AWS IoT (EN)

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Generated on 04.06.2020 by Siegfried Müller

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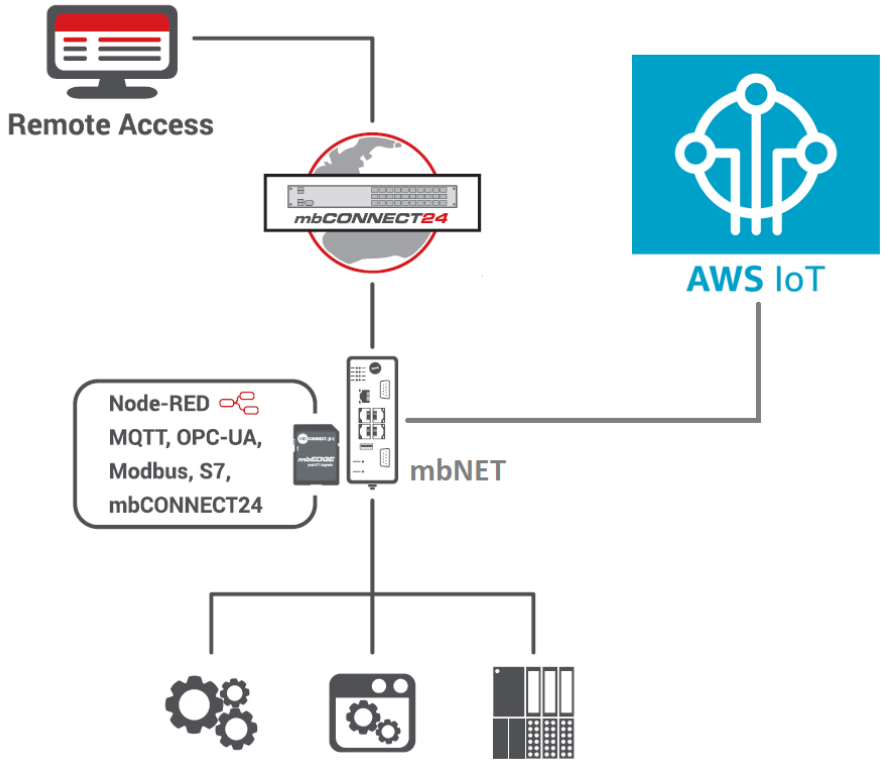

A standard MQTT client from Node-RED is used to establish the connection between mbEDGE (node-red) and AWS. The "AWS IoT" service is used on the AWS website. Here are the rough steps for implementation:

1. AWS account for the AWS IoT service
2. Create AWS IoT object
    a. Create certificates (for establishing a connection for authentication)
    b. Create a guideline (which device may use which functions such as publish or subscribe)
3. Create MQTT client in Node-RED
    a. Enter AWS endpoint as MQTT server
    b. Enter the MQTT client ID
    c. Import certificates
4. Advanced: Create and use AWS Shadow

First of all we need a mbNET router and the mbEDGE option SD Card. Every mbNET router starting from Hardwareversion 3 is suitable.

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mbNET router RKH210	mbEDGE
	

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1 Prerequisite

You can either use the mbNET router as an classic router without using with the device management cloud mbCONNECT24 or with mbCONNECT24. In both ways your mbEDGE card must be enabled and the Node-RED flow editor must be accessible.

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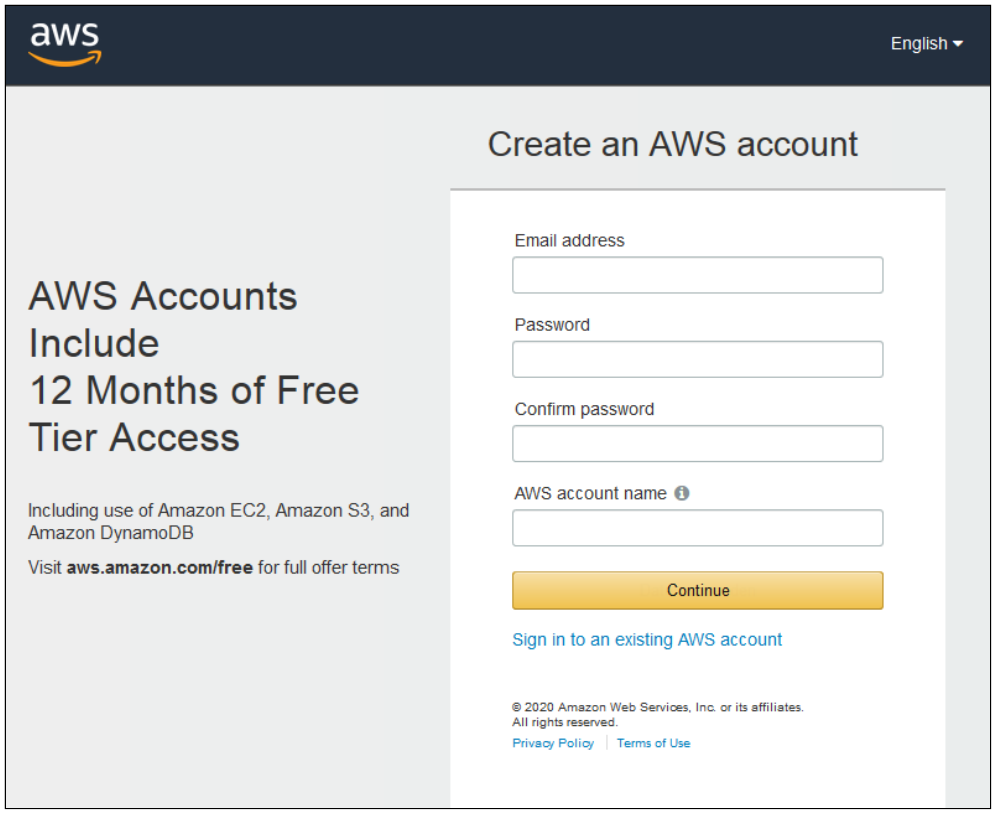
2 1. Create your AWS Account



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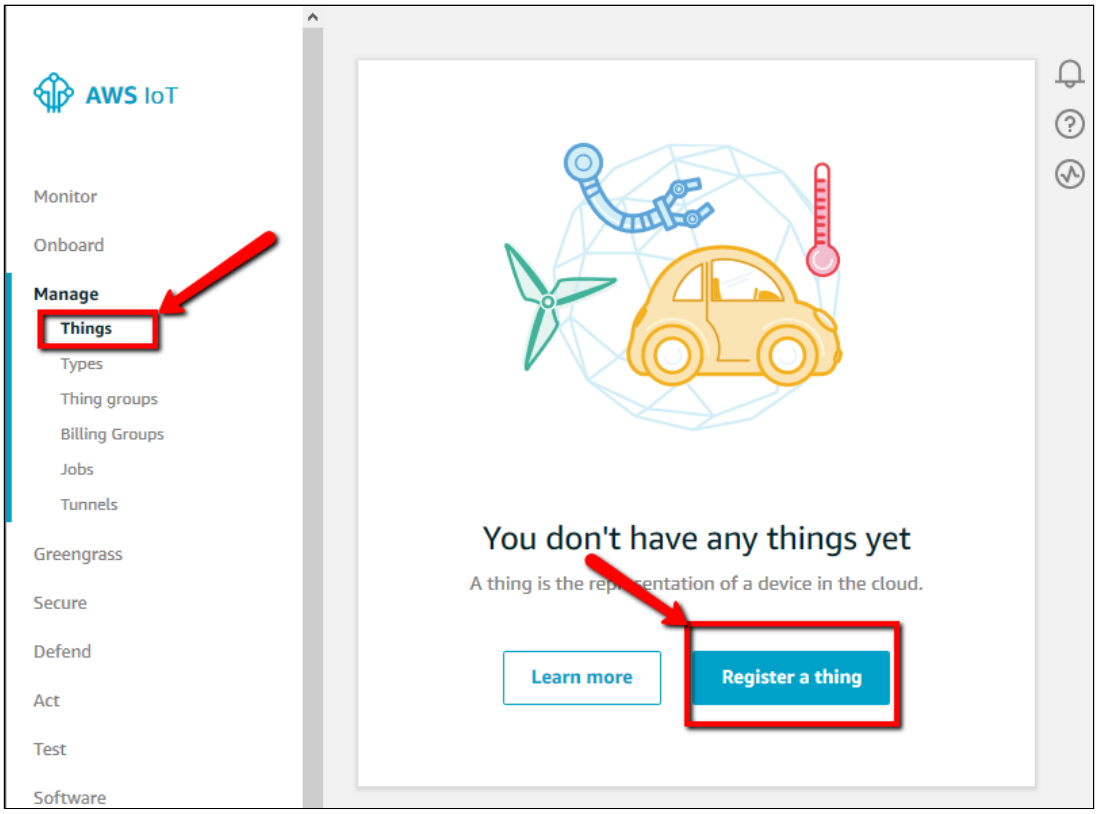
3 2. Create AWS IoT object

3.1 2.1. Create the object by "Register a thing"



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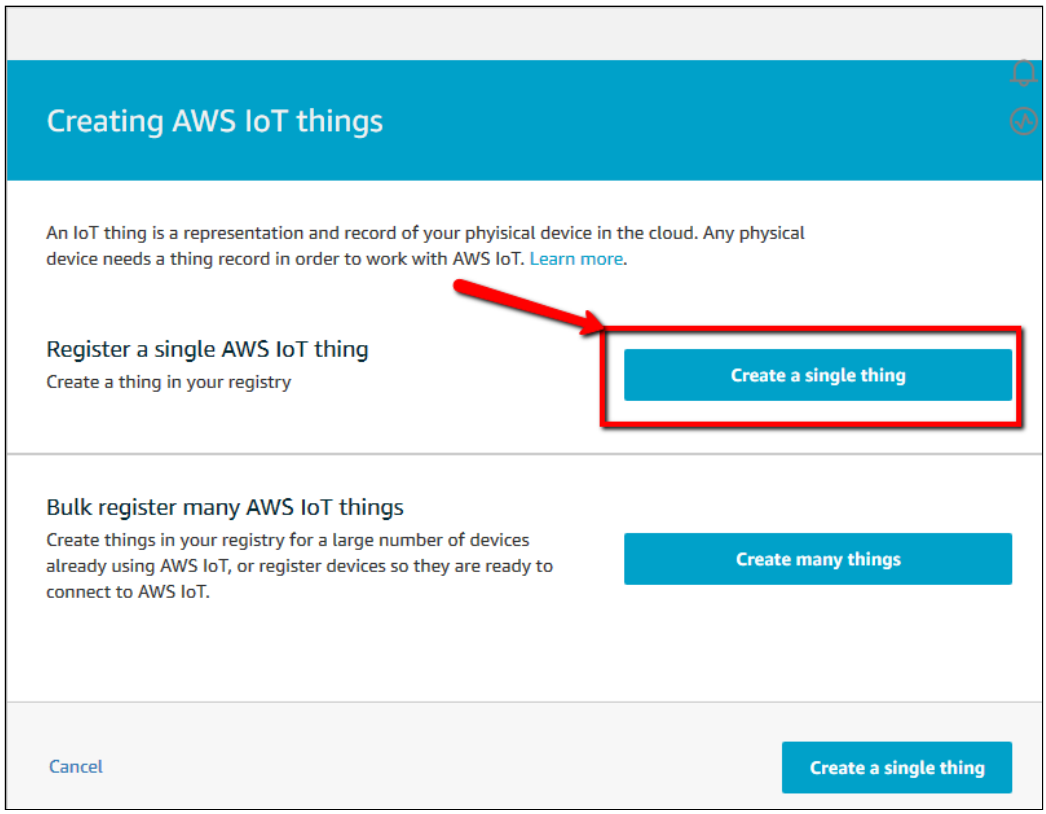
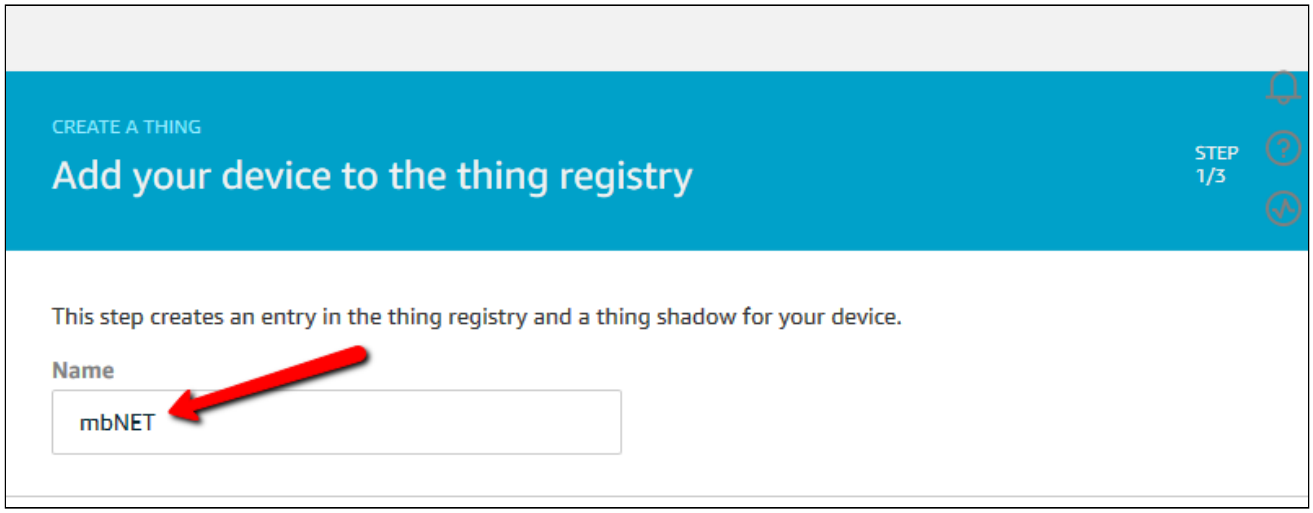
3.2 2.2. Create a single thing



3.3 2.3. Define your thing name. Thing Names should be unique per device. Use mbNET in this example.



scroll down to "next" and leave all other empty or nothing.

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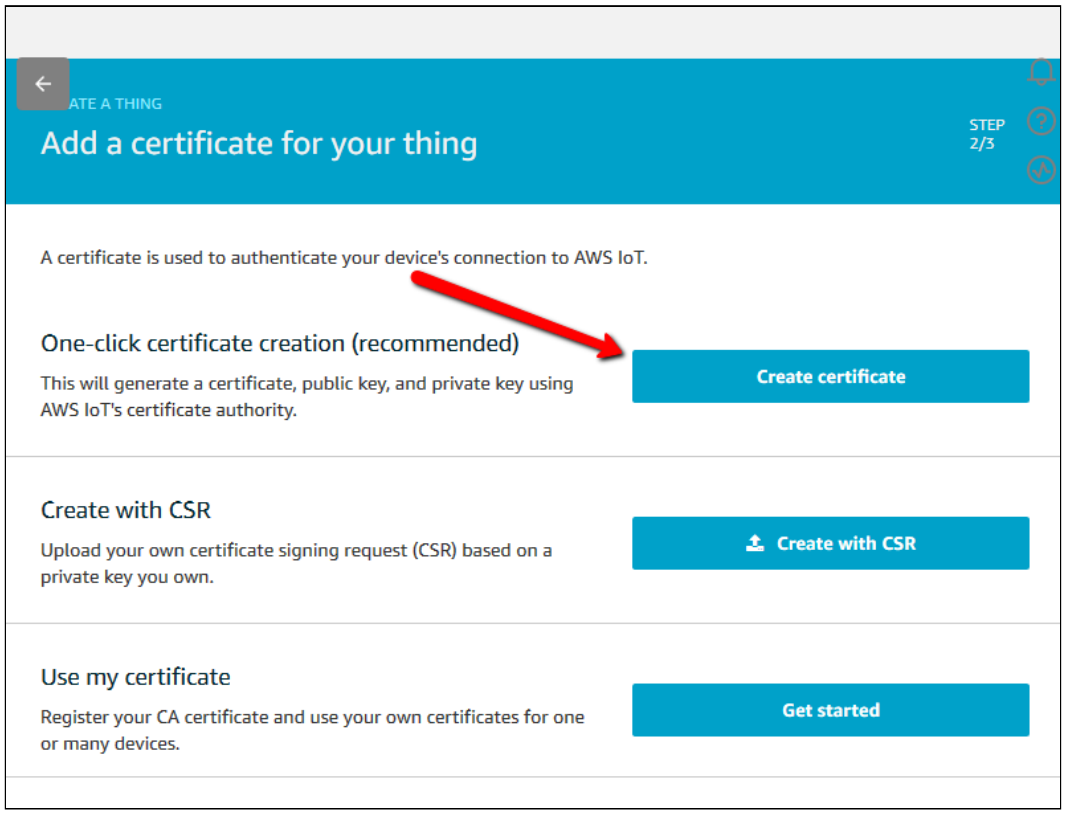
Important

Thing Names should be unique per device. The Thing Name should also correspond with the Client ID, which must be unique.

3.4 2.4. Create your certificates



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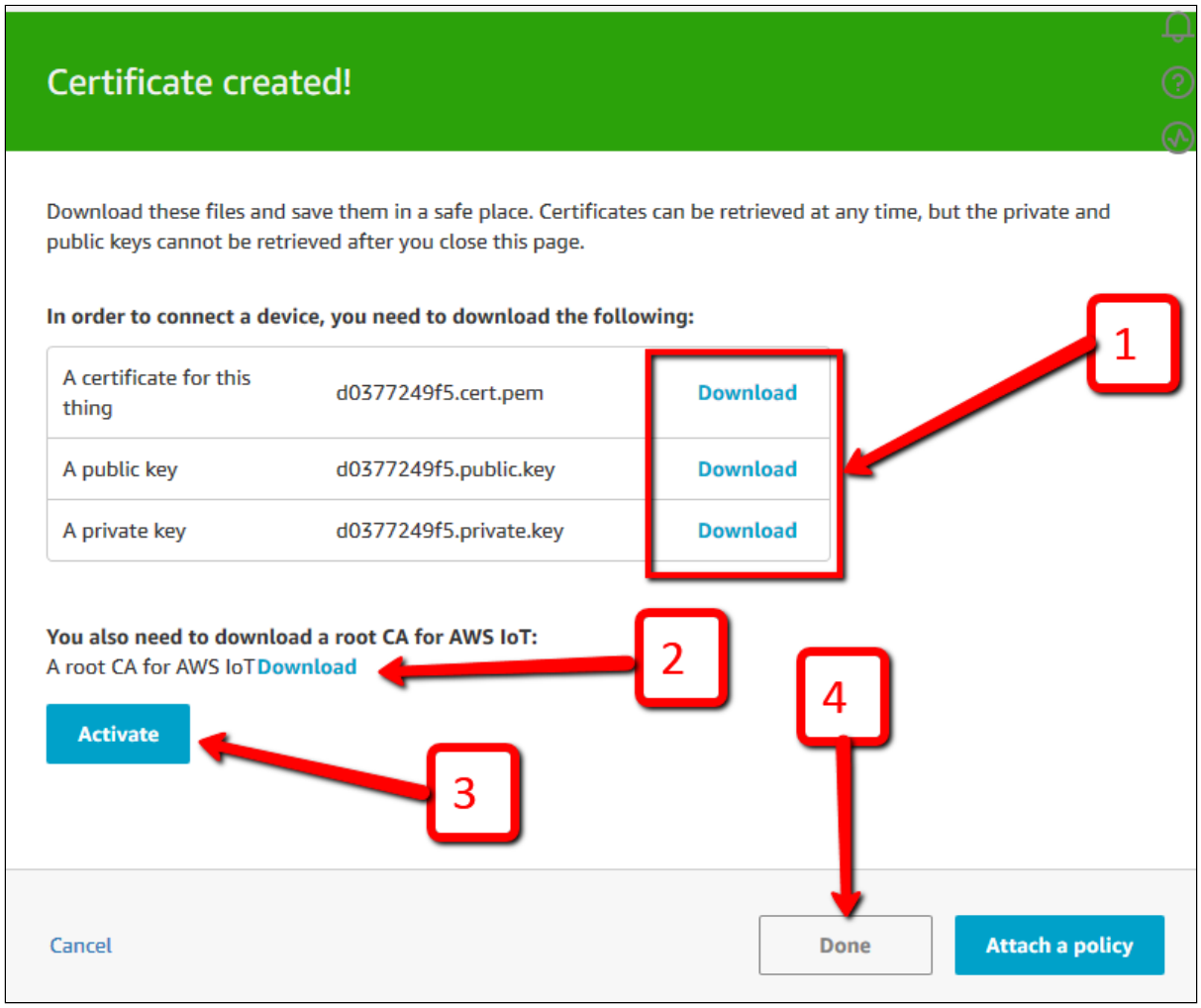
3.5 2.5. Download your certificates (1) and the root CA (2). After then activate (3) and your all set (4).



If you are done, you should see the thing "mbNET" like this.

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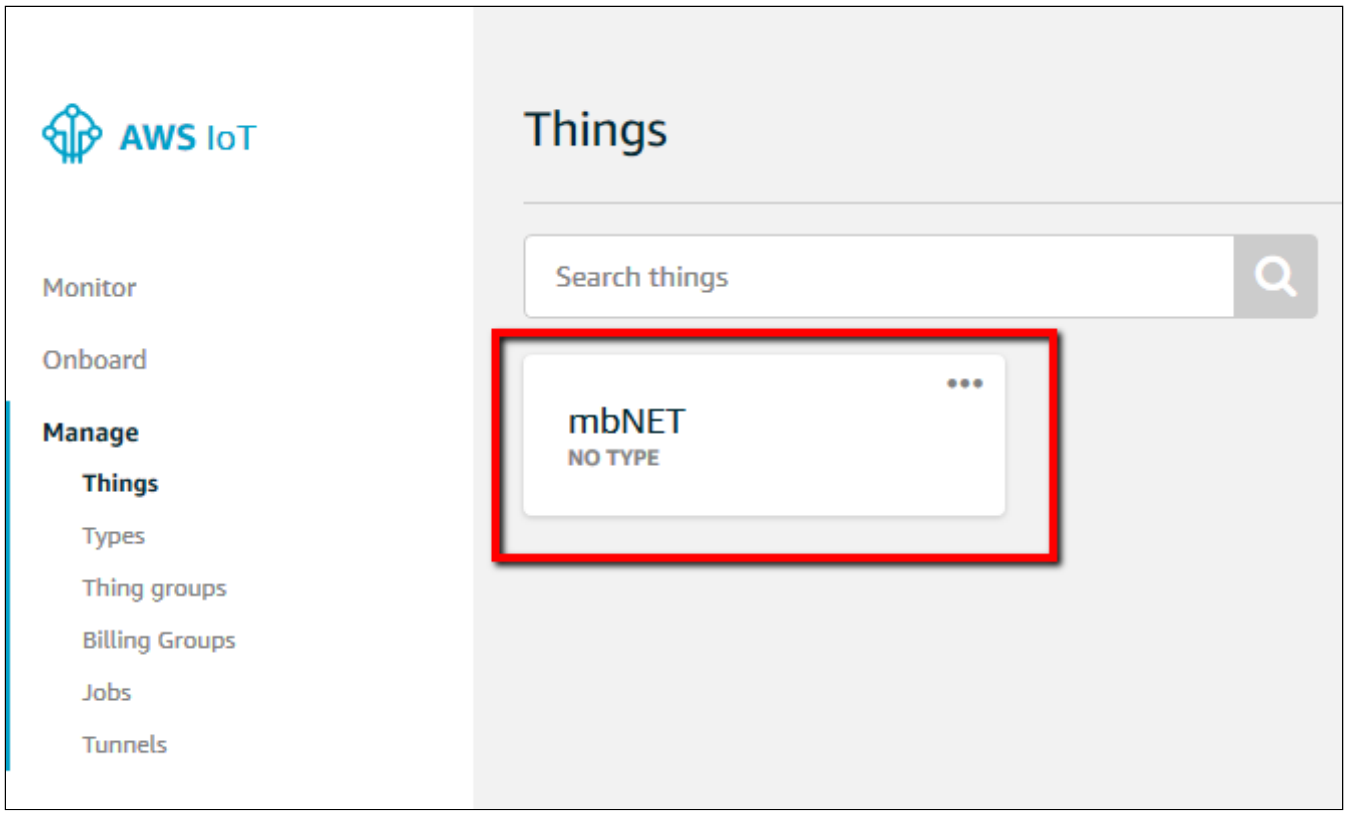

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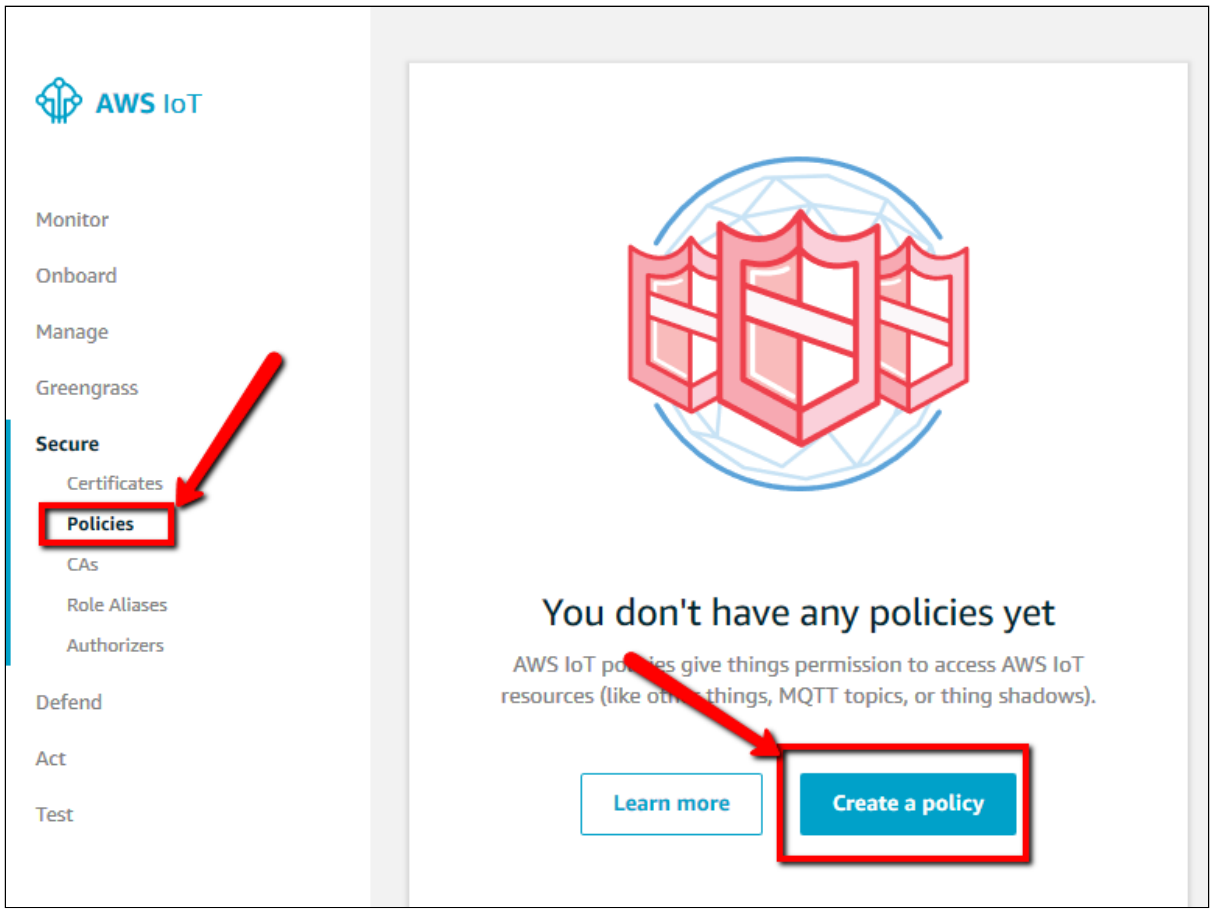
3.6 2.6. Create your policy



Define a name and add your policy statements

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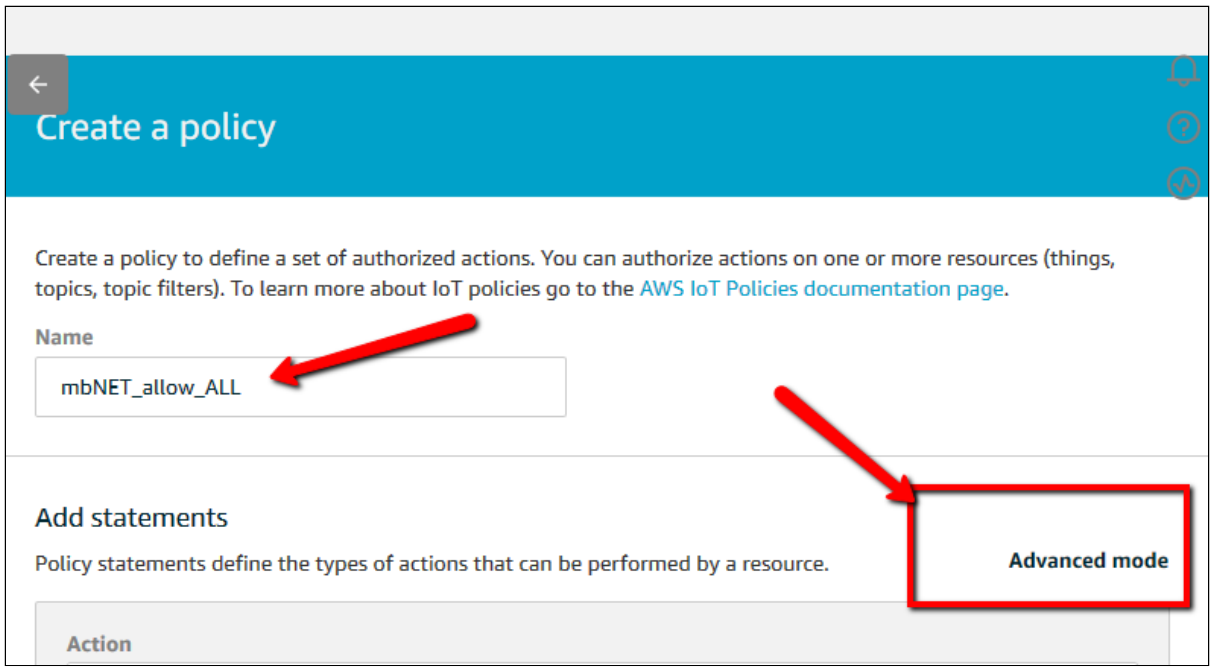
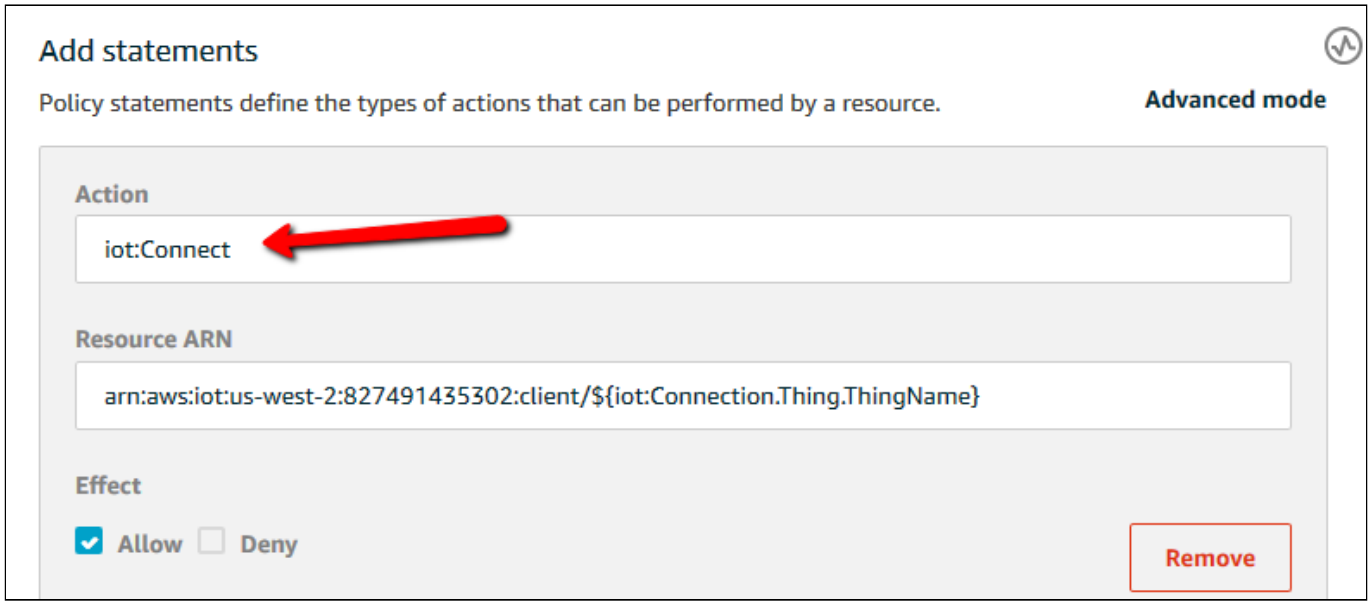


We want to differ between "Connect", "Publish/Receive" and "Subscribe". The policy handles the access to your things and topics.

In our Example we allow all to connect and access to topic "mymbNETTopic". If you want to allow all, the use the wildcard "*" instead of the topic name.

Add "iot:Connect" to the "Action" field and "Add statement". Replace the word "replaceWithAClientId" in the field "Resource ARN" with "${iot:Connection.Thing.ThingName}"



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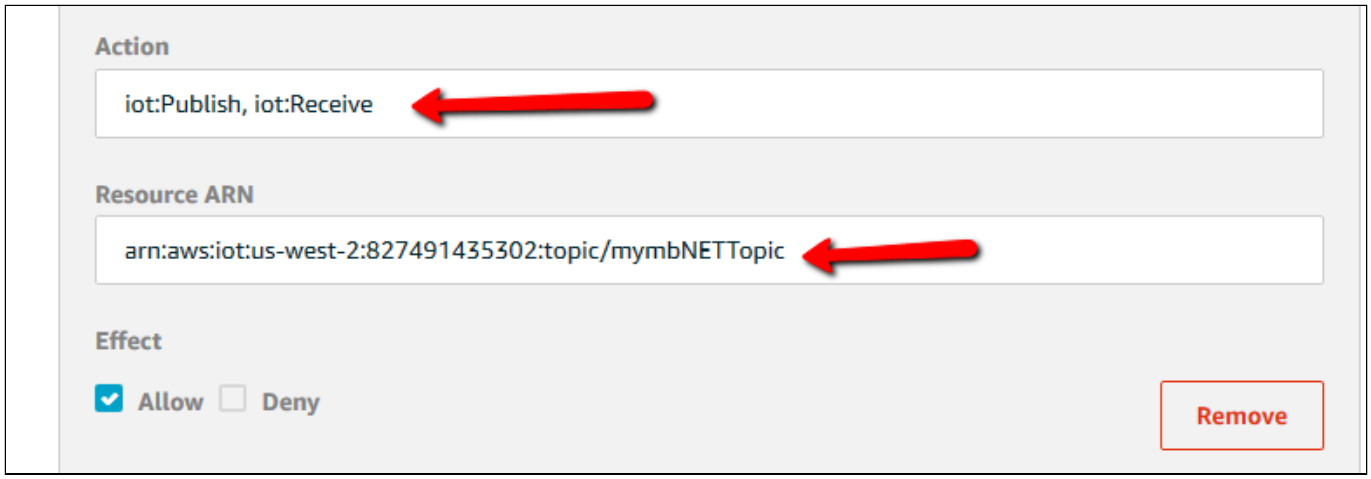
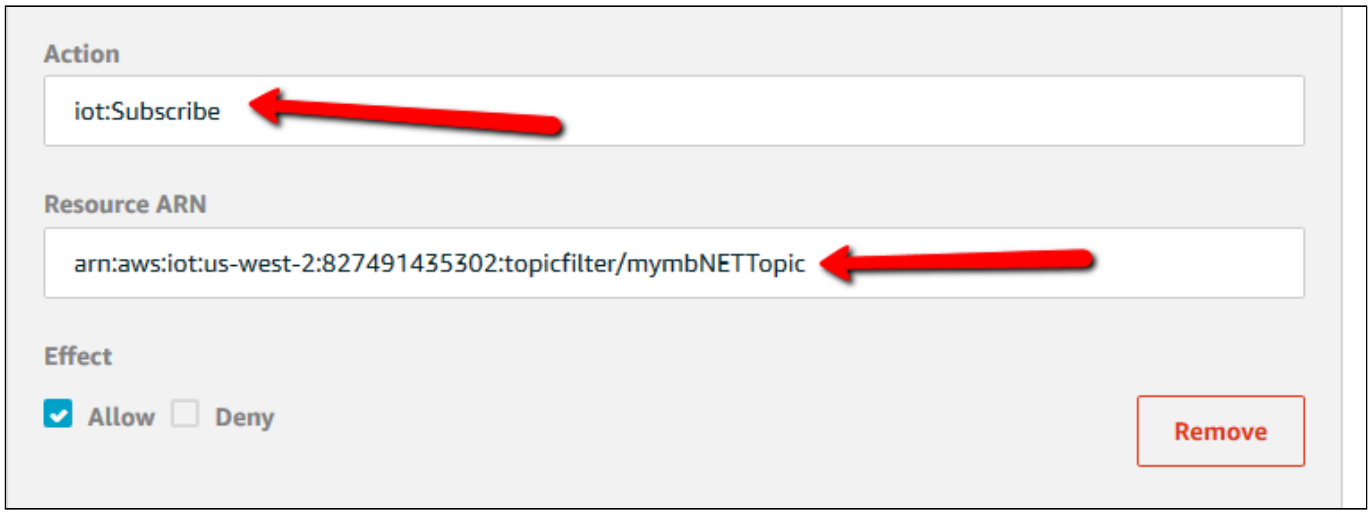
Add "iot:Publish, iot:Receive" to the "Action" field and "Add statement". Replace the word "replaceWithATopic" in the field "Resource ARN" with "mymbNETTopic"



Warning

If you want to access all topics, replace "replaceWithATopic" with "*". But use this only for testing purpouses, NOT for production use.

Add "iot:Subscribe" to the "Action" field and "Add statement". Replace the word "replaceWithATopicFilter" in the field "Resource ARN" with "mymbNETTopic"



Warning

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When you are finished, click on "Create" at the bottom of the website.

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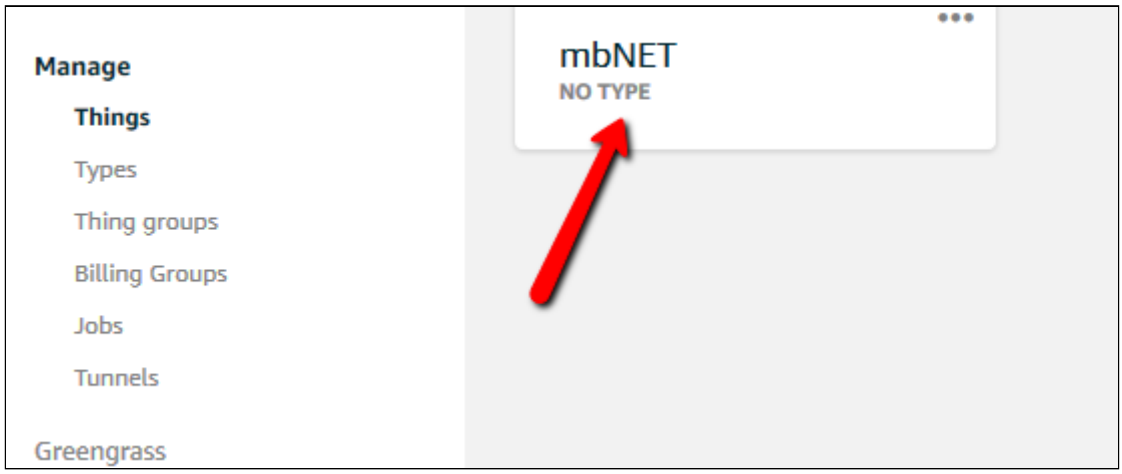
Select your thing



Select your certificate

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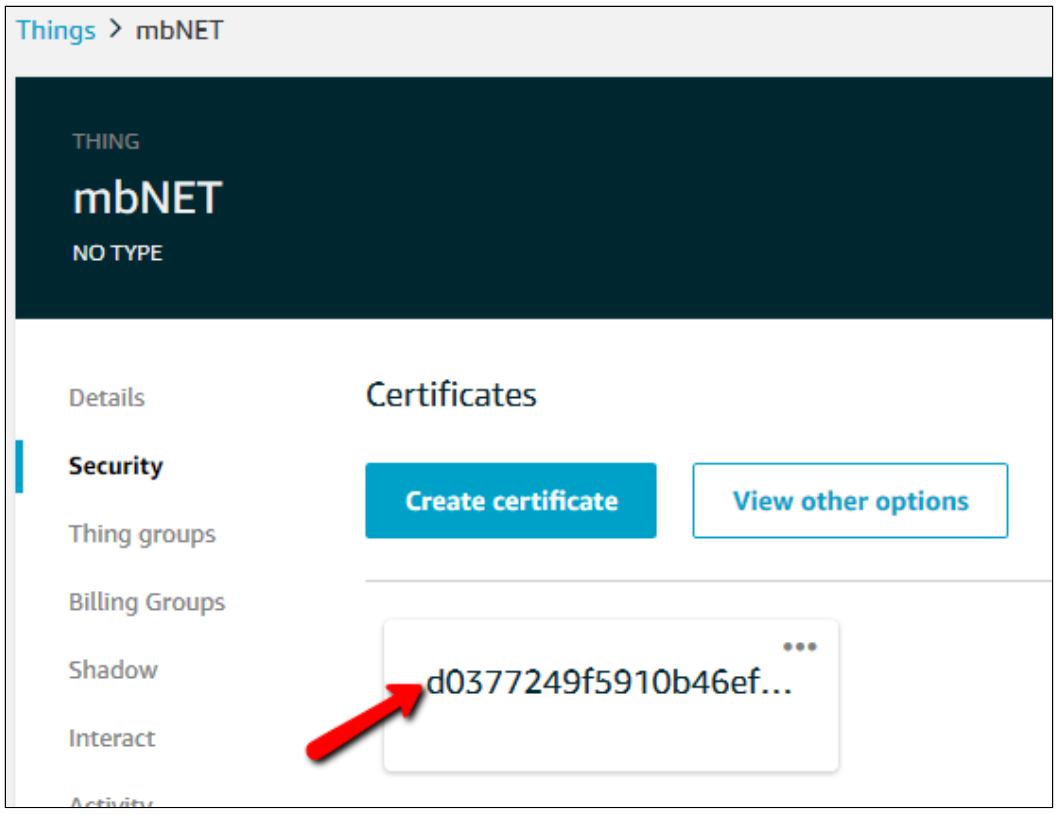
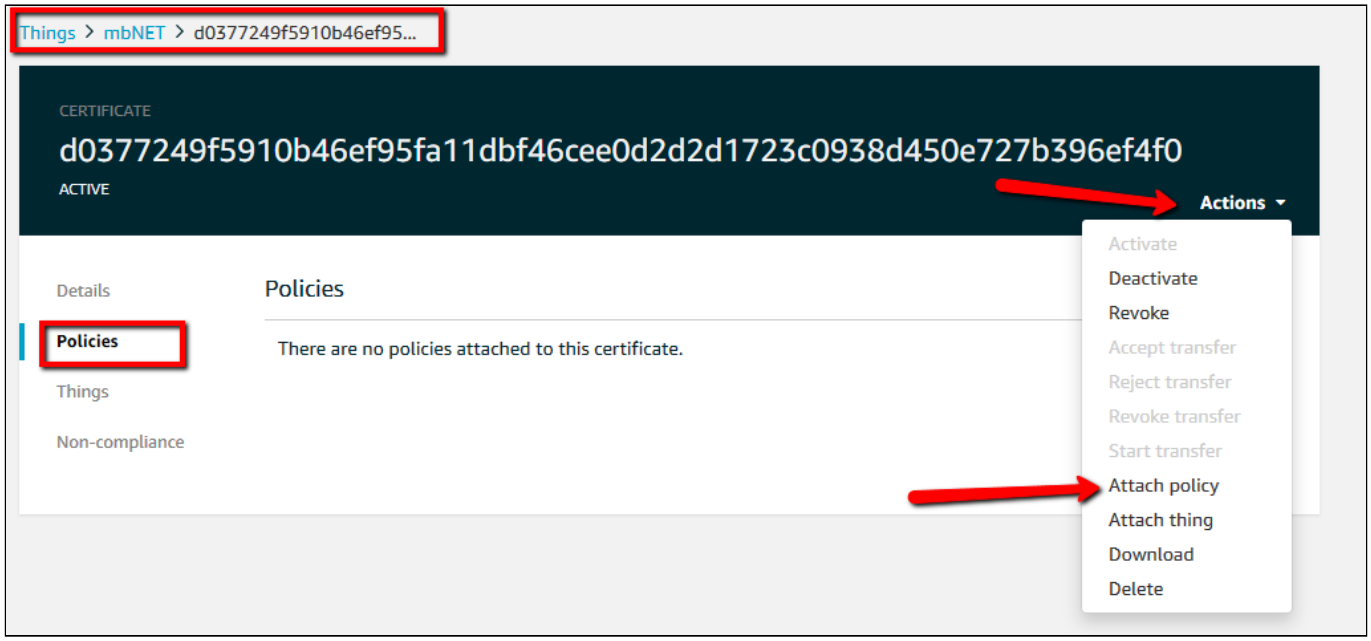


Attach your policy to your certificate



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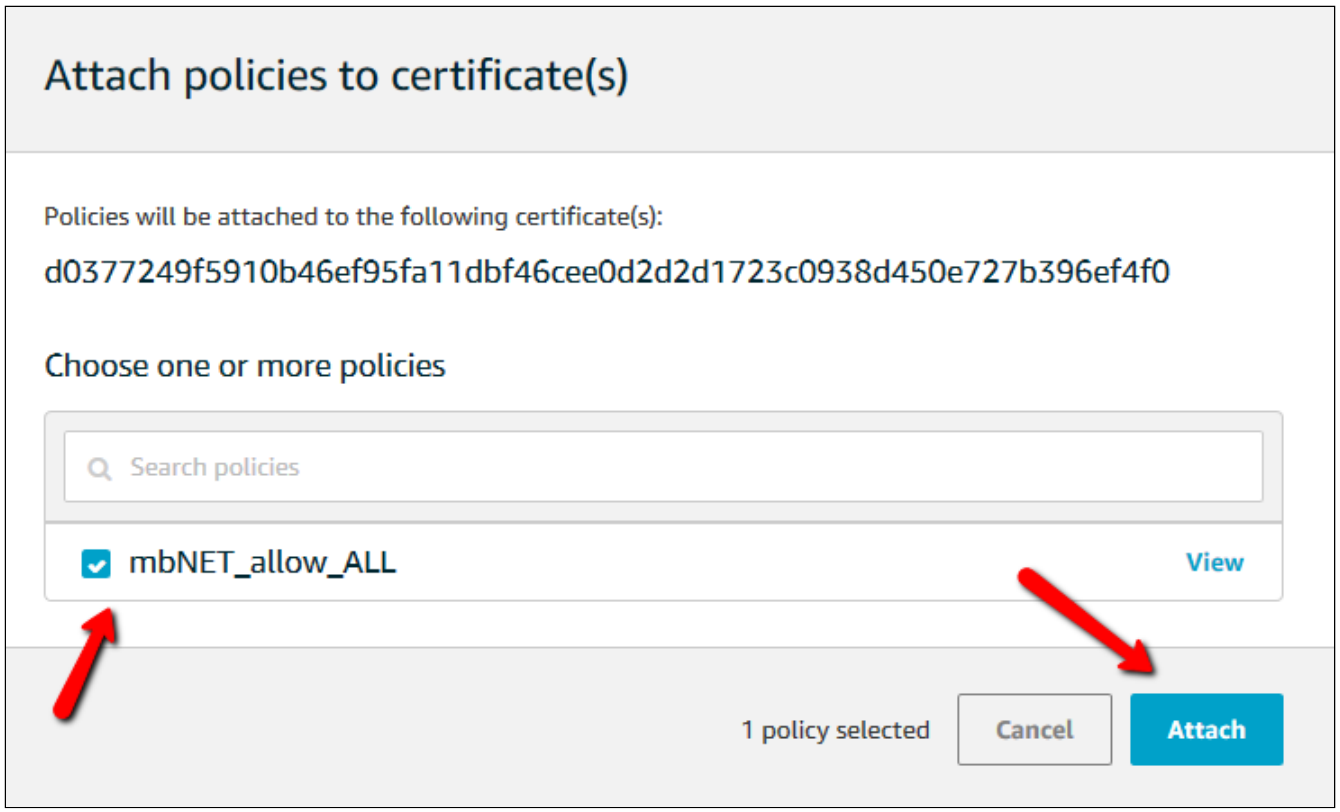

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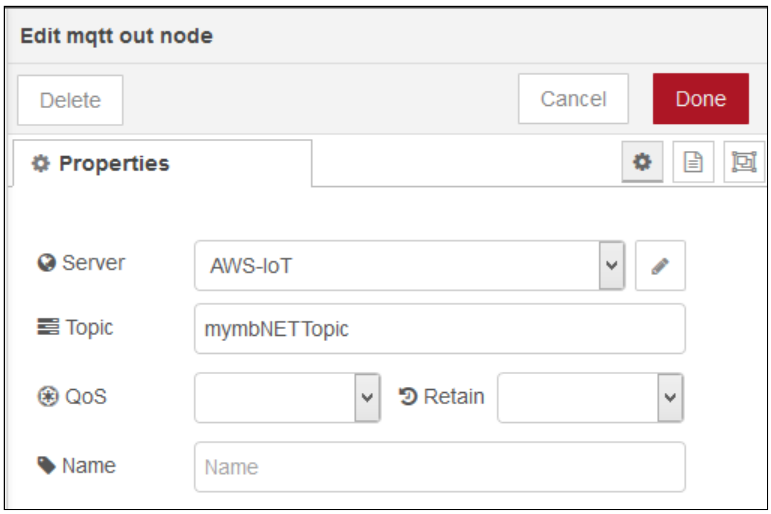
4 3. Set MQTT Node in Node-RED



4.1 3.1 AWS endpoint settings

AWS	Node-RED

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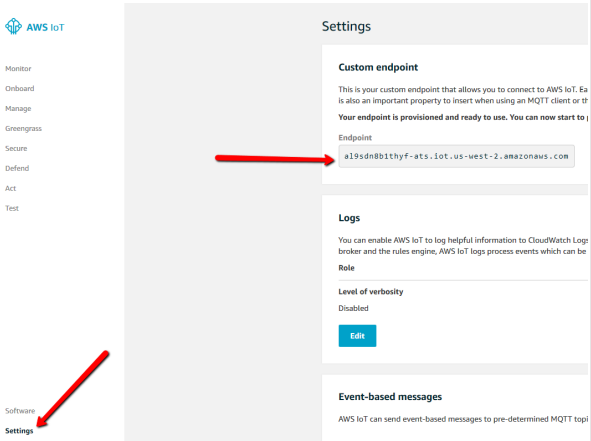
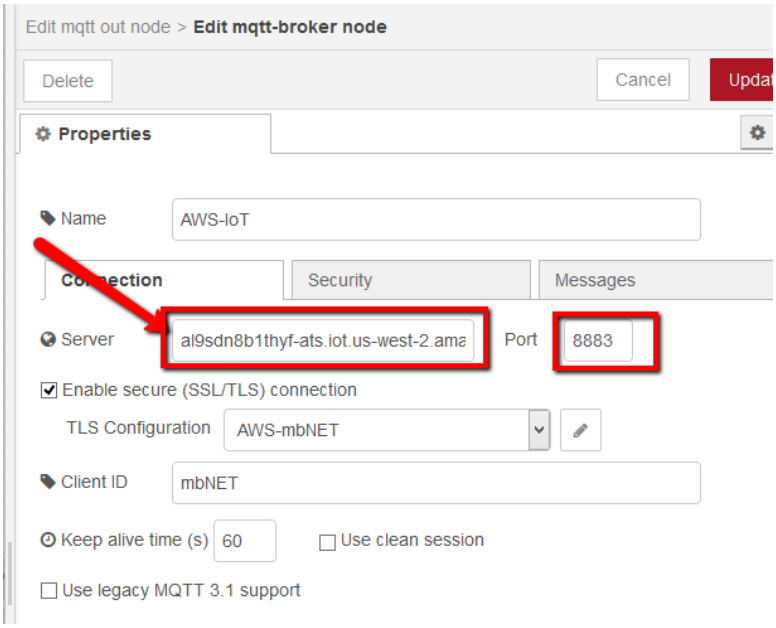
Select AWS console → Settings at AWS IoT

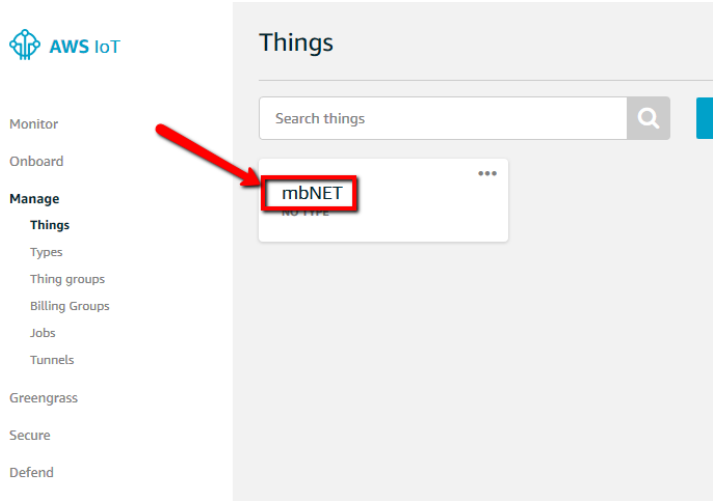


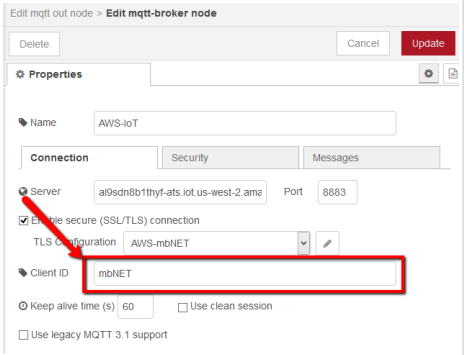
Edit your MQTT node settings and use the Endpoint from your AWS Endpoint setting for the MQTT server setting.



4.2 3.2. MQTT Client-ID settings

AWS	Node-RED
The Things Name is your Client-ID for the MQTT node.	





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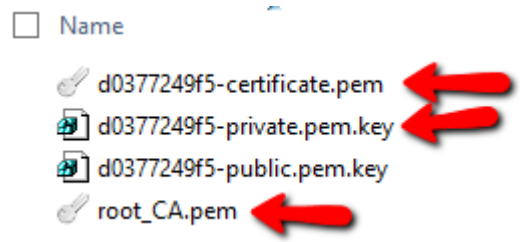
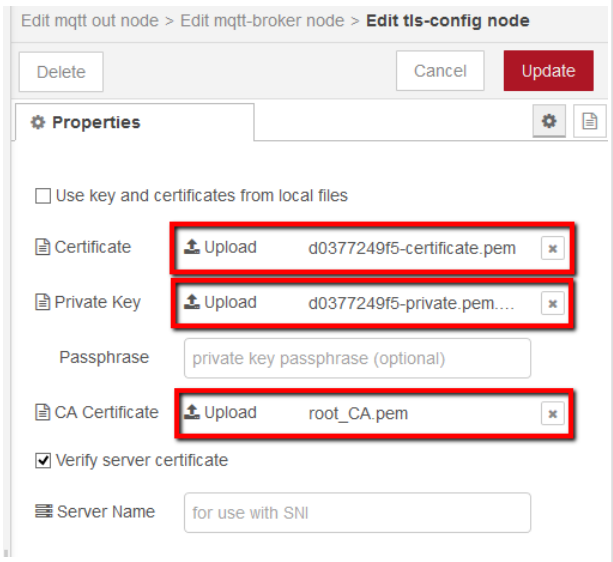
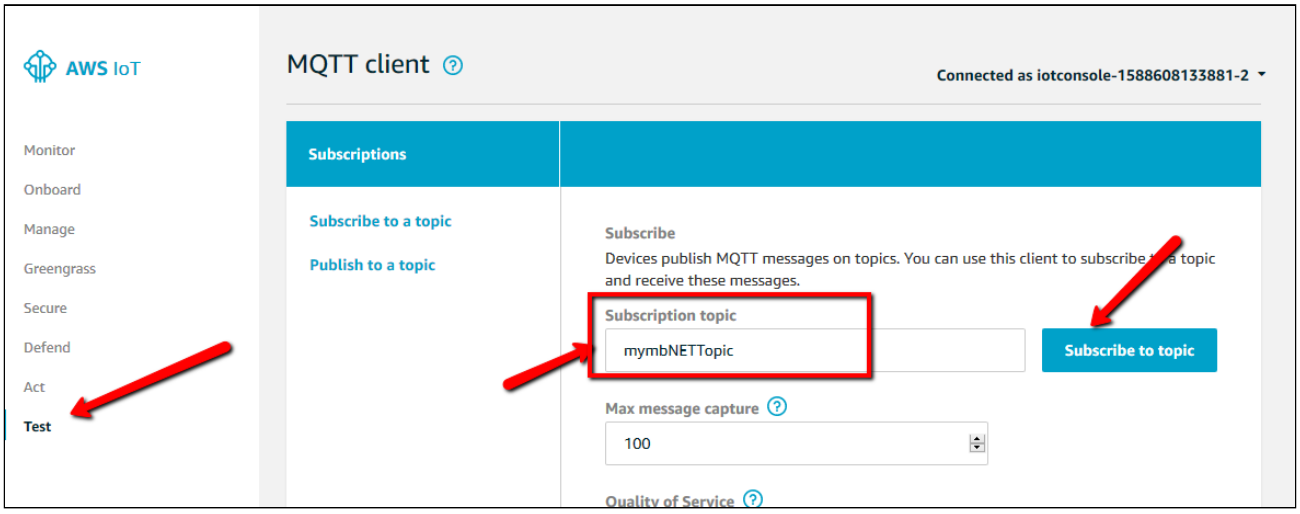
4.3 3.3. Import certificates

your Computer	Node-RED
	

4.4 3.4. check connection

Change to AWS Test page and use the topic "mymbNETTopic" and subscribe.



Every Inject on "timestamp" will send a message to AWS and you can see it at the MQTT client test page.

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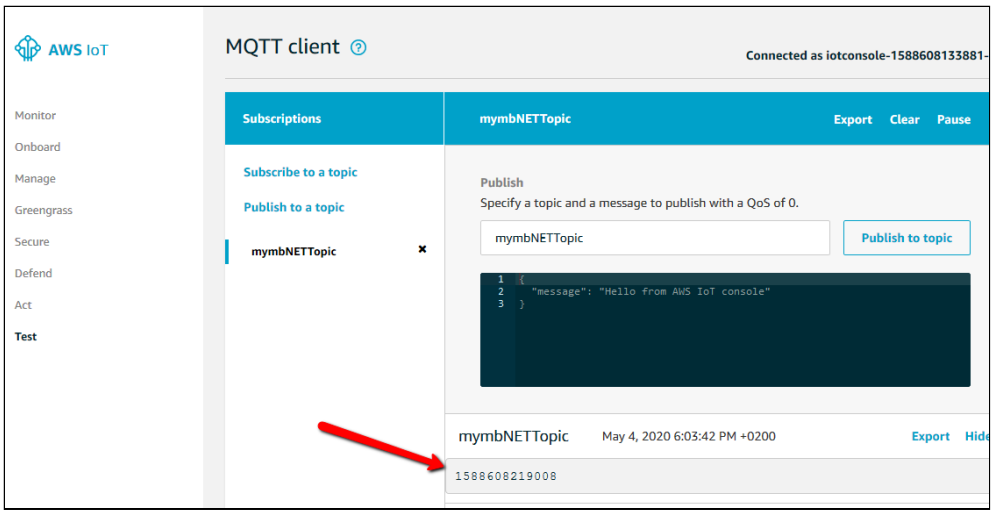

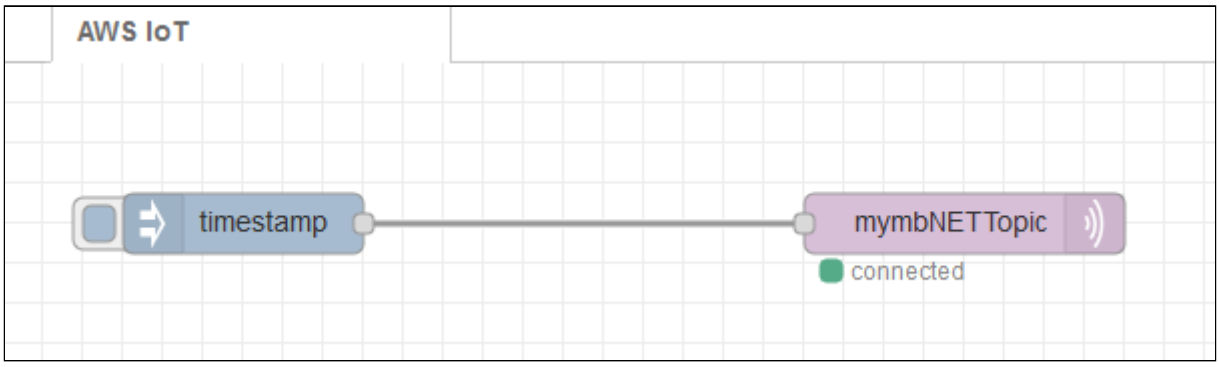

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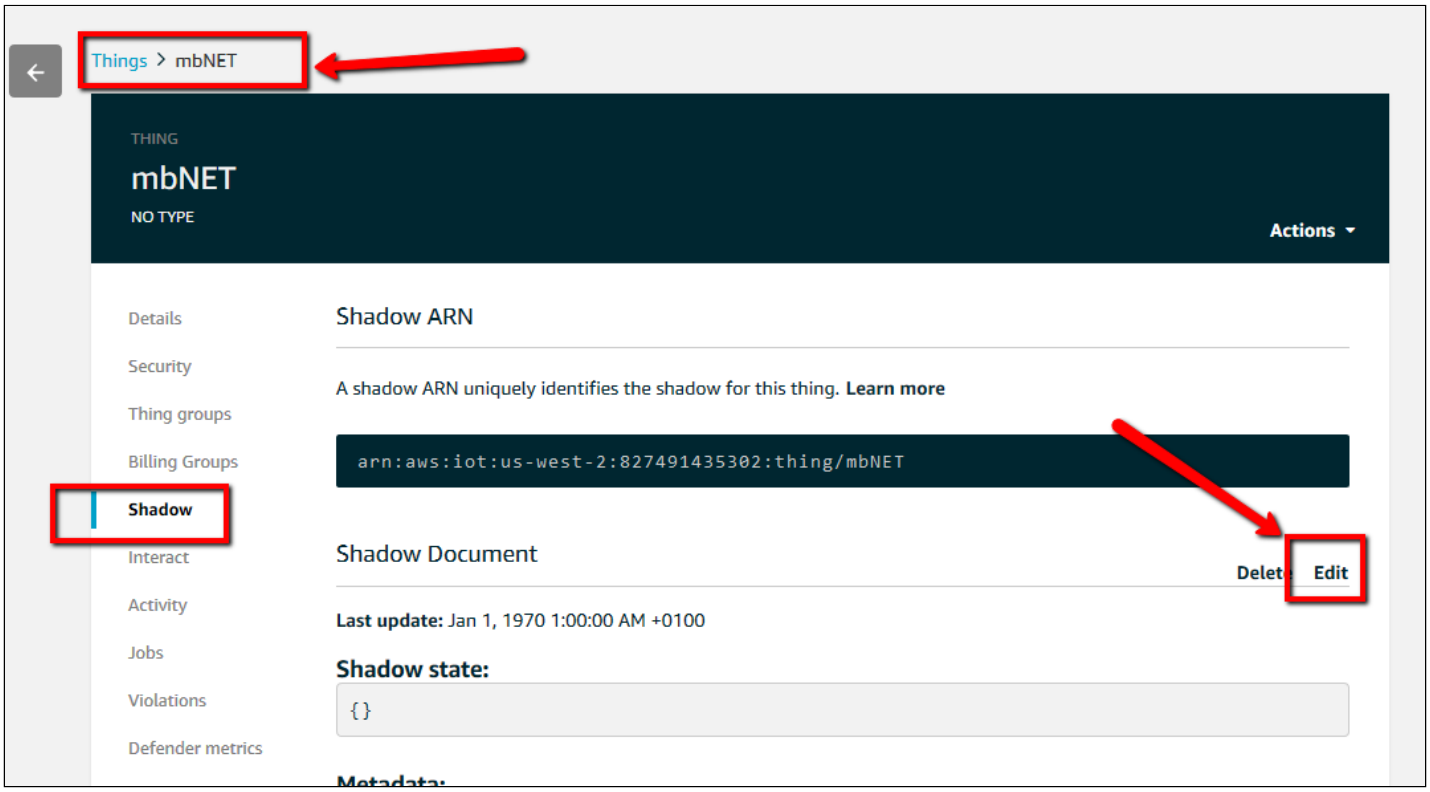
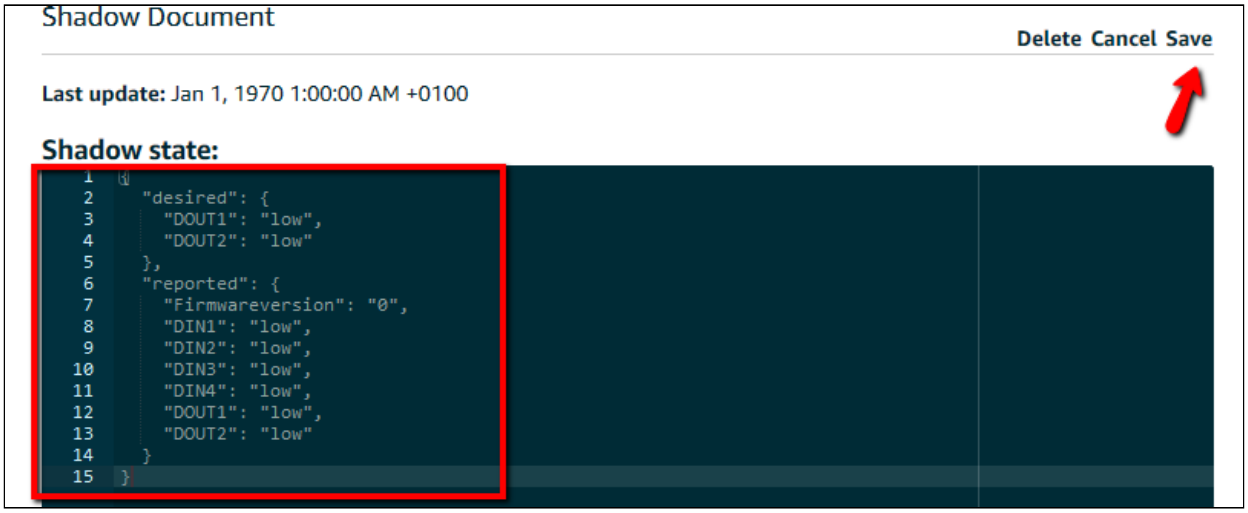
5 4. Advanced: Create and use AWS Shadow

5.1 4.1. Create our shadow document



Copy the Follwing code block into the shadow state:



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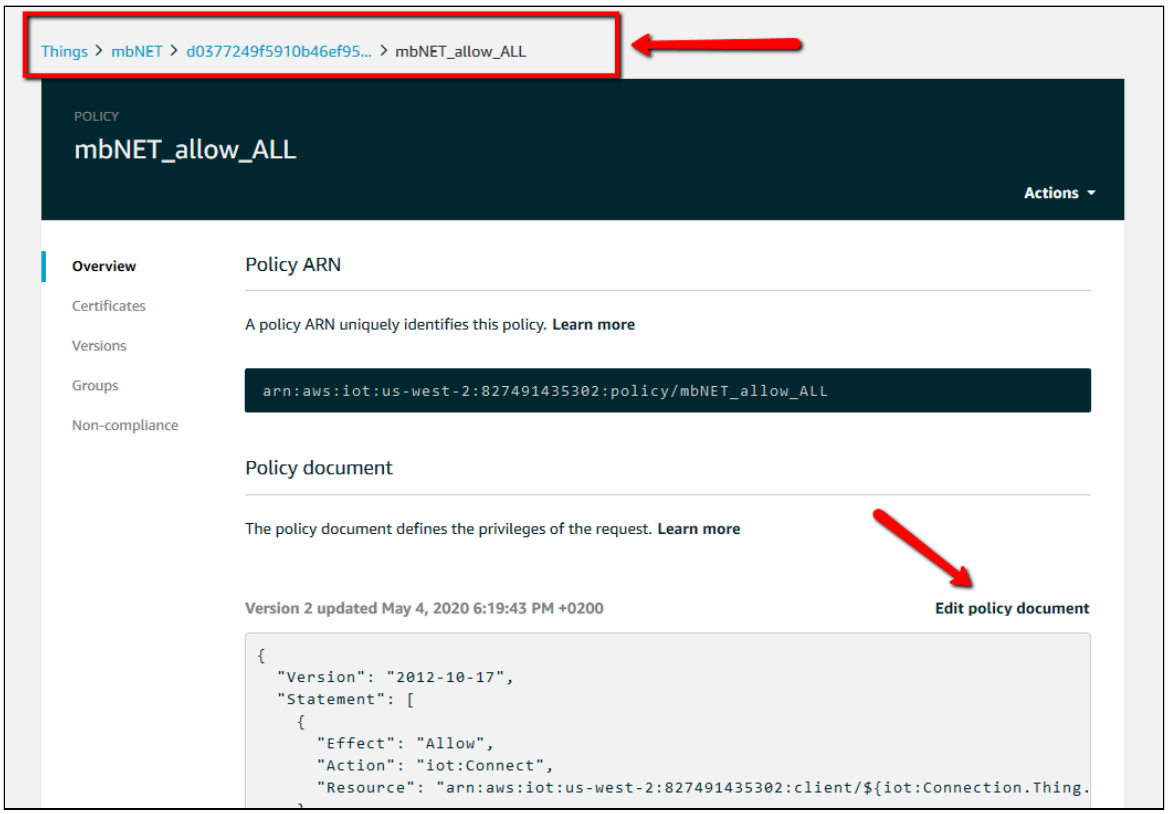
Shadow Code

```
{
  "desired": {
    "DOUT1": "low",
    "DOUT2": "low"
  },
  "reported": {
    "Firmwareversion": "0",
    "DIN1": "low",
    "DIN2": "low",
    "DIN3": "low",
    "DIN4": "low",
    "DOUT1": "low",
    "DOUT2": "low"
  }
}
```

5.2 4.2. Edit policy

Select your thing and then the certificate. Select then the policy and edit the policy



Edit the policy as follows:

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Policy

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "iot:Connect",
      "Resource": "arn:aws:iot:us-west-2:827491435302:client/$
{iot:Connection.Thing.ThingName}"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Publish",
      "Resource": [
        "arn:aws:iot:us-west-2:827491435302:topic/mymbNETTopic",
        "arn:aws:iot:us-west-2:827491435302:topic/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update"
      ]
    },
    {
      "Effect": "Allow",
      "Action": "iot:Receive",
      "Resource": [
        "arn:aws:iot:us-west-2:827491435302:topic/mymbNETTopic",
        "arn:aws:iot:us-west-2:827491435302:topic/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/delta"
      ]
    },
    {
      "Effect": "Allow",
      "Action": "iot:Subscribe",
      "Resource": [
        "arn:aws:iot:us-west-2:827491435302:topicfilter/mymbNETTopic",
        "arn:aws:iot:us-west-2:827491435302:topicfilter/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/delta",
        "arn:aws:iot:us-west-2:827491435302:topicfilter/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/get/accepted",
        "arn:aws:iot:us-west-2:827491435302:topicfilter/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/get/rejected",
        "arn:aws:iot:us-west-2:827491435302:topicfilter/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/documents",
        "arn:aws:iot:us-west-2:827491435302:topicfilter/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/accepted",
        "arn:aws:iot:us-west-2:827491435302:topicfilter/$aws/things/$
{iot:Connection.Thing.ThingName}/shadow/update/rejected"
      ]
    }
  ]
}
```


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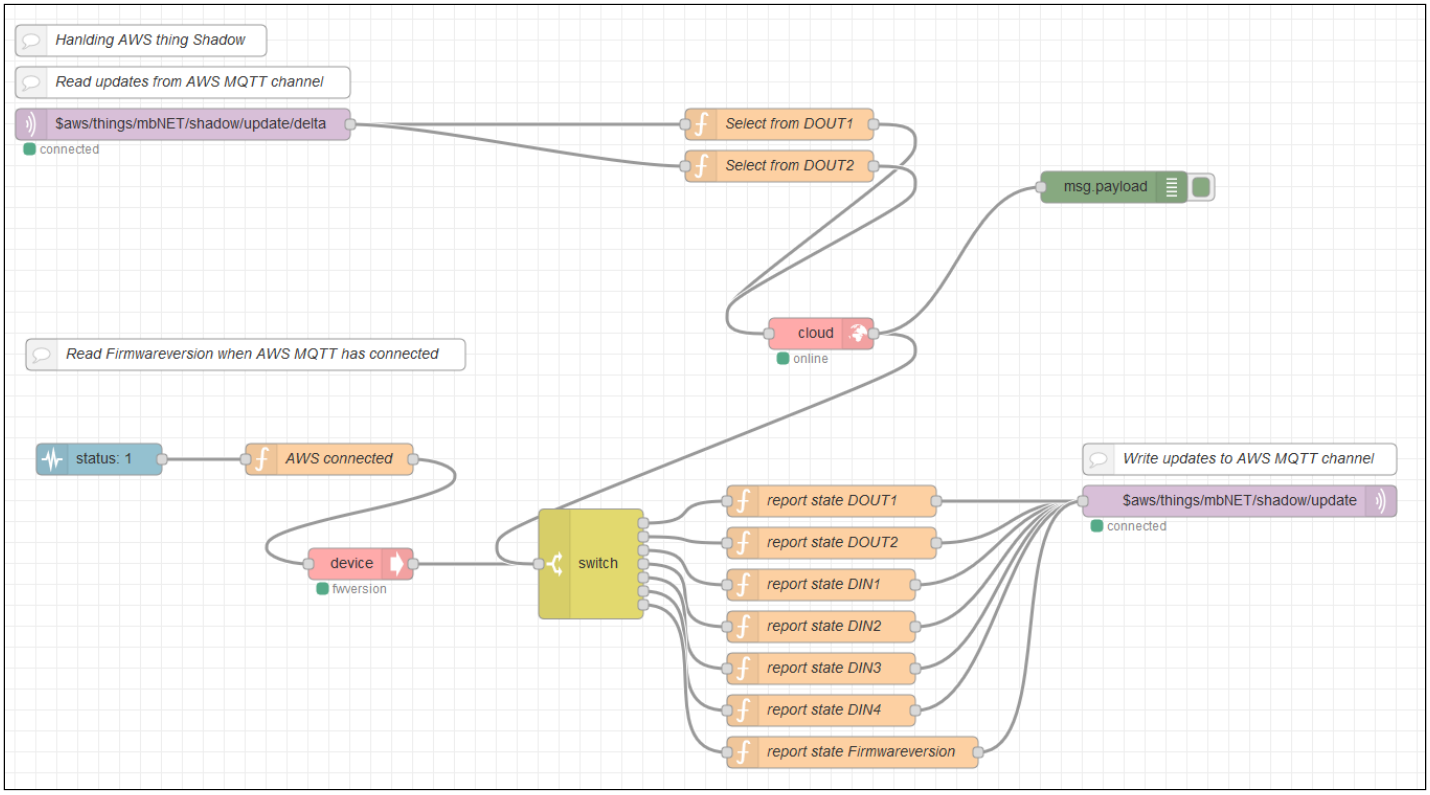
Attention

The name "arn:aws:iot:us-west-2:827491435302" could be different to your setting. Use the name of the resource from "iot:connect" segment.

5.3 4.3 Add the Node-RED Flow

This Node-RED Flow is an example on how to inreract between the mbNET router and AWS shadow. The "cloud" node communicates with the router to read and write the routers variables. In our case here we request to set/reset the digital Outputs 1 and/or 2 depending on the request from the AWS shadow. Whenever there is a change on this digital Outputs or Inputs we report to AWS shadow the status. The node "device" returns the status of the router interfaces and firmware version.



The flow can be downloaded here: https://helpdesk.mbconnectline.com/en/index.php?type=page&urlcode=872841&title=NR10V1-AWS-Connector

After activating the flow, you will see the firmwareversion of the mbNET in your AWS shadow:

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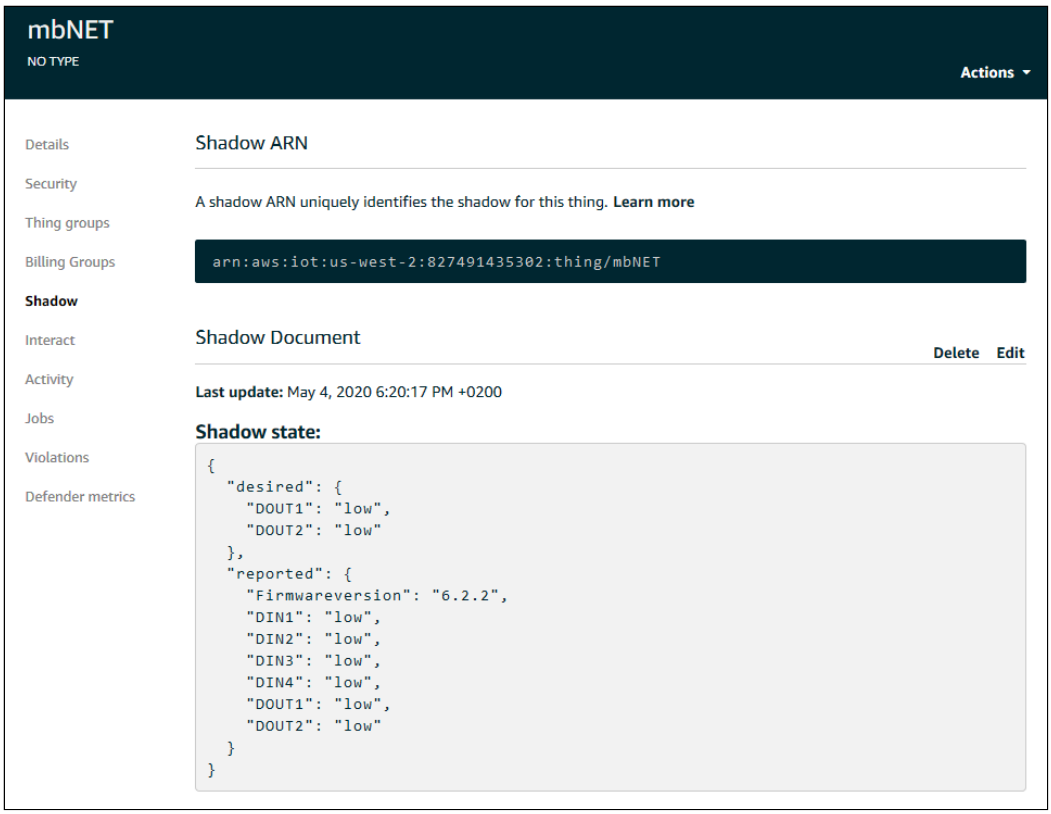

You can set the DOUT1 or DOUT2 (digital output) of the mbNET to "low" or "high" state. If digital Inputs are connected to the DI1-4 it will be reported here.

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