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From: IEEE

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Summary

This week, a new team member, Xavier, joined this team. With him, paper writers got advice on paper and rewrote the introduction part base on his feedback. Mid-presenters fixed their presentation material and the script with him.

What IEEE completed this week:

- Meeting with a new team member, Xavier
 - After meeting with the new member, Xavier who is interested in networking, some feedback about the introduction's flow was sent by him.
- Fixing a draft of the introduction
 - Our past introduction
 - Crop production has gained much importance due to population growth in recent years. Internet of Things (IoT) has been applied in agriculture to reduce labor costs and improve crop yield. In particular, there are lots of cases in America with a large territory that communicate with each farm and exchange much data through Long Range Wide Area Network (LoRaWAN) which operates in low power and covers a wide range. Thus, a real-time visualization platform using farm weather data through LoRaWAN was created for a farmer who has a large farm. It will help the farmers to recognize the environmental conditions in which crops grow. The data from LoRaWAN is sent to a service server and is offered via web interfaces.

As the scale of the smart farm system gets larger, lots of data occur. It is necessary to manage data effectively as it generates large-scale traffic in the process of dealing with huge data. There is Docker which is an open-source containerization platform for faster execution and easier deployment. However, as Docker is designed for single container management suitably, overall data management and orchestration become difficult when applying multiple containers. It is unstable to process the heavy traffic with only the Docker. When constructing a system with a single host, all services are down if a deficiency or errors occur on it. On the other hand, building a distributed system with multi-hosts enables services to work normally, even if some hosts have problems, the rest of the hosts can operate.

The role of distributed computing has been important while increasing large-scale services nowadays. Adopting distributed processes in services can

reduce central computer overloading and make it easier to gradually extend the system. For this purpose, various orchestration tools have been offered. Kubernetes has emerged as one of the powerful clustering tools. It is a framework for running distributed systems flexibly. Although there is much traffic, Kubernetes helps the deployment be accomplished stably by performing a load balancing of the network traffic. When a container has errors, Kubernetes recovers the system while replacing containers automatically. It is highly useful in application extensions and overcoming system disorders. Therefore, a farm data monitoring system was made to master distributed containers efficiently using clustering.

The rest of this paper is organized as follows. Section 2 explains Docker and Kubernetes. Section 3 deals with the overall system architecture of this study. Section 4 evaluates the stability of the containerized system using Docker

- After receiving some feedback from Xavier, a draft of the introduction was corrected.
- To change the order of the sentences to show the same context for each paragraph was suggested. So, some sentences were reordered.
- Writing a draft of related works
 - Dividing related works into 3 parts
 - About LoraWAN
 - About Docker
 - About Kubernetes
 - Researching each part and finishing the draft of the Docker part
 - About Docker

Virtualization is widely used in IT services. There are many virtualization technologies. Docker is one of them, which has many benefits compared with other virtualization methods. Among them, docker containers and virtual machines are mainly compared.

Rad et al, concluded that Docker provides some advantages, which are helpful for developers and administrators. It is an open platform can be made use of building, distributing, and running applications in a portable, lightweight runtime, and packaging tool, known as Docker Engine.

Potdar et al, conducted performance evaluation on virtual machine and Docker container-based hosts in terms of CPU Performance, Memory throughput, Disk I/O, Load test, and operation speed measurement. It is observed that Docker containers perform better over VM in every test, as the presence of Quick EMUlator (QEMU) layer in the virtual machine masks it less efficient than Docker containers.

- Preparing mid-presentation
 - The flow of the presentation was divided and scripts for mid-presentation were written.
 - draft of the scripts was sent to the Ph.D. Lee.

Things to do by next week

- Getting feedback about the draft of the introduction from Ph.D. Lee and fixing
- Writing a draft of related works and getting some feedback
- Preparing mid-presentation

Problems or challenges:

- Struggling with making the paper flow and the draft of the introduction.
 - After meeting with Xavier, redesigning the paper flow based on his feedback
 - What feedback he gave is as follows:
 - Paragraph 1 has to contain why crop production is important in detail. However, in the past one written without him, the importance of crop production is not fully explained.
 - Paragraphs 2 and 3 need to convey why IoT has made an impact in agriculture and a specific instance of IoT in agriculture that relates to this paper.
 - In the introduction part, the conclusion of this study does not need to write down in detail. Why this research is necessary and why this paper should be written is more important.
 - Thus, the introduction flow was reconstructed follow as the mentioned.
 - Through this situation, paragraphs 1 to 3 contain the importance to crop yield and the usage of IoT in agriculture.
 - In paragraphs 4 to 5, how Docker, Kubernetes, and LoraWAN will be used and what the aim of the paper is.

References

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