Challenge Azure IoT Integration

Semester 4 IOT

Discover Azure IoT

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Course: Smart Industry

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Acronyms

Acronym	*Meaning*
IOT	→ Internet of Things
ESP32	→ Expressif32
TTN	→ The Things Network

Table 1 – List of acronyms used throughout the report

Introduction

The assignment on which this document presents a small challenge of IOT subject. In this subject, we will learn how to use hardware to connect to the internet using internet protocols and such. The hardware that is going to be used to demonstrate these protocols is an ESP32. The ESP32 is a microcontroller that is used in embedded systems with an inbuilt wireless connectivity. In the following sections will provide the procedure and conclusion of the assignment.

Procedure

In this assignment, we will learn and work with Microsoft Azure. Microsoft Azure or most people just call it Azure is a cloud computing platform or service created by Microsoft. Azure provides a wide range of cloud-based services including virtual machines, storage, database, analytics, networking and more. Azure is designed to help company and organizations of all sizes to build, deploy and manage applications and services at a global scale. It offers a secure, reliable and flexible cloud platform that can be used for a variety of purposes such as hosting websites and applications, running big data analytics, creating artificial intelligence and machine learning models.

In this assignment, we are going to learn one of its services called IoT hub. IoT hub enables Azure's bi-directional communication between IoT devices and cloud applications. It is a fully managed service that is used to connect, monitor and manage multiple IoT devices from simple sensors to powerful smart industry machines.

Since it is a paid service, we are provided an Azure account by the school to login. After login in, we are to create a device and give it a name that can be used as a device ID. On the ESP32 side, the assignment provided a code that needs small configurations before it is ready to upload to the device. ESP32 also needs a unique credential called the connection string. A connection string is a string of characters that contains the information needed to connect an application to a database or other Azure resource. It typically includes the location of the resource, the authentication credentials and other parameters required to establish a connection.

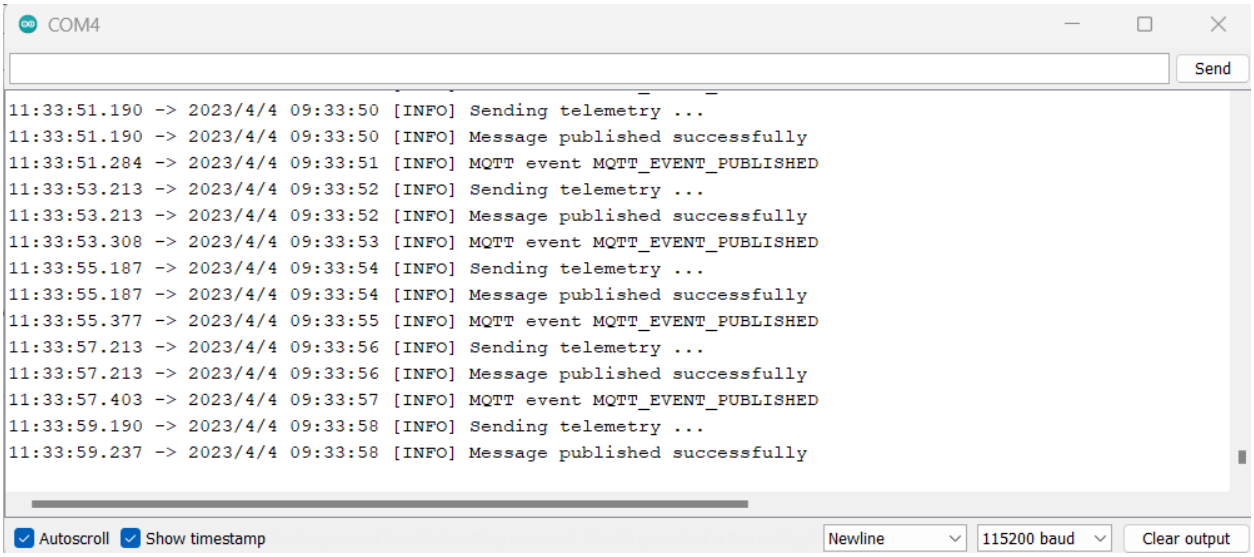

Figure 1 ESP32 Serial Monitor

As you can see in figure 1, messages are being successfully published to IoT hub. To be able to see these messages, we have to activate Azure Streaming Analytics so the messages received are directed to Azure cloud/MQTT. (See figure 2)

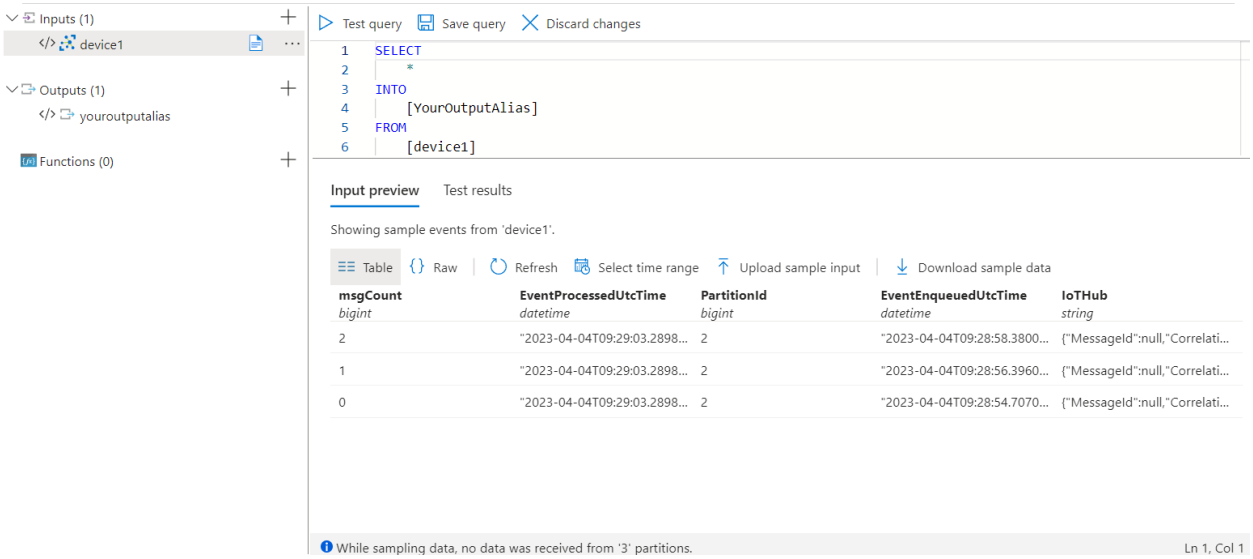

Figure 2 Azure Analytics

The messages are in a database and a query code is needed to see all the information of the connected device.

To further experiment with Azure, we are going to use Node-Red to inject payloads to IoT hub as you can see in figure 3.

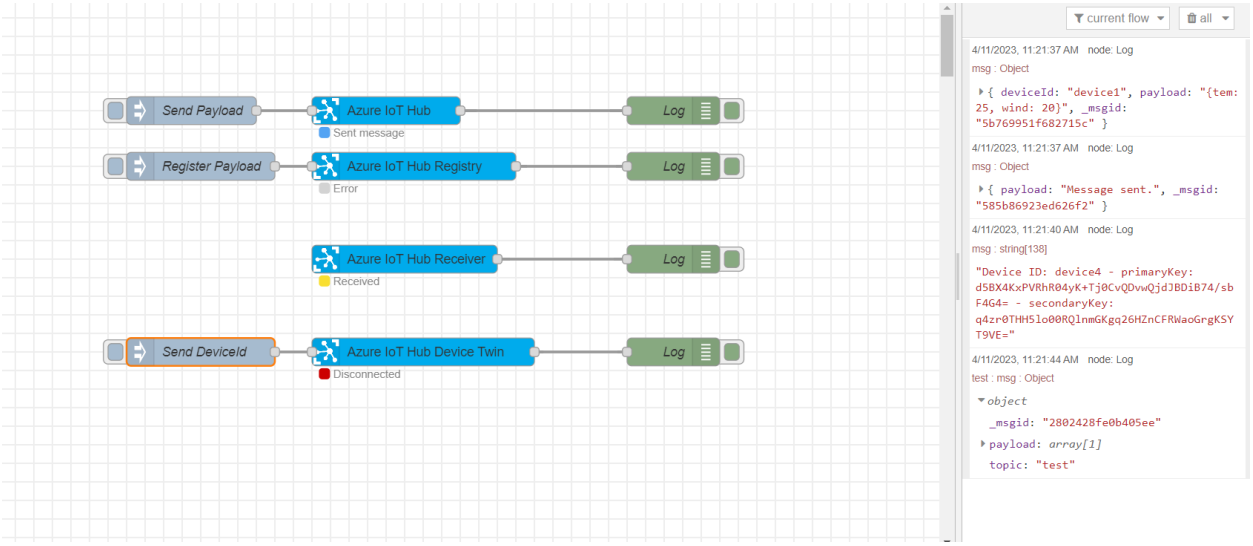

Figure 3 Node-Red Flow

The flow in the figure above contains 4 cloud nodes and each one of them will perform different task for IoT hub. The first node let us send messages to IoT hub. The second one lets us register

devices with your IoT hub. Third node is a simple receiving device to cloud messaged via Azure Events Hub endpoint and lastly the fourth node lets us retrieve Azure IoT Hub Device Twin.

Conclusion

To conclude this assignment, we gained knowledge about one of the popular cloud computing platform and experiment with one of its services. Azure is a widely used in smart industry to establish, manage and deploy IoT devices and application services on a global scale. It is also up to date with its security to avoid hackers and there is a lot of tutorials and a huge community to learn how to manage one of the services provided by Azure. With all things considered, it is a great learning outcome and hopefully we get to use Azure again in the upcoming assignments.

Reference

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