

CareerBuilder

Impact Highlights

- CareerBuilder had a simple interface for front-end users, but a very complex site from the back end.
- They needed to test from multiple locations across the public Internet.
- Keynote testing services provided extremely sophisticated scenario scripting abilities and massive traffic simulation capacity.

"Working with Keynote helped us to move forward with confidence in our efforts to support the launches of new partners and, at the same time, save valuable dollars."

Every month, more than 14 million unique visitors go to CareerBuilder.com, the leading online recruitment site that powers the online career centers for more than 350 newspaper and association partners. These partners have over 1,200 Web sites reaching national, international, local, industry and niche audiences and include agreements with key portals such as America Online and MSN. "CareerBuilder.com has a vast distribution network that is continually expanding with new partners," said Mark Fouraker, VP of Technical Operations at CareerBuilder.com.

"We began working with Keynote Transaction Perspective® measurements and then turned to Keynote LoadPro load testing to prevent any issues associated with the expansion that would adversely affect the end user. This helps to ensure that our job seekers and employers have an optimum experience with our site and partner sites."

The Challenge: Prove that the site would be able to handle new alliances with AOL and MSN

CareerBuilder.com runs a simple interface for its front-end users, but a very complex site from the back end. Job seekers create individual accounts in which they store their resumes, write cover letters, and submit and track their job applications. Employers create job descriptions and manage the job applications that arrive. On top of that, CareerBuilder.com runs co-branded sites with over 350 partners and requires customization to fit seamlessly inside another site.

To make all that work efficiently, CareerBuilder.com has two major data centers in Atlanta, Georgia, and San Diego, California. They also make extensive use of Akamai for content distribution, ensuring that graphics and other static page content are served quickly from servers that are close to the end user.

On December 1, 2003, CareerBuilder.com launched its partnership with America Online. This was closely followed by the launch of its partnership with MSN on January 1, 2004. Introducing these alliances one month apart posed a serious challenge.

Large marketing campaigns would coincide with the launches of the new sites, so it was critical to have a smooth transition and massive traffic capacity from day one. According to Fouraker, "We had created a significant amount of new code to handle our new alliances with MSN and America Online. We knew that the traffic volume was going to increase dramatically when they came on board. We were absolutely committed to handle the load effectively and took the appropriate measures ensure that the launch was a 'non-event' from a technical issues standpoint."

Because of the geographic distribution of server sites and the use of content distribution from Akamai, CareerBuilder.com knew that it had to test from multiple locations across the public Internet. Testing solely within the server rooms wouldn't disclose problems with Internet connectivity, Web infrastructure, geographic distribution technology, or the content distribution network. Discovering such problems after the launch of the new sites would create serious issues. CareerBuilder.com also needed extremely sophisticated scenario scripting abilities and massive traffic simulation capacity (over 100,000 individual users generating over 5,000 new sessions per minute). That's because the CareerBuilder.com site isn't just

servicing unchanging, static pages. It uses cookies to identify individual users and associate them with their private accounts for a user-friendly experience. The resulting complex load on back-end systems had to be tested very thoroughly.

The Solution: Keynote's LoadPro Distributed Load Testing Service

CareerBuilder.com knew that they needed cross-the-Internet testing to evaluate their Internet access and their Akamized content distribution network, but they didn't want to invest in expensive software, install it, manage it at multiple remote facilities, and then add the additional expense of remote hosting charges to generate that load. They were already satisfied customers of Keynote's Perspective performance measurement services, so it was logical for them to turn to Keynote for capacity testing with Keynote LoadPro.

According to Fouraker, "Keynote's massive capacity and realistic emulation really caught our attention. We wanted to test our site the same way the real end-users would. Plus we knew that by using Keynote's service, we could avoid making a large capital investment and taking on the job of running remote testing locations. Keynote could also handle the very short turnaround we needed; they were flexible and easy to work with; and the price was reasonable."

An additional advantage of the Keynote solution was that Keynote's Web load testing service was built from the ground up to handle the unique features of the Web environment, such as abandonment

of individual user sessions if response times are too high. Other testing solutions, originally designed for legacy terminal-host and client-server systems, don't do that. (Call center operators don't abandon their sessions if response time is long, but Web users certainly do!) The resulting effects on backend performance can be massive, and they must be considered in a realistic load test.

"Keynote LoadPro is a completely outsourced service, so Keynote staff wrote the testing scripts from scenarios designed by CareerBuilder.com," Fouraker says. "We gave them testing scenarios and load characteristics—which percentage of users were first-time users, which percentage were returning users with unique logons, the types of employment searches to do, and so on then Keynote specialists quickly created the necessary scripts."

For the test, simulated users went through as many as 30 separate pages during each site visit, using complex paths and randomization to ensure that site visits were representative of real users. They created new accounts, used existing accounts (over 100,000 different cookies were stored for use by the scripts), submitted resumes, performed searches, and more. The simulated users had different interaction speeds (think time), different levels of expertise in using the site, and different connection speeds (ranging from 28.8 k modem dial-up up to T1 connections). Each simulated user also had its own tolerance for slow Web page downloads, depending on the type

of user and that user's expectations for each particular page. For example, users are more tolerant when waiting for a transaction confirmation page than when waiting for a home page. Users accumulate 'dissatisfaction points' as they navigate through the site, and if a single user session accumulates a predefined level of dissatisfaction, the simulated user abandons the session. That creates realistic shifts in the load presented to Web system servers.

The Test Results: Scalability and Success!

Keynote testing engines, located at multiple geographic locations and on multiple Internet Service Providers (ISPs), all loaded the site simultaneously, under central control by Keynote. That produced a highly realistic load test, and the site performance could be simultaneously measured by LoadPro's realtime test scoreboard and CareerBuilder.com's normal real-time Keynote measurements. The test started with 75,000 session starts per hour, which resulted in 100% Web site availability but marginal performance and 20% session abandonment. After four iterations over multiple days, CareerBuilder.com staff had tuned the site to handle 300,000 session starts per hour (over 45,000 concurrent users), with high availability, acceptable response times, and low abandonment.

The raw power of the Keynote load testing solution is evident in these results. Generation of 300,000 unique session starts per hour involved massive bandwidth (approximately 200 megabits per second to the CareerBuilder servers, plus massive

About Keynote

Keynote Systems (NASDAQ "KEYN") is the global test and measurement company for mobile communications and online business performance. As an independent and trusted third-party, Keynote provides IT and marketing executives with an unbiased view into their Internet services from around the world. For over a decade, we have been providing measurement data and testing capabilities that allow companies to understand and improve their customer's online and mobile experience.

Keynote Systems, Inc.
777 Mariners Island Blvd.
San Mateo, CA 94404
Main Tel: 1-800-KEYNOTE
Main Fax: 650-403-5500
product-info@keynote.com

loads on the Akamai servers), highly-complex scripts (some sessions involved 30 separate Web pages), and over 100,000 unique cookies to identify individual returning users.

Besides the massive capacity and sophistication of the Keynote solution, a big help to the CareerBuilder.com staff was the real-time test results and help from Keynote staff during the test sessions. According to Fouraker, "Our team appreciated the realtime, detailed statistics on performance such as requests per second, load time per page, and error code counts. These statistics were even more powerful when combined with our normal real-time Keynote measurements. In some cases, we were even able to tune the system while the load test was running and see the results immediately."

The Bottom Line: Confidence and Cost Savings

"Production experience has now confirmed what we saw in the tests," said Fouraker. "Working with Keynote helped us to move forward with confidence in our efforts to support the launches of new partners and, at the same time, save valuable dollars."

1-800-KEYNOTE
(1-800-539-6683)
www.keynote.com

© Keynote Systems, Inc.
All rights reserved. The Mobile & Internet Performance Authority and Perspective are registered trademarks of Keynote Systems, Inc. Other trademarks are the property of their respective owners. CS1003v1

 **KEYNOTE**[®]
The Mobile & Internet Performance Authority™