Cisco Unified Computing System Using EMC CLARiiON Storage, VMware vSphere 4, and SAP Adaptive Computing Compliant System

White Paper

June 2010 Revision 1.0

Contents

1 What You Will Learn

This document describes how the Cisco Unified Computing System™(UCS) can be used in conjunction with EMC® CLARiiON® or Symmetrix VMAX storage systems and VMware® vSphere 4™ to implement SAP Systems compliant to SAP Adaptive Computing. The Cisco Unified Computing System provides the compute, network, virtualization, and storage access resources that are centrally controlled and managed as a single cohesive system. VMware vSphere 4 adds more flexibility and manageability to the computing resources. The result is an implementation that addresses many of the challenges that SAP Basis administrators and their IT departments face today, including needs for a simplified deployment and operation model, high performance for SAP systems, and lower total cost of ownership (TCO). The document introduces the Cisco Unified Computing System and provides instructions for implementing it; concluding with an analysis of reliability characteristics. This document provides an overview of configuration along with instructions for setting up the Cisco Unified Computing System. The document reports on Cisco's performance measurements and a reliability analysis that demonstrates how the system continues operation even when hardware faults occur. This document will not show SAP performance numbers or sizing suggestions.

Introduction

Leadership From Cisco

Cisco is the undisputed leader in providing network connectivity in enterprise data centers. With the introduction of the Cisco Unified Computing System, Cisco is now equipped to provide the entire infrastructure for SAP systems deployments. With the capability to scale to up to 320 servers and incorporate both blade and rack-mount servers in a single system, the Cisco Unified Computing System together with EMC CLARiiON / Symmetrix VMAX storage systems and VMware vSphere 4 virtualization technology provides an ideal foundation for SAP application deployments.

Historically, enterprise resource planning systems have run on costly symmetric multiprocessing servers that use a vertical scaling (or scale-up) model. However, as the cost of one-to-four-socket x86-architecture servers continues to drop while their processing power increases, a new model has emerged. SAP systems uses a horizontal scaling, or scale-out, model, in which the application stack uses multiple servers, each contributing its processing power to the application stack, increasing performance, scalability, and availability. SAP system logon groups can balance the workload across the application servers, and the SAP application is continuously available in the event of a server failure.

SAP System Configuration

All components for an SAP implementation work together flawlessly, and Cisco, EMC and VMware have worked closely with SAP to create, test, and certify an Adaptive Computing Compliant configuration of SAP systems on the Cisco Unified Computing System.

Benefits of a Cisco Unified Computing System Configuration

The Cisco Unified Computing System Configuration for SAP systems offers a number of important benefits:

Simplified Deployment and Operation

Because the entire SAP application stack runs on a single cohesive system, SAP Basis

administrators no longer need to painstakingly configure each element in the hardware stack independently. The system's compute, network, and storage-access resources are essentially stateless, provisioned dynamically by Cisco® UCS Manager. This role- and policy-based embedded management system handles every aspect of system configuration, from a server's firmware and identity settings to the network connections that connect storage traffic to the destination storage system. This capability dramatically simplifies the process of scaling an SAP system configuration or re-hosting an existing node on an upgrade server. Cisco UCS Manager uses the concept of service profiles and service profile templates to consistently and accurately configure resources. The system automatically configures and deploys servers in minutes, rather than the hours or days required by traditional systems composed of discrete, separately managed components. Indeed, Cisco UCS Manager can simplify server deployment to the point where it can automatically discover, provision, and deploy a new blade server when it is inserted into a chassis.

The system is based on a 10-Gbps unified network fabric that radically simplifies cabling at the rack level by consolidating both IP and Fibre Channel traffic onto the same rack-level 10GbE converged network. This "wire-once" model allows in-rack network cabling to be configured once, with network features and configurations all implemented by changes in software rather than by error-prone changes in physical cabling. The balanced resources of the Cisco Unified Computing System allow the system to easily process a data and bandwidth intensive service like Business Warehouse and response time dependent workload like ERP with no resource saturation. This sample SAP system configuration not only supports physically separate networks; it provides redundancy with automatic failover.

High-Performance Platform for SAP Systems

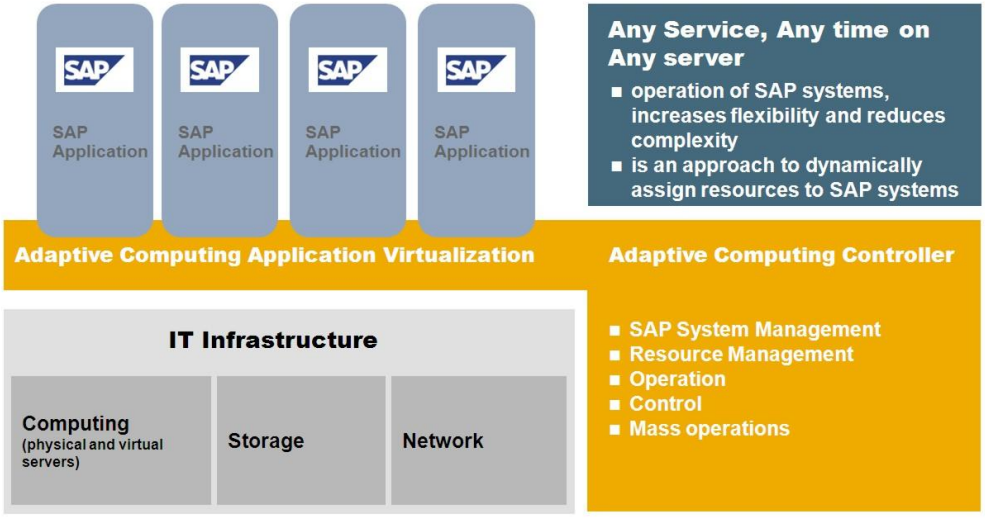
The Cisco UCS B-Series blade servers used in this configuration feature Intel Xeon 5500 series processors that deliver intelligent performance, automated energy efficiency, and flexible virtualization. Intel Turbo Boost Technology automatically boosts processing power through increased frequency and use of hyperthreading to deliver high performance when workloads demand and thermal conditions permit.

The patented Cisco Extended Memory Technology offers twice the memory footprint (384 GB) of any other server using 8-GB DIMMs, or the economical option of a 192-GB memory footprint using inexpensive 4-GB DIMMs. Both choices for large memory footprints can help speed application performance by allowing more data or programs to be cached in memory.

2 SAP Adaptive Computing Concept

This solution combines Server Virtualization from VMware with SAP Adaptive Computing Application Virtualization. This provides the highest available degree of flexibility and operability that an SAP landscape can have.

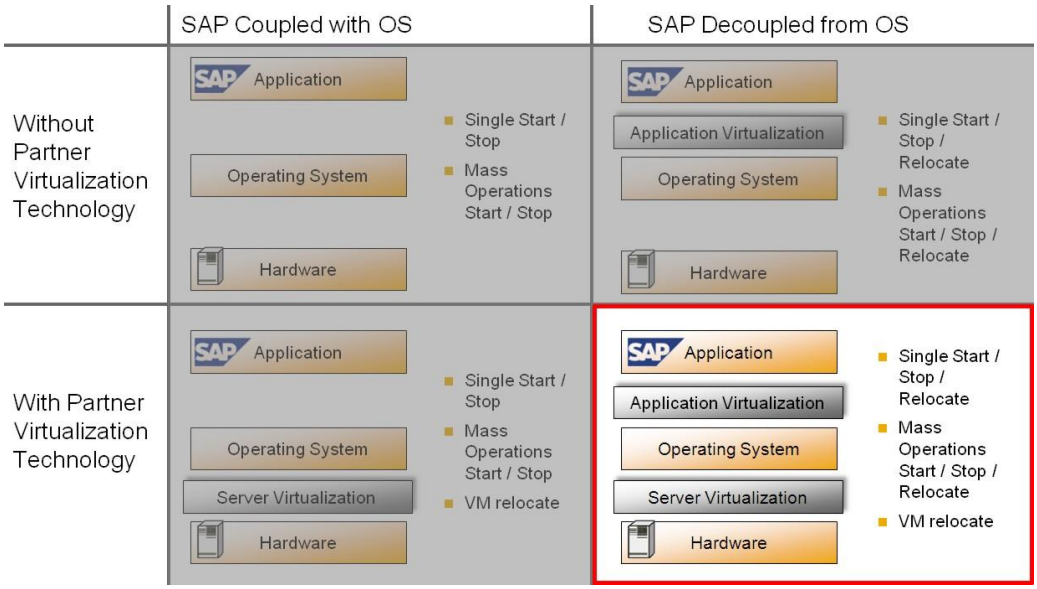
Figure 1: Server Virtualization



The SAP Adaptive Computing Controller lets you manage entire SAP software landscapes and IT infrastructures. This helps reduce complexity, cut data center costs, increase hardware utilization, and achieve the flexibility and scalability needed to improve IT efficiency and value.

The SAP Adaptive Computing Controller provides a single point of control that allows your system administrator to visualize, monitor, and manage data center tasks for deployed SAP solutions.

Figure 2: SAP Adaptive Computing Solution



3 The Cisco Unified Computing Solution

The Cisco Unified Computing System (UCS) is a next-generation data center platform that unites compute, network, and storage access. The platform, optimized for virtual environments, is designed within open industry standard technologies and aims to reduce TCO and increase business agility. The system integrates a low-latency, lossless 10 Gigabit Ethernet unified network fabric with enterprise-class, x86-architecture servers. The system is an integrated, scalable, multi-chassis platform in which all resources participate in a unified management domain.

The Cisco Unified Computing System represents a radical simplification of the traditional blade server deployment model by providing simplified, stateless blades and a blade server chassis that is centrally provisioned, configured, and managed by Cisco UCS Manager. The result is a unified system that significantly reduces the number of components while offering a just-in-time provisioning model that allows systems to be deployed or redeployed in minutes rather than hours or days.

The Cisco Unified Computing System addresses many of the challenges faced by SAP Basis administrators and their IT departments, making it an ideal platform for SAP implementation:

Comprehensive Management

The system uses an embedded, end-to-end management system that uses a high-availability active-standby configuration. Cisco UCS Manager uses role and policy-based management that allows IT departments to continue to use subject-matter experts to define server, network, and storage access policy. After a server and its identity, firmware, configuration, and connectivity are defined, the server, or a number of servers like it, can be deployed in minutes, rather than the hours or days that it typically takes to move a server from the loading dock to production use. This capability relieves SAP Basis administrators from tedious, manual assembly of individual components and makes scaling an SAP system configuration a straightforward process.

Radical Simplification

The Cisco Unified Computing System represents a radical simplification compared to the way that servers and networks are deployed today. It reduces network access-layer fragmentation by eliminating switching inside the blade server chassis. It integrates compute resources on a unified I/O fabric that supports standard IP protocols as well as Fibre Channel through FCoE encapsulation. The system eliminates the limitations of fixed I/O configurations with an I/O architecture that can be changed through software on a per-server basis to provide needed connectivity using a just-in-time deployment model. The result of this radical simplification is fewer switches, cables, adapters, and management points, helping reduce cost, complexity, power needs, and cooling overhead.

High Performance

The system's blade servers are based on the fastest Intel Xeon 5500 series processors. These processors adapt performance to application demands, increasing the clock rate on specific processor cores as workload and thermal conditions permit. These processors, combined with patented Cisco Extended Memory Technology, deliver application performance along with the memory footprint needed to support memory intensive applications. The system is integrated within a 10 Gigabit Ethernet–based unified fabric that delivers the throughput and low-latency characteristics needed to support the demands of the cluster's public network, storage traffic, and high-volume cluster messaging traffic.

Scalability Decoupled from Complexity

The system used to create the sample configuration is designed to be highly scalable, with up to 40 blade chassis and 320 blade servers connected by a single pair of low-latency, lossless fabric interconnects. New compute resources can be put into service quickly, enabling SAP systems configurations to be scaled on demand, and with the compute resources they require.

Ready for the Future

The system gives SAP systems room to scale while anticipating future technology investments. The blade server chassis, power supplies, and mid-plane are capable of handling future servers with even greater processing capacity. Likewise, the chassis is built to support future 40 Gigabit Ethernet standards when they become available.

4 The Value-Add of VMware vSphere 4 in an Adaptive Computing Environment

Consolidation and Increased Flexibility

With VMware vSphere 4 as virtual resource provider, you can achieve higher levels of utilization of your physical computing resources. By configuring a VMware Distributed Resource Scheduling (DRS) cluster, live migration of virtual computing resources can take place automatically to load balance the environment. The live migration process itself uses VMware vMotion™, which does not affect the running SAP instances or databases. The manual migration of Virtual Machines can also be performed by using the SAP Adaptive Computing Controller.

Easy Physical-to-Virtual and Virtual-to-Physical Migration

In an Adaptive Computing environment, your services (SAP instances and databases) are not bound to a specific computing resource but can be migrated from one server to another. It does not matter if this server runs on native hardware or if this server is a Virtual Machine. Physical and virtual computing resources can be lumped together in the same resource pool, so both types are able to run the same set of services.

Fast Provisioning

Templates of Virtual Machines, which are stored in your VMware vCenter™/ESX® configuration repository, can be deployed by using the SAP ACC.

Full vCenter Integration

The SAP ACC uses the VMware vCenter API to perform basic operations, read the Virtual Machine configuration and provide overview information about the available Virtual Machines and their utilization.

Combining the Features

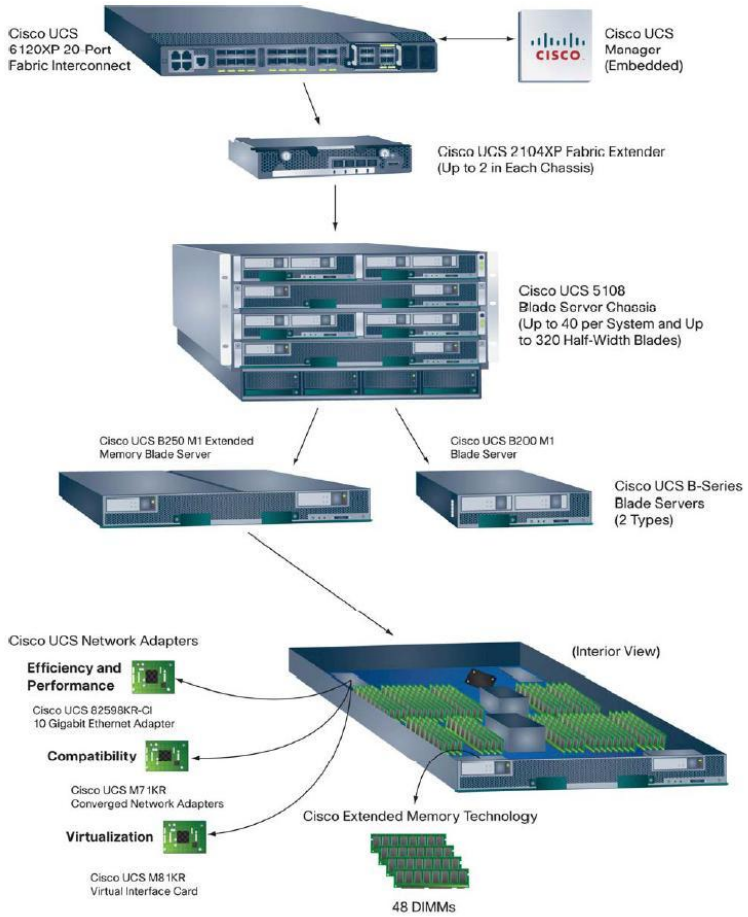
All features of VMware vSphere 4, including those not described here, can be used without interruption of the SAP ACC. In particular, VMware Business Continuity features (such as High Availability, Disaster Recovery and Data Protection) are available and can provide a great benefit for SAP systems

5 Configuration Overview

The Cisco Unified Computing System used for this configuration is based on Cisco B-Series Blade Servers; however, the breadth of Cisco's server and network product line suggests that similar product combinations will meet the same requirements. The Cisco Unified Computing System uses a form-factor-neutral architecture that will allow Cisco C-Series Rack-Mount Servers to be integrated as part of the system using capabilities planned to follow the product's first customer shipment (FCS). Similarly, the system's core components—high-performance compute resources integrated using a unified fabric—can be integrated manually today using Cisco C-Series servers and Cisco Nexus™ 5000 Series Switches.

The system used to create the sample SAP systems implementation is built from the hierarchy of components illustrated below.

Figure 3: Cisco UCS Components



The Cisco UCS 6120XP 20-Port Fabric Interconnect provides low-latency, lossless, 10-Gbps unified fabric connectivity for the cluster. The interconnect provides connectivity to blade server chassis and the enterprise IP network. Through an 8-port, 4-Gbps Fibre Channel expansion card, the interconnect provides native Fibre Channel access to the storage system. Two fabric interconnects

are configured in the cluster, providing physical separation between public and application networks and also providing the capability to securely host both networks in the event of a failure.

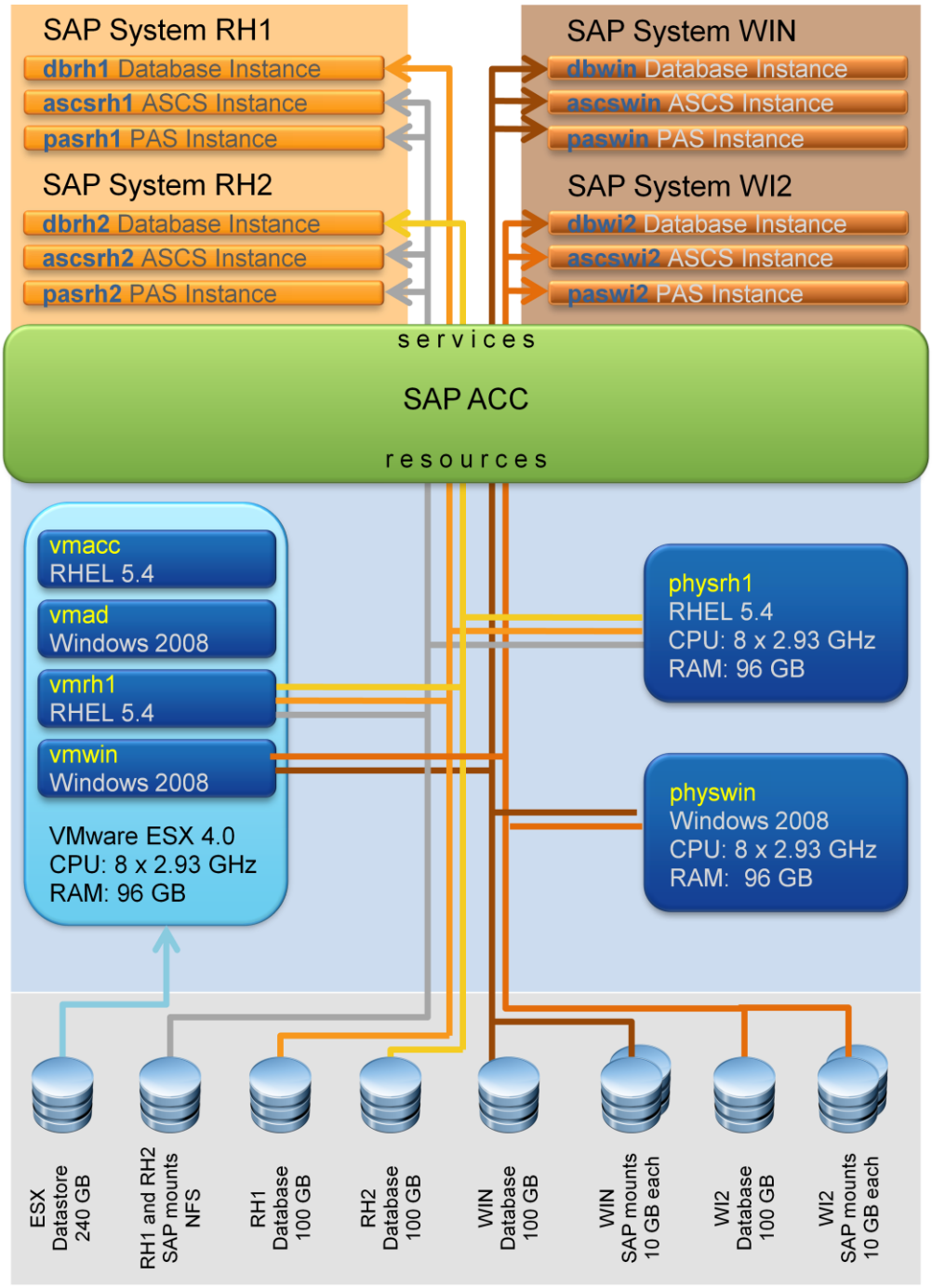
The Cisco UCS 2104XP Fabric Extender brings the unified fabric into each blade server chassis. The fabric extender is configured and managed by the fabric interconnects, eliminating the complexity of blade-server-resident switches. Two fabric extenders are configured in each of the cluster's two blade server chassis. Each one uses two of the four available 10-Gbps uplinks to connect to one of the two fabric interconnects.

The Cisco UCS 5108 Blade Server Chassis houses the fabric extenders, up to four power supplies, and up to eight blade servers. As part of the system's radical simplification, the blade server chassis is also managed by the fabric interconnects, eliminating another point of management. One chassis were configured for the SAP Adaptive Computing Compliance Test system implementation described in this document.

The blade chassis supports up to eight half-width blades or up to four full-width blades. The system was equipped with six Cisco UCS B200 M1 Blade Servers and one Cisco UCS B250 Blade Server, each equipped with two quad-core Intel Xeon 5500 series processors at 2.93 GHz. Each Cisco UCS B200 M1 blade server was configured with 96 GB of memory. The Cisco UCS B250 M1 blade was configured with 192 GB memory. A configuration of up to 384 GB is possible with the Extended Memory technology of the Cisco UCS B250 M1 Blade Server.

The blade server form factor supports a range of mezzanine-format Cisco UCS network adapters, including a 10 Gigabit Ethernet network adapter designed for efficiency and performance, the Cisco UCS M81KR Virtual Interface Card designed to deliver the system's full support for virtualization, and a set of Cisco UCS M71KR converged network adapters designed for full compatibility with existing Ethernet and Fibre Channel environments. These adapters present both an Ethernet network interface card (NIC) and a Fibre Channel host bus adapter (HBA) to the host operating system. They make the existence of the unified fabric transparent to the operating system, passing traffic from both the NIC and the HBA onto the unified fabric. Versions are available with either Emulex or QLogic HBA silicon; the sample configuration uses a Cisco UCS M71KR-Q QLogic Converged Network Adapter that provides 20-Gbps of connectivity by connecting to each of the chassis fabric extenders.

6 Solution Architecture



Detailed Topology

As shown in Figure 3, one chassis housing five blades were used for this sample SAP system

implementation. Tables 1 through 4 list the configuration details for all the server, LAN, and SAN components that were used for testing.

Figure 4: Detailed topology of the Public Network and Application Network

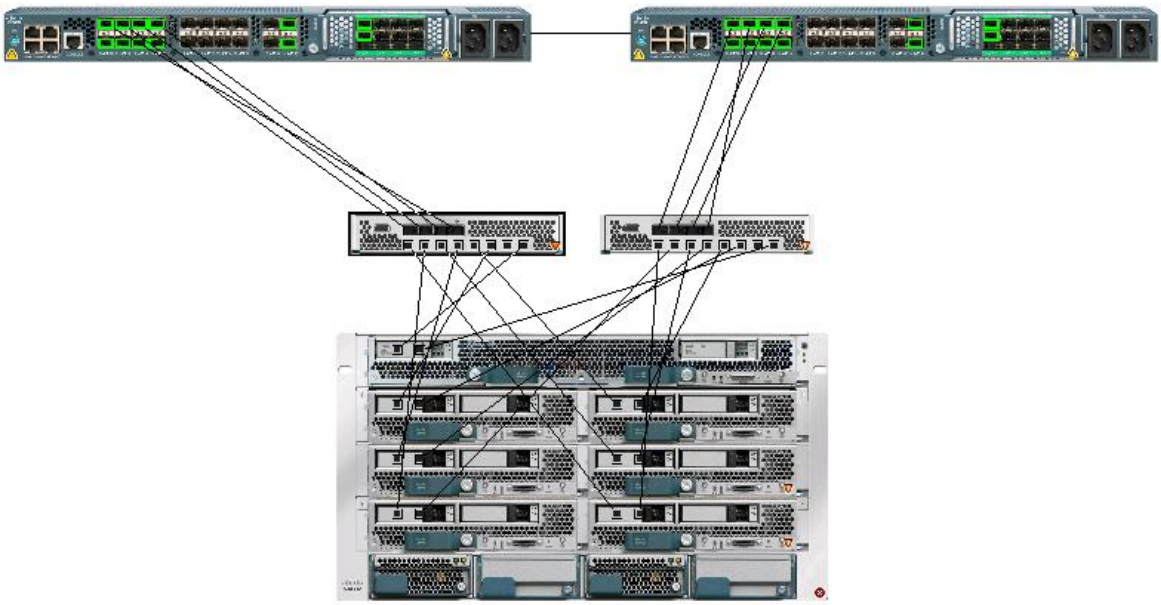


Table 1: Physical Cisco Unified Computing System Server Configuration

Quantity	Description
1	Cisco UCS 5108 Blade Server Chassis, with 2 power supply units, 8 fans, and 2 fabric extenders
6	Cisco UCS B200 M1 Blade Server
1	Cisco UCS B250 M1 Blade Server
2 per blade	Quad-core Intel Xeon 5500 series 2.93-GHz processor
12 per B200	4-GB DDR3 DIMM, 1066 MHz, totaling 48 GB per B200 blade server
48 per B250	4-GB DDR3 DIMM, 1066 MHz, totaling 192 GB per B250 blade server
1 per blade	Cisco UCS M71KR-Q QLogic Converged Network Adapter, PCIe, 2 ports, and 10 Gigabit Ethernet
2	Cisco UCS 6120XP 20-Port Fabric Interconnect with 2 power supply units and 2 fans
2	8-port, 4-Gbps Fibre Channel expansion port module
4	4-Gbps Fibre Channel- Small Form-Factor Pluggable (SFP) Line Card
8	10GBASE-CU SFP+ cable (5 meters)
8	Fiber cables for connectivity to Fibre Channel and 10 Gigabit Ethernet

Table 2: SAN Components

Quantity	Description
2	Cisco MDS 9222i switch

Table 3: Storage Configuration

Quantity	Description
1	EMC² Storage Symmetrix VMAX
45	450-GB, 15,000 RPM, Fibre Channel spindles

Table 4: Software Components

Description
Microsoft Windows 2008 Server Red Hat Linux Enterprise Server 5.4
SAP MaxDB 7.8.01 Build 08 64-Bit Oracle 10.2.0.4 64-Bit Microsoft SQL 2008 Server 64-Bit
SAP NetWeaver CE 7.2 (AS JAVA Kernel 7.20 PL30, JVM 6.1 PL10) ACC 7.2 SP01 SAP NetWeaver 7.0 EHP1 (AS ABAP Kernel 7.01 PL69) SAP Host Agent 7.20 SP22

7 Configuring Cisco UCS for SAP System Implementation

Configuring the Cisco UCS 6120XP Fabric Interconnect

The Cisco UCS 6120XP Fabric Interconnect is configured in a cluster pair for redundancy. It provides resiliency and access to the system configuration data in the rare case of hardware failure.

For fabric interconnects, the configuration database is replicated from the primary switch to the standby switch. All operations are transaction-based, keeping the data on both switches synchronized.

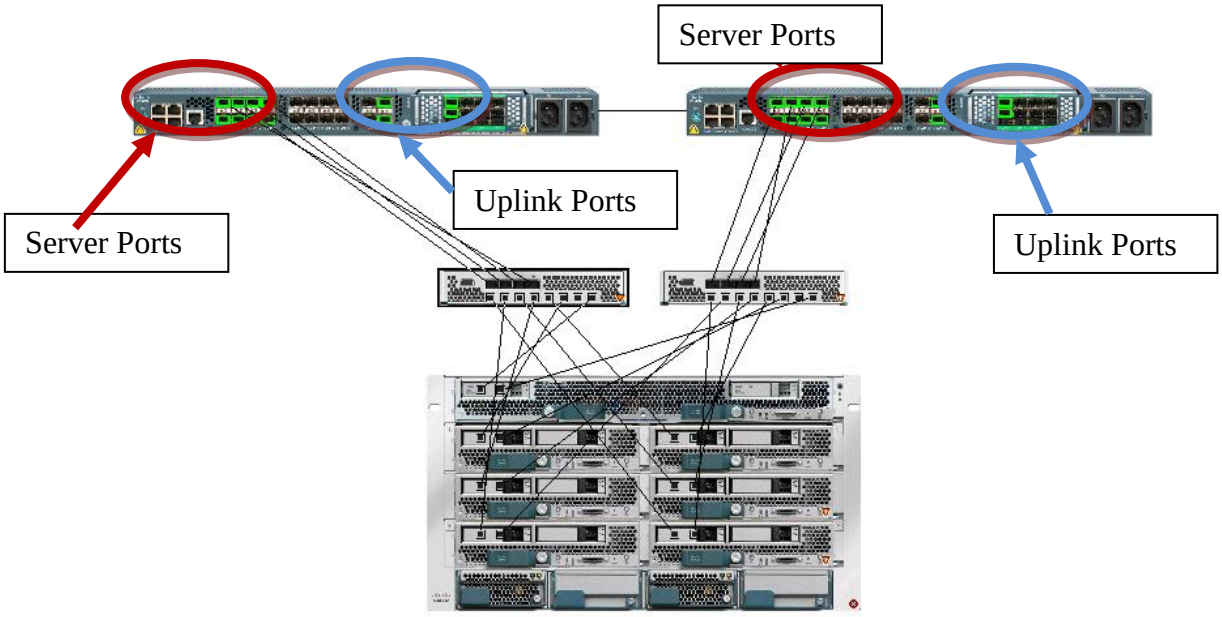
Note: Detailed information about the fabric interconnect configuration is beyond the scope of this document. For more information, refer to the Cisco Unified Computing System documentation at

http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/gui/config/guide/b_GUI_Config_Guide.html

Configuring the Server Ports

The first step is to establish connectivity between the blades and fabric interconnects. The ports should be configured as server ports as shown Figure 5 Four public links go to Fabric Interconnect A and four private links go to Fabric Interconnect B.

Figure 5: Physical Connectivity and Port Configuration



Configuring Uplinks to the SAN and LAN

Configure the uplink Fibre Channel ports (Expansion Module 2).

Configuring the SAN and LAN on Cisco UCS Manager

Before configuring the service profile, do the following:

1. Configure the SAN.

   On the SAN tab, set the VSANs to be used in the SAN (if any). We also recommend to set up pools for worldwide node name (WWNN) and worldwide port name (WWPN) for assignment to the blade server virtual HBAs (vHBAs).

   Sample pool definitions:

WWxN:	20:00:00:25:B5	The first 5 bytes are registered for Cisco
	20:00:00:25:B5:XX	The first Bit identifies 0 as node and 1 as port The second bit is used to identify the OS 0 = Windows 1= Linux 2 = VMware ESX
	20:00:00:25:B5:00:XX	The 7th Byte identifies the Organization (only a number for each Sub-Organization)
	20:00:00:25:B5:00:00:XX	The last byte identifies the node or port

2. Configure the LAN.

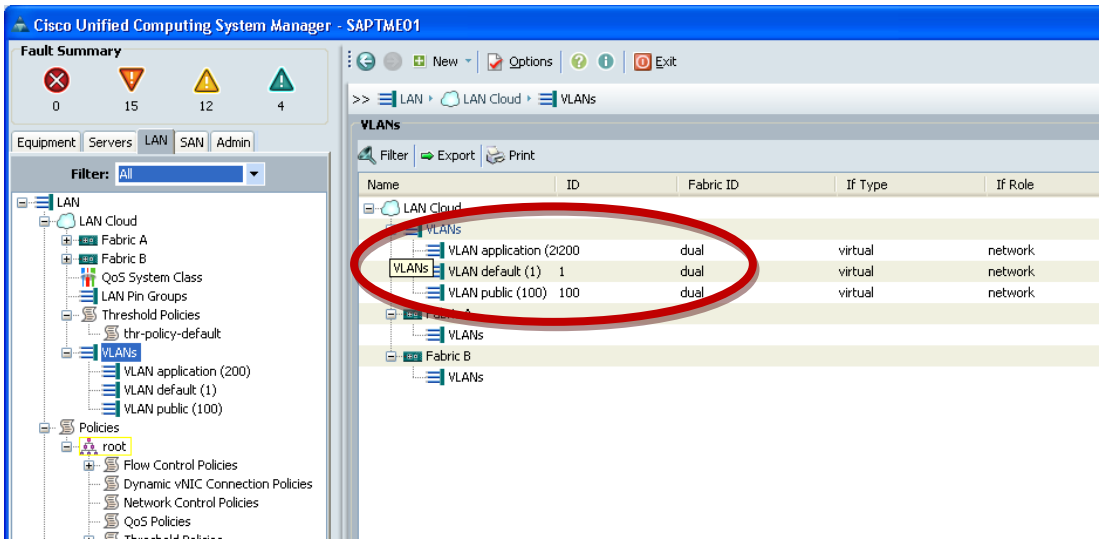
   On the LAN tab, set the VLAN assignments to the virtual NICs (vNICs). You can also set up MAC address pools for assignment to vNICs. For this setup, the public VLAN (VLAN ID 100) was used for public interfaces, and the application VLAN (VLAN ID 200) was created for SAP application to application communication.

   Sample pool definitions:

MAC:	00:25:B5	The first 3 bytes are registered for Cisco
	00:25:B5:XX	The first Bit is used to identify the port 0 for eth0, 1 for eth1, 2 for eth2*, … eth2 – ethXX with M81KR (Palo) only The second bit is used to identify the OS 0 = Windows 1= Linux 2 = VMware ESX
	00:25:B5:00:XX	The 5th Byte identifies the Organization (only a number for each Sub-Organization)
	00:25:B5:00:00:XX	The last byte identifies the NIC.

Note: It is very important that you create a VLAN that is global across both fabric interconnects. This way, VLAN identity is maintained across the fabric interconnects in case of failover.

The screen shot below shows two VLANs:



After you have completed these preparatory steps, generate a service profile template for the required hardware configuration. You can then create the service profiles for all eight nodes from the template.

8 Setting Up Service Profiles

Service profiles are the central concept of the Cisco Unified Computing System. Each service profile serves a specific purpose: to help ensure that the associated server hardware has the configuration required to support the applications it will host.

The service profile maintains configuration information about:

- Server hardware
- Interfaces
- Fabric connectivity
- Server and network identity

This information is stored in a format that can be managed through Cisco UCS Manager. All service profiles are centrally managed and stored in a database on the fabric interconnect.

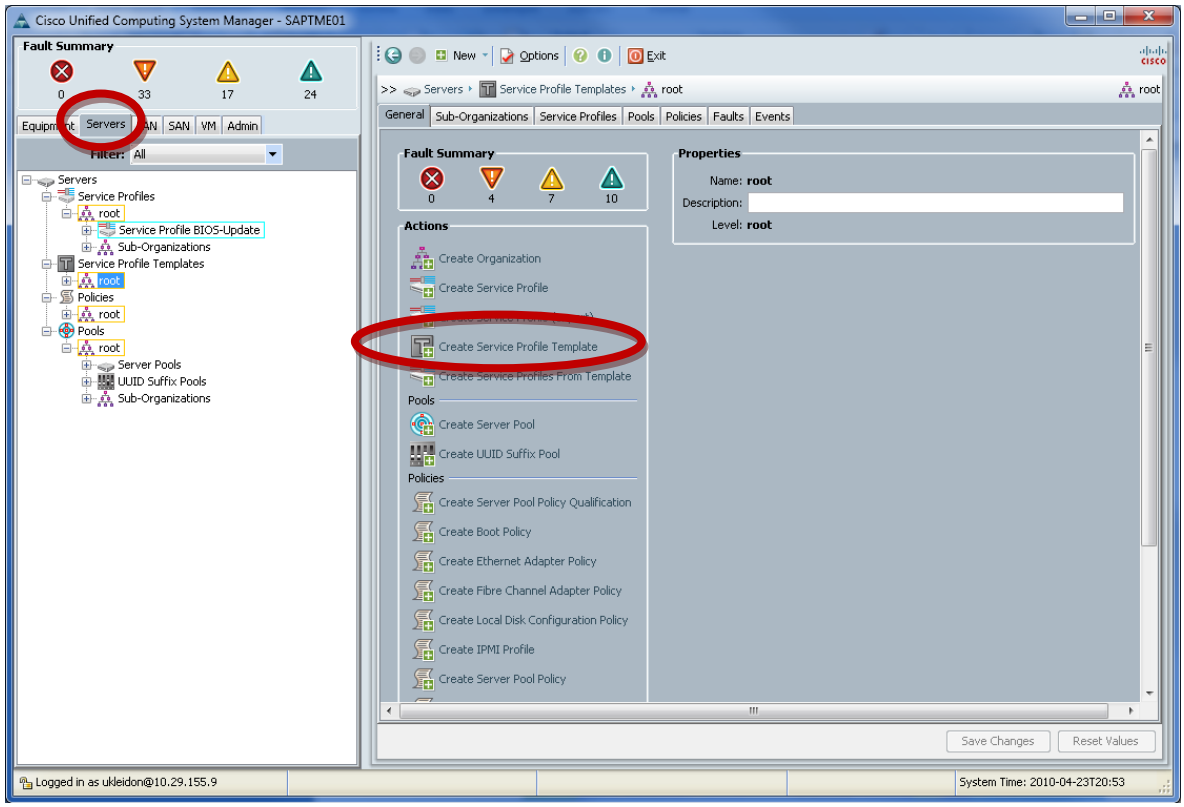
The service profile consists of the following information:

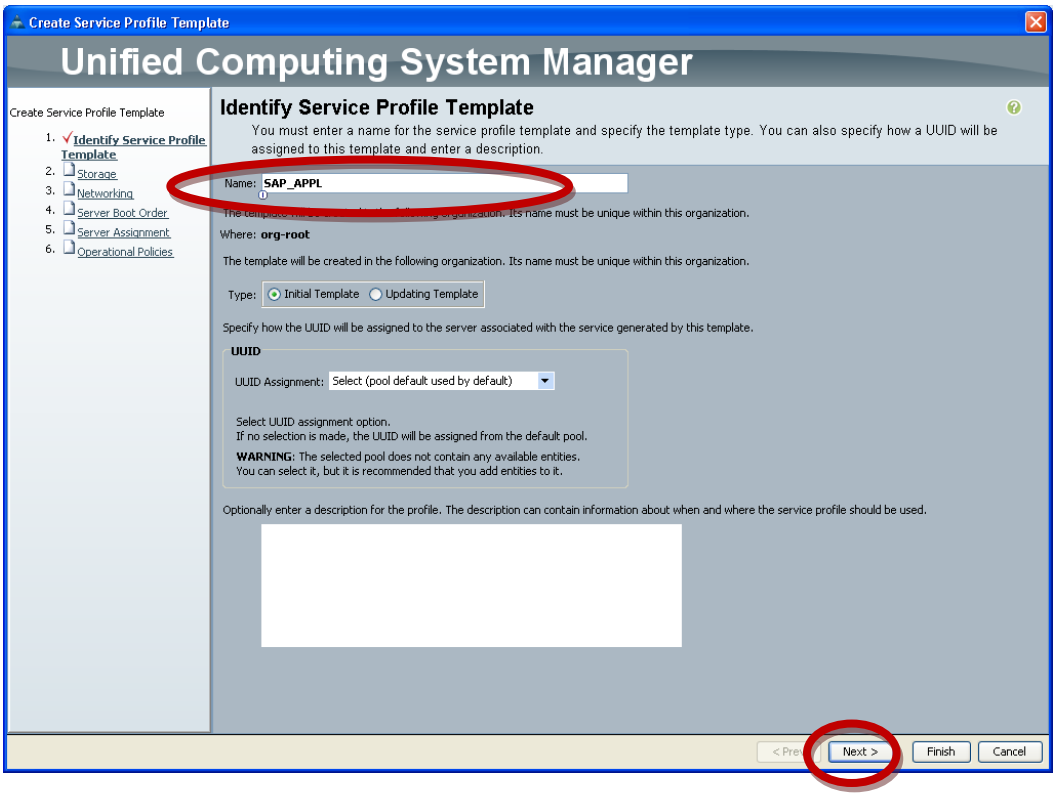
- Identity and personality information for the server
    - Universally unique ID (UUID)
    - Worldwide node name (WWNN)
    - Boot order
- LAN and SAN configuration (through the vNIC and vHBA configuration)
    - NIC and HBA identity (MAC and WWN/WWPN information)
    - Ethernet NIC profile (flags, maximum transmission unit [MTU], etc.)
    - VLAN and VSAN connectivity information
- Various policies (disk scrub policy, QoS etc.). For the SAP Adaptive Computing Compliance test system implementation, we used boot policy.

9 Creating the Service Profile Template

To create the service profile template, do the following:

1. From the Service Profile Templates screen, click the **Servers** tab.
2. Click **Service Profile Template**.





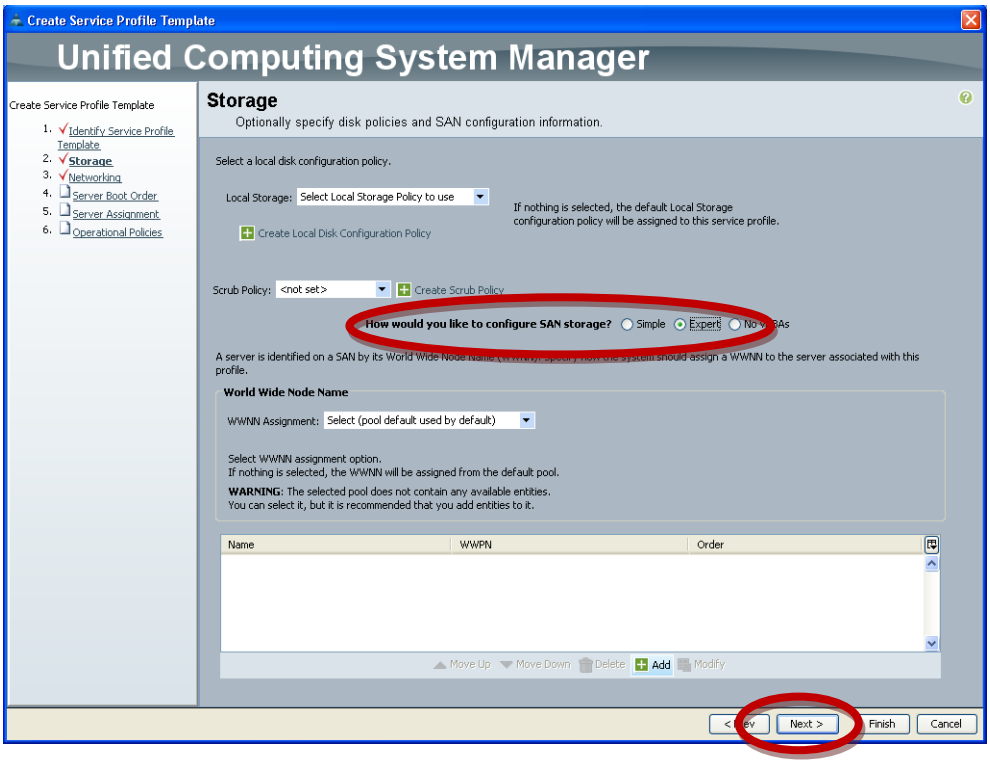
3. From the Identify Service Profile Template screen:

    a. In the **Name** field, enter the template name (for example, **SAP_APPL**).

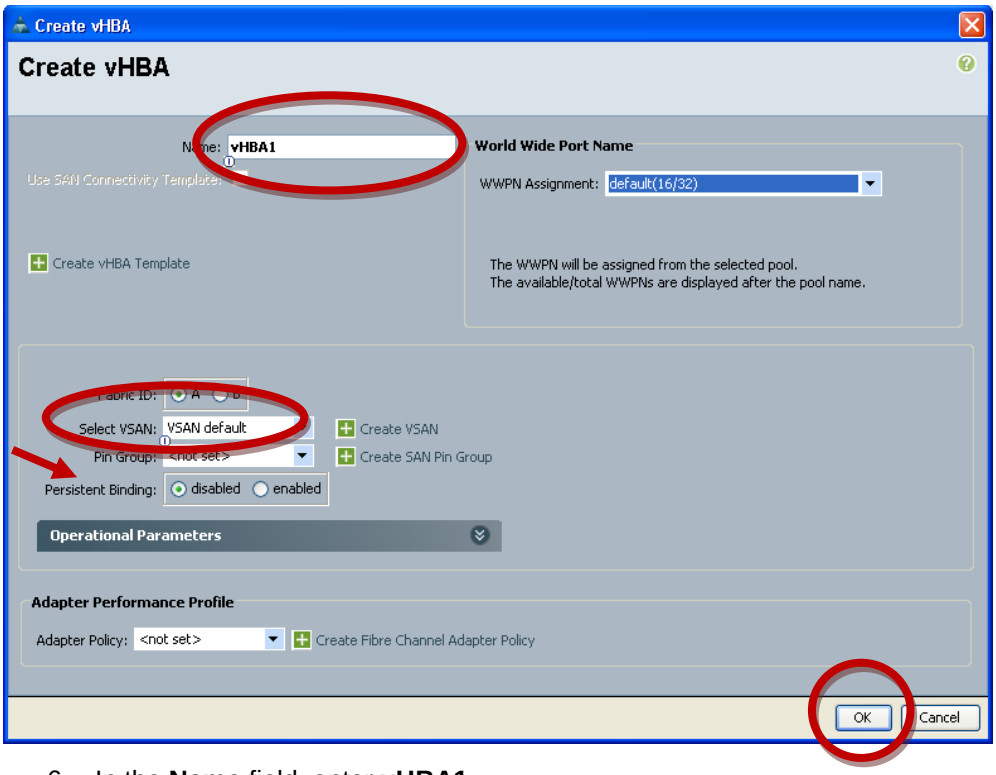
    b. For the template type, choose **initial template**.

    Initial templates create new service profiles with the same attributes but the child service profiles are not updated when a change is made to the original template. Updating templates behave that the children profiles are immediately updated when a change to the template is made. This could result in all the dependent children profiles causing servers to reboot so they should be used with care.

4. Click **Next**.



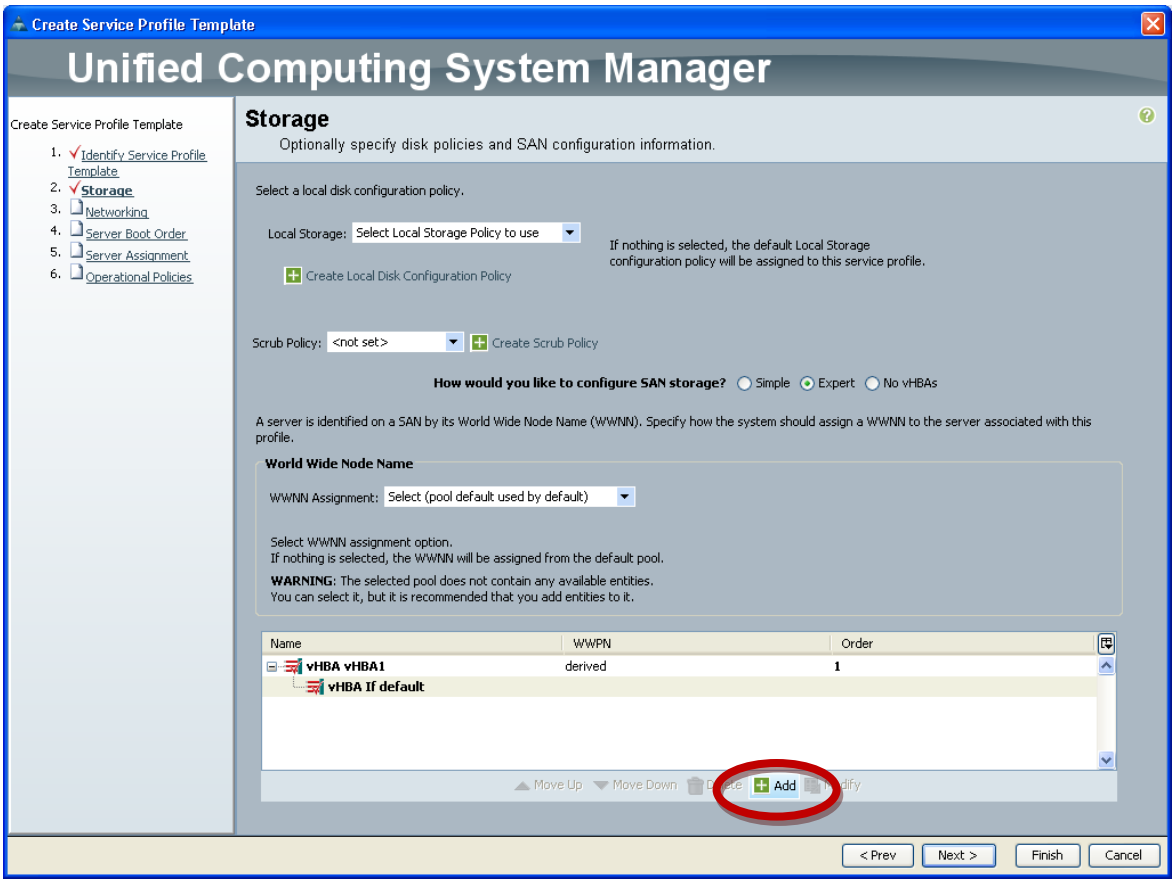
5. To create vHBAs for SAN storage:
    a. In the **How would you like to configure SAN storage?** options, select **Expert**.
    b. Click **Add** to add an HBA.



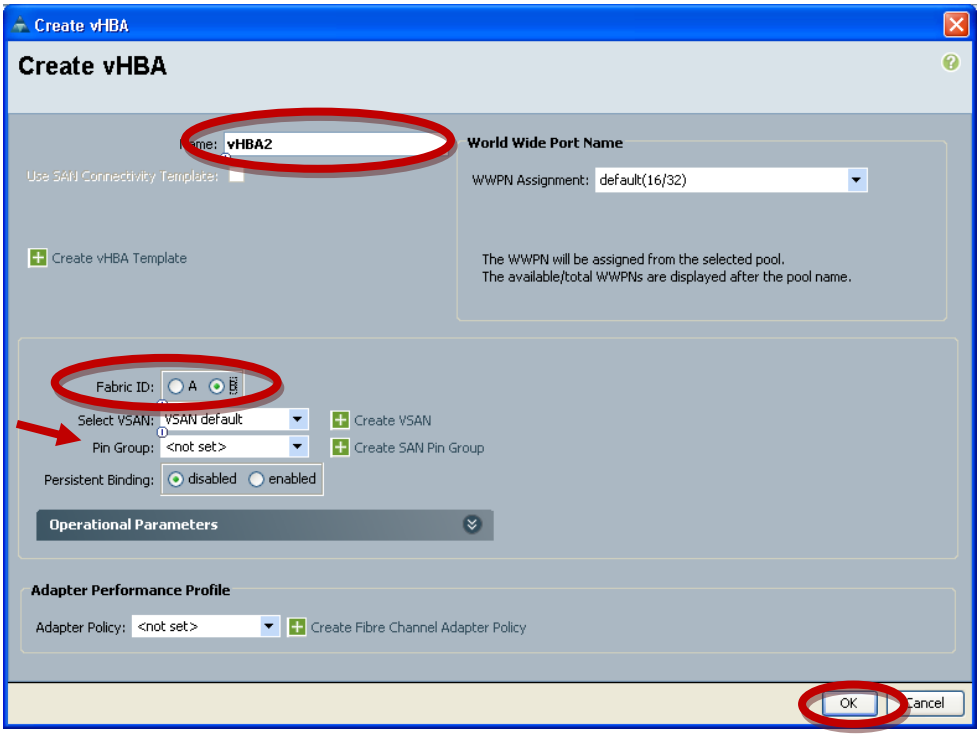
6. In the **Name** field, enter **vHBA1**.
7. In the **Select VSAN** drop-down list, choose **VSAN default**.

   For simplicity, this configuration uses the default VSAN for both HBAs. You may need to make a different selection depending on what is appropriate for your configuration.
8. If you have created SAN pin groups for pinning Fibre Channel traffic to a specific Fibre Channel port, specify appropriate pin groups, using the **Pin Group** drop-down list.

   Pinning in a Cisco Unified Computing System is relevant only to uplink ports, where you can pin Ethernet or FCoE traffic from a given server to a specific uplink Ethernet (NIC) port or uplink (HBA) Fibre Channel port. When you pin the NIC and HBA of both physical and virtual servers to uplink ports, you get finer control over the unified fabric. This control helps ensure better utilization of uplink port bandwidth. However, manual pinning requires an understanding of network and HBA traffic bandwidth across the uplink ports. We did not use pin groups for this configuration.
9. Click **OK**.
10. To create the second vHBA for SAN storage, go back to the Storage screen.



11. Click **Add** to add an HBA.



12. To create the second vHBA:

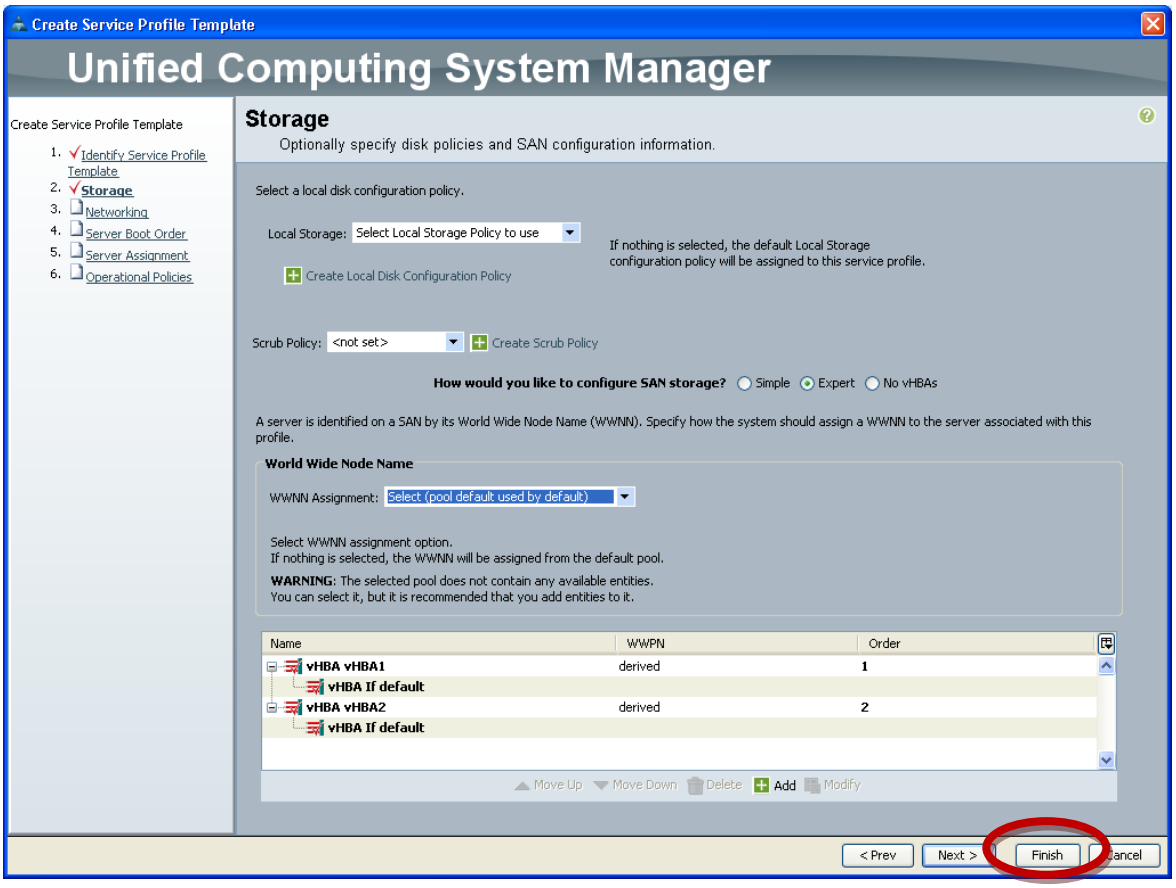
    a. In the **Name** field, enter **vHBA2**.

    b. In the **Select VSAN** drop-down list, choose **VSAN default**.

    For simplicity, this configuration uses the default VSAN for both HBAs. You may need to make a different selection depending on what is appropriate for your configuration.

    c. If you have created SAN pin groups for pinning Fibre Channel traffic to a specific Fibre Channel port, specify appropriate pin groups, using the **Pin Group** drop-down list.

13. Click **OK**.



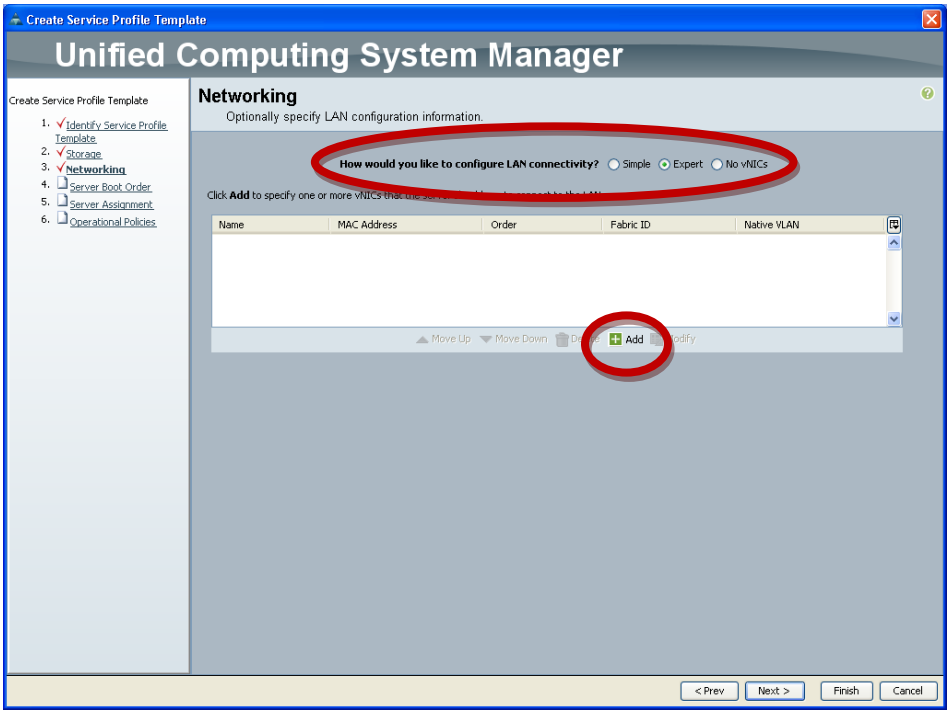
14. Click **Finish**.

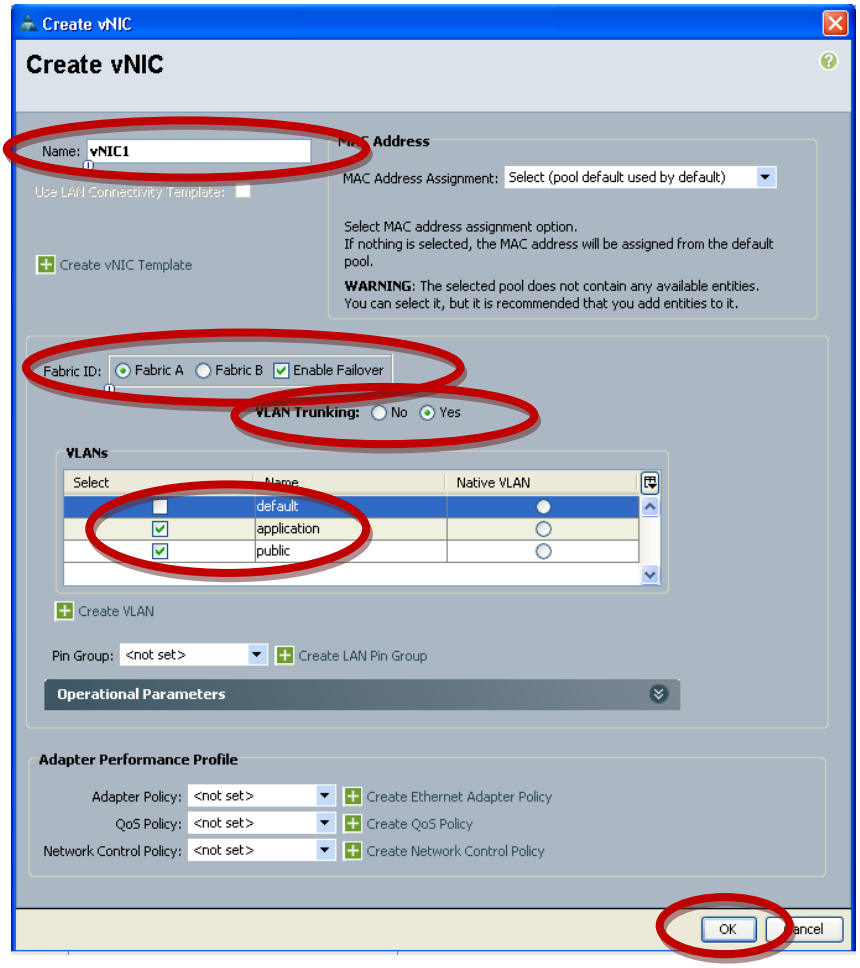
Two vHBAs have been created and completes the SAN configuration.

Creating and Associating vNICs With VLANs

To create the vNICs and associate them with the appropriate VLANs, do the following:

1. From the **Networking** screen:
    a. In the **How would you like to configure LAN connectivity?** options, select **Expert**.
    b. Click **Add**.





2. In the **Name** field, enter **vNIC1**.
3. For the Fabric ID options, select **Fabric A** and **Enable Failover**.
4. For the **VLAN Trunking** options, select **Yes**.

   VLAN trunking allows multiple VLANs to use a single uplink port on the system.
5. In the VLANs area, select the associated check boxes for **application** and **public**.
6. Click **OK**.

   vNIC1 is assigned to use Fabric Interconnect A for the public network.

To create the second vNIC, do the following:

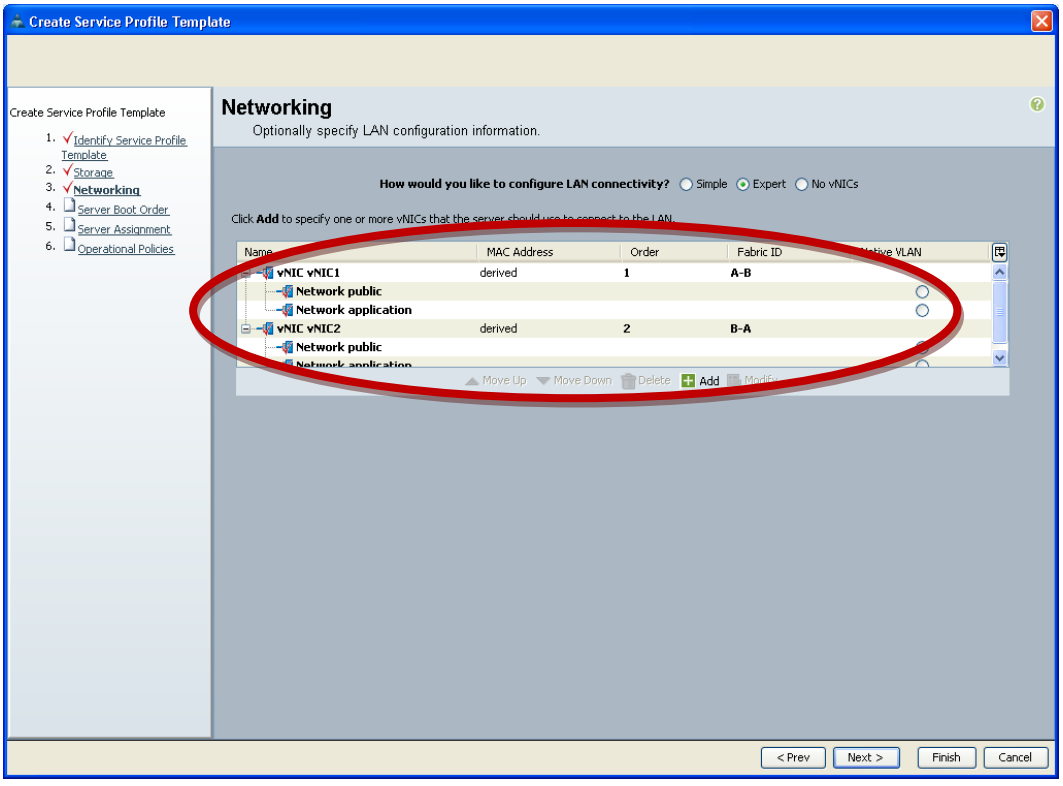
1. From the Networking screen:
    a. Click **Add** to add vNIC2.

The Create vNIC screen displays.

2. From the **Create vNICs** screen:
    a. In the **Name** field, enter **vNIC2**.
    b. For the Fabric ID options, select **Fabric B** and **Enable Failover**.
    c. For the **VLAN Trunking** options, select **Yes**.
    d. In the **VLANs** area, select the associated check boxes for **application** and **public**.
3. Click **OK**.

vNIC2 is assigned to use Fabric Interconnect B for the Application network.

The Networking screen lists the vNICs that you have created.



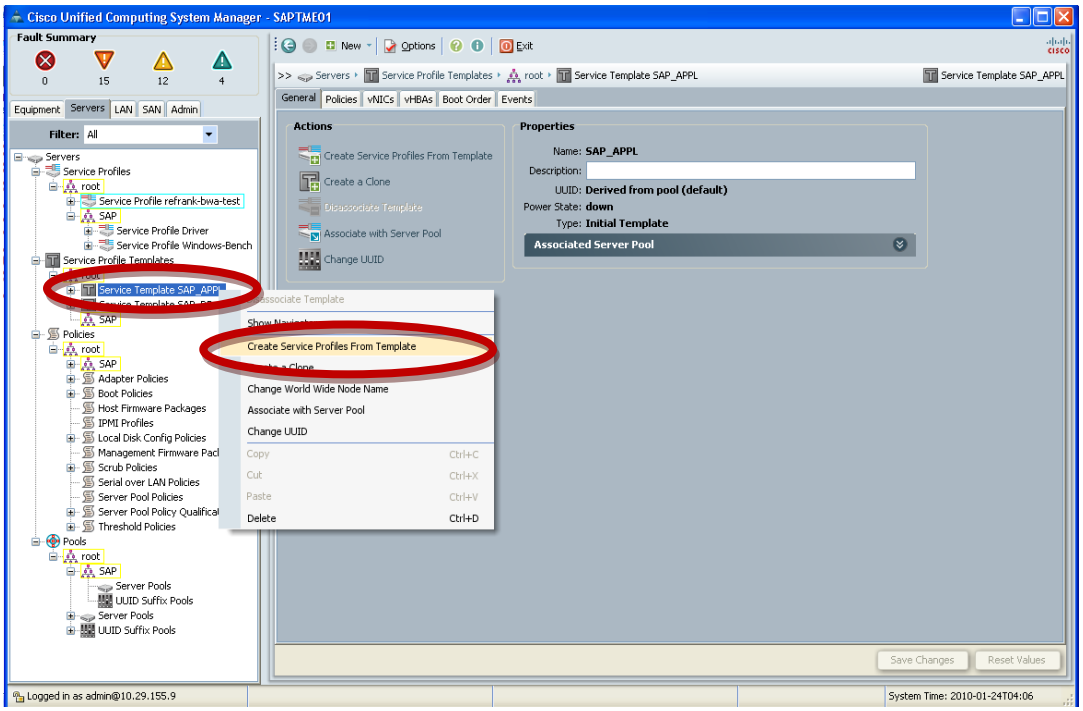
The setup created here did not use SAN boot or any other policies. You can configure these in the screens that follow the Networking screen. You may be required to configure these policies if you choose to boot from the SAN or if you associate any specific policies with your configuration.

4. Click **Finish** to complete the service profile template.

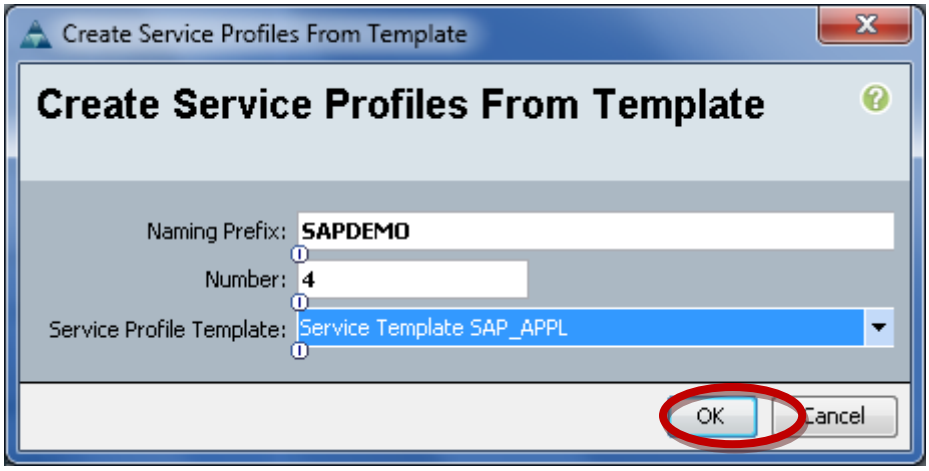
Creating and Associating Service Profiles With Blade Servers

To create eight service profiles associated with individual blade servers, do the following:

1. From the Cisco Unified Computing System Manager screen:
    a. Right-click **Service Template SAP_APPL**.
    b. Select **Create Service Profiles From Template**.



2. In the Create Service Profiles From Template dialog box:
    a. In the **Naming Prefix** field, enter **SAPDEMO**.
    b. In the **Number** field, enter **4**.
    c. In the Service Profile Template field select **SAP_APPL**.



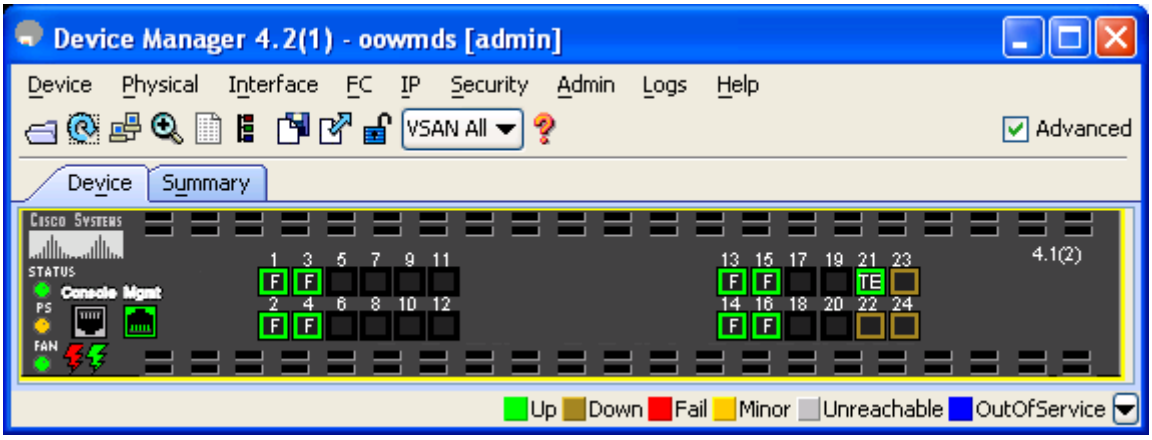
d. Click **OK**.

This step creates service profiles for all four blade servers. When the service profiles are created, they will pick unique MAC, WWN and WWPN values from the resource pools created earlier.

Now you can associate the profiles with the appropriate blade servers in the chassis.

10 Configuring the SAN Switch and Zoning

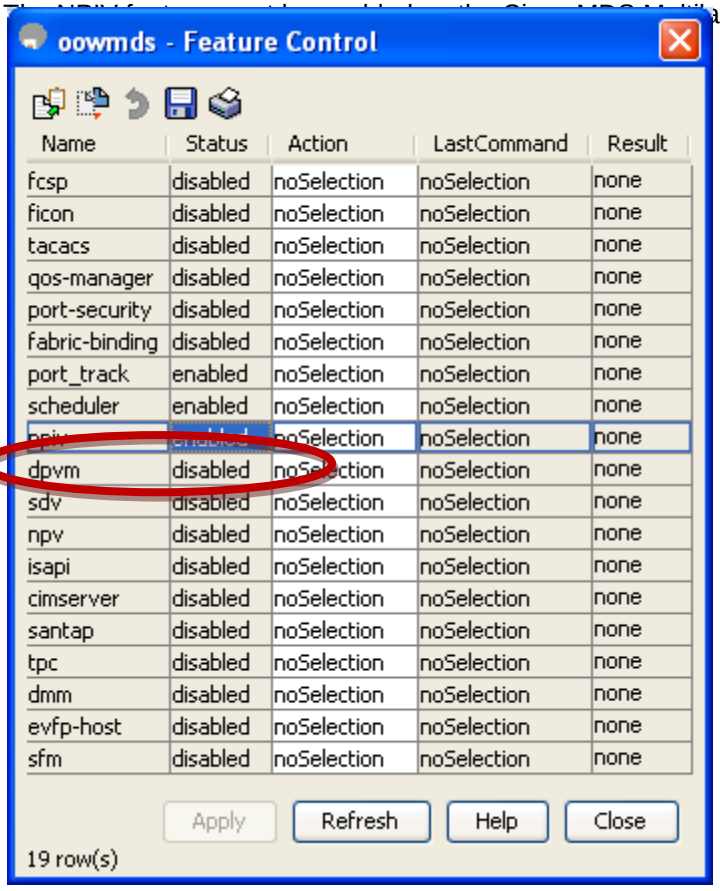
The Fabric Interconnects are connected to a SAN switch that also provides connectivity to storage.



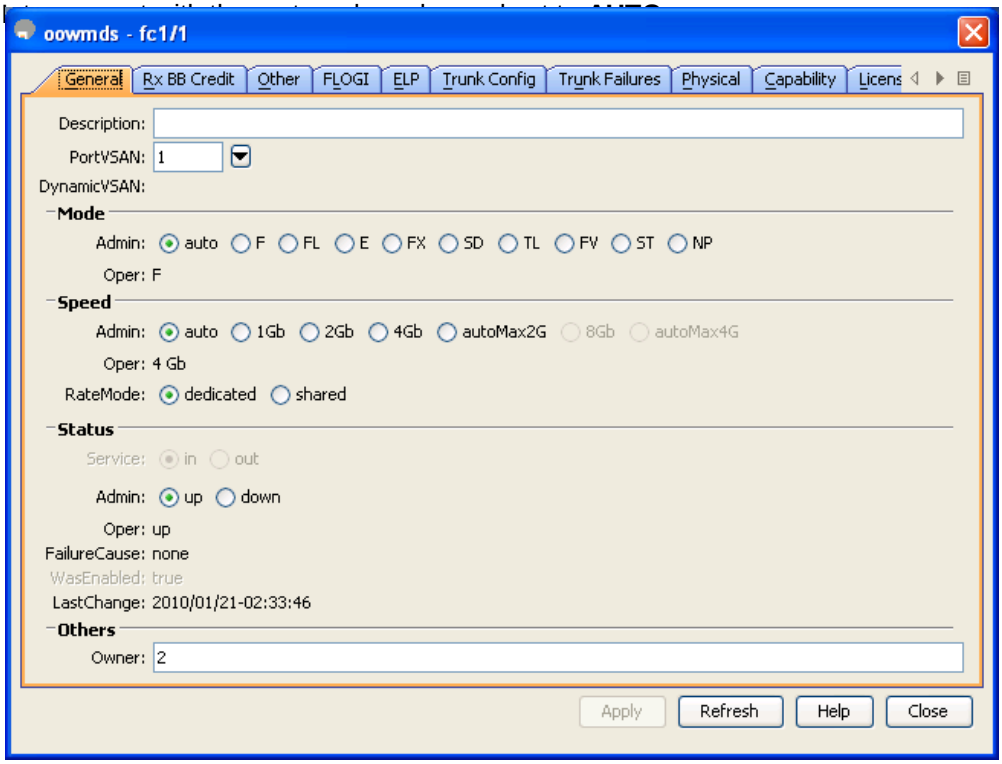
To configure the SAN switch, do the following:

1. Make sure that the following configuration details are implemented:

a. [illegible]ayer Fabric Switch.



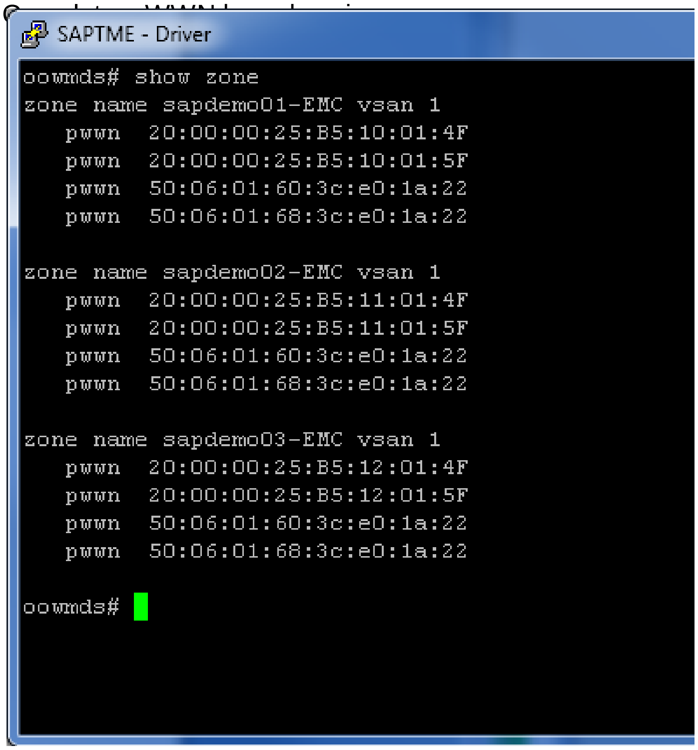
b. The 4-GB SPF+ modules must be connected to the Cisco UCS 6100 Series Fabric



c. If you have created different VSANs, make sure to associate each FC uplink with the right VSAN.

2. To continue with your setup, refer to the established SAN and zoning best practices.

3.



After you complete the zoning, you are ready to configure storage.

11 Setting Up EMC Storage

This section provides general information about storage configuration for SAP systems. However, it does not supply details about host connectivity and logical unit number (LUN)—that is, RAID—configuration. For more information about EMC storage, refer to http://powerlink.emc.com.

Prepare the Storage for Virtualized SAP implementation

Before a LUN can be used they must be mapped manually to a Server. On that server start the Computer Manager and navigate to Storage -> Disk Management. Windows open a new Window to initialize all new Disks at this Server. The next step is to create a partition and Format this with the File system NTFS on all disks that will be used for ACC. If all disks have a File system remove all Drive letters or Mount path and remove the access from this host on the storage.

For EMC² Storage and the ELSA Module there is a configuration file C:\usr\sap\adaptive\emcadaptive.ini.

For each File system add a line with the syntax:

SRID Mount-Point Diskgroup Volume-ID

Where SRID is a unique Storage Resource ID, the Diskgroup is the Windows Diskgroup or four dashes "----", Volume-ID is the Host specific GUID of the disk out of "mountvol" and the Mountpoint is the Path where the LUN must be mounted end with a backslash. For detail see the ELSA Module documentation from EMC².

To find out which Volume is which EMC² LUN it is at best to map one LUN after the other. The Volume-ID for each mapped LUN can be identified by the command "mountvol". This must be done on every Compute node to add the Volume-ID to the corresponding SRID in the emcadaptive.ini file.

Support

The interoperability of Server Hardware from different vendors and Storage products of EMC can occur in a wide variation of combinations. EMC's main focus is to achieve the highest reliability and availability. For that, EMC tests lots of combinations of hardware and publishes the results monthly in the EMC Support Matrix. This matrix is public available on the internet using this URL:

http://www.emc.com/interoperability/matrices/EMCSupportMatrix.zip

Every combination, that is not mentioned in this Matrix will not be used as general available, because these combinations are checked and handled as individual cases.

EMC provides Customers, Partners ans Employees an information Portal, where all kind of Dokumentation like Release Notes, Version Histories, Administration Guides and White Papers can be found. This portal is accessible for registered Users on the internet using this URL:

http://powerlink.emc.com

The EMC² ELSA Module for SAP Adaptive Computing Controller requires the EMC² Solution Enabler to manage the LUNs on the storage system. The Documentation and the software are can be requested by email: sap@emc.com.

EMC Symmetrix VMAX Management

The Software „Symmetrix Management Console (SMC)“ is the management GUI interface of an EMC Symmetrix VMAX Storage system. SMC runs on the Storage Processor of each Symmetrix VMAX array and provides a browser-based Management GUI. It is based on Java, each Management PC needs to have SUN JRE installed to use the GUI.

Symmetrix VMAX Autoprovisioning functionality can be perfomed from SMC to add, change and configure the EMC Symmetrix VMAX. Autoprovisioning performs the mapping and masking of the LUNS automatically. The additional Clones and Snaps can also be configured and managed from this utility.

Detailed information about SMC and Autoprovisioning can be found in the EMC Document library under http://powerlink.emc.com.

EMC CLARiiON Management

The Software „Navisphere Manager“ ist the management utility of an EMC CLARiiON Storagesystem. Navisphere Manager runs on the Storage Processor of each CLARiiON and provides a browser-based Management GUI. It is based on Java and each Management PC needs to have SUN JRE installed to use the GUI.

Navisphere Manager provides all functions for adding, changing and configuring the EMC CLARiiON. Also LUN assignment and managing the additional Software as SnapView, MirrorView and Sancopy can be done by this utility.

Detailed Information about daily administrative Tasks, LUN Management und Configuration Changes is available in the ***“Navisphere Administration Guide”*** which can be found in the EMC Documentlibrary http://powerlink.emc.com .

The following section provides an overview of the Navisphere Manager Context Menu:

How to Clone a LUN With EMC Storage

EMC Symmetrix VMAX has TimeFinder software with Clones and Snaps, and EMC CLARiiON has SnapView that uses Clones and Snapshots. We will refer to both TimeFinder and SnapView as EMC Clones and EMC Snaps for this explanation. This Software is part of the layered application software, which is running on each EMC Storage Processor. The hosts will have the Solutions Enabler software installed along with the appropriate key for the clones and snaps functionality.

EMC Snaps are logical point-in-time copies of production LUNs. The EMC Snaps are created on one storage processor and is based in the memory of the storage processor. Snaps can be handled like a normal lun and can be assigned to a host. Snaps are available as a read-write LUN. Creating Snaps is a simply process only taking a few seconds.

An EMC Clone is a physical copy of a lun. This means, data on a production lun is copies to another. The copy runs block level-based. After an initial sync, which can take some time but happens in the background, the clone can be fractured or activated. After that the clone can be assigned to a host and is available for all I/O. Changes between the original source and the clone are tracked and can be re-synchronized incrementally.

In comparison between Snaps and Clones, Clones have a higher availability because data is stored on individual physical disks. Because of that, Clones do not interfere with production lun performance.

It takes longer time to create them initially, while a Snaps is created very fast.

More procedures and information is available in the „EMC SnapView Administration Guide“ (P/N 069-001180) for CLARiiON and the „Solutions Enabler Symmetrix TimeFinder Family CLI Product Guide“ (P/N 300-000-876) for Symmetrix VMAX. Additional information is available on Powerlink.

EMC Snaps are used to create storage system based copies of LUNs for testing along with Operating System cloning and other functions.

Configuring Storage

To configure storage for Cisco UCS data center solution, do the following:

1. Make sure to check host connectivity.

   If each host has the EMC Navisphere Agent® package installed, the agent automatically registers the HBA initiators. If the package is not installed, make sure that all initiators are registered properly to complete the host registration. These can also be defined through the SMC GUI with Autoprovisioning on the Symmetrix VMAX arrays.

2. Create the RAID groups.

   Testing for the Cisco Unified Computing System solution used:

- EMC Symmetrix VMAX with 45 Fibre Channel disks
- EMC CLARiiON CX4-480 with 45 Fibre Channel disks
- 2 RAID-5 Groups to store the operating systems, applications and Archive logs
- 2 RAID-0+1 Groups to store the database data files
- 1 RAID-0+1 group to store the database redolog files

3. Create the LUNs.

Note: It is extremely important that you choose an appropriate Storage Processor as the default owner so that both the service processors are evenly balanced.

For more information about SAP best practices for EMC storage, refer to the appropriate EMC² documentation.

12 Installing the Operating Systems

After completing the configuration of the Cisco Unified Computing System, the SAN, and storage, you can install the OS. To run the Adaptive Computing Compliance Test with the Cisco Unified Computing System, 64-bit Windows 2008 Server and Red Hat Enterprise Linux 5.4 was used as OS. Both Operating Systems are installed on a physical Blade as well as on a Virtual Machine based on VMware vSphere 4.

Method of Single OS Maintenance

Installation and maintenance of operating system environments for IT landscapes today is a cost intensive and time-consuming process. Modern deployment solutions try to reduce the costs of such efforts by automating operations and using the concept of the centralized shared data model. All data in a SAP solution landscape, such as operating system images, file systems, database files and application installation paths, are located on a central storage system to which the server for the landscape can connect to.

We assume that the reader of this document has technical knowledge in administration and configuration of Windows or Linux Operating Systems.

To simplify the OS Maintenance Cisco use the default Installation feature from Microsoft Windows for the very first installation of the Operating System. All other Operating System deployments will be done with copy or cloning methods of the installed Disks.

The Cisco Unified Computing System architecture and Cisco UCS Manager make it easy to work with replicated disk images because it is easy to reconfigure disks (by reassigning them from one Service Profile to another).

If there are any major changes to be done on the operating system or other “basic” software, this change has to be done only one time. This new or changed installation will then be defined as the new Master Disk or Golden Image and can be cloned as often as needed. To activate the new installation on a Server, it is only necessary to create a clone of the Master Disk and map this new disk to a Service Profile.

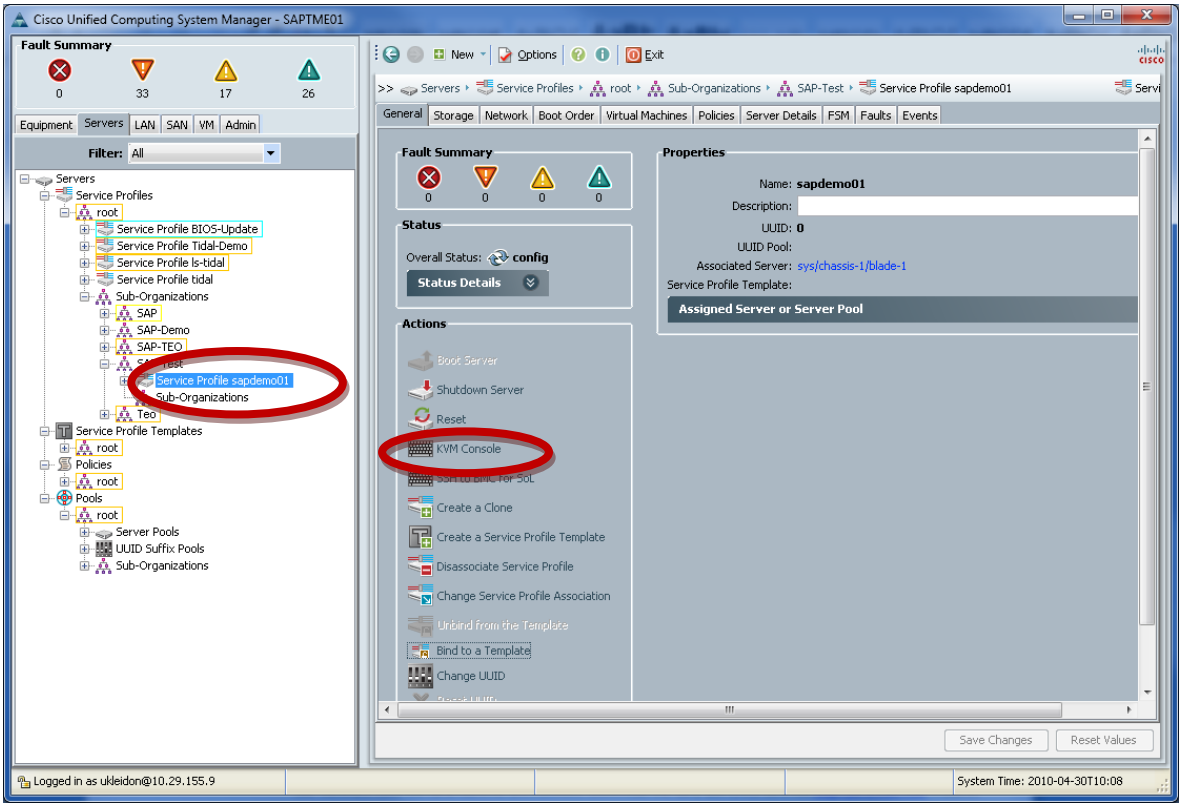
Patching or Changes can be done for a whole SAP landscape with a Rolling reboot approach. Relocate a running SAP system, shutting down the server, change the Boot LUN mapping and boot the server. Are there any problems with the new installation, change the Boot LUN back to the original LUN and restart the Server. The production can keep running with the “old” OS installation while issues with the “new” OS installation are fixed on a separate Service Profile configuration.

VMware vSphere 4 Installation

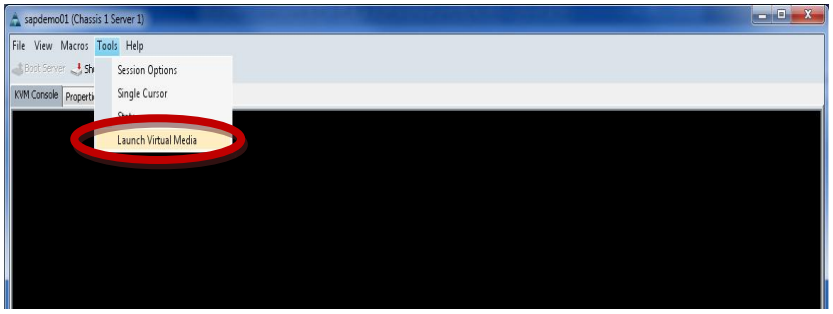
Install VMware vSphere 4 on a Cisco UCS blade server.

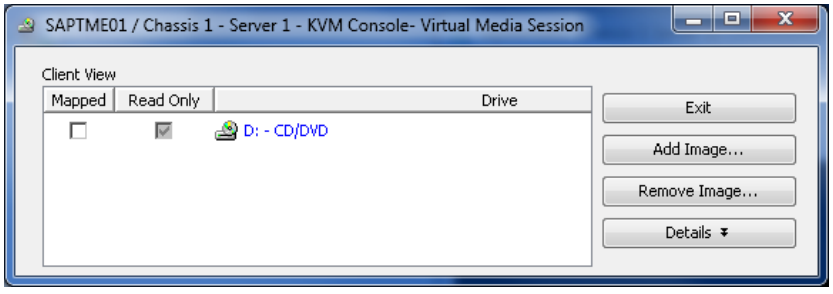
Open the Cisco UCS Manager and navigate to the service profile sapdemo03 to install the server esx001 and open the KVM Console

1. Click the **Servers** tab and navigate to sapdemo03.
2. Click **KVM Console**.



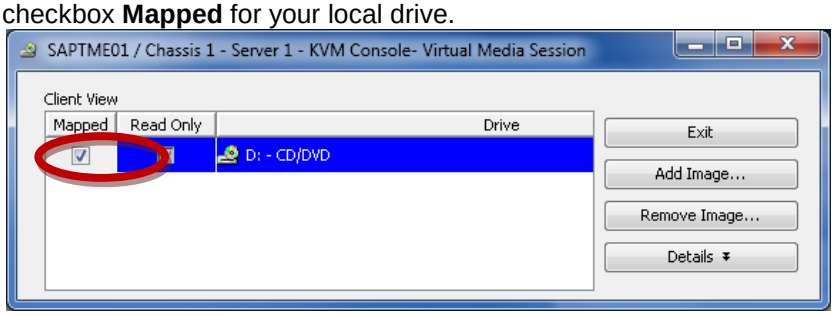
3. Open virtual media manager.
4. Go to **Tools** and select **Launch Virtual Media**.



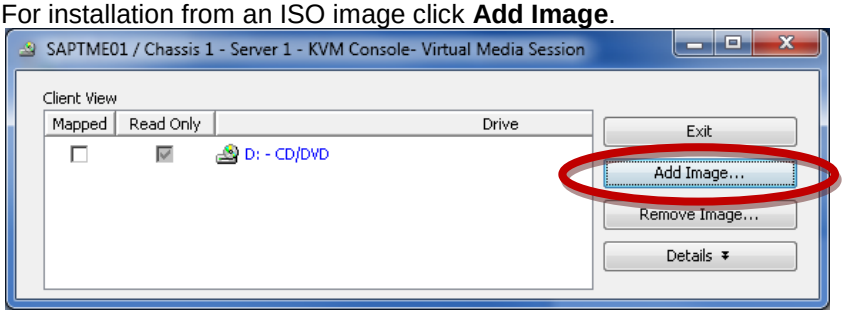


5. Map the Installation DVD to the virtual drive.

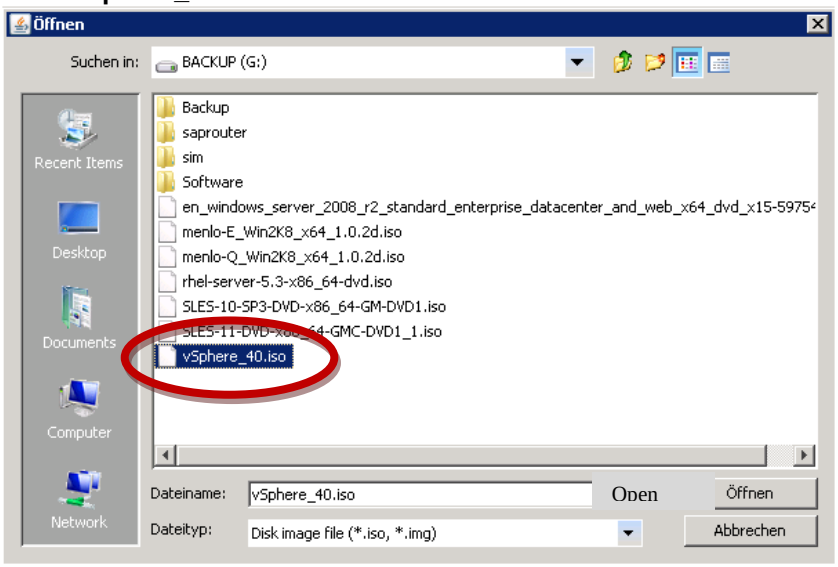
6. For installation from a physical DVD, insert the media to your local DVD-Drive and click the checkbox **Mapped** for your local drive.



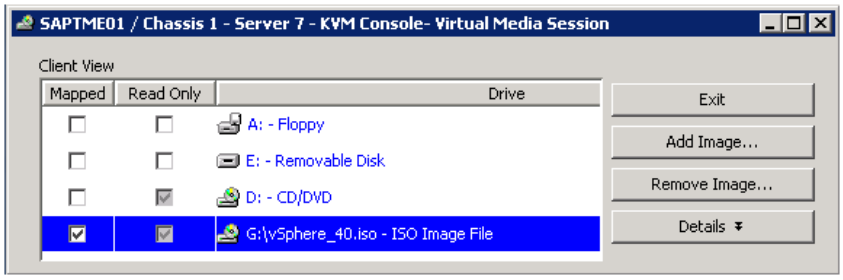
7. For installation from an ISO image click **Add Image**.



8. Click **vSphere_40.iso**.



9. Click the checkbox **Mapped**.
10. Click **Exit**.



11. Click **Boot Server** to boot the service profile.

12. Follow the installation steps displayed onscreen.

For more information, refer to the VMware installation documentation, *"ESX and vCenter Server Installation Guide"* (http://www.vmware.com/support/pubs/)

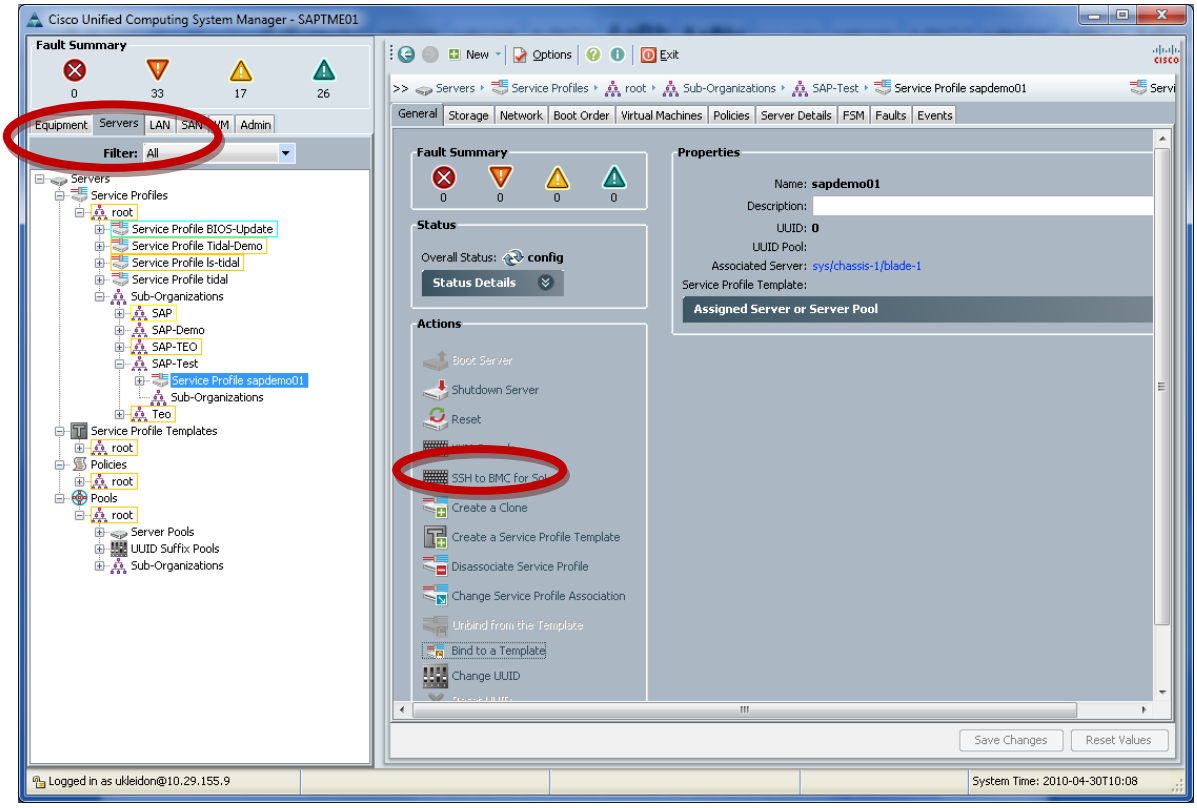
Windows Installation

Install Windows Server 2008 on a Cisco UCS Blade Server

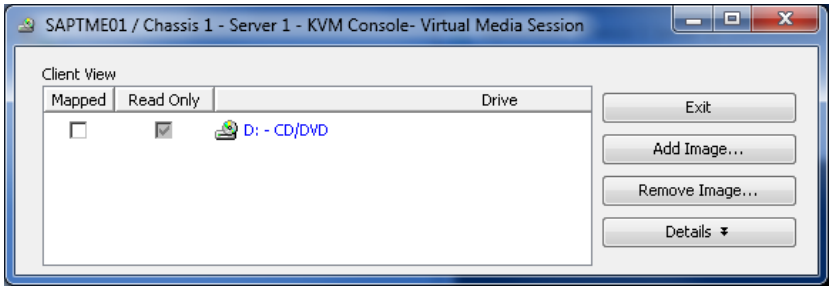
Open the Cisco UCS Manager and navigate to the service profile `sapdemo01` to install the server `physwin` and open the KVM Console.

1. Click the **Servers** tab and navigate to `sapdemo01`.

2. Click **KVM Console**.

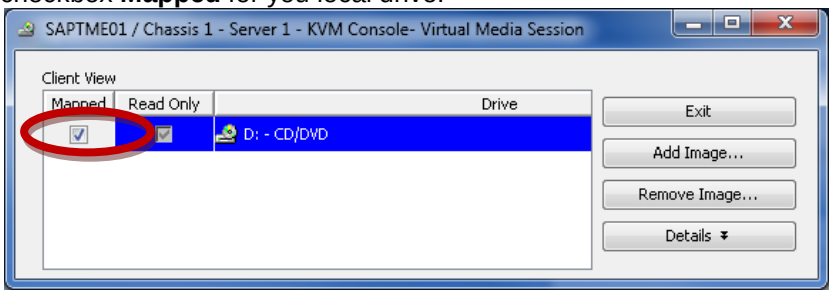


3. From **Tools** and select **Launch Virtual Mediab**.

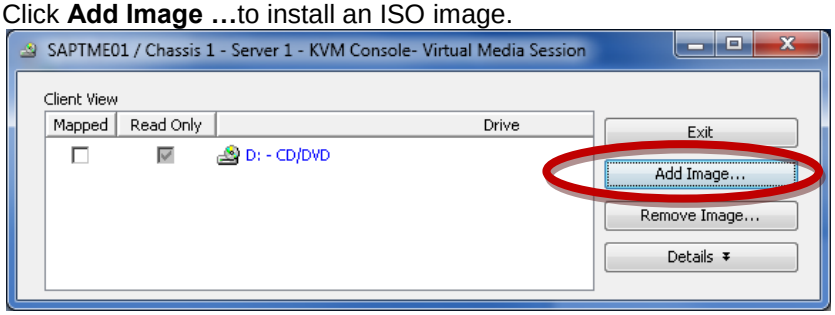


4. Map the Installation DVD to the virtual drive.

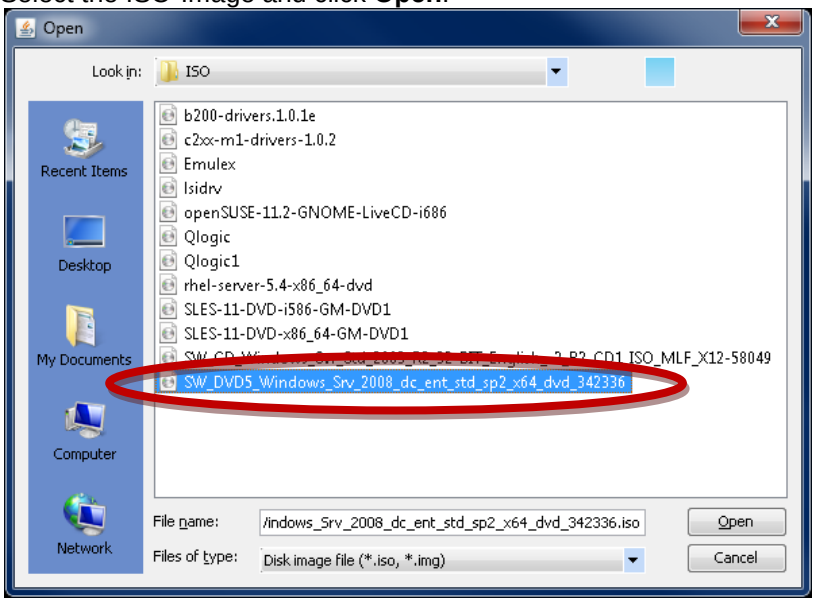
5. To install from a physical DVD, insert the media to your local DVD-Drive and click the checkbox **Mapped** for you local drive.



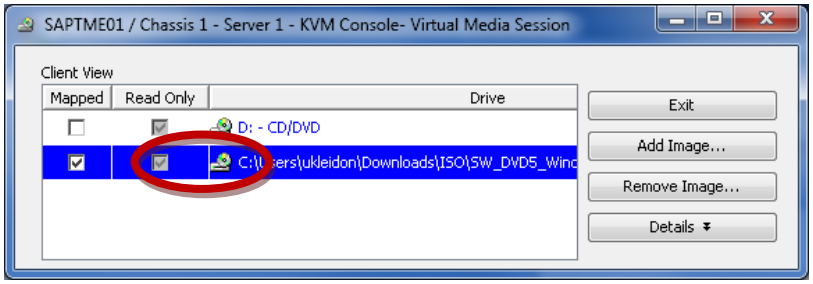
6. Click **Add Image …**to install an ISO image.



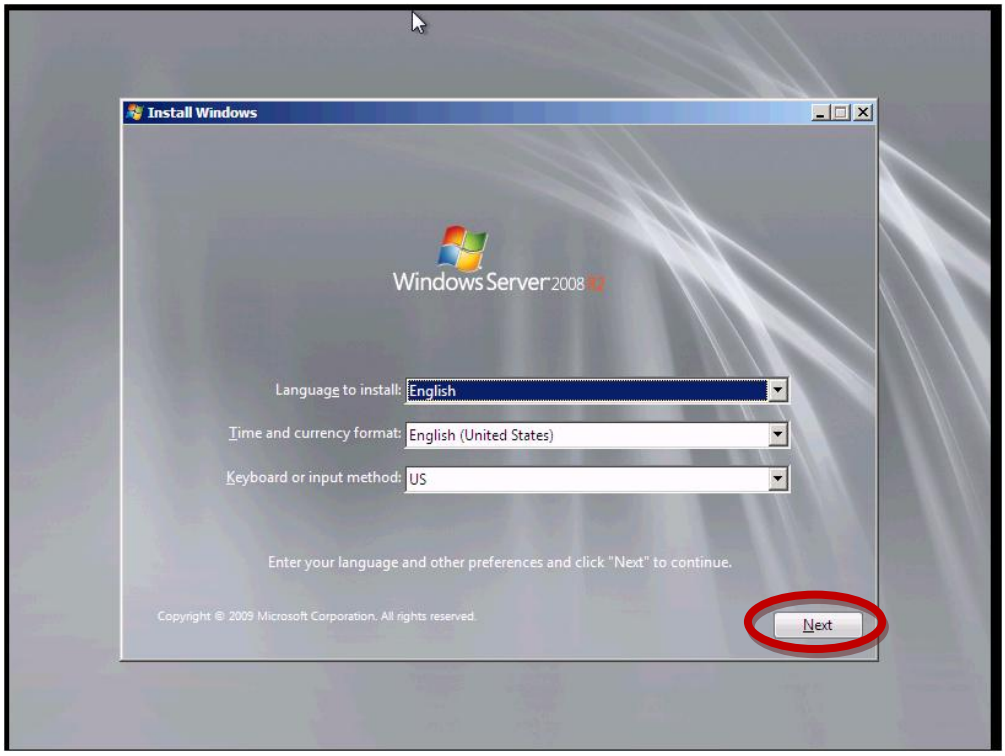
7. Select the ISO-Image and click **Open**.



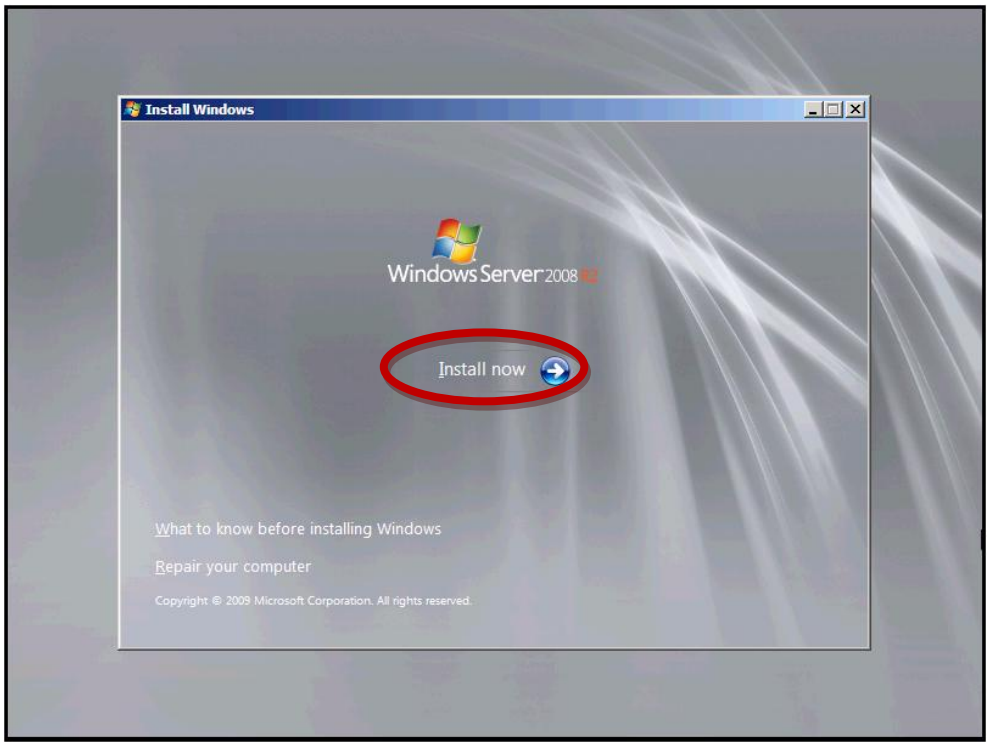
8. Click the checkbox **Mapped**.
9. Click **Exit**.



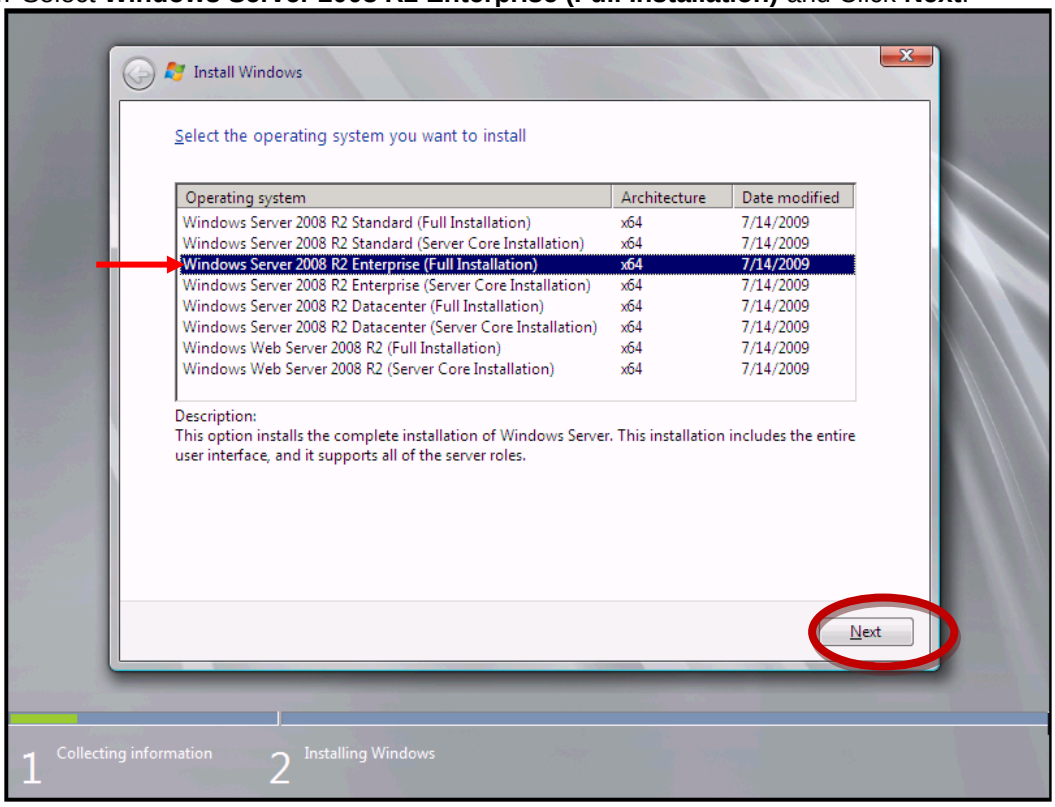
10. Click **Boot Server** to boot the service profile.
11. Select the language and format settings and Click **Next**.



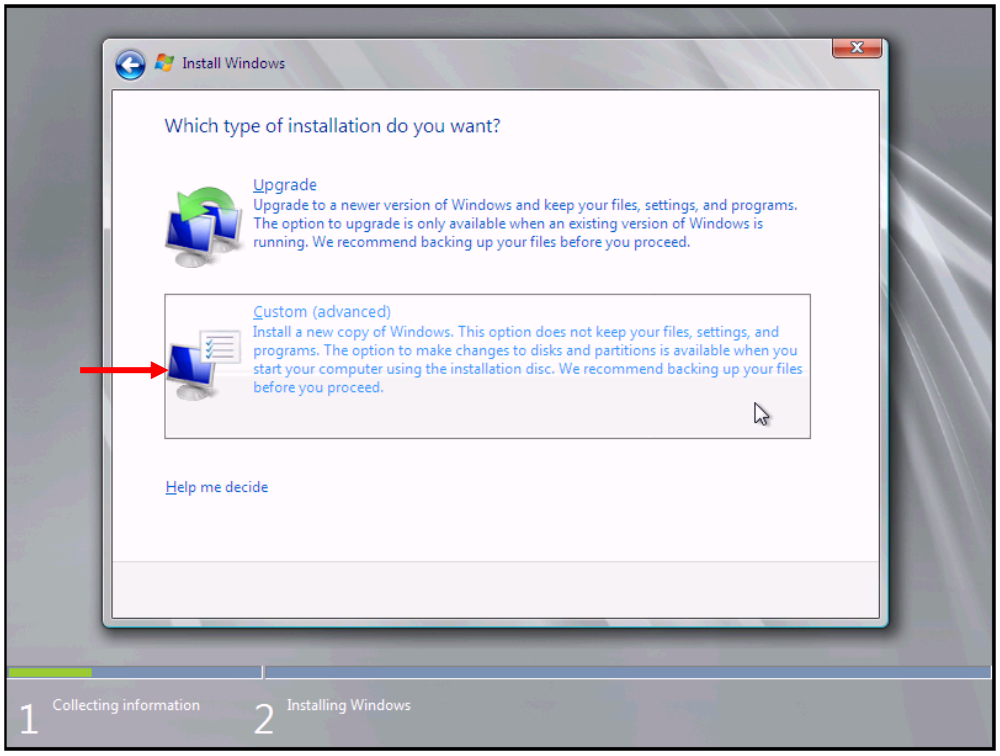
12. Click **Install now**.



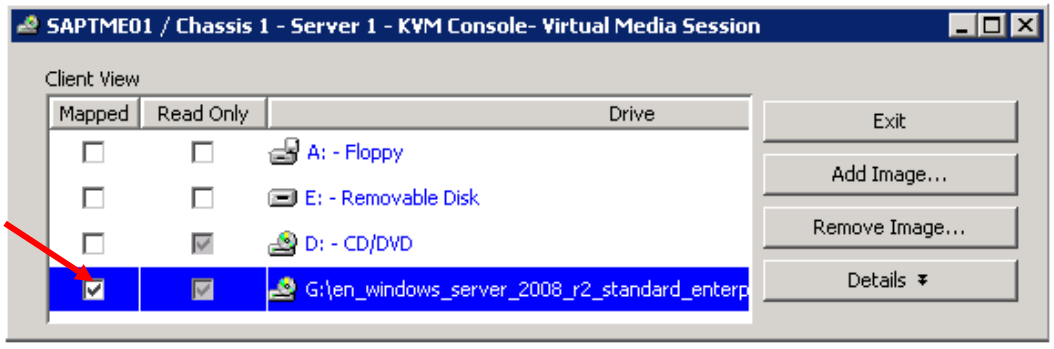
13. Select the operating system you want to install.
14. Select **Windows Server 2008 R2 Enterprise (Full Installation)** and Click **Next**.



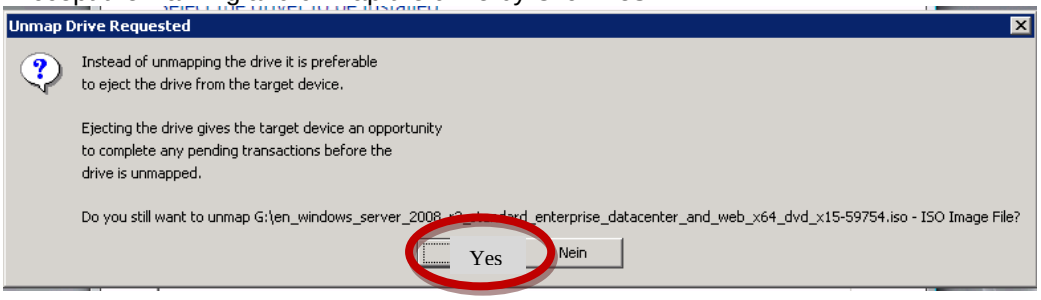
15. Read the license terms and select the checkbox **I accept the license** terms.
16. Click **Next**.
17. Select **Custom (advanced)**.



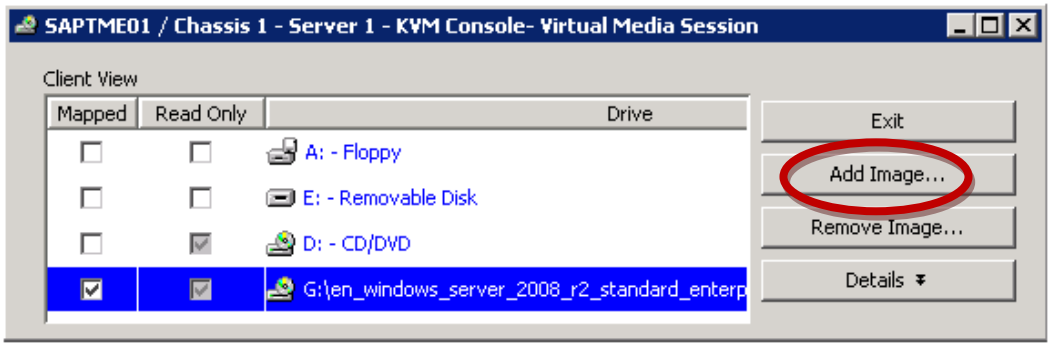
18. Go back to the Virtual Media Manager Windows and add the Cisco UCS Drivers Media.
19. Uncheck the checkbox for the Windows installation media



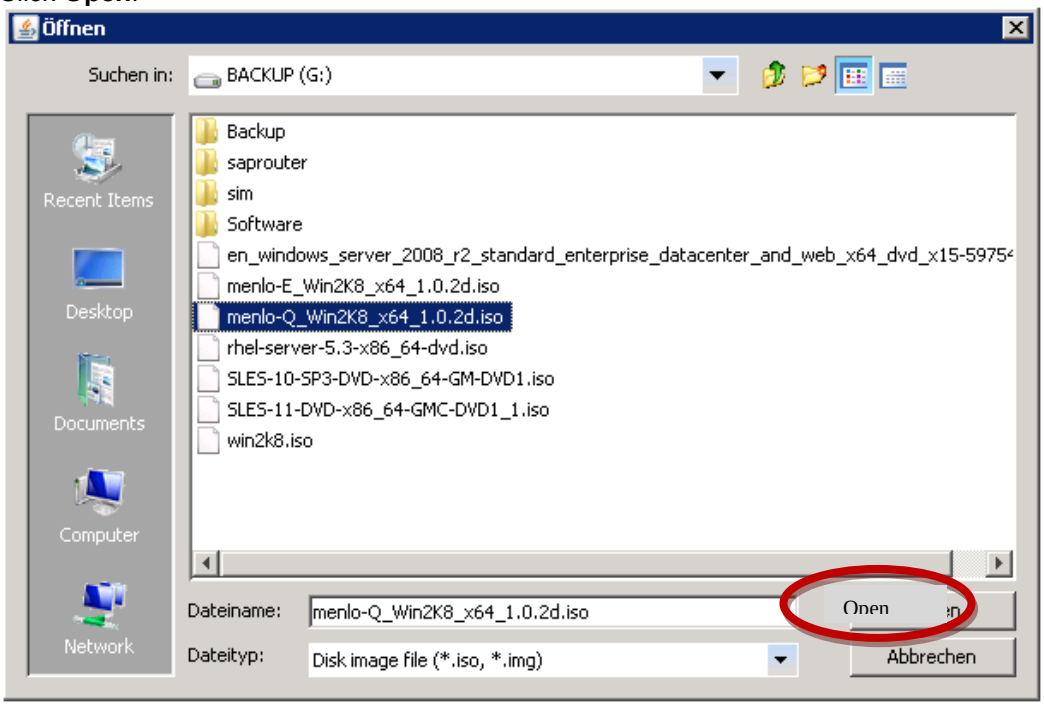
20. Accept the warning and unmap the drive by Click **Yes**.



21. Click **Add Image ….**

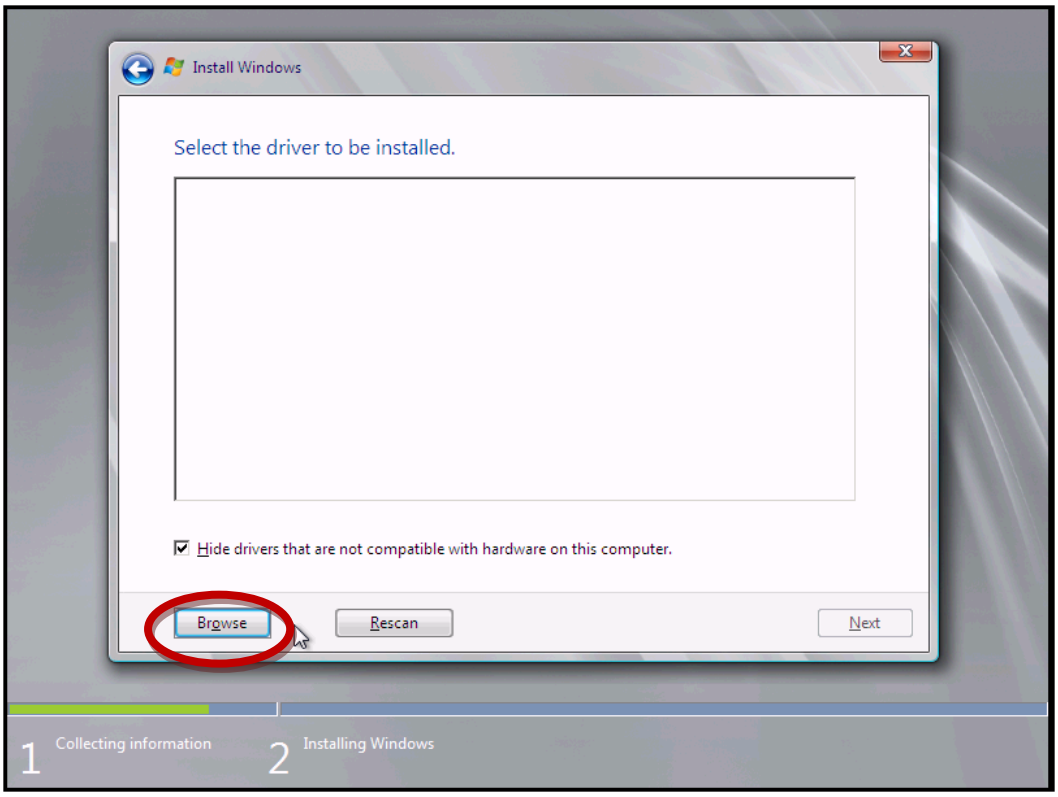


22. Select the Cisco UCS Qlogic driver media, **Menlo-Q_Win2K8_x64_1.0.2d.iso**.
23. Click **Open**.

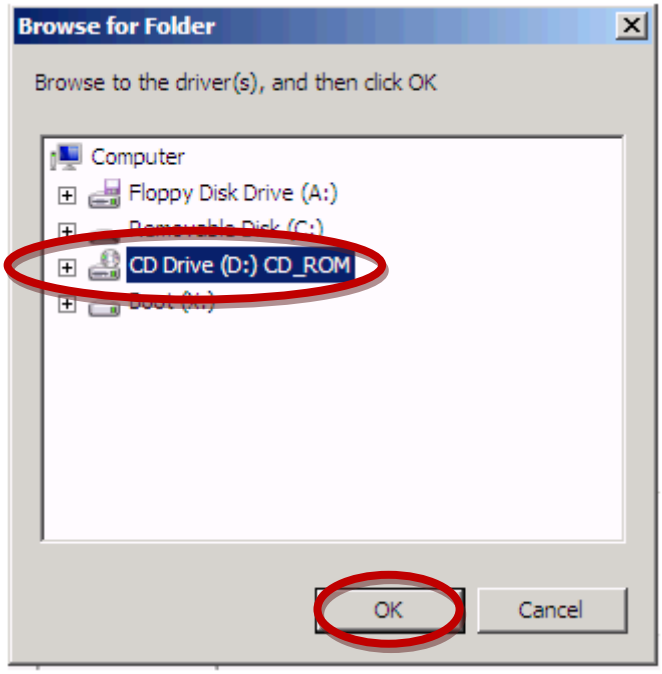


24. Click the checkbox **Mapped**.

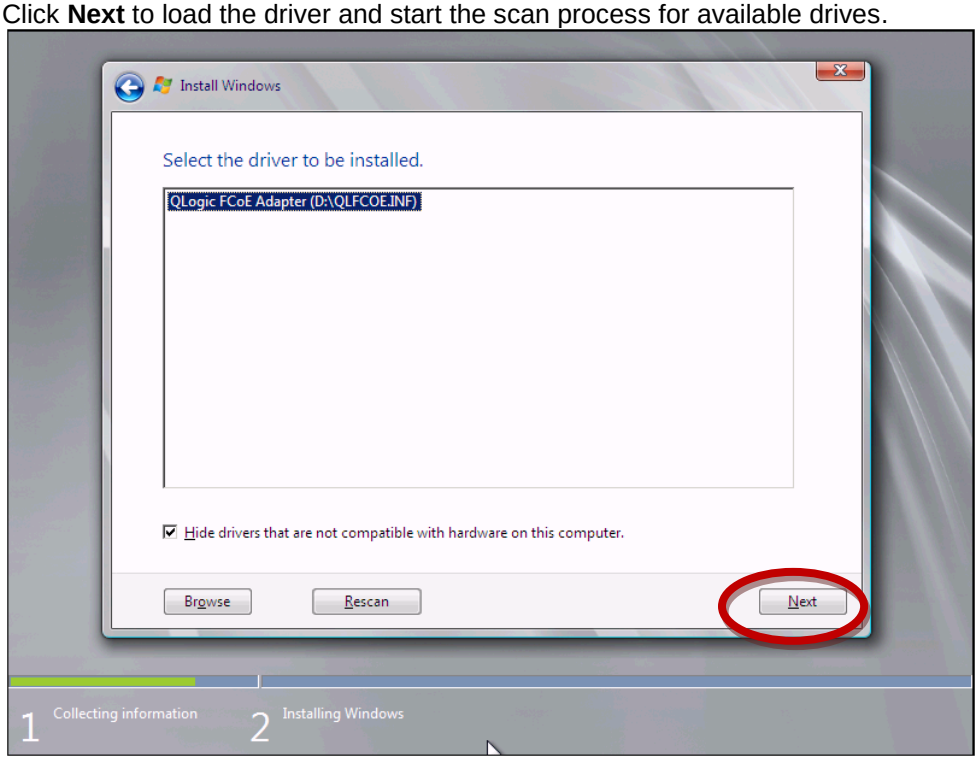
25. From the KVM screen click **Browse**.



26. Select the **CD Drive** and click **OK**.

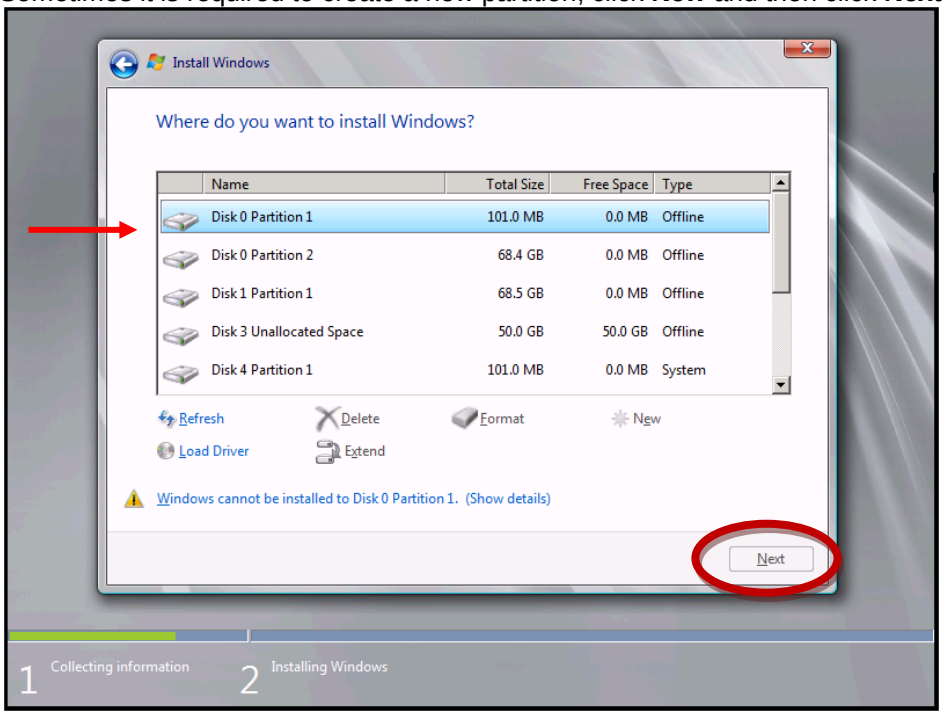


27. Click **Next** to load the driver and start the scan process for available drives.



28. Select the disk that is highlighted and click **Next**.

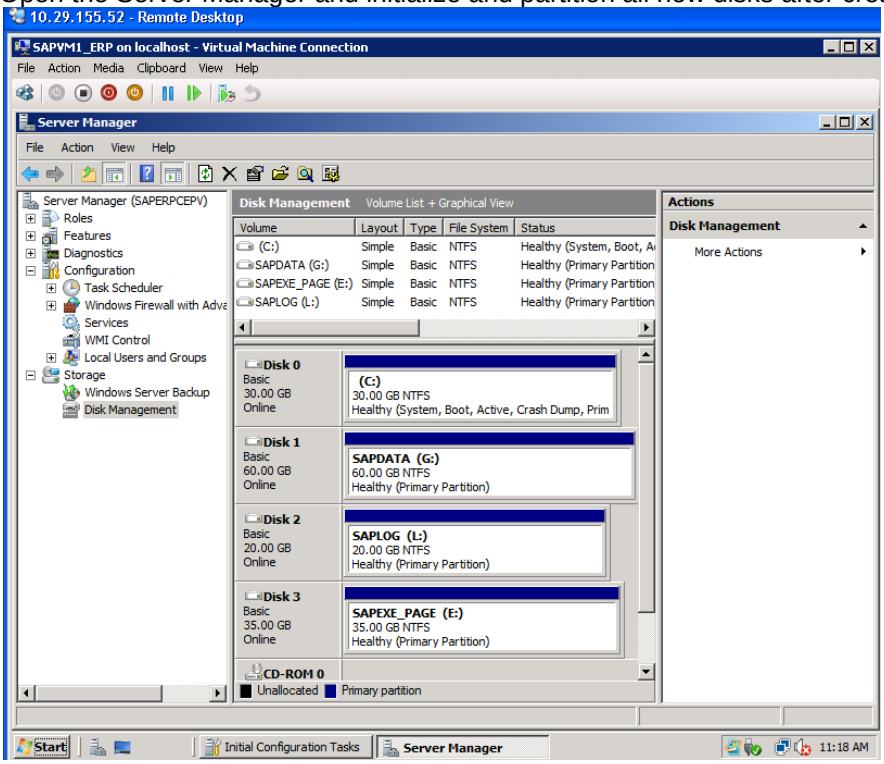
29. Sometimes it is required to create a new partition; click **New** and then click **Next**.



30. Continue to follow the Microsoft Windows installation instructions.

An additional important task to complete is to initialize and partition all new disks after creation. This is necessary since all newly created LUNs are not initialized and there is no partition and files systems yet created.

1. Open the Server Manager and initialize and partition all new disks after creation.



Install Windows Server 2008 on a Virtual Machine

Use the default VMware installation process to install Windows Server 2008 on a Virtual Machine. Refer to, "*Guest Operating System Installation Guide PDF"* (http://www.vmware.com/pdf/GuestOS_guide.pdf)

Install Java Software

SAP Software need the Java Runtime Environment. See SAP Note 941595.

Windows Registry changes

To run virtualized SAP Applications, registry changes on Windows are recommended.

1. Disable the network loopback check.
2. Create the entry DisableLoopbackCheck as a DWORD under "HKEY_LOCAL_MACHINE\SYSTEM\ CurrentControlSet\Control\Lsa" and set the Value to 1
3. Disable strict name checking.

4. Create the Entry DisableStrictNameChecking as a DWORK under “HKEY_LOKAL_MACHINE\SYSTEM\CurrentControlSet\Services\LanmanServer\Parameters ” and set the Value to 1

To disable the Auto update mechanism for Java, run the following commands:

Set EnableAutoUpdateCheck under "HKEY_LOCAL_MACHINE\SOFTWARE\JavaSoft\Java Update\Policy" /v to 0

Set SunJavaUpdateSched under "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run" to "-"

Set Environment Variables

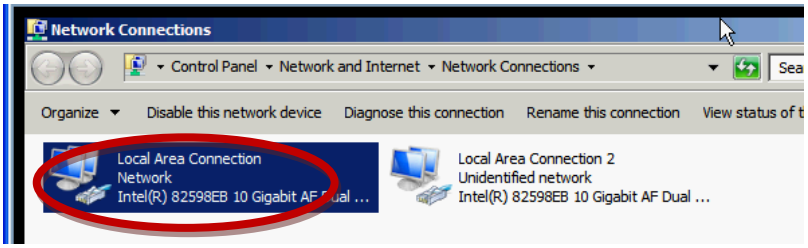
To complete the operating system installation, it is necessary to change some environment variables and install additional software. In order to do this, connect to the server using the Microsoft Remote Desktop and the IP address or the corresponding hostname.

1. Expand the %PATH% variable with the following Directories:
    (a) C:\usr\sap\adaptive
    (b) C:\j2sdk1.4.2_<PatchLevel>\bin
    (c) C:\usr\cisco\bin
2. Create JAVA_HOME variable
    (a) Set JAVA_HOME to C:\j2sdk1.4.2_<PatchLeve>

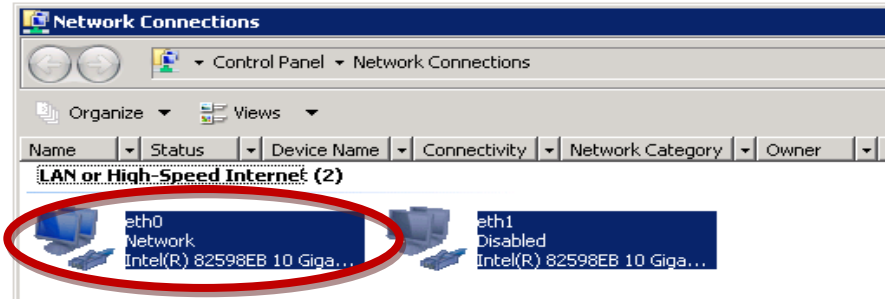
Network Configuration

Previously, we changed the default naming of the network interfaces on the Windows Operating system to a more useful name; eth0 and eth1. It is also possible to change it to the same name than the interfaces have in the service profile configuration.

“Local Area Connection” to eth0 or vNIC1 and “Local Area Connection 2” to eth1 or vNIC2.



Eth0 is used for the whole network traffic in this sample with the IP rang 192.168.121.0

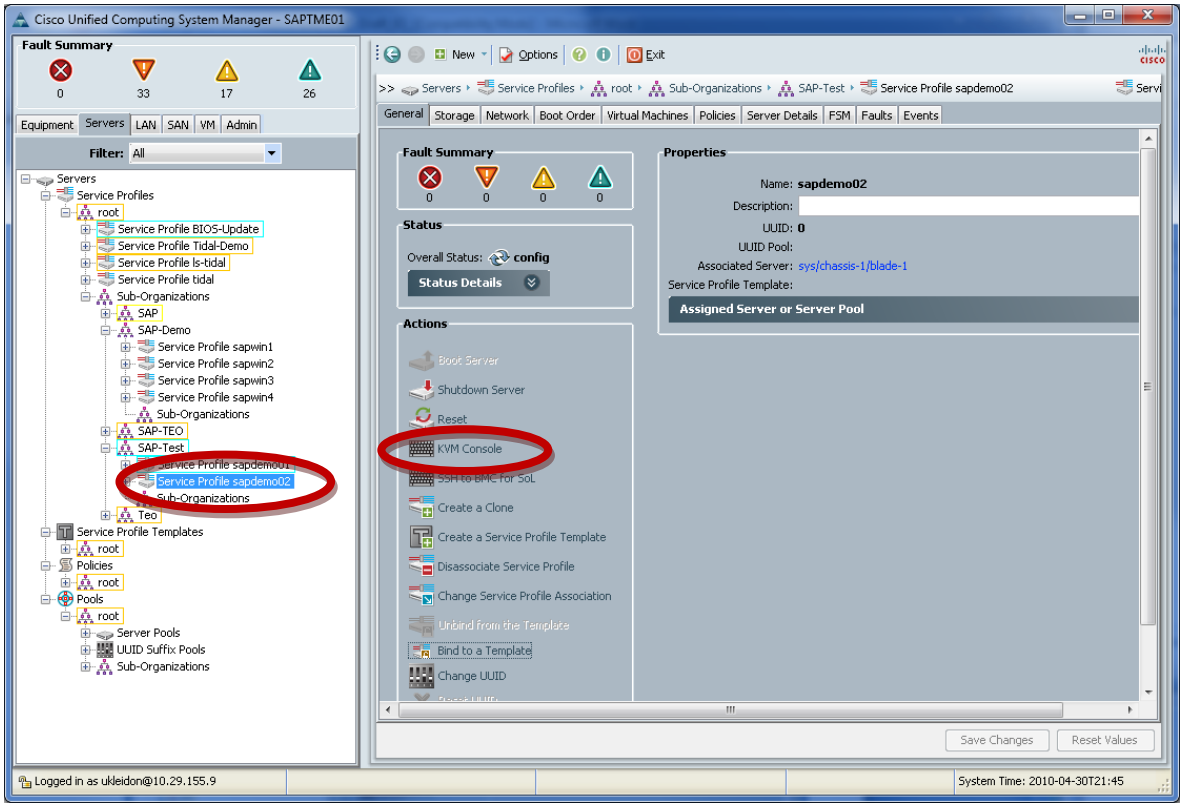


Linux Installation

Install Red Hat Enterprise Linux 5.4 on a Cisco UCS Blade Server

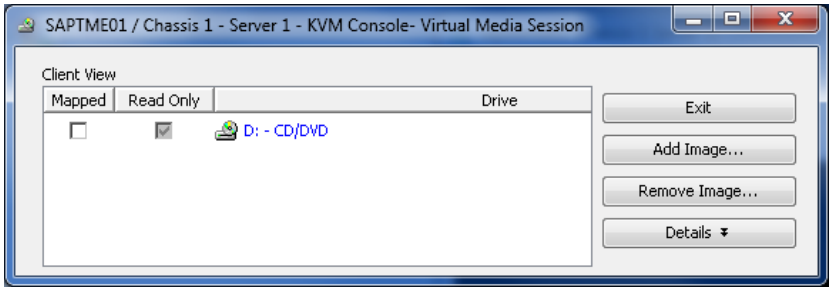
Use the default UCS installation routine to install Red Hat Linux on a Cisco UCS blade server.

1. Open the Cisco UCS Manager and navigate to the service profile sapdemo02 to install the server physrh1 and open the KVM Console.
2. Click the Servers tab and navigate to **sapdemo02b**.
3. Click **KVM Console**.



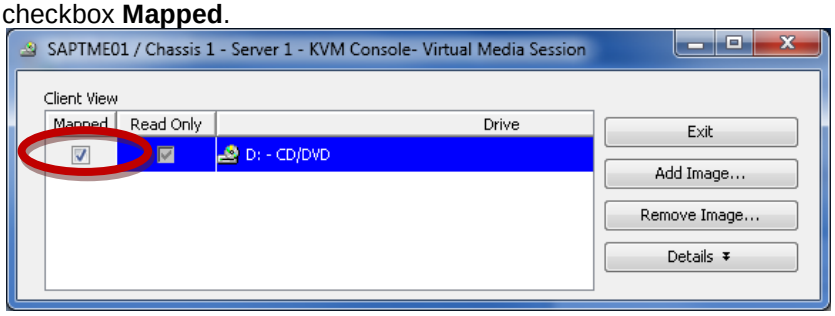
4. Open virtual media manager.

5. From **Tools** click **Launch Virtual Media**.

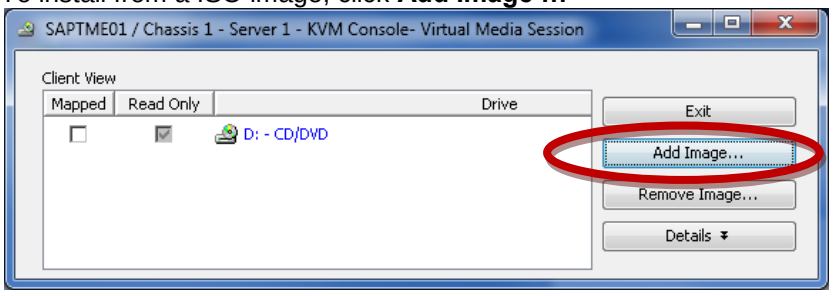


6. Map the Installation DVD to the virtual drive.

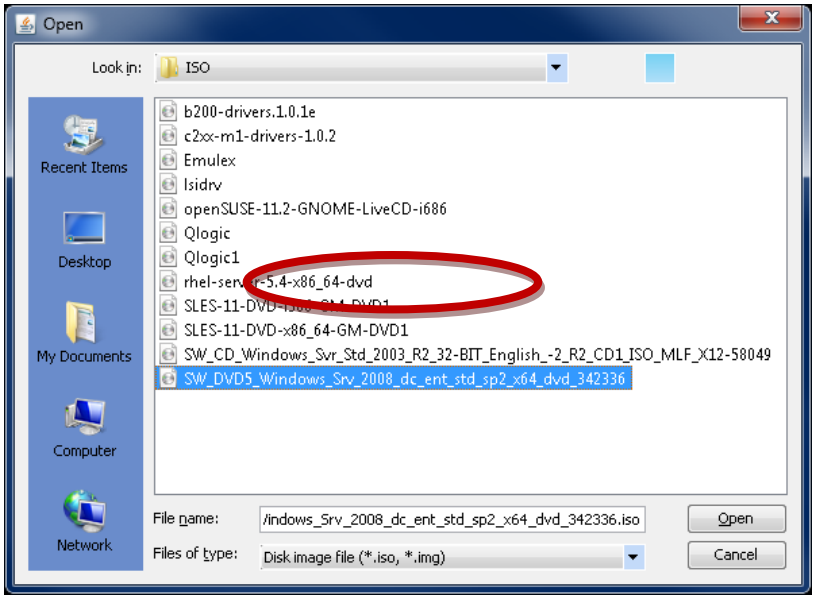
7. To install from a physical DVD, insert the media into your local DVD-Drive and click the checkbox **Mapped**.



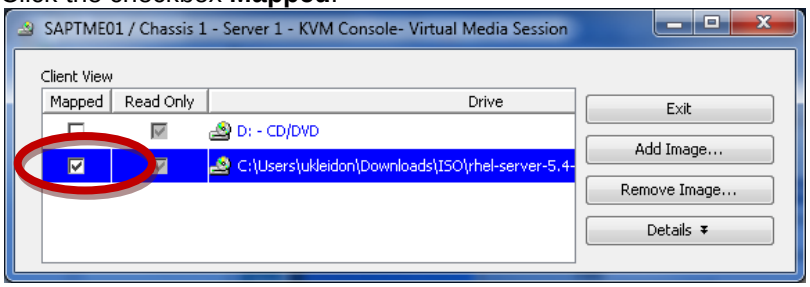
8. To install from a ISO image, click **Add Image …**



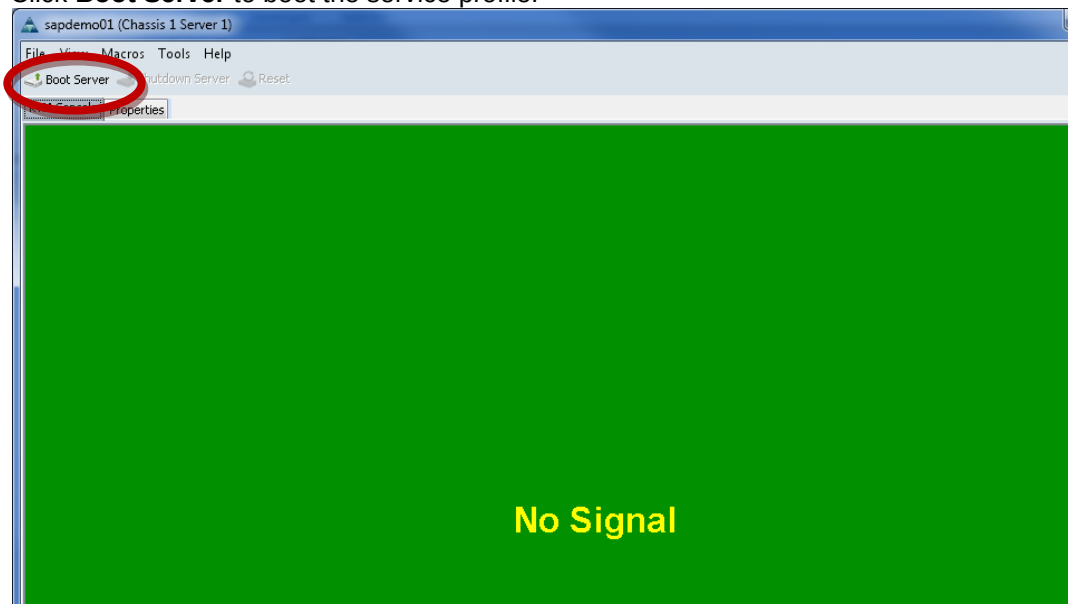
9. Select the ISO-Image and click **Open**.



10. Click the checkbox **Mapped**.



11. Click **Boot Server** to boot the service profile.



12. Continue to follow the installation procedure on the screen.

Install Red Hat Enterprise Linux 5.4 on a Virtual Machine

Use the default VMware installation process to install Red Hat Linux on a Virtual Machine. See "*Guest Operating System Installation Guide PDF"* (http://www.vmware.com/pdf/GuestOS_guide.pdf)

Install Java Software

SAP Software need the Java Runtime Environment. See SAP Note 1172419.

Preparing Linux OS to Host the SAP system

The SAP LinuxLab provides recommendations on how to prepare your Linux OS for SAP environments. See SAP Note 171356 for general SAP on Linux advisory and SAP Note 1048303 for specific Red Hat Enterprise Linux 5 configuration.

13 Additional Software

Patches

Install all recommended Patches and Updates for the OS. Please refer to the OS vendor website as well as to the SAP notes to make sure that all required patches are installed.

EMC² Software

Install the EMC² Navisphere for CLARiiON or Symmetrix Management Console (SMC) for Symmetrix VMAX. Solutions Enabler software will be used for either implementation. It is highly recommended that you install this Software because PowerPath helps ensure automatic host registration with EMC CLARiiON storage. The SolutionEnabler includes the navcli command line utility. EMC² PowerPath is recommended for SAP production systems. On Linux you can also use embedded multipathing software**.** For more information about mutipathing software and device setup, refer to EMC² PowerPath documentation.

Please refer to "SAP Adaptive Computing Controller EMC Library for SAP Adaptive (ELSA) UNIX and Windows" Technical Note (P/N 300-004-680) for more details on the EMC software.

14 Central Services

It is required that a Microsoft Active Directory (AD) Structure is running before you can start to implement any virtualized SAP systems on Windows. We recommend that a new Active Directory or a Sub-Tree of an existing Directory is used for Adaptive Computing. You need Administrative rights to add Users, Groups and Computers to this AD. Please follow the Documentation from Microsoft to setup an AD structure on a new Server.

For the SAP Adaptive Computing Compliant implementation the server vmad is used to serve the central services:

- Active Directory
- DNS - Server
- DHCP – Server (optional)

After the operating system installation the role Active Directory Domain controller must be activated. Part of the AD Domain controller is the required DNS server. The used Domain name is SAPACC.VCE.CORP as a new Tree.

Please read the related documentation from Microsoft if you are unfamiliar with the Active Directory concept.

15 Installing Database and SAP Applications

For more information about application installation, refer to the SAP installation documentation.

For our sample we use the following settings:

physical hostnames	Description	IP addresses
vmacc	virtual machine, Linux, SAP ACC system	192.168.121.16
vmad	virtual machine, Windows, Active Directory	192.168.121.17
vmrh1	virtual machine, Linux, prepared for ACC	192.168.121.18
vmwin	virtual machine, Windows, prepared for ACC	192.168.121.19
physrh1	physical machine, Linux, prepared for ACC	192.168.121.20
physwin	physical machine, Windows, prepared for ACC	192.168.121.26
virtual hostnames		
dbwin	WIN database instance	192.168.121.21
paswin	WIN Primary Application Server instance	192.168.121.22
ascswin	WIN ABAP System Central Services instance	192.168.121.23
scswin	WIN System Central Services instance	192.168.121.24
dwin01	WIN Dialog instance	192.168.121.25
dbwi2	WI2 database instance	192.168.121.35
paswi2	WI2 Primary Application Server instance	192.168.121.36
dwi201	WI2 Dialog instance	192.168.121.37
dbrh1	RH1 database instance	192.168.121.27
pasrh1	RH1 Primary Application Server instance	192.168.121.28
ascsrh1	RH1 ABAP System Central Services instance	192.168.121.29
scsrh1	RH1 System Central Services instance	192.168.121.30
drh100	RH1 Dialog instance	192.168.121.31
drh101	RH1 Dialog instance	192.168.121.32
dbrh2	RH2 database instance	192.168.121.37
pasrh2	RH2 Primary Application Server instance	192.168.121.38
ascsrh2	RH2 ABAP System Central Services instance	192.168.121.39
scsrh2	RH2 System Central Services instance	192.168.121.40
drh200	RH2 Dialog instance	192.168.121.41

File systems:

LUN	Size	Mount point	Description
024B	240 GB	-	VMware ESX datastore
[NFS]	-	/home	Linux global mount
[NFS]	-	/usr/sap/trans	Linux global mount
[NFS]	-	/sapmnt	Linux global mount
[NFS]	-	/oracle/client	RH1 global mount
0255	100 GB	/oracle/block	RH1 database instance mount
[NFS]	-	/usr/sap/RH1/DVEBMGS00	RH1 PAS instance mount
[NFS]	-	/usr/sap/RH1/ASCS01	RH1 ASCS instance mount

[NFS]	-	/oracle/client	RH2 global mount
0255	100 GB	/oracle/block	RH2 database instance mount
[NFS]	-	/usr/sap/RH2/DVEBMGS02	RH2 PAS instance mount
[NFS]	-	/usr/sap/RH2/ASCS03	RH2 ASCS instance mount
0259	100 GB	C:\MSSQL\WIN	WIN database instance mount
025D	10 GB	C:\usr\sap\WIN\DVEBMGS00	WIN CI instance mount
025E	10 GB	C:\usr\sap\WIN\SYS	WIN SYS directory mount
025F	10 GB	C:\usr\sap\WIN\D01	WIN dialog instance 01 mount
0260	100 GB	C:\MSSQL\WI2	WI2 database instance mount
0261	10 GB	C:\usr\sap\WI2\DVEBMGS02	WI2 PAS instance mount
0262	10 GB	C:\usr\sap\SYS	WI2 PAS instance mount

Grey shaded file systems are managed by ACC.

The installation process of an SAP Application at all is described in the SAP Application documentation and ACC Implementation- and Operation Guide.

Windows Based Installations

Copy the required software media that are required to install the specific application like ERP to a LUN on the EMC storage. Here are two of the existing ways to copy the SAP installation Media onto a Windows server running on Cisco Unified Computing System.

1. Insert media into the DVD-Drive of your Desktop and copy the Software through the network to a UNC or NFS path

Or

2. Use the Cisco UCS Manager Virtual Media Manager to map the local DVD-Drive to a server in the Cisco UCS system. The DVD-Content will show up as in a local drive attached to the server.

Make sure that all prerequisites' like Java Runtime or are installed before starting the sap installation.

The sapinst procedure requires installing the SAP Central Instance on the same Disk than the SAPMNT Share. Please make sure that you have 10GB free space for the installation on the disk you have created the sapmnt share. Do not mount the LUNs to the <X>:\usr\sap\<SID>\ dir for the installation process. The Database files can be located direct to the right LUNs mounted at C:\MSSQL\<SID>\

After the installation of all Instances is finished, stop the SAP system and the SAP services. Move the directories and files under the <SID>-Directory (C:\usr\sap\<SID>) to the LUN that are mounted to a temporary directory or Drive letter and remount this to C:\usr\sap\<SID>.

Please be aware that you have to set the environment variable SAPINST_USE_HOSTNAME to CITST.sample.corp before you start the installation. An option is to open a CMD-Windows and start

the installation process with “sapinst.exe SAPINST_USE_HOSTNAME=CITST.sample.corp.

Note: See also SAP Note 1282975

Microsoft SQL 2008 Server Installation

The Microsoft SQL 2008 Server must be installed on each host who should serve a SQL database individually. To help ensure that all settings for SAP are defined right we used the software media provided by SAP to install Microsoft SQL 2008 Server with the SQL4SAP.vbs command.

Note: See SAP Note 1144459

In some cases the installation procedure must install also updates for the Microsoft Installer software and the .Net framework. This required at least one operating system reboot. The installation routine will restart automatically after the logon.

Oracle RDBMS 10.2 Installation

The Oracle RDBMS binaries can be shared with some SAP systems or each SAP system can have an own Oracle installation. To be more flexible the preferred installation type is to have a dedicated Oracle installation for each SAP system. The Oracle installation shall be done before the SAP installation. The best practice is to have the same SID for the Oracle database that for the related SAP system, i.e. SAP SID = ERT -> Oracle SID = ERT.

Please follow the Oracle installation guide to install the RDBMS software.

MaxDB Installation

The MaxDB installation is part of the sapinst procedure; there is no preparation required.

SAP Host Agent Installation

Download and install the latest SAP Host Agent from SAP Service Marketplace. See SAP Note 1031096.

SAP system Installation

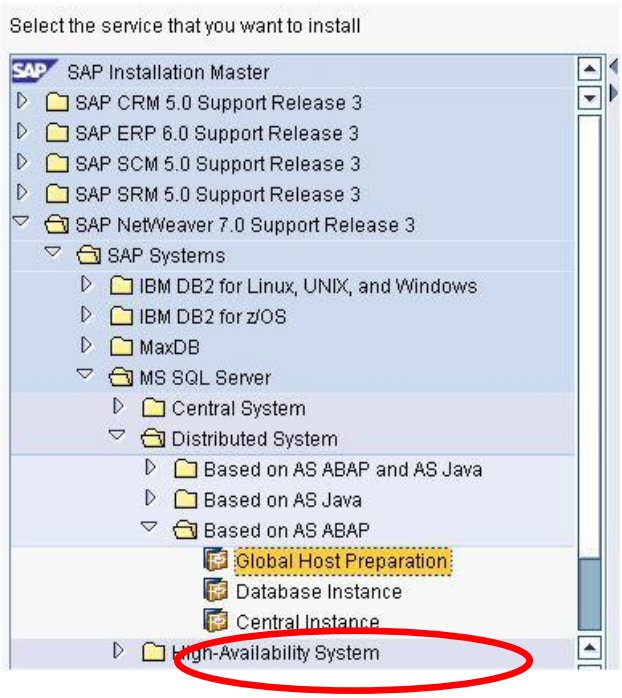
Now after the operating system and database binaries are prepared the SAP installation can be done. For a virtualized SAP installation please take care that all IP-Addresses are configured and that all LUNs to store the database files are mounted. Please start sapinst with the parameter SAPINST_USE_HOSTNAME=<hostname>. We will here only show the steps that are different to a default SAP installation procedure.

Note: See SAP Note 962955

Global Host Preparations for SAP System WIN

Start the Installation procedure with sapinst.exe SAPINST_USE_HOSTNAME=paswin.

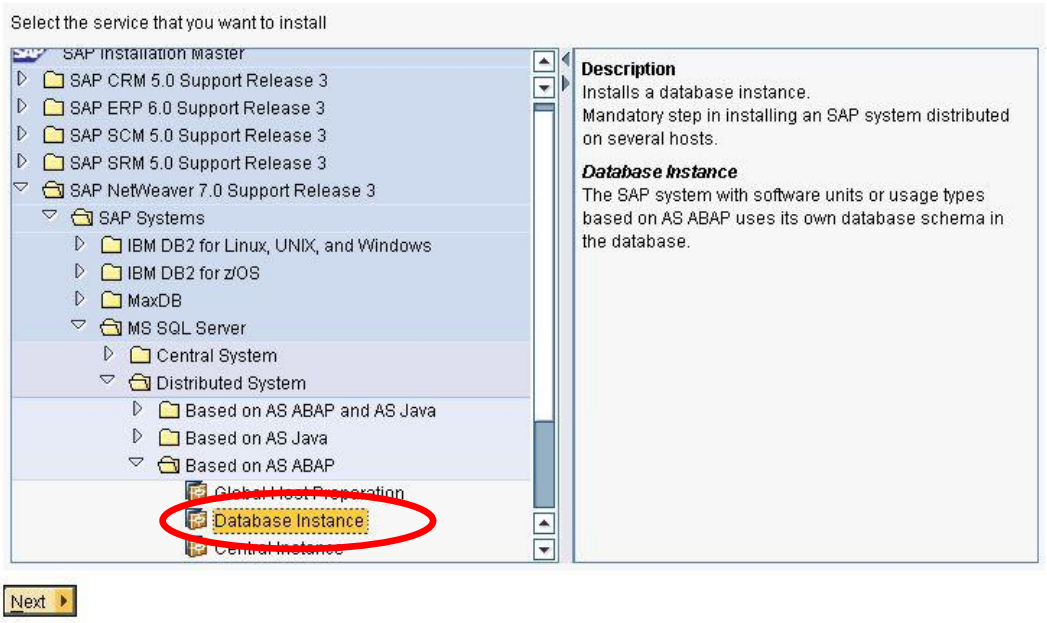
And select <APPL> -> <DB> ->Distributed System ->Based on AS <XXX> -> Global Host Preparation.



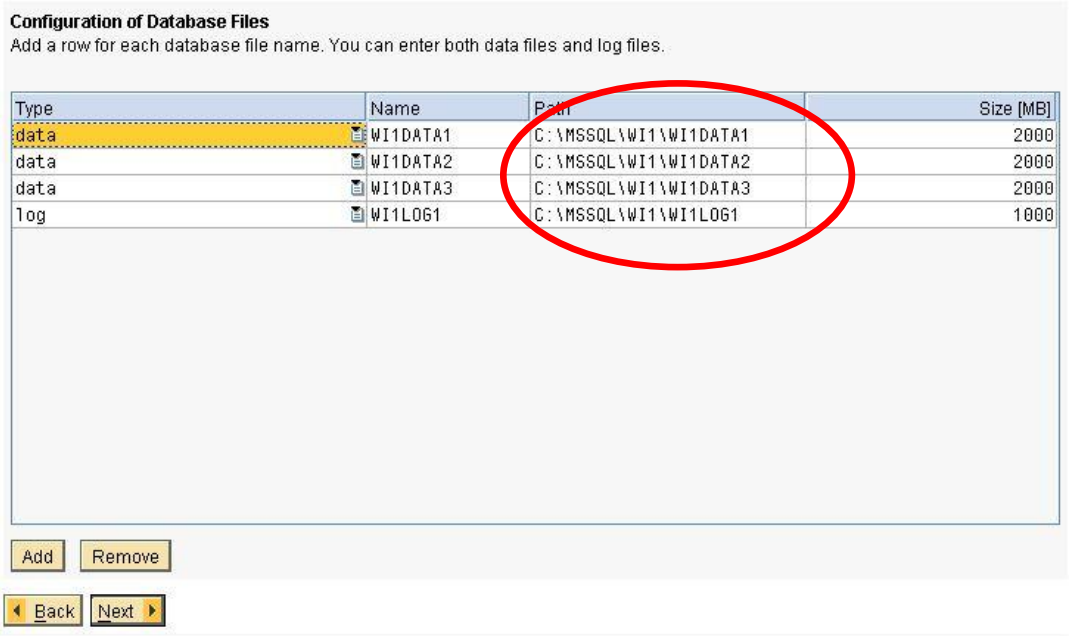
Follow the steps on the screen.

Database Instance for SAP System WIN

1. Start the Installation procedure with sapinst.exe SAPINST_USE_HOSTNAME=dbwin.
2. Select <APPL> -> <DB> ->Distributed System ->Based on AS <XXX> -> Database Instance.



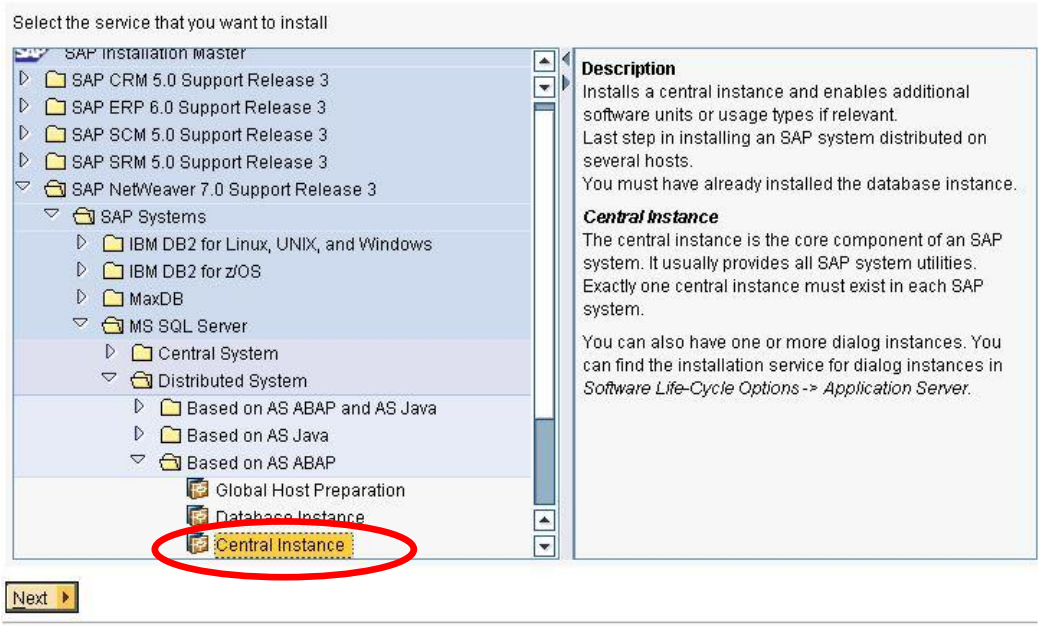
3. Follow the steps on the screen.



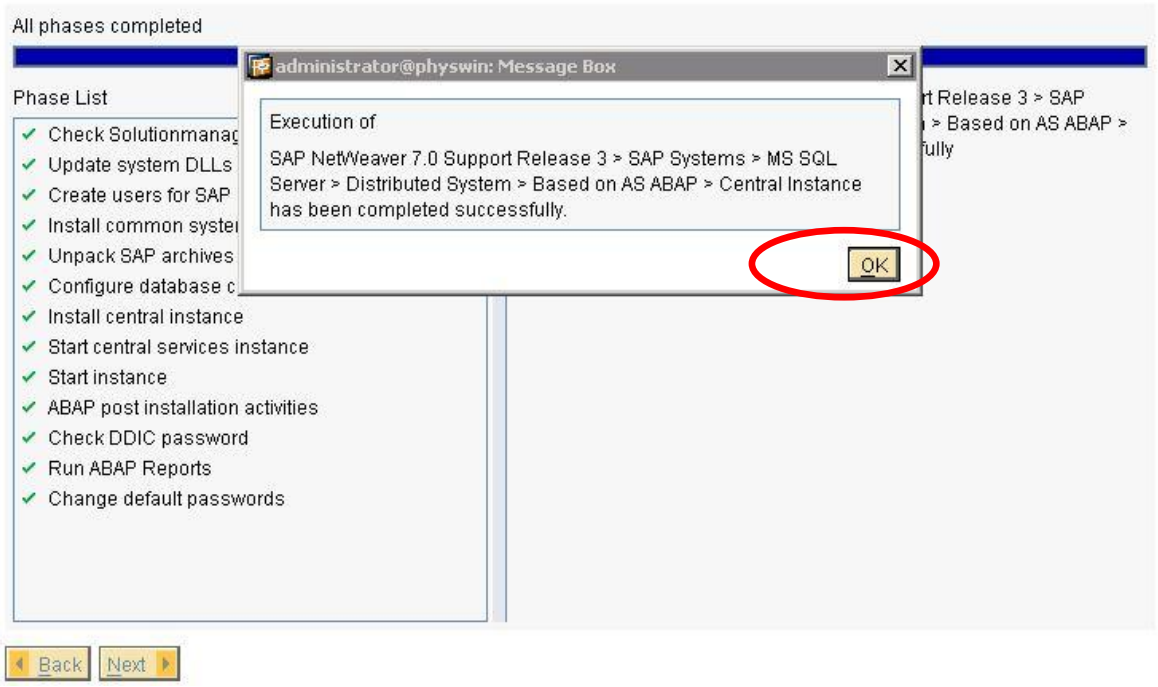
4. Change the Database File location to C:\<DATABASE TYPE>\<SID>\...

Central Instance for SAP System WIN

1. Start the Installation procedure with sapinst.exe SAPINST_USE_HOSTNAME=paswin.
2. Select <APPL> -> <DB> ->Distributed System ->Based on AS <XXX> -> Central Instance.



3. Follow the steps on the screen.



Now the SAP system is installed and running.

Linux Based Installations

Database Instance Installation

Follow the SAP Installation Guide. For installations in an Adaptive Computing environment, your database has to be switchable. To perform the necessary steps, include the sections marked "HA (UNIX)".

SAP Host Agent Installation

Download and install the latest SAP Host Agent from SAP Service Marketplace. See SAP Note 1031096.

SAP System Installation

Follow the SAP Installation Guide. For installations in an Adaptive Computing environment, your SAP instance has to be switchable. To perform the necessary steps, include the sections marked "HA (UNIX)".

Linux Host Preparation

After you installed a database or an SAP instance on a host, you have to prepare the other host(s) to take over the switchable instance. To adapt the other host(s), do the following:

- Users and groups (use the same ID)

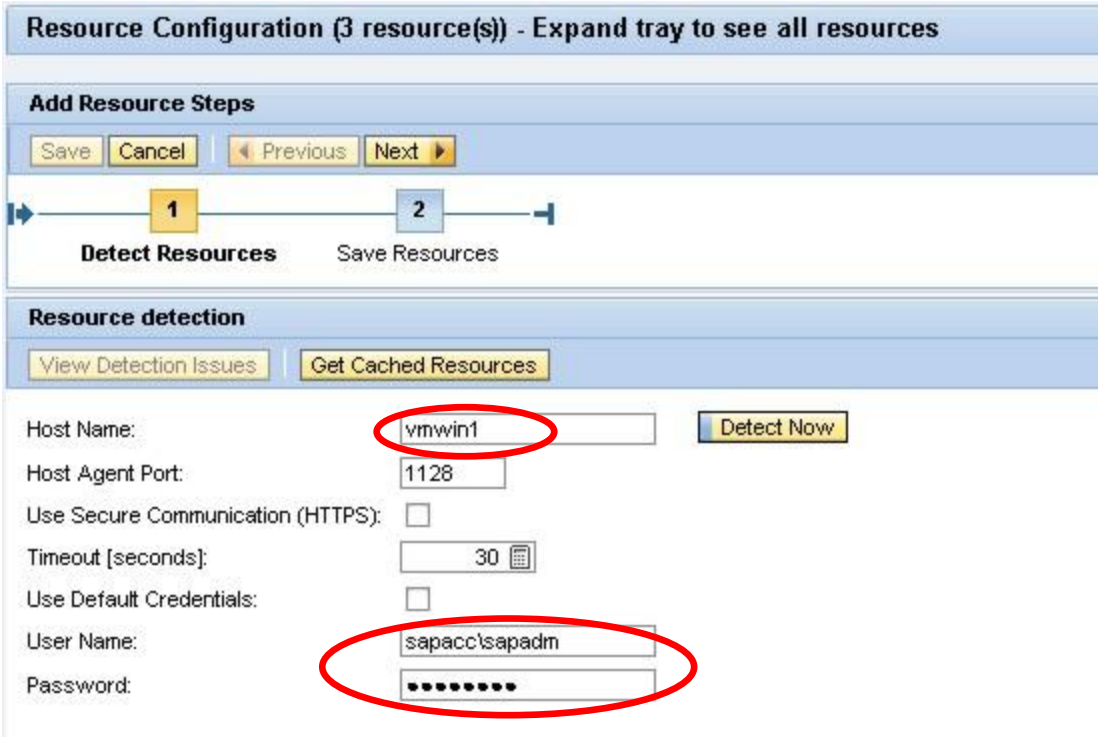
- Port configuration (/etc/services)
- Not switchable Database specific directories and files
- Not switchable SAP instance specific directories and files

16 Configuring the ACC

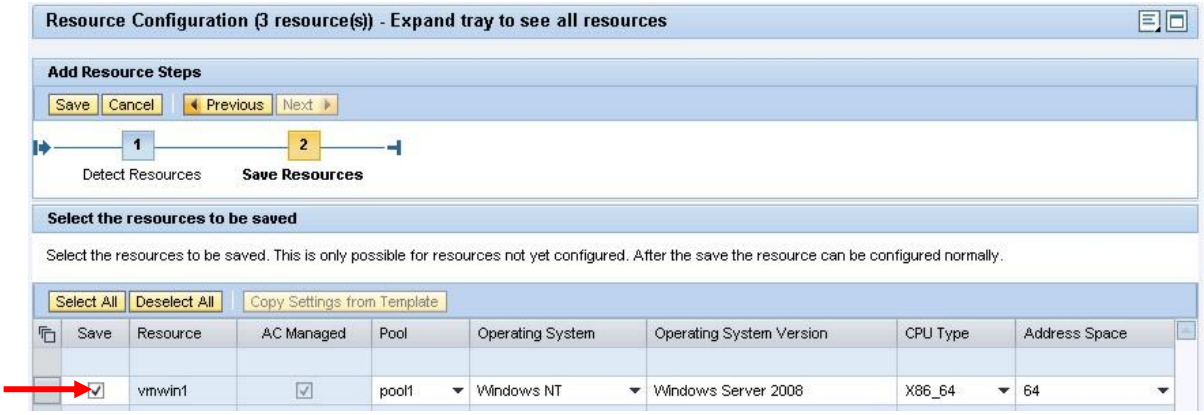
Creating Pools and Networks

Create pools and networks based on your specific environment. For the demo environment, we only created one pool and one network.

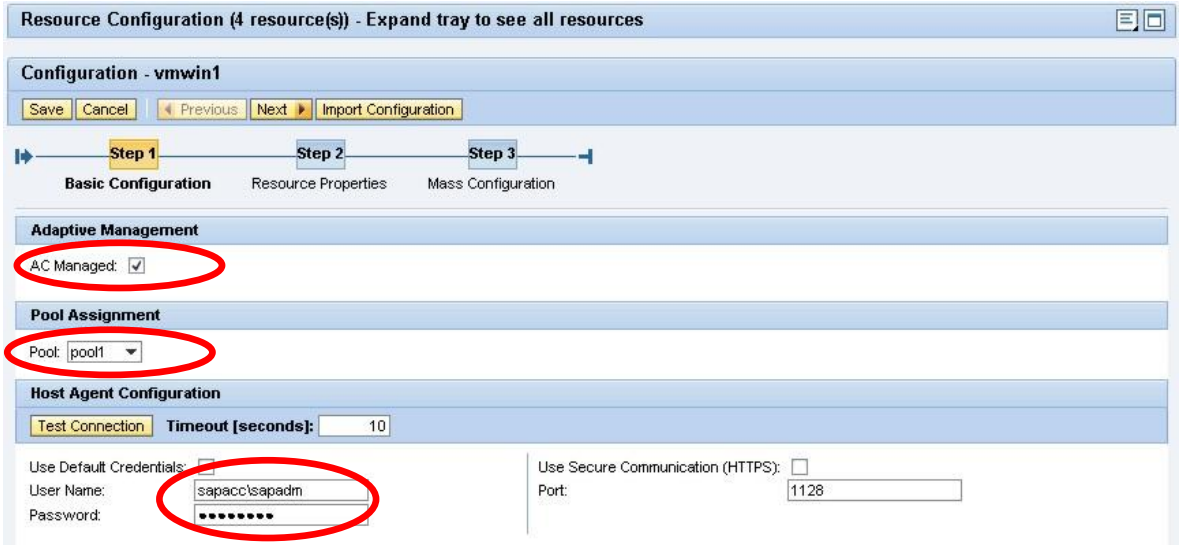
Integration of a Computing Resource



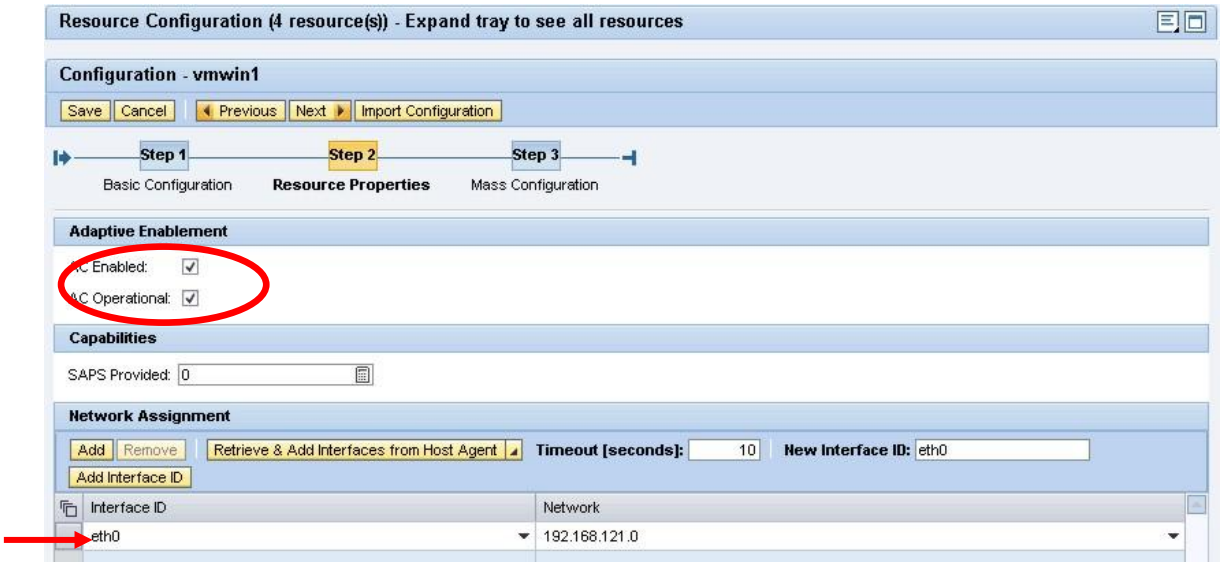
1. Enter the physical hostname of the server. Make sure that the SAP Host Agent is running and provide its credentials.



2. Assign the resource to a pool. The other columns should be filled automatically with information that the SAP Host Agent provides.



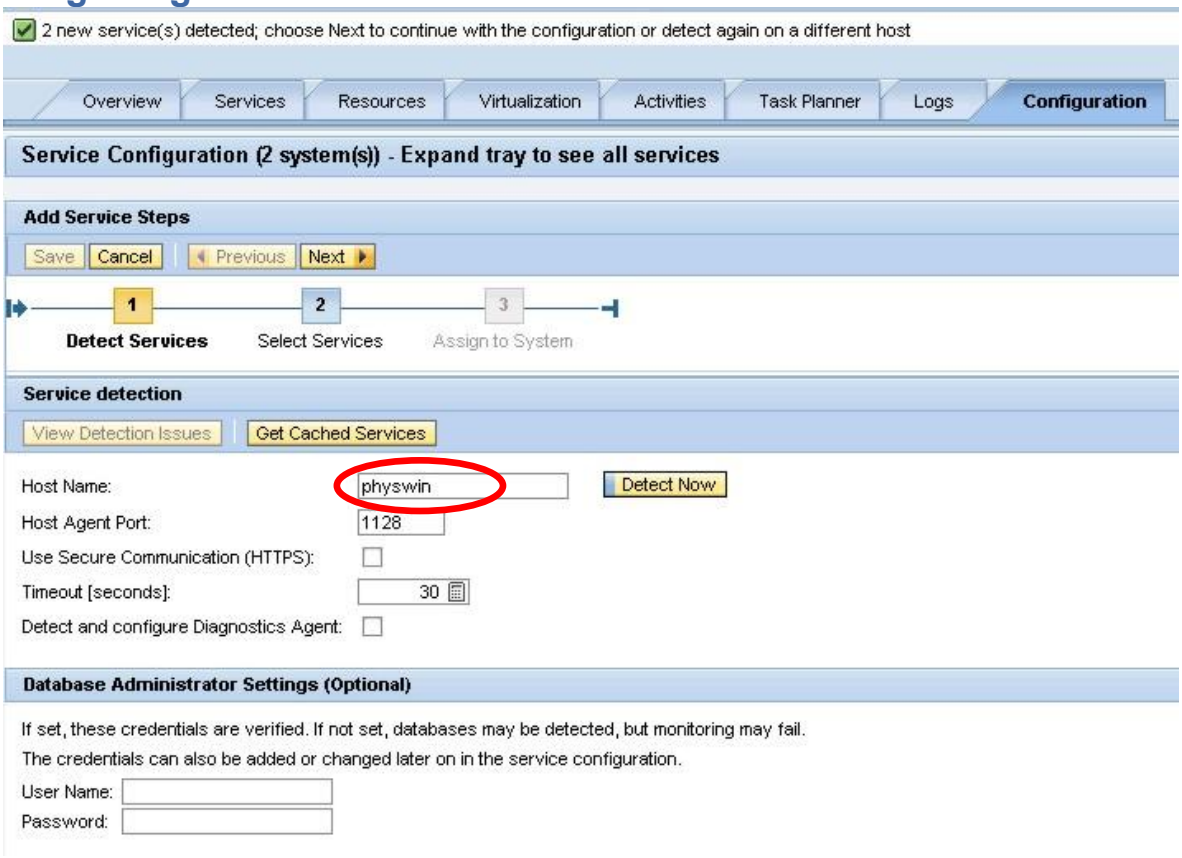
3. After you added the resource, you have to configure it. The information you specify on the first configuration page should be the same as entries you made when adding the resource.



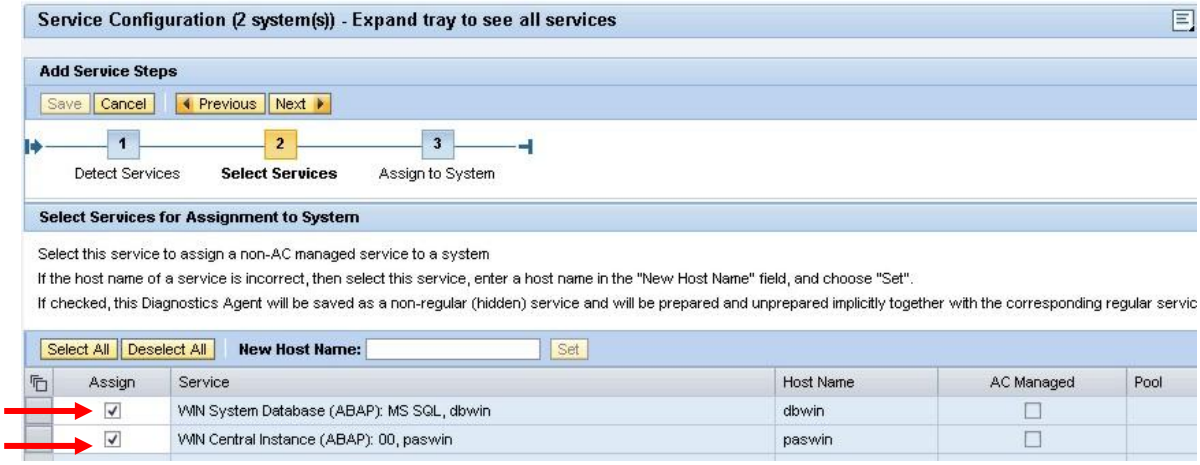
4. Enable "AC Enabled" and "AC Operational". This help ensures that the SAP ACC can operate the resource. Assign a network to each NIC that will hold virtual IP addresses.

5. Save the configuration or proceed to "Mass Configuration" if you want to configure several resources with the same settings.

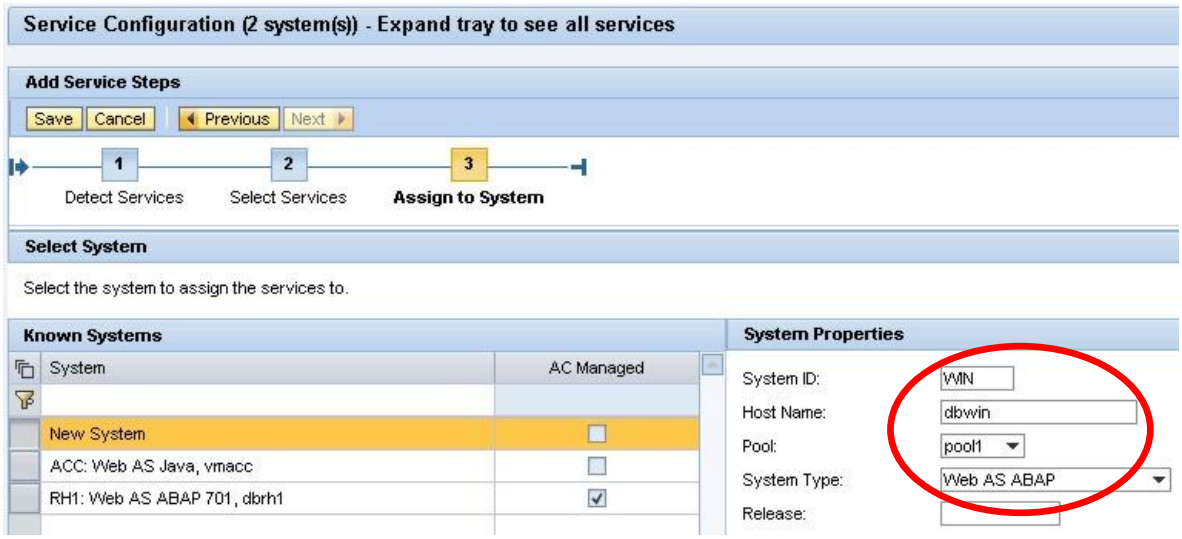
Integrating an SAP Service



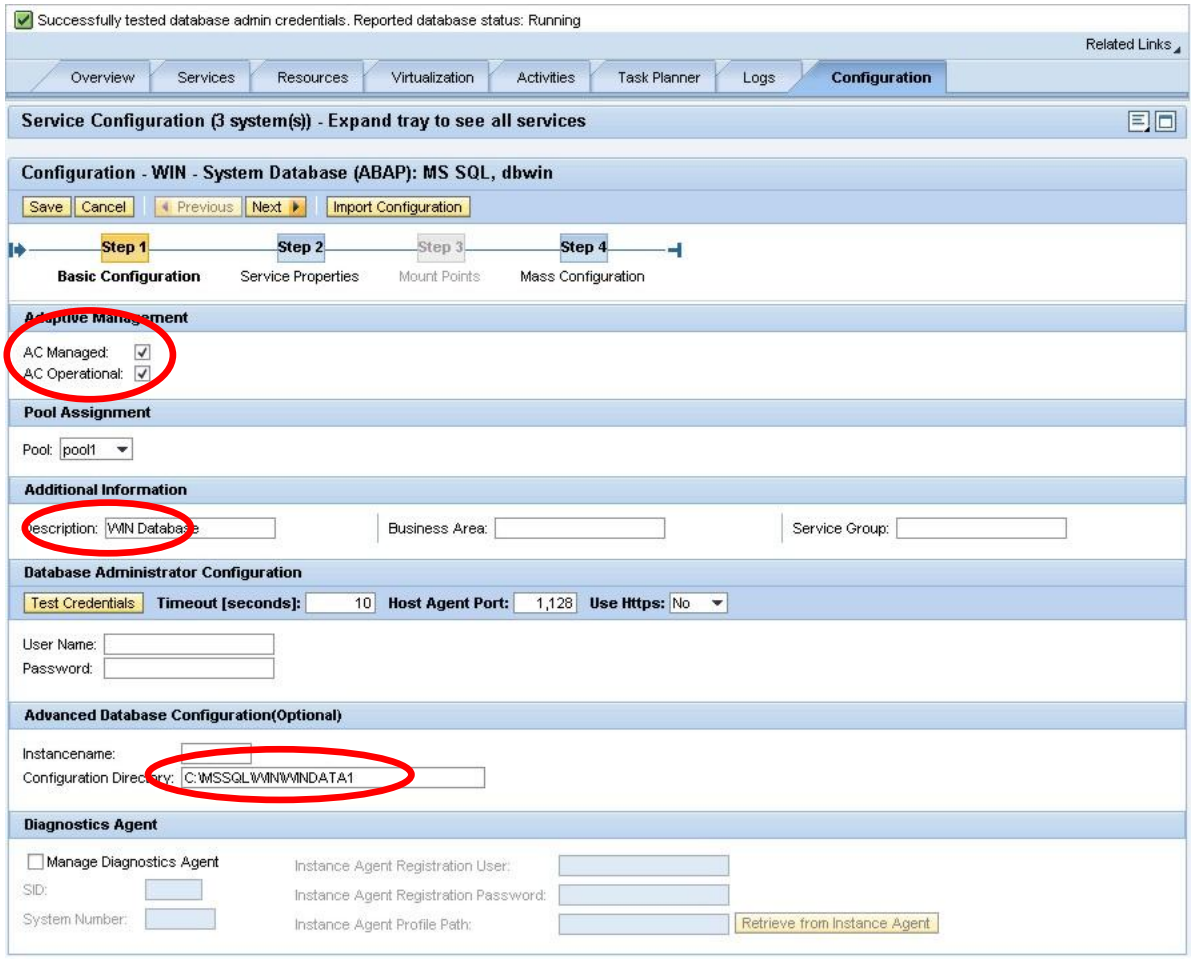
6. Enter the physical host name of the host where the SAP system is installed. Make sure that the SAP Host Agent and the SAP system are running. When you click "Detect Now", the SAP ACC collects data from the SAP Host Agent.



In the following step, you see which instances the SAP Host Agent reported to SAP ACC. These instances have to be assigned to an SAP system.

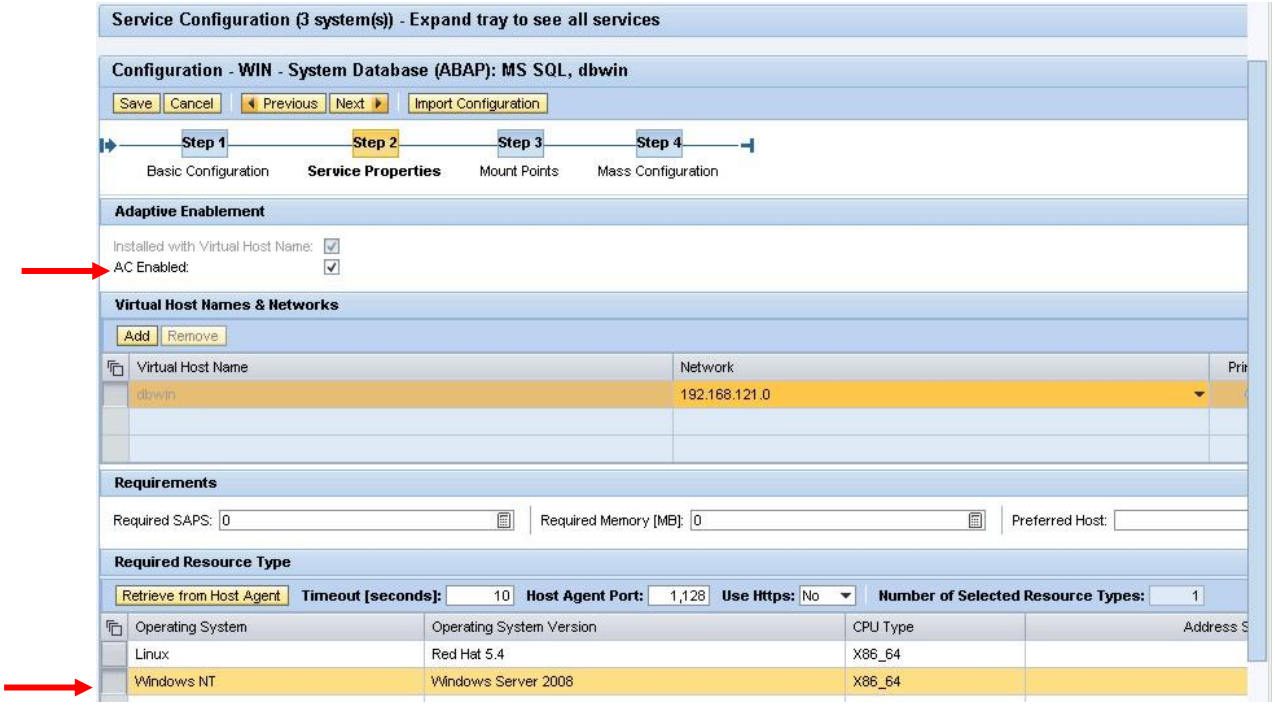


7. Create a new system. Host Name is usually the same as the virtual host name of the database instance.

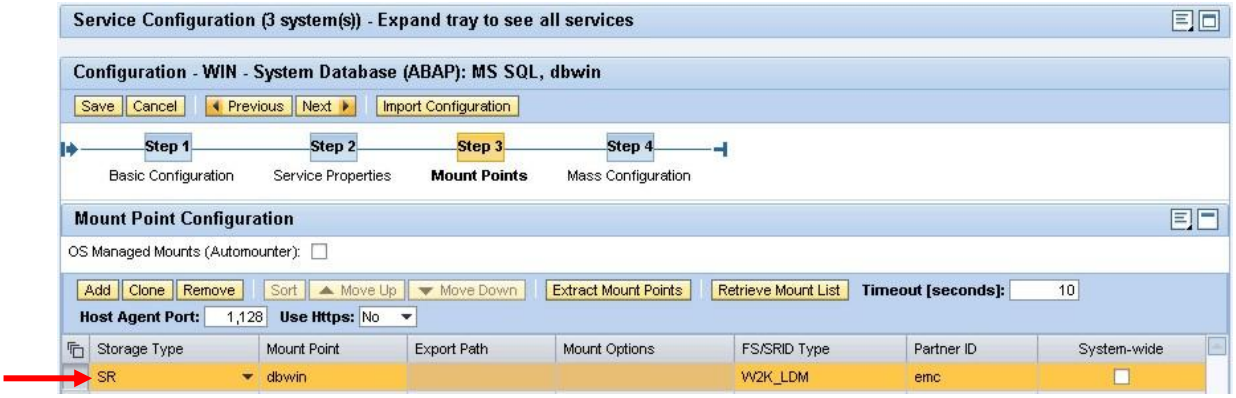


8. After you added the service, you have to configure it. Enable "AC Managed" and "AC Operational".

   These settings help ensure that the SAP ACC can operate the service. Depending on database type and installation settings, you have to provide the credentials of the database user as well as the instance name and a configuration directory.



9. Enable "AC Enabled". This help ensures that the SAP ACC can relocate the service. Assign the virtual hostname to a network configuration. Choose the Operating System types that the service can run on.



10. Choose whether your file systems get mounted by the Operating Systems automatically.

    If not, you have to configure the SAP ACC managed mount points. Depending on your setup, you first have to choose the "Storage Type". This selection determines what your mount point configuration should look like.

11. Choose "SR" as Storage Type to use a third party storage library implementation.

12. Depending on the solution you are using, configure the fields "FS/SRID Type" and "Partner ID". In our demo, we use an EMC-provided storage library (part of EMC Solutions Enabler 7.1) to mount and unmount file systems.

In the case of the EMC solution, the field "Mount Point" does not indicate the destination of the file system, but it determines the entry of the configuration file "emcadaptive.ini". In this configuration file, source, destination and type of the file system is specified. For configuration details, see the documentation for the storage library in use.

13. Under Linux, simple NFS mount points can be configured without using a third-party storage library. Choose "NFS" as the Storage Type and leave the "FS/SRID Type" and "Partner ID" fields empty. The rest of the field entries are self-explanatory.

    A "System-wide" mount point means that this mount point is available on every resource where one or more services of the same SAP system is running on.

14. Save the configuration or proceed to "Mass Configuration" if you want to configure several services with the same settings.

17 Conclusion

Designed using a new and innovative approach to improve data center infrastructure, the Cisco Unified Computing System unites compute, network, storage access, and virtualization resources into a scalable, modular architecture that is managed as a single system.

For the Cisco Unified Computing System, Cisco has partnered with SAP because SAP applications provide mission-critical software foundations for the majority of large enterprises worldwide. In addition, the architecture and large memory capabilities of the Cisco Unified Computing System, using VMware vSphere 4 virtual infrastructure and connected to industry-proven and scalable EMC storage, enable customers to scale and manage SAP system environments in ways not previously possible.

Both SAP Basis administrators and system administrators will benefit from the Cisco Unified Computing System combination of superior architecture, outstanding performance, and unified fabric. They can achieve demonstrated results by following the documented best practices for SAP installation, configuration, and management outlined in this document.

In summary, the Cisco Unified Computing System provides a new computing model that uses integrated management and combines a wire-once unified fabric with an industry-standard computing platform.

The platform:

- Optimizes SAP system environments
- Reduces total overall cost of the data center
- Provides dynamic resource provisioning for increased business agility
- The benefits of the Cisco Unified Computing System include:
- Reduced TCO: Enables up to 20 percent reduction in capital expenditures (CapEx) and up to 30 percent reduction in operating expenses (OpEx)
- Improved IT productivity and business agility: Enables IT to provision applications in minutes instead of days and shifts the focus from IT maintenance to IT innovation
- Increased scalability without added complexity: Is managed as a single system, whether the system has one server or 320 servers with thousands of virtual machines
- Improved energy efficiency: Significantly reduces power and cooling costs
- Interoperability and investment protection: Provides assurance through infrastructure based on industry standards

With VMware vSphere 4 virtual infrastructure, you can:

- Realize immediate ROI.
- Increase SAP data center utilization, flexibility, availability, and agility.
- Decrease SAP data center costs for space, energy, cooling, hardware, and labor.

- Upgrade safely to the latest SAP solutions and simplify the transition to 64-bit environments.
- Align SAP resource usage with business priorities.
- Increase availability of all environments at a lower cost.
- Increase uptime during planned maintenance
- Create cost-effective disaster recovery systems to deal with unplanned failures or outages.
- Quickly deploy new SAP solutions-based environments for development and testing.
- Increase software quality at lower cost for your own SAP application-based development.

At our test we have not seen any performance issues with the SAP Applications or the communication between the single Services in the ACC Landscape.

18 For More Information

SAP Adaptive Computing:

http://www.sdn.sap.com/irj/sdn/adaptive

Cisco Unified Computing System

http://www.cisco.com/en/US/netsol/ns944/index.html#

SAP on VMware:

http://www.vmware.com/sap

SDN Forum "SAP on VMware":

http://forums.sdn.sap.com/forum.jspa?forumID=471

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Document number: UCS-TR100008