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The Design of Library System using the Cloud Environment Based on the Raspberry pi

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Abstract

Recently, the various types of data are began to increase. In order to manage the data efficiently, a variety of cloud services are being made. However, while providing a cloud service, the problem is the cost and waste a lot of human power to manage the data that is generated and managed by the server. To solve this problem, it is build the cloud environment using a single board computer with Raspberry pi. In this paper, we used Raspberry pi as a cloud server to provide services for the users. And we construct a Total Server to manage the generated data. It can separate the processing of data and the provision of services. We ensure the efficient operation by building a cloud environment with Raspberry pi and by managing the data which generated in cloud environment with the total server.

Keywords: *Cloud, Raspberry pi*

1. Introduction

While the software industry and the internet has developed, it is provided a variety forms of cloud services that can be used by many users at the same time. However, in order to manage the cloud providing services to the users, it also have to be made not only provide a service but also management of data. Therefore in this paper, it is used the Raspberry pi as a server that provides services, This method provide a cloud service while reducing power consumption without the need for multiple administrators to users. Also, a server that manages data to be generated in The Raspberry pi is built separately. To this end, we design the SaaS cloud service environment that performs the operation of the services efficiently even though the performance of device is not good. This paper is organized as follows. Chapter 2 describes the research of cloud and the Raspberry pi, we represent the proposed method and an overall system design with chapter 3. Chapter 4 describes the application system based on the system design and architecture. Chapter 5 refers to the conclusions.

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2. Related works

2.1 SaaS (Service as a Software)

SaaS is also called "on-demand software". This is a software delivery model which the software and associated data are hosting the center and users are connected through client. In addition, it is the software which the network-based approach and manage. One or more supplier used the software platform which has at a remote location, provides the software services to a number of users. The user has to pay fee depending on the amount used. Also SaaS can be seen as the next generation of ASP(Application Service Provider) as an extension of the existing concept of ASP. Figure 1 is shown an overall structure of the cloud system based on SaaS. First, by assigning the IP address to the each cloud server, DNS server communicates with the each cloud server to identify. That is transmitted a software service to the user so that users can be connected to the client via the device such as a smart phone or PC. The user can connect to a client through a device such as PC or smart phone. The user can use service via the IP address of each cloud server providing a service and the overall structure is based on network.

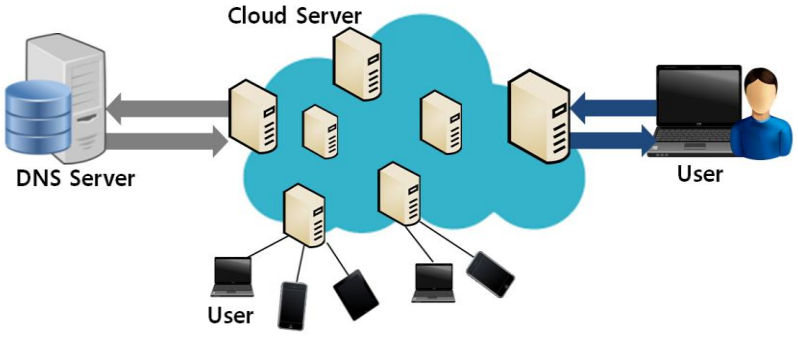

Figure 1. SaaS(Service as a Software)

2.2 Raspberry Pi

Raspberry pi is a single-board computer that has the features which are inexpensive yet superior graphics performance. In addition, Raspberry pi canuse the Linux and Android based operating system. The performance of the CPU and memory are 700MHz and 512MB. And it supports the programming languages such as scratch and Python.

3. The Design of Cloud Service System using Raspberry pi - System Architecture

Figure.2 shows the design of the overall system. First, Raspberry pi server that provides the service, was designed by the Node.JS which forms the basis of the Java script language. It has the client of the services in routes and Mapper includes Member, Product and Service data. The total server that manages the service server and processes thedata,was designed MVC (Model-View-Controller) pattern of the Spring Framework. The business module for servers provides service to controller. The monitoring module manages the Raspberry pi server in real time. The real data module controls the data that can be received in real time on the Raspberry pi server.

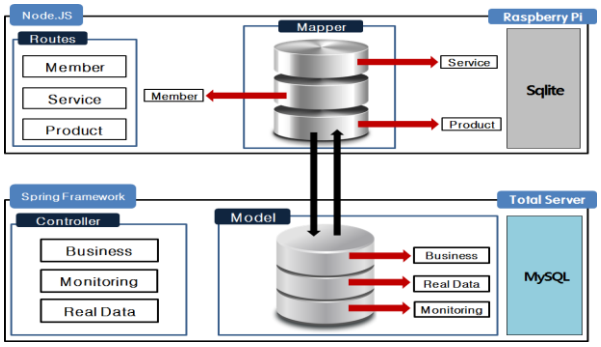

Figure 2. System Architecture

4. Application of System

Figure 3 shows the overall service structure that the proposed system is applied to library services. Afteran user authenticates the member via a bar-code stored in the device such as PC and smart phone, he can borrow a book. Each library has been used a Raspberry pi as server. To build a cloud environment, it allows to exchange information with each other through the Total Server that stores the data of the library. From the information data of the members and book data to raspberry pi, it is possible to provide a rental service libraries. Also, the data that is generated as a rental service users sends the Total Server and the Total Serve manages the data. Total Server stores the data of the library, monitoring in real time that there is a problem with the Raspberry pi server in each library. Since the data backup and recovery is made in Total Server, ongoing management is possible.

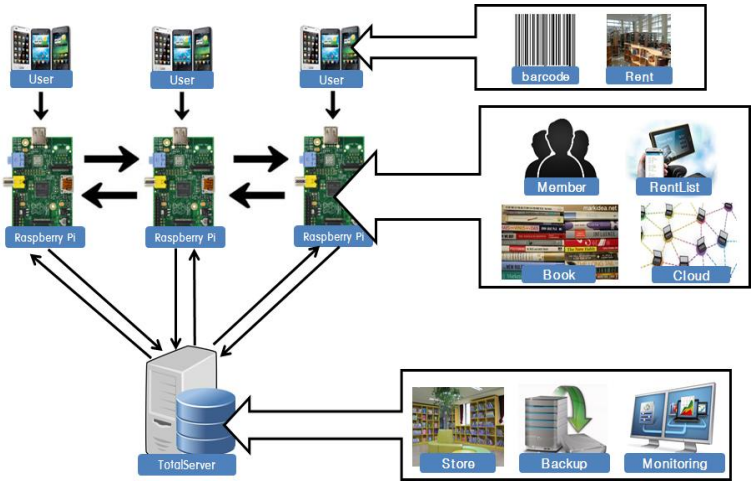

Figure 3. Application of the System

5. Conclusion

In this paper, solving the personnel costs and waste of power that occurs on many common cloud server systems, we proposes that a cloud service provider to the user using cheap raspberry pi. In addition, we constructed a server that manages the data generated by the Raspberry pi. Therefore, we designed a cloud environment that can separate the processing of data and the provision of service. This structure can be performed efficiently. In further study, we will develop a variety of interface design environment based on

the provided service. Of course, due to the low performance of Raspberry, it takes a long load times as low cost disadvantages. However, this problem will be solved with the advent of better single-board computer.

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