

IBM @server xSeries systems running Linux bring major sports events to the Web.

Overview

■ **Application**

Web serving and content on-demand delivery for sports events, hosted by IBM Global Services

■ **Business Benefits**

Ability to handle very high traffic during live events; high availability; flexible, cost-efficient platform for hosted services

■ **Servers**

IBM @server xSeries™ running Linux®

■ **Services**

IBM Global Services



While record numbers of fans attended the Grand Slam tennis tournaments this year, millions more spectators followed the matches online through IBM-hosted Web sites.

From the days of the ancient Greeks, spectator sports have always been colossal productions. In the 20th century, television expanded audiences from stadium capacity to millions of households worldwide. And as the sports event fanfare has grown over the years, so have spectator expectations. Since the 1990s, Web-connected fans have been able to follow events such as the Wimbledon and US Open tennis championships as well as

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—Jeff Lucas, All England Lawn Tennis and Croquet Club

the Masters and Ryder Cup golf tournaments—to name a few—from their desktop computers. As Internet technologies have matured, these online spectators can now look to the Web for a personalized, on-demand experience that leverages the benefits of television's realtime play.

For the past seven years, IBM has been the official IT provider working behind the scenes of many of these Web-enabled events as part of IBM's worldwide sponsorship marketing programs. The IBM Global Services Business Innovation Services and Special Events Web Solutions teams perform Web site and application design, hosting services and application and networking infrastructure. They also provide the technical Webmasters and system administration teams that design, build and operate the hosting facilities around the clock during each tournament.

“We have made great advances in Linux clustering thanks to a very efficient feedback loop with the development teams.”

*—Gerry Graham, Manager, Special Events Web Solutions
Project Executives, IBM Global Services*

Web servers running Linux benefit event sponsors and spectators alike

In its role as a managed hosting services provider, IBM Global Services has consistently chosen top-of-the-line server and software technology to gain maximum performance, availability and rapid scalability. IBM RS/6000® servers have served as the workhorses of the IBM Global Services events infrastructure. Recently, IBM Global Services introduced into the infrastructure more than one hundred IBM @server xSeries™ Model 330 and 342 systems running Linux®. These affordable, reliable machines function as Web servers, achieving more than three times the performance of their previous Web servers in this environment.

For the sports organizations running the events, this means dependable and instant gratification for millions of online spectators and increasing appeal to corporate sponsors. For IBM Global Services, the xSeries servers running Linux provide a robust, flexible, cost-effective platform that it can rapidly deploy, dismantle and reuse for any size event. The Linux servers even support multiple events simultaneously.

xSeries servers running Linux simplify the event information collection process for the onsite teams, too. At the Wimbledon Championships, for example, the xSeries machines function as a staging area, a central hub that collects realtime scores and player statistics into IBM DB2® Universal Database™ for Linux and simultaneously publishes them back to the hosting locations for subsequent, nearly-instant availability to end users.

The pairing of xSeries servers with Linux has resulted in an enterprise-strength solution that is both fast and cost-effective. “Exploring this type of solution is why we chose and continue to use IBM,” says Jeff Lucas of the All England Lawn Tennis and Croquet Club (AELTC), which hosts the Wimbledon Championships. “Linux is now able to tap into the power of DB2 Universal Database to support highly sophisticated e-business solutions like ours.”



IBM provides the USTA with an affordable, highly scalable Web infrastructure to handle massive demand from fans during the US Open.

Accommodating the unexpected

IBM deploys an impressive array of information systems for each event—from Web-connected video cameras and court-side data entry systems to realtime publishing systems. But for online spectators, it's the official event Web site that brings the action to their desktops, and the performance of the Web site is crucial to an enjoyable fan experience.

“Running usopen.org is like running a small media company,” says Ezra Kucharz, managing director of advanced media for the United States Tennis Association. “During 14 days, we need to deliver hundreds of millions of pages of news and scores, not to mention hours of live radio, TV and video. We need an infrastructure that's scalable, flexible and always available. That's why we rely on IBM.”



With clusters of nimble xSeries servers running Linux, IBM Global Services can begin preparing to host the Ryder Cup golf championships website, even while the US Open tennis matches are still in play.

As a sports event draws near, activity on the sports organization's Web site increases rapidly. To support the escalating level of activity and ensure that the Web site is continuously available, IBM Global Services moves the applications and data from the organization's year-round hosting servers to its events infrastructure.

Using clusters of xSeries servers enables IBM Global Services to allocate enough processing power to meet the needs of each event, without over-provisioning. Gerry Graham, manager, Special Events Web Solutions Project Executives for IBM Global Services, notes that his team benefits from close ties with multiple server and software development teams throughout IBM. "We have made great advances in Linux clustering, thanks to a very efficient feedback loop with the development teams," he says.

With a fixed go-live date for each event, IBM has very little time to configure and test its Linux systems. And surprises can always be expected. Due to the popularity of a recent event, for example, the technical Webmaster put in a sudden request for several additional Web server nodes. Fortunately, Linux is easy to configure. The IBM Global Services team was able to configure and integrate the additional Linux boxes in a very short period. It is not unusual for the team to allocate dozens of servers in a two-hour window.

Robust Linux servers have yet to meet their match

With the introduction of Linux into its events infrastructure, IBM is proving the enterprise merit of the open-source operating system. At the 2002 Wimbledon Tennis Championships, Linux-based staging servers collected and distributed in realtime more than 1,000 facts for each of the matches—played simultaneously on 18 different courts. In addition to point-by-point scoring, the official Wimbledon Web site, hosted by IBM, provided full match statistics, realtime scores for wireless devices, player bios and

weather information. Over 2.5 million unique visitors from around the world visited the IBM-run Official Wimbledon Web site, viewing some 202 million pages, compared to 190 million page views the previous year. On average, users spent over two hours on the site, double the time for 2001.

The 2001 US Open tournament drew over 2 million unique users from all over the world, generating more than 172 million page views. Eager fans downloaded 1.4 million IBM Real-time Scoreboards to their desktops during the tournament, with nearly 30,000 downloaded concurrently during the women's finals.

Once an event begins, there are no second chances for the events infrastructure. And the xSeries servers running Linux are charged with a crucial role in delivering on the event's promise to its online audience. With better uptime than Microsoft® Windows® platforms (according to the Standish Research Group), each xSeries server running Linux is a pillar of stability in a torrent of Web site activity.



IBM delivers the Wimbledon Tennis Championships to fans worldwide through dozens of xSeries nodes spread across multiple hosting sites.

An IBM Global Services Managed Hosting Content Serving solution helps the Web servers efficiently handle high volumes of Web traffic and shorten response times on event Web sites. Within the events infrastructure, the e-business on demand™ content serving offering¹ uses caching technology appliances at multiple points of distribution (PODs) to cache the Web site content. Requests to the event Web site are routed to the most available POD, minimizing the

time it takes for the information to appear on the visitor's Web browser. At each POD, xSeries servers running Linux capture traffic usage data in support of customer billing requirements.

Finally, security can be a critical issue at any event that draws large numbers of people—whether at a physical venue or on the Web. IBM benefits from the vigilance and contributions of the Linux open source community, which help to rapidly find and resolve security issues.

Beyond Web serving

With every event, IBM pushes its technologies further to exceed the expectations of Web-savvy sports fans. For example, in 2001 IBM raised its events infrastructure to a new level of scalability with the introduction of the xSeries servers running Linux. And in 2002, IBM tapped Linux to support its new Gryphon push technology, developed by IBM Research, which enables fans to customize the downloadable IBM Real-time Scoreboard to deliver the results and play-by-play action only for their selected matches and players. By combining Linux and Gryphon technology, IBM has demonstrated scalable Web serving efficiencies while achieving improved end-user performance.

Recently, IBM made Gryphon technology available to customers in a new product called IBM WebSphere® MQ Event Broker, which will soon be available on Linux. Because the technology was tested on Linux at Wimbledon, IBM customers can rest assured that it is ready to go to work in their IT environments.

According to Laurie Courage, director of Internet strategy and Web events for IBM's worldwide sponsorship marketing programs, the use of Linux is likely to expand across a variety of platforms and services to support additional Web-based applications. "Our Linux investment has delivered a highly efficient Web serving environment and is proving to be an excellent test bed for application innovations under load," she says. "We plan to fully exploit the Linux platform to meet our high performance application serving requirements."

For more information

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¹The content serving solution developed for the events infrastructure is now available to customers as an e-business on demand utility service called the IBM Content Serving service.

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