Microsoft SharePoint Server 2013 on Dell PowerEdge R630 with Microsoft Hyper-V Virtualization Deployment Guide
Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.
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# Abbreviations

Table 1. Abbreviations

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<th>Definition</th>
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<tbody>
<tr>
<td>bNDC</td>
<td>blade Network Daughter Card</td>
</tr>
<tr>
<td>CLI</td>
<td>command-line interface</td>
</tr>
<tr>
<td>CMC</td>
<td>Chassis Management Controller</td>
</tr>
<tr>
<td>CPLD</td>
<td>complex programmable logic device</td>
</tr>
<tr>
<td>Dell RACADM</td>
<td>Dell Remote Access Controller Admin</td>
</tr>
<tr>
<td>DCB</td>
<td>Data Centre Bridging</td>
</tr>
<tr>
<td>EULA</td>
<td>End User License Agreement</td>
</tr>
<tr>
<td>FCOE</td>
<td>Fibre Channel over Ethernet</td>
</tr>
<tr>
<td>FC</td>
<td>Fibre Channel</td>
</tr>
<tr>
<td>HBA</td>
<td>Host Bus Adapter</td>
</tr>
<tr>
<td>iDRAC8</td>
<td>integrated Dell Remote Access Controller</td>
</tr>
<tr>
<td>IOA</td>
<td>I/O aggregator</td>
</tr>
<tr>
<td>LUN</td>
<td>logical unit number</td>
</tr>
<tr>
<td>OOB Network</td>
<td>Out-of-band Network</td>
</tr>
<tr>
<td>PMUX</td>
<td>Programmable MUX</td>
</tr>
<tr>
<td>SAN</td>
<td>Storage Area Network</td>
</tr>
<tr>
<td>VLT</td>
<td>Virtual Link Trunking</td>
</tr>
<tr>
<td>VLTi</td>
<td>VLT interconnect</td>
</tr>
<tr>
<td>VMM</td>
<td>Virtual Machine Manager</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>WWN</td>
<td>World Wide Name</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
</tr>
</tbody>
</table>
Audience

This guide is intended for IT professionals and administrators who want to deploy Microsoft SharePoint solution for up to 5,000 users on PowerEdge R630 with Microsoft Hyper-V.
Overview

This guide provides guidelines to implement Microsoft SharePoint Server 2013 using Hyper-V on Dell PowerEdge R630 servers, as specified in the Reference Architecture – Microsoft SharePoint Server 2013 on Dell PowerEdge R630.

Figure 1. SharePoint 2013 on Dell PowerEdge R630
Solution requirements

The following are the hardware and software requirements for deploying Microsoft SharePoint solution on PowerEdge R630 with Microsoft Hyper-V.

Hardware requirements

The following table lists the hardware requirements:

Table 2. Hardware requirements

<table>
<thead>
<tr>
<th>Components</th>
<th>Hardware Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtualization hosts</td>
<td>4 x Dell PowerEdge R630 Servers</td>
</tr>
<tr>
<td>Processor</td>
<td>2 x Intel Xeon E5-2660 v3 Family</td>
</tr>
<tr>
<td>Memory</td>
<td>128 GB; 8 x 16GB DDR3 DIMMs</td>
</tr>
<tr>
<td>HDD</td>
<td>2 x 600GB 15K SAS in RAID 1 for OS volume</td>
</tr>
<tr>
<td>Network</td>
<td>• Broadcom 57800 dual port SFP+ NDC</td>
</tr>
<tr>
<td></td>
<td>• Broadcom 57810 dual port SFP+ Add-on NIC</td>
</tr>
<tr>
<td>OS</td>
<td>Windows Server 2012 R2 Data Center Edition</td>
</tr>
<tr>
<td>Storage arrays</td>
<td>2 x EqualLogic PS6210X with 24 x 1.2 TB 10K SAS Drives per array in RAID 10 configuration</td>
</tr>
<tr>
<td>Networking</td>
<td>• 2 x Dell Networking S4048-ON for Local Area Networking (LAN)</td>
</tr>
<tr>
<td></td>
<td>• 2 x Dell Networking S4048-ON for iSCSI Storage Area Networking (SAN)</td>
</tr>
</tbody>
</table>
Software requirements

The following table lists the software requirements:

### Software Requirements

<table>
<thead>
<tr>
<th>Components</th>
<th>Software Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypervisor</td>
<td>Microsoft Windows Server 2012 R2 Hyper-V</td>
</tr>
<tr>
<td>Virtual Machine Management</td>
<td>Microsoft System Center 2012 R2 Virtual Machine Manager</td>
</tr>
</tbody>
</table>

### Software Requirements for SharePoint farm VMs

The following table lists the software requirements for the SharePoint farm VMs:

<table>
<thead>
<tr>
<th>Components</th>
<th>Software Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>SharePoint Front End Servers</td>
<td>OS Windows Server 2012 R2 Data Center Edition</td>
</tr>
<tr>
<td></td>
<td>SharePoint SharePoint Server 2013 Standard Edition</td>
</tr>
<tr>
<td>SharePoint Application Servers</td>
<td>OS Windows Server 2012 R2 Data Center Edition</td>
</tr>
<tr>
<td></td>
<td>SharePoint SharePoint Server 2013 Standard Edition</td>
</tr>
<tr>
<td>SharePoint Database Servers</td>
<td>OS Windows Server 2012 R2 Data Center Edition</td>
</tr>
<tr>
<td></td>
<td>SQL SQL Server 2012 SP1 Enterprise Edition CU3</td>
</tr>
</tbody>
</table>

### Firmware requirements

This solution is deployed using the firmware versions listed in the following table.

<table>
<thead>
<tr>
<th>Components</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS</td>
<td>1.3.6</td>
</tr>
<tr>
<td>System CPLD</td>
<td>1.0.1</td>
</tr>
<tr>
<td>Integrated Dell Remote Access Controller (iDRAC)</td>
<td>2.15.10.10</td>
</tr>
<tr>
<td>Lifecycle Controller</td>
<td>2.15.10.10</td>
</tr>
<tr>
<td>PERC H730 Mini</td>
<td>25.2.2-0004</td>
</tr>
<tr>
<td>Broadcom 57800 Driver</td>
<td>7.12.2.0</td>
</tr>
</tbody>
</table>
### Table 6. Dell EqualLogic storage and switches

<table>
<thead>
<tr>
<th>Components</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Networking S4048-ON</td>
<td>9.9</td>
</tr>
<tr>
<td>Dell EqualLogic PS6210X</td>
<td>7.0.0</td>
</tr>
</tbody>
</table>

### End to end IO connectivity

PowerEdge R630 has several network connectivity options. Apart from Network Daughter Card (NDC) connectivity, PowerEdge R630 also offers expansion through three PCIe slots. In this reference architecture, to build HA for the network connections, a Broadcom 57800 dual port 10GbE SFP+ NDC and an additional Broadcom 57810 dual port 10GbE PCIe add-on NIC are used. As shown in the following figure, the network connection redundancy is achieved by connecting Port 0 of NDC and add-on NICs to LAN fabric, Port 1 of NDC, and add-on NIC to SAN fabric.

The LAN and SAN fabrics are separated to provide isolation between the data and application traffic. The two TOR switches in each fabric are lagged together through an inter-switch-link (ISL), which provides 80-Gb bandwidth between the two switches. The solution provides four 10GbE uplinks from each switch to link into an existing core network infrastructure. As shown in the following figure, a native Windows network team is created with Port 0 of NDC and add-on NIC connections. A Hyper-V virtual switch is then deployed with the teamed NIC, and network Quality of Service (QoS) is enabled to make sure that the Live Migration, Cluster and VM management networks are allocated minimum bandwidth weight. This configuration enables traffic throttling when specific network traffic requires the bandwidth. For the application network connections in the VMs, virtual network adapters are configured with VLAN IDs to provide network traffic isolation at the LAN fabric.

For the SAN connectivity in the host Operating System and the VMs that require in-guest iSCSI connections, two Hyper-V virtual switches are deployed, each with Port 1 of NDC and add-on NIC connections.
Figure 2. End to end connectivity
Microsoft SharePoint 2013 on the Dell PowerEdge R630 with Hyper-V virtualization — deployment workflow

This section outlines the complete deployment sequence of deploying Microsoft SharePoint on the Dell PowerEdge R630 with Hyper-V virtualization.

1. Complete the solution requirements. See Solution requirements.
2. Configure the components that are part of the solution. See Configuring components.
3. Install the virtualization infrastructure, see Installing virtualization infrastructure.
4. Deploy Microsoft SharePoint 2013 on Dell PowerEdge R630 server with Hyper-V virtual infrastructure. See Microsoft SharePoint 2013 server on Dell PowerEdge R630.
5. Verify the deployment. See Verifying the deployment.
Configuring components

Before you deploy Microsoft SharePoint solution with Microsoft Hyper-V, you must set up and configure the following components:

1. Dell Networking S4048-ON switches. See Configuring Dell Networking S4048-ON switches.
2. Dell PowerEdge R630 servers. See Configuring PowerEdge R630 servers.

Configuring Dell Networking S4048-ON switches

About this task
To configure the Dell Networking S4048-ON top and S4048-ON bottom switch, perform the following steps:

Steps
1. Access the switch console (CLI).
   To access the console, connect one end of the serial cable to the console port on the S4048-ON top and bottom switch, and the other end to the terminal server (Laptop).
2. Open the switch console using the HyperTerminal (terminal emulator application).
3. Configure out of band (OOB) management port.
   FTOS>enable
   FTOS>#config
   FTOS(conf)#interface ManagementEthernet 1/1
   FTOS(conf-if-ma-1/1)#no shutdown
   FTOS(conf-if-ma-1/1)#ip address ipaddress mask
   FTOS(conf-if-ma-1/1)#exit
4. Configure login credentials.
   FTOS(conf)#username admin privilege 15 password 0 yourpassword
   FTOS(conf)#enable password level 15 0 yourpassword
5. Enable switch ports.
   FTOS#configure
   FTOS(conf)#interface range tengigabitethernet 1/1 – 1/48
   FTOS(conf-if-range-te-1/1-1/48)#switchport
   FTOS(conf-if-range-te-1/1-1/48)#no shutdown
   FTOS#exit
   FTOS(conf)#exit
   FTOS#configure
   FTOS(conf)#interface range tengigabitethernet 1/1 – 1/48
   FTOS(conf-if-range-te-1/1-1/48)#mtu 12000
7. Configure spanning tree on edge ports.
   FTOS(conf)#interface range tengigabitethernet 1/1 – 1/48
   FTOS(conf-if-range-te-1/1-1/48)#spanning-tree rstp edge-port
   FTOS#exit
8. Configure port channel for LAG.
    The following commands configure the switch interconnect as a LAG.

    FTOS(conf)#interface Port-channel 1
    FTOS(conf-if-po-1)#mtu 12000
    FTOS(conf-if-po-1)#switchport
    FTOS(conf-if-po-1)#no shutdown
    FTOS(conf-if-po-1)#exit

9. Configure QSFP ports for LAG.
    The following commands assigns 40Gb QSFP ports to the Port Channel.

    FTOS(conf)#interface range fortyGigE 1/49-1/50
    FTOS(conf-if-range-fo-1/49-1/50)#no ip address
    FTOS(conf-if-range-fo-1/49-1/50)#mtu 12000
    FTOS(conf-if-range-fo-1/49-1/50)#no shutdown
    FTOS(conf-if-range-fo-1/49-1/50)#flowcontrol rx on tx off
    FTOS(conf-if-range-fo-1/49-1/50)#port-channel-protocol lACP
    FTOS(conf-if-range-fo-1/49-1/50-lacp)#port-channel 1 mode active
    FTOS(conf-if-range-fo-1/49-1/50-lacp)#exit
    FTOS(conf-if-range-fo-1/49-1/50)#exit
    FTOS(conf)#exit

10. Configure VLAN 10 for host management network.
    configure
    interface vlan 10
    description “host-management”
    ip address 172.168.32.1/19
    tagged port-channel 1
    tagged tengigabitethernet 1/1 – 1/48
    no shutdown
    exit

11. Configure VLAN 20 for Cluster network.
    configure
    interface vlan 20
    description “Cluster”
    ip address 172.168.64.1/19
    tagged port-channel 1
    tagged tengigabitethernet 1/1 – 1/48
    no shutdown
    exit

12. Configure VLAN 30 for Live Migration.
    configure
    interface vlan 30
    description “Live Migration”
    ip address 172.168.96.1/19
    tagged port-channel 1
    tagged tengigabitethernet 1/1 – 1/48
    no shutdown
    exit

13. Configure VLAN 50 for Application Network.
    configure
    interface vlan 50
    description “Application Network”
    ip address 172.168.96.1/19
    tagged port-channel 1
    tagged tengigabitethernet 1/1 – 1/48
    no shutdown
    exit
14. Configure VLAN 60 for Font End Network.
   ```
   configure
   interface vlan 60
   description "Front End Network"
   ip address 172.168.96.1/19
   tagged port-channel 1
   tagged tengigabitethernet 1/1 – 1/48
   no shutdown
   exit
   ```

15. Configure VLAN 70 for SQL Private Network.
   ```
   configure
   interface vlan 70
   description "SQL Private Network"
   ip address 172.168.96.1/19
   tagged port-channel 1
   tagged tengigabitethernet 1/1 – 1/48
   no shutdown
   exit
   ```

16. Run the following command to save the configuration.
   ```
   FTOS#copy running-config startup-config
   ```

Next steps
Repeat the steps to configure the second switch.

**Configuring Dell Networking S4048-ON switches for SAN iSCSI traffic**

**About this task**
To configure the Dell Networking S4048-ON top and S4048-ON bottom switch, perform the following steps:

**Steps**
1. Access the switch console (CLI).
   To access the console, connect one end of the serial cable to the console port on the S4048-ON top and bottom switch, and the other end to the terminal server (Laptop).
2. Open the switch console using the HyperTerminal (terminal emulator application).
3. Configure out-of-band (OOB) management port using the following command:
   ```
   FTOS>enable
   FTOS#config
   FTOS(conf)#interface ManagementEthernet 1/1
   FTOS(conf-if-ma-1/1)#no shutdown
   FTOS(conf-if-ma-1/1)#ip address <ipaddress mask>
   FTOS(conf-if-ma-1/1)#exit
   ```
4. Configure login credentials using the following command:
   ```
   FTOS(conf)#username admin privilege 15 password 0 <yourpassword>
   FTOS(conf)#enable password level 15 0 <yourpassword>
   ```
5. Enable switch ports using the following command:
   ```
   FTOS#configure
   FTOS(conf)#interface range tengigabitethernet 1/1 – 1/48
   FTOS(conf-if-range-te-1/1-1/48)#switchport
   FTOS(conf-if-range-te-1/1-1/48)#no shutdown
   FTOS(conf-if-range-te-1/1-1/48)#exit
   FTOS(conf)#exit
   ```
6. Enable Jumbo Frames using the following command:
   
   ```
   FTOS#configure
   FTOS(conf)# interface range tengigabitethernet 1/1 – 1/48
   FTOS(conf-if-range-te-1/1-1/48)#mtu 12000
   ```

7. Configure flow control using the following command:
   
   ```
   FTOS(conf-if-range-te-1/1-1/48)#flowcontrol rx on tx off
   ```

8. Configure spanning tree on edge ports using the following command:
   
   ```
   FTOS(conf-if-range-te-1/1-1/48)#spanning-tree rstp edge-port
   FTOS(conf-if-range-te-1/1-1/48)#exit
   ```

9. Configure port channel for LAG using the following command:
   
   ```
   FTOS(conf)#interface Port-channel 1
   FTOS(conf-if-po-1)#mtu 12000
   FTOS(conf-if-po-1)#switchport
   FTOS(conf-if-po-1)#no shutdown
   FTOS(conf-if-po-1)#exit
   ```

10. Save the configuration using the following command:
    
    ```
    FTOS#copy running-config startup-config
    ```

Next steps
Repeat the steps to configure the second switch.

**Verifying Dell Networking S4048-ON switch configuration**

**About this task**
Perform the following steps to verify the Dell networking S4048-ON configuration.

**Steps**

1. Run the following command to confirm the VLT domain is **Up**:
   
   ```
   show vlt brief
   ```

2. Run the following command to confirm Port-Channel 1 is **Up**:
   
   ```
   show interfaces
   ```

3. Run the following command to confirm that the Port-Channel 1 is tagged on the VLAN interfaces (10,20,30):
   
   ```
   show VLAN
   ```

**Configuring PowerEdge R630 servers**

This configure the PowerEdge R630 servers, perform the following tasks:

1. Configure BIOS on the server. See [Configuring BIOS on PowerEdge R630 server](#)
2. Configure iDRAC IPv4 address on the server. See [Configuring iDRAC IP4 Address on PowerEdge R630 servers](#)

**Configuring BIOS on PowerEdge R630 server**

1. Turn on or restart the server.
2. To enter System Setup, press F2 immediately after you see the following message:
   
   ```
   <F2>=System Setup
   ```
3. Ensure that the logical processor is enabled by performing the following steps:
b. On the Processor Settings screen, verify that Processor Settings is set to Enabled.

4. Ensure that Virtualization Technology is enabled by performing the following steps:
   b. On the Processor Settings screen, check Virtualization Technology is set to Enabled.

Configuring iDRAC IP4 Address on PowerEdge R630 servers

1. Turn on the managed system.
2. Press F2 immediately after you see the following message:
   <F2> = System Setup
3. In the System Setup Main Menu page, click iDRAC Settings, and press Enter.
4. In the iDRAC Settings page, click Network.
5. In the IP4 SETTINGS section, enter the following information.
   - Starting IP Address
   - Starting Gateway
   - Starting Subnet Mask
6. Click Back, and then in the System Setup page, click Finish.
7. Click Yes when the confirmation message is displayed.

Configuring Dell EqualLogic Storage

Perform the following steps to configure Dell EqualLogic Storage.

1. Configure the array. See Configuring array and creating group
2. Configure RAID policy. See Configuring RAID Policy
3. Configure array controller eth 1 ports. See Configure array controller eth1 ports
4. Create volumes. See Creating Volumes

Configuring array and creating group

Steps
1. Connect one end of the serial cable to storage, and the other end to the serial port on the server (workstation).
2. Open the console using the HyperTerminal (terminal emulator application).
3. In the console, configure the serial connection settings as follows:
   - Bits per second – 9600
   - Data bits – 8
   - Parity – None
   - Stop bits – 1
   - Flow control – None
4. When prompted to login, enter the default credentials to log in to storage.
5. When prompted: Would you like to configure the arrow now? Type Y. Wait for the initialization process complete.
6. When prompted for Member Name [ ]:, type a name for the storage array.
7. When prompted for Network interface [eth0]:, type eth0, and press Enter.
8. When prompted for IP address for network interface [ ]: type the IP address for the selected array.
9. When prompted for Netmask [255.255.255.0]: type the appropriate network mask address.
10. When prompted with Default Gateway [10.10.0.1]: type the appropriate default gateway address.
11. When prompted for Group name [ ]: type the name of the new group you want to create.
12. When prompted for the Group IP address [ ]: type the IP address of the new group on the SAN.
13. If prompted with do you want to create a new group (yes|no)[yes]: press Enter.
14. When prompted, Do you want to use the group settings shown above (yes|no) [yes]: Type yes.
15. Enter your password for managing group membership and press Enter.
16. Retype the password for confirmation and press Enter.
17. Enter your password for the default group administration (grpadmin) account and press Enter.
18. Retype the password for confirmation and press Enter.

Next steps
After the array is added to the new group, use the Group Manager GUI to set the RAID policy, configure array controller ports, and create volumes.

Configuring RAID Policy

About this task
Complete the following steps for each member.

Steps
1. In the Group Manager, from the left navigation pane, click a member.
2. When prompted, select Yes to configure RAID for the member, and then click Next.
3. On the General page, enter the name of the RAID policy, and click Next.
4. To configure storage in RAID 10, on the RAID page, in the RAID policy section, select the RAID 10 option.
5. After the storage initiation complete, click Next.
   Wait until initialization of the disks with the selected RAID setting are configured.

Configure array controller eth1 ports

1. From the left pane, click the member, and then select the Network tab.
2. Select the Network tab, double-click eth1.
3. In the Modify IP settings of network interface dialog box, enter the appropriate IP address, subnet mask, and then click the check box next to Enable interface and click OK.

Creating Volumes

Steps
1. In the Group Manager, click Volumes on the left pane.
2. In Activities section, click Create Volumes.
3. On the General page, do the following, and then click Next.
   a. In the Name box, type the name of the volume.
b. In the **Description** box, type the description for the volume.
c. In the **Storage pool assignment** table, select the storage pool.

4. On the **Space** page, in the **Volume size** field, enter the volume size.

5. On the **ISCSI access** page, perform the following tasks, and click **Next**.
   a. Select the **Define one or more basic access points** option as the access type for the volume.
   b. Select the **Yes** option to allow simultaneous access to the volume from more than one iSCSI initiator.

6. Perform the following tasks, and click **Next**.
   a. To define the access points, in the **Define one or more access points** section, click **Add**.
   b. In the **New Basic Access Point dialog** box, enter the following details of the destination server to which storage volumes are mapped, and click **OK**.
      - CHAP account name
      - iSCSI initiator name
      - IP address

7. On the **Sector size** page, select **512 bytes per sector (group default)** option and click **Next**.

8. On the **Summary** page, click **Finish**.

**Next steps**
Repeat the steps to create the second storage.
Configuring solution for virtualization –
Windows Server 2012 R2 Hyper-V

Installing virtualization infrastructure

To set up virtualization, perform the following tasks:

- Configure virtual disk for OS deployment on Dell PowerEdge R630 servers. See Configuring Virtual Disk for OS deployment in Dell PowerEdge R630 servers
- Complete the prerequisites to install Windows Server. See Configuring prerequisites to install Windows Server
- Install Windows Server 2012 R2 OS on the Dell PowerEdge R630 server. See Installing Windows Server 2012 R2 operating system in the Dell PowerEdge R630 server
- Install network drivers on Windows Server 2012 R2. See Installing Network Drivers on Windows Server 2012 R2
- Enable Hyper-V in Windows Server 2012 R2. See Enabling Hyper-V in Windows Server 2012 R2
- Set up NIC teaming in Windows Server 2013 R2. See Setting up NIC teaming in Windows Server 2012 R2
- Configure vEthernet switch on Windows Server 2012 R2. See Configuring vEthernet switch in Windows Server 2012 R2
- Installing EqualLogic HIT KIT on Windows Server 2012 R2. See Installing EqualLogic HIT KIT on Windows Server 2012 R2
- Add the Dell PowerEdge R630 servers to the domain. See Adding the Dell PowerEdge R630 servers to the domain
- Add volumes to the Dell PowerEdge R630 servers. See Adding volumes in the Dell PowerEdge R630 servers
- Enable failover clustering on Windows Server 2012 R2. See Enabling failover clustering in Windows Server 2012 R2
- Create cluster. See Creating cluster

Configuring Virtual Disk for OS deployment in Dell PowerEdge R630 servers

1. Log in to IDRAC and launch the virtual console.
2. From the menu, select Power → Power on the system.
3. In the message – You are about to execute a server control action. Are you sure you want to continue? , click Yes.
4. During system start, once you see this message press <CTRL> + <R> to Run configuration utility, press <CTRL> + <R> to run the RAID configuration utility.
5. In the configuration utility, select PERC H730 Mini and press F2 to enable operations.
6. From the drop-down list, select Create New VD.
7. Set RAID Level to RAID-1, select physical disks, set the basic settings, use default virtual disk size, virtual disk name, and then click OK.
8. In the message – It is recommended that all newly created logical drives be initialized unless you are attempting to recreate a previous configuration and recover data as initialization is a destructive process. Are you sure you want to skip initialization?, click OK.
   The virtual disk is created.
10. Restart the server.

Configuring prerequisites to install Windows Server

Mapping to virtual disk

1. Log in to iDRAC.
2. In the System page, click Console/Media tab, and then click Launch Virtual Console.
3. In the virtual console, select Connect Virtual Media, and then select Map CD/DVD.
4. In Drive/Image File, provide the drive location and click Map Device.

Setting boot device and loading the OS executable files

1. In the virtual console, select Next Boot, and then select Virtual CD/DVD/ISO.
2. In the message - The selected device is set as the boot device for the next boot until another user changes the selected boot device. Therefore, it is recommended to reboot the server immediately after saving this selection. Click OK to save the selection., click OK.
   Virtual CD/DVD/ISO is set as the boot device.
3. Restart the server.

Installing Windows Server 2012 R2 operating system in the Dell PowerEdge R630 server

1. Power on the server and press any key only after you see the message Booting from Virtual CD.
   Press any key to boot from CD or DVD.
   The Windows server setup is displayed.
2. Provide language preference, time and currency format, keyboard or input method, and then click Next.
3. In Windows Setup, click Install now.
4. Provide the product key and then click Next.
5. Select OS - Windows Server 2012 R2 Datacenter (Server with GUI) and then click Next.
6. In License terms, select I accept the license terms and then click Next.
7. In installation type, select Custom: Install windows only (advanced).
8. Select Drive0 Unallocated Space and click New to create the partition and then click Next twice.
In the message — To ensure that all Windows features work correctly, Windows might create additional partitions for system files, click OK.

9. Once the installation is complete, in Setting page, set the user name and password details.

Installing Network Drivers on Windows Server 2012 R2

1. Log in to the PowerEdge R630 server.
2. Copy the Broadcom 57800 and Broadcom 57810 network drivers for 64–bit Windows driver to a location on the PowerEdge R630 server.
3. Run the network driver installer.
4. In the welcome screen, click Next.
5. In License Agreement, select I accept the terms in the license agreement and then click Next.
6. In Custom Setup, select the default settings and click Next.
7. In Ready to Install the Program, click Install.
8. In InstallShield Wizard, click Finish.
9. To view the network card, in the Windows desktop, click Start, select Run, and then type ncpa.cpl. The Network Connections page will display all the NIC cards.

Connecting volumes on the server

About this task
Complete the steps to create and map each volume to the server.

Steps
1. On the destination server, on the Start screen, click the Search icon and type iSCSI initiator in the Search box.
2. When you see the following message, click Yes. The Microsoft iSCSI service is not running. The service is required to be started for iSCSI to function correctly. To start the service now and have the service start automatically each time the computer restarts, click the Yes button.
3. In the iSCSI Initiator Properties dialog box, click Target tab, and then in the Target box, type the IP address of EqualLogic group. Click Quick Connect. The volume is connected the server.
4. In the Quick Connect dialog box, click Done.

Adding volumes in the Dell PowerEdge R630 servers

1. Log in to the Dell PowerEdge R630 server, and in Run, type diskmgmt.msc.
2. In Disk Management, perform the following steps:
   a. Right-click new disk, and set the value of disk to Online.
   b. Right-click disk and initialize disk.
   c. Right-click disk and select New Simple Volume.
4. In Specify volume size in MB, use the default disk size, and then click Next.
5. In Assign Driver Letter or Path, select Do not assign a driver letter or driver path, and then click Next.
6. In Format Partition, select Format this volume with the following settings: and set File system to NTFS, Allocation unit size to Default, Volume label to Quorum, select perform a quick format and then click Next.


8. Repeat steps 1 – 7 to create the second volume for storing the VHD files of the virtual machines.

Enabling Hyper-V in Windows Server 2012 R2

1. In Server Manager, on Dashboard, click Manage → Add Roles and Features.
2. In Add Roles and Features Wizard, click Before you begin, and then click Next.
3. In Installation Type, click Role-based or feature-based Installation, and then click Next.
4. In Server Selection, select Select a server from the server pool and in the server pool, select server and then click Next.
5. In Server Roles, select Hyper-V and then click Next.
6. In Add Roles and Features Wizard, select Include management tools (if applicable), and then click Add Features.
7. In Server Roles, click Hyper-V and then click Next.
8. In Hyper-V, click Next.
9. In Virtual Switches, click Next.
10. In Migration, click Next.
11. In Default Stores, keep default settings and then click Next.
12. In Confirmation, review the roles you have selected, select Restart the destination server automatically if required, and then click Install.
13. In Results, once the roles and features are installed and the server restarts, click Close.

Setting up NIC teaming in Windows Server 2012 R2

1. In Server Manager, select Local Server.
3. In NIC Teaming, from TASKS, select New Team.
4. In New team, provide team name, for example ConvergedNet Team, select the NICs that you want to include in the team, in Additional properties, set Teaming mode to Switch Independent and Load balancing mode to Hyper-V Port, and then click OK.
5. Check if the NICs are active.

Configuring LAN network in Windows Server 2012 R2

About this task
In the Dell PowerEdge R630 server, start Windows PowerShell and run the following commands.

Steps
1. Create a new VM switch:
   
   ```powershell
   New-VMSwitch -AllowManagementOS 1 -Name ConvergedNetSwitch -MinimumBandwidthmode weight -Verbose
   NetAdapterName: ConvergedNet Team
   ```
2. Create VM network adapter for Cluster:
3. Create VM network adapter for Live Migration:
   Add-VMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name LiveMigration -Verbose

4. Create VM network adapter for Management Network:
   Add-VMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name Management -Verbose

5. Create VM network adapter for Application:
   Add-VMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name Application -Verbose

6. Create VM network adapter for Front End:
   Add-VMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name FrontEnd -Verbose

7. Create VM network adapter for SQL Private:
   Add-VMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name SQL Private -Verbose

8. Set VLAN access properties for the Management Network Adapter:
   Set-VMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName ConvergedNetSwitch -Access -VlanId 25

9. Set VLAN access properties for the Cluster Network Adapter:
   Set-VMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName Cluster -Access -VlanId 20

10. Set VLAN access properties to LiveMigration:
    Set-VMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName LiveMigration -Access -VlanId 30

11. Set VLAN access properties to Application:
    Set-VMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName Application -Access -VlanId 26

12. Set VLAN access properties to Front End:
    Set-VMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName Public -Access -VlanId 27

13. Set VLAN access properties to SQL Private:
    Set-VMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName SQL Private -Access -VlanId 28

14. Set minimum bandwidth reservation for Management Network Adapter:
    Set-VMNetworkAdapter -ManagementOS -Name ConvergedNetSwitch -MinimumBandwidthWeight 5

15. Set minimum bandwidth reservation for Cluster network adapter:
    Set-VMNetworkAdapter -ManagementOS -Name Cluster -MinimumBandwidthWeight 40

16. Set minimum bandwidth reservation for Live Migration network adapter:
    Set-VMNetworkAdapter -ManagementOS -Name LiveMigration -MinimumBandwidthWeight 20

   **NOTE:** Under Network Connections, view vEthernet (ConvergedNetSwitch) and adapters for cluster and live migration.
Configuring network adapter for SAN traffic

About this task
In the Dell PowerEdge R630 server, start Windows PowerShell and run the following commands

Steps
1. Create network adapter from the first Network Card using the following command:
   ```powershell
   New-VMSwitch -Name iSCSI_Switch1 -NetAdapterName <NICPortname> -Notes "SAN connectivity"
   ```
2. Create network adapter from the second Network Card using the following command:
   ```powershell
   New-VMSwitch -Name iSCSI_Switch1 -NetAdapterName <NICPortname> -Notes "SAN connectivity"
   ```

Configuring vEthernet switch in Windows Server 2012 R2

1. In **Network Connections**, right-click **vEthernet (ConvergedNetSwitch)** and in the drop-down list, select **Properties**.
2. In **vEthernet (ConvergedNetSwitch) Properties**, configure IPV4 protocol properties, include IP address and DNS server details and then click **OK**.
3. Test the network connection: ping the VLAN 10 network.

Installing EqualLogic HIT KIT on Windows Server 2012 R2

1. Download the Host Integration Tools (HIT) KIT from [https://eqlsupprt.dell.com](https://eqlsupprt.dell.com). You will need a valid support account to access the download page.
2. After download is complete, double-click on the HIT KIT installation file. The **Dell EqualLogic Host Integration Tools – <version number>** is displayed.
3. On the Welcome page, click **Next**.
4. On the **Licence Agreement** page, read and accept the licence agreement. Click **Next**.
5. On the **Destination Folder** page, retain the default folder location, and click **Next**.
6. On the **Setup Type** page, select **Complete** option, and click **Next**.
7. On the **Ready to Install the Program** page, click **Install** to begin the installation process. Wait for the installation to complete.
8. On the **InstallShield Wizard Completed** page, click **Finish**.
9. When you see the message to restart you system to changes to take effect, click **Yes**.
10. Repeat the steps to install HIT KIT on all the SharePoint and database virtual machines.

Adding the Dell PowerEdge R630 servers to the domain

1. In the Dell PowerEdge R630 server, in **System Properties**, on the **Computer Name** tab, click **Change**.
2. In **Computer Name/Domain Changes**, provide a name to the server. For example, **HyperVH3**.
3. Under **Member of**, select **Domain** and type domain name, for example **hyperv.lab**, and then click **OK**.
4. In **Windows Security**, provide domain administrator’s user name and password, and then click **OK**. After the PowerEdge R630 server is added to the domain, a welcome message is displayed.
5. In the welcome message, click **OK** and restart the server.
Enabling failover clustering in Windows Server 2012 R2

1. In Server Manager, select Manage, and then select Add Roles and Features.
2. In Add Roles and Features Wizard, In Before you begin, select Next.
3. In Installation Type, select Role-based or feature-based Installation, and then click Next.
4. In Server Selection, select Select a server from the server pool and in the server pool, select server and then click Next.
5. In Server Roles, click Next.
6. In Features, select Failover Clustering and then click Next.
7. In Add Roles and Features Wizard pop-up, add features that are required for failover clustering, select Include management tools (if applicable), and then click Add Features.
8. In Features, click Next.
9. In Confirmation, review the roles you have selected, select Restart the destination server automatically if required, and then click Install.
10. In Results, once the Failover Clustering role is installed, click Close.

NOTE: Repeat the preceding tasks for the remaining Hyper-V hosts.

Creating cluster

1. Validating configuration
2. Creating a Hyper-V host cluster in VMM

Validating configuration

1. In Failover Cluster Manager, select Validate Configuration.
2. In Validate a Configuration Wizard, do the following:
   a. In Before you Begin, click Next.
   b. In Select Servers, add all the cluster nodes and then click Next.
   c. In Testing Options, select Run all tests (recommended).
   d. In Confirmation, click Next.
   e. In Failover Cluster Validation Report, clear Create the cluster now using the validated nodes, to view report, click View Report, and then click Finish.

Creating a Hyper-V host cluster in VMM

1. Before you begin, create a host group in VMM. See Creating host groups in VMM.
2. Create a Hyper-V host cluster in VMM. See Creating a Hyper-V host cluster in VMM.

Creating host groups in VMM

About this task
To configure host groups in VMM, perform the following steps:

Steps
1. Create host group structure in VMM:
   a. Open the Fabric workspace
   b. In the Fabric pane, expand Servers, and then do either of the following:
      • Right-click All Hosts, and then click Create Host Group.
• Click All Hosts. On the Folder tab, in the Create group, click Create Host Group.

VMM creates a new host group that is named New host group with the host group name highlighted.
c. Type a new name, and then press Enter.

2. Configure host group properties in VMM.
   a. In Fabric, expand Servers, All Hosts, and then click the host group that you want to configure.
   b. On the Folder tab, in the Properties group, click Properties.
   c. Configure any of the following settings:

   Table 7. Host groups settings

<table>
<thead>
<tr>
<th>Tab</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Configure the host group name, location, description, and allow unencrypted BITS file transfers.</td>
</tr>
<tr>
<td>Placement Rules</td>
<td>VMM automatically selects the ideal host to deploy virtual machines. However, you can specify placement rules. By default, a host group uses the placement settings from the parent host group.</td>
</tr>
</tbody>
</table>

Creating a Hyper-V host cluster in VMM

1. In VMM, select Fabric → Servers.
2. On the Home tab, in Create group, click Create, and then click Hyper-V Cluster.
3. In Cluster Wizard, on the General tab, provide cluster name and administrator user credentials, and then click Next.
4. In Nodes, perform the following steps and then click Next:
   a. In Host group, select the host group that contains the Hyper-V hosts that you want to cluster.
   b. In Available hosts, select the Hyper-V host that you want to cluster and then click Add.
      The hosts that you have added are moved to Hosts to cluster.
   c. (Optional) Select Skip cluster validation tests.
5. In Storage, select the disks you want to cluster.
6. In Virtual Switches, click Next.
7. In Summary, confirm settings and then click Finish.
8. When the job is complete, verify the cluster status.
Microsoft SharePoint 2013 server on Dell PowerEdge R630

This section outlines the complete deployment sequence of virtualized Microsoft SharePoint 2013 on the Dell PowerEdge R630 solution.

1. Prepare VMs for SharePoint. See Preparing virtual machines for SharePoint.
2. Install Windows Server 2012 R2 operating system. See Installing Windows Server 2012 R2 operating system in the virtual machine.
4. Install SharePoint prerequisite files. See Installing SharePoint 2013 SP1 prerequisite files.

Preparing virtual machines for SharePoint

This section details the network and storage specifications along with their configuration for preparing the VMs. Additionally, the section provides the Windows PowerShell scripts to create Web Front End (WFE), application, and database virtual machines for SharePoint farm deployment.

Network specifications

To isolate the network traffic, four different LAN network connections are created and assigned with different VLANs on the host machine.

NOTE: The VLAN IDs used in the deployment guide represents the implementation of SharePoint farm infrastructure as mentioned in the following table. The VLAN IDs can be customized based on your existing environment.

The following table lists the network specifications for the virtual machines:

Table 8. LAN and SAN specifications

<table>
<thead>
<tr>
<th>Network</th>
<th>LAN</th>
<th>VLAN</th>
<th>SAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SharePoint front-end servers</td>
<td>1 x network adapters for management</td>
<td>25</td>
<td>2 x Virtual adapters for SAN connectivity</td>
</tr>
<tr>
<td></td>
<td>1 x Application</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 x public connectivity</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>
This environment uses virtual adapter created on 10 G physical port to map the storage volumes directly to the SharePoint application and database servers for better performance.

**Storage specifications**

For ease of management and better application performance, four content databases are created to store four site collections. Each of the data and log files of the content databases are stored in respective storage volumes. The following table lists the storage specifications for the Hyper-V cluster and the SharePoint environment.

**Table 9. Storage specifications**

<table>
<thead>
<tr>
<th>Servers</th>
<th>Number of volumes</th>
<th>Size of each volume</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hyper-V cluster</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x Application</td>
<td>1</td>
<td>1 TB</td>
</tr>
<tr>
<td>1 x SQL cluster private connectivity</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

| **SharePoint database servers** |                   |                     |
| Content database             | 4                 | 650 GB              |
| Content database logs        | 4                 | 100 GB              |
| Search database              | 1                 | 200 GB              |
| Usage Database               | 1                 | 200 GB              |
| Temp DB                      | 6                 | 50 GB               |
| Other SharePoint Databases (SharePoint Configuration and Admin Content) | 1 | 100 GB |
| Quorum volume                | 1                 | 1 GB                |

| **SharePoint application server** |                   |                     |
| Application servers           | 1 volume per server | 200 GB              |

| **SharePoint web server**      |                   |                     |
| WFE servers                   | 1 volume per server | 200 GB              |
Configuring the virtual machines

The following table summarizes the number of virtual machines required for deploying the SharePoint infrastructure.

<table>
<thead>
<tr>
<th>Application Role</th>
<th>Number of VMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SharePoint Web front-end</td>
<td>2</td>
</tr>
<tr>
<td>SharePoint application Server</td>
<td>2</td>
</tr>
<tr>
<td>SQL for SharePoint databases</td>
<td>2</td>
</tr>
<tr>
<td>Virtual Load balancer appliances</td>
<td>2</td>
</tr>
</tbody>
</table>

The following sections provide details about the WFE, APP, DB virtual machine specifications and the respective Windows PowerShell scripts for creating the virtual machines.

Configuring WFE virtual machines

About this task
This section lists the WFE virtual machine specifications and provides the steps to create WFE VMs.

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SharePoint front-end servers</td>
<td>2 x Hyper-V virtual machines</td>
</tr>
<tr>
<td>Processor</td>
<td>4 x virtual processors</td>
</tr>
<tr>
<td>Memory</td>
<td>16GB</td>
</tr>
<tr>
<td>OS VHDX</td>
<td>1 x 160GB stored on the VM store array</td>
</tr>
<tr>
<td>Data volumes</td>
<td>1 x 200GB volume per VM</td>
</tr>
<tr>
<td>Network</td>
<td>3 x network adapters for management, SQL application and public connectivity</td>
</tr>
</tbody>
</table>

Perform the following steps to create the WFE1 virtual machine for the specifications mentioned in the table:

**Steps**
1. Create fixed VHD for better IO performance.
   ```powershell
   $VHDPath="C:\ClusteredStorage\volume1\HDD\WFE1.vhdx"
   New-VHD -SizeBytes 160GB -Path $VHDPath -Fixed
   ```
2. Create a WFE1 virtual machine.
   ```powershell
   $VMPath="C:\ClusteredStorage\volume1\VMs\WFE1"
   New-VM -Name SP -Path $VMPath -MemoryStartupBytes 16GB -BootDevice CD - SwitchName Management -VHDPath $VHDPath
   ```
3. Configure the WFE1 virtual machine.
   ```powershell
   Set-VMProcessor -VMName WFE1 -Count 4
   Add-VMNetworkAdapter -VMName WFE1 -Name Application
   Add-VMNetworkAdapter -VMName WFE1 -Name LAN
   Connect-VMNetworkAdapter -VMName WFE1 -Name Application -SwitchName Application
   ```
Connect-VMNetworkAdapter -VMName WFE1 -Name Application -SwitchName LAN
Set-VMNetworkAdapterVlan -VMName WFE1 -VMNetworkAdapterName Management -Access -VlanId 25
Set-VMNetworkAdapterVlan -VMName WFE1 -VMNetworkAdapterName Application -Access -VlanId 26
Set-VMNetworkAdapterVlan -VMName WFE1 -VMNetworkAdapterName LAN -Access -VlanId 27

4. Add network adapter to SharePoint WFE virtual machine for SAN connectivity using the following command:
   Add-VMNetworkAdapter -VMName WFE1 -SwitchName iscsi_switch1
   Add-VMNetworkAdapter -VMName WFE1 -SwitchName iscsi_switch2

5. Repeat steps 1 through 4 to create WFE2 virtual machine by changing the name to WFE2.

Next steps
Next, configure the SharePoint application virtual machines after configuring the WFE virtual machines.

Configuring APP virtual machines

About this task
This section lists the APP virtual machine specifications and provides the steps to create APP VMs.

Table 12. SharePoint application server specifications

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SharePoint application servers</td>
<td>2 x Hyper-V virtual machines</td>
</tr>
<tr>
<td>Processor</td>
<td>4 x virtual processors</td>
</tr>
<tr>
<td>Memory</td>
<td>8GB</td>
</tr>
<tr>
<td>OS VHDX</td>
<td>1 x 160GB stored on the VM store array</td>
</tr>
<tr>
<td>Data volumes</td>
<td>1 x 200GB volume per VM</td>
</tr>
<tr>
<td>Network</td>
<td>3 x network adapters for management, SQL application and public connectivity</td>
</tr>
</tbody>
</table>

Perform the following steps to create APP1 virtual machine for the specifications mentioned in the table:

Steps

1. Create fixed VHD for better IO performance.
   \$VHDPath="C:\ClusteredStorage\volume1\HDD\APP1.vhdx"
   New-VHD -SizeBytes 160GB -Path \$VHDPath -Fixed

2. Create an APP1 virtual machine.
   \$VMPath="C:\ClusteredStorage\volume1\VMs\APP1"
   New-VM -Name SP -Path \$VMPath -MemoryStartupBytes 8GB -BootDevice CD -SwitchName Management -VHDPath \$VHDPath

3. Configure the APP1 virtual machine.
   Set-VMProcessor -VMName APP1 -Count 4
   Add-VMNetworkAdapter -VMName APP1 -Name Application
   Connect-VMNetworkAdapter -VMName APP1 -Name Application -Name Application
   Set-VMNetworkAdapterVlan -VMName APP1 -Name Application -Name Management -Access -VlanId 25
   Set-VMNetworkAdapterVlan -VMName APP1 -VMNetworkAdapterName Management -Access -VlanId 26
4. Add network adapter to APP virtual machine for SAN connectivity using the following command:
   Add-VMNetworkAdapter -VMName APP1 -SwitchName iscsi_switch1
   Add-VMNetworkAdapter -VMName APP1 -SwitchName iscsi_switch2

5. Repeat steps 1 through 4 to create APP2 virtual machine by changing the name to APP2.

Next steps
Next, configure the DB virtual machines after configuring the WFE and APP virtual machines.

Configuring DB virtual machines

About this task
This section lists the database virtual machine specifications and provides the steps to create DB VMs.

Table 13. SharePoint database servers specification

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SharePoint database servers</td>
<td>2 x Hyper-V virtual machines</td>
</tr>
<tr>
<td>Processor</td>
<td>6 x virtual processors</td>
</tr>
<tr>
<td>Memory</td>
<td>64GB</td>
</tr>
<tr>
<td>OS VHDX</td>
<td>1 x 160GB stored on the VM store array</td>
</tr>
<tr>
<td>Data volumes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 x 650GB volume for SharePoint Content DB</td>
</tr>
<tr>
<td></td>
<td>4 x 100GB volume for SharePoint Content Log</td>
</tr>
<tr>
<td></td>
<td>6 x 50GB volume for temp DB</td>
</tr>
<tr>
<td></td>
<td>1 x 200GB volume for search DB</td>
</tr>
<tr>
<td></td>
<td>1 x 200GB volume for usage DB</td>
</tr>
<tr>
<td></td>
<td>1 x 100GB volume for other SharePoint DB</td>
</tr>
<tr>
<td>Quorum volume</td>
<td>1 x 1GB for the cluster Quorum configuration</td>
</tr>
<tr>
<td>Network</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 x network adapters for management, SQL application, and SQL cluster private connectivity</td>
</tr>
<tr>
<td></td>
<td>2 x virtual adapters for SAN connectivity</td>
</tr>
</tbody>
</table>

Perform the following steps to create DB1 virtual machine for the specifications mentioned in the table:

Steps
1. Create fixed VHD for better IO performance.
   $VHDPath="C:\ClusteredStorage\volume1\HDD\DB1.vhdx"
   New-VHD -SizeBytes 160GB -Path $VHDPath -Fixed

2. Create a DB1 virtual machine.
   $VMPath="C:\ClusteredStorage\volume1\VMs\DB1"
   New-VM -Name SP -Path $VMPath -MemoryStartupBytes 64GB -BootDevice CD -
   SwitchName Management -VHDPath $VHDPath

3. Configure the DB1 virtual machine.
   Set-VMProcessor -VMName DB1 -Count 6
   Add-VMNetworkAdapter -VMName DB1-Name Application
   Add-VMNetworkAdapter -VMName DB1-Name SQLPrivate
Connect-VMNetworkAdapter -VMName DB1 -Name Application -SwitchName Application
Connect-VMNetworkAdapter -VMName DB1 -Name Management -SwitchName Management
Connect-VMNetworkAdapter -VMName DB1 -Name SQLPrivate -SwitchName SQLPrivate
Set-VMNetworkAdapterVlan -VMName DB1 -VMNetworkAdapterName Management -Access -VlanId 25
Set-VMNetworkAdapterVlan -VMName DB1 -VMNetworkAdapterName Application -Access -VlanId 26
Set-VMNetworkAdapterVlan -VMName DB1 -VMNetworkAdapterName SQLPrivate -Access -VlanId 28

4. Add network adapter to DB virtual machine for SAN connectivity using the following command:
   Add-VMNetworkAdapter -VMName DB1 -SwitchName iscsi_switch1
   Add-VMNetworkAdapter -VMName DB1 -SwitchName iscsi_switch2

5. Repeat steps 1 through 4 to create DB2 virtual machine by changing the name to DB2.

**Next steps**
The configuration of SharePoint WFE, APP, and DB servers is now complete.

**Installing Windows Server 2012 R2 operating system in the virtual machine**

To install Windows Server 2012 R2 operating system on the virtual machine, perform the steps provided in the section [Installing Windows Server 2012 R2 operating system in the Dell PowerEdge R630 server](#).

**Connecting volumes on the virtual machines**

To connect the volumes on the virtual machines, perform the steps provided in the section [Connecting volumes on the server](#).

**Initializing and formatting the storage volumes**

The storage volumes are formatted with 64 K allocation unit to maximize the disk performance. Run the following Windows PowerShell commands to initialize and format the storage volumes on all the SharePoint and database servers:

- **NOTE:** Ensure that both the database servers are assigned the same drive letter for a LUN.

1. Get newly added storage volumes.
   ```powershell
   Get-Disk | where-object Isoffline -eq $True
   ```
2. Initialize the disk.
   ```powershell
   Initialize-Disk -Number 1 -PartitionStyle MBR
   ```
3. Partition the disk.
   ```powershell
   New-Partition -DiskNumber 1 -DriveLetter 'E' -UseMaximumSize
   ```
4. Format the volume.
   ```powershell
   Format-Volume -DriveLetter 'E' -FileSystem NTFS -AllocationUnitSize 65536 -Confirm:$false
   ```
5. Repeat steps 1 through 4 for all the storage volumes that are assigned to the server.
Renaming and adding servers to a domain

To rename and add servers to a domain, see the section Adding the Dell PowerEdge R630 servers to the domain.

Load Balancing for SharePoint 2013 SP1

In a test environment, a KEMP LoadMaster (Vers:7.1-26-15) was used to load balance the SharePoint 2013 SP1 infrastructure.

Prerequisites

NOTE: Customers can use their existing load balancing solution to load balance SharePoint 2013 SP1.

Steps

1. Log in to the KEMP admin console and go to Virtual Services → View/Modify Services → Add New.
2. Type the IP address for the service in the Virtual Address field. Enter the port, protocol, and service name, and then click Add this Virtual Service.
3. Ensure that Force L7 check box is selected, but the L7 Transparency check box is clear.
4. Since SharePoint 2013 SP1 does not require persistence anymore, make sure that the Persistence Options is set to None.
5. For the Load method/Scheduling method, select Round-Robin.

   NOTE: Under Real Servers, configure the health checks. Make sure the KEMP LoadMaster set to use HTTPS protocol. This together with Checked Port: 443 and URL: “/owa”. Click the Set URL button to save the settings.
6. Click the Add New button under Real Servers. Add your SharePoint 2013 SP1 client servers. When all servers are added, click the Back button.
7. When the configuration is complete, press the Back button.

The services should then show up as green if the protocols are available.

   NOTE: Ensure that the virtual service IP address of the load balancer has a DNS entry made in the DNS server.

Next steps

This completes the configuration of the KEMP load balancer.

Configuring the SharePoint database servers

About this task

To configure the SharePoint database servers, perform the following tasks:

Steps

1. Install and configure Windows failover clustering. See Installing and configuring Windows cluster.

Connecting volumes on the virtual machines

To connect the volumes on the virtual machines, perform the steps provided in the section Connecting volumes on the server.
Installing and configuring Windows cluster
To configure failover clustering in Windows Server 2012 R2, perform the following:

2. Create cluster. For more information, see Creating cluster.

Installing SQL Server 2014 failover cluster

Prerequisites
Before you begin, ensure that the SQL Server installation media is ready to start the installation.

About this task
Install an SQL Server cluster instance in following sequence:

1. Run the setup in the first node.
2. After the initial installation in the first node, run setup.exe in all the other nodes where you want to install the SQL Server clustered instance.

Installing SQL Server failover cluster in the first node

About this task
Perform the following steps to install SQL Server failover cluster in the first node:

Steps
1. Run Setup.exe as Administrator.
   The SQL Server Installation Center window is displayed.
2. Select Installation in the left pane and click New SQL Server failover cluster installation to start the installation.
3. In the Product key window, enter the product key and click Next >.
4. In the License Terms window, select I Accept the license terms and click Next >.
   The installation wizard runs a validation in the Global Rules window to determine problems and report, if any.
5. In the Microsoft Update window, select Use Microsoft Update to check for updates (recommended) and click Next >.
6. Click Next > to install the failover cluster.
7. In the Install Failover Cluster Rules window, review and resolve the reported errors before you continue with the next steps, if any. Click Next >.
8. In the Setup Role window, select SQL Server Feature Installation and click Next >.
9. In the Feature Selection window, select Database Engine Services and Management Tools — Basic, and then click Next >.
10. In the Feature Rules window, ensure that all the rules have passed, and then click Next >.
11. In the Instance Configuration window, enter the SQL Server instance network name in SQL Server Network Name. Click Next >.
12. In the Cluster Resource Group window, specify SQL Server cluster resource group name and click Next >.
13. In the Cluster Disk Selection window, proceed with the default cluster disk selection and click Next >.
14. In the Cluster Network Configuration window, select the IPv4 network and configure the IP address.
15. In the **Server Configuration** window, enter the respective domain accounts and passwords for the SQL Server agent and SQL Server engine. On the **Collation** tab, click **Customize** and select **Latin1_General** for **Collation Designation**. On the **Collation** tab, select **Accent-sensitive, Kana-sensitive, Width-sensitive** and click **OK**.

16. In the **Server Configuration** tab of the **Database Engine Configuration** window, select **Windows authentication mode** and click **Add** to enter the SQL server administrators. In the **Database Engine Configuration** window, click the **Data Directories** tab and define the paths for disks or path of the root or system databases directory, user databases, log files, backup and TempDB to store the files corresponding to the SQL database. Click **Next >**.

17. In the **Feature Configuration** window, click **Next >**.

18. In the **Ready to Install** window, review all the displayed configurations and click **Install**.

   The wizard displays the installation progress and prompts you with the **Complete** window after the installation is over. This completes the initial installation in the first node.

19. In the **Complete** window, verify that all the items are successfully installed, and then click **Close**. Now, add the other nodes to the SQL Server failover clustered instance.

### Installing SQL Server 2014 failover cluster in the second node

**About this task**

Perform the following steps to install SQL Server failover cluster in the second node:

**Steps**

1. Run the SQL Server setup as Administrator to add SQL Server clustered instance in another node.
2. Select **Installation** in the left pane and click **Add node to a SQL Server failover cluster**.
3. In the **Product key** window, confirm the product key again and click **Next >**.
4. In the **License Terms** window, accept the license terms and click **Next >**.
5. In the **Microsoft Update** window, select **Use Microsoft Update to check for updates (recommended)** and click **Next >**.
6. In the **Node Rules** window, review and resolve the reported errors before proceeding, if any. Click **Next >**.
7. In the **Cluster Nodes Configuration** window, select the SQL Server instance that you want to add to the node.
8. In the **Cluster Network Configuration** window, select the **IPv4** network and configure the IP address.
9. In the **Service Accounts** window, enter and confirm the SQL Server agent and SQL Server engine passwords.
10. In the **Feature Rules** window, review all the displayed rules and click **Next >**.
11. In the **Ready to Add Node** window, confirm the settings and click **Install**.

   The wizard displays the installation progress and prompts you with the **Complete** window after the installation is over.

12. Click **Close** to exit the installation wizard.

**Next steps**

The SQL Server failover cluster installation is now complete.

### Configuring SQL Server 2014

**About this task**

Perform the following steps to get optimum database performance:
Steps
1. Open SQL Server Management Studio, click **New Query** on the menu.
4. Move temp database to another volume. See Moving temp database to another volume.
5. Add additional temp DB data files. See Adding new temp DB data files.

Configuring SQL Server memory settings

Run the following SQL query to set the maximum memory:

```sql
sp_configure 'show advanced options', 1;
GO
RECONFIGURE;
sp_configure 'max server memory', 49152;
GO
RECONFIGURE;
```

Configuring SQL Server MAXDOP settings

Run the following SQL query to set the MAXDOP settings to 1:

```sql
USE Master;
GO
EXEC sp_configure 'show advanced options', 1;
GO
RECONFIGURE WITH OVERRIDE;
EXEC sp_configure 'max degree of parallelism', 1;
GO
RECONFIGURE WITH OVERRIDE;
```

Moving temp database to another volume

About this task
To isolate the temp DB IO operations from other databases, the temp DB is moved to a different volume.

Perform the following steps to move the temp database to another volume:

Steps
1. Open SQL Server Management Studio, click **New Query** on the menu.
2. Run the following SQL query to move the temp DB files.

```sql
USE master;
GO
ALTER DATABASE tempdb
MODIFY FILE (NAME = tempdev, FILENAME = 'E:\SQLData\tempdb.mdf');
GO
ALTER DATABASE tempdb
MODIFY FILE (NAME = templog, FILENAME = 'E:\SQLLog\templog.ldf');
GO
```
3. Restart SQL Server service.
Adding new temp DB data files

Run the following SQL query to add temp DB data file:

```
ALTER DATABASE tempdb ADD FILE ( NAME = N'tempdev2',
FILENAME = N'D:\Data\tempdev2.ndf' , SIZE = 512MB , FILEGROWTH = 256MB)
GO
```

Repeat the query mentioned by changing the name and path of the remaining four volumes.

Configuring prerequisites to install SharePoint 2013 SP1

About this task
Perform the following tasks to install SharePoint Server 2013 SP1:

Steps
1. Download all the prerequisite files for SharePoint Server 2013 SP1 on Windows Server 2012 R2. See [Downloading SharePoint 2013 SP1 prerequisites](#).
2. Run Windows PowerShell scripts to install the prerequisite files. See [Installing SharePoint 2013 SP1 prerequisite files](#).

Downloading SharePoint 2013 SP1 prerequisites

To install the SharePoint 2013 SP1 prerequisites, download the prerequisite files mentioned in the following table and copy the prerequisite files to the SharePoint prerequisiteinstallerfiles.

The following table provides the complete list of SharePoint 2013 SP1 prerequisites files and the downloadable links:

NOTE: Before downloading the prerequisite files into the SharePoint prerequisiteinstallerfiles, create a folder such as, C:\software\SharePoint and store the SharePoint bits in this folder and the prerequisite files in the SharePoint\prerequisiteinstallerfiles folder.

Table 14. SharePoint 2013 SP1 prerequisite files

<table>
<thead>
<tr>
<th>Prerequisite files</th>
<th>Download links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Sync Framework Runtime v1.0 SP1 (x64)</td>
<td><a href="http://download.microsoft.com/download/E/0/0/E0060D8F-2354-4871-9596-DC78538799CC/Synchronization.msi">http://download.microsoft.com/download/E/0/0/E0060D8F-2354-4871-9596-DC78538799CC/Synchronization.msi</a></td>
</tr>
<tr>
<td>Windows Server App Fabric</td>
<td><a href="http://download.microsoft.com/download/A/6/7/A678AB47-496B-4907-B3D4-0A2D280A13C0/WindowsServerAppFabricSetup_x64.exe">http://download.microsoft.com/download/A/6/7/A678AB47-496B-4907-B3D4-0A2D280A13C0/WindowsServerAppFabricSetup_x64.exe</a></td>
</tr>
<tr>
<td>Cumulative Update Package 1 for Microsoft AppFabric 1.1 for Windows Server (KB2671763)</td>
<td><a href="http://download.microsoft.com/download/7/B/5/7B51DBD1-20FD-4BF0-87C7-4714F5A1C313/AppFabric1.1-RTM-KB2671763-x64-ENU.exe">http://download.microsoft.com/download/7/B/5/7B51DBD1-20FD-4BF0-87C7-4714F5A1C313/AppFabric1.1-RTM-KB2671763-x64-ENU.exe</a></td>
</tr>
<tr>
<td>Prerequisite files</td>
<td>Download links</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Microsoft Identity Extensions</td>
<td><a href="http://download.microsoft.com/download/0/1/D/01D06854-CA0C-46F1-ADBA-E8BF6010DCC6/rtm/">http://download.microsoft.com/download/0/1/D/01D06854-CA0C-46F1-ADBA-E8BF6010DCC6/rtm/</a> MicrosoftIdentityExtensions-64.msi</td>
</tr>
<tr>
<td>Microsoft Information Protection and Control Client</td>
<td><a href="http://download.microsoft.com/download/9/1/D/91DA8796-BE1D-46AF-84B9-663AB7811517/setup_msipc_x64.msi">http://download.microsoft.com/download/9/1/D/91DA8796-BE1D-46AF-84B9-663AB7811517/setup_msipc_x64.msi</a></td>
</tr>
<tr>
<td>Microsoft WCF Data Services 5.6</td>
<td><a href="http://download.microsoft.com/download/1/C/A/1CAA41C7-8BB9-42D6-9E11-3C655656DAB1/WcfDataServices.exe">http://download.microsoft.com/download/1/C/A/1CAA41C7-8BB9-42D6-9E11-3C655656DAB1/WcfDataServices.exe</a></td>
</tr>
</tbody>
</table>

**NOTE:** Ensure that after downloading, rename WcfDataServices.exe to WcfDataServices56.exe.

### Installing SharePoint 2013 SP1 prerequisite files

**About this task**
In Windows Server 2012 R2, run the following Windows PowerShell scripts as Administrator:

**Steps**

1. **Install roles and features on Windows Server 2012 R2.**
   
   **NOTE:** To run the Windows PowerShell script, ensure that you provide the Windows 2012 R2 media path in the code and save the code with .ps1 extension.

   ```powershell
   $windows2012R2Path="D:\sources\sxs"
   Import-Module ServerManager
   Add-WindowsFeature Net-Framework-Features –Source $windows2012R2Path
   ```

2. **Install all the prerequisites by running the following script:**
   
   **NOTE:** To run the PowerShell script, ensure that you provide the SharePoint install path in the code.

   ```powershell
   $SharePoint2013Path="C:\software\SharePoint"
   Start-Process "$SharePoint2013Path\PrerequisiteInstaller.exe" -ArgumentList 
   "\SQLNCli:\SharePoint2013Path\PrerequisiteInstallerFiles\sqlncli.msi 
   \IDFX:\SharePoint2013Path\PrerequisiteInstallerFiles\Windows6.1-KB974405-x64.msu 
   \IDFX11:\SharePoint2013Path\PrerequisiteInstallerFiles\MicrosoftIdentityExtensions-64.msi 
   \Sync:\SharePoint2013Path\PrerequisiteInstallerFiles\Synchronization.msi 
   \AppFabric:\SharePoint2013Path\PrerequisiteInstallerFiles 
   \WindowsServerAppFabricSetup_x64.exe 
   \KB2671763:\SharePoint2013Path\PrerequisiteInstallerFiles\AppFabric1.1-RTM-KB2671763-x64-ENU.exe 
   \MSIPCClient:\SharePoint2013Path\PrerequisiteInstallerFiles 
   \setup_msipc_x64.msi 
   \WCFDataServices:\SharePoint2013Path\PrerequisiteInstallerFiles 
   \WcfDataServices.exe 
   \WCFDataServices56:\SharePoint2013Path\PrerequisiteInstallerFiles 
   \WcfDataServices56.exe"
   ```
The Microsoft SharePoint 2013 Products Preparation Tool displays the prerequisite installation is in progress. After the installation is complete, reboot the server.

Next steps
The prerequisite installation needs to be done on all the SharePoint web and application servers.

Installing SharePoint Server 2013 SP1

Prerequisites
After all the prerequisites for installing SharePoint Server 2013 SP1 are installed and configured as specified in Configuring prerequisites to install SharePoint 2013 SP1, install SharePoint 2013 Server SP1. The following tables specify all the user accounts required for SharePoint 2013 SP1:

Table 15. User accounts for SQL Server

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Local rights</th>
<th>Domain rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL_Admin</td>
<td>The SQL Server service account is used to run SQL Server</td>
<td>Local administrator on the SQL Server</td>
<td>Domain user</td>
</tr>
</tbody>
</table>

Table 16. User accounts for SharePoint Server

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Local rights</th>
<th>Domain rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP_Farm</td>
<td>The server farm account is used to set up and perform other administrative tasks.</td>
<td>Local administrator on all the SharePoint Servers</td>
<td>Domain user</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SecurityAdmin and DB_Creator rights on the SQL instance</td>
<td></td>
</tr>
<tr>
<td>Web_App</td>
<td>The pool account is used to run the Web application pools</td>
<td>None</td>
<td>Domain user</td>
</tr>
<tr>
<td>SP_SearchService</td>
<td>The services account is used to run the Service application pool</td>
<td>None</td>
<td>Domain user</td>
</tr>
<tr>
<td>SP_Others</td>
<td>Generic services</td>
<td>None</td>
<td>Domain user</td>
</tr>
<tr>
<td>SP_UserProfiles</td>
<td>User profile</td>
<td>None</td>
<td>Domain user</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replicate Directory Changes permission on the domain.</td>
<td></td>
</tr>
</tbody>
</table>

About this task
Perform the following tasks to install SharePoint Server 2013 SP1.

Steps
1. Copy the following configuration code in Notepad and save the file as config.xml.

   ```xml
   <Configuration>
   <Package Id="sts">
   <NOTE> Specify the SharePoint 2013 SP1 Product ID in the config.xml script, and then copy the file to the SharePoint installation folder.
   ```

   ```xml
   <Configuration>
   <Package Id="sts">
   ```
Run the following Windows PowerShell command to start SharePoint installation.

```powershell
$SharePointpath="C:\software\SharePoint"
Start-Process $SharePointpath\setup.exe -ArgumentList "/config config.xml" -Wait
```

Next steps
Install SharePoint Server 2013 SP1 on all the SharePoint servers.

**Configuring SharePoint Server 2013 SP1**

**About this task**
Complete the following tasks to configure SharePoint Server 2013 SP1:

**Steps**
1. Create a SharePoint farm. See [Creating a SharePoint farm](#).
2. Add servers to the SharePoint farm. See [Adding servers to the SharePoint farm](#).
3. Configure search index in the SharePoint application server. See [Configuring search topology](#).

**Creating a SharePoint farm**

**About this task**
Perform the following steps to create a farm by using Windows PowerShell commands:

**Steps**
1. Load the SharePoint module.

   ```powershell
   Add-PsSnapin Microsoft.SharePoint.PowerShell -ErrorAction SilentlyContinue
   ```

2. Create a SharePoint farm.

   ```powershell
   New-SPConfigurationDatabase -DatabaseName "SharePoint_Config" -DatabaseServer "DatabaseClustername" -AdministrationContentDatabaseName "SharePoint_AdminContent" -Passphrase (ConvertTo-SecureString "EnterPassphrase" -AsPlaintext -Force) -FarmCredentials (Get-Credential)
   ```
At the Window prompt, type the farm administrator domain credentials.

NOTE: You can change the Database Server name and Passphrase as per your environment.

3. Complete the configuration.

Install-SPHelpCollection -All
Initialize-SPResourceSecurity
Install-SPService
Install-SPFeature -AllExistingFeatures
New-SPCentralAdministration -Port <type a port number> -WindowsAuthProvider "NTLM"
Install-SPApplicationContent

NOTE: Ensure to perform steps 1 through 3 only once in the SharePoint farm that hosts the central administration site.

Next steps
The installation of SharePoint Server and creating a SharePoint farm is complete and you can now add the second application server and two WFE servers to the SharePoint farm.

Adding servers to the SharePoint farm

About this task
Perform the following steps to add a server to an existing SharePoint 2013 farm:

Steps
1. Open a PowerShell window as Administrator.
2. Load the SharePoint module.

NOTE: Ensure that you use the same database name and passphrase used of creating a SharePoint farm.

Add-PsSnapin Microsoft.SharePoint.PowerShell -ErrorAction SilentlyContinue
Connect-SPConfigurationDatabase -DatabaseServer "DatabaseClustername" -DatabaseName "SharePoint_Config" -Passphrase (ConvertTo-SecureString "EnterPassphrase" -AsPlainText -Force)
Initialize-SPResourceSecurity
Install-SPService
Install-SPFeature -AllExistingFeatures

Next steps
The servers are now added to the farm and you can distribute the services that run on each server to allocate and distribute the load.

Adding managed accounts

The following section provides the commands to add the domain user account as SharePoint managed account.

$cred = Get-Credential
New-SPManagedAccount -Credential $cred

At the Window prompt, provide the credentials for the SharePoint managed accounts.

Creating a web application

Run the following Windows PowerShell commands to create a web application:

$siteName = “Site Name”
$port = 80
$hostHeader = "Type the host header"
$url = "Type the url"
$appPoolName = "Type the Site Name"
$managedAccount = "domain\username"
$dbServer = "Clustered Database Server Name"
$dbName = "Type the content DB name"
$allowAnonymous = $true
$authenticationMethod = "NTLM"
$ssl = $false


Run the following Windows PowerShell commands to create site collection:
$url = "Type the site url"
$contentDatabase = "Type the content DB name"
$websiteName = "Type the site name"
$template = "STS#0"
$primaryLogin = "domain\user"
$primaryEmail = "user@domain.com"

New-SPSite -Url $url -ContentDatabase $contentDatabase -Name $websiteName -Description $description -Template $template -OwnerAlias $primaryLogin -OwnerEmail $primaryEmail

Run the Windows PowerShell commands again to create additional sites.

**Configuring service application**

Perform the following steps to configure user profile service application in SharePoint 2013 SP1:

2. Create a user profile service application by using Central Administration. See Creating user profile.
3. Set up managed metadata service. See Creating managed metadata service.
4. Enable the session state service. See Enabling session state.

**Configuring search topology**

About this task
To configure SharePoint search topology on the application servers, perform the following steps:

Steps

1. Log in to the first application server and open the Windows PowerShell command as Administrator.
2. Load the Powershell snap-in.

    Add-PSSnapin Microsoft.SharePoint.PowerShell -ErrorAction SilentlyContinue
3. Create a search service application.
   $App1 = "APP1"
   $App2 = "APP2"
   $WFE1 = "WEB1"
   $WFE2 = "WEB2"
   $SearchAppPoolName = "SharePoint_SearchApp"
   $SearchAppPoolAccountName = "Domain\User"
   $SearchServiceName = "SharePoint_Search_Service"
   $SearchServiceProxyName = "SharePoint_Search_Proxy"
   $DatabaseName = "SharePoint_Search_AdminDB"

4. Create a search service application pool.
   $spAppPool = New-SPServiceApplicationPool -Name $SearchAppPoolName -Account $SearchAppPoolAccountName -Verbose

5. Start search service instance on all SharePoint servers.
   Start-SPEnterpriseSearchServiceInstance $App1 -ErrorAction SilentlyContinue
   Start-SPEnterpriseSearchServiceInstance $App2 -ErrorAction SilentlyContinue
   Start-SPEnterpriseSearchServiceInstance $WFE1 -ErrorAction SilentlyContinue
   Start-SPEnterpriseSearchServiceInstance $WFE2 -ErrorAction SilentlyContinue

6. Ensure that the search service is running on all the SharePoint servers.
   Get-SPEnterpriseSearchServiceInstance -Identity $APP1
   Get-SPEnterpriseSearchServiceInstance -Identity $APP2
   Get-SPEnterpriseSearchServiceInstance -Identity $WFE1
   Get-SPEnterpriseSearchServiceInstance -Identity $WFE2

7. Create search service application.
   $ServiceApplication = New-SPEnterpriseSearchServiceApplication -Name $SearchServiceName -ApplicationPool $spAppPool.Name -DatabaseName $DatabaseName

8. Create search service proxy.
   New-SPEnterpriseSearchServiceApplicationProxy -Name $SearchServiceProxyName -SearchApplication $ServiceApplication

9. Create a new topology.
   $ssa = Get-SPEnterpriseSearchServiceApplication
   $newTopology = New-SPEnterpriseSearchTopology -SearchApplication $ssa

10. Create one admin component.
    New-SPEnterpriseSearchAdminComponent -SearchTopology $newTopology -SearchServiceInstance $App1

11. Create two content processing components for HA.
    New-SPEnterpriseSearchContentProcessingComponent -SearchTopology $newTopology -SearchServiceInstance $App1
    New-SPEnterpriseSearchContentProcessingComponent -SearchTopology $newTopology -SearchServiceInstance $App2

12. Create two analytics processing components for HA.
    New-SPEnterpriseSearchAnalyticsProcessingComponent -SearchTopology $newTopology -SearchServiceInstance $App1
    New-SPEnterpriseSearchAnalyticsProcessingComponent -SearchTopology $newTopology -SearchServiceInstance $App2

13. Create two crawl components for HA.
    New-SPEnterpriseSearchCrawlComponent -SearchTopology $newTopology -SearchServiceInstance $App1
    New-SPEnterpriseSearchCrawlComponent -SearchTopology $newTopology -SearchServiceInstance $App2
14. Create two query processing components for HA.

   New-SPEnterpriseSearchQueryProcessingComponent -SearchTopology $newTopology
   -SearchServiceInstance $WFE1
   New-SPEnterpriseSearchQueryProcessingComponent -SearchTopology $newTopology
   -SearchServiceInstance $WFE2

15. Create search components.

   New-SPEnterpriseSearchIndexComponent -SearchTopology $newTopology
   -SearchServiceInstance $APP1 -IndexPartition 0
   New-SPEnterpriseSearchIndexComponent -SearchTopology $newTopology
   -SearchServiceInstance $APP2 -IndexPartition 0
   New-SPEnterpriseSearchIndexComponent -SearchTopology $newTopology
   -SearchServiceInstance $APP2 -IndexPartition 1
   New-SPEnterpriseSearchIndexComponent -SearchTopology $newTopology
   -SearchServiceInstance $APP1 -IndexPartition 1

16. Activate the search topology.

   Set-SPEnterpriseSearchTopology -Identity $newTopology

17. Verify the search topology once the configuration is complete.

   Get-SPEnterpriseSearchTopology -SearchApplication $ssa

Next steps
The creating and configuring a SharePoint 2013 SP1 search service application is now complete and you
can follow these steps to extend support for a bigger size farm.

Creating user profile

About this task
Perform the following steps to create a user profile service application by using the SharePoint Central
Administration website:

Steps
1. Open SharePoint 2013 Central Administration and click Application Management.
2. In the Application Management section, click Manage service applications.
3. On the Manage Service Applications page, click the Service Applications tab to activate the menu.
4. On the menu, click New, and then select User Profile Service Application from the list of service
   applications to create.
5. In the Create New User Profile Service Application dialog box, in the Name field, type a name for the
   user profile service application.
6. In the Application Pool section, select Create a new application pool and type the application pool name.
7. In the Application Pool section, for the Select a security account for this application pool option,
   select Configurable and choose an existing managed account.
8. In the Profile Database section, in the Database Server field, type the name of the database server. In
   the Database Name field, type the database name.
9. In the Profile Database section, for the Database authentication option, select Windows
   authentication (recommended).
10. In the Synchronization Database section, in the Database Server field, type the name of the database server. In the Database Name field, type the name of the database.
11. In the Synchronization Database section, for the Database authentication option, select Windows
   authentication (recommended).
12. In the Social Tagging Database section, in the Database Server field, type the name of the database server. In the Database Name field, type the name of the database.
13. In the Social Tagging Database section, for the Database authentication option, select Windows
   authentication (recommended).
14. In the Profile Synchronization Instance section, select application server name.
15. Retain the other settings to the default values and click Create to create user profile service application.
16. In the Site Naming Format section, select User name (do not resolve conflicts).
17. In the Default Proxy Group section, select Yes.
18. In the Yammer Integration section, select Use on-premise SharePoint social functionality.
19. Click Create.
   The user profile service application is successfully created.
20. Navigate to Application Management → Service Application → Manage Services on server to configure the user profile.
21. Start the User Profile Synchronization Service.
22. At the User Profile Synchronization Service prompt, type the password and click OK.
23. Navigate to Central Administration → Application Management → Manage Service Application → User Profile Service → Configure Synchronization Connection to configure synchronization connection.
24. Click Create New Connection.
25. In the Add new synchronization connection, do the following:
   a. Type the connection name in the Connection Name field.
   b. Select Active Directory in the Type field.
   c. In the Connection Settings section, type the domain name in the Forest name field.
   d. In the Connection Settings section, type the domain user name in the Account name field.
   e. Type the password and port value as 389.
   f. Click Populate Containers.

   ![NOTE: Ensure that the replicate directory changes permission has been granted to the search application domain user name on your domain.]

27. Select User Profile Service.
28. Click Start Profile Synchronization in Synchronization.
29. Select Start Full Synchronization and click OK.

Creating managed metadata service

About this task
Perform the following steps to create and configure the managed metadata service in central administration.

Steps
1. Navigate to Central Administration → Application Management → Manage Service applications.
2. On the Manage Service Applications page, click the Service Applications tab to activate the menu.
3. On the menu, click New, and then select Managed Metadata Service.
4. In the Create New Managed Metadata Service dialog box, in the Name field, type a name, database server name, database name, and select Windows authentication (recommended).
5. In the Application Pool section, select Create a new application pool and type the application pool name.
6. In the Application Pool section, for the Select a security account for this application pool option, select Configurable and select an existing managed account.
7. Click OK to create a managed metadata service.
Enabling session state

Run the following Windows PowerShell command to create a session database and activate the session database service:

Example

`Enable-SPSessionStateService -DatabaseServer <Database Server Name> -DatabaseName <Database Name> -SessionTimeout 120`

Moving content databases to another volume

About this task
Perform the following tasks to move the content databases in your SharePoint 2013 farm by using Windows PowerShell.

Steps
1. Detach the content databases from a web application.
   Load the SharePoint PowerShell snap-in and run the following Windows PowerShell command:

   ```powershell
   Dismount-SPContentDatabase "<ContentDB>"
   ```

2. Detach the content databases from the SQL server by performing the following:
   a. In SQL Server Management Studio, open the source SQL server instance, and then expand the Databases node.
   b. Right-click the content database, click Tasks → Detach. Repeat this step for each content database that you want to move.

3. Move the content databases to a new location by performing the following:
   a. Locate the .mdf and .ldf files for the content databases by using Windows Explorer.
   b. Select the .mdf and .ldf files for the database that you want to move and either copy or move them to the destination directory.

4. Attach the content databases to the same instance of SQL Server by performing the following:
   a. In SQL Server Management Studio, open the destination SQL Server instance.
   b. Right-click the Databases node, click Tasks → Attach.
   c. In the Attach Database dialog box, browse to the location you transferred the .mdf and .ldf files and select the .mdf file for the database that you want to attach. Click OK.

5. Repeat steps 1 through 4 for each content database that you are want to move.

6. Attach the content databases to the web application.
   Load the SharePoint PowerShell snap-in and run the following Windows PowerShell command:

   ```powershell
   Mount-SPContentDatabase "<ContentDB>" -DatabaseServer "<DBServer>" -WebApplication <http://SiteName>
   ```

Next steps
This completes the movement of the content databases to another volume.

Creating user profile

About this task
Perform the following steps to create a user profile service application by using the SharePoint Central Administration website:

Steps
1. Open SharePoint 2013 Central Administration and click Application Management.
2. In the Application Management section, click Manage service applications.
3. On the Manage Service Applications page, click the Service Applications tab to activate the menu.
4. On the menu, click New, and then select User Profile Service Application from the list of service applications to create.
5. In the Create New User Profile Service Application dialog box, in the Name field, type a name for the user profile service application.
6. In the Application Pool section, select Create a new application pool and type the application pool name.
7. In the Application Pool section, for the Select a security account for this application pool option, select Configurable and choose an existing managed account.
8. In the Profile Database section, in the Database Server field, type the name of the database server. In the Database Name field, type the database name.
9. In the Profile Database section, for the Database authentication option, select Windows authentication (recommended).
10. In the Synchronization Database section, in the Database Server field, type the name of the database server. In the Database Name field, type the name of the database.
11. In the Synchronization Database section, for the Database authentication option, select Windows authentication (recommended).
12. In the Social Tagging Database section, in the Database Server field, type the name of the database server. In the Database Name field, type the name of the database.
13. In the Social Tagging Database section, for the Database authentication option, select Windows authentication (recommended).
14. In the Profile Synchronization Instance section, select application server name.
15. Retain the other settings to the default values and click Create to create user profile service application.
16. In the Site Naming Format section, select User name (do not resolve conflicts).
17. In the Default Proxy Group section, select Yes.
18. In the Yammer Integration section, select Use on-premise SharePoint social functionality.
19. Click Create.
   The user profile service application is successfully created.
20. Navigate to Application Management → Service Application → Manage Services on server to configure the user profile.
21. Start the User Profile Synchronization Service.
22. At the User Profile Synchronization Service prompt, type the password and click OK.
23. Navigate to Central Administration → Application Management → Manage Service Application → User Profile Service → Configure Synchronization Connection to configure synchronization connection.
24. Click Create New Connection.
25. In the Add new synchronization connection, do the following:
   a. Type the connection name in the Connection Name field.
   b. Select Active Directory in the Type field.
   c. In the Connection Settings section, type the domain name in the Forest name field.
   d. In the Connection Settings section, type the domain user name in the Account name field.
   e. Type the password and port value as 389.
   f. Click Populate Containers.

   **NOTE:** Ensure that the replicate directory changes permission has been granted to the search application domain user name on your domain.
27. Select User Profile Service.
28. Click Start Profile Synchronization in Synchronization.
29. Select Start Full Synchronization and click OK.
Verifying the deployment

About this task
Once the deployment is complete, you can refer to the following steps to verify that SharePoint 2013 SP1 is installed successfully:

Steps
1. Run the following Windows PowerShell command and ensure that the sharepoint_config status is online.
   
   Get-spfarm

2. Open the Central Administration page from any of the SharePoint servers and make sure the page is accessible.

3. Shut down one of the WFE server and access the web application.

4. Shut down the active database server and access the web application.
Verifying the Microsoft Hyper-V virtualization deployment

After the deployment is complete, you may follow these steps to verify the deployment of Hyper-V virtualization:

1. Create VMs.
2. Migrate VMs across the cluster and check if the migration is progressing without any interruption.
3. Shut down one of the hosts and check if the VMs located on that host are migrating within the cluster.
4. Power off one of the network switches S4048-ON and ensure that the VMs are running without any network loss.
Additional Resources

Dell Services and Dell certified channel partners provide consulting solutions to help customers plan, deploy, and manage even the most advanced and complex SharePoint Server configurations.
Appendix A

- DellTechCenter.com
- Prerequisites for creating Hyper-V clusters: Complete all the prerequisites required for creating hyper-v clusters in VMM, for more information, see Microsoft documentation at https://technet.microsoft.com/en-us/library/gg610630.aspx.
- Reference Architecture - Microsoft SharePoint Server 2013 on Dell PowerEdge R630
- Dell PowerEdge R630
- Dell Equallogic PS6210
- Overview of farm virtualization and architectures for SharePoint 2013
- Best practice configurations for the SharePoint 2013 virtual machines and Hyper-V environment
- Configuring Dynamic Optimization in VMM
Appendix B

The following table represents an example of 4 PowerEdge R630 server cluster along with switches and storage used in the solution.

Table 17. Sample naming and IP addressing scheme example for switches and storage

<table>
<thead>
<tr>
<th>Device Name</th>
<th>OOB Management IP</th>
<th>Hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4048-ON-Top (LAN)</td>
<td>192.168.100.105</td>
<td>S4048-ON-Top</td>
</tr>
<tr>
<td>S4048-ON-Bottom (LAN)</td>
<td>192.168.100.106</td>
<td>S4048-ON-Bottom</td>
</tr>
<tr>
<td>S4048-ON-Top (Storage)</td>
<td>192.168.100.107</td>
<td>S4048-ON-Top</td>
</tr>
<tr>
<td>S4048-ON-Bottom (Storage)</td>
<td>192.168.100.108</td>
<td>S4048-ON-Bottom</td>
</tr>
<tr>
<td>Dell EqualLogic Storage</td>
<td>192.168.100.109</td>
<td></td>
</tr>
</tbody>
</table>

Table 18. Sample naming and IP addressing scheme for Servers

<table>
<thead>
<tr>
<th>Device Name</th>
<th>OOB Management IP</th>
<th>Hostname</th>
<th>Cluster</th>
<th>Live Migration</th>
</tr>
</thead>
<tbody>
<tr>
<td>R630 1 to 4</td>
<td>192.168.100.115 to 192.168.100.119</td>
<td>HyperVHost1 to HyperVHost4</td>
<td>172.168.64.116</td>
<td>172.168.96.116 to 172.168.96.120</td>
</tr>
</tbody>
</table>