Neural Applications Corporation

By implementing a solution based on Microsoft® SQL Server™ and other Microsoft technology on the popular InvestorsEdge Web site, Neural Applications has leveraged the scalability of the products in order to pioneer capabilities such as the personal online stock portfolio while supporting the site's dramatic growth with a series of completely transparent hardware upgrades.

Solution Overview

Company Profile

Neural Applications is a Web-site development company and a Microsoft Solution Provider specializing in financial-services sites. Among the sites it has developed are the InvestorsEdge, the third stock provider intro-duced on the Web, and Robertson Stephens, a major investment bank. Neural Applications also has developed numerous Java-based financial applications for E*Trade, the largest online financial-brokerage outfit, as well as an appli-cation called NetProphet, the Web's leading cross-platform portfolio-management tool. Neural Applications has 50 employees and in 1996 generated $6 million in revenues.

Situation

As one of the Internet's pioneers in offering stock quotes, and the pioneer in providing dynamically generated Web pages, InvestorsEdge remains one of the top five financial-services sites on the Web. All this growth and success, however, has come at a price for Neural Applications, the organization that developed the site. In the beginning, frequent hardware upgrades meant downtime for the site until the development team could adjust the software to accommodate the new hardware.

Business Solution

Since adopting an all-Microsoft Internet platform for InvestorsEdge, Neural Applications has upgraded the site's server hardware smoothly and easily. This is because, on each upgrade, SQL Server and other Microsoft technologies have immediately recognized the new hardware and made optimal use of it. Neural Applications also is expediting hardware upgrades with the help of administrative tools such as Microsoft Performance Manager.

Benefits

With a database based on SQL Server version 6.5, Neural Applications has pioneered a con-cept known as the personal portfolio, enabling users to create a customized stock portfolio that's regularly updated with live feeds from multiple sources. Microsoft ActiveX technology has enabled developers to create add-on capa-bilities such as automatic downloads of custo-mized portfolios, while Microsoft administrative tools such as Performance Monitor ease the tracking of process and memory use when server hardware is upgraded. Most of all, those upgrades proceed transparently thanks to the scalability of Internet Information Server and, especially, SQL Server.

There's hardly a major Web site today that doesn't rely heavily on the concept of dynamically generated pages—pages created on the fly from a multitude of data sources, including live feeds, historical databases, and real-time user input. Back in 1995, when the popular InvestorsEdge Web site was in its infancy, dynamically generated pages were "unheard of," says Patrick Connolly, who co-invented and initially launched the site on a couple of entry-level Intel Pentium-based servers. Connolly now serves as vice president of the Internet platform division of Iowa-based Neural Applications Corporation. He says his team's decision to pioneer dynamic pages on the Web—which also would mean pioneering database technology on the Web—led them to a decision to use the SQL Server database management system. As it turned out, that decision paved the way for much of the site's growth, because the scalability of SQL Server enabled the team to upgrade the site's hardware smoothly and transparently.

Now running on three two-way Pentium Pro 200 Hewlett-Packard NetServers, each with 500 megabytes of RAM and 16 gigabytes of hard-disk space, InvestorsEdge provides up-to-the-minute news, stock quotes, corporate summaries, and other financial information to more than 300,000 users weekly. Delivering nearly 8 million hits per day, it's one of the five most active financial-service sites on the Internet, competing directly with the likes of The Wall Street Journal, Quotecom, E*Trade, and CNN-FN.

The site helps investors maintain their own edge by providing one-and-a-half million stock updates and close to a million page views daily, all of them dynamically created and refreshed by the SQL Server database. This means that as soon as users access a page, they have live market indices, headline news, and, for the 250,000 users who have signed on for personal-portfolio analysis, the latest update of their stock portfolio. This is yet another capability pioneered by the developers of the InvestorsEdge Web site.

Pioneering Dynamic Pages

Not only was personal-portfolio analysis a new concept on the Internet when the InvestorsEdge development team introduced it in late 1995, but the technology it depended on—dynamically generated pages—also was a new idea in Web-development circles. "At the time, we were among just three sites on the Net even providing quotes—Quotecom and SEC-APL being the other two," Connolly points out. "Besides, we couldn't be sure that dynamically generated pages would even work on the Internet." Nonetheless, using the early 4.21a version of SQL Server, the team did manage to implement dynamic pages on the site and, soon after, the personal portfolio itself.

User response was overwhelming. Within the first week, thousands of users signed up for the service. To handle the drastically increased load on the database, Connolly and his colleagues decided to upgrade the database to the then-newly released SQL Server version 6.0. They based their decision largely on product features, such as enhanced network support and advanced locking capabilities. They also continued to seek Internet-server software, finding ultimately that none of the products they had used to that point—Purveyor, O'Reillys, and Netscape—were capable of handling the growing traffic.

In response, the team migrated the InvestorsEdge server software to Microsoft Internet Information Server when that product was first released in late 1995. Since they already were using Microsoft Windows NT® Server as the server operating system, this move meant their servers were now running an all-Microsoft Internet solution.

Completely Transparent Upgrades

Since then, InvestorsEdge has continued to grow dramatically in popularity and functionality. Today, its stock feed delivers data into the SQL Server database at roughly 100 transactions per second. Satellite feeds deliver live data to the site from S&P Comstock, Zacks, Nelson, and Comtext.

NEURAL APPLICATIONS CORPORATION

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"We know that with the scalability of the software we can upgrade the hardware whenever we need to without missing a beat—that with very little work on our part, we can have a faster site, happier users, and more potential interest from advertisers. We also have unlimited opportunities to grow the site itself and to build the robust and reliable applications that our users demand. In a word, Microsoft SQL Server is perfect for Web applications."

Patrick Connolly

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Once data arrives at the SQL server, the SQL Server database parses and dumps it into tables available for up-to-the-second and on-the-fly placement into dynamic Web pages. A typical day involves about 1.5 million such transactions, although the database has successfully handled up to 3.5 million in one day.

Connolly credits much of the site's rapidly growing presence to the ability of SQL Server and other Microsoft Internet technologies to not only handle hardware upgrades with ease, but also to support massive user demand, while simultaneously providing comprehensive stability and security. To explain, he notes that since migrating to an all-Microsoft Internet platform, developers have made three major upgrades to the server hardware without having to devote extra time to adapting the software to those upgrades. "With the scalability of Windows NT Server and SQL Server, we can upgrade hardware whenever traffic on the site calls for it, and we don't have to worry about how the software will deal with the upgrade," Connolly says. "When it's time to support more users with more RAM, more processors, more processor horsepower, or more servers, we just slap in the new hardware, and the software immediately begins making optimal use of it."

Rapid Development, Easy Administration

Connolly is also impressed by the other Microsoft Internet tools and technology that his team members use on InvestorsEdge. For example, for rapid development of site components, they use Microsoft Active Server Pages and Microsoft ActiveX controls. For simplifying site administration, they use Internet Service Manager, Microsoft Performance Monitor, Microsoft User Manager, and User Event Log. For general site development and maintenance, they use Microsoft Visual Basic®, Microsoft Visual Basic Scripts, Microsoft Visual C++®, and Microsoft Visual SourceSafe®. They also have optimized the site for Microsoft Internet Explorer.

As Connolly further explains, with ActiveX controls, team members have developed the capability to provide InvestorsEdge users with downloads of their personal portfolios throughout the day. As for site administration, he considers all the management tools—but Performance Monitor in particular—to be essential. "With all the hardware and software upgrades we've been through, Performance Monitor has been vital in helping us track processor and RAM activity," he says.

Being such extensive users of Microsoft products, Connolly's Web-development team also relies heavily on Microsoft services, such as Microsoft Knowledge Base and the Microsoft Developer Network. Team members believe these services will help them further their goals for InvestorsEdge and other Web sites they've developed, including the Robertson Stephens investment bank.

"Perfect for Web Applications"

As if the impressive growth that has already taken place at InvestorsEdge weren't enough, Connolly and his colleagues are now introducing a capability that will put even greater demands on the scalability of its database: an Internet Explorer 4.0–based channel that will enable users to subscribe to personalized content from the Web site. "Now that users can order up dynamic pages in virtually any shape or form, we're making it easier for them to pull those pages down to their client machines and desktop-productivity software," he reports. "This process involves not only automatic downloading of dynamic pages but also customization of those pages, so users can have content delivered to them exactly the way they want it." Connolly expects the channel capability to quadruple the traffic on the site and, in turn, require even greater processor horsepower and RAM capacity.

Which is all the more reason Connolly and his colleagues are grateful they're using Microsoft Internet technology, especially SQL Server. "We know that with the scalability of the software we can upgrade the hardware whenever we need to without missing a beat—that with very little work on our part, we can have a faster site, happier users, and more potential interest from advertisers. We also have unlimited opportunities to grow the site itself and to build the robust and reliable applications that our users demand," he says. "In a word, SQL Server is perfect for Web applications."

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