Case Study

Eurosport

Eurosport used Varnish Streaming Server to power seamless live and OTT video streaming and manage massive amounts of data

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With large-scale video streaming becoming more and more popular, I'd recommend that companies adopt Varnish Streaming Server.

-Benjamin Baumann, Solutions Architect, Eurosport

Background

Eurosport is a European television sports network that is a subsidiary of the Discovery Communications family.

Like most broadcasters, Eurosport has moved rapidly into expanding its digital properties, making content available through various online and OTT channels. While Eurosport has been a leader in this arena, these moves have nevertheless posed the same kinds of technical challenges that most broadcast media companies face in a constantly changing digital landscape: users demand speed, smoothness and unprecedented immediate and cross-device access to live events and other multimedia content. Meeting these demands is at the heart of what Eurosport does; staying ahead of technical challenges is part of what keeps Eurosport ahead of the game.

Eurosport at a glance

Company
- **Eurosport** is a television sports network, owned and operated by Discovery Communications
- Normal live streaming daily traffic: 20,000 req/second. Peaks at 50,000 req/second during big events, such as Roland Garros/French Open
- Varnish offloads more than 50% of live streaming traffic from Eurosport backend servers

Challenge
- Eurosport wanted to offer seamless, high-performance live video streams on various online and OTT channels. Varnish harnesses the number of requests, and prevents massive traffic loads from hitting the backend and delivers a superior user experience at any scale.

Varnish Streaming Server for Eurosport
- Started using Varnish Cache in 2009 and Varnish Streaming Server in 2016. Moved to commercial offering largely to take advantage of VHA, MSE and professional support services.
- Professional expertise/support from Varnish core developers
- Three Varnish servers, all using Varnish High Availability to replicate cache data; Varnish Custom Statistics; Massive Storage Engine

The challenge: Develop own CDN/cost reduction

Behind the scenes, Eurosport's technical experts manage a lot of projects, from websites to internal applications, but chief among these is handling live video feeds and ensuring they stream seamlessly across numerous online and OTT channels. The kinds of events Eurosport shows include the Olympic Games, Roland Garros/the French Open and the Tour de France. For example, live sporting events, such as tennis grand slam events and other events for which Eurosport has specific rights for streaming OTT. While an event may be broadcast on Eurosport 1 or 2 on television, which limits what matches the user can watch, OTT channels let the user switch over to, for example, a match on the ninth court. The user gains a lot more freedom and choice with streaming media.

Eurosport faced a few challenges to enable and scale this vision:
- Developing a new video platform and managing a massive amount of data
- Bringing logic and intelligence back in-house
- Protecting the backend/origin from being overloaded during peak traffic periods/big events

They aimed, of course, to keep users happy - and that involved tackling these technical challenges, taking back control of their own logic and intelligence and bringing these aspects of content delivery and performance back in-house and ultimately keeping the infrastructure happy and operating smoothly.

"When we knew we needed enterprise support, switching between Varnish Cache and Varnish Streaming Server was easy, and Varnish engineers helped with setting up the platform for MSE, VHA and monitoring. Varnish support was responsive, highly qualified and spoke the same language as we do: having highly qualified expertise on the other end of the line meant that we saved time, and our move to Varnish Streaming Server took only one week to set up, including a little bit of VCL and a lot of system tweaking."

-Benjamin Baumann, Solutions Architect, Eurosport

The solution

Building up & getting smarter: New video platform, massive data handling, taking back control of logic/intelligence

Eurosport was building and launching a brand-new video platform and, of course, wanted to make it resilient, scalable and able to handle the massive amounts of data that live video streaming involves. Already long-time users of the open-source Varnish Cache, they decided to move to the commercial Varnish suite in order to take advantage of the built-in components that supported these demands: Varnish High Availability (VHA), Varnish Custom Statistics (VCS) and Massive Storage Engine (MSE). The move to Varnish Streaming Server in summer 2016 was straightforward because Eurosport was launching it on a wholly new platform, and they were familiar with Varnish Configuration Language (VCL) from their years of Varnish Cache use.

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One of the challenges Eurosport aimed to solve was to find out how best to manage massive amounts of data. With several terabytes of data on each server, they needed to see whether it was better to have some data in RAM or all data on disk, letting the system speed up by putting some disk pages on the RAM. This required some investigation and experimentation, and led in part to the adoption of Varnish Streaming Server.

Eurosport's previous solution required streaming video to the Akamai CDN, which would ingest the feeds and serve the requests to the clients, i.e. Eurosport was pushing the content and Akamai was distributing it. This left all the logic and intelligence in Akamai's hands, and made new behaviors and features harder to develop and deploy. Once they built their new video platform, Akamai acted only as the HTTP CDN proxy, fetching requests from Eurosport's backend - which is where Varnish lives.

Eurosport has reclaimed efficiency and flexibility in making this move; for example, in the old setup, if they wanted to change the video format codec or even make some adjustments to the streams themselves, the intelligence was in Akamai's hands, and they had to make changes for Eurosport. The same held true if Eurosport needed a new feature: they would have to wait for Akamai. With the new setup, Eurosport was able to take back control, making changes and building features they needed on their own timeline in-house.

"Varnish Streaming Server helps us reduce the number of requests the backend has to field, protecting the origin. We are using Akamai as a CDN and use Varnish in the data center. Varnish offloads more than 50% of live streaming requests, which is a lifesaver in terms of load that does not have to hit the backend"

-Benjamin Baumann, Solutions Architect, Eurosport

Keeping the infrastructure happy: Protect the origin

Managing an average of 20,000 requests per second, Eurosport's infrastructure on the whole has worked very well. In peak traffic periods, such as during big events like Roland Garros, the number of requests can spike to upwards of 50,000 requests per second. This, coupled with a 50% year-on-year average growth in traffic, depending on the event, keeping up with the larger audience and the demand to offer reliable, high-quality live streaming, Eurosport looked to leverage Varnish Streaming Server to keep its infrastructure happy and scalable with three Varnish servers, each using Varnish High Availability, to replicate cache data and ensure resilience.

Results

Balancing innovation and cost

For Eurosport, as with most companies, costs, savings and creating efficiencies are important, but the primary driver behind developing their new video platform, integrating Varnish to power its performance, and taking back control of its intelligence, was innovation. Striving for innovation, they looked at solutions that would give them maximum flexibility and high-performance support for the new video platform. This enabled, as just one example, supporting the DASH adaptive streaming standard. The bottom line here is that improving and enhancing user experience drives Eurosport's innovation.

Does this mean that cost does not matter? No. Without the Varnish layer, for example, Eurosport states that they would have needed more USP origin servers (more servers, more licenses), which is a direct cost. In addition, if one OTT channel had a particularly huge audience (e.g. during domestic football matches), that channel would be overrun with unusually high numbers of requests. Without Varnish, this load would have gone all the way to the backend, decreasing QoS for this channel and for the channels served by the same server. Having Varnish in place prevents this kind of catastrophic failure as Varnish will not hit the backends several times for the same request. According to Eurosport Solutions Architect, Benjamin Baumann, "Varnish is a big safety net. It mitigates risk." This kind of failure is another link in the complex "cost chain": downtime costs money, getting the site back up and running costs money and resources, and users become dissatisfied with this kind of failure as well.

Quantifying the positive user experience

Many factors come together to create a better user experience. For Eurosport, some of these factors included, as an example, being able to switch to the DASH video format (instead of Smooth Streaming) to use an HTML5 video player. The new video platform has enabled distributing better video quality with smoother streaming and delivery and the ability to deploy higher bitrates for every channel (to simulate HD-quality video). They could also introduce new features, such as multiscreen viewing, allowing the user to follow several streams at once.

Perhaps the most fundamental benefit for users is one they won't see or perceive at all. In taking back control of their logic and intelligence, Eurosport is able to respond quickly and with agility to the rapid changes in broadcast and OTT, thereby making improvements to the user experience behind the scenes that the user will never know about in a concrete way.

The future

Eurosport has used Varnish with success for a long time with plans to move forward and test some new features for Eurosport websites, such as parallel ESI processing or HTTP/2 support. Eurosport is also looking at ways to make the most of Varnish Custom Statistics, for which they currently run a basic setup for real-time monitoring; storing more data would allow them to create daily reports and in-depth analysis about what type of traffic is coming to their servers.

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