Mobile Access Portal Gateway Network and IT Guidance Technical Bulletin

TL-MAP1810-0Px, TL-MAP1810-0Sx

Building Technologies & Solutions

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Johnson Controls

Contents

Document Introduction

This document contains important information about connecting a Mobile Access Portal Gateway (MAP Gateway) to your network. From an IT perspective, a system device such as a MAP Gateway is simply a node on the network. However, MAP Gateway uses communication protocols, security methods, and other technologies that you should consider carefully.

- **Important:** Engage appropriate network security professionals to ensure that the certificates are handled securely. Network security is an important issue. Typically, the IT organization must approve configurations that expose networks to the Internet. Be sure to fully read and understand IT compliance documentation for your site. Use care when performing steps on system components because restarts may be required that conflict with compliance requirements. For example, upgrading firmware or installing new SSL certificates may require the computer be offline for a period of time.

Concepts

This section describes IT concepts as they are used when working with MAP Gateway.

Chain of Trust

A chain of trust is designed to allow multiple users to create and use software on the system, which would be more difficult if all the keys were stored directly in hardware. It starts with warnings from the MAP Gateway UI when you attempt to use it without the software being digitally signed. The signing authority only signs boot programs that enforce security, such as running only programs that are themselves signed, or allowing only signed code to have access to certain features of the machine. This process may continue for several layers.

Self-Signed Certificates and Certificates Signed by a Public Certificate Authority

A self-signed certificate is a certificate that is signed by the same entity that it certifies. This term does not refer to the identity of the person or organization that actually performed the signing procedure. A self-signed certificate is a certificate signed with its own private key, that is, the entity signing the certificate is also the entity that created the certificate.

MAP Gateway is shipped with a default Johnson Controls® self signed certificate that provides secure communication. Only one certificate can be installed on MAP Gateway at a time. You will overwrite the existing certificate when you install a new certificate. MAP Gateway can be run on your network with a self-signed certificate.

However, if you need to expose the MAP Gateway UI on a public network and have browsers indicate a trusted site, you must get a signed certificate matching your domain name. You can acquire a valid signed certificate from your IT department or purchase it from a Public Certificate Authority (CA) using a certificate signing request (CSR). A certificate signed by a CA is used to establish a secure connection between your browser and the MAP Gateway.

Public and Private Keys

Public and private keys are used to verify that the entity requesting access to a system is who or what it claims to be.

Man-in-the-Middle Attack

This is a type of security breach where a person injects themselves between the user and the entity the user is trying to communicate with on the network. The person then has the ability to intercept and read traffic or send false information on to the destination. To guard against this type of attack, we **strongly recommend** that you use an Ethernet crossover cable to directly connect MAP Gateway to your computer when transferring keys to the device. This setup creates a network of two and makes a man-in-the-middle attack improbable.

IP Addresses

An IP address uniquely identifies devices on a TCP/IP network. An IP address can be private for use on a LAN or public for use on the internet or a WAN.

Dynamic Host Configuration Protocol (DHCP)

DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a device is plugged into a different location on the network. DHCP can also assign dial-up users an IP address automatically when they connect to the network. Some DHCP servers can support fixed addresses for devices that need a static IP address.

The MAP Gateway can obtain its IP address and other network information using DHCP. Each device that can connect to the Ethernet network needs a unique IP address. Without DHCP, the IP address must be entered manually for each device; and, if the devices are moved to another subnet on the network, you must enter a new IP address. The MAP Gateway supports both dynamic and static IP address assignments.

Domain Name System (DNS)

DNS is the Internet standard for naming host devices and mapping host domain names to IP addresses. A DNS server is a computer registered to join the Domain Name System. A domain name is a meaningful and easy-to-remember handle for an Internet address. A DNS server runs special-purpose networking software, features a public IP address, and contains a database of network names and addresses for other Internet hosts to ensure that they are unique.

Steps

Connecting to MAP Gateway the First Time

- **Important:** If you are going to use the MAP Gateway on Ethernet, you must plug it into external power before you attach the field bus adapter.

The following instructions are based on the information in the *Quick Start Guide (Part No. 24-10737-16),* which comes with each individual MAP Gateway. The default login credentials for each MAP Gateway are included in the Quick Start Guide that ships with each device.

1. Connect the RS-485 port of the MAP Gateway to the sensor bus or field bus port of the equipment controller using the supplied RJ-12 cable (portable model) or field bus adapter (stationary model). The MAP Gateway's LEDs flash, indicating that the device is initializing. When the Fault LED turns off and the Wi-Fi LEDs flash in succession, the MAP Gateway is ready to use.

2. In the Wi-Fi settings of your device or laptop, connect to the MAP Gateway Wi-Fi network using your default credentials. These credentials are included on a sticker in the *Quick Start Guide (Part No. 24-10737-16)* that came with your device.

3. Direct your browser to **www.mapgwy.com** to open the MAP Gateway browser interface.

4. Use your default Admin login credentials that are also included on a sticker in the *Quick Start Guide (Part No. 24-10737-16)* that came with your device.

   ⓘ **Note:** MAP Gateway ships with a private mapgwy.com SSL certificate installed to ensure secure communication with the MAP Gateway. However, this certificate does not indicate that it is trusted in a browser. If you wish to install your own certificate, refer to Adding a Private Key and Certificate to MAP Gateway.

5. Read and accept the MAP Gateway license agreement.
6. The first time you log in to the MAP Gateway, the Change Password and Passphrase web page appears. You must change the Admin password and Wi-Fi passphrase.
   a. Replace the default password in the **New Admin Password** field. Confirm the change by entering the new password in the **Verify New Admin Password** field.

      ➧ **Important:** After you change the Wi-Fi passphrase or SSID the webserver restarts and you must rejoin the MAP Gateway Wi-Fi network using the new passphrase. On some mobile devices you must select and “forget” the original MAP Gateway Wi-Fi network before rejoining the network with the new passphrase.

   b. Replace the Wi-Fi Passphrase in the **New Wi-Fi Passphrase** field and click **Save**.

You may now use your MAP Gateway through Wi-Fi. If you are connecting your MAP Gateway to an Ethernet network, continue to Connecting the MAP Gateway to Ethernet.

Connecting the MAP Gateway to Ethernet

➧ **Important:** When using the MAP Gateway on Ethernet, you **must** plug it into external power before you attach the field bus adapter.

These instructions are for additional settings required when connecting the MAP Gateway to an Ethernet network. These settings occur after the steps in Connecting to MAP Gateway the First Time.

1. In the MAP Gateway UI, navigate to ***Settings* > *Ethernet*** .
2. In the Ethernet drop-down list, select **On** to enable the MAP Ethernet port.
3. Click **Save** on the bottom of the screen.
4. By default, the MAP Gateway is configured to dynamically receive an IP address from your network using DHCP. Take note of the address that automatically appears in the IP Address field.
5. Enter only this IP address directly into your browser address bar to access the MAP Gateway over your Ethernet network.

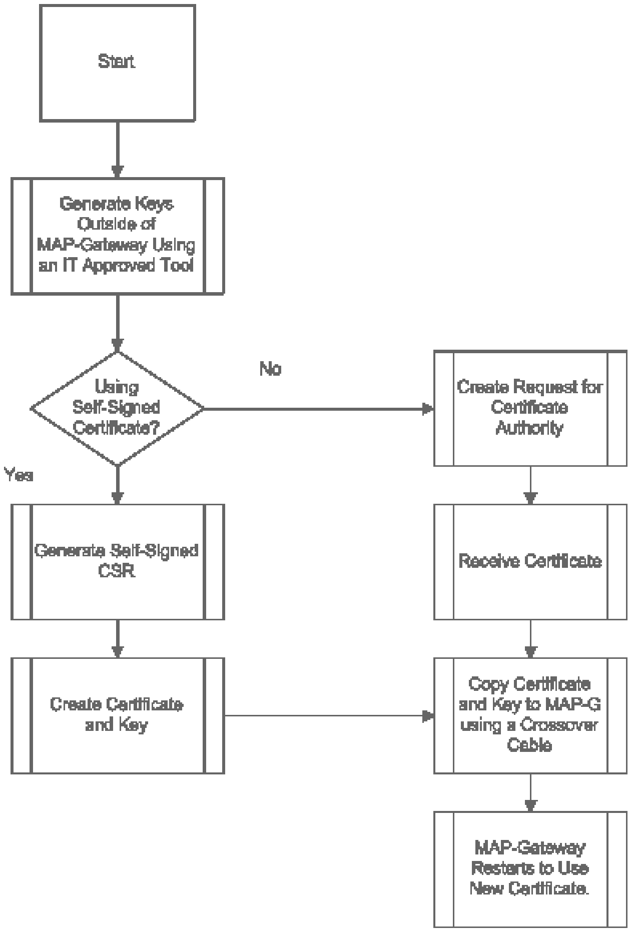
What to do nextYou can use static or manual settings rather than automatic settings with your MAP Gateway. However, if you do so, you **must** contact your IT department for all necessary manual settings to ensure that your MAP Gateway works on your company's network. **To use your MAP Gateway with a static IP Address:** Configure your own static IP address parameters by setting **Auto DHCP Configure** to Off under ***Settings* > *Ethernet***. Obtain necessary network settings from your IT department. **To use your MAP Gateway with a DNS:** If you have a Dynamic Name Server on your network, the MAP Gateway can be accessed by a unique name instead of using an IP address. To enable DNS, set the **Auto DNS Configure** setting to On under ***Settings* > *Ethernet*** .

Certificate Workflow

The following flowchart gives a general overview of how to create and install certificates on MAP Gateway. This process covers how to generate self-signed certificates and keys in addition to how to create a request for a certificate signed by a public certificate authority to install on the MAP

Gateway device. The instructions for how to install and uninstall these certificates to establish trust between the MAP Gateway and the browser you are using varies by the browser type.

Figure 1: Certificate Workflow

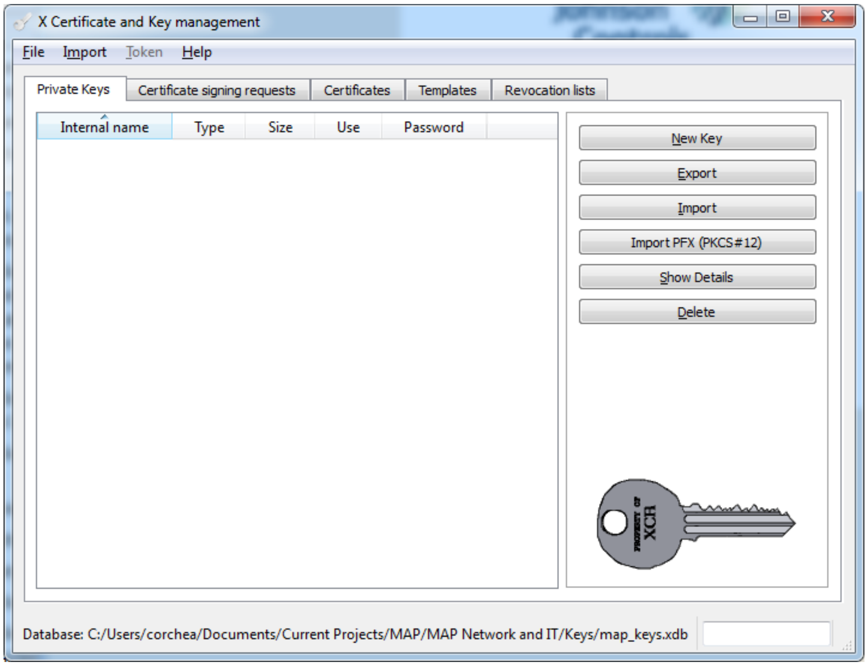

Start
Generate Keys Outside of MAP-Gateway Using an IT Approved Tool
Using Self-Signed Certificate?
No
Yes
Create Request for Certificate Authority
Receive Certificate
Generate Self-Signed CSR
Create Certificate and Key
Copy Certificate and Key to MAP-G using a Crossover Cable
MAP-Gateway Restarts to Use New Certificate.

Generating a Private Key

This procedure describes how to generate a new private key. Note that you may be required to first create an encrypted database. The password for this encrypted database is used to encrypt the private key and must be protected. The screen shots used to illustrate key generation were made with the **XCA - X Certificate and key management** application, copyright 2014 by Christian Hohnstädt. However, you must be sure to use a key generation tool that your IT department recommends or approves.

1. Open your key generating software and click ***New Key*** .

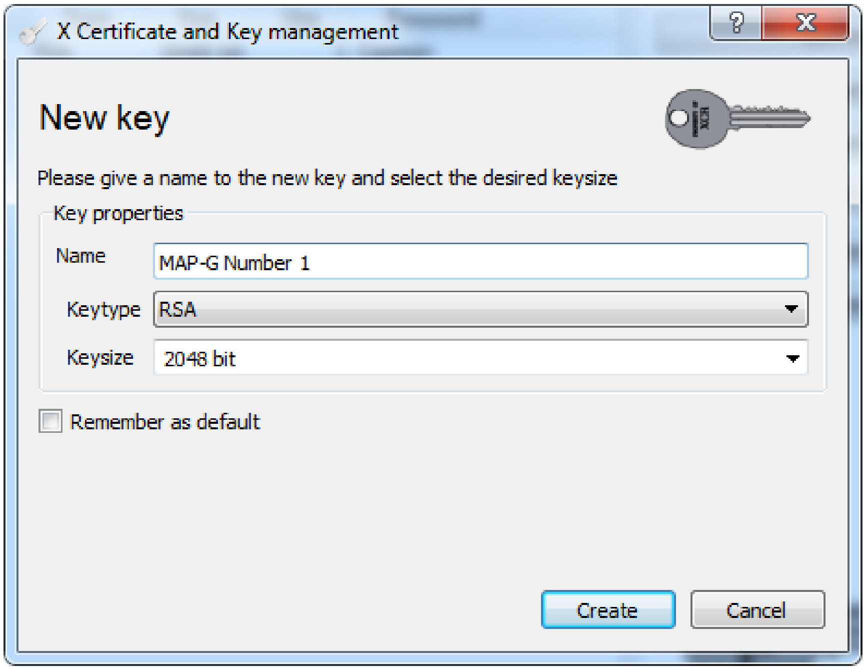
Figure 2: Key Generating Software



Database: C:/Users/corchea/Documents/Current Projects/MAP/MAP Network and IT/Keys/map_keys.xdb

2. Name the new key. Select a Keytype of **RSA** and a Keysize of **2048 bit** from the respective drop-down lists. Click **Create**.

Figure 3: New Key Screen



New key

Please give a name to the new key and select the desired keysize

Key properties

Name: MAP-G Number 1

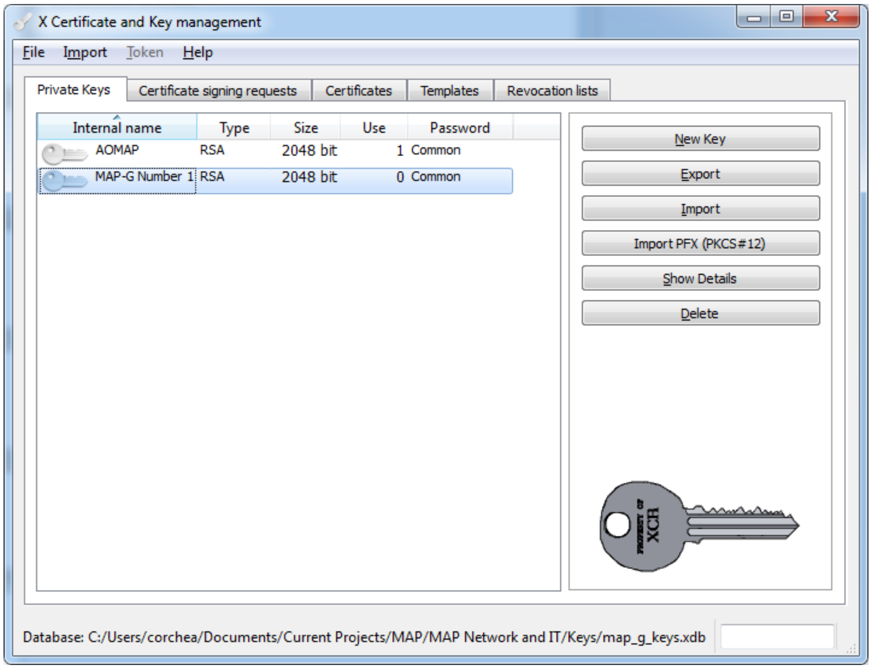
Keytype: RSA

Keysize: 2048 bit

□ Remember as default

3. The new key appears in your list of Private Keys. Select the private key you created and select Export.

Figure 4: New Key Created

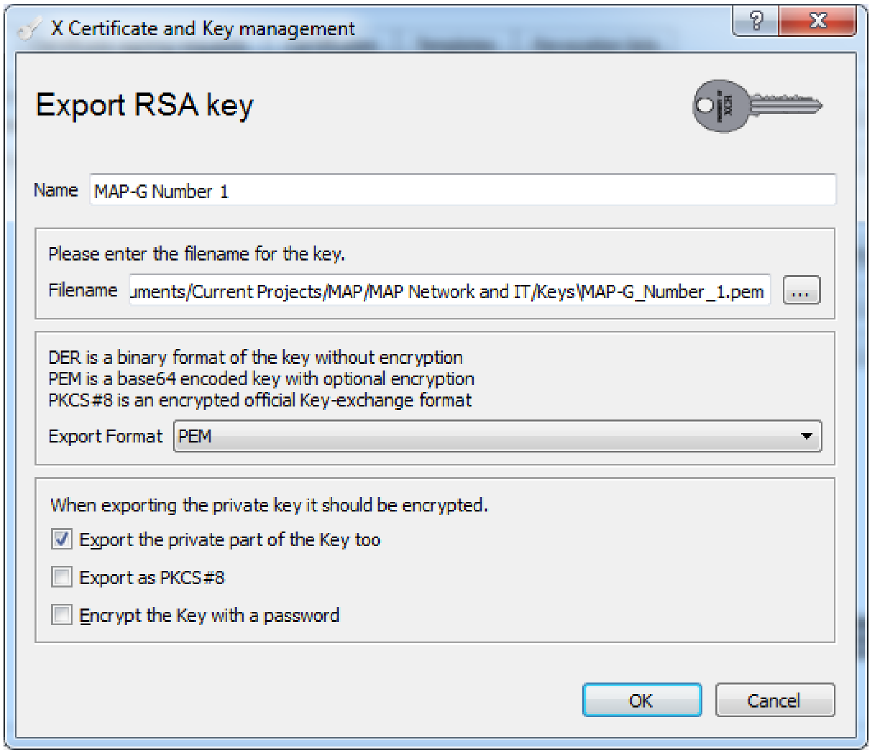


Internal name	Type	Size	Use	Password
AOMAP	RSA	2048 bit	1	Common
MAP-G Number 1	RSA	2048 bit	0	Common

Database: C:/Users/corchea/Documents/Current Projects/MAP/MAP Network and IT/Keys/map_g_keys.xdb

4. Export the private key for your device in **PEM** format. Click OK to save to a location where you can access the file to place into your MAP Gateway. This is the file you use when Adding a Private Key and Certificate to MAP Gateway.

Figure 5: Export Private Key



Name MAP-G Number 1

Please enter the filename for the key.

Filename uments/Current Projects/MAP/MAP Network and IT/Keys\MAP-G_Number_1.pem ...

DER is a binary format of the key without encryption
PEM is a base64 encoded key with optional encryption
PKCS#8 is an encrypted official Key-exchange format

Export Format PEM

When exporting the private key it should be encrypted.

☑ Export the private part of the Key too

□ Export as PKCS#8

□ Encrypt the Key with a password

Implementing SSL for MAP Gateway

To implement third-party or self-signed SSL certificates for MAP Gateway, follow the steps included in this document.

The options for SSL certificates include the following:

- Third-Party – Coordinate with the local IT department before installing the MAP Gateway. Follow the instructions included in the Installing a Security Certificate on a Client That is Connecting to MAP Gateway section. If you need to create a request for a certificate signed by a public CA, see the Creating a Certificate Request (CSR) section.
- Self-Signed – Follow the installation process that allows you to generate a self-signed certificate in the Creating a Self-Signed Certificate section.

ⓘ **Note:** We do not recommend a self-signed SSL certificate for networks exposed directly to the Internet (no firewall or VPN).

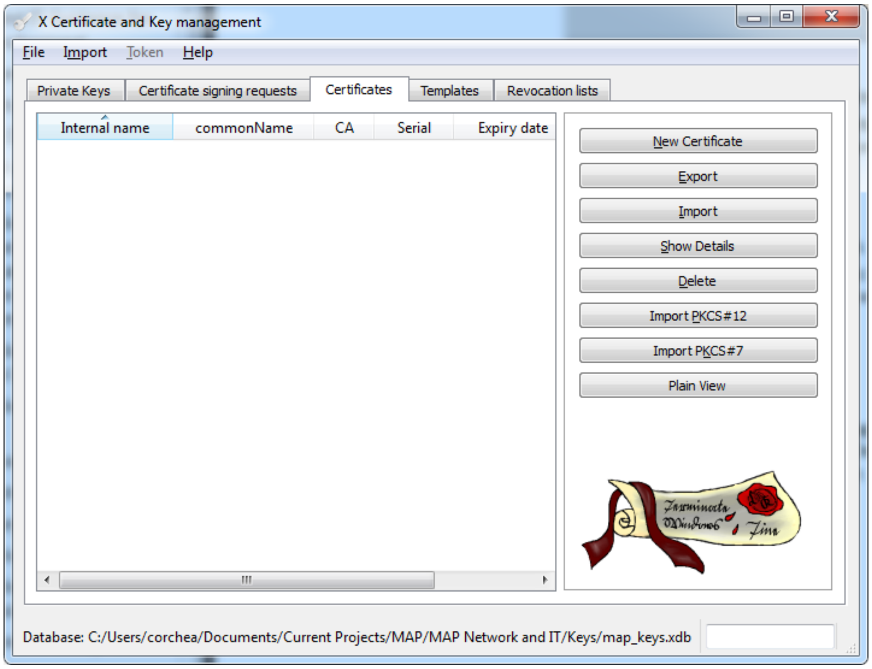
You must have Port 80 (TCP) and Port 443 (SSL) open on the computer that is connected to the MAP Gateway.

Creating a Self-Signed Certificate

The following steps demonstrate how to create a self-signed certificate using the **XCA - X Certificate and key management** application, copyright 2014 by Christian Hohnstädt, as an example of how to perform this task. You must make sure to use a certificate-generating application that is approved by your IT department. This procedure creates a file in a format for submitting the properties of your SSL certificate to the certificate authority.

1. Open your certificate creating-application, select the **Certificates** tab if necessary, and click **New Certificate**. The Create Certificate screen appears.

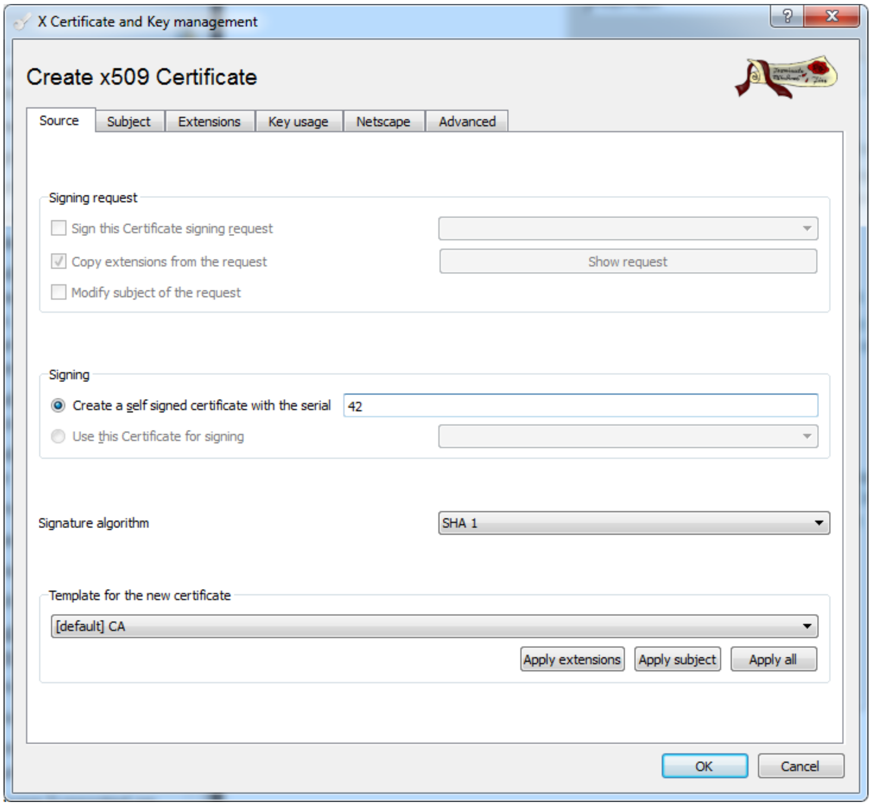
Figure 6: New Certificate



Database: C:/Users/corchea/Documents/Current Projects/MAP/MAP Network and IT/Keys/map_keys.xdb

2. Accept the defaults unless they conflict with your IT policies and select the **Subject** Tab.

Figure 7: Create the Certificate



Signing request

□ Sign this Certificate signing request

☑ Copy extensions from the request

□ Modify subject of the request

Signing

● Create a self signed certificate with the serial 42

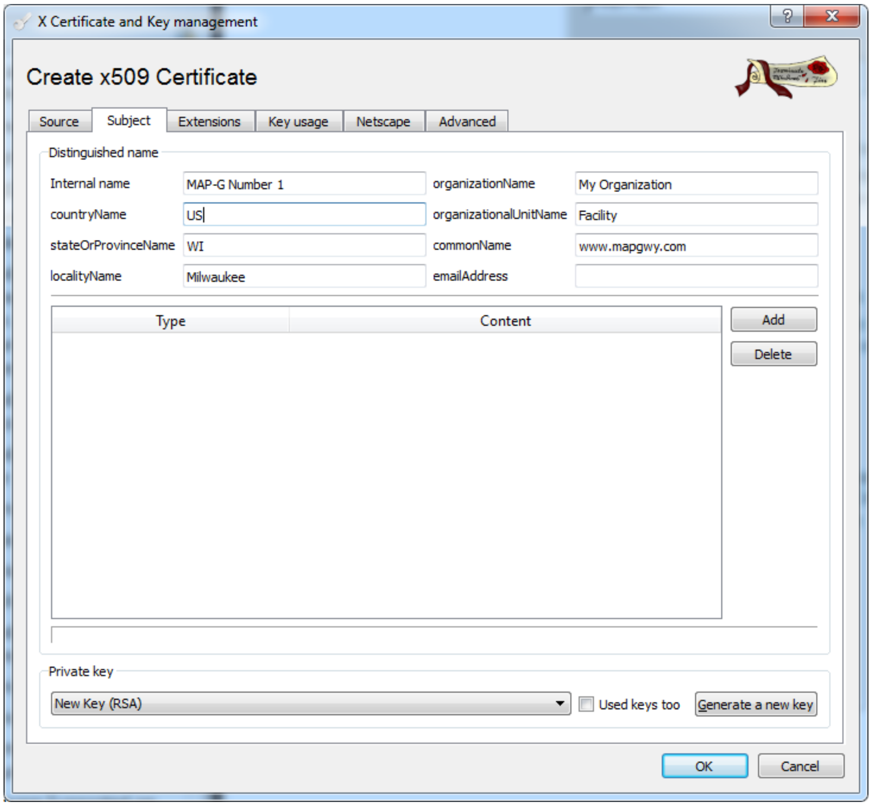
○ Use this Certificate for signing

Signature algorithm: SHA 1

Template for the new certificate: [default] CA

3. In the Distinguished name properties window, enter the following information:
   - **Internal name:** This name is only used internally and does not appear in the certificate.
   - **organizationName:** the name of your organization
   - **countryName:** the country in which your organization is located
   - **organizationalUnitName:** the name of your department within the organization
   - **stateOrProvinceName:** the state in which your organization is located
   - **commonName:** the domain name without https://. The domain name should be the site used to browse to the MAP Gateway UI.
   - **localityName:** the city in which your organization is located
   - **emailAddress:** Typically the address of the administrator of your organization.
   - **Private key:** This drop-down list contains private keys that you have already generated. In this case, select **New Key (RSA)**, which was generated in the Generating a Private Key section of this document. If you have not created a private key or wish to create a new one, click **Generate a new key** and follow the steps in Generating a Private Key in this document.

Figure 8: Subject Tab Properties



Distinguished name

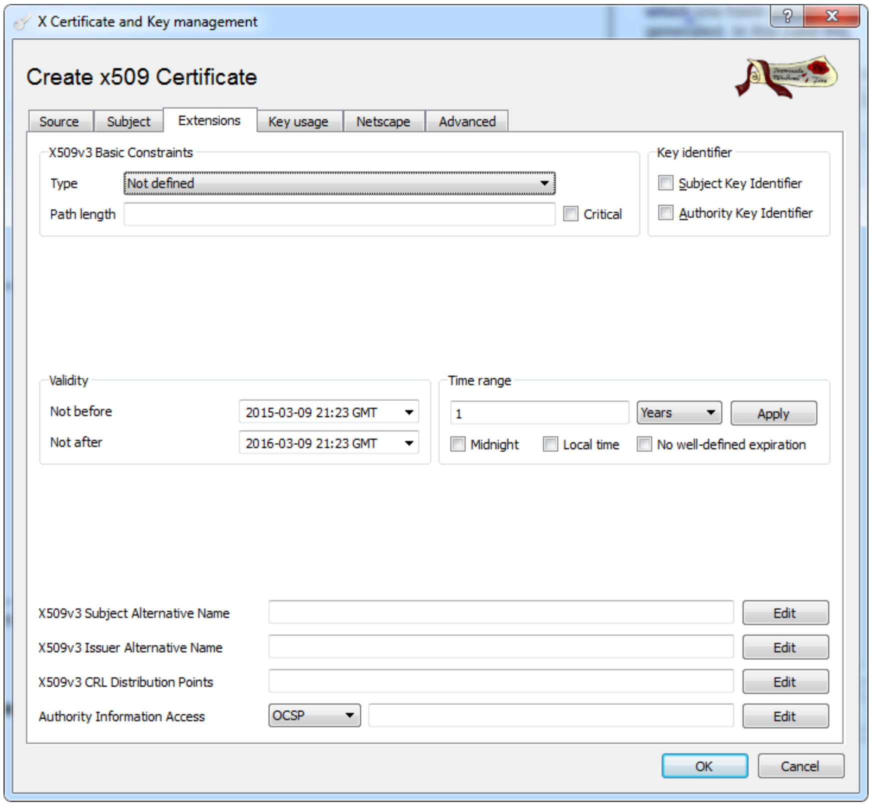
Internal name	MAP-G Number 1	organizationName	My Organization
countryName	US	organizationalUnitName	Facility
stateOrProvinceName	WI	commonName	www.mapgwy.com
localityName	Milwaukee	emailAddress	

Private key

New Key (RSA) □ Used keys too

4. Select the **Extensions** tab.

Figure 9: Extensions Tab Properties



X509v3 Basic Constraints

Type: Not defined

Path length:

□ Critical

Key identifier

□ Subject Key Identifier

□ Authority Key Identifier

Validity

Not before: 2015-03-09 21:23 GMT

Not after: 2016-03-09 21:23 GMT

Time range

1 Years

□ Midnight □ Local time □ No well-defined expiration

X509v3 Subject Alternative Name

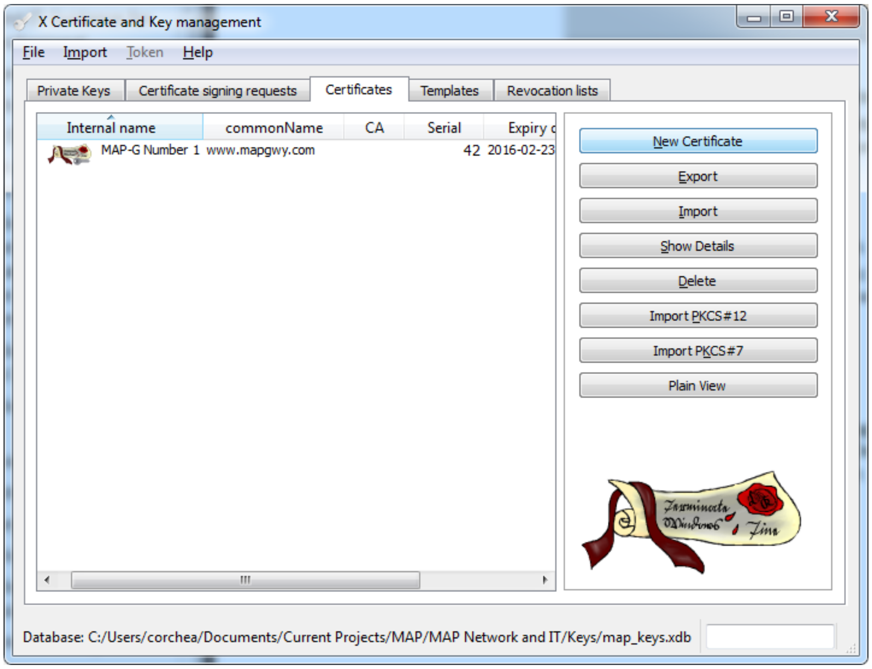
X509v3 Issuer Alternative Name

X509v3 CRL Distribution Points

Authority Information Access: OCSP

5. Use the **Validity** and **Time range** sections to define time limits and valid ranges for your certificate. Click **OK**.The new certificate is now in your list of certificates with the internal name you assigned. Select the certificate and click **Export**.

Figure 10: New Certificate Created

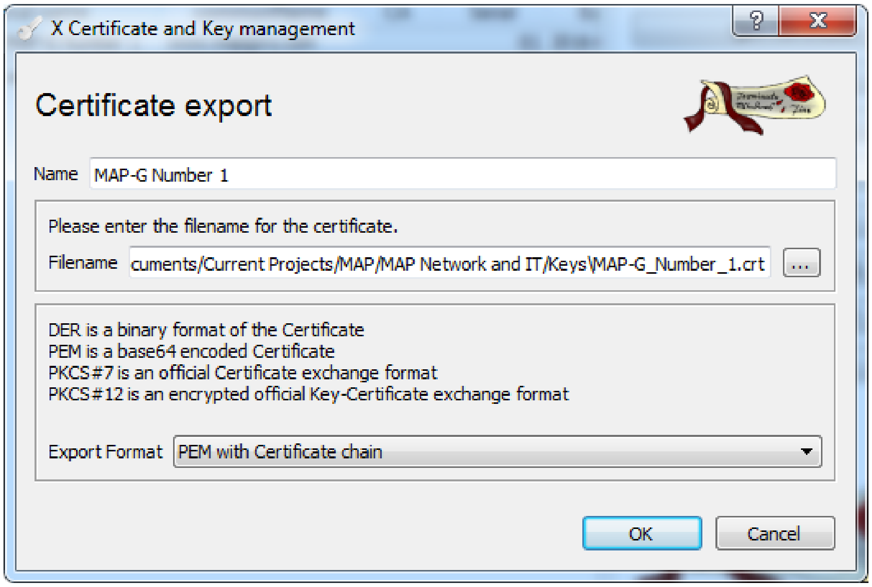


Internal name	commonName	CA	Serial	Expiry d
MAP-G Number 1	www.mapgwy.com		42	2016-02-23

Database: C:/Users/corchea/Documents/Current Projects/MAP/MAP Network and IT/Keys/map_keys.xdb

6. Choose an export format of **PEM with Certificate chain** and click OK to save the file to a location where you can access the file to place into your MAP Gateway. This is the file you use when Adding a Private Key and Certificate to MAP Gateway.

Figure 11: New Certificate Export



X Certificate and Key management

Certificate export

Name MAP-G Number 1

Please enter the filename for the certificate.

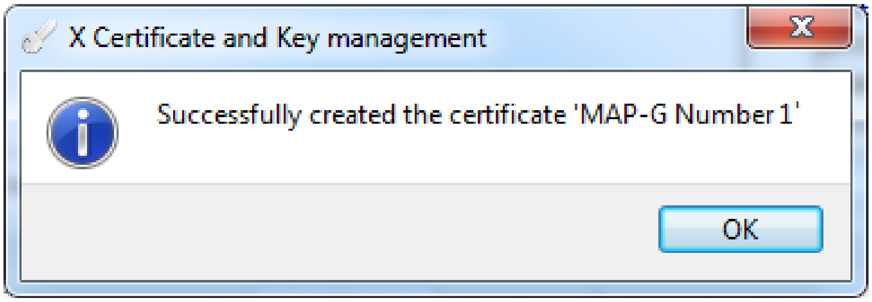
Filename cuments/Current Projects/MAP/MAP Network and IT/Keys\MAP-G_Number_1.crt

DER is a binary format of the Certificate
PEM is a base64 encoded Certificate
PKCS#7 is an official Certificate exchange format
PKCS#12 is an encrypted official Key-Certificate exchange format

Export Format PEM with Certificate chain

7. Click **Finish**.

Figure 12: Successfully Created Certificate Message



X Certificate and Key management

Successfully created the certificate 'MAP-G Number 1'

Uninstalling a Certificate on a Client That Has Connected to the MAP Gateway

If you are removing or replacing a MAP Gateway and wish to uninstall the certificate from your computer, follow the procedures in this section that are appropriate to your operating system. Note that you do not need to uninstall the certificate because a new certificate overwrites existing certificates on MAP Gateway.

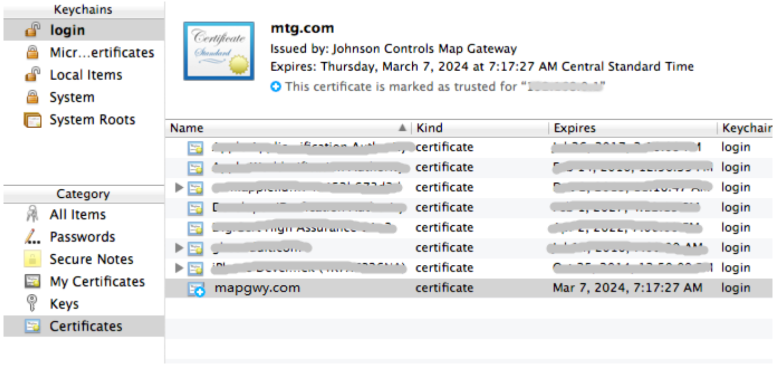
Uninstalling the Security Certificate on iOS® Platforms

To remove the MAP Gateway security certificate on an iOS platform, navigate to ***Settings* > *General* > *Profiles*** , select the mapgwy.com certificate, and then tap **Remove** twice.

Uninstalling the Security Certificate in Apple® Safari® for Mac

1. In ***Applications* > *Utilities*** , double-click the Keychain Access Application.

Figure 13: Keychain Access



mtg.com
Issued by: Johnson Controls Map Gateway
Expires: Thursday, March 7, 2024 at 7:17:27 AM Central Standard Time
This certificate is marked as trusted for "[redacted]"

Name	Kind	Expires	Keychain
[redacted]	certificate	[redacted]	login
[redacted]	certificate	[redacted]	login
[redacted]	certificate	[redacted]	login
[redacted]	certificate	[redacted]	login
[redacted]	certificate	[redacted]	login
[redacted]	certificate	[redacted]	login
[redacted]	certificate	[redacted]	login
mapgwy.com	certificate	Mar 7, 2024, 7:17:27 AM	login

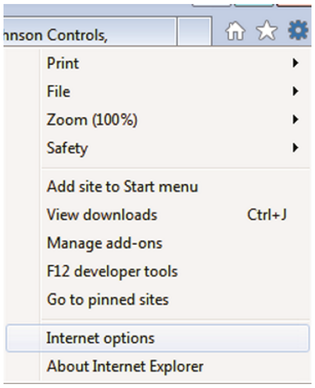
2. Right-click the certificate you wish to remove (in this case, **www.mapgwy.com**), and then click **Delete**.

3. Enter your administrator credentials, and click **Update Settings** to remove the certificate from the keychain.

Uninstalling the Security Certificate in the Windows® Internet Explorer® Web Browser

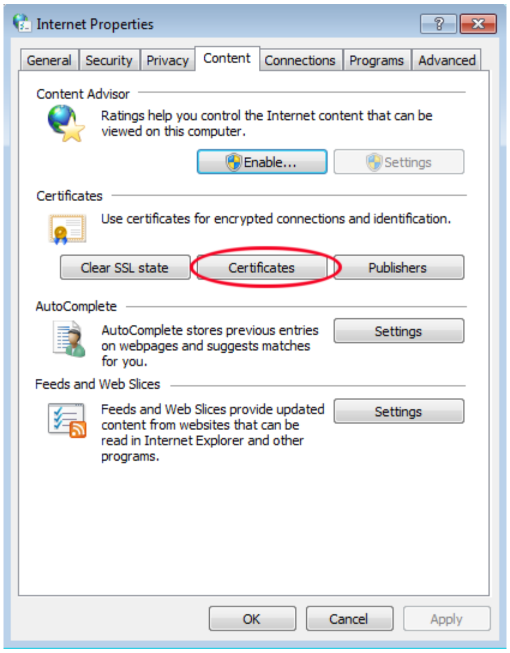
1. On the Tools menu, click **Internet options**.

Figure 14: Internet Options Selection



2. In the Internet Properties dialog box, click the **Content** tab, and then click **Certificates**.

Figure 15: Internet Properties Content Tab



Ratings help you control the Internet content that can be viewed on this computer.

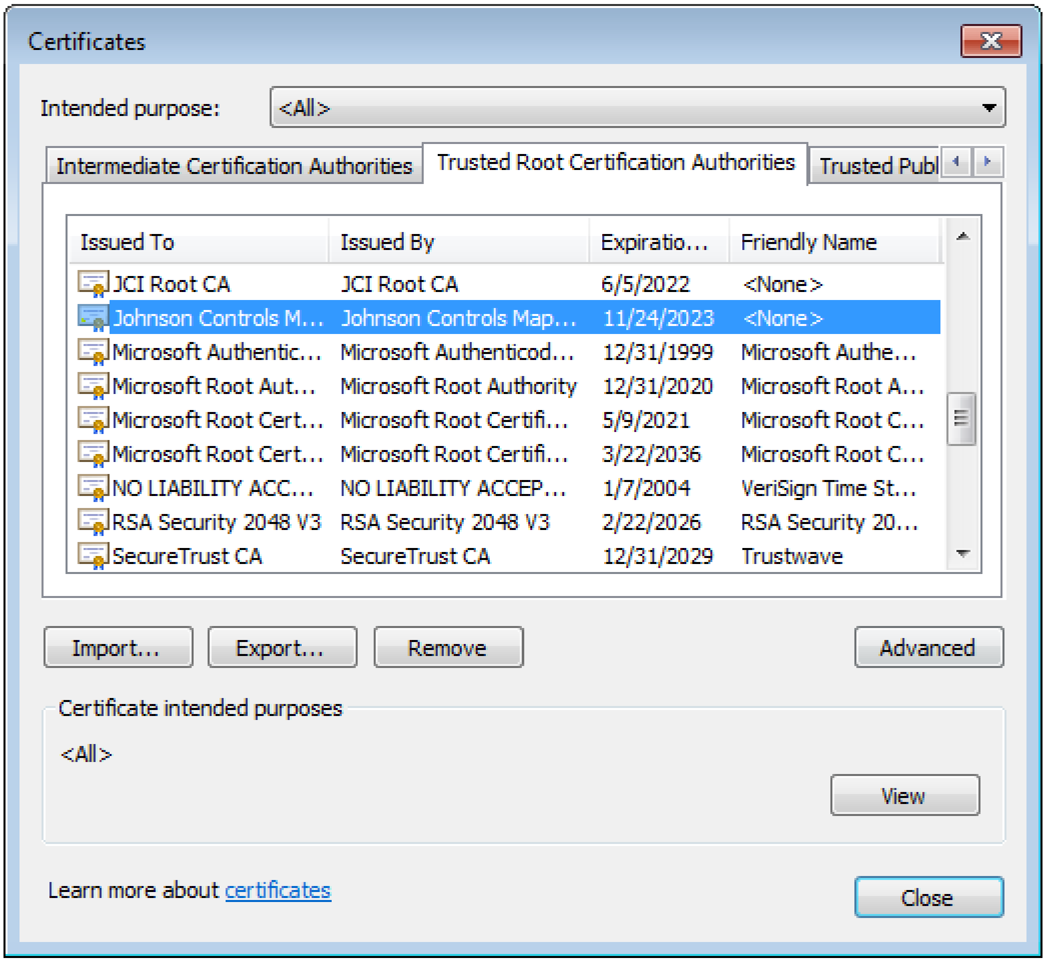
Use certificates for encrypted connections and identification.

AutoComplete stores previous entries on webpages and suggests matches for you.

Feeds and Web Slices provide updated content from websites that can be read in Internet Explorer and other programs.

3. In the Certificates dialog box, click the **Trusted Root Certification Authorities** tab, select the Johnson Controls authority, and then click **Remove**. A Certificates warning appears.

Figure 16: Certificates



Certificates

Intended purpose: <All>

Issued To	Issued By	Expiratio...	Friendly Name
JCI Root CA	JCI Root CA	6/5/2022	<None>
Johnson Controls M...	Johnson Controls Map...	11/24/2023	<None>
Microsoft Authentic...	Microsoft Authenticod...	12/31/1999	Microsoft Authe...
Microsoft Root Aut...	Microsoft Root Authority	12/31/2020	Microsoft Root A...
Microsoft Root Cert...	Microsoft Root Certifi...	5/9/2021	Microsoft Root C...
Microsoft Root Cert...	Microsoft Root Certifi...	3/22/2036	Microsoft Root C...
NO LIABILITY ACC...	NO LIABILITY ACCEP...	1/7/2004	VeriSign Time St...
RSA Security 2048 V3	RSA Security 2048 V3	2/22/2026	RSA Security 20...
SecureTrust CA	SecureTrust CA	12/31/2029	Trustwave

Certificate intended purposes

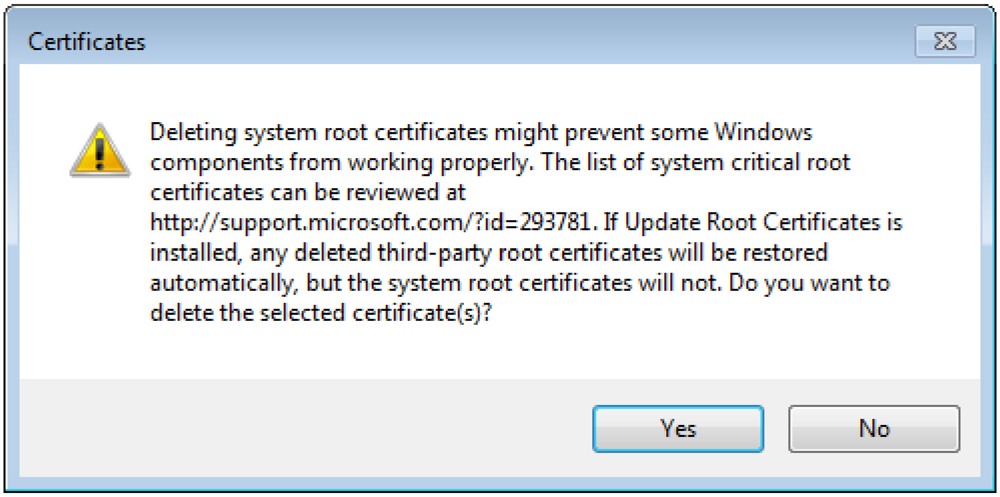
<All>

Learn more about certificates

Intermediate Certification Authorities
Trusted Root Certification Authorities
Trusted Publ
Import...
Export...
Remove
Advanced
View
Close

4. In the Certificates warning dialog box, click **Yes**. A Root Certificate Store warning appears.

Figure 17: Certificates Warning

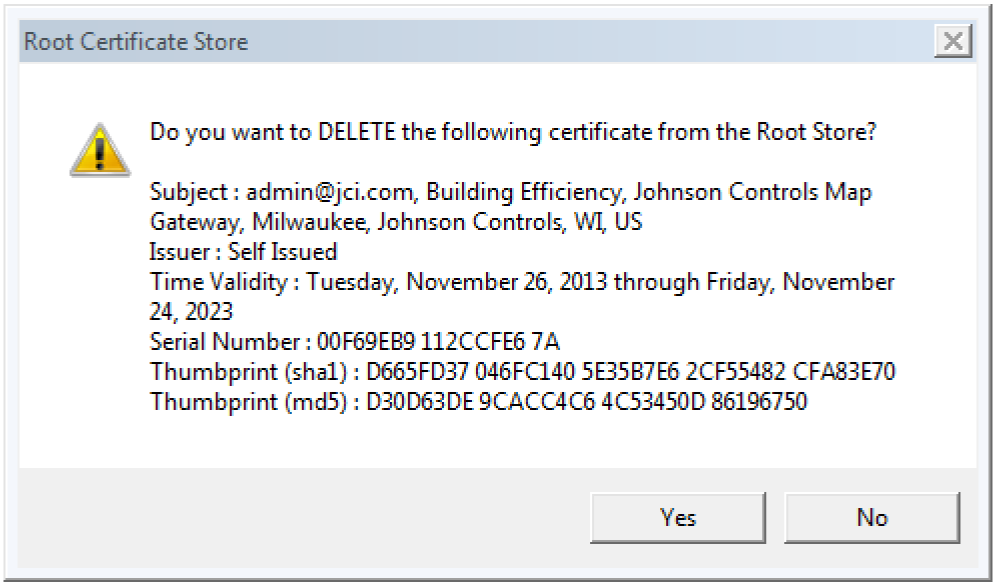


Certificates

Deleting system root certificates might prevent some Windows components from working properly. The list of system critical root certificates can be reviewed at http://support.microsoft.com/?id=293781. If Update Root Certificates is installed, any deleted third-party root certificates will be restored automatically, but the system root certificates will not. Do you want to delete the selected certificate(s)?

5. In the Root Certificate Store warning dialog box, click **Yes**. You return to the **Trusted Root Certification Authorities** tab of the Certificates dialog box.

Figure 18: Root Certificate Store Warning Dialog

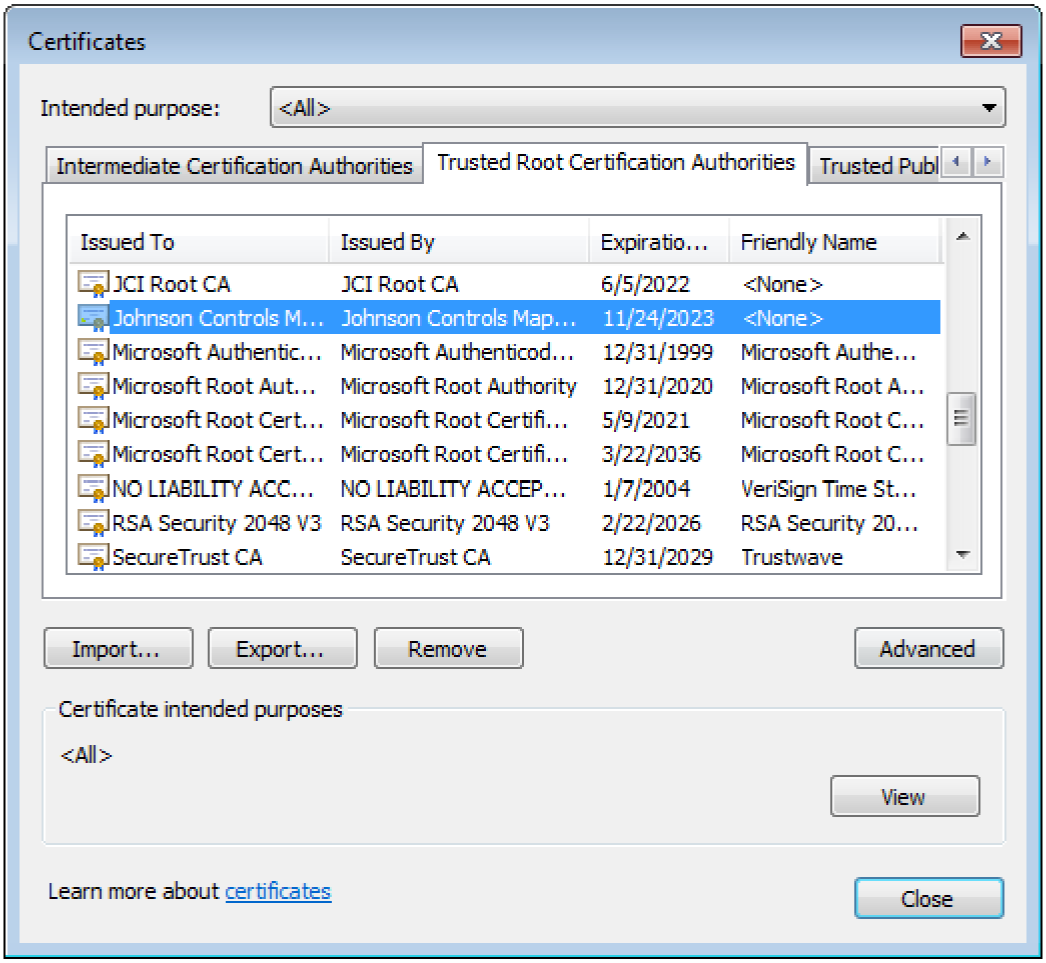


Do you want to DELETE the following certificate from the Root Store?

Subject : admin@jci.com, Building Efficiency, Johnson Controls Map Gateway, Milwaukee, Johnson Controls, WI, US
Issuer : Self Issued
Time Validity : Tuesday, November 26, 2013 through Friday, November 24, 2023
Serial Number : 00F69EB9 112CCFE6 7A
Thumbprint (sha1) : D665FD37 046FC140 5E35B7E6 2CF55482 CFA83E70
Thumbprint (md5) : D30D63DE 9CACC4C6 4C53450D 86196750

6. In the Certificates dialog box, click **Close**, and then click **OK**.

Figure 19: Trusted Root Certification Authorities Tab



Intended purpose: <All>

Intermediate Certification Authorities
Trusted Root Certification Authorities
Trusted Publ

Issued To	Issued By	Expiratio...	Friendly Name
JCI Root CA	JCI Root CA	6/5/2022	<None>
Johnson Controls M...	Johnson Controls Map...	11/24/2023	<None>
Microsoft Authentic...	Microsoft Authenticod...	12/31/1999	Microsoft Authe...
Microsoft Root Aut...	Microsoft Root Authority	12/31/2020	Microsoft Root A...
Microsoft Root Cert...	Microsoft Root Certifi...	5/9/2021	Microsoft Root C...
Microsoft Root Cert...	Microsoft Root Certifi...	3/22/2036	Microsoft Root C...
NO LIABILITY ACC...	NO LIABILITY ACCEP...	1/7/2004	VeriSign Time St...
RSA Security 2048 V3	RSA Security 2048 V3	2/22/2026	RSA Security 20...
SecureTrust CA	SecureTrust CA	12/31/2029	Trustwave

Certificate intended purposes

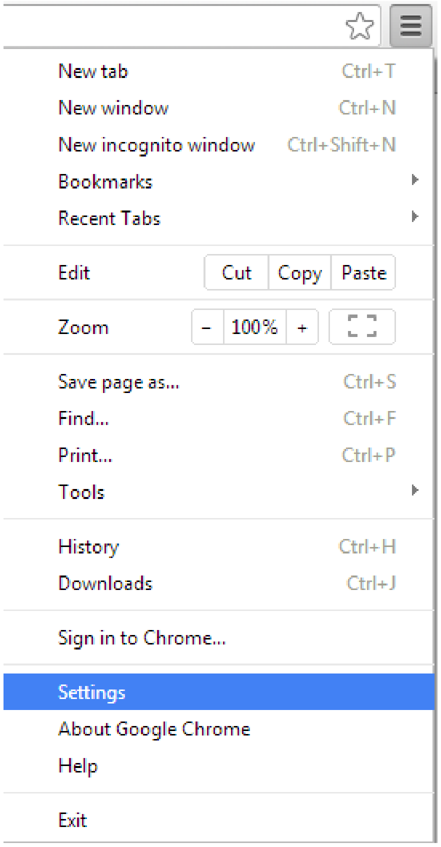
<All>

Learn more about certificates

Uninstalling a Certificate in Google® Chrome™

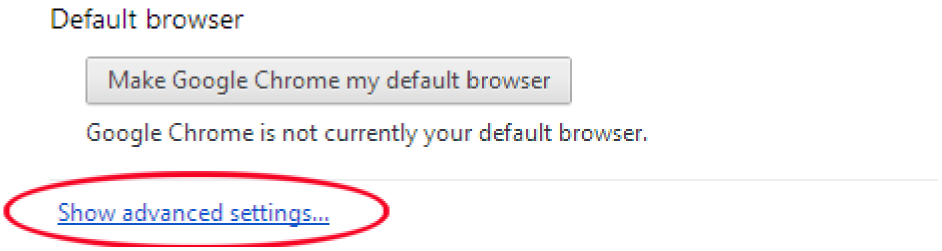
1. Click the **Customize and control Google Chrome** button and select **Settings**.

Figure 20: Google Chrome Customize and control Google Chrome menu



2. Scroll down to the bottom of the pane and select **Show advanced settings**

Figure 21: Advanced Settings


Default browser

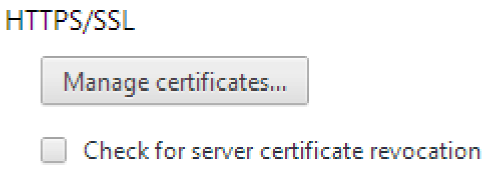
Make Google Chrome my default browser

Google Chrome is not currently your default browser.

Show advanced settings...

3. Scroll to the **HTTPS/SSL** section click **Manage certificates** and select the **Trusted Root Certification Authorities** tab.

Figure 22: HTTPS/SSL



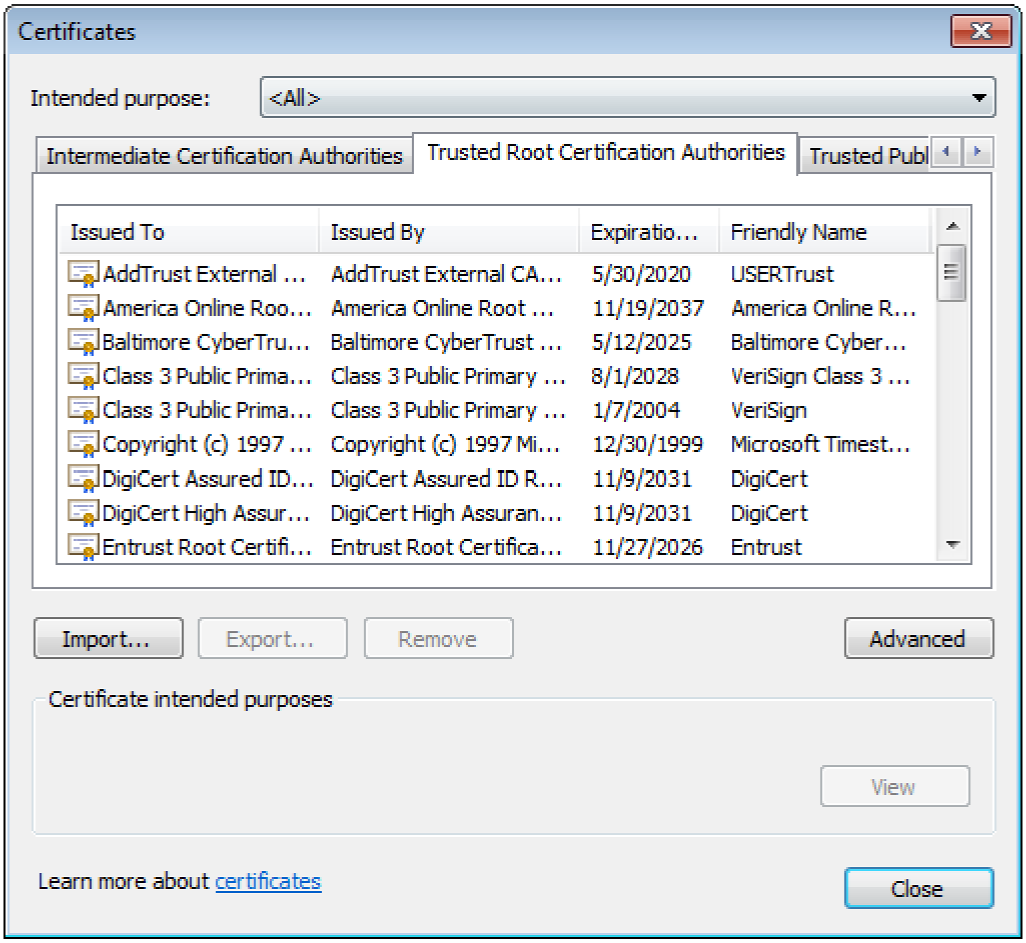
HTTPS/SSL

Manage certificates...

□ Check for server certificate revocation

4. Select the Johnson Controls authority, and then click **Remove**. A Certificates warning appears.

Figure 23: Trusted Root Certification Authority Tab



Certificates

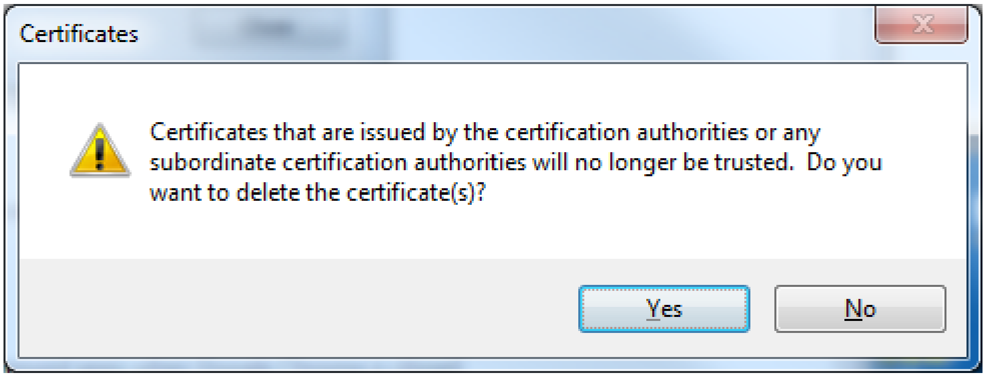
Intended purpose: <All>

Intermediate Certification Authorities | Trusted Root Certification Authorities | Trusted Publ

Issued To	Issued By	Expiratio...	Friendly Name
AddTrust External ...	AddTrust External CA...	5/30/2020	USERTrust
America Online Roo...	America Online Root ...	11/19/2037	America Online R...
Baltimore CyberTru...	Baltimore CyberTrust ...	5/12/2025	Baltimore Cyber...
Class 3 Public Prima...	Class 3 Public Primary ...	8/1/2028	VeriSign Class 3 ...
Class 3 Public Prima...	Class 3 Public Primary ...	1/7/2004	VeriSign
Copyright (c) 1997 ...	Copyright (c) 1997 Mi...	12/30/1999	Microsoft Timest...
DigiCert Assured ID...	DigiCert Assured ID R...	11/9/2031	DigiCert
DigiCert High Assur...	DigiCert High Assuran...	11/9/2031	DigiCert
Entrust Root Certifi...	Entrust Root Certifica...	11/27/2026	Entrust

5. Click **Yes**. The **certificate is removed immediately**.

Figure 24: Certificate Removal Warning



Certificates that are issued by the certification authorities or any subordinate certification authorities will no longer be trusted. Do you want to delete the certificate(s)?

Adding a Private Key and Certificate to MAP Gateway

This process describes how to add the private key and certificate to your MAP Gateway.

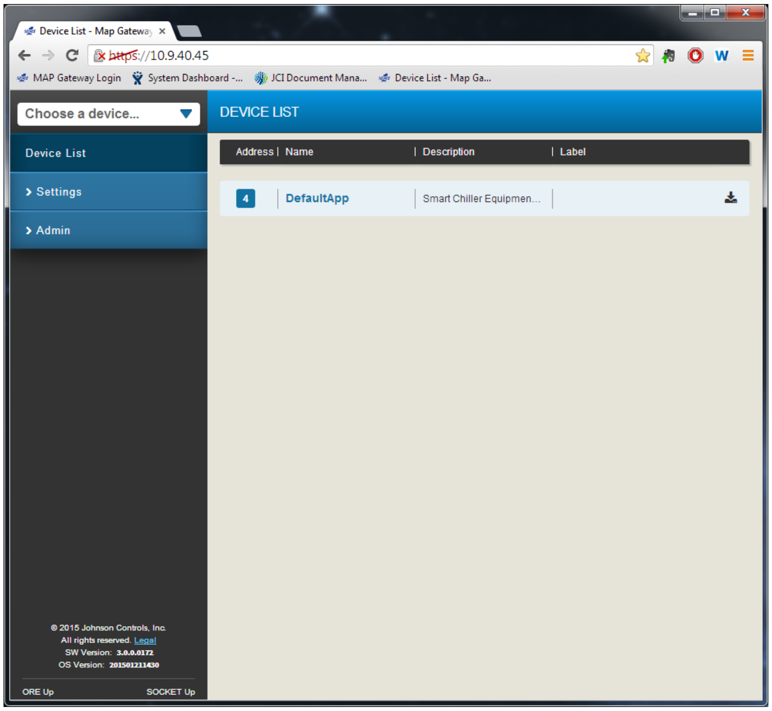
ⓘ **Note:** To prevent the possibility of a man-in-the-middle attack, we **strongly recommend** that you use an Ethernet crossover cable to directly connect the MAP Gateway to your computer when transferring keys to the MAP Gateway.

1. Connect to MAP Gateway through an Ethernet crossover cable. The direct connection helps prevent man-in-the-middle type attacks when adding security keys and certificates.

2. Log in to your MAP Gateway UI by opening your web browser and entering **www.mapgwy.com**. You must be logged in as an administrator to perform these tasks.

   ⓘ **Note:** If your computer does not connect to the MAP Gateway UI, disconnect any other network connections, LAN or wireless, and try again. If your computer is connected to another network, it might not redirect to the MAP Gateway UI when you enter **www.mapgwy.com**.

Figure 25: MAP Gateway UI Device List



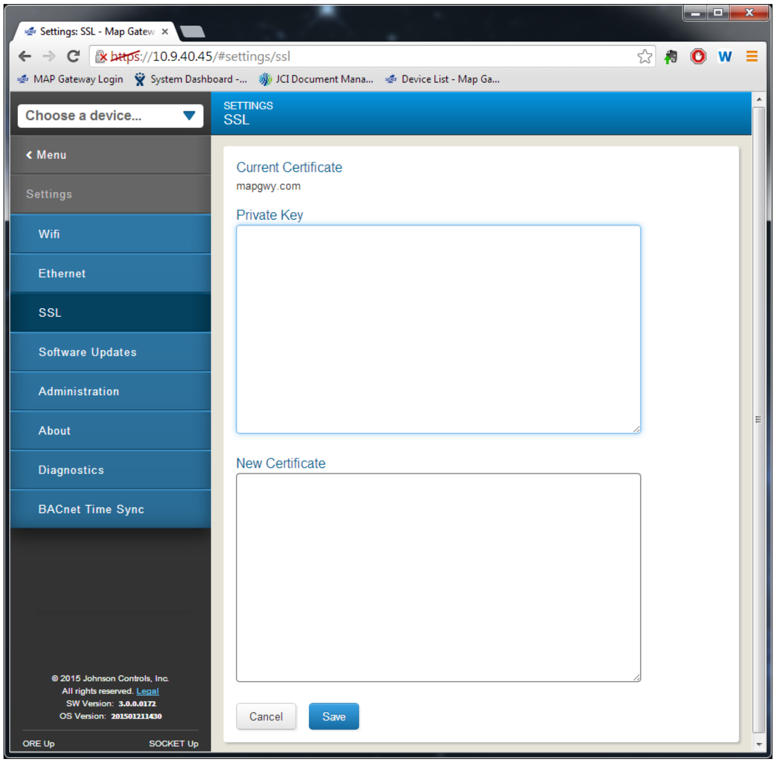
Address	Name	Description	Label
4	DefaultApp	Smart Chiller Equipmen...	

© 2015 Johnson Controls, Inc.
All rights reserved. Legal
SW Version: 3.0.0.0172
OS Version: 201501211430

ORE Up SOCKET Up

3. Click **Settings** and select **SSL**.

Figure 26: MAP Gateway SSL Screen



Current Certificate
mapgwy.com

Private Key

New Certificate

© 2015 Johnson Controls, Inc.
All rights reserved. Legal
SW Version: 3.0.0.0172
OS Version: 201501211430

ORE Up SOCKET Up

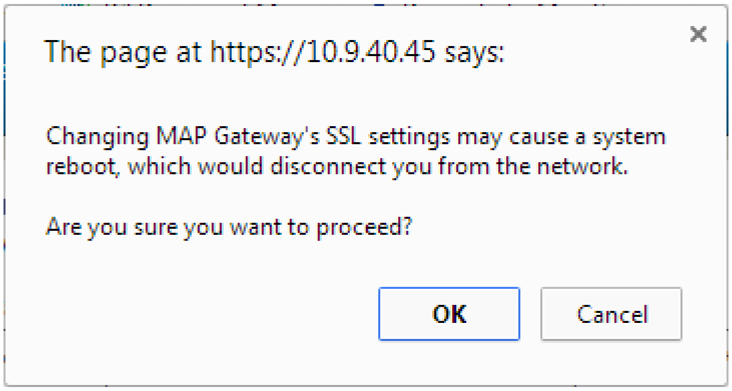
4. Navigate to the location of the private key file (***.pem) that you created for your site. Right-click the file and select **Open with**, and then select **Notepad**.
5. Select all the text and copy the entire file. Paste this file as a plain text file in the Private Key box of your MAP Gateway SSL settings Private Key box.
6. Navigate to the location of the security certificate (***.crt) that you created for your site. Right-click the file and select **Open with**, then select **Notepad**.
7. Copy the entire file. Paste this file as a plain text file in the New Certificate box of your MAP Gateway SSL settings Private Key box and click **Save**. A reset warning screen appears.
8. To apply the new certificate and private key, the MAP Gateway web server must restart. Click **OK**. The fault light flashes (for 5 seconds), and then turns off (the rest of the lights continue to function normally). The MAP Gateway goes offline while restarting and displays the Device Resetting Screen.

   ⓘ **Note:** When an SSL key or certificate is very corrupted, the SSL page detects it and alerts you to the corrupted key or certificate.

   However, if the corruption is minor, for example an extra space was copied while installing the certificate or a character was missed, the UI does not detect the problem and allows the corrupted key or certificate to be saved. The server detects the error and returns the ***Error Saving SSL Settings*** *message. While this properly prevents the bad key or certificate from being used, it does not inform you as to the source of the problem.*

   In this case you need to recopy and reinstall the SSL Key or Certificate.

Figure 27: Reset Warning Screen



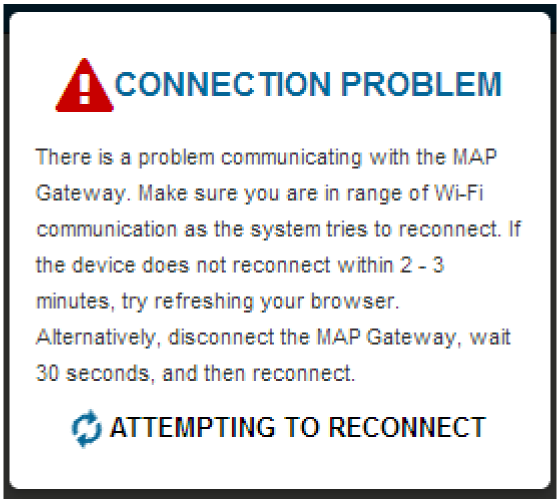
The page at https://10.9.40.45 says:

Changing MAP Gateway's SSL settings may cause a system reboot, which would disconnect you from the network.

Are you sure you want to proceed?

9. When the connection is reestablished, log in to MAP Gateway and use normally.

Figure 28: Device Resetting Screen



CONNECTION PROBLEM

There is a problem communicating with the MAP Gateway. Make sure you are in range of Wi-Fi communication as the system tries to reconnect. If the device does not reconnect within 2 - 3 minutes, try refreshing your browser. Alternatively, disconnect the MAP Gateway, wait 30 seconds, and then reconnect.

ATTEMPTING TO RECONNECT

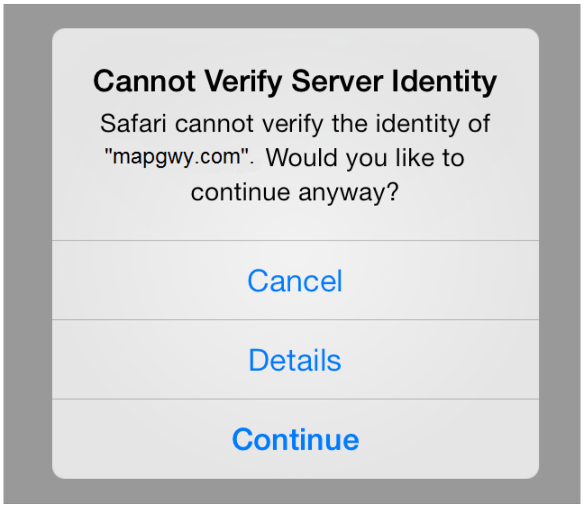
Installing a Security Certificate on a Client That is Connecting to MAP Gateway

Until the security certificate for the MAP Gateway is added as a trusted certificate, you receive a security alert every time you visit the **www.mapgwy.com** website. How you install the certificate differs based on the web browser and device platform.

Installing the Security Certificate on iOS

Mobile iOS platforms such as iPhones and iPads do not require a separate installation of SSL for MAP Gateway. When you connect to the MAP Gateway Wi-Fi access point and open Safari, you are automatically taken to **www.mapgwy.com**. Click **Continue** when presented with the **Cannot Verify Server Identity** screen. The MAP Gateway login screen appears.

Figure 29: Verify Identity in iOS



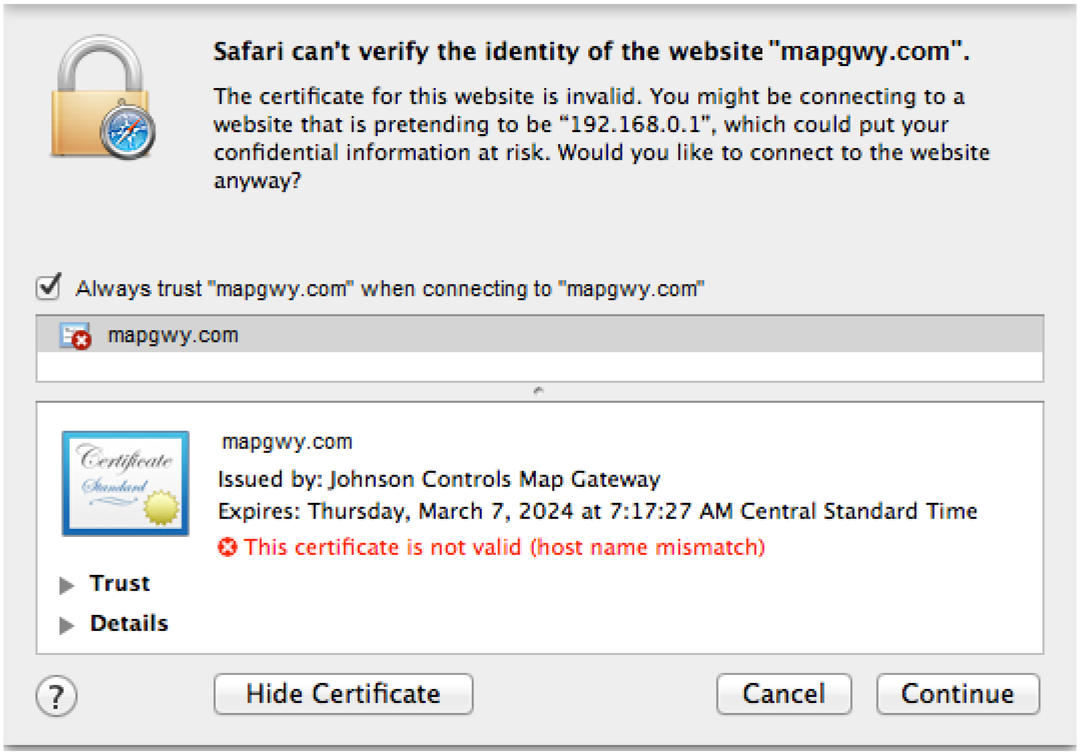
Cannot Verify Server Identity

Safari cannot verify the identity of "mapgwy.com". Would you like to continue anyway?

Installing the Security Certificate in Apple® Safari® for Mac OS

1. Navigate to **www.mapgwy.com/ downloadtlsprofile**. A screen appears saying `Safari can't verify the identity of the website mapgwy.com.`
2. Click **Show Certificate**. The screen expands to show the certificate.
3. Select the **Always trust "mapgwy.com" when connecting to "mapgwy.com"** checkbox.
4. Click **Continue**.

Figure 30: Trust MAP Gateway Identity Screen



Safari can't verify the identity of the website "mapgwy.com".

The certificate for this website is invalid. You might be connecting to a website that is pretending to be "192.168.0.1", which could put your confidential information at risk. Would you like to connect to the website anyway?

☑ Always trust "mapgwy.com" when connecting to "mapgwy.com"

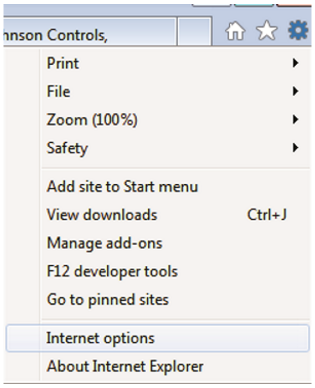
mapgwy.com

mapgwy.com
Issued by: Johnson Controls Map Gateway
Expires: Thursday, March 7, 2024 at 7:17:27 AM Central Standard Time
This certificate is not valid (host name mismatch)

Installing the Security Certificate in Internet Explorer

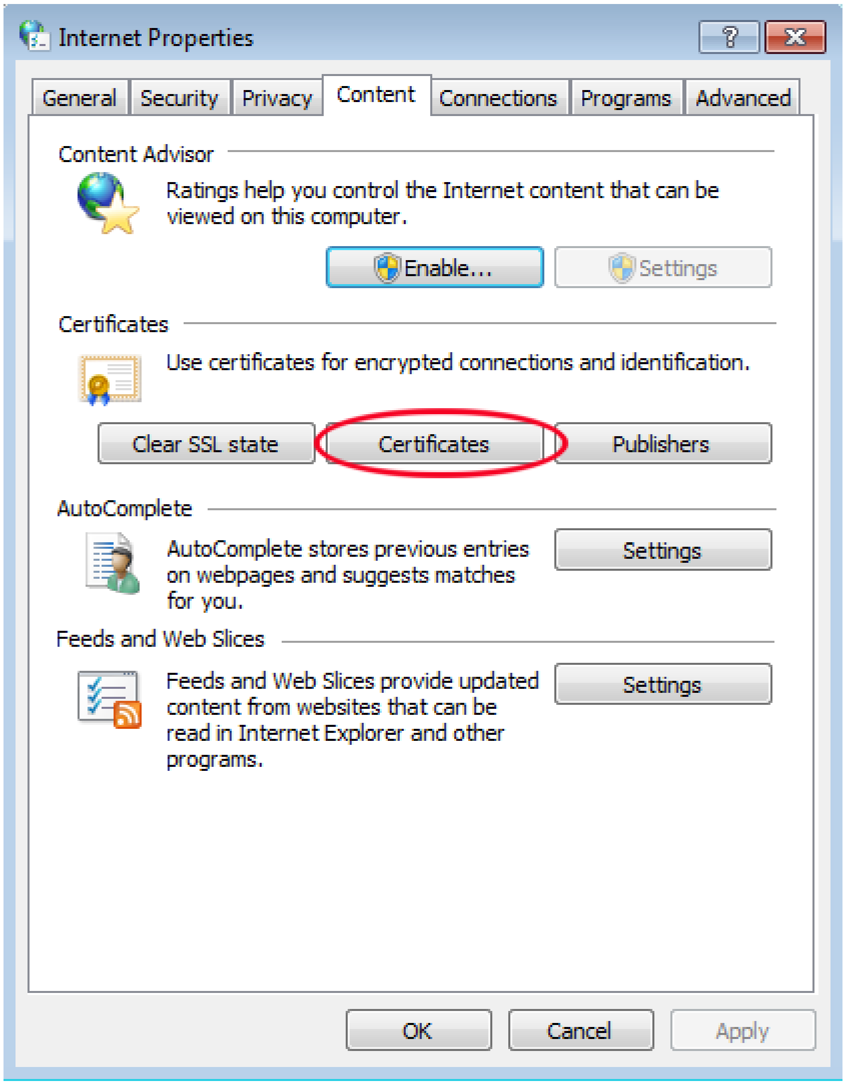
1. Navigate to **www.mapgwy.com/ downloadtlsprofile**, and then download the **rootCA.pem** file.
2. On the Tools menu, click **Internet options** then select the **Content** tab.

Figure 31: Internet Options Selection



3. In the Internet Properties dialog box, click the **Content** tab, and then click **Certificates** and select the **Trusted Root Certification Authorities** tab.

Figure 32: Internet Properties Content Tab



Ratings help you control the Internet content that can be viewed on this computer.

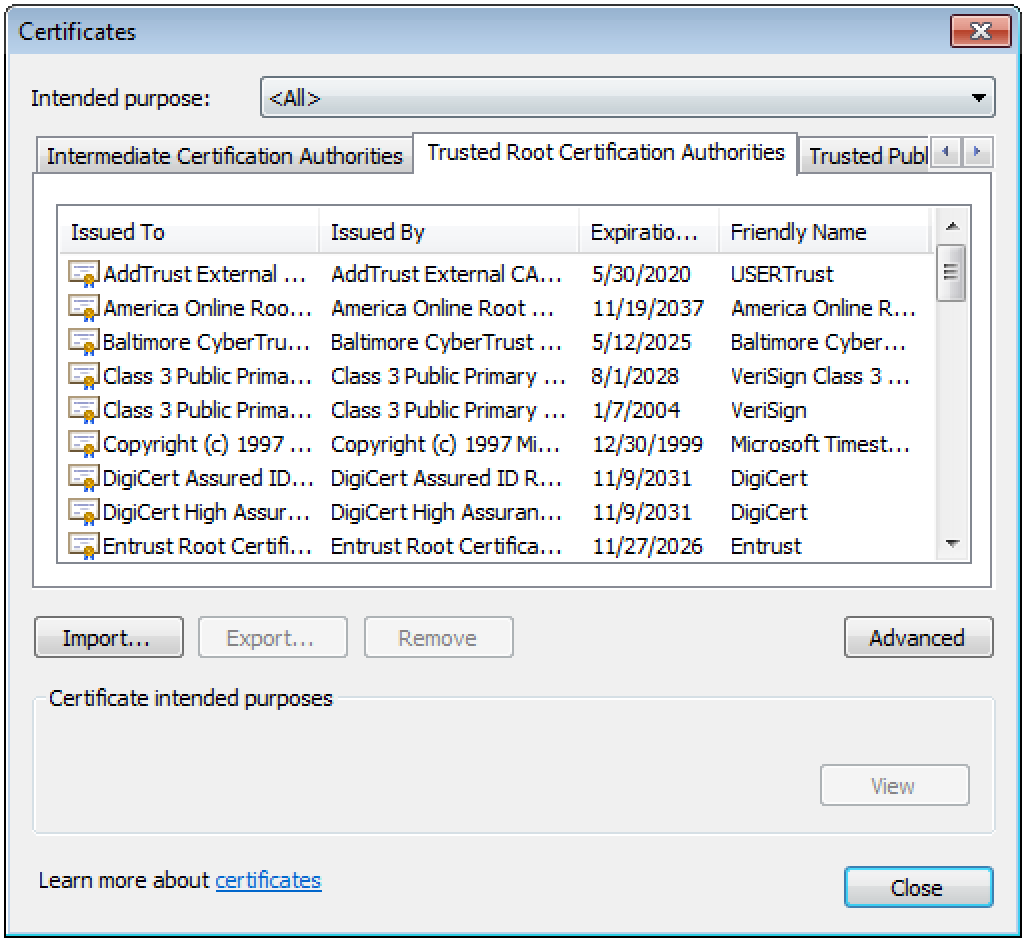
Use certificates for encrypted connections and identification.

AutoComplete stores previous entries on webpages and suggests matches for you.

Feeds and Web Slices provide updated content from websites that can be read in Internet Explorer and other programs.

4. Click **Import**. The Certificate Import Wizard opens.

Figure 33: Trusted Root Certification Authorities Tab

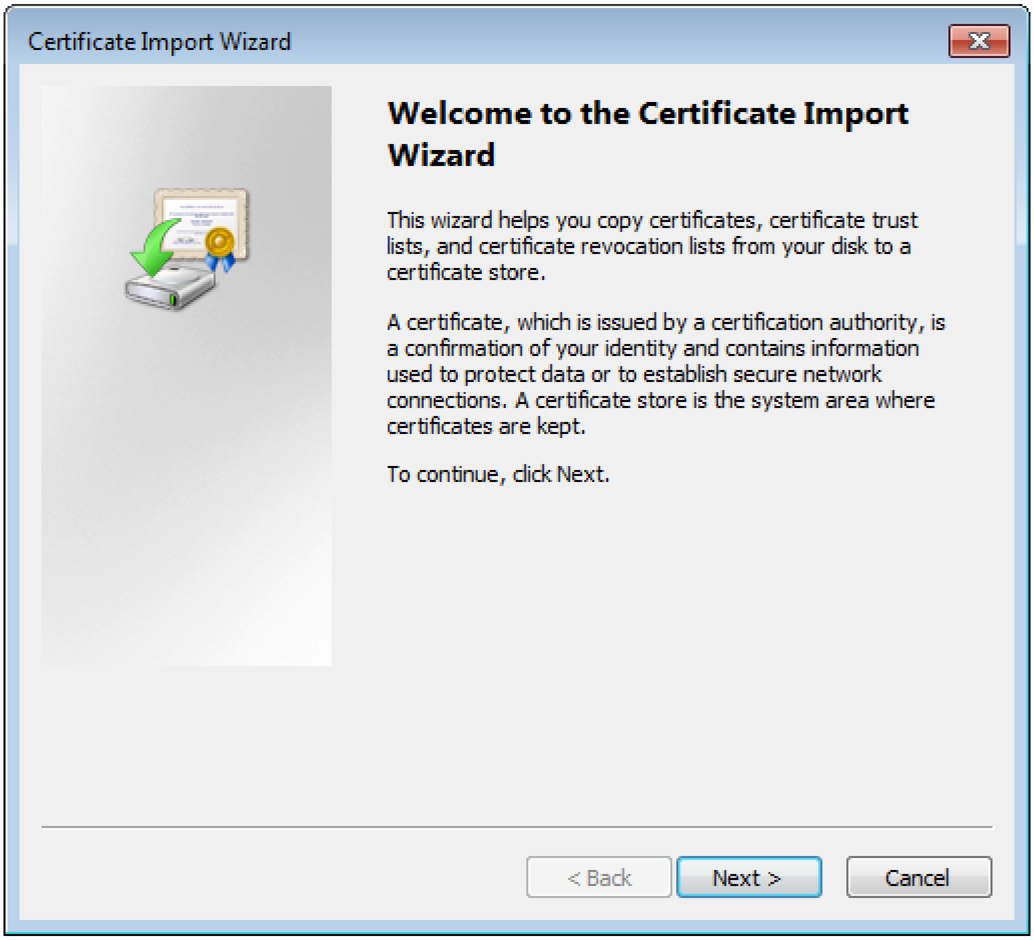

Certificates
Intermediate Certification Authorities
Trusted Root Certification Authorities
Trusted Publ
Import...
Export...
Remove
Advanced
Certificate intended purposes
View
Learn more about certificates
Close

Intended purpose: <All>

Issued To	Issued By	Expiratio...	Friendly Name
AddTrust External ...	AddTrust External CA...	5/30/2020	USERTrust
America Online Roo...	America Online Root ...	11/19/2037	America Online R...
Baltimore CyberTru...	Baltimore CyberTrust ...	5/12/2025	Baltimore Cyber...
Class 3 Public Prima...	Class 3 Public Primary ...	8/1/2028	VeriSign Class 3 ...
Class 3 Public Prima...	Class 3 Public Primary ...	1/7/2004	VeriSign
Copyright (c) 1997 ...	Copyright (c) 1997 Mi...	12/30/1999	Microsoft Timest...
DigiCert Assured ID...	DigiCert Assured ID R...	11/9/2031	DigiCert
DigiCert High Assur...	DigiCert High Assuran...	11/9/2031	DigiCert
Entrust Root Certifi...	Entrust Root Certifica...	11/27/2026	Entrust

5. In the Certificate Import Wizard dialog box, click **Next**.

Figure 34: Certificate Install Wizard



Welcome to the Certificate Import Wizard

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

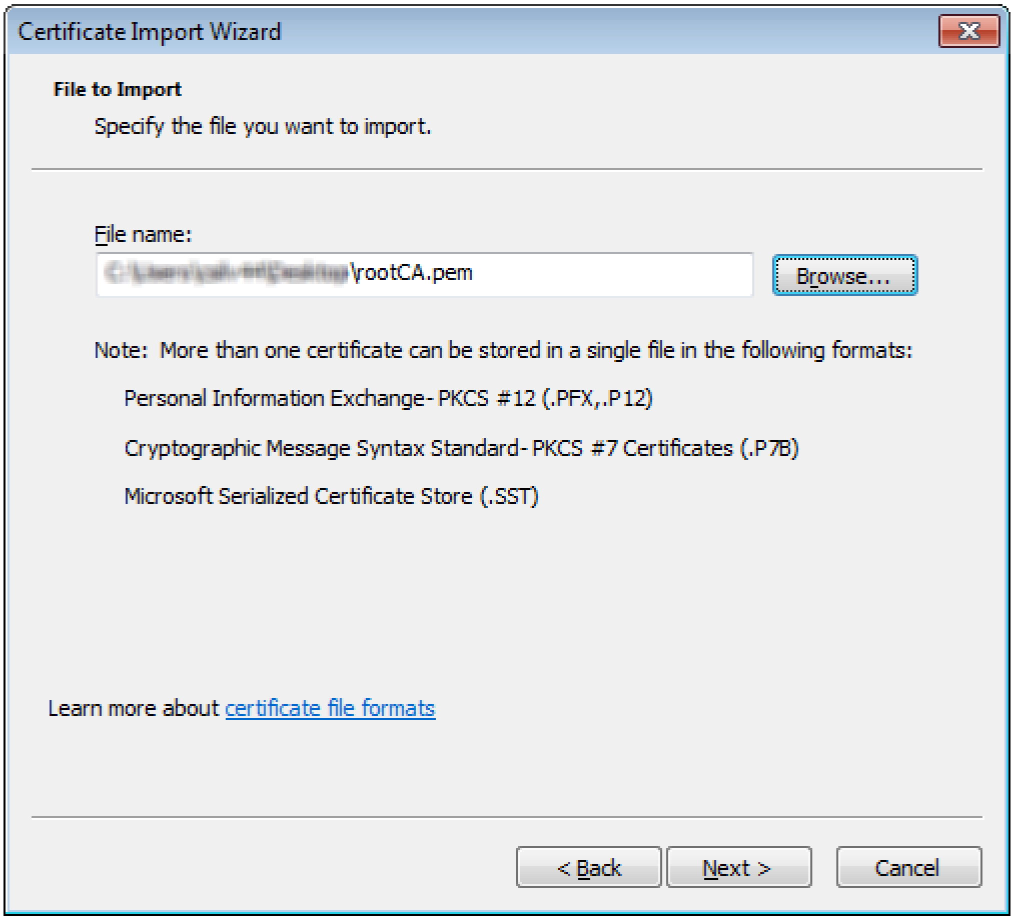
A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

To continue, click Next.

6. Browse to the **rootCA.pem** security certificate file, select it, click **Open**, and then click **Next**.

   ⓘ **Note:** Install the **rootCA.pem** file and **not** the mapgwy.com file that the browser prompts you to install. The rootCA.pem file certifies your device for any MAP Gateway you use. If you install the mapgwy.com file that the browser prompts you to install instead, you need to add a new certificate for each new MAP Gateway device that you use.

Figure 35: Certificate Import Wizard - Select File to Import



Certificate Import Wizard

File to Import

Specify the file you want to import.

File name: [redacted]\rootCA.pem

Note: More than one certificate can be stored in a single file in the following formats:

Personal Information Exchange- PKCS #12 (.PFX,.P12)

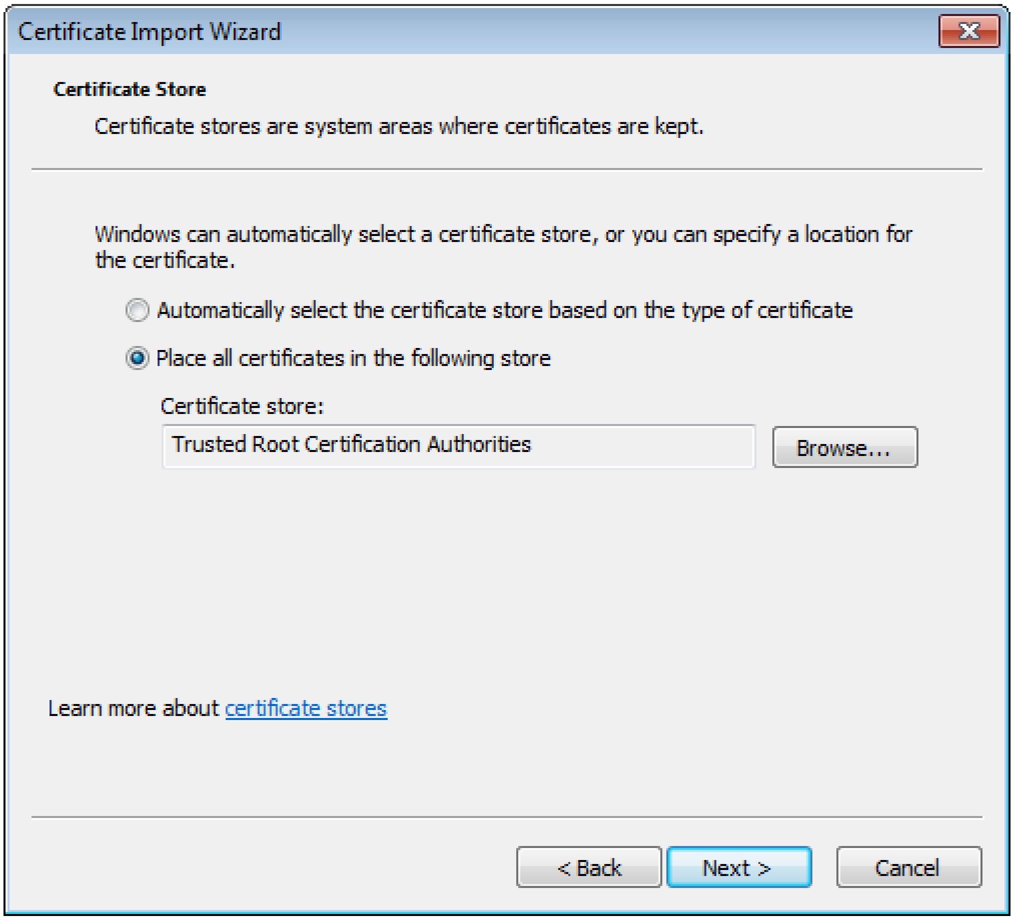
Cryptographic Message Syntax Standard- PKCS #7 Certificates (.P7B)

Microsoft Serialized Certificate Store (.SST)

Learn more about certificate file formats

7. On the Certificate Store page of the wizard, select **Place all certificates in the following store**, verify that the certificate store listed is **Trusted Root Certification Authorities**, and then click **Next**.

Figure 36: Certificate Import Wizard Certificate Store



Certificate Import Wizard

Certificate Store

Certificate stores are system areas where certificates are kept.

Windows can automatically select a certificate store, or you can specify a location for the certificate.

○ Automatically select the certificate store based on the type of certificate

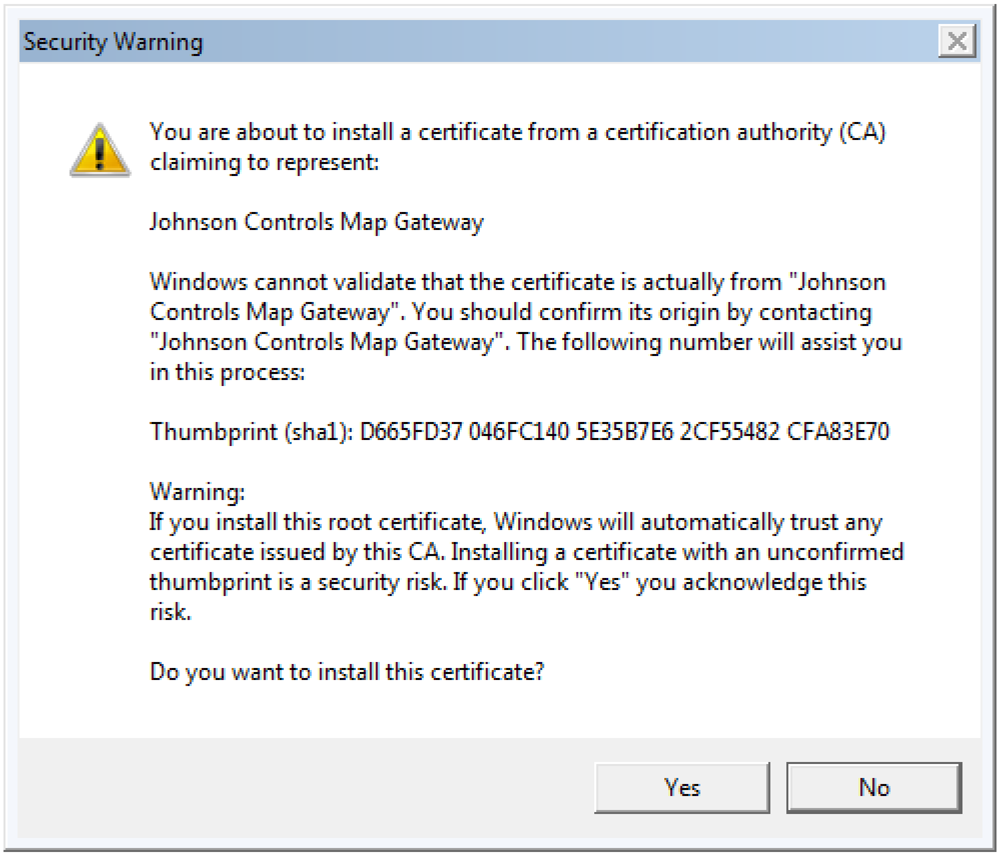
● Place all certificates in the following store

Certificate store: Trusted Root Certification Authorities

Learn more about certificate stores

8. In the Security Warning dialog box, click **Yes**.

Figure 37: Certificate Import Wizard Security Warning



You are about to install a certificate from a certification authority (CA) claiming to represent:

Johnson Controls Map Gateway

Windows cannot validate that the certificate is actually from "Johnson Controls Map Gateway". You should confirm its origin by contacting "Johnson Controls Map Gateway". The following number will assist you in this process:

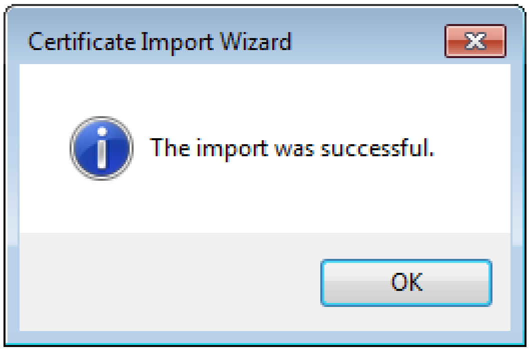
Thumbprint (sha1): D665FD37 046FC140 5E35B7E6 2CF55482 CFA83E70

Warning:
If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.

Do you want to install this certificate?

9. Click **Finish**. A success message appears.

Figure 38: Wizard Complete



The import was successful.

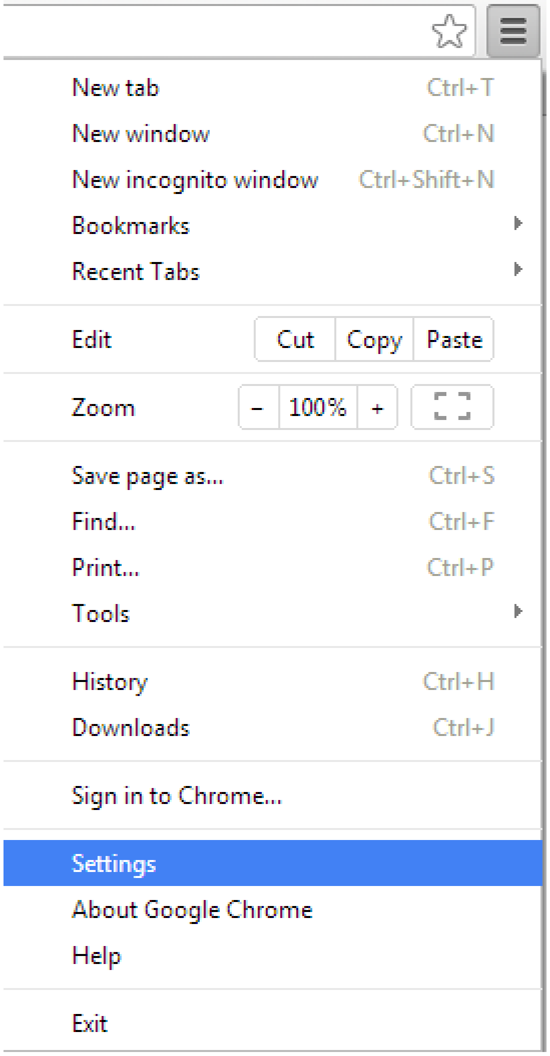
1
0. Click **OK**.

Installing the Security Certificate in Google® Chrome™

1. Navigate to **www.mapgwy.com/ downloadtlsprofile**, and then download the **rootCA.pem** file.

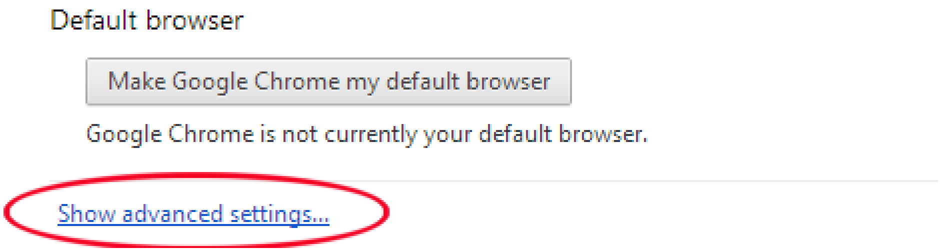
2. On the Chrome menu (≡), click **Settings**.

Figure 39: Chrome Settings Menu



3. At the bottom of the Settings page, click **Show advanced settings**.

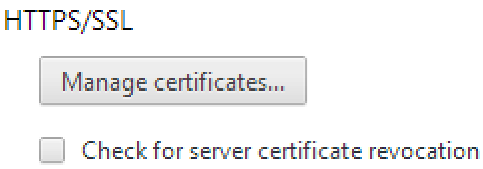
Figure 40: Advanced Settings Selection


Default browser
Make Google Chrome my default browser
Show advanced settings...

Google Chrome is not currently your default browser.

4. Under HTTPS/SSL, click **Manage certificates**.

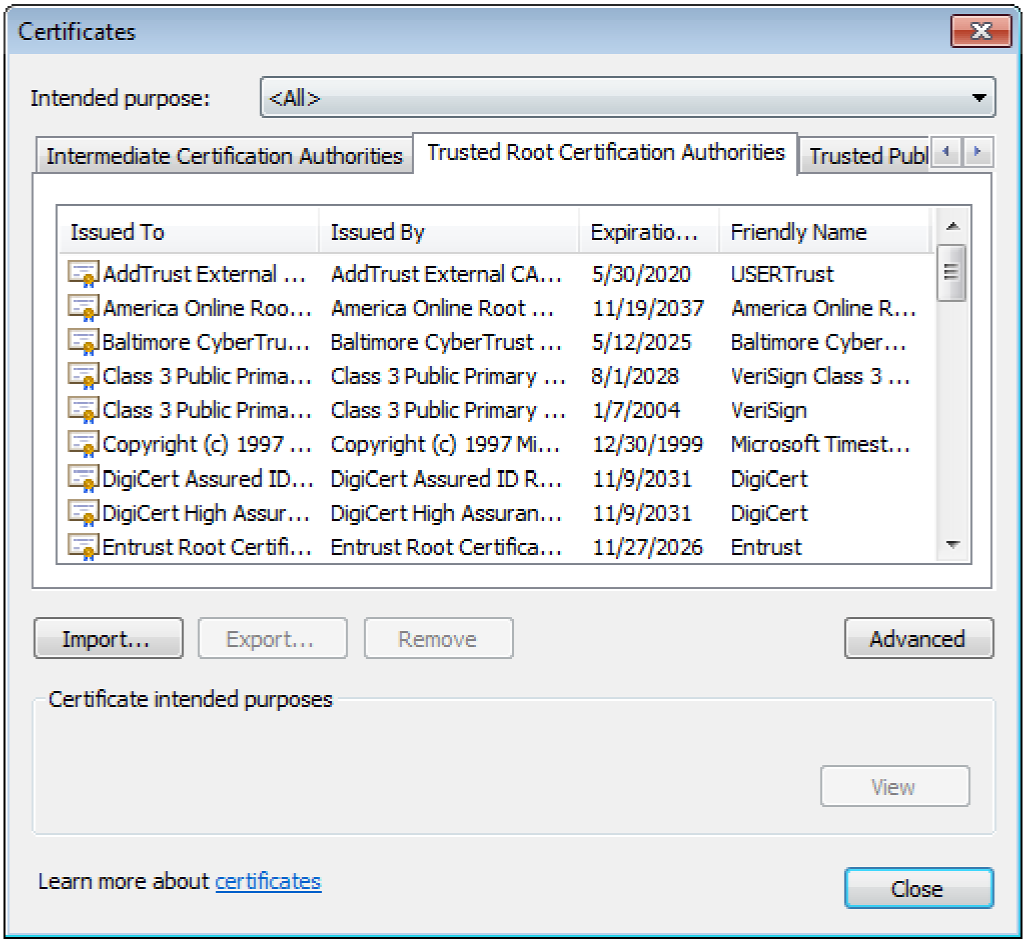
Figure 41: Manage Certificates



□ Check for server certificate revocation

5. In the Certificates dialog box, click the **Trusted Root Certification Authorities** tab, and then click **Import**. The Certificate Import Wizard opens.

Figure 42: Chrome SSL Certificates


Certificates
Intermediate Certification Authorities
Trusted Root Certification Authorities
Trusted Publ
Import...
Export...
Remove
Advanced
Certificate intended purposes
View
Close

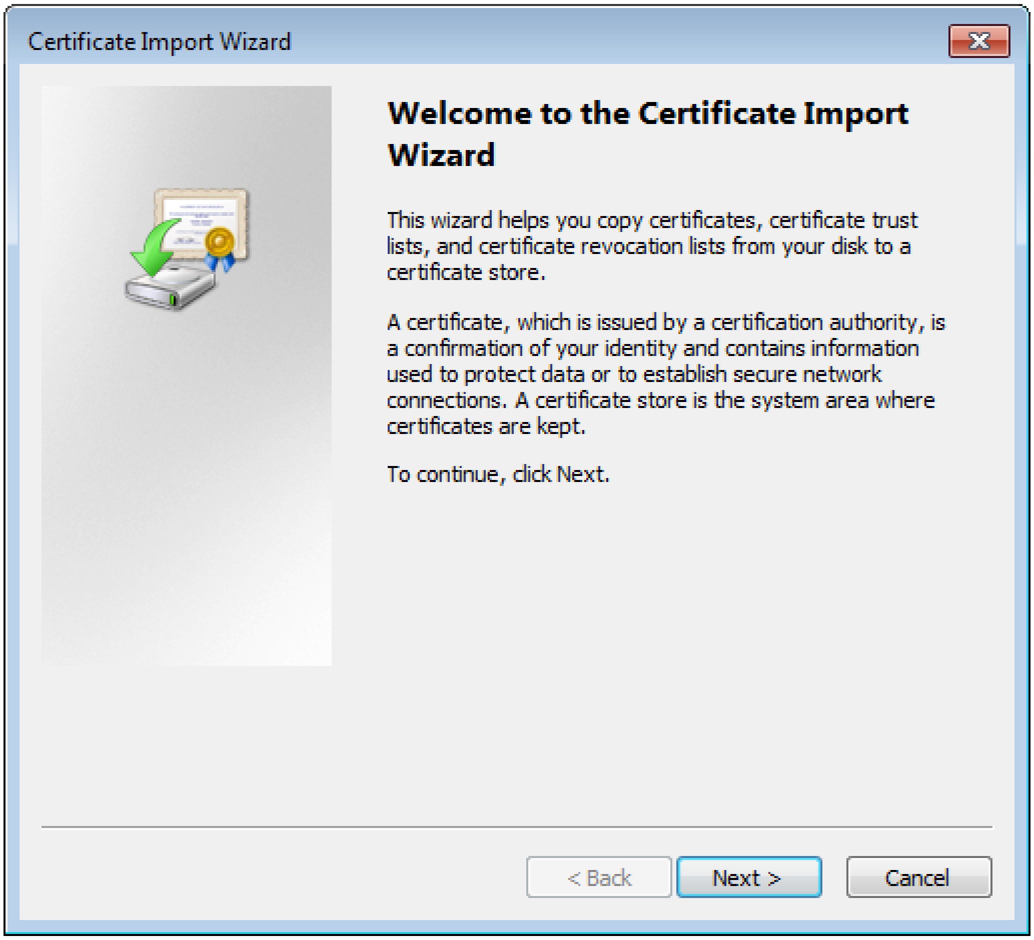
Intended purpose: <All>

Issued To	Issued By	Expiratio...	Friendly Name
AddTrust External ...	AddTrust External CA...	5/30/2020	USERTrust
America Online Roo...	America Online Root ...	11/19/2037	America Online R...
Baltimore CyberTru...	Baltimore CyberTrust ...	5/12/2025	Baltimore Cyber...
Class 3 Public Prima...	Class 3 Public Primary ...	8/1/2028	VeriSign Class 3 ...
Class 3 Public Prima...	Class 3 Public Primary ...	1/7/2004	VeriSign
Copyright (c) 1997 ...	Copyright (c) 1997 Mi...	12/30/1999	Microsoft Timest...
DigiCert Assured ID...	DigiCert Assured ID R...	11/9/2031	DigiCert
DigiCert High Assur...	DigiCert High Assuran...	11/9/2031	DigiCert
Entrust Root Certifi...	Entrust Root Certifica...	11/27/2026	Entrust

Learn more about certificates

6. In the Certificate Import Wizard dialog box, click **Next**.

Figure 43: Certificate Install wizard



Certificate Import Wizard

Welcome to the Certificate Import Wizard

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

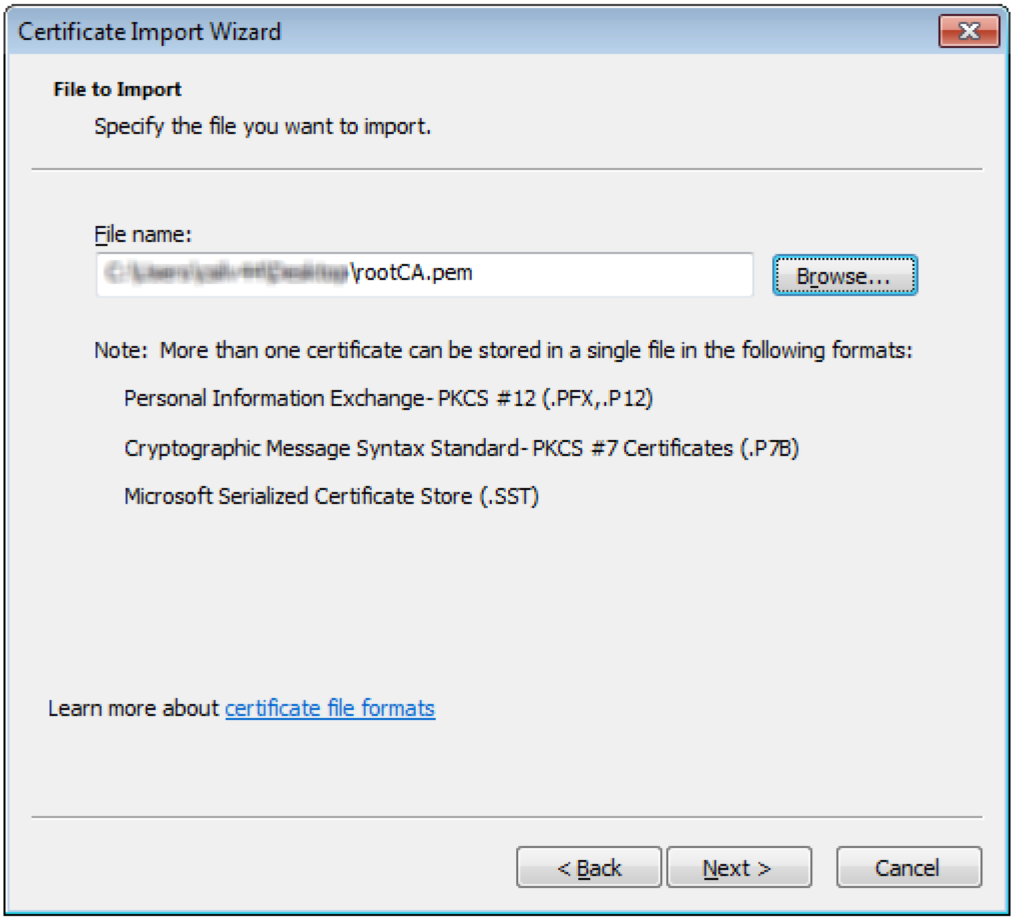
A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

To continue, click Next.

7. Browse to the **rootCA.pem** security certificate file, select it, click **Open**, and then click **Next**.

   ⓘ **Note:** Install the **rootCA.pem** file and not the mapgwy.com file that the browser prompts you to install. The rootCA.pem file certifies your device for any MAP Gateway you use. If you install the mapgwy.com file that the browser prompts you to install instead, you need to add a new certificate for each new MAP Gateway device that you use.

Figure 44: Certificate Import Wizard Browse



Certificate Import Wizard

File to Import

Specify the file you want to import.

File name:

[redacted]\rootCA.pem

Note: More than one certificate can be stored in a single file in the following formats:

Personal Information Exchange- PKCS #12 (.PFX,.P12)

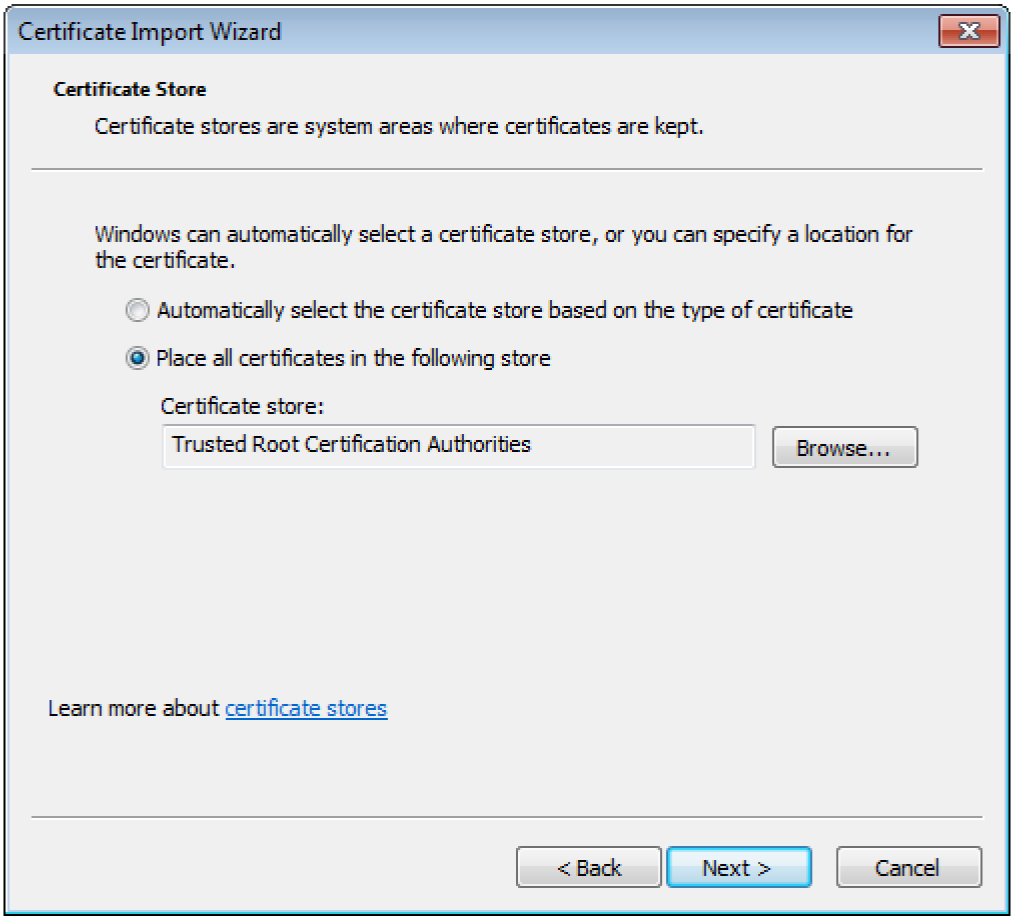
Cryptographic Message Syntax Standard- PKCS #7 Certificates (.P7B)

Microsoft Serialized Certificate Store (.SST)

Learn more about certificate file formats

8. On the Certificate Store page of the wizard, select **Place all certificates in the following store**, verify that the certificate store listed is **Trusted Root Certification Authorities**, and then click **Next**.

Figure 45: Certificate Import Wizard - Certificate Store



Certificate Store

Certificate stores are system areas where certificates are kept.

Windows can automatically select a certificate store, or you can specify a location for the certificate.

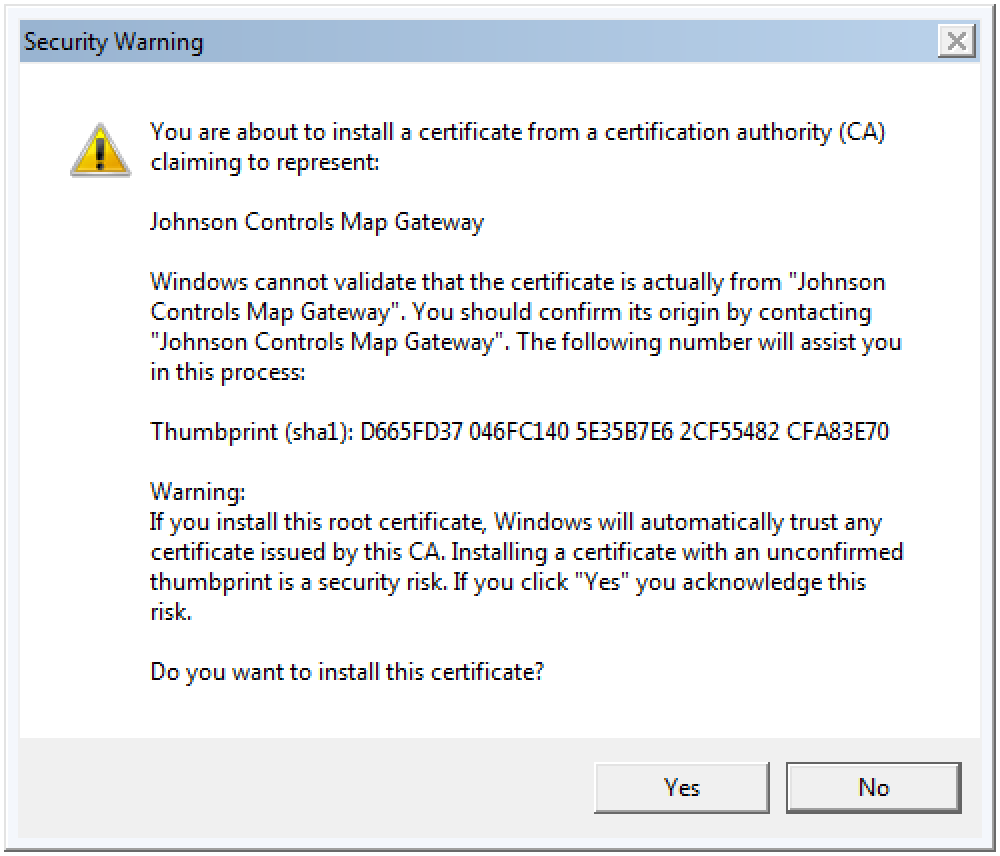
○ Automatically select the certificate store based on the type of certificate

● Place all certificates in the following store

Certificate store: Trusted Root Certification Authorities

9. In the Security Warning dialog box, click **Yes**.

Figure 46: Security Warning



Security Warning

You are about to install a certificate from a certification authority (CA) claiming to represent:

Johnson Controls Map Gateway

Windows cannot validate that the certificate is actually from "Johnson Controls Map Gateway". You should confirm its origin by contacting "Johnson Controls Map Gateway". The following number will assist you in this process:

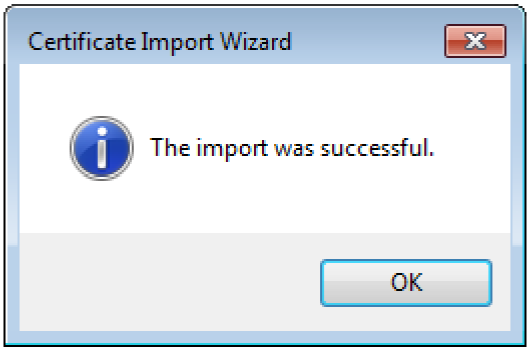
Thumbprint (sha1): D665FD37 046FC140 5E35B7E6 2CF55482 CFA83E70

Warning:
If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.

Do you want to install this certificate?

10. Click **Finish**. A success message appears.

Figure 47: Certificate Install Wizard Success



Certificate Import Wizard

The import was successful.

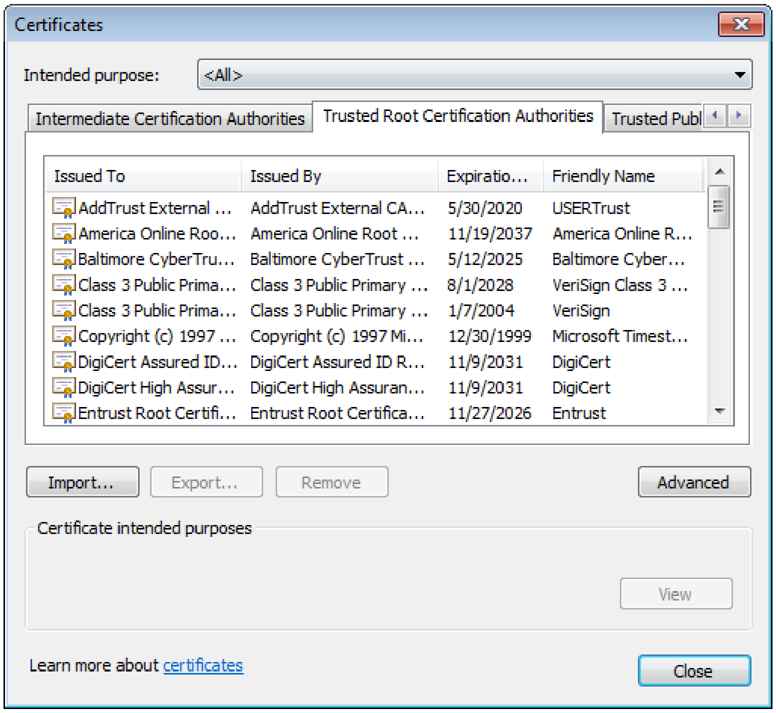
11. Click **OK**.

Importing a Certificate Signed by a Public CA

If you have a certificate from a public CA, you may import it using this procedure.

1. In the Certificates dialog box, click the **Trusted Root Certification Authorities** tab, and then click **Import**. The Certificate Import Wizard opens.

Figure 48: The Certificates Dialog Box



Certificates
Intermediate Certification Authorities
Trusted Root Certification Authorities
Trusted Publ
Import...
Export...
Remove
Advanced
Certificate intended purposes
View
Close

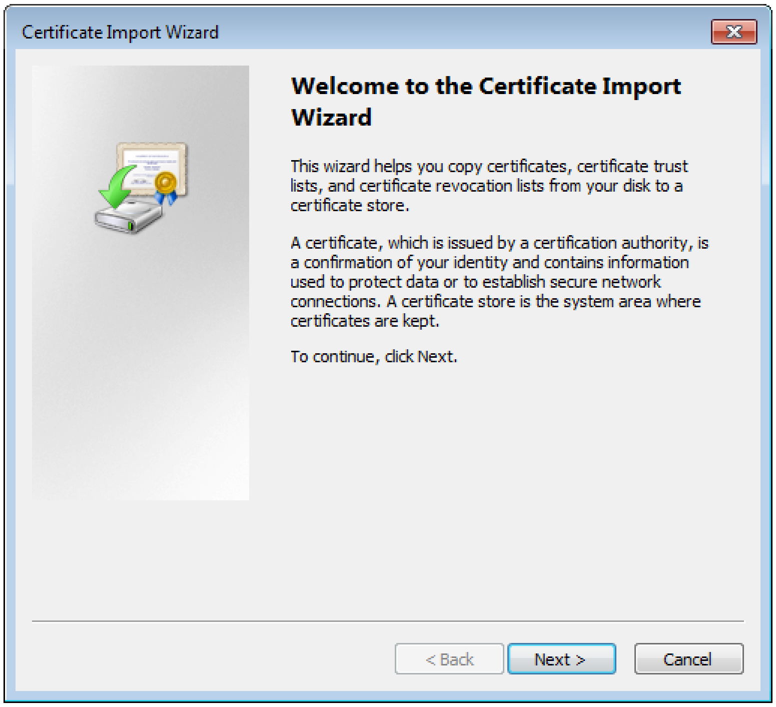
Intended purpose: <All>

Issued To	Issued By	Expiratio...	Friendly Name
AddTrust External ...	AddTrust External CA...	5/30/2020	USERTrust
America Online Roo...	America Online Root ...	11/19/2037	America Online R...
Baltimore CyberTru...	Baltimore CyberTrust ...	5/12/2025	Baltimore Cyber...
Class 3 Public Prima...	Class 3 Public Primary ...	8/1/2028	VeriSign Class 3 ...
Class 3 Public Prima...	Class 3 Public Primary ...	1/7/2004	VeriSign
Copyright (c) 1997 ...	Copyright (c) 1997 Mi...	12/30/1999	Microsoft Timest...
DigiCert Assured ID...	DigiCert Assured ID R...	11/9/2031	DigiCert
DigiCert High Assur...	DigiCert High Assuran...	11/9/2031	DigiCert
Entrust Root Certifi...	Entrust Root Certifica...	11/27/2026	Entrust

Learn more about certificates

2. In the Certificate Import Wizard dialog box, click **Next**.

Figure 49: Certificate Import Wizard



Welcome to the Certificate Import Wizard

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

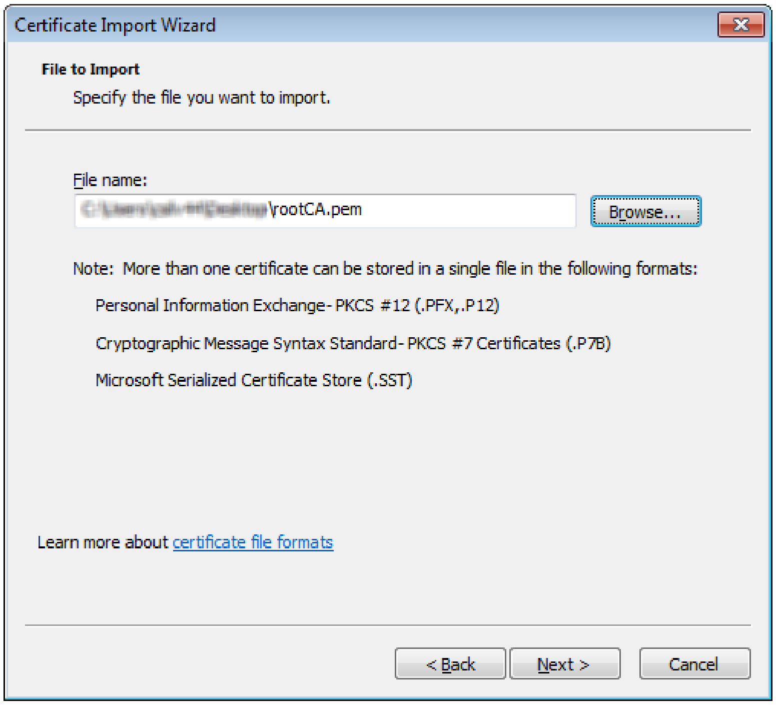
A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

To continue, click Next.

3. Browse to the **rootCA.pem** security certificate file, select it, click **Open**, and then click **Next**.

ⓘ **Note:** Install the **rootCA.pem** file and not the mapgwy.com file that the browser prompts you to install. The rootCA.pem file certifies your device for any MAP Gateway you use. If you install the mapgwy.com file that the browser prompts you to install instead, you need to add a new security certificate for each new MAP Gateway device that you use.

Figure 50: Importing the Certificate



Certificate Import Wizard

File to Import

Specify the file you want to import.

File name:

[redacted]\rootCA.pem

Note: More than one certificate can be stored in a single file in the following formats:

Personal Information Exchange- PKCS #12 (.PFX,.P12)

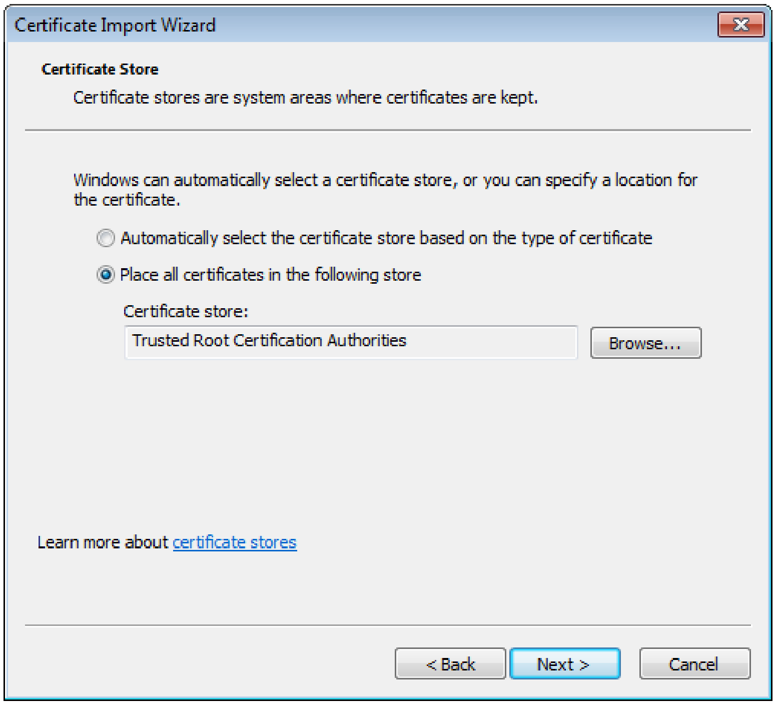
Cryptographic Message Syntax Standard- PKCS #7 Certificates (.P7B)

Microsoft Serialized Certificate Store (.SST)

Learn more about certificate file formats

4. On the Certificate Store page of the wizard, select **Place all certificates in the following store**, verify that the certificate store listed is **Trusted Root Certification Authorities**, and then click **Next**.

Figure 51: Certificate Store Options



Certificate Store

Certificate stores are system areas where certificates are kept.

Windows can automatically select a certificate store, or you can specify a location for the certificate.

○ Automatically select the certificate store based on the type of certificate

● Place all certificates in the following store

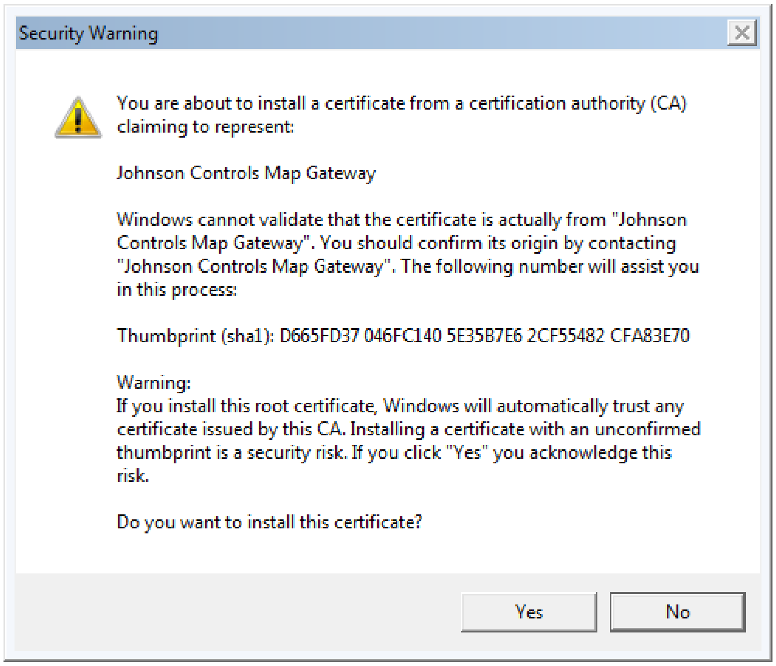
Certificate store:

Trusted Root Certification Authorities

Learn more about certificate stores

5. In the Security Warning dialog box, click **Yes**.

Figure 52: Non-Validated Certificate Security Warning



You are about to install a certificate from a certification authority (CA) claiming to represent:

Johnson Controls Map Gateway

Windows cannot validate that the certificate is actually from "Johnson Controls Map Gateway". You should confirm its origin by contacting "Johnson Controls Map Gateway". The following number will assist you in this process:

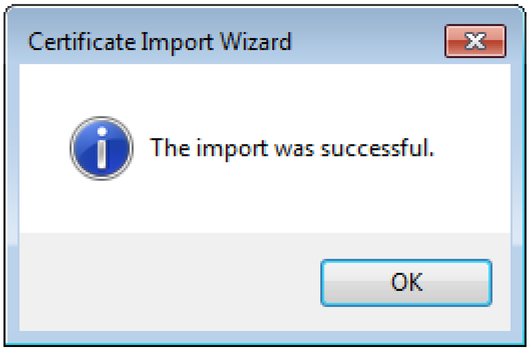
Thumbprint (sha1): D665FD37 046FC140 5E35B7E6 2CF55482 CFA83E70

Warning:
If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.

Do you want to install this certificate?

6. Click **Finish**. A success message appears.

Figure 53: The Certificate Import Success Message



Certificate Import Wizard

The import was successful.

7. Click **OK**.

Creating a Certificate Request

This section describes how to create a certificate signing request as well as how to purchase an SSL certificate from a Public Certificate Authority. You must coordinate with your IT department and only use an approved Public Certificate Authority for your location.

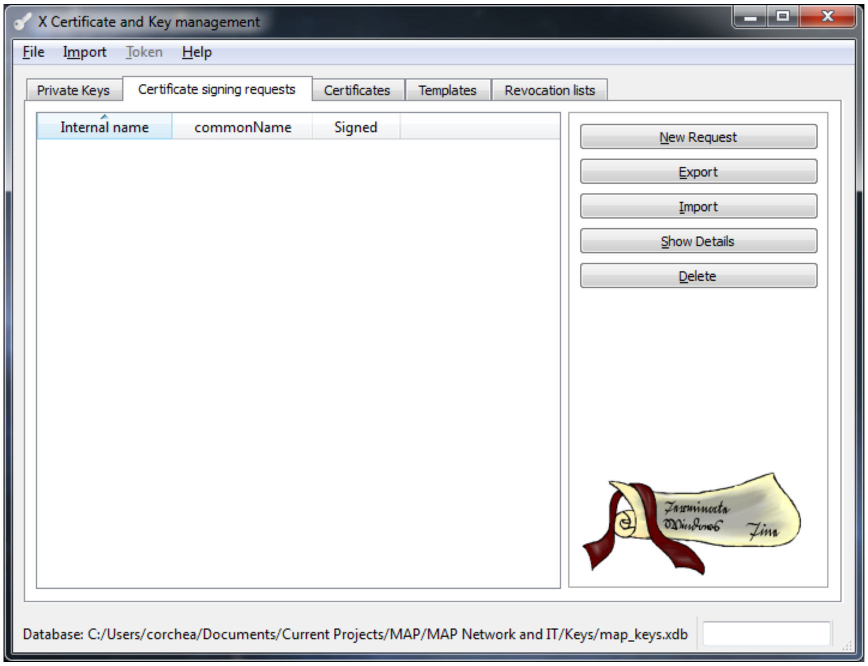
- The steps to purchase a domain name and a security certificate vary according to the registrar. Use the instructions in this document as an example. You may choose a different registrar to purchase a domain name and security certificate.
- The domain name and security certificate costs are not included as part of the purchase cost of the MAP Gateway.
- Domain names and third-party security certificates expire. We recommend registering domain names and third-party certificates for the longest duration available (typically 3 years). Plan to renew domain names and security certificates before they expire.

Creating a Certificate Request (CSR)

The following steps demonstrate how to create a request for an SSL certificate (CSR) using the **XCA - X Certificate and key management** application, copyright 2014 by Christian Hohnstädt, as an example of how to perform this task. You must make sure to use a certificate request generating application that is approved by your IT department. This procedure creates a file in a format for submitting the properties of your SSL certificate to the certificate authority. Your IT department must also approve the Public Certificate Authority to which you submit your request.

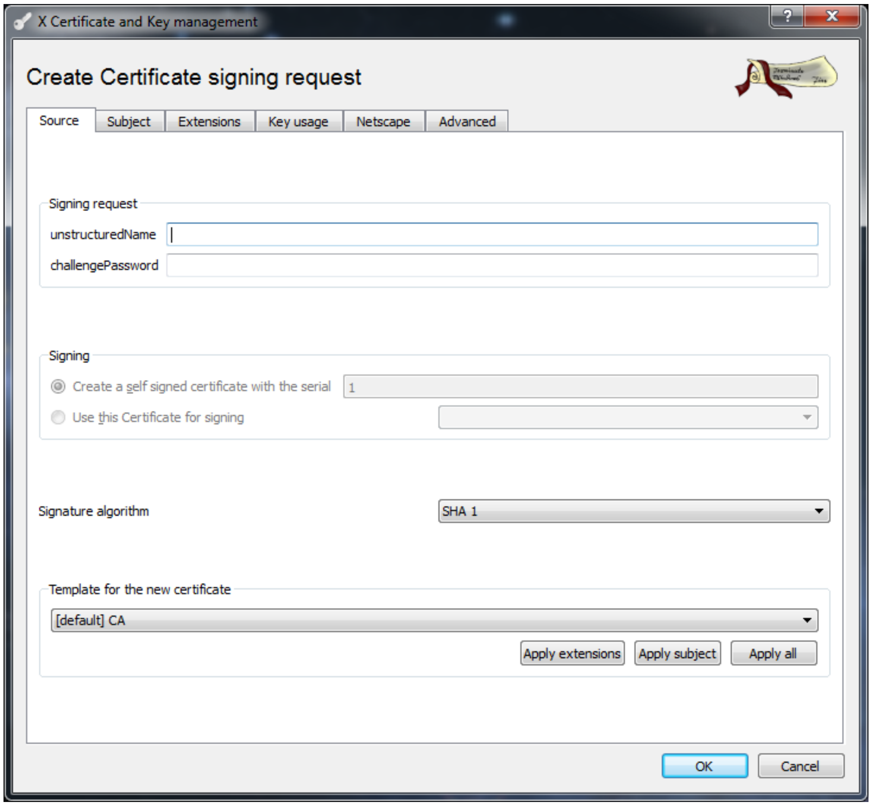
1. Open your certificate request creating application, select the **Certificate signing requests** tab if necessary, and click **New Request**. The Create Certificate signing request screen appears.

Figure 54: New Certificate Signing Request Tab


X Certificate and Key management
File
Import
Token
Help
Private Keys
Certificate signing requests
Certificates
Templates
Revocation lists
Internal name
commonName
Signed
New Request
Export
Import
Show Details
Delete
Database: C:/Users/corchea/Documents/Current Projects/MAP/MAP Network and IT/Keys/map_keys.xdb

2. In Signing request enter `unstructuredName` and `challengePassword`
   The unstructured name is used by the certificate signing authority and may be set to your organization name.
   Accept the defaults (SHA1 and [default]CA) unless they conflict with your IT policies and click the **Subject** tab.

Figure 55: Create CSR Source Screen



Signing request

unstructuredName

challengePassword

Signing

● Create a self signed certificate with the serial 1

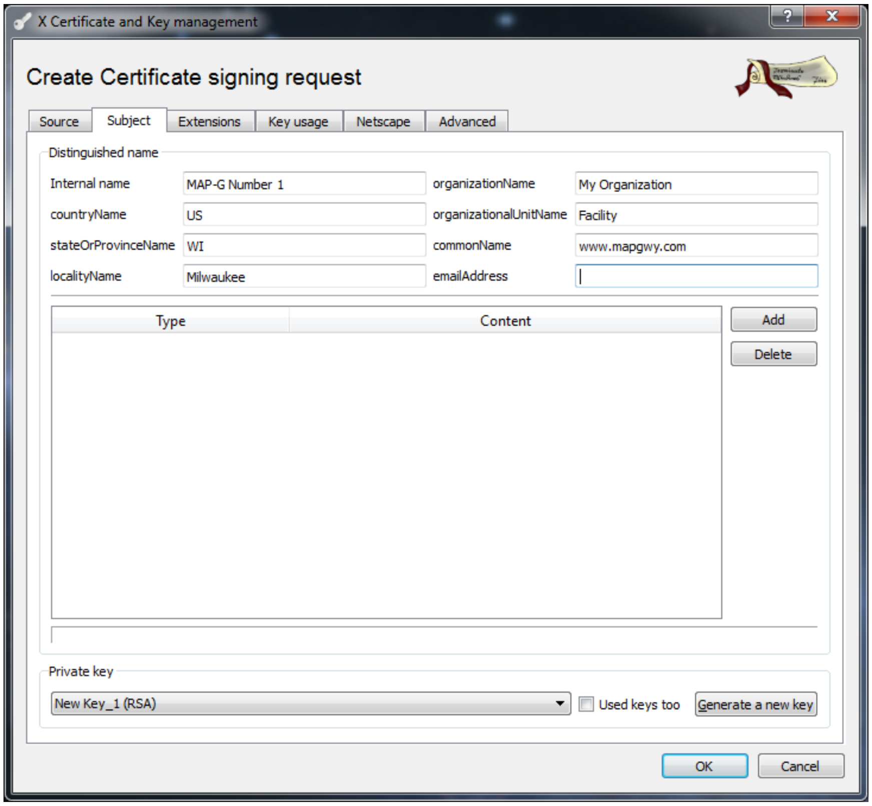
○ Use this Certificate for signing

Signature algorithm: SHA 1

Template for the new certificate: [default] CA

3. In the Distinguished Name Properties window, enter the following information:
   - **Internal name:** This name is only used internally and does not appear in the certificate.
   - **organizationName:** the name of your organization
   - **countryName:** the country in which your organization is located
   - **organizationalUnitName:** the name of your department within the organization
   - **stateOrProvinceName:** the state in which your organization is located
   - **commonName:** the domain name without https://. The domain name should be the site used to browse to the MAP Gateway UI.
   - **localityName:** the city in which your organization is located
   - **emailAddress:** Typically the address of the administrator of your organization.
   - **Private key:** This drop-down list contains private keys that you have already generated. In this case, select **New Key (RSA)** which was generated in the Generating a Private Key section of this document. If you have not created a private key or wish to create a new one, click **Generate a new key** and follow the steps in Generating a Private Key in this document.
4. Select the **Extensions** tab.

Figure 56: New CSR Subject Tab



Create Certificate signing request

Distinguished name

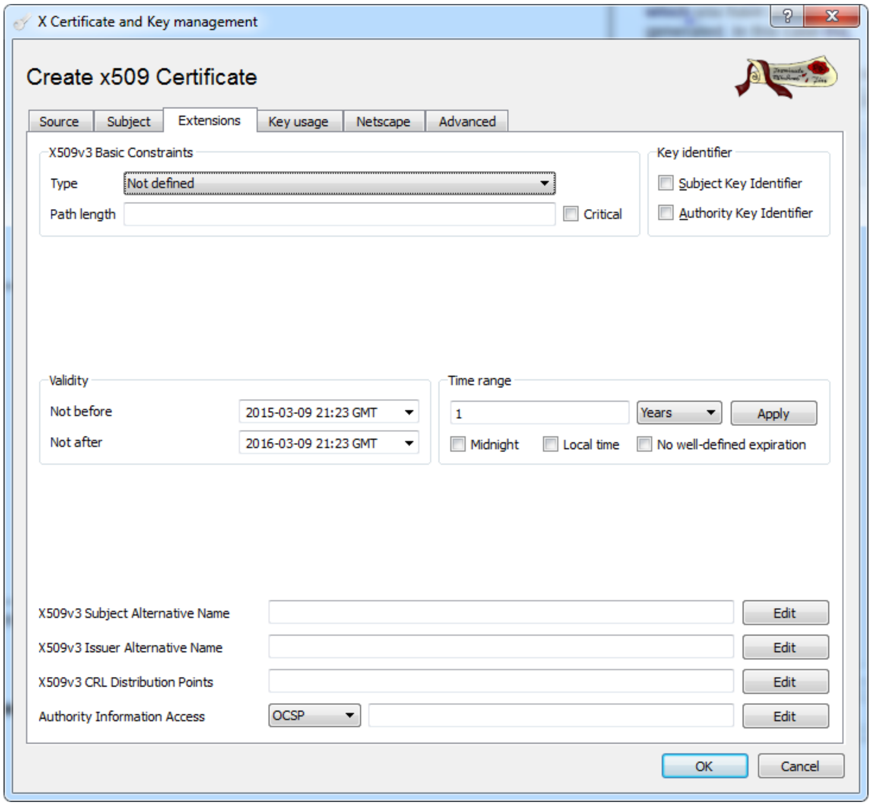
Internal name	MAP-G Number 1	organizationName	My Organization
countryName	US	organizationalUnitName	Facility
stateOrProvinceName	WI	commonName	www.mapgwy.com
localityName	Milwaukee	emailAddress	

Private key

New Key_1 (RSA) ☐ Used keys too

5. Use the **Validity** and **Time range** sections to define time limits and valid ranges for your certificate. Click **OK**.

Figure 57: New CSR Extensions Tab



Type: Not defined

Path length:

□ Critical

□ Subject Key Identifier

□ Authority Key Identifier

Not before: 2015-03-09 21:23 GMT

Not after: 2016-03-09 21:23 GMT

Time range: 1 Years

□ Midnight □ Local time □ No well-defined expiration

X509v3 Subject Alternative Name:

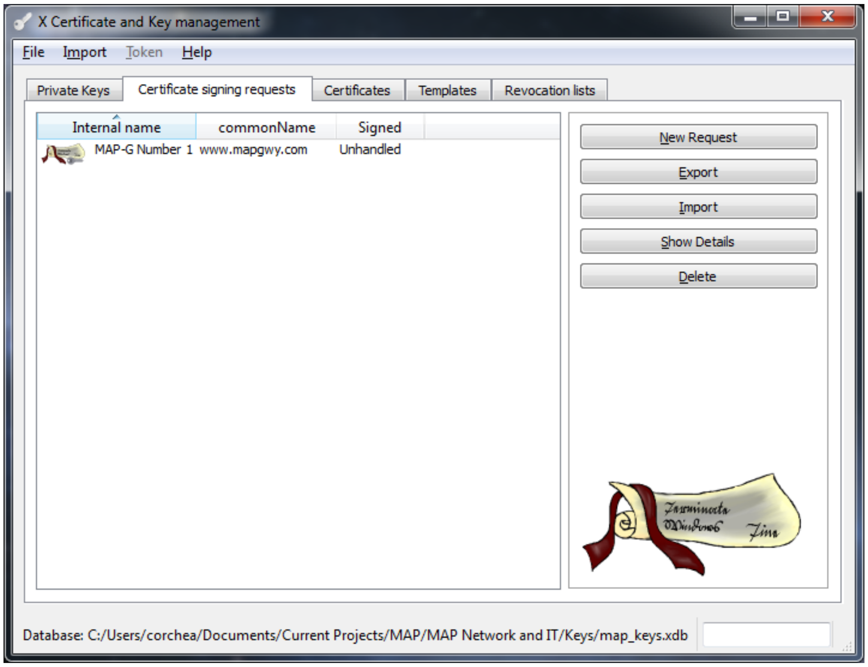
X509v3 Issuer Alternative Name:

X509v3 CRL Distribution Points:

Authority Information Access: OCSP

6. The new certificate signing request is now in your list of certificates with the internal name you assigned. Select the certificate and click **Export**.

Figure 58: New CSR Created

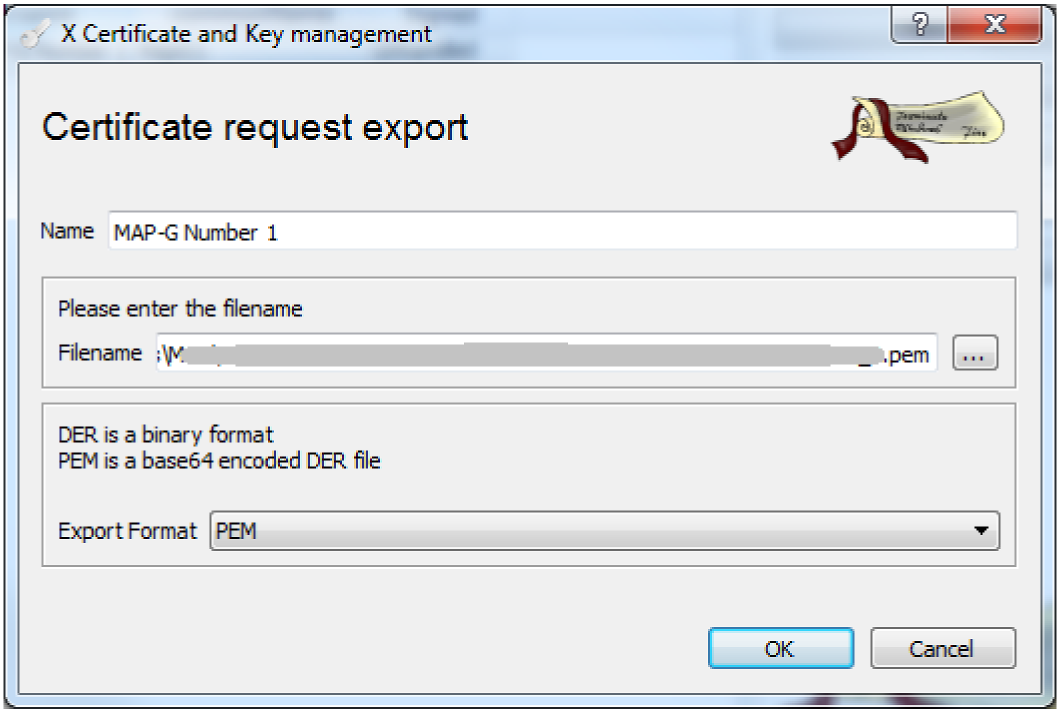


Internal name	commonName	Signed
MAP-G Number 1	www.mapgwy.com	Unhandled

Database: C:/Users/corchea/Documents/Current Projects/MAP/MAP Network and IT/Keys/map_keys.xdb

7. Click the browse button, choose a location for the new CSR file, and click OK. This file will be used to purchase a certificate request from a Public Certificate Authority.

Figure 59: Certificate Request Export



X Certificate and Key management

Certificate request export

Name: MAP-G Number 1

Please enter the filename

Filename: [redacted].pem

DER is a binary format
PEM is a base64 encoded DER file

Export Format: PEM

Purchasing an SSL Certificate from a Public Certificate Authority

You can obtain an SSL certificate from any public certificate authority. MAP Gateway requires a basic Class 1 SSL certificate, also called a domain verified certificate. This section includes instructions using the vendor . This vendor is a popular reseller of SSL certificates from several of the largest certificate authorities, including GeoTrust, Inc. The RapidSSL product from GeoTrust, Inc. is used as an example in this document. You can use any public certificate authority to purchase an SSL certificate.

1. In a web browser, browse to.

   ⓘ **Note:** The steps to purchase a security certificate vary according to the registrar. Use these instructions as an example.

2. Navigate to the SSL certificate products.
3. Choose the RapidSSL option used in these instructions and select the longest duration available for the certificate. Click **Add to Cart**.
4. The Order Confirmation page appears. Click **Confirm Order**.
5. You are prompted to create an account with . If you already have an account, log in. If you do not have an account, enter your account information and click **Create Account and Continue**.
6. The Order Review page appears. Review your order and select your payment option. Complete your purchase.
7. The SSL certificate purchase is complete. Click **Manage My Account** to view your purchased certificate.
8. On your Manage My Account page, a message appears alerting you to activate your SSL certificate. Click **SSL Certificates page**.

9. In the Status column, click **Activate Now**.
10. The Digital Certificate Order Form page appears. From the Select web server drop-down list, select **Apache + ApacheSSL**.
11. On your computer, navigate to the location where you stored the Certificate request in Creating a Certificate Request (CSR). Select all of the text from the .txt file and paste the text into the **Enter csr** field on the Digital Certificate Order Form page.
12. Click **Next**.
13. Select the approver email address to verify ownership of the domain name. You must be able to access the mailbox of the email address selected. An email containing a validation code is sent to this email address. Click **Next**.
14. A confirmation page appears. Confirm the administrator contact information is correct. Click **Submit Order**.
15. The Digital Certificate Order Process Summary appears. Wait for the email to approve the certificate. Go to Importing a Certificate Signed by a Public CA to complete the process.