



# OCI Cost Governance and Performance Monitoring Solution

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## Installation Guide

**Version: 1.0**  
**Release Date: August 24, 2020**

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# Cost Governance Documentation

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## Section 1: Introduction

Built using Oracle Analytics Cloud, Autonomous Database and Oracle APEX, the OCI Cost Governance and Performance Monitoring solution provides customers granular understanding of their spend and utilization of Oracle Cloud Infrastructure (OCI). Dashboards provide cost by OCI Resources, PaaS and IaaS services and can be grouped by application and department for budgetary purpose and chargeback. Additionally, performance monitoring and utilization matrices are available for application running on OCI Virtual Machines.

OCI Cost Governance and Performance Monitoring solution is ideal for self-service analysis and allows users to build their own visualizations and enrich the analysis by bringing in their own data (e.g. departmental budgets).

Customers leverage a Management Module to securely retrieve their tenancy cost and usage data. The module can be configured to retrieve multiple OCI tenancies data for analysis.

NOTE: Analysis contained in this solution are presented as general guidance on utilization. This solution is not meant as replacement of Oracle's official Cost Analysis insights available on OCI Console. Data presented in this application may not match 100% to OCI console or Oracle Official invoice due to delays in upstream system, rounding or other errors.

## Prerequisites

To successfully deploy this solution, following items are needed:

- An Oracle Cloud Infrastructure (OCI) Tenancy
- Appropriate access rights granted via OCI Policies by Tenancy Administrator. For help see: [link](#)
- Permissions to create
  - Resource Manager stack
  - Autonomous Data Warehouse (ADW)
  - Oracle Analytics Cloud (OAC)
  - Oracle Cloud Infrastructure VM
  - Oracle APEX Workspace
- PEM Keys. For help see: [link](#)
- SSH Keys for secure installation. [HINT: Navigate Compute > Create Instance > Generate SSH Keys, download both public and private keys] For help see [link](#)
- IDCS Access Token. For help see: [link](#)
- Tenancy OCID, User OCID and User Fingerprint. For help see [link](#)

- Cost Governance SQL Package (Apex: OCI Cost Gov. Management Module - Costgov\_Apex\_v1.sql) [Hint: Download from Marketplace Listing Page Additional Resource Section]
- Oracle Analytics Cloud project File (OCI Cost Governance Performance Monitoring - v1.dva) [Hint: Download from Marketplace Listing Page Additional Resource Section]

Note: The dashboards and insights in this solution depends heavily on resource tagging on OCI. For best results, customers are encouraged to follow OIC Tagging and resource compartmentalization best practices.

Additional Resources: OCI Tagging: [link](#) Managing Compartments: [link](#)

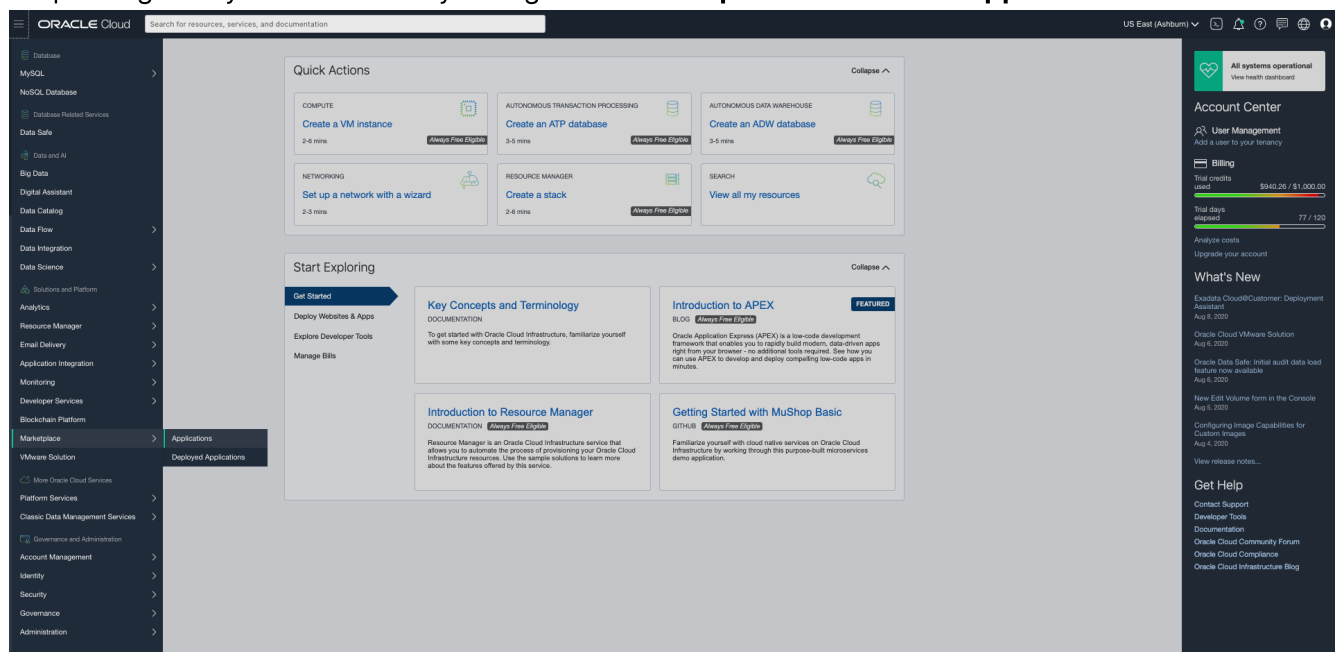
## Section 2 Installation

The installation process involves:

- **Section 2** - Launch App: Launch app from Oracle Marketplace, initiate Resource Manager Stack to create the necessary infrastructure and services for the Application.
- **Section 3** - Create an APEX Workspace, install & configure the Management Module.
- **Section 4** - Import Data Visualization project into Oracle Analytics Cloud. Connect to CostGov schema located in Autonomous Data Warehouse.

### Section 2.1 Launch App

- Step 1: Log in to your OCI Tenancy. Navigate to **Marketplace** and click on **Applications**



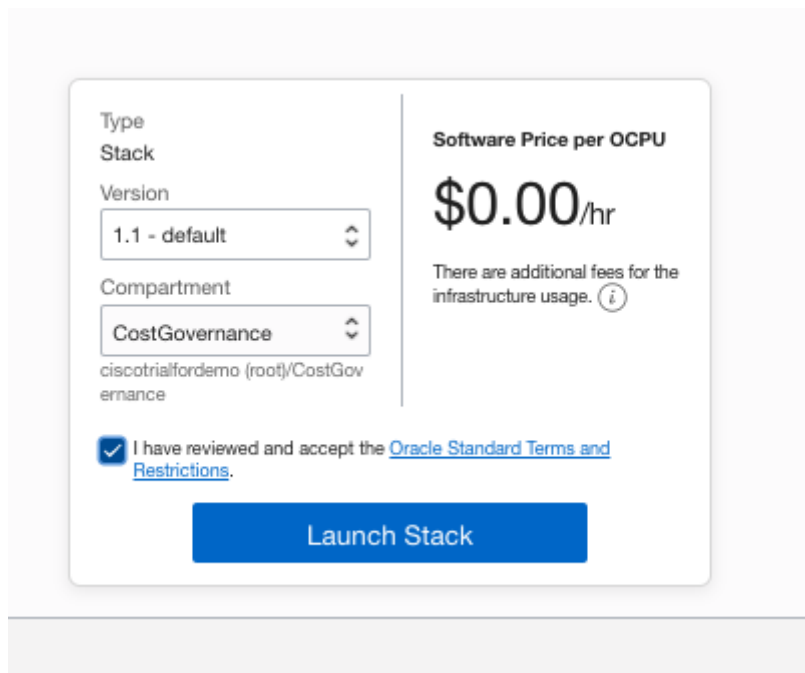
- Step 2: Search for **OCI Cost Governance and Performance Monitoring Solutions**. Click to open the Application page.

The screenshot shows the Oracle Cloud Marketplace interface. At the top, there's a search bar with the text "Search for resources, services, and documentation". Below the search bar, there are filters for "All Applications", "Deployed Applications", "TYPE", "PUBLISHER", "CATEGORY", and "PRICE". The main content area displays a grid of application cards. The first row includes cards for FortiGate Next-Gen Firewall (BYOL), Oracle E-Business Suite Cloud Manager, Altair PBS Professional, Oracle Enterprise Virtual Session Border Controller, Palo Alto Networks VM-Series Next Generation Firewall, and Oracle Database Sharding. The second row includes Qubole Data Service (QDS), RackWare RMM 6.5 for OCI, Check Point CloudGuard IaaS - Security Gateway, FortiManager Centralized Security Management (BYOL), FortiAnalyzer Centralized Logging/Reporting (BYOL), FortiGate Next-Gen Firewall (BYOL), KUSANAGI for Oracle Cloud, and Fortinet FortiWeb Web Application Firewall WAF. The third row includes ZeroDown! Software HA for Oracle Cloud, Oracle Secure Global Desktop, Oracle Database, and Oracle Linux Image Customized for PeopleSoft.

- Step 3: Download the **Analytics: OCI Cost Governance & Performance Monitoring Dashboards** and **Apex: OCI Cost Gov. Management Module** files on to your local machine. [Hint: Files are located under the Related Documents Section on this page.]
- Step 4: From the Launch Stack Section [Hint: Upper Right Corner], Choose the **Compartment** where the Resource Manager stack should be deployed.

The screenshot shows the application page for the "OCI Cost Governance and Performance Monitoring Solution". The page includes a header with the title and a brief description: "Granular Insights into OCI Cost and Utilization. Built on Oracle Analytics Cloud, Autonomous Database and Oracle APEX, OCI Cost Governance and Performance Monitoring solution provides customers granular understanding of their spend and utilization of Oracle Cloud Infrastructure (OCI). Categories: Cloud Management, Business Applications". Below the header, there are tabs for "Overview", "Provider", and "More Apps". The "Overview" tab is active, showing a section titled "App by Oracle" with a description of the solution and its benefits. To the right, there is a "Support" section with contact information and a "Version Details" section. A dropdown menu is open, showing a list of compartments for deployment, including "discotrialformdemo (root)", "Africa", "Asia", "BIPTesting", "CostGovernance", "Europe", "ManagedCompartment", "NorthAmerica", "Oceania", and "SouthAmerica". The price is listed as "\$0.00/hr".

- Step 5: Review and accept Oracle Standard Terms and Restrictions by enabling the check box and click **Launch Stack**



The screenshot shows a configuration window for launching a stack. On the left, under 'Type', 'Stack' is selected. The 'Version' dropdown is set to '1.1 - default'. The 'Compartment' dropdown is set to 'CostGovernance', with the full path 'ciscotrialfordemo (root)/CostGovernance' displayed below it. On the right, the 'Software Price per OCPU' is '\$0.00/hr'. Below this, a note states 'There are additional fees for the infrastructure usage.' with an information icon. At the bottom left, a checkbox is checked, followed by the text 'I have reviewed and accept the [Oracle Standard Terms and Restrictions](#).' A large blue 'Launch Stack' button is at the bottom center.

Type  
Stack

Version  
1.1 - default

Compartment  
CostGovernance  
ciscotrialfordemo (root)/CostGovernance


Software Price per OCPU  
\$0.00/hr

There are additional fees for the infrastructure usage. ⓘ

☒ I have reviewed and accept the [Oracle Standard Terms and Restrictions](#).

Launch Stack

- Step 6: Provide Description as appropriate.



## Create Stack

1 Stack Information

2 Configure Variables

3 Review

**NAME** OPTIONAL

**DESCRIPTION** OPTIONAL

**CREATE IN COMPARTMENT**

  
ciscotrialfordemo (root)/CostGovernance

**TERRAFORM VERSION**

0.12.x

**TAGS**

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values that can be attached to resources.

[Learn more about tagging](#)

TAG NAMESPACE	TAG KEY	VALUE	
CostGov	Department	Finance	×
Lifecycle	Test	BETA	×

+ Additional Tag

Next

Cancel

**IMPORTANT:** Do NOT change the Stack name in the "Name" field. Changes to this field will fail the installation.



- Step 7: Add **tags** for your Stack based on best practices and as required by your tenancy policy.

**TAGS**

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values that can be attached to resources.

[Learn more about tagging](#)

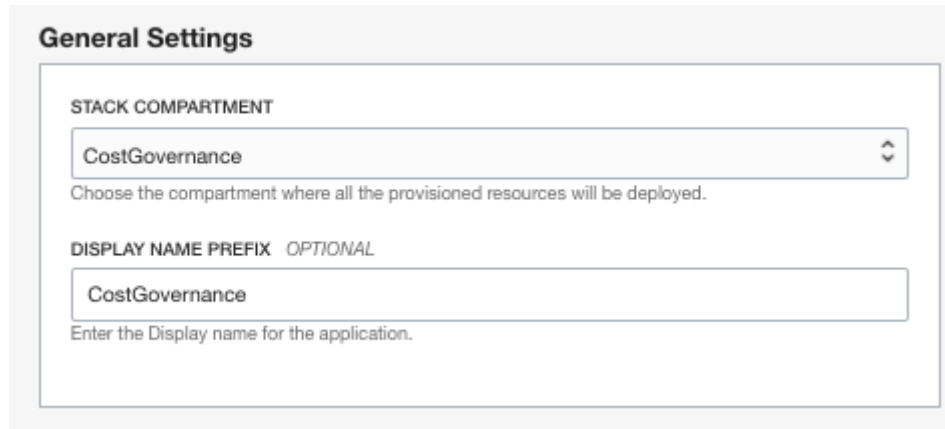
TAG NAMESPACE	TAG KEY	VALUE	
CostGov	enable	true	×

- Step 8: Click **Next**

## Section 2.2 Configuration Variables

### Section 2.2.1 General Settings

- Step 1: Choose **Compartment** where resources will be provisioned.



The screenshot shows a 'General Settings' form with two main sections. The first section, 'STACK COMPARTMENT', features a dropdown menu with 'CostGovernance' selected and a description: 'Choose the compartment where all the provisioned resources will be deployed.' The second section, 'DISPLAY NAME PREFIX OPTIONAL', has a text input field containing 'CostGovernance' and a description: 'Enter the Display name for the application.'

### Section 2.2.2 Network Configuration

- Step 1: Network Configuration, select either **Use Existing Network** or **Show Advanced Options** to configure a network for your Stack.

#### Network Configuration

- ☐ **USE EXISTING NETWORK**  
Select this option to support deployment of Cost governance application into an existing virtual cloud network (VCN).
- ☐ **SHOW ADVANCED OPTIONS**  
Enable advanced options on this page.

**NOTE:** If you do not select Use Existing Network, network components will be created as required by this application.

### Section 2.2.3 Database Configuration

- Step 1: In Database Configuration, enter the required fields and choose the appropriate database license type:
  - DATABASE NAME

- DB\_ADMIN\_PASSWORD - Must be between 12 and 30 characters.
- DB\_WALLET\_PASSWORD - Must be between 12 and 30 characters.
- Choose appropriate Database License

**Autonomous Database Configuration**

**DATABASE NAME**

CostGovDB01

Provide Database name. (Note: This will create a 2 OCPU/1 TB Autonomous Database. This configuration can be changed later from OCI console.)

**DB\_ADMIN\_PASSWORD**

\*\*\*\*\*

Provide admin password. Must be a minimum 12 characters, contain at least one uppercase letter, one lowercase letter, one number. Do not include special characters.

**DB\_WALLET\_PASSWORD**

\*\*\*\*\*

Provide database wallet password. Must be a minimum 12 characters, contain at least one uppercase letter, one lowercase letter, one number. Do not include special characters.

**DATABASE LICENSE**

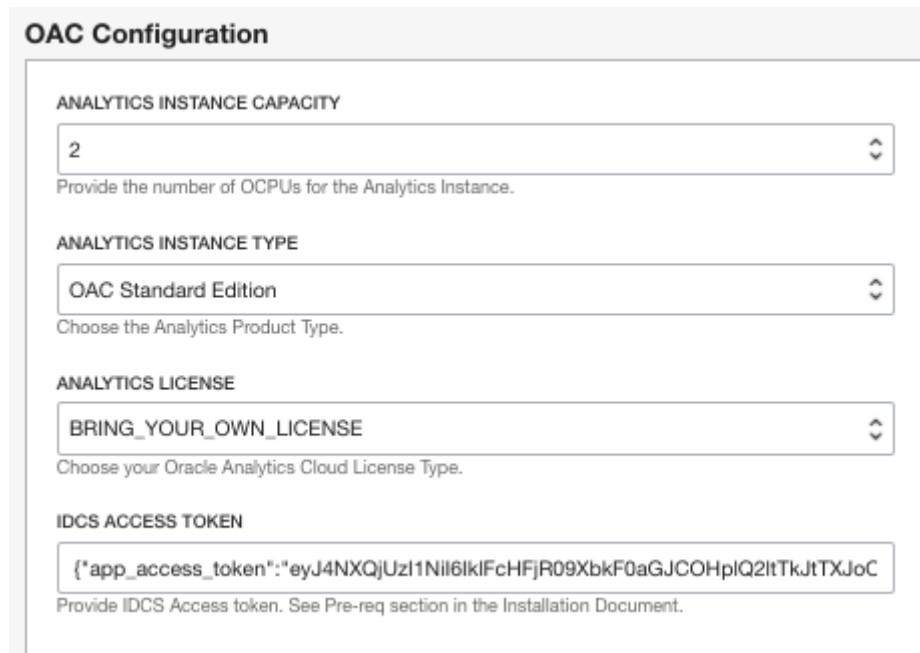
LICENSE\_INCLUDED

Choose your database license type.

**NOTE:** Please save this information for use later in the application configuration process.

## Section 2.2.4 OAC Configuration

- Step 1: Choose **OCPUs** for Oracle Analytics Instance (Hint: This can be changed later)
- Step 2: Enter **OAC Instance Type**, **OAC License Type** and enter **IDCS access token**. [Hint: Open IDCS token in a text editor, copy and paste the entire token into the IDCS ACCESS TOKEN field.]



**OAC Configuration**

**ANALYTICS INSTANCE CAPACITY**  
2  
Provide the number of OCPUs for the Analytics Instance.

**ANALYTICS INSTANCE TYPE**  
OAC Standard Edition  
Choose the Analytics Product Type.

**ANALYTICS LICENSE**  
BRING\_YOUR\_OWN\_LICENSE  
Choose your Oracle Analytics Cloud License Type.

**IDCS ACCESS TOKEN**  
{ "app\_access\_token": "eyJ4NXQjUzI1NiI6IklFcHFjR09XbkF0aGJCOHplQ2ItTkJtTXJoC  
Provide IDCS Access token. See Pre-req section in the Installation Document.

NOTE: IDCS user must have the appropriate privileges required to install components needed for this application. For help creating IDCS Access token see [link](#)

## Section 2.2.5 Instance Configuration

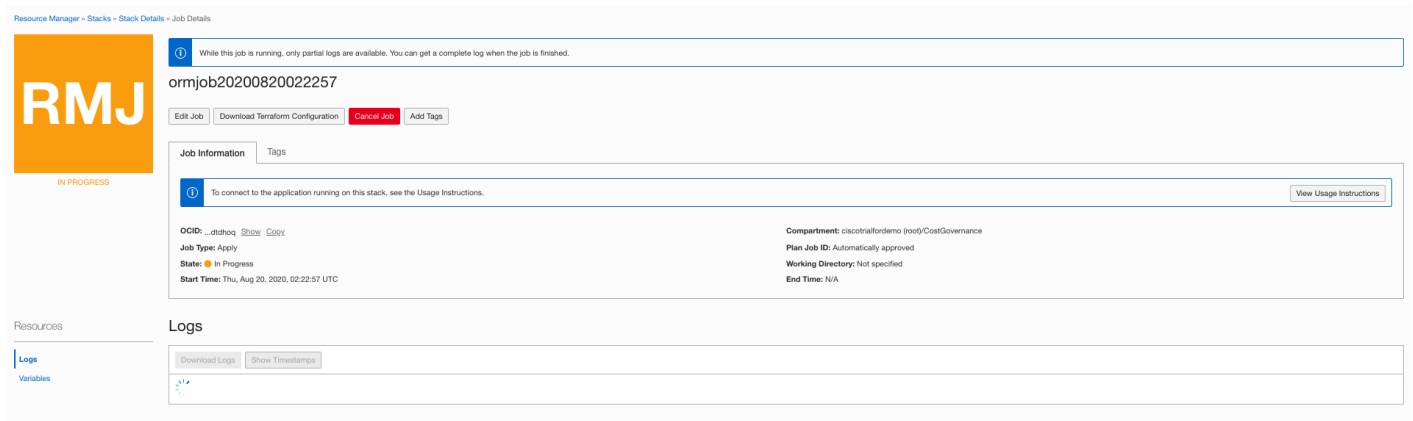
- Step 1: Enter **Public SSH Key** and the **VM Shape** for the application. [HINT: From the main menu, Navigate to Compute > Create Instance. See option for generating SSH Keys. Download both public and private keys. For help see [link](#).]

The screenshot shows the 'Instance Configuration' form. It has two main sections: 'SSH PUBLIC KEY' and 'SHAPE'. In the 'SSH PUBLIC KEY' section, the 'CHOOSE SSH KEY FILE' radio button is selected. Below it is a dashed box with a cloud icon and the text 'Drop a file here or [browse](#)'. Below the dashed box is a text input field containing 'ssh-key-2020-08-16.key.pub' with a close button 'x'. Below this section is a note: 'Use public key to secure your VM. Private key pair will be needed later.' In the 'SHAPE' section, there is a dropdown menu showing 'VM.Standard.E2.1' with a refresh icon. Below the dropdown is a note: 'Choose an available instance shape for the VM.'

- Step 2: Click **Next**
- Step 3: Verify configuration details on the next screen and click **Create**. This will launch the installation process.

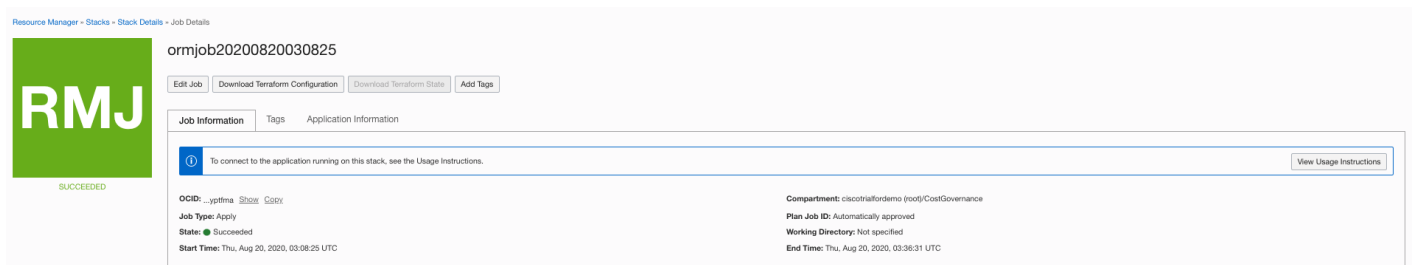
## Section 2.3 Application Installation

- Step 1: State will indicate **In Progress**. Allow the job to run. (Hint: Provisioning the app may take up to an hour.)



The screenshot shows the 'Stack Details' page for a job with ID 'ormjob20200820022257'. The job status is 'IN PROGRESS', indicated by an orange square and the text 'IN PROGRESS'. The left sidebar shows 'Resources' with 'Logs' selected. The main content area has a 'Job Information' tab active, displaying a message: 'While this job is running, only partial logs are available. You can get a complete log when the job is finished.' Below this, there are buttons for 'Edit Job', 'Download Terraform Configuration', 'Cancel Job', and 'Add Tags'. The 'Job Information' section shows 'OCID: ...', 'Job Type: Apply', 'State: In Progress', and 'Start Time: Thu, Aug 20, 2020, 02:22:57 UTC'. On the right, it shows 'Compartment: cisccotrialfordemo (root)/CostGovernance', 'Plan Job ID: Automatically approved', 'Working Directory: Not specified', and 'End Time: N/A'. A 'View Usage Instructions' button is also present. At the bottom, there is a 'Logs' section with 'Download Logs' and 'Show Timestamps' buttons.

- Step 2: Confirm that the Apply job was **successful**.



The screenshot shows the 'Stack Details' page for a job with ID 'ormjob20200820030825'. The job status is 'SUCCEEDED', indicated by a green square and the text 'SUCCEEDED'. The left sidebar shows 'Resources' with 'Logs' selected. The main content area has 'Job Information' and 'Application Information' tabs. The 'Job Information' section shows 'OCID: ...', 'Job Type: Apply', 'State: Succeeded', and 'Start Time: Thu, Aug 20, 2020, 03:08:25 UTC'. The 'Application Information' section shows 'Compartment: cisccotrialfordemo (root)/CostGovernance', 'Plan Job ID: Automatically approved', 'Working Directory: Not specified', and 'End Time: Thu, Aug 20, 2020, 03:36:31 UTC'. A 'View Usage Instructions' button is also present.

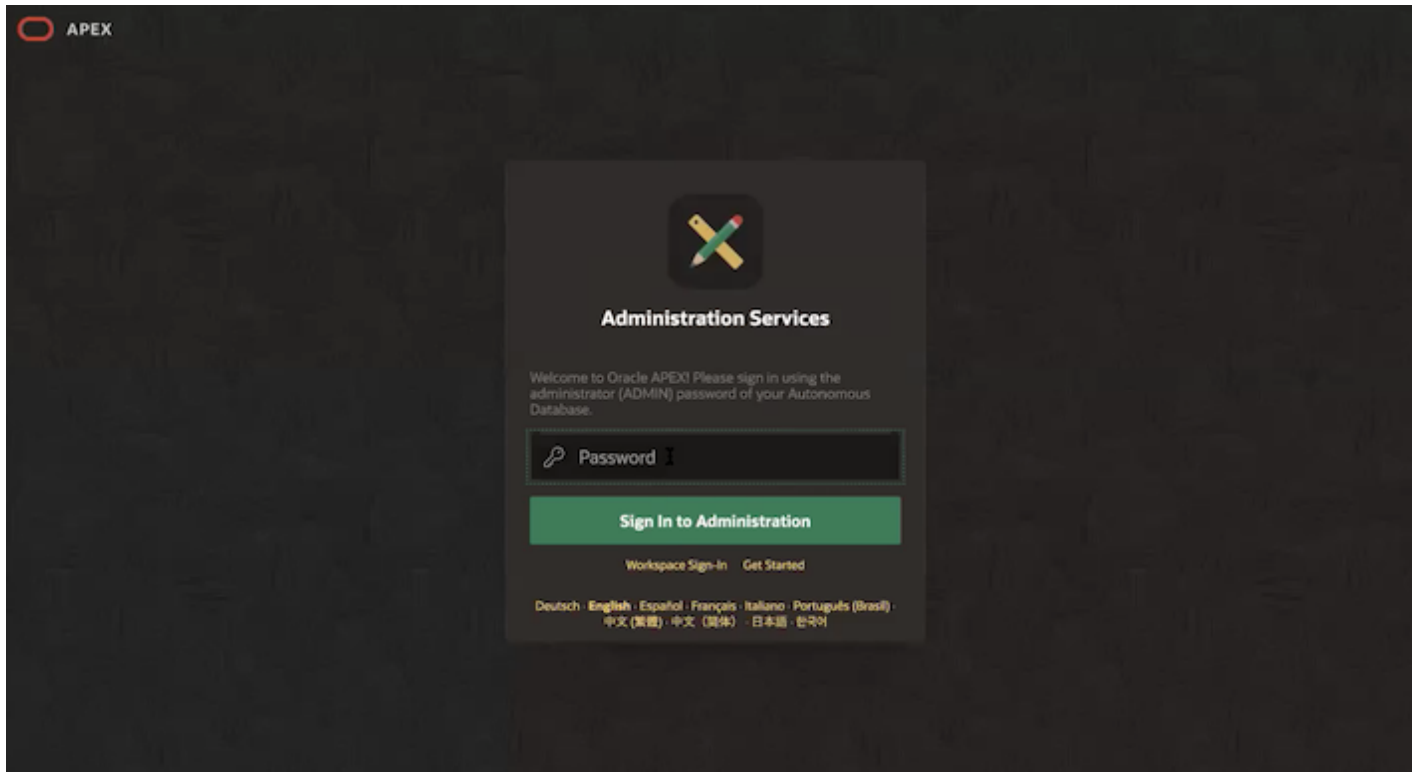
**Note:** If the Job fails, review error logs for the issue. Common issues may be: insufficient user privileges, invalid SSH keys, expired or invalid IDCS token, tenancy service limits etc.)

- Step 3: Navigate to **Application Information Tab** (Hint: Third tab from the left, next to Tags. This tab has URLs for OAC and ADW as well) on the **Stack Details** page.
- Step 4: Click the **APEX URL** to access Oracle Application Express Login.

## Section 3 Configure Management Module in APEX

### Section 3.1 Sign into APEX Administration Services

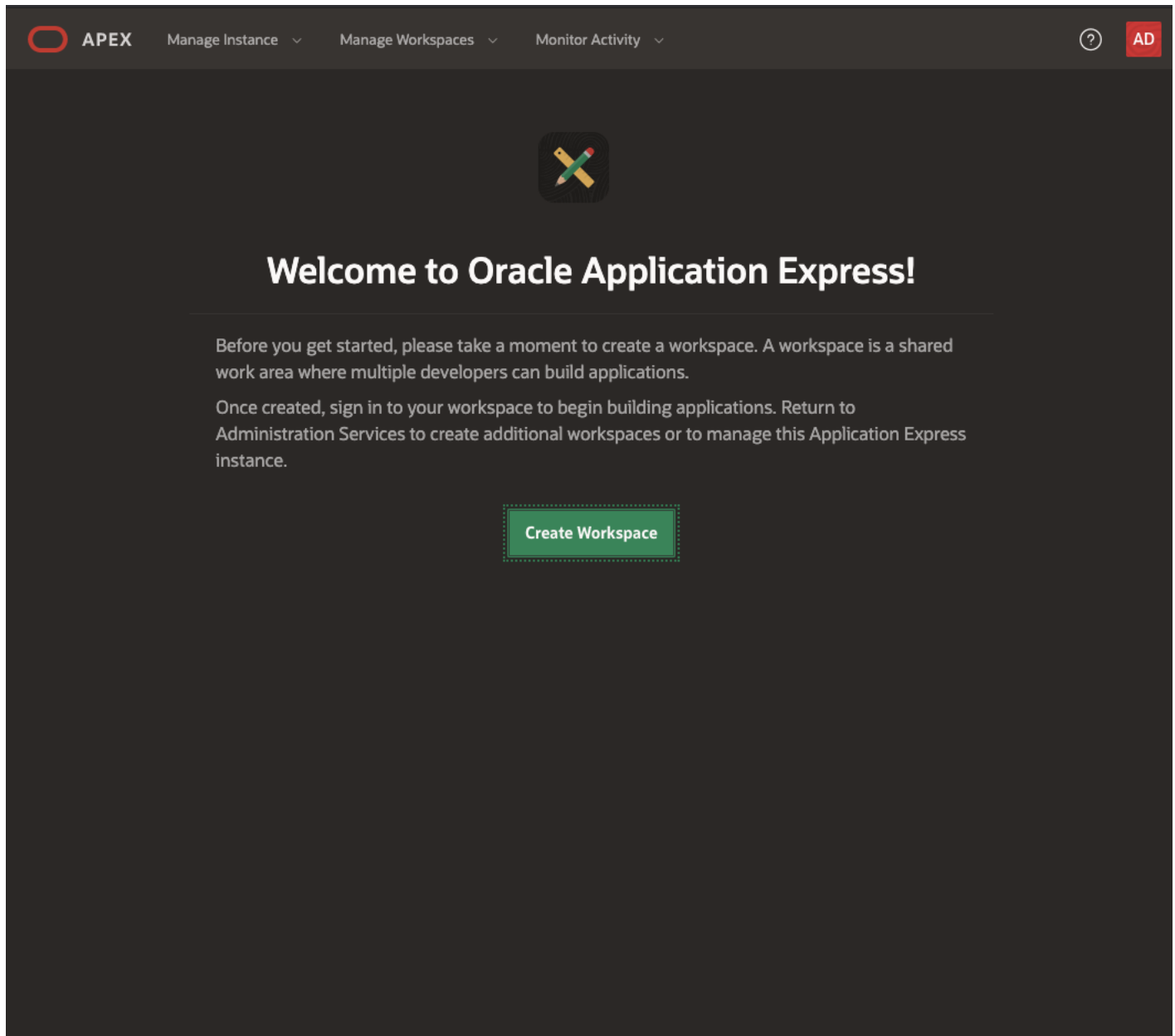
- Step 1: **Sign into APEX** by entering the password for your Autonomous Data Warehouse (Hint: Password created Section 2.2.3).



NOTE: If you are not in the APEX Administration Services section, you will see a different screen. Click on the Administration Services link that appears below the Sign In button to access the correct section.

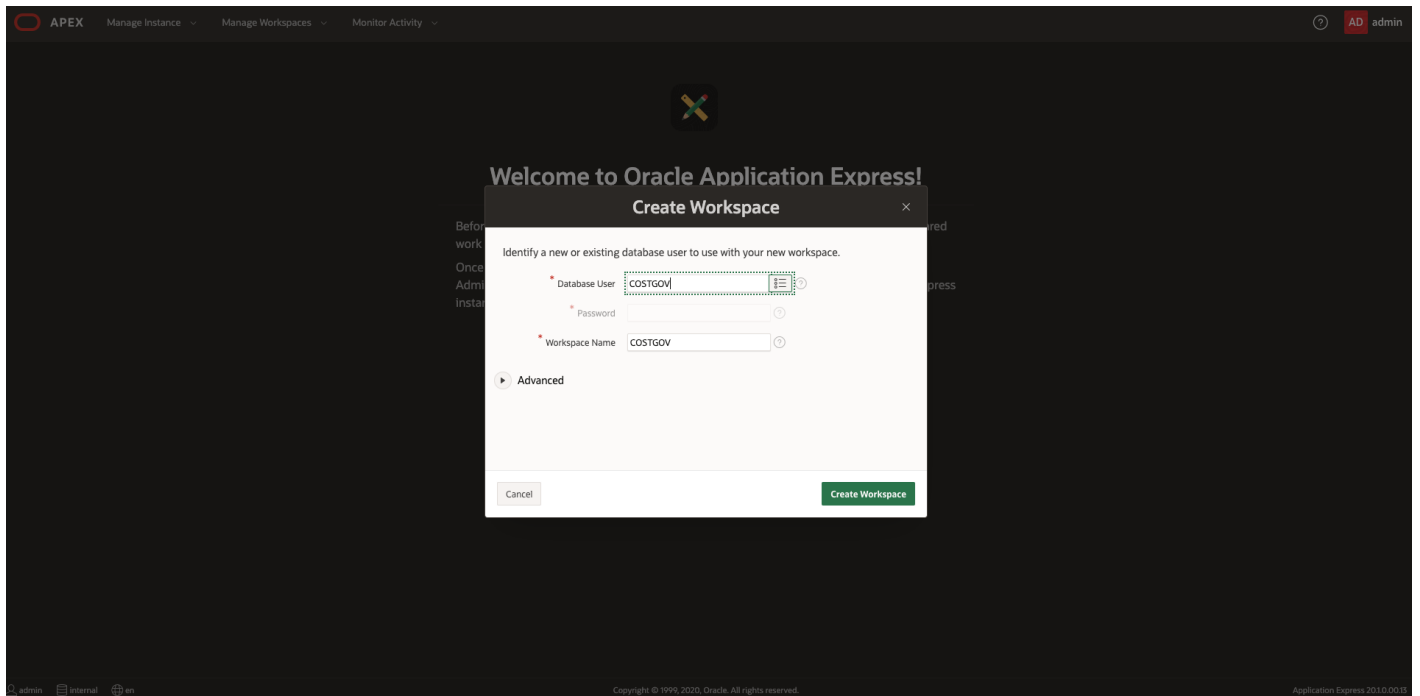
## Section 3.2 Create Workspace

- Step 1: In the APEX Welcome page Click on **Create Workspace**.



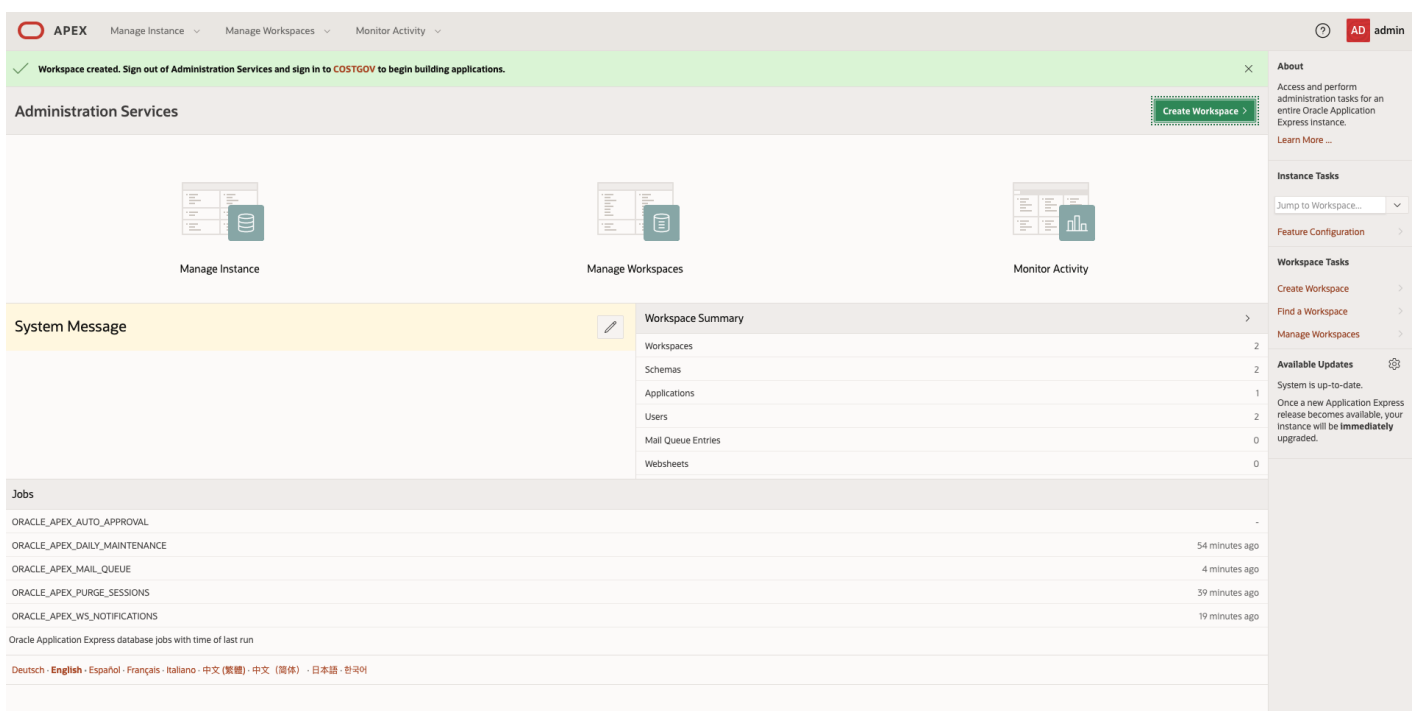


- Step 2: From the Database User drop-down menu choose **COSTGOV**
- Step 3: Keep the default Workspace name as **COSTGOV**



**NOTE:** Do not change settings in Advanced section.

- Step 4: Click **Create Workspace**. Administration Services configuration for the Management Module is now complete!



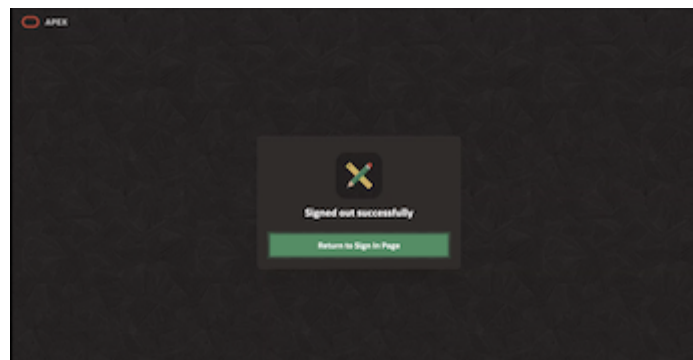
- Step 5: Sign out of Administration Services by navigating to the **Sign Out** option.

The screenshot displays the APEX Administration Services dashboard. At the top, there are navigation tabs: "Manage Instance", "Manage Workspaces", and "Monitor Activity". The main content area is titled "Administration Services" and contains three large icons: "Manage Instance", "Manage Workspaces", and "Monitor Activity". On the right side, a user profile dropdown menu is open, showing the user's name "ADMIN", workspace "INTERNAL", and role "Administrator". The "Sign out" button is visible at the bottom of this menu. Below the main content area, there is a "System Message" section, a "Workspace Summary" table, and a "Jobs" table.

Workspace Summary	
Workspaces	2
Schemas	2
Applications	1
Users	2
Mail Queue Entries	0
Web sheets	0

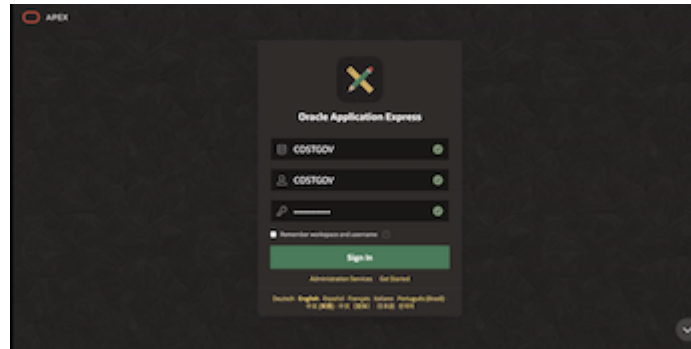
Jobs	
ORACLE_APEX_AUTO_APPROVAL	-
ORACLE_APEX_DAILY_MAINTENANCE	2 hours ago
ORACLE_APEX_MAIL_QUEUE	34 seconds ago
ORACLE_APEX_PURGE_SESSIONS	45 minutes ago
ORACLE_APEX_WS_NOTIFICATIONS	16 minutes ago

- Step 6: Click on **Return to Sign In Page**.

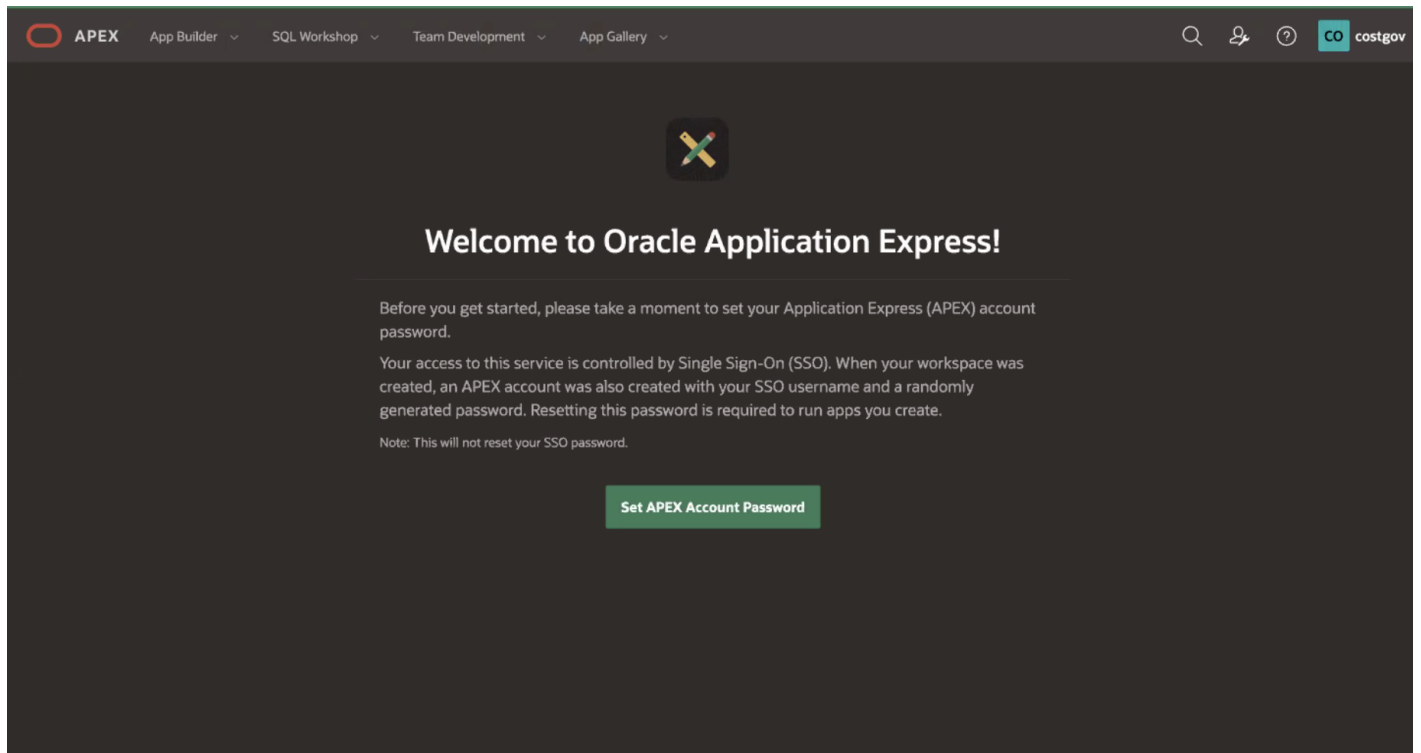


## Section 3.3 Sign In to Oracle Application Express

- Step 1: Sign back in to Oracle Application Express. Enter the needed information:
  - Workspace - **COSTGOV**
  - Username - **COSTGOV**
  - Password - (Hint: Password you used for signing into Administration Services)
  - Click **Sign In**.

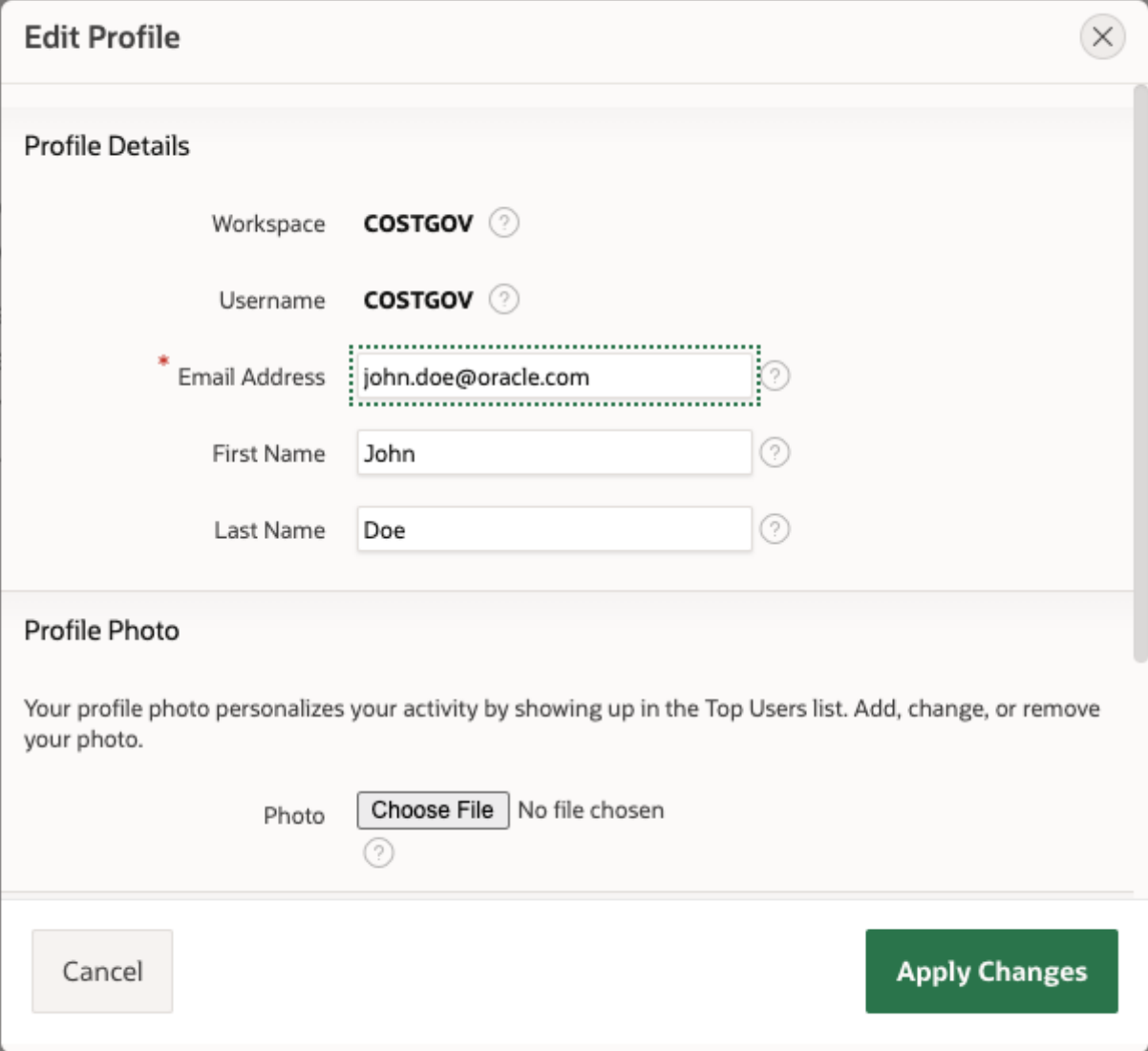


- Step 2: Click on **Set Apex Account Password**.



Enter the following user details:

- Email Address
- First Name (Optional)
- Last Name (Optional)
- Enter a New Password (Hint: Scroll down to see password field)
- Confirm Password



The image shows a modal dialog box titled "Edit Profile" with a close button (X) in the top right corner. The dialog is divided into two main sections: "Profile Details" and "Profile Photo".

**Profile Details**

- Workspace:** A text field containing "COSTGOV" with a help icon (?) to its right.
- Username:** A text field containing "COSTGOV" with a help icon (?) to its right.
- Email Address:** A text field containing "john.doe@oracle.com" with a red asterisk (\*) to its left and a help icon (?) to its right. The field is highlighted with a green dashed border.
- First Name:** A text field containing "John" with a help icon (?) to its right.
- Last Name:** A text field containing "Doe" with a help icon (?) to its right.

**Profile Photo**

Your profile photo personalizes your activity by showing up in the Top Users list. Add, change, or remove your photo.

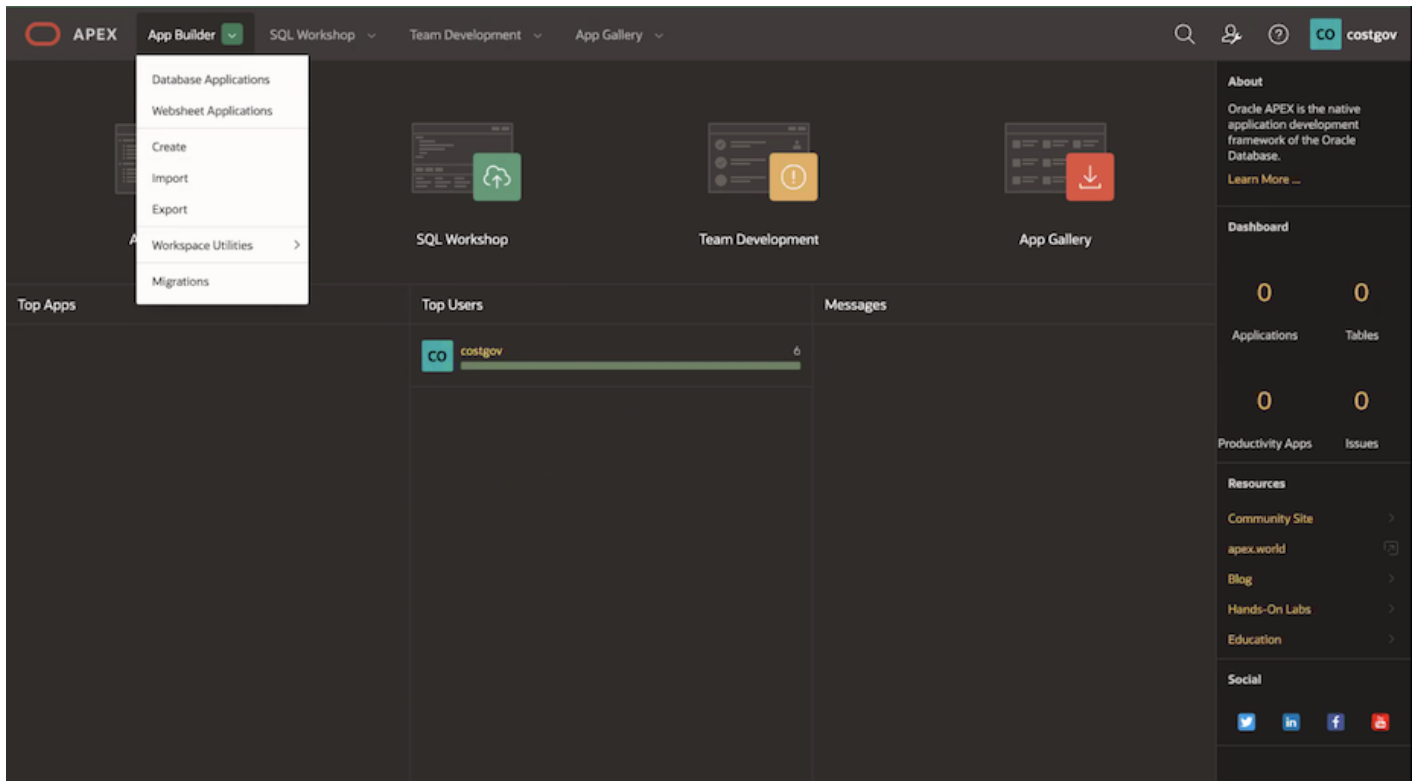
**Photo:** A button labeled "Choose File" is next to the text "No file chosen". Below the button is a help icon (?).

At the bottom of the dialog, there are two buttons: "Cancel" on the left and "Apply Changes" on the right.

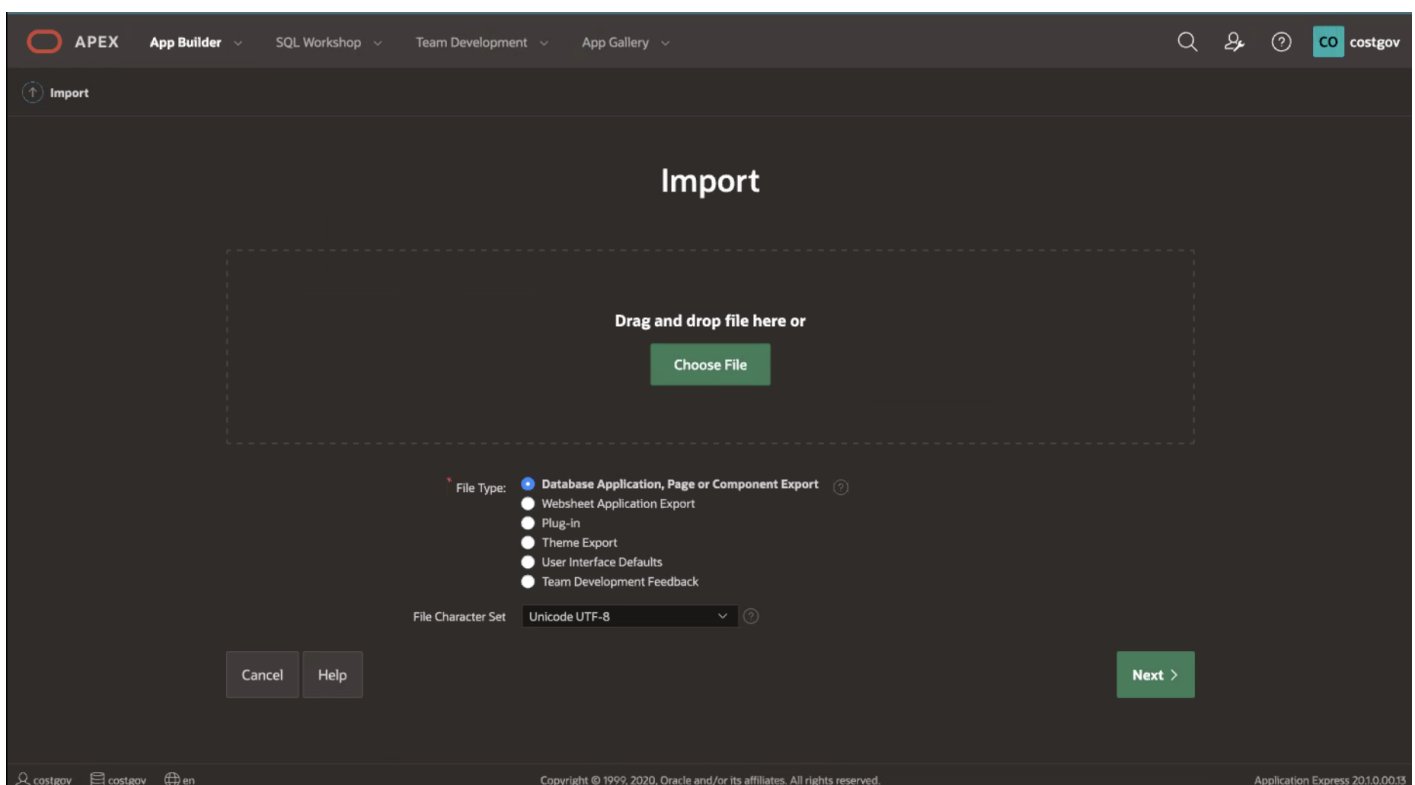
Step 3: Click **Apply Changes**.

## Section 3.4 Import the Cost Governance SQL Package

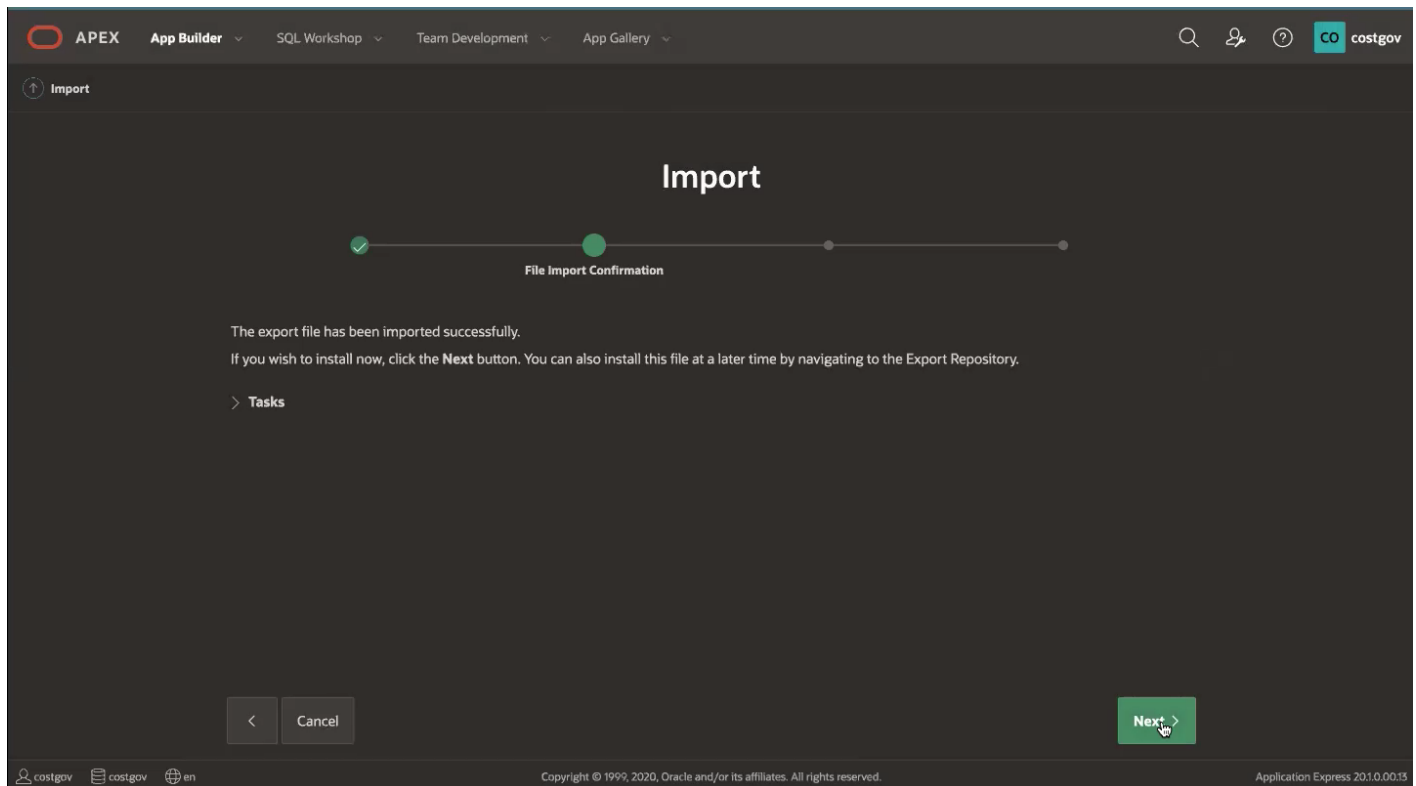
- Step 1: Navigate to the **App Builder** drop down and click **Import**.



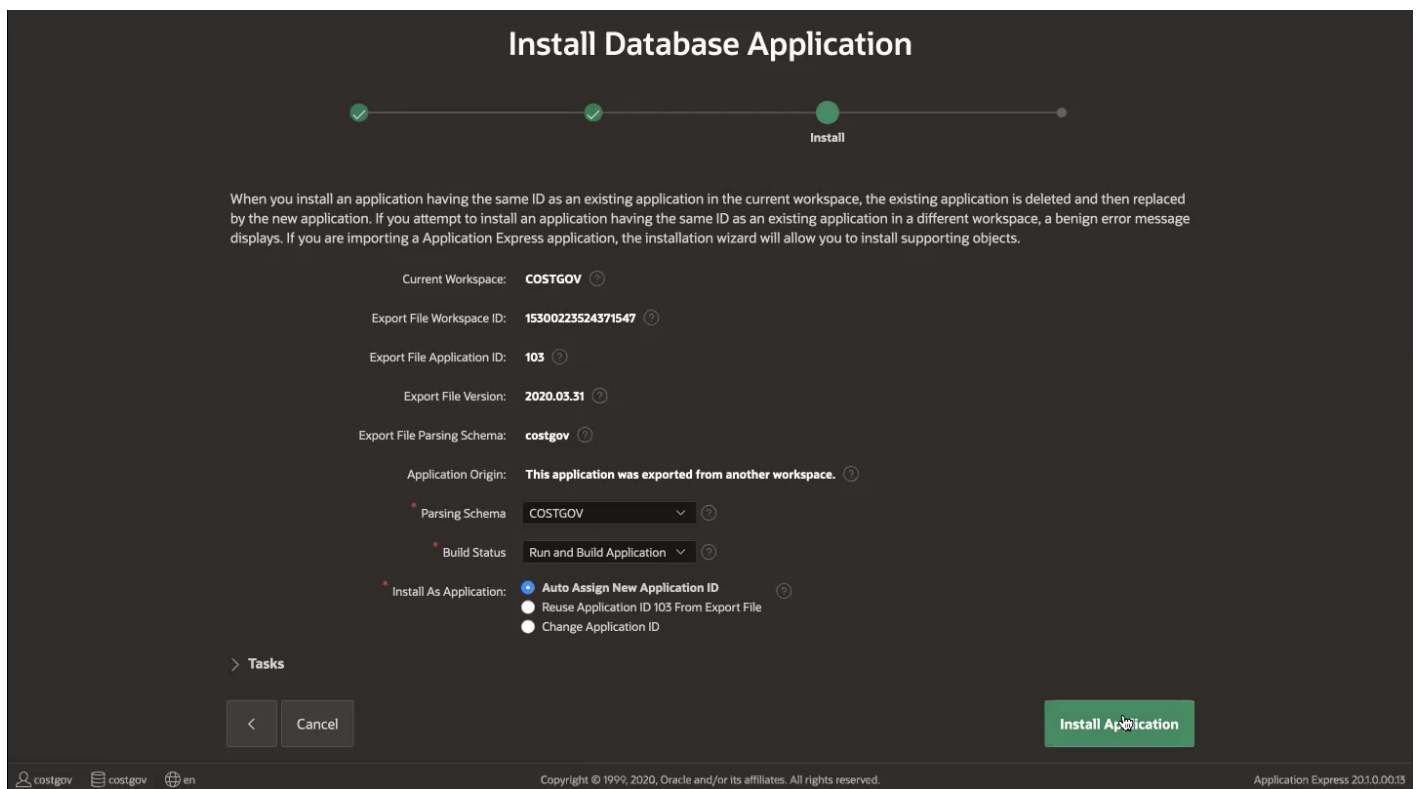
- Step 2: Import the Apex: OCI Cost Gov. Management Module file (Costgov\_Apex\_v1.sql) by clicking on **Choose File** and navigating to the locally saved copy of the package. Then click **Next**.



- Step 3: Confirm sql package has been imported successfully, click **Next** to install.



- Step 4: Review the information on the Install Database Application page and click **Install Application** when you are ready.



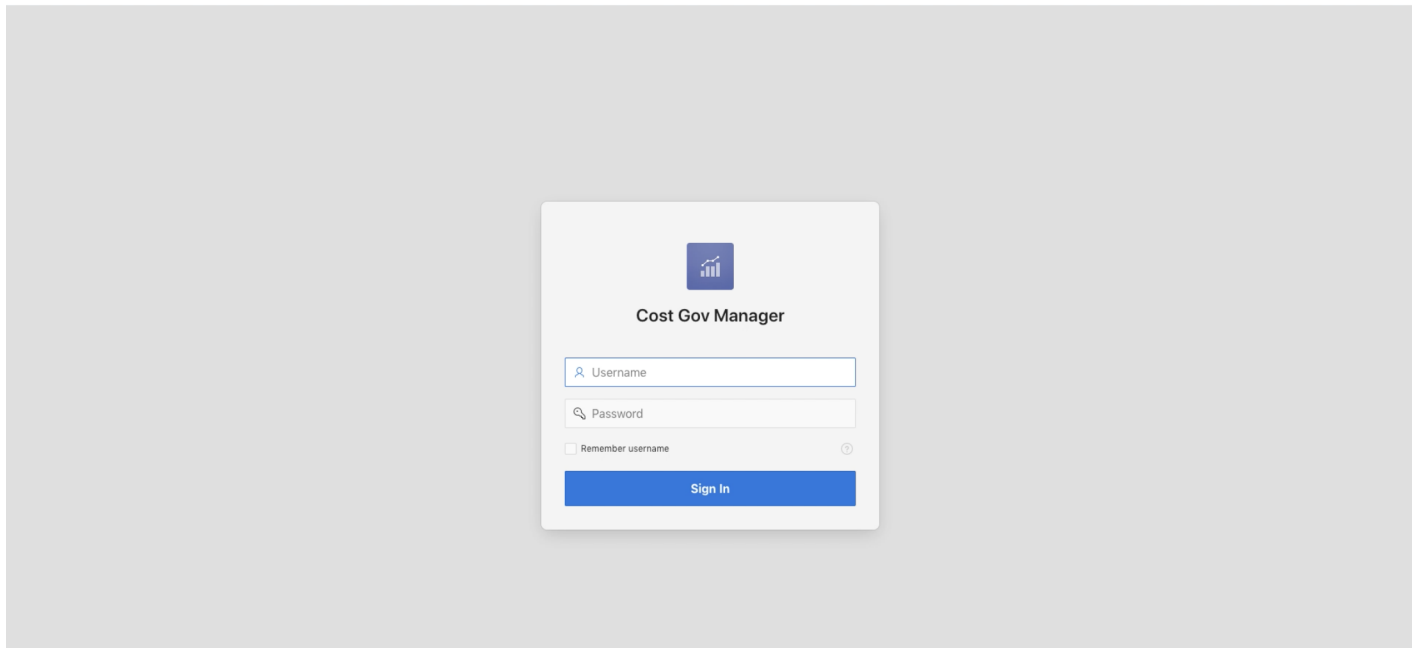
Clicking Install Application will take you to the Install Application page.

- Step 5: Click **Next**.
- Step 6: Click **Install** to install the application along with the supporting objects.
- Step 7: Click **Run Application** to initiate the installed application.

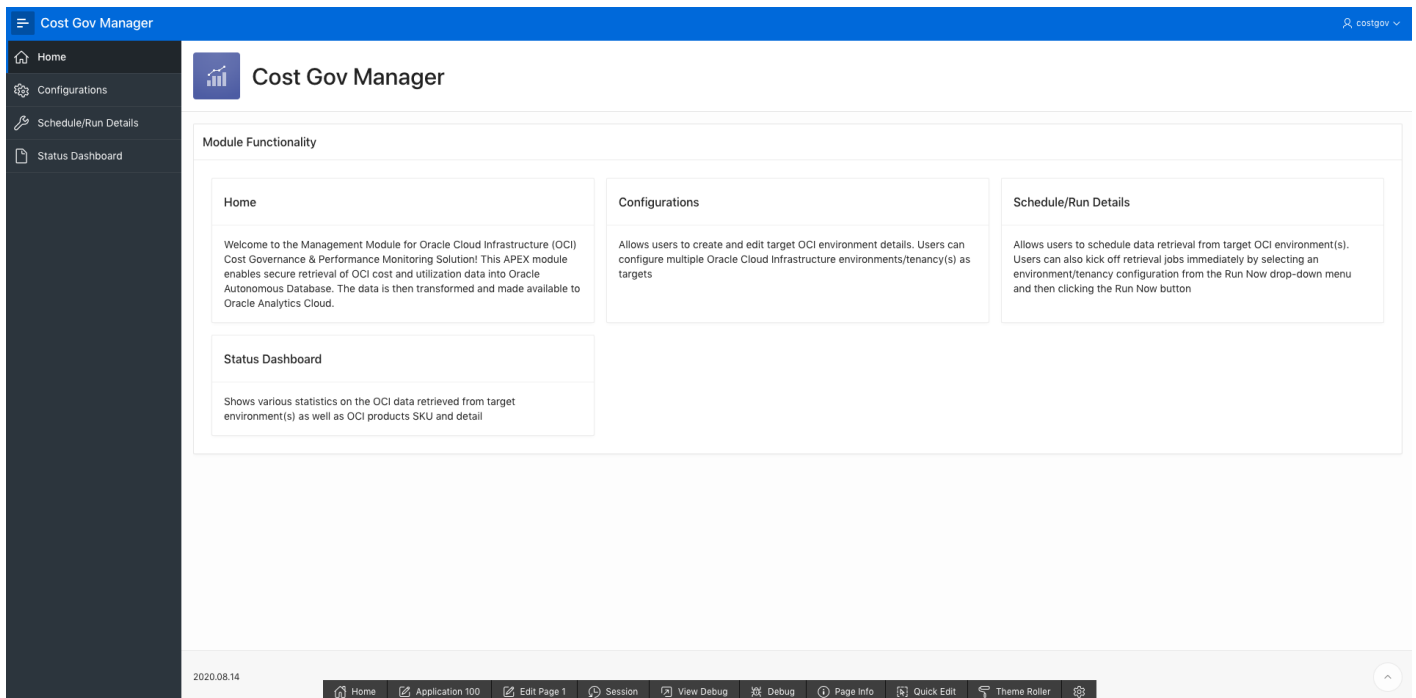


## Section 3.5 Log In to the Cost Governance Manager

- Step 1: Log in to the application **Cost Gov Manager**. Enter your **Username - COSTGOV** and **Password** (Hint: Management Module password created earlier) and click **Sign In**.



Welcome the Management Module!



### Section 3.5.1 Configure Cost Governance Manager

- Step 1: Navigate to Configurations tab by clicking **Configurations** on the left-hand menu.
- Step 2: Click the **Create Configuration** button (Hint: Located on the top-right).

**Manage Configuration**

**Configuration Information**

Config Name

Description

**Credential Information**

Tenancy OCID

User OCID

Fingerprint

Key Text or File  
-- Supply Private Key --

Cancel Create

Fill in:

- Config Name - (Hint: Choose any name)
- Description (Optional)
- Tenancy OCID
- User OCID
- Fingerprint
- Private Key Text

For more on how to locate aforementioned information see [link](#).

- Step 3: Click **Create** to complete environment configuration.

Cost Gov Manager

Home Configurations Schedule/Run Details Status Dashboard

Search Go Actions Create Configuration

Configuration Name	Description	Tenancy OCID	Region
CostGovMarketplace	-	ocid1.tenancy.oc1..aaaaaaa2vrzvc76iinwe36brcv2lofurriivmpnvcckuhgvng3p4ywfkjma	us-ashburn-1

2020.07.31

Home Application 100 Edit Page 2 Session View Debug Debug Page Info Quick Edit Theme Roller

Note: The Management module allows configuration of data retrieval from multiple OCI Tenancies. For each OCI Tenancy, a separate configuration setup is needed. Repeat steps in Section 3.5.1 to configure each separate OCI Tenancy.

- Step 4: Navigate to **Schedule/Run Details** tab, select configuration from the **Configuration drop-down menu** and click **Run Now** (Hint: This will kick off data retrieval from the configured OCI Instance into the Autonomous Data Warehouse. First time data retrieval may take several hours.)

#### IMPORTANT:

Single Tenancy configuration: Allow the First Run/Schedule Job to complete before moving to Section 4.3 Analytics Dashboard Setup.

**Multi-Tenancy configuration:** Multiple tenancies may be configured in this module, however, it is important not to run or schedule data retrieval jobs concurrently. Also, allow at least one Run jobs per tenancy to complete before proceeding to Section 4.3 Analytics Dashboard Setup.

- Step 5: From the left-hand menu, navigate to **Status Dashboard** to review the script execution and meta-data. Please proceed with the rest of the configuration while the data retrieval happens in the background. (Hint: First time retrieval of OCI cost and monitoring data may take several hours to complete.)

**Cost Gov Manager** costgov

Home Configurations Schedule/Run Details **Status Dashboard**

Config Name: CostGovMarketplace

**Statistics**

Earliest Cost Date	Latest Cost Date	Earliest Compute Metrics Date	Latest Compute Metrics Date
04 June, 2020	27 July, 2020	-	-
Number of Tenancies	Total Files Available	Total Files Processed	Total SKUs Count
1	68	64	15

Search: [ ] Go Actions

1 - 15

SKU	SKU Description	Unit Price	Unit	Last Billed
B91445	Block Volume - Free	\$0.0	GB Months	7/27/2020
B91962	Block Volume - Performance Units	\$0.0017	GB Months	7/27/2020
B91961	Block Volume - Storage	\$0.0255	GB Months	7/27/2020
B90926	Monitoring Service - Retrieval	\$0.0	Million Datapoints	7/22/2020
B91627	Object Storage - Requests	\$0.0	10K Requests	7/9/2020

Home Application 100 Edit Page 10 Session View Debug Debug Page Info Quick Edit Theme Roller

### Section 3.5.2 Schedule OCI data retrieval

- Step 1: Navigate to the **Schedule/Run Details** tab.
- Step 2: Click the pencil **Edit Icon** next to configuration just created.
- Step 3: Schedule OCI Cost and Monitoring Data retrieval by choosing a suitable job interval frequency and start time
  - Job Interval - Daily or Weekly
  - Start Date - Use the date picker to choose a start date and time. Click **Close** to confirm your selection. [Hint: Time is in Coordinated Universal Time (UTC).]
- Step 4: Click **Create/Update**.

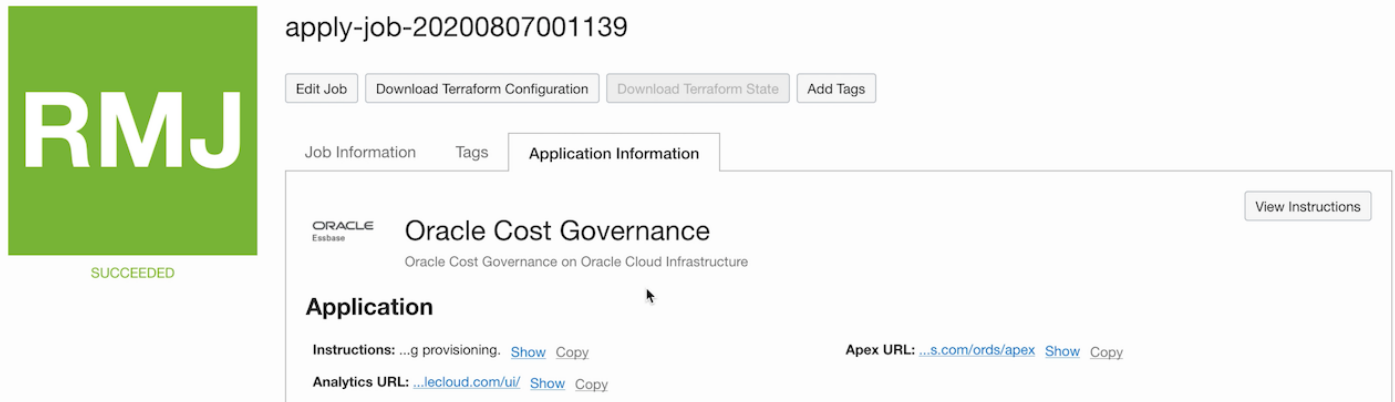
(Hint: This selection will be disabled if a data retrieval job is running. Wait for the job to finish and then schedule job frequency)

## Section 4 Oracle Analytics Cloud

### Section 4.1 Navigate to Oracle Analytics Cloud

- Step 1: Navigate to your Oracle Analytics Cloud Instance by clicking **Analytics URL** (Hint: Oracle Analytics URL is located in Application Information tab on Stack Detail page).

Resource Manager » Stacks » Stack Details » Job Details



apply-job-20200807001139

Edit Job Download Terraform Configuration Download Terraform State Add Tags

Job Information Tags Application Information

ORACLE  
Essbase

Oracle Cost Governance

Oracle Cost Governance on Oracle Cloud Infrastructure

Application

Instructions: ...g provisioning. [Show](#) [Copy](#)

Apex URL: ...s.com/ords/apex [Show](#) [Copy](#)

Analytics URL: ...lecloud.com/ui/ [Show](#) [Copy](#)

View Instructions

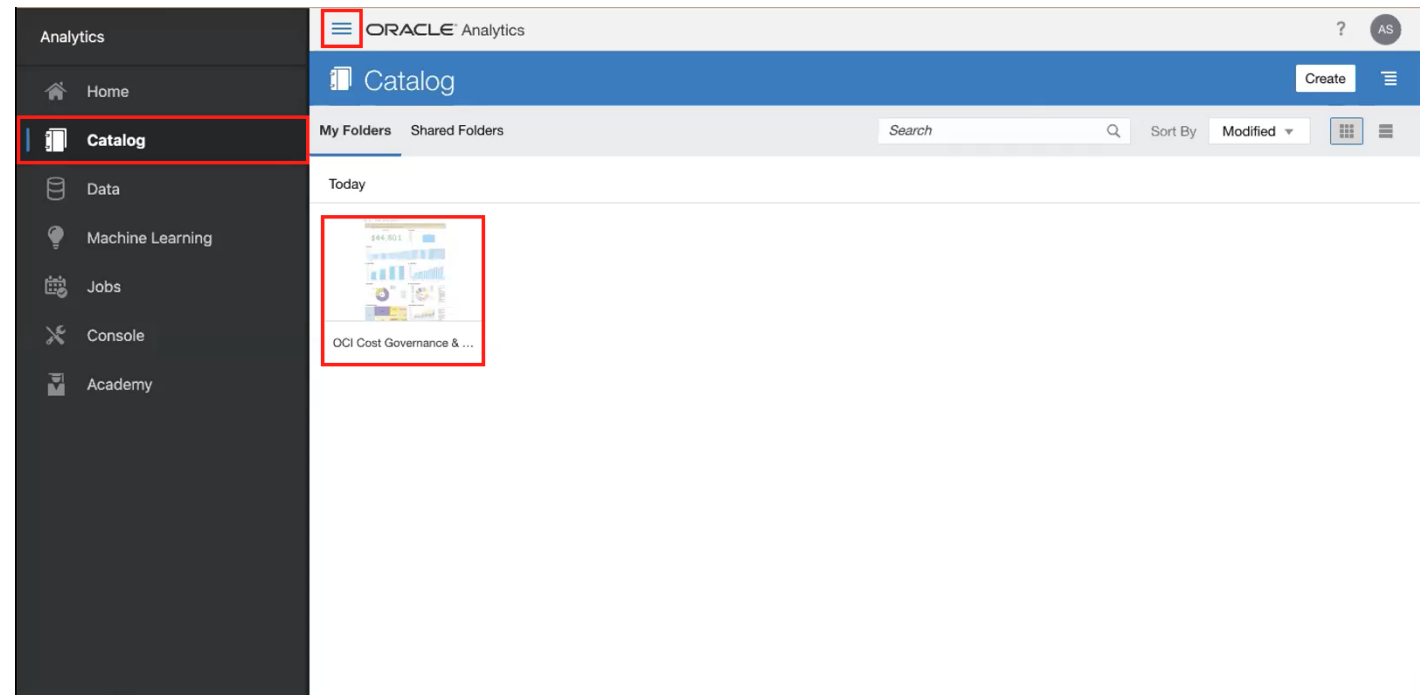
### Section 4.2 Import the Analytics: OCI Cost Governance & Performance Monitoring Dashboards file into the OAC Instance

- Step 1: From OAC Home page, click on the Right Hamburger Menu icon and select **Import Project/Flow**.
- Step 2: In the Import Project/Flow dialog, click **Select File** or drag the Analytics: OCI Cost Governance & Performance Monitoring Dashboards file (Costgov\_Analytics\_v1.dva) project onto the dialog, then click **Import**. (Hint: For help visit [link](#))
- Step 3: After project has been successfully imported Click **OK**.

### Section 4.3 Access OCI Cost Governance & Performance Monitoring Project

- Step 1: From the OAC Home page, click on Left Hamburger Menu and select **Catalog**.
- Step 2: Verify that the project named **OCI Cost Governance and Performance Monitoring - v1** has been imported. We will navigate back to this page later.

Note: Do not open the catalog.



## Section 4.4 Establish Connection Between the Oracle Autonomous Data Warehouse and OCI Cost Governance & Performance Monitoring Project

- Step 1: Download the wallet file from your Autonomous Data Warehouse. Autonomous Database URL is located in **Application Information** tab on Stack Detail page (Hint: For detailed instructions regarding these steps see [link](#)).

Note: Link to the ADW instance is located under Application Information tab on Stack Details Page. User Name is admin and password is the password that was set during the application build process.

- Step 2: From your Oracle Analytics Cloud instance Home page, click the top left hamburger menu and select **Data**.
- Step 3: Navigate to the tab labeled **Connections** and locate the **Data Connection** called **costgov**.
- Step 4: Right-Click on the connection labeled **costgov** and select **Inspect**.
- Step 5: In the General page, enter the following:
  - Connection Name: **costgov**
  - Description - Add description as needed
  - Service Name - See Step 6 below
  - Username: **costgov**
  - Client Credentials - See Step 6 below
  - Password - (Hint: Database Password provided during stack creation)

The screenshot displays the Oracle Analytics Cloud interface. On the left, a sidebar shows the 'Data' menu with 'Connections' selected. The main area shows the 'costgov' connection configuration. The 'General' tab is active, displaying the following fields:

- Connection Name:** costgov
- Description:** (empty field)
- Service Name:** costgovdb3107\_high (dropdown menu)
- Client Credentials:** cwallet.sso (with a 'Select...' button)
- Username:** costgov
- Password:** (empty field)

The interface also shows a 'costgov' connection in the 'Connections' list on the left sidebar.

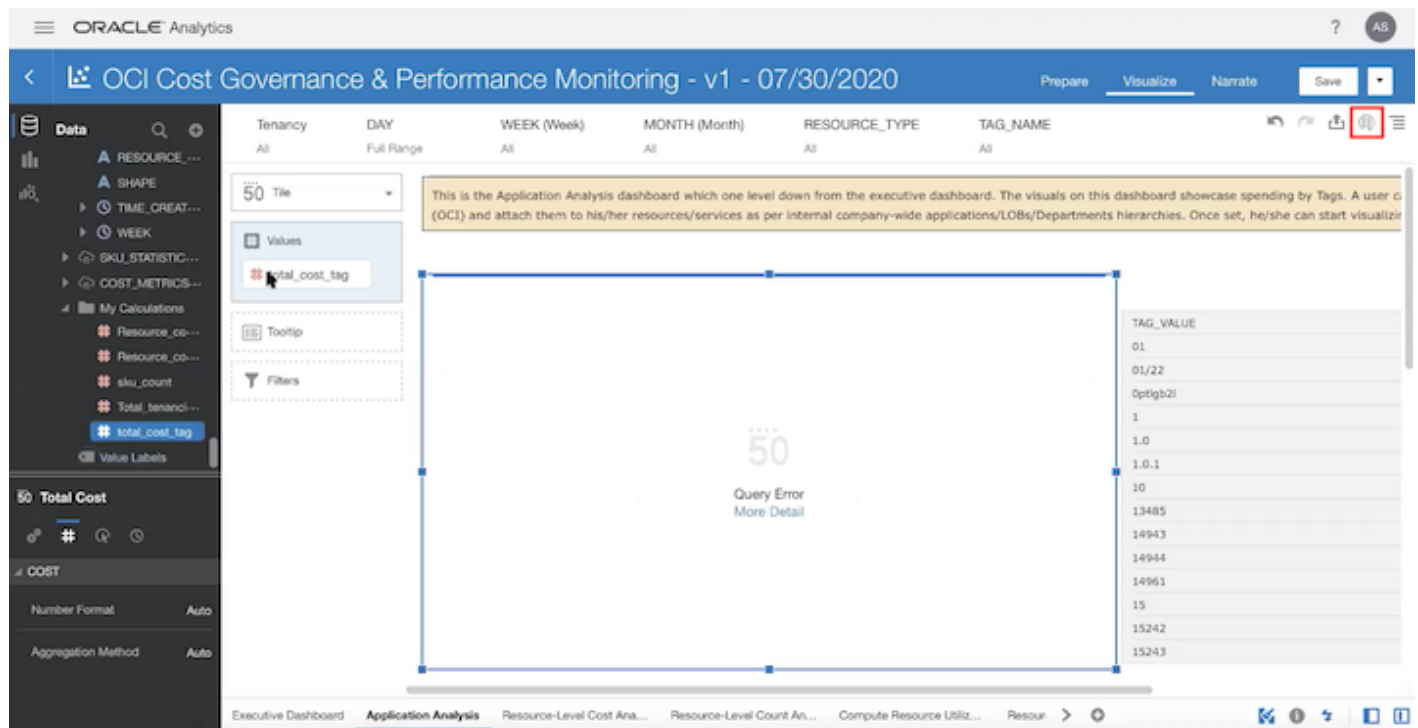
- Step 6: For Client Credentials, click the **Select...** box and choose the appropriate ADW Wallet File downloaded earlier in Step 1. This will populate both the Client Credentials field and the Service Name.
- Step 7: Click **Save** and then click **Close**.



## Section 4.5 Access your Cost Gov Project

- Step 1: Navigate back to your OAC **Catalog**.
- Step 2: Click on the project named **OCI Cost Governance and Performance Monitoring - v1** to open it.
- Step 3: You can navigate between canvases by clicking on the different tabs below. If the charts do not populate automatically, click the **refresh** button located near the top-right of each canvas. The last canvas (NOTES) contains the description of the other canvases and the analysis included in this project.

Note: Resource Utilization Trends dashboard, with 30/60/90 day utilization charts, is the only dashboard that is cached and not live querying the Autonomous Database. This was done to ensure charts populate quickly on load. To pull in new data into this dashboard, please click the refresh data button at the top right section.



## Section 4.6 Troubleshooting: Canvases or Charts not loading

Initially, certain canvases or charts may not load or may show as data not available/empty.

Causes:

- First time data retrieval may take hours to complete. To confirm data has been loaded, please check the **Cost and Monitoring Statistics** dashboard.
- Tags may not be setup on the target tenancy per OCI guidelines. For more on OCI tags visit [LINK](#).
- Analysis and views may be impacted or partially available if Compartments and Sub-compartments are not set up per OCI guidelines.

If the problem persists, please try the following:

### Tip 1:

Navigate to the **Prepare** tab. For each data set, click the Profile button at the center of the screen to see a sample of the retrieved data.

### Tip 2:

Follow the steps below if you experience issues with data retrieval:

- In the upper right-hand corner, under Prepare, click on **Edit Definition**.
- Click **Remove All** (Hint: All columns should have been removed)

The screenshot displays the Oracle Analytics 'Cost Gov - Marketplace' interface. The 'Prepare' tab is active, showing the 'COSTGOV\_RESOURCES' data set. The left sidebar contains a 'Preparation Script' section with 'Add COSTGOV\_RESOURCES External Data Set' and 'Results' section with 'All steps combined'. The main area shows a list of columns to be added, including CONFIG\_NAME, AVAILABILITY\_DOMAIN, COMPARTMENT\_ID, DISPLAY\_NAME, LIFECYCLE\_STATE, RESOURCE\_ID, RESOURCE\_TYPE, and TIME\_CREATED. A 'Remove All' button is visible in the 'Selections (8/8)' section. The right sidebar shows the data set's metadata, including its name, description, connection, and owner.

- Click **Add All** (Hint: All columns will be re-added)

- Click **OK**

You will need to repeat these four steps for each of the tables listed across the bottom of the Prepare tab.

After removing and re-adding all of the columns for all tables, navigate to the **Visualize** tab to see your Cost Governance data populated in the dashboards.

## Section 4.7 Data Join and Dashboard Descriptions

### Section 4.7.1 Data Join Methodology

To review data joins, navigate to the **Prepare** tab and then **Data Diagram** located at the bottom left. Data is joined using the logic detailed below:

Dataset	Joins	Tables
INSTANCE_COUNT_BY_BIN_LAST_30_DAYS	No	INSTANCE_COUNT_BY_BIN_LAST_60_DAYS INSTANCE_COUNT_BY_BIN_LAST_90_DAYS COSTGOV_COST_RESOURCES_MV COSTGOV_METRICS_RESOURCES_MV COST_METRICS_STATISTICS_DASHBOARD COSTGOV_COST_TAGS_MV SKU_STATISTICS_DASHBOARD
INSTANCE_COUNT_BY_BIN_LAST_60_DAYS	No	INSTANCE_COUNT_BY_BIN_LAST_90_DAYS COSTGOV_COST_RESOURCES_MV COSTGOV_METRICS_RESOURCES_MV COSTGOV_COST_TAGS_MV COST_METRICS_STATISTICS_DASHBOARD SKU_STATISTICS_DASHBOARD
INSTANCE_COUNT_BY_BIN_LAST_90_DAYS	No	COST_METRICS_STATISTICS_DASHBOARD COSTGOV_COST_RESOURCES_MV COSTGOV_METRICS_RESOURCES_MV COSTGOV_COST_TAGS_MV SKU_STATISTICS_DASHBOARD
COSTGOV_COST_RESOURCES_MV	CONFIG_NAME DAY RESOURCE_ID	COSTGOV_COST_TAGS_MV COSTGOV_METRICS_RESOURCES_MV
	CONFIG_NAME	COST_METRICS_STATISTICS_DASHBOARD SKU_STATISTICS_DASHBOARD
COSTGOV_METRICS_RESOURCES_MV	CONFIG_NAME DAY RESOURCE_ID	COSTGOV_COST_TAGS_MV
	CONFIG_NAME	COST_METRICS_STATISTICS_DASHBOARD SKU_STATISTICS_DASHBOARD
COSTGOV_COST_TAGS_MV	CONFIG_NAME	COST_METRICS_STATISTICS_DASHBOARD SKU_STATISTICS_DASHBOARD

COST\_METRICS\_STATISTICS\_DASHBOARD   CONFIG\_NAME   SKU\_STATISTICS\_DASHBOARD

## Section 4.7.2 Dashboard Description -

OCI Cost Governance and Performance Monitoring project comes with a default set of dashboards. Users can customize these dashboards or create new ones based on existing/additional data sources (e.g. departmental budget). Each canvas has universal filters (except for **Resource Utilization Trends** dashboard) at the top that can be used to slice and dice canvas insights. Additionally, dynamic filtering enables users to filter by any element on a chart (e.g. Compartment name) by right-clicking and choosing **Keep Selected**.

### The Executive Dashboard

- The Executive Analysis dashboard provides spending insights at a high level, meant for Executives review. The visuals on this dashboard showcase overall cost, daily/weekly/monthly cost breakdowns, cost by different Oracle Cloud Infrastructure (OCI) services, cost by compartments and more. Universal filters provide means to slice the data by OCI Environments/Tenancies (in case of multi-tenancy deployment), by date range, and by resource/service types. Dynamic filtering allows users to filter by any component (right-click > **Keep Selected**) within the dashboard. Users can bring in more data elements and customize the dashboard further. The export feature allows the export of this dashboard for external presentation.

### Application Analysis Dashboard

- The Application Analysis dashboard shows resource costs based on Tags. In OCI, customers can Tag resources based on Lines of Business, Applications, Projects or other business groupings. For more on OCI tags visit [LINK](#).

### Resource-Level Cost Analysis Dashboard

- The Resource Level Cost dashboard showcases spending by Resource ID, resource shape, resource status, resource name and resource type. (Hint: A Resource ID is a unique ID assigned to a resource in Oracle Cloud Infrastructure (OCI).)

### Resource-Level Count Analysis Dashboard

- The Resource Level Count dashboard shows resource counts by week, month, region, resource shape, resource status, and resource type. This dashboard also showcases trends in resource count over time.

### Compute Resource Utilization Dashboard - OCI Compute Resources

- The Compute Resource Utilization dashboard provides insights into resource utilization. Matrices include Average CPU, Max CPU, Average Memory and Max Memory. This dashboard also contains visualizations based on average of Max CPU and Max Memory by compartments and resource shapes.

## Resource Utilization Trends Dashboard

- Resource Utilization Trends Dashboard showcases all resources that fall under four manually created bins/groups based on their hourly utilization in the last 30, 60, and 90 days. The four bins in this analysis are:
  - utilization < 30%
  - 30% <= utilization < 60%
  - 60% <= utilization < 90%
  - utilization >= 90%
- This dashboard enables decision-makers to see which resources are either constantly under-utilized and may need to be scaled down or over-utilized and may need to be scaled up. Here utilization =  $\text{Max}(\text{Max CPU}, \text{Max Memory}) + 10\%$  for any given hour. 10% signifies extra buffer/headroom.

Note: Utilization details shown on this dashboard should only be one of the considerations when deciding whether or not to increase or decrease capacity. Please consult application owners, users and other relevant stakeholders before making any decisions, e.g. an application may have been deliberately over-provisioned due to anticipated demand.

- **Navigation:**

- For **Resource Utilization – Last 30 days** section:

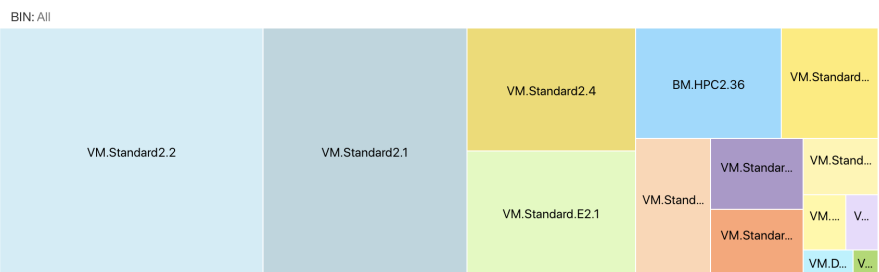
- Step 1: Click on any bin (red/yellow/green/blue box) inside the *Resource count by Bin* chart (as shown in the red highlighted area in the image below). Once selected, *Resource count by Shape* automatically adjusts to show the number of resources by compute shape within the bin. [Hint: The latest configuration of VMs are considered in this insight.]

Similarly, the *Max CPU & Memory by Resource* chart will automatically adjust to show resources and their respective Max CPU and Max Memory values over the last 30 days in that bin .

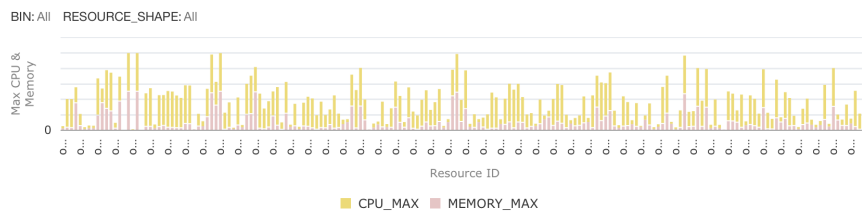
**Resource count by Bin**



**Resource count by Shape**

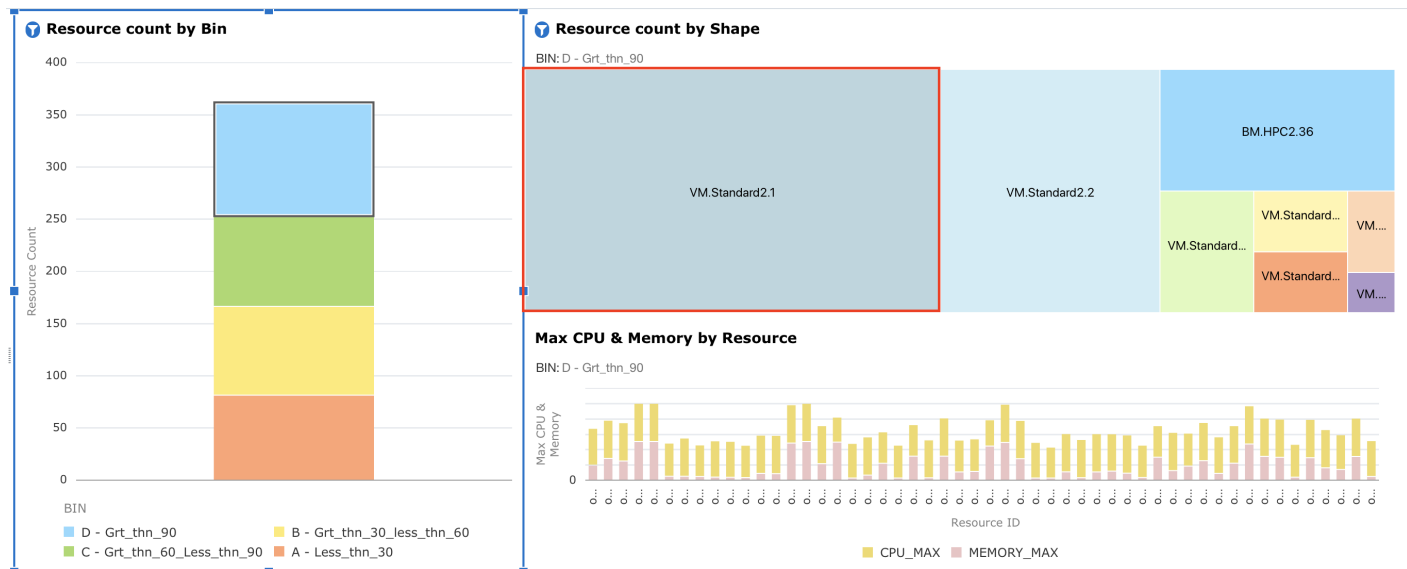


**Max CPU & Memory by Resource**





- Step 2: To further drill down into this analysis, click on any of the blocks (VM Shape) within *Resource count by Shape* chart. Based on the selection, the *Max CPU & Memory by Resource* chart will automatically update to show resources and their respective Max CPU and Max Memory values for the selected shape over the last 30 days.



- Step 3: To undo your action, simply click on the undo button in the top-right corner of the dashboard or just click on any white space inside the *Resource count by Bin* and *Resource count by Shape* visualizations.
- Follow a similar process for **Resource Utilization – Last 60 days** and **Resource Utilization – Last 90 days** sections.

Note: Please avoid adding global filters on this dashboard as the underlying datasets for this dashboard such as `*INSTANCE_COUNT_BY_BIN_LAST_30_DAYS*`, `*INSTANCE_COUNT_BY_BIN_LAST_60_DAYS*` and `*INSTANCE_COUNT_BY_BIN_LAST_90_DAYS*` are not connected/joined. For best results 30/60/90 day bins/groupings should be each reviewed independently.

## Cost and Utilization Statistics Dashboard

- This Dashboard contains metadata on OCI cost and usage information stored in the application's database. Information includes earliest and latest cost dates, earliest and latest utilization dates, number of days for which the data has been processed, SKU information etc.

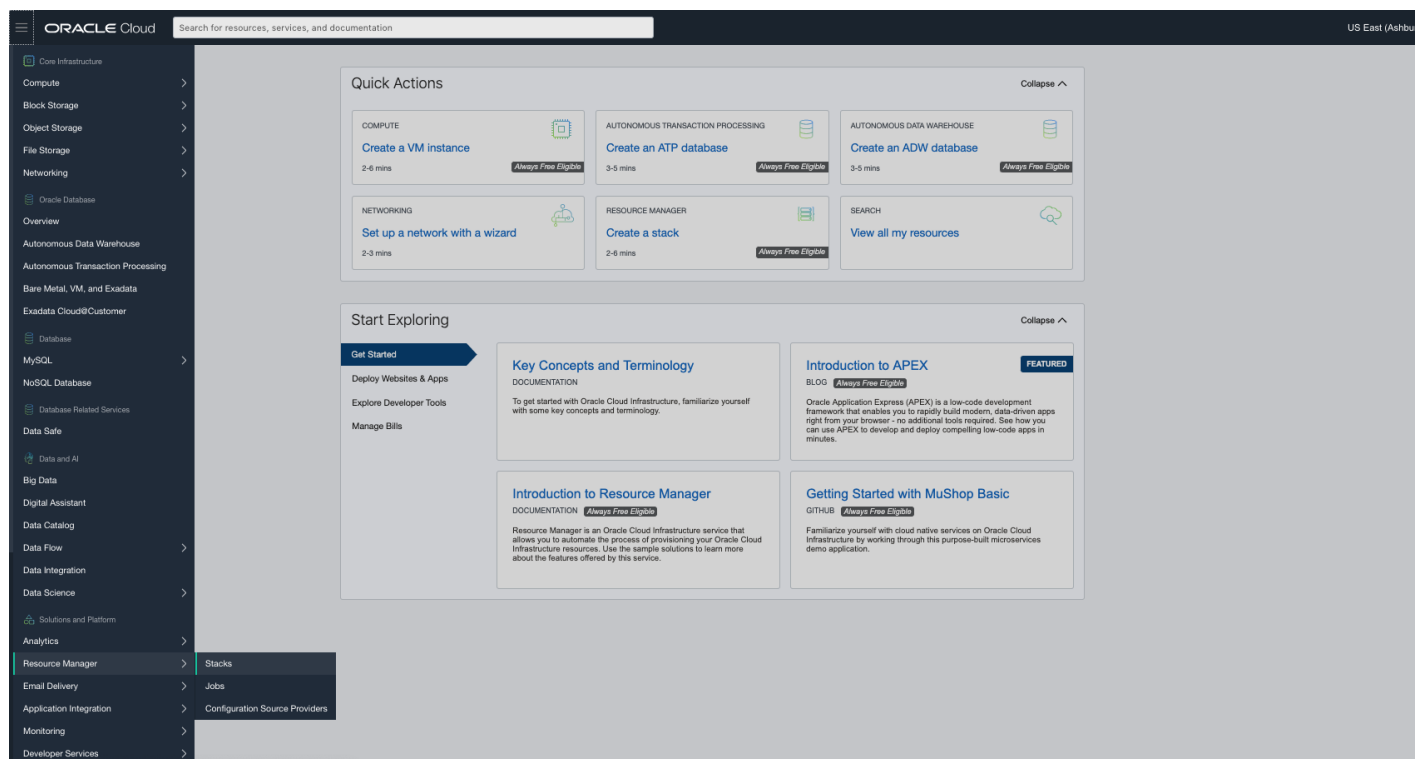
## Section 4.8 How to uninstall this application and delete all data

Follow the steps below to remove OCI Cost Governance and Performance Monitoring application.

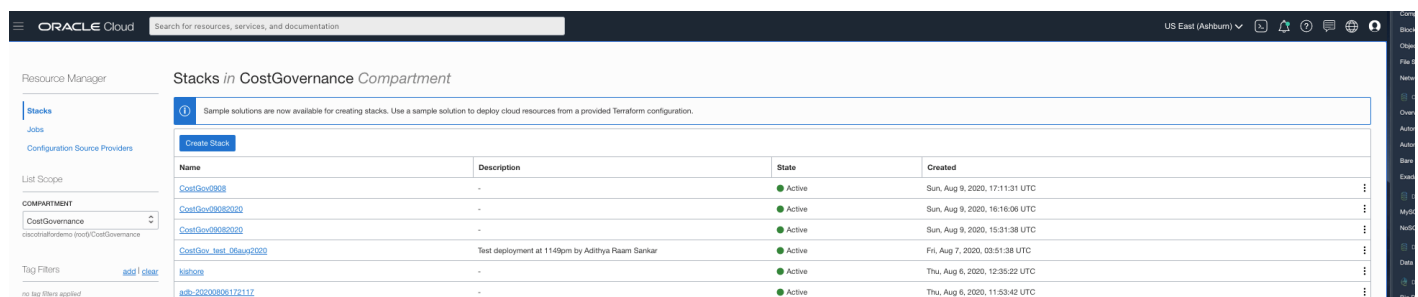
**Warning:** All data, application components and objects, including OAC, ADB, APEX application and network configurations will be removed after following the steps below. Once executed, components and data will be permanently deleted and cannot be restored.

### Section 4.8.1 Resource Manager Stack

- Step 1: From OCI Console main Hamburger menu (Top Left), Navigate to **Resource Manager** and click on **Stacks**.



- Step 2: Select the **Compartment** and locate the original stack used to create the Cost Governance and Performance Monitoring application.



- Step 3: Click to open the application **Stack**. (Hint: Stack should show as Active and last job should be an Apply job with a Green Succeeded status under State)

- Step 4: Navigate to **Terraform Actions** dropdown menu and Select **Destroy**.

**CostGov0908**

Stack Information: Tag:  Plan:  Apply:  Import State:  Destroy:

Description: OCID: [ocid:mcdafe-20200809131519](#) [Show](#) [Copy](#) [View Application Information](#)

Created: Sun, Aug 9, 2020, 17:11:31 UTC

Time of Drift Detection (Last Run): N/A [Run drift detection now](#)

Compartment: [ciscotrialordemo \(root\)/CostGovernance](#)

Terraform Configuration File (zip): [Uploaded](#) [Upload New File](#) [Download](#)

Terraform version: 0.12.x

Status of Drift Detection (Last Run): Not Checked

**Jobs**

Name	Type	State	Start Time	End Time
<a href="#">apply-job-20200809131519</a>	Apply	Succeeded	Sun, Aug 9, 2020, 17:15:55 UTC	Sun, Aug 9, 2020, 17:42:20 UTC
<a href="#">plan-job-20200809131120</a>	Plan	Succeeded	Sun, Aug 9, 2020, 17:11:53 UTC	Sun, Aug 9, 2020, 17:12:33 UTC

Showing 2 Jobs < 1 of 1 >

Warning: All data, application objects and components will be permanently deleted. If you are unsure, STOP and BACKUP the data and dashboards.

- Step 5: Enter the required **Tags** and Click **Destroy**.

**CostGov0908**

Stack Information: Tag:  Plan:  Apply:  Import State:  Destroy:

Description: OCID: [ocid:mcdafe-20200809131519](#) [Show](#) [Copy](#) [View Application Information](#)

Created: Sun, Aug 9, 2020, 17:11:31 UTC

Time of Drift Detection (Last Run): N/A [Run drift](#)

**Jobs**

Name	Type	State	Start Time	End Time
<a href="#">apply-job-20200809131519</a>	Apply	Succeeded	Sun, Aug 9, 2020, 17:15:55 UTC	Sun, Aug 9, 2020, 17:42:20 UTC
<a href="#">plan-job-20200809131120</a>	Plan	Succeeded	Sun, Aug 9, 2020, 17:11:53 UTC	Sun, Aug 9, 2020, 17:12:33 UTC






Showing 2 Jobs < 1 of 1 >

- Step 6: The process will take time. Once completed, Job Information State will show **Succeeded**.

ORACLE Cloud

Search for resources, services, and documentation

US East (Ashburn)



Resource Manager > Stacks > Stack Details > Job Details

RMJ

SUCCEEDED

destroy-job-20200810232632

Edit Job

Download Terraform Configuration

Download Terraform State

Add Tags


Job Information

Tags

Application Information

OCID: [\\_prfgua](#) [Show](#) [Copy](#)

Job Type: Destroy

State:  Succeeded

Start Time: Tue, Aug 11, 2020, 03:27:09 UTC

Compartment: [ciscotrialfordemo \(root\)/CostGovernance](#)

Plan Job ID: Automatically approved

Working Directory: Not specified

End Time: Tue, Aug 11, 2020, 03:32:36 UTC

Resources

Logs

Variables

Associated Resources

Outputs

Logs

Download Logs

Show Timestamps

Initializing provider plugins...

The following providers do not have any version constraints in configuration, so the latest version was installed.

To prevent automatic upgrades to new major versions that may contain breaking changes, it is recommended to add version = constraints to the corresponding provider blocks in configuration, with the constraint strings suggested below.