

Integration of Computers and Terminals by introduction of the Virtualization Technology and Thin Client in SPring-8

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Abstract

We applied virtualization technology to server computers to form a high-availability redundant server system. At the same time, we replaced general-purpose PCs with thin-client terminals. The introduction of these technologies reduced the number of computers substantially and gave us an opportunity to develop high-availability computing systems with inexpensive management.

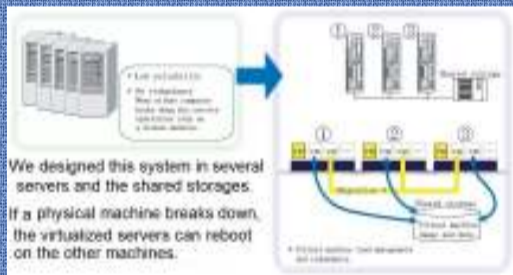
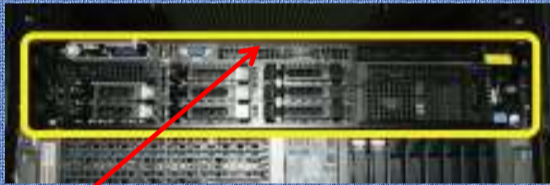
To ensure high availability, the server computer has to be built using reliable components with redundant architecture instead of reducing the number of computers. The application-processing performance of the client OS on the host OS was greater than or equal to that of a standalone server. The combination of the recent multicore architecture server and Xen hypervisor showed good performance as a result of appropriately allocating system resources to Xen Hypervisor. The thin-client system is useful for integrating widely scattered terminals into a small number of systems, which will reduce maintenance effort. The integrated virtual machine system and thinclient system use a network-attached storage system that runs under the redundant configuration.

High Availability Virtualization infrastructure



Blade enclosure for server virtualization in the three units throughout .

As integration progresses, additional units 1. Another power rack system, rack-mounted servers to set up units . Maintenance at the blade enclosure operational level MAX 15VMs.



Physical Servers Specifications

Components	Spec.	Memo
CPU	L5335 2.00GHz x 2 '07y-1	TDP:
Total Score per physical machine	E5410 2.33GHz x 2 '07y-2	L5335,5420=50w
	L5420 2.50GHz x 2 '08y	E5410=80w
Memory	16GB	
Capacity	1GB x (10VM+5VM redundancy)	
Chases	Blade or Rack	
Redundancy	Power Supply, Cooling Fan, System Disk	Hot swap

NAS System Specifications

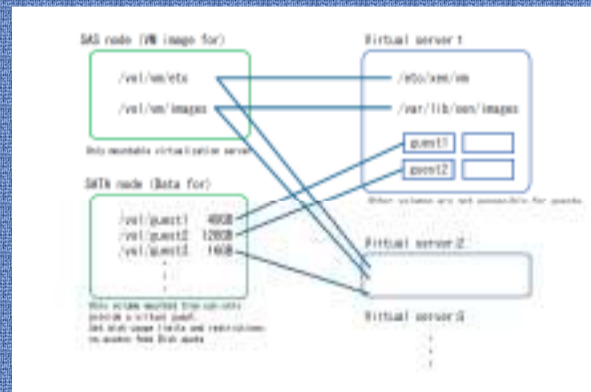
Components	Spec.	Memo
NAS Head	2 Node Cluster	High Availability
RAID	RAID-DP (RAID4+Dual Parity)	NetApp Filer
Disks	SAS for VM Images	About 1.6TB
	SATA for Data	About 4.0TB except; parity, spare disks, and snapshot area.

Volume management of Shared storage

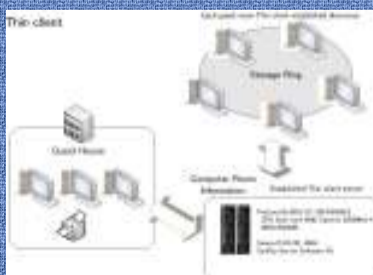
The security and operation of this storage system are described. The image files of the virtual machines are stored in the high-speed SAS disks. The data files of the virtual machines are stored in the large-capacity SATA disk.

We permit that only Domain 0 of a virtualization server does a mount as for a virtual machine image file area of this storage. Further, a virtual guest can mount only its assigned data file area. Therefore, a virtual guest cannot access the territories of other virtual guests.

In order that a specific virtual guest does not monopolize the capacity of the common storage, we set disk quotas in the territories of the guests.



Thin Client system for the visitor KIOSK terminals



System architecture

We adopted Sun Ray in a thin-client system.

Before, many Windows PCs were available at SPring-8 for visitors. The application software used with these Windows PCs was Web browser and Office Viewer.

A Solaris-based Sun Ray thin-client system is suitable for developing a kiosk terminal that restricts applications in browser and Open Office. This thinclient system is such a simple structure that the terminal side does not have the main memory, CPU, and a fan as the OS completely works on the server. Therefore, maintenance of the terminals scattered far and wide can possibly be avoided.

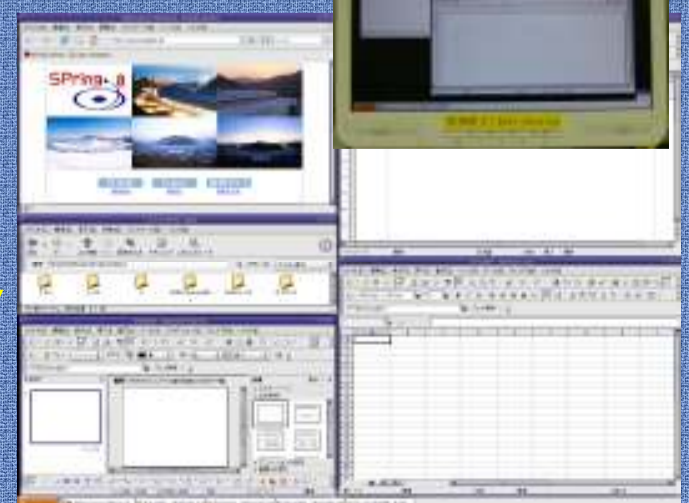
KIOSK terminal for Spring-8 visitors

The users can use a browser, Open Office, a USB storage.

When a user logs out, the home directory is initialized, and the information of the former user is not succeeded to the next user.

The preference* which is necessary for home directory generates it in a start script every time.

*e.g. printer setting



Distribution of terminals and centered of maintenance object servers