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FIPS 140-2 Compliance Configuration Guide

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Contents

Chapter 1: Overview

This document provides information on how to configure CSA to be compliant with Federal Information Processing Standards (FIPS) 140-2.

FIPS 140-2 is a standard for security requirements for cryptographic modules defined by the National Institute of Standards and Technology (NIST). To view the publication for this standard, go to:

csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf

The following information is provided in this document:

- **"Getting Started" on page 7**. Before configuring CSA, you must initially prepare your environment by completing tasks to back up affected directories and files and install additional applications required for configuration.
- **"Configure CSA for FIPS 140-2 Compliance" on page 9**. Tasks to be completed to configure CSA for FIPS 140-2 compliance.
- **"Common CSA Tasks" on page 38**. Tasks to start and restart CSA are different in a FIPS 140-2 compliant environment. Other common tasks, such as encrypting passwords, remain the same between a standard and FIPS 140-2 compliant CSA environment.
- **"Examples Used in this Document" on page 53**. This is a reference for the items and values used in the FIPS 140-2 examples.

Note: Elasticsearch is not supported in FIPS mode. Be sure it is turned off before you configure FIPS 140-2 compliance.

Refer to the following guides for more information about:

- CSA technical requirements for FIPS 140-2: *CSA FIPS 140-2 Compliance Statement*
- Supported components and versions: *Cloud Service Automation System and Software Support Matrix*
- Installation: *Cloud Service Automation Installation Guide*
- Configuration: *Cloud Service Automation Configuration Guide*

These guides are available from the HP Software Support Web site at http://h20230.www2.hp.com/selfsolve/manuals/ (this site requires that you register with HP Passport).

Chapter 2: Getting Started

Before configuring CSA to be compliant with FIPS 140-2, you must complete the following tasks, such as backing up affected directories and files and installing additional applications, to prepare your environment for configuration:

Caution: Do NOT install these content capsules:

- HPE-CODAR-1.60.0000
- Helion-Development-Platform
- Docker
- HPE-ICSP-CSA-Sequential-Integration-15.12.0000

Caution: Do NOT configure any other feature of CSA and do not use any of the CSA tools before configuring CSA to be compliant with FIPS 140-2. If you have configured any feature or used one of the tools, you must re-install CSA before you can configure CSA to be compliant with FIPS 140-2.

Note: CSA that is compliant with FIPS 140-2 supports the Microsoft SQL database and Oracle JRE only. For more information about application and version requirements, see the *Cloud Service Automation System and Software Support Matrix*.

1. Verify that you are configuring a new or fresh installation of CSA version 4.60 to be compliant with FIPS 140-2. You cannot configure an upgraded installation of CSA version 4.60 or an installation of CSA version 4.60 that is in use. For information on upgrading FIPS 140-2, see the *Cloud Service Automation Upgrade Guide*.
2. Stop the global search services as follows:
   a. Right-click on the Elasticsearch 1.6.1 service and select **Stop**.
   b. Right-click on Search Service and select **Stop**.
3. Back up the following directories:
   - `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\`
   - `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\`
   - `%CSA_HOME%\jboss-as\standalone\configuration\`
   - `%CSA_HOME%\portal\conf\`
   - `%CSA_HOME%\node.js\`
   - `<csa_jre>\lib\security`
     (where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed)
4. Download and install the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files from the following sites:

   http://www.oracle.com/technetwork/java/javase/downloads/jce8-download-2133166.html

Refer to the `Readme.txt` file from the downloaded content for information on how to deploy the files and upgrade the JRE used by CSA.

5. Download and install the Microsoft Visual C++ 2010 Redistributable Package (x86) from the following site:

   http://www.microsoft.com/en-us/download/details.aspx?id=5555

6. Install the RSA BSAFE Crypto software files. To get this library, contact HPE support. Unzip the acquired ZIP file to `<csa_jre>\lib\ext\` (where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed.
7. Install the recompiled version NodeJS needed for FIPS compliance. On the system on which CSA is installed, unzip the `\fips\nodejs-fips-windows.zip` file to the `%CSA_HOME%\node.js\` directory.

Chapter 3: Configure CSA for FIPS 140-2 Compliance

This chapter explains how to configure CSA to be compliant with FIPS 140-2.

After you have configured CSA for FIPS 140-2 compliance, CSA uses or complies with the following:

- RSA BSAFE Crypto software
- Keystore and truststore: PKCS #12
- Asymmetric algorithm: RSA
- Symmetric-key algorithm: AES
- Random number generation algorithm: HMAC DRBG (128-bit)
- Hashing algorithm: SHA-256

Complete the following tasks to configure CSA to be compliant with FIPS 140-2:

Caution: Once you have configured CSA to be compliant with FIPS 140-2, you cannot revert back to the standard configuration unless you uninstall and re-install CSA.

- "Stop CSA" on page 39
- "Update applicationContext.xml to be FIPS 140-2 Compliant" on the next page
- "Configure Properties in the Java Security File" on page 11
- "Create a CSA Encryption Keystore" on page 11
- " welcomeCreate a New Keystore and Truststore for Secure Communication" on page 14
- "Re-Encrypt CSA Passwords" on page 24
- "Configure CSA Properties" on page 26
- "Configure the Marketplace Portal" on page 28
- "Configure the Identity Management Component" on page 32
- "Start CSA" on page 37
- "Test Secure Connections" on page 37

Stop CSA

CSA should not be running while you are configuring it to be compliant with FIPS 140-2.

To stop CSA:

1. On the server that hosts CSA, navigate to **Start** > **Administrative Tools** > **Services**.
2. Right-click on the CSA service and select **Stop**.
3. Right-click on the HP Marketplace Portal service and select **Stop**.
4. If you installed an embedded Operations Orchestration instance, right-click on the Operations Orchestration Central service and select **Stop**.

Update applicationContext.xml to be FIPS 140-2 Compliant

The `applicationContext.xml` file for the Cloud Service Management Console must be updated to be FIPS 140-2 compliant. Do the following:

1. Open the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\WEB-INF\applicationContext.xml` file in a text editor. For example, edit the following file:

   ```
   C:\Program Files\HPE\CSA\jboss-as\standalone\deployments\csa.war\
   WEB-INF\applicationContext.xml
   ```

2. Locate the `START Standard Mode Configuration` comment and comment out the following content that appears between the `START Standard Mode Configuration` and `END Standard Mode Configuration` comments:

   ```
   <bean id="simpleEncryptionConfiguration"
   class="com.hp.csa.security.CSASimplePBEConfig" init-method="init">
   </bean>

   <bean id="configurationEncryptor"
   class="org.jasypt.encryption.pbe.StandardPBEStringEncryptor">
     <property name="config" ref="simpleEncryptionConfiguration" />
   </bean>

   <bean id="propertyConfigurer" class="org.jasypt.spring.properties.
   EncryptablePropertyPlaceholderConfigurer">
     <constructor-arg ref="configurationEncryptor" />
     <property name="locations">
       <list>
         <value>classpath:csa.properties</value>
       </list>
     </property>
   </bean>
   ```

3. Locate the `START FIPS Mode Configuration` comment and uncomment the following content that appears between the `START FIPS Mode Configuration` and `END FIPS Mode Configuration` comments:

   ```
   <bean id="configurationEncryptor" class="com.hp.csa.security.util.CSASecurityHelper"
   />

   <bean id="propertyConfigurer" class=
   "com.hp.csa.security.CSAEncryptablePropertyPlaceholderConfigurer">
     <constructor-arg ref="configurationEncryptor" />
     <property name="locations">
       <list>
         <value>classpath:csa.properties</value>
       </list>
     </property>
   ```

```
</bean>
```

4. Save and close the file.

Configure Properties in the Java Security File

Edit the Java security file for the JRE to add additional security providers and configure properties for FIPS 140-2 compliance. Open the `<csa_jre>\lib\security\java.security` file in an editor (where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed) and do the following:

1. For every provider listed (in the format `security.provider.<nn>=<provider_name>`), increment the preference order number (`<nn>`) by one. For example, change a provider entry from :

   `security.provider.1=sun.security.provider.Sun`

   to

   `security.provider.2=sun.security.provider.Sun`.
2. Add a new default provider (RSA JCE). Add the following provider to the top of the provider list:

   `security.provider.1=com.rsa.jsafe.provider.JsafeJCE`
3. Update the SunJSSE provider to use packages that are compliant with FIPS 140-2.

   For example, change the following entry from:

   `security.provider.<nn>=com.sun.net.ssl.internal.ssl.Provider`

   to

   `security.provider.<nn>=com.sun.net.ssl.internal.ssl.Provider JsafeJCE`
4. Set the default keystore type to PKCS #12. Edit or add the following entry:

   `keystore.type=PKCS12`
5. Add the following entry to ensure RSA BSAFE is used in FIPS 140-2 compliant mode:

   `com.rsa.cryptoj.fips140initialmode=FIPS140_SSL_MODE`
6. Set the default random number generation algorithm to HMAC DRBG with 128-bit security strength:

   `com.rsa.crypto.default.random = HMACDRBG128`
7. Exit and save the `java.security` file.

Create a CSA Encryption Keystore

This section describes an example of how to create a keystore, referred to in this document as the CSA encryption keystore that is used by CSA to encrypt and decrypt a key. This key is used to encrypt and decrypt the data in CSA. The validity period assigned to the CSA encryption keystore is not used by CSA.

The examples used in this document saves the keystore in the `CSA_HOME\jboss-as\standalone\configuration\` directory. You may choose to store the keystore in any location; however, you must remember to use that location in any other subsequent example.

> **Note:** In the following examples, `CSA_HOME` is the directory in which CSA is installed (for example, `C:\Program Files\HPE\CSA`), the `keytool` utility is included with the JRE, and a JRE has been installed for CSA in `<csa_jre>`.

The following is an example of how to create the CSA encryption keystore:

1. Open a command prompt and change directories to `CSA_HOME`.
2. Run the following command:

   ```
   "<csa_jre>\bin\keytool" -genkey -alias csa_encryption_key
   -validity 365 -keyalg rsa -keysize 2048 -storetype PKCS12
   -keystore .\jboss-as\standalone\configuration\csa_encryption_keystore.p12
   ```

   where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed.

   You can use different values for `-alias`, `-validity`, `-keysize` and `-keystore`. These instructions assume that you will use the `-alias` and `-keystore` values recommended here; you will have to adjust the commands accordingly if you use different values.

   Because the CSA encryption keystore is used by CSA to only encrypt and decrypt a key and not to generate certificates, you can enter any value for `-validity`. The validity period assigned to the CSA encryption keystore is not used by CSA.
3. Enter a keystore password (referred to in this document as the CSA encryption keystore password).

   This password is used to control access to the keystore. This password must be the same as the password you enter for the key in step 5 of this task.

   Note: You must create a password file with this password whenever CSA is started. See "Start CSA" on page 38 for more information.
4. Follow the prompts to enter your first and last name, organization, and location values.
5. Enter the keystore password you supplied earlier to use as the key password.

   Although `keytool` allows you to enter different passwords for the keystore and the key, the two passwords must be the same to work with CSA.

Generate an Encrypted Symmetric Key

This section describes an example of how to generate an encrypted symmetric key that is used by CSA to encrypt and decrypt data. This key is also used to encrypt the passwords for the Cloud Service Management Console.

Caution: Do NOT generate the key more than one time.

The following is an example of how to generate an encrypted symmetric key:

1. Open a command prompt and change to the `%CSA_HOME%\Tools\PasswordUtil` directory. For example:

   ```
   C:\Program Files\HPE\CSA\Tools\PasswordUtil
   ```
2. Run the following command (this example uses the same example names from "Create a CSA Encryption Keystore" on the previous page):

   ```
   "<csa_jre>\bin\java" -jar passwordUtil-standalone.jar genAndEncKey JsafeJCE
   ../../jboss-as/standalone/configuration/csa_encryption_keystore.p12
   <CSA encryption keystore password> csa_encryption_key
   ../../jboss-as/standalone/configuration/key.dat
   ```

   Note: The path separators used in the `passwordUtil-standalone.jar` script options are forward slashes (/). You can also use double backward slashes (\\) as your path separators.

   ```
   <csa_jre>/bin/java -jar passwordUtil-standalone.jar genAndEncKey JsafeJCE
   ```

```
../../jboss-as/standalone/configuration/csa_encryption_keystore.p12
<CSA encryption keystore password> csa_encryption_key
../../jboss-as/standalone/configuration/key.dat
```

In this example, the encrypted symmetric key is saved to:

```
%CSA_HOME%\jboss-as\standalone\configuration\key.dat
```

Note: You will use this file name and location when encrypting CSA passwords for the Cloud Service Management Console.

If you used different names for the keystore, alias, or encrypted symmetric key file, here is an example of the command without using the example names:

```
"<csa_jre>\bin\java" -jar "%CSA_HOME%\Tools\PasswordUtil\passwordUtil-
standalone.jar" genAndEncKey JsafeJCE <CSA encryption keystore>
<CSA encryption keystore password>
<CSA encryption keystore alias>
<location and name of the encrypted symmetric key>
```

Note: If you use path separators in the `passwordUtil-standalone.jar` script options, use either a single forward slash (/) or double backward slashes (\\) as your path separator.

```
<csa_jre>/bin/java -jar $CSA_HOME/Tools/PasswordUtil/passwordUtil-standalone.jar"
genAndEncKey JsafeJCE <CSA encryption keystore>
<CSA encryption keystore password>
<CSA encryption keystore alias>
<location and name of the encrypted symmetric key>
```

When to Regenerate the CSA Encryption Keystore or Encrypted Symmetric Key

You should not regenerate the CSA encryption keystore or encrypted symmetric key unless one of the following occurs:

- The CSA encryption keystore or encrypted symmetric key was deleted and is not recoverable.
- The CSA encryption keystore or encrypted symmetric key was regenerated and the original file is not recoverable.
- The CSA encryption keystore password is not retained.

Locate your situation in the table below and perform the tasks starting at the listed step.

Situation	Start at:
Lost CSA encryption keystore	Step 1
Lost encrypted symmetric key	Step 2
Regenerated CSA encryption keystore	Step 1
Regenerated encrypted symmetric key	Step 3
Forgotten CSA encryption keystore password	Step 1

Tasks to perform:

1. Regenerate the CSA encryption keystore (see "Create a CSA Encryption Keystore" on page 11).
2. Regenerate the encrypted symmetric key (see "Generate an Encrypted Symmetric Key" on page 12).
3. Encrypt CSA passwords (see "Re-Encrypt CSA Passwords" on page 24).
4. Configure CSA properties (see "Configure CSA Properties" on page 26). As applicable, update the `keystore`, `keyAlias`, `encryptedKeyFile`, and `csaTruststorePassword` property values.
5. Reset the password for every organization's LDAP access point:

   Update the passwords for the following users in the CSA_ACCESS_POINT table in the database.

   a. Open an SQL client to your database.
   b. Run the following: `update CSA_ACCESS_POINT set password=null;`
   c. Launch the Cloud Service Management Console by typing the following URL in a supported Web browser: `https://<csahostname>:8444/csa` where *<csahostname>* is the fully-qualified domain name of the system on which the Cloud Service Management Console resides.
   d. Log in to the Cloud Service Management Console as the CSA Administrator.
   e. Click the **Organizations** tile.
   f. In the left-navigation frame, select an organization.
   g. From the organization's navigation frame, select **LDAP**.
   h. Enter the password in the **Password** and **Retype Password** fields.
   i. Click **Save Changes**.
   j. Repeat steps f - i for every organization.

welcomeCreate a New Keystore and Truststore for Secure Communication

To comply with FIPS 140-2, the keystore and truststore (that store the keys and certificates used and other applications) must support PKCS #12: Personal Information Exchange Syntax Standard (PKCS #12). You must create a new keystore and truststore for CSA for PKCS #12.

This section describes the process you should follow to obtain, install, and configure a certificate that supports PKCS #12 for use by CSA.

Perform the following tasks (described in more detail in the sections that follow the list below):

1. Create the CSA server keystore that supports PKCS #12
2. Create CSA's certificate, create a truststore that supports PKCS #12, and import certificate(s)
3. Configure the Web server
4. Import the Operations Orchestration certificate as a trusted certificate
5. Import the VMware vCenter certificate as a trusted certificate
6. Import the certificates for other applications as trusted certificates
7. Configure client browsers (optional)

Note: In the following examples, `CSA_HOME` is the directory in which CSA is installed (for example, `C:\Program Files\HPE\CSA`), the `keytool` utility is included with the JRE (you may choose to use a

different utility), and a JRE has been installed for CSA in `<csa_jre>`.

Step 1: Create a CSA Server Keystore that Supports PKCS #12

Create the CSA server keystore. For example, do the following:

1. Open a command prompt and change directories to `%CSA_HOME%`.
2. Run the following command:

   ```
   "<csa_jre>\bin\keytool" -genkey -alias csa_fips -validity 365
   -keyalg rsa -keysize 2048 -storetype PKCS12
   -keystore .\jboss-as\standalone\configuration\keystore_csaID.p12
   ```

   You can use different values for `-alias`, `-validity`, `-keysize` and `-keystore`. These instructions assume that you will use the `-alias` and `-keystore` values recommended here; you will have to adjust the commands accordingly if you use different values.
3. Enter a keystore password (referred to in this document as the CSA server keystore password).

   This password is used to control access to the keystore. This password must be the same as the password you enter for the key in task 6 of this step.
4. When you are prompted for your first and last name, enter the fully qualified domain name of the CSA server.
5. Follow the prompts to enter the remaining organization and location values.
6. Enter the keystore password you supplied earlier to use as the key password.

   Although `keytool` allows you to enter different passwords for the keystore and the key, the two passwords must be the same to work with CSA.

Step 2: Create CSA's Certificate, Create a Truststore that Supports PKCS #12, and Import Certificate(s)

This section shows examples on how to export a self-signed certificate, create a Certificate Authority-signed certificate (optional), create the CSA server truststore that supports PKCS #12, and import the certificates into the truststore and keystore.

Select the type of certificate you will be using (self-signed or Certificate Authority-signed) and complete one of the applicable sections below.

Using a Self-Signed Certificate

Export a self-signed certificate, create the CSA server truststore that supports PKCS #12, and import the self-signed certificate into the CSA server truststore. For example:

1. Open a command prompt and change directories to `%CSA_HOME%`.
2. Export a self-signed certificate by exporting CSA's certificate:
   a. Run the following command:

      ```
      "<csa_jre>\bin\keytool" -export -alias csa_fips
      -file C:\csa_fips.crt -storetype PKCS12
      -keystore .\jboss-as\standalone\configuration\keystore_csaID.p12
      ```

b. When you are prompted for a password, enter the CSA server keystore password used in step 1 (where you created the CSA server keystore that supports PKCS #12).

3. Create a truststore that supports PKCS #12 and import the self-signed certificate:
   a. Run the following command:

```
"<csa_jre>\bin\keytool" -importcert -alias csa_fips
-file C:\csa_fips.crt -trustcacerts
-keystore .\jboss-as\standalone\configuration\csa_server_truststore.p12
```

   b. When prompted, enter a truststore password (referred to in this document as the CSA server truststore password). You will need this password when you import the Operations Orchestration and other certificates.
   c. Enter `yes` when prompted to trust the certificate.

Using a Certificate Authority-Signed Certificate

Create a self-signed certificate, create a Certificate Authority-signed certificate, import the Certificate Authority-signed certificate into the CSA server keystore, create the CSA server truststore that supports PKCS #12, and import the root certificate into the CSA server truststore. For example:

1. Open a command prompt and change directories to `%CSA_HOME%`.
2. To create a Certificate Authority-signed certificate, you must create a certificate signing request and submit the certificate signing request to a Certificate Authority:
   a. From the command prompt, run the following command:

```
"<csa_jre>\bin\keytool" -certreq -alias csa_fips -file C:\csacsrfips.csr
-keystore .\jboss-as\standalone\configuration\keystore_csaID.p12
```

   b. When you are prompted for a password, enter the CSA server keystore password used in step 1 (where you created the CSA server keystore that supports PKCS #12).
   c. Submit the Certificate Signing Request (`C:\csacsrfips.csr`) to the Certified Authority following the procedure used by your organization or a third-party provider. After the submission has been processed, you will receive a Certificate Authority-signed certificate (referred to as `C:\ca_signed.crt` in the example below) and a root certificate (referred to as `C:\ca_root.crt` in the example below) for the Certificate Authority.
3. Import the Certificate Authority-signed certificate into the CSA server keystore:
   a. Open a command prompt and change directories to `%CSA_HOME%`.
   b. From the command prompt, run the following command:

```
"<csa_jre>\bin\keytool" -importcert -alias ca_signed -file C:\ca_signed.crt
-keystore .\jboss-as\standalone\configuration\keystore_csaID.p12
```

   c. When you are prompted for a password, enter the CSA server keystore password used in step 1 (where you created the CSA server keystore that supports PKCS #12).
4. Create a truststore that supports PKCS #12 and import the root certificate:
   a. From the command prompt, run the following command:

```
"<csa_jre>\bin\keytool" -importcert -alias ca_root
-file C:\ca_root.crt -trustcacerts
-keystore .\jboss-as\standalone\configuration\csa_server_truststore.p12
```

   b. When prompted, enter a truststore password (referred to in this document as the CSA server truststore password). You will need this password when you import the Operations Orchestration and other certificates.
   c. Enter `yes` when prompted to trust the certificate.

Step 3: Configure the Web Server

1. Encrypt the CSA server keystore password and datasource (database) password using the JBoss vault script. Do the following:
   a. Verify that the `%JAVA_HOME%` environment variable has been defined and that `%JAVA_HOME%` has been set to the directory in which the JRE that is used by CSA is installed (for example, `C:\Program Files\HPE\CSA\openjre`).

      Note: Do NOT enclose the value in quotation marks, even if the path name includes a space. The vault script will fail if the `JAVA_HOME` variable definition contains quotation marks.

      To verify that `%JAVA_HOME%` has been defined, from a command prompt, type:

      ```
      echo %JAVA_HOME%
      ```

   b. Create a keystore used by vault. This vault keystore is used to store the CSA keystore password.

      Note: This example saves the vault keystore and encrypted vault file in the `%CSA_HOME%\jboss-as\standalone\configuration\` directory (the contents of this directory are automatically backed up during an upgrade). You may choose to store the vault keystore and encrypted vault file in any location. However, you must remember to use those locations in subsequent steps in this task and, if those locations are not automatically backed up during upgrade, to manually back up the files before upgrade.

      i. Open a command prompt.
      ii. Run the following command:

      ```
      "<csa_jre>\bin\keytool" -genkey -alias vault -validity 365 -keyalg rsa
      -keysize 2048 -storetype JKS -keystore .\jboss-
      as\standalone\configuration\csa_vault.keystore
      ```

      where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed.

      You can use different values for `-alias`, `-validity`, `-keysize` and `-keystore`. These instructions assume that you will use the `-alias` and `-keystore` values recommended here; you will have to adjust the commands accordingly if you use different values.

      iii. Enter the vault keystore password (for example, csavault).

      This password is used to control access to the vault keystore. This password must be the same as the password you enter for the key in step e of this task.

      iv. Follow the prompts to enter your first and last name, organization, and location values.
      v. Enter the key password. Click **Enter** to use the vault keystore password you supplied earlier (for example, csavault).

      Although `keytool` allows you to enter different passwords for the keystore and the key, the two passwords must be the same to work with CSA.

   c. Run the vault script. The script will generate the masked password and the values to configure in the `standalone.xml` file in order to use the masked password.
      i. From the command prompt, type: `%CSA_HOME%\jboss-as\bin\vault`
      ii. Select **0** to start the interactive session.
      iii. Enter the following information, when prompted, to configure the vault keystore:

Prompt	Description
Directory to store encrypted files	Directory in which the vault encrypted file is stored (for example, `%CSA_HOME%\jboss-as\standalone\configuration`). Verify that a vault encrypted file (`VAULT.dat`) does not already exist in this directory. If the file exists, select a different directory.
Keystore URL	The name and location of the vault keystore (for example, `%CSA_HOME%\jboss-as\standalone\configuration\csa_vault.keystore`).
Keystore password (twice)	The password to the vault keystore (for example, csavault).
8 character salt	A random number (for example, 12345678).
Iteration count as a number	The number of times the CSA keystore password is hashed (for example, 25).
Keystore alias	The alias used to identify the CSA keystore password in the vault keystore (for example, vault).

iv. Make a copy of the vault property block that is displayed. For example, copy:

```
<vault>
   <vault-option name="KEYSTORE_URL" value="%CSA_HOME%\jboss-
as\standalone\configuration\csa_vault.keystore"/>
   <vault-option name="KEYSTORE_PASSWORD" value="MASK-2PtpNyQsI1E7t"/>
   <vault-option name="KEYSTORE_ALIAS" value="vault"/>
   <vault-option name="SALT" value="12345678"/>
   <vault-option name="ITERATION_COUNT" value="25"/>
   <vault-option name="ENC_FILE_DIR" value="%CSA_HOME%\jboss-
as\standalone\configuration\"/>
</vault>
```

You will need to add this content to the `standalone.xml` file (the exact location is described in a later step).

v. Select **0** to store a secured attribute.

vi. Enter the following information, when prompted, to generate the vault entry to use for the CSA keystore password in the `standalone.xml` file:

Prompt	Description
Secured attribute value (twice)	Enter the CSA keystore password (for example, *<HP CSA server keystore password>*).
Vault Block	Enter a name for the vault block (for example, csa_keystore).
Attribute Name	Enter the attribute being stored (for example, password).

Note the VAULT entry (for example, `VAULT::csa_keystore::password::1`). You will need this value when you configure the `standalone.xml` file.

vii. Enter **2** to exit the script.

> **Note:** The vault script converts the format of the vault keystore (for example, %CSA_HOME%\jboss-as\standalone\configuration\csa_vault.keystore) to JCEKS.

2. Open `%CSA_HOME%\jboss-as\standalone\configuration\standalone.xml` in a text editor.
3. Locate the following entry for the CSA server keystore password (this entry may have been modified):

```
<ssl>
    <keystore keystore-password="..." path="%CSA_HOME%/jboss-
as/standalone/configuration/.keystore"/>
</ssl>
```

4. Update the entry by:
   - Adding or changing the value of the password to the encrypted value of the CSA server keystore password you generated in task 1 of this step.
   - Changing the value of the path to the keystore you created in step 1 (`%CSA_HOME%\jboss-as\standalone\configuration\keystore_csaID.p12`)
   - Adding the attribute provider and setting its value to `PKCS12`

   For example:

```
<ssl>
    <keystore provider="PKCS12" path="%CSA_HOME%/jboss-
as/standalone/configuration/keystore_csaID.p12" keystore-password="${VAULT::csa_
keystore:password::1}"/>
</ssl>
```

5. Locate the following entry for the datasource password (this entry may have been modified):

```
<datasource jndi-name="java:jboss/datasources/csaDS" pool-name="mssqlDS">
   <connection-
url>jdbc:jtds:sqlserver://127.0.0.1:1433/example;ssl=request</connection-url>
   <driver>mssqlDriver</driver>
   <pool>
      <min-pool-size>10;</min-pool-size>
      <max-pool-size>200;</max-pool-size>
      <prefill>true;</prefill>
   </pool>
   <security>
      <security-domain>csa-encryption-sec;</security-domain>
   </security>
</datasource>
```

6. Replace the security-domain entry with the datasource user name and password, setting the password value to the encrypted value of the datasource password you generated in task 1 of this step. For Microsoft SQL Server, also update the `connection-url ssl` attribute value from `request` to `authenticate` (if it has not already been updated).

   For example:

```
<datasource jndi-name="java:jboss/datasources/csaDS" pool-name="mssqlDS">
   <connection-url>
      jdbc:jtds:sqlserver://127.0.0.1:1433/example;ssl=requestauthenticate
   </connection-url>
   <driver>mssqlDriver</driver>
   <pool>
```

```
      <min-pool-size>10;</min-pool-size>
      <max-pool-size>200;</max-pool-size>
      <prefill>true;</prefill>
   </pool>
   <security>
      <security-domain>csa-encryption-sec;</security-domain>
      <user-name>datasource_username</user-name>
      <password>
         ${VAULT::csa_keystore::password::1}
      </password>
   </security>
<datasource>
```

7. Locate and delete the following entry for the datasource password (this entry may have been modified):

```
<security-domain name="csa-encryption-sec" cache-type="default">
   <authentication>
      <login-module
code="org.picketbox.datasource.security.SecureIdentityLoginModule" flag="required">
         <module-option name="username" value="<old_user_name>"/>
         <module-option name="password" value="<old_encoded_password>"/>
         <module-option name="managedConnectionFactoryName"
value="jboss.jca:service=LocalTxCM,name=mssqlDS"/>
      </login-module>
   </authentication>
</security-domain>
```

8. Locate the following entry for the datasource password (this entry may have been modified):

```
<datasource enabled="true" jndi-name="java:jboss/datasources/idmDS"
jta="true" pool-name="IdMDS" use-ccm="true" use-java-context="true">
   <connection-
url>jdbc:jtds:sqlserver://127.0.0.1:1433/example;ssl=request</connection-url>
  <driver>pqsqlDriver</driver>
   <pool>
      <min-pool-size>10;</min-pool-size>
      <max-pool-size>200;</max-pool-size>
      <prefill>true</prefill>
      <use-strict-min>false</use-strict-min>
      <flush-strategy>FailingConnectionOnly</flush-strategy>
   </pool>
   <security>
      <security-domain>idm-encryption-sec;</security-domain>
  </security>
</datasource>
```

9. Replace the `security-domain` entry with the datasource user name and password. Set the password value to the encrypted value of the datasource password you generated in task 1 of this step. For Microsoft SQL Server, also update the `connection-url` ssl attribute value from request to authenticate (if it has not already been updated).

   For example:

```
<datasource jta="true" jndi-name="java:jboss/datasources/idmDS" pool-
name="IdMDS" enabled="true" use-java-context="true" use-ccm="true">
   <connection-
url>jdbc:jtds:sqlserver://127.0.0.1:1433/example;ssl=requestauthenticate
```

```
    </connection-url>
    <driver>mssqlDriver</driver>
    <pool>
       <min-pool-size>10</min-pool-size>
       <max-pool-size>200</max-pool-size>
       <prefill>true</prefill>
       <use-strict-min>false</use-strict-min>
       <flush-strategy>FailingConnectionOnly</flush-strategy>
    </pool>
   <security>
       <security-domain>idm-encryption-sec</security-domain>
       <user-name>datasource_username</user-name>
       <password>${VAULT::csa_keystore::password::1}</password>
    </security>
</datasource>
```

10. Locate and delete the following entry for the datasource password (this entry may have been modified):

```
<security-domain cache-type="default" name="idm-encryption-sec">
   <authentication>
      <login-module
code="org.picketbox.datasource.security.SecureIdentityLoginModule" flag="required">
            <module-option name="username" value="<old_user_name>"/>
            <module-option name="password" value="<old_encoded_password>"/>
            <module-option name="managedConnectionFactoryName"
value="jboss.jca:service=LocalTxCM,name=IdMDS"/>
      </login-module>
   </authentication>
</security-domain>
```

11. In standalone.xml add new properties to system-properties section. Copy this:

```
<property name="javax.net.ssl.trustStore" value="%CSA_HOME%/jboss-
as/standalone/configuration/csa_server_truststore.p12"/>
<property name="javax.net.ssl.trustStorePassword" value="${VAULT::csa_
keystore::password::1}"/> <!-- vault encrypted password for csa_server_
truststore.p12 -->
<property name="javax.net.ssl.trustStoreType" value="PKCS12"/>
<property name="jsse.enableCBCProtection" value="false"/>
<property name="com.sun.net.ssl.enableECC" value="false"/>
```

12. Add the vault property block to `<server xmlns="urn:jboss:domain:1.3">` after the `<systemproperties>` block. For example, using the example values, enter the following:

```
<server xmlns="urn:jboss:domain:1.3">
.
.
.
<system-properties>
.
.
.
</system-properties>
```

```
<vault>
   <vault-option name="KEYSTORE_URL" value="%CSA_HOME%\jboss-
as\standalone\configuration\csa_vault.keystore"/>
   <vault-option name="KEYSTORE_PASSWORD" value="MASK-2PtpNyQsI1E7t"/>
   <vault-option name="KEYSTORE_ALIAS" value="vault"/>
   <vault-option name="SALT" value="12345678"/>
   <vault-option name="ITERATION_COUNT" value="25"/>
   <vault-option name="ENC_FILE_DIR" value="%CSA_HOME%\jboss-
as\standalone\configuration\"/>
</vault>
```

Step 4: Import the Operations Orchestration Certificate as a Trusted Certificate

Because the integration of CSA and Operations Orchestration requires a secure connection, you must import the Operations Orchestration certificate.

For each system running CSA, import the root certificate of each Operations Orchestration's Certificate Authority (you must first export Operations Orchestration's certificate from Operations Orchestration's truststore and then import it into the CSA server truststore).

The following is an example of how to export the Operations Orchestration certificate and import it into the CSA server truststore.

1. On the system running Operations Orchestration, open a command prompt and change the directory to `%ICONCLUDE_HOME%`.
2. Run the following command:

   Operations Orchestration 10.x, Windows

   ```
   .\java\bin\keytool -exportcert -alias tomcat -file C:\oo.crt
   -keystore .\Central\var\security\key.store -storepass changeit
   ```

   Operations Orchestration 9.x, Windows

   ```
   .\jre1.6\bin\keytool -exportcert -alias pas -file C:\oo.crt
   -keystore .\Central\conf\rc_keystore -storepass bran507025
   ```

   where `C:\oo.crt` is an example of a filename and location used to store the exported root certificate (you can choose a different filename and location).
3. If Operations Orchestration is not running on the same system as CSA, copy `oo.crt` from the Operations Orchestration system to the system running CSA (in this example, the file is copied to `C:\`).
4. On the system running CSA, change the directory to `%CSA_HOME%` and run the following command:

   ```
   "<csa_jre>\bin\keytool" -importcert -alias pas -file C:\oo.crt
   -keystore .\jboss-as\standalone\configuration\csa_server_truststore.p12
   -storepass <CSA server truststore password>
   ```
5. When prompted to trust the certificate, enter `yes`.

Step 5: Import the Provider's Certificate as a Trusted Certificate

If you configure the access point to Matrix OE, Server Automation, VMware vCenter, or any provider in the Cloud Service Management Console to use a secure connection, you must import the provider's certificate

into the truststore.

For each system running CSA, import the root certificate of the provider's Certificate Authority into the truststore (you must first export the provider's certificate from the provider's truststore and then import it into the CSA server truststore).

The following is an example of how to import the VMware vCenter certificate into the CSA server truststore.

1. Obtain the root certificate of VMware vCenter's Certificate Authority and copy it to the system running CSA (in this example, the file is copied to `C:\vcenter.crt`).
2. On the system running CSA, change the directory to %CSA_HOME% and run the following command:

   ```
   "<csa_jre>\bin\keytool" -importcert -alias vcenter -file C:\vcenter.crt
   -keystore .\jboss-as\standalone\configuration\csa_server_truststore.p12
   -storepass <CSA server truststore password>
   ```

3. When prompted to trust the certificate, enter `yes`.

Step 6: Import the Certificates for other Applications as Trusted Certificates

If other applications, such as the database, LDAP, SMTP, Operations Orchestration Load Balancer, or Continuous Delivery Automation require a secure connection, you must import the other applications' certificates into the CSA server truststore.

The following is an example of how to import another application's certificate into the CSA server truststore.

1. Export the certificate for the application and copy the certificate file to the system running CSA.
2. Import this certificate into the CSA server truststore.

   For example, run the following command on the system running CSA:

   ```
   "<csa_jre>\bin\keytool" -importcert -alias <alias>
   -file <filename.crt> -trustcacerts -keystore
   "%CSA_HOME%\jboss-as\standalone\configuration\csa_server_truststore.p12"
   -storepass <CSA server truststore password>
   ```

Step 7: Configure Client Browsers (Optional)

If CSA's certificate is not signed by a Certificate Authority, when accessing the Cloud Service Management Console, warning messages are displayed in the browser (these messages do not affect normal operations of CSA). To avoid these warning messages, import the `csa_fips.crt` file or add an exception.

- **Microsoft Internet Explorer** and **Chrome**: From Windows Explorer, double-click on the `csa_fips.crt` file to begin the import process. Install the certificate in the Trusted Root Certification Authorities store. For information on how to import the certificate, refer to the browser's online documentation.
- **Firefox**: Add an exception by opening the browser and navigating to `https://<csahostname>:8444/csa` where *<csahostname>* is the fully-qualified domain name of the system on which CSA is running. When the **This Connection is Untrusted** page opens, select **I Understand the Risks**, click the **Add Exception** button, verify the Server Location, and click **Confirm Security Exception**. For information on how to import the certificate, see the browser's online documentation.

Re-Encrypt CSA Passwords

This section describes how to generate and replace the passwords used by CSA. You will be generating new passwords using FIPS 140-2 compliant utilities.

Note: In the following instructions, `CSA_HOME` is the directory in which CSA is installed (for example, `C:\Program Files\HPE\CSA`) and a JRE has been installed for CSA in *<csa_jre>*.

Generate and replace the passwords for the following CSA properties :

- csaTruststorePassword
- securityAdminPassword
- securityCsaReportingUserPassword
- securityTransportPassword
- securityOoInboundUserPassword
- securityCdaInboundUserPassword
- securityIdmTransportUserPassword
- securityCatalogAggregationTransportUserPassword
- securityEncryptedSigningKey
- securityCodarIntegrationUserPassword

Generate and replace the passwords for the following tools:

- Content archive tool
- Purge tool
- Process definition tool
- Provider tool
- Schema installation tool

To generate and replace existing passwords used by CSA, do the following:

1. Open a command prompt and change to the `%CSA_HOME%\Tools\PasswordUtil` directory. For example:

   ```
   C:\Program Files\HPE\CSA\Tools\PasswordUtil
   ```

2. Generate a password by running the following command (this example uses the same example names from "Create a CSA Encryption Keystore" on page 11):

   ```
   "<csa_jre>\bin\java" -jar passwordUtil-standalone.jar encrypt <password> JsafeJCE
   ../../jboss-as/standalone/configuration/csa_encryption_keystore.p12 <CSA encryption
   keystore password> csa_encryption_key
   ../../jboss-as/standalone/configuration/key.dat
   ```

   Note: The path separators used in the `passwordUtil-standalone.jar` script options are forward slashes (/). You can also use double backward slashes (\\) as your path separators.

   The encrypted value of the password is displayed.

   If you used different names for the keystore, alias, or encrypted symmetric key file, here is an example of the command without using the example names:

```
"<csa_jre>\bin\java" -jar "%CSA_HOME%\Tools\PasswordUtil\passwordUtil-
standalone.jar" encrypt <password> JsafeJCE <CSA encryption keystore>
<CSA encryption keystore password>
<CSA encryption keystore alias>
<location and name of the encrypted symmetric key>
```

Note: If you use path separators in the `passwordUtil-standalone.jar` script options, use either a single forward slash (/) or double backward slashes (\\) as your path separator.

3. To update CSA properties used by the Cloud Service Management Console, edit the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\csa.properties` file. Update the password for the following properties:
   - csaTruststorePassword
   - securityAdminPassword
   - securityCsaReportingUserPassword
   - securityTransportPassword (use the same password for the Identity Management component)
   - securityOoInboundUserPassword
   - securityCdaInboundUserPassword
   - securityIdmTransportUserPassword (use the same password for the Identity Management component and Marketplace Portal)
   - securityCatalogAggregationTransportUserPassword
   - securityEncryptedSigningKey (use the same password for the Identity Management component)
   - securityCodarIntegrationUserPassword

   See "Configure the Identity Management Component" on page 32 for more information about configuring passwords for the Identity Management component.

   Note: In the properties file, the encrypted password value must be preceded by `ENC` without any separating spaces and is enclosed in parentheses.

   For more information about these properties, refer to the *Cloud Service Automation Configuration Guide*.
4. Update the password property value defined in the database property file for the following tools:
   - Content archive tool
   - Purge tool
   - Process definition tool
   - Provider tool
   - Schema installation tool

Configure CSA Properties

To configure CSA properties for FIPS 140-2 compliance:

1. Open a command prompt and change to the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\WEB-INF\classes` directory. For example:

   `C:\Program Files\HPE\CSA\jboss-as\standalone\deployments\csa.war\WEB-INF\classes`

2. Open the `csa.properties` file in an editor.
   a. Verify that the `enableHPSSO` property is either set to false or is commented out.
   b. Configure the following properties:

Property	Description
useExternalProvider	Required. For FIPS 140-2 compliance, uncomment and set this property to true. When enabled, CSA uses the RSA BSAFE libraries to encrypt and decrypt passwords. If a password was encrypted using different libraries (for example, if the password was encrypted before this property is enabled), the resulting decrypted password will not be valid. If you cannot connect to the database after you have configured CSA for FIPS 140-2 compliance, try re-encrypting the database password in the database properties file. Default: commented out/disabled
securityProviderName	Required. The name of the FIPS 140-2 compliant provider. By default, CSA uses the RSA BSAFE provider and this property should be set to JsafeJCE.
keySize	Optional. The key size used for CSA encryption. By default, the key size is 128. If you manually enter a different key size when encrypting a password, uncomment this property and configure the value to the key size used to encrypt the passwords. **Note:** All passwords must be encrypted using the same key size. By default, the password encryption utility encrypts all passwords using a key size of 128 (even if you do not specify a key size when running the utility).
keystore	Required. The absolute path to and file name of the CSA encryption keystore. This is the keystore that supports PKCS #12 and stores the key used by CSA to encrypt and decrypt data in CSA. **Example** (this example uses the same example name from "Create a CSA Encryption Keystore" on page 11): `%CSA_HOME%/jboss-as/standalone/`

Property	Description

	`configuration/csa_encryption_keystore.p12`
	`$CSA_HOME/jboss-as/standalone/configuration/csa_encryption_keystore.p12`
	Note: Use only forward slashes (/) as your path separators.

keyAlias	Required. The alias used to identify the CSA encryption key in the CSA encryption keystore. **Example** (this example uses the same example name from "Create a CSA Encryption Keystore" on page 11): csa_encryption_key
keystorePasswordFile	Required. The absolute path to and file name of the CSA encryption keystore password. This is a temporary file that stores the CSA encryption keystore password in clear text. This file is required to start the CSA service and is automatically deleted when the service is started. The password file must contain only the following content: `keystorePassword=<CSA encryption keystore password>` where `<CSA encryption keystore password>` is the CSA encryption keystore password in clear text. **Note:** Use only forward slashes (/) as your path separators.

encryptedKeyFile	Required. The location of the CSA encrypted symmetric key.
	Example (this example uses the same example name from "Create a CSA Encryption Keystore" on page 11):
	`%CSA_HOME%/jboss-as/standalone/configuration/key.dat`
	`$CSA_HOME/jboss-as/standalone/configuration/key.dat`
	Note: Use only forward slashes (/) as your path separators.

csaTruststore	Required. The CSA keystore that stores trusted Certificate Authority certificates.
	Note: This property is located in another section of the `csa.properties` file.
	Example (this example uses the same example name of the CSA server truststore from "Create a CSA Encryption Keystore" on page 11):
	`%CSA_HOME%/jboss-as/standalone/configuration/csa_server_truststore.p12`
	`$CSA_HOME/jboss-as/standalone/`

Property	Description
	`configuration/csa_server_truststore.p12` **Note:** Use only forward slashes (/) as your path separators.
csaTruststorePassword	Required. The encrypted password of the CSA keystore (see "Encrypt a Password" on page 40 for instructions on encrypting passwords). An encrypted password is preceded by `ENC` without any separating spaces and is enclosed in parentheses. Default: No default specified **Example** `ENC(9eC7TTnB0uGOGK5U648UITcEV5AuV5T)` **Note:** This property is located in another section of the `csa.properties` file. This is the <*CSA server truststore password*> from "Create a CSA Encryption Keystore" on page 11.

3. Copy the property values from step 2b to the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\idm-security.properties` file. The property values must be the same in both files.
4. When configuring a command line tool, copy the property values from step 2b to its configuration file. Add `;ssl=authenticate` at the end of the database connection string if it is missing.
5. When executing a tool, you must add this system property `"-Djsse.enableCBCProtection=false"`.For example `"java -Djsse.enableCBCProtection=false -jar provider-tool.jar <tool parameters>"`.

   Note: Each time the tool is executed, the password file must be created for that execution. The content (format and password) must be the same that was used for the CSA startup.

Configure the Marketplace Portal

This section describes how to encrypt passwords for the Marketplace Portal.

Password Encryption

The Marketplace Portal implements password encryption via PBES2 using the NodeJS crypto library. The key is hard coded in the JavaScript (JS), but it is not directly used. Instead, the key is used to decrypt a randomly-generated key that is encrypted and saved in a keyfile, which will be protected by the file system.

Note: Make sure the file system in which the Marketplace Portal exists is protected by the operating system, so that no one without permission can read or edit files or folders.

Encrypt a Password

The Marketplace Portal provides a password utility (`passwordUtil.js`), which you use to encrypt a password and generate a keyfile.

Note: It is recommended that you use the password utility in case the keyfile is deleted or lost, or the passwords need to be re-encrypted (keyfile has changed or the password has changed).

Following is the password utility syntax.

```
./passwordUtil --help
./passwordUtil --password <password to encrypt>
```

Following is an example.

```
bin> ./passwordUtil.js
Please enter password to encrypt -password hidden-
Encrypted password is TPhdYjB72z+v+pHdscGSkQ==
```

Following is the password utility syntax.

```
cd %CSA_HOME%\portal\bin
..\..\node.js\node passwordUtil.js --help
..\..\node.js\node passwordUtil.js --password <password to encrypt>
```

Following is an example.

```
..\..\node.js\node passwordUtil.js
Please enter password to encrypt -password hidden-
Encrypted password is ENC(TPhdYjB72z+v+pHdscGSkQ==)
```

Note: If the keyfile needs to be regenerated, delete the existing keyfile, as defined in the `mpp.json` file (see next section for the exact location) and run the password utility script (it will generate a keyfile if it does not exist).

Configure Settings for Keyfile, Session ID Cookie Secret, IdM Transport User Password, and SSL Keyfile or Truststore Passphrase

1. Edit the `%CSA_HOME%\portal\conf\mpp.json` file:

```
{
   "uid": "ccue_mpp",
   "port": 8089,
   "defaultOrganizationName": "CSA_CONSUMER",
   "defaultHelpLocale": "en_US",
   "defaultHelpPage": "MarketplacePortal_HELP_CSA.htm",
    "keyfile": "%CSA_HOME%/portal/conf/keyfile",
   "rejectUnauthorized": false,
   "session": {
      "cookieSecret": "ENC(udA/d1FqxrK26qQlu5cO2w==)",
```

```
      "timeoutDuration": 1800,
      "cleanupInterval": 3600
   },
   "cart": {
      "thresholdQuantity": 20,
      "maximumQuantity": 100
   },
   "provider": {
      "url": "https://MPAVM0081.hpswlabs.adapps.hp.com:8444",
      "contextPath": "/csa/api/mpp",
      "strictSSL": true,
      "secureProtocol": "SSLv23_method",
      "ca": "C:/csa_fips.crt"
   },
   "idmProvider": {
      "url": "https://MPAVM0081.hpswlabs.adapps.hp.com:8444",
      "returnUrl": "https://MPAVM0081.hpswlabs.adapps.hp.com:8089",
      "contextPath": "/idm-service",
       "username": "idmTransportUser",
      "password": "ENC(Op4ZJjnG4F8b/jalqUA6WVzgBCGarmazThflGYeX8wY=)",
      "strictSSL": true,
      "secureProtocol": "SSLv23_method",
      "ca": "C:/csa_fips.crt"
   },
   "https": {
      "enabled": true,
      "options": {
         "passphrase": "ENC(21P/dn5zzdEAvGjEP3Su7A==)",
         "key" : "%CSA_HOME%/portal/conf/.mpp_privateKey.pem",
         "cert" : "%CSA_HOME%/portal/conf/.mpp_publicKey.pem",
         "secureProtocol" : "TLSv1_method",
         "ciphers" : "TLS_RSA_WITH_3DES_EDE_CBC_SHA:HIGH:!MD5:!aNULL:!EDH",
         "honorCipherOrder" : true
      }
   },
   "ha": {
      "enabled": false,
      "numWorkers": 2,
      "redis": {
         "options": {
           "host": "MPAVM0081.hpswlabs.adapps.hp.com",
           "port": 6379
         }
      }
   },
   "logging": {
      "console": {
         "enabled": false,
         "level": "info"
   },
```

```
    "file": {
       "enabled": true,
       "level": "info",
       "maxSizeMB": 10,
       "maxFile": 10
    },
    "cef": {
       "enabled": false,
       "address": "MPAVM0081.hpswlabs.adapps.hp.com",
       "port": 9876,
       "level": "warn"
       }
    },
    "proxy": {
       "enabled": false,
       "port": 8090,
       "contextPath": "/mpp"
    }
}
```

2. Set the following parameters:
   - `keyfile` is the location of the key file generated by the Marketplace Portal password utility (`passwordUtil.js`). When the keyfile file is not placed in the default location or with a different name, use the `--keyfile` parameter for `passwordUtil.js` and change the path in the `keyfile` parameter in the configuration.
   - `session.cookieSecret` is the secret `passphrase` to encrypt the session ID cookie on the browser. This is an encryptable field, so make sure you enclose it with `enc()`.
   - `idmProvider.password` is the transport user used to connect to Identity Management (IdM). This is an encryptable field, so make sure you enclose it with `enc()`. The default password for `idmProvider.password` is `idmTransportUser`.
   - `https.options.passphrase` is the passphrase of the SSL keyfile or truststore. This is an encryptable field, so make sure you enclose it with `enc()`. The default password for `https.options.passphrase` is `changeit`.
3. Set the correct location to the CSA web public certificate (in the CSA configuration file named `csa_fips.crt`) for the following:
   - `provider.ca`
   - `idmProvider.ca`

Note: Do not copy the encrypted password from this example, because the encryption key and salt are generated and stored in the keyfile. However, you can reuse the keyfile for multiple systems, and the encrypted password in the `mpp.json` file will be the same.

Configure TLS

The Marketplace Portal uses the NodeJS HTTPS module to enable TLS. OpenSSL is used to perform the encryption and decryption.

FIPS 140-2 supports only TLS. You must configure the Marketplace Portal to use a FIPS-compliant cipher .

To configure the Marketplace Portal to use a FIPS-compliant cipher, do the following:

1. Edit the `%CSA_HOME%\portal\conf\mpp.json` file:

```
"https": {
  "enabled": true,
  "options": {
    "passphrase": "ENC(pEYj2aVNBVUyH85PDnVjZg==))"
    "key": "../conf/.mpp_privateKey.pem",
    "cert": "../conf/.mpp_publicKey.pem",
    "secureProtocol": "TLSv1_method",
    "ciphers": "TLS_RSA_WITH_3DES_EDE_CBC_SHA:HIGH:!MD5:!aNULL:!EDH",
    "honorCipherOrder": true
  }
},
```

2. The `key` and `cert` files should be generated from the `pfx` file (`../conf/.mpp_keystore`).
3. Set the `secureProtocol` parameter to `TLSv1_method`.
4. Set the `ciphers` parameter to `TLS_RSA_WITH_3DES_EDE_CBC_SHA:HIGH:!MD5:!aNULL:!EDH`.
5. Set the `honorCipherOrder` parameter to `true`.

To generate `pem` files from the `.mpp_keystore` you can use these commands:

1. Generate a private key:

```
openssl pkcs12 -in .mpp_keystore -out .mpp_privateKey.pem -nocerts
```

2. Generate a public certificate:

```
openssl pkcs12 -in .mpp_keystore -out .mpp_publicKey.pem -nokeys
```

3. You will be asked for the password to open the `.mpp_keystore` (default is `changeit`).
4. You will be asked to set the password to secure the private key.

> **Note:** If you use a different password than the default password, encrypt this password with `passwordUtil` and replace the value of the `https.options.passphrase` with this one.

Configure the Identity Management Component

If you are using the Identity Management component, to configure the Identity Management component for FIPS 140-2 compliance, do the following:

1. "Update the applicationContext.xml File" below
2. "Re-Encrypt Passwords" on the next page
3. "Update the idm-security.properties File" on page 36
4. "Initialize the IdM Client Part in CSA" on page 37

Note: The examples in this section explain how to configure the Identity Management component that is installed on the same instance as CSA, where CSA is configured in a standalone environment. If your environment is different, files may be located in a different directory.

In the following instructions, `CSA_HOME` is the directory in which CSA is installed (for example, `C:\Program Files\HPE\CSA`) and *`<csa_jre>`* is the directory in which the JRE used by CSA has been installed.

Update the applicationContext.xml File

The `applicationContext.xml` file for the Cloud Service Management Console must be updated to be FIPS 140-2 compliant. Do the following:

1. Open the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\spring\applicationContext.xml` file in a text editor.
2. Locate the `START Standard Mode Configuration` comment and comment out the following content that appears between the `START Standard Mode Configuration` and `END Standard Mode Configuration` comments:

```
<bean id="simpleEncryptionConfiguration"
class="com.hp.csa.security.CSASimplePBEConfig" init-method="init">
</bean>

<bean id="configurationEncryptor"
class="org.jasypt.encryption.pbe.StandardPBEStringEncryptor">
  <property name="config" ref="simpleEncryptionConfiguration" />
</bean>

<bean id="propertyConfigurer" class="org.jasypt.spring.properties.
EncryptablePropertyPlaceholderConfigurer">
  <constructor-arg ref="configurationEncryptor" />
  <property name="locations">
    <list>
      <value>classpath:csa.properties</value>
      <value>classpath:swagger.properties</value>
    </list>
  </property>
</bean>
```

3. Locate the `START FIPS Mode Configuration` comment that appears immediately after the `Standard Mode Configuration` section and uncomment the following content that appears between the `START FIPS Mode Configuration` and `END FIPS Mode Configuration` comments:

```
<bean id="configurationEncryptor" class="com.hp.csa.security.util.CSASecurityHelper"
/>

<bean id="propertyConfigurer" class=
```

```
"com.hp.csa.security.CSAEncryptablePropertyPlaceholderConfigurer">
  <constructor-arg ref="configurationEncryptor" />
  <property name="locations">
    <list>
      <value>/WEB-INF/spring/applicationContext.properties</value>
    </list>
  </property>
</bean>
```

4. Locate the `START FIPS Mode Configuration` comment for the `csaTemplateFactory` bean and uncomment the following content that appears between the `START FIPS Mode Configuration` and `END FIPS Mode Configuration` comments:

   ```
   <property name="fipsEnabled" value="true" />
   ```

5. Locate the `START FIPS Mode Configuration` comment for the `keystoneTemplateFactory` bean and uncomment the following content that appears between the `START FIPS Mode Configuration` and `END FIPS Mode Configuration` comments:

   ```
   <property name="fipsEnabled" value="true" />
   ```

6. Open the `%CSA_HOME%/jboss-as/standalone/deployments/idm-service.war/WEB-INF/spring/applicationContext-factories.xml` file and remove the following `bean` XML snippet with `id="propertyConfigurerBase"`:

   ```
   <bean id="propertyConfigurerBase"
         class="org.jasypt.spring3.properties.EncryptablePropertyPlaceholderConfigurer">
       <constructor-arg ref="configurationEncryptor" />
       <property name="systemPropertiesModeName" value="SYSTEM_PROPERTIES_MODE_
   OVERRIDE" />
       <property name="searchSystemEnvironment" value="true" />
       <property name="locations">
          <list>
            <value>/WEB-INF/spring/applicationContext.properties</value>
            <value>file:${idm.properties}</value>
          </list>
       </property>
       <property name="ignoreResourceNotFound" value="true" />
   </bean>
   ```

7. Save and close the file.

Re-Encrypt Passwords

This section describes how to generate and replace the passwords used by the Identity Management component. You will be generating new passwords using FIPS 140-2 compliant utilities.

Generate and replace the passwords for the following Identity Management component properties:

- idm.csa.password
- idm.encryptedSigningKey
- idm.keystone.transportPassword
- consumer
- idmTransportUser

Note: The default password values for these properties and encrypted passwords which you set during the CSA installation are provided in the steps below.

To generate and replace existing passwords used by the Identity Management component, do the following:

1. Open a command prompt and change to the `%CSA_HOME%\Tools\PasswordUtil` directory. For example:

   ```
   C:\Program Files\HPE\CSA\Tools\PasswordUtil
   ```

2. Generate a password by running the following command (this example uses the same example names from "Create a CSA Encryption Keystore" on page 11):

   ```
   "<csa_jre>\bin\java" -jar passwordUtil-standalone.jar encrypt <password> JsafeJCE
   ../../jboss-as/standalone/configuration/csa_encryption_keystore.p12 <CSA encryption
   keystore password> csa_encryption_key
   ../../jboss-as/standalone/configuration/key.dat
   ```

   Note: The path separators used in the `passwordUtil-standalone.jar` script options are forward slashes (/). You can also use double backward slashes (\\) as your path separators.

   The encrypted value of the password is displayed.

   If you used different names for the keystore, alias, or encrypted symmetric key file, here is an example of the command without using the example names:

   ```
   "<csa_jre>\bin\java" -jar "%CSA_HOME%\Tools\PasswordUtil\passwordUtil-
   standalone.jar" encrypt <password> JsafeJCE <CSA encryption keystore>
   <CSA encryption keystore password>
   <CSA encryption keystore alias>
   <location and name of the encrypted symmetric key>
   ```

   Note: If you use path separators in the `passwordUtil-standalone.jar` script options, use either a single forward slash (/) or double backward slashes (\\) as your path separator.

3. Open the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\spring\applicationContext.properties` file in a text editor and do the following:
   a. Update the `idm.csa.password` property. `idm.csa.password` must be the same password you configured for the `securityTransportPassword` property (which is configured in the `csa.properties` file). See "Re-Encrypt CSA Passwords" on page 24 for more information about encrypting the `securityTransportPassword` password property.
   b. Update the `idm.encryptedSigningKey` property. `idm.encryptedSigningKey` must be the same password you configured for the `securityEncryptedSigningKey` property (which is configured in the `csa.properties` file). See "Re-Encrypt CSA Passwords" on page 24 for more information about encrypting the `securityEncryptedSigningKey` password property.
   c. If you are using Keystone, update the `idm.keystone.transportPassword` property. `idm.keystone.transportPassword` must be the password you configured for the user defined by the `idm.keystone.transportUsername` property and is located above the `idm.keystone.transportPassword` property.
   d. Save and close the file.
4. Open the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\csa-consumer-users.properties` file in a text editor and do the following:

a. Update the `consumer` (<password>,SERVICE_CONSUMER,ROLE_REST,enabled) and `consumerAdmin`(<password>,SERVICE_CONSUMER,ROLE_REST,ROLE_ADMIN,enabled) properties.

> **Note:** This property not only contains the password, but also the roles that control access to CSA and if the account is enabled.
> This entire value must be encrypted.

b. Save and close the file.

5. Open the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\csa-provider-users.properties` file in a text editor and do the following:

a. Update the `admin` (<password>,ROLE_REST,enabled), `csaReportingUser` (<password>,ROLE_REST,ROLE_DYNAMIC,enabled), `cdaInboundUser` (<password>,ROLE_REST,enabled), `codarIntegrationUser` (<password>,ROLE_REST,enabled), and `ooInboundUser` (<password>,ROLE_REST,enabled) properties.

> **Note:** This property not only contains the password, but also the roles that control access to CSA and if the account is enabled.
> This entire value must be encrypted.

b. Save and close the file.

6. Open the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\integrationusers.properties` file in a text editor and do the following:

a. Update the `idmTransportUser` (<password>,ROLE_ADMIN,PERM_IMPERSONATE,enabled) property.

> **Note:** This property not only contains the password, but also the roles that control access to CSA and if the account is enabled.
> This entire value must be encrypted.

The password in the `idmTransportUser` value must be the same password you configured for both the `securityIdmTransportUserPassword` property (configured in the `csa.properties` file) and the `password` attribute (configured in the idmProvider section of the `mpp.json` file). See "Re-Encrypt CSA Passwords" on page 24 for more information about encrypting the `securityIdmTransportUserPassword` password property. See "Encrypt a Marketplace Portal Password" on page 40 for more information about encrypting the `password` attribute.

b. Save and close the file.

Update the idm-security.properties File

Enable the FIPS 140-2 security settings in the `idm-security.properties` file. Do the following:

1. Open the `%CSA_HOME%\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\idm-service.properties` file in a text editor.
2. Verify that the FIPS 140-2 property values in this file are the same values that are configured in the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\csa.properties` file. You should have already copied these values (see "Configure CSA Properties" on page 26 for more information about these properties).
3. Save and close the file.

Initialize the IdM Client Part in CSA

1. In the `<CSA_HOME>/jboss-as/standalone/deployments/csa.war/WEB-INF/web.xml` file, search for FIPS and uncomment the section below

```
<!-- FIPS :: IDM Security Context listener -->
<!--
<listener>
<listener-class>com.hp.ccue.identity.config.SecurityContextListener</listener-class>
</listener>
-->
```

2. Copy the configured `idm-security.properties` file from `idm-service.war/WEB-INF/classes` to `csa.war/WEB-INF/classes`.

Start CSA

To start CSA:

1. Create a CSA encryption keystore password file. The name and location of this file must match the value configured for the `keystorePasswordFile` property in the `CSA_HOME\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\csa.properties` file.

   The password file must contain only the following content:
   `keystorePassword=<CSA encryption keystore password>`

   where `<CSA encryption keystore password>` is the CSA encryption keystore password in clear text.

   This file is automatically deleted when the CSA service is started.
2. On the server that hosts CSA, navigate to **Start** > **Administrative Tools** > **Services**.
3. Right-click on the CSA service and select **Start**.
4. Right-click on the Marketplace Portal service and select **Start**.
5. If you installed an embedded Operations Orchestration instance, right-click on the Operations Orchestration Central service and select **Start**.

After the service has started, review the log files in `%CSA_HOME%\jboss-as\standalone\log\` and verify that no TLS or keystore errors are present.

Test Secure Connections

To test the connection to the Cloud Service Management Console, on a client system, open a supported Web browser and navigate to `https://<csahostname>:8444/csa` where `<csahostname>` is the fully-qualified domain name of the system that was used when the certificate was created. If the client browser is configured to accept CSA's certificate and the Web application opens without a certificate warning, then you have successfully configured CSA to use CSA's certificate. If you did not configure the client browser to accept CSA's certificate, verify that the only certificate warning relates to the certificate not being issued by a trusted authority. If any other certificate warning is displayed, review all steps in " welcomeCreate a New Keystore and Truststore for Secure Communication" on page 14 to be sure they were followed as documented.

Chapter 4: Common CSA Tasks

This chapter provides information on how to perform common CSA tasks.

Note: Steps for starting and restarting CSA that is configured for FIPS 140-2 compliance are different from the steps to start and restart the standard CSA product.

Tasks include:

Start CSA

To start CSA:

1. Create a CSA encryption keystore password file. The name and location of this file must match the value configured for the `keystorePasswordFile` property in the `CSA_HOME\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\csa.properties` file.

   The password file must contain only the following content:
   `keystorePassword=<CSA encryption keystore password>`

   where `<CSA encryption keystore password>` is the CSA encryption keystore password in clear text.

   This file is automatically deleted when the CSA service is started.
2. On the server that hosts CSA, navigate to **Start** > **Administrative Tools** > **Services**.
3. Right-click on the CSA service and select **Start**.
4. Right-click on the Marketplace Portal service and select **Start**.
5. If you installed an embedded Operations Orchestration instance, right-click on the Operations Orchestration Central service and select **Start**.

Restart CSA

To restart CSA:

1. Create a CSA encryption keystore password file. The name and location of this file must match the value configured for the `keystorePasswordFile` property in the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\csa.properties$CSA_HOME/jboss-as/standalone/deployments/csa.war/WEB-INF/classes/csa.properties` file.

   The password file must contain only the following content:
   `keystorePassword=<CSA encryption keystore password>`

where `<CSA encryption keystore password>` is the CSA encryption keystore password in clear text. This file is automatically deleted when the CSA service is started.

2. On the server that hosts CSA, navigate to **Start** > **Administrative Tools** > **Services**.
3. Right-click on the CSA service and select **Restart**.
4. Right-click on the HP Marketplace Portal service and select **Restart**.

Stop CSA

CSA should not be running while you are configuring it to be compliant with FIPS 140-2.

To stop CSA:

1. On the server that hosts CSA, navigate to **Start** > **Administrative Tools** > **Services**.
2. Right-click on the CSA service and select **Stop**.
3. Right-click on the HP Marketplace Portal service and select **Stop**.
4. If you installed an embedded Operations Orchestration instance, right-click on the Operations Orchestration Central service and select **Stop**.

Encrypt a Password

To encrypt a password (for use with CSA configuration only; see "Encrypt a Marketplace Portal Password" below for information on how to encrypt a Marketplace Portal password):

1. Open a command prompt and change to the `%CSA_HOME%\Tools\PasswordUtil` directory. For example:

   ```
   C:\Program Files\HPE\CSA\Tools\PasswordUtil
   ```

2. Generate a password by running the following command (this example uses the same example names from "Create a CSA Encryption Keystore" on page 11):

   ```
   "<csa_jre>\bin\java" -jar passwordUtil-standalone.jar encrypt <password> JsafeJCE
   ../../jboss-as/standalone/configuration/csa_encryption_keystore.p12 <CSA encryption
   keystore password> csa_encryption_key
   ../../jboss-as/standalone/configuration/key.dat
   ```

   Note: The path separators used in the `passwordUtil-standalone.jar` script options are forward slashes (/). You can also use double backward slashes (\\) as your path separators.

   The encrypted value of the password is displayed.

   If you used different names for the keystore, alias, or encrypted symmetric key file, here is an example of the command without using the example names:

   ```
   "<csa_jre>\bin\java" -jar "%CSA_HOME%\Tools\PasswordUtil\passwordUtil-
   standalone.jar" encrypt <password> JsafeJCE <CSA encryption keystore>
   <CSA encryption keystore password>
   <CSA encryption keystore alias>
   <location and name of the encrypted symmetric key>
   ```

   Note: If you use path separators in the `passwordUtil-standalone.jar` script options, use either a single forward slash (/) or double backward slashes (\\) as your path separator.

Encrypt a Marketplace Portal Password

To encrypt a password used by the Marketplace Portal:

1. Open a command prompt and change to the `%CSA_HOME%\portal\bin` directory. For example:

   ```
   C:\Program Files\HPE\CSA\portal\bin
   ```

2. Run the following command:

   ```
   ..\..\node.js\node passwordUtil --keyfilePath <keyfile> --password <myPassword>
   ```

   where <keyfile> is the path to (absolute or relative to the bin directory) and name of the file that contains the Marketplace Portal's encrypted symmetric key (if the file does not exist, it will create the file) and <myPassword> is the password to be encrypted.

Chapter 4: Upgrade CSA

This chapter describes additional steps that must be performed during an upgrade of CSA. Follow the instructions in the *Cloud Service Automation Upgrade Guide* and refer to this guide for supplemental tasks that must be performed for FIPS 140-2 compliance.

Initial Setup

While performing the initial setup steps described in the *Cloud Service Automation Upgrade Guide*, you should also complete the following tasks:

1. Manually back up the following file outside of `varCSAHOMEwindows` (this file is not automatically restored nor backed up by the upgrade installer):

   `<csa_jre>\lib\security\java.security`

2. If you are upgrading from a CSA environment that is using an existing embedded Operations Orchestration, export the certificate from the truststore of Operations Orchestration as it is needed during the upgrade process. Do the following:

   a. Open a command prompt and navigate to a directory outside of the location where the embedded Operations Orchestration installation (for example, the embedded Operations Orchestration may be installed in `C:\Program Files\HPE\Operations Orchestration\`) AND outside of `%CSA_HOME%` in which you will store the certificate file (for example, create the directory `C:\tmp` and store the certificate file in this directory).

   b. Run the following command:

   ```
   "<csa_jre>\bin\keytool" -exportcert -keystore "C:\Program Files\HPE\Operations
   Orchestration\central\var\security\key.store" -alias tomcat -file .\<filename>
   ```

   where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed and *<file_name>* is a unique filename given to the certificate file that will be imported into CSA version 4.60 later during the upgrade process.

3. If you are upgrading from CSA version 4.20, the JRE has been upgraded in this release. You must export the certificate from the truststore of CSA 4.20 so that you may import it (at a later time during the upgrade process) into the upgraded truststore of CSA.

   To export the certificate, do the following:

   a. Open a command prompt and navigate to a directory outside of `%CSA_HOME%` in which you will store the certificate file.

   b. Run the following command:

   ```
   "<csa_jre>\bin\keytool" -exportcert -keystore "%CSA_HOME%\jboss-
   as\standalone\configuration\keystore_csaID.p12" -alias <alias> -file .\<filename>
   ```

   where `<csa_jre>` is the directory in which the JRE that is used by CSA is installed, `keystore_csaID.p12` is the keystore file defined by the `certificate-key-file` property of the connector attribute in `%CSA_HOME%\jboss-as\standalone\configuration\standalone.xml`, *<alias>* is the name used by the CSA server keystore to identify the SSL certificate, and *<file_name>* is a unique filename given to the certificate file that will be imported into CSA version 4.60 later during the upgrade process.

For example, run the following command if the JRE used by CSA version 4.20 is located in `%CSA_HOME%\jre`, the alias used to identify the certificate is `csa`, and the file the certificate is saved to is `csa.cert`:

```
"%CSA_HOME%\jre\bin\keytool" -exportcert -keystore "%CSA_HOME%\jboss-as\standalone\configuration\keystore_csaID.p12" -alias csa -file .\csa.cert
```

4. Create a CSA encryption keystore password file. The name and location of this file must match the value configured for the `keystorePasswordFile` property in the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\csa.properties` file.

   The password file must contain only the following content:
   `keystorePassword=<CSA encryption keystore password>`

   where `<CSA encryption keystore password>` is the CSA encryption keystore password in clear text.

   This file is required to start/restart the CSA service and is automatically deleted when the CSA service is started.

   The upgrade installer automatically starts the CSA service upon completion.

Run the Upgrade Installer

While running the upgrade installer as described in the *Cloud Service Automation Upgrade Guide*, you should note the following:

- While running the upgrade installer, select **Disable SSO**. Do NOT enable Single Sign-On (SSO).
- While running the upgrade installer, do NOT install the sample content. The sample content cannot be deployed during the upgrade. You must update CSA tool files after the upgrade installer has completed but before installing the sample content. Refer to "Recustomize CSA Tools" on page 49 for information about updating the CSA tool files. Refer to the *Cloud Service Automation Content Pack User's Guide* or *Cloud Service Automation Content Installation Guide* for more information about installing the sample content.

Recustomize CSA

You must recustomize CSA for the features configured, customized, or used prior to the upgrade only (complete only the tasks for features that were configured, customized, or used prior to upgrade). The following are features and files that require recustomization for FIPS 140-2 compliance. If you configured other features not listed here, you may still need to recustomize them. See the *Cloud Service Automation Upgrade Guide* for more information. If the information in this guide is different from the information presented in the *Cloud Service Automation Upgrade Guide*, use the information in this guide as it is specifically for FIPS 140-2 compliance.

The following sections describe the features that require recustomization for FIPS 140-2 compliance:

- "Recustomize CSA for FIPS 140-2 Compliance" on the next page
- "Recustomize Seeded Users" on page 47
- "Recustomize CSA Tools" on page 49

Recustomize CSA for FIPS 140-2 Compliance

The following is a list of files that you may have customized for FIPS 140-2 compliance and the actions required when you upgrade CSA. Additional information about the files is provided in the Files, Actions, and Locations section.

File	Action
applicationContext.xml	**Required.** If this file was customized, you must recustomize this file (see the applicationContext.xml table below for more information). **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
web.xml	**Required.** If you are upgrading from CSA 4.20, this is a new file that must be customized. If you are upgrading from CSA 4.50, if this file was customized, you must recustomize this file (see the web.xml table below for more information). **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
csa.properties	**Required.** If you are upgrading from CSA 4.20, new passwords have been added that must be re-encrypted. If you are upgrading from CSA 4.50 Patch 1, you do not need to re-encrypt the passwords (see the csa.properties table below for more information). **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
libeay32.dll	**Required.** There might be a newer version. Contact your HPE sales representative for the new version (see the libeay32.dll table below for more information).
node.exe	**Required.** There might be a newer version. Contact your HPE sales representative for the new version (see the node.exe table below for more information).
ssleay32.dll	**Required.** There might be a newer version. Contact your HPE sales representative for the new version (see the ssleay32.dll table below for more information).
java.security	**Required.** If this file was customized, you must recustomize this file (see table below for more information).
*.p12	No action required.
key.dat	No action required.

File	Action
standalone.xml	**Required.** If this file was customized, you must recustomize this file (see table below for more information).
idm-security.properties	No action required.

Files, Actions, and Locations

applicationContext.xml	
Action	**Required.** This file must be recustomized. See "Configure CSA for FIPS 140-2 Compliance" on page 9 for more information. **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\csa.war\WEB-INF\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\csa.war\WEB-INF\`

web.xml	
Action	**Required.** If you are upgrading from CSA 4.20, this is a new file that must be customized. If you are upgrading from CSA 4.50, if this file was customized, you must recustomize this file. **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\csa.war\WEB-INF\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\csa.war\WEB-INF\`

csa.properties	
Action	**Required.** If you are upgrading from CSA 4.20, new password properties, `securityCodarIntegrationUserPassword` and `csa.provider.es.authPassword`, have been added and must be re-encrypted. See "Encrypt a Password" on page 40 for more information about re-encrypting passwords. If you are upgrading from CSA 4.50 Patch 1, you do not need to re-encrypt the

csa.properties	
	passwords. **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\csa.war\WEB-INF\classes\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\csa.war\WEB-INF\classes\`

libeay32.dll	
Action	**Required.** There might be a newer version. Check with your HPE sales representative for the new version. If there is not a new version, manually copy the file from the backup directory to the CSA 4.60 directory.
File Location in CSA 4.60	`CSA_HOME\node.js\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\node.js\`

node.exe	
Action	**Required.** There might be a newer version. Check with your HPE sales representative for the new version. If there is not a new version, customizations made to this file are preserved in the file located in the backup directory. Manually copy the file from the backup directory to the CSA 4.60 directory.
File Location in CSA 4.60	`CSA_HOME\node.js\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\node.js\`

ssleay32.dll	
Action	**Required.** There might be a newer version. Check with your HPE sales representative for the new version.

ssleay32.dll	
	If there is not a new version, customizations made to this file are preserved in the file located in the backup directory. Manually copy the file from the backup directory to the CSA 4.60 directory.
File Location in CSA 4.60	`CSA_HOME\node.js\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\node.js\`

java.security	
Action	**Required.** This file must be recustomized. See "Configure CSA for FIPS 140-2 Compliance" on page 9 for more information.
File Location in CSA 4.60	`CSA_JRE_HOME\lib\security\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	This file is not backed up. You should have manually backed this file up prior to running the upgrade installer.

***.p12**	
Action	No action required.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\configuration\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\security\`

key.dat	
Action	No action required.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\configuration\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\security\`

standalone.xml	
Action	**Required.** If this file was customized, you must recustomize this file. See "Configure CSA for FIPS 140-2 Compliance" on page 9 for more information.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\configuration\`

standalone.xml	
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\configuration\` If you are upgrading a system running a remote Marketplace Portal: `C:\csabackup\`

idm-security.properties	
Action	No action required. If this file was customized, the customizations have been merged with the upgraded file.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\idm-service.war\WEB-INF\classes\`

Recustomize Seeded Users

The following is a list of files that you may have customized if you modified or added seeded users and the actions required when you upgrade CSA. Additional information about the files is provided in the Files, Actions, and Locations section.

File	Action
applicationContext-security.xml	**Required.** If this file was customized, you must recustomize this file (see table below for more information).
csa-consumer-users.properties	**Required.** You must recustomize this file (see table below for more information. **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
csa-provider-users.properties	**Required.** You must recustomize this file (see table below for more information. **Note:** If you are upgrading a system running a remote Marketplace Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
integrationusers.properties	**Required.** You must recustomize this file (see table below for more information. **Note:** If you are upgrading a system running a remote Marketplace

File	Action
	Portal, no action is required. This file is not used on a system that has only the remote Marketplace Portal installed.
applicationContext.properties	**Required.** You must recustomize this file (see table below for more information.

Files, Actions, and Locations

applicationContext-security.xml	
Action	**Required.** If this file was customized, you must recustomize this file. If you do not remember the customizations you made to the file, refer to the backed up copy and compare it to the file installed with CSA 4.60. **Caution:** Do NOT copy the backed up file over the new file. The file has changed in CSA 4.60 and the backed up file does not contain all the required attributes for the current version.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\csa.war\WEB-INF\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\csa.war\WEB-INF\`

csa-consumer-users.properties	
Action	**Required.** You must re-encrypt the roles and password for each user configured in this file. If you customized the roles or password or added a user, you must restore those customizations before re-encrypting the roles and password. See "Encrypt a Password" on page 40 for more information about re-encrypting the roles and password.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\idm-service.war\WEB-INF\classes\`

csa-provider-users.properties	
Action	**Required.** You must re-encrypt the roles and password for each user configured in this file. If you customized the roles or password or added a user, you must restore those customizations before re-encrypting the roles and password. See "Encrypt a Password"

csa-provider-users.properties	
	on page 40 for more information about re-encrypting the roles and password.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\idm-service.war\WEB-INF\classes\`

integrationusers.properties	
Action	**Required.** You must re-encrypt the roles and password for each user configured in this file. If you customized the roles or password or added a user, you must restore those customizations before re-encrypting the roles and password. Refer to "Encrypt a Password" on page 40 for more information about re-encrypting the roles and password.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\idm-service.war\WEB-INF\classes\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\idm-service.war\WEB-INF\classes\`

applicationContext.properties	
Action	**Required.** You must re-encrypt the passwords configured in this file. Refer to "Encrypt a Password" on page 40 for more information about re-encrypting passwords.
File Location in CSA 4.60	`CSA_HOME\jboss-as\standalone\deployments\idm-service.war\WEB-INF\spring\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`CSA_HOME\_CSA_4_60_0_installation\Backup\standalone\idm-service.war\WEB-INF\spring\`

Recustomize CSA Tools

The following is a list of files that you may have customized if you ran any of the CSA tools and the actions required when you upgrade CSA. Additional information about the files is provided in the Files, Actions, and Locations section.

File	Action
config.properties (Content Archive Tool, Purge Tool, LDAP Configuration Tool, Provider Configuration Tool)	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory (see table below for more information).
config.properties.ldap (LDAP Configuration Tool)	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory (see table below for more information).
db.config.properties (Health Tool)	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory (see table below for more information).
db.properties (Process Definition Tool, Schema Installation Tool)	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory (see table below for more information).
HPOOInfoInput.xml (Process Definition Tool)	**Required.** Manually copy any custom input files from the backup directory to the CSA 4.60 directory (see table below for more information).
ldap.config.properties (Health Tool)	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory (see table below for more information).
provider.xml (Provider Configuration Tool)	**Required.** Manually copy any custom input files from the backup directory to the CSA 4.60 directory (see table below for more information).

Files, Actions, and Locations

config.properties	
Action	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory. This is the generic name of the configuration file used in some examples for the Content Archive Tool, Purge Tool, LDAP Configuration Tool, and Provider Configuration Tool. If you used a different name for the configuration file, copy that file instead.

File Location in CSA 4.60	`%CSA_HOME%\Tools\ContentArchiveTool\`
	`%CSA_HOME%\Tools\DBPurgeTool\`
	`%CSA_HOME%\Tools\LdapTool\`
	`%CSA_HOME%\Tools\ProviderTool\`

Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\ContentArchiveTool\`
	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\DBPurgeTool\`
	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\LdapTool\`
	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\ProviderTool\`

config.properties.ldap	
Action	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory. This is the generic name of the configuration file used in some examples for the LDAP Configuration Tool. If you used a different name for the configuration file, copy that file instead.
File Location in CSA 4.60	`%CSA_HOME%\Tools\LdapTool\`
Backed Up CSA 4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\LdapTool\`

db.config.properties	
Action	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory. This is the generic name of the configuration file used in some examples for the Health Tool. If you used a different name for the configuration file, copy that file instead.
File Location in CSA 4.60	`%CSA_HOME%\Tools\HealthTool\`
Backed Up CSA 4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\HealthTool\`

db.properties	
Action	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory. This is the generic name of the configuration file used in some examples for the Process Definition Tool and Schema Installation Tool. If you used a different name for the configuration file, copy that file instead.
File Location in CSA 4.60	`%CSA_HOME%\Tools\ProcessDefinitionTool\` `%CSA_HOME%\Tools\SchemaInstallationTool\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\ProcessDefinitionTool\` `%CSA_HOME%\_CSA_4_60_0_installation\Backup\SchemaInstallationTool\`

HPOOInfoInput.xml	
Action	**Required.** Manually copy any custom input files from the backup directory to the

HPOOInfoInput.xml	
	CSA 4.60 directory. This is the generic name of the input file used in some examples for the Process Definition Tool. If you used a different name for the input file, copy that file instead.
File Location in CSA 4.60	`%CSA_HOME%\Tools\ProcessDefinitionTool\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\ProcessDefinitionTool\`

ldap.config.properties	
Action	**Required.** Manually copy any custom configuration files from the backup directory to the CSA 4.60 directory. This is the generic name of the configuration file used in some examples for the Health Tool. If you used a different name for the configuration file, copy that file instead.
File Location in CSA 4.60	`%CSA_HOME%\Tools\HealthTool\`
Backed Up CSA 4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\HealthTool\`

provider.xml	
Action	**Required.** Manually copy any custom provider input files from the backup directory to the CSA 4.60 directory. This is the generic name of the input file used in some examples for the Provider Configuration Tool. If you used a different name for the provider input file, copy that file instead.
File Location in CSA 4.60	`%CSA_HOME%\Tools\ProviderTool\`
Backed Up CSA 4.20/4.50 File Location in CSA 4.60	`%CSA_HOME%\_CSA_4_60_0_installation\Backup\ProviderTool\`

Appendix A: Examples Used in this Document

The following table is a quick reference to the items and values used in the FIPS 140-2 examples. Also included are the names used in this document to reference the items. If you choose to use different values for these items, you must substitute the different value in all of the FIPS 140-2 examples in this document.

Item	Referenced as	Description	Value Used in Examples
Directory where CSA is installed	`%CSA_HOME%` `$CSA_HOME`	The directory in which the CSA product is installed.	`C:\Program Files\HPE\CSA`
Directory where the JRE used by CSA is installed	*<csa_jre>*	The directory in which the JRE used by CSA is installed. For example, `C:\Program Files\Java\CSAjre\jre`.	*<csa_jre>*
Keystore for encryption	CSA encryption keystore	The keystore that stores the keypair that is used to encrypt and decrypt CSA's symmetric key (also known as the secret key). CSA's symmetric key is used to encrypt and decrypt CSA's data.	`%CSA_HOME%\jboss-as\standalone\configuration\csa_encryption_keystore.p12`
Keystore alias for encryption	CSA encryption keystore alias	The alias is a name assigned to identify a keypair in the CSA encryption keystore. This keypair is used by CSA to encrypt and decrypt CSA's symmetric key.	csa_encryption_key
Key for encryption	CSA encryption keystore file or encrypted symmetric key	This is the file containing CSA's encrypted symmetric key and used by CSA to encrypt and decrypt data in CSA.	`%CSA_HOME%\jboss-as\standalone\configuration\key.dat`
Keystore password for encryption	CSA encryption keystore password	This is the password used to access the CSA encryption keystore.	*<CSA encryption keystore password>*
Keystore for secure communication	CSA server keystore	This is a file that stores the keypair used for secure communication and is the identity of the CSA server.	`%CSA_HOME%\jboss-as\standalone\configuration\keystore_csaID.p12`

Item	Referenced as	Description	Value Used in Examples
Keystore alias for secure communication	CSA server keystore alias	The alias is a name assigned to identify the CSA TLS keypair. When used with keytool's `-export` option, the alias is the name used by the CSA server keystore to identify the certificate.	csa_fips
Keystore password for secure communication	CSA server keystore password	This is the password used to access the CSA server keystore.	<*CSA server keystore password*>
Certificate for CSA	CSA's certificate	This is the certificate for CSA that must be imported into an application's truststore if CSA communicates with this application using TLS.	`C:\csa_fips.crt`
Truststore for secure communication	CSA server truststore	This is the truststore that holds all certificates for trusted applications that communicate with CSA using TLS.	`%CSA_HOME%\jboss-as\standalone\configuration\csa_server_truststore.p12`
Truststore alias for secure communication	CSA server truststore alias	When used with keytool's `-import` option, the alias is a name assigned to identify the certificate imported into the CSA truststore. Typically the truststore alias is identical to the keystore alias used to generate the certificate.	csa_fips (alias for CSA's certificate) pas (alias for the root certificate of Operations Orchestration's Certificate Authority)
Truststore password for secure communication	CSA server truststore password	This is the password used to access the CSA server truststore.	<*CSA server truststore password*>

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