Certificate Management for Secured Connections

Certificates

Unified CCE solution supports both RSA and ECDSA certificates. These certificates can be enabled on the following Unified CCE solution components—Cisco Unified CVP, Cisco Finesse, Cloud Connect, CUIC, Cisco VVB, Cisco IdS, and ECE.

Self-Signed Certificates

Self-signed certificates (as the name implies) are signed by the same entity whose identity they certify, as opposed to being signed by a certificate authority. Self-signed certificates are not considered to be as secure as CA certificates, but they are used by default in many applications.

Unified CCE Certificate Management Utilities

The following certificate management utilities can be used to secure machine-to-machine communication (for example, communication between the Cisco Finesse server and the CTI server), and manage interactions between web applications:

- Cisco SSL Encryption Utility used for web applications (Unified CCE Administration, WebSetup, and ISE).
- CiscoCertUtil used for creating and installing self-signed certificates and CA-signed certificates for use in machine-to-machine communications.
- Diagnostic Framework Cert Utility used for Diagnostic Portico applications.

Note The Unified CCE Certificate Monitoring service monitors the self-signed and CA-signed certificates and keys that are used for certificate management. The service alerts the system administrator about the validity and expiry of these certificates. For more information, see the *Serviceability Guide for Cisco Unified ICM/Contact Center Enterprise* at http://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html

SSL Encryption Utility

Note Although this utility currently has its original name, the SSL Encryption Utility now configures web applications for use with TLS.

Unified CCE web servers are configured for secure access (HTTPS). Cisco provides SSL Encryption Utility (SSLUtil.exe) to help you configure web servers for use with TLS.

Operating system facilities such as IIS can also accomplish the operations performed by the SSL encryption utility; however, the Cisco utility simplifies the process.

SSLUtil.exe is located in the <ICMInstallDrive>\icm\bin folder. You can invoke the SSL Encryption Utility in standalone mode or automatically as part of setup.

The SSL Encryption Utility generates log messages pertaining to the operations that it perform. When it runs as part of setup, log messages are written to the setup log file. When the utility is in standalone mode, the log messages appear in the SSL Utility Window and the <SystemDrive>\temp\SSLUtil.log file.

The SSL Encryption Utility performs the following major functions:

- SSL Configuration
- SSL Certificate Administration

TLS is available for Unified CCE web applications installed on Windows Server. You can configure Internet Script Editor for TLS.

By default, RSA certificate will be active and used by CCE web applications such as Unified CCE Administration console, WebSetup, and ISE.

To use ECDSA certificate for CCE web applications, use the **SSLUtil -crtecdsabind** console command to bind the ECDSA certificate to the default IIS port. This will internally unbind the RSA certificate and make the ECDSA certificate active.

For example, run the following command in the SSLUtil utility console, where curve_name is optional and supports all NIST curves:

`sslutil -crtecdsabind <curve_name>`. By default, the curve is P384.

Do the following to generate the new EDCSA certificate:

1. Delete the following files available at `ICMInstallDrive>\icm\ssl\`
    - host_ecdsa.pfx
    - host_ecdsa.crt (hidden file)

2. Run the `SSLUtil -crtecdsabind` command from the SSL Encryption utility console available at `ICMInstallDrive\icm\bin`
3. Do the following to revert to the RSA certificate:
   a. Launch SSL Encryption utility tool, and go to **Certificate Administration** tab.
   b. To uninstall and deactivate the existing ECDSA certificate, click **Uninstall**.
   c. To activate the RSA certificate, click **Install.**

Note The ECDSA certificate can be generated and installed only via the command line.

TLS Installation During Setup

By default, setup enables TLS for the Unified CCE Internet Script Editor application.

Note You must restart the SSL Configuration Utility if you use IIS manager to modify TLS settings while the utility is open.

The SSL Configuration Utility can be used to create self-signed certificates, to install the certificates in IIS, and to remove certificates from IIS. When invoked as part of setup, the SSL Configuration Utility sets TLS port in IIS to 443 if it is found to be blank.

To use TLS for Internet Script Editor, accept the default settings during installation and the supported servers use TLS.

During setup, the utility generates a self-signed certificate, imports it into the Local Machine Store, and installs it on the web server. Virtual directories are enabled and configured for TLS with 256-bit encryption.

Note During setup, if a certificate exists or the web server has an existing server certificate installed, a log entry is added and no changes take effect. Use the utility in standalone mode or use the IIS Services Manager to make certificate management changes.

Encryption Utility in Standalone Mode

In standalone mode, the SSL Configuration Utility displays the list of Unified ICM instances installed on the local machine. When you select an instance, the utility displays the installed web applications and their SSL settings. You can then alter the SSL settings for the web application.

The SSL Configuration Utility also facilitates the creation of self-signed certificates and the installation of the created certificate in IIS. You can also remove a certificate from IIS using this tool. When invoked as part of setup, the SSL Configuration Utility sets TLS port in IIS to 443 if it is found to be blank.

CiscoCertUtil Utility

The CiscoCertUtil utility helps you manage certificates on any Contact Center Enterprise machine for machine-to-machine secure communication across components. Examples of machine-to-machine secure communications are Finesse to CTI Server (CG), Dialer to CG, MRPG to ECE, and VRU PG to CVP, and so on.

The TLS-enabled components use this utility to set up certificates, and the Contact Center Enterprise setup uses this utility to generate and install certificates.

The CiscoCertUtil utility is supported on servers running Windows Server. It performs the following functions:

- Generates RSA and ECDSA selfsigned certificates.
- Generates RSA and ECDSA certificate signing requests (CSR).
- Installs remote certificates to the local machine certificate store under the Personal/ROOT/CA folder.
- Deletes certificates from the local machine certificate store under the Personal/ROOT/CA folder.
- Generates selfsigned certificates in the PEM format, which is an X509 extension.
- Generates the corresponding key with the filename *host.key*.
- Does not validate any certificate.
- Does not create any log file pertaining to the operations that it performs. If there are errors, the error log appears on the console.

Note Use the CiscoCertUtil utility to install or delete selfsigned certificates only.

How to use CiscoCertUtil Utility:

CiscoCertUtil *[/generateCert /curve <mandatory for ECDSA> <optional curveName>]|/generateCSR /curve <mandatory for ECDSA> <optional curveName>|/f<Optional> |/remove <cert_name> <optional_cert_store - my/root/ca>||/install <cert_file> <optional_cert_store - my/root/ca>| |/list]|* commands.

Where:

1. */list* displays a list of certificates that are present in the local machine store under personal (LOCAL_MACHINE/MY), root (LOCAL_MACHINE/ROOT) and ca (LOCAL_MACHINE/CA) store.

2. */generateCert* generates a selfsigned RSA certificate with the filename *host.pem* and a key with the filename *host.key*. The selfsigned certificate is copied to `<install_drive>:\icm\ssl\rsa` folder. If the key exists, the same key is used to generate the selfsigned certificate *host.pem*. An RSA key length of 2048 bits is used.

   /generateCert /curve The command generates a selfsigned ECDSA certificate with the P384 curve as default: The */generateCert /<curve_name>*. The file *host.pem* and key file *host.key* are copied to `<install_drive>:\icm\ssl\ecdsa` folder. If the key exists, the same key is used to generate the selfsigned certificate, *host.pem*. The curve name is optional. The curve name is P256 for secp256k1 and P384 for secp384r1. CiscoCertUtil Utility tool supports all OpenSSL NIST curves. The */generateCert* command does not overwrite the *host.key* and *host.pem*. To overwrite the existing selfsigned certificate,

use the following command: */generateCert/f*. This command overwrites *host.key* and *host.pem* if already available in the system.

3. */generateCSR* The command generates a CSR with the filename *host.csr* and a key with the filename *host.key*, which is a private key. The *host.csr* file is then sent to Certification Authority to obtain the digital identity certificate. If the key exists, the same key is used to generate *host.csr*.

   /generateCSR/curve The command generates ECDSA CSR with P384 as the default curve.

Note When you generate a certificate signing request (CSR), you will be prompted to key in the Organization Unit (OU). Based on the RFC5280 standard and baseline requirement, the Organization Unit is not required. You can leave this field blank so that the Certificate Authorities will not include the field in the certificate.

Use the **openssl req -in <csr_file> -noout -text** command to validate the presence of the Organization Unit field.

4. */remove <certificate_name>* removes the certificate *<cert_name>* from the local machine certificate store under the Personal folder. If the command fails to run, an error message appears. To display the list of certificates that are present, use the */list* command.

5. */install <cert_file> <optional_cert_store – my/root/ca>* installs the certificate that is mentioned as *<cert_file>* into the local machine certificate store under the Personal (my) or Trusted root (root) or Intermediate Certificate Authorities (CA) folder based on the option provided. If no option is provided, the certificate will be installed in the Personal folder. If the command fails to run, an error message appears.

   An example of this command:

   ```
   CiscoCertUtil /install c:\icm\ssl\certs\host.pem.
   ```

6. */help* displays the usage of the commands.

Note If the *remove* command fails, use the *list* command to verify whether the certificate you attempted to remove is present in the local machine certificate store.

Note During CCE installation, selfsigned certificates for RSA and ECDSA are already generated. RSA certificate is available at `<Install_drive>\icm\ssl\RSA`, and ECDSA certificate is available at `<Install_drive>\icm\ssl\ecdsa`. Run the following commands to generate new certificates (in cases where the certificate key is compromised or if the selfsigned certificate has expired):

- `/generateCert` to generate RSA certificate.
- `/generateCert /curve` to generate ECDSA certificate.

Diagnostic Framework Certificate Manager Utility

Diagnostic Framework Certificate Manager utility can perform the following tasks:

Before you begin

The Diagnostic Framework Certificate Manager utility is a command line utility used to manage certificate creation and binding for the Diagnostic Portico. It is installed at `<ICM_Drive>:\icm\serviceability\diagnostics\bin\DiagFwCertMgr.exe`.

Step 1 Create self-signed RSA or ECDSA certificate.

Step 2 Store the certificate in local computer personal certificate store.

Step 3 Bind the certificate to windows *HTTP* service on a given port.

Step 4 Remove a certificate binding from the windows HTTP service on a given port.

Step 5 Delete the self-signed certificate from the personal certificate store on the local computer.

Step 6 Validate the certificate binding to *HTTP* service for Diagnostic Framework service.

The following section explains the usage of the utility:

```
DiagFwCertMgr /task:<task_name> [/port:<port_number>] [/certhash:<certificate_thumbprint>]
[/logpath:<logfile_path>]
```

Where:

- `/task:` specifies the task to be performed.
- `/port:` specifies the port number used by the service. This is optional as the port number is automatically read from the service configuration file (DiagFwSvc.exe.config).
- `/certhash:` specifies the SHA-1 thumbprint of the certificate. This is required only when binding a specific certificate, which exists in the certificate store, to a port.
- `/logpath:` specifies the path where the log file should be created. By default, it is the current folder.

By default RSA certificate will be enabled. However, installer will also generate ECDSA certificate, import it the local store, and update ECDSA certificate hash in `HKLM\SOFTWARE\Cisco Systems, Inc.\ICM\Serviceability\DiagnosticFramework\SelfSignedCertECDSAForDiagFwSvc`.

To enable ECDSA, you must use the `BindCertFromStore` command with `/certhash` argument with the ECDSA hash available in the registry. For more commands, refer to the table below.

Table 1: Diagnostic Framework Certificate Manager Utility Tasks

Task	Description
CreateAndBindCert	Creates a self-signed certificate in the local computer personal certificate store and binds it with HTTP service on the given port. (Used by ICM-CCEInstall)
BindCertFromStore	Looks up the certificate provided by /certhash argument in certificate store and binds it with the HTTP service on the given port.
UnbindCert	Removes the certificate binding from the specified port, does not modify any certificate in the store.
UnbindAndDeleteCert	Removes the certificate binding from the specified port. Also, deletes the self-signed certificate created by **CreateAndBindCert** option. (Used by ICM-CCE Uninstall)

Task	Description
ValidateCertBinding	Verifies the certificate binding on the specified port and confirms its presence in the local computer certificate store.
CreateAndAddToStoreCertECDSA	Creates and stores the self-signed ECDSA certificate in the local computer certificate store without binding it to the port.
CheckAndCreateStoreCertECDSA	Checks if the certificate is present in the store and creates only if it is NOT present.
CreateAndBindCertECDSA	Creates a self-signed ECDSA certificate in the local computer certificate store and binds it with HTTP service on the given port.
DeleteCertECDSA	Deletes the self-signed ECDSA certificate.
UnbindAndDeleteCertECDSA	Removes the certificate binding from the specified port. Also, deletes the self-signed ECDSA certificate created by **CreateAndBindCertECDS** option.

Diagnostic Framework Certificate Manager utility stores the thumbprints (SHA-1 hash) of the self-signed certificate created by the utility, and of the certificate used by the Diagnostic Framework service. The thumbprints are stored in the registry at the following locations:

```
HKLM\SOFTWARE\Cisco Systems, Inc.\ICM\Serviceability\
DiagnosticFramework\SelfSignedCertCreatedForDiagFwSvc
HKLM\SOFTWARE\Cisco Systems, Inc.\ICM\Serviceability\
DiagnosticFramework\CertUsedByDiagFwSvc
```

Note For more information see, *Serviceability Guide for Cisco Unified ICM/Contact Center Enterprise* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html

Enabling ECDSA for Unified CCE Solutions

Before enabling ECDSA on the solution components—CVP, Cisco Finesse, Cloud Connect, Cisco Unified Intelligence Center, Voice Browser, IDS, and ECE—the administrator must ensure that the solution component's ECDSA certificate is exported and installed on the other component's certificate store for the interface to become active.

For example, before enabling ECDSA on the CTI Server, the CTI Server's ECDSA certificate has to be copied and installed on Cisco Finesse, ECE, and Dialer. Before enabling ECDSA on Cisco Finesse, the Cisco Finesse ECDSA certificate has to be copied and installed on the CTI server. This is required for 2-way authentication which is enabled by default on the CTI Server-to-Finesse interface.

The administrator can enable ECDSA individually on each solution component, after the certificate exchange is completed. The administrator has the option to enable ECDSA on different solution components across multiple maintenance windows.

Note A component operates on ECDSA only if the server is configured to use ECDSA.

For details about which components act as servers in various use cases, refer to the table *Server-Client Matrix* for Secured Connections at Manage Secured PII in Transit, on page 8.

Considerations for enabling ECDSA

Before enabling ECDSA, the administrator should be aware of the following:

- After enabling or disabling ECDSA, the changes will take effect only after you reboot the system.
- In a one-way trust on the TLS interface, the component acting as client must have the server ECDSA certificate in its store.
- In a two-way trust on the TLS interface, both the client and the server components should have the peer ECDSA certificate in their store.
- Ensure to have mutual ECDSA certificates that are installed on high availability enabled components for seamless failover in secured mode.
- ECDSA can be enabled in any order on the solution components that support it. However, it is recommended to enable it first on the server component.
- If you want to enable CA-signed ECDSA certificate for a specific channel, the entire certificate chain must be enabled for ECDSA.
- If Cisco Finesse is enabled for ECDSA and Cisco Finesse IP Phone Agent (IPPA) is used in your deployment, you must ensure that Cisco Unified Communications Manager is also enabled for ECDSA so that the Cisco Finesse IPPA phones can establish a secure channel with both Cisco Finesse and Cisco Unified Communications Manager. To enable ECDSA in Cisco Unified Communications Manager, see *Security Guide for Cisco Unified Communications Manager* at https://www.cisco.com/c/en/us/support/unified-communications/unified-communications-manager-callmanager/products-maintenance-guides-list.html.
- Servers that are enabled with the ECDSA mode use ECDSA certificate and ciphers. Client with either RSA or ECDSA certificate can connect to the server. For more information, refer to the table *Server-Client Matrix* at Manage Secured PII in Transit, on page 8.

By default, self-signed ECDSA certificate exists in each solution component except where it is specified as not available (for example, CVP). The self-signed certificate can be overridden with CA certificate if necessary.

RSA certificates will be used as the default cryptography algorithm. ECDSA can be enabled or disabled as and when required.

Manage Secured PII in Transit

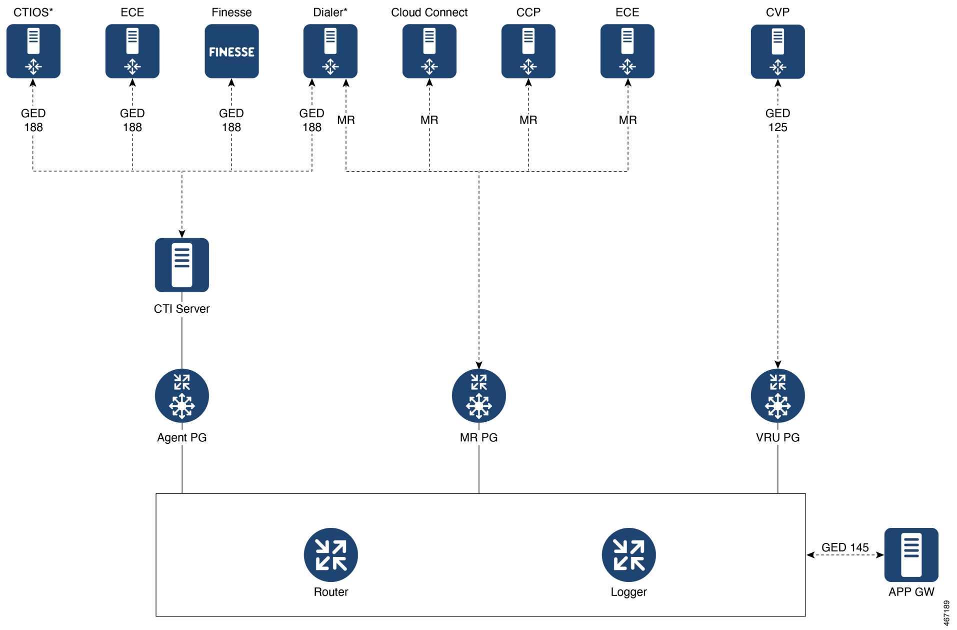
The Contact Center Enterprise solution handles customer sensitive Personally Identifiable Information (PII) that include credit card information, PIN, and other sensitive details. Such sensitive information is sent across the system in ECC variables and can be exploited.

The transport channels such as GED 188, GED 125, GED 145, and MR carry PII and are susceptible to exploitation. It is therefore necessary to secure the transport channels that carry PII and protect them from any threats.

Securing PII is also necessary to adhere to the regulatory security compliance. The CCE solution uses the TLS protocol to enable security of the transport channels that carry PII.

Note The communication channels between the Central Controller and PG are not secure. For end-to-end solution security, use the IPSec Network Isolation Zone.

Figure 1: Secured Connection Example



The following table lists the use cases for secured connections, the corresponding server-to-client matrix, and the protocol used:

Use Case	Server	Supported Client	Protocol
Secured self-service communications: To secure self-service communications, enable secured connection in CVP and VRU PG.	CVP	VRU PG	GED 125
Secured outbound calls: To secure outbound calls, enable secured connection in the CTI server, Dialer, and Media Routing PG.	CTI Server	Dialer	GED 188
	Dialer	MR PG	Media Routing Protocol

Use Case	Server	Supported Client	Protocol
Secured agent desktop communications: To secure the communications with Cisco Finesse Server and CTI OS, enable mixed-mode connection in the CTI server. Next, enable secured connection in the Cisco Finesse Server or in CTI OS, as applicable.	CTI Server	Cisco Finesse	GED 188
		CTI OS	
Secured third-party integration: To secure third-party integration with CCE, enable secured connection in the application gateway servers and clients.	Application Gateway Servers	Application Gateway Clients	GED 145
Secured multi-channel communications: To secure multi-channel communications, enable secured connection between: • ECE (Services Server) and MR PG (Client) • Customer Collaboration Platform (CCP) and MR PG (Client) • Cloud Connect and MR PG (Client) • CTI server and ECE (Client)	ECE	MR PG	Media Routing Protocol
	Customer Collaboration Platform		
	Cloud Connect		
	CTI Server	ECE	GED 188

To establish secured connection between a server and a client, you need to create mutual authentication by using one of the following security certificates:

- Self-signed Certificate
- Third-party CA Signed Certificate
- RSA certificate and keys stored in `<install_drive>:\icm\ssl\rsa`.

- ECDSA certificate and keys stored in `<install_drive>:\icm\ssl\ecdsa`.

  Based on the RSA or ECDSA deployment, please choose the corresponding certificate from the above-mentioned folder.

CTI Server–Dialer Secure Connection

To establish secured connection between the CTI Server and Dialer by exchanging self-signed certificates, perform the following steps:

1. Copy and install the self-signed certificate available on the CTI Server into the Dialer. If a valid certificate is not already available, you have to generate a new certificate. For more information, see Manage Certificates, on page 14.
2. Copy and install the self-signed certificate that is available on the Dialer into the CTI Server.

   Note If the client and the server are on the same machine, the security certificate that is available on the machine needs to be placed on the trusted store once, by the server or the client. The second attempt to place the certificate on the trusted store will fail. For more information, see CiscoCertUtil Utility, on page 4.

3. Check the **Enable Secured Connection** check box in the **CTI Server Component Properties** screen, and in the **Outbound Option Dialer Properties** screen, to ensure that the security is enabled.
4. Check the ECDSA enabled flag in the registry folder `HKLM\SOFTWARE\WOW6432Node\Cisco Systems,Inc.\ICM\Cisco SSL Configuration`. It should be **false** for RSA and **true** for ECDSA.

   Ensure that appropriate certificates are exchanged before changing the registry value.

For more information, see:

- Cisco Unified Contact Center Enterprise Installation and Upgrade Guide at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-guides-list.html
- Outbound Option Guide for Unified Contact Center Enterprise at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-user-guide-list.html

Note Exchange certificates and establish secured connection separately on both Side A and Side B of the Unified CCE solution.

Note If you add, delete, or renew a certificate, restart the service to establish a new connection.

Dialer-MR PG Secure Connection

To establish secured connection between the Dialer and MR PG by exchanging self-signed certificates, perform the following steps:

- Copy and install the self-signed certificate available on the Dialer into the MR PG. If a valid certificate is not already available, generate a new certificate. For more information, see Manage Certificates.
- Copy and install the self-signed certificate that is available on the MR PG into the Dialer.
- Check the **Enable Secured Connection** check box in the **MRPIM Properties** window and in the **Outbound Option Dialer Properties** window to ensure that the security is enabled.
- Check the ECDSA enabled flag in the registry folder `HKLM\SOFTWARE\WOW6432Node\Cisco Systems,Inc.\ICM\Cisco SSL Configuration`. It should be **false** for RSA and **true** for ECDSA.

  Ensure that appropriate certificates are exchanged before changing this registry value.

VRU PG–CVP Secure Connection

To establish secured connection between the VRU PG and Cisco Unified CVP by exchanging self-signed certificates, perform the following steps:

- Copy the certificate from Cisco Unified CVP to VRU PG and install using the command:

  `ciscoCertutil /install <cert_file>` along with the parameter `optional_cert_store -my/root/ca`.
- Copy the VRU PG certificate and install it on the Cisco Unified CVP. For more details, see the *Installation and Upgrade Guide for Cisco Unified Customer Voice Portal* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-customer-voice-portal/products-installation-guides-list.html.
- Check the **Enable Secured Connection** check box in the **VRUPIM Properties** window to ensure that the security is enabled.
- Check the ECDSA enabled flag in the registry folder `HKLM\SOFTWARE\WOW6432Node\Cisco Systems,Inc.\ICM\Cisco SSL Configuration`. It should be **false** for RSA and **true** for ECDSA.

  Ensure that appropriate certificates are exchanged before changing the registry value.

CTI Server–Finesse Secure Connection

This interface uses tomcat certificate on Finesse. To establish secured connection between the CTI Server and Finesse by exchanging self-signed certificates, perform the following steps:

- Copy the certificate from Finesse to CTI Server and install using the command `ciscoCertutil /install <cert_file>` along with the parameter `optional_cert_store -my/root/ca`.

  For more information on how to generate Finesse Certificate, see *Cisco Finesse Administration Guide* at https://www.cisco.com/c/en/us/support/customer-collaboration/finesse/products-maintenance-guides-list.html.
- Copy the CTI-Server certificate and upload it in Finesse.
- Check the **Enable Secured Connection** check box on the CTI Server Component Properties screen.
- Check the ECDSA enabled flag in the registry folder `HKLM\SOFTWARE\WOW6432Node\Cisco Systems,Inc.\ICM\Cisco SSL Configuration`. It should be **false** for RSA and **true** for ECDSA.

Ensure that appropriate certificates are exchanged before changing this registry value.

Establish secured connection between the other servers and clients that are specified in the table *Server-Client Matrix* for Secured Connections at Manage Secured PII in Transit, on page 8. It is critical to note that based on deployment, appropriate certificate needs to be exchanged between the components.

For information on secured connections between the other components, see the following guides:

- For secured connection between CVP and VRU PG, see the *Configuration Guide for Cisco Unified Customer Voice Portal* at http://www.cisco.com/c/en/us/support/customer-collaboration/unified-customer-voice-portal/products-installation-and-configuration-guides-list.html.
- For secured connection with the Dialer, see the *Outbound Option Guide for Unified Contact Center Enterprise* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-user-guide-list.html.
- For secured connection between CTI Server and Cisco Finesse, see Managing Certificates for Finesse , on page 14 and the *Cisco Finesse Administration Guide* at https://www.cisco.com/c/en/us/support/customer-collaboration/finesse/products-user-guide-list.html.
- For secured connection between CTI Server and CTI OS, see the CTI OS System Manager Guide for Cisco Unified ICM at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-guides-list.html.
- For secured connection between Application Gateway Servers and Clients, see Configuration Guide for Cisco Unified ICM/Contact Center Enterprise at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html
- For secured multichannel connections, see:Configuration Guide for Cisco Unified ICM/Contact Center Enterprise at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html.
- For more information on port details for secured connection, see: Port Utilization Guide for Cisco Unified Contact Center Solutions at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html.

Locations for Certificates and Keys

Store the certificates, intermediate and trusted certificates, and keys at the following directories in the respective machines:

Certificates and Keys	Location
Certificates	<install_drive>:\icm\ssl\certs (cert in use) <install_drive>:\icm\ssl\ecdsa (ecdsa) <install_drive>:\icm\ssl\rsa (rsa)
Intermediate and Trusted Certificate	<install_drive>:\icm\ssl\trust-certs The trusted certificate may be stored in this location and installed from here into Windows cert store.

Certificates and Keys	Location
Keys	<install_drive>:\icm\ssl\keys (keys in use) <install_drive>:\icm\ssl\ecdsa (ecdsa) <install_drive>:\icm\ssl\rsa (rsa)

The steps to generate and install certificates are provided in following section.

Manage Certificates

Managing Certificates for Unified CCE Component

All certificates are managed using Cisco tools. For more details, see Unified CCE Certificate Management Utilities, on page 1

Managing Certificates for Finesse

Refer to the following steps for security certificate management for Finesse server.

Exporting a Certificate from Finesse Server

Use this procedure to export security certificates from the Finesse server.

Step 1 Sign in to Cisco Unified Operating System Administration console on Finesse server.

Use the FQDN path of the Finesse server (`http://FQDN of Finesse server:8443/cmplatform`) to sign in.

Step 2 Select **Security** > **Certificate Management**.

Step 3 Click **Find**.

Step 4 Perform one of the following steps based on whether the Tomcat certificate is listed or not:

- If the Tomcat certificate is not listed:
  - Click **Generate New**.
  - Reboot the VOS server when the certificate generation is complete.
  - Restart this procedure.
- If the Tomcat certificate is listed:
  - Click the certificate to select it. Click **Download .pem file** and save the file to your desktop.
  - Ensure that the certificate you select includes the hostname for the server.

Note Follow the above procedure to download ECDSA certificate. The name of the certificate is `Tomcat-ECDSA`.

What to do next

Perform these steps for all the Finesse server nodes.

Importing a Certificate to Finesse Server

Use this procedure to import security certificates to the Finesse server.

Note The following steps are applicable for certificates of key types of RSA and ECDSA.

Step 1 Sign in to Cisco Unified Operating System Administration on Finesse server.

Use the FQDN path of the Finesse server (`http://FQDN of Finesse server:8443/cmplatform`) to sign in.

Step 2 Select **Security** > **Certificate Management**.

Step 3 Click Upload Certificate.

Step 4 Select **Certificate Name** > **tomcat-trust**.

Step 5 Click **Browse**.

Browse to the location of the CTI Server certificate with the `.pem` file extension.

Step 6 Select the file and click **Upload File**.

What to do next

Repeat steps 3 to 6 for the remaining unloaded certificates.

After you upload all the certificates, restart the system using `utilis system restart`.

To enable ECDSA certificate for VOS components, follow the steps at Enabling ECDSA for VOS components, on page 21

Managing Certificates for Cloud Connect

Refer to the following sections for security certificate management for Cloud Connect.

Export a Certificate from Cloud Connect

Perform the following steps to export security certificates of key types RSA and ECDSA from the Cloud Connect server:

Step 1 Sign in to Cisco Unified OS Administration on the Cloud Connect server using the following URL: `https://FQDN of Cloud Connect server:8443/cmplatform`.

Step 2 Select **Security** > **Certificate Management**.

Step 3 Enter the search criteria as **`tomcat`** and then click **Find** to filter the certificate.

The tomcat certificates list is displayed. If you do not find the tomcat certificate for your server in the **Certificate List**, then:

- For self-signed certificate, click **Generate Self-signed**. When the certificate generation is complete, reboot your server. Then restart this procedure. For more information on generating the self-signed certificate, see *Cisco Unified Operating System Administration Online Help*.
- For CA-signed certificate, see Generate and Copy CA Certificates of VOS Components, on page 17.

Step 4 Click the tomcat certificate hyperlink in the **Common Name** column.

Note Ensure that the certificate you select includes the hostname for the server. For CA-signed certificate, find and download the CA-signed application certificate, Root CA certificate, and Intermediate Authority certificate.

The tomcat **Certificate Details** dialog box is displayed.

Step 5 Click **Download .PEM File**.

Step 6 Save the .PEM file in your local machine.

What to do next

Follow the same steps for the other node of Cloud Connect for the self-signed certificate and CA-signed application certificate. The Root CA certificate and Intermediate Authority certificate are common for both the nodes of Cloud Connect.

Import a Certificate into Cloud Connect

Perform the following steps to import the security certificates of key types RSA and ECDSA into the Cloud Connect server:

Step 1 Sign in to Cisco Unified OS Administration on the Cloud Connect server using the following URL: `https://FQDN of Cloud Connect server:8443/cmplatform`.

Step 2 Select **Security** > **Certificate Management**.

Step 3 Click **Upload Certificate**.

Step 4 Select **Certificate Name** > **tomcat-trust**.

Step 5 Browse and select the server certificate with .pem file extension that you must import in to Cloud Connect.

Step 6 Click **Upload File**.

What to do next

Restart the service that is running on the Cloud Connect server. For example, if you want to restart the Digital Routing service that is running on the Cloud Connect server, use the following commands:

- **utils cloudconnect stop digitalrouting**
- **utils cloudconnect start digitalrouting**

Generate and Copy CA Certificates of Unified CCE Components

If you are using Certificate Authority (CA) certificates for mutual authentication of CCE machines, do the following:

1. Sign in to the required Unified CCE component machine as an administrator. For example, if you want to generate CA-signed certificate of MR PG, sign in to the MR PG machine as an administrator.
2. Generate CSR using `CiscoCertUtil`. Use appropriate command for CSR generation for RSA/ECDSA as specified in `CiscoCertUtil` tool using the **/generateCSR** command.

   This command generates a host.csr file and sends the CSR to a trusted Certificate Authority for sign-off. To generate a new CSR, see CiscoCertUtil Utility, on page 4.
3. Obtain the CA-signed application certificate, Root CA certificate, and Intermediate Authority certificate.
4. Copy the CA-signed application certificate file into the appropriate folder (`<install_drive>:\icm\ssl\rsa or <install_drive>:\icm\ssl\ecdsa)` as applicable.
5. Ensure registry ECDSA enabled flag is set appropriately at `HKLM\SOFTWARE\WOW6432Node\Cisco Systems,Inc.\ICM\Cisco SSL Configuration`.
6. Restart the services
7. Install the CA-signed application certificate using the command `CiscoCertUtil / install <cert file > <optional cert store>`. Certificate store can be my, root or ca with default being my when not specified. You can also manually install the CA Certificate to Windows trust store, if not already installed or present. You can verify if certificate is installed properly using windows `certlm.msc` utility in personal, Trusted Root or Intermediate Certificate Authorities based on option specified in install command. Default is Personal if no option is provided.

Note For VOS components, the procedure to upload or download the CA certificate is similar to the procedure to download the ECDSA certificate, except that, for ECDSA, the certificate purpose as `tomcat-ECDSA` instead of tomcat.

Generate and Copy CA Certificates of VOS Components

Each time you sign-in, the browser validates the certificate presented by the server. If the certificate is not signed by a trusted root Certificate Authority (CA), the browser will typically not allow the connection until the user explicitly allows it. In order to avoid this, you must obtain a root certificate signed by a CA and install it onto the VOS components.

Step 1 Generate CSR.

a) Sign in to the Cisco Unified OS Administration page using the URL: *https://<FQDN>/cmplatform*.

b) Select **Security** > **Certificate Management** > **Generate CSR**.

c) After the successful generation, click **Download CSR**.

d) Use the CSR to obtain the signed application certificate and the CA root certificate from the CA.

Step 2 After receiving the certificates, open the Cisco Unified OS Administration page using the URL: *https://<FQDN>/cmplatform*.

Step 3 Select **Security** > **Certificate Management** > **Upload Certificate**.

Step 4 Select the certificate name from the Certificate Name list.

Step 5 To upload the root certificate:

a) In the **Upload** dialog box, select **tomcat trust** from the drop-down list.

b) Browse to the file and click **Open**.

c) Click **Upload File**.

Step 6 To upload the application certificate:

a) In the **Upload** dialog box, select **tomcat** from the drop-down list.

b) In the **Root Certificate** text box, enter the name of the CA root.

c) Browse to the file and click **Open**.

d) Click **Upload File**.

Step 7 Restart the services.

For more information about CA-signed certificates, see the *Security topics* in the *Unified OS Administration online help*.

Manage CCE Web Application Security (HTTPS)

Note Starting release 12.6(2), Unified CCE web applications (like CCE Admin, Web Setup, Diagnostic Portico and Internet Script Editor tools) will use only HTTPS to communicate with the interface.

For the procedure to generate and bind the RSA certificate, see Unified CCE Certificate Management Utilities.

Before you begin

Unified CCE Installer generates both the RSA and the ECDSA certificates for all the Unified CCE web applications such as Unified CCE Administration, WebSetup, ISE and DiagnosticPortico. By default, it binds the RSA certificate to the HTTPS port. However, the administrator can change the binding to use the ECDSA certificate for web applications.

Procedure to enable ECDSA for WebSetup, Unified CCE Admin, and ISE webservices

Before you begin

SSL Encryption Utility tool is used to generate certificates for WebSetup, Unified CCE and ISE. Installer generates ECDSA certificate (*host_ecdsa.pfx*) under **<install_drive>:\icm\ssl** and imports to windows local store.

Follow the procedure below to bind ECDSA certificate to IIS port.

Step 1 Login to Unified CCE VM, where SSLUtility based webservices are used. Open the command prompt and run the **sslutil -crtecdsabind** command.

Step 2 To verify, in **IIS Manager server**, go to **Site Binding**. Select Port 443.

SSL certificate with friendly name Cisco ICM SSL ECDSA Certificate will be binded.

Note

a. ECDSA certificates can be generated and bound only with the command line option.

b. For CA certificate, the administrator can use Windows tools (IIS manager) to generate and bind to IIS port 443.

c. To revert to RSA or to bind with different curve certificate, see *SSL Encryption Utility* in the *Security Guide for Cisco Unified ICM/Contact Center* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html

Note P384 curve is used when *curve_name* is not specified.

For CA certificate, the administrator can generate CSR and install self-signed certificates to the Windows store. For more information, see *Secured PII in Transit* in the *Security Guide for Cisco Unified ICM/Contact Center* at https://www.cisco.com/c/en/us/td/docs/voice_ip_comm/cust_contact/contact_center/icm_enterprise/icm_enterprise_12_6_1/configuration/guide/ucce_b_security-guide_12_6_1.html

Procedure to enable ECDSA for Diagnostic Portico Web service

Before you begin

Diagnostic Portico certificate is generated using the **DiagFwCert** tool. Installer will generate and import the ECDSA certificate for Diagnostic Portico. The ECDSA certficate is generated and stored in **certstore** and has to be manually bound using the following procedure:

Step 1 Stop the service in Diagnostic Framework through Windows service control.

Step 2 Open the command prompt and change the directory to `<ICM_Drive>:\icm\serviceability\diagnostics\bin`.

Note Before binding, ensure that the certificate is placed in the personal store. For more information, see CiscoCertUtil Utility.

Step 3 To bind the Cisco ICM Diagnostic certifcate ECDSA, run the `DiagFwCertMgr.exe /task:BindCertFromStore /certhash:certificate_thumbprint` command.

Note Get the *certificate_thumbprint* from registry key `SelfSignedCertECDSAForDiagFwSvc` available under the path `HKEY_LOCAL_MACHINE\SOFTWARE\Cisco Systems, Inc.\ICM\Serviceability\DiagnosticFramework`

Step 4 After you bind, validate the command **DiagFwCertMgr/task:ValidateCertBinding** and confirm from the output if the certificate binding with the current port is valid.

For more information about *DiagFwCertMgr utility*, see *Certificate Management* in *Serviceability Guide for Cisco Unified ICM/Contact Center Enterprise* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-installation-and-configuration-guides-list.html.

Step 5 Restart the Diagnostic Framework service. You can use the commands:

- sc stop **diagfwsvc**
- sc start **diagfwsvc**

Note For CA certificate, the administrator can use Windows tool to generate and bind. For more information, refer to the TechNotes at https://www.cisco.com/c/en/us/support/docs/customer-collaboration/unified-contact-center-enterprise/200755-Configure-HTTPS-Access-for-UCCE-Diagnost.html

Enabling ECDSA for Unified CCE Component

Enabling ECDSA is applicable for all the secured interfaces of Unified CCE, Packaged CCE and Cisco Hosted Collaboration Solution for Contact Center deployment. By default, ECDSA is disabled and advised to be enabled during maintenance windows.

Secured interface components are divided into two categories—web services and Unified CCE core.

The applications under the web services are:

- WebSetup
- Unified CCE Administration
- DiagnosticPortico
- ISE

The applications under the Unified CCE core component services are:

- CTI Server
- Dialer
- Application Gateway
- MR PG and VRU PG

How to enable ECDSA for Unified CCE web services

To use ECDSA certificate for Unified CCE web services, see Manage CCE Web Application Security (HTTPS).

How to enable ECDSA for Unified CCE core components

Before you begin

Refer to the section Manage Secured PII in Transit on how to enable ECDSA for Unified CCE component.

Step 1 For secure connections, exchange the certificate based on the server-to-client matrix table. For details on how to do this, see Manage Secured PII in Transit for ECDSA.

Step 2 To enable ECDSA, set the ECDSAEnabledRegistry flag available at `HKLM\SOFTWARE\WOW6432Node\Cisco Systems,Inc.\ICM\Cisco SSL Configuration` to **True**, in both the local and the remote box.

Step 3 The system will restart the Unified CCE. Once the reboot is complete, ECDSA mode is enabled.

Note

a. ECDSA will be enabled only after the system restart.

b. System restart time is as per RebootWaitSecs (default is 5 mins). This can be modified.

Note For CA certificate, the administrators, can generate CSR and install the signed certificates to the Windows store. For more information, see *Manage Secured PII in Transit* in *Security Guide for Cisco Unified ICM/Contact Center Enterprise* at https://www.cisco.com/c/en/us/td/docs/voice_ip_comm/cust_contact/contact_center/icm_enterprise/icm_enterprise_12_6_1/configuration/guide/ucce_b_security-guide_12_6_1.html

To disable ECDSA, set the *ECDSAEnabled Registry* flag to **False**. The system will automatically activate the RSA certificate, available under `<install_Drive> :\icm\ssl\rsa`.

Enabling ECDSA for VOS components

Before you begin

Perform the following steps to enable ECDSA for VOS components.

Step 1 Login to the system CLI and run the set command **set tls server cert_type ecdsa** to enable ECDSA. VOS component server restarts once you run the command.

Step 2 Login to the Cisco Unified OS Administration (*https://<FQDN of the component server>:8443/cmplatform*).

Step 3 Navigate to **Security** > **Certificate Management** > **Find**.

Download ECDSA certificate from *tomcat-trust* with -EC suffix.

For more information, on how to download the ECDSA certificate, see Download the Server Certificate from VOS Node , on page 22

Import the certificate in the respective component trust store/keystore.

Note In Unified CCE deployments, the certificate should be installed at `ICM install drive>\ssl\cacerts` in Unified CCE AW VM. Use the following command:

```
keytool -import -file <path where the self-signed certificate is copied > -alias <FQDN of
the component Server> -keystore <install_drive>:\ssl\cacerts
```

Step 4 Restart the Tomcat services after importing the certificate.

What to do next

Refer to Other System CLI Commands

1. **set tls server cert_type rsa** – to set the certificate type as RSA.
2. **show tls server cert_type** – to show the current certificate type.

Access Platform Web Applications using Chrome Browser

This section is applicable only if you are using Chrome based browsers (Google Chrome or Edge Chromium) to access the Platform web applications, such as Cisco Unified OS Administration, Cisco Unified Serviceability or Disaster Recovery System.

This section is also applicable for Cisco Unified Intelligence Center Administration web application on CUIC nodes.

If you are using self-signed certificates, add the certificates to the Client OS trust store to access the administrative web applications.

Note Chrome needs the self-signed certificate to have **Subject Alternative Name** extension to load the administrative web applications. If the self-signed certificate does not have **Subject Alternative Name**, regenerate the certificate from Cisco Unified OS Administration.

Download the Server Certificate from VOS Node

Run the *show server tls cert_type* command on your server and identify the certificate type that your server uses. For more information see *show server tls cert_type* in *Administration Console User Guide for Cisco Unified Intelligence Center* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-intelligence-center/products-maintenance-guides-list.html

This section provides instructions to download the server certificate from VOS node.

Step 1 Log in to the **Cisco Unified OS Administration** page using the URL: *https://<FQDN>:8443/cmplatform*

Step 2 Go to **Security** and select **Certificate Management**.
The **Certificate List** screen appears.

Step 3 In **Find Certificate List where** do the following:

a) Select **Common Name** in the first dropdown.
b) Select **begins with** in the second dropdown.
c) Enter the host name of the node in the search box.
d) Click **Find**.
The list of **Certificates** is displayed with their **Common Name** and **Key Type**. For ECDSA, the **Key Type** is **EC** and for RSA, the **Key Type** is **RSA**.

Step 4 Based on the certificate type required for your server, click the **Common Name** link of the **tomcat-trust** certificate in the search result.

Step 5 In the new window, click **Download .DER File** or **Download .PEM File** and save it.

Add Certificate to Trusted Root Certification Authorities on Windows Client System

To add the certificate to the Trusted Root Certification Authorities on Windows Client system, do the following:

Step 1 In the **Control Panel** search for **Manage User Certificates** and click **Manage User Certificates**.
The **certmgr - [Certificates - Current User]** window appears.

Step 2 Select **Certificates - Current User** > **Trusted Root Certification Authorities** > **Certificates**.

Step 3 Right-click **Certificates** and click **All Tasks** > **Import** and then click **Next**.

Step 4 Browse and select the downloaded certificate file, click **Next** and then click **Finish**.

Step 5 In the **Security Warning** window, click **Yes**.

A window pops up to confirm that the import was successful.

Close the **Manage User Certificates** window and close all browser sessions.

Reopen the Chrome browser and clear the browser cache. Log in to the platform web application.

For example: *https://<FQDN>:8443/cmplatform*. The Chrome browser now shows the lock symbol to indicate that it is a trusted connection.

Add Certificate to Keychain Access in Mac Client Machine

This section is applicable for Mac OS Catalina version 10.15 and above. To add the certificate to Keychain Access in Mac Client machine, do the following:

Step 1 On the Mac client machine, under **Applications** > **Utilities** select **Keychain Access**.

Step 2 In the left pane, select **System** and from the center pane, select the **Certificates** tab.

Step 3 Drag and drop the downloaded certificate on to the list of displayed certificates. (Provide the credentials for authentication, if prompted.)

Step 4 Double-click the newly imported certificate and click the expand icon beside **Trust**.

Step 5 In **When using this certificate** dropdown, select **Always trust** and close the window.

Certificate management for digital channels interaction

To interact with customers through digital channels, you must establish secure communication between Cloud Connect and MR PG, and set up the Nginx reverse proxy certificate.

For instructions about how to set up certificates, see the following sections:

Establish secured connection between Cloud Connect and MR PG using self-signed certificate

To establish a secured connection between Cloud Connect and MR PG by exchanging self-signed certificates, perform the following steps:

1. Export the certificate available on Cloud Connect (both publisher and subscriber nodes). For instructions, see Export a Certificate from Cloud Connect, on page 15.
2. Import the Cloud Connect certificate into the MR PG machine.
   a. Log in to the MR PG machine as an administrator.
   b. Run the following command in the Windows Command Prompt to install the Cloud Connect certificate in the MR PG machine's certificate store under the Personal (my) folder:

      CiscoCertUtil /install <cloud_connect_platform_cert_file> my
3. Restart the MR PG machine.

4. Copy the certificate available in one of the following locations on the MR PG machine:
   - For RSA—<install_drive>:\icm\ssl\rsa
   - For ECDSA—<install_drive>:\icm\ssl\ecdsa

   If you do not find a certificate in the specified locations, run one of the following commands in the Windows Command Prompt of the MR PG machine to generate a new certificate:
   - **CiscoCertUtil /generateCert**—Generates a self-signed RSA certificate and the certificate is copied into the <install_drive>:\icm\ssl\rsa folder.
   - **CiscoCertUtil /generateCert /curve P384**—Generates a self-signed ECDSA certificate and the certificate is copied into the <install_drive>:\icm\ssl\ecdsa folder.
   - **CiscoCertUtil /install host.pem my**—Installs the certificate to the truststore under the Personal (my) folder.

5. Import the MR PG certificate into the publisher node of Cloud Connect. The certificate gets automatically replicated into the subscriber node. For instructions, see Import a Certificate into Cloud Connect, on page 16.

6. Run the following commands to restart the Digital Routing service that is running on the Cloud Connect server:
   - **utils cloudconnect stop digitalrouting**
   - **utils cloudconnect start digitalrouting**

The connection between Cloud Connect and MR PG is secured by default. You can disable the secure connection in the Unified CCE Administration portal. For instructions, see the *Manage connection between Cloud Connect and MR PG* section in the Cisco Unified Contact Center Enterprise Features Guide.

Note Mutual TLS (mTLS) authentication is enforced when the secure connection is enabled.

The RSA mode is enabled by default. To switch to the ECDSA mode, see Enabling ECDSA for Unified CCE Component, on page 20 and Enabling ECDSA for VOS components, on page 21.

Note Ensure that appropriate certificates are exchanged before you switch between RSA and ECDSA.

Establish secured connection between Cloud Connect and MR PG using CA-signed certificate

To establish a secured connection between Cloud Connect and MR PG by exchanging CA-signed certificates, perform the following steps:

1. Generate and deploy the CA-signed certificate on Cloud Connect (both publisher and subscriber nodes). For instructions, see Generate and Copy CA Certificates of VOS Components, on page 17.

2. Generate and deploy the CA-signed certificate on the MR PG machine. For instructions, see Generate and Copy CA Certificates of Unified CCE Components, on page 16.

3. Export the CA-signed certificate available on Cloud Connect (both publisher and subscriber nodes). For instructions, see Export a Certificate from Cloud Connect, on page 15.

4. Import the CA-signed certificate of Cloud Connect into the MR PG machine.

   a. Log in to the MR PG machine as an administrator.

   b. Run the following command in the Windows Command Prompt to install the CA chain root and intermediate certificates:

      CiscoCertUtil /install <cert file> <cert store>

      where <cert store> can be root or CA.

5. Restart the MR PG machine.

6. Export the CA-signed certificates available on the MR PG machine.

   a. Log in to the MR PG machine as an administrator.

   b. In the Windows Command Prompt, run **certlm.msc**.

   c. To export root certificate:

      1. Go to **Certificates** > **Trusted Root Certificate** > **Certificates**.

      2. Locate the root certificate, right-click the certificate, and then select **All Tasks** > **Export**.

      3. Choose the format based on the peer system requirement, and then save the certificate.

   d. To export intermediate certificate:

      1. Go to **Certificates** > **Intermediate Certification Authorities** > **Certificates**.

      2. Locate the intermediate certificate, right-click the certificate, and then select **All Tasks** > **Export**.

      3. Choose the format based on the peer system requirement, and then save the certificate.

Note Repeat the above steps to export all intermediate certificates.

7. Import the CA-signed certificates of MR PG into the publisher node of Cloud Connect. The certificates get automatically replicated into the subscriber node. For instructions, see Import a Certificate into Cloud Connect, on page 16.

Set up Nginx reverse proxy certificate

Set up the Nginx reverse proxy certificate for TLS connections that is digital channel tasks that originate from Webex Connect and stops at the Nginx reverse proxy server and for agent synchronization requests from Webex Engage.

Step 1 Sign in to the Nginx reverse proxy server.

Step 2 Generate the Certificate Signing Request (CSR).

a) Open the command prompt and run the following CLI command:

```
openssl req -new -newkey rsa:4096 -keyout nginx.key -out nginx.csr
```

b) Follow the prompt and provide the required details to generate the CSR (nginx.csr) and the RSA private key (nginx.key) of strength 4096 bits. Following is the sample output:

```
[root@loadproxy-cisco-com cert]# openssl req -new -newkey rsa:4096 -keyout nginx.key -out nginx.csr
Generating a RSA private key
.....+++++
........................................................................................................................................................+++++
writing new private key to 'nginx.key'
Enter PEM pass phrase:cisco
Verifying - Enter PEM pass phrase:cisco
-----
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.
-----
Country Name (2 letter code) [XX]:IN
State or Province Name (full name) []:KA
Locality Name (eg, city) [Default City]:Bangalore
Organization Name (eg, company) [Default Company Ltd]:Cisco
Organizational Unit Name (eg, section) []:CCBU
Common Name (eg, your name or your server's hostname) []:drdmzproxy.cisco.com
Email Address []:realexan@cisco.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:cisco
An optional company name []:Cisco
```

Note Make a note of the PEM pass phrase that you must decrypt the private key during the deployment.

Step 3 Send the nginx.csr that you generated in Step 2 to the Certificate Authority and obtain the CA-signed Nginx certificate with the certificate chain.

Step 4 Combine the certificates received from CA (application certificate, Root CA certificate, and Intermediate Authority certificate). The name of the file must be the same as the one specified for SSL_CERT_NAME in the installer.env file of the Nginx reverse proxy. For more information about the installer.env file, see the *Reverse Proxy Installer* section in the Cisco Unified Contact Center Enterprise Features Guide.

Step 5 Deploy the CA-signed certificate and the RSA private key.

a) Run the following CLI to decrypt the RSA private key that you generated in step 2:

```
openssl rsa -in nginx.key -out nginx_decrypted.key
```

b) Copy the decrypted key to the folder location specified in the "NGX_SSL_DIR" variable available in the installer.env file. For example, /root/reverse_proxy/drdmzproxy/ssl.

c) Upload and copy the CA-signed certificate file to the Nginx reverse proxy in the folder location that is specified in the "NGX_SSL_DIR" variable available in the installer.env file. To view the contents of a sample environment directory, see the *Configure deployment environment configurations* section in the Cisco Unified Contact Center Enterprise Features Guide.

Step 6 Restart the Nginx reverse proxy server.

Certificate Management for Customer Collaboration Platform

Control Customer Collaboration Platform Application Access

Access to Customer Collaboration Platform Administration UI is restricted to clients that have been explicitly granted access using the Admin CLI. For any modification to the allowed list to take effect, Cisco Tomcat must be restarted.

Note IP address range and subnet masks are not supported.

utils permitlist admin_ui list

This command displays all the allowed IP addresses. Use this list to authorize the source of the incoming requests.

Syntax

utils permitlist admin_ui list

Example

```
admin: utils permitlist admin_ui list

Admin UI permitlist is:
10.232.20.31
10.232.20.32
10.232.20.33
10.232.20.34
```

utils permitlist admin_ui add

This command adds the provided IP address to the allowed list of addresses.

Syntax

utils permitlist admin_ui add

```
admin:utils permitlist admin_ui add 10.232.20.33

Successfully added IP: 10.232.20.33 to the permitlist

Restart Cisco Tomcat for the changes to take effect
```

utils permitlist admin_ui delete

This command deletes the provided IP address from the allowed list.

Syntax

utils permitlist admin_ui delete

Example

```
admin:utils permitlist admin_ui delete 10.232.20.34

Successfully deleted IP: 10.232.20.34 from the permitlist

Restart Cisco Tomcat for the changes to take effect
```

Obtaining a CA-Signed Certificate

Each time you sign-in, the browser validates the certificate presented by the server. If the certificate is not signed by a trusted root Certificate Authority (CA), the browser will typically not allow the connection until the user explicitly allows it. In order to avoid this, you must obtain a root certificate signed by a CA and install it onto Customer Collaboration Platform. Also, you must upload the certificate onto the VOS components.

After You Upload the Certificates

For the uploaded certificates to take effect, do the following:

1. Restart the XMPP Service. (SSH to Customer Collaboration Platform and enter the command *utils service restart CCP XMPP Server* as an administrator in the Commad Line Interface).

2. Restart the Cisco Tomcat service. (SSH to Customer Collaboration Platform and enter the command *utils service restart Cisco Tomcat* as an administrator in the Command Line Interface).

Obtaining a Self-Signed Certificate

Browsers handle self-signed certificates in different ways. The sections below describe how to handle self-signed certificates on the browsers supported for Customer Collaboration Platform.

Internet Explorer and Self-Signed Certificates

When using an IE browser on a Windows machine, make sure your DNS server is properly configured and you can resolve the fully qualified Customer Collaboration Platform hostname to the Customer Collaboration Platform address. Use a signed certificate from a trusted certificate authority (like Verisign).

If you use a self-signed certificate (which is what is installed with Customer Collaboration Platform), follow these steps to avoid getting certificate warnings each time you sign in.

- In your Start menu, right click on IE and select "Run as Administrator".
- Enter the URL for your Customer Collaboration Platform server in the address bar.
- When prompted by the security warning, click on **Continue to this website (not recommended)**.

- Your address bar turns red and you see a certificate error next to the address bar. Select the certificate error.
- Select **View certificates** at the bottom of the popup. This opens a certificate dialog.
- On the General tab, select **Install Certificate...**.
- The certificate export wizard launches. Click **Next**.
- When prompted for where to store the certificates, select **Place all certificates in the following store**, then click **Browse** and select **Trusted Root Certification Authorities**.
- Click **Ok**, then click **Next** and **Finish** to complete the certificate import wizard.
- Click **Yes** when prompted about importing the certificate.
- Close and restart your browser to access Customer Collaboration Platform.

Firefox and Self-Signed Certificates

Due to changes in the Firefox security model, there are additional self-signed certificates that must be accepted to use the Customer Collaboration Platform web application on Firefox.

When accessing a Customer Collaboration Platform server using a newly installed Firefox browser (any version), Firefox attempts to connect to the main port that Customer Collaboration Platform uses first (port 443). If it cannot connect, it prompts the user to accept the self-signed certificate.

Note If pop ups are blocked, you are given instructions on how to manually launch the certificate page. Also, if the certificate window is closed before the certificate is accepted, the page will automatically re-launch.

- If prompted, click **I Understand the Risks**, then click **Add Exception**.
- Click **Confirm Security Exception**.

Next, Firefox attempts to connect to port 7443 (the secure XMPP port). With Firefox, a second self-signed certificate must now be accepted to use this port. Customer Collaboration Platform displays a "Checking Connectivity..." screen during this process

If the"Checking Connectivity..." screen persists after a few seconds, click **Continue** to proceed to the Firefox certificate acceptance screen (as above).

Click **I Understand the Risks**, then **Add Exception**, and **Confirm Security Exception** again.

Users need only go through this process the first time they use a new Firefox browser and self-signed certificates. After the certificates are in place, users may not see the "Checking Connectivity..." screen (or it will appear briefly and proceed to the Customer Collaboration Platform sign on screen).

Google Chrome and Self-Signed Certificates

When accessing a Customer Collaboration Platform server using Google Chrome Browser, it attempts to establish a Private secure connection using port 7443.

- After keying in the Server IP address in Chrome, the browser displays a connection warning stating **"Your Connection is not private**." To proceed with a secure connection, click **Advanced**.

- Click **Proceed to <Server IP Address>.** Next, Chrome attempts to connect to port 7443 (the secure XMPP port).
- The browser displays **"Checking connectivity**." Click **Continue** to proceed. This opens another Chrome tab, where you are prompted with another connection warning.
- Click **Advanced.**
- Upon clicking **"Proceed to <Server IP Address>",** the Customer Collaboration Platform log on page is displayed.

Note Users need to go through this process only the first time they use a new Chrome browser and self-signed certificates.

Transport Layer Security (TLS) Requirement

Contact center enterprise solutions use Transport Layer Security (TLS). Refer to your browser's documentation for details on how to configure support for TLS. See the Contact Center Enterprise Compatibility Matrix at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-device-support-tables-list.html for the supported TLS versions.

Note For backward compatibility with the earlier versions of clients, you can downgrade the Unified CCE Windows systems to earlier versions of TLS by following Microsoft procedures.

If you apply security hardening without configuring support for TLS, your browser cannot connect to the web server. An error message indicates that the page is either unavailable or that the website is experiencing technical difficulties.