IBM

IBM consolidates mail servers for a dramatic reduction in TCO.

Overview

■ **Challenge**

   Reduce total cost of ownership (TCO) of e-mail infrastructure

■ **Solution**

   Consolidate servers onto IBM @server pSeries™ 690 servers; implement storage area network; migrate to IBM Lotus Notes® 6 and IBM Lotus® Domino™ 6

■ **Drivers**

   Scalability of pSeries server; configuration flexibility; experience of IBM Global Services and server, storage and Lotus product teams

■ **Key Business Benefits**

   Greater than 80% reduction in number of servers and data centers, leading to significant savings in capital, networking and administrative costs; increased server administration efficiency; capacity to accommodate new applications

Compared to the industry-standard NotesBench benchmark of Lotus Notes clients, IBM users generate two to three times more transactions on the Domino server.

Although server consolidation is not a new concept, it is a complex undertaking on which few organizations embark without reservation—especially when the servers carry mission-critical data and applications. So, when IBM set out to consolidate the server infrastructure supporting one of its most vital e-business applications— e-mail—it relied on the guidance of IBM Global Services to minimize the risks of this large-scale project and maximize its benefits throughout the organization.

"Our analysis indicated that we could reduce the overall cost of our e-mail server infrastructure through consolidation. The question was what we would consolidate — and how."

–Johnny Barnes, Vice President, Global IT Infrastructure, IBM

@business

e-business success — blending new technologies with established strengths

Key Components

Software

- IBM Lotus Domino, R5 and 6
- IBM Lotus Notes, R5 and 6
- IBM AIX 5L™

Servers

- IBM @server pSeries 690
- IBM RS/6000® Models M80 and S80
- IBM TotalStorage™ Enterprise Storage Server™
- IBM Tivoli® Storage Manager

Services

- IBM Global Services

"We were certainly impressed with the scalability of the p690 server. And we saw how its logical partitioning capabilities would give us enormous flexibility."

–Mark Smith, Infrastructure Architect, Worldwide Global Notes Architecture, IBM

With 2001 revenues of $85.9 billion and more than 300,000 employees worldwide, IBM is the largest IT company on the planet. The company's employees send and receive e-mail through IBM Lotus Domino and use IBM Lotus Notes as the client interface to e-mail, applications and databases.

IBM AIX® is one of the company's standard platforms for Lotus Notes and Domino, and the IBM RS/6000 SP systems running various versions of AIX have served IBM well. But to satisfy all of its Lotus Notes users, IBM found itself managing as many as 1,250 multiprocessor e-mail servers in more than 57 data centers worldwide. The total cost of running and managing each of these servers is estimated in the hundreds of thousands of dollars per year, according to Johnny Barnes, IBM vice president of global IT infrastructure.

As the time drew near to upgrade its global Lotus Notes hardware infrastructure, IBM conducted an internal study to identify possible cost-saving strategies. "Our analysis indicated that we could reduce the overall cost of our e-mail server infrastructure through consolidation," Barnes says. "The question was what we would consolidate — and how."

The Global IT Infrastructure team responsible for the IBM Global Notes Architecture (GNA) turned to IBM Global Services to help determine — and implement — the most advantageous consolidation solution. The engagement began with a three-phase pilot project to determine what economies of scale could be achieved while retaining high levels of performance and availability.

While the final phase of the pilot — migration to an IBM @server pSeries 690 system — is still in progress, IBM is encouraged by the results of the first two phases. These initial phases achieved a 700 percent increase in the number of users per Domino server — supporting daily traffic volumes as high as 4.8 million transactions. As a result, the company fully anticipates meeting its TCO expectations and is already duplicating its consolidation plan worldwide.

In North America, when all user e-mail accounts are fully migrated to the new pSeries platform, IBM will have reduced the number of data centers supporting Lotus Notes by 50 percent. In Europe, Lotus Notes clients will be served by just 2 data centers instead of 17—a reduction of 88 percent. And in the Asia-Pacific region, where IBM will largely retain its existing data centers, it will consolidate 255 RS/6000 servers to just 41 servers, including 3 pSeries 690 servers and a variety of other RS/6000 servers.

By maintaining fewer servers, the company will reduce capital expenditures as well as software upgrade and administrative costs. And where it operates fewer data centers, fewer replications will be required between servers, saving IBM facility management costs, network fees and network bandwidth. Finally, the new, more scalable pSeries servers will support growing transaction volumes and new e-business applications. And together with the new features of the upcoming Lotus Notes 6 and Domino 6, they will make IBM's business-critical e-mail environment easier to manage.

Partition and conquer
In the first phase of the pilot project, IBM migrated e-mail files for 5,180 Lotus Notes users from 5 RS/6000 SP server nodes onto a single 8-processor RS/6000 Enterprise Server Model M80. The company set up two Domino partitions to run production Lotus Domino R5.06a e-mail servers.

The M80 was attached to an IBM TotalStorage Enterprise Storage Server Model F20. The Enterprise Storage Server held Lotus Notes client e-mail databases as well as the Domino server transaction logs.

The M80 server easily handled the consolidated load, with capacity to spare. Average daily CPU utilization was only 46.4 percent. Next, IBM migrated these 5,180 Lotus Notes clients onto an 18-processor RS/6000 Model S80 server attached to a SAN fabric of Enterprise Storage Server arrays. "Previously, each RS/6000 server node had its own direct attached storage device (DASD)," explains Cameron Hildebran, IT architect at the Colorado-based data center where the pilot was conducted. "The SAN provided a very effective means of gaining flexibility while reducing floor space and administrative resources dedicated to storage."

> *"The big benefit was the teamwork. IBM Global Services achieved a level of cooperation and coordinated effort that we're sure any IT organization would appreciate."*
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> *–Bill Bocchino, Migration Project Leader, IBM*

As a cost-effective alternative for IBM data centers that cannot justify a full p690 system, the company is considering the new IBM @server pSeries 670.

The final step in phase two was the addition of Lotus Notes clients from 7 other RS/6000 SP nodes, bringing the total number of clients on the S80 server to more than 10,000 and CPU utilization to 73 percent.

Phase three, which is still underway, is the migration of additional e-mail clients and applications from other RS/6000 SP nodes to a 32-processor p690 server running the new AIX 5L operating system. "We were certainly impressed with the scalability of the p690 server," says Mark Smith, infrastructure architect for the worldwide IBM GNA. "And we saw how its logical partitioning capabilities would give us enormous flexibility."

The pSeries server currently has three logical partitions (LPARs). IBM installed both Domino R5.10 and the beta version of Domino 6 in two separate LPARs, with Tivoli Storage Manager running in the third LPAR. With additional hardware, two more LPARs will be brought online for other infrastructure functions, including database applications, testing and backup. "Strategically, we chose not to leverage the full capacity of the p690 server for e-mail," Barnes notes, "although clearly, it can handle a much greater burden than what we've placed upon it."

Pulling in all the experts, pulling out all the stops
From the beginning of the pilot, IBM Global Services applied its project planning and management expertise to ensure the orderly completion and documentation of each phase of the pilot. As needed, IBM Global Services enlisted the assistance of experts from the Lotus development team as well as teams from multiple server and storage groups.

"I think the big benefit was the teamwork," says Migration Project Leader Bill Bocchino. "IBM Global Services achieved a level of cooperation and coordinated effort that we're sure any IT organization would appreciate."

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