

MasterScope Virtual DataCenter Automation - Entire IT System Cost Optimization by Automating the System Administration

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Abstract

Enterprise IT system operation conditions have changed significantly since the cloud computing era began. In order to deal with the service style by which users access services and ICT resources as and when required, integration and centralization of IT systems have been accelerating. MasterScope is a business operation and management software suite that has been developed via NEC's accumulated and proven expertise and advanced technologies. It implements the optimization of the entire system administration cost by automating and visualizing the IT system, which has tended to become more complicated and larger scale. This paper discusses how MasterScope implements the cost-effective integration and management with the system administration. It also introduces new functions for NEC Cloud IaaS and the NEC cloud platform services.

Keywords



cloud computing, SDN, administration management, workflow, ProgrammableFlow

1. Introduction

In recent years, enterprises have been subjected to far-reaching changes in their business environments and are facing issues such as the needs to achieve TCO (Total Cost of Ownership) reduction and to implement enhanced and flexible business management solutions. Under such conditions, enterprises have started to examine their IT systems from the standpoints of cost reduction, expandability, flexibility and swiftness. Consequently, many of them are now employing cloud oriented IT systems that integrate and centralize entire enterprise IT systems. This strategy also enables a real-time response to customer requests, which has resulted, however, in the enterprise IT systems becoming larger and more complicated. The staff members employed in system management departments are therefore now required to cope with highly advanced and integrated management systems.

MasterScope Virtual DataCenter Automation, (hereinafter referred to as vDC Automation) is a cloud platform software packaged in NEC's MasterScope that offers an integrated administration software suite. This paper will discuss vDC Automation and also introduces its innovative functions that are designed to support the NEC cloud platform service, NEC Cloud IaaS.

2. Cloud Computing Issues

In recent years, cloud computing has attracted much attention from a range of enterprises. However, to shift their IT systems into cloud computing does not always offer advantageous aspects. The cloud still has some issues, especially with regard to its deployment. Simply to carry out IT system virtualization or IT resource centralization is not enough in itself to acquire sufficient cost reduction for the overall system administration. An enterprise has first to find and resolve potential issues in order to keep pace with any cloud computing introduction.

Firstly, deploying cloud computing in an IT system may introduce a greater workload on system administrators. When all ICT resources such as servers, network systems and storage computers, etc. are centralized, the data volume to be handled will be increased significantly. Moreover, administration that combines the ICT resources of other multi-vendors or multi-platforms will become necessary and this will tend to make the administration more complicated. To satisfy the needs of such large-scale and complex IT systems, administrators must have diverse knowledge and expertise in order to provide customers with the most appropriate ICT resources chosen from the relevant servers. This requirement may im-

pose a greater burden for administrators.

Second issue is to maintain expandability, flexibility and swiftness of the system, which are features of cloud computing. With the conventional IT system, when the system needs to expand or if more systems must be added, it begins by purchasing the required devices needed to build a new system, etc. This task is expected to have some lead time before the release of an updated system. However, the cloud computing system is expected to allocate appropriate ICT resources as and when required and promptly. Moreover, a mechanism to cope flexibly with changing systems is essential for preparing system expansion or for adding devices to deal with the increased operation load of ongoing businesses.

3. Cloud Integration Administration System Exploited by vDC Automation Software

MasterScope is an integrated administration software suite that aims to solve the complex issues derived from scaled-up systems. It targets a wide range of administration environments, from enterprise information systems to cloud-oriented data center systems, and thereby helps to optimize entire enterprise IT systems. By visualizing the overall lifecycles of the IT systems and by automating their administrations, a system administration infrastructure is created that achieves fewer administrators and reduces costs while maintaining service quality.

vDC Automation was developed as a cloud platform software for the MasterScope software suite in order to support the entire cloud system lifecycle management (Fig. 1). vDC Automation uses the “ICT resources optimization” and “IT system visualization” methods to resolve the first issue as mentioned above, and “orchestration” to resolve the second issue. More details of these solutions are described below.

(1) Optimization of ICT resources

vDC Automation integrates the diverse kinds of ICT resources that are collected from servers (CPU, memory), storages and networks (IP address, VLAN, virtual

firewall, virtual load balancer), with the existing assets and stores them in a resource pool to enable them to be managed in a centralized manner. This strategy will make it possible to check the ICT resource usage status in real time without the need to consider performance differences between devices located in multivendor environments. Moreover, constraints applied via resource usage conditions will alert the administrator when a threshold exceeds a certain level. Such a function will help to achieve efficient ICT resource management.

vDC Automation also provides a “sub resource pool” function that allows the resource pool to be divided into smaller units, each one to be used by a specific department or for a specific type of job. This function makes it possible for individual departments to operate the cloud environment in a flexible and practical manner, just as though they have their own ICT resources (Fig. 2).

Moreover, vDC Automation provides an isolated network environment for each user. Thereby achieving an independent and secure network configuration for each department becomes possible.

(2) Visualization

Sharing physical servers in a large-scale cloud system sometimes makes it difficult to assign the cause of an IT system failure. When any failure occurs to a VM (virtual machine) it is difficult to find out which virtual platform server operates the failed VM, or to decide whether the virtual platform server or the network has caused the failure.

In order to maintain a satisfactory service level, it is essential to locate the area to be affected by the failure effortlessly. Moreover, it is also necessary to have information regarding the ICT resource usage status in order to give an appropriate judgment whether or not more ICT resources have to be used. vDC Automation displays maps of both physical and logical configurations and it also controls the linkages between resources and users, so that users can confirm the relationships between failures and their causes without the need for complicated

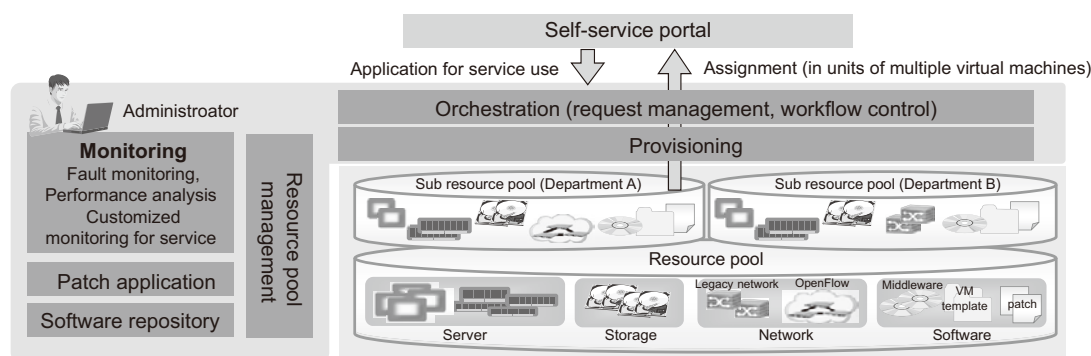


Fig. 1 Outline of the vDC Automation functions.

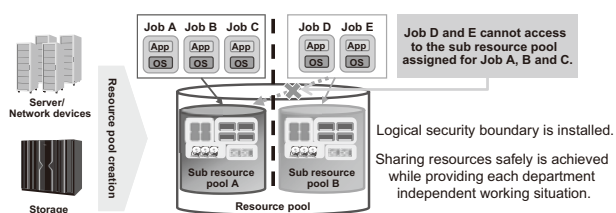


Fig. 2 Sharing ICT resources using a resource pool.

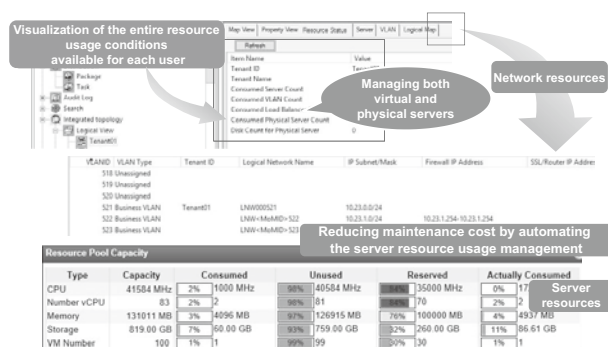


Fig. 3 Visualization of the ICT resource usage status.

procedures. It then becomes possible to acquire the usage status information of entire ICT resources and also those of individual users in real time (Fig. 3).

(3) Orchestration

vDC Automation automates the construction not only of servers and storages but also of networks. It also automatically assigns ICT resources from the resource pool to meet virtual server assignment requests from individual users. Such a technology is called an “Automation function”.

An Automation function is equipped with a “Workflow function” that automates a series of processes for the creation of ICT resources, and also with NEC-verified provisioning scenarios, which are to be provided as standard features. The standard “Workflow function” automates various processes including: virtual network creation and operation for individual users, configuration of virtual firewalls and load balancers, building virtual machines (VMs), assignment of storage to VMs, middleware installation and monitoring settings (Fig. 4). vDC Automation automates all of the setup tasks needed to make such virtual machines available for the actual work and it thereby achieves the desired management cost reduction for IT systems.

The “Workflow function” enables the execution of commands and scripts. By exploiting these execution results, it creates a series of workflow patterns by describing conditional branches and connections. Moreover, arbitrary commands and scripts can be embedded in the IT system

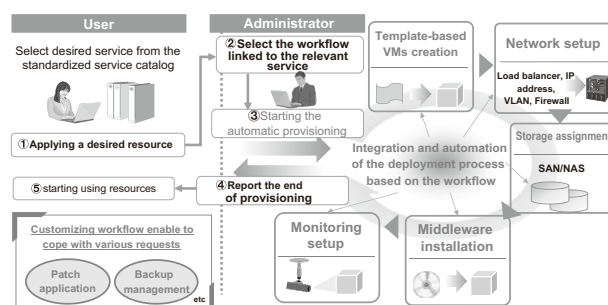


Fig. 4 Orchestration.

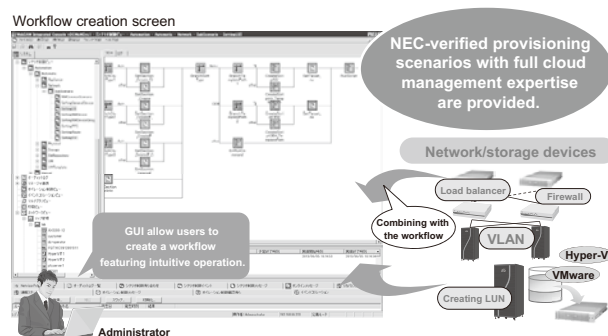


Fig. 5 Workflow function.

environment by customizing the standard workflow when a system environment is modified by replacing a network device, etc. (Fig. 5)

4. A New Function Coping with NEC Cloud IaaS Requirements

vDC Automation is a cloud platform software for NEC Cloud IaaS. NEC Cloud IaaS provides services including a cloud platform service, a housing service and a hybrid cloud service that combines the cloud platform service and the housing service. The cloud platform service also includes STD (NEC Cloud IaaS - Standard) that achieves an impressive cost performance and HA (NEC Cloud IaaS - High Availability) with high performance and high reliability. In the following sections we discuss the primary features of vDC Automation that are designed specifically for NEC Cloud IaaS.

(1) Strengthening the linkage with SDN (Software-Defined Networking)

By interacting with NEC's UNIVERGE PF6800 Network Coordinator (hereinafter UNC) that implements the ProgrammableFlow architecture, vDC Automation enables creation of a virtual network with a capacity of beyond 4 K that is the upper limit of a number of VLAN-IDs (virtual LAN identifiers).

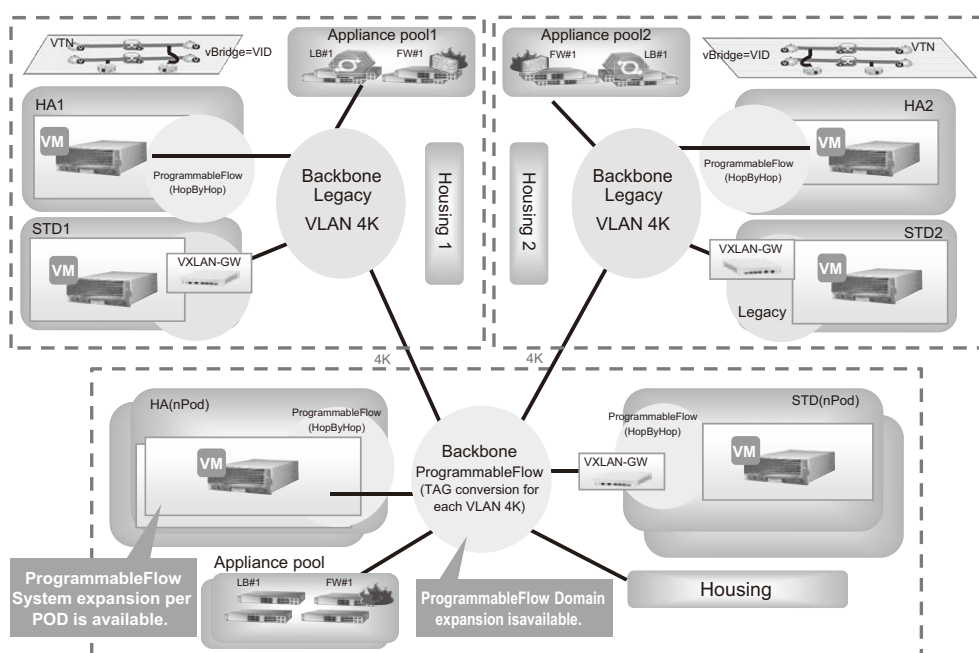


Fig. 6 Network with NEC Cloud IaaS.

Moreover, the HA and the STD services and appliances are configured under the different domains. This makes it possible not only to implement the system expansion per POD (point of delivery) in the VLAN 4K space but also achieves this without stopping the cloud platform services. After reinforcing the linkage with SDN, vDC Automation starts the service for the cloud network, configured with a single POD in the 4K VLAN space, and ultimately expands its service to the network with thousands or even tens of thousands of POD configurations, so that an expandable and flexible cloud network environment can be achieved (Fig. 6).

(2) Reinforcement of the criteria for selecting virtual platform servers for HA services

A sever criteria was employed for selecting virtual platform servers when provisioning the HA cloud platform service and assigning VMs. With the HA cloud platform service, VMs are deployed automatically on the appropriate virtual platform servers when they are assigned from ICT resources. However, the VM host was selected according to the number of existing VMs with the conventional service. The HA cloud platform service features high reliability and advanced performance, therefore it is essential to prevent interference between the CPU and memories etc., and to thereby degrade their performances. In order to deal satisfactorily with the cloud system administration and to enable a performance guarantee, vDC Automation is equipped with a virtual platform automatic selection function. This feature selects a virtual platform

automatically according to the CPU and memory usage and reserves it when creating VMs. Moreover, when selecting the virtual platform in the target network to boot VMs, the function is improved and selects those virtual platforms with resources that have more capacity in their CPUs and memories.

5. Conclusion

The vDC Automation supports cloud system management via expandability, flexibility and promptness and improves the management efficiency of ICT resources from three aspects: optimization, visualization and orchestration. Moreover, we have employed the concept of SDN for the commercially based cloud platform products and have delivered them to our customers before our competitors. NEC will facilitate MasterScope's long-experienced expertise that has been proven by many enterprises and especially by those in the datacenter markets, by providing administration products to support the cloud computing era. We will thereby be helped to contribute progressively to the business efficiency of our customers.

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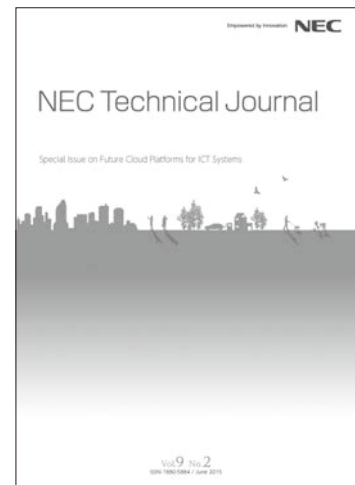
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