

BUSINESS WHITE PAPER

Automating Storage with Pure Fusion

Supercharge your fleet-wide storage automation.

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Introduction

Managing digital resources and assets and meeting the needs of technology users is a huge challenge for IT infrastructure teams. This is especially true with data storage, where often an organization's data is worth more than the equipment and software used to store it. Data must be kept accessible, be protected against cyberattacks and human error, and comply with organizational and regulatory standards.

Exponential data growth, fueled by greater overall use of digital data and especially by the rise of artificial intelligence, has led organizations to deploy increasingly larger and more complex storage systems. Historically, each storage system has been a management domain, with its data objects, client access, performance, protection, and security managed in isolation. However, once organizations reach a certain volume of storage systems, fleet-level management that automates storage management tasks and integrates with data center automation tools becomes necessary.

Over 12 years of delivering storage systems, Pure Storage® has kept pace with users' evolving capacity, security, compliance, and AI readiness needs. However, as most of our customers become multi-system users, it is evident that users need the Pure Storage mantra of storage simplicity to extend beyond the single system boundary. Fortunately for those users, Pure Storage has a solution to storage system fleet management: Pure Fusion™.

This white paper is an overview of Pure Fusion™—the transformation of our Purity storage operating system into an API-driven management platform that federates users' fleets of products in a cloud-like paradigm that makes managing 100 Pure Storage systems as straightforward as managing one.

Storage Management Defined

With the recent explosion in data, the need for systematic management of IT assets has become critical. IT infrastructure teams configure, maintain, repair, upgrade, and replenish—in short, manage—the servers, networks, and storage systems that provide IT services to their organizations. Storage systems add a dimension to the challenge in that not only must their hardware, software, and connections be managed, but also the data they contain, whose value typically exceeds that of the systems it is stored on.

Storage management can be thought of as comprising two types of activities:

- **Observation:** monitoring storage system performance, utilization, and “health” using analytics tools to optimize assets, plan future requirements, track inventory and support, and so forth
- **Action:** creating, resizing, relocating, and destroying data volumes, file systems, and object stores; establishing and breaking client connections; mitigating risk by protecting data against and recovering it from disasters, cyberattacks, and human error; and so forth



Storage Management with Pure Storage

From its earliest days, Pure Storage has sought to simplify storage. With concepts like a user guide that can fit on a business card and “specify a name and a size; the system does the rest,” our products have established a new norm for storage management simplicity.

However, with a broadening product line and many users deploying dozens of systems, it has become apparent that simplicity must extend beyond the single system boundary. Users with many Pure Storage systems need a comprehensive real-time view of all their Pure Storage systems and a means of actively managing them using data center automation tools.

Until now, active management of Pure Storage products has been on a per-system basis. For example, users with many Pure Storage FlashArray™ or FlashBlade® systems have logged into each one to create volumes, file systems, directories, or object stores; connect them to clients; specify capacity and performance limits; configure data protection; and more. Moreover, users with internal standards for data object number, size, performance, and security have been forced to specify those parameters for each new object.

Pure Fusion automates those repetitive tasks.

Enter Pure Fusion

Recognizing that most customers deploy many Pure Storage systems, we have transformed our Purity single-array storage operating system into the Pure Fusion multi-array, policy-driven data management platform with a built-in automation engine that eliminates many repetitive storage management tasks. An industry first, Pure Fusion extends administrative simplicity of Purity by federating user-defined fleets of Pure Storage systems. Each system in a fleet retains its identity and can be managed individually. Pure Fusion federates fleet members to deliver:

- **Workflow automation:** With Pure Fusion, users can combine common multi-step workflows, such as provisioning storage for new databases, containerized applications, departmental user directories, and so forth, into automated operations invoked with a few clicks, delivering outcomes that comply with organization standards.
- **Management simplification:** With Pure Fusion automation, tasks that are time-consuming and error-prone in large fleets of systems, such as locating a volume by serial number or optimizing

object placement when creating a new workload, become as simple as in a single system.

- **Accessibility:** The Pure Fusion automation engine is part of the Purity operating system. No licensing, installation, configuration, or changes to existing workflows are required. Internally, it uses Purity APIs to perform its tasks on Purity objects, so it fits easily into existing installations. Its capabilities are accessed via APIs or administrators using GUI and CLI tools.
- **Applicability:** The primary functions in Pure Fusion operate entirely within a user’s internal network, making it as applicable to users with two systems as to those with hundreds, and extend to so-called dark sites with no external network connections.
- **Extensibility:** Initially, Pure Fusion will support a subset of Pure Storage systems and provide baseline capabilities. Its architecture, however, is designed to encompass our entire product portfolio with increasing functionality over time to deliver one of the industry’s most comprehensive and approachable storage management suites.

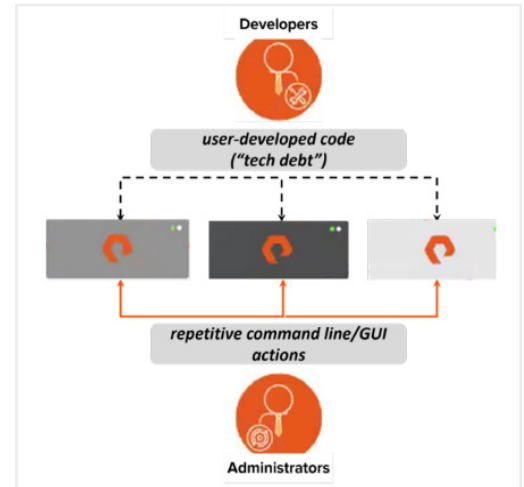


FIGURE 1 Storage management on a pre-system basis



With Pure Fusion, users can meet present and upcoming challenges to managing digital data at scale. It mitigates risk and susceptibility to cyberattacks by enforcing compliance with organizations' data protection policies. It lays the groundwork for the artificial intelligence use cases that are fast becoming a mainstay of information technology in many organizations.

Pure Fusion Concepts

The automation capabilities of Pure Fusion are based on two key concepts: fleets, which define storage management domains, and storage presets, which specify workflows for storage provisioning.

Fleets: Consolidated Storage Management

Pure Fusion federates groups of Pure Storage systems as fleets, as Figure 2 illustrates. Each system in a fleet has its own identity and retains its local workflows and interfaces, but an administrator can manage it from any system in the fleet.

Fleet membership is user-defined. A fleet might consist of systems in a data center or include systems in multiple on-premises locations as well as Pure Storage Cloud Dedicated instances.

Each system in a fleet communicates with a fleet controller (usually the first system added to the fleet) that manages configuration information for the fleet. The array administrator role is fleet-wide—a human array administrator or automation tool can manage the storage on any fleet member from any fleet member. However, member systems retain their identities, meaning storage can also be provisioned and data protection configured without access to a fleet controller.

The fleet concept allows IT teams to manage storage for many systems without a centralized portal. A fleet's storage objects can be discovered and managed regardless of location. For example, an administrator can easily select a host or host group for which to provision storage, and Pure Fusion automatically places the objects on arrays to which the hosts are connected.

Note: When provisioning new workloads, Pure Fusion automatically places each storage object in the optimal location in the fleet. Administrators provisioning storage with Pure Fusion do not specify locations for the objects that comprise a workload or provision each one individually.

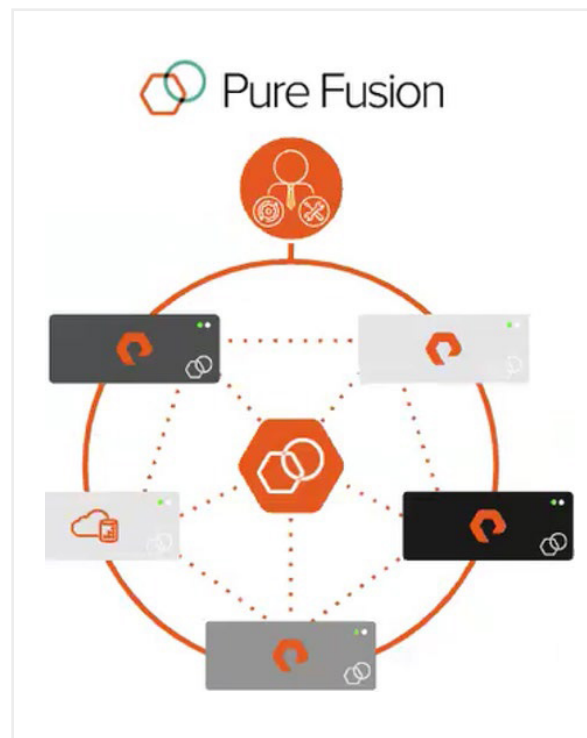


FIGURE 2 Storage management with Pure Storage Fusion

Storage Presets: Enhanced Storage Provisioning

Pure Fusion automates the workflows that provision storage for user-defined application workloads. Working from any system in a fleet, administrators use storage presets to direct Pure Fusion to provision the storage objects required by an application with a few clicks. Pure Fusion takes care of the details.

Many organizations prefer to enforce storage configuration standards for their applications. For example, an organization might set different standards for the number, maximum capacity, quality of service, and data protection of the volumes or file systems used by its database, container, departmental home directory, or other applications.

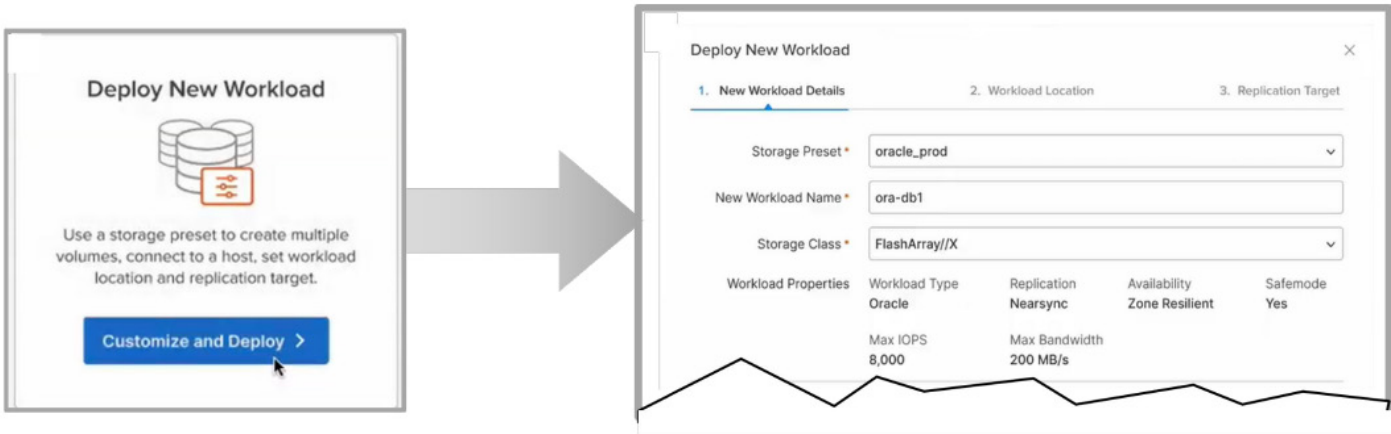


FIGURE 3 Deploying a workload

Pure Fusion simplifies and automates workload provisioning while enforcing user-defined standards with storage presets—customizable templates that define the properties of groups of storage objects. Storage presets define the properties of each object in a workflow—including size, type of system, quality of service (QoS), and data protection. To provision storage for a new application instance, administrators and automation tools specify a storage preset, and Pure Fusion takes care of details such as placing each object and configuring its size, QoS, and protection scheme.

Storage presets enable compliant storage provisioning for new application instances anywhere in a fleet with a few administrator commands, clicks, or API calls made by a data center automation tool.

Note: Storage presets significantly reduce the number of steps and ad hoc decisions required to configure storage for common workload types. They make human administrators more productive and less prone to errors and eliminate most of the custom code (“tech debt”) required to implement or integrate with conventional workflow automation tools.



Laying the Groundwork for the Future of Storage Management

As with all Pure Storage innovations, Pure Fusion provides significant user value at introduction, but its underlying structure enables the company to deliver further capabilities over time. For example, Pure Fusion currently supports FlashArray systems and storage presets for specifying groups of block volumes and their properties. Over time, however, we expect to extend Pure Fusion capabilities to our entire portfolio of FlashArray and FlashBlade systems and offer increasing capabilities, including data mobility, compliance verification, and integration with Pure1®.

Learn More

- Test-drive Pure Fusion today [live](#).

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