Oracle® Cloud Using Oracle Database Cloud Schema Service



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Preface

Using Oracle Database Cloud Schema Service describes how to provision, monitor, and manage Oracle Database Cloud Schema Service and provides references to documentation explaining how to develop and use Schema Service applications.

Topics:

- Audience
- Related Resources
- Conventions

Audience

Using Oracle Database Cloud Schema Service is intended for Oracle Database Cloud Schema Service users who want to provision, monitor, and manage their services and develop or use Schema Service applications.

Related Resources

For more information, see these related Oracle resources:

Oracle Public Cloud

http://cloud.oracle.com

- Getting Started with Oracle Cloud
- Managing and Monitoring Oracle Cloud
- Administering Oracle Database Classic Cloud Service

Conventions

Text conventions used in this document are described in this section.

The following text conventions are used in this document:

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



1 What's New for Schema Service

As soon as new and changed features become available, Schema Service instances are upgraded in the data centers where Oracle Cloud services are hosted. You don't need to request an upgrade to be able to use the new features—they come to you automatically. Here's an overview of new features and enhancements added recently to improve your Schema Service experience.

January 2019

Feature	Description
Outbound connections using TLS 1.2	Outbound HTTPS network connections from Schema Service that originate in APEX_WEB_SERVICE PL/SQL API can now be established using the TLS 1.2 protocol.

November 2018

Feature Descrip	ption
Upgrade to Oracle Application Express 18.2 All Scheupgrade (APEX) Oracle learn at this rele	ema Service environments have been ed to Oracle Application Express version 18.2. See New Features in <i>Application Express Release Notes</i> to bout major improvements introduced in ease.

August 2018

Feature	Description
Upgrade to Oracle Application Express 18.1	All Schema Service environments have been upgraded to Oracle Application Express (APEX) version 18.1. See New Features in <i>Oracle Application Express Release Notes</i> to learn about major improvements introduced in this release.



July 2018

Feature	Description				
Updated SSL/TLS certificates	An update to the SSL/TLS certificates used for encrypted HTTP access to the Schema Service (including access to any deployed APEX apps or REST endpoints) went into effect in July 2018. These new SSL/TLS certificates are signed by DigiCert certificate authority. They are trusted by modern web browsers by default and are renewed by Oracle annually. For non-browser clients that connect to APEX apps and REST endpoints deployed in the Schema Service, Oracle recommends adding the <i>DigiCert Global Root</i> <i>CA</i> certificate to the client's trust store (for example, Oracle Wallet, Java TrustStore). When this root certificate is trusted, annual certificate renewals are transparent to the client.				

September 2017

Feature Description			
Export to Oracle Storage Cloud Service	Starting September 22, all the customers who subscribed to Schema Service after August 2017 will see an option to export their schema to an Oracle Storage Cloud Service container.		
	Note: All the legacy customers who subscribed to Schema Service prior August 2017 will not have this option. However, they can still continue exporting their schema using Secure FTP.		

August 2017

Feature	Description
Redesigned service console	Starting August 18, 2017, any new subscriptions to Schema Service will see a redesigned service console with develop and manage options organized separately.
	Note: All the existing customers who subscribed to Schema Service prior August 2017 continue to see their service console without any changes.

April 2017

Feature	Description
Upgrade to Oracle Application Express 5.1	All Schema Service environments are upgraded from Oracle Application Express 5.0.4 to 5.1.1. Existing customers will be notified as the data center for their service is upgraded.

Other Noteworthy Changes

Feature	Description
Oracle Database Exadata Express Cloud Service	As of September 2016 with the release of Oracle Database Exadata Express Cloud Service, customers considering standalone Schema Service should purchase Exadata Express instead. Exadata Express is a similar fully managed service that provides important added functionality at a similar entry-level price. See Using Oracle Database Exadata Express Cloud Service.



Get Started with Oracle Database Cloud Schema Service

This section provides a brief overview of Oracle Database Cloud Schema Service, its key concepts, and an overview of developing applications for the service.

Topics:

2

- About Your Service
- Understand Key Components
- Security and Your Service
- Before You Begin with Your Service
- How to Begin with Your Service
- Sign In To Your Account
- Access the Service Console
- Access Service Details
- Quick Tour of the Service Console
- About Service User Types

To learn more about the Oracle Cloud, see Welcome to Oracle Cloud in *Getting Started with Oracle Cloud* for definitions of terms found in this and other documents in the Oracle Cloud library.

About Your Service

Oracle Database Cloud Schema Service is a schema service that provides a multitenant cloud environment for using the Oracle Database. It is not to be confused with the Oracle Database 12c Multitenant option which supports Pluggable Databases.

Schema Service is built on Oracle Database technology, running on the Oracle Exadata Database Machine.

This service has four main components:

- Oracle Database 11gR2 Enterprise Edition. The best performing database in the world.
- Oracle Application Express. Used to create and deploy all varieties of applications in a browser-based environment. See Manage Oracle Application Express Database Applications.
- **RESTful Web Services**. Allows access to the data in your Schema Service through simple URIs. See Implement RESTful Web Services.



 Packaged Applications and Sample Code. A set of business productivity applications that are installed with just a few clicks. See Manage Oracle Application Express Packaged Apps and Sample Code.

Schema Service delivers the following advantages:

- You can access your Schema Service from any supported browser on any platform.
- Your Schema Service comes in several sizes, based on a simple storage and transfer metrics.
- Your Schema Service has a simple monthly subscription cost, which includes all standard maintenance operations and Oracle Support.
- You can provision a complete Schema Service environment in a few minutes and immediately start to be productive. A Schema Service includes simple administrative tools that allow you to monitor usage, and add and drop user access. The Oracle Store enables you to modify your subscription package with a simple interface.
- Your Schema Service includes a wide variety of tools and utilities, including development wizards and flexible interactive reporting. Most importantly, Schema Service offers rapid application development and instant deployment, which allows developers and users to work together in real time to create optimal solutions for business needs.

Understand Key Components

Oracle Database Cloud Schema Service is composed of several components which provide functionality and other benefits.

Topics:

- About Oracle Database
- About Oracle Exadata
- About Oracle Application Express
- About RESTful Web Services
- About Packaged and Sample Applications
- About Tools and Utilities

About Oracle Database

The Oracle Database has been the standard for enterprise databases for more than two decades. With Oracle Database Cloud Schema Service, you get the full power of this legendary platform.

You can use the same SQL for data interaction that is used for hundreds of thousands of enterprise applications. You can use PL/SQL, the procedural extensions for the Oracle Database. All the optimizations and data structures which make the Oracle Database so robust are available in your Schema Service.

The Oracle Java Cloud Service - SaaS Extension uses Schema Service for all data operations. This support enables you to deploy Java applications with the Java Cloud Service with the enterprise-strength of the Oracle Database.



Schema Service uses schema isolation to implement multi-tenancy, which allows full transparency while still providing efficient use of database resources. The Oracle Database is, at its core, a multiuser system for sharing data, so Schema Service simply uses the capabilities built up for the Oracle Database to share resources among multiple Schema Service customers.

About Oracle Exadata

Oracle Database Cloud Schema Service runs on Oracle Exadata hardware - the most advanced database platform in the world today. Oracle Exadata uses a variety of techniques and technology to dramatically improve the operation of the most timeconsuming database operations.

You get all the benefits of Oracle Exadata with your Schema Service.

About Oracle Application Express

Oracle Application Express is a robust rapid application development system that is included with the Oracle Database. Oracle Application Express gives developers the ability to create applications in minutes.

Once development is complete, the applications are instantly available, allowing for a process of interactive development where developers work with users to quickly create and refine applications to achieve business goals.

The process of application creation with Oracle Application Express can take advantage of a wealth of wizards, which simplify and accelerate development. You can also extend Oracle Application Express applications to meet your specific business needs with PL/SQL, so the range of functionality you can implement is virtually unlimited.

These features mean that Oracle Application Express provides both extremely high levels of productivity for creating standard applications and the ability to create sophisticated mission critical applications.

Oracle Application Express includes a range of user productivity features, such as interactive reports, which let business users shape the analysis and presentation of their data without having to involve development or IT staff. End users can also created Websheets, which act like data-driven wikis, giving them full control of their business applications.

Oracle Application Express also includes capabilities for managing your data structures, and also functionality to help teams of developers manage their projects and communications.

Applications delivered through the Oracle Cloud can be accessed from a wide variety of client platforms, including Windows, Apple or mobile devices.

Oracle Application Express and your Oracle Application Express applications are built on technology that resides within an Oracle Database, so all your applications can be easily run on any Oracle platform - from Oracle Database Cloud Schema Service to your in-house data center to Oracle Database XE on your laptop.



About RESTful Web Services

RESTful Web services are services which adhere to an architecture which implements interactions with data sources with the use of URIs. RESTful Web services are one of the standard methods for accessing data in the Cloud.

Oracle Database Cloud Schema Service includes the ability to use RESTful Web services to access data in your Oracle Database. Schema Service includes a RESTful Web service wizard, which makes it easy for you to create services which implement any SQL statement or PL/SQL procedure to supply data to applications.

The RESTful Web service wizard lets you define a few attributes for a service and then use the full power of SQL and PL/SQL to perform database operations. By default, the wizard returns data in JSON format, although you can use PL/SQL to format data in any way. In addition, the wizard gives you the option of some more complex formats, such as the ability to return data from a result set with embedded links to a more detailed view of the data in the complete row, without any additional coding.

The support of RESTful Web services in Schema Service makes it easy to use the data in your Oracle Database in virtually any development tool, including dynamic languages.

About Packaged and Sample Applications

Oracle Database Cloud Schema Service includes a set of business productivity applications and sample code which can be installed with just a few clicks. Sample code is reference implementations of simple applications that can be installed and extended by a developer.

Packaged applications and sample code are full production versions designed to provide real functionality, such as project management, shared calendars and shared checklist management.

All of these applications share the same privilege levels of administrator, contributor and reader, which grant differential access to functionality and features. All of these applications and samples can be installed or removed through the same administrative interface.

About Tools and Utilities

Oracle Database Cloud Schema Service includes a variety of tools and utilities which make it easy for you to use the environment. It includes browser-based tools for monitoring and modifying all your services from a central management page.

You can create users across all your services with a simplified interface to Oracle's Identity Management solution. You can even upgrade your service from this environment for more storage and data transfer with a few clicks.

Each individual service also has a browser-based management console to provide a more detailed look at resource utilization and to install or remove business applications with a few simple clicks. The Oracle Application Express environment contains a set of administration applications which let administrators shape and monitor the environment. You can assign administrative responsibility for one or more services to an individual, giving you complete delegation capabilities to match your organization.



Schema Service includes Application Express SQL Workshop to manage the underlying Oracle Database and its structures. SQL Workshop is a browser-based component of the Oracle Application Express environment which gives you the ability to browse and manage all of your Oracle objects, run SQL or PL/SQL code, run scripts and even build queries through a graphical interface.

Security and Your Service

One of the key concerns for organizations as they move to a shared resource model on the Cloud is insuring the security of their data. Oracle Database Cloud Schema Service, like the Oracle Database that is the foundation of the Database Cloud, has been created from the beginning with the utmost concern for security.

Topics:

- Security Architecture
- Oracle Cloud Security Measures
- Oracle Database Cloud Schema Service Security Measures
- Application Security Options
- RESTful Web Service Security Options

This section reviews several aspects of security and the Oracle Cloud:

- The basic architecture of the security domains used with Oracle Cloud
- Security measures that apply to the overall service
- · Security measures that apply to individual Schema Service
- Application security options
- Security options for RESTful Web Services that access Schema Service

Oracle Cloud Security Measures

All security is based on well-thought out and implemented practices and procedures. Oracle Database Cloud Schema Service is implemented with rigorous security practices and procedures based on decades of experience.

The security processes used for the overall Oracle Cloud include secure access to data centers, annual security audits by third parties to insure regulatory security compliance and full auditing of the entire Cloud stack on a quarterly basis.

All data stored in the Oracle Cloud benefits from the use of Transparent Data Encryption. Transparent Data Encryption encrypts data stored on disk and in backups, protecting against unauthorized direct file access. The encryption and decryption of your data is handled automatically by the Oracle Database, so you do not have to add programmatic steps to use this powerful security feature.

The Oracle Cloud has to be protected against the introduction of malicious code which could harm all users. To enforce this level of protection while still allowing users to load data into their Schema Service, data loads are sent to a Secure FTP server, where they are scanned for viruses before the data in the files is loaded into the Schema Service using your database account information. With this approach, malicious data can never be loaded in such a way that it affects other accounts or breaches the security isolation. This two step process also automatically compresses



the actual data to be loaded, reducing the time needed to upload data to the Oracle Cloud.

Oracle Database Cloud Schema Service Security Measures

Oracle Database Cloud Schema Service is built on a multi-tenant architecture, with database schemas providing the boundaries of tenant isolation. Schemas have been used in the Oracle Database as a method of separating data for decades.

To enforce and protect the absolute security of tenants of Schema Service, some standard Oracle features have been locked down.

For instance, access to any data dictionary view which allows a tenant to see the existence of other schemas has been prohibited. In addition, some SQL syntax is not allowed, such as GRANT or REVOKE, since accessing objects between one schema to another schema owner uses these options.

For a detailed list of syntax, objects and operations disallowed in Schema Service, see Oracle Database Cloud Schema Service Features and Implementation Considerations.

Application Security Options

Your Oracle Database Cloud Schema Service includes Oracle Application Express, which you can use to develop and deploy HTML-based applications through a declarative process. Oracle Application Express has been in production since 2004, with hundreds of thousands of enterprise applications deployed throughout the world.

There are many features of Oracle Application Express that help you to develop secure applications in your Schema Service.

Oracle Application Express supports several authentication schemes used to insure that a particular user is properly identified. Oracle Application Express gives developers the ability to use authorization schemes, which are ways of allowing access to specific pages, regions within pages or items within regions, based on user identity. As a developer, you always have access to the identity of a user, so you can implement procedural limitations based on user identity.

Although Oracle Application Express includes robust monitoring tools, you can add in procedural logic to log application and session specific information for further security analysis.

Oracle Application Express includes protection against cross-site scripting attacks by providing a way to reference values that automatically escapes special characters, which will not allow any type of script to be included in pages returned to users through Schema Service applications.

In addition, Oracle Application Express gives you the option to automatically protect navigational URLs from being maliciously modified. This option, referred to as Session State Protection, generates checksums which are included with any parameters passed as part of a URL to retrieve a page in an application. In addition, you can prevent a page from ever being accessed by a URL, only allowing access as the destination of a navigation link or branch from another page within the application.

Application Express also includes reports which allow you to rapidly see the security options in force for a particular application, and also to monitor usage of applications and individual pages in applications.



RESTful Web Service Security Options

Application Express also includes reports which allow you to rapidly see the security options in force for a particular application, and also to monitor usage of applications and individual pages in applications.

Topics:

- Authentication
- OAUTH2 Authentication
- Logic-based Access

You can also specify security on a RESTful Web Service in several ways. These ways are different from the traditional method of using schema users to implement security. Oracle Database Cloud Schema Service is based on a single schema, and all RESTful Web Services which access data in this schema are executed by the user who owns the schema. Without any specific security implementations on a RESTful Web Service, the services will return all data that satisfies an SQL statement or is collected by a PL/SQL block.

There are three ways you can add security to your RESTful Web Services:

- Based on the application using the RESTful Web Service
- Based on the identity of the user calling the RESTful Web Service
- · Based on logic implemented in the RESTful Web Service call itself

Authentication

RESTful Services support two types of authentication: *First party authentication* and *Third party authentication*.

First party authentication is accomplished by the first-party authority, in this case the Application Express security system.

Third party authentication is accomplished by a third party authority, so the application requesting the authentication does not actually know the identity of the user.

Once a user is authenticated through either of these methods, you can limit authorization based on the identity of the user.

OAUTH2 Authentication

RESTful Web Services use the OAUTH2 model of authentication, as shown in the diagram below.





OAUTH2 authentication is one of the standard authentication flows used on the Internet. To understand how to implement application-based or user-based authentication, you need to understand how the OAUTH authentication process flow works.

OAUTH authentication requires two different tokens - a request token, which allows a client to request authorization, and an access token, which grants access to a specific user.

To limit access based on the application, you can grant access to the RESTful Web Services once authentication is complete. You can also use the username for specific authentication.

Logic-based Access

The method of implementing security described above grants access to one or more specific RESTful Web Services calls, similar to allowing a connection to a database. In traditional database security, access is granted based on the identity of the database user making the request. Since all RESTful Web Services in a specific Oracle Database Cloud Schema Service are executed by the same database user, this option is not available for these Services.

In recognition of this architecture, the SQL command GRANT is not supported in Schema Service.

However, this does not mean that you cannot limit access to data based on user identity. The identity of a user is established through Schema Service authentication process, and this identity is available to developers as the :current_user bind variable, kept securely in the header of all RESTful Web Service requests.

You can use this value as part of a standard WHERE clause, which, for instance, could be used to limit the rows returned from a query to those for the same department



as the current user. You could also use this value in more complex logic in either SQL or PL/SQL.

Before You Begin with Your Service

Developing applications for Oracle Database Cloud Schema Service is done with Oracle Application Express. Before building applications, you may want to familiarize yourself with the following procedures:

- Creating custom applications. See Manage Oracle Application Express Database Applications.
- Installing packaged applications. See Manage Oracle Application Express Packaged Apps and Sample Code.
- Creating RESTful Services. See Implement RESTful Web Services.
- Managing application users. See Manage Oracle Application Express Application End Users.

To learn more, see Develop Applications for Oracle Database Cloud Schema Service.

How to Begin with Your Service

Get started with the Oracle Database Cloud Schema Service by requesting a free trial or purchasing a subscription.

Here's how to get started with Schema Service free trials and paid subscriptions:

- 1. Request a trial or purchase a subscription. See Request and Manage Free Oracle Cloud Promotions or Buy an Oracle Cloud Subscription in *Getting Started with Oracle Cloud*.
- 2. For a purchased service, activate and verify the service. See Activating Your Order from Your Welcome Email in *Getting Started with Oracle Cloud*.
- 3. Learn about users and roles. See Manage Users and Roles.
- 4. Create accounts for your users and assign them appropriate privileges and roles. See Managing User Accounts in *Getting Started with Oracle Cloud*and Managing User Roles in *Managing and Monitoring Oracle Cloud*.

Sign In To Your Account

The home page for your account lists all of the service consoles you have access to.

To sign in to your account from the Oracle Cloud website:

1. From your browser, go to the Oracle Cloud website found here:

https://cloud.oracle.com/

- 2. Click I and then select Sign in to Cloud.
- 3. Click Sign In using Traditional Cloud Account.
- 4. Select the Data Center and click Next.
- 5. Enter your Identity Domain, and click Go.



6. Enter your username and password, and click **Sign In**.

The Infrastructure Console displays.

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O Important Notifications	æ		Database Schema of 3 Number of S5 Remaining	Database Schema of 3 Number of S20 Remaining	Database Schema of 3 Number of S50 Remaining
View Notifications	Create Instance	Manage Account			
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Note:

When Schema Service is provisioned, a service instance is not automatically created. The first time you sign in to your account, you will not see a service instance displayed for your service. The service administrator must create the service instance. See Create a Service Instance. However, if you are a legacy customer, that is, if you purchased the Schema Service before August 2017, you will see a single pre-created service instance on this page.

Access Service Details

You access the Service Details page from the Infrastructure Console.

To access the Service Details for a particular Schema Service:

1. Sign in to your account. See Sign In To Your Account.

The Infrastructure Console displays.

	nfrastructure Classic				↓ ⑦ ⊕ (
)ashboard 🐵					Identity Domain
O Important Notifications View Notifications	Create Instance	Manage Account	Database Schema of 3 Number of S5 Remaining	Database Schema of 3 Number of S20 Remaining	Database Schema of 3 Number of S50 Remaining
ctive Services Database Schema	X				
60 0.06 30 0.03 0 10 12 14 16 Number of \$20 database Nk instances	10 12 14 16 imber of S5 database instances (Unit Per				



2. Find the service you want to view the service details for, and click the Action Menu icon.

The Action Menu displays.

		oud Infrastructure Classic
	Active Services	
	Database Schema Subscription Id:523793239	Instances
	60 30 0 11 13 15 17	0.06 0.03 0.00 11 13 15 17
ŋ	Number of S20 database instances	Number of S5 database instances (Unit Per
ĺ	No data to display	View Details
	Number of S50 database instances	View Account Usage Details
	0	□ ‡

3. Select View Details.

For newer services, purchased after August 2017, you will see a Service Details page similar to the following:



Service: Ora				:	
Overview Billing Metrics	Resource Quotas Business Metrics Documents Status				
Overview Informa	ition				
Category	Oracle Database Cloud Schema Service				
Data Region	US Commercial 1 (Time zone: America/Los_Angeles)				
Identity Domain Name					
Identity Domain Id					
Subscription	Paid				
Additional Informa	ation				
Service Start Date	Aug 22, 2018				
Subscription ID					
Service Instance ID	1000				
Customer Account					

For older services, purchased before August 2017, you will see a Service Details page similar to the following:

	astructure Classic														۵	?	⊕ 9
Service: demo	Service: demo1 (Oracle Database Cloud Schema Service)							Open	Service C	onsole	:						
Overview Administration	Overview Administration Exports Business Metrics Associations																
Service Status - Se	Service Status - September 2019 🛥							-									
									Month	n View	Year Vie	ew	•	Current I	Month	Þ	
1 2 3 4 5 Time Zone: Central Daylight Tim	6 7 8 9 10 11 12 ne (CDT)	13 14	15	16	17 1	18 11	9 2	0 21	22	23	24	25	26	27 28	29	30	
Overview Information	on																
Description	Add description			Identity [Domain	Name		mycompa	any								
Data Center	US Commercial 2 (Time zone: US/Central)			Identity [Oomain	ld		mycompa	any								
Subscription	Paid	Version Status			Version 16.1.0.0.0												
Instance Type	Production					Active											
Plan	Oracle Database Cloud Schema Service - S50			Service I	nstance	URL											
Service Start Date	12-Apr-2017			Domain SFTP Host & Port		ort											
Service End Date	8-Apr-2018			Domain	SFTP U	ser Nam	10	(i)mycompAA									
Subscription ID																	
Customer Account	My Company																



Access the Service Console

To access the Service Console for a particular Oracle Database Cloud Schema Service:

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page. Instead of the steps outlined here, see Access the Service Console for Services Purchased Before August 2017.

- 1. Go to the Service Details for your service. See Access Service Details.
- 2. Find the service instance you want to open the Service Console for, and click the **Open Service Console** button.

The Service Console page displays.

Home	Service Instance: dama				
C Develop = Manage	Home				
	Distatese Version 112	APEX Version 5.1.2.00.09	Storage Usage	1.20 GB / 5 GB	
	8	-			
	Develop Rapidly create web apps with Oracle Application Express (APEX)	Manage Perform management tasks for Database Schema Service and request data export			

For more information on the service console options, see Quick Tour of the Service Console.

Access the Service Console for Services Purchased Before August 2017

The Service Console for services purchased before August 2017 is the Oracle Application Express Application Builder home page.

- 1. Navigate to the Service Details page. See Access Service Details.
- 2. Click the **Open Service Console** button or the **Service Instance URL** link.

The Oracle Application Express home page displays.





Quick Tour of the Service Console

The Oracle Database Cloud Schema Service provides a Service Console, giving you a unified starting point to access and manage all aspects of your service.

Topics

- About the Service Console
- About Develop Options
- About Manage Options

About the Service Console

The options available on the Oracle Database Cloud Schema Service Service Console are grouped into the following categories: Develop and Manage.

Note:

Only those users who are assigned Database Developer or Database Administrator role in Cloud Identity Management are able to access the Schema Service Service Console. Only those users who are assigned Database Administrator role see the Manage section.

For instructions on how to access the Schema Service Service Console, see Access the Service Console.



Note:

If you purchased the service before August 2017, you might see a different service console. For more details, refer Access the Service Console for Services Purchased Before August 2017.



About Develop Options

The Develop options from the Schema Service Service Console provide an easy way to access the tools used to develop applications, install Oracle Application Express Productivity Apps, access database via Oracle Application Express SQL Workshop, and manage REST data interfaces.

Service Console Develop Options



Option	Description
App Builder	Develop database and websheet applications quickly and declaratively. You can import files such as database applications and plug-ins. There is a dashboard showing metrics about your applications and workspace utilities to manage defaults, themes, metadata, exports, and more. See Develop Applications for Oracle Database Cloud Schema Service.
Productivity Apps	Install from a gallery of pre-built Oracle Application Express Productivity Apps. See Install Packaged Apps and Sample Code.
SQL Workshop	Allows you to go directly to browser-based SQL Workshop, where you can run SQL statements, execute scripts and explore database objects. See Getting Started with SQL Workshop
REST Data Services	Directly access the page to create and manage RESTful web services that view and manipulate data objects within your database. See Implement RESTful Web Services.

About Manage Options

The Manage options from the Oracle Database Cloud Schema Service service console provide you with options to export and download your database schema.

Service Console Manage Options





Option	Description
Export to Secure FTP	Export your database schema and download from secure FTP. See Export to Secure FTP.
Export to Cloud Storage	Export your database schema to an Oracle Storage Cloud Service container. See Export to Cloud Storage.
App Archiving	Archive your apps to tables in your database for easy migration. See Application Archiving

About Service User Types

In addition to Oracle Database Cloud Schema Service user roles and privileges, there are Application Express user roles and privileges used to access, develop and administer Application Express applications.

See Adding Users and Assigning Roles in *Getting Started with Oracle Cloud* for information on Oracle Cloud user roles and privileges.

Application Express has the following types of users:

- End Users. End users of an Oracle Application Express application. Users that have been granted permission to access an Oracle Application Express application.
- **Developers**. Developers of Oracle Application Express applications. Developers that have access to the Application Builder and the SQL Workshop.
- Workspace Administrators. Administrators given access to all Oracle Application Express application components. Additionally, they can manage application user accounts, groups and development services that use Oracle Application Express authorization.



Manage Identity Domains and Service Instances

An Oracle Database Cloud Schema Service instance is an Oracle Database 11g schema service that provides a multi-tenant cloud environment for using the Oracle Database. The service administrator is allowed to create, delete, and lock service instances and also has the ability to add users and monitor service metrics.

Topics:

- Security and Your Service
- Understand Service Details and Metrics
- Create a Service Instance
- Delete a Service Instance
- Lock a Service Instance

Understand Security Architecture

The Oracle Cloud uses a security architecture that includes different security domains and administrative and use privileges within a particular Oracle Database Cloud Schema Service.

Topics:

- Security Domains
- Security Roles
- Manage Users and Roles

Security Domains

There are several different security domains used with the overall implementation of Oracle Database Cloud Schema Service.

- Accounts
- Identity Domain
- Schema Service

Accounts

Each and every Schema Service is owned by an account. An account is the top level in the security hierarchy. The individual who initially sets up an Account is known as the Buyer. A Buyer is automatically an Account Administrator as an Account Administrator can assign themselves privileges at the Identity Domain and Service level.



When you initially sign up for Schema Service, you must have an Oracle.com user account. After you initially sign up for a service, you can grant the Account Administrator privilege to any other Oracle.com users. Any Account Administrator can remove the Account Administrator privilege from any other Account Administrator.

Account Administrators can see all services, PaaS or SaaS services, associated with an account.

Identity Domain

An Identity Domain is a pool of users. An account can have one or more Identity Domains, but each domain is separate and distinct. You must define an Identity Domain when you initially request an account, and the requester is given a username within the Identity Domain.

Identity Domain membership and privileges are defined from the Cloud Infrastrucure Console.

Members of an Identity Domain can have security roles for one or more of the Cloud Services associated with the Identity Domain. These roles described in more detail below.

Identity Domain Administrators can see all Schema Service associated with the Identity Domain, and can assign and remove all security roles associated with these services, including the Administrator role for any of the services.

An Entitlement Administrator can create or delete cloud databases, based on your specific business requirements, but is restricted to a parent Oracle Cloud identity domain.

Schema Service

Schema Service is an individual service within the Oracle Cloud. Data within an individual Schema Service is completely separated from data in all other services in the Oracle Cloud, as described in more detail below.

Schema Service administrators can define users for the services that they administer. Schema Service users can be defined from the Cloud Infrastrucure Console or within the Administration area of the development platform for the service itself. If a user is defined from the Cloud Infrastrucure Console, they must use this page to manage their profile; if a user is defined through the Administration area of the development platform, they must manage their profile through that platform. Administrators and developers for Schema Service must be defined from the Cloud Infrastrucure Console and given the appropriate security role.

Security Roles

There is an Administrator role at the Account, Identity Domain and Service levels. Administrators can grant this role at their level to other defined users.

There are three roles for each Oracle Database Cloud Schema Service:

- Service Administrator, who can create, modify and delete Schema Service users and their privileges, both from the Cloud Infrastrucure Console and the Administration area of Schema Service development platform.
- **Developers**, who can use the development platform within Schema Service to create applications, but who cannot create, modify or delete users for that Schema Service.



• **End users**, who can run applications within Schema Service, when optional custom authorization scheme is enabled.

When Schema Service is added to an Identity Domain, three individual roles which map to these levels are created within the Identity Domain. The Account Administrator and Identity Domain Administrator are automatically given the Service Administrator role for the initial Schema Service, but all other roles have to be explicitly assigned from the Cloud Infrastrucure Console.

Manage Users and Roles

All users and roles defined as part of the Cloud Identity Domain are administered from the Cloud Infrastrucure Console. On this page, an Identity Domain or Service administrator is allowed to add, delete and modify users, or to create, delete, assign or delete roles.

Identity Domain Administrators are allowed to access all users defined within their Identity Domain and their roles. Service Administrators only have access to the users defined for their Service, and users of a service can only modify their own user profile and reset their account password.

For more details, refer to Adding Users and Assigning Roles in *Getting Started with Oracle Cloud*.

Note:

- If you purchased the service before August 2017, your service will have only one Schema Service instance in a single Oracle Cloud identity domain.
- When there are multiple Schema Service instances in a single Oracle Cloud identity domain then cloud users and roles must be assigned individually based on service instance name. These cloud users and roles are separate from database users and roles created within each cloud database.

Understand Service Details and Metrics

The Oracle Database Cloud Schema Service provides the ability for you to monitor important metrics for your service.

The metrics available for the Schema Service display on the Service Details for your service, see Access Service Details.

Billing Metrics

This metric shows the prorated amount used of your entitlement per day. Because this service is subscription only, this number does not affect the amount you are billed.

Resource Quotas

This metric lists your Database instance quota and how much of it you have used. The quota is utilized when you provision a Cloud database (see Create a Service



Instance) and released when you delete a Cloud database (see Delete a Service Instance).

Note:

If you purchased the service before August 2017, your service will not support multiple service instances. Therefore, you will not see options to create or delete a service instance.

Alert Rules are the ability to get an email when the quota has reached a particular number.

Business Metrics

This is your service usage metric. You can customize the graphs on this page. The metrics provided on this page include:

- Object Count This is the number of objects in your schema.
- Table Count This is the number of tables in your schema.
- Storage Used (GB) This is the amount in GB of storage that is in use.

Documents

This metric lists all the documents generated for your service or service instances within a specified date range.

Status

This is the up time of your service including planned outages.

Create a Service Instance

When you create an Oracle Oracle Database Cloud Schema Service instance, you provision a multi-tenant cloud environment that hosts your database schema.

Note:

If you purchased the service before August 2017, your service will not support multiple service instances and you can't create new service instances.

To create a Schema Service instance:

1. Sign in to your account. See Sign In To Your Account.

The Infrastructure Console displays.



	nfrastructure Classic				↓ ⑦ ⊕ €
Dashboard 🐵			0-0		Identity Domain
O Important Notifications View Notifications	Create Instance	Manage Account	Database Schema of 3 Number of S5 Remaining	Database Schema of 3 Number of S20 Remaining	Database Schema of 3 Number of 550 Remaining
Active Services Database Schema Subscription Id:	Instances				
60 0.05 20 0.03 0 10 12 14 16 Number of \$20 database No instances	10 12 14 16 Imber of S5 database Istances (Unit Per				
No data to display					

2. Click Create Instance.

A list of service instance choices you have purchased displays.

3. From the list, click **Create** for Database Schema.

The Create New Service Instance page displays.

Create N	lew Oracle Da	atabase Cl	oud Ser	vice Instance		
Instance Details Provide the instance	details you want for your service	ce.				
Instance Detail			Administrator	Details		
* Name	New Instance Name	0	* Email	Standbard allow cont		0
Database Shape	S5 . 0			Use email as user name		
			User Name	Search and a search of the		
			* First Name	Example		
			* Last Name	User		
					Cance	Creat

- 4. On the Instance Details page, specify the following:
 - **Name**: Specify a unique name for your service instance. If you specify a name that already exists, the system displays an error and the instance is not created.
 - **Database Shape**: Specify the Database shape that you want to create. This determines the hardware resources provided to your Cloud database, particularly the maximum storage available. The available options are:
 - S5
 - S20
 - S50

Only shapes that still have quota available are displayed. See "Resource Quotas" in Understand Service Details and Metrics.

- **Email**: Enter an email for the Schema Service administrator.
- User Name: Enter a user name for the Schema Service instance administrator. Alternatively, check the Use email as user name option to copy the Email entry into the User Name field



- **First Name**: Enter the first name of the Schema Service instance administrator.
- Last Name: Enter the last name of the Schema Service instance administrator.
- 5. Click Create.

The confirmation dialog appears.

6. Click Create.

Your new instance creation will be initiated and will be provisioned in some time. Once the new instance is created, it appears on the Infrastructure Console.

Delete a Service Instance

When you delete a service instance for Oracle Oracle Database Cloud Schema Service, all data objects and data is removed. Removing an instance provides you with the ability to completely start over with a new service instance.

Note:

If you purchased the service before August 2017, your service will not support multiple service instances and you can't delete a service instance.

To delete a Schema Service instance:

1. Open the Service Details for the instance you want to delete. See Access Service Details.

The Service Details display.

2. Click the Action menu next to Open Service Console.

The menu options display.

Open Se	rvice Console
	Lock
	Modify
	Delete
	Create Like

3. Select Delete.

The Delete Instance Confirmation dialog displays.

4. To confirm, click **Delete**.



The Schema Service instance and all its data objects and data has been removed. It is not possible to recover objects or data once this is done.

Lock a Service Instance

When you lock a service instance for Oracle Oracle Database Cloud Schema Service, access to Oracle Application Express and REST web services will be disabled. You can't perform any administrative actions in the service console.

Note:

If you purchased the service before August 2017, you might see slightly different user interface options to lock your service.

To lock a Schema Service instance:

1. Open the Service Details for the instance you want to delete. See Access Service Details.

The Service Details display.

2. Click the Action menu next to Open Service Console.



The Action menu options display.

3. Select Lock.

The Lock Instance Confirmation dialog displays.

4. To confirm, click Lock.

The Schema Service instance gets locked.

Note:

The Service Administrators can unlock the service instance from Infrastructure Console.



4

Develop Applications for Oracle Database Cloud Schema Service

This section describes how to perform application developer tasks for Oracle Database Cloud Schema Service.

Topics:

- Typical Workflow
- Import Data
- Manage Data
- Export Your Database Schema
- Manage Oracle Application Express Database Applications
- Manage Oracle Application Express Websheet Applications
- Provide Access to Applications
- Monitor Oracle Application Express Application Activity
- Manage Oracle Application Express Packaged Apps and Sample Code
- Manage Oracle Application Express Application End Users
- Manage Application Security
- Use Oracle Application Express Applications and Websheets
- Send Emails
- Schedule Background and Asynchronous Jobs
- Application Archiving
- Implement RESTful Web Services
- Call SOAP and RESTful Web Services
- Troubleshoot RESTful Web Services

Typical Workflow

To start using your Oracle Database Cloud Schema Service, see the typical workflow described in the following table:

Task	Description	More Information
Purchase a subscription to Schema Service	Provide your information, and purchase a subscription.	Buying a Non-metered Subscription to an Oracle Cloud Service in Getting Started with Oracle Cloud



Task	Description	More Information
Activate a service	After Oracle processes your purchase order, sign in to My Account and activate the service.	Activating Your Order in Getting Started with Oracle Cloud
Access the service	Access your service.	Accessing an Oracle Database Cloud Schema Service
Add and manage users	Create accounts for your users and assign them appropriate privileges.	Adding Users and Assigning Roles in Getting Started with Oracle Cloud
Monitor the service	Check on the day-to-day operation of your service, monitor performance, and review important notifications.	Monitoring Your Cloud Service Usage in Getting Started with Oracle Cloud
Manage service data	Before developing or installing an application or Websheet, import data to be used by your application or Websheet.	Managing Data
Develop Oracle Application Express applications and Websheets	Create new applications and Websheets.	Managing Oracle Application Express Database Applications
Give application and Websheet access to users.	Create and authorize users to access your applications and Websheets.	Providing Access to Applications
Install Oracle Application Express applications	You can install packaged applications and sample code.	Managing Oracle Application Express Packaged Apps and Sample Code
Manage application users	Create and authorize users to access your applications and Websheets.	Managing Application Express Application End Users
Monitor Application Express applications	Monitor the performance of your applications.	Monitoring Application Express Application Activity
Use applications and Websheets	How to access and use an Application Express application or Websheet	Using Oracle Application Express Applications and Websheets
Implement RESTful Web services to access Database Cloud Service data	Implement a RESTful Web service consumer or producer for an application.	Implementing RESTful Web Services

Import Data

Several methods are available for uploading data in to the database. For an initial data upload to Oracle Database Cloud Schema Service, use Oracle SQL Developer, the Oracle Application Express SQL Workshop Data Upload Utility or the Oracle Application Express Data Load utility.

Topics:

Use Oracle SQL Developer for Data Loading


- Use Oracle Application Express SQL Workshop Data Upload Utility
- Use Oracle Application Express Application Data Load Utility

The following sections describe the various methods used to load your Schema Service with data.

See Also:

For instructions on using RESTful Services to access data, see Implement RESTful Web Services.

Use Oracle SQL Developer for Data Loading

You can use Oracle SQL Developer to load data from an on-premise database to Oracle Database Cloud Schema Service.

Topics:

- Overview of the Oracle SQL Developer Data Loading Process
- Create or Use an Existing Oracle Database Cloud Service for Data Loading
- Install Oracle SQL Developer
- Configure Oracle SQL Developer Cloud Connection
- Set Up Secure FTP Account
- Create and Deploy a Cart of Objects
- Check Deployment Status
- Restart a Deployment
- Remove a Deployment
- Clear Logs
- Create Additional Users for Oracle SQL Developer Cloud Connections

Overview of the Oracle SQL Developer Data Loading Process

Oracle SQL Developer, along with your Oracle Database Cloud Schema Service SFTP server, provides the ability to upload data to your Schema Service. Oracle SQL Developer creates a cart containing objects you want to load in to your Schema Service, connects to your service and deploys data from the cart to the service.

To deploy objects to your service you must perform the following steps:

- 1. Create or use an existing Schema Service. See Creating or Using an Existing Oracle Database Cloud Service for Data Loading.
- 2. Install SQL Developer locally. This application creates the cart of objects to load and to perform the deploying of data from the cart to your service. See Installing Oracle SQL Developer.
- 3. Add a Cloud connection from Oracle SQL Developer to your service. See Configuring Oracle SQL Developer Cloud Connection.



- 4. Reset the SFTP account user password. See Setting Up Secure FTP Account.
- 5. Using Oracle SQL Developer, create a cart filled with objects and deploy to your service. See Creating and Deploying a Cart of Objects.
- Configure Schema Service to allow access to the service from additional Oracle SQL Developer users. See Creating Additional Users for Oracle SQL Developer Cloud Connections.

Create or Use an Existing Oracle Database Cloud Service for Data Loading

The first step in the data loading process is to locate the **Welcome to Oracle Cloud** email received during the Oracle Database Cloud Schema Service creation process.

If the Schema Service does not yet exist, see Request and Manage Free Oracle Cloud Promotions and Buy an Oracle Cloud Subscription in *Getting Started with Oracle Cloud*.

During the service creation process and after your service has been activated, a **Welcome to Oracle Cloud** email is sent. This email contains important usernames and URLs required for configuring Oracle SQL Developer and the Secure FTP site for data loading. See Configuring Oracle SQL Developer Cloud Connection and Setting Up Secure FTP Account.

Note:

Save the **Welcome to Oracle Cloud** email for the Schema Service you are loading with data. This email contains information required for the data loading configuration process.

Install Oracle SQL Developer

Oracle SQL Developer creates carts of data structures, DDLs, and data to deploy to theOracle Database Cloud Schema Service. This section describes how to install Oracle SQL Developer.

Note:

The functionality described here requires the Oracle SQL Developer Release 3.2 or later.

To install Oracle SQL Developer locally, see Oracle SQL Developer documentation on the Oracle Technology Network, for installation and setup instructions. http://www.oracle.com/technetwork/developer-tools/sql-developer/downloads/ index.html



Note:

If your computer is 64 bit, you may need to run the sqldeveloper.bat file instead of sqldeveloper.exe.

Note:

You must install JDE run time if you do not have JDE run time installed. For installation and setup instructions, see Oracle SQL Developer documentation on the Oracle Technology Network at: http://www.oracle.com/technetwork/developer-tools/sql-developer/downloads/index.html

Configure Oracle SQL Developer Cloud Connection

Oracle SQL Developer must have an Oracle Cloud connection configured to connect to Oracle Database Cloud Schema Service. The connection can use the default username and password provided for Schema Service.

Additional users can access the service through Oracle SQL Developer if they are given the Developer role. See Managing User Accounts in Managing and Monitoring Oracle Cloud and Managing User Roles in Managing and Monitoring Oracle Cloud.

Oracle SQL Developer users can also be added through Oracle Application Express using the steps outlined in Creating Additional Users for Oracle SQL Developer Cloud Connections.

To add an Oracle Cloud connection:

1. Run Oracle SQL Developer locally.

The Oracle SQL Developer home page displays.





2. Under Connections, right click **Cloud Connections**.

The Cloud Connection menu appears.



3. Select New Cloud Connection.

The New Cloud Connection dialog appears.

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- 4. Navigate to the Service Details page for your Schema Service. This example uses a service purchased before August 2017, see Access Service Details.
- 5. Under Additional Information, locate the Service SFTP User Name. Make a note of this name for use in a later step.

Additional Information								
Plan:	Oracle Database Cloud Servi	Status:	Active					
Service Start Date:	13-Nov-2013	Service Instance URL:						
Service End Date:	13-Dec-2013	Domain SFTP URL:						
Subscription ID:		Domain SFTP User Name:						
Account:	Oracle	Service SFTP URL:						
C SI Number:	Not available	Service SFTP User Name:						
Data Center:		Service REST Endpoint:	Not available					
Version:	13.2.0.0.0							

6. Click Users.

The Users page displays.

7. Click SFTP Users.

The tab lists the SFTP user accounts for the current identity domain and your services in that domain.

8. Find the Service SFTP User Name you located in the Service Detail page, click the **Menu** icon.



Secur	ty Data Center: US Commercial 1 (Time zone: PST) Identity Domain:		
Users	SFTP Users Roles Custom Roles Identity Self Service		
		Search	0
•			T
	Email: User Name:	5	
			=
Ű	Email:		Reset Password
Page	0 (1-2 /tems) H 4 1 b		- Change - C

9. Select Reset Password.

The Reset Password dialog appears.

Reset Password	×
* New Password * Confirm New Password	
	Save Cancel

10. Enter a new password, confirm the new password and click Save.

The Reset Password confirmation message displays.

- **11.** To confirm change, click **Save**.
- **12.** Go back to the Service Detail page and locate the following information required to configure the new cloud connection:
 - Service Instance URL The Schema Service URL.
 - Service SFTP Host & Port The SFTP host address.
 - Service SFTP User Name The SFTP user for this Schema Service.
- **13.** On the Edit Cloud Connection dialog of Oracle SQL Developer, make the following entries:
 - Connection Name Enter the name for this cloud connection.

Database

- Username Enter the **Username** required during sign in when accessing Schema Service.
- URL Enter the Service Instance URL from the Service Detail page.

SFTP

- Username Enter the Service SFTP User Name from the Service Detail page.
- Hostname Enter the host portion of the **Service SFTP Host & Port** from the Service Detail page.



- Port Enter 22.
- **14.** Click **OK**.
- **15.** Under Cloud Connections on Oracle SQL Developer, open the new cloud connection.

The Authentication dialog appears.

16. Enter the Password required during sign in when accessing Schema Service.

If you have connected successfully, the tables and other objects from Schema Service display under Cloud Connections.



Set Up Secure FTP Account

The Secure FTP user password must be reset before you can deploy a data upload. To reset the Secure FTP user password, sign in to your account, navigate to the User Management page, find the SFTP user name, and reset the password.



 Sign in to your account. See Sign In To Your Account. The Infrastructure Console displays.



O Important Notifications Important)ashboard 🐵			0=0		Identity Domain
ctive Services Database Schema	O Important Notifications View Notifications	Create Instance	Manage Account	Database Schema or 3 Number of 35 Remaining	Database Schema of 3 Number of S20 Remaining	Database Schema of 3 Number of S50 Remaining
60 60 60 60 0 10 12 14 16 Number of S70 diabase instances Number of S8 diabase. Number of S8 diabase.						
	ctive Services Database Schema	Instances				

2. Open the navigation menu. Under Account Management, click Users.

The User Management page appears.

3. Click SFTP Users.

The list of SFTP Users appears.

4. Locate the Secure FTP user and click the **Menu** icon to the right.

Security Data Center. US Commercial 1 (Time zone: PST) Identity Domain:		
Users SFTP Users Roles Custom Roles Identity Self Service		
	Search	0
Email: User Name:	2	Ξ
Email User Name		≣ Reset Password
Page 1 (1-2 items) H 4 1 >		

5. Select Reset Password.

The Reset Password dialog appears.

Reset Password	×
* New Password * Confirm New Password	
	Save Cancel

6. Enter a new password, confirm the new password and click **Save**.

The Reset Password confirmation message displays.

7. To confirm change, click **Save**.



Create and Deploy a Cart of Objects

Use Oracle SQL Developer to create a cart of objects and deploy the cart to a destination database.



To create and deploy a cart of objects to Schema Service:

1. From Oracle SQL Developer, click **View**.

The View drop down menu displays.



🔒 Oracle	SQL Developer	
<u>F</u> ile <u>E</u> dit	<u>⊻iew</u> <u>N</u> avigate <u>R</u> un Versi <u>o</u> ning	<u>T</u> ools <u>H</u> elp
🔮 🗁 🗐 🤅	Data Modeler 🔹 🕨	<mark>8.</mark> ▼
Connectio	●■ Breakpoints Ctrl+Shift-R ■ Component Palette Ctrl+Shift-P Debugger ▶ Log Ctrl+Shift-L	
Cloud Con	▶ Run <u>M</u> anager ? Stat <u>u</u> s <u>T</u> eam ▶	racl
⊞€ 10000 17 17 17 17 17 17 17 17 17 17 17 17 17	APEX Listener Cart Cart Cart Cande Management	
⊕	Image: Connections Image: DBA	
⊕ <mark>}</mark> Tr ⊕ } Ts ⊕ 1 Se	Data Miner	
	 Ind DB Object Map ⊻iew Migration Projects 	
	OWA Output Output Recent Objects	
	Reports SQL History F8 Spinnetn	
	Tas <u>k</u> Progress	Release Note:
	✓ <u>S</u> how Status Bar Sho <u>w</u> Toolbars	x Elapsed Sc

2. From the drop down menu, click **Cart**.

The Cart window appears on the bottom right.



'∰Cart ×									-
- 5 🖻									
Selected Obj	ects						4	×	
🗌 Include	Туре	Owner	Name	DDL	Data	Where	Connection	•	$\overline{\mathbf{Q}}$
									ŵ
									Ð
									⊉
<								>	
Before S	cript: C:\Doc	uments and Sett	ings\				Sele	ct	
After Scr	ipt: C:\Doc	uments and Sett	ings\				Sele	ct	

3. From the left panel, drag the Oracle Database objects you want to load and drop them in to the Cart window on the right.

Oracle SQL Developer		
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>N</u> avigate <u>R</u> un V	ersi <u>o</u> ning <u>T</u> ools <u>H</u> elp	
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Connections × Re × _	 ✓ ∰Cart × 	-
	a 🛪 🔁 🗖	
APEX\$_WS_TAC	Selected Objects	×
B ··· ■ APEX\$_WS_WE	Include Type Owner Name	DDL Data Where
		4
		⊉
Uiews	<	> >
	Before Script: C:\Documents and Settings\	Select
Packages	After Script: C:\Documents and Settings	Select
Table DRUE.ENGINEER@Local XE DB		Editing

- 4. If you want to include data with the cart deployment, in the Cart window, click the **Data** check box.
- 5. To deploy this cart, click the **Deploy Cloud** icon at the top left of the Cart window.

∰Cart ×								G
S 2								
d Deploy C	Cloud						9	
					_		4	<u> </u>
🖌 Include	Туре	Owner	Name	🗹 DDL	🛃 Data	Where	Connection	-
	TABLE	CALLE	ENGINEER		V		Local XE DB	

The Deploy Objects To Cloud dialog displays.

6. For the Deploy Objects To Cloud dialog, make these changes: Under Cloud:



These options supply information required to connect to the Secure FTP server.

- Connection Select the cloud connection for the Schema Service you are deploying to.
- Title Enter a title for this deployment. The title is restricted to 15 characters long and alphanumeric characters (a-z, A-Z, 0-9), _ (underscore) and (dash). No special characters, such as spaces, are allowed.
- Server Enter the Secure FTP URL from the Welcome to Oracle Cloud email.
- Port Leave as default of 22.
- SFTP User Enter the Secure FTP username. See Setting Up Secure FTP Account.
- SFTP Password Enter the Secure FTP user's password. See Setting Up Secure FTP Account.

Under Transfer:

This option specifies the cart that is deployed.

• File - Enter or browse for the file you want to deploy. This file is a zip file generated by SQL Developer and contains all objects and optionally data included in the cart.

Under Deploy DDL:

These options determine if the DDL will replace existing objects.

- Do not replace existing destination objects Creates objects in the destination schema only if objects do not already exist.
- Replace existing destination objects Drops existing objects in destination schema if they already exist then creates and optionally loads them.

Under Deploy Data:

These options determine how the data is deployed to the destination Schema Service.

- Truncate destination data Select this option to truncate existing tables before adding rows.
- Disable constraints before moving data Select this option to disable all constraints before moving the data. Re-enables the constraints after the data has been moved.
- Delimiter Leave as the default.
- Line Terminator Leave as the default.
- Left Enclosure Leave as the default.
- Right Enclosure Leave as the default.



B [) eploy (Objects To Cloud	×
	Iloud		
⊆	onnection:	CloudConnectionTrialaeqz 🕶	
I	itle:	example	
S	erver	skc00gkr.us.orade.com	
P	ort	22	
<u>5</u>	FTP User:	trial020	
SI	FT <u>P</u> Password	1: ••••••	
T	ransfer —		
E	ile: C:\Docur	ments and Settings:\deploy.zip Browse	
	eploy DDL —		
0) Do not repl	ace existing destination objects	
) Replace exi	isting destination objects	
	Variation Data		
	Truncate de	estination data	
	 ∕ Disable con	straints before moving data	
Ē	ormat:	loader 💌	
D	elimiter:	Line Terminator: environment default	•
Le	eft Enclos <u>u</u> re:	: " The Right Enclosure: "	
	Help	Apply Cancel	

7. Click Apply.

The Exporting dialog displays.



Check Deployment Status

Use Oracle SQL Developer to determine deployment status.

To check on deployment status:

- 1. From Oracle SQL Developer, under Cloud Connections, open a cloud connection.
- 2. Under the open cloud connection on left panel, click **Deployments**. The list of deployments displays.
- 3. Under Deployments, click a deployment.

The deployment DETAILS tab displays at the top right.

Test-Deploy-		
DETAILS LOGS		
📌 🚱		^
Name	Value	
id	283	
import_name	Test-Deploy-08_09_12-12_28_59	
file_name	deploy3.zip	
file_type	DEPLOY	
file_size_kb	2747	
status	APPROVED	
requested_by		
requested_on	2012-08-09T04:28:59Z	
updated_by		
updated_on	2012-08-09T04:28:59Z	
import_schema		
service_name	http://	
<		> Ň

- 4. The status value on the DETAILS page indicates the progress of the deployment.
 - APPROVED The deployment passed a virus scan and is waiting for processing.
 - PROCESSING A background daemon process that is scheduled to run periodically, found the APPROVED deployment, changed the status to PROCESSING and started the SQL*loader jobs.
 - **PROCESSED** The deployment completed successfully.
 - **DENIED** The deployment is not approved.
- 5. To view deployment results, click **LOGS**.

The LOGS tab displays.

DETAILS LOGS					
📌 🚯					
ID	FILE_ID	ACTIVITY	SUB_FILE_NAME	DETAILS	IMPORT_SCHEMA
644	284	Processing	DROP.sql	table "DEPT" dropped. table "EMP" dropped. table "LOCATIONS" dropped.	EBMCM2HELA1A
645	284	Processing	DEPT.sql	table "DEPT" created.	EBMCM2HELA1A
646	284	Processing	EMP.sql	table "EMP" created.	EBMCM2HELA1A
647	284	Processing	LOCATIONS.sql	table "LOCATIONS" created.	EBMCM2HELA1A
648	284	Processing	TRUNCATE.sql	table "DEPT" truncated. table "EMP" truncated. table "LOCATIONS" truncated.	EBMCM2HELA1A
649	284	Processing	DEPT_DATA_TAB	. SQL*Loader: Release 11.2.0.3.0 - Production on Wed Aug 8 20:35:03 2012	EBMCM2HELA1A



6. To see the latest uploaded tables, on the Connections panel, click the **Refresh** icon.



Note:

If the Refresh button is not available, the cloud connection is not connected.

 From the Oracle SQL Workshop Object browser for your Schema Service, view the progress of the data upload and verify that objects and optionally data has uploaded correctly.

Oracle SQL Developer for Data Loading in to the Schema Service uses the database utility SQL*Loader to perform the data load. To find out more about restrictions on data loading, see *Oracle Database Utilities*.

Restart a Deployment

Use Oracle SQL Developer to restart deployments of data exports.

To restart a deployment:

- 1. From Oracle SQL Developer, click Cloud Connections.
- 2. Click the cloud connection.
- 3. Click **Deployments**.

The list of deployments displays.

4. Right click the deployment.

Menu options appear.





- 5. From the menu options, select **Restart**.
- 6. Follow on-screen instructions.

Remove a Deployment

Remove a deployment from Oracle SQL Developer.

To remove a deployment:

- 1. From Oracle SQL Developer, click **Cloud Connections**.
- 2. Click the cloud connection.
- 3. Click **Deployments**.

The list of deployments displays.

4. Right click the deployment.

Menu options appear.



- 5. From the menu options, select **Delete**.
- 6. Follow on-screen instructions.

Clear Logs

Use Oracle SQL Developer to clear deployment logs.

To clear the log for a deployment:

1. From Oracle SQL Developer, click **Cloud Connections**.



- 2. Click the cloud connection.
- 3. Click Deployments.

The list of deployments displays.

 Right click the deployment. Menu options appear.



- 5. From the menu options, select **Clear Logs**.
- 6. Follow on-screen instructions.

Create Additional Users for Oracle SQL Developer Cloud Connections

Oracle SQL Developer users can also be added through Oracle Application Express.

To add an Oracle Application Express user:

1. Access Oracle Database Cloud Schema Service. See Accessing an Oracle Database Cloud Schema Service.

The Oracle Application Express home page appears.

- From the Oracle Application Express home page, click the Administration menu. The Administration Menu displays.
- 3. Select Administration.

The Administration home page displays.



4. Click Manage Users and Groups.

The Manage Users and Groups page appears.

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	-	-	-	Andrea Sant Trape	-	
					100	References and the second of the second seco

5. Click Create User.

The Create User page appears.

6. Enter user information. See Managing Users in a Workspace in Oracle Application Express Administration Guide.



- 7. Under Password, for Require Change of Password on First User select No.
- 8. Under User Groups (For authentication against Application Express user account repository only), select at least **SQL Developer**.
- 9. Click Create User.

Use Oracle Application Express SQL Workshop Data Upload Utility

The Data Upload utility enables you to upload data from a text file, an XML document or a spreadsheet. The utility is accessed from the Oracle Application Express SQL Workshop.

Note:

Files uploaded with Oracle Application Express SQL Workshop must not exceed 100MB. For files larger than 100MB, please use Oracle SQL Developer. See Using SQL Developer for Data Loading.

To upload data using the Data Upload utility:

1. Access Oracle Database Cloud Schema Service. See Accessing Oracle Database Cloud Schema Service.

The Oracle Application Express home page displays.

- 2. Click SQL Workshop.
- 3. Click Utilities.
- 4. Click Data Workshop.
- 5. Click one of the following types of data:
 - Text Data
 - XML Data
 - Spreadsheet Data
- 6. Follow on-screen instructions.

To learn more about uploading data with the Data Upload utility, see Using Data Workshop in *Oracle Application Express SQL Workshop Guide*.



Upload Data with SQL Scripts

The SQL Scripts functionality allows you to create, upload, and run SQL scripts that insert data into the database. You could use an SQL script to load data into your Oracle Database Cloud Schema Service.

Note:

Files uploaded with Oracle Application Express SQL Workshop must not exceed 100MB. For files larger than 100MB, please use Oracle SQL Developer. See Using SQL Developer for Data Loading.

These operations are accessed from the Oracle Application Express SQL Workshop.

To insert data using SQL Scripts:

- 1. Launch the Schema Service. See Accessing an Oracle Database Cloud Schema Service.
- 2. Click SQL Workshop.
- 3. Click SQL Scripts.
- 4. Create or upload an SQL script.

To learn more, see Creating a SQL Script in the Oracle Application Express SQL Workshop Guide.

5. Click the Run icon for the SQL script you want to execute.

To learn more about running SQL scripts, see Executing a SQL Script in Oracle Application Express SQL Workshop Guide.

To learn more about using SQL scripts to load data, see Using SQL Scripts in *Oracle Application Express SQL Workshop Guide*.

Use Oracle Application Express Application Data Load Utility

Applications with data loading capability allow application end users to dynamically import data in to a table within any schema to which the user has access. End users run a Data Load Wizard that uploads data from a file or copies and pastes data entered by the end user directly in to the wizard.

To learn more about developing Oracle Application Express applications with this capability, see Creating a Data Load Wizard in *Oracle Application Express Application Builder User's Guide*.

To learn more about how an application end user uses this capability, see Data Loading Wizard Examples in *Oracle Application Express End User Guide*.

Manage Data

The Oracle Application Express SQL Workshop Object Browser enables developers to browse, create, and edit objects in a database. Oracle Application Express has many



views defined to help you work with the underlying table structures. The views combine multiple base tables and use meaningful column names to minimize complexity and to be more intuitive to use.

See Oracle Application Express API Reference for details of the views defined.

To manage data using Object Browser:

1. Access the Service Console for your Schema Service. See Access the Service Console.

N	otor
IN	ole:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, then click Develop.
- 3. Click SQL Workshop.
- 4. Click Object Browser.
- 5. Browse, create, edit and delete database objects.

To learn more, see Managing Database Objects with Object Browser in Oracle Application Express SQL Workshop Guide.

Export Your Database Schema

Your Oracle Database Cloud Schema Service provides you with different options to export your database schema quickly and easily to either a secure FTP or a cloud storage.

Topics:

- Export to Secure FTP
- Export to Cloud Storage

Export to Secure FTP

The Manage options from the Oracle Database Cloud Schema Service service console allow you to easily export and download your database schema using secure file transfer protocol.

To export to secure FTP:

1. Go to the Service Console for your Schema Service instance. See Access the Service Console.

The Service Console page displays.

2. Click the Manage tile.

The service console manage options display.





3. Click Export to Secure FTP.

The Export to Secure FTP page displays.

Note:
The Schema Service accepts a maximum of 10 data export requests. If you want to create a data export request and you have already reached the maximum, you must delete an old request or wait 2 days for the data export to expire and be purged.

4. To initiate a new export, click **Create Export**.

The Export dialog displays.

Export		×
What would you like to include in your data export? Include Data Structures Include Data		
	Cancel	Export

- 5. To include data with the data structures, select **Include Data**.
- 6. Click Export.

An Export request is initiated. Wait until the export status has changed to Available before initiating a download of the data export file.

Note:

Legacy customers who purchased the Schema Service before August 2017 will see the Export option from the Service Details page. See Create an Oracle Data Pump Export.

After the status changes to **Available**, the export files are available for two days and downloadable from your secure FTP download area in the download directory.

Create an Oracle Data Pump Export

Use the Service Details page to create a data export file and then go to Export Data to initiate a download of the data export file.

NOT_SUPPORTED:

This section is applicable only for the legacy customers who purchased the Schema Service before August 2017.

To create an Oracle Data Pump export of your data, code and data structure:

1. Go to the Service Details page for the Schema Service you want to export. See Access Service Details.

The Service Detail page displays.

2. Click Export Data tab.

The Export Data page displays.

3. Click the Export Data button.

The Data Export dialog for your service displays.

4. To include data with the data structures, select **Include Data**.

Data Export for databasetrial7967-use	oracletrial62549 ×
Please select what you would like to include in	your data export:
Include Data Structures	
Include Data	
	Create Data Export Cancel





5. Click Create Data Export.

The Data Export page displays and lists the requested data export job.

Export	3	
	acal.dmp Status: Requested Type: EXPORT Size: 0 KB	
	acak.dmp Status: Requested Type: EXPORT Size: 0 KB	

6. Wait until the export status has changed to Available before initiating a download of the data export file. See Download a Data Export for further instructions.



Download a Data Export

After creating a data export file, and the status of the data export file has changed to available, you can download the file.

See Create an Oracle Data Pump Export.

NOT_SUPPORTED:

This section is applicable only for the legacy customers who purchased the Schema Service before August 2017.

To download a data export:



1. Go to the Service Details for the Schema Service that has the data export file you want to download. See Access Service Details.

The Service Detail page displays.

 Under Exports, click Export Data link and make a note of the SFTP host, port and user name.

Note:

Your SFTP account password must have been reset at least once since the service was activated. See Set Up Secure FTP Account



The Domain SFTP user will not see the data export files.

- 3. Make sure you have some SFTP client software installed and setup to use for the download.
- 4. For your SFTP client software, create a new connection or SFTP site. You need the host name, username and password. When using FileZilla, enter information then click **Connect**.

The following screenshot shows using FileZilla Site Manager to do this.

Site Manager	×
Select Entry:	General Advanced Transfer Settings Charset Host: Port: Port: Protocol: SFTP - SSH File Transfer Protocol
	Logon Type: Normal ▼ User: trial@12 Password: ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●
New Site New Eolde New Bookmark Rename Delete Copy	
	Connect <u>Q</u> K Cancel

- 5. Once connected, you see two folders:
 - upload this folder is where the SQL Developer Cloud Deployments arrive
 - download this folder is where the Data Exports are delivered



E sic00gic us oracle com - shp://triai812@sic00gic us oracle com - File	eZilla		X
File Edit View Transfer Server Bookmarks Help			
🎯 - 📰 🖫 🖓 😰 🔍 🕸 🗱 🖶 🖽 🚥 🛝			
Status: Calculating timezone offset of server Command: mtime "upload" Response: 134472380			
Status: Timezone offsets: Server: 0 seconds. Local: -25200 se Status: Directory listing successful	econds. Difference: -25200 seconds.		1 1 1
Local site: C:\Users\Public\Downloads\	Remote site: /		•
Desktop Desktop Desktop Downloads Libraries Music Music Desktop	⊞- № /		
Filename Filesize Filetype Last modified	Filename Filesize	Filetype Last modified	Permissi Owner/Group
	↓ ↓ download ↓ E_1 ↓ upload	File folder 7/6/2012 2:36:00 PM File folder 7/6/2012 2:36:00 PM File folder 8/8/2012 5:33:00 PM	drwxr-xr-x sftpadm sftpadm Inwxrwxr trial812 cloudsftp drwxrwx trial812 cloudsftp
۲ III ا			

- 6. Double click the **download** folder.
- 7. Select the file in the folder to download.

File Edit View Transfer Server Bookmarks Hel	p			
Image: Constraint of the second se	: 00 N			- [1] -
Local site: C:\Users\Public\Downloads\ Local site: C:\Users\Public\Downloads\ Dosktop Documents Downloads Favorites	Remote site: /dov . / . 2 E_1 . 2 uploa	nload oad		
Filename Filesize Filetype Last mo	Filename	zip 1,851 Compres 2.093.056 DMP File	Last modified 7/16/2012 12:42:00 PM 7/27/2012 10:30:00 AM	-rw-r
	aac3.log aac5.dmp aac5.log	Download Add files to queue View/Edit	27/2012 10:30:00 AM 27/2012 11:20:00 AM 27/2012 11:20:00 AM	-rw-r -rw-r -rw-r
	LOG_deploy. LOG_deploy2	Create directory Refresh	5/2012 3:30:00 PM B/2012 5:30:00 PM B/2012 5:35:00 PM	-rw-r -rw-r -rw-r
	aae0.dmp	Delete Rename	4/2012 3:06:00 PM	-rw-r
4 III >>				

Export to Cloud Storage

The Manage options from the Oracle Database Cloud Schema Service service console allow you to easily export and download your database schema to an Oracle cloud storage container.

For more information about Oracle Storage Cloud Service, see Oracle Storage Cloud Service in Oracle Help Center.



Note:

All the legacy customers who subscribed to Schema Service prior to August 2017 will not have this option. However, they can still continue exporting their schema using Secure FTP.

To export to an Oracle cloud storage container:

1. Go to the Service Console for your Schema Service instance. See Access the Service Console.

The Service Console page displays.

2. Click the Manage tile.

The service console manage options display.

ි Home	Service Instance: demo	
Contraction Contractic	Manage	
5 Manage		
	Management	
	Export to Secure FTP Export your database schema and download from secure FTP	Export to Cloud Storage Export your database schema to an Oracle Storage Cloud Service container
	Application Express	
	App Archiving Archive your apps to tables in your database for easy migration	

3. Click Export to Cloud Storage.

The Export to Cloud Storage page displays. If you have already initiated any exports earlier, a list of all the previous exports initiated earlier is displayed on this page.

4. To initiate a new export, click **Create Export**.

The Create Export dialog appears.



Create Export		×
(i) Enter your Oracle Storage Cloud Service details. The information about Oracle Storage Cloud Service, see	export operation may take some time to complete. For mor documentation.	e
Cloud Storage Container *		
Witjes://foo.storage.oradectoud.com/v1/Storage-myldentity/SchemaDemo		
Create new container if it does not already	exist	
Cloud Storage User Name * storagetyr2 scholare1.1m 50.Hildere@oracle.a ⑦	Cloud Storage Password *	0
Cloud Storage User Name * storageove? scholare1.1am 50.Hildere@oracles. @ Export File Name *	Cloud Storage Password *	0
Cloud Storage User Name * storagetyre2 scholare1.7km 52.Httoam@oradie.a Export File Name * demo_20170925044540	Cloud Storage Password *	0
Cloud Storage User Name * storagetive2 stolate1.71m.52 Hilderel@oracle. Export File Name * demo_20170925044540 Include Data Structures	Cloud Storage Password *	0

- 5. Provide the following details, and click Create Export.
 - Cloud Storage Container
 - Enter your Cloud storage container url.

Enter your Cloud storage container url.

💙 Tip:

You can find this url on the Infrastructure Console of your Oracle Storage Cloud Service account. For example, https:// foo.storage.oraclecloud.com/vl/Storage-myIdentity/ ContainerName, where foo refers to the Oracle Cloud Identity Domain of the storage service instance.

- Create new container if it does not already exist

The schema exports are placed in a folder called ContainerName that is provided at the end of the example URL. Ensure that the **Create new container if it does not already exist** check-box is selected, if you want to create the container in case it doesn't already exist.

- Cloud Storage User Name

Enter the user name that you use to sign in to your cloud storage service account.

Tip:

Format to be used is Storage-myIdentity:user@example.com



- Export File Name
 - Select this check-box to include the data also in your export file.

Your export gets initiated and it takes few minutes to complete the process. Wait until the export status has changed to Available before downloading it from the Oracle cloud storage.

Note:

You can cancel an export by clicking the **Cancel Export** button next to the recent schema export in the list of exports.

Manage Oracle Application Express Database Applications

Database applications are managed with the Oracle Application Express Application Builder. The Oracle Application Express Application Builder enables you to create, edit and remove applications.

Topics:

- Create a Database Application
- Modify a Database Application
- Remove a Database Application

Create a Database Application

The Create Wizard enables you to create a complete application containing multiple pages including reports, interactive reports, forms, tabular forms, and master detail forms. The Create Application Wizard is designed to easily and quickly create Oracle Application Express Database applications.

Follow these steps to create a Database application:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console displays.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, then click **Develop**.
- 3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

4. Click Create.

The first page of the Create Application wizard displays.



- 5. Select Desktop, or Mobile and click Next.
- 6. Follow on-screen instructions.

To learn more about creating Database applications, see Creating a Database Application in *Oracle Application Express Application Builder User's Guide*.

To learn about using Database applications, see the Oracle Application Express End User Guide.

Modify a Database Application

Using Oracle Application Express, you can modify an existing application.

To modify a Database application:

1. Access the Service Console for your Schema Service. See Access the Service Console.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, then click **Develop**.
- 3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

4. Click the Database application you want to modify.

The Application Edit page appears.

5. Make modifications.

To learn more about modifying Database applications, see Creating Database Applications in *Oracle Application Express Application Builder User's Guide*.

To learn about using Database applications, see *Oracle Application Express End User Guide*.

Remove a Database Application

Use Oracle Application Express to remove a Database application.

To remove a Database application:

1. Access the Service Console for your Schema Service. See Access the Service Console.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.



- 2. If the Service Console includes the Develop icon, then click Develop.
- 3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

4. Click the Database application you want to remove.

The Application Edit page displays.

- 5. Under Tasks on the right panel, click Delete this Application.
- 6. Follow on-screen instructions.

To learn more about removing Database applications, see Deleting an Application in *Oracle Application Express Application Builder User's Guide*.

To learn about using Database applications, see *Oracle Application Express End User Guide*.

Manage Oracle Application Express Websheet Applications

Websheet applications are created from the Oracle Application Express Application Builder. Websheets are applications designed to be created and modified by business users, with no knowledge of SQL necessary. A Websheet is like a wiki, except that Websheets can be driven by data included in the application.

These applications are highly dynamic and defined by their users. Websheet applications include navigation controls, search capabilities, and the ability to add annotations such as files, notes, and tags. Websheet applications can be secured using access control lists and several built-in authentication models.

Topics:

- Create Websheet Database Objects
- Create a Websheet Application
- Modify a Websheet Application
- Remove a Websheet Application

Create Websheet Database Objects

Before creating a Websheet application, required database objects must be created. This section describes how to create the required objects.

To create required Websheet database objects:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.



- 2. If the Service Console includes the Develop icon:
 - a. Click Develop.
 - b. Click App Builder.

The Oracle Application Express Builder home page displays.

3. Click Administration icon at top right.

The Administration menu displays.

4. Click Administration.

The Administration home page appears.

5. Under Tasks on the right panel, click Websheet Database Objects.

The Websheet Database Objects page appears.

6. Click Create Websheet Database Objects.

The required schemas and objects display.

7. Follow on-screen instructions.

To learn more, see Removing and Validating Websheet Database Objects in Oracle Application Express Administration Guide.

Create a Websheet Application

Before creating a Websheet, required Websheet database objects must exist.

To create a Websheet application:

1. Access the Service Console for your Schema Service. See Access the Service Console.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, then click **Develop**.
- 3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

4. Click Create.

This first page of the Create Application wizard displays.

5. Select Websheet.

The Create Websheet page appears.

6. Click Create Websheet.

The Websheet Created page appears.

7. To test the Websheet, click **Run Websheet**.



To learn more about creating Websheet applications, see Create Websheet Database Objects.

To learn more about creating and modifying Websheet applications, see Creating a Websheet Application in *Oracle Application Express Application Builder User's Guide*.

To learn about using Websheet applications, see Using Websheets in Oracle *Application Express End User Guide*.

Modify a Websheet Application

You can use Oracle Application Express to modify an existing Websheet application.

To modify a Websheet application:

1. Access the Service Console for your Schema Service. See Access the Service Console.



If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, then click **Develop**.
- 3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

4. Click the websheet you want to modify.

The Websheet Properties page appears.

5. Make modifications.

To learn more about creating and modifying Websheet applications, see Creating a Websheet Application in Oracle Application Express Application Builder User's Guide.

To learn about using Websheet applications, see Using Websheets in Oracle *Application Express End User Guide*.

Remove a Websheet Application

Use Oracle Application Express to remove Websheet applications from your Oracle Database Cloud Schema Service.

To remove a Websheet application:

1. Access the Service Console for your Schema Service. See Access the Service Console.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.



- 2. If the Service Console includes the Develop icon, then click Develop.
- 3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

4. Click the websheet you want to remove.

The Websheet Properties page appears.

5. Click Delete.

The Confirm Delete page appears.

6. Click Permanently Delete Now.

To learn more about creating and modifying Websheet applications, see Deleting a Websheet Application in Oracle Application Express Application Builder User's Guide.

To learn about using Websheet applications, see Using Websheets in Oracle *Application Express End User Guide*.

Provide Access to Applications

Once an application has been created or installed to an Oracle Database Cloud Schema Service instance, end users with the appropriate authorization and authentication credentials can access it using a Web browser. The application administrator simply provides the end users with the application's URL.

The following URL shows the URL an application end user would use to access an Application Express application 100082 residing within Schema Service with an identity domain of mycompany:

https://database-mycompany.db.us2.oraclecloudapps.com/f?p=100082

The Schema Service does not support accessing Application Express applications and REST services using custom domain names or vanity URLs. If this capability is required, please consider upgrading to Oracle Database Exadata Express Cloud Service. See Upgrade to Exadata Express Cloud Service on the Schema Service Help Center.

To learn more about using Application Express applications, see Oracle Application Express End User Guide.

Monitor Oracle Application Express Application Activity

You can monitor developer activity and changes to Oracle Application Express applications within your service by accessing the Monitor Activity page in the Oracle Application Express Builder. The Monitor Activity page features links to over thirty reports that track page views, developer activity, active sessions, login attempts, environment, application errors, and workspace schemas.

To access the Monitor Activity page:

1. Access the Service Console for your Schema Service. See Access the Service Console.



Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

2. If the Service Console includes the Develop icon, then click **Develop**. Otherwise, skip this step.

3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

- From the Application Express Builder, click Administration icon and on top right. The Administration menu displays.
- 5. Select Administration .

The Administration home page displays.

- 6. From the Application Express Builder, click **Administration** icon and on top right. The Administration home page displays.
- 7. Click Monitor Activity.

The Monitor Activity page appears.



To learn more, see Monitoring Activity Within a Workspace in *Oracle Application Express Administration Guide*.

Manage Oracle Application Express Packaged Apps and Sample Code

You can install Oracle Application Express Packaged Apps and sample code.

- **Packaged Apps**. These are applications that can be installed, run, locked, unlocked and removed. They are fully supported by Oracle. You can add users, manage user access, and make changes that meet your needs.
- **Sample Code**. These are samples that illustrate a concept or demonstrate a technique. They can be installed, run, removed, viewed and modified.

Topics:

- Install Packaged Apps and Sample Code
- Lock and Unlock Packaged Apps
- Modify Packaged Apps and Sample Code
- Remove Packaged Apps and Sample Code



Install Packaged Apps and Sample Code

The Oracle Application Express Application Builder, which is available with Oracle Database Cloud Schema Service, allows you to quickly install and run a variety of built-in business process applications called Packaged Apps.

Tutorial – Installing and Running a Packaged Application in Oracle Application Express

Follow these steps to install Packaged Apps or sample code:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

2. If the Service Console includes the Develop icon, click **Develop**. Otherwise skip this step.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

3. Click Packaged Apps.

The Packaged Apps home page appears.

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4. Locate and click the Packaged App or sample code you want to install.

The application information page displays.

- 5. Click Install Application.
- 6. For Authentication, select one of the following and click **Next**:
 - Oracle Cloud Identity Management (default) Users of this packaged application are managed through the Identity Console. See Adding Users and Assigning Roles in *Getting Started with Oracle Cloud*.
 - Application Express Accounts Users of this packaged application are managed from the Application Express Administration. See Managing Users in a Workspace in Oracle Application Express Administration Guide.
- 7. On the confirmation page, click Install Application.
- 8. If you selected Application Express authentication, you need to add users from Oracle Application Express Administration before running the application. See Managing Users in a Workspace in *Oracle Application Express Administration Guide*.



- 9. If you selected Oracle Cloud Identity Management, the users currently authorized with access to your service have access to this application. Use the Oracle Cloud portal to add users. See Adding Users and Assigning Roles in *Getting Started with Oracle Cloud*.
- 10. Click Run Application icon 🕑

Lock and Unlock Packaged Apps

Packaged Apps can be locked and unlocked. When locked, Packaged Apps cannot be modified.

To lock or unlock a Packaged App:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

2. If the Service Console includes the Develop icon, click Develop.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

3. Click Packaged Apps.

The Packaged Apps home page appears.

4. Locate and click the Packaged App you want to unlock or lock.

The application information page displays.

5. Click Manage.

The Manager page displays.

6. Click Unlock to allow modifications, or Lock to not allow modifications.

Modify Packaged Apps and Sample Code

You can modify sample code and unlocked Packaged Apps just like any other Database or Websheet application you have created or imported. Packaged Apps must be unlocked before they can be modified.

See Modify a Database Application and Modify a Websheet Application.

Note:

Installed sample code can be modified. Installed packaged applications cannot be modified.



Remove Packaged Apps and Sample Code

Packaged Apps and sample code can be removed from your Oracle Database Cloud Schema Service using Oracle Application Express.

Follow these steps to remove a Packaged Apps and sample code:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

2. If the Service Console includes the Develop icon, click **Develop**.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

3. Click App Builder.

The Oracle Application Express Application Builder home page displays.

- Locate and click the Packaged App or sample code you want to remove. The application information page displays.
- 5. Click Manage.

The Manager page displays.

- 6. Click Remove.
- 7. To confirm, click Remove Application.

Manage Oracle Application Express Application End Users

Service administrators add and manage users of Oracle Application Express applications from the Oracle Identity Console or Oracle Application Express Administration. During application creation or installation, the method for managing users is defined.

- **Oracle Identity Console** (default). Use the Oracle Identity Console to add and manage application users if Oracle Identity Console is the application's authentication method selected during installation or creation. To learn more, see Adding Users and Assigning Roles in *Getting Started with Oracle Cloud*.
- Oracle Application Express Administration. Use the Manage Users and Groups page of the Oracle Application Express Administration to add and manage application end users if Oracle Application Express is the application's authentication method selected during installation or creation.

To manage Oracle Application Express users:

1. Access the Service Console for your Schema Service. See Access the Service Console.


Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, perform these sub steps. Otherwise skip this step.
 - a. Click Develop.
 - b. Click App Builder.
- 3. From the Oracle Application Express, click the **Administration** menu *at* the top right.

The Administration menu displays.

4. Select Administration.

The Administration home page displays.



5. Click Manage Users and Groups.

The Manage Users and Groups page appears.



To learn more, see Managing Users in a Workspace in *Oracle Application Express Administration Guide*.

Manage Application Security

Below are some topics that describe how to implement security best practices for Oracle Application Express and Oracle Database Cloud Schema Service. Administrators are primarily responsible for ensuring the security of the Oracle Application Express setup, while developers are responsible for building secure applications.

Tutorial – Adding Security to your Database Application Using Oracle Application Express

See the following topics in *Oracle Application Express Application Builder User's Guide*:

- Managing Application Security
- Understanding Administrator Security Best Practices
- Understanding Developer Security Best Practices



- Establishing User Identity through Authentication
- Providing Security through Authorization

Use Oracle Application Express Applications and Websheets

Once an application has been created or installed to an Oracle Database Cloud Schema Service instance, end users with the appropriate authorization and authentication credentials can access it using a Web browser. The application administrator simply provides the end users with the application's URL.

The following URL shows the URL an application end user would use to access an Oracle Application Express application 100082 residing within Schema Service with an identity domain of trialaejm:

database-trialaejm.cloud.oracle.com/apex/f?p=100082

To learn more about using Database and Websheet applications, see Oracle Application Express End User's Guide.

Send Emails

You can use the APEX_MAIL package to send an email from an Oracle Application Express application. APEX_MAIL contains three procedures for sending, delivering and adding attachments to emails.

Use APEX_MAIL.SEND to send an outbound email message from your application. Use APEX_MAIL.PUSH_QUEUE to deliver mail messages stored in APEX_MAIL_QUEUE. Use APEX_MAIL.ADD_ATTACHMENT to send an outbound email message from your application as an attachment.

Example:



To learn more, see APEX_MAIL in Oracle Application Express API Reference.



Schedule Background and Asynchronous Jobs

Background jobs are scheduled by using the CLOUD_SCHEDULER package. Since the Oracle Database Cloud Schema Service is a true multi-tenant environment, some aspects of the Oracle Database must be restricted to protect the integrity of both the data and the performance characteristics of Schema Service.

Schema Service cannot be allowed to have unlimited access to the creation and execution of jobs, as this would allow a single service, either by accident or due to malicious intent, to overrun the underlying hardware resources. To address this situation, Schema Service includes an interface which allows the limited use of database jobs.

This interface has the following characteristics:

- Users are allowed to submit jobs for immediate execution in the current database session or as scheduled tasks.
- Users are limited to the number of immediate and scheduled jobs. These limits are public. There is a limit of 10 background jobs and 5 active jobs.
- When a user submits a job, the interface checks to see if the limit for the number of jobs (of the type of the submitted job) has been reached. If the limit has been reached, the call to the interface returns an error.
- All jobs use a set of Resource Manager consumer groups of different priorities. If a job forces a consumer group to exceed the resource limits of its consumer group, the job is moved to a consumer group with a lower priority.
- Users are able to use the standard USER_SCHEDULER_% views to determine the status and number of jobs submitted, so they can prevent the return of an error from the submission process and take appropriate corrective actions.

Note:

There is a limit of 10 scheduled or defined background jobs and 5 active or running jobs.

The CLOUD_SCHEDULER package is a wrapper that exactly mirrors the DBMS_SCHEDULER package. The only difference between the packages is the CLOUD_SCHEDULER includes a simple procedure for running an immediate job in the current database session. The following example illustrates the immediate execution of the My_PLSQL_Procedure job:

```
Begin
CLOUD_SCHEDULER.RUN_JOB( 'My_PLSQL_Procedure' );
End;
/
```

For examples, see Examples of Using the Scheduler in *Oracle Database Administrator's Guide*.



Application Archiving

Modifications to your Oracle Application Express applications can be archived to tables in your database schema. Applications that belong to Oracle Database Cloud Schema Service with automatic archiving enabled are archived when they are created and when they are changed.

The Oracle APEX Application Archive packaged application manually archives applications to view, manage and restore application archives.

Note:

The archived application content is counted against your tablespace quota. By default, only 5 application versions are maintained. However, you can adjust this value from the Oracle APEX Application Archive packaged application. See View and Manage Application Archives.

Topics:

- Schedule Daily Automatic Application Archiving
- Manage and View Application Archives
- Manually Archiving Applications

Schedule Daily Automatic Application Archiving

You can schedule daily automatic archiving for all applications that belong to your Oracle Database Cloud Schema Service. Automatic daily archiving is enabled and disabled from the Service Details page, under Administration. A Schema Service enabled with application archiving generates an archive for applications when they are created and when they are changed.

You can also manually archive from the Oracle APEX Application Archive packaged application. To learn more, see Manually Archiving Applications.

To view and manage archives, use the Oracle APEX Application Archive packaged application. To learn more, see Install the Oracle APEX Application Archive Packaged App and View and Manage Application Archives.

NOT_SUPPORTED:

If you are a legacy customer who purchased the Schema Service before August 2017, please see Schedule Daily Automatic Application Archiving for Legacy Customers.

To schedule automatic application archiving:

1. Go to the Service Console for your Schema Service instance. See Access the Service Console.



The Service Console page displays.

2. Click the Manage tile.

The service console manage options display.

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🛠 Develop	Manage			
🌫 Manage	manage			
	Management			
	Export to Secure FTP Export your database schema and download from secure FTP	Export to Cloud Storage Export your database schema to an Oracle Storage Cloud Service container		
	Application Express			
	App Archiving Archive your apps to tables in your database for easy migration			

3. Click App Archiving.

If application archiving is not yet enabled, the App Archiving dialog displays asking if you want to enable application archiving.

App	Archiving
(j)	Archiving Application Express (APEX) apps to database tables ensures the app metadata will be part of schema export operations. This archiving is incremental - only new and changed apps are added. Note: archives are made available via the APEX Application Archive packaged app.
pp /	Archiving: Disabled

4. Click Enable App Archiving.





Schedule Daily Automatic Application Archiving for Legacy Customers

You can schedule daily automatic archiving for all Application Express applications that belong to your Oracle Database Cloud Schema Service. Automatic daily archiving is enabled and disabled from the Manage page in the service console. A Schema Service enabled with application archiving generates an archive for applications when they are created and when they are changed.

You can also manually archive from the Oracle APEX Application Archive packaged application. To learn more, see Manually Archiving Applications.

To view and manage archives, use the Oracle APEX Application Archive packaged application. To learn more, see Install the Oracle APEX Application Archive Packaged App and View and Manage Application Archives.

NOT_SUPPORTED:

This section is applicable only for the legacy customers who purchased the Schema Service before August 2017.

To schedule automatic application archiving:

1. Navigate to the Service Details for your Schema Service. See Access Service Details.

The Service Details page appears.

2. Under Administration, click Application Archiving.

The Application Archiving page displays.

3. Click Enable Application Archiving.

Note:

The archived application content is counted against your tablespace quota. By default, only 5 application versions are maintained. However, you can adjust this value from the Oracle APEX Application Archive packaged app. See View and Manage Application Archives.

Manage and View Application Archives

The Oracle APEX Application Archive packaged app views and manages archives. Application archives are performed when theOracle Database Cloud Schema Service is enabled for automatic application archiving or when a manual archive is performed.

Topics:

- Install the Oracle APEX Application Archive Packaged App
- Run the Oracle APEX Application Archive App
- View and Manage Application Archives



To learn more, see Schedule Daily Automatic Application Archiving and Manually Archive Applications.

Install the Oracle APEX Application Archive Packaged App

Before you can use the Oracle APEX Application Archive packaged app, it must be installed.

To install the Application Archive packaged application:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

2. If the Service Console includes the Develop icon, click **Develop**. Otherwise, skip this step.



If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

3. Click Packaged Apps.

The Packaged Apps home page appears.

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4. Locate and click the APEX Application Archive app.

The application information page displays.

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	o neeroe				
The APPL	lector i	APEX AL stress transport		VOINE .	

- 5. Click Install Application.
- 6. For Authentication, select one of the following and click Next:
 - Oracle Cloud Identity Management (default) Users of this packaged application are managed through the Identity Console. See Adding Users and Assigning Roles in *Getting Started with Oracle Cloud*.
 - Application Express Accounts Users of this packaged application are managed from the Application Express Administration. See Managing Users in a Workspace in Oracle Application Express Administration Guide.
- 7. On the confirmation page, click Install Application.



- 8. If you selected Application Express authentication, you need to add users from Oracle Application Express Administration before running the application. See Managing Users in a Workspace in *Oracle Application Express Administration Guide*.
- 9. If you selected Oracle Cloud Identity Management, the users currently authorized to have access to your Oracle Database Service have access to this application. Use the Oracle Cloud portal to add users. See Adding Users and Assigning Roles in *Getting Started with Oracle Cloud*.
- To test the application, from the APEX Application Archive app information page, click Run icon

Run the Oracle APEX Application Archive App

The Oracle APEX Application Archive packaged app views and manages application archives. Before you can run this application, it must be installed.

To run the Oracle APEX Application Archive packaged app:

1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 2. If the Service Console includes the Develop icon, click **Develop**. Otherwise skip this step.
- 3. Click App Builder.

The Application Builder home page displays.

4. For APEX Application Archive, click the **Run** icon.

The APEX Application Archive app home page appears.

To learn how to use this application, see Install the Oracle APEX Application Archive Packaged App.

View and Manage Application Archives

The Oracle APEX Application Archive packaged app views and manages application archives. Before you can run this app, it must be installed.

To view and manage application archives:

1. Run the Oracle APEX Application Archive app as described in Run the Oracle APEX Application Archive App.



2. Click the Manage Archives button.

The Archives page displays.

3. To change the maximum number of archives, under Version Retention, click Adjust.

The Adjust Preferences page appears.

- 4. For Max Versions, enter the maximum number of archive versions to save, then click **Apply Changes**.
- 5. To remove archives, under Administration on left panel, click **Purge All Archives**. The Purge page appears.
- 6. For Purge Action, select the action to perform.
- 7. Click Purge Archive(s).

To learn more, see Install the Oracle APEX Application Archive Packaged App.

Manually Archive Applications

You can manually archive applications from the APEX Application Archive packaged app.

For further instructions on how to use this application to create an on-demand archive and schedule archives, click the help icon at the top of the APEX application Archive home page.

To manually archive applications:

- 1. Install the APEX Application Archive packaged app as described in Install the Oracle APEX Application Archive Packaged App.
- 2. Run APEX Application Archive as described in Run the Oracle APEX Application Archive App.

The APEX Application Archive home page appears.

3. Click Archive Applications.

The Create Application Archive wizard appears.

 Follow wizard on-screen instructions for each page to name the archive and select the applications to archive and click Create Archive.

The Archives page displays.

Implement RESTful Web Services

RESTful Web services enable the declarative specification of RESTful services used to access the database. These services work with the Oracle Application Express Listener to enable the consumption of these services.

Tutorial – Creating and Using a RESTful Web Service in Oracle Application Express

To create a RESTful Web service:

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1. Access the Service Console for your Schema Service. See Access the Service Console.

The Service Console appears.

2. If the Service Console includes the Develop icon, click **Develop**. Otherwise skip this step.

Note:

If you purchased the service prior to August 2017, the Service Console is the Oracle Application Express home page and will not include the Develop icon.

- 3. Click SQL Workshop.
- 4. Click **RESTful Services**.
- 5. To create a RESTful Web service, click Create.
- 6. Follow on-screen instructions.

Note:

An "APEX RESTful Services - Minimum version of ORDS not met" notification may be displayed. This message indicates that you can only utilize APEX-based RESTful services in Schema Service. If you require ORDS-based RESTful services, consider migrating to Oracle Autonomous Database.

To learn more about implementing RESTful Web services, see Using RESTful Services in *Oracle Application Express SQL Workshop Guide*.

Call SOAP and RESTful Web Services

The APEX_WEB_SERVICE package enables you to integrate other systems with Oracle Application Express by allowing you to interact with Web services anywhere you can use PL/SQL in your application. The API contains procedures and functions to call both SOAP and RESTful style Web services.

It contains functions to parse the responses from Web services and to encode/decode in to SOAP friendly base64 encoding. This API also contains package globals for managing cookies and HTTP headers when calling Web services whether from the API or by using standard processes of type Web service. Cookies and HTTP headers can be set before invoking a call to a Web service by populating the globals and the cookies and HTTP headers returned from the Web service response can be read from other globals.

 All Web services must be secured. Only HTTPS services are supported. Schema Service is pre-configured with an Oracle Wallet that contains more than 90 of the most common root and intermediate SSL certificates. The APEX_WEB_SERVICE package will automatically take advantage of this Oracle Wallet with no configuration required by application developers. Because this Oracle Wallet is



centrally managed, you will not be able to consume 3rd party Web services that are protected using self-signed SSL certificates.

- Schema Service is pre-configured with a network access control list (ACL) to permit outbound Web service calls. No further configuration by application developers is necessary.
- All outbound requests are routed through the Oracle Cloud web proxy. The APEX_WEB_SERVICE package will automatically use this proxy with no configuration required by application developers.
- There is a limit of 50,000 outbound Web service requests in a 24 hour period.

Learn more:

• APEX_WEB_SERVICE in Oracle Application Express API Reference

Troubleshoot RESTful Web Services

If you receive "Your service is currently unavailable" error message or "500 Internal Server Error" HTTP status code when accessing RESTful web services deployed in Schema Service, it could be caused by a problem with the corresponding handler.

For example, a PLSQL syntax error in the handler (such as a missing semicolon) or a SQL runtime exception (such as ORA-01403: no data found) are common reasons for this message. To confirm this, examine the **Error-Reason** header in the HTTP response using developer tools within your browser or in your REST client.



Use Base64 decoder to decode the value of the Error-Reason header.



5 Migrate Applications and Data

Oracle Application Express applications and data can be migrated between onpremises Oracle Database installations, Oracle Database Cloud Schema Service, Oracle Database Classic Cloud Service and Oracle Autonomous Database.

Topics

- Migrate On-premises Applications to Database Schema Service
- Migrate from Database Schema Service to On-premises Oracle Databases
- Migrate from Database Schema Service to Oracle Database Cloud Service
- Migrate from Database Schema Service to Oracle Autonomous Database

Migrate On-premises Applications to Database Schema Service

Oracle Application Express applications and data residing in an on-premises Oracle Database can be migrated to Oracle Database Cloud Schema Service.

The migration process involves using Oracle Application Express to create an application export that includes the metadata and supporting objects used by the application, and then importing the export to Schema Service.

For more information on creating application exports in Oracle Application Express, see Understanding the Deployment Process in *Oracle Application Express Application Builder User's Guide*. For more information on importing application exports, see Importing Export Files in *Oracle Application Express Application Builder User's Guide*. For information on using Oracle SQL Developer to import data objects to Database as a Service, see Using Oracle SQL Developer for Data Loading.

Note:

Exporting Oracle Application Express applications from an on-premises Oracle Database must be performed by a Workspace Administrator. Importing the exported packaged application to Schema Service must be performed by a Service Administrator.

Note:

Because Oracle Application Express 5 is the current version available in Schema Service, only Oracle Application Express 5 applications can be migrated.



To move applications from an on-premises Oracle Database to Schema Service:

- 1. Using Oracle Application Express, create an application export file from the onpremises Oracle Database. See Understanding the Deployment Process in Oracle Application Express Application Builder User's Guide.
 - a. Access the Oracle Application Express home page located in the on-premises Oracle Database.

The Oracle Application Express home page appears.

b. Click Application Builder.

The Application Builder home page appears.

c. Click the application you want to migrate.

The Application home page appears.

d. Click Export / Import as shown below.



The Export/Import page displays.

e. Click Export then Next.

The Export Application page appears.

f. Select the **Workspace** subtab.

The Export Workspace page displays.

g. For File Format, select the format in which you want to view the export and click **Export Workspace**.

The application export file is created.

- h. Save the export file locally.
- 2. Import the application export to your destination Schema Service. See Importing Export Files in Oracle Application Express Application Builder User's Guide.
 - a. Access Oracle Application Express in the destination Schema Service.

The Oracle Application Express home page appears.

b. Click Application Builder.

The Application Builder home page displays.

c. Click Import as shown below.



The Import page appears.

- d. For Choose File, navigate to the application export file you created in previous steps and select it.
- e. For File Type, select **Database Application, Page or Component Export** and click **Next**.

The File Import Confirmation page displays.

f. To install now, click Next.

You have completed the application migration process and are ready to run the migrated application in your Schema Service.



Migrate from Database Schema Service to On-premises Oracle Databases

Oracle Application Express applications and data in Oracle Database Cloud Schema Service can be migrated to an on-premises Oracle Database.

The migration process involves using Oracle Application Express to create an application export that includes the metadata and supporting objects used by the application, and then importing the export to the on-premises Oracle Database.

For more information on creating application exports, see Understanding the Deployment Process in *Oracle Application Express Application Builder User's Guide*. For more information on importing application exports, see Importing Export Files in *Oracle Application Express Application Builder User's Guide*.

Note:

Exporting Oracle Application Express applications from Schema Service must be performed by a Service Administrator. Importing the exported packaged application to an on-premises Oracle Database must be performed by a Workspace Administrator.

Note:

Because Oracle Application Express 5 is the current version available in Schema Service, only Oracle Application Express 5 applications can be migrated.

To move applications from Schema Service to an on-premises Oracle Database:

- 1. Create an application export file from Schema Service. For further details regarding the steps below, see Understanding the Deployment Process in Oracle Application Express Application Builder User's Guide.
 - a. Access the Oracle Application Express home page located in Schema Service.

The Oracle Application Express home page appears.

b. Click Application Builder.

The Application Builder home page displays.

c. Click the application you want to migrate.

The Application home page appears.

d. Click Export / Import as shown below.



The Export/Import page displays.

e. Click Export then Next.



The Export page appears.

f. Select the **Workspace** subtab.

The Export Workspace page displays.

g. For File Format, select the format in which you want to view the export and click **Export Workspace**.

The Packaged Application Export file is created.

- h. Save the export file locally.
- 2. Import the application export to your destination on-premises Oracle Database. For further details regarding the steps below, see Importing Export Files in Oracle Application Express Application Builder User's Guide.
 - a. Access Oracle Application Express in the destination on-premises Oracle Database.

The Oracle Application Express home page appears.

b. Click Application Builder.

The Application Builder home page displays.

c. Click Import as shown below.



The Import page appears.

- **d.** For Choose File, navigate to the application export file you created in previous steps and select it.
- e. For File Type, select **Database Application, Page or Component Export** and click **Next**.

The File Import Confirmation page displays.

f. To install now, click Next.

You have completed the application migration process and are ready to run the migrated application in your on-premises Oracle Database.

Migrate from Database Schema Service to Oracle Database Cloud Service

Oracle Application Express applications and data can be migrated from Oracle Database Cloud Schema Service to Oracle Database Classic Cloud Service

To migrate from Schema Service to Database Classic Cloud Service:

- 1. Use Schema Service Data Export to move data:
 - a. Navigate to the Service Details page. See Access Service Details.
 - b. Create a data Export of the service. See Export to Secure FTP.

Note: For customers who purchased their service before August 2017, see Create an Oracle Data Pump Export.

c. Download and save the data Export file locally. For further information on downloading a Schema Service data Export, see Download a Data Export.



- d. Access Oracle Application Express Application Builder home page from Database Classic Cloud Service. See Accessing the Oracle Application Express Console in *Administering Oracle Database Classic Cloud Service*.
- e. Import the locally saved data Export file. See Importing Export Files in Oracle Application Express Application Builder User's Guide.

The data has now been migrated from Schema Service to Database Classic Cloud Service.

- 2. Use Oracle Application Express to migrate the application:
 - a. Access Oracle Application Express Application Builder home page from Schema Service. See Access the Service Console.
 - **b.** Create an application export file. See Understanding the Deployment Process in *Oracle Application Express Application Builder User's Guide*.
 - c. Save the application export file locally.
 - d. Access Oracle Application Express Application Builder home page from the destination Database Classic Cloud Service. See Accessing the Oracle Application Express Console in *Administering Oracle Database Classic Cloud Service*.
 - e. Import the locally saved application export file. See Importing Export Files in Oracle Application Express Application Builder User's Guide.

The application has now been migrated from Schema Service to Database Classic Cloud Service.

Migrate from Database Schema Service to Oracle Autonomous Database

Oracle Autonomous Database delivers self-driving, self-securing, self-repairing database services that scale instantly to meet the demands of mission critical applications.

See About Migrating Oracle Application Express Applications to Oracle Autonomous Database in *Migrating Oracle Database Cloud Schema Service Applications to Oracle Cloud Infrastructure*.



6

Troubleshoot Oracle Database Cloud Schema Service

To assist with troubleshooting issues you encounter with the Oracle Database Cloud Schema Service, there are forums, debugging utilities and documentation designed to help you.

Topics

- Before You Begin Troubleshooting
- Resolve Issues with Oracle Database Cloud Schema Service
- Resolve Issues with Oracle Application Express Applications
- Use Debug Mode to Troubleshoot Applications
- Use SQL Tracing and TKPROF to Debug Application Sessions
- Run Advisor to Check Application Integrity
- Optimize Application Performance
- Review Application Session State
- Monitor Application and Page Resource Use
- View Application and Page Resource Use
- Debug Problematic Application SQL Queries
- Remove Application Controls and Components to Isolate a Problem

Before You Begin Troubleshooting

Before you go much further in your troubleshooting efforts, there are some published Known Issues you should search first, in order to rule them out. Also, determining what type of problem you are experiencing, is very useful.

Follow these steps before you begin troubleshooting:

- 1. Check Known Issues in *Known Issues for Oracle Database Cloud Schema Service* for any known problems and solutions that could help you resolve your problem with the service.
- 2. If the problem is related to the service and is not related to Oracle Application Express or an Oracle Application Express application, then see Resolve Issues with Oracle Database Cloud Schema Service.
- **3.** If the problem is related to Oracle Application Express or an Oracle Application Express application, then see Resolve Issues with Oracle Application Express Applications.



Resolve Issues with Oracle Database Cloud Schema Service

The following steps apply to troubleshooting problems that are not listed in *Known Issues for Oracle Database Cloud Schema Service* and are problems that involve signing up for the service, managing the service or monitoring the service.

These are the first steps to take when troubleshooting a suspected Oracle Database Cloud Schema Service issue:

- 1. Make sure your service conforms to the service specifications. See Specifications.
- 2. Verify you are not trying to use components that are not available. See Components not Available.
- 3. Verify you are not trying to use SQL Syntax that is not allowed. See SQL Syntax
- Check service limitations to make sure your service does not exceed them. See Oracle Cloud Specific Limitations.
- 5. Search Frequently Asked Questions for answers.

Resolve Issues with Oracle Application Express Applications

The following steps apply to troubleshooting problems that are not listed in the *Known Issues for Oracle Database Cloud Schema Service* and are problems that are related to developing, managing, or monitoring applications with Oracle Application Express.

For problems related to Oracle Application Express:

- 1. Go to the *Oracle Application Express Release Notes* and search for known issues, changed behavior and known issues that may solve your problem.
- Go to the Oracle Application Express Documentation library and search for answers to your problem.
- 3. Refer to Debugging an Application in *Oracle Application Express Application Builder User's Guide* to set up debugging mode to troubleshoot your problem.
- 4. Go to the APEX forum and search for answers.

Use Debug Mode to Troubleshoot Applications

You can troubleshoot Oracle Application Express applications by enabling Debug Mode, running the application in Debug Mode and viewing generated reports.

For instructions on how to troubleshoot Oracle Application Express applications using Debug Mode, see the following:

- 1. Utilizing Debug Mode in Oracle Application Express Application Builder User's *Guide*.
- 2. Enabling and Disabling Debug Mode for an Application in Oracle Application Express Application Builder User's Guide.
- 3. Running an Application in Debug Mode in Oracle Application Express Application Builder User's Guide.



- 4. About Using f?p Syntax to Access Debug Mode in Oracle Application Express Application Builder User's Guide.
- 5. Viewing Debug Reports in Oracle Application Express Application Builder User's *Guide*.

Use SQL Tracing and TKPROF to Debug Application Sessions

When you enable SQL tracing, a temporary file of session activity is created.

You can use TKPROF utility to analyze the file. See Enabling SQL Tracing and Using TKPROF in *Oracle Application Express Application Builder User's Guide*.

Run Advisor to Check Application Integrity

The Oracle Application Express Advisor (Advisor) enables you to check the integrity and quality of your Oracle Application Express application. Advisor functions like a compiler or LINT and flags suspicious behavior or errors. Running Advisor checks the integrity of your application based on the underlying metadata.

See the following for further information:

- 1. About Oracle Application Express Advisor in Oracle Application Express Application Builder User's Guide.
- 2. Running Advisor on an Entire Application in Oracle Application Express Application Builder User's Guide.
- **3.** Running Advisor on a Single Page in *Oracle Application Express Application Builder User's Guide*.

Optimize Application Performance

For applications having a large number of concurrent users, maintaining optimal performance is critical.

For issues with your application's performance, see:

 Identifying Performance Issues in Oracle Application Express Application Builder User's Guide

Review Application Session State

The behavior of an Oracle Application Express application is usually driven by values in session state. Viewing the session state values may help resolve some application problems.

For information on viewing session state values, see:

 Reviewing Sessions State in Oracle Application Express Application Builder User's Guide



Monitor Application and Page Resource Use

Oracle Application Express facilitates the monitoring of resources used by applications and pages by calling the package **DBMS_APPLICATION_INFO**.

View Application and Page Resource Use

When isolating an issue within a page, it is important to clearly understand the functions it is performing.

To accomplish this goal, Oracle Application Express Application Builder includes several page and application reports. The Application Dashboard provides a comprehensive view of your application from various perspectives. You can use this dashboard to view statistics and access reports of security settings, page and application components and templates. See Utilizing Logs and Reports in Oracle Application Express Application Builder User's Guide.

Debug Problematic Application SQL Queries

If your query does not seem to be running correctly, try running it in SQL Commands. Any of these approaches will test your query outside the context of your application, making it easier to determine what the problem is.

Remove Application Controls and Components to Isolate a Problem

If you have problems running a page, try removing controls and components one at a time.

Using this approach, you can quickly determine which control or component may be the source of your problem. You can disable a control or component by selecting the Condition attribute Never. See Removing Controls and Components to Isolate a Problem in *Oracle Application Express Application Builder User's Guide*.



7 Frequently Asked Questions

This section provides answers to frequently asked questions (FAQs) for Schema Service.

Topics:

- Where can I find the latest news and information for Oracle Database Cloud Services?
- Which Oracle Database Cloud Service is right for me?
- Who is the Schema Service offering right for?
- How do customers access data in Schema Service?
- Where can I find the pricing for Oracle Database Cloud Services?
- How do customers load data into Schema Service?
- Can customers run existing applications outside Schema Service and access the data through Oracle SQL*Net?
- How is storage allocated for Schema Service?
- How are users defined for Schema Service?
- Can additional software be loaded into Schema Service?
- · Can customers move applications and data from one Schema Service to another?
- Is it possible to setup an Oracle Wallet for Schema Service?
- What Oracle Database release is Schema Service running?
- Is there any additional charge for support?
- How does Oracle prevent another tenant from accessing my data on Schema Service?
- Is it possible to configure a whitelist that restricts access to my database only to certain IP addresses?
- Is HTTP traffic over the internet to Schema Service encrypted? How are SSL/TLS certificates managed?
- How do I get patches applied to my database?
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- Can I increase the storage or compute capacity available to my database instance?
- Are there prerequisites to subscribe to other Oracle Oracle Cloud services in order to subscribe to Schema Service?
- Does the Schema Service administrator need to perform Oracle Database backups?
- Why do I see an Access Denied message when attempting to access the service console?



Is it possible to migrate from Schema Service to Oracle Autonomous Database

Where can I find the latest news and information for Oracle Database Cloud Services?

For an overview of the Oracle Database Cloud Services, pricing information, videos, documentation and much more, visit:

cloud.oracle.com/database.

Which Oracle Database Cloud Service is right for me?

Oracle Cloud offers a range of database services for different customer profiles and use cases. These services start with entry-level fully managed cloud services such as Schema Service and Oracle Database Exadata Express Cloud Service.

Higher-end cloud services that provide full-instance Oracle Databases running in elastic virtual machines, on Oracle Bare Metal Cloud, and on Exadata also are available. In addition, Oracle Cloud offers NoSQL databases. For more information on Oracle's comprehensive cloud database portfolio, visit cloud.oracle.com/database.

Note:

As of the release of Oracle Database Exadata Express Cloud Service, in September 2016, customers considering standalone Schema Service should purchase Exadata Express instead. Exadata Express is a similar fully managed service that provides important added functionality at a similar entry-level price.

Who is the Schema Service offering right for?

This offering is well suited to Oracle Application Express developers who wish to develop or deploy Oracle Application Express applications in one schema or access data in their schema using RESTful Web services.

How do customers access data in Schema Service?

You can access data in your service in multiple ways, including:

- From an Oracle Application Express application running in Schema Service
- From a Java application running in an Oracle Java Cloud Service SaaS Extension
- Through RESTful Web services



Where can I find the pricing for Oracle Database Cloud Services?

Pricing is published on cloud.oracle.com in the **Pricing** tab.

See cloud.oracle.com/database.

How do customers load data into Schema Service?

You can load data into this service using Oracle SQL Developer, allowing users to quickly identify and transfer data from external data sources. Data can also be loaded with various data import methods supported by Oracle Application Express that allow importing data from text, XML, or CSV files.

For more information about data import into this service, see Import Data.

Can customers run existing applications outside Schema Service and access the data through Oracle SQL*Net?

No. This service cannot be accessed using SQL*Net network protocol. For customers interested in using Oracle SQL*Net for service access, Oracle recommends the Oracle Database Exadata Express Cloud Service, which does support this type of access.

How is storage allocated for Schema Service?

For Schema Service, the database storage is limited to 5GB, 20GB or 50GB depending on which level of service you sign up for. Upgrading to a higher level of maximum storage is possible by purchasing the corresponding subscription.

How are users defined for Schema Service?

Users of this service are defined in the Traditional Cloud Identity Management system through the Oracle Cloud Portal.

Can additional software be loaded into Schema Service?

No. You cannot load additional software into this service.

Can customers move applications and data from one Schema Service to another?

Yes, you can export your data and scripts (DDL) from this service and import them into any other on-premise Oracle Database (11g Release 2 or 12c) or Schema Service to reproduce your data structures, applications, and RESTful Web Services.



In addition, Oracle Application Express application metadata can be exported and imported using Oracle Application Express application administration functions. For more information about data import into Schema Service, see Import Data

Is it possible to setup an Oracle Wallet for Schema Service?

No. It is not possible to setup individual SSL certificates or Oracle Wallets for a specific custom domain with this service. However, this service is attached to an Oracle Wallet with over 50 common certificates.

What Oracle Database release is Schema Service running?

Schema Service runs Oracle Database 11g Release 2 Enterprise Edition. Other database releases are not offered.

Is there any additional charge for support?

No. Support is included in the subscription price for Schema Service.

How does Oracle prevent another tenant from accessing my data on Schema Service?

Schema Service provides isolation at the database and network levels. Each tenant receives a dedicated Oracle Database schema.

In addition to standard protections provided by database schemas, Oracle has implemented an additional schema lock-down technology for advanced tenant isolation.

Is it possible to configure a whitelist that restricts access to my database only to certain IP addresses?

Because the web tier of Schema Service is shared between tenants, it is not possible to define a whitelist at the web tier level that will apply only to an individual tenant. However, customers can implement their own IP whitelists specifically for Oracle Application Express applications and RESTful Web services by using OWA_UTIL PL/SQL package and examining the value of the REMOTE_ADDR CGI variable.

Customers who desire a whitelist at the web tier level should consider using Oracle Database Exadata Express Cloud Service instead of Schema Service. Exadata Express supports whitelists in the optional load balancer component. See Managing Vanity URLs for Exadata Express Hosted Applications in Using Oracle Database Exadata Express Cloud Service.



Is HTTP traffic over the internet to Schema Service encrypted? How are SSL/TLS certificates managed?

Yes. HTTP traffic over the internet to Oracle Database Cloud Schema Service is encrypted by SSL/TLS. Unencrypted access is not permitted.

Schema Service uses public SSL/TLS certificates signed by DigiCert certificate authority for all HTTP access. These certificates are trusted by modern web browsers by default and are renewed by Oracle annually. For non-browser clients that connect to APEX apps and REST endpoints deployed in Schema Service, Oracle recommends adding the *DigiCert Global Root CA* certificate to the client's trust store (for example, Oracle Wallet, Java TrustStore). When this root certificate is trusted, annual certificate renewals are transparent to the client.

How do I get patches applied to my database?

Since Schema Service is a fully managed service, all critical patches are applied by Oracle.

Is it possible to upgrade Oracle Application Express and Oracle REST Data Services in Schema Service?

No. For latest releases of these software components, consider migrating to Oracle Autonomous Database.

Can I increase the storage or compute capacity available to my database instance?

You can increase the database storage allocation for Schema Service up to 50GB by purchasing a higher shape of service. Schema Service is not a metered service and does not support on-demand scaling.

Schema Service does not offer the ability to increase the compute capacity.

Are there prerequisites to subscribe to other Oracle Oracle Cloud services in order to subscribe to Schema Service?

No such prerequisites exist.

Does the Schema Service administrator need to perform Oracle Database backups?

Customers should implement their own backup strategy.

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For example, customers can use the Schema Service Export to Secure FTP or Export to Cloud Storage features to create their own backups.

Note:

Oracle Cloud Operations takes internal backups of Schema Service regularly. These backups are intended for restoring internal systems in the unlikely event of a severe outage impacting multiple customers.

Why do I see an Access Denied message when attempting to access the service console?

Two common reasons why access to the service console user interface may be denied are:

- 1. The logged in user does not have either the Database Administrator or Database Developer role for this Database Schema Service instance. To remedy this, logout and login with another user account that has the Identity Domain Administrator role, then grant either Database Administrator or Database Developer role to the target user.
- 2. The cloud Identity Domain of the current login session does not match the Identity Domain where the Database Schema Service instance is provisioned. You can determine the current Identity Domain by checking it in the user dropdown at topright of the Service Console. You can determine the Identity Domain where your instance is provisioned by checking the URL of Access Denied message in the browser address bar. This URL should follow the format https://<Instance Name>-<ID Domain>.db.*. If the Identity Domain where your instance is provisioned.

Is it possible to migrate from Schema Service to Oracle Autonomous Database

Yes. Oracle APEX apps, data, and RESTful services can be migrated from Schema Service to Oracle Autonomous Database, including Always Free Oracle Autonomous Database, which remains free for an unlimited time as long as it is used.

See About Migrating to Oracle Autonomous Database in *Migrating Oracle Database Cloud Schema Service Apps to Oracle Cloud Infrastructure.*

A Oracle Database Cloud Schema Service Security Lockdown Implementation Considerations

The Oracle Database Cloud Schema Service is a multitenant environment, based on schema isolation. To ensure the security of each tenant's data, and the overall performance integrity of the entire Schema Service environment, some aspects of the Oracle Database, Enterprise Edition, have to be curtailed or completely eliminated.

The limitations required to protect security and performance integrity are detailed in this section. The limitations are permanent and cannot be relaxed. None of the limitations listed have been put in place as an attempt to limit the functionality of the Schema Service. Virtually all standard SQL and PL/SQL syntax and constructs used with the Oracle Database work in the Schema Service.

Topics:

- Summary of Threats
- Specifications
- SQL Syntax
- Database Object Security
- Oracle Cloud Specific Limitations
- Data Dictionary Access
- Resource Limitations

Summary of Threats

There are several types of threats which could be used to compromise the Oracle Database Cloud Schema Service and some specific areas that are potential security weaknesses.

- Any interaction with the operating system or file system including:
 - The use of BFILEs or external LOBs, operating system ACLs, database DIRECTORY capabilities and any option, feature or supplied PL/SQL package that allows file handling (UTIL_FILE, DBFS, XDB, etc.)
- Any native interaction with the network including:
 - Any database capability that provides access to TCP sockets, HTTP or SMTP requests, hostname or IP address lookup, Oracle Streams or Advanced Queues, database links, replication operations, network ACLs or other options, features or supplied PL/SQL that has network access or permissions. Inbound and outbound Web Service requests are allowed through the use of inbound RESTful Web Services or using the Oracle Application Express Web Services APIs for calling external services. Sending email is also allowed using the Oracle Application Express Mail API, within the limits described below.



- Database operations that might allow one tenant user to access another tenant's data or code including:
 - Any GRANTs on anything to anyone, or any option, feature or supplied PL/SQL that provides granted access to PUBLIC, ANONYMOUS or APEX_PUBLIC_USER.
 - Tenant users with objects with "coded identifiers" that could allow cross-schema access.
 - Any database view that may allow a tenant user to access any information about another tenant. (For example, all DBA_% or V\$% data dictionary views and some ALL_% data dictionary views).
- Database operations that might impact the integrity of the service or another user.
 - This is the control of a tenant's use of any shared system resources, where the tenant could reduce the availability of these resources, either accidentally or maliciously. These shared resources include CPU, I/O, memory or any internal objects or handles that use CPU, I/O and memory. This also includes anything stored in the SYSTEM tablespace, TEMP or UNDO tablespaces.
- Database operations that might be used to launch a denial of service (DoS) attack on the database service itself or on some other system.
 - This consists of many of the threats already mentioned, but specifically includes code that can easily create an attack, like job scheduling.

Specifications

This section outlines Oracle Database Cloud Schema Service specifications.

Topics:

- Oracle Database Version and Edition
- Components not Available
- Schemas and Data
- Database Time Zone

Oracle Database Version and Edition

The current version of Oracle Database Cloud Schema Service is based on Oracle Database 11g Release 2, Enterprise Edition with each quarterly security patch set applied. The only option included in Schema Service is the Partitioning Option.

Components not Available

The following features and components are not part of the current version of Oracle Database Cloud Schema Service:

- Oracle Database Extensions for .NET
- Oracle Database Vault
- Oracle Java VM
- Oracle Label Security



- Oracle Multimedia
- Oracle OLAP
- Oracle Spatial
- Oracle Text
- Oracle Warehouse Builder

Schemas and Data

The following schemas and data are not accessible in the Oracle Database Cloud Schema Service:

- Sample schemas
- Local Enterprise Manager repository
- Oracle Data Mining RDBMS APIs for file access

Database Time Zone

Oracle Database Cloud Schema Service databases use UTC (Coordinated Universal Time, +00:00 time zone offset) as the database and system time zone in all data centers. This system setting impacts dates returned by SYSDATE, SYSTIMESTAMP, column type TIMESTAMP WITH LOCAL TIMEZONE, and similar datetime functions, and cannot be changed.

In order to display dates in time zones other than UTC, please alter the database session time zone in your application and use <code>CURRENT_TIMESTAMP</code>, <code>LOCALTIMESTAMP</code> and similar datetime functions.

See Datetime Functions in *Database SQL Language Reference* and APEX_UTIL.SET_SESSION_TIME_ZONE in *Oracle Application Express API Reference*.

SQL Syntax

The following sections describe various SQL syntax in the Oracle Database Cloud Schema Service.

Topics:

- Allowed CREATE Statements
- Removed SQL Statements
- PL/SQL Packages and Types
- Included Supplied PL/SQL Packages and Types

Allowed CREATE Statements

CREATE statements have a broad range of syntax and options. This list includes the allowed CREATE statements in Oracle Database Cloud Schema Service:

- CREATE DIMENSION
- CREATE FUNCTION



- CREATE INDEX
- CREATE INDEXTYPE
- CREATE OPERATOR
- CREATE PACKAGE
- CREATE PROCEDURE
- CREATE SEQUENCE
- CREATE TABLE
- CREATE TRIGGER
- CREATE TYPE
- CREATE VIEW

Removed SQL Statements

The following SQL statements cannot be used in the Oracle Database Cloud Schema Service:

- CREATE CLUSTER
- CREATE CONTEXT
- CREATE JOB (Background jobs can be created through the CLOUD_SCHEDULER package. See Schedule Background and Asynchronous Jobs)
- CREATE SYNONYM
- CREATE JAVA
- CREATE ROLE
- CREATE DIRECTORY
- CREATE TABLESPACE
- CREATE DATABASE LINK
- CREATE MATERIALIZED VIEW
- Some ALTER SESSION options, although most session level changes for NLS or character sets are still allowed

Additionally, parallel operations are not supported in the Schema Service, so any SQL DDL clauses that allow for parallel operations are not supported.

PL/SQL Packages and Types

Oracle Database 11g Release 2 includes many PL/SQL packages to deliver extended functionality. The following sections list the PL/SQL packages that are part of Oracle Database Cloud Schema Service and some prominent packages which are not included.

Included Supplied PL/SQL Packages and Types

The following PL/SQL packages and types are included in Oracle Database Cloud Schema Service:



- ANYDATA
- ANYDATASET
- ANYTYPE
- AQ\$_AGENT
- AQ\$_SIG_PROP
- AQ\$_SUBSCRIBERS
- DBMS_APPLICATION_INFO
- DBMS_ASSERT
- DBMS_CRYPTO
- DBMS_DB_VERSION
- DBMS_FREQUENT_ITEMSET
- DBMS_LCR
- DBMS_LOB
- DBMS_METADATA
- DBMS_OUTPUT
- DBMS_RANDOM
- DBMS_SQL
- DBMS_STANDARD
- DBMS_STATS
- DBMS_TYPES
- All DBMS_XML% packages and types
- DBMS_XPLAN
- All DBMS_XQUERY% packages and types
- DBMSOUTPUT_LINESARRAY
- HTF
- HTP
- All Oracle Application Express API packages except for APEX_PLSQL_JOB and APEX_LDAP
- All ODCI% packages and types
- All OWA% packages and types
- PLITBLM
- SCN_TO_TIMESTAMP
- STANDARD
- STRAGG
- SYS_NT_COLLECT
- SYS_STUB_FOR_PURITY_ANALYSIS
- TIMESTAMP_TO_SCN



- UTL_COLL
- UTL_COMPRESS
- UTL_ENCODE
- UTL_GDK
- UTL_I18N
- UTL_IDENT
- UTL_LMS
- UTL_MATCH
- All UTL_NLA% packages and types
- UTL_RAW
- UTL_REF
- WPG_DOCLOAD
- XMLGENFORMATTYPE
- XMLSEQUENCE
- XMLSEQUENCEFROMREFCURSOR
- XMLSEQUENCEFROMREFCURSOR2
- XMLSEQUENCEFROMXMLTYPE
- XMLSEQUENCETYPE
- XMLTYPE
- XMLTYPEEXTRA
- XMLTYPEI
- All XQ% packages and types

All packages not listed here are not available in the Schema Service. Exceptions cannot be made.

Database Object Security

By default, all Oracle Application Express applications and RESTful Web Services execute with the privileges of the schema owner. You can create users within the Oracle Application Express environment and use authentication schemes to limit access to application objects at all levels in your application through Oracle Application Express.

You cannot use a GRANT command to assign access to another user, since other schema owners are not allowed to access your schema objects in the schema-isolation multitenant environment of the Oracle Database Cloud Schema Service.

You can also assign security across multiple dimensions, including origin, application and users, for any RESTful Web Services. See Security and Oracle Database Cloud Schema Service.

Topics:

Database Object Limitations



Query Limitations

Database Object Limitations

The following limitations apply to the DDL (Data Definition Language), syntax:

- You cannot use any PARALLEL syntax in defining tables.
- You cannot use quoted identifiers with special characters.
- You cannot define BFILEs or external LOBs.
- You cannot use external tables.
- You cannot specify any caching for database objects.

Query Limitations

By default, you can use all Oracle SQL syntax for SQL statements used against your Oracle Database Cloud Schema Service. The following limitations apply to SQL queries:

No PARALLEL hints allowed

Oracle Database Cloud Schema Service Specific Limitations

The core of the Schema Service development environment is Oracle Application Express, which is also a no-cost option for all versions of the Oracle Database since Oracle Database 10g Release 2. The following areas of functionality are limited when used for applications within the Schema Service environment:

- Background Jobs A Schema Service is able to submit jobs, but is limited to a
 maximum of 10 defined jobs and 5 jobs running or scheduled at any one time.
 Jobs are subject to resource limitations imposed by Database Resource Manager,
 similar to the way overall resources are limited as described below. These limits
 and conditions are implemented through a PL/SQL package called
 CLOUD_SCHEDULER.
- E-mails Schema Service is limited to 5,000 emails in a 24 hour period.
- BI Publisher is not available for Schema Service.
- Outbound Web Service calls Schema Service applications can make outbound Web Service calls through the APEX_WEB_SERVICE PL/SQL package. These calls can only use HTTPS or SSL and use a proxy server from within the Oracle Cloud. There is a limit of 50,000 calls in a 24 hour period.
- Oracle Application Express Public API Packages The APEX_LDAP API package is not available.
- Identity Domain for Schema Service cannot be changed.
- Files uploaded must not exceed 100MB. This limit is imposed by a parameter setting in the ORDS and applies to application imports from the Oracle Application Express Application Builder, static file uploads, script imports from Oracle Application Express SQL Workshop, file uploads in Oracle Application Express applications, and so on. For files larger than 100MB, please use Oracle SQL Developer. See Use Oracle SQL Developer for Data Loading.



Data Dictionary Access

Access to standard data dictionary objects in the Oracle Database is limited, since the security requirements of schema isolation prevent any user from seeing or knowing the existence of other schemas.

The following data dictionary views and synonyms are accessible from the Oracle Database Cloud Schema Service:

- ALL_ALL_TABLES
- ALL_COL_COMMENTS
- ALL_CONS_COLUMNS
- ALL_CONSTRAINTS
- ALL_DEPENDENCIES
- ALL_ERRORS
- ALL_IND_COLUMNS
- ALL_IND_EXPRESSIONS
- ALL_IND_PARTITIONS
- ALL_IND_STATISTICS
- ALL_INDEXES
- ALL_OBJECTS
- ALL_OBJECT_TABLES
- ALL_PLSQL_OBJECT_SETTINGS
- ALL_REFS
- ALL_SEQUENCES
- ALL_SYNONYMS
- ALL_TAB_COLS
- ALL_TAB_COLUMNS
- ALL_TAB_COMMENTS
- ALL_TAB_PARTITIONS
- ALL_TAB_SUBPARTITIONS
- ALL_TABLES
- ALL_TRIGGERS
- ALL_TYPES
- ALL_UPDATABLE_COLUMNS
- ALL_VIEWS
- AUDIT_ACTIONS
- COL
- COLUMN_PRIVILEGES



- DATABASE_COMPATIBLE_LEVEL
- DATABASE_PROPERTIES
- DICTIONARY
- DICT_COLUMNS
- DUAL
- INDEX_HISTOGRAM
- INDEX_STATS
- PRODUCT_COMPONENT_VERSION
- TAB
- NLS_DATABASE_PARAMETERS
- NLS_INSTANCE_PARAMETERS
- NLS_SESSION_PARAMETERS
- ROLE_ROLE_PRIVS
- ROLE_SYS_PRIVS
- ROLE_TAB_PRIVS
- All USER_% views
- V_\$TIMEZONE_NAMES

You can also view schema objects in both Oracle SQL Developer and the SQL section of the Oracle Application Express development environment.

Resource Limitations

The Oracle Database excels at managing shared resources among thousands of database users. Oracle Database Cloud Schema Service uses this proven ability to distribute computer resources among tenants.

The Schema Service uses Database Resource Manager consumer groups to prevent any tenant from impacting the performance of other tenants. All tenant operations are initially placed in a consumer group with maximum access to resources. If a user exceeds the resource limitations of this initial consumer group, their user process is pushed to a lower priority user group, with a much longer limit on resource consumption, but a lower priority. If a user process exceeds this limit, they are pushed to a lower priority group with a much higher resource limit.

If a user process should exceed this last limit, the process may be terminated with the ORA-00040: active time limit exceeded - call aborted error. Please be aware that this lowest consumer group allows for the consumption of up to 180 seconds of dedicated CPU time, a threshold which is normally only crossed by runaway processes. If you encounter the ORA-00040: active time limit exceeded - call aborted error, identify the specific SQL operation that is causing it (for example, a query or an update statement) and reduce its complexity.

