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Uncomplicate Data Storage, Forever

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WHITE PAPER

Greening the Data Center

How Pure Storage® and Intel increase data-center sustainability by reducing the cost of powering storage.

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Introduction

Climate change poses an extreme threat to global society. To meet this challenge, governments around the world are accelerating efforts to regulate industries and encourage energy efficiency. Yet these new mandates come at the same time that energy prices are soaring, forcing organizations like yours to focus on energy efficiency in ways that they have never had to before.

In a business environment increasingly focused on these overlapping imperatives, and with a joint emphasis on sustainable IT, Pure Storage and Intel have become natural partners in tackling sustainability and energy efficiency for storage in the data center. Together, Pure and Intel provide full-spectrum coverage of compute and storage needs for customers across a wide variety of industry verticals. Intel® processors sit at the heart of Pure Storage technology, which has been architected from the ground up for efficiency that never compromises performance, delivering density, reliability, and simplicity. As a result, FlashArray™ products powered by Intel® Xeon® Scalable processors can boost performance while consuming less power. For example, FlashArray products can help organizations save up to 85% in both energy and direct carbon usage, versus using competitive all-flash systems.[1]

Pure Storage FlashArray//X™ R4 and FlashArray//C™ R4 products powered by 4th Gen Intel Xeon Scalable processors are a good example of the synergy between these two visionary companies. These products can help drive IT infrastructure toward a greener, most sustainable future.

Pure Storage FlashArray Portfolio (FlashArray//X R4 and FlashArray//C R4)

The Pure Storage FlashArray portfolio of all-flash storage solutions can provide energy savings, space savings, and e-waste savings—all without compromising performance. FlashArray//X can provide energy savings of up to 85%, as compared to other all-flash storage products, and it can take up to 95% less data center space than hybrid flash solutions.[2] The latest generation of the FlashArray portfolio—FlashArray//X R4 and FlashArray//C R4—provides highly efficient and scalable storage solutions that are representative of the energy-savings capabilities of Pure Storage products. In fact, both new FlashArray R4 models deliver 30–40% more performance than the previous R3 models for approximately the same energy usage.[2] These capabilities contribute to reduced power consumption and improved storage density compared to competing storage systems, enabling organizations like yours to do more with less.

Select models of FlashArray//X R4 and FlashArray//C R4 provide DirectCompress acceleration, a CPU offload card that handles the processing for the Purity software's inline data reduction, enabling the controller processors in FlashArray//X R4 and FlashArray//C R4 products to focus on other tasks, such as replication or array management.

Several key technologies deliver energy savings and overall efficiency for FlashArray//X R4 and FlashArray//C R4 products, compared to other all-flash systems. High-density, custom DirectFlash® modules enable the solutions to maximize the capabilities of flash storage and provide better performance, power utilization, and efficiency than all-flash systems employing commodity solid-state drives (SSDs). Advanced data-reduction technologies in FlashArray enable up to 10:1 data reduction, which can reduce the footprint of storage solutions in your data center.[3]

The Pure Storage Evergreen® architecture and subscription model offers unequaled storage lifetimes and flexibility in how you purchase and consume storage.[4] Because you can upgrade, scale, and modernize your Pure Storage solution modularly and non-disruptively for up to 10+ years, you don't have to over-provision storage up front to account for growth, or replace storage completely every few years. This means no unnecessary storage in your data center and ultimately less e-waste generated through the "forklift" complete replacement storage-refresh cycle. In fact, 97% of Pure arrays sold within the last six years are still in service today, given that they've been upgraded to run like brand new systems.[1]

Intel Xeon Scalable Processors

4th Gen Intel Xeon Scalable processors represent a major milestone in energy-efficient computing. These processors use advanced technologies to provide optimized power consumption and improved performance-per-watt ratios. 4th Gen Intel Xeon Scalable processors provide 80 lanes of PCIe 4.0 per socket to ensure high input/output (I/O) performance.[5] DDR5 DRAM support in 4th Gen Intel Xeon Scalable processors enables better performance and power savings: DDR5 memory provides up to 1.5x the bandwidth and speed of DDR4, at 4,800 megatransfers per second (MT/s)[6], while consuming 15% less energy than DDR4.[7]

With Intel® Crypto Acceleration and Intel® Advanced Vector Extensions 512 (Intel® AVX-512) technologies in 4th Gen Intel Xeon Scalable processors, Pure Storage enhances data encryption and security measures, providing organizations with peace of mind regarding their sensitive information. The integration of these Intel features helps ensure that data remains protected throughout its lifecycle, from storage to retrieval. By making use of the advanced capabilities in 4th Gen Intel Xeon Scalable processors, Pure Storage optimizes data deduplication, compression, and other storage-related operations. This results in improved data-reduction ratios and increased storage-capacity utilization, ultimately lowering costs and improving the value of the storage infrastructure.

Customer Use Cases

The following short use cases illustrate how actual Pure Storage customers are reducing their power consumption and increasing their data-center sustainability with Pure Storage FlashArray products powered by Intel processors.

Virgin Media O2

For Virgin Media O2, the United Kingdom–based telecommunications provider, a move to Pure Storage saved money while building a scalable platform for growth. The company immediately began to see benefits from a sustainability perspective, with a **90% data center floor-space reduction**. That adds up to an incredible **96% reduction in power consumption**.

For more information on the Pure Storage partnership with Virgin Media O2, read the full case study.

> "Without the move to Pure Storage FlashArray, we would have needed to build an additional data center."

Ajit Sharma, Business Optimization Manager, Virgin Media O2

County of San Luis Obispo, CA

Luis Obispo County provides more than 700 municipal services and administers state and federal programs for nearly 300,000 citizens in central California. The county chose Pure Storage to support all of its public-facing applications, in addition to its internal systems.

Today, the county delivers uninterrupted services to citizens and supports a secure, hybrid workforce of 2,800 employees. With a near 3:1 compression rate, San Luis Obispo County can run a lean, cost-effective data center and advance its sustainability goals.

> "We've reduced our footprint by 75% and [total] power consumption by 59%. Pure has played a big role in helping us achieve these results."

Gary Hicklin, IT Supervisor, San Luis Obispo County

Read more about how San Luis Obispo County leads with Pure Storage.

Ministry of Economic Affairs, Taiwan

The Taiwan Ministry of Economic Affairs works to promote economic development and international trade. As the ministry's Information Management Center (IMC) worked to digitize to serve its constituents better, power use and data center space became significant issues. By moving to Pure Storage, the IMC saw a reduction of **more than 98% in storage rack space** and **84% in power requirements**.

See the full case study highlighting how Pure Storage works with the Ministry of Economic Affairs and the IMC.

> "Pure Storage provides us with the foundation we need to move towards smart technology and environmental sustainability."

Lin, Tsung-Ren, Director of the IMC

Boosting Performance and Sustainability

Collaboration between Pure Storage and Intel has resulted in a game-changing solution for data centers. These companies' partnership provides increased energy efficiency and sustainability for storage solutions in the data center. 4th Gen Intel Xeon Scalable processors at the heart of Pure Storage FlashArray solutions dramatically increase storage performance. FlashArray//X R4 and FlashArray//C R4 products provide powerful performance, efficiency, and sustainability benefits, which are made possible with the pairing of innovative storage and processor technologies. These benefits include reduced power consumption and a smaller footprint for storage in the data center.

Organizations like yours are putting these solutions into production and bearing out these benefits in the real world. They have cut their power consumption (and power bill) for storage, in addition to reducing the amount of data-center real estate that they must dedicate to storage by more than 90% in some cases. Beyond the immediate savings that come from heightened efficiency, FlashArray storage solutions can help cut e-waste, further improving the sustainability of storage solutions made possible by Pure Storage and Intel.

To learn more about how this dynamic partnership can help improve performance while reducing power use, visit the Pure Storage energy-savings page and the Intel sustainability page.

1 Pure Storage. "2021 ESG Report: Technology & Sustainability." March 2022. www.purestorage.com/content/dam/pdf/en/misc/esg/2021-esg-pure-report-technology.pdf.
2 Pure Storage. "Meet the World's Most Powerful AND Efficient Storage." June 2023. https://blog.purestorage.com/purely-technical/xcr4-technical/.
3 Pure Storage. "What Is Data Reduction?" Accessed August 2023. www.purestorage.com/knowledge/what-is-data-reduction.html.
4 Pure Storage. "What Is Evergreen Architecture?" Accessed October 2023. www.purestorage.com/knowledge/what-is-evergreen-architecture.html.5 4th Gen Intel Xeon Scalable processors provide 80 lanes of PCIe 5.0, which can be used at PCIe 4.0 specifications by the flash storage in Pure Storage FlashArray//X R4 and FlashArray//C R4. Source: Intel. "4th Gen Intel® Xeon® Scalable Processors." December 2022. https://download.intel.com/newsroom/2023/data-center-hpc/4th-Gen-Xeon-Scalable-Product-Brief.pdf.
6 See [G2] at intel.com/processorclaims: 4th Gen Intel Xeon Scalable processors. Results may vary.
7 DDR5 uses a lower voltage than DDR4: 1.1V as opposed to 1.2V. Because the difference in power dissipation is proportional to the squares of voltages, the proportion of power consumption for DDR5 relative to DDR4 is $1.1^2/1.2^2 = 0.84$, or a 15.97% lower power draw. Source: Jim Handy. "DDR5 DRAM: How a New Interface Improves Performance with Less Power." Electronic Design. September 2022. www.electronicdesign.com/technologies/embedded/article/21251500/objective-analysis-ddr5-dram-how-a-new-interface-improves-performance-with-less-power.

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