OKV for EDB Postgres TDE

How to integrate PostgreSQL with OKV

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Public

Purpose statement

This document provides a step by step guide how to integrate OKV with EDB Postgres TDE for key management.

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# Purpose

This document provides a step by step guide how to integrate OKV with EDB Postgres TDE for key management.   
The code provided in this plugin is no official Oracle software and thus support is on best effort of the author and falls outside of the scope of your Oracle Support agreements. Use at your own discretion.

# Introduction

EDB Postgres TDE uses a Key Encryption Key that gets stored in a file key.bin in the tde\_encryption directory of the database. During the initdb phase this key can be wrapped using a key encryption key from a KMIP compliant KMS.  
For the integration with Oracle Key Vault a java class has been created using the software development kit.

# Required software

In my setup I used the following software and versions

* Oracle Linux 8 server for the Database install
* EDB Postgres Advanced Server version 17.5
* Oracle Key Vault 21.10
* Java software Development Kit of OKV
* JDK 1.8

# How does the integration work

During the initdb phase of EDB the keymanagement commands for “key wrap” and “key unwrap” are passed. This can be achieved either by specifying two environment variables or by passing commandline arguments.

The key wrap command will be used to wrap the key generated by initdb before writing it into the pg\_encryption/key.bin file located in the database directory. The key unwrap command will also be used during initdb and will be added to the file postgresql.conf as entry data\_encryption\_key\_unwrwap\_command.

The key wrap and key unwrap commands are shell scripts that call the java class with the correct arguments.

# How to setup

Install the package in e.g. /var/lib/edb/pg\_okv.

## Install OKV java sdk

From the OKV node download the java sdk.

Extract okvjsdk.jar into /var/lib/edb/pg\_okv/jsdk/lib

## Compile the java class

$ cd /var/lib/edb/pg\_okv

$ export CLASSPATH=`pwd`/jsdk/lib/okvjsdk.jar:`pwd`/kmip

$ cd kmip

$ javac javac KmipClient.java

## Install OKV endpoint

On OKV create a new Endpoint (type other) with a default wallet and in that wallet create and activate a non-extractable symmetric key. The Unique ID of the new key will be used during the initdb command.

In the usual way deploy the endpoint into $OKV\_HOME (e.g. /opt/oracle/okvpostgres) directory. Endpoint deployment steps can be found [here](https://docs.oracle.com/en/database/oracle/key-vault/21.10/okvag/okv_endpoints.html#GUID-5C1A6874-C7A9-41C6-859D-9FFD9010E13D).

# Initdb

If the package was not installed in /var/lib/edb/pg\_okv, please update KMIP\_DIR entries in encrypt.sh and decrypt.sh files in the bin directory to reflect the correct path.

For the purpose of this document the initdb will be run from /var/lib/edb as follows:

$ initdb -D hrprod -y --key-unwrap-command='/var/lib/edb/pg\_okv/bin/decrypt.sh 7CD1A23D-AEC4-4D25-9333-BDDE6B045245 "%p"' --key-wrap-command='/var/lib/edb/pg\_okv/bin/encrypt.sh 7CD1A23D-AEC4-4D25-9333-BDDE6B045245 "%p"' -U admin -W --auth-local=trust

In this command hrprod is the name of the database and 7CD1A23D-AEC4-4D25-9333-BDDE6B045245 the unique ID of the key in OKV.

# Start and create the database

After initdb successfully finishes start the database:

$ pg\_ctl -D hrprod -l logfile start

and create the database:

$ createdb hrprod -U admin

# Key Rotation

Key rotation involves the Key Encryption Key that is stored in OKV. Key rotation is performed in the following manner. Create a new Symetric key in OKV and note the UUID.

On the EDB Postgres side execute the following command where the first key ID is the existing key ID and the second Key ID (used by encrypt) is the new key.

/var/lib/edb/kmip/bin/decrypt.sh 7CD1A23D-AEC4-4D25-9333-BDDE6B045245 "/var/lib/edb/hrprod/pg\_encryption/key.bin"|/var/lib/edb/kmip/bin/encrypt.sh "/var/lib/edb/hrprod/pg\_encryption/key.bin" 38B83678-EBD9-4824-BC83-A960D452975C

Also change the postgresql.conf to have the new key in the unwrap command like this:

data\_encryption\_key\_**unwrap**\_command = '/var/lib/edb/kmip/bin/decrypt.sh 38B83678-EBD9-4824-BC83-A960D452975C "%p"'

/var/lib/edb/kmip/bin/decrypt.sh 7CD1A23D-AEC4-4D25-9333-BDDE6B045245 "/var/lib/edb/hrprod/pg\_encryption/key.bin"|/var/lib/edb/kmip/bin/encrypt.sh "/var/lib/edb/hrprod/pg\_encryption/key.bin" 38B83678-EBD9-4824-BC83-A960D452975C

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