Configure CA Signed Certificate via CLI in Cisco Voice Operating System (VOS)

Contents

Introduction

This document describes configuration steps on how to upload 3rd party Certificate Authority (CA) signed certificate on any Cisco Voice Operating System (VOS) based collaboration server by using the command line interface (CLI).

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Basic understanding of Public Key Infrastructure (PKI) and its implementation on Cisco VOS servers and Microsoft CA
- DNS infrastructure is preconfigured

Components Used

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

- VOS Server: Cisco Unified Communications Manager (CUCM) version 9.1.2
- CA: Windows 2012 Server
- Client browser: Mozilla Firefox version 47.0.1

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, make sure that you understand the potential impact of any command.

Background Information

In all Cisco Unified Comunications VOS products there are at least two credentials types: application like (ccmadmin, ccmservice, cuadmin, cfadmin, cuic) and VOS platform (cmplatform, drf, cli).

In some specific scenarios it is very convenient to manage applications via the web page and perform platform related activities via the command line. Below you may find a procedure on how to import 3rd party signed certificate solely via CLI. In this example Tomcat certificate is uploaded. For CallManager or any other application it looks the same.

Generate CA Signed Certificate

Commands Summary

A list of the commands used in the article.

```
show cert list own
show cert own tomcat

set csr gen CallManager
show csr list own
show csr own CallManager

show cert list trust
set cert import trust CallManager
set cert import own CallManager CallManager-trust/allevich-DC12-CA.pem
```

Check Correct Certificate Information

List all uploaded trusted certificates.

```
admin:show cert list own tomcat/tomcat.pem: Self-signed certificate generated by system
ipsec/ipsec.pem: Self-signed certificate generated by system CallManager/CallManager.pem:
Certificate Signed by allevich-DC12-CA CAPF/CAPF.pem: Self-signed certificate generated by
system TVS/TVS.pem: Self-signed certificate generated by system
```

Check who issued the certificate for Tomcat service.

```
admin:show cert own tomcat [ Version: V3 Serial Number: 85997832470554521102366324519859436690
SignatureAlgorithm: SHA1withRSA (1.2.840.113549.1.1.5) Issuer Name: L=Krakow, ST=Malopolskie,
CN=ucm1-1.allevich.local, OU=TAC, O=Cisco, C=PL Validity From: Sun Jul 31 11:37:17 CEST 2016 To:
Fri Jul 30 11:37:16 CEST 2021 Subject Name: L=Krakow, ST=Malopolskie, CN=ucm1-1.allevich.local,
OU=TAC, O=Cisco, C=PL Key: RSA (1.2.840.113549.1.1.1) Key value: 3082010a0282010100a2
<output omited>
```

This is a self-signed certificate since the issuer matches the subject.

Generate Certificate Sign Request (CSR)

Generate CSR.

```
admin:set csr gen tomcat Successfully Generated CSR for tomcat
```

Verify that the certificate sign requst was generated successfully.

```
admin:show csr list own tomcat/tomcat.csr
```

Open it and copy the content to the text file. Save it as **tac_tomcat.csr** file.

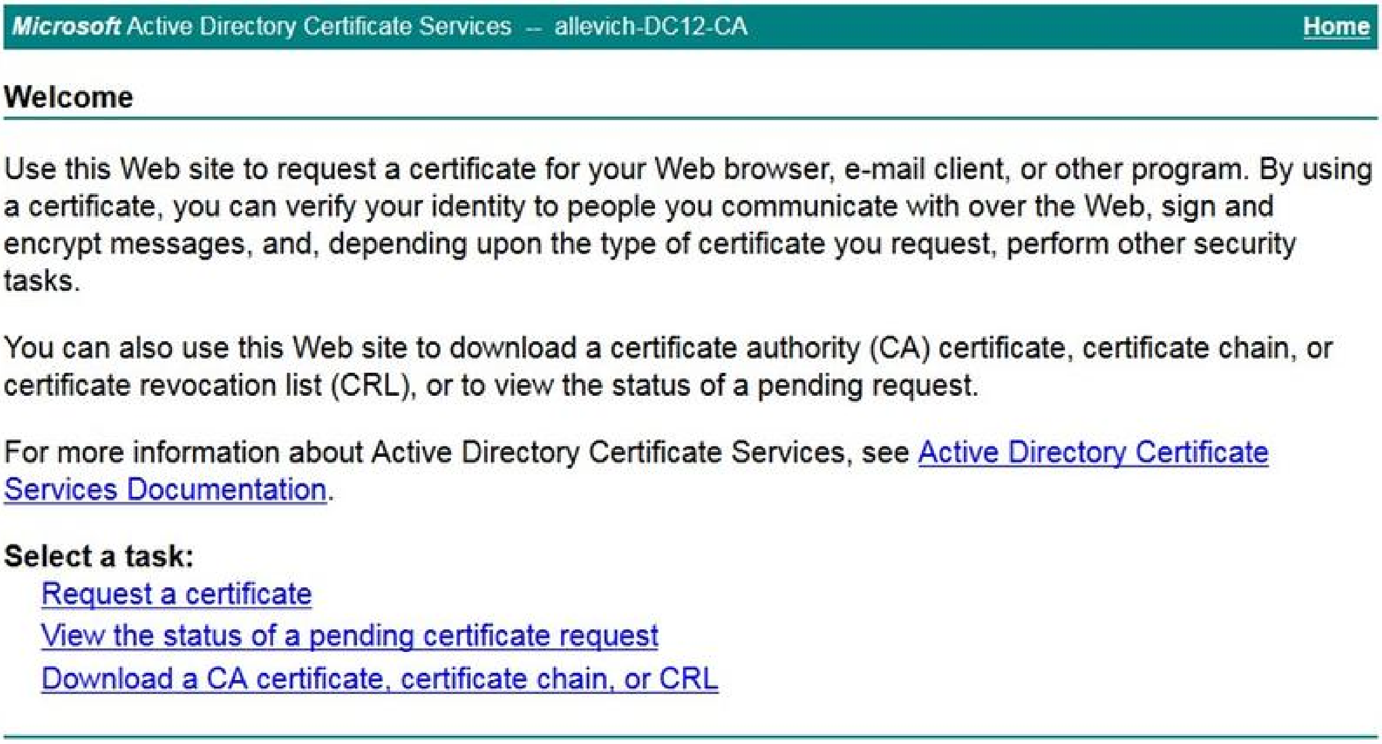
```
admin:show csr own tomcat -----BEGIN CERTIFICATE REQUEST-----
MIIDSjCCAjICAQAwgb0xCzAJBgNVBAYTAlBMMRQwEgYDVQQIEwtNYWxvcG9sc2tp
ZTEPMA0GA1UEBxMGS3Jha293MQ4wDAYDVQQKEwVDaXNjbzEMMAoGA1UECxMDVEFD
MR4wHAYDVQQDExV1Y20xLTEuYWxsZXZpY2gubG9jYWwxSTBHBgNVBAUTQDlhMWJk
NDA5M2VjOGYxNjljODhmNGUyZTYwZTYzM2RjNjlhZmFkNDY1YTgzMDhkNjRhNGU1
MzExOGQ0YjZkZjcwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQCVo5jh
lMqTUnYbHQUnYPt00PTflWbj7hi6PSYI7pVCbGUZBpIZ5PKwTD56OZ8SgpjYX5Pf
l9D09H2gtQJTMVv1Gm1eGdlJsbuABRKn6lWkO6b706MiGSgqel+41vnItjn3Y3kU
7h51nruJye3HpPQzvXXpOKJ/JeJc8InEvQcC/UQmFMKn0ulO0veFBHnG7TLDwDaQ
W1Al1rwrezN9Lwn2a/XZQR1P65sjmnkFFF2/FON4BmooeiiNJD0G+F4bKig1ymlR
84faF27plwHjcw8WAn2HwJT6O7TaE6EOJd0sgLU+HFAI3txKycS0NvLuMZYQH81s
/C74CIRWibEWT2qLAgMBAAGgRzBFBgkqhkiG9w0BCQ4xODA2MCcGA1UdJQQgMB4G
CCsGAQUFBwMBBggrBgEFBQcDAgYIKwYBBQUHAwUwCwYDVR0PBAQDAgO4MA0GCSqG
SIb3DQEBBQUAA4IBAQBUu1FhKuyQ1X58A6+7KPkYsWtioS0PoycltuQsVo0aav82
PiJkCvzWTeEo6v9qG0nnaI53e15+RPpWxpEgAIPPhtt6asDuW30SqSx4eClfgmKH
ak/tTuWmZbfyk2iqNFy0YgYTeBkG3AqPwWUCNoduPZ0/fo41QoJPwjE184U64WXB
gCzhIHfsV5DzYp3IR5C13hEa5fDgpD2ubQWja2LId85NGHEiqyiWqwmt07pTkBc+
7ZKa6fKnpACehrtVqEn02jOi+sanfQKGQqH8VYMFsW2uYFj9pf/Wn4aDGuJoqdOH
StV2Eh0afxPEq/1rQP3/rzq4NMYlJ7glyNFGPUVP -----END CERTIFICATE REQUEST-----
```

Generate Tomcat Server Certificate

Generate a certificate for Tomcat service on the CA.

Open the web page for the Certificate Authority in a browser. Put the correct credentials in the authentication prompt.

http://dc12.allevich.local/certsrv/


Microsoft Active Directory Certificate Services -- allevich-DC12-CA

Home

Welcome

Use this Web site to request a certificate for your Web browser, e-mail client, or other program. By using a certificate, you can verify your identity to people you communicate with over the Web, sign and encrypt messages, and, depending upon the type of certificate you request, perform other security tasks.

You can also use this Web site to download a certificate authority (CA) certificate, certificate chain, or certificate revocation list (CRL), or to view the status of a pending request.

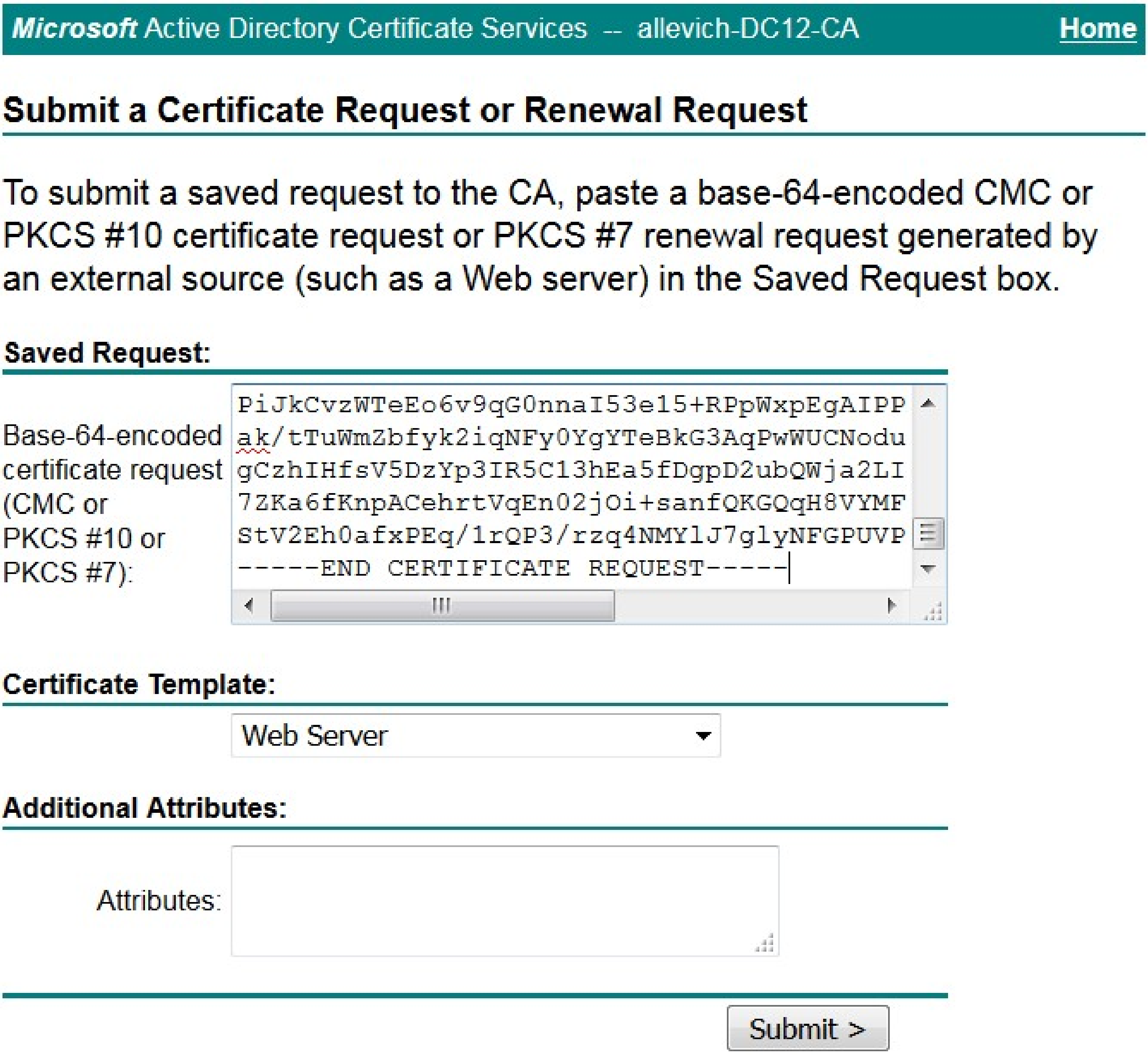
For more information about Active Directory Certificate Services, see Active Directory Certificate Services Documentation.

Select a task:

Request a certificate
View the status of a pending certificate request
Download a CA certificate, certificate chain, or CRL

Download the CA root certificate. Select **Download a CA certificate, certificate chain, or CRL** menu. In the next menu choose the proper CA from the list. Encoding method should be **Base 64**. Download the CA certificate and save it to the operating system with name **ca.cer**.

Press **Request a Certificate** and then **Advanced Certificate Request**. Set **Certificate Template** to web server and paste the CSR content from the text file **tac_tomcat.csr** as shown.



Microsoft Active Directory Certificate Services -- allevich-DC12-CA
Home

Submit a Certificate Request or Renewal Request

To submit a saved request to the CA, paste a base-64-encoded CMC or PKCS #10 certificate request or PKCS #7 renewal request generated by an external source (such as a Web server) in the Saved Request box.

Saved Request:

Base-64-encoded certificate request (CMC or PKCS #10 or PKCS #7):

```
PiJkCvzWTeEo6v9qG0nnaI53e15+RPpWxpEgAIPP
ak/tTuWmZbfyk2iqNFy0YgYTeBkG3AqPwWUCNodu
gCzhIHfsV5DzYp3IR5C13hEa5fDgpD2ubQWja2LI
7ZKa6fKnpACehrtVqEn02jOi+sanfQKGQqH8VYMF
StV2Eh0afxPEq/1rQP3/rzq4NMYlJ7glyNFGPUVP
-----END CERTIFICATE REQUEST-----
```

Certificate Template:

Web Server

Additional Attributes:

Attributes:

> **Tip**: If the operation is done in the lab (or Cisco VOS server and the CA is under the same administrative domain) to save time copy and paste the CSR from the memory buffer.

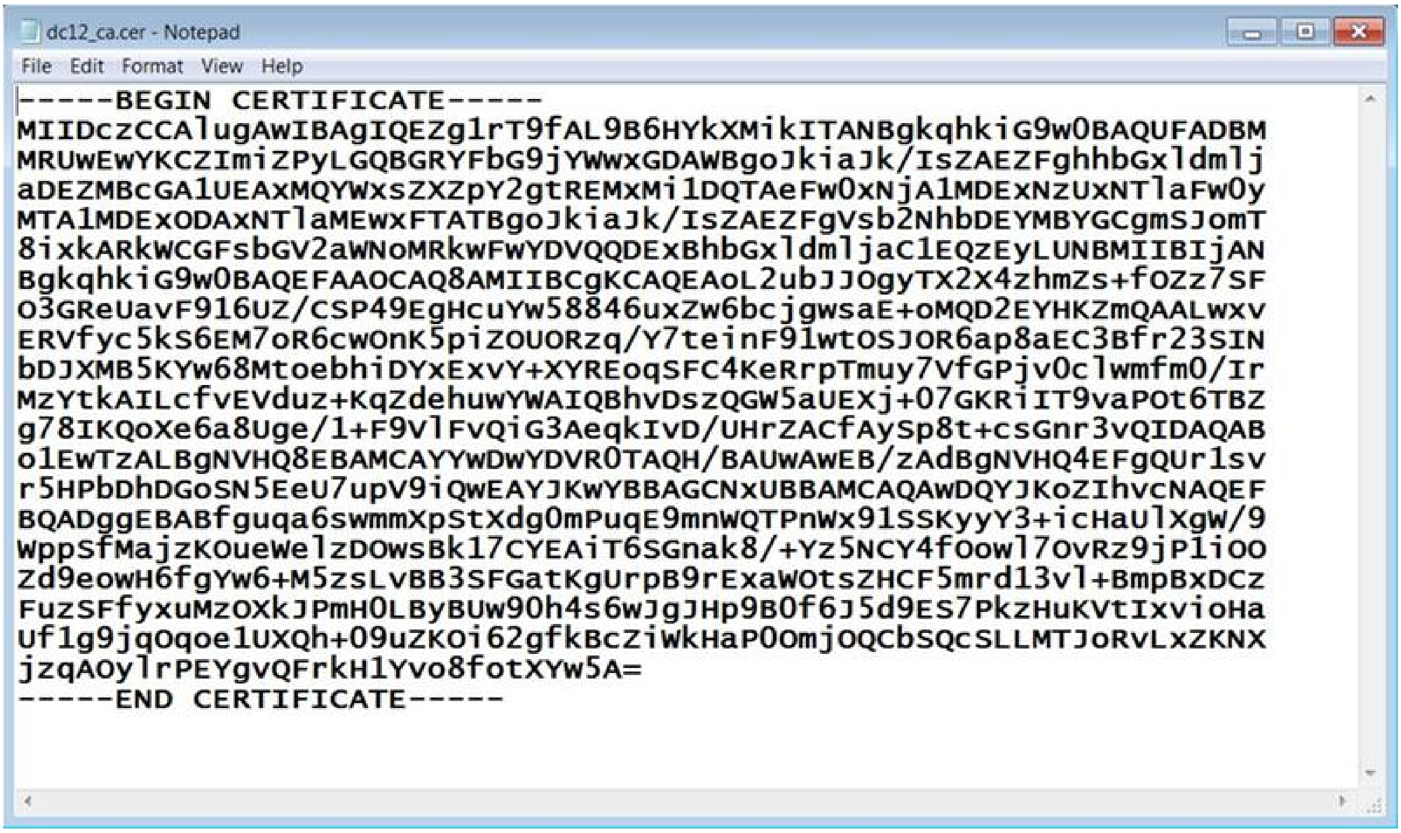
Press **Submit**. Select **Base 64 encoded** option and download the certificate for the Tomcat service.

> **Note**: If certificate generation is performed in bulk ensure to change a name of the certificate to a meaninful one.

Import Tomcat Certificate to the Cisco VOS Server

Import CA Certificate

Open the CA certificate that was stored with a name **ca.cer**. It must be imported first.



```
-----BEGIN CERTIFICATE-----
MIIDczCCAlugAwIBAgIQEZg1rT9fAL9B6HYkXMikITANBgkqhkiG9w0BAQUFADBM
MRUwEwYKCZImiZPyLGQBGRYFbG9jYWwxGDAWBgoJkiaJk/IsZAEZFghhbGxldmlj
aDEZMBcGA1UEAxMQYWxsZXZpY2gtREMxMi1DQTAeFw0xNjA1MDExNzUxNTlaFw0y
MTA1MDExODAxNTlaMEwxFTATBgoJkiaJk/IsZAEZFgVsb2NhbDEYMBYGCgmSJomT
8ixkARkWCGFsbGV2aWNoMRkwFwYDVQQDExBhbGxldmljaC1EQzEyLUNBMIIBIjAN
BgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAoL2ubJJOgyTX2X4zhmZs+fOZz7SF
O3GReUavF916UZ/CSP49EgHcuYw58846uxZw6bcjgwsaE+oMQD2EYHKZmQAALwxv
ERVfyc5kS6EM7oR6cwOnK5piZOUORzq/Y7teinF91wtOSJOR6ap8aEC3Bfr23SIN
bDJXMB5KYw68MtoebhiDYxExvY+XYREoqSFC4KeRrpTmuy7VfGPjv0clwmfm0/Ir
MzYtkAILcfvEVduz+KqZdehuwYWAIQBhvDszQGW5aUEXj+07GKRiIT9vaPOt6TBZ
g78IKQoXe6a8Uge/1+F9VlFvQiG3AeqkIvD/UHrZACfAySp8t+csGnr3vQIDAQAB
o1EwTzALBgNVHQ8EBAMCAYYwDwYDVR0TAQH/BAUwAwEB/zAdBgNVHQ4EFgQUr1sv
r5HPbDhDGoSN5EeU7upV9iQwEAYJKwYBBAGCNxUBBAMCAQAwDQYJKoZIhvcNAQEF
BQADggEBABfguqa6swmmXpStXdg0mPuqE9mnWQTPnWx91SSKyyY3+icHaUlXgW/9
WppSfMajzKOueWelzDOwsBk17CYEAiT6SGnak8/+Yz5NCY4fOowl7OvRz9jP1iOO
Zd9eowH6fgYw6+M5zsLvBB3SFGatKgUrpB9rExaWOtsZHCF5mrd13vl+BmpBxDCz
FuzSFfyxuMzOXkJPmH0LByBUw90h4s6wJgJHp9B0f6J5d9ES7PkzHuKVtIxvioHa
Uf1g9jqOqoe1UXQh+09uZKOi62gfkBcZiWkHaP0OmjOQCbSQcSLLMTJoRvLxZKNX
jzqAOylrPEYgvQFrkH1Yvo8fotXYw5A=
-----END CERTIFICATE-----
```

Copy its content to the buffer and type the following command in the CUCM CLI:

```
admin:set cert import trust tomcat Paste the Certificate and Hit Enter
```

Prompt to paste the CA certificate will be displayed. Paste it as shown below.

```
-----BEGIN CERTIFICATE-----
MIIDczCCAlugAwIBAgIQEZg1rT9fAL9B6HYkXMikITANBgkqhkiG9w0BAQUFADBM
MRUwEwYKCZImiZPyLGQBGRYFbG9jYWwxGDAWBgoJkiaJk/IsZAEZFghhbGxldmlj
aDEZMBcGA1UEAxMQYWxsZXZpY2gtREMxMi1DQTAeFw0xNjA1MDExNzUxNTlaFw0y
MTA1MDExODAxNTlaMEwxFTATBgoJkiaJk/IsZAEZFgVsb2NhbDEYMBYGCgmSJomT
8ixkARkWCGFsbGV2aWNoMRkwFwYDVQQDExBhbGxldmljaC1EQzEyLUNBMIIBIjAN
BgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAoL2ubJJOgyTX2X4zhmZs+fOZz7SF
O3GReUavF916UZ/CSP49EgHcuYw58846uxZw6bcjgwsaE+oMQD2EYHKZmQAALwxv
ERVfyc5kS6EM7oR6cwOnK5piZOUORzq/Y7teinF91wtOSJOR6ap8aEC3Bfr23SIN
bDJXMB5KYw68MtoebhiDYxExvY+XYREoqSFC4KeRrpTmuy7VfGPjv0clwmfm0/Ir
MzYtkAILcfvEVduz+KqZdehuwYWAIQBhvDszQGW5aUEXj+07GKRiIT9vaPOt6TBZ
g78IKQoXe6a8Uge/1+F9VlFvQiG3AeqkIvD/UHrZACfAySp8t+csGnr3vQIDAQAB
o1EwTzALBgNVHQ8EBAMCAYYwDwYDVR0TAQH/BAUwAwEB/zAdBgNVHQ4EFgQUr1sv
r5HPbDhDGoSN5EeU7upV9iQwEAYJKwYBBAGCNxUBBAMCAQAwDQYJKoZIhvcNAQEF
BQADggEBABfguqa6swmmXpStXdg0mPuqE9mnWQTPnWx91SSKyyY3+icHaUlXgW/9
WppSfMajzKOueWelzDOwsBk17CYEAiT6SGnak8/+Yz5NCY4fOowl7OvRz9jP1iOO
Zd9eowH6fgYw6+M5zsLvBB3SFGatKgUrpB9rExaWOtsZHCF5mrd13vl+BmpBxDCz
FuzSFfyxuMzOXkJPmH0LByBUw90h4s6wJgJHp9B0f6J5d9ES7PkzHuKVtIxvioHa
Uf1g9jqOqoe1UXQh+09uZKOi62gfkBcZiWkHaP0OmjOQCbSQcSLLMTJoRvLxZKNX
jzqAOylrPEYgvQFrkH1Yvo8fotXYw5A=
-----END CERTIFICATE-----
```

In case a trust certificate upload is successful this output will be displayed.

```
Import of trust certificate is successful
```

Verify that the CA certificate is successfully imported as Tomcat-trust one.

```
admin:show cert list trust tomcat-trust/ucm1-1.pem: Trust Certificate tomcat-trust/allevich-win-CA.pem: w2008r2 139 <output omited for brevity>
```

Import Tomcat Certificate

Next step is to import Tomcat CA signed certificate. The operation looks the same as with tomcat-trust cert, just the command is different.

```
set cert import own tomcat tomcat-trust/allevich-DC12-CA.pem
```

Restart the Service

And lastly restart Tomcat service.

```
utils service restart Cisco Tomcat
```

> **Caution**: Keep in mind that it disrupts the operation of web server dependant services, like Extension Mobility, Missed Calls, Corporate Directory and the others.

Verify

Verify the certificate that was generated.

```
admin:show cert own tomcat [ Version: V3 Serial Number:
2765292404730765620225406600715421425487314965 SignatureAlgorithm: SHA1withRSA
(1.2.840.113549.1.1.5) Issuer Name: CN=allevich-DC12-CA, DC=allevich, DC=local Validity From:
Sun Jul 31 12:17:46 CEST 2016 To: Tue Jul 31 12:17:46 CEST 2018 Subject Name: CN=ucm1-
1.allevich.local, OU=TAC, O=Cisco, L=Krakow, ST=Malopolskie, C=PL Key: RSA
(1.2.840.113549.1.1.1) Key value: 3082010a028201010095a
```

Ensure that the issuer name belongs to the CA that constructed that certificate.

Login to the web page by typing FQDN of the server in a browser and no certificate warning will be displayed.

Troubleshoot

The goal of this article is to give a procedure with command syntax on how to upload the certificate via CLI, not to highlight the logic of Public Key Infrastucture (PKI). It does not cover SAN certificate, Subordinate CA, 4096 certificate key length and many other scenarios.

In some rare cases when uploading a web server certificate via the CLI the operation fails with an error message "Unable to read CA certificate". A workaround for that is to install the certificate using the web page.

A non standard Certificate Authority configuration can lead to the problem with certificate installation. Try to generate and install the certificate from another CA with a basic default configuration.

Back Out Plan

In case there will be a need to generate a self-signed certificate it can also be done in the CLI.

Type the command below and Tomcat certificate will be regenerated to the self-signed one.

```
admin:set cert regen tomcat WARNING: This operation will overwrite any CA signed certificate
previously imported for tomcat Proceed with regeneration (yes|no)? yes Successfully Regenerated
Certificate for tomcat. You must restart services related to tomcat for the regenerated
```

```
certificates to become active.
```

To apply a new certificate Tomcat service must be restarted.

```
admin:utils service restart Cisco Tomcat Don't press Ctrl-c while the service is getting
RESTARTED.If Service has not Restarted Properly, execute the same Command Again Service Manager
is running Cisco Tomcat[STOPPING] Cisco Tomcat[STOPPING] Commanded Out of Service Cisco
Tomcat[NOTRUNNING] Service Manager is running Cisco Tomcat[STARTING] Cisco Tomcat[STARTING]
Cisco Tomcat[STARTED]
```

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