Deploying SharePoint 2013 Using a Dell EqualLogic PS Series iSCSI SAN

Configuration and Management Best Practices

Dell Storage Engineering
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A Dell Best Practices Guide
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Preface

PS Series arrays optimize resources by automating performance and network load balancing. Additionally, PS Series arrays offer all-inclusive array management software, host software, and free firmware updates. By deploying SharePoint 2013 with a PS Series SAN, businesses can combine the industry-leading collaboration application with reliable, scalable, and high-performance disk storage to meet the ever-expanding needs of SharePoint users.

Audience

The information in this guide is intended for technology professionals interested in using Dell EqualLogic storage in a Microsoft Windows environment. Also intended for administrators that have or will be deploying SharePoint 2013 and are interested in using Dell EqualLogic storage.

Related documentation

For detailed information about PS Series arrays, groups, volumes, array software, and host software, see www.dell.com/PSseries or log in to the Documentation page at the customer support site.

Dell online services

You can learn about Dell products and services using this procedure:

2. Use the locale menu or click on the link that specifies your country or region.

Dell EqualLogic storage solutions

To learn more about Dell EqualLogic products and new releases being planned, visit the Dell EqualLogic TechCenter site: http://en.community.dell.com/techcenter/storage/w/wiki/2660.equallogic-technical-content. Here you can also find articles, demos, online discussions, technical documentation, and more details about the benefits of our product family.

For an updated Dell EqualLogic compatibility list please visit the following URL: https://support.equallogic.com/compatibility
1 Introduction to SharePoint 2013 and PS Series storage

Microsoft SharePoint 2013 is a collaboration tool with many new features that may impact your storage needs. SharePoint 2013 offers a range of enhancements and has been optimized for the way people work, providing people with a familiar, consistent view of information, collaboration, and processes. It also provides IT with a comprehensive, easily-managed and integrated platform to meet the needs of your business. These enhancements include:

- **Search**: Enterprise search in SharePoint Server 2013 includes many of the capabilities of SharePoint Server 2010 and provides numerous improvements, such as better query processing and targeting of search results. Administrators can configure search to enable users to find relevant information more quickly and easily than ever before.

- **Records management and compliance**: The records management and compliance features in SharePoint 2013 provide improved ways to help you protect your business. The records archive and in-place record retention from earlier versions of SharePoint Server are still supported, and SharePoint 2013 introduces retention policies that can be applied at the site level.

- **Web content management**: The web content management improvements in SharePoint 2013 simplify how you design publishing sites, and enhance the authoring and publishing processes of your organization. It also contains new features that use enterprise search to surface dynamic web content on publishing sites.

By deploying SharePoint 2013 with a PS Series SAN, businesses can combine the industry-leading collaboration application with reliable, scalable, and high-performance disk storage to meet the ever-expanding needs of SharePoint users. As SharePoint deployments expand, your organization will likely experience increases in the amount of data stored in SharePoint, and subsequently Microsoft SQL Server databases. Data protection and disaster recovery are among the top concerns for administrators. Requirements for reducing backup windows and restore times continue as demands for continuous SharePoint Farm uptime is increasing. PS Series arrays provide administrators the ability to create volume based copies of data using snapshots, clones and replicas. These copies are known as “point-in-time” copies of volume data.

The EqualLogic Host Integration Tools (Hit Kit) Version 4.7 enhances Auto-Snapshot Manager / Microsoft Edition (ASM/ME) – adding the ability to create data and application-consistent Smart Copies of SharePoint Farms. Auto-Snapshot Manager / Microsoft Edition is a Windows server application offering application-consistent Smart Copies of SharePoint Data leveraging the built-in snapshot, clone and replication facilities in PS Series arrays. With ASM/ME a SharePoint administrator can:

- **Create Smart Copies of SharePoint Farm Data**, where the copy operation is coordinated with SharePoint Farm operations.
  - Use the management GUI or built-in scheduler to create Smart Copy sets
  - Use the command-line interface (asmcli) that enables you to perform many common tasks. GUI wizards are included to generate fully-formed command lines.
  - Set up automatic e-mail notification of events

- **Allow system or SharePoint administrators to perform SharePoint restore operations in the following ways:**
- Restore corrupt / deleted content databases (Restore selected DBs).
- Restore Search (Restore SSA).
- Item-level restore
  - 3rd party database tools. (Restore as New DB)

The capabilities of ASM/ME extend the use of SAN copy facilities beyond storage administrators, to server
and SharePoint administrators. This raises the productivity of SharePoint administrators, and allows them
to leverage efficient SAN copy facilities without requiring SAN privileges. By automating data protection
and recovery operations, the headaches and time-consuming day-to-day operations of managing and
maintaining volume and SharePoint Server uptime is minimized and data availability is increased
extensively. Data availability can be maintained at a higher level of assurance using Auto-Snapshot
Manager / Microsoft Edition and Smart Copy technologies with PS Series arrays.

With any SAN, you can consolidate storage resources and provide a more scalable configuration than DAS,
while also improving performance and simplifying management. In addition, a SAN can deliver high-end
functionality like snapshots and data replication that not only improve data protection and recovery
capabilities, but also enhance SharePoint operations. To provide storage consolidation for any enterprise,
EqualLogic PS Series storage arrays from Dell enable you to set up an IP-based (iSCSI) SAN that delivers
performance, scalability, recoverability, and resilience beyond that delivered by other SANs. To work with a
PS Series SAN, all a server needs is a standard iSCSI initiator. Once connected to a PS Series SAN over an IP
network, volumes on the SAN appear as regular disks, which can be formatted and managed as usual
that simple.

Integrated virtualization software makes a PS Series SAN easy to manage, providing automatic RAID
configuration, disk sparing, data provisioning, replication, and load balancing. For reliability, PS Series
storage arrays include redundant, hot-swappable hardware, including disks, control modules, fans, and
power supplies. Increasing volume size, like most SAN management tasks, is a point-and-click operation.

To expand SAN capacity and performance, you can group together multiple arrays. Storage and
performance scale linearly. With multiple arrays in the SAN you gain the ability to create a tiered storage
solution along with pools, in effect SANs within the SAN.

To get the maximum benefits from SharePoint 2013 and PS Series storage, you should adhere to the best
practices for SharePoint 2013, as outlined by Microsoft and industry experts. In addition, this Technical
Report contains requirements and recommendations for deploying SharePoint 2013 with PS Series
storage, including best practices for performance, reliability, scalability, flexibility, and recoverability. The
best practices described in this report are applicable to all versions of Microsoft SharePoint. The examples
in this Technical Report were created using Microsoft SharePoint 2013 SP1 running on Microsoft Windows
Server 2012 R2. Key issues addressed by this report are:

- Design considerations, including availability, performance, scalability, and management.
- How to set up a PS Series group and volumes.
- Benefits of booting servers from a SAN.
- How to set up a SharePoint 2013 Farm, including optimizing the server and connecting to
  volumes.
- Configuring SharePoint 2013 to use PS Series volumes.
- Expanding SAN capacity and file systems without affecting availability.
- Backing up SharePoint 2013 data.
Benefits of deploying SharePoint with PS Series storage

The benefits of deploying SharePoint 2013 with a PS Series SAN are as follows:

- **Rapid deployment and configuration of storage**: A PS Series SAN can be quickly deployed providing storage for SharePoint 2013. A simple setup utility lets you configure an array on the network and create a PS Series group. Automation of complex operations such as RAID configuration, disk sparing, data provisioning, and load balancing means that even users new to SAN technologies can effectively manage the SAN.

- **Redundant hardware and hot serviceable configuration**: PS Series storage arrays are fully redundant with dual controllers, power supplies, and fans all of which can be serviced online and without disrupting applications.

- **Data protection**: All data is protected with RAID and spare disks. Combined with “hot” service capabilities, online operation is assured. Volume snapshot, clone, and replication protection capabilities are available and included at no extra cost.

- **Simple and immediate storage expansion**: Using modular PS Series storage arrays as the SharePoint 2013 storage solution, you can increase SAN storage capacity and performance online, without server or application disruption.

- **SAN boot capability**: iSCSI host bus adapters (HBAs) along with certain Intel and Broadcom NICs provide the ability to install and boot the Windows operating system from a PS Series volume, increasing disaster tolerance. When server hardware fails, the unit can be quickly removed and replaced with a similarly-configured spare hardware platform. This new platform can be directed to the SAN boot volume and, in minutes, resume providing application services. Other benefits of SAN boot include centralized storage management and reliable and highly available storage resources that eliminate the need for mirrored boot volumes.

- **Network path protection and load balancing**: Using multiple NICs or iSCSI HBAs, multipath I/O (MPIO) enables the dynamic load balancing of iSCSI SAN traffic across redundant paths between the SharePoint 2013 and the PS Series SAN. Dell EqualLogic MPIO Device Specific Module (DSM) coordinates activity between the MPIO drivers and PS Series group storage, maximizing the capabilities of both the operating system and the iSCSI SAN. The EqualLogic MPIO component works with the Microsoft iSCSI initiator and MPIO driver to improve both reliability and performance.

- **Excellent Performance**: PS Series arrays provide excellent performance and scale automatically.

- **Advanced Management features**: PS Series storage comes standard with a comprehensive set of features including:
  - Automatic load balancing
  - Virtual volume management
  - Thin Provisioning
  - Space-efficient snapshots for instant backup and restore
  - Snapshot Space Borrowing
  - Volume cloning for rapid server provisioning
  - Thin Clones
  - Multipath I/O (MPIO) support
  - Volume Undelete
- Volume Unmapping
- Volume Mount Point support
- Auto-replication for a comprehensive disaster recovery solution
- Synchronous replication for volume high availability
- Storage pools creating a “SAN within a SAN”
- Member-by-member RAID level control
- Volume Collections (consistency groups) tying volumes together across arrays and pools

**VSS-based backups:** The EqualLogic Host Integration Tools for Windows is a tool kit for Windows systems that installs host tools and utilities including a VSS provider and a VSS requestor data protection application called Auto-Snapshot Manager / Microsoft Edition (ASM/ME). ASM/ME interacts with the PS Series storage volume snapshot function to dramatically improve data protection operations by creating flexible, space-efficient, application consistent point-in-time-copies of data called Smart Copies.

**Thin provisioning database and Log volumes:** With PS Series thin provisioning capability, administrators have the option to provision storage resources for SharePoint without actually allocating physical storage before it is required. This type of storage allocation eliminates the pains of expanding available storage when the application requires it. Repeated data growth operations can be avoided and the result is improved utilization of physical storage resources.

**Synchronous and Remote site volume replication:** With the PS Series replication capabilities, SharePoint data can be automatically transferred to a remote data center, protecting the data from serious failures, ranging from the corruption of the volume to a complete site disaster with no impact on local data availability or performance.

EqualLogic PS Series arrays provide enhanced storage performance for the small-to-medium enterprise with the simplicity of the EqualLogic product line. Dell EqualLogic PS6210 arrays can drive up to approximately 2GB/sec of throughput per array for sequential, large-block workloads. In addition, flash-enabled EqualLogic PS6210 arrays provide up to three times the random performance of prior-generation arrays. The full line of PS6210 Series arrays brings 10GbE iSCSI SAN speed and efficiency to real-world applications, featuring:

- Dual controllers, each with 16GB non-volatile cache of memory
- Two 10GBASE-T RJ45 auto-sensing (10Gb/1Gb/100Mb) ports
- Two 10GbE SFP+ ports for fiber or copper cabling
- Up to 24 hot-pluggable drives, including SAS, NL-SAS and SSD
- Model options for 2.5” drives and 3.5” drives
- Up to 96TB capacity per array
3 Deploying SharePoint 2013 with PS Series storage

The following sections describe SharePoint 2013 requirements and recommendations and the basic tasks for deploying SharePoint 2013 with a PS Series SAN.

3.1 Overview of deploying SharePoint 2013 with a PS Series SAN

Use these steps to deploy SharePoint 2013 with a PS Series SAN:

1. Review planning and design considerations.
2. Review Microsoft SharePoint 2013 Farm requirements including minimum requirements for a database server, front-end web servers and application servers in a farm.
3. Review supported High Availability.
4. Configure the server storage, including installing Dell EqualLogic Host Integration Tools for Microsoft on SharePoint SQL hosts. Configure Multi-Path I/O and PS Series group access and provisioning volumes.
5. Install SQL Server 2012 and configure it to use the PS Series storage.
   a. Change the max degree of parallelism.
   b. Assign SQL Permissions.
8. Run the Farm Configuration Wizard.
9. Configure SharePoint Content Databases to use PS Series storage.
10. Configure ASM/ME on a SharePoint Farm.

3.2 Planning and design considerations

When designing a SharePoint 2013 environment, you should understand these often conflicting requirements:

- Reliability, Availability, and Serviceability
- Performance
- Scalability
- Recoverability
- Ease of management
- Service level commitments

It is critical to focus on these requirements before you begin the initial SharePoint installation, or they may become serious challenges to future growth and stability of the SharePoint environment.

Before you begin the deployment, Dell recommends that you review the following documents:

- Microsoft TechNet article: Hardware and software requirements for SharePoint 2013
- Configuration Guide: Dell EqualLogic Configuration Guide
3.3 Microsoft SharePoint 2013 Farm requirements

The requirements to deploy SharePoint 2013 are similar to SharePoint 2010 and the following key points can help you with your deployment.

- Active Directory must be at Windows Server 2003 forest functionality mode or higher.
- The Domain Controllers must be running at least Windows Server 2008.
- The Schema Master must be running on Windows Server 2003 SP2 or higher.
- Like the other versions, it is highly recommended to deploy SharePoint 2013 as a member server.
- SharePoint 2013 is supported on Windows Server 2012 and Windows Server 2008 R2 Service Pack 1 (SP1) or higher.
- SharePoint Server 2013 Service Pack 1 is the only version supported on a Windows Server 2012 R2 environment.

Minimum requirements for a database server in a farm:

- One of the following:
  - The 64-bit edition of Microsoft SQL Server 2012
  - The 64-bit edition of SQL Server 2008 R2 Service Pack 1
- The 64-bit edition of Windows Server 2008 R2 SP1 Standard, Enterprise, or Datacenter or the 64-bit edition of Windows Server 2012 Standard or Datacenter
- The SharePoint parsing process crashes in Windows Server 2008 R2 (KB 2554876)
- FIX: IIS 7.5 configurations are not updated when you use the ServerManager class to commit configuration changes (KB 2708075)
- Hotfix: ASP.NET (SharePoint) race condition in .NET 4.5 RTM:
  - Windows Server 2008 R2 SP1 (KB 2759112)
  - Windows Server 2012 (KB 2765317)
- Microsoft .NET Framework version 4.5

Minimum requirements for web front-end servers and application servers in a farm:

- The 64-bit edition of Windows Server 2008 R2 SP1 Standard, Enterprise, or Datacenter or the 64-bit edition of Windows Server 2012 Standard or Datacenter.
- The SharePoint parsing process crashes in Windows Server 2008 R2 (KB 2554876)
- FIX: IIS 7.5 configurations are not updated when you use the ServerManager class to commit configuration changes (KB 2708075)
- Hotfix: ASP.NET (SharePoint) race condition in .NET 4.5 RTM:
- Windows Server 2008 R2 SP1 (KB 2759112)
- Windows Server 2012 (KB 2765317)

- The Microsoft SharePoint Products Preparation Tool installs the following prerequisites for web front-end servers and application servers in a farm:
  - Web Server (IIS) role
  - Application Server role
  - Microsoft .NET Framework version 4.5
  - SQL Server 2008 R2 SP1 Native Client
  - Microsoft WCF Data Services 5.0
  - Microsoft Information Protection and Control Client (MSIPC)
  - Microsoft Sync Framework Runtime v1.0 SP1 (x64)
  - Windows Management Framework 3.0 which includes Windows PowerShell 3.0
  - Windows Identity Foundation (WIF) 1.0 and Microsoft Identity Extensions (previously named WIF 1.1)
  - Windows Server AppFabric
  - Cumulative Update Package 1 for Microsoft AppFabric 1.1 for Windows Server (KB 2671763)


### 3.4 High availability

Microsoft SharePoint 2013 supports SQL Server 2008 R2 and SQL Server 2012 synchronous mirroring in a farm and SQL Server AlwaysOn Availability Group with synchronous-commit for supported high availability and disaster recovery options for SharePoint 2013 databases. For detailed information about these databases, such as size and supported backup and recovery tools, see [Database types and descriptions (SharePoint 2013)](http://msdn.microsoft.com/en-us/library/ff530027.aspx).

### 3.5 Server storage configuration

Additional SharePoint requirements and recommendations for a configuration that uses a PS Series SAN are as follows:

The following assumes that a PS Series Array has been configured with Local CHAP Account authentication.

1. Configure two or more 1 GB or 10 GB Ethernet NICs or HBAs. Consult the vendor’s initiator documentation for installation instructions. Always check the Knowledge Base on the EqualLogic Customer Support website for the latest initiator information.
3. Install Dell EqualLogic Host Integration Tools and Auto-Snapshot Manager.

4. Configure Dell EqualLogic Multi-Path I/O DSM. Dell has developed a DSM that plugs into the Microsoft MPIO framework and is used to optimize Windows Server usage of Dell EqualLogic PS Series storage arrays. For more information on Multipath I/O DSM, see the EqualLogic Technical Report Deploying and Configuring the Dell EqualLogic Multipath Device Specific Module with Microsoft Windows

3.5.1 MPIO configuration

MPIO can be setup as follows:

1. Launch the Dell EqualLogic Auto-Snapshot Manager application. Select Settings at the bottom left of the application and click on MPIO Settings in the left menu. Under Network Connections, select the subnet(s) not associated with your SAN, and under Action click Exclude. See Figure 1.

![Figure 1 Configure Dell EqualLogic Multipath I/O DSM](image)

2. Setup PS Series group access as follows: Launch the Dell EqualLogic Auto-Snapshot Manager application. Select Settings at the bottom left of the application, and click on PS Group Access in the left menu. Click Add PS Group on the right side of the PS Group Access window. Enter the PS Group Name and Group IP, then save. Next, select and enter the VDS/VSS Access settings (CHAP user name and password from PS Group), then save. Finish with Smart Copy access (CHAP user name and password from PS Group) then PowerShell/SMP access (PS Group Username and PS Group Password). See Figure 2.
Figure 2  Configure PS Series group access

3. Provision at least one array volume per Application Server host. Provision two if you want more complex search topologies. Provision at least four array volumes for the SQL host. Database and log files will be placed on separate volumes so always create pairs of volumes. More volumes will be needed on the SQL host to separate content DBs for restore. Create a folder H:\Data on the (Application Host and Web Front-End Host) on an EqualLogic volume.

4. Create directories and specify default database locations in SQL under Server- >Properties/Database Settings. This ensures the initial SharePoint databases are created on EqualLogic volumes and minimizes the manual work of moving all of them off of the C: drive.

   Data: K:\DATA
   Log: L:\LOGS

5. Setup volume(s) for SQL databases and logs adding an Access Control List (ACL) record for each interface the host will use to connect to the volume(s). See Figure 3 and Figure 4.
6. Using the Microsoft iSCSI Initiator Configuration Tool, persistently connect the server to the PS Series volume(s) created for the SharePoint or SQL configuration and enable multi-path. See Figure 5.
7. Initialize the connected PS Series volume and Format with a drive letter. Open Server Manager\File and Storage Services\Volumes\Disks, select new volume (click Rescan Storage under the Tasks menu if you do not see the new volume) right-click on the new disk number, as shown in Figure 6. Select Bring Online.

Figure 5  Persistently connect PS Series volume

Figure 6  Select Bring Online
Figure 7  Select Initialize

8. Right-click on new disk number as shown in Figure 7, and select **Initialize**.
9. Right-click on new disk again, and select new volume to start the new volume wizard as shown in Figure 8.

Figure 8  Assign Drive Letter or Path

10. Format with the settings shown in Figure 9, and apply volume label
Figure 9 Format with the following settings

4 Install SQL Server 2012 and configure it to use PS Series storage

1. Run setup.exe as an administrator.
2. From the SQL Server Installation Center click on Installation on the left side as shown in Figure 10.
3. On the right side, click on New SQL Server stand-alone or add features to an existing installation.

![Figure 10 New SQL Server installation](image)

4. After the Setup Support Rules run, click OK.
5. Enter your Product Key and then click Next.
6. Select I accept the license terms.
7. Select whether to Send feature usage data to Microsoft....
8. Click Next.
9. If Product Updates pops up, check Include SQL Server product updates and click Next.
10. When the Setup Support Rules screen pops up, review any errors or warnings you get. If everything is okay, the Next button will be available to click. Click Next.
11. For Setup Role, select SQL Server Feature Installation and click Next.
12. On the Feature Selection screen select the check boxes shown in Figure 11, Database Engine Services, Management Tools - Basic and Management Tools – Complete, then click Next.
13. On the Installation Rules screen SQL will make some checks, then review any errors or warnings you get. If everything is okay, the Next button will be available to click. Click Next.
14. At the Instance Configuration screen, select **Named instance** as shown in Figure 12, then choose a new instance name – this example uses SP13INST_1. Click **Next**.
15. At the Disk Space Requirements screen click Next.
16. The Server Configuration screen asks what accounts you want to run SQL Server as shown in Figure 13. The SQL Server Database Engine should always be run as a domain account, not a local account. Next to SQL Server Database engine click on NT Service\MSSQLSERVER and a drop down arrow will appear.
17. Click <<Browse...>>.
18. Select your SQL Service account and click OK.
19. Enter the account password and click Next.
20. On the Database Engine Configuration screen, click Add Current User, then select the Data Directories tab, as shown in Figure 14. By default, SQL Server will store everything on the C: drive. SQL Server best practice is to store your data and log files on different volumes. Set up at least five volumes, one for Backup, one each for Tempdb and Templog, and one each for database directory and log directory. Future content databases can be moved to their own volumes as created.

21. Click Next.

22. On the Error Reporting screen, choose whether or not to Send Windows and SQL Server Error Reports...

23. Click Next.

24. At the Installation Configuration Rules screen, click Next.

25. You are Ready To Install, so click Install.

26. When the SQL Installation is done, the Complete screen will display, as shown in Figure 15. Click Close.
4.1 Max Degree of Parallelism

Now that you have SQL Server installed, there is one more configuration change needed to make SQL work with SharePoint 2013. You need to change the max degree of parallelism. This limits the number of processors used in parallel execution, or put another way, it ensures that a single SQL Server process serves each request. SQL Server defaults to 0 and SharePoint 2013 requires you to set it to 1. Make the change as follows:

1. From your newly installed SQL Server click Start > Arrow Down for Apps by name > Microsoft SQL Server 2012 > SQL Server Management Studio.
2. On the Connect to Server screen, click Connect. If the Server name field is blank, enter Server name\Instance name.
3. At the top of the Object Explorer window you will see your server. Right click on it.
4. From the menu that appears, click Properties.
5. In the Select a page section, click Advanced.
6. Scroll to the bottom and change Max Degree of Parallelism from 0 to 1, as shown in Figure 16.
7. Click OK.

4.2 SQL permissions

The Windows Account that you plan to install and configure SharePoint with needs elevated rights in SQL. Best practice is to use a dedicated account (some examples are sp_Install or sp_Farm). This account needs the following roles on the SQL Server:

- DB_Creator
- Security_Admin
- Public

Add a new Login as follows:

1. Make sure you have SQL Server 2012 Management Studio open on your SQL Server, or open it if not.
2. From Object Explorer, expand Security > Logins.
3. Right click on Logins.
4. From the menu choose **New Login**... as shown in Figure 17.

![New Login](image)

Figure 17  New Login

5. For Login name enter `domain\sp_install` or the account that will be logged into SharePoint when you do the install.
6. On the left, under Select a page, click **Server Roles**.
7. Check the box for **dbcreator** and **securityadmin** and leave **public** selected, as shown in Figure 18.
Figure 18  Server roles

8. Click **OK**.
5 SharePoint 2013 prerequisites

This section includes offline (no internet connection) installation of SharePoint 2013 SP1 prerequisites on Windows Server 2012 R2 Operating System.

5.1 PowerShell installation

SharePoint 2013 SP1 has many prerequisites including server features and additional EXE files that must be installed.

Edward Van Biljon created two scripts and a txt file that guide you through the installation of the prerequisites:

- **Script 1** - Server features. This installs all the server features/roles needed for SharePoint. Once installed, you will need to reboot your server. See Figure 19.
- **TXT file** - This includes all the .EXE files (Prerequisites) needed. Download them to a specific location.
- **Script 2** - This looks at the folder where you downloaded all the separate .EXE files above and installs them for you. Make sure to put in the drive letter (for example D: \ ) and the folder name.


CJ Rawson has a blog that goes into detail on offline installation of SharePoint 2013 SP1 prerequisites: [http://blogs.technet.com/b/cjrawson/archive/2014/04/06/offline_2d00_sharepoint2013sp1_2d00_prerequisites_2d00_server2012r2.aspx](http://blogs.technet.com/b/cjrawson/archive/2014/04/06/offline_2d00_sharepoint2013sp1_2d00_prerequisites_2d00_server2012r2.aspx)

![Figure 19 SharePoint 2013 PowerShell prerequisites installation](image-url)
5.2 SharePoint 2013 Prerequisites GUI installation

This installation was installed using the sp13_farm account which was added to local administrator group on the SharePoint server and was given SECURITYADMIN and DBCREATOR roles in SQL Server.

1. Launch the Installation, and select **Install software prerequisites**.

![Install software prerequisites](image)

2. Click **Next**.

![Required products and updates](image)
3. Accept the License Terms, and click Next.

4. Prerequisites will now install.
5. Your system will need to restart after you click **Finish**.
6. When you reboot and login, you may find that the wizard will run again.

---

**Figure 24**  Software prerequisites restart

**Figure 25**  Continue installation after reboot
Figure 26  Install software prerequisites

7. Let the wizard complete, and click Finish. This completes the Prerequisites installation.
6 SharePoint 2013 installation

1. Log in with an sp_Install or sp_Farm account that is in the local administrator group.
2. Double-click the SharePoint 2013 install media to launch the install splash screen.
3. Select **Install SharePoint Server**.

![Install SharePoint Server](image)

**Figure 27** Install SharePoint Server

4. Enter your Product Key, and click **Continue**.

![Enter Product Key](image)

**Figure 28** Enter Product Key
5. Accept the License Terms, and click **Continue**.

![Figure 29  Accept the License Terms](image)

6. For this installation, select **Complete** on the Server Type tab as shown in Figure 30, then click on the **File Location** tab.

![Figure 30  Select Complete](image)
7. At the File Location tab, as shown in Figure 31, select the location for the SharePoint 2013 directory be stored. Note that SharePoint allows you to store search index files to another location. To get better performance, change this path to an EqualLogic storage volume for search index files because this kind of file can be very large and the volume can be thin provisioned as well as expanded without going offline.

**Note:** Having Search on EqualLogic storage is required to provide snapshot backup and recovery.

Figure 31  File locations

8. Select **Run the SharePoint Products Configuration Wizard Now**, then click **Close** to start the Configuration Wizard, as shown in Figure 32.
6.1 SharePoint 2013 Configuration Wizard

1. Click **Next** after confirming you have the database server and database name, along with user name and password to access them.
2. Select **Yes** at the restart services notice shown in Figure 34.

![Figure 34](image)

**Figure 34** Restart services notice

3. Select **Create a new server farm**, as shown in Figure 35, then click **Next**.

![Figure 35](image)

**Figure 35** Create a new server farm

4. Enter the Database server name if you used the default instance. If you used a custom instance name, then enter it as: `Server name\Instance name`. Enter the account that will be used to connect to the configuration database as shown in Figure 36. Click **Next**.
5. Enter the passphrase. Click **Next**.

6. Enter the port number that Central Administration will use, and click **Next**.
7. Review your selections as shown in Figure 39. Click **Next**.

8. The wizard will configure the farm.
9. Click **Finish**. Central Administration will open in Internet Explorer.
6.2 Farm Configuration Wizard

1. When Central Administration starts, you will be prompted to login, then the sign up for the Customer Experience Improvement Program is presented as shown in Figure 42. Select Yes or No, and then click OK.

   ![Customer Experience](Image)

   **Figure 42**  Customer Experience

2. You will be prompted to start the Configuration Wizard, as shown in Figure 43. Click **Start the Wizard**.

   ![Start Wizard](Image)

   **Figure 43**  Start Wizard

3. Select **Create a new managed account**. The example uses DJCHV10\SP13_Farm because it will be a development environment. Next enter the password.
4. Select the Services you want to run on your farm. Click Next.

![Services and account](image)

**Figure 44** Services and account

5. The wizard configures the farm.

**Working on it...**

* This shouldn't take long.

![Working on Farm configuration](image)

**Figure 45** Working on Farm configuration

6. Create a Site Collection from the wizard. Click OK.
Figure 46  Create a Site Collection

7. The Farm Configuration Wizard is complete, so click Finish.

This completes the Farm Configuration Wizard.

Details of this SharePoint farm:

Site Title: Engineering
Site URL: http://sp2/app/site/Engineering

Service Applications:
- Secure Store Service Application
- PowerPoint Conversion Service Application
- State Service
- PerformancePoint Service Application
- Visio Graphics Service Application
- Managed Metadata Service
- Workflow Service Application
- App Management Service Application
- Excel Services Application Web Service Application
- Security Token Service Application
- Machine Translation Service
- Application Discovery and Load Balancer Service Application
- Usage and Health Data Collection Service Application
- Search Administration Web Service Application
- Word Automation Services
- User Profile Service Application
- Business Data Connectivity Service Application
- Work Management Service Application
- Search Service Application

Click Finish to continue to the SharePoint Central Administration page where you can continue configuring other settings for your farm.

To return to this wizard, or access additional installed wizards, click "Configuration Wizards" in the left navigation pane.

Figure 47  Farm Wizard complete
8. You will be redirected to the Central Administration Home Page as shown in Figure 48.

In the process of setting up SQL and installing SharePoint we deployed all components to Dell EqualLogic storage. The next two sections cover moving content databases to their own volumes and setting up Auto-Snapshot Manager/Microsoft Edition (ASM/ME) to protect SharePoint. ASM/ME is a Windows server application that offers application-consistent Smart Copies of SharePoint data leveraging the built-in snapshot, clone and replication facilities in PS Series arrays.
7 Configuring SharePoint Content Databases to use PS Series storage

The following steps cover the procedures for moving SharePoint Content Databases to individual volumes on PS Series storage.

The steps assume the group and volume have already been created, the server is persistently connected to the volumes, the new disks associated with the volumes have been initialized, the disks have been formatted, and the drive letters or mount points have been assigned.

After deployment, you can expand iSCSI disks online, expand PS Series group capacity, and protect data, as described in the EqualLogic Technical Report Using Dell EqualLogic Storage with Microsoft Windows Server 2012.

7.1 Specifying SharePoint log and database locations

Once the Farm Wizard completed, a new content database was created named WSS_Content_Development and a Development site collection was also created, see Figure 49.

![Figure 49 New content database](image)

**Note**: As with any critical application whose configuration you are modifying, it is strongly recommended that you perform a full backup of all Databases and logs before performing the migration.

1. To move the content database and logs, connect to the SQL server, and open SQL Management Studio. Expand Databases and right-click WSS_Content_Development. Select Properties.
2. In the Database Properties window, note mdf and ldf locations, and close the window. See Figure 50.
3. Next, right-click **WSS_Content_Development** and select **Tasks** then select **Detach**, as shown in Figure 51.

4. At the Detach Database window, check both **Drop Connections** and **Update Statistics** boxes and click **OK**, as shown in Figure 52.
5. Open File Explorer and go to the directory where WSS_Content_Development.mdf is located (shown in Figure 50), drag and drop (move) to the new volume\folder. In this example, drag from K:\data01 to F:\Dev-db. See Figure 53.
6. Next, move WSS_Content_Development.ldf, in this example from L:\log01 to G:\Dev-log.

7. Next, open SQL Management Studio if it is not already open. Right-click on Databases and select Attach as shown in Figure 54.

Figure 53 Detach Database window

Figure 54 Attach Databases window
8. The **Attach Databases** window opens, as shown in Figure 55. Click **Add**... and a Locate Database window will open.

![Attach Databases window](image)

**Figure 55**  Attach Database
9. In the left pane, expand the drive letter and select the folder where you moved the database. In the right pane, select the database. Click OK. See Figure 56.

![Figure 56 Database file location](image)

10. A window with the added database displays the database details. In the details section, note that the .ldf file was not found. Click on the Box with the ellipsis marks next to the current file path for the .ldf file. See Figure 57.
11. A Locate Database window will open. In the left pane, expand the drive letter and select the folder where you moved the logs. In the right pane, select the .ldf file. Click **OK**. See Figure 58.
Figure 58  Locate .ldf

12. The window shows the added database and displays the database details again, but this time without any error messages. See Figure 59. Click OK.
13. Clicking Ok closes the attach databases window and the SQL Management Studio, File Explorer is shown. WSS_Content_Development database should again be listed under Databases, if not, refresh. Right click on **WSS_Content_Development** and select **Properties**.

14. Select **Files** and confirm paths for the .mdf and .ldf files. See Figure 60. Click **Cancel** to close.
Figure 60  Database Properties
Setting up ASM/ME on a SharePoint Farm

Auto-Snapshot Manager/Microsoft Edition (ASM/ME) has already been installed on the SQL and Application servers. It was used to configure Dell EqualLogic Multi-Path I/O DSM and PS Series group access in section 3.5. Now ASM/ME will be configured to talk to the SharePoint VSS writer (unlike SQL, SharePoint writers are not enabled by default), and make sure all backup documents are accessible to Hit Group Hosts. For a deep dive into protecting SharePoint and installing ASM/ME please review this Tech Report:

SharePoint Data Protection with Auto-Snapshot Manager/Microsoft Edition 4.7 Dell EqualLogic PS Series

1. Identify a network shared directory to store Smart Copy backup documents:
   a. All farm hosts that ASM/ME will be managing must be able to access this exact path.
   b. The farm administrator must have read-write access to this path.
   c. Any HIT Group hosts on which you plan to import Smart Copies using ASM/ME should also have read-write access to this path.
2. From the Application server (SP13APP2), start Auto-Snapshot Manager, then click on the Applications icon and notice you get a message that states; “There are no supported applications running on this host”, as shown in Figure 61. This error will be addressed in this section, but first click on Settings in the bottom left corner of Auto-Snapshot Manager. Select General Settings in the left hand Settings panel if not already selected. Notice in the upper right panel, under Auto-Snapshot Manager Document Directory that a share named vss has been set up as the shared backup document directory, as shown in Figure 62. When the SQL server (SP13SQL2) is added to the Hit Group, we will go back and add the share here.

Figure 61  No supported applications
Choose a farm host on which SharePoint is installed to serve as the writer host, and then enable the SharePoint VSS writer on it. The SharePoint VSS writer is not enabled by default. You can use a web front end server or an application server as your writer host. From the Application server (SP13APP2) we will enable the SharePoint VSS writer by performing the following steps:

3. Use the following command when running SharePoint 2013 (If you are running SharePoint 2010, then substitute 14 for 15 in the command.):
   a. Start the command prompt with the right-click “Run as Administrator” option.
   b. Run the following command:
      
      "C:\Program Files\Common Files\Microsoft Shared\Web Server Extensions\15\BIN\STSADM.exe" -o registerwsswriter
   
   c. You will see the following message as a result: Operation completed successfully. See Figure 63.
   d. Confirm SharePoint VSS writers on the nodes where it is registered by running "vssadmin.exe" list writers from an elevated command prompt. Search writers will appear only on hosts where that SharePoint service is provisioned. See Figure 64.
Figure 63  SharePoint VSS writers

Figure 64  Confirm VSS writers
4. After restarting Auto-Snapshot Manager, a pop-up will appear that will let you know what Farm Host needs to be added to the Hit Group. See Figure 65. Click **Add Hosts**.

![Add Hosts](image)

Figure 65  Add Host

5. The Choose Host wizard opens and displays multiple methods for selecting Hosts. The wizard will have Cluster and SharePoint farm nodes checked, as shown in Figure 66. Click **Next**.
6. The Discover through Cluster and SharePoint farm nodes window will open. Select the SQL server and click on the arrow to move to the Host to Add or Upgrade pane. Click **Next**. The Hit Installation and Host Verification window displays. Enter credentials, and click **Add Hosts**. See Figure 67. Click **Next**.

Figure 66  Choose selection methods

![Choose Host Selection Method](image)

Figure 67  Host Verification

![Host Verification](image)
7. After restarting Auto-Snapshot Manager, a window opens stating that the SQL (SP13SQL2) Host needs to be added to the Backup Documents file share. Click View. See Figure 68.

![Figure 68 Backup document folder error](image)

8. The General Settings window will open. Select sp13sql2 in the center panel and in the right hand panel type in the shared backup directory path under Auto-Snapshot Manager Document Directory.

9. Next, in the right panel in the Run ASM Services As panel, select Specified User. Fill in the Farm Administrator Domain account and password. See Figure 69. Click Save.

![Figure 69 ASM/ME Settings](image)
10. Restart Auto-Snapshot Manager. A two host Hit Group will be displayed. You are now able to view the whole farm from one application, take Smart Copy Snapshots (for backup and restore) of the whole farm, all or selected content databases and search service applications. See Figure 70.

**Note:** For more information on Auto-Snapshot Manager, see: SharePoint Data Protection with Auto-Snapshot Manager/Microsoft Edition 4.7 Dell EqualLogic PS Series
Summary

As SharePoint 2013 adds complex new features from Shredded Storage, SQL Improvements, Cache Service, Request Management, to Themes and Sharing, EqualLogic PS series from Dell simplifies your storage deployment and management with built-in automation, Storage virtualization with non-disruptive load balancing and scale-out, as well as tight management integration with Virtual Machines and Operating Systems. Application level data protection provides a superior solution for SharePoint deployments in both large and small environments.
# A Configuration details

Table 1 Software and firmware

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Model</th>
<th>Software Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft</td>
<td>Windows Server 2012 R2</td>
<td>RTM or higher</td>
</tr>
<tr>
<td>Microsoft</td>
<td>SQL Server 2012</td>
<td>Service Pack 1 or higher</td>
</tr>
<tr>
<td>Microsoft</td>
<td>SharePoint 2013</td>
<td>Service Pack 1 or higher</td>
</tr>
<tr>
<td>Dell EqualLogic</td>
<td>Host Integration Tools Kit for Microsoft Windows</td>
<td>Version 4.7 and later*</td>
</tr>
<tr>
<td>Dell EqualLogic</td>
<td>PS Series Firmware</td>
<td>Version 5.2, 7.0.3 and later*</td>
</tr>
</tbody>
</table>

* For a complete version support list see the Host Integration Tools Release Notes.

**Note:** Current customers may not be running the latest versions of the tools and software listed above. If you are under valid warranty or support agreements for your PS Series array, you are entitled to obtain the latest updates and new releases as they become available.
B  PS Series array software

**Firmware**: Installed on each array, this software allows you to manage your storage environment and provides capabilities such as volume snapshots, clones, and replicas to ensure data hosted on the arrays can be protected in the event of an error or disaster.

B.1 Host software / Host Integration Tools for Microsoft Windows

- **Group Manager GUI**: Provides a graphical user interface for managing your array.
- **Group Manager CLI**: Provides a command line interface for managing your array.

**Manual Transfer Utility (MTU)**: Runs on Windows and Linux host systems and enables secure transfer of large amounts of data to a replication partner site when configuring disaster tolerance. You use portable media to eliminate network congestion, minimize downtime, and quick-start replication.

**Remote Setup Wizard (RSW)**: Enables you to initialize a PS Series SAN array and set up or expand a PS Series Group. An alternate command-line interface (RSWCLI) can also be used from the Windows command prompt.

**Multipath I/O Device Specific Module (MPIO DSM)**: Includes a connection awareness-module that understands PS Series network load balancing and facilitates host connections to PS Series volumes.

**Volume Rethinning Tools**: Enables you to perform rethinning and optional defragmentation operations on one or more volumes.

**VSS and VDS Provider Services**: Allows third-party backup software vendors to perform off-host backups.

**PowerShell Tools**: Enables you to manage one or many PS Series groups through a comprehensive set of PowerShell cmdlets.

**Auto-Snapshot Manager/Microsoft Edition (ASM/ME)**: Provides point-in-time SAN protection of critical application data using PS Series snapshots, clones, and replicas of supported applications such as SQL Server, Exchange, SharePoint, Hyper-V, and NTFS file shares.

**SMP Provider**: Enables you to manage Dell EqualLogic storage through native Windows storage interfaces such as PowerShell cmdlets, File Services UI in Windows Server 2012, and WMI.

**Virtual Disk Service (VDS) Provider**: Enables you to use Microsoft VDS and Microsoft Storage Manager for SANs to create and manage volumes in a PS Series group.

**SAN HeadQuarters (SANHQ)**: Provides centralized monitoring, historical performance trending, and event reporting for multiple PS Series groups.
B.2 Host software for VMware

Storage Adapter for Site Recovery Manager (SRM): Allows SRM to understand and recognize PS Series replication for full SRM integration.

Auto-Snapshot Manager/VMware Edition (ASM/VE): Integrates with VMware Virtual Center and PS Series snapshots to allow administrators to enable Smart Copy protection of Virtual Center folders, datastores, and virtual machines.

MPIO Plug-In for VMware ESX: Provides enhancements to existing VMware multipathing functionality.

Note: For additional information on the Dell EqualLogic Host Integration Tools for Microsoft, including Operating System support and Dell EqualLogic product compatibility, please refer to the Dell EqualLogic Host Integration Tools for Microsoft Deployment and Configuration Guide at EqualLogic Configuration Guide v15.2.
C Additional resources

Support.dell.com is focused on meeting your needs with proven services and support.

DellTechCenter.com is an IT Community where you can connect with Dell Customers and Dell employees for the purpose of sharing knowledge, best practices, and information about Dell products and installations.

Referenced or recommended Dell publications:

- Dell EqualLogic Configuration Guide:
  http://en.community.dell.com/dell-groups/dtcmedia/m/mediagallery/19852516/download.aspx

Referenced or recommended Microsoft publications:

- Release Notes for SharePoint 2013:

The following table lists the documents referred to in this paper. All PS Series Technical Reports are available on the Customer Support site at: http://eqlsupport.dell.com/

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft</td>
<td>Install and configure SharePoint 2013</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Plan for high availability and disaster recovery for SharePoint 2013</td>
</tr>
<tr>
<td>Microsoft</td>
<td>SQL Server and storage (SharePoint 2013)</td>
</tr>
</tbody>
</table>
D  Technical support and customer service

Dell’s support service is available to answer your questions about PS Series SAN arrays. If you have an Express Service Code, have it ready when you call. The code helps Dell’s automated-support telephone system direct your call more efficiently.

D.1  Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services might not be available in your area.

For customers in the United States, call 800-945-3355.

**Note:** If you do not have access to an Internet connection, contact information is printed on your invoice, packing slip, bill, or Dell product catalog.

Use the following procedure to contact Dell for sales, technical support, or customer service issues:

1. Visit support.dell.com or the Dell support URL specified in information provided with the Dell product.
2. Select your locale. Use the locale menu or click on the link that specifies your country or region.
3. Select the required service. Click the “Contact Us” link, or select the Dell support service from the list of services provided.
4. Choose your preferred method of contacting Dell support, such as e-mail or telephone.

D.2  Online services

You can learn about Dell products and services using the following procedure:

1. Visit www.dell.com (or the URL specified in any Dell product information).
2. Use the locale menu or click on the link that specifies your country or region.