

# Oracle® APEX

## Release Notes



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ORACLE®

Oracle APEX Release Notes, Release 23.1

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# Contents

## 1 About These Release Notes

---

1.1	Before You Begin	1-1
1.1.1	Oracle Database Requirements	1-1
1.1.2	Browser Requirements	1-1
1.1.3	Web Server Requirements	1-2
1.1.4	About Release Numbering Conventions	1-2
1.1.5	About Checking for the Most Current Release	1-2
1.1.6	About Upgrading to the Latest Oracle APEX Release	1-2
1.1.7	About Determining Your Release Version	1-2
1.1.8	Important Information if Updating from a Release Prior to 23.1	1-3

## 2 New Features

---

2.1	Template Components	2-1
2.2	PWA Push Notifications	2-2
2.3	Modernized Object Browser	2-2
2.4	Page Processing Improvements	2-3
2.5	REST Data Source Enhancements	2-3
2.6	Property Graph Support	2-4
2.7	SQL Developer Web Integration	2-4
2.8	Capture ECID in APEX Webservice Log	2-4
2.9	Application Continuity	2-4
2.10	APEX Administrator Digest	2-5
2.11	Auto-Provisioning Restrictions	2-5
2.12	New Application Administration API Package	2-5
2.13	New Color Picker	2-6
2.14	Import and Export in Theme Roller	2-6
2.15	Region Display Selector Enhancements	2-6
2.16	Plug-In Attributes Updates	2-6
2.17	Improved App Icon Fidelity	2-6
2.18	Translation of Runtime Messages into Icelandic	2-7
2.19	Save and Run Page from Code Editor	2-7
2.20	Context-Sensitive APEX Help	2-7

2.21	Multi-Tenant Authentication	2-7
2.22	Approvals Component Enhancements	2-7
2.23	JavaScript API Updates	2-7
2.24	JavaScript Library Upgrades	2-8

## 3 Changed Behavior

---

3.1	Rich Text Editor	3-1
3.2	Unsupported Format Masks in Date Picker	3-1
3.3	HTML Sanitization	3-1
3.4	Shuttle Item Events	3-2
3.5	Combined JavaScript File Change	3-2
3.6	Substitutions in HTML Expressions of Interactive Report	3-2
3.7	App Builder UI Changes	3-3
3.8	Compatibility Mode	3-3
3.9	Enabling Network Services in Oracle Database	3-6
3.9.1	When and Why Network Services Must be Enabled	3-6
3.9.2	Granting Connect Privileges	3-7
3.9.3	Troubleshooting an Invalid ACL Error	3-8

## 4 Ideas App Implementations

---

## 5 Deprecated Features

---

5.1	CKEditor5 Deprecated	5-1
5.2	Deprecated Object Browser Features	5-1
5.3	Preventing Double Escaping of LOV Display Values	5-1
5.4	Display Only Item with Format HTML (Unsafe) Deprecated	5-2
5.5	Deprecated Functions and Procedures	5-2

## 6 Deprecated in Previous Releases

---

6.1	Deprecated APEX Item Markup	6-1
6.2	Deprecated jQuery Date Picker	6-2
6.3	Previously Deprecated APIs	6-2
6.4	Deprecated Utilities	6-2
6.5	Deprecated Legacy Web Service References	6-2
6.6	jQuery UI Deprecated	6-2

## 7 Desupported Features

---

7.1	Desupported Query Builder	7-1
7.2	Desupported User Interfaces Removed	7-1
7.3	Desupported JET Date Picker Item Type Migrated	7-2
7.4	DOM Object Desupported	7-2
7.5	Legacy Bulk Utilities Desupported	7-2

## 8 Desupported in Previous Releases

---

8.1	Desupported Attributes in App Builder	8-1
8.2	Desupported Properties	8-2
8.3	Desupported View Columns	8-2
8.4	FullCalendar 3 Desupported	8-2
8.5	App Builder Defaults Desupported	8-2
8.6	Copying Legacy Themes Desupported	8-2
8.7	CKEditor4 Desupported	8-2
8.8	Desupported Public Package APIs	8-3
8.9	Desupported Page Positions	8-3
8.10	Desupported Region Positions	8-3
8.11	Custom Page Region Templates with Duplicated Positions Desupported	8-4
8.12	Legacy Substitution Strings Desupported	8-4
8.13	Desupported JavaScript Functions	8-4
8.14	Post Calculation for Page Items Desupported	8-4
8.15	Show / Hide All Page Items On Same Line Attributes Desupported	8-5
8.16	apex.server Plug-in and Process Function Async Option Desupported	8-5
8.17	apex.widget.initPageItem Function Desupported	8-5
8.18	Popup LOV Template Desupported	8-5
8.19	Based On - Output of PL/SQL Code attribute Desupported	8-5
8.20	Syntax {COLUMN_NAME}_LABEL in Interactive Grid Icon and Detail Views Desupported	8-5
8.21	Removed Content Delivery Network	8-5
8.22	APEX-Based REST Services Desupported	8-6

## 9 Fixed Bugs

---

## 10 Open Bugs and Known Issues

---

10.1	Known Issue with Confirm or Alert Dynamic Action Messages When Upgrading	10-1
10.2	Known Issue using 'Source Display' region type plug-in in previously installed Sample Apps	10-2

10.3	Known Issues for jQuery Upgrade	10-2
10.4	Interactive Grid support for REST Enabled SQL	10-3
10.5	Group By Component Type mode prevents Default View	10-3
10.6	Known Issues for Data Generator	10-3
10.7	Known Issue Using Readable Export Format	10-3
10.8	Known Issue when Displaying RESTful Module Definition Full URL	10-4
10.9	Known Issue when Displaying Full URL for Enabled Object Definition when using a Named Pool in ORDS	10-4

## 11 Documentation Accessibility

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## 12 Privacy Notice

---

## Index

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# 1

## About These Release Notes

These release notes contain important information not included in the Oracle APEX documentation.

- [Before You Begin](#)

### 1.1 Before You Begin

Review the following to ensure your readiness for this version of Oracle APEX.

- [Oracle Database Requirements](#)
- [Browser Requirements](#)  
Oracle APEX requires a JavaScript-enabled browser and supports the current and prior major release of Google Chrome, Mozilla Firefox, Apple Safari, and Microsoft Edge.
- [Web Server Requirements](#)  
Oracle APEX requires Oracle REST Data Services (ORDS) 20.x or later.
- [About Release Numbering Conventions](#)  
New releases of Oracle APEX correlate to the calendar year.
- [About Checking for the Most Current Release](#)
- [About Upgrading to the Latest Oracle APEX Release](#)
- [About Determining Your Release Version](#)
- [Important Information if Updating from a Release Prior to 23.1](#)

#### 1.1.1 Oracle Database Requirements

Oracle APEX release 23.1 requires an Oracle Database release 19c or later. APEX runs on all database editions, including Enterprise Edition (EE), Standard Edition (SE) and Database 23ai Free. APEX can be installed in single-instance database and in Oracle Real Application Clusters (Oracle RAC) database.



#### See Also:

Oracle APEX Installation Requirements in *Oracle APEX Installation Guide*

#### 1.1.2 Browser Requirements

Oracle APEX requires a JavaScript-enabled browser and supports the current and prior major release of Google Chrome, Mozilla Firefox, Apple Safari, and Microsoft Edge.

## 1.1.3 Web Server Requirements

Oracle APEX requires Oracle REST Data Services (ORDS) 20.x or later.

Oracle REST Data Services (ORDS) is Java-based web server. Oracle REST Data Services features the ability to emit RESTful web services, offers improved file upload capability, and is certified with Oracle WebLogic Server and Apache Tomcat.

### Tip:

APEX-based REST Services were desupported in release 22.1. Oracle REST Data Services (ORDS) release 21.4.2 now ships with migration scripts that enable you to upgrade any remaining APEX-based REST Services to ORDS-based Services. To learn more, see [Migration of Oracle APEX RESTful Service Modules in Oracle REST Data Services Release Notes](#).

## 1.1.4 About Release Numbering Conventions

New releases of Oracle APEX correlate to the calendar year.

In 2018 and starting with release 18.1 and 18.2, APEX introduced correlating the release number to the calendar year.

In addition, APEX now only offers full releases and no longer provides patch set releases (such as 5.1.1). Eliminating patch set releases reduces downtime when updating existing installations. APEX architecture also enables developers to revert releases if necessary.

Patch set exceptions (PSEs) may still be delivered for major defects. To learn more about PSEs, visit the [Oracle APEX 23.1 Known Issues](#) page or the [Prior Release Archives](#) for earlier releases.

## 1.1.5 About Checking for the Most Current Release

Oracle APEX is released more frequently than the Oracle Database. To view information about or download a more current release, see:

<http://www.oracle.com/technetwork/developer-tools/apex/downloads/index.html>

## 1.1.6 About Upgrading to the Latest Oracle APEX Release

If you already have Oracle APEX installed, Oracle strongly recommends that you regularly upgrade to the latest version available.

To learn more, see [Upgrading from a Previous Oracle APEX Release](#) in the *Oracle APEX Installation Guide*.

## 1.1.7 About Determining Your Release Version

To determine which release of Oracle APEX you are currently running, do one of the following:



- View the release number on the Workspace home page:
  - Sign in to APEX.  
The Workspace home page appears. The current release version displays in the bottom right corner.
- View the About APEX page:
  1. Sign in to APEX.  
The Workspace home page appears.
  2. Click the **Help** menu at the top of the page and select **About**.  
The About APEX page appears.

**See Also:**

About Accessing Your Development Environment in *Oracle APEX App Builder User's Guide*

## 1.1.8 Important Information if Updating from a Release Prior to 23.1

If you are updating from a previous release of Oracle APEX, see the Changed Behavior sections in the following documents:

- [Oracle APEX Release Notes release 22.2](#)
- [Oracle APEX Release Notes release 22.1](#)
- [Oracle Application Express Release Notes release 21.2](#)
- [Oracle Application Express Release Notes release 21.1](#)
- [Oracle Application Express Release Notes release 20.2](#)
- [Oracle Application Express Release Notes release 20.1](#)
- [Oracle Application Express Release Notes release 19.2](#)
- [Oracle Application Express Release Notes release 19.1](#)
- [Oracle Application Express Release Notes release 18.2](#)
- [Oracle Application Express Release Notes release 18.1](#)
- [Oracle Application Express Release Notes release 5.1](#)
- [Oracle Application Express Release Notes release 5.0](#)

# 2

## New Features

Oracle APEX release 23.1 includes a number of new features. These new features are not present in APEX release 22.2 and earlier releases.

- [Template Components](#)
- [PWA Push Notifications](#)
- [Modernized Object Browser](#)
- [Page Processing Improvements](#)
- [REST Data Source Enhancements](#)
- [Property Graph Support](#)
- [SQL Developer Web Integration](#)
- [Capture ECID in APEX Webservice Log](#)
- [Application Continuity](#)
- [APEX Administrator Digest](#)
- [Auto-Provisioning Restrictions](#)
- [New Application Administration API Package](#)
- [New Color Picker](#)
- [Import and Export in Theme Roller](#)
- [Region Display Selector Enhancements](#)
- [Plug-In Attributes Updates](#)
- [Improved App Icon Fidelity](#)
- [Translation of Runtime Messages into Icelandic](#)
- [Save and Run Page from Code Editor](#)
- [Context-Sensitive APEX Help](#)
- [Multi-Tenant Authentication](#)
- [Approvals Component Enhancements](#)
- [JavaScript API Updates](#)
- [JavaScript Library Upgrades](#)

### 2.1 Template Components

Template Components are a new plug-in type for building re-usable UI components with support for actions, menus, and custom attributes within Page Designer. These components can be rendered standalone as regions displaying one or multiple rows of data, and can also be within reports as partials for a column.

**Fully Declarative** - Template Components let you create plug-ins with attributes that can be set declaratively in Page Designer. Attributes defined in the plug-in are available in Page Designer for any column or region using the plug-in type.

**Actions and Menu Buttons** - With the introduction of Action Positions and Action Templates for plug-ins, you can define actions and menu buttons with row-level conditions for Template Components.

**Universal Theme Components** - Six out-of-the-box Template Components are added to Universal Theme and available as region types in Page Designer: Avatar, Badge, Comments, Content Row, Media List, and Timeline. These new regions remember pagination, work with faceted search and smart filters, and support the external Order By Item. When working with apps that use the latest version of Universal Theme, Comments, Content Row, Media List, and Timeline are available in the Create Page wizard.

**Partials for Report Columns** - Use partial components as Interactive Report column types to display content like avatars and badges or apply a Template Component directly in any HTML Expression using new template directive syntax.

For more information, see Template Components in *Oracle APEX App Builder User's Guide*.

## 2.2 PWA Push Notifications

Low-code push notifications are now available with a single switch. Users on all devices, desktop and mobile, can opt-in to receive push notifications.

**Notifications** - Send notifications directly to user's devices that feature a message title, body, and icon. Tap on notifications to link back to the APEX application, or a specific page in the app.

**Easy Subscription** - APEX users can subscribe to push notifications from within the application, while instance administrators can manage a queue of notifications.

**New Process and API** - A new native process and public API (`apex_pwa`) are available in APEX to handle sending push notifications from APEX applications.

## 2.3 Modernized Object Browser

### New Functionality

The Object Browser delivers a more accessible and streamlined user experience that makes managing database objects easier.

**Easy Filtering** - You can now view and filter database objects of all types from a single tree. Stay focused on your filtered subset of objects throughout your browser session until you clear or change the filter.

**Editing Made Easier** - An enhanced editing experiences makes it easy to continue editing the last object you viewed, including remembering your cursor position in the code editor. A new warning on navigation ensures unsaved changes are never unintentionally lost.

**Improved Performance** - Create common objects from a new landing page, using a simplified Create Object wizard. When viewing an object, you can now switch quickly

between an object's tabs--for example, between the spec and body of a package, or the columns and data of a table.

**Accessible** - Object Browser is now coded to accessibility guidelines, making it easier to work on database objects with assistive technologies like screen readers.

### Changed Functionality

As part of streamlining the Create Object wizards, some functionality that used to be in the wizard is now only available when editing the object.

Additional changes to the Object Browser include:

- Data downloads from tables, views, or materialized views are now in .XLSX format instead of .CSV format.
- The REST tab for tables, views, packages, procedures, and functions is moved. It is now available in the RESTful Services, Enabled Objects section.
- The UI Defaults tab for tables is moved. To access the UI defaults for a selected table, go to the **Columns** tab and select **More**, then **UI Defaults**

### Deprecated Functionality

For a list of items that are deprecated, see [Deprecated Object Browser Features](#).

### More Information

For more information on the modernized Object Browser, see Managing Database Objects with Object Browser in *Oracle APEX SQL Workshop Guide*.

## 2.4 Page Processing Improvements

New features are available to streamline and better manage page processing.

**Execution Chains** - There is a new page process type: Execution Chain. Group page processes together, or execute page processes one after the other by adding them as children of a chain. Chains can be declaratively run in the background or in the foreground.

**Control Background Execution** - Monitoring is added to the Active Sessions page, giving you more control over processes executing in the background.

**Status and Progress Reporting** - Report on the status and progress of background processes with a new API (`APEX_BACKGROUND_PROCESS`) and APEX view (`APEX_APPL_PAGE_BG_PROC_STATUS`).

## 2.5 REST Data Source Enhancements

REST Data Sources are updated to provide more control over source discovery and responses.

**Invoke API for REST Sources** - The Invoke API process is extended to support REST Data Sources. This provides fully declarative REST invocation for page processes, and makes it simple to map REST source parameters to page items, SQL expressions, static values, and more.

There are new REST Source Parameter types:

- Use "Status Code" and "Reason Phrase" to easily get the server response into the page items.
- Use "Data Profile" to easily fetch a JSON response attribute into a page item.

**Discover REST Sources with Swagger** - APEX now supports REST Source discovery based on a Swagger/OpenAPI response. Create a complete REST Data Source based on a response, including a data profile and additional metadata like operations, URL, or other parameters.

**Raw Selectors** - A new switch item is added to REST Data Source Profiles to select rows as they are. When enabled, all selectors are used exactly as specified and APEX does not sanitize row and column selectors when generating the SQL query for JSON parsing.

## 2.6 Property Graph Support

APEX now supports building APEX components based on Property Graph queries, a feature introduced in Oracle Database 23ai. Build APEX Page Components, shared LOVs, Automations, and Search Configurations directly on a Property Graph using SQL queries.

## 2.7 SQL Developer Web Integration

You can now open SQL Developer Web directly from the SQL Workshop menu in the menu bar. This feature requires ORDS version 23.1, and is configured at the instance level.

For workspaces with one associated schema that is REST-enabled, SQL Developer Web opens in a separate tab. Otherwise, you must select the desired schema from a pop-up dialog. You can only log in to SQL Developer Web with a single schema at a time. If you have a SQL Developer Web window open for a particular schema and then open a second SQL Developer Web window for a different schema, the session for the original schema is invalidated.

## 2.8 Capture ECID in APEX Webservice Log

You can now pass the Execution Context ID (ECID) to external web services for end-to-end tracing with the **Pass ECID** application setting. If this attribute is switched on, customers can relate external web service calls to page calls in APEX.

You can overwrite this value in the configuration of a REST Data Source or by using the web service API `apex_web_service.set_request_ecid_context`. You can use `APEX_APPLICATION_INSTALL` to set the value during application installation.

## 2.9 Application Continuity

A new application security attribute, **Session State Commit**, controls how changes to session and item values and the accompanying commits are handled:

- End of Request - Changes are deferred to the end of request processing.
- Immediate - Changes are immediately written and committed.

New applications are set to **End of Request**, and existing applications to **Immediate**.

## 2.10 APEX Administrator Digest

Monitor the health of your instances, workspaces, and schemas with metrics and trend charts in the new APEX Administrator Digest. Reports in the summary dashboard include daily metrics for the previous day:

- Instance Metrics - Metrics at the instance level, including created workspaces, removed workspaces, and database links.
- Workspace Metrics - Metrics at the workspace level, including user accounts, distinct users, page events, login attempts, created and removed applications, and web service requests.
- Schema Metrics - Metrics at the schema level, including database links, aggregations for user scheduler jobs, and information about used versus free space.

## 2.11 Auto-Provisioning Restrictions

Instance Administrators can now easily manage the auto-provisioning of workspaces with a new UI and API that allows you to define and manage a list of email patterns. Query a block list when auto-provisioning a workspace to restrict email addresses that match the pattern on the block list. Automatic Provisioning must be enabled for this restriction to work.

This functionality adds two new procedures to the `APEX_INSTANCE_ADMIN` package:

- `ADD_AUTO_PROV_RESTRICTIONS`
- `REMOVE_AUTO_PROV_RESTRICTIONS`

## 2.12 New Application Administration API Package

You can now programmatically interface with admin jobs through the new `APEX_APPLICATION_ADMIN` package. This package contains existing APIs moved from `APEX_UTIL`, and has the following methods for administrative tasks:

- `(s|g)et_application_alias`
- `(s|g)et_application_name`
- `(s|g)et_application_status`
- `(s|g)et_application_version`
- `(s|g)et_authentication_scheme`
- `(s|g)et_build_option_status`
- `(s|g)et_build_status`
- `(s|g)et_global_notification`
- `(s|g)et_image_prefix`
- `(s|g)et_max_scheduler_jobs`
- `(s|g)et_parsing_schema`
- `(s|g)et_pass_ecid`

- `(s|g)et_proxy_server`
- `get_no_proxy_domains`

## 2.13 New Color Picker

There is a new web component-based color picker with JET-compatible color objects. You can create the color picker dynamically and change options at runtime to re-render it. The new color picker replaces the old one in Theme Roller, Page Designer, and Interactive Report/Interactive Grid highlighting dialogs.

## 2.14 Import and Export in Theme Roller

You can now import and export theme styles directly from Theme Roller in JSON format. Use the Additional Options menu in Theme Roller to import, export, or reset a theme style.



### Tip:

The Vita theme and the Redwood Light theme are not compatible. It is not possible to export from one and import into the other.

## 2.15 Region Display Selector Enhancements

The Region Display Selector now supports:

- displaying region icons next to titles in Region Display Selector tabs
- controlling tab selection on page load with **Remember Last Selection** tab
- using `APEX_REGION.RESET` to reset user or session preference for tab selection

## 2.16 Plug-In Attributes Updates

The item plug-in infrastructure is extended to support 25 attributes, up from 15. The `apex_application_page_items` dictionary view is extended to show these new attributes.

You can now define custom groups for plug-in attributes, making it easy to group similar plug-in attributes together. You can add custom attribute groups to existing plug-ins by editing the plug-in.

## 2.17 Improved App Icon Fidelity

When creating an application or changing application icons, APEX now generates two new icon files in Shared Component, Application Static Files. These new icons styles support PWAs for all operating systems, including Windows, macOS, Android, and iOS.

For applications created prior to APEX 23.1, use the **Change Icon** button in the User Interface Attributes page to regenerate the full suite of icons.

## 2.18 Translation of Runtime Messages into Icelandic

APEX now supports the translation of runtime messages into Icelandic, extending our language support to 32 languages.

APEX supports the following languages: Arabic, Brazilian Portuguese, Croatian, Czech, Danish, Dutch, Finnish, French, French - Canada, German, Greek, Hebrew, Hungarian, Icelandic, Italian, Japanese, Korean, Norwegian, Polish, Portuguese (Portugal) (pt), Romanian, Russian, Serbian - Cyrillic, Serbian - Latin, Simplified Chinese, Slovak, Slovenian, Spanish, Swedish, Thai, Traditional Chinese, and Turkish.

For more information, see *Installing Translated Versions of APEX* in *Oracle APEX Installation Guide*.

## 2.19 Save and Run Page from Code Editor

You can now run standard pages in Page Designer directly from a code editor dialog without closing it first. Use the new **Save and Run Page** button in the editor toolbar or the default keyboard shortcut (**Alt+F8**).

## 2.20 Context-Sensitive APEX Help

Links to documentation resources in internal applications are updated to redirect to the appropriate book or chapter. This improves the quality of all documentation links from within APEX App Builder, SQL Workshop, and other internal applications.

## 2.21 Multi-Tenant Authentication

The new Configuration Procedure attribute allows you to use a procedure to dynamically configure authentication at runtime. The authentication procedure runs at least once per session. You can use the procedure to specify the `authentication_name`, `substitutions`, and the `tenant_id`.

## 2.22 Approvals Component Enhancements

A new due date parameter is now available for tasks.

In Page Designer, Due Date Item is available under Settings. When specified, this value overrides the due date calculated from the associated task definition.

The parameter `p_due_date` is also available in the `CREATE_TASK` API.

## 2.23 JavaScript API Updates

### New Functions and Methods

This release contains new functions or methods:

- actions interface method `ariaKeyshortcut`
- `apex.pwa` namespace functions:



- `getPushSubscription`
- `hasPushSubscription`
- `subscribePushNotifications`
- `unsubscribePushNotifications`
- **model interface method** `getDataOverflow`

### New Options, Parameters, and Functionality

This release contains new options, parameters, and functionality:

- `apex.message.alert` and `apex.message.confirm` have new options enabling functionality that was previously only available from the Alert and Confirm dynamic actions
- `apex.model.create` has new model option `trackChanges`
- `apex.page.isChanged`, used by Warn on Unsaved Changes feature, now logs which item or model is changed when the page is in debug mode

### Improved API Descriptions

API descriptions are improved for:

- `apex.model.create` **options** `onlyMarkForDelete` and `identityField`, and **parameters** `pMoreData` and `pDataOverflow`
- **model interface** Ajax Messages section
- **model interface methods**:
  - `fetch`
  - `getTotalRecords`
  - `indexOf`
  - `setOption`
- `apex.page` **function** `warnOnUnsavedChanges`
- `apex.pwa` **various** function return values
- `apex.util.applyTemplate` **fix** loop directive example
- `item.displayValueFor` `pValue` **parameter**
- **menu widget** item type definition `accelerator` property

## 2.24 JavaScript Library Upgrades

- CKEditor5 36.0.0
- cropperjs 1.5.13
- CSSO 5.0.5
- DOMPurify 2.4.3
- FullCalendar 5.11.3
- JavaScript Extension Toolkit (JET) 14.0.0

- jQuery 3.6.4
- MapLibre 2.4.0
- MarkedJS 4.2.5
- prism.js 1.29.0
- Terser 5.16.1

# 3

## Changed Behavior

Some existing behaviour changes in this release.

- [Rich Text Editor](#)
- [Unsupported Format Masks in Date Picker](#)
- [HTML Sanitization](#)
- [Shuttle Item Events](#)
- [Combined JavaScript File Change](#)
- [Substitutions in HTML Expressions of Interactive Report](#)
- [App Builder UI Changes](#)
- [Compatibility Mode](#)
- [Enabling Network Services in Oracle Database](#)

You must enable network services in Oracle Database to send outbound mail, use Web services, or use template-based PDF report printing with BI Publisher in Oracle APEX.

### 3.1 Rich Text Editor

New Rich Text Editor page items are now based on a new third party library, TinyMCE. APEX 23.1 ships with the free edition of TinyMCE version 6.3.1.

Existing items based on the CKEditor5 library continue to work. However, these items are deprecated, and will be automatically converted to TinyMCE in a future release.

You can choose which library the Rich Text Editor uses via the new item attribute **Library**. Note that the two libraries are API-incompatible, and any custom code using CKEditor5 APIs must be re-worked.

### 3.2 Unsupported Format Masks in Date Picker

Some formatting elements are not supported by the Date Picker. Previously, APEX attempted to render these elements. Now, unsupported format masks cause an error. To resolve the error, modify the format mask.

Unsupported items in the format mask include SSSSS, SYEAR, SYYYY, IYYY, YEAR, IYY, SCC, TZD, TZH, TZM, TZR, AD, BC, CC, EE, FF, FX, IW, IY, RM, TS, WW, E, I, J, Q, W, and X.

### 3.3 HTML Sanitization

Before APEX 23.1, the following components output HTML without any sanitization for Cross-Site Scripting (XSS):

- Display Only Page Item (Format HTML)
- Interactive Grid - Display Only Column (Format HTML)

- Classic Report - Rich Text Column (Format HTML)
- Interactive Report - Rich Text Column (Format HTML)

It was the developer's responsibility to ensure the contents were safe. This was not a trivial task.

As of APEX 23.1, these components sanitize the HTML content on the client before displaying it. This simplifies display of user-provided HTML, including the content of an HTML-based Rich Text Editor.

Consciously displaying "unsafe" HTML, such as script tags or `javascript:` expressions, `onclick` attributes, etc., is no longer possible as this content is stripped away. While display of this content is not recommended, you can choose to display it with the following methods:

- for Display Only Page Items in HTML format, use a Static Content Region
- for Display Only Interactive Grid Columns in HTML format, use an HTML Expression Column
- for Classic Report Rich Text Columns in HTML format, use a Plain Text Column with **Escape special characters** disabled
- for Interactive Report Rich Text Columns in HTML format, use a Plain Text Column with **Escape special characters** disabled

## 3.4 Shuttle Item Events

Shuttle Item now triggers the `change` event when the selected items are reordered. When a Shuttle item value can be reordered, the value's order is important. A change to the order is a change to the value, which justifies the `change` event.

If you previously used both `change` and `shuttlechangeorder` Dynamic Actions or event handlers, only the `change` handler is needed now. If you need to distinguish the two cases, the `change` event happens after the `shuttlechangeorder` event.

## 3.5 Combined JavaScript File Change

The combined JavaScript file `interactiveGrid.min.js` is replaced with `modelViewBase.min.js`, which contains a subset of the files in the former combined file. This is unlikely to affect existing apps unless custom code on your page implicitly depends on a module that was included in `interactiveGrid.min.js` and is not otherwise loaded on the page now. To avoid issues with custom code, always specify the individual files your code depends on.

## 3.6 Substitutions in HTML Expressions of Interactive Report

Interactive Reports now use HTML escaping as the default escape mode for item substitutions in HTML expressions.

If it is safe to output the referenced item value, developers can replicate the previous behavior of an unescaped value by using the RAW escape mode (`&ITEM!RAW.`).

## 3.7 App Builder UI Changes

User interface changes in this release include:

- Quickly create copies of pages from the current application or other applications directly from the Create Page Wizard with the new **Create Page as Copy** button.
- The Page Designer "Pick Table" dialog no longer shows table comments from the Data Dictionary.
- When creating new plug-ins, the default type is now **Template Component** rather than **Item**.
- Global template options and template option groups now display in an interactive grid to make editing easier.
- All internal applications (4000-4999), including App Builder and SQL Workshop, now use Friendly URLs. This paves the way for future enabling of PWA in Builder.

## 3.8 Compatibility Mode

The application attribute **Compatibility Mode** controls the compatibility mode of the APEX runtime engine. Certain runtime behaviors change from release to release. You can use the Compatibility Mode attribute to obtain specific application behavior. This section lists Compatibility Mode changes by release. Note that all mode changes are inclusive in that all changes in older releases are included in newer releases.

### Compatibility Mode Changes in Mode 4.1

In Oracle Application Express release 4.1, Automatic DML forms raised an error when rendering the page if the column name of the source of an item was invalid. Prior to Oracle Application Express release 4.1, an invalid column name of the source of an item would not raise an error when rendering the page but it would also not set session state of the item.

Also, in Oracle Application Express release 4.1, there are two new application Security Attributes to control Browser Security: **Cache** and **Embed in Frames**. Enabling the Cache attribute enables the browser to save the contents of your application's pages in its cache, both in memory and on disk. The Embed in Frames attribute controls if the browser displays your application's pages within a frame. Applications running in a Pre-4.1 Compatibility Mode function as if the Cache is enabled and as if Embed in Frames is set to allowed. Applications running in Compatibility Mode **4.1** or later respect the specific Browser Security attributes.

Also, in Oracle Application Express release 4.1, because of bug 12990445, the following changes were implemented for Automatic Row Processing (DML) process types. The code which performs the INSERT was changed to determine if the columns should be included in the INSERT statement. Note that these are the same checks which occur before an UPDATE. These new checks include:

- Is the source type a DB Column?
- Is the page item contained in the POST request? For example, if the page item is conditional it will not be contained in the POST request if the condition evaluates to FALSE during page rendering.
- Is the page item not of type Display Only where Save State is set to No?

To enable these behaviors, set the Compatibility Mode to **4.1** or later. For behavior that matches earlier releases, set the Compatibility Mode to **Pre-4.1**.

## Compatibility Mode Changes in Mode 4.2

In Oracle Application Express release 4.2 due to changes for the new grid layout, when a page is rendered, all regions in a certain display point are evaluated before rendering that display point, to find out if they should be displayed or not (so that the grid layout knows how many columns to render). The regions where the evaluation returned true will be executed and displayed. However, this will not work if a PL/SQL based region sets session state which is then used in a subsequent region condition to determine if the region should be displayed. In that scenario, the condition has already been checked before the display point is rendered. Use computations or PL/SQL processes to set session state before any region is displayed. In previous versions, the condition was evaluated right before each region was displayed.

In Oracle Application Express release 4.2, computations and processes with a processing point Before Region(s) do now fire before any region gets rendered. Computations and processes with a processing point After Region(s) fire after all regions have been rendered. In previous versions, the computations and processes fired just before and after the region display point Page Template Body (1-3).

Oracle Application Express Patch Set 4.2.2 added two new Compatibility Mode changes for Compatibility Mode **4.2**:

- Text areas were changed to always use the Maximum Width attribute to restrict text input.
- Enhanced security for report column links, where the link contains both JavaScript and references to other report column substitutions, for example:

```
javascript:alert( 'Delete #NAME#' );
```

In the previous example, *NAME* is a column name in the report.

Prior to Oracle Application Express release 4.2.1, to protect against possible cross-site scripting vulnerabilities, you would have had to explicitly escape any column values in the report source, so that they could safely be used in JavaScript links. When running in Compatibility Mode **4.2**, Oracle Application Express automatically JavaScript escapes column name substitutions referenced in JavaScript links if the column is defined to escape special characters.

To fix this, Oracle recommends that you remove the manual JavaScript escaping from your report source and use of the native escaping.

## Compatibility Mode Changes in Mode 5.0

In Oracle Application Express release 5.0, referencing a Static Application File with `#WORKSPACE_IMAGES#` no longer returns the application file. Instead, use `#APP_IMAGES#`.

### The API calls

to `wwv_flow_custom_auth_std.logout`, `wwv_flow_custom_auth_std.logout_then_go_to_page`, `wwv_flow_custom_auth_std.logout_then_go_to_url`, and `apex_custom_auth.logout` are desupported and will raise a runtime error instead of logging out from the Oracle Application Express session. Instead, use the `apex_authentication.logout` entry point.

Prior to release 5.0, developers using data upload did not have the option to choose a date format. Instead, a parser checked for the best format to match the user's entry or

an end user could enter their own format. Oracle Application Express release 5.0 includes a new item that enables the user to choose an application date format or user entered format. Because applications created before release 5.0 do not have an item, a Compatibility Mode of **5.0** checks if the user has entered some data. If no data has been entered, it picks the application date format.

When a session timeout occurs and no timeout URL is specified, Oracle Application Express raises an error instead of redirecting to the application's home page. If the session setup for an Ajax requests fails, Oracle Application Express also raises an error. For Ajax requests that expect JSON, the response is a JSON string with members that describe the error. For other requests, the error appears on an error page.

Page items based on a database column where the attribute Source Used is set to **Only when current value in session state is null** will raise an error when the page item gets rendered. Using this setting for a database column is very dangerous and can result in accidentally overwriting data when viewing and saving multiple records. Always set the Source Used attribute to **Always, replacing any existing value in session state**.

### Compatibility Mode Changes in Mode 5.1 / 18.1 / 18.2

In Oracle Application Express 18.1, buttons where the Execute Validations attribute is set to **Yes** also perform some client-side validations (such as item required checks) and will not submit the page until all issues are fixed. In previous versions this flag was just used to determine if server-side validations should be executed.

#### Tip:

Please pay attention when changing the Compatibility Mode to 5.1/18.1/18.2. Buttons, such as Cancel or Previous, where the Execute Validation flag has incorrectly been set to **Yes** and which use an After Submit branch, never execute validations when the user clicks the button. You can address this issue by using the new client-side validations, or by setting Execute Validations to **No**.

In release 5.1, any Ajax-based Dynamic Actions where the "Wait for Result" attribute is set to **Yes** perform an asynchronous Ajax call. Prior to 5.1, such calls would be made synchronously.

### Compatibility Mode Changes in Mode 19.1

In Oracle Application Express 19.1, the Rich Text editor now enforces validation of the `Max Length` item attribute. When the length of the HTML markup exceeds the `Max Length` value, the system produces an error message.

### Compatibility Mode Changes in Mode 19.2 / 20.1 / 20.2 / 21.1

In Oracle Application Express 19.2, Classic Reports render empty column values as an empty cell instead of using a "non-breaking white-space" (`&nbsp;`).

### Compatibility Mode Changes in Mode 21.2 / 22.1 / 22.2 / 23.1

Prior to Oracle Application Express 21.2, all processes of the current processing point have been executed regardless of the added errors.

In Oracle Application Express 21.2, calling `APEX_ERROR.ADD_ERROR` in a process stops further processes from executing and immediately displays the inline errors.

## 3.9 Enabling Network Services in Oracle Database

You must enable network services in Oracle Database to send outbound mail, use Web services, or use template-based PDF report printing with BI Publisher in Oracle APEX.



### Note:

The following does not apply to APEX instances running on Oracle Autonomous Database. APEX can communicate with external endpoints over the internet without additional configuration.

- [When and Why Network Services Must be Enabled](#)  
Enabling network services enables support for sending outbound mail in Oracle APEX, using REST Services, REST Enabled SQL, or other web services, and using a remote server for report printing.
- [Granting Connect Privileges](#)
- [Troubleshooting an Invalid ACL Error](#)  
Learn how to identify any invalid ACL error by running the query.

### 3.9.1 When and Why Network Services Must be Enabled

Enabling network services enables support for sending outbound mail in Oracle APEX, using REST Services, REST Enabled SQL, or other web services, and using a remote server for report printing.

By default, the ability to interact with network services is disabled in Oracle Database. Therefore, you must use the `DBMS_NETWORK_ACL_ADMIN` package to grant network connect privileges to the `APEX_230100` database user. Failing to grant these privileges results in issues with:

- Sending outbound mail in Oracle APEX.  
Users can call methods from the `APEX_MAIL` package, but issues arise when sending outbound email.
- Consuming REST services and other web services from APEX.
- Making outbound LDAP calls from APEX.
- Using a remote print server for report printing.



### Note:

When upgrading APEX, the upgrade automatically configures Network Services based on the configuration of the previous APEX version.



**Tip:**

To run the examples described in this section, the compatible initialization parameter of the database must be set to at least 11.1.0.0.0. By default, the parameter is set properly, but a database upgraded from a version prior to 11g may require an update. For information about changing database initialization parameters, see *Specifying the Database Compatibility Level in Oracle Multitenant Administrator's Guide*.

**See Also:**

About Report Printing in *Oracle APEX App Builder User's Guide*.

## 3.9.2 Granting Connect Privileges

The following example demonstrates how to grant connect privileges to any host for the APEX\_230100 database user. This example assumes you connected to the database where Oracle APEX is installed as SYS specifying the SYSDBA role.

```
BEGIN
  DBMS_NETWORK_ACL_ADMIN.APPEND_HOST_ACE(
    host => '*',
    ace => xs$ace_type(privilege_list => xs$name_list('connect'),
                      principal_name => 'APEX_230100',
                      principal_type => xs_acl.ptype_db));
END;
/
```

The following example demonstrates how to provide less privileged access to local network resources. This example enables access to servers on the local host only, such as email and report servers.

```
BEGIN
  DBMS_NETWORK_ACL_ADMIN.APPEND_HOST_ACE(
    host => 'localhost',
    ace => xs$ace_type(privilege_list => xs$name_list('connect'),
                      principal_name => 'APEX_230100',
                      principal_type => xs_acl.ptype_db));
END;
/
```

### 3.9.3 Troubleshooting an Invalid ACL Error

Learn how to identify any invalid ACL error by running the query.

If you receive an **ORA-44416: Invalid ACL error** after running the previous script, use the following query to identify the invalid ACL:

```
REM Show the dangling references to dropped users in the ACL that is
assigned
REM to '*'.
```

```
SELECT ACL, PRINCIPAL
FROM DBA_NETWORK_ACLS NACL, XDS_ACE ACE
WHERE HOST = '*' AND LOWER_PORT IS NULL AND UPPER_PORT IS NULL AND
      NACL.ACLID = ACE.ACLID AND
      NOT EXISTS (SELECT NULL FROM ALL_USERS WHERE USERNAME =
PRINCIPAL);
```

Next, run the following code to fix the ACL:

```
DECLARE
  ACL_ID    RAW(16);
  CNT       NUMBER;
BEGIN
  -- Look for the object ID of the ACL currently assigned to '*'
  SELECT ACLID INTO ACL_ID FROM DBA_NETWORK_ACLS
  WHERE HOST = '*' AND LOWER_PORT IS NULL AND UPPER_PORT IS NULL;

  -- If just some users referenced in the ACL are invalid, remove just
  those
  -- users in the ACL. Otherwise, drop the ACL completely.
  SELECT COUNT(PRINCIPAL) INTO CNT FROM XDS_ACE
  WHERE ACLID = ACL_ID AND
        EXISTS (SELECT NULL FROM ALL_USERS WHERE USERNAME =
PRINCIPAL);

  IF (CNT > 0) THEN

    FOR R IN (SELECT PRINCIPAL FROM XDS_ACE
              WHERE ACLID = ACL_ID AND
                    NOT EXISTS (SELECT NULL FROM ALL_USERS
                                WHERE USERNAME = PRINCIPAL)) LOOP
      UPDATE XDB.XDB$ACL
      SET OBJECT_VALUE =
        DELETEXML(OBJECT_VALUE,
                  '/ACL/ACE[PRINCIPAL="' || R.PRINCIPAL || '"]')
      WHERE OBJECT_ID = ACL_ID;
    END LOOP;

  ELSE
    DELETE FROM XDB.XDB$ACL WHERE OBJECT_ID = ACL_ID;
  END IF;
```

```
END;  
/
```

```
REM commit the changes.
```

```
COMMIT;
```

Once the ACL has been fixed, you must run the first script in this section to apply the ACL to the `APEX_230100` user.

## 4

# Ideas App Implementations

APEX thrives because of community engagement and feedback. The [APEX Ideas](#) app makes it easier for you to contribute directly to the product direction of APEX.

Feature Request Number	Subject	Solution
<a href="#">FR-845 / FR-2455</a>	API to set Version No	Delivered. See <a href="#">New Application Administration API Package</a> .
<a href="#">FR-1576</a>	Advisor report on buttons in invalid region template positions	Delivered. See 33352932 in <a href="#">Fixed Bugs</a> .
<a href="#">FR-1600 / FR-2565</a>	Save and Run from the Code Editor modal screen	Delivered. See <a href="#">Save and Run Page from Code Editor</a> .
<a href="#">FR-1639 / FR-1701</a>	Display Loading Indicator when performing actions in SQL Workshop	Delivered. See <a href="#">Modernized Object Browser</a> .
<a href="#">FR-1740</a>	Visual/Wizard support for ASYNC server-side processes	Delivered. See <a href="#">Page Processing Improvements</a> .
<a href="#">FR-1885</a>	Edit default value of table columns	Delivered. See <a href="#">Modernized Object Browser</a> .
<a href="#">FR-1928</a>	Native push notifications and push events for dynamic actions	Delivered. See <a href="#">PWA Push Notifications</a> .
<a href="#">FR-2005</a>	Identity Column in SQL Workshop	Delivered. See <a href="#">Modernized Object Browser</a> .
<a href="#">FR-2085</a>	Fix objects filter in SQL Workshop - Object Browser	Delivered. See <a href="#">Modernized Object Browser</a> .
<a href="#">FR-2086</a>	Fix: Using SQL Workshop we need to reset query columns to load new ones when column is added to table.	Delivered. See <a href="#">Modernized Object Browser</a> .
<a href="#">FR-2133</a>	Declarative way to add dropdown menu button to report & assign dynamic actions or process to menu items	Delivered. See <a href="#">Content Row in Template Components</a> .
<a href="#">FR-2421</a>	Allow me to use real JSON paths in REST Service Row Selector	Delivered. See <a href="#">REST Data Source Enhancements</a> .
<a href="#">FR-2507</a>	Possibility to give comments to the tables and columns during creation	Delivered. See <a href="#">Modernized Object Browser</a> .
<a href="#">FR-2898</a>	Return timezone in addition to longitude and latitude in APEX geocoded address item	Delivered. See 34929885 in <a href="#">Fixed Bugs</a> .

# 5

## Deprecated Features

Deprecated features are features which Oracle plans to desupport or remove in a future release of Oracle APEX. If a feature is related to application metadata or an API, existing applications can still use the feature, but Oracle strongly recommends that developers start to modify their applications as described in this section. Use APEX Advisor to scan existing applications for deprecated attributes.

- [CKEditor5 Deprecated](#)
- [Deprecated Object Browser Features](#)
- [Preventing Double Escaping of LOV Display Values](#)
- [Display Only Item with Format HTML \(Unsafe\) Deprecated](#)
- [Deprecated Functions and Procedures](#)

### 5.1 CKEditor5 Deprecated

CKEditor5 is deprecated. Existing items based on the CKEditor5 library continue to work. However, these items will be automatically converted to TinyMCE in a future release. Any custom code using CKEditor5 APIs must be re-worked.

### 5.2 Deprecated Object Browser Features

Some functionality in Object Browser is deprecated:

- The Model tab for tables is removed.
- The Create Materialized View Wizard is removed. Create materialized views by using a `CREATE MATERIALIZED VIEW` statement in SQL Commands or SQL Scripts. You can still view materialized views in Object Browser.

### 5.3 Preventing Double Escaping of LOV Display Values

By default, APEX automatically HTML-escapes Lists of Values (LOV) display values as necessary. To ensure backward compatibility with legacy apps, APEX checks whether the LOV query already includes a utility function to escape the display value. If it does, APEX avoids double-escaping the value when displaying it in a Select List, Popup LOV, Shuttle, Display Only item, or similar components.

Oracle recommends removing redundant inline escaping calls from your LOVs. In a future version of APEX, this prevention mechanism may be removed, which could cause some display values to appear double-escaped.

To identify whether any of your LOVs are impacted, run the following queries:

```
select *
  from apex_application_lovs
 where lov_type = 'Dynamic'
```

```

and ( upper(list_of_values_query) like '%HTF.ESCAPE_SC%'
      or upper(list_of_values_query) like '%APEX_ESCAPE.HTML%'
      or upper(list_of_values_query) like '%WWV_FLOW_ESCAPE.HTML%' );

select *
  from apex_application_page_items
 where lov_named_lov is null
       and ( upper(lov_definition) like '%HTF.ESCAPE_SC%'
             or upper(lov_definition) like '%APEX_ESCAPE.HTML%'
             or upper(lov_definition) like '%WWV_FLOW_ESCAPE.HTML%' );

```

If the queries returns no rows, then no action is required. Otherwise, check the LOV definition and/or page items, remove any manual escaping, and test your applications to ensure that the values still appear as intended.

## 5.4 Display Only Item with Format HTML (Unsafe) Deprecated

As of APEX 23.1, Format HTML sanitizes the HTML content on the client before displaying it. This simplifies the display of user-provided HTML, including the content of HTML-based rich text editors.

To maintain backward compatibility with existing applications, all current Display Only page items using the Format HTML option will be migrated to HTML (Unsafe) to preserve their current behavior. However, going forward, this option is deprecated, and displaying "unsafe" HTML, such as script tags or `javascript: expressions`, `onclick` attributes, and others, is no longer possible, as this content is stripped away.

Although it is not recommended to display unsafe HTML content, you can still choose to display it. For more information, see [HTML Sanitization](#).

## 5.5 Deprecated Functions and Procedures

As part of moving existing APIs from `APEX_UTIL` to `APEX_APPLICATION_ADMIN`, some comments changed. The following functions and procedures are deprecated:

- `set_build_option_status`
- `get_build_option_status` (two times, overloaded)
- `set_application_status`
- `get_application_status`
- `set_global_notification`
- `get_global_notification`
- `set_app_build_status`

# 6

## Deprecated in Previous Releases

The following section lists features which were deprecated in a previous release but have not been fully removed or desupported from Oracle APEX.

Oracle strongly recommends that developers start to modify their applications as described in this section. Use APEX Advisor to scan existing applications for deprecated attributes.

- [Deprecated APEX Item Markup](#)
- [Deprecated jQuery Date Picker](#)
- [Previously Deprecated APIs](#)
- [Deprecated Utilities](#)
- [Deprecated Legacy Web Service References](#)
- [jQuery UI Deprecated](#)

### 6.1 Deprecated APEX Item Markup

Future releases of APEX may include fixes and improvements to the accessibility, usability, and functionality of various items that require changing the markup or using custom elements (web components). These changes may create more dynamic behaviors for items, and will be done in a way that minimizes impact to items and forms in existing apps.

The `apex.item` namespace and item interface are the only supported APIs for customizing and programatically working with items. APEX discourages customizations that rely on undocumented item markup or CSS classes, as these may not work as expected in future releases.

Assumptions about the HTML markup used by each of the native APEX items may not hold in the future. Item customization through Advanced attributes (CSS Classes), Custom Attributes, JavaScript code, and CSS rules that assumes particular markup could break.

For example, you could make the text area item character counter bold by adding class `important-text` to the **Advanced: CSS Classes** attribute of a text area and then add a custom CSS rule like:

```
.important-text.apex-item-textarea + .apex-item-textarea-counter {  
    font-weight: bold;  
}
```

This currently works, but may not in the future because it relies on undocumented class names and the counter element directly following the `textarea` element. It is also not a best practice to add event handlers in Custom Attributes.

Future releases may document new custom element markup, classes, and CSS variables to allow more supportable customization.

## 6.2 Deprecated jQuery Date Picker

jQuery Date Picker is now deprecated and cannot be used for new pages or applications. The old jQuery Date Picker JavaScript APIs are not supported.

Oracle recommends replacing all old Date Pickers with the new Date Picker.

## 6.3 Previously Deprecated APIs

The `APEX_IR.GET_REPORT` API is deprecated. Instead, use `APEX_REGION.OPEN_QUERY_CONTEXT` to get interactive report data.

## 6.4 Deprecated Utilities

The `APEXExport` utility is deprecated, and will be removed in a future release.

Oracle recommends using `SQLcl` instead.

## 6.5 Deprecated Legacy Web Service References

SOAP style Web Service references and legacy support for REST style Web Services references are deprecated.

## 6.6 jQuery UI Deprecated

jQuery UI is deprecated. Oracle recommends that customers update third-party APEX plug-ins and custom JavaScript code to remove any jQuery UI references. Native APEX components that use jQuery UI will continue to function, but support will be removed in a future release.

Oracle ships a custom bundle of JQuery UI 1.13.2 that includes only the modules that APEX needs. Oracle no longer ships individual widgets or any jQuery UI CSS files.



# 7

## Desupported Features

Desupported features are no longer available. If a desupported feature has to do with application metadata or APIs, then existing applications may not work as they did previously. Oracle recommends modifying the application to replace the feature.

- [Desupported Query Builder](#)
- [Desupported User Interfaces Removed](#)
- [Desupported JET Date Picker Item Type Migrated](#)
- [DOM Object Desupported](#)
- [Legacy Bulk Utilities Desupported](#)

### 7.1 Desupported Query Builder

SQL Workshop Query Builder is now desupported, and will be removed in a future release.

### 7.2 Desupported User Interfaces Removed

APEX previously defined multiple users interfaces for each application. This is no longer the case. This release cleans up desupported user interfaces, which impacts many APEX Dictionary Views:

- **Obsolete views:**
  - `apex_workspace_ui_types`
  - `apex_appl_user_interfaces`
- **New view columns:**
  - `apex_applications.theme_style_by_user_pref`
  - `apex_applications.built_with_love`
  - `apex_applications.navigation_list`
  - `apex_applications.navigation_list_position`
  - `apex_applications.nav_bar_type`
  - `apex_applications.nav_bar_list`
  - `apex_applications.include_legacy_javascript`
  - `apex_applications.include_jquery_migrate`
- **Obsolete view columns:**
  - `apex_applications.ui_detection_css_urls`
  - `apex_appl_concatenated_files.user_interface_id`
  - `apex_application_pages.user_interface_id`

- apex\_application\_pages.page\_transition
- apex\_application\_pages.popup\_transition
- apex\_application\_themes.ui\_type\_id
- apex\_application\_themes.ui\_type\_name
- apex\_application\_themes.default\_page\_transition
- apex\_application\_themes.default\_popup\_transition
- apex\_appl\_plugins.supported\_ui\_types
- apex\_appl\_plugin\_std\_attrs.supported\_ui\_types
- apex\_appl\_plugin\_attributes.supported\_ui\_types
- Removed Page Designer Properties:
  - Page Transition
  - Popup Transition
  - User Interface

Older applications created when APEX could have two User Interfaces now only use the active user interface. Inactive user interfaces are removed from the metadata.

## 7.3 Desupported JET Date Picker Item Type Migrated

The Date Picker (JET) item type is now removed. Existing page items and interactive grid columns are automatically migrated to the new Date Picker item type introduced in APEX 22.2.

This impacts any JavaScript customizations made for the JET Date Picker component.

## 7.4 DOM Object Desupported

The DOM Object Dynamic Action selector type is desupported. Any page that uses this type for an action now throws an exception in the browser console, and the action does not execute.

Use the JavaScript Expression type instead of DOM Object.

## 7.5 Legacy Bulk Utilities Desupported

The **Grid Edit** tools are now desupported. This includes grid edit tools available in:

- Cross Page Utilities
- Region Utilities
- Button Utilities
- Item Utilities
- Computation Utilities
- Validation Utilities
- Process Utilities

- Dynamic Action Utilities
- Branch Utilities

You can edit items individually through Page Designer, or view them in bulk through the appropriate Utility area.

# 8

## Desupported in Previous Releases

The following section lists features that were desupported in a previous release.

If a desupported feature has to do with application metadata or APIs, then existing applications may not work as they did previously. Oracle recommends modifying the application to replace the feature.

- [Desupported Attributes in App Builder](#)
- [Desupported Properties](#)
- [Desupported View Columns](#)
- [FullCalendar 3 Desupported](#)
- [App Builder Defaults Desupported](#)
- [Copying Legacy Themes Desupported](#)
- [CKEditor4 Desupported](#)
- [Desupported Public Package APIs](#)
- [Desupported Page Positions](#)
- [Desupported Region Positions](#)
- [Custom Page Region Templates with Duplicated Positions Desupported](#)
- [Legacy Substitution Strings Desupported](#)
- [Desupported JavaScript Functions](#)
- [Post Calculation for Page Items Desupported](#)
- [Show / Hide All Page Items On Same Line Attributes Desupported](#)
- [apex.server Plug-in and Process Function Async Option Desupported](#)
- [apex.widget.initPageItem Function Desupported](#)
- [Popup LOV Template Desupported](#)
- [Based On - Output of PL/SQL Code attribute Desupported](#)
- [Syntax {COLUMN\\_NAME}\\_LABEL in Interactive Grid Icon and Detail Views Desupported](#)
- [Removed Content Delivery Network](#)
- [APEX-Based REST Services Desupported](#)

### 8.1 Desupported Attributes in App Builder

The following attributes in App Builder are desupported:

- In Edit Application Definition:
  - Progressive Web App - Icon URL
  - Application Icon - Icon File Name

- In Edit User Interface:
  - Favicon

## 8.2 Desupported Properties

The following properties in the property editor are desupported:

- Region Image
- Image Tag Attributes

## 8.3 Desupported View Columns

The following view columns are desupported:

- In apex\_applications:
  - app\_builder\_icon\_name
  - favicons
  - pwa\_manifest\_icon\_url

## 8.4 FullCalendar 3 Desupported

FullCalendar v3 is desupported, including:

- deprecated plug-in attributes
- files and folders specific to v3 or `jquery-fullcalendar`
- v3-specific logic in PL/SQL and JavaScript

The used library version is now FullCalendar 5.11.2. APEX upgrades the library automatically.

## 8.5 App Builder Defaults Desupported

Developers can no longer define App Builder Defaults from Workspace Utilities, App Builder Defaults. The Create Application Wizard no longer uses the defined attributes.

## 8.6 Copying Legacy Themes Desupported

The Copy Theme Wizard no longer supports copying legacy themes. This includes Themes 1 - 26, and the jQuery Mobile theme.

## 8.7 CKEditor4 Desupported

Rich Text Editor items based on CKEditor4, which are marked as deprecated since APEX 20.2, are now desupported and will be automatically converted to CKEditor5. CKEditor4 is removed from APEX completely.

Converted items receive the following configuration:

- **Format:** HTML

- **Toolbar**: unchanged
- **Toolbar Style**: `Multiline`
- **Minimum Height**: `180`
- **Maximum Height**: `null`
- **Allow Custom HTML**: `Enabled`

The properties **Toolbar Position** and **Skin** do not have a CKEditor5 equivalent, and are removed. Any code included in the **JavaScript Initialization Code** attribute is automatically commented out.

Oracle recommends manually checking the functioning of each Rich Text Editor item.

**Note:**

With this update, any code referencing CKEditor4 and the `CKEDITOR` global object no longer works.

## 8.8 Desupported Public Package APIs

Desupported public package APIs:

- `apex_page.is_desktop_ui` function
- `apex_page.get_ui_type` function

## 8.9 Desupported Page Positions

The following page positions are desupported and display as **Legacy** in Page Designer:

- Body 1
- Body 2
- Body 3
- After Header
- Before Footer

## 8.10 Desupported Region Positions

The following region positions used for button positioning are desupported and display as **Legacy** in Page Designer:

- Top of Region
- Bottom of Region
- Above Region
- Below Region

## 8.11 Custom Page Region Templates with Duplicated Positions Desupported

Custom page template and custom region templates with duplicated positions are desupported. For example, a region template referencing position `#CHANGE#` twice is not recommended because that duplicate position causes duplicate DOM IDs.

## 8.12 Legacy Substitution Strings Desupported

As of this release, the following `apex.env` substitution strings are desupported:

- `APP_IMAGES`
- `IMAGE_PREFIX`
- `THEME_DB_IMAGES`
- `THEME_IMAGES`
- `WORKSPACE_IMAGES`

While the legacy substitutions still function, Oracle recommends developers update their environments to use updated substitutions (listed below).

**Table 8-1 Updated `apex.env` Substitutions**

Legacy	New
<code>IMAGE_PREFIX</code>	<code>APEX_FILES</code>
<code>WORKSPACE_IMAGES</code>	<code>WORKSPACE_FILES</code>
<code>APP_IMAGES</code>	<code>APP_FILES</code>
<code>THEME_IMAGES</code>	<code>THEME_FILES</code>
<code>THEME_DB_IMAGES</code>	<code>THEME_DB_FILES</code>

## 8.13 Desupported JavaScript Functions

The following functions are desupported:

Universal Theme JavaScript API function:

- `apex.theme42.util.mq` (use `apex.theme.mq` instead)

## 8.14 Post Calculation for Page Items Desupported

The **Post Calculation** functionality of page items is desupported.

This functionality remains for existing page items where it has been used, but you can no longer set it for new page items nor add it to existing page items where it has not been used in the past.

## 8.15 Show / Hide All Page Items On Same Line Attributes Desupported

In Dynamic Actions, the Show and Hide actions have attributes **Show all page items on same line** and **Hide all page items on same line**, respectively. These attributes were designed for forms with a table-based layout. Because Universal Theme no longer uses table-based layout, these attributes are desupported.

This functionality remains for existing Dynamic Actions where it was set to **Yes**, but developers cannot select it for new Dynamic Actions.

## 8.16 apex.server Plug-in and Process Function Async Option Desupported

In a future release, the **async** option will be ignored and all Ajax requests will be asynchronous.

## 8.17 apex.widget.initPageItem Function Desupported

The function `apex.widget.initPageItem` is desupported. Item plug-in creators should use `apex.item.create` instead.

## 8.18 Popup LOV Template Desupported

The Popup LOV template type is desupported.

## 8.19 Based On - Output of PL/SQL Code attribute Desupported

The selection **Output of PL/SQL Code** of the attribute **Based On** is now desupported.

## 8.20 Syntax {COLUMN\_NAME}\_LABEL in Interactive Grid Icon and Detail Views Desupported

The `&{COLUMN_NAME}_LABEL.` syntax, which is used to reference the column label in Interactive Grid Detail and Icon views, is desupported.

Instead, use `&{COLUMN_NAME}%LABEL..`

## 8.21 Removed Content Delivery Network

The attribute **Content Delivery Network** that could be found under **User Interface Attributes**, **Javascript with options** **None**, **Google**, **Microsoft**, and **jQuery**, has been removed. Enabling this option was only relevant for pulling in a few of the JavaScript libraries that APEX needs.



If you were using this option, it's recommended to instead use the more modern, Oracle-provided CDN approach. For further information, see [Announcing Oracle APEX Static Resources on Content Delivery Network](#).

## 8.22 APEX-Based REST Services Desupported

APEX-based REST Services are desupported in this release. Prior to release 18.1, definitions of RESTful services created within Oracle APEX were stored within the metadata tables of the core APEX schema, and referred to as APEX-based REST Services. With release 18.1, we introduced support for Oracle REST Data Services (ORDS) -based REST Services, where definitions are stored in the ORDS repository. ORDS-based REST Services continue to be supported for definitions of RESTful Services in Oracle APEX.

The instance parameter `APEX_REST_PATH-PREFIX` is desupported.



### Note:

Oracle REST Data Services (ORDS) release 21.4.2 now ships with migration scripts that enable you to upgrade any remaining APEX-based REST Services to ORDS-based Services. To learn more, see [Migration of Oracle APEX Restful Service Modules](#) in *Oracle REST Data Services Release Notes*.

# 9

## Fixed Bugs

The following section lists bugs fixed in this release.

Bug Number	Description
28685154	PUBLISH THE EXPLANATION ABOUT "JOIN LOV FOR COLUMN DISPLAY" ATTRIBUTE TO MANUAL
30203115	IMPROVE HELP TEXT FOR SWITCH ITEM TO BETTER EXPLAIN WHEN ON/OFF LABEL TEXT IS DISPLAYED
31811949	IGNORE COMBINED FILE WHEN FILE GETS LOADED VIA REQUIREJS OR REQUIREJET
32749605	NLS: LOCALIZATION OF DATE FORMATS REQUIRED FOR CERTAIN PAGES UNDER MONITOR ACTIVITY
33352932	ADD AN ADVISOR ENTRY CHECK FOR LEGACY ORPHAN COMPONENTS
33697490	COPY COMPONENT TO OTHER PAGE DOESN'T CHANGE PAGE ITEM REFERENCES
34131666	FACETED SEARCH - DEPENDING ON HAS UNEXPECTED BEHAVIOUR WHEN CONDITION NOT EQUAL
34146043	CHECKBOXES AND RADIOS IN FACETED SEARCH ARE NO LONGER ACCESSIBLE
34327856	SMART FILTERS - PAGE SUBMITTED WHEN SETTING FILTER ON ENTER
34415818	INTERACTIVE GRID POPUP LOV COLUMN: WHEN A DEFAULT IS SET, NEW ROW IS INITIALIZED WITH RETURN AND NOT WITH DISPLAY VALUE
34418403	DIALOGS OF INTERACTIVE REPORT COLUMN HEADERS MISSING VISUALLY HIDDEN HEADERS FOR SCREEN READERS
34447426	INTERACTIVE GRID - SWITCHING TO SINGLE ROW VIEW MOVES JAWS CURSOR UNEXPECTANTLY
34447594	RECORDVIEW NOT RENDERING PROPER READONLY INPUT FIELDS WHEN IN READ-ONLY MODE
34458064	MULTIPLE EXPORTS IN A SINGLE SESSION MAY RESULT IN CORRUPTED EXPORT FILE
34473422	PAGE DESIGNER: MULTIPLE ATTRIBUTE VALUES NOT ALWAYS INDICATED AFTER SELECTING MULTIPLE ITEMS
34481324	SINGLE CHECKBOXES HAVE UNLABELED INACCESSIBLE OBJECTS IN VIRTUAL PC MODE OF JAWS
34600714	COLLAPSIBLE REGION CONTENT FLICKERS ON PAGE LOAD
34608372	HELP TEXTS FOR TEXT WITH AUTOCOMPLETE ATTRIBUTES CACHE AND SEARCH ARE INCORRECT
34609210	TEXT WITH AUTOCOMPLETE DROPDOWN CONTENT IS NOT SCROLLED TO TOP
34616851	APEX_STRING_UTIL.FIND_TAGS MISSING SUCCESSIVE TAGS
34624879	CREATING DATA LOAD DEFINITION IN MULTIBYTE NAME RAISES WWV_FLOW_LOAD_TAB_UK ERROR

Bug Number	Description
34628417	XLSX EXPORT: NO SUBSTITUTIONS APPLIED FOR PAGE HEADER
34629449	IMPROVE TOOLTIP FOR HELP TEXT BUTTONS
34632218	APEX_WEB_SERVICE.MAKE_REST_REQUEST THROWS ORA-6502 FOR URLS LARGER THAN 4K
34657289	DISCOVERY OF FUSION SAAS REST API FAILS WHEN ATTRIBUTE IS DEFINED AS "STRING" WITH MORE PRECISION THAN "99.999"
34663380	EMBEDDED CODE DOESN'T INCLUDE ATTRIBUTE VALUE INTO THE FULL TEXT SEARCH
34667623	ORA-12899: VALUE TOO LARGE FOR COLUMN CHANGE 'STANDARD' TEMPLATE OPTIONS TO NON-DEFAULT SETTINGS
34669937	BUTTON'S SHORTCUT SHOULD BE EXPOSED TO SCREEN READER USING ARIA-KEYSHORTCUTS
34678180	TYP0 IN HELP TEXT FOR "CONTENT DISPOSITION" COLUMN ATTRIBUTE
34680349	INTERACTIVE GRID DML ON REST DATA SOURCE, WITH MULTIPLE PRIMARY KEY COLUMNS, GENERATES WRONG ORDS QUERIES
34689727	AFTER DISABLING LAYOUT VIEW IN PAGE DESIGNER, PAGE FINDER LINKS STOP WORKING
34693264	PDF DOWNLOADS WITH ROW HIGHLIGHTS SOMETIMES CAUSE PDF SYNTAX ISSUES
34696059	CREATING PWA SCREENSHOTS OR SHORTCUTS CAN TRIGGER A PAGE REFRESH EVEN WHEN PWA IS NOT ENABLED
34698147	REST SOURCE EDIT PAGE (4000:1921) SHOULD SHOW THE SCHEMA OF A SYNC TABLE
34698814	REGEXP: OPTION FOR APPLICATION SEARCH IS BROKEN
34703814	SINGLE LINE COMMENT BREAKS JAVASCRIPT MLE CODE EXECUTION IN SQL COMMANDS
34713426	EMAIL TEMPLATES: HELP TEXT FOR ADVANCED HTML TEMPLATE IS INCORRECT
34719591	DATA EXPORT: INCREASE MAX LENGTH OF A COLUMN HEADER
34731045	PAGE DESIGNER THROWS "JSON ERROR" WHEN TRYING TO USE POST PROCESSING SQL WITH CSV REST SOURCE
34731068	COPY REST SOURCE DOES NOT COPY DATA PROFILE IF THE NAME IS ALREADY USED
34731085	CSV REST SOURCES CANNOT BE DISCOVERED WHEN MIME TYPE "APPLICATION/VND.MS-EXCEL" IS RETURNED
34731887	APEX_AUTOMATION.ABORT SHOULD DROP EXECUTOR JOB ALSO WHEN IN "DISABLED" STATE
34733255	ORA-01008: NOT ALL VARIABLES BOUND USING DOUBLE-HYPHEN COMMENT IN SQL COMMANDS
34736771	APP_ID IS ALWAYS NULL FROM APEX_APPROVAL.GET_TASKS
34738383	REPORT BASED ON TABLE WITH LONG RAW COLUMN THROWS ORA-00932: INCONSISTENT DATATYPES ERROR
34739526	ADB-S WORKSPACE CREATED THROUGH APEX VS. USING API RESULTS IN DIFFERENT DEFAULT LOGIN PAGE
34741944	REGRESSION: COPY FACETED SEARCH PAGE: "FILTERED REGION" ATTRIBUTE IS NOT ON COPIED PAGE
34750627	DYNAMIC CONTENT REGION ALWAYS FAILS ADVISOR CHECK

Bug Number	Description
34758496	RUNNING TRANSLATIONS > PUBLISH WHEN APP BUILDER RUNNING IN NON-ENGLISH LANGUAGE CAN RESULT IN WRONG META DATA GENERATED FOR LIST OF VALUES LOV QUERY
34778937	PAGE DESIGNER: SETTING ORDER BY ITEM FOR CLASSIC REPORT DOESN'T DISABLE COLUMN LEVEL SORTABLE
34785016	INTERACTIVE GRID - NAVIGATION MODE - INACCESSIBLE ROW HEADERS IN VIRTUAL CURSOR MODE OF JAWS
34787217	QUICK SQL JSON COLUMN DIRECTIVE GENERATES INVALID COLUMN NAME WITHIN IS JSON CHECK CONSTRAINT
34788868	PAGE DESIGNER: CLASSIC REPORT BASED ON SQL QUERY ORDER BY ITEM ATTRIBUTE DOES NOT SHOW THE CURRENT VALUE
34801334	HTML CODE IS EXPOSED BY SCREEN READER IN INTERACTIVE GRID FOR SORTED COLUMNS WHEN HTML PRESENTS IN THE HEADING
34810793	XMLHTTPREQUEST / AJAX POST REQUESTS ARE INTERCEPTED BY DEFAULT PWA SERVICE WORKER
34815591	LEGACY TABULAR FORM: COLUMN HEADING SORTS ARE BROKEN IN THE BUILDER
34816104	REGION'S LANDMARK EXPOSE HTML CODE TO SCREEN READER
34816695	INACCESSIBLE EDIT LINK IN SHARED COMP > LISTS > LIST DETAILS PAGE
34823431	APEX 22.2 CLASSIC REPORT MEDIA LIST TEMPLATE HAS NO EQUAL SIGN AFTER ATTRIBUTE ARIA-HIDDEN
34829685	WHEN IMPORTING PLUGINS, CANCEL BUTTON IS REDIRECTING TO APP BUILDER HOME PAGE
34835558	INTERACTIVE REPORT: HIDDEN COLUMN AS TEMPLATE DIRECTIVE ARGUMENT IGNORED
34835670	MAXIMUM LOGIN FAILURES ALLOWED ATTRIBUTE HELP TEXT IS NOT CLEAR IN INTERNAL WORKSPACE
34850640	TEXTAREA WITH CHARACTER COUNTER SHOULD NOT DEPEND ON MAXIMUM LENGTH
34859744	NULL SUBSTITUTIONS NOT HANDLED FOR QUICK PICKS
34874022	MEGA MENU SOMETIMES DISPLAYS IN WRONG LOCATION
34876366	INTERACTIVE GRID: DISABLING COLUMN FROM USER BREAK CONTROL SHORT-CIRCUITS EXPECTED SORTING IN GROUPS
34880567	REGRESSION: INTERACTIVE GRID: JAVASCRIPT ERROR WHEN SWITCHING INTO SINGLE ROW VIEW IN MODEL.JS
34880761	NUMBERFIELD: CLIENT SIDE VALIDATION WORKS NOT CORRECTLY WHEN MIN IS A DECIMAL NUMBER IN GERMAN
34888991	JAVASCRIPT ERROR WHEN "REFRESH ROWS" AFTER DISABLING CELLS IN INTERACTIVE GRID WITH DYNAMIC ACTION
34896762	WWW_FLOW_EXEC_LOCAL CAN NOT DESCRIBE TABLES WITH COLUMN TYPES > 30 BYTES
34909201	SIMPLE HTTP REST SOURCE WITH NO PAGINATION: APEX COMPONENTS CAN ONLY ACCESS THE FIRST PAGE
34918155	CODE EDITOR NOTIFICATIONS ARE NOT ANNOUNCED BY SCREEN READERS
34929885	GEOCODING FAILS TO RETURN TIMEZONE INFO THAT ELOCATION SERVICE KNOWS HOW TO PROVIDE
34964974	POPUP LOV TRIGGER FOCUS EVENT ON THE DATE PICKER WHEN BOTH ARE ON THE SAME PAGE

Bug Number	Description
34969093	DICTIONARY CACHE JOB ERRORS OUT WHEN TABLE HAS PK CONSTRAINT ON OBJECT TYPE ATTRIBUTE
34974960	ADD APEX_LANG.GET_LANGUAGE_SELECTOR_LIST
34977538	MAP REGION THROWS ORA-6502 WHEN GEOMETRY TYPE DOES NOT MATCH LAYER TYPE AND PRIMARY KEY VALUE IS NON-NUMERIC
34980663	CHOOSING SMART FILTER OPTION USING KEYBOARD UNEXPECTEDLY APPLIES TEXT SEARCH FIRST, UNLIKE WHEN MOUSE USED
34995573	CREATE FORM PAGE WIZARD GENERATES INVALID SELECT LIST FOR FOREIGN KEY COLUMNS WHEN TABLE AS UI DEFAULTS
35000191	BROWSER DEVELOPER TOOLS MAY RAISE SOURCE MAP WARNINGS FOR JET BUNDLES
35003356	APEX SERVES WASM FILES WITH WRONG CONTENT TYPE
35003528	APEX_MARKDOWN TO_HTML CANNOT PARSE EMOJIS
35009997	SAML AUTH: TIMESTAMPS WITH FRACTIONAL SECONDS LEAD TO NLS ERRORS WHEN APP PRIMARY LANGUAGE IS GERMAN
35011645	QUICK SQL ALTERS IDENTITY COLUMN TO ALWAYS TO RESET THE SEQUENCE IF /INSERT DIRECTIVE USED AND CAUSES SIDE BY SIDE MD WIZARD TO FAIL
35027073	PAGE DESIGNER: LOV TYPE ATTRIBUTES HAVE SQL QUERY EXAMPLE IN THE HELP TEXT
35032340	UNESCAPED ARIA-LABEL ATTRIBUTE MAY CAUSE HTML CODE TO BE EXPOSED TO SCREEN READER USERS
35032866	UNIVERSAL THEME: LINKS LIST TEMPLATE DOES NOT SHOW CHILD LIST ENTRIES
35038471	USE SEMICOLONS TO SEPARATE SQL STATEMENTS WHEN EXPORTING EMBEDDED CODE
35042503	WORKSPACE FILE VERSION IS NOT INCREMENTED WHEN IMPORTING A WORKSPACE EXPORT FILE
35045970	PAGE DESIGNER INTERNAL ERRORS ARE REPORTED POORLY ("UNEXPECTED END OF JSON INPUT")
35046331	INTERACTIVE GRID REVERT ACTION DOES NOT CLEAR ROW ERROR
35047273	CHANGE PAGE DESIGNER "PICK TABLE" PROPERTY TO NO LONGER FETCH AND DISPLAY TABLE COMMENTS
35047632	INTERACTIVE GRID DISPLAY HIDE COLUMN ACTION WHEN THE PROPERTY IS OFF
35059564	PASSWORD ITEMS INTERACTIVE REPORT HIGHLIGHT ON PG 4000:59 IS NOT ACCESSIBLE
35061631	APEX_CREDENTIAL.SET_SESSION_CREDENTIALS DOES NOT PREPARE PRIVATE KEY FOR THE "OCI" CREDENTIAL TYPE
35072569	SOCIAL SIGN IN WITH OAUTH: SETTING "VALID FOR URLS" FOR THE USED CREDENTIAL LEADS TO "CREDENTIAL NOT ALLOWED FOR THIS URL" ERROR
35074102	"RESTRICTED" DEVELOPER ACCOUNTS CANNOT DELETE APPLICATIONS
35088401	POPUP LOVS IN APP BUILDER HAVE OVERESCAPING ISSUES
35089582	USING SHARED LOV WITH MIXED NAME FOR COLUMN DISPLAY BREAKS CLASSIC REPORT
35092961	DATA PROFILE EDIT PAGE: REDISCOVER WITH SAMPLE RESPONSE DOES NOT WORK FOR CSV

Bug Number	Description
35096513	ORDS REST SOURCE THROWS HTTP-400 IF THE REST SERVICE USES THE "CSV" HANDLER TYPE
35102526	CREATE ORDS REST SOURCE GENERATES WRONG URL PATTERNS FOR ORDS SERVICES WHEN ENDPOINT URL CONTAINS PARAMETERS
35105737	APPROVAL COMPONENT: CLOB COLUMNS IN THE TASK DEFINITION ACTION SOURCE RESULT IN ERRORS WHEN CREATING NEW TASK INSTANCE
35115943	VIEW APEX_WORKSPACE_CREDENTIALS DOES NOT CONTAIN ID (PRIMARY KEY OF THE CREDENTIAL)
35118803	DATALOADING: SPINNER CONTINUES FOREVER AND BROWSER POPUP FOR UNSAVED CHANGES IS DISPLAYED WHILE SAVING CHANGES FOR COLUMN MAPPING
35118846	DATE PICKER: THE YEAR SELECTION LIST SHOULD ADAPT TO MIN/MAX VALUES
35120434	COPY PAGE FROM OTHER APP: FACETS ARE TURNED TO NORMAL TEXT ITEMS WHEN "DO NOT COPY" LOV OPTION WAS CHOSEN
35122774	QUICKSQL SETTINGS HELP MENTIONS "IDENTIFIERS" INCORRECTLY FOR "LONGVC" OPTION
35125503	CREATE "REST ENABLED SQL QUERY" REST SOURCE: NOT NULL VALIDATION ON "REST SQL REFERENCE" IS MISSING
35125959	INVALID YAML FILE FOR SUBSCRIBED LISTS
35130003	SUBMIT FEEDBACK: SESSION STATE SHOULD NOT CONTAIN INTERNAL ITEMS (WITHOUT NAME)
35132561	ADB-S: UNABLE TO SET APPLICATION_ACTIVITY_LOGGING INSTANCE PARAMETER USING API
35144981	CHANGING FORM REGION TYPE LEAVES PAGE WITH DUPLICATE PAGE PROCESS & EXTRA ITEMS
35145009	PAGE PROCESSES, COMPUTATIONS, VALIDATIONS, BRANCHES CAN BE COPIED TO GLOBAL PAGE
35154878	BRANCH_TO_PAGE_ACCEPT REQUEST ON MODAL PAGES THROWS JAVASCRIPT ERROR WITH FRIENDLY URLS ON
35159175	DATE FORMAT SHOWS UP INCORRECTLY IN REPORT DOWNLOAD FOR EXCEL
35161374	TEXTFIELD WITH AUTOCOMPLETE MISSING RED BORDER WHEN FAILING VALIDATION
35166428	TABS CONTAINER REGION TEMPLATE FAILS TO RENDER WHEN USING HTML IN REGION TITLE
35171187	INVALID IDENTIFIER: CHECKBOX OR RADIO GROUP ON SHARED COMP LOV ON REST-ENABLED SQL OR REST SOURCE
35174652	XML DATA LOAD CAN RAISE ORA-1706: USER FUNCTION RESULT VALUE WAS TOO LARGE
35195711	REMOVE EXTRA WHITESPACE IN FACETED SEARCH CHART LABELS
35215039	SHUTTLE ITEM DOESN'T FIRE CHANGE EVENT ON REORDER
35215238	APEX.WIDGET.UTIL.WHENBECOMESVISIBLE DOESN'T WORK WHEN THERE ARE MULTIPLE COMPONENTS BECOMING VISIBLE AT THE SAME TIME
35217084	REST SOURCE: CANNOT ADD SQL EXPRESSION BASED ON CLOB COLUMN TO DATA PROFILE

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Bug Number	Description
35260689	REPORT TEMPLATE WITH MULTIBYTE CHARACTERS IS CORRUPTED UPON IMPORT
35285406	REGRESSION: CLOBS FAIL TO BE CLONED WITH APEX_CLONE_SESSION

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# 10

## Open Bugs and Known Issues

This section describes bugs and known issues for Oracle APEX release 23.1.



### Tip:

This section is current as of the writing of this document. To view the most current listing of changed behavior, go to the **Known Issues** page:

<https://www.oracle.com/tools/downloads/apex-downloads/apex-231-known-issues/>

- [Known Issue with Confirm or Alert Dynamic Action Messages When Upgrading](#)
- [Known Issue using 'Source Display' region type plug-in in previously installed Sample Apps](#)
- [Known Issues for jQuery Upgrade](#)
- [Interactive Grid support for REST Enabled SQL](#)
- [Group By Component Type mode prevents Default View](#)
- [Known Issues for Data Generator](#)
- [Known Issue Using Readable Export Format](#)
- [Known Issue when Displaying RESTful Module Definition Full URL](#)
- [Known Issue when Displaying Full URL for Enabled Object Definition when using a Named Pool in ORDS](#)

### 10.1 Known Issue with Confirm or Alert Dynamic Action Messages When Upgrading

#### Issue

When upgrading from APEX 21.2 or earlier, the text in existing Confirm or Alert dynamic action messages may be truncated if it is too long, leading to data loss. This is due to APEX HTML-escaping messages, which may increase their size past the 4000-byte limit.

#### Resolution

Prior to upgrading, run a query to check whether any messages are affected:

```
select *
  from apex_application_page_da_acts
 where action_name in ('Alert', 'Confirm')
        and ( lengthb( attribute_01 )
```



```
+ ( 4 * nvl( regexp_count( attribute_01, '&|"<|>' ), 0 ) )
) > 4000;
```

If the query does not return any rows, proceed with the upgrade.

If the query does return rows, convert the affected rows into application text messages and reference them with substitution syntax before proceeding with the upgrade.

## 10.2 Known Issue using 'Source Display' region type plug-in in previously installed Sample Apps

### Issue

The Source Display region type plug-in that is used in a Sample App installed in a previous release of APEX no longer works. This issue is due to the removal of views associated with AnyChart charts and AnyMap map charts.

### Resolution

1. Open the application to edit it.
2. Navigate to **Shared Components**, under Other Components select **Plug-ins**, and **Source Display**.
3. Update the PL/SQL Code to **remove** the following lines of code (lines 35 - 48):

```
union all
select reg.source_type, fs.series_seq, fs.series_name,
fs.series_query source
from apex_application_page_regions reg,
     apex_application_page_flash5_s fs
where reg.application_id = :APP_ID
     and reg.page_id = :APP_PAGE_ID
     and reg.static_id = d_region_static_id
     and fs.application_id = reg.application_id
     and fs.page_id = reg.page_id
     and fs.region_id = reg.region_id
     and reg.source_type in (
         'Flash Chart',
         'Map'
     )
```

4. Click **Apply Changes**.

## 10.3 Known Issues for jQuery Upgrade

jQuery 3.x breaks compatibility with earlier 2.x versions. For applications that still rely on removed 2.x functionality, you can use the jQuery Migrate plug-in (to include this plug-in, set the Desktop User Interface Details attribute **Include jQuery Migrate to Yes**).

If your application relies on removed 1.x jQuery APIs, that functionality no longer works as of Application Express release 18.1. You must update the JavaScript to only use jQuery 3.5 or later APIs. See the jQuery migration guides to learn more:

- To migrate from 1.x to 2.x see <http://jquery.com/upgrade-guide/1.9/>
- To migrate from 2.x to 3.5.x see <https://jquery.com/upgrade-guide/3.5/>

## 10.4 Interactive Grid support for REST Enabled SQL

### Issue

Oracle REST Data Services (ORDS) REST Enabled SQL has a limit of 1000 bind variables in a REST Enabled SQL request. As a result, when Interactive Grid DML sends more than 1000 column values, the following error displays: "Internal ORDS OUT Bind limits exceeded."

### Solution

Reduce the amount of DML rows.

## 10.5 Group By Component Type mode prevents Default View

### Issue

Due to the removal of "Sort by Processing Order" and "Group by Component Type" from Page Designer, developers may be stuck in "Group by Component Type" mode without a way to switch back to the default view ("Sort by Processing Order").

### Resolution

1. In Page Designer, open Developer Console in the browser, and run the following command:

```
pageDesigner.saveBoolPref( "GROUP_BY_COMPONENT_TYPE", true );
```

2. Refresh the page.

## 10.6 Known Issues for Data Generator

There are known issues with the API for the data generator:

- API does not accept Percent Blank value of 100.
- Some built-ins that return a number data type ignore values set for minimum value, maximum value, and value precision.
- Preview ignores columns when all their values are null.
- When generating data and using row scaling other than 1x, sometimes an extra row is added.

These issues will be fixed in a future release.

## 10.7 Known Issue Using Readable Export Format

The Readable Export Format in JSON and YAML does not include attribute values for plug-ins, themes, and templates.

This will be resolved in a future release of APEX.

## 10.8 Known Issue when Displaying RESTful Module Definition Full URL

### Issue

The full URL displayed when viewing a module definition is incorrect. This issue is tracked in bug 35378812.

### Resolution

Remove the module name from the full URL.

### Example

For the default module, `oracle.example.hr`, the full URL displays as:

```
server/ORDS alias/schema alias/oracle.example.hr/hr/
```

The correct URL is:

```
server/ORDS alias/schema alias/hr/
```

## 10.9 Known Issue when Displaying Full URL for Enabled Object Definition when using a Named Pool in ORDS

### Issue

The full URL displayed when viewing an enabled module definition when using a named pool in ORDS is incorrect. This issue is tracked in bug 35340435.

### Resolution

Add the ORDS named pool to the full URL.

### Example

For an AutoREST enabled object definition with ORDS configured to use a named pool, the full URL displays as:

```
server/ORDS alias/schema alias/object alias/
```

The correct URL is:

```
server/ORDS alias/ORDS named pool/schema alias/object alias
```

# 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>.

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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.

# Privacy Notice

This privacy notice describes what to expect when Oracle APEX directly collects information about users of applications that you create or install. Note that all APEX internal applications (such as Application Builder) are written in APEX, so the same facts apply to developers and administrators who are using these applications. Oracle is not responsible for information collection of applications that were developed by customers.

## Event Logging

APEX provides extensive logging of user triggered events. For example, developers and administrators can use this data to find security and performance issues. The log data includes the user's IP address and application username plus event specific information. Below is a brief list of event log types.

- **Activity Log** - Page views and Ajax requests. Can be disabled by developers and instance administrators.
- **Login Access Log** - Successful and failed login attempts.
- **Debug Log** - Application-specific instrumentation, such as internal variable values. Disabled by default, the debug log can be enabled by end users and developers.
- **Click Count Log** - Clicks on external links within applications.
- **Web Service Activity Log** - Requests to external web services from inside the database.
- **Developer Activity Log** - Changes to application components.
- **SQL Workshop Log** - History of SQL statements in the development environment's SQL Workshop.

## Cookies and Related Technologies

APEX does not use any third-party cookies, but it does use functional cookies (no tracking) and the browser's SessionStorage and LocalStorage for maintaining the login session and for personalization. This is essential for application security, performance, and ease of use. Below are details about the cookie and storage names that APEX uses and their intended use.

### Session Cookies

- `ORA_WWV_USER_instance id` - Security cookie for internal applications, like Application Builder.
- `ORA_WWV_APP_application id`, `ORA_WWV_APP_workspace cookie id`, `custom name` - Security cookie for applications. Developers can choose custom cookie names in an application's authentication scheme.
- `ORA_WWV_RAC_INSTANCE` - Session cookie for the Real Application Cluster (RAC) node instance number, for node pinning on the web server. Only sent when multiple RAC nodes are detected.

## Persistent Cookies

- `ORA_WWV_REMEMBER_LANG` - The user's selected application language.
- `ORA_WWV_REMEMBER_UN` - (Optional) Workspace and username of the previous login to the development environment login page. See check box **Remember workspace and username** on the development environment login page for details.
- `LOGIN_USERNAME_COOKIE` - (Optional) Username of the previous login to developed applications. See check box **Remember username** on login pages of new applications for details. To make this cookie optional on login pages of existing applications, add a **Remember username** checkbox to the page. The API documentation for `APEX_AUTHENTICATION.GET_LOGIN_USERNAME_COOKIE` and `APEX_AUTHENTICATION.SEND_LOGIN_USERNAME_COOKIE` has examples for the PL/SQL process code to set the check box value and to only send the cookie when the check box is checked.

## Session Storage

- Object Browser - Session storage keys used for the Object Browser:
  - `ORA_WWV_apex.objectBrowser.openTabs` - Stores a JSON structure with information about the currently open object.
  - `ORA_WWV_apex.objectBrowser.viewState` - Stores view state for the current view of the current open object.
  - `ORA_WWV_apex.objectBrowser.lastSchema` - Stores an opaque number related to the last used schema.
  - `ORA_WWV_apex.objectBrowser.treeExpansionState` - Stores a list of expanded tree nodes.
  - `ORA_WWV_apex.objectBrowser.treeSelection` - Stores the selected tree node.
  - `ORA_WWV_apex.objectBrowser.objectFilter` - Stores the current filter.
- Spatial Map Region - Session storage keys used on the map component:
  - `ORA_WWV_apex.spatialMap.application id.page.region id.zoomState` - Stores the current zoom level on the map
  - `ORA_WWV_apex.spatialMap.application id.page.region id.lngState` - Stores the current longitude on map
  - `ORA_WWV_apex.spatialMap.application id.page.region id.latState` - Stores the current latitude on map
  - `ORA_WWV_apex.spatialMap.application id.page.region id.bearingState` - Stores the current tilt in degrees on the map
  - `ORA_WWV_apex.spatialMap.application id.page.region id.pitchState` - Stores current direction user is facing measured clockwise as an angle on the map
- `ORA_WWV_apex.facets.application id.page.region id.clientSideFiltering` - Stores the facets where the user has enabled or disabled on client-side filtering.
- `ORA_WWV_apex.facets.application id.page.region id.hiddenFacets` - Stores the facets where the user has set Visibility to Off.

- `ORA_WWV_apex.facets.application id.page.region id.chartConfig` - Stores the configuration for the facet charts.
- `ORA_WWV_apex.facets.application id.page.region id.openCharts` - Stores the facet charts that have been opened.
- `ORA_WWV_apex.facets.application id.page.region id.facetCollapsedState` - Stores the facet-collapsible state.
- `ORA_WWV_apex.PopupLov_*.application id.page.state` - This stores the popup dialog size, column widths, sort column, and direction of popup LOV items.
- `ORA_WWV_apex.builder.devToolbar.grid` - This stores the current setting of the Development Toolbar's Show Layout Columns option.
- `ORA_WWV_apex.builder.utr.application id.*` - This stores settings of the Development Toolbar's Theme Roller popup.
- `ORA_WWV_apex.builder.pageDesigner.application id.(current tab id)` - This stores the current tab in each of the tab sets of Page Designer.
- `ORA_WWV_apex.core.userHasTouched` - This is used to remember if the user has interacted with the application using touch (a touchstart event has been seen). It is used by some components to customize the user experience when using touch devices.
- `ORA_WWV_apex.apexTabs.application id.page.*.activeTab` - This remembers the last tab selected for Region Display Selector regions or regions using the Tabs Container template that have enabled the option to save the current tab
- `ORA_WWV_apex.Calendar.application id.page.region id.lastview` - This remembers the last viewed calendar period.
- `ORA_WWV_apex.toggleCore.*.application id.page.*.preferenceForExpanded` - This remembers the expanded state for collapsible regions.
- `ORA_WWV_apex.MED_*.splitterPosition` - This stores the splitter bar position for various Interactive Grid settings dialogs.

### Local Storage

- `ORA_WWV_apex.builder.devToolbar.options` - This stores the Developer Toolbar user preference settings: Auto Hide, Show Icons Only, and Display Position.
- `ORA_WWV_apex.builder.pageDesigner.model.componentIds` - This stores a pool of not yet used IDs for new components in Page Designer.

### Check for Updates

When developers log in to the APEX development environment, they get a notification when a new version is available. To get this version information, APEX sends a request to an oracle.com server on a bi-weekly basis. It passes anonymized, statistical information about the development server (such as database version and APEX component usage) that the APEX product development team uses to make decisions about the products' future. This check is enabled by default, but can be disabled by instance administrators. To learn more, review the `CHECK_FOR_UPDATES` parameter in `APEX_INSTANCE_ADMIN` in *Oracle APEX API Reference*.

# Index

## B

---

browser  
    requirement, [1-1](#)

## I

---

installation  
    enabling network services, [3-6](#)

## N

---

network services  
    enabling, [3-6](#)  
    granting connect privileges, Oracle Database  
        12c, [3-7](#)  
    invalid ACL error, [3-8](#)

## O

---

Oracle APEX  
    browser requirement, [1-1](#)

## R

---

release numbering  
    convention, [1-2](#)  
requirements  
    browser, [1-1](#)

## W

---

Web browser  
    requirements, [1-1](#)  
web server  
    Oracle REST Data Services, [1-2](#)  
    requirements, [1-2](#)