Oracle® Application Express

Release Notes

Release 19.1

F13755-02

May 2019

About These Release Notes

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

- · Before You Begin
- Configuration Requirements
- New Features
- Changed Behavior
- Deprecated Features
- · Desupported Features
- Fixed Bugs
- Open Bugs and Known Issues
- Documentation Additions
- Documentation Accessibility
- Privacy Notice

Before You Begin

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

- About Release Numbering Convention
- About Checking for the Most Current Release
- · About Upgrading to the Latest Oracle Application Express Release
- About Determining Your Release Version
- Important Information if Updating from a Previous Release
- Important Information if Upgrading from Oracle Database Version 12c CDB

About Release Numbering Convention



New releases of Oracle Application Express correlate to the calendar year.

This convention was introduced in 2018 with Application Express 18.1 and 18.2.

Additionally, Application Express 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. Application Express 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 Application Express Known Issues page.

About Checking for the Most Current Release

Oracle Application Express 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

About Upgrading to the Latest Oracle Application Express Release

If you already have Oracle Application Express installed, Oracle strongly recommends that you regularly upgrade to the latest version available. To learn more about see "Upgrading from a Previous Oracle Application Express Release" in *Oracle Application Express Installation Guide*.

About Determining Your Release Version

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

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

The About Application Express page appears.



See Also:

"About Accessing Your Development Environment" in *Oracle Application* Express App Builder User's Guide

Important Information if Updating from a Previous Release

If you are updating from previous release of Oracle Application Express, see the "Changed Behavior" sections in the following documents:

- 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
- Oracle Application Express Release Notes release 4.2
- Oracle Application Express Release Notes release 4.1
- Oracle Application Express Release Notes release 4.0

Important Information if Upgrading from Oracle Database Version 12c CDB

If you are upgrading an Oracle Database 12c Release 1 (12.1) multitenant container database (CDB), you must download the patch for Bug 20618595 from My Oracle Support and apply it to your database. To locate this patch, search for **20618595** on the Patches tab.

Configuration Requirements

When configuring the mod_plsql Database Access Descriptor (DAD), you must set the value of the character set portion of PlsqlNLSLanguage to AL32UTF8 regardless of the underlying database character set.

The Database Access Descriptor now contains a parameter for PlsqlRequestValidationFunction. The purpose of this parameter is to limit the number of procedures which can be invoked through mod_plsql. By default, the only procedures permitted are the public entry points of Oracle Application Express. This can be extended using the validation functions shipped with Oracle Application Express.

Enabling the PlsqlRequestValidationFunction for a Database Access Descriptor may cause existing applications which relied upon publicly executable procedures to fail. You may choose to either omit

the PlsqlRequestValidationFunction from the Database Access Descriptor



definition, or follow the recommended approach of extending the supplied validation function.



"Restricting Access to Oracle Application Express by Database Access Descriptor (DAD)" in *Oracle Application Express Administration Guide*

New Features

Oracle Application Express release 19.1 includes a number of new features. These new features are not present in Oracle Application Express release 18.2 and earlier releases.

- JavaScript API Documentation
- Region template Inline Pop-up
- Open Region and Close Region Dynamic Actions
- Dark Mode
- New Form Region
- Data Loading
- · Charts and Library Upgrades
- Universal Theme
- JET Chart Enhancements
- Other Features and Changes

JavaScript API Documentation

The JavaScript API chapter in the *Oracle Application Express API Reference* is being migrated to its own new reference guide, *Oracle Application Express JavaScript API Reference*. This new guide is not finalized and may not include all relevant information.

New widget APIs in this release include:

- apex.util.getNestedObject
- interactiveGrid toolbarData:
 - toolbarRemove
 - toolbarInsertAfter
- model.create option:
 - makeLoadingIndicator
- interactiveGrid widget options:



- saveLoadingIndicatorPosition
- saveLoadingIndicator
- trackParentSelection
- interactiveGrid widget method:
 - setMasterRecord
- grid widget option:
 - cellCssClassesColumn

See Also:

Oracle Application Express JavaScript API Reference

Region template Inline Pop-up

A new region template Inline Pop-up is now available in Universal Theme. This template places the region content in a pop-up region that can be opened with the Open Region dynamic action (similar to the Inline Dialog region).

Open Region and Close Region Dynamic Actions

This release introduces two new dynamic actions:

- Open Region
- Close Region

These dynamic actions work with the new Inline Popup region, the Inline Dialog region template, and the Collapsible region template.

Dark Mode

The development environment can now render with a darker color scheme, which reduces eye strain and is especially helpful for developing late into the night.

New Form Region

This release introduces the new Form Region. The form region stores all data source details at the region level; processes and items reference that region. The new form region provides superior functionality compared to the old legacy form pages:

- Data source support (Local Database, Remote Database, REST Services)
- Forms can be created on SQL Queries or "PL/SQL Functions returning SQL Queries"
- More than two Primary Key Columns allowed



More control on Lost Update detection and Row Locking

Migrating Form Pages to Form Regions

Customers can migrate existing legacy form pages to the new form region with the **Upgrade Application** function in App Builder Utilities. Eligible legacy form pages are listed as "Upgrade Legacy Form page to page containing Form Region."

To upgrade a legacy form page to form region, it must meet the following requirements:

- The page must have an Automatic Row Fetch, an Application Row DML process, or both.
- The page must contain only one Automatic Row Fetch.
- The page must contain only one Automatic Row DML process.
- The Table, Primary Key, and Row Version column settings must be equal in the automatic fetch and DML process.
- At least one of the regions (which contain the form items) must be a "Static HTML Content" region and not contain any text (region source must be empty).

If a legacy form page meets these requirements, it is listed as a candidate object for application migration in Upgrade Application. If the requirements are not met, the form cannot be upgraded automatically .



"Running Upgrade Application" in *Oracle Application Express App Builder User's Guide*

Additional Form Region Type Enhancements

In prior releases, developers used a Static Content region and place items associated with a Pre-Rendering process. The Form region type and changes in how data is retrieved and processed for these regions enable you to update multiple tables within a single form page.

Changed Source Definition

Instead of defining the source in the Pre-Rendering process, developers now define the source within the region definition.

Expanded Source Type

The source for a Forms Region now includes Table, SQL based, or PL/SQL Function returning SQL Query.



Additional Region Attributes

Form region attributes include edit properties, similar to Interactive Grid properties, including enabling / disabling editing, allowed operations, allowed operation column, lost update type, and edit authorizations.

Modified DML Process

The DML process used to insert, update, or delete a record has been modified to be based on a Form region, rather than being based on a table.

Updated Item References

Rather than specifying the source type as Database Column and the associated table column, developers can now specify the Form region, data type and Database column.

REST Enabled Forms

The built-in support for REST Enabled SQL and Web Sources has been extended to Form regions, allowing read and write access to remote data sources.

REST Enabled SQL

Developers who have REST enabled a table or view can declaratively create full CRUD form pages, as simply as creating a form page on a local database table.

Web Sources

When a REST API is defined as a Web SOurce Module the automatic discovery now identifies available operations, including PUT, POST, and DELTE. Based on the available operations, corresponding CRUD operations will be defined on form pages based on these Web Sources.

REST Enabling Database Objects

Within SQL Workshop > Object Browser developers can now declaratively REST enable tables or views.

Data Loading

The data upload functionality in SQL Workshop has a new drag & drop user interface and support for native Excel, CSV, XML and JSON documents. The same capabilities are in the Create App from Spreadsheet wizard and a new, public data loading PL/SQL API will be made available.

Streamlined User Interface

Drag and drop the file you want to load and follow a wizard to load your data.

Enhanced Create App from Spreadsheet Wizard

Create apps from spreadsheets using the updated **Create App from Spreadsheet** wizard.

Support for CSV, XSLX, XML and JSON files

Load data from various popular data file types.



Upload large files in the background

Large files are automatically processed in the background.

New APEX DATA PARSER API

This new API provides a developer friendly interface to parse files and exposes more advanced functionality.

Charts and Library Upgrades

This release includes improvements to the status gauge meter chart, the Gantt chart (upgraded to JET 6.1), jQuery, jQuery Mobile, and additional options for fonts.

Accessibility Improvements

There are a number of accessibility improvements including a new "Skip to Main Content" link.

New Navigation Menu Styles

There are now two additional styles for the tree-based Navigation Menu.

Inline Popup Region Template

A new Inline Popup region template is now available.

UI Refinements

A number of components and styles have been visually tweaked and refined to provide a more streamlined user interface.

Mobile Improvements

Responsive behavior has been improved for breadcrumbs and other UI components.

Universal Theme

Universal Theme contains UI refinements, accessibility improvements, new template options, and Theme Roller enhancements to help your applications look better than ever.

Accessibility Improvements

Many accessibility improvements including a new "Skip to Main Content" link.

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JET Chart Enhancements

JET Chart Styling Enhancements

New declarative attributes have been added to JET Charts to support the styling of text on a chart. The following attributes are available to declaratively style the chart title, legend text, and axes titles, and labels:

- Font Family
- Font Style
- Font Size
- Font Color

JET Chart Stacked Chart Enhancements

Two new declarative attributes have been added to JET charts to support the rendering of a stacked chart:

- Stack Category In stacked charts, setting the Stack Category groups series together for stacking. By default, all series are assigned to the same stack. Setting this attribute enables you to render different stacks on one chart.
- Stack Label Defines whether the total values of stacked data items display on the chart. This option only applies to bar charts.

Other Features and Changes

Additional declarative attributes have been added to Page Designer for managing Interactive Grids and Oracle JET Charts. Social Sign-In is available for authenticating to the App Builder.

Other updates include:

- New Additions to JavaScript API Doc
- Dynamic Actions to open and close regions
- Application Express Upgrade will automatically copy ACLs
- · Removal of jQuery Mobile
- Allow REST Enablement of Objects in Object Browser
- Social Authentication for App Builder
- APEX STRING enhancements
- Removal of APEXExportSplitter

Changed Behavior



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/technetwork/developer-tools/apex/downloads/apex-191-known-issues-5434469.html

Changed behavior in Oracle Application Express release 19.1 includes:

- Browser Requirements
- Compatibility Mode
- Read Only Calendar regions Do Not Support Drag and Drop
- Enabling Network Services in Oracle Database 11g or Later
- apex.item Select List Behavior
- Interactive Grid Enhancements
- JET Chart Gantt Tooltip Enhancements
- ORDS Services tree focus

Browser Requirements

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



Microsoft Internet Explorer 11 is the prior major release, with Microsoft Edge being the current Microsoft browser.

Compatibility Mode

The application attribute **Compatibility Mode** controls the compatibility mode of the Application Express 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.

See Also:

To learn more, see Oracle Application Express Patch Set Notes and search for *Compatibility Mode*.

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_ur l, 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



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. 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.

Read Only Calendar regions Do Not Support Drag and Drop

As of Application Express 19.1, the calendar disables drag-and-drop operation of calendar events when the region is set to "Read Only."

Enabling Network Services in Oracle Database 11g or Later

You must enable network services in Oracle Database 11q or later versions to send outbound mail, use Web services, or use PDF report printing in Oracle Application Express.

When and Why Network Services Must be Enabled

Enabling network services enables support for sending outbound mail in Oracle Application Express, use of Web services in Oracle Application Express, and PDF report printing.

By default, the ability to interact with network services is disabled in Oracle Database 11q Release 2 or later. Therefore, if you are running Oracle Application Express with Oracle Database 11g Release 2 or later, you must use the new



DBMS_NETWORK_ACL_ADMIN package to grant connect privileges to any host for the APEX 190100 database user. Failing to grant these privileges results in issues with:

- Sending outbound mail in Oracle Application Express.
 - Users can call methods from the APEX_MAIL package, but issues arise when sending outbound email.
- Using Web services in Oracle Application Express.
- PDF report printing.



When upgrading Application Express on a database 12c or newer, based on the configuration of the old Application Express version the upgrade automatically configures Network Services.



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 a 11g or 12c database will already have the parameter set properly, but a database upgraded to 11g or 12c from a prior version may not. For information about changing database initialization parameters, see "Creating and Configuring an Oracle Database" in *Oracle Database Administrator's Guide*.

Granting Connect Privileges Prior to Oracle Database 12c

Demonstrates how to grant connect privileges to any host for the APEX_190100 database user.

The following example demonstrates how to grant connect privileges to any host for the APEX_190100 database user. This example assumes you connected to the database where Oracle Application Express is installed as SYS specifying the SYSDBA role.

```
DECLARE

ACL_PATH VARCHAR2(4000);

BEGIN

-- Look for the ACL currently assigned to '*' and give APEX_190100

-- the "connect" privilege if APEX_190100 does not have the privilege yet.

SELECT ACL INTO ACL_PATH FROM DBA_NETWORK_ACLS

WHERE HOST = '*' AND LOWER_PORT IS NULL AND UPPER_PORT IS NULL;

IF DBMS NETWORK ACL ADMIN.CHECK PRIVILEGE(ACL PATH, 'APEX 190100',
```



```
'connect') IS NULL THEN
    DBMS_NETWORK_ACL_ADMIN.ADD_PRIVILEGE(ACL_PATH,
    'APEX_190100', TRUE, 'connect');
END IF;

EXCEPTION
    -- When no ACL has been assigned to '*'.
    WHEN NO_DATA_FOUND THEN
    DBMS_NETWORK_ACL_ADMIN.CREATE_ACL('power_users.xml',
        'ACL that lets power users to connect to everywhere',
        'APEX_190100', TRUE, 'connect');
    DBMS_NETWORK_ACL_ADMIN.ASSIGN_ACL('power_users.xml','*');
END;
//
COMMIT;
```

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.

```
DECLARE
 ACL PATH VARCHAR2(4000);
BEGIN
 -- Look for the ACL currently assigned to 'localhost' and give
APEX 190100
 -- the "connect" privilege if APEX_190100 does not have the privilege
 SELECT ACL INTO ACL PATH FROM DBA NETWORK ACLS
  WHERE HOST = 'localhost' AND LOWER_PORT IS NULL AND UPPER_PORT IS NULL;
 IF DBMS_NETWORK_ACL_ADMIN.CHECK_PRIVILEGE(ACL_PATH, 'APEX_190100',
     'connect') IS NULL THEN
     DBMS NETWORK ACL ADMIN.ADD PRIVILEGE(ACL PATH,
     'APEX_190100', TRUE, 'connect');
 END IF;
EXCEPTION
 -- When no ACL has been assigned to 'localhost'.
 WHEN NO DATA FOUND THEN
 DBMS_NETWORK_ACL_ADMIN.CREATE_ACL('local-access-users.xml',
    'ACL that lets users to connect to localhost',
    'APEX_190100', TRUE, 'connect');
 DBMS_NETWORK_ACL_ADMIN.ASSIGN_ACL('local-access-users.xml','localhost');
END;
COMMIT;
```

Granting Connect Privileges in Oracle Database 12c or Later

Procedures CREATE_ACL, ASSIGN_ACL, ADD_PRIVILEGE and CHECK_PRIVILEGE in DBMS_NETWORK_ACL_ADMIN are deprecated in Oracle Database 12c. Oracle recommends to use APPEND HOST ACE.

The following example demonstrates how to grant connect privileges to any host for the APEX_190100 database user. This example assumes you connected to the database where Oracle Application Express is installed as SYS specifying the SYSDBA role.

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.

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 $APEX_190100$ user.

apex.item Select List Behavior

Prior to this release, the default behavior of <code>apex.item().setValue</code> for a select element differed from the Select List item <code>setValue</code> behavior. When the value was something other than one of the existing options, each function implemented <code>setValue</code> differently.

In this release, both functions behave the same.

The Select List page item uses the apex.item default setValue implementation. When you use apex.item().setValue or a dynamic action to set the value of a select element, setting it to a value other than one of the option values results in the value of the first option if the select element is a drop-down; if the select element is not a drop-down, it results in an empty string.

Additionally, this release improves the logic to detect if the element is a drop down.

Interactive Grid Enhancements

This release includes several updates to interactive grid:

- Changing views when the grid view has edits no longer warns about unsaved changes and the changes are not lost.
- The icon and detail views update if the underlying model data changes due to programmatic updates.
- The Filter and Highlights now have the correct max length for the value field.
- The chart view now obeys the "Lazy Loading" attribute and uses the "Messages: When No Data Found" attribute.
- The icon, detail, and chart views no longer fetch data or render if the view is not visible (such as in a collapsible region). The grid view already worked this way.

Interactive Grid Attributes

New Interactive Grid Attributes:

- Toolbar / Controls: Search Column Selection
- Toolbar / Controls: Search Field
- Toolbar / Controls: Actions Menu
- Enable Users To: Flashback
- Enable Users To: Define Chart View
- Appearance: Select First Row

Updated Interactive Grid Attributes:

- Toolbar / Controls (was Toolbar / Buttons)
- Toolbar / Controls: Reset Button (was Reset)
- Toolbar / Controls: Save Button (was Save)

Interactive Grid Column Attributes

New Interactive Grid Column Attributes:

Enable Users To: Hide



Enable Users To: Control Break/Aggregate

Updated Interactive Grid Column Attributes:

Enable Users To: Sort (was Sort/Control Break/Aggregate)

JET Chart Gantt Tooltip Enhancements

New declarative attributes have been added to JET charts to support the customization of the Gantt chart tooltip. The following attributes are available to declaratively customize the tooltip:

- Show Row
- Show Label
- Show Start Date
- Show End Date
- Show Progress
- Show Baseline

The column mapping Custom Tooltip can be used to override the declarative tooltip settings.

ORDS Services tree focus

Prior to this release, the ORDS Services tree always displayed fully expanded. This became bothersome if you had more than a small number of services and templates.

The tree now only displays the currently focused item (the item being edited/viewed) and above in the tree. All others are collapsed. Within a user session, the tree used across the ORDS RESTful Services Workshop remembers which nodes are open and closed.

Deprecated Features

Deprecated features are features which Oracle plans to desupport or remove in a future release of Oracle Application Express. 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 Oracle Application Express Advisor to scan existing applications for deprecated attributes.

- Team Development Deprecated
- Oracle REST Data Services (ORDS)-based Printing Deprecated
- AnyChart, AnyMap, and AnyGantt charts Deprecated
- Calendar PDF Printing Deprecated
- apex.server Plug-in and Process Function Async Option Deprecated
- apex.widget.initPageItem Function Deprecated



- APEX_ERROR.GET_ARIA_ERROR_ATTRIBUTES Deprecated
- APEX_UTIL.STRING_TO_TABLE Function Deprecated
- APEX_UTIL.TABLE_TO_STRING Function Deprecated
- Deprecated JavaScript Functions
- Popup LOV Template Deprecated
- APEX_PAGE.IS_JQM_SMARTPHONE_UI is Deprecated



"Running Advisor to Check Application Integrity" in the *Oracle Application* Express App Builder User's Guide

Team Development Deprecated

Team Development is deprecated as of this release. It will be removed in a future release.

A new system to track feedback, issues, and milestones will replace it.

Oracle REST Data Services (ORDS)-based Printing Deprecated

Oracle REST Data Services (ORDS)-based Printing is deprecated as of this release. It will be removed in a future release.

AnyChart, AnyMap, and AnyGantt charts Deprecated

The legacy AnyChart, AnyMap and AnyGantt charting components are deprecated as of this release, and will be removed in a future release. Use the JET charting solution instead.



"Switching from AnyChart to JET Chart" in the *Oracle Application Express App Builder User's Guide*

Calendar PDF Printing Deprecated

The "Export to PDF" functionality of the CSS Calendar region is deprecated.

This option remains for existing calendar regions. You can no longer it add to new CSS calendar regions.



apex.server Plug-in and Process Function Async Option Deprecated

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

apex.widget.initPageItem Function Deprecated

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

APEX_ERROR.GET_ARIA_ERROR_ATTRIBUTES Deprecated

APEX_ERROR.GET_ARIA_ERROR_ATTRIBUTES is deprecated and will no longer be available in the next major release of Oracle Application Express. Developers should replace this functionality with apex_plugin_util.get_element_attributes, which provides better support with native functionality.

APEX_UTIL.STRING_TO_TABLE Function Deprecated

As of Oracle Application Express 5.1, APEX_UTIL.STRING_TO_TABLE is deprecated. Use APEX_STRING.STRING_TO_TABLE instead.

APEX_UTIL.TABLE_TO_STRING Function Deprecated

As of Oracle Application Express 5.1, APEX_UTIL.TABLE_TO_STRING is deprecated. Use APEX_STRING.TABLE_TO_STRING instead.

Deprecated JavaScript Functions

The following functions are deprecated as of this release:

Theme-specific global functions:

- openModal
- closeModal

apex.item namespace:

afterModify

apex.page.confirm parameter:

pMessage default value



Other:

- apex.navigation.dialog.fireCloseHandler
- \$d_Find
- \$d_LOV_from_JSON
- \$dom_JoinNodeLists
- \$dom_Replace
- \$f_Enter
- \$f_First_field
- \$s_Split
- \$tr_RowMoveFollow
- \$u_ArrayToString
- \$u_js_temp_drop
- \$u_SubString
- \$x_Check_For_Compound
- \$x_object
- \$x_Show_Hide
- addLoadEvent
- ajax_Loading
- base_disableItem
- confirmDelete2
- dhtml_ShuttleObject
- doMultiple
- findPosX
- findPosY
- flowSelectAll
- getScrollXY
- hideShow
- html_GetTarget
- html_ReturnToTextSelection
- html_RowDown
- html_RowUp
- html_StringReplace
- htmldb_ch
- htmldb_ch_message



- htmldb_doUpdate
- htmldb_goSubmit
- htmldb_item_change
- ie_RowFixFinish
- ie_RowFixStart
- json_SetItems
- lc_SetChange
- selectString
- setCaretToBegin
- setCaretToEnd
- setCaretToPos
- setSelectionRange
- setValue2
- widget.util.disableIcon
- wiget.util.enableIcon

Popup LOV Template Deprecated

The Popup LOV template type is deprecated. A future release of Application Express will not use this template to render Popup LOV dialogs.

APEX_PAGE.IS_JQM_SMARTPHONE_UI is Deprecated

The PL/SQL function APEX_PAGE.IS_JQM_SMARTPHONE_UI is Deprecated is deprecated and will be removed in a future release.

openModal and closeModal are Deprecated

The undocumented theme specific functions ${\tt openModal}$ and ${\tt closeModal}$ are deprecated.

Resolution

Use the <code>apex.theme.openRegion</code> and <code>apex.theme.closeRegion</code> functions or the corresponding dynamic actions "Open Region" and "Close Region."

afterModify is Deprecated

The apex.item callback afterModify is deprecated. It was used primarily for jQuery Mobile, which is no longer supported.



apex.page.confirm pMessage Parameter is Deprecated

The default value for the apex.page.confirm parameter pMessage is deprecated. In the future this parameter will be required.

apex.navigation.dialog.fireCloseHandler function is Deprecated

The apex.navigation.dialog.fireCloseHandler function is deprecated. It will be removed in a future release.

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.

- jQuery Flot and Flot Plug-ins Desupported
- External Processing in Classic Report Desupported
- JET Dial Gauge chart type Deprecated

jQuery Flot and Flot Plug-ins Desupported

The jQuery Flot versions 0.7, 0.8, 0.8.2, and 0.8.3 are no longer used in Oracle Application Express. Packaged Applications have also been updated to remove Flot Line, Flot Bar, and Flot Pie chart plug-ins. Remove any references in your application code and use our declarative chart solution, based on Oracle JET Data Visualizations.

External Processing in Classic Report Desupported

The External Processing functionality of Classic Report is no longer supported.

To use the External Processing function, your application must include the **Deprecated or Desupported JavaScript** file. To include this file, select the application and edit the User Interface Details. For Include Deprecated or Desupported JavaScript Functions, select **Pre 18.x**.

See Also:

- "Editing User Interface Details" in the Oracle Application Express App Builder User's Guide
- "JavaScript" in the Oracle Application Express App Builder User's Guide



JET Dial Gauge chart type Deprecated

The JET Dial Gauge chart type is desupported as of this release. Existing Dial Gauge regions will automatically convert to the new JET Status Meter Gauge circular chart in this release.

Fixed Bugs

The following section lists bugs fixed in this release.

Table Fixed Bugs in 19.1 – Interactive Grid

Bug Number	Description
25538861	CAN'T SET MULTI SELECT FOR INTERACTIVE GRID ICON VIEW
28070376	INTERACTIVE GRID SINGLE ROW VIEW FIELD ORDER NOT KEPT IN SYNC WITH GRID COLUMN ORDER
28513035	INTERACTIVE GRID SAVE DOES NOT SHOW A PROGRESS SPINNER
28587534	INTERACTIVE GRID - MASTER DETAIL GRID - MISSING FILTER FOR SOME COLUMNS
28611267	INTERACTIVE GRID VIEW BLANK AFTER CHANGING REPORTS
28847536	APPLICATION IMPORT CONTAINING INTERACTIVE GRID WILL SET A DEFAULT OF 100000 FOR MAX_ROW_COUNT

Table Fixed Bugs in 19.1 – Productivity and Sample Apps

Bug Number	Description
27585087	P-TRACK: PROJECT STATUS REPORTS RUN BY JOB DO NOT INCLUDE DETAIL
27740810	QUICK SQL: PROJECT MANAGEMENT SAMPLE CREATES WRONG QUERY FOR "PROJECT_MS" VIEW
28499176	SCRIPT PLANNER: CREATE NOTIFICATION DIALOG DATE FIELDS NOT VALIDATED CORRECTLY
28504655	SURVEY BUILDER: VIEW EMAIL HISTORY DETAIL, NO CONTENT SHOWN
28546077	P-TRACK: NOT SENDING SCHEDULED PROJECT STATUS EMAILS
28618878	P-TRACK: PEOPLE SUMMARY LINKS RETURNING NO RESULTS
29342781	CUSTOMER TRACKER: HOME PAGE FILTERS REGION IS MISSING A HEADING



Table (Cont.) Fixed Bugs in 19.1 – Productivity and Sample Apps

Bug Number	Description
29342818	CUSTOMER TRACKER: COMPETITORS PAGE REPORT EDIT LINKS HAVE NO TEXT

Table Fixed Bugs in 19.1 — Other

Bug Number	Description
26320937	RAS: POST AUTHENTICATION CAN NOT BE USED TO SET NAMESPACE ATTRIBUTES
27444973	HTTP 500 ERROR WITH APEX PAGE WITH COLUMN LINK USING SPECIAL CHARACTERS / IE
27782172	PAGE DESIGNER: TABLES IN GRID LAYOUT SHOULD BE MARKED AS LAYOUT TABLES
27823566	CSS CALENDAR REGION ALLOWS DRAG & DROP ALTHOUGH REGION IS READ ONLY
27845117	PLUGIN SUBSCRIPTION: APP ID IS TRUNCATED TO 8 DIGITS
28147764	SOCIAL SIGN-IN: SUPPORT NEWER VERSIONS OF AUTHENTICATION PROVIDER APIS
28174793	SQL COMMANDS: ALLOW COMMENTS BEFORE STARTING SQL STATEMENTS
28206868	UPGRADE OF BUILDER AUTHENTICATION: PRE-AUTH AND POST-AUTH CODE NOT COPIED
28519634	APEX_INSTANCE_ADMIN: INCONSISTENT VALIDATION WHEN SETTING SMTP_FROM
28533670	JET CHART: X COLUMN MAPPING SHOULD ONLY ALLOW FOR SELECTION OF NUMERIC COLUMNS
28539197	INCORRECT NUMBER OF FILES RETURNED FROM VIEW APEX_WORKSPACE_FILES
28557144	IMPORT OF 3.1.2 APPLICATION EXPORT FILE THROWS PARSE ERROR "EXPECTED WHITELISTED_EXECUTE_IMMEDIATE_EXP RESSION"
28568524	PAGE DESIGNER: MISSING HELP FOR 'TEXT WITH AUTOCOMPLETE' SETTING MINIMUM SEARCH'
28574697	NEW WEB SOURCE OPERATION PARAMETER NOT BEING ADDED TO EXISTING PAGE COMPONENTS



Table (Cont.) Fixed Bugs in 19.1 — Other

Description
LINK TO APP NOT WORKING IN EMAIL TEMPLATE NOTIFICATION
INDEX FOR PRIMARY KEY ON WWV_FLOW_DATA IS NOT UNIQUE
WEB SOURCE MODULE SHOULD ALLOW MORE THAN ONE OPERATION NOT MAPPED TO DATABASE OPERATION
CREDENTIAL STORE SHOULD SUPPORT TOKEN VALUES > 4000 CHARACTERS
SAMPLE DATASET EMP/DEPT: ORA-01400 ERROR IN APP CREATED ON DATASET
INTERACTIVE REPORT CHARTS DON'T WORK WITH DECIMAL VALUES AND GERMAN NLS
COPY BREADCRUMB TEMPLATE WIZARD ASKS NEW TEMPLATE NAME TWICE
ORA-20876: STOP APEX ENGINE FOR EXECUTE PL/SQL CODE USING DYNAMIC ACTION
APEX_EXEC.ADD_ORDER_BY API CHANGES: ADD P_COLUMN_NAME, REMOVE P_LOV
HEADER AUTHENTICATION: FAIL IF MULTIPLE AUTHN HEADERS
SOCIAL SIGN-IN: ADD SCOPE PARAMETER TO APEX_AUTHENTICATION.CALLBACK (GOOGLE)
INSTALL IN RDBMS: APEX_180200.WWV_INSTALL\$_CK_INSTAL L_TYPE VIOLATED
CREATE PAGE WIZARD: SELECT TABLE ON REMOTE DATABASE IS LIMITED TO 500 TABLES
APEX_SESSION.DELETE_SESSION DOES NOT DELETE THE CURRENT SESSION
AUTOMATIC ROW FETCH/TABFORM PROCESS - ROWID IS NOT IN LIST
CALLING RESET_IMAGE_PREFIX.SQL SHOULD NOT CAUSE INVALIDATION
SOCIAL SIGN-N: IF ACCESS_TOKEN ALREADY CONTAINS USERNAME ATTRIBUTES
WHEN TRACE IS ENABLED, LOG FULL PATH OF TRACE FILE



Table (Cont.) Fixed Bugs in 19.1 — Other

Description
INTERACTIVE REPORT: INITIAL QUERY NOT RESPECTING 'MAXIMUM ROWS PER PAGE' REPORT ATTRIBUTE ON APEX 18
UTILIZING WEBGATE SECURITY - APEX_AUTHENTICATION.CALLBACK CANNOT BE USED FOR SOCIAL AUTHENTICATION
INTERACTIVE REPORT: DIFFERENT ROW TOTALS ARE SHOWING IN 18.1 COMPARED TO 5.1
DECODING BASE64 DATA IS RETURNING JUNK WITH APEX_WEB_SERVICE.CLOBBASE642BLOB
APEX_EXEC.EXECUTE_WEB_SOURCE THRIOWS ORA-06502 WHEN DATA PROFILE HAS ENCODING AND RESPONSE IS EMPTY
WORKSPACE IMPORT: ORA-02291 ON WWV_FLOW_FND_GU_INT_G_FK
APEX COLLECTION PERFORMANCE ISSUE DUE TO USER_ID
ITEM TYPE DISPLAY IMAGE SHOULD HAVE MIME TYPE ATTRIBUTE
CREATE JET CHART PAGE WIZARD DOES NOT ADD WEB SOURCE MODULE PARAMETERS TO THE REGION
CREDENTIAL STORE DOES NOT SUPPORT "SCOPE" ATTRIBUTE FOR OAUTH AUTHENTICATION
SOCIAL SIGN-IN: GOOGLE REQUIRES "HD" PARAMETER IN CALLBACK
ORA-6502 THROWN WHEN DB HAS MAX_STRING_SIZE="EXTENDED" AND VC2 VALUES LARGER THAN 4K ARE SELECTED
SYS.VALIDATE_APEX MIGHT NOT RUN CONNECTLY ON RUNTIME-ONLY WHEN INVOKED AFTER DB UPGRADE FROM 11.X TO 12.2
TRANSLATION WRITES LARGE AMOUNT OF BUILDER AUDIT TRAIL
APPLICATION DELETION ERROR - ERR-1029 UNABLE TO STORE SESSION INFO
DATE PICKER DOES NOT CORRECTLY DISPLAY HOUR AND MINUTE FOR SOME LOCALES (E.G. EN-GB)



Table (Cont.) Fixed Bugs in 19.1 — Other

Bug Number	Description
29247143	SOCIAL SIGN-IN: SUPPORT OKTA (NO CLIENT_ID IN TOKEN REQUEST)
29250408	AFTER DATABASE UPGRADE VALIDATE_APEX THROWS ERROR ORA-38824: A CREATE OR REPLACE COMMAND MAY NOT CHANGE THE EDITIONABLE
29258731	COPY PAGE FROM ANOTHER APPLICATION DOES NOT COPY REFERENCED WEB SOURCE MODULES
29259014	FILE UPLOAD: SUPPORT UPLOADS VIA WWV_FLOW.AJAX
29270564	DATA LOAD WIZARD CAN THROW ORA-1403 WHEN UNIQUE COLUMN IS MISSING IN UPLOADED DATA
29292075	JET CHART:REMOVE 'INVALID DATA' DEFAULT MESSAGE DISPLAYED WHEN GANTT DATA LOADING
29297694	ADDING ACL FEATURE TO EXISTING APPLICATION, ADMIN ROLE NOT RESPECTED
29325658	UPDATE PREREQUISITES > REQUIRED SYSTEM PRIVILEGES FOR PACKAGED APPS
29329165	APEX_JSON.WRITE(XMLTYPE): ORA-01756 WHEN NLS_SORT=GERMAN NLS_TERRITORY=SWITZERLAND
29339164	PRINTER FRIENDLY REPORT DOES NOT PRINT ALL ROWS IN APEX 18.1 - WORKS IN 5.1
29348856	DATE PICKER HIDDEN SCREEN READER TEXT FOR SAMPLE DATE NOT USEFUL
29499983	ORACLE_APEX_DAILY_MAINTENANCE CAN FAILS WITH ORA-02014

Open Bugs and Known Issues

This section describes bugs and known issues for Oracle Application Express release 19.1.



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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/technetwork/developer-tools/apex/downloads/apex-191-known-issues-5434469.html

- Removal of AnyChart Flash Components from Images Folder
- Width issue for item type Text with Autocomplete in IE11
- Known Issues for jQuery UI and jQuery Upgrade
- Known Issues for RESTful Services and Oracle REST Data Services (ORDS)

Removal of AnyChart Flash Components from Images Folder

In a previous release, the AnyChart and AnyGantt flash .swf files were removed from the /images folder. This results in AnyChart map chart and gantt charts no longer rendering. No error message displays, instead the region will be blank.



See Also:

"Switching from AnyChart to JET Chart" in the *Oracle Application Express App Builder User's Guide*

Width issue for item type Text with Autocomplete in IE11

Issue

The item type Text with Autocomplete does not render with the correct width using Oracle JET in IE11. This is due to the use of the flex property in the JET CSS class .oj-inputsearch-choice.

Solution

Add the following code to your application page inline CSS attribute:

```
.oj-inputsearch-input { flex: 1 1 auto; }
```



Known Issues for jQuery UI and jQuery Upgrade

jQuery 3.1.1 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 Oracle Application Express release 18.1. You must update the JavaScript to only use jQuery 3.1 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.x see https://jquery.com/upgrade-guide/3.0/

jQuery UI 1.12.x has changed the folder structure and files that make up the library compared to version 1.10.4. If you have direct references to any of the old file filenames, you must update them to the new name. For example, if you previously referenced the tabs widget with #JQUERYUI_DIRECTORY#ui/#MIN_DIRECTORY#jquery.ui.tabs#MIN#.js, you must change it to #JQUERYUI_DIRECTORY#ui/widgets/#MIN_DIRECTORY#tabs#MIN#.js.

The Oracle Application Express specific bundle <code>jquery-ui-apex[.min].js</code> that loads by default for Application Express desktop UI pages (either as <code>jquery-ui-apex.js</code> or as part of <code>desktop[_all].min.js</code>) includes all the core files, the drop effect, and the following widgets:

- button
- checkboxradio
- controlgroup
- datepicker
- dialog
- draggable
- droppable
- resizable
- selectable
- sortable
- tooltip

This is essentially the same set as in 1.10.4 with the addition of sortable. If you have a separate reference to sortable, you can remove it.

The <code>jquery-ui-apex[.min].css</code> file loads by default and includes all the <code>jQuery UI CSS</code> files. If you had references to individual <code>jQuery UI css</code> files, you can remove them.



See Also:

JET v4.2.0 Release Notes

Known Issues for RESTful Services and Oracle REST Data Services (ORDS)

Customers using Oracle Application Express 18.1 and Oracle REST Data Services 18.1 may encounter the following issues when developing and deploying RESTful Services.

- Issue when Migrating Application Express RESTful Services with a Null URI to ORDS
- Issue when Workspace Name Differs From First Provisioned Schema Name
- Issue when Using SQL Developer or SQL Scripts to Enable ORDS on an Application Express 18.1 or later Schema

Issue when Workspace Name Differs From First Provisioned Schema Name

Issue

This issue affects all releases of Oracle REST Data Services **except** 17.4.1 and 18.2 or later and all releases of Application Express (ORDS services can be created by SQL Developer or an API). This issue exists for services created in the First Apportioned Schema of a workspace when the workspace name and schema name are different.

Due to an error in the way older releases of Oracle REST Data Services retrieve information about the Application Express environment, Oracle REST Data Services cannot serve ORDS Based RESTful Services if a given workspace name does not match the first provisioned schema name. This error was corrected in Oracle REST Data Services 17.4.1 but regressed in Oracle REST Data Services 18.1.

The following examples describe the issue:

- A user has existing APEX Based RESTful Services and migrates them to Oracle REST Data Services, then modifies the ORDS Based RESTful Services definition. If the user calls the services and expects the new logic to perform, instead the older APEX Based RESTful Services are still called. If the user then goes to the APEX Based RESTful Services page, deletes the original service, and runs the service expecting to call the ORDS service, the user instead gets a 404 error.
- If a user creates new ORDS Based RESTful Services in the first provisioned schema but does not have corresponding APEX Based RESTful Services, a 404 error results when the user calls the services.

There is no supported resolution at this time.



Issue when Migrating Application Express RESTful Services with a Null URI to ORDS

Issue

Prior to 5.1, the Application Express RESTful Services interface enabled users to create RESTful service modules with a null URI Prefix (users could also create multiple modules with null URI Prefixes). The URI templates in all modules had to be unique in order to share the null URI Prefix across the services.

Example Module Definitions with Null URI Prefixes

Consider the following definitions:

Module 1

```
Name: MyMod1
URI Prefix: NULL

URI Templates: /Template1
/Template2
```

Module 2

```
Name: MyMod2
URI Prefix: NULL

URI Templates: /Template3
/Template4
```

In effect, these definitions create a single virtual service with four templates with *null* for the URI Prefix. These can be called in the following ways:

```
http://server.com/ords/mySchema/Template1
http://server.com/ords/mySchema/Template2
http://server.com/ords/mySchema/Template3
http://server.com/ords/mySchema/Template4
```

Where:

```
http://server.com
The server URL.
ords
```

mySchema

The Path Prefix.

The ORDS alias.



null

The **null Module URI Prefix**. Does not appear in the call, but is processed by the services.

Template1

The **URI Template**.

While the ability to create null URI Prefixes was disabled in Application Express 5.1, legacy services that were defined in prior releases were migrated and functioned as long as they were not deleted. However, when migrating these services to Oracle REST Data Services, the ORDS Based data model does not accept multiple modules with duplicate URI Prefixes (including null prefixes).

The logic to migrate APEX Based Rest Services to Oracle REST Data Services in Application Express 18.1 is a simple pass-through to an Oracle REST Data Services procedure (introduced in Oracle REST Data Services 17.4.1). However, the logic of that procedure fails to process multiple modules with a null base path. Users in this situation who try to migrate to Oracle REST Data Services encounter a "Duplicate Value" and throw an ORA-0001 error (Oracle bug 27916570).

Resolution

Logic added to the migration procedure merges all modules that have null URI Prefixes. The rules are as follows:

Oracle REST Data Services 18.2

All affected modules collapse into a single ORDS Based module named merged.apex.rest.services

If **any** of the APEX Based modules being merged are published, the new merged module publishes.

If **none** of the APEX Based modules being merged are published, the new merged module does not publish.

All **roles** associated with APEX Based modules being merged are assigned to the new merged module.

The **pagination size** of the merged module is set to the largest pagination size in the modules being merged.

For APEX Based modules with null URI Prefixes that also have duplicate URI templates, the following occurs:

- The most recently updated template maintains the duplicate URI.
- All other templates are given the prefix dup001_*
- The comment for the template contains: 1) the original module name that it migrated from, and 2) the original Template URI.

Oracle Application Express 18.1

If you have **one module or none** with a null URI Prefix, the services migrate successfully regardless of your release of Oracle REST Data Services (the migration is only available in Oracle REST Data Services 17.4.1 or later).

If you have two or more modules with a null URI Prefix, one of the following occurs:



- If you have Oracle REST Data Services 18.2 or later, the modules migrate using the rules above.
- If your Oracle REST Data Services release is older than 18.2, a warning message displays and you cannot migrate your services to Oracle REST Data Services until you upgrade to 18.2 or later.

Issue when Using SQL Developer or SQL Scripts to Enable ORDS on an Application Express 18.1 or later Schema

Issue

This issue affects systems running ORDS 17.4 or prior and Oracle Application Express 18.1 or later.

This issue only affects schemas that are assigned to an Application Express Workspace.

The issue occurs when you use SQL Developer or SQL Scripts (i.e. not the APEX ORDS Workshop) to enable ORDS for a schema, when that schema is also assigned to an Application Express Workspace.

The APEX ORDS Workshop ensures that the ORDS SCHEMA ALIAS and the APEX PATH PREFIX synchronize. However, when ORDS enables a schema using another method, the APEX PATH PREFIX does not sync. When these two items are out of sync, ORDS returns a 404 error when attempting to access ORDS services defined within the schema.

Resolution

To sync the APEX PATH PREFIX with the ORDS URI PREFIX:

- **1.** In Application Express, navigate to the ORDS REST Workshop.
- 2. Click the **Configure** button to launch the ORDS Schema Attributes modal dialog.
- 3. For Schema Alias, select the alias.
- 4. Click the Save Schema Attributes button.

This sets the same value for both the ORDS SCHEMA ALIAS and the APEX PATH PREFIX.

Documentation Additions

This section lists additions to Oracle Application Express documentation.

- Oracle Application Express JavaScript API Reference
- Oracle Application Express JavaScript API



Oracle Application Express JavaScript API Reference

The content of the JavaScript APIs chapter has been moved to the *Oracle Application Express JavaScript API Reference*.

Oracle Application Express JavaScript API

This reference describes the JavaScript APIs available to Oracle Application Express applications. You can use these functions to provide client-side functionality, such as showing and hiding page elements, or making AJAX (Asynchronous JavaScript and XML) requests. Note that the interactiveGrid widget and interactiveGridView are not entirely complete and will be enhanced in a future documentation refresh.

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=trs if you are hearing impaired.

Privacy Notice

This privacy notice describes what to expect when Oracle Application Express directly collects information about users of applications that you create or install. Note that all Application Express internal applications (such as Application Builder) are written in Application Express, 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

Application Express 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

Application Express 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 Application Express 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

- ORA_WWV_apex.builder.devToolbar.grid This stores the current setting of the Development Toolbar's Show Layout Columns option.
- ORA_WWV_apex.builder.themeRoller.application id.* This stores settings of the Development Toolbar's Theme Roller popup.
- .4000.4500.* This stores the current tab in each of the tab sets of Page Designer.
- APEX.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.
- .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.
- .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.useComponentView This stores the users preference for the Page Designer's Component View tab.
- 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 Application Express development environment, they get a notification when a new version is available. To get this version information, Application Express 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 Application Express component usage) that the Application Express 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 the Oracle Application Express API Reference.

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