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From: IIEEE

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Summary

This project had five parts: Kubernetes, Backend, Frontend, Design, and Network. Every team member decided to be in charge of each part they wanted. A wireframe was discussed in the best direction for this project. In the web interface, some graphs showing sensor data were located on the top and a map for all locations in the States was on the bottom. In addition, the paper and presentation were prepared for the midterm. Two people were chosen as presenters and others were written a draft of the paper. This week was time to make a specific direction and frame for the project and prepare for the midterm.

What IIEEE completed this week:

- Dividing up the work
    - The parts wavered between what the team members wanted to do and what they were good at.
    - In conclusion, the leader of each work was decided who is the best at each work. Each working member was what wanted to do that work.
    - Conclusion (The first member in each part is a leader)
        - Kubernetes: Sungjin Park, Gayoung Yeom and Haegyeong Im.
        - Backend: Haegyeong Im.
        - Frontend: Gayoung Yeom and Dayeon Won.
        - Design: Dayeon Won and Minji Kim.
        - Network: Minji Kim and Sungjin Park.
- Wireframing
    - Presentation
        - Each team member made the wireframe and announced it.
    - Discussion
        - Should log-in be developed?
            - There will be no time to develop the functions which are not much related to this project's subject. This project will not be deployed, so user confidence does not have to be built.
            - Web's local storage will be used instead of login.
    - Use Case
        - The users open the main page.
            - The users' location can be tracked by Global Positioning System(GPS).
        - The users check the weather data sets based on their location.
            - The users can search the weather stations by zip code.
        - The users can set the sensor data's range.
            - The sensor data's range is the range that is needed for the users' cultivation.
            - If the sensor value becomes out of range, the users can discover it.
- Writing a draft of the introduction

    - Paper flow
        - An issue was raised. The issue is that the farmers in the States need to know the weather condition of their large farms where they could not see.
        - A solution is presented. Providing weather condition services for farmers using the Long Range Wide Area Network(LoRaWAN) can solve this problem as LoRaWAN can cover long-range wide areas.
        - This project's service and subject are explained in detail.
        - This project's subject comes down to a sentence: This service is a platform visualizing real-time weather condition data from LoRa for farmers.

Things to do by next week

- Writing a Literature review of the paper
- Finishing writing a draft of the paper for mid submit and request feedback
- Preparing a presentation and making a PPT

Problems or challenges:

- Struggling with selecting each part
    - Part leader
        - There are five parts mentioned above. The problem was that two people wanted to be a leader of Kubernetes.
        - After a long conversation, the fact came out that one has been more interested in Kubernetes than the other.
    - Members
        - Each part was decided to have two members including the leader. However, there was one person in Backend and three people in Kubernetes.
        - There were two opinions that it is okay three in one part and it is not okay. As one person strictly suggests dividing equally, it was hard to gather opinions.
        - Having enough discussion, all team members agree to divide three and one.
- Buying equipment at a reasonable price
    - It was hard to get a Raspberry Pi(RPi) as the price has become expensive recently.
    - There were 4 RPis that were located in K-SW. It was not enough for testing this project.
    - Instead of RPi, more efficient equipment was found by Prof. Smith. It is ESP32 which is cheaper and has more battery efficiency than RPi.

- Losing direction of the project
    - The main topic was a comparison between Docker and Kubernetes. However, it was confused about the meaning of “comparison” of the distributed system.

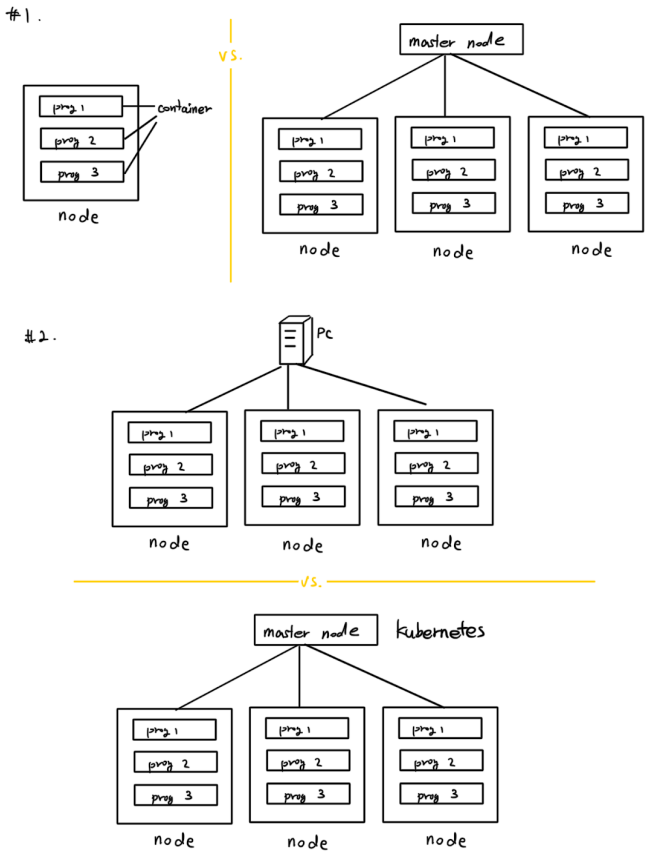

Fig. 1. Two Cloud Architectures

- Fig. 1 is two options for this project’s main idea which is part of containerizing. The first one is using Docker with one node and using Kubernetes with some nodes. It looks like a process of development not a comparison between them. The second one is based on a distributed system. Either using Docker or Kubernetes, it does not matter the count of nodes. It might be fit well with the meaning of “comparison”.
- After discussing and getting feedback from Ph.D. Lee, it was decided to choose the first architecture. It might have more novelty.

References

J. Muangprathub, et al., “IoT and agriculture data analysis for smart farm,” in *Computers and Electronics in Agriculture 156 (2019)*, pp. 467-474.

M. Ji, J. Yoon, J. Choo, M. Jang and A. Smith, "LoRa-based Visual Monitoring Scheme for Agriculture IoT," *2019 IEEE Sensors Appl. Symp. (SAS)*, 2019, pp. 1-6.

R. K. Kodali, S. Yerroju and S. Sahu, "Smart Farm Monitoring Using LoRa Enabled IoT," *2018 2nd Int. Conf. on Green Computing and Internet of Things (ICGCIoT)*, 2018, pp. 391-394.

N. Naik, "Docker container-based big data processing system in multiple clouds for everyone," *2017 IEEE Int. Syst. Eng. Symp. (ISSE)*, 2017, pp. 1-7.