

Oracle® Communications

Cloud Native Core, Operations Services Overlay Installation and Upgrade Guide



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ORACLE®

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Contents

1	Introduction	
1.1	Overview	1
1.2	References	1
1.3	Oracle Error Correction Policy	1
1.4	Oracle Open Source Support Policies	2
2	Installing OSO	
2.1	Prerequisites	1
2.2	Resource Utilization	5
2.3	Downloading the OSO package	6
2.4	Installing OSO Using CSAR	7
2.4.1	Automated Configuration of NF Alerts	11
2.4.2	Configuration of Alert Processing Microservice (APM)	18
2.5	Postinstallation Tasks	21
2.5.1	Verifying Installation	21
2.5.2	Enable TLS in APM Post Installation	27
2.6	Enabling APM Service Post Installation	28
3	Customizing OSO	
3.1	Naming Conventions and Limits	1
3.2	OSO Configuration Parameters	3
3.2.1	Prometheus Configuration Parameters	3
3.2.2	Alertmanager Configuration Parameters	22
3.2.3	Alert Config Configuration Parameters	32
3.2.4	Alert Processing Microservice Configuration Parameters	35
4	Using OSO with IPv6	
5	Upgrading OSO	
5.1	Supported Upgrade Paths	1

5.2	Prerequisites	2
5.3	Upgrading OSO using CSAR	2
6	Rolling Back OSO	
6.1	Supported Rollback Paths	1
6.2	Prerequisites	1
6.3	Rollback Tasks	1
7	Uninstalling OSO	
7.1	Uninstalling OSO Using Helm	1
7.2	Deleting Kubernetes Resources	4
A	Key Information About OSO	
B	Prometheus Vertical Scaling	
C	Creating Backup of Prometheus Time Series Database (TSDB) Using Snapshot Utility	

Preface

- [Documentation Accessibility](#)
- [Diversity and Inclusion](#)
- [Conventions](#)

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Conventions

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.
<i>italic</i>	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.

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1. Select **2** for New Service Request.
2. Select **3** for Hardware, Networking and Solaris Operating System Support.
3. Select one of the following options:
 - For Technical issues such as creating a new Service Request (SR), select **1**.
 - For Non-technical issues such as registration or assistance with My Oracle Support, select **2**.

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Acronyms

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

Table Acronyms and Terminologies

Acronym	Description
alm	AlertManager
cm-r	Configmap-reload
CNC Console	Cloud Native Configuration Console
CNE	Oracle Communications Cloud Native Core, Cloud Native Environment
CSAR	Cloud Service Archive
GUI	Graphical User Interface
ONAP	Open Network Automation Platform
OSDC	Oracle Software Download Center
OSO	Operations Services Overlay
OSO_PROM_CONFIGMAP	Configmap name of OSO prometheus
OSO_ALERTRULE_CONFIG_FILE	Alert-rule file of NFs
OSO_ALR_CONFIG_CONFIGMAP	Configmap name of OSO-ALR-CONFIG feature
OSO_APM_SVC	Service to forward alerts to kafka cluster
prom	Prometheus
svr	Server
TSDB	Time Series Database

What's New in This Guide

This section introduces the documentation updates for release 26.1.2xx.

Release 26.1.200- G55292-01, July 2026

General Updates

- Updated the release version to 26.1.200 in the entire document.
- Updated the release information in the [Table 1-1](#) in the [Oracle Error Correction Policy](#) section.

Installation Updates

- Updated the versions for the following images in the [Prerequisites](#) section:
 - OS0_PROMETHEUS_IMAGE=occne.io/oso/prometheus:v3.9.1
 - OS0_ALERTMANAGER_IMAGE=occne.io/oso/alertmanager:v0.30.0
 - OS0_SNAPSHOT_IMAGE=occne.io/occne/oso_snapshot:26.1.200
 - OS0_APM_IMAGE=occne.io/occne/oso_apm_service:26.1.200
 - OS0_ALERT_CONFIG_IMAGE=occne.io/occne/oso_alert_config:26.1.200
 - OS0_HELM_TEST_IMAGE=occne.io/occne/oso_helm_test:26.1.200
 - Helm version = 3.20.1
 - Kubernetes version = 1.35.2
 - Updated the [Table 2-2](#) and [Table 2-3](#) in the [Prerequisites](#) section for this release.
- Added the apm-alert-rules.yaml file in the [Installing OSO Using CSAR](#)
- Added a known limitation in the [Configuration of Alert Processing Microservice \(APM\)](#) section for single replica deployments.
- Updated the [Automated Configuration of NF Alerts](#) section for the following:
 - Added the apm-alert-rules.yaml file in the CSAR of the alert configuration files.
 - Added the steps for installing the oso-alr-config feature, when APM is disabled.
- Moved the post install verification procedures from [Configuration of Alert Processing Microservice \(APM\)](#) section to the [Verifying Installation](#) section.
- Removed the optional APM enablement and configuration procedure from the [Configuration of Alert Processing Microservice \(APM\)](#) section and moved it to the [Enabling APM Service Post Installation](#) section.
- Added the server.strategy.type parameter in the [Prometheus Configuration Parameters](#) section.
- Updated the default value of the server.image.tag parameter to 3.9.1 in the [Prometheus Configuration Parameters](#) section.
- Added the following parameters in the [Prometheus Configuration Parameters](#) section:s
 - extraScrapeConfigs[].job_name(job_name: apm-service)
 - extraScrapeConfigs[].kubernetes_sd_configs[].role(job_name: apm-service)
 - extraScrapeConfigs[].relabel_configs[].source_labels (Namespace Filter)

- `extraScrapeConfigs[].relabel_configs[].regex` (Namespace Filter)
- `extraScrapeConfigs[].relabel_configs[].action` (Namespace Filter)
- `extraScrapeConfigs[].relabel_configs[].source_labels` (Service Filter)
- `extraScrapeConfigs[].relabel_configs[].regex` (Service Filter)
- `extraScrapeConfigs[].relabel_configs[].action` (Service Filter)
- `extraScrapeConfigs[].relabel_configs[].source_labels` (Endpoint Port Filter)
- `extraScrapeConfigs[].relabel_configs[].regex` (Endpoint Port Filter)
- `extraScrapeConfigs[].relabel_configs[].action` (Endpoint Port Filter)
- `extraScrapeConfigs[].relabel_configs[].target_label`
- `extraScrapeConfigs[].relabel_configs[].replacement`
- Added the `helmtestimage` and `service.portName` parameters in the [Alert Processing Microservice Configuration Parameters](#) section.

Upgrade and Rollback Updates

- Updated the upgrade paths in the [Supported Upgrade Paths](#) section.
- Added a note about support for leapfrog upgrade in the [Supported Upgrade Paths](#) section.
- Updated the [Upgrading OSO using CSAR](#) section to include the alert processing microservice files in the upgrade procedure.
- Added a note in the [Upgrading OSO using CSAR](#) and [Prerequisites](#) sections to clarify the required OSO upgrade order during a CNC solution upgrade.
- Updated the current release and the previous release versions in the following sections:
 - [Prerequisites](#)
 - [Rollback Tasks](#)
- Updated the rollback paths in the [Supported Rollback Paths](#) section.
- Added a note about support for leapfrog rollback in the [Supported Rollback Paths](#) section.

Uninstall Updates

There are no changes made to this section in this release.

1

Introduction

This guide describes how to install or upgrade Oracle Communications Cloud Native Core, Operations Services Overlay (OSO) in a cloud native environment.

Caution

User, computer and applications, and character encoding settings may cause an issue when copy-pasting commands or any content from PDF. PDF reader version also affects the copy-pasting functionality. It is recommended to verify the pasted content especially when the hyphens or any special characters are part of the copied content.

1.1 Overview

Oracle Communications Cloud Native Core, Operations Services Overlay is a key component of the 5G Service Based Architecture (SBA).

Oracle Communications Cloud Native Core, Operations Services Overlay installs and configures common operation services. For example, you can install and configure Prometheus and its components like AlertManager in a previously installed Kubernetes cluster.

Oracle Communications Cloud Native Core, Operations Services Overlay is an independent deliverable distinct from Oracle Communications Cloud Native Core, Cloud Native Environment (CNE).

1.2 References

Following are the reference documents while deploying OSO:

- *Oracle Communications Cloud Native Core, Operations Services Overlay User Guide*
- *Oracle Communications Cloud Native Core, Operations Services Overlay Network Impact Report*
- *Oracle Communications Cloud Native Core Release Notes*
- *Oracle Communications Cloud Native Core Licensing Information User Guide*
- *Oracle Communications Cloud Native Core Solution Installation, Upgrade, and Fault Recovery Guide*
- *Oracle Communications Cloud Native Core Security Guide*

1.3 Oracle Error Correction Policy

The table below outlines the key details for the current and past releases, their General Availability (GA) dates, the latest patch versions, and the end dates for the Error Correction Grace Period.

Table 1-1 Error Correction Policy

Cloud Native Core Release Number	General Availability (GA) Date	Error Correction Grace Period End Date
3.26.1.200	July 2026	July 2027
3.25.2.200	March 2026	March 2027
3.25.2.100	November 2025	November 2026
3.25.1.200	July 2025	July 2026

Note

- For the latest patch releases, see their corresponding *Oracle Communications Cloud Native Core Release Notes*.
- For a release, Sev1 and Critical Patch Unit (CPU) patches are supported for 12 months. For more information, see [Oracle Communications Cloud Native Core and Network Analytics Error Correction Policy](#).

1.4 Oracle Open Source Support Policies

Oracle Communications Cloud Native Core uses open source technology governed by the Oracle Open Source Support Policies. For more information, see [Oracle Open Source Support Policies](#).

2

Installing OSO

This chapter provides information about installing Oracle Communications Cloud Native Core, Operations Services Overlay (OSO) in a cloud native environment.

Note

For release version 26.1.200, OSO supports both fresh installation and upgrade from 25.1.2xx, 25.2.1xx, and 25.2.2xx. For more information on how to upgrade OSO, see [Upgrading OSO](#).

OSO, packaged as a Cloud Service Archive (CSAR) file, is a ZIP file that contains the following components:

- All the required OSO images, including opensource software as a tar file.
- All the required OSO Helm charts.
- The following custom values.yaml files:
 - `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` is used for configuring the Prometheus parameters.
 - `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml` is used for configuring the Alertmanager parameters.
 - `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` is used for configuring the Alert processing microservice parameters.
 - `ocoso_csar_26_1_200_0_0_alr_config_custom_values.yaml` is used for configuring the Alert configuration parameters.

Note

The README doc contains the details to populate mandatory values in the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` and `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml` files. For more information about the configuration parameters, see [OSO Configuration Parameters](#).

2.1 Prerequisites

Before installing and configuring OSO, ensure that the following prerequisites are met:

1. CSAR packages are downloaded.
2. Unzip and TAR utilities are installed.
3. Docker or Podman (v5.4.0) is installed, and you must be able to run the docker or podman commands.
4. Minimum supported Helm version (v3.20.0) is installed.

5. kubectl is installed (1.35.2).
6. A central repository is made available for all images, binaries, helm charts, and so on, before running this procedure.
7. The following images are populated in the registry on the repository server:

Table 2-1 Images in the Registry on the Repository Server

Image Name	Path in Repository with version
OSO_ALERTMANAGER_IMAGE	occne.io/oso/alertmanager:v0.30.0
OSO_PROMETHEUS_IMAGE	occne.io/oso/prometheus:v3.9.1
OSO_CONFIGMAPPRELOAD_IMAGE	occne.io/oso/configmappreload:v0.15.0
OSO_ALERT_CONFIG_IMAGE	occne.io/occne/oso_alert_config:26.1.200
OSO_HELM_TEST_IMAGE	occne.io/occne/oso_helm_test:26.1.200
OSO_SNAPSHOT_IMAGE	occne.io/occne/oso_snapshot:26.1.200
OSO_APM_IMAGE	occne.io/occne/oso_apm_service:26.1.200

All above images are packed into tar format and will be present in OSO CSAR under (Artifacts/Images) folder except for `oso_alert_config` which is present in `ocoso_alr_config_csar_26_1_200.zip`. You can use the following commands to load these images into your cluster's registry.

```
$ docker/podman load -i <image-name>.tar
$ docker/podman tag <image-url> <registry-address>:<port>/image-url
$ docker/podman push <registry-address>:<port>/image-url
```

8. OSO can now be installed in one of the following ways:
 - without the snapshot utility feature (disabled): proceed as per existing procedure and resize the PVC storage.
 - with the snapshot utility feature (enabled): adjust the size of the PVC storage to fit the snapshot data. Otherwise, the Prometheus pod may crash. OSO recommends the users to configure thrice the existing storage capacity. If this feature is enabled, users experience variations in CPU and RAM usage. It is recommended that each NF should benchmark these figures and obtain them from the respective NFs.

For example, if the PVC storage size required at user environment for OSO Prometheus is 50GB then in snapshot enabled OSO deployment, the storage configuration is given as 150GB (50GB*3). This value is defined in `PROM-PV-SIZE` for the required size.

```
persistentVolume:
  enabled: true
  ...
  ...
  mountPath: /data
  size: PROM-PV-SIZE
  storageClass: "PROM-STORAGE-CLASS"
```

Use the `web.enable-admin-api` parameter to enable the snapshot utility feature. For more information about this parameter, see [Prometheus Configuration Parameters](#).

Note

Tables [Table 2-2](#) and [Table 2-3](#) in this section offer a comprehensive list of software necessary for the proper functioning of OSO during deployment. However, these tables are indicative, and the software used can vary based on the customer's specific requirements and solution.

The Software Requirement column in [Table 2-2](#) and [Table 2-3](#) tables indicates one of the following:

- **Mandatory:** Absolutely essential; the software cannot function without it.
- **Recommended:** Suggested for optimal performance or best practices but not strictly necessary.
- **Conditional:** Required only under specific conditions or configurations.
- **Optional:** Not essential; can be included based on specific use cases or preferences.

Table 2-2 Preinstalled Software Versions

Software	26.1.2xx	25.2.2.xx	25.2.1xx	25.1.2xx	Software Requirement	Usage Description
Helm	3.20.0	3.19.1	3.18.2	3.16.2	Mandatory	Helm, a package manager, simplifies deploying and managing NFs on Kubernetes with reusable, versioned charts for easy automation and scaling. Impact: Preinstallation is required. Without this capability, management of NF versions and configurations becomes time-consuming and error-prone, impacting deployment consistency.
Kubernetes	1.35.2	1.35.2	1.33.1	1.32.0	Mandatory	Kubernetes orchestrates scalable, automated NF deployments for high availability and efficient resource utilization. Impact: Preinstallation is required. Without orchestration capabilities, deploying and managing network functions (NFs) can become complex, leading to inefficient resource utilization and potential downtime.

Table 2-2 (Cont.) Preinstalled Software Versions

Software	26.1.2xx	25.2.2.xx	25.2.1xx	25.1.2xx	Software Requirement	Usage Description
Podman	5.4.0	5.4.0	5.4.0	5.4.0	Recommended	Podman is a part of Oracle Linux. It manages and runs containerized NFs without requiring a daemon, offering flexibility and compatibility with Kubernetes. Impact: Preinstallation is required. Without efficient container management, the development and deployment of NFs could become cumbersome, impacting agility.

To check the versions for the preinstalled software in the cloud native environment, run the following commands:

```
kubectl version
```

```
helm version
```

```
podman version
```

If you are deploying OSO in a cloud native environment, these following additional software are to be installed before installing OSO.

Table 2-3 Additional Software Versions

Software	26.1.2xx	25.2.2xx	25.2.1xx	25.1.2xx	Software Requirement	Usage Description
AlertManager	0.30.0	0.28.0	0.28.0	0.28.0	Recommended	Alertmanager is a component that works in conjunction with Prometheus to manage and dispatch alerts. It handles the routing and notification of alerts to various receivers. Impact: Not implementing alerting mechanisms can lead to delayed responses to critical issues, potentially resulting in service outages or degraded performance.

Table 2-3 (Cont.) Additional Software Versions

Software	26.1.2xx	25.2.2xx	25.2.1xx	25.1.2xx	Software Requirement	Usage Description
Configmap reload	0.15.0	0.15.0	0.15.0	0.15.0	Mandatory	Configmapreload is a simple binary to trigger a reload when Kubernetes ConfigMaps or Secrets, mounted into pods, are updated. It watches mounted volume dirs and notifies the target process that the config map has been changed. Impact: Not employing this solution would impact downtime as pods would need to restart everytime a configmap is updated.
Prometheus	3.9.1	3.6.0	3.4.1	3.2.0	Mandatory	Prometheus is a popular open source monitoring and alerting toolkit. It collects and stores metrics from various sources and allows for alerting and querying. Impact: Not employing this monitoring solution could result in a lack of visibility into NF performance, making it difficult to troubleshoot issues and optimize resource usage.

2.2 Resource Utilization

The use of resources such as CPU and RAM by the OSO services are constrained to ensure that the CPU and RAM do not consume excess resources that could be used by other applications.

During the deployment of the services, each service gets an initial CPU and RAM allocation. Each service is allowed to consume the resources to a specified upper limit while it continues to run. The initial allocation limit and the upper limit are set to the same value for services where the resource consumption limit remains the same as the initial allocation or in a case where increasing the CPU or RAM limits underneath a running application can cause service disruption.

Note

Each NF is supposed to benchmark their application against OSO services and set the RAM, CPU, and PVC values accordingly. These initial resource request is set by OSO team as a placeholder and it is not recommended for any NF.

The resource requests and limits are as follows:

Table 2-4 CPU, RAM, and Ephemeral Resource Requests and Limits

Service	CPU Initial Request (m)	CPU Limit (m)	RAM Initial Request (Mi)	RAM Limit (Mi)	PVC (Gb)	Ephemeral Storage Request (Gi)	Ephemeral Storage Limit (Gi)
Prometheus	2000	2000	4096 (4 Gb)	4096 (4 Gb)	8	8	12
Prometheus (with snapshot utility enabled)	4000	8000	32768 (32 Gb)	65536 (64 Gb)	150	8	12
AlertManager	100	500	32	200	2	1	1
AlertManager*	2000	2000	16384(16 gb)	16384(16 gb)	2	1	1
APM (Alert Processing Microservice)	2000	4000	2048 (2Gb)	4096 (4 Gb)	NA	1	2
Configmapreload Prometheus	10	10	32	32	NA	1	1
Configmapreload Alertmanager	400	400	124	124	NA	1	1
Helm test	10	10	32	32	NA	NA	NA

The overall observability services resource usage varies on each worker node. The observability services listed in the table are distributed evenly across all worker nodes in the Kubernetes cluster.

Note

*When Alertmanager is used with APM service, a high resource profile is required to handle bursts of alert traffic. The specified memory configuration supports processing bursts of up to 200 alerts per second for a duration of 15 minutes.

2.3 Downloading the OSO package

To download the OSO package from [My Oracle Support](#), perform the following procedure:

1. Log in to [My Oracle Support](#) using your login credentials.
2. Click the **Patches & Updates** tab to locate the patch.
3. In the **Patch Search** console, click the **Product or Family (Advanced)** option.
4. In the **Product** field, enter Oracle Communications Cloud Native Core - 5G and select the product from the Product drop-down list.
5. From the **Release** drop-down list, select **Oracle Communications Cloud Native Core Network Repository Function <release_number>**.
Where, <release_number> indicates the required release number of OSO.
6. Click **Search**.
The Patch Advanced Search Results list appears.

7. Select the required patch from the list.
The Patch Details window appears.
8. Click **Download**.
The File Download window appears.
9. Click the <p*****>_<release_number>_Tekelec>.zip file to download the release package.
Where, <p*****> is the MOS patch number and <release_number> is the release number of OSO.

2.4 Installing OSO Using CSAR

Open Network Automation Platform (ONAP) compliant orchestrator uses CSAR format to onboard, validate, and install OSO. However, in the absence of an orchestrator, manual installation is possible using the CSAR file contents.

Perform the following steps to install OSO using CSAR artifacts:

1. Download the OSO CSAR zip files from [My Oracle Support](#) (MOS).
2. Extract the CSAR zip files:

```
$ unzip <OSO CSAR package>
$ unzip -d ./oso_csar/ ocoso_csar_<26.1.200 version>.zip
$ unzip -d ./oso_alert_config_csar/ ocoso_alr_config_csar_<26.1.200
version>.zip
```

3. Upload all the artifacts present in the Artifacts/Images folder to the configured repository.
The following structure indicates the CSAR file containing the Prometheus, alertmanager, and alert processing microservice files.

```
├── Artifacts
│   ├── ChangeLog.txt
│   └── Images
│       ├── alertmanager-0.30.0.tar
│       ├── configmappreload-0.15.0.tar
│       ├── oso-apm-service-26.1.200.tar
│       ├── oso-helm-test-26.1.200.tar
│       ├── oso-snapshot-26.1.200.tar
│       └── prometheus-3.9.1.tar
│   ├── Licenses
│   └── Scripts
│       ├── alertmanager
│       ├── ocoso_csar_26_1_200_0_0_alertmanager_charts.tgz
│       ├── ocoso_csar_26_1_200_0_0_alm_custom_values.yaml
│       ├── ocoso_csar_26_1_200_0_0_apm_charts.tgz
│       ├── ocoso_csar_26_1_200_0_0_apm_custom_values.yaml
│       ├── ocoso_csar_26_1_200_0_0_prometheus_charts.tgz
│       ├── ocoso_csar_26_1_200_0_0_prom_custom_values.yaml
│       ├── oso_apm_svc
│       ├── OSO_README.md
│       └── prometheus
├── Tests
└── Definitions
    └── etsi_nfv_sol001_vnfd_2_5_1_types.yaml
```

```

├── oso_vnfd.yml
├── helm_extensions_1_0.yaml
├── ocoso_csar_26_1_200_0_0.zip
├── oso_vnfd.mf
├── TOSCA-Metadata
└── TOSCA.meta

```

The following structure indicates the CSAR file containing the alert configuration files.

```

├── Artifacts/
│   ├── ChangeLog.txt
│   ├── Images/
│   │   └── oso-alert-config-26.1.200.tar
│   ├── Licenses/
│   ├── Scripts/
│   │   ├── apm-alert-rules.yaml
│   │   └── ocoso_alr_config_csar_26_1_200_0_0_alert_config_charts.tgz
│   └── oso_alr_config_csar_26_1_200_0_0_alert_config_custom_values.yaml
├── OSO_ALR_CONFIG_README.md
├── Tests/
├── Definitions/
│   ├── etsi_nfv_sol001_vnfd_2_5_1_types.yaml
│   ├── oso_alr_config_vnfd.yml
│   └── vz_helm_extensions_1_0.yaml
├── oso_alr_config_vnfd.mf
├── TOSCA-Metadata/
└── TOSCA.meta

```

For more information about the artifacts, see the [Prerequisites](#) section.

- From 25.2.200 onwards, the `custom_values.yaml` file is split into three different files:
 - `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` is used for configuring the Prometheus parameters
 - `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml` is used for configuring the Alertmanager parameters.
 - `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` is used for configuring the alert processing microservice.

These files are required to be populated and installed separately. Update the respective `custom_values.yaml` files inside respective `Artifacts/Images` directory with the required values as mentioned in [OSO Configuration Parameters](#).

5. Enable IPv6 Dualstack.
 - a. **To enable IPv6 DualStack in Prometheus**
 - Enable IPv6 Dualstack in the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` file. Search for the following comment in the yaml file and uncomment the following four lines after this comment.

```
# Custom section to enable IPV6, Uncomment below section in order
to enable Dualstack OS0
    having both Ipv4 and Ipv6 addresses
```

```
#ipFamilies:
#- IPv4
#- IPv6
#ipFamilyPolicy: PreferDualStack
```

- Save the file and proceed with the normal installation.

- To enable IPv6 DualStack in AlertManager** Replace "ENABLE_DUAL_STACK" with "true" in below section inside the `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml` file before installing alertmanager.

```
# ip dual stack
ipDualStack:
  enabled: ENABLE_DUAL_STACK
  ipFamilies: ["IPv6", "IPv4"]
  ipFamilyPolicy: "PreferDualStack"
```

6. Save the file and proceed with the normal installation.
7. Install OSO using the following steps:
 - a. Extract the Helm charts tgz files which are available in the Artifacts/Scripts directory and populate the three `custom_values.yaml` files.

```
$ cd Artifacts/Scripts
$ tar -xvzf ocoso_csar_26_1_200_0_0_alertmanager_charts.tgz
$ tar -xvzf ocoso_csar_26_1_200_0_0_prometheus_charts.tgz
$ tar -xvzf ocoso_csar_26_1_200_0_0_apm_charts.tgz
$ tar -xvzf ocoso_csar_26_1_200_0_0_alert_config_charts.tgz
```

- b. Install Prometheus, Alertmanager, and Alert Processing Microservice (APM) using the Helm charts provided and update the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml`, `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml`, and `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` files with the following commands. For more information about APM, see [Alert Processing Microservice Configuration Parameters](#). To install alert-config feature, see [Automated Configuration of NF Alerts](#).
Use the following command for installation using Helm, if custom labels are given:

```
$ kubectl create namespace <deployment-namespace-name>
$ helm --namespace=<deployment-namespace-name> install <oso-prom-release-name> -f <ocoso_csar_26_1_200_0_0_prom_custom_values.yaml> ./ocoso_csar_26_1_200_0_0_prometheus_charts.tgz
$ helm --namespace=<deployment-namespace-name> install <oso-alertmanager-release-name> -f <ocoso_csar_26_1_200_0_0_alm_custom_values.yaml> ./ocoso_csar_26_1_200_0_0_alertmanager_charts.tgz
$ helm --namespace=<deployment-namespace-name> install <oso-apm-release-name> -f <ocoso_csar_26_1_200_0_0_apm_custom_values.yaml> ./ocoso_csar_26_1_200_0_0_apm_charts.tgz
```

For example:

```
$ kubectl create namespace <oso-namespace>
# Example for Prometheus:
$ helm --namespace=<oso-namespace> install <oso-prom-release-name> -f
ocoso_csar_26_1_200_0_0_prom_custom_values.yaml
./ocoso_csar_26_1_200_0_0_prometheus_charts.tgz
# Similarly for Alertmanager
$ helm --namespace=<oso-namespace> install <oso-alertmanager-release-
name> -f ocoso_csar_26_1_200_0_0_alm_custom_values.yaml
./ocoso_csar_26_1_200_0_0_alertmanager_charts.tgz
# For apm service, configure the values files before running helm
install
$ helm --namespace=<oso-namespace> install <oso-apm-release-name> -f
ocoso_csar_26_1_200_0_0_apm_custom_values.yaml ./
ocoso_csar_26_1_200_0_0_apm_charts.tgz
```

```
$ kubectl create namespace ns1
## Prometheus
$helm install -f ocoso_csar_26_1_200_0_0_prom_custom_values.yaml --
namespace=ns1 --name-template=oso-p ./
ocoso_csar_26_1_200_0_0_prometheus_charts.tgz
## Alertmanager
$ helm install -f ocoso_csar_26_1_200_0_0_alm_custom_values.yaml --
namespace=ns1 --name-template=oso-a ./
ocoso_csar_26_1_200_0_0_alertmanager_charts.tgz
# For apm service, configure the values files before running helm
install
$ helm install -f ocoso_csar_26_1_200_0_0_apm_custom_values.yaml ./
ocoso_csar_26_1_200_0_0_apm_charts.tgz
```

- c. Run the following command to perform a Helm test. Populate the values in the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` and `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml` files to run the Helm test. Run the Helm test separately for each Alertmanager and Prometheus.

```
$ helm test <release-name> -n <oso-namespace>
```

Note

Helm Test can be run for the first time smoothly, but if some issue occurs, and there's a need to re-run the helm test, first you will have to delete the existing test job and repeat the "helm test" command as shown above.

```
$ kubectl get jobs.batch -n <namespace>
```

```
$ kubectl delete jobs.batch oso-test -n <namespace>
```

Figure 2-1 Helm Test

```
[cloud-user@occn4-devansh-m-marwaha-bastion-1 Scripts]$ helm test oso-dev -n devamarw-ns
NAME: oso-dev
LAST DEPLOYED: Mon Mar 11 06:42:03 2024
NAMESPACE: devamarw-ns
STATUS: deployed
REVISION: 1
TEST SUITE: oso-test
Last Started: Mon Mar 11 07:14:16 2024
Last Completed: Mon Mar 11 07:14:42 2024
Phase: Succeeded
NOTES:
The Prometheus server can be accessed via port 80 on the following DNS name from within your cluster:
oso-dev-prom-svr.devamarw-ns.svc.cluster.local

Get the Prometheus server URL by running these commands in the same shell:
export POD_NAME=$(kubectl get pods --namespace devamarw-ns -l "app=prom,component=svr" -o jsonpath="{.items[0].metadata.name}")
kubectl --namespace devamarw-ns port-forward $POD_NAME 9090

The Prometheus alertmanager can be accessed via port 80 on the following DNS name from within your cluster:
oso-dev-prom-alm.devamarw-ns.svc.cluster.local

Get the Alertmanager URL by running these commands in the same shell:
export POD_NAME=$(kubectl get pods --namespace devamarw-ns -l "app=prom,component=alm" -o jsonpath="{.items[0].metadata.name}")
kubectl --namespace devamarw-ns port-forward $POD_NAME 9093
#####
##### WARNING: Pod Security Policy has been moved to a global property. #####
##### use .Values.podSecurityPolicy.enabled with pod-based #####
##### annotations #####
##### (e.g. .Values.nodeExporter.podSecurityPolicy.annotations) #####
#####
```

2.4.1 Automated Configuration of NF Alerts

This section explains the process of automating the NF alerts configuration in OSO after deploying all the relevant NFs and OSO components. The process manages the alert rule definitions and dynamically updates the OSO Prometheus configmap as part of the Helm chart installation or upgrade.

1. Prerequisites

- a. Install the respective NF, CNC Console, cnDBTier, and OSO in their designated namespace.
- b. The existing structure of the `nf-alertrule.yaml` file remains unchanged. Operators must prepare the alert rule file(s) and place them in a directory on the server, which will be provided as input to the new Helm chart.

2. Existing Functionality

NF Alerts are configured in Prometheus manually post OSO deployment by performing the following step:

```
$ kubectl patch configmap occne-prometheus-server -n occne-infra --type merge --patch "$(cat ~/occncc_alertrules_<version>.yaml)"
```

3. Alert Automation

a. Installing Alert Automation feature using Helm

- i. Extract the Helm charts tgz file and available in the `Artifacts/Scripts` directory.

```
$ cd Artifacts/Scripts
$ tar -xvzf ocoso_csar_26_1_200_0_0_alert_config_charts.tgz
```

The following structure indicates the CSAR file containing the alert configuration files.

```

.
├── Artifacts/
│   ├── ChangeLog.txt
│   ├── Images/
│   │   └── oso-alert-config-26.1.200.tar
│   ├── Licenses/
│   ├── Scripts/
│   │   └── apm-alert-rules.yaml
│   └──
├── ocoso_alr_config_csar_26.1.200_alert_config_charts.tgz
├── ocoso_alr_config_csar_26.1.200_alert_config_custom_values.yaml
│   └── OSO_ALR_CONFIG_README.md
├── Tests/
├── Definitions/
│   ├── etsi_nfv_sol001_vnfd_2_5_1_types.yaml
│   ├── oso_alr_config_vnfd.yml
│   └── vz_helm_extensions_1_0.yaml
├── oso_alr_config_vnfd.mf
├── TOSCA-Metadata/
└── TOSCA.meta

```

Note

Deploy the oso-alr-config Helm chart after OSO Prometheus and Alertmanager are installed using the `helm install` command.

- ii. Provide the appropriate values in the `ocoso_csar_26_1_200_0_0_alert_config_custom_values.yaml` file for oso-alr-config configmap and proceed with the installation of the alert automation feature.
 - APM is disabled: The chart can accept one or more alert rule files during deployment. To achieve installation of oso-alr-config feature, perform the following steps:
 - Install the alert configuration feature by providing one alert-rule file:


```
helm -n <oso-namespace> install <oso-alr-config-feature-name> ./oso-alr-config -f ocoso_csar_26_1_200_0_0_alert_config_custom_values.yaml -f path/to/nf_alertrules.yaml
```
 - Install the alert configuration feature by providing multiple alert-rule files:


```
helm -n <oso-namespace> install <oso-alr-config-feature-name> ./oso-alr-config -f ocoso_csar_26_1_200_0_0_alert_config_custom_values.yaml -f path/to/nf1_alertrules.yaml -f path/to/nf2_alertrules.yaml
```
 - APM is enabled: The chart can accept one or more alert rule files during deployment. To achieve installation of oso-alr-config feature, perform the following steps:

- Install the alert configuration feature by providing one alert-rule file:

```
helm -n <oso-namespace> install <oso-alr-config-feature-name> ./oso-alr-config -f ocoso_csar_26_1_200_0_0_alert_config_custom_values.yaml -f apm-alert-rules.yaml -f path/to/nf_alertrules.yaml
```

- Install the alert configuration feature by providing multiple alert-rule files:

```
helm -n <oso-namespace> install <oso-alr-config-feature-name> ./oso-alr-config -f ocoso_csar_26_1_200_0_0_alert_config_custom_values.yaml -f apm-alert-rules.yaml -f path/to/nf1_alertrules.yaml -f path/to/nf2_alertrules.yaml
```

- iii. Run the following command to verify if `oso-alr-config` configmap is created by Helm.

```
$ kubectl -n <oso-namespace> get configmap
```

Example:

```
kubectl -n oso get cm
```

Sample output

```
NAME DATA AGE
oso-alr-config-cm 2 2d21h
oso-prom-svr 8 2d21h
```

- iv. Verify if the alerts are successfully loaded in the Prometheus GUI. For more information, see [Verifying Installation](#) section to understand how to access OSO Prometheus GUI and how to verify alerts.
- v. If no alert rule file is provided during installation, the script will not perform any actions, but the `oso-alr-config` Helm chart will still be installed. It is strongly recommended to supply at least one alert rule file, as it is required for configuration.

Note

The deployment fails in any of the following cases:

- If `OSO-PROM-CONFIGMAP-NAME` does not exist (Helm deployment fails before triggering script).
- If there are validation errors.
- If K8s API returns error.

b. Adding more alerts using Helm Upgrade

- Prepare the NF alert rule file and trigger a Helm upgrade for the `oso-alr-config` chart by providing the alert rule file as input.

- The deployment fails in any of the following cases:

Note

- If OSO-PROM-CONFIGMAP-NAME or oso-alr-config-cm does not exist.
- If there are validation errors.
- If K8s API returns error.

- The chart can accept one or more alert rule files during deployment. Run the following command to provide multiple files:

Using Multiple -f Flags

```
helm upgrade oso-alr-config oso-alr-config/ -f
<ocoso_csar_26_1_200_0_0_alert_config_custom_values.yaml> -f
<path/to/nf1_alertrules.yaml> -f <path/to/nf2_alertrules.yaml> -n
<oso-namespace>
```

Note

It is recommended to provide all the alert files together like all NFs, cnDBTier, and CNC Console).

- OSO_ALERTRULE_CONFIGMAP will be created by Helm and will be accessible to user using the following command:

```
$ kubectl -n <oso-namespace> get configmap
```

For example, `kubectl -n oso get cm`

Sample output:

```
NAME DATA AGE
oso-alr-config-cm 2 2d21h
oso-prom-svr 8 2d21h
```

- After successfully verifying the upgrade, Route to the OSO Prometheus GUI to verify if the Alerts are successfully loaded, For more information about accessing Prometheus GUI and verifying the alerts, see [Verifying Installation](#).

c. Unpatching or removing the alert automation feature

- Clear the alerts from the OSO Prometheus ConfigMap and Prometheus GUI by using an empty alert rule file will be provided during the Helm upgrade. However, the references are retained under `rule_files "/etc/config/alertscncc"` and alert rules will be empty `"alertscncc: { }"`

Note

It is recommended to unpatch all alerts together. This can be achieved by providing all the empty alert files at once, which restores the alerts section in the OSO deployment to its original state.

- Prepare empty alert files (`empty_nf_alertrules.yaml`) for all the respective NFs that should be removed from the Prometheus GUI. For example, CNC Console alerts should not be listed under Prometheus GUI.

```
apiVersion: v1
data:
  alertscncc: |
    {}
```

- Run a helm upgrade (for more information, see step 3.b) and pass these empty files. The following example, indicates when only 1 empty file of CNC Console is given to display the effect of this empty file.

Updated Prometheus ConfigMap (`oso-prom-svr configMap` output):

```
kubectl get configmap/oso-prom-svr -n default -oyaml
apiVersion: v1
data:
  alerting_rules.yml: |
    {}
  alerts: |
    {}
  alertscncc: |
    {}
  alertsnrf: |
    groups:
    - name: OcnrfAlerts
      rules:
      - alert: OcnrfTotalIngressTrafficRateAboveMinorThreshold
        annotations:
          description: 'Ingress traffic Rate is above the
configured minor threshold i.e. 800 requests per second (current
value is: {{ $value }})'
          summary: 'timestamp: {{ with query "time()" }}{{ . |
first | value | humanizeTimestamp }}{{ end }}: Traffic Rate is
above 80 Percent of Max requests per second(1000)'
          expr:
sum(rate(oc_ingressgateway_http_requests_total{app_kubernetes_io_nam
e="ingressgateway",kubernetes_namespace="ocnrf"}[2m])) by
(kubernetes_namespace) >= 800 < 900
          labels:
            severity: minor
            oid: "1.3.6.1.4.1.323.5.3.36.1.2.7001"
            kubernetes_namespace:
' {{ $labels.kubernetes_namespace }} '
      - alert: OcnrfTotalIngressTrafficRateAboveMajorThreshold
        annotations:
```

```

        description: 'Ingress traffic Rate is above the
configured major threshold i.e. 900 requests per second (current
value is: {{ $value }})'
        summary: 'timestamp: {{ with query "time()" }}{{ . |
first | value | humanizeTimestamp }}{{ end }}: Traffic Rate is
above 90 Percent of Max requests per second(1000)'
        expr:
sum(rate(oc_ingressgateway_http_requests_total{app_kubernetes_io_nam
e="ingressgateway",kubernetes_namespace="ocnrf"}[2m])) by
(kubernetes_namespace) >= 900 < 950
        labels:
        severity: major
        oid: "1.3.6.1.4.1.323.5.3.36.1.2.7002"
        kubernetes_namespace:
' {{ $labels.kubernetes_namespace }} '
        alertsscp: |
        groups:
        - name: SCPAlerts
        rules:
        - alert: SCPIngressTrafficRateAboveMinorThreshold
        annotations:
        description: 'Ingress Traffic Rate at locality:
"{{$labels.ocscp_locality}}" is above minor threshold (i.e. 2380
mps)'
        summary: 'namespace: {{$labels.kubernetes_namespace}},
podname: {{$labels.kubernetes_pod_name}},scpfqdn:
{{$labels.ocscp_fqdn}},scpauthority:{{$labels.ocscp_authority}},
timestamp: {{ with query "time()" }}{{ . | first | value |
humanizeTimestamp }}{{ end }}: Current Ingress Traffic Rate is
{{ $value | printf "%.2f" }} mps which is above 70 Percent of Max
MPS(3400)'
        expr:
sum(rate(ocscp_metric_http_rx_req_total{app_kubernetes_io_name="scp-
worker"}[2m])) by
(kubernetes_namespace,ocscp_locality,kubernetes_pod_name,ocscp_fqdn,
ocscp_authority) >= 2380 < 2720
        for: 1m
        labels:
        severity: minor
        alertname: "SCPIngressTrafficRateAboveMinorThreshold"
        oid: "1.3.6.1.4.1.323.5.3.35.1.2.7001"
        namespace: '{{$labels.kubernetes_namespace}}'
        podname: '{{$labels.kubernetes_pod_name}}'
        vendor: oracle
        - alert: SCPIngressTrafficRateAboveMajorThreshold
        annotations:
        timestamp: ' {{ with query "time()" }}{{ . | first |
value | humanizeTimestamp }}{{ end }} '
        description: 'Ingress Traffic Rate at locality:
{{$labels.ocscp_locality}} is above major threshold (i.e. 2720 mps)'
        summary: 'namespace: {{$labels.kubernetes_namespace}},
podname: {{$labels.kubernetes_pod_name}},scpfqdn:
{{$labels.ocscp_fqdn}},scpauthority:{{$labels.ocscp_authority}},
timestamp: {{ with query "time()" }}{{ . | first | value |
humanizeTimestamp }}{{ end }}: Current Ingress Traffic Rate is
{{ $value | printf "%.2f" }} mps which is above 80 Percent of Max

```

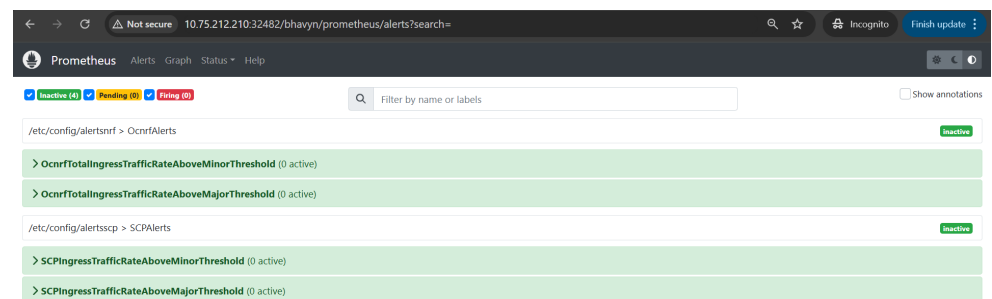
```

MPS(3400)'
    expr:
sum(rate(ocscp_metric_http_rx_req_total{app_kubernetes_io_name="scp-
worker"}[2m])) by
(kubernetes_namespace, ocscp_locality, kubernetes_pod_name, ocscp_fqdn,
ocscp_authority) >= 2720 < 3230
    for: 1m
    labels:
      severity: major
      alertname: "SCPIngressTrafficRateAboveMajorThreshold"
      oid: "1.3.6.1.4.1.323.5.3.35.1.2.7001"
      namespace: '{{ $labels.kubernetes_namespace }}'
      podname: '{{ $labels.kubernetes_pod_name }}'
      vendor: oracle
allow-snippet-annotations: "false"
prometheus.yml: |
  global:
    evaluation_interval: 1m
    scrape_interval: 1m
    scrape_timeout: 30s
  rule_files:
  - /etc/config/alertsnrf
  - /etc/config/recording_rules.yml
  - /etc/config/alerts
  - /etc/config/alerting_rules.yml
  - /etc/config/alertsscp
  - /etc/config/alertscncc
  - /etc/config/rules
.....
.....
.....

```

Screenshot of Prometheus GUI without CNC Console alerts:

Figure 2-2 Prometheus GUI with No CNC Console Alert Files



d. Helm Uninstall

- i. Run the following command to uninstall oso-alr-config Helm chart.

```
helm uninstall oso-alr-config -n <oso-namespace>
```

During `oso-alr-config` Helm chart uninstallation, no hooks are executed. As a result, the OSO Prometheus configmapMap and its alert configurations remain intact, while all other `oso-alr-config` resources are deleted.

- ii. In the event of a failure during an upgrade followed by an uninstall, the failed jobs may persist. In such cases, you must manually clear all jobs using the following command:

- Run the following command to retrieve the jobs:

```
#Get the jobs
$ kubectl get jobs -n <oso-namespace>
```

Sample output:

NAME	COMPLETIONS	DURATION	AGE
oso-alr-config-hook-post-install	0/1	138m	138m

- Run the following command to delete the jobs:

```
# Delete the jobs
$ kubectl delete job oso-alr-config-hook-post-install
```

Sample output:

```
job.batch "oso-alr-config-hook-post-install" deleted
```

2.4.2 Configuration of Alert Processing Microservice (APM)

This section describes the steps required to install, configure, and enable the Alert Processing Microservice (APM) within the OSO environment.

Note

The APM service is optional and should be installed separately using a Helm chart only if alert forwarding from Alert Manager to Kafka is required.

Prerequisites

- A functional Kafka cluster is available and accessible from the OSO environment where the APM Service is deployed.
- All artifacts and images related to APM are pushed to the Bastion repo host.

Limitations

- APM deployment is configured to forward alerts to only one Kafka topic at a time.
- The APM service uses the `confluent-kafka-python 2.11.0` client. It works with Apache Kafka brokers version 0.8 or higher, and Confluent Platform versions 7.5.x to 8.0.x. Full feature support is available when using Kafka versions 3.5.x to 4.0.x.

- APM supports a single replica deployment. If the APM pod is unavailable for an extended period or scaled down to zero replicas, Alert Manager buffers undelivered alerts and retries delivery. This can lead to increased memory consumption and may result in Out of Memory (OOM) conditions in Alert Manager pods.

1. Create Kubernetes secret(s) for APM TLS mode

This is an optional step and can be skipped if TLS for APM should be disabled.

To use TLS or mTLS mode of APM, see [Enable TLS in APM Post Installation](#).

To create Kubernetes secret from Kafka certificates, see "Update Kafka Certificates in Kubernetes secret" section in *Oracle Communications Cloud Native Core, Operations Services Overlay Installation and Upgrade Guide*.

Perform the following steps to create secret from Kafka certificates and key:

Note

Check the following:

- If TLS should be disabled, set the value of `apmTLS.enable` parameter to `false`, and skip this step.
- Use the following recommended pattern for the file names in which Kafka certificates and keys are stored:
 - Broker CA certificate should be stored in a file named `ca.crt`.
 - Server certificate should be stored in a file named `tls.crt` (Only required for mTLS).
 - Server key should to be stored in a file named `tls.key` (Only required for mTLS).

- a. Create a secret for `ca.crt` using the following command:

```
kubectl create secret generic tls-ca-secret --from-file=ca.crt=ca.crt -n <oso-namespace>
```

- b. Create an additional secret (if mTLS) using the following command:

```
kubectl create secret tls mTLS-server-secret --cert=tls.crt --key=tls.key -n <oso-namespace>
```

2. Installing and Configuring APM feature using Helm

- a. Install APM:

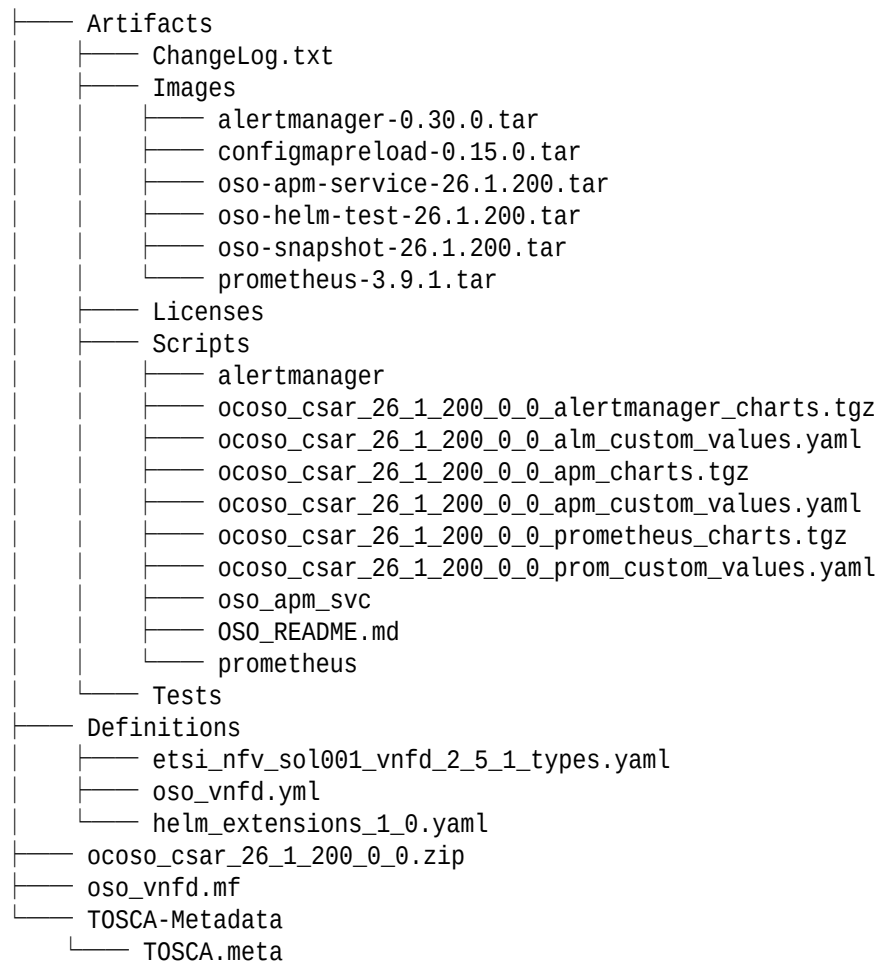
Perform the following manual steps to install OSO using CSAR artifacts:

- i. Download the OSO CSAR zip files from [My Oracle Support](#) (MOS).
- ii. Extract the CSAR zip files:

```
$ unzip <OSO CSAR package>
$ unzip -d ./oso_csar/ ocoso_csar_<26.1.200 version>.zip
```

- iii. Upload all the artifacts present in the `Artifacts/Images` folder to the configured repository.

The following structure indicates the CSAR file containing the Prometheus, alertmanager, and alert processing microservice files.



- b. Configure the APM parameters
Provide the appropriate values in the `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` file for `oso-apm-service` configmap and proceed with the installation of the APM. For more information, see [Alert Processing Microservice Configuration Parameters](#).

- c. Install APM
Run the following command to install APM in the created OSO namespace.

```
$ helm --namespace=<deployment-namespace-name> install <oso-apm-release-name> -f <ocoso_csar_26_1_200_0_0_apm_custom_values.yaml> ./ocoso_csar_26_1_200_0_0_apm_charts.tgz
```

For example:

```
# For apm service, configure the values files before running helm
install
$ helm --namespace=<oso-namespace> install <oso-apm-release-name> -f
ocoso_csar_26_1_200_0_0_apm_custom_values.yaml ./
ocoso_csar_26_1_200_0_0_apm_charts.tgz
```

- d. To perform post install verification, see [Verifying Installation](#).

Note

To enable ALM to forward alerts to APM, the receiver plugin must include the `webhook_configs` protocol, and the APM service details must be specified in the URL.

Here is an example of how to configure the `webhook_configs` protocol in the receiver plugin for alert forwarding:

- `apm-svc`: Service name of APM (must match the `fullnameOverride` specified in the APM custom-values file)
- `oso`: Namespace where OSO is deployed
- `80`: Service port of APM (corresponds to `service.port` in the APM custom-values file)

```
receivers:
- name: default-receiver
  webhook_configs:
    - url: 'http://apm-svc-name.osons.svc:80/webhook'
      send_resolved: true
```

2.5 Postinstallation Tasks

This section explains the postinstallation tasks for OSO.

2.5.1 Verifying Installation

To verify if OSO is installed:

1. Run the following command to verify the OSO version.

```
helm ls -n <oso-namespace>
```

For example:

```
helm ls -n oso-name
```

Sample output:

NAME	NAMESPACE	REVISION	UPDATED
STATUS	CHART	APP VERSION	
oso	oso	3	2024-03-27 18:06:42.575679972 +0000 UTC
deployed	prometheus-15.16.1	24.1.0	

2. Run the following commands to verify if pods are up and running:

```
$ kubectl get pods --namespace <deployment-namespace-name>
```

For example:

```
$ kubectl get pods -n occne-infra
```

Sample output:

NAME	READY	STATUS	RESTARTS	AGE
oso-prom-alm-0	2/2	Running	0	14h
oso-prom-alm-1	2/2	Running	0	14h
oso-prom-svr-84c8c7d488-qsnvx	2/2	Running	0	14h

3. Run the following commands to verify if services are up and running and are assigned an EXTERNAL-IP (if LoadBalancer is being used):

```
$ kubectl get service --namespace <deployment-namespace-name>
```

For example:

```
$ kubectl get service -n occne-infra
```

Sample output:

NAME	EXTERNAL-IP	PORT(S)	TYPE	CLUSTER-IP
oso-prom-alm	<none>	80/TCP	ClusterIP	10.233.16.83
oso-prom-alm-headless	<none>	80/TCP, 6783/TCP	ClusterIP	None
oso-prom-svr	<none>	80/TCP	ClusterIP	10.233.46.136

4. Verify that all the GUIs are accessible.

Note

Prometheus and Alertmanager GUIs can be accessed only using the CNC Console. For more information about accessing Prometheus and Alertmanager GUIs using CNC Console, see *Oracle Communications Cloud Native Configuration Console User Guide*.

If the service is of type LoadBalancer, use EXTERNAL-IP to open the Prometheus GUI. Refer to Step 2 to get the services and their EXTERNAL-IPs.

Example to access service IP address with output:

```
# kubectl get nodes -o wide
NAME      STATUS    ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP
OS-IMAGE                                KERNEL-VERSION   CONTAINER-RUNTIME
master    Ready     master   87d   v1.17.1   10.75.226.13
<none>    Oracle Linux Server 7.5
4.1.12-112.16.4.el7uek.x86_64   docker://19.3.11
slave1    Ready     <none>   87d   v1.17.1   10.75.225.177
```

```
<none> Oracle Linux Server 7.5
4.1.12-112.16.4.el7uek.x86_64 docker://19.3.11
slave2 Ready <none> 87d v1.17.1 10.75.225.47
<none> Oracle Linux Server 7.5
4.1.12-112.16.4.el7uek.x86_64 docker://19.3.11
```

```
# kubectl get service -n ocnrf
```

NAME	EXTERNAL-IP	PORT(S)	TYPE	AGE	CLUSTER-IP
oso-prom-alm			ClusterIP		10.103.63.10
<none>		80/TCP		35m	
oso-prom-alm-headless			ClusterIP		None
<none>		80/TCP		35m	
oso-prom-svr			ClusterIP		10.101.91.81
<none>		80/TCP		35m	

Note

In case Dualstack with IPv6 is enabled, change the service type to LoadBalancer in the custom values file. You can see both IPs when calling the `kubectl get service` command, and the output is as follows:

```
[root@master Scripts]# kubectl get service -n ocnrf
NAME                                TYPE                                CLUSTER-IP
EXTERNAL-IP                        PORT(S)                            AGE
oso-prom-alm                       LoadBalancer                      10.103.63.10
10.75.202.205,2606:b400:605:b809::2 80/TCP                            35m
oso-prom-alm-headless              ClusterIP                           None
<none>                             80/TCP                            35m
oso-prom-svr                       LoadBalancer                      10.101.91.81
10.75.202.204,2606:b400:605:b809::1 80/TCP                            35m
```

Figure 2-3 Prometheus GUI

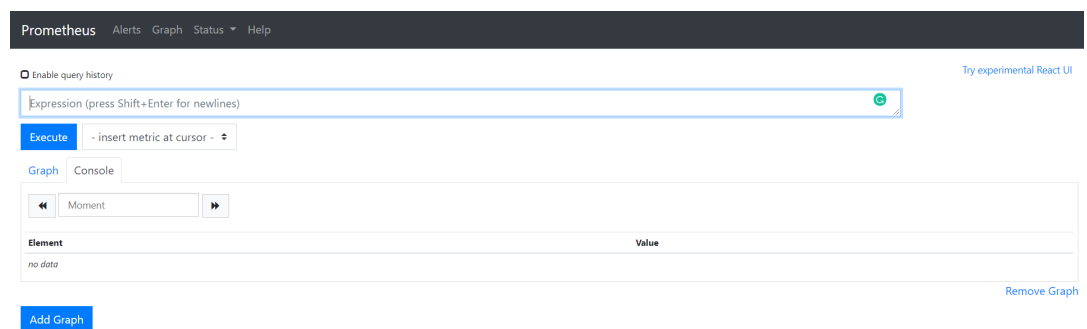
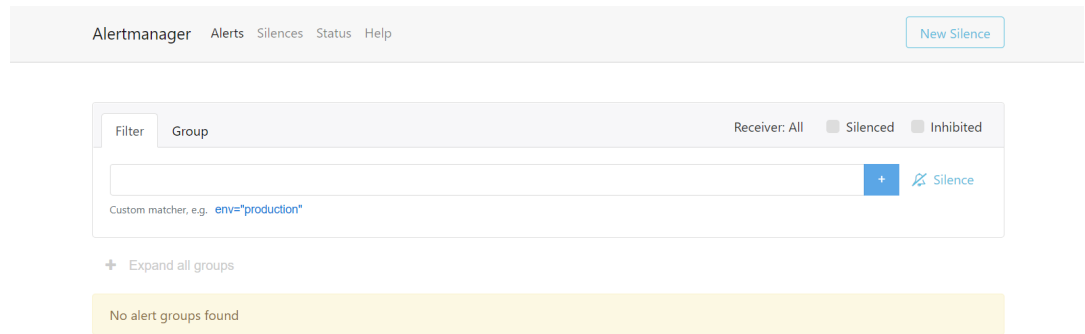


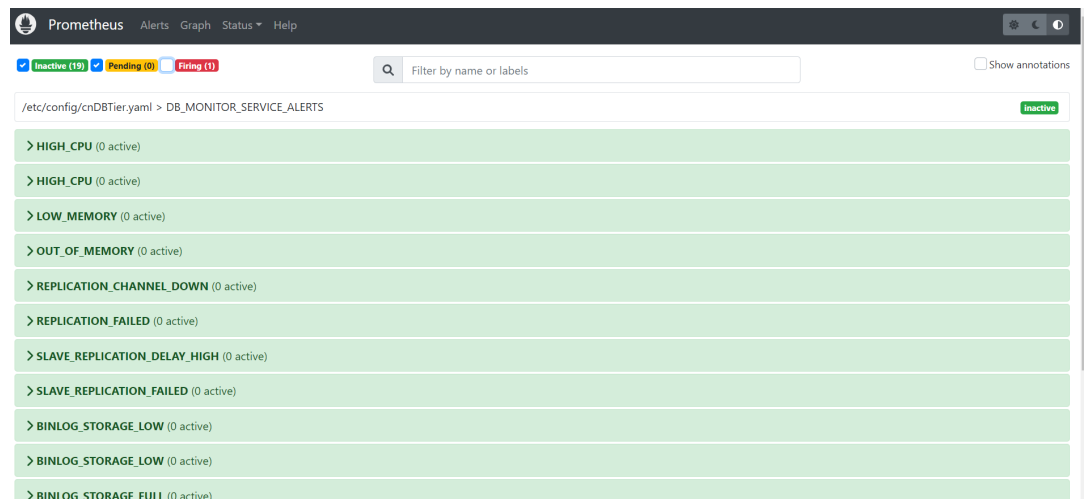
Figure 2-4 Alert Manager GUI

- On the Prometheus GUI, click **Alerts** to verify that all the alerts (NF Alerts) are visible.

Note

OSO Prometheus doesn't have any alerts of its own, therefore the GUI must appear empty initially. You can patch any NF alert rules in this section.

The following image displays the alerts for cnDBTier:

Figure 2-5 Prometheus GUI

After alerts are raised, the GUI must display the triggered alerts as shown in the following image:

Figure 2-6 Prometheus GUI - Alerts

The screenshot shows the Prometheus Alerts interface. At the top, there are tabs for 'Inactive (19)', 'Pending (0)', and 'Firing (1)'. A search bar is present with the text 'Filter by name or labels'. Below this, the selected alert is shown for the file '/etc/config/cnDBTier.yaml' with the rule 'DB_MONITOR_SERVICE_ALERTS'. The alert is 'NODE_DOWN' (1 active). The alert details include:

```

name: NODE_DOWN
expr: db_tier_node_status == 0
labels:
  oid: 1.3.6.1.4.1.323.5.3.50.1.2.2001
  severity: critical
annotations:
  description: MySQL {{ $labels.node_type }} node with node id {{ $labels.node_id }} is down for cnDBTier site {{ $labels.site_name }} and kubernetes namespace {{ $labels.namespace }}
  summary: MySQL {{ $labels.node_type }} node having node id {{ $labels.node_id }} is down for cnDBTier site {{ $labels.site_name }} and kubernetes namespace {{ $labels.namespace }}

```

Below the annotations, there is a table of labels:

Labels	State	Active Since	Value
alertname=NODE_DOWN	FIRING	2022-08-04T11:34:17.830706719Z	0
app=db-monitor-svc			
kubernetes_namespace=osoharshita1			
node_type=ND8			

Below the table, there are expandable sections for 'HIGH_CPU (0 active)', 'HIGH_CPU (0 active)', 'LOW_MEMORY (0 active)', and 'OUT_OF_MEMORY (0 active)'.

6. Select **Alerts** tab on the Alertmanager GUI to view the triggered alerts as shown in the following image:

Figure 2-7 Alertmanager - Alerts

The screenshot shows the Alertmanager Alerts interface. At the top, there are tabs for 'Alertmanager', 'Alerts', 'Silences', 'Status', and 'Help'. A 'New Silence' button is visible. Below this, there is a filter section with 'Filter' and 'Group' tabs. The 'Filter' tab is selected, and a search bar is present with the text 'Custom matcher, e.g. env=production'. Below the search bar, there is a 'Receiver: All' section with 'Silenced' and 'Inhibited' checkboxes. Below this, there is a '1 alert' section. The alert details include:

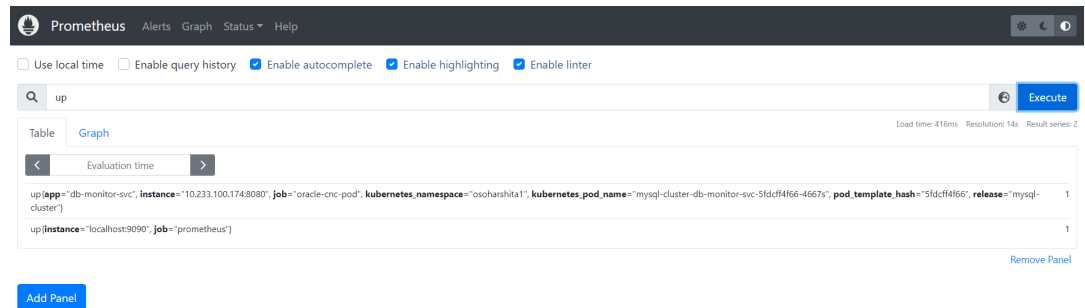
```

2022-08-04T11:34:17.830Z + Info + Source + Silence
alertname="NODE_DOWN" + app="db-monitor-svc" + application="db-monitor-svc" + instance="10.233.100.174.8080" + job="oracle-cnc-pod" +
kubernetes_namespace="osoharshita1" + kubernetes_pod_name="mysql-cluster-db-monitor-svc-5fdcf4f66-4667s" + namespace="osoharshita1" +
node_id="2" + node_type="ND8" + node_version="mysql-8.0.30 ndb-8.0.30" + oid="1.3.6.1.4.1.323.5.3.50.1.2.2001" +
pod_template_hash="5fdcf4f66" + release="mysql-cluster" + severity="critical" + site_name="osoharshita1" +

```

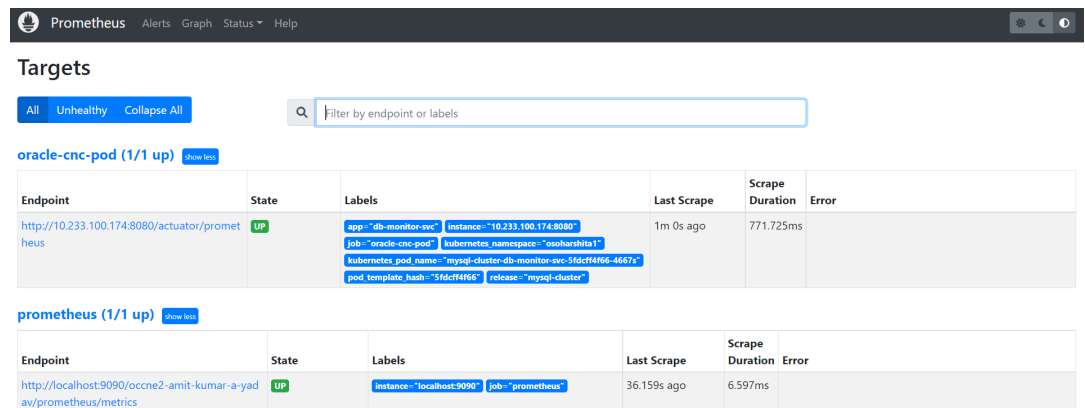
7. On the Prometheus GUI, click **Graph** to verify if the expected metrics (example, NF Metrics) are displayed. The following image displays a sample Prometheus Graph with metrics:

Figure 2-8 Prometheus Graph



8. On the Prometheus GUI, navigate to **Status** and then click **Target** to verify if the configured targets are displayed.
The following image shows Prometheus targets that are being extracted:

Figure 2-9 Prometheus Target



9. After deploying the APM Service, verify that all related Kubernetes resources are running as expected.
 - a. Check the resource status
Run the following command to display the status of all APM-related resources (pods, services, deployments, and replica sets) in the specified namespace:

```
$ kubectl get all -n <namespace> | grep apm
```

Sample command:

```
[cloud-user@ocme2-bastion-1 ~]$ kubectl get all -n <namespace> | grep apm
```

Sample output:

```
pod/apm-svc-66b696f5c9-vdnhs 1/1 Running 0 3m45s service/apm-svc
ClusterIP 10.233.31.4 <none> 80/TCP 3m44s deployment.apps/apm-svc 1/1 1
1 3m44s replicaset.apps/apm-svc-66b696f5c9 1 1 1 3m45s
```

Ensure that the following are verified post installation:

- All APM pods show a Running status.

- APM services are listed with assigned cluster IPs or ports as configured.
- APM deployments and replica sets show the correct number of available and ready pods.

Note

If any APM resource is not in the expected state, use the following commands for more detailed troubleshooting:

```
kubectl describe <apm-pod-name> -n <namespace>
kubectl logs <apm-pod-name> -n <namespace>
```

b. Check the service health endpoints

To validate the liveness of the APM service, access the health endpoints (/healthz) using port forwarding:

- **Terminal 1:** Set up port forwarding from bastion to the APM service:

```
kubectl port-forward svc/apm-svc 5000:80 -n <namespace>
```

Sample output

```
Forwarding from [::1]:5000 -> 5000
Handling connection for 5000
Handling connection for 5000
```

- **Terminal 2:** In a new terminal window, query the health endpoints through the forwarded ports:

```
$ curl http://localhost:5000/healthz
```

Sample output

Healthy

Ensure that you receive the expected responses indicating the service is healthy.

Note

Post installation, Prometheus can be vertically scaled to add more resources to an existing Prometheus server for load balancing. For more information about, Prometheus vertical scaling, see [Prometheus Vertical Scaling](#).

2.5.2 Enable TLS in APM Post Installation

To enable TLS in APM post installation, perform the following steps:

1. Update certificates in custom-values.yaml (ocoso_csar_26_1_200_0_0_apm_custom_values.yaml) file.

```
vi ocoso_csar_26_1_200_0_0_apm_custom_values.yaml
```

2. Apply the changes using Helm upgrade. Run a Helm upgrade command to apply the new configuration.

```
helm --namespace=<OSO_NAMESPACE> upgrade <OSO_APM_RELEASE_NAME> -f  
ocoso_csar_26_1_200_0_0_apm_custom_values.yaml ./  
ocoso_csar_26_1_200_0_0_apm_charts.tgz
```

3. Verify the changes by confirming the ages of pods and secrets.
Confirm the age of pods.

```
kubectl get pods -n <namespace>
```

Confirm the age of secrets.

```
kubectl get secret -n <namespace>
```

2.6 Enabling APM Service Post Installation

This section describes how to enable APM, configure its Kafka connection settings, and apply the updated configuration using Helm post installation.

Note

This procedure is optional. Perform it only if you want to enable and configure APM post installation.

1. Navigate to the custom values.yaml file
Change directory to the oso-apm scripts location: `cd oso_<zip_version>/Artifacts/Scripts`

2. Edit the custom values file
Open the custom values.yaml file inside the APM tarball:

```
vi ocoso_csar_26_1_200_0_0_apm_custom_values.yaml
```

3. Enable APM and set required variables
Locate the apmEnabled parameter and set its value to true:

```
apmEnabled: true
```

Ensure valid values are provided for the following essential parameters for providing proper APM functionality and seamless integration with the Kafka messaging infrastructure:

- severityList
- kafkaIp

- kafkaPort
 - kafkaTopic
 - kafkaGroupId
4. Use TLS mode of APM
To use TLS or mTLS mode of APM, see [#unique_22/unique_22_Connect_42_OL_LSR_NKZ_LHC](#).
Update the placeholders of apmTLS.caSecret and apmTLS.serverSecret parameters with the Kubernetes secret names.
 5. Apply the changes with Helm upgrade
Run the following Helm upgrade command to apply the new configuration:

```
helm --namespace=<OSO_NAMESPACE> upgrade <OSO_APM_RELEASE_NAME> -f  
ocoso_csar_26_1_200_0_0_apm_custom_values.yaml ./  
ocoso_csar_26_1_200_0_0_apm_charts.tgz
```
 6. Verify the deployment
Confirm the APM deployment and related resources are updated and running as expected:

```
kubectl get pods -n <namespace>
```



```
kubectl get svc -n <namespace>
```


For more information, see [Post-Install Verification](#).

3

Customizing OSO

This chapter provides information about customizing Oracle Communications Cloud Native Core, Operations Services Overlay (OSO) deployment in a cloud native environment.

The OSO deployment is customized by overriding the default values of various configurable parameters in the `<custom-value.yaml>` files.

3.1 Naming Conventions and Limits

This section provides the naming conventions and limits for OSO containers and labels.

Naming Conventions and Limits for Containers

OSO supports customization of container names using custom prefix and suffix. Currently, the name field supports up to 63 characters (including the custom prefix, custom suffix, and default fixed name).

Note

- The maximum length of default fixed names is 17.
- To avoid name truncation, limit the number of characters in the custom prefix and suffix to match the defined limit.

The following table displays the default fixed names of containers without prefix and suffix:

Table 3-1 Default Fixed Names of Containers

POD Name	Fixed Container Name
Prometheus-server(prom-svr)	• prom-svr-cm-r • prom-svr
Alertmanager(prom-alm)	• prom-alm • prom-alm-cm-r
APM service(apm-svc)	apm-svc

You can use the following values in the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml`, `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml`, and `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` files to add the custom prefix and suffix to container names:

```
global:
# provide the prefix and suffix to be added to k8Resources
  k8Resource:
    container:
```

```
prefix:
suffix:
```

Naming Conventions and Limits for Labels

1. OSO supports custom labels for Kubernetes resources. It provides three types of label definitions that must be configured in the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml`, `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml`, and `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` files:
 - a. **Global Labels(allResources):** These labels are attached to all the Kubernetes resources. This is depicted as TYPE1 in the following sample `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` file.
 - b. **LB and NON-LB TYPE label:** These labels are attached to LoadBalancer and non-LoadBalancer type deployments, statefulsets, and services. This is depicted as TYPE2 in the following sample `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` file.
 - c. **Service specific label:** These labels are attached to each service in their specific service-label metadata sections and can be used to uniquely label services, regardless of them being LoadBalancer or non-LoadBalancer.

Note

Prometheus and Alertmanager have their own set of service-specific labels.

You can use the following values in the `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` file to provide custom labels for Kubernetes resources:

```
customExtension:
# TYPE1 Label
  allResources:
    labels: {}
# TYPE2 Labels
  lbServices:
    labels: {}

  nonlbServices:
    labels: {}

  lbDeployments:
    labels: {}

  nonlbDeployments:
    labels: {}

  lbStatefulSets:
    labels: {}
..
```

Note

You must be well aware of the naming guidelines while labeling the resources. For more information on Helm naming guidelines, see [Helm Labels and Annotations](#).

3.2 OSO Configuration Parameters

Overview

This section provides the configuration parameters details that are used to install the OSO CSAR packages manually.

OSO CSAR is packaged with the following open source images:

```
OSO_ALERTMANAGER_IMAGE=occne.io/occne/alertmanager
OSO_PROMETHEUS_IMAGE=occne.io/occne/prometheus
OSO_CONFIGMAPRELOAD_IMAGE=occne.io/occne/configmapreload
OSO_HELM_TEST_IMAGE=occne.io/occne/oso_helm_test
OSO_ALERT_CONFIG_IMAGE=occne.io/occne/oso_alert_config
OSO_SNAPSHOT_IMAGE=occne.io/occne/oso_snapshot
OSO_APM_IMAGE=occne.io/occne/oso_apm_service
```

Prerequisites

- Docker or Podman must be installed.
- Helm repository must be set up and accessible.

3.2.1 Prometheus Configuration Parameters

This section provides the Prometheus configuration parameters details that are used to install the OSO CSAR packages manually.

Configure `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml` with the specific values.

Table 3-2 OSO Prometheus Configuration Parameter

Parameter	Description	Details
nameOverride	This is an optional parameter. Indicates the custom name override applied to all Kubernetes resources created by this Helm release.	Data Type: String Default Value: NA Range: NA Placeholder: prom
helmtestimage	This is an optional parameter. Indicates the repository URL of the Helm test image where it is located. Example: <code>occne.io/occne/oso_helm_test:25.2.200</code> Note: Configure this parameter only when Helm tests are required after installation or upgrade.	Data Type: String Default Value: NA Range: NA Placeholder: HELM-TEST-IMAGE-REPO-ADDRESS

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
useasm	This is an optional parameter. Indicates if the Aspen Service Mesh (ASM) environment is used or not in OSO deployment. If this parameter is set as true, ASM is enabled for the OSO deployment. If this parameter is set as false, ASM is disabled for the OSO deployment. Example: useasm: true	Data Type: String Default Value: NA Range: true, false Placeholder: USEASM
namespace	This is an optional parameter. Indicates the namespace where OSO will be installed. This value is required in multiple places in the custom values.yaml file. Example: namespace: ocnf	Data Type: String Default Value: NA Range: NA Placeholder: NAMESPACE
clustername	This is an optional parameter. Specifies the cluster name prefix appended to Alertmanager GUI URLs. Note: - Comment out this parameter if cluster-specific URL prefixes are not required. - If you replace the cluster name, replace them in all the places where you have the placeholder as /CLUSTER-NAME.	Data Type: String Default Value: NA Range: NA Placeholder: /CLUSTER-NAME
resources.limits.cpu	This is an optional parameter. Specifies the maximum CPU resources allocated for Helm test operations.	Data Type: String Default Value: 10m Range: NA Unit: millicores
resources.limits.memory	This is an optional parameter. Specifies the maximum memory resources allocated for Helm test operations.	Data Type: String Default Value: 32Mi Range: NA Unit: Mebibytes
resources.requests.cpu	This is an optional parameter. Specifies the minimum CPU resources allocated for Helm test operations.	Data Type: String Default Value: 10m Range: NA Unit: millicores
resources.requests.memory	This is an optional parameter. Specifies the minimum memory resources allocated for Helm test operations.	Data Type: String Default Value: 32Mi Range: NA Unit: Mebibytes
promsvcname	This is a mandatory parameter. Specifies the Kubernetes Service name exposed for the Prometheus server.	Data Type: String Default Value: NA Range: NA Placeholder: OSO-RELEASE-NAME-prom-svr

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>prometheushealthyurl</code>	This is an optional parameter. Specifies the HTTP path used to perform Prometheus health checks.	Data Type: String Default Value: NA Range: NA Placeholder: /prometheus/-/healthy
<code>prometheusreadyurl</code>	This is an optional parameter. Specifies the HTTP path used to check Prometheus readiness.	Data Type: String Default Value: NA Range: NA Placeholder: /prometheus/-/ready
<code>global_oso.k8Resource.container.prefix</code>	This is an optional parameter. Specifies the value that is prefixed to all the container names of OSO. This value is used to prefix to all the container names of OSO.	Data Type: String Default Value: NA Range: NA
<code>global_oso.k8Resource.container.suffix</code>	This is an optional parameter. Specifies the value that is suffixed to all the container names of OSO. This value is used to suffix to all the container names of OSO.	Data Type: String Default Value: NA Range: NA
<code>global_oso.serviceAccountNamePromSvr</code>	This is an optional parameter. Specifies the Kubernetes service account name used by the OSO Prometheus server pod.	Data Type: String Default Value: "" Range: NA
<code>global_oso.customExtension.allResources.labels</code>	This is an optional parameter. Specifies the custom labels that should be added to all the OSO Kubernetes resources. This can be used to add custom label(s) to all Kubernetes resources that are created by OSO helm chart.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.lbServices.labels</code>	This is an optional parameter. Specifies the custom labels required to be added to OSO services that are considered as load balancer type. This can be used to add custom label(s) to all load balancer type services that are created by OSO helm chart.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.nonlbServices.labels</code>	This is an optional parameter. Specifies the custom labels to be added to OSO services that are considered as not load balancer type. This can be used to add custom label(s) to all non-load balancer type services that is created by OSO helm chart.	Data Type: String Default Value: {} Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>global_oso.customExtension.lbDeployments.labels</code>	This is an optional parameter. Specifies the custom labels to be added to OSO deployments that are associated to a service which is of load balancer type. This can be used to add the custom label(s) to the deployments that will be created by OSO helm chart that are associated to a load balancer type service.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.nonlbDeployments.labels</code>	This is an optional parameter. Specifies the custom labels to be added to OSO deployments that are associated to a service which is not of load balancer type. This can be used to add custom label(s) to all deployments that is created by OSO helm chart which are associated to a service which is not of load balancer type.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.lbStatefulSets.labels</code>	This is an optional parameter. Specifies custom labels applied to be added to StatefulSets that are exposed through load-balanced services.	Data Type: String Default Value: {} Range: NA
<code>annotations</code>	This is an optional parameter. Specifies the custom annotations that should be added to all the OSO Kubernetes resources. This can be used to add custom annotation(s) to all Kubernetes resources that are created by OSO helm chart. annotations: # - sidecar.istio.io/inject: "false"	Data Type: String Default Value: {} Range: NA
<code>rbac.create</code>	This is a mandatory parameter. Specifies if the default RBAC roles and role bindings are created for Prometheus in OSO deployments.	Data Type: String Default Value: CREATE_DEFAULT_RBAC Range: NA
<code>podSecurityPolicy.enabled</code>	This is an optional parameter. Specifies if the pod security is enabled or not for Prometheus server in OSO deployments. If the value is set as true, pod security is enabled. If the value is set as false, pod security is disabled.	Data Type: Boolean Default Value: false Range: true, false
<code>imagePullSecrets</code>	This is an optional parameter. Specifies the list of image pull secrets needed to pull the image from the repository. Example: - name: "image-pull-secret"	Data Type: List Default Value: [] Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>serviceAccounts.server.create</code>	This is an optional parameter. Specifies whether a service account will be created for the Prometheus server. Enabling this provides a dedicated identity for Prometheus pods. If the value is set as true, a service account is created for Prometheus server. If the value is set as false, a service account is not created for Prometheus server.	Data Type: String Default Value: NA Range: true, false Placeholder: USE-DEFAULT-SVCACCOUNT-PROM
<code>serviceAccounts.server.name</code>	This is an optional parameter. Specifies the service account name of the Prometheus server.	Data Type: String Default Value: "" Range: NA
<code>serviceAccounts.server.annotations</code>	This is an optional parameter. Specifies the service account annotations that should be added to the Prometheus server.	Data Type: String Default Value: {} Range: NA
<code>commonMetaLabels</code>	This is an optional parameter. Specifies all the additional labels that should be attached to all the resources.	Data Type: String Default Value: {} Range: NA
<code>configmapReload.reloadUrl</code>	This is an optional parameter. Specifies the HTTP endpoint invoked by the configmapReload container to initiate a Prometheus configuration reload. If this parameter is not configured, the default Prometheus reload endpoint is applied.	Data Type: String Default Value: "" Range: NA
<code>configmapReload.prometheus.enabled</code>	This is an optional parameter. Specifies if the configmap-reload container is deployed or not. If the value is true, configmap-reload container is deployed. If the value is false, configmap-reload container is not deployed. Note: Recommended value is true, as OSO can be installed even if the parameter is not configured.	Data Type: Boolean Default Value: true Range: true, false
<code>configmapReload.prometheus.name</code>	This is an optional parameter. Specifies the configmap-reload container name.	Data Type: String Default Value: NA Range: NA Placeholder: configmap-reload
<code>configmapReload.prometheus.image.repository</code>	This is an optional parameter. Specifies the container image repository address for configmap-reload.	Data Type: String Default Value: CONFIGMAP-RELOAD-REPO-ADDRESS Range: NA
<code>configmapReload.prometheus.image.tag</code>	This is an optional parameter. Specifies the tag of the configmap-reload image to be deployed.	Data Type: String Default Value: 0.15.0 Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>configmapReload.prometheus.image.digest</code>	This is an optional parameter. Specifies the image digest for pulling the configmap-reload container image. When a non-empty value is set, Kubernetes pulls the image by digest rather than by tag, overriding the tag value.	Data Type: String Default Value: "" Range: NA
<code>configmapReload.prometheus.image.pullPolicy</code>	This is an optional parameter. Indicates the image pull policy for the configmap-reload container. This controls when Kubernetes pulls the image from the repository. - IfNotPresent—Pulls the image only once, and it doesn't try again. - Always—always pulls the image when the deployment is created. - Never—it doesn't pull the image when the deployment is created.	Data Type: String Default Value: IfNotPresent Range: Always, IfNotPresent, Never
<code>configmapReload.prometheus.containerSecurityContext.capabilities.drop</code>	This is an optional parameter. Specifies the list of capabilities to be removed from the container to protect the system from having more privileges. Note: Do not change the default value.	Data Type: List of string Default Value: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW"] Range: NA
<code>configmapReload.prometheus.containerSecurityContext.runAsUser</code>	This is an optional parameter. Specifies the user ID under which the configmap-reload container runs. Note: Do not change the default value.	Data Type: Integer Default Value: 65534 Range: NA
<code>configmapReload.prometheus.containerSecurityContext.runAsNonRoot</code>	This is an optional parameter. Specifies whether the container must run as a non-root user. If the value is set as true, the container runs as a non-root user. If the value is set as false, the container runs as a root user.	Data Type: Boolean Default Value: true Range: true, false
<code>configmapReload.prometheus.containerSecurityContext.runAsGroup</code>	This is an optional parameter. Specifies the group ID under which the container process runs. Note: Do not change the default value.	Data Type: Integer Default Value: 65534 Range: NA
<code>configmapReload.prometheus.containerSecurityContext.allowPrivilegeEscalation</code>	This is an optional parameter. Indicates whether the container can gain more privileges than its parent process. If the value is set as true, it allows privilege escalation and does not provide an additional layer of security. If the value is set as false, it blocks privilege escalation and provides an additional layer of security.	Data Type: Boolean Default Value: false Range: true, false

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>configmapReload.prometheus.resources.limits.cpu</code>	This is an optional parameter. Specifies the maximum amount of CPU allocated to the configmap-reload container.	Data Type: String Default Value: 10m Range: NA Unit: millicores
<code>configmapReload.prometheus.resources.limits.memory</code>	This is an optional parameter. Specifies the maximum amount of memory allocated to the configmap-reload container.	Data Type: String Default Value: 32Mi Range: NA Unit: Mebibytes
<code>configmapReload.prometheus.resources.limits.ephemeral-storage</code>	This is an optional parameter. Specifies the maximum ephemeral storage allocation for the configmap-reload container.	Data Type: String Default Value: 1Gi Range: NA Unit: Gibibytes
<code>configmapReload.prometheus.resources.requests.cpu</code>	This is an optional parameter. Specifies the minimum CPU allocated to the configmap-reload container.	Data Type: String Default Value: 10m Range: NA Unit: millicores
<code>configmapReload.prometheus.resources.requests.memory</code>	This is an optional parameter. Specifies the minimum amount of memory allocated to the configmap-reload container.	Data Type: String Default Value: 32Mi Range: NA Unit: Mebibytes
<code>configmapReload.prometheus.resources.requests.ephemeral-storage</code>	This is an optional parameter. Specifies the minimum ephemeral storage allocation for the configmap-reload container.	Data Type: String Default Value: 1Gi Range: NA Unit: Gibibytes
<code>server.name</code>	This is an optional parameter. Specifies the name assigned to the Prometheus server instance.	Data Type: String Default Value: "svr" Range: NA
<code>server.releaseNamespace</code>	This is an optional parameter. Indicates whether release operations (like deletion or upgrades) will affect resources in the same namespace as the Helm release. If the value is set as true, it restricts actions to the release namespace for better isolation. If the value is set as false, it does not restrict actions to the release namespace for better isolation.	Data Type: Boolean Default Value: false Range: true, false
<code>server.image.repository</code>	This is an optional parameter. Specifies the repository URI to pull the Prometheus server container image from.	Data Type: String Default Value: "PROMETHEUS-REPO-ADDRESS" Range: NA
<code>server.image.tag</code>	This is an optional parameter. Indicates the specific image tag for the Prometheus server container.	Data Type: String Default Value: 3.9.1 Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.image.digest</code>	This is an optional parameter. Specifies the image digest for pulling the server image. When a non-empty value is set, Kubernetes pulls the image by digest rather than by tag, overriding the tag value.	Data Type: String Default Value: "" Range: NA
<code>server.image.pullPolicy</code>	This is an optional parameter. Indicates the image pull policy for the Prometheus server. This controls when Kubernetes pulls the image from the repository. - IfNotPresent—Pulls the image only once, and it doesn't try again. - Always—always pulls the image when the deployment is created. - Never—it doesn't pull the image when the deployment is created.	Data Type: String Default Value: IfNotPresent Range: Always, IfNotPresent, Never
<code>server.prefixURL</code>	This is an optional parameter. Specifies the path prefix under which Prometheus's user interface and API are served.	Data Type: String Default Value: /CLUSTER-NAME/prometheus Range: NA
<code>server.baseURL</code>	This is an optional parameter. Indicates the externally accessible full base URL for Prometheus, ensuring generated links are accurate when accessed remotely.	Data Type: String Default Value: http://localhost/CLUSTER-NAME/prometheus Range: NA
<code>server.extraFlags</code>	This is a conditional parameter. Indicates that the <code>web.enable-admin-api</code> parameter controls access to the administrative HTTP API. This parameter is disabled by default. Uncomment the <code>web.enable-admin-api</code> parameter to enable it. If the parameter is enabled, it allows capturing snapshots in TSDB.	Data Type: String Default Value: disabled Range: disabled, enabled
<code>server.global.scrape_interval</code>	This is an optional parameter. Indicates how frequently Prometheus scrapes all targets. Use a longer interval to reduce load or a shorter interval for more granular metrics.	Data Type: String Default Value: 1m Range: NA Unit: minutes
<code>server.global.scrape_timeout</code>	This is an optional parameter. Specifies the maximum duration Prometheus allows for a single scrape before timing out.	Data Type: String Default Value: 10s Range: NA Unit: seconds
<code>server.global.evaluation_interval</code>	This is an optional parameter. Indicates how frequently Prometheus evaluates alerting and recording rules.	Data Type: String Default Value: 1m Range: NA Unit: minutes

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.remoteWrite[].url</code>	This is an optional parameter. Indicates the remote write endpoint URL where Prometheus writes metrics for long-term storage or integration.	Data Type: String Default Value: OSO_CORTEX_URL Range: NA
<code>server.remoteWrite[].remote_timeout</code>	This is an optional parameter. Specifies the timeout for remote write requests to the external endpoint.	Data Type: String Default Value: OSO_REMOTE_WRITE_TIMEOUT Range: NA
<code>server.remoteWrite[].bearer_token</code>	This is an optional parameter. Specifies the authentication bearer token for secure communication with the remote write server.	Data Type: String Default Value: BEARER_TOKEN Range: NA
<code>server.tsdb</code>	This is an optional parameter. Indicates Prometheus time series database (TSDB) configuration for advanced storage settings, such as out-of-order time windows or block compaction.	Data Type: Object Default Value: {} Range: NA
<code>server.podDisruptionBudget.enabled</code>	This is an optional parameter. Specifies whether to create a PodDisruptionBudget for Prometheus server pods, which limits how many pods can be disrupted during maintenance or scaling. If the value is true, pod disruption budget is created for Prometheus server pods. If the value is false, pod disruption budget is not created for Prometheus server pods.	Data Type: Boolean Default Value: false Range: true, false
<code>server.podDisruptionBudget.maxUnavailable</code>	This is an optional parameter. Specifies the maximum number of pods allowed to be unavailable during voluntary disruptions (such as node drains).	Data Type: Integer Default Value: 1 Range: 0, >0
<code>server.persistentVolume.enabled</code>	This is an optional parameter. Indicates whether persistent storage is enabled for Prometheus data, ensuring metrics persist across pod restarts.	Data Type: Boolean Default Value: true Range: true, false
<code>server.persistentVolume.accessModes</code>	This is an optional parameter. Specifies the access modes for the PersistentVolumeClaim (PVC).	Data Type: List Default Value: ["ReadWriteOnce"] Range: NA
<code>server.persistentVolume.labels</code>	This is an optional parameter. Specifies the labels to be applied to the PersistentVolumeClaim.	Data Type: String Default Value: {} Range: NA
<code>server.persistentVolume.annotations</code>	This is an optional parameter. Specifies the annotations to be added to the PersistentVolumeClaim.	Data Type: String Default Value: {} Range: NA
<code>server.persistentVolume.existingClaim</code>	This is a conditional parameter. Indicates the name of an existing PersistentVolumeClaim.	Data Type: String Default Value: "" Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.persistentVolume.mountPath</code>	This is an optional parameter. Specifies the file system path where the persistent volume is mounted inside the Prometheus container.	Data Type: String Default Value: /data Range: NA
<code>server.persistentVolume.size</code>	This is an optional parameter. Indicates the storage size for the persistent volume claim, determining how much space is allocated for Prometheus data.	Data Type: String Default Value: PROM-PV-SIZE Range: NA
<code>server.persistentVolume.storageClass</code>	This is an optional parameter. Specifies the storage class for the persistent volume, allowing control over the underlying storage backend.	Data Type: String Default Value: PROM-STORAGE-CLASS Range: NA
<code>server.strategy.type</code>	This is an optional parameter. Specifies the deployment strategy used for the Prometheus server. If set to <code>Recreate</code> , all existing Prometheus pods are terminated before new ones are created, ensuring upgrades are fully applied. If set to <code>RollingUpdate</code> , pods are updated incrementally to reduce downtime, but manual restarts may be required for changes to take full effect. Note: If no value is assigned, the default is <code>RollingUpdate</code> . However, it is recommended to use <code>Recreate</code> .	Data Type: String Default Value: Recreate Range: Recreate, RollingUpdate
<code>server.emptyDir.sizeLimit</code>	This is an optional parameter. Indicates the size limit for the ephemeral <code>emptyDir</code> storage if persistent volume is not used.	Data Type: String Default Value: "" Range: NA
<code>server.podAnnotations</code>	This is an optional parameter. Specifies key-value annotations to apply to the Prometheus server pod metadata.	Data Type: String Default Value: {} Range: NA
<code>server.podLabels</code>	This is an optional parameter. Specifies custom labels to apply to the Prometheus server pod.	Data Type: String Default Value: {} Range: NA
<code>server.alertmanagers</code>	This is an optional parameter. Indicates the list of Alertmanager configuration objects.	Data Type: List Default Value: [] Range: NA
<code>server.alertmanagers[].kubernetes_sd_configs</code>	This is an optional parameter. Indicates the list of Kubernetes service discovery configurations to locate Alertmanager endpoints.	Data Type: List Default Value: [] Range: NA
<code>server.alertmanagers[].kubernetes_sd_configs[].namespaces</code>	This is an optional parameter. Specifies one or more namespaces in which to search for Alertmanager pods or services.	Data Type: List Default Value: [] Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.alertmanagers[].kubernetes_sd_configs[].names</code>	This is an optional parameter. Specifies resource names for filtered Alertmanager discovery within the given namespaces.	Data Type: List Default Value: {} Range: NA
<code>server.alertmanagers[].kubernetes_sd_configs[].role</code>	This is an optional parameter. Indicates the Kubernetes resource type for discovery (for example, pod, service, endpoints).	Data Type: String Default Value: pod Range: pod, service, endpoints, node
<code>server.alertmanagers[].path_prefix</code>	This is an optional parameter. Specifies the HTTP path prefix for Alertmanager requests.	Data Type: String Default Value: CLUSTER-NAME/alertmanager Range: NA
<code>server.alertmanagers[].relabel_configs</code>	This is an optional parameter. Specifies the relabeling rules for Alertmanager target selection or endpoint label manipulation.	Data Type: List Default Value: [] Range: NA
<code>server.alertmanagers[].relabel_configs[].source_labels</code>	This is an optional parameter. Specifies the label keys used for matching and relabeling Alertmanager endpoints.	Data Type: List Default Value: [] Range: NA
<code>server.alertmanagers[].relabel_configs[].regex</code>	This is an optional parameter. Specifies the regular expression used to evaluate source label values during relabeling.	Data Type: String Default Value: "" Range: NA
<code>server.alertmanagers[].relabel_configs[].action</code>	This is an optional parameter. Indicates the action taken by this relabeling rule (for example, keep, drop, replace, and so on).	Data Type: String Default Value: keep Range: keep, drop, replace, labelmap
<code>server.replicaCount</code>	This is an optional parameter. Specifies the number of Prometheus server replicas for high availability.	Data Type: Integer Default Value: 1 Range: 1 or >1
<code>server.deploymentAnnotations</code>	This is an optional parameter. Specifies the annotations to be applied to the Prometheus server deployment.	Data Type: String Default Value: {} Range: NA
<code>server.resources.limits.cpu</code>	This is an optional parameter. Specifies the maximum CPU the container can use, in Kubernetes resource format.	Data Type: String Default Value: 2 Range: NA
<code>server.resources.limits.memory</code>	This is an optional parameter. Specifies the maximum amount of memory the Prometheus server container can use.	Data Type: String Default Value: 4Gi Range: NA Unit: Gibibytes
<code>server.resources.limits.ephemeral-storage</code>	This is an optional parameter. Specifies the maximum amount of ephemeral storage for the Prometheus pod.	Data Type: String Default Value: 12Gi Range: NA Unit: Gibibytes

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.resources.requests.cpu</code>	This is an optional parameter. Indicates the minimum CPU guaranteed to the Prometheus server pod.	Data Type: String Default Value: 2 Range: NA
<code>server.resources.requests.memory</code>	This is an optional parameter. Indicates the minimum memory reserved for the Prometheus server pod.	Data Type: String Default Value: 4Gi Range: NA Unit: Gibibytes
<code>server.resources.requests.ephemeral-storage</code>	This is an optional parameter. Specifies the minimum requested ephemeral storage for the Prometheus server pod.	Data Type: String Default Value: 8Gi Range: NA Unit: Gibibytes
<code>server.securityContext.runAsUser</code>	This is an optional parameter. Indicates the user ID for running the Prometheus server container process.	Data Type: Integer Default Value: 65534 Range: NA
<code>server.securityContext.runAsNonRoot</code>	This is an optional parameter. Specifies whether the Prometheus server container must run as a non-root user.	Data Type: Boolean Default Value: true Range: true, false
<code>server.securityContext.runAsGroup</code>	This is an optional parameter. Indicates the group ID for the container process.	Data Type: Integer Default Value: 65534 Range: NA
<code>server.securityContext.fsGroup</code>	This is an optional parameter. Specifies a supplementary group ID for the volume mount.	Data Type: Integer Default Value: 65534 Range: NA
<code>server.containerSecurityContext.capabilities.drop</code>	This is an optional parameter. Specifies the set of capabilities to drop from the server container for reducing its privileges.	Data Type: List Default Value: ["KILL", "MKOD", "SETUID", "SETGID", "NET_RAW"] Range: NA
<code>server.containerSecurityContext.runAsUser</code>	This is an optional parameter. Indicates the user ID for the Prometheus container at runtime.	Data Type: Integer Default Value: 65534 Range: NA
<code>server.containerSecurityContext.runAsNonRoot</code>	This is an optional parameter. Indicates whether the container must run as a non-root user. If the value is set as true, container runs as non-root user. If the value is set as false, container runs as a root user.	Data Type: Boolean Default Value: true Range: true, false
<code>server.containerSecurityContext.runAsGroup</code>	This is an optional parameter. Specifies the group ID for the container process at runtime.	Data Type: Integer Default Value: 65534 Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.containerSecurityContext.allowPrivilegeEscalation</code>	This is an optional parameter. Indicates whether the container can gain more privileges than its parent process. If the value is set as true, container gains more privileges than its parent process. If the value is set as false, container does not gain more privileges than its parent process.	Data Type: Boolean Default Value: false Range: true, false
<code>server.service.enabled</code>	This is an optional parameter. Specifies whether a Kubernetes service is created to expose Prometheus server for network access. If the value is set as true, Kubernetes service is created to expose Prometheus server for network access. If the value is set as false, Kubernetes service is not created to expose Prometheus server for network access..	Data Type: Boolean Default Value: true Range: true, false
<code>server.service.annotations</code>	This is an optional parameter. Specifies key-value annotations added to the Kubernetes service resource.	Data Type: String Default Value: {} Range: NA
<code>server.service.labels</code>	This is an optional parameter. Specifies labels to be attached to the Kubernetes service resource.	Data Type: String Default Value: {} Range: NA
<code>server.service.clusterIP</code>	This is an optional parameter. Indicates the cluster-internal IP address for the Kubernetes service. If the value is set as empty, Kubernetes automatically assigns an IP address.	Data Type: String Default Value: "" Range: NA
<code>server.service.externalIPs</code>	This is an optional parameter. Specifies a list of external IP addresses for client access to Prometheus via the Kubernetes service.	Data Type: List Default Value: [] Range: NA
<code>server.service.loadBalancerIP</code>	This is an optional parameter. Indicates the static external IP to assign for LoadBalancer-type Services.	Data Type: String Default Value: "" Range: NA
<code>server.service.loadBalancerSourceRanges</code>	This is an optional parameter. Specifies allowed CIDR ranges for connections to the Prometheus LoadBalancer service for network-level access control.	Data Type: List Default Value: [] Range: NA
<code>server.service.servicePort</code>	This is an optional parameter. Specifies the Service port that Prometheus is reachable on.	Data Type: Integer Default Value: 80 Range: 1–65535
<code>server.service.sessionAffinity</code>	This is an optional parameter. Indicates the session affinity mode for the Service (for example, None, ClientIP).	Data Type: String Default Value: None Range: ClientIP, None

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>server.service.type</code>	This is an optional parameter. Specifies the Kubernetes Service type (ClusterIP, NodePort, LoadBalancer) used to expose Prometheus server.	Data Type: String Default Value: ClusterIP Range: ClusterIP, NodePort, LoadBalancer
<code>server.retention</code>	This is an optional parameter. Indicates the duration for which Prometheus retains metric data before deletion.	Data Type: String Default Value: PROM-DATA-RETENTION-DAYS Range: NA
<code>server.retentionSize</code>	This is a mandatory parameter. Indicates the retention size for Prometheus persistence volume. It should be 80% of the PV size (6.8GB). Retention size will remain the same percentage of storage size in both snapshot enabled or disabled cases. Example: If PV = 8GB With Snapshot enabled: PV size: 24GB Without Snapshot enabled: PV size: 8GB Retention in both cases: 6.4GB extraArgs: storage.tsdb.retention.size: 6.4GB	Data Type: String Default Value: 7.3 GB Range: NA Placeholder: "STORAGE_RETENTION_SIZE_PROM" Unit: Gibibytes

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
serverFiles.prometheus.yml. rule_files	This is a mandatory parameter. Specifies the list of Prometheus rule files to be loaded, including recording and alerting rules. All rule file names must be verified before upgrading to ensure consistency; they must match previous releases to guarantee rule preservation through upgrade. Example: <pre>serverFiles: prometheus.yml: rule_files: - /etc/config/ recording_rules.yml - /etc/config/ alerting_rules.yml # All the Alert-rule names given below MUST be verified by the user before attempting UPGRADE. # The names has to match N-1 Alert- rule names in order to guarantee their preservation through Upgrade. - /etc/config/alertscnapm - /etc/config/alertscncc - /etc/config/alertscndbtier - /etc/config/alertsoccne- cndbtier - /etc/config/alertsscp - /etc/config/alertsnrf - /etc/config/alertspcf - /etc/config/alertsbsf - /etc/config/alertsudr - /etc/config/alertssepp - /etc/config/alertsnssf</pre>	Data Type: List Default Value: See example. Range: NA
serverFiles.prometheus.yml. scrape_configs[].job_name	This is a mandatory parameter. Specifies the unique identifier for the scrape job.	Data Type: String Default Value: oracle-cnc-pod Range: NA
serverFiles.prometheus.yml. scrape_configs[].fallback_s crape_protocol	This is an optional parameter. Indicates the fallback protocol Prometheus should use if the primary scrape attempt fails.	Data Type: String Default Value: PrometheusText1.0.0 Range: NA
serverFiles.prometheus.yml. scrape_configs[].kubernetes _sd_configs[].role	This is a mandatory parameter. Indicates the type of Kubernetes resource to discover for this scrape job. Common values include pod, service, endpoints, or node.	Data Type: String Default Value: pod Range: pod, service, endpoints, node

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>serverFiles.prometheus.yml.scrape_configs[].kubernetes_sd_configs[].namespaces</code>	This is an optional parameter. Specifies the namespaces that limit service discovery scope.	Data Type: Object Default Value: NA Range: NA
<code>serverFiles.prometheus.yml.scrape_configs[].kubernetes_sd_configs[].namespaces.names</code>	This is an optional parameter. Specifies the list of namespace names where Prometheus should perform target discovery.	Data Type: List Default Value: [] Range: NA
<code>serverFiles.prometheus.yml.scrape_configs[].relabel_configs[].source_labels</code>	This is an optional parameter. Indicates the source label keys whose values will be used as input for the relabeling action.	Data Type: String Default Value: NA Range: NA
<code>serverFiles.prometheus.yml.scrape_configs[].relabel_configs[].regex</code>	This is an optional parameter. Specifies a regular expression to apply to the concatenated values of the <code>source_labels</code> .	Data Type: String Default Value: NA Range: NA
<code>serverFiles.prometheus.yml.scrape_configs[].relabel_configs[].action</code>	This is an optional parameter. Specifies the relabeling action (such as keep, drop, replace, labelmap).	Data Type: String Default Value: NA Range: keep, drop, replace, labelmap, labeldrop, labelkeep
<code>serverFiles.prometheus.yml.scrape_configs[].relabel_configs[].target_label</code>	This is a conditional parameter. Indicates the label that will be set or replaced during relabeling.	Data Type: String Default Value: NA Range: NA
<code>serverFiles.prometheus.yml.scrape_configs[].relabel_configs[].replacement</code>	This is a conditional parameter. Specifies the value to use as a replacement when the action is 'replace' for the <code>serverFiles.prometheus.yml.scrape_configs[].relabel_configs[].action</code> parameter.	Data Type: String Default Value: NA Range: NA
<code>extraScrapeConfigs[].job_name(generic CNC scrape jobs)</code>	This is a mandatory parameter. Specifies the unique identifier for the scrape job. Use this to define and differentiate between metric scrape targets for service, endpoints, or ingress monitoring.	Data Type: String Default Value: NA Range: NA Example: oracle-cnc-service
<code>extraScrapeConfigs[].fallback_scrape_protocol(generic CNC scrape jobs)</code>	This is an optional parameter. Indicates the protocol Prometheus should use if the primary scrape attempt fails. Use this to ensure compatibility with metric endpoints using non-default protocols.	Data Type: String Default Value: PrometheusText1.0.0 Range: NA
<code>extraScrapeConfigs[].kubernetes_sd_configs(generic CNC scrape jobs)</code>	This is a mandatory parameter. Specifies the list of Kubernetes service discovery configurations. Each configuration defines the Kubernetes resource type (role) to search for dynamic metric target endpoints.	Data Type: List of object Default Value: NA Range: List of Kubernetes SD config objects
<code>extraScrapeConfigs[].kubernetes_sd_configs[].role(generic CNC scrape jobs)</code>	This is a mandatory parameter. Indicates the Kubernetes resource type to discover for this scrape job. Accepted values are service, endpoints, or ingress as per your cluster monitoring needs.	Data Type: String Default Value: NA Range: service, endpoints, ingress, node, pod

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>extraScrapeConfigs[].kubernetes_sd_configs[].namespace_s(generic CNC scrape jobs)</code>	This is an optional parameter. Specifies the namespace limits for service discovery. Fill this object to restrict Prometheus scraping to specific namespaces and improve control, security, or scalability.	Data Type: Object Default Value: NA Range: NA
<code>extraScrapeConfigs[].kubernetes_sd_configs[].namespace_s.names(generic CNC scrape jobs)</code>	This is an optional parameter. Specifies the explicit list of namespace names for resource discovery. This limits scraping to selected namespaces for the given role.	Data Type: List of String Default Value: NA Range: NA
<code>extraScrapeConfigs[].relabel_configs[].source_labels(generic replace rules)</code>	This is an optional parameter. Indicates the Prometheus label keys, including standard and dynamically discovered Kubernetes annotations and labels, used as input to the relabeling action.	Data Type: List of String Default Value: As provided in each rule Range: NA
<code>extraScrapeConfigs[].relabel_configs[].regex (generic replace rules)</code>	This is an optional parameter. Specifies a regular expression for matching the combined values of <code>source_labels</code> , enabling advanced filtering or transformation logic during target relabeling.	Data Type: String Default Value: NA Range: NA
<code>extraScrapeConfigs[].relabel_configs[].action (generic replace rules)</code>	This is an optional parameter. Specifies the relabeling action to perform (such as keep, drop, replace, labelmap). Controls how discovered targets are processed or filtered according to matching conditions.	Data Type: String Default Value: NA Range: keep, drop, replace, labelmap, labeldrop, labelkeep, or any Prometheus-supported action
<code>extraScrapeConfigs[].relabel_configs[].target_label (generic replace rules)</code>	This is an optional parameter. Indicates the Prometheus label that will be set or replaced as a result of a relabeling rule, such as <code>metrics_path</code> , <code>address</code> , or <code>scheme</code> , to correctly direct metric collection. Required for actions like 'replace'.	Data Type: String Default Value: NA Range: NA
<code>extraScrapeConfigs[].relabel_configs[].replacement (generic replace rules)</code>	This is an optional parameter. Specifies the replacement value used during a 'replace' relabeling action. Enables transformation or normalization of target label values for consistent scraping.	Data Type: String Default Value: NA Range: NA Example: \$1:\$2
<code>alertmanager.enabled</code>	This is an optional parameter. Indicates whether the Alertmanager component is enabled and deployed as part of the monitoring stack. If this value is set to true, OSO deploys Alertmanager for managing Prometheus alerts. If the value is set as false, OSO does not deploy Alertmanager for managing Prometheus alerts.	Data Type: Boolean Default Value: false Range: true, false

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
kube-state-metrics.enabled	This is an optional parameter. Indicates whether the kube-state-metrics exporter is enabled for cluster state monitoring. Set to true to deploy the component and provide Kubernetes object metrics to Prometheus. If the value is set as true, kube-state-metrics exporter is enabled for cluster state monitoring. If the value is set as false, kube-state-metrics exporter is disabled for cluster state monitoring.	Data Type: Boolean Default Value: false Range: true, false
prometheus-node-exporter.enabled	This is an optional parameter. Indicates whether the Prometheus node exporter is enabled for collecting node-level hardware and OS metrics. Set to true to deploy it as a DaemonSet on all cluster nodes. If the value is set as true, Prometheus node exporter is enabled for collecting node-level hardware and OS metrics. If the value is set as false, Prometheus node exporter is disabled.	Data Type: Boolean Default Value: false Range: true, false
prometheus-pushgateway.enabled	This is an optional parameter. Specifies whether the Prometheus Pushgateway service is enabled. Use this to enable collection of ephemeral or batch job metrics via push functionality, or disable if not needed for your monitoring scenario. If the value is set as true, Prometheus Pushgateway service is enabled to collect the ephemeral or batch job metrics via push functionality. If the value is set as false, Prometheus Pushgateway service is disabled and not required for monitoring scenario.	Data Type: Boolean Default Value: false Range: true, false
extraScrapeConfigs[].job_name(job_name: apm-service)	This is a conditional parameter. Specifies the unique identifier for the APM Prometheus scrape job. Note: Configure this parameter only if the Alert Processing Microservice (APM) service is enabled.	Data Type: String Default Value: apm-service Range: NA
extraScrapeConfigs[].kubernetes_sd_configs[].role(job_name: apm-service)	This is a mandatory parameter. Indicates the Kubernetes resource type used for service discovery of APM scrape targets. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: endpoints Range: pod, service, endpoints, ingress, node
extraScrapeConfigs[].relabel_configs[].source_labels(namespace filter)	This is a mandatory parameter. Specifies the Kubernetes namespace metadata label used to filter APM scrape targets. Note: Configure this parameter only if the APM service is enabled.	Data Type: List of String Default Value: [__meta_kubernetes_namespace] Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
<code>extraScrapeConfigs[].relabel_configs[].regex</code> (namespace filter)	This is a mandatory parameter. Specifies the namespace value used to match APM scrape targets. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: NAMESPACE Placeholder: NAMESPACE Range: NA
<code>extraScrapeConfigs[].relabel_configs[].action</code> (namespace filter)	This is a mandatory parameter. Specifies the relabeling action that retains only the targets matching the configured namespace. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: keep Range: keep, drop
<code>extraScrapeConfigs[].relabel_configs[].source_labels</code> (Service Filter)	This is a mandatory parameter. Specifies the Kubernetes service name metadata label used to filter the APM service. Note: Configure this parameter only if the APM service is enabled.	Data Type: List of String Default Value: <code>[_meta_kubernetes_service_name]</code> Range: NA
<code>extraScrapeConfigs[].relabel_configs[].regex</code> (Service Filter)	This is a mandatory parameter. Specifies the APM service name that Prometheus must scrape. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: apm-svc Range: NA
<code>extraScrapeConfigs[].relabel_configs[].action</code> (Service Filter)	This is a mandatory parameter. Specifies the Kubernetes endpoint port name metadata label used to filter the APM endpoint. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: keep Range: keep, drop
<code>extraScrapeConfigs[].relabel_configs[].source_labels</code> (Endpoint Port Filter)	This is a mandatory parameter. Specifies the Kubernetes endpoint port name metadata label used to filter the APM endpoint. Note: Configure this parameter only if the APM service is enabled.	Data Type: List of String Default Value: <code>[_meta_kubernetes_endpoint_port_name]</code> Range: NA
<code>extraScrapeConfigs[].relabel_configs[].regex</code> (Endpoint Port Filter)	This is a mandatory parameter. Specifies the endpoint port name used for scraping APM metrics. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: apmsvc Range: NA
<code>extraScrapeConfigs[].relabel_configs[].action</code> (Endpoint Port Filter)	This is a mandatory parameter. Specifies the relabeling action that retains only the targets matching the configured endpoint port. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: keep Range: keep, drop
<code>extraScrapeConfigs[].relabel_configs[].target_label</code> (metrics path override)	This is a mandatory parameter. Specifies the target label updated during relabeling to set a custom metrics path. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: <code>__metrics_path__</code> Range: NA

Table 3-2 (Cont.) OSO Prometheus Configuration Parameter

Parameter	Description	Details
extraScrapeConfigs[].relabel_configs[].replacement (metrics path override)	This is an optional parameter. Specifies the HTTP metrics path exposed by the APM service. Note: Configure this parameter only if the APM service is enabled.	Data Type: String Default Value: /metrics Range: NA

3.2.2 Alertmanager Configuration Parameters

This section provides the alertmanager configuration parameters details that are used to install the OSO CSAR packages manually.

Configure the `ocoso_csar_26_1_200_0_0_al_alm_custom_values.yaml` with the defined values.

Table 3-3 OSO Alertmanager Configuration Parameters

Parameter	Description	Details
helmtestimage	This is an optional parameter. Indicates the repository URL of the Helm test image where it is located. Example: <code>occne.io/occne/oso_helm_test:25.2.200</code>	Data Type: String Default Value: NA Range: NA Placeholder: HELM-TEST-IMAGE-REPO-ADDRESS
useasm	This is an optional parameter. Indicates if the Aspen Service Mesh (ASM) environment is used or not in OSO deployment. If this parameter is set as true, ASM is enabled for the OSO deployment. If this parameter is set as false, ASM is disabled for the OSO deployment. Example: <code>useasm: true</code>	Data Type: String Default Value: "false" Range: "true", "false" Placeholder: USEASM
namespace	This is an optional parameter. Indicates the namespace where OSO will be installed. This value is required in multiple places in the custom values.yaml file. Example: <code>namespace: ocnf</code>	Data Type: String Default Value: NA Range: NA Placeholder: NAMESPACE
clustername	This is an optional parameter. Specifies the prefix for GUI URLs and endpoints. Note: • Comment out this parameter if cluster-specific URL prefixes are not required. • If you replace the cluster name, replace them in all the places where you have the placeholder as /CLUSTER-NAME.	Data Type: String Default Value: NA Range: NA Placeholder: /CLUSTER-NAME

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
test.resources.limits.cpu	This is a conditional parameter. Specifies the maximum CPU resources allocated for Helm test operations. Note: If the <code>helmtestimage</code> is set, then set the following parameters: • <code>test.resources.limits.cpu</code> • <code>test.resources.limits.memory</code> • <code>test.resources.requests.cpu</code> • <code>test.resources.requests.cpu</code>	Data Type: String Default Value: 10m Range: NA Unit: millicores
test.resources.limits.memory	This is a conditional parameter. Specifies the maximum memory resources allocated for Helm test operations. Note: If the <code>helmtestimage</code> is set, then set the following parameters: • <code>test.resources.limits.cpu</code> • <code>test.resources.limits.memory</code> • <code>test.resources.requests.cpu</code> • <code>test.resources.requests.cpu</code>	Data Type: String Default Value: 32Mi Range: NA Unit: Mebibytes
test.resources.requests.cpu	This is a conditional parameter. Specifies the minimum CPU resources allocated for Helm test operations. Note: If the <code>helmtestimage</code> is set, then set the following parameters: • <code>test.resources.limits.cpu</code> • <code>test.resources.limits.memory</code> • <code>test.resources.requests.cpu</code> • <code>test.resources.requests.cpu</code>	Data Type: String Default Value: 10m Range: NA Unit: millicores
test.resources.requests.memory	This is a conditional parameter. Specifies the minimum memory resources allocated for Helm test operations. Note: If the <code>helmtestimage</code> is set, then set the following parameters: • <code>test.resources.limits.cpu</code> • <code>test.resources.limits.memory</code> • <code>test.resources.requests.cpu</code> • <code>test.resources.requests.cpu</code>	Data Type: String Default Value: 32Mi Range: NA Unit: Mebibytes
almsvcname	This is a mandatory parameter. Specifies the name of the Alertmanager service resource.	Data Type: String Default Value: NA Range: NA Placeholder: OSO-ALM-RELEASE-NAME-alm
global_oso.k8Resource.container.prefix	This is an optional parameter. Specifies the value that is prefixed to all the container names of OSO. This value is used to prefix to all the container names of OSO.	Data Type: String Default Value: "" Range: NA

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
<code>global_oso.k8Resource.container.suffix</code>	This is an optional parameter. Specifies the value that is suffixed to all the container names of OSO. This value is used to suffixed to all the container names of OSO.	Data Type: String Default Value: "" Range: NA
<code>global_oso.serviceAccountNameAlertMgr</code>	This is an optional parameter. Specifies the ServiceAccount name to be used for Alertmanager.	Data Type: String Default Value: "" Range: NA
<code>global_oso.customExtension.allResources.labels</code>	This is an optional parameter. Specifies the custom labels that should be added to all the OSO Kubernetes resources. This can be used to add custom label(s) to all Kubernetes resources that are created by OSO helm chart.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.lbServices.labels</code>	This is an optional parameter. Specifies the custom labels required to be added to OSO services that are considered as load balancer type. This can be used to add custom label(s) to all load balancer type services that are created by OSO helm chart.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.nonlbServices.labels</code>	This is an optional parameter. Specifies the custom labels to be added to OSO services that are considered as not load balancer type. This can be used to add custom label(s) to all non-load balancer type services that is created by OSO helm chart.	Data Type: String Default Value: {} Range: NA
<code>global_oso.customExtension.lbStatefulSets.labels</code>	This is an optional parameter. Specifies the custom labels to be added to OSO services that are considered as stateful sets with load balancers. This can be used to add custom label(s) to all stateful sets with load balancer services that is created by OSO helm chart.	Data Type: String Default Value: {} Range: NA
<code>annotations</code>	This is an optional parameter. Specifies the annotations that should be added to all the OSO Kubernetes resources.	Data Type: String Default Value: {} Range: NA
<code>replicaCount</code>	This is a mandatory parameter. Indicates the number of replica pods used for the OSO deployment.	Data Type: Integer Default Value: 2 Range: 1 or greater
<code>revisionHistoryLimit</code>	This is an optional parameter. Indicates the number of previous ReplicaSets to retain for rollback. The default Kubernetes value is 10.	Data Type: Integer Default Value: 10 Range: 0 or greater

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
image.repository	This is a mandatory parameter. Specifies the container image repository for Alertmanager.	Data Type: String Default Value: NA Range: NA Placeholder: ALERTMANAGER-REPO-ADDRESS
image.pullPolicy	This is an optional parameter. Specifies the image pull policy for the alert configuration container image. The pull policy controls if and when images are refreshed from the repository. - IfNotPresent—Pulls the image only once, and it doesn't try again. - Always—always pulls the image when the deployment is created. - Never—it doesn't pull the image when the deployment is created.	Data Type: String Default Value: IfNotPresent Range: Always, IfNotPresent, Never
image.tag	This is a mandatory parameter. Specifies the version tag for the Alertmanager image. Note: Do not change the default value.	Data Type: String Default Value: 0.28.0 Range: NA
baseUrl	This is an optional parameter. Specifies the full external URL at which Alertmanager is accessible.	Data Type: String Default Value: http://localhost/CLUSTER-NAME/alertmanager Range: NA
extraArgs.data.retention	This is an optional parameter. Specifies retention time for Alertmanager data.	Data Type: String Default Value: NA Range: NA Placeholder: RETENTION-TIME-ALM
nameOverride	This is an optional parameter. Specifies a custom name override for the Alertmanager release.	Data Type: String Default Value: alm Range: NA
fullnameOverride	This is an optional parameter. Specifies the fully qualified name override for all resources.	Data Type: String Default Value: "" Range: NA
namespaceOverride	This is an optional parameter. Specifies the namespace in which resources are deployed.	Data Type: String Default Value: "" Range: NA
automountServiceAccountToken	This is an optional parameter. Specifies if pods should be auto-assigned the service account token. If the value is set to true, the pods are auto-assigned with the service account token. If the value is set to false, the pods are not assigned with the service account token.	Data Type: Boolean Default Value: true Range: true, false

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
<code>serviceAccount.create</code>	This is a mandatory parameter. Specifies whether the service account is created automatically or not for the alert manager files. If the value is set to true, it automatically creates a service account for the alert manager files. If the value is set as false, create a service account manually for the alert manager files.	Data Type: Boolean Default Value: true Range: true, false Placeholder: USE-DEFAULT-SVCACCOUNT-ALM
<code>serviceAccount.annotations</code>	This is an optional parameter. Specifies the annotations to be added to the ServiceAccount.	Data Type: String Default Value: {} Range: NA
<code>serviceAccount.name</code>	This is an optional parameter. Specifies the service account name for the alert manager deployment. If the value of <code>serviceAccount.create</code> is set to true, it automatically generates a service account name for the alert manager files. If the value of <code>serviceAccount.create</code> is set to false, it uses the default service account name, which is created already.	Data Type: String Default Value: "" Range: Any string
<code>podSecurityContext.fsGroup</code>	This is an optional parameter. Specifies the filesystem group ID for Alertmanager pods.	Data Type: Integer Default Value: 65534 Range: NA
<code>securityContext.capabilities.drop</code>	This is a mandatory parameter. Specifies that some privileges are given to process but not with all the privileges of the root user. If the value is set as ALL, all capabilities are dropped or no capabilities are given.	Data Type: List Default Value: NA Range: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW", "ALL"] Place holder: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW"]
<code>securityContext.runAsUser</code>	This is a mandatory parameter. Specifies the user ID to run the entrypoint of the container process. Note: Do not change this value.	Data Type: Integer Default Value: 65534 Range: NA
<code>securityContext.runAsNonRoot</code>	This is a mandatory parameter. Indicates that the container must run as a non-root user. If the value is set as true, the Kubelet validates the image at runtime to ensure that it does not run as UID 0 (root) and fail to start the container if it does. If the value is set as false, the validations are not performed.	Data Type: Boolean Default Value: true Range: true, false
<code>securityContext.runAsGroup</code>	This is a mandatory parameter. Specifies the group user ID to run the entrypoint of the container process. Note: Do not change this value.	Data Type: Integer Default Value: 65534 Range: NA

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
<code>securityContext.allowPrivilegeEscalation</code>	This is a mandatory parameter. Specifies if a process can gain more privileges than its parent process. If this value is set as true, the process can gain more privileges than its parent process. If this value is set as false, the process can't gain more privileges than its parent process.	Data Type: Boolean Default Value: true Range: true, false
<code>service.annotations</code>	This is an optional parameter. Specifies the additional annotations for the Alertmanager service.	Data Type: String Default Value: {} Range: NA
<code>service.labels</code>	This is an optional parameter. Specifies the additional labels for the Alertmanager service.	Data Type: String Default Value: {} Range: NA
<code>service.type</code>	This is an optional parameter. Specifies the service type for exposing Alertmanager.	Data Type: String Default Value: ClusterIP Range: ClusterIP, NodePort, LoadBalancer, ExternalName
<code>service.port</code>	This is an optional parameter. Specifies the port to expose on the Alertmanager service.	Data Type: Integer Default Value: 80 Range: 1–65535
<code>service.targetPort</code>	This is an optional parameter. Specifies the target container port for Alertmanager traffic.	Data Type: Integer Default Value: 9093 Range: 1–65535
<code>service.clusterPort</code>	This is an optional parameter. Specifies the port used for intra-cluster Alertmanager communication.	Data Type: Integer Default Value: 9094 Range: 1–65535
<code>service.loadBalancerIP</code>	This is a conditional parameter. Specifies a static external IP address to use for the LoadBalancer service type. Note: If the value of <code>service.type</code> is set as LoadBalancer, then set the value for this parameter.	Data Type: String Default Value: "" Range: Any IPv4/IPv6 address
<code>service.loadBalancerSourceRanges</code>	This is an optional parameter. Specifies the allowed IP source ranges for LoadBalancer access.	Data Type: List Default Value: [] Range: NA
<code>service.extraPorts</code>	This is an optional parameter. Specifies an extra list of additional ports exposed by the Alertmanager service.	Data Type: List Default Value: [] Range: NA

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
service.ipDualStack.enabled	This is an optional parameter. Specifies if IP dual-stack is enabled for the Alertmanager service. If the value is set as true, dual stack is supported for Alertmanager. If the value is set as false, dual stack support is unavailable for Alertmanager.	Data Type: String Default Value: NA Range: true, false Placeholder: ENABLE_DUAL_STACK
service.ipDualStack.ipFamilies	This is an optional parameter. Specifies the order of IP families (for example, IPv4, IPv6) for dual-stack networking.	Data Type: List Default Value: ["IPv6", "IPv4"] Range: ["IPv6", "IPv4"], ["IPv4", "IPv6"]
service.ipDualStack.ipFamilyPolicy	This is an optional parameter. Specifies the dual-stack policy for the Alertmanager service, such as "PreferDualStack".	Data Type: String Default Value: PreferDualStack Range: NA
resources.limits.cpu	This is an optional parameter. Specifies the maximum CPU allocated for Alertmanager pods.	Data Type: String Default Value: 500m Range: NA
resources.limits.memory	This is an optional parameter. Specifies the maximum memory available to Alertmanager pods.	Data Type: String Default Value: 200Mi Range: NA
resources.limits.ephemeral-storage	This is an optional parameter. Specifies the maximum ephemeral storage allowed for Alertmanager pods to control disk usage.	Data Type: String Default Value: 1Gi Range: NA
resources.requests.cpu	This is an optional parameter. Specifies the minimum CPU requested for Alertmanager pods.	Data Type: String Default Value: 100m Range: NA
resources.requests.memory	This is an optional parameter. Specifies the minimum memory requested for Alertmanager pods, reserving required memory for stable operation.	Data Type: String Default Value: 32Mi Range: NA
resources.requests.ephemeral-storage	This is an optional parameter. Specifies the minimum ephemeral storage requested for Alertmanager pods, reserving minimum disk space.	Data Type: String Default Value: 1Gi Range: NA
nodeSelector	This is an optional parameter. Specifies node selector labels for scheduling Alertmanager pods on suitable nodes.	Data Type: String Default Value: {} Range: NA
statefulSet.annotations	This is an optional parameter. Specifies annotations added to the Alertmanager StatefulSet resource.	Data Type: String Default Value: {} Range: NA
podAnnotations	This is an optional parameter. Specifies additional pod-level annotations for Alertmanager pods.	Data Type: String Default Value: {} Range: NA

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
podLabels	This is an optional parameter. Specifies additional labels for Alertmanager pods.	Data Type: String Default Value: {} Range: NA
podDisruptionBudget.minAvailable	This is an optional parameter. Specifies the minimum number of Alertmanager pods that must be available during pod disruptions.	Data Type: Integer Default Value: 1 Range: 0 or greater
command	This is an optional parameter. Specifies custom command(s) for launching Alertmanager containers.	Data Type: List Default Value: [] Range: NA
persistence.enabled	This is an optional parameter. Specifies whether persistent storage is enabled for Alertmanager. If the value is set as true, persistent storage is enabled for Alertmanager. If the value is set as false, persistent storage is disabled for Alertmanager.	Data Type: Boolean Default Value: true Range: true, false
persistence.storageClass	This is an optional parameter. Specifies the Kubernetes storage class used for persistent Alertmanager storage.	Data Type: String Default Value: ALM-STORAGE-CLASS Range: NA
persistence.accessModes	This is an optional parameter. Specifies the access modes (for example, ReadWriteOnce) for persistent Alertmanager storage volumes.	Data Type: List Default Value: [ReadWriteOnce] Range: NA
persistence.size	This is a mandatory parameter. Specifies the size for persistent storage to be provisioned for Alertmanager. Example: 8Gi	Data Type: String Default Value: ALM-PV-SIZE Range: NA
config.enabled	This is a mandatory parameter. Specifies whether Alertmanager configuration is active or inactive. If the value is set as true, Alertmanager configuration is active. If the value is set as false, Alertmanager configuration is inactive.	Data Type: Boolean Default Value: true Range: true, false
config.global	This is an optional parameter. Specifies the global-level configuration settings for Alertmanager, such as SMTP or Slack integration.	Data Type: String Default Value: {} Range: NA
config.templates	This is an optional parameter. Specifies file paths to Alertmanager template files, used for custom alert notifications.	Data Type: List Default Value: [/etc/alertmanager/*.tmpl] Range: NA

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
config.receivers	This is an optional parameter. Specifies the alert receivers for routing.	Data Type: List Default Value: NA Range: NA
config.route.group_wait	This is an optional parameter. Specifies how long to wait to buffer alerts before sending a notification.	Data Type: String Default Value: 10s Range: NA Unit: Seconds
config.route.group_interval	This is an optional parameter. Specifies how often to send a notification for repeating alert groups.	Data Type: String Default Value: 5m Range: NA Unit: Minutes
config.route.receiver	This is a mandatory parameter. Specifies the default receiver to which alerts will be sent.	Data Type: String Default Value: default-receiver Range: NA
config.route.repeat_interval	This is an optional parameter. Specifies the wait time duration to resend a notification about a given alert.	Data Type: String Default Value: 3h Range: NA Unit: Hours
configmapReload.enabled	This is an optional parameter. Specifies whether the configmap-reload deployment is enabled or disabled. If the value is set as true, configmap-reload deployment is enabled. If the value is set as false, configmap-reload deployment is disabled.	Data Type: Boolean Default Value: true Range: true, false
configmapReload.name	This is an optional parameter. Specifies the configmap-reload container name.	Data Type: String Default Value: configmap-reload Range: NA Placeholder: configmap-reload
configmapReload.image.repository	This is an optional parameter. Specifies the repository for the configmap-reload container image.	Data Type: String Default Value: CONFIGMAP-RELOAD-REPO-ADDRESS Range: NA
configmapReload.image.tag	This is an optional parameter. Specifies the image tag for the configmap-reload container.	Data Type: String Default Value: 0.15.0 Range: NA
configmapReload.image.pullPolicy	This is an optional parameter. Specifies the image pull policy for the configmap-reload container image.	Data Type: String Default Value: IfNotPresent Range: IfNotPresent, Always, Never

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
<code>configmapReload.resources.limits.cpu</code>	This is an optional parameter. Specifies the maximum CPU resources for configmap-reload. Limiting resource consumption is strongly recommended.	Data Type: String Default Value: 400m Range: NA Unit: millicores
<code>configmapReload.resources.limits.memory</code>	This is an optional parameter. Specifies the maximum memory allowed for the configmap-reload container.	Data Type: String Default Value: 124Mi Range: NA Unit: Mebibytes
<code>configmapReload.resources.limits.ephemeral-storage</code>	This is an optional parameter. Specifies the ephemeral storage limit for the configmap-reload container.	Data Type: String Default Value: 1Gi Range: NA Unit: Gibibytes
<code>configmapReload.resources.requests.cpu</code>	This is an optional parameter. Specifies the minimum CPU request for the configmap-reload container.	Data Type: String Default Value: 400m Range: NA Unit: millicores
<code>configmapReload.resources.requests.memory</code>	This is an optional parameter. Specifies the minimum memory request for the configmap-reload container.	Data Type: String Default Value: 124Mi Range: NA Unit: Mebibytes
<code>configmapReload.resources.requests.ephemeral-storage</code>	This is an optional parameter. Specifies the minimum ephemeral storage request for the configmap-reload container.	Data Type: String Default Value: 1Gi Range: NA Unit: Gibibytes
<code>configmapReload.securityContext.capabilities.drop</code>	This is a mandatory parameter. Specifies that some privileges are given to process but not with all the privileges of the root user in the configmap-reload container. If the value is set as ALL, all capabilities are dropped or no capabilities are given. Note: Do not change the default value.	Data Type: List Default Value: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW"] Range: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW", "ALL"]
<code>configmapReload.securityContext.runAsUser</code>	This is an optional parameter. Specifies the user ID to run configmap-reload as, usually set to a non-root value. Note: Do not change the default value.	Data Type: Integer Default Value: 65534 Range: NA
<code>configmapReload.securityContext.runAsNonRoot</code>	This is a mandatory parameter. Specifies if configmap-reload must run as a non-root user. If the value is set as true, the Kubelet validates the image at runtime to ensure that it does not run as UID 0 (root) and fail to start the container if it does. If the value is set as false, the validations are not performed.	Data Type: Boolean Default Value: true Range: true, false

Table 3-3 (Cont.) OSO Alertmanager Configuration Parameters

Parameter	Description	Details
<code>configmapReload.securityContext.runAsGroup</code>	This is a mandatory parameter. Specifies the group user ID to run the configmap-reload process in the container. Note: Do not change this value.	Data Type: Integer Default Value: 65534 Range: NA
<code>configmapReload.securityContext.allowPrivilegeEscalation</code>	This is a mandatory parameter. Specifies if a process can gain more privileges than its parent process for the configmap-reload container. If this value is set as true, the process can gain more privileges than its parent process for the configmap-reload container. If this value is set as false, the process can't gain more privileges than its parent process for the configmap-reload container.	Data Type: Boolean Default Value: false Range: true, false
<code>verticalPodAutoscaler.enabled</code>	This is an optional parameter. Specifies if vertical pod auto-scaling is enabled or not. If the value is set as true, vertical pod auto-scaling is enabled. If the value is set as false, vertical pod auto-scaling is disabled.	Data Type: Boolean Default Value: false Range: true, false

3.2.3 Alert Config Configuration Parameters

This section provides the alert config configuration parameters details that are used to install the OSO CSAR packages manually.

Configure the `ocoso_csar_26_1_200_0_0_alr_config_custom_values.yaml` with the defined values.

Table 3-4 OSO AlertConfig Configuration Parameters

Parameter Name	Description	Details
<code>annotations</code>	This is an optional parameter. Specifies the custom annotations to be added to OSO deployments that are associated to disable the sidecar injections into OSO pods. Note: This parameter is mandatory if ASM is enabled. Example: <pre> annotations: - sidecar.istio.io/inject: "false" </pre>	Data Type: String Default Value: {} Range: NA

Table 3-4 (Cont.) OSO AlertConfig Configuration Parameters

Parameter Name	Description	Details
config.weight	This is an optional parameter. Specifies an operator-defined value to control alert prioritization or execution order for available deployments.	Data Type: String Default Value: "" Range: NA
containerSecurityContext.allowPrivilegeEscalation	This is a mandatory parameter. This parameter controls whether a process can gain more privileges than its parent process. If this value is set as true, the process can gain more privileges than its parent process. If this value is set as false, the process can't gain more privileges than its parent process. Specifies whether the container can gain additional privileges. Disabling privilege escalation increases the overall pod security.	Data Type: Boolean Default Value: false Range: true, false
containerSecurityContext.capabilities.drop	This is a mandatory parameter. Indicates that some privileges are given to the process, but not with all the privileges of the root user. or This attribute indicates when security context at the container level is enabled; this parameter can be used to drop all the default capabilities provided by the orchestration system. Note: Do not change the default value.	Data Type: List Default Value: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW"] Range: List of capabilities
containerSecurityContext.fsGroup	This is a mandatory parameter. Specifies the file system group ID for mounted volumes, providing group permissions to shared storage used by the container. Note: Do not change the default value.	Data Type: Integer Default Value: 65534 Range: NA
containerSecurityContext.runAsGroup	This is a mandatory parameter. Specifies the group ID used by container processes to enforce security and resource access control. Note: Do not change the default value.	Data Type: Integer Default Value: 65534 Range: NA
containerSecurityContext.runAsNonRoot	This is a mandatory parameter. Specifies that the container must run as a non-root user. If the value is set as true, the Kubelet validates the image at runtime to ensure that it does not run as UID 0 (root) and fail to start the container if it does. If the value is set as false, the validations are not performed.	Data Type: Boolean Default Value: false Range: true, false
containerSecurityContext.runAsUser	This is a mandatory parameter. Specifies the User Id (UID) to run the entrypoint of the container process. Note: Do not change this value.	Data Type: Integer Default Value: 65534 Range: NA

Table 3-4 (Cont.) OSO AlertConfig Configuration Parameters

Parameter Name	Description	Details
<code>global_oso_alr_config.customExtension.allResources.annotations</code>	This is an optional parameter. Specifies the annotations to add to all created resources in the deployment. Specifies the custom annotations that should be added to all the OSO deployments for alert configuration resources.	Data Type: String Default Value: {} Range: NA
<code>global_oso_alr_config.customExtension.allResources.labels</code>	This is an optional parameter. Specifies the custom annotations that should be added to all the OSO deployments for alert configuration.	Data Type: String Default Value: {} Range: NA
<code>hookJobResources.limits.cpu</code>	This is an optional parameter. Specifies the maximum CPU resource allocated to hook jobs, including the Helm test job.	Data Type: Integer Default Value: 0.5 Range: NA
<code>hookJobResources.limits.memory</code>	This is an optional parameter. Specifies the maximum memory allocated to hook jobs, including the helm test job.	Data Type: String Default Value: 512Mi Range: NA Unit: Mebibytes
<code>hookJobResources.requests.cpu</code>	This is an optional parameter. Specifies the amount of CPU that the system will guarantee for the hook job resource, and Kubernetes will use this value to decide on which node to place the pod.	Data Type: Integer Default Value: 0.5 Range: NA
<code>hookJobResources.requests.memory</code>	This is an optional parameter. Specifies the maximum memory for requests allocated to hook jobs, including the helm test job. The memory that the system will guarantee for the hook job resource, and Kubernetes will use this value to decide on which node to place the pod.	Data Type: String Default Value: 512Mi Range: NA Unit: Mebibytes
<code>image.pullPolicy</code>	This is a mandatory parameter. Specifies the image pull policy for the alert configuration container image. The pull policy controls if and when images are refreshed from the repository. • IfNotPresent—Pulls the image only once, and it doesn't try again. • Always—always pulls the image when the deployment is created. • Never—it doesn't pull the image when the deployment is created.	Data Type: String Default Value: IfNotPresent Range: Always, IfNotPresent, Never
<code>image.repository</code>	This is a mandatory parameter. Specifies the container image repository URL of the oso-alr-config image where it is located. Example: <code>occne.io/occne/oso_alert_config</code>	Data Type: String Default Value: NA Placeholder: OSO_ALERT_CONFIG_IMAGE Range: NA

Table 3-4 (Cont.) OSO AlertConfig Configuration Parameters

Parameter Name	Description	Details
image.tag	This is a mandatory parameter. Specifies the version tag for the alert configuration container image. Example: 25.2.200	Data Type: String Default Value: NA Placeholder: OSO_VERSION_PLACEHOLDER Range: NA
osoConfigMapName	This is a mandatory parameter. Specifies the name of the OSO Prometheus ConfigMap which contains the alert configuration. Set this parameter to ensure Prometheus loads the correct alerting rules and settings. Example: oso-prom-svr	Data Type: String Default Value: NA Placeholder: OSO-PROM-CONFIGMAP-NAME Range: NA
serviceAccount.create	This is a mandatory parameter. Specifies whether the service account is created automatically or not for the alert configuration files. If the value is set as true, it automatically creates a service account for the alert configuration files. If the value is set as false, create a service account manually for the alert configuration files.	Data Type: Boolean Default Value: false Range: true, false
serviceAccount.name	This is a mandatory parameter. Specifies the service account name for the alert configuration deployment. If the value of serviceAccount.create is set as true, it automatically generates a service account name for the alert configuration files. If the value of serviceAccount.create is set as false, it uses the default service account name, which is created already.	Data Type: String Default Value: NA Range: NA Placeholder: oso-config-serviceaccount

3.2.4 Alert Processing Microservice Configuration Parameters

This section provides the Alert Processing Microservice configuration parameters details that are used to install the OSO CSAR packages manually.

Configure `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` with the specific values.

Table 3-5 OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
useasm	This is an optional parameter. Indicates if ASM feature is enabled or disabled. If the value is set to true, ASM feature is enabled. If the value is set to false, ASM feature is disabled.	Data Type: Boolean Default Value: false Placeholder: <USEASM> Range: false, true

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
apmEnabled	This is an optional parameter. Indicates if the Alert Processing Microservice (APM) feature is enabled or disabled. If the value is set to true, APM feature is enabled. If the value is set to false, APM feature is disabled.	Data Type: Boolean Default Value: false Placeholder: <BOOL-APM-ENABLED> Range: false, true
namespace	This is a mandatory parameter. Indicates the Kubernetes namespace where the service will be deployed.	Data Type: String Default Value: oso Placeholder: <NAMESPACE> Range: NA
clustername	This is a mandatory parameter. Indicates the cluster name prefix that appears in GUI URLs. Comment this line if the prefix is not needed.	Data Type: String Default Value: "" Placeholder: <CLUSTER-NAME> Range: NA
resources.requests.cpu	This is a mandatory parameter. Indicates the minimum amount of CPU resources guaranteed for the APM container.	Data Type: String Default Value: 2000m Placeholder: <APM-CPU-REQUEST> Range: NA Unit: millicpu
resources.requests.memory	This is a mandatory parameter. Indicates the minimum amount of memory resources guaranteed for the APM container.	Data Type: String Default Value: 2Gi Placeholder: <APM-MEMORY-REQUEST> Range: NA Unit: Gi (gibibytes)
resources.requests.ephemeral-storage	This is a mandatory parameter. Indicates the minimum ephemeral storage allocated for the APM container.	Data Type: String Default Value: 1Gi Placeholder: <APM-EPHEMERAL-STORAGE-REQUEST> Range: NA Unit: Gi (gibibytes)
resources.limits.cpu	This is a mandatory parameter. Indicates the maximum amount of CPU resources allowed for the APM container; used for burst scenarios.	Data Type: String Default Value: 4000m Placeholder: <APM-CPU-LIMIT> Range: NA Unit: millicpu
resources.limits.memory	This is a mandatory parameter. Indicates the maximum amount of memory resources allowed for the APM container to prevent resource overuse.	Data Type: String Default Value: 4Gi Placeholder: <APM-MEMORY-LIMIT> Range: NA Unit: Gi (gibibytes)

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
resources.limits.ephemeral-storage	This is a mandatory parameter. Indicates the maximum ephemeral storage allowed for APM container.	Data Type: String Default Value: 4Gi Placeholder: <APM-EPHEMERAL-STORAGE-LIMIT > Range: NA Unit: Gi (gibibytes)
fullnameOverride	This is a mandatory parameter. Indicates the APM service name. Note: This name should match with the <APM-SVC-NAME > in the Alertmanager custom values.yaml file.	Data Type: String Default Value: oso-apm Placeholder: <APM-SVC-NAME > Range: NA
global_oso.k8Resource.container.prefix	This is an optional parameter. Indicates the prefix to be added to container names in the OSO deployment.	Data Type: String Default Value: NA Range: NA
global_oso.k8Resource.container.suffix	This is an optional parameter. Indicates the suffix to be added to container names in the OSO deployment.	Data Type: String Default Value: NA Range: NA
global_oso.serviceAccountName	This is an optional parameter. Indicates the custom service account name for APM, if specified.	Data Type: String Default Value: "" Range: NA
global_oso.customExtension.allResources.labels	This is an optional parameter. Indicates the key/value labels to be applied to all resources as defined by TYPE1 label.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
global_oso.customExtension.lbServices.labels	This is an optional parameter. Indicates the key/value labels to be applied to load balancer services as defined by TYPE2 label.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
global_oso.customExtension.nonlbServices.labels	This is an optional parameter. Indicates key/value labels to be applied to non-load balancer services as defined by TYPE2 label.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
global_oso.customExtension.lbDeployments.labels	This is an optional parameter. Indicates key/value labels to be applied to load balancer deployments as defined by TYPE2 label.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
global_oso.customExtension.nonlbDeployments.labels	This is an optional parameter. Indicates key/value labels to be applied to non-load balancer deployments as defined by TYPE2 label.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
helmtestimage	This is an optional parameter. Specifies the test container image used by Helm test jobs. Use this parameter to validate deployment success and configuration by running tests during install or upgrade procedures.	Data Type: String Default Value: HELM-TEST-IMAGE-REPO-ADDRESS Range: Any string

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
annotations	This is an optional parameter. Indicates custom annotations to be added to OSO pods. Use this parameter to disable sidecar injections or similar.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
deploymentAnnotations	This is an optional parameter. Indicates additional annotations for the deployment.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
replicaCount	This is a mandatory parameter. Indicates the number of replica pods for the deployment.	Data Type: Integer Default Value: 1 Range: 1 or more
podAnnotations	This is an optional parameter. Indicates the additional annotations for pods.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
podLabels	This is an optional parameter. Indicates the labels to be added to pods.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
revisionHistoryLimit	This is an optional parameter. Indicates the number of previous ReplicaSets to retain for rollback. The default Kubernetes value is 10.	Data Type: Integer Default Value: 10 Range: NA
automountServiceAccountToken	This is an optional parameter. Indicates whether the service account token should be automatically mounted or not. If the value is set to true, the service account tokens are automatically mounted. If the value is set to false, the service account tokens are not mounted automatically.	Data Type: Boolean Default Value: true Range: true, false
serviceAccount.create	This is a mandatory parameter. Indicates whether a service account should be created or not for APM. If the value is set to true, service account is created for APM. If the value is set to false, service account is not created for APM.	Data Type: Boolean Default Value: true Placeholder: <USE-DEFAULT-SVCACCOUNT-APM> Range: true, false
serviceAccount.annotations	This is an optional parameter. Indicates the annotations to add to the service account.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
serviceAccount.name	This is an optional parameter. Indicates the name of the service account to use. If a name is not set and the value of serviceAccount.create is true, a name is generated automatically.	Data Type: String Default Value: "" Range: NA

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
nodeSelector	This is an optional parameter. Indicates node selector labels for pod assignment.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
securityContext.capabilities.drop	This is a mandatory parameter. Indicates the Linux capabilities to drop from the container for enhanced security.	Data Type: List of Strings Default Value: ["KILL", "MKNOD", "SETUID", "SETGID", "NET_RAW"] Range: NA
securityContext.runAsUser	This is a mandatory parameter. Indicates the user ID the process runs as inside the container.	Data Type: Integer Default Value: 65534 Range: 0 - 65535
securityContext.runAsNonRoot	This is a mandatory parameter. Indicates whether the container must run as a non-root user or not. If the value is set to true, the container runs as non-root user. If the value is set to false, the container does not run as a non-root user.	Data Type: Boolean Default Value: true Range: true or false
securityContext.runAsGroup	This is a mandatory parameter. Indicates the primary group ID the process runs as inside the container.	Data Type: Integer Default Value: 65534 Range: 0 - 65535
securityContext.allowPrivilegeEscalation	This is a mandatory parameter. Indicates whether privilege escalation is allowed inside the container or not. If the value is set to true, privilege escalation is allowed inside the container. If the value is set to false, privilege escalation is not allowed inside the container.	Data Type: Boolean Default Value: false Range: true or false
command	This is an optional parameter. Indicates the custom commands to be run in the container on startup.	Data Type: List Default Value: [] Range: Any list of command strings
env.severityList	This is a mandatory parameter. Indicates the list of alert severities to be used in the environment configuration.	Data Type: String Default Value: SEVERITYLIST Range: minor, major, fatal, informational, warning, error, critical
env.kafkaIp	This is a conditional parameter. Configure this parameter when apmenabled is set to true. Indicates the external bootstrap service IP which maps to the Kafka brokers. Internal bootstrap service IP if APM or OSO is deployed in the same cluster.	Data Type: String Default Value: NA Placeholder: KAFKAIP Range: NA

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
env.kafkaPort	This is a conditional parameter. Configure this parameter when apmenabled is set to true. Indicates the external bootstrap service port which maps to the Kafka brokers. Internal bootstrap service port if APM or OSO is deployed in the same cluster.	Data Type: String Default Value: NA Placeholder: KAFKAPORT Range: NA
env.kafkaTopic	This is a conditional parameter. Configure this parameter when apmenabled is set to true. Indicates the Kafka topic to which APM will publish alert messages.	Data Type: String Default Value: NA Placeholder: KAFKATOPIC Range: NA
env.kafkaGroupId	This is a conditional parameter. Configure this parameter when apmenabled is set to true. Indicates a name that the user provides.	Data Type: String Default Value: NA Placeholder: KAFKAGROUPID Range: NA
env.kafkaBatchingLinger	This is an optional parameter. Indicates the time that the Kafka producer waits before sending a batch, allowing more messages to be grouped together. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "50" Range: NA Unit: milliseconds
env.kafkaMaxBatchSize	This is an optional parameter. Indicates the maximum number of messages in a batch to be included before the producer flushes the batch to Kafka. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "500" Range: NA
env.kafkaDeliveryTimeout	This is an optional parameter. Indicates the timeout for an individual Producer message write operation. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "60000" Range: NA Unit: milliseconds

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
env.kafkaRetryBackoff	This is an optional parameter. Indicates the wait time before retrying a failed Kafka write operation. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "100" Range: NA Unit: milliseconds
env.kafkaRetryBackoffMax	This is an optional parameter. Indicates the maximum wait time on successive retries for Kafka writes. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "1000" Range: NA Unit: milliseconds
env.kafkaCompressionType	This is an optional parameter. Indicates the compression type (like none, gzip, and so on) used when sending messages to Kafka. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "none" Range: none, gzip, and so on
env.kafkaRequestTimeout	This is an optional parameter. Indicates the maximum time the producer waits for a server response for each request to Kafka. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "20000" Range: NA Unit: milliseconds
env.AMPollWait	This is an optional parameter. Indicates the time that the APM waits between polling Kafka for delivery events. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "0.001" Range: NA Unit: seconds

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
env.APMMsgWriteTimeout	This is an optional parameter. Indicates the maximum time to wait for Kafka message delivery acknowledgment per message. Note: Do not change the default value. This parameter influences internal batching, timeouts, and retry behaviors for the Kafka producer and APM's messaging workflow. Adjust the value only if specifically required for Kafka performance tuning or troubleshooting purposes.	Data Type: String Default Value: "70" Range: NA Unit: seconds
image.repository	This is a mandatory parameter. Indicates the repository location of the APM Docker image.	Data Type: String Default Value: APM-REPO-ADDRESS Range: Valid registry path
image.pullPolicy	This is a mandatory parameter. Indicates the image pull policy for the Docker image.	Data Type: String Default Value: IfNotPresent Range: "Always", "IfNotPresent", or "Never"
image.tag	This is a mandatory parameter. Indicates the image tag in docker repository.	Data Type: String Default Value: 26.1.200 Placeholder: OSO_VERSION_PLACEHOLDER Range: Any string value
imagePullSecrets	This is an optional parameter. Indicates the list of image pull secrets needed to pull the image from the repository.	Data Type: List Default Value: [] Range: List of secret objects
terminationGracePeriodSeconds	This is an optional parameter. Indicates the duration in that Kubernetes waits before forcefully terminating the pod.	Data Type: Integer Default Value: 40 Range: 0 or more Unit: seconds
service.annotations	This is an optional parameter. Indicates additional annotations to add to the service.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
service.labels	This is an optional parameter. Indicates additional labels to add to the service.	Data Type: Key Value Pair Default Value: {} Range: Any key/value pairs
service.clusterIP	This is an optional parameter. Indicates the cluster IP address for the service.	Data Type: String Default Value: "" Range: Valid IP as string or empty for auto-assignment
service.externalIPs	This is an optional parameter. Indicates a list of external IPs for the service.	Data Type: List Default Value: [] Range: List of valid IP addresses

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
service.loadBalancerIP	This is an optional parameter. Indicates the load balancer IP address for the service.	Data Type: String Default Value: "" Range: Valid IP or empty
service.loadBalancerSourceRanges	This is an optional parameter. Indicates the allowed source address ranges for service access via load balancer.	Data Type: List Default Value: [] Range: List of valid IP addresses
service.ipDualStack.enabled	This is an optional parameter. Indicates whether dual stack support is enabled for the service IP family. if the value is set to true, dual stack support is enabled for the service IP family. if the value is set to false, dual stack support is disabled for the service IP family.	Data Type: Boolean Default Value: false Placeholder: ENABLE_DUAL_STACK Range: true, false
service.ipDualStack.ipFamilies	This is an optional parameter. Indicates the IP families allowed for service assignment.	Data Type: List Default Value: ["IPv6", "IPv4"] Range: IPv4, IPv6
service.ipDualStack.ipFamilyPolicy	This is an optional parameter. Indicates the policy for IP family assignment when dual stack is enabled. - If the value is set as "SingleStack", then OSO supports either IPv4 or IPv6. - If the value is set as "PreferDualStack", then OSO supports both IPv4 or IPv6. Note: When dual stack is supported, OSO prefers IPv6 over IPv4.	Data Type: String Default Value: "PreferDualStack" Range: "SingleStack", "PreferDualStack"
service.sessionAffinity	This is an optional parameter. Indicates the session affinity to be used for the service.	Data Type: String Default Value: None Range: None
service.port	This is a mandatory parameter. Indicates the main service port exposed by the APM service.	Data Type: Integer Default Value: NA Placeholder: APM-SVC-PORT Range: NA
service.portName	This is a mandatory parameter. Indicates the main service port name exposed by the APM service.	Data Type: String Default Value: NA Placeholder: apmsvc Range: NA
service.targetPort	This is a mandatory parameter. Indicates the target port on the pod that receives the traffic. Note: Do not change the default value.	Data Type: Integer Default Value: 5000 Range: NA
service.extraPorts	This is an optional parameter. Indicates a list of additional ports exposed on both services. Note: Do not change the default value.	Data Type: List Default Value: [] Range: NA

Table 3-5 (Cont.) OSO Alert Processing Microservice Configuration Parameter

Parameter Name	Description	Details
service.type	This is a mandatory parameter. Indicates the service type for Kubernetes service configuration.	Data Type: String Default Value: "ClusterIP" Range: "ClusterIP", "NodePort", "LoadBalancer"
apmTLS.enable	This is a mandatory parameter. Indicates if the TLS configuration is enabled or disabled for APM service. If the value is set as <i>true</i> , TLS configuration is enabled for APM service. If the value is set as <i>false</i> , TLS configuration is disabled for APM service.	Data Type: Boolean Default Value: true Range: true, false
apmTLS.caSecret	This is a conditional parameter. Indicates the name of the Kubernetes secret with ca.crt. Configure the apmTLS.caSecret parameter, if the value of apmTLS.enable parameter is <i>true</i> . Note: The file name inside secret must be ca.crt.	Data Type: String Default Value: "" Range: NA Place holder: <APM_TLS_CA_SECRET> Example: tls-ca-secret
apmTLS.serverSecret	This is an optional parameter. Indicates the name of the Kubernetes secret with tls.key and tls.crt for establishing mTLS connection. Note: The file names inside secret must be tls.key and tls.crt.	Data Type: String Default Value: "" Range: NA Place holder: <APM_TLS_SERVER_SECRET> Example: mTLS-server-secret
apmTLS.autoReloadTLS.enable	This is a mandatory parameter. Indicates whether automatic reloading of TLS certificates is enabled or disabled when changes are detected in the configured secrets. If the value is set as <i>true</i> , the system automatically reloads TLS certificates when changes are detected in the configured secrets. If the value is set as <i>false</i> , TLS certificates are not reloaded automatically and require manual intervention.	Data Type: Boolean Default Value: true Range: true, false
apmTLS.autoReloadTLS.certificateMonitorTimer	This is a mandatory parameter. Indicates the time interval (in seconds) at which the system checks for updates to the TLS certificates and reloads them if changes are detected.	Data Type: Integer Default Value: 30 Range: NA Unit: seconds

4

Using OSO with IPv6

This section details the steps to access OSO services like Prometheus and Alertmanager using IPv6.

Note

You can use the [Installing OSO using CSAR](#) procedure to install OSO in an IPv6 cluster.

- To access Prometheus GUI using IPv6, use the following URL format and open the GUI using any IPv6 supported browser:

Load Balancer:

LoadBalancerIP-Prometheus]

Example:

`http://[2606:b400:605:b819:4631:92ff:fe73:9d2c]`

Node Port:

`[AnyWorkerNodeIP]:NodePort-Prometheus`

Example:

`http://[2606:b400:605:b819:4631:92ff:fe73:9d2c]:30090`

- Currently, Alertmanager has an issue in accessing Alertmanager GUI with IPv6 (see, [Parsing URLs with IPv6 host](#) issue). To overcome this issue, perform the following steps to use the DNS names concept as Alertmanager does not support IPv6 address format.

1. Open the hosts file from the following path:
`C:\Windows\System32\drivers\etc\hosts.`
2. Add the following entry to map the worker-node IP of IPv6 cluster with a DNS name:

```
# DNS Mapping for alertmanager
2606:b400:605:b819:4631:92ff:fe73:9d2c alertmanager
```

3. Open GUI using NodePort and DNS name. For example, `http://alertmanager:30854/alertmanager`

5

Upgrading OSO

This chapter provides information about upgrading Oracle Communications Cloud Native Core, Operations Services Overlay (OSO) deployment to the latest release. It is recommended to perform OSO upgrade in a specific order. For more information about the upgrade order, see *Oracle Communications Cloud Native Core, Solution Upgrade, and Fault Recovery Guide*.

Note

- While performing OSO upgrade from 25.1.2xx, 25.2.1xx or 25.2.2xx to 26.1.200, a small service interruption is expected. This outage is caused because OSO pods will be deleted and recreated after the upgrade.
- When performing an OSO upgrade, if you make changes to the configmap, the OSO pods do not restart automatically and continue using the existing data. To ensure the OSO pods retrieve the latest data, add the following to the `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml` file:

```
configmapReload:
  extraArgs:
    webhook-url: http://127.0.0.1:9093/<CLUSTER-NAME>/
alertmanager/-/reload
```

Where, <CLUSTER-NAME> is the name of the target cluster where OSO is deployed. For more details about the AlertManager configuration parameters, see [Alertmanager Configuration Parameters](#).

5.1 Supported Upgrade Paths

The following table lists the supported upgrade paths for OSO:

Table 5-1 Supported Upgrade Paths

Source Release	Target Release
25.2.2xx	26.1.200
25.2.1xx	26.1.200
25.1.2xx	26.1.200

Note

Release 26.1.200 introduces leapfrog upgrade capability in OSO, enabling direct upgrades from three prior releases (N+3), without requiring sequential upgrades. For example, a deployment on 25.1.2xx can be directly upgraded to 26.1.2xx.

5.2 Prerequisites

Following are the prerequisites for upgrading OSO:

- Ensure that the system has OSO 25.2.2xx or 25.2.1xx or 25.1.2xx installed and the OSO is working properly.
- Verify if all the pods and services are up and running.
- Ensure that all required NF upgrades must be completed before upgrading OSO. OSO must be upgraded as the final component in the CNC solution upgrade sequence, as defined in the *Oracle Communications Cloud Native Core Solution Upgrade Guide*.

Note

When OSO is deployed as part of the CNC solution upgrade flow, follow the upgrade sequence described in the *Oracle Communications Cloud Native Core Solution Upgrade Guide*. Upgrade OSO only after completing the required CNC or NF component upgrades.
Do not start the OSO upgrade until the required NF upgrades are complete, unless a release-specific exception is explicitly documented.

5.3 Upgrading OSO using CSAR

This section describes the procedure to upgrade an existing OSO using CSAR.

Note

Before starting the OSO upgrade procedure, ensure that the required CNC or NF upgrades have been completed as described in the *Oracle Communications Cloud Native Core Solution Upgrade Guide*.

1. Prepare the `ocoso_csar_26_1_200_0_0_custom_values.yaml` file by performing the following steps. This yaml file is used as the input during the upgrade process.
 - a. Download OSO CSAR zip file from [My Oracle Support](#) (MOS).
 - b. Unzip the CSAR zip file:

```
$ unzip <OSO CSAR package>
```
 - c. Upload all the artifacts present in the `Artifacts/Images` folder to the configured repository. For more information on the artifacts, see the [Installation Prerequisite](#) section.
 - d. Update the Prometheus, Alertmanager, and APM service `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml`, `ocoso_csar_26_1_200_0_0_alm_custom_values.yaml`, and `ocoso_csar_26_1_200_0_0_apm_custom_values.yaml` files present in the `Artifacts/Scripts` directory with the required values as mentioned in [OSO Configuration Parameters](#).

- e. Untar the Helm charts tgz file available in the Artifacts/Scripts directory.

```
cd Artifacts/Scripts
$ tar -xvzf <helm charts.tgz file>
```

2. Run the following command to upgrade the existing OSO release:

```
$ helm upgrade <OSO release-name for prometheus> <path to the new prom-OSO
helm chart> -n <oso-namespace> -f <path to
ocoso_csar_26_1_200_0_0_prom_custom_values.yaml file>
$ helm upgrade <OSO release-name for alertmanager> <path to the new alm-
OSO helm chart> -n <oso-namespace> -f <path to
ocoso_csar_26_1_200_0_0_alm_custom_values.yaml file>
$ helm upgrade <OSO release-name for alertmanager> <path to the new alm-
OSO helm chart> -n <oso-namespace> -f <path to
ocoso_csar_26_1_200_0_0_apm_custom_values.yaml file>
```

Note

To install the alert config feature, see [Automated Configuration of NF Alerts](#).

3. Post the Helm upgrade a new Prometheus pod spins up, which is in container creating state. To make it into running state, detach the PVC from old pod in Kubernetes and let it attach to this new upgraded pod.

Note

Find Prometheus deployment name and replace it in the following commands, Both the commands given below should be run at the same time.

```
$ kubectl get deployment -n <oso-namespace>
# Find Prometheus deployment name and replace it in below commands, Both
the commands below needs to be run at the same time
$ kubectl -n <oso-namespace> scale deploy <oso-deployment-name> --
replicas=0
$ kubectl -n <oso-namespace> scale deploy <oso-deployment-name> --
replicas=1
```

4. Verify if all the pods are up and running with the latest versions and changes.
5. Verify if the upgraded OSO is working as expected by performing the [Verifying Installation](#) procedure.

6

Rolling Back OSO

This chapter provides information about rolling back Oracle Communications Cloud Native Core, Operations Services Overlay (OSO) deployment to previous releases.

6.1 Supported Rollback Paths

The following table lists the supported rollback paths for OSO:

Table 6-1 Supported Rollback Paths

Source Release	Target Release
26.1.200	25.2.2xx
26.1.200	25.2.1xx
26.1.200	25.1.2xx

Note

Release 26.1.200 introduces leapfrog rollback capability in OSO, without requiring sequential downgrades to up to three prior releases (N-3).
For example, a deployment on 26.1.2xx can be directly rolled back to 25.1.2xx.

6.2 Prerequisites

Following are the prerequisites to rollback OSO:

- Ensure that the system has OSO 26.1.200 installed and the OSO is working properly.
- Verify if all the pods and services are up and running.

6.3 Rollback Tasks

To roll back from OSO 26.1.200 to previous releases 25.2.2xx or 25.2.1xx or 25.1.2xx:

1. Run the following command to check the installed Helm charts.

```
$ helm -n oso ls
```

For example:

NAME	NAMESPACE	REVISION	STATUS
UPDATED			
CHART		APP VERSION	

```

oso-a      oso      2      2025-08-04 17:46:51.998024802 +0000
UTC    deployed  alertmanager-1.15.1      25.2.200-39-gbc755fc
oso-alr-cfg  oso      2      2025-08-04 17:47:18.547249161
+0000 UTC    deployed  oso-alr-config-0.1.0      25.2.200-39-gbc755fc
oso-apm    oso      1      2025-08-01 22:08:15.58454657 +0000
UTC    deployed  apm-service-25.2.200      25.2.200-alpha.1
oso-p      oso      2      2025-08-04 17:46:51.276209128 +0000
UTC    deployed  prometheus-27.5.0      25.2.200-39-gbc755fc

```

- Pick a chart to rollback and check the revision you want to roll back your release to. The chart can be either Prometheus or alertmanager.

```
$ helm -n <namespace> history <oso-release-name>
```

For example:

```
$ helm -n oso history oso-p
```

Sample output

REVISION	UPDATED	STATUS
CHART	APP VERSION	DESCRIPTION
1	Fri Aug 1 17:46:51 2025	superseded
prometheus-27.5.0	26.1.200	Install complete
2	Mon Aug 4 14:46:19 2025	deployed
prometheus-27.5.0	26.1.200	Upgrade complete

- Pick the revision number to which you wish to roll back your release into. In above example, it will be 1. Run the following command to roll back:

```
$ helm -n <namespace> rollback <oso-release-name> <oso revision number>
```

For example:

```
$ helm -n oso rollback oso 1
```

Sample output

Rollback was a success! Happy Helming!

For example:

```

$ helm -n oso history oso-p
REVISION      UPDATED      STATUS
CHART          APP VERSION  DESCRIPTION
1             Fri Aug 1 17:46:51 2025    superseded
prometheus-27.5.0  25.1.200    Install complete
2             Mon Aug 4 14:46:19 2025    superseded
prometheus-27.5.0  25.2.100    Upgrade complete
3             Thu Aug 7 12:37:02 2025    deployed
prometheus-27.5.0  25.1.200    Rollback to 1

```

4.

Note

This step is only required for Prometheus chart.

After Helm rollback a new Prometheus pod is created but in pending state. To make it into running state, we have to detach the PVC from old pod and attach to the new pod using below steps:

Note

Find Prometheus deployment name and replace it in the following commands, both the commands given below should be run at the same time.

```
$ kubectl get deployment -n <oso-namespace>
# Find Prometheus deployment name and replace it in below commands, Both
the commands below needs to be run at the same time
$ kubectl -n <oso-namespace> scale deploy <oso-deployment-name> --
replicas=0
$ kubectl -n <oso-namespace> scale deploy <oso-deployment-name> --
replicas=1
```

For example with sample output

```
$ kubectl -n oso scale deploy oso-p-prom-svr --replicas=0
deployment.apps/oso-prom-svr scaled
$ kubectl -n oso scale deploy oso-p-prom-svr --replicas=1
deployment.apps/oso-prom-svr scaled
```

5. Verify if all the pods are up and running with the latest versions and changes, perform the following command:

```
$ kubectl get pods --namespace <namespace>
```

For example:

```
$ kubectl get pods -n occne-infra
```

Sample output

NAME	READY	STATUS	RESTARTS	AGE
oso-prom-alm-0	2/2	Running	0	25h
oso-prom-alm-1	2/2	Running	0	25h
oso-prom-svr-84c4hfd488-qsnvx	2/2	Running	0	14s

6. Verify if the upgraded OSO is working as expected by performing the [Verifying Installation](#) procedure.

7

Uninstalling OSO

This chapter provides information about uninstalling Oracle Communications Cloud Native Core, Operations Services Overlay (OSO).

7.1 Uninstalling OSO Using Helm

To uninstall OSO, run the following commands:

1. [Optional]: Take backup of prometheus data using [Creating Backup of Prometheus Time Series Database \(TSDB\) Using Snapshot Utility](#).
2. Run the following command to list all the OSO components installed using OSO namespace.

```
$ helm list -n <oso-namespace>
```

For example: \$ helm list -n oso

Sample output:

NAME	NAMESPACE	REVISION	STATUS
UPDATED			
CHART	APP	VERSION	
oso-alm	oso	1	2026-01-22
07:21:12.915700279 +0000 UTC	deployed		alertmanager-1.15.1
25.2.200			
oso-alrt-config	oso	1	2026-01-22
11:57:34.950494069 +0000 UTC	deployed		oso-alr-config-0.1.0
25.2.200			
oso-apm	oso	1	2026-01-22
07:21:14.085348726 +0000 UTC	deployed		apm-service-25.2.200
25.2.200			
oso-prom	oso	1	2026-01-22
07:21:11.719282076 +0000 UTC	deployed		prometheus-27.5.0
25.2.200			

3. Run the following command to list all the Kubernetes services:

```
$ kubectl get all -n <oso-namespace>
```

For example: \$ kubectl get all -n oso

Sample output:

NAME	READY	STATUS	RESTARTS	AGE
pod/apm-svc-6584494467-zfdwv	1/1	Running	0	4h45m
pod/oso-alm-0	2/2	Running	0	4h42m

```
pod/oso-alm-1          2/2    Running  0        4h42m
pod/oso-prom-svr-74cff66546-nrrd4  2/2    Running  0        4h45m
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP
service/apm-svc	ClusterIP	10.233.31.59	<none>
80/TCP			
service/oso-alm	NodePort	10.233.11.166	<none>
80:30939/TCP			
service/oso-alm-headless	ClusterIP	None	<none>
TCP, 9094/TCP, 9094/UDP			
service/oso-prom-svr	NodePort	10.233.56.164	<none>
80:31048/TCP			

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/apm-svc	1/1	1	1	4h45m
deployment.apps/oso-prom-svr	1/1	1	1	4h45m

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/apm-svc-6584494467	1	1	1	4h45m
replicaset.apps/oso-prom-svr-74cff66546	1	1	1	4h45m

NAME	READY	AGE
statefulset.apps/oso-alm	2/2	4h45m

- Run the following command to delete all PVCs in the OSO namespace.

```
# Delete all pvcs
$ kubectl delete pvc --all -n <oso-namespace>
```

Sample output

```
persistentvolumeclaim "storage-oso-alm-0" deleted
persistentvolumeclaim "storage-oso-alm-1" deleted
```

- Run the following commands to uninstall the OSO components:

- Run the following command to uninstall oso-prometheus.

```
$ helm uninstall oso-prom -n <oso-namespace>
```

For example:

```
$ helm uninstall oso-prom -n oso
```

Sample output:

```
release "oso-prom" uninstalled
```

- Run the following command to uninstall oso-alert-manager.

```
$ helm uninstall oso-alm -n <oso-namespace>
```

For example:

```
$ helm uninstall oso-alm -n oso
```

Sample output:

```
release "oso-alm" uninstalled
```

- Run the following command to uninstall oso-apm service.

```
$ helm uninstall oso-apm -n <oso-namespace>
```

For example:

```
$ helm uninstall oso-apm -n oso
```

Sample output:

```
release "oso-apm" uninstalled
```

- Run the following command to uninstall oso-alert-config.

```
$ helm uninstall oso-alrt-config -n <oso-namespace>
```

For example:

```
$ helm uninstall oso-alrt-config -n oso
```

Sample output:

```
release "oso-alrt-config" uninstalled
```

Helm keeps a record of its releases, so you can still reactivate the release after uninstalling it. Run the following command to verify if all the OSO related resources are uninstalled.

```
$ kubectl get all -n <oso-namespace>
```

Sample output:

NAME	COMPLETIONS	DURATION	AGE
oso-alr-config-hook-post-install	0/1	138m	138m

In case of successful uninstallation, no OSO resource is displayed in the command output.

If the command output displays the OSO resources or objects, then perform [Deleting Kubernetes Resources](#).

7.2 Deleting Kubernetes Resources

This section describes how to delete Kubernetes resources or objects where OSO is deployed.



Caution

Be sure before running the following command as it deletes all the Kubernetes objects in the specified namespace.

Run the following command to delete the Kubernetes specific resources:

```
kubectl delete <resource-type> <resource-name> -n <release-namespace>
```

For example:

```
$ kubectl delete job oso-alr-config-hook-post-install
```

Sample output:

```
job.batch "oso-alr-config-hook-post-install" deleted
```

A

Key Information About OSO

This section provides important information that the user must know about OSO.

The following are some of the important points about OSO installation that you must be aware of:

1. All the services having GUI are converted to ClusterIP as Cloud Native Configuration Console (CNC Console) hyperlinks for OSO GUIs are currently not enabled. Therefore, you can access the GUIs through CNC Console only.
Run the following command to get the list of services and check their service type.

```
$ kubectl get service -n <namespace>
```

Sample output:

NAME				TYPE	CLUSTER-
IP	EXTERNAL-IP	PORT(S)		AGE	
apm-svc				ClusterIP	
10.233.48.96	<none>	80/TCP			4d13h
oso-prom-alm				ClusterIP	
10.233.48.28	<none>	80:31717/TCP			4d13h
oso-prom-alm-headless				ClusterIP	
None	<none>	80/TCP, 6783/TCP			4d13h
oso-prom-svr				ClusterIP	
10.233.22.117	<none>	80:30266/TCP			4d13h

2. Since Alertmanager is a StatefulSets, the Persistent Volume (PV) or Persistent Volume Claim (PVC) do not get deleted automatically when the following helm uninstallation command is run for the respective OSO helm-release:

```
$ helm uninstall oso-release-name -n <namespace>
```

This uninstallation command removes all resources related to the OSO release. However it does not remove the PVs or PVCs for Alertmanager. Therefore, perform the following steps to manually remove PVs and PVCs in Alertmanager:

- a. Run the following command to retrieve the list of PVCs:

```
$ kubectl get pvc -n <namespace>
```

Sample output:

NAME	STATUS	VOLUME	
CAPACITY	ACCESS MODES	STORAGECLASS	AGE
oso-prom-svr	BOUND	pvc-a639c8cb-eee1-4fa3-be1b-d4c4e5d66b9a	
8Gi	RWO	standard	159m

```

oso-prom-alm-0  BOUND      pvc-a639c8cb-eee1-4fa3-be1b-d4c4e5d6689J
2Gi            RWO          standard      159m
oso-prom-alm-1  BOUND      pvc-a639c8cb-eee1-4fa3-be1b-d4c4e5d6689k
2Gi            RWO          standard      159m

```

- b. Run the following command to delete the PVCs:

```
$ kubectl delete pvc oso-prom-svr oso-prom-alm-0 oso-prom-alm-1 -n
<namespace>
```

Sample output:

```

persistentvolumeclaim "oso-prom-svr" deleted
persistentvolumeclaim "oso-prom-alm-0" deleted
persistentvolumeclaim "oso-prom-alm-1" deleted

```

- c. Run the following command to retrieve the PV details:

```
$ kubectl get pv -n <namespace>
```

Sample output:

NAME			CAPACITY	ACCESS	MODES
RECLAIM POLICY	STATUS				
CLAIM					
STORAGECLASS	REASON	AGE			
pvc-104a1c0c-72f7-4ae0-b368-71c4e22082ce			2Gi		RWO
Delete	Bound	osoxyz2/storage-volume-oso-xyz2-prom-alm-1			
	standard		4d13h		
pvc-1e75d93e-0731-45f2-9ef7-46cf8cbbb3f9			2Gi		RWO
Delete	Bound	osoxyz1/storage-volume-oso-xyz2-prom-alm-0			
	standard		4d13h		
pvc-30400fe7-61dd-4e2f-8a50-149e4e14be90			2Gi		RWO
Delete	Bound	osoxyz2/oso-xyz2-prom-svr			
	standard				4d12h

- d. Run the following command to delete the PVs:

```

$ kubectl delete pv pvc-104a1c0c-72f7-4ae0-b368-71c4e22082ce
pvc-1e75d93e-0731-45f2-9ef7-46cf8cbbb3f9
pvc-30400fe7-61dd-4e2f-8a50-149e4e14be90 -n osoxyz1

```

B

Prometheus Vertical Scaling

This section describes the procedure for vertical scaling of Prometheus.

To scale Prometheus deployments, follow these steps:

1. Get the list of deployments and identify the OSO Prometheus deployment with the suffix prom-svr:

```
# To list all the deployments in the OSO namespace
$ kubectl -n <OSO_namespace> get deployments
# To filter the deployment name by its suffix
$ kubectl -n <OSO_namespace> get deployments | grep prom-svr
```

2. Edit the OSO deployment using the following command:

Note

This will open a *vi* editor with the deployment's yaml definition.

```
$ kubectl -n <OSO_namespace> edit deployment <oso_deployment_name>-prom-svr
```

3. Find the resources section for the prom-svr container in the edit mode of deployment, and edit the amount of resources as per the requirements.

```
name: prom-svr
ports:
... # ports definitions
readinessProbe:
... # readiness probe definition
resources:
  limits:
    cpu: "2"
    memory: 4Gi
  requests:
    cpu: "2"
    memory: 4Gi
```

4. Save and quit from the editor after making the required changes in the yaml file for the CPU and memory. In case of any errors while editing, the editor opens again and error message appears at the top of the yaml file as a comment.

Note

If any of these objects have two containers each, you will find two resources sections. For more information about how to assign resources, see <https://kubernetes.io/docs/concepts/configuration/manage-resources-containers/>.

C

Creating Backup of Prometheus Time Series Database (TSDB) Using Snapshot Utility

This section details how users can create backup of Prometheus Time Series Database (TSDB) using the snapshot utility.

Note

The Prometheus PVC size must be increased when the snapshot utility is enabled. For more information about the resources, see [Resource Utilization](#).

Capturing TSDB Snapshots

Perform the following steps to capture the TSDB snapshots:

1. Enable the `web.enable-admin-api` flag provided in `ocoso_csar_26_1_200_0_0_prom_custom_values.yaml`:

extraFlags:
- web.enable-lifecycle
web.enable-admin-api flag controls access to the administrative HTTP API which includes functionality such as deleting time series. This is disabled by default.
- web.enable-admin-api
2. Install OSO using [Installing OSO Using CSAR](#).
3. Use the ephemeral (Debug) container to capture the snapshot and export it out of Prometheus. After the export is done successfully, ephemeral container will be exited and stopped.

Note

- Take the backup of current Prometheus data. You can wait for a couple days for Prometheus database to fill up with the required data or until OSO's retention period is over (the default period is 7 days). Then, perform the following steps to take the backup.
- Use the `ocne.io/ocne/oso_snapshot:26.1.200` image for ephemeral container. This image is created for the purpose of handling the creation and removal of the TSDB snapshots. You must load and push this image into the customer's central or system registry.

4. Capture snapshots by connecting the Debug container to the Prometheus server. When OSO is configured with `CLUSTER_NAME_PREFIX`, run the following command:

```
$ kubectl -n <oso-namespace> debug <oso-prom-pod-name> -it --  
image=<oso_snapshot_image_url> --target=<name of Prometheus server>
```

```
container> --env OSO_PROMETHEUS_SERVICE_NAME=<oso-prometheus-service-name>
--env CLUSTER_NAME_PREFIX=<cluster-name-prefix> &
```

When OSO is **not** configured with CLUSTER_NAME_PREFIX, provide only the OSO_PROMETHEUS_SERVICE_NAME and run the following command:

```
$ kubectl -n <oso-namespace> debug <oso-prom-pod-name> -it --
image=<oso_snapshot_image_url> --target=<name of Prometheus server
container> --env OSO_PROMETHEUS_SERVICE_NAME=<oso-prometheus-service-name>
&
```

For example:

```
$ kubectl -n oso debug oso-p-prom-svr-55f8d47c74-4vwfx -it --image=occne-
repo-host:5000/occne.io/occne/oso_snapshot:26_1_200 --target=prom-svr --
env OSO_PROMETHEUS_SERVICE_NAME=oso-p-prom-svr --env
CLUSTER_NAME_PREFIX=occne3-n2 &
```

Targeting container "prom-svr". If you don't see processes from this container it may be because the container runtime doesn't support this feature.

--profile=legacy is deprecated and will be removed in the future. It is recommended to explicitly specify a profile, for example "--profile=general".

Defaulting debug container name to debugger-x25bq.

If you don't see a command prompt, try pressing enter.

```
[1]+ Stopped kubectl -n oso debug oso-p-prom-svr-55f8d47c74-4vwfx -
it --image=occne-repo-host:5000/occne.io/occne/oso_snapshot:26_1_200 --
target=prom-svr --env OSO_PROMETHEUS_SERVICE_NAME=oso-p-prom-svr --env
CLUSTER_NAME_PREFIX=occne3-n2
```

Note

There is an ampersand (&) character at the end of the command. This character indicates that the process is running in the background and allows the terminal available for other processes. In the above example, "Defaulting debug container name to debugger-x25bq.", the name "debugger-x25bq" indicates the ephemeral container name of the active container. This is used to copy the snapshot out of the pod and to remove it later.

5. Run the below command to view the logs, when the snapshot process is running in the background. The output should look like below with "200 OK" code.

```
kubectl -n <oso-namespace> logs <oso-prom-pod-name> -c <ephemeral-
container-name>
```

For example:

```
$ kubectl -n oso logs oso-p-prom-svr-55f8d47c74-4vwfx -c debugger-x25bq
```

Sample output:

```
total 36K
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
-rw-r--r--. 1 nobody nobody  0 Aug 19 17:12 lock
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
-rw-r--r--. 1 nobody nobody 7.2K Aug 20 16:53 snapshots.log
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
  % Total    % Received % Xferd  Average Speed   Time    Time       Time
Current
                                Dload  Upload  Total  Spent  Left
Speed
  0      0    0     0     0     0     0     0  --:--:--  --:--:--
--:--:--    0*   Trying 10.233.11.145:80...
* Connected to oso-p-prom-svr (10.233.11.145) port 80 (#0)
> POST /occne3-n2/prometheus/api/v1/admin/tsdb/snapshot HTTP/1.1
> Host: oso-p-prom-svr
> User-Agent: curl/7.76.1
> Accept: */*
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< Content-Type: application/json
< Date: Wed, 20 Aug 2025 16:53:24 GMT
< Content-Length: 72
<
{ [72 bytes data]
100   72 100   72    0     0 1440     0  --:--:--  --:--:--  --:--:--
1440
* Connection #0 to host oso-p-prom-svr left intact
```

6. Verify if the log of the curl command that issues the snapshot creation logic inside debug container is successful, by looking for a "< HTTP/1.1 200 OK" in the above sample output. Export the tarball (.tgz artifact) out of the debug container using the following command.

```
$ kubectl cp <oso-namespace>/<oso-prom-svr-pod-name>:/proc/1/root/data/
snapshots.tgz -c <debug-container-name> /tmp/<snapshot-folder-name>/
snapshots.tgz
```

Figure C-1 Exporting tgz artifact from Debug container

```
[cloud-user@occn5-aram-ortiz-bastion-1 ~]$ kubectl cp oso/oso-prom-svr-85b78db88d-tkwjz:/proc/1/root/data/snapshots.tgz -c debugger-zh6jz /tmp/snapshots/snapshots.tgz
tar: Removing leading '/' from member names
[cloud-user@occn5-aram-ortiz-bastion-1 ~]$ cd /tmp/snapshots/
[cloud-user@occn5-aram-ortiz-bastion-1 snapshots]$ ls
snapshots.tgz
[cloud-user@occn5-aram-ortiz-bastion-1 snapshots]$
```

7. Get the snapshot process back to foreground, once the snapshots tar is available in the local system, by running the following command:

```
$ fg $(jobs | awk -F '[][]' '/oso_snapshot/{print $2}')
```

For example:

```
$ fg $(jobs | awk -F '[][]' '/oso_snapshot/{print $2}')
```

Sample output:

```
$ fg $(jobs | awk -F '[][]' '/oso_snapshot/{print $2}')
kubectl -n oso debug oso-p-prom-svr-55f8d47c74-4vwfx -it --image=occne-
repo-host:5000/occne.io/occne/oso_snapshot:26_1_200 --target=prom-svr --
env OSO_PROMETHEUS_SERVICE_NAME=oso-p-prom-svr --env
CLUSTER_NAME_PREFIX=occne3-n2
```

The above step leaves the terminal in a waiting state.

Press **Enter** in the terminal to finalize the process and to see the full log of the snapshot creation process.

```
----- Snapshot procedure started
-----
```

STEP 1: CHECKING FOR EXISTING SNAPSHOT ARCHIVES AND CLEANING UP IF NECESSARY

Listing current contents of the directory for snapshot archives:

```
total 32K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody  0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
-rw-r--r--. 1 nobody nobody 239 Aug 20 16:51 snapshots.log
```

No previous snapshots.tgz found. All clear!

No previous snapshots directory found. All clear!

STEP 2: CAPTURING SNAPSHOT OF CURRENT PROMETHEUS DB USING ADMINISTRATIVE API

Wed Aug 20 16:51:01 UTC 2025

Sending POST request to Prometheus API to create a snapshot with Cluster Name Prefix...

Executing: curl -vvv -XPOST "http://oso-p-prom-svr/occne3-n2/prometheus/api/v1/admin/tsdb/snapshot"

```
% Total    % Received % Xferd  Average Speed   Time    Time     Time
Current                                  Dload  Upload  Total   Spent    Left
Speed
  0    0    0    0    0    0    0    0  --:--:--  --:--:--
--:--:--    0*   Trying 10.233.11.145:80...
* Connected to oso-p-prom-svr (10.233.11.145) port 80 (#0)
> POST /occne3-n2/prometheus/api/v1/admin/tsdb/snapshot HTTP/1.1
> Host: oso-p-prom-svr
> User-Agent: curl/7.76.1
> Accept: */*
```

```
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< Content-Type: application/json
< Date: Wed, 20 Aug 2025 16:51:01 GMT
< Content-Length: 72
<
{ [72 bytes data]
100  72 100  72  0  0  911  0 --:--:-- --:--:-- --:--:--
911
* Connection #0 to host oso-p-prom-svr left intact
{"status":"success","data":{"name":"20250820T165101Z-0eb533ff8d43ed64"}}
```

Snapshot is successfully created!

Directory contents of Prometheus DB AFTER successful Snapshot:

```
total 36K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody  0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:51 snapshots
-rw-r--r--. 1 nobody nobody 2.0K Aug 20 16:51 snapshots.log
```

STEP 3: CREATING EXPORTABLE ARCHIVE OF THE SNAPSHOT DATA

Snapshots is successfully archived!

```
total 40K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody  0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:51 snapshots
-rw-r--r--. 1 nobody nobody 162 Aug 20 16:51 snapshots.tgz
-rw-r--r--. 1 nobody nobody 2.5K Aug 20 16:51 snapshots.log
Non-interactive shell detected. Skipping interactive prompt...
```

```
----- Snapshot creation procedure completed
-----
```

```
----- Snapshot procedure started
-----
```

STEP 1: CHECKING FOR EXISTING SNAPSHOT ARCHIVES AND CLEANING UP IF NECESSARY

Listing current contents of the directory for snapshot archives:

```
total 40K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
```

```
-rw-r--r--. 1 nobody nobody    0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:51 snapshots
-rw-r--r--. 1 nobody nobody 162 Aug 20 16:51 snapshots.tgz
-rw-r--r--. 1 nobody nobody 3.3K Aug 20 16:53 snapshots.log
```

Found snapshots.tgz archive. Deleting...

Successfully deleted!

Found snapshots directory. Deleting...

Successfully deleted!

STEP 2: CAPTURING SNAPSHOT OF CURRENT PROMETHEUS DB USING ADMINISTRATIVE API

Wed Aug 20 16:53:01 UTC 2025

Sending POST request to Prometheus API to create a snapshot with Cluster Name Prefix...

Executing: curl -vvv -XPOST "http://oso-p-prom-svr/occne3-n2/prometheus/api/v1/admin/tsdb/snapshot"

```
% Total    % Received % Xferd  Average Speed   Time    Time     Time
Current                                  Dload  Upload  Total   Spent    Left
Speed
  0      0    0      0      0      0      0      0 --:--:-- --:--:--
--:--:--    0*   Trying 10.233.11.145:80...
* Connected to oso-p-prom-svr (10.233.11.145) port 80 (#0)
> POST /occne3-n2/prometheus/api/v1/admin/tsdb/snapshot HTTP/1.1
> Host: oso-p-prom-svr
> User-Agent: curl/7.76.1
> Accept: */*
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< Content-Type: application/json
< Date: Wed, 20 Aug 2025 16:53:01 GMT
< Content-Length: 72
<
{ [72 bytes data]
100   72 100   72    0    0 2000    0 --:--:-- --:--:-- --:--:--
1945
* Connection #0 to host oso-p-prom-svr left intact
{"status":"success","data":{"name":"20250820T165301Z-0572f8dd893c2028"}}
```

Snapshot is successfully created!

Directory contents of Prometheus DB AFTER successful Snapshot:

```
total 40K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
```

```
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody 0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:53 snapshots
-rw-r--r--. 1 nobody nobody 5.3K Aug 20 16:53 snapshots.log
```

STEP 3: CREATING EXPORTABLE ARCHIVE OF THE SNAPSHOT DATA

Snapshots is successfully archived!

```
total 44K
drwxrws---. 2 root nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody 0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:53 snapshots
-rw-r--r--. 1 nobody nobody 161 Aug 20 16:53 snapshots.tgz
-rw-r--r--. 1 nobody nobody 5.8K Aug 20 16:53 snapshots.log
Non-interactive shell detected. Skipping interactive prompt...
```

```
----- Snapshot creation procedure completed
-----
```

```
----- Snapshot procedure started
-----
```

STEP 1: CHECKING FOR EXISTING SNAPSHOT ARCHIVES AND CLEANING UP IF NECESSARY

Listing current contents of the directory for snapshot archives:

```
total 44K
drwxrws---. 2 root nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody 0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:53 snapshots
-rw-r--r--. 1 nobody nobody 161 Aug 20 16:53 snapshots.tgz
-rw-r--r--. 1 nobody nobody 6.6K Aug 20 16:53 snapshots.log
```

Found snapshots.tgz archive. Deleting...

Successfully deleted!

Found snapshots directory. Deleting...

Successfully deleted!

STEP 2: CAPTURING SNAPSHOT OF CURRENT PROMETHEUS DB USING ADMINISTRATIVE API

Wed Aug 20 16:53:24 UTC 2025

Sending POST request to Prometheus API to create a snapshot with Cluster

Name Prefix...

Executing: curl -vvv -XPOST "http://oso-p-prom-svr/occne3-n2/prometheus/api/v1/admin/tsdb/snapshot"

% Total	% Received	% Xferd	Average Speed		Time	Time	Time
Current			Dload	Upload	Total	Spent	Left
Speed							
0	0	0	0	0	0	0	--:--:-- --:--:--
--:--:--	0*	Trying 10.233.11.145:80...					
* Connected to oso-p-prom-svr (10.233.11.145) port 80 (#0)							
> POST /occne3-n2/prometheus/api/v1/admin/tsdb/snapshot HTTP/1.1							
> Host: oso-p-prom-svr							
> User-Agent: curl/7.76.1							
> Accept: */*							
>							
* Mark bundle as not supporting multiuse							
< HTTP/1.1 200 OK							
< Content-Type: application/json							
< Date: Wed, 20 Aug 2025 16:53:24 GMT							
< Content-Length: 72							
<							
{ [72 bytes data]							
100	72	100	72	0	0	1440	0 --:--:-- --:--:-- --:--:--
1440							
* Connection #0 to host oso-p-prom-svr left intact							
{"status":"success","data":\{"name":"20250820T165324Z-3e8dc6572924e398"}}							

Snapshot is successfully created!

Directory contents of Prometheus DB AFTER successful Snapshot:

```
total 44K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody 0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:53 snapshots
-rw-r--r--. 1 nobody nobody 8.5K Aug 20 16:53 snapshots.log
```

STEP 3: CREATING EXPORTABLE ARCHIVE OF THE SNAPSHOT DATA

Snapshots is successfully archived!

```
total 48K
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
-rw-r--r--. 1 nobody nobody 0 Aug 19 17:12 lock
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:53 snapshots
-rw-r--r--. 1 nobody nobody 163 Aug 20 16:53 snapshots.tgz
-rw-r--r--. 1 nobody nobody 9.0K Aug 20 16:53 snapshots.log
```

```
----- Snapshot creation procedure completed
-----
```

Session ended, the ephemeral container will not be restarted but may be reattached using 'kubectl attach oso-p-prom-svr-55f8d47c74-4vwfx -c debugger-x25bq -i -t' if it is still running

8. (Mandatory) Clean up the snapshot archive. Run the following command to remove the snapshots created.

 Warning

Failing to perform the following step will leave a snapshot hanging in your system and may fill up your system's storage.

```
kubectl -n <oso-namespace> debug <oso-prom-pod-name> -it --
image=<oso_snapshot_image_url> --target=prom-svr --env REMOVE=yes
```

9. Verify the output of the above command to confirm if the snapshots were removed. For example:

```
$ kubectl -n oso debug oso-p-prom-svr-55f8d47c74-4vwfx -it --image=ocne-
repo-host:5000/ocne.io/ocne/oso_snapshot:26_1_200 --target=prom-svr --
env REMOVE=yes
```

Sample output:

Targeting container "prom-svr". If you don't see processes from this container it may be because the container runtime doesn't support this feature.

--profile=legacy is deprecated and will be removed in the future. It is recommended to explicitly specify a profile, for example "--profile=general".

Defaulting debug container name to debugger-fc5q6.

```
----- REMOVE flag is set to 'yes'. Cleaning
up snapshot archives -----
```

```
Prometheus DB Directory contents BEFORE cleanup:
total 48K
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
-rw-r--r--. 1 nobody nobody  0 Aug 19 17:12 lock
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 3 nobody nobody 4.0K Aug 20 16:53 snapshots
-rw-r--r--. 1 nobody nobody 9.5K Aug 20 16:54 snapshots.log
-rw-r--r--. 1 nobody nobody 163 Aug 20 16:53 snapshots.tgz
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal
```

Snapshots archives removed successfully!

```
Prometheus DB Directory contents AFTER cleanup:
total 28K
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 chunks_head
-rw-r--r--. 1 nobody nobody   0 Aug 19 17:12 lock
drwxrws---. 2 root  nobody 16K Aug 19 17:12 lost+found
-rw-r--r--. 1 nobody nobody 20K Aug 19 17:12 queries.active
drwxr-sr-x. 2 nobody nobody 4.0K Aug 19 17:12 wal

----- Snapshot cleanup process completed
-----
```

10. (Mandatory) Validate the contents of the snapshot by running the following command on the snapshot file:

```
$ tar tvf snapshots.tgz
```

For example:

```
$ tar tvf snapshots.tgz
drwxr-sr-x nobody/nobody      0 2025-08-25 21:11 snapshots/
drwxr-sr-x nobody/nobody      0 2025-08-25 21:11 snapshots/
20250825T211118Z-0aa128d1c1f37e71/
drwxr-sr-x nobody/nobody      0 2025-08-25 21:11 snapshots/
20250107T084350Z-2a422bf3ea6cee2c/01JGZYYEXF1DR08XFAHX99Z1EW/
drwxr-sr-x nobody/nobody      0 2025-08-25 21:11 snapshots/
20250107T084350Z-2a422bf3ea6cee2c/01JGZYYEXF1DR08XFAHX99Z1EW/chunks/
-rw-r--r-- nobody/nobody 14004 2025-08-25 21:11 snapshots/
20250107T084350Z-2a422bf3ea6cee2c/01JGZYYEXF1DR08XFAHX99Z1EW/chunks/000001
-rw-r--r-- nobody/nobody      9 2025-08-25 21:11 snapshots/
20250107T084350Z-2a422bf3ea6cee2c/01JGZYYEXF1DR08XFAHX99Z1EW/tombstones
-rw-r--r-- nobody/nobody 69072 2025-08-25 21:11 snapshots/
20250107T084350Z-2a422bf3ea6cee2c/01JGZYYEXF1DR08XFAHX99Z1EW/index
-rw-r--r-- nobody/nobody 273 2025-08-25 21:11 snapshots/
20250107T084350Z-2a422bf3ea6cee2c/01JGZYYEXF1DR08XFAHX99Z1EW/meta.json
```

Note

If the snapshot in your system does not have the structure shown above, delete the snapshot and try the process again.