Dell EqualLogic Software

All-inclusive software for enterprise power with everyday simplicity

Built on patented peer storage architecture, the Dell™ EqualLogic™ PS Series Internet SCSI (iSCSI) storage arrays offer high performance, reliability, intelligent automation and seamless virtualization of storage to enable simplified enterprise storage deployment and management, along with comprehensive data protection. EqualLogic FS Series network-attached storage (NAS) appliances work with new and existing EqualLogic block storage systems to provide highly scalable unified storage solutions.

The Dell difference

- **All-inclusive software**: New EqualLogic software releases will run on legacy EqualLogic systems under active service agreement with Dell, allowing you to bring advanced enterprise-class SAN features into your existing environment without additional licensing costs.

- **Multi-generational storage**: As your storage and business requirements grow, your existing SAN resources receive continuous advancements and capabilities from software advances and can be pooled with newer EqualLogic arrays.

- **Advanced functionality**: EqualLogic software brings advanced SAN functionality that automatically virtualizes and optimizes storage resources—giving you the power to do more.

- **Monitoring and analysis**: SAN Headquarters helps you analyze and optimize storage performance and resource allocation.

- **Host Integration Tools**: Advanced integration with Microsoft®, VMware®, and Linux® applications and platforms for cutting-edge protection and easier management.

The power behind EqualLogic

EqualLogic™ all-inclusive software gives you the power to do more with both your new and existing EqualLogic PS Series arrays and FS Series NAS appliances. From advanced functionality in the EqualLogic™ Array Software to the SAN Headquarters (SAN HQ) monitoring and analysis tools to the Host Integration Tools for VMware®, Microsoft®, and Linux® platforms—EqualLogic provides you with an innovative end-to-end solution that provides exceptional investment and data protection, ease of use and virtualization capabilities.

EqualLogic software provides you with the functionality you need today and tomorrow. EqualLogic software, built on the Dell™ Fluid Data™ architecture, is inspired by you. Our engineering team 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, have a remote or branch office, or are implementing a virtual desktop infrastructure (VDI), EqualLogic is an effective solution for both your physical and virtual storage needs.

A strong foundation—Array Software

EqualLogic Array Software provides you with advanced functions that enable virtualized storage and data protection. With EqualLogic Array Software, you don’t need to choose between data protection, capacity, performance and advanced management. EqualLogic Array Software features all the tools required for developing a sound data protection strategy and automatically virtualizes and optimizes resources within the SAN to deliver consistent application performance.

EqualLogic PS Series Firmware is a full-function SAN operating system integrated across the entire family of EqualLogic storage arrays that virtualizes SAN resources and provides the advanced functionality of a Fluid Data architecture. An essential component of the software is the capability to automatically adjust system resources—optimizing performance and capacity and reducing IT administrative effort.
EqualLogic PS Series Firmware 6.0 offers new features so your hardware can continue to meet your current needs and grow with you as the demands of the virtual era increase. In addition to the features you have come to rely on over the years, release 6.0 brings you new functionality, including:

- Real-time data protection with Synchronous Replication
- Increased efficiency with Snapshot Borrowing, Volume Unmap and Volume Undelete
- Improved data security, incorporating Self-Encrypting Drives (SED) and IPsec

FS Series Firmware
Powered by Dell Fluid File System (FluidFS), the FS Series Firmware running on FS Series NAS appliances adds scale-out NAS capability to EqualLogic SANs, thus providing a single scale-out unified storage solution. Management complexity is simplified with both block and file storage management integrated into a single EqualLogic Group Manager interface. With its highly scalable architecture, the FS Series Firmware enables up to 509TB of usable capacity within a single file namespace. Multiple smaller file systems or NAS systems can be consolidated into a single solution, simplifying the administration and data management of managing multiple file storage islands.

Unlike many unified storage solutions that only scale in capacity, the EqualLogic FS NAS appliances and PS Series arrays can scale in both capacity and performance. As your needs grow over time, block and file storage capacity can be added without disrupting existing applications and storage systems. Up to two FS series appliances can be clustered together to provide a single scalable file storage solution. Additionally, included data protection features such as snapshots, NAS replication, NDMP backup and CIFS antivirus provide robust tools to protect and recover file data.

Reliable infrastructure management
EqualLogic Group Manager is a management tool integrated with the EqualLogic PS and FS Series Firmware that provides you with detailed information on your block and file storage configuration, and provides you with an easy-to-use tool for storage provisioning, replication scheduling and array management. The EqualLogic Group Manager is available as a command-line interface (CLI) or graphical-user interface (GUI) that can be accessed from Microsoft® Internet Explorer®, Mozilla® Firefox®, Safari® or Google Chrome® web browsers with a connection to the EqualLogic SAN.

EqualLogic 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 EqualLogic Array Firmware, EqualLogic Manual Transfer Utility helps your organization eliminate network congestion, minimize downtime and quick-start replication.

Knowledge is power—SAN Headquarters
EqualLogic SAN Headquarters (SAN HQ) gives you in-depth reporting and analysis, consolidated performance and robust event monitoring across multiple EqualLogic groups so you have a well-tuned EqualLogic SAN to meet and surpass your business requirements. SAN HQ 2.5 introduces SAN Assist, automatic diagnostic data collection and transmission to Dell Support—designed to expedite resolution of issues. With SAN HQ, you can:

- Improve performance by identifying performance bottlenecks
- Effectively allocate group resources by identifying under-utilized assets within the SAN
- Improve availability by proactively identifying potential issues within your EqualLogic environment
- Identify requirements for storage growth for more accurate planning
- Set up email alerts for around-the-clock monitoring

From a single graphical interface, 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, the EqualLogic Group Manager can be launched directly from SAN HQ giving you the ability to quickly adjust storage systems to meet business needs.

SAN HQ also enables you to perform experimental analysis on the data collected to determine if a group has reached its full capabilities and identify requirements for storage growth and future planning.

Collaboration counts—Host Integration Tools
The EqualLogic Host Integration Tools tightly integrate EqualLogic platforms 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 backup and recovery tasks customized to user applications and environments with Auto-Snapshot Managers that enhance the efficiency and performance of data-protection tasks in Microsoft, VMware and Linux environments.

Management costs associated with comparable vendors are up to 60% more expensive than with EqualLogic. The associated costs include data migration, system upgrades after three years and manpower.*

EqualLogic Multipath I/O (MPIO) enables Microsoft, VMware and Linux platforms to intelligently leverage the EqualLogic SAN architecture, storage and network for optimized performance in your environment. For Linux systems, 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.

EqualLogic Host Integration Tools automate end-to-end operations from the hosts to the array, helping streamline data management and enabling simplified configuration. With the EqualLogic Remote Setup Wizard (RSW) and Remote Setup Wizard Command-line Interface (RSWCLI), traditionally tedious discovery and setup tasks are simplified using an intuitive, step-by-step user interface. EqualLogic PowerShell tools help manage and automate routine EqualLogic management tasks in a Microsoft environment. Virtual Storage Manager (VSM, part of the Host Integration Tools for VMware) and Host Integration Tools for Microsoft offer centralized data protection and management features to simplify administration of multiple hosts and EqualLogic SAN groups in your infrastructure. VSM also offers datastore management and virtual desktop deployment capabilities.

<table>
<thead>
<tr>
<th>EqualLogic™ Array Software Feature</th>
<th>EqualLogic PS Series Firmware and Group Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance</strong></td>
<td>Volume Unmap (re-thinning), Enhanced Load Balancing, Intelligent Tiering on hybrid arrays (SSD &amp; HDD), SAN Copy Offload, Block Zeroing and Scalable Hardware Assisted Locking for VMware® and Data Center Bridging (with 10GbE arrays)</td>
</tr>
<tr>
<td><strong>Data protection, availability and recovery</strong></td>
<td>Synchronous Replication, Volume Undelete, IPSEC support, Self-encrypting Drive (SED) support, Controller Failover, Automatic RAID Placement, Multi-Volume Writeable Snapshots, Volume Cloning, Auto-Replication, Snapshot and Auto-Replication Scheduler, Volume Consistency Sets and VMware® Thin Provisioning Awareness</td>
</tr>
<tr>
<td><strong>Storage virtualization</strong></td>
<td>Complete SAN Virtualization, Peer Storage Architecture, Storage Pools, Tiering, non-disruptive Array addition and removal, non-disruptive Array Evacuation, Thin Provisioning, Thin Clones and integration with VMware APIs (VAAI)</td>
</tr>
<tr>
<td><strong>Operations, maintenance and management</strong></td>
<td>Single Sign-on, Group Manager, Host Scripting tools, Role-based administration, Microsoft® Active Directory Integration, Audit Logging, Non-disruptive Firmware Upgrade, Phone Home &amp; Email Home, Auto-Stat Disk Monitoring System, Enclosure Monitoring System, detailed Historical Performance monitoring</td>
</tr>
</tbody>
</table>

### Technical highlights

**Supported host environments**

**Delivery**
- Embedded; also available for download from EqualLogic.com/Support website for all systems under a valid support agreement.* EqualLogic software is included in the cost of the array.

**User interface**
- EqualLogic Group Manager provides CLI and a GUI compatible with Microsoft® Internet Explorer®, Mozilla®, Firefox® Safari® or Google Chrome® web browsers

**SAN group maximums**
- EqualLogic Array Software can support up to 16 arrays in one group enabling maximum SAN resources of up to 2.3 PB†, 768 drives, 32 storage controllers, 64 GB† mirrored memory

<table>
<thead>
<tr>
<th>Configuration</th>
<th>PS6xxx-only or mixed groups</th>
<th>PS4xxx-only groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum members in a pool/group</td>
<td>8/16</td>
<td>2/2</td>
</tr>
<tr>
<td>Max volume connections per pool/group</td>
<td>1024/4096</td>
<td>512/1024</td>
</tr>
<tr>
<td>Max volumes per group</td>
<td>1024</td>
<td>512</td>
</tr>
<tr>
<td>Snapshots / Replicas per volume</td>
<td>512/512</td>
<td>128/128</td>
</tr>
<tr>
<td>Max snapshots per group</td>
<td>10,000</td>
<td>2048</td>
</tr>
<tr>
<td>Replication partners per group</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Replication partners per volume</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Volumes enabled for Replication (Point-in-time replication)</td>
<td>256</td>
<td>32</td>
</tr>
<tr>
<td>Volumes enabled for Synchronous Replication</td>
<td>32</td>
<td>4</td>
</tr>
</tbody>
</table>

### EqualLogic Manual Transfer Utility

<table>
<thead>
<tr>
<th><strong>Feature</strong></th>
<th><strong>Initial Replication of large volumes, Replication of volumes after significant changes, Failback of large volumes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target uses</strong></td>
<td>File Compression, Data Encryption, Password Protection, Transfer Status Updates, Replication and Failback, Transfer Continuation after interrupt</td>
</tr>
</tbody>
</table>

### Technical highlights

**Operating platforms**

**User interface**
- EqualLogic Group Manager can be accessed from the graphical-user interface (GUI) or through a command-line interface (CLI), Manual Transfer Utility from Group Manager

**Transfer media**
- Removable media including high-capacity tape, portable disk drive, DVD-ROM, or Blu-ray disk, portable computer that has access to both EqualLogic groups through a command-line interface (CLI), Manual Transfer Utility from Group Manager

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*Availability and terms of Dell Services vary by region. For more information, visit www.dell.com/servicedescriptions.

†GB means 1 billion bytes, TB equals 1 trillion bytes and PB equals 1 quadrillion bytes; actual capacity varies with preloaded material and operating environment and will be less.

**Note:** The table above provides a snapshot of the key features and specifications of EqualLogic Array Software. For comprehensive details, please refer to the official EqualLogic documentation or contact Dell support.
### EqualLogic FS Series Firmware

<table>
<thead>
<tr>
<th>Performance</th>
<th>Scale-out clustered architecture, Dual Active-Active NAS controllers per NAS appliance, Adaptive Controller Cache, Adaptive Load Balancing, Link Aggregation, and 1Gb or 10Gb Ethernet connectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data protection, availability and recovery</td>
<td>Highly available NAS appliance with two Active Controllers per appliance, redundant power supplies, fans and network ports, Snapshots, Replication, NDMP Backup, and CIFS Antivirus</td>
</tr>
<tr>
<td>Storage virtualization</td>
<td>Complete Storage Virtualization, Single Namespace across Multiple Active-Active NAS Controllers, Virtual NAS Containers, Non-Disruptive NAS Appliance Scaling, and Non-Disruptive Capacity Scaling</td>
</tr>
<tr>
<td>Operations, maintenance and management</td>
<td>EqualLogic Group Manager, Group Manager CLI, Microsoft Active Directory, LDAP, NIS, and SNMP</td>
</tr>
</tbody>
</table>

#### Technical highlights

<table>
<thead>
<tr>
<th>Supported PS Series arrays</th>
<th>New or existing EqualLogic PS Series arrays with version 6.0 or later Array Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>EqualLogic Group Manager provides CLI and a GUI compatible with Microsoft® Internet Explorer®, Mozilla®, Firefox® Safari® or Google Chrome® web browsers</td>
</tr>
<tr>
<td>Group maximums</td>
<td>Up to two FS series appliances working in a single NAS cluster per EqualLogic Group. FS series NAS appliances part of an EqualLogic group can serve up to 509TB usable capacity from a single EqualLogic pool.</td>
</tr>
</tbody>
</table>

#### Configuration

<table>
<thead>
<tr>
<th>Expansion capability</th>
<th>Up to 509TB of usable capacity in a single namespace. Up to two FS7600/FS7610 systems in a single NAS cluster. All appliances in a single cluster must have either 1Gb or 10Gb connectivity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum/maximum NAS containers</td>
<td>256 for a single NAS appliance cluster, 512 for two appliance cluster</td>
</tr>
<tr>
<td>Maximum file size</td>
<td>4TB</td>
</tr>
<tr>
<td>File name length</td>
<td>255 bytes</td>
</tr>
<tr>
<td>Maximum files in a cluster</td>
<td>~64 billion</td>
</tr>
<tr>
<td>Maximum directories in a cluster</td>
<td>~34 billion</td>
</tr>
<tr>
<td>Maximum containers in a cluster</td>
<td>256 for a single NAS appliance cluster, 512 for two appliance cluster</td>
</tr>
<tr>
<td>Maximum snapshots per container</td>
<td>512</td>
</tr>
<tr>
<td>Maximum snapshots per cluster</td>
<td>10,000</td>
</tr>
<tr>
<td>Maximum CIFS shares</td>
<td>1024</td>
</tr>
<tr>
<td>Maximum NFS exports</td>
<td>1024</td>
</tr>
<tr>
<td>Maximum concurrent active CIFS connections</td>
<td>1500 for single NAS appliance cluster, 3000 for two appliance cluster</td>
</tr>
<tr>
<td>Maximum quota rules per container</td>
<td>512</td>
</tr>
<tr>
<td>Maximum quota rules per cluster</td>
<td>100,000</td>
</tr>
<tr>
<td>Maximum directory depth</td>
<td>512</td>
</tr>
<tr>
<td>Maximum local users/groups in a NAS cluster</td>
<td>300</td>
</tr>
<tr>
<td>Maximum NAS containers enabled for replication</td>
<td>100</td>
</tr>
<tr>
<td>Maximum simultaneous replication in progress</td>
<td>10</td>
</tr>
<tr>
<td>Maximum replication partners</td>
<td>16</td>
</tr>
</tbody>
</table>
## EqualLogic SAN Headquarters Features

### Monitoring and analytics
- Comprehensive information on EqualLogic PS Series: groups, members, disks, volumes and volume collections:
  - Status
  - Configuration
  - Capacity
  - I/O performance
  - Network performance
- Multi-Group management, multi-site support, RAID evaluator, experimental analysis
- SAN Assist—automatic diagnostic data collection and transmission to Dell Support

### Reporting and views
- Graphs and Archives, Data tables and circle graphs for point-in-time data and data average over a period, Summary and Pop-up Views, Group Diagnostic Report, Normalized View Reporting, Live View and Formatted Reports.

### Events and alerts
- 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.

### Ease of use
- Ability for multiple users to access and monitor simultaneously, single sign on for launching EqualLogic Group Manager, Timeline Navigation

### Technical highlights

#### Operating platforms
- Note: Microsoft .NET 2.0 or later is required for IPv4 network addresses; Microsoft .NET 3.5 or later is required for IPv6 network addresses.

#### Host Integration Tools for Microsoft® Features

- Protect business-critical data: Auto-Snapshot Manager/Microsoft Edition (ASM/ME) for Microsoft SharePoint, Exchange, SQL Server®, NTFS File System and Hyper-V™, and Volume Shadow Copy Service (VSS) Provider
- Optimize storage performance: Multipath I/O (MPIO)
- Management and operations: PowerShell Tools, Remote Setup Wizard (RSW), VDS Provider, and HPC iSCSI Provider

### Technical highlights

#### Operating platforms
- Note: PowerShell Tools require a minimum version of Windows PowerShell 2.0

#### Host Integration Tools for VMware® Features

- Protect business-critical data: Auto-Snapshot Manager, Storage Recovery Replicas, Storage Replication Adapter for VMware® Site Recovery Manager (SRA SRM) and Storage Recovery Replicas
- Optimize storage performance: Multipath I/O (MPIO), also known as Multipathing Extension Module (MEM)
- Streamline storage management and operations: Centralized management of multiple groups, Datastore management and Virtual Desktop deployment

### Technical highlights

#### Operating platforms
- Virtual Storage Manager (VSM) 3.5
- VMware ESX server 4.1, 5.0, 5.1, and VMware® vCenter® Server 5.0, 5.1
- Virtual Desktop Deployment feature requires VMware View 4.5, 4.6 or 5.0
- Storage Recovery Adapter (SRA) 2.2
- VMware vCenter Site Recovery Manager (SRM) 5.0, 5.1
- Customers using an older version of SRM can use SRA 1.0.n

#### Software delivery
- HIT/VMware is delivered as three packages:
  - EqualLogic Virtual Storage Manager (VSM) which contains a vSphere plug-in for centralized management of multiple groups, Auto-Snapshot Manager, datastore management and virtual desktop deployment features
  - Storage Replication Adapter for VMware Site Recovery Manager
  - Multipath I/O, also called Multipathing Extension Module (MEM)

#### Host Integration Tools for Linux® Features

- Protect business-critical data: Auto-Snapshot Manager/Linux edition (ASM/LE) — Linux file system
- Optimize storage performance: Multipath I/O (MPIO), Host Performance and Configuration Tuning Suite (equality)
- Streamline storage management and operations: Remote Setup Wizard Command Line Interface (RSWCLI), EqualLogic Volume Rethinning Facility (eqvolume)

### Technical highlights

#### Operating platforms
- Red Hat® Enterprise Linux® 5.7, 5.8, 5.9, 6.2 and 6.3, SUSE® Linux Enterprise® Server (SLES) 11
- SP1, SP2

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All software updates are available for download from the EqualLogic.com support site. All EqualLogic software is included in the cost of the EqualLogic platform.

Customers with a valid Dell support agreement can download software updates without paying additional license fees.

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