Application Updating Method for Legacy Server in Virtual Environment

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Abstract: Dedicated hardware and cluster configuration tend to be applied to legacy servers built for infrastructure systems (ex. call control server) to reduce the failure rate. The transition of legacy servers to a virtual environment with common hardware like general information services is being considered, due to the advancement of virtualization and improved performance of common hardware. In conjunction with this, a suitable method is needed for updating applications of servers. This letter suggests methods for updating applications of legacy servers built in a virtual environment.

Keywords: Legacy server, Virtualization, Update method

Classification: Network System

References

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1 Introduction

Servers for recently built infrastructure systems (ex. call control server that provides telecom services) tend to use dedicated hardware and redundant configuration with clustering to meet high-availability requirements. In addition, these servers are often stateful constructs to ensure high-speed response. In this letter, we define the servers described above as legacy servers. The transition of a legacy server to a virtual environment with common hardware (IA Server) like general information services is being considered due to the advancement of virtualization and improved performance of common hardware [1]. In conjunction with this, a suitable method is needed to update applications of servers [2]. On the
basis of the above, this letter describes application updating methods for legacy servers which in a virtual environment.

Section 2 presents current updating methods of common information system servers and legacy servers and the assumed updating method (tentative method) of a legacy server migrated to a virtual environment and its problem. Section 3 presents two proposed methods to solve the problem described in Section 2. The tentative method and two proposed methods are compared in Section 4.

2 Preliminaries

2.1 Updating method of legacy servers

Consider call control servers as representative examples of legacy servers that have features such as statefulness and clustering. Call control servers require high availability, e.g., they need to be available even while the application is being updated because of the nature of the service. To provide the required availability, the servers has updated one side at a time with the current method. The current method is as follows.

1. Stop the operation of system 1 (Standby) and release it from cluster pairing. The service is provided by only system 0 (Active).
2. Update the application of system 1.
3. Restart system 1 and reconstruct clustering between systems 0 and 1.
4. Switch between Active and Standby and then perform the same operation on system 0 (Standby).

2.2 Updating method of general information system servers in a virtual environment

The application updating method of general information system servers in a virtual environment is as follows.

1. Launch a new virtual machine (VM) that includes a new application on the same platform.
2. Shift service delivery to the new VM, and stop the other old VM that includes the old application.

2.3 Assumed application updating method of legacy server migrated to a virtual environment

In this subsection, we assume that legacy servers are migrated to a virtual environment. The application updating method of legacy servers migrated to a virtual environment is expected to be as follows.

1. Launch a new VM (system 1') that includes the new application.
2. Convert cluster pairing from system 0/1 to system 0/1'.
3. Switch Active and Standby between systems 0 and 1' and then perform the same operation on system 0 (Standby).
2.4 Problem and solution policy

The method described in the previous section has the problem that two VMs (systems 0/1') may not be able to communicate. For example, consider a (virtualized) call control server as a representative legacy server. Systems 0 and 1 of call control servers recognize each other by IP addresses, but a different IP address will be assigned to a new VM (system 1'), so system 0 will not be able to recognize or communicate with system 1'.

Changing the IP address information of the other of the pair (system 1 to 1') is undesirable because changing settings while the service is running is dangerous, and failure to change the IP address information may result in interruption of service provision. The following tentative method could be used to set the same IP address to the VM of system 1', but this method has another problem that a single-system operation period (i.e., when only system 0 is providing a service) will be extended, which leads to instability in service delivery.

[Tentative method]
1. Release the VM of system 1 (Standby) and stop the VM.
2. Eliminate the VM of system 1.
3. Launch a new VM (system 1') and set the IP address that was set on the old VM (system 1).
4. Reconstruct clustering between systems 0 and 1'.
5. Switch Active and Standby between systems 0 and 1' and then perform the same operation on system 0 (Standby).

In this letter, the issue is lengthening of the single-system operation period during the application updating for a legacy server that requires high availability as mentioned above. We suggest a new application updating method that reconfigures the IP address to a new VM.
Proposed methods

As mentioned in Section 2, the application updating method of legacy servers migrated to a virtual environment is expected to be implemented with launching and switching a new VM. We propose two methods to reconfigure the IP address to a new VM more rapidly.

3.1 Proposed method 1: Using floating IP address

A floating IP address hides the original IP addresses of servers to external servers and service users, so it enables the use of services without external servers and service users being aware of original IP addresses. We use this function to reconfigure IP addresses.

(1) Launch a new VM (system 1’).
(2) Set the floating IP address of the old VM (system 1, Standby) to the new VM (system 1’).
(3) Stop the old VM (system 1, Standby) and then put the new VM (system 1’) on standby.
(4) Disable the floating IP address setting of the old VM (system 1).
(5) Switch Active and Standby between systems 0 and 1’ and then perform the same operation on system 0 (Standby).

Fig. 2. Updating methods of legacy servers in virtual environment
3.2 Proposed method 2: Moving over virtual network interface card (vNIC)

Openstack, a typical virtualization platform, has the function to attach/detach vNICs to VM. vNICs attached/detached using this function will still retain assigned IP addresses. Therefore, by detaching vNICs from the old VM and then attaching them to the new VM, IP addresses will be able to be moved over.

1. Launch a new VM (system 1’).
2. Detach vNICs with IP addresses from the old VM (system 1) and then attach them to the new VM.
3. Stop the old VM (system 1) and then reconstruct cluster pairing between systems 0 and 1’.
4. Switch Active and Standby between systems 0 and 1’ and then perform the same operation on system 0 (Standby).

4 Evaluation of methods

We compare proposed methods 1 and 2 with the tentative method described in Section 2.4.

If either proposed method 1 or 2 is applied, the single-system operation period in which service provision is unstable will be shorter than if the tentative method is applied because there is no need to wait to shut down the old VM and start the new

(A) Proposed method 1: Using floating IP addresses

(B) Proposed method 2: Moving over vNICs

Fig. 3. Proposed methods
VM. In addition to the above, proposed method 1 is superior in that it does not use the function of the virtualization platform side and therefore has less need for coordination of inter-functional collaboration. On the other hand, proposed method 2 needs fewer addresses so it is easy to manage them.

5 Conclusion

In this letter, a method that uses floating IP addresses and a method that uses the function to attach/detach vNICs to VM are presented for updating applications of legacy servers in a virtual environment.

For future works, to quantitatively evaluate our proposed methods by verifying actual equipment, we will provide a desk evaluation of the decline degree of a single-system operation period between the proposed two methods.