REPORT

KU 건국대학교 KONKUK UNIV.

과목명 | 클라우드IOT서비스

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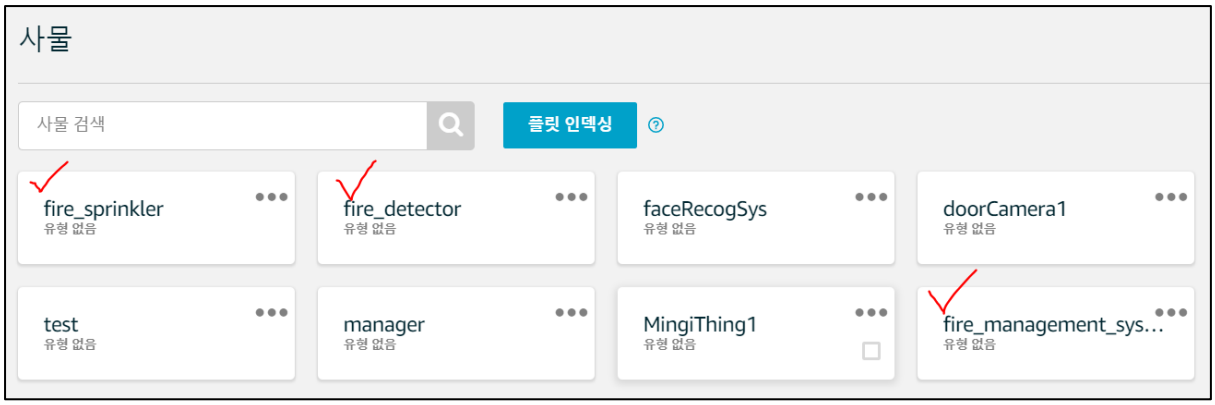
1. Fire Detector

1-1. Create fire_detector & fire_sprinkler (Virtual Device) & fire_management_system(EC2)

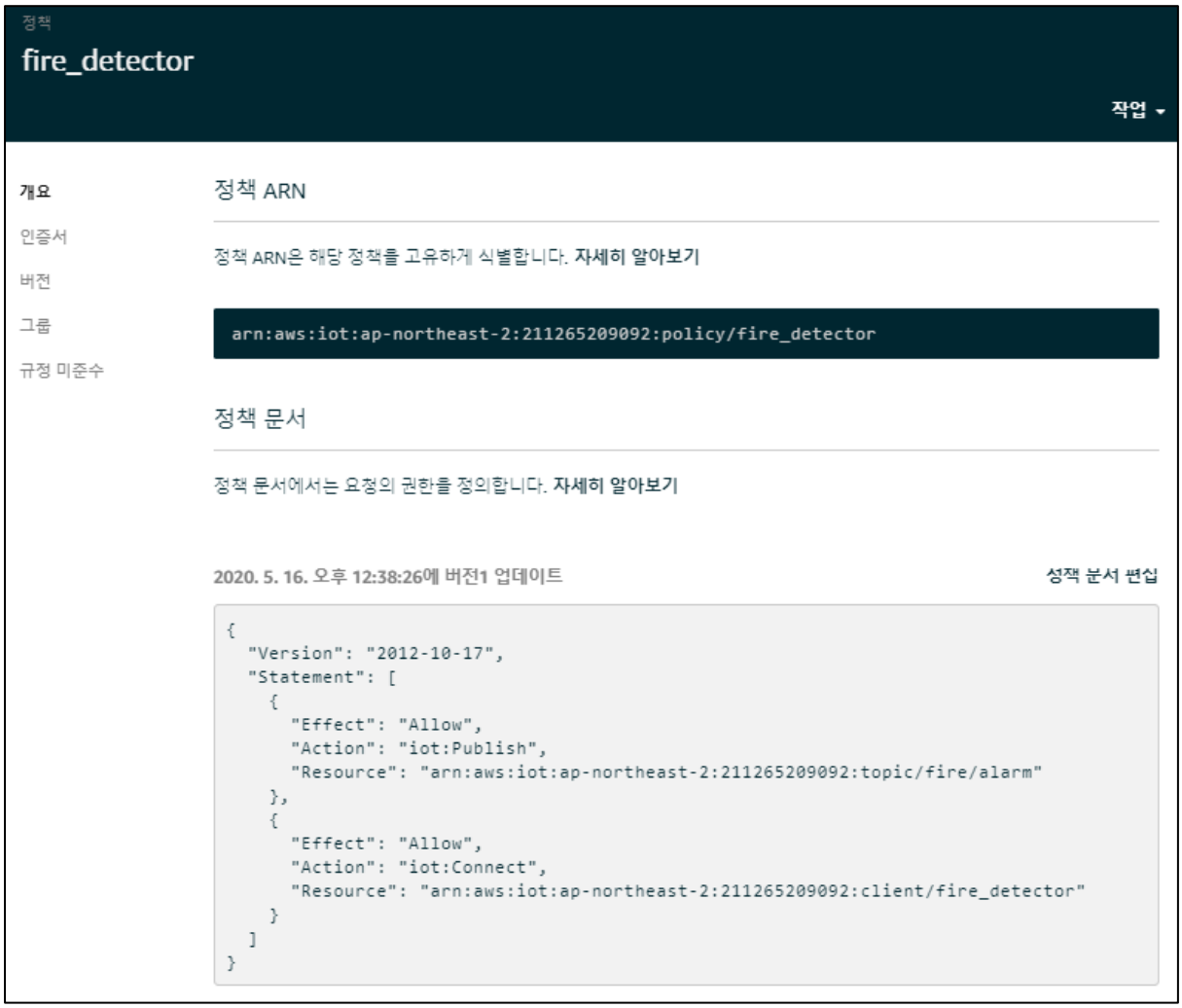


1-2. file_sender.js (For fire_detector)

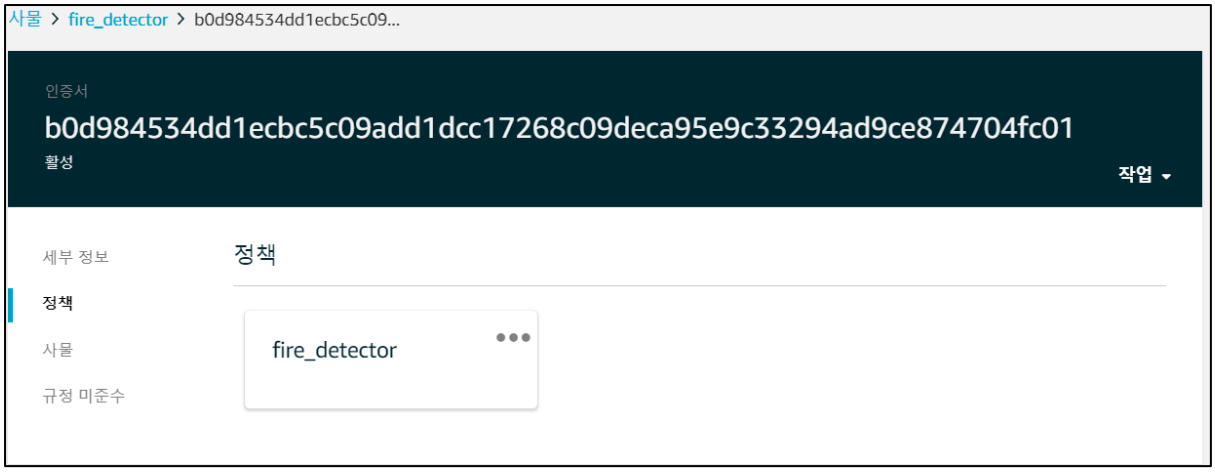
```
//fire_detector
var awsIot = require("aws-iot-device-sdk");

var fire_detector = awsIot.device({
    keyPath: "./credentials/fire_detector/b0d984534d-private.pem.key",
    certPath: "./credentials/fire_detector/b0d984534d-certificate.pem.crt",
    caPath: "./credentials/fire_detector/AmazonRootCA1.pem",
    clientId: "fire_detector",
    host: "a1wc5scouqf41e-ats.iot.ap-northeast-
2.amazonaws.com" // MQTT DN for Device Gateway
  });

  // Device is an instance returned by mqtt.Client(), see mqtt.js for full doc
umentation.
  fire_detector.on('connect', function () {
    console.log('fire_detector connected!');

    // String Instead.
    var fire = ['fire1', 'fire2', 'fire3', 'fire4', 'fire5', 'fire6', 'fire7',
 'fire8', 'fire9', 'fire10'];

    // Every 3 seconds, fire_detector send a request to fire_management_System
    setInterval(function () {
      // randomly select one of the ten images // ceil : return whole number(
정수)
      var idx = Math.ceil(Math.random() * 10);
      var message = { 'notify': 'fire/sprinkler', 'alarm': fire[idx] };
      console.log('publish to fire/alarm' + JSON.stringify(message));
```

```
      fire_detector.publish('fire/alarm', JSON.stringify(message));//json topi
c 에 publish
    }, 3000);
  });
```

1-3. fire_detector policy setting



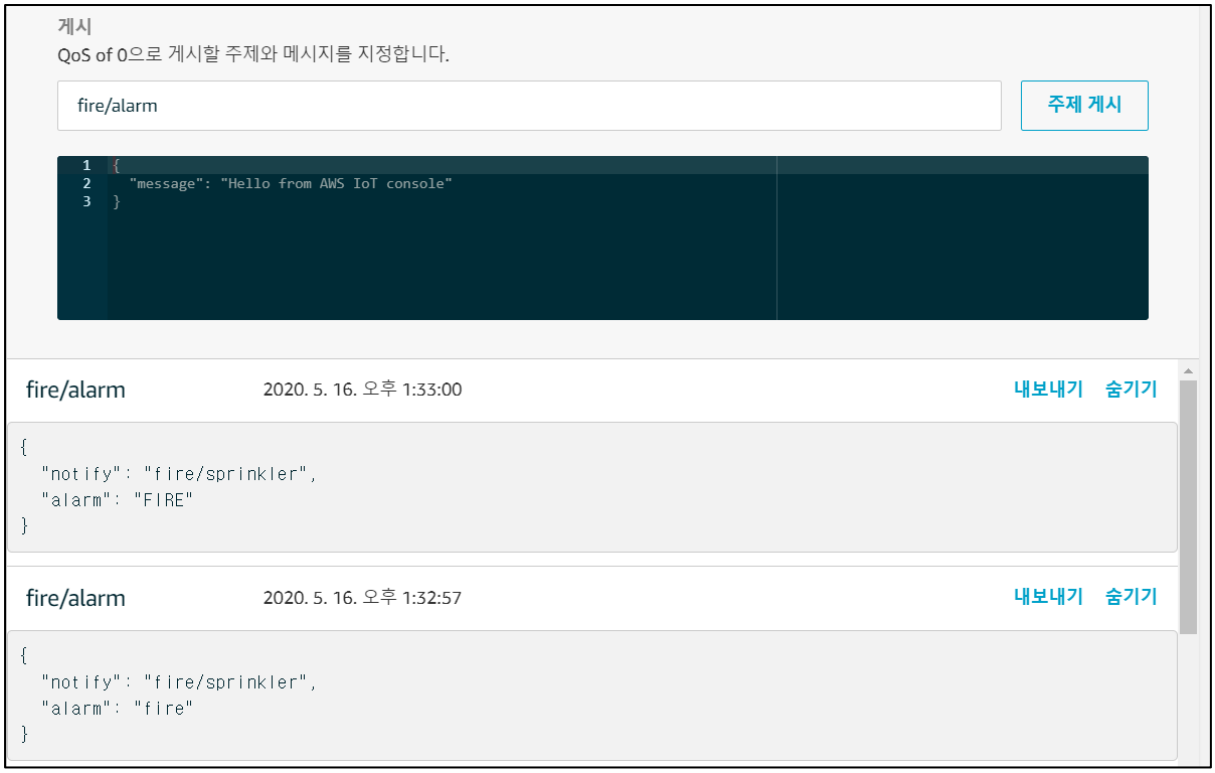
1-4. Attach Policy to fire_detector



1-5. Check fire_detector

```
C:\Program Files\nodejs\node.exe fileSender.js
fire_detector connected!
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"fire"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"fire"}
publish to fire/alarm{"notify":"fire/sprinkler"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"fire"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"FIRE"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"FIRE"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"FIRE"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"FIRE"}
publish to fire/alarm{"notify":"fire/sprinkler","alarm":"fire"}
```

1-6. check on the web(test)



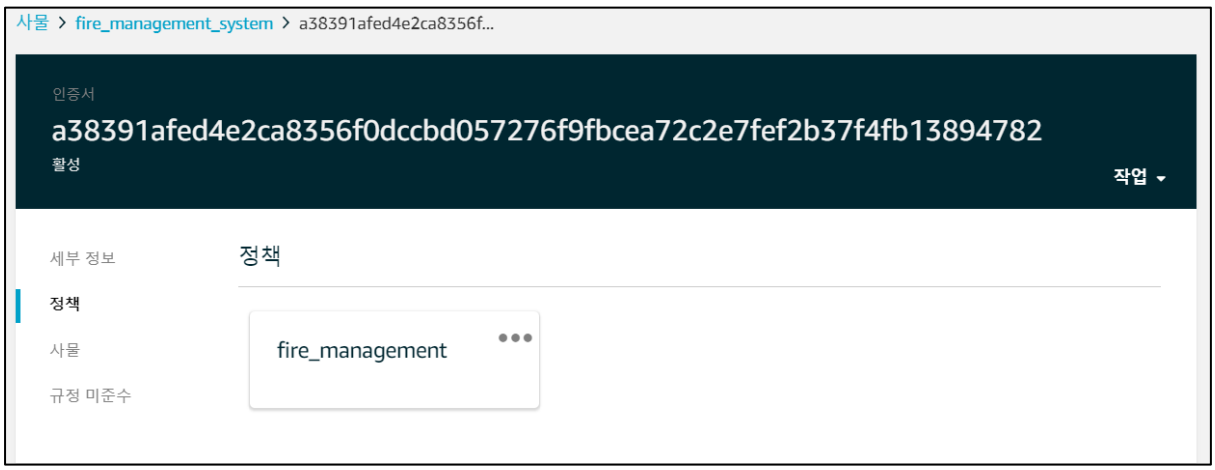
2. Fire Management System

2-1. create fire _management_system policy

2020. 5. 16. 오후 9:11:57에 버전4 업데이트 정책 문서 편집


```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "iot:Connect",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:client/fire_management_syste
    },
    {
      "Effect": "Allow",
      "Action": "iot:Subscribe",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topicfilter/fire/alarm"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Receive",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topic/fire/alarm"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Publish",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topic/fire/sprinkler"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Publish",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topic/fire/alert/*"
    }
  ]
}
```


2-2. Attach Policy to fire_managemnet_system



2-3. Fire Management System node js (Code)

```
// Fire Management System

var awsIot = require('aws-iot-device-sdk');

var fire_management_sys = awsIot.device({
    keyPath: "./credentials/fire_management_system/a38391afed-
private.pem.key",
    certPath: "./credentials/fire_management_system/a38391afed-
certificate.pem.crt",
    caPath: "./credentials/fire_management_system/AmazonRootCA1.pem",
    clientId: "fire_management_system",
    host: "a1wc5scouqf41e-ats.iot.ap-northeast-2.amazonaws.com"
});

// Device is an instance returned by mqtt.Client(), see mqtt.js for full docum
entation.
fire_management_sys.on('connect', function () {
    console.log('Fire Management System connected');
    fire_management_sys.subscribe('fire/alarm', function () {
        console.log('subscribing to the topic fire/alarm !');
    });

    var fire = ['fire1', 'fire2', 'fire3', 'fire4', 'fire5', 'fire6', 'fire7',
 'fire8', 'fire9', 'fire10'];
    fire_management_sys.on('message', function (topic, message) {
        console.log('Request:', message.toString());
        if (topic != 'fire/alarm') return;
        var req = JSON.parse(message.toString());
        var id = fire.indexOf(req.alarm);
        var news = {news : "Alert! On Fire!!!"};
        if (id != -1) {
            fire_management_sys.publish(req.notify, JSON.stringify({ 'alarm':
req.alarm, 'command': 'Fire' }));
            fire_management_sys.publish('fire/alert/sprinkler',  JSON.stringif
y(news));
        } else {
            fire_management_sys.publish(req.notify, JSON.stringify({ 'alarm':
req.alarm, 'command': 'Safe' }));
        }
    })
});
```

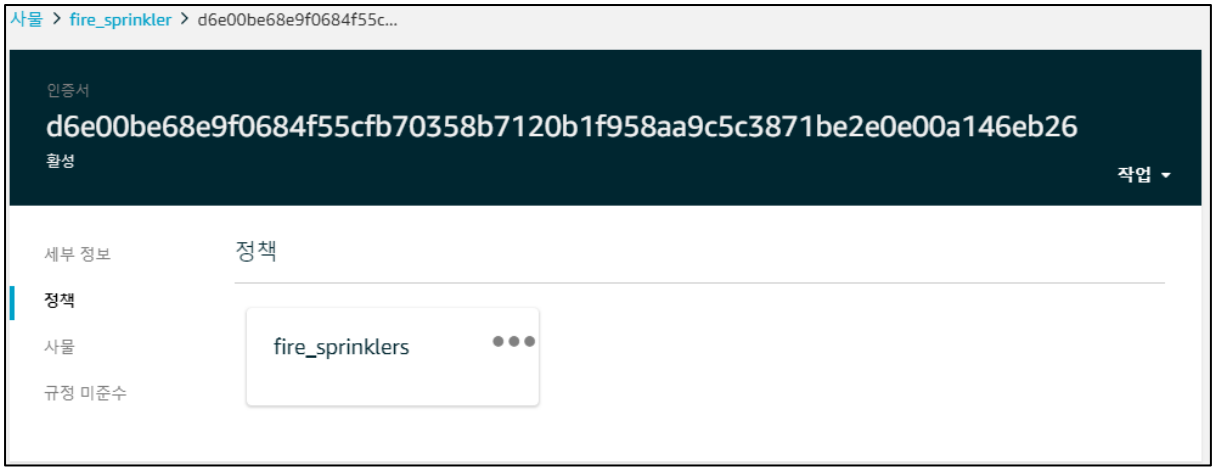
3. Fire Sprinkler

3-1. create sprinkler's policy

2020. 5. 16. 오후 9:06:08에 버전3 업데이트 정책 문서 편집


```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "iot:Connect",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:client/sprinkler"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Subscribe",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topicfilter/fire/sprinkler"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Receive",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topic/fire/sprinkler"
    },
    {
      "Effect": "Allow",
      "Action": "iot:Subscribe",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topicfilter/fire/alert/sprin
    },
    {
      "Effect": "Allow",
      "Action": "iot:Receive",
      "Resource": "arn:aws:iot:ap-northeast-2:211265209092:topic/fire/alert/sprinkler"
    }
  ]
}
```

3-2. attach to the device(fire_sprinkler)



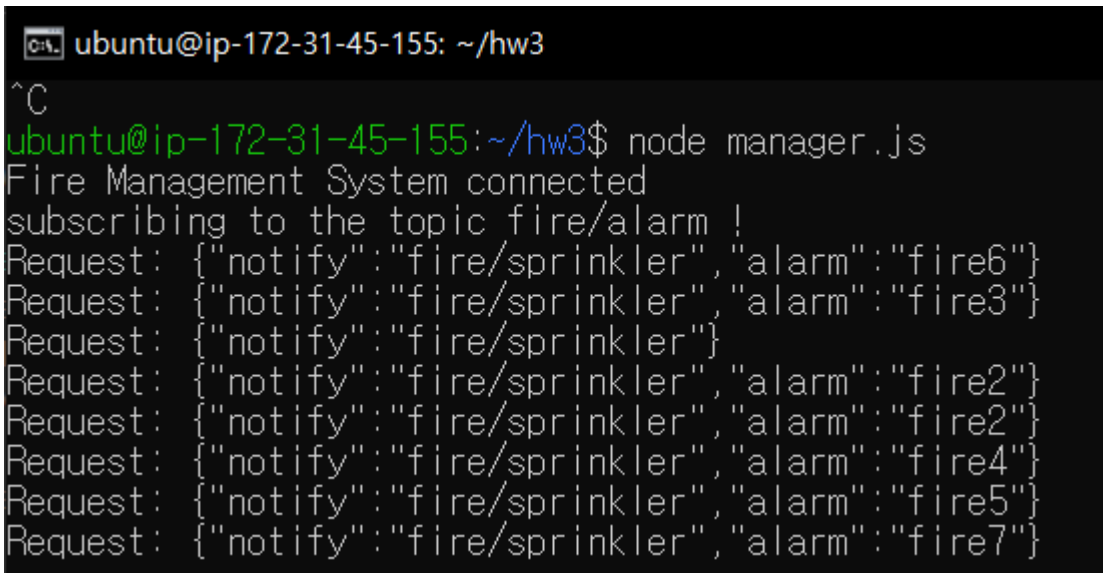
3-3. fire_sprinkler node js file (code)

```
//Fire Sprinkler

var awsIot = require('aws-iot-device-sdk');

var sprinkler = awsIot.device({
  keyPath: "./credentials/fire_sprinkler/d6e00be68e-private.pem.key",
  certPath: "./credentials/fire_sprinkler/d6e00be68e-certificate.pem.crt",
  caPath: "./credentials/fire_sprinkler/AmazonRootCA1.pem",
  clientId: "sprinkler",
  host: "a1wc5scouqf41e-ats.iot.ap-northeast-2.amazonaws.com"
});

// Device is an instance returned by mqtt.Client(), see mqtt.js for full docum
entation.
sprinkler.on('connect', function () {
  console.log('Sprinkler connected');
  sprinkler.subscribe('fire/sprinkler', function () {
    console.log('subscribing to the topic fire/sprinkler !');
  });
  sprinkler.subscribe('fire/alert/sprinkler', function () {
    console.log('subscribing to the topic fire/alert/sprinkler !');
  });

  sprinkler.on('message', function (topic, message) {
    if (topic == 'fire/sprinkler') {
      var noti = JSON.parse(message.toString());
      if (noti.command == 'Fire') console.log(noti.alarm, ' : Fire! Go Sprinkl
er!!!')
      else console.log(noti.alarm, ': its Safe')
```

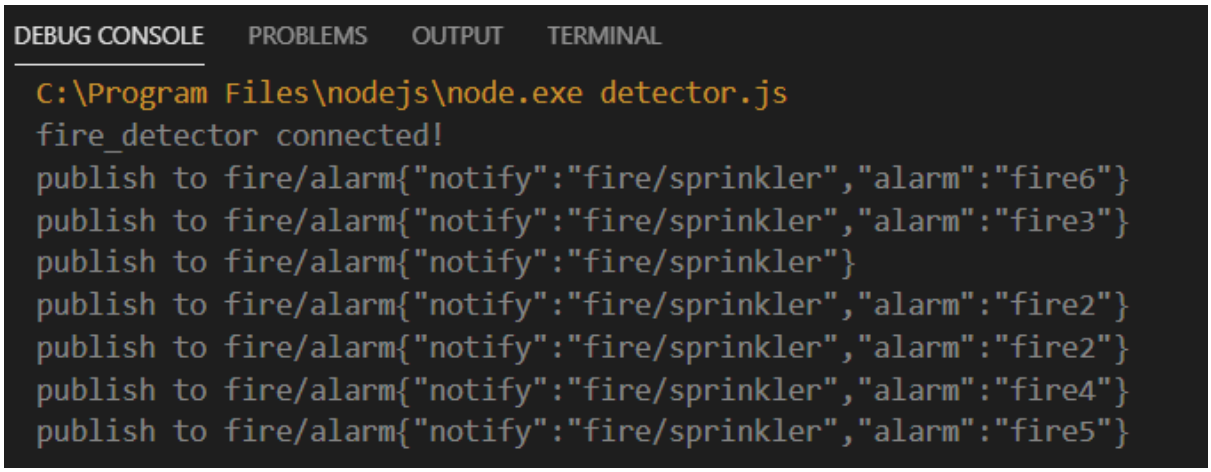
```
    }
    if (topic == "fire/alert/sprinkler"){
        var noti2 = JSON.parse(message.toString());
        console.log(noti2.news);
    }
  })
});
```

4. Result

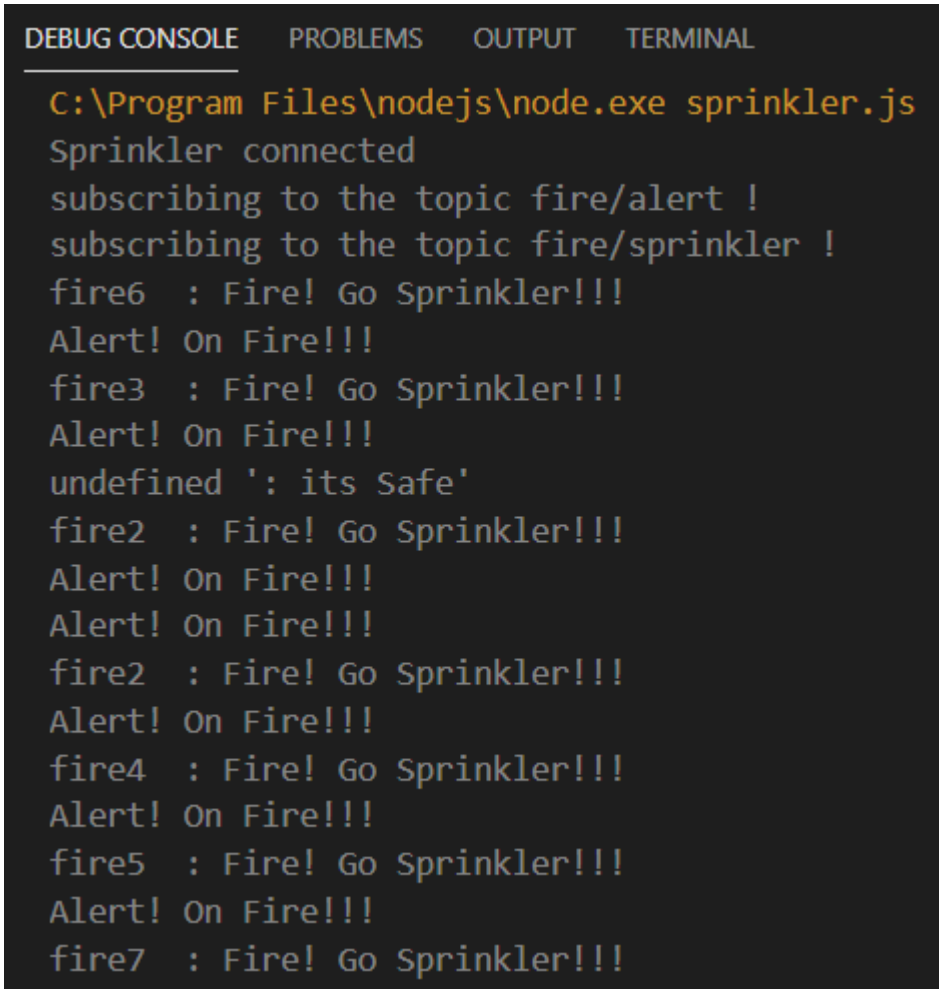
4-1. fire_management_system (Based EC2)



4-2. fire_detector(Virtual Iot Machine)



4-3. fire_sprinkler(Virtual Iot Machine)



5. Conclusion

이번 과제 수행을 통하여 AWS 상에서의 Virtual Machine 간의 mqtt 통신의 전반적인 이해를 할 수 있었다. 각각의 디바이스에 policy를 attach하여 publish . subscibe . receive . 와 같은 기능 등을 통하여 메시지를 주고 받는 것을 확인 할 수 있었다. 실제 디바이스를 통한 실습을 해보지 못한 것이 많은 아쉬움으로 남는다.