI_ACCOUNT	7800		108	100
113	Luis	Popp	LPOPP	515.124.4567	07-DEC-1999	FI_ACCOUNT	6900		108	100
114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-1994	PU_MAN	11000		100	30

row(s) 1 - 15 of 107 | [Next](#)

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Sometimes an interactive report may not be appropriate, as in the following situations:

- When you want to build the SQL query dynamically by using a PL/SQL function that returns a SQL query
- When you want multiple reports on a page. Currently, you can have only one interactive report on a page.

The two types of classic reports, SQL and wizard, are both based on SQL queries. The screenshot in the slide displays a classic SQL report.

Creating a Classic (SQL) Report

To create a classic (SQL) report:

1. Access the Create Report Wizard.
2. Select Classic Report for the report type.
3. Specify the page name and breadcrumb, and choose whether you want tabs.
4. Enter the SQL query for the report, or use Query Builder to create the SQL.
5. Specify the report attributes (such as column heading sorting, CSV output, and enable search).
6. Confirm your selections and click Create.



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The slide shows the steps to create a classic report.

You can view the demonstration of creating a classic report by opening the `/home/oracle/labs/demos/les05_classic_report.html` file.

Lesson Agenda

- Creating Classic Reports
- Creating Wizard Reports
 - Wizard Report
 - Creating a Wizard Report
- Creating List View for Mobile Applications



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Wizard Reports

Wizard Report					
Employee Id	First Name	Last Name	Email	Phone Number	Hire Date
100	Steven	King	SKING	515.123.4567	17-JUN-1987
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994
109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994
110	John	Chen	JCHEN	515.124.4269	28-SEP-1997
111	Ismael	Sciarrra	ISCIARRA	515.124.4369	30-SEP-1997
112	Jose Manuel	Urman	JMURMAN	515.124.4469	07-MAR-1998
113	Luis	Popp	LPOPP	515.124.4567	07-DEC-1999
114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-1994

row(s) 1 - 15 of 107 Next >



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A wizard report looks the same as a classic (SQL) report except that you cannot modify the query in the source area. Also, instead of specifying the SQL query, you can select the table name and the columns to display in the report. To create wizard reports, you don't have to know SQL, but it prompts you to create the report through a series of windows based on the table name and columns to be displayed in the report.

Creating a Wizard Report

To create a wizard report:

1. Access the Create Report Wizard.
2. Select Wizard Report for the report type.
3. Specify the page and region names as well as the breadcrumbs. Choose whether you want tabs.
4. Select the table and columns that you want to display.
5. Specify the report attributes (such as template and number of rows).
6. Click Create.



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When you create a wizard report, you select the table and columns that you want to be displayed in the report rather than building a SQL query.

You can view the demonstration of creating a wizard report by opening the `/home/oracle/labs/demos/les05_wizard_report.html` file.

Workshop 5-1 Overview: Creating Classic Reports

This workshop covers the following topics:

- Creating a classic report
- Creating a wizard report



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Lesson Agenda

- Creating Classic Reports
- Creating Wizard Reports
- Creating List View for Mobile Applications
 - Creating a List View
 - Modifying a List View



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Creating List View for Mobile Applications

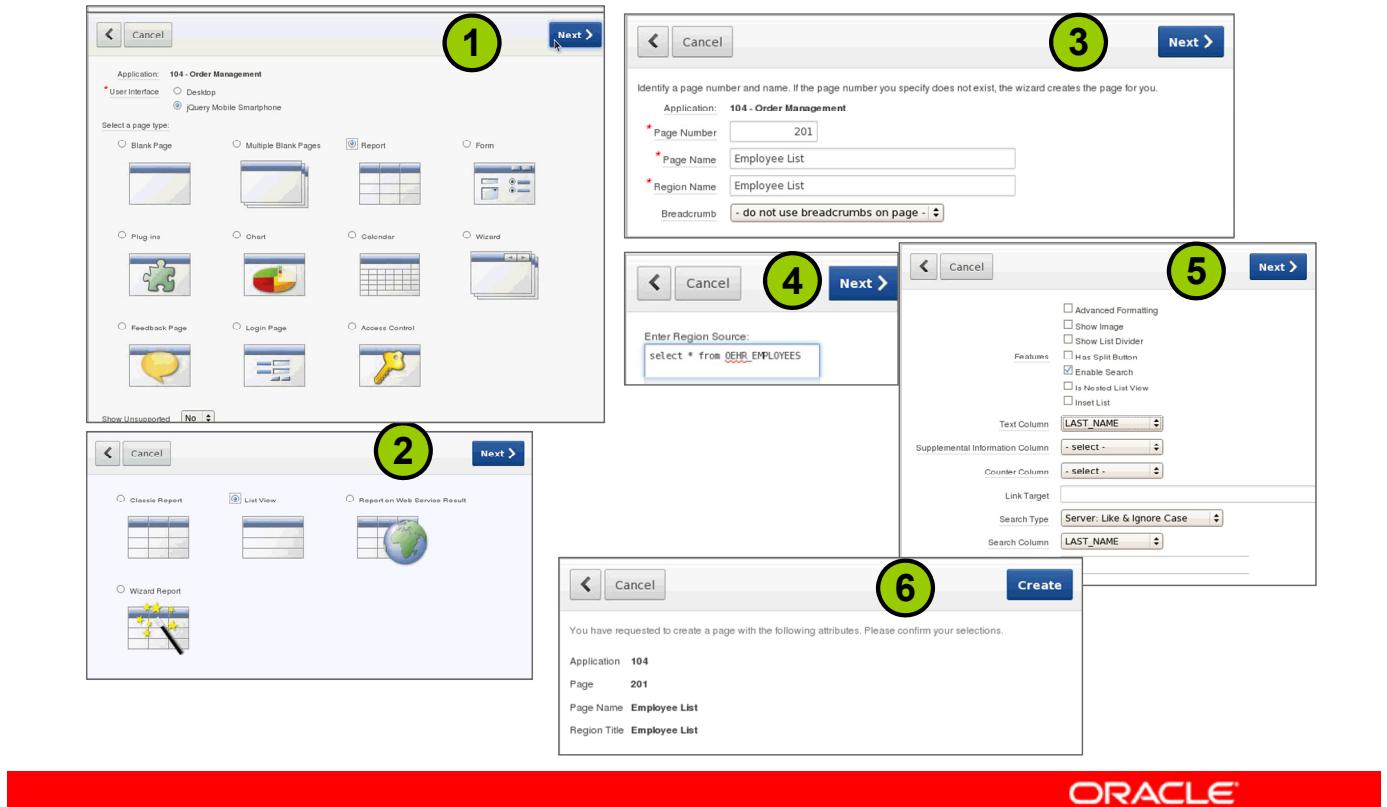
The image shows two side-by-side screenshots. On the left is a screenshot of the 'Create Page Wizard' interface. It has a title bar with 'Cancel' and 'Next >' buttons. Below this are four radio button options: 'Classic Report' (selected), 'List View' (highlighted with a cursor icon), 'Report on Web Service Result', and 'Wizard Report'. On the right is a screenshot of a mobile application titled 'Employee List'. It shows a list of employee names: King, Kochhar, De Haan, Hunold, Ernst, Austin, Pataballa, Lorentz, Greenberg, Faviet, and Chen. Each name is followed by a circular arrow icon.

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When you create a report for a mobile application by using the Create Page Wizard, you can select different report types. These report types are similar to the report types available for desktop applications, except that the Interactive Report is replaced by List View.

Creating a List View



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To create a List View, perform the following steps:

1. Access the Create Report wizard and select jQuery Mobile Smartphone for User Interface. Select Report as the page type.
2. Select List View for the report type.
3. Specify the Page Number, Page Name, and Region Name. Make sure to specify the Page Number to be distinct for mobile application pages. Select the Page Number in the 200 series.
4. Enter the Region Source.
5. Specify the Report Settings (such as, features to enable search and search column in the report).
6. Click Create.

You can view the demonstration of creating a List View by opening the /home/oracle/labs/demos/les05_mobile_report.html file.

Modifying a List View

The image shows two parts illustrating the modification of a List View:

- Left Panel (Configuration):** A screenshot of the "List View Configuration" dialog. It includes sections for "Features" (with "Enable Search" checked), "Text Column" (set to LAST_NAME), "Supplemental Information Column" (set to FIRST_NAME), and "Search Column" (set to LAST_NAME). A red box highlights the "Supplemental Information Column" field, and a green circle labeled "b" highlights the "Text Column" field.
- Right Panel (Report):** A screenshot of the "Employee List" report. The report displays employee names in two columns: LAST_NAME and FIRST_NAME. A red box highlights the header row, and a green circle labeled "a" highlights the search icon in the top-left corner of the report area.

Last Name	First Name
King	Steven
Kochhar	Neena
De Haan	Lex
Hunold	Alexander
Ernst	Bruce
Austin	David
Pataballa	Valli
Lorentz	Diana

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You can modify your List View by modifying the features and some attributes of the report. For example, selecting Enable Search allows you to enable search in your report based on the Search Column. Similarly, adding Supplemental Information Column enables you to add supplemental information for the list view entry. In the example shown in the slide, first name is the Supplemental Information Column.

Workshop 5-2 Overview: Creating a List View

This practice covers adding and modifying a list view in a mobile application.



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Summary

In this lesson, you should have learned how to:

- Create classic reports
- Create wizard reports
- Create a list view type of mobile report and modify the report



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In this lesson, you learned how to create classic (SQL), wizard, and list view reports.

Creating Forms

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Objectives

After completing this lesson, you should be able to do the following:

- Identify the types of forms that you can include in an application
- Create:
 - A form on a table
 - A form with a report
 - A tabular form
 - A master detail form
- Edit forms
- Create forms in a mobile application



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In this lesson, you learn how to create forms in your application by using the various built-in wizards. You also learn how to edit and modify forms.

Lesson Agenda

- Using Forms
 - Introducing Forms
 - Types of Forms
 - Accessing the Create Form Wizard
 - ROWID Versus Primary Key
- Creating Forms
- Modifying Forms
- Creating Forms in a Mobile Application



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Introducing Forms

- What are forms in Oracle APEX?
 - Forms are application components that are used to manipulate database tables and objects.
- How are forms created in Oracle APEX?
 - Manually
 - Declaratively by using wizards
- Where are forms created?
 - On a new page in the application
 - On an existing page of the application



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Forms are application components that take input from a user and submit it to a server. A form usually consists of one or more page items (drop-down list, text box, check box, radio buttons, and so on), which enable users to enter information, and a button or link with a submit action.

In Oracle Application Express, you use forms when you must gather input from a user before performing a task on a database table. For example, you can create a form to insert data into a database table.

In Oracle Application Express, you can create forms easily by using wizards. For example, by using the “Form on a Table or View” wizard, you can create one item for each column in a table. The wizard automatically includes the necessary buttons and processes that are required to insert, update, and delete rows from the table.

You can create a form when you create a page in an application. You can also include a form on an existing page by creating a region.

Types of Forms



Form on a
Table or View



Tabular Form



Form on a
Table with Report



Master Detail
Form



Form on a
Procedure



Form on a
SQL Query



Form on
Web Service



Form and Report
on Web Service



Summary Page

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Oracle Application Express provides wizards to create the types of forms listed in the slide.

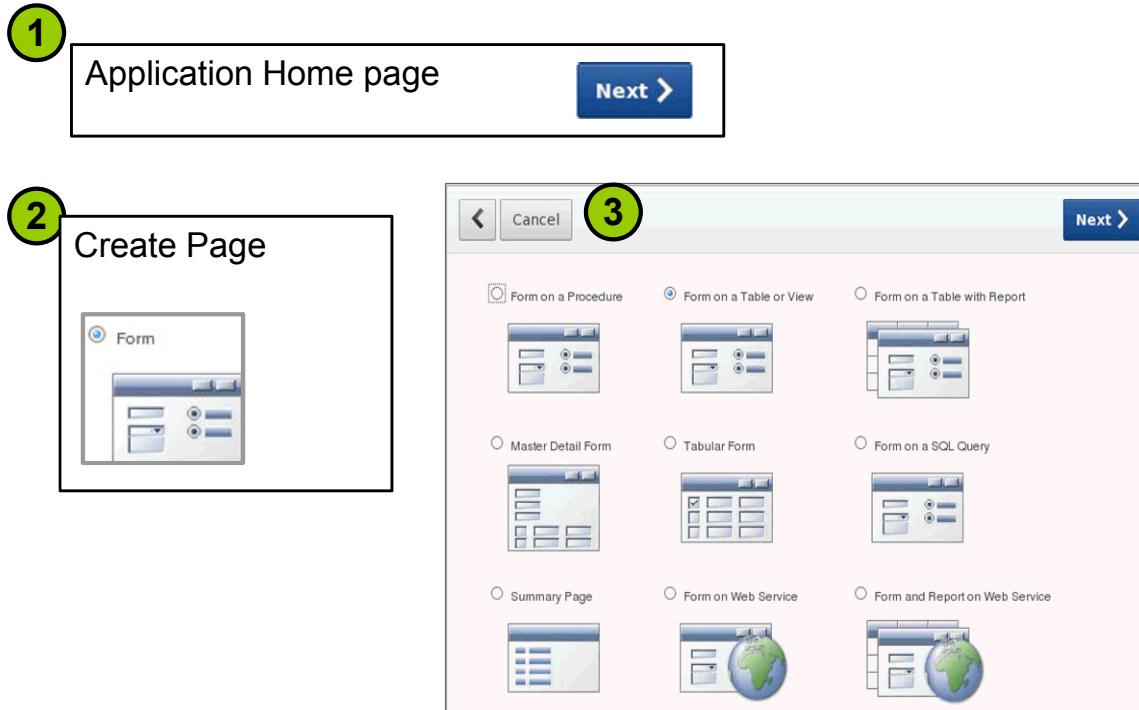
- **“Form on a Table or View” wizard:** Create a form to enable users to insert rows into a table.
- **Tabular Form Wizard:** Create a form to enable users to edit or delete multiple rows in a table simultaneously. Users will also be able to insert rows into the table.
- **“Form on a Table with Report” wizard:** Display a report and enable users to edit or delete rows one at a time. Users will also be able to insert rows into the table.
- **Master Detail Form Wizard:** Enable users to update data from two tables. You should have a foreign key relation between the two tables.

In this lesson, you learn how to create forms by using these four wizards.

The following are the other wizards:

- **“Form on a Procedure” wizard:** Create a form based on stored procedure arguments. Use this approach when you have implemented logic or data manipulation language (DML) in a stored procedure or package.
- **“Form on a SQL Query” wizard:** Create a form based on the columns returned by a SQL SELECT query.
- **“Form on Web Service” wizard:** Create a page with items based on a web service definition. This wizard creates a user input form, a process to call the web service, and a Submit button.
- **“Form and Report on Web Service” wizard:** Create a page with items based on a web service definition. This wizard creates a user input form, a process to call the web service, and a Submit button, and displays the results returned in a report.
- **Summary Page Wizard:** Create a read-only version of a form. A typical use case is to provide a confirmation page at the end of a wizard.

Accessing the Create Form Wizards



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To access the Create Form wizards while creating a new page in your application, perform the following steps:

1. Click Create Page on the home page of the application where you want to create the form.
2. The Create Page Wizard opens. Select Form from the available options and click Next.
3. The form wizards are displayed. You can select a wizard based on the type of form that you want to create.

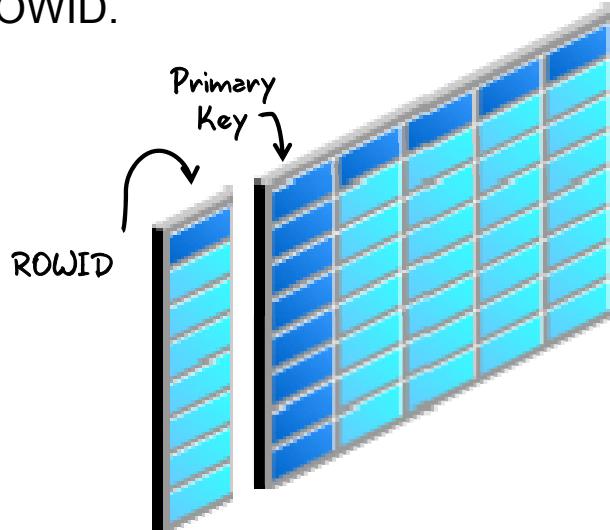
You can also access these wizards while creating a region on a page. You learn more about regions in the lesson titled “Working with Pages and Regions.”

The following wizards are also accessible when you create a database application from scratch:

- Form
- Report and Form
- Tabular Form
- Master Detail

ROWID Versus Primary Key

- Oracle Application Express supports up to two primary key columns.
- For tables with no primary key or more than two primary key columns, use ROWID.



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Each row in a database table should be uniquely identifiable so that the DML operations in a form function properly. The most common practice is to specify a primary key for the table. A primary key can be a single column in a table or can be a combination of two or more columns.

In Oracle Application Express, the Create Form wizards allow you to specify up to a maximum of two columns for a primary key. If your table does not have a primary key or if it has three or more columns, Oracle Application Express recommends that you use the ROWID feature. ROWID is a pseudocolumn that uniquely identifies a row in a table.

Lesson Agenda

- Using Forms
- Creating Forms
 - Creating a Form on a Table
 - Creating a Form with a Report
 - Creating a Tabular Form
 - Creating a Master Detail Form
- Modifying Forms
- Creating Forms in a Mobile Application

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Example: Form on a Table

Each table column
is displayed as a field.

Automatically Created
Region Buttons

Oehr Employees

First Name

Last Name *

Email *

Phone Number

Hire Date *

Job Id *

Salary

Commission Pct

Manager Id

Department Id

Cancel Create

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The slide shows the form that is created by using the “Form on a Table or View” wizard. The wizard creates a form where users can enter values for the selected columns of an EMPLOYEES table. The wizard displays two buttons on the page: Cancel and Create. To create a new row in the table, enter the details and click the Create button. The data is inserted in the table and you are redirected to the page that you specified while creating the form. Click Cancel to branch to the page that you specified while creating the form.

Creating a Form on a Table



Access the “Form on a Table or View” wizard, and then perform the following steps:

1. Select the schema and table.
2. Enter the page number and name, region name, and template (filled by default).
3. Select a tab option.
4. Select the primary key columns.
5. Select the source for primary key column.
6. Select the columns to include in the form.
7. Select and name the buttons.
8. Select the pages to branch to.
9. Confirm the details and create the form.



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The slide provides an overview of the steps to create a form on a table by using the “Form on a Table or View” wizard. You must access the wizard and follow the wizard instructions. You can change the label name of the buttons created on the form page. You can also specify the page that should be displayed after clicking these buttons.

Example: Form on a Table with Report

The screenshot shows a two-panel interface. The left panel is a report table titled 'Employees' with columns: Employee Id, First Name, Last Name, Email, Phone Number, Hire Date, and Salary. It lists 10 rows of employee data. The right panel is a modal dialog titled 'Edit Employees' containing fields for First Name (with 'Steven' entered), Last Name (with 'King' entered), Email (with 'SKING'), Phone Number (with '515.123.4567'), Hire Date (with '17-JUN-1987'), and Salary (with '24000'). Buttons for 'Cancel', 'Delete', and 'Apply Changes' are visible.

Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	Salary
100	Steven	King	SKING	515.123.4567	17-JUN-1987	24000
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	17000
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	17000
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	9000
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	6000
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	1800
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	4000
107	Diana	Lorentz	DLORE	515.123.4567	17-JUN-1987	24000
108	Nancy	Greenberg	NGREE	515.123.4568	21-SEP-1989	17000
109	Daniel	Faviet	DFAVIE	515.123.4569	13-JAN-1993	17000

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The slide shows the pages that are created by using the “Form on a Table with Report” wizard. The first page is an interactive report that lists the details from an EMPLOYEES table. When you click the Create button, a form appears where you can insert new rows in the EMPLOYEES table. When you click the link column in the report, the form is populated with the row details. Then you edit the details and save your changes.

Creating a Form on a Table with a Report



- Type of report
- Page number and name
- Region template and name
- Tabs
- Columns to display
- Image for edit link
- Page number and name
- Region template and name
- Primary key and trigger source
- Columns to edit
- Actions to enable (insert, update, and delete)

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The “Form on a Table with Report” wizard combines the steps to create a report and the steps to create a form—and creates two pages. The first page is a report with an edit link (link column) for each row. The report page also includes a Create button to enable users to insert rows into the table. The second page is a form to edit or delete the row selected from the first page (reports page). The slide shows the various wizard steps for creating the Report and Form pages.

You can view a demonstration of creating a form on a table with report by opening the `/home/oracle/labs/demos/les06_form_with_report.html` file.

Workshop 6-1 Overview: Creating a Form on a Table

This practice covers the following topics:

- Creating a form based on a table
- Linking to the form from a report



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Example: Master Detail Form

The screenshot displays a Master Detail Form for the OEHR_ORDERS table. The master table on the left shows 105 rows of order data. An edit icon for order 2458 triggers a modal dialog titled "Edit OEHR_ORDERS" which contains fields for Order Date, Order Mode, Customer Id, Order Status, Order Total, Sales Rep Id, and Promotion Id. Below this is a detail table for OEHR_ORDER_ITEMS, showing four items with their respective line item IDs, product IDs, unit prices, quantities, and order item IDs.

Line Item Id	Product Id	Unit Price	Quantity	Order Item Id
6	3163	32	142	1661
1	3117	38	140	1105
2	3123	79	112	1174
3	3127	488.4	114	1219

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The slide shows the form that is created by using the Master Detail Form Wizard. You can select whether you want the wizard to create a report page on the master table. You can also specify whether you want the master and details information on the same page or on different pages. In the slide example, the reports page is created and the master and details information is shown on the same page. On the reports page, you can insert rows into the master table or edit the information in the existing rows. When you click the Edit icon, the master table row and any associated rows in the details table are shown. You can modify the data, as well as add or delete rows in the details table.

Creating a Master Detail Form



Access the Master Detail Form Wizard, and then perform the following steps:

1. Select the schema, table, and columns for the master and detail tables.
2. Select the primary key source for the master and detail tables.
3. Specify master row navigation and the master report (optional).
4. Specify layout, page attributes, and tab options.
5. Review the details and create the form.



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A master detail form reflects a one-to-many relationship between two tables in a database. Typically, a master detail form displays a master row and multiple detail rows within a single HTML form. With this form, users can insert, update, and delete values from two tables or views. When you create the master detail form, you have the option to customize the output. Your decisions result in the creation of one to three pages.

- You can include a master report. This displays the selected master columns and provides links to the master detail page, displaying the selected master record.
- You decide whether to edit the detail records on the same page (that is, you get a tabular form on your master detail page) or to edit the detail records on a separate page (that is, you get only a report in the detail section of your master detail page and the editing is done by using a form on another page).

You can view a demonstration of creating a master detail form by opening the following file:
`/home/oracle/labs/demos/les06_master_table.html`

Workshop 6-2 Overview: Creating a Master Detail Form

This practice covers creating a Master Detail form and make some modifications to it.



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Example: Tabular Form

Tabular Form

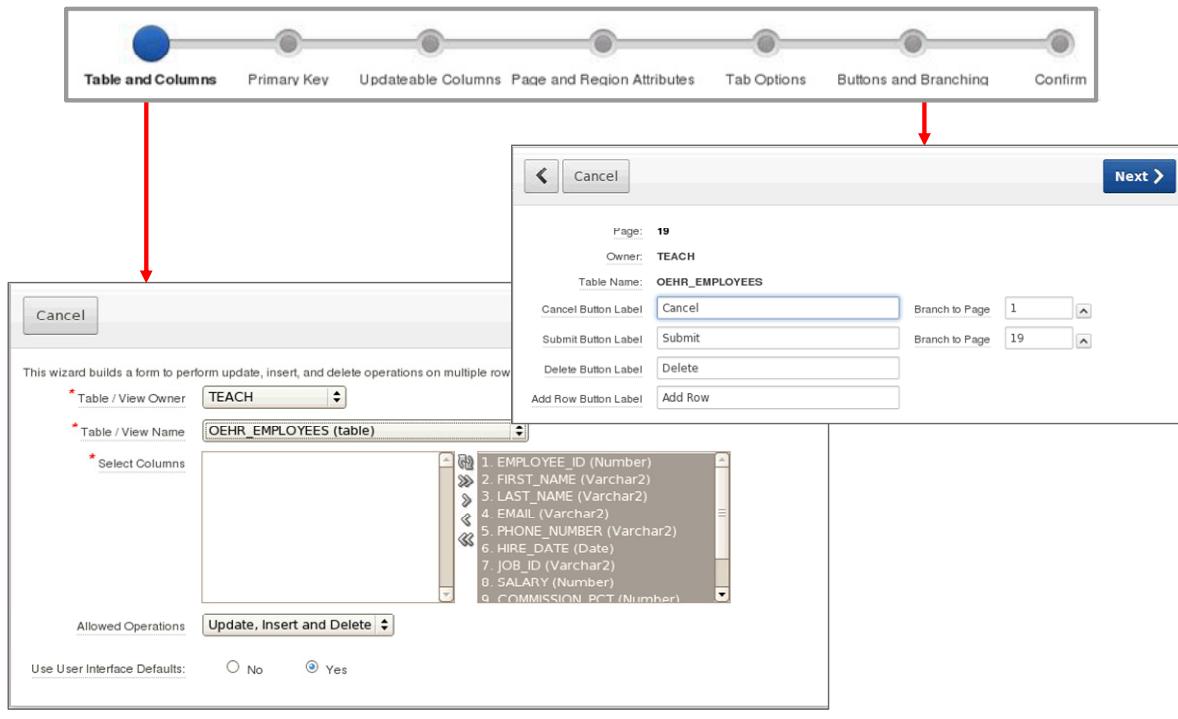
<input type="checkbox"/>	<u>Employee Id</u>	<u>First Name</u>	<u>Last Name</u>	<u>Email</u>	<u>Phone Number</u>	<u>Hire Date</u>	<u>Salary</u>
<input type="checkbox"/>	100	Steven	King	SKING	515.123.4567	17-JUN-1987	24000
<input type="checkbox"/>	101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	17000
<input type="checkbox"/>	102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	17000
<input type="checkbox"/>	103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	9000
<input type="checkbox"/>	104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	6000
<input type="checkbox"/>	105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	4800
<input type="checkbox"/>	106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	4800
<input type="checkbox"/>	107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	4200
<input type="checkbox"/>	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	12000
<input type="checkbox"/>	109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994	9000

row(s) 1 - 10 of 107

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The slide shows the form that is created by using the Tabular Form Wizard. If you allowed all the operations in the wizard, the tabular form presents the user with four action buttons. By default, Cancel, Delete, and Submit are displayed on the upper-right corner and Add Row is displayed at the bottom. Additionally, a check box appears to the left of each row, enabling you to select the rows and delete them. You can also select all the rows simultaneously by selecting the check box to the left of the column headings. You can make changes to the data in any row, and then click the Submit button to save the changes in the database.

Creating a Tabular Form



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The Tabular Form Wizard has steps that are similar to the “Form on a Table or View” wizard. While selecting the schema, the wizard prompts you to set the operations that you want to allow users to perform on the form. By default, the “Update, Insert and Delete” option is selected. The wizard enables you to select the columns to be displayed in the form and the columns that can be updatable. Depending on the operations that you allowed the users to perform, the buttons are included on the form page. You can change the label name for the buttons.

You can view a demonstration of creating a tabular form by opening the `/home/oracle/labs/demos/les06_form_tabular.html` file.

Workshop 6-3 Overview: Creating a Tabular Form

This practice covers creating and manipulating a Tabular form.



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Quiz

Which type of form would you create if you want to show a CUSTOMER and all the ORDERS that the customer has placed for a product?

- a. Form on a table
- b. Tabular form
- c. Master detail form
- d. Form on a table with report



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Answer: c

Quiz

You have a report that displays a list of all employees. You want to create a page to enter details for a new employee. Which of the following wizards should you use?

- a. Form on a Table or View
- b. Tabular Form
- c. Master Detail Form
- d. Form on a Table with Report



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Answer: a

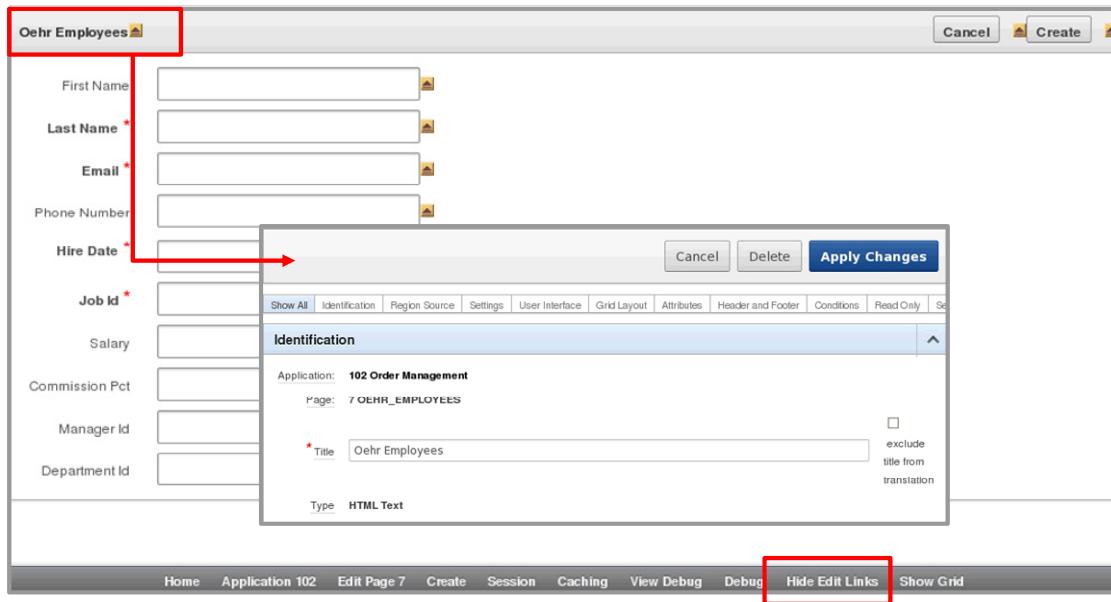
Lesson Agenda

- Using Forms
- Creating Forms
- Modifying Forms
 - Using Show/Hide Edit Links
 - Linking a Report to a Form
 - Reordering Items in the Tree View
 - Editing Items by Using Edit All
 - Changing the Item Display Type
 - Customizing Forms
- Creating Forms in a Mobile Application

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Using Show/Hide Edit Links



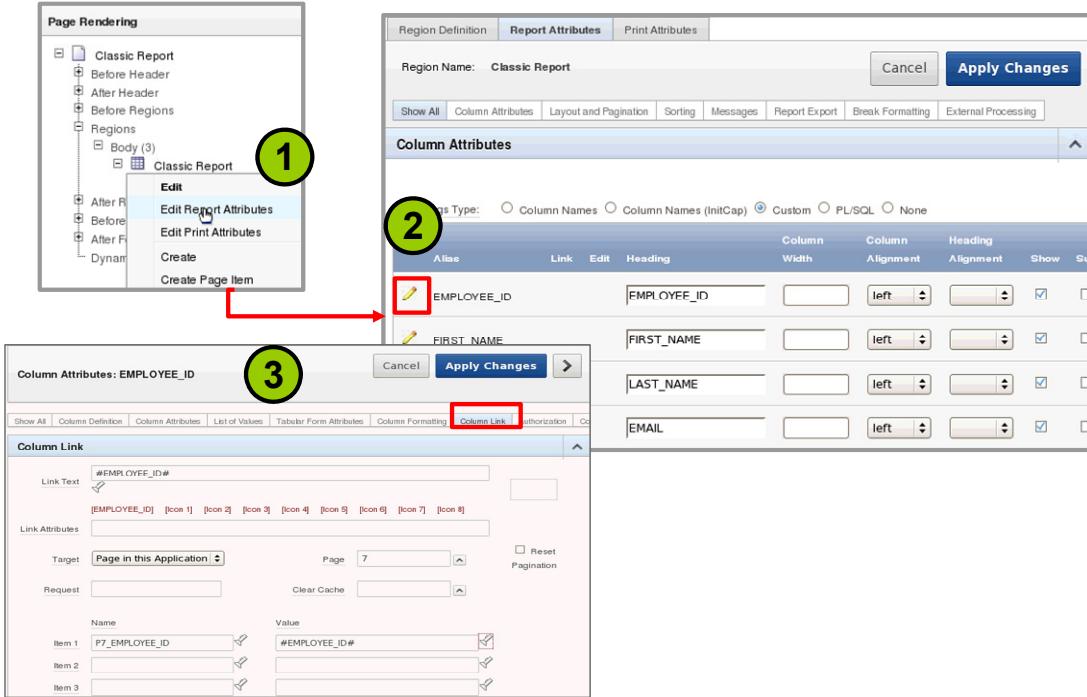
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When you run your form page, you can modify its objects by using the Show Edit Links button on the Developer toolbar. When you click Show Edit Links, an icon appears next to each item in the form. Click the icon to view the details about that item. This is useful, for example, when changing a label or the format of an item.

To disable the edit links, click Hide Edit Links on the Developer toolbar.

Linking a Report to a Form



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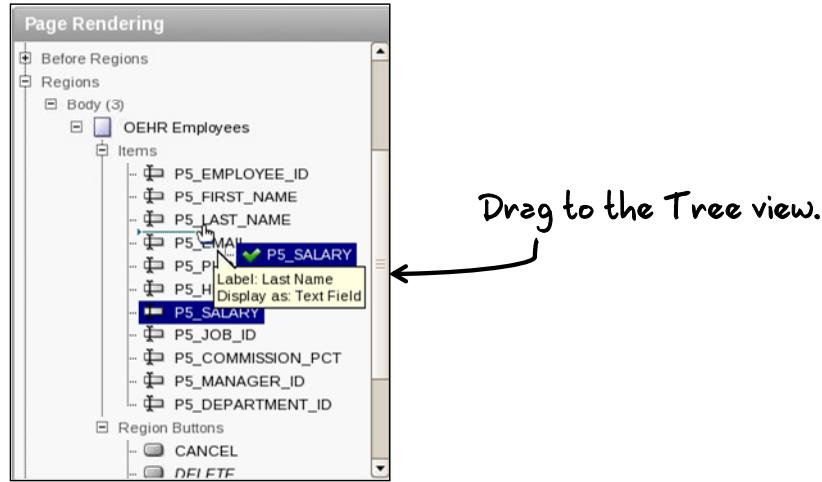
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When you create a “Form on a Table with Report,” the wizard automatically creates the required report and form and links between them. Stand-alone reports (interactive or classic) can also be linked to existing forms. This slide shows how you can link a classic report to a form.

1. From the page definition of the page where you have created the report, right-click the report node and select Edit Report Attributes.
2. Click the Edit icon next to the column that you want to link.
3. Click the Column Link tab and in the Link Text field, enter the HTML text to be shown as the link. Use an image tag to display images, or select one from the list of default images. From the Target drop-down list, select “Page in this Application.” In Page, specify the target page ID. To reset the pagination for this page, select Reset Pagination. Use the Name and Value fields to specify the session state for a specific item, and then click Apply Changes.

For example, a column link is created on EMPLOYEE_ID and page 5, which contain a form on the EMPLOYEES table.

Reordering Items



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You can drag an item listed under the Items node to a different location among the items.

Editing Form Items by Using “Edit All”

The screenshot shows two windows related to editing form items.

Top Window: A hierarchical tree view of page items. Under 'Body (3)', there is a node 'Oehr Employees'. Expanding it reveals several items: 'Create Page Item', 'Create Page Item Button', and a context menu with options 'Edit All', 'Expand All', and 'Collapse All'. Below these are several item definitions, each with a small icon and a name like 'P7_PHONE_NUMBER', 'P7_HIRE_DATE', etc.

Bottom Window: A table-based interface titled 'Items'. It lists two items: 'P7_ROWID' and 'P7_EMPLOYEE_ID'. Each row has columns for 'Sequence', 'Name', 'Prompt', 'Field Template', and 'Region'. The 'Edit' icon (pencil) is visible in the first column of both rows. The 'Region' column shows 'Oehr Employees (0)' for both items.

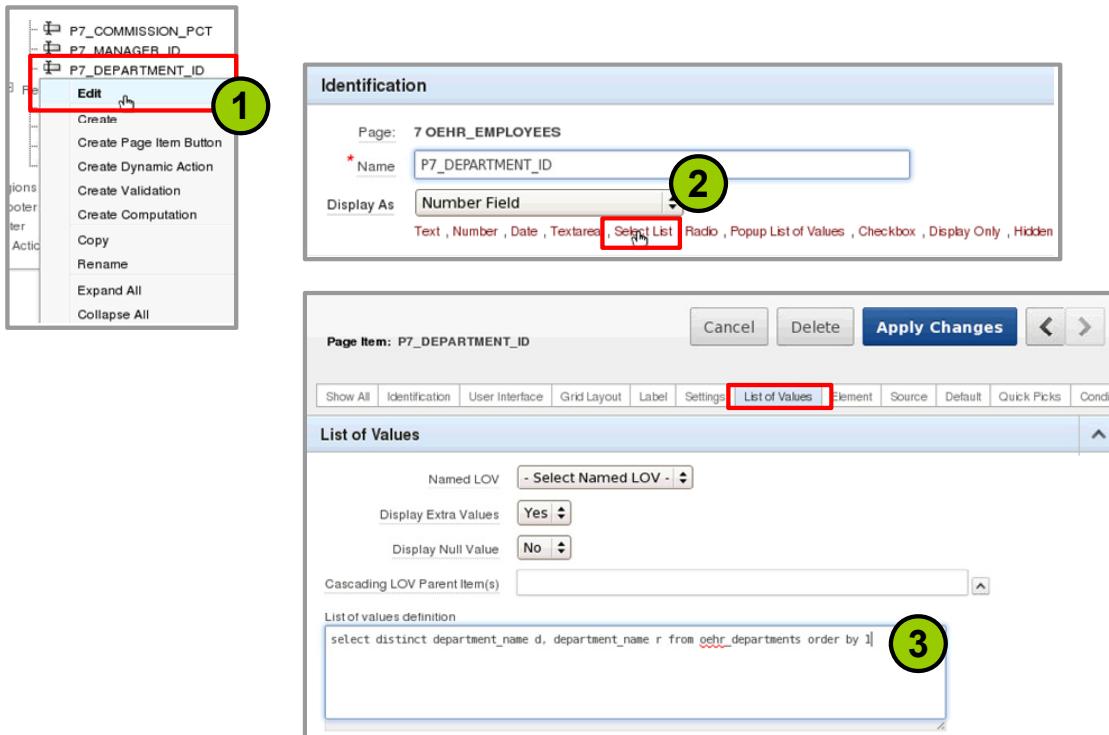
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To modify multiple items simultaneously, you can use the Edit All capability. Right-click the Items node and select Edit All. The Page Items page appears, where all the items on the page are listed on the Items tab. Click the Edit icon to edit the corresponding item. In addition, the following tabs are available:

- **Reassign Region Items:** Enables you to assign multiple items to different regions
- **Delete Multiple Items:** Enables you to delete multiple items at a time
- **Utilities:** Enables you to edit item labels or help text, and view reports across all pages in the selected application
- **History:** Enables you to get the history of all the items on this page

Changing Item Display Type



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By default, your varchar/number type columns are displayed as text fields in a form. You can change this default type to other available types, such as drop-down lists, radio buttons, check boxes, and pop-up LOVs.

To change the display type for an item, perform the following steps:

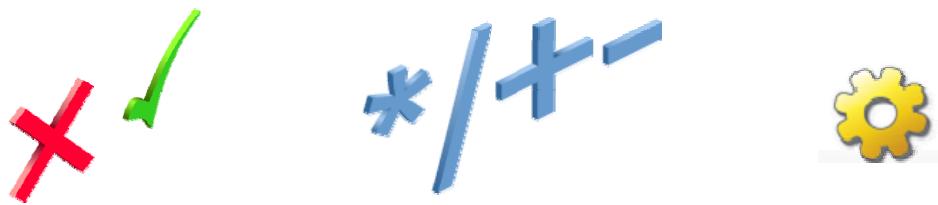
1. Right-click the item for which you want to change the display type and select Edit.
2. For the Display As field (on the Name tab), select the new type from the drop-down list.
3. Click the “List of Values” tab and enter the values for the list. You can view example syntax for writing the list of values by clicking the “List of Values Examples” node below the text area.

You can also create and save a list of values and use it to specify the list values here. You learn how to create a list of values as a shareable component in the lesson titled “Adding Items and Buttons.”

Customizing Forms

You can include the following in your forms:

- Validations
- Computations
- Processes



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You can customize your forms by creating computations and processes. You can also include validations to verify user inputs. You learn about these topics in detail in the lesson titled “Adding Page Processing.”

Quiz

Which edit facility should you use if you want to change all the item prompts and templates on a page simultaneously?

- a. Show Edit Links
- b. Edit All
- c. Reorder Region Items
- d. Drag and Drop



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Answer: b

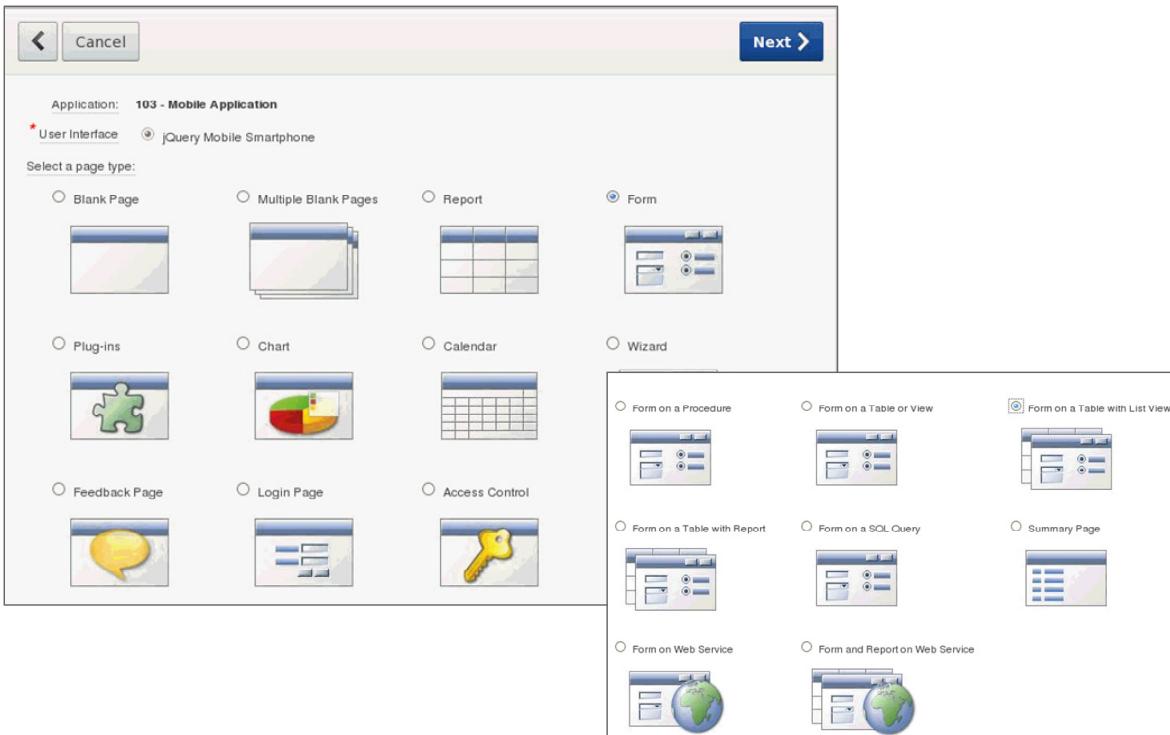
Lesson Agenda

- Using Forms
- Creating Forms
- Modifying Forms
- Creating Forms in a Mobile Application
 - Creating a Form with List View
 - Creating a Form on a Table and link it from an existing List View
 - Modifying a Form

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Form on a Table with List View



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When you create a form for a mobile application using the Create Page Wizard, you can choose different form types. “Form on a Table with List View” is the commonly used form in a mobile application. To select this option, you first select jQuery Mobile Smartphone User Interface and then select Form. You then select “Form on a Table with List View.”

Creating a Form on a Table with List View

Access the “Form on a Table with List View” wizard for jQuery Mobile Smartphone User Interface, and then perform the following steps:

1. On the List View Page, specify the Page Number, Page Name, and Region Title.
2. This page builds two pages, which is a combination of a report and a form on a single table/view. Specify the Table/View Name.
3. Select the columns to include on the page.
4. Specify page and region information for the Form page.
5. Review the details and create the form and list view pages.



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The “Form on a Table with List View” wizard combines the steps to create a list view and the steps to create a form by creating two pages. The first page (List View Page) enables users to specify the row to be updated. It also includes a button to create a new row. The second page (Form Page) provides users with the ability to update the selected table or view. The slide lists the steps to define the List View and Form pages.

You can view a demonstration of creating a form on a table with list view by opening the `/home/oracle/labs/demos/les06_form_with_list_view.html` file.

Creating a Form on a Table

The screenshot shows a mobile application interface titled "EMPLOYEES DETAIL". At the top right is a "Logout" button. The main area contains nine input fields, each with a red asterisk indicating it is a required field. The fields are labeled: "Last Name", "Email", "Phone Number", "Hire Date", "Job Id", "Salary", "Commission Pct", "Manager Id", and "Department Id". Below these fields are two buttons: "Cancel" and "Create".

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In the Create Page Wizard for Form using jQuery Mobile Smartphone user interface, you can also select the “Form on a Table or View” form type. With this option, you create a form to update a single row in a database table or view. Access the “Form on a Table” wizard for jQuery Mobile Smartphone User Interface, and then perform the following steps:

1. Select the table or view name on which you want to build a form.
2. Specify page and region information by specifying the Page Number, Page Name, and Region Name.
3. Select the Primary Key type.
4. Select the columns to include in the form.
5. Identify the process options and button display text for the form.
6. Specify the branching details of the page and confirm your selections.

Linking to a Form on a Table from an Existing List View

The left screenshot shows the 'Page Rendering' interface with a context menu open over the 'Employee List' region. The right screenshot shows the 'Region Attributes' dialog for the 'Employee List' region, specifically the 'Settings' tab. The 'Link Target' field is highlighted with a red box and contains the URL `f?p=&APP_ID.:203:&APP_SESSION::&DeBUG:RP,203:P203_EMPLOYEE_ID:&EMPLOYEE_ID.`

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You have seen how a List View report was created in the previous lesson. You can link to a Form on a Table from an existing List View. This can be done by editing the Settings in the Region Attributes of the List View page and by specifying a Link Target to the Form page.

Workshop 6-4 Overview: Create a Form on a Table for Mobile Applications

This practice covers adding a form page to the mobile application and linking the form to a list view.



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Summary

In this lesson, you should have learned how to:

- Identify the types of forms that you can include in an application
- Create:
 - A form on a table
 - A form with a report
 - A tabular form
 - A master detail form
- Edit forms
- Create forms in a mobile application



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This lesson showed you how to create forms, how to use the various built-in wizards that help you create forms, and how to edit the attributes of a form.

Working with Pages and Regions

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Objectives

After completing this lesson, you should be able to do the following:

- View page definitions
- Edit page attributes
- Create a new region
- View region attributes
- Create a subregion
- Create a global page
- Create common pages for different user interfaces



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This lesson shows you how to create pages and regions and how to edit their attributes.

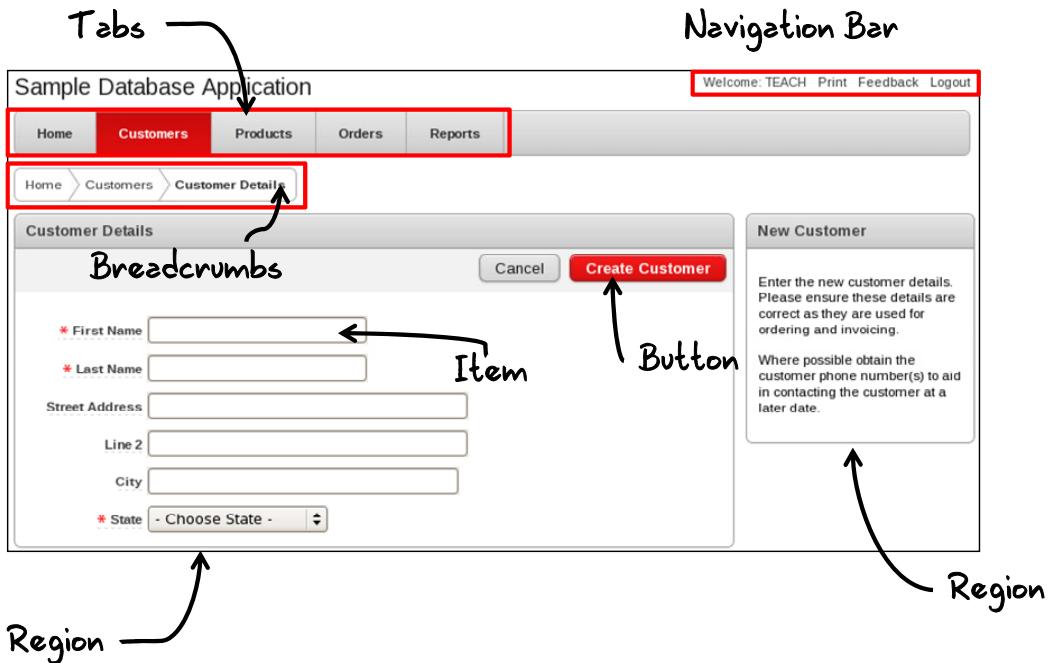
Lesson Agenda

- Introducing Page Definition
 - What Is a Page? (Review)
 - Accessing a Page Definition
 - Page Definition Interface
 - Editing Page Attributes
- Working with Page Regions
- Working with Pages

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What Is a Page? (Review)



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In the lesson titled “Creating a Database Application,” you learned that a page is the basic building block of any application. This slide presents a recap of the components of a page.

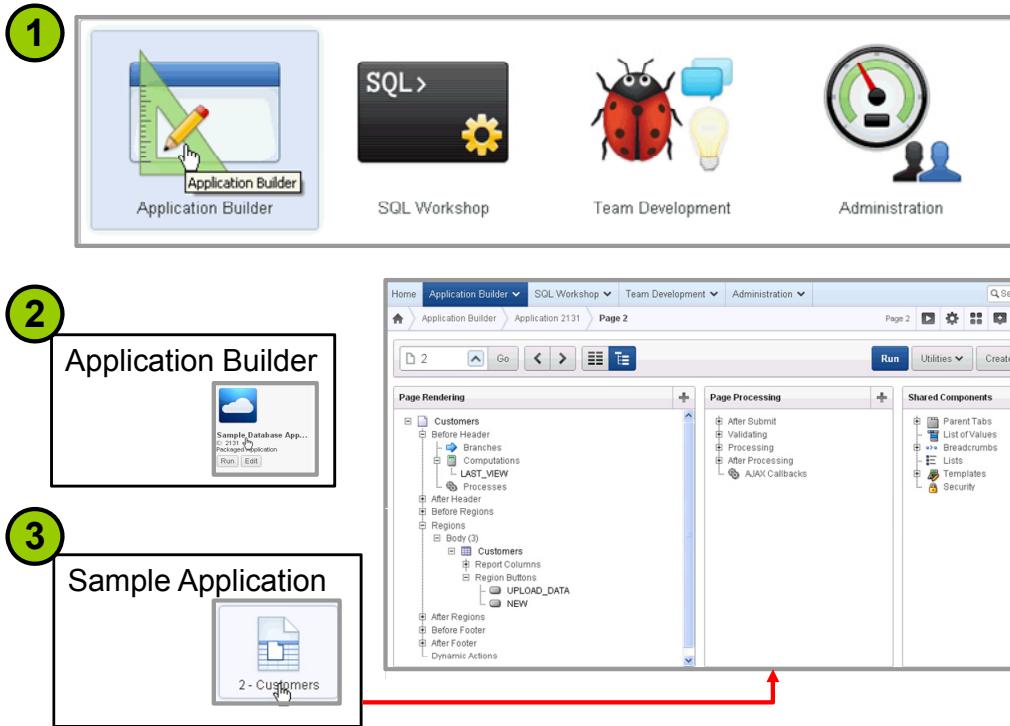
A page contains user interface elements and application logic. A page is divided into regions. A region is a section of a page that contains content. The content of a region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static HTML.

A region can also contain the following:

- Items, such as a text field, text area, select list, and check box
- Buttons to direct users to a specific page or URL, and also to post and process information
- Breadcrumbs, tabs, and a navigation bar to enable navigation

Each page in your application has a unique page ID and name. All information about a page and its components is displayed in a *page definition*.

Accessing a Page Definition



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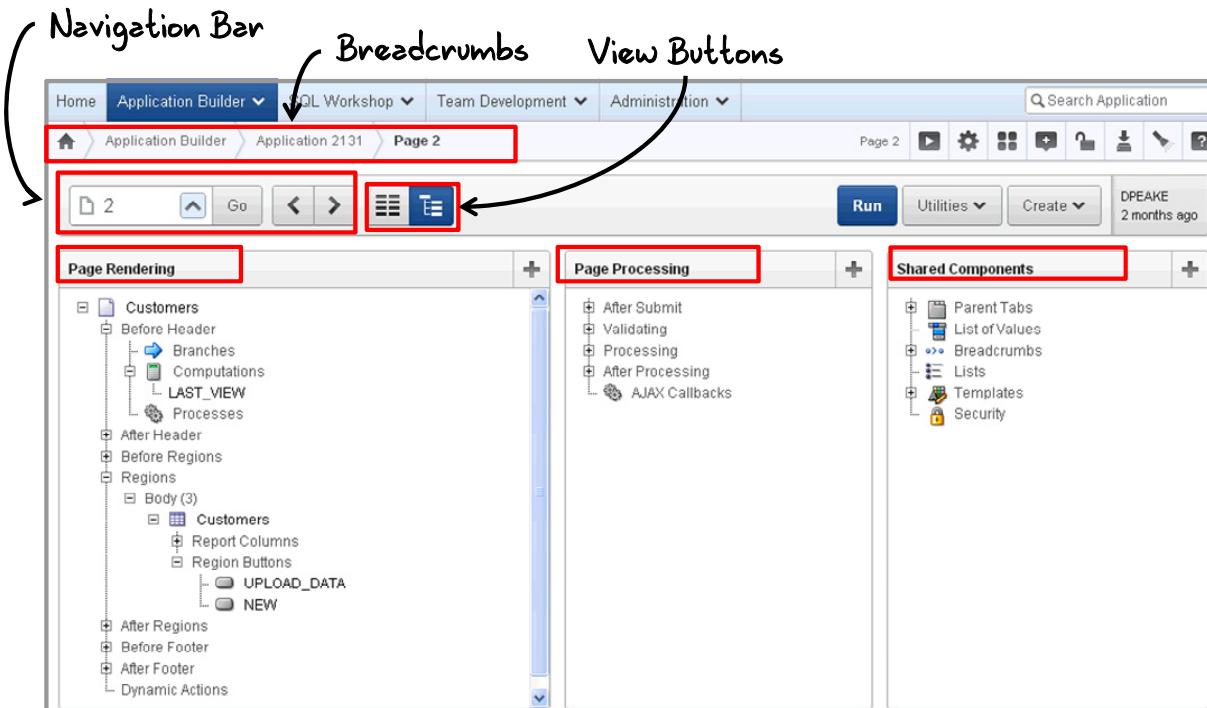
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You use the Page Definition to view, create, and edit the components of a page. To access the page definition for a page, perform the following steps:

1. On the Oracle Application Express home page, click the Application Builder icon.
2. On the Application Builder page, click the application that you want to access.
3. On the selected application page, click a page to view its definition.

The page definition is displayed.

Page Definition Interface



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A page definition has three sections:

- **Page Rendering:** Lists user interface controls and logic that are executed when a page is rendered. Page Rendering is the process of generating a page from the database.
- **Page Processing:** Lists logic controls (such as computations and processes) that are evaluated and executed when the page is processed.
- **Shared Components:** Lists common components that can be used by one or more pages within an application.

In this lesson, you learn to work with the Page Rendering section. The Page Processing and Shared Components sections are discussed in the lessons titled “Adding Page Processing” and “Adding Shared Components That Aid Navigation,” respectively.

A breadcrumb menu is displayed at the top-left of the page. Each entry indicates your current location and functions as a navigation path. You can instantly navigate by clicking the respective breadcrumb.

You can use the navigation bar to navigate to another page by either entering the page number and clicking the Go button, or clicking the Back or Next buttons.

Tree View

You can use the View buttons to switch between the Tree and Component views of a page definition. The Tree view (shown in the screenshot in the slide) is the default view. Click the Component View button to switch to the Component view. The Component view is discussed in the next slide.

In the Tree view, page details are listed based on event sequence, that is, how Oracle Application Express processes them while rendering a page. Page components, such as regions, page items, and application logic, are represented as nodes in a tree. This organization provides a better understanding of when a component is processed.

Key Features of the Tree View

- Each node in the tree has a custom context menu. You can access this menu by right-clicking the node.
- Each context menu includes options that link to default wizards. For example, selecting Create Validation for an item displays the Create Validation Wizard.
- You can quickly access the attributes page for a node by double-clicking the node. If available, an attributes page appears.
- You can reorder page items, report columns, processes, validations, branches, or computations by dragging them to another display, processing point, or region.
- Each tree node has a tool tip, which displays basic information about the component, such as item type, condition, and authorization.
- If a component has a condition, authorization, or build option, the tree node label is displayed in italic.
- Tree nodes with a Rename option in the context menu can be directly modified within the tree without having to go to the edit page. You can press F2 to enable inline edit. Use Show Names and Show Labels from the Utilities > Switch To menu to show component names or labels.

You can view the demonstration of understanding page definition by opening the `/home/oracle/labs/demos/les07_about_page_definition.html` file.

Page Definition Interface: Component View

The screenshot shows the Oracle Application Express Page Definition Interface in Component View. The interface is divided into several sections:

- Page Rendering:** Contains fields for Page Name (Customers), Template (Application default), Title (Sample Database Application - Customers), Header Text, Footer Text, HTML Body, Help Text (Help for this page), Build Option, Authorization (No), Page Group (Desktop), and Cached (No).
- Regions:** Displays a list of regions: Display Point, Page Template Body (3), and Buttons.
- Buttons:** Shows a Region named "Customers" with two items: "Upload Data" (Redirect to page 21) and "Create Customer" (Redirect to page 7).
- Page Processing:** Contains sections for Computations, Validations, Processes, and Branches.
- Shared Components:** Contains sections for Parent Tabs (Tab Set TS1, TS1), Tabs (Tab Set TS1, Home, Customers, Products, Orders, Reports, Administration), Lists of Values, and Breadcrumbs.

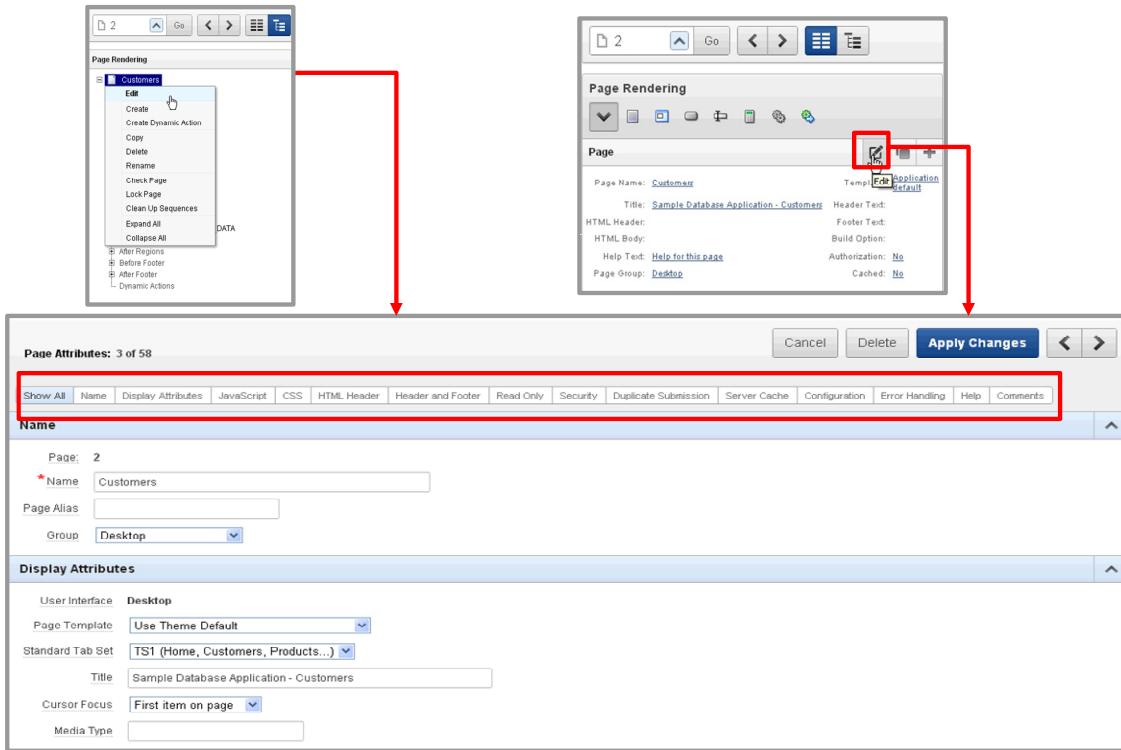
A red box highlights the toolbar buttons for Page, Regions, Buttons, Items, Computations, Processes, and Dynamic Actions. Another red box highlights the "Show All" button at the far left. A red arrow points from the text below to the "Show All" button.

→ Show All, Page, Regions, Buttons, Items, Computations, Processes, Dynamic Actions

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In the Component view, the page components are listed by type. The buttons in each of the sections enable you to focus on one of the components in that section. For example, if you click the Items button, you see only the items in that section. You can move from component to component by clicking the corresponding button. To see all the components again, click the Show All button at the far left.

Editing Page Attributes



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To edit a page's attributes, right-click the page node and select Edit. To edit a page in the Component view, click the Edit icon in the Page area. The Edit Page page is displayed. You can modify the following page attributes:

- **Name:** You can modify the page name, alias, and group to be displayed in the browser window.
- **Display Attributes:** You can define general display attributes for the current page such as the selected page template, standard tab set, title, and cursor focus. You can also set the cursor focus to be placed on the first item on the page. Select “Do not focus cursor” to bypass this behavior. You can select a page template to define the appearance of this page. This template takes precedence, for this page, over the application template.
- **JavaScript:** You can include JavaScript to be executed when the page loads.
- **CSS:** You can use these attributes to include Cascading Style Sheets (CSS) files on the current page.
- **HTML Header:** You can use this attribute to:
 - Specify page-specific inline cascading style classes
 - Add additional style sheets for a specific page

- **Header and Footer:** You can enter the text that you want to display in the page header or page footer. The page header displays text after the HTML header and before the body section. The footer section displays text after the page template body and before the page template footer.
- **Read Only:** Select a condition type from the list that must be met for the page to render page items as read-only.
- **Security:** Select the authorization scheme to be applied to the page from the Authorization Scheme drop-down list. Authorization schemes are defined at the application level and can be applied to many elements within the application. A given authorization scheme is set up to be evaluated once, either for each application session (at session creation) or for each page view. If the selected authorization scheme evaluates to true (subject to other defined conditions), the page is displayed. If it evaluates to false, the page is not displayed and an error message appears.
From the Authentication drop-down list, specify whether this page is defined as public or whether it requires authentication. If a page is identified as public, the page can be viewed before authentication. This attribute applies only if the application uses authentication.
- **Duplicate Submission:** Use the “Allow duplicate page submissions” drop-down list to specify whether Oracle Application Express allows users to process a page multiple times. This can happen when you click the browser’s Back button, and then submit the page again, or, in some cases, when you click the browser’s Reload button. Setting this attribute to No prevents duplicate page submissions.
- **Server Cache:** You can enable caching for the current page. This improves performance for static pages.
- **Configuration:** Select a Build option for this component. Build options are predefined settings that determine whether or not the components within an application are enabled. Using Build options, you can enable or disable functionality. Most application attributes have a Build option attribute. Do not specify a Build option unless you plan to exclude that object from specific installations. Build options have two possible values: INCLUDE and EXCLUDE. An attribute that is excluded is treated as if it does not exist.
- **Error Handling:** Use this attribute to specify the error text displayed in the #NOTIFICATION_MESSAGE# substitution string that is included in the page template.
- **Help:** Use this attribute to enter the help text for the current page.
- **Comments:** Use this attribute to record your comments about the current page.

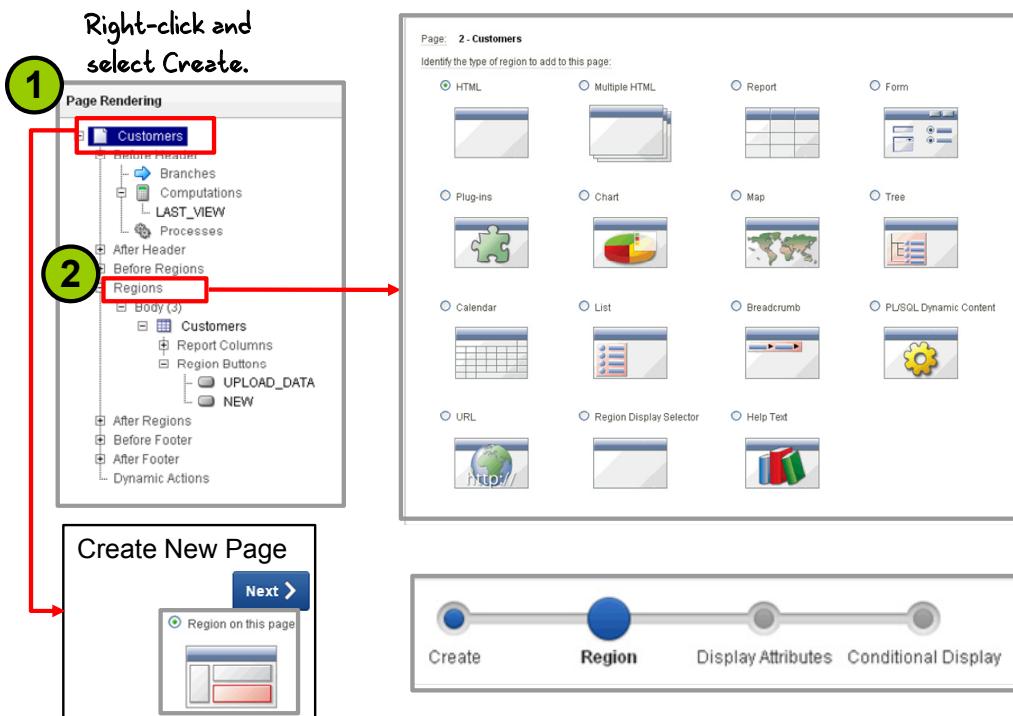
Lesson Agenda

- Introducing Page Definition
- Working with Page Regions
 - Accessing the Create Region Wizard
 - About Region Types
 - Positioning a Region
 - Conditional Display of Regions
 - Viewing and Editing Region Attributes
 - Specifying Region Header or Footer
 - Creating a Region Display Selector
 - Copying Regions
 - Creating a Subregion
- Working with Pages



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Accessing the Create Region Wizard



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To access the Create Region Wizard, navigate to the page definition of the page where you want to create a new region, and then perform one of the following steps:

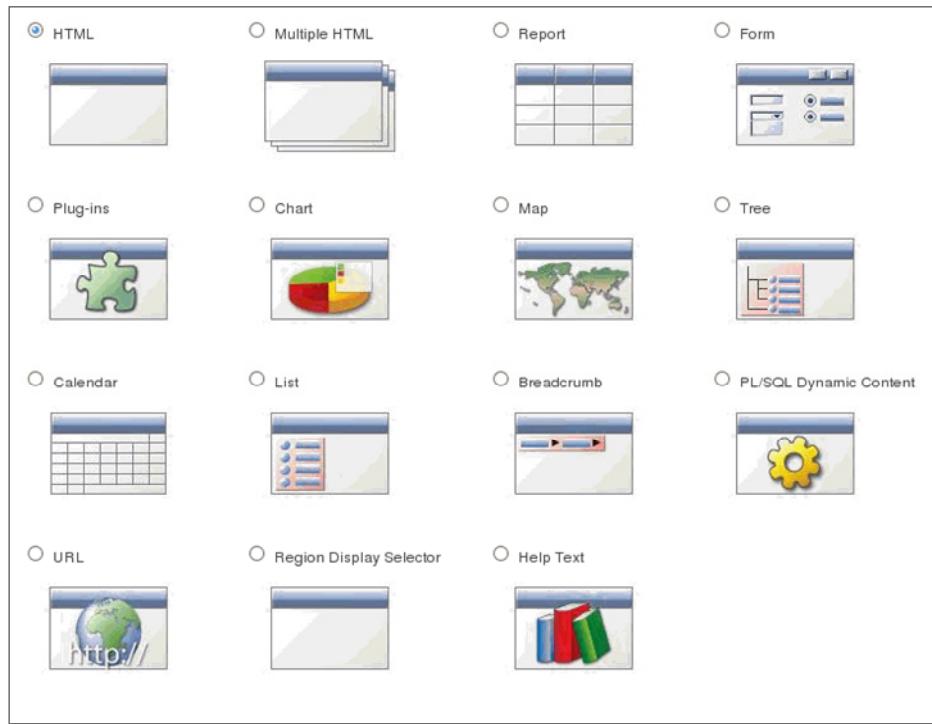
- Right-click the parent page node and select Create. Select “Region on this page” and click Next.
- Right-click the Regions node and select Create.

You can also click the down arrow on the Create button and select “Region on this page.”

The various regions that you can create are displayed. Select an option depending on the type of region that you want to create, and click Next to proceed. The List option is displayed only if you have created a list in the application. The Region Display Selector enables you to create a show/hide control for each region on the page for which region display selection is enabled.

Note: To access the Create Region Wizard in the Component view, click the Create icon in the Regions section.

About Region Types



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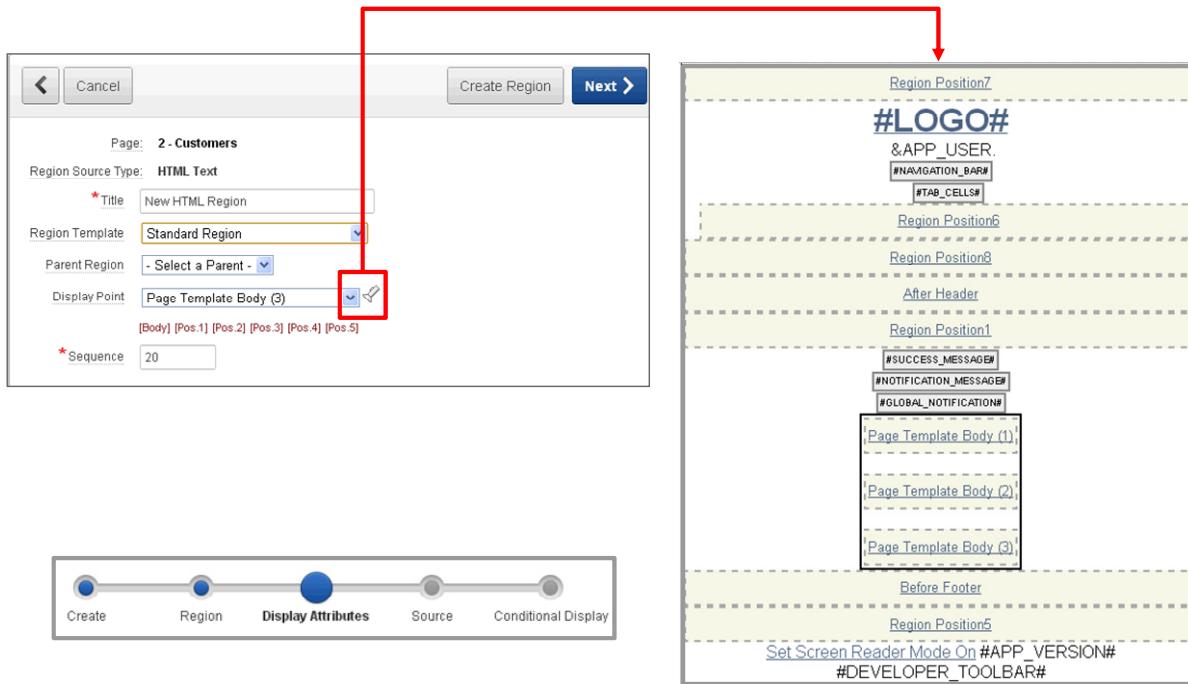
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When you create a region, you select a region type. The Application Express engine interprets a region differently based on the type you select. The available region types are:

- **HTML:** This functions as containers for items and contains the HTML you provide.
- **Multiple HTML:** You use this to create multiple HTML regions at once.
- **Report:** You can define this region by a SQL query you write, or by using a wizard to guide you through the steps needed to write a query.
- **Form:** Form regions are used to contain a form.
- **Plug-ins:** Plug-ins allow developers to declaratively extend the built-in types available with Application Express.
- **Chart:** Chart regions contain line, bar, or pie charts based on SQL queries.
- **Map:** Map regions contain declaratively defined Flash maps.
- **Tree:** Trees are a hierarchical navigational control based on a SQL query executed at run time.
- **Calendar:** Calendar regions are used to contain a calendar.
- **List:** List regions contain a shared collection of links called list.

- **Breadcrumb:** The Breadcrumb region contains a hierarchical list of links called breadcrumb.
- **PL/SQL Dynamic Content:** Regions based on PL/SQL allow you to render any HTML or text using the PL/SQL Web Toolkit.
- **URL:** URL-based regions obtain their content by calling a web server using a predefined URL.
- **Region Display Selector:** This region enables the display of show hide controls for each region on a page for which region display selection has been enabled.
- **Help Text:** This region enables you to provide page-level help.

Positioning the Region



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When you create a region, you must specify its position (Display Point) on the page. You can select either a default position (such as Page Template Body) or a user-defined position in the template (such as Page Template Region Position 4).

You can also specify the sequence of the region to position the region in relation to other regions on the page.

Additionally, you can specify the column in which the region will be placed. Oracle Application Express automatically renders the necessary HTML to produce a multiple-column layout.

You can click the flashlight icon to see a picture of all the templates and where they appear on the page.

Note: The Parent Region field is used to create a subregion. You learn to create a subregion later in the lesson.

Conditional Display of Regions



The screenshot shows a configuration dialog for creating a new region. At the top right is a blue button labeled "Create Region". The page title is "2 - Customers" and the region title is "New HTML Region". Under "Condition Type", a dropdown menu is open, showing "Exists (SQL query returns at least one row)" as the selected option. Below the dropdown is a list of other condition types: [PL/SQL] [item / column=value] [item / column not null] [item / column null] [request=e1] [page in] [page not in] [exists] [never] [none]. An "Expression" field contains the SQL query:

```
SELECT cust_first_name  
FROM DEMO_CUSTOMERS  
WHERE credit_limit > 1000
```

. There is also a checkbox for "Do not validate code (parse code at runtime only)". The "Authorization Scheme" dropdown is set to "- No Security Check Required -".



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You can display regions conditionally. A condition is a small unit of logic that enables you to control the display of regions, items, buttons, tabs, and other components. When you apply the condition to a component (for example, a region), the condition is evaluated at run time. The component is displayed only if the condition evaluates to true.

You can set the condition by selecting a condition type when you create the component or by editing the component's conditional display attribute. For example, if you want a particular region to be displayed only when the administrator logs in, you can set an appropriate condition for that region. The condition evaluates to true or false based on the values you enter in the expression fields.

You can click a link below the Condition Type field to select a condition type. The following are some of the predefined condition types:

- Exists
- Not exists
- SQL Expression
- PL/SQL Expression

Viewing the Regions Page

The screenshot shows the Oracle Application Builder interface. On the left, the 'Page Rendering' tree view is open, showing the structure of the page. A red arrow points from the 'Regions' node in the tree to the 'Regions' tab in the main table below. The 'Regions' tab is selected, and its sub-tab 'Delete Multiple Regions' is highlighted with a red box. In the table, there are two rows of data:

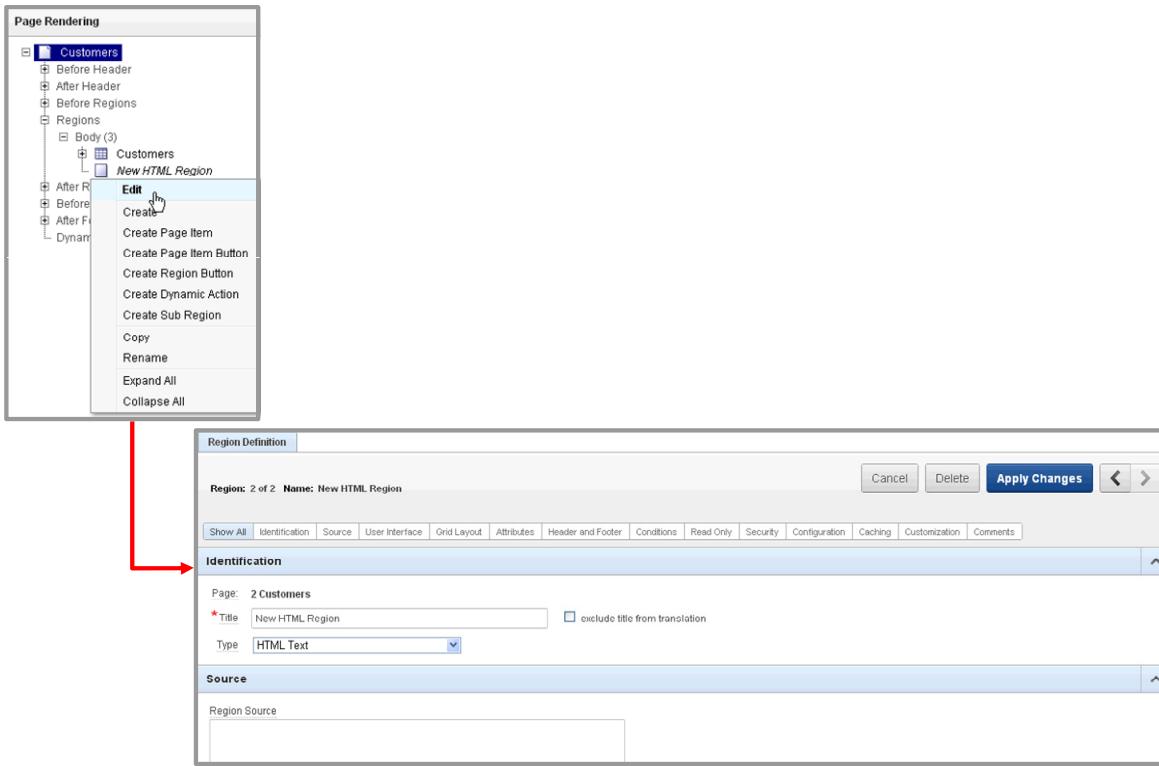
Sequence	Region Name	Template	Type	Items	Buttons	Display Point	Conditional	Updated
10	Customers	No Template	Interactive Report	0	2	Page Template Body (3)	-	-
20	New HTML Region	25. Standard Region	HTML Text	0	0	Page Template Body (3)	✓	65 seconds ago

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To view the Regions page, right-click the Regions node and select Edit All. All the regions on the page are listed. You can click the Edit icon to edit the corresponding region. Use the Edit Page Region page to edit the region attributes. Click the Delete Multiple Regions tab to delete multiple regions simultaneously.

Editing a Region



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To edit a region, right-click the region's node and select Edit. Use the Edit Region page to change any region definition, and click Apply Changes to save the changes.

Specifying a Region Header and Footer

The screenshot shows the Oracle Application Express 'Region Definition' page. A region named 'Customers' is selected. The 'Header and Footer' tab is active. In the 'Region Header' section, handwritten text says: 'You can use substitution strings in region headers and footers.' An arrow points from this text to the header area of a report grid. In the 'Region Footer' section, handwritten text says: 'This displays the time taken to render the region.' An arrow points from this text to the footer area of the report grid. The report grid displays customer data with the following rows:

Address	City	State	ZIP Code	Tags
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145
Logan, Edward	1 Harborside Drive	East Boston	MA	02128
OHare, Frank	10000 West OHare	Chicago	IL	60666

At the bottom of the grid, it says 'Fetched 7 Rows in 0.12 seconds.'

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You can specify additional HTML to be placed above and below a region, or in its header and footer. Substitution strings can be used in region headers and footers.

In the example shown in the slide, the #ROWS_FETCHED# and #TIMING# substitution strings are used in the region footer. These substitution strings calculate the number of rows fetched in the elapsed time in seconds when rendering a region.

Enabling Region Display Selection

The screenshot shows the 'Region Definition' page in Oracle Application Express. The 'Attributes' tab is selected. A dropdown menu labeled 'Region Display Selector' is set to 'Yes'. A red box highlights this dropdown. Below it, there are fields for 'Static ID', 'Region CSS Classes', 'Region Attributes', 'Region Image', and 'Image Tag Attributes'. At the bottom right of the main window are 'Cancel', 'Delete', and 'Apply Changes' buttons. A callout arrow points from the 'Region Display Selector' dropdown to a smaller screenshot of a 'Report Region' containing a list of names: FIRST_NAME (Alexis, Alberto, Alexander, Alyssa, Alexander, Allan, Alana). The number '1 - 7' is at the bottom of the list.

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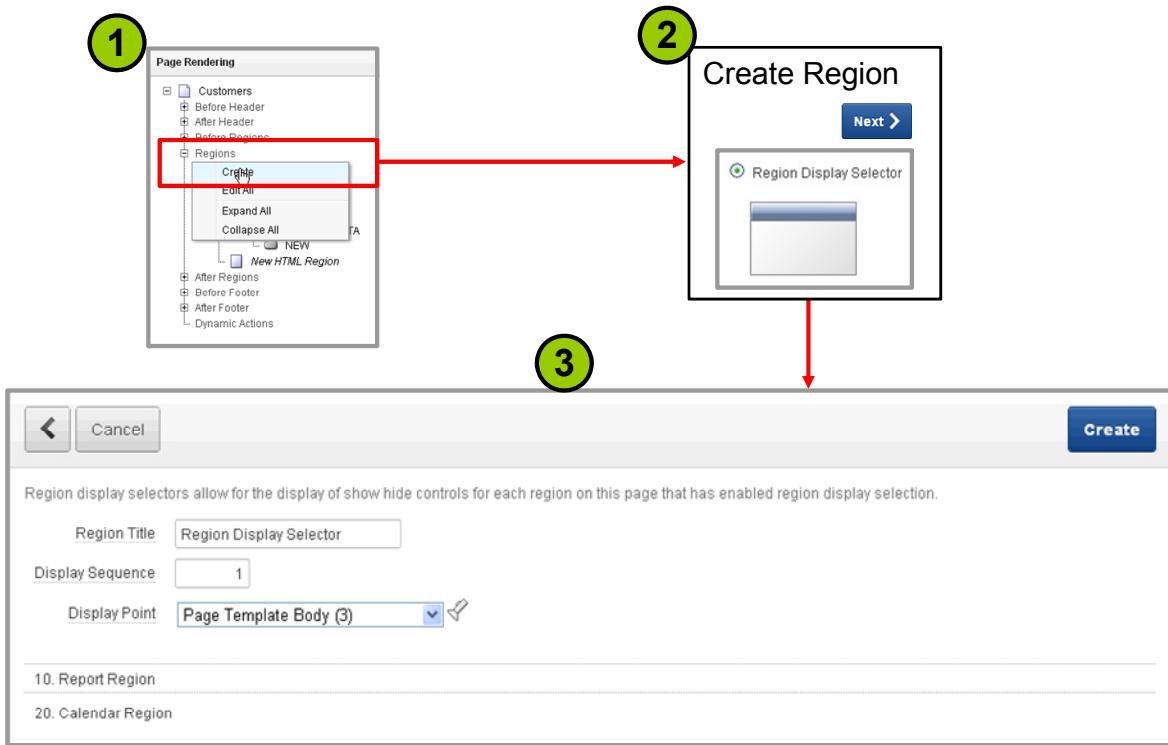
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To enable region display selection, select Yes for Region Display Selector on the Attributes tab. This attribute is used along with the Region Display Selector region.

The Region Display Selector region enables you to hide or show regions on a page. For example, if you have multiple regions on your page, a Region Display Selector allows you to view all the regions at once or only one region at a time.

You learn to create a Region Display Selector in the next slide.

Creating a Region Display Selector



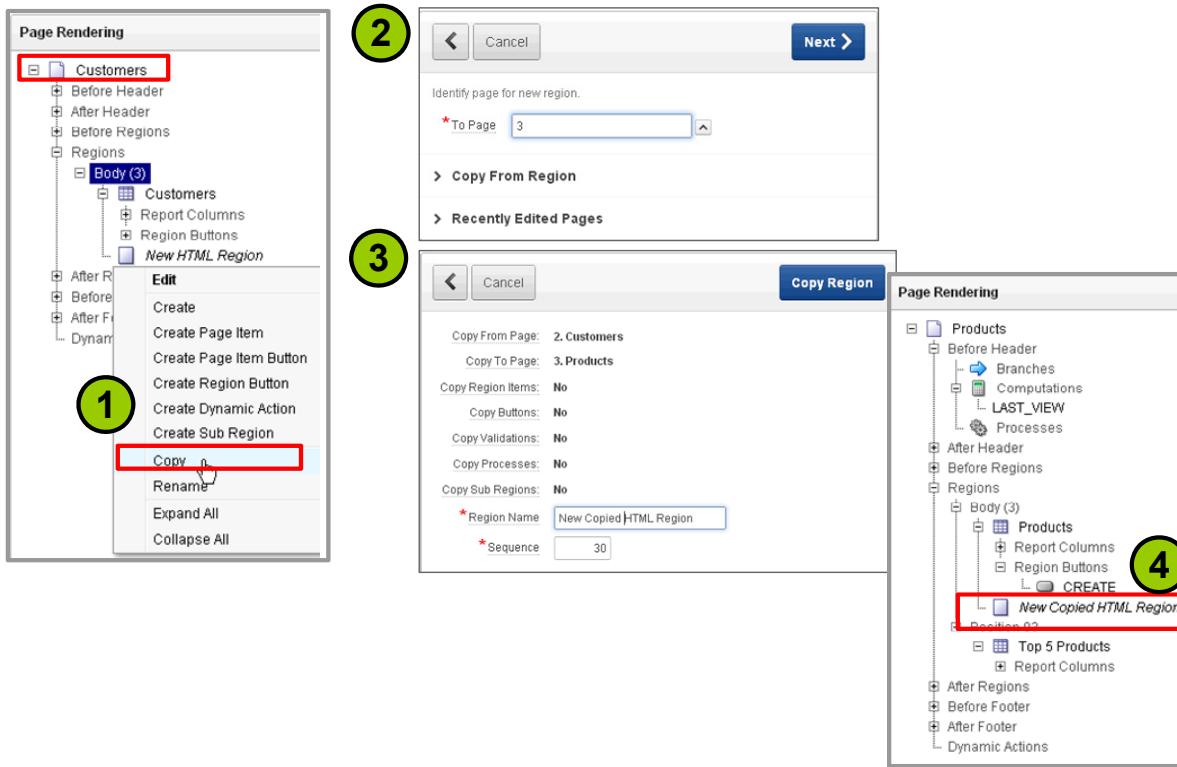
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To create a Region Display Selector on a page, navigate to the page's definition and perform the following steps:

1. Right-click the Regions node and select Create.
2. In the Create Region Wizard, select the Region Display Selector option and click Next.
3. The list of selectable regions is displayed. You see only the regions for which you have enabled region display selection. (See the previous slide.) Click Create to create the region.

Copying Regions



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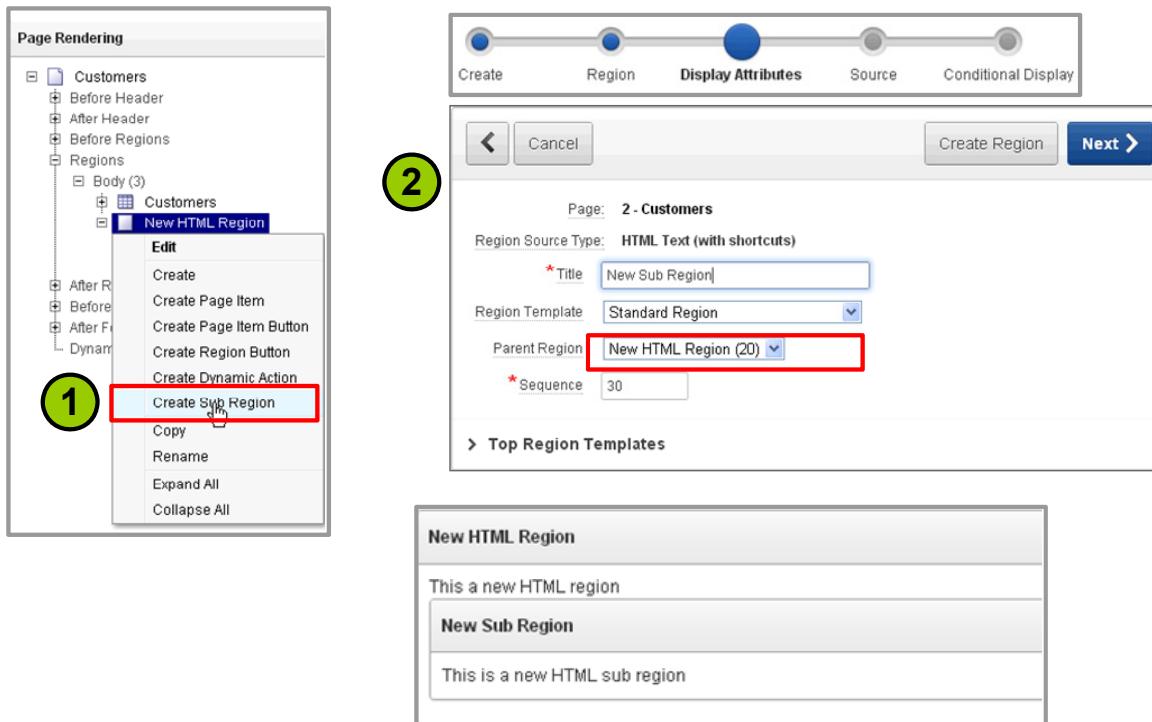
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You can copy regions from one page to another within an application. When copying, you can include the region items and buttons as well. To copy a region, perform the following steps:

1. Right-click the region node and select Copy.
2. Specify the page where you want to copy the region. You also have an option to copy the subregions. Click Next.
3. Enter the new region name and click Copy Region.
4. The region is copied to the specified page.

Note: Certain restrictions in Application Express prevent you from copying a region to another page. For example, a page can contain only one interactive report region. You will not be able to copy an interactive report region to a page that already contains an interactive report.

Creating a Subregion



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A subregion is a region within another region. To create a subregion, you need to specify a parent region while creating the region. Detailed steps are as follows:

1. Right-click the node for the region where you want a subregion and select Create Sub Region.
2. The Create Region Wizard opens. Select the type of region that you want to create.
3. Specify the region attributes. Note that the Parent Region field is automatically set to the region node that you selected in the previous step.
4. Follow the wizard instructions to create the region.

Workspace 7-1 Overview: Creating and Modifying Pages and Regions

This practice covers the following topics:

- Creating a SQL report region
- Creating a sidebar region
- Editing region attributes, including:
 - Adding a region footer
 - Changing the template



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Lesson Agenda

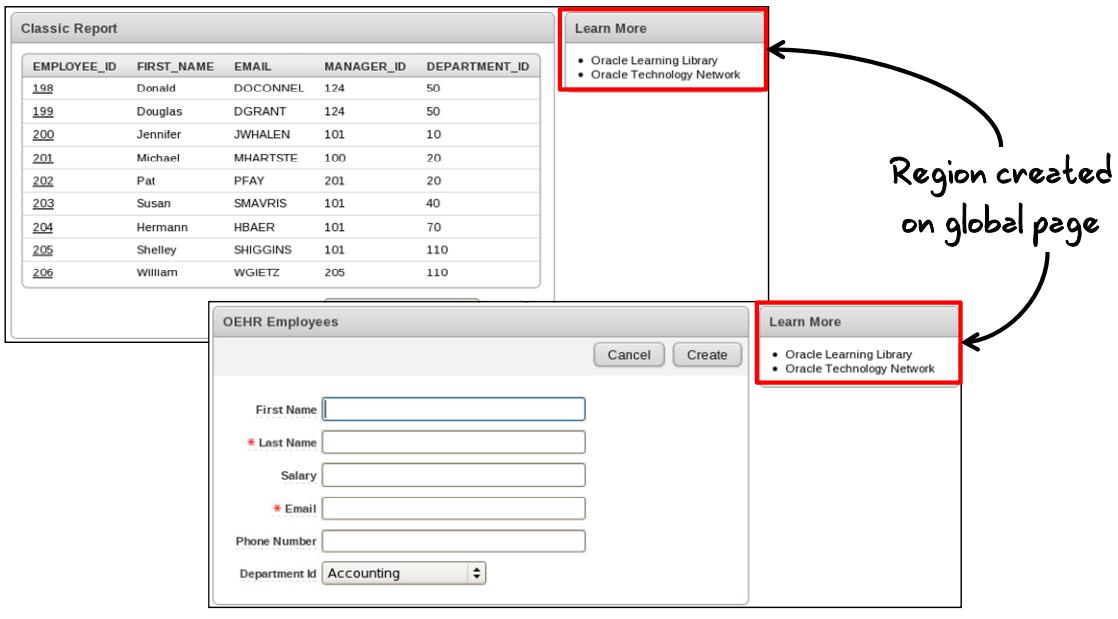
- Introducing Page Definition
- Working with Page Regions
- Working with Pages
 - What Is a Global Page?
 - Creating a Global Page
 - Common Pages for Different User Interfaces
 - Auto-detection of Application Pages
 - Creating and Using Page Groups
 - Copying a Page

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Global Page

Any item, button, or region on this page is displayed on all the pages in the application.



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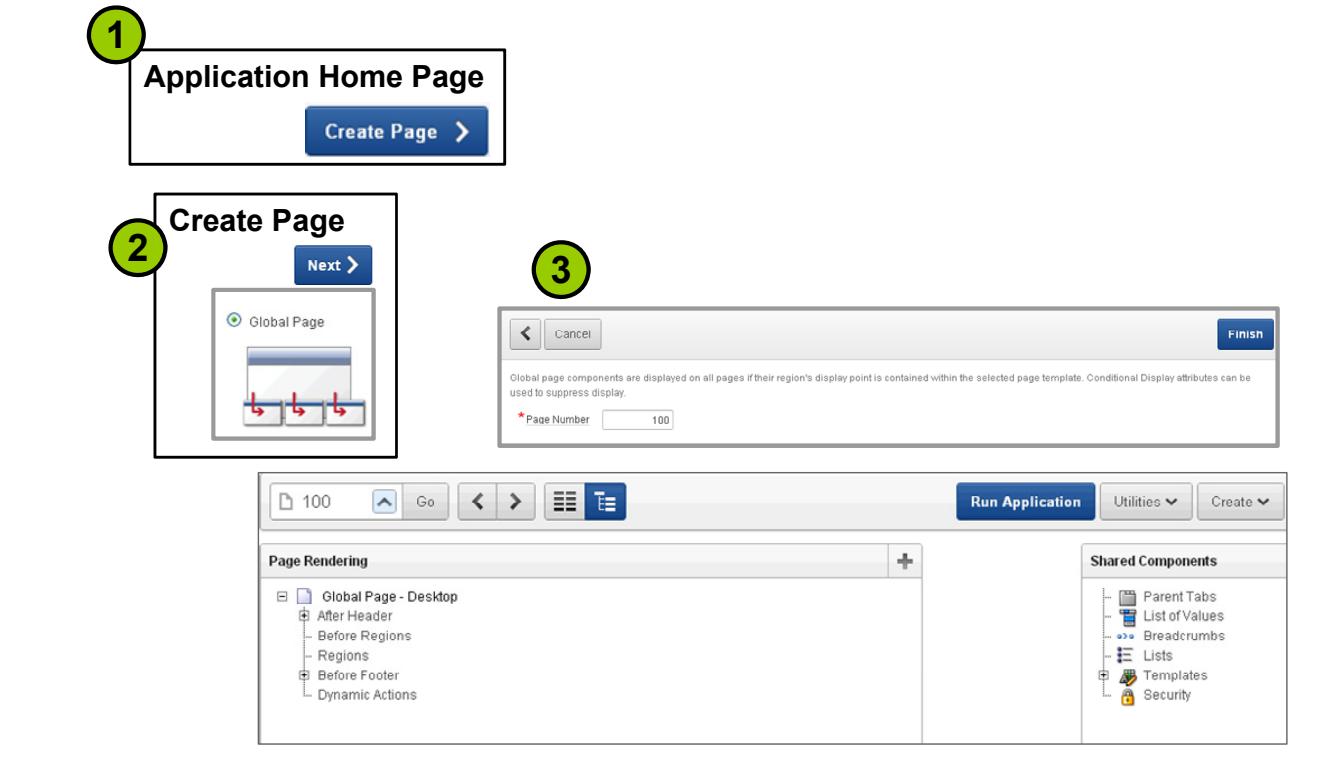
The global page of your application functions as a master page. You can add a separate global page for each user interface. The Application Express engine renders all components you add to a global page on every page within your application. You can further control whether the Application Express engine renders a component or runs a computation, validation, or process by defining conditions.

When you create a mobile application, apart from the Home page and the Login page, a Global page is automatically created.

The example in the slide first creates the “Learn More” HTML region type on the global page. By defining the region on the global page, the region is displayed on all pages in the application. You can also restrict the region to appear only on certain pages.

You cannot create processes, computations, or branches on the global page.

Creating a Global Page



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To create a global page, perform the following steps:

1. Navigate to the application home page and click Create Page.
2. On Create Page, select a user interface for the page. If it is a Desktop interface, then select Global Page as the page type. Note that the Global Page option does not appear for a mobile application because it is already created at the time of creating the application. Also, note that the Global Page option appears only if the application does not have a global page already.
3. For Page Number, enter an integer value that identifies a page within the application. For Mobile applications, the Global Page has a default value of 0.
4. Click Finish.

The page definition for a global page looks different from other pages. You cannot run a global page directly.

You can view the demonstration of creating a global page by opening the `/home/oracle/labs/demos/les07_global_page.html` file.

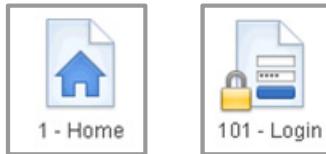
Workshop 7-2 Overview: Creating a Global Page and Adding a Region

This practice covers creating a Global desktop page and adding a static HTML region to it.



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Common Pages for Different User Interfaces



Desktop Application



Mobile Application



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At the time of creating an application, Oracle Application Express will create a set of default pages based on the type of user interface you select for the application.

- **Desktop applications:** Home page and Login page
- **Mobile applications:** Global Page, Home page, and Login page

If you add the mobile user interface to an existing desktop application, then new Global, Home, and Login pages for the mobile user interface will be added to the application.

Auto-detection of Application Pages

The screenshot shows the 'User Interfaces' section of the Oracle Application Express application definition. It lists two entries:

Name	Type	Sequence	Auto Detect	Default	Home	Login
Desktop	Desktop	10	Yes	Yes	f?p=&APP_ID.:1:&SESSION.	f?p=&APP_ID.:LOGIN_DESKTOP:&SESSION.
jQuery Mobile Smartphone	jQuery Mobile Smartphone	20	Yes	No	f?p=&APP_ID.:HOME_JQM_SMARTPHONE:&SESSION.	f?p=&APP_ID.:LOGIN_JQM_SMARTPHONE:&SESSION.

A red box highlights the 'Home' URL for the 'jQuery Mobile Smartphone' entry, which is `f?p=&APP_ID.:HOME_JQM_SMARTPHONE:&SESSION.`. A red arrow points from this highlighted URL to a detailed view of the 'Mobile Home Page' configuration.

Mobile Home Page Configuration:

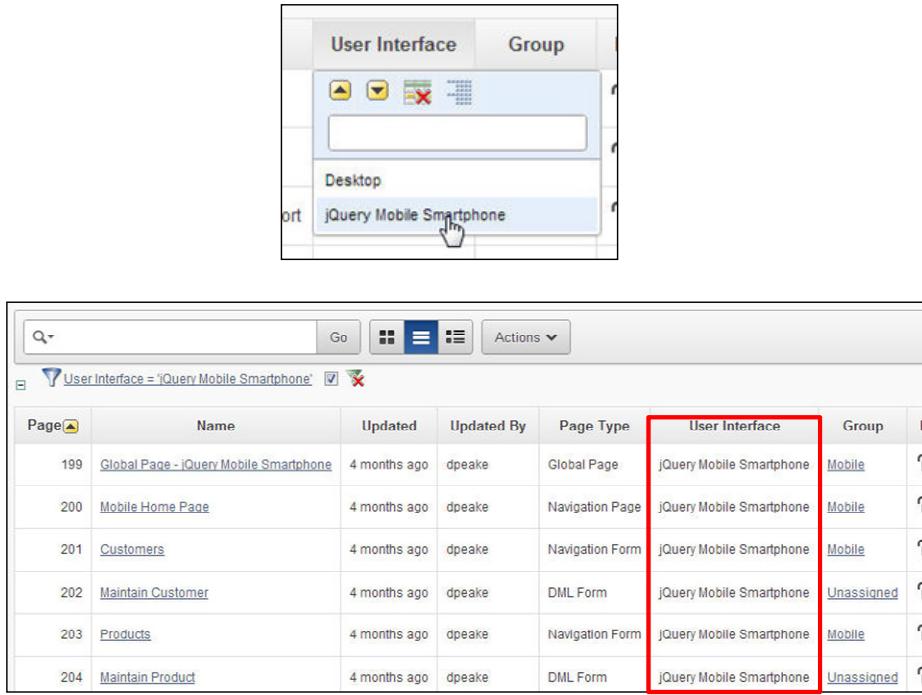
- Page: 200
- * Name: Mobile Home Page
- Page Alias: HOME_JQM_SMARTPHONE
- Group: Mobile

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Application Express can automatically detect application pages on multiple devices. Auto-detection is enabled based on the user interface. In the screenshot in the slide, you have two user interfaces: Desktop and jQuery Mobile Smartphone. Both user interfaces are set to Auto Detect. In addition, the Default is for the Desktop user interface to be displayed. When a user accesses the application, from a desktop or tablet, the Desktop user interface will be displayed. If on a mobile device, the jQuery Mobile Smartphone user interface is displayed. The value of HOME_JQM_SMARTPHONE is the page alias of the page that is displayed on a mobile device. Note that you can change this alias to a specific page number in the user interface definition or move the page alias to the desired page.

Viewing jQuery Mobile Smartphone Pages



The screenshot shows two parts of the Oracle Application Express interface. The top part is a configuration window titled 'User Interface' with tabs for 'User Interface' and 'Group'. It displays a toolbar with icons for creating, deleting, and modifying user interfaces. Below the toolbar, there are two entries: 'Desktop' and 'jQuery Mobile Smartphone'. The 'jQuery Mobile Smartphone' entry is highlighted with a mouse cursor. The bottom part is a grid-based list of pages. The columns are labeled: Page, Name, Updated, Updated By, Page Type, User Interface, Group, and ID. The 'User Interface' column for all listed pages is highlighted with a red border. The pages listed are:

Page	Name	Updated	Updated By	Page Type	User Interface	Group	ID
199	Global Page - jQuery Mobile Smartphone	4 months ago	dpeake	Global Page	jQuery Mobile Smartphone	Mobile	?
200	Mobile Home Page	4 months ago	dpeake	Navigation Page	jQuery Mobile Smartphone	Mobile	?
201	Customers	4 months ago	dpeake	Navigation Form	jQuery Mobile Smartphone	Mobile	?
202	Maintain Customer	4 months ago	dpeake	DML Form	jQuery Mobile Smartphone	Unassigned	?
203	Products	4 months ago	dpeake	Navigation Form	jQuery Mobile Smartphone	Mobile	?
204	Maintain Product	4 months ago	dpeake	DML Form	jQuery Mobile Smartphone	Unassigned	?

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To view all the jQuery Mobile Smartphone pages in your application, select the User Interface header and select jQuery Mobile Smartphone. If you have both Desktop and jQuery Mobile Smartphone user interfaces in the same application, it is a best practice to have the sequence numbers for all your jQuery Mobile Smartphone pages together. In the example in the slide, all of the mobile pages are in the 200 sequence series.

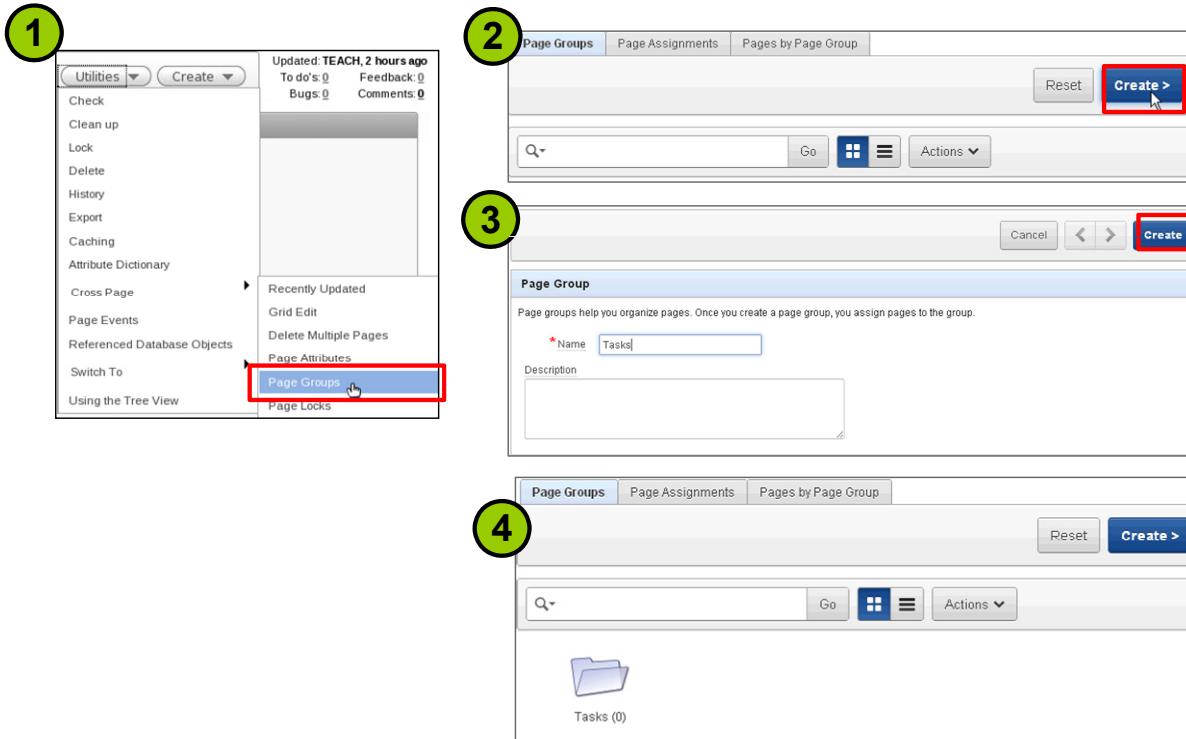
Workshop 7-3 Overview: Modify the Mobile Home page

This practice covers modifying the Home region on the Mobile Home page.



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Creating a Page Group



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Page groups help you to organize pages. To use page groups, you must create a group, and then assign pages to this group.

To create a group, perform the following steps:

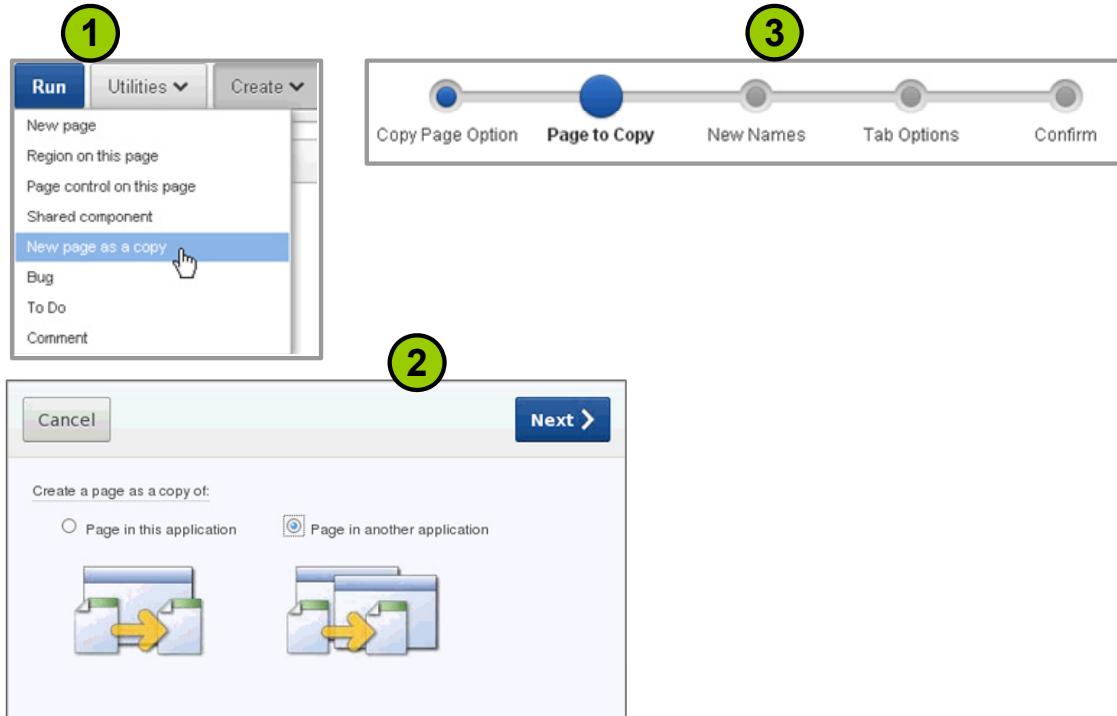
1. From the page definition of any page, click the down arrow on the Utilities button and select Page Groups from the Cross Page submenu.
2. Click the Create button.
3. Enter the name of the page group and click Create.
The Page Group is created.

To assign pages to a group, click the Page Assignments tab and select the group from the New Group list. Select the check box next to the pages that you want to assign to the group and click the Assign Checked button.

After you have created page groups and assigned pages to them, you can view the page group by clicking "Pages by Page Group."

You can prevent conflicts during application development by locking the pages in your application. By locking a page, you prevent other developers from editing it.

Copying a Page



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You can copy pages within an application or from another application. If you are copying a page from another application, that application must reside in the current workspace.

To copy a page from another application, perform the following steps:

1. Click the down arrow on the Create button from the Page Definition of any page. Select "New page as a copy."
2. Select "Page in another application" and click Next.

Follow the wizard instructions. You will be prompted to select the application to copy from, the page to copy, and so on, and whether you want to copy the tabs, templates, and so on from the other page.

Quiz

A global page is used for:

- a. Performing page processing
- b. Identifying a different template
- c. Displaying a set of items or buttons on all the pages in your application
- d. Calculating session values



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Answer: c

Quiz

Which of the following statements are true?

(Choose all that apply.)

- a. Each page can have any number of regions.
- b. You cannot copy a page from another application.
- c. You can add developer comments to an application, a page, or a group of pages.
- d. You can choose to display regions conditionally.



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Answer: a, c, d

Summary

In this lesson, you should have learned how to:

- View page definitions
- Edit page attributes
- Create a new region
- View region attributes
- Create a subregion
- Create a global page



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In this lesson, you learned about pages and regions. You learned how to create pages and regions, and how to edit their attributes.

8

Adding Items and Buttons

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Objectives

After completing this lesson, you should be able to do the following:

- Identify the different types of items
- Create items and edit item attributes
- Create and use lists of values
- Create buttons and edit button attributes



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In this lesson, you learn how to include items and buttons on application pages. You also learn how to create a list of values (which is a shared component) and associate it with the supported item types.

Lesson Agenda

- Introducing Items
 - Examples
 - What Are Application Items?
 - Accessing the Create Item Wizard
 - Types of Page Items
- Using Items
- Creating List of Value (LOV) Type Items
- Using Buttons



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Items

Items are HTML form elements. There are two categories of items:

- Page-level items
- Application-level items



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Items are HTML form elements such as text fields, select lists, and check boxes with an associated session item. Item attributes affect the display and behavior of items on a page. For example, these attributes can impact where a label displays, how large an item is, and whether the item displays next to or below the previous item.

There are two categories of items: page items and application items. Page-level items are placed on a page and have associated user interface properties. Application-level items are not associated with a page and therefore have no user interface properties. An application item can be used as a global variable.

Page Items: Examples

The slide displays two examples of Oracle Application Express page items:

- Product Details:** A form for adding a new product. It includes fields for Product Name (Text Field), Product Description (Text Area), Category (Select List), Product Available (Radio Group), List Price (Text Field), Product Image (File Browse), and Tags (Text Field). Buttons for Cancel and Add Product are at the bottom.
- Create Order for:** A form for creating an order. It includes a Radio Group for Customer type (Existing customer or New customer), a Pop-up LOV for selecting a customer, and a text field for quantity.

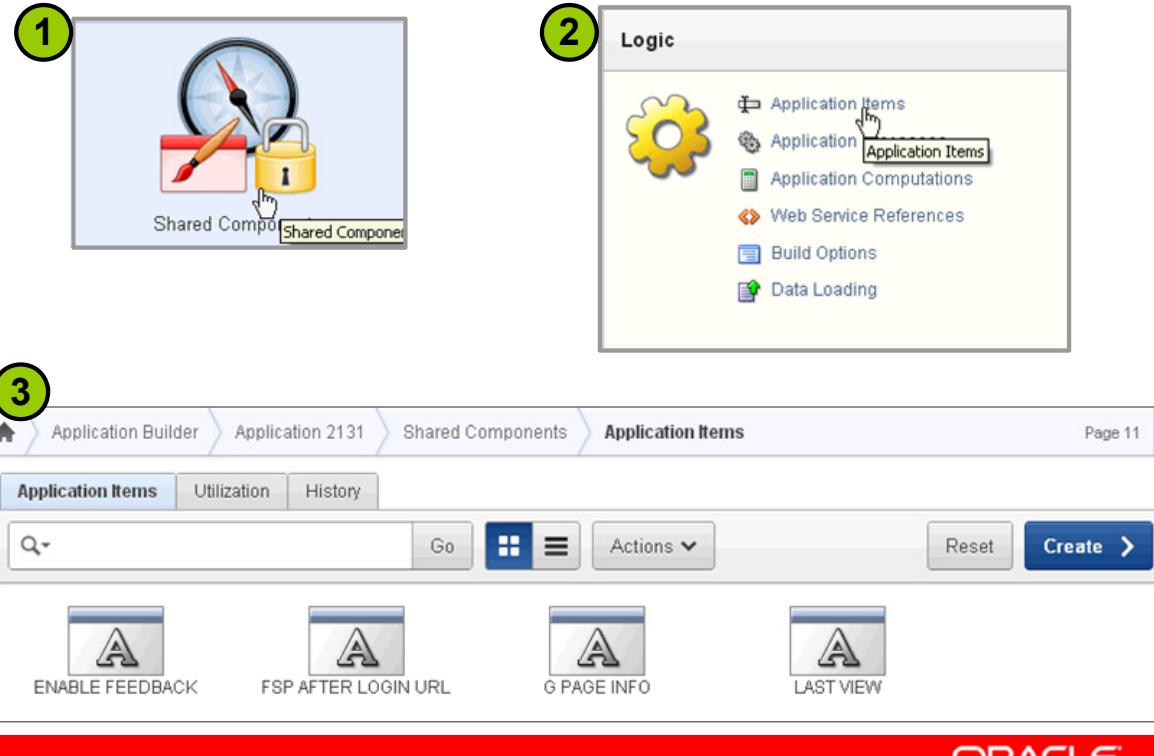
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The slide displays some page item examples. An item is part of an HTML form and can be used to store a value in session state so that it can be retrieved at a later time. The examples shown in the slide are page items. Page items are placed on a page and have associated user interface properties, such as Display As, Label, and Label Templates. Another type of item, application items, is discussed in the next slide.

When you create a form by using a wizard, an item is created for each column of the table. The default item type is a text field, text area, number field, date picker, or File Browse depending on whether the database table column type is varchar, varchar2 (with size greater than 255 characters), numeric, date, or BLOB, respectively. You can edit the item properties to change the display type. For example, you can change a text field to a text area or select list.

What Are Application Items?



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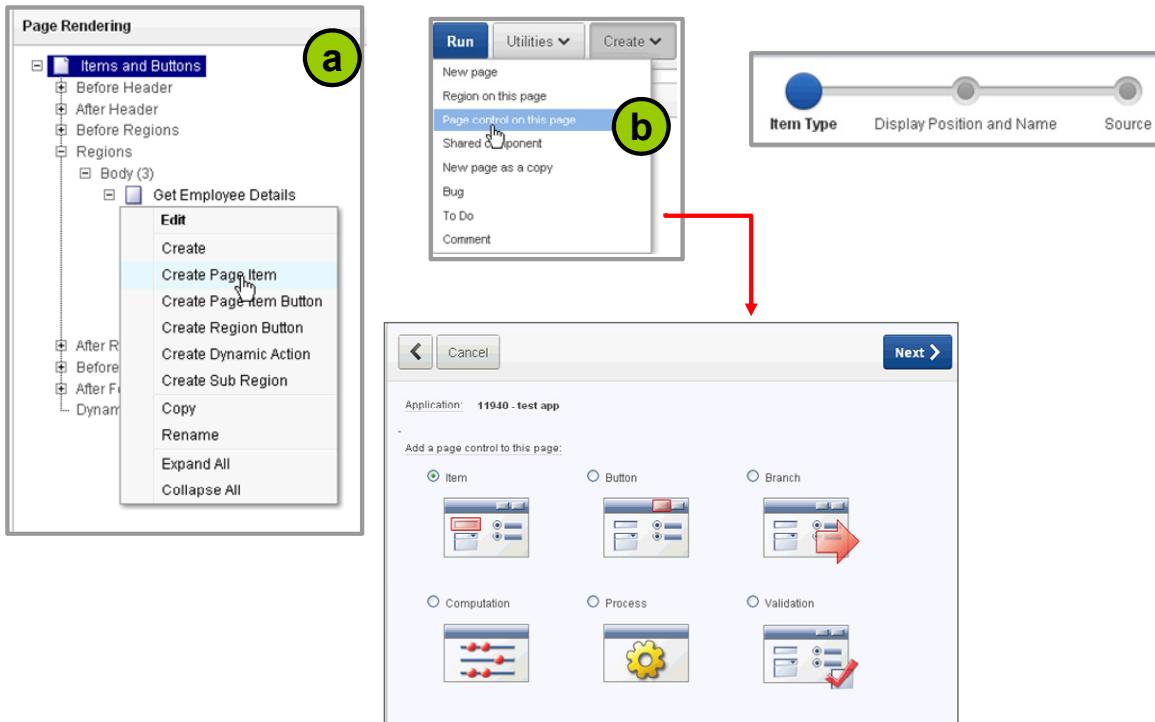
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Application items are not associated with a page and, therefore, have no user interface properties. An application item can be thought of as a global variable. You create an application item from the Application Items page. To access the Application Items page, perform the following steps:

1. Click the Shared Components icon on the application home page.
2. In the Logic pane, click Application Items.
The Application Items page is displayed.

Application items are typically configured by using processes or computations, or by passing values in a URL. For example, the `FSP_AFTER_LOGIN_URL` application item is used internally by Oracle Application Express to remember the page that users attempted to visit before they were shown the login page. You can click the item icon to view or edit details.

Accessing the Create Page Item Wizard



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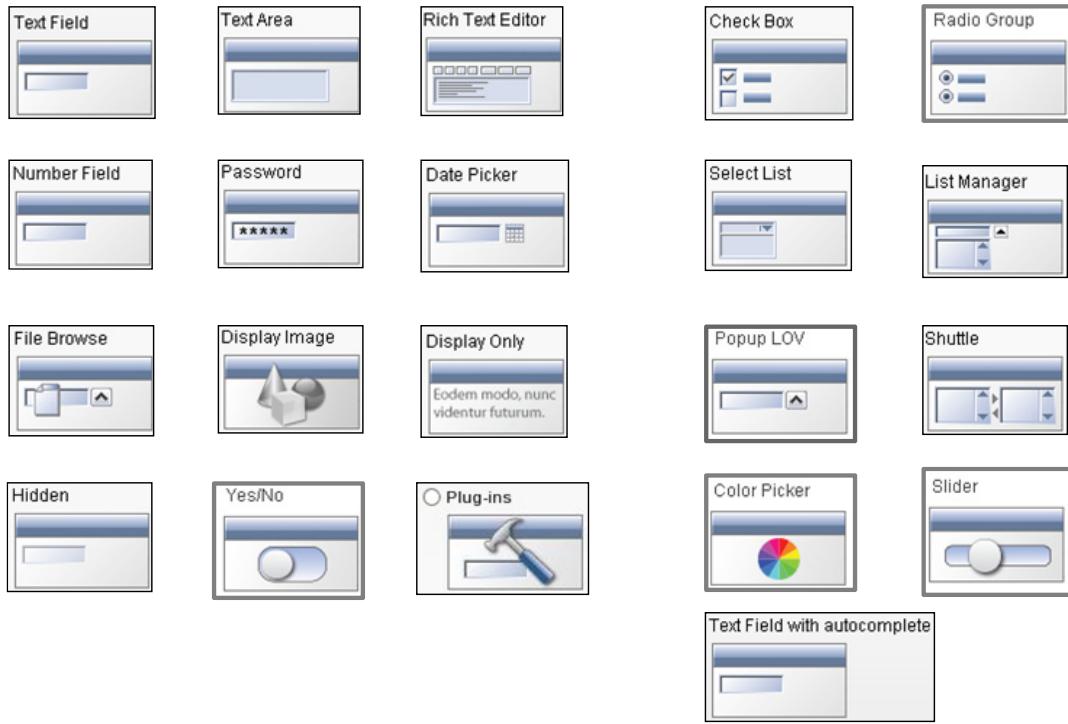
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You can access the Create Page Item wizard in either of the following ways:

- Right-click the region node where you want to create the item and select Create Page Item.
- Click the down arrow on the Create button and select Create Page Control. Then select Items and click Next.

Note: The wizard steps differ depending on the item that you want to create.

Types of Page Items



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- **Text Field, Text Area, Rich Text Editor:** Allow users to enter textual data. The Text Area field is resizable. Rich Text Editor provides various formatting options. You can specify up to 32,767 bytes for a Text Area or Rich Text Editor item.
- **Number Field:** Validates the user input and accepts only numerical data
- **Password:** Creates a text field that displays an asterisk for each character entered
- **Date Picker:** Displays a text field with a calendar icon next to the text field. You can specify a format mask, maximum and minimum date, year range, and so on while creating the item.
- **File Browse:** Displays a text field with a Browse button. This enables you to locate a file in a local file system and upload it. The files that you upload are stored in a table called `wwv_flow_file_objects$`. Every workspace has access to this table through a view called `APEX_APPLICATION_FILES`.
- **Display Image, Display Only:** The Display Only item displays a read-only version of a display value. The Display Image item displays a specified image.
- **Hidden:** Creates an HTML hidden form element. You can use this item to store session state values.

- **Yes/No:** Displays Flip Toggle Switch in jQuery Mobile user interfaces and as a select list in nonmobile environments.
- **Check Box:** Is based on a list of values. The value corresponding to a check box is returned in a string delimited by a single colon (:).
- **Radio Group:** Displays an HTML radio group form element based on a list of values
- **Select List:** Displays a list of values. The values in the select list are determined by using a shared list of values or a list of values defined at the item level.
- **List Manager:** It is based on a list of values. It enables you to manage a list of items by selecting from and adding to a list.
- **Popup LOV:** Renders a text field with an icon next to it. A user can click it and select a value from the pop-up window. The list in the pop-up window is driven by a list of values.
- **Shuttle:** It is used to move one or more list elements from left to right.
- **Plug-ins:** Plug-ins enable developers to declaratively extend, share, and reuse the built-in types available with Oracle Application Express.
- **Color Picker:** Renders as a text field with an icon. When the user clicks the icon, a pop-up window appears. When the user makes a selection from the palette, the HTML value for the color selected (for example, #0000000 for black) is returned.
- **Slider:** Renders slider item type for jQuery Mobile applications. This item type enables users to use slide handler to set a value.
- **Text Field with autocomplete:** Shows data from a table as you enter text in the field

Note: You can create a maximum of 100 items on a page.

Lesson Agenda

- Introducing Items
- Using Items
 - Creating a Date Picker Item
 - Creating Multiple Items by Using the Tabular Form
 - Editing an Item
 - Creating Quick Picks
 - Finding Items by Using the Item Finder
 - Adding Subtypes on Mobile Item Types
- Creating List of Value (LOV) Type Items
- Using Buttons

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Creating a Date Picker Item

1

Page: 4 - Items and Buttons
Display As: Date Picker
Item Name: P4_DATE
Sequence: 100
Region: Get Employee Details (10)

2

Page: 4 - Items and Buttons
Item Name: P4_DATE
Display As: Date Picker
Label: Date
Field Width: 30
Template: Optional with help

3

Page: 4 - Items and Buttons
Item Name: P4_DATE
Display As: Date Picker
Value Required: No
Format Mask: DD-MON-YYYY
Minimum Date: -2d
Maximum Date: +2d
Show: on icon click
Show other Months: No
Navigation List for: None

4

Identify the source of the item. If the item source is null the default value will be used.
Page: 4 - Items and Buttons
Item Name: P4_DATE
Display As: Date Picker
Source Used: Only when current value in session state is null
Source Type: Static Assignment (value equals source attribute)
Item Source Value:
Default:
Item Default Type: Static Text with Session State Substitutions

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To create a date picker item, select Date Picker in the Create Page Item Wizard. Click Next and perform the following steps:

1. Enter a name for the item. As a best practice, use the default format `P<n>_<item_name>` to name the items. Click Next.
2. Accept the defaults or change the item label and display properties. Select the appropriate label template. If you select an option with “with help,” a help window opens when the item label is clicked. If you select a “required” option, a red asterisk is displayed before the label. Click Next.
3. You can specify whether a value is required for the item. If you select Yes, the item is validated to ensure that it is not null when the page is submitted. The options in this step may differ for each item type. For the date picker item, you can specify a format mask, the date to be highlighted, and so on. Click Next.
4. Specify the source for the item. You can also specify a default value for the item. Click Create Item.

You can run the page to check whether the item was created successfully.

Creating Multiple Items by Using the Tabular Form

Sequence	Name	Label	Type	Cache	LOV
10	P4_NAME	Name	Text Field	Yes	
20	P4_GENDER	Gender	Radio Group	Yes	STATIC:M,F
30	P4_BIRTHDATE	Birthdate	Text Field	Yes	
40	P4_CONTACT_NUMBER	Contact Number	Text Field	Yes	
50	P4_		Text Field	Yes	
60	P4_		Text Field	Yes	
70	P4_		Text Field	Yes	
80	P4_		Text Field	Yes	
90	P4_		Text Field	Yes	
100	P4_		Text Field	Yes	
110	P4_		Text Field	Yes	
120	P4_		Text Field	Yes	

Cancel **Create Multiple Items**

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You can create multiple text field, text area, radio, check box, and hidden field items by using a tabular form. Perform the following steps:

1. Navigate to the page where you want to create the items and access the Create Page Item Wizard.
2. Click the “Create multiple items using tabular form” link at the bottom of the page.
3. On the Create Multiple Items page, select the region to contain the items and select a template for the item labels.
4. For each item that you want to create, enter the name, label, and type.
5. Click Create Multiple Items.

Run the page to confirm that the items were created successfully.

Editing an Item

The screenshot shows the Oracle Application Express Page Definition interface. On the left, there's a tree view under 'Page Rendering' with nodes like 'Items and Buttons', 'Regions', and 'Body (3)'. In the 'Body (3)' node, there's a 'Get Employee Details' region containing an 'Items' node. Under 'Items', a specific item named 'P4_MGR' is selected, and a context menu is open over it. The menu options include 'Edit', 'Create', 'Create Page Item Button', 'Create Dynamic Action', 'Create Validation', 'Create Computation', 'Copy', 'Rename', 'Expand All', and 'Collapse All'. Below this, the main workspace shows a 'Page Item: P4_MGR' configuration screen. At the top of this screen are buttons for 'Cancel', 'Delete', and 'Apply Changes'. Below these are tabs for 'Show All', 'Identification', 'User Interface', 'Grid Layout', 'Label', 'Settings', 'Element', 'Source', 'Default', 'Quick Picks', 'Conditions', 'Read Only', 'Security', 'Configuration', 'Help Text', and 'Comments'. The 'Identification' tab is selected and highlighted with a red box. The 'Identification' tab contains fields for 'Name' (set to 'P4_MGR') and 'Display As' (set to 'Number Field'). A dropdown menu below 'Display As' lists other options: Text, Number, Date, Textarea, Select List, Radio, Popup List of Values, Checkbox, Display Only, and Hidden.

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To edit an item, navigate to the Page Definition. Right-click the item node and select Edit. Depending on the type of the item, you can edit the following attributes:

- Name
- Display details
- Label
- Element
- Source
- Default
- List of values
- Security
- Conditions
- Read-only display settings
- Help text
- Configuration
- Comments

Creating Quick Picks

The screenshot illustrates the process of creating quick picks for a page item. At the top, a user interface window titled "Get Employee Details" shows a text field labeled "Manager" containing the value "Neena, Lex, Nancy". Below this, a callout arrow points from the text to the heading "Quick Picks".

The main part of the screenshot is a configuration screen for the "P4_MGR" page item. It includes tabs for "Show All", "Identification", "User Interface", "Grid Layout", "Label", "Settings", "Element", "Source", "Default", "Quick Picks", "Conditions", "Read Only", and "Se". The "Quick Picks" tab is selected.

The "Quick Picks" section contains a dropdown menu "Show Quick Picks" set to "Yes". It lists 10 rows for quick picks, each with a "Label" and a "Value". The first three rows are populated:

Label	Value
1 Neena	101
2 Lex	102
3 Nancy	108
4	
5	
6	
7	
8	
9	
10	

Buttons at the bottom include "Cancel", "Delete", "Apply Changes", and navigation arrows.

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Quick picks are links that you display below an item. You can click the quick pick links to enter a value in the item field. You can create up to 10 selections for items that support quick picks, such as text field, number field, select list, and pop-up LOV.

To create quick picks, right-click the item node and select Edit. Click the Quick Picks tab. Select Yes for Show Quick Picks and enter the label name and value for each quick pick that you want to create. Click Apply Changes and run the page to view the created quick picks. In the example in the slide, three quick picks are created for the Manager text field item.

Finding Items by Using the Item Finder

Name	Label	Type	Page
P4_COMM	Comm	Page Item	4
P4_DEPTNO	Deptno	Page Item	4
P4_EMPNO	Empno	Page Item	4
P4_ENAME	Ename	Page Item	4
P4_HIREDATE	Hiredate	Page Item	4
P4_JOB	Job	Page Item	4
P4_MGR	Mgr	Page Item	4
P4_ROWID	Rowid	Page Item	4
P4_SAL	Sal	Page Item	4

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To quickly find items on a specific page, perform the following steps:

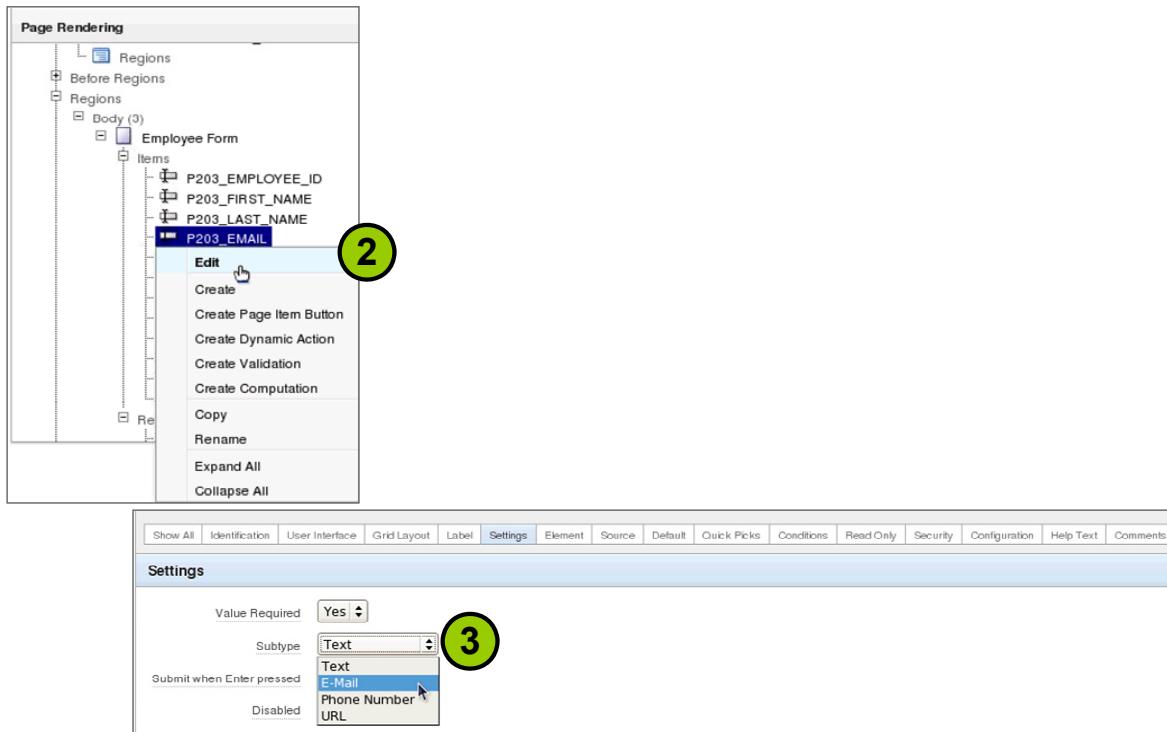
1. Navigate to the Page Definition page.
2. Click the Find icon at the top-right corner.
3. The items on the selected page are displayed. To find items on another page, enter the page number and click Go. You can also search for a particular string, such as find all items beginning with P3_CUST.
4. Click the page link. The Item Edit page is displayed.

Using the other tabs in the Find window, you can also find the following:

- **Pages:** Displays all the pages in the application
- **Queries:** Displays all the queries in the application, along with the respective page numbers
- **Tables:** Displays all the available tables in your schema
- **PL/SQL:** Displays all PL/SQL expressions, along with the respective page numbers

- **Images:** Displays all the images in the application
- **Debug:** Displays debugging messages
- **Session:** Displays various information about session state (page and application items, collections, and so on)
- **Errors:** Displays any errors found when running your application

Adding Subtypes on Mobile Item Types



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Subtype specifies what kind of text field the page item is. This will allow devices with on-screen keyboards to show an optimized keyboard layout specific to the subtype, for easier data input. The subtype selection will also be used to render an appropriate link with the value of the page item, if it's rendered read only. This HTML5 feature works in modern browsers only.

To access subtype, perform the following steps:

1. Select the form of the mobile application where you can find item types.
2. Right-click the item type and select Edit.
3. Under the Settings tab, select the Subtype drop-down list and select the subtype for that item.

Quiz

Which of the following is *not* a page item type?

- a. Date Picker
- b. File Browse
- c. HTML
- d. List Manager



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Answer: c

Workshop 8-1 Overview: Adding Items and Buttons

This practice covers the following topics:

- Creating a blank page
- Creating and adding items to pages
 - Date picker
 - Text area
 - Text
 - Select list



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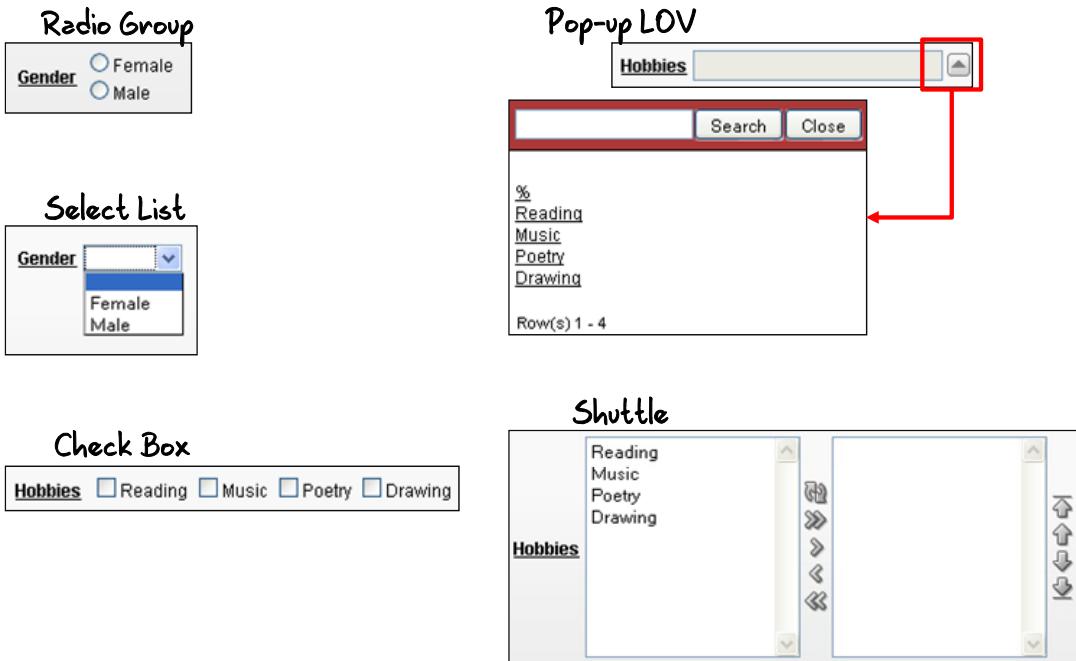
Lesson Agenda

- Introducing Items
- Using Items
- Creating List of Value (LOV) Type Items
 - What Is an LOV?
 - Accessing the Lists of Values Page
 - Creating a Static LOV
 - Creating a Dynamic LOV
 - Associating an LOV with an Item
 - Creating a Select List Item
 - Converting an LOV
 - Creating a Cascading LOV
- Using Buttons

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What Is an LOV?



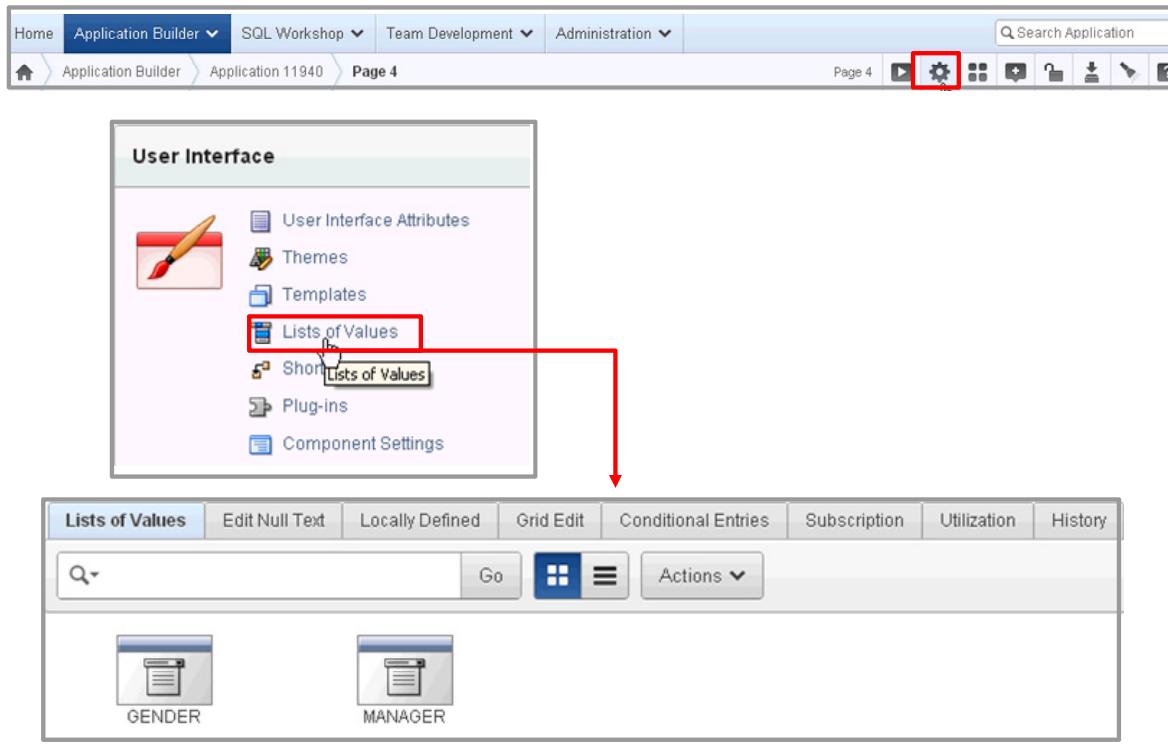
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A list of values (LOV) is used to display values for some specific type of page item, such as a radio group, check box, or select list. You can create an LOV while creating the item or create an LOV as a shared component, and then reference it in one or more items. An LOV can be either of the following:

- **Static:** Based on a set of predefined display and return values
- **Dynamic:** Based on a SQL query that selects values from tables

Accessing the “Lists of Values” Page



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The LOVs that are created as shared components are listed on the “Lists of Values” page. To access the “Lists of Values” page, navigate to the Shared Components page for the application. Under User Interface, click “Lists of Values.” The LOVs that are created for the application are displayed. You can create new LOVs or create a copy of an existing LOV.

Note: Shared component LOVs are also called “named” LOVs.

Creating a Static LOV

The figure consists of three vertically stacked screenshots of the Oracle Application Express interface, each with a large green circle containing a number indicating the step:

- Step 1:** A dialog box titled "Create List of Values". It contains a "Cancel" button, a "Next >" button, and a text area explaining what a List of Values is. Below this is a "Create List of Values:" section with two options: "From Scratch" (selected) and "As a Copy of an Existing List of Values".
- Step 2:** A dialog box titled "Create List of Values". It contains a "Cancel" button, a "Next >" button, and a text area explaining that static lists are based on predefined pairs of display and return values. Below this is a form with a required field "Name" containing "Gender" and a "Type" section with "Static" selected.
- Step 3:** A dialog box titled "Create List of Values". It contains a "Cancel" button, a "Create List of Values" button, and a table for entering static display and return values. The table has columns "Sequence", "Display Value", and "Return Value". It shows four rows:

Sequence	Display Value	Return Value
1	Female	F
2	Male	M
3		
4		

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A static LOV is based on a predefined list of display and return values. To create a static LOV, click the Create button on the "Lists of Values" page and perform the following steps:

1. Select From Scratch and click Next. You can select the second option to create a copy of an LOV from another application in the same workspace.
2. Enter a name for the LOV. Select Static and click Next.
3. Enter the static display and return values. Values are displayed in the order in which they are entered here. The return value is not displayed, and is the value returned to the Oracle Application Express engine. In a case where you do not enter a return value, the display value is also the return value. Click "Create List of Values."

After you add a static LOV to the repository, you can create a check box, radio group, select list, or pop-up list item and reference the LOV there.

Creating a Dynamic LOV

1

A List of Values is a static or dynamic definition used to display a specific type of page item, such as popup lists of values, a select list, a check box, a radio group, or multiple select lists.

Create List of Values:

- From Scratch
- As a Copy of an Existing List of Values

2

Static lists are based on predefined pairs of display and return values. Dynamic lists are based on a SQL query you write that selects values from a table.

* Name: Managers

Type: Static Dynamic

3

Enter a SQL query that returns two columns. The first column is the display value. The display value is the value you see in a list of values. This column should be aliased and a different name than the return column. The second column is the return value. The return value is the value returned when the display value is selected. The return column should be aliased if it includes any operations. Use bind variable syntax within your SQL query to reference the session state of the application or page items.

List of Values Name: MANAGERS

*Query (SELECT DISPLAY_VALUE, RETURN_VALUE FROM...):

```
SELECT ename d, empno r
FROM emp e, empn
WHERE m.empno=e.mgr
ORDER BY 2
```

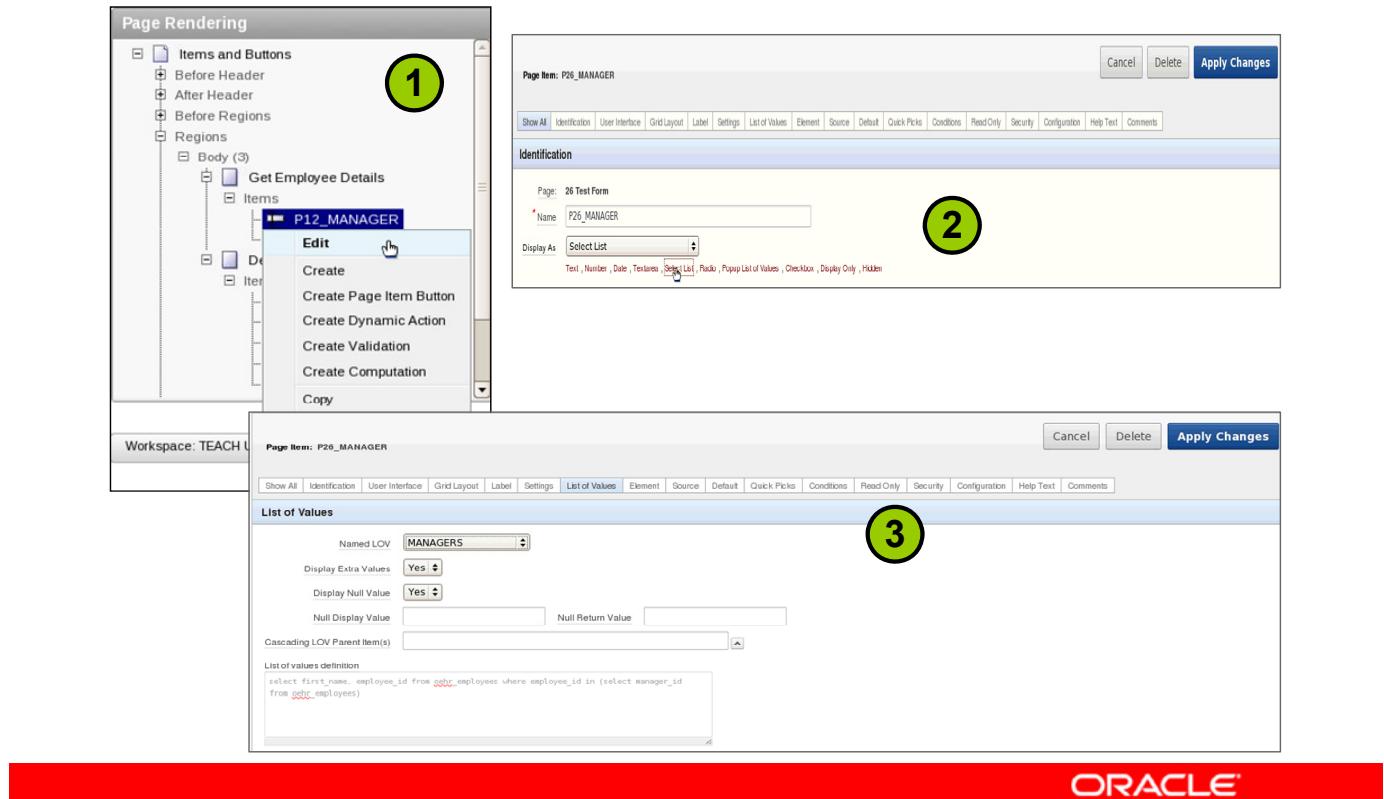
Create List of Values

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Dynamic LOVs are based on SQL queries that are executed at run time and select values from tables or views. To create a dynamic LOV, click the Create button on the "Lists of Values" page and perform the following steps:

1. Select From Scratch and click Next.
2. Enter a name for the LOV. Select Dynamic and click Next.
3. Enter a SQL query that returns two columns. The first column returns the values to be displayed in the items list. The second column gives the value that is returned to the Oracle Application Express engine when the display value is selected. You can click the Examples link at the bottom of the page to see sample SQL queries. If the display and return columns are the same, or if a column includes a function or operator, you must use column aliases in the query. Click "Create List of Values."

Associating an LOV with an Item



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You can associate a named LOV with an item that can accept a list of values. To associate an LOV to an item, perform the following steps:

1. Right-click the item node and select Edit.
2. Ensure that the display type is an LOV type item by clicking the Name tab. You can change the display type, if required. In this example, the Manager text field item is changed to a select list item.
3. Click the "List of Values" tab. For Named LOV, select the LOV that you already created. In this example, the Managers LOV is selected. Click Apply Changes.

Run the page to check whether the item displays the list of values.

Creating a Select List Item

The screenshot shows the 'Creating a Select List Item' page in Oracle Application Express. The page has a header with 'Cancel' and 'Next >' buttons. Below the header, a note says: 'Use this page to define the list of values. Either construct a SQL statement with the number of columns required by the item type, or use the STATIC syntax. See the List Of Values Examples section for examples.' The main form contains the following fields:

- Application/Page: 11940/4
- Item Name: P4_SELECTLIST
- Display As: Select List
- Named LOV: [text input]
- Display Null Value: Yes [dropdown]
- Null Display Value: [text input]
- Null Return Value: [text input]
- Cascading LOV Parent Item(s): [text input]

A text area labeled 'List of Values Query' contains the following SQL code:

```
SELECT ename d, empno r
FROM emp
ORDER BY 1
```

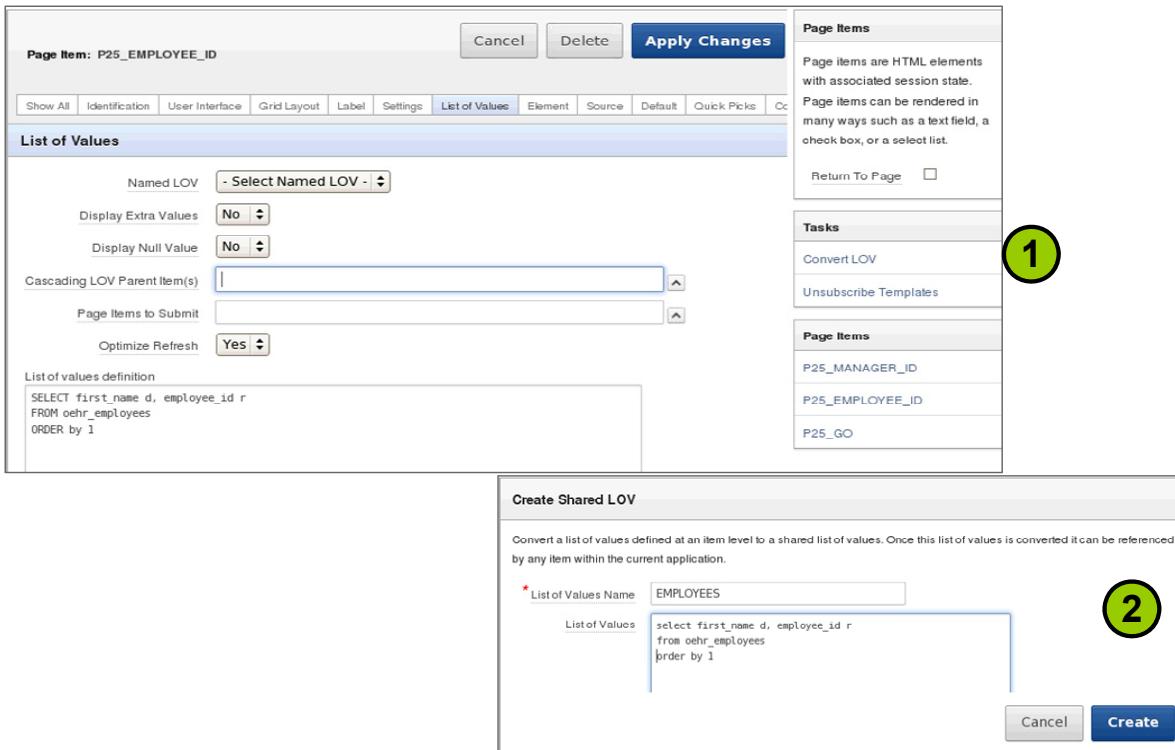
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The steps to create a Select List item are similar to creating a date picker item that was discussed earlier in this lesson. In addition, you specify the list of values for the item. You can do this in two ways:

- Create a list of values as a shared component and reference it here.
- Enter the list of values in the text area. You can view syntax examples by clicking the "List of Values Examples" node at the bottom of the page.

In the example in the slide, the SQL query is entered in the text area. You can click the links below the text area to create a static or dynamic list of values.

Converting an LOV



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The LOVs that are defined while creating an item (as discussed in the previous slide) can be used only for that item. You have an option to convert this LOV to a named LOV so that you can reuse it for other items. Right-click the item that has the LOV defined and select Edit. Perform the following steps:

1. Click the “List of Values” tab and review the SQL query.
2. Under Tasks, click Convert LOV.
3. Enter a name for the LOV and click Create.

The LOV is converted to a shared component LOV and is listed in the Shared Components region of Page Definition. Shared Components are discussed in detail in the lesson titled “Adding Shared Components That Aid Navigation.”

Creating a Cascading LOV

The values displayed in the Employee select list depend on the Manager that is selected.

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A cascading LOV is a dynamic LOV that references another page item for its list of values. For example (shown in the slide), you can populate an Employees item with the names of employees who work for the manager entered in the Manager item. You can define a cascading LOV while creating the item or by editing the item. Before creating a cascading LOV, you must first create the item that is referred to. To define a cascading LOV for an existing item, perform the following steps:

1. Navigate to the appropriate page definition. Right-click the item node and select Edit.
2. Click the "List of Values" tab.
3. Click the up arrow for the Cascading LOV Parent Item(s) field and select the item that you want to refer in the SQL query.
4. Select the page items to submit.
5. Modify the SQL query to include the referred item in the WHERE clause. If you have selected a named LOV for the item, you must edit the named LOV from the List of Values page. Click Apply Changes.

Run the page to confirm that the items are populated as required.

You can view the demonstration of modifying an item type by opening the `/home/oracle/labs/demos/les08_modify_item_form.html` file.

Note: You can define a cascading LOV only for LOV-type items, such as select list, check box, and pop-up LOV.

Lesson Agenda

- Introducing Items
- Using Items
- Creating List of Value (LOV) Type Items
- Using Buttons
 - What Is a Button?
 - Creating a Button
 - Creating a Region Button
 - Accessing the Create Multiple Buttons Option
 - Creating Multiple Buttons
 - Editing Button Attributes
 - Modifying a Button to Redirect to a URL



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What Is a Button?

The screenshot shows a form titled "Customer" with the following fields:

- * First Name: Eugene
- * Last Name: Bradley
- Street Address: Schoephoester Road
- Line 2: (empty)
- City: Windsor Locks
- * State: Connecticut
- * Postal Code: 06096
- Email: (empty)
- Phone Number: (860) 555-1835
- Alternate Number: (empty)
- URL: (empty)
- * Credit Limit: 1000
- Tags: REPEAT CUSTOMER

At the bottom, there are three buttons: "Cancel", "Delete", and "Apply Changes". The "Apply Changes" button is highlighted with a red box and has a handwritten-style label "Region Buttons" with an arrow pointing to it.

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A button is an interface element that is used to either submit a page or navigate to another page or URL. You can create a button that is placed next to other page items. You can also create region buttons that are placed in predefined region templates.

When you use wizards to create page components such as reports and forms, some buttons (such as Cancel, Save, Create, and Delete) are automatically created.

In this lesson, you learn how to create a region button named CANCEL, which, when clicked, clears the cache for the items on a page and redirects to another page. You also create a button named GO next to an item, which, when clicked, submits the page items and displays a report region.

Creating an Item Button

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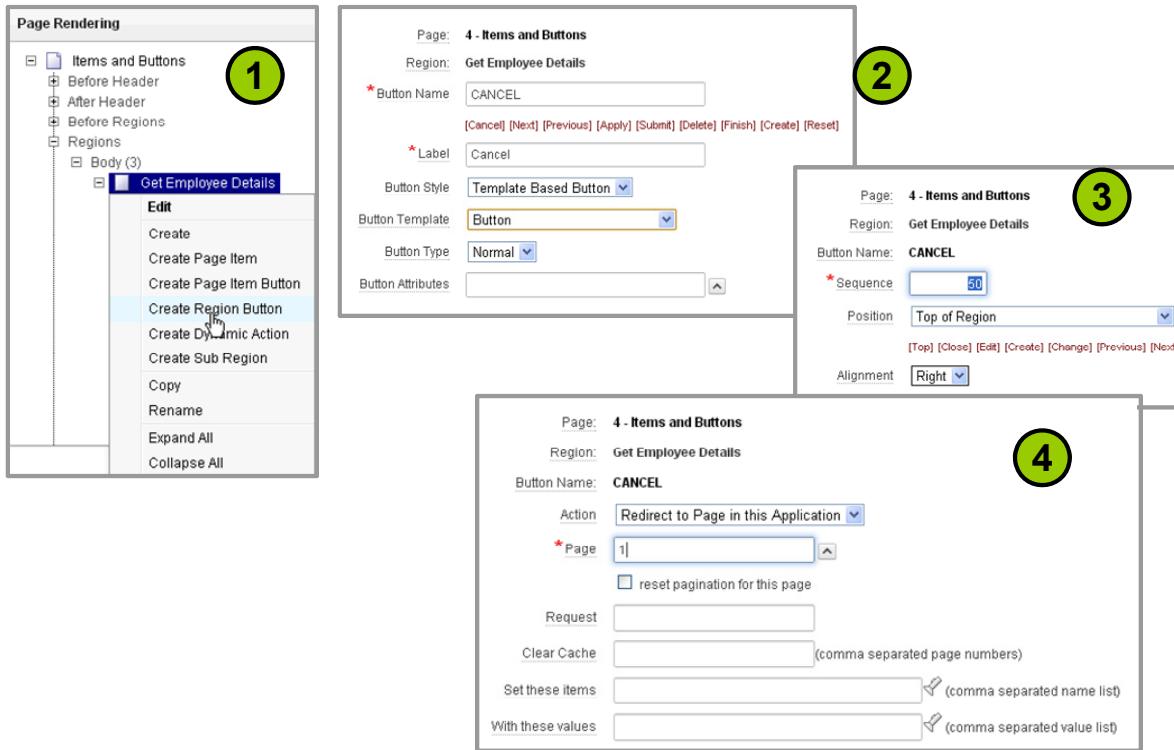
To create a new button, navigate to the Page Definition and perform the following steps:

1. Identify the region to contain the button. Right-click the region node and select Create Button.
2. Fill details in the Create Button Wizard and click Create Button.
 - Enter a name for the button.
 - Specify whether the button should display in a separate line or next to the previous item.
 - Enter a label name.
 - Select a style for the button.

The button is created.

If you run the page and click the button, you notice that the page gets submitted. You can now define the actions that are required when the page is submitted.

Creating a Region Button



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To create a region button, navigate to the Page Definition and perform the following steps:

1. Right-click the region where the button should be created and select Create Region Button.
2. Enter a name for the button (you can use the quick pick links that are available) and the label. (When you enter a name in the Button Name field, the Label field populates automatically.) Specify the button style.
3. Specify where and how the button should be displayed.
4. Select the action that is required when the button is clicked. In this example, you redirect to another page in the application. Click Create Button.

You can click Next if you want to specify a condition for the button to be displayed. You can run the page to verify that the button was created successfully.

Accessing the Create Multiple Buttons Option



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You can create multiple buttons within the same region simultaneously by using the Create Multiple Buttons Wizard. To access the wizard, perform the following steps:

1. In the page definition, click the down arrow on the Create button and select “Page control on this page.”
2. Select Button and click Next.
3. Under Tasks, click Create Multiple Buttons.

Creating Multiple Buttons

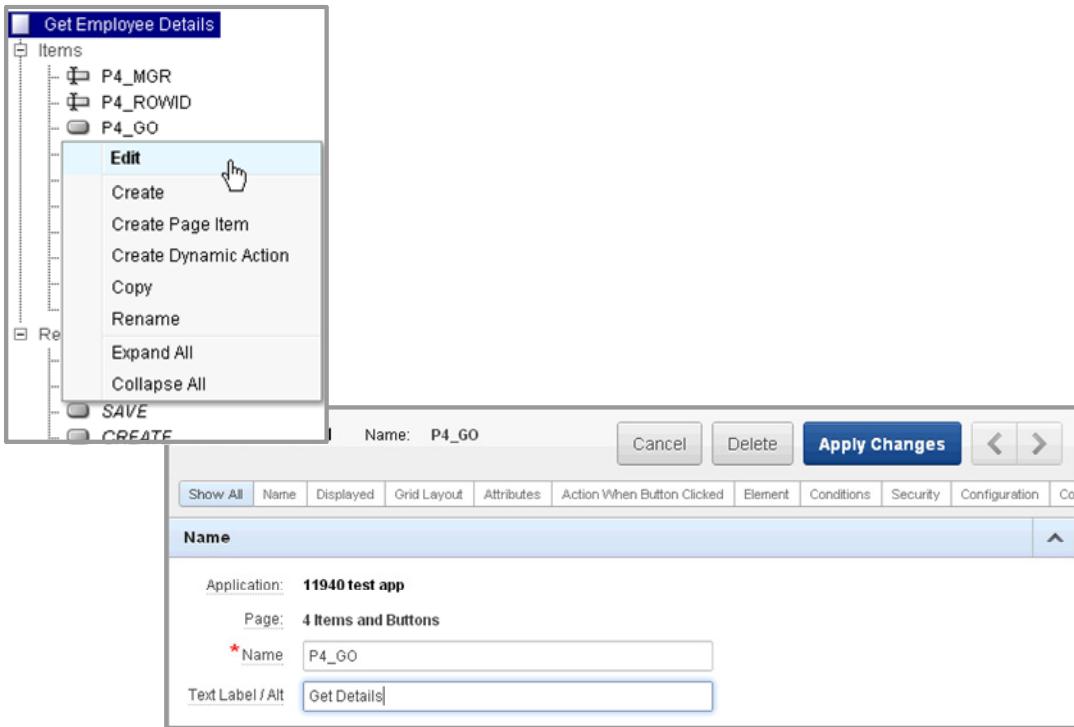
Sequence	Name	Label	Position	Attribu
10	CANCEL	Cancel	Region Template Position #CLOSE#	
20	PREVIOUS	< Previous	Region Template Position #PREVIOUS#	
30	NEXT	Next >	Region Template Position #NEXT#	
40	SUBMIT	Submit	Region Template Position #CREATE#	
50			Bottom of Region	



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On the Create Multiple Buttons page, specify the region to contain the buttons and a style for the buttons. For each button that you want to create, enter a name, label, and position. You can use the links under Quick Buttons to create some commonly used buttons.

Editing Button Attributes

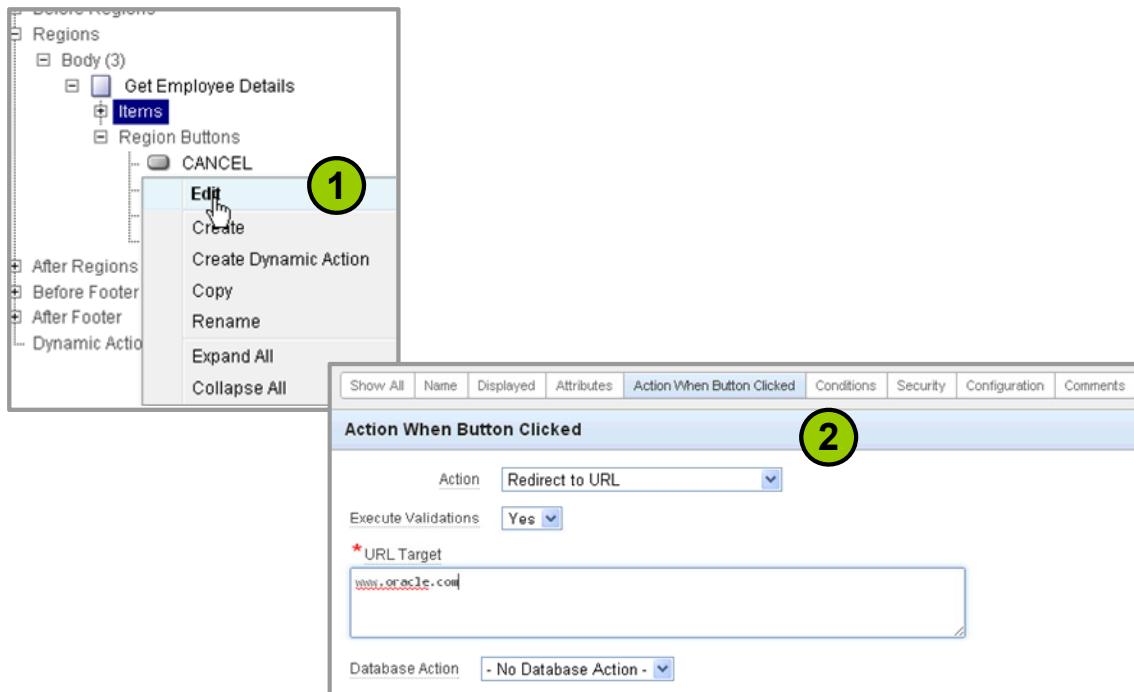


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After you create a button, you can edit its attributes on the Edit Button page. To access the Edit Button page, right-click the button node in the page definition and select Edit. You can modify the button properties and click Apply Changes to save your changes.

Modifying a Region Button to Redirect to a URL



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To edit a region button, navigate to the Page Definition and perform the following steps:

1. Right-click the button name and select Edit. (The button is listed under the Region Buttons node for the region.)
2. Click the Action When Button Clicked tab. Select “Redirect to URL” for Action and enter the URL in the text area. In the slide example, the URL that is entered is <http://www.oracle.com>.

Quiz

Which of the following statements are true about buttons?
(Choose all that apply.)

- a. You can place a button in any position defined in the region template.
- b. A button cannot branch to a URL without submitting the page.
- c. You can edit the button attributes on the Edit Button page.
- d. You can create multiple buttons at a time.



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Answer: a, c, d

Workshop 8-2 Overview: Manipulating Items on Your Desktop Pages

This practice covers the following topics:

- Creating and adding Submit and Cancel buttons to the page
- Editing item and button attributes
- Modifying the mobile form page to include some HTML5 item types



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Summary

In this lesson, you should have learned how to:

- Identify the different types of items
- Create items and edit item attributes
- Create and use lists of values
- Create buttons and edit button attributes



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In this lesson, you learned about items and buttons. You learned how to create items and buttons, as well as how to edit their attributes.

9

Understanding Session State

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Objectives

After completing this lesson, you should be able to do the following:

- Define a *session state*
- Explain how Oracle Application Express implements session state
- View session state values
- Reference a session state value
- Clear the session state

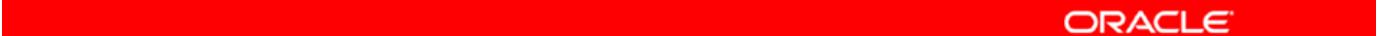


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This lesson shows you how Oracle Application Express manages the session state of an application.

Lesson Agenda

- Understanding Session State in Oracle Application Express
 - What Is a Session State?
 - What Is a Session ID?
 - What Is Session Timeout?
 - How Does Oracle Application Express Implement Session State?
 - Identifying the Parts of an Oracle Application Express URL
- Using Session State in Oracle Application Express

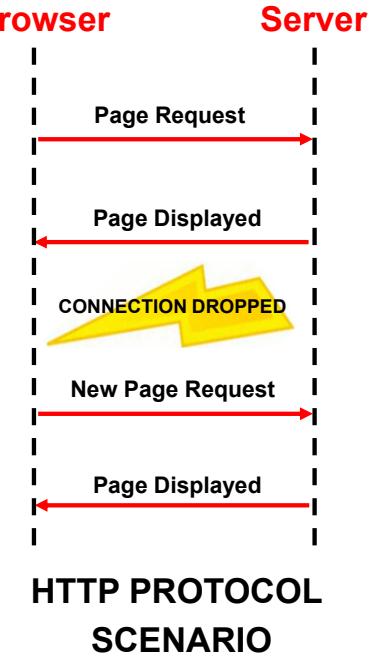
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What Is a Session State?

- HTTP protocol is:
 - Used to transfer data across the web
 - Stateless
- A *session* is a series of browser requests and server responses within a specified time.
- A *session state* is the state or value of an item in a session.



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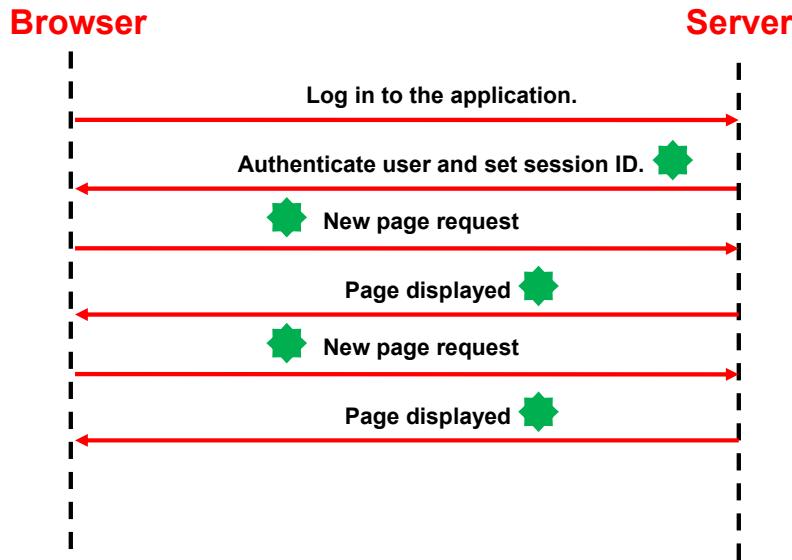
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To understand what a session state is, you must first understand what HTTP is and how it works. HTTP is the protocol that is used to transfer data across the web. HTTP is a stateless protocol. It means that each page request from a browser is treated as an independent request by the server. There is no memory or saved state between the requests.

In a web application scenario, such as an online shopping application, it is essential to maintain application state information. For example, a user fills out a web form for ordering products, then adds the items to be purchased, and finally submits the form. In this scenario, it is necessary to store the list of items in the shopping cart, and then present this list when required, such as when confirming the order. In addition, the user information must also be retrievable when necessary. To access the values that are entered on one page from a different page, some sort of management is required. A series of requests that originate from the same user by using the same web browser to a web server is called a *session*. The value of the page item during the session length is called the *session state* of the item.

Session ID

A session ID is a unique identifier that is assigned to each new session in an application.



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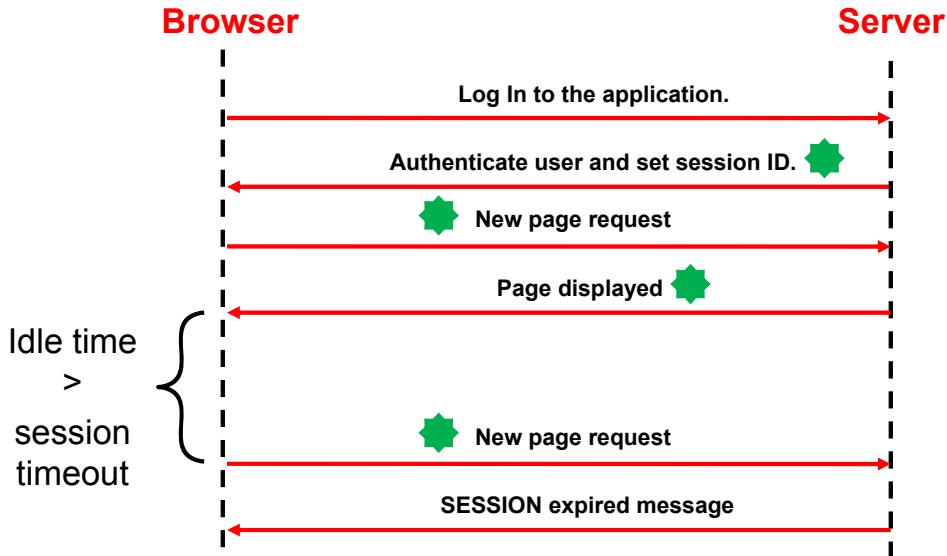
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To manage sessions and to store session state information, each session should be uniquely identifiable by the server and the browser. This is done by using session IDs. A session ID is a unique identifier for each session created in an application. For each new session that is initiated by the browser, the server assigns a session ID. This session ID is associated with subsequent page requests, establishing a session.

In the graphic in the slide, a user logs in to an application. The server authenticates the user and starts a new session. A session ID (depicted by a green symbol) is assigned to the session. Each time the browser makes a request to the server, the session ID is also sent to the server. The server uses this session ID to identify the user and maintain the session state for the user.

Session Timeout

Session timeout is the time period a session can be idle before the server terminates the session.



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Session timeout is the time period set for an application session. If the user does not request a new page or refresh the current page within the time period, the server automatically terminates the session. By configuring Session Timeout attributes, you can reduce your application's exposure. By setting the session and idle timeout, users are automatically logged out of their application after the specified timeout.

Session Timeout attributes include:

- **Maximum Session Length in Seconds** – Enter a positive integer to control how many seconds a session exists and is used by this application.
- **Session Timeout URL** - Enter an optional URL to redirect to when the maximum session lifetime has been exceeded.
- **Maximum Session Idle Time in Seconds** – Enter a positive integer to control the seconds of inactivity or idle time for sessions used by this application. The idle time is the time between one page request and the next one.
- **Idle Timeout URL** – Enter an optional URL to be redirected to when the maximum session idle time has been exceeded.

Setting Session Timeout

By configuring Session Timeout attributes, you can reduce your application's exposure.

The screenshot shows the 'Session Timeout' tab of the 'Edit Application Properties' dialog for Application 104. The 'Security' tab is selected. The 'Session Timeout' tab is active. The configuration includes:

- Maximum Session Length in Seconds: 60
- On session timeout direct to this URL: f?p=&APP_ID.:10:0:SESSION
- Maximum Session Idle Time in Seconds: 10
- On session idle time timeout direct to this URL: f?p=&APP_ID.:10:0:IDLE

Buttons at the bottom include 'Cancel' and 'Apply Changes'.



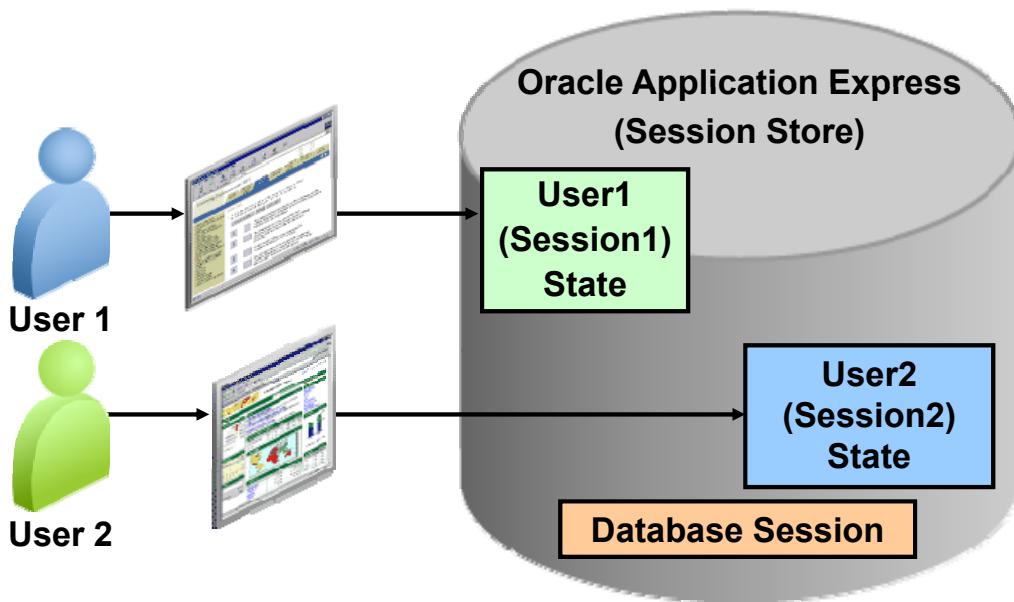
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In Oracle Application Express, you can declaratively specify session timeouts for maximum idle time and maximum session duration. To set the session timeout for an application, click the Edit Application Properties button on the application home page. Click the Security tab and then the Session Timeout tab. Set the following attributes:

- Maximum Session Length in Seconds
- On session timeout direct to this URL
- Maximum Session Idle Time in Seconds
- On session idle time timeout direct to this URL

How Does Oracle Application Express Implement Session State?

Oracle Application Express maintains session state implicitly.



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In Oracle Application Express, you do not need to write code to manage and maintain sessions or session state. Session state is maintained transparently and you can easily access session state values and manipulate them, if required.

Each time users log in to an application, Oracle Application Express assigns a unique session identifier, which is associated with users until they log out of the application. This session ID is used by the Oracle Application Express engine to store and retrieve the application's working set of data before and after each page view. This is done by comparing the session ID with the session cookie and the session record in the database. The session cookie and the session record safeguard the integrity of the session ID and the authentication status of the user.

You can view the session ID in the URL for a page request. The other visible location is on the page's HTML POST structure or in a session cookie sent by the Oracle Application Express engine during authentication and maintained for the life of the application or the browser session.

Multiple sessions can exist in the database at the same time, because Oracle Application Express treats each session independently. The session information persists in the database until it is purged. Therefore, as long as the client's session has not expired, a user can continue running the application long after having first launched it.

Oracle Application Express uses cookies to store session state. If you turn off cookies in your browser, Application Express applications will not work properly.

The cookies hold information about the application, page, and so on. If developers run multiple instances that use the same browser on one PC when they build applications, then the different browser instances interfere with each other. When switching between the two different browser screens, the tool will exhibit strange behavior, including unexpected errors. This can be avoided by developing applications by using different browsers (such as Internet Explorer and Mozilla Firefox) because each browser tool uses its own cookies.

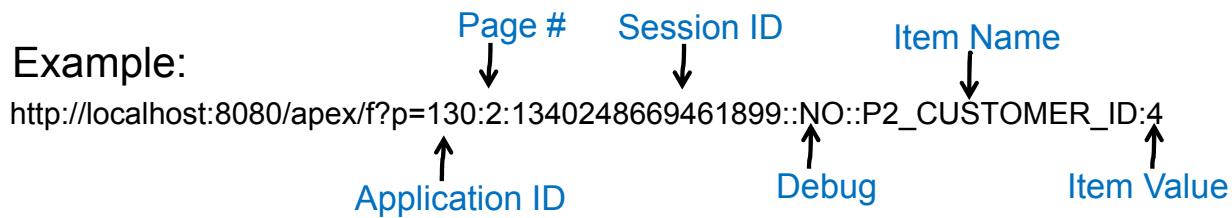
Oracle Application Express sessions are different from the Oracle database sessions that are used to service page requests. An end user runs an application in a single Oracle Application Express session from login to logout. For each page that is requested during that session, Oracle Application Express engine creates or reuses an Oracle database session to access the database resources. The Oracle Application Express engine uses the session ID to fetch the session state from the database.

Identifying the Parts of an Oracle Application Express URL

Oracle Application Express URL syntax:

1	http://<servername>:<port>/pls/apex/
2	f?p=
3	App : Page : Session :
4	Request : Debug : ClearCache :
5	itemNames : itemValues :
6	PrinterFriendly

Example:



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The slide shows the syntax of a complete URL for an application developed by using Oracle Application Express.

1. The URL starts with the address of the Oracle Application Express instance. `pls` in the URL indicates that you are using Oracle HTTP Server with `mod_plsql`. If you are using Application Express Listener or Embedded PL/SQL Gateway, `pls` is omitted.
2. `f` is the procedure that is called and `p` is the rest of the URL that is passed as parameters to the procedure.
3. `App` is the application ID or alias of the application that you want to access.
`Page` is the page number or alias of the page that you want to access.
`Session` is the identifier for the session assigned by Oracle Application Express when you log in to an application.

4. Request is set to the request attribute value of a button when it is clicked. For example, if you click a button called CREATE, CREATE is passed as request in the URL.
Debug can be set to YES (uppercase) to switch on the debug mode for your application. Every other value turns the debugger off.
ClearCache is used to set the session state values to null. To clear a page, specify the page number. To clear multiple pages, specify a comma-separated list of page numbers. You can also set the following values:
 - RP – To reset pagination
 - APP – To clear cache for all the pages and application-level items in the current application
 - SESSION – To clear cache for the current user session
5. itemNames is a comma-separated list of item names and itemValues is a comma-separated list of item values. Item values cannot include colons, but can contain commas if enclosed with backslashes. To pass a comma in an item value, enclose the characters with backslashes (for example, \123,45\).
6. PrinterFriendly can be set to YES to render the page by using the printer-friendly page template.

Quiz

What does the number **29** indicate in the following URL?

`http://localhost:9001/apex/f?p=100:29:13402486694618`

`99::NO::P29_ORDER_ID:4`

- a. Application name
- b. Session ID
- c. Page number
- d. Item value



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Answer: c

Lesson Agenda

- Understanding Session State in Oracle Application Express
- Using Session State in Oracle Application Express
 - Viewing Session State
 - Referencing Session State
 - Referencing Session State by Using Bind Variables: Example
 - Referencing Session State in Static Text: Example
 - Clearing the Cache



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Viewing Session State

The screenshot shows the 'Get Employee Details' page from Oracle Application Express. At the top, there are dropdown menus for 'Manager' (set to 'Steven') and 'Employee' (set to 'Neena'), with a 'Go' button. Below these are links for 'Neena, Lex, Nancy'. The toolbar includes buttons for 'Home', 'Application 104', 'Edit Page 16', 'Create', 'Session' (which is highlighted with a red box), 'Caching', 'View Debug', 'Debug', 'Show Edit Links', and 'Show Grid'. The main content area is titled 'Page Items' and contains two tables. The first table lists application items: P16_EMPLOYEE_ID (Hidden, Value: RESET_TO_NULL) and P16_FIRST_NAME (Select List, Value: empty). The second table lists page items: P16_EMPLOYEE_ID (Hidden, Value: 101, Status: Updated) and P16_FIRST_NAME (Select List, Value: 109, Status: Inserted).

Application	Page	Item Name	Display	Item Value	Status	Encrypted
104	16	P16_EMPLOYEE_ID	Hidden	RESET_TO_NULL	No	
104	16	P16_FIRST_NAME	Select List		RESET_TO_NULL	No

Application	Page	Item Name	Display	Item Value	Status	Encrypted
104	16	P16_EMPLOYEE_ID	Hidden	101	Updated	No
104	16	P16_FIRST_NAME	Select List	109	Inserted	No

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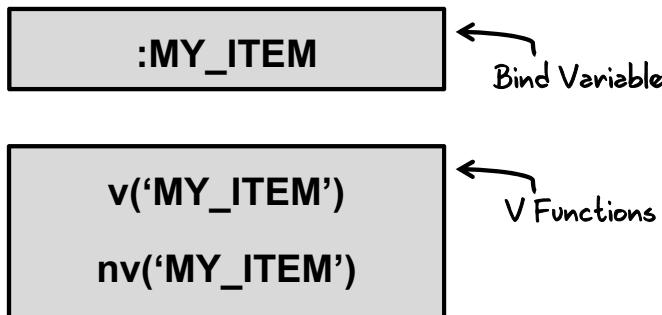
Each time you request or submit a page, Oracle Application Express automatically saves session state values. To view the session state for a page, click the Session button on the Developer toolbar. The Session State page opens in a new window and provides information about a page, such as:

- Session ID, current user, workspace ID, and the browser language
- The attributes of the page, such as the item name, how the item is displayed, the state or session ID, and the status. The status column indicates the status of the session state. The values include I (Inserted), U (Updated), and R (Reset).
- The application items that do not reside on a page. The application items are session state variables without the associated user interface properties. Application items are not used for display, but used as global variables to the application.

When you view a page for the first time, before making any changes and submitting the page, the state column on the session page displays null. After you click a button and submit the page, when you view the session page, the state column displays the item values and the status column shows that an insert operation has been performed.

Referencing Session State

Referencing session state values in SQL and PL/SQL:



Referencing session state values in static text:

&MY_ITEM.



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In many situations, you may want to reference session state values of items in regions, computations, processes, validations, and branches. You can reference the session state values by using the following:

- **SQL and PL/SQL**
 - Use the standard bind variable syntax for item names that are not longer than 30 characters. You can use this syntax for references within a SQL or PL/SQL query (for example, `:MY_ITEM`).
 - Use the `v` function to reference the item value [for example, `v ('MY_ITEM')`] if the item name is longer than 30 characters, or when you are coding a stored procedure.
 - Use the `nv` function to reference numeric items [for example, `nv ('MY_NUMERIC_ITEM')`].
- **Static text**
 - Use `&item name` followed by a period “.” (for example, `&MY_ITEM.`).

Referencing Session State by Using Bind Variables: Example

```
select * from oechr_employees  
where employee_id = :P10_EMPLOYEE
```

A SQL query used to create a report

A SQL query used to create an LOV

```
select first_name d, employee_id r  
from oechr_employees  
where manager_id = :P10_MANAGER  
order by 1
```

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There are many scenarios where you can use bind variables to reference the session state value. For example, if you want to display a report and restrict the result based on some item values entered or selected by the user, you can use bind variables to reference the item's session state value in the WHERE clause of the SQL query. Similarly, if you want to display a list of values depending on user input, you can use a bind variable in the SQL query.

In Oracle Application Express, you can use bind variables to reference the session state in any place where you use SQL or PL/SQL. Other examples of where you can use bind variables are in computations and processes.

Referencing Session State in Static Text: Example

The screenshot shows two parts of the Oracle Application Express interface.

Region Definition:

- Region: 1 of 1 Name: Details for Employee &P26_EMPLOYEE.
- Buttons: Cancel, Delete, Apply Changes, Back, Forward.
- Tab Bar: Show All, Identification, Source, User Interface, Grid Layout, Attributes, Header and Footer, Conditions, Read Only, Security, Configuration, Cache.
- Identification:**
 - Page: 27 Test Report
 - * Title: Details for Employee &P26_EMPLOYEE. (highlighted with a red box)
 - Type: SQL Query
 - exclude title from translation

Report Output:

Details for Employee 206

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
206	William	Gietz	WGIETZ	515.123.8181	07-JUN-1994	AC_ACCOUNT	8300		205	110

Download

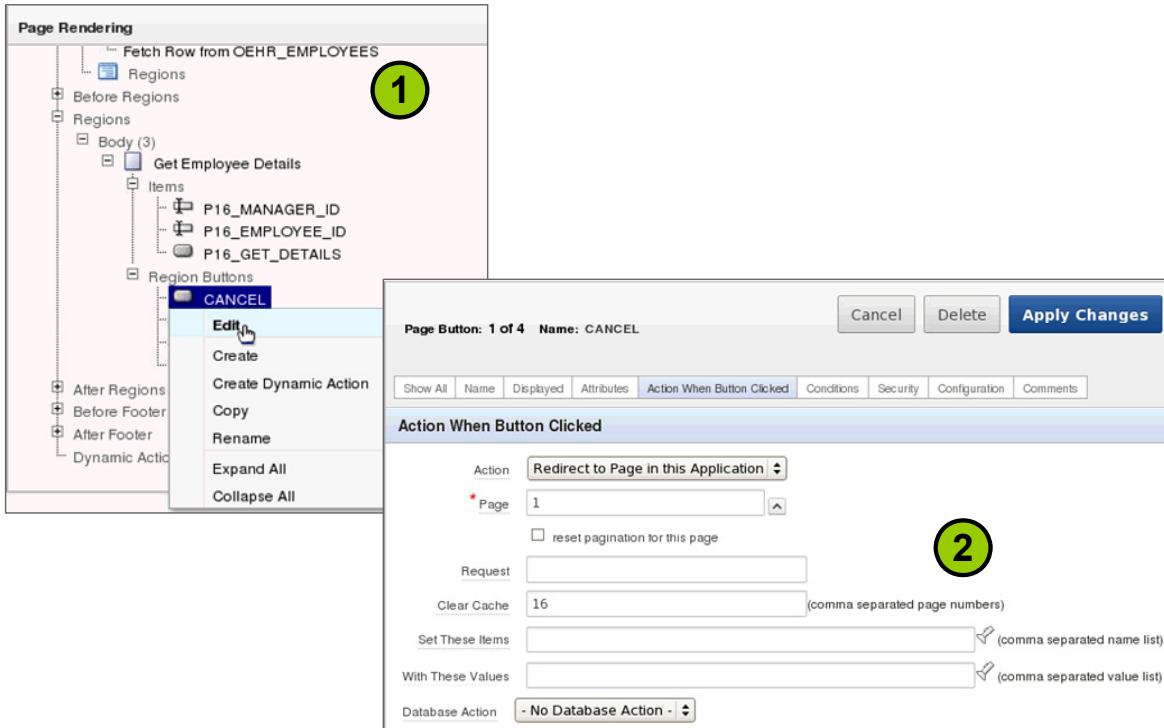
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In this example, you want to display the id of the employee whose details have been retrieved in the region title.

You can view the demonstration of viewing session state by opening the `/home/oracle/labs/demos/les09_using_session_state.html` file.

Clearing the Cache



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You can clear the session state information by using a built-in Oracle Application Express process. For example, you want to clear cache for a page when the Cancel button in a form is clicked. To clear cache, perform the following steps:

1. Right-click the button node and select Edit.
2. Click the Action When Button Clicked tab. In the Clear Cache field, enter the page number of the page for which you want to clear the cache. Click Apply Changes.

Note: To clear the cache on multiple pages, you can enter multiple page numbers in the Clear Cache field. For example, if you enter 11, 17, 18, the cache of pages 11, 17, and 18 are cleared.

Quiz

What does the number **100** indicate in the following URL?

`http://localhost:9001/apex/f?p=100:29:1340248669461899::NO
::P29_ORDER_ID:4`

- a. Application ID
- b. Session ID
- c. Page number
- d. Item value



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Answer: a

Summary

In this lesson, you should have learned how to:

- Explain what a session state is
- Explain how Oracle Application Express implements session state
- View session state values
- Reference a session state value
- Clear the session state



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In this lesson, you learned how Oracle Application Express manages the session state of an application. You also learned how to debug an application.

Workshop 9 Overview: Understanding Session State

This practice covers how session state variables work and clearing the cache in a page.



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Adding Page Processing

10

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Objectives

After completing this lesson, you should be able to do the following:

- Explain the difference between page rendering and page processing
- Create computations on application pages
- Create page processes
- Create validations to verify user input
- Create branches within an application



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This lesson explains how the Oracle Application Express engine renders and processes a page. You create computations, validations, and processes that are executed when the page is processed. You create page branches to enable navigation between pages after processing.

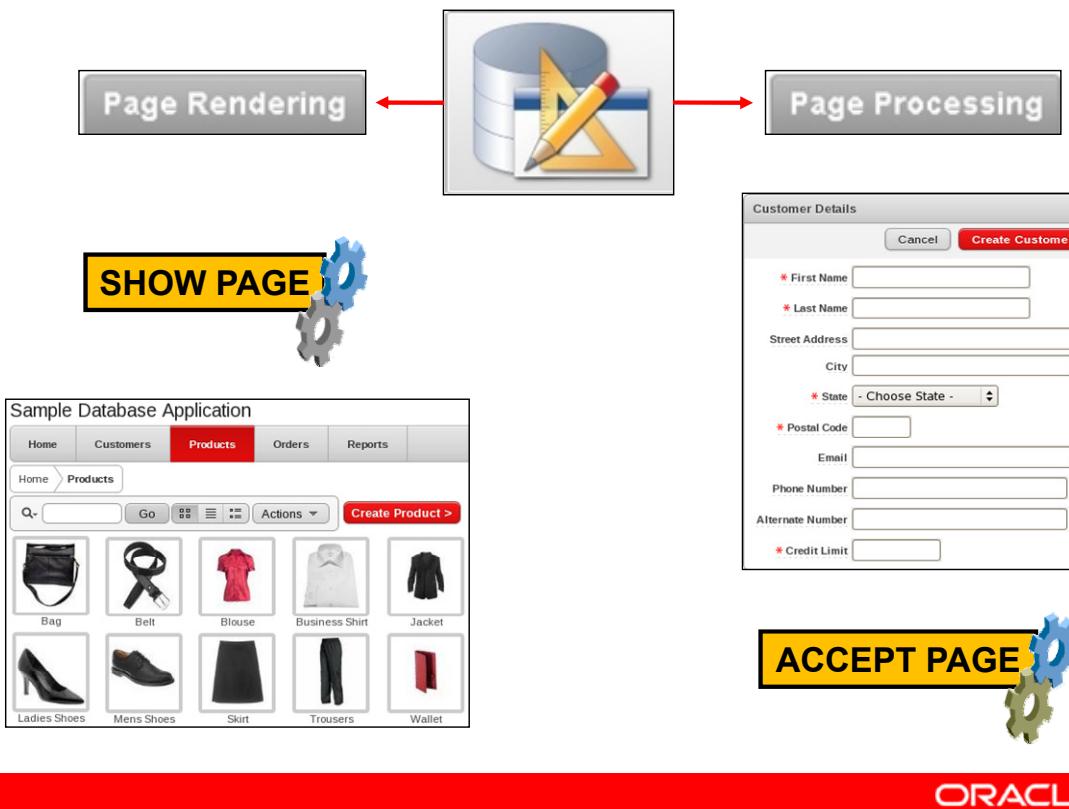
Lesson Agenda

- Introducing Page Processing
 - Page Rendering Versus Page Processing
 - Types of Logic
 - Scenarios
- Including Computations
- Including Processes
- Including Validations
- Including Branches

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Page Rendering Versus Page Processing



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Oracle Application Express performs page rendering and page processing.

Page rendering occurs when the APEX engine assembles a page from the database by using a Show Page process. For example, when you request a page by using a URL, the APEX engine runs Show Page. You use the Page Rendering section of a page definition to modify the controls that impact the rendering of a page, including page attributes, regions, buttons, items, computations, and processes.

Page processing occurs when the APEX engine executes a process by using the data submitted from a page. For page processing, the APEX engine runs an Accept Page process. Typically, a page is submitted when a user clicks a button. You use the Page Processing section of page definition to specify application logic such as computations, validations, processes, and branches.

Types of Logic

	Page Rendering	Page Processing
Computations	✓	✓
Processes	✓	✓
Validations		✓
Branching		✓



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There are four types of logic that you can perform on a page: computations, processes, validations, and branching. The point at which the logic is performed can be specified when the logic is created. If you have more than one process or computation defined at the same point, you can specify a sequence order.

Page rendering computations and processes are performed when the HTML page is assembled and displayed, whereas page-processing computations and processes are performed when the page is submitted to the APEX engine.

Scenario 1: Page Rendering

The diagram illustrates the flow of page rendering in Oracle Application Express. It shows two pages: a list page and a form page.

List Page: This page displays a grid of customer data with columns for Customer Name, Address, City, State, and ZIP Code. A red box highlights the "Create Customer >" button at the top right of the grid.

Form Page: This page is titled "Customer Details" and contains fields for First Name, Last Name, Street Address, Line 2, City, State, Postal Code, Email, Phone Number, Alternate Number, and Credit Limit. A red box highlights the "Create Customer" button at the top right of the form.

Annotations:

- A red arrow points from the "Create Customer >" button on the list page to the "Create Customer" button on the form page.
- A red arrow points from the "Cancel" button on the form page back to the list page.
- Handwritten text on the left side of the diagram says: "On Cancel, another page is rendered."
- Handwritten text on the right side of the diagram says: "Click Create Customer to view an empty form page."

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In the example in the slide, one page redirects to another page. When you click the Create Customer button, the page is submitted and a branch to a form page is invoked.

When you click the Cancel button on the form page, you are redirected to the previous page. Nothing is submitted, so there is no page processing.

Scenario 2: Page Processes

Search Nancy| Display 15 Go Reset

Report 1

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID
100	Steven	King	SKING	515.123.4567	17-JUN-1987	AD_PRES
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	AD_VP
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	AD_VP
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	IT_PROG
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	IT_PROG
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	IT_PROG
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	SA REP
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1998	IT_PROG
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	FI_MGR
109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994	FI_ACCOUNT
110	John	Chen	JCHEN	515.124.4269	28-SEP-1997	FI_ACCOUNT

Session State
Nancy

When you click Go, the page is submitted and the value is stored in a session.

Search Nancy| Display 15 Go Reset

Report 1

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	FI_MGR

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In the example in the slide, you have a report with a search bar. When you enter a search criterion and click the Go button, the page is submitted. A process stores the search value in a session state and a branch to the same page is invoked. When the page is displayed again, a process runs to display only those rows that match the value stored in the session state.

Scenario 3: Page Processes

The session value is used to fetch the row.

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing		
Lambert, Albert	10701 Lambert International Blvd.	St. Louis		
Logan, Edward	1 Harborside Drive	East Boston		
OHare, Edward "Butch"	10000 West OHare	Chicago		

Session State

ID

When you click Edit, the ID value is stored in session state, and the page is redirected.

Customer Details

First Name: Eugene
Last Name: Bradley
Street Address: Schoephoester Road
Line 2:
City: Windsor Locks
State: Connecticut
Postal Code: 06096
Email:
Phone Number: (860) 555-1835
Alternate Number:
Credit Limit: 1000

Cancel Delete Apply Changes

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This slide explains another scenario to understand page processing. In this example, you have an editable reports page. When you click the Edit icon for a row in the report, the ID value for the row is stored in session state and you are redirected to a forms page. When the form page is displayed, a process runs to fetch the row details by using the ID value stored in the session state.

Scenario 4: Page Validation

The diagram illustrates the Oracle Application Express validation process. It shows two pages: 'Customer Details' and 'Customer Record Processed'.

Customer Details Page: This page contains fields for First Name (Eugene), Last Name (Bradley), Street Address (Schoephoester Road), Line 2, City (Windsor Locks), State (Connecticut), Postal Code (06096), Email, Phone Number ((860) 555-1835), Alternate Number, and Credit Limit (1000). The 'Apply Changes' button is highlighted with a red box.

Customer Record Processed Page: This page displays a table of customer records. The table has columns: Customer Name, Address, City, State, and ZIP Code. The data is as follows:

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145
Logan, Edward	1 Harborside Drive	East Boston	MA	02128
OHare, Edward "Butch"	10000 West OHare	Chicago	IL	60666

Annotations:

- A red X is placed over the error message '1 error has occurred'.
- A green checkmark is placed over the success message 'Customer Record Processed.'
- Text on the left says: 'If you get an error, a message is displayed on the same page, and no processing or computation occurs.' A red arrow points from this text to the error message.
- Text on the right says: 'On success, the insert row process is executed, and another page is displayed.' A green arrow points from this text to the success message.

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In the example in the slide, you have a forms page. You enter the form details and click the Apply Changes button. The page is submitted and the validations that are created for the page are executed. If you entered data as required by the form and all validations run without error, a success message is displayed. In this example, an insert row process is executed and you are redirected to another page with a success message displayed in the notification area. If any validation fails, an error message is displayed.

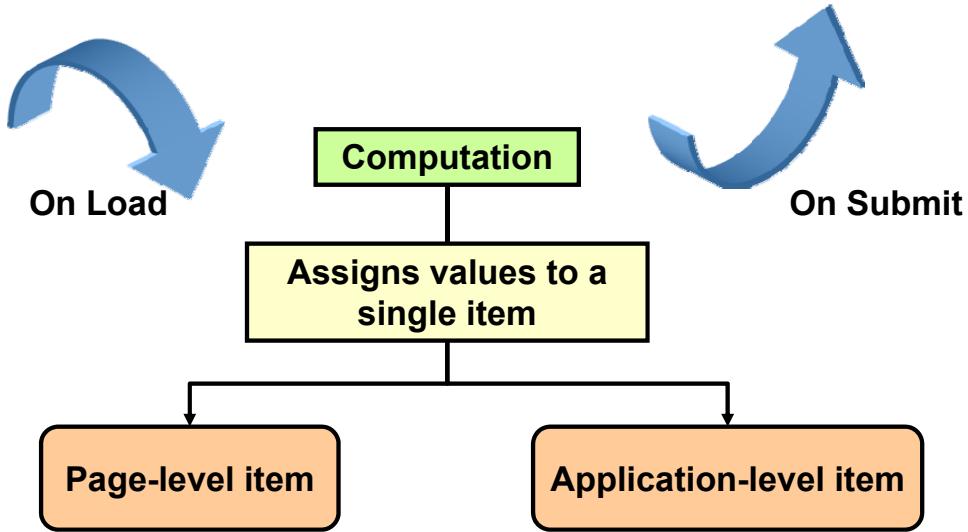
Lesson Agenda

- Introducing Page Processing
- Including Computations
 - What Is a Computation?
 - Computation Use Cases
 - Creating an On Load Computation
 - Creating an On Submit Computation
- Including Processes
- Including Validations
- Including Branches

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What Is a Computation?



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A computation is a logic that assigns values to a single item. You can create computations that are executed when a page is rendered or when a page is processed. You can use computations on page items and application-level items. Application-level computations assign a value to an application item when any page in an application is rendered or processed. A typical use of application computation is to store the number of the last page visited. In contrast, page-level computations assign a value to an identified item when a page is displayed or submitted (rendered or processed). The following slides discuss how to create page computations.

Computation Examples

- Page-rendering computations
 - You want to retrieve values (such as total order or existing orders) from the database when a page is displayed.
 - You want to set the value of an item, depending on the existing values in the database or on some conditions.
- Page-processing computations
 - You want to store the values that are entered in two or more fields in a form in a single database column.
 - You want to perform calculations (such as handling fees) based on the values (the order) entered in a form.



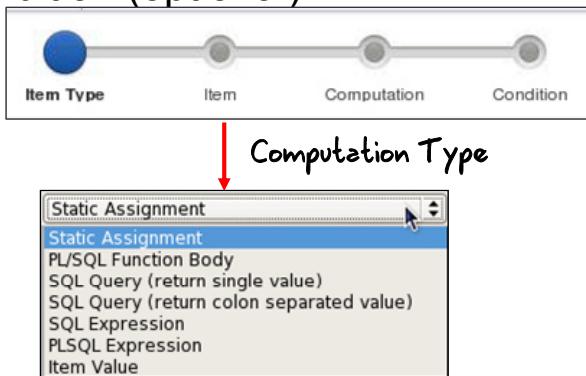
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The slide lists some scenarios when you can create page rendering or page-processing computations.

Creating Computations

Access the Create Computation Wizard, and then perform the following steps:

1. Specify the item type.
2. Select the item, computation point, and computation type.
3. Enter the computation.
4. Specify a condition (optional).



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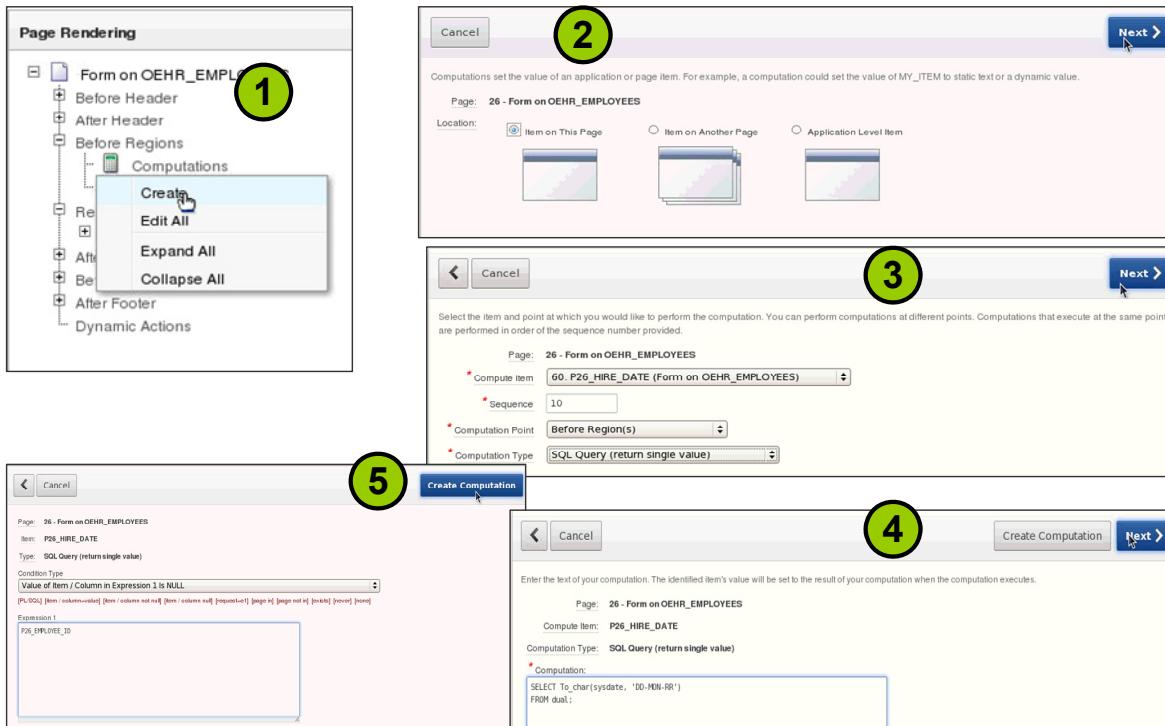
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To access the Create Computation Wizard in the Tree view, identify the node where you want to create the computation. For example, before or after a header, region, or footer in the Page Rendering section or after submit in the Page Processing section. To access the wizard in the Component view, click the create icon in the Computation section of page rendering or page processing.

To create a computation, perform the following steps:

1. Identify whether the item on which you want to create a computation is an item on the current page or a different page, or is an application item. Click Next.
2. Select the item from the list on which you want to create a computation. Specify whether the computation should be executed before or after the header, region, or footer or on submit. Select On New Instance if you want the computation to be executed for each new session. Select the type of computation that you want to create. Click Next.
3. Enter the computation to be executed. The syntax of the computation should correspond to the computation type that you selected in step 2. Click Next.
4. Optionally, add a condition. The computation will be executed only when the condition is met. Click Next.

Creating a Page-Rendering Computation



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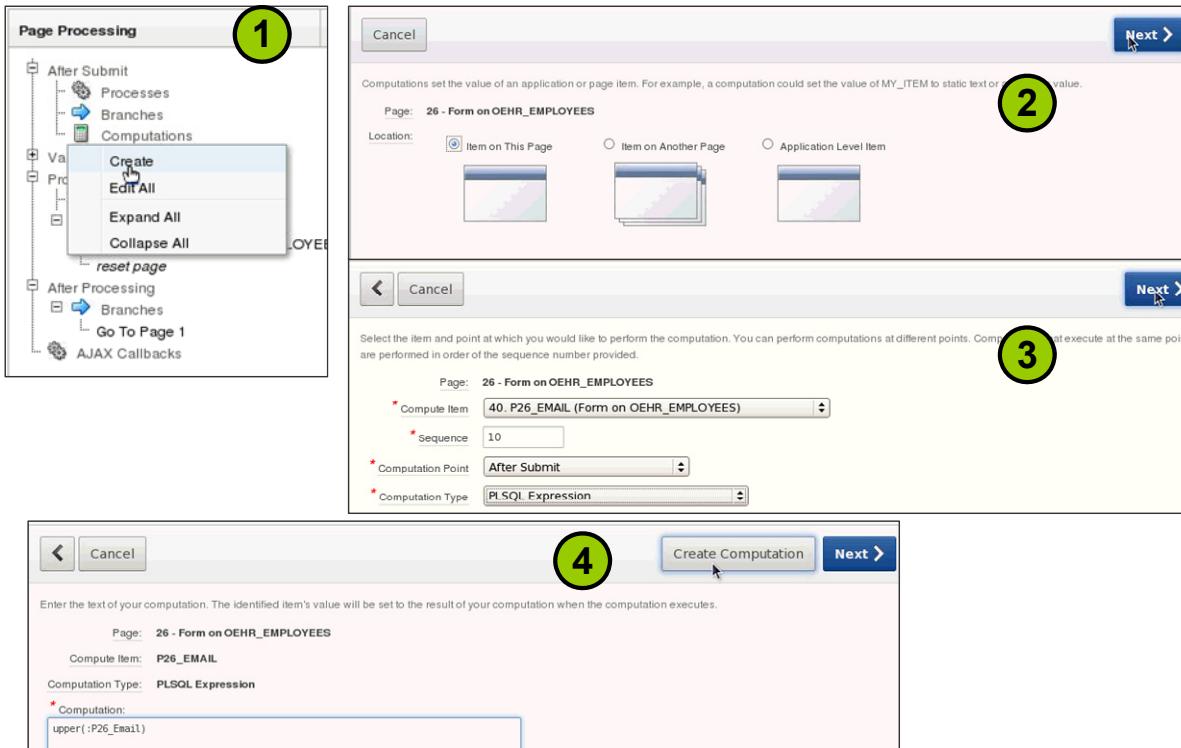
In this example, you create a computation before the regions are rendered to set the value of the hire_date field to the current date. To create this page-rendering computation, perform the following steps:

1. Right-click Computation under the Before Regions node in the Page Rendering section and select Create.
2. Select “Item on This Page.” Click Next.
3. Select P<n>_HIRE_DATE for Compute Item. Select SQL Query for Computation Type. Click Next.
4. In the Computation field, enter TO _CHAR (sysdate, ‘DD-Mon-RR’) and click Create.

The Computation is created and is listed under the Computations node.

When the hire_date item is created by the Create Form Wizard, the default value of the item Source Used is “Always, replacing any existing value in the session state.” For this example to work, you need to change this to “Only when current value in session state is null.”

Creating a Page-Processing Computation



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You can define the computations to be performed when the page is submitted from the Computations region of the Page Processing section. This computation is different from the computations of the page-rendering process.

In this example, you want to specify that `P<n>_CUST_EMAIL` that is entered should be stored in the database in uppercase. To create this page-processing computation, perform the following steps:

1. Right-click Computation under the After Submit node in the Page Processing section and click Create.
2. Select “Item on This Page” and click Next.
3. Select `P<n>_EMAIL` for Compute Item, PLSQL Expression for Computation Type, and click Next.
4. In the Computation field, enter `upper(:P<n>EMAIL)`. In this example, you do not want any conditions. Click Create to create the computation. (To specify a condition, click Next.)

The Computation is created and is listed under the Computations node.

You can view the demonstration of an example about computation by opening the `/home/oracle/labs/demos/les10_computation.html` file.

Quiz

Which of the following computation points would you select to execute the computation before the page is rendered?

- a. On New Instance
- b. Before Header
- c. After Header
- d. After Submit



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Answer: b

Lesson Agenda

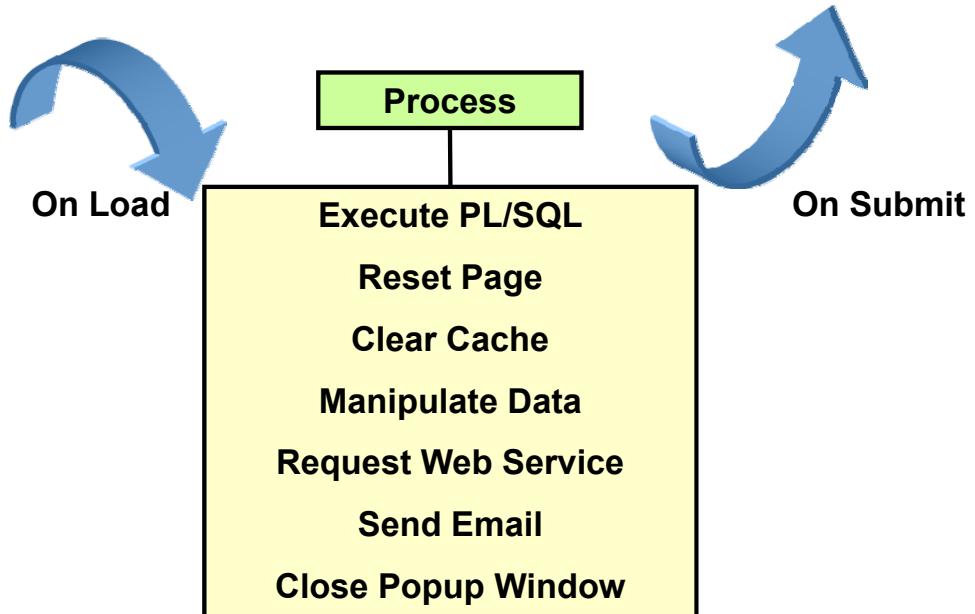
- Introducing Page Processing
- Including Computations
- Including Processes
 - What Is a Page Process?
 - Reviewing Automatically Created Processes
 - Creating an On Load Process
 - Creating an On Submit Process
 - Options to Populate Items in a Form
 - Creating a Tabular Form Process
- Including Validations
- Including Branches

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What Is a Page Process?

A page process is used to perform a specific action when a page is rendered or submitted.



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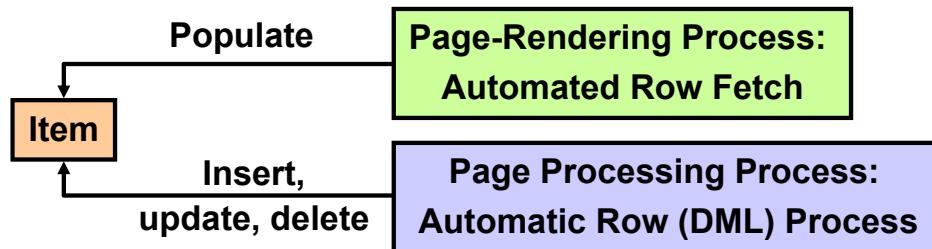
A page process is a specific event that runs when a page is loaded or submitted. You create a page process to execute some code (such as SQL or PL/SQL) or to make a call to the rendering engine. For example, you create a page process to alter data through an `INSERT`, an `UPDATE`, or a `DELETE` statement.

When you use wizards, such as Create Report or Create Form, some processes are automatically created. For example, a process to insert, update, or delete a row from the database is created when the user clicks the appropriate button. The next few slides discuss some automatically created processes.

Automatic Processing Processes

Oracle Application Express provides automatic data manipulation language (DML) processing.

- You are not required to provide any SQL code.
 - Just reference a database column.
- The processes automatically perform lost update detection.



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When you create a form by using the Create Form Wizard, the wizard creates two processes:

- The Automated Row Fetch process that is executed when a page is rendered. This process populates the items by fetching data from the database.
- The Automatic Row (DML) process that is executed when a page is submitted. This process updates the database by using the `INSERT`, `DELETE`, or `UPDATE` command.

These processes are automatic in that you must specify only the database column names and not any SQL code. They also perform lost update detection. Lost update detection ensures that data integrity in applications is maintained where data can be accessed concurrently.

Reviewing an Automated Row Fetch Process

The screenshot shows two windows from Oracle Application Express. On the left is the 'Page Rendering' tree for a page named 'Form on OEHR_EMPLOYEES'. The tree includes nodes for 'Before Header', 'After Header' (with 'Computations' and 'Processes' children), and 'Regions' (with 'Before' and 'Body' children). A context menu is open over the 'Processes' node under 'After Header', with options like 'Edit', 'Create', 'Copy', 'Rename', 'Expand All', and 'Collapse All'. On the right is the 'Edit Page Process' dialog for a process named 'Fetch Row from OEHR_EMPLOYEES'. The 'Source' tab is selected, showing details for 'Automatic Row Processing (DML)'. The configuration includes:

- Table Owner: USER01
- Table Name: OEHR_EMPLOYEES
- Item Containing Primary Key Column Value: P26_EMPLOYEE_ID
- Primary Key Column: EMPLOYEE_ID
- Item Containing Secondary Key Column Value: (empty)
- Secondary Key Column: (empty)
- Row Version Column: (empty)
- Return Key Into Item: (empty)
- Return Second Key Into Item: (empty)

At the bottom, it says 'Valid Update Request Values: APPLY%CHANGES%, GET_NEXT%, GET_PREV%'.

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An Automated Row Fetch process populates the fields in a form by retrieving data from a database table, by using a primary key column value.

To view an Automated Row Fetch process, navigate to the page definition of the page that contains a form created by the Create Form Wizard. Perform the following steps:

1. In the Page Rendering section, right-click “Fetch Row from <table_name>” under the After Header node and select Edit.
2. The Edit Page Process page opens. You can view the process details. Click the Source tab. The table name, item name, and column name are listed.

Reviewing an Automatic Row (DML) Processing Process

The screenshot shows two windows related to page processing:

- Left Window (Page Processing):** A tree view of page processing steps. Under the "Processing" node, there is a "Processes" branch which contains "Process Row of OEHR_EMPLOYEES". This item is selected and has a context menu open with options: Edit, Create, Copy, Rename, Expand All, and Collapse All. The "Edit" option is highlighted.
- Right Window (Edit Page Process):** A detailed configuration screen for the selected process. The title bar says "Process: 2 of 3 Name: Process Row of OEHR_EMPLOYEE". The "Source: Automatic Row Processing (DML)" tab is selected. The configuration fields include:
 - Table Owner: USER01
 - Table Name: OEHR_EMPLOYEES
 - Item Containing Primary Key Column Value: P26_EMPLOYEE_ID
 - Primary Key Column: EMPLOYEE_ID
 - Secondary Key Column: (empty)
 - Row Version Column: (empty)
 - Allowed Operations: Insert, Update, Delete (all checked)
 - Return Key Into Item: (empty)
 - Return Second Key Into Item: (empty)
 - Valid Update Request Values: SAVE, APPLY CHANGES, UPDATE, UPDATE ROW, CHANGE, APPLY, APPLY%CHANGES%, GET_NEXT%, GET_PREV%
 - Valid Insert Request Values: INSERT, CREATE, CREATE AGAIN, CREATEAGAIN
 - Valid Delete Request Values: DELETE, REMOVE, DELETE ROW, DROP

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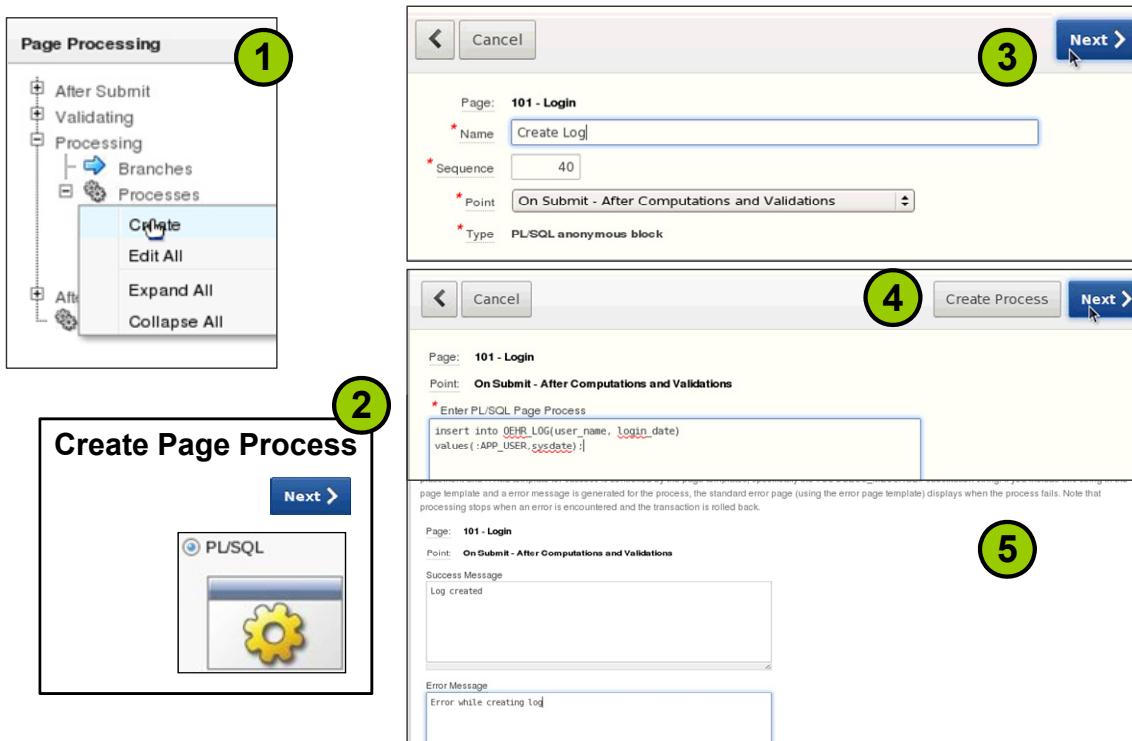
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An Automatic Row Processing (DML) process updates the database.

To view an Automated Row (DML) process, navigate to the page definition of the page that contains a form created by the Create Form Wizard. Perform the following steps:

1. In the Page Processing section, right-click “Process row of <table_name>” under the Processing node and select Edit.
2. The Edit Page Process page opens. You can view the process details. Click the Source tab. The table name, item name, column name, and the operations that are allowed on the table are listed.

Creating an On Submit Process



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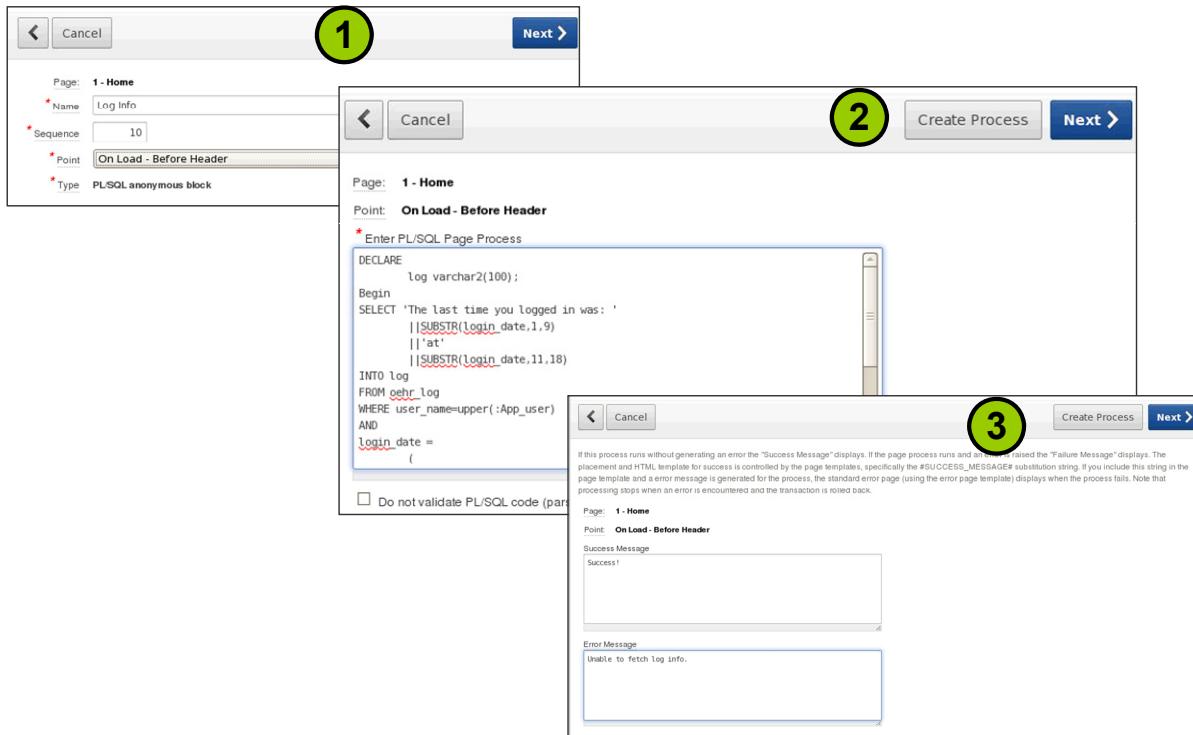
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In this example, you create an On Submit process to perform a logging function. Whenever users log in to the application, you want to store the user's name, and the login date and time in a database table. To create the page process, perform the following steps:

1. From the page definition for the Login page, right-click the Processes node under Processing in the Page Processing section and select Create.
2. Select PL/SQL for process type and click Next.
3. Enter a name for your process and accept the other default values. Click Next.
4. Enter the PL/SQL code in the text area. In this example, an `INSERT` command to enter the application username (`:APP_USER`) and the date/time information (`sysdate`) into an `OEHR_LOG` table is entered.
5. Enter the Success and Failure messages. Click Create Process. Optionally, you can specify a condition for executing the process by clicking Next.

You can view the demonstration of creating an On Submit process by opening the `/home/oracle/labs/demos/les10_processes.html` file.

Creating an On Load Process



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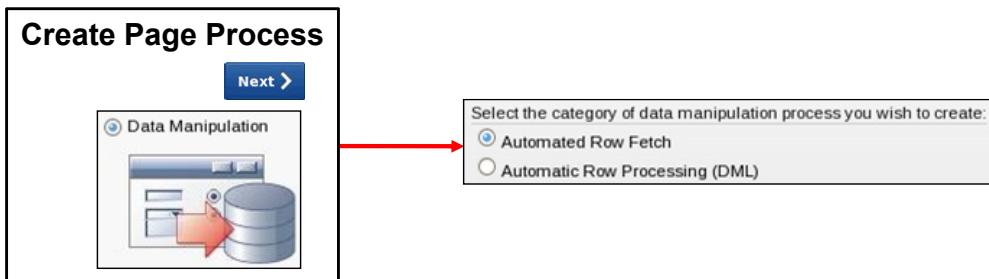
In this example, you create an On Load process to retrieve the date and time that a user last logged in to the application. To create the page process, navigate to the page definition for the page where you want to display the details. Right-click the Processes node under Before Regions in the Page Rendering section and select Create. Select PL/SQL for the process type, click Next, and then perform the following steps:

1. Enter a name for your process and accept the other default values. Click Next.
2. Enter the PL/SQL code in the text area. In this example, a SELECT query to retrieve the date and time that the user last logged in is entered.
3. Enter the Success and Failure messages. Click Create Process. Optionally, you can specify a condition for executing the process by clicking Next.

Options to Populate Items in a Form

Items in forms are populated in one of the following ways:

- Create a form by using the wizard, and an Automated Row Fetch process is created automatically.
- Create a page-rendering process manually and define the type as Automated Row Fetch.
- Populate the form manually by referencing an item in a session state.



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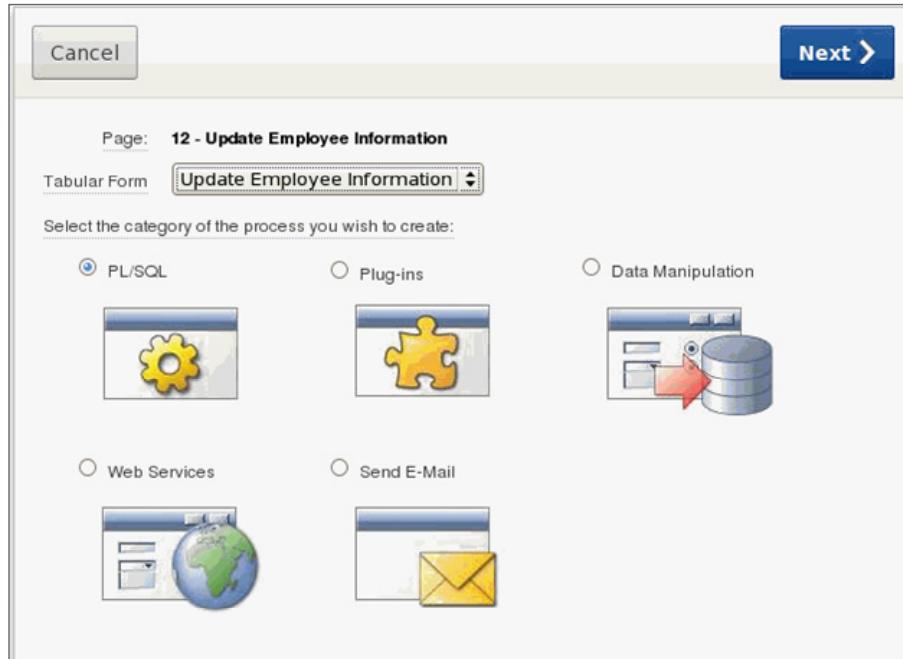
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In the previous slides, you reviewed the Automated Row Fetch process and also saw how to create a page process. To populate items in a form, you can use the Create Form Wizard so that the wizard automatically creates the required processes for you. Using the Create Form Wizard was covered in the lesson titled “Creating Forms.”

You can also create your own process. For this, you must select the Data Manipulation process type in the Create Page Process Wizard. You can then use the available options to create an automated process.

Alternatively, you can also populate the form manually by referencing an item in a session state.

Creating a Tabular Form Process



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You can create processes on tabular forms. Perform the following steps:

1. Navigate to the page definition where the tabular form is created.
2. Select the Processes node, depending on when you want the process to execute.
3. Right-click the Processes node and select Create.
4. Select the tabular form from the Tabular Form list.
5. Select the type of process that you want to create and follow the wizard instructions.

Lesson Agenda

- Introducing Page Processing
- Including Computations
- Including Processes
- Including Validations
 - What Are Validations?
 - Using the Create Validation Wizard
 - Creating a SQL Validation
 - Creating a PL/SQL Validation
 - Creating an Item String Comparison Validation
 - Creating a Regular Expression Validation
 - Creating a Tabular Form Validation
- Including Branches

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What Are Validations?

The screenshot shows a web-based application titled "Order Management". In the top right corner, there is a user session indicator for "teach_admin" and a "Logout" link. A modal dialog box is displayed, indicating "2 errors have occurred" with a yellow warning icon. The errors listed are:

- Last Name must have some value. ([Go to error](#))
- Credit Limit should be less than 5000 ([Go to error](#))

The main form is titled "Customer Details" and contains the following fields:

Field	Value
First Name *	Diane
Last Name *	(empty)
State	MI
Postal Code	48933
Email	Diane.Higgins@TANGER.COM
Credit Limit	6000

Red validation messages are displayed below the Last Name and Credit Limit fields:

Last Name must have some value.

Credit Limit should be less than 5000

At the bottom right of the form, there are "Cancel", "Delete", and "Create Customer" buttons.

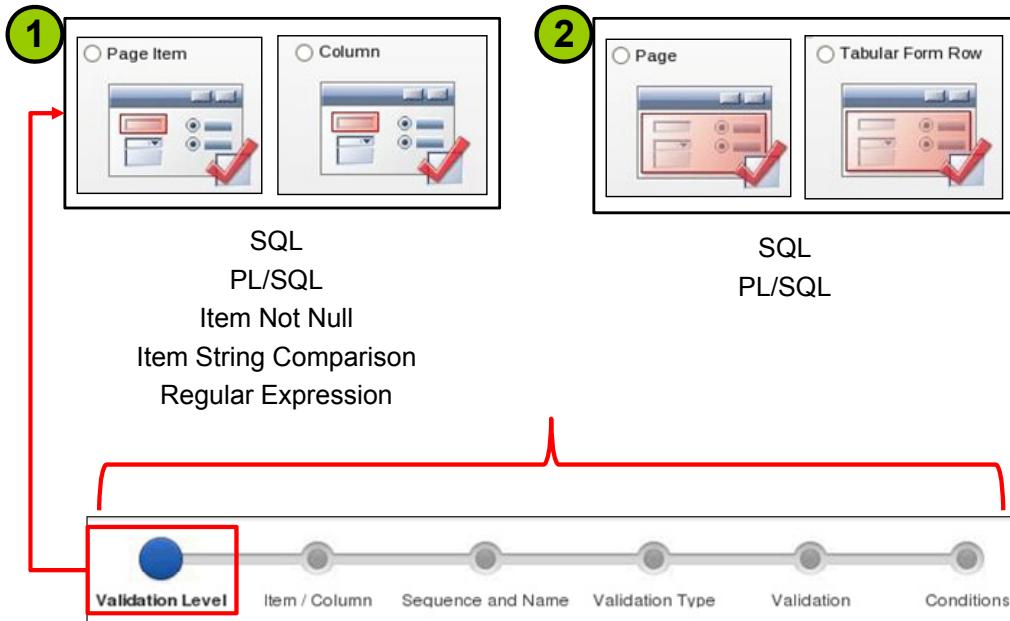
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A validation is a logical control to verify data. You create validations to ensure that an application user enters valid and accurate data. If all the validations created on the page succeed, Oracle Application Express proceeds to the next step of processing; otherwise, Oracle Application Express redraws the page and displays the items along with the validation messages.

When you use the Create Form Wizard, some validations are automatically created. For example, a Not Null validation is created for items that refer to a database column that is defined as Not Null. Similarly, if the database column is of type NUMBER, a validation to confirm that only numeric values are entered is created.

The slide example shows a form created by using the Create Form Wizard. The Not Null validations are created automatically by the wizard. The form also displays a red symbol for items that have their columns set as Not Null. A validation for the Credit Limit field is manually created to ensure that a value higher than 5000 is not entered.

Using the Create Validation Wizard



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You can define a validation declaratively by using the Create Validation Wizard. To access the Create Validation Wizard, navigate to the page definition of the page where you want to create the validation. In the Page Processing section, right-click Validations under the validating node and select Create.

You can create two types of validations, depending on your form type:

- **Page Item/Column validation:** This validation is specific to a single item. If you select this option, the items on the current page are listed and you can choose the item that you want to validate. You can select from five methods, as listed in the slide, to define the validation. In the next few slides, you will see the creation of validations by using four of the methods. How to create a Not Null validation is not discussed. You can actually specify an item to be Not Null in the attributes of the item itself. If your form is a tabular form, you can create a validation on an entire column.
- **Page/Tabular Form Row validation:** This validation does not apply to any single item. It applies to an entire page. For a tabular form, it applies to a row. These validations can be of type SQL or PL/SQL.

The validation that you enter must be consistent with the validation type that you select.

SQL Validation: Example

Create a validation to ensure that the salary entered is not a negative number.

The screenshot shows a form titled "OEHR Employees". At the top, a message box displays "1 error has occurred" with the sub-item "Salary should be greater than zero! (Go to error)". The form contains fields for First Name (Jackson), Last Name (Lord), Email (JACKSON.LORD@ORACLE.COM), Phone Number, Hire Date (12-Oct-11), Salary (-250), Commission Pct, Manager Id, Department Id, and Job Id (AC_ACCOUNT). The "Salary" field has a red validation message "Salary should be greater than zero!" next to it. Buttons for "Cancel" and "Create" are visible at the top right.

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In this example, you create a validation to ensure that the value entered in the Salary field is not a negative value. You will display the error message in the notification area and next to the Salary item.

Creating a SQL Validation

Step 1: Validation Name: Salary not negative
Error Display Location: **Select where to display the error.**

Step 2: Validation Type: SQL Expression

Step 3: Validation Type: SQL Expression

Step 4: Validation Code: :P5_SALARY > 0
Error Message: Salary should be greater than zero!

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To create a SQL validation, access the Create Validation Wizard. Select Page Item Validation and click Next. Select the salary item and click Next. Perform the following steps:

1. Enter a name for the validation and from the Error Display Location drop-down list, select a location to display the error. In this example, “Inline with Field and in Notification” is selected. Click Next.
2. Select SQL and click Next.
3. Select the type of SQL validation that you want to create and click Next. In this example, SQL Expression is selected.
4. Enter the validation and the error message. In this example, the value of the salary item should be greater than zero. Therefore, `:P<n>_SALARY > 0` ; is entered. Click Create.

Run the form and fill in the details. In the Salary field, enter a negative number and click Apply Changes. You should get an error message in the notification area and next to the Salary item.

PL/SQL Validation: Example

Create a validation to calculate the maximum salary and to ensure that the salary entered is not more than 10% of the maximum salary.

The screenshot shows a form titled "OEHR Employees". At the top, a red message box displays "1 error has occurred". The form contains fields for First Name (Jackson), Last Name (Lord), Email (JACKSON.LORD@ORACLE.COM), Phone Number, Hire Date (12-Oct-11), Salary (100000), Commission Pct, Manager Id, Department Id, and Job Id Id (AC_ACCOUNT). A validation error message "Salary entered is out of range." is displayed next to the Salary field, indicating that the entered value exceeds the maximum allowed.

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In this example, you want to make sure that the salary entered is not higher than 10% of the maximum salary. You will display the error message only next to the Salary item.

Creating a PL/SQL Validation

The figure consists of four screenshots of the Oracle APEX Create Validation Wizard, each with a green circle containing a number indicating the step:

- Screenshot 1:** Step 1 of 4. Shows the validation details: Page: 27, Item: P27_SALARY, Sequence: 10, Validation Name: Calculate Salary, and Error Display Location: Inline with Field and in Notification.
- Screenshot 2:** Step 2 of 4. Shows the validation type selection: PL/SQL is selected, while Not Null, String Comparison, Regular Expression, SQL, and Function Returning Error Text are not selected.
- Screenshot 3:** Step 3 of 4. Shows the validation type selection again, with Function Returning Boolean selected.
- Screenshot 4:** Step 4 of 4. Shows the validation code and error message. The validation code retrieves the maximum salary from the OEHR_EMPLOYEES table and compares it to 1.1 times the entered salary. The error message is "Salary entered is out of range".

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To create a PL/SQL validation, access the Create Validation Wizard. Select Page Item Validation and click Next. Select the salary item and click Next. Perform the following steps:

1. Enter a name for the validation, and from the Error Display Location drop-down list, select a location to display the error. In this example, “Inline with Field and in Notification” is selected. Click Next.
2. Select PL/SQL and click Next.
3. Select the type of PL/SQL validation that you want to create and click Next. In this example, Function Returning Boolean is selected.
4. Enter the validation code and the error message. In this example, the maximum salary is retrieved. The value entered in the Salary field is compared to a value 10% higher than the maximum salary. If the entered salary is less than the calculated value, `true` is returned; otherwise, `false` is returned. Click Create.

Run the form and fill in the details. In the Salary field, enter 100000 and click Apply Changes. You should get an error message next to the Salary item.

Item String Comparison Validation: Example

Create a validation to ensure that the specified special characters are not entered in the Email field.

The screenshot shows a modal dialog box titled "1 error has occurred" with the message "• You can not specify special characters. (Go to error)". Below the dialog is the "OEHR Employees" form. The form fields are as follows:

Field	Value
First Name	Jackson
* Last Name	Lord
* Email	JACKSON-LORD@ORACLE.COM
Phone Number	
* Hire Date	12-Oct-11
Salary	2000
Commission Pct	
Manager Id	
Department Id	
Job Id Id	AC_ACCOUNT



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In this example, you want to make sure that the Email field does not contain special characters, which are ' , " , * , & , ^ , \$, # , - , and | . You will display the error message only in the notification area.

Creating an Item String Comparison Validation

Step 1: Enter validation details. Page: 27, Item: P27_EMAIL, Sequence: 20, Validation Name: No special characters in email, Error Display Location: Inline with Field and in Notification.

Step 2: Select validation type. Validation Type: Item / Column in Expression 1 does not contain any of the characters in Expression 2. Options: NOT NULL, String Comparison (selected), Regular Expression, SQL, PL/SQL.

Step 3: Pick the type of validation you wish to create. Condition: Item / Column in Expression 1 does not contain any of the characters in Expression 2.

Step 4: Enter validation details. Validation Type: Item / Column in Expression 1 does not contain any of the characters in Expression 2. Expression 2: ',^,&,^,\$,#,-,|. Error Message: You cannot specify special characters. Always Execute: No.

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To create an Item String Comparison validation, access the Create Validation Wizard. Select Page Item Validation and click Next. Select the email item and click Next. Perform the following steps:

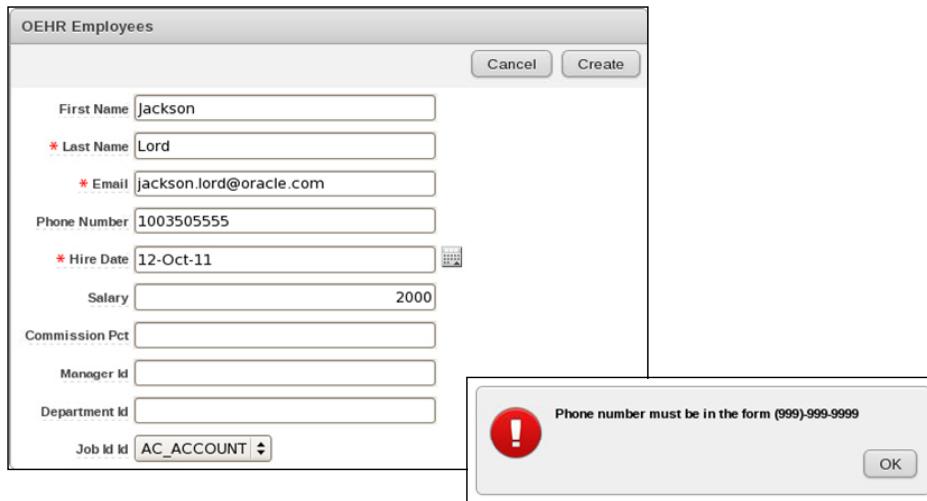
1. Enter a name for the validation and from the Error Display Location drop-down list, select a location to display the error. In this example, “Inline in Notification” is selected. Click Next.
2. Select String Comparison and click Next.
3. Select the type of comparison that you want to perform and click Next. In this example, “Item in Expression 1 does not contain any of the characters in Expression 2” is selected.
4. Enter the special characters in the Validate String2 field. In this example, (', ", *, ^, \$, #, -, |) are entered. Enter the error message text. Click Next.

Optionally, specify a condition and click Create. Run the form and fill in the details. In the Email field, enter jackson-lord@aol.com and click Apply Changes. You should get an error message in the notification area.

You can view the demonstration of this task by opening the /home/oracle/labs/demos/les10_validations.html file.

Regular Expression Validation: Example

Create a validation to ensure that the phone number is entered in a particular format.



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In this example, you want the phone number to be entered in this particular format: 999.999.9999. You will display the error message on the Error Page.

Creating a Regular Expression Validation

The figure consists of three screenshots of the Oracle APEX Create Validation Wizard, each with a green circle numbered 1, 2, or 3 indicating the step:

- Screenshot 1:** Step 1 of the wizard. It shows the validation details: Item: P27_PHONE_NUMBER, Sequence: 30, Validation Name: Phone Number Format, and Error Display Location: Inline with Field and in Notification. A red box highlights the 'Validation Name' field.
- Screenshot 2:** Step 2 of the wizard. It shows the validation type selection. The 'Regular Expression' option is selected, indicated by a red arrow pointing from the previous screenshot's validation name to this screen's validation type section.
- Screenshot 3:** Step 3 of the wizard. It shows the validation configuration. The 'Regular Expression' field contains the pattern `^(\d{3})-(\d{3})-(\d{4})$`. The 'Error Message' field contains the text 'Phone number must be in the form (999)-999-9999'. A red box highlights the search icon next to the Regular Expression field, which is used to select the 'Phone Number, US, 999.999.9999' expression from a pop-up window.

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To create a Regular Expression validation, access the Create Validation Wizard. Select Item Level Validation and click Next. Select the phone number item and click Next. Perform the following steps:

1. Enter a name for the validation and select a location to display the error. In this example, “Inline with Field and in Notification” is selected. Click Next.
2. Select Regular Expression and click Next.
3. Select an expression. You can click the search icon next to the Regular Expression field and select an expression from the pop-up window. In this example, Phone Number, US, 999.999.9999 is selected. This specifies the format in which the phone number can be entered in this field. Enter the error message text. Click Create.

Run the form and fill in the details. In the Phone Number field, enter 100305000 or any other invalid format and click Apply Changes. The Error Page should appear and display the error message.

Tabular Form Validation: Example

Create a validation to ensure that the value entered in the Email column has no spaces.

The screenshot shows a tabular form with the following data:

Employee Id	First Name	Last Name	Email	Hire Date	Department Id	Job Id Id
198	Donald	OConnell	DO CONNEL	21-JUN-99	50	SH_CLERK
199	Douglas	Grant	DGRANT	13-JAN-00	50	SH_CLERK
200	Jennifer	Whalen	JWHALEN	17-SEP-87	10	AD_ASST
201	Michael	Hartstein	MHARTSTE	17-FEB-96	20	MK_MAN
202	Pat	Fay	PFAY	17-AUG-97	20	MK_REP
203	Susan	Mavris	SMAVRIS	07-JUN-94	40	HR_REP

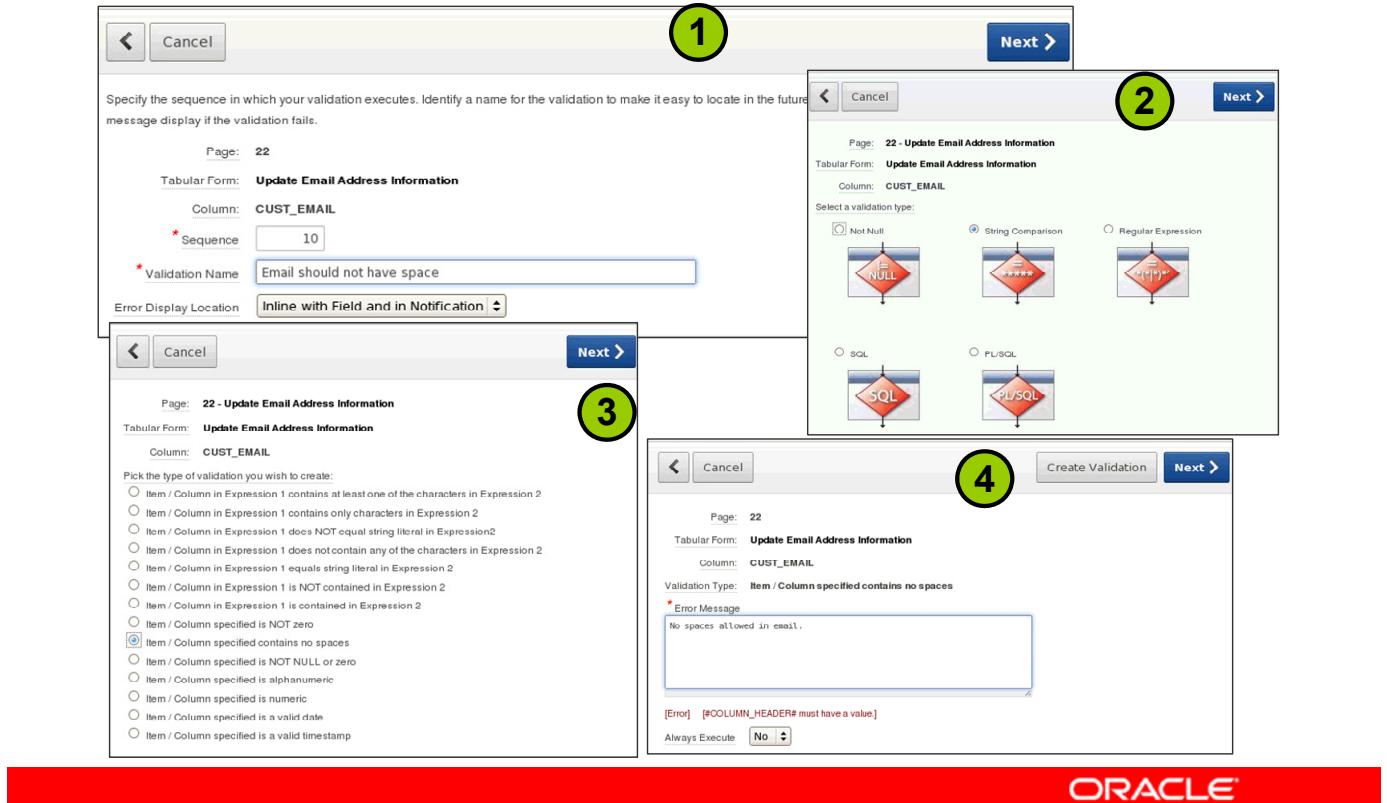
A validation message box at the top says "1 error has occurred" with the sub-message "No spaces allowed in email (Row 1)".

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In this example, you want to ensure that the value entered in the Email column does not have any spaces.

Note: Remember that a Tabular Form Validation can be created only on a page that contains a tabular form. Also, when you create a tabular form by using a wizard, it automatically creates some validations (such as not null, column must be numeric, and valid date), based on the column definition in the database.

Creating a Tabular Form Validation



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To create a Tabular Form validation, access the Create Validation Wizard. Select Tabular Form from the list. Select Column type and click Next. Select the email item and click Next. Perform the following steps:

1. Enter the validation name and select the location to display the error message. In this example, “Inline with Field and in Notification” is selected. Click Next.
2. Select a validation and click Next. In this example, String Comparison is selected.
3. Select the comparison type and click Next. In this example, “Column specified contains no spaces” is selected.
4. Specify the error message and click Next.

Specify a condition if necessary, and click Create. Run the page. In the Email field, for any row, enter a space in the value and click Apply Changes. The error message should be displayed in the notification area.

Quiz

Which of the following is *not* a validation method?

- a. PL/SQL
- b. Item Level Null
- c. HTML
- d. Regular Expression



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Answer: c

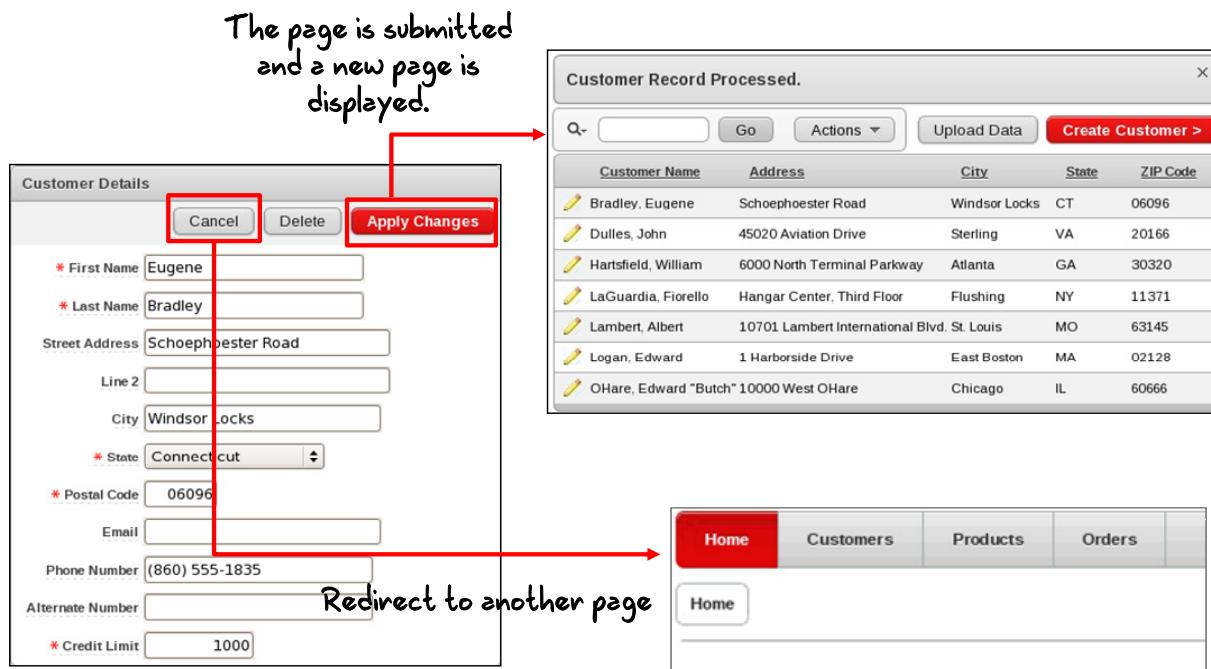
Lesson Agenda

- Introducing Page Processing
- Including Computations
- Including Processes
- Including Validations
- Including Branches
 - What Is Branching?
 - Creating a Branch



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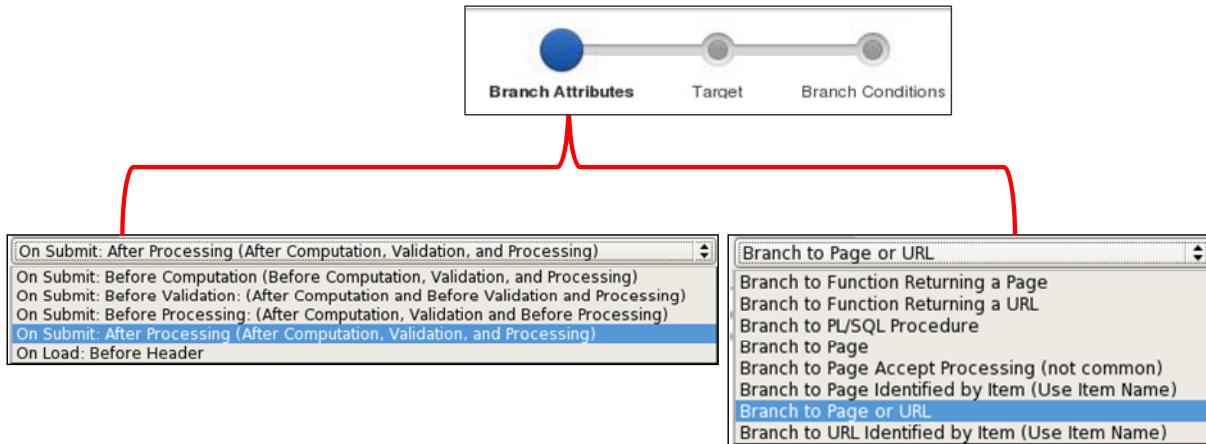
What Is Branching?



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A branch is an instruction executed in the Oracle Application Express engine to take the user from one page to another page, a URL, or a procedure. For example, you have a form page that accepts values from the user. After the form page is submitted, the Oracle Application Express engine executes the branch that navigates the user to another page. If the Cancel button is clicked, no processing occurs and the user is redirected to another page.

Creating a Branch



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You can create a new branch by running the Create Page Branch Wizard and specifying the branch point and branch type. The branch points and branch types are shown in the slide. To access the Create Branch Wizard, right-click the branch node from the Page Processing section and click Create.

Creating a Branch

The figure consists of three vertically stacked screenshots of the Oracle Application Express Create Branch Wizard, each with a green numbered circle indicating the step:

- Step 1:** The first screen shows the basic configuration for a new branch. It includes fields for Name (About Branching), Sequence (11), Branch Point (On Submit: After Processing (After Computation, Validation, and Processing)), and Branch Type (Branch to Page). A link to Existing Branches is also present.
- Step 2:** The second screen shows the selection of the page to branch to. The Branch to Page field contains '1' and '[2]'. Below it are two checkboxes: 'branch to page using redirect' (checked) and 'include process success message' (unchecked).
- Step 3:** The third screen shows the detailed configuration for the branch action. It specifies Page: 4 - Update Email Address Information, Branch Point: On Submit: After Processing (After Computation, Validation, and Processing), Branch Type: Branch to Page, and Branch Action: f?p=&APP_ID.:1:&SESSION::&DEBUG.&success_msg=#SUCCESS_MSG#. It also shows the 'When Button Pressed' dropdown set to 'SAVE (Apply Changes)' and a 'Condition Type' section with a placeholder '- Select Condition Type -'.

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In this example, a branch to another page is created on submit, after computations, processes, and validations. To create the branch, access the Create Branch Wizard and perform the following steps:

1. Select the branch point and the branch type. Click Next.
2. Enter the page or URL to branch to. Click Next.
3. Specify conditions, if any, and click Create Branch.

Summary

In this lesson, you should have learned to:

- Explain the difference between page rendering and page processing
- Create computations on application pages
- Create page processes
- Create validations to verify user input
- Create branches within an application



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This lesson explained the difference between page rendering and page processing. You should also have learned how to create computations, processes, and validations.

Workshop 10 Overview: Creating and Manipulating Computations, Processes and Validations

This practice covers the following topics:

- Creating an On Load computation
- Creating an On Submit computation
- Creating an On Submit process
- Validating Form Items



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11

Validating and Debugging Your Application

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Objectives

After completing this lesson, you should be able to do the following:

- Use the Advisor to verify your application
- Manage user interface defaults by using the Attribute Dictionary
- Use the Debug option to debug your application



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In this lesson, you learn how to use the Advisor to verify your application, manage user interface defaults by using Attribute Dictionary and debug your applications using the Debug option.

Lesson Agenda

- Using the Advisor
 - Resolving Advisor Errors/Warnings
- Managing Your Attribute Dictionary
- Using the Debug Option



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Using the Advisor

The screenshot shows the Oracle Application Express Advisor interface. At the top, there's a toolbar with buttons for 'Perform Check' and 'Check Page(s)'. Below that is a section titled 'Checks to Perform' with two columns: 'Errors:' and 'Performance:'. Under 'Errors:', there are several checked items like 'References with Substitution Syntax' and 'Is Valid SQL or PL/SQL Code'. Under 'Performance:', there's one checked item: 'Function used in SQL Statements'. To the right of these is a 'Usability:' section with checked items like 'Associated Item or Column is Associated for Current Component' and 'Report has Default Order'. Below these sections is a 'Quality Assurance:' section with checked items like 'Hardcoded Application ID' and 'Page Item has Help Text'. At the bottom of this main panel are buttons for 'Select All' and 'Deselect All'. To the right of this main panel is a small icon of three overlapping documents with a green checkmark, labeled 'Advisor'. Below the main panel is a 'Filter Result' section with a checkbox for 'Error (1)' which is checked. Underneath this are two tables of results.

Applications > 108 - Order Management > Pages > 8 - Top Tier Salary > Regions > Top Tier Salary
Attribute: Region Source (Identifies the source of the region, reference Region Source Type)
Check: Report has Default Order
Category: Quality Assurance
Message: Report does not have a default order.
Value:
<pre>select * from (select OHR_EMPLOYEES.LAST_NAME as LAST_NAME, OHR_EMPLOYEES.EMAIL as EMAIL, OHR_EMPLOYEES.SALARY as SALARY from OHR_EMPLOYEES OHR_EMPLOYEES where OHR_EMPLOYEES.SALARY Between 5000 and 12000) where 1=1 and (upper(:LAST_NAME),upper(nvl(:P8_REPORT_SEARCH,:LAST_NAME))) > 0 or upper(:EMAIL),upper(nvl(:P8_REPORT_SEARCH,:EMAIL))) > 0</pre>
View

Applications > 108 - Order Management > Pages > 10 - Customer Address List > Regions > Customer Address List
Attribute: Region Source (Identifies the source of the region, reference Region Source Type)
Check: Report has Default Order
Category: Quality Assurance
Message: Report does not have a default order.
Value:
<pre>SELECT "OHR_CUSTOMERS"."CUST_FIRST_NAME" "CUST_FIRST_NAME", "OHR_CUSTOMERS"."CUST_LAST_NAME" "CUST_LAST_NAME"</pre>

A red box highlights the 'View' link in the first table's 'Value' column. A callout arrow points from the text 'A list of issues is displayed based on your selections.' to this 'View' link.

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Before deploying your application, you can use the Oracle Application Express Advisor (Advisor) to perform various sanity checks on your application.

The Advisor enables you to check the integrity and quality of your Oracle Application Express application. The Advisor functions like a compiler or LINT flagging suspicious behavior or errors. (LINT is a utility that examines and analyzes programs for style, usage, and portability issues.) By running the Advisor, you can check the integrity of your application based on the underlying metadata.

The Advisor performs several checks on your application or pages in your application, including programming errors, security issues, quality assurance, and other best practices.

After the Advisor is executed, your previous settings are recalled for the next use. You can also save the settings without executing by using the “Save as My Preferences” task in the Task menu.

To not perform a check on a particular violation, deselect the check box next to the violation. When there are no violations, you receive a message indicating that no errors or warnings were found.

In the example in the slide, you see that errors and quality assurance violations were found. You can click the View link for each violation to go to the page where you can correct the issue and then return to the Advisor to recheck. In the screenshot in the slide, a quality assurance anomaly was detected because there is a report that does not contain a default order.

Note that many of the checks are for informational purposes only and do not need to be resolved before deploying your application (unless you choose to do so).

To run the Advisor on an entire application, perform the following steps:

1. Navigate to your application.
 1. On the Workspace home page, click the Application Builder icon.
 2. Select your application.
2. Click Utilities.
3. Click Advisor.

Resolving Advisor Errors/Warnings

The screenshot shows the 'Report Attributes' tab selected in the Region Definition interface. In the Identification section, the title is set to 'Top Tier Salary' and the type is 'SQL Query'. A callout points to the 'Sort Sequence' column in the 'Column Attributes' table, which is highlighted with a red box. The table lists columns LAST_NAME, EMAIL, and SALARY with their respective sort sequences (1, -1, 1).

Specify a sort sequence for a column in your report.

Alias	Link	Edit	Heading	Column Width	Column Alignment	Heading Alignment	Show	Sum	Sort	Sort Sequence
LAST_NAME	LAST_NAME				left	left	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1
EMAIL	EMAIL				left	left	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-1
SALARY	SALARY				left	left	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1

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You can click the View link (visible in the screenshot in the previous slide); the Report definition for the page is displayed. To define the sort sequence, click the Report Attributes tab and select the sort sequence for one of the columns (in this case, FIRST_NAME) and click Apply Changes. Rerun the Advisor to see that the violation is no longer in the list.

You can view the demonstration about using the Advisor by opening the `/home/oracle/labs/demos/les11_using_advisor.html` file.

Quiz

You must resolve all errors and warnings before deploying your application.

- a. True
- b. False



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Answer: b

Workshop 11-1 Overview: Using the Advisor

This workshop covers the following topics:

- Running the Advisor and correcting the warning
- Change the settings in the Advisor



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Lesson Agenda

- Using the Advisor
- Managing Your Attribute Dictionary
 - Changing Item Properties
 - Review Items/Report Columns
 - Modifying Attributes in the Dictionary
- Using the Debug Option

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Managing Your Attribute Dictionary

View a list of pages that contain items and report columns.

Page	Name	Page Type	Group Name	Displayed Items	Displayed Report Columns
0	Global Page - jQuery Mobile Smartphone	Global Page	Unassigned	0	0
1	Home	Home	Unassigned	0	0
2	Home	Navigation Page	Unassigned	0	0
3	Customers	Interactive Report	Unassigned	0	14
4	Employee Commission	Interactive Report	Unassigned	0	4
8	Top Tier Salary	Report	Unassigned	2	3
10	Customer Address List	Report	Unassigned	0	6
14	Items and Buttons	DML Form	Unassigned	11	0
15	Customer Details	DML Form	Unassigned	7	0
18	List of Orders	Report	Unassigned	0	7
19	Master Detail	DML Form	Unassigned	8	4
22	Update Email Address Information	Tabular Form	Unassigned	0	3
23	Global Page - Desktop	Global Page	Unassigned	0	0
25	Customer Feedback	Navigation Form	Unassigned	3	0
101	Login	Login	Unassigned	2	0
201	Employee List	Static HTML	Unassigned	0	0
202	Employee Detail	DML Form	Unassigned	10	0
1001	Login	Login	Unassigned	2	0

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The Attribute Dictionary contains a set of attributes about a column that are used in creating forms and reports. The definitions are matched by column name and a particular definition can be shared by several columns by using synonyms.

You can use Page Item and Report Column definitions to update the Attribute Dictionary. You can also use the Attribute Dictionary to update page items and report columns.

Hidden objects, those in hidden regions, and button items are not counted in the number of candidate items and report columns, because these are not used in the updates.

Select the page that you want to work with. You can also access the Attribute Dictionary for a particular page by navigating to the page definition and selecting Utilities > Attribute Dictionary.

Reviewing Items and Report Columns

Page Items	
Update Page  • 0 Items for update	
Update Attribute Dictionary  • Review 10 Items for insert into the Attribute Dictionary • 0 Items for update of the Attribute Dictionary	
Summary	
Total Page Items	11
Displayed Items	10
Potential New Entries	10
Potential Updates	0
Identical Attributes	0

Report Columns	
Update Page  • 0 Report Columns for update	
Update Attribute Dictionary  • 0 Items for insert into the Attribute Dictionary • 0 Report Columns for update of the Attribute Dictionary	
Summary	

Review the list of items or report columns. Determine which attributes to include in the Attribute Dictionary.

Page: 19 - Master Detail Cancel **Update Attribute Dictionary**

Include in Update: Label Help Text General Format Mask Default
 Form Format Mask Width Height Data Type

Region	Item	Will Become	Label	Format Mask	Help Text	Default	Width	Height	
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_CUSTOMER_ID	CUSTOMER_ID	Customer Id	-	-	-	30	1
<input checked="" type="checkbox"/>	Edit_OEHR_ORDERS	P19_ORDER_DATE	ORDER_DATE	Order Date	-	TIMESTAMP WITH LOCAL...	-	-	-
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_ORDER_ID_COUNT	ORDER_ID_COUNT	-	-	-	-	30	-
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_ORDER_MODE	ORDER_MODE	Order Mode	-	CHECK constraint	-	30	1
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_ORDER_STATUS	ORDER_STATUS	Order Status	-	0: Not fully entered...	-	30	1
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_ORDER_TOTAL	ORDER_TOTAL	Order Total	-	CHECK constraint	-	30	1
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_PROMOTION_ID	PROMOTION_ID	Promotion Id	-	Sales promotion ID...	-	30	1
<input type="checkbox"/>	Edit_OEHR_ORDERS	P19_SALES_REP_ID	SALES_REP_ID	Sales Rep Id	-	References oehr_empl...	-	30	1



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When you create an item on a page or create a report, you must review and evaluate which attributes you want to update in the dictionary. In the slide example, you want to update the Attribute Dictionary with all the attributes (such as Label and Help text) for the P19_ORDER_DATE item. Select the check box for the appropriate row and click Update Attribute Dictionary. The page number prefix is removed when the Attribute Dictionary entry is created. For example, P19_ORDER_DATE becomes ORDER_DATE.

Modifying Attributes in the Dictionary

You can modify attributes in the Attribute Dictionary using SQL Workshop utilities.

The Help Text field contains the text "Date when the Order was placed. A not null column."

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User Interface Defaults enable you to assign default user interface properties for regions and items. The wizard enables you to specify whether you want to use user interface defaults if they exist. When you create a form or report by using a wizard, the wizard uses this information to create default values for region and item properties. Using user interface defaults can save valuable development time and has the added benefit of providing consistency across multiple pages in an application. User interface defaults are divided into two categories: the Table Dictionary and the Attribute Dictionary.

- The Table Dictionary enables you to specify defaults for tables and columns that are initialized from the database definition.
- The Attribute Dictionary enables you to create defaults based on attribute or column names (and thereby usable for all tables). Attribute definitions can also have synonyms, allowing more than one attribute to share a common definition.

The Table Dictionary takes priority over the Attribute Dictionary when user interface defaults are used during creation of pages and regions. If a table-and-column combination exists, that combination is used rather than an attribute definition of the same name.

This can be useful, for example, when you want to have a specific label or Help text for the `CREATED_BY` column in the `EMP` table. However, use more generic defaults for `CREATED_BY` in another table.

To view a list of the columns in the Attribute Dictionary, select SQL Workshop > User Interface Defaults and click the Attribute Dictionary tab. To make changes to a column, click the Edit icon for the column, make your changes, and click Apply Changes.

You can view the demonstration about managing attribute dictionary by opening the `/home/oracle/labs/demos/les11_managing_attribute_dictionary.html` file.

Quiz

Nancy wants to apply the same Help text to all her Order Status items on all pages in her application. What must she do to make this happen? (Choose all that apply.)

- a. Add an item on a page with the Help text.
- b. Add a table with a new Status column.
- c. Review the column and update the directory.
- d. Create a new page with the column already in the dictionary.



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Answer: a, b, d

Workshop 11-2 Overview: Managing Your Attribute Dictionary

This workshop covers the following topics:

- Adding items from a page to the Attribute Dictionary
- Updating the Attribute Dictionary for the items
- Using the User Interface defaults in a new form.



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Lesson Agenda

- Using the Advisor
- Managing Your Attribute Dictionary
- Using the Debug Option
 - What Is the Debug Option?
 - Enabling and Disabling Debug Mode
 - Viewing the Debug Messages
 - Troubleshooting Issues

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What Is the Debug Option?

The Debug option is used to:

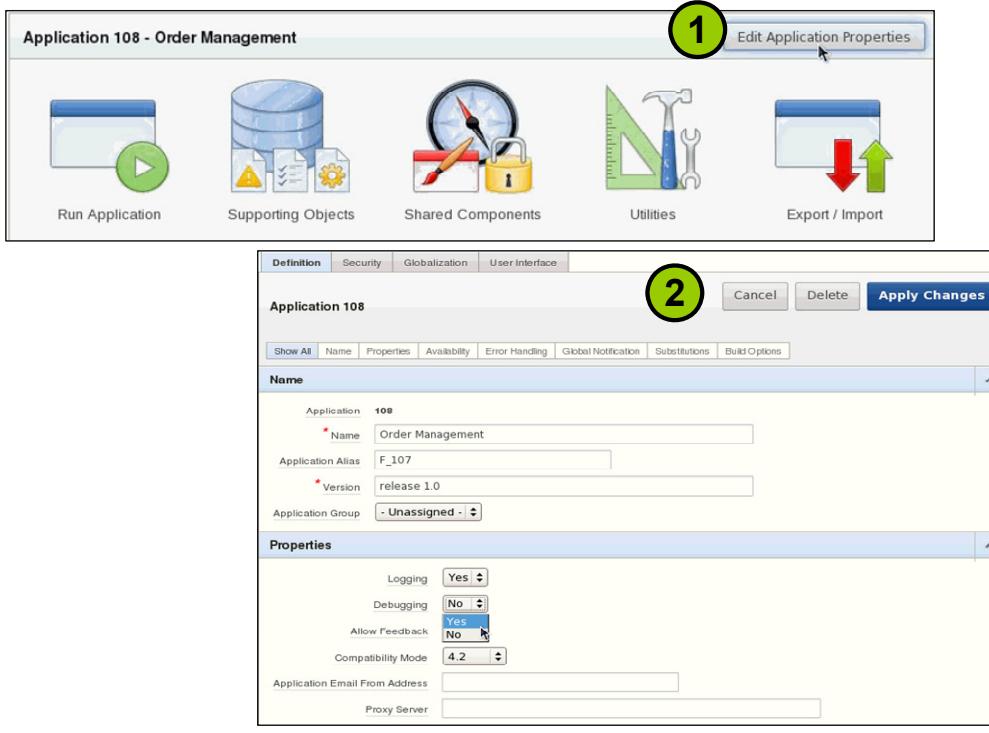
- View the processing details of a page
- Check the performance of a page



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The Debug mode is a built-in mechanism used to track down unexpected application behavior. The debug option is used at run time to view the processing of a page. It provides useful information about what is happening in the background. In addition, it can be used to check the performance of a given page so that the performance can be tuned.

Enabling and Disabling Debug Mode



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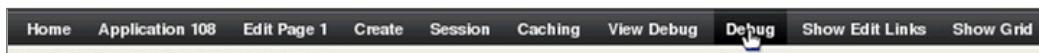
You can configure whether end users can run the application in debug mode by using the Debugging attribute on the Edit Application Definition page. Running an application in debug mode is useful when an application is under development. If the application is run from the Application Express development environment, debugging can always be enabled. A developer who is logged into the application's workspace can always run the application in debug mode. To enable or disable debugging feature in your application during development, perform the following steps:

1. On the application's home page, click the Edit Application Properties button.
2. Click the Properties tab, select Yes for Debugging, and click Apply Changes.

To disable the debugging option for an application, perform the same steps and set the debugging field to No.

Debugging an Application

Turning debug mode ON



Click Debug.

Set the Debug argument to YES.

<http://localhost:8080/apex/f?p=108:1:3505293171146720::YES::>

Turning debug mode OFF



Click No Debug.

Set the Debug argument to NO.

<http://localhost:8080/apex/f?p=108:1:3505293171146720::NO::>

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You can turn on debug mode for an application at run time by using one of the following methods:

- Click the Debug link on the Developer toolbar.
- Set the Debug attribute in the URL to YES.

To turn off debug mode, use one of the following methods:

- Click the No Debug link on the Developer toolbar.
- Set the Debug attribute in the URL to NO.

Note: Before you want to debug a page, you should click the Debug option before you make any changes because the page will be reset when you do this. For example. If you make a change to a form, then click Debug. The page will be reset back to the original values in session state allowing you not to lose the changes you made.

Viewing the Debug Messages: SHOW Application

The screenshot shows the Oracle Application Express interface with the 'View Debug' button highlighted in the toolbar. Below the toolbar, there are two main sections. The top section displays a grid of application details, with the 'View Identifier' column containing the value '21' highlighted by a red box. The bottom section shows a detailed view of debug messages for this identifier, also with the 'Message' column highlighted by a red box. The Oracle logo is visible at the bottom right.

View Identifier	Session Id	User	Application	Page	Path Info	Entries	Timestamp
21	7693612875498	USER01	108	1	show	106	7 minutes ago

Elapsed	Execution	Message	Level	Graph
0.03843	0.00013	S H O W : application=“108” page=“1” workspace=“” session=“7693612875498”	4	
0.03855	0.00030	Reset NLS settings	4	
0.03884	0.00019	alter session set NLS_LANGUAGE=“AMERICAN”	4	

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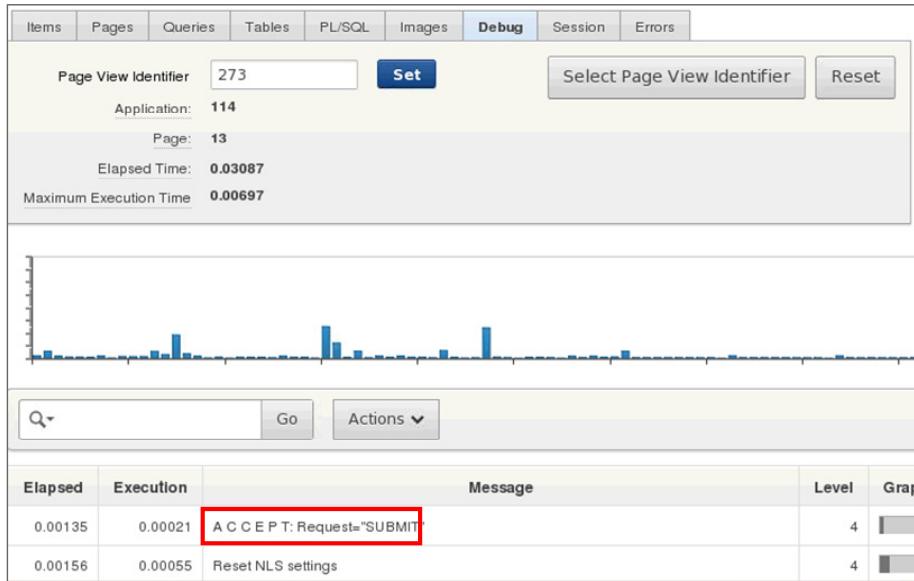
When a page is rendered, a set of messages is displayed under “SHOW application.” The messages displayed include the following (in the order in which they appear):

- NLS Language messages
- Authentication messages
- Session state messages
- BEFORE_HEADER and AFTER_HEADER processing messages for any branching, computations, and processes
- Region
- Item
- BEFORE_FOOTER and AFTER_FOOTER processing messages for any branching, computations, and processes

In addition to the preceding messages, the timing is displayed to make it clear how long each process is taking.

In the slide example, after a page is displayed, you click the View Debug button on the Developer toolbar. The Debug messages are shown. You can place the cursor over the graph to view additional details.

Viewing the Debug Messages: ACCEPT Request



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When values in a form have been changed and submitted, ACCEPT Request messages are displayed before the SHOW application. When the debug option is enabled, the following messages appear in the following order:

- NLS Language messages
- Session state messages
- ON_SUBMIT_BEFORE_COMPUTATION process
- BEFORE_COMPUTATION branch
- AFTER_SUBMIT computation
- BEFORE_VALIDATION branch
- BEFORE_PROCESSING branch
- AFTER_SUBMIT process
- AFTER_PROCESSING branch

In the slide example, you click a SUBMIT button, and then click the View Debug button on the Developer toolbar. The Debug messages are displayed.

You can view the demonstration about using the Debug option by opening the /home/oracle/labs/demos/les11_debugging.html file.

Troubleshooting Issues

Scenario

Employee Id	First Name	Last Name	Customer Id	Email	Department
155	Oliver	Tuvault	104	OTUVULT	Sales
155	Oliver	Tuvault	105	OTUVULT	Sales

localhost:8080/apex/f?p=131:4:3585470173806::NO::P4_EMPLOYEE_ID:155

Debug Example

Employee Detail

Employee Id *

First Name

Last Name

Email

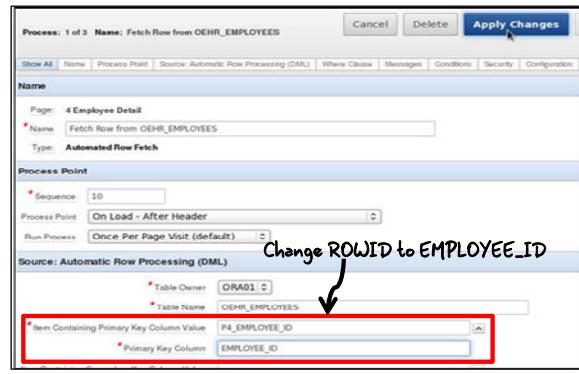
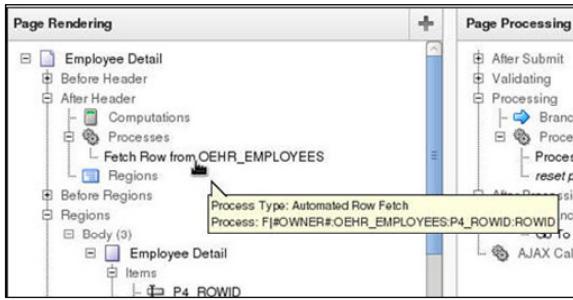
Phone Number

Hire Date

Job Id

Salary

Solution



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Consider an example where you have an Employee Details form that is linked to an Employee Report. When you pass values to the form by using the edit link in the report, you notice that the form fetches a row that uses the ROWID as the primary key column. However, the link in the report specifies a value for EMPLOYEE_ID as the primary key. You will find that the form does not display any values. This is due to a mismatch in the column used as the primary key. You can fix this issue by changing the primary key column in the form from ROWID to EMPLOYEE_ID, which will display the values in the form.

Workshop 11-3 Overview: Debugging Your Application

This workshop covers the following topics:

- Enabling debugging in your application
- Turning debug on
- Modifying a record
- Viewing the results
- Troubleshooting issues



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Summary

In this lesson, you should have learned how to:

- Use the Advisor to verify your application
- Manage user interface defaults by using the Attribute Dictionary
- Use the Debug Option



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In this lesson, you learnt about using the Advisor, managing user interface defaults using the Attribute Dictionary and also use the Debug option.

12

Adding Shared Components That Aid Navigation

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Objectives

After completing this lesson, you should be able to do the following:

- Explain the use of shared components in an application
- Create and edit the following navigational shared components in an application:
 - Parent and standard tabs
 - Navigation bar entries
 - Lists
 - Breadcrumbs



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In this lesson, you learn how to create, edit, and use navigational shared components (tabs, navigation bars, lists, and breadcrumbs) in your application.

Lesson Agenda

- Introducing Shared Components
 - What Are Shared Components?
 - Navigational Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar



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What Are Shared Components?

Shared Components Page

Page Definition

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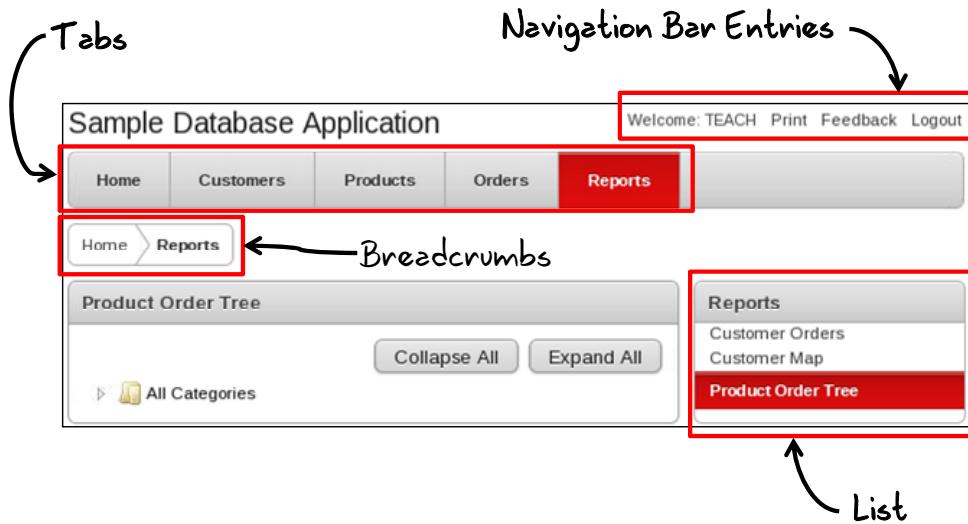
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Shared components are components that can be included on one or more pages of your application. The Shared Components Page screenshot in the slide shows the categories of shared components that you can include in your application.

In the Shared Components section of a page's definition (shown in the Page Definition screenshot in the slide), you can view the shared components that are included on that page.

In this lesson, you learn how to create navigational shared components: tabs, lists, breadcrumbs, and navigation bar entries.

Navigational Shared Components



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An application typically uses a combination of tabs, lists, navigation bars, and breadcrumbs.

- Tabs are used to provide navigation between the major components of an application.
- A list is a collection of links. Each list entry is associated with a page.
- Breadcrumbs are a hierarchical list of links. They show you where you are within the application.
- A navigation bar is used to link text or an image to a page. You need not reference it on every page (as you must do with the other navigational shared components). An application can have only one navigation bar.

The slide shows the Sample Application interface. Home, Customers, Products, Orders, Reports are the tabs. Print, Feedback, and Logout links at the top-right of the page are the navigation bar entries. Home > Reports are the breadcrumbs used to go back and forth between the pages within the application's major components. The Reports section on the right is a list. Thus, you can use a combination of tabs, lists, navigation bars, and breadcrumbs to navigate within an application.

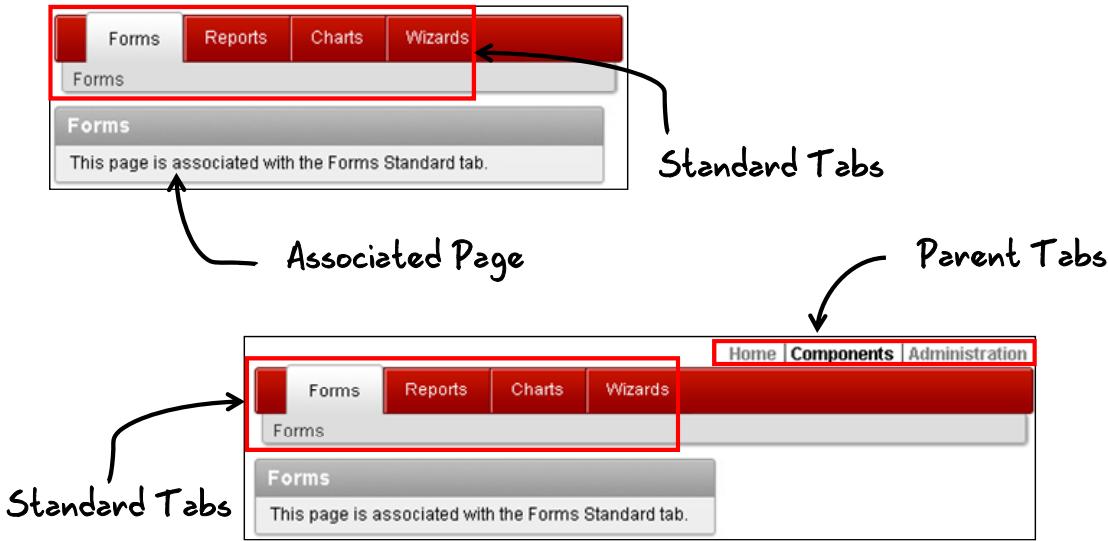
Lesson Agenda

- Using Shared Components
- Creating Tabs
 - Types of Tabs
 - Creating a Tab Set
 - Adding Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar

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Types of Tabs



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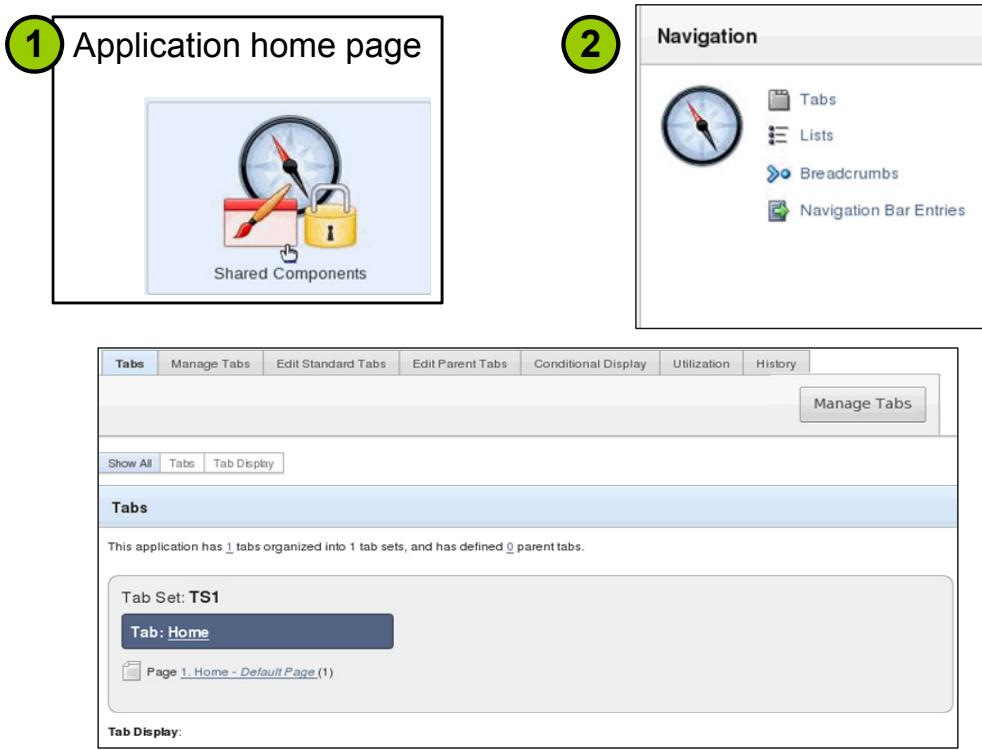
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You create tabs to provide navigation within the major components of an application. Tabs are positioned at the top section of an application. When you click a tab, it displays the associated page.

In Oracle Application Express, you can create two types of tabs: parent and standard. If you want only one level of tabs in your application, you must create a standard tab set. Each tab is associated with a specific page. If you want two levels of tabs, you must create a parent tab. The parent tab displays a page, which has its own standard tab set.

You must make sure that your application template and page template support the type of tab that you create for an application. For example, if you create a two-level tab set with parent and standard tabs, you must ensure that the application page template has a two-level tabs option selected. Also, you must ensure that the page-level template does not override the application-level template. You learn how to view template properties and edit them in the lesson titled “Working with Themes, Templates, and Files.”

Accessing the Tabs Page



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When you create an application or a page, the Create Application and Create Page wizards provide options to create tabs in the application or on the page. You can view the existing tabs in your application and modify them or create a new tab from the Tabs page. To access the Tabs page, perform the following steps:

1. On the application home page, click the Shared Components icon.
2. On the Shared Components page, click the Tabs link in the Navigation pane.
The Tabs page is displayed.

Alternatively, perform the following steps:

1. On the application home page, click a page.
2. In the Shared Components section in the page definition, right-click the Tabs node and select Create or Edit All.

Managing Tabs

Click on a tab name to make a tab current. Once you select a tab you will be able to change that tab's properties.

Selected Pseudo Parent Tab: **TS1**

Select Standard Tab: **Home**
Tab Current for Page: **1-Home**

TS1 Add

1
Home

Tabs

This page displays a graphical representation of the Tabs defined in your application.

Use Standard Tabs to link users to a specific page. A Parent Tab functions as a container to hold a group of Standard Tabs. Parent Tabs give users another level of navigation as well as a sense of place within the application.

Click **Add** in the upper row to add Parent Tabs. Click **Add** in the lower row to add Standard Tabs.

Parent Tab Tasks

No parent tabs exist.

Standard Tab Tasks

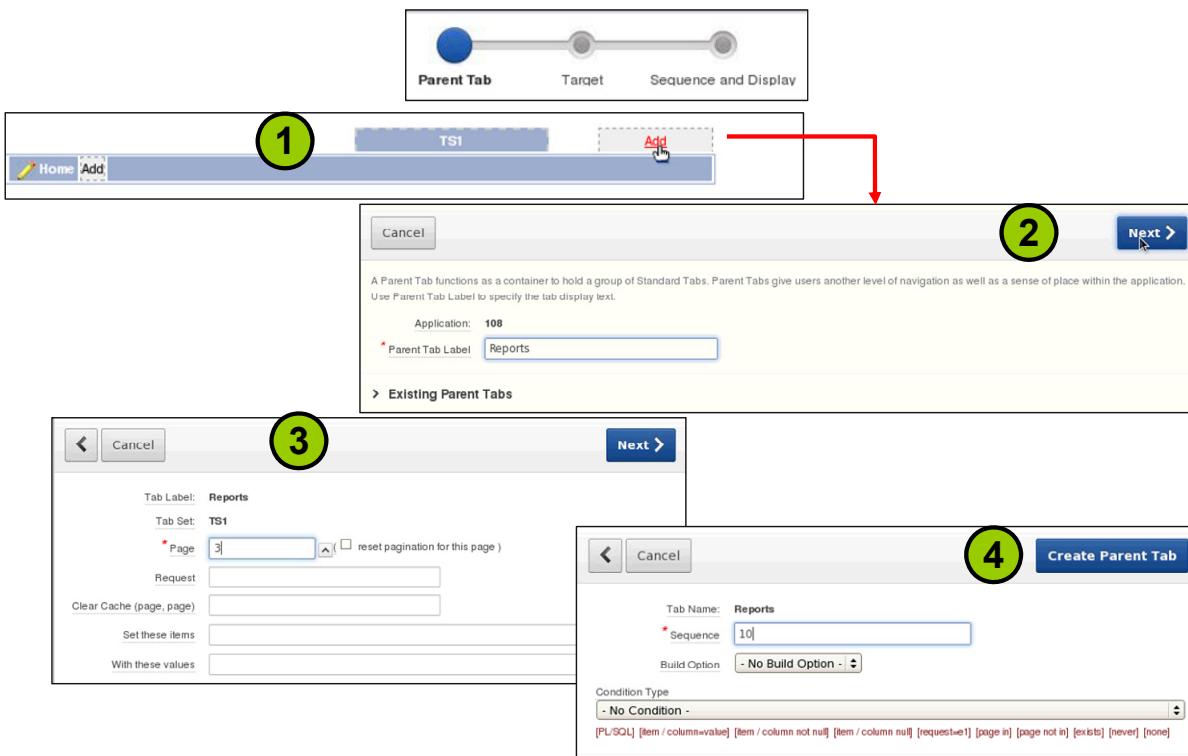
Rename Standard Tab Set
Resequence display order
Associate Page(s) with selected Standard Tab
Create New Standard Tab
Create New Standard Tab Set

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The Manage Tabs page has a graphical layout of the tabs. You can add a new tab to the parent or standard set. The slide shows the tabs available for the Demo application. Because no parent tab is created, a pseudo-parent tab, TS1, is assigned to hold the standard tabs. Tasks that you can perform are listed in the Parent Tab Tasks and Standard Tab Tasks lists (at the bottom right of the page).

Creating Parent Tabs



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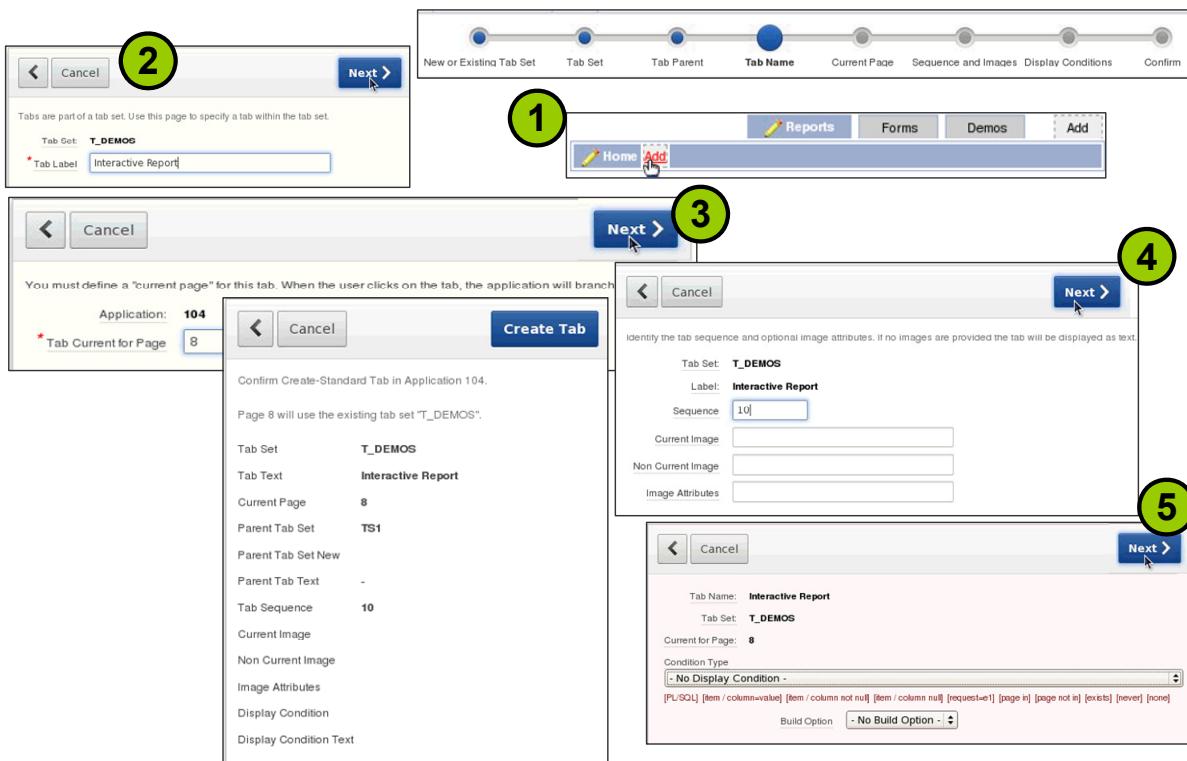
To create a parent tab, perform the following steps:

1. Click the Add link on the parent-level tabs on the Manage Tabs tab. The Create Parent Tab Wizard starts.
2. Enter the Parent Tab Label and click Next. In the slide example, Reports is entered.
3. Indicate the target of the tab, and click Next. In this example, page 3 is specified.
4. Accept the default or specify a different sequence and click Create Parent Tab.

In this example, the Reports parent tab is created. Similarly, a Forms parent tab can be created.

Note: To be able to see two-level tabs in your application, ensure that you are using the required templates for your application and pages.

Creating Standard Tabs



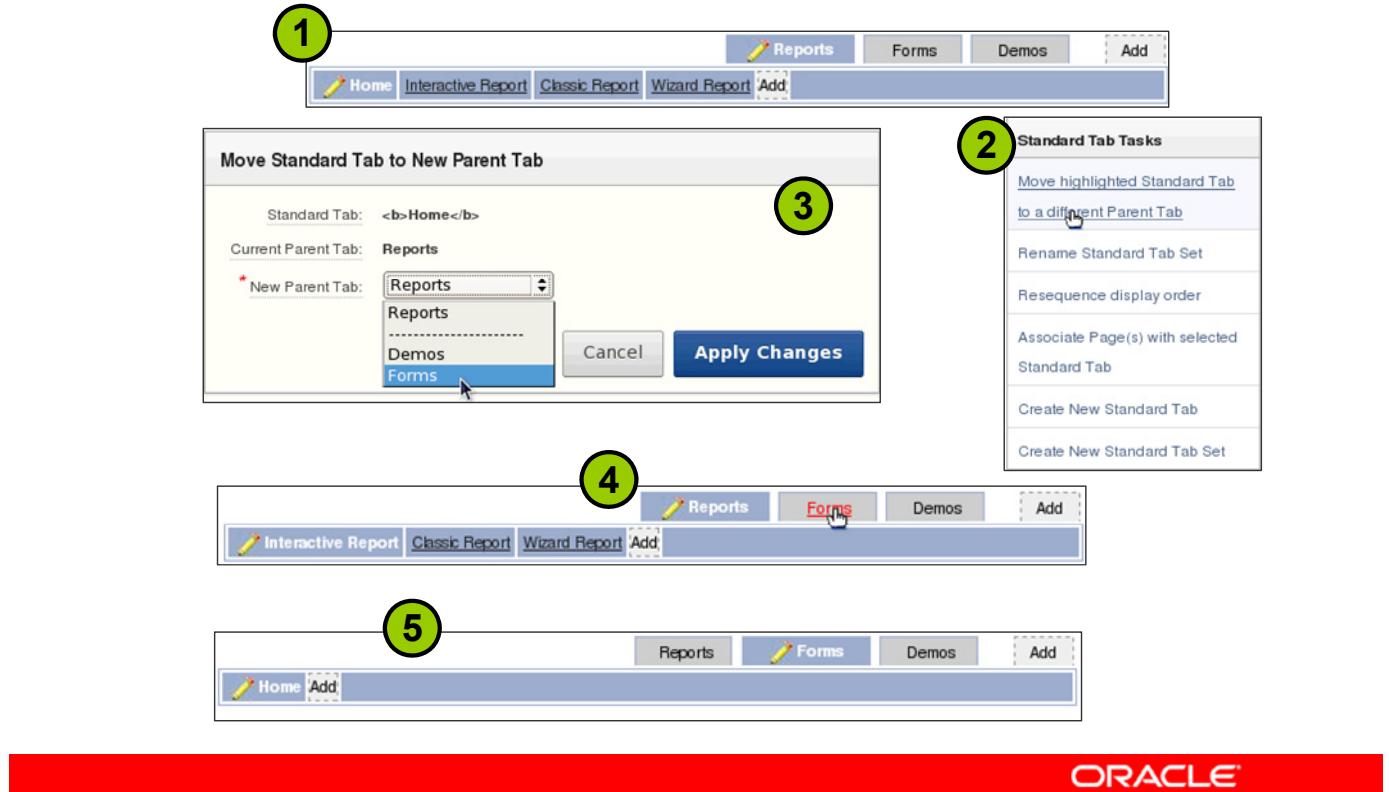
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To create a standard tab, perform the following steps:

1. On the Manage Tabs tab, ensure that the required parent tab is selected and click the Add link in the standard tabs level. The wizard automatically picks up the details for the Tab Set and Tab Parent and starts from the Tab Name step.
2. Enter the Tab Label and click Next. In the slide example, Interactive Report is entered.
3. Indicate the page that is associated with the tab and click Next. In this example, page 2 is specified.
4. Specify a sequence for the tab.
5. (Optional) Specify the conditions under which the tab is displayed.
6. Click Next.
7. Review the details and click Create Tab.

Reassigning a Standard Tab



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To assign a standard tab associated with a parent tab to another parent tab, perform the following steps:

1. Ensure that the standard tab that you want to move is selected. In the slide example, the Home tab is selected.
2. Click the “Move highlighted Standard Tab to a different Parent Tab” link in the Standard Tab Tasks list.
3. Select the new parent tab for the standard tab and click Apply Changes. In this example, the Forms tab is selected.
4. Note that the Home tab is no longer listed in the standard tab set for the Reports parent tab.
5. Click the Forms parent tab to confirm that the Home tab is now listed on it.

You can view the demonstration about creating and using tabs in your application by opening the `/home/oracle/labs/demos/les12_standard_tabs.html` file.

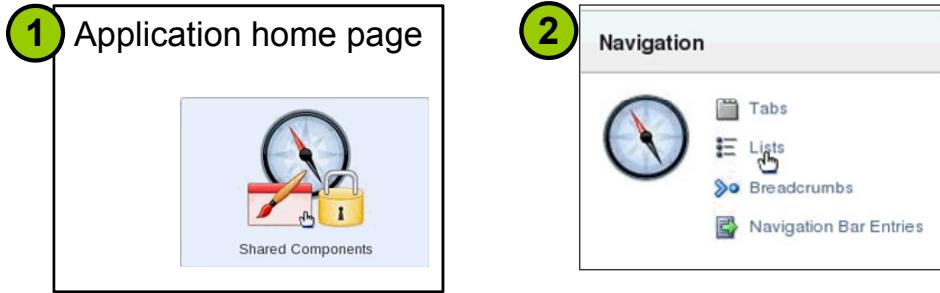
Lesson Agenda

- Using Shared Components
- Creating Tabs
- Creating Lists
 - Accessing the Lists Page
 - Creating a Static List
 - Creating a List Entry
 - Creating a List Region
 - Creating a List Region on Global Page
- Creating Breadcrumbs
- Creating a Navigation Bar

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Accessing the Lists Page



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A list is a collection of links. Each link is called a list entry. For each list entry, you must specify the display text, a target URL, and other attributes that control when and how the entries in the list are to be displayed.

To access the Lists page, perform the following steps:

1. On the application home page, click the Shared Components icon.
2. On the Shared Components page, click the Links link in the Navigation pane.

Alternatively, perform the following steps:

1. On the Application home page, click a page.
2. In the Shared Components section in the page definition, right-click the Lists node and select Create or Edit All.

The Lists page is displayed. Existing Lists, if any, are displayed on the Lists tab. You can create a new list or copy a list from another application. (The other application must reside in the same workspace.)

Creating a Static List

1

A List is a static or dynamic definition used to display a specific type of page item, such as progress bars, a navigation list.

2

A list is a shared collection of links, each link is called a list entry. You control the appearance of a list through list templates. You add a list to a page by creating a list region. Deleting a list will cause referencing regions to be removed.

Name: Tasks
Type: Static Dynamic
Build Option: No Build Option

3

List Name: Tasks

List Entry Label	Target Page ID or custom URL
1 Create Employee	5
2 View Employee List	6
3 Edit Multiple Employees	8
4	
5	

4

List Name: Tasks

Create List Regions? Do not create list region(s)

List Entry Label	Target Page ID or custom URL
1 Create Employee	5
2 View Employee List	6
3 Edit Multiple Employees	8
4	
5	

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To create a static list, click the Create button on the Lists page and perform the following steps:

1. Ensure that From Scratch is selected and click Next.
2. Enter a name for the list. Accept the other defaults and click Next.
3. Enter the text for the list entries and specify the page number that you want to link with each entry. Click Next.
4. You can create a list region on the current page. In this example, you accept the defaults and click Create.

The static list is created. You can edit the list to add additional list entries.

You can view the demonstration of using static lists by opening the /home/oracle/labs/demos/les12_static_list.html file.

Creating List Entries

The screenshot shows the Oracle Application Express interface for creating list entries. The main window displays a list of existing entries with columns: Sequence, Name, Parent Entry, Target, Conditional, Updated, Level, Authorization Scheme, and Copy. A new entry is being created with the following details:

Sequence	Name	Parent Entry	Target
10	Create Employee	-	f?p=&APP_ID.:5:&SE
20	View Employee List	-	f?p=&APP_ID.:6:&SE
30	Edit Multiple Employees	-	f?p=&APP_ID.:8:&SE

A modal dialog titled "List Entry" is open, showing the "Entry" tab. It contains fields for Parent List Entry (set to "No Parent List Item"), Sequence (40), Image, Attributes, Alt Attribute, and List Entry Label (set to "Create Master Detail Record"). The "Target" tab is also visible, showing Target type "Page in this Application" and Page "18". The "Create List Entry" button is highlighted with a red box.

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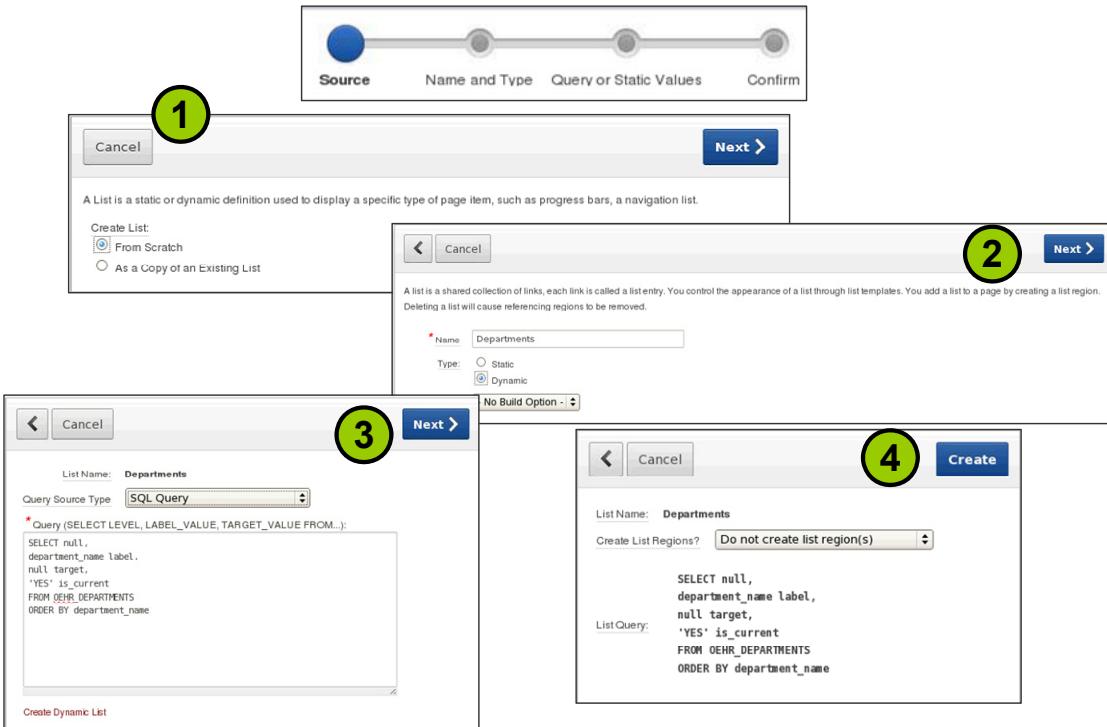
After you create a list, you can populate the list. You can also create new list entries in lists that are already populated. To create a list entry, perform the following steps:

1. Click Create List Entry on the Lists page.
2. Enter the text for the link in the List Entry Label field. On the Target tab, enter the page that you want to associate this list entry with. Click Create.

The list entry is created.

Note: On the Entry tab, if you select a list item for the Parent List Entry field, you can create a hierarchical list.

Creating a Dynamic List



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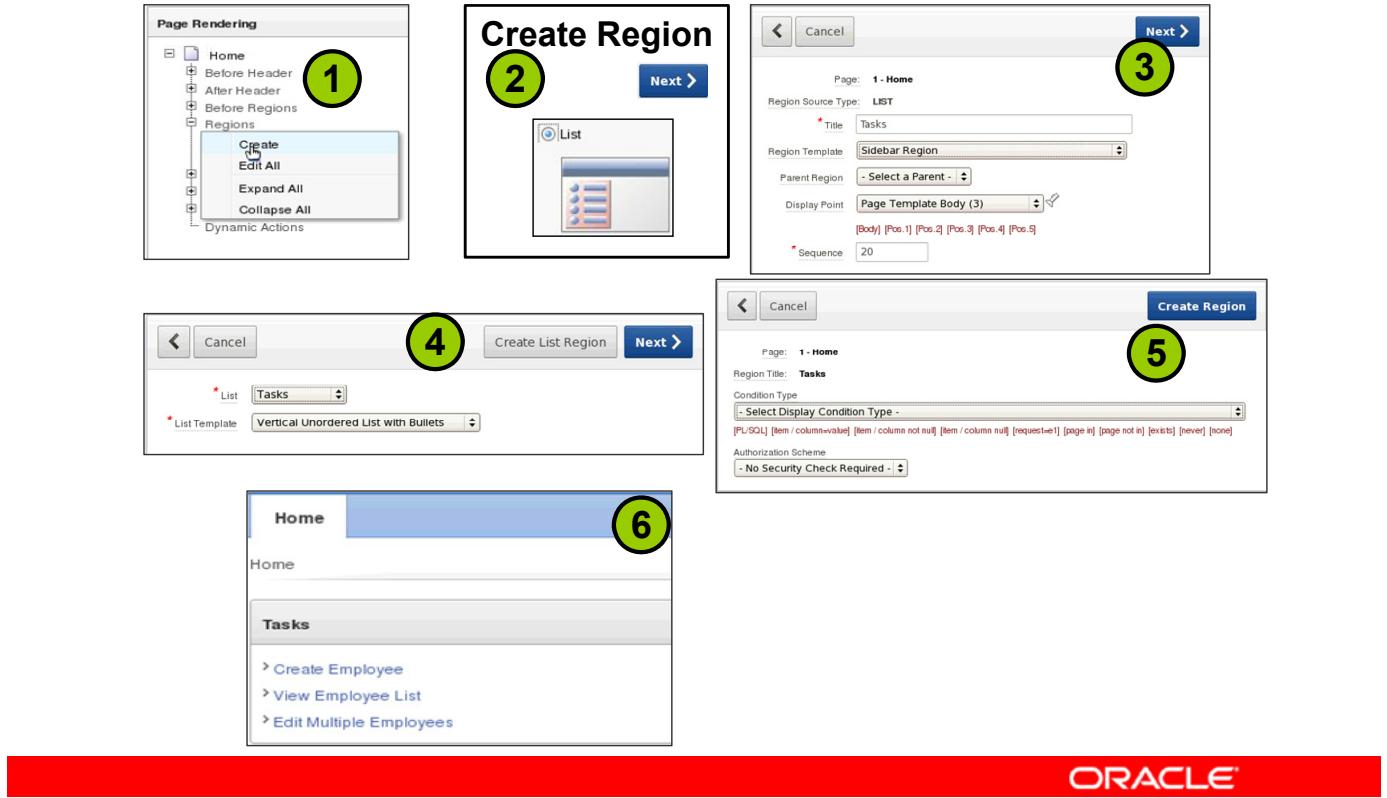
To create a dynamic list, click the Create button on the Lists page and perform the following steps:

1. Ensure that From Scratch is selected and click Next.
2. Enter a name for the list and select Dynamic for Type and click Next.
3. Enter the SQL Query to create the list and click Next. You can view examples of SQL queries by clicking the Examples link at the bottom.
4. You can create a list region on the current page. In this example, you accept the defaults and click Create.

The dynamic list is created. You can edit the query to modify the list entries.

You can view the demonstration of creating dynamic lists by opening the /home/oracle/labs/demos/les11_dynamic_list.html file.

Creating a List Region



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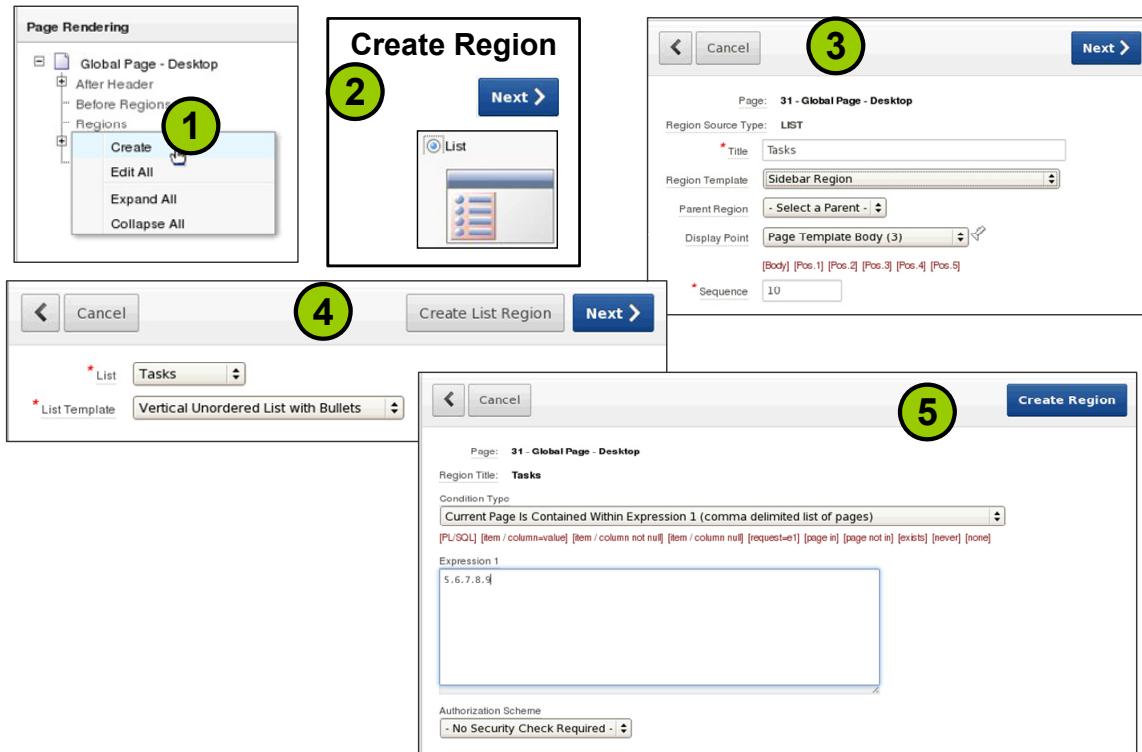
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After you create a list and populate it with values, you can add the list to a page. To add the list to a page, navigate to the page's definition and perform the following steps:

1. Right-click the Regions node and select Create.
2. Select the List option and click Next.
Note: You see the list option in the Create Regions Wizard only if the application already has a list.
3. Specify the region details and click Next.
4. Select the list from the List drop-down list and click Next.
5. (Optional) Specify any conditions for the display of the region.
6. Click Create Region.

The list region is created on the page.

Creating a List Region on the Global Page



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To display a list on multiple pages of an application, you can create the list region on a global page and specify the pages where the region should be displayed. Navigate to the page definition for the global page and perform the following steps:

1. Right-click the Regions node and select Create.
2. Select List and click Next.
3. Specify the region details and click Next.
4. Select the list from the Lists drop-down list and click Next.
5. Click the “[page in]” link below the Condition Type field and enter the pages that you want the region to be displayed on in the Expression 1 field. (You can enter multiple page numbers by separating them with a comma.) Click Create Region.

If you run your application, you should see the list region displayed on the pages that you specified.

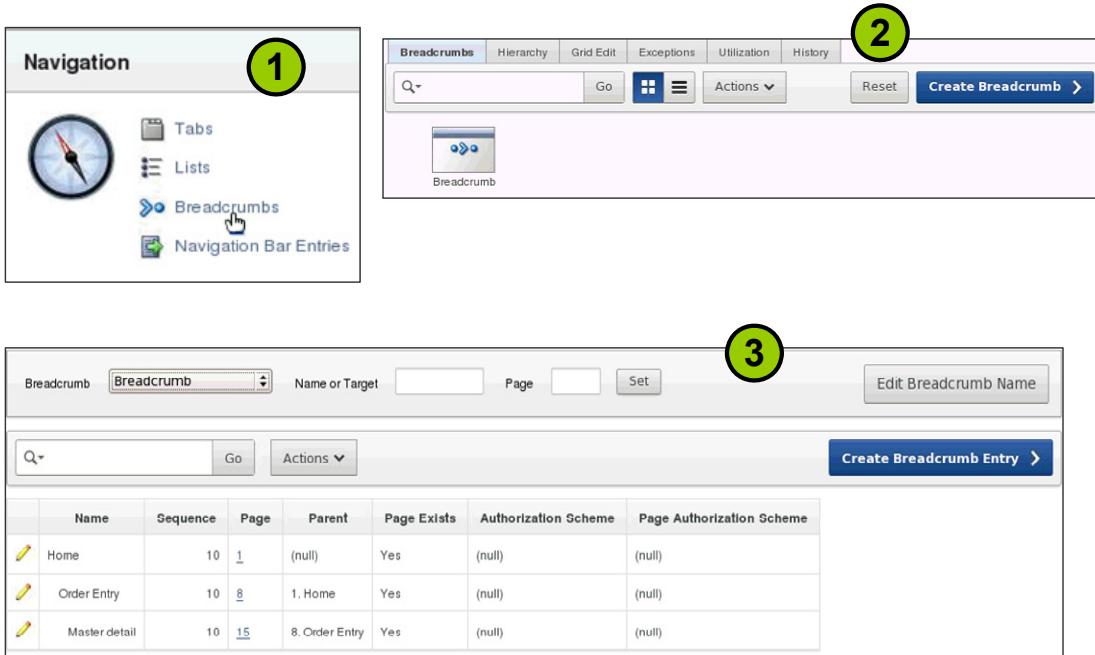
Lesson Agenda

- Using Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
 - Viewing a Breadcrumb
 - Creating Breadcrumb Entries
 - Reparenting Breadcrumbs
 - Creating a Breadcrumb Region
- Creating Navigation Bar

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Viewing a Breadcrumb



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A breadcrumb is a hierarchical list of links. It shows you where you are within the application. You can click a specific page name link to view that page immediately. The breadcrumb path is displayed below the standard tab at the top of each page. You can define the Breadcrumb region in global page so that it appears on all pages or on each page individually. Conditions can be defined to exclude the breadcrumb region from specific pages where they are not to be displayed, such as pop-up LOV pages.

By default, each application contains one breadcrumb. The breadcrumb contains multiple breadcrumb entries. The Create Page Wizard provides an option to create a breadcrumb entry. To view the breadcrumb for an application, perform the following steps:

1. On the Shared Components page, click the Breadcrumbs link in the Navigation pane.
2. On the Breadcrumbs page, the existing breadcrumb is listed. Click the icon to view the breadcrumb entries for the breadcrumb. To create a new breadcrumb, click the Create Breadcrumb button.
3. The current breadcrumb hierarchy appears. You may navigate to a page by clicking the associated link. You can also add another breadcrumb entry by clicking the Create Breadcrumb Entry.

Creating Breadcrumb Entries

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To create a new entry in a breadcrumb, click the breadcrumb icon on the Breadcrumbs page. The Entries page appears. Click the Create Breadcrumb Entry button. A Create/Edit page appears (shown in the slide).

In the Breadcrumb section, ensure that the required breadcrumb is selected for the Breadcrumb field. For the Page field, enter the page on which you want the breadcrumb to appear.

In the Entry section, enter the name for the entry. You can also specify a parent entry for the entry that you are creating.

In the Target section (not shown in slide), specify the page that should appear when the entry is clicked.

You have an option to change the title of the referenced page to the same as the breadcrumb name. To do this, select the check box for “Page Name and Title” in the Synchronize Breadcrumb With section (in the upper-right corner of the page).

Reparenting Breadcrumbs

Step 1: RepARENT Entries within this Breadcrumb

Name	Sequence	Page
Home	10	1
Order Entry	10	8
Master detail	10	15
Interactive Report	10	24

Step 2: Interactive Report selected and checked.

Name	Sequence	Page
Home	10	1
Order Entry	10	8
Master detail	10	15
Interactive Report	10	24

Step 3: Interactive Report moved under Home.

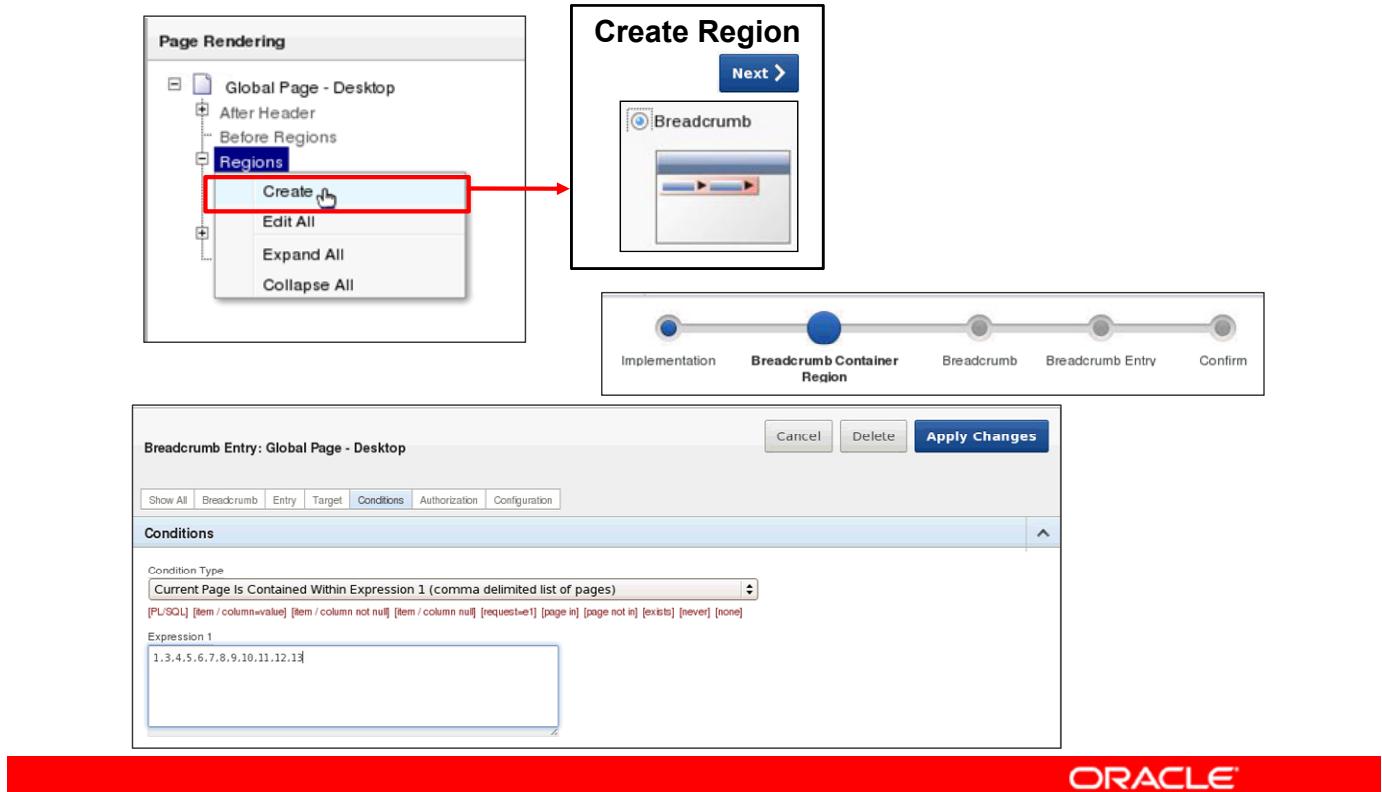
Name	Sequence	Page
Home	10	1
Order Entry	10	8
Master detail	10	15
Interactive Report	10	24

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You can change the parent entry for one or more breadcrumb entries. To reparent the breadcrumb entries, perform the following steps:

1. On the Breadcrumb page, select “Reparent Entries within this Breadcrumb” from the Tasks menu (in the bottom-right corner of the page).
2. Select a parent entry for the RepARENT To field. Select the check box for each breadcrumb that you want to reparent. Click the RepARENT Checked Entries button. The entry is now listed under the new parent.

Creating a Breadcrumb Region



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To display a breadcrumb on a page, you must create a breadcrumb region. You can create the breadcrumb region in global page, and then specify the pages that should display the breadcrumb.

To create a breadcrumb region, from the page definition for global page, right-click the Regions node and click Create. Select Breadcrumb in the Create Region Wizard and click Next. Follow the wizard instructions. The breadcrumb region is created.

To specify the pages on which the breadcrumb region should be displayed, right-click the breadcrumb region node and select Edit. On the Edit Region page, click the Conditions tab. Click the “[page in]” link for Condition Type and enter the page numbers, separated by a comma, in the Expression 1 field. Click Apply Changes.

If you run the application, you should see the breadcrumb region on the pages that you specified.

Note: On the page that you specified, a breadcrumb entry should have been created.

You can view the demonstration of creating a breadcrumb by opening the `/home/oracle/labs/demos/les11Breadcrumb.html` file.

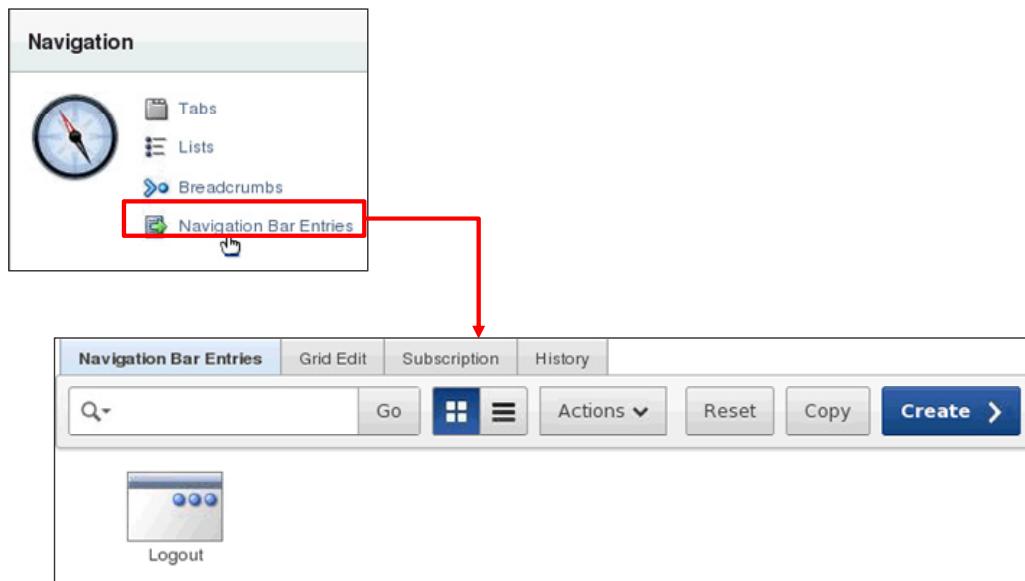
Lesson Agenda

- Using Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar
 - Accessing the Navigation Bar Entries Page
 - Creating a Help Page
 - Creating a Navigation Bar Entry



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Accessing the Navigation Bar Entries Page



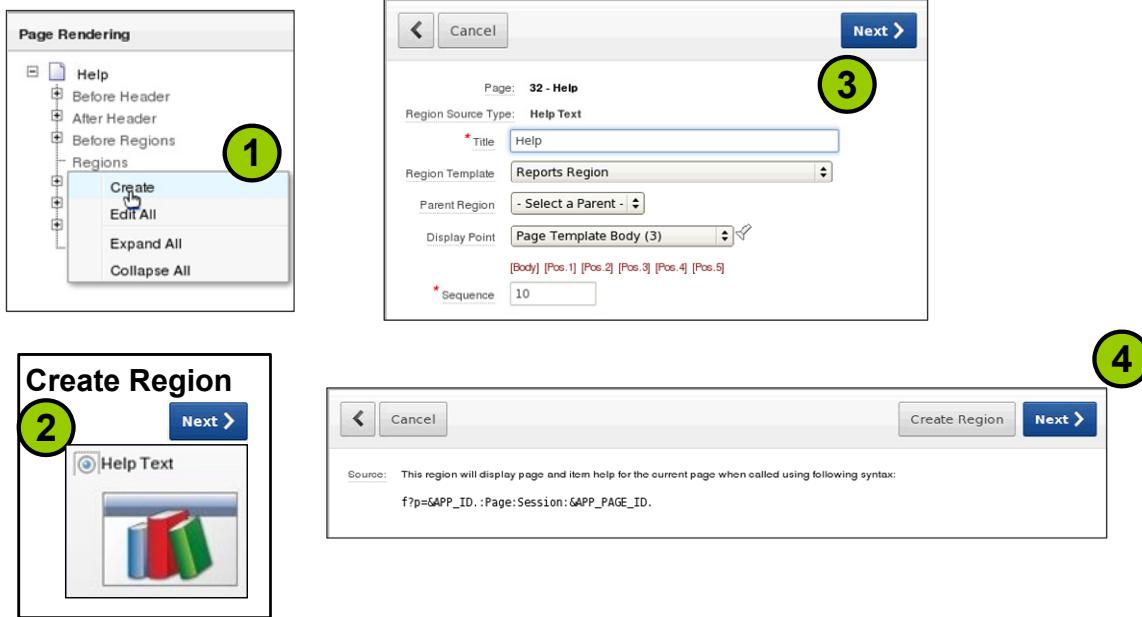
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Each application can have only one navigation bar. The items inside the navigation bar are called navigation bar entries. Some of the typical situations where you use navigation bars are accessing the home page and linking to a Help page. The location of the navigation bar depends on the associated page template. You use text or images when you create a navigation bar icon.

If you click the Navigation Bar Entries link from the application's Shared Components page, you can view the navigation bar entries for the application.

Creating a Help Page



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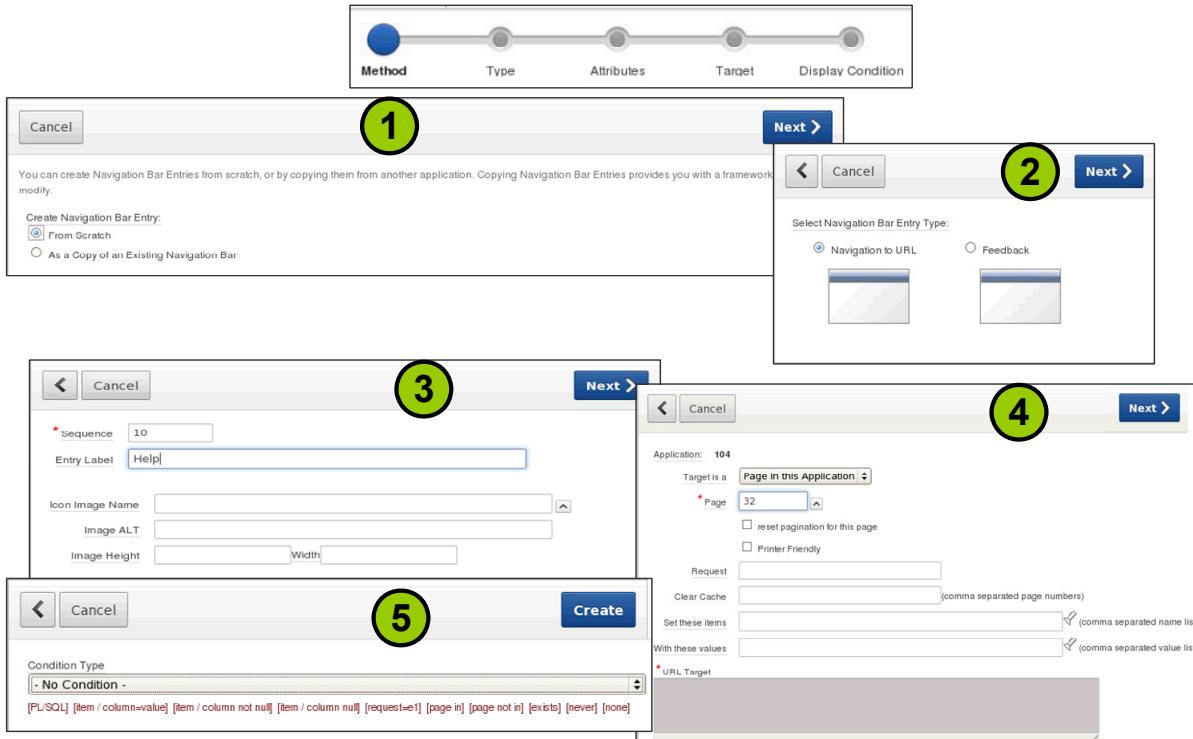
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In the next slide, you create a Help navigation bar entry. Before you do that, however, you must create a Help page in the application. Create a blank page and perform the following steps:

1. In the page definition of the blank page, right-click the Regions node and select Create.
2. Select the Help Text option and click Next.
3. Enter a title for the help region and click Next.
4. Click Create Region.

The Help page with a Help Text region is created. When this page is accessed, the page help and item help (if any) are displayed.

Creating a Navigation Bar Entry



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Click the Create button on the Navigation Bar Entries page. The Create Wizard opens, and you perform the following steps:

1. Select From Scratch and click Next. You can also copy from another application.
2. Select “Navigation to URL” and click Next.
3. Enter the name for the entry and click Next.
4. Specify the target help page to be linked to the entry and click Next.
5. (Optional) Specify a condition. Click Create.

The navigation bar entry is successfully created.

You can view the demonstration about creating a navigation bar entry by opening the /home/oracle/labs/demos/les11_navigation_bar_entry.html file.

Quiz

Which shared components would you use to create a shared collection of links on a page?

- a. Breadcrumbs
- b. Lists
- c. Navigation bar entries
- d. Tabs



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Answer: b

Summary

In this lesson, you should have learned how to:

- Provide an overview of shared components
- Include the following shared components in your application:
 - Parent and standard tabs
 - Navigation bars
 - Lists
 - Breadcrumbs



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In this lesson, you learned how to create, edit, and use navigational shared components in your application.

Workshop 12 Overview: Adding Shared Components That Aid Navigation

This practice covers the following topics:

- Creating a list
- Creating and editing standard tabs
- Creating a Help page and adding a navigation bar entry
- Editing navigation bar entries
- Creating a conditional display of a navigation bar



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