

Oracle® Communications

Operations Services Overlay User Guide



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ORACLE®

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Acronyms

The following table provides information about the acronyms used in the document.

Table Acronyms

Acronym	Description
CNE	Cloud Native Environment
CNC	Cloud Native Core
CRD	Custom Resource Definition
CSAR	Cloud Service Archive
NF	Network Function
OCCNE	Oracle Communications Cloud Native Environment
ONAP	Open Network Automation Platform
OSO	Operations Services Overlay
OSDC	Oracle Software Download Center

What's New in This Guide

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

Release 24.2.5- F99778-02 , February 2025

Added [Support for Time Series Database \(TSDB\) Snapshot](#) section to provide the procedure for capturing snapshots in TSDB.

Release 24.2.0- F99778-01 , June 2024

There are no updates made to this document.

1

Overview

The Oracle Communications Operations Services Overlay (OSO) 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.

OSO is an independent deliverable distinct from Oracle Communications Cloud Native Core, Cloud Native Environment (CNE). OSO assists efficient integration of network measurement mechanisms, resource allocation, and dynamic decision-making based on a common set of measurements.

This document guides the OSO users to operate and maintain OSO services.

1.1 References

Following are the reference documents:

- *Oracle Communications Operations Services Overlay Installation and Upgrade Guide*
- *Oracle Communications Operations Services Overlay Network Impact Report*

2

Installing and Configuring OSO

Oracle Communications Operations Services Overlay (OSO) can be installed on any supported version of Kubernetes. For more information about how to install and configure OSO, see *Oracle Communications Operations Services Overlay Installation and Upgrade Guide*.

3

OSO Services

Oracle Communications Operations Services Overlay (OSO) provides the following observability services to help users observe the behavior of applications running in their cloud native environment.

3.1 Metrics

This section describes the observability metrics provided by the OSO services.

3.1.1 Metrics Collection

OSO uses Prometheus to collect metrics from all the Cloud Native Core (CNC) applications deployed in the user's CNE. Prometheus collects metrics from the following:

- OSO services: Prometheus collects and stores metrics generated by the OSO services, such as Prometheus and AlertManager.
- CNC Network Functions: OSO Prometheus receives customer metrics generated and delivered by the CNC NFs.

3.1.2 Storing Metrics

OSO Prometheus stores all the metrics in an internal Time Series Database (TSDB).

3.1.3 Support for Time Series Database (TSDB) Snapshot

Prometheus uses Time Series Database (TSDB) to store the metrics. Along with metric storage, OSO captures a snapshot at a specific point of time with the available data in the Prometheus data store. OSO allows you to capture these snapshots without shutting down or disrupting the Prometheus instance.

This feature can be used for the following:

- Backups
- Recovery
- Debugging

For more information about the procedure for capturing TSDB snapshots, see the "Creating Backup of Prometheus Time Series Database (TSDB) Using Snapshot Utility" section in *Oracle Communications Operations Services Overlay Installation and Upgrade Guide*.

3.2 OSO Alerts

OSO uses AlertManager to raise alerts. These alerts inform the user about the aspect of OSO that requires attention.

The applications deployed on OSO define their alerts to inform the user about the problems specific to each application. For more information on how applications can load alerting rules, see the [Updating Alert Rules for an NF](#) section.

4

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. The resource requests and limits are as follows:

Table 4-1 CPU and RAM Resource Requests and Limits

Service	CPU Initial Request(m)	CPU Limit(m)	RAM Initial Request(Mi)	RAM Limit(Mi)	Instances
Prometheus	2000	2000	4096	4096	2
Prometheus AlertManager	20	20	64	64	2

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.

5

Maintenance Procedures

This section provides details about the OSO maintenance procedures.

5.1 Postinstallation CNE Configuration

5.1.1 Changing Metrics Storage Allocation

The following procedure describes how to increase or decrease the amount of persistent storage allocated to Prometheus for metrics storage.

Prerequisites

The user must calculate the revised amount of persistent storage required by the metrics.

Procedure

1. A Prometheus resource is used to configure all Prometheus instances running in OSO. Run the following command to identify the Prometheus resource:

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

2. Run the following command to resize the Prometheus metric allocation size by setting the value of `allowVolumeExpansion` to `true`.

```
$ kubectl -n <namespace> get sc  
$ '{"allowVolumeExpansion": true}'
```

3. Run the following command to scale the Prometheus pod down.

```
$ kubectl -n <namespace> scale deploy oso-prom-svr --replicas 0
```

4. Run the following command to change the pvc size of Prometheus pods:

```
$ kubectl -n <namespace> edit pvc oso-prom-svr
```

Note

You will be placed in a `vi` editor session that contains all of the configurations for the OSO Prometheus pvc. Scroll down to the line that contains the `"spec.Capacity"` key, then update the value to the `<desired increased pv size>` as configured in the above step. The file must look similar to the following example:

```
spec.Capacity: 10Gi
```

Type `":wq"` to exit the editor session and save the changes.

5. Run the following command to verify that the pvc size change was applied:

```
$ kubectl get pv | grep oso-prom-svr
```

Note

Wait until the new desired size gets reflected "10Gi".

6. Once both the pv sizes are updated to the new desired size, run the following command to scale up the Prometheus pods:

```
$ kubectl -n <namespace> scale deploy oso-prom-svr --replicas 1
```

Note

You will be placed in a *vi* editor session that contains all of the configurations for the OSO Prometheus instances. Scroll down to the line that contains the "replicas" key, then change the value back to 2. This scale backs up both the pods. The file must look similar to the following example:

7. Run the following command to verify that the Prometheus pods are up and running:

```
kubectl get pods -n <namespace> | grep oso-prometheus
```

5.2 Managing 5G NFs

This section describes procedures to manage 5G NFs in CNE OSO.

5.2.1 Updating Alert Rules for an NF

This section describes the procedure to add or update the alerting rules for any Cloud Native Core (CNC) 5G Network Functions (NF) in OSO Prometheus GUI.

Prerequisites

- All NFs are required to create a separate Alert-rules.
- For OSO Prometheus: A valid OSO release must be installed and an alert file describing all NF alert rules according to old format is required.

Add or Update Alert Rules

Perform the following steps to add alert rules in OSO Prometheus GUI:

1. Take the backup of current configuration map of OSO Prometheus.

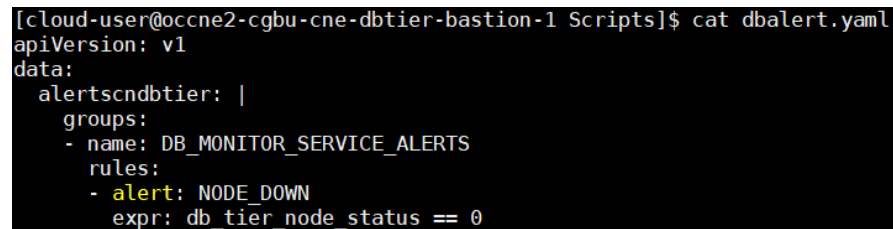
```
$ kubectl get configmaps <OSO-prometheus-configmap-name> -o yaml -n  
<namespace> /tmp/tempPrometheusConfig.yaml
```

Where,

- `<OSO-prometheus-configmap-name>` is the name of the OSO Prometheus configuration map.
 - `<namespace>` is the OSO namespace.
2. Check and add the NF Alert file name inside the Prometheus configuration map. `<nf-alertsname>` varies from NF to NF, and can be retrieved from each individual NF alert rules file.

For example, in the following screenshot, "alertsncdbtier" is the `nf-alertsname` for `cnDBTier`.

Figure 5-1 OSO Alert file



```
[cloud-user@ocne2-cgbu-cne-dbtier-bastion-1 Scripts]$ cat dbalert.yaml
apiVersion: v1
data:
  alertsncdbtier: |
    groups:
    - name: DB_MONITOR_SERVICE_ALERTS
      rules:
      - alert: NODE_DOWN
        expr: db_tier_node_status == 0
```

After retrieving the `nf-alertsname` run the following steps:

```
$ sed -i '/etc/config/<nf-alertsname>/d' /tmp/tempPrometheusConfig.yaml
$ sed -i '/rule_files:/a\    \- /etc/config/<nf-alertsname>' /tmp/
tempPrometheusConfig.yaml
```

3. Update the configuration map with the updated file.

```
$ kubectl -n <namespace> replace configmap <OSO-prometheus-configmap-name>
-f
/tmp/tempPrometheusConfig.yaml
```

4. Patch the NF alert rules in OSO Prometheus configuration map by mentioning the Alert-rule file path.

```
$ kubectl patch configmap <OSO-prometheus-configmap-name> -n <namespace> --
type merge --patch "$(cat ./NF_alterrules.yaml)"
```

5.3 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/>.