

## A Framework of Performance Measurement of Cloud Service Infrastructure System for Service Delivery

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**Abstract.** Cloud computing is a computing paradigm of providing IT resources, such as infrastructure, platform and application, in the form of service by using internet technology. In recent, cloud platform service is being used to establish the platform ecosystem of ICT service industry and ensure application agility. In spite of these trends, the market is not being actively revitalized due to sudden service interruption, users' concern for failure or lack of compatibility between cloud systems. This paper proposes a reliable cloud service for providing objective, quantitative and measurable performance results on cloud service. In particular, this paper will define the scope for measuring the system performance of VM for IaaS among various areas of cloud service, while focusing on the area of requirements to deduce performance measurement items.

**Keywords:** Cloud Service, IaaS, Virtual Machine, Performance Measurement System, Framework.

### 1 Introduction

Cloud computing, a computing paradigm for providing IT resources such as infrastructure, platform and application in the form of service using internet technology, is being used as a means of changing and innovating the lives of people and the business environment of companies by changing the existing IT service delivery method. In recent, cloud service provides continuous innovation and growth of ICT service industry, and ensures application agility in the new software convergence market [2].

In spite of the importance of cloud service, users are deeply concerned about sudden service interruption or failure because of the characteristic of users' data being stored and managed in the server of cloud service provider. In addition, there is a concern for confidential information being leaked resulting from storing data externally, as well as a concern for dependency resulting from lack of compatibility between cloud systems [4].

This paper proposes a framework of cloud service performance measurement system to provide criteria for choosing cloud service with confidence according to needs by providing objective and quantitative comparison and evaluation results on

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cloud service. In particular, this paper defines the scope of system performance measurement of virtual machine (VM) of infrastructure service (IaaS) among various areas of cloud service, and deduces performance measurement items by analyzing requirements. Based on this, this paper will develop a framework of performance measurement system of VM to provide assistances in the performance management of IaaS [4].

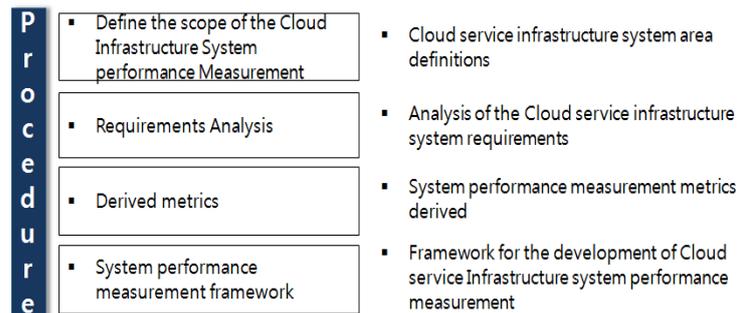


Fig. 1. Purpose and scope of the study

## 2 VM System Performance Measurement Area

IaaS as a cloud service is providing a service for easily and quickly creating, managing and monitoring server resources such as CPU, memory, disk, network and OS via internet browser, and hardware platform can be divided into several logical units that are respectively referred to as virtual machine (VM) [1].

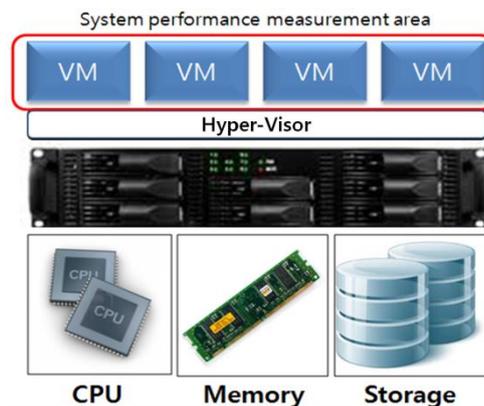


Fig. 2. Performance measurement area of cloud service infrastructure system [3]

VM refers to server resources such as CPU, memory and disk that are ready to be used through allocation or appropriate arrangement, and analyzes the requirements of

measuring VM performance from the VM creation to extinction according to users' request in the virtualization area of cloud service infrastructure system.

### 3 VM System Performance Measurement Framework

Requirements for measuring system performance are deduced by analyzing the essential/optional items that need to be selected, as well as additional functions provided to request VM of cloud infrastructure service [5].

Based on this, performance measurement items of cloud service infrastructure system can be deduced through existing IT infrastructure system performance analysis type and server system performance measurement item analysis. Table 1 that shows performance measurement items shows the performance of CPU, memory and disk.

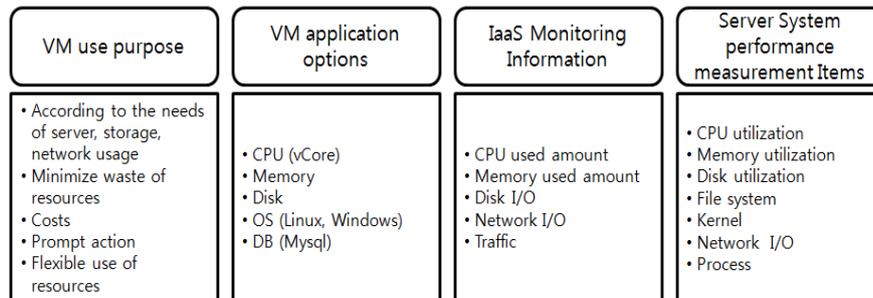


Fig. 3. Requirements analysis

Table 1. VM Performance Measurement Items

Item	Content
CPU	● Measurement of processing speed of processor (CPU) based on the VM
Memory	● Measurement of processing speed of memory based on the VM
Disk	● Measurement of I/O performance transmitted to disk based on the VM
Response Time	● Measurement of total time taken to receive the response result of user's request

### 4 Conclusion

This paper defined the scope for measuring the performance of cloud infrastructure service, and deduced according items of performance characteristics of VM to

develop a framework for managing the performance of infrastructure system. In particular, the framework has been developed to quickly reflect market requirements in a form that allows convenient addition/deletion of tools in a module form for responding to future cloud technology and service users' needs.

It is expected that the result of this paper will allow cloud service to be changed from the supplier-centered technology perspective to user-centered service perspective, and can be used as a framework for developing tools to manage the performance of cloud service infrastructure system.

This paper has some limitations. As this study was conducted for IaaS among various areas of cloud services, it would be necessary to expand the scope of study in the future to SaaS and PaaS. In addition, a more specific framework can be proposed for measuring the performance of cloud service by conducting a study for measuring the performance of network and storage according to the characteristics of IaaS.

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