



**Implementer Certificate
Installation Guide**

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Document Change History

Version	Date	Items Changed Since Previous Version	Changed By
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Table of Contents

1	OVERVIEW	1
1.1	Definitions.....	1
1.2	Production Certificate Process Overview	1
2	SUPERSEDED CERTIFICATE INFORMATION	1
3	INFORMATION FOR REQUESTING A CERTIFICATE	2
3.1	Production Request Documents/Information.....	2
3.2	Uploading the forms and next steps	2
4	OVERVIEW OF PROPER HANDLING OF CODES AND CERTIFICATES.....	2
4.1	Handling Codes.....	2
4.2	Handling Certificates	2
5	GENERATE CSR	3
5.1	CSR Values for Production.....	3
6	SUBMIT CSR	4
6.1	Production URL.....	4
7	IMPORT WEB SERVER CERTIFICATE	7
8	ACQUIRING ROOT AND INTERMEDIATE CA CERTIFICATE INTO WEB SERVER	7
8.1	Retrieve CA Certificate from Managed Services.....	7
8.2	Installing Root and Intermediate CA Certificate.....	8
9	VERIFYING ROOT, INTERMEDIATE AND SERVER CERTIFICATES.....	8
9.1	Production Certificate Details.....	9
10	BEST PRACTICES	9
11	TROUBLESHOOTING	9

List of Figures

Figure 1. Entrust Authority™ Enrollment Server for Web Screen	4
Figure 2. Web Server PKCS#10 Certificate Request Screen	5
Figure 3. Web Server PKCS#10 Certificate Request Screen Filled	6
Figure 4. File Download – Security Warning Dialog Box	8

1 Overview

An important feature of a Participant's onboarding process with the Carequality is obtaining and using digital security certificates. This document will guide Participants through the certificate installation process as well as discuss the importance of best practices for certificate handling.

1.1 Definitions

The following terms are used throughout this document:

1. Participant – Refers to the organization that is onboarding to the Carequality such as an HIE, Hospital etc.
2. Subscriber – The individual within a participant that signed the Entrust contract in order to acquire a certificate
3. Proxy – The individual assigned by the Subscriber with the role of managing and installing the certificate.

1.2 Production Certificate Process Overview

During the Production onboarding process, Participants will submit a request to the Carequality Support Staff for a new certificate. After the Carequality Support Staff validates the appropriate documents (see section 2 of this document) a certificate acquisition "reference number" and "authorization code" will be sent by two separate **modalities** to the Subscriber or the Subscriber's Proxy. These codes will be utilized to create the Certificate Signing Request (CSR) as well as obtaining the signed certificate. After the certificate installation is complete the Organization will be able to perform partner testing and connect to other Participants in the Production environment.

2 Superseded Certificate Information

In the past there were some installation steps that are no longer required. This guide along with the links to the additional information contain the latest information with regards to your certificate installation guide. After installing all the certificates mentioned in this document ensure that your trust chain and certificates match what is mentioned.

Known superseded steps:

1. There is no longer a need for a Cross-Certificate. The only certificates that should be installed on your environment are your server, intermediate and root certificates mentioned in this document.

3 Information for Requesting a Certificate

3.1 Production Request Documents/Information

1. The following Identity Proofing forms (via hyperlinks) shall be completed for any Implementer who is designating/updating a Subscriber to receive the Certificate codes, or if the current forms are more than two years old. Note – these forms are valid for 2 years from the date they are Notarized and Certificates expire after one year's time.

<https://carequality.org/wp-content/uploads/2020/02/Subscriber-Identity-Verification-Form.pdf>

<https://carequality.org/wp-content/uploads/2020/02/Subscriber-Agreement-Form.pdf>

2. The Subscriber's approval for any renewal request shall be needed. (Include name, email address, and cell phone number)

3.2 Uploading the forms and next steps

Upon completion/Notarization of the required forms, an Implementer Representative uploads them along with photocopies of IDs to the appropriate Implementer folder on Box.

4 Overview of Proper Handling of Codes and Certificates

Before an Organization begins the final stage of the onboarding process, installing the Production certificate and moving into Production, it is imperative that the individual (Subscriber or Proxy) handling the codes and certificate understand the proper guidelines and procedures for dealing with them.

4.1 Handling Codes

It is important to understand that, in Production, these codes are the keys to obtaining access to millions of patients' data, and therefore it is extremely important that they are handled correctly. The codes are issued by Carequality Support Staff directly to, and only to, the x.509 Subscriber or a person named by the Subscriber to act as his/her Proxy. These codes must **not** be shared with anyone; only the Subscriber **or** the Proxy should have them (not both). Also, a reminder that the use of these codes is covered in the Entrust agreements that you or your organization notarized and executed, and the associated Entrust and FBCA policies, and applicable state and federal law and regulations.

4.2 Handling Certificates

Your production certificate allows your organization to access the network and all of its patients' data. For this reason, it is required that your organization take the necessary precautions to ensure that this certificate remains secure. The following items should be followed (including but not limited to):

- Private key should never be shared.
- Private key should be created on the production server.

- Private key should never leave the production server.
- Individuals should become familiar with X.509 key management best practices.
- Individuals should be familiar with applicable law and FBCA procedures and policies.

In general individuals must agree to follow certificate best handling practices. For a list of similar or best practices organizations can and should review certificate PCI compliance. See: https://www.pcisecuritystandards.org/security_standards/documents.php?category=sags (requires free registration).

5 Generate CSR

After the Organization receives the reference number and authorization code from the Carequality Support Staff, it starts the process of creating a certificate for a Web server. The first step is to generate a pair of cryptographic keys and a PKCS#10 Certificate Signing Request (CSR). The CSR contains information used to create the certificate. The following values should be used to fill out your Certificate Signing Request:

Note: depending on the tool used to generate the CSR a Keystore might need to be created before the CSR. Regardless the Keystore size needs to be set to 2048.

IMPORTANT: ensure that you follow the lower case/upper case of each value for your CSR e.g. the Organization 'O' for validation is all lower case 'nhin' while the Organizational Unit 'OU' is mixed.

5.1 CSR Values for Production

```
CN=<registry.nhinonline.net> (Replace this value with your Reference Number)  
O=HHS-ONC  
OU=CAREQUALITY  
C=US
```

Note: Only enter the information after the equals sign '=' e.g. for the organization field enter 'HHS-ONC' (no quotes)

Note: The Common Name (CN) is an important piece of information required in the CSR. The CN **must** be the reference number sent by Carequality Support Staff to the Organization. Once the CSR is signed the resulting certificates CN should be an FQDN that resolves (not an IP).

Note: If City and State are required fields for your CSR enter the City and State of your organization.

For Windows IIS users: Leave the Cryptographic service provider as "Microsoft RSA SChannel Cryptographic Provider" and make sure to select a bit length of 2048.

6 Submit CSR

After the Organization generates the CSR for the Web server, it submits the certificate request through the Entrust Authority™ Enrollment Server for Web. Use the following steps to complete this procedure.

Using Internet Explorer go to the appropriate URL:

6.1 Production URL

<https://enrollwebfed.managed.entrust.com/nfi/cda-cgi/clientcgi?action=start>

Note: Please verify that the Organization is utilizing the latest endpoints by cross checking the information with question 1 on the following article:

<https://carequality.org/wiki/carequality-certificates/>

1. The Entrust Authority™ Enrollment Server for Web tool should appear.

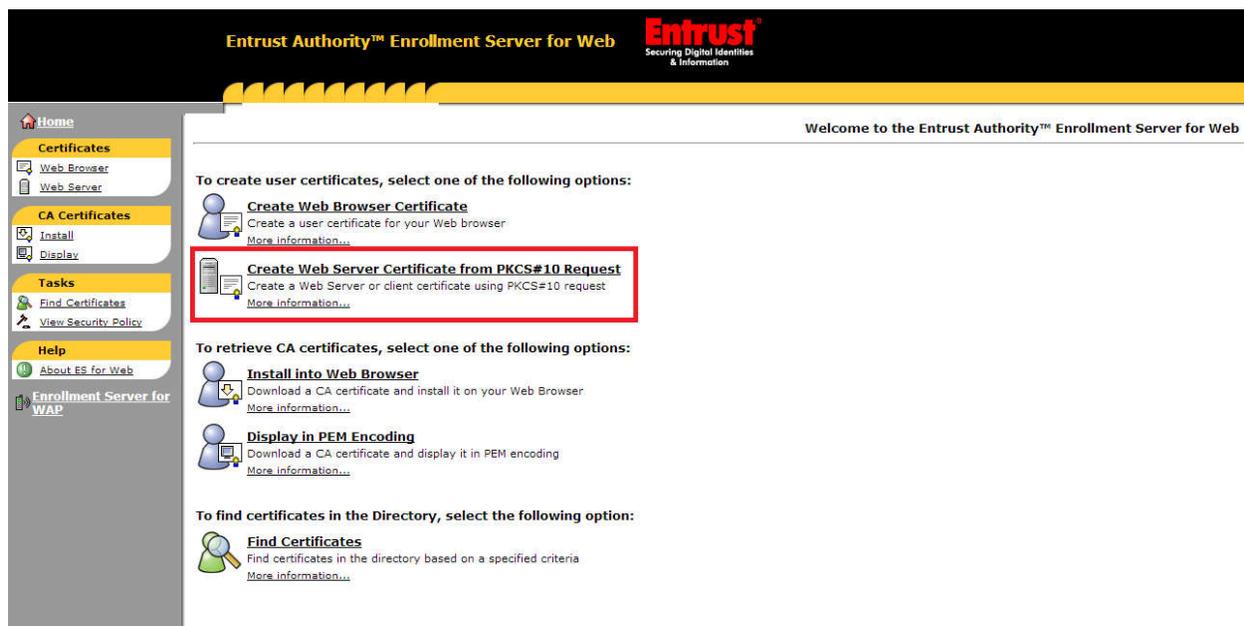
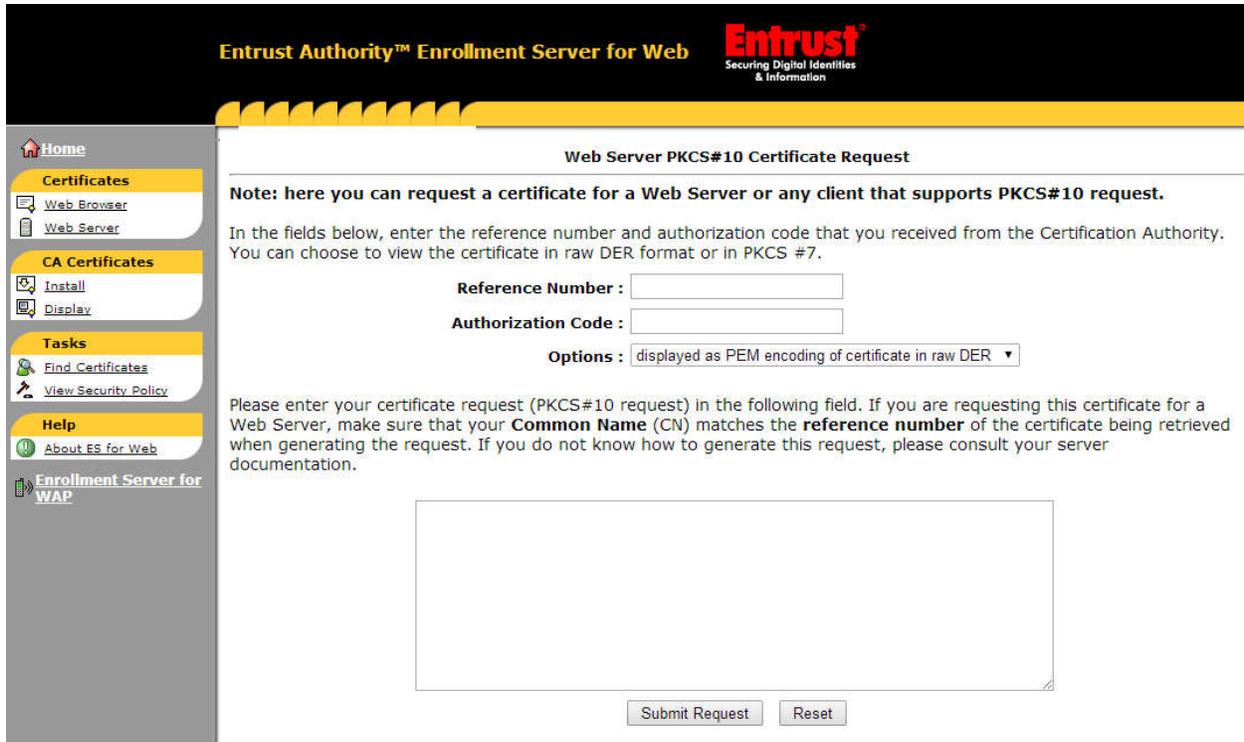


Figure 1. Entrust Authority™ Enrollment Server for Web Screen

Warning: The system may prompt you to install a Java Applet. Agree to the installation and follow the screen prompts to run the applet. **Note:** The system does not confirm installation.

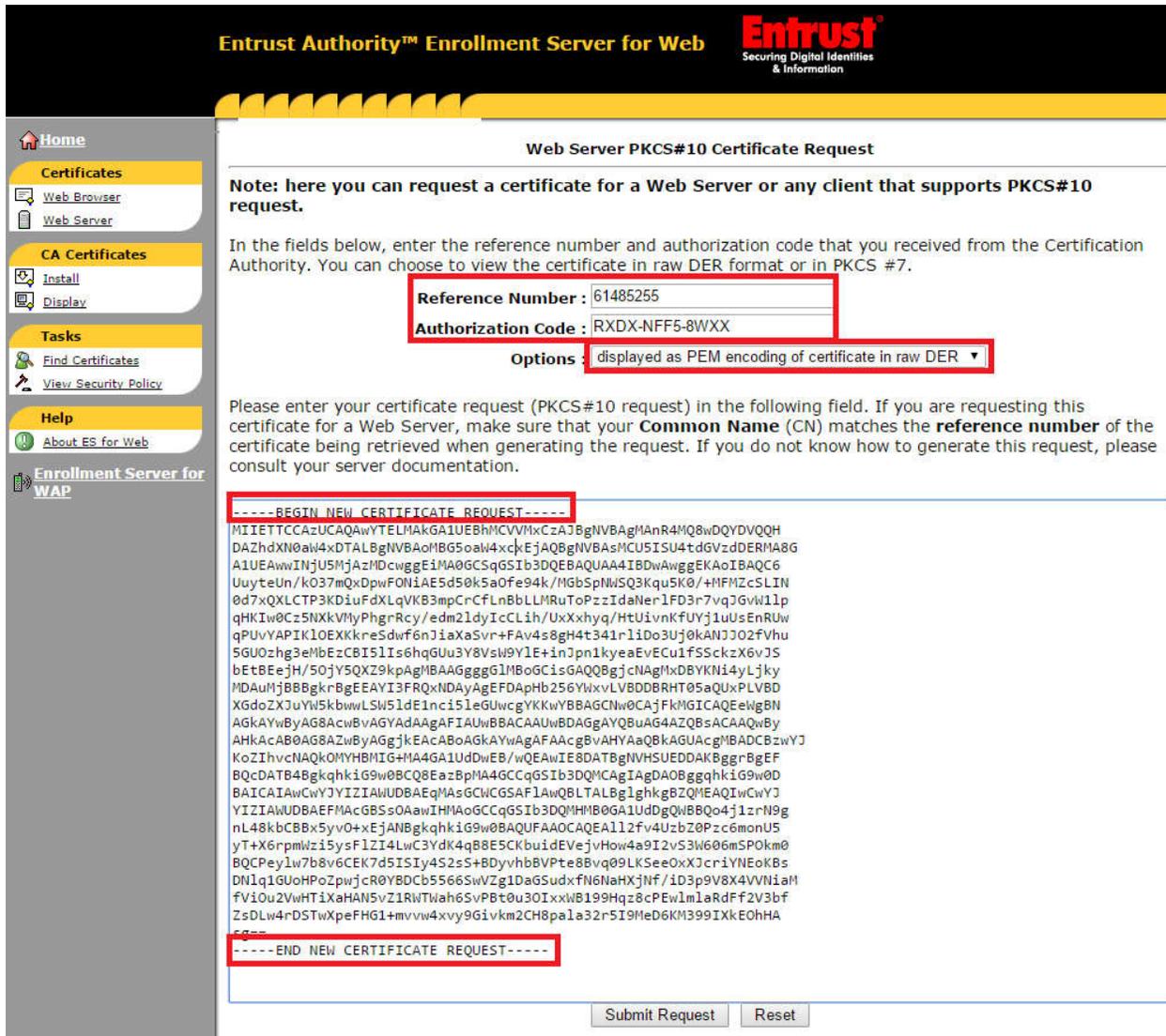
2. Click **Create Certificate from PKCS#10 Request**. The Web Server PKCS#10 Certificate Request screen appears.



The screenshot shows the 'Web Server PKCS#10 Certificate Request' page. The page has a black header with the Entrust logo and 'Securing Digital Identities & Information'. Below the header is a yellow navigation bar. On the left is a grey sidebar with a 'Home' icon and several menu items: 'Certificates' (with sub-items 'Web Browser' and 'Web Server'), 'CA Certificates' (with sub-items 'Install' and 'Display'), 'Tasks' (with sub-items 'Find Certificates' and 'View Security Policy'), 'Help' (with sub-item 'About ES for Web'), and 'Enrollment Server for WAP'. The main content area has a title 'Web Server PKCS#10 Certificate Request' and a note: 'Note: here you can request a certificate for a Web Server or any client that supports PKCS#10 request.' Below the note is a paragraph: 'In the fields below, enter the reference number and authorization code that you received from the Certification Authority. You can choose to view the certificate in raw DER format or in PKCS #7.' There are three input fields: 'Reference Number', 'Authorization Code', and 'Options' (a dropdown menu currently set to 'displayed as PEM encoding of certificate in raw DER'). Below these fields is a large text box for the certificate request. At the bottom of the form are two buttons: 'Submit Request' and 'Reset'.

Figure 2. Web Server PKCS#10 Certificate Request Screen

3. In the *Reference Number*: field, enter **(Reference Number)** (or use copy/paste) issued by Carequality Support Staff.
4. In the *Authorization Code*: field, enter **(Authorization Code)** (or use copy/paste) issued by Carequality Support Staff.
5. Leave the *Options*: field with the default selection.
6. Copy the **(CSR)** you stored earlier in Notepad. (Include the *BEGIN* and *END* lines)
7. In the *Certificate Request* field, paste the **(CSR)** into the large text box.
8. Click **Submit Request**. Managed Services generates a Web server certificate and sends it to the Enrollment Server for Web.



Entrust Authority™ Enrollment Server for Web **Entrust®**
Securing Digital Identities & Information

Home

Certificates

- Web Browser
- Web Server

CA Certificates

- Install
- Display

Tasks

- Find Certificates
- View Security Policy

Help

- About ES for Web

Enrollment Server for WAP

Web Server PKCS#10 Certificate Request

Note: here you can request a certificate for a Web Server or any client that supports PKCS#10 request.

In the fields below, enter the reference number and authorization code that you received from the Certification Authority. You can choose to view the certificate in raw DER format or in PKCS #7.

Reference Number : 61485255

Authorization Code : RXDX-FFF5-8WXX

Options : displayed as PEM encoding of certificate in raw DER

Please enter your certificate request (PKCS#10 request) in the following field. If you are requesting this certificate for a Web Server, make sure that your **Common Name (CN)** matches the **reference number** of the certificate being retrieved when generating the request. If you do not know how to generate this request, please consult your server documentation.

```

-----BEGIN NEW CERTIFICATE REQUEST-----
MIIEITCCAzUCAQAwYTELMakGA1UEBhMCVVMxZzA1BjBmVBAgMAnR4M08wDQYDVQQH
DAZhdnN0aW4xDTALBgNVBAoMBG5oaW4xckEjAQBgNVBAsMCUSISU4tdGVzdDERMA8G
A1UEAwINInJU5MjAzMDCwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQC6
UuyteUn/k037mQxDpwFONiAE5d50k5a0Fe94k/MGbSpNWSQ3Kqu5K0/+HFMZcSLIN
0d7xQXLCTP3KD1uFdXLqVK83mpCrcFLn8bLLMRuToPzzIdaNer1FD3r7vqJGvW11p
qHKIw0Cz5NXkVMyPhgrRcy/edm21dyIcCLih/UxXxyq/HtUivnKFUYj1uUsEnRUw
qPUvYAPiK10EXKkreSdwf6nJiaXaSvr+FAv4s8gH4t341r1iDo3Uj0kANJJO2fvhu
5G00zhg3eMbEzCBI51Is6hgGUu3Y8Vsw9Y1E+inJpn1kyeaEvECu1f5SckzX6vJS
bEtBEejH/50jY5QXZ9kpAgMBAAGggG1MBoGCisGAQQBgjcNAgMxDBYkNi4yLjky
MDAUMjBBBgrBgEEAYI3FRQxNDAYAgEFDAPhb256YXxvLVBDDBRHT05aQUxPLVBD
XGdoZXJ0YW5kbwL5W51de1nc151eGUwcyYkKwYBBAGCNw0CAjFkMGICAQEeWgBN
AGkAYwByAG8AcwBvAGYAdAAgAFIAUwBBACAAUwBDAGGAYQBUAG4AZQBsACAQAwBy
AHkAcAB0AG8AZwByAGYjKEAcAB0AGkAYwAgAFAAcgBvAHYAaQBkAGUAcgMBADCBzwYJ
KoZiHvcNAQOMYHBMIG+MA4GA1UdEB/wQEAwIE8DATBgNVHUEDDAKBggrBgEF
BQcDATB4BggqhkiG9w0BCCQ8EazBpMA4GCQcGSIb3DQMAcAgIAgDAOBggqhkiG9w0D
BAICAIAwCwYJYIZIAWUDBAEqMASGCWGSFAFlAwQBLTALBg1ghkgBZQMEAIwCwYJ
YIZIAWUDBAEFMacGBSs0AawIHMAoGCCqGSIb3DQMHMB0GA1UdGQwBBQo4j1zrN9g
n148kCB8x5yv0+xEjANBgkqhkiG9w0BAQUFAAOCAQEA112fv4Uzbz0Pzc6monU5
yT+X6rpmWz5ysFLZiALwC3YdK4qB8E5CKbuideVeJvHow4a9I2vS3W606mSPOkM0
BQCPey1w7b8v6CEK7d5ISiY4S2sS+BDyvhbBVpTe8Bvq09LKSeeOXJcrYNEokBs
DM1q1GUoHPoZpwjCR0YBDCb5566SvVZg1DaGSDuxfn6NaHXjnf/iD3p9V8X4VvNiAm
fvIou2VwHTiXaHAN5vZ1RWTWah6SvPBt0u30IxxwB199Hqz8cPewlmlaRdFf2V3bf
ZsDLw4rD5TwXpeFHG1+mvvw4xvy96ivkm2CH8pala32r5I9MeD6KM399IXkE0hHA
5G==
-----END NEW CERTIFICATE REQUEST-----

```

Figure 3. Web Server PKCS#10 Certificate Request Screen Filled

Note: Figure 3 does not contain accurate data, is for reference only.

Note: If an issue occurs during the submission process, after verifying that all the information was entered correctly on the CSR and website, and the correct URL was utilized please contact the Carequality Support Staff.

9. Click **Download** on the page displaying your certificate. A dialog box appears. **Note:** Depending on your browser, the dialog box could vary, but the steps are similar.
 - a. In Internet Explorer:
 - i. In the **File Download** dialog box, click **OK** to save this file to disk.

- ii. In the **Save As** dialog box, choose a name and path of a text file to save the certificate.
 - iii. Click **Save**.
 - b. In Firefox:
 - i. In the **Opening** dialog box, select **Save to Disk**.
 - ii. Click **OK**. Firefox saves the file to the desktop.

If the system saves the certificate in the text file; the file extension may be `.bin` or `.cer`.

Note: If the download does not contain the right extension, copy and paste the certificate text to a text editor and save as a `.cer` file

You have submitted the certificate request.

7 Import Web Server Certificate

Because every system is unique and has different configurations it will be left up to the organization to properly and securely install the signed certificate to the web server.

8 Acquiring Root and Intermediate CA Certificate into Web Server

The following steps guide the Organization with instructions to acquiring the Intermediate and Root certificates.

Note: Previously there was a need for a Cross-Certificate to be installed. Please ensure that the Cross-Certificate is not present on the certificate trust chain and that only the following intermediate and root are present.

Note: Some systems will derive the incorrect intermediate and root certificate ensure that the certificate trust chain matches the certificates mentioned on section 9.

Note: Be sure to NOT install the FBCA cross-signed certs instead of the Carequality/Entrust FBCA certs unless you have good reason.

8.1 Retrieve CA Certificate from Managed Services

1. Using a Web browser go to the Production URL used to sign your CSR. See section 4.1 and 4.2. The Entrust Authority™ Enrollment Server for Web tool appears.
2. On the left side of the screen, under CA Certificates, click **Install**.

Note: Depending on your browser, the dialog box could vary, but the steps are similar.

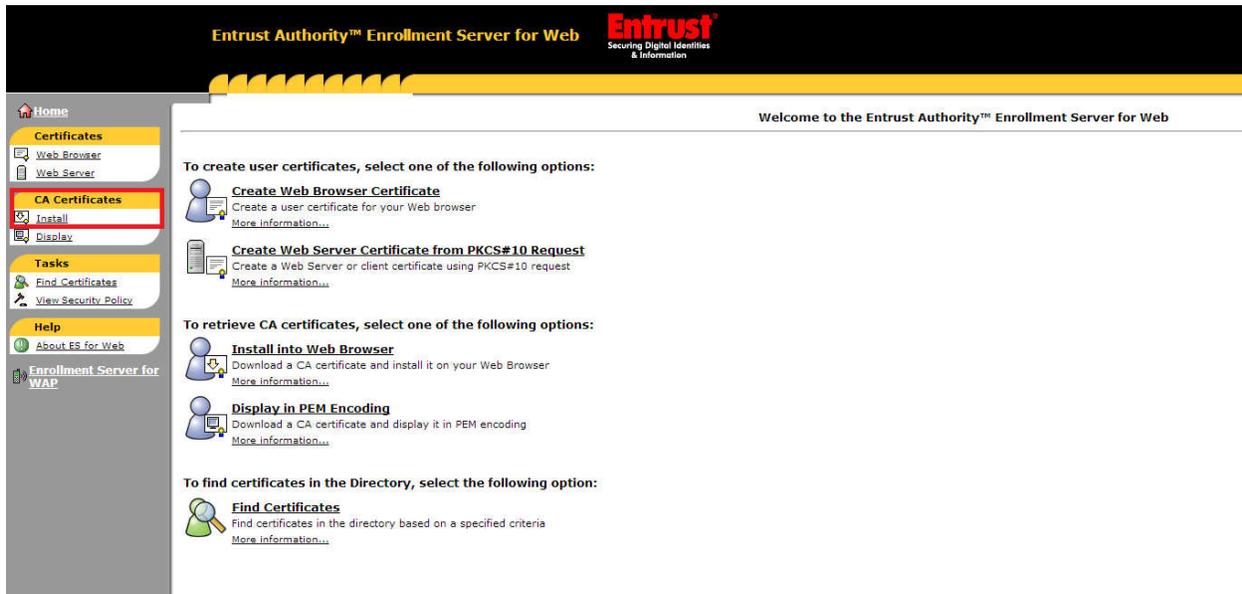


Figure 4. File Download – Security Warning Dialog Box

3. Save the certificate on the server. Ensure that the extension is `.cer`

Note: this download will have both the intermediate and root ensure that each certificate gets installed on the appropriate location.

Important: some systems will not derive the root out of the intermediate (mainly linux machines). If you are having issues with extracting the root certificate for your chain please contact Carequality Tech Support.

8.2 Installing Root and Intermediate CA Certificate

It will be left up to the organization to properly and securely install the signed certificate to the web server. These two certificates should be installed on your server based on the Organization's policies and procedures. Once installed ensure that the information on each certificate is accurate by comparing the detailed information of the certificate with the information in section 8 of this document.

9 Verifying Root, Intermediate and Server Certificates

After an Organization has installed all three CA certificates (Root, Intermediate and Server) in order to ensure that the correct certificates have been installed verify that the following information agrees with your installed certificates.

9.1 Production Certificate Details

The Entrust Root (self-signed) CA cert:

- serial number: 4A:A8:A6:0D
- issued 11/16/2017
- valid until 12/17/2027
- issuer OU = Entrust Managed Services NFI Root CA, OU = Certification Authorities, O = Entrust, C = US
- subject OU = Entrust Managed Services NFI Root CA, OU = Certification Authorities, O = Entrust, C = US

The Entrust Intermediate (Signing) CA cert:

- serial number: 4A:A8:B9:EA
- issued 5/16/2017
- valid until 12/17/2027
- issuer OU = Entrust Managed Services NFI Root CA, OU = Certification Authorities, O = Entrust, C = US
- subject OU = Entrust NFI Medium Assurance SSP CA, OU = Certification Authorities, O = Entrust, C = US

Your Server cert:

- serial number/dates (customer specific)
- issuer OU = Entrust NFI Medium Assurance SSP CA, OU = Certification Authorities, O = Entrust, C = US
- subject CN = (your FQDN), OU = CAREQUALITY, O = HHS-ONC, C = US

10 Best Practices

This certificate is the key to the Carequality ecosystem. The organization is responsible for following all best practices with regards to certificate handling and installation. The organization (as well as the individual installing the certificate) needs to be familiar with our minimum certificate best practices (See section 3 of this document). In addition, keys need to be handled using industry best practices. For example, see the PCI DSS Self-Assessment Questionnaire D questions 3.5 and 3.6 which may be found at https://www.pcisecuritystandards.org/security_standards/documents.php?category=sags (requires free registration). Last but not least, ensure familiarity with the Carequality's X.509 certificate article <https://carequality.org/wiki/carequality-certificates/>

11 Troubleshooting

Troubleshooting is largely dependent on one's environment. A few troubleshooting items that should be common to most environments are as follows:

- See question 22 of <https://carequality.org/wiki/carequality-certificates/> for information on smoke testing and partner testing.
- Section 8 of this document should be used to verify that you have the correct certificates installed.