VARNISH SOFTWARE

One of Europe's largest retailers relies on Varnish for performance, resilience, cost management and improved user experiences on their online shopping website

Case Study:

European retailer with global presence

We rely on **Varnish** for performance, resilience, cost management and improved user experiences

Background

A Europe-based multinational retail corporation specializing in grocery sales and with operations all over the world needed to scale up online grocery shopping options - fast.

The retailer's online grocery operations, centralized at a single website, offers online shopping for pickup and delivery in a single European country. The site's technical operations and performance is managed by a front-layer engineering team that handles the order-processing and checkout phases of online grocery shopping.

The challenge

Redundancy and resilience

During the 2020 coronavirus pandemic, online grocery service and delivery was designated by many countries' governments as "critical infrastructure". Understandably, even during normal times, uptime, resilience and the ability to serve online shoppers no matter what traffic levels were hitting the website were essential functions.

For one major European grocer, normal operations comprise a somewhat complex setup that amounts to well over 1,000 different locations and delivery areas. This is the equivalent of having more than 1,000 individual stores operating all at once under the umbrella of a single website, each with its own inventory, product information, product availability and pricing.

A major online grocer at a glance

Organization

- A Europe-based, multinational corporation specialized in retail, with a website dedicated to online grocery shopping services

Challenge

- Handle traffic spikes from cache, ensuring high performance, resilience and protection for the backend
- Decrease operating costs by reducing the number of backend servers needed
- Improve user experience with faster page loads and smoother transactions

Varnish Enterprise

- Cloud-based (Azure) infrastructure with Varnish caching solution
- Varnish High Availability for redundancy
- Professional Varnish support

High-performance content dielivery

Equally important to engineers at the online grocery service was continuing to improve the user experience, which could be achieved by increasing the cache-hit rate to speed up content delivery and eliminating slowdowns from unnecessary round-trips to the backend to fetch content.

These considerations led the company to choose a new caching solution that could meet both their immediate needs and provide the flexibility for future development.

> Varnish is the industry-standard, go-to solution for high-performance website environments when you need a cache at the edge of your infrastructure, so we went straight to Varnish. It's not just a caching system; it's a flexible tool.
>
> ***-SRE/DevOps Engineer, major European retailer***

The solution

Varnish for high availability, redundancy and future-oriented flexibility

The retailer selected Varnish as their caching solution to work hand in hand with their application delivery platform, which does not do much caching and is instead used mostly as a web application firewall. From there, traffic hits their three Varnish High Availability (VHA)-enabled Varnish servers, which sit in front of PHP Symfony servers.

> It's easy to give in to feature creep and sacrifice performance, but we appreciate that the Varnish culture is always performance-driven. We prioritize stability and reliability over 'bells and whistles'. Keep it stable, fast, performant -- that is what we expect and get from Varnish.
>
> ***-SRE/DevOps Engineer, major European retailer***

The setup was kept simple, using mostly default VCL, letting the backend set caching policy with a few custom VCL overrides. Using Varnish virtually out-of-the-box with the cache being backend-driven and with VHA enabled, the company has immediately improved performance with an increased cache-hit rate and greater resilience with its distributed cache.

The decision to select Varnish also took the future and the development of more advanced solutions into consideration. The engineering team evaluated Varnish's flexibility and built-in extensibility, seeing it as an asset to build on, with both extra modules and VCL available to add or develop additional functionality as needed.

> Essentially you can do whatever you want with Varnish. The scope for us was about how far we wanted to go and what the scope for extensibility was. For us, that might mean advanced work with ESIs. This future orientation made Varnish the straightforward choice for us.
>
> ***-SRE/DevOps Engineer, major European retailer***

Results

The company realized tangible benefits from their Varnish implementation:

- **Resilience, redundancy and ability to handle traffic spikes**
  Being able to handle traffic, including spikes, by having Varnish serve requests from cache instead of hitting backend servers. This protects the origin server(s) and safeguards resilience and uptime.

- **Cost savings**
  Achieving better performance at the same or reduced server capacity is cost effective. Increasing cache-hit rates for better performance and speed while being able to reduce the number of active servers serving content equals cost savings.

- **Improved user experience**
  Content is served much faster, with pages loading faster, when Varnish is able to serve content from cache rather than having backend servers process each request. Time to first byte (TTFB) is drastically lower when content is served from cache, e.g., cached content can be served in 20ms versus 200-400ms with Symfony backend processing. Cutting response times by a factor of 10 or 20, as the company managed with Varnish, is a noticeable improvement for users.

- **Future development possibilities**
  The flexibility of VCL enables the possibility to develop advanced features, such as granular, event-based cache invalidation as well as other custom features, such as an in-house queue system.

> Varnish has been a workhorse – we sometimes forget that the Varnish servers are there because they rarely cause an issue. Varnish has been set and forget -- it just does the job
>
> *-SRE/DevOps Engineer,*
> *major European retailer*

The online retail future with Varnish

In the immediate future, the team will migrate from Varnish 4.1 to Varnish 6.0. Varnish 4.1 works well for their needs, but because the site depends on the default VCL for caching, migrating to the latest version will bring them in line with the most current VCL. In addition, Varnish 6.0 offers native JSON logging, which is a feature the company has wanted for some time.

A more advanced project under consideration would require more software development and cross-functional cooperation. This would involve adopting Varnish's Ykey feature, which will allow the engineering team to add tags to objects and invalidate them from cache individually by store. As stated, the site handles almost 1,500 different "stores", and because each one has its own pricing and product data, the cache is quite fragmented, and each store's data has to be cached in Varnish individually.

Implementing the Ykey feature to tag each item would allow for an overall increase in caching times (TTL) and increase in cache-hit rate. Only selected objects/items/pages would have to be cleared from cache on an event-based paradigm, e.g. when the price of a package of pasta at one store location is reduced while all the others remain the same. It would no longer have to be 15 or 30-minute default TTLs; Varnish could selectively invalidate and refresh just the objects and pages that feature that product for that individual store while retaining an entire cache for TTLs that last several hours instead of minutes.

> Varnish delivers the performance and stability we need and is flexible enough to create all kinds of features we may need in the future. Professional support is responsive, and in the very rare occasions that something needs advanced troubleshooting, Varnish has sometimes even come onsite to help.
>
> ***-SRE/DevOps Engineer,***
> ***major European retailer***

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