

Disaggregated High-performance Storage for CDN

Agenda

- Introduction
- The Challenge – Improving CDN Efficiency
- The Solution – Disaggregated Storage & Compute

Introduction

50+ Years of Global Trust

Western Digital is powered by the brightest minds in the industry—
a worldwide team of engineers, inventors, makers and innovators.

OPERATES IN
30+
COUNTRIES

12+
MANUFACTURING &
PRODUCT FACILITIES

65K
EMPLOYEES
WORLDWIDE

14K
ACTIVE
PATENTS

ETHISPHERE
GOOD. SMART. BUSINESS. PROFIT.
ONE OF THE WORLD'S
MOST **ETHICAL COMPANIES**

RECOGNITIONS:

Newsweek
ONE OF AMERICA'S MOST
RESPONSIBLE COMPANIES

WORLD ECONOMIC FORUM
**GLOBAL
LIGHTHOUSE**



Telefónica's mission is to make our world more human by connecting lives.

STRONG PRESENCE IN

12

COUNTRIES

OVER

350M

CUSTOMERS

MORE THAN

112K

EMPLOYEES

REVENUES OVER

€43B

2020

A Growing Partnership

From Devices to Platforms

2010



CARDS

SanDisk

2015



EMBEDDED NAND

Western
Digital

2020



FABRIC ATTACHED
JBOFs

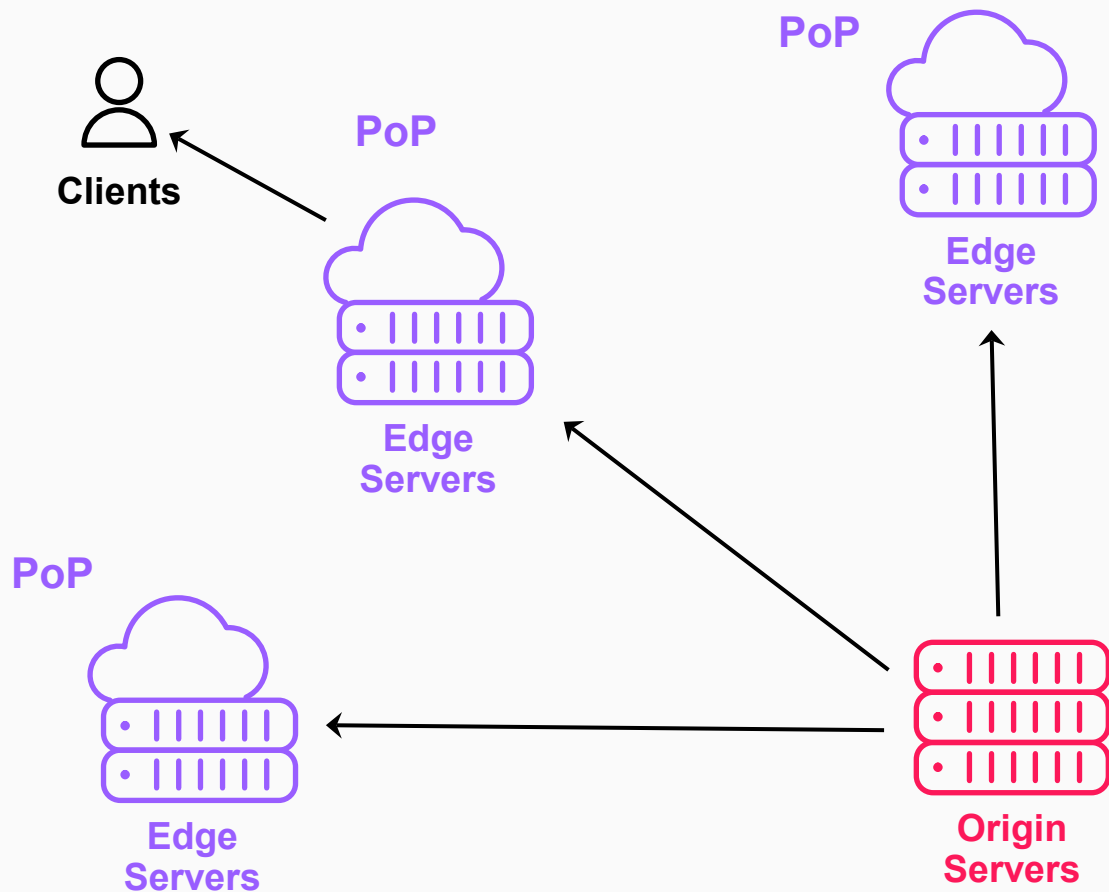
Western
Digital

2022



The Challenge

CDN Overview

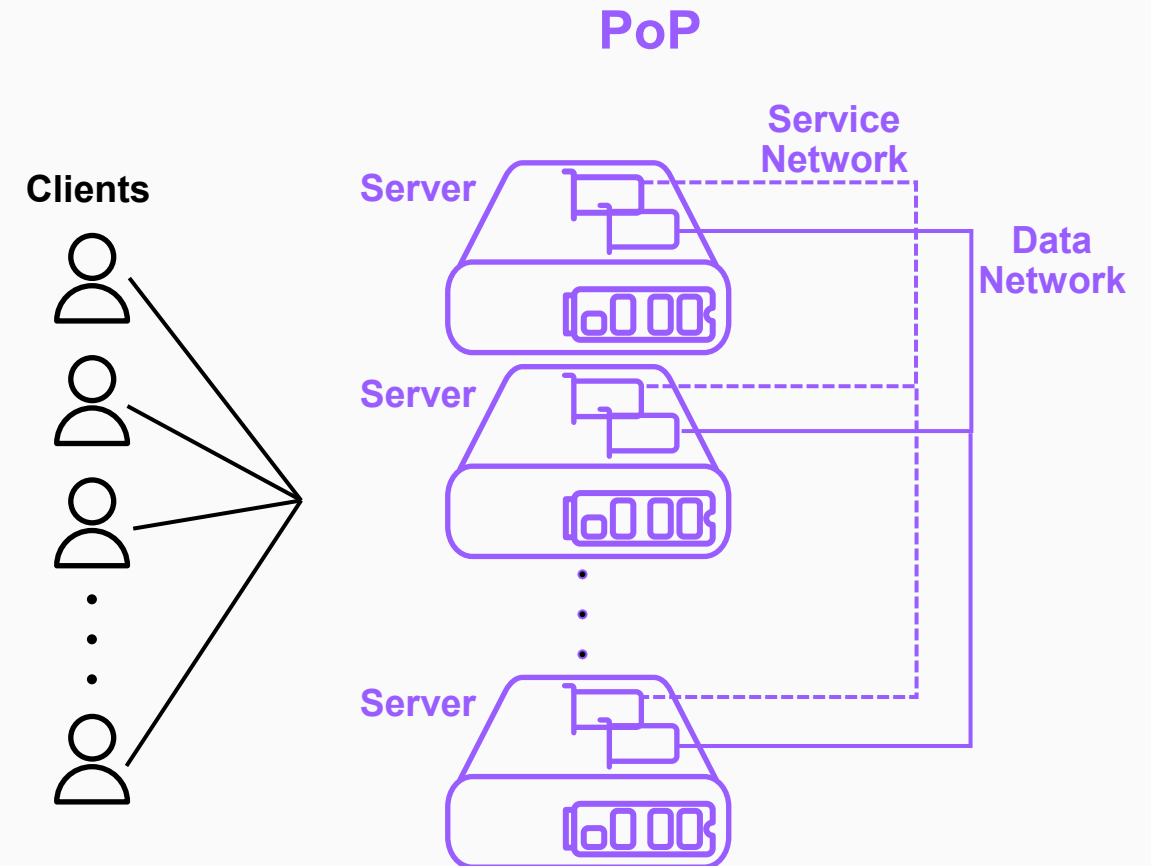


Benefits

- Lower latency to clients
- Reduced load on Origin Servers
- Increased uptime and security

Prior Solution

- Varying numbers of servers in each CDN PoP
- Servers have same bandwidth and storage capacity
- File sizes vary from <1MB to 5 GB
- Resource utilization varies based on content – Video on Demand (VoD) or live streaming



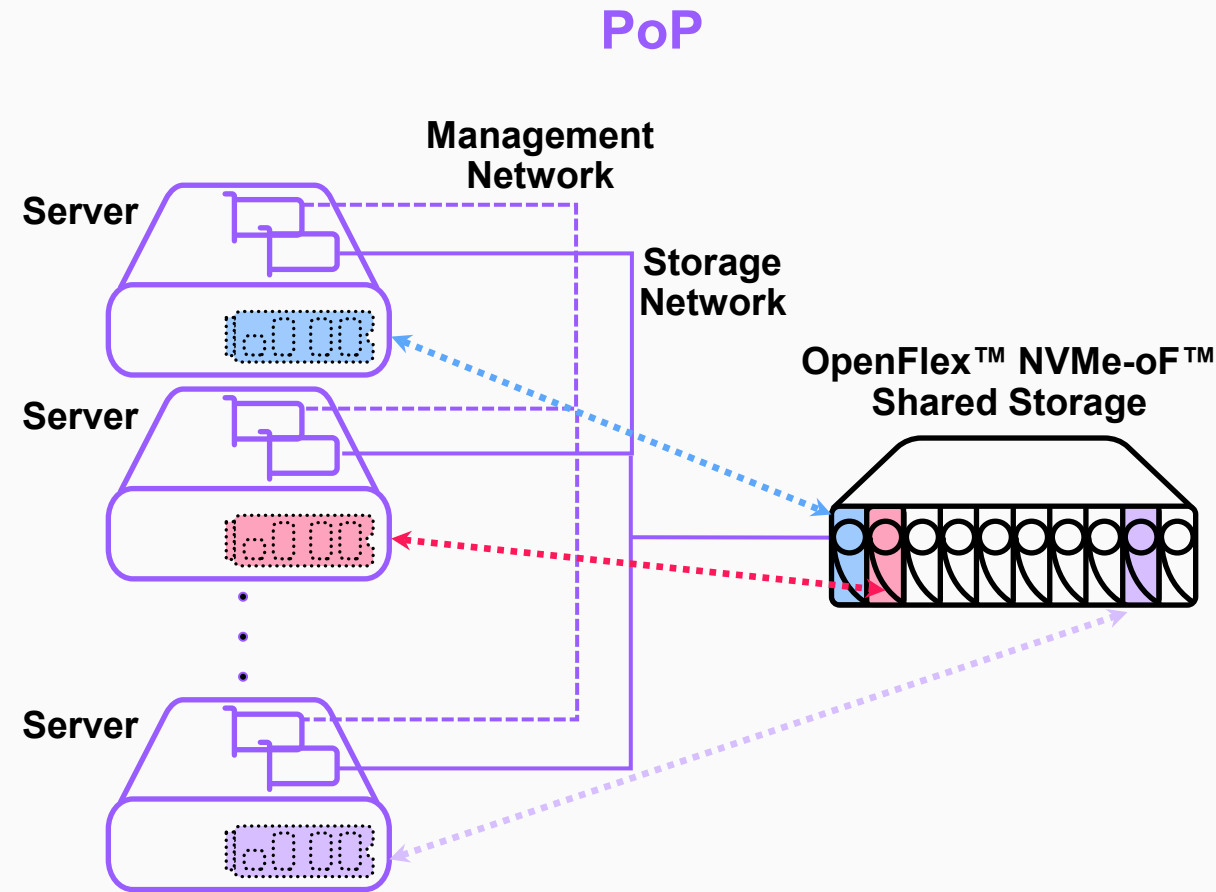
The Solution

Key Objectives

- Decouple storage and processing to improve resource utilization
- Enable storage growth and sharing without sacrificing performance
- Allow storage scaling with zero downtime
- Deliver High Availability access

New Solution

- Disaggregated storage and processing
- Separate storage and management networks
- Ability to dedicate or share storage amongst servers and applications



Key Results

- Decouple storage and processing to enable scale up and scale out
 - 25%+ increase in storage capacity utilization
- Enable storage growth and sharing without sacrificing performance
 - Leverage existing servers with ability to expand NVMe-oF™ shared storage
 - Performance was comparable or better than direct-attached storage
 - Potential for 2x throughput increase with network upgrade
- Allow storage scaling with zero downtime
- Deliver High Availability access



Summary

- Disaggregation delivers flexibility
 - Scale-up storage for VoD
 - Scale-out access for live streaming
- CDN efficiency
 - Measured in price/performance (€/Gbps)
 - Improved for both VoD and live streaming under normal and stressed loads



“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



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