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 data protection and simplified enterprise storage deployment and management. Dell 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

Dell 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 equips you with an innovative end-to-end solution that provides exceptional investment and data protection, ease of use and virtualization capabilities.

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 all the tools required for developing a sound data protection strategy and automatic virtualization and optimization of resources within the SAN, EqualLogic delivers consistent application performance.

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

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 gives you 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. With SAN HQ, you can:

- Improve performance by identifying performance bottlenecks

- 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

SAN HQ 2.6 brings you enhanced RAID Reliability Reporting, designed to evaluate storage reliability based on current RAID levels, and to forecast reliability improvements from potential RAID policy changes. 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.

SAN HQ 2.6 also marks the beginning of Dell's implementation of SupportAssist for EqualLogic, designed to proactively collect data and detect failures in your EqualLogic storage infrastructure. When enabled by your Storage Administrator, system log and diagnostic data will be transmitted to Dell Support to help accelerate detection and streamline issue resolution. Now, SAN HQ working with SupportAssist can enable certain types of support cases to be opened automatically. For these cases, Dell Support will proactively begin working the issue and inform you that a case has been opened. Dell will continue to build in additional SupportAssist capabilities for EqualLogic to deliver a proactive and automated support process that helps improve productivity and accuracy while helping you gain insight and control.

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 Dell EqualLogic. The associated costs include data migration, system upgrades after three years and manpower.*

*Source: ESG Lab Report, "Dell Equal Logic TCO Analysis–Multi-generational Manageability and Efficiency at a Low Cost," an April 2012 report sponsored by Dell.

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.

Dell™ EqualLogic™ Array Software	Feature	
Dell EqualLogic PS Series Firmware and Group Manager		
Performance	Volume Unmap (Re-thinning), Enhanced Load Balancing, Intelligent Tiering on hybrid arrays (SSD & HDD), SAN Copy Offload, Block Zeroing and Scalable Hardware Assisted Locking for VMware® and Data Center Bridging (with 10GbE arrays)	
Data protection, availability and recovery	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	
Storage virtualization	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)	
Operations, maintenance and management	Single Sign-on, Group Manager, Host Scripting tools, Role-based administration, Microsoft® Active Directory Integration, Audit Logging, Non-disruptive Firmware Upgrade, Phone Home & Email Home, Auto-Stat Disk Monitoring System, Enclosure Monitoring System, Detailed Historical Performance Monitoring	
Technical highlights		
Supported host environments	Microsoft® Windows Server® 2003, Windows Server® 2008, including Hyper-V™, Windows Server® 2008 R2, including Hyper-V™, VMware® ESX® Server 3/3.5/4/4.1/5, VMware® ESXi™ 3.5/4/4.1/5, Citrix® XenSource, Red Hat® Enterprise Linux®, SUSE® Linux® Enterprise, Sun™ Solaris, IBM® AIX, HP-UX®, Mac OS® X, Novell® NetWare®	
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	

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

Dell™ EqualLogic™ Manual Transfer Utility	Feature
Target uses	Initial Replication of large volumes, Replication of volumes after significant changes, Failback of large volumes
Key features	File Compression, Data Encryption, Password Protection, Transfer Status Updates, Replication and Failback, Transfer Continuation after interrupt
Technical highlights	
Operating platforms	Microsoft® Windows Vista®, Windows® XP, Windows® 7; Microsoft® Windows Server® 2003, Windows Server® 2008, Windows Server® 2008 R2; Red Hat® Enterprise Linux® and SUSE® Linux Enterprise
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

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

Dell EqualLogic FS Series Firmware	
Performance	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
Data protection, availability and recovery	Highly available NAS appliance with two Active Controllers per appliance, Redundant Power Supplies, Fans and Network Ports, Snapshots, Replication, NDMP Backup, and CIFS Antivirus
Storage virtualization	Complete Storage Virtualization, Single Namespace across Multiple Active-Active NAS Controllers, Virtual NAS Containers, Non-Disruptive NAS Appliance Scaling, and Non-Disruptive Capacity Scaling
Operations, maintenance and management	EqualLogic Group Manager, Group Manager CLI, Microsoft Active Directory, LDAP, NIS, and SNMP
Technical highlights	
Supported PS Series arrays	New or existing EqualLogic PS Series arrays with version 6.0 or later array software
User interface	EqualLogic Group Manager provides CLI and a GUI compatible with Microsoft® Internet Explorer®, Mozilla®, Firefox®, Safari® or Google Chrome® web browsers
Group maximums	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
Configuration	
Expansion capability	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
Minimum/maximum NAS containers	256 for a single NAS appliance cluster, 512 for two-appliance cluster
Maximum file size	4TB
File name length	255 bytes
Maximum files in a cluster	~64 billion
Maximum directories in a cluster	~34 billion
Maximum containers in a cluster	256 for a single NAS appliance cluster, 512 for two-appliance cluster
Maximum snapshots per container	512
Maximum snapshots per cluster	10,000
Maximum CIFS shares	1024
Maximum NFS exports	1024
Maximum concurrent active CIFS connections	1500 for single NAS appliance cluster, 3000 for two-appliance cluster
Maximum quota rules per container	512
Maximum quota rules per cluster	100,000
Maximum directory depth	512
Maximum local users/groups in a NAS cluster	300
Maximum NAS containers enabled for replication	100
Maximum simultaneous replication in progress	10
Maximum replication partners	16

Dell 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, SupportAssist—diagnostic data collection and transmission to Dell Support enabling automatic creation of certain support cases
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	Microsoft XP SP2, XP SP3, Windows Vista®, Windows® 7, Windows Server® 2003 SP2, Windows Server® 2008, Windows Server® 2012 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	Microsoft XP Pro SP2, Windows Vista®, Windows® 7, Windows Server® 2008, Windows Server® 2008 Core, Windows Server® 2008 R2, Windows Server® 2008 R2 Core, Windows Server® 2012 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 (eqltune)
Streamline storage management and operations	Remote Setup Wizard Command Line Interface (RSWCLI), EqualLogic Volume Rethinning Facility (eqlvolume)
Technical highlights	
Operating platforms	Red Hat® Enterprise Linux®/CentOS 5.7, 5.8, 6.2 and 6.3, SUSE® Linux Enterprise® Server (SLES) 11 SP1, SP2

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.

Download EqualLogic software at EQLsupport.dell.com