Building Responsive Mobile Applications with Oracle Application Express 5.1

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1. Mobile Development – Overview
2. Developing Mobile Apps with the jQuery Mobile Theme
3. Developing Responsive Apps with the Universal Theme
4. Testing, Debugging and Deploying your Mobile Apps
Mobile Development – Overview

2 Developing Mobile Apps with the jQuery Mobile Theme

3 Developing Responsive Apps with the Universal Theme

4 Testing, Debugging and Deploying your Mobile Apps
Oracle Application Express (APEX)

Database Centric Application Development

Browser → WebLogic Server → Oracle Database (PDB or Dedicated)

- Schemas
- APEX Engine
- SQL & PL/SQL Engine

https://
Mobile Application Development

Native Apps vs Mobile Web Apps

• Native Apps:
  – Built for a specific platform
  – Using platform specific language and tools
  – Pros:
    • Full access to device’s hardware and APIs
    • Potentially better performance
    • Offline use
  – Cons:
    • Separate codebase for different platforms
    • Expensive to build, maintain and distribute
Mobile Application Development

Native Apps vs Mobile Web Apps

• Mobile Web Apps:
  – Apps developed using HTML/CSS/JavaScript
  – Pros:
    • Can be accessed by any device with a web browser
    • Use standard Web technologies
    • Easy to deploy and update on the server
  – Cons:
    • Limited access to device specific hardware and APIs
    • Require permanent Internet connection
Mobile Application Development

Native Apps vs Mobile Web Apps

• Hybrid Apps:
  – Apps developed using Web technologies – deployed as native app
  – Wrapped in platform-specific container using e.g. PhoneGap / Cordova
  – Pros:
    • Single code base due to use of Web technologies
    • Access to device specific APIs
  – Cons:
    • Subject to store approval – best suited for apps installed locally on device
    • Security model requires whitelisting of outside domains
Mobile Application Development

Responsive Design vs Dedicated Mobile Pages

• Responsive Design
  – Providing an optimal viewing experience – easy reading and navigation with a minimum of resizing, panning, and scrolling – across a wide range of devices
  – Supporting a variety of devices and screen sizes with a single implementation
  – Offering content and feature parity: same content and functionality is available
  – Potentially slower due to larger file size (HTML, CSS, JS, images)
  – More expensive to develop
Mobile Application Development

Responsive Design vs Dedicated Mobile Pages

• Dedicated Mobile Pages
  – Building separate sites for mobile and for desktop
  – Optimized support for touch events, orientation change, native controls, etc.
  – Easier and faster to use due to light-weight HTML and small static file content (CSS, JS, images)
  – Less expensive to develop
Mobile Application Development

Mobile Development with Oracle Application Express

• Mobile Theme
  – Introduced with APEX 4.2 in 2012
  – jQuery Mobile framework used to render mobile UI
  – Comprehensive support for Mobile-specific capabilities and touch events

• Universal Theme
  – Introduced with APEX 5.0 in 2015
  – Build responsive pages that work on any screen and device
1 Mobile Development – Overview

2 Developing Mobile Apps with the jQuery Mobile Theme

3 Developing Responsive Apps with the Universal Theme

4 Oracle JET Charts

5 Testing, Debugging and Deploying your Mobile Apps
Mobile Theme

jQuery Mobile - Philosophy

• One Code Base, All Platforms
• Works everywhere
• Built on standards
• Built on top of jQuery Core
• Mobile-first not Mobile-Only
Mobile Theme

jQuery Mobile - Features

• Unified user interface across all popular mobile platforms
• User Experience based on device capabilities
• Lightweight size and minimal image dependencies for speed
• Accessibility features like WAI-ARIA integrated in framework
• Support for screen readers and other assistive technologies
• AJAX based page load and HTML5 push state used for smooth / native-like page transitions
Mobile Theme

jQuery Mobile - Features

- Form inputs enhanced to be touch-friendly
- Touch-friendly UI widgets
- Auto-enhances forms to become touch-friendly
- Auto-grows text areas
- Designed to be touch-first
Mobile Theme

Application Express User Interfaces

- Apps can have multiple User Interfaces
- Each User Interface is associated with one Theme
- Individual Pages can have only one User Interface
- User Interface defines:
  - Login URLs
  - UI specific home pages
  - Global Pages
  - Auto Detection
Mobile Theme

Navigation menus and side panels

• All top level pages added to Navigation List
• Navigation lists in Mobile apps are implemented as menu panels
• Shown on the left with menu button shown in top bar
• Custom panels using “Panel” region template
• Choice of display modes: Overlay, Reveal, Push
• data-role="panel"
Mobile Theme

**List View**

- Default View for data display, navigation, drill-down view
- Based on unordered list
- Automatic Dividers
- Custom formatting options
- Declarative Search Options, supporting server- and client side search
- `data-role="listview"`
Mobile Theme

Column Toggle Report

• Selectively hides columns at narrower widths as a sensible default
• Offers a menu to let users manually control which columns they want to see
• Column Toggle popup contains a dynamically generated list of columns based on the table markup
Mobile Theme

Reflow Table Report

• Collapsing table data into label/data pairs for each row
• Stacked presentation style default
• Media query used to switch to tabular style presentation above a specific screen width
Mobile Theme

ThemeRoller

- Mobile theme provides a variety of theme styles
- Create custom styles using ThemeRoller
- Upload ThemeRoller file as application or workspace files
- Define new theme style using your own ThemeRoller layout
Demo
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Universal Theme

Responsive Grid

- Smart Page Layouts
- Improved Grid System
- Complex Form Layout
- Responsive Components
- Tap Event Handling
Universal Theme

Responsive Grid

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Universal Theme

Right to Left Support

• APEX 5.1 adds support for right-to-left scripts, such as Arabic and Hebrew
• Available with Universal Theme
• Set “Document Direction” in globalization attributes und translation language mapping
Universal Theme

Theme Styles

- Variety of different theme styles included with Universal Theme
- Set default Theme Style for app
- Administrators can change theme style for all users
- End users can select personal theme style
- Create custom Theme Styles using Theme Roller
Universal Theme

Theme Roller

• Easily build custom Theme Styles
• Compiles CSS on the fly
• See changes live in your app
• Runs from developer toolbar
• Save changes directly to your theme
Universal Theme

Template Options

- Declarative CSS modifiers for HTML5 templates
  - Apply styles like borders, padding, icons, colors, size, etc.
  - Uses easy-to-understand, descriptive names
  - Available for most template types:
    - Page, Region, Report, Breadcrumb, List, Item, Button
  - Significantly reduces the number of required templates for a theme
Universal Theme

**Live Template Options**

- Apply Template Options at Runtime
- Instantly see impact on selected component
- Enabled via Quick Edit
Universal Theme

Navigation Lists

• Choice of sidebar menu or tab-style navigation on top
• Accessible multi-level pull-down menus
• Implemented as lists
• Migration of tabs from legacy themes
Universal Theme

Theme Subscriptions

• Keep up-to-date with latest version of theme
• Enables consistent UI across applications using master themes
• Identical templates, custom theme styles
• Push templates & template option changes to subscribing templates
• Subscribed templates are read only
• Edit local copies of templates
Demo
Testing, Debugging and Deploying

Testing Strategies

• Use resized standard Desktop browser for basic layout testing
• Use platform-specific development tools like Xcode or Android SDK to test mobile features:
  – native form controls, orientation change
  – simulate different devices, screen resolutions, High DPI, etc.
• Also include testing on real, physical devices for full access to hardware functions
Testing, Debugging and Deploying

Desktop Browser testing

• Resize browser to approximate device
• Use tools such as Google Chrome device toolbar
  – Exact control over height and width
  – Built-in dimensions simulating popular devices
  – Optionally shows device frame
Testing, Debugging and Deploying

Testing and Debugging with Safari and XCode

• Access iOS Simulator from Xcode
  – Simulate different iPhone and iPad models, Retina and non-Retina, different iOS versions

• Use Desktop Safari Web Inspector to debug app running in Safari on device
  – Also works with actual USB connected iOS device
  – Access to resources, debugger, console, etc.
Testing, Debugging and Deploying

Testing and Debugging with Android Studio

• Get the Android SDK or Android Studio
  – Includes Eclipse + ADT plug-in
  – Includes Android Emulator

• Use Android Virtual Device Manager

• Create virtual devices using different screen sizes, DPI and Android OS versions
Testing, Debugging and Deploying

Deploying Mobile Apps

• Mobile Apps are accessed through web browser on device

• In-house applications
  – Deploy to APEX instance in the company internal network
  – Access from outside the network via VPN

• Public-facing applications
  – Deploy on APEX instance that is accessible from the Internet
  – Deploy to public-facing site or Cloud Services
Testing, Debugging and Deploying

Add to Home Screen

• Users open Mobile Web Apps by opening a URL in the Web browser of their device
• App specific URLs can be made available through mobile dashboards, portals, or communicated through email
• Apps that are frequently used can be bookmarked
• For easy and quick access to mobile Apps, use Add-To-Home-Screen function to place icon on the home screen of your device
Testing, Debugging and Deploying

Deploying Hybrid Apps using Cordova / PhoneGap

• Set of device APIs that allow access to native device functions from JavaScript

• Combined with a UI framework like jQuery Mobile this allows a smartphone app to be developed with just HTML, CSS, and JavaScript

• JavaScript APIs consistent across multiple device platforms thus apps are portable to other device platforms with minimal to no changes

• Apps made available for installation from platform specific app store
Demo
Integrated Cloud
Applications & Platform Services