

Dan Rayburn: EVP [StreamingMedia.com](http://StreamingMedia.com), Principal Analyst, [Frost & Sullivan](http://Frost & Sullivan) | 917-523-4562 | [Email](#) |

Subscribe   

## How Dynamic Site Acceleration Works, What Akamai and Cotendo Offer

Dan Rayburn | Monday October 18, 2010 | 09:38 AM | [8 Comments](#)

Like  Tweet  G+1  Share

For those that track the content delivery networks, they are familiar with the idea that CDNs are trying to diversify their revenue by adding "value add services" to their portfolio. While that term is widely used by CDNs, and was originally coined by Akamai, I have yet to see any CDN define what it really means or which services fall under that term. After my post two weeks ago regarding [AT&T teaming up with Cotendo](#) to bring new CDN services to the market, I got a lot of questions specifically about dynamic site acceleration (DSA). I thought it would be helpful to explain what dynamic site acceleration is, what are the differences between DSA offerings, and what's the business case for the product.

Simply put, dynamic site acceleration is a suite of technologies and/or products that make websites reliant on dynamically served content perform better, load faster, and ultimately, make more money. Traditional CDNs improved performance by caching critical content closer to end users. The personalization (Facebook), streams (Twitter), geolocation (FourSquare), real-time info (Google Instant), and customization (MyYahoo) inherent in Web 2.0 have made caching content far less useful. SaaS and enterprise applications (B2B and B2C) have made the case for dynamic, transactional content, as well as the demand for ecommerce and web retailers – focusing on personalized recommendations, and transactional and secure check-out and shopping carts.

DSA augments or in many instances replaces caching by creating new ways to quickly deliver online content or deliver online services and transactions faster. This, in turn, translates into a better user experience, more user clicks and interactions, higher conversion rates and better search engine visibility. [Researchers from Microsoft and Google found](#) that a 2-second site loading slowdown resulted in 2% fewer queries, 3.75% fewer clicks, and significant decreases in user satisfaction. The [Aberdeen Group found](#) that a 1-second delay in page load time equals 11% fewer page views and a 7% loss in conversions. (In other words, a site that averages \$100,000 a day in revenues would lose an additional \$2.5 million in sales each year). This is precisely why Google has an entire team of engineers dedicated to shaving milliseconds off load times for search results and is the rationale for DSA.

What makes up a DSA offering? Traditional DSA services often include most or all of the following technologies, most of which are dealing with optimizing bit delivery across the network:

- **TCP optimization:** Algorithms designed to handle network congestion and packet loss, providing ways for an origin content provider or a CDN to quickly recover from these issues or compensate for slow starts and other common TCP-related bottlenecks.
- **Route optimization:** Technology that optimizes the route of the request from the end-user to the origin and ensures the reliability of the connection, by routing it through a CDN network and going through routes that are constantly measured to ensure a faster and more reliable route. True DSAs optimize all parts of the route including first mile (origin to CDN), middle mile (within the CDN cloud) and last mile (CDN edge to user).

- **Connection management:** Includes persistent connection provision and HTTP multiplexing. The DSA will maintain reusable and optimized HTTP connections from the edge servers to the origin servers, and between the edge servers, rather than initiating a new connection for every request. This can dramatically speed up content delivery, as delivery of content and set up of a new connection can take 3-4 times longer than delivery of the same content over an existing connection.
- **On-the-fly compression:** Modern browsers reconstitute compressed objects, allowing for compression of text objects (HTML, CSS, JS) to 20% of their original size. Most dynamic, uncacheable content is compressible (think Facebook or Twitter feeds). Compression by origin servers is very compute intensive, however. True DSA services compress text objects shortly after they leave the origin servers. This results in less load on the origin servers, less data moving across the Internet to the end user and faster content delivery without requiring additional bandwidth or hardware.
- **SSL offload:** A mechanism to speed up the critical secure transaction process – such as a check-out at an online store. This traffic is highly personalized and dynamic, and is also a regular point of abandonment by end-users. CDNs with SSL offload offerings take over the critical secure transaction and speed them up by moving the transaction closer to the end user while simultaneously reducing the processing load of the origin server by performing the key calculations and encryption for new connections, which, like all encrypted operations, are compute intensive.
- **Pre-fetching:** Offered by Akamai, this service will parse through a served HTML file and will prefetch from the origin server the cacheable objects embedded in the file. A CDN can prefetch only cacheable content. Dynamic content by definition is contextual and can only be requested by the user. Technologies such as AJAX and HTML5 have also made this technique [fairly obsolete](#). In contrast, the other major DSA provider Cotendo addresses cacheable objects by providing tight integration between its DSA and caching services and developing advanced caching technologies that ensure higher cache efficiencies and minimal cache misses.  
*[Updated 10/25: Akamai contacted me to comment on this and said, "by default, when prefetching is enabled, the Akamai server will prefetch objects that are non-cacheable along with those that are cacheable. It also prefetches objects that have a zero second TTL assigned to them. The Akamai server holds these objects in a separate buffer. They expire after a short time, can be served only once, and can be served only to the same user that requested the page that references them (based on the Browser-ID). The Akamai server can prefetch two kinds of non-cacheable objects: objects with "no-store" or "bypass-cache" metadata, and objects that are non-cacheable based on their response headers (for example, a Vary: header)".]*
- **Whole-site delivery:** Most web pages are a hybrid of dynamic and static content. Site operators increasingly prefer to deliver the entire site through a CDN to improve performance and to manage key components of each site experience. Whole-site delivery has different flavors at different vendors, and differs by the efficiency of identifying cacheable and dynamic content, and whether it applies DSA techniques to the dynamic part or simply fetches from origin.

While there are numerous companies providing services labeled as DSA, Cotendo and Akamai offer the most comprehensive DSA technologies and products. It is important to know the differences between the two services, and that can be a bit tricky. Akamai has dominated the space since 2007 when it acquired Netli, the first company to truly deliver DSA as part of a CDN service and not attached to a dedicated appliance. Cotendo launched in 2009 and has quickly acquired over 200 customers including some marquee names like Facebook and Answers.com. Both companies have viable DSA offerings that include all the above-mentioned.

Akamai represents an older, big-iron approach to DSA. It has a large network with hundreds of PoPs located very deep inside of ISPs. However, not all of Akamai's PoP's are DSA capable and many are used primarily for other CDN and video delivery platforms that still account for the largest portion of Akamai's huge traffic volume. In general, Akamai still focuses on base-level network delivery and reliability problems with technologies such as SureRoute, path failover and more. However, in many cases these once critical problems/bottlenecks are no longer as severe due to the improved efficiency of modern networks, and reliable networks providers that focus on solving it (Level 3, AT&T, ...) especially in US and Europe.

Also, it is important to note that Akamai has grown by acquisition and so not all of its various technologies

from Akamai, Speedera and Netli work seamlessly together. Inefficient integration between caching services and DSA make configuration very complex and reduce the overall acceleration potential. In terms of configurability and tunability, Akamai does not really accommodate the real-time Internet and the modern world of dynamic content and customers tell me it can take hours for changes to take place on the Akamai network.

Cotendo takes a different and more modern approach to DSA. Rather than focus on only improving network performance, Cotendo is also focused on providing intelligence above the network layer. At its core, Cotendo's DSA offering is a suite of services aimed at improving the four key elements of performance: DNS, connection, first byte (get to origin), and content delivery. Cotendo provides advanced DNS services that accelerate DNS requests and provides this service from every PoP since this is really the only service Cotendo specializes in.

The company is not streaming video, is not deploying Flash Media Servers and has a network focused on DSA and application acceleration. Cotendo says they improve on the more traditional DSA TCP routing system by including enhanced adaptive congestion algorithms. These algorithms measure network conditions between all PoPs, origin servers, and end-user/ISPs and then optimize each connection according to the conditions. Their system provides an adaptive topology to optimize the route according to network conditions, reliability, and number of CDN hops, providing the fastest and most reliable path from end-user to origin.

In comparison, Akamai's DNS system goes through several levels of resolution before finally getting to the server that will serve the content, sometimes as many as four or five lookups. Even when you get there the secure and plain text portions of the site may be served from different machines reducing the effectiveness of caching.

[**Updated 10/25:** Akamai contacted me to comment on this and said, *"It's important to understand that one of those 'several levels of lookup' is done against our edge infrastructure and this is well-documented to be much closer to end users than any 'centralized' DNS infrastructure. Its also important to note that DNS typically is looked up once per transaction, not once per object so any penalty paid on the initial DNS lookup due to our additional level (typically only 5-10 msec) is more than made up for by the superior acceleration."*]

Cotendo also implements an advanced application integration layer trying to make DSA more accessible to customers. This layer enables efficient handling of both cacheable and non-cacheable content, but also enables smart caching of content that would otherwise be not cacheable. The layer does this by analyzing request streams and making the cache more contextual by, for example, caching geo-targeted results and offloading some of the logic from the origin server back to the CDN. This can dramatically help with introduction of new services that may make caching become even less efficient, reverting previously cacheable requests to become dynamic.

For example, location based services, that present relevant recommendations based on the user's location (IP address, or location information in case of mobile). This cannot be cached on a traditional CDNs as cache can't distinguish between different locations (or parameters of the request). Another example is decisions based on device types, like redirecting a request coming from mobile device to a different origin, or site, or serve different content to optimize for the device. All of these decisions are typically done on the origin.

[**Updated 10/25:** Akamai wrote in to say they also have an advanced application layer that can, *"Cache results pages generated by keyword searches (for example, 'shoes')", "generate pages on the fly for searches on product names which Akamai would cache", and "can cache dynamically generated product category pages."*]

These types of offerings typify the next wave of DSA as website operators seek more granular controls and real-time analytics capabilities from CDNs in order to drive more timely decisions around site optimization and traffic handling, among other topics. We will be talking a lot more about this in-person at the [Content Delivery Summit](#), May 2011 in NYC.

In addition to Akamai and Cotendo, other players like Limelight and CDNetworks [have entered the DSA market](#) but it remains to be seen how quickly these other services get traction for their new offerings. Dynamic site acceleration and application acceleration are the future of the CDN business and vendors are hard at work spending a lot of engineering resources and R&D dollars on making these services more valuable to content owners. Now if they would just do a better job of actually defining what they classify as "value add services", we'd have a lot more educated people in the market.

*I'm not a network engineer and I don't know everything there is to know about DSA, but if you have a question about dynamic site acceleration, put it in the comments section and I'll try to answer it.*

*[In the comments section, Joshua Bixby pointed me to an article he wrote on the subject of DSA. It's a good read and you can [find it on his blog here.](#)]*

### **Related Posts:**

- [AT&T Partners With Cotendo For App Acceleration, Will Challenge Akamai](#)
- [CDN Cotendo Raises \\$12M, Has 120 Customers For DSA and App Delivery](#)
- [CDNs Will Challenge Akamai For Value Add Services: CDNetworks The Latest](#)
- [A Detailed Look At Akamai's Application Delivery Product – Part 1](#)
- [Overview Of Akamai's Application Delivery Customers – Part 2](#)

---

### **Related**

It's Official: Akamai To Acquire  
Cotendo, Good For Akamai, Bad For  
Customers  
December 22, 2011  
In "Acquisitions & Investments"

AT&T Partners With Cotendo For  
App Acceleration, Will Challenge  
Akamai  
October 4, 2010  
In "Content Delivery"

When It Comes To CDN, What Is  
Value Add Services and What Isn't?  
August 24, 2012  
In "Content Delivery"

Filed in [Content Delivery](#) | [Permalink](#) | [8 Comments](#)  
[« Here Comes Google: TV Meets The Web](#)  
[The Future Of Enterprise Webcasting »](#)

**8 Comments**

**StreamingMediaBlog.com**

**1 Login ▾**

♥ Recommend

↗ Share

Sort by Newest ▾



Join the discussion...



**Buy Twitter Followers** • 4 years ago

Akamai's DSA offering is actually Netli's which was acquired by Akamai in 2007. At Netli Michael Kuperman ran Operations and led the deployment of the Netli Application Delivery Network Service from an idea to worldwide presence serving Fortune 1,000 companies. Now Michael is VP operations at Cotendo - a true new class CDN and ADN. Looking forward to see how Cotendo will stand out.

^ | v • Reply • Share ›



**Cheap Hosting Jaipur** • 4 years ago

I recently wrote a post in which I talked about the pros and cons of DSA on a more general level, and for now my conclusion is that the cost of DSA outweighs the performance improvements that most North American and European sites would gain.

^ | v • Reply • Share ›



**SEO Hampshire** • 4 years ago

... ..



It's interesting to see other leaders jumping into the market and/or tweaking their CDN offerings to address the need for dynamic content delivery.

^ | v · Reply · Share ›



search engine marketing melbou · 5 years ago

According to my view, Delivery of a truly dynamic resource can be accelerated only that much and while the number of resources on every page keeps growing (and more and more are non-cacheable), this is a hopeless race. To win this race and to truly offer a dynamic site acceleration, a company should address the two big web protocols bottlenecks - the huge number of round-trips for every web page and the randomness of their order.

^ | v · Reply · Share ›



cdnXite · 5 years ago

DSA are more about reliability as it is about speed.

In today's world, a website owner need 3 services to run a flawless online business.

1. A Domain Name with globally distributed DNS for reliability and speed, where reliability is the key.
2. A VPS hosting or Dedicated Server Solution with 24/7 customer support.
3. A CDN for static files and DSA for Dynamic files. And again with 24/7 customer support.

^ | v · Reply · Share ›



Leonid Fainberg · 5 years ago

My personal opinion is that DSA (as it's implemented these days in the CDNs) is a technology of the past. For most websites, it provides some acceleration, but it's not that substantial. Delivery of a truly dynamic resource can be accelerated only that much and while the number of resources on every page keeps growing (and more and more are non-cacheable), this is a hopeless race. To win this race and to truly offer a dynamic site acceleration, a company should address the two big web protocols bottlenecks - the huge number of round-trips for every web page and the randomness of their order.

Disclaimer: I'm the CTO of AcceloWeb ([www.acceloweb.com](http://www.acceloweb.com)) which provides alternative dynamic website acceleration solutions.

^ | v · Reply · Share ›



Jonathan Hoppe · 5 years ago

Dan, thanks for this great food for thought. It's interesting to see other leaders jumping into the market and/or tweaking their CDN offerings to address the need for dynamic content delivery. DSA and application acceleration services will no doubt become more prevalent as dynamic content use continues to surge. To Joshua's point above, the price point of DSAs can certainly be viewed as cost prohibitive – that is the cost often outweighs the performance improvements rendered. Many of these “leaders” of the DSA market appear to ignore the needs of small to mid-size businesses and enterprises. There is no reason to have these high-end, exclusive costs. Unlike CDNs, DSA, app acceleration, and cloud acceleration services are not dependent on a decade's worth of infrastructure build-out designed only to reduce latency. Accelerating Website content – dynamic, UDP, even static – should be more about eliminating packet loss. Dan, are these DSA solutions able to accelerate and optimize the delivery of UDP content (VoIP, IPTV, Online Gaming, etc.)? That is a common shortcoming that we are seeing in the DSA/Cloud Acceleration space...

Thanks again for a great article, and it will be interesting to see how the media delivery market shakes out these new technologies.



Jonathan Hoppe

^ | v • Reply • Share ›



Joshua Bixby • 5 years ago

Great breakdown of what the key players are offering, Dan. I recently wrote a post in which I talked about the pros and cons of DSA on a more general level, and for now my conclusion is that the cost of DSA outweighs the performance improvements that most North American and European sites would gain.

In my post, I also outlined a series of steps that someone considering DSA should follow to determine if the service will actually be of any benefit to them:

<http://www.webperformancetoday.com/2010/09/02/dynamic-and-whole-site-acceleration/>

Having said all this, I'm not ready to dismiss DSA. I think there's a lot of potential for this sort of technology, and I'm willing to be convinced if anyone can present a solid instance of it offering value right now.

^ | v • Reply • Share ›

Subscribe

Add Disqus to your site

Privacy

## Blog Sponsored By:

**FOR WEB SECURITY**  
Digital Media Services  
LEARN MORE

**LEVEL 3 CDN**  
Fast, high-performing,  
secure global delivery  
  
Connecting and Protecting  
the Networked World™  
LEARN MORE

  
**Fast. Global. Reliable.**  
Amazon CloudFront CDN  
[learn more](#)



# Transparent Caching


FOR DUMMIES

DOWNLOAD

Qwilt

ELEMENTAL

WHITE PAPER:  
High Dynamic Range Video




Deliver the best video experiences  
with the fastest CDN

Learn More

Limelight NETWORKS

SIMPLIFY YOUR STREAMING  
EFFORTS, MAXIMIZE YOUR REACH  
Try the Pro-Grade Live Streaming  
Service from Wowza



WOWZA media systems

Start Your Free Trial




Switch CDNs. Get a Free Trial

Always select the ideal CDN  
for your video content


umbrellaCDN™  
A Broadpeak solution

Click here  
to find out how




DYNAMIC WEB APPLICATIONS DEMAND A NEW APPROACH  
**YOTTA ADAPTIVE CDN**  
WITH PATENTED EDGE ACTIONS  
TRANSFORM / ACCELERATE / AUTOMATE / ANALYZE

LEARN MORE



Only with Cedexis  
Start your free Radar trial!



Open content  
caching for local  
content delivery

CDNs Extinct Next Year?

instartlogic

**EUCLIDiq**  
Supercharge your encoder's performance [LEARN MORE >](#)

**Cut Bitrate by 50% Without Losing Quality**  
[Get a Free Trial ->](#)

**MEDIANOVA**  
THE FASTEST STREAMING SERVICE PROVIDER IN EMEA

**GO BEHIND THE SCREENS**  
SEE THE INSIDE NUMBERS ON THE LATEST VIDEO TRENDS [GET THE GLOBAL VIDEO INDEX](#)

**OOYALA**

## Categories

- [Acquisitions & Investments](#)
- [Analysts, Research & Metrics](#)
- [Conferences & Events](#)
- [Consumer Content](#)
- [Content Delivery](#)
- [Devices \(Xbox, Roku, TiVo etc.\)](#)
- [Enterprise Video](#)
- [Executives & Jobs](#)
- [Free Product Giveaways](#)
- [Internet TV](#)
- [Media & Entertainment](#)
- [Mobile Video](#)
- [News, Broadcast & Cable](#)
- [Online Video Industry](#)
- [Patents & Legal Issues](#)
- [Uncategorized](#)
- [User Generated Video](#)
- [Video Advertising](#)
- [Video Formats](#)
- [Video Formats/Platforms](#)

1861 readers  BY FEEDBURNER

## Recent Posts

- [Next-Gen Video Needs Next-Gen Audio: But at What Cost to License?](#)
- [HEVC Advance Says They Will “Adjust Fees” For Licensing HEVC Patents](#)
- [Amazon Highlights HEVC Support With New Fire TV Streaming Box](#)
- [Verizon Still Scamming Customers: Tries To “Upsell” Me To 75Mbps, To Get Better Quality](#)



[Netflix/iPhone Streaming](#)

- [Server Side Ad Stitching Finds A Home In Live and Catch-up](#)

Daily posts by Dan Rayburn about the online video industry, business trends & analysis, market data & research as well as the online video business models in the media & entertainment, broadcast, advertising & enterprise industries.

The views expressed by Dan Rayburn are his own and do not necessarily reflect the views of Information Today, Inc.

Business of Video blog, © 2007 - 2015 by Dan Rayburn, Published by Information Today, Inc., Medford, NJ, USA 08055 [www.infotoday.com](http://www.infotoday.com), who controls all commercial rights. Readers of this blog are free to use the contents of this blog in any way whatsoever, as long as the use is non-commercial in nature. Creating a mirror site for this blog is prohibited, please link to official blog site instead.

**Information Today, Inc. Privacy/Cookies Policy**