

Oracle® APEX

Release Notes



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Oracle APEX Release Notes, Release 23.2

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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. The use of Quick SQL requires Oracle REST Data Services (ORDS) 23.3 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 23.2](#)

1.1.1 Oracle Database Requirements

Oracle APEX release 23.2 requires an Oracle Database release 19c or later. APEX runs on all database editions, including Enterprise Edition (EE), Standard Edition (SE) and Database 23c 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. The use of Quick SQL requires Oracle REST Data Services (ORDS) 23.3 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 and newer now ship 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 23.2 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*.

- [About Upgrading to the Latest Version of Universal Theme](#)

1.1.6.1 About Upgrading to the Latest Version of Universal Theme

APEX supports the current and prior APEX version of Universal Theme for each release. For example, APEX 23.2 supports Universal Theme 23.2 and 23.1.

It is highly recommended users refresh Universal Theme within their applications after each APEX release. While refreshing Universal Theme is not mandatory and your application will continue to work, older versions of Universal Theme do not have support for new features or bug fixes introduced in subsequent APEX releases. Therefore, it is important to refresh your theme regularly so your applications are on the latest (or one version prior) release of Universal Theme and remain supported.

Universal Theme moved to CSS variables in APEX 21.1. This means refreshing Universal Theme is easier to customize and manage. For more on refreshing Universal Theme, see [Refreshing the Universal Theme in Oracle APEX App Builder User's Guide](#) and the [Migration Guides](#) on the Oracle APEX Universal Theme app.

For the Universal Theme [Change Log](#), see the Oracle APEX Universal Theme app.

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 23.2

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 23.1](#)
- [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 23.2 includes a number of new features. These new features are not present in APEX release 23.1 and earlier releases.

- [Application Working Copies](#)
- [New Workflow Feature](#)
- [New Combobox Item](#)
- [New Image Upload Item](#)
- [New QR Code Item](#)
- [Custom Map Backgrounds](#)
- [Faceted Search Enhancements](#)
- [More Attributes for Template Components](#)
- [Improved Shared Component Subscriptions](#)
- [Quick SQL Updates](#)
- [Improvements to REST Source Infrastructure](#)
- [REST Source Catalogs from OpenAPI Documents](#)
- [OData Connector as a Native REST Source Type](#)
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- [Approvals Component Enhancements](#)
- [Action Tasks](#)
- [Simplified Create Application Wizard](#)
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- [Utility Apps Available in Gallery](#)
- [JavaScript API Updates](#)
- [JavaScript Library Upgrades](#)

2.1 Application Working Copies

With the introduction of this new feature, you can now create a copy of your application (**Working Copy**), make changes in the copy, and merge those changes back into your application (**Main**). APEX produces a visual diff of the changes between your working copy and main application.

You can now do feature development and testing in a working copy of your application, and merge changes back in when you are ready for them to be included in the main application.

Tip:

When multiple developers use separate working copies to fix or enhance the same application in parallel, follow these tips to proactively avoid component or page conflicts:

- Agree on distinct page number ranges for new pages.
- Decide on new component names and communicate them to teammates.
- Lock a page in the main application before changing it in your working copy.

Implementing these practices ensures your team never has to decide which developer's component or page changes to keep and which to overwrite. For more information, see *Creating a Working Copy to Merge, Refresh, or Compare* in *Oracle APEX App Builder User's Guide*.

You can refresh a working copy by pulling updated components or pages from the main application into your working copy. Before deciding which candidates to include, you can review individual differences in each component or page.

2.2 New Workflow Feature

The new **Workflow** component is implemented in APEX for a fully-integrated workflow solution that lets you automate business processes using an intuitive visual workflow designer. Workflows include:

- a visual **Workflow Designer** to create and author workflows
- a **Workflow Console** for monitoring and administration of workflows
- the new **Workflow Runtime Engine** for executing workflows

You can combine workflows with existing task functionality, add conditional routing, invoke APIs, send email or push notifications, wait until a future time, or use process type plugins to expand the palette of workflow activities.

2.3 New Combobox Item

A new item type, **Combobox**, is now available. Combobox is a web component that supports:

- users selecting a single value or multiple values
- display of multiple values as chips
- automatic tag creation
- identification of manually-entered items not in the LOV dataset
- Template Directives
- Icons
- Groups
- multi-column search and display
- free-entry text
- multi-selection

Combobox is not currently supported for interactive grids.

2.4 New Image Upload Item

The new Image Upload item makes it easy to crop, resize, and upload images to your application using on-device processing. You can also configure whether to use the main camera or the selfie camera for mobile devices.

2.5 New QR Code Item

The new **QR Code** item lets you easily embed scannable QR codes that contain text, URL, phone, email, SMS, or location data. You can also use the associated QR code API to embed QR codes in reports, emails, or other parts of your application.

2.6 Custom Map Backgrounds

You can now add custom map backgrounds under Shared Components, Other Components.

APEX supports Raster, Vector, and OGC WMS tile layers. You must provide a map background name and a URL to fetch the background. Optionally, you can provide HTTP headers, an API Key value, Min and Max Zoom, and a Map Attribution message.

You can use custom map backgrounds in map regions, display map, and geocoded address items. You can subscribe, refresh, and publish your map backgrounds just like any other shared component.

2.7 Faceted Search Enhancements

You can now set the sort direction for distinct LOV-based facets.

Users can now choose the comparison operator for input-based facets in faceted search and smart filters. In addition to the existing comparison operators, APEX now supports `not equals`, `does not start with`, and `does not contain`.

2.8 More Attributes for Template Components

Template Component plug-ins are no longer capped at 25 attributes. You can now create more complex template components because APEX no longer restricts you to only 25 attributes.

With this change, querying metadata is changed. For template components only, the `ATTRIBUTE_01...ATTRIBUTE_25` columns of `APEX_APPLICATION_PAGE_REGIONS` and `APEX_APPLICATION_PAGE_IR_COL` public views now return null. Instead, use the new `ATTRIBUTES` column that stores a JSON object of all attribute values. Use the attribute's **Static ID** as the object key. Note that a table alias is always needed when using the JSON dot notation. For example:

```
select r.attributes.COLOR
       from apex_application_page_regions r
      where r.application_id = 100
            and r.page_id    = 1
            and r.static_id  = 'user_badge';
```

For more information on template components, see *About Template Component Type Plug-ins* in *Oracle APEX App Builder User's Guide*.

2.9 Improved Shared Component Subscriptions

Subscription functionality is now available for the following Shared Components:

- Application Items
- Application Processes
- Application Computations
- Application Settings
- Build Options
- Application Access Control, Roles
- Email Templates
- Component Settings
- Report Layouts
- Text Messages

Copy functionality is added wherever it was missing.

Highlights

- **Subscribed Components are now read only:** Subscribed Shared Components are read-only to prevent any unintended changes from the source component. This enforces consistency and enables a simple refresh and publish mechanism to roll out changes across components.
- **Automatic Dependency Resolution:** APEX can more gracefully handle dependencies between Shared Components by re-using existing components with the same name or by automatically copying over the dependent component.

- **Subscription Status:** There is a new Subscription Status column available across Shared Components reports that clearly identifies whether the component is up to date, or whether it needs to be refreshed from the subscription source.
- **Bulk Refresh and Deletion:** Easily view subscribed Shared Components that are out of sync and refresh them. If the source component is deleted, APEX automatically clears any remaining subscriptions to keep applications clean and ensure that no stray components are left behind.

2.10 Quick SQL Updates

Create, maintain, and review application data models with minimal typing, lightning-fast SQL generation, and a built-in entity relationship diagram.

Use the **Entity Relationship Diagram** to visualize your data model's tables, columns, datatypes, and relationships in the new Diagram tab. The generated SQL script and entity relationship diagram refresh instantly whenever you pause your typing.

Quick SQL now relies on a minimum ORDS version of 23.3.0.

2.11 Improvements to REST Source Infrastructure

There are now multiple improvements for REST Data Sources, including support of data types for REST Source parameters, validation for regular expressions, and smaller enhancements for the programming interface for REST Source Plug-Ins.

You can now delete a column from the data profile columns APEX finds during discovery. Use the new Response Body tab to view information about the response body structure APEX finds.

2.12 REST Source Catalogs from OpenAPI Documents

APEX can now generate a REST Source Catalog from OpenAPI documents. For more information, see *Creating a REST Source Catalog from OpenAPI* in *Oracle APEX App Builder User's Guide*.

2.13 OData Connector as a Native REST Source Type

The OData protocol is used by SAP, Microsoft, and other software providers as the protocol for their REST APIs. APEX can now provide connectivity to OData REST APIs out of the box. Support is currently limited to read only (Reports, Charts, etc.). Support for DML (Forms, Editable IG) is planned for a future release.

For more information on the OData specification, see [OASIS Open Data Protocol](#).

2.14 Support for Fusion Apps Extensions

You can now create REST data sources to query, insert, update, and delete data from Fusion Apps REST APIs. After defining your REST Data Sources, use them with any APEX regions to build custom experiences for Fusion Applications data. They take full advantage of APEX features like REST synchronization to improve performance and local post-processing to join remote data to local tables and further filter it using the power of SQL.

Oracle Cloud Apps REST Data Sources handle all read and write operations, leveraging data pruning, filtering, ordering, and bulk operations automatically. You can evolve APEX apps in tandem with in-progress customizations in a Fusion Apps sandbox. You can also build cascading select lists and query by example pages using filter parameters, and easily show users Fusion Apps validation errors.

2.15 Approvals Component Enhancements

Editing Task Definition Parameters

Task parameters can now be set as **Updatable** in the task definition. This allows the owner or business administrator for the task to modify the value of specific parameters before task approval.

New Business Administrator Actions

The business administrator for a task can now remove potential owners. They can also cancel tasks.

New Substitution Strings

The text message sent in Add Comment, Request Information, and Submit Information task actions is now available as a substitution string: `APEX$TASK_TEXT`.

Unified Task List Enhancements

Users can now claim unassigned tasks directly from the task list. To get this new behavior in your application, regenerate any existing Unified Task List pages.

2.16 Action Tasks

Building on the task framework introduced in the Approvals Component, **Action Tasks** are tasks that do not require approval. Use action tasks for scenarios where users need to add data to a form, upload a file, verify information, or do other work to complete the task. You can add an action task as a step in an APEX workflow.

APEX can assign action tasks to any user, including the task initiator. Action tasks show up in the Unified Task List alongside approval tasks. When you create an action task definition, APEX also generates a boilerplate task detail page that you can easily customize for your specific application.

2.17 Simplified Create Application Wizard

When creating a new application, you now have the option to enter an app name and click **Create Application** to immediately create the application without going through the Create Application Wizard. The simplified Create Application Wizard generates a new application with a single page and default settings.

The list of additional create options now has a new look and new options to use the full Create App Wizard or Quick SQL.

2.18 Simplified Application Export

Exporting applications, pages, and components is now centralized and standardized, making exports more user-friendly. When you export, APEX now only displays the essential, customizable export content, providing a more intuitive experience.

2.19 Simplified Application Import

The import wizard is streamlined and simplified to make importing easier than ever. Install apps with or without supporting objects, pages, and components in just a few steps.

2.20 Improvements to Background Page Processing

Background page processing now supports:

- a new **Context Value** to allow better control for serialization of multiple process instances
- improved error handling
- the ability to submit a background execution as part of the main transaction

2.21 Populate List Item Subentries with List Reference

Child items of a static list item can now be populated by referencing a list, with the ability to nest lists up to 10 levels. The referenced list can be static or dynamic. Use the List Utilization report to easily identify list and sublist relations.

Sublist references are fully integrated with the copy and subscribe functionality, meaning a sublist is automatically copied to the target application when the referencing list is copied. Sublist references are fully supported by application export and import.

2.22 Translate Default Reports

APEX can now translate default reports in Interactive Report and Interactive Grid. The XLIFF file now includes default report translatable texts, including the report name, filter name, highlight name, and chart axis labels. For interactive grids, you can translate the Report Aggregate tooltip, and for interactive reports, you can translate the label and format mask for computations, pivot aggregates, and group by functions.

2.23 Ubiquitous Search

With Oracle Database 23c Ubiquitous Database Search, you can use the `DBMS_SEARCH` PL/SQL package for indexing of multiple schema objects in a single index. APEX supports Ubiquitous Search indexes by providing a new search type in the Search Configuration wizard: **Oracle Ubiquitous Search**.

For more on Ubiquitous Search, see *Creating a Ubiquitous Search* in *Oracle APEX App Builder User's Guide* and *Performing Ubiquitous Search with DBMS_SEARCH APIs* in *Oracle Text Application Developer's Guide*.

2.24 New Instance Parameters for APEX_INSTANCE_ADMIN

Two new parameters are now available in APEX_INSTANCE_ADMIN:

- `RESTRICT_APPS_HEADER` that identifies the HTTP request header and restricts access to a specific list of applications based on a list in the header
- `DISABLE_APPS_LOGIN` disables login to APEX apps when set to Y. You can disable login to specific apps by using a comma-separated list of app IDs.

You can also set `DISABLE_APPS_LOGIN` by going to Internal Administration, Manage Instance, Security.

2.25 EMP/DEPT Dataset Support in Arabic and Italian

The EMP/DEPT dataset is now available in Arabic and Italian.

To install the datasets, go to **SQL Workshop, Utilities**, and then click **Sample Datasets**. For more information on sample datasets, see *Accessing Sample Datasets in Oracle APEX SQL Workshop Guide*.

2.26 Store Static Resources in Oracle Cloud Object Storage

Static application files, including images, CSS, and JavaScript files, can now be stored in Oracle Cloud Object Storage. For more information on using OCI for static application file storage, see *Managing Static Application Files in Oracle APEX App Builder User's Guide*.

2.27 Utility Apps Available in Gallery

Utility apps are ready-to-use apps that simplify common APEX application development tasks. If available, the Utility App category shows in the **App Gallery**. For more on the App Gallery, see *Using the App Gallery in Oracle APEX App Builder User's Guide*.

2.28 JavaScript API Updates

New and Changed APIs

This release contains new options, parameters, and functionality:

- `apex.util.escapeHTML`: when `pValue` is NULL, an empty string is returned.
- **Removed option** `lovValuesOptimization` from `facetsRegion listControl` and `selectListControl` types because it was not useful and is no longer used.
- `mapRegion` option `tileLayer` has a number of new properties.
- `model.allowDelete` has a change in behavior for tree shape models: all the child nodes must also allow delete.

- `model.walkTree` `pVisitor` **parameter** `postNode` **callback** allows for post-order traversal.
- `facetsRegion` **interface** describes Flexible Operators for facet type Input Field.

Fixed or Improved Examples

The Index Introduction text is improved.

This release includes fixed or improved examples:

- `apex.pwa.getPushSubscription`
- `model.child`
- `model.childCount`
- `model.clearChanges`
- `model.fetchAll`
- `model.setValue`

Improved API Descriptions

This release includes improved API descriptions:

- `grid` **and** `tableModelView` **widget option** `hideSinglePage`
- `interactiveGrid` **widget type definition** `toolbarData` **properties**
- `model.clearChanges`
- `model.getRecord`
- `model.getTotalRecords`
- `model.setData`
- `model.setValue` `pValue` **parameter**
- `model.walkTree`

2.29 JavaScript Library Upgrades

- Backbone.js 1.4.1
- DOMPurify 3.0.5
- FullCalendar 6.1.8
- jQuery Migrate 3.4.1
- lodash 4.17.21
- Marked.js 5.1.2
- Oracle JET 15.0.7
- Terser 5.19.2
- TinyMCE 6.7.1

3

Changed Behavior

Some existing behaviour changes in this release.

- [Builder Extension Links](#)
- [Application Gallery Improvements](#)
- [Build Options](#)
- [Usability Improvements Made to "Load More" Pagination](#)
- [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 Builder Extension Links

Workspace administrators can now define links that appear in the main APEX Builder top-level toolbar in the **Extensions** menu. Links display as entries of a new navigation bar item, and always open in a separate tab or window. Links can point to any URL, and support substitutions for workspace name, workspace id, username, builder session id, current application, and current page.

If you do not configure any links for a workspace, the extension menu is not displayed. For more on configuring links, see *Managing Links on the Extension Menu* in *Oracle APEX Administration Guide*.

3.2 Application Gallery Improvements

You can now install applications from the gallery in the background without needing to launch a modal dialog. You can continue to do other tasks while the application installs, or you can start the installation of multiple applications in sequence.

For apps that have been updated since the last time you installed them, there is a new **Update** option that replaces an existing app with the updated one.

3.3 Build Options

Previously, validations on APEX Builder pages prevented the creation of duplicate build option names. Now, a new unique constraint is added to the database in the Build Options table to enforce uniqueness of build option names.

In cases where existing applications contain duplicate build option names, APEX adjusts the name to ensure the build option names become unique. This modification takes place either during an APEX upgrade or when importing older application.

3.4 Usability Improvements Made to "Load More" Pagination

This change applies to Interactive Grid and Cards regions that support "Load More" pagination through the attribute Advanced Initialization JavaScript Function and the Popup LOV item results list. The button label is changed from **Load More Rows** to **Show More**. On click, the focus returns to the last focused cell in the report without changing the scroll offset.

3.5 App Builder UI Changes

Changes to the application builder user interface for this release include:

- When adding a custom target column to an interactive report in Page Designer, the default icon is now Font APEX `fa-edit`. The `fa-edit` icon is also available from the quick pick list.
- **File Browse** is renamed to **File Upload**
- You can now toggle any component's **Build Option** property to comment or uncomment the component directly from the tree context menu. This option is available by default for every new application. For existing applications, you must add a Build Option called "Commented Out".
- The **Close Dialog** process has a new attribute: **Show Success Messages**. If switched on, success messages display in the top-level frame of the page. By default, this attribute is switched `on` for new applications and `off` for existing ones.
- Button templates now have a new substitution string: `#BUTTON_NAME#`. This string refers to the name of the button in the Page Designer button attributes.
- On the App Home page, the **Run** and **Lock** actions are combined into a single **Actions** column in the report view.
- A new **Copy** action button is available on most Shared Components pages to allow for quick copying of a specific component.
- A new authentication scheme is no longer automatically made the default one. APEX supports switching the authentication scheme at runtime. Creating an authentication scheme and setting one as default are now two distinct actions.
- Template Directives are now available for use inside the Text, Textarea, and HTML Template Component attributes in Page Designer, as well as in assignments of a `{with/}` and `{apply/}` block.
- This release adds general accessibility enhancements to the development environment and implements numerous accessibility-focused bug fixes.

3.6 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" (` `).

Compatibility Mode Changes in Mode 21.2 / 22.1 / 22.2 / 23.1 / 23.2

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.

3.7 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.

3.7.1 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_230200` 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*.

3.7.2 Granting Connect Privileges

The following example demonstrates how to grant connect privileges to any host for the APEX_230200 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_230200',
                      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_230200',
                      principal_type => xs_acl.ptype_db));
END;
/
```

3.7.3 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_230200 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
FR-1919	Show me clearly which Authentication Scheme is current	Delivered. See App Builder UI Changes .
FR-1933	Show process success or error messages on parent page after closing modal dialogs	Delivered. See App Builder UI Changes .
FR-1942	Image/photo compress in browser before upload	Delivered. See New Image Upload Item .
FR-2120	Text Field with Chips	Delivered. See Combobox Item .
FR-2166	Remove the extra unnecessary box in the PopupLOV	Delivered. See Combobox Item .
FR-2208	Popup LOV with multi-checkboxes, quick pick, and client-side filtering	Delivered. See Combobox Item .
FR-2250	QR Code generation and QR Code recognition	Delivered. See QR Code .
FR-2639	Subscription for All Shared Components	Delivered. See Improved Shared Component Subscriptions .
FR-2650/FR-2691/FR-2985	File Upload and Image Editor	Delivered. See Image Upload .
FR-2715	Translation of alternative default report names	Delivered. See Translate Default Reports .
FR-2717/FR-2844/FR-3086/FR-3145/FR-3237	Use custom map as background map	Delivered. See Custom Map Backgrounds .
FR-2757	Enable LOV with multiple values	Delivered. See Combobox Item .
FR-2778/FR-2943	Supported APIs to export and import saved interactive reports or copy saved reports from one user to another	Delivered. See CLONE_REPORT Function, EXPORT_SAVED_REPORTS Function, and IMPORT_SAVED_REPORTS Procedure in Oracle APEX API Reference .
FR-2998	Report to show out-of-sync component subscriptions	Partially delivered. See Improved Shared Component Subscriptions .
FR-3033	Expose P_TEXT parameter as substitution variable in APEX Approval Tasks	Delivered. See Approvals Component Enhancements .
FR-3176	Extend the Quick Pick list for Attribute "Link Text"	Delivered. See App Builder UI Changes .
FR-3198	APEX Workflow Builder with Drag and Drop feature	Delivered. See New Workflow Feature .

Feature Request Number	Subject	Solution
FR-3408	API to remove test tasks from workflow	Delivered. See REMOVE_DEVELOPMENT_INSTANCES Procedure in <i>Oracle APEX API Reference</i> .

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.

- [Quick SQL Deprecated Functionality](#)
- [JSON Application Export Deprecated](#)

5.1 Quick SQL Deprecated Functionality

Deprecated Settings

The following Quick SQL settings are deprecated:

- Data Language (`#language:"DE"`): No longer generates sample data into different languages (German, Korean, Japanese, Spanish).
- Tags Framework (`#tags:true`): No longer generates tag framework objects (table, trigger, sync procedure).
- On Delete (`#ondelete:"cascade"`): No longer supports system-wide `ondelete` settings. Handle these settings through the new `/cascade` column directive.
- Longer Varchar2 (`#longVC:true`): No longer supports artificially shortening or increasing `VARCHAR2` size.
- Tenant ID (`#tenantID:true`): No longer supported.

Deprecated Directives

The following Quick SQL directives are deprecated:

- `/select`: No longer generates a SQL `SELECT` statement after generating data for each table.

5.2 JSON Application Export Deprecated

The JSON application export option is deprecated, and will be removed in the next release.

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.

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

6.1 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 the next release. Any custom code using CKEditor5 APIs must be re-worked.

6.2 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.

6.3 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.

6.4 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.

6.5 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`

6.6 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 programmatically 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.

6.7 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.

6.8 Previously Deprecated APIs

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

6.9 Deprecated Legacy Web Service References

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

6.10 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 Utilities](#)
- [Querying Template Component Metadata](#)

7.1 Desupported Utilities

The `APEXExport` utility is desupported and is no longer included with Oracle APEX. Oracle recommends using `SQLcl` to perform export operations.

7.2 Querying Template Component Metadata

For template components only, the `ATTRIBUTE_01...ATTRIBUTE_25` columns of `APEX_APPLICATION_PAGE_REGIONS` and `APEX_APPLICATION_PAGE_IR_COL` public views now return null.

Instead, use the new `ATTRIBUTES` column that stores a JSON object of all attribute values. Use the attribute's Static ID as the object key. Note that a table alias is always needed when using the JSON dot notation. For example:

```
select r.attributes.COLOR
       from apex_application_page_regions r
      where r.application_id = 100
             and r.page_id   = 1
             and r.static_id = 'user_badge';
```

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

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

8.2 Desupported User Interfaces Removed

APEX previously defined multiple users interfaces for each application. This is no longer the case. Desupported user interfaces are cleaned up, 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.

8.3 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.

8.4 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.

8.5 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.

8.6 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

8.7 Desupported Properties

The following properties in the property editor are desupported:

- Region Image
- Image Tag Attributes

8.8 Desupported View Columns

The following view columns are desupported:

- In apex_applications:
 - app_builder_icon_name
 - favicons
 - pwa_manifest_icon_url

8.9 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 6.1.8. APEX upgrades the library automatically.

8.10 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.

8.11 Copying Legacy Themes Desupported

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

8.12 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.

8.13 Desupported Public Package APIs

Desupported public package APIs:

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

8.14 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

8.15 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

8.16 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.

8.17 Legacy Substitution Strings Desupported

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).

Legacy	New
IMAGE_PREFIX	APEX_FILES
WORKSPACE_IMAGES	WORKSPACE_FILES
APP_IMAGES	APP_FILES
THEME_IMAGES	THEME_FILES
THEME_DB_IMAGES	THEME_DB_FILES

8.18 Desupported JavaScript Functions

The following functions are desupported:

Universal Theme JavaScript API function:

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

8.19 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.

8.20 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.

8.21 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.

8.22 apex.widget.initPageItem Function Desupported

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

8.23 Popup LOV Template Desupported

The Popup LOV template type is desupported.

8.24 Based On - Output of PL/SQL Code attribute Desupported

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

8.25 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..`

8.26 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](#).

8.27 APEX-Based REST Services Desupported

APEX-based REST Services are desupported. 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 and newer now ship 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
25965625	INTERACTIVE GRID: UI INCONSISTENCIES WITH PAGINATION DISPLAY WHEN DELETING, INSERTING ROWS
28655783	DROP TABLE FROM SQL COMMAND, EXPLAIN TAB SHOWS ERROR COMPUTING PLAN FOR STATEMEN
32706915	APEX UNIVERSAL THEME MODAL PAGE ISSUE
32930834	APP BUILDER HAS INACCESSIBLE BREADCRUMBS
33527839	REGRESSION DIALOG APPEARS TO CLOSE EVEN IF CANCELED DURING DIALOGBEFORECLOSE EVENT HANDLING
33636441	UNLABELED IMAGES ON SHARED COMPONENTS PAGE
33638611	LINK BUILDER HAS TOO MANY ACCESSIBLE LABELS FOR "SET ITEMS" TABLE
33809368	APEX CLASSIC REPORT WITH RESET PAGINATION LINK BREAKS PAGE
33856322	ARIA-READONLY IS MISSING IN MONACO EDITOR WHEN ITEM IS READ ONLY
33996997	BUILD OPTION IS NOT AUTOMATICALLY COPIED AT ITEM LEVEL IN SUBSCRIBED LIST
33998890	PAGE SUBMIT INCLUDES INTERACTIVE GRID RADIO BUTTON CAUSING INTERNAL SERVER ERROR
34086532	ORA-14552 IN UTILITIES => PAGE CHECKSUM REPORT
34133596	FOOTER OF APP BUILDER NEEDS ACCESSIBILITY IMPROVEMENTS
34403783	REFRESH OF STATUS METER GAUGE WITH VALUE NULL DOES NOT REFRESH GAUGE CHART
34552693	UNLABELED BUTTON IN SUCCESS MESSAGES FOR SCREEN READER USERS
34764478	APEX DOES NOT CHECK FOR DB PARAMETER MULTILINGUAL_ENGINE
34969961	LANGUAGE SELECTOR IS NOT ACCESSIBLE BY SCREEN READER USERS
34975208	PAGE DESIGNER, STATIC VALUES DIALOG FOR LOVS HAS INCORRECT ACCESSIBLE NAME FOR THE TABLE WITH DISPLAY AND RETURN VALUES
35044172	CARDS REGION ON PAGE ZERO INTERFERES W/ SMART FILTERS SEARCH FUNCTIONALITY
35081166	CREATE PAGE WIZARD SHOULD NOT UPDATE SUBSCRIBED LISTS
35087260	MASTER DETAIL IG- DETAIL COLUMN DISTINCT FILTERL TOO MANY XML HTTP REQUESTS
35104460	INVOKEAPI SHOWS DOUBLE PARAMS ON APEX ON ADB FOR APEX_UTIL.CREATE_USER
35191154	APEX CHANGES AN EXCEL SHEET NAME

Bug Number	Description
35195802	REST SOURCES AND RELATED OBJECTS CANNOT BE COMPONENT-PATCHED; AS CONSTRAINTS ARE NOT DEFERRABLE
35209607	APPLICATION CREATION WIZARD'S ADVANCED SESSION SETTINGS ARE INCONSISTENT WITH THE SECURITY PAGE
35211622	APP BUILDER > IMPORT LINK THROWS UNABLE TO FIND ITEM ID FOR ITEM "F4000_P56_CREATE_OPTION" ERROR
35211946	SAML AUTH: LOGOUTRESPONSE SHOULD BE SENT WITH A SAMLRESPONSE, NOT SAMLREQUEST PARAMETER
35213299	OBJECT BROWSER PACKAGE DEPENDENCIES TAB OMITTS PACKAGE BODY DEPENDENCIES
35214239	AUTOMATION CAN BE DELETED ALTHOUGH EXECUTION JOB IS CURRENTLY RUNNING
35217138	TEMPLATE COMPONENT MENU ENTRY WITH #ACTION\$ LINK IS NOT WORKING
35227189	EMAIL TEMPLATES: ORA-22828 RAISED WHEN EMAIL BODY IS LARGER THAN 32K AFTER PLACEHOLDER SUBSTITUTIONS
35253635	ORDS REST DATA SOURCE: WRONG FILTER SYNTAX GENERATED FOR TWO OR MORE IN FILTERS
35259482	APEX_EXEC RAISES BAD ERROR MESSAGE WHEN GET() FUNCTIONS ARE CALLED FOR INVALID ROW OR COLUMN
35269401	INTERACTIVE GRID, NAVIGATION MODE, COLUMN HEADER IS NOT EMITTED BY JAWS FOR COLUMNS MARKED TO BE ROW HEADERS
35279035	SEARCH REGION: "RESULTS PER PAGE" ATTRIBUTE SHOULD ALLOW ITEM SUBSTITUTIONS
35281964	SQL COMMANDS: EXCESSIVE SUGGESTIONS IN JAVASCRIPT MLE CODE EDITOR
35284932	CLASSIC REPORT USING APEX_REGION.OPEN_QUERY_CONTEXT REFERENCING ANOTHER CLASSIC REPORT OVERRIDES PARTIAL PAGE REFERESH COLUMN SORTING
35285449	POPUP LOV ON SHARED COMPONENT LOV W/ ONE COLUMN SHOWS NO DATA IN MODAL PAGE
35289191	APEX_REST_SOURCE_SYNC PACKAGE LACKS FUNCTION TO CHECK WHETHER A SYNCHRONIZATION IS RUNNING
35292437	ON APP IMPORT THE "IS ACTIVE" FLAG IS NOT DISABLED FOR A REST SOURCE SYNCHRONIZATION
35300750	PAGE DESIGNER, PROPERTY EDITOR, STATIC VALUES DIALOG HAS DUPLICATED OUTPUT FOR SCREEN READER USERS AND OTHER ACCESSIBILITY IMPROVEMENTS
35304298	PAGE DESIGNER, PROPERTY PANE, STATIC VALUES BUTTON HAS VERY LONG ACCESSIBLE NAME
35308544	TINYMCE RICH TEXT EDITOR: ABILITY TO ENTER EMPTY LINES
35311861	COPY PAGE DOES NOT COPY "WHEN BUTTON PRESSED" CORRECTLY FOR PAGE LEVEL BUTTONS
35313908	APEX BUILDER LOGIN PAGE, LANGUAGE SELECTOR DOES NOT HAVE ACCESSIBLE LANDMARK
35314916	TINYMCE RICH TEXT EDITOR: ON FIREFOX CLOSING INTERACTIVE GRID DIALOG SCROLLS TO THE BOTTOM OF THE PAGE
35320364	JAVASCRIPT MLE OPTION MISSING IN BUILDER WHEN GRANTED VIA ROLE
35327284	CLOB SESSION STATE DOES NOT WORK IN MLE

Bug Number	Description
35328167	PAGE ITEM SUBSTITUTION SYNTAX NOT WORKING IN IR REGION ->ATTRIBUTES -> LINK ATTRIBUTES
35335923	EXECUTION CHAIN THROWS ORA-6533 WHEN "COPY" FILE OPTION IS USED AND NO COMMIT IS DONE BEFORE
35336880	MAP REGION RENDERS GEOMETRY CONTAINING AN "OPTIMIZED RECTANGLE" AS A LINE
35342590	SEARCH CONFIGURATION ON REST SOURCE WITH "SQL" POST PROCESSING THROWS ORA-00928: SELECT KEYWORD MISSING
35345646	BUTTONS IN PAGE DESIGNER HAVE LONG ACCESSIBLE NAMES
35362394	SETTING "EXECUTION CHAIN" OF PAGE RENDER PROCESS TO "NONE" MOVES IT TO "PAGE PROCESSING"
35373004	PAGE DESIGNER SHOULD NOT ALLOW CHANGING AN EXECUTION CHAIN WITH CHILDREN TO ANOTHER PROCESS TYPE
35373139	REQUIRED REST SOURCE PARAMETERS OF "REQUEST BODY" TYPE NOT RECOGNIZED WHEN SESSION STATE TYPE "CLOB" IS USED
35373716	APP BUILDER, CREATE PAGE WIZARD HAS A LISTBOX WHICH IS DIFFICULT TO USE IN JAWS SCREEN READER
35379286	ALL RADIO BUTTONS RENDERED IN COLUMNS HAVE INCORRECT ACCESSIBLE ORDER NUMBER "1 OF 1" FOR SCREEN READER USERS
35388689	DATA PROFILE COLUMN: TRIM TRANSFORMS DO NOT ALLOW SPECIFYING THE SPACE CHARACTER TO BE TRIMMED
35390432	APEX_WEB_SERVICE.GENERATE_REQUEST_BODY THROWS ORA-22275 IF ONE OF THE MULTIPARTS IS A NULL BLOB VALUE
35393328	IMPROVE ICON LIST ACCESSIBLE NAME AND DESCRIPTION
35406886	INTERACTIVE GRID, CHART DIALOG, TYPE ITEM DOES NOT HAVE ACCESSIBLE LABEL "TYPE"
35415947	PLUG-IN COUNT IN BANNER OF APEX EXPORT SQL FILE SHOULD NOT INCLUDE THEME PLUG-INS
35416355	DIFFICULT TO UNDERSTAND THE NAVIGATION IN LIST BOXES USING SCREEN READERS
35430561	SQL COMMANDS CAN REPORT INCORRECT LINE NUMBER FOR ORA ERROR
35436280	INTERACTIVE REPORT, DOWNLOAD DIALOG HAS INCORRECT ACCESSIBLE LABEL FOR "CHOOSE REPORT FORMAT" ITEM
35444579	"WHEN BUTTON PRESSED" CONDITION IS NOT CONSIDERED WHEN THE PROCESS IS PART OF A EXECUTION CHAIN PROCESS
35445308	QUICK SQL SAVED MODELS ARE LOST UPON APEX UPGRADE
35447648	"UNKNOWN" WORKSPACES SHOW IN ADMIN DIGEST THAT EXISTING WORKSPACES SUPPRESSES
35452094	OBJECT BROWSER DDL INCLUDES COLLATE "USING_NLS_COMP" CLAUSE
35482751	CANNOT COPY TEMPLATE COMPONENT OF A THEME
35483731	REGRESSION: COLLAPSIBLE REGION DEFAULT STATE ISN'T RESPECTED WHEN REMEMBER STATE IS ON
35493114	INTERACTIVE GRID COLUMN IS NOT DISPLAYED IN DOWNLOADS WHICH IS ALSO PART OF THE CONTROL BREAK
35503169	APP IMPORT VIOLATES WWV_CREDENTIAL_WS_NAME_UK WHEN EXISTING WEB CREDENTIAL HAS SAME NAME BUT DIFF STATIC ID
35505796	INTERACTIVE REPORT, SINGLE ROW VIEW ICON IS NOT ACCESSIBLE

Bug Number	Description
35507691	APEX_DATA_PARSER.GET_XLSX_WORKSHEETS CAN RETURN WRONG SHEET FILE NAMES
35515589	RUNNING APPLICATION AFTER IMPORT MAY RESULT IN HTTP-400 BAD REQUEST (THE REQUEST PATH CONTAINS ILLEGAL CHARACTERS)
35605500	TABS IN INTERNAL APPS GOT ACCESSIBILITY PROBLEMS AFTER JAWS 2023 JUNE'S RELEASE
35621716	CARDS REGION TO RENDER CLOB COLUMN VALUE ERRORS WITH ORA-06502
35644698	"VALUE TOO LARGE FOR COLUMN" ERROR THROWN DURING DISCOVERY IF RESPONSE HEADER IS GREATER THAN 4000 CHARS
35645244	WHILE INSTALLING APEX 23.1 IN CDB OF A 23.2.0 DB, EXECUTE APEX_REST_CONFIG FROM CDB, ORA-65023 ERRORS IN THE LOG
35658697	DATE PICKER SELECT LIST STYLING ISSUE ON WINDOWS
35662124	SUPPORT SPECIFYING "\t" IN PAGE DESIGNER TO USE <TAB> SEPARATOR IN REPORT DOWNLOADS
35666286	INTERACT. REPORT ON REST SOURCES CAN THROW "ASSOC ARRAY SHAPE IS NOT CONSISTENT WITH SESSION PARAMETERS" WHEN APP HAS CUSTOM NLS SETTINGS
35669017	INTERACTIVE GRID, DUPLICATE ROW ACTION MOVES FOCUS TO NOWHERE
35673063	"PATCH" OPERATION CHIP MISSING FROM "CREATE REST DATASOURCE FROM CATALOG" PAGE
35677766	SPLIT MENU GOT ACCESSIBILITY ISSUES WITH JAWS 2023 JUNE'S RELEASE
35678491	SPLIT MENUS HAVE UNLABELLED MENUS IN JAWS VIRTUAL PC CURSOR MODE
35679349	MARK OLD "WEB SERVICE" PAGE PROCESS TYPE AS "LEGACY"
35696096	FACETED SEARCH: AJAX CALL RETURNED SERVER ERROR ORA-01426: NUMERIC OVERFLOW FOR SEARCH
35696138	USING PAGINATION SCHEME OF TYPE X TO Y OF Z WITH SYNCHRONIZATION TABLE SHOWS ERROR
35734207	GETTING ERROR MESSAGE WHEN DOWLOADING AN INTERACTIVE REPORT THAT INCLUDES A PIVOT VIEW
35740914	EXPOSE OPTIMIZER HINT PAGE DESIGNER ATTRIBUTE FOR ALL DATA SOURCE AND QUERY TYPES
35741356	TEMPLATE COMPONENTS: ATTRIBUTES OF TYPE TEXTAREA AND HTML DON'T SHOW QUICKPICKS IN PAGE DESIGNER
35744834	APEX_APPLICATIONS VIEW UPDATES TO AVAILABILITY_STATUS
35750929	REFRESHING A APPLICATION THEME SUBSCRIBED TO A WORKSPACE THEME FAILS
35767698	EMAIL RESTRICTION - REPORT DOESN'T SHOW THE RECORDS WHEN CLICK ON THE NUMBER(LINK) IN THE MATCHES COLUMN
35772993	CLASSIC REPORT: VALUE FOR COLUMN PRINT WIDTH IS NOT GETTING SUBSTITUTED
35776313	TEMPLATE COMPONENTS: COPY PAGE FROM DIFFERENT APP DOES ADAPT TEMPLATE_ID AND POSITION_ID FOR COMPONENT ACTIONS
35790456	SIMPLE HTTP REST SOURCE: "PAGE SIZE AND PAGE NUMBER" PAGINATION SCHEME IS BROKEN

Bug Number	Description
35796625	YAML APPLICATION EXPORT: REST REMOTE SERVERS SHOULD NOT HAVE THE ID OFFSET
35798185	PAGE DESIGNER, RENDER TREE HAS UNLABELLED OBJECTS WITHOUT AN ACCESSIBLE SEMANTIC ROLE
35832592	BLANK PAGE AFTER TIMEOUT, WHEN SESSION SWITCHED TO SOCIAL SIGN-IN AUTH SCHEME
35895299	CREATE SEARCH PAGE WIZARD FAILS IN NON-ENGLISH LANGUAGES

10

Open Bugs and Known Issues

This section describes bugs and known issues for Oracle APEX release 23.2.

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-232-known-issues/>

Alternatively, you can view the Accessibility Conformance Report (ACR). The ACR (formerly known as the VPAT) includes details of all known issues with APEX. Please go to [ACRs for Oracle Database related products](#), then select **Database Products** or **Open All**, then find the relevant version of APEX.

- [Known Issues for Approval Tasks and Task Definitions](#)
- [Known Issue for Sublists](#)
- [Known Issues for Working Copy Feature](#)
- [Known Issues for Workflow Component](#)
- [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](#)

10.1 Known Issues for Approval Tasks and Task Definitions

Using `apex_approval.set_task_due` in a task action causes the task history to be erased.

Rather than using the API, the Business Administrator for the task can change the due date using the **Change Due Date** button on the task details page.

10.2 Known Issue for Sublists

Currently, sublist entries are not included in list search results when the list search configuration is defined on the list referencing the sublist. This will be fixed in a future release.

10.3 Known Issues for Working Copy Feature

The known issues for the working copy feature are:

- **Server Error** message - If you are running APEX on database version 19c and using the new working copy feature, when you choose the actions **Merge into Main** or **Refresh from Main** or **Compare Changes**, you may get a "Server Error" message that is caused by an underlying ORA-00600 error message. For example:

```
ORA-00600: internal error code, arguments:  
[qjsnplsDecDomRefCnt:noValP], [], [], [], [], [], [], [], [], [], []  
[], []
```

The fix for this error is to upgrade to 19.16 or higher.

- **ORA-00001** error during merge - The Working Copy feature raises an ORA-00001 unique constraint error when attempting to merge changes for component names that are not unique. It is important to coordinate the naming of shared components across working copies and the main application to avoid this error occurring.

10.4 Known Issues for Workflow Component

The known issues for the Workflow Component are:

- The workflow title can only use workflow parameters as substitution strings, but not any additional data source columns
- When using Workflow Designer in a Safari browser, arrows become straight lines in the Workflow Diagram Builder and the type text disappears under the Additional Data Property for workflow version.
- Terminating a Workflow does not auto-cancel the human task(s) created while executing the workflow.
- When deleting a workflow using the `Delete` key on the keyboard, there is no warning message. Deleting a workflow by right-clicking the workflow and selecting **Delete** provides a warning message and a prompt for user confirmation.

10.5 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.

10.6 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**.

10.7 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/>

10.8 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.

10.9 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.

10.10 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.

11

Documentation Accessibility

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

Access to Oracle Support

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

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*.

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