



# Managing Certificates and Server Security

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## Managing the Server Certificate

You can generate a certificate signing request (CSR) to obtain a new certificate, and you can upload the new certificate to the Cisco IMC to replace the current server certificate. The server certificate may be signed either by a public Certificate Authority (CA), such as Verisign, or by your own certificate authority. The generated certificate key length is 2048 bits.



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**Note** Before performing any of the following tasks in this chapter, ensure that the Cisco IMC time is set to the current time.

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### Procedure

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- Step 1** Generate the CSR from the Cisco IMC.
- Step 2** Submit the CSR file to a certificate authority that will issue and sign your certificate. If your organization generates its own self-signed certificates, you can use the CSR file to generate a self-signed certificate.
- Step 3** Upload the new certificate to the Cisco IMC.

**Note** The uploaded certificate must be created from a CSR generated by the Cisco IMC. Do not upload a certificate that was not created by this method.

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# Generating a Certificate Signing Request



**Note** Do not use special characters (For example ampersand (&)) in the **Common Name** and **Organization Unit** fields.

## Before you begin

- You must log in as a user with admin privileges to configure certificates.
- Ensure that the Cisco IMC time is set to the current time.

## Procedure

**Step 1** In the **Navigation** pane, click the **Admin** menu.

**Step 2** In the **Admin** menu, click **Certificate Management**.

**Step 3** In the **Actions** area, click the **Generate New Certificate Signing Request** link.

The **Generate New Certificate Signing Request** dialog box appears.

**Step 4** In the **Generate New Certificate Signing Request** dialog box, update the following properties:

| Name                                | Description  |
|-------------------------------------|--|
| <b>Common Name</b> field            | <p>The fully qualified name of the Cisco IMC.</p> <p>By default the CN of the servers appears in CXXX-YYYYYY format, where XXX is the model number and YYYYYY is the serial number of the server.</p> <p>When you upgrade to latest version, CN is retained as is.</p>   |
| <b>Subject Alternate Name (SAN)</b> | <p>You can now provide additional input parameter for Subject Alternate Name. This allows various values to be associated using the subject field of the certificate.</p> <p>The various options of SAN includes:</p> <ul style="list-style-type: none"> <li>• Email</li> <li>• DNS name</li> <li>• IP address</li> <li>• Uniform Resource Identifier (URI)</li> </ul> <p><b>Note</b> This field is optional. You can configure any number of SAN instances of each type, but all together the instances count must not exceed 10.</p> |
| <b>Organization Name</b> field      | The organization requesting the certificate.   |

| Name                                | Description   |
|-------------------------------------|---|
| <b>Organization Unit</b> field      | The organizational unit.  |
| <b>Locality</b> field               | The city or town in which the company requesting the certificate is headquartered.  |
| <b>State Name</b> field             | The state or province in which the company requesting the certificate is headquartered.   |
| <b>Country Code</b> drop-down list  | The country in which the company resides.   |
| <b>Email</b> field                  | The email contact at the company.   |
| <b>Signature Algorithm</b>          | <p>Allows you to select the signature algorithm for generating certificate signing request. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• SHA384</li> <li>• SHA1</li> <li>• SHA256</li> <li>• SHA512</li> </ul> <p>The default signature algorithm selected for generating certificate signing request is SHA384.</p>  |
| <b>Challenge Password</b> check box | <p>A <b>Challenge Password</b> is to be embedded in the Certificate Signing Request (CSR) dialog box, which the issuer Certificate Authority (CA) uses to authenticate the certificate.</p> <p>If <b>Challenge Password</b> option is selected, then <b>Challenge Password String</b> will be populated for the user to enter the valid password string.</p> <p><b>Note</b> The user has an option not to select the <b>Challenge Password</b> in which case the <b>Challenge Password String</b> is not populated. However, the user can proceed with generating the CSR successfully.</p> |
| <b>String Mask</b> drop-down list   | <p>This sets a mask for permitted string types in Certificate Signing Request (CSR) dialog box. This option masks out the use of certain string types in certain fields. The string types are as follows:</p> <ul style="list-style-type: none"> <li>• <b>Default:</b> Uses PrintableString, T61String, BMPString.</li> <li>• <b>pkix:</b> Uses PrintableString, BMPString.</li> <li>• <b>utf8only:</b> Uses only UTF8Strings.</li> <li>• <b>nombstr:</b> Uses PrintableString, T61String (no BMPStrings or UTF8Strings).</li> </ul>  |

| Name                              | Description  |
|-----------------------------------|--|
| Self Signed Certificate check box | <p>Generates a Self Signed Certificate.</p> <p><b>Warning</b> After successful certificate generation, the Cisco IMC Web GUI restarts. Communication with the management controller may be lost momentarily and you will need to re-login.</p> <p><b>Note</b> If enabled, CSR is generated, signed and uploaded automatically.</p> |

**Note** If Self-signed certificate is enabled, ignore steps 5 and 6.

**Step 5** Click **Generate CSR**.

The **Opening csr.txt** dialog box appears.

**Step 6** Perform any one of the following steps to manage the CSR file, csr.txt:

- a) Click **Open With** to view csr.txt.
- b) Click **Save File** and then click **OK** to save csr.txt to your local machine.

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#### What to do next

- Submit the CSR file to a certificate authority that will issue and sign your certificate. If your organization generates its own self-signed certificates, you can use the CSR file to generate a self-signed certificate.
- Ensure that the certificate is of type **Server**.

## Creating a Self-Signed Certificate

As an alternative to using a public Certificate Authority (CA) to generate and sign a server certificate, you can operate your own CA and sign your own certificates. This section shows commands for creating a CA and generating a server certificate using the OpenSSL certificate server running on Linux. For detailed information about OpenSSL, see <http://www.openssl.org>.




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**Note** These commands are to be entered on a Linux server with the OpenSSL package, not in the Cisco IMC.

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#### Before you begin

- Obtain and install a certificate server software package on a server within your organization.
- Ensure that the Cisco IMC time is set to the current time.

**Procedure**

|               | <b>Command or Action</b>   | <b>Purpose</b>  |
|---------------|--|---|
| <b>Step 1</b> | <p><b>openssl genrsa -out CA_keyfilename keysize</b></p> <p><b>Example:</b></p> <pre># openssl genrsa -out ca.key 2048</pre>   | <p>This command generates an RSA private key that will be used by the CA.</p> <p><b>Note</b> To allow the CA to access the key without user input, do not use the -des3 option for this command.</p> <p>The specified file name contains an RSA key of the specified key size.</p>  |
| <b>Step 2</b> | <p><b>openssl req -new -x509 -days numdays -key CA_keyfilename -out CA_certfilename</b></p> <p><b>Example:</b></p> <pre># openssl req -new -x509 -days 365 -key ca.key -out ca.crt</pre>   | <p>This command generates a new self-signed certificate for the CA using the specified key. The certificate is valid for the specified period. The command prompts the user for additional certificate information.</p> <p>The certificate server is an active CA.</p>  |
| <b>Step 3</b> | <p><b>echo "nsCertType = server" &gt; openssl.conf</b></p> <p><b>Example:</b></p> <pre># echo "nsCertType = server" &gt; openssl.conf</pre>  | <p>This command adds a line to the OpenSSL configuration file to designate the certificate as a server-only certificate. This designation is a defense against a man-in-the-middle attack, in which an authorized client attempts to impersonate the server.</p> <p>The OpenSSL configuration file openssl.conf contains the statement "nsCertType = server".</p> |
| <b>Step 4</b> | <p><b>openssl x509 -req -days numdays -in CSR_filename -CA CA_certfilename -set_serial 04 -CAkey CA_keyfilename -out server_certfilename -extfile openssl.conf</b></p> <p><b>Example:</b></p> <pre># openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 04 -CAkey ca.key -out myserver05.crt -extfile openssl.conf</pre> | <p>This command directs the CA to use your CSR file to generate a server certificate.</p> <p>Your server certificate is contained in the output file.</p>   |
| <b>Step 5</b> | <p><b>openssl x509 -noout -text -purpose -in &lt;cert file&gt;</b></p> <p><b>Example:</b></p> <pre>openssl x509 -noout -text -purpose -in &lt;cert file&gt;</pre>  | <p>Verifies if the generated certificate is of type <b>Server</b>.</p> <p><b>Note</b> If the values of the fields <b>Server SSL</b> and <b>Netscape SSL</b> server are not yes, ensure that openssl.conf is configured to generate certificates of type server.</p>   |
| <b>Step 6</b> | <p>(Optional) If the generated certificate does not have the correct validity dates, ensure the Cisco IMC time is set to the current time, and</p>   | <p>Certificate with the correct validity dates is created.</p>  |

|  | Command or Action  | Purpose |
|--|--|---------|
|  | regenerate the certificate by repeating steps 1 through 5. |         |

### Example

This example shows how to create a CA and to generate a server certificate signed by the new CA. These commands are entered on a Linux server running OpenSSL.

```
# /usr/bin/openssl genrsa -out ca.key 2048
Generating RSA private key, 2048 bit long modulus
.....+++++
.....+++++
e is 65537 (0x10001)
# /usr/bin/openssl req -new -x509 -days 365 -key ca.key -out ca.crt
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
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Country Name (2 letter code) [GB]:US
State or Province Name (full name) [Berkshire]:California
Locality Name (eg, city) [Newbury]:San Jose
Organization Name (eg, company) [My Company Ltd]:Example Incorporated
Organizational Unit Name (eg, section) []:Unit A
Common Name (eg, your name or your server's hostname) []:example.com
Email Address []:admin@example.com
# echo "nsCertType = server" > openssl.conf
# /usr/bin/openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 01
-CAkey ca.key -out server.crt -extfile openssl.conf
Signature ok
subject=/C=US/ST=California/L=San Jose/O=Example Inc./OU=Unit
A/CN=example.com/emailAddress=john@example.com
Getting CA Private Key
#
```

### What to do next

Upload the new certificate to the Cisco IMC.

## Creating a Self-Signed Certificate Using Windows

### Before you begin

- You must log in as a user with admin privileges to configure certificates.
- Ensure that the Cisco IMC time is set to the current time.

### Procedure

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- Step 1** Open **IIS Manager** and navigate to the level you want to manage.
- Step 2** In the **Features** area, double-click **Server Certificate**.
- Step 3** In the **Action** pane, click **Create Self-Signed Certificate**.
- Step 4** On the **Create Self-Signed Certificate** window, enter name for the certificate in the **Specify a friendly name for the certificate** field.
- Step 5** Click **Ok**.
- Step 6** (Optional) If the generated certificate does not have the correct validity dates, ensure the Cisco IMC time is set to the current time, and regenerate the certificate by repeating steps 1 through 5. Certificate with the correct validity dates is created.
- 

## Uploading a Server Certificate

You can either browse and select the certificate to be uploaded to the server or copy the entire content of the signed certificate and paste it in the **Paste certificate content** text field and upload it.

### Before you begin

- You must log in as a user with admin privileges to upload a certificate.
- The certificate file to be uploaded must reside on a locally accessible file system.
- Ensure that the generated certificate is of type server.
- The following certificate formats are supported:
  - .crt
  - .cer
  - .pem



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**Note** You must first generate a CSR using the Cisco IMC Certificate Management menu, and you must use that CSR to obtain the certificate for uploading. Do not upload a certificate that was not obtained by this method.

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### Procedure

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- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Certificate Management**.
- Step 3** In the **Actions** area, click **Upload Server Certificate**.
- The **Upload Certificate** dialog box appears.

**Step 4** In the **Upload Certificate** dialog box, update the following properties:

| Name  | Description  |
|---|--|
| <b>File</b> field                             | The certificate file you want to upload.   |
| <b>Browse</b> button                          | Opens a dialog box that allows you to navigate to the appropriate certificate file.  |
| <b>Paste Certificate content</b> radio button | Opens a dialog box that allows you to copy the entire content of the signed certificate and paste it in the <b>Paste certificate content</b> text field.<br><br><b>Note</b> Ensure the certificate is signed before uploading. |
| <b>Upload Certificate</b> button              | Allows you to upload the certificate.  |

**Step 5** Click **Upload Certificate**.

## Key Management Interoperability Protocol

Key Management Interoperability Protocol (KMIP) is a communication protocol that defines message formats to handle keys or classified data on a key management server. KMIP is an open standard and is supported by several vendors. Key management involves multiple interoperable implementations, so a KMIP client works effectively with any KMIP server.



**Note** The KMIP feature is supported only on the C220 M4, C240 M4 and S3260 M4 servers.

Self-Encrypting Drives (SEDs) contain hardware that encrypts incoming data and decrypts outgoing data in realtime. A drive or media encryption key controls this function. However, the drives need to be locked in order to maintain security. A security key identifier and a security key (key encryption key) help achieve this goal. The key identifier provides a unique ID to the drive.

Different keys have different usage requirements. Currently, the responsibility of managing and tracking local keys lies primarily with the user, which could result in human error. The user needs to remember the different keys and their functions, which could prove to be a challenge. KMIP addresses this area of concern to manage the keys effectively without human involvement.

## Downloading a Client Certificate

### Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** On the **Server** tab, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Download Client Certificate**.

**Step 5** In the **Download Client Certificate** dialog box, complete these fields:

| Name   | Description   |
|--|---|
| <p><b>Download From Remote Location</b> radio button</p>   | <p>Selecting this option allows you to choose the certificate from a remote location and download it. Enter the following details:</p> <ul style="list-style-type: none"> <li>• <b>TFTP Server</b></li> <li>• <b>FTP Server</b></li> <li>• <b>SFTP Server</b></li> <li>• <b>SCP Server</b></li> <li>• <b>HTTP Server</b></li> </ul> <p><b>Note</b> If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> <li>• <b>Server IP/Hostname</b> field — The IP address or hostname of the server on which the client certificate file should be stored. Depending on the setting in the <b>Download Certificate from</b> drop-down list, the name of the field may vary.</li> <li>• <b>Path and Filename</b> field — The path and filename Cisco IMC should use when downloading the file to the remote server.</li> <li>• <b>Username</b> field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP.</li> <li>• <b>Password</b> field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP.</li> </ul> |
| <p><b>Download Through Browser Client</b> radio button</p> | <p>Selecting this option allows you to navigate to the certificate stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a <b>Browse</b> button that lets you navigate to the file you want to import.</p>  |
| <p><b>Paste Content</b> radio button</p>                   | <p>Selecting this option allows you to copy the entire content of the signed certificate and paste it in the <b>Paste Certificate Content</b> text field.</p> <p><b>Note</b> Ensure the certificate is signed before uploading.</p>   |

## Exporting a Client Certificate

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** On the **Server** tab, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Export Client Certificate**.
- Step 5** In the **Export Client Certificate** dialog box, complete these fields:

| Name                             | Description   |
|----------------------------------|---|
| <b>Export to Remote Location</b> | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> <li>• <b>TFTP Server</b></li> <li>• <b>FTP Server</b></li> <li>• <b>SFTP Server</b></li> <li>• <b>SCP Server</b></li> <li>• <b>HTTP Server</b></li> </ul> <p><b>Note</b> If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> <li>• <b>Server IP/Hostname</b> field — The IP address or hostname of the server on which the certificate file should be exported. Depending on the setting in the <b>Download Certificate from</b> drop-down list, the name of the field may vary.</li> <li>• <b>Path and Filename</b> field — The path and filename Cisco IMC should use when downloading the certificate from the remote server.</li> <li>• <b>Username</b> field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP.</li> <li>• <b>Password</b> field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP.</li> </ul> |

| Name                 | Description   |
|----------------------|---|
| Export to Local File | Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it. |

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## Deleting a Client Certificate

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
  - Step 2** In the **Compute** menu, select a server.
  - Step 3** On the **Server** tab, click **Secure Key Management**.
  - Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Delete Client Certificate**.
  - Step 5** At the prompt, click **OK** to delete the client certificate, or **Cancel** to cancel the action.
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## Downloading a Client Private Key

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** On the **Server** tab, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Download Client Private Key**.
- Step 5** In the **Download Client Private Key** dialog box, complete these fields:

| Name   | Description  |
|--|--|
| <p><b>Download From Remote Location</b> radio button</p>   | <p>Selecting this option allows you to choose the private key from a remote location and download it. Enter the following details:</p> <ul style="list-style-type: none"> <li>• <b>TFTP Server</b></li> <li>• <b>FTP Server</b></li> <li>• <b>SFTP Server</b></li> <li>• <b>SCP Server</b></li> <li>• <b>HTTP Server</b></li> </ul> <p><b>Note</b> If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> <li>• <b>Server IP/Hostname</b> field — The IP address or hostname of the server on which the client private key should be stored. Depending on the setting in the <b>Download Certificate From</b> drop-down list, the name of the field may vary.</li> <li>• <b>Path and Filename</b> field — The path and filename Cisco IMC should use when downloading the file to the remote server.</li> <li>• <b>Username</b> field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP.</li> <li>• <b>Password</b> field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP.</li> </ul> |
| <p><b>Download Through Browser Client</b> radio button</p> | <p>Selecting this option allows you to navigate to the private key stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a <b>Browse</b> button that lets you navigate to the file you want to import.</p>   |
| <p><b>Paste Content</b> radio button</p>                   | <p>Selecting this option allows you to copy the entire content of the signed private key and paste it in the <b>Paste Private Key Content</b> text field.</p>  |

What to do next

## Exporting a Client Private Key

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** On the **Server** tab, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Export Client Private Key**.
- Step 5** In the **Export Client Private Key** dialog box, complete these fields:

| Name                             | Description   |
|----------------------------------|---|
| <b>Export to Remote Location</b> | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> <li>• <b>TFTP Server</b></li> <li>• <b>FTP Server</b></li> <li>• <b>SFTP Server</b></li> <li>• <b>SCP Server</b></li> <li>• <b>HTTP Server</b></li> </ul> <p><b>Note</b> If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> <li>• <b>Server IP/Hostname</b> field — The IP address or hostname of the server on which the certificate file should be exported. Depending on the setting in the <b>Download Certificate from</b> drop-down list, the name of the field may vary.</li> <li>• <b>Path and Filename</b> field — The path and filename Cisco IMC should use when downloading the certificate from the remote server.</li> <li>• <b>Username</b> field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP.</li> <li>• <b>Password</b> field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP.</li> </ul> |

| Name                 | Description   |
|----------------------|---|
| Export to Local File | Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it. |

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## Deleting a Client Private Key

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
  - Step 2** In the **Compute** menu, select a server.
  - Step 3** On the **Server** tab, click **Secure Key Management**.
  - Step 4** In the **Actions** area of the **Secure Key Management** pane, click **Delete Client Private Key**.
  - Step 5** At the prompt, click **OK** or **Cancel** to delete the client private key, or cancel the action.
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## Downloading a Root CA Certificate

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** On the **Server** tab, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Download Root CA Certificate**.
- Step 5** In the **Download Root CA Certificate** dialog box, complete these fields:

| Name   | Description  |
|--|--|
| <p><b>Download From Remote Location</b> radio button</p>   | <p>Selecting this option allows you to choose the certificate from a remote location and download it. Enter the following details:</p> <ul style="list-style-type: none"> <li>• <b>TFTP Server</b></li> <li>• <b>FTP Server</b></li> <li>• <b>SFTP Server</b></li> <li>• <b>SCP Server</b></li> <li>• <b>HTTP Server</b></li> </ul> <p><b>Note</b> If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> <li>• <b>Server IP/Hostname</b> field — The IP address or hostname of the server on which the root CA certificate file should be stored. Depending on the setting in the <b>Download Certificate from</b> drop-down list, the name of the field may vary.</li> <li>• <b>Path and Filename</b> field — The path and filename Cisco IMC should use when downloading the file to the remote server.</li> <li>• <b>Username</b> field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP.</li> <li>• <b>Password</b> field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP.</li> </ul> |
| <p><b>Download Through Browser Client</b> radio button</p> | <p>Selecting this option allows you to navigate to the certificate stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a <b>Browse</b> button that lets you navigate to the file you want to import.</p>   |
| <p><b>Paste Content</b> radio button</p>                   | <p>Selecting this option allows you to copy the entire content of the signed certificate and paste it in the <b>Paste Certificate Content</b> text field.</p> <p><b>Note</b> Ensure the certificate is signed before uploading.</p>  |

## Exporting a Root CA Certificate

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** On the **Server** tab, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Export Root CA Certificate**.
- Step 5** In the **Export Root CA Certificate** dialog box, complete these fields:

| Name                                    | Description   |
|---|---|
| <p><b>Export to Remote Location</b></p> | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> <li>• <b>TFTP Server</b></li> <li>• <b>FTP Server</b></li> <li>• <b>SFTP Server</b></li> <li>• <b>SCP Server</b></li> <li>• <b>HTTP Server</b></li> </ul> <p><b>Note</b> If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> <li>• <b>Server IP/Hostname</b> field — The IP address or hostname of the server on which the certificate file should be exported. Depending on the setting in the <b>Download Certificate from</b> drop-down list, the name of the field may vary.</li> <li>• <b>Path and Filename</b> field — The path and filename Cisco IMC should use when downloading the certificate from the remote server.</li> <li>• <b>Username</b> field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP.</li> <li>• <b>Password</b> field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP.</li> </ul> |

| Name                 | Description   |
|----------------------|---|
| Export to Local File | Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it. |

## Deleting a Root CA Certificate

### Procedure

- 
- Step 1** In the **Navigation** pane, click the **Compute** menu.
  - Step 2** In the **Compute** menu, select a server.
  - Step 3** On the **Server** tab, click **Secure Key Management**.
  - Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Delete Root CA Certificate**.
  - Step 5** At the prompt, click **OK** or **Cancel** to delete the root CA certificate, or cancel the action.
- 

## Deleting KMIP Login Details

### Procedure

- 
- Step 1** In the **Navigation** pane, click the **Compute** menu.
  - Step 2** In the **Compute** menu, select a server.
  - Step 3** On the **Server** tab, click **Secure Key Management**.
  - Step 4** In the **Actions** area of the **Secure Key Management** pane, click **Delete KMIP Login**.
  - Step 5** At the prompt, click **OK** to delete the KMIP login details, or **Cancel** to cancel the action.
- 

## Restoring the KMIP Server to Default Settings

### Procedure

- 
- Step 1** In the **Navigation** pane, click the **Compute** menu.
  - Step 2** In the **Compute** menu, select a server.
  - Step 3** On the **Server** tab, click **Secure Key Management**.
  - Step 4** In the **KMIP Servers** area of the **Secure Key Management** tab, select a row by checking the check box and click **Delete**.

- Step 5** At the prompt, click **OK**  
This restores the KMIP server to its default settings.
- 

## Testing the KMIP Server Connection

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.  
**Step 2** In the **Compute** menu, select a server.  
**Step 3** On the **Server** tab, click **Secure Key Management**.  
**Step 4** In the **KMIP Servers** area of the **Secure Key Management** tab, select a row by checking the check box and click **Test Connection**.  
**Step 5** If the connection is successful, a success message is displayed.
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## Viewing Secure Key Management Settings

### Procedure

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- Step 1** In the **Navigation** pane, click the **Compute** menu.  
**Step 2** In the **Compute** menu, select a server.  
**Step 3** On the **Server** tab, click **Secure Key Management**.  
**Step 4** In the **Work** pane, review the following field:

| Name  | Description   |
|---|---|
| <b>Enable Secure Key Management</b> check box | If checked, allows you to enable the secure key management feature. |

- Step 5** In the **Actions** Area, review the following fields:

| Name                                     | Description  |
|--|--|
| <b>Download Root CA Certificate</b> link | This allows you to download the root CA certificate to Cisco IMC.                              |
| <b>Export Root CA Certificate</b> link   | This allows you to export the downloaded root CA certificate to a local file or remote server. |
| <b>Delete Root CA Certificate</b> link   | This allows you to delete the root CA certificate.   |
| <b>Download Client Certificate</b> link  | This allows you to download the client certificate to Cisco IMC.                               |

| Name                                    | Description   |
|---|---|
| <b>Export Client Certificate</b> link   | This allows you to export the downloaded client certificate to a local file or remote server. |
| <b>Delete Client Certificate</b> link   | This allows you to delete the client certificate.   |
| <b>Download Client Private Key</b> link | This allows you to download the client private key to Cisco IMC.                              |
| <b>Export Client Private Key</b> link   | This allows you to export the downloaded root CA certificate to local file or remote server.  |
| <b>Delete Client Private Key</b> link   | This allows you to delete the root CA certificate.  |
| <b>Delete KMIP Login</b> link           | This allows you to delete the KMIP login details.   |

**Step 6** In the **KMIP Servers** Area, review the following fields:

| Name                          | Description   |
|-------------------------------|---|
| <b>ID</b> field               | ID for the KMIP server configuration.                                 |
| <b>IP Address</b> field       | IP address of the KMIP server.  |
| <b>Port</b> field             | Communication port to the KMIP server.                                |
| <b>Timeout</b> field          | Time period that Cisco IMC waits for a response from the KMIP server. |
| <b>Delete</b> button          | Deletes the KMIP server configuration.                                |
| <b>Test Connection</b> button | Tests whether or not the KMIP connection was successful.              |

**Step 7** In the **KMIP Root CA Certificate** Area, review the following fields:

| Name                                    | Description   |
|---|---|
| <b>Server Root CA Certificate</b> field | Indicates the availability of the root CA certificate.                |
| <b>Download Status</b> field            | This field displays the status of the root CA certificate download.   |
| <b>Download Progress</b> field          | This field displays the progress of the root CA certificate download. |
| <b>Export Status</b> field              | This field displays the status of the root CA certificate export.     |
| <b>Export Progress</b> field            | This field displays the progress of the root CA certificate export.   |

**Step 8** In the **KMIP Client Certificate** Area, review the following fields:

| Name                            | Description  |
|---------------------------------|--|
| <b>Client Certificate</b> field | Indicates the availability of the client certificate.                |
| <b>Download Status</b> field    | This field displays the status of the client certificate download.   |
| <b>Download Progress</b> field  | This field displays the progress of the client certificate download. |
| <b>Export Status</b> field      | This field displays the status of the client certificate export.     |
| <b>Export Progress</b> field    | This field displays the progress of the client certificate export.   |

**Step 9**

In the **KMIP Login Details** Area, review the following fields:

| Name                                   | Description   |
|--|---|
| <b>Use KMIP Login</b> check box        | Allows you to choose whether or not to use KMIP login details.  |
| <b>Login name to KMIP Server</b> field | User name of the KMIP server.   |
| <b>Password to KMIP Server</b> field   | Password of the KMIP server.  |
| <b>Change Password</b> check box       | Allows you to change the KMIP password.   |
| <b>New Password</b> field              | Allows you to enter the new password that you want to assign to the KMIP server.<br><br><b>Note</b> This option is only visible when you enable the <b>Change Password</b> check box. |
| <b>Confirm Password</b> field          | Enter the new password again in this field.<br><br><b>Note</b> This option is only visible when you enable the <b>Change Password</b> check box.                                      |

**Step 10**

In the **KMIP Client Private Key** Area, review the following fields:

| Name                            | Description  |
|---------------------------------|--|
| <b>Client Private Key</b> field | Indicates the availability of the client private key.                |
| <b>Download Status</b> field    | This field displays the status of the client private key download.   |
| <b>Download Progress</b> field  | This field displays the progress of the client private key download. |
| <b>Export Status</b> field      | This field displays the status of the client private key export.     |

| Name                  | Description  |
|-----------------------|--|
| Export Progress field | This field displays the progress of the client private key export. |

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