Barbican Documentation

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CONTENTS

CHAPTER ONE

WHAT IS BARBICAN?

Barbican is the OpenStack Key Manager service. It provides secure storage, provisioning and management of secret data. This includes keying material such as Symmetric Keys, Asymmetric Keys, Certificates and raw binary data.

CHAPTER

TWO

API GUIDE

If youre trying to learn how to use barbican, you can start by reading about Secrets in the Barbican API Guide.

Once youre comfortable working with secrets you can dig into the rest of the API.

2.1 Cloud Administrator Guide - Key Manager service

The Key Manager service, code-named Barbican, is the default secret storage service for OpenStack. The service provides secure storage, provisioning and management of secrets.

2.1.1 Access Control

Role Based Access Control (RBAC)

Like many other services, the Key Manager service supports the protection of its APIs by enforcing policy rules defined in a policy file. The Key Manager service stores a reference to a policy JSON file in its configuration file, `/etc/barbican/barbican.conf`. Typically this file is named `policy.yaml` and it is stored in `/etc/barbican/policy.yaml`.

Each Key Manager API call has a line in the policy file that dictates which level of access applies:

```
API_NAME: RULE_STATEMENT or MATCH_STATEMENT
```

where `RULE_STATEMENT` can be another `RULE_STATEMENT` or a `MATCH_STATEMENT`:

```
RULE_STATEMENT: RULE_STATEMENT or MATCH_STATEMENT
```

`MATCH_STATEMENT` is a set of identifiers that must match between the token provided by the caller of the API and the parameters or target entities of the API in question. For example:

```
"secrets:post": "role:admin or role:creator"
```

indicates that to create a new secret via a POST request, you must have either the admin or creator role in your token.

Warning

The Key Manager service scopes the ownership of a secret at the project level. This means that many calls in the API will perform an additional check to ensure that the project_id of the token matches the project_id stored as the secret owner.

Default Policy

The policy engine in OpenStack is very flexible and allows for customized policies that make sense for your particular cloud. The Key Manager service comes with a sample `policy.yaml` file which can be used as the starting point for a customized policy. The sample policy defines 5 distinct roles:

key-manager:service-admin
: The cloud administrator in charge of the Key Manager service. This user has access to all management APIs like the project-quotas.

admin
: Project administrator. This user has full access to all resources owned by the project for which the admin role is scoped.

creator
: Users with this role are allowed to create new resources and can also delete resources which are owned by the project for which the creator role is scoped. They are also allowed full access to existing secrets owned by the project in scope.

observer
: Users with this role are allowed to access to existing resources but are not allowed to upload new secrets or delete existing secrets.

audit
: Users with this role are only allowed access to the resource metadata. So users with this role are unable to decrypt secrets.

Access Control List API

There are some limitations that result from scoping ownership of a secret at the project level. For example, it is not possible to grant a user access to a single secret, as granting a role on a project would allow access to all all secrets owned by that project.

Additionally, there is no easy way to upload a private secret (i.e. a secret that only you have access to) without creating a new project for which only you have roles assigned on it.

To address these limitations the Key Manager service includes an Access Control List (ACL) API. For full details see the ACL API User Guide

2.1.2 Barbican Service Management Utility

Description

`barbican-manage` is a utility that is used to control the barbican key manager service database and Hardware Secure Module (HSM) plugin device. Use cases include migrating the secret database or generating a Master Key Encryption Key (MKEK) in the HSM. This command set should only be executed by a user with admin privileges.

Options

The standard pattern for executing a barbican-manage command is:

```
barbican-manage <category> <command> [<args>]
```

Running `barbican-manage` without arguments shows a list of available command categories. Currently, there are 2 supported categories: *db* and *hsm*.

Running with a category argument shows a list of commands in that category:

- `barbican-manage db --help`
- `barbican-manage hsm --help`
- `barbican-manage --version` shows the version number of barbican service.

The following sections describe the available categories and arguments for barbican-manage.

Barbican Database

Warning

Before executing **barbican-manage db** commands, make sure you are familiar with Database Migration first.

`barbican-manage db revision [--db-url] [--message] [--autogenerate]`

Create a new database version file.

`barbican-manage db upgrade [--db-url] [--version]`

Upgrade to a future version database.

`barbican-manage db history [--db-url] [--verbose]`

Show database changeset history.

`barbican-manage db current [--db-url] [--verbose]`

Show current revision of database.

`barbican-manage db clean [--db-url] [--verbose] [--min-days] [--clean-unassociated-projects] [--soft-delete-expired-secrets] [--log-file]`

Clean up soft deletions in the database. More documentation can be found here: *Database Cleaning*

`barbican-manage db sync_secret_stores [--db-url] [--verbose] [--log-file]`

Synchronize the secret_store database table with the configuration in barbican.conf. This is useful when multiple secret stores are enabled and new secret stores have been enabled.

Barbican PKCS11/HSM

`barbican-manage hsm gen_mkek [--library-path] [--passphrase] [--slot-id] [--label] [--length]`

Create a new Master key encryption key in HSM. This MKEK will be used to encrypt all project key encryption keys. Its label must be unique.

`barbican-manage hsm gen_hmac [--library-path] [--passphrase] [--slot-id] [--label] [--length]`

Create a new Master HMAC key in HSM. This HMAC key will be used to generate an authentication tag of encrypted project key encryption keys. Its label must be unique.

`barbican-manage hsm rewrap_pkek [--dry-run]`

Rewrap project key encryption keys after rotating to new MKEK and/or HMAC key(s) in HSM. The new MKEK and HMAC key should have already been generated using the above commands. The user will have to configure new MKEK and HMAC key labels in /etc/barbican/barbican.conf and restart barbican server before executing this command.

2.1.3 Database Cleaning

Entries in the Barbican database are soft deleted and can build up over time. These entries can be cleaned up with the clean up command. The command can be used with a cron job to clean the database automatically on intervals.

Commands

The command `` `barbican-manage db clean` `` can be used to clean up the database. By default, it will remove soft deletions that are at least 90 days old since deletion

`` `barbican-manage db clean --min-days 180` `` (`` `-m` ``) will go through the database and remove soft deleted entries that are at least 90 days old since deletion. The default value is 90 days. Passing a value of `` `--min-days 0` `` will delete all soft-deleted entries up to today.

`` `barbican-manage db clean --clean-unassociated-projects` `` (`` `-p` ``) will go through the database and remove projects that have no associated resources. The default value is False.

`` `barbican-manage db clean --soft-delete-expired-secrets` `` (`` `-e` ``) will go through the database and soft delete any secrets that are past their expiration date. The default value is False. If `` `-e` `` is used along with `` `---min-days 0` `` then all the expired secrets will be hard deleted.

`` `barbican-manage db clean --verbose` `` (`` `-V` ``) will print more information out into the terminal.

`` `barbican-manage db clean --log-file` `` (`` `-L` ``) will set the log file location. The creation of the log may fail if the user running the command does not have access to the log file location or if the target directory does not exist. The default value for log_file can be found in `` `/etc/barbican/barbican.conf` `` The log will contain the verbose output from the command.

Cron Job

A cron job can be created on linux systems to run at a given interval to clean the barbican database.

Crontab

1. Start the crontab editor `` `crontab -e` `` with the user that runs the clean up command 2. Edit the crontab section to run the command at a given interval. `` `<minute 0-59> <hour 0-23,0=midnight> <day 1-31> <month 1-12> <weekday 0-6, 0=Sunday> clean up command` ``

Crontab Examples

`` `00 00 * * * barbican-manage db clean -p -e` `` -Runs a job everyday at midnight which will remove soft deleted entries that 90 days old since soft deletion, will clean unassociated projects, and will soft delete secrets that are expired.

`` `00 03 01 * * barbican-manage db clean -m 30` `` -Runs a job every month at 3AM which will remove soft deleted entries that are at least 30 days old since deletion.

`` `05 01 07 * 6 barbican-manage db clean -m 180 -p -e -L /tmp/barbican-clean-command.log` `` -Runs a job every month at 1:05AM on the 7th day of the month and every Saturday. Entries that are 180 days old since soft deletion will be removed from the database. Unassociated projects will be removed. Expired secrets will be soft deleted. The log file will be saved to `` `/tmp/barbican-clean-command.log` ``

2.1.4 Key Manager Service Upgrade Guide

This document outlines several steps and notes for operators to reference when upgrading their barbican from previous versions of OpenStack.

Plan to Upgrade

- The release notes should be read carefully before upgrading the barbican services. Starting with the Mitaka release, specific upgrade steps and considerations are well-documented in the release notes.
- Upgrades are only supported between sequential releases.
- When upgrading barbican, the following steps should be followed:
  1. Destroy all barbican services
  2. Upgrade source code to the next release
  3. Upgrade barbican database to the next release

     ```
     barbican-db-manage upgrade
     ```

  4. Start barbican services

Upgrade from Newton to Ocata

The barbican-api-paste.ini configuration file for the paste pipeline was updated to add the http_proxy_to_wsgi middleware. It can be used to help barbican respond with the correct URL refs when its put behind a TLS proxy (such as HAProxy). This middleware is disabled by default, but can be enabled via a configuration option in the oslo_middleware group.

See Ocata release notes.

Upgrade from Mitaka to Newton

There are no extra instructions that should be noted for this upgrade.

See Newton release notes.

Upgrade from Liberty to Mitaka

The Metadata API requires an update to the Database Schema. Existing deployments that are being upgraded to Mitaka should use the barbican-manage utility to update the schema.

If you are upgrading from previous version of barbican that uses the PKCS#11 Cryptographic Plugin driver, you will need to run the migration script.

```
python barbican/cmd/pkcs11_migrate_kek_signatures.py
```

See Mitaka release notes.

2.1.5 PKCS11 Key Generation - User Guide

The Key Generation script was written with the Deployer in mind. It allows the deployer to create an MKEK and HMAC signing key for their HSM setup. This script is intended to be used initially or for key rotation scenarios.

Setup

Initially, the deployer will need to examine the settings in their *barbican.conf* file under the Crypto plugin settings section. Set these values to whichever defaults you need. This will be used for both the script and your usage of barbican.

The following items are required to use the PKCS11 plugin:

- Library Path
- Login Passphrase (Password to HSM)
- Slot ID (on HSM)

The following will need to be provided to generate the HMAC and MKEK:

- MKEK Label
- MKEK Length
- HMAC Label

Usage

Viewing the help page can give some awareness to the structure of the script as well as inform you of any changes.

```
$ pkcs11-key-generation --help

usage: pkcs11-key-generation [-h] [--library-path LIBRARY_PATH]
                             [--passphrase PASSPHRASE] [--slot-id SLOT_ID]
                             {mkek,hmac} ...

Barbican MKEK & HMAC Generator

optional arguments:
  -h, --help            show this help message and exit
  --library-path LIBRARY_PATH
                        Path to vendor PKCS11 library
  --passphrase PASSPHRASE
                        Password to login to PKCS11 session
  --slot-id SLOT_ID     HSM Slot id (Should correspond to a configured PKCS11
                        slot)

subcommands:
  Action to perform

  {mkek,hmac}
    mkek                Generates a new MKEK.
    hmac                Generates a new HMAC.
```

Note: The user is able to pass the password in as an option or they can leave the flag out and will be prompted for the password upon submission of the command.

Generating an MKEK

To generate an MKEK, the user must provide a length and a label for the MKEK.

```
$ pkcs11-key-generation --library-path {library_path here}
--passphrase {HSM password here} --slot-id {HSM slot here} mkek --length 32
--label 'HMACLabelHere'
MKEK successfully generated!
```

Generating an HMAC

To generate an HMAC, the user must provide a label for the HMAC.

```
$ pkcs11-key-generation --library-path {library_path here}
--passphrase {HSM password here} --slot-id {HSM slot here} hmac
--label 'HMACLabelHere'
HMAC successfully generated!
```

2.2 CLI Reference

2.2.1 barbican-status

Synopsis

```
barbican-status <category> <command> [<args>]
```

Description

barbican-status is a tool that provides routines for checking the status of a Barbican deployment.

Options

The standard pattern for executing a **barbican-status** command is:

```
barbican-status <category> <command> [<args>]
```

Run without arguments to see a list of available command categories:

```
barbican-status
```

Categories are:

- upgrade

Detailed descriptions are below.

You can also run with a category argument such as upgrade to see a list of all commands in that category:

```
barbican-status upgrade
```

These sections describe the available categories and arguments for **barbican-status**.

Upgrade

`barbican-status upgrade check`

Performs a release-specific readiness check before restarting services with new code. This command expects to have complete configuration and access to databases and services.

Return Codes

Return code	Description
0	All upgrade readiness checks passed successfully and there is nothing to do.
1	At least one check encountered an issue and requires further investigation. This is considered a warning but the upgrade may be OK.
2	There was an upgrade status check failure that needs to be investigated. This should be considered something that stops an upgrade.
255	An unexpected error occurred.

History of Checks

8.0.0 (Stein)

- Placeholder to be filled in with checks as they are added in Stein.

2.3 Key Manager service

2.3.1 Key Manager service overview

The Key Manager service provides secure storage, provisioning and management of secrets, such as passwords, encryption keys, etc.

The Key Manager service consists of the following components:

`barbican-api` service

Provides an OpenStack-native RESTful API that supports provisioning and managing Barbican secrets.

`barbican-worker` service

Provides an Openstack RPC interface that interacts with `barbican-api` and reads from the barbican message queue. Supports the fulfillment of Barbican orders.

`barbican-keystone-listener` service

Listens to messages from the Keystone notification service. Used to manage the representation of Keystone projects in the Barbican database when projects are deleted.

2.3.2 Install and configure

This section describes how to install and configure the Key Manager service, code-named barbican, on the controller node.

This section assumes that you already have a working OpenStack environment with at least the Identity Service (keystone) installed.

For simplicity, this configuration stores secrets on the local file system.

Note that installation and configuration vary by distribution.

Install and configure for Red Hat Enterprise Linux and CentOS

This section describes how to install and configure the Key Manager service for Red Hat Enterprise Linux 7 and CentOS 7.

Prerequisites

Before you install and configure the Key Manager service, you must create a database, service credentials, and API endpoints.

1. To create the database, complete these steps:

   - Use the database access client to connect to the database server as the `root` user:

     ```
     # mysql
     ```

   - Create the `barbican` database:

     ```
     CREATE DATABASE barbican;
     ```

   - Grant proper access to the `barbican` database:

     ```
     GRANT ALL PRIVILEGES ON barbican.* TO 'barbican'@'localhost' \
       IDENTIFIED BY 'BARBICAN_DBPASS';
     GRANT ALL PRIVILEGES ON barbican.* TO 'barbican'@'%' \
       IDENTIFIED BY 'BARBICAN_DBPASS';
     ```

     Replace `BARBICAN_DBPASS` with a suitable password.

   - Exit the database access client.

     ```
     exit;
     ```

2. Source the `admin` credentials to gain access to admin-only CLI commands:

   ```
   $ source admin-openrc
   ```

3. To create the service credentials, complete these steps:

   - Create the `barbican` user:

     ```
     $ openstack user create --domain default --password-prompt barbican
     ```

   - Add the `admin` role to the `barbican` user:

     ```
     $ openstack role add --project service --user barbican admin
     ```

   - Create the `creator` role:

     ```
     $ openstack role create creator
     ```

   - Add the `creator` role to the `barbican` user:

     ```
     $ openstack role add --project service --user barbican creator
     ```

   - Create the barbican service entities:

```
$ openstack service create --name barbican --description "Key Manager
↪" key-manager
```

4. Create the Key Manager service API endpoints:

```
$ openstack endpoint create --region RegionOne \
  key-manager public http://controller:9311
$ openstack endpoint create --region RegionOne \
  key-manager internal http://controller:9311
$ openstack endpoint create --region RegionOne \
  key-manager admin http://controller:9311
```

Install and configure components

1. Install the packages:

```
# dnf install openstack-barbican-api
```

2. Edit the /etc/barbican/barbican.conf file and complete the following actions:

   - In the [DEFAULT] section, configure database access:

   ```
   [DEFAULT]
   ...
   sql_connection = mysql+pymysql://barbican:BARBICAN_DBPASS@controller/
   ↪barbican
   ```

   Replace BARBICAN_DBPASS with the password you chose for the Key Manager service database.

   - In the [DEFAULT] section, configure RabbitMQ message queue access:

   ```
   [DEFAULT]
   ...
   transport_url = rabbit://openstack:RABBIT_PASS@controller
   ```

   Replace RABBIT_PASS with the password you chose for the openstack account in RabbitMQ.

   - In the [keystone_authtoken] section, configure Identity service access:

   ```
   [keystone_authtoken]
   ...
   www_authenticate_uri = http://controller:5000
   auth_url = http://controller:5000
   memcached_servers = controller:11211
   auth_type = password
   project_domain_name = default
   user_domain_name = default
   project_name = service
   username = barbican
   password = BARBICAN_PASS
   ```

Replace BARBICAN_PASS with the password you chose for the barbican user in the Identity service.

> **Note**
>
> Comment out or remove any other options in the [keystone_authtoken] section.

3. Populate the Key Manager service database:

   If you wish the Key Manager service to automatically populate the database when the service is first started, set db_auto_create to True in the [DEFAULT] section. By default this will not be active and you can populate the database manually as below:

   ```
   $ su -s /bin/sh -c "barbican-manage db upgrade" barbican
   ```

   > **Note**
   >
   > Ignore any deprecation messages in this output.

4. Barbican has a plugin architecture which allows the deployer to store secrets in a number of different back-end secret stores. By default, Barbican is configured to store secrets in a basic file-based keystore. This key store is NOT safe for production use.

   For a list of supported plugins and detailed instructions on how to configure them, see *Configure Secret Store Back-end*

Finalize installation

1. Create the /etc/httpd/conf.d/wsgi-barbican.conf file with the following content:

   ```
   <VirtualHost [::1]:9311>
       ServerName controller

       ## Logging
       ErrorLog "/var/log/httpd/barbican_wsgi_main_error_ssl.log"
       LogLevel debug
       ServerSignature Off
       CustomLog "/var/log/httpd/barbican_wsgi_main_access_ssl.log" combined

       WSGIApplicationGroup %{GLOBAL}
       WSGIDaemonProcess barbican-api display-name=barbican-api␣
   ↪group=barbican processes=2 threads=8 user=barbican
       WSGIProcessGroup barbican-api
       WSGIScriptAlias / "/usr/lib/python3.9/site-packages/barbican/api/app.
   ↪wsgi"
       WSGIPassAuthorization On
   </VirtualHost>
   ```

2. Start the Apache HTTP service and configure it to start when the system boots:

```
# systemctl enable httpd.service
# systemctl start httpd.service
```

Install and configure for Ubuntu

This section describes how to install and configure the Key Manager service for Ubuntu 14.04 (LTS).

Prerequisites

Before you install and configure the Key Manager service, you must create a database, service credentials, and API endpoints.

1. To create the database, complete these steps:

   - Use the database access client to connect to the database server as the `root` user:

     ```
     # mysql
     ```

   - Create the `barbican` database:

     ```
     CREATE DATABASE barbican;
     ```

   - Grant proper access to the `barbican` database:

     ```
     GRANT ALL PRIVILEGES ON barbican.* TO 'barbican'@'localhost' \
       IDENTIFIED BY 'BARBICAN_DBPASS';
     GRANT ALL PRIVILEGES ON barbican.* TO 'barbican'@'%' \
       IDENTIFIED BY 'BARBICAN_DBPASS';
     ```

     Replace `BARBICAN_DBPASS` with a suitable password.

   - Exit the database access client.

     ```
     exit;
     ```

2. Source the `admin` credentials to gain access to admin-only CLI commands:

   ```
   $ source admin-openrc
   ```

3. To create the service credentials, complete these steps:

   - Create the `barbican` user:

     ```
     $ openstack user create --domain default --password-prompt barbican
     ```

   - Add the `admin` role to the `barbican` user:

     ```
     $ openstack role add --project service --user barbican admin
     ```

   - Create the `creator` role:

     ```
     $ openstack role create creator
     ```

   - Add the `creator` role to the `barbican` user:

```
$ openstack role add --project service --user barbican creator
```

- Create the barbican service entities:

```
$ openstack service create --name barbican --description "Key Manager
↪" key-manager
```

4. Create the Key Manager service API endpoints:

```
$ openstack endpoint create --region RegionOne \
  key-manager public http://controller:9311
$ openstack endpoint create --region RegionOne \
  key-manager internal http://controller:9311
$ openstack endpoint create --region RegionOne \
  key-manager admin http://controller:9311
```

Install and configure components

1. Install the packages:

```
# apt-get update

# apt-get install barbican-api barbican-keystone-listener barbican-worker
```

2. Edit the /etc/barbican/barbican.conf file and complete the following actions:

- In the [DEFAULT] section, configure database access:

```
[DEFAULT]
...
sql_connection = mysql+pymysql://barbican:BARBICAN_DBPASS@controller/
↪barbican
```

Replace BARBICAN_DBPASS with the password you chose for the Key Manager service database.

- In the [DEFAULT] section, configure RabbitMQ message queue access:

```
[DEFAULT]
...
transport_url = rabbit://openstack:RABBIT_PASS@controller
```

Replace RABBIT_PASS with the password you chose for the openstack account in RabbitMQ.

- In the [keystone_authtoken] section, configure Identity service access:

```
[keystone_authtoken]
...
www_authenticate_uri = http://controller:5000
auth_url = http://controller:5000
memcached_servers = controller:11211
```

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```
auth_type = password
project_domain_name = default
user_domain_name = default
project_name = service
username = barbican
password = BARBICAN_PASS
```

Replace `BARBICAN_PASS` with the password you chose for the `barbican` user in the Identity service.

Note

Comment out or remove any other options in the `[keystone_authtoken]` section.

3. Populate the Key Manager service database:

   If you wish the Key Manager service to automatically populate the database when the service is first started, set db_auto_create to True in the `[DEFAULT]` section. By default this will not be active and you can populate the database manually as below:

   ```
   $ su -s /bin/sh -c "barbican-manage db upgrade" barbican
   ```

   Note

   Ignore any deprecation messages in this output.

4. Barbican has a plugin architecture which allows the deployer to store secrets in a number of different back-end secret stores. By default, Barbican is configured to store secrets in a basic file-based keystore. This key store is NOT safe for production use.

   For a list of supported plugins and detailed instructions on how to configure them, see *Configure Secret Store Back-end*

Finalize installation

Restart the Key Manager services:

```
# service barbican-keystone-listener restart
# service barbican-worker restart
# service apache2 restart
```

Configure Secret Store Back-end

The Key Manager service has a plugin architecture that allows the deployer to store secrets in one or more secret stores. Secret stores can be software-based such as a software-only encryption mechanism, or hardware devices such as a hardware security module (HSM).

Secret Stores implement both the encryption mechanisms as well as the storage of the encrypted secrets.

This section compares all the plugins that are currently available and the security tradeoffs that need to be considered when deciding which plugins to use.

Simple Crypto Plugin

This back end plugin implements encryption using only software. The encrypted secrets are stored in the Barbican database.

This crypto plugin is configured by default in `/etc/barbican/barbican.conf`.

This plugin uses single symmetric key (kek - or key encryption key) - which is stored in plain text in the `/etc/barbican/barbican.conf` file to encrypt and decrypt all secrets.

Security	Master Key (KEK) stored in the configuration file
Maturity	Tested on every patch
Ease of Use	Simple to deploy Key rotation is disruptive (all secrets must be re-encrypted)
Scalability	Storage can be scaled in SQL DB Failover/HA is simple, just run more barbican-api instances High performance - Software crypto is fast
Cost	Free (as in beer)

Warning

This plugin stores its KEK in plain text in the configuration file, which will be present in any node running the *barbican-api* or *barbican-worker* services. Extreme care should be taken to prevent unauthorized access to these nodes. When using this plugin the KEK is the only thing protecting the secrets stored in the database.

The configuration for this plugin in `/etc/barbican/barbican.conf` is as follows:

```
# ================= Secret Store Plugin ===================
[secretstore]
..
enabled_secretstore_plugins = store_crypto

# ================= Crypto plugin ===================
[crypto]
..
enabled_crypto_plugins = simple_crypto

[simple_crypto_plugin]
# the kek should be a 32-byte value which is base64 encoded
kek = 'YWJjZGVmZ2hpamtsbW5vcHFyc3R1dnd4eXoxMjM0NTY='
```

Note

Setting crypto plugins has effect only when *secretstore* plugin is set to *store_crypto* unless multiback-end storage is used. So, for example, using vault for secretstore and PKCS#11 for crypto will not work (vault will be responsible for both storage and encryption).

PKCS#11 Crypto Plugin

This crypto plugin can be used to interface with a Hardware Security Module (HSM) using the PKCS#11 protocol.

Secrets are encrypted (and decrypted on retrieval) by a project specific Key Encryption Key (KEK), which in its turn encrypted with Master Key (MKEK) and signed with HMAC key. Both MKEK and HMAC resides in the HSM.

The configuration for this plugin in `/etc/barbican/barbican.conf`. Settings for some different HSMs are provided below:

Thales Luna Network HSM

The PKCS#11 plugin configuration for Luna Network HSM looks like:

```
[secretstore]
enable_multiple_secret_stores = True
stores_lookup_suffix = luna

# ========== Secret Store configuration ==========
[secretstore:luna]
secret_store_plugin = store_crypto
crypto_plugin = p11_crypto

# ================= Crypto plugin ===================
[p11_crypto_plugin]
# Path to vendor PKCS11 library
library_path = '/usr/lib/libCryptoki2_64.so'

# Token serial number for the token to be used.  Required
# when the device has multiple tokens with the same label.
# (string value)
#token_serial_number = 12345678

# Token label for the token to be used.  Required when
# token_serial_number is not specified. (string value)
token_labels = myPCKS11Token

# (Optional) HSM Slot ID that contains the token device to be used.
# Required when token_serial_number and token_labels are not␣
↪specified.
# (integer value)
#slot_id = 0
```

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```
# Password (PIN) to login to PKCS11 session
login = 'mypassword'

# Encryption algorithm used to encrypt secrets
encryption_mechanism = CKM_AES_CBC_GCM

# Label to identify master KEK in the HSM (must not be the same as␣
↪HMAC label)
mkek_label = 'my_mkek_label'

# Label to identify master HMAC key in the HSM (must not be the same␣
↪as MKEK label)
hmac_label = 'my_hmac_label'

# Key Type for the master HMAC key
hmac_key_type = CKK_GENERIC_SECRET

# HMAC Key Generation Algorithm used to create the master HMAC Key
hmac_keygen_mechanism = CKM_GENERIC_SECRET_KEY_GEN

# HMAC algorith used to sign ecnrypted data
hmac_mechanism = CKM_SHA256_HMAC

# Key Wrap algorithm used to wrap Project KEKs
key_wrap_mechanism = CKM_AES_KEY_WRAP_KWP
```

The HMAC and MKEK keys can be generated as follows:

```
barbican-manage hsm gen_hmac --library-path /usr/lib/libCryptoki2_64.
↪so \
--passphrase XXX --slot-id 1 --label my_hmac_label
```

```
barbican-manage hsm gen_mkek --library-path /usr/lib/libCryptoki2_64.
↪so \
--passphrase XXX --slot-id 1 --label my_mkek_label
```

nCipher

For a nCipher nShield Connect XC, the plugin configuration looks like:

```
# ================= Secret Store Plugin ===================
[secretstore]
..
enabled_secretstore_plugins = store_crypto

# ================= Crypto plugin ===================
[crypto]
..
enabled_crypto_plugins = p11_crypto
```

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```
[p11_crypto_plugin]
# Path to vendor PKCS11 library
library_path = '/opt/nfast/toolkits/pkcs11/libcknfast.so'

# Token serial number used to identify the token to be used. ␣
↪Required
# when the device has multiple tokens with the same label. (string
# value)
token_serial_number = 12345678

# Token label used to identify the token to be used.  Required when
# token_serial_number is not specified. (string value)
#token_label = <None>

# Password to login to PKCS11 session
login = 'XXX'

# Label to identify master KEK in the HSM (must not be the same as␣
↪HMAC label)
mkek_label = 'thales_mkek_0'

# Length in bytes of master KEK
mkek_length = 32

# Label to identify HMAC key in the HSM (must not be the same as␣
↪MKEK label)
hmac_label = 'thales_hmac_0'

# (Optional) HSM Slot ID that contains the token device to be used.
# (integer value)
# slot_id = 1

# Enable Read/Write session with the HSM?
# rw_session = True

# Length of Project KEKs to create
# pkek_length = 32

# How long to cache unwrapped Project KEKs
# pkek_cache_ttl = 900

# Max number of items in pkek cache
# pkek_cache_limit = 100

# Secret encryption mechanism (string value)
# Deprecated group/name - [p11_crypto_plugin]/algorithm
encryption_mechanism = CKM_AES_CBC
```

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```
# HMAC Key Type (string value)
hmac_key_type=CKK_SHA256_HMAC

# HMAC Key Generation Mechanism (string value)
hmac_keygen_mechanism = CKM_NC_SHA256_HMAC_KEY_GEN

# Generate IVs for CKM_AES_GCM mechanism. (boolean value)
# Deprecated group/name - [p11_crypto_plugin]/generate_iv
aes_gcm_generate_iv=True

# Always set CKA_SENSITIVE=CK_TRUE including
# CKA_EXTRACTABLE=CK_TRUE keys.
# default true
always_set_cka_sensitive=false
```

The HMAC and MKEK keys can be generated as follows:

```
barbican-manage hsm gen_hmac \
--library-path /opt/nfast/toolkits/pkcs11/libcknfast.so \
--passphrase XXX --slot-id 1 --label thales_hmac_0 \
--key-type CKK_SHA256_HMAC \
--mechanism CKM_NC_SHA256_HMAC_KEY_GEN
```

```
barbican-manage hsm gen_mkek \
--library-path /opt/nfast/toolkits/pkcs11/libcknfast.so \
--passphrase XXX --slot-id 1 --label thales_mkek_0
```

ATOS Bull

For an ATOS Bull HSM, the plugin configuration looks like:

```
# ================= Secret Store Plugin ===================
[secretstore]
..
enabled_secretstore_plugins = store_crypto

# ================= Crypto plugin ===================
[crypto]
..
enabled_crypto_plugins = p11_crypto

[p11_crypto_plugin]
# Path to vendor PKCS11 library
library_path = '/usr/lib64/libnethsm.so'

# Token serial number used to identify the token to be used. ␣
↪Required
# when the device has multiple tokens with the same label. (string
# value)
```

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```
token_serial_number = 12345678

# Token label used to identify the token to be used.  Required when
# token_serial_number is not specified. (string value)
#token_label = <None>

# Password to login to PKCS11 session
login = 'XXX'

# Label to identify master KEK in the HSM (must not be the same as␣
↪HMAC label)
mkek_label = 'atos_mkek_0'

# Length in bytes of master KEK
mkek_length = 32

# Label to identify HMAC key in the HSM (must not be the same as␣
↪MKEK label)
hmac_label = 'atos_hmac_0'

# (Optional) HSM Slot ID that contains the token device to be used.
# (integer value)
# slot_id = 1

# Enable Read/Write session with the HSM?
# rw_session = True

# Length of Project KEKs to create
# pkek_length = 32

# How long to cache unwrapped Project KEKs
# pkek_cache_ttl = 900

# Max number of items in pkek cache
# pkek_cache_limit = 100

# Secret encryption mechanism (string value)
# Deprecated group/name - [p11_crypto_plugin]/algorithm
encryption_mechanism = CKM_AES_CBC

# HMAC Key Type (string value)
hmac_key_type = CKK_GENERIC_SECRET

# HMAC Key Generation Mechanism (string value)
hmac_keygen_mechanism = CKM_GENERIC_SECRET_KEY_GEN

# Always set CKA_SENSITIVE=CK_TRUE including
# CKA_EXTRACTABLE=CK_TRUE keys.
# default true
always_set_cka_sensitive=false
```

The HMAC and MKEK keys can be generated as follows:

```
barbican-manage hsm gen_hmac --library-path /usr/lib64/libnethsm.so \
--passphrase XXX --slot-id 1 --label atos_hmac_0 \
--key-type  CKK_GENERIC_SECRET \
--mechanism  CKM_GENERIC_SECRET_KEY_GEN
```

```
barbican-manage hsm gen_mkek --library-path /usr/lib64/libnethsm.so \
--passphrase XXX --slot-id 1 --label atos_mkek_0
```

Utimaco

The PKCS#11 plugin configuration looks like:

```
# ================= Secret Store Plugin ===================
[secretstore]
..
enabled_secretstore_plugins = store_crypto

# ================= Crypto plugin ===================
[crypto]
..
enabled_crypto_plugins = p11_crypto

[p11_crypto_plugin]
# Path to vendor PKCS11 library (string value)
library_path = '/opt/utimaco/lib/libcs_pkcs11_R2.so'

# Token serial number used to identify the token to be used. ␣
↪Required
# when the device has multiple tokens with the same label. (string
# value)
token_serial_number = 12345678

# Token label used to identify the token to be used.  Required when
# token_serial_number is not specified. (string value)
#token_label = <None>

# Password to login to PKCS11 session (string value)
login = '$up3r$e<retP4ssw0rd'

# Master KEK label (as stored in the HSM) (string value)
mkek_label = 'my_mkek'

# Master KEK length in bytes. (integer value)
#mkek_length = 32

# Master HMAC Key label (as stored in the HSM) (string value)
hmac_label = 'my_hmac_key'
```

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```
# (Optional) HSM Slot ID that contains the token device to be used.
# (integer value)
# slot_id = 1

# Flag for Read/Write Sessions (boolean value)
#rw_session = true

# Project KEK length in bytes. (integer value)
#pkek_length = 32

# Project KEK Cache Time To Live, in seconds (integer value)
#pkek_cache_ttl = 900

# Project KEK Cache Item Limit (integer value)
#pkek_cache_limit = 100

# Secret encryption mechanism (string value)
# Deprecated group/name - [p11_crypto_plugin]/algorithm
encryption_mechanism = CKM_AES_CBC

# HMAC Key Type (string value)
#hmac_key_type = CKK_AES

# HMAC Key Generation Algorithm (string value)
#hmac_keygen_mechanism = CKM_AES_KEY_GEN

# File to pull entropy for seeding RNG (string value)
#seed_file =

# Amount of data to read from file for seed (integer value)
#seed_length = 32

# User friendly plugin name (string value)
#plugin_name = PKCS11 HSM

# Generate IVs for CKM_AES_GCM mechanism. (boolean value)
# Deprecated group/name - [p11_crypto_plugin]/generate_iv
#aes_gcm_generate_iv = true

# HMAC key wrap mechanism
hmac_keywrap_mechanism = CKM_AES_MAC
```

The HMAC and MKEK keys can be generated as follows:

```
barbican-manage hsm gen_mkek --library-path \
/opt/utimaco/lib/libcs_pkcs11_R2.so --passphrase XXX \
--slot-id 0 --label 'my_mkek'
```

```
barbican-manage hsm gen_hmac --library-path \
```

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```
/opt/utimaco/lib/libcs_pkcs11_R2.so --passphrase XXX \
--slot-id 0 --label 'my_hmac_key'
```

KMIP Plugin

This secret store plugin is used to communicate with a KMIP device. The secret is securely stored in the KMIP device directly, rather than in the Barbican database. The Barbican database maintains a reference to the secrets location for later retrieval.

The plugin can be configured to authenticate to the KMIP device using either a username and password, or using a client certificate.

The configuration for this plugin in `/etc/barbican/barbican.conf` is as follows:

```
[secretstore]
..
enabled_secretstore_plugins = kmip_plugin

[kmip_plugin]
username = 'admin'
password = 'password'
host = localhost
port = 5696
keyfile = '/path/to/certs/cert.key'
certfile = '/path/to/certs/cert.crt'
ca_certs = '/path/to/certs/LocalCA.crt'
```

Dogtag Plugin

Dogtag is the upstream project corresponding to the Red Hat Certificate System, a robust, full-featured PKI solution that contains a Certificate Manager (CA) and a Key Recovery Authority (KRA) which is used to securely store secrets.

The KRA stores secrets as encrypted blobs in its internal database, with the master encryption keys being stored either in a software-based NSS security database, or in a Hardware Security Module (HSM).

Note that the software-based NSS database configuration provides a secure option for those deployments that do not require or cannot afford an HSM. This is the only current plugin to provide this option.

The KRA communicates with HSMs using PKCS#11. For a list of certified HSMs, see the latest release notes. Dogtag and the KRA meet all the relevant Common Criteria and FIPS specifications.

The KRA is a component of FreeIPA. Therefore, it is possible to configure the plugin with a FreeIPA server. More detailed instructions on how to set up Barbican with FreeIPA are provided here.

The plugin communicates with the KRA using a client certificate for a trusted KRA agent. That certificate is stored in an NSS database as well as a PEM file as seen in the configuration below.

The configuration for this plugin in `/etc/barbican/barbican.conf` is as follows:

```
[secretstore]
..
enabled_secretstore_plugins = dogtag_crypto
```

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```
[dogtag_plugin]
pem_path = '/etc/barbican/kra_admin_cert.pem'
dogtag_host = localhost
dogtag_port = 8443
nss_db_path = '/etc/barbican/alias'
nss_password = 'password123'
```

Vault Plugin

Vault is a HashiCorp tool for securely accessing secrets and other objects, such as API keys, passwords, or certificates. Vault provides a unified interface to any secret, while providing tight access control and recording a detailed audit log.

The plugin communicates with the Vault using a Vault token.

The configuration for this plugin in `/etc/barbican/barbican.conf` is as follows:

```
[secretstore]
..
enabled_secretstore_plugins = vault_plugin

[vault_plugin]
root_token_id =
approle_role_id =
approle_secret_id =
kv_mountpoint = secret
vault_url = https://127.0.0.1:8200
use_ssl = True
ssl_ca_crt_file = /opt/vault/tls/tls-ca.crt
```

2.3.3 Verify operation

Verify operation of the Key Manager (barbican) service.

Note

Perform these commands on the controller node.

1. Install python-barbicanclient package:

   - For Red Hat Enterprise Linux and CentOS:

     ```
     $ dnf install python-barbicanclient
     ```

   - For Ubuntu:

     ```
     $ apt-get install python-barbicanclient
     ```

2. Source the `admin` credentials to be able to perform Barbican API calls:

```
$ . admin-openrc
```

3. Use the OpenStack CLI to store a secret:

```
$ openstack secret store --name mysecret --payload j4=]d21
+---------------+------------------------------------------------------------------------
↪--------------+
| Field         | Value                                                                  ␣
↪              |
+---------------+------------------------------------------------------------------------
↪--------------+
| Secret href   | http://10.0.2.15:9311/v1/secrets/655d7d30-c11a-49d9-
↪a0f1-34cdf53a36fa |
| Name          | mysecret                                                               ␣
↪              |
| Created       | None                                                                   ␣
↪              |
| Status        | None                                                                   ␣
↪              |
| Content types | None                                                                   ␣
↪              |
| Algorithm     | aes                                                                    ␣
↪              |
| Bit length    | 256                                                                    ␣
↪              |
| Secret type   | opaque                                                                 ␣
↪              |
| Mode          | cbc                                                                    ␣
↪              |
| Expiration    | None                                                                   ␣
↪              |
+---------------+------------------------------------------------------------------------
↪--------------+
```

4. Confirm that the secret was stored by retrieving it:

```
$ openstack secret get http://10.0.2.15:9311/v1/secrets/655d7d30-c11a-
↪49d9-a0f1-34cdf53a36fa
+---------------+------------------------------------------------------------------------
↪--------------+
| Field         | Value                                                                  ␣
↪              |
+---------------+------------------------------------------------------------------------
↪--------------+
| Secret href   | http://10.0.2.15:9311/v1/secrets/655d7d30-c11a-49d9-
↪a0f1-34cdf53a36fa |
| Name          | mysecret                                                               ␣
↪              |
| Created       | 2016-08-16 16:04:10+00:00                                              ␣
↪              |
```

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```
| Status        | ACTIVE                                        ␣
↪             |
| Content types | {'default': 'application/octet-stream'}      ␣
↪             |
| Algorithm     | aes                                           ␣
↪             |
| Bit length    | 256                                           ␣
↪             |
| Secret type   | opaque                                        ␣
↪             |
| Mode          | cbc                                           ␣
↪             |
| Expiration    | None                                          ␣
↪             |
+---------------+--------------------------------------------------------
↪--------------+
```

Note

Some items are populated after the secret has been created and will only display when retrieving it.

5. Confirm that the secret payload was stored by retrieving it:

```
$ openstack secret get http://10.0.2.15:9311/v1/secrets/655d7d30-c11a-
↪49d9-a0f1-34cdf53a36fa --payload
+---------+---------+
| Field   | Value   |
+---------+---------+
| Payload | j4=]d21 |
+---------+---------+
```

2.3.4 Next steps

Your OpenStack environment now includes the barbican service.

To add additional services, see https://docs.openstack.org/install-guide .

The Key Manager service (barbican) provides secure storage, provisioning and management of secret data. This includes keying material such as symmetric keys, asymmetric keys, certificates and raw binary data.

This chapter assumes a working setup of OpenStack following the OpenStack Installation Tutorial.

2.4 Setting up Barbican

2.4.1 Using Keystone Middleware with Barbican

Prerequisites

To enable Keystone integration with Barbican youll need a relatively current version of Keystone. It is sufficient if you are installing an OpenStack cloud where all services including Keystone and Barbican are from the same release. If you dont have an instance of Keystone available, you can use one of the following ways to setup your own.

1. Simple Dockerized Keystone
2. Installing Keystone
3. An OpenStack cloud with Keystone (Devstack in the simplest case)

Hooking up Barbican to Keystone

Assuming that youve already setup your Keystone instance, connecting Barbican to Keystone is quite simple. When completed, Barbican should require a valid X-Auth-Token to be provided with all API calls except the get version call.

1. Turn off any active instances of Barbican
2. Edit `/etc/barbican/barbican-api-paste.ini`
    1. Change the pipeline `/v1` value from unauthenticated `barbican_api` to the authenticated `barbican-api-keystone`. This step will not be necessary on barbican from OpenStack Newton or higher, since barbican will default to using Keystone authentication as of OpenStack Newton.

       ```
       [composite:main]
       use = egg:Paste#urlmap
       /: barbican_version
       /v1: barbican-api-keystone
       ```

    2. Replace `authtoken` filter values to match your Keystone setup

       ```
       [filter:authtoken]
       paste.filter_factory = keystonemiddleware.auth_token:filter_factory
       auth_plugin = password
       username = {YOUR_KEYSTONE_USERNAME}
       password = {YOUR_KEYSTONE_PASSWORD}
       user_domain_id = {YOUR_KEYSTONE_USER_DOMAIN}
       project_name = {YOUR_KEYSTONE_PROJECT}
       project_domain_id = {YOUR_KEYSTONE_PROJECT_DOMAIN}
       www_authenticate_uri = http://{YOUR_KEYSTONE_ENDPOINT}:5000/v3
       auth_url = http://{YOUR_KEYSTONE_ENDPOINT}:5000/v3
       ```

       Alternatively, you can shorten this to

       ```
       [filter:authtoken]
       paste.filter_factory = keystonemiddleware.auth_token:filter_factory
       ```

       and store Barbicans Keystone credentials in the `[keystone_authtoken]` section of `/etc/barbican/barbican.conf`

```
[keystone_authtoken]
auth_plugin = password
username = {YOUR_KEYSTONE_USERNAME}
password = {YOUR_KEYSTONE_PASSWORD}
user_domain_id = {YOUR_KEYSTONE_USER_DOMAIN}
project_name = {YOUR_KEYSTONE_PROJECT}
project_domain_id = {YOUR_KEYSTONE_PROJECT_DOMAIN}
www_authenticate_uri = http://{YOUR_KEYSTONE_ENDPOINT}:5000/v3
auth_url = http://{YOUR_KEYSTONE_ENDPOINT}:5000/v3
```

3. Start Barbican `{barbican_home}/bin/barbican.sh start`

2.4.2 Troubleshooting your Barbican Setup

If you cannot find the answers youre looking for within this document, you can ask questions on the OFTC IRC channel `#openstack-barbican`

Getting a Barbican HTTP 401 error after a successful authentication to Keystone

What you might see

You get a HTTP 401 Unauthorized response even with a valid token

```
curl -X POST -H "X-Auth-Token: $TOKEN" -H "Content-type: application/json" \
-d '{"payload": "my-secret-here", "payload_content_type": "text/plain"}' \
http://localhost:9311/v1/secrets
```

Caused by

Expired signing cert on the Barbican server.

How to avoid

Check for an expired Keystone signing certificate on your Barbican server. Look at the expiration date in `/tmp/barbican/cache/signing_cert.pem`. If it is expired then follow these steps.

1. On your Keystone server, verify that signing_cert.pem has the same expiration date as the one on your Barbican machine. You can normally find `signing_cert.pem` on your Keystone server in `/etc/keystone/ssl/certs`.
2. If the cert matches then follow these steps to create a new one
   1. Delete it from both your Barbican and Keystone servers.
   2. Edit `/etc/keystone/ssl/certs/index.txt.attr` and set unique_subject to no.
   3. Run `keystone-manage pki_setup` to create a new `signing_cert.pem`
   4. The updated cert will be downloaded to your Barbican server the next time you hit the Barbican API.
3. If the cert **doesnt match** then delete the `signing_cert.pem` from your Barbican server. Do not delete from Keystone. The cert from Keystone will be downloaded to your machine the next time you hit the Barbican API.

Returned refs use localhost instead of the correct hostname

What you might see

```
curl -X POST -H "X-Auth-Token: $TOKEN" -H "Content-type: application/json" \
-d '{"payload": "my-secret-here", "payload_content_type": "text/plain"}' \
http://myhostname.com/v1/secrets

# Response:
{
  "secret_ref": "http://localhost:9311/v1/secrets/UUID_HERE"
}
```

Caused by

The default configuration on the response host name is not modified to the endpoints host name (typically the load balancers DNS name and port).

How to avoid

Change your `barbican.conf` files `host_href` setting from `localhost:9311` to the correct host name (myhostname.com in the example above).

Barbicans tox tests fail to run on my Mac

What you might see

```
clang: error: unknown argument: '-mno-fused-madd'
```

How to avoid

There is a great blog article that provides more details on the error and how to work around it. This link provides more details on the error and how to work around it.

Barbicans tox tests fail to find ffi.h on my Mac

What you might see

```
c/_cffi_backend.c:13:10: fatal error: 'ffi.h' file not found
...
ERROR: could not install deps [...]; v = InvocationError('...', 1)
```

How to avoid

Be sure that xcode and cmd line tools are up to date. Easiest way is to run `xcode-select --install` from an OS X command line. Be sure to say yes when asked if you want to install the command line tools. Now `ls /usr/include/ffi/ffi.h` should show that missing file exists, and the tox tests should run.

Barbicans tox tests fail with ImportError: No module named _bsddb

What you might see

```
ImportError: No module named _bsddb
```

How to avoid

Running tests via tox (which uses testr) will create a .testrepository directory containing, among other things, data files. Those datafiles may be created with bsddb, if it is available in the environment. This can cause problems if you run in an environment that does not have bsddb. To resolve this, delete your .testrepository directory and run tox again.

uWSGI logs OOPS ! failed loading app

What you might see

```
...
spawned uWSGI master process (pid: 59190)
spawned uWSGI worker 1 (pid: 59191, cores: 1)
spawned uWSGI worker 1 (pid: 59192, cores: 1)
Loading paste environment: config:/etc/barbican/barbican-api-paste.ini
WSGI app 0 (mountpoint='') ready in 0 seconds on interpreter \
    0x7fd098c08520 pid: 59191 (default app)
OOPS ! failed loading app in worker 1 (pid 59192) :( trying again...
Respawned uWSGI worker 1 (new pid: 59193)
Loading paste environment: config:/etc/barbican/barbican-api-paste.ini
OOPS ! failed loading app in worker 1 (pid 59193) :( trying again...
worker respawning too fast !!! i have to sleep a bit (2 seconds)...
...
```

Note

You will not see any useful logs or stack traces with this error!

Caused by

The vassal (worker) processes are not able to access the datastore.

How to avoid

Check the `sql_connection` in your `barbican.conf` file, to make sure that it references a valid reachable database.

Cannot register CLI option error when importing logging

What you might see

```
...
  File ".../oslo_config/cfg.py", line 1275, in register_cli_opt
```

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```
    raise ArgsAlreadyParsedError("cannot register CLI option")
ArgsAlreadyParsedError: arguments already parsed: cannot register CLI option
```

Caused by

An attempt to call the olso.configs `register_cli_opt()` function after the configuration arguments were parsed (see the comments and method in the oslo.config projects cfg.py file for details.

How to avoid

Instead of calling `import barbican.openstack.common.log as logging` to get a logger, call `from barbican.common import config` with this to get a logger to use in your source file: `LOG = config.getLogger(__name__)`.

Responder raised `TypeError: 'NoneType' object has no attribute '__getitem__'`

What you might see

```
...
2013-04-14 14:17:56 [FALCON] [ERROR] POST \
/da71dfbc-a959-4ad3-bdab-5ee190ce7515/csrs? => Responder raised \
TypeError: 'NoneType' object has no attribute '__getitem__'
```

Caused by

Forgetting to set your non-nullable FKs in entities you create via `XxxxResource` classes.

How to avoid

Dont forget to set any FKs defined on an entity prior to using the repository to create it.

uWSGI config issue: `ImportError: No module named site`

What you might see

```
...
uwsgi socket 0 bound to TCP address :9311 fd 3
Python version: 2.7.3 (...)  [...]
Set PythonHome to ./.venv
ImportError: No module named site
```

Caused by

- Cant locate the Python virtualenv for the Barbican project.
- Either the broker setting above is incorrect, or else you havent started a queue process yet (such as RabbitMQ)

How to avoid

Make sure the uWSGI config file at `etc/barbican/barbican-api-paste.ini` is configured correctly (see installation steps above), esp. if the virtualenv folder is named differently than the `.ini` file has.

REST Request Fails with JSON error

What you might see

```
{
    "title": "Malformed JSON"
}
```

Caused by

Barbican REST server cannot parse the incoming JSON message from your REST client.

How to avoid

Make sure you are submitting properly formed JSON. For example, are there commas after all but the last name/value pair in a list? Are there quotes around all name/values that are text-based? Are the types of values matching what is expected (i.e. integer and boolean types instead of quoted text)?

If you are using the Advanced REST Client with Chrome, and you tried to upload a file to the secrets PUT call, not only will this fail due to the multi-part format it uses, but it will also try to submit this file for every REST request you make thereafter, causing this error. Close the tab/window with the client, and restart it again.

Crypto Mime Type Not Supported when I try to run tests or hit the API

What you might see

A stack trace that has this in it (for example):

```
CryptoMimeTypeNotSupportedException: Crypto Mime Type of 'text/plain' not␣
↪supported
```

Caused by

The Barbican plugins are not installed into a place where the Python plugin manager can find them.

How to avoid

Make sure you run the `pip install -e .`.

Python cant find module errors with the uWSGI scripts

What you might see

```
*** has_emperor mode detected (fd: 6) ***
...
!!! UNABLE to load uWSGI plugin: dlopen(./python_plugin.so, 10): image not␣
```

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```
↪found !!!
...
  File "./site-packages/paste/deploy/loadwsgi.py", line 22, in import_string
      return pkg_resources.EntryPoint.parse("x=" + s).load(False)
  File "./site-packages/distribute-0.6.35-py2.7.egg/pkg_resources.py", line␣
↪2015, in load
      entry = __import__(self.module_name, globals(),globals(), ['__name__'])
ImportError: No module named barbican.api.app
...
*** Starting uWSGI 1.9.13 (64bit) on [Fri Jul  5 09:59:29 2013] ***
```

Caused by

The Barbican source modules are not found in the Python path of applications such as uwsgi.

How to avoid

Make sure you are running from your virtual env, and that pip was executed **after** you activated your virtual environment. This especially includes the `pip install -e` command. Also, it is possible that your virtual env gets corrupted, so you might need to rebuild it.

unable to open database file None None errors running scripts

What you might see

```
...
  File "./site-packages/sqlalchemy/engine/strategies.py", line 80, in connect
    return dialect.connect(*cargs, **cparams)
  File "./site-packages/sqlalchemy/engine/default.py", line 283, in connect
    return self.dbapi.connect(*cargs, **cparams)
OperationalError: (OperationalError) unable to open database file None None
[emperor] removed uwsgi instance barbican-api.ini
...
```

Caused by

Destination folder for the sqlite database is not found, or is not writable.

How to avoid

Make sure the `/var/lib/barbican/` folder exists and is writable by the user that is running the Barbican API process.

ValueError: No JSON object could be decoded with Keystoneclient middleware

What you might see

```
...
2013-08-15 16:55:15.759 2445 DEBUG keystoneclient.middleware.auth_token \
```

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```
[-] Token validation failure. _validate_user_token \
./site-packages/keystoneclient/middleware/auth_token.py:711
...
2013-08-15 16:55:15.759 2445 TRACE keystoneclient.middleware.auth_token \
raise ValueError("No JSON object could be decoded")
2013-08-15 16:55:15.759 24458 TRACE keystoneclient.middleware.auth_token \
ValueError: No JSON object could be decoded
...
2013-08-15 16:55:15.766 2445 WARNING keystoneclient.middleware.auth_token \
[-] Authorization failed for token ...
2013-08-15 16:55:15.766 2445 INFO keystoneclient.middleware.auth_token \
[-] Invalid user token - rejecting request...
```

Caused by

The `keystoneclient` middleware component is looking for a `cms` command in `openssl` that wasnt available before version `1.0.1`.

How to avoid

Update openssl.

accept-encoding of gzip,deflate,sdch not supported

What you might see

```
Secret retrieval issue seen - accept-encoding of 'gzip,deflate,sdch' not␣
↪supported
```

Caused by

This might be an issue with the browser you are using, as performing the request via curl doesnt seem to be affected.

How to avoid

Other than using an command such as curl to make the REST request you may not have many other options.

2.4.3 No Auth barbican

As of OpenStack Newton, barbican will default to using Keystone like every other OpenStack service for identity and access control. Nonetheless, sometimes it may be useful to run barbican without any authentication service for development purposes.

To this end, `barbican-api-paste.ini` contains a filter pipeline without any authentication (no auth mode):

```
# Use this pipeline for barbican API - DEFAULT no authentication
[pipeline:barbican_api]
pipeline = unauthenticated-context apiapp
```

To enable this pipeline proceed as follows:

1. Turn off any active instances of barbican
2. Edit `/etc/barbican/barbican-api-paste.ini`

   Change the pipeline `/v1` value from authenticated `barbican-api-keystone` to the unauthenticated `barbican_api`

   ```
   [composite:main]
   use = egg:Paste#urlmap
   /: barbican_version
   /v1: barbican_api
   ```

With every OpenStack service integrated with keystone, its API requires access token to retireve certain information and validate users information and privileges. If you are running barbican in no auth mode, you have to specify project_id instead of an access token which was retrieved from the token instead. In case of API, replace `'X-Auth-Token: $TOKEN'` with `'X-Project-Id: {project_id}'` for every API request in *Barbican API Documentation*.

You can also find detailed explanation to run barbican client with an unauthenticated context here and run barbican CLI in no auth mode here.

2.4.4 Using Audit Middleware with Barbican

Background

Audit middleware is a python middleware logic which is added in service request processing pipeline via paste deploy filters. Audit middleware constructs audit event data in CADF format.

Audit middleware supports delivery of CADF audit events via Oslo messaging notifier capability. Based on *notification_driver* configuration, audit events can be routed to messaging infrastructure (notification_driver = messagingv2) or can be routed to a log file (notification_driver = log).

Audit middleware creates two events per REST API interaction. First event has information extracted from request data and the second one has request outcome (response).

Enabling Audit for API Requests

Audit middleware is available as part of keystonemiddleware (>= 1.6) library. Assuming a barbican deployment is already using keystone for token validation, auditing support requires only configuration changes. It has Oslo messaging library dependency as it uses this for audit event delivery. pyCADF library is used for creating events in CADF format.

- Enable Middleware : Enabling Middleware Link . Change is primarily in service paste deploy configuration.
- Configure Middleware : Configuring Middleware Link . Can use provided audit mapping file. If there are no custom mapping for actions or path, then related mapping values are derived from taxonomy defined in pyCADF library.

Note

Audit middleware filter should be included after Keystone middlewares keystone_authtoken middleware in request pipeline. This is needed so that audit middleware can utilize environment variables set by keystone_authtoken middleware.

Steps

1. Turn off any active instances of Barbican.
2. Copy *api_audit_map.conf* to `/etc/barbican` directory.
3. Edit `/etc/barbican/barbican-api-paste.ini`

   Replace the /v1 app pipeline from `barbican_api` to `barbican-api-keystone-audit` pipeline:

   ```
   [pipeline:barbican-api-keystone-audit]
   pipeline = authtoken context audit apiapp
   ```
4. Edit `barbican.conf` to update *notification_driver* value.
5. Start Barbican `{barbican_home}/bin/barbican.sh start`

Sample Audit Event

Following is the sample of audit event for symmetric key create request

```
{
   "priority":"INFO",
   "event_type":"audit.http.request",
   "timestamp":"2015-12-11 00:44:26.412076",
   "publisher_id":"uwsgi",
   "payload":{
      "typeURI":"http://schemas.dmtf.org/cloud/audit/1.0/event",
      "eventTime":"2015-12-11T00:44:26.410768+0000",
      "target":{
         "typeURI":"service/security/keymanager/secrets",
         "addresses":[
            {
               "url":"http://{barbican_admin_host}:9311",
               "name":"admin"
            },
            {
               "url":"http://{barbican_internal_host}:9311",
               "name":"private"
            },
            {
               "url":"https://{barbican_public_host}:9311",
               "name":"public"
            }
         ],
         "name":"barbican_service_user",
         "id":"barbican"
      },
      "observer":{
         "id":"target"
      },
      "tags":[
         "correlation_id?value=openstack:7e0fe4a6-e258-477e-a1c9-0fd0921a8435"
      ],
```

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```
      "eventType":"activity",
      "initiator":{
         "typeURI":"service/security/account/user",
         "name":"cinder_user",
         "credential":{
            "token":"***",
            "identity_status":"Confirmed"
         },
         "host":{
            "agent":"curl/7.38.0",
            "address":"192.168.245.2"
         },
         "project_id":"8eabee0a4c4e40f882df8efbce695526",
         "id":"513e8682f23446ceb598b6b0f5c4482b"
      },
      "action":"create",
      "outcome":"pending",
      "id":"openstack:3a6a961c-9ada-4b81-9095-90968d896c41",
      "requestPath":"/v1/secrets"
   },
   "message_id":"afc3fd93-51e9-4c80-b330-983e66962265"
}
```

Ceilometer audit wiki can be referred to identify meaning of different fields in audit event to **7 Ws of Audit and Compliance**.

2.4.5 Using Secret Store Plugins in Barbican

Summary

By default, Barbican is configured to use one active secret store plugin in a deployment. This means that all of the new secrets are going to be stored via same plugin mechanism (i.e. same storage backend).

In **Newton** OpenStack release, support for configuring multiple secret store plugin backends is added (Spec Link). As part of this change, client can choose to select preferred plugin backend for storing their secret at a project level.

Enabling Multiple Barbican Backends

Multiple backends support may be needed in specific deployment/ use-case scenarios and can be enabled via configuration.

For this, a Barbican deployment may have more than one secret storage backend added in service configuration. Project administrators will have choice of pre-selecting one backend as the preferred choice for secrets created under that project. Any **new** secret created under that project will use the preferred backend to store its key material. When there is no project level storage backend selected, then new secret will use the global secret storage backend.

Multiple plugin configuration can be defined as follows.

```
[secretstore]
# Set to True when multiple plugin backends support is needed
```

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```
enable_multiple_secret_stores = True
stores_lookup_suffix = software, kmip, pkcs11, dogtag, vault

[secretstore:software]
secret_store_plugin = store_crypto
crypto_plugin = simple_crypto

[secretstore:kmip]
secret_store_plugin = kmip_plugin
global_default = True

[secretstore:dogtag]
secret_store_plugin = dogtag_plugin

[secretstore:pkcs11]
secret_store_plugin = store_crypto
crypto_plugin = p11_crypto

[secretstore:vault]
secret_store_plugin = vault_plugin
```

When *enable_multiple_secret_stores* is enabled (True), then list property *stores_lookup_suffix* is used for looking up supported plugin names in configuration section. This section name is constructed using pattern secretstore:{one_of_suffix}. One of the plugin **must** be explicitly identified as global default i.e. *global_default = True*. Ordering of suffix and label used does not matter as long as there is a matching section defined in service configuration.

Note

For existing Barbican deployment case, its recommended to keep existing secretstore and crypto plugin (if applicable) name combination to be used as global default secret store. This is needed to be consistent with existing behavior.

Warning

When multiple plugins support is enabled, then *enabled_secretstore_plugins* and *enabled_crypto_plugins* values are **not** used to instantiate relevant plugins. Only above mentioned mechanism is used to identify and instantiate store and crypto plugins.

Multiple backend can be useful in following type of usage scenarios.

- In a deployment, a deployer may be okay in storing their dev/test resources using a low-security secret store, such as one backend using software-only crypto, but may want to use an HSM-backed secret store for production resources.
- In a deployment, for certain use cases where a client requires high concurrent access of stored keys, HSM might not be a good storage backend. Also scaling them horizontally to provide higher scalability is a costly approach with respect to database.

- HSM devices generally have limited storage capacity so a deployment will have to watch its stored keys size proactively to remain under the limit constraint. This is more applicable in KMIP backend than with PKCS11 backend because of plugins different storage approach. This aspect can also result from above use case scenario where deployment is storing non-sensitive (from dev/test environment) encryption keys in HSM.
- Barbican running as IaaS service or platform component where some class of client services have strict compliance requirements (e.g. FIPS) so will use HSM backed plugins whereas others may be okay storing keys in software-only crypto plugin.

2.4.6 barbican.conf

DEFAULT

`debug`

Type
boolean

Default
`False`

Mutable
This option can be changed without restarting.

If set to true, the logging level will be set to DEBUG instead of the default INFO level.

`log_config_append`

Type
string

Default
`<None>`

Mutable
This option can be changed without restarting.

The name of a logging configuration file. This file is appended to any existing logging configuration files. For details about logging configuration files, see the Python logging module documentation. Note that when logging configuration files are used then all logging configuration is set in the configuration file and other logging configuration options are ignored (for example, log-date-format).

Table 1: Deprecated Variations

Group	Name
DEFAULT	log-config
DEFAULT	log_config

`log_date_format`

Type
string

Default
`%Y-%m-%d %H:%M:%S`

Defines the format string for %(asctime)s in log records. Default: the value above . This option is ignored if log_config_append is set.

`log_file`

Type
string

Default
`<None>`

(Optional) Name of log file to send logging output to. If no default is set, logging will go to stderr as defined by use_stderr. This option is ignored if log_config_append is set.

Table 2: Deprecated Variations

Group	Name
DEFAULT	logfile

`log_dir`

Type
string

Default
`<None>`

(Optional) The base directory used for relative log_file paths. This option is ignored if log_config_append is set.

Table 3: Deprecated Variations

Group	Name
DEFAULT	logdir

`use_syslog`

Type
boolean

Default
`False`

Use syslog for logging. Existing syslog format is DEPRECATED and will be changed later to honor RFC5424. This option is ignored if log_config_append is set.

`use_journal`

Type
boolean

Default
`False`

Enable journald for logging. If running in a systemd environment you may wish to enable journal support. Doing so will use the journal native protocol which includes structured metadata in addition to log messages.This option is ignored if log_config_append is set.

`syslog_log_facility`

Type
string

Default
`LOG_USER`

Syslog facility to receive log lines. This option is ignored if log_config_append is set.

`use_json`

Type
boolean

Default
`False`

Use JSON formatting for logging. This option is ignored if log_config_append is set.

`use_stderr`

Type
boolean

Default
`False`

Log output to standard error. This option is ignored if log_config_append is set.

`log_color`

Type
boolean

Default
`False`

(Optional) Set the color key according to log levels. This option takes effect only when logging to stderr or stdout is used. This option is ignored if log_config_append is set.

`log_rotate_interval`

Type
integer

Default
`1`

The amount of time before the log files are rotated. This option is ignored unless log_rotation_type is set to interval.

`log_rotate_interval_type`

Type
string

Default
`days`

Valid Values
Seconds, Minutes, Hours, Days, Weekday, Midnight

Rotation interval type. The time of the last file change (or the time when the service was started) is used when scheduling the next rotation.

`max_logfile_count`

Type
integer

Default
`30`

Maximum number of rotated log files.

`max_logfile_size_mb`

Type
integer

Default
`200`

Log file maximum size in MB. This option is ignored if log_rotation_type is not set to size.

`log_rotation_type`

Type
string

Default
`none`

Valid Values
interval, size, none

Log rotation type.

Possible values

interval
Rotate logs at predefined time intervals.

size
Rotate logs once they reach a predefined size.

none
Do not rotate log files.

`logging_context_format_string`

Type
string

Default
```
%(asctime)s.%(msecs)03d %(process)d %(levelname)s %(name)s
[%(global_request_id)s %(request_id)s %(user_identity)s]
%(instance)s%(message)s
```

Format string to use for log messages with context. Used by oslo_log.formatters.ContextFormatter `logging_default_format_string`

Type
string

Default
`%(asctime)s.%(msecs)03d %(process)d %(levelname)s %(name)s [-] %(instance)s%(message)s`

Format string to use for log messages when context is undefined. Used by oslo_log.formatters.ContextFormatter

`logging_debug_format_suffix`

Type
string

Default
`%(funcName)s %(pathname)s:%(lineno)d`

Additional data to append to log message when logging level for the message is DEBUG. Used by oslo_log.formatters.ContextFormatter

`logging_exception_prefix`

Type
string

Default
`%(asctime)s.%(msecs)03d %(process)d ERROR %(name)s %(instance)s`

Prefix each line of exception output with this format. Used by oslo_log.formatters.ContextFormatter

`logging_user_identity_format`

Type
string

Default
`%(user)s %(project)s %(domain)s %(system_scope)s %(user_domain)s %(project_domain)s`

Defines the format string for %(user_identity)s that is used in logging_context_format_string. Used by oslo_log.formatters.ContextFormatter

`default_log_levels`

Type
list

Default
`['amqp=WARN', 'boto=WARN', 'sqlalchemy=WARN', 'suds=INFO', 'oslo.messaging=INFO', 'oslo_messaging=INFO', 'iso8601=WARN', 'requests.packages.urllib3.connectionpool=WARN', 'urllib3.connectionpool=WARN', 'websocket=WARN', 'requests.packages.urllib3.util.retry=WARN', 'urllib3.util.retry=WARN', 'keystonemiddleware=WARN', 'routes.middleware=WARN',`

`'stevedore=WARN', 'taskflow=WARN', 'keystoneauth=WARN', 'oslo.cache=INFO', 'oslo_policy=INFO', 'dogpile.core.dogpile=INFO']`

List of package logging levels in logger=LEVEL pairs. This option is ignored if log_config_append is set.

`publish_errors`

Type
boolean

Default
`False`

Enables or disables publication of error events.

`instance_format`

Type
string

Default
`"[instance:  %(uuid)s] "`

The format for an instance that is passed with the log message.

`instance_uuid_format`

Type
string

Default
`"[instance:  %(uuid)s] "`

The format for an instance UUID that is passed with the log message.

`rate_limit_interval`

Type
integer

Default
`0`

Interval, number of seconds, of log rate limiting.

`rate_limit_burst`

Type
integer

Default
`0`

Maximum number of logged messages per rate_limit_interval.

`rate_limit_except_level`

Type
string

Default
`CRITICAL`

Valid Values
CRITICAL, ERROR, INFO, WARNING, DEBUG,

Log level name used by rate limiting. Logs with level greater or equal to rate_limit_except_level are not filtered. An empty string means that all levels are filtered.

`fatal_deprecations`

Type
boolean

Default
`False`

Enables or disables fatal status of deprecations.

`admin_role`

Type
string

Default
`admin`

Role used to identify an authenticated user as administrator.

`allow_anonymous_access`

Type
boolean

Default
`False`

Allow unauthenticated users to access the API with read-only privileges. This only applies when using ContextMiddleware.

`max_allowed_request_size_in_bytes`

Type
integer

Default
`25000`

Maximum allowed http request size against the barbican-api.

`max_allowed_secret_in_bytes`

Type
integer

Default
`20000`

Maximum allowed secret size in bytes.

`host_href`

Type
string

Default
`http://localhost:9311`

Host name, for use in HATEOAS-style references Note: Typically this would be the load balanced endpoint that clients would use to communicate back with this service. If a deployment wants to derive host from wsgi request instead then make this blank. Blank is needed to override default config value which is http://localhost:9311

`db_auto_create`

Type
boolean

Default
`False`

Create the Barbican database on service startup.

`max_limit_paging`

Type
integer

Default
`100`

Maximum page size for the limit paging URL parameter.

`default_limit_paging`

Type
integer

Default
`10`

Default page size for the limit paging URL parameter.

`sql_pool_class`

Type
string

Default
`QueuePool`

Accepts a class imported from the sqlalchemy.pool module, and handles the details of building the pool for you. If commented out, SQLAlchemy will select based on the database dialect. Other options are QueuePool (for SQLAlchemy-managed connections) and NullPool (to disabled SQLAlchemy management of connections). See http://docs.sqlalchemy.org/en/latest/core/pooling.html for more details

Warning

This option is deprecated for removal. Its value may be silently ignored in the future.

Reason
This option has been ineffective

`sql_pool_logging`

Type
boolean

Default
`False`

Show SQLAlchemy pool-related debugging output in logs (sets DEBUG log level output) if specified.

`backdoor_port`

Type
string

Default
`<None>`

Enable eventlet backdoor. Acceptable values are 0, <port>, and <start>:<end>, where 0 results in listening on a random tcp port number; <port> results in listening on the specified port number (and not enabling backdoor if that port is in use); and <start>:<end> results in listening on the smallest unused port number within the specified range of port numbers. The chosen port is displayed in the services log file.

Warning

This option is deprecated for removal. Its value may be silently ignored in the future.

Reason
The backdoor_port option is deprecated and will be removed in a future release.

`backdoor_socket`

Type
string

Default
`<None>`

Enable eventlet backdoor, using the provided path as a unix socket that can receive connections. This option is mutually exclusive with backdoor_port in that only one should be provided. If both are provided then the existence of this option overrides the usage of that option. Inside the path {pid} will be replaced with the PID of the current process.

Warning

This option is deprecated for removal. Its value may be silently ignored in the future.

Reason
The backdoor_socket option is deprecated and will be removed in a future release.

`log_options`

Type
boolean

Default
`True`

Enables or disables logging values of all registered options when starting a service (at DEBUG level).

`graceful_shutdown_timeout`

Type
integer

Default
`60`

Specify a timeout after which a gracefully shutdown server will exit. Zero value means endless wait.

`executor_thread_pool_size`

Type
integer

Default
`64`

Size of executor thread pool when executor is threading or eventlet.

Table 4: Deprecated Variations

Group	Name
DEFAULT	rpc_thread_pool_size

`rpc_response_timeout`

Type
integer

Default
`60`

Seconds to wait for a response from a call.

`transport_url`

Type
string

Default
`rabbit://`

The network address and optional user credentials for connecting to the messaging backend, in URL format. The expected format is:

driver://[user:pass@]host:port[,[userN:passN@]hostN:portN]/virtual_host?query

Example: rabbit://rabbitmq:password@127.0.0.1:5672//

For full details on the fields in the URL see the documentation of oslo_messaging.TransportURL at https://docs.openstack.org/oslo.messaging/latest/reference/transport.html

`control_exchange`

Type
string

Default
`openstack`

The default exchange under which topics are scoped. May be overridden by an exchange name specified in the transport_url option.

`rpc_ping_enabled`

Type
boolean

Default
`False`

Add an endpoint to answer to ping calls. Endpoint is named oslo_rpc_server_ping

audit_middleware_notifications

`use_oslo_messaging`

Type
boolean

Default
`True`

Indicate whether to use oslo_messaging as the notifier. If set to False, the local logger will be used as the notifier. If set to True, the oslo_messaging package must also be present. Otherwise, the local will be used instead.

`driver`

Type
string

Default
`<None>`

The Driver to handle sending notifications. Possible values are messaging, messagingv2, routing, log, test, noop. If not specified, then value from oslo_messaging_notifications conf section is used.

`topics`

Type
list

Default
`<None>`

List of AMQP topics used for OpenStack notifications. If not specified, then value from oslo_messaging_notifications conf section is used.

`transport_url`

Type
string

Default
`<None>`

A URL representing messaging driver to use for notification. If not specified, we fall back to the same configuration used for RPC.

cors

`allowed_origin`

Type
list

Default
`<None>`

Indicate whether this resource may be shared with the domain received in the requests origin header. Format: <protocol>://<host>[:<port>], no trailing slash. Example: https://horizon.example.com

`allow_credentials`

Type
boolean

Default
`True`

Indicate that the actual request can include user credentials

`expose_headers`

Type
list

Default
```
['X-Auth-Token', 'X-Openstack-Request-Id', 'X-Project-Id',
'X-Identity-Status', 'X-User-Id', 'X-Storage-Token',
'X-Domain-Id', 'X-User-Domain-Id', 'X-Project-Domain-Id',
'X-Roles']
```

Indicate which headers are safe to expose to the API. Defaults to HTTP Simple Headers.

`max_age`

Type
integer

Default
`3600`

Maximum cache age of CORS preflight requests.

`allow_methods`

Type
list

Default
`['GET', 'PUT', 'POST', 'DELETE', 'PATCH']`

Indicate which methods can be used during the actual request.

`allow_headers`

Type
list

Default
`['X-Auth-Token', 'X-Openstack-Request-Id', 'X-Project-Id', 'X-Identity-Status', 'X-User-Id', 'X-Storage-Token', 'X-Domain-Id', 'X-User-Domain-Id', 'X-Project-Domain-Id', 'X-Roles']`

Indicate which header field names may be used during the actual request.

crypto

`namespace`

Type
string

Default
`barbican.crypto.plugin`

Extension namespace to search for plugins.

`enabled_crypto_plugins`

Type
multi-valued

Default
`simple_crypto`

List of crypto plugins to load.

database

`sqlite_synchronous`

Type
boolean

Default
`True`

If True, SQLite uses synchronous mode.

`backend`

Type
string

Default
`sqlalchemy`

The back end to use for the database.

`connection`

Type
string

Default
`<None>`

The SQLAlchemy connection string to use to connect to the database.

`slave_connection`

Type
string

Default
`<None>`

The SQLAlchemy connection string to use to connect to the slave database.

`asyncio_connection`

Type
string

Default
`<None>`

The SQLAlchemy asyncio connection string to use to connect to the database.

`asyncio_slave_connection`

Type
string

Default
`<None>`

The SQLAlchemy asyncio connection string to use to connect to the slave database.

`synchronous_reader`

Type
boolean

Default
`True`

Whether or not to assume a reader context needs to guarantee it can read data committed by a writer assuming replication lag is present; defaults to True. When False, a reader context works the same as async_reader and will select the slave database if present. When using a galera cluster, this can be set to False only if you set mysql_wsrep_sync_wait to 1 (this will guarantee that the reader will wait until writesets are committed).Note that this may incur a performance degradation within the galera cluster. Note also that this parameter has no effect if you do not set any slave_connection.

`mysql_sql_mode`

Type
string

Default
`TRADITIONAL`

The SQL mode to be used for MySQL sessions. This option, including the default, overrides any server-set SQL mode. To use whatever SQL mode is set by the server configuration, set this to no value. Example: mysql_sql_mode=

`mysql_wsrep_sync_wait`

Type
integer

Default
`<None>`

For Galera only, configure wsrep_sync_wait causality checks on new connections. Default is None, meaning dont configure any setting.

`connection_recycle_time`

Type
integer

Default
`3600`

Connections which have been present in the connection pool longer than this number of seconds will be replaced with a new one the next time they are checked out from the pool.

`max_pool_size`

Type
integer

Default
`5`

Maximum number of SQL connections to keep open in a pool. Setting a value of 0 indicates no limit.

`max_retries`

Type
integer

Default
`10`

Maximum number of database connection retries during startup. Set to -1 to specify an infinite retry count.

`retry_interval`

Type
integer

Default
`10`

Interval between retries of opening a SQL connection.

`max_overflow`

Type
integer

Default
`50`

If set, use this value for max_overflow with SQLAlchemy.

`connection_debug`

Type
integer

Default
`0`

Minimum Value
0

Maximum Value
100

Verbosity of SQL debugging information: 0=None, 100=Everything.

`connection_trace`

Type
boolean

Default
`False`

Add Python stack traces to SQL as comment strings.

`pool_timeout`

Type
integer

Default
`<None>`

If set, use this value for pool_timeout with SQLAlchemy.

`use_db_reconnect`

Type
boolean

Default
`False`

Enable the experimental use of database reconnect on connection lost.

`db_retry_interval`

Type
integer

Default
`1`

Seconds between retries of a database transaction.

`db_inc_retry_interval`

Type
boolean

Default
`True`

If True, increases the interval between retries of a database operation up to db_max_retry_interval.

`db_max_retry_interval`

Type
integer

Default
`10`

If db_inc_retry_interval is set, the maximum seconds between retries of a database operation.

`db_max_retries`

Type
integer

Default
`20`

Maximum retries in case of connection error or deadlock error before error is raised. Set to -1 to specify an infinite retry count.

`connection_parameters`

Type
string

Default
`''`

Optional URL parameters to append onto the connection URL at connect time; specify as param1=value1&param2=value2&

dogtag_plugin

`pem_path`

Type
string

Default
`/etc/barbican/kra_admin_cert.pem`

Path to PEM file for authentication

`dogtag_host`

Type
string

Default
`localhost`

Hostname for the Dogtag instance

`dogtag_port`

Type
port number

Default
`8443`

Minimum Value
0

Maximum Value
65535

Port for the Dogtag instance

`nss_db_path`

Type
string

Default
`/etc/barbican/alias`

Path to the NSS certificate database

`nss_password`

Type
string

Default
`<None>`

Password for the NSS certificate databases

`plugin_name`

Type
string

Default
`Dogtag KRA`

User friendly plugin name

`retries`

Type
integer

Default
`3`

Retries when storing or generating secrets

healthcheck

`detailed`

Type
boolean

Default
`False`

Show more detailed information as part of the response. Security note: Enabling this option may expose sensitive details about the service being monitored. Be sure to verify that it will not violate your security policies.

`backends`

Type
list

Default
`[]`

Additional backends that can perform health checks and report that information back as part of a request.

`allowed_source_ranges`

Type
list

Default
`[]`

A list of network addresses to limit source ip allowed to access healthcheck information. Any request from ip outside of these network addresses are ignored.

`ignore_proxied_requests`

Type
boolean

Default
`False`

Ignore requests with proxy headers.

`disable_by_file_path`

Type
string

Default
`<None>`

Check the presence of a file to determine if an application is running on a port. Used by DisableByFileHealthcheck plugin.

`disable_by_file_paths`

Type
list

Default
`[]`

Check the presence of a file based on a port to determine if an application is running on a port. Expects a port:path list of strings. Used by DisableByFilesPortsHealthcheck plugin.

`enable_by_file_paths`

Type
list

Default
`[]`

Check the presence of files. Used by EnableByFilesHealthcheck plugin.

keystone_authtoken

`www_authenticate_uri`

Type
string

Default
`<None>`

Complete public Identity API endpoint. This endpoint should not be an admin endpoint, as it should be accessible by all end users. Unauthenticated clients are redirected to this endpoint to authenticate. Although this endpoint should ideally be unversioned, client support in the wild varies. If youre using a versioned v2 endpoint here, then this should *not* be the same endpoint the service user utilizes for validating tokens, because normal end users may not be able to reach that endpoint.

Table 5: Deprecated Variations

Group	Name
keystone_authtoken	auth_uri

`auth_uri`

Type
string

Default
`<None>`

Complete public Identity API endpoint. This endpoint should not be an admin endpoint, as it should be accessible by all end users. Unauthenticated clients are redirected to this endpoint to authenticate. Although this endpoint should ideally be unversioned, client support in the wild varies. If youre using a versioned v2 endpoint here, then this should *not* be the same endpoint the service user utilizes for validating tokens, because normal end users may not be able to reach that endpoint. This option is deprecated in favor of www_authenticate_uri and will be removed in the S release.

Warning

This option is deprecated for removal since Queens. Its value may be silently ignored in the future.

Reason
The auth_uri option is deprecated in favor of www_authenticate_uri and will be removed in the S release.

`auth_version`

Type
string

Default
`<None>`

API version of the Identity API endpoint.

`interface`

Type
string

Default
`internal`

Interface to use for the Identity API endpoint. Valid values are public, internal (default) or admin.

`delay_auth_decision`

Type
boolean

Default
`False`

Do not handle authorization requests within the middleware, but delegate the authorization decision to downstream WSGI components.

`http_connect_timeout`

Type
integer

Default
`<None>`

Request timeout value for communicating with Identity API server.

`http_request_max_retries`

Type
integer

Default
`3`

How many times are we trying to reconnect when communicating with Identity API Server.

`cache`

Type
string

Default
`<None>`

Request environment key where the Swift cache object is stored. When auth_token middleware is deployed with a Swift cache, use this option to have the middleware share a caching backend with swift. Otherwise, use the `memcached_servers` option instead.

`certfile`

Type
string

Default
`<None>`

Required if identity server requires client certificate

`keyfile`

Type
string

Default
`<None>`

Required if identity server requires client certificate

`cafile`

Type
string

Default
`<None>`

A PEM encoded Certificate Authority to use when verifying HTTPs connections. Defaults to system CAs.

`insecure`

Type
boolean

Default
`False`

Verify HTTPS connections.

`region_name`

Type
string

Default
`<None>`

The region in which the identity server can be found.

`memcached_servers`

Type
list

Default
`<None>`

Optionally specify a list of memcached server(s) to use for caching. If left undefined, tokens will instead be cached in-process.

Table 6: Deprecated Variations

Group	Name
keystone_authtoken	memcache_servers

`token_cache_time`

Type
integer

Default
`300`

In order to prevent excessive effort spent validating tokens, the middleware caches previously-seen tokens for a configurable duration (in seconds). Set to -1 to disable caching completely.

`memcache_security_strategy`

Type
string

Default
`None`

Valid Values
None, MAC, ENCRYPT

(Optional) If defined, indicate whether token data should be authenticated or authenticated and encrypted. If MAC, token data is authenticated (with HMAC) in the cache. If ENCRYPT, token data is encrypted and authenticated in the cache. If the value is not one of these options or empty, auth_token will raise an exception on initialization.

`memcache_secret_key`

Type
string

Default
`<None>`

(Optional, mandatory if memcache_security_strategy is defined) This string is used for key derivation.

`memcache_tls_enabled`

Type
boolean

Default
`False`

(Optional) Global toggle for TLS usage when comunicating with the caching servers.

`memcache_tls_cafile`

Type
string

Default
`<None>`

(Optional) Path to a file of concatenated CA certificates in PEM format necessary to establish the caching servers authenticity. If tls_enabled is False, this option is ignored.

`memcache_tls_certfile`

Type
string

Default
`<None>`

(Optional) Path to a single file in PEM format containing the clients certificate as well as any number of CA certificates needed to establish the certificates authenticity. This file is only required when client side authentication is necessary. If tls_enabled is False, this option is ignored.

`memcache_tls_keyfile`

Type
string

Default
`<None>`

(Optional) Path to a single file containing the clients private key in. Otherwhise the private key will be taken from the file specified in tls_certfile. If tls_enabled is False, this option is ignored.

`memcache_tls_allowed_ciphers`

Type
string

Default
`<None>`

(Optional) Set the available ciphers for sockets created with the TLS context. It should be a string in the OpenSSL cipher list format. If not specified, all OpenSSL enabled ciphers will be available.

`memcache_pool_dead_retry`

Type
integer

Default
`300`

(Optional) Number of seconds memcached server is considered dead before it is tried again.

`memcache_pool_maxsize`

Type
integer

Default
`10`

(Optional) Maximum total number of open connections to every memcached server.

`memcache_pool_socket_timeout`

Type
integer

Default
`3`

(Optional) Socket timeout in seconds for communicating with a memcached server.

`memcache_pool_unused_timeout`

Type
integer

Default
`60`

(Optional) Number of seconds a connection to memcached is held unused in the pool before it is closed.

`memcache_pool_conn_get_timeout`

Type
integer

Default
`10`

(Optional) Number of seconds that an operation will wait to get a memcached client connection from the pool.

`memcache_use_advanced_pool`

Type
boolean

Default
`True`

(Optional) Use the advanced (eventlet safe) memcached client pool.

`include_service_catalog`

Type
boolean

Default
`True`

(Optional) Indicate whether to set the X-Service-Catalog header. If False, middleware will not ask for service catalog on token validation and will not set the X-Service-Catalog header.

`enforce_token_bind`

Type
string

Default
`permissive`

Used to control the use and type of token binding. Can be set to: disabled to not check token binding. permissive (default) to validate binding information if the bind type is of a form known to the server and ignore it if not. strict like permissive but if the bind type is unknown the token will be rejected. required any form of token binding is needed to be allowed. Finally the name of a binding method that must be present in tokens.

`service_token_roles`

Type
list

Default
`['service']`

A choice of roles that must be present in a service token. Service tokens are allowed to request that an expired token can be used and so this check should tightly control that only actual services should be sending this token. Roles here are applied as an ANY check so any role in this list must be present. For backwards compatibility reasons this currently only affects the allow_expired check.

`service_token_roles_required`

Type
boolean

Default
`False`

For backwards compatibility reasons we must let valid service tokens pass that dont pass the service_token_roles check as valid. Setting this true will become the default in a future release and should be enabled if possible.

`service_type`

Type
string

Default
`<None>`

The name or type of the service as it appears in the service catalog. This is used to validate tokens that have restricted access rules.

`memcache_sasl_enabled`

Type
boolean

Default
`False`

Enable the SASL(Simple Authentication and Security Layer) if the SASL_enable is true, else disable.

`memcache_username`

Type
string

Default
`''`

the user name for the SASL

`memcache_password`

Type
string

Default
`''`

the username password for SASL

`auth_type`

Type
unknown type

Default
`<None>`

Authentication type to load

Table 7: Deprecated Variations

Group	Name
keystone_authtoken	auth_plugin

`auth_section`

Type
unknown type

Default
`<None>`

Config Section from which to load plugin specific options

keystone_notifications

`enable`

Type
boolean

Default
`False`

True enables keystone notification listener functionality.

`control_exchange`

Type
string

Default
`keystone`

The default exchange under which topics are scoped. May be overridden by an exchange name specified in the transport_url option.

`topic`

Type
string

Default
`notifications`

Keystone notification queue topic name. This name needs to match one of values mentioned in Keystone deployments notification_topics configuration e.g. notification_topics=notifications, barbican_notificationsMultiple servers may listen on a topic and messages will be dispatched to one of the servers in a round-robin fashion. Thats why Barbican service should have its own dedicated notification queue so that it receives all of Keystone notifications. Alternatively if the chosen oslo.messaging backend supports listener pooling (for example rabbitmq), setting a non-default pool_name option should be preferred.

`pool_name`

Type
string

Default
`<None>`

Pool name for notifications listener. Setting this to a distinctive value will allow barbican notifications listener to receive its own copy of all messages from the topic without without interfering with other services listening on the same topic. This feature is supported only by some oslo.messaging backends (in particilar by rabbitmq) and for those it is preferrable to use it instead of separate notification topic for barbican.

`allow_requeue`

Type
boolean

Default
`False`

True enables requeue feature in case of notification processing error. Enable this only when underlying transport supports this feature.

`version`

Type
string

Default
`1.0`

Version of tasks invoked via notifications

`thread_pool_size`

Type
integer

Default
`10`

Define the number of max threads to be used for notification server processing functionality.

kmip_plugin

`username`

Type
string

Default
`<None>`

Username for authenticating with KMIP server

`password`

Type
string

Default
`<None>`

Password for authenticating with KMIP server `host`

Type
string

Default
`localhost`

Address of the KMIP server

`port`

Type
port number

Default
`5696`

Minimum Value
0

Maximum Value
65535

Port for the KMIP server

`ssl_version`

Type
string

Default
`PROTOCOL_TLSv1_2`

SSL version, maps to the module ssls constants

`ca_certs`

Type
string

Default
`<None>`

File path to concatenated certification authority certificates

`certfile`

Type
string

Default
`<None>`

File path to local client certificate

`keyfile`

Type
string

Default
`<None>`

File path to local client certificate keyfile

`pkcs1_only`

Type
boolean

Default
`False`

Only support PKCS#1 encoding of asymmetric keys

`plugin_name`

Type
string

Default
`KMIP HSM`

User friendly plugin name

oslo_messaging_kafka

`kafka_max_fetch_bytes`

Type
integer

Default
`1048576`

Max fetch bytes of Kafka consumer

`kafka_consumer_timeout`

Type
floating point

Default
`1.0`

Default timeout(s) for Kafka consumers

`consumer_group`

Type
string

Default
`oslo_messaging_consumer`

Group id for Kafka consumer. Consumers in one group will coordinate message consumption

`producer_batch_timeout`

Type
floating point

Default
`0.0`

Upper bound on the delay for KafkaProducer batching in seconds

`producer_batch_size`

Type
integer

Default
`16384`

Size of batch for the producer async send

`compression_codec`

Type
string

Default
`none`

Valid Values
none, gzip, snappy, lz4, zstd

The compression codec for all data generated by the producer. If not set, compression will not be used. Note that the allowed values of this depend on the kafka version

`enable_auto_commit`

Type
boolean

Default
`False`

Enable asynchronous consumer commits

`max_poll_records`

Type
integer

Default
`500`

The maximum number of records returned in a poll call

`security_protocol`

Type
string

Default
`PLAINTEXT`

Valid Values
PLAINTEXT, SASL_PLAINTEXT, SSL, SASL_SSL

Protocol used to communicate with brokers `sasl_mechanism`

Type
string

Default
`PLAIN`

Mechanism when security protocol is SASL

`ssl_cafile`

Type
string

Default
`''`

CA certificate PEM file used to verify the server certificate

`ssl_client_cert_file`

Type
string

Default
`''`

Client certificate PEM file used for authentication.

`ssl_client_key_file`

Type
string

Default
`''`

Client key PEM file used for authentication.

`ssl_client_key_password`

Type
string

Default
`''`

Client key password file used for authentication.

oslo_messaging_notifications

`driver`

Type
multi-valued

Default
`''`

The Drivers(s) to handle sending notifications. Possible values are messaging, messagingv2, routing, log, test, noop `transport_url`

Type
string

Default
`<None>`

A URL representing the messaging driver to use for notifications. If not set, we fall back to the same configuration used for RPC.

`topics`

Type
list

Default
`['notifications']`

AMQP topic used for OpenStack notifications.

`retry`

Type
integer

Default
`-1`

The maximum number of attempts to re-send a notification message which failed to be delivered due to a recoverable error. 0 - No retry, -1 - indefinite

oslo_messaging_rabbit

`amqp_durable_queues`

Type
boolean

Default
`False`

Use durable queues in AMQP. If rabbit_quorum_queue is enabled, queues will be durable and this value will be ignored.

`amqp_auto_delete`

Type
boolean

Default
`False`

Auto-delete queues in AMQP.

`rpc_conn_pool_size`

Type
integer

Default
`30`

Minimum Value
1

Size of RPC connection pool.

`conn_pool_min_size`

Type
integer

Default
`2`

The pool size limit for connections expiration policy

`conn_pool_ttl`

Type
integer

Default
`1200`

The time-to-live in sec of idle connections in the pool

`ssl`

Type
boolean

Default
`False`

Connect over SSL.

`ssl_version`

Type
string

Default
`''`

SSL version to use (valid only if SSL enabled). Valid values are TLSv1 and SSLv23. SSLv2, SSLv3, TLSv1_1, and TLSv1_2 may be available on some distributions.

`ssl_key_file`

Type
string

Default
`''`

SSL key file (valid only if SSL enabled).

`ssl_cert_file`

Type
string

Default
`''`

SSL cert file (valid only if SSL enabled).

`ssl_ca_file`

Type
string

Default
`''`

SSL certification authority file (valid only if SSL enabled).

`ssl_enforce_fips_mode`

Type
boolean

Default
`False`

Global toggle for enforcing the OpenSSL FIPS mode. This feature requires Python support. This is available in Python 3.9 in all environments and may have been backported to older Python versions on select environments. If the Python executable used does not support OpenSSL FIPS mode, an exception will be raised.

`heartbeat_in_pthread`

Type
boolean

Default
`False`

(DEPRECATED) It is recommend not to use this option anymore. Run the health check heartbeat thread through a native python thread by default. If this option is equal to False then the health check heartbeat will inherit the execution model from the parent process. For example if the parent process has monkey patched the stdlib by using eventlet/greenlet then the heartbeat will be run through a green thread. This option should be set to True only for the wsgi services.

Warning

This option is deprecated for removal. Its value may be silently ignored in the future.

Reason
The option is related to Eventlet which will be removed. In addition this has never worked as expected with services using eventlet for core service framework.

`kombu_reconnect_delay`

Type
floating point

Default
`1.0`

Minimum Value
0.0

Maximum Value
4.5

How long to wait (in seconds) before reconnecting in response to an AMQP consumer cancel notification.

`kombu_reconnect_splay`

Type
floating point

Default
`0.0`

Minimum Value
0.0

Random time to wait for when reconnecting in response to an AMQP consumer cancel notification.

`kombu_compression`

Type
string

Default
`<None>`

EXPERIMENTAL: Possible values are: gzip, bz2. If not set compression will not be used. This option may not be available in future versions.

`kombu_missing_consumer_retry_timeout`

Type
integer

Default
`60`

How long to wait a missing client before abandoning to send it its replies. This value should not be longer than rpc_response_timeout.

Table 8: Deprecated Variations

Group	Name
oslo_messaging_rabbit	kombu_reconnect_timeout

`kombu_failover_strategy`

Type
string

Default
`round-robin`

Valid Values
round-robin, shuffle

Determines how the next RabbitMQ node is chosen in case the one we are currently connected to becomes unavailable. Takes effect only if more than one RabbitMQ node is provided in config.

`rabbit_login_method`

Type
string

Default
`AMQPLAIN`

Valid Values
PLAIN, AMQPLAIN, EXTERNAL, RABBIT-CR-DEMO

The RabbitMQ login method.

`rabbit_retry_interval`

Type
integer

Default
`1`

Minimum Value
1

How frequently to retry connecting with RabbitMQ.

`rabbit_retry_backoff`

Type
integer

Default
`2`

Minimum Value
0

How long to backoff for between retries when connecting to RabbitMQ.

`rabbit_interval_max`

Type
integer

Default
`30`

Minimum Value
1

Maximum interval of RabbitMQ connection retries.

`rabbit_ha_queues`

Type
boolean

Default
`False`

Try to use HA queues in RabbitMQ (x-ha-policy: all). If you change this option, you must wipe the RabbitMQ database. In RabbitMQ 3.0, queue mirroring is no longer controlled by the x-ha-policy argument when declaring a queue. If you just want to make sure that all queues (except those with auto-generated names) are mirrored across all nodes, run: rabbitmqctl set_policy HA ^(?!amq.).* {ha-mode: all}

`rabbit_quorum_queue`

Type
boolean

Default
`False`

Use quorum queues in RabbitMQ (x-queue-type: quorum). The quorum queue is a modern queue type for RabbitMQ implementing a durable, replicated FIFO queue based on the Raft consensus algorithm. It is available as of RabbitMQ 3.8.0. If set this option will conflict with the HA queues (`rabbit_ha_queues`) aka mirrored queues, in other words the HA queues should be disabled. Quorum queues are also durable by default so the amqp_durable_queues option is ignored when this option is enabled.

`rabbit_transient_quorum_queue`

Type
boolean

Default
`False`

Use quorum queues for transients queues in RabbitMQ. Enabling this option will then make sure those queues are also using quorum kind of rabbit queues, which are HA by default.

`rabbit_quorum_delivery_limit`

Type
integer

Default
`0`

Each time a message is redelivered to a consumer, a counter is incremented. Once the redelivery count exceeds the delivery limit the message gets dropped or dead-lettered (if a DLX exchange has been configured) Used only when rabbit_quorum_queue is enabled, Default 0 which means dont set a limit.

`rabbit_quorum_max_memory_length`

Type
integer

Default
`0`

By default all messages are maintained in memory if a quorum queue grows in length it can put memory pressure on a cluster. This option can limit the number of messages in the quorum queue. Used only when rabbit_quorum_queue is enabled, Default 0 which means dont set a limit.

`rabbit_quorum_max_memory_bytes`

Type
integer

Default
`0`

By default all messages are maintained in memory if a quorum queue grows in length it can put memory pressure on a cluster. This option can limit the number of memory bytes used by the quorum queue. Used only when rabbit_quorum_queue is enabled, Default 0 which means dont set a limit.

`rabbit_transient_queues_ttl`

Type
integer

Default
`1800`

Minimum Value
0

Positive integer representing duration in seconds for queue TTL (x-expires). Queues which are unused for the duration of the TTL are automatically deleted. The parameter affects only reply and fanout queues. Setting 0 as value will disable the x-expires. If doing so, make sure you have a rabbitmq policy to delete the queues or you deployment will create an infinite number of queue over time.In case rabbit_stream_fanout is set to True, this option will control data retention policy (x-max-age) for messages in the fanout queue rather then the queue duration itself. So the oldest data in the stream queue will be discarded from it once reaching TTL Setting to 0 will disable x-max-age for stream which make stream grow indefinitely filling up the diskspace

`rabbit_qos_prefetch_count`

Type
integer

Default
`0`

Specifies the number of messages to prefetch. Setting to zero allows unlimited messages.

`heartbeat_timeout_threshold`

Type
integer

Default
`60`

Number of seconds after which the Rabbit broker is considered down if heartbeats keep-alive fails (0 disables heartbeat).

`heartbeat_rate`

Type
integer

Default
`3`

How often times during the heartbeat_timeout_threshold we check the heartbeat.

`direct_mandatory_flag`

Type
boolean

Default
`True`

(DEPRECATED) Enable/Disable the RabbitMQ mandatory flag for direct send. The direct send is used as reply, so the MessageUndeliverable exception is raised in case the client queue does not exist.MessageUndeliverable exception will be used to loop for a timeout to lets a chance to sender to recover.This flag is deprecated and it will not be possible to deactivate this functionality anymore

Warning

This option is deprecated for removal. Its value may be silently ignored in the future.

Reason
Mandatory flag no longer deactivable.

`enable_cancel_on_failover`

Type
boolean

Default
`False`

Enable x-cancel-on-ha-failover flag so that rabbitmq server will cancel and notify consumerswhen queue is down

`use_queue_manager`

Type
boolean

Default
`False`

Should we use consistant queue names or random ones `hostname`

Type
string

Default
`node1.example.com`

This option has a sample default set, which means that its actual default value may vary from the one documented above.

Hostname used by queue manager. Defaults to the value returned by socket.gethostname().

`processname`

Type
string

Default
`nova-api`

This option has a sample default set, which means that its actual default value may vary from the one documented above.

Process name used by queue manager

`rabbit_stream_fanout`

Type
boolean

Default
`False`

Use stream queues in RabbitMQ (x-queue-type: stream). Streams are a new persistent and replicated data structure (queue type) in RabbitMQ which models an append-only log with non-destructive consumer semantics. It is available as of RabbitMQ 3.9.0. If set this option will replace all fanout queues with only one stream queue.

oslo_middleware

`enable_proxy_headers_parsing`

Type
boolean

Default
`False`

Whether the application is behind a proxy or not. This determines if the middleware should parse the headers or not.

oslo_policy

`enforce_scope`

Type
boolean

Default
`True`

This option controls whether or not to enforce scope when evaluating policies. If `True`, the scope of the token used in the request is compared to the `scope_types` of the policy being enforced. If the scopes do not match, an `InvalidScope` exception will be raised. If `False`, a message will be logged informing operators that policies are being invoked with mismatching scope.

Warning

This option is deprecated for removal. Its value may be silently ignored in the future.

Reason
This configuration was added temporarily to facilitate a smooth transition to the new RBAC. OpenStack will always enforce scope checks. This configuration option is deprecated and will be removed in the 2025.2 cycle.

`enforce_new_defaults`

Type
boolean

Default
`True`

This option controls whether or not to use old deprecated defaults when evaluating policies. If `True`, the old deprecated defaults are not going to be evaluated. This means if any existing token is allowed for old defaults but is disallowed for new defaults, it will be disallowed. It is encouraged to enable this flag along with the `enforce_scope` flag so that you can get the benefits of new defaults and `scope_type` together. If `False`, the deprecated policy check string is logically ORd with the new policy check string, allowing for a graceful upgrade experience between releases with new policies, which is the default behavior.

`policy_file`

Type
string

Default
`policy.yaml`

The relative or absolute path of a file that maps roles to permissions for a given service. Relative paths must be specified in relation to the configuration file setting this option.

`policy_default_rule`

Type
string

Default
`default`

Default rule. Enforced when a requested rule is not found.

`policy_dirs`

Type
multi-valued

Default
`policy.d`

Directories where policy configuration files are stored. They can be relative to any directory in the search path defined by the config_dir option, or absolute paths. The file defined by policy_file must exist for these directories to be searched. Missing or empty directories are ignored.

`remote_content_type`

Type
string

Default
`application/x-www-form-urlencoded`

Valid Values
application/x-www-form-urlencoded, application/json

Content Type to send and receive data for REST based policy check

`remote_ssl_verify_server_crt`

Type
boolean

Default
`False`

server identity verification for REST based policy check

`remote_ssl_ca_crt_file`

Type
string

Default
`<None>`

Absolute path to ca cert file for REST based policy check

`remote_ssl_client_crt_file`

Type
string

Default
`<None>`

Absolute path to client cert for REST based policy check

`remote_ssl_client_key_file`

Type
string

Default
`<None>`

Absolute path client key file REST based policy check `remote_timeout`

Type
floating point

Default
`60`

Minimum Value
0

Timeout in seconds for REST based policy check

oslo_versionedobjects

`fatal_exception_format_errors`

Type
boolean

Default
`False`

Make exception message format errors fatal

p11_crypto_plugin

`library_path`

Type
string

Default
`<None>`

Path to vendor PKCS11 library

`token_serial_number`

Type
string

Default
`<None>`

Token serial number used to identify the token to be used.

`token_labels`

Type
list

Default
`[]`

List of labels for one or more tokens to be used. Typically this is a single label, but some HSM devices may require more than one label for Load Balancing or High Availability configurations.

`login`

Type
string

Default
`<None>`

Password (PIN) to login to PKCS11 session

`mkek_label`

Type
string

Default
`<None>`

Master KEK label (as stored in the HSM)

`mkek_length`

Type
integer

Default
`32`

Minimum Value
1

Master KEK length in bytes.

`hmac_label`

Type
string

Default
`<None>`

Master HMAC Key label (as stored in the HSM)

`slot_id`

Type
integer

Default
`1`

(Optional) HSM Slot ID that contains the token device to be used.

`rw_session`

Type
boolean

Default
`True`

Flag for Read/Write Sessions

`pkek_length`

Type
integer

Default
`32`

Project KEK length in bytes.

`pkek_cache_ttl`

Type
integer

Default
`900`

Project KEK Cache Time To Live, in seconds

`pkek_cache_limit`

Type
integer

Default
`100`

Project KEK Cache Item Limit

`encryption_mechanism`

Type
string

Default
`CKM_AES_CBC`

Secret encryption mechanism

`hmac_key_type`

Type
string

Default
`CKK_AES`

HMAC Key Type

`hmac_keygen_mechanism`

Type
string

Default
`CKM_AES_KEY_GEN`

HMAC Key Generation Algorithm used to create the master HMAC Key.

`hmac_mechanism`

Type
string

Default
`CKM_SHA256_HMAC`

HMAC algorithm used to sign encrypted data.

Table 9: Deprecated Variations

Group	Name
p11_crypto_plugin	hmac_keywrap_mechanism

`key_wrap_mechanism`

Type
string

Default
`CKM_AES_CBC_PAD`

Key Wrapping algorithm used to wrap Project KEKs.

`key_wrap_generate_iv`

Type
boolean

Default
`True`

Generate IVs for Key Wrapping mechanism.

`seed_file`

Type
string

Default
`''`

File to pull entropy for seeding RNG

`seed_length`

Type
integer

Default
`32`

Amount of data to read from file for seed

`plugin_name`

Type
string

Default
`PKCS11 HSM`

User friendly plugin name

`aes_gcm_generate_iv`

Type
boolean

Default
`True`

Generate IVs for CKM_AES_GCM mechanism.

Table 10: Deprecated Variations

Group	Name
p11_crypto_plugin	generate_iv

`always_set_cka_sensitive`

Type
boolean

Default
`True`

Always set CKA_SENSITIVE=CK_TRUE including CKA_EXTRACTABLE=CK_TRUE keys.

`os_locking_ok`

Type
boolean

Default
`False`

Enable CKF_OS_LOCKING_OK flag when initializing the PKCS#11 client library.

queue

`enable`

Type
boolean

Default
`False`

True enables queuing, False invokes workers synchronously

`namespace`

Type
string

Default
`barbican`

Queue namespace

`topic`

Type
string

Default
`barbican.workers`

Queue topic name

`version`

Type
string

Default
`1.1`

Version of tasks invoked via queue

`server_name`

Type
string

Default
`barbican.queue`

Server name for RPC task processing server

`asynchronous_workers`

Type
integer

Default
`1`

Number of asynchronous worker processes

quotas

`quota_secrets`

Type
integer

Default
`-1`

Number of secrets allowed per project

`quota_orders`

Type
integer

Default
`-1`

Number of orders allowed per project

quota_containers

Type
integer

Default
`-1`

Number of containers allowed per project

quota_consumers

Type
integer

Default
`-1`

Number of consumers allowed per project

quota_cas

Type
integer

Default
`-1`

Number of CAs allowed per project

retry_scheduler

initial_delay_seconds

Type
floating point

Default
`10.0`

Seconds (float) to wait before starting retry scheduler

periodic_interval_max_seconds

Type
floating point

Default
`10.0`

Seconds (float) to wait between periodic schedule events

secretstore

namespace

Type
string

Default
`barbican.secretstore.plugin`

Extension namespace to search for plugins.

`enabled_secretstore_plugins`

Type
multi-valued

Default
`store_crypto`

List of secret store plugins to load.

`enable_multiple_secret_stores`

Type
boolean

Default
`False`

Flag to enable multiple secret store plugin backend support. Default is False

`stores_lookup_suffix`

Type
list

Default
`<None>`

List of suffix to use for looking up plugins which are supported with multiple backend support.

simple_crypto_plugin

`kek`

Type
multi-valued

Default
`''`

Fernet Key-Encryption Key (KEK) to be used by SimpleCrypto Plugin to encrypt Project-specific KEKs.

`plugin_name`

Type
string

Default
`Software Only Crypto`

User friendly plugin name

vault_plugin

root_token_id

Type
string

Default
`<None>`

root token for vault

approle_role_id

Type
string

Default
`<None>`

AppRole role_id for authentication with vault

approle_secret_id

Type
string

Default
`<None>`

AppRole secret_id for authentication with vault

kv_mountpoint

Type
string

Default
`secret`

Mountpoint of KV store in Vault to use, for example: secret

vault_url

Type
string

Default
`http://127.0.0.1:8200`

Use this endpoint to connect to Vault, for example: http://127.0.0.1:8200

ssl_ca_crt_file

Type
string

Default
`<None>`

Absolute path to ca cert file

`use_ssl`

Type
boolean

Default
`False`

SSL Enabled/Disabled

`namespace`

Type
string

Default
`<None>`

Vault Namespace to use for all requests. Namespaces is a feature available in HasiCorp Vault Enterprise only.

2.4.7 Policy configuration

Warning

JSON formatted policy file is deprecated since Barbican 12.0.0 (Wallaby). This oslopolicy-convert-json-to-yaml tool will migrate your existing JSON-formatted policy file to YAML in a backward-compatible way.

Configuration

The following is an overview of all available policies in Barbican. For a sample configuration file.

barbican

`secret_project_match`

Default
`project_id:%(target.secret.project_id)s`

(no description provided)

`secret_project_reader`

Default
`role:reader and rule:secret_project_match`

(no description provided)

`secret_project_member`

Default
`role:member and rule:secret_project_match`

(no description provided)

`secret_project_admin`

Default
`role:admin and rule:secret_project_match`

(no description provided)

`secret_owner`

Default
`user_id:%(target.secret.creator_id)s`

(no description provided)

`secret_is_not_private`

Default
`True:%(target.secret.read_project_access)s`

(no description provided)

`secret_acl_read`

Default
`'read':%(target.secret.read)s`

(no description provided)

`container_project_match`

Default
`project_id:%(target.container.project_id)s`

(no description provided)

`container_project_member`

Default
`role:member and rule:container_project_match`

(no description provided)

`container_project_admin`

Default
`role:admin and rule:container_project_match`

(no description provided)

`container_owner`

Default
`user_id:%(target.container.creator_id)s`

(no description provided)

`container_is_not_private`

Default
`True:%(target.container.read_project_access)s`

(no description provided)

`container_acl_read`

Default
`'read':%(target.container.read)s`

(no description provided)

`order_project_match`

Default
`project_id:%(target.order.project_id)s`

(no description provided)

`order_project_member`

Default
`role:member and rule:order_project_match`

(no description provided)

`audit`

Default
`role:audit`

(no description provided)

`observer`

Default
`role:observer`

(no description provided)

`creator`

Default
`role:creator`

(no description provided)

`admin`

Default
`role:admin`

(no description provided)

`service_admin`

Default
`role:key-manager:service-admin`

(no description provided)

`all_users`

Default
`rule:admin or rule:observer or rule:creator or rule:audit or rule:service_admin`

(no description provided)

`all_but_audit`

Default
`rule:admin or rule:observer or rule:creator`

(no description provided)

`admin_or_creator`

Default
`rule:admin or rule:creator`

(no description provided)

`secret_creator_user`

Default
`user_id:%(target.secret.creator_id)s`

(no description provided)

`secret_private_read`

Default
`'False':%(target.secret.read_project_access)s`

(no description provided)

`secret_non_private_read`

Default
`rule:all_users and rule:secret_project_match and not rule:secret_private_read`

(no description provided)

`secret_decrypt_non_private_read`

Default
`rule:all_but_audit and rule:secret_project_match and not rule:secret_private_read`

(no description provided)

`secret_project_creator`

Default
`rule:creator and rule:secret_project_match and rule:secret_creator_user`

(no description provided)

`secret_project_creator_role`

Default
`rule:creator and rule:secret_project_match`

(no description provided)

`container_private_read`

Default
`'False':%(target.container.read_project_access)s`

(no description provided)

`container_creator_user`

Default
`user_id:%(target.container.creator_id)s`

(no description provided)

`container_non_private_read`

Default
`rule:all_users and rule:container_project_match and not rule:container_private_read`

(no description provided)

`container_project_creator`

Default
`rule:creator and rule:container_project_match and rule:container_creator_user`

(no description provided)

`container_project_creator_role`

Default
`rule:creator and rule:container_project_match`

(no description provided)

`secret_acls:get`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **GET** `/v1/secrets/{secret-id}/acl`

Scope Types

- **project**

Retrieve the ACL settings for a given secret.If no ACL is defined for that secret, then Default ACL is returned.

`secret_acls:delete`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **DELETE** `/v1/secrets/{secret-id}/acl`

Scope Types

- **project**

Delete the ACL settings for a given secret.

`secret_acls:put_patch`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **PUT** `/v1/secrets/{secret-id}/acl`
- **PATCH** `/v1/secrets/{secret-id}/acl`

Scope Types

- **project**

Create new, replaces, or updates existing ACL for a given secret.

`container_acls:get`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private))`

Operations

- **GET** `/v1/containers/{container-id}/acl`

Scope Types

- **project**

Retrieve the ACL settings for a given container.

`container_acls:delete`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private))`

Operations

- **DELETE** `/v1/containers/{container-id}/acl`

Scope Types

- **project**

Delete ACL for a given container. No content is returned in the case of successful deletion.

`container_acls:put_patch`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private))`

Operations

- **PUT** `/v1/containers/{container-id}/acl`
- **PATCH** `/v1/containers/{container-id}/acl`

Scope Types

- **project**

Create new or replaces existing ACL for a given container.

`consumer:get`

Default
`True:%(enforce_new_defaults)s and (role:admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private) or rule:container_acl_read)`

Operations

- **GET** `/v1/containers/{container-id}/consumers/{consumer-id}`

Scope Types

- **project**

DEPRECATED: show information for a specific consumer

`container_consumers:get`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private) or rule:container_acl_read)`

Operations

- **GET** `/v1/containers/{container-id}/consumers`

Scope Types

- **project**

List a containers consumers.

`container_consumers:post`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private) or rule:container_acl_read)`

Operations

- **POST** `/v1/containers/{container-id}/consumers`

Scope Types

- **project**

Creates a consumer.

`container_consumers:delete`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private) or rule:container_acl_read)`

Operations

- **DELETE** `/v1/containers/{container-id}/consumers`

Scope Types

- **project**

Deletes a consumer.

`secret_consumers:get`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private) or rule:secret_acl_read)`

Operations

- **GET** `/v1/secrets/{secret-id}/consumers`

Scope Types

- **project**

List consumers for a secret.

`secret_consumers:post`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private) or rule:secret_acl_read)`

Operations

- **POST** `/v1/secrets/{secrets-id}/consumers`

Scope Types

- **project**

Creates a consumer.

`secret_consumers:delete`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private) or rule:secret_acl_read)`

Operations

- **DELETE** `/v1/secrets/{secrets-id}/consumers`

Scope Types

- **project**

Deletes a consumer.

`containers:post`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **POST** `/v1/containers`

Scope Types

- **project**

Creates a container.

`containers:get`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **GET** `/v1/containers`

Scope Types

- **project**

Lists a projects containers.

`container:get`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private) or rule:container_acl_read)`

Operations

- **GET** `/v1/containers/{container-id}`

Scope Types

- **project**

Retrieves a single container.

`container:delete`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private))`

Operations

- **DELETE** `/v1/containers/{uuid}`

Scope Types

- **project**

Deletes a container.

`container_secret:post`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private))`

Operations

- **POST** `/v1/containers/{container-id}/secrets`

Scope Types

- **project**

Add a secret to an existing container.

`container_secret:delete`

Default
`True:%(enforce_new_defaults)s and (rule:container_project_admin or (rule:container_project_member and rule:container_owner) or (rule:container_project_member and rule:container_is_not_private))`

Operations

- **DELETE** `/v1/containers/{container-id}/secrets/{secret-id}`

Scope Types

- **project**

Remove a secret from a container.

`orders:get`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **GET** `/v1/orders`

Scope Types

- **project**

Gets list of all orders associated with a project.

`orders:post`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **POST** `/v1/orders`

Scope Types

- **project**

Creates an order.

`orders:put`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **PUT** `/v1/orders`

Scope Types

- **project**

Unsupported method for the orders API.

`order:get`

Default
`True:%(enforce_new_defaults)s and rule:order_project_member`

Operations

- **GET** `/v1/orders/{order-id}`

Scope Types

- **project**

Retrieves an orders metadata.

`order:delete`

Default
`True:%(enforce_new_defaults)s and rule:order_project_member`

Operations

- **DELETE** `/v1/orders/{order-id}`

Scope Types

- **project**

Deletes an order.

`quotas:get`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/quotas`

Scope Types

- **project**

List quotas for the project the user belongs to.

`project_quotas:get`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **GET** `/v1/project-quotas`
- **GET** `/v1/project-quotas/{uuid}`

Scope Types

- **project**

List quotas for the specified project.

`project_quotas:put`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **PUT** `/v1/project-quotas/{uuid}`

Scope Types

- **project**

Create or update the configured project quotas for the project with the specified UUID.

`project_quotas:delete`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **DELETE** `/v1/quotas}`

Scope Types

- **project**

Delete the project quotas configuration for the project with the requested UUID.

`secret_meta:get`

Default
```
True:%(enforce_new_defaults)s and (rule:secret_project_admin
or (rule:secret_project_member and rule:secret_owner) or
(rule:secret_project_member and rule:secret_is_not_private)
or rule:secret_acl_read)
```

Operations

- **GET** `/v1/secrets/{secret-id}/metadata`
- **GET** `/v1/secrets/{secret-id}/metadata/{meta-key}`

Scope Types

- **project**

metadata/: Lists a secrets user-defined metadata. || metadata/{key}: Retrieves a secrets user-added metadata.

`secret_meta:post`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **POST** `/v1/secrets/{secret-id}/metadata/{meta-key}`

Scope Types

- **project**

Adds a new key/value pair to the secrets user-defined metadata.

`secret_meta:put`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **PUT** `/v1/secrets/{secret-id}/metadata`
- **PUT** `/v1/secrets/{secret-id}/metadata/{meta-key}`

Scope Types

- **project**

metadata/: Sets the user-defined metadata for a secret || metadata/{key}: Updates an existing key/value pair in the secrets user-defined metadata.

`secret_meta:delete`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **DELETE** `/v1/secrets/{secret-id}/metadata/{meta-key}`

Scope Types

- **project**

Delete secret user-defined metadata by key.

`secret:decrypt`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private) or rule:secret_acl_read)`

Operations

- **GET** `/v1/secrets/{uuid}/payload`

Scope Types

- **project**

Retrieve a secrets payload.

`secret:get`

Default
`True:%(enforce_new_defaults)s and (role:admin or rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private) or rule:secret_acl_read)`

Operations

- **GET** `/v1/secrets/{secret-id}`

Scope Types

- **project**

Retrieves a secrets metadata.

`secret:put`

Default
`True:%(enforce_new_defaults)s and (rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **PUT** `/v1/secrets/{secret-id}`

Scope Types

- **project**

Add the payload to an existing metadata-only secret.

`secret:delete`

Default
`True:%(enforce_new_defaults)s and (role:admin or rule:secret_project_admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_project_member and rule:secret_is_not_private))`

Operations

- **DELETE** `/v1/secrets/{secret-id}`

Scope Types

- **project**

Delete a secret by uuid.

`secrets:post`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **POST** `/v1/secrets`

Scope Types

- **project**

Creates a Secret entity.

`secrets:get`

Default
`True:%(enforce_new_defaults)s and role:member`

Operations

- **GET** `/v1/secrets`

Scope Types

- **project**

Lists a projects secrets.

`secretstores:get`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/secret-stores`

Scope Types

- **project**

Get list of available secret store backends.

`secretstores:get_global_default`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/secret-stores/global-default`

Scope Types

- **project**

Get a reference to the secret store that is used as default secret store backend for the deployment.

`secretstores:get_preferred`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/secret-stores/preferred`

Scope Types

- **project**

Get a reference to the preferred secret store if assigned previously.

`secretstore_preferred:post`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **POST** `/v1/secret-stores/{ss-id}/preferred`

Scope Types

- **project**

Set a secret store backend to be preferred store backend for their project.

`secretstore_preferred:delete`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **DELETE** `/v1/secret-stores/{ss-id}/preferred`

Scope Types

- **project**

Remove preferred secret store backend setting for their project.

`secretstore:get`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/secret-stores/{ss-id}`

Scope Types

- **project**

Get details of secret store by its ID.

`transport_key:get`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/transport_keys/{key-id}}`

Scope Types

- **project**

Get a specific transport key.

`transport_key:delete`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **DELETE** `/v1/transport_keys/{key-id}`

Scope Types

- **project**

Delete a specific transport key.

`transport_keys:get`

Default
`True:%(enforce_new_defaults)s and role:reader`

Operations

- **GET** `/v1/transport_keys`

Scope Types

- **project**

Get a list of all transport keys.

`transport_keys:post`

Default
`True:%(enforce_new_defaults)s and role:admin`

Operations

- **POST** `/v1/transport_keys`

Scope Types

- **project**

Create a new transport key.

2.4.8 Dogtag Setup - User Guide

Dogtag is the Open Source upstream community version of the Red Hat Certificate System, an enterprise certificate management system that has been deployed in some of the largest PKI deployments worldwide. RHCS is FIPS 140-2 and Common Criteria certified.

The Dogtag Certificate Authority (CA) subsystem issues, renews and revokes many different kinds of certificates. It can be used as a private CA back-end to barbican, and interacts with barbican through the Dogtag CA plugin.

The Dogtag KRA subsystem is used to securely store secrets after being encrypted by storage keys that are stored either in a software NSS database or in an HSM. It can serve as a secret store for barbican, and interacts with barbican core through the Dogtag KRA plugin.

In this guide, we will provide instructions on how to set up a basic Dogtag instance containing a CA and a KRA, and how to configure barbican to use this instance for a secret store. Much more detail about Dogtag, its deployment options and its administration are available in the RHCS documentation.

Note: The code below is taken from the devstack Barbican-Dogtag gate job. You can extract this code by looking at the Dogtag functions in contrib/devstack/lib/barbican.

Installing the Dogtag Packages

Dogtag packages are available in Fedora/RHEL/Centos and on Ubuntu/Debian distributions. This guide will include instructions applicable to Fedora/RHEL/Centos.

If installing on a Fedora platform, use at least Fedora 21. To install the required packages:

```
dnf install pki-ca pki-kra 389-ds-base
```

Creating the Directory Server Instance for the Dogtag Internal DB

The Dogtag CA and KRA subsystems use a 389 directory server as an internal database. Configure one as follows:

```
mkdir -p /etc/389-ds

cat > /etc/389-ds/setup.inf <<EOF

[General]
FullMachineName= localhost.localdomain
SuiteSpotUserID= nobody
SuiteSpotGroup= nobody

[slapd]
ServerPort= 389
ServerIdentifier= pki-tomcat
Suffix= dc=example,dc=com
RootDN= cn=Directory Manager
RootDNPwd= PASSWORD
EOF

setup-ds.pl --silent --file=/etc/389-ds/setup.inf
```

Creating the Dogtag CA

The following bash code sets up a Dogtag CA using some reasonable defaults to run in an Apache Tomcat instance on ports 8373 and 8370. Detailed version-specific documentation is packaged and installed with the Dogtag packages as Linux man pages. For more details on how to customize a Dogtag instance, see the man pages for *pkispawn* or consult the RHCS documentation.

```
mkdir -p /etc/dogtag

cat > /etc/dogtag/ca.cfg <<EOF

[CA]
pki_admin_email=caadmin@example.com
pki_admin_name=caadmin
pki_admin_nickname=caadmin
pki_admin_password=PASSWORD
pki_admin_uid=caadmin
pki_backup_password=PASSWORD
pki_client_database_password=PASSWORD
```

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```
pki_client_database_purge=False
pki_client_pkcs12_password=PASSWORD
pki_clone_pkcs12_password=PASSWORD
pki_ds_base_dn=dc=ca,dc=example,dc=com
pki_ds_database=ca
pki_ds_password=PASSWORD
pki_security_domain_name=EXAMPLE
pki_token_password=PASSWORD
pki_https_port=8373
pki_http_port=8370
pki_ajp_port=8379
pki_tomcat_server_port=8375
EOF

pkispawn -v -f /etc/dogtag/ca.cfg -s CA
```

Creating the Dogtag KRA

The following bash code sets up the Dogtag KRA in the same Apache Tomcat instance as above. In this simple example, it is required to set up the CA even if only the KRA is being used for a secret store.

Note that the actual hostname of the machine should be used in the script (rather than localhost) because the hostname is used in the subject name for the SSL server certificate for the KRA.

```
mkdir -p /etc/dogtag

hostname=$(hostname)
cat > /etc/dogtag/kra.cfg <<EOF

[KRA]
pki_admin_cert_file=/root/.dogtag/pki-tomcat/ca_admin.cert
pki_admin_email=kraadmin@example.com
pki_admin_name=kraadmin
pki_admin_nickname=kraadmin
pki_admin_password=PASSWORD
pki_admin_uid=kraadmin
pki_backup_password=PASSWORD
pki_client_database_password=PASSWORD
pki_client_database_purge=False
pki_client_pkcs12_password=PASSWORD
pki_clone_pkcs12_password=PASSWORD
pki_ds_base_dn=dc=kra,dc=example,dc=com
pki_ds_database=kra
pki_ds_password=PASSWORD
pki_security_domain_name=EXAMPLE
pki_security_domain_user=caadmin
pki_security_domain_password=PASSWORD
pki_token_password=PASSWORD
pki_https_port=8373
pki_http_port=8370
```

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```
pki_ajp_port=8379
pki_tomcat_server_port=8375
pki_security_domain_hostname=$hostname
pki_security_domain_https_port=8373
EOF

pkispawn -v -f /etc/dogtag/kra.cfg -s KRA
```

Configuring Barbican to Communicate with the Dogtag CA and KRA

In order for barbican to interact with the Dogtag CA and KRA, a PEM file must be created with trusted agent credentials.

```
PASSWORD=password
USER=barbican
BARBICAN_CONF_DIR=/etc/barbican
openssl pkcs12 -in /root/.dogtag/pki-tomcat/ca_admin_cert.p12 -passin␣
↪pass:PASSWORD \
    -out $BARBICAN_CONF_DIR/kra_admin_cert.pem -nodes
chown $USER $BARBICAN_CONF_DIR/kra_admin_cert.pem
```

The barbican config file (/etc/barbican/barbican.conf) needs to be modified. The modifications below set the Dogtag plugins as the only enabled secret store. Makee sure to restart barbican once these changes are made.

Note that the actual hostname of the machine should be used in the script (rather than localhost) because the hostname is used in the subject name for the SSL server certificate for the CA.

```
[dogtag_plugin]
pem_path = '/etc/barbican/kra_admin_cert.pem'
dogtag_host = $(hostname)
dogtag_port = 8373
nss_db_path = '/etc/barbican/alias'
nss_db_path_ca = '/etc/barbican/alias-ca'
nss_password = 'password'
simple_cmc_profile = 'caOtherCert'
approved_profile_list = 'caServerCert'

[secretstore]
namespace = barbican.secretstore.plugin
enabled_secretstore_plugins = dogtag_crypto
```

Testing the Setup

TODO

2.5 Barbican for Developers

If youre new to OpenStack development you should start by reading the OpenStack Developers Guide.

Once youve read the OpenStack guide youll be ready to set up a local barbican development environment.

2.5.1 Setting up a Barbican Development Environment

These instructions are designed to help you setup a standalone version of Barbican which uses SQLite as a database backend. This is not suitable for production due to the lack of authentication and an interface to a secure encryption system such as an HSM (Hardware Security Module). In addition, the SQLite backend has known issues with thread-safety. This setup is purely to aid in development workflows.

Installing system dependencies

Ubuntu 15.10:

```
# Install development tools
sudo apt-get install git python-tox

# Install dependency build requirements
sudo apt-get install libffi-dev libssl-dev python-dev gcc
```

Fedora 30:

```
# Install development tools
sudo dnf install git python3-tox

# Install dependency build requirements
sudo dnf install gcc libffi-devel openssl-devel redhat-rpm-config
```

Setting up a virtual environment

We highly recommend using virtual environments for development. You can learn more about Virtual Environments in The Python Tutorial.

If you installed tox in the previous step you should already have virtualenv installed as well.

```
# Clone barbican source
git clone https://opendev.org/openstack/barbican
cd barbican

# Create and activate a virtual environment
virtualenv .barbicanenv
. .barbicanenv/bin/activate

# Install barbican in development mode
pip install -e $PWD
```

Configuring Barbican

Barbican uses oslo.config for configuration. By default the api process will look for the configuration file in `$HOME/barbican.conf` or `/etc/barbican/barbican.conf`. The sample configuration files included in the source code assume that youll be using `/etc/barbican/` for configuration and `/var/lib/barbican` for the database file location.

```
# Create the directories and copy the config files
sudo mkdir /etc/barbican
sudo mkdir /var/lib/barbican
sudo chown $(whoami) /etc/barbican
sudo chown $(whoami) /var/lib/barbican
cp -r etc/barbican /etc
tox -e genconfig
cp etc/oslo-config-generator/barbican.conf /etc/barbican/barbican.conf
sed -i 's/\/v1: barbican-api-keystone/\/v1: barbican_api/' /etc/barbican/
↪barbican-api-paste.ini
```

All the locations are configurable, so you dont have to use `/etc` and `/var/lib` in your development machine if you dont want to.

Running Barbican

If you made it this far you should be able to run the barbican development server using this command:

```
bin/barbican-api
```

An instance of barbican will be listening on `http://localhost:9311`. Note that the default configuration uses the unauthenticated context. This means that requests should include the `X-Project-Id` header instead of including a keystone token in the `X-Auth-Token` header. For example:

```
curl -v -H 'X-Project-Id: 12345' \
        -H 'Accept: application/json' \
        http://localhost:9311/v1/secrets
```

For more information on configuring Barbican with Keystone auth see the *Keystone Configuration* page.

Building the Documentation

You can build the html documentation using tox:

```
tox -e docs
```

Running the Unit Tests

You can run the unit test suite using tox:

```
tox -e py36
```

2.5.2 Running Barbican on DevStack

Barbican is currently available via the plugin interface within DevStack.

This installation guide assumes you are running devstack within a clean virtual machine (local or cloud instance) using one of the supported Linux distributions with all available system package updates.

1. Make sure you are logged in as the stack user with sudo privileges
2. Install git

   ```
   # Debian/Ubuntu
   sudo apt-get install git

   # CentOS
   sudo dnf install git
   ```

3. Clone DevStack

   ```
   git clone https://opendev.org/openstack/devstack.git
   cd devstack/
   ```

4. Add the Barbican plugin to the `local.conf` file and verify the minimum services required are included. You can pull down a specific branch by appending the name to the end of the git URL. If you leave the space empty like below, then origin/master will be pulled.

   ```
   enable_plugin barbican https://opendev.org/openstack/barbican
   enable_service rabbit mysql key tempest
   ```

   If this is your first time and you do not have a `local.conf` file, there is a working sample file in the Barbican repository. Copy the file and place it in the `devstack/` directory.

5. Start DevStack

   ```
   ./stack.sh
   ```

6. Clone and install barbican-tempest-plugin

   ```
   cd /opt/stack/
   git clone https://opendev.org/openstack/barbican-tempest-plugin.git
   pip install -e /opt/stack/barbican-tempest-plugin
   ```

When youre ready to dive deeper in to barbican take a look at:

2.5.3 Contributing to Barbican

For general information on contributing to OpenStack, please check out the contributor guide to get started. It covers all the basics that are common to all OpenStack projects: the accounts you need, the basics of interacting with our Gerrit review system, how we communicate as a community, etc.

Below will cover the more project specific information you need to get started with the Barbican project, which is responsible for the following OpenStack deliverables:

barbican

The OpenStack Key Manager service.
code: https://opendev.org/openstack/barbican

docs: https://docs.openstack.org/barbican

api-ref: https://docs.openstack.org/barbican/latest/api/index.html#api-reference

Launchpad: https://bugs.launchpad.net/barbican

barbican-ui

Horizon extension for the OpenStack Key Manager API.

code: https://opendev.org/openstack/barbican-ui

Launchpad: https://bugs.launchpad.net/barbican-ui

python-barbicanclient

Python client library for the OpenStack Key Manager API.

code: https://opendev.org/openstack/python-barbicanclient

docs: https://docs.openstack.org/python-barbicanclient

Launchpad: https://bugs.launchpad.net/python-barbicanclient

barbican-tempest-plugin

Additional Barbican tempest-based tests beyond those in the main OpenStack Integration Test Suite (tempest).

code: https://opendev.org/openstack/barbican-tempest-plugin

Launchpad: http://bugs.launchpad.net/barbican

ansible-role-lunasa-hsm

Ansible role to manage Luna SA Hardware Security Module (HSM) client software

code: https://opendev.org/openstack/ansible-role-lunasa-hsm

Launchpad: http://bugs.launchpad.net/barbican

See the `CONTRIBUTING.rst` file in each code repository for more information about contributing to that specific deliverable. Additionally, you should look over the docs links above; most components have helpful developer information specific to that deliverable.

Communication

IRC

People working on the Barbican project may be found in the `#openstack-barbican` channel on OFTC during working hours in their timezone. The channel is logged, so if you ask a question when no one is around, you can check the log to see if its been answered: http://eavesdrop.openstack.org/irclogs/%23openstack-barbican/

weekly meeting

Tuesdays at 13:00 UTC in `#openstack-barbican` on OFTC. Meetings are logged: http://eavesdrop.openstack.org/meetings/barbican/

More information (including a link to the Agenda, some pointers on meeting etiquette, and an ICS file to put the meeting on your calendar) can be found at: http://eavesdrop.openstack.org/#Barbican_Meeting

mailing list

We use the openstack-discuss@lists.openstack.org mailing list for asynchronous discussions or to communicate with other OpenStack teams. Use the prefix `[barbican]` in your subject line (its a high-volume list, so most people use email filters).

More information about the mailing list, including how to subscribe and read the archives, can be found at: http://lists.openstack.org/cgi-bin/mailman/listinfo/openstack-discuss

meet-ups

The Barbican project usually has a presence at the OpenDev/OpenStack Project Team Gathering that takes place at the beginning of each development cycle. Planning happens on an etherpad whose URL is announced at the weekly meetings and on the mailing list.

Contacting the Core Team

The barbican-core team is an active group of contributors who are responsible for directing and maintaining the Barbican project. As a new contributor, your interaction with this group will be mostly through code reviews, because only members of barbican-core can approve a code change to be merged into the code repository.

Note

Although your contribution will require reviews by members of barbican-core, these arent the only people whose reviews matter. Anyone with a gerrit account can post reviews, so you can ask other developers you know to review your code and you can review theirs. (A good way to learn your way around the codebase is to review other peoples patches.)

If youre thinking, Im new at this, how can I possibly provide a helpful review?, take a look at How to Review Changes the OpenStack Way.

You can learn more about the role of core reviewers in the OpenStack governance documentation: https://docs.openstack.org/contributors/common/governance.html#core-reviewer

The membership list of barbican-core is maintained in gerrit: https://review.opendev.org/#/admin/groups/178,members

New Feature Planning

The Barbican project uses both specs and blueprints to track new features. Heres a quick rundown of what they are and how the Barbican project uses them.

specs

Exist in the barbican-specs repository. Each spec must have a Launchpad blueprint associated with it for tracking purposes.

A spec is required for any new Barbican core feature, anything that changes the Key Manager API, or anything that entails a mass change to the existing codebase.

The specs repository is: https://opendev.org/openstack/barbican-specs
It contains a `README.rst` file explaining how to file a spec.

You can read rendered specs docs at:
https://specs.openstack.org/openstack/barbican-specs/

blueprints

Exist in Launchpad, where they can be targeted to release milestones.
You file one at https://blueprints.launchpad.net/barbican

Examples of changes that can be covered by a blueprint only are:

- adding a new backend; or
- adding support for a defined capability that already exists in one or more existing backends.

Feel free to ask in `#openstack-barbican` or at the weekly meeting if you have an idea you want to develop and youre not sure whether it requires a blueprint *and* a spec or simply a blueprint.

The Barbican project observes the OpenStack-wide deadlines, for example, final release of non-client libraries (barbican), final release for client libraries (python-barbicanclient), feature freeze, etc. These are also noted and explained on the release schedule for the current development cycle.

Task Tracking

We track our tasks in Launchpad. See the top of the page for the URL of each Barbican project deliverable.

If youre looking for some smaller, easier work item to pick up and get started on, search for the low-hanging-fruit tag in the Bugs section.

When you start working on a bug, make sure you assign it to yourself. Otherwise someone else may also start working on it, and we dont want to duplicate efforts. Also, if you find a bug in the code and want to post a fix, make sure you file a bug (and assign it to yourself!) just in case someone else comes across the problem in the meantime.

Reporting a Bug

You found an issue and want to make sure we are aware of it? You can do so in the Launchpad bugs tracker of the affected deliverable.

Getting Your Patch Merged

The Barbican project policy is that a patch must have two +2s before it can be merged. (Exceptions are documentation changes, which require only a single +2, and specs, for which the PTL may require more than two +2s, depending on the complexity of the proposal.)

Patches lacking unit tests are unlikely to be approved. Check out the testing-barbican section of the Barbican Contributors Guide for a discussion of the kinds of testing we do with barbican.

In addition, some changes may require a release note. Any patch that changes functionality, adds functionality, or addresses a significant bug should have a release note. You can find more information about how to write a release note in the release-notes section of the Barbican Contributors Guide.

Keep in mind that the best way to make sure your patches are reviewed in a timely manner is to review other peoples patches. Were engaged in a cooperative enterprise here.

You can see whos been doing what with Barbican recently in Stackalytics: https://www.stackalytics.com/report/activity?module=barbican-group

Project Team Lead Duties

All common PTL duties are enumerated in the PTL guide.

2.5.4 Getting Involved

The best way to join the community and get involved is to talk with others online or at a meetup and offer contributions. Here are some of the many ways you can contribute to the Barbican project:

- Development and Code Reviews
- Bug reporting/Bug fixes
- Wiki and Documentation
- Blueprints/Specifications
- Testing
- Deployment scripts

OFTC IRC (Chat)

You can find Barbicaneers in our publicly accessible channel on OFTC `#openstack-barbican`. All conversations are logged and stored for your convenience at eavesdrop.openstack.org. For more information regarding OpenStack IRC channels please visit the OpenStack IRC Wiki.

Mailing List

The mailing list email is openstack@lists.openstack.org. This is a common mailing list across the OpenStack projects. If you wish to ask questions or have a discussion related to Barbican include `[barbican]` in your email subject line. To participate on the mailing list:

- Subscribe to the mailing list
- Browse the mailing list archives

Launchpad

Most of the tools used for OpenStack require a Launchpad ID for authentication. Like other OpenStack related projects, we utilize Launchpad for our bug and release tracking.

- Barbican Launchpad Project

Source Repository

Like other OpenStack related projects, the official Git repository is available on opendev.org; however, the repository is also mirrored to GitHub for easier browsing.

- Barbican on GitHub

Gerrit

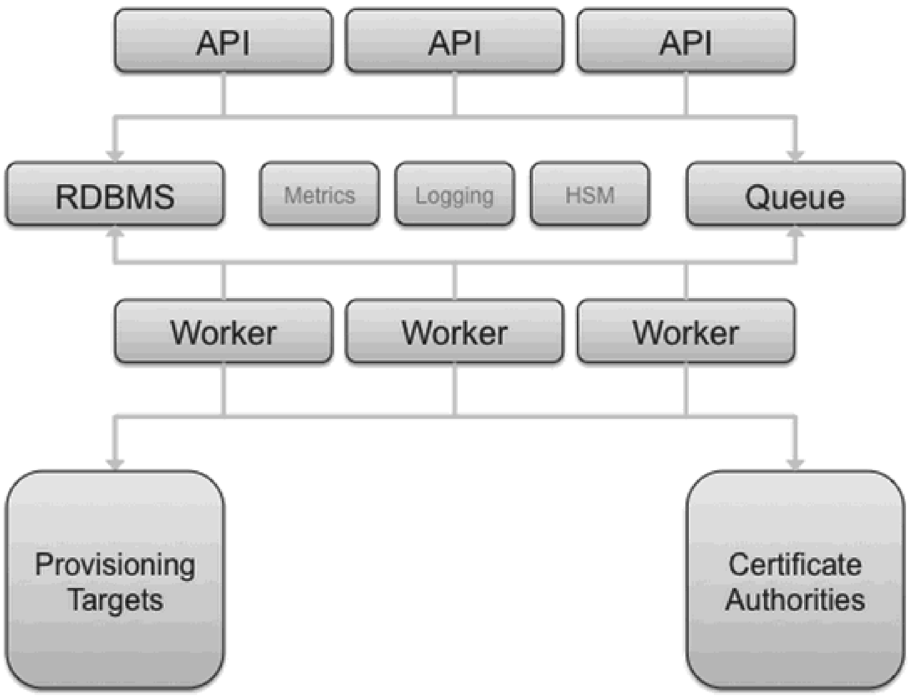
Like other OpenStack related projects, we utilize the OpenStack Gerrit review system for all code reviews. If youre unfamiliar with using the OpenStack Gerrit review system, please review the Gerrit Workflow wiki documentation.

2.5.5 Architecture

This document describes the architecture and technology selections for Barbican. In general, a goal is to utilize the OpenStack architecture and technology selections as much as possible. An overall architecture is presented first, followed by technology selection details to implement the system.

Overall Architecture

The next figure presents an overall logical diagram for Barbican.

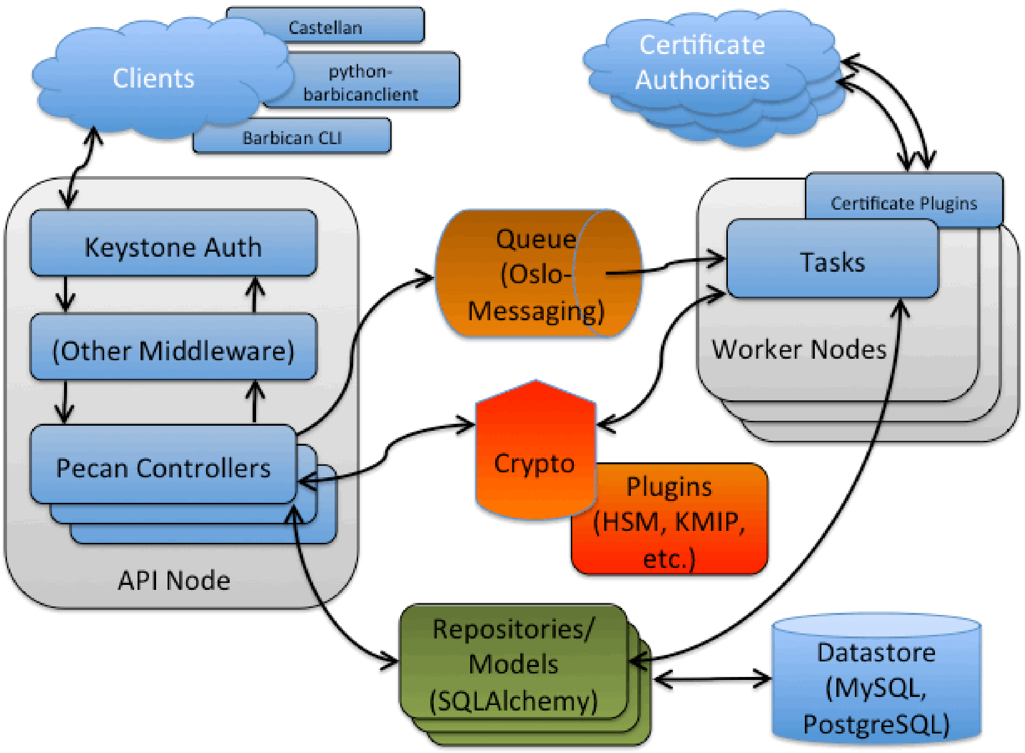


The API node(s) handle incoming REST requests to Barbican. These nodes can interact with the database directly if the request can be completed synchronously (such as for GET requests), otherwise the queue supports asynchronous processing by worker nodes. The latter could include interactions with third parties such as certificate authorities. As implied in the diagram, the architecture supports multiple API and worker nodes being added/removed to/from the network, to support advanced features such as auto scaling. Eventually, the database could be replicated across data centers supporting region-agnostic storage and retrieval of secured information, albeit with lags possible during data synchronization.

Technology Selection

In general, components from the Oslo commons project are used within Barbican, such as config, messaging and logging.

The next figure examines the components within Barbican.



Several potential clients of the Barbican REST interface are noted, including Castellan which presents a generic key management interface for other OpenStack projects with Barbican as an available plugin.

The API node noted in the previous section is a WSGI server. Similar to OpenStack projects such as Glance it utilizes paste to support configurable middleware such as to interface with Keystone for authentication and authorization services. Pecan (a lean Python web framework inspired by CherryPy, TurboGears, and Pylons) is utilized to map resources to REST routes. These resources contain the controller business logic for Barbican and can interface with encryption/decryption processes (via crypto components), datastore (via repository components) and asynchronous tasks (via queue components).

The crypto components provide a means to encrypt and decrypt information that accommodates a variety of encryption mechanisms and cryptographic backends (such as key management interoperability protocol (KMIP) or hardware security module (HSM)) via a plugin interface.

The repository components provide an interface and database session context for the datastore, with model components representing entities such as Secrets (used to store encrypted information such as data encryption keys). SQLAlchemy is used as the object relational model (ORM) layer to the database, including MySQL and PostgreSQL.

For asynchronous processing, Oslo Messaging is used to interact with the queue, including RabbitMQ. The worker node processes tasks from the queue. Task components are similar to API resources in that they implement business logic and also interface with the datastore and follow on asynchronous tasks as needed. These asynchronous tasks can interface with external systems, such as certificate authorities for SSL/TLS certificate processing.

2.5.6 Project Structure

1. `barbican/` (Barbican-specific Python source files)
    1. `api/` (REST API related source files)
        1. `controllers/` (Pecan-based controllers handling REST-based requests)
        2. `middleware/` (Middleware business logic to process REST requests)
    2. `cmd/` (Barbican admin command source files)
    3. `common/` (Modules shared across other Barbican folders)
    4. `locale/` (Translation templates)
    5. `model/` (SQLAlchemy-based model classes)
    6. `plugin/` (Plugin related logic, interfaces and look-up management)
        1. `resources.py` (Supports interactions with plugins)
        2. `crypto/` (Hardware security module (HSM) logic and plugins)
        3. `interface/` (Certificate manager and secret store interface classes)
        4. (The remaining modules here are implementations of above interfaces)
    7. `queue/` (Client and server interfaces to the queue)
        1. `client.py` (Allows clients to publish tasks to queue)
        2. `server.py` (Runs the worker service, responds to enqueued tasks)
    8. `tasks/` (Worker-related controllers and implementations)
    9. `tests/` (Unit tests)
2. `bin/` (Start-up scripts for the Barbican nodes)
3. **`devstack/` (Barbican DevStack plugin, DevStack gate configuration and**
    Vagrantfile for installing DevStack VM)
4. `etc/barbican/` (Configuration files)
5. `functionaltests` (Functional Barbican tests)
6. `doc/source` (Sphinx documentation)
7. `releasenotes` (Barbican Release Notes)

2.5.7 Dataflow

Bootup flow when the Barbican API service begins

This is the sequence of calls for booting up the Barbican API server:

1. `bin/barbican.sh start`: Launches a WSGI service that performs a PasteDeploy process, invoking the middleware components found in `barbican/api/middleware` as configured in `etc/barbican/barbican-api-paste`. The middleware components invoke and then execute the Pecan application created via `barbican/api/app.py:create_main_app()`, which also defines the controllers (defined in `barbican/api/controllers/`) used to process requested URI routes.

Typical flow when the Barbican API executes

For **synchronous** calls, the following sequence is generally followed:

1. A client sends an HTTP REST request to the Barbican API server.
2. The WSGI server and routing invokes a method on one of the `XxxxController` classes in `barbican/api/controllers/xxxx.py`, keyed to an HTTP verb (so one of POST, GET, DELETE, or PUT).
    1. Example - GET /secrets:
        1. In `barbican/api/controllers/secrets.py`, the `SecretControllers` `on_get()` is invoked.
        2. A `SecretRepo` repository class (found in `barbican/model/respositories.py`) is then used to retrieve the entity of interest, in this case as a `Secret` entity defined in `barbican/model/models.py`.
        3. The payload is decrypted as needed, via `barbican/plugin/resources.pys` `get_secret()` function.
        4. A response JSON is formed and returned to the client.

For **asynchronous** calls, the following sequence is generally followed:

1. A client sends an HTTP REST request to the Barbican API server.
2. The WSGI server and routing again invokes a method on one of the `XxxxcController` classes in `barbican/api/controllers/`.
3. A remote procedure call (RPC) task is enqueue for later processing by a worker node.
    1. Example - POST /orders:
        1. In `barbican/api/controllers/orders.py`, the `OrdersControllers` `on_post()` is invoked.
        2. The `OrderRepo` repository class (found in `barbican/model/respositories.py`) is then used to create the `barbican/model/models.pys` `Order` entity in a PENDING state.
        3. The Queue APIs `process_type_order()` method on the `TaskClient` class (found in `barbican/queue/client.py`) is invoked to send a message to the queue for asynchronous processing.
        4. A response JSON is formed and returned to the client.
4. The Queue service receives the message sent above, invoking a corresponding method on `barbican/queue/server.pys` `Tasks` class. This method then invokes the `process_and_suppress_exceptions()` method on one of the `barbican/tasks/resources.pys` `BaseTask` implementors. This method can then utilize repository classes as needed to retrieve and update entities. It may also interface with third party systems via plugins‘. The `barbican/queue/client.pys` `TaskClient` class above may also be invoked from a worker node for follow on asynchronous processing steps.
    1. Example - POST /orders (continued):
        1. Continuing the example above, the queue would invoke the `process_type_order()` method on `barbican/queue/server.pys` `Tasks` class. Note the method is named the same as the `TaskClient` method above by convention.

2. This method then invokes `process_and_suppress_exceptions()` on the `barbican/tasks/resources.py`s `BeginTypeOrder` class. This class is responsible for processing all newly-POST-ed orders.

2.5.8 Adding/Updating Dependencies

Adding new Dependency

If you need to add a new dependency to Barbican, you must edit a few things:

1. Add the package name (and minimum version if applicable) to the requirements.txt file in the root directory.

> **Note**
>
> All dependencies and their version specifiers must come from the OpenStack global requirements repository.

2. We support deployment on CentOS Stream 9, so you should check CentOS Stream + EPEL 9 yum repos to figure out the name of the rpm package that provides the package youre adding. Add this package name as a dependency in `rpmbuild/SPECS/barbican.spec`.
3. If there is no package available in CentOS or EPEL, or if the latest available packages version is lower than the minimum required version we must build an rpm for it ourselves. Add a line to `rpmbuild/package_dependencies.sh` so that jenkins will build an rpm using fpm and upload it to the cloudkeep yum repo.

2.5.9 Database Migrations

Database migrations are managed using the Alembic library. The consensus for OpenStack and SQLAlchemy is that this library is preferred over sqlalchemy-migrate.

Database migrations can be performed two ways: (1) via the API startup process, and (2) via a separate script.

Database migrations can be optionally enabled during the API startup process. Corollaries for this are that a new deployment should begin with only one node to avoid migration race conditions.

Policy

A Barbican deployment goal is to update application and schema versions with zero downtime. The challenge is that at all times the database schema must be able to support two deployed application versions, so that a single migration does not break existing nodes running the previous deployment. For example, when deleting a column we would first deploy a new version that ignores the column. Once all nodes are ignoring the column, a second deployment would be made to remove the column from the database.

To achieve this goal, the following rules will be observed for schema changes:

1. Do not remove columns or tables directly, but rather:
   a. Create a version of the application not dependent on the removed column/table
   b. Replace all nodes with this new application version
   c. Create an Alembic version file to remove the column/table

   d. Apply this change in production manually, or automatically with a future version of the application

2. Changing column attributes (types, names or widths) should be handled as follows:

   a. TODO: This Stack Overflow Need to alter column types in production database page and many others summarize the grief involved in doing these sorts of migrations

   b. TODO: What about old and new application versions happening simultaneously?

      i. Maybe have the new code perform migration to new column on each read similar to how a no-sql db migration would occur?

3. Transforming column attributes (ex: splitting one `name` column into a `first` and `last` name):

   a. TODO: An Alembic example, but not robust for large datasets.

Overview

Prior to invoking any migration steps below, change to your `barbican` *projects folder and activate your virtual environment per the* Developer Guide.

If you are using PostgreSQL, please ensure you are using SQLAlchemy version 0.9.3 or higher, otherwise the generated version files will not be correct.

You cannot use these migration tools and techniques with SQLite databases.

Consider taking a look at the Alembic tutorial. As a brief summary: Alembic keeps track of a linked list of version files, each one applying a set of changes to the database schema that a previous version file in the linked list modified. Each version file has a unique Alembic-generated ID associated with it. Alembic generates a table in the project table space called `alembic_version` that keeps track of the unique ID of the last version file applied to the schema. During an update, Alembic uses this stored version ID to determine what if any follow on version files to process.

Generating Change Versions

To make schema changes, new version files need to be added to the `barbican/model/migration/alembic_migrations/versions/` folder. This section discusses two ways to add these files.

Automatically

Alembic autogenerates a new script by comparing a clean database (i.e., one without your recent changes) with any modifications you make to the Models.py or other files. This being said, automatic generation may miss changes it is more of an automatic assist with expert review. See What does Autogenerate Detect in the Alembic documentation for more details.

First, you must start Barbican using a version of the code that does not include your changes, so that it creates a clean database. This example uses Barbican launched with DevStack (see Barbican DevStack wiki page for instructions).

1. Make changes to the barbican/model/models.py SQLAlchemy models or checkout your branch that includes your changes using git.

2. Execute `barbican-db-manage -d <Full URL to database, including user/pw> revision -m '<your-summary-of-changes>' --autogenerate`

   a. For example: `barbican-db-manage -d mysql+pymysql://root:password@127.0.0.1/barbican?charset=utf8 revision -m 'Make unneeded verification columns nullable' --autogenerate`

3. Examine the generated version file, found in `barbican/model/migration/alembic_migrations/versions/`:

   a. **Verify generated update/rollback steps, especially for modifications to existing columns/tables**

   b. Remove autogenerated comments such as: `### commands auto generated by Alembic - please adjust! ###`

   c. **If you added new columns, follow this guidance**:

      1. For non-nullable columns you will need to add default values for the records already in the table, per what you configured in the `barbican.model.models.py` module. You can add the `server_default` keyword argument for the SQLAlchemy `Column` call per SQLAlchemys server_default. For boolean attributes, use *server_default=0* for False, or *server_default=1* for True. For DateTime attributes, use *server_default=str(timeutils.utcnow())* to default to the current time.

      2. If you add *any* constraint, please *always* name them in the barbican.model.models.py module, and also in the Alembic version modules when creating/dropping constraints, otherwise MySQL migrations might crash.

   d. **If you added new tables, follow this guidance**:

      1. Make sure you added your new table to the `MODELS` element of the `barbican/model/models.py` module.

      2. Note that when Barbican boots up, it will add the new table to the database. It will also try to apply the database version (that also tries to add this table) via alembic. Therefore, please edit the generated script file to add these lines:

         a. `ctx = op.get_context()` (to get the alembic migration context in current transaction)

         b. `con = op.get_bind()` (get the database connection)

         c. `table_exists = ctx.dialect.has_table(con.engine, 'your-new-table-name-here')`

         d. `if not table_exists:`

         e. `...remaining create table logic here...`

Note: For anything but trivial or brand new columns/tables, database backups and maintenance-window downtimes might be called for.

Manually

1. Execute: `barbican-db-manage revision -m "<insert your change description here>"`

2. This will generate a new file in the `barbican/model/migration/alembic_migrations/versions/` folder, with this sort of file format: `<unique-Alembic-ID>_<your-change-description-from-above-but-truncated>.py`. Note that only the first 20 characters of the description are used.

3. You can then edit this file per tutorial and the Alembic Operation Reference page for available operations you may make from the version files. **You must properly fill in the** `upgrade()` **methods.**

Applying Changes

Barbican utilizes the Alembic version files as managing delta changes to the database. Therefore the first Alembic version file does **not** contain all time-zero database tables.

To create the initial Barbican tables in the database, execute the Barbican application per the Via Application section.

Thereafter, it is suggested that only the `barbican-db-manage` command above be used to update the database schema per the Manually section. Also, automatic database updates from the Barbican application should be disabled by adding/updating `db_auto_create = False` in the `barbican.conf` configuration file.

Note : Before attempting any upgrade, you should make a full database backup of your production data. As of Kilo, database downgrades are not supported in OpenStack, and the only method available to get back to a prior database version will be to restore from backup.

Via Application

The last section of the Alembic tutorial describes the process used by the Barbican application to create and update the database table space automatically.

By default, when the Barbican API boots up it will try to create the Barbican database tables (using SQLAlchemy), and then try to apply the latest version files (using Alembic). In this mode, the latest version of the Barbican application can create a new database table space updated to the latest schema version, or else it can update an existing database table space to the latest schema revision (called `head` in the docs).

To bypass this automatic behavior, add `db_auto_create = False` *to the* `barbican.conf` *file.*

Manually

Run `barbican-db-manage -d <Full URL to database, including user/pw> upgrade -v head`, which will cause Alembic to apply the changes found in all version files after the version currently written in the target database, up until the latest version file in the linked chain of files.

To upgrade to a specific version, run this command: `barbican-db-manage -d <Full URL to database, including user/pw> upgrade -v <Alembic-ID-of-version>`. The `Alembic-ID-of-version` is a unique ID assigned to the change such `as1a0c2cdafb38`.

Downgrade

Upgrades involve complex operations and can fail. Before attempting any upgrade, you should make a full database backup of your production data. As of Kilo, database downgrades are not supported, and the only method available to get back to a prior database version will be to restore from backup.

You must complete these steps to successfully roll back your environment:

1. Roll back configuration files.
2. Restore databases from backup.
3. Roll back packages.

Rolling back upgrades is a tricky process because distributions tend to put much more effort into testing upgrades than downgrades. Broken downgrades often take significantly more effort to troubleshoot and resolve than broken upgrades. Only you can weigh the risks of trying to push a failed upgrade forward versus rolling it back. Generally, consider rolling back as the very last option.

The backup instructions provided in Backup tutorial ensure that you have proper backups of your databases and configuration files. Read through this section carefully and verify that you have the requisite backups to restore.

Note : The backup tutorial reference file only updated to Juno, DB backup operation will be similar for Kilo. The link will be updated when the reference has updated.

For more information and examples about downgrade operation please see Downgrade tutorial as reference.

TODO Items

1. *[Done - It works!]* Verify alembic works with the current SQLAlchemy model configuration in Barbican (which was borrowed from Glance).
2. *[Done - It works, I was able to add/remove columns while app was running]* Verify that SQLAlchemy is tolerant of schema miss-matches. For example, if a column is added to a table schema, will this break existing deployments that arent expecting this column?
3. *[Done - It works]* Add auto-migrate code to the boot up of models (see the `barbican\model\repositories.py` file).
4. *[Done - It works]* Add guard in Barbican model logic to guard against running migrations with SQLite databases.
5. Add detailed deployment steps for production, so how new nodes are rolled in and old ones rolled out to complete move to new versions.
6. *[In Progress]* Add a best-practices checklist section to this page.
   a. This would provide guidance on safely migrating schemas, dos and donts, etc.
   b. This could also provide code guidance, such as ensuring that new schema changes (eg. that new column) arent required for proper functionality of the previous version of the code.
   c. If a server bounce is needed, notification guidelines to the devop team would be spelled out here.

2.5.10 API Microversions

Background

Barbican uses a framework we call API Microversions for allowing changes to the API while preserving backward compatibility. The basic idea is that a user has to explicitly ask for their request to be treated with a particular version of the API. So breaking changes can be added to the API without breaking users who dont specifically ask for it. This is done with an HTTP header `OpenStack-API-Version` which has as its value a string containing the name of the service, `key-manager`, and a monotonically increasing semantic version number starting from `1.0`. The full form of the header takes the form:

```
OpenStack-API-Version: key-manager 1.1
```

If a user makes a request without specifying a version, they will get the `MIN_API_VERSION` as calculated from the defined _MIN_MICROVERSION in `barbican/api/controllers/versions.py`. This value is currently `1.0` and is expected to remain so for quite a long time.

There is a special value `latest` which can be specified, which will allow a client to always receive the most recent version of API responses from the server.

Warning

The `latest` value is mostly meant for integration testing and would be dangerous to rely on in client code since microversions are not following semver and therefore backward compatibility is not guaranteed. Clients, like python-barbicanclient, should always require a specific microversion but limit what is acceptable to the version range that it understands at the time.

For full details please read the Microversion Specification.

When do I need a new Microversion?

A microversion is needed when the contract to the user is changed. The user contract covers many kinds of information such as:

- the Request
  - the list of resource urls which exist on the server

    Example: adding a new servers/{ID}/foo which didnt exist in a previous version of the code
  - the list of query parameters that are valid on urls

    Example: adding a new parameter `is_yellow` servers/{ID}?is_yellow=True
  - the list of query parameter values for non free form fields

    Example: parameter filter_by takes a small set of constants/enums A, B, C. Adding support for new enum D.
  - new headers accepted on a request
  - the list of attributes and data structures accepted.

    Example: adding a new attribute consumer: to the request body
- the Response
  - the list of attributes and data structures returned

    Example: adding a new attribute consumers: [] to the output of secrets/{ID}
  - the allowed values of non free form fields

    Example: adding a new allowed `secret_type` to secrets/{ID}
  - the list of status codes allowed for a particular request

    Example: an API previously could return 200, 400, 403, 404 and the change would make the API now also be allowed to return 409.

    See[2] for the 400, 403, 404 and 415 cases.
  - changing a status code on a particular response

    Example: changing the return code of an API from 501 to 400.

[2] The exception to not needing a microversion when returning a previously unspecified error code is the 400, 403, 404 and 415 cases. This is considered OK to return even if previously unspecified in the code since its implied given keystone authentication can fail with a 403 and API validation can fail with a 400 for invalid json request body. Request to url/resource that does not exist always fails with 404. Invalid content types are handled before API methods are called which results in a 415.

Note

Fixing a bug so that a 400+ code is returned rather than a 500 or 503 does not require a microversion change. Its assumed that clients are not expected to handle a 500 or 503 response and therefore should not need to opt-in to microversion changes that fixes a 500 or 503 response from happening. According to the OpenStack API Working Group, a **500 Internal Server Error** should **not** be returned to the user for failures due to user error that can be fixed by changing the request on the client side. See[1].

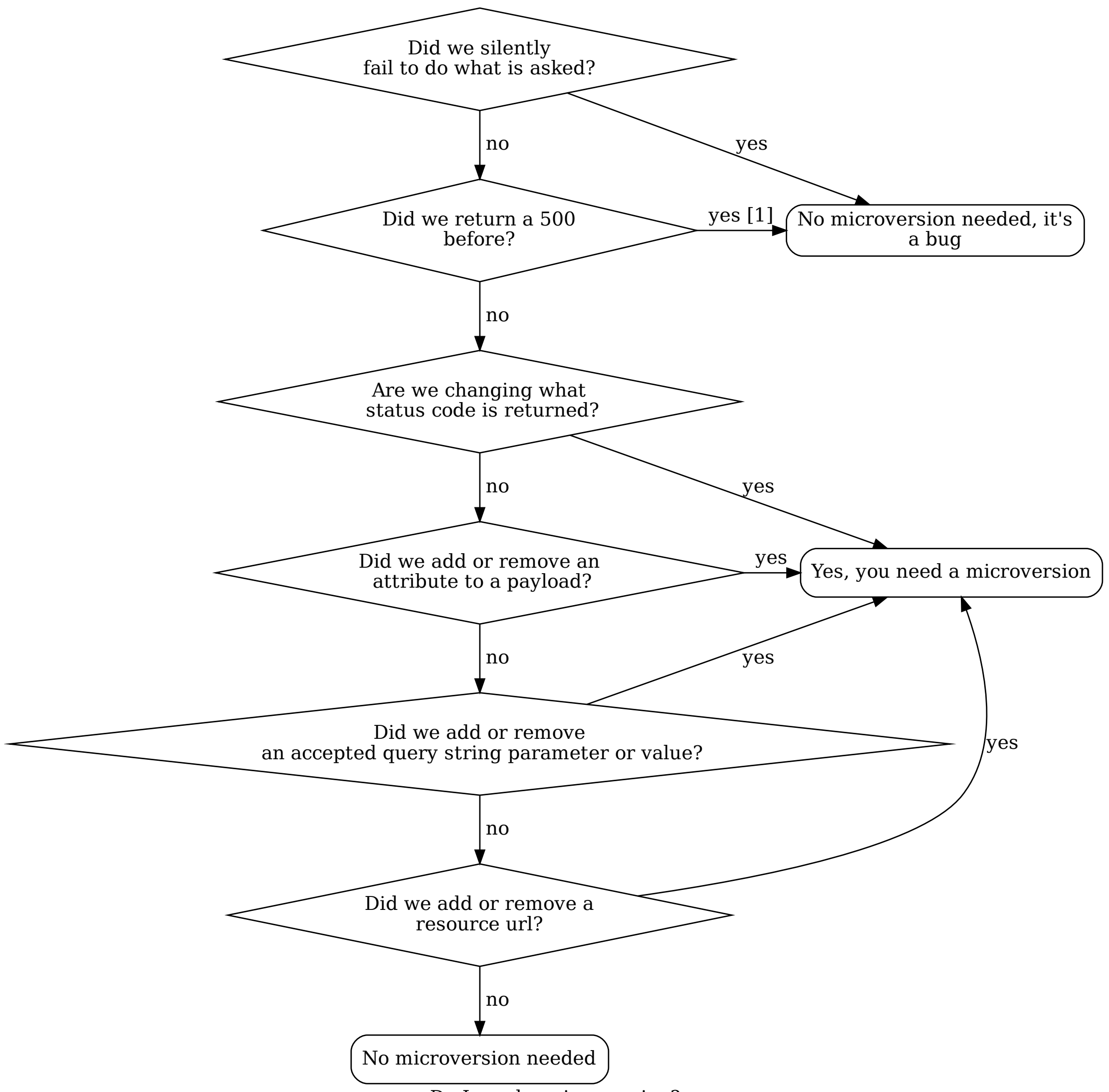
- new headers returned on a response

The following flow chart attempts to walk through the process of do we need a microversion.

[1] When fixing 500 errors that previously caused stack traces, try to map the new error into the existing set of errors that API call could previously return (400 if nothing else is appropriate). Changing the set of allowed status codes from a request is changing the contract, and should be part of a microversion (except in[Page 132, 2]).

The reason why we are so strict on contract is that wed like application writers to be able to know, for sure, what the contract is at every microversion in Barbican. If they do not, they will need to write conditional code in their application to handle ambiguities.

When in doubt, consider application authors. If it would work with no client side changes on both Barbican versions, you probably dont need a microversion. If, on the other hand, there is any ambiguity, a microversion is probably needed.


Did we silently fail to do what is asked?
no
yes
Did we return a 500 before?
yes [1]
No microversion needed, it's a bug
no
Are we changing what status code is returned?
no
yes
Did we add or remove an attribute to a payload?
yes
Yes, you need a microversion
no
yes
Did we add or remove an accepted query string parameter or value?
yes
no
Did we add or remove a resource url?
no
No microversion needed

Do I need a microversion?

Footnotes

When a microversion is not needed

A microversion is not needed in the following situation:

- the response
  - Changing the error message without changing the response code does not require a new microversion.
  - Removing an inapplicable HTTP header, for example, suppose the Retry-After HTTP header is being returned with a 4xx code. This header should only be returned with a 503 or 3xx response, so it may be removed without bumping the microversion.
  - An obvious regression bug in an admin-only API where the bug can still be fixed upstream on active stable branches. Admin-only APIs are less of a concern for interoperability and generally a regression in behavior can be dealt with as a bug fix when the documentation

clearly shows the API behavior was unexpectedly regressed. See[3] for an example from Nova. Intentional behavior changes to an admin-only API *do* require a microversion.

Footnotes

In Code

In `barbican/api/controllers/versions.py` we define the `is_supported` function which is intended to be used in Controller methods to check if API request version satisfies version restrictions. The function accepts `min_version` and `max_version` arguments, and returns `True` when the requested version meets those constrainst.

Note

Originally Nova also implemented a decorator API, but it frequently lead to code duplication. In Barbican it was decided to limit the microversion API to just the `is_supported` function.

If you are adding a patch which adds a new microversion, it is necessary to add changes to other places which describe your change:

- Update `_MAX_MICROVERSION` and bump `_LAST_UPDATED` in `barbican/api/controllers/versions.py`
- Add a verbose description to `doc/source/api/microversion_history.rst`.
- Add a release note with a `features` section announcing the new or changed feature and the microversion.
- Update the expected versions in affected tests, add new tests to test both the old and new behavior to avoid regressions.
- Make a new commit to python-barbicanclient and update corresponding files to enable the newly added microversion API.
- If the microversion changes the response schema, a new schema and test for the microversion must be added to Tempest.
- Update the API Reference documentation as appropriate. The source is located under *doc/source/api/reference/*.

Allocating a microversion

If you are adding a patch which adds a new microversion, it is necessary to allocate the next microversion number. Except under extremely unusual circumstances and this would have been mentioned in the barbican spec for the change, the `_MAX_MICROVERSION` will be incremented. This will also be the new minor version number for the API change.

It is possible that multiple microversion patches would be proposed in parallel and the microversions would conflict between patches. This will cause a merge conflict. We dont reserve a microversion for each patch in advance as we dont know the final merge order. Developers may need over time to rebase their patch calculating a new version number as above based on the updated value of `_MAX_MICROVERSION`.

[3] https://review.opendev.org/#/c/523194/

Testing Microversioned API Methods

Testing a microversioned API method is very similar to a normal controller method test, you just need to add the `OpenStack-API-Version` header For unit tests, barbican.test.utils.set_version function can be used, for example:

```
def test_should_get_secret_as_json_v1(self):
    utils.set_version(self.app, '1.1')
    secret = self._test_should_get_secret_as_json()
    self.assertIn('consumers', secret)
```

2.5.11 Plugin Developers Guide

This guide describes how to develop custom plugins for use by Barbican. While Barbican provides useful plugin implementations, some OpenStack operators may require customized implementations, perhaps to interact with an existing corporate database or service. This approach also gives flexibility to operators of OpenStack clouds by allowing them to choose the right implementation for their cloud.

Plugin Status

A Barbican plugin may be considered `stable`, `experimental` or `out-of-tree`.

- A *stable* status indicates that the plugin is fully supported by the OpenStack Barbican Team
- An *experimental* status indicates that we intend to support the plugin, but it may be missing features or may not be fully tested at the gate. Plugins in this status may occasionally break.
- An *out-of-tree* status indicates that no formal support will be provided, and the plugin may be removed in a future release.

Graduation Process

By default, new plugins proposed to be in-tree will be in the *experimental* status. To be considered *stable* a plugin must meet the following requirements:

- 100% unit test coverage, including branch coverage.
- Gate job that executes the functional test suite against an instance of Barbican configured to use the plugin. The gate may be a devstack gate, or a third-party gate.
- Implement new features within one cycle after the new blueprint feature is approved.

Demotion Process

Plugins should not stay in the *experimental* status for a long time. Plugins that stay in *experimental* for more than **two** releases are expected to move into *stable*, as described by the Graduation Process, or move into *out-of-tree*.

Plugins in the *stable* status may be deprecated by the team, and moved to *out-of-tree*.

Plugins that stay in the *out-of-tree* status for more than **two** releases may be removed from the tree.

Architecture

Barbicans plugin architecture enables developers to create their own implementations of features such as secret storage and generation and event handling. The plugin pattern used defines an abstract class, whose methods are invoked by Barbican logic (referred to as Barbican core in this guide) in a particular sequence. Typically plugins do not interact with Barbicans data model directly, so Barbican core also handles persisting any required information on the plugins behalf.

In general, Barbican core will invoke a variation of the plugins `supports()` method to determine if a requested action can be implemented by the plugin. Once a supporting plugin is selected, Barbican core will invoke one or more methods on the plugin to complete the action.

The links below provide further guidance on the various plugin types used by Barbican, as well as configuration and deployment options.

Secret Store Plugin Development

This guide describes how to develop a custom secret store plugin for use by Barbican.

Barbican supports two storage modes for secrets: a secret store mode (detailed on this page), and a *cryptographic mode*. The secret store mode offloads both encryption/decryption and encrypted secret storage to the plugin implementation. Barbican includes plugin interfaces to a Red Hat Dogtag service and to a Key Management Interoperability Protocol (KMIP) compliant security appliance.

Since the secret store mode defers the storage of encrypted secrets to plugins, Barbican core does not need to store encrypted secrets into its data store, unlike the *cryptographic mode*. To accommodate the discrepancy between the two secret storage modes, a secret store to cryptographic plugin adapter has been included in Barbican core, as detailed in *The Cryptographic Plugin Adapter* section below.

`secret_store` Module

The `barbican.plugin.interface.secret_store` module contains the classes needed to implement a custom plugin. These classes include the `SecretStoreBase` abstract base class which custom plugins should inherit from, as well as several Data Transfer Object (DTO) classes used to transfer data between Barbican and the plugin.

Data Transfer Objects

The DTO classes are used to wrap data that is passed from Barbican to the plugin as well as data that is returned from the plugin back to Barbican. They provide a level of isolation between the plugins and Barbicans internal data models.

class `barbican.plugin.interface.secret_store.`**`SecretDTO`**(*type*, *secret*, *key_spec*, *content_type*, *transport_key=None*)

> This object is a secret data transfer object (DTO).
>
> This object encapsulates a key and attributes about the key. The attributes include a KeySpec that contains the algorithm and bit length. The attributes also include information on the encoding of the key.

class `barbican.plugin.interface.secret_store.`**`AsymmetricKeyMetadataDTO`**(*private_key_meta=None*, *public_key_meta=None*, *passphrase_meta=None*)

This DTO encapsulates metadata(s) for asymmetric key components.

These components are private_key_meta, public_key_meta and passphrase_meta.

Secret Parameter Objects

The secret parameter classes encapsulate information about secrets to be stored within Barbican and/or its plugins.

`class barbican.plugin.interface.secret_store.`**`SecretType`**

Constant to define the symmetric key type.

Used by getSecret to retrieve a symmetric key.

`class barbican.plugin.interface.secret_store.`**`KeyAlgorithm`**

Constant for the Diffie Hellman algorithm.

`class barbican.plugin.interface.secret_store.`**`KeySpec`**`(`*alg=None*, *bit_length=None*, *mode=None*, *passphrase=None*`)`

This object specifies the algorithm and bit length for a key.

Plugin Base Class

Barbican secret store plugins should implement the abstract base class `SecretStoreBase`. Concrete implementations of this class should be exposed to Barbican using `stevedore` mechanisms explained in the configuration portion of this guide.

`class barbican.plugin.interface.secret_store.`**`SecretStoreBase`**

`abstract` **`delete_secret`**`(`*secret_metadata*`)`

Deletes a secret from the secret store.

Deletes a secret from a secret store. It can no longer be referenced after this call.

Parameters

`secret_metadata` secret_metadata

`abstract` **`generate_asymmetric_key`**`(`*key_spec*`)`

Generate a new asymmetric key pair and store it.

Generates a new asymmetric key pair and stores it in the secret store. An object of type AsymmetricKeyMetadataDTO will be returned containing attributes of metadata for newly created key pairs. The metadata is stored by Barbican and passed into other methods to aid the plugins. This can be useful for plugins that generate a unique ID in the external data store and use it to retrieve the key pairs in the future.

Parameters

`key_spec` KeySpec that contains details on the type of key to generate

Returns

An object of type AsymmetricKeyMetadataDTO containing metadata about the key pair.

`abstract` **`generate_supports`**`(`*key_spec*`)`

Returns a boolean indicating if the secret type is supported.

This checks if the algorithm and bit length are supported by the generate methods. This is useful to call before calling generate_symmetric_key or generate_asymetric_key to see if the key type is supported before trying to generate it.

Parameters
`key_spec` KeySpec that contains details on the algorithm and bit length

Returns
boolean indicating if the algorithm is supported

`abstract generate_symmetric_key`(*key_spec*)

Generate a new symmetric key and store it.

Generates a new symmetric key and stores it in the secret store. A dictionary is returned that contains metadata about the newly created symmetric key. The dictionary of metadata is stored by Barbican and passed into other methods to aid the plugins. This can be useful for plugins that generate a unique ID in the external data store and use it to retrieve the key in the future. The returned dictionary may be empty if the SecretStore does not require it.

Parameters
`key_spec` KeySpec that contains details on the type of key to generate

Returns
an optional dictionary containing metadata about the key

`abstract get_plugin_name`()

Gets user friendly plugin name.

This plugin name is expected to be read from config file. There will be a default defined for plugin name which can be customized in specific deployment if needed.

This name needs to be unique across a deployment.

`abstract get_secret`(*secret_type*, *secret_metadata*)

Retrieves a secret from the secret store.

Retrieves a secret from the secret store and returns a SecretDTO that contains the secret.

The secret_metadata parameter is the metadata returned from one of the generate or store methods. This data is used by the plugins to retrieve the key.

The secret_type parameter may be useful for secret stores to know the expected format of the secret. For instance if the type is SecretDTO.PRIVATE then a PKCS8 structure is returned. This way secret stores do not need to manage the secret type on their own.

Parameters

- `secret_type` secret type
- `secret_metadata` secret metadata

Returns
SecretDTO that contains secret

`get_transport_key`()

Gets a transport key.

Returns the current valid transport key associated with this plugin. The transport key is expected to be a base64 encoded x509 certificate containing a public key. Admins are responsible for deleting old keys from the database using the DELETE method on the TransportKey resource.

By default, returns None. Plugins that support transport key wrapping should override this method.

`is_transport_key_current`(*transport_key*)

Determines if the provided transport key is the current valid key

Returns true if the transport key is the current valid transport key. If the key is not valid, then barbican core will request a new transport key from the plugin.

Returns False by default. Plugins that support transport key wrapping should override this method.

`abstract store_secret`(*secret_dto*)

Stores a key.

The SecretDTO contains the bytes of the secret and properties of the secret. The SecretStore retrieves the secret bytes, stores them, and returns a dictionary of metadata about the secret. This can be useful for plugins that generate a unique ID in the external data store and use it to retrieve the secret in the future. The returned dictionary may be empty if the SecretStore does not require it.

Parameters
`secret_dto` SecretDTO for secret

Returns
an optional dictionary containing metadata about the secret

`abstract store_secret_supports`(*key_spec*)

Returns a boolean indicating if the secret can be stored.

Checks if the secret store can store the secret, give the attributes of the secret in the KeySpec. For example, some plugins may need to know the attributes in order to store the secret, but other plugins may be able to store the secret as a blob if no attributes are given.

Parameters
`key_spec` KeySpec for the secret

Returns
a boolean indicating if the secret can be stored

Barbican Core Plugin Sequence

The sequence that Barbican invokes methods on `SecretStoreBase` depends on the requested action as detailed next. Note that these actions are invoked via the `barbican.plugin.resources` module, which in turn is invoked via Barbicans API and Worker processes.

For secret storage actions, Barbican core calls the following methods:

1. `get_transport_key()` - If a transport key is requested to upload secrets for storage, this method asks the plugin to provide the transport key.
2. `store_secret_supports()` - Asks the plugin if it can support storing a secret based on the `KeySpec` parameter information as described above.
3. `store_secret()` - Asks the plugin to perform encryption of an unencrypted secret payload as provided in the `SecretDTO` above, and then to store that secret. The plugin then returns a dictionary

of information about that secret (typically a unique reference to that stored secret that only makes sense to the plugin). Barbican core will then persist this dictionary as a JSON attribute within its data store, and also hand it back to the plugin for secret retrievals later. The name of the plugin used to perform this storage is also persisted by Barbican core, to ensure we retrieve this secret only with this plugin.

For secret retrievals, Barbican core will select the same plugin as was used to store the secret, and then invoke its `get_secret()` method to return the unencrypted secret.

For symmetric key generation, Barbican core calls the following methods:

1. `generate_supports()` - Asks the plugin if it can support generating a symmetric key based on the `KeySpec` parameter information as described above.
2. `generate_symmetric_key()` - Asks the plugin to both generate and store a symmetric key based on the `KeySpec` parameter information. The plugin can then return a dictionary of information for the stored secret similar to the storage process above, which Barbican core will persist for later retrieval of this generated secret.

For asymmetric key generation, Barbican core calls the following methods:

1. `generate_supports()` - Asks the plugin if it can support generating an asymmetric key based on the `KeySpec` parameter information as described above.
2. `generate_asymmetric_key()` - Asks the plugin to both generate and store an asymmetric key based on the `KeySpec` parameter information. The plugin can then return an `AsymmetricKeyMetadataDTO` object as described above, which contains secret metadata for each of the three secrets generated and stored by this plugin: private key, public key and an optional passphrase. Barbican core will then persist information for these secrets, and also create a container to group them.

The Cryptographic Plugin Adapter

Barbican core includes a specialized secret store plugin used to adapt to cryptographic plugins, called `StoreCryptoAdapterPlugin`. This plugin functions as a secret store plugin, but it directs secret related operations to *cryptographic plugins* for encryption/decryption/generation operations. Because cryptographic plugins do not store encrypted secrets, this adapter plugin provides this storage capability via Barbicans data store.

This adapter plugin also uses `stevedore` to access and utilize cryptographic plugins that can support secret operations.

Cryptographic Plugin Development

This guide describes how to develop a custom cryptographic plugin for use by Barbican.

Barbican supports two storage modes for secrets: a cryptographic mode (detailed on this page), and a *secret store mode*. The cryptographic mode stores encrypted secrets in Barbicans data store, utilizing a cryptographic process or appliance (such as a hardware security module (HSM)) to perform the encryption/decryption. Barbican includes a PKCS11-based interface to SafeNet HSMs.

Note that cryptographic plugins are not invoked directly from Barbican core, but rather via a *secret store mode* plugin adapter class, further described in *The Cryptographic Plugin Adapter*.

`crypto` Module

The `barbican.plugin.crypto` module contains the classes needed to implement a custom plugin. These classes include the `CryptoPluginBase` abstract base class which custom plugins should inherit from, as well as several Data Transfer Object (DTO) classes used to transfer data between Barbican and the plugin.

Data Transfer Objects

The DTO classes are used to wrap data that is passed from Barbican to the plugin as well as data that is returned from the plugin back to Barbican. They provide a level of isolation between the plugins and Barbicans internal data models.

`class barbican.plugin.crypto.base.`**`KEKMetaDTO`**`(`*kek_datum*`)`

Key Encryption Key Meta DTO

Key Encryption Keys (KEKs) in Barbican are intended to represent a distinct key that is used to perform encryption on secrets for a particular project.

`KEKMetaDTO` objects are provided to cryptographic backends by Barbican to allow plugins to persist metadata related to the projects KEK.

For example, a plugin that interfaces with a Hardware Security Module (HSM) may want to use a different encryption key for each project. Such a plugin could use the `KEKMetaDTO` object to save the key ID used for that project. Barbican will persist the KEK metadata and ensure that it is provided to the plugin every time a request from that same project is processed.

`plugin_name`

String attribute used by Barbican to identify the plugin that is bound to the KEK metadata. Plugins should not change this attribute.

`kek_label`

String attribute used to label the projects KEK by the plugin. The value of this attribute should be meaningful to the plugin. Barbican does not use this value.

`algorithm`

String attribute used to identify the encryption algorithm used by the plugin. e.g. AES, 3DES, etc. This value should be meaningful to the plugin. Barbican does not use this value.

`mode`

String attribute used to identify the algorithm mode used by the plugin. e.g. CBC, GCM, etc. This value should be meaningful to the plugin. Barbican does not use this value.

`bit_length`

Integer attribute used to identify the bit length of the KEK by the plugin. This value should be meaningful to the plugin. Barbican does not use this value.

`plugin_meta`

String attribute used to persist any additional metadata that does not fit in any other attribute. The value of this attribute is defined by the plugin. It could be used to store external system references, such as Key IDs in an HSM, URIs to an external service, or any other data that the plugin deems necessary to persist. Because this is just a plain text field, a plug in may even choose to persist data such as key value pairs in a JSON object.

`class barbican.plugin.crypto.base.`**`EncryptDTO`**`(`*unencrypted*`)`

Secret Encryption DTO

Data Transfer Object used to pass all the necessary data for the plugin to perform encryption of a secret.

Currently, this DTO only contains the raw bytes to be encrypted by the plugin, but in the future this may contain more information.

`unencrypted`

The secret data in Bytes to be encrypted by the plugin.

`class barbican.plugin.crypto.base.`**`DecryptDTO`**`(`*encrypted*`)`

Secret Decryption DTO

Data Transfer Object used to pass all the necessary data for the plugin to perform decryption of a secret.

Currently, this DTO only contains the data produced by the plugin during encryption, but in the future this DTO will contain more information, such as a transport key for secret wrapping back to the client.

`encrypted`

The data that was produced by the plugin during encryption. For some plugins this will be the actual bytes that need to be decrypted to produce the secret. In other implementations, this may just be a reference to some external system that can produce the unencrypted secret.

`class barbican.plugin.crypto.base.`**`GenerateDTO`**`(`*algorithm*, *bit_length*, *mode*, *passphrase=None*`)`

Secret Generation DTO

Data Transfer Object used to pass all the necessary data for the plugin to generate a secret on behalf of the user.

`generation_type`

String attribute used to identify the type of secret that should be generated. This will be either `"symmetric"` or `"asymmetric"`.

`algorithm`

String attribute used to specify what type of algorithm the secret will be used for. e.g. `"AES"` for a `"symmetric"` type, or `"RSA"` for `"asymmetric"`.

`mode`

String attribute used to specify what algorithm mode the secret will be used for. e.g. `"CBC"` for `"AES"` algorithm.

`bit_length`

Integer attribute used to specify the bit length of the secret. For example, this attribute could specify the key length for an encryption key to be used in AES-CBC.

`class barbican.plugin.crypto.base.`**`ResponseDTO`**`(`*cypher_text*, *kek_meta_extended=None*`)`

Data transfer object for secret generation response.

Barbican guarantees that both the `cypher_text` and `kek_metadata_extended` will be persisted and then given back to the plugin when requesting a decryption operation.

`kek_metadata_extended` takes the idea of Key Encryption Key (KEK) metadata further by giving plugins the option to store secret-level KEK metadata. One example of using secret-level KEK metadata would be plugins that want to use a unique KEK for every secret that is encrypted. Such a plugin could use `kek_metadata_extended` to store the Key ID for the KEK used to encrypt this particular secret.

Parameters

- **`cypher_text`** Byte data resulting from the encryption of the secret data.
- **`kek_meta_extended`** Optional String object to be persisted alongside the cyphertext.

Plugin Base Class

Barbican cryptographic plugins should implement the abstract base class `CryptoPluginBase`. Concrete implementations of this class should be exposed to barbican using `stevedore` mechanisms explained in the configuration portion of this guide.

`class barbican.plugin.crypto.base.`**`CryptoPluginBase`**

Base class for all Crypto plugins.

Barbican requests operations by invoking the methods on an instance of the implementing class. Barbicans plugin manager handles the life-cycle of the Data Transfer Objects (DTOs) that are passed into these methods, and persist the data that is assigned to these DTOs by the plugin.

`abstract` **`bind_kek_metadata`**(*kek_meta_dto*)

Key Encryption Key Metadata binding function

Bind a key encryption key (KEK) metadata to the sub-system handling encryption/decryption, updating information about the key encryption key (KEK) metadata in the supplied kek_metadata data-transfer-object instance, and then returning this instance.

This method is invoked prior to the encrypt() method above. Implementors should fill out the supplied kek_meta_dto instance (an instance of KEKMetadata above) as needed to completely describe the kek metadata and to complete the binding process. Barbican will persist the contents of this instance once this method returns.

Parameters

`kek_meta_dto` Key encryption key metadata to bind, with the kek_label attribute guaranteed to be unique, and the and plugin_name attribute already configured.

Returns

kek_meta_dto: Returns the specified DTO, after modifications.

`abstract` **`decrypt`**(*decrypt_dto*, *kek_meta_dto*, *kek_meta_extended*, *project_id*)

Decrypt encrypted_datum in the context of the provided project.

Parameters

- **`decrypt_dto`** data transfer object containing the cyphertext to be decrypted.
- **`kek_meta_dto`** Key encryption key metadata to use for decryption
- **`kek_meta_extended`** Optional per-secret KEK metadata to use for decryption.
- **`project_id`** Project ID associated with the encrypted datum.

Returns
str unencrypted byte data

`abstract encrypt(`*encrypt_dto*, *kek_meta_dto*, *project_id*`)`

Encryption handler function

This method will be called by Barbican when requesting an encryption operation on a secret on behalf of a project.

Parameters

- **encrypt_dto** (*EncryptDTO*) *EncryptDTO* instance containing the raw secret byte data to be encrypted.
- **kek_meta_dto** (*KEKMetaDTO*) *KEKMetaDTO* instance containing information about the projects Key Encryption Key (KEK) to be used for encryption. Plugins may assume that binding via `bind_kek_metadata()` has already taken place before this instance is passed in.
- **project_id** Project ID associated with the unencrypted data.

Returns
A response DTO containing the cyphertext and KEK information.

Return type
ResponseDTO

`abstract generate_asymmetric(`*generate_dto*, *kek_meta_dto*, *project_id*`)`

Create a new asymmetric key.

Parameters

- **generate_dto** data transfer object for the record associated with this generation request. Some relevant parameters can be extracted from this object, including bit_length, algorithm and passphrase
- **kek_meta_dto** Key encryption key metadata to use for decryption
- **project_id** Project ID associated with the data.

Returns
A tuple containing objects for private_key, public_key and optionally one for passphrase. The objects will be of type ResponseDTO. Each object containing encrypted data and kek_meta_extended, the former the resultant cypher text, the latter being optional per-secret metadata needed to decrypt (over and above the per-project metadata managed outside of the plugins)

`abstract generate_symmetric(`*generate_dto*, *kek_meta_dto*, *project_id*`)`

Generate a new key.

Parameters

- **generate_dto** data transfer object for the record associated with this generation request. Some relevant parameters can be extracted from this object, including bit_length, algorithm and mode
- **kek_meta_dto** Key encryption key metadata to use for decryption
- **project_id** Project ID associated with the data.

Returns

An object of type ResponseDTO containing encrypted data and kek_meta_extended, the former the resultant cypher text, the latter being optional per-secret metadata needed to decrypt (over and above the per-project metadata managed outside of the plugins)

abstract get_plugin_name()

Gets user friendly plugin name.

This plugin name is expected to be read from config file. There will be a default defined for plugin name which can be customized in specific deployment if needed.

This name needs to be unique across a deployment.

abstract supports(*type_enum*, *algorithm=None*, *bit_length=None*, *mode=None*)

Used to determine if the plugin supports the requested operation.

Parameters

- **type_enum** Enumeration from PluginSupportsType class
- **algorithm** String algorithm name if needed

Barbican Core Plugin Sequence

Barbican invokes a different sequence of methods on the `CryptoPluginBase` plugin depending on the requested action. Note that these actions are invoked via the secret store adapter class `StoreCryptoAdapterPlugin` which is further described in *The Cryptographic Plugin Adapter*.

For secret storage actions, Barbican core calls the following methods:

1. `supports()` - Asks the plugin if it can support the `barbican.plugin.crypto.base.PluginSupportTypes.ENCRYPT_DECRYPT` operation type.
2. `bind_kek_metadata()` - Allows a plugin to bind an internal key encryption key (KEK) to a project-ID, typically as a label or reference to the actual KEK stored within the cryptographic appliance. This KEK information is stored into Barbicans data store on behalf of the plugin, and then provided back to the plugin for subsequent calls.
3. `encrypt()` - Asks the plugin to perform encryption of an unencrypted secret payload, utilizing the KEK bound to the project-ID above. Barbican core will then persist the encrypted data returned from this method for later retrieval. The name of the plugin used to perform this encryption is also persisted into Barbican core, to ensure we decrypt this secret only with this plugin.

For secret decryptions and retrievals, Barbican core will select the same plugin as was used to store the secret, and then invoke its `decrypt()` method, providing it both the previously-persisted encrypted secret data as well as the project-ID KEK used to encrypt the secret.

For symmetric key generation, Barbican core calls the following methods:

1. `supports()` - Asks the plugin if it can support the `barbican.plugin.crypto.base.PluginSupportTypes.SYMMETRIC_KEY_GENERATION` operation type.
2. `bind_kek_metadata()` - Same comments as for secret storage above.
3. `generate_symmetric()` - Asks the plugin to both generate a symmetric key, and then encrypted it with the project-ID KEK. Barbican core persists this newly generated and encrypted secret similar to secret storage above.

For asymmetric key generation, Barbican core calls the following methods:

1. `supports()` - Asks the plugin if it can support the `barbican.plugin.crypto.base.PluginSupportTypes.ASYMMETRIC_KEY_GENERATION` operation type.
2. `bind_kek_metadata()` - Same comments as for secret storage above.
3. `generate_asymmetric()` - Asks the plugin to generate and encrypt asymmetric public and private key (and optional passphrase) information, which Barbican core will persist as a container of separate encrypted secrets.

2.5.12 Writing and Running Barbican Tests

As a part of every code review that is submitted to the Barbican project there are a number of gating jobs which aid in the prevention of regression issues within Barbican. As a result, a Barbican developer should be familiar with running Barbican tests locally.

For your convenience we provide the ability to run all tests through the `tox` utility. If you are unfamiliar with tox please see refer to the tox documentation for assistance.

Unit Tests

Currently, we provide tox environments for Python 2.7 and 3.5. By default all available test environments within the tox configuration will execute when calling `tox`. If you want to run them independently, you can do so with the following command:

```
# Executes tests on Python 2.7
tox -e py27
```

Note

If you do not have the appropriate Python versions available, consider setting up PyEnv to install multiple versions of Python. See the documentation regarding *Setting up a Barbican Development Environment* for more information.

Note

Individual unit tests can also be run, using the following commands:

```
# runs a single test with the function named
# test_can_create_new_secret_one_step
tox -e py27 -- test_can_create_new_secret_one_step

# runs only tests in the WhenTestingSecretsResource class and
# the WhenTestingCAsResource class
tox -e py27 -- '(WhenTestingSecretsResource|WhenTestingCAsResource)'
```

The function name or class specified must be one located in the *barbican/tests* directory.

Groups of tests can also be run with a regex match after the `--`. For more information on what can be done with `testr`, please see: http://testrepository.readthedocs.org/en/latest/MANUAL.html

You can also setup breakpoints in the unit tests. This can be done by adding `import pdb; pdb.set_trace()` to the line of the unit test you want to examine, then running the following command:

```
# Executes tests on Python 2.7
tox -e debug
```

Note

For a list of pdb commands, please see: https://docs.python.org/2/library/pdb.html

Python 3.5

In order to run the unit tests within the Python 3.5 unit testing environment you need to make sure you have all necessary packages installed.

- On Ubuntu/Debian:

  ```
  sudo apt-get install python3-dev
  ```

- On Fedora:

  ```
  sudo dnf install python3-devel
  ```

You then specify to run the unit tests within the Python 3.5 environment when invoking tox

```
# Executes tests on Python 3.5
tox -e py35
```

Functional Tests

Unlike running unit tests, the functional tests require Barbican and Keystone services to be running in order to execute. For more information on *setting up a Barbican development environment* and using *Keystone with Barbican*, see our accompanying project documentation.

Once you have the appropriate services running and configured you can execute the functional tests through tox.

```
# Execute Barbican Functional Tests
tox -e functional
```

By default, the functional tox job will use `testr` to execute the functional tests as used in the gating job.

Note

In order to run an individual functional test function, you must use the following command:

```
# runs a single test with the function named
# test_secret_create_then_check_content_types
tox -e functional -- test_secret_create_then_check_content_types

# runs only tests in the SecretsTestCase class and
# the OrdersTestCase class
tox -e functional -- '(SecretsTestCase|OrdersTestCase)'
```

The function name or class specified must be one located in the *functionaltests* directory.

Groups of tests can also be run with a regex match after the `--`. For more information on what can be done with `testr`, please see: http://testrepository.readthedocs.org/en/latest/MANUAL.html

Remote Debugging

In order to be able to hit break-points on API calls, you must use remote debugging. This can be done by adding `import rpdb; rpdb.set_trace()` to the line of the API call you wish to test. For example, adding the breakpoint in `def on_post` in `barbican.api.controllers.secrets.py` will allow you to hit the breakpoint when a `POST` is done on the secrets URL.

Note

After performing the `POST` the application will freeze. In order to use `rpdb`, you must open up another terminal and run the following:

```
# enter rpdb using telnet
telnet localhost 4444
```

Once in rpdb, you can use the same commands as pdb, as seen here: https://docs.python.org/2/library/pdb.html

2.6 Barbican API Documentation

2.6.1 User Guide

The OpenStack Key Manager API version 1.0 supports microversions. See *doc/source/api/microversions.rst* for details.

API guide docs are built to: https://docs.openstack.org/api-guide/key-manager/

2.6.2 API Reference

Secrets API - Reference

GET /v1/secrets

Lists a projects secrets.

The list of secrets can be filtered by the parameters passed in via the URL.

The actual secret payload data will not be listed here. Clients must instead make a separate call to retrieve the secret payload data for each individual secret.

Parameters

Name	Type	Description
offset	integer	The starting index within the total list of the secrets that you would like to retrieve.
limit	integer	The maximum number of records to return (up to 100). The default limit is 10.
name	string	Selects all secrets with name similar to this value.
alg	string	Selects all secrets with algorithm similar to this value.
mode	string	Selects all secrets with mode similar to this value.
bits	integer	Selects all secrets with bit_length equal to this value.
secret_type	string	Selects all secrets with secret_type equal to this value.
acl_only	boolean	Selects all secrets with an ACL that contains the user. Project scope is ignored.
created	string	Date filter to select all secrets with *created* matching the specified criteria. See Date Filters below for more detail.
updated	string	Date filter to select all secrets with *updated* matching the specified criteria. See Date Filters below for more detail.
expiration	string	Date filter to select all secrets with *expiration* matching the specified criteria. See Date Filters below for more detail.
sort	string	Determines the sorted order of the returned list. See Sorting below for more detail.

Date Filters:

The values for the `created`, `updated`, and `expiration` parameters are comma-separated lists of time stamps in ISO 8601 format. The time stamps can be prefixed with any of these comparison operators: `gt:` (greater-than), `gte:` (greater-than-or-equal), `lt:` (less-than), `lte:` (less-than-or-equal).

For example, to get a list of secrets that will expire in January of 2020:

```
GET /v1/secrets?expiration=gte:2020-01-01T00:00:00,lt:2020-02-01T00:00:00
```

Sorting:

The value of the `sort` parameter is a comma-separated list of sort keys. Supported sort keys include `created`, `expiration`, `mode`, `name`, `secret_type`, `status`, and `updated`.

Each sort key may also include a direction. Supported directions are `:asc` for ascending and `:desc` for descending. The service will use `:asc` for every key that does not include a direction.

For example, to sort the list from most recently created to oldest:

```
GET /v1/secrets?sort=created:desc
```

Request:

```
GET /v1/secrets?offset=1&limit=2&sort=created
Headers:
    Accept: application/json
```

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```
    X-Auth-Token: {keystone_token}
    (or X-Project-Id: {project id})
```

Response:

```
{
    "next": "http://{barbican_host}:9311/v1/secrets?limit=2&offset=3",
    "previous": "http://{barbican_host}:9311/v1/secrets?limit=2&offset=0",
    "secrets": [
        {
            "algorithm": null,
            "bit_length": null,
            "content_types": {
                "default": "application/octet-stream"
            },
            "created": "2015-04-07T03:37:19.805835",
            "creator_id": "3a7e3d2421384f56a8fb6cf082a8efab",
            "expiration": null,
            "mode": null,
            "name": "opaque octet-stream base64",
            "secret_ref": "http://{barbican_host}:9311/v1/secrets/{uuid}",
            "secret_type": "opaque",
            "status": "ACTIVE",
            "updated": "2015-04-07T03:37:19.808337"
        },
        {
            "algorithm": null,
            "bit_length": null,
            "content_types": {
                "default": "application/octet-stream"
            },
            "created": "2015-04-07T03:41:02.184159",
            "creator_id": "3a7e3d2421384f56a8fb6cf082a8efab",
            "expiration": null,
            "mode": null,
            "name": "opaque random octet-stream base64",
            "secret_ref": "http://{barbican_host}:9311/v1/secrets/{uuid}",
            "secret_type": "opaque",
            "status": "ACTIVE",
            "updated": "2015-04-07T03:41:02.187823"
        }
    ],
    "total": 5
}
```

Response Attributes

Nam	Type	Description
se-crets	list	Contains a list of secrets. The attributes in the secret objects are the same as for an individual secret.
to-tal	in-te-ger	The total number of secrets available to the user.
next	string	A HATEOAS URL to retrieve the next set of secrets based on the offset and limit parameters. This attribute is only available when the total number of secrets is greater than offset and limit parameter combined.
pre-vi-ous	string	A HATEOAS URL to retrieve the previous set of secrets based on the offset and limit parameters. This attribute is only available when the request offset is greater than 0.

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource

POST /v1/secrets

Creates a Secret entity. If the `payload` attribute is not included in the request, then only the metadata for the secret is created, and a subsequent PUT request is required.

Attributes

Attribute Name	Type	Description	Default
name	string	(optional) The name of the secret set by the user.	None
expiration	string	(optional) This is a UTC timestamp in ISO 8601 format `YYYY-MM-DDTHH:MM:SSZ`. If set, the secret will not be available after this time.	None
algorithm	string	(optional) Metadata provided by a user or system for informational purposes.	None
bit_length	integer	(optional) Metadata provided by a user or system for informational purposes. Value must be greater than zero.	None
mode	string	(optional) Metadata provided by a user or system for informational purposes.	None
payload	string	(optional) The secrets data to be stored. `payload_content_type` must also be supplied if payload is included.	None
payload_content_	string	(optional) (required if payload is included) The media type for the content of the payload. For more information see *Secret Types*	None
payload_content_	string	(optional) (required if payload is encoded) The encoding used for the payload to be able to include it in the JSON request. Currently only `base64` is supported.	None
secret_type	string	(optional) Used to indicate the type of secret being stored. For more information see *Secret Types*	`opaque`

Request:

```
POST /v1/secrets
Headers:
    Content-Type: application/json
    X-Auth-Token: <token>

Content:
{
    "name": "AES key",
    "expiration": "2015-12-28T19:14:44.180394",
    "algorithm": "aes",
    "bit_length": 256,
    "mode": "cbc",
    "payload": "YmVlcg==",
    "payload_content_type": "application/octet-stream",
    "payload_content_encoding": "base64"
}
```

Response:

```
201 Created

{
    "secret_ref": "https://{barbican_host}/v1/secrets/{secret_uuid}"
}
```

HTTP Status Codes

Code	Description
201	Successfully created a Secret
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
403	Forbidden. The user has been authenticated, but is not authorized to create a secret. This can be based on the users role or the projects quota.
415	Unsupported media-type

GET /v1/secrets/{uuid}

Retrieves a secrets metadata.

Request:

```
GET /v1/secrets/{uuid}
Headers:
    Accept: application/json
    X-Auth-Token: {token}
    (or X-Project-Id: {project_id})
```

Response:

```
200 OK

{
    "status": "ACTIVE",
    "created": "2015-03-23T20:46:51.650515",
    "updated": "2015-03-23T20:46:51.654116",
    "expiration": "2015-12-28T19:14:44.180394",
    "algorithm": "aes",
    "bit_length": 256,
    "mode": "cbc",
    "name": "AES key",
    "secret_ref": "https://{barbican_host}/v1/secrets/{secret_uuid}",
    "secret_type": "opaque",
    "content_types": {
        "default": "application/octet-stream"
```

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```
    }
}
```

Payload Request:

Warning

DEPRECATION WARNING: Previous releases of the API allowed the payload to be retrieved from this same endpoint by changing the Accept header to be one of the values listed in the `content_types` attribute of the Secret metadata. This was found to be problematic in some situations, so new applications should make use of the */v1/secrets/{uuid}/payload* endpoint instead.

```
GET /v1/secrets/{uuid}
Headers:
    Accept: application/octet-stream
    X-Auth-Token: <token>
```

Payload Response:

```
200 OK

beer
```

HTTP Status Codes

Code	Description
200	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found
406	Not Acceptable

PUT /v1/secrets/{uuid}

Add the payload to an existing metadata-only secret, such as one made by sending a POST /v1/secrets request that does not include the `payload` attribute.

Note

This action can only be done for a secret that doesnt have a payload.

Headers

Name	Description	Default
Content-Type	Corresponds with the payload_content_type attribute of a normal secret creation request.	text/plain
Content-Encoding	(optional) Corresponds with the payload_content_encoding attribute of a normal secret creation request.	None

Request:

```
PUT /v1/secrets/{uuid}
Headers:
    X-Auth-Token: <token>
    Content-Type: application/octet-stream
    Content-Encoding: base64

Content:
YmxhaA==
```

Response:

```
204 No Content
```

HTTP Status Codes

Code	Description
204	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found

DELETE /v1/secrets/{uuid}

Delete a secret by uuid

Request:

```
DELETE /v1/secrets/{uuid}
Headers:
    X-Auth-Token: <token>
```

Response:

```
204 No Content
```

HTTP Status Codes

Code	Description
204	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found

GET /v1/secrets/{uuid}/payload

Retrieve a secrets payload

Accept Header Options:

When making a request for a secrets payload, you must set the accept header to one of the values listed in the `content_types` attribute of a secrets metadata.

Request:

```
GET /v1/secrets/{uuid}/payload
Headers:
    Accept: text/plain
    X-Auth-Token: <token>
```

Response:

```
200 OK

beer
```

HTTP Status Codes

Code	Description
200	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found
406	Not Acceptable

Secret Types - Reference

Every secret in Barbican has a type. Secret types are used to describe different kinds of secret data that are stored in Barbican. The type for a particular secret is listed in the secrets metadata as the `secret_type` attribute.

The possible secret types are:

- `symmetric` - Used for storing byte arrays such as keys suitable for symmetric encryption.
- `public` - Used for storing the public key of an asymmetric keypair.

- `private` - Used for storing the private key of an asymmetric keypair.
- `passphrase` - Used for storing plain text passphrases.
- `certificate` - Used for storing cryptographic certificates such as X.509 certificates.
- `opaque` - Used for backwards compatibility with previous versions of the API without typed secrets. New applications are encouraged to specify one of the other secret types.

Symmetric

The `symmetric` secret type is used to store byte arrays of sensitive data, such as keys that are used for symmetric encryption. The content-type used with symmetric secrets is `application/octet-stream`. When storing a symmetric secret with a single POST request, the data must be encoded so that it may be included inside the JSON body of the request. In this case, the content encoding of `base64` can be used.

Example 1.1

Create an encryption key for use in AES-256-CBC encryption and store it in Barbican. First, well see how this can be done in a single POST request from the command line using curl.

```
# Create an encryption_key file with 256 bits of random data
dd bs=32 count=1 if=/dev/urandom of=encryption_key

# Encode the contents of the encryption key using base64 encoding
KEY_BASE64=$(base64 < encryption_key)

# Send a request to store the key in Barbican
curl -vv -H "X-Auth-Token: $TOKEN" -H 'Accept: application/json' \
-H 'Content-Type: application/json' \
-d '{"name": "AES encryption key",
     "secret_type": "symmetric",
     "payload": "'"$KEY_BASE64"'",
     "payload_content_type": "application/octet-stream",
     "payload_content_encoding": "base64",
     "algorithm": "AES",
     "bit_length": 256,
     "mode": "CBC"}' \
http://localhost:9311/v1/secrets | python -m json.tool
```

This should return a reference (URI) for the secret that was created:

```
{
  "secret_ref": "http://localhost:9311/v1/secrets/48d24158-b4b4-45b8-9669-
↪d9f0ef793c23"
}
```

We can use this reference to retrieve the secret metadata:

```
curl -vv -H "X-Auth-Token: $TOKEN" -H 'Accept: application/json' \
http://localhost:9311/v1/secrets/48d24158-b4b4-45b8-9669-d9f0ef793c23 |
python -m json.tool
```

The metadata will list the available content-types for the symmetric secret:

```
{
    "algorithm": "AES",
    "bit_length": 256,
    "content_types": {
        "default": "application/octet-stream"
    },
    "created": "2015-04-08T06:24:16.600393",
    "creator_id": "3a7e3d2421384f56a8fb6cf082a8efab",
    "expiration": null,
    "mode": "CBC",
    "name": "AES encryption key",
    "secret_ref": "http://localhost:9311/v1/secrets/48d24158-b4b4-45b8-9669-
↪d9f0ef793c23",
    "secret_type": "symmetric",
    "status": "ACTIVE",
    "updated": "2015-04-08T06:24:16.614204"
}
```

The `content_types` attribute describes the content-types that can be used to retrieve the payload. In this example, there is only the default content type of `application/octet-stream`. We can use it to retrieve the payload:

```
 # Retrieve the payload and save it to a file
curl -vv -H "X-Auth-Token: $TOKEN" \
-H 'Accept: application/octet-stream' \
-o retrieved_key \
http://localhost:9311/v1/secrets/48d24158-b4b4-45b8-9669-d9f0ef793c23/payload
```

The `retrieved_key` file now contains the byte array we started with. Note that barbican returned the byte array in binary format, not base64. This is because the `payload_content_encoding` is only used when submitting the secret to barbican.

Public

The `public` secret type is used to store the public key of an asymmetric keypair. For example, a public secret can be used to store the public key of an RSA keypair. Currently, there is only one file format accepted for public secrets: A DER-encoded `SubjectPublicKeyInfo` structure as defined by X.509 RFC 5280 that has been Base64 encoded with a PEM header and footer. This is the type of public key that is generated by the `openssl` tool by default. The content-type used with public secrets is `application/octet-stream`. When storing a public secret with a single POST request, the contents of the file must be encoded since JSON does not accept newline characters. In this case, the contents of the file must be Base64 encoded and the content encoding of `base64` can be used.

Example 2.1

Create an RSA keypair and store the public key in Barbican. For this example, we will be using a metadata-only POST followed by a PUT.

```
# Create the RSA keypair
openssl genrsa -out private.pem 2048
```

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```
# Extract the public key
openssl rsa -in private.pem -out public.pem -pubout

# Submit a metadata-only POST
curl -vv -H "X-Auth-Token: $TOKEN" \
-H 'Accept: application/json' \
-H 'Content-Type: application/json' \
-d '{"name": "RSA Public Key",
     "secret_type": "public",
     "algorithm": "RSA"}' \
http://localhost:9311/v1/secrets | python -m json.tool
```

This should return a reference (URI) for the secret that was created:

```
200 OK

{
  "secret_ref": "http://localhost:9311/v1/secrets/cd20d134-c229-417a-a753-
↪86432ad13bad"
}
```

We can use this reference to add the payload with a PUT request:

```
curl -vv -X PUT -H "X-Auth-Token: $TOKEN" \
-H 'Accept: application/json' \
-H 'Content-Type: application/octet-stream' \
--data-binary @public.pem \
http://localhost:9311/v1/secrets/cd20d134-c229-417a-a753-86432ad13bad
```

The server should respond with a 2xx response to indicate that the PUT request was processed successfully:

```
204 - No Content
```

Now we should be able to request the metadata and see the new content-type listed there:

```
curl -vv -H "X-Auth-Token: $TOKEN" \
-H 'Accept: application/json' \
http://localhost:9311/v1/secrets/cd20d134-c229-417a-a753-86432ad13bad |
python -m json.tool
```

```
{
    "algorithm": "RSA",
    "bit_length": null,
    "content_types": {
        "default": "application/octet-stream"
    },
    "created": "2015-04-08T21:45:59.239976",
    "creator_id": "3a7e3d2421384f56a8fb6cf082a8efab",
    "expiration": null,
```

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```
    "mode": null,
    "name": "RSA Public Key",
    "secret_ref": "http://localhost:9311/v1/secrets/cd20d134-c229-417a-a753-
↪86432ad13bad",
    "secret_type": "public",
    "status": "ACTIVE",
    "updated": "2015-04-08T21:52:57.523969"
}
```

Finally, we can use the default content-type listed in `content_types` to retrieve the public key:

```
curl -vv -H "X-Auth-Token: $TOKEN" \
-H 'Accept: application/octet-stream' \
-o retrieved_public.pem \
http://localhost:9311/v1/secrets/cd20d134-c229-417a-a753-86432ad13bad/payload
```

The `retrieved_public.pem` file now has the same contents as the public.pem file we started with.

Example 2.2

Create an RSA keypair and store the public key in Barbican. For this example we will be using a single POST request.

```
# Create the RSA keypair
openssl genrsa -out private.pem 2048

# Extract the public key
openssl rsa -in private.pem -out public.pem -pubout

# Base64 encode the contents of the public key
PUB_BASE64=$(base64 < public.pem)

curl -vv -H "X-Auth-Token: $TOKEN" \
-H 'Accept: application/json' \
-H 'Content-Type: application/json' \
-d '{"name": "RSA Public Key",
     "secret_type": "public",
     "payload": "'"$PUB_BASE64"'",
     "payload_content_type": "application/octet-stream",
     "payload_content_encoding": "base64",
     "algorithm": "RSA"}' \
http://localhost:9311/v1/secrets | python -m json.tool
```

This should return a reference (URI) for the secret that was created.

```
200 OK

{
  "secret_ref": "http://localhost:9311/v1/secrets/d553f0ac-c79d-43b4-b165-
↪32594b612ad4"
```

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```
}
```

Secret consumers API - Reference

GET {secret_ref}/consumers

Lists a secrets consumers.

The list of consumers can be filtered by the parameters passed in via the URL.

Parameters

Name	Type	Description
offset	integer	The starting index within the total list of the consumers that you would like to retrieve.
limit	integer	The maximum number of records to return (up to 100). The default limit is 10.

Request:

```
GET {secret_ref}/consumers
Headers:
    X-Auth-Token: <token>
```

Response:

```
200 OK

{
    "total": 3,
    "consumers": [
        {
            "created": "2015-10-15T21:06:33.123872",
            "updated": "2015-10-15T21:06:33.123878",
            "status": "ACTIVE",
            "service": "image",
            "resource_type": "image",
            "resource_id": "123e4567-e89b-12d3-a456-426614174001"
        },
        {
            "created": "2015-10-15T21:17:08.092408",
            "updated": "2015-10-15T21:17:08.092416",
            "status": "ACTIVE",
            "service": "volume",
            "resource_type": "volume",
            "resource_id": "123e4567-e89b-12d3-a456-426614174002"
        },
```

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```
        {
            "created": "2015-10-15T21:21:29.970365",
            "updated": "2015-10-15T21:21:29.970370",
            "status": "ACTIVE",
            "service": "load-balancer",
            "resource_type": "listener",
            "resource_id": "123e4567-e89b-12d3-a456-426614174003"
        }
    ]
}
```

Request:

```
GET {secret_ref}/consumers?limit=1&offset=1
Headers:
    X-Auth-Token: <token>
```

```
{
    "total": 3,
    "next": "http://localhost:9311/v1/secrets/{secret_ref}/consumers?limit=1&
↪offset=2",
    "consumers": [
        {
            "created": "2015-10-15T21:17:08.092408",
            "updated": "2015-10-15T21:17:08.092416",
            "status": "ACTIVE",
            "service": "volume",
            "resource_type": "volume",
            "resource_id": "123e4567-e89b-12d3-a456-426614174002"
        }
    ],
    "previous": "http://localhost:9311/v1/secrets/{secret_ref}/consumers?
↪limit=1&offset=0"
}
```

Response Attributes

Name	Type	Description
consumers	list	Contains a list of dictionaries filled with consumer metadata.
total	integer	The total number of consumers available to the user.
next	string	A HATEOAS URL to retrieve the next set of consumers based on the offset and limit parameters. This attribute is only available when the total number of consumers is greater than offset and limit parameter combined.
previous	string	A HATEOAS URL to retrieve the previous set of consumers based on the offset and limit parameters. This attribute is only available when the request offset is greater than 0.

HTTP Status Codes

Code	Description
200	OK.
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource.
403	Forbidden. The user has been authenticated, but is not authorized to list consumers. This can be based on the users role.

POST {secret_ref}/consumers

Creates a consumer

Attributes

Attribute Name	Type	Description	Default
service	string	Consumers OpenStack service type. Each service should preferably use its reserved name, as shown in: https://service-types.openstack.org/service-types.json	None
resource_type	string	**Name of the resource type using the secret** e.g. images or lbaas/loadbalancer	None
resource_id	string	Unique identifier for the resource using this secret.	None

Request:

```
POST {secret_ref}/consumers
Headers:
    X-Auth-Token: <token>
    Content-Type: application/json

Content:
{
    "service": "image",
    "resource_type": "image",
    "resource_id": "123e4567-e89b-12d3-a456-426614174000"
}
```

Response:

```
200 OK

{
    "status": "ACTIVE",
    "updated": "2015-10-15T17:56:18.626724",
    "name": "secret name",
    "consumers": [
        {
            "service": "image",
            "resource_type": "image",
            "resource_id": "123e4567-e89b-12d3-a456-426614174000"
        }
    ],
    "created": "2015-10-15T17:55:44.380002",
    "secret_ref": "http://localhost:9311/v1/secrets/74bbd3fd-9ba8-42ee-b87e-
↪2eecf10e47b9",
    "creator_id": "b17c815d80f946ea8505c34347a2aeba",
    "secret_type": "opaque",
    "expiration": null,
    "algorithm": "aes",
    "bit_length": 256,
    "mode": "cbc"
}
```

HTTP Status Codes

Code	Description
200	OK.
400	Bad Request.
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource.
403	Forbidden. The user has been authenticated, but is not authorized to create a consumer. This can be based on the users role or the projects quota.

DELETE {secret_ref}/consumers

Delete a consumer.

Attributes

Attribute Name	Type	Description	Default
service	string	Consumers OpenStack service type as shown in https://service-types.openstack.org/service-types.json	None
resource_type	string	**Name of the resource type using the secret** e.g. images or lbaas/loadbalancer	None
resource_id	string	Unique identifier for the resource using this secret.	None

Request:

```
DELETE {secret_ref}/consumers
Headers:
    X-Auth-Token: <token>
    Content-Type: application/json

Content:
{
    "service": "image",
    "resource_type": "image",
    "resource_id": "123e4567-e89b-12d3-a456-426614174000"
}
```

Response:

```
200 OK

{
    "status": "ACTIVE",
    "updated": "2015-10-15T17:56:18.626724",
    "name": "secret name",
    "consumers": [],
    "created": "2015-10-15T17:55:44.380002",
    "secret_ref": "http://localhost:9311/v1/secrets/74bbd3fd-9ba8-42ee-b87e-
↪2eecf10e47b9",
```

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```
    "creator_id": "b17c815d80f946ea8505c34347a2aeba",
    "secret_type": "opaque",
    "expiration": null,
    "algorithm": "aes",
    "bit_length": 256,
    "mode": "cbc"
}
```

HTTP Status Codes

Code	Description
200	OK.
400	Bad Request.
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource.
403	Forbidden. The user has been authenticated, but is not authorized to delete a consumer. This can be based on the users role.
404	Consumer Not Found.

Secret Metadata API - Reference

GET /v1/secrets/{uuid}/metadata

Lists a secrets user-defined metadata.

If a secret does not contain any user metadata, an empty list will be returned.

Request:

```
GET /v1/secrets/{uuid}/metadata
Headers:
    Accept: application/json
    X-Auth-Token: <token>
```

Response:

```
{
  'metadata': {
    'description': 'contains the AES key',
    'geolocation': '12.3456, -98.7654'
    }
}
```

Response Attributes

Name	Type	Description
meta-data	list	Contains a list of the secret metadatas key/value pairs. The provided keys must be lowercase. If not they will be converted to lowercase.

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to access this resource.
403	Forbidden. The user has been authenticated, but is not authorized to retrieve secret metadata. This can be based on the users role.
404	Not Found

PUT /v1/secrets/{uuid}/metadata

Sets the metadata for a secret. Any metadata that was previously set will be deleted and replaced with this metadata.

Parameters

Name	Type	Description
meta-data	list	Contains a list of the secret metadatas key/value pairs. The provided keys must be lowercase. If not they will be converted to lowercase.

Request:

```
PUT /v1/secrets/{uuid}/metadata
Headers:
    Content-Type: application/json
    X-Auth-Token: <token>

Content:
{
  'metadata': {
      'description': 'contains the AES key',
      'geolocation': '12.3456, -98.7654'
    }
}
```

Response:

```
201 OK
{
    "metadata_ref": "https://{barbican_host}/v1/secrets/{secret_uuid}/metadata
↪"
}
```

HTTP Status Codes

Code	Description
201	Successfully created/updated Secret Metadata
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to access this resource.
403	Forbidden. The user has been authenticated, but is not authorized to create secret metadata. This can be based on the users role.

GET /v1/secrets/{uuid}/metadata/{key}

Retrieves a secrets user-added metadata.

Request:

```
GET /v1/secrets/{uuid}/metadata/{key}
Headers:
    Accept: application/json
    X-Auth-Token: <token>
```

Response:

```
200 OK
{
  "key": "access-limit",
  "value": "0"
}
```

HTTP Status Codes

Code	Description
200	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to access this resource
403	Forbidden. The user has been authenticated, but is not authorized to retrieve secret metadata. This can be based on the users role.
404	Not Found

POST /v1/secrets/{uuid}/metadata/

Adds a new key/value pair to the secrets user metadata. The key sent in the request must not already exist in the metadata. The key must also be in lowercase, otherwise it will automatically be changed to lowercase.

Request:

```
POST /v1/secrets/{uuid}/metadata/
Headers:
    X-Auth-Token: <token>
    Content-Type: application/json

Content:
  {
    "key": "access-limit",
    "value": "11"
  }
```

Response:

```
201 Created
Secret Metadata Location: http://example.com:9311/v1/secrets/{uuid}/metadata/
↪access-limit
  {
    "key": "access-limit",
    "value": "11"
  }
```

HTTP Status Codes

Code	Description
201	Successful request
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to access this resource.
403	Forbidden. The user has been authenticated, but is not authorized to create secret metadata. This can be based on the users role.
409	Conflict. The provided metadata key already exists.

PUT /v1/secrets/{uuid}/metadata/{key}

Updates an existing key/value pair in the secrets user metadata. The key sent in the request must already exist in the metadata. The key must also be in lowercase, otherwise it will automatically be changed to lowercase.

Request:

```
PUT /v1/secrets/{uuid}/metadata/{key}
Headers:
    X-Auth-Token: <token>
    Content-Type: application/json

Content:
  {
    "key": "access-limit",
    "value": "11"
  }
```

Response:

```
200 OK

{
  "key": "access-limit",
  "value": "11"
}
```

HTTP Status Codes

Code	Description
200	Successful request
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to access this resource.
403	Forbidden. The user has been authenticated, but is not authorized to update secret metadata. This can be based on the users role.
404	Not Found

DELETE /v1/secrets/{uuid}/metadata/{key}

Delete secret metadata by key.

Request:

```
DELETE /v1/secrets/{uuid}/metadata/{key}
Headers:
    X-Auth-Token: <token>
```

Response:

```
204 No Content
```

HTTP Status Codes

Code	Description
204	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to access this resource.
403	Forbidden. The user has been authenticated, but is not authorized to delete secret metadata. This can be based on the users role.
404	Not Found

Secret Stores API - Reference

Barbican provides API to manage secret stores available in a deployment. APIs are provided for listing available secret stores and to manage project level secret store mapping. There are two types of secret stores. One is global default secret store which is used for all projects. And then project *preferred* secret store which is used to store all *new* secrets created in that project. For an introduction to multiple store backends support, see *Using Multiple Secret Store Plugins* . This document will focus on the details of the Barbican */v1/secret-stores* REST API.

When multiple secret store backends support is not enabled in service configuration, then all of these API will return resource not found (http status code 404) error. Error message text will highlight that the support is not enabled in configuration.

GET /v1/secret-stores

Project administrator can request list of available secret store backends. Response contains list of secret stores which are currently configured in barbican deployment. If multiple store backends support is not enabled, then list will return resource not found (404) error.

Request/Response:

```
Request:

   GET /secret-stores
   Headers:
      X-Auth-Token: "f9cf2d480ba3485f85bdb9d07a4959f1"
      Accept: application/json

 Response:

   HTTP/1.1 200 OK
   Content-Type: application/json

  {
     "secret_stores":[
        {
           "status": "ACTIVE",
           "updated": "2016-08-22T23:46:45.114283",
           "name": "PKCS11 HSM",
           "created": "2016-08-22T23:46:45.114283",
           "secret_store_ref": "http://localhost:9311/v1/secret-stores/
```

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```
↪4d27b7a7-b82f-491d-88c0-746bd67dadc8",
            "global_default": True,
            "crypto_plugin": "p11_crypto",
            "secret_store_plugin": "store_crypto"
         },
         {
            "status": "ACTIVE",
            "updated": "2016-08-22T23:46:45.124554",
            "name": "KMIP HSM",
            "created": "2016-08-22T23:46:45.124554",
            "secret_store_ref": "http://localhost:9311/v1/secret-stores/
↪93869b0f-60eb-4830-adb9-e2f7154a080b",
            "global_default": False,
            "crypto_plugin": None,
            "secret_store_plugin": "kmip_plugin"
         },
         {
            "status": "ACTIVE",
            "updated": "2016-08-22T23:46:45.127866",
            "name": "Software Only Crypto",
            "created": "2016-08-22T23:46:45.127866",
            "secret_store_ref": "http://localhost:9311/v1/secret-stores/
↪0da45858-9420-42fe-a269-011f5f35deaa",
            "global_default": False,
            "crypto_plugin": "simple_crypto",
            "secret_store_plugin": "store_crypto"
         }
   }
```

Response Attributes

Name	Type	Description
secret_stores	list	A list of secret store references
name	string	store and crypto plugin name delimited by + (plus) sign.
secret_store _ref	string	URL for referencing a specific secret store

HTTP Status Codes

Code	Description
200	Successful Request
401	Authentication error. Missing or invalid X-Auth-Token.
403	The user was authenticated, but is not authorized to perform this action
404	Not Found. When multiple secret store backends support is not enabled.

GET /v1/secret-stores/{secret_store_id}

A project administrator (user with admin role) can request details of secret store by its ID. Returned response will highlight whether this secret store is currently configured as global default or not.

Request/Response:

```
Request:
   GET /secret-stores/93869b0f-60eb-4830-adb9-e2f7154a080b
   Headers:
      X-Auth-Token: "f9cf2d480ba3485f85bdb9d07a4959f1"
      Accept: application/json

Response:
   HTTP/1.1 200 OK
   Content-Type: application/json

   {
      "status": "ACTIVE",
      "updated": "2016-08-22T23:46:45.124554",
      "name": "KMIP HSM",
      "created": "2016-08-22T23:46:45.124554",
      "secret_store_ref": "http://localhost:9311/v1/secret-stores/93869b0f-
↪60eb-4830-adb9-e2f7154a080b",
      "global_default": False,
      "crypto_plugin": None,
      "secret_store_plugin": "kmip_plugin"
   }
```

Response Attributes

Name	Type	Description
name	string	store and crypto plugin name delimited by + (plus) sign
global_default	boolean	flag indicating if this secret store is global default or not
status	list	Status of the secret store
updated	time	Date and time secret store was last updated
created	time	Date and time secret store was created
secret_store_ref	string	URL for referencing a specific secret store

HTTP Status Codes

Code	Description
200	Successful Request
401	Authentication error. Missing or invalid X-Auth-Token.
403	The user was authenticated, but is not authorized to perform this action
404	Not Found. When multiple secret store backends support is not enabled or that secret store id does not exist.

GET /v1/secret-stores/preferred

A project administrator (user with admin role) can request a reference to the preferred secret store if assigned previously. When a preferred secret store is set for a project, then new project secrets are stored using that store backend. If multiple secret store support is not enabled, then this resource will return 404 (Not Found) error.

Request/Response:

```
Request:

  GET /v1/secret-stores/preferred
  Headers:
    X-Auth-Token: "f9cf2d480ba3485f85bdb9d07a4959f1"
    Accept: application/json


Response:

  HTTP/1.1 200 OK
  Content-Type: application/json

  {
    "status": "ACTIVE",
    "updated": "2016-08-22T23:46:45.114283",
    "name": "PKCS11 HSM",
    "created": "2016-08-22T23:46:45.114283",
    "secret_store_ref": "http://localhost:9311/v1/secret-stores/4d27b7a7-b82f-
↪491d-88c0-746bd67dadc8",
    "global_default": True,
    "crypto_plugin": "p11_crypto",
    "secret_store_plugin": "store_crypto"
  }
```

Response Attributes

Name	Type	Description
secret_store_ref	string	A URL that references a specific secret store

HTTP Status Codes

Code	Description
200	Successful Request
401	Authentication error. Missing or invalid X-Auth-Token.
403	The user was authenticated, but is not authorized to perform this action
404	Not found. No preferred secret store has been defined or multiple secret store backends support is not enabled.

POST /v1/secret-stores/{secret_store_id}/preferred

A project administrator can set a secret store backend to be preferred store backend for his/her project. From there on, any new secret stored in that project will use specified plugin backend for storage and reading thereafter. Existing secret storage will not be impacted as each secret captures its plugin backend information when initially stored. If multiple secret store support is not enabled, then this resource will return 404 (Not Found) error.

Request/Response:

```
Request:

  POST /v1/secret-stores/7776adb8-e865-413c-8ccc-4f09c3fe0213/preferred
  Headers:
    X-Auth-Token: "f9cf2d480ba3485f85bdb9d07a4959f1"

Response:

  HTTP/1.1 204 No Content
```

HTTP Status Codes

Code	Description
204	Successful Request
401	Authentication error. Missing or invalid X-Auth-Token.
403	The user was authenticated, but is not authorized to perform this action
404	The requested entity was not found or multiple secret store backends support is not enabled.

DELETE /v1/secret-stores/{secret_store_id}/preferred

A project administrator can remove preferred secret store backend setting. If multiple secret store support is not enabled, then this resource will return 404 (Not Found) error.

Request/Response:

```
Request:

  DELETE /v1/secret-stores/7776adb8-e865-413c-8ccc-4f09c3fe0213/preferred
  Headers:
    X-Auth-Token: "f9cf2d480ba3485f85bdb9d07a4959f1"

Response:

  HTTP/1.1 204 No Content
```

HTTP Status Codes

Code	Description
204	Successful Request
401	Authentication error. Missing or invalid X-Auth-Token.
403	The user was authenticated, but is not authorized to perform this action
404	The requested entity was not found or multiple secret store backends support is not enabled.

GET /v1/secret-stores/global-default

A project or service administrator can request a reference to the secret store that is used as default secret store backend for the deployment.

Request/Response:

```
Request:

  GET /v1/secret-stores/global-default
  Headers:
    X-Auth-Token: "f9cf2d480ba3485f85bdb9d07a4959f1"
    Accept: application/json


Response:

  HTTP/1.1 200 OK
  Content-Type: application/json

 {
    "status": "ACTIVE",
    "updated": "2016-08-22T23:46:45.114283",
    "name": "PKCS11 HSM",
    "created": "2016-08-22T23:46:45.114283",
    "secret_store_ref": "http://localhost:9311/v1/secret-stores/4d27b7a7-b82f-
↪491d-88c0-746bd67dadc8",
    "global_default": True,
    "crypto_plugin": "p11_crypto",
    "secret_store_plugin": "store_crypto"
 }
```

Response Attributes

Name	Type	Description
secret_store_ref	string	A URL that references a specific secret store

HTTP Status Codes

Code	Description
200	Successful Request
401	Authentication error. Missing or invalid X-Auth-Token.
403	The user was authenticated, but is not authorized to perform this action
404	Not Found. When multiple secret store backends support is not enabled.

Containers API - Reference

GET /v1/containers

Lists a projects containers.

Returned containers will be ordered by creation date; oldest to newest.

Parameters

Name	Type	Description
offset	integer	The starting index within the total list of the containers that you would like to retrieve.
limit	integer	The maximum number of containers to return (up to 100). The default limit is 10.

Response Attributes

Name	Type	Description
containers	list	Contains a list of dictionaries filled with container data
total	integer	The total number of containers available to the user
next	string	A HATEOAS URL to retrieve the next set of containers based on the offset and limit parameters. This attribute is only available when the total number of containers is greater than offset and limit parameter combined.
previous	string	A HATEOAS URL to retrieve the previous set of containers based on the offset and limit parameters. This attribute is only available when the request offset is greater than 0.

Request:

```
GET /v1/containers
Headers:
    X-Auth-Token: <token>
```

Response:

```
{
    "containers": [
        {
            "consumers": [],
            "container_ref": "https://{barbican_host}/v1/containers/{uuid}",
            "created": "2015-03-26T21:10:45.417835",
            "name": "container name",
            "secret_refs": [
                {
                    "name": "private_key",
                    "secret_ref": "https://{barbican_host}/v1/secrets/{uuid}"
                }
            ],
            "status": "ACTIVE",
            "type": "generic",
            "updated": "2015-03-26T21:10:45.417835"
        }
    ],
    "total": 1
}
```

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource

GET /v1/containers/{uuid}

Retrieves a single container.

Response Attributes

Name	Type	Description
name	string	(optional) Human readable name for the container
type	string	Type of container. Options: generic, rsa, certificate
secret_refs	list	A list of dictionaries containing references to secrets

Request:

```
GET /v1/containers/{uuid}
Headers:
    X-Auth-Token: <token>
```

Response:

```
{
    "type": "generic",
    "status": "ACTIVE",
    "name": "container name",
    "consumers": [],
    "container_ref": "https://{barbican_host}/v1/containers/{uuid}",
    "secret_refs": [
        {
            "name": "private_key",
            "secret_ref": "https://{barbican_host}/v1/secrets/{uuid}"
        }
    ],
    "created": "2015-03-26T21:10:45.417835",
    "updated": "2015-03-26T21:10:45.417835"
}
```

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Container not found or unavailable

POST /v1/containers

Create a container

There are three different types of containers that can be created: generic, rsa, and certificate.

Generic

This type of container holds any number of references to secrets. Each secret reference is accompanied by a name. Unlike other container types, no specific restrictions are enforced on the contents name attribute.

RSA

This type of container is designed to hold references to only three different secrets. These secrets are enforced by their accompanied names: public_key, private_key, and private_key_passphrase.

Certificate

This type of container is designed to hold a reference to a certificate and optionally private_key, private_key_passphrase, and intermediates.

Request Attributes

Name	Type	Description
name	string	(optional) Human readable name for identifying your container
type	string	Type of container. Options: generic, rsa, certificate
secret_refs	list	A list of dictionaries containing references to secrets

Request:

```
POST /v1/containers
Headers:
    X-Auth-Token: <token>

Content:
{
    "type": "generic",
    "name": "container name",
    "secret_refs": [
        {
            "name": "private_key",
            "secret_ref": "https://{barbican_host}/v1/secrets/{secret_uuid}"
        }
    ]
}
```

Response:

```
{
    "container_ref": "https://{barbican_host}/v1/containers/{container_uuid}"
}
```

HTTP Status Codes

Code	Description
201	Successful creation of the container
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
403	Forbidden. The user has been authenticated, but is not authorized to create a container. This can be based on the users role or the projects quota.

DELETE /v1/containers/{uuid}

Deletes a container

Request:

```
DELETE /v1/containers/{container_uuid}
Headers:
    X-Auth-Token: <token>
```

Response:

```
204 No Content
```

HTTP Status Codes

Code	Description
204	Successful deletion of a container
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Container not found or unavailable

POST /v1/containers/{container_uuid}/secrets

Add a secret to an existing container. This is only supported on generic containers.

Request Attributes

Name	Type	Description
name	string	(optional) Human readable name for identifying your secret within the container.
se-cret_ref	uri	(required) Full URI reference to an existing secret.

Request:

```
POST /v1/containers/{container_uuid}/secrets
Headers:
    X-Project-Id: {project_id}

Content:
{
    "name": "private_key",
    "secret_ref": "https://{barbican_host}/v1/secrets/{secret_uuid}"
}
```

Response:

```
{
    "container_ref": "https://{barbican_host}/v1/containers/{container_uuid}"
}
```

Note that the requesting container_uuid is the same as that provided in the response.

HTTP Status Codes

In general, error codes produced by the containers POST call pertain here as well, especially in regards to the secret references that can be provided.

Code	Description
201	Successful update of the container
400	Missing secret_ref
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
403	Forbidden. The user has been authenticated, but is not authorized to add the secret to the specified container. This can be based on the users role or the projects quota.

DELETE /v1/containers/{container_uuid}/secrets

Remove a secret from a container. This is only supported on generic containers.

Request Attributes

Name	Type	Description
name	string	(optional) Human readable name for identifying your secret within the container.
secret_ref	uri	(required) Full URI reference to an existing secret.

Request:

```
DELETE /v1/containers/{container_uuid}/secrets
Headers:
    X-Project-Id: {project_id}

Content:
{
    "name": "private key",
    "secret_ref": "https://{barbican_host}/v1/secrets/{secret_uuid}"
}
```

Response:

```
204 No Content
```

HTTP Status Codes

Code	Description
204	Successful removal of the secret from the container.
400	Missing secret_ref
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
403	Forbidden. The user has been authenticated, but is not authorized to remove the secret from the specified container. This can be based on the users role or the projects quota.
404	Specified secret_ref is not found in the container.

Container consumers API - Reference

GET {container_ref}/consumers

Lists a containers consumers.

The list of consumers can be filtered by the parameters passed in via the URL.

Parameters

Name	Type	Description
offset	integer	The starting index within the total list of the consumers that you would like to retrieve.
limit	integer	The maximum number of records to return (up to 100). The default limit is 10.

Request:

```
GET {container_ref}/consumers
Headers:
    X-Auth-Token: <token>
```

Response:

```
200 OK

{
    "total": 3,
    "consumers": [
        {
            "status": "ACTIVE",
            "URL": "consumerurl",
            "updated": "2015-10-15T21:06:33.123878",
            "name": "consumername",
            "created": "2015-10-15T21:06:33.123872"
        },
        {
```

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```
                "status": "ACTIVE",
                "URL": "consumerURL2",
                "updated": "2015-10-15T21:17:08.092416",
                "name": "consumername2",
                "created": "2015-10-15T21:17:08.092408"
            },
            {
                "status": "ACTIVE",
                "URL": "consumerURL3",
                "updated": "2015-10-15T21:21:29.970370",
                "name": "consumername3",
                "created": "2015-10-15T21:21:29.970365"
            }
        ]
}
```

Request:

```
GET {container_ref}/consumers?limit=1\&offset=1
Headers:
    X-Auth-Token: <token>
```

```
{
    "total": 3,
    "next": "http://localhost:9311/v1/containers/{container_ref}/consumers?
↪limit=1&offset=2",
    "consumers": [
        {
            "status": "ACTIVE",
            "URL": "consumerURL2",
            "updated": "2015-10-15T21:17:08.092416",
            "name": "consumername2",
            "created": "2015-10-15T21:17:08.092408"
        }
    ],
    "previous": "http://localhost:9311/v1/containers/{container_ref}/
↪consumers?limit=1&offset=0"
}
```

Response Attributes

Name	Type	Description
consumers	list	Contains a list of dictionaries filled with consumer metadata.
total	integer	The total number of consumers available to the user.
next	string	A HATEOAS URL to retrieve the next set of consumers based on the offset and limit parameters. This attribute is only available when the total number of consumers is greater than offset and limit parameter combined.
previous	string	A HATEOAS URL to retrieve the previous set of consumers based on the offset and limit parameters. This attribute is only available when the request offset is greater than 0.

HTTP Status Codes

Code	Description
200	OK.
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource.
403	Forbidden. The user has been authenticated, but is not authorized to delete a consumer. This can be based on the users role.

POST {container_ref}/consumers

Creates a consumer

Attributes

Attribute Name	Type	Description	Default
name	string	The name of the consumer set by the user.	None
url	string	The URL for the user or service using the container.	None

Request:

```
POST {container_ref}/consumers
Headers:
    X-Auth-Token: <token>
    Content-Type: application/json

Content:
{
    "name": "ConsumerName",
    "url": "ConsumerURL"
}
```

Response:

```
200 OK

{
    "status": "ACTIVE",
    "updated": "2015-10-15T17:56:18.626724",
    "name": "container name",
    "consumers": [
        {
            "URL": "consumerURL",
            "name": "consumername"
        }
    ],
    "created": "2015-10-15T17:55:44.380002",
    "container_ref": "http://localhost:9311/v1/containers/74bbd3fd-9ba8-42ee-
↪b87e-2eecf10e47b9",
    "creator_id": "b17c815d80f946ea8505c34347a2aeba",
    "secret_refs": [
        {
            "secret_ref": "http://localhost:9311/v1/secrets/b61613fc-be53-
↪4696-ac01-c3a789e87973",
            "name": "private_key"
        }
    ],
    "type": "generic"
}
```

HTTP Status Codes

Code	Description
200	OK.
400	Bad Request.
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource.
403	Forbidden. The user has been authenticated, but is not authorized to create a consumer. This can be based on the users role or the projects quota.

DELETE {container_ref}/consumers

Delete a consumer.

Attributes

Attribute Name	Type	Description	Default
name	string	The name of the consumer set by the user.	None
URL	string	The URL for the user or service using the container.	None

Request:

```
DELETE {container_ref}/consumers
Headers:
    X-Auth-Token: <token>
    Content-Type: application/json

Content:
{
    "name": "ConsumerName",
    "URL": "ConsumerURL"
}
```

Response:

```
200 OK

{
    "status": "ACTIVE",
    "updated": "2015-10-15T17:56:18.626724",
    "name": "container name",
    "consumers": [],
    "created": "2015-10-15T17:55:44.380002",
    "container_ref": "http://localhost:9311/v1/containers/74bbd3fd-9ba8-42ee-
↪b87e-2eecf10e47b9",
    "creator_id": "b17c815d80f946ea8505c34347a2aeba",
    "secret_refs": [
        {
            "secret_ref": "http://localhost:9311/v1/secrets/b61613fc-be53-
↪4696-ac01-c3a789e87973",
            "name": "private_key"
        }
    ],
"type": "generic"
}
```

HTTP Status Codes

Code	Description
200	OK.
400	Bad Request.
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource.
403	Forbidden. The user has been authenticated, but is not authorized to delete a consumer. This can be based on the users role.
404	Consumer Not Found.

ACL API - Reference

Note

This feature is applicable only when Barbican is used in an authenticated pipeline i.e. integrated with Keystone.

Note

Currently the access control list (ACL) settings defined for a container are not propagated down to associated secrets.

Warning

This ACL documentation is work in progress and may change in near future.

Secret ACL API

GET /v1/secrets/{uuid}/acl

Retrieve the ACL settings for a given secret.

If no ACL is defined for that secret, then Default ACL is returned.

Request/Response (With ACL defined):

```
Request:

GET /v1/secrets/{uuid}/acl
Headers:
    X-Auth-Token: {token_id}

Response:

HTTP/1.1 200 OK
{
  "read":{
    "updated":"2015-05-12T20:08:47.644264",
    "created":"2015-05-12T19:23:44.019168",
    "users":[
      {user_id1},
      {user_id2},
      .....
    ],
    "project-access":{project-access-flag}
  }
}
```

Request/Response (With no ACL defined):

```
Request:

GET /v1/secrets/{uuid}/acl
Headers:
    X-Auth-Token: {token_id}

Response:

HTTP/1.1 200 OK
{
  "read":{
    "project-access": true
  }
}
```

HTTP Status Codes

Code	Description
200	Successful request.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Secret not found for the given UUID.

PUT /v1/secrets/{uuid}/acl

Create new or replaces existing ACL for a given secret.

This call is used to add new ACL for a secret. If the ACL is already set on a secret, this method will replace it with the requested ACL settings. In case of create (first new explicit ACL) or replace existing ACL, 200 is returned in both cases. To delete existing users from an ACL definition, pass empty list [] for *users*.

Returns an ACL reference in success case.

Attributes

The ACL resource detailed in this page allows access to individual secrets to be controlled. This access is configured via operations on those secrets. Currently only the read operation (which includes GET REST actions) is supported.

Attribute Name	Type	Description	Default
read	parent element	ACL data for read operation.	None
users	[string]	(optional) List of user ids. This needs to be a user id as returned by Keystone.	[]
project-access	boolean	(optional) Flag to mark a secret private so that the user who created the secret and `users` specified in above list can only access the secret. Pass *false* to mark the secret private.	*true*

Request/Response (Set or Replace ACL):

```
Request:

PUT /v1/secrets/{uuid}/acl
Headers:
    Content-Type: application/json
    X-Auth-Token: {token_id}

Body:
{
  "read":{
    "users":[
      {user_id1},
      {user_id2},
      .....
    ],
    "project-access":{project-access-flag}
  }
}

Response:

HTTP/1.1 200 OK
{"acl_ref": "https://{barbican_host}/v1/secrets/{uuid}/acl"}
```

HTTP Status Codes

Code	Description
200	Successfully set/replaced secret ACL.
400	Bad Request.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Secret not found for the given UUID.
415	Unsupported Media Type.

PATCH /v1/secrets/{uuid}/acl

Updates existing ACL for a given secret. This method can be used to apply partial changes on existing ACL settings. Client can update the *users* list and enable or disable *project-access* flag for existing ACL. List of provided users replaces existing users if any. For an existing list of provided users from an ACL definition, pass empty list [] for *users*.

Returns an ACL reference in success case.

Note

PATCH API support will be changing in near future.

Attributes

Attribute Name	Type	Description	Default
read	parent element	ACL data for read operation.	None
users	[string]	(optional) List of user ids. This needs to be a user id as returned by Keystone.	None
project-access	boolean	(optional) Flag to mark a secret private so that the user who created the secret and `users` specified in above list can only access the secret. Pass *false* to mark the secret private.	None

Request/Response (Updating project-access flag):

```
PATCH /v1/secrets/{uuid}/acl
Headers:
    Content-Type: application/json
    X-Auth-Token: {token_id}

Body:
{
  "read":
    {
      "project-access":false
    }
}

Response:
HTTP/1.1 200 OK
{"acl_ref": "https://{barbican_host}/v1/secrets/{uuid}/acl"}
```

Request/Response (Removing all users from ACL):

```
PATCH /v1/secrets/{uuid}/acl
Headers:
    Content-Type: application/json
    X-Auth-Token: {token_id}

Body:
{
  "read":
    {
      "users":[]
    }
}

Response:
HTTP/1.1 200 OK
{"acl_ref": "https://{barbican_host}/v1/secrets/{uuid}/acl"}
```

HTTP Status Codes

Code	Description
200	Successfully updated secret ACL.
400	Bad Request.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Secret not found for the given UUID.
415	Unsupported Media Type.

DELETE /v1/secrets/{uuid}/acl

Delete ACL for a given secret. No content is returned in the case of successful deletion.

Request/Response:

```
DELETE /v1/secrets/{uuid}/acl
Headers:
    X-Auth-Token: {token_id}

Response:
HTTP/1.1 200 OK
```

HTTP Status Codes

Code	Description
200	Successfully deleted secret ACL.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Secret not found for the given UUID.

Container ACL API

GET /v1/containers/{uuid}/acl

Retrieve the ACL settings for a given container.

If no ACL is defined for that container, then Default ACL is returned.

Request/Response (With ACL defined):

```
Request:

GET /v1/containers/{uuid}/acl
Headers:
    X-Auth-Token: {token_id}

Response:

HTTP/1.1 200 OK
{
  "read":{
    "updated":"2015-05-12T20:08:47.644264",
    "created":"2015-05-12T19:23:44.019168",
    "users":[
      {user_id1},
      {user_id2},
      .....
    ],
    "project-access":{project-access-flag}
  }
}
```

Request/Response (With no ACL defined):

```
Request:

GET /v1/containers/{uuid}/acl
Headers:
    X-Auth-Token: {token_id}

Response:
```

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```
HTTP/1.1 200 OK
{
  "read":{
    "project-access": true
  }
}
```

HTTP Status Codes

Code	Description
200	Successful request.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Container not found for the given UUID.

PUT /v1/containers/{uuid}/acl

Create new or replaces existing ACL for a given container.

This call is used to add new ACL for an container. If the ACL is already set on a container, this method will replace it with the requested ACL settings. In case of create (first new explicit ACL) or replace existing ACL, 200 is returned in both cases. To delete existing users from an ACL definition, pass empty list [] for *users*.

Returns an ACL reference in success case.

Attributes

The ACL resource detailed in this page allows access to individual containers to be controlled. This access is configured via operations on those containers. Currently only the read operation (which includes GET REST actions) is supported.

Attribute Name	Type	Description	Default
read	parent element	ACL data for read operation.	None
users	[string]	(optional) List of user ids. This needs to be a user id as returned by Keystone.	[]
project-access	boolean	(optional) Flag to mark a container private so that the user who created the container and `users` specified in above list can only access the container. Pass *false* to mark the container private.	*true*

Request/Response (Set or Replace ACL):

```
PUT /v1/containers/{uuid}/acl
Headers:
    Content-Type: application/json
    X-Auth-Token: {token_id}

Body:
{
  "read":{
    "users":[
      {user_id1},
      {user_id2},
      .....
    ],
    "project-access":{project-access-flag}
  }
}

Response:
HTTP/1.1 200 OK
{"acl_ref": "https://{barbican_host}/v1/containers/{uuid}/acl"}
```

HTTP Status Codes

Code	Description
200	Successfully set/replaced container ACL.
400	Bad Request.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Container not found for the given UUID.
415	Unsupported Media Type.

PATCH /v1/containers/{uuid}/acl

Update existing ACL for a given container. This method can be used to apply partial changes on existing ACL settings. Client can update *users* list and enable or disable *project-access* flag for existing ACL. List of provided users replaces existing users if any. For an existing list of provided users from an ACL definition, pass empty list [] for *users*.

Returns an ACL reference in success case.

Note

PATCH API support will be changing in near future.

Attributes

Attribute Name	Type	Description	Default
read	parent element	ACL data for read operation.	None
users	[string]	(optional) List of user ids. This needs to be a user id as returned by Keystone.	None
project-access	boolean	(optional) Flag to mark a container private so that the user who created the container and `users` specified in above list can only access the container. Pass *false* to mark the container private.	None

Request/Response (Updating project-access flag):

```
PATCH /v1/containers/{uuid}/acl
Headers:
    Content-Type: application/json
    X-Auth-Token: {token_id}

Body:
{
  "read":
    {
      "project-access":false
    }
}

Response:
HTTP/1.1 200 OK
{"acl_ref": "https://{barbican_host}/v1/containers/{uuid}/acl"}
```

Request/Response (Removing all users from ACL):

```
PATCH /v1/containers/{uuid}/acl
Headers:
    Content-Type: application/json
    X-Auth-Token: {token_id}

Body:
{
  "read":
    {
      "users":[]
    }
}

```

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```
Response:
HTTP/1.1 200 OK
{"acl_ref": "https://{barbican_host}/v1/containers/{uuid}/acl"}
```

HTTP Status Codes

Code	Description
200	Successfully updated container ACL.
400	Bad Request.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Container not found for the given UUID.
415	Unsupported Media Type.

DELETE /v1/containers/{uuid}/acl

Delete ACL for a given container. No content is returned in the case of successful deletion.

Request/Response:

```
DELETE /v1/containers/{uuid}/acl
Headers:
    X-Auth-Token: {token_id}

Response:
HTTP/1.1 200 OK
```

HTTP Status Codes

Code	Description
200	Successfully deleted container ACL.
401	Missing or Invalid X-Auth-Token. Authentication required.
403	User does not have permission to access this resource.
404	Container not found for the given UUID.

Quotas API - Reference

GET /v1/quotas

Get the effective quotas for the project of the requester. The project id of the requester is derived from the authentication token provided in the X-Auth-Token header.

Request/Response:

```
Request:

  GET /v1/quotas
  Headers:
    X-Auth-Token:<token>
    Accept: application/json


Response:

  HTTP/1.1 200 OK
  Content-Type: application/json

  {
    "quotas": {
      "secrets": 10,
      "orders": 20,
      "containers": 10,
      "consumers": -1,
      "cas": 5
    }
  }
```

Response Attributes

Name	Type	Description
quotas	dict	Contains a dictionary with quota information
secrets	integer	Contains the effective quota value of the current project for the secret resource.
orders	integer	Contains the effective quota value of the current project for the orders resource.
containers	integer	Contains the effective quota value of the current project for the containers resource.
consumers	integer	Contains the effective quota value of the current project for the consumers resource.
cas	integer	Contains the effective quota value of the current project for the CAs resource.

Effective quota values are interpreted as follows:

Value	Description
-1	A negative value indicates the resource is unconstrained by a quota.
0	A zero value indicates that the resource is disabled.
int	A positive value indicates the maximum number of that resource that can be created for the current project.

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource

GET /v1/project-quotas

Gets a list of configured project quota records. Paging is supported using the optional parameters offset and limit.

Request/Response:

```
Request:

  GET /v1/project-quotas
  Headers:
    X-Auth-Token:<token>
    Accept: application/json

Response:

  200 OK

  Content-Type: application/json

  {
    "project_quotas": [
      {
        "project_id": "1234",
        "project_quotas": {
             "secrets": 2000,
             "orders": 0,
             "containers": -1,
             "consumers": null,
             "cas": null
         }
      },
      {
        "project_id": "5678",
        "project_quotas": {
             "secrets": 200,
             "orders": 100,
             "containers": -1,
             "consumers": null,
             "cas": null
         }
      },
    ],
```

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```
    "total" : 30,
}
```

Parameters

Name	Type	Description
offset	integer	The starting index within the total list of the project quotas that you would like to receive.
limit	integer	The maximum number of records to return.

Response Attributes

Name	Type	Description
project-id	string	The UUID of a project with configured quota information.
project-quotas	dict	Contains a dictionary with project quota information.
secrets	integer	Contains the effective quota value of the current project for the secret resource.
orders	integer	Contains the effective quota value of the current project for the orders resource.
containers	integer	Contains the effective quota value of the current project for the containers resource.
consumers	integer	Contains the effective quota value of the current project for the consumers resource.
cas	integer	Contains the effective quota value of the current project for the CAs resource.
total	integer	The total number of configured project quotas records.
next	string	A HATEOAS URL to retrieve the next set of quotas based on the offset and limit parameters. This attribute is only available when the total number of secrets is greater than offset and limit parameter combined.
previous	string	A HATEOAS URL to retrieve the previous set of quotas based on the offset and limit parameters. This attribute is only available when the request offset is greater than 0.

Configured project quota values are interpreted as follows:

Value	Description
-1	A negative value indicates the resource is unconstrained by a quota.
0	A zero value indicates that the resource is disabled.
int	A positive value indicates the maximum number of that resource that can be created for the current project.
null	A null value indicates that the default quota value for the resource will be used as the quota for this resource in the current project.

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource

GET /v1/project-quotas/{uuid}

Retrieves a projects configured project quota information.

Request/Response:

```
Request:

  GET /v1/project-quotas/{uuid}
  Headers:
    X-Auth-Token:<token>
    Accept: application/json


Response:

  200 OK

  Content-Type: application/json

  {
    "project_quotas": {
      "secrets": 10,
      "orders": 20,
      "containers": -1,
      "consumers": 10,
      "cas": 5
    }
  }
```

Response Attributes

Name	Type	Description
project-quotas	dict	Contains a dictionary with project quota information.
secrets	integer	Contains the configured quota value of the requested project for the secret resource.
orders	integer	Contains the configured quota value of the requested project for the orders resource.
containers	integer	Contains the configured quota value of the requested project for the containers resource.
consumers	integer	Contains the configured quota value of the requested project for the consumers resource.
cas	integer	Contains the configured quota value of the requested project for the CAs resource.

HTTP Status Codes

Code	Description
200	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found. The requested project does not have any configured quotas.

PUT /v1/project-quotas/{uuid}

Create or update the configured project quotas for the project with the specified UUID.

Request/Response:

```
Request:

  PUT /v1/project-quotas/{uuid}
  Headers:
    X-Auth-Token:<token>
    Content-Type: application/json

  Body::

    {
      "project_quotas": {
        "secrets": 50,
        "orders": 10,
        "containers": 20
      }
    }
```

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```
Response:

  204 OK
```

Request Attributes

Attribute Name	Type	Description
project-quotas	dict	A dictionary with project quota information.
secrets	integer	The value to set for this projects secret quota.
orders	integer	The value to set for this projects order quota.
containers	integer	The value to set for this projects container quota.
consumers	integer	The value to set for this projects consumer quota.
cas	integer	The value to set for this projects CA quota.

Configured project quota values are specified as follows:

Value	Description
-1	A negative value indicates the resource is unconstrained by a quota.
0	A zero value indicates that the resource is disabled.
int	A positive value indicates the maximum number of that resource that can be created for the specified project.
	If a value is not given for a resource, this indicates that the default quota should be used for that resource for the specified project.

HTTP Status Codes

Code	Description
204	Successful request
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource

DELETE /v1/project-quotas/{uuid}

Delete the project quotas configuration for the project with the requested UUID. When the project quota configuration is deleted, then the default quotas will be used for the specified project.

Request/Response:

```
Request:

  DELETE v1/project-quotas/{uuid}
  Headers:
    X-Auth-Token:<token>
```

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```
Response:

  204 No Content
```

HTTP Status Codes

Code	Description
204	Successful request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found

Orders API - Reference

GET /v1/orders

Lists a projects orders.

The list of orders can be filtered by the parameters passed in via the URL.

Parameters

Name	Type	Description
offset	integer	The starting index within the total list of the orders that you would like to retrieve. (Default is 0)
limit	integer	The maximum number of records to return (up to 100). (Default is 10)

Request:

```
GET /v1/orders
Headers:
    Content-Type: application/json
    X-Auth-Token: {token}
```

Response:

```
200 Success

{
    "orders": [
    {
        "created": "2015-10-20T18:38:44",
        "creator_id": "40540f978fbd45c1af18910e3e02b63f",
        "meta": {
```

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```
            "algorithm": "AES",
            "bit_length": 256,
            "expiration": null,
            "mode": "cbc",
            "name": "secretname",
            "payload_content_type": "application/octet-stream"
        },
        "order_ref": "http://localhost:9311/v1/orders/2284ba6f-f964-4de7-b61e-
↪c413df5d1e47",
        "secret_ref": "http://localhost:9311/v1/secrets/15dcf8e4-3138-4360-
↪be9f-fc4bc2e64a19",
        "status": "ACTIVE",
        "sub_status": "Unknown",
        "sub_status_message": "Unknown",
        "type": "key",
        "updated": "2015-10-20T18:38:44"
    },
    {
        "created": "2015-10-20T18:38:47",
        "creator_id": "40540f978fbd45c1af18910e3e02b63f",
        "meta": {
            "algorithm": "AES",
            "bit_length": 256,
            "expiration": null,
            "mode": "cbc",
            "name": "secretname",
            "payload_content_type": "application/octet-stream"
        },
        "order_ref": "http://localhost:9311/v1/orders/87b7169e-3aa2-4cb1-8800-
↪b5aadf6babd1",
        "secret_ref": "http://localhost:9311/v1/secrets/80183f4b-c0de-4a94-
↪91ad-6d55251acee2",
        "status": "ACTIVE",
        "sub_status": "Unknown",
        "sub_status_message": "Unknown",
        "type": "key",
        "updated": "2015-10-20T18:38:47"
    }
    ],
    "total": 2
}
```

Response Attributes

Nam	Type	Description
or-ders	list	Contains a list of dictionaries filled with order metadata.
to-tal	in-te-ger	The total number of orders available to the user.
next	string	A HATEOS URL to retrieve the next set of objects based on the offset and limit parameters. This attribute is only available when the total number of objects is greater than offset and limit parameter combined.
pre-vi-ous	string	A HATEOS URL to retrieve the previous set of objects based on the offset and limit parameters. This attribute is only available when the request offset is greater than 0.

HTTP Status Codes

Code	Description
200	Successful Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource

POST /v1/orders

Creates an order

Parameters

Attribute Name	Type	Description	Default
type	string	The type of key to be generated. Valid types are key and asymmetric	None
meta	dict	Dictionary containing the secret metadata used to generate the secret.	None

Request:

```
POST /v1/orders
Headers:
    Content-Type: application/json
    X-Auth-Token: {token}

Content:
{
    "type":"key",
    "meta":
```

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```
        {
            "name":"secretname",
            "algorithm": "AES",
            "bit_length": 256,
            "mode": "cbc",
            "payload_content_type":"application/octet-stream"
        }
}
```

Response:

```
202 Created

{
    "order_ref": "http://{barbican_host}/v1/orders/{order_uuid}"
}
```

Response Attributes

Name	Type	Description
order_ref	string	Order reference

HTTP Status Codes

Code	Description
202	Successfully created an order
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
415	Unsupported media-type

GET /v1/orders/{uuid}

Retrieves an orders metadata

Request:

```
GET /v1/orders/{order_uuid}
Headers:
    Accept: application/json
    X-Auth-Token: {token}
```

Parameters

None

Response:

```
200 Success

{
    "created": "2015-10-20T18:49:02",
    "creator_id": "40540f978fbd45c1af18910e3e02b63f",
    "meta": {
        "algorithm": "AES",
        "bit_length": 256,
        "expiration": null,
        "mode": "cbc",
        "name": "secretname",
        "payload_content_type": "application/octet-stream"
    },
    "order_ref": "http://localhost:9311/v1/orders/5443d349-fe0c-4bfd-bd9d-
↪99c4a9770638",
    "secret_ref": "http://localhost:9311/v1/secrets/16f8d4f3-d3dd-4160-a5bd-
↪8e5095a42613",
    "status": "ACTIVE",
    "sub_status": "Unknown",
    "sub_status_message": "Unknown",
    "type": "key",
    "updated": "2015-10-20T18:49:02"
}
```

Response Attributes

Name	Type	Description
created	string	Timestamp in ISO8601 format of when the order was created
creator_id	string	Keystone Id of the user who created the order
meta	dict	Secret metadata used for informational purposes
order_ref	string	Order href associated with the order
secret_ref	string	Secret href associated with the order
status	string	Current status of the order
sub_status	string	Metadata associated with the order
sub_status_message	string	Metadata associated with the order
type	string	Indicates the type of order
updated	string	Timestamp in ISO8601 format of the last time the order was updated.

HTTP Status Codes

Code	Description
200	Successfully retrieved the order
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found

DELETE /v1/orders/{uuid}

Delete an order

Request:

```
DELETE /v1/orders/{order_uuid}
Headers:
    X-Auth-Token: {token}
```

Parameters

None

Response:

```
204 Success
```

HTTP Status Codes

Code	Description
204	Successfully deleted the order
400	Bad Request
401	Invalid X-Auth-Token or the token doesnt have permissions to this resource
404	Not Found

Microversions

API v1.0 supports microversions: small, documented changes to the API. A user can use microversions to discover the latest API microversion supported in their cloud. A cloud that is upgraded to support newer microversions will still support all older microversions to maintain the backward compatibility for those users, who depend on older microversions. Users can also discover new features easily with microversions, so that they can benefit from all the advantages and improvements of the current cloud.

There are multiple cases which you can resolve with microversions:

- **Older clients with new cloud**

Before using an old client to talk to a newer cloud, the old client can check the minimum version of microversions to verify whether the cloud is compatible with the old API. This prevents the old client from breaking with backwards incompatible API changes.

Currently the minimum version of microversions is *1.0*, which is a microversion compatible with the legacy v1 API. That means the legacy v1 API user doesnt need to worry that their older client software will be broken when their cloud is upgraded with new versions. The cloud operator doesnt need to worry that upgrading their cloud to newer versions will break any user with older clients that dont expect these changes.

- **User discovery of available features between clouds**

The new features can be discovered by microversions. The user client should first check the microversions supported by the server. New features are only enabled when clouds support it. In this way, the user client can work with clouds that have deployed different microversions simultaneously.

Version Discovery

The Version API will return the minimum and maximum microversions. These values are used by the client to discover the APIs supported microversion(s).

Requests to / will get version info for all endpoints. A response would look as follows:

```
{
  "versions": [
      {
          "id": "v1.0",
          "links": [
              {
                  "href": "http://openstack.example.com/v1/",
                  "rel": "self"
              }
          ],
          "max_version": "1.1",
          "min_version": "1.0",
          "updated": "2021-02-10T00:00:00Z"
      }
  ]
}
```

max_version is the maximum microversion, min_version is the minimum microversion. The client should specify a microversion between (and including) the minimum and maximum microversion to access the endpoint.

Client Interaction

A client specifies the microversion of the API they want by using the following HTTP header:

```
OpenStack-API-Version: key-manager 1.1
```

Note

For more detail on the syntax see the Microversion Specification.

This acts conceptually like the Accept header. Semantically this means:

- If *OpenStack-API-Version* (specifying *key-manager*) is not provided, act as if the minimum supported microversion was specified.
- If *OpenStack-API-Version* is provided, respond with the API at that microversion. If thats outside of the range of microversions supported, return 406 Not Acceptable.
- *OpenStack-API-Version* has a value of `latest` (special keyword), act as if maximum was specified.

Warning

The `latest` value is mostly meant for integration testing and would be dangerous to rely on in client code since microversions are not following semver and therefore backward compatibility is not guaranteed. Clients should always require a specific microversion but limit what is acceptable to the microversion range that it understands at the time.

This means that out of the box, an old client without any knowledge of microversions can work with an OpenStack installation with microversions support.

From microversion *1.1* two additional headers are added to the response:

```
OpenStack-API-Version: key-manager microversion_number
Vary: OpenStack-API-Version
```

REST API Version History

This documents the changes made to the REST API with every microversion change. The description for each version should be a verbose one which has enough information to be suitable for use in user documentation.

1.0

This is the initial version of the v1.0 API which supports microversions.

A user can specify a header in the API request:

```
OpenStack-API-Version: key-manager <version>
```

where `<version>` is any valid api version for this API.

If no version is specified then the API will behave as if a version request of v1.0 was requested.

1.1 (Maximum in Wallaby)

Added Secret Consumers to Secrets.

When requesting Secrets (individual Secret or a list), the results contain an additional `consumers` key, which contains references to Secret Consumers.

CHAPTER THREE

SAMPLE FILES

3.1 Barbican Sample Configuration File

Use the `barbican.conf` file to configure most Key Manager service options:

3.2 Barbican Sample Policy

The following is a sample Barbican policy file that has been auto-generated from default policy values in code. If youre using the default policies, then the maintenance of this file is not necessary, and it should not be copied into a deployment. Doing so will result in duplicate policy definitions. It is here to help explain which policy operations protect specific Barbican APIs, but it is not suggested to copy and paste into a deployment unless youre planning on providing a different policy for an operation that is not the default.

The sample policy file can also be viewed in file form.

```
#"secret_project_match": "project_id:%(target.secret.project_id)s"

#"secret_project_reader": "role:reader and rule:secret_project_match"

#"secret_project_member": "role:member and rule:secret_project_match"

#"secret_project_admin": "role:admin and rule:secret_project_match"

#"secret_owner": "user_id:%(target.secret.creator_id)s"

#"secret_is_not_private": "True:%(target.secret.read_project_access)s"

#"secret_acl_read": "'read':%(target.secret.read)s"

#"container_project_match": "project_id:%(target.container.project_id)s"

#"container_project_member": "role:member and rule:container_project_match"

#"container_project_admin": "role:admin and rule:container_project_match"

#"container_owner": "user_id:%(target.container.creator_id)s"

#"container_is_not_private": "True:%(target.container.read_project_access)s"
```

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```
#"container_acl_read": "'read':%(target.container.read)s"

#"order_project_match": "project_id:%(target.order.project_id)s"

#"order_project_member": "role:member and rule:order_project_match"

#"audit": "role:audit"

#"observer": "role:observer"

#"creator": "role:creator"

#"admin": "role:admin"

#"service_admin": "role:key-manager:service-admin"

#"all_users": "rule:admin or rule:observer or rule:creator or rule:audit or␣
↪rule:service_admin"

#"all_but_audit": "rule:admin or rule:observer or rule:creator"

#"admin_or_creator": "rule:admin or rule:creator"

#"secret_creator_user": "user_id:%(target.secret.creator_id)s"

#"secret_private_read": "'False':%(target.secret.read_project_access)s"

#"secret_non_private_read": "rule:all_users and rule:secret_project_match and␣
↪not rule:secret_private_read"

#"secret_decrypt_non_private_read": "rule:all_but_audit and rule:secret_
↪project_match and not rule:secret_private_read"

#"secret_project_creator": "rule:creator and rule:secret_project_match and␣
↪rule:secret_creator_user"

#"secret_project_creator_role": "rule:creator and rule:secret_project_match"

#"container_private_read": "'False':%(target.container.read_project_access)s"

#"container_creator_user": "user_id:%(target.container.creator_id)s"

#"container_non_private_read": "rule:all_users and rule:container_project_
↪match and not rule:container_private_read"

#"container_project_creator": "rule:creator and rule:container_project_match␣
↪and rule:container_creator_user"

#"container_project_creator_role": "rule:creator and rule:container_project_
```

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```
↪match"

# Retrieve the ACL settings for a given secret.If no ACL is defined
# for that secret, then Default ACL is returned.
# GET  /v1/secrets/{secret-id}/acl
# Intended scope(s): project
#"secret_acls:get": "True:%(enforce_new_defaults)s and (rule:secret_project_
↪admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_
↪project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret_acls:get":"rule:all_but_audit and rule:secret_project_match"
# has been deprecated since W in favor of
# "secret_acls:get":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Delete the ACL settings for a given secret.
# DELETE  /v1/secrets/{secret-id}/acl
# Intended scope(s): project
#"secret_acls:delete": "True:%(enforce_new_defaults)s and (rule:secret_
↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret_acls:delete":"rule:secret_project_admin or
# rule:secret_project_creator or (rule:secret_project_creator_role and
# rule:secret_non_private_read)" has been deprecated since W in favor
# of "secret_acls:delete":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Create new, replaces, or updates existing ACL for a given secret.
# PUT  /v1/secrets/{secret-id}/acl
# PATCH  /v1/secrets/{secret-id}/acl
# Intended scope(s): project
#"secret_acls:put_patch": "True:%(enforce_new_defaults)s and (rule:secret_
↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret_acls:put_patch":"rule:secret_project_admin or
# rule:secret_project_creator or (rule:secret_project_creator_role and
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```
# rule:secret_non_private_read)" has been deprecated since W in favor
# of "secret_acls:put_patch":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Retrieve the ACL settings for a given container.
# GET  /v1/containers/{container-id}/acl
# Intended scope(s): project
#"container_acls:get": "True:%(enforce_new_defaults)s and (rule:container_
↪project_admin or (rule:container_project_member and rule:container_owner)␣
↪or (rule:container_project_member and  rule:container_is_not_private))"

# DEPRECATED
# "container_acls:get":"rule:all_but_audit and
# rule:container_project_match" has been deprecated since W in favor
# of "container_acls:get":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Delete ACL for a given container. No content is returned in the case
# of successful deletion.
# DELETE  /v1/containers/{container-id}/acl
# Intended scope(s): project
#"container_acls:delete": "True:%(enforce_new_defaults)s and (rule:container_
↪project_admin or (rule:container_project_member and rule:container_owner)␣
↪or (rule:container_project_member and  rule:container_is_not_private))"

# DEPRECATED
# "container_acls:delete":"rule:container_project_admin or
# rule:container_project_creator or
# (rule:container_project_creator_role and
# rule:container_non_private_read)" has been deprecated since W in
# favor of "container_acls:delete":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Create new or replaces existing ACL for a given container.
# PUT  /v1/containers/{container-id}/acl
# PATCH  /v1/containers/{container-id}/acl
# Intended scope(s): project
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#"container_acls:put_patch": "True:%(enforce_new_defaults)s and␣
↪(rule:container_project_admin or (rule:container_project_member and␣
↪rule:container_owner) or (rule:container_project_member and  rule:container_
↪is_not_private))"

# DEPRECATED
# "container_acls:put_patch":"rule:container_project_admin or
# rule:container_project_creator or
# (rule:container_project_creator_role and
# rule:container_non_private_read)" has been deprecated since W in
# favor of "container_acls:put_patch":"True:%(enforce_new_defaults)s
# and (rule:container_project_admin or (rule:container_project_member
# and rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# DEPRECATED: show information for a specific consumer
# GET  /v1/containers/{container-id}/consumers/{consumer-id}
# Intended scope(s): project
#"consumer:get": "True:%(enforce_new_defaults)s and (role:admin or␣
↪(rule:container_project_member and rule:container_owner) or (rule:container_
↪project_member and  rule:container_is_not_private) or rule:container_acl_
↪read)"

# DEPRECATED
# "consumer:get":"rule:admin or rule:observer or rule:creator or
# rule:audit or rule:container_non_private_read or
# rule:container_project_creator or rule:container_project_admin or
# rule:container_acl_read" has been deprecated since W in favor of
# "consumer:get":"True:%(enforce_new_defaults)s and (role:admin or
# (rule:container_project_member and rule:container_owner) or
# (rule:container_project_member and  rule:container_is_not_private)
# or rule:container_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# List a containers consumers.
# GET  /v1/containers/{container-id}/consumers
# Intended scope(s): project
#"container_consumers:get": "True:%(enforce_new_defaults)s and␣
↪(rule:container_project_admin or (rule:container_project_member and␣
↪rule:container_owner) or (rule:container_project_member and  rule:container_
↪is_not_private) or rule:container_acl_read)"

# DEPRECATED
# "container_consumers:get":"rule:container_non_private_read or
# rule:container_project_creator or rule:container_project_admin or
# rule:container_acl_read" has been deprecated since W in favor of
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```
# "container_consumers:get":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private) or rule:container_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Creates a consumer.
# POST  /v1/containers/{container-id}/consumers
# Intended scope(s): project
#"container_consumers:post": "True:%(enforce_new_defaults)s and␣
↪(rule:container_project_admin or (rule:container_project_member and␣
↪rule:container_owner) or (rule:container_project_member and  rule:container_
↪is_not_private) or rule:container_acl_read)"

# DEPRECATED
# "container_consumers:post":"rule:container_non_private_read or
# rule:container_project_creator or rule:container_project_admin or
# rule:container_acl_read " has been deprecated since W in favor of
# "container_consumers:post":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private) or rule:container_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Deletes a consumer.
# DELETE  /v1/containers/{container-id}/consumers
# Intended scope(s): project
#"container_consumers:delete": "True:%(enforce_new_defaults)s and␣
↪(rule:container_project_admin or (rule:container_project_member and␣
↪rule:container_owner) or (rule:container_project_member and  rule:container_
↪is_not_private) or rule:container_acl_read)"

# DEPRECATED
# "container_consumers:delete":"rule:container_non_private_read or
# rule:container_project_creator or rule:container_project_admin or
# rule:container_acl_read " has been deprecated since W in favor of
# "container_consumers:delete":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private) or rule:container_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# List consumers for a secret.
# GET  /v1/secrets/{secret-id}/consumers
# Intended scope(s): project
#"secret_consumers:get": "True:%(enforce_new_defaults)s and (rule:secret_
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↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private) or rule:secret_
↪acl_read)"

# DEPRECATED
# "secret_consumers:get":"rule:secret_non_private_read or
# rule:secret_project_creator or rule:secret_project_admin or
# rule:secret_acl_read" has been deprecated since W in favor of
# "secret_consumers:get":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private) or rule:secret_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Creates a consumer.
# POST  /v1/secrets/{secrets-id}/consumers
# Intended scope(s): project
#"secret_consumers:post": "True:%(enforce_new_defaults)s and (rule:secret_
↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private) or rule:secret_
↪acl_read)"

# DEPRECATED
# "secret_consumers:post":"rule:secret_non_private_read or
# rule:secret_project_creator or rule:secret_project_admin or
# rule:secret_acl_read" has been deprecated since W in favor of
# "secret_consumers:post":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private) or rule:secret_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Deletes a consumer.
# DELETE  /v1/secrets/{secrets-id}/consumers
# Intended scope(s): project
#"secret_consumers:delete": "True:%(enforce_new_defaults)s and (rule:secret_
↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private) or rule:secret_
↪acl_read)"

# DEPRECATED
# "secret_consumers:delete":"rule:secret_non_private_read or
# rule:secret_project_creator or rule:secret_project_admin or
# rule:secret_acl_read" has been deprecated since W in favor of
# "secret_consumers:delete":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
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# rule:secret_is_not_private) or rule:secret_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Creates a container.
# POST  /v1/containers
# Intended scope(s): project
#"containers:post": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "containers:post":"rule:admin_or_creator" has been deprecated since
# W in favor of "containers:post":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Lists a projects containers.
# GET  /v1/containers
# Intended scope(s): project
#"containers:get": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "containers:get":"rule:all_but_audit" has been deprecated since W in
# favor of "containers:get":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Retrieves a single container.
# GET  /v1/containers/{container-id}
# Intended scope(s): project
#"container:get": "True:%(enforce_new_defaults)s and (rule:container_project_
↪admin or (rule:container_project_member and rule:container_owner) or␣
↪(rule:container_project_member and  rule:container_is_not_private) or␣
↪rule:container_acl_read)"

# DEPRECATED
# "container:get":"rule:container_non_private_read or
# rule:container_project_creator or rule:container_project_admin or
# rule:container_acl_read" has been deprecated since W in favor of
# "container:get":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private) or rule:container_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Deletes a container.
# DELETE  /v1/containers/{uuid}
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# Intended scope(s): project
#"container:delete": "True:%(enforce_new_defaults)s and (rule:container_
↪project_admin or (rule:container_project_member and rule:container_owner)␣
↪or (rule:container_project_member and  rule:container_is_not_private))"

# DEPRECATED
# "container:delete":"rule:container_project_admin or
# rule:container_project_creator" has been deprecated since W in favor
# of "container:delete":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Add a secret to an existing container.
# POST  /v1/containers/{container-id}/secrets
# Intended scope(s): project
#"container_secret:post": "True:%(enforce_new_defaults)s and (rule:container_
↪project_admin or (rule:container_project_member and rule:container_owner)␣
↪or (rule:container_project_member and  rule:container_is_not_private))"

# DEPRECATED
# "container_secret:post":"rule:container_project_admin or
# rule:container_project_creator or
# rule:container_project_creator_role and
# rule:container_non_private_read" has been deprecated since W in
# favor of "container_secret:post":"True:%(enforce_new_defaults)s and
# (rule:container_project_admin or (rule:container_project_member and
# rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Remove a secret from a container.
# DELETE  /v1/containers/{container-id}/secrets/{secret-id}
# Intended scope(s): project
#"container_secret:delete": "True:%(enforce_new_defaults)s and␣
↪(rule:container_project_admin or (rule:container_project_member and␣
↪rule:container_owner) or (rule:container_project_member and  rule:container_
↪is_not_private))"

# DEPRECATED
# "container_secret:delete":"rule:container_project_admin or
# rule:container_project_creator or
# rule:container_project_creator_role and
# rule:container_non_private_read" has been deprecated since W in
# favor of "container_secret:delete":"True:%(enforce_new_defaults)s
# and (rule:container_project_admin or (rule:container_project_member
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# and rule:container_owner) or (rule:container_project_member and
# rule:container_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Gets list of all orders associated with a project.
# GET  /v1/orders
# Intended scope(s): project
#"orders:get": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "orders:get":"rule:all_but_audit" has been deprecated since W in
# favor of "orders:get":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Creates an order.
# POST  /v1/orders
# Intended scope(s): project
#"orders:post": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "orders:post":"rule:admin_or_creator" has been deprecated since W in
# favor of "orders:post":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Unsupported method for the orders API.
# PUT  /v1/orders
# Intended scope(s): project
#"orders:put": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "orders:put":"rule:admin_or_creator" has been deprecated since W in
# favor of "orders:put":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Retrieves an orders metadata.
# GET  /v1/orders/{order-id}
# Intended scope(s): project
#"order:get": "True:%(enforce_new_defaults)s and rule:order_project_member"

# DEPRECATED
# "order:get":"rule:all_users and
# project_id:%(target.order.project_id)s" has been deprecated since W
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# in favor of "order:get":"True:%(enforce_new_defaults)s and
# rule:order_project_member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Deletes an order.
# DELETE  /v1/orders/{order-id}
# Intended scope(s): project
#"order:delete": "True:%(enforce_new_defaults)s and rule:order_project_member"

# DEPRECATED
# "order:delete":"rule:admin and
# project_id:%(target.order.project_id)s" has been deprecated since W
# in favor of "order:delete":"True:%(enforce_new_defaults)s and
# rule:order_project_member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# List quotas for the project the user belongs to.
# GET  /v1/quotas
# Intended scope(s): project
#"quotas:get": "True:%(enforce_new_defaults)s and role:reader"

# DEPRECATED
# "quotas:get":"rule:all_users" has been deprecated since W in favor
# of "quotas:get":"True:%(enforce_new_defaults)s and role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# List quotas for the specified project.
# GET  /v1/project-quotas
# GET  /v1/project-quotas/{uuid}
# Intended scope(s): project
#"project_quotas:get": "True:%(enforce_new_defaults)s and role:admin"

# DEPRECATED
# "project_quotas:get":"rule:service_admin" has been deprecated since
# W in favor of "project_quotas:get":"True:%(enforce_new_defaults)s
# and role:admin".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Create or update the configured project quotas for the project with
# the specified UUID.
# PUT  /v1/project-quotas/{uuid}
# Intended scope(s): project
#"project_quotas:put": "True:%(enforce_new_defaults)s and role:admin"

# DEPRECATED
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# "project_quotas:put":"rule:service_admin" has been deprecated since
# W in favor of "project_quotas:put":"True:%(enforce_new_defaults)s
# and role:admin".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Delete the project quotas configuration for the project with the
# requested UUID.
# DELETE  /v1/quotas}
# Intended scope(s): project
#"project_quotas:delete": "True:%(enforce_new_defaults)s and role:admin"

# DEPRECATED
# "project_quotas:delete":"rule:service_admin" has been deprecated
# since W in favor of
# "project_quotas:delete":"True:%(enforce_new_defaults)s and
# role:admin".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# metadata/: Lists a secrets user-defined metadata. || metadata/{key}:
# Retrieves a secrets user-added metadata.
# GET  /v1/secrets/{secret-id}/metadata
# GET  /v1/secrets/{secret-id}/metadata/{meta-key}
# Intended scope(s): project
#"secret_meta:get": "True:%(enforce_new_defaults)s and (rule:secret_project_
↪admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_
↪project_member and rule:secret_is_not_private) or rule:secret_acl_read)"

# DEPRECATED
# "secret_meta:get":"rule:secret_non_private_read or
# rule:secret_project_creator or rule:secret_project_admin or
# rule:secret_acl_read" has been deprecated since W in favor of
# "secret_meta:get":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private) or rule:secret_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Adds a new key/value pair to the secrets user-defined metadata.
# POST  /v1/secrets/{secret-id}/metadata/{meta-key}
# Intended scope(s): project
#"secret_meta:post": "True:%(enforce_new_defaults)s and (rule:secret_project_
↪admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_
↪project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret_meta:post":"rule:secret_project_admin or
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# rule:secret_project_creator or (rule:secret_project_creator_role and
# rule:secret_non_private_read)" has been deprecated since W in favor
# of "secret_meta:post":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# metadata/: Sets the user-defined metadata for a secret ||
# metadata/{key}: Updates an existing key/value pair in the secrets
# user-defined metadata.
# PUT  /v1/secrets/{secret-id}/metadata
# PUT  /v1/secrets/{secret-id}/metadata/{meta-key}
# Intended scope(s): project
#"secret_meta:put": "True:%(enforce_new_defaults)s and (rule:secret_project_
↪admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_
↪project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret_meta:put":"rule:secret_project_admin or
# rule:secret_project_creator or (rule:secret_project_creator_role and
# rule:secret_non_private_read)" has been deprecated since W in favor
# of "secret_meta:put":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Delete secret user-defined metadata by key.
# DELETE  /v1/secrets/{secret-id}/metadata/{meta-key}
# Intended scope(s): project
#"secret_meta:delete": "True:%(enforce_new_defaults)s and (rule:secret_
↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret_meta:delete":"rule:secret_project_admin or
# rule:secret_project_creator or (rule:secret_project_creator_role and
# rule:secret_non_private_read)" has been deprecated since W in favor
# of "secret_meta:delete":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Retrieve a secrets payload.
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# GET  /v1/secrets/{uuid}/payload
# Intended scope(s): project
#"secret:decrypt": "True:%(enforce_new_defaults)s and (rule:secret_project_
↪admin or (rule:secret_project_member and rule:secret_owner) or (rule:secret_
↪project_member and rule:secret_is_not_private) or rule:secret_acl_read)"

# DEPRECATED
# "secret:decrypt":"rule:secret_decrypt_non_private_read or
# rule:secret_project_creator or rule:secret_project_admin or
# rule:secret_acl_read" has been deprecated since W in favor of
# "secret:decrypt":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private) or rule:secret_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Retrieves a secrets metadata.
# GET  /v1/secrets/{secret-id}
# Intended scope(s): project
#"secret:get": "True:%(enforce_new_defaults)s and (role:admin or rule:secret_
↪project_admin or (rule:secret_project_member and rule:secret_owner) or␣
↪(rule:secret_project_member and rule:secret_is_not_private) or rule:secret_
↪acl_read)"

# DEPRECATED
# "secret:get":"rule:secret_non_private_read or
# rule:secret_project_creator or rule:secret_project_admin or
# rule:secret_acl_read" has been deprecated since W in favor of
# "secret:get":"True:%(enforce_new_defaults)s and (role:admin or
# rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private) or rule:secret_acl_read)".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Add the payload to an existing metadata-only secret.
# PUT  /v1/secrets/{secret-id}
# Intended scope(s): project
#"secret:put": "True:%(enforce_new_defaults)s and (rule:secret_project_admin␣
↪or (rule:secret_project_member and rule:secret_owner) or (rule:secret_
↪project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret:put":"rule:admin_or_creator and rule:secret_project_match"
# has been deprecated since W in favor of
# "secret:put":"True:%(enforce_new_defaults)s and
# (rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
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# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Delete a secret by uuid.
# DELETE  /v1/secrets/{secret-id}
# Intended scope(s): project
#"secret:delete": "True:%(enforce_new_defaults)s and (role:admin or␣
↪rule:secret_project_admin or (rule:secret_project_member and rule:secret_
↪owner) or (rule:secret_project_member and rule:secret_is_not_private))"

# DEPRECATED
# "secret:delete":"rule:secret_project_admin or
# rule:secret_project_creator or (rule:secret_project_creator_role and
# not rule:secret_private_read)" has been deprecated since W in favor
# of "secret:delete":"True:%(enforce_new_defaults)s and (role:admin or
# rule:secret_project_admin or (rule:secret_project_member and
# rule:secret_owner) or (rule:secret_project_member and
# rule:secret_is_not_private))".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Creates a Secret entity.
# POST  /v1/secrets
# Intended scope(s): project
#"secrets:post": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "secrets:post":"rule:admin_or_creator" has been deprecated since W
# in favor of "secrets:post":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Lists a projects secrets.
# GET  /v1/secrets
# Intended scope(s): project
#"secrets:get": "True:%(enforce_new_defaults)s and role:member"

# DEPRECATED
# "secrets:get":"rule:all_but_audit" has been deprecated since W in
# favor of "secrets:get":"True:%(enforce_new_defaults)s and
# role:member".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Get list of available secret store backends.
# GET  /v1/secret-stores
# Intended scope(s): project
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#"secretstores:get": "True:%(enforce_new_defaults)s and role:reader"

# DEPRECATED
# "secretstores:get":"rule:all_users" has been deprecated since W in
# favor of "secretstores:get":"True:%(enforce_new_defaults)s and
# role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Get a reference to the secret store that is used as default secret
# store backend for the deployment.
# GET  /v1/secret-stores/global-default
# Intended scope(s): project
#"secretstores:get_global_default": "True:%(enforce_new_defaults)s and␣
↪role:reader"

# DEPRECATED
# "secretstores:get_global_default":"rule:all_users" has been
# deprecated since W in favor of
# "secretstores:get_global_default":"True:%(enforce_new_defaults)s and
# role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Get a reference to the preferred secret store if assigned
# previously.
# GET  /v1/secret-stores/preferred
# Intended scope(s): project
#"secretstores:get_preferred": "True:%(enforce_new_defaults)s and role:reader"

# DEPRECATED
# "secretstores:get_preferred":"rule:all_users" has been deprecated
# since W in favor of
# "secretstores:get_preferred":"True:%(enforce_new_defaults)s and
# role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Set a secret store backend to be preferred store backend for their
# project.
# POST  /v1/secret-stores/{ss-id}/preferred
# Intended scope(s): project
#"secretstore_preferred:post": "True:%(enforce_new_defaults)s and role:admin"

# DEPRECATED
# "secretstore_preferred:post":"rule:admin" has been deprecated since
# W in favor of
# "secretstore_preferred:post":"True:%(enforce_new_defaults)s and
# role:admin".
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# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Remove preferred secret store backend setting for their project.
# DELETE  /v1/secret-stores/{ss-id}/preferred
# Intended scope(s): project
#"secretstore_preferred:delete": "True:%(enforce_new_defaults)s and role:admin
↪"

# DEPRECATED
# "secretstore_preferred:delete":"rule:admin" has been deprecated
# since W in favor of
# "secretstore_preferred:delete":"True:%(enforce_new_defaults)s and
# role:admin".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Get details of secret store by its ID.
# GET  /v1/secret-stores/{ss-id}
# Intended scope(s): project
#"secretstore:get": "True:%(enforce_new_defaults)s and role:reader"

# DEPRECATED
# "secretstore:get":"rule:all_users" has been deprecated since W in
# favor of "secretstore:get":"True:%(enforce_new_defaults)s and
# role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Get a specific transport key.
# GET  /v1/transport_keys/{key-id}}
# Intended scope(s): project
#"transport_key:get": "True:%(enforce_new_defaults)s and role:reader"

# DEPRECATED
# "transport_key:get":"rule:all_users" has been deprecated since W in
# favor of "transport_key:get":"True:%(enforce_new_defaults)s and
# role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Delete a specific transport key.
# DELETE  /v1/transport_keys/{key-id}
# Intended scope(s): project
#"transport_key:delete": "True:%(enforce_new_defaults)s and role:admin"

# DEPRECATED
# "transport_key:delete":"rule:service_admin" has been deprecated
# since W in favor of
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```
# "transport_key:delete":"True:%(enforce_new_defaults)s and
# role:admin".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Get a list of all transport keys.
# GET  /v1/transport_keys
# Intended scope(s): project
#"transport_keys:get": "True:%(enforce_new_defaults)s and role:reader"

# DEPRECATED
# "transport_keys:get":"rule:all_users" has been deprecated since W in
# favor of "transport_keys:get":"True:%(enforce_new_defaults)s and
# role:reader".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.

# Create a new transport key.
# POST  /v1/transport_keys
# Intended scope(s): project
#"transport_keys:post": "True:%(enforce_new_defaults)s and role:admin"

# DEPRECATED
# "transport_keys:post":"rule:service_admin" has been deprecated since
# W in favor of "transport_keys:post":"True:%(enforce_new_defaults)s
# and role:admin".
# The default policy for the Key Manager API has been updated to use
# scopes and default roles.
```

CHAPTER

FOUR

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