Oracle® Communications
Cloud Native Core, OCI Deployment Guide

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Contents

Acronyms

The following table lists the acronyms and the terminologies used in the document:

Table   Acronyms

Acronyms	Description
AD	Availability Domain
APM	Application Performance Monitoring (of OCI, that receives traces)
ARP	Address Resolution Protocol
CAF Landing Zone	Cloud Adoption Framework - Landing Zone
CIDR	Classless Inter-Domain Routing
CNC	Cloud Native Core
CNCC	Cloud Native Configuration Console
CNCF	Cloud Native Computing Foundation
CNI	Container Network Interface
DRG	Dynamic Routing Gateway
EGW	Egress Gateway
FD	Fault Domain
GUI	Graphical User Interface
IAM	Identity and Access Management
IGW	Ingress Gateway
LDAP	Lightweight Directory Access Protocol
NF	A 3GPP-defined processing function in a network, which has defined functional behaviour and 3GPP-defined interfaces.
NF service	It is a functionality exposed by an NF through a service-based interface and consumed by other authorized NFs.
NF service instance	An identifiable instance of the NF service
NLB	Network Load Balancer
NPN	Non Public Network
NRF	Network Repository Function
CNE	Cloud Native Environment (CNC On-premises Environment)
OCI	Oracle Cloud Infrastructure
OCI Adaptor	OCI Adaptor components conduit between CNC Applications and OCI's observability services.
OCI LA	OCI Logging Analytics
OCPU	Oracle Compute Unit
OKE	OCI Container Engine for Kubernetes Environment
OTEL	OpenTelemetry
PaaS	Platform as a Service
Private VM	A Private Virtual Machine is a virtual machine hosted on-premise within a private network or infrastructure, usually owned and managed by an organization.
Public VM	A Public Virtual Machine is a virtual machine hosted on a public cloud infrastructure, such as Amazon Web Services (AWS), Microsoft Azure, and so on.
RDP	Remote Desktop Protocol
RPC	Remote Peering Connection

Table   (Cont.) Acronyms

Acronyms	Description
SAML	Security Assertion Markup Language
SCP	Oracle 5G Service Communication Proxy
SEPP	Security Edge Protection Proxy network function
SSH	Secure Shell
Terraform	Infrastructure as Code (IaC) software tool to provision and manage infrastructure in any cloud.
VCN	Virtual Cloud Network
WN	Worker Nodes

What's New in This Guide

This section lists the documentation updates for release 24.2.x.

Release 24.3.0- G14587-01, October 2024

There are no updates made to this document.

Release 24.2.0- G11784-02, August 2024

The following change is made in this release:

- Moved the Deploying OCI Adaptor section from *Oracle Communications Cloud Native Core, OCI Adaptor User Guide.*

Release 24.2.0- G11784-01, July 2024

Installation Updates:

- Added **Enable App Dimension** check-box in the Deploying OCI Adaptor section for configuring an extra dimension named **app** in the application metrics.
- Added **Scraping Interval** parameter in the Deploying OCI Adaptor section for configuring interval to scrape the application metrics.

Release 24.1.0- F92397-01, April 2024

This is the initial release of the document.

1

Introduction

This document contains information about the functionalities of Cloud Native Core Oracle Cloud Infrastructure (OCI) Adaptor and how to use it to seamlessly integrate the OCI's observability stack with CNC NFs.

The information in this document allows the users to:

- Deploy the OCI Adaptor on the public cloud OCI platform.
- Collect logs, metrics, and traces of CNC Applications and share them with OCI PaaS (Platform as a Service) using OCI Adaptor.

Overview

Oracle Cloud Infrastructure (OCI) is a set of complementary cloud services that enable you to host, build, and run a range of applications and services in a High Availability (HA) environment. OCI provides high-performance computing capabilities (comparable to physical hardware instances) and storage capacity in a flexible overlay virtual network that is securely accessible from your on-premises network.

Oracle Cloud Infrastructure (OCI) Container Engine for Kubernetes Environment (OKE) offers a carrier-grade container orchestration platform that fulfils the deployment requirements of cloud-native containerized applications.

OKE assists in managing and efficiently operating the Kubernetes cluster resources by automating administration and scaling tasks. OKEs simplify cloud deployment operations and reduce the operator's day-to-day network intervention. OKE provides two types of clusters a basic cluster and an enhanced cluster. CNC NFs are deployed on a basic cluster with only managed nodes.

You must perform OCI deployment tasks in the same sequence as outlined in the following table:

Table 1-1   OCI Deployment Task Sequence

Task	Subtask	References
Creating OCI User Management		Creating OCI User Management
	Creating User Groups	Creating User Groups
	Creating the User	Creating the User
	Creating the Auth Token to be Used as Registry Password	Creating the Auth Token to be Used as Registry Password
Creating OCI Infrastructure		Creating OCI Infrastructure
Deploying OCI Adaptor		Deploying OCI Adaptor
Configuring OCI Observability and Management		Configuring OCI Observability and Management
	Configuring NF Metrics Dashboard on OCI	Configuring NF Metrics Dashboard on OCI
	Configuring NF Alerts on OCI	Configuring NF Alerts on OCI

Table 1-1   (Cont.) OCI Deployment Task Sequence

Task	Subtask	References
Deploying CNC Applications		Deploying CNC Applications
Uninstalling OCI Adaptor		For more information, see the "Uninstalling OCI Adaptor" section in *Oracle Communications Cloud Native Core OCI Adaptor User Guide*.
Deleting OCI Infrastructure		Deleting OCI Infrastructure

Comparison of OCI and CNE

Oracle CNC 5G applications running on the Oracle on-premises platform consume the services listed under the "CNE Service" column as against the "OCI Service" in the table below.

Table 1-2   Comparison of OCI and CNE

Item	CNE Service	OCI Service	Details
App Logs	Fluentd and Kibana	OCI Logging Analytics	Fluentd is used with OCI Logging Analytics Output Plugin to send logs to OCI Logging Analytics (LA) service.
CNIs or Multus	Calico, Multus	Flannel, OCI NPN and IPvlan or MacVLAN	Multus is not preferred for Public OCIs.
Container Images	Operator's Registry Server	OCI Registry Server	5G CNC NF images and OCI-Adaptor images are added to the registry.
DNS	Core DNS	Core DNS	-
Keys	Kubernetes Secret	Kubernetes Secret	-
Load Balancer	LBVM with HAProxy	L4 Network Load Balancer	Network Load Balancers (NLB) facilitate automated traffic distribution from one entry point to multiple servers in the backend set.
Metrics and Alerts	Prometheus and Grafana	OCI Monitoring Service	Metrics are extracted and subsequently shared with the OCI Management Agent.
Traces	OpenTelemetry with Jaeger	OTEL Collector	OCI supports OpenTelemetry. The Application Performance Monitoring (APM) Java Tracer is not utilized.

2

Deployment Model

The Oracle Cloud Infrastructure (OCI) deployment infrastructure provides a flexible management system that allows you to create objects required during the instance deployment procedure prior to or during that deployment.

CNC NF on OKE

In the initial phase, the integration architecture requirements target deploying CNC Applications in two regions, with each region having one Availability Domain (AD) and a Fast Connect to the cloud operator's on-premise deployment.

Availability Domains and regions physically host the OCI. A region is a localized geographic area, and an AD is one or more data centers located within a region. Oracle cloud regions are globally distributed data centers that provide secure and high-performance local environments.

- ADs are isolated from each other, fault-tolerant, and unlikely to fail simultaneously or be impacted by the failure of another AD. If the OCI Region supports multiple ADs per OCI Region, configure the cloud services using multiple ADs to ensure HA (recommended).

- A Fault Domain (FD) is created by grouping the hardware and infrastructure within an AD. Each AD contains three FDs. FDs provide anti-affinity by allowing instance distribution so that the instances are not on the same physical hardware within a single AD.

The following diagram is a high-level architectural deployment showcasing the deployment of Oracle CNC Applications in one AD and two regions with OCI Fast Connect towards the operator's data centre. Each Oracle AD comprises three FDs. However, the diagram does not depict the same for brevity.

You can deploy 3GPP-based Oracle CNC Applications in OKE clusters running on OCI in public cloud regions. OCI Region comprises multiple Availability Domains, including numerous FDs within ADs. Some of the allowed deployment models for CNF NFs include the following:

- One Region with One AD or One Region with multiple ADs

- Multiple regions with One AD and multiple regions with multiple ADs

Cloud operators may choose an appropriate deployment based on the cost, redundancy requirements and so on.

Figure 2-1   Deployment of Oracle CNC NFs in One AD and Two Regions
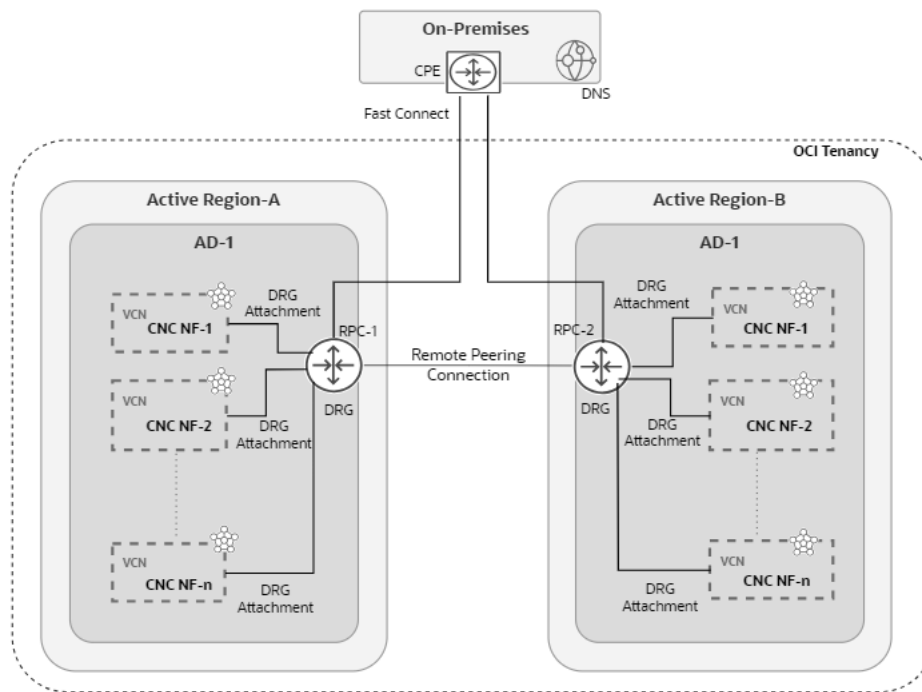
Two Regions Each with One Availability Domain

The following diagram depicts the deployment of a CNC Applications across two OCI regions with one OCI Availability Domain (AD) used in each region. The customer owns the OCI tenancy.

Each AD hosts the CNC NF in a separate OKE Cluster. CNC NF is deployed based on an active-active redundancy model in both regions.

CNC Applications residing in the OCI regions are provisioned by the operator using a Bastion Service which is reachable over the public internet.

Cross Data Centre Replication (XDCR) is enabled on the cnDBTier, thus enabling one region's failure to be seamlessly handled by the resources of the other OCI region.

The 5G NFs on the Operator's on-premises reach the CNC Applications in the OCI Regions over Fast Connect.

Figure 2-2   CNC NF deployment on OCI Public Cloud with one AD and two Regions
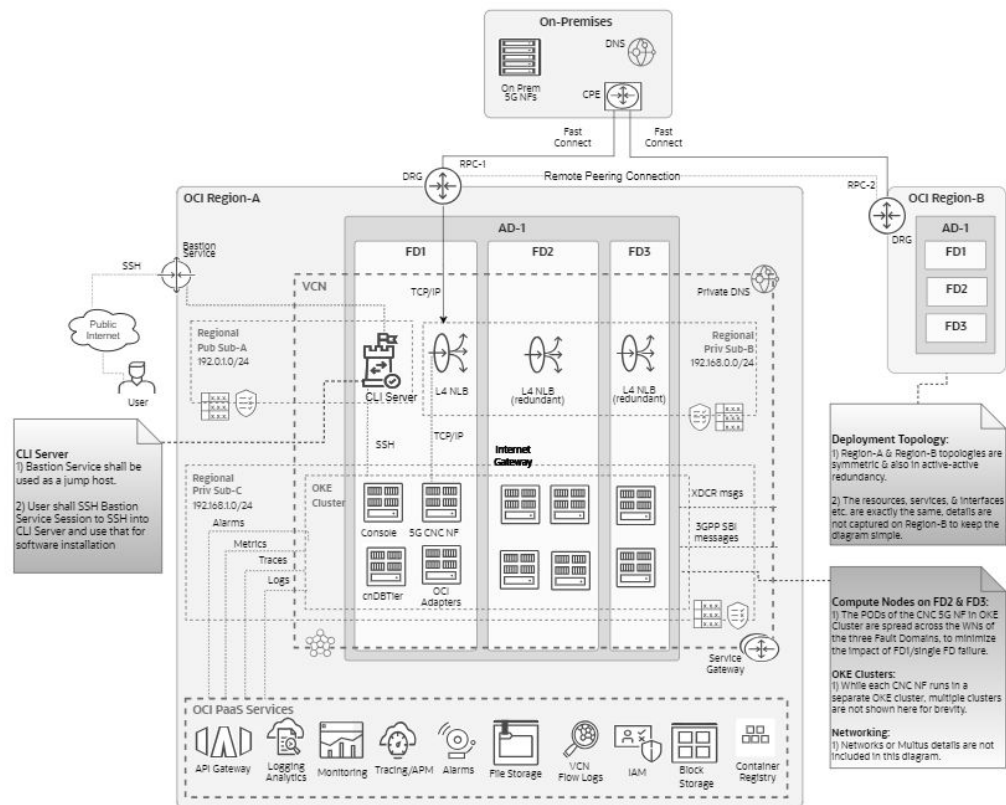
Account and Tenancy

The customer owns OCI tenancy and a portfolio of CNC 5G applications deployed on the OCI public cloud. CNC supports a two-site NF deployment in the initial phase, where a 'site' corresponds to an AD. Each OCI Region has one to three ADs.

A two-site NF deployment includes two OCI regions with one AD in each region or one OCI region with two ADs in the same region.

CNC NF Deployment Layout

This section describes the deployment of 3GPP CNC Applications as an NFset in the customer's OCI tenancy spanning two OCI regions.

The below diagram below depicts a hierarchical 3GPP NF set deployment layout in OCI regions grouped by compartments:

• Each OCI region comprises a root compartment and a "5G Core Network Compartment".

• Within the "5G Core Network Compartment", each CNC NF is placed in a separate "NFType Compartment".

• The NFType compartments are logically grouped across OCI regions, thus helping count the resources of NF or NF-set.

• Access policies such as read, use, and inspect are configured at the parent "5G Core Network Compartment" level.

- Users can avail access policies such as read, use, inspect, and manage at the "NFType Compartment" level.

- Separating each NF into a separate compartment enables the operator to use the `Tenancy Explorer` and obtain a count of the total resources used by each NF Type across this tenancy.

- By default, each NF OKE cluster is hosted in one single namespace (although the operator can host Console, CNC NF, cnDBTier, and OCI Adaptor in separate namespaces). Replication is enabled between the cnDBTier of each NF within an NFType compartment.

The diagram below displays a sample deployment layout of a 3GPP NF set across OCI regions grouped by compartments:

Figure 2-3   NF Deployment Layout Hierarchy
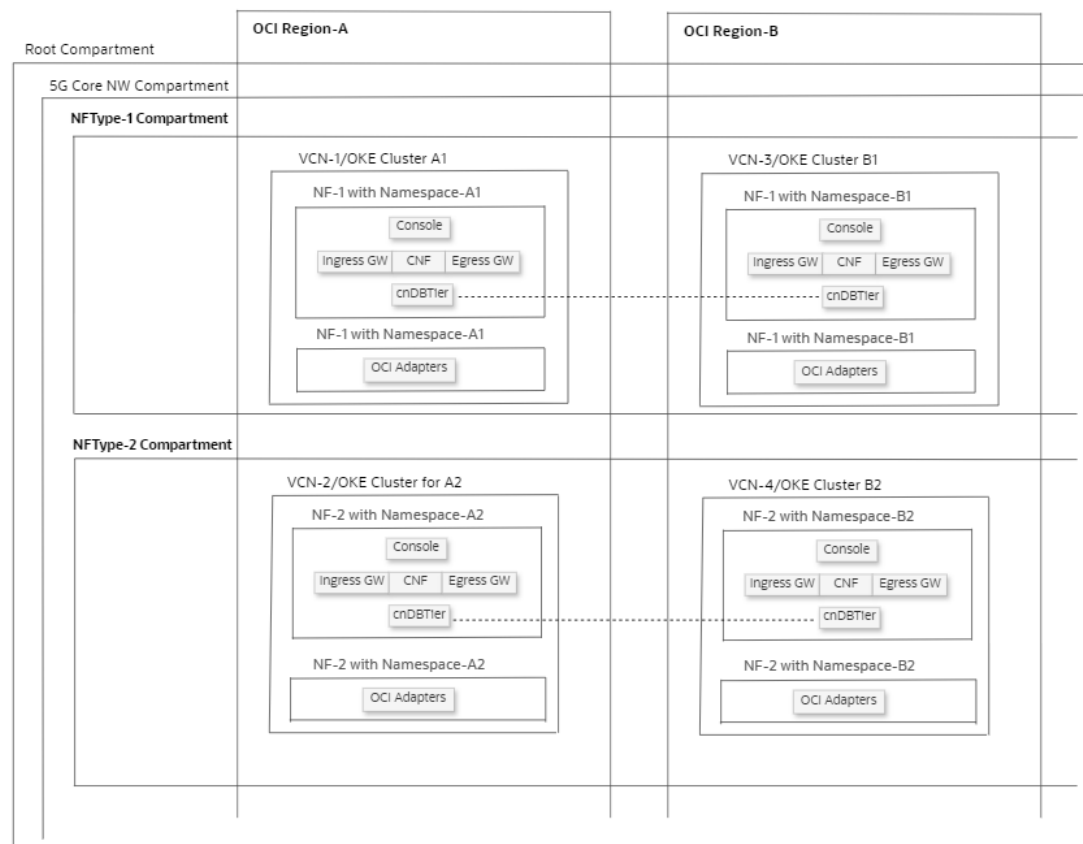
> ⓘ **Note**
>
> Georedundancy setup is optional. CNC NF deployment on OCI supports both Georedundant and Non-Georedundant deployments.

3

Preparing the OCI Tenancy and Deploying NFs

The following diagram represents the process for NF deployment in OCI:

Figure 3-1   Process for NF deployment in OCI
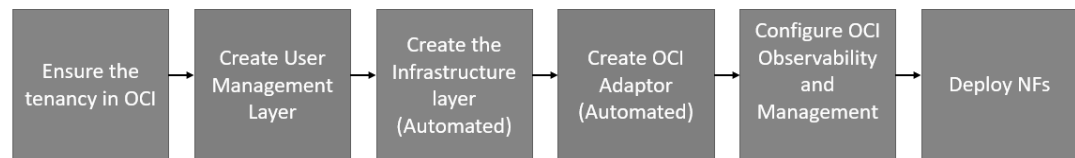
The User must perform the given procedures to deploy the NF:

1. Ensure the OCI tenancy is available.

2. Create Compartment Admin, OCI Adaptor Admin and Non-Admin User Groups. For more information, see Creating OCI User Management.

3. Create an infrastructure layer along with the components. For more information, see Creating OCI Infrastructure.

4. Deploy the OCI Adaptor. The Adaptor acts as a channel to transfer information between the CNC NF and OCI observability management. For more information, see Deploying OCI Adaptor.

5. Configure OCI Observability and Management. You can observe analytics and performance through OCI Observability and Management. For more information, see Configuring OCI Observability and Management.

6. Deploy the CNC Applications.

Prerequisites

Before installing and configuring OCI Adaptor, ensure the following:

- The user has OCI tenancy.

- The user has `Tenancy Admin` access.

- A `Tenancy Admin` or a `Compartment Admin` can run the terraform stack for creating infrastructure, but the stack responsible for deploying OCI Adaptor can only be executed by a `Tenancy Admin`.

Compute Instance

Following are the Compute Instance features and resources identified for CNC NF on OCI:

Table 3-1   Compute Instance

Features	Resources	Details
Compute instance	VM instances	CNC NF's shall support VM instances for OCI public cloud deployment. Bare Metal shall not be supported for OCI public cloud deployment.
Instance type	Regular instance	OCI supports instance features that allow instance customization for specialized workloads and security requirements. The supported instance types are Burstable instances, Shielded instances and Regular instances.
Shape type	Flexible shape	OCI supports several shapes for various computing and application requirements, such as Standard shapes, Dense-IO shapes, GPU shapes, and Flexible shapes. Flexible shapes allow choosing the number of OCPUs and the amount of RAM. NW bandwidth and count of vNICs scale proportionately with the number of OCPU's or various computing and application requirements, such as Standard shapes, Dense-IO shapes, GPU shapes, and Flexible shapes. Flexible shapes allow choosing the number of OCPUs and the amount of RAM. NW bandwidth and count of vNICs scale proportionately with the number of OCPUs.
VM shape	VM.Standard.E4.Flex (AMD)	The OCI supports a variety of shapes, as mentioned in the section Compute_Shapes, but CNC NFs on OCI are only hosted on "VM.Standard.E4.Flex". This VM shape supports up to six vNICs.
OS Image	Linux 8	OCI offers a multitude of OS images that determines the operating system and other software for an instance. The various category of images include platform images, trusted third-party images and Custom images, including bring your own image scenarios. For CNC NFs on OCI, the recommended image is Linux 8.
OCPU	32	The VM shape: VM.Standard.E4.Flex, supports a minimum of 1 OCPU and a maximum of 64 OCPUs.
RAM (GB)	256	The VM shape: VM.Standard.E4.Flex, supports a minimum of 1 GB and a maximum of 768 GB memory. ⓘ **Note** On OCI, for 32 OCPU's, the default RAM is 512GB.
Network Bandwidth (Gbps)	33	The VM shape: VM.Standard.E4.Flex, supports a minimum of 1 Gbps and a maximum of 40 Gbps bandwidth.
Storage	Block Volume	OCI also provides storage for compute instances with the services like Block Volume, File Storage, Object Storage and Archive Storage. Bastion compute and cnDBTier storage shall use block volume with iSCSIbased volume attachment for a superior performance.

Table 3-1   (Cont.) Compute Instance

Features	Resources	Details
Maintenance Action	Live migration	OCI provides multiple maintenance actions for compute instances, like Live Migration, Reboot Migration, Rebuild in Place and Manual Migration as indicated at maintenance-actions. CNC NF's shall support Live Migration, also recommended by OCI.

OCI Registry

The OCI Registry helps simplify development and production workflow. The CNC NF images are stored in the OCI public registry before deployment. CNC Helm charts refer to these images for deployment in the OKE cluster.

Pushing and Pulling Images

OCI generates an authentication token to push images to the OCIR.

For more information, see the "Pushing Images Using the Docker CLI" section in *Oracle Cloud Infrastructure Documentation*.

Install CNC NF

CNC Network Function (NF) needs to be installed manually following the instructions laid out in the *CNC NF installation guide*.

For more information, see "Installing CNC NF" section in *NF specific Installation, Upgrade, and Fault Recovery Guide*.

Terraform Scripts for OCI Deployment

Terraform is an Infrastructure as Code (IaC) tool that allows users to build, change, and version the cloud and on-premise resources safely and efficiently. Following are the terraform scripts (Infrastructure Automation Script) provided to automate the OCI deployment steps:

*   ocociAdaptor_csar_<version>.zip
    This package is in the standard CSAR format and contains the terraform scripts to create the OCI infrastructure and deploy OCI Adaptor. It also includes OCI Adaptor images and Helm charts.

    Download package from My Oracle Support as a prerequisite.

    Users cannot upload the CSAR package directly to OCI's Resource Manager stack. Therefore, unzip the CSAR package to extract the terraform scripts and then upload the scripts to the resource manager stack. Within the scripts directory, the following terraform scripts are present:

    –   ocociAdaptor_infra_create_<version>.zip
        This package contains the terraform scripts responsible for creating the infrastructure.

    –   ocociAdaptor_install_<version>.zip
        This package contains the `Terraform scripts`, `Helm charts`, and `Shell scripts` to deploy the OCI Adaptor. Administrators can directly upload this package as the OCI's Resource Manager Stack and deploy the OCI Adaptor.

> **ⓘ Note**
>
> The package is available for download at <u>My Oracle Support</u>.

Installation Sequence

This chapter provides information about deploying the NFs in the OCI environment.

Creating Identity Domain

This section explains how to create the identity domain.

An identity domain is a container for managing users and roles, federating and provisioning users, secure application integration through *Oracle Single Sign-On* (SSO) configuration, and *SAML* or *OAuth*-based Identity Provider administration. It represents a user population in Oracle Cloud Infrastructure and its associated configurations and security settings.

> **ⓘ Note**
>
> You can use the default domain or create a new domain (recommended).

The following are the steps to create the identity domain:

1. Log in to the **OCI Console**.
   For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

2. Open the navigation menu and select **Identity and Security**. The **Identity and Security** page appears.

3. Under **Identity**, select **Domains**. The **Domains** page appears.

Figure 3-2   Identity Domain
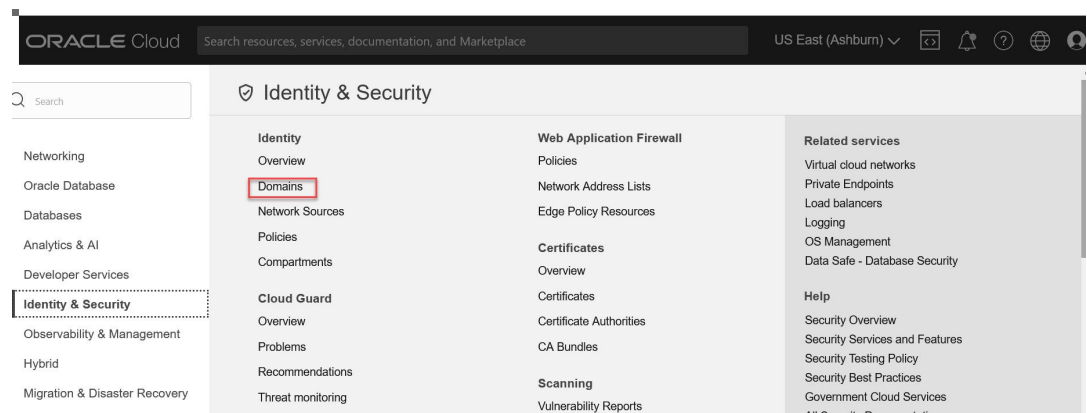
4. Click **Create Domain** on the right pane.

5. On the **Create Domain** page, assign a name to the domain and enter a description.

6. Select **Free** in Domain Type.

7. Enter the details of the Identity Domain **Administrator** and select the **Compartment**.

8. Click **Create Domain**.

Creating OCI User Management

This section describes how to create the users. User and Groups must be created manually. The users can be created and grouped together.

The `Tenancy Admin` is responsible for creating `Compartment Admins` and other users and user groups.

> ⓘ **Note**
>
> Now the infrastructure creation terraform can be executed by both `Tenancy Admin` and `Compartment Admins`.

To enable `Compartment Admin`, create infrastructure using provided terraform. Following polices needs to applied on the `Compartment Admins User Groups`.

- Allow group `<DOMAIN_NAME>/<COMPARTMENT_ADMIN_USER_GROUP>` to manage all-resources in compartment `<COMPARTMENT_NAME>`.

- Allow group `<DOMAIN_NAME>/<COMPARTMENT_ADMIN_USER_GROUP>` to manage dynamic-groups in tenancy where `target.resource.domain.name=<DOMAIN_NAME>`.

Creating User Groups

This section describes the steps to create the user groups.

1. Log in to the **OCI Console**.
   For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

2. Open the navigation menu and click **Identity and Security**. Under **Identity**, click **Domains**.

3. Select the **Identity Domain** that you want to work in. Change the compartment to find the required domain. Then, click **Groups**.

4. Click **Create Group**.
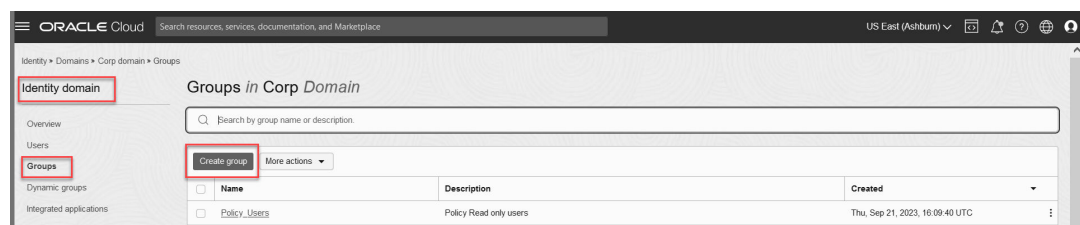
In the **Name** and **Description** fields on the **Create Group** window, enter the **Name** and **Description** about the group.

5. To allow users to request access to this group, select **User can request access**.

6. To add users to the group, select the check box for each user that you want to add to the group.

7. Click **Create**.

The **User Group** is created.

Creating the User

The following are the steps to create a user account for a user in an OCI IAM identity domain:

1. Open the navigation menu and click **Identity and Security**. Under **Identity**, click **Domains**.
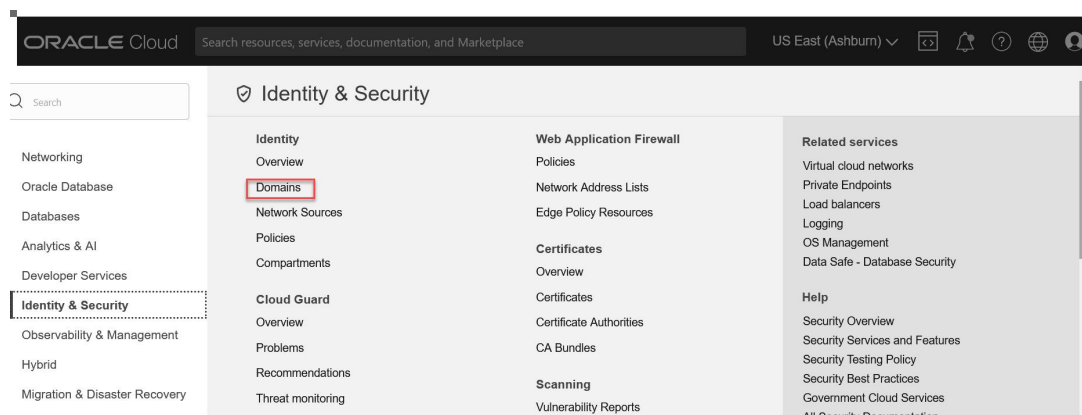
2. Select the **Identity domain** that you want to work in. Change the compartment to find the required domain. Then, click **Groups**.

3. Click **Create user**.

Create user   Help

First name *Optional*

Last name

Username / Email

☑ Use the email address as the username

[Create] Cancel

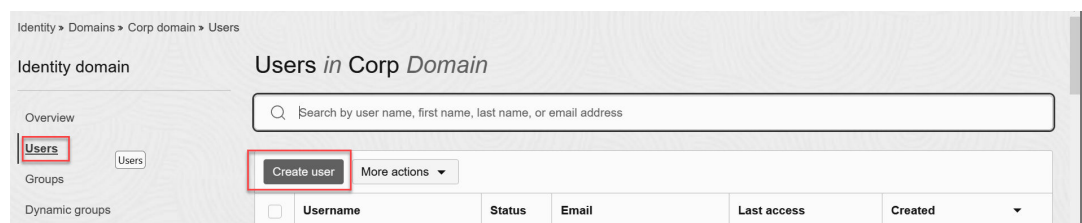**4.** In the **First name** and **Last name** fields, enter the user's name.

5. To sign in using email address, follow the following steps:

    a. In the **Username or Email** field, enter the email address for the user account.

    b. Leave the **Use the email address as the username** check box selected.

6. Alternatively, to sign in with the username, follow the steps below:

    a. In the **Username or Email** field, enter the username.

    b. Clear the **Use the email address as the username** check box.
The following characters are allowed in the **Username or Email** field:

        i. a-z

        ii. A-Z

        iii. 0-9

        iv. Special characters! @ # $ % ^ & * ( ) _ + = - { } [ ] | \ : " ' ; < > ? / . ,

        v. Blank spaces

    c. In the **Email** field, enter the email address.

7. To assign the user to a group, select the check box for each group that you want to assign to the user account.

**8.** Click **Create**.

The user account is created.

Creating the Auth Token to be Used as Registry Password

This section describes how to create the Auth token to be used as registry password.

1. Log in to the **OCI console**.
For more information, see "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

2. Click **User** on the top right corner.

3. Click **My profile**.

4. Click **Auth tokens**.

5. Click **Generate token**.

Figure 3-3   Create Auth Token
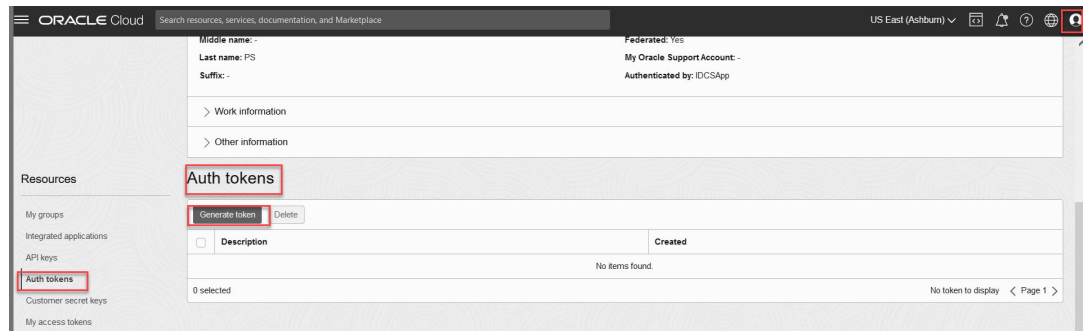
6. Enter the **Description**.

7. Click **Generate token**.

The token is created.

> ⓘ **Note**
>
> Copy the generated token. Ensure to preserve that as that will not be displayed again.

Creating OCI Infrastructure

This section describes how to create the OCI infrastructure.

> ⓘ **Note**
>
> - This procedure creates one OKE Cluster, and all the necessary platform components required to run OCI Adaptor and CNC NFs.
>
> - To create the Oracle Cloud Infrastructure (OCI), it is recommended that first-level subcompartments be created in the root compartment. The creation of OCI infrastructure at the second-level subcompartment is not supported.
>
> - Use the terraform tool to set up the necessary infrastructure components, including the OKE Cluster, Bastion Service, Compartment,CLI Server, and Virtual Cloud Network (VCN). Run the appropriate version-specific script (`ocociAdaptor_infra_create_<version>.zip`).
>
> - The terraform script does not create the Network Load Balancers (NLB), Dynamic Routing Gateways (DRG), and Remote Peering Connections (RPC). You must create the NLB, DRGs, and RPCs manually.

The following are the steps to create OCI Infrastructure:

1. Log in to the **OCI Console.**
   For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.
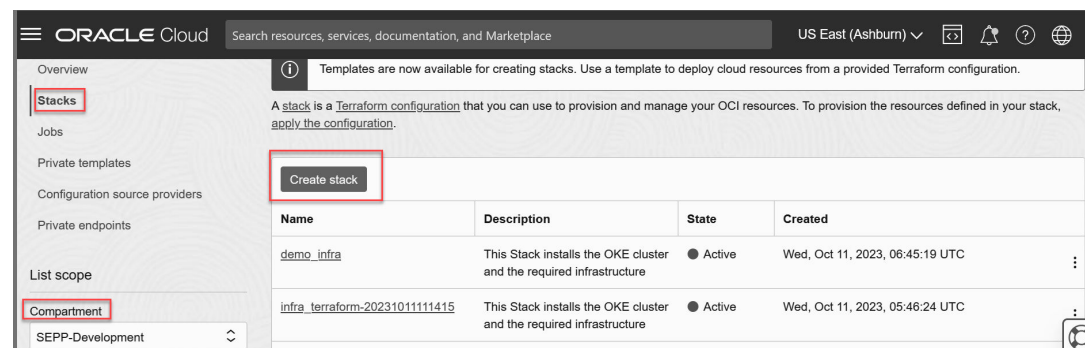
2. Open the navigation menu and select **Developer Services**. The **Developer Services** window appears in the right pane.

3. In **Developer Services**, select **Resource Manager**.

4. Under **Resource Manager**, select **Stacks**.

Figure 3-4   Create Stack
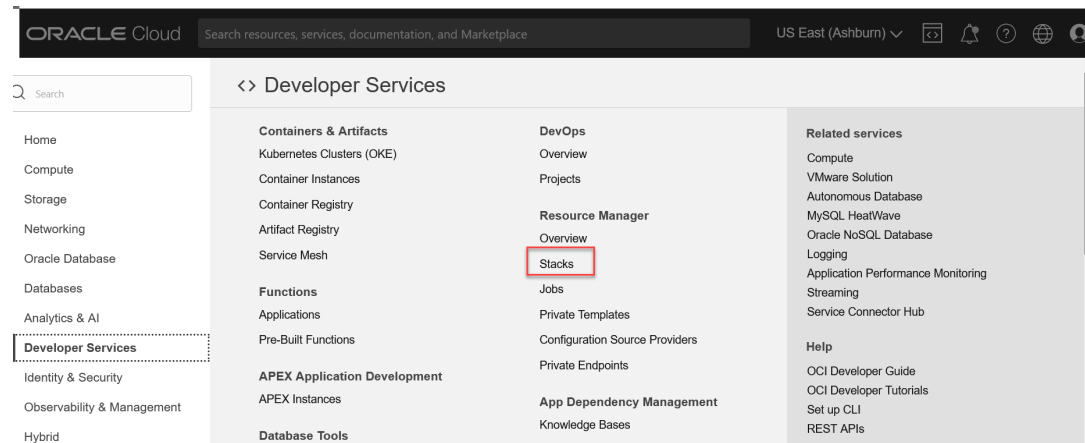
5. In the stack window, select **Compartment**.

6. Click **Create stack** on the right pane.

Figure 3-5   Create Stack

7. Click the default **My configuration** radio button.

8. Under **Stack configuration**, select the **.Zip file** radio button and upload the **ocociadaptor_infra_create_<version>.zip** file.

Figure 3-6   Stack Configuration

9. Enter the **Name** and **Description** and select the **compartment**.

10. Click **Next**. The **Edit stack** screen appears.

11. Enter the required inputs to create the infrastructure layer components and click **Save** and **Run apply**.
    The inputs required are as follows:

    a. Create Stack

        i.   Name: Enter the name of the Stack.

        ii.   Description: Provide a description for your stack.

        iii. Compartment: Specify the compartment name.

        iv.   Terraform (Select the latest one).

    b. Tenancy Configuration

        i.   Identity Domain Name: Enter the domain name.

        ii.   Tenancy Home Region Identifier: Home Region Identifier of the tenancy. Eg - us-ashburn-1.
                For more information, see the "Regions and Availability Domains" section in *Oracle Cloud Infrastructure Documentation*.

        iii. Enclosing Compartment ID: Specify the ID of the parent compartment.

        iv.   Compartment Name: Create a new compartment or select an existing one.

        v.   Compartment tag Namespace: Enter an alphanumeric string to tag your instance.

        vi.   Identity Domain URL: Enter the Identity Domain URL where the dynamic groups are to be created. For more information, see the Getting Identity Domain URL.

     c. **VCN Configuration**

          i. **VCN Name**: Enter the name of your Virtual Cloud Network (VCN).

          ii. **CIDR Block**: Provide the CIDR (Classless Inter-Domain Routing) block for your VCN.

     d. **Cluster Configuration**

          i. **Cluster Name**: Enter the name of your OKE Cluster.

          ii. **Kubernetes Version**: Specify the version of Kubernetes you are using.

          iii. **Node Pool Size**: Set the size of your Node Pool.

          iv. **Node Pool Shape**: Choose the shape of your Node Pool.

          v. **Node Pool Image**: Select the image for your Node Pool.

          vi. **OCPUs**: Define the number of Oracle CPUs.

          vii. **Memory (GB)**: Input the memory capacity.

          viii. **Node Pool Boot Volume Size**: Set the boot volume size for the Node Pool.

          ix. **Public Key**: Enter the public key.

     e. **CLI Server Configuration**

          i. **Public Key**: Enter the public key.

          ii. **Private Key**: Enter the private key.

12. After entering the values, user needs to click next and then click save changes button.

13. Plan and apply the terraform stack and it will create the required infrastructure.

> ⓘ **Note**
>
> The `Run apply` option is provided along with saving the stack itself, but it is recommended to first execute plan on your stack and then apply it.

> ⓘ **Note**
>
> Important:
>
> - To use the OKE Cluster created as a part of the OCI infrastructure and to deploy the OCI Adaptor, install the following components in the CLI Server:
>   - `kubectl`
>   - `Helm`
> - Select the kubectl version based on the Kubernetes version installed in the OKE cluster.
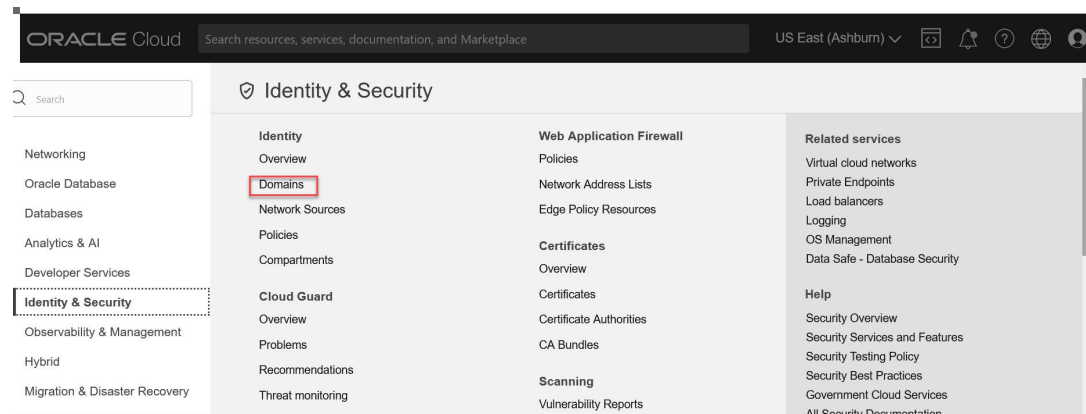
Getting Identity Domain URL

This section describes how to create a user account.

The following are the steps to create a user account for a user in an Oracle Cloud Infrastructure (OCI) IAM identity domain:
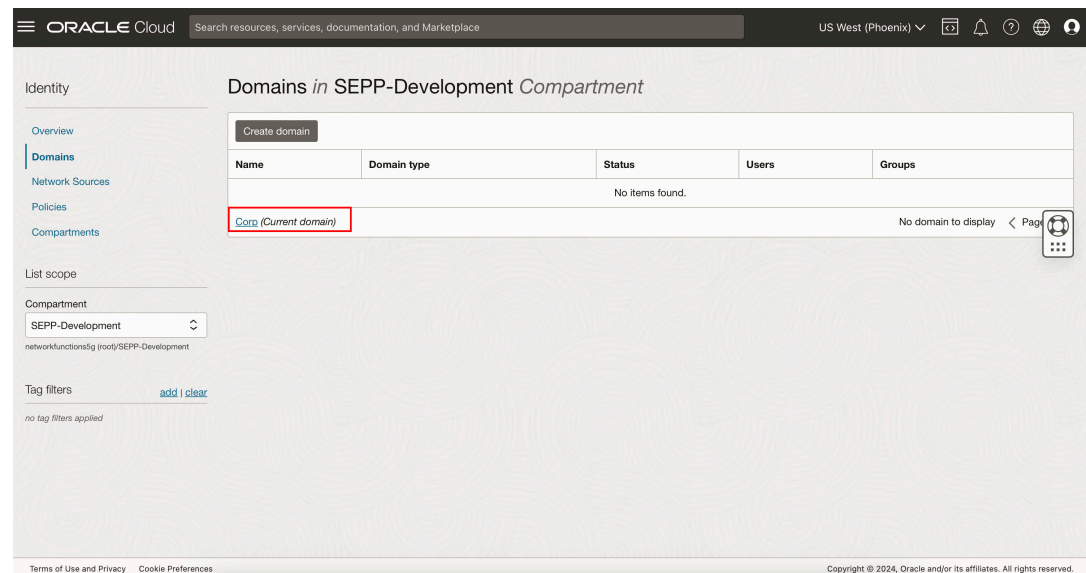
1. Open the navigation menu and click **Identity and Security**. Under Identity, click **Domains**.
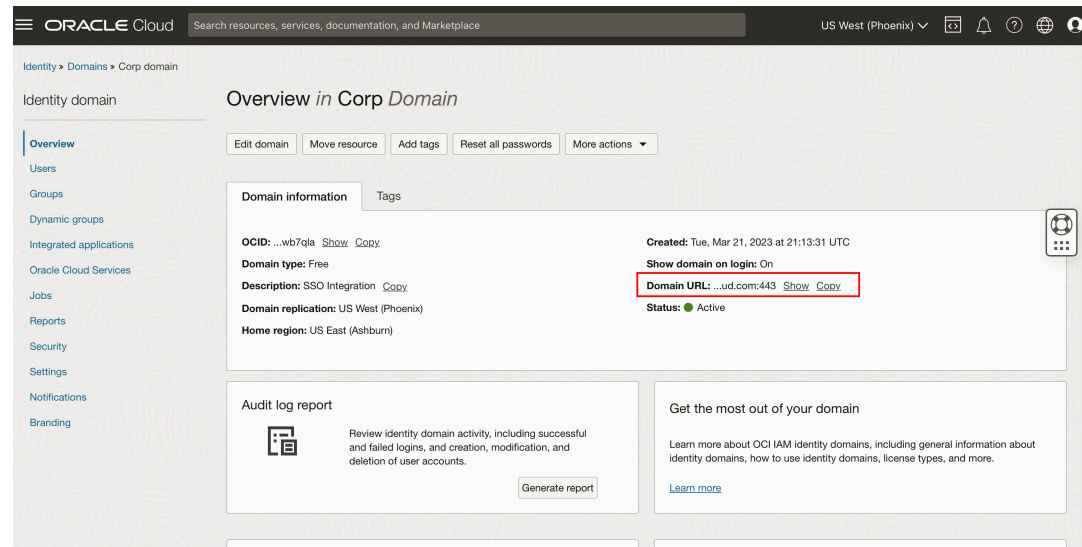
Figure 3-7   Identity and Security

2. click on **Current domain**.

Figure 3-8   Current Domain

3. Copy the **Domain URL** in the domain information tab.

Figure 3-9   Domain URL

Deploying CNC Applications

CNC NF deployment on OCI is a manual process performed on the CLI Server.

- On-premise deployment

    - It refers to deploying CNC NF and its components on the customer's private data centre. The deployment components include `CNC NF`, `cnDBTier`, and `CNC Console`, deployed on the underlying CNE platform.

- OCI deployment

    - It refers to the deployment of CNC NF and its components on the customer's tenancy in the public cloud OCI. The deployment components include `CNC NF`, `cnDBTier` and `CNC Console` deployed on OCI platform.

For more information, see the "Deploying CNC Applications" section in *CNC NF-specific installation guides*.

Configuring OCI Observability and Management

This section describes how to configure OCI Observability and Management.

Configuring NF Metrics Dashboard on OCI

This section describes about the steps to upload the NF specific json file (Example: `<NF>_oci_dashboard_<version>.json`) file on OCI Logging Analytics Dashboard Service. As OCI doesn't support Grafana, OCI uses the Logging Analytics Dashboard Service for visualizing the metrics and logs.

Follow the steps below:

1. Log in to **OCI Console**.

> ⓘ **Note**
>
> For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

2. Open the navigation menu and click **Observability and Management**.

3. Under **Logging Analytics**, Click **Dashboards**. The **Dashboards** page appears.

4. Choose the **Compartment** in the left pane.

5. Click **Import dashboards**.

6. Select and upload the `<NF>_oci_dashboard_<version>.json` file. Customize the following three parameters of JSON file before uploading it:

    a. COMPARTMENT_ID: The OCID of the compartment.

    b. METRIC_NAMESPACE: The metrics namespace that the user provided while deploying OCI Adaptor.

    c. K8_NAMESPACE: Kubernetes namespace where SEPP is deployed.

7. **Import dashboard** page appears. Click **Import** button on the page. Users can view the imported dashboard and the metrics on the dashboard.

For more information, see the "NF specific metrics" section in *NF-specific User Guides*.

Configuring NF Alerts on OCI

The following procedure describes how to configure the NF alerts for OCI. OCI supports metric expressions written in MQL (Metric Query Language) and thus requires a new NF alert file to configure alerts in the OCI observability platform.

The following are the steps:

1. Run the following command to extract the NF specific alert .zip file:

    ```
    unzip <nf>_oci_alertrules_<version>.zip
    ```

    Example:

    ```
    unzip ocAdaptor_oci_alertrules_<version>.zip
    ```

    Depending on the NF, either one or both of the following folders are available in the zip file:

    • `<NF>_oci`

    • `<NF>_oci_resources`

    For example:

    • In SEPP, the following folders are available:

        – `ocsepp_oci`

        – `ocsepp_oci_resources`

    • In cnDBTier, the following folder is available:

        – `ocsepp_oci`

> ⓘ **Note**
>
> The zip file is available in the Scripts folder of the NF CSAR package.

2. Open the `<NF>_oci` folder and look for the `notifications.tf` file.

3. Open the `notifications.tf` file and update the `endpoint` parameter with the email ID of the user.

4. Open the `<NF>_oci_resources` folder, in the `notifications.tf` file, update the parameter `endpoint` with the email id of the user.

5. Log in to the **OCI Console**.
   For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

6. Open the navigation menu and select **Developer Services**. The **Developer Services** window appears in the right pane.

7. Under the **Developer Services**, select **Resource Manager**.

8. Under **Resource Manager**, select **Stacks**. The **Stacks** window appears.

9. Click **Create stack**.

10. Select the default **My configuration** radio button.

11. Under **Stack configuration**, select the folder radio button and upload the `<NF>_oci` folder.

12. Enter the **Name** and **Description** and select the **compartment**.

13. Select the latest terraform version from the **Terraform version** drop-down.

14. Click **Next**. The **Edit stack** screen appears.

15. Enter the required inputs to create the SEPP alerts or alarms.

16. Click **Save** and **Run apply.**

17. Verify that the alarms are created in the Alarm Definitions screen (**OCI Console> Observability and Management> Monitoring>Alarm definitions**) provided.
    The required inputs are:

    - **Alarms Configuration**

      a. **Compartment name**: Choose the compartment's name from the drop-down list.

      b. **Metric namespace**: Metric namespace that the user provided while deploying OCI Adaptor.

      c. **Topic name**: This is a user-configurable name. It can contain a maximum of 256 characters. Only alphanumeric characters plus hyphens (-) and underscores (_) are allowed.

      d. **Message format**: Keep it as **ONS_OPTIMIZED** (This is pre-populated).

      e. **Alarm is_enabled**: Keep it as **True** (This is pre-populated).

18. Repeat the steps 6 to 17 for uploading the `<NF>_oci_resources` folder. Here **Metric namespace** will be pre-populated.
    For more information, see the "NF specific alerts" section in *NF User Guides*.

Creating a Custom Dashboard on OCI

The user can create custom dashboards on OCI, such as the APM dashboard for visualizing the traces and the Logging Analytics dashboard for visualizing the logs and metrics.

For more information, see the "Create a Custom Dashboard", "Create a Query-based Widget Using Metrics" and "Create a Query-based Widget Using Traces" sections in *Oracle Cloud Infrastructure Documentation*.

The user can export a custom dashboard, widgets, and filters and import it to a different tenancy or region.

For more information, see the "Export and Import Dashboards" section in *Oracle Cloud Infrastructure Documentation*.

> ⓘ **Note**
>
> The following are the available sample dashboards:
>
> - **Logging Dashboard**: Displays the Kubernetes Workloads, Kubernetes Cluster Summary, Kubernetes Nodes, Kubernetes Pods.
>
> - **Metric Dashboard**: This is a sample Kubernetes Monitoring dashboard. It is a part of the Logging Analytics dashboard.
>
> - **APM or Tracing Dashboard**: This is a sample APM or Tracing dashboard. It is part of the APM dashboard.
>
> By default, sample dashboards for logging, tracing, and metrics are created as part of OCI Adaptor terraform scripts. The user can refer to the sample dashboards to create personalized dashboards.
>
> The sample APM or Tracing dashboard is located as part of APM dashboards. Metric and Logging dashboards are located as part of Logging Analytics dashboards.

For more information, see the "OCI Monitoring Service" section in *Oracle Communications Cloud Native Core, OCI Adaptor User Guide*.

Deleting OCI Infrastructure

This section provides information about deleting the OCI infrastructure that was created for deploying the OCI Adaptor and NFs.

Prerequisite:

The user must uninstall the OCI Adaptor.

For more information, see the "Uninstalling OCI Adaptor" section in *Oracle Communications Cloud Native Core, OCI Adaptor User Guide*.

Deleting the OCI Infrastructure

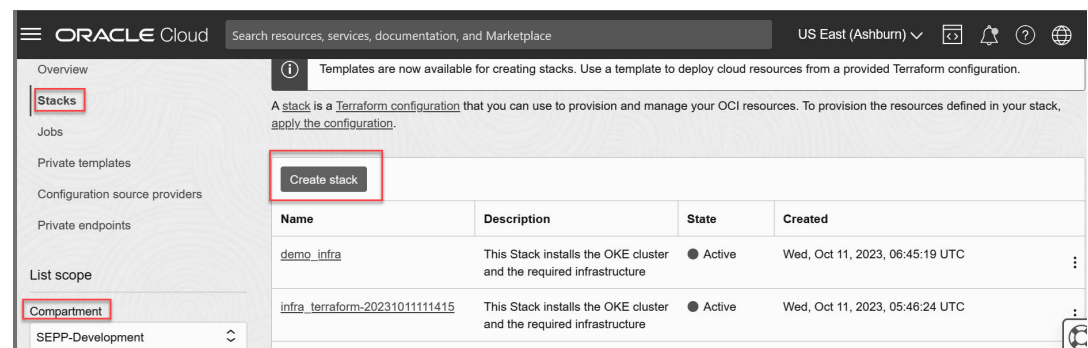To delete the OCI Infrastructure, perform the following procedure:

1. Log in to the **OCI Console**.
    For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

2. Open the navigation menu and select **Developer Services**. The **Developer Services** window appears in the right pane.

3. Under the **Developer Services**, select **Resource Manager**.

4. Under **Resource Manager**, select **Stacks**. The **Stacks** window appears.
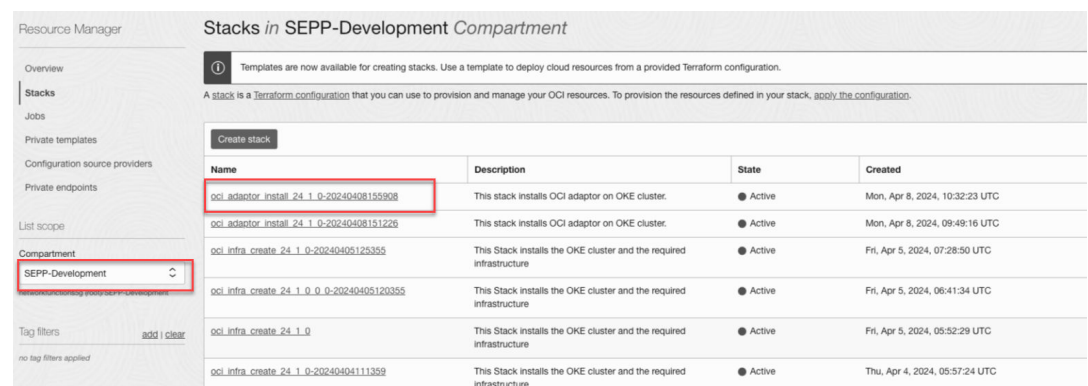
Figure 3-10   Developer Services
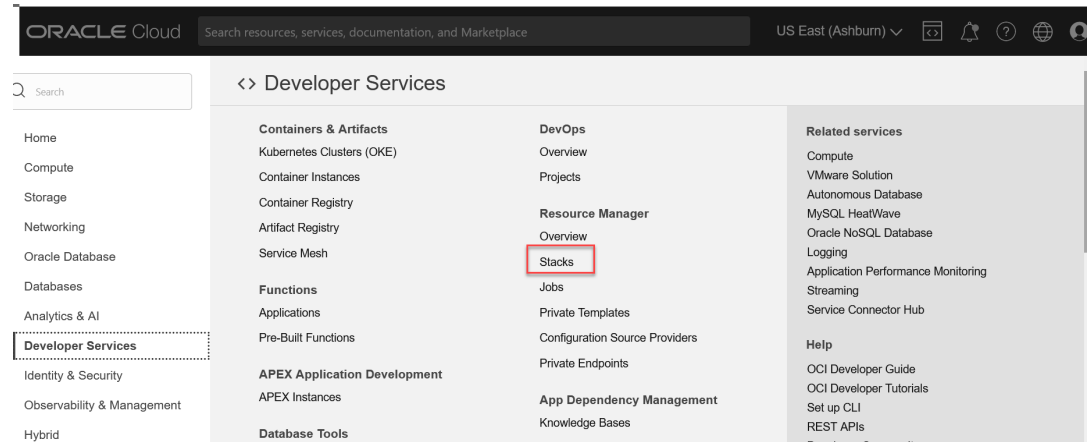
5. Select **Compartment** from the **Compartment** drop-down list.
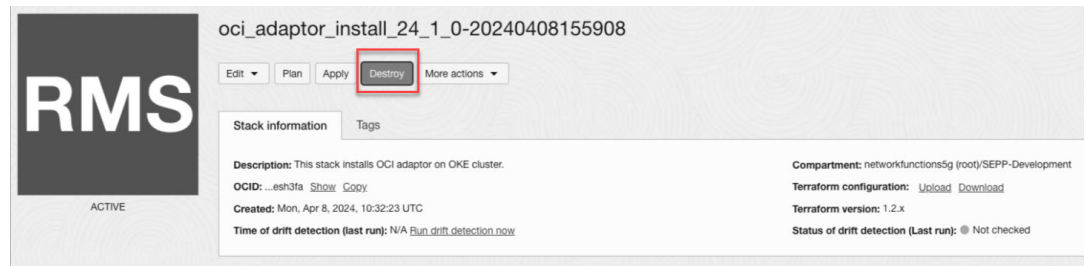
Figure 3-11   Compartment

6. Select the **stack** which was created for creating the OCI Infrastructure.

Figure 3-12   Select Stack

7. Click **Destroy**.

Figure 3-13   Destroy Stack

8.   The confirmation page appears. Click **Destroy** to delete the OCI Infrastructure.

ⓘ **Note**

Deleting the OCI Infrastructure will not delete the compartment. User can delete it manually.

4
Deploying OCI Adaptor

This section describes how to deploy the OCI Adaptor.

All OCI Adaptor components will be deployed automatically using terraform scripts.

For more information, see the [Terraform Scripts for OCI Deployment](#).

> ### ⓘ Note
>
> Deployment of OCI Adaptor is restricted to the infrastructure created using Release 24.2.x and above.

Following are the steps to create the components of the OCI Adaptor:

1. Move all the tar files in the file's folder of `ocociAdaptor_csar_<version>.zip` package to CLI Server at `/home/opc/oci_adaptor`.

   > ### ⓘ Note
   >
   > Download package from [My Oracle Support](#) as a prerequisite.

2. Create the path(`/home/opc/oci_adaptor`) if it does not exist.

   > ### ⓘ Note
   >
   > Since the CLI Server is only accessible from Bastion Service, the user needs to create a Bastion Session first, and use Bastion Session to copy the files to the CLI Server.
   > For more information, see the "Bastion Service" section in *Oracle Communications Cloud Native Core, OCI Adaptor User Guide*.

3. Log in to the **OCI Console**.
   For more information, see the "Signing In to the OCI Console" section in *Oracle Cloud Infrastructure Documentation*.

4. Open the navigation menu and select **Developer Services**. The **Developer Services** window appears in the right pane.

5. Under the **Developer Services**, select **Stacks** which is displayed under **Resource Manager**.

6. Under **Resource Manager**, select **Stacks**.

Figure 4-1   Developer Services
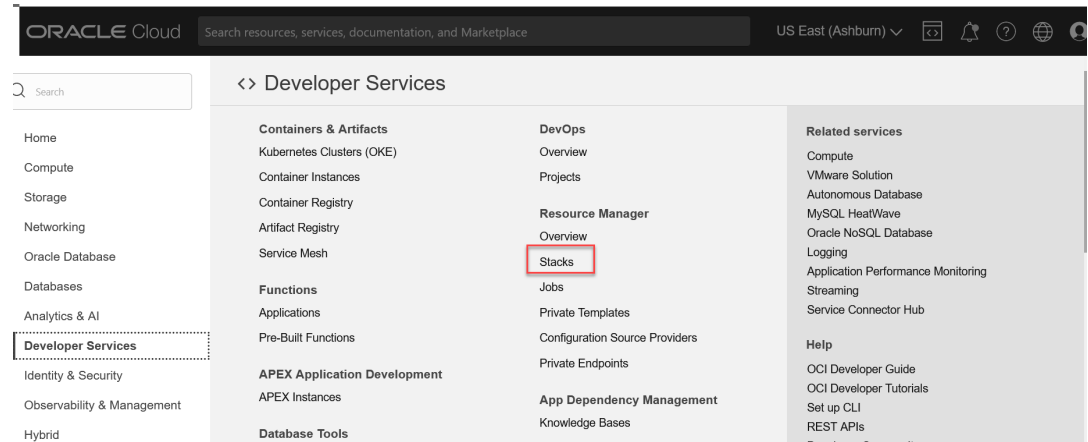
7. Click **Create stack**.

Figure 4-2   Create Stack
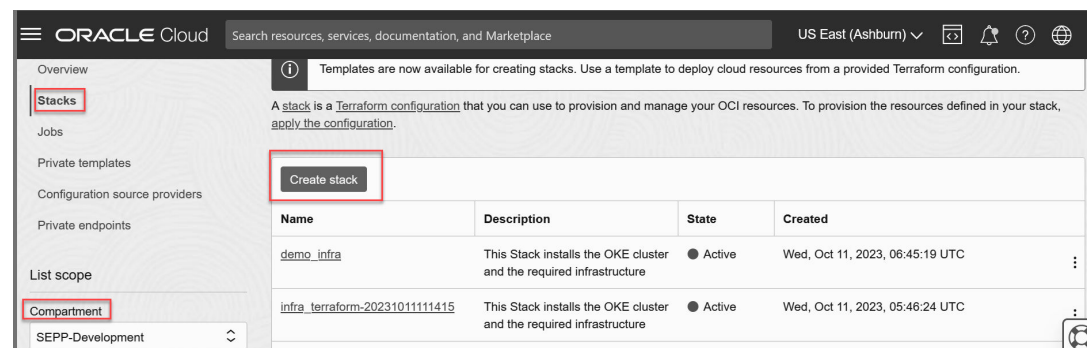
8. Select the default My Configuration radio button, present inside the **Scripts folder** of **oci-adaptor CSAR**.

9. Under **Stack configuration**, select the .zip file radio button and upload the `oci_Adaptor_install_<version>.zip` file.

Figure 4-3   Stack

10. Enter the **Name and Description** (User-Defined Name and Description for the stack) and select the compartment.

11. Select the latest terraform version from the terraform version drop-down.

Figure 4-4   Create Stack

12. Click **Next**. The Edit Stack screen appears.

13. The required inputs are:

    • Tenancy Configuration

        a. **Identity Domain Name**: Name of the domain.

    b. **Compartment Name**: Name of the Compartment.

- Identifiers

    a. **NF Name**: Name of the NF.

    b. **Unique Identifier**: Unique identifier for each NF in the timestamp format.

- User Groups

    a. **Admin Group Name**: The admin group name.

    b. **Non-Admin Group Name**: The non-admin group name.

- Cluster Configuration

    a. **Cluster Name**: Name of the OKE Cluster.

    b. **Cluster OCID**: All the cluster IDs in the compartment will be displayed in this drop-down.

- Baston Configuration

    a. **CLI Server** for the OKE cluster.

    b. **Private Key**: Private key to login into Bastion. Enter the Key in Base64 encoded format.

- OCIR Registry Configuration

    a. **Registry Name**: The name registry name.

    b. **Registry Username**: The name registry username.

    c. **Registry Password**: The password registry username.

- OCI Adaptor Generic Configuration

    a. **OCI Adaptor Namespace**

    b. **Enable App Dimension**: A Check-box enabling which will make an extra dimension named **app** getting populated in the Metrices of Applications.

    c. **Scraping Interval**: The interval at which the Management Agent will scrape Application Matrices.

- Management Agent or Metrics Configuration

    a. **Max Management Agent Install Count**: User Configurable (The upper limit is 1000).

    b. **Management Agent Key Expire Time**: The time in the specified format.

    c. **NF Metric Path**: The metric path will be populated.

    d. **Metric Namespace**: The metrics namespace.

Verify that the OCI Adaptor have been installed in the namespace provided.

14. Enter the required inputs to create the infrastructure layer components and click **Save** and **Run apply**.

> ⓘ **Note**
>
> The Plan option is provided along with the **Run apply**. The (optional) Plan option provides a view of the steps that are to be performed while creating the stack. This is recommended.

5
Troubleshooting Scenarios

This section provides information on troubleshooting the common errors encountered during the deployment and creation of the OCI Adaptor infrastructure.

- Problem: The user encounters the following errors while running the terraform:
  `"Failed to read ssh private key: no key found"` or `"Failed to read ssh public key: no key found"`

  Solution: Verify the format of the public and private keys and ensure there are no blank spaces either at the beginning or at the end of the keys.