SOLUTION BRIEF

How a Mobile Carrier Saved on Data Center Power and Space

A major mobile operator realized dramatic savings while increasing reliability by moving from disk to all-flash.

A Tier 1 mobile network operator and global leader in telecommunications achieved a remarkable 90% reduction in its data storage power consumption by implementing Pure Storage® solutions. Faced with rapidly expanding data volumes and the associated challenges of managing a large, complex storage infrastructure, the operator sought a more efficient, scalable, and sustainable approach. This document highlights the strategic partnership between the operator and Pure Storage, the technical solutions deployed, and the significant operational and environmental benefits realized through this transformation.

Introduction

In the highly competitive and data-intensive telecommunications industry, efficient data management is paramount. The US network operator highlighted in this document serves over 140 million wireless customers through its extensive network of over 40,000 cell sites. Each cell site generates telemetry data, which is crucial for detecting any network threat, anomaly, or outage. Additionally, this carrier is increasingly connecting customers through its fixed wireless access (FWA) solution, allowing residential customers to experience broadband services through the wireless infrastructure. The operator is continually expanding its fiber network, connecting over seven million households. Telemetry data from wireless, fiber, and FWA access points is continuously streamed to a centralized storage solution for crucial operational processing.

This data set is key to detecting and preventing distributed denial-of-service (DDoS) attacks, as well as providing insight into network optimization and congestion management strategies. The sheer scale of this growing data set presented ongoing challenges related to cost, performance, power consumption, and physical space requirements for its legacy storage systems. Recognizing the need for a modern, agile storage infrastructure, the network operator embarked on a journey to optimize its data centers, leading to a pivotal collaboration with Pure Storage.

Environmental Savings

Overall power consumption was reduced by over 90% compared to legacy storage.

Space Savings

Rack space was reduced by 75%, freeing up scarce data center floor space.

Ease of Use

Simplified storage management took pressure off the IT team.

The Challenge: Escalating Storage Demands

The operator's existing storage infrastructure, while robust, was struggling to keep pace with exponential data growth. Key challenges included:

- **Massive data footprint:** A sprawling array of 16 systems with ~40PB of traditional storage hardware capacity consumed significant physical space in data centers.
- **High power consumption:** The energy demands of numerous legacy systems contributed to substantial operational costs and environmental impact. Over 250kWh were necessary to power the aging infrastructure.
- **Complexity and high failure rate:** Close to 4,000 drives with an average 4% annual failure rate meant a technician was needed to make a manual intervention every 2.4 days.
- **Performance bottlenecks:** Legacy systems faced limitations in delivering the speed and agility required for modern applications and services.
- **Cost of ownership:** The total cost of ownership (TCO) for maintenance, upgrades, and power was continually escalating due to the cost of replacement units, full-time employees necessary to maintain the infrastructure, and power consumption.

The carrier recognized that addressing these challenges was critical not only for operational efficiency, but also for maintaining its competitive edge and commitment to sustainability.

The Solution: Pure Storage FlashBlade

After a thorough evaluation of various storage technologies, the carrier selected the Pure Storage FlashBlade® platform for its superior performance, efficiency, and sustainability features. The phased deployment involved:

- **FlashBlade//E™ implementation:** Traditional disk-based arrays were replaced with high-performance FlashBlade//E for mission-critical applications and primary data storage.
- **Data reduction technologies:** FlashBlade uses a proprietary data compression algorithm that operates continuously and inline without performance overhead.
- **Evergreen® storage model:** The carrier adopted the nondisruptive upgrade and maintenance model of Evergreen, which eliminates the need for forklift upgrades and ensures continuous innovations can be easily deployed.
- **Consolidation and simplification:** The carrier consolidated multiple legacy systems onto a significantly smaller number of Pure Storage arrays, streamlining management and reducing physical footprint.

Results: A 90% Reduction in Storage Power Consumption

The implementation of Pure Storage solutions yielded transformative results for the operator, including:

- **75% reduction in physical storage footprint:** The operator achieved an unprecedented reduction in the physical space required for its data storage, significantly freeing up valuable data center real estate. This was primarily driven by the high density and efficiency of all-flash arrays combined with leading data reduction technologies. Pure Storage helped the operator consolidate its storage infrastructure, reducing the number of systems from 16 to one and racks from eight to under two. This resulted in an over 75% reduction in space.
- **90%+ energy savings:** With a dramatically smaller hardware footprint, the carrier saw a substantial decrease in power consumption and cooling requirements, contributing to lower operational costs and a reduced carbon footprint. The deployed Pure Storage FlashBlade//E consumed less than 20kWh, representing a 90%+ reduction in power consumption.
- **Simplified management:** The consolidated and simplified Pure Storage environment reduced management overhead, allowing IT teams to focus on strategic initiatives rather than routine maintenance.
- **87% lower TCO:** Reduced power, cooling, and management costs, combined with the Evergreen storage model that eliminates costly rebuys, resulted in a lower TCO over time.
- **Environmental benefits:** The substantial reduction in hardware and energy consumption aligned with the operator's broader sustainability goals, demonstrating a commitment to environmentally responsible operations.

Technical Details and Implementation

Table 1 shows the significant transformation the mobile carrier achieved with Pure Storage solutions compared to legacy storage infrastructure.

Feature	Legacy Storage Infrastructure	Pure Storage All-Flash Arrays	Impact on Carrier
Storage Medium	Mix of hard-disk drives and hybrid arrays	100% NAND flash (NVMe DirectFlash®)	Drastically improved I/O performance and reduced latency for critical applications
Physical Footprint	Eight racks, large floor space	Less than two rack units, minimal floor space	Enabled data center consolidation, freed up physical space for other critical infrastructure, and reduced real estate costs
Power Consumption	High due to spinning disks and extensive cooling needs; approximately 250kWh	Substantially lower at 20kWh	Direct reduction in electricity bills and cooling overhead, contributing to lower operational expenditures and environmental sustainability goals
Management Complexity	Distributed, heterogeneous management tools; manual provisioning	Unified, simple management interface (Pure1®); automated provisioning	Reduced IT operational burden, freed up administrative staff to focus on strategic initiatives, and accelerated service delivery
Upgrade Model	Forklift upgrades, disruptive data migrations	Evergreen storage (nondisruptive upgrades, controller refreshes)	Eliminated planned downtime for storage upgrades, ensured continuous access to the latest technology, and protected initial investment
Cooling Requirements	High	Low	Further reduced energy consumption and environmental impact by minimizing the need for extensive cooling infrastructure
Resilience/Availability	Standard enterprise redundancy; 4% disk fail rate; frequent disk replacements needed	Far lower drive failure rate; DirectFlash Modules can be replaced nondisruptively	Enhanced business continuity and disaster recovery capabilities, ensuring uninterrupted service delivery for critical telecommunications operations
Data Protection	Traditional backups	Snapshots, replication, rapid restores	Improved RPO/RTO metrics, allowing for quicker recovery from data loss events and enhanced data integrity
Environmental Impact	Higher carbon footprint per terabyte	Lower carbon footprint per terabyte due to efficiency	Aligned with the carrier's corporate social responsibility initiatives, contributing to a greener IT infrastructure

TABLE 1 Summary of impacts on carrier after optimizing its data centers with Pure Storage

Conclusion

The leading US network operator's success in reducing its storage power consumption by 90% with Pure Storage stands as a testament to the power of modern all-flash technology and a strategic partnership focused on efficiency and sustainability. This transformation not only addressed the immediate challenges of data growth and infrastructure management but also positioned the operator for future innovation, empowering it to deliver superior services to its customers while realizing significant operational and environmental benefits. Results of the partnership between the operator and Pure Storage offer a compelling blueprint for other telcos looking to optimize their data centers in an increasingly data-driven world.

Additional Resources

- Learn more about Pure Storage solutions for telecom providers.
- Explore FlashBlade//E for high-capacity, all-flash data storage at the cost of disk.
- Discover the Pure Storage Enterprise Data Cloud.

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