Microsoft SQL Server TDE and Entrust CSP Key Management Vault

Integration Guide

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Table of Contents

Chapter 1. Introduction

This document describes the procedure for integrating the Entrust Cryptographic Security Platform (CSP) Vault with Microsoft SQL Server. After integration, the Entrust CSP Vault serves as the Extensible Key Management (EKM) provider for Microsoft SQL Server Transparent Data Encryption (TDE).

1.1. Product configurations

Entrust has successfully tested the integration of Microsoft SQL Server TDE with the Entrust CSP Vault in the following configurations:

Product	Version
Operating System	Windows Server 2025 24H2 (26100.33158)
Microsoft SQL Server	Enterprise Edition 2025
SQL Server Management Studio	22.8.2
Entrust CSP	1.4
Entrust CSP Vault	10.5.3

1.2. Requirements

You must have access to the Entrust TrustedCare Portal, which is available to customers under active maintenance. To request an account, contact nshield.support@entrust.com.

Before beginning the integration, familiarize yourself with the documentation for the following products:

- CSP Compliance Manager 10.5.3
- Cryptographic Security Platform Vault v10.5.3

Chapter 2. The test environment

The test environment consisted of four virtual machines:

- Entrust CSP Compliance Manager server
- Entrust CSP Vault server (two nodes)
- Windows Server hosting the SQL database server and management tools

The Entrust CSP Compliance Manager server was deployed and configured as described in CSP Compliance Manager 10.5.3 - Installation and Administration.

The Entrust CSP Vault was implemented as a two-node cluster. The cluster was deployed and configured as described in Cryptographic Security Platform Vault v10.5.3 Online Documentation Set.

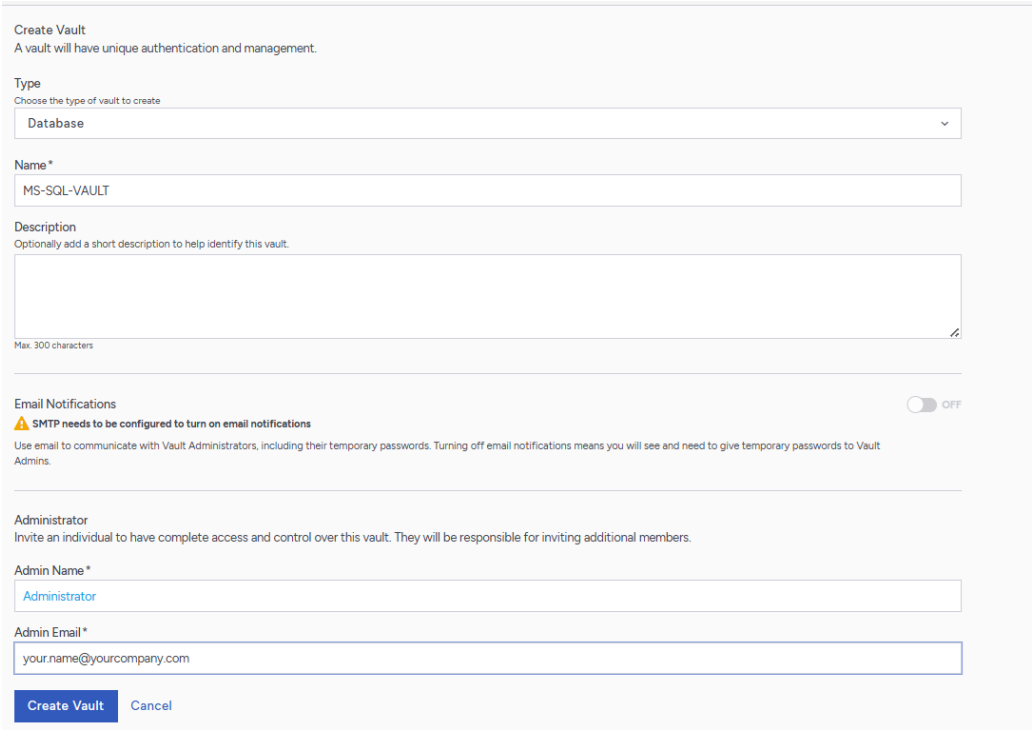
Microsoft SQL Server was deployed as a standalone instance on a single machine. A database named TestDatabase was created for this integration.

Chapter 3. Configure the Entrust CSP Vault

Use the following procedure to create and configure a vault.

1. Sign in to the Entrust CSP Vault management web GUI.
2. Select the **+ Create Vault** icon.
3. For **Type**, select **Database** from the drop-down menu.
4. Enter a vault name and description, an administrator name and email, and then select **Create Vault**.

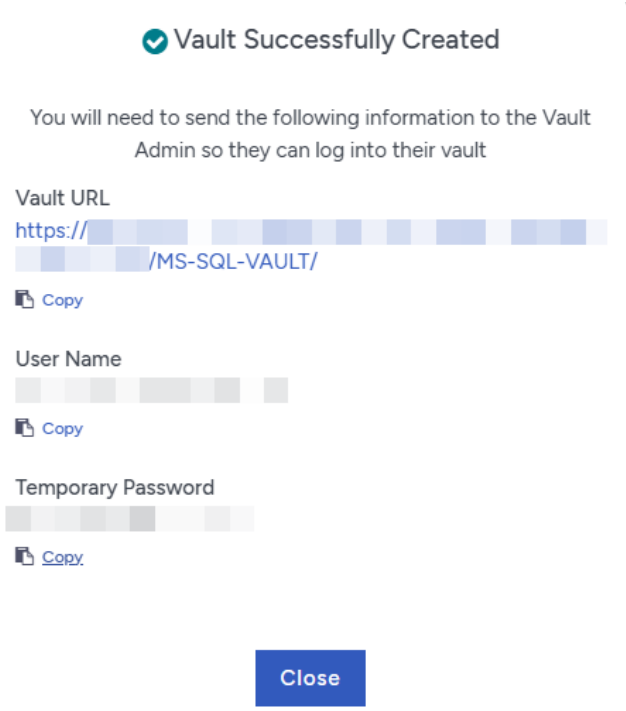
   For example:



   This creates the vault.

5. Copy and save the **Vault URL** and **Temporary Password**.

   For example:



6. Bookmark the vault URL in the browser on the Microsoft SQL Server host.
7. Sign in to your vault for the first time with your temporary administrator credentials.
8. Enter the new administrator password, and then select **Close**.
9. Sign in again with your new password.

3.1. Connect the database vault to the Compliance Manager node

In production systems, Entrust recommends that you connect the vault to Compliance Manager, however you can complete the integration without doing so.

Set up the database vault as a data source in the Compliance Manager.

Data sources are organized into "collections" in the Cryptographic Security Platform Compliance Manager. Each collection can contain one or more data sources. All data sources are added to the default collection when they are first connected.

Data sources include the Discovery Source Vault and the entities that are being analyzed for compliance. These entities include CSP Vaults (CloudKeys, Secrets, KMIP, and others), File Encryption, and KeySafe 5. Data sources are not managed in the Compliance Manager; however, when a data source is connected, metadata about the cryptographic assets within that data source is synchronized with the Compliance Manager every 8 hours.

For more information about this process, refer to Collections and Data Sources.

Chapter 4. Integrate the Microsoft SQL Server with the Entrust CSP Vault

For reference on how to manually install and configure the Cryptographic Security Platform Vault and Microsoft SQL Server for TDE, see Microsoft SQL Server Manual Installation and Configuration.

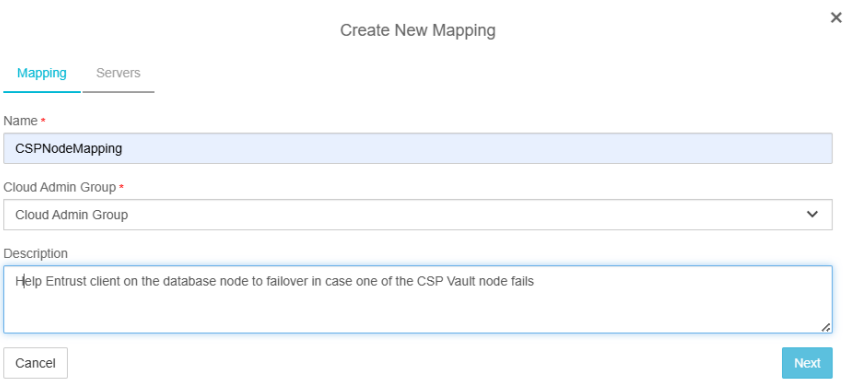
This guide describes the automated setup and configuration of the database CSP Vault with Microsoft SQL Server, and vice versa. Follow the steps below:

1. Create Mapping
2. Download TDE Script Bundle
3. Entrust CSP Vault client setup on the Microsoft SQL server instance
4. Encrypt the Database on the SQL Server Node
5. Rotate the Master Key

4.1. Create Mapping

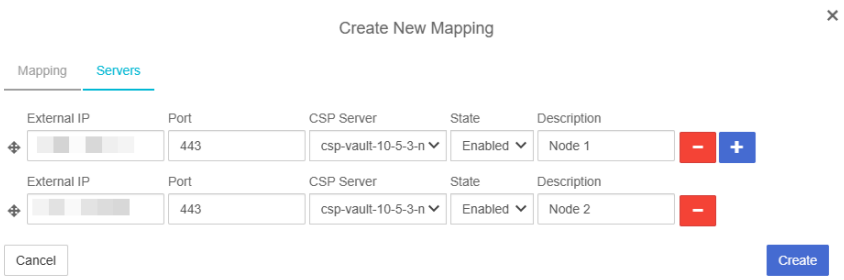
1. Sign in to your Database CSP Vault web GUI.
2. Navigate to **Workloads**.
3. Select the **Mappings** tab.
4. From the **Actions** menu, select **Create Mapping**.
5. In the **Create New Mapping** dialog, on the **Mapping** tab, complete the following fields and then select **Next**:
    a. **Name**: Enter a name for the mapping.
    b. **Cloud Admin Group**: Select the default option, **Cloud Admin Group**.
    c. **Description**: Enter a description for the mapping.

    For example:



6. On the **Servers** tab, provide the following information for each node in the CSP Vault cluster:
   a. **External IP**: Enter the IP address of the node.
   b. **Port**: Enter 443.
   c. **CSP Server**: Select the CSP Vault server.
   d. **State**: Select **Enabled**.
   e. **Description**: Enter a description for the node.

   For example:

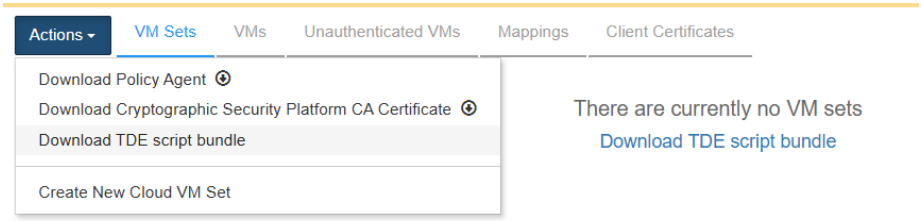


7. Select **Create**, and then select **Close**. The new mapping appears in the mappings list.

4.2. Download TDE Script Bundle

1. Sign in to your Database CSP Vault web GUI.
2. Navigate to **Workloads**.
3. Select the **VM Sets** tab.
4. From the **Actions** menu, select **Download TDE script bundle**.

   For example:

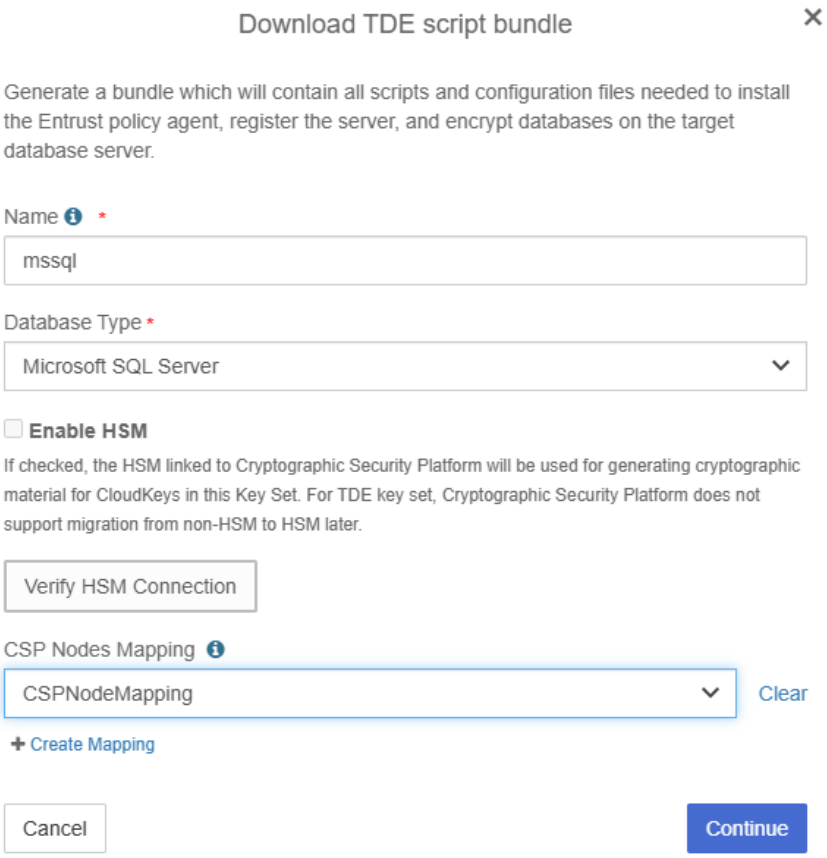


5. In the **Download TDE Scripts Bundle** dialog, complete the following fields and then select **Continue**:
   a. **Name**: Enter the prefix to be used for the keyset and CVMset.
   For example, entering `mssql` produces `mssql_keyset` and `mssql_cvmset`.
   b. **Database Type**: Select **Microsoft SQL Server**.

c. **Enable HSM**: Select this checkbox only if an HSM is configured and the TDE master keys are to be protected by it. When enabled, the HSM connection must be verified before continuing.

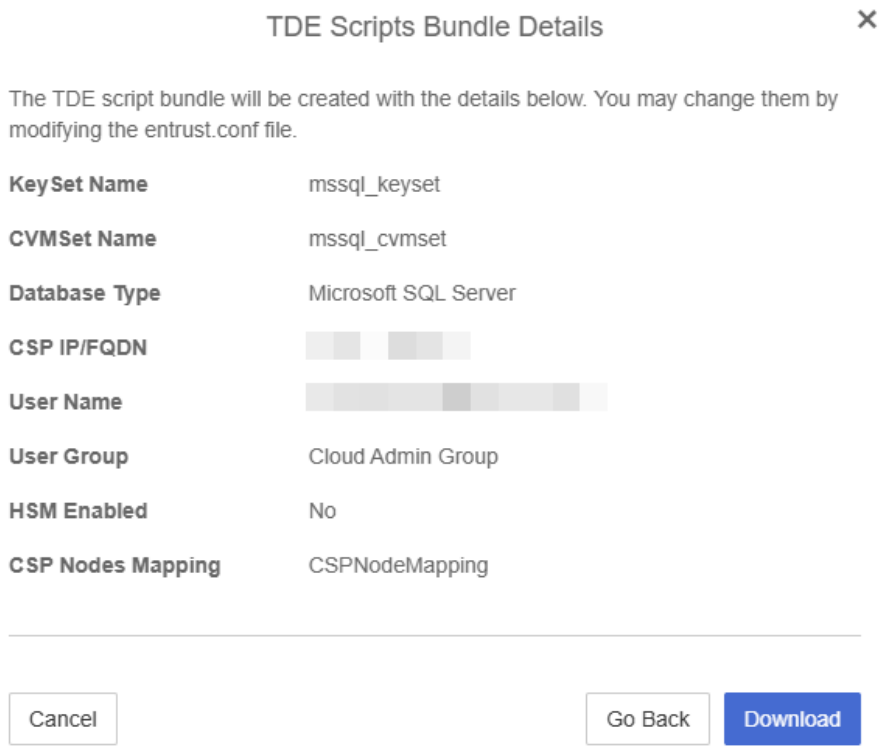
d. **CSP Nodes Mapping**: Select the mapping created previously. If no mapping has been created, you can leave the field empty.

   For example:



6. Review the **TDE Scripts Bundle Details** and select **Download**.

   For example:



This downloads a ZIP archive named after the value entered in the **Download TDE Scripts Bundle** dialog, for example, `mssql.zip`.

7. Save this archive. It will be used on every Microsoft SQL Server instance in the deployment.
8. Transfer the TDE script bundle to the Microsoft SQL Server host and place it in the `Downloads` folder.

4.3. Entrust CSP Vault client setup on the Microsoft SQL server instance

1. Sign in to the Microsoft SQL Server host.
2. Confirm that the TDE bundle is present in the `Downloads` folder as described in the previous section.

   The bundle is a ZIP archive named `<name>.zip`, where `<name>` matches the value supplied when the bundle was downloaded (for example, `mssql.zip`).

3. Open a PowerShell session.
4. Extract the bundle.

```
PS C:\Users\Administrator> cd ~/Downloads
PS C:\Users\Administrator\Downloads> mkdir tde
```

```
    Directory: C:\Users\Administrator\Downloads


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----         8/12/2026   9:44 AM                tde

PS C:\Users\Administrator\Downloads> cd tde
PS C:\Users\Administrator\Downloads\tde> mv ..\mssql.zip .
PS C:\Users\Administrator\Downloads\tde> Expand-Archive -Path .\mssql.zip -DestinationPath .
PS C:\Users\Administrator\Downloads\tde> ls


    Directory: C:\Users\Administrator\Downloads\tde


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----          5/9/2026   1:43 PM          72820 encryptclust.ps1
-a----         8/12/2026   1:29 PM           2748 entrust.conf
-a----         8/12/2026   9:34 AM          56468 mssql.zip
-a----          5/9/2026   1:43 PM          53361 open_db_key.ps1
-a----          5/9/2026   1:43 PM          45073 setup.ps1
```

5. Edit `entrust.conf` to match the target environment.

   Most values in `entrust.conf` are pre-populated. Some parameters, however, are specific to the Microsoft SQL Server deployment and must be set by the database administrator:

   - `db_server_name`: The database server name. In this environment, set it to `MSSQLCSPW25\MSSQLCSP`.

   The `entrust.conf` file used in this integration

```
#
# kind of a cluster or setup name for your MSSQL failover cluster
# it should be unique in a vault
# script uses this to generate the name of keyset and cvmset
# Make sure these same parameters are used from all the nodes in your MSSQL cluster and DR nodes
#
dbset_name = mssql

#
#
#
# -----> DO NOT USE " or ' to quote the string <-----
# -----> Lines starting with # are comments, but you cannot comment out only part of a line <-----
#
#
#
# KeyControl parameters
# ---------------------
#
kcv_ip_or_fqdn = xx.xxx.xxx.115
#
# If KeyControl mapping has been setup on the KC cluster, it can be provided here
#
kc_mapping = CSPNodeMapping
#
```

```
#
# If KeyControl is configured with HSM then it can be enabled using "yes" as value
# if not specified here then the default value is yes if KC has hsm enabled
#
enable_hsm = no
#

#
# Vault parameters
# ---------------------
#
vaultid = 1a6c49fb-45c1-4b97-8e2c-2f3e4c1137bd
user_name = xxxx.xxxx@yourcompany.com
#
# Uncomment the password parameter, if you want to set it here
# if you do not provide password for vault admin then setup script will prompt you
#
# password = password123
#
user_group = Cloud Admin Group

#
# Microsoft SqlServer parameters
# ------------------------------
# The script uses "Windows Authentication", so the credentials of the admin running the script will be used
# In order to use "SQL server authentication", you can set sysadmin_user and sysadmin_password parameters
#
# if sysadmin_user is set then script will call SQL query under the context of this user
#
# For Example
# ------------
# db_server_name = MSSQLSERVER1\MSSQLSERVER1
# sysadmin_user = QA\Administrator
# sysadmin_password = Password123
#
db_server_name = MSSQLCSPW25\MSSQLCSP
#
# Optional parameters, uncomment if you want to set them
# used for --- SQL server authentication
#
# sysadmin_user = <sysadmin_user>
# sysadmin_password = <sysadmin_password>
#

#
# these are the default encryption parameters
# tde_algorithm:   tde master key algorithm
# encryption_algo: algorithm used for data encryption
#
tde_algorithm = RSA_2048
encryption_algo = AES_256


#
# Installation directory
# Please do not change as scripts can not handle non default value yet
#
installation_directory = C:\Program Files\hcs

#
# TDE config file
# this is where the script stores the Access token
# same file path is used on all cluster nodes
#
# By default the script stores the TDE config file here
# ${installation_directory}\tde_configs\${dbset_name}.txt
```

```
#
# for example C:\Program Files\hcs\tde_configs\mssql.txt
#
# Uncomment the following line, if you want to store it in custom path
#
# tde_config_file = C:\Users\Administrator.QA\sqltde.txt
# keyset_name = custom_keyset_name
# cvmset_name = custom_cvmset_name
#
```

6. Save the changes to `entrust.conf`.

4.3.1. Set up the client

1. Run the `setup.ps1` PowerShell script:

```
Usage: setup.ps1 <first|other> <config file>
       first -- for first node, keyset/vmset are created with this option
       other -- for subsequent nodes.
```

For example:

```
PS C:\Users\Administrator\Downloads\tde> .\setup.ps1 -node first -config entrust.conf
```

Example output

```
Logging debug trace and output to: C:\Users\Administrator\Downloads\tde\trace\setup.log

First node configuration in MSSql cluster

Enter password for your.name@yourcompany.com: ***********
Login to  xx.xxx.xxx.115 as your.name@yourcompany.com
Successfully logged in to  xx.xxx.xxx.115 as your.name@yourcompany.com

Downloading installer for Entrust Policy Agent from xx.xxx.xxx.115
Installing Entrust Policy Agent
Successfully installed Entrust Policy Agent

Create cvmset mssql_cvmset
Successfully created cvmset mssql_cvmset

Create keyset mssql_keyset
Successfully created keyset mssql_keyset with guid 37922644-ecc1-4329-a2f5-50f6b95dc955

Register this VM to vault 1a6c49fb-45c1-4b97-8e2c-2f3e4c1137bd on kcv xx.xxx.xxx.115
vault admin is your.name@yourcompany.com and cvmset name is mssql_cvmset

Registered as mssqlcspw25 with KeyControl node(s) xx.xxx.xxx.115

Completing authentication for mssqlcspw25 on KeyControl node(s) xx.xxx.xxx.115

Authentication complete, machine ready to use
Getting KeyControl Mapping information

KeyControl Mapping: CSPNodeMapping
server description: Node 1, ip: xx.xxx.xxx.115, port: 443
server description: Node 2, ip: xx.xxx.xxx.116, port: 443
```

```
Updated KeyControl list with KeyControl nodes xx.xxx.xxx.115:443,xx.xxx.xxx.116:443
Enable TDE on this VM
Enabling tde will change permissions of some Files.

If you are enabling TDE for an Oracle database, follow the steps mentioned below from the Administritor
Guide.
"Administration Guide > KeyControl Vault for Databases > KeyControl with Oracle TDE > Configuring the
Oracle Server Database"
Successfully registered VM and enabled TDE

Creating TDE connector with name mssql_cvmset.mssqlcspw25.1353bfb3--fd69--4d86--b213--51b7f1a8ca8b
Successfully created TDE connector

Create Access Token
Successfully created access token

Saving access token in file C:\Program Files\hcs\tde_configs\mssql.txt
Setup complete


Please check the connection to KCV using command
    &'C:\Program Files\hcs\bin\check-connection.exe' 'C:\Program Files\hcs\tde_configs\mssql.txt'

Please reboot the VM now, before proceeding with database encryption
```

2. Verify the connection:

```
PS C:\Users\Administrator\Downloads\tde> &'C:\Program Files\hcs\bin\check-connection.exe' 'C:\Program
Files\hcs\tde_configs\mssql.txt'
```

Example output

```
Starting test

Initialize Provider                                                              ----- PASS
Open Session                                                                     ----- PASS
Get Provider Info: check buf size                                                ----- PASS
Get Provider Info: actual operation                                              ----- PASS

Provider version 1.1.0.0
Provider name Entrust KeyControl SQLEKM Provider

Get Algorithm Info: algId 1: check buf size                                      ----- PASS
Get Algorithm Info: algId 1: actual operation                                    ----- PASS
Get Algorithm Info: algId 2: check buf size                                      ----- PASS
Get Algorithm Info: algId 2: actual operation                                    ----- PASS
Get Algorithm Info: algId 3: check buf size                                      ----- PASS
Get Algorithm Info: algId 3: actual operation                                    ----- PASS
Get Algorithm Info: algId 4: check buf size                                      ----- PASS
Get Algorithm Info: algId 4: actual operation                                    ----- PASS
Create Key _rsa_2048_test_key_: check buf size                                   ----- PASS
Create Key _rsa_2048_test_key_: actual operation                                 ----- PASS
Get Key Info by Name _rsa_2048_test_key_: check buf size                         ----- PASS
Get Key Info by Name _rsa_2048_test_key_: actual operation                       ----- PASS
Get Key Info returns same thumbprint as create for _rsa_2048_test_key_           ----- PASS
Get Key Info by Thumbprint _rsa_2048_test_key_: check buf size                   ----- PASS
Get Key Info by Thumbprint _rsa_2048_test_key_: actual operation                 ----- PASS
Get Key Info by thumbprint returns same name _rsa_2048_test_key_                 ----- PASS
Get Key Info by Name: check buf size                                             ----- PASS
Get Key Info by Name: actual operation                                           ----- PASS
Get Export Key: check buf size                                                   ----- PASS
Get Export Key: actual operation                                                 ----- PASS
Encrypt size check                                                               ----- PASS
```

```
Encrypt                                                                    ----- PASS
Decrypt size check                                                         ----- PASS
Decrypt                                                                    ----- PASS
Drop Key: destroy_object                                                   ----- PASS
Get Key Info should fail for _rsa_2048_test_key_ after drop key: check buf size      ----- PASS
Get Key Info should fail for _rsa_2048_test_key_ after drop key: actual operation    ----- PASS
Get Key Info by Thumbprint _rsa_2048_test_key_ after drop key: check buf size        ----- PASS
Get Key Info by Thumbprint _rsa_2048_test_key_ after drop key: actual operation      ----- PASS
Import Key (not supported)                                                 ----- PASS
Close Session                                                              ----- PASS
Free Provider                                                              ----- PASS

Test successfully completed
```

3. Reboot the server.
4. After the server has rebooted, check the client status:

```
PS C:\WINDOWS\system32> hcl status

Summary
--------------------------------------------------------------------------------
KeyControl: xx.xxx.xxx.115:443
KeyControl list: xx.xxx.xxx..115:443 xx.xxx.xxx..116:443
Vault ID: 1a6c49fb-45c1-4b97-8e2c-2f3e4c1137bd
KeyControl Mapping: CSPNodeMapping
Status: Connected
Last heartbeat: Wed Aug 12 10:48:52 2026 (successful)
Certificate Expiration: Aug 12 14:12:39 2027 GMT
PS C:\WINDOWS\system32>
```

4.4. Encrypt the Database on the SQL Server Node

Run the following steps on the Microsoft SQL Server node that hosts the database to be encrypted.

1. Encrypt the database with the provided script:

```
PS> .\encryptclust.ps1 -database <my_test_db> -config .\entrust.conf
```

Where `-database` specifies the target database and `-config` specifies the configuration file.

The script validates the certificate chain when connecting to the database, so the certificate chain must be trusted. If the chain cannot be validated, pass the `-nocheckcert` option to bypass the check.

The following example encrypts a database called `TestDatabase`.

```
PS C:\Users\Administrator\Downloads\tde>.\encryptclust.ps1 -database TestDatabase -config .\entrust.conf
```

```
-nocheckcert
```

Example output

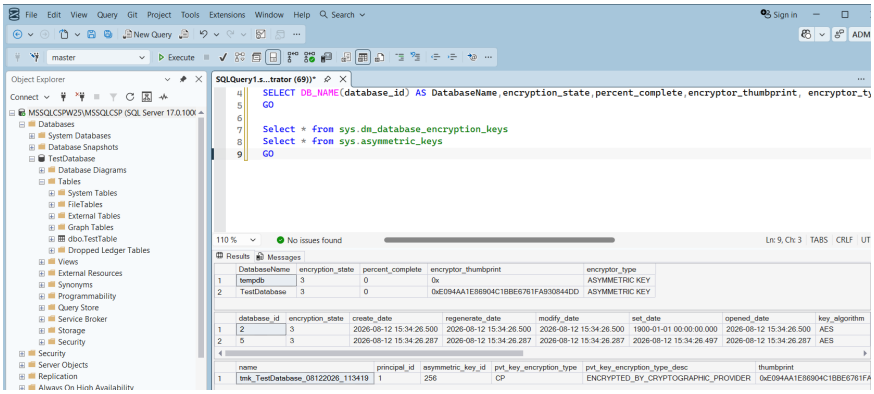
```
Logging debug trace and output to: C:\Users\Administrator\Downloads\tde\trace\encryptclust_3.log

Checking Active node: my node name is mssqlcspw25, configured server is MSSQLCSPW25\MSSQLCSP
Continuing execution with -nocheckcert flag set, ignoring certificate errors
                  \.............. Pass
Checking if database TestDatabase is present on server MSSQLCSPW25\MSSQLCSP
Changed database context to 'TestDatabase'.
                  \.............. Pass


################################################################################
  Encrypting database 'TestDatabase' with TDE master key
################################################################################

Database TestDatabase is not part of any Availability Group

Using this suffix for all keys, credentials and TDE logins -- 08122026_113419

Database TestDatabase is not encrypted, setting up fresh encryption


Creating key, login and credential in node     MSSQLCSPW25\MSSQLCSP
--------------------------------------------------------------------------------
Enabling EKM provider support in MSSql server
                  \.............. Done

Creating cryptographic provider entrust_ekm_provider
                  \.............. Done

Check credential entrust_sa_ekm_cred for Admin user
Creating credential entrust_sa_ekm_cred for Admin user
                  \.............. Done

Adding credential entrust_sa_ekm_cred to XXXX\Administrator login
                  \.............. Done

Create TDE master key tmk_TestDatabase_08122026_113419
Changed database context to 'master'.
                  \.............. Done

Remove entrust_sa_ekm_cred from Admin login
Changed database context to 'master'.
                  \.............. Done

Creating credential tmk_cred_TestDatabase_08122026_113419
                  \.............. Done

Creating login tmk_login_TestDatabase_08122026_113419
                  \.............. Done

Adding credential tmk_cred_TestDatabase_08122026_113419 to login tmk_login_TestDatabase_08122026_113419
                  \.............. Done

Creating database encryption key on node     MSSQLCSPW25\MSSQLCSP
--------------------------------------------------------------------------------
Encrypting database TestDatabase with tmk_TestDatabase_08122026_113419
Changed database context to 'TestDatabase'.
                  \.............. Done

Generating temporary report file C:\Program Files\hcs\tde_reports\TestDatabase_08122026_113419.report
It will be pushed to KeyControl and removed from local system.
```

```
                \.............. Done

Encryption of TestDatabase complete
```

2. Verify the encryption state and the associated keys in SQL Server Management Studio:
    a. Select **New Query**, paste the following SQL into the query window, and select **Execute**.

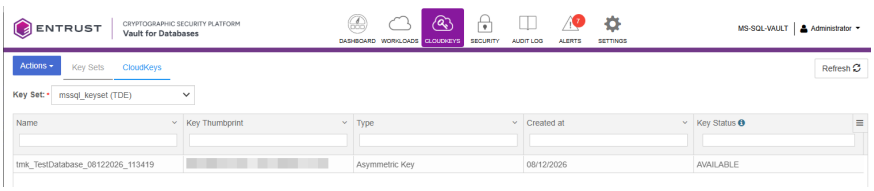
```
use master
GO

SELECT DB_NAME(database_id) AS DatabaseName,encryption_state,percent_complete,encryptor_thumbprint,
encryptor_type FROM sys.dm_database_encryption_keys
GO

Select * from sys.dm_database_encryption_keys
Select * from sys.asymmetric_keys
GO
```

    For example:



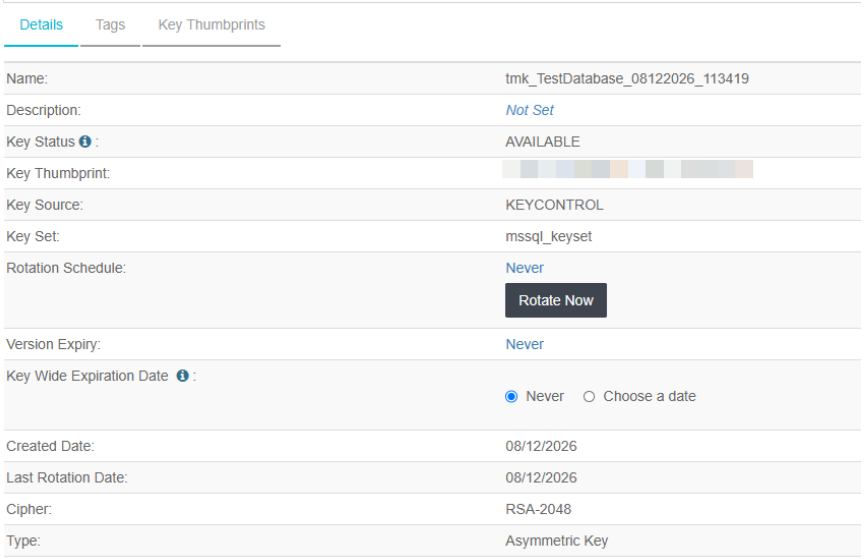
3. Review the same key in the Database CSP Vault:
    a. In the Cryptographic Security Platform Vault for Database web UI, navigate to **CloudKeys**.
    b. Select the **CloudKeys** tab, then select **mssql_keyset (TDE)** to list the keys in that keyset.

    For example:



    c. Select the `tmk_xxxx` key, the same key shown in SQL Server Management Studio, to view its details.

For example:



4.5. Rotate the Master Key

Rotate the TDE master key using the same `encryptclust.ps1` script.

Run the following steps on the Microsoft SQL Server node that hosts the target database.

1. Rotate the master key with the following command:

```
PS> .\encryptclust.ps1 -database <my_test_db> -config .\entrust.conf -rotate
```

Where:

- `-database` is the name of the database.
- `-config` is the updated configuration file.
- `-rotate` indicates that the database is already encrypted and the master key must be rotated.

For example:

```
PS>C:\Users\Administrator\Downloads\tde>.\encryptclust.ps1 -database TestDatabase -config
.\entrust.conf -rotate -nocheckcert
```

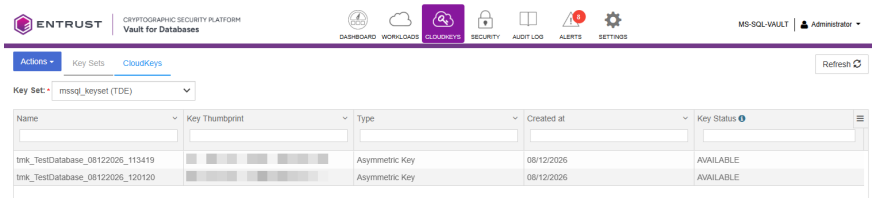
Example output

```
Logging debug trace and output to: C:\Users\Administrator\Downloads\tde\trace\encryptclust_5.log

Checking Active node: my node name is mssqlcspw25, configured server is MSSQLCSPW25\MSSQLCSP
Continuing execution with -nocheckcert flag set, ignoring certificate errors
                  \.............. Pass
```

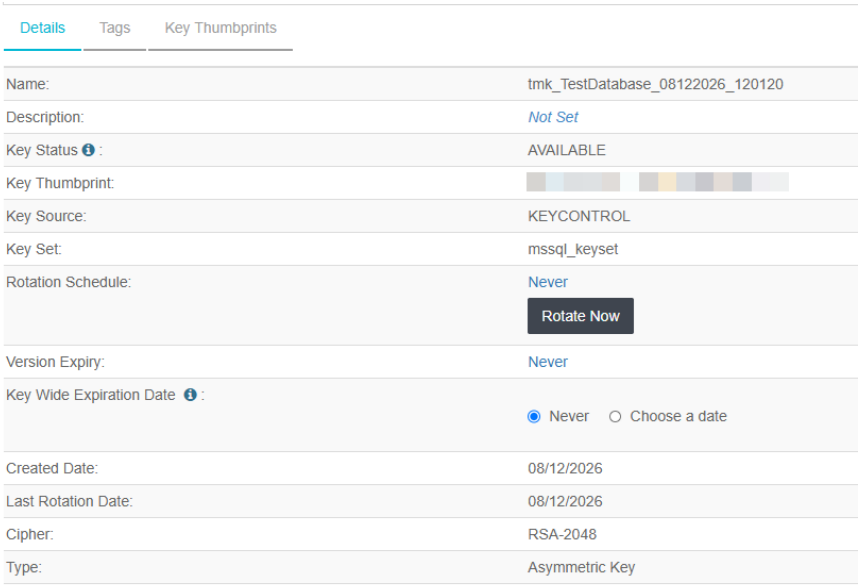
```
Checking if database TestDatabase is present on server MSSQLCSPW25\MSSQLCSP
Changed database context to 'TestDatabase'.
                  \.............. Pass


###############################################################################
  Encrypting database 'TestDatabase' with TDE master key
###############################################################################

Database TestDatabase is not part of any Availability Group

Using this suffix for all keys, credentials and TDE logins -- 08122026_120120

Database TestDatabase is already encrypted rotating master key


Generating temporary report file C:\Program
Files\hcs\tde_reports\TestDatabase_08122026_120120_prerotate.report
It will be pushed to KeyControl and removed from local system.
                  \.............. Done

Creating key, login and credential in node     MSSQLCSPW25\MSSQLCSP
-------------------------------------------------------------------------
Enabling EKM provider support in MSSql server
                  \.............. Done

Creating cryptographic provider entrust_ekm_provider
                  \.............. Done

Check credential entrust_sa_ekm_cred for Admin user
Creating credential entrust_sa_ekm_cred for Admin user
                  \.............. Done

Adding credential entrust_sa_ekm_cred to XXXX\Administrator login
                  \.............. Done

Create TDE master key tmk_TestDatabase_08122026_120120
Changed database context to 'master'.
                  \.............. Done

Remove entrust_sa_ekm_cred from Admin login
Changed database context to 'master'.
                  \.............. Done

Creating credential tmk_cred_TestDatabase_08122026_120120
                  \.............. Done

Creating login tmk_login_TestDatabase_08122026_120120
                  \.............. Done

Adding credential tmk_cred_TestDatabase_08122026_120120 to login
tmk_login_TestDatabase_08122026_120120
                  \.............. Done

Creating database encryption key on node     MSSQLCSPW25\MSSQLCSP
-------------------------------------------------------------------------
Rotating database TestDatabase encryption key with tmk_TestDatabase_08122026_120120
Changed database context to 'TestDatabase'.
                  \.............. Done

Generating temporary report file C:\Program Files\hcs\tde_reports\TestDatabase_08122026_120120.report
It will be pushed to KeyControl and removed from local system.
                  \.............. Done

Encryption key rotation for database TestDatabase complete

Please take log backup for database TestDatabase as recommended by SQL server documentation.
```

```
Note that if log backup is not taken then next key rotation will fail
```

2. Take a log backup of the database as recommended by the SQL Server documentation.
3. Review the rotated key in the CSP Vault:
   a. In the Cryptographic Security Platform Vault for Database web UI, navigate to **CloudKeys**.
   b. Select the **CloudKeys** tab and then select **mssql_keyset (TDE)**. The new key is listed alongside the previous one.



   c. Select the new `tmk_xxxx` key to view its details.



4.5.1. Rotating keys by using the web GUI

You can also rotate the Microsoft SQL Server keys by using the Cryptographic Security Platform Vault for Database web UI. For more information, see the online documentation for Rotating Microsoft SQL Server Keys. The documentation also describes how to rotate keys manually in Microsoft SQL Server.

Chapter 5. Test the integration

5.1. Test the database TDE encryption

Transparent Data Encryption (TDE) protects data at rest, the `.mdf`, `.ldf`, and `.bak` files on disk, by encrypting database pages with a Database Encryption Key (DEK). The DEK is wrapped either by a certificate or, in an EKM/CSP Vault deployment, by an asymmetric key stored in the vault.

SQL Server only needs to unwrap the DEK when the database transitions to the online state, for example, service start, `SET ONLINE`, restore, or attach. After it is unwrapped, the plaintext DEK is cached in SQL Server process memory, and subsequent queries use the cached copy without contacting the vault.

To demonstrate that the database is genuinely protected by CSP, the following procedure takes the database offline, disconnects the host from the network, and attempts to bring the database back online. If the DEK is wrapped by the vault key, SQL Server cannot unwrap it and the online transition fails. Restoring network connectivity and reissuing the command returns the database to a normal state.

Before beginning the test, confirm that the vault is reachable, the database is online, and the sample data is visible.

1. Take the database offline:

```
ALTER DATABASE TestDatabase SET OFFLINE WITH ROLLBACK IMMEDIATE;
```

2. Disable the network interface or block outbound traffic to the vault at the firewall.
3. Attempt to bring the database back online:

```
ALTER DATABASE TestDatabase SET ONLINE;

Msg 15466, Level 16, State 28, Line 1
An error occurred during decryption.
Msg 5181, Level 16, State 5, Line 1
Could not restart database "TestDatabase". Reverting to the previous status.
Msg 5069, Level 16, State 1, Line 1
ALTER DATABASE statement failed.

Completion time: 2026-08-12T13:47:44.3551944-04:00
```

4. Re-enable the network interface.
5. Bring the database back online:

```
ALTER DATABASE TestDatabase SET ONLINE;
```

```
Commands completed successfully.

Completion time: 2026-08-12T13:49:45.5999530-04:00
```

5.2. Database backup and restore

For information about backing up and restoring the database, refer to Database Backup and Restore.

5.3. Remove Microsoft SQL Server TDE from the CSP Vault for Databases

For information about uninstalling the Cryptographic Security Platform Vault Policy Agent and the VM for Microsoft SQL Server TDE, refer to Removing Microsoft SQL Server TDE from the CSP Vault for Databases.

Chapter 6. Additional resources and related products

6.1. Entrust CSP Key Manager

6.2. Entrust products

6.3. nShield product documentation