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Abstract

This white paper is intended to assist IT professionals in installing HP Insight software from the HP Insight Control Management DVD v2.30 on a Microsoft® Windows®-based Central Management Server (CMS) to create a highly available environment. The CMS on ProLiant may be configured in a Microsoft Cluster Service (MSCS) implementation on two nodes. Using Windows Server 2003 Enterprise Edition with HP Insight software can be a simple way of achieving redundancy, availability, load balancing, and failover capability from this powerful management software.

Introduction

Insight Control Management (ICM) DVD provides an integrated installer to quickly and accurately deploy, configure, integrate, and update HP Insight software suites and individual management products. Refer to Appendix B for an overview of the Insight Dynamics – VSE and Insight Control Environment suites. The individual components delivered with ICM v2.30 include:

- Insight Control Management Integrated Installer—A wizard-based installer used to simplify the installation, configuration, and integration of HP Insight software.
- HP Systems Insight Manager (HP SIM)—The central management server (CMS) that provides unified foundation management services for HP servers, storage, and network resources from a single console. HP SIM delivers centralized fault, configuration, inventory, performance management, warranty details, automated service call initiation and troubleshooting information. HP SIM is built according to industry standards to manage HP and non-HP infrastructure resources.
- Extensions for HP SIM on Microsoft Windows—A software package that adds menus to HP SIM that access server management tools for HP-UX and Linux. The server management tools run on HP-UX and Linux managed systems, and include HP GlancePlus and HP-UX tools such as Ignite-UX, Software Distributor UX, HP-UX configuration tools, and HP-UX Workload Manager. You license HP-UX and Linux server management tools separately (for example, as part of an HP-UX 11i operating environment).
- HP BladeSystem Integrated Manager—Graphical user interface (GUI) used to discover, monitor, and administer HP BladeSystem enclosures and managed components, including servers (ProLiant and Integrity), storage, power, and cooling. This component is installed with HP SIM.
- HP Insight Power Manager (IPM) —Power management application that extends HP SIM with power consumption and thermal output monitoring to optimize data center power and cooling. Includes power regulation policies for groups of HP ProLiant servers. This component is installed with HP SIM.
- HP Service Essentials Remote Support Pack—Remote support tool that provides remote monitoring to supplement local monitoring of HP SIM. It also provides real time hardware event monitoring and secure event submission to HP Support to help identify and prevent potentially critical problems on HP ProLiant servers, Linux based Integrity servers, and their associated internal devices.
- HP Rapid Deployment Pack (RDP)—Tool that configures and deploys multiple servers quickly and predictably in an unattended fashion using scripts and system images. Includes predefined scripts to configure HP server hardware and deploy operating systems for Windows and Linux platforms.
- HP Insight Control Management Services—Management services that facilitate component integration and update. These services simplify assignment of Insight Control licenses to servers managed by HP SIM and identification of software updates.
- HP Insight Control Environment Advisor—Tool that automatically verifies the target platform for compliance with installation prerequisites. The advisor runs a series of tests on the server and identifies issues that might affect the Insight Control suite installation or operation.
- HP Performance Management Pack (PMP)—Performance and monitoring tool that enables HP SIM to proactively detect, analyze, and report performance bottlenecks on HP ProLiant and Integrity
servers, Modular Storage Array storage, and VMware and Microsoft Virtual Server virtual machines, ensuring server workloads run at peak performance levels.

- HP ProLiant Essentials Vulnerability and Patch Management Pack (VPM)—Vulnerability and patch tool that integrates comprehensive vulnerability assessment and advanced patch management into HP SIM to identify and resolve security vulnerabilities quickly and reliably in Microsoft Windows and Linux environments.

- HP Virtual Machine Management Pack (VMM)—Virtual machine management tool that provides unified virtual machine management of physical and virtual server resources within HP SIM. Supports VMware and Microsoft virtual machine environments.

- HP Server Migration Pack - Universal Edition—Management software application that provides an automated, accurate, and affordable way to migrate existing servers and their content to the latest HP BladeSystem or ProLiant server technologies, or the latest virtualization platforms from VMware, Microsoft, and Citrix. SMP Universal supports physical-to-ProLiant (P2P), virtual-to-ProLiant (V2P), physical-to-virtual (P2V), and virtual to virtual (V2V) migrations.

- HP Virtual Connect Enterprise Manager (VCEM)—Software application that simplifies the management of BladeSystem environments that use HP Virtual Connect to control LAN and SAN connectivity. This application provides a central console to manage and control infrastructure resources, a single resource pool for LAN and SAN address administration, and grouping capabilities that enable rapid, reliable deployment and movement of servers across the data center.

- HP Virtual Server Environment Management Software—provides the flexibility of virtualization for physical servers and real-time capacity planning for server capacity and power. For ProLiant servers it is delivered through HP Insight Dynamics – VSE Suite and includes HP Capacity Advisor and HP Virtualization Manager for logical server management. For Integrity customers, it is delivered through the VSE Suite and it also includes HP Global Workload Manager to automate resource allocation.

Note:
Some of the Insight software components listed above are not supported in a highly available cluster environment and thus are not described in this white paper. These are: HP Service Essentials Remote Support Pack and HP ProLiant Essentials Vulnerability and Patch Management Pack.

Insight software components may be run in a Microsoft Windows Server environment, using Microsoft SQL Server on HP ProLiant servers. By installing Insight software components as clustered applications, these management products can also be highly available. In an MSCS environment, a virtual server name and associated IP address for the HP Systems Insight Manager service (from which Virtualization Manager may be launched) may be created as cluster resources, allowing failover for higher availability in case of system failure or planned shutdown. Cluster resources are also created for other Insight software components, including those that are bundled with Insight Dynamics – VSE, also allowing failover of these services.

Additionally, by distributing the load for Microsoft SQL Server and Insight software components on separate systems, more efficient use can be made of cluster system resources.

This white paper describes the steps to install a highly available clustered version of Insight software on HP ProLiant servers running Microsoft Windows Server 2003 Enterprise Edition and Microsoft SQL Server 2005 Enterprise Edition. Alternatively, a highly available clustered version of Insight software may also be installed on servers running Microsoft SQL Server 2000. Refer to the HP Insight Control Management Quick Setup Poster for details on the hardware and software installation requirements for Insight software.
The majority of the databases used by the Insight software reside on a Microsoft SQL Server 2005 virtual server, which is also clustered. Other data files are stored on the shared disk.

- The relationship between the Microsoft SQL Server 2005 Enterprise Edition instances and Insight software is shown in Figure 1.
- Insight Control Management/Insight Dynamics - VSE connects to its own Microsoft SQL Server 2005 database instance using the network name configured especially for Insight Control Management/Insight Dynamics - VSE.
- A named instance of Microsoft SQL Server 2005 has a virtual server within the cluster, with a network name and an IP address to which clients may connect.
- HP SIM has its own network name and IP address. Clients who wish to browse to the HP SIM service can do so by using either of these cluster resources. Virtualization Manager may be launched from HP SIM to display and manage VSE resources.

![Figure 1. The relationship between Insight software, SQL Server 2005, and the cluster disks](image)

### Getting started

The maximum number of nodes supported in a cluster varies depending on operating system version and type of storage. For details, refer to the article “Maximum number of supported nodes in a cluster” (navigate to http://support.microsoft.com, and search for “Maximum number of supported nodes in a cluster”). This whitepaper documents a two node cluster.

Tip:
In order to allow boot disks and cluster disks to be on the same SAN, the registry must be modified on each node, before installing Microsoft Cluster Service. For detailed instructions, depending on the version of Windows Server 2003, refer to the article “How to add a registry value to a Windows Server 2003-based computer that you start from a SAN so that the startup disk, the pagefile disks, and the cluster disks are all on the same SAN fabric” at http://support.microsoft.com (search for “How to add a registry value to a Windows Server 2003-based computer that you start from a SAN so that the startup disk, the pagefile disks, and the cluster disks are all on the same SAN fabric”). Or to avoid improper modification of the registry, the Boot from SAN Cluster Registry Update utility may be used to add the ManageDisksOnSystemBuses key. The utility (BFSClRegUp.exe) may be downloaded from http://www.hp.com (select Support & Troubleshooting, then Business Support Center, then search for “Boot from SAN Cluster Registry Update utility”).

If Insight software is being installed into an environment without a Microsoft SQL Server 2005 Enterprise Edition instance already installed, refer to “Installing the Microsoft SQL Server 2005 Enterprise Edition,” for steps to install a clustered named instance of Microsoft SQL Server 2005 Enterprise Edition. This named instance can host the VSE Management Software and HP SIM databases.

If an instance of Microsoft SQL Server 2005 Enterprise Edition already exists in the cluster, refer to “Installing Insight software components on the cluster” for steps to install Insight software components, and the process to make them highly available.

Target audience
It is assumed that readers of this document have an excellent understanding of the following concepts and services:

• Basic clustering concepts
• Basic Microsoft Windows 2003 services
• Advanced TCP/IP and DNS network concepts

In addition, readers must be familiar with installing and administering these products:

• Microsoft Windows Server 2003 Enterprise Edition and MSCS
• Microsoft SQL Server 2005 Enterprise Edition, particularly named instances

Hardware and software requirements
This document discusses configuring and administering a cluster using the following products:

A two-system HP ProLiant cluster with

– Each system satisfying all the hardware requirements for Insight software

Note: For best results, each system should meet the recommended memory and processor speed requirements.
– One free shared disk for the Insight software program files
– At least one free shared disk for Microsoft SQL Server 2005
– Microsoft Cluster Service
– Microsoft Internet Explorer 6.0
– Simple Network Management Protocol (SNMP)
– Microsoft SQL Server 2005 Enterprise Edition
– HP Insight Control Management DVD 2.30
– HP Management CD (version 7.1 or later) and related ProLiant Support Packs

Refer to the HP Insight Control Management Quick Setup Poster for details on the hardware and software installation requirements for Insight software.

System infrastructure

Figure 1 shows how to configure a cluster for enhanced performance once all components are installed. With this configuration, load is distributed by designating each virtual group to work on a separate system.

The purpose of the primary system is to run the Microsoft SQL Server 2005 Enterprise Edition processes and handling remote Microsoft SQL Server commands.

The purpose of the secondary system is to run Insight Dynamics - VSE, the HP SIM service and other Insight Control components.

Storage configuration

Figure 1 shows the relationship between Microsoft SQL Server 2005 Enterprise Edition instances and VSE Management Software/HP SIM. At least two logical drives must be available in the shared storage environment if the infrastructure does not have Microsoft SQL Server installed to which you can attach the VSE Management Software and HP SIM databases.

• The first shared disk contains the Microsoft SQL Server 2005 Enterprise Edition data files. For the examples discussed in this paper, this drive is S:.
• The second shared disk contains the Insight software components program files. For the examples discussed in this paper, this drive is V:.

Tip:
In Cluster Administrator, create a separate cluster resource group for SQL, and another for VSE Management Software. Add the SQL Server shared disk (in this example, S:) as a new disk resource in the cluster resource group for SQL. Add the VSE Management Software shared disk (in this example, V:) as a new disk resource in the cluster resource group for VSE Management Software. However, if you plan to use the script in Appendix A to create the required VSE Management Software cluster resources, neither create the VSE Management Software cluster resource group, nor add the VSE Management Software shared disk as a new disk resource to the group, at this time; these steps will be performed later by the script.

IP addresses

Microsoft Cluster Service requires that each virtual server in a cluster have a unique static IP address. For the configuration described in this paper, five unique IP addresses are required.
1. MSCS cluster IP address and name
   Function: To act as the virtual server IP address and name for the MSCS software.
   Suggested action: MSCS management tools would use this address to get status and reconfigure the MSCS software. For the examples discussed in this paper, the IP address is 140.110.240.62.

2. HP SIM virtual server IP address and name
   Function: To act as the virtual server IP address and name for HP SIM event reception. You specify this name and address to connect to HP SIM through Internet Explorer. From HP SIM, the Virtualization Manager may be launched.
   Suggested action: All SNMP devices that report their events to HP SIM should use this IP address and name for the location of the Event Consolidator, the SNMP Trap Destination. For the examples discussed in this paper, the IP address is 140.110.240.64.

3. Microsoft SQL Server 2005 virtual server IP address and name
   Function: To act as the virtual server IP address and name for the Microsoft SQL Server 2005 Enterprise Edition database software. This software is used to extract, manipulate, or back up the VSE Management Software and HP SIM databases.
   Suggested action: The HP SIM Open Database Connectivity (ODBC) data source uses this as the location where the VSE HP SIM Data Source Name (DSN) points. In the examples discussed in this paper, the IP address is 140.110.240.63.

4. MSCS primary system IP address and name
   Function: To serve as the TCP/IP address and name of the specific Microsoft Windows server host.
   Suggested action: Any software that references system-specific functions uses this address to connect to this system. In the examples discussed in this paper, the IP address is 140.110.240.60.

5. MSCS secondary system IP address and name
   Function: To serve as the TCP/IP address and name of the specific Microsoft Windows server host.
   Suggested action: Any software that references system-specific functions uses this address to connect to this system. For the examples discussed in this paper, the IP address is 140.110.240.61.

Setting up the failover environment

This section of the white paper assumes that you log into each of your cluster systems with the same administrator credentials that you are using to access all the Insight software and Microsoft SQL Server 2005 components that are being set up.

Installing Insight software prerequisites

Review the Insight software installation requirements listed in the HP Insight Control Management Quick Setup Poster included on the HP ICM DVD. Ensure the operating systems component services listed are installed on each node. Installation of these component services can be verified by running the Insight Control Environment Advisor and enabling the “Pre-Install Items” option from the ICM installer menu.
Installing the ProLiant Support Pack

Install all appropriate components from the ProLiant Support Pack (PSP) relevant to your system. Be sure to include the component “HP Insight Management Agents for Windows Server 2003”.

Activating the HP cluster MIB agents

The HP Cluster MIB Agents provide information about your cluster through SNMP. It is a prerequisite for HP SIM that these MIB agents be installed on your cluster to discover and identify itself as a cluster, as well as recognizing its systems as such. To activate the HP Cluster MIB Agents on each system:

1. From the Control Panel, select “HP Management Agents”. The HP Management Agents for Servers window appears.
2. Select the Services tab.
3. Under the Inactive Agents: list box on the right side, double-click Clustering Information to add it to the Active Agents list box on the left side.
   Note: You might need to scroll down to the bottom of the Active Agents list box to ensure and verify that Clustering Information has been added to the list.
4. Click OK to apply the update and Yes to restart the management agents.

Installing the Microsoft SQL Server 2005 Enterprise Edition

The Microsoft SQL Server 2005 Enterprise Edition is required for the installation of Insight software components to be highly available. If you already have an instance of Microsoft SQL Server 2005 Enterprise Edition installed, you can create the VSE Management Software database and attach it to the existing server.


This section of the white paper assumes that you already have a working two-system cluster with at least two free logical drives: one for the Microsoft SQL Server 2005 data files and another for the Insight software components program files.

2. Begin installing Microsoft SQL Server 2005 from the system that currently owns all the shared disks in the cluster. This server is referred to as the primary node for the remainder of this section.
3. Follow the setup process. When the System Configuration Check window appears, ensure that each node is validated. Wait for the check to complete, and resolve any errors or warnings reported.
4. When the Components to Install window appears, select SQL Server Database Services, Create a SQL Server failover cluster, and click Advanced. The Feature Selection window appears.
5. Open Client Components, select Management Tools and Connectivity Components.
6. When the **Instance Name** window appears, enter a name for this database instance. By default, **Default instance** is selected and clients connect to the server by the server name. You must deselect **Default instance** and enter a name in the Instance name field, as shown in Figure 2. For this example, a named instance of a Microsoft SQL Server 2005 virtual server called **VSE_INSTANCE** has been installed. Clients connect to the server through the name **VSE-SQLSVR\VSE_INSTANCE**.

![Figure 2. The Instance Name window](image)

7. When the **Virtual Server Name** window appears, enter the name of the new virtual server. In this example, the name **VSE-SQLSVR** was used, as shown in Figure 3.
8. When the Virtual Server Configuration window appears, enter the IP address for the new virtual server. This address must be unique. Be sure that the Public network is selected in the Network To Use field. In this example, the IP Address 140.110.240.63 was used. There is no need to assign the private LAN address.

9. When the Cluster Group Selection window appears, select the cluster group where the Microsoft SQL Server 2005 program files are to be saved, by selecting the group name, as shown in Figure 4. In this example, the group name “SQL Group” was used.
10. When the **Cluster Node Configuration** window appears, ensure that each node of the cluster appears as either the **Required node** or in the **Selected nodes** list.

11. Follow instructions to complete the MS SQL Server setup process.

12. The **Setup Progress** window appears. Refer to setup error logs, if necessary. Log files can be found in the `Program Files\Microsoft SQL Server\90\Setup Bootstrap\LOG\Files` directory of the local boot disk.

**Tip:**
If the **Setup Progress** window fails to appear, or another message box displays an error involving inability to start a remote task, a probable cause is a misconfigured MS DTC service on one or both nodes. Review and repair the MS DTC service configuration before attempting to reinstall SQL Server.

13. Click **Finish**. Reboot of your servers is not necessary. If required, be sure to follow any reboot instructions at the end of the installation.

14. Verify the installation of the Microsoft SQL Server 2005 Enterprise Edition resources using Cluster Administrator by opening Cluster Administrator from the **Start->Programs->Administrative Tools->Cluster Administrator** menu. You should see the following resources in the group containing your...
Microsoft SQL Server 2005 disk: SQL IP Address, SQL Network Name, SQL Server, SQL Server Agent, SQL Server Fulltext. Be sure that the new Microsoft SQL Server virtual server is running by connecting to it through the Microsoft SQL Server Management Studio.

Installing Insight software components on the cluster

After completing the installation of a Microsoft SQL Server 2005 Enterprise Edition instance, or verification of the availability of an existing Microsoft SQL Server 2005 instance, you are ready to proceed with the installation of the Insight software components on the cluster.

IMPORTANT: Before you begin, be sure that all hardware and software installation requirements are satisfied. Refer to the HP Insight Control Management Installation Checklist and HP Insight Control Management Quick Setup Poster included on the HP ICM DVD

- Ensure that both systems are running cluster services.
- Ensure that the SQL Server instance to which you are installing the Insight software databases is running as a cluster service. Test failover between nodes.
- Review the Release Notes for the components being installed.
- Confirm the installation prerequisites are met by running the Insight Control Environment Advisor.

Installing Insight software components on the primary system

1. Shutdown the secondary node. The Insight software installation process requires a reboot. If the second cluster node is active, all resources will automatically failover to that node preventing a clean installation.
2. On the primary system, log into Microsoft Windows as a user with administrator rights.
   Note: Be sure to log in with the same user ID that you used to install the Microsoft SQL Server 2005 Enterprise Edition instance.
3. Insert the HP ICM DVD into the DVD drive. If the DVD has an AutoRun feature, the End User License agreement appears. If AutoRun is not enabled on the primary system, execute autorun.exe from the DVD root directory. Read the End User License agreement and continue following the installation instructions.
4. Run the Insight Control Environment Advisor to confirm that all the installation requirements are met.
5. When ready, select “3. Run Integrated Installer”. Select installation by customized product list. From the list select desired products. DO NOT select “HP Service Essentials Remote Support Pack”, or “HP Vulnerability and Patch Management Pack”, as these are not supported in a clustered environment.
6. When prompted for the Installation Directory, specify a directory on the shared disk. If the path does not exist, confirm path creation when prompted.
7. If you have selected Rapid Deployment Pack, you must choose to use RDP on an existing remote server. RDP is not supported in a clustered environment.
8. From the Database configuration prompt, select Use existing SQL/MSDE database.
   - Enter the virtual host name assigned to the SQL Server.
   - Enter the name of the Microsoft SQL Server 2005 Enterprise Edition instance that you created. Refer to “Installing the Microsoft SQL Server 2005 Enterprise Edition.” For this paper, the instance name VSE-SQLSVR\VSE_INSTANCE is used.
   - Ensure that the port number is correctly determined.
MS SQL Server 2005 may automatically assign a TCP/IP port number to the SQL Server instance. The port number is required to install Insight software components. Generally, the Insight Control Manager installer will automatically determine the SQL Server port number. However, the TCP/IP port of the SQL Server instance may be determined by following these steps:

a. Run SQL Server Configuration Manager
b. Expand SQL Server 2005 Network Configuration in the left panel
c. Select Protocols for InstanceName in the left panel, where InstanceName is a placeholder for the named instance of SQL Server 2005
d. Double-click TCP/IP in the right panel
e. In the Protocol tab, note the value of the Listen All item
f. In the IP Addresses tab:
   i) If the value of Listen All is yes, the TCP/IP port number for this instance of SQL Server 2005 is the value of the TCP Dynamic Ports item under IPAll
   ii) If the value of Listen All is no, the TCP/IP port number for this instance of SQL Server 2005 is the value of the TCP Dynamic Ports item for a specific IP address

Refer to the article “How to connect to a named instance of SQL Server 2005 or SQL Server 2000 by using the client tools in the earlier version of SQL Server” at http://support.microsoft.com (search for “How to connect to a named instance of SQL Server 2005 or SQL Server 2000 by using the client tools in the earlier version of SQL Server”), or the article “How to configure an instance of SQL Server to listen on a specific TCP port or a dynamic port” at http://support.microsoft.com (search for “How to configure an instance of SQL Server to listen on a specific TCP port or a dynamic port”) for more information on how to determine the port where the SQL Server instance is listening.

9. Continue to follow the ICM installation instructions.
10. When prompted for VSE Local Data Storage directory, be sure to specify a directory that is on the shared disk.
11. Click Install. The installation of ICM components is initiated.

   REMINDER: The installation of ICM components will cause a reboot. Be sure the other node of the cluster is now shutdown; otherwise physical resources such as shared disks, SQL server, etc. will failover to the other node resulting in a failed ICM installation.

12. To specify that any configuration change in the list of available IP addresses should automatically reconfigure System Management Homepage (SMH), restarting it when needed, edit the smhpdp.xml file located in the c:\hp\hpsmh\conf directory to insert:

    <monitor-ip-changes>1</monitor-ip-changes>

   immediately following:

    <localaccess-type>Anonymous</localaccess-type>

   and save the file. Restart the “HP System Management Homepage” service from Services console under Administrative tools.

**Installing Insight software components on the secondary system**

To have a clustered installation of HP ICM, the second system in the cluster must complete the installation process as well, with a few differences in the procedure to account for the existing program files on the cluster disk.
IMPORTANT:
Be sure to specify the same user credentials and path information that you used on the primary system.

Be sure that the secondary system owns all of the clustered disks. It is recommended to shutdown the primary node.

1. Shutdown the primary node.
2. On the secondary system, rename the existing HP ICM installation folder with all its installed components folders on the shared disk. For this paper, the shared disk V:\ is used. Be sure to specify the same location and same folder name on the same shared disk as in the primary system installation.
3. On the secondary system, before attempting installation, run the **Insight Control Environment Advisor** to confirm that all the installation requirements are met. Then, repeat steps 3-12 in “Installing Insight software components on the primary system” with respect to the secondary system.
4. Open the `~\Systems Insight Manager\config\database.props` file (e.g. using notepad) and record the database name corresponding to the keyword `hp.Database.databaseName`.
5. Shutdown the Secondary system.

Adjusting the HP SIM data source name on the primary system

1. Bring up primary system.
2. Run **Control Panel->Administrative Tools->Data Sources (ODBC)**.
3. Select the **System DSN** tab.
4. Select **Insight_v50_0** and click **Configure**.
5. Update the Database Description referring to the database name created on the secondary system.

    Note: Use the database name (corresponding to the `hp.Database.databaseName` keyword) recorded in step 4 of “Installing Insight software components on the secondary system.”

6. Click **Next**. The authentication mode selection window appears. The default settings may be retained.
7. Click **Next**. The database selection window appears, as shown in Figure 5.
8. Select the database created by the secondary system. Use the database name (corresponding to the `hp.Database.databaseName` keyword) recorded in step 4 of “Installing Insight software components on the secondary system.”
9. Click **Next**. The final Microsoft SQL Server DSN Configuration window appears.
10. Click **Finish** to complete the configuration. A summary window appears. Optionally, click **Test Data Source** to validate the connection.
11. Click **OK**. The **ODBC Data Source Administrator** window appears.
12. Click **OK** to close the **ODBC Data Source Administrator** window.
Figure 5. Adjusting the data source name on the primary system

Adding the Insight software cluster resources

To complete the installation of HP ICM to the cluster, several cluster resources must be created using Cluster Administrator. This can be accomplished by either running the HA-VSE configuration scripts or by following the next steps.

Naming Insight software resource groups

1. Power the primary system on, and log in to Windows as Administrator.
2. Power the secondary system on.
3. Open the Cluster administrator tool from the primary system and confirm that the primary system owns all the cluster resources. Ensure that the Cluster Service is running on the secondary system (select the Start Cluster Service menu option if it is not running).
4. In the Cluster Administrator window, create a new cluster group, using CTRL-G or File, New, Group. Enter the name of the group, e.g., “HA-VSE Group”. Click Next and add from the list of available nodes, the preferred owner(s). Click Finish. Figure 6 shows the result.
Creating the Insight software physical disk resource

1. In the **Cluster Administrator** window, right click the **HA VSE Group** from the left pane and select **New->Resource** from the dropdown menu.
2. The **New Resource** window appears.
3. In the **Name** field, enter “HA-VSE Disk” and select **Physical Disk** from the **Resource type** dropdown menu.
4. Click **Next**. The **Possible Owners** window appears. Be sure that the two systems in your cluster are listed in the **Possible Owners** pane.
5. Click **Next**. The **Dependencies** window appears.
6. Click **Next**. Select the shared disk (in this case V: \) containing the Insight software components program files.
7. Click **Finish**.

Creating the HP SIM IP address resource

1. Following the same steps as in “Creating the Insight software physical disk resource,” create another resource in the HA VSE Group. Name the resource “HA-VSE IP Address” and select resource type **IP Address**.
2. Be sure that the two systems of the cluster are listed in the **Possible Owners** pane.
3. No resource dependencies are required for the HP SIM IP address resource.
4. In the **TCP/IP Address Parameters** window, enter the unique IP address to use for connecting to the HP SIM service. This IP address (in this white paper, 140.110.240.64) is the one associated with the network name resource, and may be used by clients to connect to the service, regardless of which system currently owns the group. Select **Public** network and enable NetBIOS settings, if it is not enabled by default.

**Creating the HP SIM network name resource**

1. Following the same steps as in “Creating the Insight software physical disk resource,” create another resource in the HA VSE Group. Name the resource “HA-VSE Network Name” and select resource type **Network Name**.
2. Be sure that the two systems of the cluster are listed in the Possible Owners pane.
3. Select HA-SIM IP Address as a dependency for this new resource.
4. In the **Network Name Parameters** window, provide a network name (in this white paper, VSE-CMS) for the resource. Clients access the CMS by this name. This name is not required to be NetBIOS compliant.

**Creating the HP SIM generic service resource**

1. Following the same steps as in “Creating the Insight software physical disk resource,” create another resource in the HA VSE Group. Name the resource “HA-VSE SIM Service” and select resource type **Generic Service**.
2. Be sure that the two systems of the cluster are listed in the Possible Owners pane.
3. Select “HA-VSE Disk” and “HA-VSE Network Name” as dependencies.
4. In the **Service Parameters** window, enter “HP Systems Insight Manager” in the Service Name field. This is the service name for the HP SIM. Parameters are not required.
5. Registry replication information is not required.

**Creating the OpenSSH Services generic service resource**

1. Following the same steps as in “Creating the HP SIM generic service resource,” create another resource in the HA VSE Group. Name the resource “HA-VSE OpenSSH Service” and select resource type **Generic Service**.
2. Be sure that the two systems of the cluster are listed in the Possible Owners pane.
3. Select “HA-VSE Disk” as a dependency.
4. In the **Service Parameters** window, enter “OpenSShd” in the Service Name field. This is the service name for the OpenSSH Server. Parameters are not required.
5. Registry replication information is not required.

**Creating the Pegasus WMI Mapper generic service resource**

1. Following the same steps as in “Creating the HP SIM generic service resource,” create another resource in the HA VSE Group. Name the resource “HA-VSE WMI Service” and select resource type **Generic Service**.
2. Be sure that the two systems of the cluster are listed in the Possible Owners pane.
3. Select “HA-VSE Disk” as a dependency.
4. In the **Service Parameters** window, enter “WMI Mapper” in the Service Name field. This is the service name for the Pegasus WMI Mapper. Parameters are not required.
5. Registry replication information is not required.
Other Insight software components

Depending upon which other Insight software components were selected for installation, create the required cluster resources, as described in the following sections.

Version Control Repository Manager
VCRM is not a cluster-aware application. HP does not support a configuration in which it automatically fails over.

Virtual Machine Management Pack
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “hpvmmsvc” as the **Service Name**.

Proliant Essentials Performance Management Pack
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “HP Performance Management Pack” as the **Service Name**.
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “HP PMP Tools” as the **Service Name**.

Virtual Server Environment Management Software
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “AppDisc” as the **Service Name**.
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “HP Global Workload Manager CMS” as the **Service Name**.
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “HP LSA Controllers” as the **Service Name**.
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “HP Logical Server Automation” as the **Service Name**.
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “hpSMPsvc” as the **Service Name**.
• Create a resource, selecting **Generic Service** as the **Resource type**, and specifying “hpwebSMPsvc” as the **Service Name**.

Summary of Insight software cluster resources

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Resource Type</th>
<th>Dependencies</th>
<th>Parameters</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA VSE Group</td>
<td>Group</td>
<td></td>
<td></td>
<td>“Container” for physical resource</td>
</tr>
<tr>
<td>HA-VSE Disk</td>
<td>Physical Disk</td>
<td>None</td>
<td>Shared disk</td>
<td></td>
</tr>
<tr>
<td>HA-VSE IP Address</td>
<td>IP Address</td>
<td>None</td>
<td>IP Address</td>
<td>Virtual IP used to connect to SIM</td>
</tr>
<tr>
<td>HA-VSE Network Name</td>
<td>Network Name</td>
<td>HA-VSE IP Address</td>
<td>Network Name</td>
<td>Network name of virtual IP address used to connect to SIM</td>
</tr>
<tr>
<td>HA-VSE SIM Service</td>
<td>Generic Service</td>
<td>HA-VSE Disk</td>
<td>“HP Systems Insight Manager”</td>
<td></td>
</tr>
<tr>
<td>HA-VSE OpenSSH Service</td>
<td>Generic Service</td>
<td>HA-VSE Disk</td>
<td>“OpenSSHd”</td>
<td></td>
</tr>
</tbody>
</table>
Bringing the virtual group containing the Insight software resources online

In the Cluster Administrator window, right-click on the HA VSE Group in the left pane, and select **Bring Online** from the dropdown menu. If configured properly, all resources should come online, as shown in Figure 7.
Figure 7. Cluster Administrator: Cluster resources in the HA-VSE Group

The cluster installation of HP ICM is now complete. The following section discusses how to validate your cluster installation of HP ICM.

Additional Configuration Steps

Server Migration Pack/Universal Edition
- SMP/UE stores its license keys in the Windows registry. Therefore, apply the SMP/UE license on each node of the cluster.
- Edit the SMP/UE - \bin\mmweb.xml file and change all instances of the parameter “Set name=Host”, replacing “localhost” with the cluster virtual host name:

```xml
<!-- <Set name="Host">localhost</Set> -->
<Set name="Host">VSE-CMS</Set>
```


Validating the Installation

To be sure that the HA-VSE Group resources can be moved between both systems, perform the following steps from either one of the cluster systems:

1. Open the Cluster Administrator and connect to the cluster.
2. In the Cluster Administrator window, on the left pane, right-click on the disk group containing the Insight software components program files. For example, the name **HA-VSE Group** was used in this paper. Select **Move Group**. Be sure that the group fails over to the other system, and that all of the HA-VSE Group cluster resources come online.

3. After waiting a few minutes to ensure that the HP SIM service has restarted, connect to the HP SIM service through a Web browser, using the network name you specified when creating the HP SIM network name resource (VSE-CMS in this paper). The URL **http://VSE-CMS:280** specifies the virtual network name and the port of the HP SIM service.

   Tip
   You must always specify the port 280 in the URL of your Web browser to connect to the HP SIM service. To learn more about connecting to HP SIM, refer to the *HP Systems Insight Manager User Guide*.

   The Systems Insight Manager icon on the Windows desktop of each system was created by the installation of HP SIM as a handy shortcut for a regular standalone server only. This icon is no longer applicable at this point because the HP SIM is clustered. The icon should be deleted from the desktop of each system to avoid future confusion.

4. A security alert displays. Click **OK**. The **Login** window appears.

5. Be sure to log in with the appropriate username, password, and domain for your cluster. After you have successfully logged in, the HP SIM home page appears.

   Tip
   **IMPORTANT:** Clustering allows any system in the cluster to own the virtual group containing the Insight software resources. With the creation of a virtual network name and IP address specific to the HP SIM service, clients can connect to the service without knowing which system currently owns the virtual group. When browsing to the virtual name for HP SIM rather than the name of the server that owns the virtual group, a security certificate for HP SIM is sent to your browser. If your browser is configured to warn about invalid site certificates, a security alert displays when connecting to the HP SIM virtual server (which was created earlier in this paper). This alert indicates that the name you have connected to does not match the name on the certificate. This is because the name on the certificate is the name of the secondary system and not that of the virtual server. To learn more about the browser security alert, refer to the *HP Systems Insight Manager User Guide* located on the HP Management CD (version 7.1 or greater).

6. Navigate to **Options → Discovery**. Select **System Automatic Discovery** task and click **Edit**. The **Edit Discovery** page appears. Take a look at the **Ping inclusion ranges** list box (on the left side of the right frame, near the bottom of the screen). Note that HP Systems Insight Manager automatically generates a range for each of the IP addresses the current system has. Because one of these ranges is based on the cluster heartbeat IP address (generally of the form 10.0.0.1), that range would not be of any use, and you should remove it from the list in order to prevent future confusion. Be sure to click **OK**.

7. Navigate to the **Options → Protocol Settings → WMI Mapper Proxy**. Check the **Host** list and ensure that the cluster virtual name is used instead of any of the system names (delete the system name, if it is used, and add the cluster virtual name).

8. Return to the Cluster Administrator.

9. Repeat steps 2 through 7 in the section “Validating the Installation” using the other system.
These steps are to ensure Insight software components are working after failover.

You should be able to use the active system name to establish a command-line session to the cluster HP Systems Insight Manager service from a client system that has an OpenSSH client installed, using SSH.
Appendix A — Sample cluster resources creation script

This appendix includes a Microsoft Windows Script Host file that may be copied (e.g., cut and pasted), customized for your environment, and then executed to create the required HA VSE cluster resources. Also included are two VBScript script files containing common definitions and functions used by the cluster resources creation script. Follow these steps to create the required cluster resources:

1. Create the files HA-VSE_defines.vbs, HA-VSE_common.vbs, and HA-VSE_script.wsf by copying the contents (e.g., using cut and paste) as listed below.
2. Modify the HA-VSE_defines.vbs file to reflect values specific to your installation. The values for the following constants are likely to be unique to each configuration.
   - simIPNW
   - simIPAddr
   - simIPNetmask
   - simNWname
   - simDiskDrive
3. To verify that all prerequisite conditions to create the cluster resources are satisfied, execute the prerequisites check job step in the Windows Command line Window as follows:
   ```
   cscript HA-VSE_script.wsf //job:check
   ```
4. Ensure that the output of the prerequisites check job step reports all conditions are "OK" before proceeding to the next step.
5. If all prerequisite conditions are met, execute the cluster resources definition job step as follows:
   ```
   cscript HA-VSE_script.wsf //job:define
   ```
6. The results of the cluster resources creation script may be validated using the Cluster Administrator.

Notes:

- If copying across page breaks, extraneous characters may be included in the text. Remove any such extraneous characters to avoid syntax errors. For example, extraneous characters could result in a syntax error such as the following:
  ```
  ha-vse_script.wsf(81, 2) Windows Script Host: Invalid character
  ```
- A line wrap in the document will appear as two lines in the source file. Remove extraneous new lines to avoid syntax errors. For example, extraneous new lines could result in a syntax error such as the following:
  ```
  ha-vse_script.wsf(104, 76) Microsoft VBScript compilation error: Unterminated string constant
  ```

Examine the lines (in this example, line 104), and edit to join together, removing extraneous new lines.

......
HA-VSE_defines.vbs

The HA-VSE_defines.vbs script file contains global definitions used by the cluster resources creation script. The values in the file must be customized for your environment before executing the cluster resources creation script, HA-VSE_script.wsf.

```
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
The HA-VSE_common.vbs script file contains global data and common functions used by the cluster resources creation script, HA-VSE_script.wsf.

Option Explicit
Public objCluster, arrCluRes(), iWarn

Public Function WarnMsg( strWarn )
    WScript.Echo "WARNING - " & strWarn
    iWarn = iWarn + 1
End Function

Public Function ErrorCheck( strTask, strDesc )
    'On Error Resume Next
    'Wscript.Echo "Error Checking " & offset & " " & strTask & " " & strDesc ' DEBUG
    If Err.Number <> 0 Then
        Wscript.Echo "Error# " & Err.Number & ": " & strTask & " - " & strDesc
        iWarn = iWarn + 1
    Wscript.Echo
    Err.Clear
End Function

Public Function invertHash( ByRef hash, ByRef inverted )
    On Error Resume Next
    Dim key
    For Each key In hash.Keys
        inverted.Add hash(key), key
    Next
End Function

Public Sub cluConnect(cluHost, objCluster)
    ' Purpose: to connect to cluster on host and instantiate cluster object.
    ' If no host name, then "this host" where script is running
    ' is default.
    Set objCluster = CreateObject("MSCluster.Cluster")
    objCluster.Open cluHost
End Sub

Public Function cluDisconnect()
' Dereferences global objects. Used with cluConnect.
' Set objCluster = Nothing
End Function

Public Sub cluEnumNodes(cluster, nodes)
' Purpose: list all nodes configured in cluster definition.
' If no cluster name, then "this cluster" is default.
' Dim objNode
ReDim nodes(0)
Dim n
n = 0

for each objNode in cluster.Nodes
    nodes(n) = objNode.Name
    n = n + 1
    ReDim Preserve nodes(n)
next
End Sub

Public Function getClusterResources
'On Error Resume Next
Dim collCluResources, counter, res, obj, cluNumRes
Set collCluResources = objCluster.Resources
cluNumRes = collCluResources.Count
'Wscript.Echo "Found " & cluNumRes & " Resources" 'DEBUG
ReDim arrCluRes(cluNumRes)
For counter = 1 to cluNumRes
    Set res = collCluResources.Item(counter)
    arrCluRes(counter) = res.Name
    'WScript.Echo "Resource: " & arrCluRes(counter) 'DEBUG
Next
End Function

Public Function checkResource( resName )
On Error Resume Next
Dim cluRes

For Each cluRes In arrCluRes
    If resName = cluRes Then
        'Wscript.Echo "Found " & resName & " in resource array" 'DEBUG
        checkResource = True
        Exit Function
    End If
Next
' if we get here w/o Exiting: then the resource wasn't found
checkResource = False
End Function

Public Function verifySvc( svcName, hostName )
On Error Resume Next
Dim objLocator, objService
Dim objMySvc, colSvcs
WMIConnect hostname, objService
Set colSvcs = objService.ExecQuery("Select * from Win32_Service Where Name = '" & svcName & "'")
'WScript.Echo "Err: " & Err.Number & Err.Description
If colSvcs.Count < 1 Then
    WarnMsg "Missing required service '" & _
    svcName & _
    "' on node " & hostName
Else For Each objMySvc in colSvcs
    If objMySvc.Name = svcName Then
        WScript.Echo "OK! - " & _
        objMySvc.DisplayName & _
End If
Next
End Function
Public Function WMIconnect( hostName, objWMI )
On Error Resume Next
Dim objLocator, objService

Set objLocator = CreateObject("WbemScripting.SWbemLocator")
Set objWMI = objLocator.ConnectServer(hostName, "root\cimv2",,,,,128)

if Err.Number <> 0 then
    WScript.Echo "Err Connect: " & Err.Number & Err.Description
    ErrorCheck "ConnectServer", Err.Description
    Exit Function
end if

objWMI.Security_.ImpersonationLevel = 3
End Function

Public Function getdiskSig( driveLtr, disksig )
DIM hostname, objWMIService, WMIquery
DIM objPartitions, objPartition
DIM objDisks, objDisk

hostname = "."
WMIconnect hostname, objWMIService
WMIquery = "WIN32_LogicalDisk.DeviceID='" & driveLtr & `'"
Set objPartitions = objWMIService.AssociatorsOf (WMIquery,"Win32_DiskPartition")
Errorcheck "objPartitions", Err.Description

If objPartitions.count > 1 Then
    Err.Number = 999
    Errorcheck "objPartitions", "More partitions retrieved than expected."
End If

For Each objPartition in objPartitions
    WMIquery = "Win32_DiskPartition.DeviceId='" & objPartition.DeviceId & `'"
    Set objDisks = objWMIService.AssociatorsOf (WMIquery,"Win32_DiskDrive")
    Errorcheck "objDisks", Err.Description

    If objDisks.count > 1 Then
        Err.Number = 999
        Errorcheck "objDisks", "More disks retrieved than expected."
    End If

    For Each objDisk in objDisks
        disksig = objDisk.Signature
        Exit Function
    Next
Next
End Function
HA-VSE_script.wsf

The HA-VSE_script.wsf file contains the cluster resources creation script. It includes a job that
determines if prerequisite conditions for creating the HA-VSE cluster resources are satisfied, and a job
that creates the required HA-VSE cluster resources.

```xml
<?xml version="1.0"?>
<!--------------------------------------------------------------------------->
; HA-VSE_script.wsf
; This is a Microsoft Windows Script Host file (.wsf)
; It consists of two job steps:
; 1) JOB:check - determines if the prerequisite conditions
;   for creating the HA-VSE cluster resources
;   are satisfied.
;
; 2) JOB:define - creates the HA-VSE cluster resource
;   definitions
;
; Execution example:
;   cscript HA-VSE_script.wsf //job:check
;
; © Copyright 2008 Hewlett-Packard Development Company, L.P.
-------------------------------------------------------------------------->
<package id="Main">
<job id="check">
<!--------------------------------------------------------------------------->
; The following line references the MSCLUS type library, which
; makes the library-defined constants and enums available to the
; script. The reference is job-specific. Each job must include
; this line in order to use the type library definitions.
-------------------------------------------------------------------------->
<reference guid="{F2E606E0-2631-11D1-89F1-00A0C90D061E}" version="1.0" />
<!--------------------------------------------------------------------------->
; The following lines include the specified external file for
; this job.
-------------------------------------------------------------------------->
<script language="VBScript" src="HA-VSE_defines.vbs"/>
<script language="VBScript" src="HA-VSE_common.vbs"/>
<script language="VBScript">
<!CDATA[
Option Explicit
On Error Resume Next
DIM host
host = ""    'null defaults to "this host"

Dim cluGroup

Dim hRes, resKey
Dim hResInv

cluConnect host,objCluster
ErrorCheck "cluConnect", "Fail to connect to cluster on host: "_
   & host & Err.Description

DIM cluNode
DIM n
On Error Goto 0
' Now check pre-req services availability on each node
WScript.Echo _
   "Checking for required Windows services on cluster nodes..."
For Each cluNode in objCluster.Nodes
   For n = 0 to UBOUND(arrSvcName,2)
      verifySvc arrSvcName(0,n), cluNode.Name
      ErrorCheck "verifySvc", "An error occured: "_
         & Err.Description
```

```
WSCript.Echo ""
WSCript.Echo "Checking if VSE cluster resources are able to be defined..."

This On Error will allow execution if grpName does not exist. On Error Resume Next
Set cluGroup = objCluster.ResourceGroups.Item(grpName)
If cluGroup Is Nothing Then
    WScript.Echo "OK! - Cluster Group " & grpName & ""
Else
    WarnMsg "Cluster Group " & grpName & " already exists."
End If

'Reset Error handling
On Error Goto 0
Set hRes = CreateObject("Scripting.Dictionary")
hRes.Add "hasimDisk", simDisk
hRes.Add "hasimNetname", simNetname
hRes.Add "hasimIP", simIP
' create an inverted hash to more easily compare against the set of keys, in this case, the resource names assigned above
Set hResInv = CreateObject("Scripting.Dictionary")
invertHash hRes, hResInv

getClusterResources
ErrorCheck "getClusterResources", "Error encountered: " & Err.Description & hres(resKey)

'loop thru resource strings, to verify that it matches the 'hash configured above. If we find a match of a resource, 'that may prevent it from being created by the next job step.
For Each resKey In hRes.Keys
    If checkResource (hres(resKey)) = True Then
        WarnMsg "Cluster resource " &
        hres(resKey) & " already exists."
    Else
        Wscript.Echo "OK! - Cluster resource " &
        hres(resKey) & ""
    End If
ErrorCheck "checkResource", "Error encountered: " &
Err.Description & hres(resKey)
Next

If iWarn > 0 Then
    WScript.Echo ""
    WScript.Echo "There have been " & iWarn & " warnings."
    WScript.Echo "Some prerequisite conditions have not" &
    " been met."
    WScript.Echo "Continuing with VSE cluster resource" &
    " definition is not recommended."
Else
    WScript.Echo ""
    WScript.Echo "Prerequisite conditions appear to have" &
    " been met."
    WScript.Echo "Continue with VSE cluster resource" &
    " definition."
End If

cluDisconnect
]]>
</script>
</job>

<!---------------------------------------------------------------------
--------------------------------------------------------------------->

<!---------------------------------------------------------------------

; The following line references the MSCLUS type library, which
; makes the library-defined constants and enums available to
; the script. The reference is job-specific. Each job must
; include this line in order to use the type library definitions.
---------------------------------------------------------->
<reference guid="{F2E606E0-2631-11D1-89F1-00A0C90D061E}" version="1.0" />

<script language="VBScript" src="HA-VSE_defines.vbs"/>
<script language="VBScript" src="HA-VSE_common.vbs"/>
<script language="VBScript">

<!--[CDATA[
Option Explicit
On Error Resume Next
DIM host
host = "" 'null defaults "this host"

cluConnect host,objCluster
WScript.echo "Creating VSE Cluster resources using cluster: " & objCluster.Name

DIM cluNodes
DIM n
cluEnumNodes objCluster, cluNodes
WScript.Echo "There are " & uBound(cluNodes) & " nodes in cluster."
For n = 0 to UBound(cluNodes) - 1
  Wscript.Echo cluNodes(n)
Next

' Does given resource exist?
Dim cluGroup
Dim cluResource
Dim cluResProps
Dim cluResIP
Dim cluNetName
Dim cluDisk
Dim cluService
On Error Goto 0

Set cluGroup = objCluster.ResourceGroups.CreateItem(grpName)
If Err.Number <> 0 Then
  ErrorCheck "Create cluGroup", Err.Description
Else
  WScript.Echo "OK! - VSE Cluster group " & grpName & " created."
End If

' IP Address Resource
Set cluResIP = cluGroup.Resources.CreateItem(simIP,"IP Address",0)
Set cluResProps = cluResIP.PrivateProperties
cluResProps.Item("Network").Value = simIPNW
cluResProps.Item("Address").Value = simIPAddr
cluResProps.Item("SubNetMask").Value = simIPNetmask
cluResProps.Item("EnableNetBIOS").Value = 1
cluResProps.SaveChanges
If Err.Number <> 0 Then
  ErrorCheck "Create cluResIP", Err.Description
Else
  WScript.Echo "OK! - SIM Cluster IP Resource " & simIP & " created."
End If

'Network Name Resource
Set cluNetName = cluGroup.Resources.CreateItem(simNetname,"Network Name",0)
Set cluResProps = cluNetName.PrivateProperties
cluResProps.Item("Name").Value = simNWname
cluNetName.Dependencies.AddItem(cluResIP)
cluResProps.SaveChanges
If Err.Number <> 0 Then
    ErrorCheck "Create cluNetName", Err.Description
Else
    WScript.Echo "OK! - SIM Cluster Network Name Resource " _
        & simNetName & ") created."
End If
'
' SIM Disk Resource
On Error Goto 0
Dim simDiskSig
getdiskSig simDiskDrive, simDiskSig
Set cluDisk = cluGroup.Resources.CreateItem(simDisk, _
    "Physical Disk",0)
Set cluResProps = cluDisk.PrivateProperties
cluResProps.Item("Signature").Value = simDiskSig
cluResProps.SaveChanges
If Err.Number <> 0 Then
    ErrorCheck "Save cluDisk", Err.Description
Else
    WScript.Echo "OK! - VSE Cluster Disk Resource " _
        & simDisk & ") created."
End If
'
' Generic Service Resources
For n = 0 To UBOUND(arrSvcName,2)
    'This is a very long statement. Watch line wrap.
    Set cluService = cluGroup.Resources.CreateItem(arrSvcName(1,n),"Generic Service",0)
    'End of long statement.
    Set cluResProps = cluService.PrivateProperties
    cluResProps.Item("ServiceName").Value = arrSvcName(0,n)
    cluService.Dependencies.AddItem(cluDisk)
    cluResProps.SaveChanges
    If Err.Number <> 0 Then
        ErrorCheck "Create VSE Service", Err.Description
    Else
        WScript.Echo "OK! - VSE Service Resource " _
            & arrSvcName(1, n) & ") created."
    End If
Next
'
' Bring HA-VSE Group online
On Error Goto 0
Dim ol
ol=cluGroup.Online(5)
If Err.Number <> 0 Then
    ErrorCheck "cluGroup Online", Err.Description
Else
    WScript.Echo "OK! - VSE Cluster Group Online on this node."
End If
'
' Cleanup; deref objects
Set cluResProps = Nothing
Set cluService = Nothing
Set cluDisk = Nothing
Set cluNetName = Nothing
Set cluResIP = Nothing
Set cluGroup = Nothing
Set objCluster = Nothing
]]>
</script>
</job>

</package>
Sample output from prerequisite check step:

C:\script>cscript HA-VSE_script.wsf //job:check
Microsoft (R) Windows Script Host Version 5.6
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Checking for required Windows services on cluster nodes...
OK! - 'HP Systems Insight Manager' in state 'Stopped' on node SYS001
OK! - 'Pegasus WMI Mapper' in state 'Running' on node SYS001
OK! - 'OpenSSH Server' in state 'Stopped' on node SYS001
OK! - 'HP Virtual Machine Management Service' in state 'Stopped' on node SYS001
OK! - 'HP Performance Management Pack' in state 'Stopped' on node SYS001
OK! - 'HP PMP Tools' in state 'Stopped' on node SYS001
OK! - 'HP Application Discovery' in state 'Stopped' on node SYS001
OK! - 'HP Global Workload Manager Central Management Server' in state 'Stopped' on node SYS001
OK! - 'HP LSA Controllers' in state 'Stopped' on node SYS001
OK! - 'HP Logical Server Automation' in state 'Stopped' on node SYS001
OK! - 'HP SMP Universal Edition Application Service' in state 'Stopped' on node SYS001
OK! - 'HP SMP Universal Edition Web Service' in state 'Stopped' on node SYS001
OK! - 'HP Systems Insight Manager' in state 'Stopped' on node SYS002
OK! - 'Pegasus WMI Mapper' in state 'Running' on node SYS002
OK! - 'OpenSSH Server' in state 'Stopped' on node SYS002
OK! - 'HP Virtual Machine Management Service' in state 'Stopped' on node SYS002
OK! - 'HP Performance Management Pack' in state 'Stopped' on node SYS002
OK! - 'HP PMP Tools' in state 'Stopped' on node SYS002
OK! - 'HP Application Discovery' in state 'Stopped' on node SYS002
OK! - 'HP Global Workload Manager Central Management Server' in state 'Stopped' on node SYS002
OK! - 'HP LSA Controllers' in state 'Stopped' on node SYS002
OK! - 'HP Logical Server Automation' in state 'Stopped' on node SYS002
OK! - 'HP SMP Universal Edition Application Service' in state 'Stopped' on node SYS002
OK! - 'HP SMP Universal Edition Web Service' in state 'Stopped' on node SYS002

Checking if VSE cluster resources are able to be defined...
OK! - Cluster Group 'HA-VSE Group'
OK! - Cluster resource 'HA-VSE Disk'
OK! - Cluster resource 'HA-VSE Network Name'
OK! - Cluster resource 'HA-VSE IP Address'

Prerequisite conditions appear to have been met.
Continue with VSE cluster resource definition.

Sample output from cluster resources creation step:

C:\script >cscript HA-VSE_script.wsf //job:define
Microsoft (R) Windows Script Host Version 5.6
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Creating VSE cluster resources using cluster: HA-VSE
There are 2 nodes in cluster.
SYS001
SYS002
OK! - VSE Cluster group 'HA-VSE Group' created.
OK! - SIM Cluster IP Resource 'HA-VSE IP Address' created.
OK! - SIM Cluster Network Name Resource 'HA-VSE Network Name' created.
OK! - VSE Cluster Disk Resource 'HA-VSE Disk' created.
OK! - VSE Service Resource 'HA-VSE SIM Service' created.
OK! - VSE Service Resource 'HA-VSE WMI Service' created.
OK! - VSE Service Resource 'HA-VSE OpenSSH Service' created.
OK! - VSE Service Resource 'HA-VSE VMM Service' created.
OK! - VSE Service Resource 'HA-VSE PMP Service' created.
OK! - VSE Service Resource 'HA-VSE PMP Tools Service' created.
OK! - VSE Service Resource 'HA-VSE AD Service' created.
OK! - VSE Service Resource 'HA-VSE gWLM Service' created.
OK! - VSE Service Resource 'HA-VSE LSA Controllers Service' created.
OK! - VSE Service Resource 'HA-VSE LSA Service' created.
OK! - VSE Service Resource 'HA-VSE SMP Service' created.
OK! - VSE Service Resource 'HA-VSE SMP Web Service' created.
OK! - VSE Cluster Group Online on this node.
Appendix B – HP Insight software suites

The Insight Control Management DVD can be used to deploy and license the following HP Insight software suites. You can install one or more suites during installation.

- Insight Control Environment (ICE)
- Insight Control Environment for BladeSystem (ICE-BL)
- Insight Dynamics - VSE
- Insight Control Data Center Edition (ICDC)
- iLO Power Management Pack (iPMP)
- iLO Power Management Pack for BladeSystem (iPMP-BL)

Insight Control Environment is an integrated software package that delivers comprehensive foundation management for ProLiant DL and ML servers. Key features include the following:

- Unified system monitoring and control, built on HP SIM
- Graphical blade infrastructure discovery and administration
- Rapid server and operating system deployment
- Advanced server power management, including power capping
- Industry leading remote control and administration delivered through HP Integrated Lights-Out management
- Proactive performance management and bottleneck analysis
- Consolidated vulnerability scanning and patching for Microsoft Windows and Linux
- United management of physical and virtual infrastructure for VMware or Microsoft Virtual Server Environments

Insight Control Environment for BladeSystem is an integrated software suite that simplifies the provisioning and management of HP BladeSystem infrastructures. Key features include the following:

- Unified system monitoring and control, built on HP SIM
- Graphical blade infrastructure discovery and administration
- Rapid server and operating system deployment
- Advanced power management for BladeSystem servers and enclosure resources, including power capping
- Industry-leading remote control and administration delivered through embedded BladeSystem functionality and HP Integrated Lights-Out 2 management
- Proactive performance management and bottleneck analysis
- Consolidated vulnerability scanning and patching for Windows and Linux servers
- United management of physical and virtual infrastructure for VMware or Microsoft Virtual Server Environments

HP Insight Dynamics - VSE enables you to continuously analyze and optimize your infrastructure. Key features include the following:

- Bring the flexibility of virtualization to physical servers
- Real-time capacity planning for servers and power
- Control physical and virtual resources in the same way
- Includes Insight Control Environment

Refer to the HP Insight Control Management User Guide for further information.
References

Refer to the following for more information regarding the topics discussed in this paper.

Microsoft Cluster Service

2. “Maximum number of supported nodes in a cluster” (article ID: 288778).  
   http://support.microsoft.com (search for “Maximum number of supported nodes in a cluster”)
3. “How to add a registry value to a Windows Server 2003-based computer that you start from a SAN so that the startup disk, the pagefile disks, and the cluster disks are all on the same SAN fabric” (article ID: 886569).  
   http://support.microsoft.com (search for “How to add a registry value to a Windows Server 2003-based computer that you start from a SAN so that the startup disk, the pagefile disks, and the cluster disks are all on the same SAN fabric”)
4. Boot from SAN Cluster Registry Update utility (BFSCLRegUp.exe).  
   http://www.hp.com (select Support & Troubleshooting, then Business Support Center, then search for “Boot from SAN Cluster Registry Update utility”)
   http://support.microsoft.com (search for “How to configure Microsoft Distributed Transaction Coordinator on a Windows Server 2003 cluster”)
   http://support.microsoft.com (search for “How to enable network DTC access in Windows Server 2003”)

Microsoft SQL Server 2005

   http://support.microsoft.com (search for “Bug 408784”)
3. “How to configure an instance of SQL Server to listen on a specific TCP port or a dynamic port” (article ID: 823938).  
   http://support.microsoft.com (search for “How to configure an instance of SQL Server to listen on a specific TCP port or a dynamic port”)
4. “How to connect to a named instance of SQL Server 2005 or SQL Server 2000 by using the client tools in the earlier version of SQL Server” (article ID: 265808).  
   http://support.microsoft.com (search for “How to connect to a named instance of SQL Server 2005 or SQL Server 2000 by using the client tools in the earlier version of SQL Server”)

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For more information

www.hp.com/go/insightdynamics
www.hp.com/go/insightcontrol
www.hp.com/go/vse
www.hp.com/go/hpsim

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490637-001, May 2008