IBM

IBM intranet accommodates 100-fold growth in traffic–six million hits daily

How do nearly 270,000 employees in an $80 billion multinational corporation communicate with each other? What binds the innumerable product and research teams, spread across continents with diverse business cultures, into a cohesive, consistent, and profitable entity? At IBM, that melting pot is a vast intranet, the backbone of the company's corporate communications network.

"We use ourselves as the testing ground. If it isn't good enough for IBM, it certainly isn't good enough for our customers."

–Sandesh Bhat, Technical Manager and Webmaster for IBM's intranet

"Our intranet lets IBMers worldwide keep up with a rapidly changing marketplace," says Maria Arbusto, manager of IBM's corporate intranet. "It enables them to collaborate, pool resources, and work more productively, unhindered by time zones and geographical divisions. It's a cost-effective knowledge management tool." The intranet is part of an enterprise-wide implementation of IBM's network computing strategy. The strategy has yielded $2.5 billion in savings per year in IBM's IT budget by consolidating scattered computing centers into a few very large delivery centers worldwide, and providing client access over a wide area network via TCP/IP.

The IBM intranet delivers enormous amounts of information. Users can access more than one million documents detailing customer account data, product lines and specifications, executive communications, a library of technical references, an employee directory, internal job listings, human resource and financial information–the list is endless. There are 800 registered sites and more than 3,000 unregistered sites–sites that individual project teams and researchers create as needed. New intranet applications are being developed all the time. One such application is the Media Juke Box, a multimedia library of live events and slide presentations. Another is a common download location for all of IBM's software products and patches.

Keeping pace with swelling IBM masses

With this wealth of information readily available on the IBM intranet, traffic quickly

Application	Global corporate intranet
Business Benefits	Pooling of intellectual capital; faster access to information; more effective decision making
Software	IBM® eNetwork Dispatcher Lotus® Domino™ 4.5 Lotus Domino Go Webserver™ Lotus Notes® IBM DB2® Universal Database™ on AIX® Transarc® Distributed File System™
Hardware	IBM RS/6000™ SP™
Services	IBM Global Services
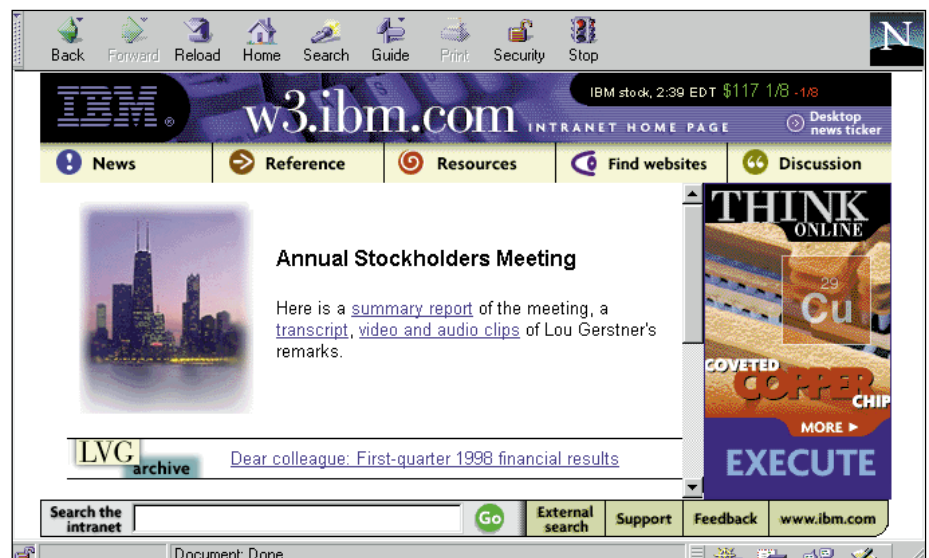
An intranet is IBM's global corporate communications backbone.

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exceeded the company's projections. Initially, the intranet server—an IBM RS/6000 F30 running IBM Internet Connection Server (the predecessor product to Lotus Domino Go Webserver)—fielded a mere 62,000 hits per day. But by 1997, the number of users was surging, and information content was expanding rapidly. On average, a new site was being added each month, affecting the intranet's performance. Users were becoming frustrated at not being able to access information as quickly as they needed. Publishing needs were also growing—a Domino 4.5 server was added to publish content from Lotus Notes databases on the Web. Thus, it soon became evident that the intranet had to be revamped. "We needed something the scale of what we had implemented for the Atlanta or Nagano Olympics," recalls Sandesh Bhat, technical manager and Webmaster for the intranet.

Today, IBM's intranet takes a pounding, drawing some six million hits daily, and that number is growing. But, Bhat isn't concerned anymore, because the intranet is based on an RS/6000 SP server and IBM eNetwork Dispatcher (formerly Interactive Network Dispatcher). "We've designed our server complex to easily tackle double that volume if needed," he says.

Freeing the intranet gridlock

Indeed, scalability was the prime reason for selecting the massively parallel processing RS/6000 SP server. Rather than continuing to add individual servers to support increasing traffic volumes and diversifying applications, Bhat's team decided to collapse the intranet onto a single 16-node RS/6000 SP.

The server comprises 12 production nodes. Four nodes house the Lotus Domino Go Webserver software, which serves static HTML pages. Five nodes run Lotus Domino, which accesses various Lotus Notes databases on the intranet. Domino also provides groupware and e-mail functions. One high node is dedicated to DB2 transaction processing and ad hoc SQL queries. Another node acts as an FTP server, and the last node secures and encrypts transmissions using the Secure Sockets Layer standard.

During peak traffic—when a major product launch is announced, or when everyone flocks to the intranet to catch Chairman and CEO Lou Gerstner's annual address—four backup nodes help smooth out traffic spikes.

eNetwork Dispatcher manages intranet traffic onslaught

Fronting the server complex is IBM eNetwork Dispatcher software running on an RS/6000 F30, with an additional server providing redundancy. Receiving all incoming Web traffic bound for the RS/6000 SP server complex, eNetwork Dispatcher performs load balancing and IP traffic management across the multiple nodes, evenly distributing requests to the appropriate servers. "No challenge in traffic management is beyond the eNetwork Dispatcher's capabilities," Bhat claims. "It can manage immense volumes." In Nagano, Bhat recalls, it handled 56.8 million hits on a busy day.

Mirror sites for overseas users

The intranet team is now enhancing intranet performance for global users. By establishing mirror sites in all the regions where IBM does business—North America, Europe and the Middle East, Asia-Pacific and Latin America—Bhat expects to ease traffic load over the transatlantic link, thus minimizing network delays. Transarc's Distributed File System (DFS), residing on an RS/6000 F50 server, plays a central role in the creation of the mirror sites. DFS's caching and built-in replication features allow HTML files published on the intranet's main server complex to be automatically replicated to the mirror sites. Bhat points out that the multi-site load balancing ability of eNetwork Dispatcher will also prove useful for load balancing across mirror sites.

Paving the way for customers

The server complex, hosted by IBM Global Services at Southbury, Connecticut, was defined and implemented within a month. Rapid implementation was important because once business units became aware of the intranet's potential, they counted on having it available to meet their business objectives. "We could do it quickly," Bhat says, "because we worked as a team with IBM Global Services and other researchers at IBM."

It is this depth of experience that IBM Global Services draws on to help create best-of-breed intranet and Internet solutions for its customers. "Based on our experiences, we've defined an IBM Global Web Architecture, a set of standard guidelines, and technology that IBM Global Services utilizes to implement similar projects for IBM customers," informs Bhat. "We use ourselves as the testing ground," he adds. "If it isn't good enough for IBM, it certainly isn't good enough for our customers."

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