



**ENTRUST**

# Bring Your Own Key for AWS Key Management Service and Entrust KeyControl

Integration Guide

2024-11-21

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# Chapter 1. Introduction

This document describes the integration of AWS Bring Your Own Key (referred to as AWS BYOK in this guide) with the Entrust KeyControl key management solution (KMS). KeyControl serves as a key manager for cloud keys and KMIP objects.

## 1.1. Product configurations

Entrust has successfully tested the integration of KeyControl with AWS BYOK in the following configurations:

System	Version
Entrust KeyControl	10.3.1

## 1.2. Requirements

Before starting the integration process, familiarize yourself with:

- [AWS Key Management Service](#)
- [Entrust KeyControl Online Documentation Set](#)

# Chapter 2. Deploy and configure KeyControl

## 2.1. Deploy a KeyControl cluster

For the purpose of this integration, a two-node cluster was deployed as follows:

1. Download the KeyControl software from [Entrust TrustedCare](#). This software is available as an OVA or ISO image. This guide deploys an OVA installation.
2. Install KeyControl as described in [KeyControl OVA Installation](#).
3. Configure the first KeyControl node as described in [Configuring the First KeyControl Node \(OVA Install\)](#).
4. Add second KeyControl node to cluster as described in [Adding a New KeyControl Node to an Existing Cluster \(OVA Install\)](#).



Both nodes need access to an NTP server, otherwise the above operation will fail. Sign in to the console to change the default NTP server if required.

Node	Status	Server Name	IP Address
Current Node	Online	KeyControl-1-2023-11-08	10.10.10.200
	Online	KeyControl-2-2023-11-08	10.10.10.201

Name: KeyControl-1-2023-11-08  
Status: Online  
Authenticated: Yes  
Domain: Appliance Management Admin Group  
IP Address: 10.10.10.200  
Certificate: Internal Web server: Default  
External Web server: Default

5. Install the KeyControl license as described in [Upgrading Your Trial License](#).

## 2.2. Additional KeyControl cluster configuration

After the KeyControl cluster is deployed, additional system configuration can be done as described in [KeyControl System Configuration](#).

---

## 2.3. Configure authentication

This guide uses local account authentication.

For AD-managed Security groups, configure the LDAP/AD Authentication Server as described in [Specifying an LDAP/AD Authentication Server](#).

## 2.4. Create DNS record for the KeyControl cluster

This guide uses the individual IP addresses of the KeyControl nodes.

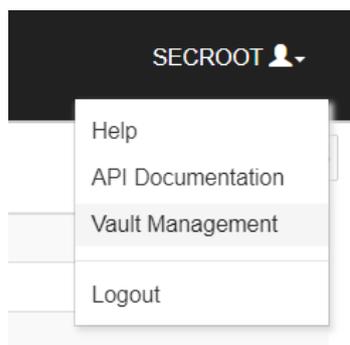
To use hostnames, configure your DNS server giving each node in the KeyControl a unique name.

## 2.5. Create a Cloud Keys Vault in the KeyControl

The KeyControl Vault appliance supports different type of vaults. For example: cloud key management, KMIP, PASM, database, and others. This section describes how to create a Cloud Keys vault for this integration.

Refer to the [Creating a Vault](#) section of the admin guide for more details.

1. Sign in to the KeyControl Vault Server web user interface:
  - a. Use your browser to access the IP address of the server.
  - b. Sign in using the **secroot** credentials.
2. From the user's dropdown menu, select **Vault Management**.



3. In the KeyControl Vault Management interface, select the **Create Vault** icon.
4. In the **Create Vault** page, select **Cloud Keys**. Then enter your information.

For example:

**Create Vault**  
A vault will have unique authentication and management.

**Type**  
Choose the type of vault to create  
Cloud Keys

**Name\***  
AWS-BYOK-KC

**Description**  
AWS BYOK integration with Entrust KeyControl  
Max: 300 characters

**Email Notifications**  OFF  
**⚠ SMTP needs to be configured to turn on email notifications**  
Use email to communicate with Vault Administrators, including their temporary passwords. Turning off email notifications means you will see and need to give temporary passwords to Vault Admins.

**Administrator**  
Invite an individual to have complete access and control over this vault. They will be responsible for inviting additional members.

**Admin Name\***  
Administrator

**Admin Email\***  
[Redacted]

**Create Vault** **Cancel**

5. Select **Create Vault**, then select **Close**.

A window with the newly created vault information appears. In addition, an email with the same vault information is sent to the security administrator **secret**.

Example vault information window:

---

## ✔ Vault Successfully Created

You will need to send the following information to the Vault Admin so they can log into their vault

### Vault URL

[Redacted]

 Copy

### User Name

[Redacted]

 Copy

### Temporary Password

[Redacted]

 Copy

Close

Example email:



**Administrator, you have been invited to become an administrator of the KMIP vault, CommVault.**

To sign in, use the following:

URL: [Redacted]

User Name: [Redacted]

Password: [Redacted]

---

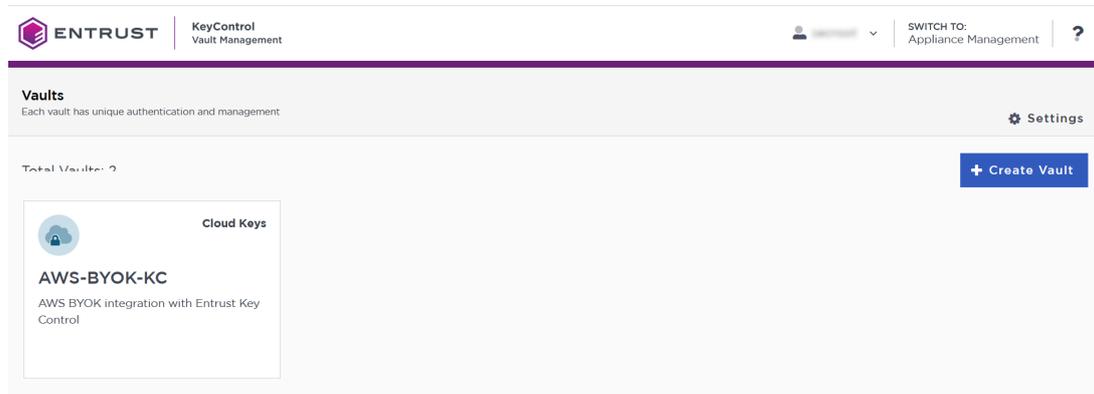
If you have any issues, [contact support](#).

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6. Bookmark the **Vault URL** listed above.

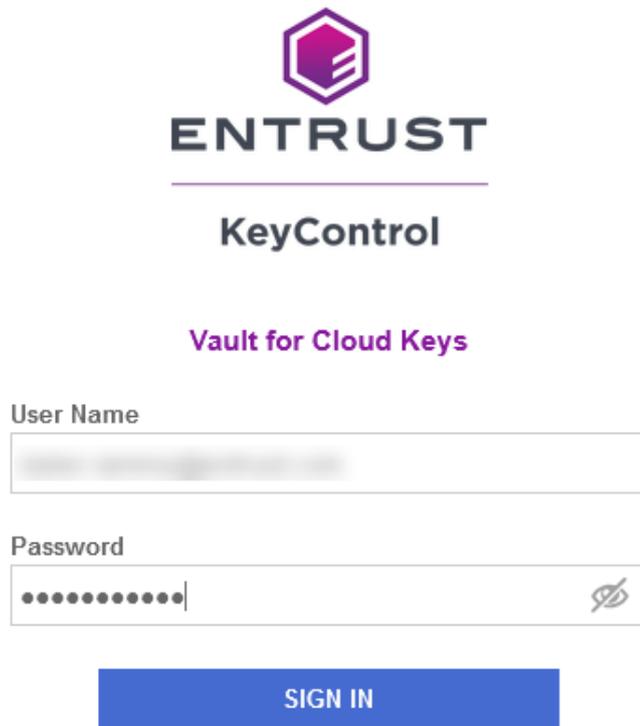
The newly created Vault is added to the **Vault Management** dashboard.

For example:



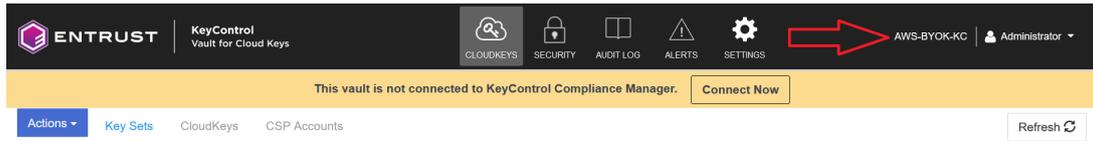
7. Sign in to the **Vault URL** with the temporary password. Change the initial password when prompted. Sign in again to verify.

For example:



8. Notice the new vault.

For example:



There are currently no Key Sets

[Create a Key Set Now](#)

## 2.6. View the Cloud Keys Vault details

1. Back in the **Vault Management** dashboard, hover over the Vault and select **View Details**.

For example:

## Vault Details



### AWS-BYOK-KC

AWS BYOK integration with Entrust KeyControl

#### Type

Cloud Keys

#### Created

Jul 30, 2024 03:38:30 PM

---

#### Vault URL

[Redacted Vault URL]

 Copy

#### API URL

[Redacted API URL]

 Copy

---

#### Administrator

##### Admin Name

Administrator

##### User Name

[Redacted User Name]

---

#### Email Notifications

Off

2. Select **Close** when done.

---

## Chapter 3. Create a AWS AIM user service account

Entrust KeyControl utilizes an AWS IAM user service account to perform the KMS functionality in BYOK.



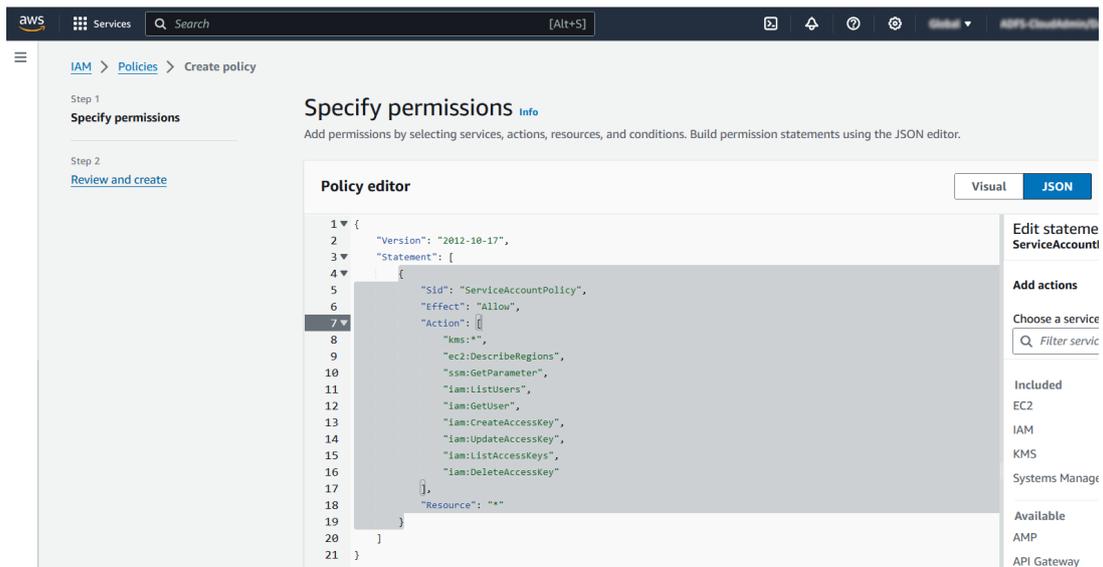
In addition to the IAM user service account, the feature to utilize an AWS domain user to perform the KMS functionality is under consideration for a future release of Entrust KeyControl.

The following steps create a customer managed policy in AWS. Then create an IAM user service account with the customer managed policy.

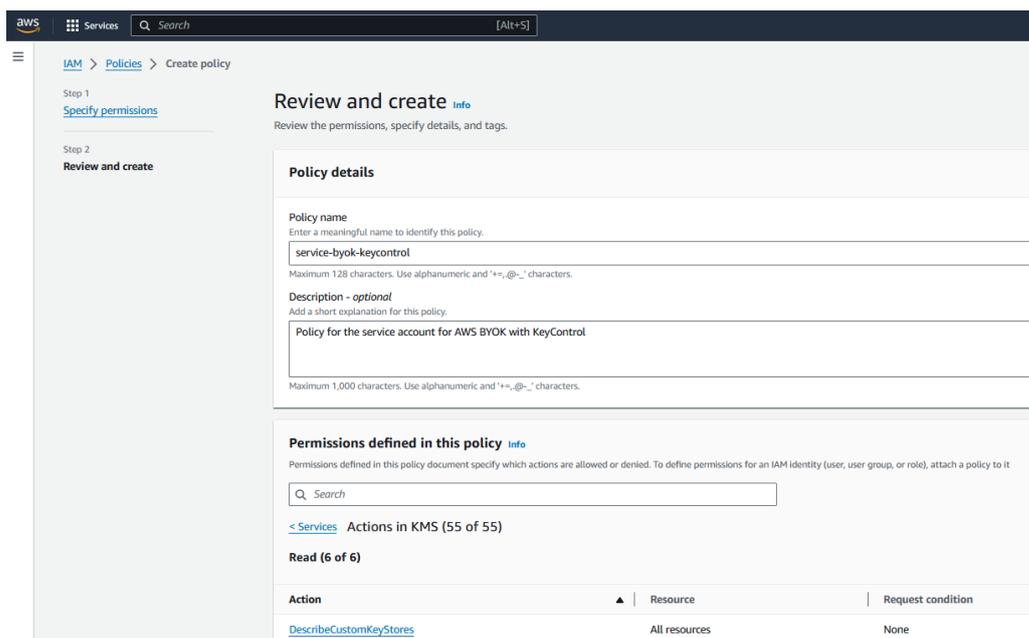
### 3.1. Create a AWS BYOK service account policy

1. Select **Services / IAM**.
2. In the left pane select **Access management / Policies**. Then select the **Create policy** icon.
3. In the **Specify permissions** window, select the **JASON** icon.
4. Copy the following in the **policy editor** window. Then select **Next**

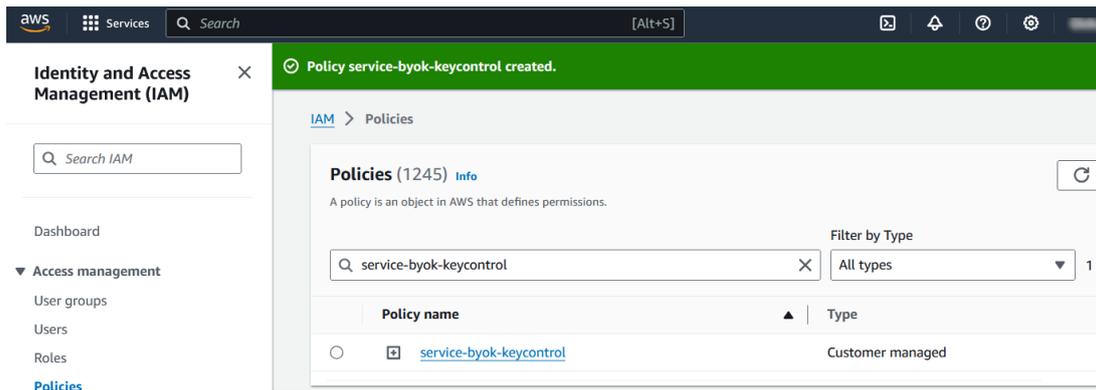
```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "ServiceAccountPolicy",
      "Effect": "Allow",
      "Action": [
        "kms:*",
        "ec2:DescribeRegions",
        "ssm:GetParameter",
        "iam:ListUsers",
        "iam:GetUser",
        "iam:CreateAccessKey",
        "iam:UpdateAccessKey",
        "iam:ListAccessKeys",
        "iam:DeleteAccessKey"
      ],
      "Resource": "*"
    }
  ]
}
```



5. In the **Review and create** window, enter a name and description.
6. In the **Permissions defined for this policy** section, select **KMS**. Then select **Create policy**.



7. Notice the new policy created.



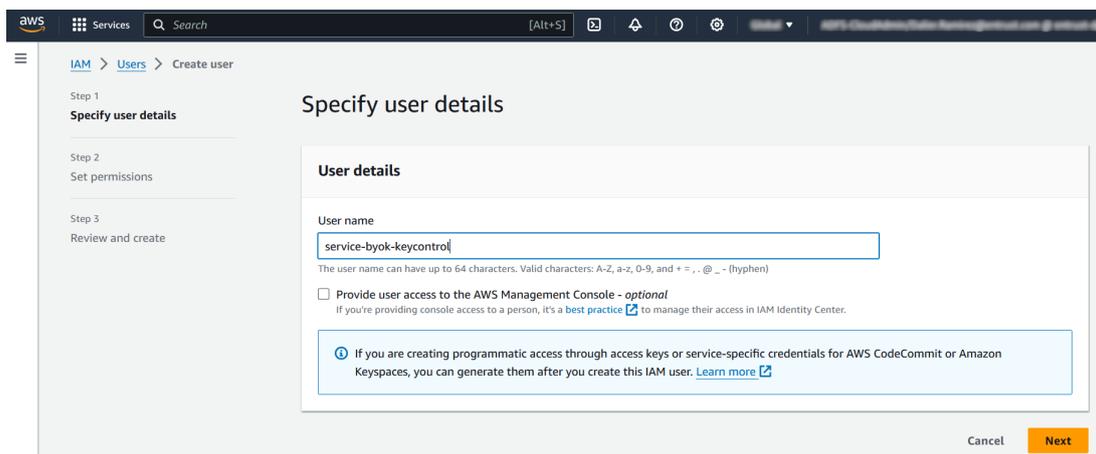
For further information, refer to the [AWS BYOK Service Account Requirements](#).

## 3.2. Create AWS AIM user service account

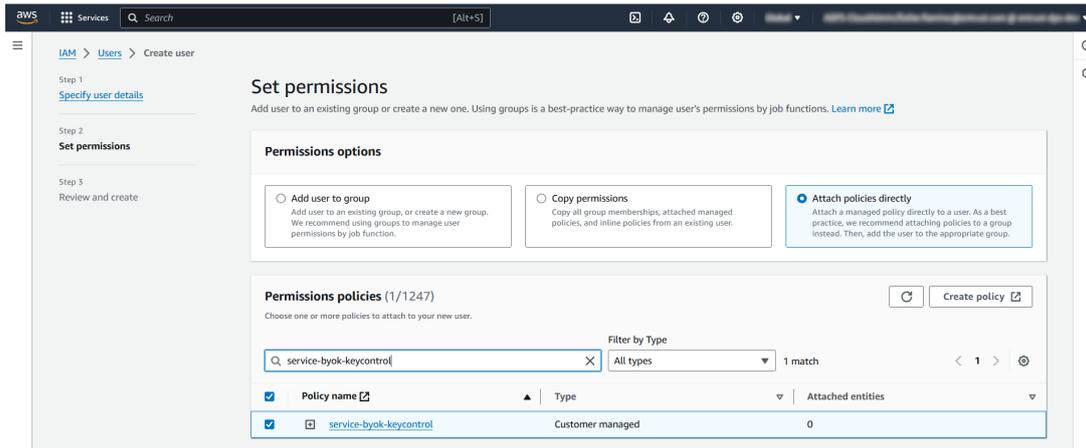
This steps create an AWS IAM user with no console access, a service account, with policy created in [Create a AWS BYOK service account policy](#).

1. Select **Services / IAM**.
2. In the left pane select **Access management / Users**. Then select the **Create user** icon.
3. Enter the user name. Uncheck **Provide user access to AWS Management Console - optional** since we are creating a service account. Then select **Next**.

For example:



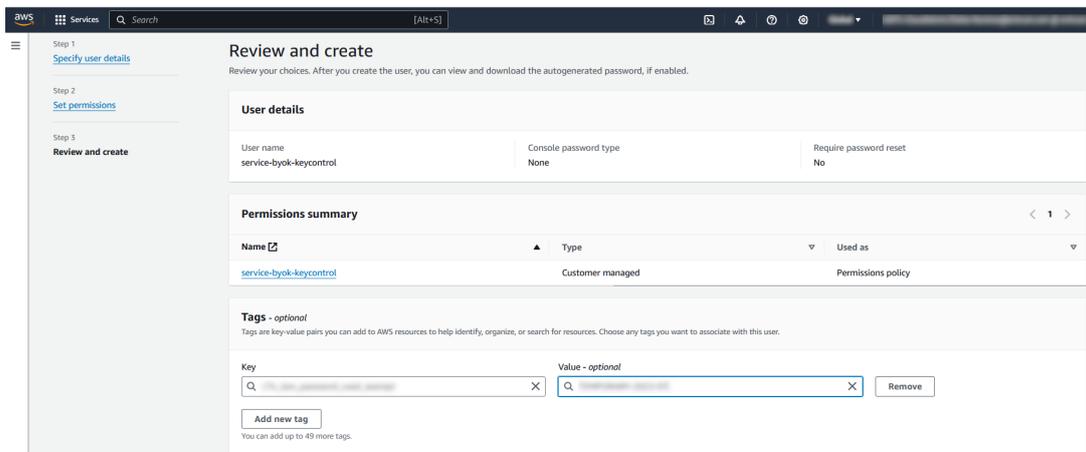
4. In the **Set permissions** window, select the **Attach policies directly** radio button.
5. In the **Permissions policy** section, enter the policy created in [Create a AWS BYOK service account policy](#). Check the policy. Then select **Next**.



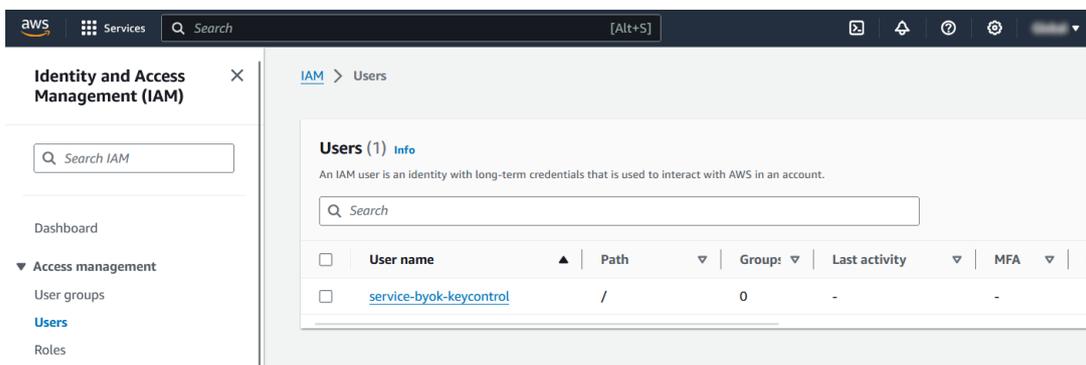
6. In the **Review and create** window, go to section **Tags - optional** and select **Add new tag** if required by your organization. Enter the key-value pair. Then select **Create user**.

 Some organizations uses tags manage IAM users key. Check your organization’s policies.

For example:



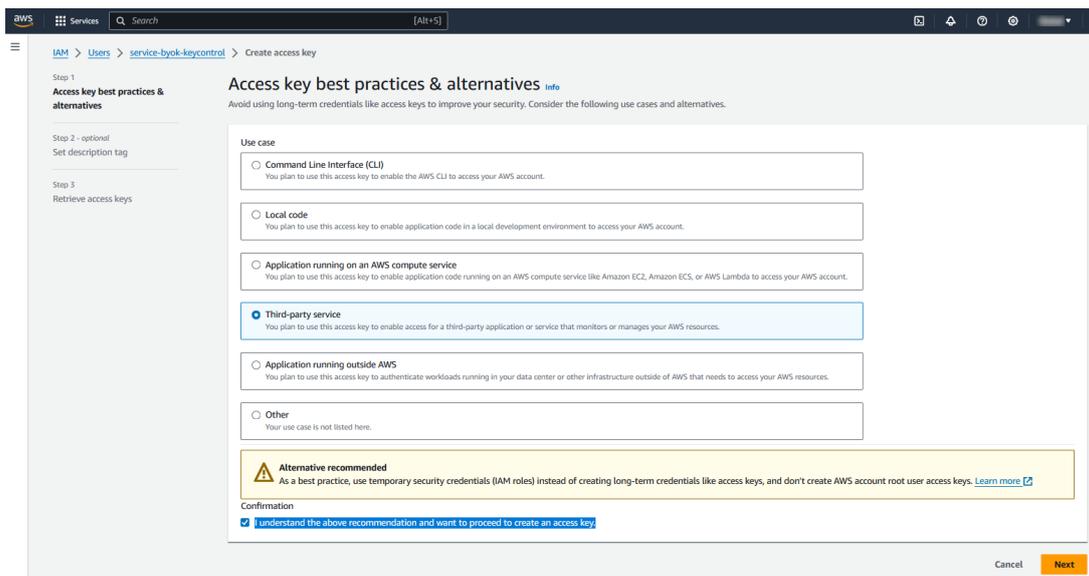
7. Notice the new user created.



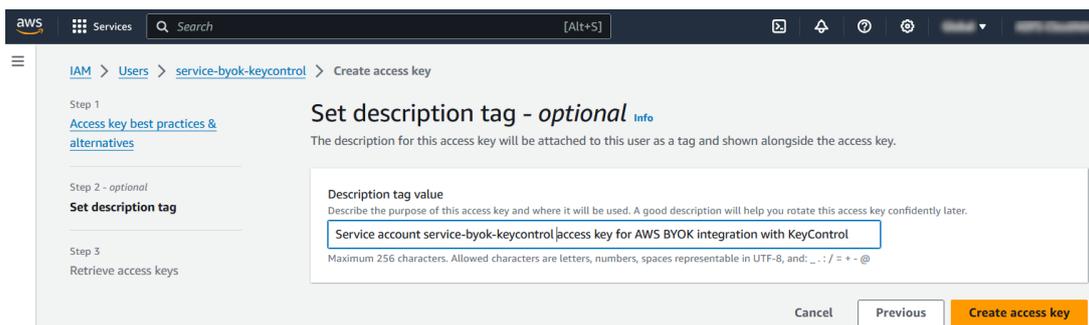
8. Select the new user. Then select the **Security credentials** tab.
9. In the **Access keys (0)** section, select the **create access key** icon.
10. In the **Access key best practices & alternatives** window, select the **Third party service** radio button. Check **I understand the above recommendation and want to proceed to create an access key**. Then select **Next**.



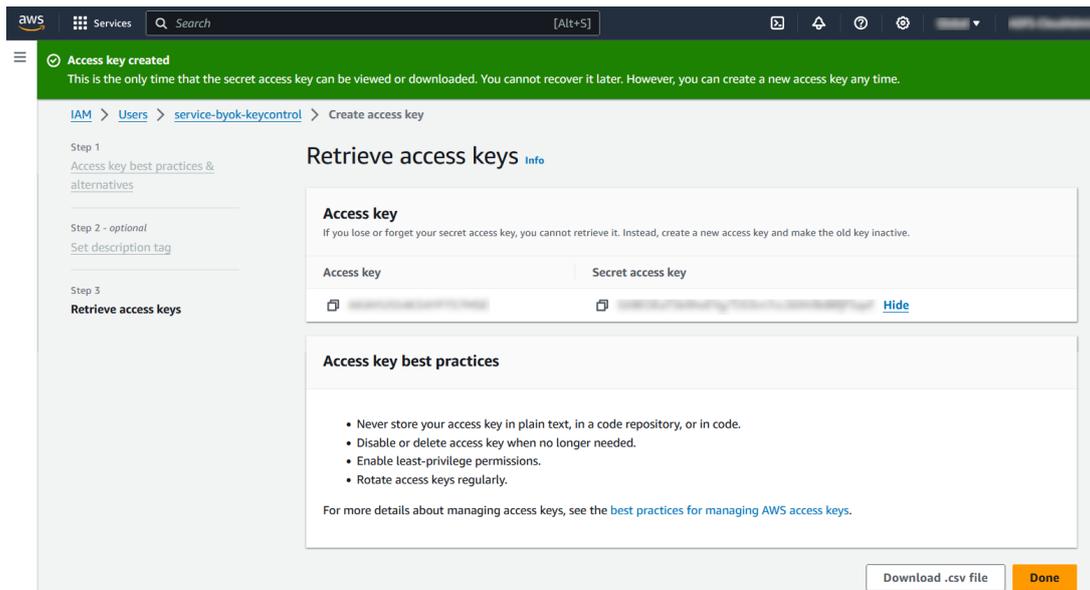
Entrust KeyControl gives you the ability to rotate the access keys. You can set the rotation schedule later on, in [Create an AWS CSP account](#).



11. In the **Set description tag - optional** window, enter a description tag if desired. Then select **Create access key**.



12. In the **Retrieve access key** window, select **Download .csv file** to download a file containing the **Access key** and **Secret access key**. Save these keys. You will need them to [Create an AWS CSP account](#). Then select **Done**.



---

# Chapter 4. Integrate BYOK for AWS Key Management Service and Entrust KeyControl

## 4.1. Create an AWS CSP account

1. Sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **CSP Accounts** tab.
3. In the **Actions** pull down menu, select **Add CSP Account**.
4. In the **Add CSP Account** window, enter the **Name** and **Description**.
5. In the **Admin Group** pull-down menu, select **Cloud Admin Group**.
6. In the **Type** pull-down menu, select **AWS**.
7. In the **AWS Access Key ID** text box, enter the **Access key** created in [Create AWS AIM user](#).
8. In the **AWS Secret Access Key** text box, enter the **Secret access key** created in [Create AWS AIM user](#).
9. In the **Default region**, choose your AWS region. Then select **Continue**.

For example:

Add CSP Account ✕

Details Schedule

Name \*

Description

Admin Group \*

Type \*

AWS Access Key ID \*

AWS Secret Access Key \*

Default Region ⓘ

10. In the **Schedule** tab, enter your organization’s standard rotation schedule for the access keys. Then select **Apply**.

Add CSP Account ✕

Details Schedule

Define a schedule for which access keys are rotated.

Rotation Schedule \*

Never  Define Schedule

Every   (max limit is 1096 days)

11. Notice the newly created CSP account.



## 4.2. Create a key set in KeyControl

1. sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **Key Sets** tab.
3. In the **Actions** pull down menu, select **Create Key Set**.
4. In the **Choose the type of keys in this key set:** window, select **AWS Key**.
5. In the **Create Key Set** window, enter a **Name** and **Description**. In the **Admin Group** pull-down menu, select **Cloud Admin Group**. Then select **Continue**.

For example:

Create Key Set ✕

Details   CSP Account   HSM   Schedule

**Name \***

**Description**

**Admin Group \***

6. In the **CSP Account** tab, select the CSP account created in [Create an AWS CSP account](#). Check **Use as External Key Store** to allow Entrust KeyControl to encrypt and decrypt the KMS keys. Then select **Continue**.

For example:

**Create Key Set** ✕

---

Details CSP Account HSM Schedule

---

CSP Account \*  
Choose an existing CSP Account or add a new one to use with this Key Set.

AWSBYOKKeyControl ▼

[+ Add CSP Account](#)

External Key Store

Enabling external key store allows KeyControl to encrypt and decrypt KMS keys.

Use as External Key Store

Cancel Continue

- In the **HSM** tab, check **Enable HSM** if an HSM is configured. Then select **Continue**.

For example:

**Create Key Set** ✕

---

Details CSP Account HSM Schedule

---

 There is no HSM configured. HSM needs to be configured in Settings before it can be enabled in the Key Set.

**Enable HSM**

If checked, the HSM linked to KeyControl will be used for generating cryptographic material for Cloudkeys in this Key Set

Cancel Test Connection Continue

See [Integrating with an HSM](#) for additional information.

- In the **Schedule** tab, select a **Rotation Schedule** matching the selection made during [Create an AWS CSP account](#). Then select **Apply**.

For example:

×

## Create Key Set

Details
CSP Account
HSM
Schedule

Default CloudKey rotation schedule presented during CloudKey creation.

Rotation Schedule \*

Other
▼

Every   days  (max limit is 1096 days)

Cancel
Apply

9. Notice the newly created key set.

For example:

Key Set Name	Description	Admin Group	Type	Keys
AWSBYOKKeyControl	AWS BYOK integration with KeyControl	Cloud Admin Group	AWS	0

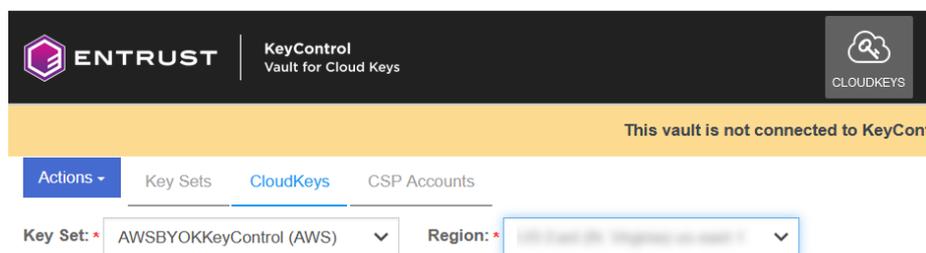
For further information, refer to [Creating a Key Set](#) in the KeyControl online documentation.

## Chapter 5. Test the integration

### 5.1. Create a cloud key in KeyControl

1. Sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **CloudKeys** tab.
3. In the **Key Set** pull-down menu, select the key set created in [Create a key set in KeyControl](#). In the **Region** pull-down menu, select your region.

For example:



Multi-region keys will be supported in a future release of Entrust KeyControl.

4. In the **Actions** pull down menu, select **Create CloudKey**. The **Create CloudKey** window appears.
5. In the **Details** tab, enter the **Name** and **Description**. Then select **Continue**.

For example:

×

### Create CloudKey

Details
Purpose
Access
Schedule

Type **AWS**

Key Set **AWSBYOKKeyControl**

Region **us-east-1**

Name \*

Description

Cancel
Continue

- In the **Purpose** tab, select from the **Purpose** and **Algorithm** pull-down menus. Then select **Continue**.

For example:

×

### Create CloudKey

Details
Purpose
Access
Schedule

Choosing a purpose will determine the key type and algorithm selection

Purpose \*

Algorithm \*

Cancel
Continue

- In the **Access** tab, select the service account created in [Create AWS AIM user](#) in box the **Administrator** and **Users** text box. Then select **Continue**.

For example:

**Create CloudKey** [Close]

Details Purpose **Access** Schedule

**Administrators**  
Choose users (AWS IAM users) who should have administrative rights to the key.  
service-byok-keycontrol [X] Add an Administrator

**Users**  
Choose users (AWS IAM users) who can use key to encrypt/decrypt.  
service-byok-keycontrol [X] Add a User

Cancel Continue

8. In the **Schedule** tab, select your **Rotation Schedule** and **Expiration** date. Then select **Apply**.

For example:

**Create CloudKey** [Close]

Details Purpose Access **Schedule**

**Rotation Schedule \***  
Define a schedule for which the CloudKey will be rotated.  
Inherit from keyset (Once 7 days) [v]

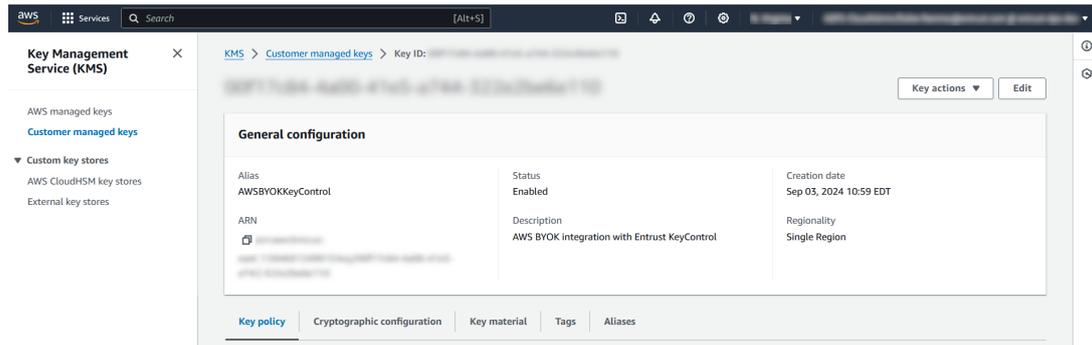
**Expiration \***  
Define when the CloudKey should be expired.  
 Never  Choose a date

Cancel Apply

9. Notice the newly created cloud key.

CloudKey Name	Description	Expires	Cloud Status
AWSBYOKKeyControl	AWS BYOK integration with Entrust KeyControl	Never	AVAILABLE

10. Verify the cloud key is visible in the AWS Key Management Service (KMS).



For further information, refer to [Creating a CloudKey](#) in the KeyControl online documentation.

## 5.2. Create a cloud key in AWS Key Management Service

1. In AWS, navigate to **Services > Key Management Service > Customer managed keys**. Then select the **Create key** icon.
2. In the **Configure key** window, select the **Key type** and **Key usage**. Then expand the **Advance options** and select the **Key material origin**. For **Regionality** select the **Single-Region key** radio button. Then select **Next**.

For example:

The screenshot shows the 'Configure key' page in the AWS IAM console. The page is divided into several sections:

- Step 1: Configure key** (Current step)
- Step 2: Add labels**
- Step 3: Define key administrative permissions**
- Step 4: Define key usage permissions**
- Step 5: Review**

The main configuration area includes:

- Key type:**  Symmetric (A single key used for encrypting and decrypting data or generating and verifying HMAC codes) and  Asymmetric (A public and private key pair used for encrypting and decrypting data, signing and verifying messages, or deriving shared secrets).
- Key usage:**  Encrypt and decrypt (Use the key only to encrypt and decrypt data.) and  Generate and verify MAC (Use the key only to generate and verify hash-based message authentication codes (HMAC)).
- Advanced options:**
  - Key material origin:**  KMS - recommended (AWS KMS creates and manages the key material for the KMS key.) and  External (Import Key material) (You create and import the key material for the KMS key.).
  - AWS CloudHSM key store (AWS KMS creates the key material in the AWS CloudHSM cluster of your AWS CloudHSM key store.)
  - External key store (The key material for the KMS key is in an external key manager outside of AWS.)
- Regionality:**  Single-Region key (Never allow this key to be replicated into other Regions) and  Multi-Region key (Allow this key to be replicated into other Regions).

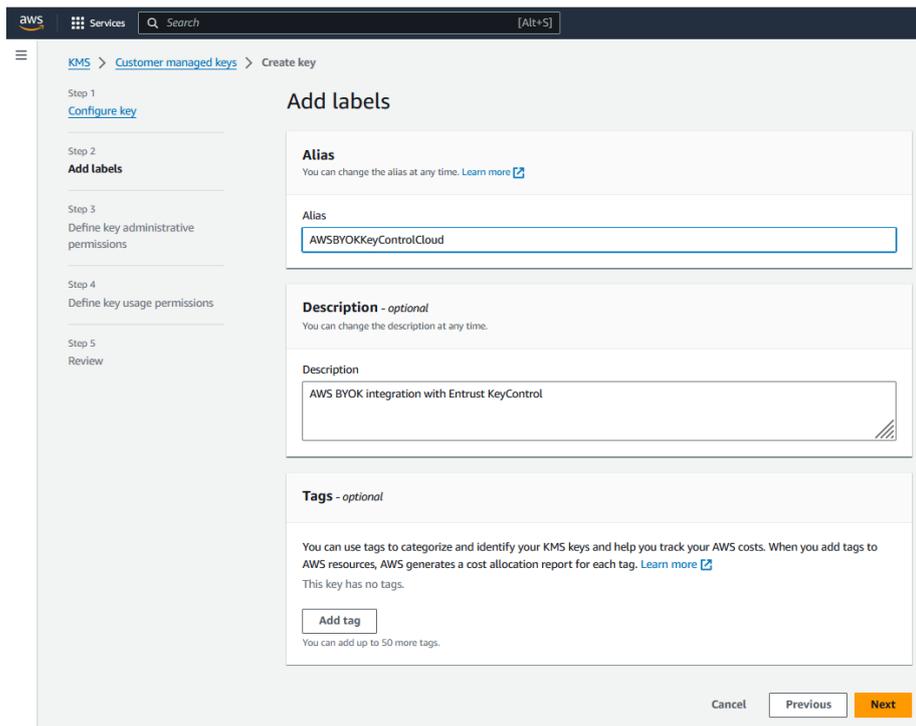
At the bottom right, there are 'Cancel' and 'Next' buttons.



Multi-region keys will be supported in a future release of Entrust KeyControl.

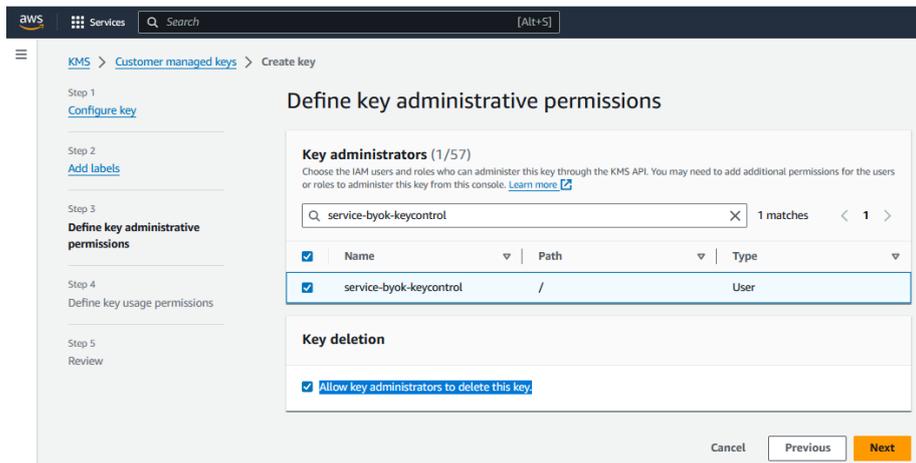
3. In the **Add labels** window, enter the **Alias** and **Description**. Then select **Next**.

For example:



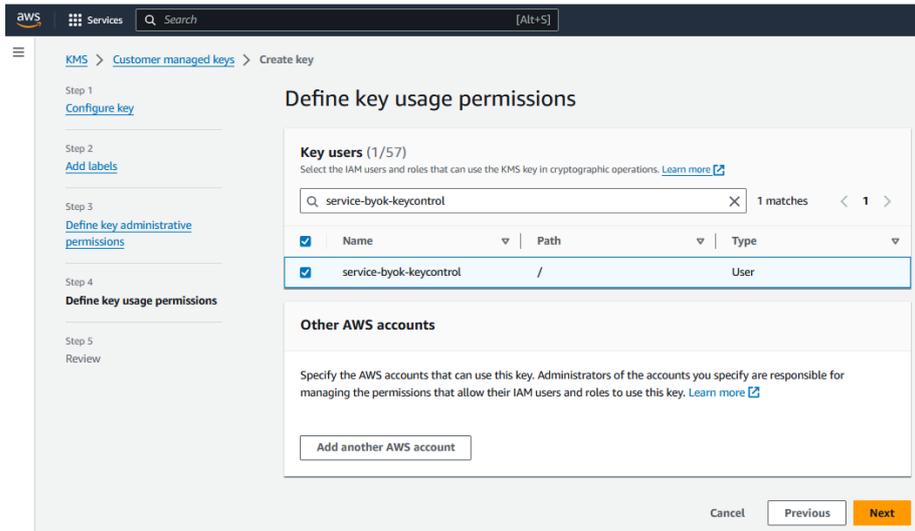
- In the **Define key administrative permissions** window, enter the service account name created in [Create AWS AIM user](#) and select it. In the **Key deletion** section, check **Allow key administrators to delete this key**. Then select **Next**.

For example:

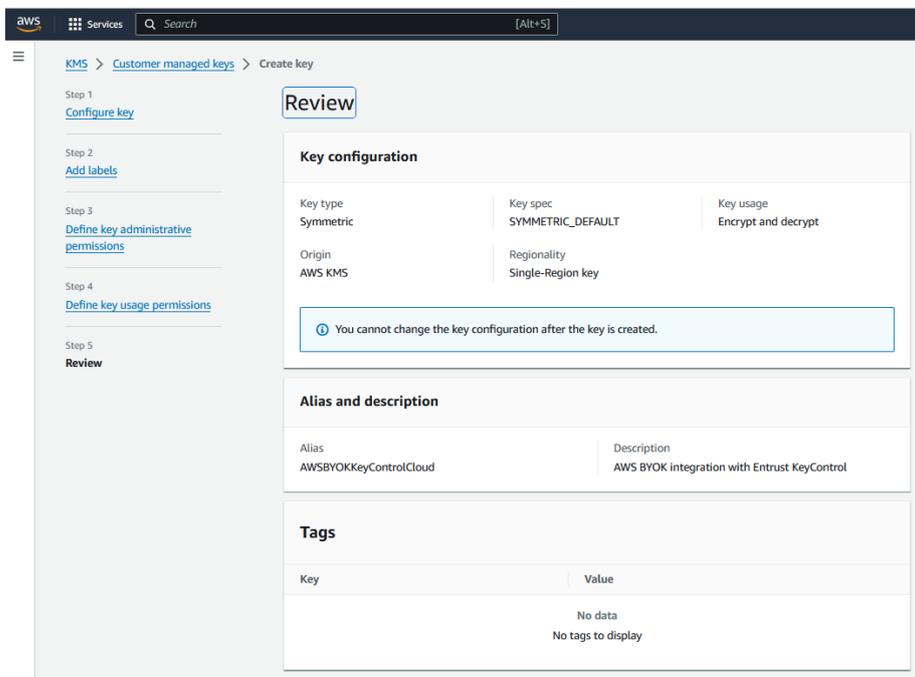


- In the **Define key usage permissions** window, enter the service account name created in [Create AWS AIM user](#) and select it. Then select **Next**.

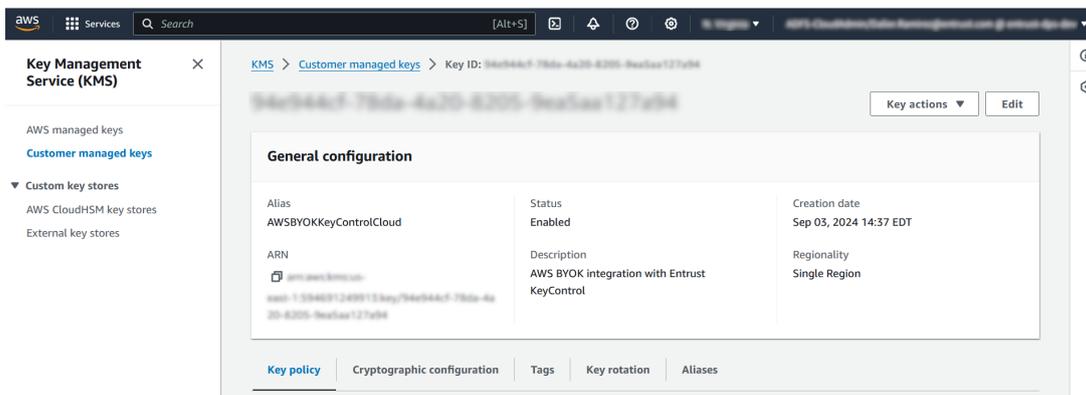
For example:



6. In the **Review** window, select **Finish**.

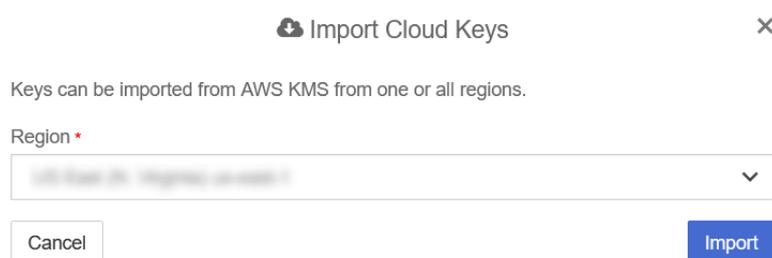


7. Notice the new key in the AWS KMS.

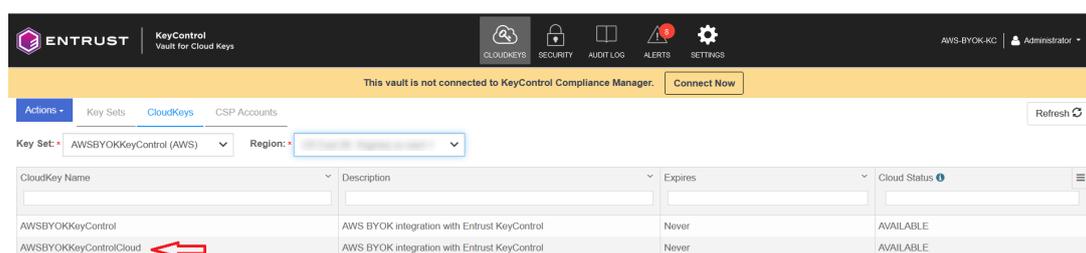


To import the cloud key in KeyControl:

1. Sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **Key Sets** tab. Then select the key set created in [Create a key set in KeyControl](#).
3. In the **Actions** pull down menu, select **Import CloudKeys**. The **Import Cloud Keys** window appears.
4. Select your region. Then select **Import**.



5. Select the **CloudKeys** tab and select **Refresh**.
6. Verify the imported key is visible in the Entrust KeyControl cloud keys vault.



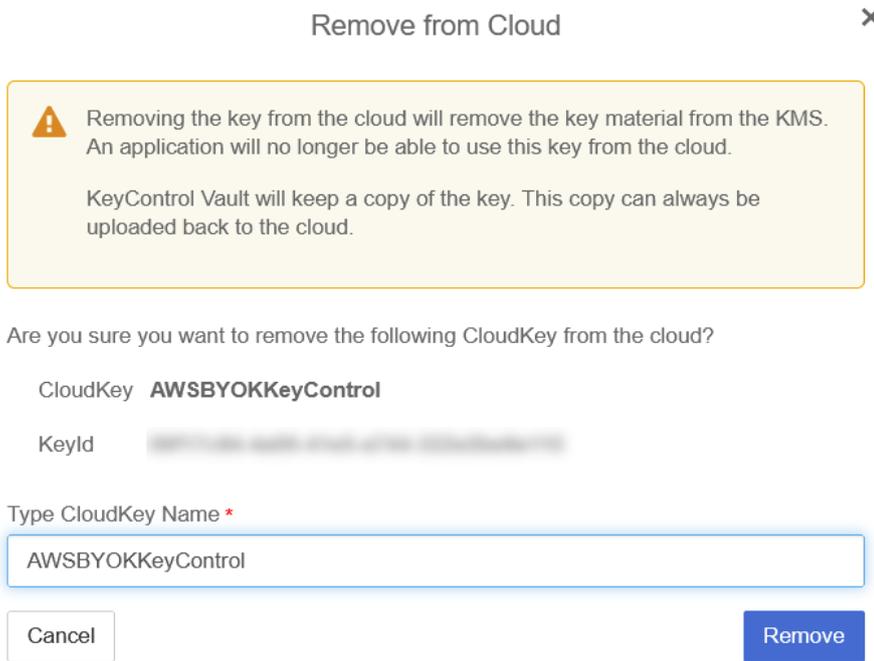
For further information, refer to [Importing CloudKeys](#) in the KeyControl online documentation.

### 5.3. Remove a cloud key in KeyControl

1. Sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **CloudKeys** tab.
3. In the **Key Set** pull-down menu, select the key set created in [Create a key set in KeyControl](#). In the **Region** pull-down menu, select your region.
4. Select the key to be removed from the cloud.
5. In the **Actions** pull down menu, select **Remove from Cloud**. The **Remove from Cloud** dialog appears.

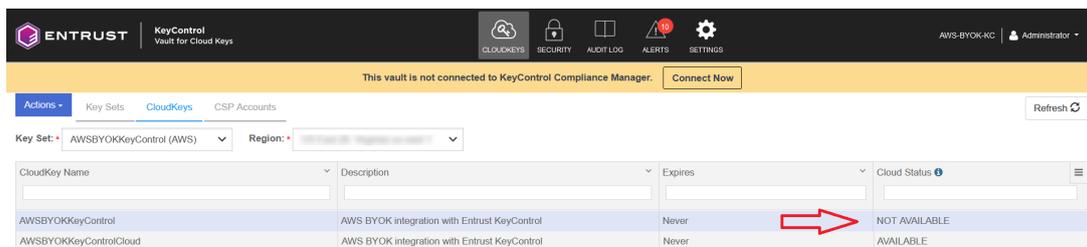
- 6. Type the name of the key in the **Type CloudKey Name** text box. Then select **Remove**.

For example:

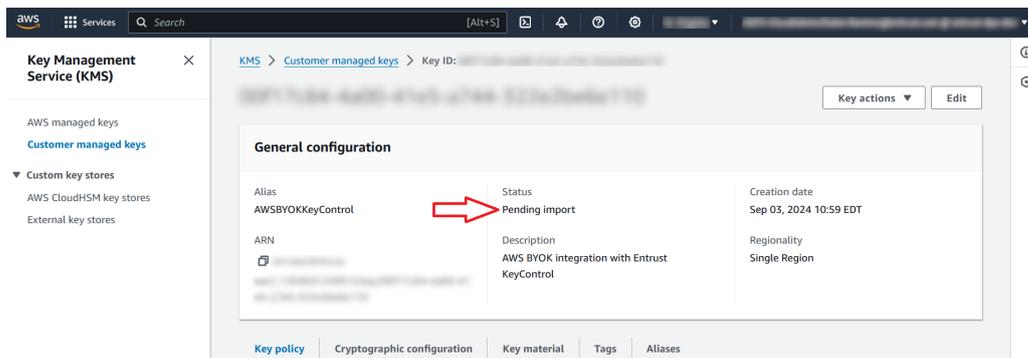


- 7. Notice the key **Cloud Status** becomes **NOT AVAILABLE**.

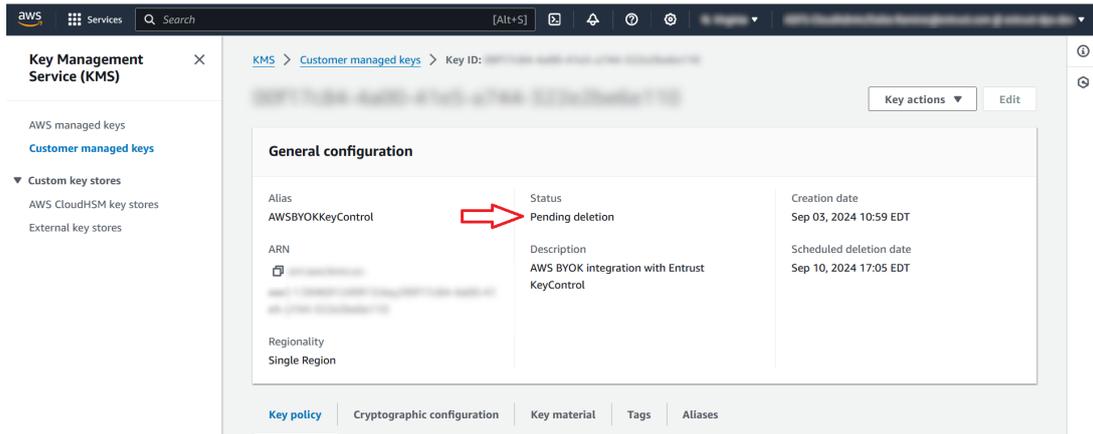
For example:



- 8. Verify the key **Status** changed in AWS KMS.



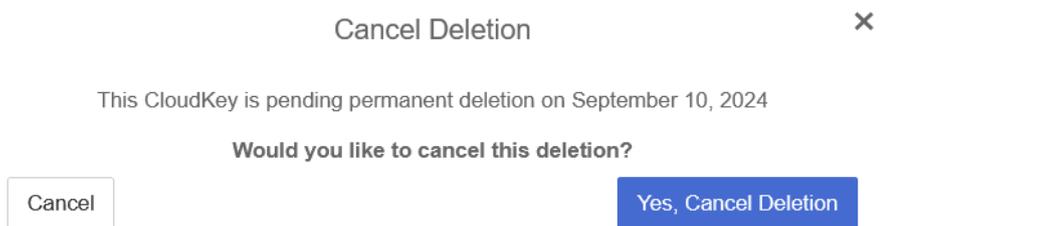




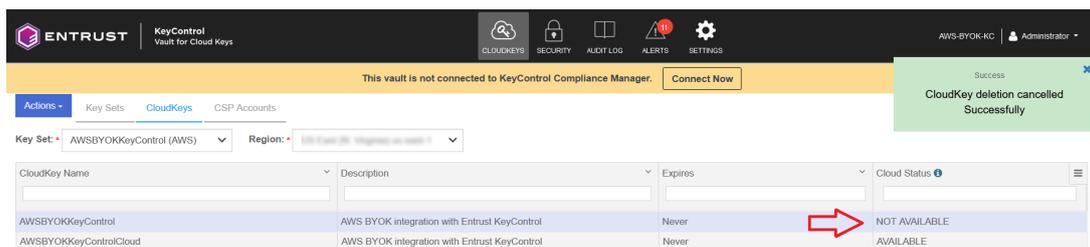
For further information, refer to [Deleting a CloudKey](#) in the KeyControl online documentation.

## 5.5. Cancel a cloud key deletion in KeyControl

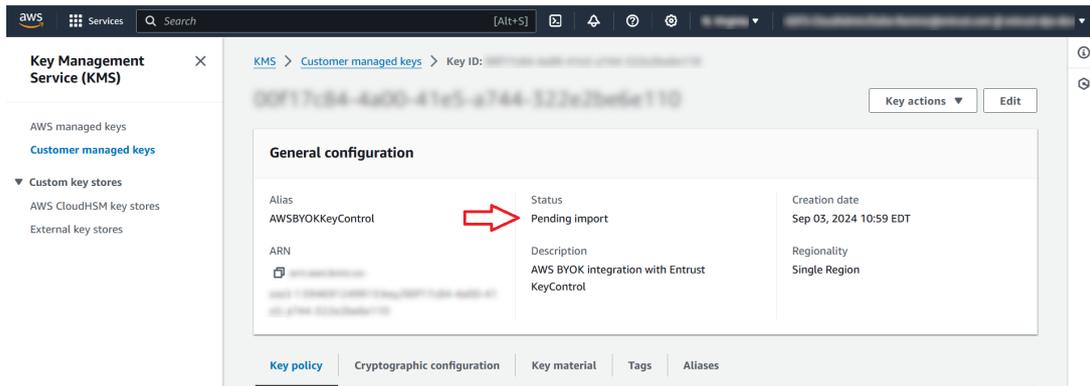
1. Sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **CloudKeys** tab.
3. In the **Key Set** pull-down menu, select the key set created in [Create a key set in KeyControl](#). In the **Region** pull-down menu, select your region.
4. Select the key who's scheduled deletion is going to be cancelled.
5. In the **Actions** pull down menu, select **Cancel Deletion**. The **Cancel Deletion** dialog appears.
6. Select **Yes, Cancel Deletion**.



7. Notice the key **Cloud Status** becomes **NOT AVAILABLE**.

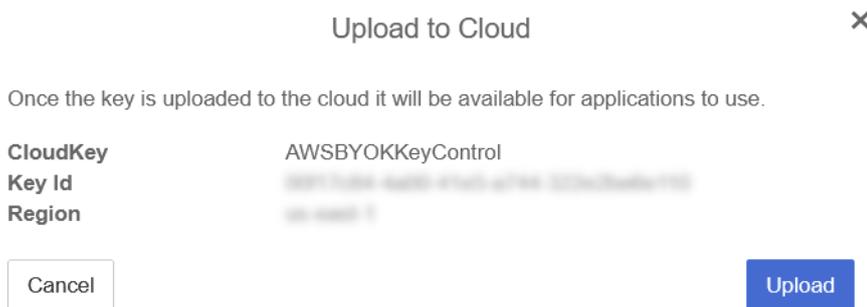


8. Verify the key **Status** changed in AWS KMS.

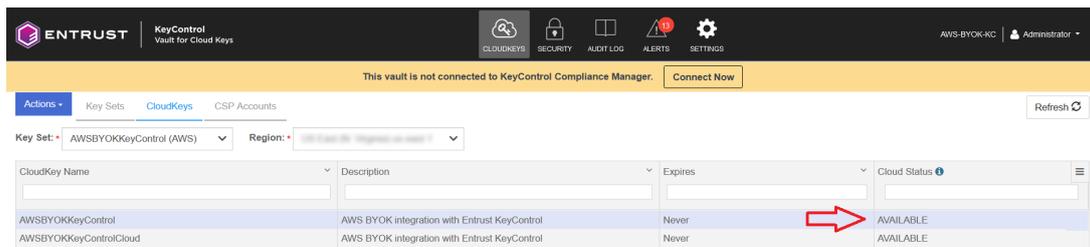


9. Back in Entrust KeyControl, In the **Actions** pull down menu, select **Upload to Cloud**. The **Upload to Cloud** dialog appears.

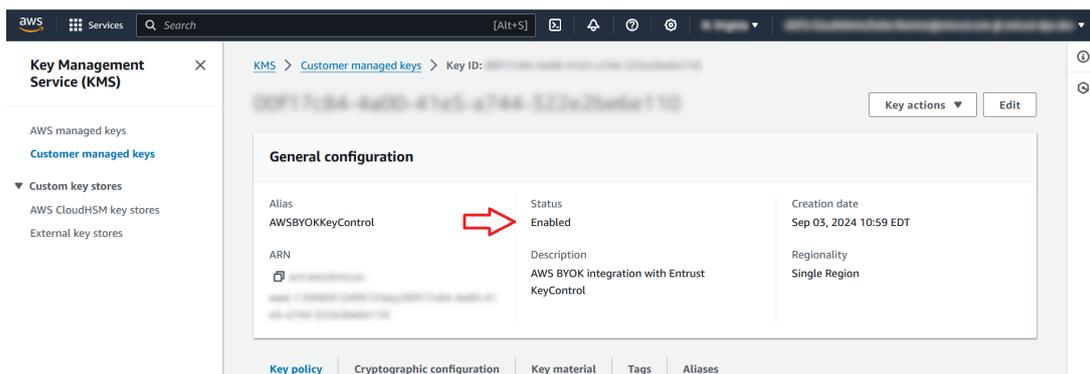
10. Select **Upload**.



11. Notice the key **Cloud Status** becomes **AVAILABLE**.



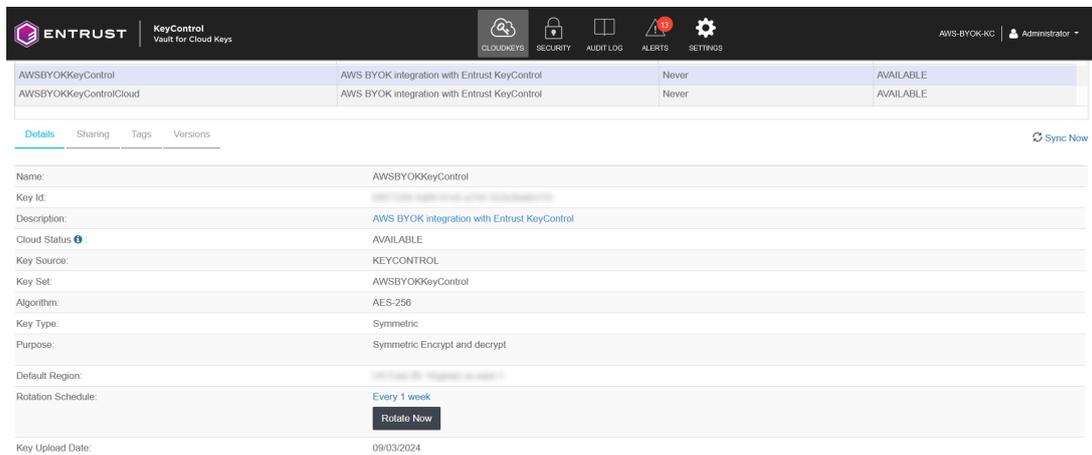
12. Verify the key **Status** changed in AWS KMS.



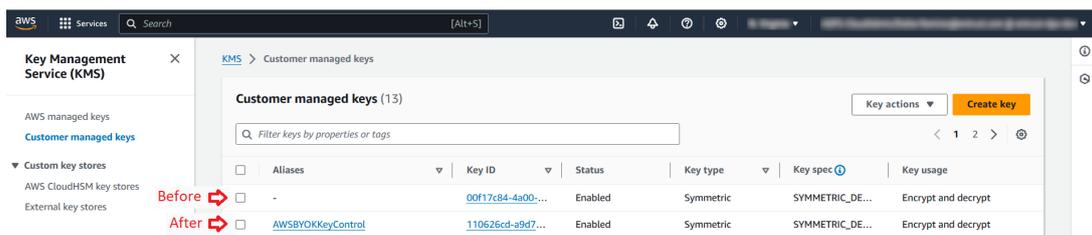
For further information, refer to [Canceling a CloudKey Deletion](#) in the KeyControl online documentation.

## 5.6. Rotate a cloud key in KeyControl

1. Sign in to the cloud keys vault URL created in [Create a Cloud Keys Vault in the KeyControl](#).
2. Select the **CloudKeys** tab.
3. In the **Key Set** pull-down menu, select the key set created in [Create a key set in KeyControl](#). In the **Region** pull-down menu, select your region.
4. Select the key to be rotated.
5. Scroll down, select the **Details** tab, and select the **Rotate Now** icon.



6. Verify that the key has been rotated in AWS KMS.



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## Chapter 6. Integrating with an HSM

For guidance on integrating the Entrust KeyControl with a Hardware Security Module (HSM), consult with your HSM vendor. If you are using an Entrust nShield HSM, refer to the [Entrust KeyControl nShield HSM Integration Guide](#) available at [Entrust documentation library](#).

## Chapter 7. Additional resources and related products

7.1. nShield Connect

7.2. nShield as a Service

7.3. KeyControl

7.4. KeyControl BYOK

7.5. KeyControl as a Service

7.6. Entrust products

7.7. nShield product documentation