



# Dell Storage PS Series Software

All-inclusive software for enterprise power with everyday simplicity

Built on award winning peer scaling EqualLogic™ architecture, the Dell™ Storage PS Series iSCSI arrays offer high performance, reliability, intelligent automation and seamless virtualization of storage to enable simplified enterprise storage management and data protection. For scalable, unified storage solutions, combine PS Series block storage arrays with FS Series network-attached storage (NAS) appliances.

## The Dell difference

- All-inclusive software: New PS Series software releases will run on existing PS Series systems under active Dell service agreements, allowing you to bring new enterprise-class SAN features into your existing environment without additional licensing costs.
- Long-term investment protection: As your storage and business requirements grow, your existing PS Series hardware resources receive continuous advancements in capabilities from software releases and can be pooled with newer PS Series arrays. In addition, cross-platform replication and common management capabilities for PS Series and SC Series arrays provide future flexibility.
- With advanced integration with vSphere Virtual Volumes, the PS Series provides support for both a datastore or volume centric model and a per virtual machine model for faster VM deployments and snapshot restores.
- Monitoring and analysis: SAN Headquarters helps you analyze and optimize storage performance and resource allocation, and offers SupportAssist for proactive monitoring designed to expedite resolution of issues with Dell ProSupport services.
- Host Integration Tools: Advanced integration with Microsoft®, VMware® and Linux® platforms and applications for integrated protection and simplified management.
- Tiering and load balancing to unlock the power of flash: All-flash arrays take advantage of PS Series' load-balancing algorithms and peer scaling to grow SSD performance and capacity predictably. Hybrid-flash arrays are ideal for VDI deployments, important databases, and other mixed workloads thanks to auto-tiering for hot data.

## The power behind Dell Storage PS Series

The PS Series all-inclusive software gives you the power to do more with both new and existing PS Series arrays and FS Series NAS appliances. With the advanced functionality of the Dell Storage PS Series Array Software, the monitoring and analysis tools of SAN Headquarters, and the Host Integration Tools for VMware, Microsoft, and Linux environments, the PS Series equips you with an innovative storage solution that provides exceptional investment and data protection, ease of use, and virtualization capabilities.

Inspired by you, Dell innovates with each release to give you more of what you need to scale capacity and performance seamlessly, integrate and grow strategically, and maximize your return on investment — both in effort and cost. Whether you are running a data center, deploying a virtual desktop environment, or have a remote or branch office, the PS Series is an effective storage solution to support both your physical and virtual servers.

## A strong foundation — Array Software

Dell Storage PS Series Array Software provides you with advanced functions that enable virtualized storage and data protection. With the tools for a sound data protection strategy, and automatic virtualization and optimization of resources within the SAN, the PS Series delivers consistent application performance with the availability your organization requires.

Dell Storage PS Series Firmware is a full-function SAN operating system integrated across the entire family of PS Series storage arrays to virtualize SAN resources. An essential component of the software is the capability to automatically adjust system resources — optimizing performance and capacity and reducing IT administrative effort.

The latest software releases from the PS Series and SC Series, including the new Dell Storage Manager (DSM), offer common management and cross-platform replication capabilities for both PS Series and SC Series arrays. These new features allow you to take advantage of new SC Series functionality while leveraging your existing PS Series investment.

If you are adding an SC Series array to your environment, DSM provides a "single pane of glass" management tool for PS Series and SC Series day-to-day activities. You can also initiate volume replication between PS Series and SC Series with DSM, and easily configure and monitor scheduled replication tasks. To simplify migration, you can import data from PS Series to SC Series using the thin import feature.<sup>1</sup>

## FluidFS v4

Powered by Dell Fluid File System (FluidFS), the FS7610 NAS appliance brings scale-out file storage capability to PS Series SANs, providing a single, unified storage solution. FluidFS v4 incorporates data management enhancements such as automated home shares, directory quotas and also includes protocol support for SMB 3.0, NFS v4 ACLs and NFS v4.1. With its highly scalable architecture, FluidFS enables up to 509TB of usable capacity within a single file namespace. Multiple smaller file systems, or NAS containers, can be consolidated into a single solution, simplifying administration and improving file storage utilization.

Unlike many unified storage solutions that only scale in capacity, the FS7610 NAS appliance and PS Series arrays can transparently scale both capacity and performance for file and/or block requirements as needed. As your needs grow over time, block and file storage capacity can be added without disrupting existing applications and storage systems. Additionally, included data protection features such as NAS container shrinking and cloning, snapshots, replication, access-based enumeration, encryption of NFS access, secured LDAP, NDMP backup and antivirus provide robust tools to protect and recover file data.

## Reliable infrastructure management

PS Series Group Manager is a management tool integrated with the PS and FS Series Firmware that provides you with detailed information on your block and file storage configuration, and gives you an easy-to-use tool for storage provisioning, data protection and array management. PS Series Group Manager is available as a CLI or GUI with search functionality, accessible through web browsers with a connection to the PS Series SAN.

PS Series Manual Transfer Utility is a host-based tool that enables the replication of large amounts of block storage data using removable media. Integrated with the native replication function of the PS Series Array Firmware, PS Series Manual Transfer Utility helps your organization eliminate network congestion, minimize downtime and accelerate replication setup.

Dell Storage Update Manager provides guided update management to simplify the process of updating the firmware for your PS Series platform. Storage Update Manager works with PS Series, FS Series and disk drive firmware. Using a single tool, you are able to facilitate both single-member and multi-member group updates so you can easily take advantage of the latest firmware features.

## Knowledge is power — SAN Headquarters

PS Series SAN Headquarters (SAN HQ) gives you in-depth reporting and analysis, consolidated performance and robust event monitoring across multiple PS Series groups to provide a well-tuned PS Series SAN that surpasses your business requirements. With SAN HQ, you can:

- Improve performance by identifying performance bottlenecks
- Better allocate group resources by identifying under-utilized assets within the SAN
- Improve availability by proactively identifying potential issues within your PS Series environment
- Speed up resolution of issues with SupportAssist integration with Dell Services to automate the creation of Dell ProSupport cases
- Identify requirements for storage growth for more accurate planning
- Set up email alerts for around-the-clock monitoring

- Evaluate storage reliability based on current RAID levels and forecast reliability improvements from potential RAID policy changes

From a single GUI, you can see information on all of the monitored PS Series groups at a glance — including configuration and performance of pools, members, disks and volumes, as well as any alerts. If action is required, you can launch the PS Series Group Manager directly from SAN HQ so you can quickly adjust storage systems to meet business needs. With SAN HQ you can also estimate how close a group, pool or array is to its full capabilities with analytics to help plan for storage growth. In addition, SAN HQ can integrate with third-party SNMP event management consoles, enables monitoring for performance and capacity metrics, and allows you to easily launch Storage Update Manager directly from the SAN HQ Group list. You can also monitor events and performance in relation to vSphere Virtual Volumes objects for more consistent reporting.

With the compression feature, you can reduce replica and snapshot size up to 50% in a pool that contains at least one PS6210 or PS6610 array<sup>2</sup>

SAN HQ provides proactive support capability with SupportAssist for PS Series. When enabled, system log and diagnostic data are transmitted to Dell Support to help accelerate issue detection and streamline resolution. Support cases are opened automatically by Dell Support and a new case tracker allows you to view your open PS Series cases, delivering a more automated support process to help improve productivity and accuracy.

## Collaboration counts — Host Integration Tools

The PS Series Host Integration Tools allow PS Series platforms to communicate and coordinate functions with hosts and applications, delivering advanced data protection, high availability and performance, and simplified management of application data and virtual machines for Microsoft, VMware and Linux environments.

Dell helps simplify and automate protection and recovery tasks customized to user applications and environments with Auto-Snapshot Manager software that enhances the efficiency and performance of data-protection tasks for Microsoft SQL Server®, SharePoint®, Exchange, Hyper-V®, NTFS and ReFS file systems, as well as Red Hat® and SUSE® Linux environments. Dell Virtual Storage Manager (VSM, part of the Host Integration Tools for VMware) offers high-performance, space-efficient data protection of VMware VMs and datastores within folders and clusters. Advanced vSphere Virtual Volumes can make operations like single VM snapshot-restores nearly instantaneous. Virtual Volumes integration transforms the PS Series from a LUN-centric to a VM-aware storage solution by providing data services and data placement at the VM level. Coupled with the PS Series dynamic page balancing, it provides a highly optimized cost/performance/capacity solution. Storage Recovery Replicas provide a simplified storage recovery solution across single and multisite vCenter™ installations, managing multiple PS Series groups.

PS Series multipath I/O (MPIO) enables Microsoft, VMware and Linux platforms to intelligently leverage the PS Series SAN architecture for optimized performance in your environment. For Linux systems, the Host Performance and Configuration Tuning Suite (eqltune) enhances performance and usability by verifying and proactively correcting your Linux system parameters for optimal setup of iSCSI configuration.

PS Series Host Integration Tools automate end-to-end operations from the hosts to the array, helping streamline data management and enabling simplified configuration. With the PS Series Remote Setup Wizard (RSW) for Windows

and Linux, traditionally tedious discovery and setup tasks are simplified using an intuitive, step-by-step user interface. PS Series PowerShell tools help manage and automate routine management tasks in a Microsoft environment. Storage Management integration with System Center Virtual Machine Manager further extends your management capabilities for virtual Microsoft environments. VSM and Host Integration Tools for Microsoft offer centralized data protection and management features to simplify administration of multiple hosts and PS Series SAN groups in your infrastructure.

| PS Series Array Software                             |   |                    |
|--|---|--------------------|
| PS Series Firmware and Group Manager                 |   |                    |
| <b>Performance</b>                                   | 64-bit kernel for newer generation PS Series arrays (PS4100, PS4210, PS6100, PS6210, PS6610), volume unmap (re-thinning), enhanced load balancing, intelligent tiering on hybrid arrays (SSD and HDD), SAN copy offload, Offloaded Data Transfers (ODX), UNMAP, block zeroing and scalable hardware assisted locking for VMware, and data center bridging (with 10GbE arrays)   |                    |
| <b>Data protection, availability and recovery</b>    | Snapshots (point-in-time, schedulable, writeable, multi-volume snaps that can be coordinated across volume consistency sets), Default Daily Snapshot; replication (point-in-time, schedulable auto-replication and continuous synchronous replication); volume cloning; volume undelete, IPSEC, self-encrypting drives (SED), active-standby controller failover, automatic RAID placement, cross-platform replication capabilities for PS Series and SC Series arrays with DSM                                       |                    |
| <b>Storage virtualization</b>                        | Complete SAN virtualization, peer storage architecture, storage pooling and tiering, hybrid-flash array tiering, non-disruptive array addition and removal (evacuation), thin provisioning, thin clones and integration with VMware APIs (VAAI), vSphere Virtual Volumes support, and VMware thin provisioning awareness  |                    |
| <b>Operations, maintenance and management</b>        | Access Control Policies, Single Sign-on, Group Manager, host scripting tools, role-based administration, Microsoft Active Directory Integration, Audit Logging, Non-disruptive Firmware Upgrade, SupportAssist, E-Mail Home, Auto-Stat Disk Monitoring System, Enclosure Monitoring System, detailed historical performance monitoring, Smart Tags, Compression, Space Borrowing, Multiple Delegated Spaces, (DSM supports day-to-day tasks across SC Series and PS Series arrays from a single management interface) |                    |
| <b>Supported host environments</b>                   | Microsoft Windows Server® including Hyper-V, VMware vSphere ESXi™, Red Hat Enterprise Linux® (RHEL), SUSE Enterprise Linux® (SLES), Oracle® Linux, Citrix® XenServer®<br>For a complete list of supported OS versions including software initiators, NICs/CNAs, and HBAs, please see the <a href="#">PS Series Compatibility Matrix</a> .   |                    |
| <b>Delivery</b>                                      | Firmware is pre-loaded on the arrays; updates are also available for download from <a href="http://EQLSupport.Dell.com">EQLSupport.Dell.com</a> website for all systems under a valid support agreement at no additional cost <sup>3</sup>  |                    |
| <b>User interface</b>                                | PS Series Group Manager provides CLI and a GUI compatible with Microsoft Internet Explorer®, Mozilla® Firefox®, Apple® Safari® or Google Chrome® web browsers, DSM interface for SC/PS Series management  |                    |
| <b>SAN group maximums</b>                            | PS Series Array Software can support up to 16 arrays in one group enabling maximum SAN resources of up to 8.06PB, 1344 drives, 32 storage controllers, 1024GB of total system memory  |                    |
| <b>Configuration</b>                                 | PS6xxx-only or mixed groups   | PS4xxx-only groups |
| <b>Maximum members in a pool/group</b>               | 8/16  | 2/2                |
| <b>Max volume connections per pool/group</b>         | 1024/4096   | 512/1024           |
| <b>Max volumes per group</b>                         | 1024  | 512                |
| <b>Snapshots/Replicas per volume</b>                 | 512/512   | 128/128            |
| <b>Max snapshots per group</b>                       | 10,000  | 2048               |
| <b>Replication partners per group</b>                | 16  | 16                 |
| <b>Replication partners per volume</b>               | 1   | 1                  |
| <b>Volumes enabled for point-in-time replication</b> | 256   | 32                 |
| <b>Volumes enabled for synchronous replication</b>   | 32  | 4                  |
| PS Series Manual Transfer Utility                    |   |                    |
| <b>Target uses</b>                                   | Initial replication of large volumes, replication of volumes after significant changes, failback of large volumes   |                    |
| <b>Key features</b>                                  | Data encryption, password protection, transfer status updates, replication and failback, transfer continuation after interrupt  |                    |
| <b>User interface</b>                                | PS Series Group Manager   |                    |
| <b>Transfer media</b>                                | Removable media including high-capacity tape, portable disk drive, DVD-ROM, or Blu-ray disk, portable computer that has access to both EqualLogic groups  |                    |

| PS Series SAN Headquarters                          |  |
|---|--|
| <b>Monitoring and analytics</b>                     | <p>Comprehensive information on PS Series: groups, pools, members, disks, volumes and volume collections:</p> <ul style="list-style-type: none"> <li>• Status</li> <li>• Configuration</li> <li>• Capacity</li> <li>• I/O performance</li> <li>• Network performance</li> </ul> <p>Multi-group monitoring, multi-site support, RAID evaluator, experimental analysis<br/>SupportAssist—diagnostic data collection and transmission to Dell Support enabling automatic creation of certain support cases now with a case tracker so you can easily view and track cases</p>   |
| <b>Reporting and views</b>                          | <p>Graphs, dashboards, tables displaying detailed and summarized historical and point-in-time data; Live View for near real-time monitoring; formatted reports for diagnostics, performance and configuration</p>  |
| <b>Events and alerts</b>                            | <p>Performance-related alerts, hardware alarms and syslog events, built-in email alerts and alerts ranging from basic hardware health status to more sophisticated analysis on volume, I/O, network or capacity threshold</p>  |
| <b>Ease of use</b>                                  | <p>Ability for multiple users to access and monitor simultaneously; Single Sign-on for launching PS Series Group Manager; Timeline Navigation</p>  |
| <b>Operating platforms</b>                          | <p>Microsoft Windows 8, 8.1, 10; Microsoft Windows 7 SP1; Microsoft Windows Server 2012; Microsoft Windows Server 2012 R2</p>  |
| Dell Storage Update Manager                         |  |
| <b>Streamline management and operations</b>         | <p>The Dell Storage Update Manager application can help you analyze your current PS Series Storage configurations to determine which components, if any, can or need to be updated. With an intuitive workflow design, Storage Update Manager guides you to help simplify the update process and also tracks the status of your updates. It provides an outline of all components that require updating and the estimated time to complete the process. Deployed as a standalone Java application, Storage Update Manager runs independently of Group Manager and SAN Headquarters, but offers a similar interface and help features. Storage Update Manager targets PS Series groups running PS Series firmware version 5.0.x and higher, or FS Series Firmware version 3.x.x or higher, and updates the following components:</p> <ul style="list-style-type: none"> <li>• PS Series array firmware</li> <li>• FS Series controller firmware</li> <li>• PS Series disk drive firmware (excluding SED disk drives and FS Series disk drives)</li> </ul> |
| Host Integration Tools for VMware                   |  |
| <b>Protect business-critical data</b>               | <p>Dell Virtual Storage Manager (VSM), Storage Recovery Replicas, Storage Replication Adapter for VMware Site Recovery Manager (SRA SRM)</p>   |
| <b>Optimize storage performance</b>                 | <p>MPIO</p>  |
| <b>Streamline storage management and operations</b> | <p>VSM provides datastore management that allows you to create, manage, and monitor datastores on Dell Storage PS Series and FS Series arrays from within a single VSM table. With Virtual Volumes integration, VSM also provides support for a per VM data services model. Dell Storage PS Series Adapter for vRealize Operations Manager™ provides comprehensive insights on capacity, performance and health of PS Series storage arrays through alerts and metrics.</p>  |
| <b>Operating platforms</b>                          | <p>Virtual Storage Manager (VSM) for VMware 4.5 with vSphere Virtual Volumes support</p> <ul style="list-style-type: none"> <li>• VMware vCenter Server™ 5.5, 6.0</li> <li>• VMware ESXi Server™ 5.1, 5.5, 6.0</li> </ul> <p>Storage Recovery Adapter (SRA) 2.2.1</p> <ul style="list-style-type: none"> <li>• VMware vCenter Site Recovery Manager (SRM) 5.1, 5.5, 5.8, 6.0</li> </ul> <p>Dell Storage PS Series Multipathing Extension Module v1.4</p> <ul style="list-style-type: none"> <li>• VMware ESXi Server 5.5, 6.1</li> </ul>   |
| <b>Software delivery</b>                            | <p>HIT/VMware is delivered as four packages:</p> <ul style="list-style-type: none"> <li>• PS Series Virtual Storage Manager (VSM) integrates natively into VMware vSphere Web Client 5.5 and 6.0 with functionality role-based access controls (RBAC), VM-centric data protection, template-based scheduling and data protection workflows; includes vSphere Storage APIs (VASA) Provider</li> <li>• Storage Replication Adapter for VMware Site Recovery Manager</li> <li>• Multipath I/O, also called multipathing extension module (MEM)</li> <li>• PS Series Adapter for vRealize Operations Manager</li> </ul> <p>Advanced Virtual Volumes support for VM-aware functionality requires vSphere 6.0 and Array Software 8.0 or greater</p>  |

| Host Integration Tools for Microsoft                |  |
|---|--|
| <b>Protect business-critical data</b>               | Auto-Snapshot Manager/Microsoft Edition (ASM/ME) for Microsoft SharePoint, Exchange, SQL Server, Hyper-V, NTFS and ReFS  |
| <b>Optimize storage performance</b>                 | MPIO DSM   |
| <b>Management and operations</b>                    | Storage Management integration with Microsoft System Center Virtual Machine Manager® (SCVMM), Storage Management Provider (SMP), PowerShell Tools, Remote Setup Wizard, VSS Provider, VDS Provider, and HPC iSCSI Provider, remote HIT installation and remote server management capabilities with ASM/ME HIT Groups |
| <b>Operating platforms</b>                          | Microsoft Windows Server 2012 R2, Microsoft Windows Server 2012  |
| Host Integration Tools for Linux                    |  |
| <b>Protect business-critical data</b>               | Auto-Snapshot Manager/Linux edition (ASM/LE) – Linux file system   |
| <b>Optimize storage performance</b>                 | MPIO, Host Performance and Configuration Tuning Suite (eqltune)  |
| <b>Streamline storage management and operations</b> | Remote Setup Wizard CLI, PS Series Volume Re-thinning Facility (eqlvolume)   |
| <b>Operating platforms</b>                          | Red Hat Enterprise Linux 6.7, 7.2<br>Oracle Linux 7.2  |
| FS Series   |  |
| <b>File protocol support</b>                        | NFSv4.x, NFSv4 ACLs, SMB 3.0 (for implementation details, see the FluidFS support matrix: <a href="http://en.community.dell.com/techcenter/extras/m/white_papers/20440246">http://en.community.dell.com/techcenter/extras/m/white_papers/20440246</a> )  |
| <b>Storage arrays supported</b>                     | PS Series running version 8.1 or later firmware  |
| <b>Cluster capability</b>                           | Up to two FS7610 appliances (four controllers) in a single NAS cluster   |
| <b>Management</b>                                   | PS Series Group Manager  |
| <b>10GbE configuration options</b>                  | Two Intel 10GbE dual-port NICs per controller, copper or optical, SFP+ or 10GBASE-T standards<br>Client connectivity over Ethernet, SAN connectivity over iSCSI Ethernet switch is required; direct connect to the SAN is not supported  |
| <b>Data protection</b>                              | <ul style="list-style-type: none"> <li>• Redirect-on-write snapshots; max number of snapshots per container/cluster: 1,024/10,000</li> <li>• Policy based deduplication and compression</li> <li>• Asynchronous file replication</li> </ul>  |

## End-to-end technology solutions

Reduce IT complexity, lower costs and eliminate inefficiencies by making IT and business solutions work harder for you. You can count on Dell for end-to-end solutions to maximize your performance and uptime. A proven leader in Servers, Storage and Networking, Dell Enterprise Solutions and Services deliver innovation at any scale. And if you're looking to preserve cash or increase operational efficiency, Dell Financial Services™ has a wide range of options to make technology acquisition easy and affordable. Contact your Dell Sales Representative<sup>4</sup> for more information.

<sup>1</sup>SC Series software, version 6.7 or greater, offers a Thin Import feature when migrating from PS Series to SC Series.

<sup>2</sup>Based on September 2014 internal Dell analysis of the Dell Storage PS Series Array Software 8.0 compression feature with PS6210 arrays, using real-world home share environment comprised of snapshots and replicas. Requires a PS6210 or PS6610 in the environment. Results will vary based on configuration, data types and usage.

<sup>3</sup>All software updates are available for download on [EQLSupport.Dell.com](http://EQLSupport.Dell.com). All PS Series software is included in the cost of the PS Series platform. Customers with a valid Dell support agreement can download software updates without paying additional license fees.

<sup>4</sup>Availability and terms of Dell Services vary by region. Dell Basic Service is included standard with PS Series units. For more information, visit [Dell.com/servicesdescriptions](http://Dell.com/servicesdescriptions).

## Download PS Series Software at [EQLSupport.Dell.com](http://EQLSupport.Dell.com)

