



# FIPS 140–2 Compliance for Caché Database Encryption

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# FIPS 140–2 Compliance for Caché Database Encryption

On specific platforms, Caché supports FIPS 140–2 compliant cryptography for database encryption. (FIPS 140–2 refers to Federal Information Processing Standard Publication 140-2, which is available at <https://csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf>.)

## 1 Supported Platforms

This version of Caché supports FIPS 140-2–compliant cryptography for database encryption on Red Hat Enterprise Linux 6.6 (or later minor versions) and Red Hat Enterprise Linux 7.1 (or later minor versions) for x86-64. For each supported version, Red Hat has a certificate of validation for the OpenSSL libcrypto.so and libssl.so libraries; this certificate is available at the site listed below.

### Red Hat 6.6

- The libraries are libcrypto.so.1.0.1e and libssl.so.1.0.1e.
- The certificate is <https://csrc.nist.gov/projects/cryptographic-module-validation-program/Certificate/2441>.

### Red Hat 7.0 – 7.3

- The libraries are libcrypto.so.1.0.1e and libssl.so.1.0.1e.
- The certificates are <https://csrc.nist.gov/projects/cryptographic-module-validation-program/Certificate/2441>, <https://csrc.nist.gov/projects/cryptographic-module-validation-program/certificate/3538>, and <https://csrc.nist.gov/projects/cryptographic-module-validation-program/certificate/3867>.

### Red Hat 7.4 – 7.9

- The libraries are libcrypto.so.1.0.2k and libssl.so.1.0.2k.
- The certificate is <https://csrc.nist.gov/projects/cryptographic-module-validation-program/Certificate/3016>, <https://csrc.nist.gov/projects/cryptographic-module-validation-program/certificate/3538>, and <https://csrc.nist.gov/projects/cryptographic-module-validation-program/certificate/3867>.

**Note:** Caché does not support FIPS 140–2 compliant cryptography for Red Hat 8.

For information about Red Hat support for government standards, see <https://www.redhat.com/en/technologies/industries/government/standards>.

## 2 Enabling FIPS Support

To enable Caché support for FIPS 140–2 compliant cryptography for database encryption, do the following:

1. Download and install the openssl package from the RedHat repository (rhel-6-server-rpms or rhel-7-server-rpms, depending on which version of Red Hat Enterprise Linux for x86-64 you are using).
2. Enable FIPS mode for the operating system. For these instructions, see the article [How can I make RHEL 6/7/8 FIPS 140-2 compliant?](#) on the Red Hat web site.

**Note:** Access to this article requires Red Hat login credentials.

3. Check the directory `/usr/lib64` for the following symbolic links. If these do not exist, create them:
  - The symbolic link `libssl.so` should point to the appropriate file (such as `libssl.so.1.0.2k`), in the same directory.
  - The symbolic link `libcrypto.so` should point to the appropriate file (such as `libcrypto.so.1.0.2k`), in the same directory.
4. In Caché, specify the **FIPSMODE** CPF parameter as **True** (1). To do so:
  - a. Open the Management Portal.
  - b. Select **System Administration > Configuration > Additional Settings > Startup**.  
Here you will see a row for **FIPSMODE**.
  - c. Specify the value for **FIPSMODE** as **True** and save your change.
5. Restart Caché.
6. Enable and configure encrypted databases as outlined in “[Using Encrypted Databases](#)” in the chapter “[Managed Key Encryption](#)” in *Caché Security Administration Guide*.

## 3 Startup Behavior and cconsole.log

When Caché is started:

- If **FIPSMODE** is 0, Caché native cryptography is used, including optimized assembly code using Intel AES-NI hardware instructions, if supported by the CPU. In this mode, Caché writes the following to `cconsole.log` upon startup:

```
FIPS 140-2 compliant cryptography for database encryption is not configured in cache.cpf
```

- If **FIPSMODE** is 1, Caché attempts to resolve references to functions in the `/usr/lib64/libcrypto.so` FIPS-validated library, and then attempts to initialize the library in FIPS mode. If these steps are successful, Caché writes the following to `cconsole.log`:

```
FIPS 140-2 compliant cryptography for database encryption is enabled for this instance.
```

- If **FIPSMODE** is 1, but the initialization of the library is unsuccessful, Caché does not start. In this case, `cconsole.log` contains the following message:

```
FIPS 140-2 compliant cryptography for database encryption initialization failed. Aborting.
```

- On platforms other than `lnxrhx64`, if **FIPSMODE** is 1, Caché native cryptography is used, and Caché writes the following to `cconsole.log`:

```
FIPS 140-2 compliant cryptography for database encryption is not supported on this platform.
```