Oracle® APEX
Accessibility Guide

Release 21.2
F43169-02
December 2021

ORACLE®

Oracle APEX Accessibility Guide, Release 21.2

F43169-02

Primary Author: Terri Jennings

Contributors: John Godfrey

Contributing Authors: Anthony Rayner, Chaitanya Koratamaddi

Contents

4   Developing Accessible Apps

Preface

Oracle APEX Accessibility Guide offers an introduction to accessibility in Oracle APEX. The guide contains information both for developers who are building applications and also end-users using applications built with Oracle APEX.

- Audience
- Documentation Accessibility
- Diversity and Inclusion
- Related Documents
- Conventions

Audience

Oracle APEX Accessibility Guide is intended for developers building Oracle APEX applications. "Using Oracle APEX with Assistive Technologies and Keyboard" is intended for both developers and end users of applications built with APEX.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

Related Documents

For more information, see these Oracle resources:

- *Oracle APEX Release Notes*
- *Oracle APEX Installation Guide*
- *Oracle APEX App Builder User's Guide*
- *Oracle APEX End User's Guide*
- *Oracle APEX Administration Guide*
- *Oracle APEX SQL Workshop Guide*
- *Oracle APEX API Reference*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Changes in Release 21.2 for *Oracle APEX Accessibility Guide*

All content in *Oracle APEX Accessibility Guide* has been updated to reflect release 21.2 functionality and user interface changes.

Deprecated and Desupported Features

See "Deprecated Features" and "Desupported Features" *Oracle APEX Release Notes*.

2

About This Accessibility Guide

This guide consists of two distinct sections: general instructions for accessing Oracle APEX with a assistive technologies and a keyboard, and guidelines for developing Oracle APEX applications that are accessible and highly usable to all users.

"Oracle is committed to creating accessible technologies and products that enhance the overall workplace environment and contribute to the productivity of our employees, our customers, and our customers' customers." —Safra Catz, Chief Executive Officer, Oracle

Accessibility Overview

Web accessibility means people with disabilities can effectively use and contribute to the web. To ensure people with disabilities can use Oracle APEX, we need to design and develop more accessible web applications and software.

Accessibility is not just a checklist, but an ongoing and planned effort. The aim of this guide is to help you start the planning process, and understand how to build accessible applications with Oracle APEX.

Accessibility Statement for Oracle APEX

Oracle APEX is Oracle's primary tool for developing web applications with SQL and PL/SQL. Using only a web browser, you can develop and deploy professional web-based applications for desktops and mobile devices. Oracle APEX is a fully supported, no cost option for the Oracle Database. It is installed by default in all editions of the Oracle Database.

Oracle APEX, including the Universal Theme (UT), follows Oracle's corporate web accessibility guidelines, which themselves are based on WCAG 2.0 to AA Level and the applicable standards of Section 508. How well Oracle APEX meets these standards is described in the VPAT for Oracle APEX, which is the framework's statement of conformance to these guidelines.

- What is Web Accessibility?
- Why Accessibility is Important
- About Building for Accessibility

2.1 What is Web Accessibility?

This guide refers to the Web Content Accessibility Guidelines 2.0 (WCAG 2.0) to back up some of the guidelines with the relevant standard and provide further reading.

According to W3C, web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the web, and that they can contribute to the web. The disabilities that affect access to the web can be categorized as: visual, auditory, speech, cognitive, physical, and neurological. The goal of web accessibility is to provide equal access to users with disabilities. That is, developers need to focus on building more accessible web applications and products. Apart from people with disabilities, the elderly with increasing impairments, and people in a limiting situation (for example, slow internet connection, no audio etc.) can also benefit with accessible applications and products.

Principles of Accessibility

WCAG 2.0, which is created by W3C defines the four principles of accessibility as:

- **Perceivable**: Information and user interface components must be presentable to users in ways they can perceive. That is, users must be able to perceive the information presented.

- **Operable**: User interface components and navigation must be operable. That is, users must be able to operate the interface.

- **Understandable**: Users must be able to understand the information as well as the operation of the user interface.

- **Robust**: Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

Each principle includes a list of guidelines that address the principle and there are a total of 12 guidelines. Each guideline includes one or more testable success criteria, which are at three levels: A, AA, and AAA. To learn more about these principles, guidelines, and success criteria, see Web Content Accessibility Guidelines 2.0 (WCAG 2.0).

2.2 Why Accessibility is Important

Up to 16% of the world population is disabled, either through birth, ageing, illness, or the result of an accident. Accessible products remove obstacles between a company and its existing or potential customers. Accessibility enables employers to recruit from a broader pool of talent. Overall, accessibility generally improves product for everyone (Universal Design).

Developing accessible products is very important for companies in order to adhere to Procurement and Discrimination laws such as:

- Section 508 of the Rehabilitation Act of 1973

- Mandate 376 (E.U.)

- Accessibility for Ontarians with Disabilities Act (Canada)

- Americans with Disabilities Act (U.S.)

- Disability Discrimination Act, and Equality Act (U.K.)

- Twenty-First Century Communications and Video Accessibility Act (U.S.)

2.3 About Building for Accessibility

Building for accessibility means coding to standards and not for a specific technology. Building to standards often leads to better, standardized HTML and cleaner code. The process of building accessible applications at Oracle involves considerable amount of time and resources at all stages of the development cycle. Accessibility guidelines and standards are considered, implemented, and reviewed through the Voluntary Product Accessibility Template (VPAT, a product's statement of conformance to Section 508 of the U.S. Federal Rehabilitation Act).

The Oracle Accessibility Program Office, reporting to the office of the Chief Corporate Architect, is responsible for defining the corporate standards for accessibility, and developing materials to train all employees so that they can successfully create

products that meet those standards. To learn more about Oracle's Accessibility Program, see Oracle Accessibility Information and Resources.

Oracle uses the VPAT to represent the degree of conformance to various accessibility standards and guidelines, including Section 508, WCAG 1.0, and WCAG 2.0. Depending on when a product was developed and released, different standards may be listed.

3

Using Oracle APEX with Assistive Technologies and Keyboard

Users can access Oracle APEX using only a keyboard or a screen reader such Freedom Scientific's screen reader JAWS.

> **Note:**
>
> JAWS with all the default settings was used in writing this section. All instructions in this section are based on using a full size keyboard. Note that instructions may vary if using a laptop keyboard.

- Recommended Configuration
- Accessing Form Pages Using JAWS
- Accessing Oracle APEX Using a Keyboard

> **See Also:**
>
> Oracle's Accessibility Program

3.1 Recommended Configuration

If using Oracle APEX with JAWS, Oracle recommends using either the most recent versions of Google Chrome or Microsoft Edge for the best user experience.

3.2 Accessing Form Pages Using JAWS

Many of the pages in Oracle APEX are form pages designed for maintaining application metadata. This section describes how you can gain an understanding of the structure of these pages and interact with them using a screen reader such as JAWS.

- About the Structure of Pages
- Accessing Help Text
- Dealing with Validation Errors

3.2.1 About the Structure of Pages

Many form pages are logically broken up into different regions. For example, the Edit Page Item page has the following regions containing form fields for maintaining information about the page item:

- Name
- Displayed
- Label
- Settings
- List of Values (depending on item type)
- Element
- Source
- Default
- Quick Picks (depending on item type)
- Conditions
- Read Only
- Security
- Configuration
- Help Text
- Comments

Oracle APEX uses Heading (Hn) tags throughout its development interface to define page structure. For example, the Edit Page Item page contains one H1 heading with text pertaining to the current item name, and then H2 headings for all other discrete page sections, including all the item attribute groupings listed above. Please use standard screen reader heading navigation to navigation such pages.

3.2.2 Accessing Help Text

Most items within the Oracle APEX development environment have field-level help defined. To activate field-level help, focus on the item for which you need help and press the keyboard shortcut **ALT+F1**. Pressing this keyboard shortcut displays a popup window containing the help text.

3.2.3 Dealing with Validation Errors

Oracle APEX provides many in-built features that help a JAWS user deal validation errors on form pages.

- About Understanding the an Error Has Occurred
- Reviewing the Error
- Navigating to the Relevant Fields to Fix the Errors
- About WAI-ARIA Support

3.2.3.1 About Understanding the an Error Has Occurred

If a validation has failed on a form page when using Screen Reader mode, the page title is prefixed with the following:

```
x errors have occurred - [page title]
```

When a page loads, JAWS announces the page title. This means a JAWS user immediately knows a validation has failed.

3.2.3.2 Reviewing the Error

To navigate to the section of the page where the error messages displays, locate the `H2` `(Heading Level 2)` tag with the text `"n error has occurred"` (where `'n'` is the number of errors). Immediately after this heading there will be an unordered list containing all the errors that have occurred on the page.

3.2.3.3 Navigating to the Relevant Fields to Fix the Errors

For validations that are associated with a particular page item, Oracle APEX renders the actual error message as a link in the notification section. When a user activates the link, focus shifts to the associated item. This enables all users to easily navigate straight to the page item related to the error.

3.2.3.4 About WAI-ARIA Support

Oracle APEX includes some Web Accessibility Initiative - Accessible Rich Internet Applications (WAI-ARIA) markup to help screen reader usability in dealing effectively with item errors. This enhancement improves the screen reader user experience for screen reader and browser combinations that support WAI-ARIA.

When an error occurs relating to a specific page item, that page item is given the following additional attributes:

- `aria-invalid="true"`

  This means a screen reader announces "Invalid Entry"when the screen reader user is focused on the page item.

- `aria-describedby="[page_item_name]_error"`

  This attribute value matches up with the item's associated error messages so when the screen reader user focuses on the page item, the screen reader announces the actual error.

Before this enhancement, if a screen reader user navigated to a page item that had an error, the screen reader might announce, "Job, Edit, Type of Text." Now the screen reader would announce, "Job Edit, Invalid Entry, Job must have some value, Type of Text."

3.3 Accessing Oracle APEX Using a Keyboard

This section describes how to access components in Oracle APEX using a keyboard.

> **❶ Important:**
>
> The Oracle APEX interface is intended for use with the US keyboard layout. Users of other keyboard layouts should refer to the US keyboard layout in conjunction with this documentation as there may be incompatibilities regarding number and special character keys, such as the ' (quote) key.

- General Keyboard Shortcuts
- Date Picker Keyboard Shortcuts
- CSS Calendar Keyboard Shortcuts
- Map Region Keyboard Shortcuts
- Interactive Grid Region Keyboard Shortcuts
- About Configuring Interactive Grids to Support Multi-select
- Interactive Report Regions Keyboard Shortcuts

3.3.1 General Keyboard Shortcuts

The following table lists general Oracle APEX keyboard shortcuts.

If a page incorporates specialized keyboard shortcuts, click the **Help** icon (located in the top-right of the page) and select **Shortcuts**. (Not all pages have specialized shortcuts.)

Table 3-1   Oracle APEX Keyboard Shortcuts

Where	Keys	Action
Any page	Ctrl+Quote	Display Global Search
Any page with special keyboard shortcuts	Alt+Shift+F1	Display the list of valid Keyboard Shortcuts for the page
Page Designer, Layout	Ctrl+Alt+D	Display from here
Page Designer, Layout	Ctrl+Alt+T	Display from page
Page Designer	Alt+2	Go to Dynamic Actions
Page Designer	Alt+9	Go to Gallery, Buttons
Page Designer	Alt+8	Go to Gallery, Items
Page Designer	Alt+7	Go to Gallery, Regions
Page Designer	Alt+5	Go to Layout
Page Designer	Alt+F1	Go to Help
Page Designer	Ctrl+F1	Go to Messages
Page Designer	Alt+4	Go to Page Shared Components
Page Designer	Alt+3	Go to Processing
Page Designer	Alt+6	Go to Property Editor
Page Designer	Alt+1	Go to Rendering
Page Designer	Alt+Shift+F1	List Keyboard Shortcuts

Table 3-1   (Cont.) Oracle APEX Keyboard Shortcuts

Where	Keys	Action
Page Designer	Ctrl+Alt+F	Page Search
Page Designer	Ctrl+Y	Redo
Page Designer	Alt+F11	Restore/Expand
Page Designer	Ctrl+Alt+S	Save
Page Designer	Ctrl+Alt+R	Save and Run Page
Page Designer	Ctrl+Alt+E	Toggle Hide Empty Positions
Page Designer	Ctrl+Z	Undo
Page Designer with focus anywhere that has a context menu	Shift+F10 or Context menu key	Open context menu
Page Designer Layout Gallery and Icon List in wizards	Arrow keys	Move selection
Page Designer Property Editor with focus on a group heading	Up/Down Arrow keys	Move to previous/next group
Page Designer Property Editor with focus on a group heading	Home/End keys	Move to first/last group
Page Designer Property Editor with focus on a group heading	Left/Right Arrow keys or Enter or Space	Expand or collapse the group
Page Designer With focus on any tab	Arrow keys	Select previous/next tab
Focus on a splitter handle	Arrow keys	Move splitter
Focus on a splitter handle	Enter	Expand or collapse splitter if supported by splitter
On pages that have a splitter	Ctrl+F6	Move to next splitter
On pages that have a splitter	Ctrl+Shift+F6	Move to previous splitter
Focus on any field with a (?) help icon	Alt+F1	Open field help dialog
Focus on a field help dialog	Alt+F6	Move focus back to field without closing dialog
Focus in any dialog	Escape	Close dialog
Any page, focus on region display selector "tabs"	Arrow keys	Select the previous/next tab
SQL Commands	Ctrl+Enter	Run the current command
Code Editor	Ctrl+Z	Undo
Code Editor	Ctrl+Shift+Z	Redo
Code Editor	Ctrl+F	Find

Table 3-1   (Cont.) Oracle APEX Keyboard Shortcuts

Where	Keys	Action
Code Editor	Ctrl+Shift+F	Replace
Code Editor with focus in find field	Up/Down Arrows	Find previous/next instance
Code Editor	Ctrl+Space	Auto complete when available
Code Editor	Alt+F6	Leave code editor and go to next tab stop
Code Editor	Alt+Shift+F6	Leave code editor and go to previous tab stop
Markdown Editor	Ctrl+Shift+.	Leave markdown editor and go to next tab stop
Markdown Editor	Ctrl+Shift+,	Leave markdown editor and go to previous tab stop

3.3.2 Date Picker Keyboard Shortcuts

This topic describes keyboard shortcuts for the Date Picker.

To open a Date Picker:

1. Tab to the relevant input field.
2. Press **CTRL+HOME** to open the Date Picker.
3. Once the Date Picker is open, you have the following keyboard navigation options:
   - By month:
     – Press **PAGE UP** to go to the previous month.
     – Press **PAGE DOWN** to go to the next month.
     – Press **CTRL +HOME** to go to the current month.
   - By week:
     – Press **CTRL+UP** to go to the previous week.
     – Press **CTRL+DOWN** to go to the next week.
   - By day:
     – Press **CTRL+LEFT** to go to the previous day.
     – Press **CTRL+RIGHT** to go to the next day.
4. Once you are finished with the Date Picker:
   - Press **ENTER** to accept the selected date.
   - Press **ESCAPE** to close the date picker without selection.
   - Press **CTRL+END** to close the date picker and erase the date.

3.3.3 CSS Calendar Keyboard Shortcuts

The following table lists available keyboard shortcuts in CSS Calendar.

When the calendar grid (month, week or day view) is being focused, the arrow keys can be used to navigate within the calendar. There are 2 calendar browsing methods: **Event Browsing** that focuses the existing calendar events and **Calendar Browsing** that allows to freely select dates or date ranges. Initial mode is **Event Browsing**. The actual behavior depends on the current view.

Table 3-2   Oracle APEX CSS Calendar Keyboard Shortcuts

Where	Keys	Action
Event Browsing	Up Arrow	Go to the previous event. If on the first event in the given view, move to the last event.
Event Browsing	Down Arrow	Go to the next event. If on the last event in the given view, move to the first one.
Event Browsing	N	Switch to **Calendar Browsing** mode.
Event Browsing	Escape	Leave browsing mode. The calendar Grid is now being focused and **[Tab]** can be used to navigate to other application regions.
Month View	Left Arrow	Go to the previous day (if on the first day of a month, switch to the previous month).
Month View	Right Arrow	Go to the next day (if on the last day of a month, switch to the next month).
Month View	Down Arrow	Go to the next week; same day.
Month View	Up Arrow	Go to the Previous week; same day.
Month View	SHIFT + RIGHT	Extend the selection by one day. Only up to the end of the current view.
Month View	SHIFT + LEFT	Decrease the selection by one day. Only until the selection spans one day.
Month View	ENTER or SPACE	Execute the **Create Link** given as Plug-in attribute by the developer or fire **Calendar Date Select** event.
Month View	Escape	Leave **Calendar Browsing** and go back to **Event Browsing**.
Month View	Page Up or Page Down	Move to the next/previous month.
Week View	LEFT	Go to the previous day (if on the first day of a week, switch to the previous week).
Week View	RIGHT	Go to the next day (if on the last day of a month, switch to the next month).
Week View	SHIFT + RIGHT	Extend the selection by one day. Only up to the end of the current view.
Week View	SHIFT + LEFT	Decrease the selection by one day. Only until the selection spans one day.
Week View	UP	Move selection 30 minutes back in time.
Week View	DOWN	Move selection 30 minutes forward.
Week View	SHIFT+ DOWN	Extend selection range by 30 minutes
Week View	SHIFT+ UP	Decrease selection by 30 minutes as long as the minimum of 30 minutes is left.
Week View	ENTER or SPACE	Execute the **Create Link** given as plug-in attribute by the developer or fire **Calendar Date Select** event.

Table 3-2   (Cont.) Oracle APEX CSS Calendar Keyboard Shortcuts

Where	Keys	Action
Week View	Escape	Leave **Calendar Browsing** and go back to **Event Browsing**.
Week View	Page Up or Page Down	Move to the next/previous month.
Day View	LEFT	Go to the previous day.
Day View	RIGHT	Go to the next day.
Day View	UP	Move selection 30 minutes back in time.
Day View	DOWN	Move selection 30 minutes forward.
Day View	SHIFT+ DOWN	Extend selection range by 30 minutes.
Day View	SHIFT+ UP	Decrease selection by 30 minutes as long as the minimum of 30 minutes is left.
Day View	ENTER or SPACE	Execute the **Create Link** given as plug-in attribute by the developer or fire **Calendar Date Select** event.
Day View	Escape	Leave **Calendar Browsing** and go back to **Event Browsing**.
Day View	Page Up or Page Down	Move to the next/previous day.
List View	Not Applicable	The list view has no special keyboard support. If an edit link is defined by the application developer, the **Tab** key can be used to navigate between the entries

3.3.4 Map Region Keyboard Shortcuts

The following table lists available keyboard shortcuts in map regions.

Keys	Action
= / +	Increase the zoom level by 1.
Shift-= / Shift-+	Increase the zoom level by 2.
-	Decrease the zoom level by 1.
Arrow keys	Pan by 100 pixels.
Shift + Right Arrow	Increase the rotation by 15 degrees.
Shift + Left Arrow	Decrease the rotation by 15 degrees.
Shift + Up Arrow	Increase the pitch by 10 degrees.
Shift + Down Arrow	Decrease the pitch by 10 degrees.

3.3.5 Interactive Grid Region Keyboard Shortcuts

Interactive grid regions come with many keyboard shortcuts and keyboard-specific features to help the keyboard-only and power user. Specifically they are designed to provide all functionality that is available with the mouse, to be also available to keyboard users.

In addition, the grid containing the data provides two distinct modes of interaction: **Navigation** and **Edit** mode. **Navigation** mode is designed for use when the grid is not currently editable and allows fast and easy navigation around the grid using keyboard. **Navigation** mode is the default and the only mode if the interactive grid is not editable. **Edit** mode is designed for use when the grid is currently editable, and keyboard behavior differs slightly as described in the section that follows.

The following table lists available keyboard shortcuts in interactive grid regions. If the Mode states **Any**, the corresponding keyboard shortcut works in both Navigation and Edit modes.

Table 3-3   Keyboard Shortcuts in Interactive Grid Regions

Mode	Location	Keys	Description
Any	Grid View	F8	Toggle selection mode between Row Selection and Cell Selection.
Any **Note:** In Edit mode, Tab may have special meaning in certain situations, such as when moving between editable cells.	General	Tab or Shift+Tab	Move to the next or previous tab stop in the interactive grid region. **Note:** The interactive grid region consists of multiple separate user interface elements, some of which handle tab stops differently depending on the element type and its expected keyboard semantics. For example, the toolbar and pagination controls are implemented as separate tab stops, whereas the grid view and icon view are implemented as a single tab stop where cursor key navigation is used to move around the view elements when the view has focus.
Any	Grid view, column header has focus	Enter or Space	Opens the column header menu, allowing quick actions on a specific column (for example filtering, aggregating, or hiding).
Any	Grid view, column header has focus	Windows: Ctrl+Left / Ctrl+Right Mac: Ctrl+Cmd+Left / Ctrl+Cmd+Right	Increase, or decrease column width. Sets the **Minimum Column Width** report setting for that column.
Any	Grid view, column header has focus	Shift+Left / Shift+Right	Move column to the next or previous column position. Sets the display order for that column.
Any	Grid view, column header has focus	Alt+Up / Alt+Down Shift+Alt+Up / Shift+Alt+Down	Sort ascending (up) or descending (down) on the current column. Use the shift key modifier to add to the existing search columns.
Any	Grid view, column header menu open	Tab or Shift+Tab	Move to next or previous tab stop in the column header menu. Focus is constrained in the menu widget, so tabbing on the last focusable element in the menu will loop focus back to the first focusable element. **Note:** This is not currently implemented as a single tab stop, so Tab / Shift+Tab must be used to navigate in the menu.

Table 3-3   (Cont.) Keyboard Shortcuts in Interactive Grid Regions

Mode	Location	Keys	Description
Any	Grid view, column header menu open	Escape	Close the column header menu.
Any	Grid view, single row view, focus on column	ALT+F1	Show help for an item. **Note:** Only shows help if help has been defined for that column.
Navigation	Grid view	Up/Down/Left/ Right arrow keys	When focus is in the grid view, use the arrow cursor keys to move around the entire grid (including column headers). When a row is focused, the row will also automatically be selected. **Note:** The grid view will remember its last focused cell, so if you Tab away, then later move focus back to the grid view, you will be taken back to the last focused cell.
Navigation	Grid view	Windows: Ctrl+Up / Ctrl+Down, Space, Ctrl+Space Mac: Ctrl+Alt+Up / Ctrl+Alt+Down, Space, Ctrl+Alt+Space	Move without changing the selection. Use Space key to select or Ctrl+Space to toggle selection. **See Also:** "About Configuring Interactive Grids to Support Multi-select"
Navigation	Grid view	Shift+Up / Shift+Down	Range select and de-select multiple rows. **See Also:** "About Configuring Interactive Grids to Support Multi-select"
Navigation	Grid view	Page Up / Page Down	Move one page up or down in the current column.
Navigation	Grid view	Home / End	Move to first, or last cell in the current row.
Navigation	Grid view	Enter or F2	Switches from **Navigation** to **Edit** mode. **Note:** Only works if the interactive grid is defined as editable. See Making an Existing Interactive Grid Editable in *Oracle APEX App Builder User's Guide*.
Navigation	Editable grid	Insert	Will add a row after the last selected row or if no row is selected before the first row.
Navigation	Editable grid	Delete	Deletes the selected rows.
Navigation	Icon view	Up/Down/Left/ Right arrow keys	When focus is in the icon view, use the arrow cursor keys to move around the icons. When an icon is focused, its corresponding row is automatically selected. **Note:** The icon view will remember its last focused icon, so if you Tab away, then later move focus back to the icon view, you will be taken back to the last focused icon.
Navigation	Icon view	Home / End	Move to first, or last icon.

Table 3-3   (Cont.) Keyboard Shortcuts in Interactive Grid Regions

Mode	Location	Keys	Description
Navigation	Grid view	Ctrl+Home (Windows) Option+Up Arrow (Mac)	In navigation mode moves to the first cell in the report.
Navigation	Grid view	Ctrl+End (Windows) Option+Down Arrow (Mac)	In navigation mode moves to the last cell in the report.
Edit	Grid view	Tab or Shift+Tab	Row navigation. Move to the next, or previous cell on the same row, and automatically opens the edit control for that cell if applicable. **Note:** When at the end of a row, Tab takes the user to the first cell in the next row.
Edit	Grid view	Enter or Shift+Enter	Column navigation. Move to the next, or previous cell in the same column, and automatically opens the edit control for that cell if applicable. **Note:** If the edit control itself uses the Enter key (for example a text area), this shortcut will not work and the user will have Ctrl+F6 to close the popup without leaving edit mode then press Enter or Shift+Enter. Pressing Ctrl+F6 again will open the closed popup.
Edit	Grid view	Escape	Exits Edit mode, and goes back to Navigation mode. **Note:** If the edit control itself uses the Escape key (for example a radio group that uses a popup control, where Escape key closes the popup), then Escape will need to pressed twice to first close the popup, then exit Edit mode.

3.3.6 About Configuring Interactive Grids to Support Multi-select

Interactive grids must be configured to support multi-select. When multi-select is enabled, users can use arrow keys to move around an entire grid, use the Space key to select, or use Ctrl+Space to toggle selections.

To configure an interactive grid to support multi-select:

- Editable interactive grid - Configure the `APEX$ROW_SELECTOR` column which is automatically created for you when you make an interactive grid editable. Under **Settings**, set the **Enable Multi Select** attribute to **Yes** (the default).

- Non-editable interactive grid - Use an advanced JavaScript configuration. To see an example, install the *Sample Interactive Grids* packaged application and see **Multiple Selection** example under **Reporting**.

> ✏️ **See Also:**
>
> Making an Existing Interactive Grid Editable in *Oracle APEX App Builder User's Guide*

3.3.7 Interactive Report Regions Keyboard Shortcuts

Interactive report regions include many keyboard shortcuts and keyboard-specific features.

- Searching Data in an Interactive Report
- Using the Actions Menu
- Managing Bulk Updates
- Utilizing Drill Down Links
- Editing Existing Filters
- Loading Saved Reports

3.3.7.1 Searching Data in an Interactive Report

If a search bar displays above an interactive report then the Include Search Bar attribute has been enabled in Report Attributes. This attribute is enabled by default when a new interactive report is created.

To execute a search:

1. Press **TAB** until the search field has focus.

2. Type your search keywords into the search field.

3. Press **ENTER** to invoke the search.

4. To refine your search to a specific column:

   a. Press **TAB** to access the magnifying glass icon to the left of the search field.

   b. Press **ENTER** to activate the pull down menu and display a list of all available columns to search.

   c. Press the **DOWN** or **UP** arrow keys on your keyboard to navigate through the list of **columns**.

   d. Press **ENTER** to select the column you want to search on. This sets the context of the subsequent search as specific to the column selected.

5. Repeat steps 1 and 2 to execute your column specific search.

3.3.7.2 Using the Actions Menu

By default, new interactive reports include both a search bar and Actions menu. Both of these features are controlled by the developer by enabling the Include Search Bar and Actions menu attributes on the Report Attributes page. Depending upon how the developer creates the report, the Action menu can contain different options.

To access the Actions menu using a keyboard:

1. Press **TAB** until the Actions menu has focus.

2. Press **ENTER** to open the menu.

3. Once the menu is open, you have the following navigation options:

   - Press the **DOWN** arrow key to go down the menu.

   - Press the **UP** arrow key to go up the menu.

   - Press the **RIGHT** arrow key to open a submenu (indicated by a right arrow) and move focus to the first item in the submenu.

   - Press the **LEFT** arrow key to close a submenu and move focus back to the appropriate item in the parent menu.

4. To exit the Action menu:

   - Press **ENTER** to load the action specific dialog. Focus is set to the first focusable element within the dialog box.

   - Press **ESC** to close the menu without selection.

> ✎ **See Also:**
>
> About the Actions Menu in *Oracle APEX App Builder User's Guide*

3.3.7.3 Managing Bulk Updates

Some interactive reports contain form items for applying bulk updates to components. All form items within the report and buttons to apply the changes are keyboard accessible. Also some pages feature a check box in the first row to perform bulk processing and corresponding **Select All** and **Deselect All** links below the report. All of these items are keyboard accessible.

3.3.7.4 Utilizing Drill Down Links

Some interactive reports contain at least one link to edit or view a specific sub-components. These are all standard links and are therefore keyboard accessible.

3.3.7.5 Editing Existing Filters

When an existing search filter is applied to an interactive report, a search filter displays below the Search bar.

You can access the search filter using the keyboard to:

- Edit the search filter.

  Press **TAB** to navigate to the search filter and then press **ENTER** to open the Filter dialog box. Focus is automatically set to first focusable element in the dialog box.

- Disable or enable the search filter.

  Press **TAB** to navigate to the check box to the left of the filter and **SPACEBAR** to disable or enable the filter.

- Delete the search filter.

Press **TAB** to navigate to the search filter and then **ENTER** to open the Filter dialog box. Press **TAB** or **SHIFT+TAB** to navigate to the Delete button and then press **ENTER**.

3.3.7.6 Loading Saved Reports

If an Interactive Report includes a Search bar, Actions menu, and support for saved reports, then these options have been enabled by the developer on the Report Attributes page.

To load a saved report:

1. Press **TAB** until the Reports select list has focus. Note that the Reports select list only displays if there are saved reports.

2. Press the **UP** and **DOWN** keys to select the specific saved report you want to view.

3. Press **ENTER** to view the saved report.

> **✎ See Also:**
>
> "Managing Interactive Report Attributes" in the *Oracle APEX App Builder User's Guide*

4

Developing Accessible Apps

This section provides guidelines for creating an accessible app with Oracle APEX.

- Developing Accessible Themes
  Themes are collections of templates that enable you to define the layout and style of an entire application. Oracle APEX apps use Universal Theme by default.

- Developing Accessible Pages
  Enable easy navigation of your app for users of assistive technology by properly configuring some common attributes of all your pages, such as the title, page mode, cursor focus, and reload on submit.

- Developing Accessible Regions
  Ensure the regions on a page provide sufficient navigational information for users of assistive technology.

- Developing Accessible Form Pages and Items
  Ensure that your form pages and items provide sufficient information to users of assistive technology.

- Developing Accessible Buttons
  Buttons in Universal Theme offer great display flexibility while supporting accessibility.

- Testing Apps for Accessibility
  Oracle APEX includes a built-in tool called the Advisor, which developers can run as part of quality assurance of an application.

4.1 Developing Accessible Themes

Themes are collections of templates that enable you to define the layout and style of an entire application. Oracle APEX apps use Universal Theme by default.

> **⚠ Important:**
>
> Oracle recommends using Universal Theme for creating accessible apps.
>
> This guide is written for use with the Universal Theme. This guide does not support customized themes directly. While some discussion applies generally to all apps, many discussions are specific to Universal Theme.

- About Accessibility Features in Universal Theme
- About Accessible Theme Styles
- About Theme Roller

4.1.1 About Accessibility Features in Universal Theme

Universal Theme (also called Theme 42 or sometimes abbreviated as UT) was first introduced in Oracle APEX 5.0 to improve out of the box usability and accessibility for APEX apps.

While you can create and use your own fully accessible custom themes in Oracle APEX, this guide only provides instructions for apps using Universal Theme.

Oracle strongly recommends migrating from older themes to Universal Theme. See the Universal Theme migration guide for further assistance.

4.1.2 About Accessible Theme Styles

Theme styles enable you to change the look and feel of an app without switching to an entirely different theme.

Oracle recommends using the default Oracle APEX theme style Vita for best accessibility.
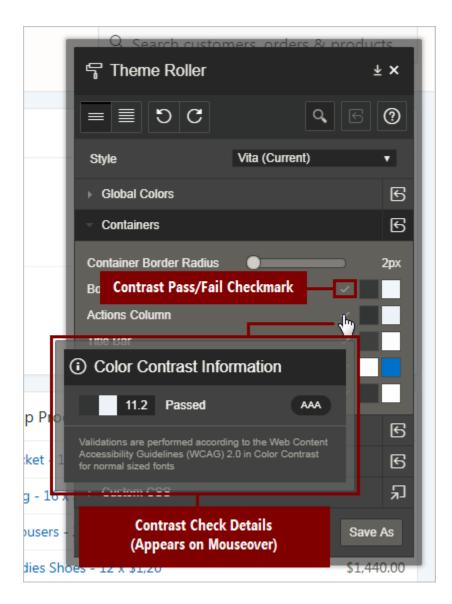
You can mark theme styles in Oracle APEX as **accessibility tested**. Because the underlying CSS of a theme style affects the overall accessibility of an app, you can mark a theme style as accessibility tested if you are confident that it meets the appropriate accessibility standards that you or your organization must adhere to. The Vita theme style is accessibility tested.

4.1.3 About Theme Roller

Theme Roller is a developer tool in the application runtime for analyzing and declaratively adjusting the style settings of Universal Theme without needing to know the underlying CSS.

Some color combinations cause accessibility issues due to a lack of contrast. To help prevent this, Theme Roller has automatic color contrast checking that analyzes your app's compliance with WCAG 2.0 contrast standards. Theme Roller notifies you if a setting passes or fails this contrast check.

A check mark appears next to color combinations for settings to indicate that the color contrast defined meets the minimum required ratio. You can also mouse over the check mark, and a small dialog displays showing the exact contrast ratio, and to what WCAG 2.0 conformance level this achieves (either AA or AAA).

To learn more about minimum color contrast, see WCAG 2.0 Understanding 1.4.3 Color Contrast.

> **✎ Note:**
>
> While Theme Roller is a powerful tool for assessing the accessibility of your app, unfortunately Theme Roller itself is not fully accessible. A more accessible version of Theme Roller is planned for a future release.

4.2 Developing Accessible Pages

Enable easy navigation of your app for users of assistive technology by properly configuring some common attributes of all your pages, such as the title, page mode, cursor focus, and reload on submit.

- Accessible Page Titles
- Accessible Page Modes
- Accessible Cursor Focus
- Accessible Reload on Submit

> ✎ **See Also:**
>
> - Right Pane of Page Designer (Property Editor) in *Oracle APEX App Builder User's Guide*
> - Accessing Property Editor in *Oracle APEX App Builder User's Guide*

4.2.1 Accessible Page Titles

A good page title helps users of assistive technology understand the purpose of the page. Since the page title is usually the first thing a user of a screen reader hears when loading the page, every page title should be meaningful and unique.

Consider the following example. The title of a Form page should include some information about the record the user is currently editing, such as "Create / Edit Customer: *[customer name]*." In Page Designer, select the page in the Rendering tree and do the following in the Property Editor:

- To replace P1_CUSTOMER_NAME with the page item containing the item that best identifies the current record, in the Identification – Title field enter `Create / Edit Customer: &P1_CUSTOMER_NAME.` (ensure you include the period).

- Form pages have a Fetch Row process that fetches the row in the Execution Options. By default, this is set to fire after the page header (**After Header**). Change this to fire **Before Header**.

> 💡 **Tip:**
>
> You can review and update all page titles in an app with the Grid Edit of all Pages tool. You should review all titles for accuracy and meaning, especially different pages with the same title and null page titles.

> **See Also:**
>
> - Controlling When a Page Process Executes in *Oracle APEX App Builder User's Guide*
> - Accessing Cross Page Utilities in *Oracle APEX App Builder User's Guide*

4.2.2 Accessible Page Modes

Oracle APEX supports multiple page mode types:

- **Normal**
- **Modal Dialog**
- **Non-Modal Dialog**

All of these page types can be used and are coded to the accessibility standards.

For example, modal dialog pages follow guidelines for pages including constraining keyboard focus inside of the dialog and ensuring screen reader users only hear information about the current modal dialog page (and not the base page where the modal dialog page was launched).

4.2.3 Accessible Cursor Focus

The Navigation – Cursor Focus attribute specifies where the cursor appears for the user on page load. You can select from the following options:

- Do not focus cursor
- First item on page

Select **Do not focus cursor** to focus on nothing on page load.

Select **First item on page** to focus the cursor in the first field on the page on page load.

Oracle recommends setting your cursor focus to **First item on page** wherever your users want it most of the time, such as in a wizard that has multiple pages with multiple options on each page. Ensure that your **First item on page** design does not misplace important information that users could miss.

4.2.4 Accessible Reload on Submit

This attribute controls how errors display on the page. You can select from the following options:

- Always
- Only for Success

Oracle recommends using **Only for Success**. When **Only for Success** is selected, Oracle APEX renders errors on the client-side without reloading the entire page. This option is faster for all users, and if there are errors, screen reader users are immediately notified and read the error information because the error notification is using the ARIA role of *alert*.

> **Note:**
>
> Tabular form regions can only be set to Always. You cannot use this client-side error display on tabular form pages.

> **See Also:**
>
> Dealing with Validation Errors

4.3 Developing Accessible Regions

Ensure the regions on a page provide sufficient navigational information for users of assistive technology.

- Accessible Page Structure
- Accessible Interactive Grid Regions
- Accessible Interactive Report Regions
- Accessible Classic Report Regions
- Accessible Tabular Forms Regions
- Accessible JET Chart Regions

4.3.1 Accessible Page Structure

Users of assistive technology require a clearly defined structure on every page. After a page loads, screen reader users review all of the heading elements on the page. Correctly defined headings orientate your users by providing a structural overview of the page. You should nest page headings so that there is one H1 on a page to uniquely identify the page contents, then nest H2s, H3s, and so forth accordingly.

You achieve this structure with regions in Oracle APEX. Follow one or more of the following guidances as best practices for structuring pages in your app.

H1 Headings

Include a breadcrumb region on your pages to create a unique H1. You can use the Create Application Wizard to generate breadcrumbs automatically based on the hierarchy of pages defined in the wizard, or you can configure the breadcrumbs in your app manually. By default, the last breadcrumb entry on a page is the H1.

Alternatively, use the Hero region template in Universal Theme. This region template renders the region title as the H1 text on the page by default, which is useful if your current app layout and design does not warrant breadcrumbs.
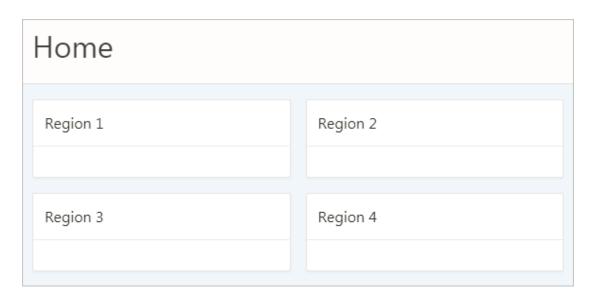
> 💡 **Tip:**
>
> Only use one Hero region per page to avoid creating more than one H1 element.

H2 Headings

After the H1, most region templates in Universal Theme render other content on the page with an H2 around the region title

H2s are appropriate for non-nested regions on a page, such as the following example heading structure:
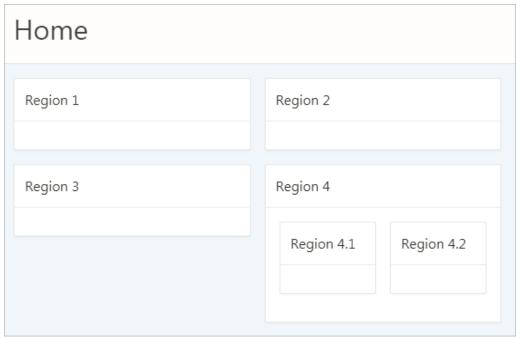
```
H1: Charts
    H2: region 1
    H2: region 2
    H2: region 3
    H2: region 4
```

This semantic structure helps all users scan the current page, both visually using the eyes and audibly using a screen reader.

H3 and Other Sub-Region Headings

Universal Theme does not automatically support headings beyond H2, such as when you have sub-regions nested within an H2 region.

By default, APEX applies H2s to nested sub-regions (regions 4.1 and 4.2 in the above example) in the Standard region template. This creates an accessibility problem because screen reader users may incorrectly believe that these sub-regions are of similar importance to the parent region or that the regions are not ancestral to the parent region.

```
H1: Charts
    H2: region 1
    H2: region 2
    H2: region 3
    H2: region 4
    H2: region 4.1
    H2: region 4.2
```

To properly structure these sub-regions, you must duplicate the Standard region template, then use the Code Editor to manually replace the H2 tags with H3s in the template's definition.

> 💡 **Tip:**
>
> To copy a region, see Creating a New Template in *Oracle APEX App Builder User's Guide* and select the **As a Copy of an Existing Template** option.

Changing the sub-regions to H3s only affects the structure of the element (not the style), which is what we want for accessibility.

This results in the following heading structure:

```
H1: Charts
    H2: region 1
    H2: region 2
    H2: region 3
    H2: region 4
        H3: region 4.1
        H3: region 4.2
```

> ⚠ **Important:**
>
> Be aware of the following issues when copying the Standard region template:
>
> • While a copied template keeps the theme subscription (which enables you to refresh the theme when Oracle APEX is upgraded), the copied template does not upgrade automatically on refresh. You may need to manually change or re-copy the template post-refresh if there are any markup changes in that template.
>
> • You must manually add an additional template for every deeper heading level in your app (H3, H4, H5...). We plan to make it easier to control the heading level without requiring an additional template in a future Oracle APEX release.

Region Titles

You should define meaningful titles for most region types because Universal Theme uses the region title as the heading text for the region.

Descriptive titles are essential for accessibility. By default, titles are visible on screen. However, sometimes you may not want a title for a region, such as when sighted users can quickly discern the region's content from surrounding page content at a glance. In such cases, you must still provide heading text for screen reader users. To make such a page accessible, select the region, in Property Editor open the Template Options, and set the Header attribute to **Hidden but accessible**.

> **Tip:**
>
> You can review and update all region titles in an app with the Grid Edit of all Region Titles page. You should review all titles for accuracy and meaning, especially regions with the same title on the same page which may be an issue depending on the context.

> **See Also:**
>
> Accessing Page Specific Utilities in *Oracle APEX App Builder User's Guide*

4.3.2 Accessible Interactive Grid Regions

Introduced in Oracle APEX 5.1, interactive grids combine powerful reporting with grid-based editing in a single component. Users can access all interactive grid functionality with just a keyboard, enabling all users to navigate around the grid and edit their data using the keyboard. For a complete list of keyboard support in interactive grids, see Interactive Grid Region Keyboard Shortcuts.

Interactive grids do contain some accessibility bugs affecting screen reader users. All bugs are listed in the current VPAT.

4.3.3 Accessible Interactive Report Regions

Data Table Accessible Label

You must enable screen reader mode to ensure the underlying data table rendered by interactive reports has an accessible label. Once enabled, Oracle APEX generates the following SUMMARY text for the rendered data table:

```
Region = [region title], Report = [current saved report name], View =
[current View], Displayed Rows Start = [current start of rows displayed,
Displayed Rows End = [current end of rows displayed], Total Rows = [total
number of rows]
```

This text identifies the data table, and therefore provides a great deal of contextual information to users of assistive technology.

Edit Icon Link Text

When creating a Report and Form, Oracle APEX generates the links between the two pages to allow you to edit specific records. The link text generated for all rows is `Edit` by default. You should make this text a meaningful label so that screen reader users (who listen to all the links on the current page) can understand the purpose of the link and where it takes them. The link text should be specific to the current row in the report. For example, for a report of customers, the link text could be `Edit Customer: SMITH`.

You can define the link text of an interactive report region by selecting the Attributes node, then in the Property Editor expand the Link column, set Link Column to **Link to**

Single Row View or **Link to Custom Target**, and update the alt text in the Link Icon field.

Because there is no visible link text used, the link uses the inline image's alt text as the text for the link. Note that you can use a substitution string such as #CUSTOMER_NAME# to target the column that best identifies the current row.

> ✎ **See Also:**
>
> Editing Interactive Report Attributes in *Oracle APEX App Builder User's Guide*

4.3.4 Accessible Classic Report Regions

Data Table

By default, Oracle APEX generates SUMMARY text equal to the region title. This identifies the data table to users of assistive technology.

> ✎ **Note:**
>
> Unlike interactive reports, classic reports do not provide any additional information about the report state. This may limit your app's functionality.

Edit Link Text

When creating a Report and Form, Oracle APEX generates the links between the two pages to allow you to edit specific records. The link text generated for all rows is `Edit` by default. You should make this text a meaningful label so that screen reader users (who listen to all the links on the current page) can understand the purpose of the link and where it takes them. The link text should be specific to the current row in the report. For example, for a report of customers, the link text could be `Edit Customer: SMITH`

You can define the link text of an interactive report region by selecting the Attributes node, then in the Property Editor expand the Link column, set Link Column to **Link to Single Row View** or **Link to Custom Target**, and update the alt text in the Link Icon field.

Because there is no visible link text used, the link uses the inline image's alt text as the text for the link. Note that you can use a substitution string such as #ENAME# to target the column that best identifies the current row.

> ✎ **Note:**
>
> Although classic report regions support column headers in the report, currently Oracle APEX does not support the ability to define a row header column in the report. Row headers are important for accessibility of data tables because screen readers announce the row header when navigating to a new row in the report (in the above example, that would be the ENAME value). See the VPAT for more details and the related bug number.

4.3.5 Accessible Tabular Forms Regions

Tabular forms provide simple multi-row editing capability in your apps.

Data Table

By default, Oracle APEX generates SUMMARY text equal to the region title. This identifies the data table to users of assistive technology.

Use as Row Header

Specify if a column should be used as the heading for the row. Including the column value can greatly improve accessibility for form fields rendered in the tabular form. When specified, Oracle APEX uses the Row Header together with the Column Header to render unique labels for the form fields in the report in the following format: `<Column Header> : <Row Header>`

For example, you define the ENAME column as the Row Header for a report on the EMP table. For a row where ENAME is '"JONES," the label for the Salary field in that row would be `Salary : JONES`. This approach enables a screen reader user to navigate by the form fields in the report and still understand which form fields relate to which row.

4.3.6 Accessible JET Chart Regions

Oracle APEX 5.1 introduced charts based on the Oracle JET Data Visualization components (JET charts). Releases prior to 5.1 used charts based on AnyChart, where there were many accessibility issues.

For more information about accessibility of Oracle JET Data Visualization components including support for keyboard and touch, see the Oracle JET documentation.

The following sections detail some chart settings that are particularly useful for ensuring chart accessibility.

Chart Title

The chart title displays in the chart region next to the chart. It is also the accessible label for the chart page section. In Page Designer, the chart title is defined in the chart Attributes node.

If there is only one chart displayed within a region, consider hiding the region title to avoid visual duplication. You can hide the region title by changing the Header region appearance setting in the Template Options dialog to **Hidden but accessible**. This removes the region title from the page but preserves the heading for assistive technologies (if users scan the current headings on the page to orientate themselves, they can perceive this title).

Tooltip

The tooltip displays when the mouse hovers over a specific chart section or the keyboard has focus on this section. In addition, the tooltip is the accessible label for that section of the chart. For example, when screen reader users navigate around the chart sections, this tooltip is announced.

To display the tooltip, select the chart Attributes node in the Rendering tree; in the Property Editor, set the Show field to **Yes**; and finally, select what information to include in the tooltip. You can define this in two ways:

- Adjust the other attributes displayed in the Tooltip group in Page Designer. This allows you to control display of Series Name, Group Name, Value, and Label information where applicable for your chart. For example, if the chart only has one series, then you may want to exclude the series name in the tooltip, so you would set Show Series Name to **No**.

- For a highly customized tooltip, set a column in your database table to be used as the source for the tooltip. You can configure this on the individual Series node nested under the chart in the Rendering tree.

Automatic Refresh Functionality

Developers can define an Automatic Refresh, **Interval** in the chart Attributes which causes the chart region to automatically refresh according to the interval defined. Oracle recommends avoiding this functionality for accessibility purposes since this type of automatic refresh is very disruptive for users of assistive technology.

4.4 Developing Accessible Form Pages and Items

Ensure that your form pages and items provide sufficient information to users of assistive technology.

> **Note:**
>
> The following overview is not a comprehensive list of all item types in Oracle APEX. This section only cites items that have specific settings or issues related to accessibility.

- Accessible Form Page Attributes
- Accessible Date Pickers
- Accessible Select Lists and Radio Groups
- Accessible Display Image Alternative Text

4.4.1 Accessible Form Page Attributes

Item Labels

Define meaningful labels for all items. Users of assistive technology require meaningful labels to understand and interact with a field.

> **Tip:**
>
> You can review and update all item in an app with the Grid Edit of all Item Labels page. You should review all labels for accuracy and meaning, especially items with null labels and items with the same label on the same page.

> **✎ See Also:**
>
> Viewing Item Utilities in *Oracle APEX App Builder User's Guide*

Value Placeholder

Oracle recommends against using just a value placeholder as the only label for an item because it is insufficient for accessibility.

To hide a visible label from display for design reasons, Oracle recommends using a Hidden label template in conjunction with a label.

Item Templates

Universal Theme includes the following item templates to control how the label renders for the item:

Hidden
Hides the label from display but preserves it in the markup for use by assistive technologies.
Use this template to preserve accessibility rather than not providing a label.

Optional / Optional - Above
Labels the field optional without any further decoration.

Required / Required - Above
Labels the field required and displays an asterisk adjacent to the label.
For accessibility, Oracle APEX ignores the asterisk and appends hidden text "Value Required" to the label. Assistive technology announces this label as "*Label* (Value Required)" so that the user can immediately tell if the field is required.
Additionally, Oracle APEX adds "Value Required" to the end of the label rather than the beginning, so that screen readers users can still search for a specific field by label name.

Value Required

Oracle does not recommend use of the Value Required attribute for accessibility purposes. If the Value Required attribute is set to **Yes** and the item's label template is **Required**, APEX duplicates reporting of the required state to Assistive Technologies (see the VPAT to learn more).

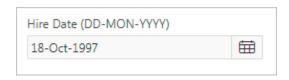If you have a simple required field, use a Not Null style validation on the page item.

> **✎ See Also:**
>
> • Validating User Input in Forms in *Oracle APEX App Builder User's Guide*
> • Dealing with Validation Errors

4.4.2 Accessible Date Pickers

Date pickers are not accessible by default, but you can help users to more easily enter a date manually. For example, Oracle recommends configuring date picker items to display a sample date to indicate the input format. You can include this sample information in the label, such as in the following example:

Hire Date (DD-MON-YYYY)

18-Oct-1997

> ✏ **See Also:**
>
> Available Item Types, "Date Picker" in *Oracle APEX App Builder User's Guide*

4.4.3 Accessible Select Lists and Radio Groups

You can define select lists and radio groups to redirect or submit the page when the value of the control changes in the Page Action on Selection attribute. However, this behavior disrupts users of assistive technology, who do not expect a page reload and lose context. Instead, use dynamic actions or cascading LOVs to achieve similar functionality.

Consider the following example. You have a select list on a page to filter a report region. You submit the page with this attribute in order to update the report to show the filtered results. Instead, use a Dynamic Action on "change" of the select list, and then define an action to refresh the report region.

For further examples, see the Sample Dynamic Action app in Packaged Applications.

4.4.4 Accessible Display Image Alternative Text

The display image item type enables you to display alternative text with an image on a form page, which is essential to users of assistive technology.

Alternative text settings for the display image item type relevant to accessibility include:

Alternative Text Column
Displayed when Based On is set to **BLOB Column Specified in Item Source**
Defines the column that stores the alternative text for the image.

Alternative Text
Displayed when Based On is set to **Image URL stored in Page Item Value**
Defines alternative text to describe the image. This can also be dynamic by using substitution syntax, such as `&P1_ALT_TEXT.` (ensure you include the period)

4.5 Developing Accessible Buttons

Buttons in Universal Theme offer great display flexibility while supporting accessibility.

Label

The label is crucial for button accessibility. Assistive technologies such as screen readers announce the button label, and users with speech recognition software can speak the name of the label to activate the button. Ensure your button labels are clear, unique, and meaningful.
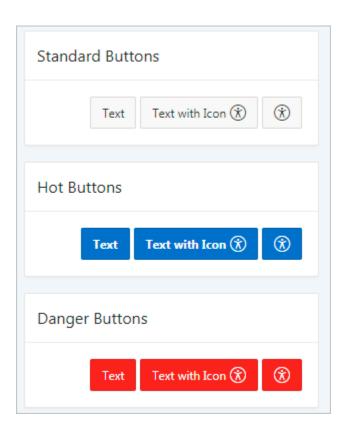
Button Template

Buttons can be based on the following templates:

- Icon
- Text
- Text with Icon

All of these are accessible. Labels for icon-based buttons are hidden from display, but they still exist in the markup for screen readers.

Template Options

Be aware that in the Template Options dialog, the **Type** option changes the button design in ways that can affect accessibility. For example, the Danger type colors the button background red and the foreground text white. Conveying information by color alone is an accessibility issue, so only use the Type template options with this potential

problem in mind. For example, the Danger type can still be accessible if the button text clearly indicates the purpose of the button (as opposed to only an exclamation point).

> 💡 **Tip:**
>
> You can review and update all item in an app with the Grid Edit of all Button Labels page. You should review all labels for accuracy and meaning, especially items with the same label on the same page.

> ✏️ **See Also:**
>
> Accessing Page Specific Utilities in *Oracle APEX App Builder User's Guide*

4.6 Testing Apps for Accessibility

Oracle APEX includes a built-in tool called the Advisor, which developers can run as part of quality assurance of an application.

To help with other non-mandatory attributes defined by a developer, the Advisor includes a set of accessibility checks to highlight possible common accessibility problems (such as page items with no labels or page regions with no row headers defined). Developers should review and fix such problems as part of their ongoing development process. We recommend fixing issues identified by the Advisor before performing other accessibility testing (such as testing with Assistive Technologies).

- About Accessibility Checks in Advisor
  The Advisor performs the following accessibility checks when you run it. These checks identify some common configuration errors which have a negative impact on accessibility.

- Running Advisor on a Single Page
  Perform accessibility checks (and others) on a page in an app.

- Running Advisor on an Entire Application
  Perform accessibility checks (and others) on an entire app.

- Enabling Accessibility Tags in PDF Documents
  Manually enable and disable accessibility preferences that persist beyond the user's current session using the `APEX_UTIL.SET_PREFERENCE` procedure.

4.6.1 About Accessibility Checks in Advisor

The Advisor performs the following accessibility checks when you run it. These checks identify some common configuration errors which have a negative impact on accessibility.

Theme Style tested for accessibility
Theme Styles that have not been tested for accessibility may contain more issues, such as insufficient color contrast.

Page has page title
Meaningful page titles help users understand the content and purpose of the current page. (*Note:* Global pages, and pages with no regions are excluded from this check.)

Region has Row Header
Regions that support row headers should have a column with the "Use as Row Header" attribute set to Yes.

Page item has label
The item should have a defined label. For example, only defining the Value Placeholder text is not sufficient in labelling an item for accessibility.

Page item does not cause an unexpected context change
Some page item settings can cause an unexpected change of context for the user, such as select lists that submit the page after a value is selected.
Consider the following ways to retain the context of the page:

- Remove page submit or redirect behavior from page items, and replace the functionality with Dynamic Actions or Cascading LOVs (if you need to stay on the same page).

- Notify users what happens when they click an item. For example, adding "Launches new page" in the label.

Display Image item has image ALT text defined
Display Image page items must provide text or a column (depending on the Based On setting) to serve as the image's alternative text. This is important for accessibility, as it is the only way for some users to perceive the content of the image.

4.6.2 Running Advisor on a Single Page

Perform accessibility checks (and others) on a page in an app.

To run Advisor on a single page:

1. Navigate to the appropriate page.

2. Click the **Utilities** menu and select **Advisor**.

   Advisor appears.

3. Under Checks to Perform, review the selected options. Select and deselect options as appropriate.

4. Click **Perform Check** at the top of the page.

   A Results page appears.

5. To alter the existing preferences:

   a. Under Filter Result, deselect the appropriate options.

   b. Click **Apply Filter**

6. To re-run the Advisor and see if reported problems are fixed, click **Perform Check**.

4.6.3 Running Advisor on an Entire Application

Perform accessibility checks (and others) on an entire app.

To run Advisor on an entire application:

1. Navigate to the appropriate application:

   a. On the Workspace home page, click the **App Builder** icon.

      The App Builder home page appears.

   b. Select the application.

      The Application home page appears.

2. Click **Utilities**.

3. Click **Advisor**.

   The Advisor page appears.

4. Under Checks to Perform:

   a. Expand Checks to Perform.

   b. Review the selected options. Select and deselect options as appropriate.

5. In Pages(s), enter a comma separated list of pages in the field provided. To check all pages, leave this option blank.

6. Click **Perform Check** at the top of the page.

   A Results page appears.

   > **Tip:**
   >
   > Current Advisor settings are used next time the check is performed.

7. To alter the existing preferences:

   a. Under Filter Result, deselect the appropriate options.

   b. Click **Apply Filter**.

8. To run Advisor again, click **Perform Check**.

4.6.4 Enabling Accessibility Tags in PDF Documents

Manually enable and disable accessibility preferences that persist beyond the user's current session using the `APEX_UTIL.SET_PREFERENCE` procedure.

Creating an accessible PDF enables the document to be read aloud by a screen reader and other text-to-speech tools and increases the PDF file size. Setting the `p_preference` parameter `APEX_PDF_ACCESSIBLE` to `Y` adds accessibility tags for native PDF printing. Alternately, setting `APEX_PDF_ACCESSIBLE` to `N` disables accessibility tags. This preference is set automatically when the **Include Accessibility Tags** switch is enabled in the download dialog of an interactive report or interactive grid.

> **See Also:**
>
> SET_PREFERENCE Procedure in *Oracle APEX API Reference*

5

Open Bugs and Known Issues

Review known issues in Oracle APEX in the following documents.

VPAT

VPATs for Oracle Database related products - VPAT for Oracle APEX.

Click the link, click **Database Products** or **Open All**, then find the relevant version of APEX.

The VPAT lists exceptions in the product, along with their corresponding bug number. Bugs are categorized as one of the following:

• Affecting the Development Environment
• Affecting Websheet Applications
• Affecting Database Applications
• Affecting Documentation

6

Further Reading

Additional resources for the assessment and enhancement of accessibility in Oracle APEX apps include the following documents.

- Oracle Accessibility Program - General information about accessibility at Oracle. Click **Database Products** or **Open all** and locate the relevant version of APEX.

- Plug-ins - Plug-ins enable developers to readily extended with custom item types, region types, processes and dynamicactions. Once defined, plug-in based components are created and maintained very much like standard Oracle APEX components.

- Universal Theme Sample App - Sample app hosted on apex.oracle.com with information about Universal Theme, including a Migration Guide to move from older themes.

- Understanding WCAG 2.0 - A guide to understanding and implementing web apps to the WCAG 2.0 set of guidelines.

Index

A

accessibility
    about, *3-1*
    WAI-ARIA support, *3-3*
accessibility preferences
    disabling, *4-19*
    enabling, *4-19*
accessing components with keyboard, *3-3*
Advisor, *4-17*
    entire app, *4-18*
    single page, *4-18*
alternative text, *4-15*
APEX_PDF_ACCESSIBLE, *4-19*
APEX_UTIL.SET_PREFERENCE
    APEX_PDF_ACCESSIBLE preference, *4-19*
application pages, *4-4*

B

buttons, *4-16*

C

charts, *4-12*
classic reports, *4-11*
components
    accessing with keyboard, *3-3*
cursor focus, *4-4*

D

date pickers, *4-15*
display image, *4-15*
dynamic actions, *4-15*

F

form pages, *4-13*
forms
    accessing using JAWS, *3-1*

H

headings, *4-6*
Help text
    accessing with JAWS, *3-2*

I

interactive grids, *4-10*
interactive reports, *4-10*

J

JAWS, *3-1*
    about validation errors, *3-2*
    accessing forms, *3-1*
    accessing Help text, *3-2*
    recommended browsers, *3-1*

K

keyboard shortcuts
    CSS Calendar, *3-6*
    Date Picker, *3-6*
    general, *3-4*
    Interactive Grid Regions, *3-8*
    map, *3-8*

O

Oracle APEX
    keyboard shortcuts, *3-4*, *3-6*, *3-8*

P

page modes, *4-4*
pages, *4-4*

R

radio groups, *4-15*
region titles, *4-6*
regions, *4-6*
reload on submit, *4-4*

S

select lists, *4-15*

T

tabular forms, *4-12*
Theme 42, *4-1*
Theme Roller, *4-2*
theme styles, *4-2*

U

Universal Theme, *4-1*

UT, *4-1*

V

validation errors, running JAWS, *3-2*

W

WAI-ARIA support, *3-3*