THALES

payShield 10K

GENERATING & INSTALLING TLS CERTIFICATES

CPL Technical Training

Revision History

Revision	Date	Reason
A	5 June 2023	Initial release

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CPL Technical Training Documentation

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Contents

This document covers how to generate and install TLS certificates for the HOST Port on payShield 10k using OpenSSL on Microsoft Windows.

Open SSL Installation and Configuration

1. Use the freely available OpenSSL to generate a CA. You can obtain a compiled version from: https://slproweb.com/products/Win32OpenSSL.html

   Use the following version: Win64 OpenSSL v3.1.0 Light on Windows 10 x64
2. Perform the installation using the default options.
3. Open a command line with elevated privileges, go to the default path where you find the binary of OpenSSL (C:\Program Files\OpenSSL-Win64\bin\).
4. Create a subdirectory to store your certificates and keys; name it **PC** (mkdir PC, to create it).
5. Create a file called **v3.ext** under the subdirectory PC containing the following lines:

```
authorityKeyIdentifier=keyid,issuer

basicConstraints=CA:FALSE

keyUsage = digitalSignature, nonRepudiation, keyEncipherment, dataEncipherment
```

> **What is the purpose of step 5 above?** If this file extension is not used when creating the client certificate and payShield host port certificate, OpenSSL generates them in version v1 instead of version v3. payShield will not install certificates with version v1! Only v3 certificates are accepted.
>
> The other two essential parameters are **nonRepudiation** and **dataEncipherment** for client certificates to work with payShield.

Generating Certificates

1. Generate the CA key by entering the command:

   ```
   openssl genrsa -out PC\CADISprivate.key 2048
   ```

2. Generate the self-signed certificate for the CA, by entering the command:

   ```
   openssl req -new -x509 -key  PC\CADISprivate.key -out PC\CADIS.crt -days 365
   ```

3. Connect to the payShield Console or Virtual Console to obtain the certificate signing request.

   You need to be in **Secure mode** and issue the command SG

   > **NOTE:** If you are using the virtual console, reply NO when asked to save the certificate request, otherwise payShield tries to save it on a USB stick connected to the USB-A port on the rear of the appliance (generally used for printers).

4. Copy the command output and save it in a file with the extension **CSR** under the **PC** directory.
   For example: **10kDIS.csr**

5. Sign the payShield certificate request using the CA:

   ```
   openssl x509 -req -in PC\10kDIS.csr -CAcreateserial -extfile PC\v3.ext -out
   PC\10kDISv3.crt -days 365 -CA PC\CADIS.crt -CAkey PC\CADISprivate.key
   ```

Generating the Client Certificate

1. Create the KEY for your client and the certificate signature request:

   ```
   openssl genrsa -out PC\laptopPrivate.key 2048
   ```

   ```
   openssl req -new -key PC\laptopPrivate.key -out PC\laptopDIS.csr
   ```

2. Sign the request using your CA:

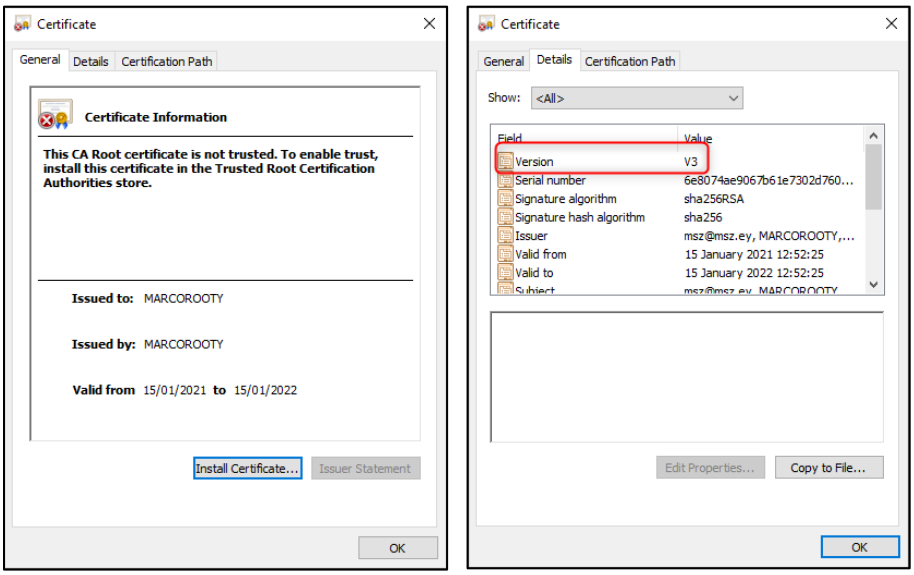
   ```
   openssl x509 -req -in PC\laptopDIS.csr -CA PC\CADIS.crt -CAkey
   PC\CADISprivate.key -CAcreateserial -extfile PC\v3.ext -out PC\laptopDISv3.crt
   ```

Verifying Certificates

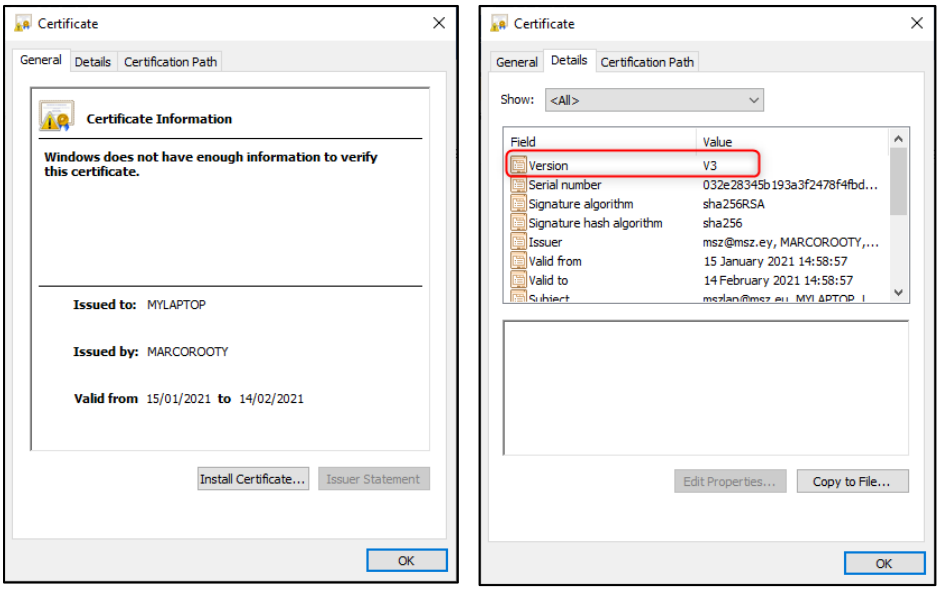
In this section, you will verify that all your certificates are version v3.

1. Double-click the CRT files. They should appear as in the images below.

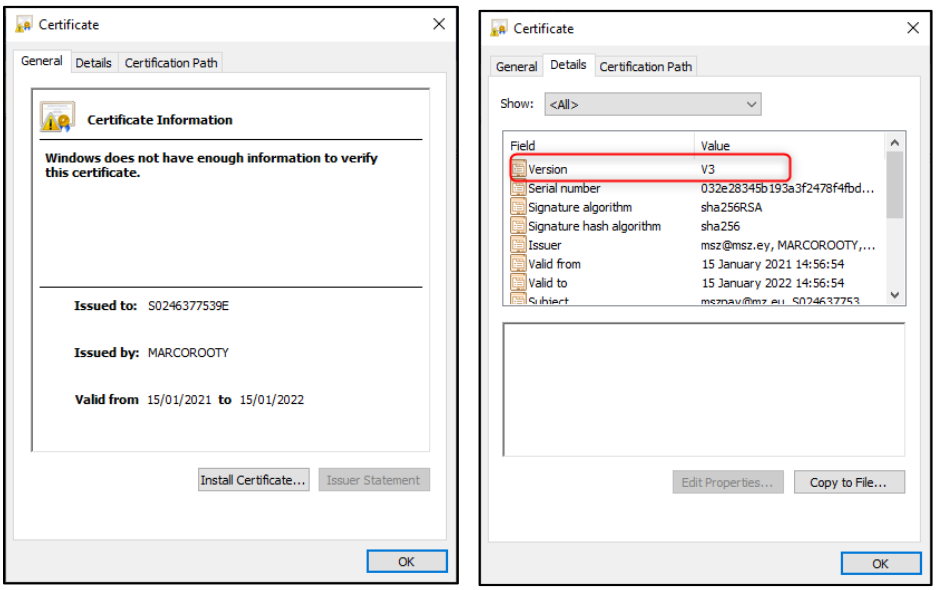
CADIS.CRT



10KDISv3.CRT



laptopDISv3.CRT



Installing Certificates on payShield

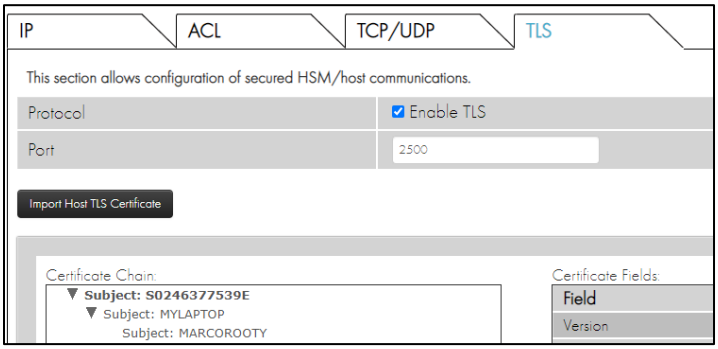
In this section, you will install certificates on payShield using the payShield Manager.

1. Log in using both the **L** and **R RACC** cards, and then enter Secure mode.
2. Go to **Configuration> Host Settings> TLS**, enable **TLS**, and then click **Import Host TLS Certificate**.

3. Import the certificates one by one in the following order:
   - **CADIS.crt** - your CA
   - **10kDISv3.crt** - the appliance certificate signed using your CA
   - **laptopDISv3.crt** - the client certificate signed by your CA

> **NOTE:** Every time a certificate is imported, you must reconnect to the payShield Manager.

4. After installing the last certificate, reconnect to the appliance, go to **Configuration> Host Settings> TLS**. If the certificates are installed correctly, you should see this:



Using the payShield Console or Virtual Console

1. Format a USB stick using the FAT file system (not ext3 or NTFS).
2. Copy all the **.CRT** files onto the USB stick.
3. Plug the USB stick into the USB-A port at the back of the appliance.
4. Enter Secure mode and issue the `SI` command.
5. Import the files in the following order:
   - **CADIS.crt** - your CA
   - **10kDISv3.crt** - the appliance certificate signed using your CA
   - **laptopDISv3.crt** - the client certificate signed by your CA
6. Use the `SV` command to verify that the certificates have been installed correctly. Remember to remove the USB stick from the port.

How to Test the TLS Host Connection

Using PayShieldPressureTest

> **PayShieldPressureTest** is a free Open Source tool written in Python to test the host port connectivity and to create a workload on the payShield 10k and 9k.

> The tool is freely available here: https://github.com/mszeu/PayShieldPressureTest

> A binary version for Microsoft Windows is also available on the same page.

> To test the connectivity, enable the host command **B2** and use the tool with the following parameters:

```
pressureTest.exe 192.168.0.36 --proto tls --keyfile PC\laptopPrivate.key  --
crtfile PC\laptopDISv3.crt --port 2500 --times 1 --b2 --echo TEST
```

If all is ok, the expected output is similar to the following:

Return code: 00 No error

Command sent/received: B2 ==> B3

sent data (ASCII) : HEADB20004TEST

sent data (HEX) : 000e484541444232303030454455354

received data (ASCII): HEADB300TEST

received data (HEX) : 000c48454144233303054455354DONE

Using OpenSSL

> Test if the connection can be established correctly through TLS with payShield. Use OpenSSL with the following parameters:

```
openssl s_client -connect 192.168.0.36:2500 -CAfile pc\CADIS.crt -key
pc\laptopPrivate.key -cert pc\laptopDISv3.crt -debug
```

> Verify that the certificate chain displayed is ok and that there are no evident errors.

The output should look similar to this:

```
SSL handshake has read 4232 bytes and written 2936 bytes
Verification: OK
---
New, TLSv1.2, Cipher is DHE-RSA-AES256-GCM-SHA384
Server public key is 2048 bit
Secure Renegotiation IS supported
Compression: NONE
Expansion: NONE
No ALPN negotiated
SSL-Session:
    Protocol  : TLSv1.2
    Cipher    : DHE-RSA-AES256-GCM-SHA384
    Session-ID: C2CD4159B669DED54FF57858C5F81D015B627744CEE2FD2E72BAE3D073B142F8
    Session-ID-ctx:
    Master-Key: BEA8EABE308FEE8EF2CE225949C1718B3E03AA9D83EECC34E333979C299C1B9A9530240368DD9C305F38F75F866E78CF
    PSK identity: None
    PSK identity hint: None
    SRP username: None
    TLS session ticket lifetime hint: 7200 (seconds)
    TLS session ticket:
    0000 - bc e2 9d 3a f2 e9 bc c5-58 0e 7c fe 9c ef 03 ee   ...:....X.|.....
```

```
   Start Time: 1684323590
   Timeout   : 7200 (sec)
   Verify return code: 0 (ok)
   Extended master secret: yes
---
```

If all is ok, the connection is established. To terminate it and return to the command prompt, press Ctrl-C.