The Hitachi Data Systems cloud storage solution provides a consolidated, flexible and secure storage platform for our cloud storage. It allows for nondisruptive system expansion and upgrading as well as advanced data access control, such as data read/write protection. And, it makes full use of the existing storage resources, simplifies management and improves storage performance.

Chang Xiuling  
Inner Mongolia Mobile (subsidiary)  
China Mobile

**Hitachi Data Systems Helps Inner Mongolia Mobile Implement Cloud Storage to Support Leading Communications Services**

As a subsidiary of China Mobile Communications Corporation, Inner Mongolia Mobile has developed extensive coverage to provide its customers with communication services, anywhere and anytime. It has more than 20,000 service centers covering towns and villages, ensuring 1 service engineer in 1 service center per village. The company determined it needed a cloud storage platform to address long response times when accessing the existing storage. It needed to answer the challenges of poor data reliability, failure in storage resource sharing, and the inability to unify the management platforms. Hitachi Data Systems, as a pioneer of storage virtualization technologies, provided a solution based on Hitachi Virtual Storage Platform to address these challenges and support cloud storage.

**About Inner Mongolia Mobile**

With services, such as Inner Mongolia Mobile and Over-the-Air Top-up, Inner Mongolia Mobile provides great convenience for its customers. International roaming is available from 403 operators in 237 countries. In addition, it has established partnerships with the Inner Mongolia Autonomous Region and city governments as well as more than 50 corporations. For the Autonomous Region, Inner Mongolia Mobile has developed mobile phones in the Mongolian language and provided Mongolian-speaking agents across the country for its 10086 service hotline. This provision enables more than 5.8 million Inner Mongolians to communicate in their native language.

Through 7 years of construction and optimization, Inner Mongolia Mobile has built an integrated communications network. Its widespread coverage, high-quality communication, and rich and leading services, "

**Benefits at a Glance**

- Optimized overall response time.
- Management via single interface.
- Improved ROI with virtualization.

**Inner Mongolia Mobile**

**INDUSTRY**
Telecommunication

**SOLUTIONS**
Enterprise Platform, Virtualization, Cloud Enablement

**HARDWARE**
Hitachi Virtual Storage Platform

**SOFTWARE**
Hitachi Basic Operating System, Hitachi Universal Volume Manager, Hitachi Dynamic Provisioning

**SERVICES**
SAN implementation and data migration services provided by Hitachi Data Systems Global Services
continually gain trust from customers. The network covers nearly 98% of the cities, banners, counties and highways, and 83% of the national and provincial roads. It also covers 72 Class A scenic areas as well as numerous tourist attractions. In addition, telephone service is available across villages. All of these offerings help drive the social and economic development in the Autonomous Region.

The Challenge

Inner Mongolia Mobile determined that its cloud storage platform must provide virtualization technologies with cloud services. Storage resources would be used as a pool to enable on-demand leasing of cloud hosting and storage. And it required that the new project would not only meet application requirements for infrastructure but also further improve the unified resource pool for the infrastructure.

Specifically, the company’s overall requirements were to:

- Eliminate silos of data and build a unified storage resource pool.
- Enable seamless data migration and advanced data protection.
- Provide simplified daily maintenance and management for complicated heterogeneous storage systems.
- Make full use of the old resources and protect existing investment.

Based on these requirements, HDS proposed an overall storage solution to enable virtualized convergence. It combined Hitachi Virtual Storage Platform (VSP) managing virtualized EMC, Oracle (Sun) StorageTek and HP disk arrays.

The Solution

Considering the requirements of Inner Mongolia Mobile, HDS proposed an overall cloud storage solution built around VSP and its storage virtualization capabilities. The solution would:

- Provide better performance and higher transactions with the high performance of VSP to help Inner Mongolia Mobile improve its customer service level.
- Virtualize the existing storage of Inner Mongolia Mobile with VSP. Build the cloud storage platform at the production center by consolidating the existing storage into a shared storage pool that is centrally managed.
- Allocate the storage to applications with dynamic tiering to reduce waste of storage by eliminating the need for actual physical mapping before the storage is used.

Solution Features

A project priority was to enable unified consolidation and management of heterogeneous storage systems to support the secure and high-performance operation for massive amounts of data (see Figure 1). To support Inner Mongolia Mobile’s needs, the new infrastructure has the following capabilities:

- A new VSP virtualizes the existing storage devices (including EMC, Oracle (Sun), StorageTek, and HP) to build the cloud storage architecture at the production center.
- With storage partitioning, different storage devices can be divided into different logical partitions with virtualized consolidation of VSP. Each partition has independent resources, including the front-end port, cache, back-end port and external storage. Each partition runs independently, without interfering with each other, avoiding resource contention after consolidation. Additionally, all the partitions can be managed and scheduled in a unified manner.
- With Hitachi Tiered Storage Manager, the underlying data of the disk storage system can be migrated online without affecting production operations across storage devices after the virtualized consolidation. This approach allows Inner Mongolia Mobile to address its requirements for adjusting service deployment.

Figure 1. Network Management System Architecture for Inner Mongolia Mobile

We are always confident in HDS products. As its products enable us to consolidate various storage platforms in the data center, we can manage different storage from different vendors on a single platform, which will drive future development of our data center.

Chang Xiuling
Inner Mongolia Mobile (subsidiary)
China Mobile
VSP interacts with the host of the front-end applications to improve the response time when the applications access the storage.

Structured data is managed in a unified manner through the storage consolidation platform, and a storage pool is formed with resources from different storage. The data can be migrated dynamically online within the pool to adjust application deployment.

The entire storage pool can be allocated in a unified way and expanded dynamically. HDP can help make good use of the storage. It is designed to allocate the exact amount of storage space required by the exact amount of data; it does not occupy all the space that the host allocates.

VSP cache is partitioned, which can separate IBM® storage from Hitachi storage logically; they do not affect each other.

The Benefits

HDS provided a cloud storage platform for storage consolidation with an ideal infrastructure consisting of VSP and other storage. The solution offered 3 advantages, including:

3 Advantages

Advanced architecture. With the compatibility of the SAN architecture, storage virtualization can be managed in a unified manner, providing a powerful virtualized SAN cloud storage infrastructure.

Advanced product. VSP architecture can be scaled flexibly to meet performance and capacity requirements. In addition, the return on investment (ROI) of the storage assets is improved by virtualizing the multivendor storage. The platform provides superior data mobility to mitigate business impacts that changes cause. It supports unprecedented performance and capacity, and minimizes power and cooling requirements.

Advanced functionality required by cloud. Cloud storage infrastructure (virtualization solution) and sophisticated capabilities enable unified management of data migration, snapshot and disaster recovery in the consolidated storage infrastructure. After deployment of the cloud storage, all the storage forms a large pool that can be allocated flexibly. This capability not only eliminates silos of storage but also improves disk utilization. All data is stored at different tiers on the cloud storage platform, based on the level of importance of an application. In addition, the data can be migrated easily and flexibly according to the level of importance of the application during different periods of time.

3 Capabilities

Flexibility. With Hitachi Dynamic Provisioning, end users can allocate their storage to applications, even though the storage does not have true physical mapping before it is used. The “on-demand” allocation means that the storage to be allocated can exceed the actual storage. Administrators can avoid disrupting the operation of applications when they add physical storage capacity. Because the company needed to purchase only the necessary physical disk capacity, the initial installation cost was reduced. In addition, the management expenses and time that changes cause in storage and host configuration were also decreased.

Management. VSP can be divided into 32 independent storage partitions, which can be customized based on the level of importance of applications as well as their performance and capacity requirement.

The resources among partitions do not interfere with each other, which helps guarantee the quality of service of applications at different levels as well as their service level.

All the partitions offer the same rich software features.

All the partitions can be managed and scheduled centrally, in a unified way.

Data migration. Data is migrated transparently. Traditionally, data is replicated in homogeneous environment based on the data replication between storage systems. However, HDS enables heterogeneous data replication between storage systems, significantly simplifying data migration.

Data can be migrated online without disruption.

Migration virtually has no impact on application performance; in addition, application I/O requirements can be met by setting the level of control, which is transparent to the higher storage tier.

Data migration is widely applicable and compatible with various hosts, operating systems, switches and storage systems.

The migration can be rolled back simply and securely. Virtualization will neither change the storage format of the source data nor alter the source data or host environment.