**IoT Example Iot Device communication protocol document**

**Change log**

| Document version | Author | Changes |
| --- | --- | --- |
| 1.0 | MN | Initial version |
|  |  |  |

## 

[**Protocol requirements**](#_rf8ijoe22p21) **2**

[**Topics used**](#_xmcn8eogmxiv) **2**

[**Firmware version report**](#_n62l57iggrla) **2**

[Description](#_5nj04qcva553) 2

[Reporting topic](#_9k9gpdk171do) 2

[Reporting interval:](#_yoe5npj2460m) 2

[Message structure](#_16mbbr3l6wda) 2

[Response](#_9or3rq9exkvd) 3

[Response topic](#_mv1x3vxack8z) 3

[If firmware is not up to date:](#_x2yeuoy9jrb5) 3

[If firmware is up to date:](#_2d5sqpvqybsw) 3

[**Sensor data reporting**](#_1a2blwpbr8wh) **4**

[Description](#_qpd7u04e1uf6) 4

[Topic](#_uw9wg7xtizh2) 4

[Reporting interval:](#_wtql2odeqqp2) 4

[Message structure](#_utq67ti1h43q) 4

## 

## Protocol requirements

As the IoT broker is hosted on AWS, IoT devices are required to communicate using MQTT 3.1.1 and following the security rules in place for AWS.

This requires that all devices implement a mutual authentication process

https://docs.aws.amazon.com/iot/latest/developerguide/mqtt.html

Each IoT device must have its own set of unique certificates.

The shell script provided creates a policy for this device that allows each device to subscribe/publish to its own set of topics.

## Topics used

<version> is the protocol version, this will be updated with new features to firmware.

<device ID> is the unique ID of the device, usually assigned to match the serial number.

| **topic** | **purpose** | **subscribe/publish** |
| --- | --- | --- |
| iot/version/<device ID> | Device to report it’s firmware version to the cloud | publish |
| iot/commands/<device ID> | Device to listen for commands from the cloud | subscribe |
| iot/data/<version>/<device ID> | Device send sensor data to the cloud | publish |

## Firmware version report

### Description

This message is sent from the IoT device to the cloud to inform the cloud of the firmware version that IoT is currently running.

### Reporting topic

iot/version/<device ID>

### Reporting interval:

IoT devices are required to report their firmware version:

* On power up
* At a regular interval while running (recommended once every 24 hours)

### Message structure

| { "version": "1.0.0" } |
| --- |

| **key** | **Data type** | **units** | **description** |
| --- | --- | --- | --- |
| version | string | N/A | The version number of the firmware the device is currently running |

### Response

If the firmware is out of date, cloud will reply with an OTA request.

The request contains a https path which the device is required to use to download the update binary and update itself.

### Response topic

iot/commands/<device ID>

#### If firmware is not up to date:

| { "ota": "https://iotfwbucket-acdc760-f6ac-c1ec-bcef-ccdcbb82aadb.s3.amazonaws.com/your\_firmware\_file.bin?AWSAccessKeyId=NO55PSDFVRSDCVF&Signature=JzgLxJDo0i0OzQHm5DxnWmB7zgo%3D&x-amz-security-token=IQoJb3JpZ2luX2VjENb%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaCXVzLWVhc3QtMSSDCSDC8USpts2wLEqmWjZMb9HFq9zTmrRgYte%2F7wImjNAVG2AiEAjvqDObr5Bi%2FdKveXYQS78a14GhRxGzl1ZnkikAj0mggqogII7v%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FARABGgw4MjEzNzMyMDE3NTQiDECL4Ui79SFsY%2BwtMyr2AUd2u3%2BB44AQRrM%2B2svv%2B0UepT1uSDCSDCy%2FuN1xL6BvQbFL7jhKhaTiR8xxWFlcZmz6uzsTb%2B4QSDCSDCmX3Xq7kLQ%2By2BxAbfT1lOOljvH8NYbVluDORMjA6cFZkVoliltL%2B4NOArUho%2Bss780Mpc6Y%2F%2FG0IcpdJpCZSGMyiYrloVi4xpra8nXyhfCl7m6WwpeAqH0O3Cih%2F%2FPzg1PH%2B62EgdB7X1RpHuBzKJ1pin86LjtGoriPTLiBki5EDj%2FJ7FKHAV18SU0fvFAQ%2FxwriR2P1VbAhDfsPa0T9nygcPGb8%2BDXwEcfut7orDTCD%2FeuVBjqaAUl%2F0VPWfXDE0xj2EkdonjzvbHQiR9KVmaNjZm5lcUrtMPPGEZSdjtA3jEkQYKtLBOXLCBhhFlX9J2OQpS%2BqQ2FzRBukwp9IrHE%2Bp4z5%2BBwdH%2BekFu4HdsUrq0BBPzal%2BsGrUElCxDNmT37qmfeAXc94Y6zOTSDCSDCSXOHGSWDCidNR3fdDz4B0PglMYswCYMeWSP53X4%3D&Expires=1656422321" } |
| --- |

| **key** | **Data type** | **units** | **description** |
| --- | --- | --- | --- |
| ota | string | N/A | The URL that the device must use to download the new firmware binary and update itself |

#### If firmware is up to date:

{ "time": 165421308 }

| **key** | **Data type** | **units** | **description** |
| --- | --- | --- | --- |
| time | int | Seconds since epoch | UTC Time from cloud for device to set its interval RTC |

## Sensor data reporting

### Description

This message is sent from the IoT device to the cloud continuously to report changes in sensor values.

### Topic

iot/data/<version>/<device ID>

### Reporting interval:

IoT devices are required to transmit sensor data every 60 seconds. It is recommended that the device monitors the sensors at a higher frequency and transmits a moving average of the data captured in order to minimise noise, interference and errors.

### Message structure

| {  "timestamp": 165421308,  "temp": 22.1,  "hum": 67  }   | **key** | **Data type** | **units** | **description** | | --- | --- | --- | --- | | timestamp | int | Seconds since epoch | UTC Time when message was transmitted by the device | | temp | float | celsius | Average temperature since last report | | hum | int | Relative humidity percent | Average relative humidity since last report | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

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