Oracle® Communications

Cloud Deployment Guide

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Contents

About This Guide

This document gives an overview of how to deploy the Oracle Communications Converged Application Server in cloud environments.

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- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

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1. Access the Oracle Help Center site at http://docs.oracle.com.
2. Click **Industries**.
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4. Click on your Product and then Release Number.
   A list of the entire documentation set for the selected product and release appears.
5. To download a file to your location, right-click the **PDF** link, select **Save target as** (or similar command based on your browser), and save to a local folder.

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Revision History

Table 1 Revision History

Date	Description
December 2021	• Initial release
January 2022	• Removed instructions for building Docker images locally
June 2022	• Updated patch procedure • Add link to Custom Application Router in Developer Guide.
Sept 2022	• Removes instructions for building your own OCCAS Docker images
June 2023	• Updates OCCAS variable.

1 Cloud Deployment

The cloud native Oracle Communications Converged Application Server Server is deployed on a Kubernetes cluster using Docker images from the Oracle Container Registry. Use the Docker images to deploy Admin and Managed servers as Kubernetes Pods.

The high-level steps to deploy the Converged Application Server include:

1. Install the dependencies.
2. Install Docker.
3. Log in to the Oracle Container Registry.
4. Pull the image from the Oracle Container Registry.
5. Install Kubernetes.
6. Install the Kubernetes WebLogic Operator.
7. Create a Persistent Volume
8. Deploy the domain.

Optional steps include:

- Bring up another managed server.
- Install the EFK stack (ElasticSearch, FluentD, Kibana).
- Install Prometheus and Grafana
- Apply a patch

Install Dependencies

The `java-devel` and `iproute-tc` packages are required dependencies for Converged Application Server. The `git` package is required to clone the Kubernetes WebLogic Operator.

1. Install the required dependencies.

   ```
   sudo yum install java-devel git iproute-tc
   ```

2. Set the JAVA_HOME variable.

   For example:

   ```
   export JAVA_HOME=/etc/alternatives/jre
   ```

   Append this line to your ~/.bashrc file.

Install Docker

Docker is a popular container platform that allows you to create and distribute applications across your Oracle Linux servers. The Converged Application Server containers published on the Oracle Container Registry require Docker in order to pull and manage.

To deploy Converged Application Server in a cloud environment, install Docker.

1. On your Oracle Linux 7 machine, enable the `ol7_addons` repository if it is disabled.

   ```
   sudo yum-config-manager --enable ol7_addons
   ```

2. Install Docker.

   ```
   sudo yum install docker-engine
   ```

3. Start the docker service.

   ```
   sudo systemctl enable --now docker
   ```

4. Add your user account to the docker group.

   ```
   sudo usermod -a -G docker $USER
   ```

5. Log out and log back in again.
6. Confirm your user account was added to the docker group.

   ```
   [myuser@ol7 ~]$ groups
   myuser wheel docker
   ```

   > **Note:**
   >
   > If your user is not in the docker group, confirm the docker group exists with the command `grep docker /etc/group`. If that command returns no output, the docker group was not created when you installed docker-engine. Manually create the group with the command `sudo groupadd docker` and add your user again.

7. (Optional) If you are behind a proxy, follow these steps to set up the http_proxy and https_proxy variables for your docker client.

Log in to Oracle Container Registry

Before deploying Converged Application Server, you must log in to the Oracle Container Registry and accept the Java License Agreement for the JDK and the Middleware License Agreement for Converged Application Server.

Oracle provides access to the Oracle Container Registry for customers that have a Single Sign-On account at Oracle. The Oracle Container Registry contains Docker

images for licensed commercial Oracle software products that you may use in your enterprise. Images may also be used for development and testing purposes. The license covers both production and non-production use. The Oracle Container Registry provides a web interface where customers are able to select Oracle Docker images and agree to terms of use before pulling the images using the standard Docker client software.

If necessary, create an account.

1. Navigate to the Oracle Container Registry.
2. In the top-right corner, click **Sign In**.
3. Enter your Oracle credentials and click **Submit**.
4. Click **Middleware** and then click **occas**.
5. Select your language and click **Continue**.
6. Scroll to the end of the License Agreement and click **Accept**.
7. From the server where you installed Docker, log in to the Oracle Container Registry.

```
docker login container-registry.oracle.com
```

> **Note:**
>
> If you are behind a proxy, follow these steps to set up the http_proxy and https_proxy variables for your docker client.

8. Create an account on https://hub.docker.com and use your credentials to login to Docker's repository with the `docker login` command..

```
[myuser@ol7 ~]$ docker login
Login with your Docker ID to push and pull images from Docker Hub. If you
don't have a Docker ID, head over to https://hub.docker.com to create one.
Username: <enter your username>
Password: <enter your password>
```

Creating an account and logging in circumvents the limit that Docker places on anonymous downloads.

Download the Docker Files

In addition to downloading the occas_generic.jar file, you need to download the Docker image files and scripts.

1. Sign in to My Oracle Support.
2. Download the occas8.zip file.
   a. Search for "Docker Script for OCCAS 8 Installation".
   b. Select Doc ID 2823095.1.
   c. Click the link under the Details section to download occas8.zip.

3. Unzip the file.

```
unzip occas8.zip
```

This creates the `occas8/` directory.

Pull the Image

The Converged Application Server docker image is located on the Oracle Container Registry.

1. If using JDK 8, pull the JDK 8 OCCAS container.

```
docker pull container-registry.oracle.com/middleware/
occas:8.0.0.0.0-generic-8
```

2. If using JDK 11, pull the JDK 11 OCCAS container.

```
docker pull container-registry.oracle.com/middleware/
occas:8.0.0.0.0-generic-11
```

Install Kubernetes

Kubernetes orchestrates the Converged Application Server containers, deploying and scaling them as necessary. Because Kubernetes is complex with many customer-specific requirements, you should consider either using a hosted solution or reading the Kubernetes documentation in full to find the right solution for your needs. To use kubeadm, see Installing kubeadm for prerequisites, installation steps, and troubleshooting.

1. After Kubernetes is installed, run `kubeadm init` to start Kubernetes.
2. Follow the instructions returned by the kubeadm command.

```
mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

3. Deploy a Pod network to the cluster.

   Converged Application Server supports Calico as the Pod network.

Install the Kubernetes Weblogic Operator

The WebLogic Kubernetes Operator supports running your WebLogic Server domains on Kubernetes, an industry standard, cloud neutral deployment platform. It lets you encapsulate your entire WebLogic Server installation and layered applications into a portable set of cloud neutral images and simple resource description files. You can run them on any on-premises or public cloud that supports Kubernetes where you've deployed the operator.

Kubernetes must be installed before following the procedure below. If you have not yet installed Kubernetes, see the Kubernetes documentation.

1. Install Helm, a package manager for Kubernetes.
   a. Download Helm.

      ```
      curl -O https://get.helm.sh/helm-v3.6.3-linux-amd64.tar.gz
      ```

      See the Releases page for other Linux architectures.
   b. Extract Helm.

      ```
      tar xf helm-v3.6.3-linux-amd64.tar.gz
      ```

   c. Move the Helm binary into your PATH.

      ```
      sudo install linux-amd64/helm /usr/local/bin/helm
      ```

2. Install the Oracle Weblogic Kubernetes Operator.

   The Oracle Weblogic Kubernetes Operator is used to configure the lifecycle of the Converged Application Server images. See the Oracle Weblogic Kubernetes Operator documentation.
   a. Clone the Weblogic Kubernetes Operator git repository.

      You can install any version higher than 3.2.0.

      ```
      git clone --branch v3.2.3 https://github.com/oracle/weblogic-kubernetes-operator
      ```

   b. Navigate to the `weblogic-kubernetes-operator` directory.

      ```
      cd weblogic-kubernetes-operator
      ```

      > **Note:**
      >
      > Subsequent commands will assume your current directory is `weblogic-kubernetes-operator`.

3. Pull the Docker image for the WebLogic Kubernetes Operator and copy that image to all the nodes in your cluster.

   ```
   docker pull ghcr.io/oracle/weblogic-kubernetes-operator:3.3.2
   ```

4. Create the namespace for the Weblogic Kubernetes Operator.

   The syntax for the command is: `kubectl create namespace <unique name>`. For example:

   ```
   kubectl create namespace sample-weblogic-operator-ns
   ```

5. Create the service account within that namespace for the WebLogic Kubernetes Operator.

   ```
   kubectl create serviceaccount -n sample-weblogic-operator-ns sample-weblogic-operator-sa
   ```

6. Update the following parameters in the file `weblogic-kubernetes-operator/kubernetes/charts/weblogic-operator/values.yaml`.

   If you plan on installing the EFK stack, set `elkIntegrationEnabled` to true; otherwise, leave `elkIntegrationEnabled` as false.

   - `serviceAccount`—Set this to the previously created service account for the WebLogic Kubernetes Operator.

     ```
     serviceAccount: "sample-weblogic-operator-sa"
     ```

   - `domainNamespaces`—Set this to the previously created namespace for the WebLogic Kubernetes Operator.

     ```
     domainNamespaces:
     - "sample-weblogic-operator-ns"
     ```

   - `elkIntegrationEnabled`—Set this to true if you plan on installing the EFK stack; leave as false if you do not plan on installing the EFK stack.

     ```
     elkIntegrationEnabled: true
     ```

   - `elasticSearchHost`—Change the word 'default' in 'elasticsearch.**default**.svc.cluster.local' to the namespace previously created for the WebLogic Kubernetes Operator.

     ```
     elasticSearchHost: "elasticsearch.sample-weblogic-operator-ns.svc.cluster.local"
     ```

7. Paste the following role-based access control (RBAC) definition into a YAML file called `rbac.yaml`.

   See Using RBAC Authorization.

   ```
   apiVersion: rbac.authorization.k8s.io/v1
   kind: ClusterRoleBinding
   metadata:
     name: helm-user-cluster-admin-role
   roleRef:
     apiGroup: rbac.authorization.k8s.io
     kind: ClusterRole
     name: cluster-admin
   subjects:
   - kind: ServiceAccount
     name: default
     namespace: kube-system
   ```

8. Apply the RBAC file.

```
kubectl apply -f rbac.yaml
```

9. From the `weblogic-kubernetes-operator` directory, start the operator.

```
helm install sample-weblogic-operator kubernetes/charts/weblogic-operator
\
  --namespace sample-weblogic-operator-ns \
  --set image=ghcr.io/oracle/weblogic-kubernetes-operator:3.3.2 \
  --set serviceAccount=sample-weblogic-operator-sa \
  --set "enableClusterRoleBinding=true"\
  --set "domainNamespaceSelectionStrategy=LabelSelector"\
  --set "domainNamespaceLabelSelector=weblogic-operator\=enabled"\
  --wait
```

You can verify the pod is running with the following command:

```
kubectl get pods -n sample-weblogic-operator-ns
```

For example:

> **Note:**
>
> If you are installing the EFK stack and set `elkIntegrationEnabled` to true, then the READY column will display 2/2 when both containers are ready. If you are not installing the EFK stack and left `elkIntegrationEnabled` as false, then the READY column will display 1/1 when the container is ready.

```
[weblogic-kubernetes-operator]$ kubectl get pods -n sample-weblogic-operator-
ns
NAME                                  READY   STATUS    RESTARTS   AGE
weblogic-operator-7885684685-4jz5l    2/2     Running   0          2m32s
[weblogic-kubernetes-operator]$
```

Create the Persistent Volume

Converged Application Server uses a Persistent Volume (PV) to store logs that can be viewed with Kibana. The PV may be either a local path on the master node or a NFS location.

1. Create and label a namespace that can host one or more domains.

```
kubectl create namespace sample-domain1-ns
kubectl label ns sample-domain1-ns weblogic-operator=enabled
```

2. On the server where you'll store the log files, create the PV directory with open permissions.

```
mkdir /u01/pv
chmod 777 /u01/pv
```

> **Note:**
>
> See Persistent Storage for details about permissions.

3. On the master node, navigate to the `occas8/dockerfiles/8.0.0.0.0/occas-domain-home-on-pv` directory.
4. Open the `sample-domain1-weblogic-sample-pv.yaml` file.
5. Set the `storage` parameter to the number of gigabytes to allocate to the persistent volume.

   ```
   storage: 50Gi
   ```

6. Update the `hostPath` parameter.
   - If using a local PV, set the `path` parameter to the local path.

     ```
     hostPath:
       path: "/u01/pv"
     ```

   - If using a remote PV, uncomment the `nfs` parameter and set the `server` and `path` parameters to the NFS server where the PV is located.

     ```
     nfs:
       server: 10.0.0.1
       path: "/mnt/share/pv"
     ```

7. Use the `kubectl create` command to create the persistent volume and the persistent volume claim.

   ```
   kubectl create -f sample-domain1-weblogic-sample-pv.yaml


   kubectl create -f sample-domain1-weblogic-sample-pvc.yaml
   ```

8. Use the `kubectl get` command to verify the persistent volume and persistent volume claim was created.

   ```
   [doc@docker:occas-persistant-volume]$ kubectl get pv -n sample-
   domain1-ns
   NAME                                 CAPACITY   ACCESS MODES
   RECLAIM POLICY   STATUS
   CLAIM
   STORAGECLASS                                    REASON   AGE
   sample-domain1-weblogic-sample-pv   50Gi       RWX
   Retain           Bound    sample-domain1-ns/sample-domain1-weblogic-
   sample-pvc   sample-domain1-weblogic-sample-storage-
   class            23m
   [doc@docker:occas-persistant-volume]$ kubectl get pvc -n sample-
   domain1-ns
   NAME                                 STATUS
   VOLUME                               CAPACITY   ACCESS MODES
   STORAGECLASS                                    AGE
   sample-domain1-weblogic-sample-pvc   Bound    sample-domain1-
   ```

```
weblogic-sample-pv   50Gi       RWX            sample-domain1-weblogic-
sample-storage-class   8m11s
[doc@docker:occas-persistant-volume]$
```

Deploy the Replicated Domain

An Converged Application Server replicated domain is a logically related group of resources. Domains include the administration server and all managed servers. Converged Application Server domains extend Oracle WebLogic Server domains to support SIP and other telecommunication protocols.

See Understanding Oracle WebLogic Server Domains.

1. Navigate to the `occas8/dockerfiles/8.0.0.0.0/occas-domain-home-on-pv` directory.
2. Run the `create-weblogic-credentials.sh` script to create the Secret for Weblogic.

   Kubernetes Secrets contain sensitive information like passwords. See Secrets.

   ```
   ./create-weblogic-credentials.sh -u weblogic -p <password> -n sample-
   domain1-ns -d sample-domain1 -s sample-domain1-weblogic-credentials
   ```

3. Navigate to the `domain-home-on-pv` folder.

   ```
   cd ~/occas8/dockerfiles/8.0.0.0.0/occas-domain-home-on-pv/domain-home-on-pv
   ```

4. Open the `create-domain-inputs.yaml` file.
5. Set the following parameters.
   - domainHome—If you set the `path` parameter of the persistent volume to `/u01/pv`, then set the `domainHome` parameter to `/u01/pv/domains/sample-domain1`.
   - logHome—If you set the `path` parameter of the persistent volume to `/u01/pv`, then set the `logHome` parameter to `/u01/pv/logs/sample-domain1`.
   - domainPVMountPath—The `domainPVMountPath` parameter should match the `path` parameter of the persistent volume.
6. Use the `create-domain.sh` script to create the domain.

   The command requires two arguments: the input YAML file and the output directory.

   ```
   ./create-domain.sh \
       -i create-domain-inputs.yaml \
       -o ~/occas8/dockerfiles/8.0.0.0.0/occas-domain-home-on-pv/domain-home-
   on-pv
   ```

7. Navigvate to the sample-domain1 folder.

   ```
   cd weblogic-domains/sample-domain1/
   ```

8. Deploy the WebLogic domain in the Kubernetes cluster.

   ```
   kubectl apply -f domain.yaml
   ```

   The domain will now be managed by the Weblogic Operator.

9. Open a browser and navigate to http://<IP address>:30701/console to visit the WebLogic Server's management interface.

For information on building a custom application router, see Configuring a Custom Application Router in the *Developer Guide*.

Modify the Domain File

For quick, on-demand changes to your domain, modify the domain.yaml file directly and use kubectl to apply your changes. By modifying the domain file you can scale up or down the number of managed servers, change JMV options, or update the mountPath for your PV.

Follow the steps below to manually add a second managed server.

1. Navigate to the sample-domain1 directory.

   ```
   cd ~/occas8/dockerfiles/8.0.0.0.0/occas-domain-home-on-pv/domain-home-on-pv/weblogic-domains/sample-domain1
   ```

2. Open the file `domain.yaml`.
3. Set the replicatas attribute to the number of managed servers you want.

   For example:

   ```
   replicas: 2
   ```

4. Reapply the domain.yaml file.

   ```
   kubectl apply -f domain.yaml
   ```

Monitoring Tools

Converged Application Server can integrate with several third-party monitoring tools.

- The EFK stack—The EFK stack is the combination of Elasticsearch, FluentD, and Kibana working together to centralize log files for easy monitoring. FluentD gathers logs files from multiple nodes and sends them to Elasticsearch, which stores and indexes them, while Kibana provides the front-end web interface.
- Prometheus and Grafana—Converged Application Server can use the WebLogic Monitoring Exporter to export Prometheus-compatible metrics that are then exposed to Grafana, which visualizes the metrics over time to provide futher insights into the data.

Deploy the EFK Stack

Customers may deploy the EFK stack to increase visibility into the state of their Converged Application Server instances. Once the EFK stack is deployed, the Kibana web interface displays multiple Converged Application Server metrics.

> **Note:**
>
> Converged Application Server does not require the EFK stack and its installation is optional.

> **Note:**
>
> The FluentD pod runs in the sample-domain1-ns namespace and the ElasticSearch and Kibana pods run in the sample-weblogic-operator-ns namespace.

1. Download the Docker images for FluentD, busybox, ElasticSearch, and Kibana.

   ```
   docker pull fluent/fluentd-kubernetes-daemonset:v1.3.3-debian-
   elasticsearch-1.3
   docker pull busybox
   docker pull elasticsearch:6.8.0
   docker pull kibana:6.8.0
   ```

2. Navigate to the `occas8/dockerfiles/8.0.0.0.0/occas-efk-pv/FluentD/` directory.
3. Open the file `configmap.yml` and confirm your domain and namespace settings.
   - `weblogic.domainUID: sample-domain1`
   - `namespace: sample-domain1-ns`

   These two parameters identify the domain and namespace where the EFK stack will be deployed. They must match the `domainUID` and `namespace` parameters from the `create-domain-inputs.yaml` file that you used to create the domain.
4. Apply the FluentD ConfigMap.

   ```
   kubectl apply -f configmap.yml
   ```

5. Open the file FluentD domain file `fluentd.yml` and set the following values.
   - `weblogic.domainUID`—Confirm this is the same value in the ConfigMap.
   - `namespace`—Confirm this is the same value in the ConfigMap.
   - `LOG_PATH`—Set the beginning of the `value` parameter to your persistent volume. This value should match the `logHome` parameter in the create-domain-inputs.yaml file.

     ```
       - name:
     LOG_PATH
     ```

```
    value: /u01/pv/logs/sample-domain1
```

- `SIP_MESSAGES_LOG_PATH`—Set the beginning of the `value` parameter to your persistent volume.

```
  - name:
SIP_MESSAGES_LOG_PATH


    value: /u01/pv/domains/sample-domain1/servers/managed-
server*/logs/sip-messages*.log*
```

- `claimName`—Confirm this matches your persistent volume claim

```
claimName: sample-domain1-weblogic-sample-pvc
```

- `mountPath`—Set the mount path for `occas-domain-storage-volume` to your persistent volume.

> **Note:**
>
> There is more than one `mountPath` parameter. Make sure you edit the mount path for `occas-domain-storage-volume`.

```
 - mountPath: /u01/pv
   name: occas-domain-storage-volume
```

6. Base64 encode the values of elasticSearchHost and elasticSearchPort from the file `weblogic-kubernetes-operator/kubernetes/charts/weblogic-operator/values.yaml`.

```
[k8smain:~]$ grep ^elasticSearch[HP] ~/weblogic-kubernetes-operator/
kubernetes/charts/weblogic-operator/values.yaml
elasticSearchHost: "elasticsearch.sample-weblogic-operator-
ns.svc.cluster.local"
elasticSearchPort: 9200
[k8smain:~]$ echo -n elasticsearch.sample-weblogic-operator-
ns.svc.cluster.local | base64
ZWxhc3RpY3NlYXJjaC5zYW1wbGUtd2VibG9naWMtb3BlcmF0b3ItbnMuc3ZjLmNsdXN0
ZXIubG9j
YWw=
[k8smain:~]$ echo -n 9200 | base64
OTIwMA==
[k8smain:~]$
```

7. Add those base64 encoded values to the `sample-domain1-weblogic-credentials` Kubernetes secret.

```
kubectl edit secret sample-domain1-weblogic-credentials -n sample-
domain1-ns
```

The top of the resulting YAML:

```
apiVersion: v1
data:
  password: VGhpcyBpcyBub3QgcmVhbGx5IHRoZSBwYXNzd29yZC4K
  username: d2VibG9naWM=
  elasticsearchhost:
ZWxhc3RpY3NlYXJjaC5zYW1wbGUtd2VibG9naWMtb3BlcmF0b3ItbnMuc3ZjLmNsdXN0ZXIubG
9jYWw=
  elasticsearchport: OTIwMA==
kind: Secret
. . .
```

8. Navigate to the `weblogic-kubernetes-operator/kubernetes/samples/scripts/elasticsearch-and-kibana` directory.

   ```
   cd ~/weblogic-kubernetes-operator/kubernetes/samples/scripts/
   elasticsearch-and-kibana
   ```

9. Update the value of the namespace parameter in the file `elasticsearch_and_kibana.yaml`.

   Kibana and ElasticSearch must use the same namespace as the Kubernetes WebLogic Operator.

   ```
   sed -i 's/namespace: "default"/namespace: "sample-weblogic-operator-ns"/'
   elasticsearch_and_kibana.yaml
   ```

10. Deploy ElasticSearch and Kibana in the Kubernetes WebLogic Operator namespace.

    ```
    kubectl apply -f elasticsearch_and_kibana.yaml
    ```

11. Verify the pods were created with the command `kubectl get pods -n sample-weblogic-operator-ns`.

    ```
    [k8smain]$ kubectl get pods -n sample-weblogic-operator-ns
    NAME                                READY   STATUS    RESTARTS      AGE
    elasticsearch-f7b7c4c4-zkhp8        1/1     Running   2 (52s ago)   2m26s
    kibana-57f6685789-25zsn             1/1     Running   0             2m26s
    weblogic-operator-5789ddb9fc-jgdh6  2/2     Running   0             15h
    ```

12. Enter the ElasticSearch pod and verify that ElasticSearch is running by making a curl request to "http://elasticsearch:9200/". Then exit the ElasticSearch pod.

    ```
    [k8smain]$ kubectl exec -it elasticsearch-f7b7c4c4-wd94v -n sample-
    weblogic-operator-ns -- /usr/bin/curl "http://elasticsearch:9200/"
    Defaulted container "elasticsearch" out of: elasticsearch, set-vm-max-map-
    count (init)
    {
      "name" : "cx-LGcm",
      "cluster_name" : "docker-cluster",
      "cluster_uuid" : "yApntSbeRS6CnNlhqOnMjQ",
      "version" : {
        "number" : "6.8.0",
    ```

```
    "build_flavor" : "default",
    "build_type" : "docker",
    "build_hash" : "65b6179",
    "build_date" : "2019-05-15T20:06:13.172855Z",
    "build_snapshot" : false,
    "lucene_version" : "7.7.0",
    "minimum_wire_compatibility_version" : "5.6.0",
    "minimum_index_compatibility_version" : "5.0.0"
  },
  "tagline" : "You Know, for Search"
}
```

13. Deploy FluentD.

```
kubectl apply -f ~/occas8/dockerfiles/8.0.0.0.0/occas-efk-pv/
FluentD/fluentd.yml
```

14. After a few minutes, verify the pods are running.

```
[k8smain:~]$ kubectl get pods -n sample-domain1-ns
NAME                                READY   STATUS    RESTARTS
AGENAME
READY   STATUS      RESTARTS   AGE
fluentd-container-d658498c7-6bd7q   1/1     Running   0
87m
sample-domain1-admin-server         1/1     Running   0
21h
sample-domain1-managed-server1      1/1     Running   0
21h
```

15. To view the Kibana interface, first use the `kubectl describe service` command to find the port number for Kibana. Then navigate to `http://<IP address>:<port number>/status` where <IP address> is the IP address of the master node.

```
[k8smain]$ kubectl describe service kibana -n sample-weblogic-
operator-ns
Name:                     kibana
Namespace:                sample-weblogic-operator-ns
Labels:                   app=kibana
Annotations:              <none>
Selector:                 app=kibana
Type:                     NodePort
IP Family Policy:         SingleStack
IP Families:              IPv4
IP:                       10.96.76.176
IPs:                      10.96.76.176
Port:                     <unset>  5601/TCP
TargetPort:               5601/TCP
NodePort:                 <unset>  32488/TCP
Endpoints:                172.16.145.212:5601
Session Affinity:         None
External Traffic Policy:  Cluster
Events:                   <none>
```

16. From the Kibana interface, click **Management**, and then **Index Patterns**, and then **Create Index pattern** to create the default index pattern.

    After creating an index pattern, click **Discover** to view the log.
    The following default patterns are available with Converged Application Server:

Table 1-1 Index Patterns

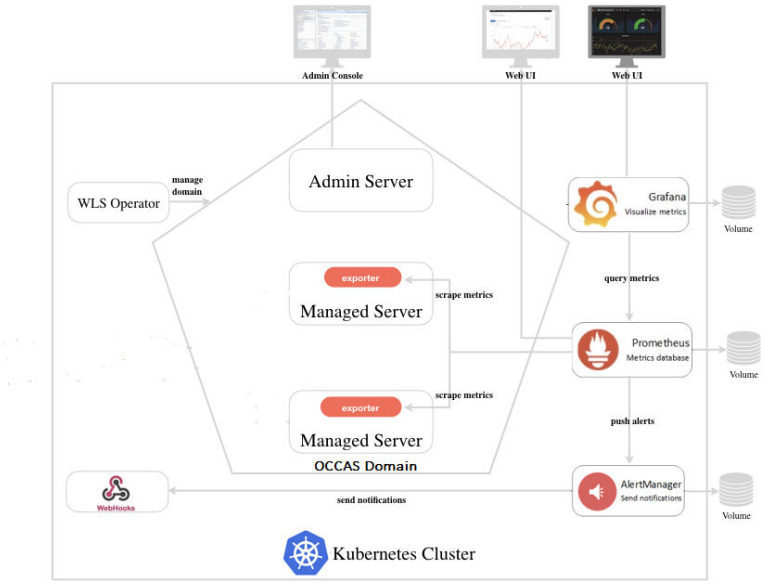
Name	Description
occas-generic-index	Fluentd reads all log files under the log folder logHome and exports to this index.
engine-stdout-log	Fluentd reads Converged Application Server engine stdout logs and filters 'stdout'.
admin-server-critical-warnings	Fluentd reads Converged Application Server admin-server logs and filters critical/warning messages.
engine-all-log	Fluentd reads all engine logs and exports to this index.
occas-log	Fluentd reads engine logs and filters 'wlss' or 'msg' to get Converged Application Server specific logs.
occas-error-log	Fluentd reads engine logs and filters 'error' to get Converged Application Server error logs.
occas-warning-log	Fluentd reads engine logs and filters 'warning' to get Converged Application Server warning logs.
occas-sip-message-log	Fluentd reads engine/sip-message logs and filters 'CSeq' to get Converged Application Server SIP logs.

Deploy Prometheus and Grafana

Prometheus and Grafana are optional third-party monitoring tools that you can install to gather metrics on your Converged Application Server installation. When both are installed, Converged Application Server uses the WebLogic Monitoring Exporter to export Prometheus-

compatible metrics that are then exposed to Grafana, which visualizes the metrics over time to provide futher insights into the data.

Figure 1-1 Cluster Architecture with Monitoring Tools



1. Pull the WebLogic Monitoring Exporter Docker image.

   ```
   docker pull ghcr.io/oracle/weblogic-monitoring-exporter:2.0.1
   ```

2. Navigate to the directory `occas8/dockerfiles/8.0.0.0.0/monitoring`.
3. Open the file `domain.yaml` and confirm the image, namespace,domainUID, and domainHome are correct.
   - `image: "oracle/occas:8.0.0.0.0-generic-8"`
   - `namespace: sample-domain1-ns`
   - `weblogic.domainUID: sample-domain1`
   - `domainHome: /u01/pv/domains/sample-domain1`
4. Depoy the WebLogic Monitoring Exporter .

   ```
   kubectl apply -f domain.yaml
   ```

5. Configure the Persistent Volume (PV) paths for Prometheus and Grafana.

   In this example, `/u01/pv` is the root PV directory.

   ```
   export PV_ROOT=/u01/pv
   sed -i 's@%PV_ROOT%@'"$PV_ROOT"'@' prometheus/persistence.yaml
   sed -i 's@%PV_ROOT%@'"$PV_ROOT"'@' prometheus/alert-persistence.yaml
   sed -i 's@%PV_ROOT%@'"$PV_ROOT"'@' grafana/persistence.yaml
   ```

6. Create a new namespace `monitoring`.

```
kubectl create ns monitoring
```

7. Deploy the PV and PVC files for Prometheus and Grafana.

```
kubectl apply -f prometheus/persistence.yaml
kubectl apply -f prometheus/alert-persistence.yaml
kubectl apply -f grafana/persistence.yaml
```

8. Add the Helm repositories for Prometheus and Grafana.

```
helm repo add prometheus-community https://prometheus-community.github.io/
helm-charts
helm repo add grafana https://grafana.github.io/helm-charts
```

9. Update the `extraScrapeConfigs/basic_auth` values in the file `prometheus/values.yaml`.
10. Install the Prometheus chart.

```
helm install --wait prometheus --namespace monitoring --values prometheus/
values.yaml prometheus-community/prometheus
```

11. Create the Grafana administrative credentials.

```
kubectl --namespace monitoring create secret generic grafana-secret \
  --from-literal=username=admin --from-literal=password=<password>
```

12. Install the Grafana chart.

```
helm install grafana --namespace monitoring --values grafana/values.yaml
grafana/grafana
```

Refer to the Prometheus documentation and the Grafana documentation for how to configure and use those products.

Configure Grafana Data Sources

Once the WebLogic Monitoring Exporter starts exporting Converged Application Server metrics to Prometheus, configure Grafana to use Prometheus as its own source of data.

1. Navigate to the Grafana web interface.

   The URL is http://<IP address>:31000/.
2. Click **Configuration**, and then **Data Source**, and then **Add Data Source**.
3. Select **Prometheus**.
4. Fill in the URL with the port number.

   The default URL for Prometheus is http://<IP address>:30000/.
5. Click **Save & test**.
6. Click **Dashboards**, and then **Manage**, and then **Import**.

7. On the **Import** page, click **Upload .json File** and upload the file `oiccas8/dockerfiles/8.0.0.0.0/monitoring/grafana/OCCAS-DashBoard.json`.

Apply a Patch

The Dockerfile in the `occas8/dockerfiles/8.0.0.0.0/patch-opatch-update` directory extends the Converged Application Server image by updating OPatch and applying a patch. If an update is released for Converged Application Server or one of its components (like WebLogic or Confluence), use OPatch to patch your system.

See Security Alerts to register for security notifications.

1. Log in to My Oracle Support.
2. Download the patches for Converged Application Server or one of its components.
3. Identify the top-level folder name within the archive file.

   Syntax:

   ```
   unzip -l <zip file> | head
   ```

   For example:

   ```
   [user@host:~]$ unzip -l p33286174_141100_Generic.zip | head
   Archive:  p33286174_141100_Generic.zip
     Length      Date    Time    Name
   ---------  ---------- -----   ----
           0  09-22-2021 13:08   33286174/
           0  09-21-2021 19:11   33286174/etc/
           0  09-21-2021 19:11   33286174/etc/config/
           0  09-21-2021 19:11   33286174/files/
           0  09-21-2021 19:11   33286174/files/coherence/
           0  09-21-2021 19:11   33286174/files/coherence/bin/
           0  09-21-2021 19:11   33286174/files/coherence/lib/
   ```

   In this example, the top-level folder is `33286174`.

4. Move the patch files into the `occas8/dockerfiles/8.0.0.0.0/patch-opatch-update` directory.

   For example:

   ```
   mv ~/Downloads/p28186730_139426_Generic.zip ~/occas8/dockerfiles/
   8.0.0.0.0/patch-opatch-update
   ```

5. Update `PATCH_PKG` variables in the Dockerfile to match the filename of patch files.

   ```
   ENV PATCH_PKG0="p28186730_139426_Generic.zip"
   ENV PATCH_PKG1="p33286174_141100_Generic.zip"
   ENV PATCH_PKG2="p33416881_141100_Generic.zip"
   ```

6. Update the `/u01/<folder>` directories within the Dockerfile with the top-level folder names of the patches you're installing.

7. Build the image.

```
docker build --force-rm=true --no-cache=true -t oracle/occas:occas-
generic-oct2021cpupatch-upgrade -f Dockerfile .
```