



CASE STUDY

At a Time When Technology Is More Present Than Ever in Our Lives, the Most Important Connections Are Human Connections

Decoupling Storage From Delivery Throughput Enables Content Delivery Networks to Provide Better Human Connections



"The Western Digital OpenFlex™ is a good fit for the Telefónica Content Delivery Network (TCDN) because we can independently scale high-performance storage and delivery throughput."

Francisco Cano – Head of TCDN Architecture, Evolution and Optimization – Telefónica

Telefónica Profile

Telefónica's mission is to make our world more human by connecting lives. As one of the world's largest telecommunications companies, Telefónica offers both fixed and mobile connectivity as well as a wide range of digital services for residential and demanding business customers. With over 345 million customers, and more than 112,000 employees, Telefónica operates in Europe and Latin America with revenues over €43B (2020).

The Challenge – Improving CDN Efficiency for Video on Demand (VoD) Delivery

A CDN (Content Delivery Network) is a geographically distributed network composed of several cache servers grouped in different Points of Presence (PoPs) distributed across a particular geography. The aim of a CDN is to improve content delivery, thereby improving the end user's Quality of Experience (QoE) and at the same time the network and infrastructure associated costs.

When a user requests content from a website or from a video service, the CDN chooses the most suitable cache server to deliver that content to that user, typically selecting the geographically closest cache server which already has stored the content requested by the user. CDNs are where the digital and physical worlds meet and where perceptions of performance can be felt most keenly by end users.

In the case of delivering video content, it is important to distinguish between live (i.e., traditional linear channels) and Video-on-Demand (VoD) contents due to their different characteristics. The live video traffic is characterized by a high content concurrency; all users watching a reduced number of channels, as few as one in the case of massive events as with sports, and a very high temporal concurrency because all the users watch them at the same time. On the other hand, VoD content is characterized by having very large content catalogs, comprising thousands of titles, with a reduced probability that one piece of content is being watched at the same time by a relevant number of users. Accordingly, the bottlenecks in the CDN cache servers' performance for live traffic are mainly the CPU, the RAM, and the network interfaces, while for VoD traffic the main bottleneck is the storage access speed. The CDN cache is typically a server with storage locally attached and it can be considered to be a building block providing a certain amount of video throughput (Gbps) and cache storage (TB).

In VoD traffic delivery the number of customers being served drives how much processing and bandwidth are needed, while the video catalog size drives how much storage is needed. Since these two factors are quite independent and their relationship could change over the time (e.g., a reduced catalog of very popular series could generate very high traffic while a large catalog of long-tail content could generate considerably less traffic), deploying fixed amounts of storage per server decreases the efficiency of the solution and increases costs.

"Telefónica's content delivery network touches so many lives on a daily basis. We are very happy to enable better efficiency and more flexibility by disaggregating storage from compute with our OpenFlex solution."

Davide Villa, Business Development Director – Western Digital EMEA



OpenFlex™ F3200 Series Fabric Device

Telefónica was looking for a way to increase the efficiency of their CDN for VoD delivery by decoupling the storage from delivery, providing the right amount of NVMe™ storage in each PoP regardless of the number of cache servers. Doing so would enable them to lower costs, increase performance, and provide better quality of service to their customers.

The Solution – OpenFlex™ F3200

NVMe-over-Fabrics, or NVMe-oF™, is a high-performance networked storage protocol that allows storage to be disaggregated from processing to make that storage widely available to multiple applications and servers. Enabling servers to share a common pool of storage capacity allows data to be easily shared at low latency, resulting in improved performance for clients.

Western Digital OpenFlex F3200 NVMe-based storage uses dual 50Gb/s network connectivity to maximize performance. Latency is comparable to the storage being inside the server but with the added benefit of the storage being a shared resource between multiple servers. This approach enables Telefónica to deploy fewer servers which lowers TCO while maintaining high performance.

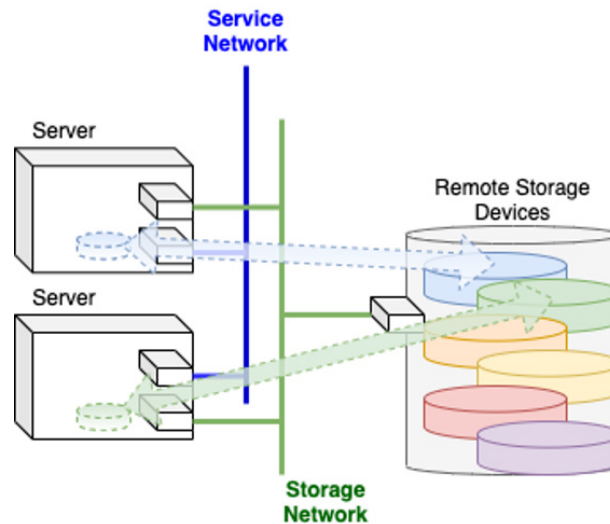


Figure 1 – OpenFlex NVMe-oF Disaggregated Storage Network

Conclusion

Telefónica's deployment of Western Digital OpenFlex technology has enabled their content delivery network to be able to scale delivery throughput and storage separately for more efficient deployment. The point-of-presence servers can be much simpler with minimal storage onboard and are therefore much less expensive to add or to replace. In addition, Western Digital represents for Telefónica a one-stop shop for their NVMe-over-Fabrics storage hardware needs (proprietary NVMe drives and JBOF).

At the point where the digital world meets the physical world, improved digital network connections allow Telefónica to keep providing their customers with a great content delivery experience that enhances their human connections. Western Digital is participating in this effort with the OpenFlex technology every step of the way.

Western Digital.