

# Business Communications Review - April, 2002

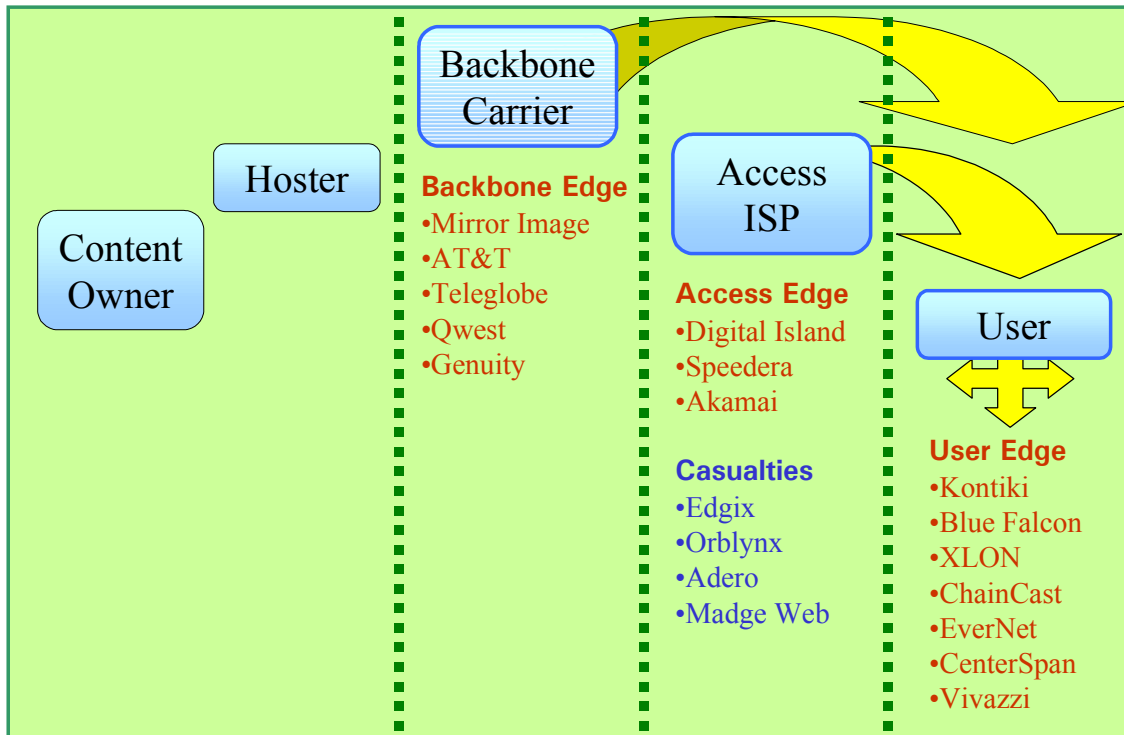
## CDN Business Models - The Drama Continues

Rebecca Wetzel  
rwetzel@rwetzel.com

During the past year, the content distribution network (CDN) market has embodied all the drama of a Verdi opera. A number of players on the CDN stage have sung their swan songs, others are inventing new roles for themselves and new players have made their debuts. But so far, no player is yet singing his way to the bank.

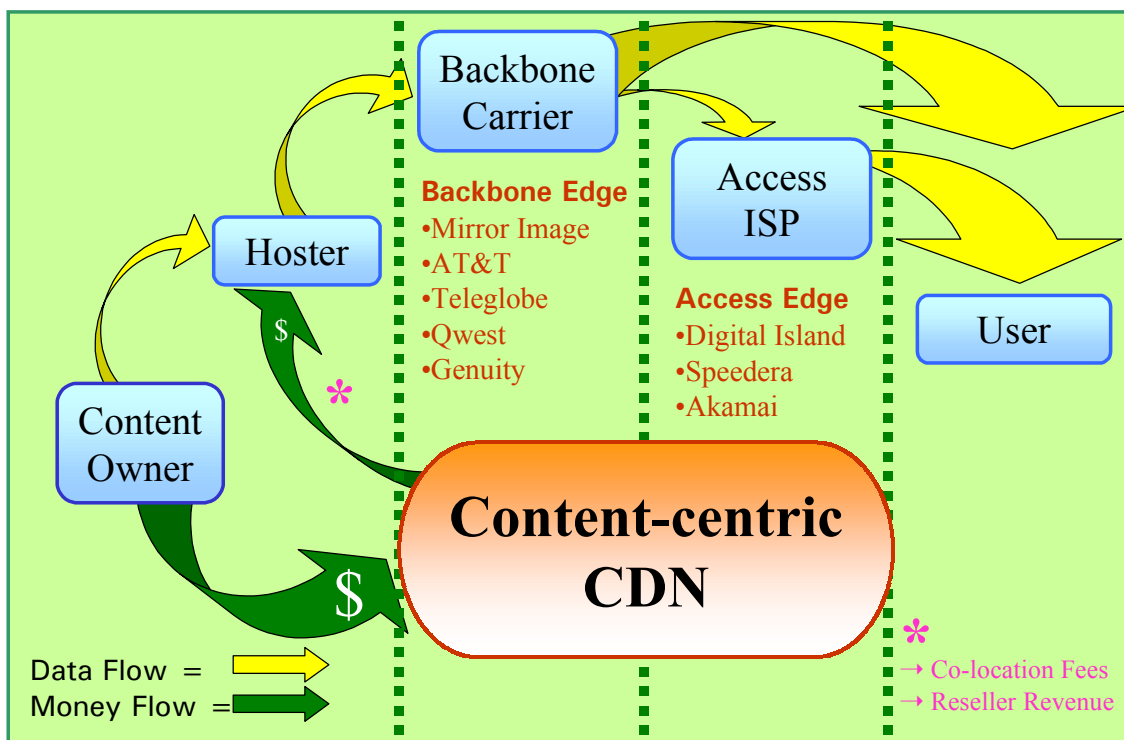
Last year, I described two fundamental CDN business models – one content-centric, the other access-centric (see *BCR*, April 2001). During the past year new approaches have hatched, that are literally “over the edge,” -- making it essential to define the delivery edge for all of the CDN players before dissecting their business models this year (**Figure 1**). Last year, the delivery “edge” was either on the perimeter of a carrier’s backbone or the Internet backbone, or within an access ISP’s network. Now a new set of market entrants has nudged the delivery edge out, to include users’ computers.

**Figure 1 “Edges” from Which CDN Players Serve Content**



Although it is essential to understand where and how content is delivered, how data flows has surprisingly little bearing on how money flows. In the content-centric model, money flows from content owners to CDNs (**Figure 2**); in the access-centric model money flows from access ISPs to CDNs (**Figure 3**). Content-centric CDN customers pay to distribute content to their audience in order to save bandwidth and origin server costs, and to improve the users' experience. Access-centric customers pay for managed caching services to distribute popular content to their access customers from within their networks, with an eye to saving upstream bandwidth costs and reducing customer churn through a better user experience.

**Figure 2 “Traditional” Content-centric Business Model**

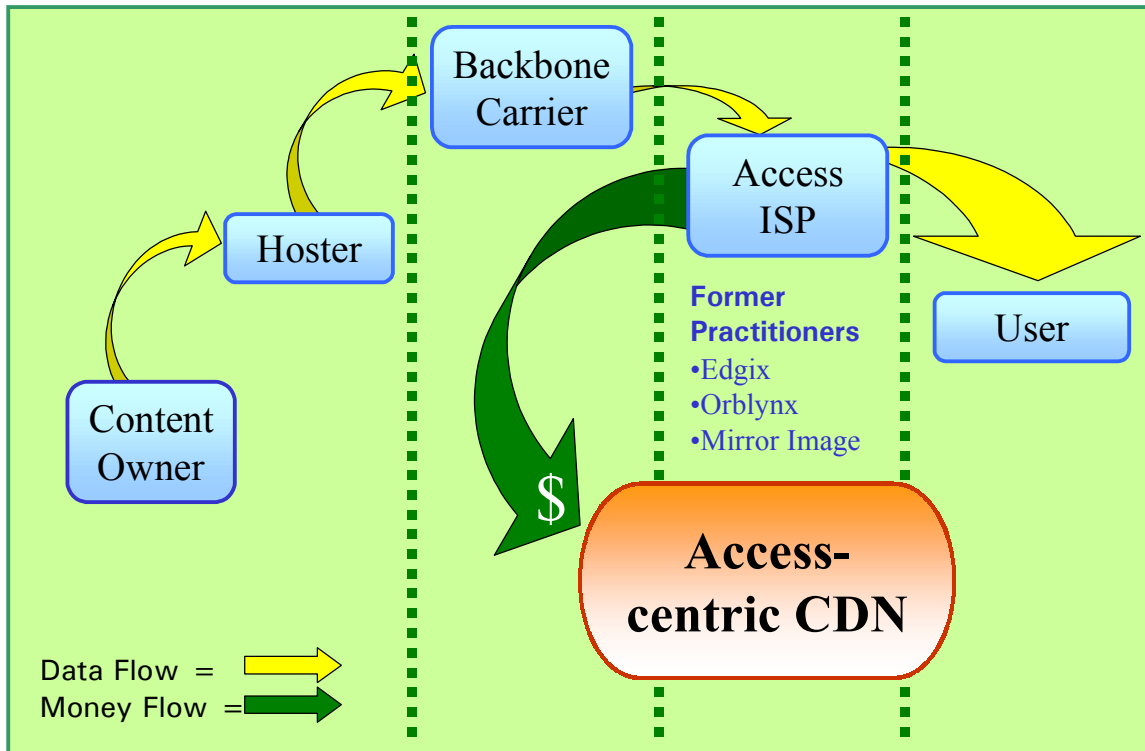


Unfortunately for those who bet on the access-centric model, it left the stage during the past year. Its primary proponents, Edgix and Orblynx, closed shop in 2001, and Mirror-Image Internet admits that the model collapsed for it, leaving the content-centric model, while not exactly triumphant, at least ambulatory.

Of the standalone content-centric CDNs, Speedera claims to be on a fast track to profitability this year. Akamai, once a Wall Street darling, is struggling to earn back investor and customer confidence, while losing market share to lower cost providers. Meanwhile, Cable & Wireless annexed Digital Island, Mirror Image Internet took its lumps when partner Exodus declared bankruptcy and Adero and MadgeWeb turned out the lights.

Despite the alarming attrition rate, new content-centric CDN players entered the fray - each confidently proclaiming that they have a cheaper, faster, better way to skin the content-delivery cat. The common theme among the emerging players, including Kontiki, Blue Falcon, XLON, ChainCast, EverNet, CenterSpan, Peer Genius, Red Swoosh, eMikolo Networks, Yaga, and Vivendi's Vivazzi, is a peer-to-peer approach, aimed at lowering content distribution costs and improving scalability.

**Figure 3 Access-centric Business Model**



### Why Access-Centric CDNs Flopped

The fact is that ISPs are unwilling and/or unable to pay for the benefits of having popular content distributed within their networks. With the ISPs hunkered down in survival mode, they've been in no position to buy anything but essentials - and managed caching services have been deemed *nonessential*. To compound the problem, Akamai and Digital Island bestow some of the same benefits *gratis*, in exchange for placing their servers inside ISPs' networks. And to add insult to injury, most ISPs already do their own caching. These factors conspired to doom the access-centric business model.

According to Bob Hammond, senior vice president of Mirror Image Internet's Advanced Technology Group, "The ISP model collapsed because the ability to pass on costs collapsed. ISPs couldn't absorb the additional cost and pass it along to their customers. They also couldn't quantify the improved quality of

service and translate that value into additional revenue. Since margins were so tight, this was one of the first things they pushed back on. They couldn't justify it."

Mirror Image Internet had to increase its capacity for each ISP customer, and each customer had to shoulder the cost of buying local caches. Once those costs were incurred and the service was up and running, Mirror Image found that a mere 15 percent of the cached content was requested more than once. Observes Hammond, "It was a never-ending spiral death trap, and we decided to exit."

Akamai's role in the demise of the access-centric CDN model is reflected in EarthLink's recent decision to welcome Akamai's servers into its network. As Steve Dougherty, EarthLink's director of systems vendor management explains, "The installation of Akamai's servers provides the two-fold benefit of reduced bandwidth costs and maximum performance of some of the world's most popular Internet content." That is precisely the rationale that access-centric CDNs promoted for ISPs to *pay* for their services, and ISPs just said no.

### **Moves to Add Value**

The first-generation, content-centric CDNs are peddling hard to add value to their services. Adding value and charging for it has become critical as the first-generation CDN offering – selling bandwidth at the edge – has quickly become a commodity. Unfortunately, downward price pressure and price wars this early in the game, make reaching profitability a tough slog. This is especially true for lead-dog Akamai, which bears high costs from placing servers on every virtual street corner.

To address its dilemma, Akamai is systematically distancing itself from its core CDN business (referring to it as Akamai 1.0), and is repositioning itself as Akamai 2.0 – a supplier of edge computing services. The goal is to improve margins, and to create hooks into customers to keep them from hopping to lower-cost alternatives like Speedera. According to a January report by HTRC Group, price is paramount in choosing a CDN service. "Content delivery services are price-sensitive and cost is the largest barrier to their adoption. The majority of content sites will choose the least expensive solution that yields acceptable performance." (From "The Commercial-Grade Internet: Edge Systems and Services" – January 2002, by HTRC Group, LLC.)

Speedera is a beneficiary of CDN customers' price sensitivity. According to its vice president of marketing Gordon Smith, "A surprisingly large number of Speedera's customers are Akamai refugees," which he attributes largely to better value. Smith believes that Speedera is well positioned to compete on price because, "We have a more efficient infrastructure. What it takes Akamai 14,000 servers to do, we can do with many fewer servers. Our capital structure is totally different. Theirs is capex [capital expenditure]

heavy, and from an opex [operational expenditure] point of view, we are extremely efficient.”

Akamai’s biggest step toward edge computing to date is dynamic Web page assembly on Akamai servers. Ultimately, Akamai aims to become a distributed computing platform, actually running applications at the edge. Through a concept called “content atomization,” they intend to lessen the burden on central servers, thus saving customers’ money. Dynamic Web page assembly is a small step in Akamai’s grand vision.

Several startups, including Ejasent, may beat Akamai to the punch on the distributed computing platform front. Ejasent has a network of geographically distributed, shared servers, that are linked together into a single processing resource pool. In Ejasent’s model, processing power becomes a computing utility, allocating processing as needed to make it massively scalable and less expensive. For example, website managers can distribute identical copies of Web applications across the network. When load on the central site exceeds pre-defined thresholds, these applications are activated in the server nearest the user. Ejasent bills its customers based on “delivered computing minutes,” and not on bandwidth.

Mirror Image Internet has similar plans for delivering Web services such as credit-card authentication. Says Mirror Image’s Bob Hammond, “We will partner with ‘glue’ technologies, middle-ware vendors and professional services organizations to deliver applications on a platform worldwide.” He predicts, “Applications now behind Web servers will migrate out. Ultimately, everything except inventory databases will migrate out from the data center to the edge. Applications are being broken apart so they can be run on the Internet. You can install your backend database, and the rest is sold per use and runs at the edge using SOAP and XML.”

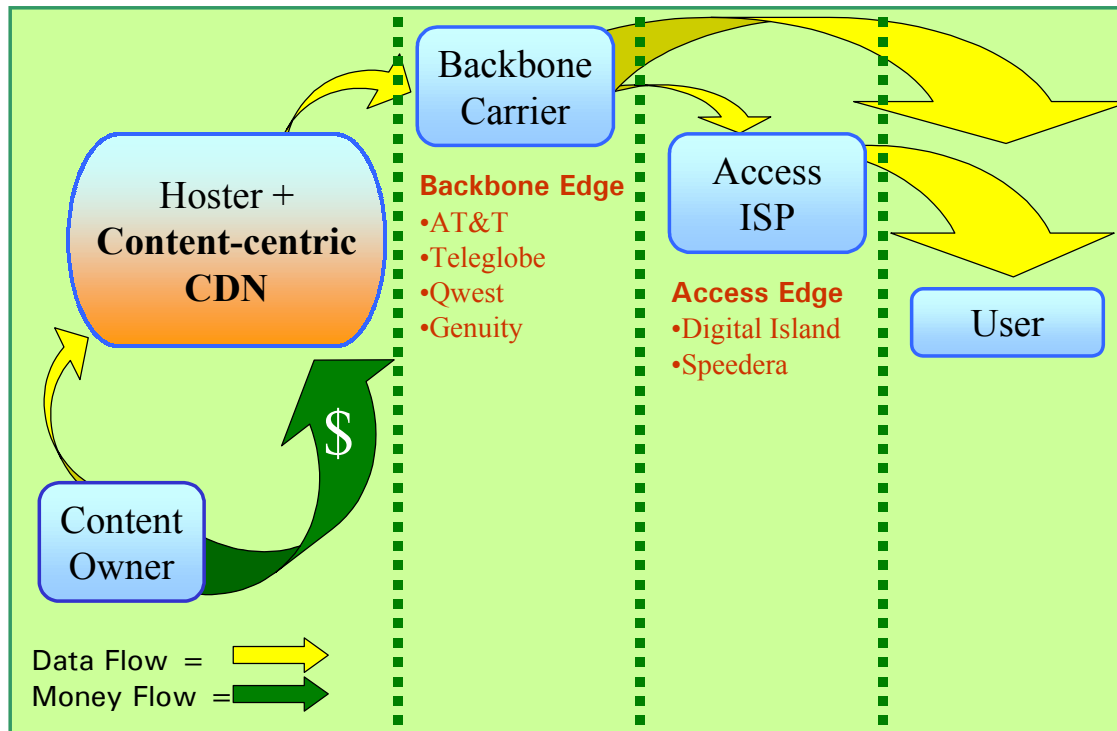
Not everyone agrees that demand for distributed computing will be sufficient to lift CDN players into the black anytime soon. Greg Howard, principal analyst of HTRC Group, is skeptical about current demand for distributed computing. “What is the killer app? There isn’t one yet. We can look at the ASP market for some clues as to what to expect. The vertical applications did well, but horizontal applications didn’t. When it came to CRM and SAP for example, growth was a big goose egg. There needs to be a good reason to distribute an application.”

### **CDNs Mate with Hosting Services**

The past year has seen a closer coupling of CDN and hosting services. CDN services often are presented as a distributed extension of centralized Web hosting services. Historically, hosters have seen CDN services as cannibalizing data center services, because content served from any of the CDN delivery edges (Figure 1) translates into fewer servers and less bandwidth needed in the data center. But customers want CDN services, so hosters are now on the CDN bandwagon, anxious to collect a piece of the

action (**Figure 4**). Additionally, hosters welcome such a service-line extension, because the more services a customer buys from a single vendor, the less likely they are to switch providers or to migrate services in house.

**Figure 4 Hoster/CDN Coupling Business Model**



Coupling CDNs with hosting services may, however, prove thorny for standalone CDNs. If they expand their offerings into Web-hosting data centers, they risk channel clash with their resellers who are Web hosters. Akamai, for example, will face this type of channel clash as it expands its services to include data-center services such as placing caches between Web servers and the network to reduce server load.

The increasingly close CDN/hosting service relationship is embodied in Digital Island's new 2Way Web service line. C. J. Stumpf, Digital Island's Chief Technical Officer, sees the combining of hosting and content distribution services into a single Web-hosting services menu as a way to make it easier for customers who are not technically inclined to buy services. Says Stumpf, "We've modularized our services to allow customers to put them together in ways they can use. Customers can put services together like Legos into solutions. It's easier for people to understand what they're getting. Before [selling CDN services] was a technology sale. We got our first 100 customers that way. Now it's more of a business sale."

Like Digital Island, AT&T also hopes to be a one-stop-shop for combined hosting and CDN sales. Walter Sturm, director of AT&T's content and media

services, believes it makes good business sense for customers to get hosting and CDN services from a single source. "It's more expensive to get services from multiple players. If my hosting is provided by one player, I have to make a commitment to them, and the same thing for my CDN services. You run into operational and cost issues in supporting multiple vendors, increasing the total cost of ownership. Then you have to ask, do you want to be in the integration business?"

In keeping with the one-stop-shop argument, carriers like AT&T, Cable & Wireless, Qwest and Teleglobe point out that because they own networks, they can provide better service quality. They believe their ability to assure plenty of network headroom, and the fact that they have control over the network from data center to backbone edge allows them to offer better service quality.

Akamai dispute this, claiming that because each backbone carrier has a limited footprint, they cannot be close enough to provide as good an end-user experience as Akamai can provide through its 13,500+ servers. AT&T's Sturm counters, "The number of servers is irrelevant. We have a hub strategy that will allow us to deliver content to 92 percent of the world's users in one hop."

Standalone CDN Speedera offers a novel way to closely yoke its services with Web hosting offerings. Rather than simply using Web hosters as resellers as rival Akamai does, Speedera puts Web hosters into the CDN business by designing, building, and operating CDN services for them. This allows a hoster to add customized, branded CDN services that it controls and prices, to its Web hosting service line, without having to build or operate anything. Hosters receive a bigger piece of the revenue pie, and they control the service in a way they can't when simply reselling someone else's offering. For example, hosters can determine when traffic will stay on their own network, and when it will be routed to third party networks. This allows hosters to control costs and service quality.

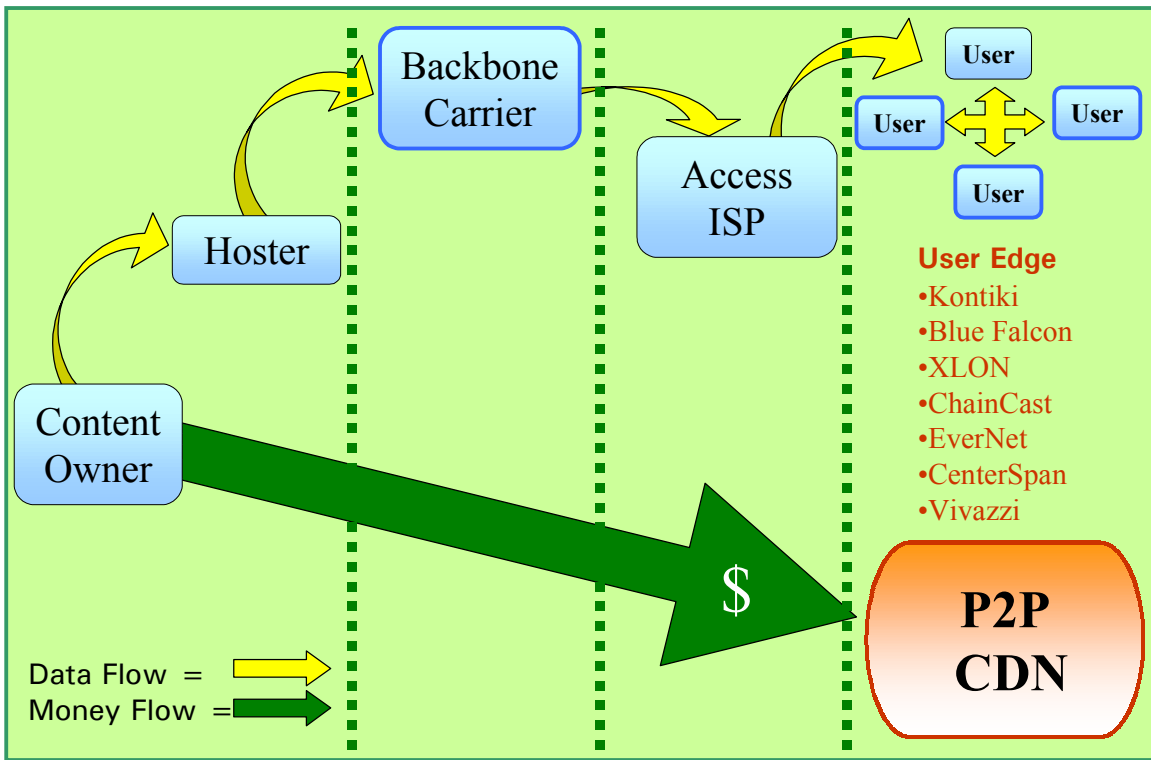
### **Peer-to-Peer CDNs Emerge**

While many established CDNs like Mirror Image Internet, Teleglobe and AT&T pursue hub strategies, which deliver content from the backbone edge, an emerging CDN business model transforms content consumers into content distributors to deliver content from the user edge. The current list of CDNs requiring audience participation to dispense content is extensive -- Kontiki, ChainCast, Blue Falcon, CenterSpan, XLON Technologies, Vivazzi, EverNet, Peer Genius, Red Swoosh, eMikolo Networks and Yaga. This fully distributed, peer-to-peer approach is designed to deliver large files and/or streamed content to users inexpensively.

In what is best described as a "managed Napster" approach, client software enables local machines to feed each other requested content; in the case of streaming media, local machines share streams. In this model, content

owners pay CDNs to distribute their content (**Figure 5**). According to John Bartlett an analyst at NetForecast: "The place these technologies will work best is within a large corporation or on a campus." A coveted pot of gold at the end of the peer-to-peer rainbow is for users to pay for content. But that day has not yet come, and it is unclear if or when it will come.

**Figure 5 Peer-to-Peer Content-centric Business Model**



Tony Espinoza, Kontiki's vice president of products and services describes how his peer-to-peer CDN downloads large files. "Say 10 machines have the content at an enterprise site. Then all 10 will send a piece of the file [when a user near them requests it]. The idea is to turn all nodes on the network into well-behaved servers. If one computer goes off the network, then [the requester] will get that information from another computer." Kontiki also pushes requested content to users from origin servers during off-peak times to reduce content providers' bandwidth costs and server loads. Says Espinoza, "Kontiki can start at about one-third of the cost of an existing CDN, and improve the quality at the same time."

Kontiki charges for the use of its software to protect and sell content, and to track and report on content dissemination. Additionally, it charges for bandwidth used between end user nodes as well as from its own central origin servers. According to Espinoza: "One component of what we charge for is like your FedEx bill, and the other is your application bill."



The bevy of new peer-to-peer CDNs can be attributed to Napster's success as well as to its downfall. Industry analyst Greg Howard of HTRC Group observes, "After seeing the initial popularity of Napster, lots of companies began developing similar peer-to-peer engines. Then copyright issues emerged and dashed that model. Then CDNs began getting paid to deliver content, and the peer-to-peer players moved in that direction."

Despite the current flurry of activity, Howard sees a rocky future for the newly minted peer-to-peer CDNs. "[The technology] should work fine for audio and for some other applications, but when we get into things like large video files, it's a different story. Users are likely to become annoyed with performance. Plus, if a hacker got into any one of these networks, they could wreak havoc."

Howard also foresees reliance on client software as a pitfall. "Every time I hear that a client is required, a red flag goes up. First of all, getting clients to the desktop is an issue. And once they are there, clients can create problems for end-users' connections, causing a support burden for enterprises and service providers. If I were an IT manager, I'd be hesitant to let these clients behind my firewall." The cons don't stop there. He points out that consumer ISPs have rules against Internet access customers serving content.

Similarly, John Bartlett of NetForecast sees the scale weighted toward cons for peer-to-peer CDNs. "If the technology is used to distribute the morning news report from CNN within a company, it makes sense. Some of the streaming chains make sense in the same way -- if folks are really using streaming. But I wonder about the impact on the average desktop to source this data. There will need to be some management of the disk space consumed, it could become extensive. I certainly would not be interested in having my dial-up line consumed with serving someone else's data. I also think ISPs would be concerned, since it means that the access lines to their clients will be consumed with serving each other. This means that the lowest bandwidth point in the chain is getting more use, and the core is getting less use. This model does not work."

But Kontiki's Espinoza remains upbeat. "Kontiki is not just about delivering and pricing bandwidth like many other content delivery networks. Kontiki is focused on delivering a more complete solution to enterprises, addressing their need to easily distribute and support the network throughout their organization, to ensure high-quality content is delivered and to utilize digital media in a cost-effective and efficient way for their business."

### **What Became of Content Settlements?**

The Content Bridge Alliance, envisioned two years ago as a public forum for settlements across service providers, failed to thrive. In theory, the Alliance, which is now operated by Digital Island, allows hosting providers, backbone carriers and access ISPs to offer content distribution services beyond the

limits of their own networks, and gives them a share of revenue for services rendered within their own networks.

In practice, however, the alliance has failed to win converts. Says Peter Christy, principal of NetsEdge Research Group, "It continues to plod along in terms of standards activity, but it's a cumbersome business model, and it hasn't amounted to anything."

Private content peering appears to be faring better than public peering. Digital Island has announced a bilateral, private-content-peering partnership called PCX (Private Content Exchange). PCX allows ISPs and carriers that operate regional CDNs to take advantage of Digital Island's reach, and to receive a share of revenue based on the amount of traffic that they generate and serve. According to Digital Island's Kurt Merriweather, the service has sparked considerable interest in Asia and Europe, where caching infrastructure is less prevalent. Despite some private content peering activity, uptake has been uninspiring so far.

### **The Future - .Net and Beyond**

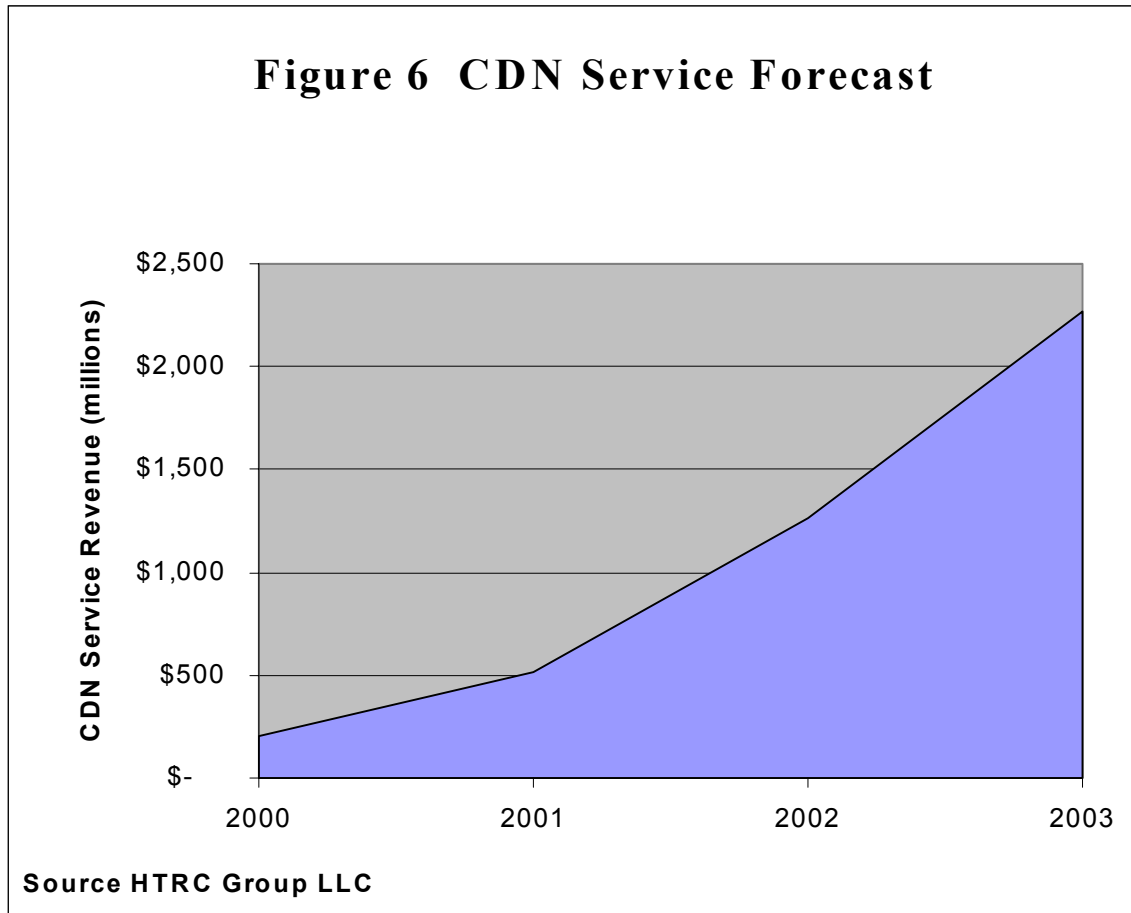
What can we expect the future to bring to content-distribution network services? In terms of market growth, HTRC Group sees the aggregate CDN market topping \$2.2 billion next year, up from just over \$510 million in 2001 (**Figure 6**).

Given that peer-to-peer CDNs appear to have the scale tipped against them, it is unclear whether they will play a major role in how users receive content. The involvement of a heavy hitter could substantially brighten the future of the peer-to-peer CDN model. Greg Howard posits that, "In an ideal world, it would be great if peer-to-peer worked. If Microsoft wanted to get into it with MSN for their services, that might work."

There are differing points of view regarding the future of streaming media. Some, like Speedera's Gordon Smith, see streaming media coming into its own, and he cites streaming as the fastest growing part of Speedera's "soon to be profitable" business. "There is irresistible movement toward wanting streaming content over the net with suitable quality at a suitable price," he said. "The lesson learned is that you can't give it away."

But others, like NetsEdge's Christy don't buy it. "I don't think that streaming makes sense. Digital video makes much more sense. Even for predicted killer video apps like e-learning, you can just transfer video to disk drives, which are cheap. I don't want to be deemed a nay sayer, but I don't think there's a business case for streaming yet."

Christy does, however, see a "huge opportunity" in distributed computing services that can make .Net types of services work better. "You ought to be able to have interactive PC performance across the Internet. You need distributed computing for that. Your computer should be able to connect to, say, Cisco, from a distance and experience PC speeds. That will be possible with the children of today's CDN services."



Since I began following the CDN market in 1999, I have expected large access ISPs to begin demanding compensation for content delivered by CDNs from within the ISP's network. After all, ISPs own the 'ocean front property' on which access edge CDN servers perch, and the likes of Akamai, Digital Island and Speedera reach millions of Internet users with the cooperation of access ISPs. In addition, access ISPs have valuable information about the content audience, such as the viewer's billing address, which could be enormously useful to content owners.

So far, however, even the most massive access ISPs, most recently EarthLink, are content to give away that beachfront property to CDN service providers - even while struggling to become profitable. Go figure.

Some day, however, the access ISPs will wake up to their market clout, and will demand entrée to the CDN game. Cable companies and online service providers in particular should grasp the importance of getting a piece of the action for content delivered by CDNs through their pipes. It would be jaw dropping if they let this opportunity slip completely through their fingers.

Whatever the future holds, chances are that behemoths like Microsoft, AOL Time Warner and IBM will play an increasingly prominent role. As the plot thickens one thing is clear: The outcome of today's CDN drama won't be known for certain until the fat lady sings.

***Bio: Rebecca Wetzel is an Internet industry analyst, consultant and writer. She headed marketing for one of the first commercial ISPs, BBN Planet, and went on to become VP of marketing for caching vendor InfoLibria. She can be reached at [rwetzel@rwetzel.com](mailto:rwetzel@rwetzel.com).***