VARNISH
SOFTWARE

"Varnish Administration Console for purging."

Case Study:

Morningstar

Fresh data is vital for **Morningstar** and our customers.

Fred Wong, Morningstar, Inc

Handling Your Cache - A High Speed Solution

Caching content is difficult, however maintaining data consistency across different systems and several datacenters is even harder. For Morningstar Inc., leading provider of independent investment research in North America, Europe, Australia and Asia, caching is a critical part of their operations.
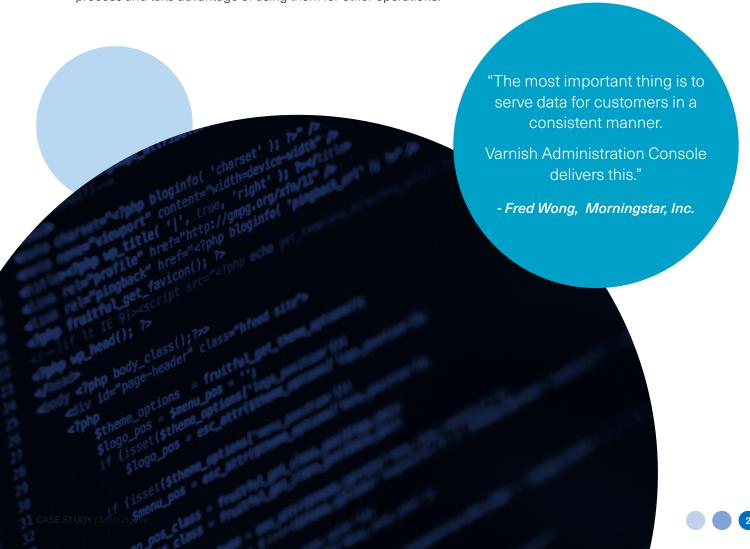
Morningstar provides data to approximately 456,000 investment offerings, including stocks, mutual funds, and similar vehicles, along with real-time global market data on more than 12 million equities, indexes, futures, options, commodities and precious metals, in addition to foreign exchange and Treasury markets.

Using the Varnish Administration Console (VAC) and its Super Fast Purger, Morningstar can trust on having fresh data, all of the time.

The Challenge

Modern financial businesses rely on fresh data given the rapid changes that occur. Initial specifications for Morningstar's purging requirement was to serve over 2,000 cache deletions per second as a minimum for critical business integrity. Data was to be supplied consistently and in real-time across multiple servers and locations.

Before taking advantage of the benefits VAC and the Super Fast Purger offer, Morningstar's internal API shelf was not using any form of high speed purging. The need for a simple standardized solution for the underlying platform proved to be vital, as was the need for technology that developers and system administrators could both share, regardless of location. Morningstar also wanted to release resources used in the cache purging process and take advantage of using them for other operations.

"The most important thing is to serve data for customers in a consistent manner.

Varnish Administration Console delivers this."

- Fred Wong, Morningstar, Inc.

The Solution

Varnish Administration Console has a built in Super Fast Purger feature - a high performance cache invalidation delivery mechanism that works across multiple instances of Varnish Cache.

Performance

Varnish Administration Console provides a single point of control over your Varnish Cache servers, helping you run a scalable, reliable and efficient online business. VAC provides a vital source of real-time analytics for Varnish Cache.

VAC's Super Fast Purger is able to manage different Varnish Cache instances. When using multiple servers in different locations, it uses a distributed architecture to spread out purge requests. Through testing in a real use case scenario the Super Fast Purger performed well beyond the initial requirement of 2,000 requests per second. The test results revealed 60,000 requests per second could be issued. Even when testing with a virtualised environment and limited hardware capability over four Varnish Caches the Super Fast Purger was able to handle 4,000 requests per second.

Taking advantage of the Super Fast Purger means objects can now be cached for longer periods of time, given there is full control over the objects and their ability to be actively removed.

Global distribution

Morningstar Inc's global presence truly pushed Varnish Cache purging to the next level. Their distributed architecture ensures data is synced across multiple servers, and more importantly that those servers can be in any given datacenter. By doing this, data freshness and consistency are safeguarded as opposed to a solution where individual requests are issued to Varnish Cache instances. This solution is scalable and gives control over grouping caches in different scenarios.

Security

Issuing purges across multiple data centers is the equivalent of remotely requesting content removal over a potentially unreliable medium. When considering financial data, the need for a secure channel is critical making a great deal of caution necessary. In VAC, the mechanism to check for integrity of the requests is HMAC1. Therefore, this is the mechanism that is used for the Super Fast Purger when sending purge requests to Varnish Cache servers.

The authenticity of the purge request can be validated and further strengthened by the use of an Access Control List (ACL) in the Varnish Cache server's Varnish Configuration Language (VCL) setup. This implies only purge requests from specified servers are allowed to be executed.

Up to
60,000
Requests
Per sec

ACL
Verified

HMAC, or keyed-hash message authentication code is a cryptographic function requiring a secret key between VAC and the respective Varnish Cache servers.
The longer the key, the more secure it is. HMAC is safer than other algorithms against attacks.

What's Inside The Super Fast Purger?

The Super Fast Purger relies on a RESTful API that exposes functionality to clients. The API acts as a hub between your purge request and all the Varnish Cache servers that are part of one group. The Varnish Administration Console enables groups to be created and managed through both the API and user interface. By having a single administration point for issuing cache purge requests, the Super Fast Purger guarantees cache purge requests are distributed to all relevant Varnish Cache instances, regardless of their geographical location. This is achieved by issuing a simple HTTP request command with relevant body data, correct cipher, and authentication.

The workflow of the SuperFast Purger starts with a client issuing a HTTP request containing both the group name and the purge expression. The VAC purger receives each request and validates the group name. Once validated, and after all Varnish Cache endpoints are identified, a purge request is constructed and sent out to the Varnish Cache servers.

There is also the option of reusing connections with HTTP keep-alive approach, taking advantage of the same connections previously established.

Additional Benefits

For Morningstar, Inc. there were also many other benefits outside cache purging. Varnish Cache hit levels were increased from 70% to 90%, releasing significant resources for other important tasks. The robustness of Varnish Administration Console meant there continue to be no problems to report. Team focus has shifted to other issues due to a higher level of confidence in data on a scale not anticipated before setup.

About Morningstar

Morningstar, Inc. is a leading provider of independent investment research in North America, Europe, Australia, and Asia. The company offers an extensive line of products and services for individual investors, financial advisors, asset managers, and retirement plan providers and sponsors. Morningstar provides data on approximately 473,000 investment offerings, including stocks, mutual funds, along with real-time global market data on more than 12 million equities, indexes, futures, options, commodities, and precious metals, in addition to foreign exchange and Treasury markets.

Administration Console meant there continue to be no problems to report. Team focus has shifted to other issues due to a higher level of confidence in data on a scale not anticipated before setup.

About Varnish Software

Varnish Software is the company behind Varnish Cache, a widely trusted open source web cache engine. Varnish Cache significantly enhances web performance for online businesses and powers influential content providers such as the BBC, Transport for London, The New York Times and Vimeo. It supports more than 2.3 million websites worldwide.

Varnish Plus is the commercial offering by Varnish Software which includes solutions for scalability, customization, content delivery, monitoring and expert services.

"Fresh data is vital for us and our customers. Varnish Administration Console gives us a competitive advantage as a company."

- Fred Wong, Morningstar, Inc.

Los Angeles - Paris - London
Stockholm - Singapore - Karlstad
Dusseldorf - Oslo - Tokyo

VARNISH
SOFTWARE

www.varnish-software.com