

Contents

O Course Overview

Course Description O-2

Target Audience O-7

What's Next? O-8

1 Introduction to Extensions in Visual Builder Studio

Objectives 1-2

Topics 1-3

What Can You Do with Oracle Visual Builder Studio? 1-4

Extensions Deliver New Capabilities to Oracle Cloud Apps 1-5

Examples of Extensions and Configurations 1-6

Extension Best Practices 1-8

Topics 1-9

Customize Existing Page Components 1-10

The Extension Life Cycle: Customize Existing Page Components 1-11

Customize an Existing Page's Components: Basic Use Cases 1-12

Customize an Existing Page's Components: Intermediate Use Cases 1-13

Choose or Create a Project to Hold Your Extension 1-14

Topics 1-15

Create New Pages 1-16

The Extension Life Cycle: Create a Bespoke App UI 1-17

Develop Bespoke Mash-Up Visual Applications 1-18

VBS Support for External Bespoke Mash-Up Visual Applications 1-19

Topics 1-20

Create a New Application Extension and Dependency 1-21

Work with an Extension 1-22

What Is a Workspace? 1-23

What Is the VB Studio Designer? 1-24

What Is a Dependency? 1-25

Add and Remove Dependencies 1-26

Work with a Sandbox 1-27

What Are Dynamic Components? 1-28

What Are Fragments? 1-29

Summary 1-30

2 Create App UIs in Extensions

Objectives 2-2

Topics 2-3

Overview of an App UI Application 2-4

Single Page Application Architecture 2-5

App UI Single Page Application Architecture 2-6

Opening a Workspace 2-7

Choose What to Do in Your Workspace 2-8

What Is an App UI? 2-9

Topics 2-10

Configuring an Existing App UI 2-11

Creating a New App UI 2-12

Why Should Multiple App UIs Be Created in a Single Extension? 2-13

How Are App UI Applications Structured? 2-14

Topics 2-15

Use the Designer to Edit Source Files in the Workspace 2-16

Use the Designer to Edit Source Files 2-17

Reopen Closed Editor Tabs 2-18

Personalize Designer Theme 2-19

Use Diagram View to See the App UI's Structure 2-20

Designer Modes: Live, Design, Code 2-21

Use the Structure View to View and Modify the Page 2-22

Control Placement of Panels 2-23

Preview a Visual Application 2-24

Commit Your Work 2-25

Use Branches to Isolate Changes 2-26

Oracle Fusion Apps Naming Conventions 2-27

Topics 2-28

Manage Extension and App UI Settings 2-29

Flow and Page Level Settings 2-30

Control Access to Your App UI 2-31

Summary 2-32

3 Configure and Manage Service Connections in Extensions

Objectives 3-2

Topics 3-3

Add Service Connections to Your Extension 3-4

What Are Service Connections? 3-5

How to Use Service Connections 3-6

Service Connection Metadata 3-7

Service Connections: Static vs. Dynamic 3-8

Topics 3-9

Create a Service Connection 3-10

Create a Service Connection from the Catalog 3-11

Dynamically Retrieve Metadata 3-13

Copy Minimal OpenAPI to the Application 3-14

Create an External Service Connection (No Catalog) 3-15

Create an External Service Connection (No Descriptor) 3-16

Overview Tab 3-17

Server Tab 3-18

Operation Tab 3-19

Request Tab 3-20

Response Tab 3-21

Test Tab 3-22

Topics 3-23

Edit a Service Connection Definition 3-24

What Edits Can You Make to a Service Connection? 3-25

Add a Server: New or Copy Existing 3-26

Edit a Server's Authentication Details 3-27

Add Server Variables for Service Connections 3-28

Edit a Service Connection: Add Endpoints 3-29

Edit a Service Connection: Edit Endpoints 3-30

Retrieve Metadata for a Dynamic Service Connection 3-31

Convert a Service Connection between Static and Dynamic 3-32

Add Transforms: Implemented in Backend 3-33

Authentication Mechanisms and Identity Propagation 3-34

Topics 3-35

What Is a Backend? 3-36

Create a Backend 3-37

Add a Local Server to Use a Different Backend During Development 3-38

Display Data from a REST Service: Overview 3-39

Display Data from a REST Service: Details 3-40

Summary 3-41

4 Develop Flows, Pages, and Fragments

Objectives 4-2

Agenda 4-3

Anatomy of App UI Applications 4-4

Agenda 4-5

Work with Pages and Flows 4-6

Create and Manage Pages 4-7

Page Flow and Navigation 4-8

Page Flow and Navigation: Return Navigation 4-9
Page Flow and Navigation: Pass Page Parameters 4-10
Embed a Subflow within a Page 4-11
Use Diagram View to Manage App UI and Flows 4-12
Agenda 4-13
Use Fragments to Manage and Reuse Code 4-14
Create and Use a Fragment 4-15
Define Descriptive Properties for Fragment Slots 4-16
Customize How a Fragment Variable Is Displayed in the Properties Pane 4-17
Section Fragment Properties for Display in the Properties Pane 4-18
Create and Use a Fragment 4-19
Putting It All Together: Pass Data to the Fragment 4-20
Pass Data to the Fragment Container 4-21
Emit an Event to the Container: Create the Fragment Event 4-22
Emit an Event to the Container: Configure the Container 4-23
Defer Rendering of a Fragment's Content 4-24
Agenda 4-25
How Fragments Behave in Extensions 4-26
What Are Referenceable and Extendable Fragments? 4-27
Add a Fragment from a Dependency 4-28
Summary 4-29

5 Implement Event Handling and Action Chains

Objectives 5-2
Agenda 5-3
Anatomy of App UI Applications 5-4
Agenda 5-5
What Are Variables? 5-6
Create Variables 5-7
Kinds of Variables 5-8
Variables and Scope 5-9
Default Value and Expressions 5-10
Expressions and Implicit Objects 5-11
Bind Variables to Components 5-13
Visual Builder Studio Types 5-14
ServiceDataProvider (SDP) Types and Variables 5-15
Define Filter Criteria for SDP Variables 5-16
Use ArrayDataProvider for Arrays of Data 5-17
Create Variables to Temporarily Store Data Changes in a Buffer 5-18
Types and Variables 5-19
Create Custom Types and Assign to Variables 5-20

Create Types from Endpoints	5-21
Make Variables and Types Available to Extensions	5-22
Agenda	5-23
What Is an Action chain?	5-24
Action Chain Scope	5-25
JavaScript vs. JSON Action Chains	5-26
JavaScript Action Chains	5-27
Visual Builder Studio Built-In Actions	5-28
Add Actions to the Chain	5-29
Sequential Assign Variable Actions Are Stacked	5-30
Add a Code Action	5-31
Action Chains: If Else	5-32
Simplify Action Chain View with the Summary Button	5-33
Fire Notifications to Display Banners	5-34
Agenda	5-35
Events Trigger Actions	5-36
Work with Events and Event Listeners	5-37
Types of Events: Components	5-38
Types of Events: Life Cycle	5-39
Types of Events: Variable	5-40
Types of Events: Custom	5-41
Add an Edit Page to a Selected Table Event	5-42
Investigate How the Edit Page Is Constructed	5-43
Make a REST Call in an Action Chain	5-44
Summary	5-45

6 Develop App UIs with Redwood Components

Objectives	6-2
Topics	6-3
Redwood UI Components	6-4
VBS and Redwood Components Are JET Components	6-5
JET Cookbook	6-6
Work with the Component Exchange	6-7
Install Components from the Component Exchange	6-8
Badges for Developers	6-9
Component Contract's Four Aspects	6-10
Properties Pane	6-11
Topics	6-12
What is Redwood?	6-13
Redwood Platform Enables Better Designs with Components	6-14
Redwood Templates and Patterns	6-15

Redwood Patterns Build a Complete Page	6-16
Redwood Page Templates: Referenced Layout and Functionality	6-17
Create a New Page: Select Page Pattern and Template	6-18
Common Pattern Template Page Configuration	6-19
Welcome and Overviews: Display Content and Take Action	6-20
Smart Search: Search, Display Results, and Take Action	6-21
Simple Create and Edit Page Pattern	6-22
Horizontal Foldout: Display Details	6-23
Redwood Templates Are Responsive by Design	6-24
Redwood Templates Support Responsive Mobile Layouts	6-25
Use Styling for Finer-Grained Control of Layout	6-26
Style Components with JET Styles	6-27
Use Redwood Containers and Layout Components in Pages	6-28
Topics	6-29
Add a GUI Component to the Page	6-30
Components Palette	6-31
Insert a GUI Component into the Structure Pane	6-32
Add a Component to the Parent Slot	6-33
Bind Data to Components: REST Endpoints	6-34
Bind Data to Components: Quick Start Wizards	6-35
Bind Data Using QuickStart Wizards	6-36
Edit Table Columns	6-37
Use Lists Instead of Tables	6-38
Comboboxes and Select Components	6-39
Filter Queries with Selection Components	6-40
Topics	6-41
Use Pop-Up Dialog Boxes to Display Information	6-42
Use Drawers to Display Information	6-43
Visualize Data Using Charts and Gauges	6-44
Charts and Graphs Return Selected Items	6-45
Use Gauges for Table Data	6-46
Summary	6-47

7 Enhance App UI Applications

Objectives	1-2
Introducing the VBCookbook	7-3
Create a Visual Application for the VBCookbook	7-4
Use VBCookbook Recipes in Visual Builder	7-5
Build Queries with Components: Input Text	7-6
Build a Query: Use Master RowKey as Filter to Detail Collection	7-7
Populate Variables with Selected rowData	7-9

- Modify Table Columns and Headers 7-10
- Use Component Properties: Deselect Rows in a Table 7-11
- Fire Data Provider Event to Refresh Data 7-12
- Show Additional Data for Selection Components 7-13
- Use Cascading Selection Lists of Values (LOVs) 7-14
- What Do the Endpoint Test Query Params Mean and How Are They Used? 7-15
- Selectively Display a Field 7-16
- Selectively Enable a Field and Handle Button Navigation 7-17
- Work with Resource Files 7-18
- Work with JavaScript 7-19
- JavaScript Editor 7-20
- Create and Use a Custom JavaScript Function 7-21
- Add Swipe Motions to Navigate in Mobile Apps 7-22
- Work with Translations 7-23
- Audit Your Application 7-24
- Preview a Visual Application 7-25
- Share an App UI 7-26
- Summary 7-27

8 Create Dynamic Components in Visual Builder Studio

- Objectives 8-2
- Topics 8-3
- What Are Dynamic Components? 8-4
- Work with Layouts in Your Extension 8-5
- Explore a Layout 8-6
- Extend a Layout in a Dependency 8-7
- Three Ways to Create a Layout 8-8
- Create a Rule Set in a Layout 8-9
- Override Field Properties in a Layout 8-10
- Terminology: Data Model and Presentation Layer 8-11
- Add a Dynamic Table to a Page 8-12
- Add a Dynamic Form to a Page 8-13
- Topics 8-14
- Determine What's Displayed at Runtime with Rule Sets 8-15
- Add a Rule Set to a Layout 8-16
- Build a Dynamic Component Rule Set Based on Screen Size 8-17
- Build a Rule Condition Based on User Role 8-18
- Build a Rule Condition Based on Context 8-19
- Preview Different Layouts 8-20
- Topics 8-21
- Control How a Field is Rendered with Field Templates 8-22

- Create Field Templates 8-23
- Apply a Template to a Field 8-24
- Start an Action Chain from a Field 8-25
- Add and Group Fields in Dynamic Form Layouts 8-26
- Edit a Field's Properties 8-27
- Set a Field to Be Read Only 8-28
- Set How User Assistance Is Rendered in a Layout 8-29
- Set a Field to Display as a Text Area in a Form 8-30
- Set a Field as Required 8-31
- Use Conditions to Show or Hide Fields in a Layout 8-32
- Configure How Columns Render in a Dynamic Table's Layout 8-33
- Add Converters and Validators to a Field 8-34
- Create Fields For a Layout 8-35
- Create a Calculated Field 8-36
- Create a Virtual Field 8-37
- Topics 8-38
- Add a Dynamic Container to a Page 8-39
- Dynamic Container Displays Content in Sections 8-40
- Use Fragments as Sections for Dynamic Containers 8-41
- Guidelines for Working with Container Sections 8-42
- Make a Rule Set Extendable 8-43
- Summary 8-44

9 Create Business Rules in Visual Builder Studio

- Objectives 9-2
- Topics 9-3
- What Are Business Rules? 9-4
- What Are Business Rules in Redwood and VB Studio? 9-5
- Customize Tables and Forms Using Business Rules: Express 9-6
- Customize Tables and Forms Using Business Rules: Advanced 9-7
- Topics 9-8
- Control Your Display with Rule Sets 9-9
- Modify Field Attributes for a Single Layout and Rule Set 9-10
- Modify Field Attributes for All Layouts in the Rule Set 9-11
- Control Layouts with Business Rules Instead of Rule Sets 9-12
- How Do Business Rules Govern Layout Settings? 9-13
- Use Business Rules Across All Your Rule Sets 9-14
- Main Components: Conditions and Properties 9-15
- Create a Rule For Forms 9-16
- Create a Rule For Tables 9-17
- Filter Your Rules 9-18

Set Conditions for a Rule	9-19
Use Condition Builder to Define Conditions	9-20
Build Advanced Expressions	9-21
Override Field Properties in a Form	9-22
Set a Default Value for a Field	9-24
Locks, Blanks, and Dashes	9-25
Topics	9-26
Nested Rules	9-27
Add an If/Else Rule	9-29
Add a Switch Rule	9-30
Understand What Will Be Shown at Runtime	9-31
Identify the Regions and Fields Impacted By a Rule	9-32
Display Messages When Conditions Are Met	9-33
Which Rules Take Precedence in the Presentation Layer?	9-34
Summary	9-35

10 Configure Business Rules Using Express Mode in Visual Builder Studio

Objectives	10-2
What Is Express Mode?	10-3
How to Access Express Mode: Edit Page in VB Studio	10-4
Express Mode vs. Advanced Mode	10-5
Using Express and Advanced Modes	10-6
Express Mode: Page Designer	10-7
Advanced Mode	10-8
Publish Your Changes	10-9
Manage Your Published Extensions	10-10
Summary	10-11

11 Review Code with Merge Requests

Objectives	11-2
Topics	11-3
What Is a Merge Request?	11-4
Requestor Creates a Merge Request	11-5
Merge Request Details	11-6
Create a Merge Request from a Template	11-7
Topics	11-8
A Word About Roles	11-9
Manage Your Extension with Git	11-10
Committed Work Is Pushed for Review	11-12
Reviewer Opens a Merge Request	11-13
Reviewer Views the Merge Request and Requests Attention	11-14

Reviewer Can See Commits and Changed Files	11-15
Reviewers Can Add an Inline Comment to a File	11-16
Reviewers and Developers Can Add a General Comment	11-17
Use the Toolbar to Work with Comments	11-18
Filter Merge Requests	11-19
Topics	11-20
Reviewers Approve or Reject a Merge Request	11-21
Merge Branches and Close the Merge Request	11-22
View Merge Request Statuses	11-23
Different Ways to Merge Branches	11-24
Revert a Merge Request	11-25
Set a Merge Request to Draft State	11-27
Summary	1-28

12 Manage Git Repositories and Build, Package, and Deploy Extensions

Objectives	12-2
Topics	12-3
How Are Extensions Applied at Runtime?	12-4
Create a New Git Remote Branch for New Work	12-6
Branch Protection Settings	12-7
Create or Switch a Branch	12-8
Manage Local Branches: Rename and Delete	12-9
Switch a Workspace's Environment	12-10
Topics	12-11
Builds, Jobs, and Pipelines	12-12
Create and Manage Jobs	12-13
Manage Jobs with Pipelines	12-14
Create a Pipeline	12-15
Add Other Jobs to the Pipeline	12-16
View Pipeline Layout	12-17
Administrators Manage Pipelines and Secure Build Jobs	12-18
Enable or Disable the CI/CD Pipeline for Publishing	12-19
Deploy Application – Build Jobs	12-20
VB Studio Extension Package and Deploy Steps	12-21
Topics	12-22
Manage an Extension	12-23
Export an Extension	12-24
Import an Extension	12-25
Manage Your Published Extensions	12-26
Summary	12-27

13 Manage Project Assets in Visual Builder Studio

Objectives 13-2

Topics 13-3

What is Visual Builder Studio? 13-4

VB Studio Application Development and Delivery 13-5

Topics 13-6

What Do You Want to Do with VB Studio and Oracle Cloud Apps? 13-7

Get Started: Open a Project or Use Edit Page in VB Studio 13-8

Project Home 13-9

Add Team Members 13-10

Manage Environments 13-12

Track Issues 13-13

Create Products for Issue Tracking 13-14

Create Issues for Issue Tracking 13-15

Manage the Git Repository 13-16

Create a New Project Using a Template 13-17

Administer Projects 13-18

Repositories 13-19

Branch Protection with Custom Rules 13-20

Builds 13-21

Set Your Preferred Color Theme 13-22

Use Wiki Pages to Collaborate 13-23

Topics 13-24

Develop Bespoke Mash-Up Visual Applications 13-25

VBS Support for External Bespoke Mash-Up Visual Applications 13-26

Application Extension vs. Visual Application 13-27

Summary 13-29

