Microsoft SharePoint 2010 with Hitachi RBS Provider Adapter

Implementation Guide

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Microsoft SharePoint 2010 with Hitachi RBS Provider Adapter

Implementation Guide

Use these instructions to implement a 200,000-seat Microsoft SharePoint 2010 farm, with Remote BLOB Storage (RBS) for the twenty content databases in the farm. The BLOB store volumes are SAN-attached volumes on Hitachi Virtual Storage Platform using economical SATA volumes.

This document uses Hitachi Data Systems lab naming conventions. Adapt all object naming (SAN zones, machine names, LUN names, and CIFS share names) to fit the deployment environment.

**Tested Solution Components**

These are the major components used in this tested solution.

**Hardware Components**

Table 1 describes the hardware resources used in the SharePoint farm.

**Table 1. Hardware Resources**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitachi Virtual Storage Platform</td>
<td>4 × 8 GB Fibre Channel ports&lt;br&gt;69 GB cache memory&lt;br&gt;376 × 300 GB 10k RPM SAS drives&lt;br&gt;64 × 2 TB 7.2K RPM SATA drives</td>
<td>1</td>
</tr>
<tr>
<td>Hitachi Compute Blade 2000 chassis</td>
<td>2 × 1/10 Gb/sec Ethernet switch modules</td>
<td>1</td>
</tr>
<tr>
<td>Hitachi E55-A2 Server Blade</td>
<td>2 × Intel X5670 core processors&lt;br&gt;72 GB RAM&lt;br&gt;2 × 300 GB 10k RPM SAS hard drives&lt;br&gt;Hitachi 4 Port 1 G Ethernet Mezzanine card&lt;br&gt;2 × Hitachi GVX-CC2N8G2X1 2-port PCIe HBA Fibre Channel cards</td>
<td>4</td>
</tr>
<tr>
<td>Brocade 5340 SAN Switch</td>
<td>80 Gb/sec Fibre Channel ports</td>
<td>2</td>
</tr>
</tbody>
</table>

The physical server configuration of the SharePoint farm is in Figure 1. It shows these components used in the Hitachi Data Systems lab for the following:

- Four server blades
- Virtual Storage Platform
- 1/10 Gb/sec switches
- Fibre Channel switches.
Figure 1

Servers of comparable speed and capacity can be used for this SharePoint farm. See the server hardware details in Table 1.

Software Components

Table 2 shows the operating system and applications installed on each server blade.
Table 2. Server and Role Details for the Server Blades

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Virtual Machine</th>
<th>OS Installed</th>
<th>Applications and Roles Installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blade 4</td>
<td>N/A</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SQL Server 2008 R2 Enterprise</td>
</tr>
<tr>
<td>Blade 5</td>
<td>N/A</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td>Blade 6</td>
<td>N/A</td>
<td>Microsoft Windows 2008 R2 Datacenter SP1</td>
<td>Microsoft Windows 2008 R2 Hyper-V</td>
</tr>
<tr>
<td></td>
<td>SP-WS01</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td></td>
<td>SP-WS02</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td></td>
<td>SP-WS03</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td></td>
<td>SP-WS04</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td>Blade 7</td>
<td>N/A</td>
<td>Microsoft Windows 2008 R2 Datacenter SP1</td>
<td>Microsoft Windows 2008 R2 Hyper-V</td>
</tr>
<tr>
<td></td>
<td>SP-WS05</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td></td>
<td>SP-WS06</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td></td>
<td>SP-WS07</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
<tr>
<td></td>
<td>SP-WS08</td>
<td>Microsoft Windows 2008 R2 Enterprise SP1</td>
<td>Microsoft SharePoint 2010</td>
</tr>
</tbody>
</table>

Note — Microsoft SharePoint 2010 requires the support of an Active Directory environment. In production environments, join the servers to the existing Active Directory domain before the installation of any components of Microsoft SQL Server and Microsoft SharePoint. The architecture used in the Hitachi Data Systems lab included an existing Active Directory installation.

Solution Implementation

These instructions assume that hardware has been previously installed and connected.

To deploy this Microsoft SharePoint Server 2010 solution, follow these steps:

2. Configure the Hitachi Virtual Storage Platform.
3. Configure the physical servers.
4. Enable the Hyper-V role on the Virtualization Hosts.
5. **Deploy the virtual machines.**
6. **Install and configure Microsoft SQL Server 2008 R2.**
7. **Install and configure Microsoft SharePoint Server 2010.**
8. **Create CIFS BLOB stores on the SharePoint client machines (web front ends)**
9. **Install RBS Components**
10. **Create CIFS BLOB Stores**
11. **Enable RBS**

These are the general tasks necessary for a successful deployment. The following text gives details for each step. Your task list might vary from these steps, based on your environment and needs.

For more information about each of these tasks, see additional documentation provided by Hitachi Data Systems and Microsoft:

- Hitachi Storage Navigator online help
- *Hitachi Virtual Storage Platform Provisioning Guide for Open Systems*
- Microsoft *TechNet* articles:
  - "SQL Server and storage (SharePoint Server 2010)"
  - "Deployment for SharePoint 2010"
  - "Overview of RBS (SharePoint Server 2010)"

## Configure Fabric Switch Zones

Configure zones on your fabric switches according to the manufacturer’s guidelines, following these recommended practices:

- Use World Wide Port Name (WWPN) identification for all zoning configuration.
- Connect a minimum of two HBAs per server for multipath high availability.
- Disable all unused switch ports to increase security.
- Configure ports for point-to-point topology.
- Set ports to a specific speed. Do not use the auto negotiate setting.
- Use single initiator zoning.

Table 3 lists the Fibre Channel fabric zoning details used in the Hitachi Data Systems lab environment. Server names and Switch Zone names should be altered for the standards in the environment where this farm is to be deployed.
Table 3. SAN Switch Architecture

<table>
<thead>
<tr>
<th>Server</th>
<th>HBA Ports</th>
<th>Switch Zone</th>
<th>Storage Port</th>
<th>Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blade6-HV</td>
<td>HBA1-1</td>
<td>BS2K_01_B6_HBA1_1_ASE45_36_3B</td>
<td>3B</td>
<td>5300-01</td>
</tr>
<tr>
<td>Blade6-HV</td>
<td>HBA2-2</td>
<td>BS2K_01_B6_HBA2_2_ASE45_36_7B</td>
<td>7B</td>
<td>5300-02</td>
</tr>
<tr>
<td>Blade7-HV</td>
<td>HBA1-1</td>
<td>BS2K_01_B7_HBA1_1_ASE45_36_3B</td>
<td>3B</td>
<td>5300-01</td>
</tr>
<tr>
<td>Blade7-HV</td>
<td>HBA2-2</td>
<td>BS2K_01_B7_HBA2_2_ASE45_36_7B</td>
<td>7B</td>
<td>5300-02</td>
</tr>
<tr>
<td>MSFT-SP-SQL-1</td>
<td>HBA1-1</td>
<td>BS2K_01_B4_HBA1_1_ASE45_36_3A</td>
<td>3A</td>
<td>5300-01</td>
</tr>
<tr>
<td>MSFT-SP-SQL-1</td>
<td>HBA1-2</td>
<td>BS2K_01_B4_HBA2_1_ASE45_36_4A</td>
<td>4A</td>
<td>5300-01</td>
</tr>
<tr>
<td>MSFT-SP-SQL-1</td>
<td>HBA2-1</td>
<td>BS2K_01_B4_HBA1_2_ASE45_36_7A</td>
<td>7A</td>
<td>5300-02</td>
</tr>
<tr>
<td>MSFT-SP-SQL-1</td>
<td>HBA2-2</td>
<td>BS2K_01_B4_HBA2_2_ASE45_36_8A</td>
<td>8A</td>
<td>5300-02</td>
</tr>
<tr>
<td>MSFT-SP-WS-SC</td>
<td>HBA1-1</td>
<td>BS2K_01_B5_HBA1_1_ASE45_36_3A</td>
<td>3A</td>
<td>5300-01</td>
</tr>
<tr>
<td>MSFT-SP-WS-SC</td>
<td>HBA1-2</td>
<td>BS2K_01_B5_HBA1_2_ASE45_36_4A</td>
<td>4A</td>
<td>5300-01</td>
</tr>
<tr>
<td>MSFT-SP-WS-SC</td>
<td>HBA2-1</td>
<td>BS2K_01_B5_HBA2_1_ASE45_36_7A</td>
<td>7A</td>
<td>5300-02</td>
</tr>
<tr>
<td>MSFT-SP-WS-SC</td>
<td>HBA2-2</td>
<td>BS2K_01_B5_HBA2_2_ASE45_36_8A</td>
<td>8A</td>
<td>5300-02</td>
</tr>
<tr>
<td>SANBOOT</td>
<td>HBA1-1</td>
<td>BS2K_01_B4_HBA1_1_ASE45_36_4B</td>
<td>4B</td>
<td>5300-01</td>
</tr>
<tr>
<td>MSFT-SP-WS-SC</td>
<td>HBA1-1</td>
<td>BS2K_01_B5_HBA1_1_ASE45_36_4B</td>
<td>4B</td>
<td>5300-01</td>
</tr>
</tbody>
</table>

Configure the Hitachi Virtual Storage Platform

This is the storage architecture created for the Microsoft SharePoint environment using RBS. It takes into consideration Hitachi Data Systems and Microsoft recommended practices for the deployment of large SharePoint environments.

This document uses **Hitachi Storage Navigator** as the interface to manage the Hitachi Virtual Storage Platform. The specific configuration dictates pool sizing and arrangement of available parity groups on Virtual Storage Platform.

*Dynamic Provisioning Pool Details*

This SharePoint Farm uses four dynamic provisioning pools on Hitachi Virtual Storage Platform. These pools are composed of LDEVs which are created when initially defining the parity groups.

Table 4 provides details on the pool configurations.
### Table 4. Dynamic Provisioning Pools

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>RAID Group Config.</th>
<th>Drive Type</th>
<th>Number of RAID Groups</th>
<th>Pool Capacity (TB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB</td>
<td>RAID-5 (7D+1P)</td>
<td>300 GB 10k RPM SAS</td>
<td>1</td>
<td>7.00</td>
</tr>
<tr>
<td>▪ SQL database files (.mdf and .ndf)</td>
<td></td>
<td>Tier 1 storage for frequently accessed data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ tempDB database files (.mdf)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Dynamic provisioning pool with Hitachi Dynamic Tiering enabled</td>
<td>RAID-5 (7D+1P)</td>
<td>2 TB 7.2k RPM SATA</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>▪ Tier 2 storage for remaining data, using more cost-effective drives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOG</td>
<td>RAID-5 (7D+1P)</td>
<td>300 GB 10k RPM SAS</td>
<td>1</td>
<td>1.87</td>
</tr>
<tr>
<td>▪ SQL database transaction log files (.ldf)</td>
<td>RAID-5 (7D+1P)</td>
<td>Tier 1 storage for frequently accessed data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ tempDB transaction log files (.ldf)</td>
<td>RAID-5 (7D+1P)</td>
<td>Tier 2 storage for remaining data, using more cost-effective drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Dynamic provision pool</td>
<td>RAID-5 (7D+1P)</td>
<td>300 GB 10k RPM SAS</td>
<td>1</td>
<td>1.87</td>
</tr>
<tr>
<td>VMPOOL</td>
<td>RAID-5 (7D+1P)</td>
<td>300 GB 10k RPM SAS</td>
<td>1</td>
<td>1.87</td>
</tr>
<tr>
<td>▪ Guest virtual machines boot and index volumes</td>
<td>RAID-5 (7D+1P)</td>
<td>Tier 1 storage for frequently accessed data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Dynamic provisioning pool</td>
<td>RAID-5 (7D+1P)</td>
<td>Tier 2 storage for remaining data, using more cost-effective drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLOBSTORE</td>
<td>RAID-5 (7D+1P)</td>
<td>2 TB 7.2k RPM SATA</td>
<td>2</td>
<td>5.13</td>
</tr>
<tr>
<td>▪ BLOB stores that are presented to the SharePoint virtual machines.</td>
<td>RAID-5 (7D+1P)</td>
<td>Tier 1 storage for frequently accessed data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Dynamic provisioning pool</td>
<td>RAID-5 (7D+1P)</td>
<td>Tier 2 storage for remaining data, using more cost-effective drives</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Launch Hitachi Storage Navigator**

To launch Hitachi Storage Navigator, do the following:

1. Open Microsoft Internet Explorer.
2. Type the following in the address bar:
   
   http://<SVP IP ADDRESS>/
3. Log on to the SVP console.

   The Hitachi Storage Navigator console opens.

   The links to the wizards referred to in this guide are located on the **General Tasks** pane in the main window.
**Create Dynamic Provisioning Pools**

Follow these steps to create the pools:

1. Open the Create Pools Wizard.
   1. From the **Explorer** panel, click **Pools**. The right panel shows previously configured pools on the storage system.
   2. At the bottom of that window, click **Create Pools**.

2. Add one or more LDEVs to a dynamic provisioning pool.
   1. From the **Pool Type** list, click **Dynamic Provisioning**.
   2. (optional) Click **Enable** for the **Multi-Tier Pool** option (database pool).
   3. Click **Select Pool VOLs**. The **Select Pool VOLs** dialog box opens.
   4. In the new dialog box, click the heading **Drive Type/RPM** to sort the LDEVS.
   5. Select one or more LDEV to add them to the pool.
      - If the pool is a **Multi-Tier Pool**, the Virtual Storage Platform marks each selected LDEV with a tier number. The fastest LDEVs are marked as Tier 1.
         - **Top Tier** — Select an LDEV from the fastest LDEVs available by **Drive Type/RPM**, and then click **ADD**. The selected LDEV moves to the right panel. This positions this LDEV as the top volume in the pool.
         - **Other Tier** — Select the remaining LDEV or LDEVs to be added to the pool and then click **ADD**.
   6. When done adding LDEVs, click **OK**.
      - The **Select Pool VOLs** window closes. Return to the Create Pools Wizard.
   7. Check the quantity of the pool volumes and pool size numbers under **Select Pool VOLs**.

3. Name and set other details for the dynamic provisioning pool.
   1. Type a prefix for the pool name in **Prefix**.
      - The Hitachi Data Systems lab environment uses the prefixes in Table 5.

<table>
<thead>
<tr>
<th>Type</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database pool</td>
<td>SP-DB</td>
</tr>
<tr>
<td>Log pool</td>
<td>SP-LOG</td>
</tr>
<tr>
<td>Virtual machine storage</td>
<td>SP-VMPOOL</td>
</tr>
<tr>
<td>BLOB stores</td>
<td>SP-BLOBSTORE</td>
</tr>
</tbody>
</table>

(2) (Optional) Type the initial number for the first pool name in **Initial Number**.

(3) Expand the **Options** area.
(4) Type the ID in **Pool ID**.

(5) Assign a subscription limit in **Subscription Limit**.
   This sets the percentage of oversubscription allowed for this pool in your environment.

(6) Click a value from the **User-Defined Threshold** list and then click **Add**.
   The **User-Defined Threshold** value determines when to trigger a pool capacity alert.
   The **Selected Pools** pane shows each pool that is being created.

(7) Click **Finish**.
   The **Create Pools** dialog box opens.

(8) (Optional) From the **Create Pools** dialog box, click **Next** to start the following:
   - The creation of LDEVs within the pool. See “Create LDEVs within the Pools.”
   - The selection of the host groups to assign the LDEVs. See “Create Host Groups.”

(9) Click **Apply**.

Repeat these steps to create the other dynamic provisioning pools.

**SharePoint LDEV Details**

The following tables detail the LDEVs created within the pools for the Hitachi Data Systems LAB SharePoint farm.

The pool names, the pool indices (the number in parenthesis in the pool name column), the LDEV numbers, and the storage ports are specific to the Hitachi Data Systems lab SharePoint farm, and should be altered to fit any other SharePoint installation.

The volume sizes are the recommended sizes for a 200,000 seat SharePoint farm.

All LDEVs created from the various pools are thin provisioned on Hitachi Virtual Storage Platform. In practice, the actual space usage for each LDEV is reduced significantly from the maximum capacity of the LDEV, especially for the database volumes. These numbers represent the maximum space available for each component.

Table 6 lists the volumes provisioned for the configuration database.

**Table 6. Configuration Database Volumes**

<table>
<thead>
<tr>
<th>Dynamic Provisioning pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-DB (30)</td>
<td>MSFT-SP-SQL-1</td>
<td>30:00</td>
<td>10</td>
<td>Database</td>
<td>3A/4A/7A/8A</td>
</tr>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-SQL-1</td>
<td>31:00</td>
<td>1</td>
<td>Log</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 7 lists the volumes provisioned for the central administration database.
Table 7. Central Administration Database Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-DB (30)</td>
<td>MSFT-SP-SQL-1</td>
<td>30:01</td>
<td>10</td>
<td>Database</td>
<td>3A/4A/7A/8A</td>
</tr>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-SQL-1</td>
<td>31:01</td>
<td>1</td>
<td>Log</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 8 lists the volumes provisioned for the content databases.

Table 8. Content Databases Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEVs</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-SQL-1</td>
<td>31:02 31:03 31:04 31:05 31:06 31:07 31:08 31:09 31:0A 31:0B 31:0C 31:0D 31:0E 31:0F 31:10 31:11 31:12 31:13 31:14 31:15</td>
<td>40</td>
<td>SharePoint Content Database Logs 00-19</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 9 lists the volumes provisioned for the search administration database.
Table 9. Search Administration Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-DB (30)</td>
<td>MSFT-SP-SQL-1</td>
<td>30:16</td>
<td>10</td>
<td>Database</td>
<td>3A/4A/7A/8A</td>
</tr>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-SQL-1</td>
<td>31:16</td>
<td>2</td>
<td>Log</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 10 lists the volumes provisioned for the crawl database.

Table 10. Crawl Database Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-DB (30)</td>
<td>MSFT-SP-WS-SC</td>
<td>30:17</td>
<td>185</td>
<td>Database</td>
<td>3A/4A/7A/8A</td>
</tr>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-WS-SC</td>
<td>31:17</td>
<td>36</td>
<td>Log</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 11 lists the volumes provisioned for the search property database.

Table 11. Search Property Database Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-DB (30)</td>
<td>MSFT-SP-WS-SC</td>
<td>30:18</td>
<td>60</td>
<td>Database</td>
<td>3A/4A/7A/8A</td>
</tr>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-WS-SC</td>
<td>31:18</td>
<td>15</td>
<td>Log</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 11 lists the volumes provisioned for the tempdb files.

Table 12. tempDB Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>Mapped to Server</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Purpose</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-DB (30)</td>
<td>MSFT-SP-SQL-1</td>
<td>30:50</td>
<td>120</td>
<td>TempDB Databases 0-11</td>
<td>3A/4A/7A/8A</td>
</tr>
<tr>
<td>SP-LOG (31)</td>
<td>MSFT-SP-SQL-1</td>
<td>30:31</td>
<td>320</td>
<td>Log</td>
<td>3A/4A/7A/8A</td>
</tr>
</tbody>
</table>

Table 13 lists the volumes provisioned for the Hyper-V virtual machines and Index volumes.
Table 13. Virtual Machine Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Mapped to VMhost -&gt; Virtual machine</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:20</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS01 boot volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:24</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS01 index volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:21</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS02 boot volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:25</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS02 index volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:22</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS03 boot volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:26</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS03 index volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:23</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS04 boot volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:27</td>
<td>150</td>
<td>BLADE6-HV -&gt; SP-WS04 index volume</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:28</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS05 boot volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:2C</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS05 index volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:29</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS06 boot volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:2D</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS06 index volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:2A</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS07 boot volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:2E</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS07 index volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:2B</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS08 boot volume</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-VMPOOL (35)</td>
<td>30:2F</td>
<td>150</td>
<td>BLADE7-HV -&gt; SP-WS08 index volume</td>
<td>4B/8B</td>
</tr>
</tbody>
</table>

Table 14 lists the volumes used for the BLOB store shares.

Table 14. BLOB Store Volumes

<table>
<thead>
<tr>
<th>Dynamic Provisioning Pool Name (ID)</th>
<th>LDEV</th>
<th>Size (GB)</th>
<th>Mapped to VMhost -&gt; Virtual machine</th>
<th>Storage Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:00</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS01 RBSCDB01</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:01</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS01 RBSCDB02</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:02</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS02 RBSCDB03</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:03</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS02 RBSCDB04</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:04</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS02 RBSCDB05</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:05</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS03 RBSCDB06</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:06</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS03 RBSCDB07</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:07</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS04 RBSCDB08</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:08</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS04 RBSCDB09</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:09</td>
<td>200</td>
<td>BLADE6-HV -&gt; SP-WS04 RBSCDB10</td>
<td>3B/7B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:0A</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS05 RBSCDB11</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:0B</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS05 RBSCDB12</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:0C</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS06 RBSCDB13</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:0D</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS06 RBSCDB14</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:0E</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS06 RBSCDB15</td>
<td>4B/8B</td>
</tr>
<tr>
<td>Dynamic Provisioning Pool Name (ID)</td>
<td>LDEV</td>
<td>Size (GB)</td>
<td>Mapped to VMhost -&gt; Virtual machine</td>
<td>Storage Port</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>-------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:0F</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS07 RBSCDB16</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:10</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS07 RBSCDB17</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:11</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS08 RBSCDB18</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:12</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS08 RBSCDB19</td>
<td>4B/8B</td>
</tr>
<tr>
<td>SP-BLOBSTORE (32)</td>
<td>30:13</td>
<td>200</td>
<td>BLADE7-HV -&gt; SP-WS08 RBSCDB20</td>
<td>4B/8B</td>
</tr>
</tbody>
</table>

Create LDEVs within the Pools

To create a LDEV, follow these steps:

1. Start creating the LDEV or LDEVs.
   1. On the Explorer panel, select Pools.
   2. Click the pool name in which to create one or more LDEVs.
   3. Click Create LDEVs.

2. Enter the size of each LDEV and number of LDEVs to create.
   1. Type a size for each LDEV to be created in LDEV Capacity.
   2. Type the number of LDEVs to be created in Number of LDEVs.

3. Enter the prefix and starting number for the LDEVs.
   1. Type a prefix for the LDEV or LDEVs that you are creating in Prefix.
      Use something descriptive, like SP-CDB-.
   2. Type the starting number in Initial Number using two digits when creating more than one LDEV (for example, 01).
      This number increases by 1 for each LDEV created.

4. Set the pool number and starting number of the LDEV.
   1. Expand the Options section under the LDEV Name section.
   2. In the CU list, click the number of the pool that you are using (for example, 30).
      Use the pool ID to identify the source pool for the LDEVs.
   3. In the DEV list, click the starting number of the LDEV that you are creating.
      You cannot create more than one LDEV with the same CU:DEV combination.

5. Click Add. The created LDEV or LDEVs populate the Selected LDEVs column.

6. Click Finish, and then click Apply.
Create Host Groups

Enable port security on the Hitachi Virtual Server Platform ports used for this solution before creating host groups.

To create a host group using Hitachi Storage Navigator, follow these steps:

1. Start the Create Host Groups Wizard.
   
   (1) From the Explorer panel, click Ports/Host Groups.
   
   (2) At the bottom of the Storage Systems panel, click Create Host Groups. The Create Host Groups wizard opens.

2. Type a name for the group in Host Group Name.

3. From the Host Mode list, click 2C [Windows Extended].

4. In the Available Hosts area, select one or more hosts.

5. In the Available Ports pane, select one or more ports.

6. Click Add.
   
   The Selected Host Groups area is populated with the selected port.

7. Click Finish.
   
   The Create Host Groups window opens.

8. Click Apply.

Map LDEVs to Host Groups

To map an LDEV using Hitachi Storage Navigator software, follow these steps:

1. From the Actions menu, point to Logical Device and then click Add LUN Paths.
   
   The Add LUN Paths window opens.

2. In the Available LDEVs area, select one or more LDEVs.

3. Click Add.
   
   The Selected LDEVs area is populated with the selected LDEVs.

4. Click Next.

5. In the Available Host Groups area, select one or more host groups.

6. Click Add.
   
   The Selected Host Groups pane is populated with the selected host groups.
7. Click Next.
   The Add LUN Paths window opens.

8. Write down the LDEV ID and LUN ID correlations from this window. This information will be used later.

9. Click Finish.
   The Add LUN Paths window opens.

10. Click Apply.

Configure the Physical Servers

Install the appropriate edition of Microsoft Windows Server 2008 R2 on the hosts. Refer to Figure 1 and Table 2 for the operating system versions used on the servers and virtual machines.

After installing the operating system, do the following:

- Download and apply all available operating system patches.
- Verify that the server’s BIOS and the HBA firmware are up to date.

Install any required administrative tools, such as the HBA management software.

When choosing Fibre Channel card drivers, verify that you are using the recommended drivers for the Hitachi Virtual Storage Platform. For a list of currently supported Fibre Channel cards and drivers, see “Interoperability” on the Hitachi Data Systems web site.

Set up mount points on the physical hosts

See the tables in “SharePoint LDEV Details” the mappings used when validating this reference architecture for a SharePoint Farm. Use appropriate names for your network architecture.

To map the presented volumes to mount points on the servers, do the following:

1. On the SQL server, open Windows Explorer, and then click Local Disk (C:)

2. Create the follow folders:

   (1) In the root directory of drive C, create these folders:
   - C:\SQLData
   - C:\SQLLog
   - C:\SQLSystem

   (2) In C:\SQLData, create folders for the following SharePoint mount points:
   - DB LUNs
   - TempDB LUNs
     Example folders include C:\SQLData\SPCDB01 and C:\SQLData\TEMPDB01.
(3) In C:\SQLLog, create folders for the following SharePoint mount points:

- Log LUNs
- TempDB log LUN

Example folders include C:\SQLLog\SPCLOG01 and C:\SQLLog\TEMPLOG.

(4) In C:\SQLSystem, create folders for the following SharePoint mount points:

- Central Administration and log LUNs
- Admin Content and log LUNs
- Search Administration DB and LOG LUNs

Example folders include C:\SQLSystem\SPCADB and C:\SQLSystem\SPCLOG.

3. Initialize Disk.

(1) Open Server Manager.

(2) In the left pane, expand the Storage section, and left click Disk Management.

The central pane in the window populates with information about all of the volumes attached to the system. The new LUNs are marked Offline.

- If the LUNs are not present, right click Disk Management and then click Rescan Disks.
  This refreshes the list of volumes.

The bottom half of the central pane displays the actual disk numbers.

(3) Right-click the heading (the leftmost section of each item) for the first offline disk, and then click Properties.

A new dialog box opens.

The LUN number in the Location line is the actual LUN ID of the volume from the list of LUN IDs that was recorded when the LUNs were mapped. (See “Map LDEVs to Host Groups.”)

(4) Close the Hitachi Open-V Disk Device Properties window.

(5) Right-click the heading of the same disk, and click Online.

The status of the disk changes to Online. Right-click again, and click Initialize Disk.


(1) Right click the Information section for the selected disk, and then click New Simple Volume…

The New Simple Volume Wizard opens.

(2) Click Next and then Next.

(3) On the Assign Drive Letter or Path page of the wizard, Click Mount in the following empty NTFS folder, and then click Browse.

A selection window opens.

(4) Click the folder for this LUN number.

The path to that location populates the field to the left of the Browse button.

(5) Click Next.
(6) Click **Format this volume with the following settings** and then set the parameters from Table 15:

**Table 15. Disk Volume Settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>File system</td>
<td>NTFS</td>
</tr>
<tr>
<td>Allocation unit size</td>
<td>64 KB</td>
</tr>
<tr>
<td></td>
<td>The 64 KB allocation unit size is recommended for Microsoft SQL Server volumes.</td>
</tr>
<tr>
<td>Volume Label</td>
<td>Type the volume label.</td>
</tr>
</tbody>
</table>

(7) Verify that the **Perform a quick format** checkbox is selected, and then click **Next**.

(8) Click **Finish**.

The window closes, and the LUN formats and mounts.

5. Create a folder in the root directory of the mount point. For example, create the directory *SQLDATA*. This folder is for storing SQL files.

Repeat these steps for every LUN on the system.

Repeat these steps on the SharePoint Search Crawl server for consistency.

---

**Note** – The LUNs mapped to the Hyper-V hosts are used as pass-through disks. Hyper-V assigns these to the virtual machines in “Enable the Hyper-V Role on the Virtual Hosts.”

---

**Enable the Hyper-V Role on the Virtual Hosts**

Follow these steps to enable the Hyper-V role on the virtual hosts:

1. Open Server Manager.

2. Click **Roles**. To the right, click **Add Roles Wizard**.

   The Add Roles wizard opens.

3. Click **Next**.

   A list of available roles displays.

4. Select the **Hyper-V** check box, and then click **Next**.

5. Answer the questions for the system’s configuration options, and **do not select** any network adapters. Selecting adapters adds unnecessary complexity to the network configuration done later. When finished, click to confirm those answers.

   Microsoft Windows then reboots twice and installs the hypervisor. When you are able to log on to the system, Microsoft Hyper-V is installed.
6. Run **Windows Update** on the machine.

7. From the **Administrative tools**, open the **Hyper-V Manager**. Click on the **Virtual Network Manager** option in the **Actions** panel. The **Virtual Network Manager** dialog box opens.

Hyper-V uses virtual network switches. These may have a dedicated connection to a physical network interface. From that, virtual NICs (VNIC) may be assigned to the host system and to virtual machines. The specific configuration is dependant on the network configuration for the individual host and available network adapters.

In the lab environment, each of the two Hyper-V hosts contained six 1G Ethernet adapters, as follows:

- One adapter is dedicated to host access.
- Four adapters are available to the virtual machines.

Each virtual machine has two VNICs assigned to them, as follows:

- One for SQL server access
- One for Web services

All VNICs IP addresses are in a single /24 subnet.

Refer to the Microsoft **TechNet** article [Hyper-V](https://technet.microsoft.com/en-us/library/hh831788.aspx) for more details on the deployment and operation of Hyper-V on Microsoft Windows Server 2008 R2.

**Deploy the Virtual Machines**

You have various options to deploy the virtual machines within a Microsoft Hyper-V environment. Use the best method for your environment when deploying the virtual machines on the two Hyper-V enabled hosts.

In the testing lab farm, there are four virtual machines on each Hyper-V host, each connected to two Hyper-V virtual networks, as follows:

- One for SQL traffic
- One for web traffic (using Microsoft Network load balancing).

All disk volumes are pass-through disks.

For more information about setting up Microsoft Hyper-V to deploy virtual machines, see [Hyper-V](https://technet.microsoft.com/en-us/library/hh831788.aspx) on Microsoft **TechNet**. Take special note of these sections:

- Getting Started
- Planning
- Installation
- Configuration

Run the **Hyper-V Best Practices Analyzer** to verify appropriate configuration for your environment. For more information, see [Hyper-V Best Practices Analyzer](https://technet.microsoft.com/en-us/library/hh831788.aspx).
Install and Configure Microsoft SQL Server 2008 R2

Keep these requirements in mind while installing and configuring Microsoft SQL Server 2008 R2 for Microsoft SharePoint 2010 deployments.

As part of the SQL 2008 R2 install, ensure that the following collation settings are selected to suit SharePoint database use:

- Latin1_General
- Case Insensitive (CS)
- Accent Sensitive (AS)
- Kana Sensitive (KS)
- Width Sensitive (WS)

You may use the default location for the database and log files at this time. After completing the installation, move the tempdb databases to Hitachi Virtual Storage Platform, as described in “Configure SQL Server 2008 R2.”

Use the Microsoft SQL Server Best Practices Analyzer to analyze and identify collation selection and other best practices. For more information, see Microsoft SQL Server 2008 R2 Best Practice Analyzer.

For more information, see the Microsoft TechNet article How to: Install SQL Server 2008 R2 (Setup).

Configure SQL Server 2008 R2

In the Hitachi Data Systems lab environment, the following are mapped:

- 83 LUNs mapped from the database and log pools to the primary SQL server
- 36 LUNs mapped from the VMPOOL and BLOBSTORE pools to the two Hyper-V hosts
- 4 LUNs mapped to the Search Crawl server.

Refer to the tables in “Create LDEVs within the Pools” and “Set up mount points on the physical hosts” before installing Microsoft SQL Server.

“Databases and Transaction Log Files” and “tempdb Files” describe storage configuration requirements for Microsoft SQL Server when hosting the databases, logs, and tempdb files on the Hitachi Virtual Storage Platform.

Databases and Transaction Log Files

When provisioning the storage for the SQL databases and logs, establish an allocation strategy using these configuration parameters:

- SIZE
- FILEGROWTH
- MAXSIZE
For the database, the values of SIZE, FILEGROWTH, and MAXSIZE are determined by expected growth.

- The minimum file size for all of the databases was changed to 420 MB. The minimum file size for the logs was changed to 42 MB. Use a multiple of 42 MB when using Hitachi Dynamic Provisioning and Hitachi Dynamic Tiering because the page size is 42 MB.
- The file auto extends in size by the amount specified in FILEGROWTH when the currently allocated space for the file runs out. Use a value for FILEGROWTH that is a multiple of 42 MB.
- The file growth stops if it reaches the amount specified in MAXSIZE. This keeps your application from exceeding the capacity of the LUN.

Pay special attention to the SIZE and FILEGROWTH values given to log files. Small sizes might affect system performance. The log files may grow to a large size in many small increments. This can slow database startup as well as the log backup and restore operations for a given SQL server instance. Microsoft recommends the following:

- Assign log files a SIZE value close to the final size required (not initial).
- Have a relatively large FILEGROWTH value. Remember to use a multiple of 42 MB for implementations that use Hitachi Dynamic Provisioning or Hitachi Dynamic Tiering.

Use the TSQL code samples in Figure 2 and Figure 3 to create the required databases on your SQL Server installation.

Execute the SQL statements in Figure 2 using the query window opened by the New Query option in Microsoft SQL Server 2008 R2 Management Studio.

```
CREATE DATABASE <name of database> ON PRIMARY (  
    NAME = <logical database name>,  
    FILENAME = <OS location and name of database>,  
    SIZE = <initial size of the database file in kb/mb/gb/tb>,  
    MAXSIZE = <the size limit of the database file in kb/mb/gb/tb>,  
    FILEGROWTH = <the database growth increment in kb/mb/gb/tb>)  
LOG ON (  
    NAME = <logical log file name>,  
    FILENAME = <OS location and name of log file>,  
    SIZE = <initial size for log file in kb/mb/gb/tb>,  
    MAXSIZE = <the size limit of the log file in kb/mb/gb/tb>,  
    FILEGROWTH = <specifies the log growth increment in kb/mb/gb/tb>)
```

Figure 2
For the implementation described in this installation guide, the parameters in Figure 3 were used, replacing the placeholder variables with lab-specific parameters shown in red:

```
CREATE DATABASE COL01 ON PRIMARY (  
    NAME = COL01,  
    FILENAME = 'C:\SQLDBMNT\COL01DB\DB\COL01.mdf',  
    SIZE = 420mb,  
    MAXSIZE = 200000mb,  
    FILEGROWTH = 42mb)  
LOG ON (  
    NAME = COLO1_LOG,  
    FILENAME = 'C:\SQLLOGMNT\COL01LOG\COL01.ldf',  
    SIZE = 420mb,  
    MAXSIZE = 200000mb,  
    FILEGROWTH = 42mb)
```

Figure 3

Use the instant file initialization feature of Microsoft SQL Server for the following:

- Faster and optimized data file creation and growth
- Faster execution of database or file group restore operations

Instant file initialization reclaimes used disk space without filling that reclaimed space with zeros (create zero pages). Instead, disk content is overwritten as new data is written to the files. This Microsoft SQL Server feature works in conjunction with Hitachi Dynamic Provisioning. For more information, see Database File Initialization on SQL Server 2008 Books Online.

### tempdb Files

The default location for tempdb files in Microsoft SQL Server is on drive C of the server. Use the ALTER DATABASE TSQL command to modify the tempdb file location to the LUN provisioned for that purpose on Hitachi Virtual Storage Platform. To do this, execute the SQL statements in Figure 4 using the query window opened by the New Query option in SQL Server 2008 R2 Management Studio.

```
USE tempdb
GO

ALTER DATABASE tempdb  
MODIFY FILE (NAME='tempdev', FILENAME= <OS location and name of tempdb>,  
SIZE = <initial size of the database file in kb/mb/gb/tb>,  
MAXSIZE = <the size limit of the database file in kb/mb/gb/tb>,  
FILEGROWTH = <the database growth increment in kb/mb/gb/tb>)

ALTER DATABASE tempdb  
MODIFY FILE (NAME='templog', FILENAME= <OS location and name of tempdb>,  
SIZE = <initial size of the log file in kb/mb/gb/tb>,  
MAXSIZE = <the size limit of the log file in kb/mb/gb/tb>,  
FILEGROWTH = <the log growth increment in kb/mb/gb/tb>)
```

Figure 4
For the implementation described in this installation guide, the parameters in Figure 5 were used, replacing the placeholder variables with lab-specific parameters shown in red:

```
USE tempdb
GO

ALTER DATABASE tempdb
MODIFY FILE (NAME='tempdev', FILENAME= 'C:\SQLDBMNT\TempDB\tempdb.mdf',
SIZE=420MB, MAXSIZE=120GB, FILEGROWTH=42MB)

ALTER DATABASE tempdb
MODIFY FILE (NAME='templog', FILENAME= 'C:\SQLLOGMNT\TempLog\templog.ldf',
SIZE=42MB, MAXSIZE=20GB, FILEGROWTH=42MB)
```

Figure 5

*Note* — Set the file sizes and growth increment to a multiple of 42MB to align sizes used in the databases with the page size of the Hitachi Virtual Storage Platform.

This locates the files on a LUN that is assigned to the SQL server for the tempdb file.

Create an additional tempdb file for each CPU core in each server. The Hitachi Data Systems test environment had 12 CPU cores on the test server.

For the implementation described in this installation guide, the parameters shown in red in Figure 6 replaced the placeholder variables:

```
USE tempdb
GO

ALTER DATABASE tempdb
ADD FILE (NAME= tempdev1', FILENAME= 'C:\SQLDBMNT\TempDB1\tempdb1.ndf ',
SIZE=420MB, MAXSIZE=120GB, FILEGROWTH=42MB)

ALTER DATABASE tempdb
ADD FILE (NAME= tempdev2', FILENAME= 'C:\SQLDBMNT\TempDB2\tempdb2.ndf ',
SIZE=420MB, MAXSIZE=120GB, FILEGROWTH=42MB)

ALTER DATABASE tempdb
ADD FILE (NAME= tempdev3', FILENAME= 'C:\SQLDBMNT\TempDB3\tempdb3.ndf ',
SIZE=420MB, MAXSIZE=120GB, FILEGROWTH=42MB)
```

Figure 6

For more information about deploying using DBA-created databases, see the Microsoft *TechNet* article *“Deploy by using DBA-created databases (SharePoint 2010).”*

For more information about configuring Microsoft SQL Server for SharePoint 2010 deployments, see the Microsoft *TechNet* article *“SQL Server and storage (SharePoint 2010).”*
Install and Configure Microsoft SharePoint Server 2010

This implementation guide concentrates on the tasks related to the storage configuration for Microsoft SharePoint 2010 deployments. For more information about how to install and configure each of the components for your deployment, see the Microsoft TechNet article “Deployment for SharePoint Server 2010.”

Create CIFS BLOB Stores on the SharePoint Client Machines (Web Front Ends)

Map the LDEVs that are intended to contain the Blob stores to the Hyper-V hosts that contain the virtual machines serving the SharePoint web front-end role. In the environment referenced in this document, there are 8 virtual machines running this role on two Hyper-V hosts. There are 20 LDEVs created for the 20 content databases (enabled databases for RBS), with 10 mapped to each Hyper-V host.

The volumes are distributed in the lab environment as pass-through disks to the four virtual machines on each Hyper-V host. Table 16 details how the BLOB store pass-through disks were mapped.

<table>
<thead>
<tr>
<th>Hyper-V Host</th>
<th>Virtual Machine Name</th>
<th>BLOB Store Name</th>
<th>CIFS Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLADE 6-HV</td>
<td>SP-WS01</td>
<td>RBSCDB01</td>
<td>\SP-WS01\RBSCDB01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB02</td>
<td>\SP-WS01\RBSCDB02</td>
</tr>
<tr>
<td>BLADE 6-HV</td>
<td>SP-WS02</td>
<td>RBSCDB03</td>
<td>\SP-WS02\RBSCDB03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB04</td>
<td>\SP-WS02\RBSCDB04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB05</td>
<td>\SP-WS02\RBSCDB05</td>
</tr>
<tr>
<td>BLADE 6-HV</td>
<td>SP-WS03</td>
<td>RBSCDB06</td>
<td>\SP-WS03\RBSCDB06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB07</td>
<td>\SP-WS03\RBSCDB07</td>
</tr>
<tr>
<td>BLADE 6-HV</td>
<td>SP-WS04</td>
<td>RBSCDB08</td>
<td>\SP-WS04\RBSCDB08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB09</td>
<td>\SP-WS04\RBSCDB09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB10</td>
<td>\SP-WS04\RBSCDB10</td>
</tr>
<tr>
<td>BLADE 7-HV</td>
<td>SP-WS05</td>
<td>RBSCDB11</td>
<td>\SP-WS05\RBSCDB11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB12</td>
<td>\SP-WS05\RBSCDB12</td>
</tr>
<tr>
<td>BLADE 7-HV</td>
<td>SP-WS06</td>
<td>RBSCDB13</td>
<td>\SP-WS06\RBSCDB13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB14</td>
<td>\SP-WS06\RBSCDB14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB15</td>
<td>\SP-WS06\RBSCDB15</td>
</tr>
<tr>
<td>BLADE 7-HV</td>
<td>SP-WS07</td>
<td>RBSCDB16</td>
<td>\SP-WS07\RBSCDB16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB17</td>
<td>\SP-WS07\RBSCDB17</td>
</tr>
<tr>
<td>BLADE 7-HV</td>
<td>SP-WS08</td>
<td>RBSCDB18</td>
<td>\SP-WS08\RBSCDB18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB19</td>
<td>\SP-WS08\RBSCDB19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RBSCDB20</td>
<td>\SP-WS08\RBSCDB20</td>
</tr>
</tbody>
</table>
Volumes on each virtual machine (SP-WS0X) are mapped as UNC/CIFS shares using “Advanced Sharing.” Full control was granted for the SharePoint farm account. For example, the RBSCDB01 share (the BLOB store for SPCDB01) is mapped as \SP-WS01\RBSCDB01 for the farm.

The naming in the laboratory environment SharePoint 2010 farm are provided as examples to show the structure and distribution of LUNs to the various machines. Use naming appropriate for your environment.

Install RBS Components

The RBS infrastructure is comprised of two different installation packages, the Microsoft RBS Feature Pack for SQL server 2008 (X64 version), and the RBS Provider Adapter for Hitachi Storage.

The Microsoft RBS Feature Pack install creates the appropriate tables and stored procedures within a specified database to support RBS. Copy the packages to a location, such as drive C, on every server in the farm.

Prepare SQL databases for RBS

Enable master key encryption in the content databases. Use the TSQL statement in Figure 7 using Microsoft SQL Server 2008 R2 Management Studio.

```sql
USE [<YourDatabaseName>]
CREATE MASTER KEY ENCRYPTION BY PASSWORD = '<YourPassword>';
GO
```

Figure 7

Execute this TSQL command against every database that supports RBS. (For SharePoint 2010, execute this against content databases only. It is not necessary to execute this against other SharePoint 2010 databases.)

Install the Microsoft RBS Feature Pack on the SQL server

To install the Microsoft RBS Feature Pack on the SQL server, do the following:

1. Open a command prompt on the SQL server
2. Log on to the SQL server as the database owner, typically the SharePoint farm account.
3. Navigate to the folder where RBS.msi resides.
4. Execute the command in Figure 8 to install RBS features to the database.

```cmd
msiexec /lvx* \LOGS\rbs_enable_SPCDB01.log /q /i rbs.msi ADDLOCAL=EnableRBS
DBINSTANCE="<YourDatabaseServerName>" DBNAME="<YourDatabaseName>"
```

Figure 8

Execute this msiexec command on the SQL server once for every RBS-enabled content database. (Do not run this on the SharePoint administration databases.)
The log file name specified in the command (in this example, “\LOGS\rbs_enable_SPCDB01.log”) need to be changed for each execution to avoid overwriting the previous log file on the next execution.

Verify the install by looking in each log file. Check for the presence of several new tables written into the specified database with the “mssqlrbs_resources” name prefix.

**Install the Microsoft RBS Feature Pack on the Client Machines**

To install the Microsoft RBS Feature Pack on the web and application servers, do the following:

1. Open a command prompt.
2. Navigate to the path where RBS.MSI resides.
3. Execute the command in Figure 9 to install RBS binaries to the hosts.

   ```
   msiexec /lvx* rbs_install.log /q /i rbs.msi
   ADDLOCAL=ServerScript,Client,Maintainer
   ```

   **Figure 9**

   Repeat this process for every web or application server in your farm.

**Install RBS Package on the Client Machines**

Install Microsoft Windows® PowerShell Snap-in for Hitachi Storage on every web and application server. Included with RBS Provider for Hitachi Storage are two .msi files that require installation.

1. Execute the .msi file for Microsoft Windows PowerShell Snap-in for Hitachi Storage.

   ```
   Hitachi-pssnapin-setup(04.0.5)-(x64).msi
   ```

2. Execute the RBS Admin console installer.

   ```
   Hitachi-rbsprovider-setup(01.2.1)-(x64).exe
   ```

   When this installer finishes, the icon to launch this program displays on the desktop.
Use RBS Provider for Hitachi Storage to Create and Register BLOB Stores

To create and register BLOB stores, do the following:

1. Open RBS Provider for Hitachi Storage. The console window opens, as shown in Figure 10

   ![Figure 10](image)

2. Click on the RBS Providers tree to expand the tree. You will use this later.

3. Right-click RBS Providers and click Set Database connection data. The dialog box in Figure 11 opens.

   ![Figure 11](image)
4. Type the database server name and the database name of the first database for which this system stores BLOBs.

This process connects this Admin console to the named database. It inserts the BLOB store name into the RBS table in the database.

5. Click Test & Apply.

6. In tree under RBS Providers, select CIFS 1.0. See Figure 12.

![Hitachi RBS Admin Console - [Console Root\Hitachi RBS\RBS Providers\CIFS 1.0]](image)

**Figure 12**

Create CIFS BLOB Stores

To create CIFS BLOB stores, do the following:

1. In the Actions pane, click Create CIFS Blob Store. A new dialog box opens.

2. Type the name in BLOB Store Name and 99999 in BLOB Pool Capacity (#BLOBs). Select the Set as Default checkbox, and click Next.

3. Select the Use UNC Path checkbox, and type the path to the share that you created earlier to the BLOB store for this database. Click Next.

4. Clear the Set Store Credentials checkbox, and click Next.

5. Click Create. A completion dialog box confirms the completion of the BLOB store record in the database.

Repeat these steps for each content database on every web server.

When finished, there is an icon for Launch Hitachi RBS Admin Console on the desktop. It has details about the mapped RBS store to the last mapped content database in the middle panel.
Enable RBS

Enable RBS in each database after creating the BLOB store once in each content database. Use SharePoint 2010 Management Shell, which was installed with Microsoft SharePoint 2010.

When running SharePoint 2010 Management Shell, use the Run as administrator option.

Type the commands in Figure 13 at the PowerShell prompt:

```powershell
$cdb = Get-SPContentDatabase <SharePoint database name>
$rbss = $cdb.RemoteBlobStorageSettings
$rbss.SetActiveProviderName($rbss.GetProviderNames()[0])
$rbss.Enable()
```

**Figure 13**

Type `$rbss <enter>` at the prompt to confirm that the setting is complete. Figure 14 shows the command flow and appropriate feedback with the SPCDB01 database connected to the RBSCDB01 BLOB store.

**Figure 14**

Repeat the PowerShell commands for all of your content databases.
Set up the RBS Maintainer Tasks

The RBS Maintainer executable requires connection strings manually entered into a configuration file to find the RBS databases. Run the maintainer through the Windows Task Scheduler.

The configuration file `Microsoft.Data.SqlRemoteBlobs.Maintainer.exe.config` installs with the Microsoft RBS Feature Pack installation in this location: `C:\Program Files\Microsoft SQL Remote Blob Storage 10.50\Maintainer`.

By default, the connection strings are encrypted in the default configuration file. Remove everything between `<connectionstrings>` and `</connectionstrings>`, as shown in Figure 15.

```
<configuration>
  <connectionStrings>
    <RemoteBlobStorage>
      <Logging>
        <add key="ConsoleLog" value="0" />
      </Logging>
    </RemoteBlobStorage>
  </connectionStrings>
</configuration>
```

Figure 15

Create a connection string for each content database that you have RBS enabled on, as shown in Figure 16.

```
<configuration>
  <connectionStrings>
    <add name="first connection string name" connectionString="Data Source=<SQL server name>;Initial Catalog=<first content database name>;Integrated Security=True;Application Name="Remote Blob Storage Maintainer";" providerName="System.Data.SqlClient" />
    <add name="second connection string name" connectionString="Data Source=<SQL server name>;Initial Catalog=<second content database name>;Integrated Security=True;Application Name="Remote Blob Storage Maintainer";" providerName="System.Data.SqlClient" />
    <add name="third connection string name" connectionString="Data Source=<SQL server name>;Initial Catalog=<second content database name>;Integrated Security=True;Application Name="Remote Blob Storage Maintainer";" providerName="System.Data.SqlClient" />
  </connectionStrings>
</configuration>
```

Figure 16

When complete, there should be a connection string for every content database in your farm. Copy this file so that it overwrites the old file in each client machine’s maintainer directory.
**Schedule RBS Maintainer tasks**

Run a maintainer task on the web servers for each BLOB store for each directly connected web server.

For example, in the Hitachi Data Systems lab, the web server SP-WS01 has mapped BLOB stores for SPCDB01 and SPCDB02. Two maintainer tasks, one for each database and BLOB store mapping, are created on that server.

To create a basic task, do the following:

1. Type the **Name** of the title of the task and the **Description** for the task. When finished, click **Next**.

   ![Create Basic Task Wizard](image)

   **Create Basic Task Wizard**

   Use this wizard to quickly schedule a common task. For more advanced options or settings such as multiple task actions or triggers, use the Create Task command in the Actions pane.

   **Name:** RESCDB01 Maintainer
   **Description:** RBS Maintainer Task for SPCDB01

   ![Figure 17](image)

2. Select a daily trigger and click **Next**.
   - Run the maintainer tasks once a day, when server load is low.

3. Set the start time 2 hours apart from any other Maintainer task. Click **Next**
   - Do not run maintainer tasks at the same time.

4. On the **Action** screen, verify that the **Start a program** button is selected and click **Next**.

5. In **Program/Script**, type the maintainer executable name:

   ```
   C:\Program Files\Microsoft SQL Remote Blob Storage 10.50\Maintainer\Microsoft.Data.SqlRemoteBlobs.Maintainer.exe
   ```
6. In Add arguments (optional), type in the following with the connection string name that was created in the Microsoft.Data.SqlRemoteBlobs.Maintainer.exe.config.

   ConnectionStringName <connection string name> - Operation GarbageCollection ConsistencyCheck ConsistencyCheckForStores - GarbageCollectionPhases rdo - ConsistencyCheckMode r - TimeLimit 120


8. Click Finish.

Repeat this process to create a maintainer for each BLOB store on the web server where the BLOB store is mounted and shared.

In the Hitachi Data Systems lab, the RBS store volumes are distributed to the entire web front ends to balance the workload. When active, a sizable percentage of traffic to and from the BLOB stores is local to each web front end server. All of the RBS maintainer tasks are operating locally, further minimizing network traffic.

In the farm installed in the lab environment, half of the web front ends handle two BLOB stores and the associated maintainer tasks. The other half of the web front ends handle three BLOB stores and the associated maintainer tasks.

Once completing these are created, your SharePoint farm is ready to go live.
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