

Making Sense of CDNs

An Executive Briefing on top CDN Business Models

For Mediaware Magazine, Spring 2009

By: Claudia Kienzle

The Content Delivery Network (CDN) industry is very vibrant and dynamic, with revenues estimated to top \$1 billion dollars this year. That's especially impressive when you consider that, not all that long ago, the CDN business didn't even exist. The oldest CDNs are only about 15 years old.

Jim Davis, senior analyst at New York-based Tier 1 Research, estimated that 2008 revenues would top \$1.316 billion in 2008, up from \$992.5 million in 2007 and \$671.31 million in 2006. These findings are included in a report offered by Tier 1 Research (www.tier1research.com).

But things are not all rosy in the CDN marketplace. While venture capital has been flowing into the industry and new start-ups appear all the time, this is a very complex, competitive, high stakes game. Companies must toss out millions of dollars to ante in; compete against a wide field of aggressive CDN providers; and maintain a healthy bottom line despite fierce downward pricing pressures.

Fledgling but Flourishing

So first, what exactly is a CDN? Wikipedia defines it this way: "A CDN is a system of computers networked together across the Internet that cooperate transparently to deliver content most often for the purpose of improving performance, scalability, and cost efficiency to end users."

Simply stated, since the Internet was never designed to handle the increasing demand we're seeing for very large files, CDNs step in and "cache" content onto servers that are strategically placed closer to the end user to improve the access times. The faster information moves, the more impatient people have become when requesting to see large-sized content, such as videos and movies, and if they're not served immediately, they become frustrated and abandon their attempts to download the content. They bail.

All the CDNs we spoke with said that Quality of Service (QoS) is a given, and a CDN won't survive without hitting superior performance benchmarks on a global scale. This is not easy when big online media events—like video associated with the Beijing Olympics, the 2008 Democratic National Convention, or a hot Disney movie for kids—can draw millions of hits at once.

For example, Seoul, Korea-based CDN provider CDNetworks reported that millions of people worldwide have viewed the high-profile Barack Obama "Yes We Can" Flash video at high quality from its customer Dipdive's website at dipdive.com. So, a

CDN worth its salt has to be able to handle these huge spikes in traffic or ecommerce activity without any delays, jitter, or failures.

Historic Democratic Convention

In preparing for the 2008 Democratic National Convention, being held August 25-28, 2008 in Denver, Level 3 Communications anticipated that the video on the multimedia rich, official website, www.demconvention.com, would experience hundreds of millions of views by a worldwide audience. This traffic is estimated based on statistics from the previous convention plus the promise that history is going to be made.

“Level 3 Communications will be doing a true simulcast. Our video broadcast services will transport the HDTV signal for traditional broadcast, and our CDN services will take it and encode it for live streaming from our cache servers,” said Maria Farnon, vice president, product management, content markets, for Level 3 Communications, in Broomfield, CO.

Farnon added: “This will involve caching the entire website at our more than 30 locations in North America to get it closer to end users; encoding the HD video for Microsoft’s Silverlight media player; then tracking data, such as the amount of content served and the number of views, in realtime for our client, the DNCC [Democratic National Convention Committee].”

Showing Some Backbone

According to Lisa Guillaume, vice president, product management, content markets, also for Level 3 Communications, what distinguishes Level 3 from other CDNs is that Level 3 owns its own global network, including the fiber in the ground, servers, data centers, and other components since it’s also a top ISP.

More importantly, Guillaume added, “We own the intellectual properties that are the key building blocks for CDN services. We paid over \$100 million for this intellectual property when we acquired the CDN services of SAVVIS in 2007. To be a long-term, sustainable player in this market, you have to have the patents.”

While the first thing that comes to mind with CDNs is the physical network infrastructure, not all CDNs own their network. CDNs that own their own backbone infrastructure position it as a competitive advantage, but Dwight Merriman, chairman and co-founder of NY-based Panther Express explained there are distinct disadvantages to this business model.

“It’s not uncommon for an entire Internet backbone owned by one ISP to have an outage. A CDN does not have to own its own network to be a player. We don’t own our own network and neither does Akamai, which is the largest CDN in the business. We feel that contracting for use of a variety of third-party networks is a superior architecture because it ensures diversification, redundancy, and flexibility,” said Merriman. Panther Express owns its own servers and storage devices, which are

globally distributed, but they connect to over a dozen different ISPs for bandwidth and networking with end users.

Dispelling Myths

Another myth that Merriman debunks is the idea that the heart of the CDN business is the physical network. He points out that the CDN business is actually software-driven. “Since CDNs must distribute content reliably by the most efficient means possible, it’s a content management problem that must be solved using computer software engineering. Since 1999, many ISPs [with elaborate global networks] have tried to get into the CDN business and most of them failed because the skill set is different,” Merriman said.

Panther’s business model is different from most of the top CDNs in many ways. Merriman comes to the business having been a CDN customer, when he ran an ad serving company called Double Click, and as a result, he’s structured Panther’s contract terms and pricing to support and promote the growth of his customers’ businesses. Panther offers a pay-as-you-grow contract that automatically triggers lower prices as a customer’s usage volume increases.

Merriman said that Web 2.0 startup Jango, an online radio service, has grown exponentially over the last six to 10 months, in part because of Panther’s amenable contract terms that have no burst fees or ongoing service fees.

Panther’s philosophy also bucks another common practice—where a CDN will tell its customers that they must use their services exclusively to get the best pricing. Panther actually encourages its customers to spread their work over several CDNs as a way to gain real leverage in pricing; for redundancy; and to really experience the services of many CDNs first-hand.

Streaming vs Progressive Downloads

While most of the CDNs contacted for this article pointed out that Panther did not have the streaming media capabilities that they had, Merriman pointed out that supporting many different streaming media formats adds to the capital costs and operational overhead of running a CDN. While many CDNs offer a wide range of streaming formats, including Adobe Flash, Microsoft Silverlight, and Apple QuickTime, Panther’s business model uses the standard approach of progressive downloads via http protocol exclusively.

“Instead of streaming media, we came up with a better technology approach, the Autobahn Platform from our global partner Swarmcast, which breaks up live video into smaller, more manageable chunks for progressive download,” he said. “The vast majority of videos offered via the Internet are delivered as progressive downloads, including all of the videos on You Tube.”

With the Autobahn platform, the Panther Express CDN easily plugs into Silverlight or Flash rich media environments, enabling content providers to stream the highest

quality live and on-demand video without committing to costly, closed, proprietary delivery methods.

The Big Guns

While there are currently about 28 providers in the CDN market, many analysts and listings on the Internet estimate that the lion's share of the revenue (close to 80-percent) goes to the top three players: Akamai, Limelight, and CDNetworks. And most sources consider Akamai to the market leader.

In its report of first quarter 2008 financial results, Akamai put its revenues at \$187 million, a 34-percent increase over first quarter 2007 revenue of \$139.3 million, and a two percent increase over fourth quarter 2007 revenue of \$183.2 million.

The report said that Akamai's customer base—companies under long-term services contracts—was 2,672. Among its customers are Fox Sports, which provides rich sports media content from its websites, including FoxSports.com on MSN.

Another power customer on Akamai's client roles is NBC Olympics, at nbcOlympics.com, which has relied on Akamai for its heavily trafficked websites since 2004. Akamai's global network helped NBC deliver average page download times of less than three seconds, and there hasn't been any downtime.

Akamai also provides on-going support to the National Basketball Association (NBA)'s online presence, including 60 heavily trafficked websites, such as NBA.com, WBNA.com, and international websites, which provide news, results, statistics, broadband video highlights, exclusive behind-the-scenes access, and games. The NBA webcasts over 1500 games annually, and supports over 35 million unique users each month and over 30.4 million video streams per month worldwide.

Managing Peaks and Surges

"Our global network consists of over 34,000 servers, strategically placed at the edge of our network. And Akamai is the only CDN that is globally deployed in all the leading ISPs. This allows 85-percent of all end user requests to happen within one hop for faster response times and a better playback experience," said Tim Napoleon, chief strategist, media and entertainment, Akamai based in Cambridge, MA.

"Akamai's globally deployed server architecture ensures the capacity to keep your site available even under tremendous loads—like during March Madness or on Black Friday," said Napoleon. "It's not uncommon for a major retail chain to see a 20 times spike in peak traffic to their websites on Black Friday, and our network is designed to handle those huge spikes in traffic."

The Akamai model is based on placing its servers at the edge of leading ISP networks around the world, and then using its patented intellectual properties to manage all the traffic to those servers and end users from its network operations center.

Burgeoning Internet TV

The Akamai distribution network is scalable and flexible, which provides an advantage as market demand grows for streaming media. “There’s absolutely a trend towards Internet broadcasting,” said Napoleon. “When I started in this space years ago, people weren’t sure you could put a movie trailer online. Now some companies are bypassing traditional outlets and going to the Web directly.” For example, Akamai customer Cinsay.com produces shows solely for Internet distribution.

At New York-based Limelight Networks, Paul Alfieri, senior director of corporate communications said that, in June 2008, Disney used their CDN services to distribute a summer family movie, “Camp Rock,” online. Within the 24-hour period during which the movie was available online, there were over 850,000 plays of the movie on demand. This online distribution followed a single broadcast showing during which the online event was promoted.

Since Limelight owns its own private fiber optic network, 85-percent of the time, the content never travels over the public Internet. Limelight’s network connects with its own servers at the edge of networks operated by over 900 broadband providers like Comcast, AT&T and Verizon, which avoids traffic congestion and delays. Alfieri estimated that Limelight Networks controls approximately 18-percent of the market, earning over \$100 million in annual revenue in 2007, and \$30.2 million in just the first quarter of 2008.

Limelight was also the CDN behind the high-profile Oprah webcast series of Eckhart Tolle’s “A New Earth.” Alfieri said, “The first of the ten live sessions attracted over 500,000 participants, making it the largest Internet event at that time, since trumped by the Disney ‘Camp Rock’ online movie.” Another coup for this CDN is that it has been contracted by NBC Olympics to handle all video streaming for the 2008 Beijing Olympics.

High Cache-It Ratio

Now in its 11th year in business, CDN pioneer Mirror Image Internet has its own global network consisting of 21 Content Access Point (CAPs). These CAPs are large data centers, located at Internet Exchange points around the world, which contain hundreds of servers that stream content in popular formats, including Windows Media, Microsoft Silverlight, Flash, Real, and QuickTime. The routing of content to end-users is managed 24/7/365 from Mirror Image’s NOC in Tewksbury, MA.

“When content is requested by an end user, we can deliver it from the CAP closest to them because we maintain very high ‘cache-it ratios’ where 98.5-percent of the time content is stored on all of our servers, and delivered from the one closest to the end-user,” said Martin Hayward, director of marketing for Mirror Image Internet.

Hayward continued: “For the remaining 1.5-percent of the time, we have to go back to our customer’s origin server. But many of our competitors only have a 60- to 70-percent cache-it ratio, which means that 30-to 40-percent of the time, they must go back to the origin server to retrieve that content, which is inefficient.” Hayward noted that, in some cases, these CDN competitors even charge an administrative bandwidth fee for the retrieval of their customers’ content—which is essentially a charge to cover their own shortcomings.

Among Mirror Image’s customers are: HSN (Home Shopping Network); New York Times’ website; WHDH-channel 7 in Boston, and WSVN, the Fox TV affiliate in Miami. They also provide CDN services to NOAA (National Oceanic Atmospheric Association), the Center for Disease Control, and the National Hurricane Center. And they’re the CDN for 4kids.tv, a kids’ entertainment website that combines social networking and TV content from sources like The CW TV network.

Not a Do-It-Yourself Project

All of the CDNs contacted for this article agreed that their customers could never justify the costs of setting up their own networks and managing the delivery of their own content.

At Internap, in Atlanta, GA, David Frigeri, vice president and general manager of the CDN business, and Jim Leach, vice president of marketing, agreed, “companies are realizing that it doesn’t make business sense for them to build their own networks for delivering rich media, such as video, music downloads, and images.”

“Customers want to enlist the services of a qualified CDN that guarantees 100-percent availability and a full complement of services, such as encoding and audience analytics,” said Frigeri. “Concrete audience data and reliable content delivery help them attract higher CPMs from advertisers.”

Internap maintains two major NOCs, and 42 data centers globally, as well as managed servers and IP delivery, intellectual properties, and a support staff in the hundreds. Internap’s customers include: established online media sites like New York Magazine, emerging social media and commerce organizations like MOLI, and a number of Internet TV broadcasters that deliver TV programming over the Web with custom interactive capabilities and tailored ad models. There’s also Weiss Research, which disseminates financial information via online videos and sells research reports from its website.

“Business models are evolving very fast right now, and these companies can’t grow and expand aggressively if they have to worry about running their own global network infrastructures,” said Leach. “We’re also seeing green field opportunities serving all the companies that want to deliver media online in innovative, new ways.”

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