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Preparing for installation

Hardware requirements

Table 1 Hardware requirements

<table>
<thead>
<tr>
<th>Role</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD/DNS server</td>
<td>Windows Server 2012</td>
</tr>
<tr>
<td>Cluster node</td>
<td>HP ProLiant DL380 G7 (two GE NICs)</td>
</tr>
<tr>
<td>Storage server</td>
<td>HP P2000 G3 FC/iSCSI</td>
</tr>
<tr>
<td>Switch</td>
<td>H3C S5500EI</td>
</tr>
</tbody>
</table>

Software requirements

Table 2 Software requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Version requirements</th>
</tr>
</thead>
</table>
| OS     | • Microsoft Windows Server 2012 DataCenter  
         • Microsoft SQL Server 2012 Enterprise  
         **NOTE:**  
         This installation guide is applicable to Microsoft Windows Server 2012 R2 Standard  
         and Microsoft SQL Server 2012 Standard, which also support clustering. |
| IMC    | • iMC PLAT 7.0 (E0202)  
         • iMC EIA 7.0 (E0203)  
         • iMC CAMS 7.0 (E0201)  
         • iMC EAD 7.0 (E0202) |

Prerequisites

Before you configure failover clustering settings, perform the following tasks:

1. Set up a SAN and configure the storage server:
   a. Partition the storage into three logical volumes:
      - Cluster quorum disk (512 MB).
      - Distributed transaction coordinator (DTC) disk (1 GB).
      - Data disk to install SQL Server and IMC (100 GB).
   b. Assign logical unit numbers to the logical volumes.
   c. Map the logical volumes to Node 1 and Node 2 at a specific port.

You can change the size of the data disk based on the number of authentication users. For more information, see the installation guides for IMC.

This guide uses the HP P2000 G3 FC/iSCSI as the storage server. For more information about installing and configuring the server, see the documentation for the server.

2. Install the AD/DNS server.
The AD server is the core of failover cluster management and ensures correct operation of the cluster. To guarantee high availability of the AD server, see “AD High Availability Solution for IMC Failover Clustering”.

As a best practice, use one server to provide both AD and DNS services. For the cluster nodes to join the AD domain, do not specify another DNS server in the network as the primary DNS server on the NIC of the AD server. For more information about installing the AD and DNS server, see the documentation for the server.

3. Configure routes and gateways on the switches for the servers to reach each other.

Network requirements

As shown in Figure 1:
- Use two servers that each has two GE NICs to form the failover cluster.
- Use Windows Server 2012 DataCenter running on a VM to provide AD and DNS services for the failover cluster.
- Use a storage server to provide shared storage services for the failover cluster.
- Use Switch 1 to provide LAN networking services for the cluster. Use Switch 2 to provide SAN networking services for the cluster. Assign the LAN-facing NICs of the cluster nodes to a VLAN, and assign the SAN-facing NICs of the cluster nodes and the storage server to another VLAN.

Figure 1 Network diagram

<table>
<thead>
<tr>
<th>Table 3 IP address assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>AD/DNS server</td>
</tr>
</tbody>
</table>
| Node 1 | • Service IP: 192.168.0.17  
• Storage IP: 100.88.1.17 |
<p>| Node 2 | • Service IP: 192.168.0.18 |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>IP addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Storage IP: 100.88.1.18</td>
</tr>
<tr>
<td>iSCSI storage server</td>
<td>100.88.1.23</td>
</tr>
<tr>
<td>Cluster IP</td>
<td>192.168.0.15</td>
</tr>
<tr>
<td>DTC disk</td>
<td>192.168.0.16</td>
</tr>
<tr>
<td>SQL Server</td>
<td>192.168.0.19</td>
</tr>
<tr>
<td>IMC service IP</td>
<td>192.168.0.19</td>
</tr>
</tbody>
</table>
Assigning the cluster nodes to an AD domain

Configuring the AD/DNS server

1. Assign the IP address 192.168.1.181 to the AD/DNS server.
2. Navigate to Active Directory Users and Computers.
3. Set the AD domain name to iMC12.com. Create the cluster administrator imcadm and assign it to the Domain Admins group.

Assigning Node 1 and Node 2 to the AD domain

1. Disable IPv6 on Node 1.
2. Assign the IP address 192.168.0.17 to the LAN-facing NIC, as shown in Figure 2.
3. Configure the computer name as node1 and specify the domain name as iMC12.com as shown in Figure 3. Then reboot the server for the modification to take effect.
4. Turn off the Windows Firewall and allow remote desktop connections to the server, as shown in Figure 4 and Figure 5.
Figure 4 Turning off Windows Firewall

Customize settings for each type of network

You can modify the firewall settings for each type of network that you use.

Domain network settings

- Turn on Windows Firewall
  - Block all incoming connections, including those in the list of allowed apps
  - Notify me when Windows Firewall blocks a new app
- Turn off Windows Firewall (not recommended)

Private network settings

- Turn on Windows Firewall
  - Block all incoming connections, including those in the list of allowed apps
  - Notify me when Windows Firewall blocks a new app
- Turn off Windows Firewall (not recommended)

Public network settings

- Turn on Windows Firewall
  - Block all incoming connections, including those in the list of allowed apps
  - Notify me when Windows Firewall blocks a new app
- Turn off Windows Firewall (not recommended)
5. Assign Node 2 to the AD domain **iMC12.com** in the same way Node 1 has been configured.
Configuring the storage system

Assigning IP addresses to SAN-facing NICs of Node 1 and Node 2

1. On Node 1, assign the IP address 100.88.1.17 to the SAN-facing NIC, as shown in Figure 6.

   Figure 6 Assigning an IP address to the SAN-facing NIC

2. Assign the IP address 100.88.1.18 to Node 2 in the same way Node 1 has been configured.

Connecting Node 1 to the storage server


2. On the Configuration tab, verify that the initiator name is the same as the IQN of Node 1 on the storage server, as shown in Figure 7.
3. On the **Targets** tab, enter the storage server’s IP address 100.88.1.23, and then click **Quick Connect**, as shown in **Figure 8**.
Node 1 automatically connects to the storage server.

**Figure 8 Connecting to the storage server**

4. Click the **Volumes and Devices** tab, and then click **Auto Configure**.
The iSCSI interface discovers three unknown volumes mapped to Node 1, as shown in **Figure 9**.
5. Navigate to **Server Manager > File and Storage Services > Volumes > Disks**.
6. Right-click an unknown iSCSI partition and select **Bring Online** from the menu.
7. In the confirmation dialog box, click **Yes**.
8. Right-click the online partition and select **New Volume** from the menu.
9. Follow the wizard through to the **Server and Disk** page.
10. On the **Server and Disk** page, select Node 1, select a shared storage disk, and then click **Next**.
11. On the **Size** page, specify the size of the volume, and then click **Next**.
12. On the **Drive Letter or Folder** page, assign a drive letter to the disk, and then click **Next**.
13. On the **File System Settings** page, use the default settings for the **File system** and **Allocation unit size** fields, specify the volume label, and then click **Next**.
14. On the **Confirmation** page, click **Create**.
15. Repeat steps 6 through 14 to configure the other unknown partitions.
16. Verify that the shared storage disks are added on the **Computer** console.

**Connecting Node 2 to the storage server**

On Node 2, perform steps 1 through 7 in "Connecting Node 1 to the storage server" to bring the shared storage disks online, as shown in Figure 10.
**Figure 10 Bringing disks online**

![Diagram showing server management interface](image)

View the online status of the shared storage disks, as shown in **Figure 11**.

**Figure 11 Disks are online**

![Diagram showing server management interface](image)

- **Table 1:**

<table>
<thead>
<tr>
<th>Number</th>
<th>Virtual Disk</th>
<th>Status</th>
<th>Capacity</th>
<th>Unallocated</th>
<th>Partition</th>
<th>Read Only</th>
<th>Clustered</th>
<th>Subsystem</th>
<th>Bus Type</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Online</td>
<td>100 GB</td>
<td>0.00 B</td>
<td>MBR</td>
<td></td>
<td></td>
<td></td>
<td>SAS</td>
<td>VMware Virtual disk S,</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Online</td>
<td>64 GB</td>
<td>0.00 B</td>
<td>GPT</td>
<td></td>
<td></td>
<td></td>
<td>iSCSI</td>
<td>HP P2000-G3 FC SCS,</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Online</td>
<td>954 MB</td>
<td>0.00 B</td>
<td>GPT</td>
<td></td>
<td></td>
<td></td>
<td>iSCSI</td>
<td>HP P2000-G3 FC SCS,</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Online</td>
<td>93.1 GB</td>
<td>0.00 B</td>
<td>GPT</td>
<td></td>
<td></td>
<td></td>
<td>iSCSI</td>
<td>HP P2000-G3 FC SCS,</td>
<td></td>
</tr>
</tbody>
</table>
Setting up and installing a SQL Server failover cluster

Adding roles and features on the cluster nodes

1. On Node 1, disable the ClusSvc service and all idle NICs.
2. Navigate to Server Manager > Dashboard.
3. Click Add roles and features, as shown in Figure 12.

![Figure 12 Adding roles and features](image)

4. On the Before You Begin page, click Next, as shown in Figure 13.

![Figure 13 Skipping the Before You Begin step](image)
5. Select **Role-based or feature-based installation**, and then click **Next**, as shown in **Figure 14**.

**Figure 14 Selecting the installation type**

![Figure 14 Selecting the installation type](image)

6. Select the **Select a server from the server pool** option, select **node1.iMC12.com** in the **Server Pool** area, and then click **Next**, as shown in **Figure 15**.

**Figure 15 Selecting the destination server**

![Figure 15 Selecting the destination server](image)
7. Select the **Application Server** option, and then click **Next**, as shown in Figure 16.

**Figure 16 Selecting server roles**

8. Select the **Failover Clustering** option, as shown in Figure 17.

**Figure 17 Selecting features**
9. Click **Add Features**, as shown in **Figure 18**.

**Figure 18 Adding features required for failover clustering**

10. Select the **.NET Framework 4.5**, **Distributed Transactions**, **Incoming Network Transactions**, and **Outgoing Network Transactions** options, and then click **Next**, as shown in **Figure 19**.
11. Click **Install**, as shown in Figure 20.

**Figure 20 Confirming installation selections**

12. On the **Installation progress** page, click **Close**, as shown in Figure 21.
13. Configure Node 2 in the same way Node 1 has been configured.

Setting up the failover cluster

Creating the cluster

1. On the node that is connected to the shared storage disks, navigate to Control Panel > System and Security > Administrative Tools > Failover Cluster Manager, as shown in Figure 22.
2. In the Management area, click Create Cluster, as shown in Figure 23.

Figure 23 Failover Cluster Manager

3. On the Before You Begin page, click Next, as shown in Figure 24.
4. Click **Browse** to select the computer names of Node 1 and Node 2 or enter the computer names in the **Enter server name** field, and then click **Next**, as shown in Figure 25, Figure 26, and Figure 27.

**Figure 25 Entering computer names**
5. Select **Yes** to permit configuration validation checks, and then click **Next**, as shown in Figure 28.
6. Configure the cluster name as iMCHAen and the cluster IP address as 192.168.0.15, and then click Next, as shown in Figure 29.

Figure 29 Specifying the cluster name and cluster IP address

7. On the Confirmation page, click Next, as shown in Figure 30.
8. On the **Summary** page, click **Finish**.

9. Verify that the cluster’s nodes, storage, and networks are operating correctly.

   After the cluster is created, the system selects a shared storage disk as the quorum disk, as shown in **Figure 31**.

**Figure 31 Quorum disk**
10. On the navigation tree, right-click the cluster name imCHAen.imC12.com, and select **More Actions > Configure Cluster Quorum Settings** from the menu, as shown in Figure 32.

**Figure 32 Configuring cluster quorum settings**

11. Follow the wizard through to the **Select Quorum Configuration Option** page.

12. Select the **Advanced quorum configuration and witness selection** option, as shown in Figure 33.
13. Follow the wizard through to the **Configure Storage Witness** page.

14. Select the target disk, and then click **Next**, as shown in Figure 34.

**Figure 34 Selecting the target quorum disk**
15. Follow the wizard through to completion.

Configuring the DTC role

1. From the navigation tree, select **Storage > Disks**.
   The target disk is specified as the quorum.

2. On the navigation tree, right-click **iMCHAen.iMC12.com**, and select **Configure Role** from the menu, as shown in **Figure 35**.

   **Figure 35 Configuring the DTC role**

3. Follow the wizard through to the **Select Role** page.

4. Select the **Distributed Transaction Coordinator (DTC)** option, and then click **Next**, as shown in **Figure 36**.
5. Configure the name as **iMCHADTCen** and the IP address as **192.168.0.16**, and then click **Next**, as shown in **Figure 37**.

**Figure 37 Specifying client access point settings**
6. Select the target DTC disk, and then click **Next**, as shown in **Figure 38**.

**Figure 38 Selecting the target DTC disk**

7. On the **Confirmation** page, click **Next**, as shown in **Figure 39**.

**Figure 39 Confirming DTC settings**
8. Follow the wizard through to completion. The DTC role is added, as shown in Figure 40.

Figure 40 Verifying the DTC role

Installing a SQL Server failover cluster

Installing .NET Framework 3.5

1. On Node 1, navigate to Server Manager > Dashboard, and then click Add roles and features.
2. Follow the wizard through to the Features page.
3. Select the .NET Framework 3.5 Features option, and then click Next, as shown in Figure 41.
4. Click Specify an alternative source path, as shown in Figure 42.

Figure 42 Specifying an alternative source path

5. Enter `target disk:sources\sxs` in the Path field, and then click OK, as shown in Figure 43.
The **target disk** parameter represents the drive letter of the installation medium for SQL Server 2012.

**Figure 43 Entering the alternate source path**

6. On the **Confirmation** page, click **Install**.

7. Install .NET Framework 3.5 on Node 2 in the same Node 1 has been configured.

### Installing SQL Server on Node 1

1. Run the **setup** installation program in the installation medium of SQL Server 2012, as shown in **Figure 44**.
2. On the SQL Server Installation Center page, click Options, and then specify the installation medium root directory, as shown in Figure 45.

Figure 45 Specifying the installation medium root directory

3. Click Installation, and then click New SQL Server failover cluster installation, as shown in Figure 46.
Figure 46 Installing a new SQL Server failover cluster

4. On the **Setup Support Rules** page, click **OK** after the setup support rule check is finished, as shown in Figure 47.
5. On the **Product Key** page, specify the product key, and then click **Next**, as shown in Figure 48.
6. Follow the program through to the **Product Updates** page.
7. Clear the **Include SQL Server product updates** option, and then click **Next**, as shown in Figure 49.
Figure 49 Cancelling update installation

8. Follow the program through to the **Setup Support Rules** page, as shown in **Figure 50**.

Figure 50 Check passed
9. After the setup support rule check is finished, perform one of the following tasks:
   o If no check item fails, click Next. You can ignore the warnings.
   o If some check items fail, modify the settings as prompted and rerun the check.

10. On the Setup Role page, select the SQL Server Feature Installation option, and then click Next, as shown in Figure 51.

Figure 51 Installing SQL Server features

11. Select the Database Engine Services, SQL Server Replication, and Full-Text and Semantic Extractions for Search options, as shown in Figure 52.
12. Select the Management Tools-Basic and Management Tools-Complete options, and then click Next, as shown in Figure 53.
Figure 53 Selecting management tools

13. Enter **iMCHADBen** in the SQL Server Network Name field, select the **Default instance** option, use the default instance ID **MSSQLSERVER**, and then click **Next**, as shown in Figure 54.
14. Follow the program through to the Cluster Resource Group page.
15. Specify the SQL Server cluster resource group name as SQL Server (MSSQLSERVER), and then click Next, as shown in Figure 55.
Figure 55 Specifying cluster resource group name

16. Select the shared data disk, and then click **Next**, as shown in Figure 56.

Figure 56 Selecting a cluster disk
17. Assign the IP address **192.168.0.19** to the SQL Server cluster, and then click **Next**, as shown in **Figure 57**.

**Figure 57 Specifying network settings**

![Network Configuration Screen](image)

18. Click **Browse** in the **Account Name** field for the **SQL Server Agent** service, as shown in **Figure 58**.
19. Select the cluster administrator account `imcadm`, and then click OK, as shown in Figure 59.
20. Select the cluster administrator account `imcadm` for the SQL Server Database Engine service, and then click **Next**, as shown in Figure 60.

**Figure 60 Selecting an account for the SQL Server Database Engine service**

![Server Configuration](image)

21. On the **Server Configuration** tab, select the **Mixed Mode** option in the **Authentication Mode** area, enter a password, and select the `imcadm` account as the SQL Server administrator, as shown in Figure 61.
22. Click **Data Directories** tab, verify that the data directories are on the shared data disk, and then click **Next**, as shown in Figure 62.
23. Follow the program through to the Ready to Install page.
24. Click Install, as shown in Figure 63.
25. Follow the program through to the Complete page, and click Close, as shown in Figure 64.

Figure 64 Installation completed
Installing SQL Server on Node 2

1. Run the setup installation program in the installation medium of SQL Server 2012.
2. Click Installation, and then click Add node to a SQL Server failover cluster, as shown in Figure 65.

Figure 65 Adding node to a SQL Server failover cluster

3. On the Setup Support Rules page, click OK after the setup support rule check is finished.
4. Select the SQL Server instance MSSQLSERVER on Node 1, specify the name of Node 2, and then click Next, as shown in Figure 66.
5. Assign the IP address 192.168.0.19 to Node 2, and then click Next, as shown in Figure 67.

Figure 67 Assigning an IP address to Node 2
6. Enter the account password for the **SQL Server Database Engine** and **SQL Server Agent** services, and then click **Next**, as shown in **Figure 68**.

**Figure 68 Entering the password**

7. Follow the program through to completion.

**Verifying the status of the failover cluster**

1. On the active node of the cluster, run the Failover Cluster Manager.
2. From the navigation tree, select the **Roles** node under the **iMCHAen.iMC12.com** cluster.
   The SQL Server cluster is running as the **SQL Server (MSSQLSERVER)** role, as shown in **Figure 69**.
Modifying properties of the SQL Server cluster

1. Right-click the SQL Server (MSSQLSERVER) role, and then select Properties from the menu.
2. On the General tab, change the name of the cluster to DB-iMCen (MSSQLSERVER).
   As a best practice, use the default priority and do not modify the preferred owners.
3. On the Failover tab, modify the Maximum failures in the specified period parameter, use the default settings for other parameters, and then click OK.
   If the number of failures exceeds the specified limit, the cluster stays in failed state. As a best practice, set a high limit for failures to avoid this situation.
4. In the Roles area, select the DB-iMCen (MSSQLSERVER) role.
5. In the lower part of page, click the Resources tab, as shown in Figure 70.
6. Right-click the SQL Server resource and select Properties from the menu, as shown in Figure 71.

Figure 71 Modifying SQL Server properties
7. Click the **Policies** tab.
8. Set the following parameters, as shown in **Figure 72**:
   a. Select **If resource fails, attempt restart on current node**.
   b. Set the **Period for restarts** parameter to **05:00**.
   c. Set the **Maximum restarts in the specified period** parameter to **4**.
   d. Set the **Delay between restarts** parameter to **1.0**.

The settings enable the SQL Server resource to restart a maximum of four times within five minutes, and the interval between two restarts must be longer than one second. If the number of restart failures exceeds four within five minutes, the SQL Server service fails over to the other node.

**Figure 72 Specifying SQL Server properties**

9. Click **OK**.
10. Modify properties of the SQL Server Agent service in the same way the SQL Server service has been configured, as shown in **Figure 73**.
Figure 73 Modifying SQL Server Agent properties
Installing and deploying IMC

Centralized deployment

Perform this task to install the IMC platform and its service components on the failover cluster.

Installing and deploying the IMC platform on Node 1

1. Navigate to \HP\windows\install in the installation package, right-click the install.bat script, and then select Run as administrator.
2. In the Select Locale window, specify the country/region and language, select Typical as the installation type, and then click OK, as shown in Figure 74.

Figure 74 Selecting the locale

3. In the Checking installation parameters window, specify the parameters for database connectivity, as shown in Figure 75:
   a. Select Microsoft SQL Server from the Database Type list.
   b. Enter the database superuser name and password.
   c. Select other server from the Database Location list and enter the SQL Server IP address 192.168.0.19 in the Database Server Address field.
   d. Specify the shared data disk as the installation location and data file location.
   e. Use the default settings for other parameters.
   f. Click OK.
4. In the **Deployment and Upgrade Options** window, select **Deploy or update at once**, and then click **Next**, as shown in **Figure 76**.
5. Follow the program through to completion.

6. In the **Installation Completed** window, select **Open deployment monitoring agent**, and then click **Finish**.

7. In the **Intelligent Deployment Monitoring Agent** window, specify the component location, and then click **OK**, as shown in **Figure 77**.
8. Click Install.

**IMPORTANT:**
Do not select the **Automatically start the services when the OS starts** option.

9. In the **Choose Target Folder** window, select the target components, and then click **Next**, as shown in Figure 78.
10. In the Deployment and Upgrade Options window, select **Deploy or update at once**, and then click **Next**, as shown in Figure 79.
11. Select the target components, and then click OK, as shown in Figure 80.

Figure 80 Selecting components for batch deployment
12. Enter the IP address 192.168.0.19 in the IPv4 Address(Client) and IPv4 Address(Server) fields, and then click Deploy, as shown in Figure 81.

Figure 81 Specifying strategy proxy server configuration

13. Enter 192.168.0.19 in the UAM Server's IPv4 Address field, as shown in Figure 82:

The Database Password and Confirm Password fields are automatically populated with the database password that is configured when the IMC platform is installed.
14. Click **Deploy**.
15. Deploy the rest of the components in the same way UAM has been deployed.

**Registering the iMC Cluster service on Node 1**

1. Navigate to the **deploy** directory under the IMC installation directory.
2. Right-click the **installClusterService.bat** script and select **Edit** from the menu, as shown in Figure 83.
3. Verify that the drive letter of the IMC installation directory is correct. Modify the drive letter if it is incorrect and save the file.

4. Right-click the `installClusterService.bat` script and select `Run as administrator` from the menu.

5. Open the Services console and verify that the IMC Cluster service has been successfully registered, as shown in Figure 84.
Registering the iMC Cluster and HP iMC Server services on Node 2

1. Disable all business processes and services of IMC on Node 1.
2. Run the Failover Cluster Manager.
3. On the navigation tree, right-click node1 and select Pause > Drain Roles from the menu, as shown in Figure 85.
4. Verify that all cluster resources on Node 1 have been moved to Node 2, as shown in Figure 86.

5. On Node 2, navigate to `C:\Windows\System32\cmd.exe`. 
6. Right-click the `cmd.exe` program and select Run as administrator from the menu.

7. Navigate to the Deploy directory under the IMC installation directory and execute the following commands to register the HP iMC Server service:

```
svcinst.bat -install -instdir "H:\Program Files\iMC" -datadir "H:\Program Files\imcdata" -servertype master -language zh -country CN -dbtype SQLServer -dbadminusername sa_(database instance username) -dbadminpasswd "iMC123456" (database password) -dbaddress 192.168.0.19 (SQL Server IP address) -dbport 1433
```

You must specify the `servertype` parameter as `master`.

**Figure 87 Registering the HP iMC Server service**

8. Register the iMC Cluster service in the same way the service has been registered on Node 1.

**Verifying Visual C++ 2008 Redistributable has been installed on Node 2**

1. Verify that Visual C++ 2008 Redistributable has been installed on Node 2, as shown in **Figure 88**.
2. If Visual C++ 2008 Redistributable is not installed, install the program:
   a. Navigate to $IMC$ installation drive:Program Files$IMC$deploy$components$common$server$.
   b. Double-click the vcredist.exe program and install Visual C++ 2008 Redistributable.
   c. If vcredist.exe cannot be run, first run instmsi.exe in the same directory.
3. Run the Intelligent Deployment Monitoring Agent as an administrator.
4. Click the Environment tab and verify that the Intelligent Deployment Monitoring Agent is monitoring the database of the service components.
   If the agent cannot monitor the database, re-set the password for the database superuser.
5. Run Failover Cluster Manager.
6. On the navigation tree, right-click node1 and select Resume > Fail Roles Back from the menu, as shown in Figure 89.
Creating the process monitoring script on Node 1

1. For the cluster to monitor the key processes of IMC and collect running logs, you must create the process monitoring script **MonitorProcess.bat**. The following is a sample:

   ![MonitorProcess.bat](image)

   You must replace the installation drive in the file with the actual IMC installation drive.

2. Change the file suffix to `.bat` and copy the script to `IMC installation drive: \Program Files\iMC\`.

3. Open the script in Notepad to verify that contents of the script are correctly displayed.

Installing KillProcess and PsExec (optional)

To deal with zombie processes, install the **KillProcess** and **PsExec** programs:

1. On Node 1, navigate to `IMC installation drive: \Program Files\iMC\`.

2. Copy **PSTools.rar** to the **iMC** directory and uncompress the file.

   ![PSTools.rar](image)

   The **PSTools.rar** file is also stored in **iMC (PLAT)V700R001B02D004-E0202.H3C:Professional\windows\tools\cluster_tools.zip**.

3. Open the **PSTools** directory and edit the `killpro.bat` file.

   Replace the installation drive with the actual IMC installation drive in `cscript " H:\Program Files\iMC\PSTools\KillProcess.vbs"`. 

Figure 89 Resuming the roles of Node 1
4. Run `cmd.exe` as an administrator.
5. Access `IMC installation drive:\Program Files\iMC\PSTools`.
6. Enter `PsExec.exe`, and then click `Agree` in the `PsExec License Agreement` window, as shown in Figure 90.

**Figure 90 Installing PsExec**

```
PsExec License Agreement

You can also use the /accepteula command-line switch to accept the EULA.

SYSINTERNALS SOFTWARE LICENSE TERMS

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```

7. In the Failover Cluster Manager, move all cluster resources from Node 1 to Node 2.
8. Install `PsExec.exe` on Node 2. After the program is installed, resume the roles of Node 1.

**Monitoring key services and scripts of IMC**

1. On Node 1, run Failover Cluster Manager.
2. Right-click the `DB-iMCen (MSSQLSERVER)` role and select `Add Resource > Generic Service` from the menu, as shown in Figure 91.
3. In the New Resource Wizard window, select HP iMC Server, and then click Next, as shown in Figure 92.

4. Follow the program through to completion.
5. Add the iMC Cluster service in the same way HP iMC Server has been added, as shown in Figure 93.

**Figure 93 Adding the iMC Cluster service**

6. Right-click the **DB-IMCen (MSSQLSERVER)** role, and then select **Add Resource > Generic Application** from the menu, as shown in Figure 94.
7. Specify the location of the **MonitorProcess.bat** script, and then click **Next**, as shown in Figure 95.

**Figure 95 Adding the MonitorProcess.bat script**
8. Follow the program through to completion.

9. Add the `killPro.bat` script in the same way `MonitorProcess.bat` has been added, as shown in Figure 96.

**Figure 96 Adding the killPro.bat script**

![Image of adding killPro.bat script]

10. Verify that HP iMC Server, iMC Cluster, MonitorProcess, and killPro have been added for monitoring. The resources are in the offline state, as shown in Figure 97.
Modifying properties of the monitored resources

1. Right-click the **HP iMC Server** resource and select **Properties** from the menu, as shown in Figure 98.
2. Click the **Policies** tab, specify the parameters, and then click **OK**, as shown in **Figure 99**. For more information, see “Modifying properties of the SQL Server cluster.”

**Figure 99** Modifying policy settings
3. Modify properties of the iMC Cluster, MonitorProcess, and killPro resources in the same way the HP iMC Server has been modified. Make sure the policy settings for the resources are consistent.

4. Right-click the HP iMC Server resource and select Properties from the menu.

5. Click the Dependencies tab, add dependency on SQL Server, SQL IP Address, and killPro Application, and then click OK, as shown in Figure 100.

Figure 100 Adding dependency for HP iMC Server

6. Add dependency on the SQL IP Address and the HP iMC Server for the iMC Cluster resource, as shown in Figure 101.
Figure 101 Adding dependency for the iMC Cluster

7. Add dependency on the iMC Cluster for the MonitorProcess resource, as shown in Figure 102.

Figure 102 Adding dependency for the MonitorProcess resource
8. Add dependency on the **Cluster Disk** and **SQL IP Address** for the killPro resource, as shown in **Figure 103**.

**Figure 103 Adding dependency for killPro**

![Failover Cluster Manager](image)

9. Bring the **killPro**, **HP iMC Server**, **iMC Cluster** and **MonitorProcess** resources online in sequence, as shown in **Figure 104**.

The iMC Cluster resource starts the business processes of IMC after it is brought online. It takes three to five minutes to start all processes.
10. Verify that IMC is operating correctly, as shown in Figure 105. IMC provides services at the IMC service IP address 192.168.0.19; the cluster is transparent to users.

Figure 105 Logging in to IMC
Applying for a license for Node 2

If IMC fails over from Node 1 to Node 2, the license of Node 2 becomes invalid. You must apply for a new license for Node 2. For more information about applying for a license, see the installation guides for IMC.

Distributed deployment

Distributed deployment deploys the IMC platform on an independent server (primary IMC server) and the service components on the failover cluster. The distributed deployment procedure is the same as centralized deployment, except for the following differences:

1. When you install IMC components on the primary server, select **Deploy or upgrade later** in the **HP iMC Installation Wizard** window, as shown in **Figure 106**.

   **Figure 106 Deployment option for IMC components**

2. When you install IMC components on the failover cluster, perform the following tasks:
   
a. On the node that is connected to the shared storage disks, run **cmd.exe** as an administrator.

   b. Access the **install** directory of the IMC installation package.

   c. Execute **installslave.bat localIp=192.168.0.19**.
      
      The IP address is the SQL Server IP address.

   d. Enter the IP address of the primary server and click **OK**.

   e. Select **Other server** from the **Database Location** list and enter the SQL Server IP address **192.168.0.19** in the **Database Server Address** field.

   f. Specify the shared data disk for the installation location and data file location.
3. When you use the Intelligent Deployment Monitoring Agent to deploy service components on the failover cluster, specify the SQL Server IP address **192.168.0.19** for each component, as shown in Figure 107.

**Figure 107 Batch deploying service components**

![Intelligent Deployment Monitoring Agent](image-url)

4. When you use commands to register the HP iMC Server service on the failover cluster, set the `servertype` parameter to `slave`. For more information, see "Registering the iMC Cluster and HP iMC Server services on Node 2."
Maintaining the failover cluster

Maintaining the running environment

Before you add or remove hardware or maintain the OS for the active node in the cluster, suspend the node manually:

1. Right-click the active node and select **Pause > Drain Roles** from the menu, as shown in Figure 108.

   **Figure 108 Draining resources on the active node**

   ![Failover Cluster Manager](image)

   This action pauses this cluster node and will move all clustered roles from this node to other nodes in the cluster.

2. To resume the role of the node after maintenance, right-click the node and select **Resume > Fail Roles Back** from the menu, as shown in Figure 109.
3. Before you maintain the standby node in the cluster, suspend the node manually. After maintenance, right-click the node and select Resume > Do Not Fail Roles Back from the menu.

Maintaining the database

To install upgrades or patches for the database, install them on both cluster nodes. Use the default settings for all parameters and follow the wizard through to completion.

If IMC is installed on the cluster, take all IMC resources on the active node offline and suspend the standby node before installing upgrades or patches.

1. On the active node, right-click an IMC resource in Failover Cluster Manager and select Take Offline from the menu, as shown in Figure 110.
2. Take the rest of the IMC resources offline, as shown in Figure 111.
3. On the navigation tree, right-click the standby node, and then select **Pause > Drain Roles** from the menu, as shown in Figure 112 and Figure 113.
Figure 112 Suspending the active node

Figure 113 Node suspended
4. Run the upgrade wizard of SQL Server, as shown in Figure 114.

Figure 114 Running the upgrade wizard

The wizard automatically checks the environment, as shown in Figure 115.

Figure 115 Checking the environment
5. Ignore the warnings and click **Next**, as shown in **Figure 116**.

**Figure 116 Environment check completed**

6. Follow the wizard through to the **Check Files In Use** page, and click **Next**, as shown in **Figure 117**.
7. Follow the wizard through to the **Update Progress** page, as shown in Figure 118.
During the upgrade, all resources are set to the offline state on the active node, as shown in Figure 119.

**Figure 119 All resources in offline state**

8. On the **Complete** page, click **Close**, as shown in Figure 120.
9. Upgrade the SQL Server on the standby node in the same way the SQL Server has been upgraded on the active node, as shown in Figure 121 and Figure 122.
Figure 121 Suspending the active node

Figure 122 Draining resources on the standby node
10. After the upgrade is finished, resume the roles on the active node and bring IMC resources online, as shown in Figure 123.

**Figure 123 Resuming the roles on the active node**

11. Verify that the failover cluster is operating correctly:
   a. On the active node, right-click the **DB-iMCen (MSSQLSERVER)** role and select **Move > Select Node** from the menu, as shown in Figure 124.
b. Select the standby node and click OK, as shown in Figure 125.
12. To use DBMAN to restore the database on the cluster, first perform the following tasks:
   a. Move all cluster resources to the cluster node where IMC is installed and suspend the other node.
   b. Take the HP iMC Server, HP iMC Start, MonitorProcess, SQL Server, and SQL Server Agent services offline in Failover Cluster Manager.
   c. Manually start the HP iMC Server, SQL Server (MSSQLSERVER), and SQL Server Agent (MSSQLSERVER) in the Services console.

**Maintaining IMC**

To upgrade IMC or install new service components:
1. In the Failover Cluster Manager, take the HP iMC Server, iMC Cluster and MonitorProcess resources offline, as shown in Figure 126.

   **Figure 126 Taking offline the HP iMC Server, iMC Cluster and MonitorProcess resources**

2. Manually start the **iMC Server** service in the **Services** console.
3. Run the Intelligent Deployment Monitoring Agent as an administrator, as shown in Figure 127.
4. Upgrade IMC or install new service components in the same way as initial installation, as shown in Figure 128 and Figure 129.
5. Select a deployment and upgrade option:
   - For centralized deployment, select **Deploy or upgrade at once**, as shown in Figure 130.
For distributed deployment, select **Deploy or upgrade later**, as shown in Figure 131, Figure 132, and Figure 133.

**Figure 131 Manually upgrading components**
6. In the Failover Cluster Manager, bring the **iMC Cluster** and **MonitorProcess** resources online.
Modifying IP addresses for the cluster

The cluster IP, SQL Server IP, and IMC service IP must be in the same network segment as the IP address of the LAN-facing NICs.

Modifying the SQL Server IP address

1. In the Failover Cluster Manager, right-click the **DB-iMCen (MSSQLSERVER)** role, and then select **Stop Role** from the menu, as shown in Figure 134.

   Figure 134 Stopping the DB-iMCen (MSSQLSERVER) role

   ![Figure 134 Stopping the DB-iMCen (MSSQLSERVER) role](image)

   The **DB-iMCen (MSSQLSERVER)** role is stopped, as shown in Figure 135.
2. Right-click the **IP Address** node in the **Server Name** area, and then select **Properties** from the menu, as shown in Figure 136.
3. Modify the SQL Server IP address, as shown in Figure 137:
   a. Click the General tab.
   b. Select the network segment of the LAN-facing NIC.
   c. Enter a new IP address in the Static IP Address field.
   d. Click OK.
4. Bring the storage disk of the DB-iMCen (MSSQLSERVER) role online, as shown in Figure 138.
5. Navigate to IMC installation drive:\Program Files\IMC\common\conf.

6. Right-click the server-addr.xml file and select Properties from the menu, as shown in Figure 139.

Figure 139 Modifying properties of server-addr.xml

7. Click the Security tab, and then click Edit, as shown in Figure 140.
8. Click **Add**.

9. Add the user **imcadm**, and then click **OK**, as shown in Figure 141.

**Figure 141 Adding the user imcadm**

The user **imcadm** appears in the **Group or user names** area, as shown in Figure 142.
10. Click OK.
11. Right-click the server-addr.xml file and select Edit from the menu, as shown in Figure 143.

12. Replace the SQL Server IP address with the new IP address, as shown in Figure 144.
13. Save and close the `server-addr.xml` file.

14. Right-click the `server-addr.xml` file and select Properties from the menu.

15. Remove the permissions for `imcadm`.

16. Bring all resources of `DB-iMCen (MSSQLSERVER)` online, as shown in Figure 145.

Figure 145 Bringing online all resources
Modifying the IP address of the LAN-facing NIC for a cluster node

1. Right-click the node and select **Pause > Drain Roles** from the menu, as shown in **Figure 146**.

   **Figure 146 Suspending the node**

   ![Figure 146 Suspending the node](image)

2. Modify the IP address of the LAN-facing NIC, as shown in **Figure 147**.

   The old and new IP addresses must in the same network segment. The remote desktop connection disconnects after you modify the NIC IP address. Use the new IP address to set up a remote desktop connection.
The Failover Cluster Manager detects the IP address change and updates the IP information for network connections, as shown in Figure 148.

Figure 148 Updating IP information

3. Resume the roles of the node.
Modifying the network segment for the cluster

1. In the Failover Cluster Manager, right-click `iMCHAen.iMC12.com` on the navigation tree and select More Actions > Shut Down Cluster from the menu, as shown in Figure 149.

Figure 149 Shutting down the cluster

2. Run the Task Manager, and then click the Services tab to verify that the ClusSvc service is stopped.

3. Modify the IP address of the LAN-facing NIC for each cluster node.
   The remote desktop connection disconnects after you modify the NIC IP address. Use the new IP address to set up a remote desktop connection.

4. In the Failover Cluster Manager, start the `iMCHAen.iMC12.com` cluster.

5. Right-click the new network node under Networks and select Properties from the menu.

6. Change the network name to iMC and click OK.

7. Right-click the IP Address node in the Server Name area and select Properties from the menu.

8. On the General Tab, modify the network segment and IP address, and then click OK.
   The new network segment and IP address do not take effect. For the modification to take effect, you must reconfigure the network segment and IP address. The Failover Cluster Manager identifies the IP Address resource and sets the resource name if the modification takes effect.

9. Bring the iMCHADBEn resource online in the Server Name area.

10. Modify the IP addresses of the iMCHADTCen and DB-iMCen (MSSQLSERVER) roles in the same way the cluster IP address has been modified, and then bring the roles online.

11. Navigate to `IMC installation drive:\Program Files\iMC\common\conf`.

12. Modify the SQL Server IP address in the `server-addr.xml` file.

13. In Failover Cluster Manager, start the DB-iMCen (MSSQLSERVER) role.
All resources of the **DB-iMCen (MSSQLSERVER)** role are brought online.

14. Wait for several minutes and verify that IMC can provide services correctly and the IMC Web console is available.
FAQs

Can I skip the checks when I set up the failover cluster and install the SQL Server?

As a best practice, do not skip the checks. The checks test the system environment comprehensively to verify whether the hardware and software requirements for installation are met and help you identify incorrect settings. If you skip the checks, failure might occur during installation.

Why can’t IMC provide services and why can’t I access the IMC Web console when the failover cluster is running correctly?

The domain firewall is automatically enabled on a node after the node joins a domain and reboots. IMC cannot provide services if the domain firewall is enabled. You must disable the domain firewall on both cluster nodes.

How can I change the SQL Server IP address if I specified a wrong address when I deployed IMC?

You can navigate to `IMC installation drive\Program Files\IMC\common\conf` and modify the SQL Server IP address in the `server-addr.xml` file. For more information, see “Modifying the SQL Server IP address.”

Why can’t the cluster nodes identify volume changes if I change the shared storage disks mapped to the nodes?

Real time update is not supported by iSCSI sessions. After changing the shared storage disks, reset the iSCSI connections on the cluster nodes for the nodes to update volume information. As a best practice, do not change the shared storage disks after the failover cluster is set up and configured.

Why can’t I log in to the IMC Web console when the IMC Cluster service is running?

It takes the IMC Cluster service three to five minutes to start all IMC business processes. The IMC Web console is unavailable before all IMC business processes are started. Wait for about five minutes, and then log in to the IMC Web console again.
AD High Availability Solution for IMC Failover Clustering
About HPE IMC documents

The following are the documents available for HPE IMC:

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<td>HPE IMC Getting Started Guide</td>
<td>Quickly guides you through the IMC main features and troubleshooting common problems.</td>
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<td>HPE IMC Centralized Deployment Guide with Embedded Database</td>
<td>Provides a complete guide to IMC platform and components installation and centralized deployment using embedded database.</td>
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Document conventions

This section describes the conventions used in the documentation.

Port numbering in examples
The port numbers in this document are for illustration only and might be unavailable on your device.

Command conventions

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<th>Description</th>
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<td><strong>Boldface</strong></td>
<td>Bold text represents commands and keywords that you enter literally as shown.</td>
</tr>
<tr>
<td><em>Italic</em></td>
<td><em>Italic</em> text represents arguments that you replace with actual values.</td>
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<tr>
<td>#</td>
<td>A line that starts with a pound (#) sign is comments.</td>
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GUI conventions

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<tr>
<td><strong>Boldface</strong></td>
<td>Window names, button names, field names, and menu items are in Boldface. For example, the <strong>New User</strong> window appears; click <strong>OK</strong>.</td>
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<tr>
<td>&gt;</td>
<td>Multi-level menus are separated by angle brackets. For example, <strong>File &gt; Create &gt; Folder</strong>.</td>
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Symbols

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<td>![WARNING!]</td>
<td>An alert that calls attention to important information that if not understood or followed can result in personal injury.</td>
</tr>
<tr>
<td>![CAUTION:]</td>
<td>An alert that calls attention to important information that if not understood or followed can result in data loss, data corruption, or damage to hardware or software.</td>
</tr>
<tr>
<td>![IMPORTANT:]</td>
<td>An alert that calls attention to essential information.</td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td>An alert that contains additional or supplementary information.</td>
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<tr>
<td>![TIP:]</td>
<td>An alert that provides helpful information.</td>
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Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website: www.hpe.com/assistance
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website: www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
  - Hewlett Packard Enterprise Support Center Get connected with updates page: www.hpe.com/support/e-updates
  - Software Depot website: www.hpe.com/support/softwaredepot
- To view and update your entitlements, and to link your contracts, Care Packs, and warranties with your profile, go to the Hewlett Packard Enterprise Support Center More Information on Access to Support Materials page: www.hpe.com/support/AccessToSupportMaterials

⚠️ IMPORTANT:
Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.
Websites

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<tr>
<td>General websites</td>
<td></td>
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<tr>
<td>Hewlett Packard Enterprise Information Library</td>
<td><a href="http://www.hpe.com/info/enterprise/docs">www.hpe.com/info/enterprise/docs</a></td>
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<tr>
<td>Hewlett Packard Enterprise Support Center</td>
<td><a href="http://www.hpe.com/support/hpesc">www.hpe.com/support/hpesc</a></td>
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<tr>
<td>Contact Hewlett Packard Enterprise Worldwide</td>
<td><a href="http://www.hpe.com/assistance">www.hpe.com/assistance</a></td>
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<tr>
<td>Subscription Service/Support Alerts</td>
<td><a href="http://www.hpe.com/support/e-updates">www.hpe.com/support/e-updates</a></td>
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<td>Software Depot</td>
<td><a href="http://www.hpe.com/support/softwaredepot">www.hpe.com/support/softwaredepot</a></td>
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<tr>
<td>Customer Self Repair (not applicable to all devices)</td>
<td><a href="http://www.hpe.com/support/selfrepair">www.hpe.com/support/selfrepair</a></td>
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<tr>
<td>Insight Remote Support (not applicable to all devices)</td>
<td><a href="http://www.hpe.com/info/insightremotesupport/docs">www.hpe.com/info/insightremotesupport/docs</a></td>
</tr>
</tbody>
</table>

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website: www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty, Care Pack Service, or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website: www.hpe.com/info/insightremotesupport/docs

Documentation feedback

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