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## Summary

Last week, the code of reading and writing the wav file in C programming was completed. Since the final purpose of the code is writing wav file using sampled acoustic data, the team tried two different ways. First was writing wav files in the ESP32 and sending those wav files through UDP connection with C and the second is sending sensor data through MQTT with Arduino IDE.

UDP is more suitable for projects. So, figure out how to communicate between the end node and gateway. As a result, it must need socket programming.[6][7][10] When the UDP transmission file will be changed to packet[8] and after transmission the packet should be turned into a file.[12] the most important thing is that transmission should be fast and don't lose many packets.[9]

At first, since the environment to get the real-time data is not set, existing wav file was used to build the sound filtering code. However, the code was so far from the purpose. It was necessary to build the header of the wav file but it was not easy to make the header with no standard. [4]Also, the way to build the header is so different between using real-time data and using existing data.

Since the LoRaWAN hacking team has established their network environment, it seemed possible to register the RAK7249 gateway to their servers. But the RAK gateway was not accessible through AP mode or WAN port. So it had to be disassembled to reset it. While doing the disassembling, the fact that a power cable was not connected to the RAK main board was found, and it was reconnected. And RAK was connected to the local network server of the hacking team, which is connected to the Internet. After installing the gateway bridge to the network server, and changing some configuration of the gateway, it was successfully registered to the chirpstack. In the application server of the Chipstack, it showed the uplink packet successfully received by the gateway.

But to use it to the Coyote project, a new application server and a network server was needed. Last week, the reason the gateway cannot be connected to the things stack cloud server was presumed to be the lack of internet connection of the gateway. Since it was connected to the internet through hacking team's network server, the team tried to connect the things stack with the gateway and it succeeded.[11]

## What Coyote Team completed this week:

- Connecting Rak Gateway and The-Things-Stack cloud server using LoRaWan
- Transmit the file on UDP using C programming
- Conducted a test experiment sending audio sensor data to Raspberry Pi through MQTT.
- Connected MAX4466 to ESP32 on breadboard

## Things to do by next week

- Add end nodes in application server
- discuss how we can send some files through UDP
- research about file carving
- Writing code of sound filtering in NodeMCU
- Making wav file using signals of acoustic sensor (Packet)

## Problems or challenges:

- How to send .wav files with UDP, Socket connection
- How to add file extension in C command
- How to filter the sound and extract the data
- How to set the frequency boundary of the data

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