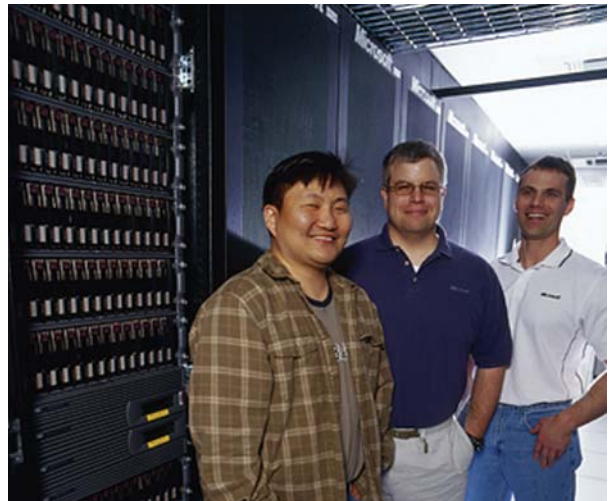


Microsoft Corporation deploys an HP virtual RAID solution to launch its storage utility

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– Jason Watson, Group Manager, IT Utility Services, Microsoft Corporation

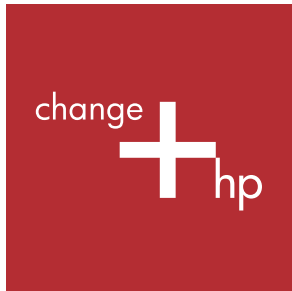


Business need:

Microsoft Corporation develops, manufactures, licenses, and supports a wide range of software products for various computing devices. For its internal business units, Microsoft established IT standards and a buying list of preferred products. Over time, it became costly and inefficient for business units to purchase and manage their own storage systems. Microsoft wanted to economize by consolidating its storage assets into a storage utility (SU) model, and recognized that this concept would require innovative storage virtualization capabilities.

Solution overview:

The Microsoft storage utility consists of Microsoft® Windows Server™ 2003 connected with host bus adapters to storage switches and one or more storage area network (SAN) controllers. An HP StorageWorks 5000 Enterprise Virtual Array (EVA5000) configured in the SAN is one of the technologies that enables Microsoft to realize its storage utility concept. The flexible EVA5000 helps Microsoft align IT resources to accommodate business demand. In addition to the EVA5000, Microsoft IT staff configured approximately 28 HP ProLiant servers and several non-HP storage arrays into the storage utility environment.



Powering up a utility service model

In mid-2004, Microsoft formed an internal IT group to launch a storage utility. The previous practice of business units buying storage hardware from an approved list caused overbuying and underutilized capacity. The company believed it could achieve cost advantages and staff efficiencies by consolidating its many SAN islands into a utility model. To make this model a reality, the software company made IT procurement, budgeting, and management the responsibility of Microsoft IT Utility Services, headed by Senior Director Mike Carlson.

The Microsoft storage utility will incorporate a collection of storage systems providing 300 TB of raw capacity and up to 1,000 Fibre Channel ports per fabric. Eventually, Microsoft will form multiple storage utilities with a similar configuration. Microsoft IT leases storage capacity back to business units based on a defined service-level agreement. The first storage utility now serves approximately 30 business units representing thousands of users; eventually the service will support Microsoft's worldwide workforce.

Before placing hardware from selected vendors on an approved list and installing their products into any company data center, the group evaluates performance, scalability, reliability, manageability, and price criteria. The team ultimately selects the vendor and product that best meets these stringent requirements at the time of purchase.

To measure the RAID performance of the HP StorageWorks EVA5000 system, for example, Microsoft used a storage stress tool. The staff also ran reliability tests at peak loads and staged manageability tests using comparative lab analyses and trouble tickets. These findings prompted Microsoft to deploy approximately 50

EVA5000 systems throughout the enterprise. The company has purchased HP StorageWorks solutions since 1998, and includes the EVA5000 among standard hardware for its SAN environments.

Connecting to powerful HP virtualization

Microsoft IT assigned a 21.5 TB HP virtualization solution to its first storage utility. "The virtualization functionality of the HP StorageWorks 5000 Enterprise Virtual Array allows Microsoft to develop a 'storage-as-a-service' strategy," says Jason Watson, Group Manager, IT Utility Services, Microsoft Corporation. "The EVA5000 lets us provision storage quickly, reallocate surplus capacity from one host to another, and make seamless changes. HP introduced the virtualization concept in the EVA5000. Storage virtualization is the backbone of our new storage utility model."

Unlike Microsoft's former procurement process, in which internal groups acquired their own storage assets, the shared infrastructure lets Microsoft IT buy storage ahead of time and provision those assets just in time – without interrupting applications. "The ability to provision storage at will shortened our procurement cycle from days and weeks to hours," Watson notes. "We can create a new volume or LUN (logical unit number) quickly and assign it to a server, which benefits our internal users. There are a lot of virtualization controllers on the market, but the HP StorageWorks EVA5000 is the best for enabling seamless changes to storage on the fly." The HP array also provides storage access control or LUN masking so that a host cannot access data belonging to a different host. This feature helps guard data on certain servers.

To facilitate management from a central console, the staff uses the HP OpenView Storage Management Appliance and HP StorageWorks Command View EVA. Command

View EVA software eases configuring, monitoring, and trouble shooting. "The management interfaces of the HP StorageWorks EVA5000 and Command View EVA make our job easier," says Watson. "The HP OpenView Storage Management Appliance has a good scripting engine that we like to use for automation, while the Command View EVA helps us configure, monitor, and troubleshoot our EVA5000."

"HP has been a key partner in supplying hardware and software solutions for our utility. We look forward to continuing our partnership with HP in the future."

– Angus Drummond, Group Manager, IT Storage Utility Operations

With the EVA5000, the staff also uses the Microsoft® Multipath Input/Output (MPIO) SAN solution and Microsoft Storport. MPIO provides path selection for failover and load balancing – and makes Microsoft Windows® more supportable in a SAN environment. Storport, a storage driver interface for SAN access, offers high performance with Fibre Channel buses and RAID adapters.

Additionally, Microsoft IT combines Microsoft Volume Shadow Copy Service (VSS) with the array's virtual snapshot technology. "The virtual snapshot and snapclone features of the HP StorageWorks EVA5000 make backup and business copying effective and efficient," says Watson.

Saving money while supporting a surge of applications

The bulk of Microsoft's line-of-business applications are on SAN islands today, and the EVA5000 supports most of them. The storage utility-based EVA5000 – configured at 60 percent utilization – handles 25 to 30 applications, including various Microsoft SQL Server databases and file services. "Our goal is to increase utilization of the HP StorageWorks EVA5000 to 80 percent," Watson notes. "The more client hosts we can consolidate on one array, the better our return."

Meanwhile, the storage utility curtails costs and improves storage services. For example, the company gains greater efficiency from dynamic provisioning, simplified management, resource sharing, and better capacity utilization. From the all-important financial side, the storage utility allows the reassignment of full-time

personnel managing DAS assets; it's projected to trim floor space and power requirements by 75 percent over the next three years. Microsoft estimates that combining these cutbacks with lower capital expenditures will net at least \$20 million in savings over three years.

"HP has been a key partner in supplying hardware and software solutions for our storage utility, and we look forward to continuing our partnership with HP in the future," concludes Angus Drummond, Group Manager, Microsoft IT Storage Utility Operations.

About Microsoft Corporation

Founded in 1975, Microsoft Corporation (NASDAQ "MSFT") (www.microsoft.com), is the worldwide leader in software, services, and solutions that help people and businesses realize their full potential. Headquartered in Redmond, Washington, the world's number-one software company manufactures and supports software products for various computing devices. The corporation maintains seven product segments: Client, Server and Tools, Information Worker, Microsoft Business Solutions, MSN, Mobile and Embedded Devices, and Home and Entertainment.



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At a glance

Hardware:

- HP StorageWorks 5000 Enterprise Virtual Array system in the Microsoft storage utility
- HP OpenView Storage Management Appliance
- 28 HP ProLiant DL360, DL380, and DL580 series servers operating in the storage utility
- Cisco MDS 9506 Multilayer Director Switches

Software:

- HP OpenView Storage Management Appliance software
- HP StorageWorks Command View EVA
- Microsoft Volume Shadow Copy Service
- Microsoft Storport driver interface
- Microsoft Multipath Input/Output (MPIO) SAN solution
- Microsoft Windows Server 2003
- Microsoft Operations Manager 2005
- Microsoft SQL Server™ 2000
- Microsoft Exchange Server 2003
- Microsoft SharePoint® Portal Server 2003

HP Services:

- Hardware warranty (4-hour response time, 24x7)

Challenges

- Provide a storage utility
- Lower operational costs
- Improve storage services
- Consolidate and use storage assets more efficiently

Solution

- Implemented an HP StorageWorks 5000 Enterprise Virtual Array (EVA5000) with HP storage virtualization technology as one of the technologies to realize the Microsoft storage utility concept
- Storage management facilitated from a central console with the HP OpenView Storage Management Appliance and HP StorageWorks Command View EVA
- Deployed HP ProLiant DL-series servers for strong performance and reliability

Results

- The virtualized architecture of the HP StorageWorks EVA5000 helps Microsoft provide storage utility services.
- Microsoft expects the storage utility to lower operational costs and capital expenditures: reducing assigned storage management staff, decreasing floor space/power requirements by 75 percent, and netting more than \$20 million in savings over the next three years.
- The Microsoft storage utility provides greater storage utilization: 60 percent versus 40 percent in the direct-attached storage environment.
- The flexibility to share storage assets, assign resources dynamically as needed, and automate management tasks improves staff efficiency and service quality.
- Microsoft derives an almost immediate return on investment (ROI) resulting from its new storage procurement and allocation process.

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