Coverage Initiation: Zycada uses predictive page loading to create an e-commerce express lane

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Introduction

Content-delivery networks are adept at handling static content, such as corporate web pages or video-on-demand. Even a live-streamed event is static to the CDN, in the sense that any given action happened seconds ago. Dynamic content, however, is a challenge. If that live stream lets the user choose from multiple camera angles, then it becomes less predictable which video frames to deliver next. In e-commerce, personalization can dictate web page layout, product selection and even pricing, meaning these elements can't be cached ahead of time. If a website or an application draws from a database that is continually changing, then it isn't ideal to use cached data that could be minutes or hours out of date.

Zycada accelerates the delivery of dynamic content by using bots and machine learning to 'fingerprint' a website and predict what content is likely to be needed next. While potential use cases are broad, Zycada is starting out by targeting e-commerce, where it can speed up website performance and directly impact revenue. Zycada operates from nodes inside public clouds and could conceivably ride on CDNs and telco infrastructure, as well.

The 451 Take

E-commerce is the low-hanging fruit, but Zycada's approach could apply to any number of scenarios for web pages or even data retrieval in general. The ubiquity of data, the trend toward personalization and the coming age of 5G speeds for content would all seem to play into Zycada's wheelhouse. The company's technology could be used alongside a CDN as a performance boost, but Zycada could also face direct competition as CDNs develop their own answers to dynamic content. Challengers from the general AI/ML sector are likely to emerge, as well.

Context

Founded in 2014, Zycada emerged from stealth in June. The company was founded by chief product officer Subbu Varadarajan, a veteran of CDN provider Akamai and bot-wall-maker Shape Security, and CTO Roy Antonyraj. CEO James Brear joined Zycada months before its official launch; his long Silicon Valley history includes being CEO of Veriflow, which was sold to VMware in 2019, and Procera, which was taken private by Francisco Partners in 2015. Zycada is based in Campbell, California.

Financial

Zycada has raised roughly $19m from venture funds including Khosla Ventures, Cervin Ventures and Nordic Eye Venture Capital. The company has 20 employees and is supporting live traffic, earning revenue from a handful of name-brand customers in e-commerce.

Technology

Content-delivery networks speed up the web by caching static content – the elements of a web page that don't change. The classic example is a movie being streamed on-demand; copies of the movie can be stored in caches relatively close to different user populations. Additionally, the skeleton of a web page – including graphics, layout, some text and possibly some ads – can be prepared in advance and stored in a nearby cache, resulting in faster delivery. This is standard operating procedure for mass-market websites in areas from e-commerce to news publishing. However, some businesses are increasingly dependent on dynamic content, including personalized page elements and variable pricing. These items cannot be cached ahead of time. They must be generated at the origin server, which might have to do some computation or database querying to complete the task. This typically adds a delay of 800-1,000 milliseconds to the website loading time, Zycada claims. The challenge faced by CDNs is how to eliminate that pause and deliver dynamic content as quickly as static content – in the neighborhood of 30-50 milliseconds.

Zycada uses bots and machine learning to predict a customer's next move. The bots learn a site's shopping flows and observe and emulate customer activity over time to build a 'heat map' of likely next steps. For example, the bots might determine that 70% of customers shopping for baseball caps search for jerseys next. Armed with that information, Zycada watches user activity and preemptively caches the content for that customer's probable next steps. If the bot is right, then by the time the customer's request arrives, the dynamic content can be delivered immediately. If the bot is incorrect, nothing is lost; the network contacts the origin server just as it would have otherwise.

Zycada is running the technology in live situations with big-name retailers, and is claiming some dramatic results. One customer found that, with Zycada, pages were consistently being delivered at 10-20x the normal speed. In e-commerce, better website performance ties directly to revenue, since fewer customers leave the site in frustration; in this example, the customer's revenue grew to $170m from $150m. Of course, Zycada's impact will vary by scenario – for example, Zycada says it helped one customer handle a Black Friday surge of traffic, but then again, Black Friday specials can encourage predictable behavior that makes machine learning's job easier.

The product is meant to drop into a customer's workflow like a plug-in. It can be brought up in a matter of hours and requires no infrastructure on the customer's part; in fact, Zycada claims it can help customers extract more value from their existing infrastructure. (The customer does have to instruct DNS to send traffic to Zycada's nodes.) Sophisticated customers can use Zycada's APIs to adapt the platform for tasks such as A/B testing or load balancing. Zycada bills based on usage – a combination of bandwidth and computing cycles consumed. The calculation essentially relates to the number of transactions being accelerated by the bots.

Strategy

Zycada's platform could apply to any website with dynamic content. The company is focusing on e-commerce first, partly because it is a venue where slower page-loading times directly impinge on revenue. Looking elsewhere, Zycada believes it could help with video streaming by improving start times and lowering rebuffering rates. Content providers keep many formats of a video in cache to accommodate different devices, players and bit rates; Zycada has created streaming bots that can winnow those choices while simultaneously lowering lag. The company believes its technology could also be applied to live-streamed events that offer multiple camera angles.

Customers could use Zycada stand-alone, but the SaaS technology can also work alongside CDNs, telco services and even public clouds. Unlike a CDN, Zycada does not own a network of its own and does not intend to build one. Its compute nodes are located in public clouds and can also be hosted on edge infrastructure such as telecom networks or the CDNs themselves.

Competition

Does Zycada compete with CDNs? It does, in the sense that customers could view its web acceleration as an alternative to features offered by CDNs; then again, CDN web acceleration includes tasks that Zycada doesn't do. Zycada prefers to describe itself as a potential partner, helping CDN providers solve a problem. Possible paths to success for Zycada would be to partner with multiple CDNs or to be acquired by one of them.

CDNs have some mechanisms for handling dynamic content, albeit without the level of machine learning that Zycada applies. Akamai's Dynamic Page Caching uses factors such as request path, cookies and query strings to narrow down the possibilities of which cached web page will be needed. This can save some trips to the origin server. CDNs can also approach dynamic content by speeding up delivery in general, again trying to close the gap to a truly real-time response. Cloudflare, for instance, can combine a service called Railgun (which compresses origin payloads to shorten delivery time) with Argo, its network-wide routing optimization. Akamai offers Dynamic Site Accelerator, which optimizes the network path between origin server and cache, allowing faster delivery of updates. Fastly's Instant Purge clears a customer's cache globally in 150ms, which, while not the same as dynamic-content caching, can help close the gap for content that is changing in real time. (CDN and edge computing startup Section, which, like Fastly, is based on Varnish Cache, quotes a purge time of 180ms.)

Company officials do not consider Zycada an AI company. Even so, it could face competition from the AI/ML sector, perhaps from an area such as marketing automation. We can see meaningful parallels with a company like 6sense, which uses predictive ML in business-to-business e-commerce to try to discern information about otherwise anonymous customers – where they are in their buying process, for instance. It is also important to remember that Zycada is not strictly an e-commerce play. The company's technology can apply to any web-delivered content or service, and the wider it casts its net, the more ML specialists it will encounter as competition.

SWOT Analysis

Strengths	Weaknesses
The challenge of caching dynamic content is real and has not been fully solved by the CDNs. In e-commerce, Zycada is targeting a market where behavioral data is plentiful and user behavior can be predictable (even as it differs between users) – a good hunting ground for ML.	Some website operators could regard Zycada as yet another component in their workflow; they might prefer to see this technology offered as part of an integrated system. In that case, partnerships will be a must.

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Opportunities	Threats
Performance enhancement does not go out of style. As the web becomes increasingly interactive and real-time, Zycada should be able to broaden beyond e-commerce.	ML startups in peripheral areas could overlap Zycada's markets. CDNs could develop suitable methods for closing the gap created by dynamic content.

Source: 451 Research, LLC