

EVERGREEN[®]

THE MODERN DATA STORAGE PARADIGM

Data storage technology changes fast. At the enterprise level, it seems that every three to five years, developments in technology make enterprise storage systems either technically obsolete or uneconomical to operate.

Enterprises cope with this by periodically *refreshing* (replacing) their storage equipment in “forklift upgrades” that effectively require them to repurchase storage capacity they already own.

Refreshing storage systems is costly and disruptive. Planning, budgeting, procuring, installing, testing, migrating data, and integrating the new storage systems into IT operations is a months-long series of labor-intensive, risky projects that divert IT teams from an enterprise’s core mission. It’s not uncommon for enterprises with hundreds of storage systems to constantly have several storage refresh projects underway, consuming resources, disrupting business, and risking permanent data loss.

What if it didn’t have to be that way?

- ▶ What if storage system lifetimes were decade or more during which the systems *improved* rather than becoming obsolete?
- ▶ What if storage could meet enterprises’ changing needs without disrupting applications?
- ▶ What if data never had to migrate?

That’s what Evergreen[®] does!

This brief describes Pure Storage’s *Evergreen* subscription concept. With Evergreen, storage stays responsive to user needs while eliminating the cycles of cost and disruption that have historically been a fact of IT life.

EVERGREEN CHANGES THE ENTERPRISE STORAGE MODEL

Evergreen improves the enterprise storage ownership experience in four fundamental ways:

Risk Reduction

- ▶ No risk of data migrations going wrong.
- ▶ No disruption due to hardware or software upgrades.
- ▶ No risk of buying capacity for needs that never materialize.
- ▶ No risk of hobbling applications by buying insufficient performance.

Financial Flexibility

- ▶ Decade+ system lifetimes with predictable subscription fees eliminate planning and budgeting for periodic “forklift upgrades.”
- ▶ High density storage and long system lifetimes minimize e-waste.

IT Agility

- ▶ Pure1 monitoring and analytics facilitate workload balancing and enable accurate capacity planning.
- ▶ Non-disruptive capacity and/or performance upgrades are available whenever and however required.

Operational Efficiency

- ▶ Uninterrupted client access to data throughout a system’s life.
- ▶ Administrative simplicity and consistent user interfaces free DevOps resources for activities with more direct value to the enterprise.

THE EVERGREEN CONCEPT

Evergreen is a program of subscription services for Pure Storage systems. The name is a metaphor that captures the program's essence. With Evergreen subscriptions, the company's products are literally *ever green*; unlike conventional storage systems, they don't become obsolete or uneconomical to operate or need to be replaced every few years.

Evergreen eliminates storage refresh cycles, as evidenced by the fact that nearly all Pure Storage systems ever shipped are still in service. Many contain none of their original hardware or software, but today they are more reliable, perform better, use less space and power, and have larger capacities and capabilities that didn't exist when they were installed. And they're ready for the next decade of technological evolution. Moreover, the hardware and software upgrades that have modernized them have been and will continue to be *non-disruptive*—performed while the systems are in use with no downtime or performance degradation.

The Purity software that drives Pure's systems is what makes Evergreen possible. A fundamental property of Purity is *non-disruptive upgrade* (NDU)—the software enables both software and hardware to be upgraded while systems are operating. NDU encourages users to keep their storage both technologically current and responsive to their changing needs. Enterprises aren't saddled with systems that become inadequate as they age until the next refresh cycle. Freed from the need to periodically disrupt operations to refresh storage, they can devote more resources to activities that benefit their core missions directly.

An up-to-date installed base creates a virtuous cycle. Because most of Pure's products in the field are up to date, the company can devote more of its R&D resources to innovation. New products and features reach customers faster, user feedback on them encourages more innovation, and the cycle repeats. Evergreen inverts the enterprise data storage paradigm, from a **depreciation** model of static storage systems with anticipated obsolescence, periodic replacement, and the attendant data migration, to:

*an **appreciation** model of storage systems whose capabilities improve as technology evolves and as user needs change, without disrupting operations or migrating data.*

WHY TOLERATE STORAGE LIFECYCLES?

Storage technology evolves so fast that after three to five years in service, installed systems underperform newer offerings or become unreliable or too expensive to maintain. Vendors often encourage “upgrading” by increasing support costs or discontinuing support for older products.

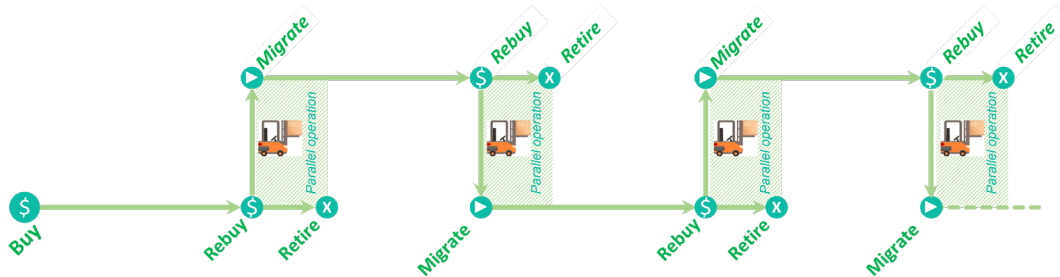


Figure 1: The Enterprise Storage Treadmill

Every storage refresh incurs cost, complicates operations, and introduces risk:

- ▶ Each entails budgeting, planning, procurement, delivery, installation, testing, parallel operation, and disposal of old equipment.
- ▶ Replacing systems, updating software licenses, migrating data, and reprovisioning take IT operations teams away from their core responsibilities, sometimes for months.
- ▶ Migrating data causes application outages that disrupt business and may result in permanent data loss if something goes wrong.

The result is more cost, greater risk, and ultimately, distraction from an enterprise’s core mission.

OTOH, EVERGREEN SUBSCRIBERS...

- ▶ Don’t have expensive and disruptive cycles of planning, budgeting, procuring, and staffing for “rebuy, rip, and replace” storage refresh cycles.
- ▶ Procure storage to meet immediate needs, knowing that they can increase capacity and/or performance at any time with no downtime or data migration.
- ▶ Count on regular software releases, some with new capabilities, and on available equipment upgrades that keep their storage systems modern.
- ▶ Predict future storage costs with subscription pricing that doesn’t increase.

With Evergreen, storage becomes a long-term investment whose value **increases** over time because it both tracks technology and meets user requirements as they evolve. Pure Storage calls this new enterprise storage paradigm the *Modern Data Experience™*.

Pure’s systems have many technical advantages—consistent high performance, high availability, low power consumption, efficient use of physical capacity, and administrative and user *simplicity*¹. Pure’s business practices also offer advantages that are uncommon elsewhere in the industry.

¹ Based on Pure1® data, the company estimates that administrators can manage as much as ten times more FlashArray™ or FlashBlade® capacity than is common with other vendors’ storage systems.

Evergreen further enhances the customer experience with decades-long system lifetimes of uninterrupted service during which the systems improve, with predictable long-term operating costs, and with no data migration risk.

THE EVERGREEN JOURNEY: AN EXAMPLE

Figure 2 suggests how a FlashArray system delivered in the company's early days might have evolved over ten years with Evergreen//Forever. The large ○ shapes indicate non-disruptive hardware upgrades, the smaller ones, a sampling of software updates.

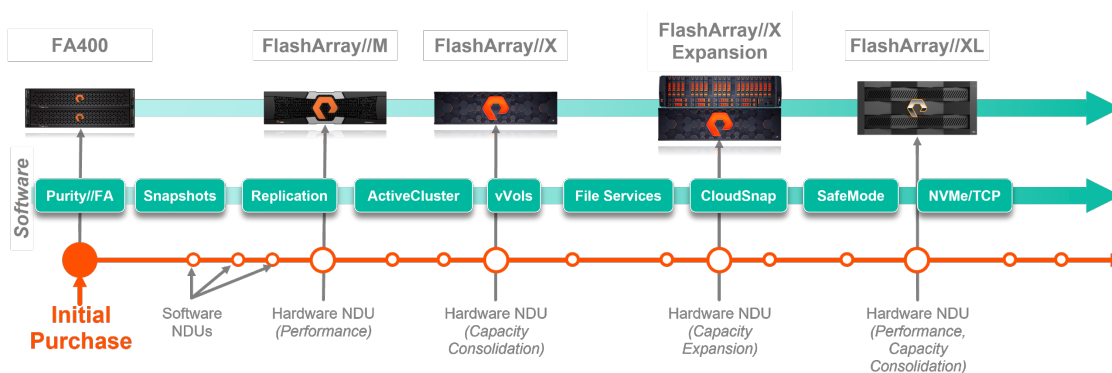


Figure 2: An Evergreen Journey

Hardware upgrades may have modernized technology, or they may have satisfied the user's need for additional capacity or I/O performance. The figure indicates modernizations from:

- ▶ The original FA400 to Pure's first in-house controller design (FlashArray//M),
- ▶ FlashArray//M to the higher-performing FlashArray//X, and from SSDs to *DirectFlash™* Modules (DFMs),
- ▶ FlashArray//X to FlashArray//XL with its 60% higher performance and higher density DFMs for a smaller data center footprint.

Over a decade of use, added software capabilities would have included:

- ▶ Automatic and on-demand snapshots and replication to remote arrays or public clouds.
- ▶ Native file services.
- ▶ Support for VMware virtual volumes (vVols).
- ▶ SafeMode protection from ransomware attacks.

and many others. These capabilities automatically became available to all Evergreen subscribers immediately upon release. All hardware and software upgrades would have been performed while the system was operating. Today, none of the system's original components would be present, but the data would have been in continuous use as the system evolved.

Evergreen completely upends the enterprise data storage paradigm.

REFERENCES

EVERGREEN PROGRAM DESCRIPTION

<https://www.purestorage.com/legal/evergreen-program-description.html>

EVERGREEN//FLEX FREQUENTLY ASKED QUESTIONS

<https://www.purestorage.com/docs.html?item=/type/pdf/subtype/doc/path/content/dam/pdf/en/wite-papers/faq-evergreen-flex.pdf>

EFFECTIVE USED CAPACITY (EUC) CALCULATION

https://support.purestorage.com/Pure1/Pure1_Manage/006_Analytics/Effective_Used_Capacity_FAQ

EVERGREEN//ONE STORAGE AS A SERVICE (STAAS) OVERVIEW

<https://www.purestorage.com/docs.html?item=/type/pdf/subtype/doc/path/content/dam/pdf/en/solution-briefs/sb-business-evergreen-one.pdf>

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