Oracle Primavera Cloud

Bring Your Own Keys (BYOK) Setup Guide

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1 Overview

> **Note**
>
> This feature is only available for customers in the Oracle UK Sovereign Cloud (OC4) who have purchased the license for Oracle Primavera Cloud Service, BYOK for United Kingdom Sovereign Cloud.

Bring Your Own Key (BYOK) lets you use and manage your own encryption keys to secure data in Oracle Primavera Cloud environments.

By default, Oracle Primavera Cloud encrypts customer data at rest using Oracle-managed encryption keys. BYOK allows eligible customers to replace Oracle-managed keys with customer-managed keys while Oracle continues to manage the Primavera Cloud service.

With BYOK, your organization maintains ownership and lifecycle management of the encryption keys used to protect supported Primavera Cloud resources. You create, disable, and delete the keys in your OCI tenancy according to your organization's security and compliance requirements.

Benefits of BYOK

BYOK helps organizations:

- Maintain full control of encryption keys used to protect Primavera Cloud data.
- Meet internal security, governance, and regulatory requirements.
- Manage key lifecycle operations, including re-keying and retirement.
- Use Oracle Cloud Infrastructure Vault to securely store and manage encryption keys.
- Continue using Oracle-managed Primavera Cloud services while retaining control of encryption keys.
- Oracle does not require customers to manually share encryption key OCIDs. Oracle securely discovers the required resources through OCI IAM policies and defined tags.

Prerequisite

The customer tenancy must be in same regions (primary and disaster recovery) as the Oracle Primavera Cloud tenancy.

Setting up BYOK

The BYOK configuration process involves the following steps:

1. Submit a Service Request to Enable BYOK.
2. Oracle prepares your Primavera Cloud environment and provides you with the information required to configure your environment in the Service Request.
3. Create a Tag Namespace and Tag Key Definitions
    a. Create Tag Namespace

   b. Create Tag Key Definitions

4. Create Keys
   a. Create the ADB Key
   b. Create the Object Storage Bucket Key
5. Create Policies
6. Verify the Vault Replica Exists
7. Update the Service Request with the Vault OCID

Your encryption keys remain in your OCI tenancy throughout this process. Oracle accesses the keys only through tightly scoped OCI Identity and Access Management (IAM) policies that you configure.

2

Submit a Service Request to Enable BYOK

You must submit a Service Request to initiate the process for setting up BYOK.

For instructions on submitting a Service Request, go to My Oracle Support site, sign in, and then select **Service Requests (SRs)**.

When filling out the Service Request, be sure to select **Oracle Primavera Cloud Service for United Kingdom Government** as the Product.

After Oracle has prepared your environment, the parameters will be provided to you in the Service Request. These parameters will be needed during the set up process. For a list of those parameters, see Parameters Required for the BYOK Setup.

3
Parameters Required for the BYOK Setup

There are a number of parameters that are needed during the process of setting up BYOK. There are parameters that are provided to you in the Service Request after Oracle has prepared your environment. There are parameters that are based on how you set up your environment.

Review these parameters to be sure you have all the information you need before you begin.

Table 3-1 Parameters Provided by Oracle

Parameter	Used for
OPC_TENANCY_OCID	Oracle Primavera Cloud Tenancy OCID for creating cross-tenancy IAM policies.
OPC_BYOK_DG_OCID	OCID of opc_byok_dg Dynamic Group in Oracle Primavera Cloud tenancy.
REGION_1	Primary region for creating regional IAM policies and vault configuration.
REGION_2	Disaster recovery region for configuring vault replication for disaster recovery.

The following parameters are provided by you. If these are not already configured, you can follow the link to complete the steps before you continue with the configuration process.

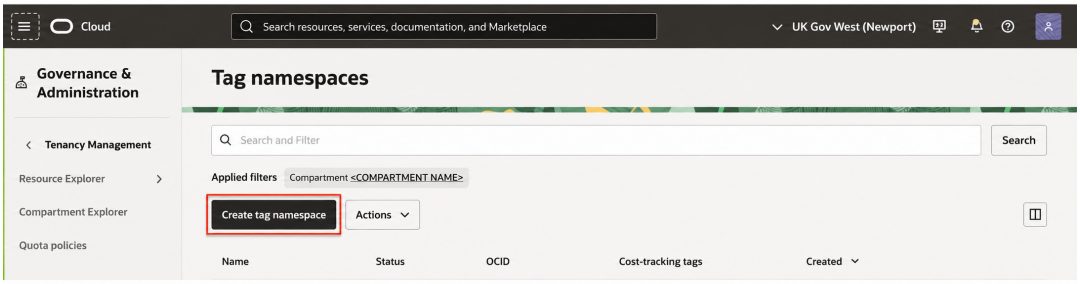
Table 3-2 Parameters Provided by Customer

Parameter	Used for
COMPARTMENT_NAME	Name of the compartment in which the Vault that will be used for Oracle Primavera Cloud BYOK is located. • If the Vault exists in the root compartment, the COMPARTMENT_NAME is the root compartment name. • If a suitable compartment does not exist and a new compartment is preferred, follow the instructions to Create a Compartment.
VAULT_NAME	Name of the Vault in <COMPARTMENT_NAME> in which to create keys for Oracle Primavera Cloud BYOK. If a suitable vault does not exist and a new vault is preferred, follow the instructions to Create a Vault.
VAULT_OCID	OCID of the Vault <VAULT_NAME>.

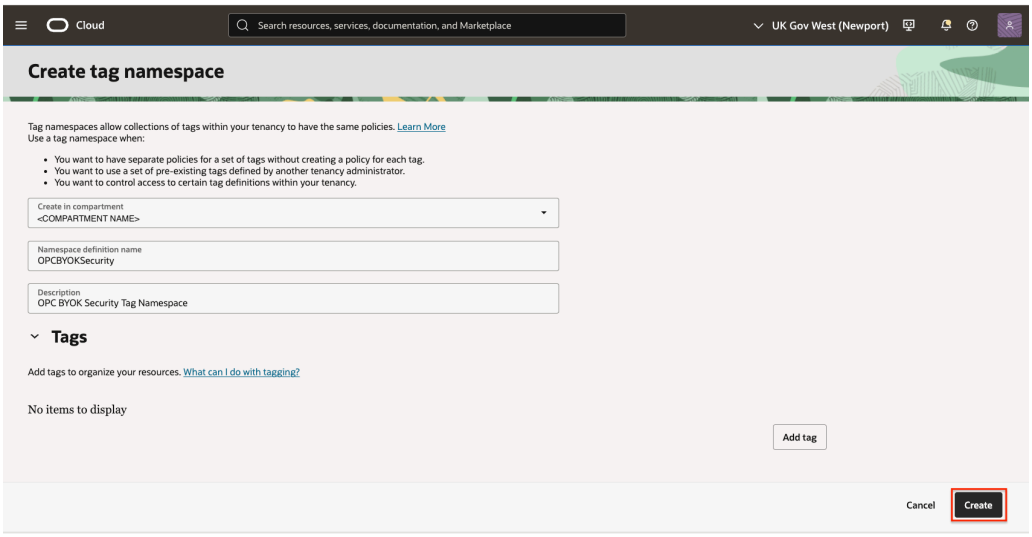
4

Create Tag Namespace

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Governance & Administration**, and in the **Tenancy Management** section, select **Tag Namespaces**.
3. On the **Tag namespaces** page, select **Create tag namespace**.



4. On the **Create tag namespace** page:
   a. In the **Create in compartment** list, select <COMPARTMENT_NAME>.
   b. In the **Namespace definition name** field, enter: `OPCBYOKSecurity`.
   c. In the **Description** field, enter: `OPC BYOK Security Tag Namespace`.
   d. Select **Create**.



5

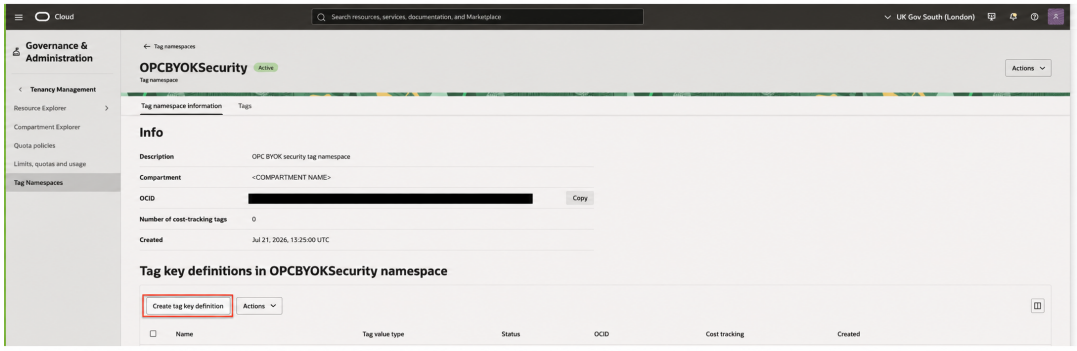
Create Tag Key Definitions

Add the following three tags to the OPCBYOKSecurity tag namespace.

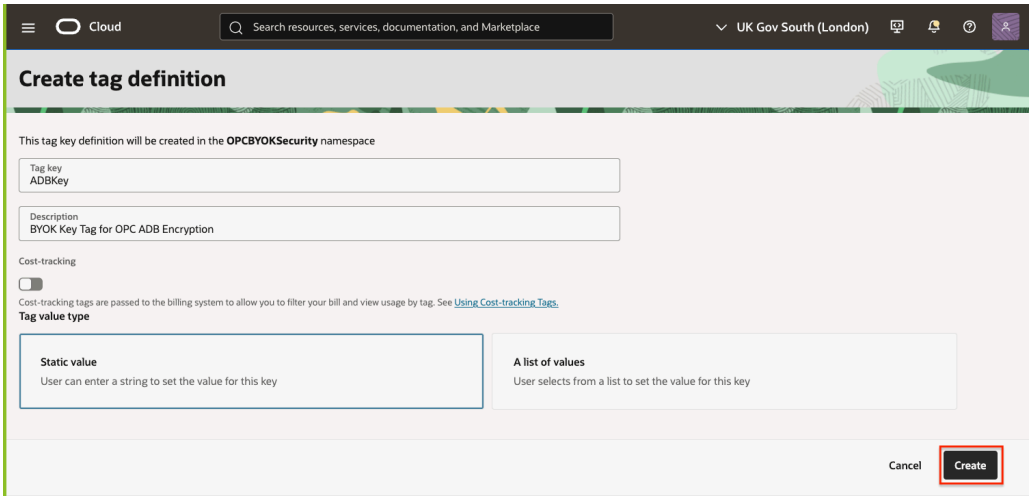
- ADBKey
- BucketKey
- IsCurrent

To create namespace tags:

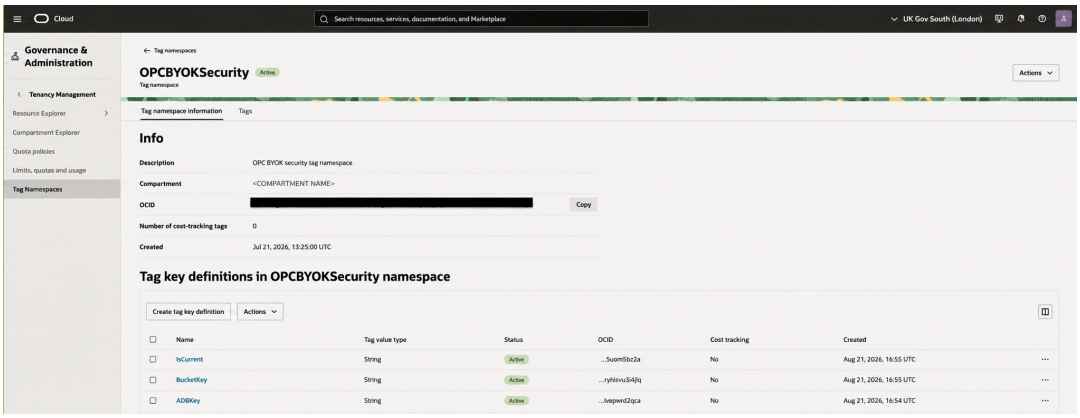
1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Governance & Administration**, and in the **Tenancy Management** section, select **Tag Namespaces**.
3. On the **Tag namespaces** page, select **OPCBYOKSecurity.**
4. On the **OPCBYOKSecurity Tag names** page, select **Create tag key definition**.



5. On the **Create tag definition** page:
   a. In the **Tag key** field, enter: `ADBKey`.
   b. In the **Description** field, enter: `BYOK Key Tag for OPC ADB Encryption`
   c. Select **Create**.



6. Repeat the process using the following tag key and description:
   a. **Tag Key**: `BucketKey`
   b. **Description**: `BYOK Key Tag for OPC Bucket Encryption`
7. Repeat one more time with the following tag key and description:
   a. **Tag Key**: `IsCurrent`
   b. **Description**: `BYOK Key Tag for Identifying Current Key`

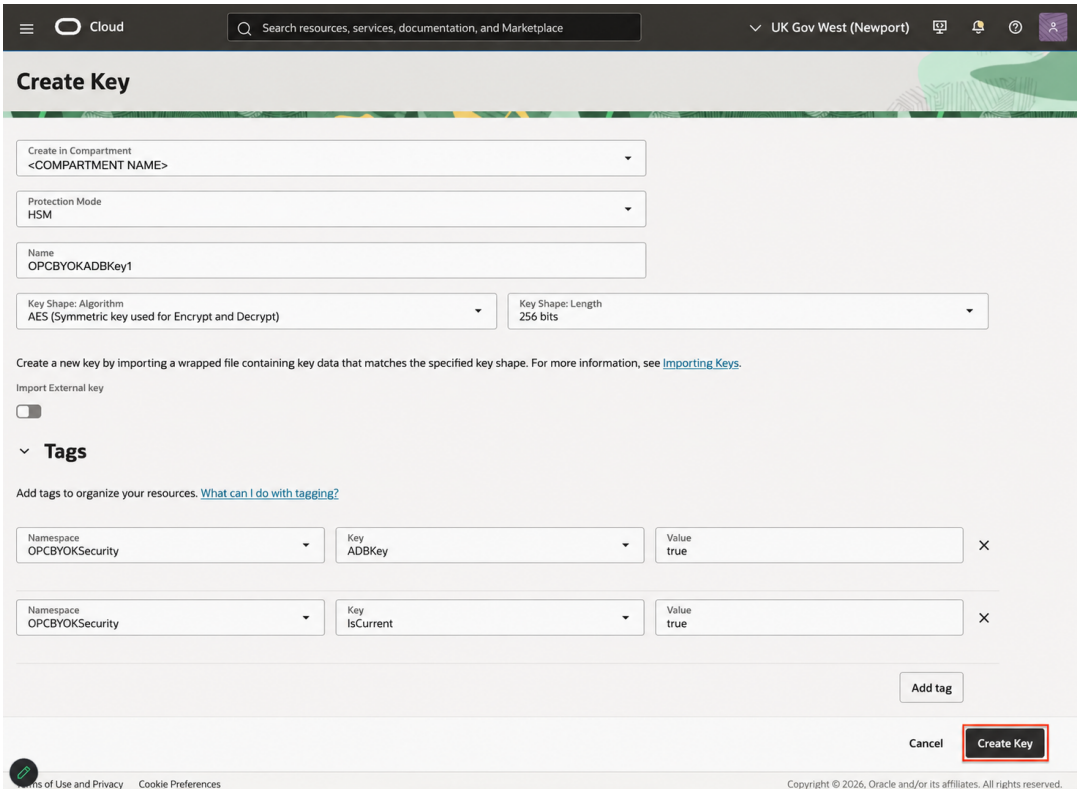


After all tag definitions are created, the key definitions are shown in the OPCBYOKSecurity Tag namespace **Status** column as **Active**.

6

Create the ADB Key

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.
3. On the **Vaults** page, select the **Vault** list and select <VAULT_NAME>.
4. On the **Vaults** details page, select **Master encryption keys**.
5. Select **Create Key**.
6. On the **Create Key** page, enter the following:
    a. In the **Create in Compartment** list, select the <COMPARTMENT_NAME>.
    b. In the **Protection Mode** list, select **HSM**.
    c. In the **Name** field, enter: `OPCBYOKADBKey1`. Or, you can enter whatever name you choose.
    d. In the **Key Shape: Algorithm** list, select **AES (Symmetric key used for Encrypt and Decrypt)**.
    e. In the **Key Shape: Length** list, select **256 bits**.
    f. **Import External Key**: By default, this toggle is off. It indicates OCI will create the key. If you want to import an external key, follow the instructions in Import an External Key to wrap the external key and upload, and then return here to continue.
7. In the **Tags** section, select **Add tag**.
    a. In the **Namespace** list, select: **OPCBYOKSecurity**.
    b. In the **Key** list, select **ADBKey**.
    c. In the **Value** field, enter **true**.
8. In the **Tags** section, select **Add tag**.
    a. In the **Namespace** list, select: **OPCBYOKSecurity**.
    b. In the **Key** list, select **IsCurrent**.
    c. In the **Value** field, enter **true**.
9. Click **Create Key**.



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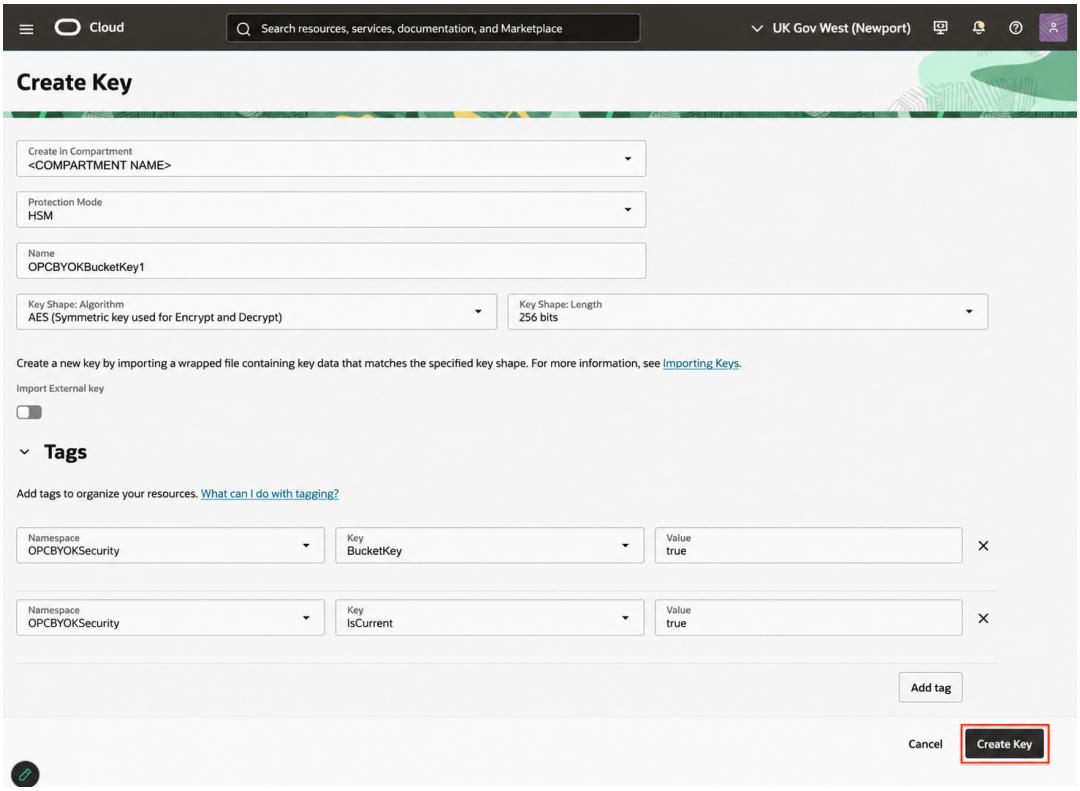
Create the Object Storage Bucket Key

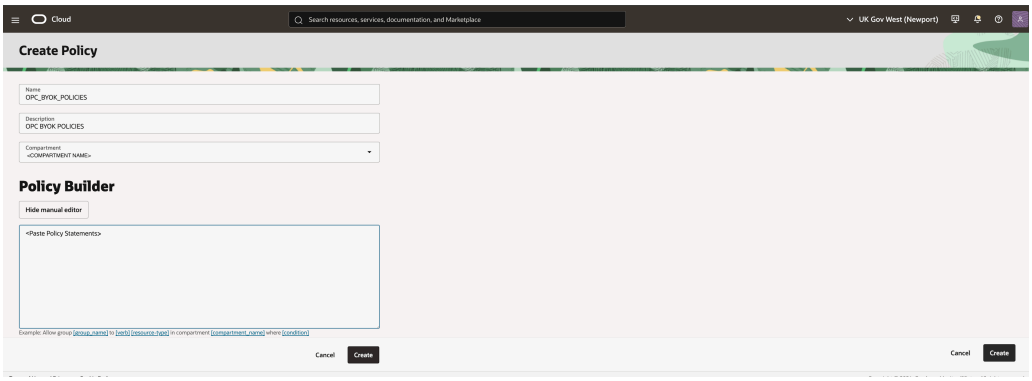
1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.
3. On the **Vaults** page, select the **Vault** list and select <VAULT_NAME>.
4. On the **Vaults** details page, select **Master encryption keys**.
5. Select **Create Key**.
6. On the **Create Key** page, enter the following:
   a. In the **Create in Compartment** list, select the <COMPARTMENT_NAME>.
   b. In the **Protection Mode** list, select **HSM**.
   c. In the **Name** field, enter: **OPCBYOKBucketKey1**.
   d. In the **Key Shape: Algorithm** list, select **AES (Symmetric key used for Encrypt and Decrypt)**.
   e. In the **Key Shape: Length** list, select **256 bits**.
   f. **Import External Key**: By default, this toggle is off. It indicates OCI will create the key. If you want to import an external key, follow the instructions in Import an External Key to wrap the external key and upload, and then return here to continue.
7. In the **Tags** section, select **Add tag**.
   a. In the **Namespace** list, select: **OPCBYOKSecurity**.
   b. In the **Key** list, select **BucketKey**.
   c. In the **Value** field, enter **true**.
8. In the **Tags** section, select **Add tag**.
   a. In the **Namespace** list, select: **OPCBYOKSecurity**.
   b. In the **Key** list, select **IsCurrent**.
   c. In the **Value** field, enter **true**.
9. Click **Create Key**.



8
Create Policies

These policies must be created in the root compartment regardless of which compartment the vaults are created in. The policies are only created once.

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Identity** section, select **Policies**.
3. On the **Policies** page, select **Create Policy**.
4. On the **Create Policy** page:
   a. In the **Name** field, enter: `OPC_BYOK_POLICIES`.
   b. In the **Description** field, enter: `OPC BYOK POLICIES`.
   c. In the **Policy Builder** section, select **Show manual editor**.



   d. In the text field, enter the following policy statements.

```
define tenancy opc-tenancy as <OPC_TENANCY_OCID>
define dynamic-group opc_byok_dg as <OPC_BYOK_DG_OCID>
allow service objectstorage-<REGION_1> to use keys in compartment
<COMPARTMENT_NAME> where ALL { target.vault.id = '<VAULT_OCID>',
target.resource.tag.OPCBYOKSecurity.BucketKey = 'true' }
allow service objectstorage-<REGION_2> to use keys in compartment
<COMPARTMENT_NAME> where ALL { target.vault.id = '<VAULT_OCID>',
target.resource.tag.OPCBYOKSecurity.BucketKey = 'true' }
admit dynamic-group opc_byok_dg of tenancy opc-tenancy to use vaults in
compartment <COMPARTMENT_NAME> where target.vault.id = '<VAULT_OCID>'
admit dynamic-group opc_byok_dg of tenancy opc-tenancy to inspect keys
in compartment <COMPARTMENT_NAME> where target.vault.id = '<VAULT_OCID>'
admit dynamic-group opc_byok_dg of tenancy opc-tenancy to use keys in
compartment <COMPARTMENT_NAME> where ALL { target.vault.id =
'<VAULT_OCID>, ANY { target.resource.tag.OPCBYOKSecurity.BucketKey =
'true', target.resource.tag.OPCBYOKSecurity.ADBKey = 'true' } }
admit dynamic-group opc_byok_dg of tenancy opc-tenancy to use key-
```

```
delegate in compartment <COMPARTMENT_NAME>
admit dynamic-group opc_byok_dg of tenancy opc-tenancy to associate
keys in compartment <COMPARTMENT_NAME> with buckets in tenancy opc-
tenancy
allow service keymanagementservice to manage vaults in tenancy
```

Replace the following parameter values in the policy statements:

- <COMPARTMENT_NAME> = Name of the Compartment that contains the customer BYOK Vault with <VAULT_OCID> in the customer tenancy.

  If the compartment is not in the root compartment but belongs to another compartment, the <COMPARTMENT_NAME> should include the parent compartment separated by colon, such as <COMPARTMENT_NAME> = parent compartment:compartment

  For example, if the compartment COMP3 is a sub-compartment of COMP2 which is a sub-compartment of COMP1, the <COMPARTMENT_NAME> should be specified as: COMP1:COMP2:COMP3
- <VAULT_OCID> = OCID of customer BYOK Vault which will be provided by the customer.
- <OPC_TENANCY_OCID> = Oracle Primavera Cloud Tenancy OCID in the Oracle Primavera Cloud tenancy. Provided by Oracle in the Service Request.
- <OPC_BYOK_DG_OCID> = Oracle Primavera Cloud BYOK Dynamic Group OCID in the Oracle Primavera Cloud tenancy. Provided by Oracle in the Service Request.
- <REGION_1> = Oracle Primavera Cloud Primary Region Identifier. Provided by Oracle in the Service Request.
- <REGION_2> = Oracle Primavera Cloud Disaster Recovery Region Identifier. Provided by Oracle in the Service Request.

e. Select **Create**.

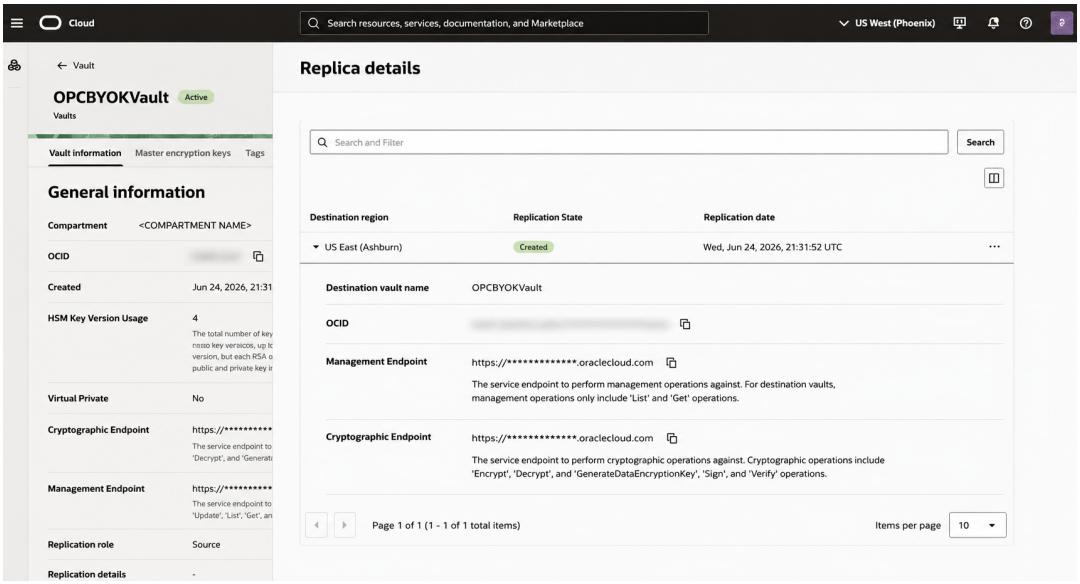
9

Verify the Vault Replica Exists

Important: It is required that a vault replica exists in the disaster recovery region of the Oracle Primavera Cloud tenancy for BYOK encryption to work. Without a replica, the encryption process using BYOK will fail.

Verify a vault replica exists in the Oracle Primavera Cloud disaster recovery region.

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.
3. On the **Vaults** page, select <VAULT_NAME>.
4. Select **Replica details**.
5. Verify there is replica for <REGION_2> under **Destination region** with a **Replication State** of **Created**. If there is no replica, proceed to Replicate the Vault in <REGION_2> to create a replica in <REGION_2>.



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Update the Service Request with the Vault OCID

Verify a vault replica exists in the Oracle Primavera Cloud disaster recovery region.

1. Open the **Navigation** menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.
2. On the **Vaults** page, select <VAULT_NAME>.
3. On the **Vault Information** tab, under **General information**, locate the **OCID** and select **Copy**.
4. Open the Service Request ticket, enter `BYOK Keys created. Vault OCID = <VAULT_OCID>`, and paste the Vault OCID into the ticket. After Oracle receives the updated ticket, Support will complete the encryption process and update your ticket when the process is complete.

11

Appendices

This section contains supplemental material for this document.

Create a Compartment

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Identity** section, select **Compartments**.
3. On the **Compartments** page, select **Create compartment**.
4. On the **Create compartment** page:
   a. In the **Name** field, enter a name for your compartment. For example, you could enter: `OPCBYOK`
   b. In the **Description** field, enter meaningful text to help you identify the compartment. For example, you could enter:`Dedicated Compartment for Oracle Primavera Cloud BYOK vault, keys, tags, and policies.`
   c. In the **Parent compartment** list, select the root compartment.
   d. Select **Create compartment**.

      The **Status** for the compartment shows as **Creating**. This may take a minute or more. Wait until the **Status** changes to **Active**.

Create a Vault

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.
3. On the **Vaults** page, select **Create Vault**.
4. In the **Create in compartment** list, select <COMPARTMENT_NAME>.
5. In the **Name** field, enter a name for your vault. For example, you could enter: `OPCBYOKVault`.
6. Select **Create Vault**.

   The creation may take several seconds. The vault status changes from **Creating** to **Active** to indicate it is available.

Replicate the Vault in <REGION_2>

Important: The vault replica must not be removed at any time after it is created for Oracle Primavera Cloud BYOK keys to function.

To replicate the vault:

1. Sign in to the Oracle Cloud Console as an Account Administrator with appropriate privileges.
2. Open the **Navigation** menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.
3. On the **Vaults** page, select **<VAULT_NAME>**.
4. Verify if there is replica for <REGION_2> under **Destination region** with a **Replication State** of **Created**. If there is no replica, proceed to next step to create a replica in <REGION_2>.
5. From the **Actions** menu, select **Replicate Vault**.
6. Select the <REGION_2> from the drop-down and click **Create Replica**.

   The Replication State for the replica will show as **Creating**.

   When the process has finished, the Replication State is **Created**.

Import an External Key

When creating a key, if you choose to import an external key, follow these instructions.

1. Wrap the external key with **OCI Vault public wrapping** key. Follow the instructions under **Wrapping the External Key Before Import** section in the topic Creating Encryption Keys. This will result in a wrapped key file with extension.bin. For example, let's refer to the file as **wrappedkey.bin** file.
2. Select the **Import External Key** toggle to on.
3. Upload the wrapped key file under **External Key Data Source**. For example, **wrappedkey.bin**.
4. Return to the key creation steps.
   - Create the ADB Key.
   - Create the Object Storage Bucket Key.

Re-Keying with New BYOK Keys

> **Note**
>
> Do not delete the current keys that are being used for encryption.

1. Create a new ADB Key.

   Refer to Create the ADB Key. This key should have the IsCurrent tag set to true.

2. Create a new object storage bucket key.

   Refer to Create the Object Storage Bucket Key. This key should have the IsCurrent tag set to true.

3. Remove the IsCurrent tag from the ADB key.

   a. Open the Navigation menu, select **Identity & Security**, and in the **Key Management** section, select **Vault**.

   b. On the **Vault** page, from the Vault list, select the <VAULT_NAME>.

   c. On the **Vaults** details page, select **Master encryption keys**.

   d. Locate the currently used ADB key.

   e. Delete the **IsCurrent** tag.

4. Remove the IsCurrent tag from the existing object storage bucket key following the process in the step above.

5. Create a Service Request ticket for re-encryption. Enter details such as: New Oracle Primavera Cloud BYOK Keys created. Requesting re-encryption of Oracle Primavera Cloud ADB and Object Storage Bucket keys.