

Implementing Oracle Key Vault on the Oracle Compute Cloud@Customer

How to install and deliver Oracle Key Vault on the Oracle Compute Cloud@Customer.

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INTRODUCTION

Oracle Compute Cloud@Customer – Basics, Benefits & Background

Oracle Compute Cloud@Customer is fully managed, rack-scale infrastructure that lets organizations consume common OCI services anywhere. Remotely managed by Oracle, it lets customers gain cloud automation and economics benefits, while meeting data residency requirements by controlling their data's location.

Oracle Key Vault – Introduction to Oracle Key Vault & Key Management+

Oracle Key Vault enables you to deploy encryption and other security solutions by centrally managing Transparent Data Encryption (TDE) database encryption keys, Oracle Wallets, Java Keystores, credential files, and other secrets. Key Vault supports a scalable, fault-tolerant cluster deployment architecture to deliver continuous availability and geographic locality.

Installing Oracle Key Vault on Oracle Compute Cloud@Customer

Downloading the OKV image From Marketplace

Oracle Key Vault image for Compute Cloud@Customer is available on Oracle Cloud Infrastructure Marketplace.

- 1. Login to your OCI account and go to OCI Marketplace
- 2. On filters option, select Compute Cloud@Customer or Roving Edge compatible images
- 3. Select Oracle Key Vault image for Compute Cloud@Customer.

https://console.us-ashburn-1.oraclecloud.com/marketplace/application/164834538/overview?region=us-phoenix-1





Import the OKV Image to the Oracle Compute Cloud@Customer

Place the custom image in a location accessible via http. This is often a utility VM somewhere on the same network as your OC3, or even a utility VM on your OC3. Here, we will use the bastion host for our OC3. Copy the .oci file into a directory and make it accessible via http.

[root@myC3bast okv]# cd /export/home/okv [root@myC3bast okv]# python -m SimpleHTTPServer 8088 Serving HTTP on 0.0.0.0 port 8088 ...

Meanwhile, on the OC3, begin the Custom Image import process through the GUI by navigating to the Custom Images section:





This will take you to the listing of custom images in the selected compartment. If necessary, change to the appropriate compartment using the drop down in the upper center of the page.



	ud Appliance				Auto Reload Solutions -
Dashboard / Custom Images					
	Custom In	nages in tl	ne solution -	compartment	Import In
Compute	Auto Reload Refr	resh Filter by Tag(s)			
Instances		Select Tag(s)	\oplus		16 items ≪ < Page: 1
Instance Configurations	Image		State	Created	Action
Instance Pools	adb-c3.oci		Available	11/13/2023, 12:18:47 PM	:
Instance Exports	Almalinux9.2		Available	10/18/2023, 10:45:14 AM	:
			Figure 3		

Click on the 'Import Image' button in the upper right, complete the dialog box as presented, and select 'Import Image' in the lower right:

Name		
okv_21_7_oci		
Create in Compartment		
solution	•	
Source Type		
 Import from an Object Storage Bucket 		
0		
 Import from an Object Storage URL 		
 Import from an Object Storage URL 		
 Import from an Object Storage URL Object Storage URL 		
 Import from an Object Storage URL Object Storage URL :p://myC3bast.example.com:8088:/OKV_217_1013_1000.or 	i	
 Import from an Object Storage URL Object Storage URL :p://myC3bast.example.com:8088:/OKV_217_1013_1000.o Image Type 	i	
 Import from an Object Storage URL Object Storage URL :p://myC3bast.example.com:8088:/OKV_217_1013_1000.or Image Type QCOW2 	i	
 Import from an Object Storage URL Object Storage URL :p://myC3bast.example.com:8088:/OKV_217_1013_1000.o Image Type QCOW2 For disk image files used by QEMU. 	i	
 Import from an Object Storage URL Object Storage URL :p://myC3bast.example.com:8088:/OKV_217_1013_1000.or Image Type QCOW2 For disk image files used by QEMU. VMDK 	i	
 Import from an Object Storage URL Object Storage URL :p://myC3bast.example.com:8088:/OKV_217_1013_1000.o Image Type QCOW2 For disk image files used by QEMU. VMDK Virtual machine disk file format. For disk images used in virtual machine 	i IS.	

Figure 4

Be sure to select the correct file type (OCI) and 'Paravirtualized Mode'.



For disk image files used by OEMU.	
Virtual machine disk file format. For disk	images used in virtual machines.
For images that were exported from Ora be changed in the Console.	cle Cloud Infrastructure. The launch mode is specified in the .oci file and can't
Launch Mode	
O Deven interelized Mede	
Paravirtualized Mode	
For virtual machines that support paravi	rtualized drivers, created outside of Oracle Cloud Infrastructure.
For virtual machines that support paravi	tualized drivers, created outside of Oracle Cloud Infrastructure.
Tagging Tagging is a metadata system th tenancy. Tags are composed of k Tag Namespace	at allows you to organize and track resources within your eys and values that can be attached to resources.
Tagging Tagging is a metadata system th tenancy. Tags are composed of k Tag Namespace None (add a free-form tag)	at allows you to organize and track resources within your eys and values that can be attached to resources.
Tagging Tagging is a metadata system th tenancy. Tags are composed of k Tag Namespace None (add a free-form tag) Value	at allows you to organize and track resources within your eys and values that can be attached to resources.
Tagging Tagging is a metadata system th tenancy. Tags are composed of k Tag Namespace None (add a free-form tag) Value	at allows you to organize and track resources within your eys and values that can be attached to resources.
Tagging Tagging is a metadata system th tenancy. Tags are composed of k Tag Namespace None (add a free-form tag) Value	at allows you to organize and track resources within your eys and values that can be attached to resources.

Figure 5

In this case, we exported the image using python web server on port 8088, so do not forget to specify port 8088 in the URL.

Depending on the size of the image being imported and the available network bandwidth, the import may take some time. An hour or more may be expected for images in excess of 100GB.

Once the image import is complete, the status will change from 'Importing" to 'Available' and you may create your instance from the image.

okv_21_7_oci	Available	10/27/2023, 11:44:58 AM	:
	Figure 6	5	

Creating your OKV Instance

When the custom image becomes available, use the 'Create Instance from Image' option in the drop down on the right end of the line (three vertical dots in the box).

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			view Details
Kalil_Linux	Available	10/19/2023, 10:23:06 AM	Edit
nobysimagefrom	Deleted	11/13/2023, 12:13:19 PM	Copy OCID
nobyvmdb	Available	11/13/2023, 12:54:58 PM	Create Instance From Image Export Image
okv_10_24_1_vmdk	Available	10/24/2023, 10:50:56 AM	Delete image



Complete the dialog box giving your image a name, choose a compartment, appropriate shape information (we chose 4 OCPU, 64GB of memory, 100GB boot volume, one public network interface but your needs may differ) and your ssh key, then select 'Create Instance' in the lower right. See Figures 7, 8, 9 as examples.

my_okv1	
Create in Compartment	Fault Domain
solution	✓ Automatically select the best fau
okv_21_7_oci	
Shape	
Shape VM.PCAStandard.E5.Flex	•
Shape VM.PCAStandard.E5.Flex	▼
Shape VM.PCAStandard.E5.Flex OCPUs	•
Shape VM.PCAStandard.E5.Flex OCPUs	4

Figure 8



Create Instance

UCPUS		
0	4	
Memory (GBs)		
-0	64	
Boot Volume		
Specify a custom boot volume size		
Specify a custom boot volume size Boot volume size (GB)		
Specify a custom boot volume size Boot volume size (GB) 100	~ ^	
Specify a custom boot volume size Boot volume size (GB) 100 Boot volume performance (VPUs)	~ ^	
Specify a custom boot volume size Boot volume size (GB) 100 Boot volume performance (VPUs) 10	× ^ × ^	
Specify a custom boot volume size Boot volume size (GB) 100 Boot volume performance (VPUs) 10 Subnet	× × × •	
Specify a custom boot volume size Boot volume size (GB) 100 Boot volume performance (VPUs) 10 Subnet VCN solution (char	v A	



ily non-
: key(s) +
: key(5) +
: key(s)
+
+
+
·
OK (Remove)
ок

Figure 10

Once you select 'Create Instance', the system will create an instance using the custom image you have provided. Wait for this instance to boot. Once the instance is booted, log into the console and verify it is running. Once complete, repeat the process above to create an additional OKV node which will be used to create a high availability cluster.

Configuring your OKV Instances

Once the system has booted up, you must go through the post install steps to perform the initial configuration.

You will need:

The IP address or fqdn of a linux or Mac system to perform the configuration from. This can be any linux server on the same network as your OKV server(s) or a laptop. We will use c3bastion in this example.

Take note of the external and internal IP addresses assigned to the nodes you wish to add to your cluster. We will need both sets of addresses.

The IP address or fqdn of the OKV server(s) to be configured. We will use 10.122.56.38/172.20.0.33 and 10.122.56.29/172.20.0.21 in this example.

Server Initial Passwords

First, log into the the server to set the requisite temporary passwords.

my_laptop ~ \$ ssh opc@10.122.56.29

Warning: Permanently added '10.122.56.29' (ED25519) to the list of known hosts.

Oracle Key Vault 21.7.0.0.0

DO NOT CHANGE ANY CONFIGURATIONS IN Oracle Key Vault Server APPLIANCE WITHOUT GUIDANCE FROM ORACLE SUPPORT. ANY CHANGES SHOULD BE TRACEABLE TO APPROPRIATE SR REFERENCE.

Hello!

You are logged in as the 'opc' user.

'opc' is a temporary user used to set the root and support user passwords.

Once the passwords are set successfully, the 'opc' user will be deleted and

login to the Oracle Key Vault(OKV) instance using SSH will be turned off.

You can re-enable login to the OKV instance using SSH from the OKV management

console and login as the 'support' user.

Run the command below to set the root and support user passwords.

\$ set_password

Next, login to the OKV management console to complete the post-install tasks.

[opc@okv0013978e4ef7 ~]\$ set_password Setting root password

Set root password:

Confirm:

Changing password for user root.

passwd: all authentication tokens updated successfully.

Successfully set the root password..

Do you wish to set the support user password at this time.

Enter 'y' or 'yes' to proceed: y

Set support user password:

Confirm:

Changing password for user support.

passwd: all authentication tokens updated successfully.

Successfully set the support user password..

Deleted 'opc' user..

You can re-enable login to the Oracle Key Vault instance using

SSH from the Oracle Key Vault management console.

Login as the 'support' user using the same ssh key as 'opc' user.

Connection to 10.122.56.29 closed.

my_laptop ~ \$^D

Once this stage is complete, log in via the GUI using the root password provided in the previous step and complete the post install configuration; perform the user set up, system administrator setup, Time (NTP) and Domain Name System (DNS) setups. Then save this information.





Setup for Key, System, and Audit users



lefreshed Time: 15-NC	V-2023 14:50:48 [All times UTC -05:0	10 hours]	
 User Setup 			
Key Administrato	pr		
Key Administrator	KADMIN	Allow Forward Grant 🧿	Username is valid
Password *	••••••		
Re-enter Password			
Full Name	Admin Bob		
Email	bob@example.com		



ystem Administra	ator		
🕽 New User 🦳 Sam	e as Key Administrator		
			Licornamo in valid
System Administrator *	SADMIN	Allow Forward Grant	
Password *			
Re-enter Password			
Full Name	Systems Admin Alys		



Audit Manager		
New User San	e as Key Administrator 🔘 Same as System Administrator	
Audit Manager *	AMANAGER 🧷 🖉 Allow Forward 📀 Usernan Grant	ne is valid
Password *		
Re-enter Password *		
Full Name	Charlie the Auditor	
F	sharlin Qayamala sam	



Specify the Recovery passphrase. Note: Do not lose the Recovery Passphraser. Store this in a secure locaton.



	10V-2023 14:50:48 [All times 01C -05:00 nours]
Recovery Passp	phrase
The Recovery Pas	sphrase allows for emergency recovery in two situations:
- When one or mo	pre of the administrative roles cannot be used because it is not granted to any valid user account,
authentication wi	th the Recovery Passphrase is required to return to this screen to create new user accounts for each
administrative rol	le.
- When the Oracle	e Key Vault server must be restored from a previous backup file, the Recovery Passphrase is required to
decrypt the backu	up file.
acci jet ine sacht	
Password *	

Figure 15

Lastly, set up the NTP and DNS servers.

NOTE: On the C3, These should always be set to the default for the C3 chassis. Please only specify a single NTP server, and a single DNS server. The IP address to be used for both is the same, 169.254.169.254

• 1	Time Setup	
Syste	m Time	Do Not Set 🥥 Set Manually 💿 Use Network Time Protocol
	Server 1 Address	169.254.169.254 💿 Test Server
		OCI default NTP server 📀
	Server 1 Time (in UTC)	IS-NOV-2023 20:04:20 (2.815187 seconds difference)
	Server 2 Address	() Test Server
	Server 2 Time (in UTC)	
	Server 3 Address	③ Test Server
	Server 3 Time (in	

Figure 16

Here you can see we have used the single NTP server, 169.254.169.254 and tested it to confirm operation.

Use the same IP address for the lone DNS server. DNS and NTP are both provided redundantly inside the C3 and thus should only have the single entry.

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DNS Setup		
Server 1	169.254.169.254	
Server 2		
Server 3		
Enable DNS Revers		

Figure 17

Once these steps are completed, select the 'SAVE' button at the upper right of the page and repeat for any additional servers you will be adding to a cluster.

You must then log out, log back in as the Systems Admin user and start the REST services.





Select 'RESTful Services' from the System tab, check the 'Enable' box and Save the setting.



← → G	O 🔓 https://10	.122.56.29/ords/f?p=7700:266	8559684973206:::::		ŝ	© ≌
C Key Vault 21	.7				٨	SADMIN ~ ⑦ H
🞧 Home	🖵 Endpoints	🔦 Keys & Wallets	n Reports	🙉 Users	🗐 System	🔀 Cluster
st Refreshed Time: 15	5-NOV-2023 15:34:33 [All t	imes UTC -05:00 hours]				
ystem						
tatus	Ne	twork Datails	Monitoring an	d Alorte	Notwork Sonvicos	
Settings		twork Details	Monitoring and		Network Services	
	RESTful Service	25				୬୭ gle Sign-On
	Enable			Cano	Save	
	· · · · ·	-				
	Fil	neout ୍ଟ୍ର Kestore PSଆ RESTful Services ଆ	Certificate	Certificates		
	Pr	mary-				

Figure 19

Once complete, you may complete the configuration using the RESTful service interface.

Server Configuration

On the server you will be using to perform the configuration download the RESTful OKV service package as follows:

NOTE: You must do this once per server you are configuring as the download includes certificates for the OKV server.

[root@c3bastion tmp]# mkdir /tmp/okv

root@c3bastion tmp]# cd /tmp/okv

root#c3bastion okv]# curl -Ok --tlsv1.2 https://10.122.56.16:5695/okvrestclipackage.zip

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

100 2740 100 2740 0 0 78 0 0:00:35 0:00:34 0:00:01 741

[root@c3bastion okv]# unzip okvrestclipackage.zip

Archive: okvrestclipackage.zip

creating: lib/

creating: bin/

inflating: bin/okv

inflating: bin/okv.bat

creating: conf/

inflating: conf/okvrestcli.ini

inflating: conf/okvrestcli_logging.properties

inflating: lib/okvrestcli.jar

[root@scasg03bast okv]# cd bin

```
Edit bin/okv:
Remove the "#" from the beginning of the third line, save and exit:
     *******
     #!/bin/bash
     export OKV_RESTCLI_DIR=$(dirname "${0}")/..
     #export OKV_RESTCLI_CONFIG=$OKV_RESTCLI_DIR/conf/okvrestcli.ini
     if [ -z "$JAVA HOME" ]
     then
       echo "JAVA HOME environment variable is not set."
       exit 1
     fi
     if [ -z "$OKV_RESTCLI_CONFIG" ]
     then
       echo "OKV_RESTCLI_CONFIG environment variable is not set."
       exit 1
     fi
     export OKV_RESTCLI_JAR=$OKV_RESTCLI_DIR/lib/okvrestcli.jar
     $JAVA_HOME/bin/java -jar $OKV_RESTCLI_JAR "$@"
```

Edit conf/okvrestcli.ini:

Remove the "#" sign from the beginning of lines 3 .. 6, add in the private IP address of the first server, add in the username and delete the line that starts with "password"



```
#Provide absolute path for log_property, okv_client_config properties
[Default]
#log_property=./conf/okvrestcli_logging.properties
#server=172.20.0.21
#okv_client_config=./conf/okvclient.ora
#user=sadmin
#password=[user password]
#Provide absolute path for log property, okv client config properties
[Default]
log_property=./conf/okvrestcli_logging.properties
server=<IP_address of OKV01>
okv_client_config=./conf/okvclient.ora
user=<name of an OKV-administrator with the SYSADMIN privilege>
client_wallet = .
```

JAVA_HOME needs to be set for OKV REST command to work:

\$ java -version openjdk version "1.8.0_372" OpenJDK Runtime Environment (build 1.8.0_372-b07) OpenJDK 64-Bit Server VM (build 25.372-b07, mixed mode)

OpenJDK is not supported; the Linux program "namei" follows symbolic links and helps to confirm where OpenJDK is installed:



\$ which java

```
/usr/bin/java
$ namei /usr/bin/java | grep " 1 "
1 java -> /etc/alternatives/java
1 java -> /usr/lib/jvm/java-1.8.0-openjdk-1.8.0.372.b07-1.el7_9.x86_64/jre/bin/java
```

Oracle Java can be downloaded with script-friendly commands (Oracle Java 17 is the current long-term release):

```
[root@c3bastion okv]# wget <a href="https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.rpm">https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.rpm</a>
<content redacted for brevity>
Saving to: 'jdk-17 linux-x64 bin.rpm'
2023-11-14 10:21:48 (35.5 MB/s) - 'jdk-17_linux-x64_bin.rpm' saved [182170753/182170753]
[root@c3bastion okv]# yum localinstall ./jdk-17_linux-x64_bin.rpm
Loaded plugins: ulninfo
Examining ./jdk-17_linux-x64_bin.rpm: 2000:jdk-17-17.0.9-11.x86_64
Marking ./jdk-17_linux-x64_bin.rpm to be installed
<content redacted for brevity>
Installed:
 jdk-17.x86 64 2000:17.0.9-11
Complete!
[root@c3bastion okv]# namei /usr/bin/java | grep " 1 "
1 java -> /etc/alternatives/java
  l java -> /usr/lib/jvm/jdk-17-oracle-x64/bin/java
[root@c3bastion okv]#
```

Eventually, confirm that "alternatives" has been updated by the java installation process:

```
$ namei /usr/bin/java | grep " 1 "
```

```
l java -> /etc/alternatives/java
```

```
l java -> /usr/lib/jvm/jdk-17-oracle-x64/bin/java
```

That output gives us JAVA_HOME:

```
[root@c3bastion okv]# export JAVA_HOME=/usr/lib/jvm/jdk-17-oracle-x64
```

In order to simplify the deployment process, store the password of the OKV administrator with the SYSADMIN privilege in a wallet:

```
$ okv admin client-wallet add --client-wallet . --wallet-user <name of an OKV-
administrator with the SYSADMIN privilege>
Password: <type password of an OKV-administrator with the SYSADMIN privilege>
{
    "result" : "Success"
}
```

Cluster Configuration

Once the initial OKV software is installed and configured on the server, convert the stand alone OKV into a candidate node:

[root@c3bastion okv]# bin/okv cluster node create --cluster-name OCEAN11 --cluster-subgroup
WEST COAST --node-name OKV04

```
{
    "result" : "Success",
    "value" : {
        "requestId" : "26032"
    }
}
[root@c3bastion okv]#
[root@scasg03bast okv]# bin/okv cluster node status --pairing-request-id 26032
{
        "result" : "Success",
        "value" : {
        "status" : "IN-PROGRESS"
    }
}
```

After several minutes, this will change to SUCCEEDED, much like this:



```
[root@c3bastion okv]# bin/okv cluster node status --pairing-request-id 26032
{
    "result" : "Success",
    "value" : {
        "status" : "SUCCEEDED"
    }
}
[root@c3bastion okv]#
```

Once this step is completed, the node should show up in the cluster management and monitoring tab.

Key Vault 21	.7								OKV04@WEST_C	OAST.OCEAN11	久 SADM	IIN 🗸 Phelp	
🔓 Home	🖵 Endpoir	nts	🔇 Keys & Wallets			📠 Report	S	<mark>ጲ</mark> Us	ers	🗏 System	🔀 Cluste		
Last Refreshed Time: 16	-NOV-2023 12:3	6:16 [All tim	es UTC -05	:00 hours]								
WARNING: Key Vault op	perating in Read-	Only Restri	cted Mode										
Cluster		Cluster Information						Current Node Information					
Management													
Monitoring		Cluster Name OCEAN11					Node Name OKV04						
Conflicts		Cluster Subgroups WEST_COAST					Node Type Read-Only						
Conflict Resolution		Maximum Cluster Ve	Disable Node Duration 24 hrs ? sion 21.7.0.0.0				Cluster Su	ubgroup WE	ST_COAST				
		Cluster Details Edit Add Delete Force								orce Delete	Disable		
		Go Action					Actions						
		Select Node	Node ID ↑≞	Name	IP Address	Mode	Status	Write Peer	Cluster Subgroup	Join Date	Disable Date	Version	
		0	1	OKV04	172.20.0.21	Read-Only Restricted	ACTIVE	-	WEST_COAST	15- NOV-2023 17:05:10	-	21.7.0.0.0	

Figure 20

The next command, which adds the 2nd stand-alone OKV server to first to build a read-write pair, asks for a unique nodelD, Before adding a node, confirm which nodelD has already been taken:

```
$ okv cluster info get | jq -r '.value.nodes[].nodelD'
```

```
$ okv cluster node add --candidate-node-ip-address 172.20.0.33 --candidate-node-user sadmin --cluster-subgroup
WEST_COAST --mode READ-WRITE --node-id 2 --node-name OKV06
Recovery Passphrase: (of first OKV node)
Candidate Node Password: candidate Node Password: candidate Node Password: candidate node-ip-address 172.20.0.33 --candidate-node-user sadmin --cluster-subgroup
WEST_COAST --mode READ-WRITE --node-id 2 --node-name OKV06
Recovery Passphrase: (of first OKV node)
Candidate Node Password: candidate Node Password: candidate Node Password: candidate Node Password of an OKV-administrator with the SYSADMIN privilege>
{
    "result": "Success",
    "value": {
        "requestId": "3060"
        }
    }
Monitor the process on the first node:
[root@c3bastion okv]$ bin/okv cluster node status --pairing-steps TRUE --node-name OKV04
{
```

"result" : "Success",

"value" : {

"stages" : [{

"step1" : "Open transport channel with the candidate node",

```
"status" : "COMPLETED"
```

}, {

"step2" : "Verify the candidate node details",

"status" : "COMPLETED"

}, {

"step4" : "Generate the controller node details",

"status" : "COMPLETED"

}, {

"step5" : "Generate backup of the controller node for cloning",

"status" : "COMPLETED"

}, {

"step6" : "Send clone bundle to the candidate node",

"status" : ""

}, {

"step7" : "Enable data replication (downstream mining configuration) to the candidate node",

"status" : ""

}, {

"step8" : "Enable data replication to other cluster nodes",

```
"status" : ""
```

}, {

"step9" : "The candidate node successfully joins the cluster",

```
"status" : ""
```

```
}]
}
```

```
}
```

And check on the second node:

[root@c3bastion okv]# bin/okv cluster node status --pairing-steps TRUE --candidate-node-ip-address 172.20.0.21 - -candidate-node-user sadmin

Candidate Node Password:

{

```
"result" : "Success",
```

"value" : {

"stages" : [{

"step1" : "Send node details to the controller node",

```
"status" : "COMPLETED"
```

}, {

"step2" : "Receive clone bundle from the controller node",

"status" : "COMPLETED"

}, {

"step3" : "Restore backup on the candidate node",

"status" : "COMPLETED"

}, {

"step4" : "Update credentials of the candidate node",

"status" : "COMPLETED"

}, {

"step5" : "Tune the database on the candidate node",

"status" : "COMPLETED"

}, {

"step6" : "Setup network configuration on the candidate node",

"status" : "COMPLETED"

}, {

"step7" : "Enable data replication (downstream mining configuration) on the candidate node",

```
"status" : "COMPLETED"
  }, {
   "step8" : "Enable data replication on the candidate node",
   "status" : "COMPLETED"
 }]
}
}
[root@c3bastion okv]#
When complete, the command will show 'No pairing status":
[root@c3bastion okv]# bin/okv cluster node status --pairing-steps TRUE --node-name OKV10
{
 "result" : "Failure",
 "message" : "No pairing status"
}
[root@c3bastion okv]#
The first 2-node OKV read-write pair is ready to be used:
[root@c3util okv]$ bin/okv cluster info ge
{
 "result" : "Success",
 "value" : {
  "clusterName": "OCEAN11",
  "clusterSubgroups" : [ "WEST_COAST" ],
  "clusterVersion" : "21.7.0.0.0",
  "maximumDisableNodeDuration" : "24 hrs",
  "nodes" : [ {
   "nodeName" : "OKV04",
   "nodeID" : "1",
   "ipAddress" : "172.20.0.33",
   "mode" : "Read-Write",
   "status" : "ACTIVE",
```

```
"readWritePeer" : "OKV05",
  "clusterSubgroup" : "WEST_COAST",
  "joinDate" : "2023-11-16 20:53:25",
  "disableDate" : "",
  "version" : "21.7.0.0.0"
 }, {
  "nodeName" : "OKV05",
  "nodeID" : "2",
  "ipAddress" : "172.20.0.21",
  "mode" : "Read-Write",
  "status" : "ACTIVE",
  "readWritePeer": "OKV04",
  "clusterSubgroup" : "WEST_COAST",
  "joinDate" : "2023-11-16 21:02:24",
  "disableDate" : "",
  "version" : "21.7.0.0.0"
}]
}
```

[root@c3bastion okv]#

}

Congratulations, you now have an operation Oracle Key Vault system. You may begin to use your key vault as outlined in the **Oracle Key Vault documentation**.

NOTE: For additional use cases with Oracle Key Vault (OKV), please refer to the OKV official documentation.

Oracle Key Vault 21.8 Official Documentation Oracle Key Vault Use Cases

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