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# Trust&Go Step by Step Guide - Loading Manifest & Connect to AWS-IoT

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# 1 Introduction

This document explains step by step process involved in uploading a manifest file to AWS cloud. If you are already familiar with Jupyter Notebook you can skip this section and move to Section 2.

## 1.1 Getting started with Jupyter Notebook Tutorials

Jupyter Notebook is open source web application which allows you to create documents that contain code that you can execute in place as well as narrative text. It provides GUI elements, ability to execute code in place, ability to add images and gives it the look and feel that normal code files lack.

Jupyter notebooks are mainly used to explain/evaluate code in an interactive way.

### 1.1.1 Starting Jupyter Notebook

Jupyter notebook can be launched from the Anaconda Navigator main window.



## 1.2 Jupyter Notebook Basics

It is recommended to become familiar with Jupyter basic concepts with the online documentation, <https://jupyter-notebook.readthedocs.io/en/stable/examples/Notebook/Notebook%20Basics.html>

Some of the content is duplicated here for convenience. The online documentation should always be used as a reference.

### 1.2.1 The Notebook dashboard

When you first start the notebook server, your browser will open Notebook dashboard. The dashboard serves as a home page for the notebook. Its main purpose is to display the Notebooks and files in the current directory.

For example, here is a screenshot of the Jupyter dashboard. The top of the notebook list displays clickable breadcrumbs of the current directory. By clicking on these breadcrumbs or on sub-directories in the notebook list, you can navigate your file system.

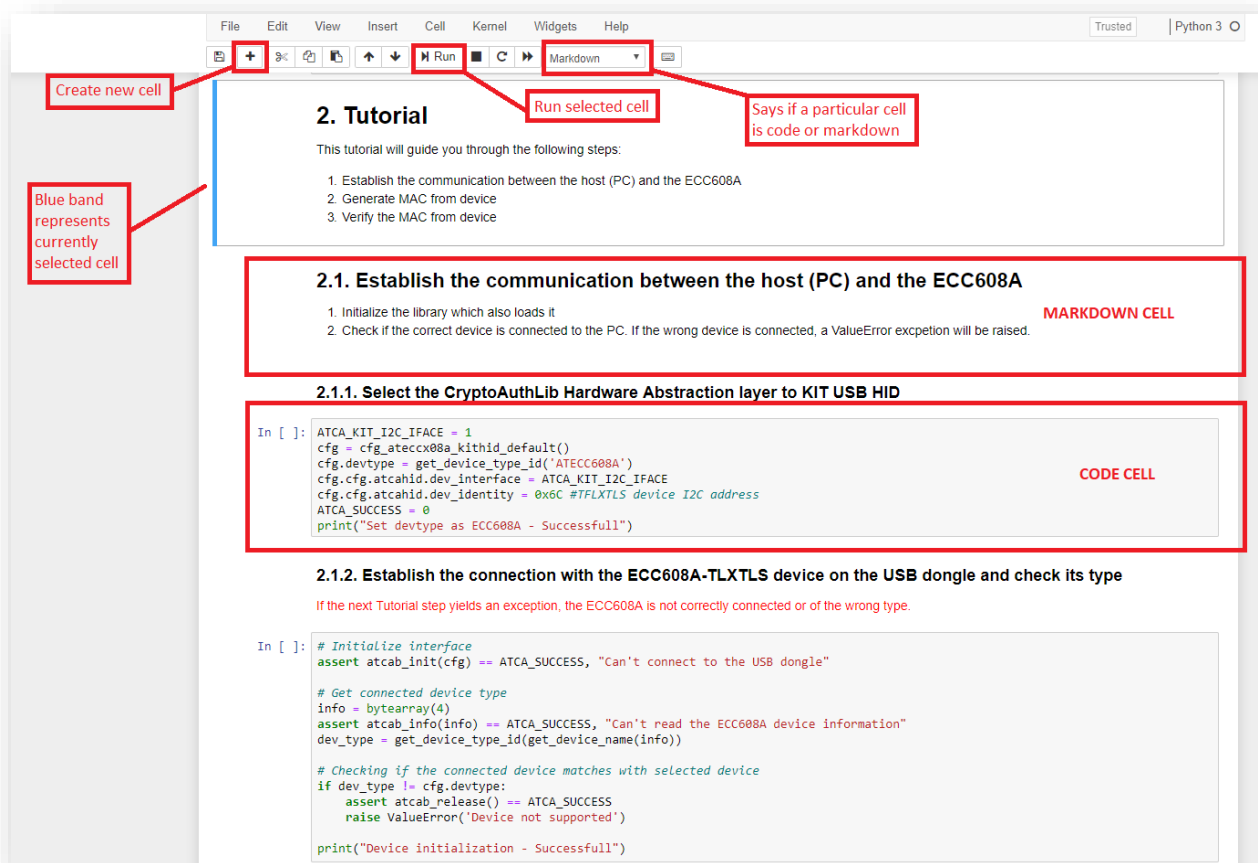


### 1.3 Introduction to Jupyter Notebook GUI.

Jupyter Notebooks contain cells where you can either write code or markdown text. Notebooks contain multiple cells, some set as code and others markdown. Code cells contain code that can be executed live, and markdown contains text and images to explain the code.

Below image shows some options in a typical Jupyter Notebook. Individual cells can be executed by pressing on the RUN button as shown in the below image.

All cells in the Notebook can be executed in order by **Kernel->Restart & Run All**.



To run all cells in sequence.



## 2 Jupyter Notebook Tutorials

The TrustPlatform Design Suite comes with a Notebook Tutorials to easily prototype popular use cases for Trust&GO devices. Here are the available Jupyter Notebook Tutorials.

<b>Jupyter Notebook Tutorials</b>	<b>Relative Path</b>	<b>Applicable Devices</b>
Manifest Generation	TrustnGO\00_resource_generation\TNGTLS_manifest_file_generation.ipynb	Trust&GO
AWS Connect	TrustnGO\01_aws_connect\notebook\ TNGTLS_aws_connect.ipynb	Trust&GO
GCP Connect	TrustnGO\02_gcp_connect\notebook\TNGTLS_GCP_connect.ipynb	Trust&GO

### 3 Manifest Generation Notebook

Trust&GO device is one of the three devices available in the Trust Platform USB Dongle Board.

Trust&GO devices come with pre-programmed certificates in slots 10, 11 and 12, also slots 0-4 have pre-generated private keys, other than the previously mentioned slots all the other slots are locked.

The secure element manifest format is designed to convey the unique information about a device including its unique ID (e.g. serial number), public keys, and certificates. The manifest file generated can be used to register the device to cloud providers.

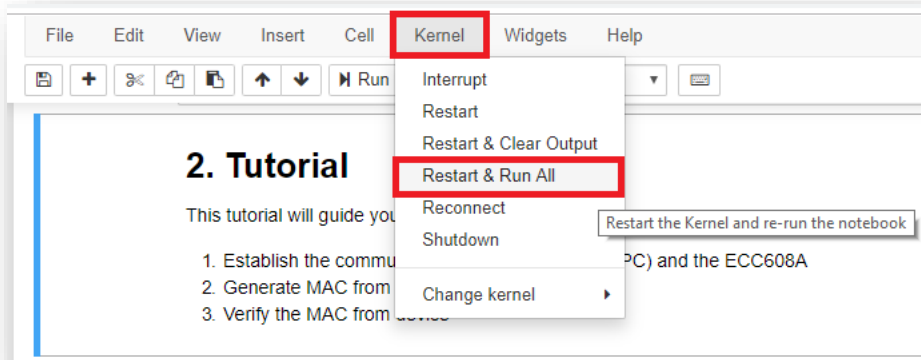
By default, Jupyter starts in Users directory (\$HOME for MacOS or Linux systems). For the remainder of this document, it will be assumed that the trust\_platform folder is contained in Users directory. If this is not the case, please move trust\_platform folder to your Users directory

Within the Jupyter Dashboard, navigate **trust\_platform\DesignTools\TrustnGO\00\_resource\_generation** folder to open **TNGTLS\_manifest\_file\_generation.ipynb**



Run all cells of the TNGTLS\_manifest\_file\_generation Notebook: Kernel->Restart & Run All

**Note:** Before executing the cells on Crypto Trust Platform, its required to have factory default program running on SAMD21 of Trust Platform. Refer to [4.3 CryptoAuth TrustPlatform Factory reset](#) section for reloading default program.



If all the steps ran without errors, you will see result as shown below.  
Loading logger key

Generating self-signed logging certificate  
Saving to log\_signer.crt

-----  
TNG Root Certificate:

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

77:d3:6d:95:6e:c8:ae:62:05:e5:8e:3a:cb:98:5a:81

Signature Algorithm: ecdsa-with-SHA256

Issuer: O = Microchip Technology Inc, CN = Crypto Authentication Root CA 002

Validity

Not Before: Nov 8 19:12:19 2018 GMT

Not After : Nov 8 19:12:19 2058 GMT

Subject: O = Microchip Technology Inc, CN = Crypto Authentication Root CA 002

Subject Public Key Info:

Public Key Algorithm: id-ecPublicKey

Public-Key: (256 bit)

pub:

04:bd:54:e6:6d:e3:87:54:84:00:6b:53:ae:15:80:

d5:0a:a0:69:e7:8a:df:55:78:d8:5c:e2:d5:4d:d5:

b8:30:29:6b:ff:dd:6e:6f:72:56:fb:d9:9e:f1:a1:

16:b1:1d:33:ad:49:10:3a:a1:85:87:39:dc:fa:e4:

37:e1:9d:63:4e

ASN1 OID: prime256v1

NIST CURVE: P-256

X509v3 extensions:

X509v3 Subject Key Identifier:

7A:ED:7D:6D:C6:B7:78:9D:B2:38:01:A5:E8:4A:8C:B0:A4:0E:2A:8C



X509v3 Authority Key Identifier:  
keyid:7A:ED:7D:6D:C6:B7:78:9D:B2:38:01:A5:E8:4A:8C:B0:A4:0E:2A:8C

X509v3 Basic Constraints: critical  
CA:TRUE

CA:TRUE

Signature Algorithm: ecdsa-with-SHA256

30:45:02:21:00:a1:dc:63:45:90:ec:81:9e:e1:de:5b:81:12:

65:51:ad:d4:c2:c4:f8:e5:95:28:2e:e0:4b:e7:68:ec:7c:02:

73:02:20:3e:6b:a7:4e:9e:4c:0a:d6:8c:24:b0:fb:2e:e7:93:

d2:e6:be:94:65:ca:15:d0:ea:5b:c8:7f:55:79:99:5c:ad

-----BEGIN CERTIFICATE-----

MIIB8TCCAzegAwIBAgIQd9NtIW7IrmIF5Y46y5hagTAKBggqhkJOPQQDAjBPMSEw  
HwYDVQQKDBhNaWNyb2NoaXAgVGVjaG5vbG9neSBjbMmXkjaAoBgNVBAMMIUNyeXB0  
byBBdXR0ZW50aWNhdGlvbSB290IENBIDAwwMjAgFw0xODExMDgxOTEyMTIaGA8y  
MDU0MTEwODE5MTIxOVowTzEhMB8GA1UECgwYTWljcm9jaGlwIFRlY2hub2xvZ3kg  
SW5jMSowKAYDVQQDDCFDcnlnwG8gQXV0aGVudGljYXRpb24gUm9vdCBDQSAwMDIw  
WTATBgqhkJOPQIBBggqhkJOPQMBBwNCAAS9VOZT44dUABR0U64VgNUK0Gnnit9V  
eNhc4tVN1bgwKWv/3W5vclb72Z7xoRaxHTOtSRA6oYWH0dz65DfhnWNOo1MwUTAd  
BgNVHQ4EFgQUeu19bca3eJ2yOAGI6EqMsKQOKowwHwYDVR0jBBGwFoAUeu19bca3  
eJ2yOAGI6EqMsKQOKowwDwYDVR0TAQH/BAUwAwEB/zAKBggqhkJOPQQDAgNIADBF  
AiEAodxjRZDsgZ7h3luBEmVRrdTCxPjllSgu4EvnaOx8AnMCID5rp06eTarWjCSw  
+y7nk9LmvpRlyhXQ6lvIf1V5mVyt  
-----END CERTIFICATE-----

Validate Root Certificate:

OK

TNG Signer Certificate:

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

7c:31:16:e0:34:06:5b:25:e0:53:bf:b0:9e:26:1a:66

Signature Algorithm: ecdsa-with-SHA256

Issuer: O = Microchip Technology Inc, CN = Crypto Authentication Root CA 002

## Validity

Not Before: Dec 14 19:00:00 2018 GMT

Not After : Dec 14 19:00:00 2049 GMT

Subject: O = Microchip Technology Inc, CN = Crypto Authentication Signer F640

Subject Public Key Info:

Public Key Algorithm: id-ecPublicKey

Public-Key: (256 bit)

pub:

04:0e:7f:32:95:f2:eb:46:40:f4:aa:39:4c:e5:e5:

20:d7:d9:b5:0b:b9:54:f5:c3:f8:bb:6f:3f:2c:18:

5a:4d:b9:90:91:bc:af:49:ea:06:fc:4b:cc:5c:2a:

27:c8:d0:02:2b:1a:9b:f0:1b:f4:46:dd:9a:c5:62:

30:4c:7a:38:76

ASN1 OID: prime256v1

NIST CURVE: P-256

X509v3 extensions:

X509v3 Key Usage: critical

Digital Signature, Certificate Sign, CRL Sign

X509v3 Basic Constraints: critical

CA:TRUE, pathlen:0

X509v3 Subject Key Identifier:

EB:62:03:2B:8C:81:58:16:42:9A:1C:AB:F1:BE:8C:22:1E:B7:A6:C9

X509v3 Authority Key Identifier:

keyid:7A:ED:7D:6D:C6:B7:78:9D:B2:38:01:A5:E8:4A:8C:B0:A4:0E:2A:8C

Signature Algorithm: ecdsa-with-SHA256

30:46:02:21:00:e0:78:ed:06:27:15:f0:31:32:f0:ef:31:97:

22:a5:49:e2:e1:86:28:73:b5:f2:b7:5f:28:3e:e3:7d:13:6e:

bc:02:21:00:df:68:76:be:05:22:ae:7f:e9:15:84:82:fa:08:

45:8d:da:9c:f3:08:17:2f:d6:60:74:fc:11:90:7a:30:47:7b

-----BEGIN CERTIFICATE-----

MIICBTCCAaqgAwIBAgIQfDEW4DQGWyXgU7+wniYaZjAKBggqhkJOPQQDAjBPMSEw  
HwYDVQQKDBhNaWNyb2NoaXAgaGVjaG5vbG9neSBjb2N0aG9neSBjb2N0aG9neSBj  
byBBdXRoZW50aWNhdGlvbSb290IENBIDAuMjAgFw0xODEyMTQxOTAwMDBaGA8y  
MDQ5MTIxNDE5MDAwMFowTzEhMB8GA1UECgwYTWljcm9jaGlwIFRIY2hub2xvZ3kg  
SW5jMSowKAYDVQQDDCFDcnlwdG8gQXV0aGVudGljYXRpb24gU2lnbmVvIEY2NDAw  
WTATBgcqhkJOPQIBBggqhkJOPQMBBwNCAAOQfzKV8utGQPSqOUzl5SDX2bULuVT1  
w/i7bz8sGFpNuZCRvK9J6gb8S8xcKifi0AIrGpwwG/RG3ZrFYjBMejh2o2YwZDAO  
BgNVHQ8BAf8EBAMCAYYwEgYDVR0TAQH/BAgwBgEB/wIBADAdBgNVHQ4EFgQU62ID  
K4yBWBZCmhyr8b6MIh63pskwHwYDVR0jBBgwFoAUeu19bca3eJ2yOAGl6EqMsKQO  
KowwCgYIKoZIzj0EAwIDSQAwwRgIhAOB47QYnFfAxMvDvMZcipUni4YYoc7Xyt18o  
PuN9E268AIEA32h2vgUirn/pFYSC+ghFjdqc8wgXL9ZgdPwRkHowR3s=  
-----END CERTIFICATE-----

Validate Signer Certificate:

OK

TNG Device Certificate:

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

71:4f:f4:a3:24:1b:e8:18:dc:6d:8b:b0:c5:53:aa:6f

Signature Algorithm: ecdsa-with-SHA256

Issuer: O = Microchip Technology Inc, CN = Crypto Authentication Signer F640

Validity

Not Before: Aug 1 00:00:00 2019 GMT

Not After : Aug 1 00:00:00 2047 GMT

Subject: O = Microchip Technology Inc, CN = 0123CEDC3CD337AA01 ATECC

Subject Public Key Info:

Public Key Algorithm: id-ecPublicKey

Public-Key: (256 bit)

pub:

04:97:24:09:48:8c:20:89:19:6f:24:47:b0:8a:4d:

90:cc:74:d6:cc:14:37:60:b0:aa:b5:76:4d:cd:bf:

03:f6:06:e9:46:80:18:e5:2c:9f:75:4a:3b:c8:3f:

17:2d:b5:24:d7:5b:c4:ba:f7:34:92:f3:a3:45:58:

c2:eb:ae:69:34

ASN1 OID: prime256v1

NIST CURVE: P-256

X509v3 extensions:

The Notebook will be used to generate a manifest file which can be uploaded into the public cloud provider of your choice (Google GCP, AWS IoT and soon to be supported Microsoft Azure). TNGTLS Manifest Generation notebook needs to be run for all Trust&Go example Notebooks that require a Manifest file.

## 4 Use Case Prototyping

This hands-on lab is intended to demonstrate the usage of Trust&GO to secure an AWS IoT connection based on a custom PKI.

Here are the steps that will be required to complete this Tutorial:

- Configure AWS CLI
- Upload Manifest File
- Build the AWS IoT device source code and flash it to the USB Dongle Board

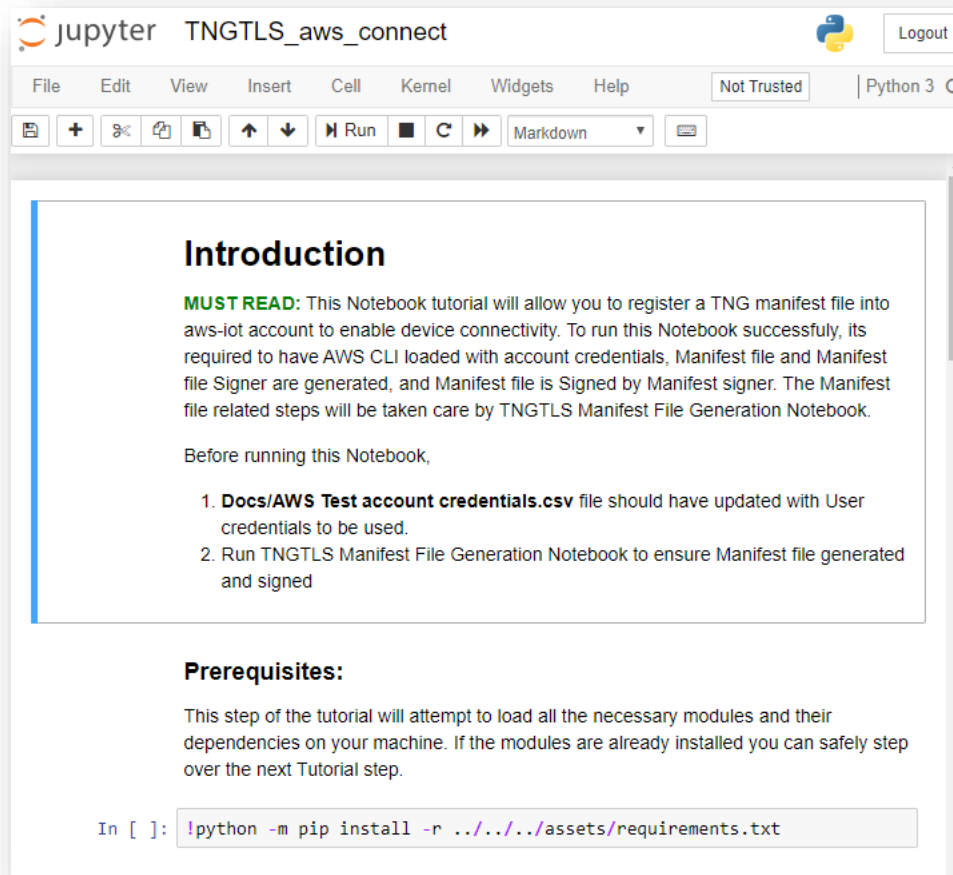
### 4.1 Running AWS IoT example on Jupyter Notebook

By running following step, we can configure AWS CLI and able to upload manifest file. To upload manifest file, we would be using the manifest file and logger file generated in the previous section 3. TNGTLS Manifest File generation notebook. The Manifest file contains information about the device including serial number, public keys and certificates.

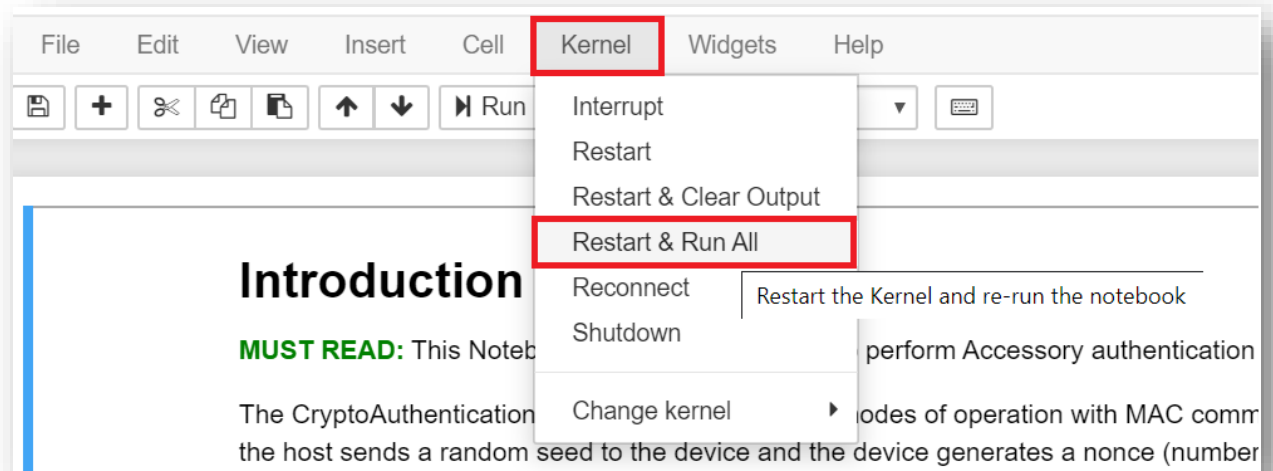
1. From the Jupyter Home page, navigate to **TrustnGO\01\_aws\_connect\notebook\TNGTLS\_aws\_connect.ipynb** notebook file and open it.



Opening the notebook from Jupyter home page should load the following on the browser.



2. Run All cells by using Kernel -> Restart & Run all



3. After running all cells in notebook, it will create four buttons: 1. "Config AWS-CLI", 2. "Load Manifest JSON File", 3. "Load Validation CERT File" and 4. "AWS GUI".
4. Press "**Config AWS-CLI**" button to configure AWS command line interface with AWS account credentials.

Once you press the button, it will ask AWS User Region:  where region name has to be mentioned as shown in below image.

Name	Value	Type	Location
profile	<not set>	None	None
access_key	*****5SSB	shared-credentials-file	
secret_key	*****pWV0	shared-credentials-file	
region	us-east-2	config-file	~/.aws/config

Step1. Config AWS-CLI

Step2 a. Load Manifest JSON File (0)

Step2 b. Load Validation CERT File (0)

Step2 c. Upload Manifest File

Before clicking AWS GUI its required to have Manifest file uploaded and C and wifi credentials. Click below AWS GUI button ONLY after establishing

Step3. AWS GUI

AWS User Region:

After enter your region press 'enter'. On successful AWS CLI configuration, you will see the result as shown in below image

Step1. Config AWS-CLI

Step2 a. Load Manifest JSON File (0)

Step2 b. Load Validation CERT File (0)

Step2 c. Upload Manifest File

-----

Before clicking AWS GUI its required to have Manifest file uploaded and C and wifi credentials. Click below AWS GUI button ONLY after establishing

Step3. AWS GUI

-----

AWS User Region:

Setting aws access key...  
 Setting aws secret access key...  
 Setting aws region...

Name	Value	Type	Location
profile	<not set>	None	None
access_key	*****5S5B	shared-credentials-file	
secret_key	*****pwV0	shared-credentials-file	
region	us-east-2	config-file	~/.aws/config

-----

- Press “**Load Manifest JSON File**” button, it will open file explorer window, there you need to navigate **TrustnGO\00\_resource\_generation** and choose the manifest file generated using TNG Manifest Generation Notebook.

Name	Value	Type	Location
profile	<not set>	None	None
access_key	*****5S5B	shared-credentials-file	
secret_key	*****pwV0	shared-credentials-file	
region	us-east-2	config-file	~/.aws/config

-----

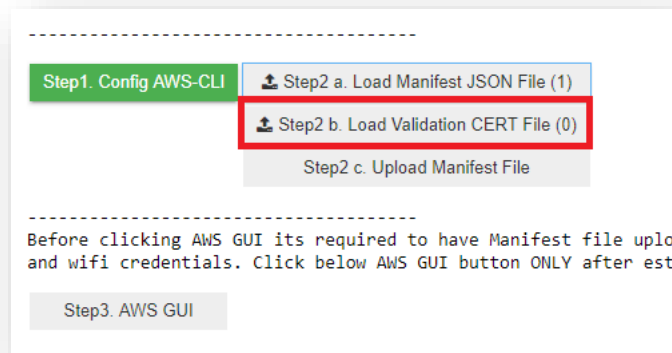
Step1. Config AWS-CLI

Step2 a. Load Manifest JSON File (0)

Step2 b. Load Validation CERT File (0)

Step2 c. Upload Manifest File

- Press “**Load Validation CERT File**” button, it will open file explorer window, there you need to navigate **TrustnGO\00\_resource\_generation** and choose the validation certificate file generated using TNG Manifest Generation Notebook.



7. Press “**Upload Manifest File**” button to upload manifest file to aws cloud.



Once it is successfully uploaded, the result will be as shown below.

```
number of certificates: 1

Loading the manifest item
uniqueId: 01236c7dc62e6dc001
About to try certificate import
Response: {'ResponseMetadata': {'RequestId': '8a4596b5-b71c-49ad-a453-bedd44e281c8', 'HTTPStatusCode': 200, 'HTTPHeaders': {'date': 'Sat, 09 Nov 2019 13:29:31 GMT', 'content-type': 'application/json', 'content-length': '209', 'connection': 'keep-alive', 'x-amzn-requestid': '8a4596b5-b71c-49ad-a453-bedd44e281c8', 'access-control-allow-origin': '*', 'x-amz-apigw-id': 'C5LRQEEEXPHcF djw=', 'x-amzn-trace-id': 'Root=1-5dc6bf3b-a36debb6c3255f8972bddcbb'}, 'RetryAttempts': 0}, 'certificateArn': 'arn:aws:iot:us-west-2:460277143081:cert/461095d8771f95db78d442d2015415804e3093bcae3fd56d78a486aa5b7b59de', 'certificateId': '461095d8771f95db78d442d2015415804e3093bcae3fd56d78a486aa5b7b59de'}
Certificate import complete - returning
MANIFEST_IMPORT SUCCESS arn:aws:iot:us-west-2:460277143081:cert/461095d8771f95db78d442d2015415804e3093bcae3fd56d78a486aa5b7b59de
arn:aws:iot:us-west-2:460277143081:thing/01236c7dc62e6dc001
number of thingIds to check: 1

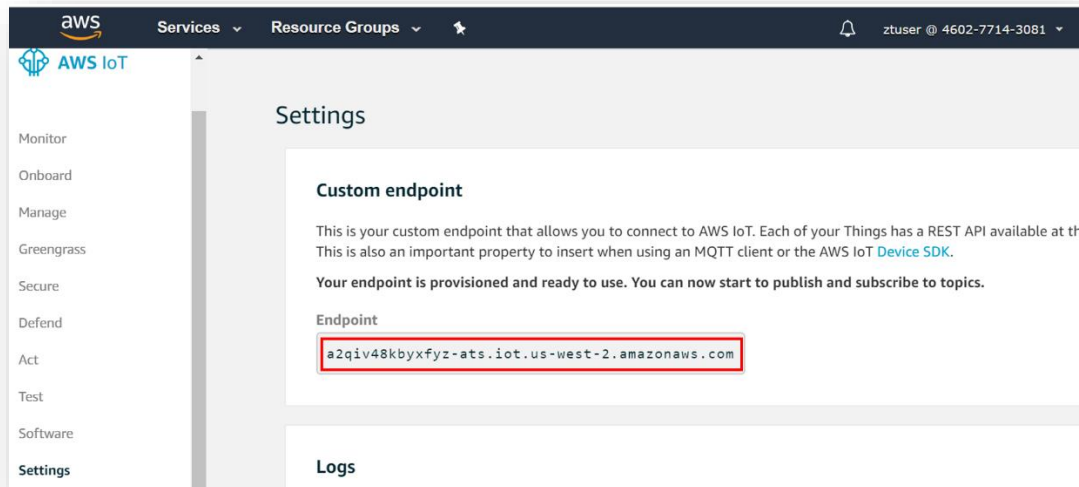
Checking the manifest_item
uniqueId: 01236c7dc62e6dc001
Manifest was loaded successfully
```

Note down your unique id from the manifest upload log which is the **Thing name** of your device and is needed for AWS GUI step.

Once this step is completed, manifest file is successfully uploaded to AWS IoT. Continue to next steps when connecting to AWS using TNGTLS device.



8. Login to the AWS account, From Services select IoT core. In the IoT core, Click setting and note down your endpoint as highlighted below. This endpoint is needed for the embedded c project.



**NOTE:** Make sure that you executed C project successfully before executing the next step in the Jupyter notebook. To execute C project, refer "Running AWS IoT example on Embedded platform" next section.

#### AWS GUI:

Code block of this step generates "**AWS GUI**" button.

```
-----  
Before clicking AWS GUI its required to have Manifest file up  
and wifi credentials. Click below AWS GUI button ONLY after e
```

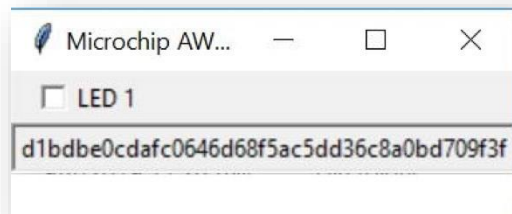
Step3. AWS GUI

Clicking the button asks for the Thing name. Enter the number which we noted from the previous step and press enter.

Enter Thing Name:

it will create a very basic graphical interface that will display the device ID and will allow to switch the board LED status.

Below screenshot display the graphical interface



Using this interface, Custom PKI CryptoAuth Trust Platform can able to communicate with AWS IoT. Upon successful communication, you have now a device connected to AWS IoT through a secure TLS session with a custom PKI using a Crypto Trust Platform.

## 4.2 Running AWS IoT example on Embedded platform

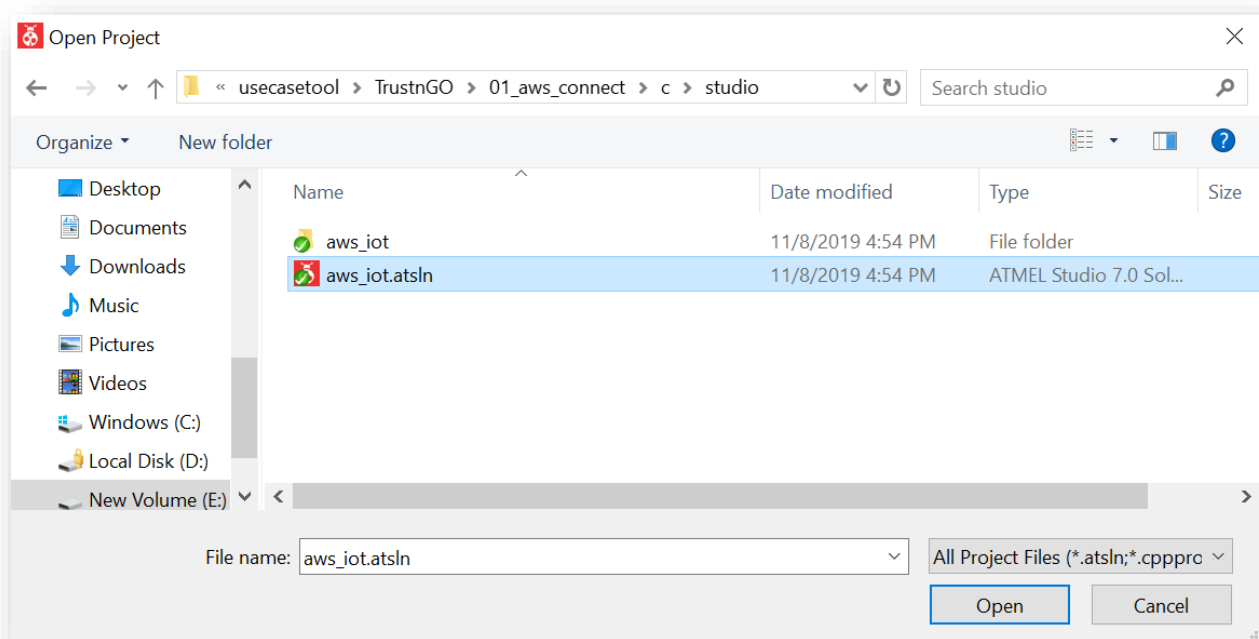
Once the resources are generated, both Atmel Studio and MPLAB projects provided can be used to run the use case on CryptoAuth Trust Platform.

This project can configure the Wi-Fi credentials, establish a TLS connection, subscribe to MQTT topic and establish communication but not upload manifest file to AWS IoT. It is required to use the AWS IoT Jupyter notebook to upload manifest file.

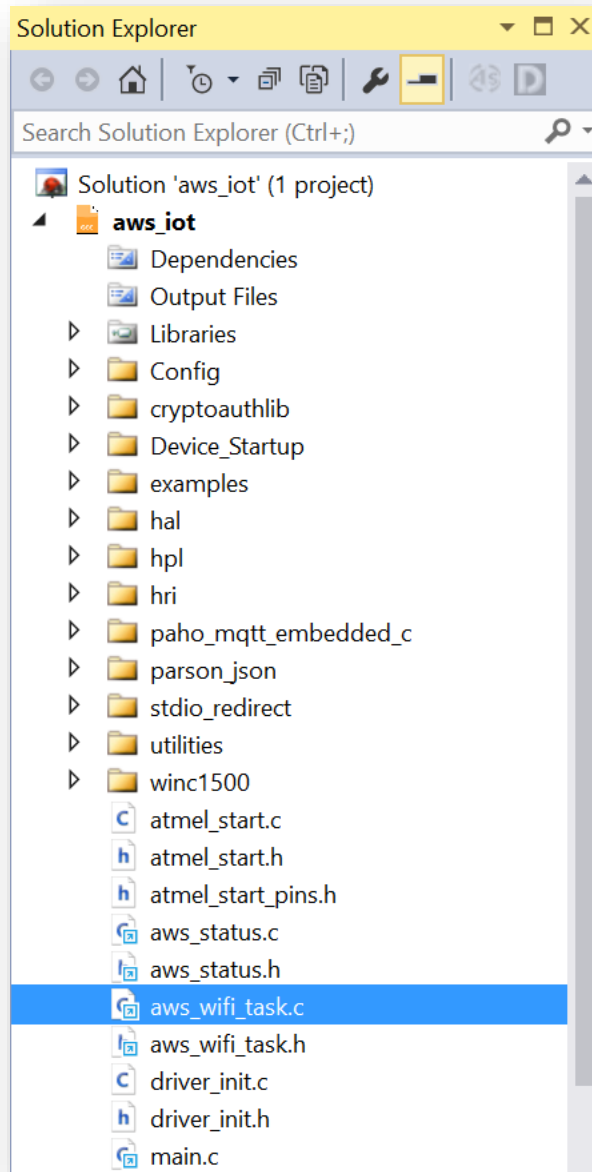
Once the manifest file uploaded to AWS IoT then these embedded projects can be executed.

### 4.2.1 Atmel Studio:

1. Open **aws\_iot.atsln** project by navigating  
**TrustnGO\01\_aws\_connect\c\studio\ aws\_iot.atsln**



2. In the project navigate to **aws\_iot -> aws\_wifi\_task.c** file



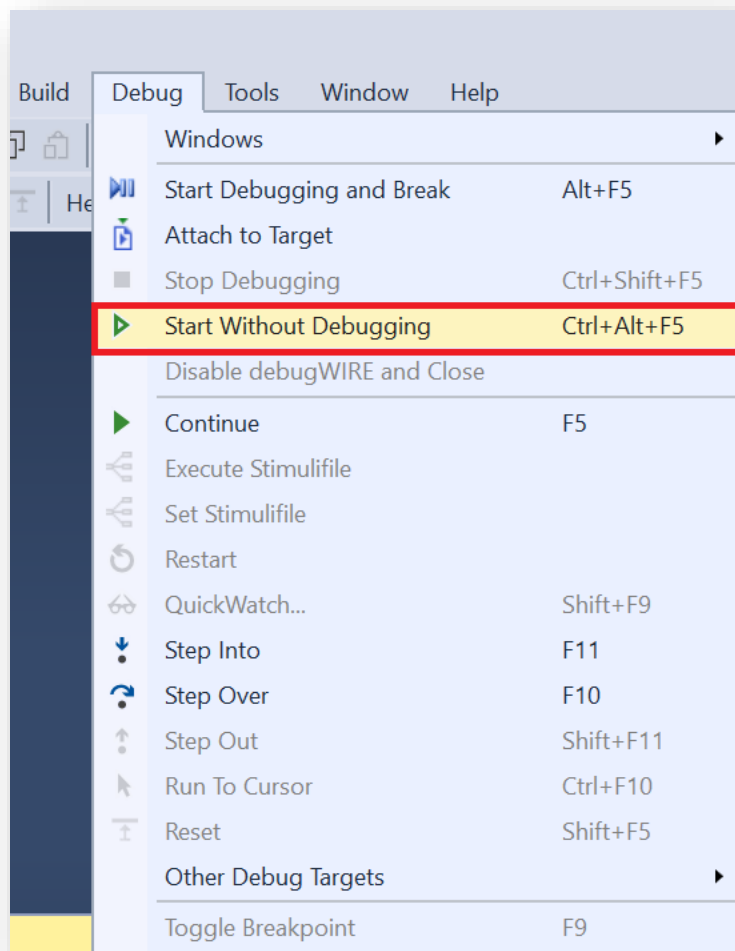
update the following constants before building the project:

- MAIN\_WLAN\_SSID
- MAIN\_WLAN\_PSK
- AWS\_HOST\_ENDPOINT

```
#define MAIN_WLAN_SSID      "xxxxxx"
#define MAIN_WLAN_AUTH      M2M_WIFI_SEC_WPA_PSK
#define MAIN_WLAN_PSK       "xxxxxxxxxx"

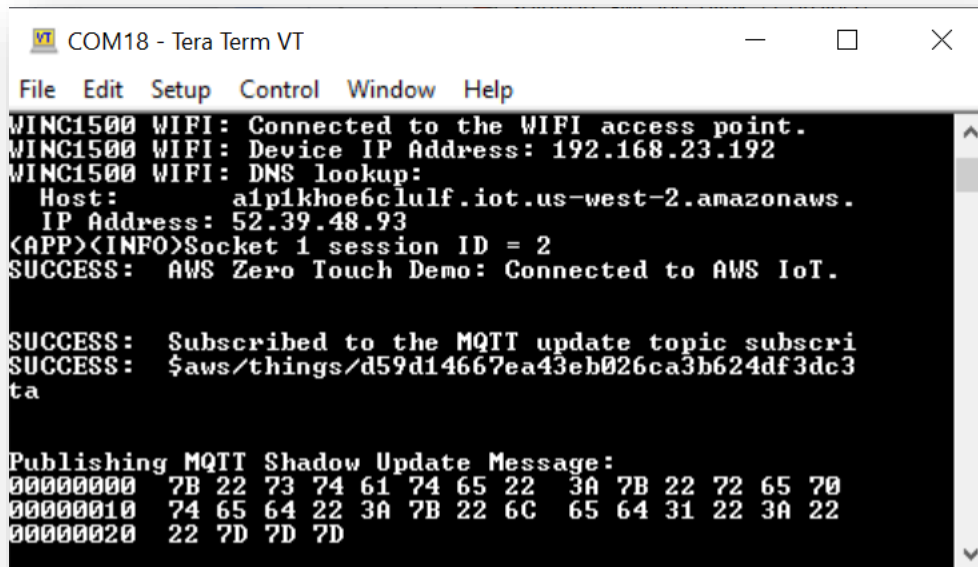
#define AWS_HOST_ENDPOINT   "xxxxxxx.iot.us-west-2.amazonaws.com"
```

3. Program the CryptoAuth Trust Platform by navigating to **Debug -> Start Without Debugging**



This step may take some time, wait for Atmel Studio to compile and program the device.

Once the programming is done, reset the hardware (press the reset button) and view the Console messages by using applications like 'Tera Term'. Open the application with the COM related to CryptoAuth Trust Platform with 115200-8-N-1 settings.



```
COM18 - Tera Term VT
File Edit Setup Control Window Help
WINC1500 WIFI: Connected to the WIFI access point.
WINC1500 WIFI: Device IP Address: 192.168.23.192
WINC1500 WIFI: DNS lookup:
  Host:      alpikhoe6clulf.iot.us-west-2.amazonaws.
  IP Address: 52.39.48.93
<APP><INFO>Socket 1 session ID = 2
SUCCESS:  AWS Zero Touch Demo: Connected to AWS IoT.

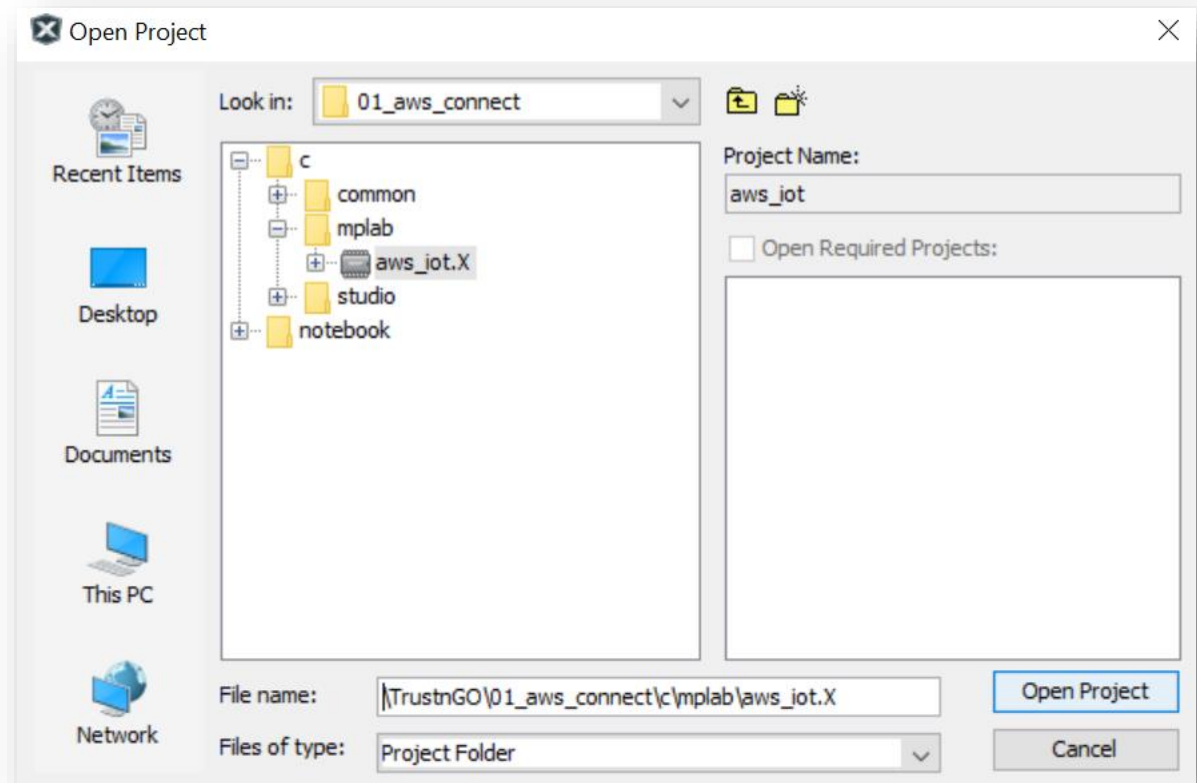
SUCCESS:  Subscribed to the MQTT update topic subscri
SUCCESS:  $aws/things/d59d14667ea43eb026ca3b624df3dc3
ta

Publishing MQTT Shadow Update Message:
00000000  7B 22 73 74 61 74 65 22  3A 7B 22 72 65 70
00000010  74 65 64 22 3A 7B 22 6C  65 64 31 22 3A 22
00000020  22 7D 7D 7D
```

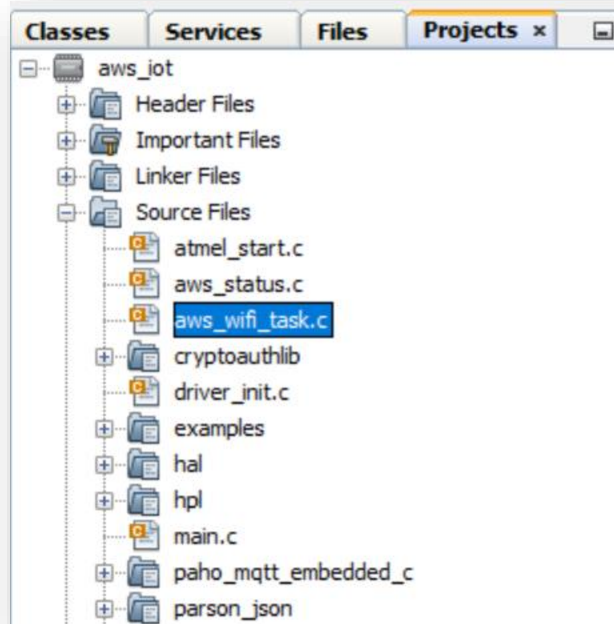
Once successfully programmed the CryptoAuth Trust Platform, now we can run the last step in the Jupyter Notebook. Just navigate to previous section 4.1 to run the last step (AWS GUI) in the Jupyter Notebook.

#### 4.2.2 MPLAB:

1. Open **aws\_iot.X** project by navigating to MPLAB -> File -> Open Project -> **TrustnGO\01\_aws\_connect\c\mplab \aws\_iot.X**



2. Open **aws\_wifi\_task.c** file by navigating to **aws\_iot -> Source Files -> aws\_wifi\_task.c**



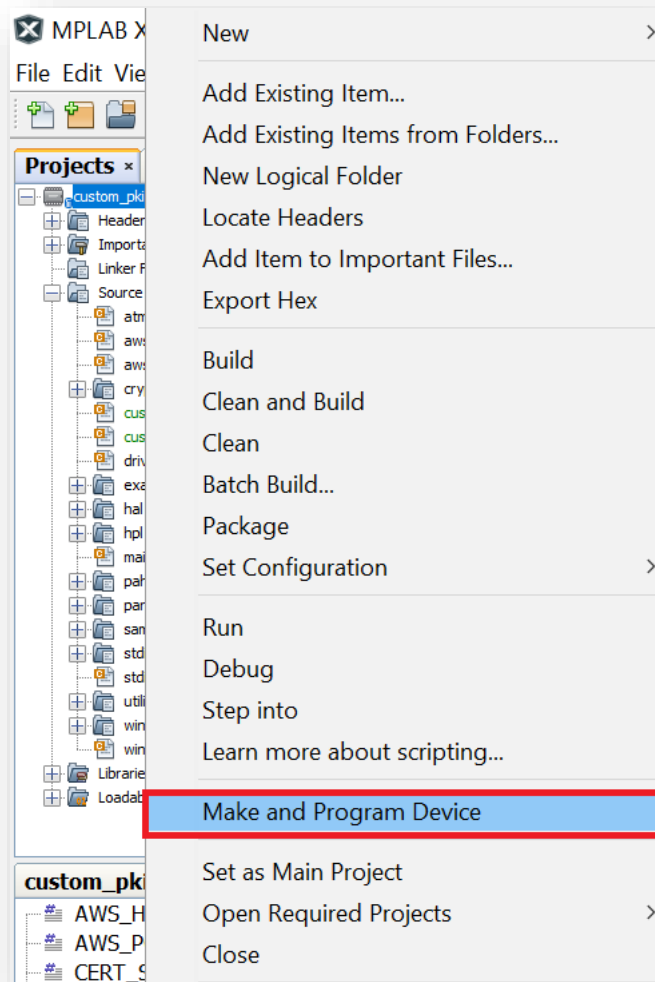
update the following constants before building the project:

- MAIN\_WLAN\_SSID
- MAIN\_WLAN\_PSK
- AWS\_HOST\_ENDPOINT

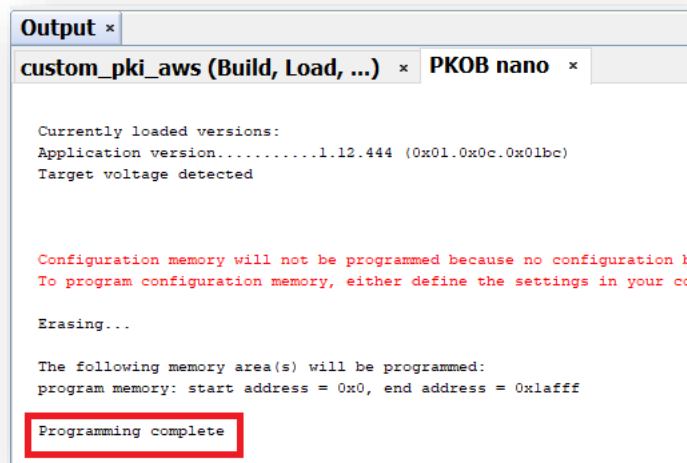
```
49
50 #define MAIN_WLAN_SSID      "XXXXXXX"
51 #define MAIN_WLAN_AUTH     M2M_WIFI_SEC_WPA_PSK
52 #define MAIN_WLAN_PSK      "XXXXXXX"
53
54 #define AWS_HOST_ENDPOINT   "XXXXXXXXX.iot.us-west-2.amazonaws.com"
55
```

3. Program the CryptoAuth Trust platform by navigating to **aws\_iot -> Make and Program Device**





This step may take some time, wait for MPLAB to program the device. Once it is done programming you will see "**Programming complete**" message in Output Window.



```
Output x
custom_pki_aws (Build, Load, ...) x PKOB nano x

Currently loaded versions:
Application version.....1.12.444 (0x01.0x0c.0x01bc)
Target voltage detected

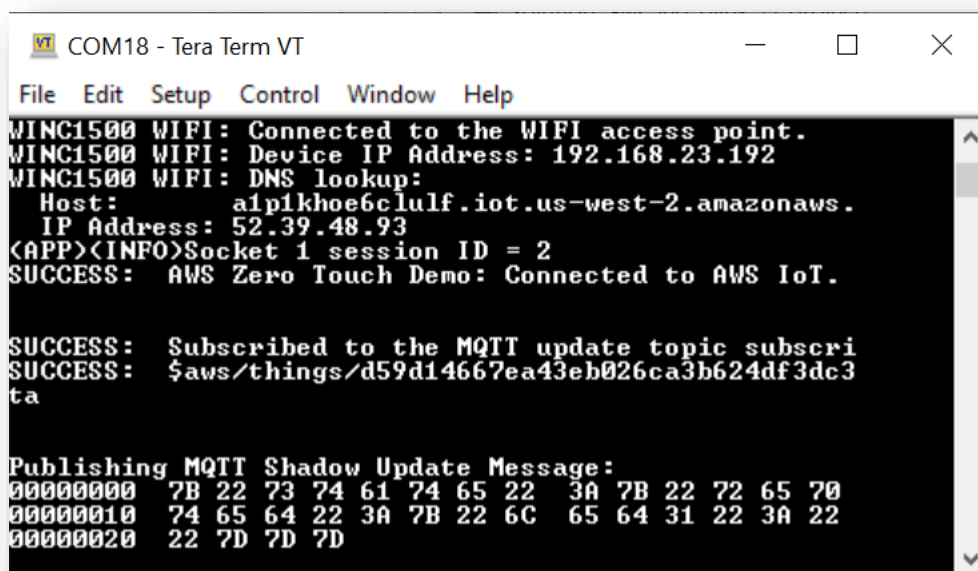
Configuration memory will not be programmed because no configuration b
To program configuration memory, either define the settings in your co

Erasing...

The following memory area(s) will be programmed:
program memory: start address = 0x0, end address = 0xffff

Programming complete
```

Once the programming is done, reset the hardware (press the reset button) and view the Console messages by using applications like 'Tera Term'. Open the application with the COM related to CryptoAuth Trust Platform with 115200-8-N-1 settings.



```
COM18 - Tera Term VT
File Edit Setup Control Window Help
WINC1500 WIFI: Connected to the WIFI access point.
WINC1500 WIFI: Device IP Address: 192.168.23.192
WINC1500 WIFI: DNS lookup:
Host: aipikhoeculuf.iot.us-west-2.amazonaws.
IP Address: 52.39.48.93
(APP)<INFO>Socket 1 session ID = 2
SUCCESS: AWS Zero Touch Demo: Connected to AWS IoT.

SUCCESS: Subscribed to the MQTT update topic subscri
SUCCESS: $aws/things/d59d14667ea43eb026ca3b624df3dc3
ta

Publishing MQTT Shadow Update Message:
00000000 7B 22 73 74 61 74 65 22 3A 7B 22 72 65 70
00000010 74 65 64 22 3A 7B 22 6C 65 64 31 22 3A 22
00000020 22 7D 7D 7D
```

Once successfully programmed the CryptoAuth Trust Platform, now we can run the last step in the Jupyter Notebook. Just navigate to previous section 4.1 to run the last step (AWS GUI) in the Jupyter Notebook

### 4.3 CryptoAuth TrustPlatform Factory reset

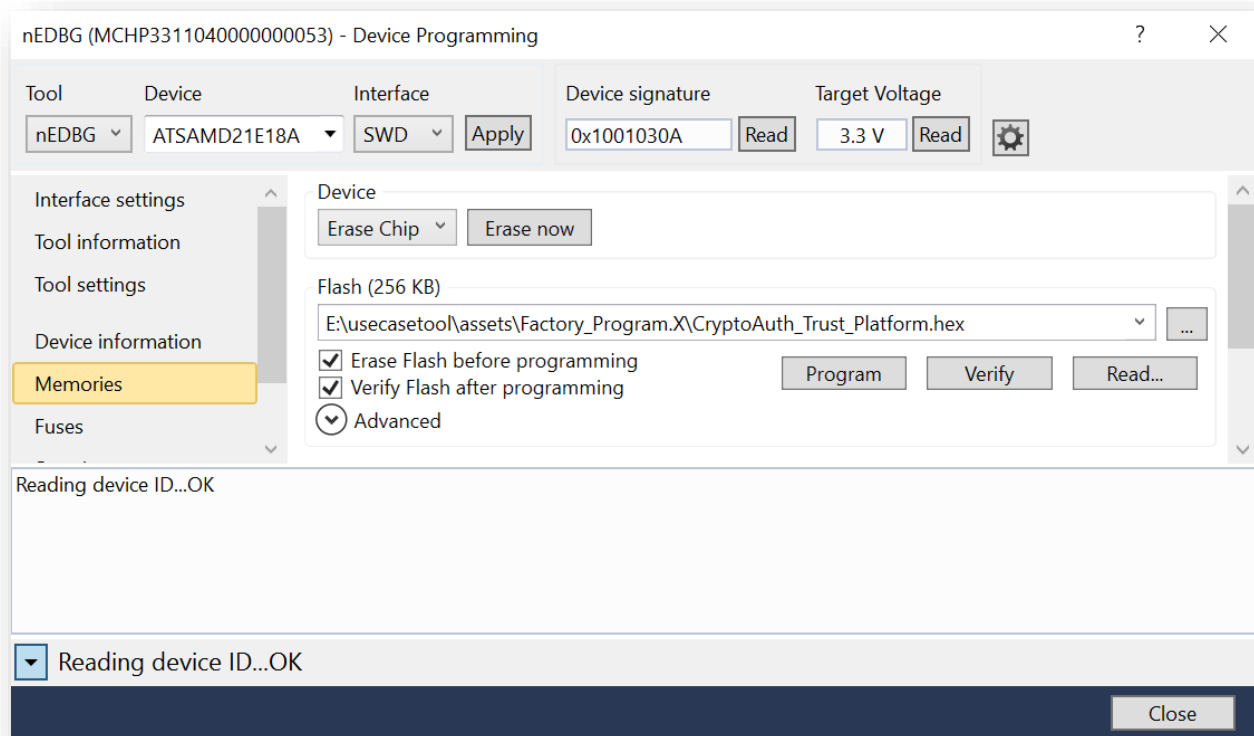
Once any of the embedded project is loaded to CryptoAuth TrustPlatform, the default program that enables interaction with TrustPlatform tools will be erased.

Before using the Platform with any other notebook or tools on PC, its required to reprogram the default .hex file. Default hex file is available at

**assets\Factory\_Program.X\CryptoAuth\_Trust\_Platform.hex**

To reprogram using Atmel Studio:

1. Navigate to AtmelStudio -> Tools -> Device Programming
2. Select Tool as nEDBG and Apply
3. Go to Memories and navigate to above path under Flash dropdown
4. Check both Erase Flash and Verify Flash
5. Click on Program



To reprogram using MPLAB:

1. Open **assets\Factory\_Program.X** project in MPLAB IDE
2. Program the Crypto Trust platform by navigating to  
**CryptoAuth\_Trust\_Platform\_Factory\_Program -> Make and Program Device**

Now, Crypto Trust Platform contains factory programmed application that enables interactions with Notebooks and/or PC tools.

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