

EVERGREEN//ONE™

The Truly Modern Data Experience™

IT operations teams devote much of their effort to storage management—to installing and configuring systems, integrating them with applications, relocating data sets to balance load, replacing systems every three to five years because they have become unreliable and/or too costly to operate, and worst of all, *migrating* data to new systems—often a months-long process fraught with disruption and risk. An enterprise with 100 storage systems typically has several *storage refresh* operations in progress at any one time, with new ones starting every month. The complexity of managing storage has driven many users to public clouds, where complexity is lower, but cost and performance can become untenable.

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

- ▶ What if storage system capacity, performance, reliability, energy efficiency, and capability *improved* over time?
- ▶ What if data migration was never necessary and planned downtime was non-existent?

That is precisely how systems with Pure Storage *Evergreen®* subscriptions operate. Pure's products are designed to be modernized and upgraded on demand without disrupting applications or migrating data. Furthermore,

- ▶ What if a storage vendor guaranteed adequate capacity and I/O performance for the life of a service contract?
- ▶ What if the vendor took responsibility for storage system uptime and protecting against data loss?
- ▶ What if the vendor backed up its guarantees financially?

That's *Evergreen//One™*—subscriptions that deliver storage *as a service*—a cloud-like model that eliminates capital outlays for on-premises storage. Subscriptions include *service level agreements* (SLAs) for performance, uptime, energy efficiency, and more. SLAs include *Service Credits* for non-compliance. With Evergreen//One, Pure Storage manages the storage so subscribers can concentrate on the data that drives their businesses.

EVERGREEN//ONE AND THE ENTERPRISE STORAGE EXPERIENCE

Evergreen//One improves the enterprise storage experience in four fundamental ways:

Risk Reduction

- ▶ No risk of data migrations going wrong.
- ▶ No risk of disruption due to hardware and software upgrades.
- ▶ No risk of acquiring capacity for needs that never materialize.
- ▶ No risk of hobbling applications with insufficient I/O performance.

Financial Flexibility

- ▶ Decade+ system lifetimes with predictable subscription fees eliminate planning and budgeting for periodic “forklift upgrades.”
- ▶ On-demand buffer eliminates “emergency” capacity acquisitions.
- ▶ Easy adjustment of subscriptions to meet changing needs.
- ▶ Paid power & rack space frees space/power budget for other uses.

IT Agility

- ▶ Seamless accommodation of “spikes” in demand.
- ▶ Pure1™ monitoring and analytics facilitate workload balancing, capacity planning, and asset lifecycle and subscription usage management.
- ▶ Non-disruptive capacity and/or performance adjustments available whenever and however required.

Operational Efficiency

- ▶ Uninterrupted client access to data.
- ▶ Consistent user interfaces minimize DevOps training needs.
- ▶ SLA-based management of storage by Pure Storage frees IT teams for activities with more direct value to the enterprise.

BACKGROUND:

THE EVERGREEN® UNDERPINNINGS

Evergreen is Pure Storage's program of subscription services for its systems. The program name captures its essence. With Evergreen subscriptions, the company's products are literally *ever green*—unlike conventional storage, they don't become obsolete, uneconomical to operate, or need replacement every few years. Instead, they actually *improve* over time.

Evergreen eliminates storage refreshes, as evidenced by the fact that nearly all Pure Storage systems shipped over the last decade are still in service. Many contain none of their original hardware or software, but today they are more reliable, perform better, occupy less space, consume less power, have larger capacities, and support 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 and minimal performance impact.

The Purity software that drives Pure's systems is an important Evergreen enabler. A fundamental property of Purity is *non-disruptive upgrades* (NDU)—the software supports both software and hardware upgrades while systems are operating. NDU encourages enterprises to keep their storage both technologically current and responsive to their changing needs. Enterprises aren't saddled with systems that become inadequate or too expensive to maintain as they age. Freed from the need to periodically disrupt operations for storage refreshes, they can devote more resources to activities that directly benefit their core missions.

An up-to-date installed base creates a virtuous cycle. Because most Pure products in the field are up to date, the company spends less effort on supporting older products and can devote more of its R&D to innovation. New products and features reach customers faster, user feedback about them encourages more innovation, and the cycle repeats.

Evergreen inverts the enterprise data storage paradigm, from a **depreciation** model of static storage systems, inherent obsolescence, periodic replacement, and data migration to:

*an **appreciation** model of storage systems whose capabilities improve as technology evolves and as user needs change, without application disruption or data migration.*

Technical brief TB-210601f, available at <https://support.purestorage.com> and from Pure Storage representatives, describes the features of the overall Evergreen program in more detail.

EVERGREEN//ONE™

From “traditional” storage ownership to The Modern Data Experience™

Evergreen//One™ delivers Evergreen benefits—storage that stays modern over decades and responds to changing user needs without disruption—but it delivers the storage as a subscription service rather than via purchase or lease. It goes further in that it includes *service level agreements* (SLAs) that specify performance, uptime, energy efficiency expectations, and others such as *No Data Migrations* and *Zero Data Loss* guarantees. SLAs specify *Service Credits* to be provided to subscribers in cases of SLA non-compliance.

With Evergreen//One, Pure delivers configurations that meet contracted SLAs, and reimburses subscribers for the rack space and power they consume. The company retains ownership of the storage and maintains it in conformance with SLAs. A designated *customer success manager* (CSM) for each subscription ensures that SLAs are met for the term of a subscription.

THE EVERGREEN//ONE DIFFERENCE

Subscribers choose the Evergreen//One subscriptions whose SLAs for performance, uptime, and energy efficiency meet their needs. Pure delivers the contracted capacity plus a *capacity buffer* for seamless handling of “spikes” in demand and is responsible for meeting SLAs for the full term of a subscription.¹ The company makes any configuration adjustments (e.g., performance or buffer capacity increases) required to meet SLAs, non-disruptively and at its expense.

Evergreen//One eliminates the periodic budgeting, procurement, installation, data migration, testing, and integration costs of purchased storage. Subscriptions are renewable indefinitely. With Pure managing the storage, subscriber IT labor costs are significantly lower and service disruptions are a thing of the past.

While Evergreen//One subscribers contract for specific capacities, monthly charges are based on *capacity used* (not on capacity installed), if it is greater than contracted capacity. This minimizes the risk of procuring too little storage to meet short-term needs.

With Evergreen//One, storage is a predictable operating expense—base rates do not increase during the term of a subscription. Moreover, with Pure’s *all-inclusive software licensing*, systems automatically acquire new capabilities as the company introduces them, with no adjustment to subscription rates. Pure modernizes system hardware components periodically. In addition, subscribers can adjust contracted capacity or performance SLAs as their requirements change.

In short, Evergreen//One subscribers:

- ▶ Pay for capacity as they use it rather than making capital purchases to meet forecasted requirements that may not materialize.

¹ Pure modernizes Evergreen//One systems by periodically replacing key hardware components, but a *system*’s lifetime extends for as long its subscription is continuously active.

- ▶ Rely on Pure Storage to keep their systems both technologically current and responsive to their needs over more than a decade of uninterrupted service.
- ▶ Experience continuous storage system operation and predictable costs without disruptive cycles of planning, budgeting, and staffing for storage refresh and data migration.
- ▶ Are compensated financially for any failures to meet SLAs.

That, in summary, is Evergreen//One.

THE MODERN DATA EXPERIENCE™

Pure Storage systems have many technical advantages—consistent high performance, high availability, efficient use of physical capacity, low power consumption, and *simplicity*. Pure’s systems are easy to install, integrate, administer, and upgrade compared to other vendors’ products. Evergreen//One extends that simplicity to the entire storage experience:

- ▶ Regular modernizations keep systems technologically current. System configurations can be adjusted to meet changing needs no matter how long they have been in use.
- ▶ Live upgrades with no downtime or data migration eliminate risk and replace periodic capital outlays with predictable subscription costs that don’t increase over time.
- ▶ Customer-friendly business practices, summarized in Appendix A make Pure Storage the industry’s most approachable storage vendor.

Figure 1 suggests the financial uncertainty of the conventional storage acquisition model—increasing maintenance costs as systems age, periodic capital outlays for upgrading, and the expense of operating old and new systems in parallel during the transition—but it doesn’t capture the difficult-to-quantify IT service outage and data loss risks inherent in storage refresh and data migration. With Evergreen//One, subscription costs are predictable and data doesn’t migrate, so those risks don’t exist.

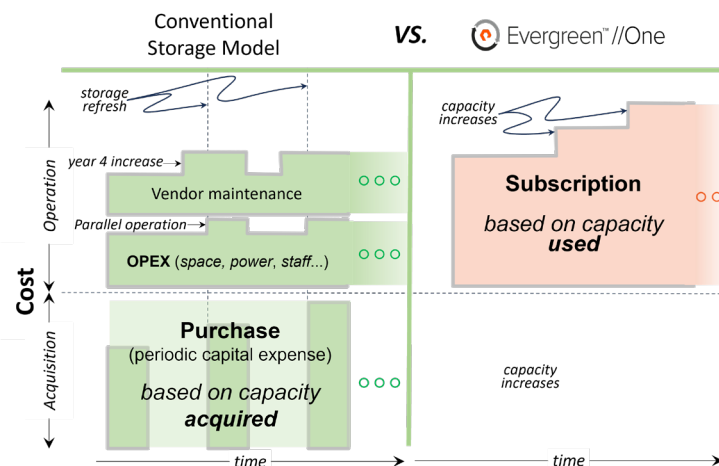


Figure 1: Evergreen//One vs. Purchased Storage

Evergreen//One delivers a cloud-like experience with the economics, performance, security, and simplicity of on-premises storage.

INSIDE EVERGREEN//ONE™

Evergreen//One subscribers contract for a *Reserve Commitment* of capacity which Pure Storage delivers. The company retains ownership of the equipment and cooperates with subscribers to manage upgrades and modernizations. Capacity can be located on subscriber premises, at a co-location facility, or in a public cloud². Pure Storage provides hardware that meets SLAs and augments the Reserve Commitment with an *On Demand* buffer³ to accommodate temporary fluctuations in demand and/or unanticipated data growth.

Pure's systems continuously measure their own utilization, performance, and power consumption and report the data to Pure1 via a secure *phonehome* connection. Designated *Customer Success Managers* (CSMs) are tasked with ensuring subscriber satisfaction.

CAPACITY CHARGES

Evergreen//One subscription charges are based on a monthly average *Effective Used Capacity* (EUC) rather than on installed capacity. Pure calculates EUC based on data as written by clients; the calculation does not take data reduction into account. Appendix C (page 13) describes how the company measures EUC.

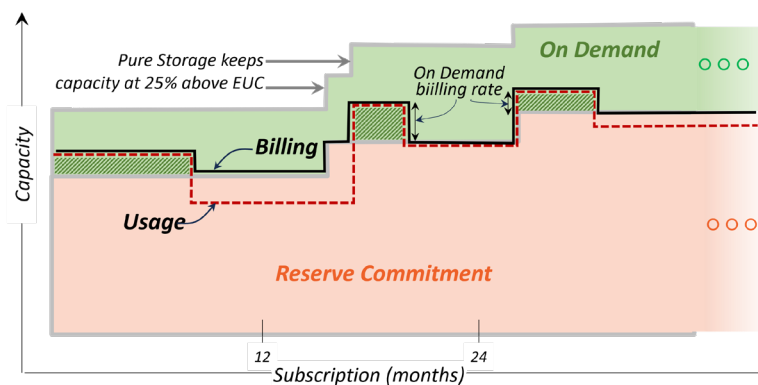


Figure 2: Evergreen//One Capacity Usage

Monthly billing is based on the contracted Reserve Commitment.

As Figure 2 suggests, any On Demand capacity used during a month is billed at a higher rate.

When EUC exceeds the Reserve Commitment for a month or more, CSMs work with subscribers to understand their usage, determine whether a Reserve Commitment increase is appropriate, and coordinate any physical expansion needed to maintain buffer capacity at 25% over EUC.

² Using Pure's Cloud Block Store (CBS) virtual array product, available on AWS and Azure at time of publication.

³ Up to a limit of one pebibyte. Evergreen//One capacities are specified in tebibytes. (1 TiB = 2⁴⁰ bytes = 1,099,511,627,776 bytes; 1 PiB = 1,024 TiB).

Throughput is specified in megabytes per second (1,000,000 bytes/second).

SUBSCRIPTIONS AND LICENSES

To meet a range of user needs for block, file, and object storage, Pure offers Evergreen//One subscriptions for three types of storage:

- ▶ *Unified Block and File* (UBF) for applications that require lowest latency.
- ▶ *Unified File and Object* (UFFO) for applications that require high throughput.
- ▶ *Unified Data Repository* (UDR) for large, less-frequently accessed data sets.

A subscription may include multiple *licenses*, each specifying a location (site), storage type, Reserve Commitment, and service level. Table 1⁴ summarizes the main SLA provisions for each storage type and service level. Pure Storage delivers system(s) that meet license specifications. Some Evergreen//One SLAs are license-specific; others apply to all licenses.

LICENSE-SPECIFIC SLAs

Each Evergreen//One license includes SLAs for performance, uptime, and energy efficiency. Pure's systems transmit capacity utilization, I/O performance, and power consumption data to Pure1 every few seconds for use in evaluating SLA conformance. Conformance is evaluated over all systems covered by a license. Failure to meet SLAs results in Service Credits to the subscriber as well as any necessary remediation, the latter performed by Pure Storage at its expense. Remediation may include hardware addition or substitution, but it does not change license terms or pricing.

Storage Type	Service Level	(MB/s IOPS/TiB)	Uptime (%)	Power (W/TiB)
UBF	Ultra	32MB/s 2000 IOPS	99.9999	7
	Premium	16MB/s 1000 IOPS	99.999	4
	Performance	8MB/s 500 IOPS	99.99	3
	Capacity	1.6MB/s 100 IOPS	99.95	2
UFFO	Ultra	130MB/s	99.9999	6
	Premium	50MB/s	99.999	4
	Performance	20MB/s	99.99	4
UDR	Unified Data Repository	0.5MB/s	99.95	3

Table 1: Evergreen//One License SLA Summary

PERFORMANCE

Performance SLAs specify sustained throughput (MB/s) or command execution rate (16KB NFS, S3, or equivalent IOPS) per TiB for all systems covered by a license. For latency-optimized UBF systems, Pure recommends Fibre Channel or NVMe-oF host connection because the high latency and overhead inherent in the iSCSI protocol may make it difficult for systems to deliver their full performance to clients. Performance SLAs do not apply to

⁴ Table 1 lists SLA terms at publication time. Current details of Evergreen//One subscription offerings, including Service Credit details, can be found at any time at <https://www.purestorage.com/legal/evergreen-one-product-guide.html>. Subscriptions are not available for certain *excluded products*, such as first-generation FlashBlade systems.

Cloud Block Store capacity because performance depends on the underlying cloud provider facilities contracted for directly by the customer.

UPTIME

Uptime SLAs cover system outages based on cause and duration. Pure calculates downtime for systems covered by a license over a month with a granularity of one second. This SLA requires subscribers to configure host multipathing on all covered systems. Temporary latency increases due to path or controller failover and lack of host/client support for storage service failover are not considered downtime.

ENERGY EFFICIENCY

Energy efficiency SLAs specify bounds on average monthly watts/TiB used by all systems covered by a license. Consumption is calculated by dividing power consumption reported to Pure1 by EUC. This SLA requires a minimum Reserve Commit for each license level.

SLAs APPLICABLE TO ALL LICENSES

The following Evergreen//One SLAs apply to all licenses:

BUFFER CAPACITY

Pure Storage maintains the total physical capacity of systems covered by a license at 25% over Reserve Commitment⁵. Subscribers who regularly exceed their Reserve Commitment should work with CSMs to discuss future needs for additional buffer capacity.

PAID POWER & RACK

For each license, Pure uses local norms to calculate the cost of rack space and power needed by the equipment that provides the Reserve Commitment over the term of the license and remits the entire amount to the subscriber at the start of the license period. Effectively, the company rents the space its equipment occupies and pays the subscriber for the power to operate it. The Paid Power & Rack SLA requires a minimum Reserve Commitment.

ZERO PLANNED DOWNTIME

Pure Storage systems do not require planned downtime, even for hardware and software upgrades, so all Evergreen subscriptions implicitly include a Zero Planned Downtime SLA. Should Pure Storage ever request planned downtime, subscribers are entitled to 100% credit of the EUC of affected system(s) for the out-of-service period.

Non-disruptive controller failover and user actions such as subscriber-ordered data center shutdown or disruptive maintenance are not counted as downtime.

NO DATA MIGRATION

Hardware and software upgrades to Pure Storage systems do not disrupt operations or require data migration. If data migration *should* be required for some reason, Pure provides Service Credits for affected systems. This SLA does not cover data migration to or from other vendors' equipment or architecture changes (e.g., migration from UBF to UFFO).

⁵ Up to a maximum buffer capacity of 250TiB.

ZERO DATA LOSS

If Pure determines that a loss of subscriber data is the result of faults in systems covered by an Evergreen//One license, the company attempts to recover the lost data at its expense, including replacing any defective components. If unable to recover data, it provides the subscriber with Service Credits for the Reserve Commitment for the elapsed portion of the license. Service Credits provided under the terms of this SLA are Pure's sole liability for data loss caused by its systems.

Subscribers should not consider this SLA a substitute for robust data protection measures such as snapshots and backups, that protect against administrator and application errors, data center disasters, ransomware attacks, etc.

THE OPTIONAL RANSOMWARE RECOVERY SLA

When systems fall victim to ransomware attacks, insurers, regulators, and other authorities often require that they be preserved intact (e.g., for forensic analysis), thus preventing them from being used to restart operations. Pure's *SafeMode* technology helps recover data from ransomware attacks by preventing unauthorized premature destruction of snapshots taken prior to an attack, which would prevent their use for data recovery. For Evergreen//One licenses that include the optional Ransomware Recovery SLA, Pure guarantees to:

- ▶ Ship replacement systems within one business day of attack discovery with expedited shipment if available.
- ▶ Provide on-site Technical Support engineers to oversee transfer of data known to be valid to replacement systems and assist with recovering IT operations. The SLA specifies data transfer from infected system to replacement at a rate of 8TB/hour.

SUBSCRIBER RESPONSIBILITIES

In general, Evergreen//One licenses require subscriber data center environments that make it possible to meet SLAs. CSMs work with subscribers to ensure that Evergreen//One subscribers:

- ▶ Meet Pure Storage product environmental specifications.
- ▶ Implement the company's published best practices⁶.
- ▶ Provide client connectivity, network bandwidth, and the necessary protocols to enable performance SLAs to be met.
- ▶ Ensure that clients generate adequate I/O workload.
- ▶ Balance capacity utilization and I/O load appropriately across all licensed systems.

In cases of SLA non-compliance, CSMs and subscribers jointly determine root causes and arrange for any necessary remediation by Pure Storage.

Optional Ransomware Recovery SLAs require that all subscribers enable *SafeMode* on all volumes and file systems and schedule regular snapshots with a minimum retention of 14 days.

⁶ https://support.purestorage.com/Solutions/SAN/Best_Practices/SAN_Guidelines_for_Maximizing_Pure_Performance

EVERGREEN//ONE: A COMPLETELY DIFFERENT ENTERPRISE STORAGE EXPERIENCE

Evergreen//One subscriptions replace up-front capital expenditures for storage with predictable lifetime operating costs that don't increase over the term of a license. The SLAs that accompany subscription licenses eliminate subscriber risks of mis-configuration, downtime, inadequate performance, and excessive energy consumption.

With Evergreen//One, Pure Storage delivers configurations that meet SLAs and adjusts them if necessary. The Pure Storage business practices listed in Appendix A, including *Right-Size* and *Love Your Storage* guarantees and *Flat is Fair* subscription pricing all apply to Evergreen//One storage delivered as a service.

Pure adjusts hardware configurations as necessary to meet SLAs, and periodically modernizes systems by replacing key components. Upgrades and modernizations are performed in cooperation with subscribers. Subscribers can increase license Reserve Commitments for capacity and/or change to a higher subscription level at any time. Either or both may result in non-disruptive hardware upgrades.

Pure Storage designates *Customer Success Managers* tasked with ensuring that SLAs are met, that any required remediation is prompt and adequate, and that subscribers are satisfied with the service. With Evergreen//One subscriptions, Pure Storage manages hardware and software, freeing subscribers to manage data for the benefit of their businesses.

APPENDIX A:

PURE STORAGE PRACTICES

Integral to the Pure Storage Modern Data Experience™ are several practices that are uncommon or nonexistent elsewhere in the industry. These include:

RIGHT-SIZE GUARANTEE⁷

For a range of well-understood I/O workloads, Pure Storage will, on customer request:

- ▶ Use Pure1's AI tools to estimate capacity and I/O performance needs and recommend configurations that meet customers' stated requirements.
- ▶ Negotiate 12-month capacity *service level agreements* (SLAs).
- ▶ Augment system capacity at no cost to the customer if necessary to fulfill SLAs.

The Right-Size Guarantee eliminates the risk of mis-estimating needs prior to deploying storage. It is especially useful for new deployments where user experience is lacking.

LOVE YOUR STORAGE (LYS) GUARANTEE

A customer's first acquisition of a Pure Storage system is covered by a no-questions-asked money-back guarantee. The customer can return a system within 30 days of receipt for any reason and receive a full product and subscription refund, provided that the system has been professionally installed and connected to Pure1.

FLAT IS FAIR SUBSCRIPTION PRICING

With Flat is Fair subscription pricing, a system's base subscription rate doesn't increase for the term of its Evergreen license. Users can plan ongoing storage operating expenses far in advance. There are no surprise increases in subscription cost.

NO "ENDURANCE ANXIETY"

The lifetime DFM replacement guarantee eliminates user concerns about flash *endurance* (ability to retain data with repeated usage). Pure1™ data indicates that when managed by Purity software, average DFM lifetimes are well over 10 years—much longer than flash memory vendors' specifications would suggest.

FLEET-WIDE STORAGE MANAGEMENT

All Pure Storage customers have access to Pure1 Manage, the company's cloud-based facility for system monitoring, AI-assisted capacity planning, and predictive analytics that detect potential issues before they occur and proactively initiate preventive measures.

With Pure1's *Pure Fusion* control plane, customers can consolidate management of multiple Pure Storage systems from a single interface. They can monitor system status, relocate workloads to balance load, plan capacity needs with AI assistance, and manage support cases, storage assets, and Evergreen subscriptions.

⁷ Applicable to FlashArray//X and FlashArray//XL systems at publication time.

ALL-INCLUSIVE SOFTWARE LICENSING

Pure Storage produces Purity software updates (which include any necessary DFM firmware updates) every one to three months. Updates include new features as well as reliability, efficiency, and performance improvements.

Some examples illustrate the value of all-inclusive software licensing:

- ▶ A year after Pure introduced ActiveCluster synchronous replication (2017), over a third of the systems using the feature had been acquired before its introduction.
- ▶ With the rollout of FlashArray File Services in 2020, FlashArray systems with Evergreen subscriptions became eligible to serve files as well as blocks.
- ▶ When Pure Storage introduced SafeMode ransomware protection and recovery assistance in 2022, the feature was available immediately to all Evergreen systems at no incremental subscription cost.

These and other capabilities automatically became available for all deployed products to enable and use with no downtime, performance degradation, or change in subscription fees.

“WHITE-GLOVE” SERVICE

Pure Storage regularly achieves the industry’s highest audited Net Promoter Scores⁸, due in no small part to the efficiency and quality of its after-the-sale service. Service is integrated with Pure1 alerting and analytics, which often identifies potential issues before they occur, and proactively initiates support cases with Pure Storage Technical Services.

Technical Services also monitors impending environmental events (hurricanes, wildfires, etc.) to ensure that both customers and the company are as prepared as possible to avoid or minimize disaster-related outages.

The quality of Pure’s customer support is demonstrated by the fact that over 60% of support cases are initiated by the company, before customers are aware of impending issues. But when a customer *does* call, the call is answered by a support engineer (in many cases one already familiar with the customer), not by an automated service.

⁸ A widely recognized measure of customer satisfaction with a vendor or service provider. Pure Storage’s independently audited scores are consistently in the mid-eighties.
See <https://www.netpromoter.com/know/>

APPENDIX B:

PURE'S SYSTEM ARCHITECTURE

The Evergreen program is made possible in part by the Pure Storage product architecture. Subscriptions deliver the benefits of the architecture to the company's customers.

Pure regards data storage as advanced technology in its own right, rather than as a commodity that simply supports the rest of the IT stack. Throughout its history, the company has demonstrated this with innovations such as two-stage data reduction, symmetric synchronous data replication, superior DFMs, and many others. These innovations are reflected in the quality and utility of the company's products, but some are especially key enablers of Evergreen:

MASTERY OF FLASH TECHNOLOGY

Rather than commodity SSDs, Pure Storage systems use DFMs of its own design for persistent storage. DFMs are superior to other types of solid-state storage partly because the company invests heavily in fully understanding each new generation of flash memory and adapts firmware and Purity software for optimal results. Pure's DFMs have greater capacity, higher performance, lower power consumption, and longer lifetimes than SSDs built with the same flash technology.

High DFM reliability and endurance contribute to system longevity and make Evergreen's lifetime device replacement guarantee possible.

PURITY SOFTWARE

The Purity software that drives Pure's systems enables key features that Evergreen exploits:

CROSS-GENERATIONAL NON-DISRUPTIVE UPGRADE (NDU)

All Pure Storage systems are software and hardware upgradable while operating. Pure's NDU differs from other vendors' "non-disruptive" upgrades, which typically require data migration, are limited to one refresh, and/or do not support upgrading across generations.

Throughout the company's history, NDU has been a feature of its systems, even when hardware generations have differed significantly. For example:

- ▶ 2015: from FA400 to the first in-house designed FlashArray//M platform.
- ▶ 2023: FlashArray//X to FlashArray//XL with its unique chassis and NVRAM designs.⁹
- ▶ 2020-present: host interconnect transitions from SAS, iSCSI, and Fibre Channel to NVMe.

During the past decade, Pure Storage and partner technicians have performed thousands of hardware upgrades and countless software ones. Some of the company's early systems

⁹ For a detailed description of this NDU, see <https://blog.purestorage.com/purely-technical/non-disruptive-upgrade-to-flasharray-xl-2/>

have been modernized as much as six times. Today, many contain none of their original hardware; they have effectively become new systems while they were operating.

With cross-generational NDU, Evergreen systems can evolve with technology while continuing to meet changing user needs for a decade or more.

DETAILED SYSTEM BEHAVIOR AND EVENT TRACKING

Even in Pure's earliest systems, Purity automatically logged and reported status and events to a company repository, using a secure *phonehome* communication path. The repository has evolved into the cloud database that Pure1™ Manage uses to track and analyze the company's entire installed base¹⁰. Detailed tracking and analysis enables:

- ▶ Automated response to issues in deployed products (over 60% of all support tickets are initiated by Pure1 before customers are aware of issues).
- ▶ "Fingerprinting" that detects known issues before they arise in other systems and initiates preventive measures.
- ▶ Centralized self-monitoring of an enterprise's entire fleet of Pure Storage products.
- ▶ AI-assisted workload analysis and capacity planning, including "what if" modeling.

Event logging allows Evergreen subscribers to view and actively manage their entire complement of Pure Storage products from a single console or management app.

PRODUCT LINE CONSISTENCY

Although the capabilities of Pure's systems have evolved significantly over the past decade, Purity has preserved their common "look and feel." Users and management apps interact via the same interfaces today that they used with the first systems shipped. New features and products add capabilities, but they preserve existing ones.

Consistent capabilities and interfaces across product generations minimize retraining needs and simplify NDU for IT operations teams.

To maintain and evolve these system capabilities and properties, Pure invests more heavily in R&D than is typical of its major competitors. The company's high level of R&D illustrates its ongoing commitment to an engineering philosophy that treats storage as high technology and makes it possible to deliver Evergreen's one-of-a-kind benefits to customers.

¹⁰ Systems only log status and events; no customer data is ever transmitted.
Logs are not collected from so-called "dark sites" that do not allow external connections.

APPENDIX C:

EUC MEASUREMENT

Evergreen//One (and Evergreen//Flex for purchased capacity) monthly subscription charges are based on an average *Effective Used Capacity* (EUC) of systems covered by a license rather than on configured capacity. Because Pure Storage products thin-provision storage, EUC is not simply the sum of provisioned volume and file system sizes. With thin provisioning, for example, no physical storage is consumed until clients write data. Similarly, snapshots and clones only consume storage when clients first overwrite data in their parent volumes (clones also consume storage when clients first write or overwrite data in them).

Systems calculate EUC by tracking clients' first writes to volume (LBA) and file ({inode,offset}) addresses at MiB granularity. Taking snapshots or creating clones does not initially increase EUC because they share all storage with their parent volumes. Overwriting data on a snapshot or clone's parent volume for the first time does consume storage, and therefore increases EUC.¹¹ Client TRIM and UNMAP operations on volumes deallocate physical storage and may therefore reduce EUC. A detailed description of EUC calculation for Evergreen//One and Evergreen//Flex subscriptions is available at:

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

¹¹ Typically, only a small portion of a volume is overwritten after a snapshot is taken, so snapshot contributions to EUC are minor. An exception would occur, for example, if a volume was encrypted after a snapshot is taken. Encryption changes all data in the volume, so the volume's entire unencrypted content would be preserved in the snapshot and the encrypted content in the live volume would increase EUC.

REFERENCES

EVERGREEN PROGRAM DESCRIPTION

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

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>

EVERGREEN//ONE PRODUCT GUIDE

<https://www.purestorage.com/legal/evergreen-one-product-guide.html>

EVERGREEN//ONE INCLUDED SERVICES DESCRIPTION

<https://www.purestorage.com/legal/pure-as-a-service-included-services.html>

EVERGREEN//ONE™ PURITY INSTALL AND UPGRADE POLICY (REQUIRES SUPPORT.PURESTORAGE.COM LOGIN)

https://support.purestorage.com/Evergreen_Subscriptions/Evergreen%2F%2F%2F%2FOne/Evergreen%2F%2F%2F%2FOne_Getting_Started/Evergreen%2F%2F%2F%2FOne%E2%84%A2%3A_Purity_Install_and_Upgrade_Policy

SAN GUIDELINES FOR MAXIMIZING PURE PERFORMANCE

https://support.purestorage.com/Solutions/SAN/Best_Practices/SAN_Guidelines_for_Maximizing_Pure_Performance

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