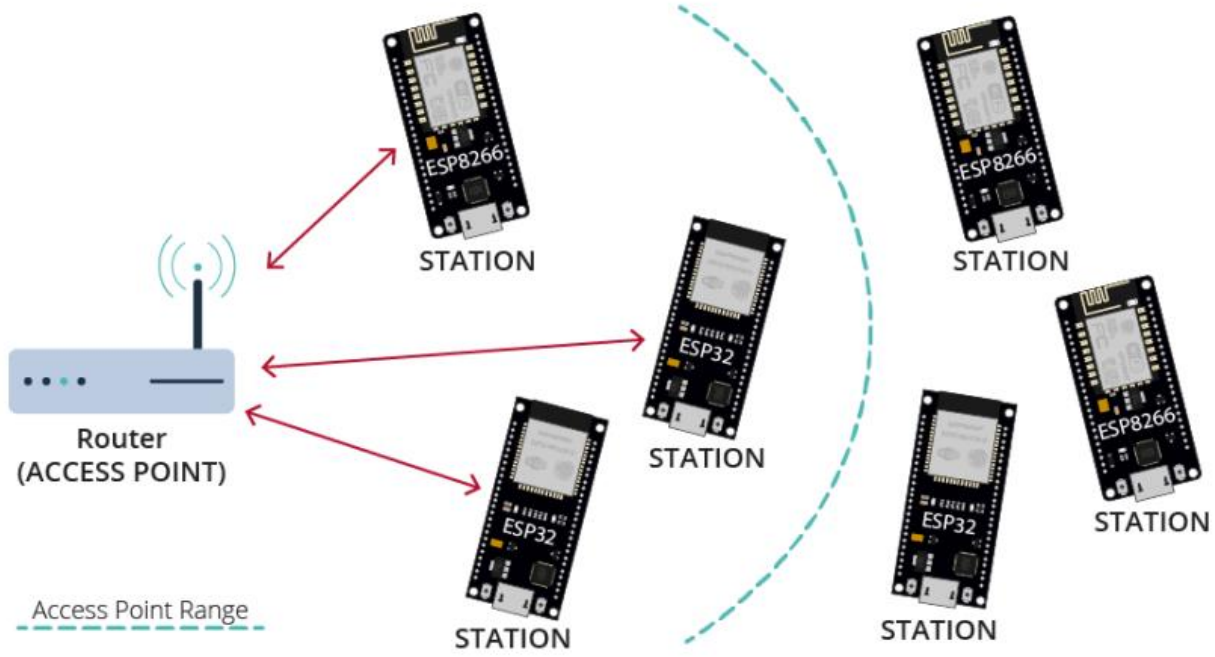
Challenge Meshed network



Semester 4 IOT

Let’s Mesh with Painless Mesh

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Course: Smart Industry

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Acronyms

Acronym	*Meaning*
IOT	→ Internet of Things
ESP32	→ Expressif32
MQTT	→ MQ Telemetry Transport

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 challenge, we will be using the PainlessMesh library on the ESP32 and upload some basic example sketch. The assignment provided a tutorial as an introduction for mesh networks. The tutorial shows us how to broadcast a message at a certain interval to people who has the same mesh details. That way we can make each individual microcontroller work on sending messaging simultaneously.

Extension

We further investigate the PainlessMesh library and try to push messages to Node-Red through MQTTBridge. By using two ESP32, one will be the access point to make a bridge between Node-Red and ESP32 nodes as you can see in figure 1 below.

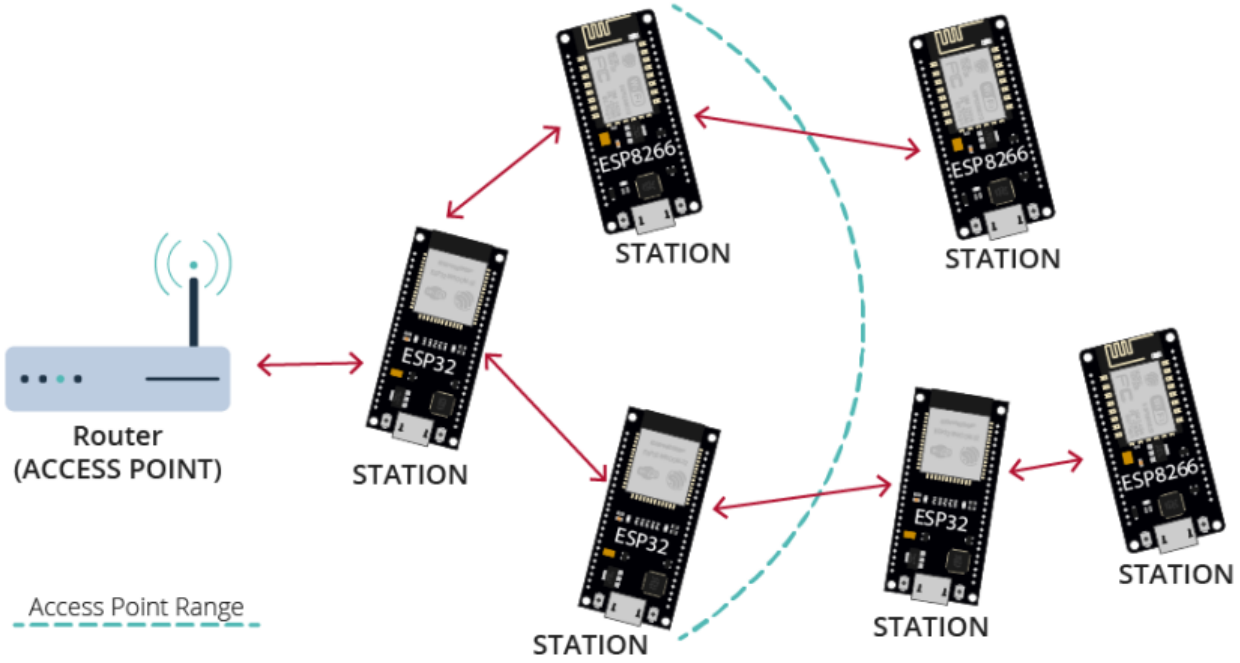

Figure 1 Mesh network architecture

To create the same architecture shown in figure 1, we looked for example sketch inside the PainlessMesh library and modified it with a different access credentials to make it private so that we can only broadcast to certain ESP32 and of course everyone has to be on the same channel to be able to receive the messages.

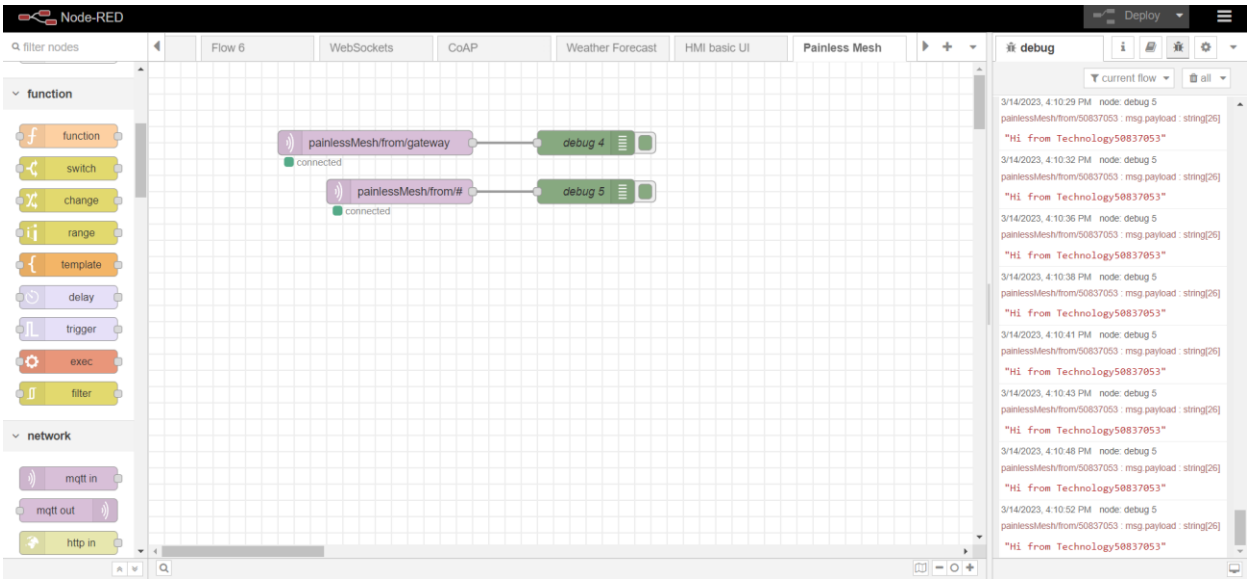

Figure 2 Node-Red flow

In figure 2, we used the knowledge from previous workshops and created a MQTT node with a topic to capture the messages that passes through the MQTTBridge. With the debugger block, we can see the messages being received by the ESP32 node

Conclusion

To conclude this assignment, we learned how to connect and send messages simultaneously using mesh network and by using an access point to pass all the message to the Node-Red server. At first, we were having trouble getting message from the node despite having the same mesh details. However, while using the Airport Utility app we saw that the ESP32 node was on a different channel than the access point. We changed it and fixed the issue and we were successfully receiving message on Node-Red. We hope that we can use the learning outcome of this assignment in the upcoming projects.

Reference

Strobistar, Santos, S., Tony, NguyenVu, Gilbert, Sergi, K., D., Graham, Larry, Neil, Ralph, Jp, Tomtom, Straw, J., Eulamie, Alvim, E., Seixas, M., Nuno, Tanny, … Jaeil. (2020, November 23). *ESP-mesh with ESP32 and ESP8266: Getting started*. Random Nerd Tutorials. Retrieved March 19, 2023, from https://randomnerdtutorials.com/esp-mesh-esp32-esp8266-painlessmesh/