“Under this architecture of Hitachi storage virtualization technology, our front-end users will always be able to take advantage of the latest hard disks with top-access-speed performance.”

Chien-Ming Yang
Director of IT Department
Academia Sinica

### Academia Sinica

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Taiwan’s Academia Sinica Speeds Performance In Its Computing Center with Hitachi Virtualization Technology

With more than 80 years of history since its initiation, Academia Sinica is Taiwan’s highest national body of academic research. It is entrusted with the task of overseeing cutting-edge academic research in Taiwan and cultivating the country’s brightest research talents. With a large and sophisticated organizational structure, Academia Sinica handles an incredible amount and variety of data on a daily basis. By boosting its data center with the high-performance Hitachi Virtual Storage Platform and other Hitachi technology, Academia Sinica has improved data access and storage. It has also enabled completion of its remote backup at a reduced cost while ensuring high availability and stability for its systems.

For many years, Academia Sinica Computing Center has acquired numerous batches of independent storage systems to accommodate the needs of different applications. These include its administrative systems, journal and periodical system, email, geographic information system (GIS), high-performance computing (HPC), multimedia and data systems, and so forth. From 1994 onward, the center has grown to manage a total of 1,213TB of storage space, and this is still growing steadily at a rate of 100TB per year, even now. With the Hitachi solution, the center brings its various distributed spaces under central control for the management of its massive databank.

Remote Backup Improves Data and System Reliability Simultaneously

“Collective management” is one of the goals that Academia Sinica wishes to achieve in its ongoing effort for storage architecture reconstruction. In the past, in order to boost the efficiency of data access and storage, Academia Sinica had adopted storage area network (SAN) architecture in the deployment of its various application systems. This allowed users to access specific storage equipment distributed throughout the network through the LAN. However, because the hard disks for the aforementioned SANs were installed on servers of different models by different manufacturers, neither connection nor integrated management of all the hard disks were viable solutions. As such, a significant amount of space on the hard disks was left unused as a waste of available resource.

Another issue of having a distributed storage architecture was the obstacle in the creation of a high-availability (HA) scheme for the system. Not only that, the architecture also made it difficult to create a comprehensive remote backup scheme. Director Yang Chien-Ming of Academia Sinica Computing Center pointed out that it would be very costly to achieve HA under a distributed architecture. As such, he noted that there was limited data protection through the use of functions such as mainframe backup, RAID caching, duplication and so forth for the systems at the center in the past. Consequently, the overall system reliability at the center had been fairly low and should any mainframe malfunction for any reason, it would lead to direct impact on Academia Sinica’s day-to-day operation. Needless to say, having low system reliability is equivalent to having a potential risk.

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The center has been actively trying to establish a sound backup scheme. However, the fact that the organization operates as many as 15 units of storage systems from different manufacturers means that the center would have to purchase products of identical brand and model to the existing equipment to achieve full backup. This would not only be extremely expensive but also create twice the workload on the system administrator. And, as such, with the exception of Academia Sinica’s email service system (the disruption of which would cripple the organization’s operation), the center has yet to back up its remaining systems.

And this is where the Hitachi Data Systems (HDS) virtualized storage solution comes in: it is capable of achieving backup for architectures with 2 or more storage systems (see Figure 1). Hitachi Virtual Storage Platform (VSP) offers exceptional storage space integration through a gateway that can be connected to various interfaces (i.e. SAN, NAS, iSCSI and so forth). The gateway makes it possible for the data stored in different SAS and SATA hard disks scattered across Academia Sinica’s network. Data can be managed collectively as a storage pool through dynamic provisioning, to reduce wastage of unused space. Hitachi Dynamic Tiering technology makes it possible for administrators to move data across different types of hard disks to achieve high management versatility with 3D scaling. Furthermore, with 2 VSPs in place, all key data from local systems can be synchronously written to the hard disks on the remote network. Should the local systems fail for any reason, the remote system will become operational immediately to take its place, thus achieving the objective of undisrupted operations.

In addition to delivering outstanding performance, VSP also comes with exclusive monitoring software that provides multiple data protection features. Coupled with the capability to generate reports instantly, VSP proves incredibly helpful to administrators by offering better monitoring over the operation of storage architecture to reinforce data security.
Outstanding Product Performance Brings Noticeable Results

Virtualization technologies allow Academia Sinica to utilize its existing storage equipment with greater efficiency. At the local end, the technology enables mutual backup support for 2 hard disk devices to achieve a HA scheme while at the remote end, data is written into another hard disk simultaneously. Based on the level of the hard disks’ importance, the center is planning its new purchases for hard disks with average lifecycles of 2 years and 4 years; they will gradually deploy hard disk equipment with average lifecycles of 6 years in the remote backup system.

Such implementation would ensure optimal system performance and data security at all times. “Under this architecture, our front-end users will always be able to take advantage of the latest hard disks with top-access-speed performances,” Director Yang added. He also noted that given the level of dependence that Academia Sinica users have on the storage systems for various public services, the center will continue to work on the improvement in the speed of data access and storage as well as the reliability of data.

The greatest benefit of collective management for different storage equipment for Academia Sinica is saving a substantial sum of money that would otherwise have gone towards the purchase of remote backup equipment. According to Director Yang, the VSP solution from Hitachi Data Systems has saved Academia Sinica no less than 20% of its purchasing budget compared to buying a series of compatible products to add to the center’s existing systems.

The center has always been prudent and meticulous in its assessment of IT equipment purchases. After extensive comparison of similar products in the market, the center opted for the Hitachi Data Systems solution. As Director Yang remarked, “The speed and reliability of data transfer are the key advantages that made HDS stand out from the rest of the competitors. The majority of similar products make use of software in storage space control, and the downside of such design is reduced efficiency during the transfer of massive data. In contrast, Hitachi VSP has achieved virtualization through hardware by integrating sophisticated data management features in its chipset in order to achieve stable performance, even when we tried to move incredible volume of data that exceeded 1000TB in size.”

In addition, HDS has adopted a simple and unified management interface for all its products, whether they are entry-level or flagship products. This effectively eliminates the problem of management interface integration during the process of product selection for consumers. Not only that, system administrators would not have to make the extra effort of familiarizing themselves with new management interfaces if they should choose to upgrade their systems in the future. Hitachi Adaptable Modular Storage 2500 also makes the process of replacement much more convenient in the event of damages.

Director Yang also noted that, in addition to its product’s performance, HDS and its collaborating partners’ professional services in the area of technology and storage architecture planning turned out to be the tipping factor that has convinced the center to choose Hitachi Virtual Storage Platform. “The fact is, many IT administrators have the habit of seeing things from the perspective of application programs when they think of ways to boost system performance, and they have overlooked the possibility that the underlying cause to reduced performance usually stems from the lack of storage equipment optimization. In this regard, HDS has helped us to identify the issue in our existing architecture and given us a great solution that has effectively resolved all the problems we have had in space planning, data protection, system backup and so forth.”

Needless to say, Director Yang is very satisfied with the changes that have been made to the center’s storage architecture so far. Under this framework, Academia Sinica is also planning to gradually realize its goals of introducing cloud storage, network architecture virtualization and so forth in the hopes of securing Academia Sinica’s lead in the area of IT application maturity and staying ahead of other governmental bodies.