

A Study on UNIX Server Consolidation by Virtualization

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Abstract. In this paper, problems that additional hardwares should be introduced due to the introduction of new servers are reduced by reducing the space on the top surface of the computer data center after many old physical UNIX servers are loaded on one new virtualization consolidation server. In addition, some effects for reducing the computer maintenance cost and the power consumption of the computer data center could be generated. With such virtualization of UNIX server consolidation, it is expected that the maintenance cost of the computer center will be reduced in the future as well as currently and IT will be changed into green-IT. The method for establishing a virtualization of server consolidation which is applied in this paper can be applied in the same way that other group of servers are consolidation.

Keywords: virtualization, UNIX, server consolidation

1 Introduction

The existing UNIX systems were operated while consisting of the individual hardware for each system in order to minimize the interruption with each other for each service. However, lots of additional IT resources are needed according to the changes in the computer system interfaces which become various gradually. However, in the process of introducing new systems, the maintenance cost will increase in addition to the introduction cost since the space on the top surface of the data center is insufficient and some additional power is needed. Accordingly, the situation that some kinds of fundamental infrastructure should be established additionally will be faced. In addition, many old equipments which are deteriorated as time passes by must be replaced every time and the introduction of some new systems is an element to be held in order to strengthen the competitiveness of the data center. In order to solve such a problem, some infrastructure for kinetic and flexible affairs should be established through the server virtualization [1-2] and the network virtualization [3-4] as the whole IT assets. In this paper, many UNIX servers were consolidation into one server through the virtualization work. As a result, the space on

the top surface and the power consumption were saved remarkably and the operation of servers became easier.

2 Virtualization of Server Consolidation

2.1. Virtualization Technology

Virtualization technology[5], as a kind of technology indicating some truly existing physical resources as the forms of logical resources, is viewed only as the logical forms by the users using the physical resources. Virtualization technology plays a role for connecting such logical resources with the real physical resources. Such technology which separates the applications and services from the real resources by using a middle class, so called, "Virtualization" allows the users to share the same resources and allows the IT resources to use and deal with as logical resources rather as individual resources. As a representative example of virtualization, partitioning within a server allows the users to share the server resources by making one big server system look like many small systems. The conversion into a virtualized system can generate various benefits. The Green-IT can be accomplished with the following reasons. First, the costs for operating the data center and for new investment will be reduced, second, the workforce will be effective thanks to the increased time spent for repeated duties and, third, it is possible to operate with some low power consumption thanks to securing some space on the top surface.

2.2. Check Points for Server Consolidation

Current review on the consolidation technology for virtualized servers is conducted from the perspective of saving operating costs caused by the replacement of old systems and the introduction of new equipments. Therefore, in order to establish the consolidation servers, the Consolidation servers should be selected by grasping the operating environment of each server which is currently established and the status of resource use and by closely examining the dualization preparing for some failures and the structure of storage. First, the operating environment and the status of servers should be analyzed closely. Second, old and low-performance, low-usage rate servers should be selected. Third, the usage and the OS and the resources on the part of H/W, such as CPUs, Memories and Disks, etc., of each server which is consolidation to a virtualized server should be understood. And then, while its future expandability based on the understanding is considered, the specification and number of the consolidation servers should be selected. Fourth, since many systems are operated under one physically virtualized consolidation server, in case that H/W and Network failures of such virtualized consolidation servers occur, since a phenomenon which the service of the consolidation virtualized system is stopped occurs, the plan for adequate structure should be considered and it is materialized based on the understanding on the virtualization architecture and technology.

3 Establishment of Virtualization Server in UNIX System

3.1. UNIX Server H/W Configuration

For virtualization of server consolidation, the status should be understood first for constructing the system. Table 1 shows the H/W structure of old UNIX servers with low usage. It is in the situation that such systems as old equipments older than 5 years should be replaced and they are low in the aspects of expandability into the whole single manufacturer and a sole server and the efficiency. In addition, as a result of monitoring the usual operation of servers, the usage of CUP is less than 30% and the number of simultaneous client connections is less than 10, so they are the equipments with little usage.

Table 1. UNIX server H/W configuration

Server	Model	CPU		Memory capacity(MB)	Disk Usage(GB)
		Model	Core		
A	SUN B6000	UltraSPARC-T2 1.2GHz	2	8192	146
B	SUN SF480R	UltraSPARC-III 1.2GHz	2	4096	128
C	SUN SF490	UltraSPARC-IV+ 1.5GHz	2	8192	1024
D	SUN SF480R	UltraSPARC-III 1.2GHz	2	4096	72
E	SUN SF880	UltraSPARC-III 1.2GHz	4	8192	1024
F	SUN SF880	UltraSPARC-III 1.2GHz	4	4096	300
Total			16	36864	2694

3.2. System S/W configuration

The target server for consolidation is being operated solely as the DB(Database) server. And Oracle Database Version 9 or 10g are being used as each DBMS S/W. Data is stored in local disks and storage, UFS is being used as the file system and some often source softwares, such as Apache and Tomcat, etc., are being operated. As some considerations based on the analysis of the current status, the H/W of a single manufacture and the compatibility in case of transferring into the OS should be considered. And it should be considered that the less important database with low

usage should be consolidation into one database. In addition, as the system software considerations, since the OS and file system of each system is different with each other, it is necessary to configure the optimum OS by considering the compatibility with the existing operating environment while considering the methods and speed when data is transmitted to the target system.

3.3. Result from System Consolidation

As seen in Figure 1, the consolidation structure was established by applying the partition virtualization technology of the server manufacturer after each system which is operated in 6 UNIX servers is transferred into 2 UNIX consolidation servers. (CPU: 64bit 3.3Ghz * 12core, Memory: 64GB, HDD: 300GB*8ea, NIC: 8, HBA: 16) It was structured by applying one partition (DLPAR) to each server and more than 3 DB instances were created in the partition for the created DBMS. A highly available system was established by introducing PowerHA solution of the consolidation server manufacturer and it was structured in order that it is possible to be taken over with a stand-by server when a failure occurs.

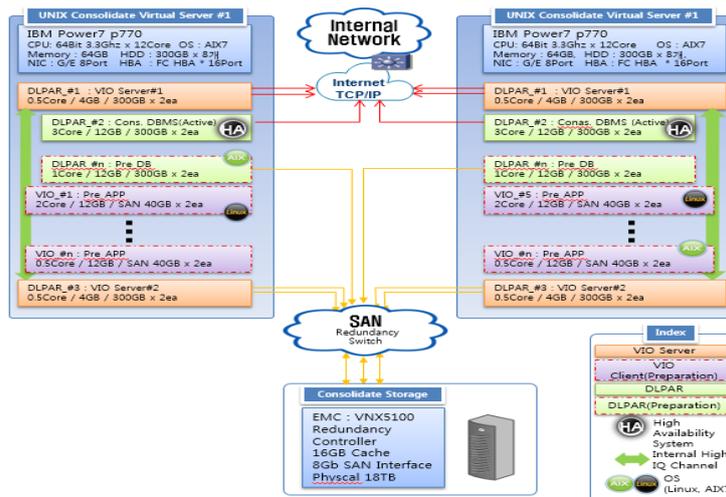


Fig. 1. UNIX Server Consolidation Result

4. Conclusion

In this paper, the methods of and the results from virtualization of many UNIX servers into one consolidation server were examined. The virtualization technology and selection methods for and the results from virtualization of UNIX servers are suggested. The power consumption and cooling costs of servers were remarkably reduced through the virtualization work of consolidation servers. And there was an

effect which the power consumption was saved by 79~89% compared to the existing servers. Such virtualization of the consolidation servers makes us expect that IT will change into Green-IT as well as saving the maintenance costs of a computer center.

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