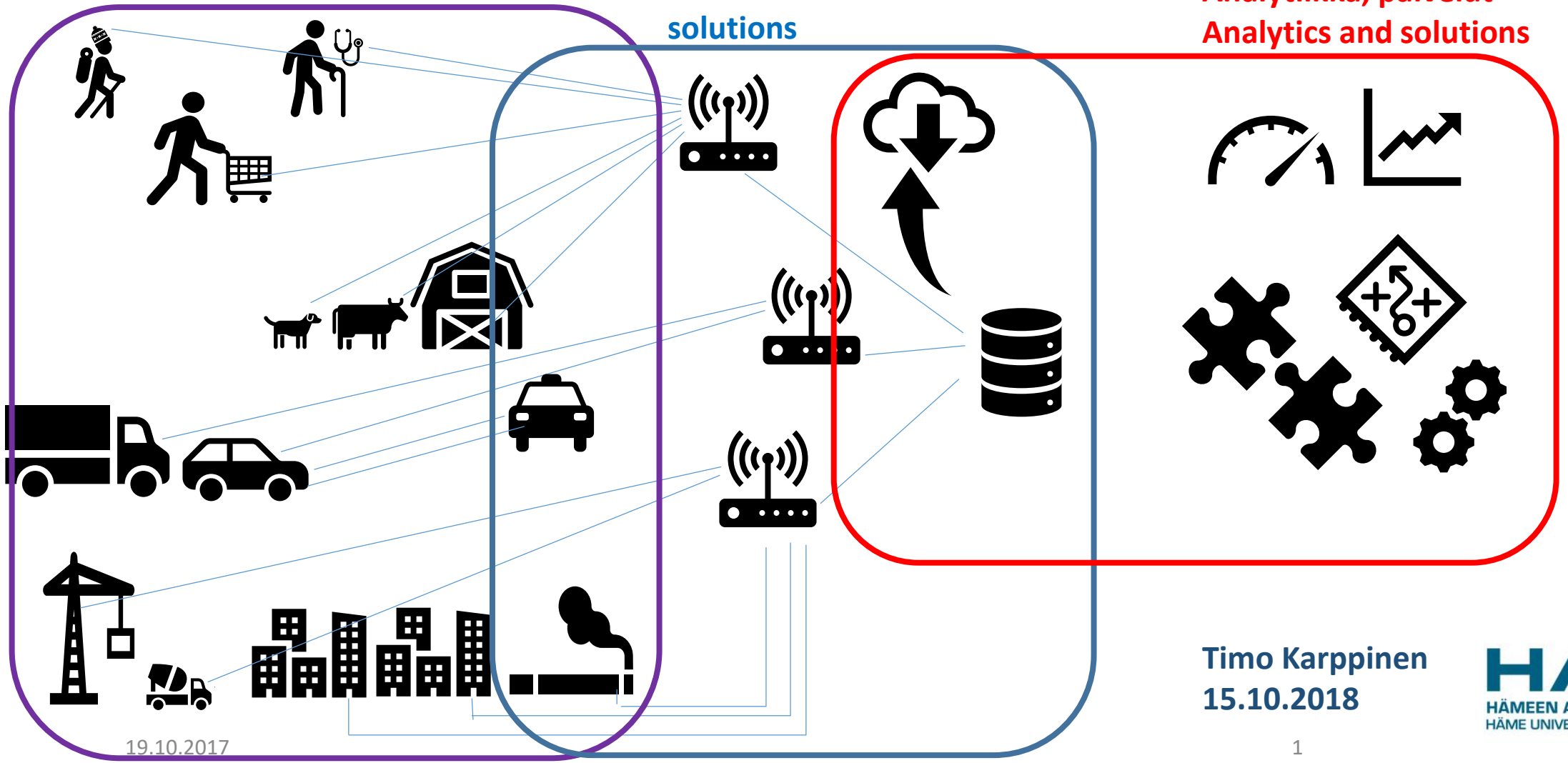
IoT Internet of Things – Esineiden Internet

Anturit ja laitteet – Sensors and devices

Tiedonsiirto- ja palvelinratkaisut – communications and server solutions

Analytiikka, palvelut – Analytics and solutions



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Timo Karppinen

15.10.2018

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IoT is a Business – but for which players?

Automation

- Capital investment on industry production line 1 milj. € .. 100 milj. €
- Automation for production line 100 thousand € … 10 milj. €
- Engineering design work done for production line 20 thousand € … 2 milj €

IoT

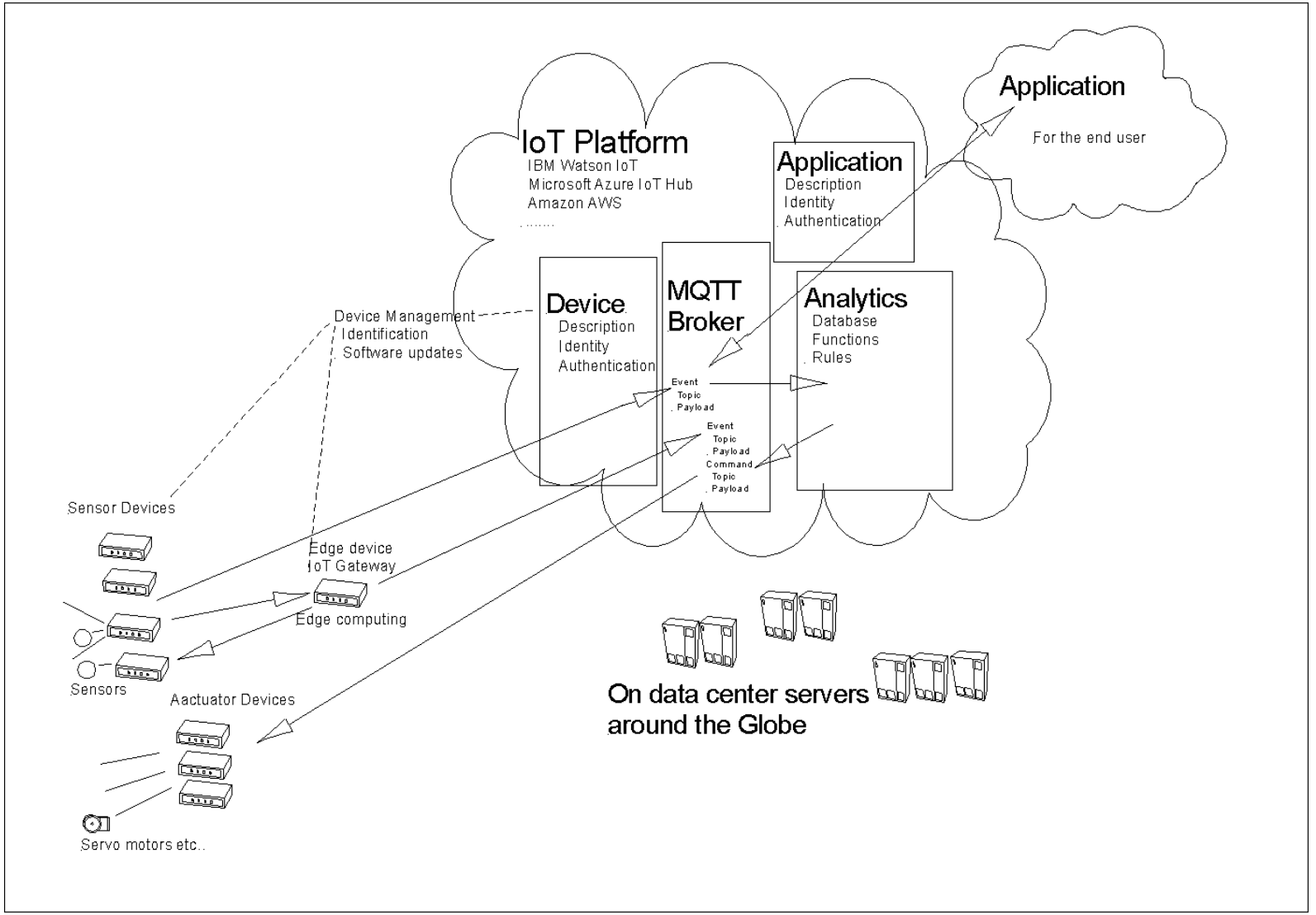
- Sensors , camera modules, etc. 1 € … 10 € each
- Processor for local processing and a module for communications 5 € … 50 €
- Monthly fee for processing in cloud application xx € / kk.
- Monthly fee for analytics capacity, etc. xx € / kk.
- Customer support xx €/kk.
- Modifying the application for specific needs xx €/kk
- ???? What is most important for generating turnover euros ?????

IoT as a part of product or part of service

The products or services have existed already and IoT is used for giving more value for the business:

- Timing of service activities
- Prediction of service needs
- Collection of user experience details
- Benefits for third parties; market segment analytics, etc.

IoT Platform , IoT MQTT Broker



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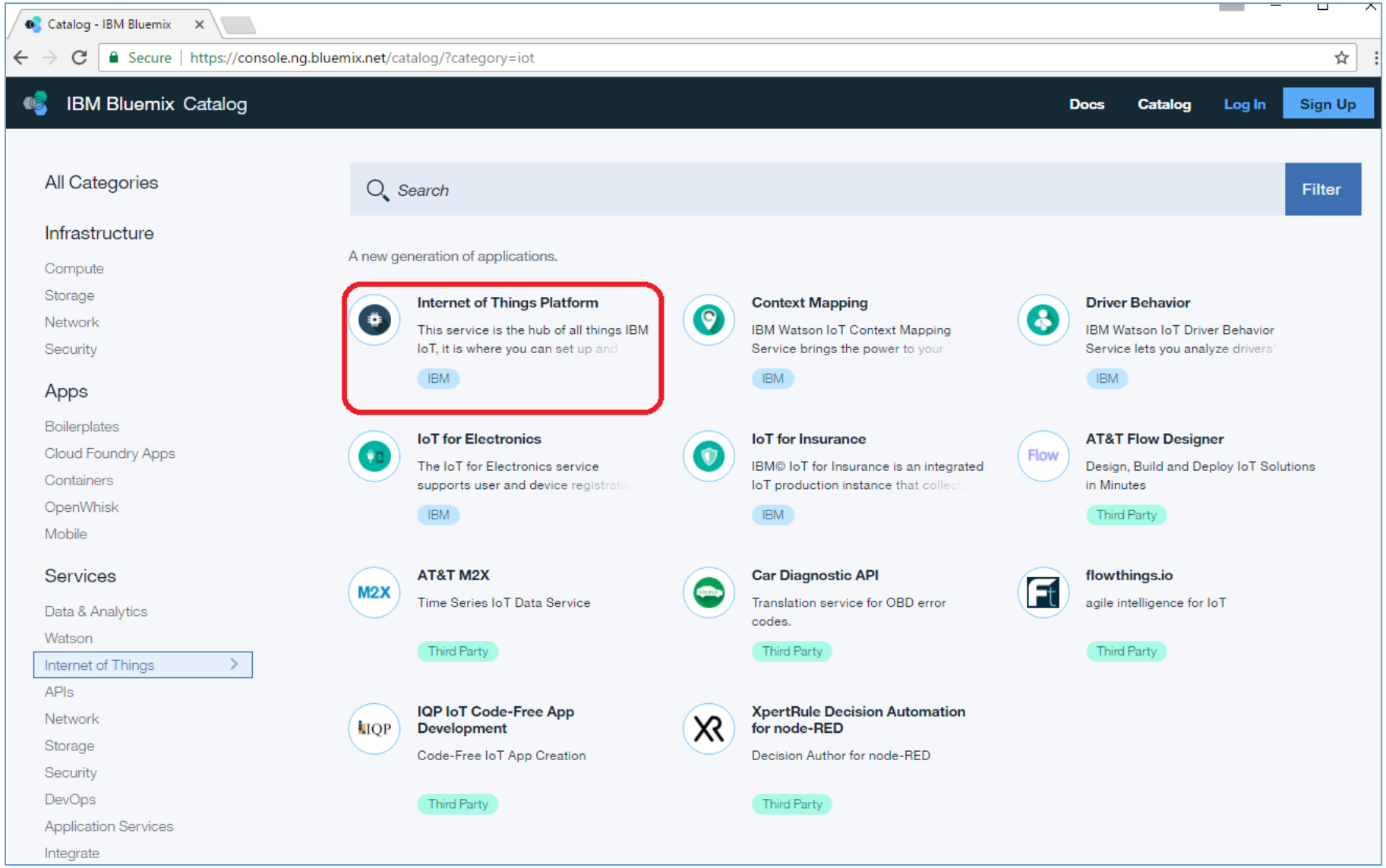
IoT Platform: The platform in IBM Cloud



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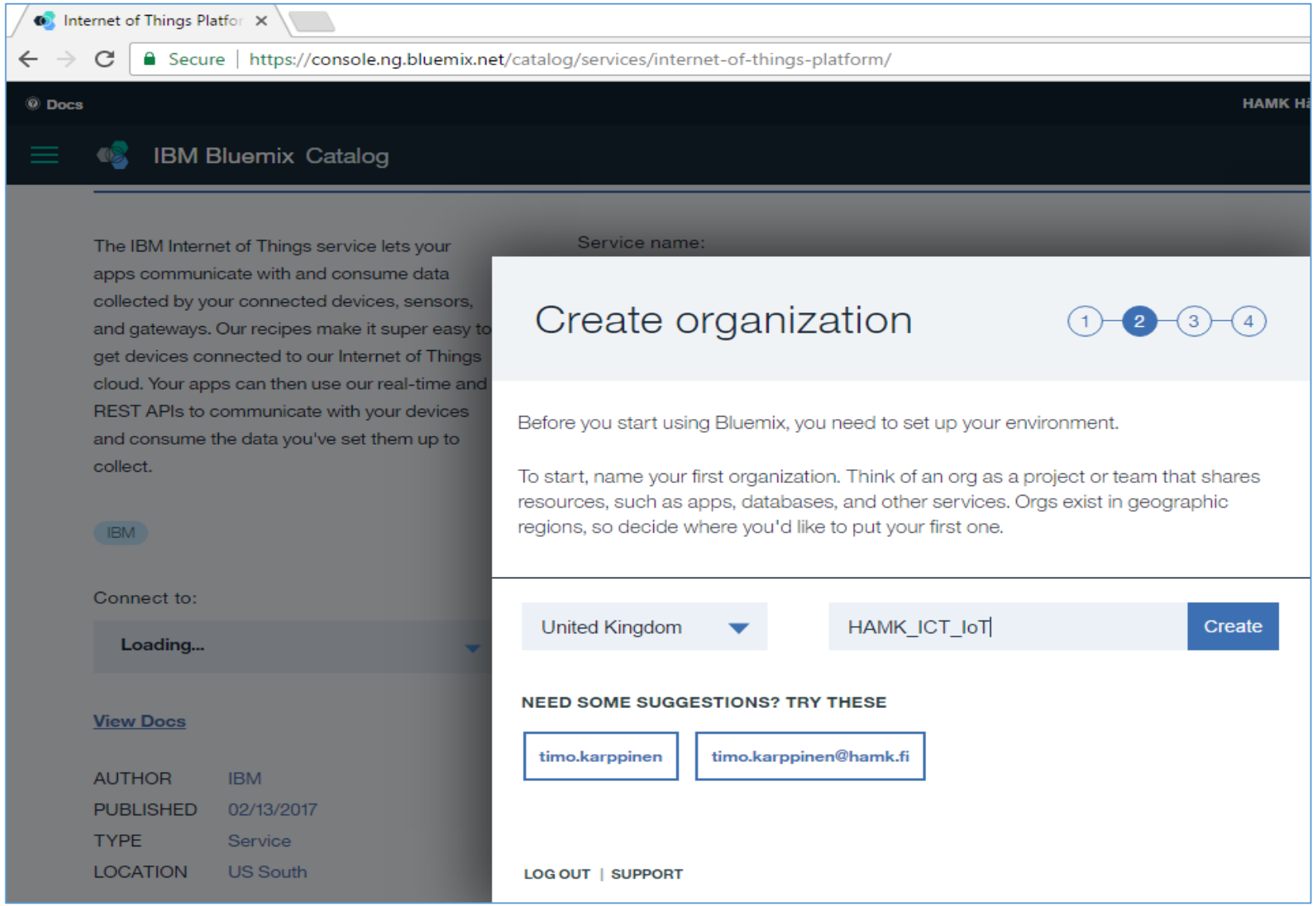
IoT Platform; Create an ”organization”



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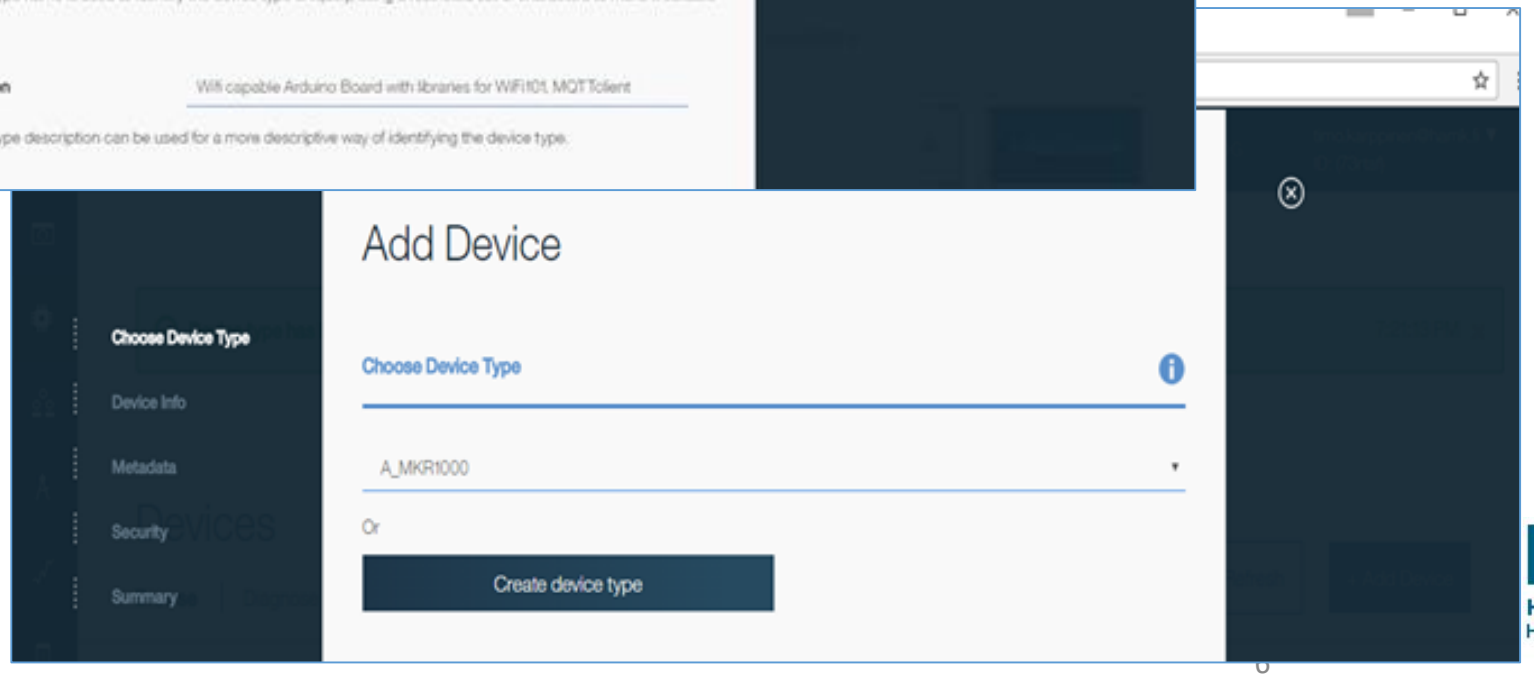
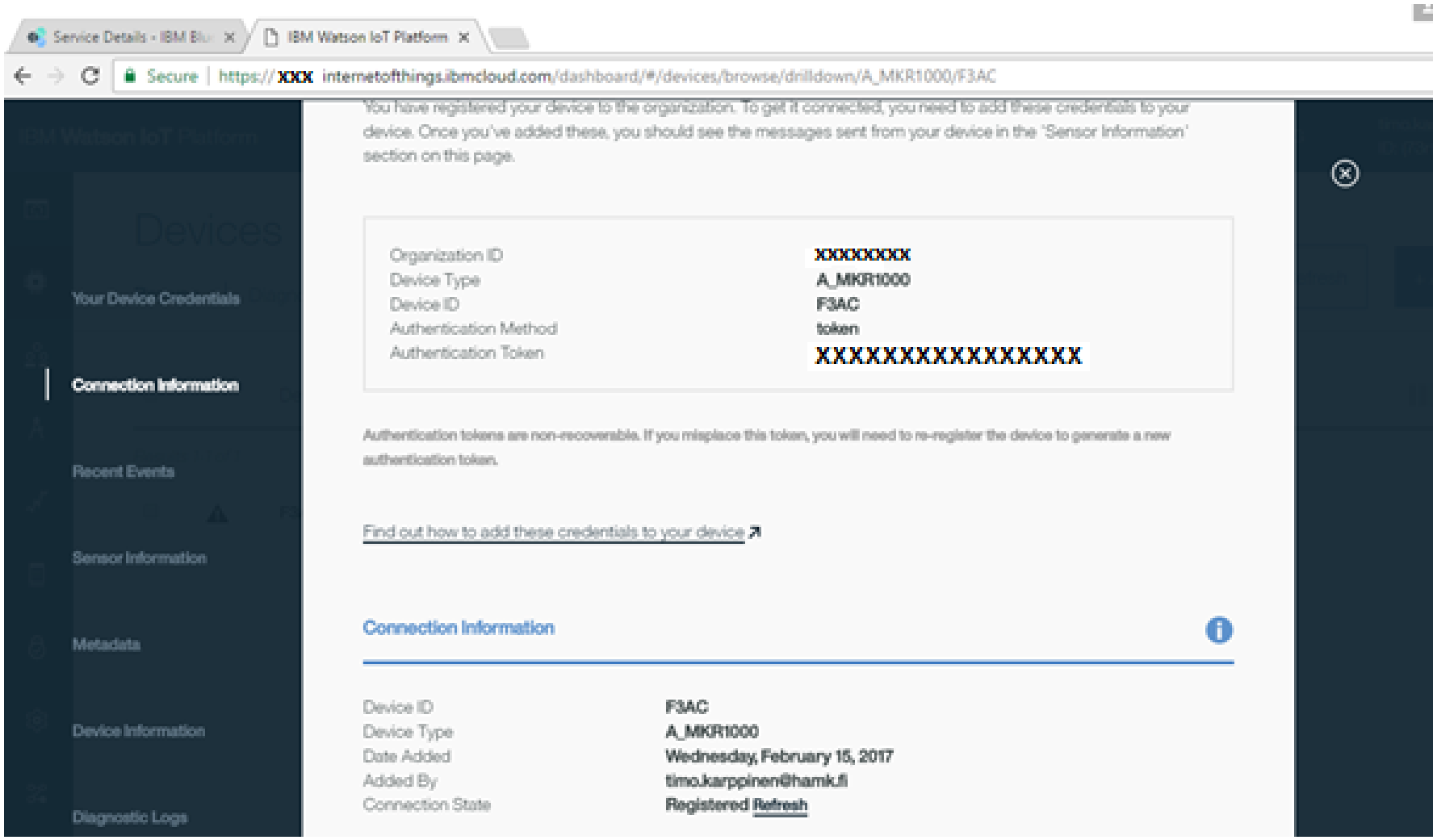
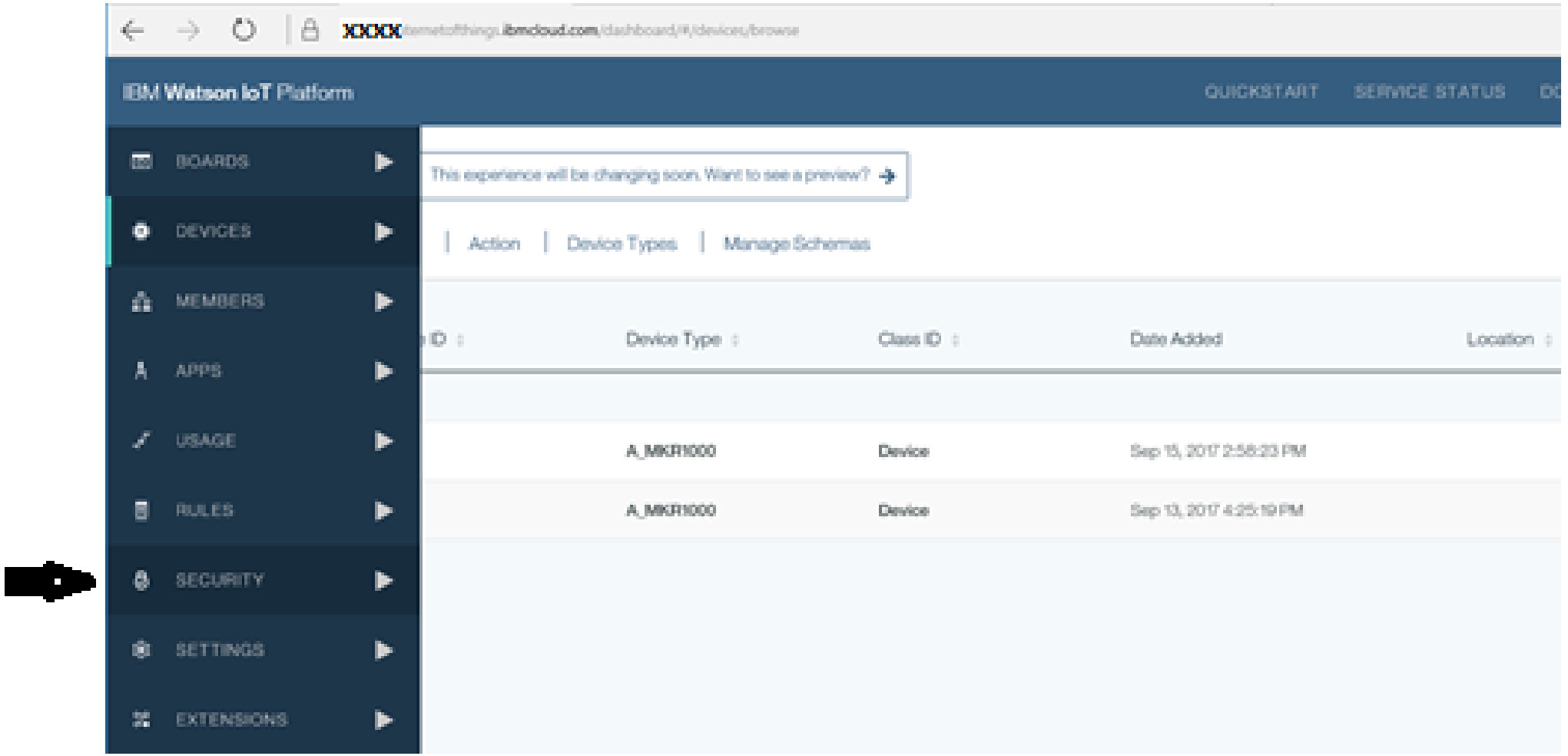
IoT Platform; Create a Device Type
Add Device for each of your devices



IoT Platform; An Authentication will be created for each individual device



IoT Platform; Adjust the security settings



IoT Device - Microcontroller; It is time to write the software…..authentication…..

```
#include <SPI.h>
#include <WiFi101.h>
#include <WiFiSSLClient.h>
#include <MQTTClient.h>

// WLAN
char ssid[] = "Moto_Z2_TK"; //  your network SSID (name)
char pass[] = "xxxxxxxxxxxx";    // your network password (use for WPA)

//char ssid[] = "HAMKvisitor"; //  your network SSID (name)
//char pass[] = "xxxxxxxxxxxxxxxxxx";    // your network password (use for WPA)


// IBM Watson
// Your organization and device needs to be registered in IBM Watson IoT Platform.
// Instruction for registering on page
// https://internetofthings.ibmcloud.com/#

//char *client_id = "d:<your Organization ID>:<your Device Type>:<your Device ID>";
char *client_id = "d:xxxxxxxx:A_MKR1000:DF48";
char *user_id = "use-token-auth";   // telling that authentication will be done with token
char *authToken = "xxxxxxxxxxx"; // Your IBM Watson Authentication Token

//char *ibm_hostname = â€œyour-org-id.messaging.internetofthings.ibmcloud.comâ€
char *ibm_hostname = “xxxxxxxxx.messaging.internetofthings.ibmcloud.com";
```

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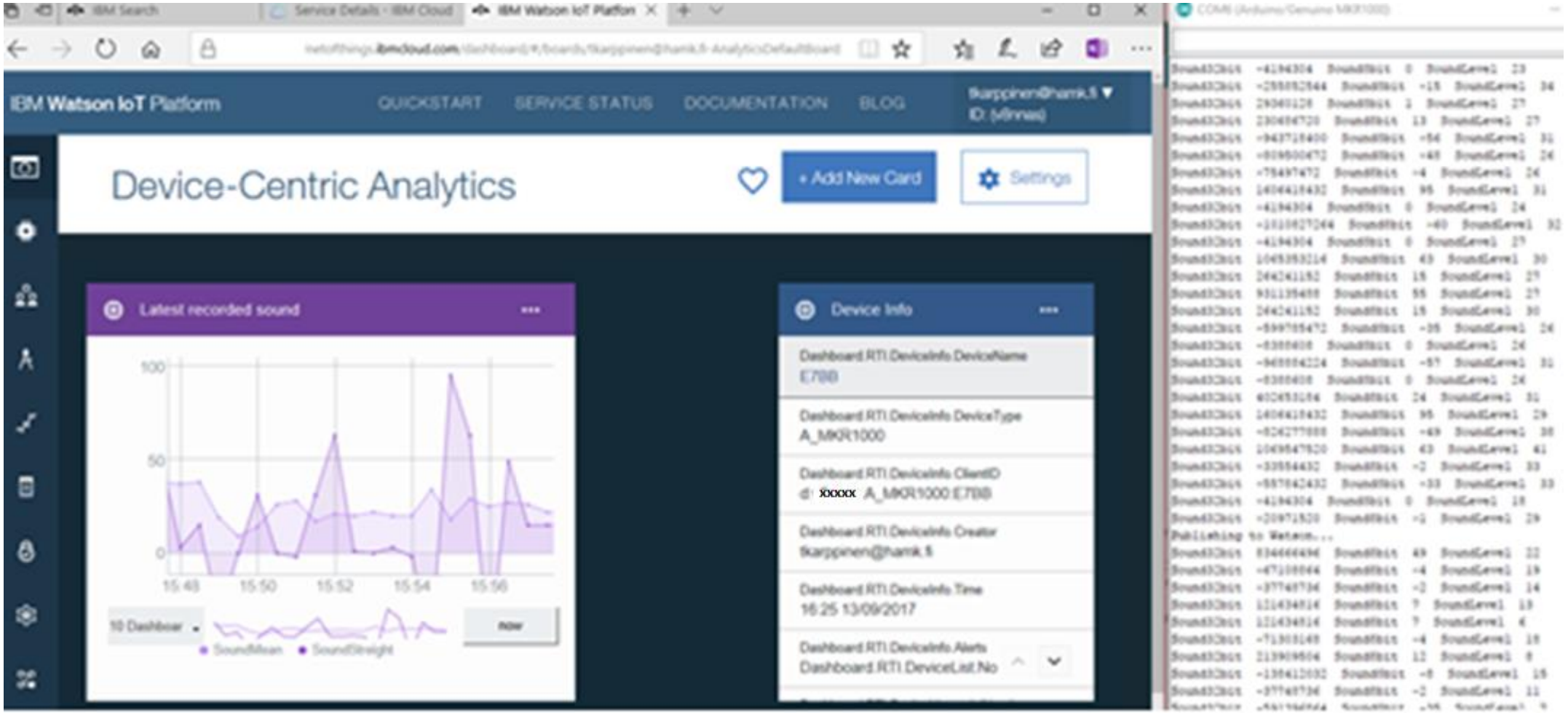
IoT Device - Microcontroller; It is time to write the software…..add a mqtt message…

```
 /*
   client.begin("<Address Watson IOT>", 1883, net);
   Address Watson IOT:
<WatsonIOTOrganizationID>.messaging.internetofthings.ibmcloud.com
   Example:
   client.begin("iqwckl.messaging.internetofthings.ibmcloud.com", 1883, net);
  */
  MQTTc.begin(ibm_hostname, 1883, net);
.
.
.
.
      String wpayload = "{\"d\":{\"TemperatureSensor\":\"TC1 \",\"TempScaledF3AC\":" +
      String(tempScaledF)+ ", \"TempStreightDF48\":" + String(temp14bit)+"}}";

      MQTTc.publish("iot-2/evt/TemperatureTC1/fmt/json", wpayload);
```

IoT Platform; Data in the Dashboard



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IoT Platform; Analysis with node.js and NodeRED or the **NodeRED on Watson IoT**

The Node.js needs to be installed on computer. The installation file can be loaded from a web page.
https://nodejs.org/en/

NodeRed will be installed by following insructions at
https://nodered.org/docs/platforms/windows

Type on the command line:
npm install -g --unsafe-perm node-red

Getting started on IBM Cloud Watson

A new development can be started by installing a starter kit on IBM Cloud Watson. Instructions and installation: ”Create and Connect a Node-Red device simulator” .
https://console.bluemix.net/docs/services/IoT/noderedddevice_sample.html#creating-and-connecting-a-node-red-device-simulator

Installing a starter kit
https://console.bluemix.net/catalog/starters/internet-of-things-platform-starter

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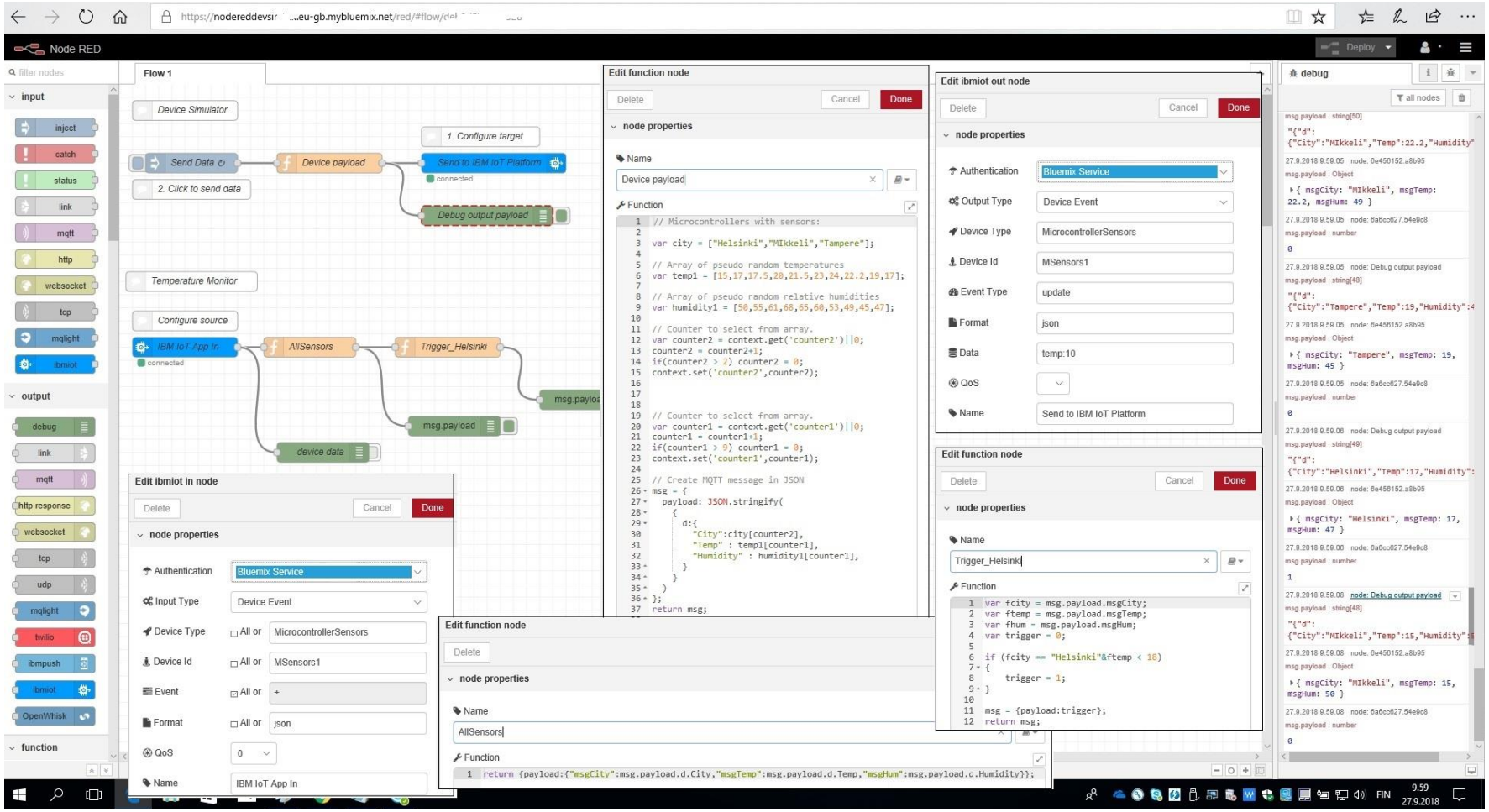
IoT Platform; Analysis with **NodeRED on Watson IoT**



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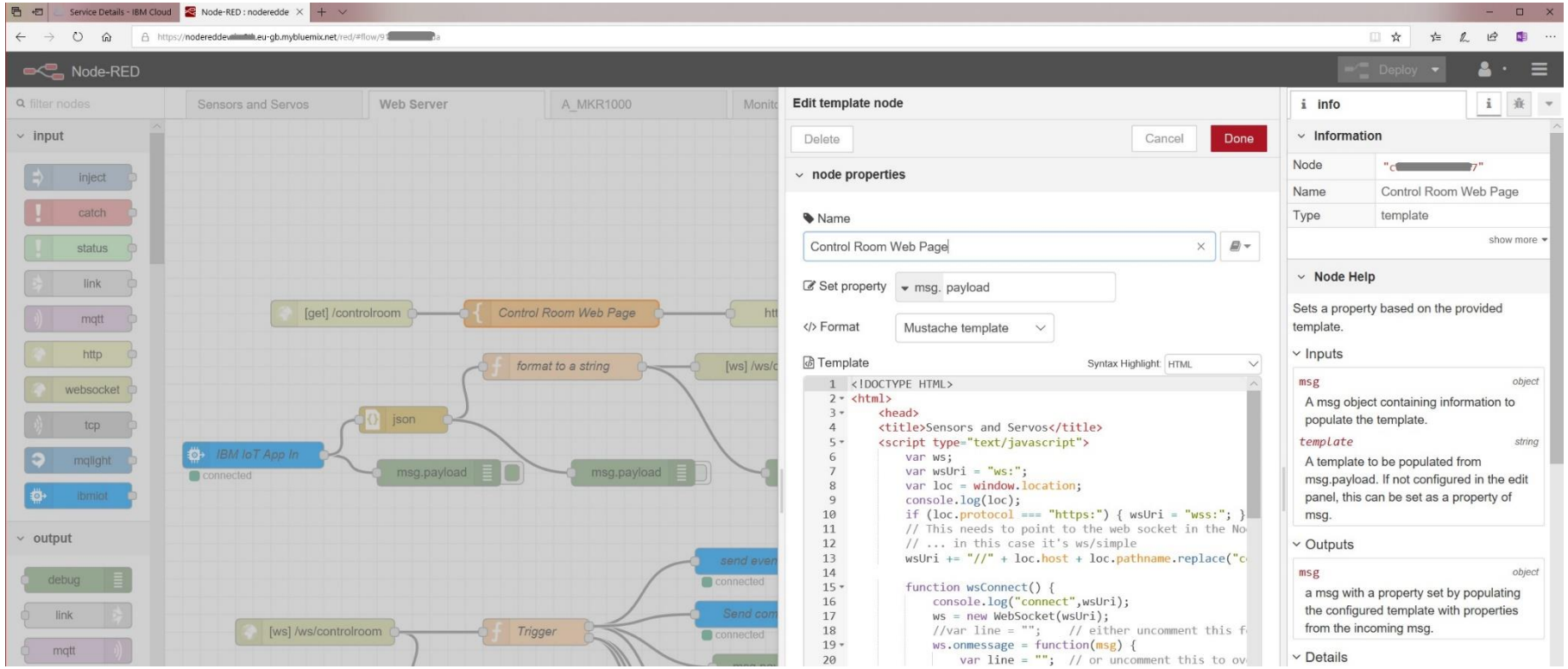
IoT Platform; User interface on

- Web page code can be inserted into a NodeRED flow



- Web page interface is typically for the “end user”

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IoT Platform;

We have had a look on the signal chain from sensor value to user interface

Thank you for your attention!

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