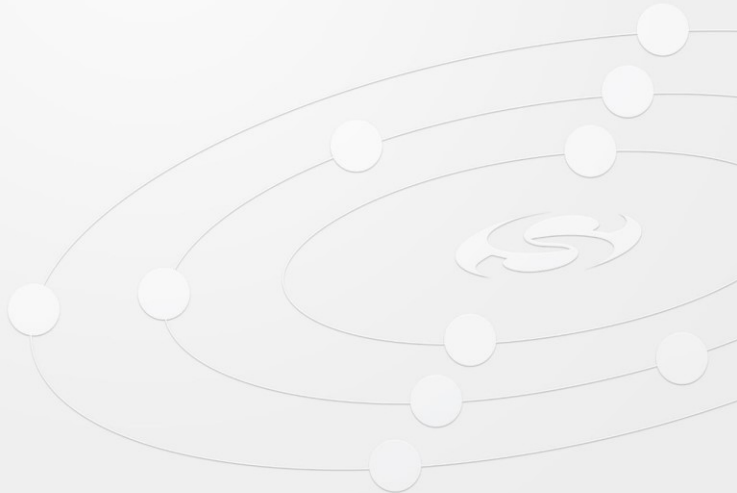




Gateway Basic and OTA

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DEC 10, 2019



Welcome

Agenda

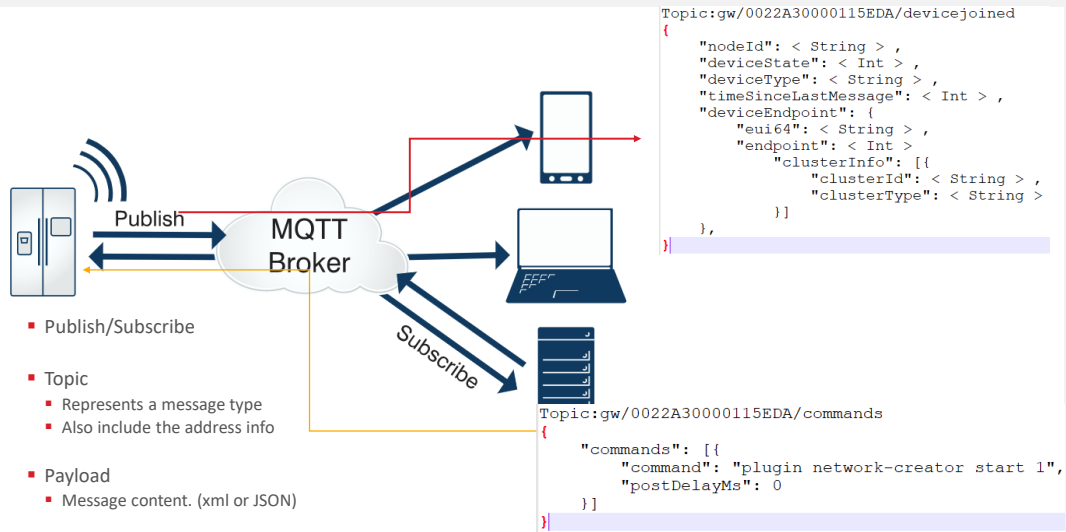
- Hands-on : Control Zigbee Devices with MQTT Clients
- Hands-on : OTA
- Q & A

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Today we will have two hands-on.

The first one is to control Zigbee devices with MQTT clients. With this hands-on, we can learn how zigbee devices are controlled through web, Apps, and smart speakers.
The second one is about OTA upgrading.

MQTT



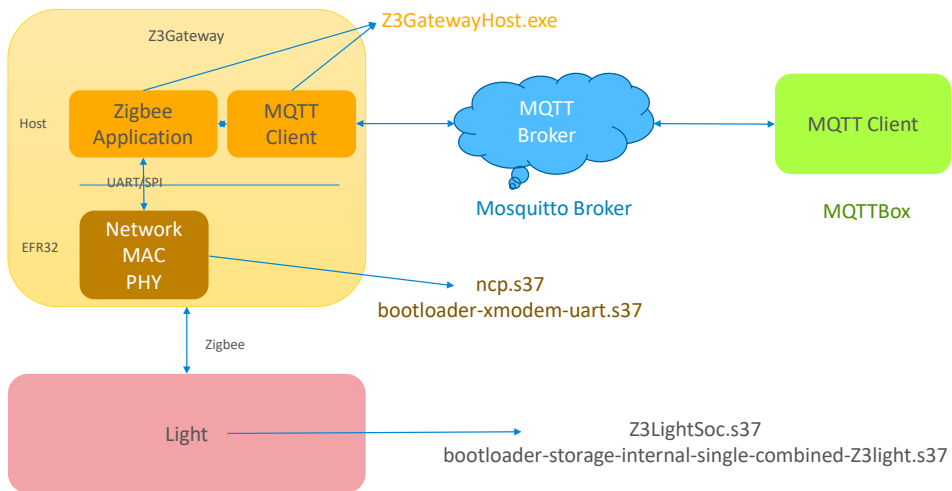
This is a typical work flow of MQTT.

There is a MQTT broker which works as the server. Normally it's deployed on the cloud. Zigbee gateway is a MQTT client here. And the web client, client tool on PC and mobile phones can exchange messages with the gateway through the broker.

MQTT works with publish/subscribe method.

Clients can subscribe some MQTT topic. And then some client publishes messages of this topic, other clients who subscribed it can be notified.

MQTT Hands-on



In this hands-on, we use Mosquitto Broker installed on your own PC and we use MQTTBox as the client tool on your PC.

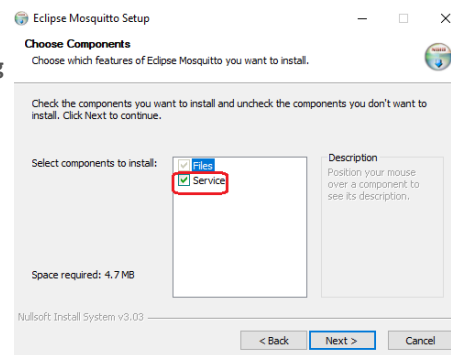
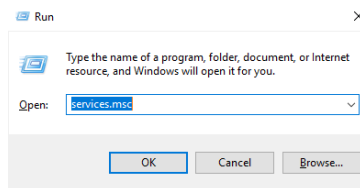
For the gateway, we will use host + NCP mode.

You will need to build the host program and the NCP image.

For the light which we will control, we will use the pre-built image.

Hands-on: Install MQTT Broker --- Mosquitto

- `mosquitto-1.6.7-install-windows-x64.exe`
- Make sure the service “Mosquitto Broker” is running
 - “win+R” then input “`services.msc`” to start the service manager, then check the service state
 - If it’s not running, right click and select “start”



In this hands-on, you need to install the provided Mosquitto as the broker. You need to make sure the server is running before you start.

Hands-on: MQTT Client

The screenshot displays the MQTT Client Settings page in MQTTBox. The page title is "MQTT CLIENT SETTINGS". The interface includes a navigation menu with "MQTT CLIENTS" and "Create MQTT Client". A message states "No MQTT clients added. Click Create MQTT Client to add new MQTT Client". The settings are organized into two columns:

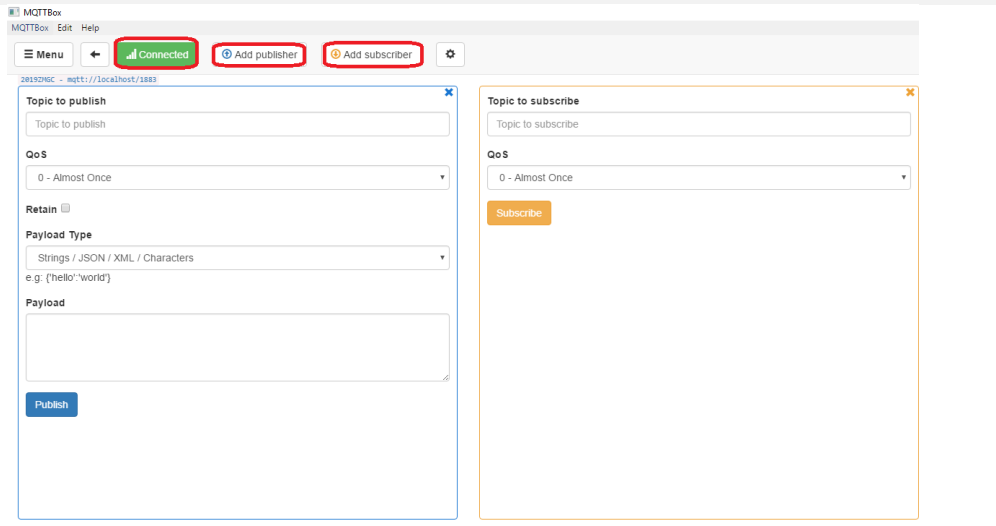
MQTT Client Name	MQTT Client Id
2019ZMGJ	984f6267-a1c9-46c7-9d0f-32d912eebe5b
Protocol	Host
mqtt / tcp	localhost/1883
Username	Password
Reconnect Period (milliseconds)	Connect Timeout (milliseconds)
1000	30000
Will - Topic	Will - QoS
Will - Topic	0 - Almost Once

A "Save" button is located at the bottom right of the settings form.

On the client side, first you need to set the parameter of the broker which you will connect.

In this hands-on, it's on local machine.

Hands-on: MQTT Client



After that, you can subscribe a topic as described in the hands-on guide. Also you need to publish a topic to control the light.

MQTT Client on Mobile Phone

- **IOS**

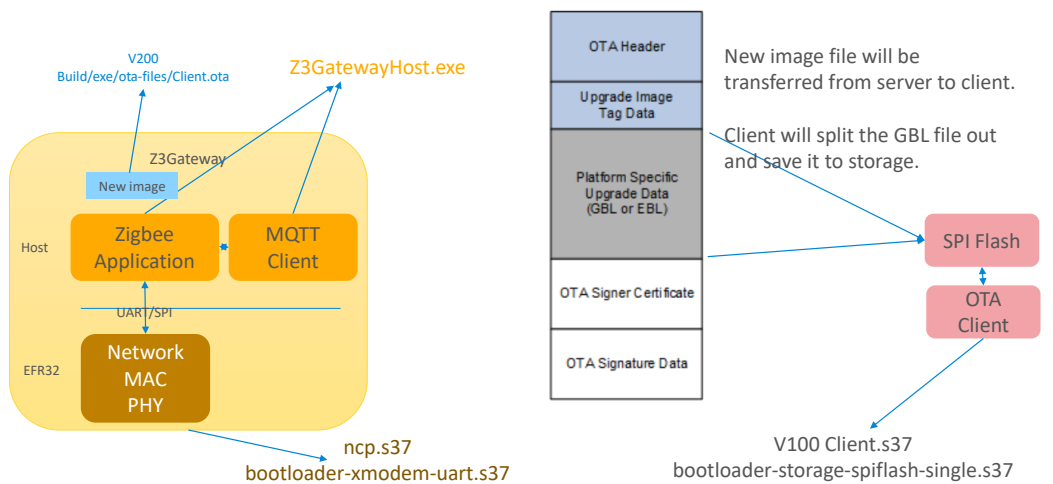
- https://github.com/mqtt/mqtt.github.io/wiki/mqtt_on_ios

- **Android**

- https://github.com/mqtt/mqtt.github.io/wiki/mqtt_on_the_android_platform

There is also iOS MQTT client and Android MQTT client. You can install them on your phone so that you can control our Zigbee light with your phone. But first, you need to make your PC as a WiFi hotspot and connect your phone to your PC through WiFi.

OTA Overview



- Then we talk a little about the OTA hands-on.
- In this hands-on, we will use the gateway we setup in the last hands-on as the OTA server. The new OTA image will be put on the filesystem of the host side.
- On the client side, we will use SPI flash to store the new image.

OTA Storage Setting

- OTA file storage is implemented by bootloader. (Internal storage or SPI storage)

- Plugin “OTA Simple Storage EEPROM Driver ”

- Using slot-manager

Gecko Bootloader, version:1.9.2

Name	Start address	Size (bytes)
Slot 0	0	524288

- Using address offset

Options:

SOC Bootloading Support

EM35x SOC Only: Enable 4.2 Application Bootloader Compatibility Mode

Gecko Bootloader Storage Support:

Storage Slot To Save Images To:

OTA Storage Start Offset:

OTA Storage End Offset:

EEPROM Device Read-modify-write Support:

Frequency for Saving Download Offset to EEPROM (bytes): 1024

Use first slot

Do not use slots

Use first slot

Use last slot

Use specific slot

262144

false

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Here we talk a little bit about the storage settings in OTA.

There are two types of settings.

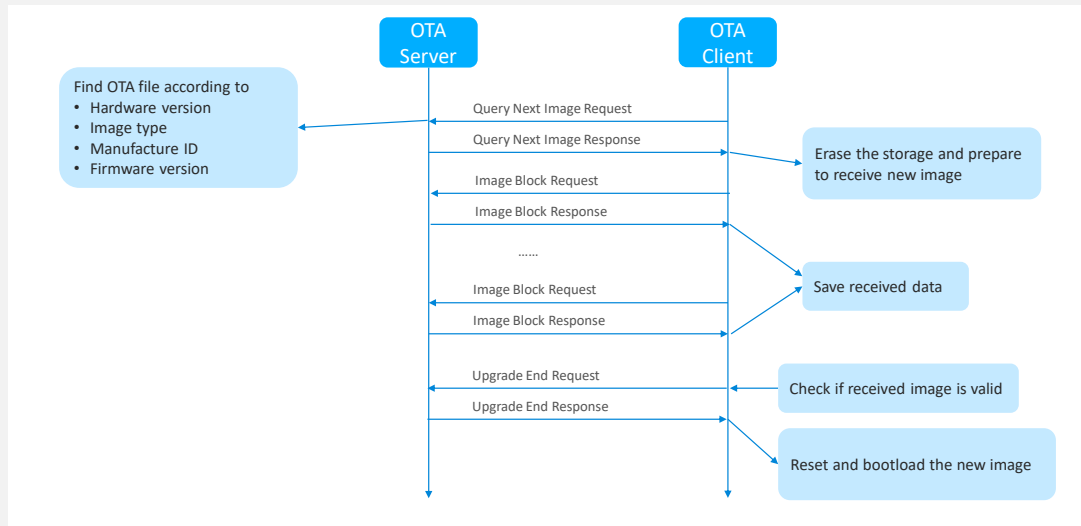
The first one is to use slot-manager. In this case, we need to specify the slot we will use in the properties of plugin “OTA Simple Storage EEPROM Driver”.

The offset of the slot will be set in bootloader.

The other one is to use direct offset of the storage. In this case, we just need to set the storage offset in the properties of plugin “OTA Simple Storage EEPROM Driver”.

We need to make sure the offset settings match one of the slot in bootloader.

OTA Procedure



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- Here is the OTA upgrading procedure.
- First OTA client will send a query to get the new image. In this request, the current firmware version, hardware version and image type, manufacture ID are carried in.
- The server then find the corresponding OTA image according to these info, and respond it to the client.
- After that, the client will request data of the new image block by block. Normally one block is 63 bytes.
- When the transferring finished, the client will send a upgrade end request to the server.
- The server then respond the time when the client will start to upgrade.
- When it's the time, the client will reset. And the bootloader will start to bootload to the new image.

Commands

- Show OTA images on server

```
OtaServer>plugin ota-storage printImages
Image 0
Header Version: 0x0100
Header Length: 56 bytes
Field Control: 0x0000
Manuf ID: 0x1002
Image Type: 0x0000
Version: 0x00000022
Zigbee Version: 0x0002
Header String: Our Test Image
Image Size: 146954 bytes
Total Tags: 1
  Tag: 0x0000
    Length: 146880
1 images in OTA storage.
```

- Show version on client

```
OtaClient>plugin ota-client info
Client image query info
Manuf ID: 0x1002
Image Type ID: 0x0000
Current Version: 0x00000001
Hardware Version: NA
Query Delay ms: 300000
Server Discovery Delay ms: 600000
Download Delay ms: 0
Run Upgrade Delay ms: 600000
Verify Delay ms: 10
Download Error Threshold: 10
Upgrade Wait Threshold: 10
```

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Here are some useful commands which will be used to query image info on client side and server side.

Q&A

Q&A

Any questions?

Thank you!



Thanks