Exchange Self-Signed Certificates in a PCCE Solution

Contents

Introduction

This document describes how to exchange self signed certificates between principal administration server (ADS/AW) and other application server in Cisco Packaged Contact Center Enterprise (PCCE) solution.

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Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- PCCE Release 12.5(1)
- Customer Voice Portal (CVP) Release 12.5 (1)

Components Used

The information in this document is based on these software versions:

- PCCE 12.5(1)
- CVP 12.5(1)

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background

In PCCE solution from 12.x all devices are controlled via Single Pane of Glass (SPOG) which is hosted in the principal AW server. Due to security-management-compliance (SRC) in PCCE 12.5(1) version all the communication between SPOG and other servers in the solution are strictly done via secure HTTP protocol.

Certificates are used in order to achieve seamless secure communication between SPOG and the other devices. In a self-signed certificate environment, certificate exchange between the servers becomes a must. This certificate exchange is also necessary to enable new features that are present in 12.5(1) version such as Smart Licensing, Webex Experience Management (WXM) and Customer Virtual Assistant (CVA).

Procedure

These are the the components from which self-signed certificates are exported and components into which self-signed certificates need to be imported.

(i) Principal AW server: This server requires certificate from:

- Windows platform: ICM: Router and Logger(Rogger){A/B}, Peripheral Gateway (PG){A/B}, all ADS and Email and Chat (ECE) servers. Note: IIS and diagnostic framework certificates are needed.CVP: CVP servers, CVP Reporting server. Note 1: Web Service Management (WSM) certificate from the servers are needed.Note 2: Certificates must be with Fully Qualified Domain Name (FQDN).
- VOS Platform: Cloud Connect, Cisco Virtual Voice Browser (VVB), Cisco Unified Call Manager (CUCM), Finesse, Cisco Unified Intelligent Center (CUIC), Live Data (LD), Identity Server (IDS) and other applicable servers.

Same applies for other ADS servers in the solution.

(ii) Router \ Logger Server: This server requires certificate from:

- Windows platform: All ADS servers IIS certificate.

(iii) CUCM PG Server: This server requires certificate from:

- VOS Platform: CUCM publisher. Note: This is needed to download the JTAPI client from CUCM server.

(iv) CVP Server: This server requires certificate from

- Windows platform: All ADS servers IIS certificate
- VOS Platform: Cloud Connect server for WXM Integration, VVB Server for Secure SIP and

HTTP communication.

(v) CVP Reporting server: This server requires certificate from:

- Windows platform: All ADS servers IIS certificate

(vi) VVB Server: This server requires certificate from:

- Windows platform: CVP VXML Server (Secure HTTP), CVP Call server (Secure SIP)

The steps needed to effectively exchange the self-signed certificates in the solution are divided in three sections.

Section 1: Certificate Exchange Between CVP Servers and ADS Servers.

Section 2: Certificate Exchange Between VOS Platform Applications and ADS Server.

Section 3: Certificate Exchange Between Roggers, PGs and ADS Server.

Section 1: Certificate Exchange Between CVP and ADS Servers

The steps needed to complete this exchange successfully are:

Step 1. Export CVP Server WSM Certificates.

Step 2. Import CVP Server WSM Certificate to ADS Server.

Step 3. Export ADS Server Certificate.

Step 4. Import ADS Server to CVP Servers and CVP Reporting Server.

Step 1. Export CVP Server Certificates

Before you export the certificates from the CVP servers you need to regenerate the certificates with the FQDN of the server, otherwise, few features like Smart Licensing, CVA and the CVP synchronization with SPOG can experience problems.

> **Caution**: Before you begin, you must do this:

- Obtain the keystore password. Run this command:
  more %CVP_HOME%\conf\security.properties
- Copy the %CVP_HOME%\conf\security folder to another folder.
- Open a Command window as Administrator to run the commands.

> **Note**: You can streamline the commands used in this document by the use of the keytool parameter -storepass. For all CVP servers, you paste in the password obtained from the security.properties file specified. For the ADS servers you type the password: **changeit**

To regenerate the certificate on the CVP servers follow these steps:

(i) List the certificates in the server

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
list
```

> **Note**: The CVP Servers have these self-signed certificates: wsm_certificate , vxml_certificate , callserver_certificate. If you use the parameter -v of the keytool you are able to see more detailed information of each certificate. In addition you can add the ">" symbol at the end of the keytool.exe list command to send the output to a text file, for exmple: > test.txt

(ii) Delete the old self-signed certificates

CVP servers : command to delete the self-signed certificates:

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
delete -alias wsm_certificate

%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
delete -alias vxml_certificate

%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
delete -alias callserver_certificate
```

CVP Reporting servers: command to delete the self-signed certificates:

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
delete -alias wsm_certificate

%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
delete -alias callserver_certificate
```

> **Note**: CVP Reporting servers have these self-signed certificates wsm_certificate, callserver_certificate.

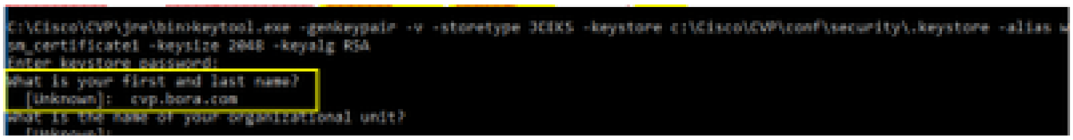
(iii) Generate the new self-signed certificates with the FQDN of the server

CVP servers

Command to generate the self-signed certificate for WSM:

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
genkeypair -alias wsm_certificate -keysize 2048 -keyalg RSA -validity XXXX
```

Specify the FQDN of the server, on the question **what is your fist and last name**?



```
C:\Cisco\CVP\jre\bin>keytool.exe -genkeypair -v -storetype JCEKS -keystore c:\Cisco\CVP\conf\security\.keystore -alias w
sm_certificate1 -keysize 2048 -keyalg RSA
Enter keystore password:
What is your first and last name?
  [Unknown]:  cvp.bora.com
What is the name of your organizational unit?
  [Unknown]:
```

Complete these other questions:

What is the name of your organizational unit?

[Unknown]: <specify OU>

What is the name of your organization?

[Unknown]: <specify the name of the org>

What is the name of your City or Locality?

[Unknown]: <specify the name of the city/locality>

What is the name of your State or Province?

[Unknown]: <specify the name of the state/province>

What is the two-letter country code for this unit?

[Unknown]: <specify two-letter Country code>

Specify **yes** for the next two inputs.

Perform the same steps for vxml_certificate and callserver_certificate:

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
genkeypair -alias vxml_certificate -keysize 2048 -keyalg RSA -validity XXXX

%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
genkeypair -alias callserver_certificate -keysize 2048 -keyalg RSA -validity XXXX
```

Reboot the CVP call server.

CVP Reporting servers

Command to generate the self-signed certificates for WSM:

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
genkeypair -alias wsm_certificate -keysize 2048 -keyalg RSA -validity XXXX
```

Specify the FQDN of the server for the query **what is your fist and last name ?** and follow the same steps as done with CVP servers.

Perform the same steps for callserver_certificate:

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
genkeypair -alias callserver_certificate -keysize 2048 -keyalg RSA -validity XXXX
```

Reboot the Reporting servers.

> **Note**: By default, the self-signed certificates are generated for two years. Use -validity XXXX to set the expiry date when certificates are regenerated, otherwise certificates are valid for 90 days. For most of these certificates, 3-5 years must be a reasonable validation time.

Here are some standard validity inputs:

One Year	365
Two Years	730
Three Years	1095
Four Year	1460
Five Years	1895
Ten Years	3650

> **Caution**: In 12.5 certificates must be **SHA 256**, Key Size **2048**, and encryption Algorithm **RSA**, use these parameters to set these values: -keyalg RSA and -keysize 2048. It is important that the CVP keystore commands include the -storetype JCEKS parameter. If this is not done, the certificate, the key, or worse the keystore can become corrupted.

(iv) Export wsm_Certificate from CVP and Reporting servers

a) Export WSM Certificate from each CVP server to a temporary location, and rename the certificate with a desired name. You can rename it as wsmcsX.crt. Replace "X" with a unique number or letter. that is wsmcsa.crt, wsmcsb.crt.

Command to export the self-signed certificates:

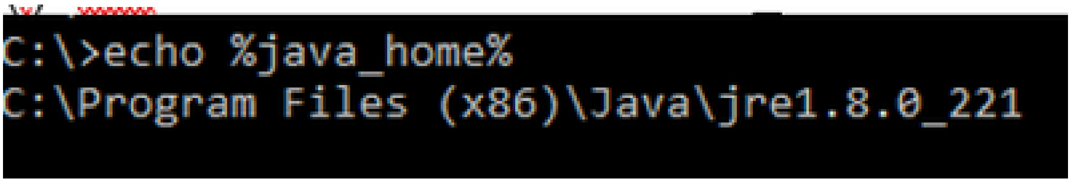
```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
export -alias wsm_certificate -file %CVP_HOME%\conf\security\wsm.crt
```

b) Copy the certificate from the path **C:\Cisco\CVP\conf\security\wsm.crt**, rename it to **wsmcsX.crt** and move it to a temporary folder on the ADS server.

Step 2. Import CVP Servers WSM Certificate to ADS Server

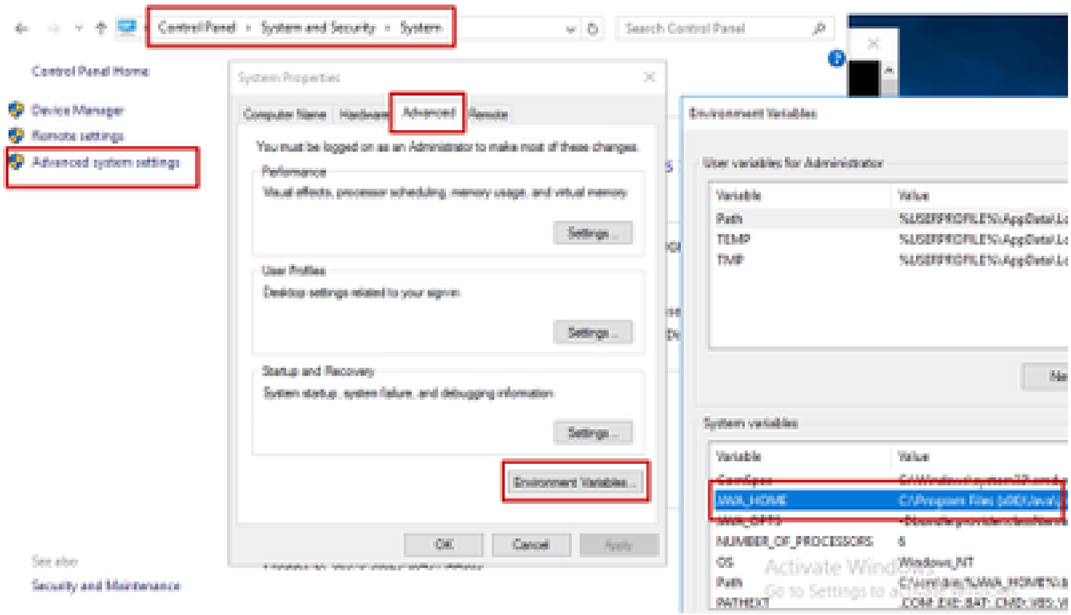
To import the certificate in ADS server you need to use the keytool which is a part of java toolset. There are couple of ways you can find the java home path where this tool is hosted.

(i) CLI command > **echo %JAVA_HOME%**



```
C:\>echo %java_home%
C:\Program Files (x86)\Java\jre1.8.0_221
```

(ii) Manually via **Advanced system setting,** as shown in the image.



On PCCE 12.5 default path is **C:\Program Files (x86)\Java\jre1.8.0_221\bin**

Command to import the self-signed certificates:

```
keytool -keystore "C:\Program Files (x86)\Java\jre1.8.0_221\lib\security\cacerts"  -import -
storepass changeit -alias {fqdn_of_cvp} -file c:\temp\certs\wsmcsX.crt
```

> **Note**: Repeat the commands for each CVP in the deployment and perform the same task on other ADS servers

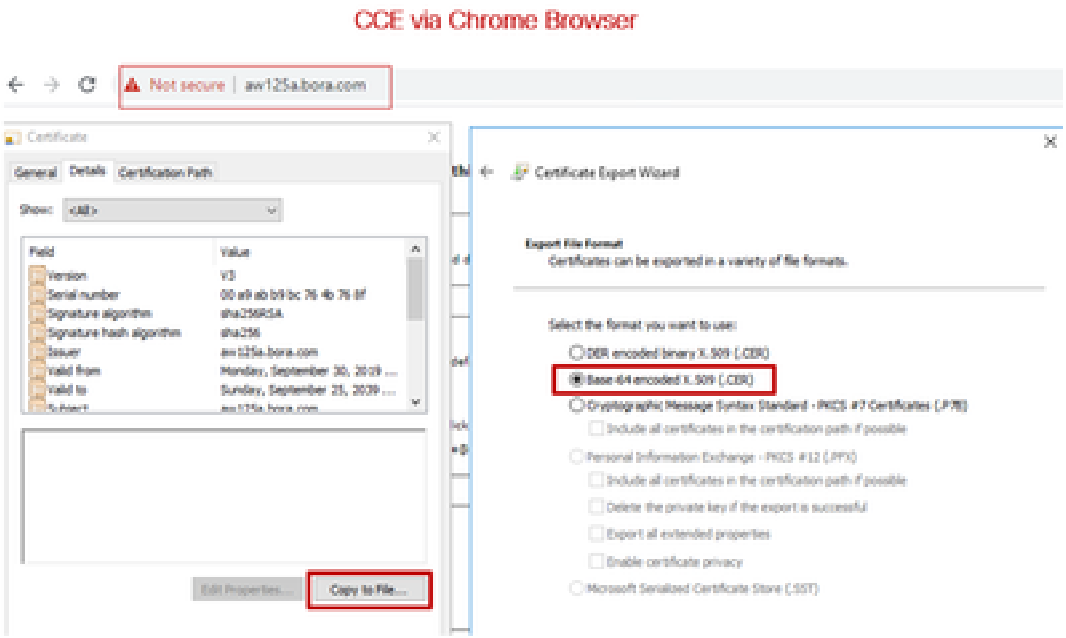
d) Restart the Apache Tomcat service on the ADS servers.

Step 3. Export ADS Server Certificate

For CVP Reporting server you have to exports the ADS certificate and import i into the Reporting server. Here are the steps:

(i) On ADS server from a browser, navigate to the server url : **https://{servername}**

(ii) Save the certificate to a temporary folder, for example: **c:\temp\certs** and name the certificate as **ADS{svr}[ab].cer**



CCE via Chrome Browser

Not secure | aw125a.bora.com

Certificate

General | Details | Certification Path

Show: <All>

Field	Value
Version	V3
Serial number	00 a9 ab b9 bc 76 4b 76 8f
Signature algorithm	sha256RSA
Signature hash algorithm	sha256
Issuer	aw125a.bora.com
Valid from	Monday, September 30, 2019 ...
Valid to	Sunday, September 25, 2039 ...
Subject	aw125a.bora.com

Edit Properties... | Copy to File...

Certificate Export Wizard

Export File Format

Certificates can be exported in a variety of file formats.

Select the format you want to use:

○ DER encoded binary X.509 (.CER)

● Base-64 encoded X.509 (.CER)

○ Cryptographic Message Syntax Standard - PKCS #7 Certificates (.P7B)

□ Include all certificates in the certification path if possible

○ Personal Information Exchange - PKCS #12 (.PFX)

□ Include all certificates in the certification path if possible

□ Delete the private key if the export is successful

□ Export all extended properties

□ Enable certificate privacy

○ Microsoft Serialized Certificate Store (.SST)

Note: Select the option Base-64 encoded X.509 (.CER).

Step 4. Import ADS Server to CVP Servers and Reporting Server

(i) Copy the certificate to CVP Servers and CVP Reporting server in the directory **C:\Cisco\CVP\conf\security.**

(ii) Import the certificate to CVP servers and CVP Reporting server.

```
%CVP_HOME%\jre\bin\keytool.exe -storetype JCEKS -keystore %CVP_HOME%\conf\security\.keystore -
import -trustcacerts -alias {fqdn_of_ads} -file %CVP_HOME%\conf\security\ICM{svr}[ab].cer
```

Perform the same steps for other ADS servers.

(iii) Restart the CVP Servers and Reporting server

Section 2: Certificate Exchange Between VOS Platform Applications and ADS Server

The steps needed to complete this exchange successfully are:

Step 1. Export VOS Platform Application Server Certificates.

Step 2. Import VOS Platform Application Certificates to ADS Server.

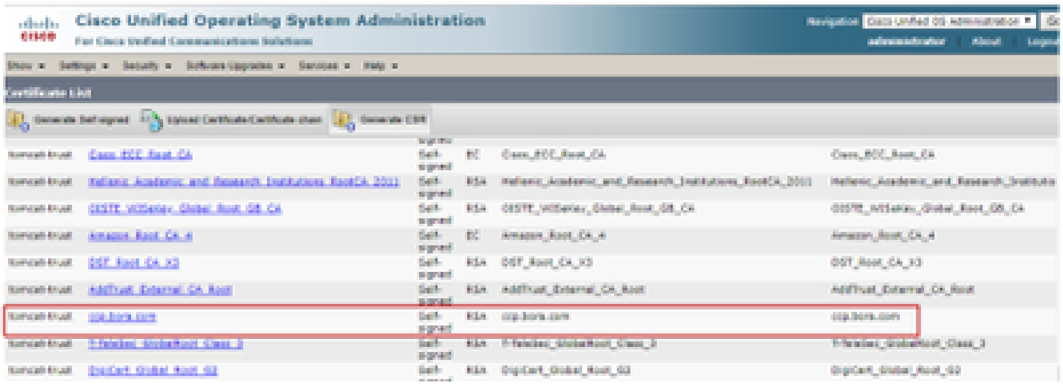
This process is applicable for all VOS applications such as:

- CUCM
- VVB
- Finesse
- CUIC \ LD \ IDS
- Cloud Connect

Step 1. Export VOS Platform Application Server Certificates.

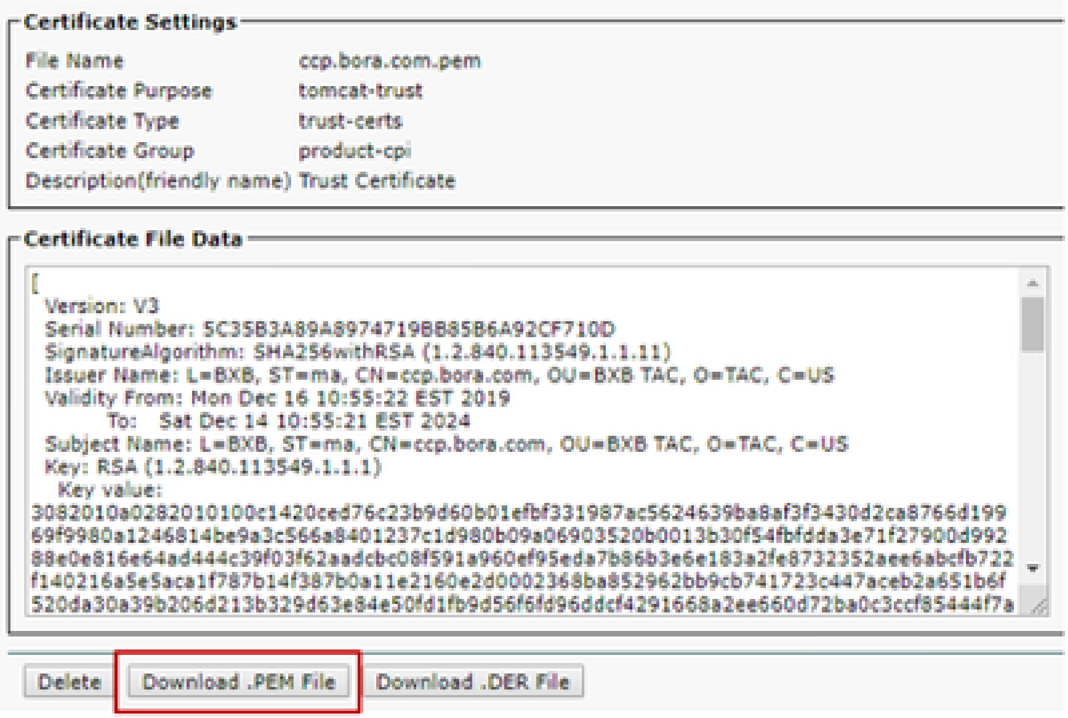
(i) Navigate to Cisco Unified Communications Operating System Administration page: https://FQDN:8443/cmplatform

(ii) Navigate to **Security > Certificate Management** and find the application primary server certificates in **tomcat-trust** folder.


Cisco Unified Operating System Administration
For Cisco Unified Communications Solutions
Navigation Cisco Unified OS Administration
administrator
About
Logout
Show
Settings
Security
Software Upgrades
Services
Help
Certificate List
Generate Self-signed
Upload Certificate/Certificate chain
Generate CSR

tomcat-trust	Cisco ECC Root CA	Self-signed	EC	Cisco_ECC_Root_CA	Cisco_ECC_Root_CA
tomcat-trust	Hellenic Academic and Research Institutions RootCA 2011	Self-signed	RSA	Hellenic_Academic_and_Research_Institutions_RootCA_2011	Hellenic_Academic_and_Research_Institutio
tomcat-trust	OISTE WISeKey Global Root GB CA	Self-signed	RSA	OISTE_WISeKey_Global_Root_GB_CA	OISTE_WISeKey_Global_Root_GB_CA
tomcat-trust	Amazon Root CA 4	Self-signed	EC	Amazon_Root_CA_4	Amazon_Root_CA_4
tomcat-trust	DST Root CA X3	Self-signed	RSA	DST_Root_CA_X3	DST_Root_CA_X3
tomcat-trust	AddTrust External CA Root	Self-signed	RSA	AddTrust_External_CA_Root	AddTrust_External_CA_Root
tomcat-trust	ccp.bora.com	Self-signed	RSA	ccp.bora.com	ccp.bora.com
tomcat-trust	T-TeleSec GlobalRoot Class 3	Self-signed	RSA	T-TeleSec_GlobalRoot_Class_3	T-TeleSec_GlobalRoot_Class_3
tomcat-trust	DigiCert Global Root G3	Self-signed	RSA	DigiCert_Global_Root_G3	DigiCert_Global_Root_G3

(iii) Select the certificate and click on download .PEM file to save it in a temporary folder on the ADS server.



Certificate Settings

File Name	ccp.bora.com.pem
Certificate Purpose	tomcat-trust
Certificate Type	trust-certs
Certificate Group	product-cpi
Description(friendly name)	Trust Certificate

Certificate File Data

```
[
  Version: V3
  Serial Number: 5C35B3A89A8974719BB85B6A92CF710D
  SignatureAlgorithm: SHA256withRSA (1.2.840.113549.1.1.11)
  Issuer Name: L=BXB, ST=ma, CN=ccp.bora.com, OU=BXB TAC, O=TAC, C=US
  Validity From: Mon Dec 16 10:55:22 EST 2019
         To:   Sat Dec 14 10:55:21 EST 2024
  Subject Name: L=BXB, ST=ma, CN=ccp.bora.com, OU=BXB TAC, O=TAC, C=US
  Key: RSA (1.2.840.113549.1.1.1)
    Key value:
3082010a0282010100c1420ced76c23b9d60b01efbf331987ac5624639ba8af3f3430d2ca8766d199
69f9980a1246814be9a3c566a8401237c1d980b09a06903520b0013b30f54fbfdda3e71f27900d992
88e0e816e64ad444c39f03f62aadcbc08f591a960ef95eda7b86b3e6e183a2fe8732352aee6abcfb722
f140216a5e5aca1f787b14f387b0a11e2160e2d0002368ba852962bb9cb741723c447aceb2a651b6f
520da30a39b206d213b329d63e84e50fd1fb9d56f6fd96ddcf4291668a2ee660d72ba0c3ccf85444f7a
```

Note: Perform the same steps for the subscriber.

Step 2. Import VOS Platform Application to ADS Server

Path to run the Key tool: **C:\Program Files (x86)\Java\jre1.8.0_221\bin**

Command to import the self-signed certificates:

```
keytool -keystore "C:\Program Files (x86)\Java\jre1.8.0_221\lib\security\cacerts"  -import -
```

```
storepass changeit -alias {fqdn_of_vos}  -file c:\temp\certs\vosapplicationX.cer
```

Restart the Apache Tomcat service on the ADS servers.

Note: Perform the same task on other ADS servers

Section 3: Certificate Exchange Between Roggers , PG and ADS Servers

The steps needed to complete this exchange successfully are:

Step 1: Export IIS Certificate from Rogger and PG Servers

Step 2: Export Diagnostic Framework Portico (DFP) Certificate from Rogger and PG Servers

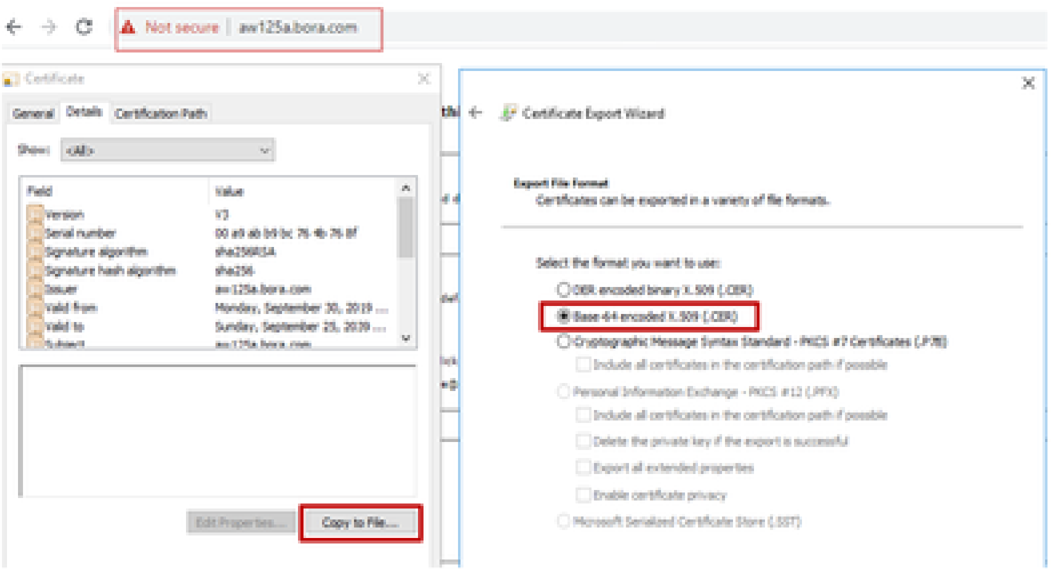
Step 3: Import Certificates into ADS Servers

Step 1. Export IIS Certificate from Rogger and PG Servers

(i) On ADS server from a browser, navigate to the servers (Roggers , PG)
url: **https://{servername}**

(ii)Save the certificate to a temporary folder, for example **c:\temp\certs and name the cert as ICM{svr}[ab].cer**

CCE via Chrome Browser



Field	Value
Version	V3
Serial number	00 a9 ab b9 bc 76 4b 76 8f
Signature algorithm	sha256RSA
Signature hash algorithm	sha256
Issuer	aw125a.bora.com
Valid from	Monday, September 30, 2019 ...
Valid to	Sunday, September 25, 2039 ...
Subject	aw125a.bora.com

Export File Format
Certificates can be exported in a variety of file formats.

Select the format you want to use:

○ DER encoded binary X.509 (.CER)
● Base-64 encoded X.509 (.CER)
○ Cryptographic Message Syntax Standard - PKCS #7 Certificates (.P7B)
□ Include all certificates in the certification path if possible
○ Personal Information Exchange - PKCS #12 (.PFX)
□ Include all certificates in the certification path if possible
□ Delete the private key if the export is successful
□ Export all extended properties
□ Enable certificate privacy
○ Microsoft Serialized Certificate Store (.SST)

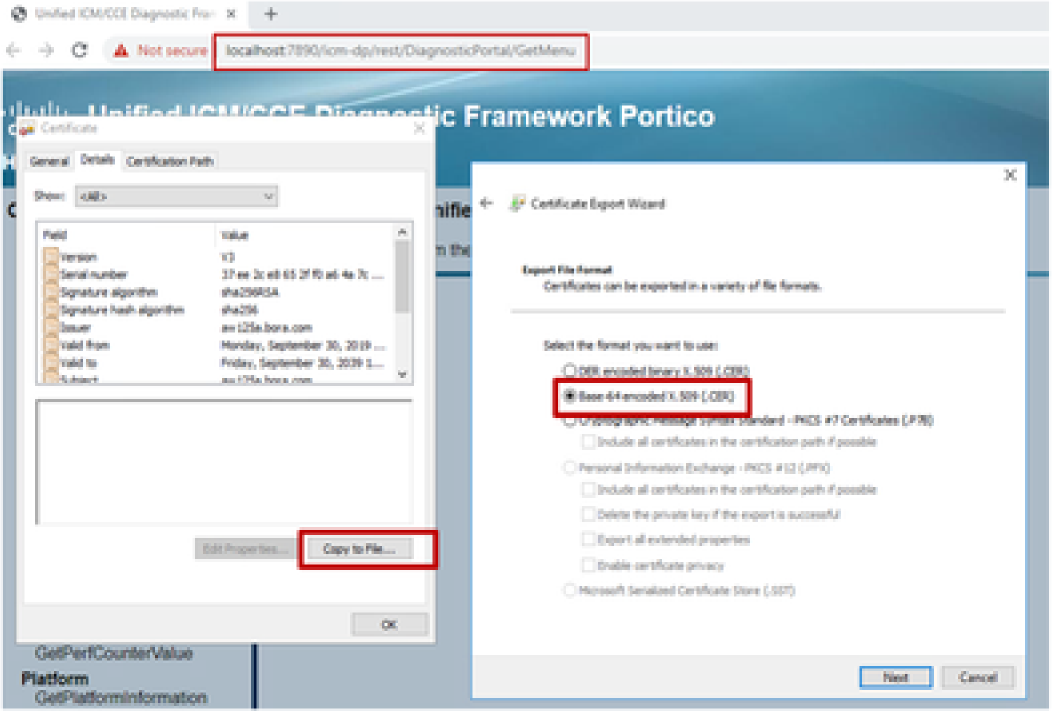
Note: Select the option Base-64 encoded X.509 (.CER).

Step 2. Export Diagnostic Framework Portico (DFP) Certificate from Rogger and PG Servers

(i) On ADS server from a browser, navigate to the servers (Roggers, PGs) DFP url : ***https://{servername}:7890/icm-dp/rest/DiagnosticPortal/GetProductVersion***

(ii) Save the certificate to folder example c:\temp\certs and name the cert as dfp{svr}[ab].cer

Portico via Chrome Browser



Field	Value
Version	V3
Serial number	37 ee 3c e8 65 2f f0 a6 4a 7c ...
Signature algorithm	sha256RSA
Signature hash algorithm	sha256
Issuer	aw125a.bora.com
Valid from	Monday, September 30, 2019 ...
Valid to	Friday, September 30, 2039 1...
Subject	aw125a.bora.com

Export File Format
Certificates can be exported in a variety of file formats.

Select the format you want to use:

○ DER encoded binary X.509 (.CER)
● Base-64 encoded X.509 (.CER)
○ Cryptographic Message Syntax Standard - PKCS #7 Certificates (.P7B)
□ Include all certificates in the certification path if possible
○ Personal Information Exchange - PKCS #12 (.PFX)
□ Include all certificates in the certification path if possible
□ Delete the private key if the export is successful
□ Export all extended properties
□ Enable certificate privacy
○ Microsoft Serialized Certificate Store (.SST)

Note: Select the option Base-64 encoded X.509 (.CER).

Step 3. Import Certificates into ADS Server

Command to import the IIS self-signed certificates into ADS server. The path to run the Key tool: **C:\Program Files (x86)\Java\jre1.8.0_221\bin.**

```
keytool -keystore "C:\Program Files (x86)\Java\jre1.8.0_221\lib\security\cacerts"  -import -
storepass changeit -alias {fqdn_of_server}_IIS -file c:\temp\certs\ ICM{svr}[ab].cer

Example: keytool -keystore "C:\Program Files (x86)\Java\jre1.8.0_221\lib\security\cacerts"  -
import -storepass changeit -alias myrgra.domain.com_IIS -file c:\temp\certs\ICMrgra.cer
```

Note: Import all the server certificates exported into all ADS servers.

Command to import the diagnostic self-signed certificates into ADS server

```
keytool -keystore "C:\Program Files (x86)\Java\jre1.8.0_221\lib\security\cacerts"  -import -
storepass changeit -alias {fqdn_of_server}_DFP -file c:\temp\certs\ dfp{svr}[ab].cer

Example: keytool -keystore "C:\Program Files (x86)\Java\jre1.8.0_221\lib\security\cacerts"  -
import -storepass changeit -alias myrgra.domain.com_DFP -file c:\temp\certs\dfprgra.cer
```

Note: Import all the server certificates exported into all ADS servers.

Restart the Apache Tomcat service on the ADS servers.

Section 4: CVP CallStudio WEBService Integration

For detailed information about how to establish a secure communication for Web Services Element and Rest_Client element

refer to User Guide for Cisco Unified CVP VXML Server and Cisco Unified Call Studio Release 12.5(1) - Web Service Integration [Cisco Unified Customer Voice Portal] - Cisco

Related Information

- CVP Configuration Guide: CVP Configuration Guide - Security
- UCCE Configuration Guide: UCCE Configuration Guide - Security
- PCCE Administration Guide: PCE Admin guide - Security
- UCCE Self-Signed Certificates: Exchange UCCE Self-Signed Certificates
- Install and Migrate to OpenJDK in CCE 12.5(1): CCE OpenJDK Migration
- Install and Migrate to OpenJDK in CVP 12.5(1): CVP OpenJDK Migration