Oracle WebLogic Using Cisco Unified Computing System

Oracle WebLogic Server, Oracle Database and Apache on OEL

Depolyment Guide

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1. Goals

This document details how to deploy the Oracle WebLogic Middleware solution on Cisco® UCS B-Series Blade Servers that are connected to the EMC CLARiiON CX4 Storage array. It also details the best practice recommendations for configuring Cisco UCS Service Profiles, the SAN Boot configuration, and describes the Cisco UCS advantages for Java Enterprise Edition platforms.

1.1 Audience

This document is intended to assist solution architects, sales engineers, field engineers and consultants in deploying Oracle WebLogic Cluster solutions on the Cisco Unified Computing System. This document assumes that the reader has an architectural understanding of the Cisco Unified Computing System, Java EE , Oracle WebLogic middleware platform , and related software.

2. Infrastructure Components

The following sections detail the infrastructure components used in this particular configuration.

2.1 Cisco Unified Computing System

The Cisco Unified Computing System is a next-generation data center platform that unites compute, network, storage access, and virtualization into a cohesive system designed to reduce total cost of ownership (TCO) and increase business agility. The Cisco Unified Computing System server portfolio consists of the blade server platform, B-Series and the C-Series Rack-Mount platform. We chose the Cisco UCS B-Series Blade Server platform for this study. 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 main system components include:

Compute—the system is based on an entirely new class of computing system that incorporates blade servers based on Intel Xeon 5500 Series Processors. The Cisco UCS blade servers offer patented Cisco Extended Memory Technology to support applications with large datasets and allow more virtual machines per server.

Network—the system is integrated onto a low-latency, lossless, 10-Gbps unified network fabric. This network foundation consolidates what today are three separate networks: LANs, SANs, and high-performance computing networks. The unified fabric lowers costs by reducing the number of network adapters, switches, and cables, and by decreasing power and cooling requirements.

Virtualization—the system unleashes the full potential of virtualization by enhancing the scalability, performance, and operational control of virtual environments. Cisco security, policy enforcement, and diagnostic features are now extended into virtualized environments to better support changing business and IT requirements.

Storage access—the system provides consolidated access to both SAN storage and Network Attached Storage (NAS) over the unified fabric. Unifying storage access means that the Cisco Unified Computing System can access storage over Ethernet, Fibre Channel, Fibre Channel over Ethernet (FCoE), and iSCSI, providing customers with choice and investment protection. In addition, administrators can pre-assign storage-access policies for system connectivity to storage resources, simplifying storage connectivity and management while helping increase productivity.

Management—the system uniquely integrates all the system components, enabling the entire solution to be managed as a single entity through the Cisco UCS Manager software. The Cisco UCS Manager provides an

intuitive graphical user interface (GUI), a command-line interface (CLI), and a robust application programming interface (API) to manage all system configuration and operations. The Cisco UCS Manager helps increase IT staff productivity, enabling storage, network, and server administrators to collaborate on defining service profiles for applications. Service profiles are logical representations of desired physical configurations and infrastructure policies. They help automate provisioning and increase business agility, allowing data center managers to provision resources in minutes instead of days.

Working as a single, cohesive system, these components unify technology in the data center. They represent a radical simplification in comparison to traditional systems, helping simplify data center operations while reducing power and cooling requirements. The system amplifies IT agility for improved business outcomes. The Cisco Unified Computing System components illustrated in Figure 1 include, from left to right, fabric interconnects, blade server chassis, blade servers, and in the foreground, fabric extenders and network adapters.

Figure 1. Cisco Unified Computing System

2.2 Cisco Unified Computing System Components

2.2.1 Cisco UCS Manager

Cisco UCS Manager serves as an embedded device manager for all Cisco Unified Computing System components. The Cisco UCS Manager creates a unified management domain that serves as the central nervous system of the Cisco Unified Computing System. The Cisco UCS Manager takes the place of the system management tools associated with a traditional computing architecture by integrating computing, networking, and virtualization resources into one cohesive system. Cisco UCS Manager implements policy-based management using *service profiles* to help automate provisioning and increase agility.

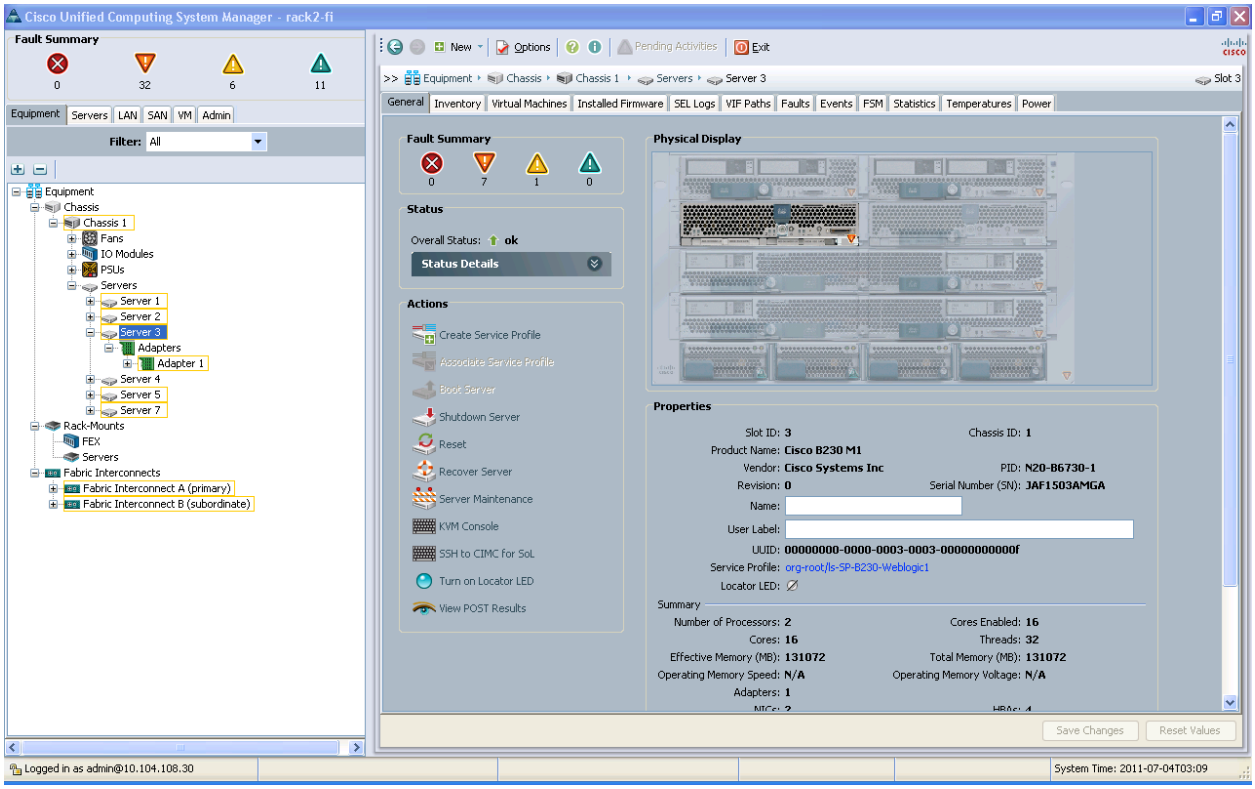
In managing the services within Cisco UCS, configuration details are applied to service profiles, instead of many tedious touches of a physical server and the associated LAN, SAN, and management networks. The service profile includes all the firmware, firmware settings, and BIOS settings. For example, definition of server connectivity, configuration, and identity.This model allows for rapid service instantiation, cloning, growth, shrink, retirement, and re-use in a highly automated fashion. One capability is for a project-by-project instantiation of compute resources with integrated governance, and a life-cycle that returns the physical compute hardware to a pool for other business unit usage. If the project requires a re-build of a previous infrastructure, the stateless nature of Cisco UCS provides for a rapid standup of the prior environment (assuming a SAN boot, or physical disk storage scenario). With other vendors, there is a loosely coupled system of packages having many meshed and customized interconnections. When any of these items is versioned, the effects of updating are not isolated to a given component—they impact other components within a solution. Cisco UCS, with its single source of information and

configuration, and open schema, handles upgrades, as well as daily operations, in a simple, straightforward manner.

In the present setup consists of two B200M2 Servers for Apache and an application server for each. A configured service profile was used for one of the B200M2 servers and then simply cloned the profile for the second server. This allows fast provisioning of new servers in the Cisco UCS configuration.

Figure 2 illustrates the Cisco UCS Manager with a service profile associated with a B200M2 server.

Figure 2. Cisco UCS Manager View



2.2.2 Fabric Interconnect

The Cisco UCS 6100 Series Fabric Interconnects are a core part of the Cisco Unified Computing System, providing both network connectivity and management capabilities for the system (Figure 2). The Cisco UCS 6100 Series offers line-rate, low-latency, lossless 10 Gigabit Ethernet and FCoE functions.

The Cisco UCS 6100 Series provides the management and communication backbone for the Cisco UCS B-Series Blade Servers and Cisco UCS 5100 Series Blade Server Chassis. All chassis and therefore all blades, attached to the Cisco UCS 6100 Series Fabric Interconnects become part of a single, highly available management domain. In addition, by supporting unified fabric, the Cisco UCS 6100 Series provides both the LAN and SAN connectivity for all blades within its domain.

From a networking perspective, the Cisco UCS 6100 Series uses a cut-through architecture, supporting deterministic, low-latency, line-rate 10 Gigabit Ethernet on all ports, independent of packet size and enabled services. The product family supports Cisco low-latency, lossless 10 Gigabit Ethernet unified network fabric capabilities, which increase the reliability, efficiency, and scalability of Ethernet networks. The fabric interconnect

supports multiple traffic classes over a lossless Ethernet fabric from the blade through the interconnect. Significant TCO savings come from an FCoE-optimized server design in which network interface cards (NICs), host bus adapters (HBAs), cables, and switches can be consolidated.

The Cisco UCS 6100 Series is also built to consolidate LAN and SAN traffic onto a single unified fabric, saving the capital and operating expenses associated with multiple parallel networks, different types of adapter cards, switching infrastructure, and cabling within racks. Fibre Channel expansion modules in the interconnect support direct connections from the Cisco Unified Computing System to existing native Fibre Channel SANs. The capability to connect FCoE to native Fibre Channel protects existing storage system investments while dramatically simplifying in-rack cabling.

Figure 3. Cisco UCS 6120XP 20-Port Fabric Interconnect (Top) and Cisco UCS 6140XP 40-Port Fabric Interconnect

The Cisco UCS 6100 Series is equipped to support the following module options:

- Ethernet module that provides 6 ports of 10 Gigabit Ethernet using the SFP+ interface
- Fibre Channel plus Ethernet module that provides 4 ports of 10 Gigabit Ethernet using the SFP+ interface; and 4 ports of 1/2/4-Gbps native Fibre Channel connectivity using the SFP interface
- Fibre Channel module that provides 8 ports of 1/2/4-Gbps native Fibre Channel using the SFP interface for transparent connectivity with existing Fibre Channel networks
- Fibre Channel module that provides 6 ports of 1/2/4/8-Gbps native Fibre Channel using the SFP or SFP+ interface for transparent connectivity with existing Fibre Channel networks

Figure 4. From left to right: 8-Port 1/2/4-Gbps Native Fibre Channel Expansion Module; 4-Port Fibre Channel plus 4-Port 10

2.2.3 Cisco Fabric Extenders Module

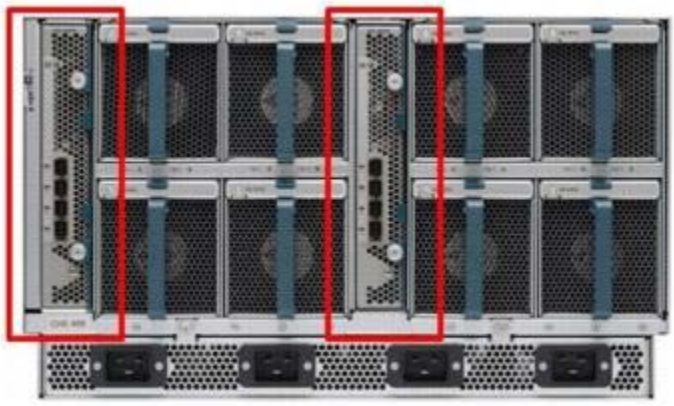
The Cisco UCS 2100 Series Fabric Extenders bring the unified fabric into the blade server enclosure, providing 10 Gigabit Ethernet connections between blade servers and the fabric interconnect, simplifying diagnostics, cabling, and management.

The Cisco UCS 2100 Series extends the I/O fabric between the Cisco UCS 6100 Series Fabric Interconnects and the Cisco UCS 5100 Series Blade Server Chassis, enabling a lossless and deterministic FCoE fabric to connect all blades and chassis together. Since the fabric extender is similar to a distributed line card, it does not do any switching and is managed as an extension of the fabric interconnects. This approach removes switching from the chassis, reducing overall infrastructure complexity and enabling the Cisco Unified Computing System to scale to many chassis without multiplying the number of switches needed, reducing TCO and allowing all chassis to be managed as a single, highly available management domain.

The Cisco 2100 Series also manages the chassis environment (the power supply and fans as well as the blades) in conjunction with the fabric interconnect. Therefore, separate chassis management modules are not required.

The Cisco UCS 2100 Series Fabric Extenders fit into the back of the Cisco UCS 5100 Series chassis. Each Cisco UCS 5100 Series chassis can support up to two fabric extenders, enabling increased capacity as well as redundancy.

Figure 5. Rear view of Cisco UCS 5108 Blade Server Chassis with two Cisco UCS 2104XP Fabric Extenders



The Cisco UCS 2104XP Fabric Extender has four 10 Gigabit Ethernet, FCoE-capable, Small Form-Factor Pluggable Plus (SFP+) ports that connect the blade chassis to the fabric interconnect. Each Cisco UCS 2104XP has eight 10 Gigabit Ethernet ports connected through the midplane to each half-width slot in the chassis. Typically configured in pairs for redundancy, two fabric extenders provide up to 80 Gbps of I/O to the chassis.

Figure 6. Cisco UCS 2104XP Fabric Extender

2.2.4 Cisco UCS Chassis

The Cisco UCS 5100 Series Blade Server Chassis is a crucial building block of the Cisco Unified Computing System, delivering a scalable and flexible blade server chassis for today's and tomorrow's data center while helping reduce TCO.

Cisco's first blade server chassis offering, the Cisco UCS 5108 Blade Server Chassis, is six rack units (6RU) high and can mount in an industry-standard 19-inch rack. A chassis can house up to eight half-width Cisco UCS B-Series Blade Servers and can accommodate both half- and full-width blade form factors.

Four single-phase, hot-swappable power supplies are accessible from the front of the chassis. These power supplies are 92 percent efficient and can be configured to support non-redundant, N+ 1 redundant and grid-redundant configuration. The rear of the chassis contains eight hot-swappable fans, four power connectors (one per power supply), and two I/O bays for Cisco UCS 2104XP Fabric Extenders.

A passive mid-plane provides up to 20 Gbps of I/O bandwidth per server slot and up to 40 Gbps of I/O bandwidth for two slots. The chassis is capable of supporting future 40 Gigabit Ethernet standards.

Figure 7. Cisco Blade Server Chassis (front and back view)

2.2.5 Intel Xeon 5600 Series Processor

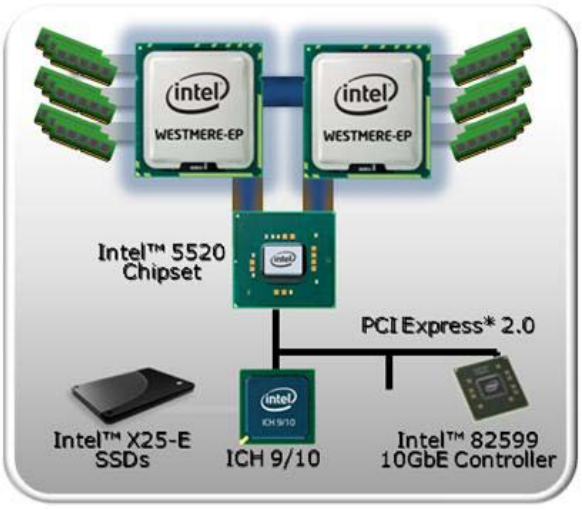
As data centers reach the upper limits of their power and cooling capacity, efficiency has become the focus of extending the life of existing data centers and designing new ones. As part of these efforts, IT needs to refresh existing infrastructure with standard enterprise servers that deliver more performance and scalability, more efficiently. The Intel Xeon 5600 Series Processor automatically regulates power consumption and intelligently adjusts server performance according to your application needs, both energy efficiency and performance. The secret to this compelling combination is Intel's new 32nmXeon microarchitecture. Featuring Intel Intelligent Power Technology that automatically shifts the CPU and memory into the lowest available power state, while delivering the performance you need, the Intel Xeon 5600 Series Processor with Intel Micro-architecture Xeon delivers the same performance as previous-generation servers but uses up to 30 percent less power. You can achieve up to a 93 percent reduction in energy costs when consolidating your single-core infrastructure with a new infrastructure built on Intel Xeon 5600 Series Processor.

This groundbreaking intelligent server technology features:

- Intel's new 32nm Microarchitecture Xeon built with second-generation high-k and metal gate transistor technology.
- Intelligent Performance that automatically optimizes performance to fit business and application requirements and delivers up to 60 percent more performance per watt than Intel Xeon 5500 Series Processor.
- Automated Energy Efficiency that scales energy usage to the workload to achieve optimal performance/watt and with new 40 Watt options and lower power DDR3 memory, you can lower your energy costs even further.

- Flexible virtualization that offers best-in-class performance and manageability in virtualized environments to improve IT infrastructure and enable up to 15:1 consolidation over two socket, single-core servers. New standard enterprise servers and workstations built with this new generation of Intel process technology offer an unprecedented opportunity to dramatically advance the efficiency of IT infrastructure and provide unmatched business capabilities.

Figure 8. Intel Xeon 5600 Series Processor



2.2.6 Intel Xeon 7500 Series Processor

The Intel Xeon processor 7500 series supports up to eight integrated cores and 16 threads, and is available with frequencies up to 2.66 GHz, and 24 MB of cache memory, four Intel QPI links and Intel Turbo boost technology. Thermal design point (TDP) power levels range from 95 watt to 130 watts.

This new Intel processor is packed with more than 20 new features that deliver a leap forward in reliability, availability and serviceability (RAS). These reliability capabilities are designed to improve the protection of data integrity, increase availability and minimize planned downtime.

For example, this is the first Xeon processor to possess Machine Check Architecture (MCA) Recovery, a feature that allows the silicon to work with the operating system and virtual machine manager to recover from otherwise fatal system errors, a mechanism until now found only in Intel® Itanium® processor family and RISC processors.

2.2.7 Cisco UCS B200M2 Blade Server

The Cisco UCS B200M2 Blade Server is a half-width, two-socket blade server. Cisco UCS B200M2 blade server uses two Intel Xeon 5600 Series Processors, with up to 96GB of DDR3 memory, two optional hot-swappable small form factor (SFF) serial attached SCSI (SAS) disk drives, and a single mezzanine connector for up to 20 Gbps of I/O throughput. The server balances simplicity, performance, and density for production-level virtualization and other mainstream data center workloads.

Figure 9. Cisco UCS B200 M2 Blade Server

2.2.8 Cisco UCS B230M1 Blade Server

Cisco has expanded the architectural advantages of its Intel Xeon Processor 6500 and 7500 Series-based server platforms with an exceptionally high density blade server. The two-socket Cisco UCS B230M1 Blade Server platform delivers high performance and density in a compact, half-width form factor.

In addition, it provides one dual-port mezzanine card for up to 20 Gbps I/O per blade. Options include a Cisco UCS M81KR Virtual Interface Card or converged network adapter (Emulex or QLogic compatible).

Other features include:

- 32 dual in-line memory module (DIMM) slots and up to 256 GB at 1066 MHz based on Samsung 40-nanometer class (DDR3) technology
- Two optional front-accessible, hot-swappable solid-state drives (SSDs) and an LSI SAS2108 RAID Controller
- Greatly simplified deployment and systems management with embedded integration into Cisco UCS Manager
- Each Cisco UCS 5108 Blade Server Chassis can house up to eight B230M1 servers (a maximum of 320 per Cisco Unified Computing System).

Figure 10. Cisco UCS B230 M1 Blade Server

2.2.9 Cisco UCS B250M2Extended Memory Blade Server

The Cisco UCS B250M2 Extended Memory Blade Server is a full-width, two-socket blade server featuring Cisco Extended Memory Technology. The system supports two Intel Xeon 5600 Series Processors, up to 384 GB of DDR3 memory, two optional SFF SAS disk drives, and two mezzanine connections for up to 40 Gbps of I/O throughput. The server increases performance and capacity for demanding virtualization and large-data-set workloads with greater memory capacity and throughput.

Figure 11. Cisco UCS B250 M2 Extended Memory Blade Server

2.2.10 Extended Memory Architecture

Modern CPUs with built-in memory controllers support a limited number of memory channels and slots per CPU. The need for virtualization software to run multiple OS instances demands large amounts of memory, and that, combined with the fact that CPU performance is outstripping memory performance, can lead to memory bottlenecks. Even some traditional non-virtualized applications demand large amounts of main memory: database management system performance can be improved dramatically by caching database tables in memory, and modeling and simulation software can benefit from caching more of the problem state in memory.

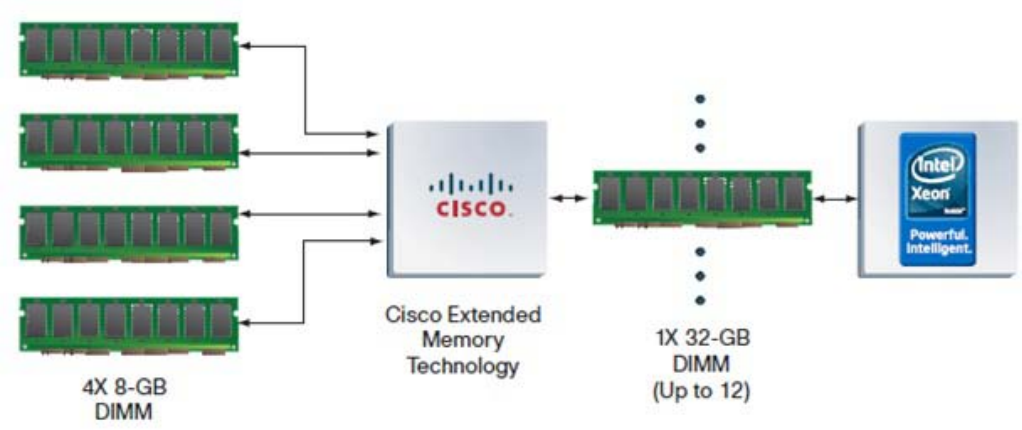
To obtain a larger memory footprint, most IT organizations are forced to upgrade to larger, more expensive, four-socket servers. CPUs that can support four-socket configurations are typically more expensive, require more power, and entail higher licensing costs. Cisco Extended Memory Technology expands the capabilities of CPU-based memory controllers by logically changing the geometry of main memory while still using standard DDR3 memory. This technology makes every four DIMM slots in the expanded memory blade server appear to the CPU's memory controller as a single DIMM that is four times the size (Figure 16). For example, using standard DDR3DIMMs, the technology makes four 8-GB DIMMS appear as a single 32-GB DIMM. Cisco UCS B250M2 servers implements Cisco Extended Memory technology.

This patented technology allows the CPU to access more industry-standard memory than ever before in a two-socket server:

For memory-intensive environments, data centers can better balance the ratio of CPU power to memory and install larger amounts of memory without having the expense and energy waste of moving to four-socket servers simply to have a larger memory capacity. With a larger main-memory footprint, CPU utilization can improve because of fewer disk waits on page-in and other I/O operations, making more effective use of capital investments and more conservative use of energy.

For environments that need significant amounts of main memory but which do not need a full 384 GB, smaller-sized DIMMs can be used in place of 8-GB DIMMs, with resulting cost savings: two 4-GB DIMMS are typically less expensive than one 8-GB DIMM.

Figure 12. Cisco Extended Memory Architecture



2.2.11 Cisco UCS Virtual Interface Card (VIC)

Cisco Virtual Interface Cards were developed ground up to provide acceleration for the various new operational modes introduced by server virtualization. The Virtual Interface Cards are highly configurable and self-virtualized adapters that can create up 128 PCIe endpoints per adapter. These PCIe endpoints are created in the adapter firmware and present fully compliant standard PCIe topology to the host OS or hypervisor.

Each of these PCIe endpoints the Virtual Interface Card creates can be configured individually for the following attributes:

- Interface type: FCoE, Ethernet or Dynamic Ethernet interface device
- Resource maps that are presented to the host: PCIeBARs, interrupt arrays
- The Network presence and attributes: MTU, VLAN membership
- QoS parameters: 802.1p class, ETS attributes, rate limiting and shaping

Figure 13. Cisco UCS Virtual Interface Card

2.3 EMC CLARiiON

EMC CLARiiON CX4 model 240 is a powerful networked storage system that scales seamlessly up to 231 TB of capacity. CLARiiON CX4 model 240 combines CLARiiON five 9s availability with automated storage tiering (FAST), FAST Cache, Flash drives, compression, 64-bit operating system, and multicore processors.

In the present setup, we have used CX4-240 to deploy Oracle WebLogic Cluster.

Figure 14. EMC Clariion – CX4-240

2.4 Cisco Networking Infrastructure

2.4.1 Cisco Nexus 5010 28-Port Switch

The Cisco Nexus 5010 Switch is a 1RU, 10 Gigabit Ethernet/FCoE access layer switch built to provide more than 500 Gigabits per second (Gbps) throughput with very low latency. It has 20 fixed 10 Gigabit Ethernet/FCoE ports that accept modules and cables meeting the Small Form-Factor Pluggable Plus (SFP+) form factor. One expansion module slot can be configured to support up to six additional 10 Gigabit Ethernet/FCoE ports, up to eight Fibre Channel ports, or a combination of both. The switch has a single serial console port and a single out-of-band 10/100/1000-Mbps Ethernet management port. Two N+1 redundant, hot-pluggable power supplies and five N+1 redundant, hot-pluggable fan modules provide highly reliable front-to-back cooling.

2.4.2 Cisco Nexus 5000 Series Feature Highlights

Features and Benefits

The switch family's rich feature set makes the series ideal for rack-level, access-layer applications. It protects investments in data center racks with standards-based Ethernet and FCoE features that allow IT departments to consolidate networks based on their own requirements and timing.

The combination of high port density, wire-speed performance, and extremely low latency makes the switch an ideal product to meet the growing demand for 10 Gigabit Ethernet at the rack level. The switch family has sufficient port density to support single or multiple racks fully populated with blade and rack-mount servers.

Built for today's data centers, the switches are designed just like the servers they support. Ports and power connections are at the rear, closer to server ports, helping keep cable lengths as short and efficient as possible. Hot-swappable power and cooling modules can be accessed from the front panel, where status lights offer an at-a-glance view of switch operation. Front-to-back cooling is consistent with server designs, supporting efficient data center hot- and cold-aisle designs. Serviceability is enhanced with all customer-replaceable units accessible from the front panel. The use of SFP+ ports offers increased flexibility to use a range of interconnect solutions, including copper for short runs and fiber for long runs.

Fibre Channel over Ethernet and IEEE Data Center Bridging features supports I/O consolidation, eases management of multiple traffic flows, and optimizes performance. Although implementing SAN consolidation requires only the lossless fabric provided by the Ethernet pause mechanism, the Cisco Nexus 5000 Series provides additional features that create an even more easily managed, high-performance, unified network fabric.

10 Gigabit Ethernet and Unified Fabric Features

The Cisco Nexus 5000 Series is first and foremost a family of outstanding access switches for 10 Gigabit Ethernet connectivity. Most of the features on the switches are designed for high performance with 10 Gigabit Ethernet. The Cisco Nexus 5000 Series also supports FCoE on each 10 Gigabit Ethernet port that can be used to implement a unified data center fabric, consolidating LAN, SAN, and server clustering traffic.

Low Latency

The cut-through switching technology used in the Cisco Nexus 5000 Series ASICs enables the product to offer a low latency of 3.2 microseconds, which remains constant regardless of the size of the packet being switched. This latency was measured on fully configured interfaces, with access control lists (ACLs), quality of service (QoS), and all other data path features turned on. The low latency on the Cisco Nexus 5000 Series enables application-to-application latency on the order of 10 microseconds (depending on the network interface card [NIC]). These numbers, together with the congestion management features described next, make the Cisco Nexus 5000 Series a great choice for latency-sensitive environments.

Other features include: Nonblocking Line-Rate Performance, Single-Stage Fabric, Congestion Management, Virtual Output Queues, Lossless Ethernet (Priority Flow Control), Delayed Drop Fibre Channel over Ethernet, Hardware-Level I/O Consolidation, and End-Port Virtualization. For more information, see: http://www.cisco.com/en/US/products/ps9670/prod_white_papers_list.html.

3. Platform Components

3.1 Oracle WebLogic Server 11gR1

Oracle WebLogic Server is a scalable, enterprise-ready Java Platform, Enterprise Edition (Java EE) application server. The WebLogic Server infrastructure supports the deployment of many types of distributed applications and is an ideal foundation for building applications based on Service Oriented Architectures (SOA).

The WebLogic Server complete implementation of The Sun Microsystems Java EE 5.0 specification provides a standard set of APIs for creating distributed Java applications that can access a wide variety of services, such as databases, messaging services, and connections to external enterprise systems. End-user clients access these applications using Web browser clients or Java clients. It also supports the Spring Framework, a programming model for Java applications which provides an alternative to aspects of the Java EE model.

In addition to the Java EE implementation, WebLogic Server enables enterprises to deploy mission-critical applications in a robust, secure, highly available, and scalable environment. These features allow enterprises to configure clusters of WebLogic Server instances to distribute load, and provide extra capacity in case of hardware or other failures.

In the present setup, we clustered Oracle WebLogic 11g (10.3.5) on Cisco UCS B230M1 blade server.

3.2 Oracle Database 11gR2

Oracle Database is an ORDBMS (Object Relational DatabaseManagement System), with its own Volume Manager and managed Database. Oracle Database 11g Release 2 provides the foundation for IT to successfully deliver more information with higher quality of service, reduce the risk of change within IT, and make more efficient use of their IT budgets.

Oracle implements, Oracle Real Application Clusters (RAC), an option to Oracle Database 11g Release 2, enables acluster of low-cost commodity servers to work together as a single shared database grid.Applications can be deployed on a grid without modification or re-architecture and enjoy thebenefit of consolidation, higher availability, faster performance and scalability on-demand.

3.3 Oracle Enterprise Linux

Oracle Linux is an open source operating system available under the GNU General Public License (GPL) and is available for free download through Oracle E-Delivery. Oracle Linux offers two Linux kernels to choose from:

- The Red Hat Compatible Kernel, for those who prefer strict Red Hat compatibility
- The new Unbreakable Enterprise Kernel, for those who want to leverage the latest features in Linux and boost performance and scalability

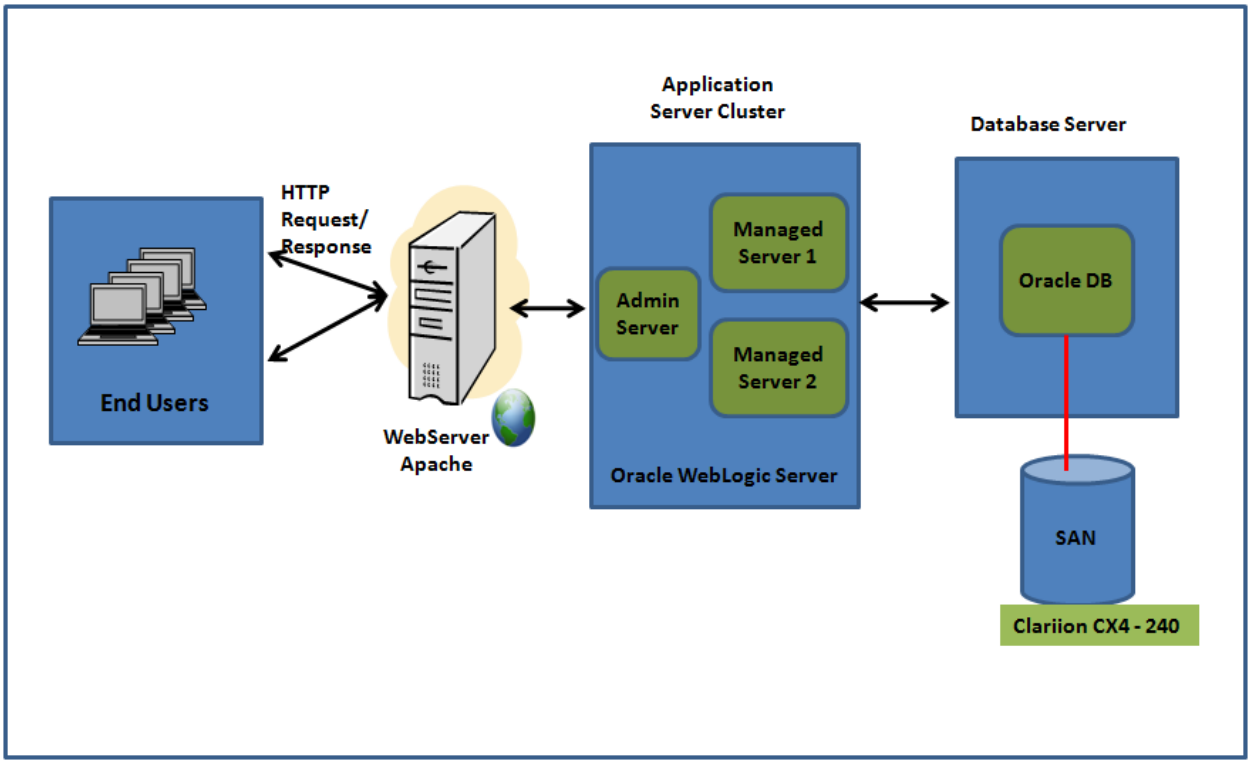
In the present setup, we used 64-bit Oracle Enterprise Linux 5.5.

4. Solution Validation

4.1 Deployment Architecture

The three-tier web deployment used in the present setup is detailed in Figure 15.

Figure 15. Three-Tier Web Deployment

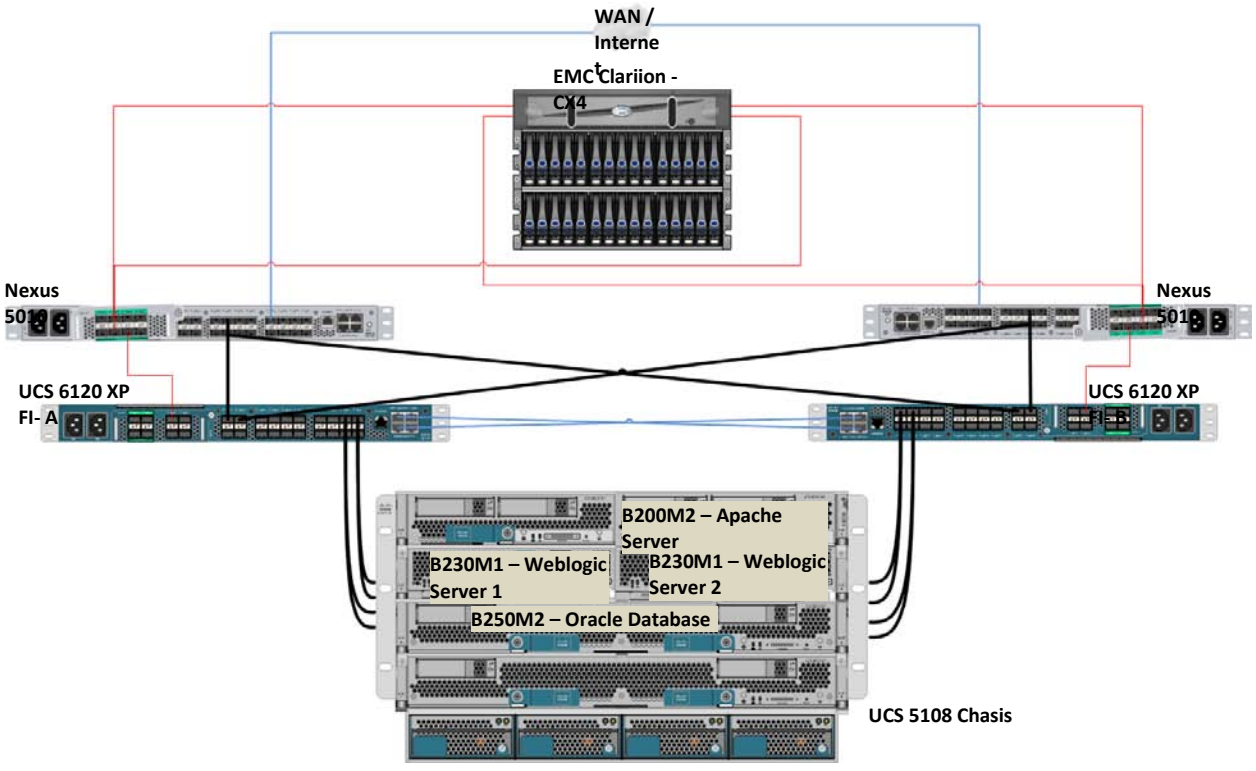


The configuration presented in this document is based on the following main components (**Error! Reference source not found.**).

Table 1. Configuration Components

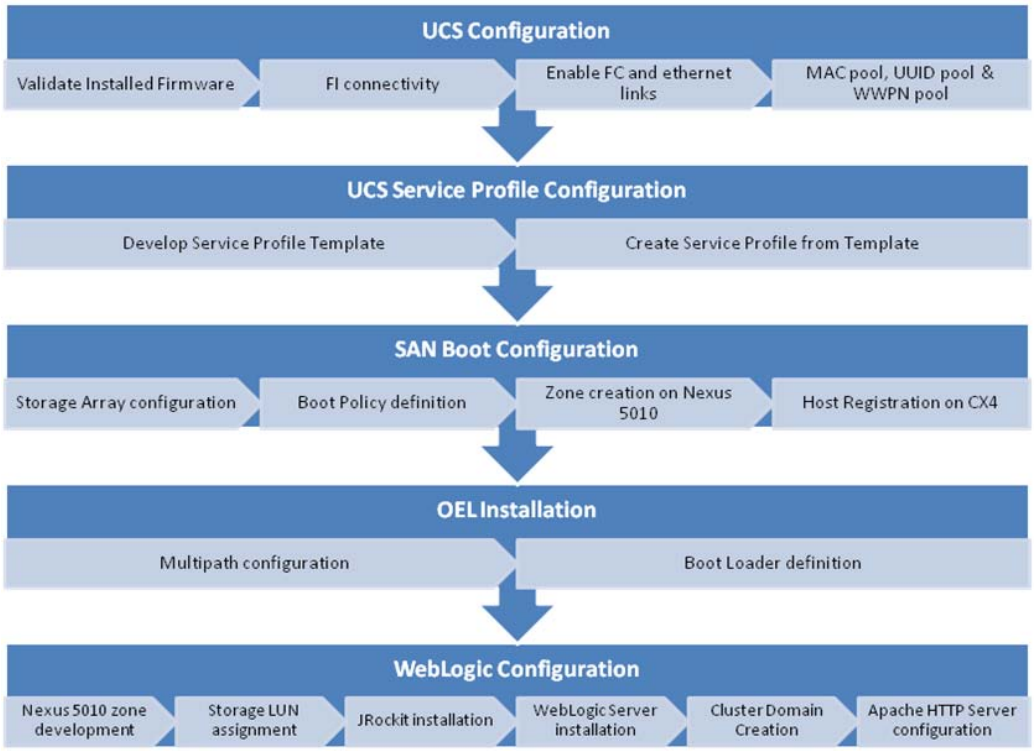
WebServer	Apache 2.2 is deployed on UCS B200M2 blade server equipped with two six-core Intel Xeon 5680 processors at 3.33 GHz with a physcial memory of 24G
Application Server	Oracle WebLogic Server 11g (10.3.5) Cluster is deployed on 2X1 UCS B230M1 Server, both equipped with two eight-core Intel Xeon 7560 processors at 2.26GHz with a physcial memory of 128G
Database	Oracle Database 11g Release is deployed on Cisco Full width blade sever – B250M2 which is equipped with with two six-core Intel Xeon 5680 processors at 3.33 GHz and configured with 96G of physical memory through the use of a Cisco Extended Memory Technology
Storage	EMC Clariion CX4-240
Operating System (64 bit)	Oracle Enterprise Linux 5.5

Figure 16. Deployment Architecture



The high-level workflow to configure the system is elaborated in Figure 17.

Figure 17. Workflow – 3-tier cluster deployment on WebLogic Server



4.2 Cisco Unified Computing System Configuration

This section details the Cisco Unified Computing System configuration that was done as part of the infrastructure build out for deployment of WebLogic platform. The racking, power and installation of the chassis are described in the install guide (http://www.cisco.com/en/US/docs/unified_computing/ucs/hw/chassis/install/ucs5108_install.html) and it is beyond the scope of this document. More details on each step can be found in the following documents:

- Cisco Unified Computing System CLI Configuration guide http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/cli/config/guide/1.4/b_UCSM_CLI_Configuration_Guide_1_4.html
- Cisco UCSManager GUI configuration guidehttp://www.cisco.com/en/US/docs/unified_computing/ucs/sw/gui/config/guide/1.4/b_UCSM_GUI_Configuration_Guide_1_4.html

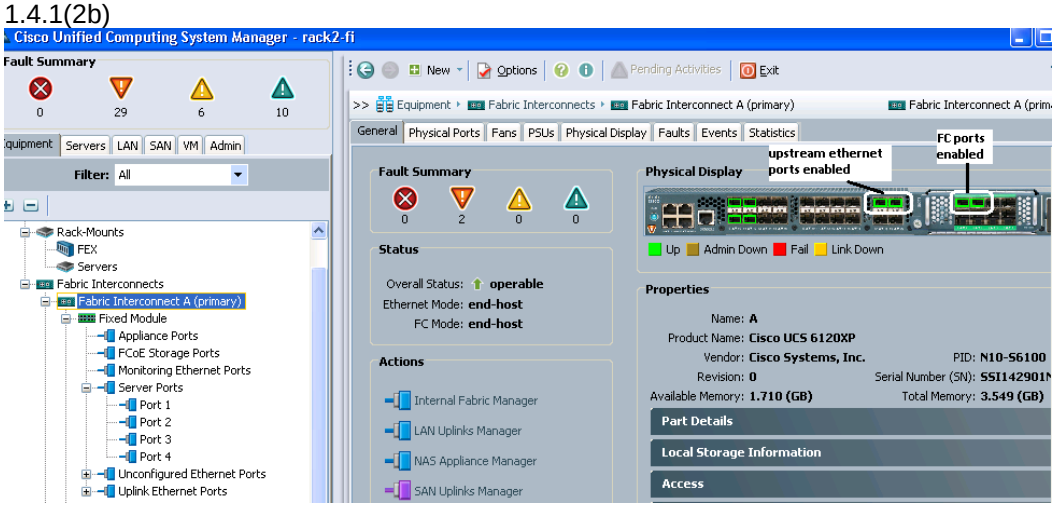
An important aspect of configuring a physical server in a Cisco UCS 5108 chassis is to develop a service profile through Cisco UCS Manager. Service profile is an extension of the virtual machine abstraction applied to physical servers. The definition has been expanded to include elements of the environment that span the entire data center, encapsulating the server identity (LAN and SAN addressing, I/O configurations, firmware versions, boot order, network VLAN, physical port, and quality-of-service [QoS] policies) in logical “service profiles” that can be dynamically created and associated with any physical server in the system within minutes rather than hours or days. The association of service profiles with physical servers is performed as a simple, single operation. It enables migration of identities between servers in the environment without requiring any physical configuration changes and facilitates rapid bare metal provisioning of replacements for failed servers.

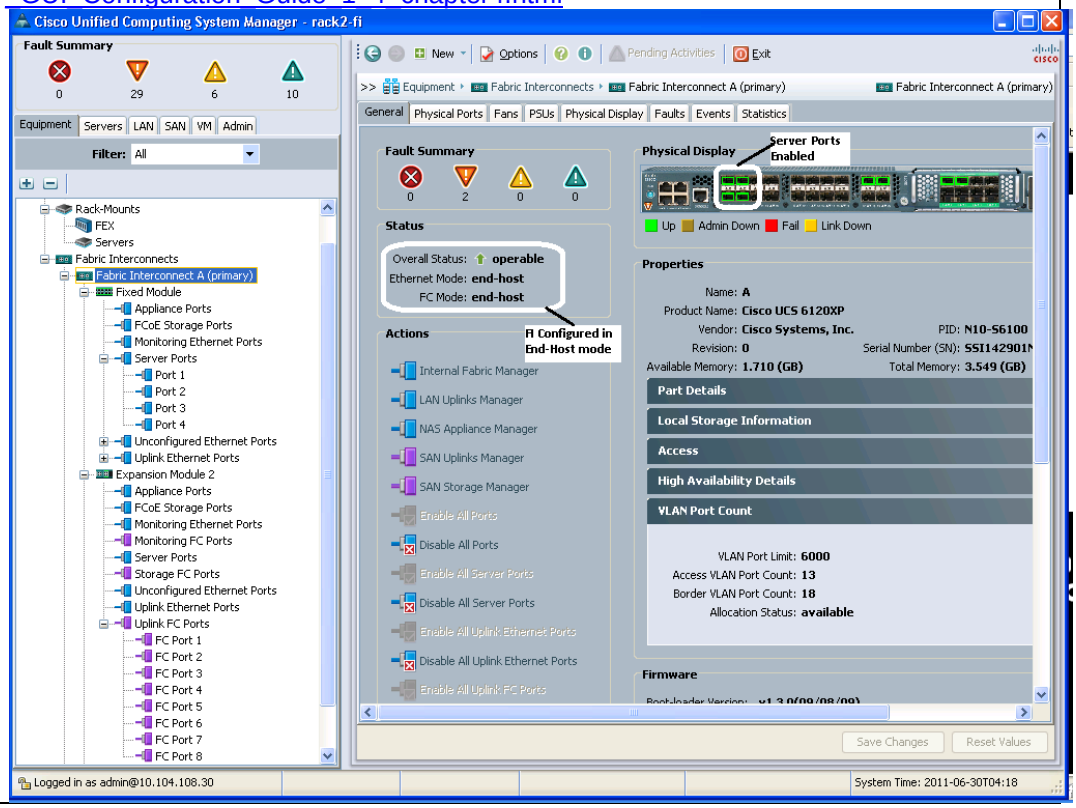
Service profiles can be created in several ways:

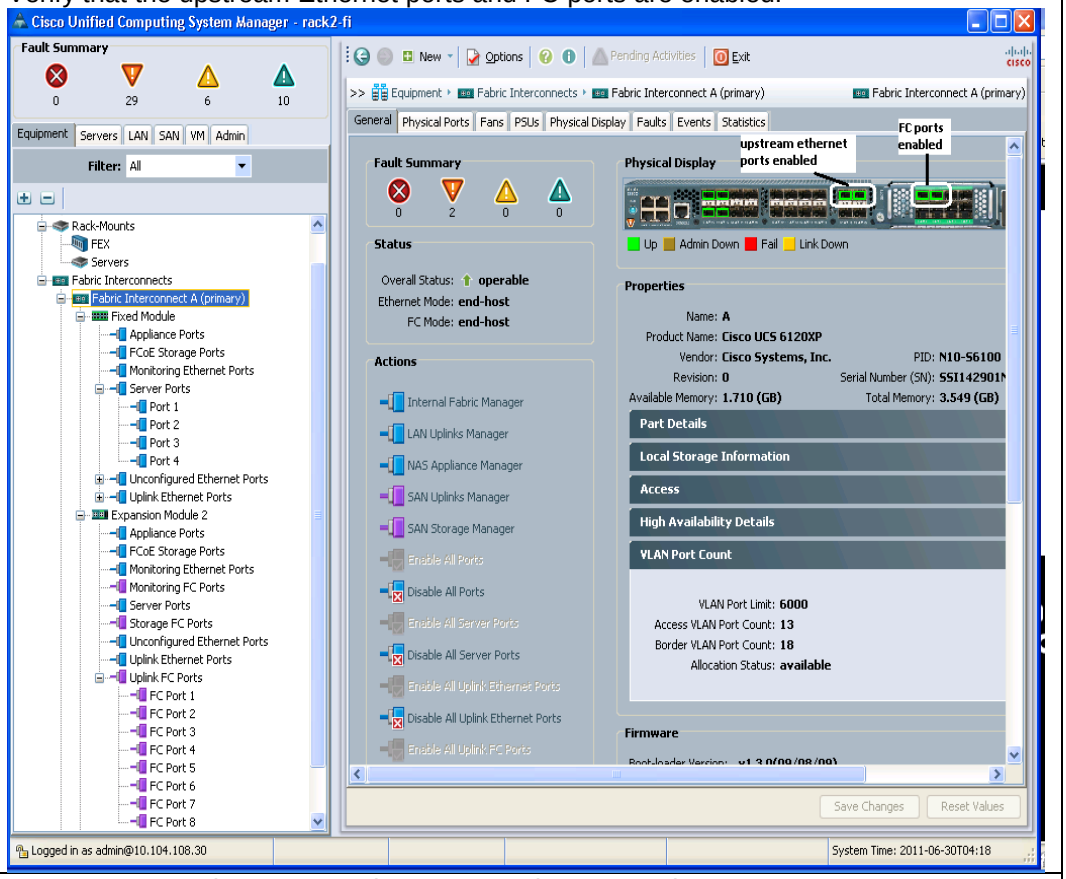
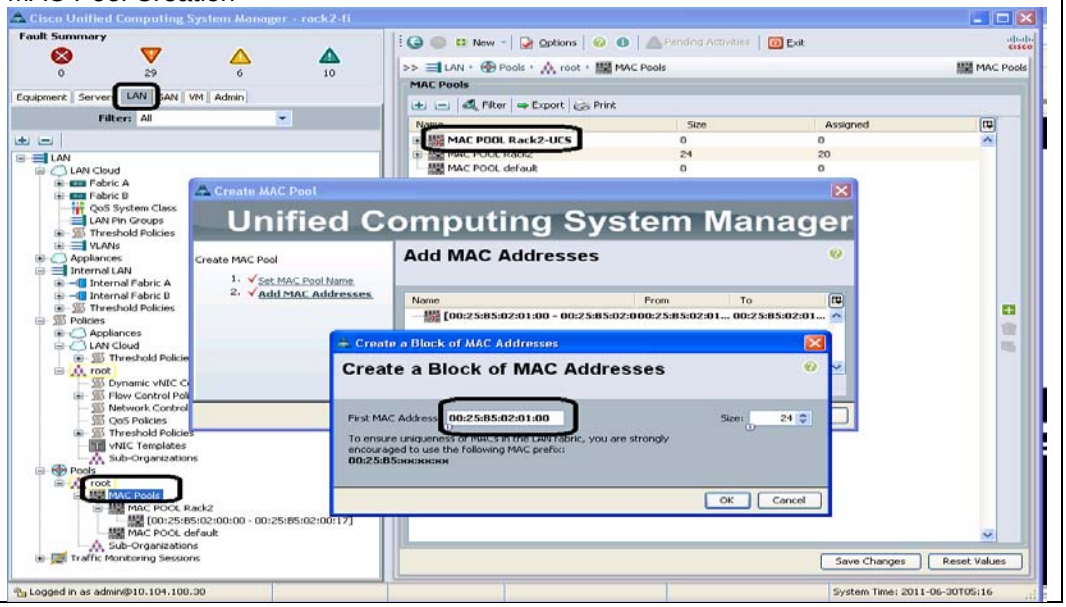
- Manually: Create a new service profile using the Cisco UCS Manager GUI.
- From a Template: Create a service policy from a template.
- By Cloning: Cloning a service profile creates a replica of a service profile. Cloning is equivalent to creating a template from the service policy and then creating a service policy from that template to associate with a server.

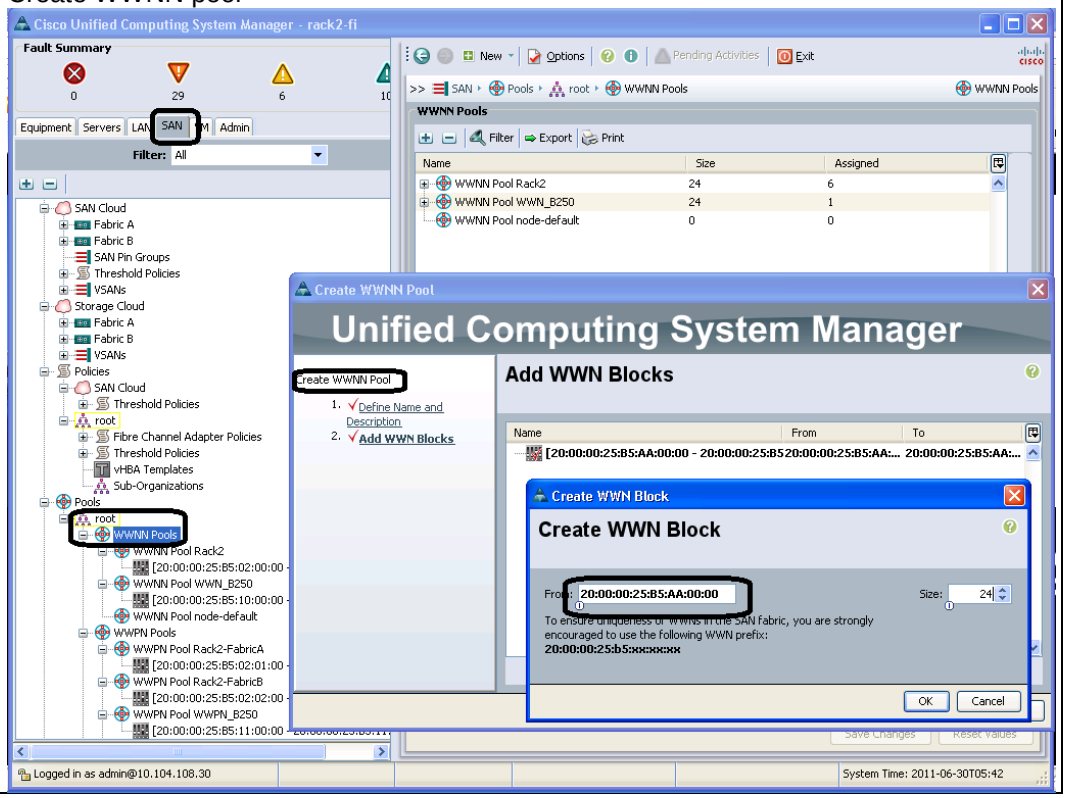
Before starting the service profile creation make sure to do the following:

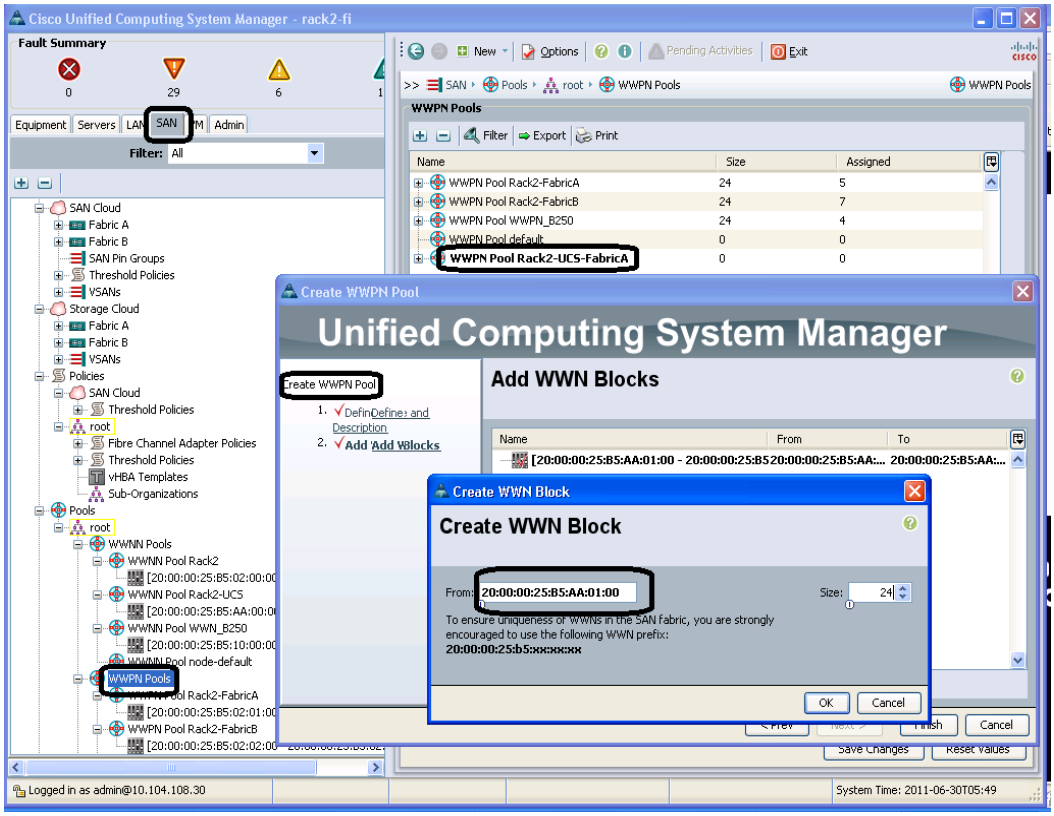
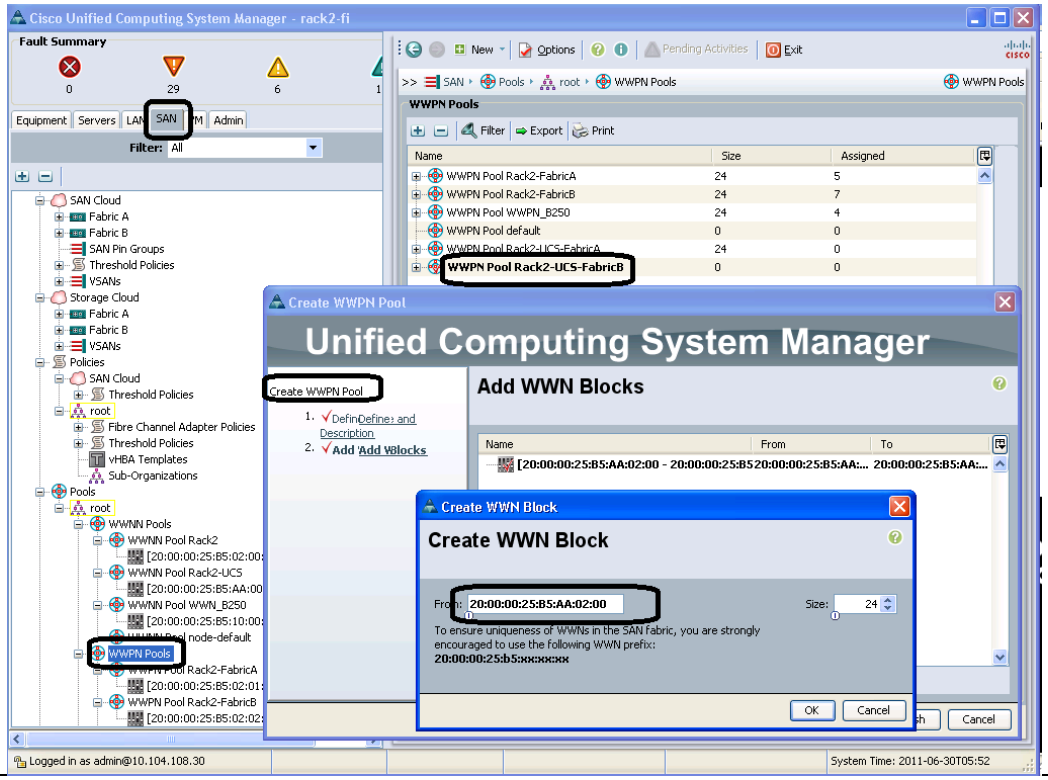
- Firmware on the UCS system is current, the latest firmware as of now is 1.4.1(2b).
- Connectivity between Fabric Interconnect and Chassis is enabled
- Upstream Ethernet links and Fiber Channel links are enabled
- MAC pool, WWPN pool, WWNN pool, UUID pool are created

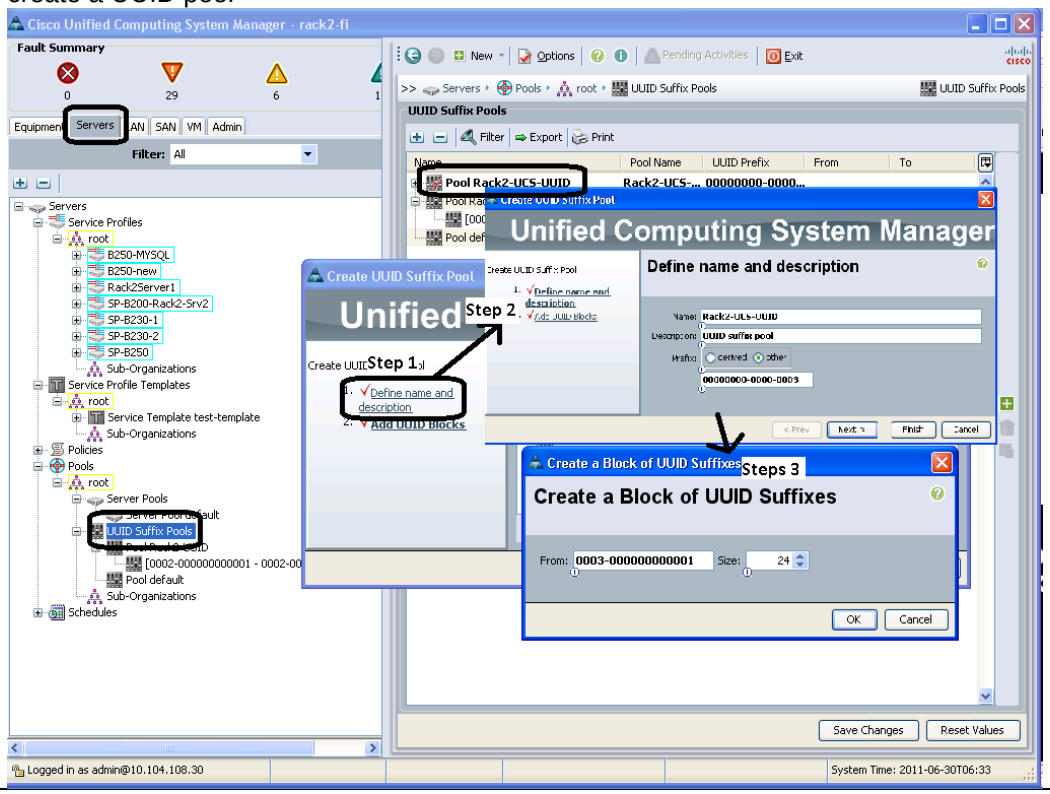
Tasks #	Task Description
1.	Check the firmware on the system and see if it is current. The latest firmware is 1.4.1(2b)  If the firmware is not current, follow the installation and upgrade guide for Cisco UCS firmware. Also do not forget to upgrade the BIOS to the latest level and associate it with all the blades. For more information refer to http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/gui/config/guide/1.4/UCSM_GUI_Configuration_Guide_1_4_chapter10.html

2.	Verify that the server ports on FI are enabled. For detailed Fabric Interconnect configuration refer to http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/gui/config/guide/1.4/UCSM_GUI_Configuration_Guide_1_4_chapter4.html 

3.	Verify that the upstream Ethernet ports and FC ports are enabled. 
4.	Create MAC pool, WWPN pool, WWNN pool, UUID pool
4.1	MAC Pool Creation 

4.2	Create WWNN pool 

4.3	Create WWPNpool for both Fabric Interconnect A and Fabric Interconnect B WWPN for FabricA.  WWPN for Fabric B 

4.4	create a UUID pool 

4.2.1 Service Profile Configuration

In the present scenario we created a Service profile initial template and thereafter instantiate service profile through the template.

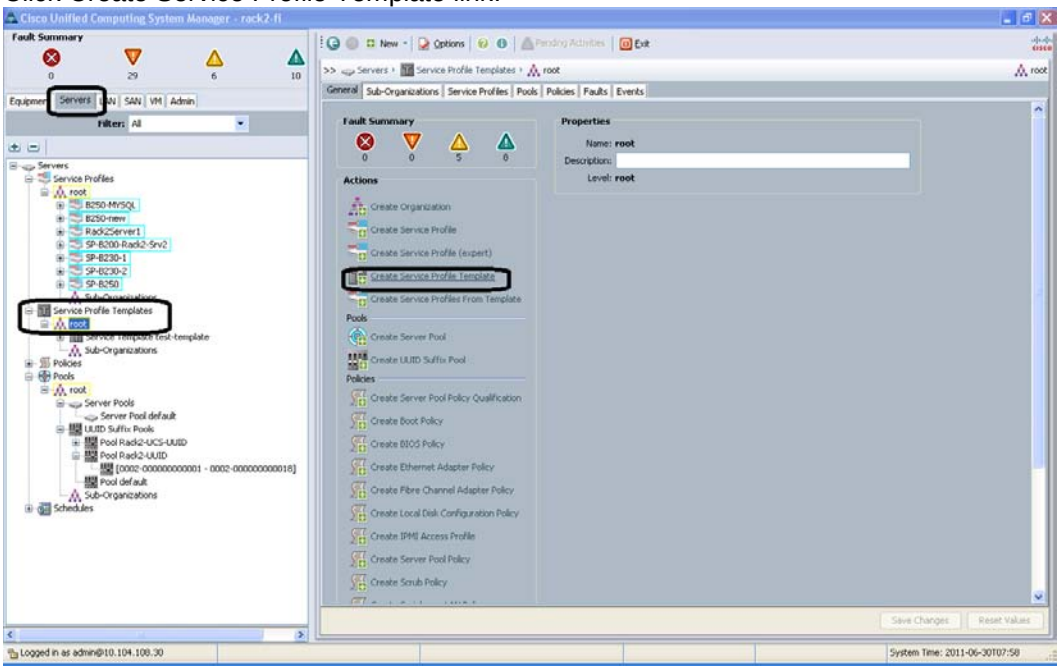
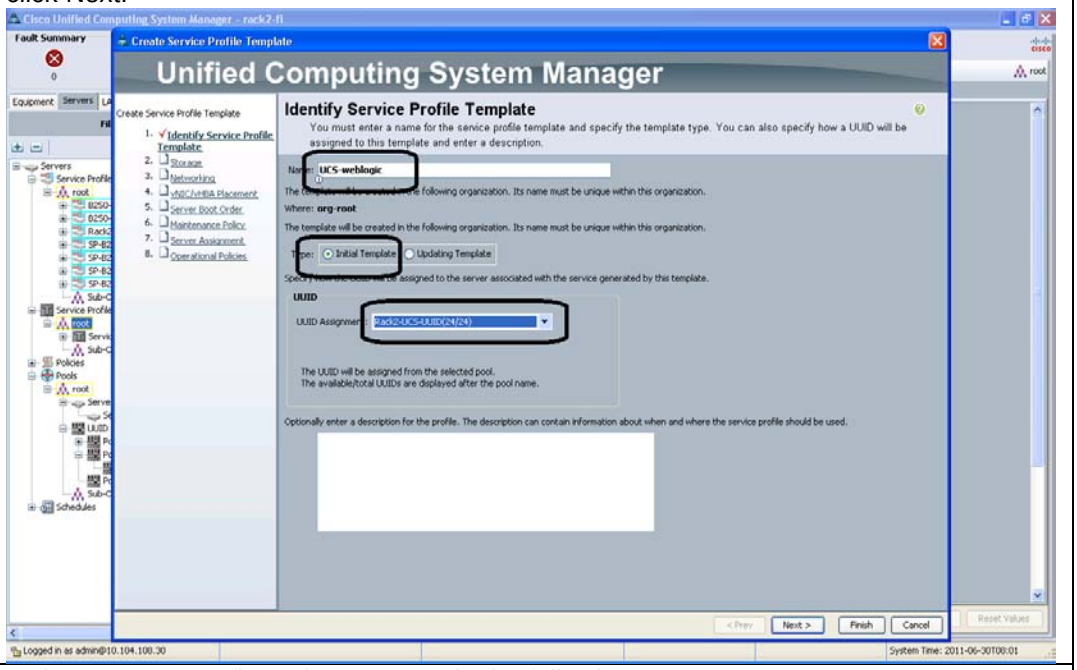
A service profile template parameterizes theUIDs that differentiate one instance of an otherwise identical server from another. Templates can be categorized into two types: initial and updating.

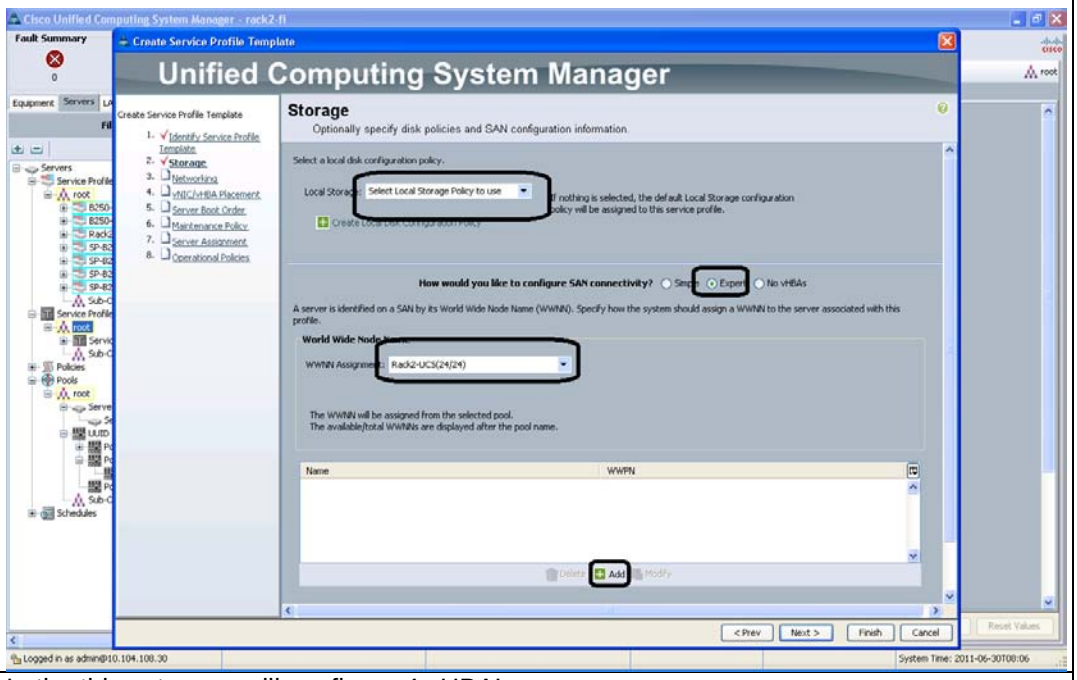
Initial Template: The initial template is used to create a new server from a service profile with UIDs, but after the server is deployed, there is no linkage between the server and the template, so changes to the template will not propagate to the server, and all changes to items defined by the template must be made individually to each server deployed with the initial template.

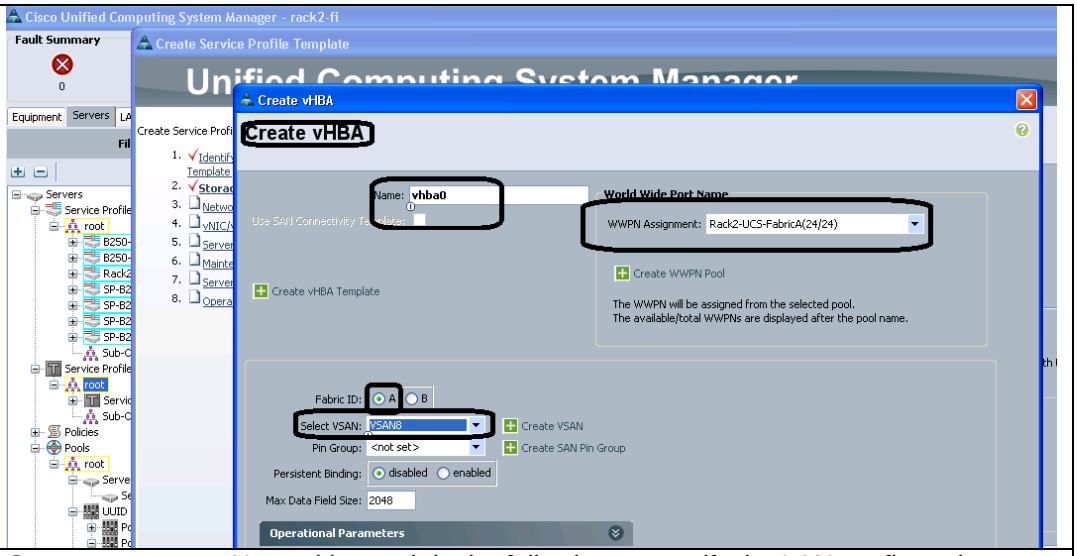
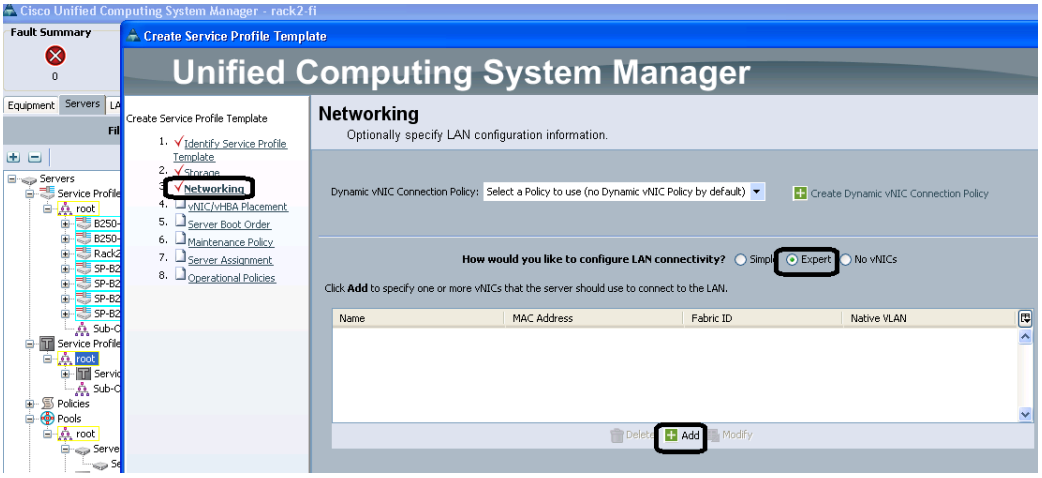
Updating Template: An updating template maintains a link between the template and the deployed servers, and changes to the template (most likely to be firmware revisions) cascade to the servers deployed with that template on a schedule determined by the administrator.

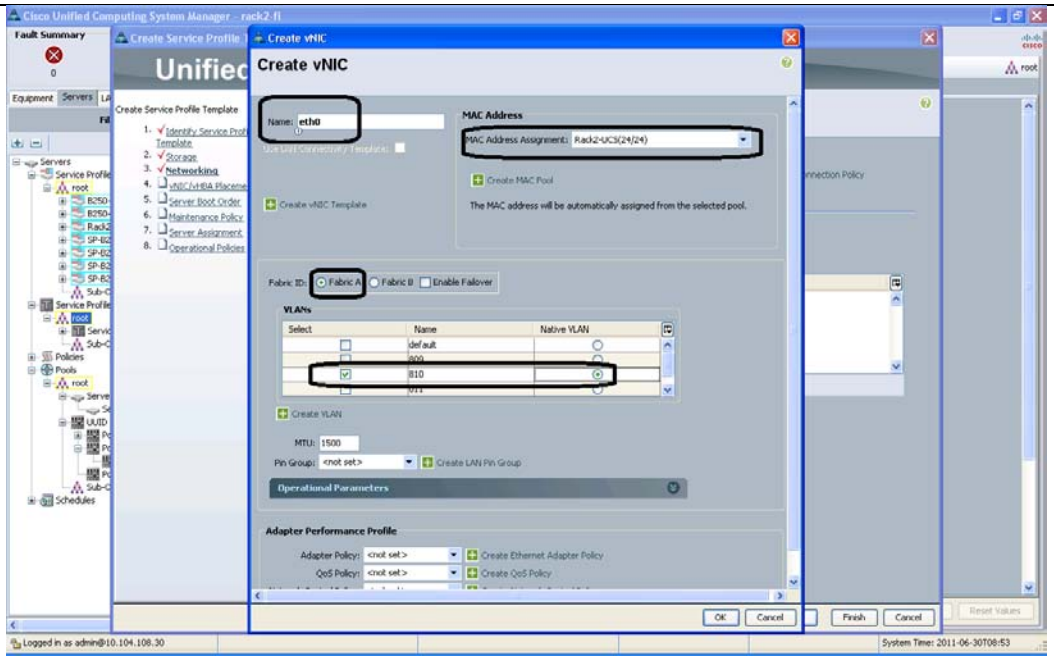
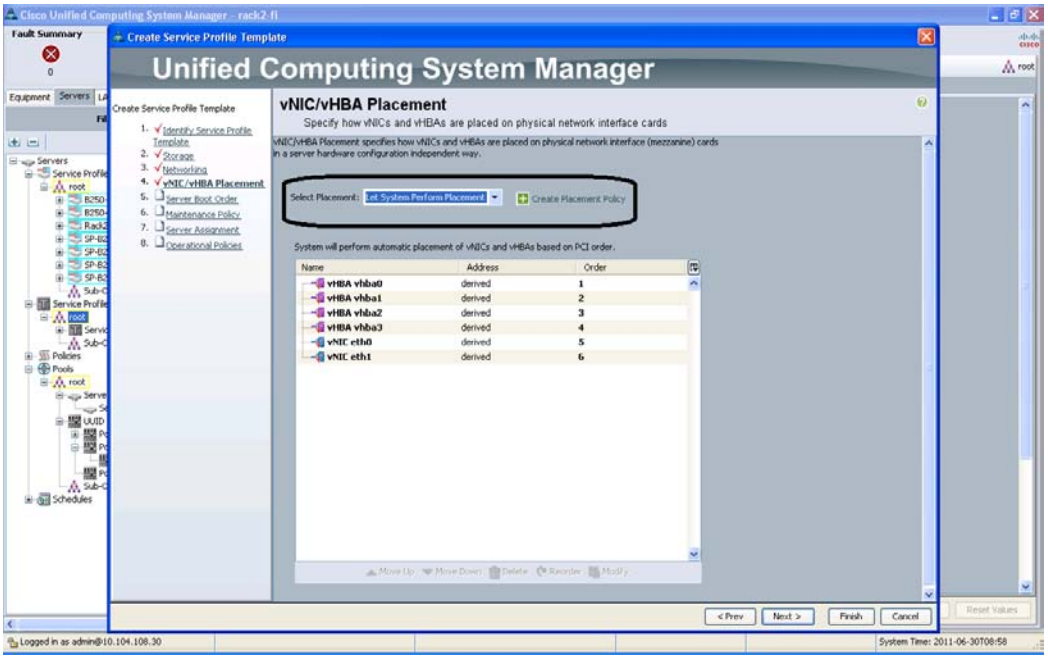
Service profiles, templates, and other management data is stored in high-speed persistent storage on the CiscoUnified Computing System fabric interconnects, with mirroring between fault-tolerant pairs of fabric interconnects.

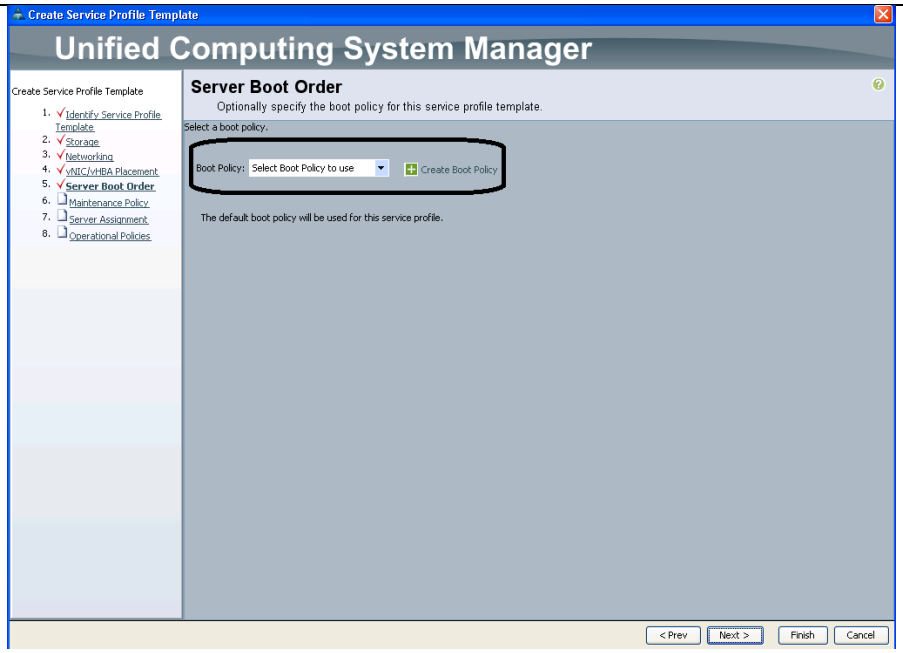
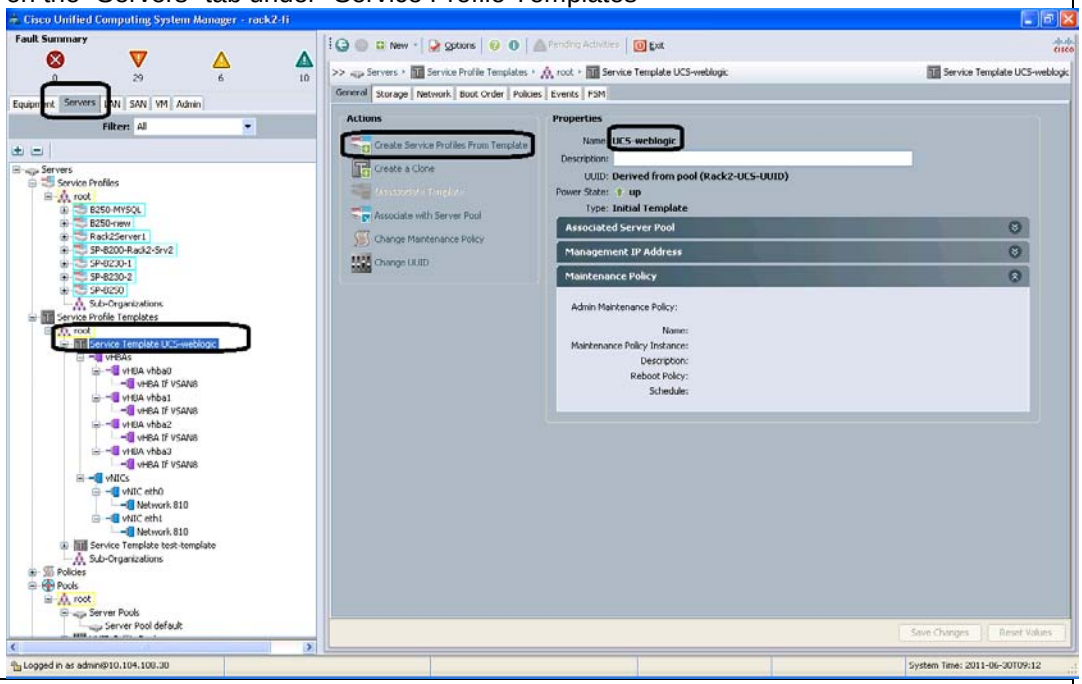
The following are the steps to configure a service profile template.

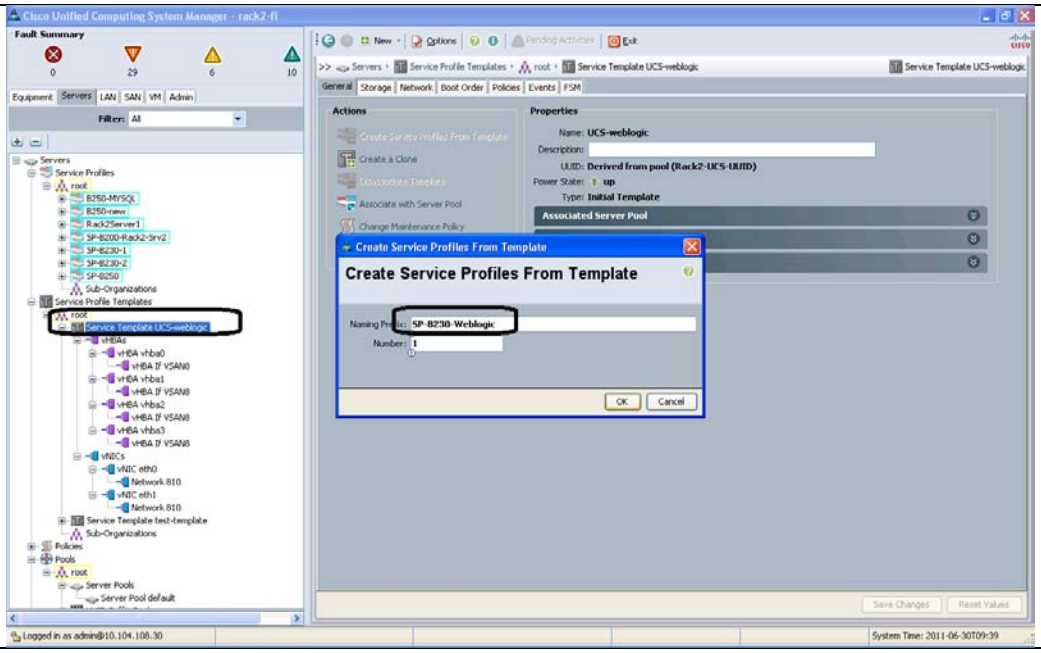
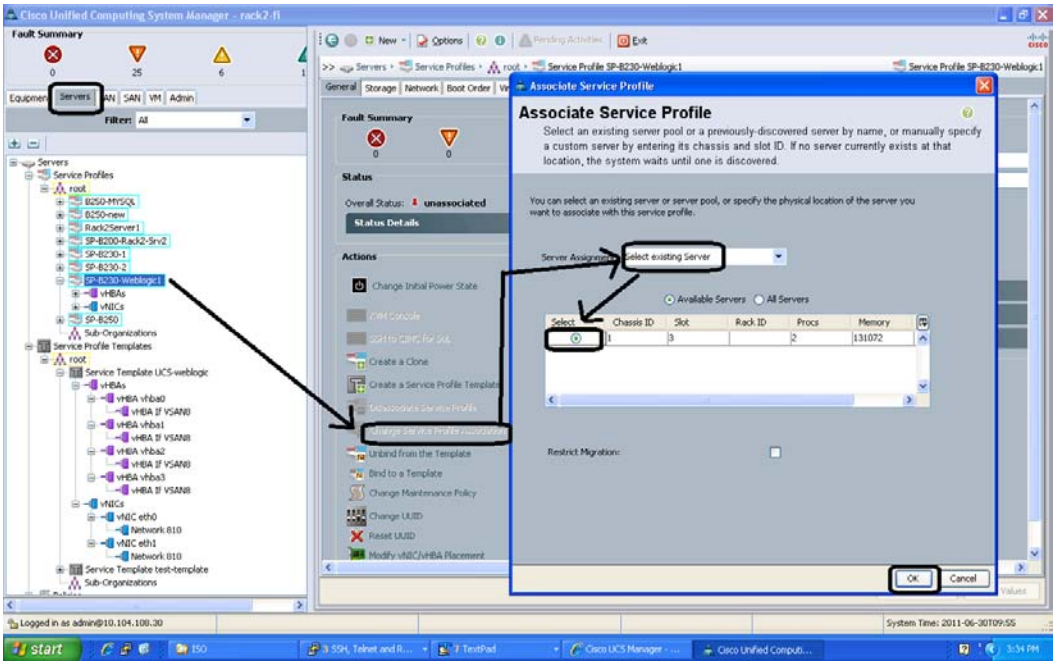
Tasks #	Task Description
1.	Click Create Service Profile Template link. 
2.	Name the service profile template, select UUID pool as created in previous section and click Next. 
3.	In the Storage Configuration Screen, do the following 1. Do not select any local Disk policy. You are doing a SAN Boot for theB230 server and the RAID policy configured in the Storage LUNis be used. 2. Select Expert mode in SAN Connectivity option.

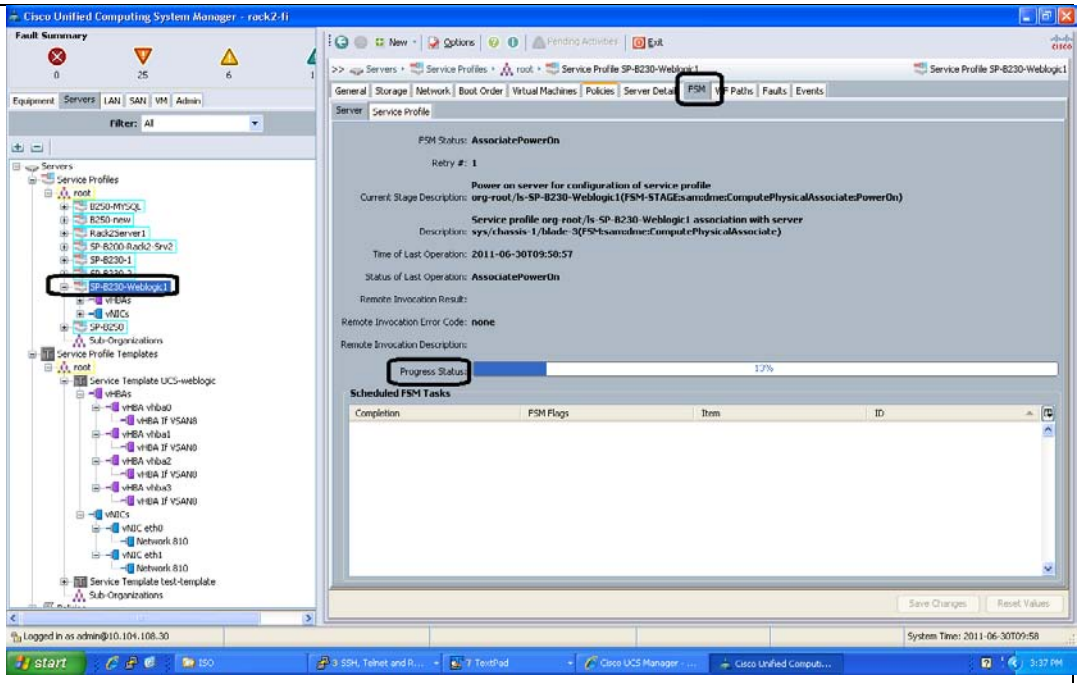
	3. Assign WWNN from the WWNN pool configured in the previous section. 4. Click Add to assign WWPN for vHBA's 
4.	In the this setup we will configure 4 vHBA's • 2 of the vHBA's will be used for SAN Boot with SAN LUN configured with RAID 10 • The other two vHBA'sare used for WebLogic 11gR1 installation configured with SAN LUN configured with RAID1 Each of the vHBA for SANBoot and WebLogic installation are mapped to Fabric A and Fabric B respectively. This allows redundancy at the Fabric interconnect level. To configure vHBA screen: 1. Select the WWPN pool as configured in the previous section. You have configured different WWPN pools for Fabric A and Fabric B. So this has to be selected as per the Fabric IS selected 2. Select Fabric ID as "A", select Fabric ID as "B" for vHBA2 3. Select VSAN as configured previously 4. Follow same steps for the other three vHBA

	
5.	Go to next screen, Networking and do the following to specify the LAN configuration: 1. Select Expert Mode 2. Add vNIC 
6.	Add vNIC configuration. Add two vNIC, eth0 and eth1, each configured with Fabric A and Fabric B.

	
7.	In the vNIC/vHBA placement screen, select the default “Let System Performance Placement” 
8.	In the Boot order Screen, do not select any boot policy. You will do a SAN Boot and will configure a new boot policy in the “SAN Configuration” section.

	
9.	Select default for the Maintenance policy, server assignment and operation policy screen. You can define our custom policy for each of the three screens, for instance, in operational policy you can define a BIOS policy which is assigned to a server per the requirement. Finish developingthe Service Profile template. You can view the service profile template on the “Servers” tab under “Service Profile Templates” 
10.	Create a service profile from the above created service profile template and associate it with a B230M1 server placed in the Cisco UCS chassis 5108.

	
11.	When the service profile is created, associate the service profile with the available server slot in Chassis 5108. 1. Select the created Service profile and go to “Change Service Profile Association” 2. Select “Existing Server” under “Server Assignment” option The workflow of Service Profile Association is shown in the subsequent figure. 
12.	Start the Service Profile Association on the available server;you can view the progress in the FSM status tab.



As demonstrated in the above steps, the Cisco Unified Computing System enables data center servers to become stateless and fungible,where the server's identity (using MAC or WWN addressing or UIDs) as well as build and operational policyinformation such as firmware and BIOS revisions and network and storage connectivity profiles can be dynamicallyprovisioned or migrated to any physical server in the system.

4.3 Boot from SAN

Booting from SAN is another critical feature which helps in moving towards stateless computing in which there is no static binding between a physical server and the OS / applications it is supposed to run. The OS is installed on a SAN lun and boot from SAN policy is applied to the service profile template or the service profile. If the service profile were to be moved to another server, the pwwn of the HBAs and the server policy also moves along with it. The new server now takes the same exact view of the old server, the true stateless nature of the blade server.

The main benefits of booting from the SAN:

- Reduce Server Footprints: Boot from SAN alleviates the necessity for each server to have its own direct-attached disk, eliminating internal disks as a potential point of failure. Thin diskless servers also take up less facility space, require less power, and are generally less expensive because they have fewer hardware components.
- Disaster and Server Failure Recovery: All the boot information and production data stored on a local SAN can be replicated to a SAN at a remote disaster recovery site. If a disaster destroys functionality of the servers at the primary site, the remote site can take over with minimal downtime.
- Recovery from server failures is simplified in a SAN environment. With the help of snapshots, mirrors of a failed server can be recovered quickly by booting from the original copy of its image. As a result, boot from SAN can greatly reduce the time required for server recovery.

- High Availability: A typical data center is highly redundant in nature - redundant paths, redundant disks and redundant storage controllers. When operating system images are stored on disks in the SAN, it supports high availability and eliminates the potential for mechanical failure of a local disk.
- Rapid Redeployment: Businesses that experience temporary high production workloads can take advantage of SAN technologies to clone the boot image and distribute the image to multiple servers for rapid deployment. Such servers may only need to be in production for hours or days and can be readily removed when the production need has been met. Highly efficient deployment of boot images makes temporary server usage a cost effective endeavor.
- Centralized Image Management: When operating system images are stored on networked disks, all upgrades and fixes can be managed at a centralized location. Changes made to disks in a storage array are readily accessible by each server.

With boot from SAN, the image resides on the SAN and the server communicates with the SAN through a host bus adapter (HBA). The HBAs BIOS contain the instructions that enable the server to find the boot disk. After power on self test (POST), the server hardware component fetches the boot device that is designated as the boot device in the hardware BOIS settings. When the hardware detects the boot device, it follows the regular boot process.

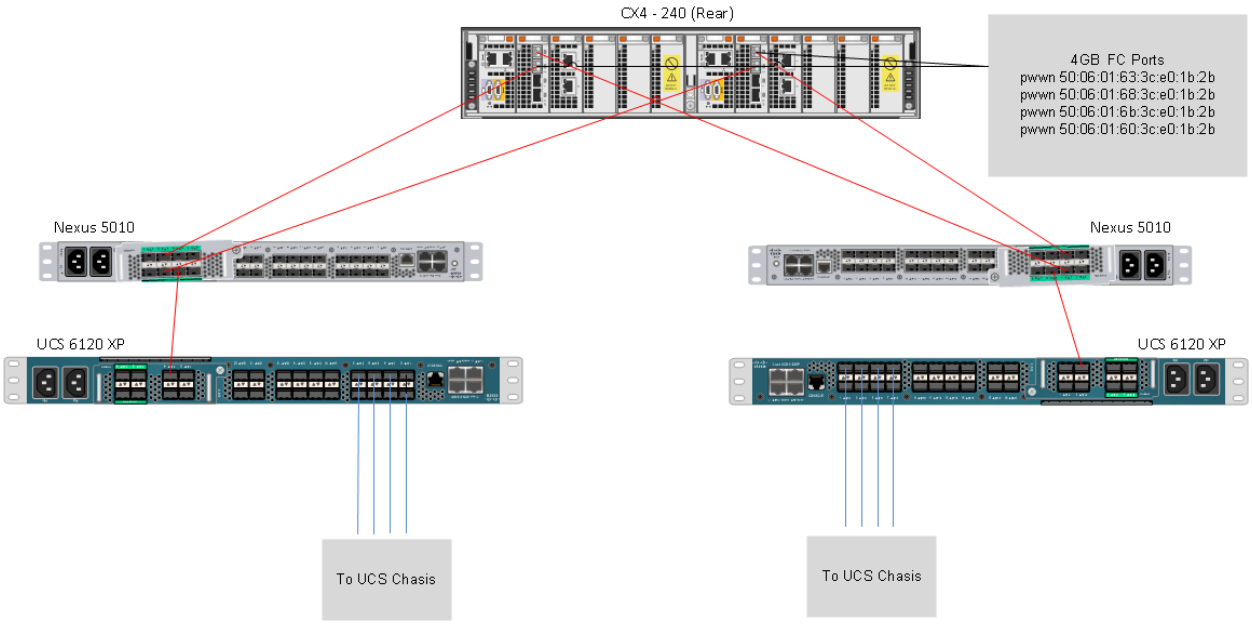
There are four distinct portions of the SAN procedure:

- Storage array configuration
- Cisco UCS configuration of service profile
- SAN zone configuration
- Host Registration on Storage

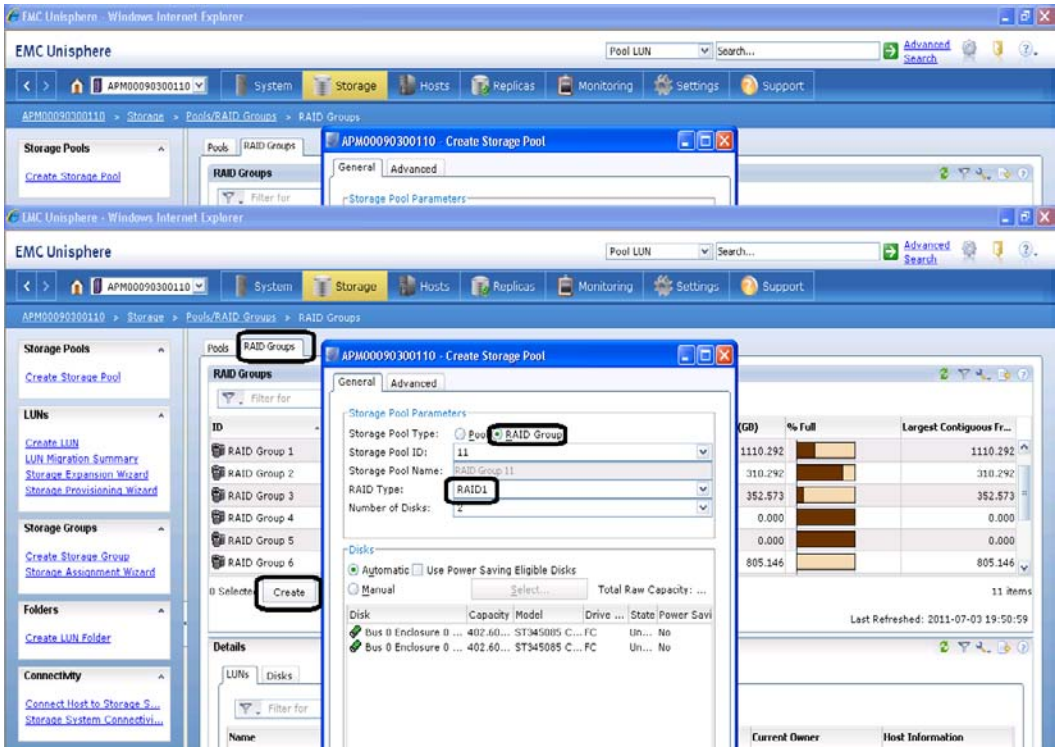
4.3.1 Storage Array Configuration

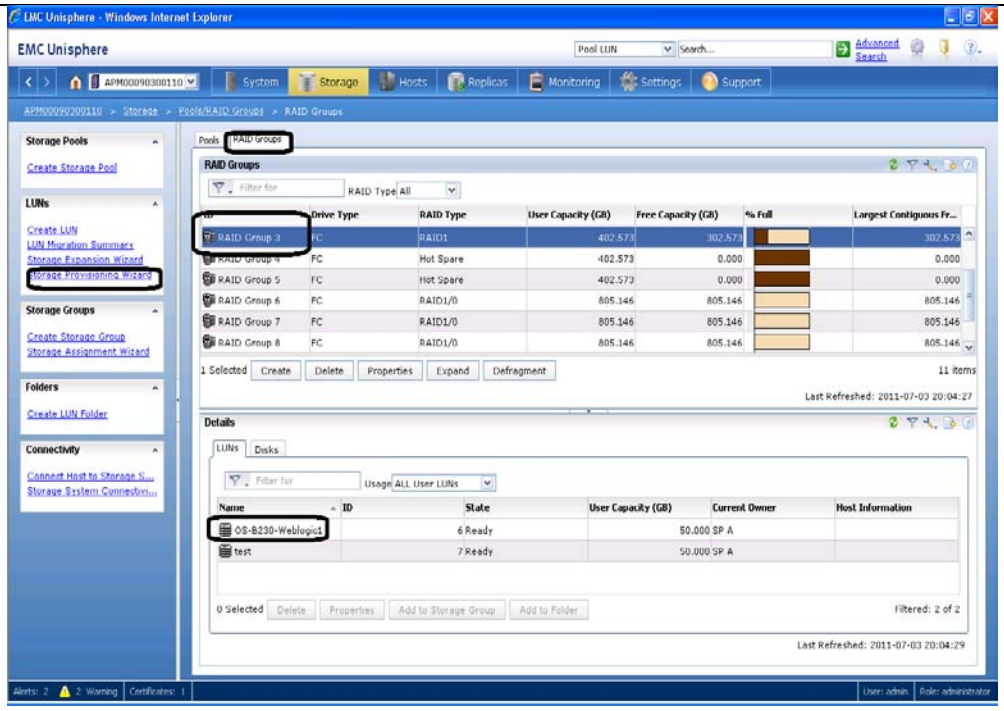
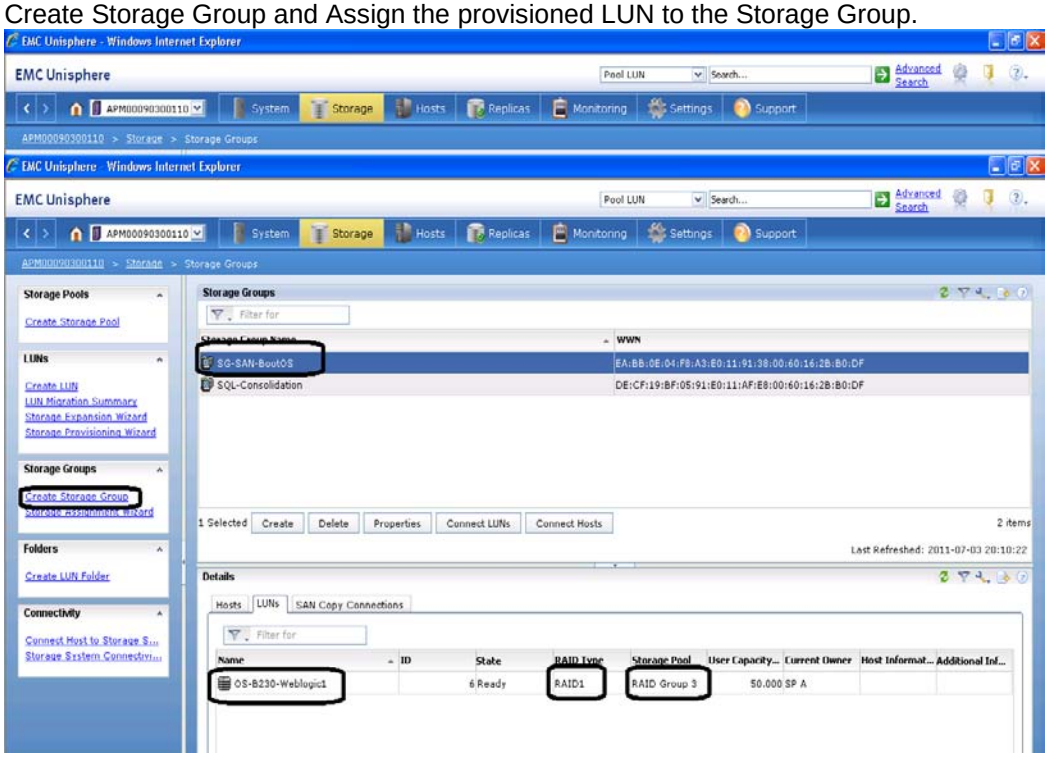
In the present setup, EMC CLARiiON CX4-240 is used as a Storage device. Subsequent figure gives an overview of SAN connectivity for the WebLogic deployment over Cisco UCS Blade servers.

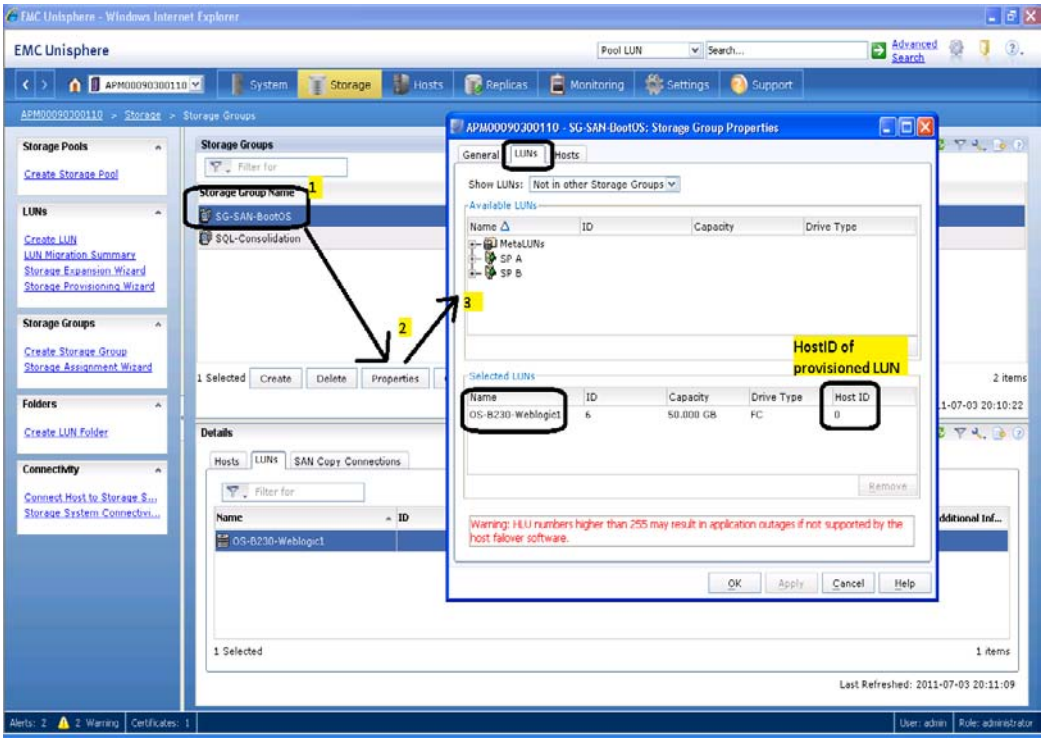
Figure 18. Storage Connectivity



The process to configure storage is as follows:

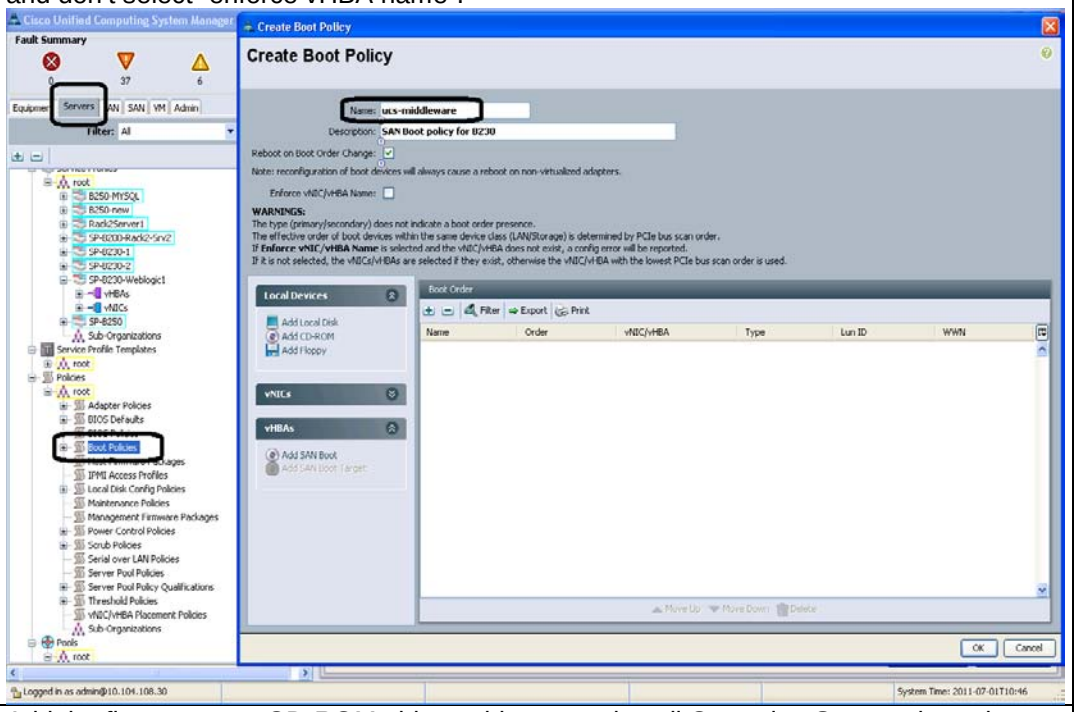
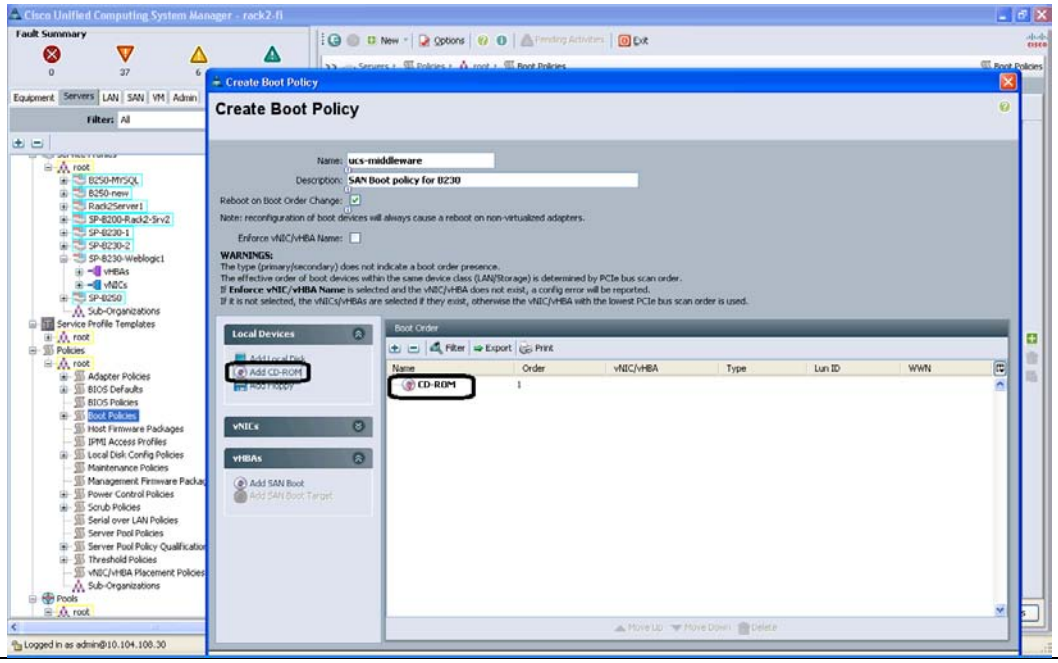
Tasks #	Task Description
1.	Create RAID Group in CX4-240 You have created a RAID Type of RAID1 for OS installation. Inthe this setup you have allocated 2 disk for SAN Boot, allocating a total of around 400G. You would carve out LUNs from this RAID group for all OS installations. 
2.	Create 50GLUN from the RAID Group created through Storage Provisioning Wizard. You have created a 50GLUN for OEL installation used for WebLogic Server.

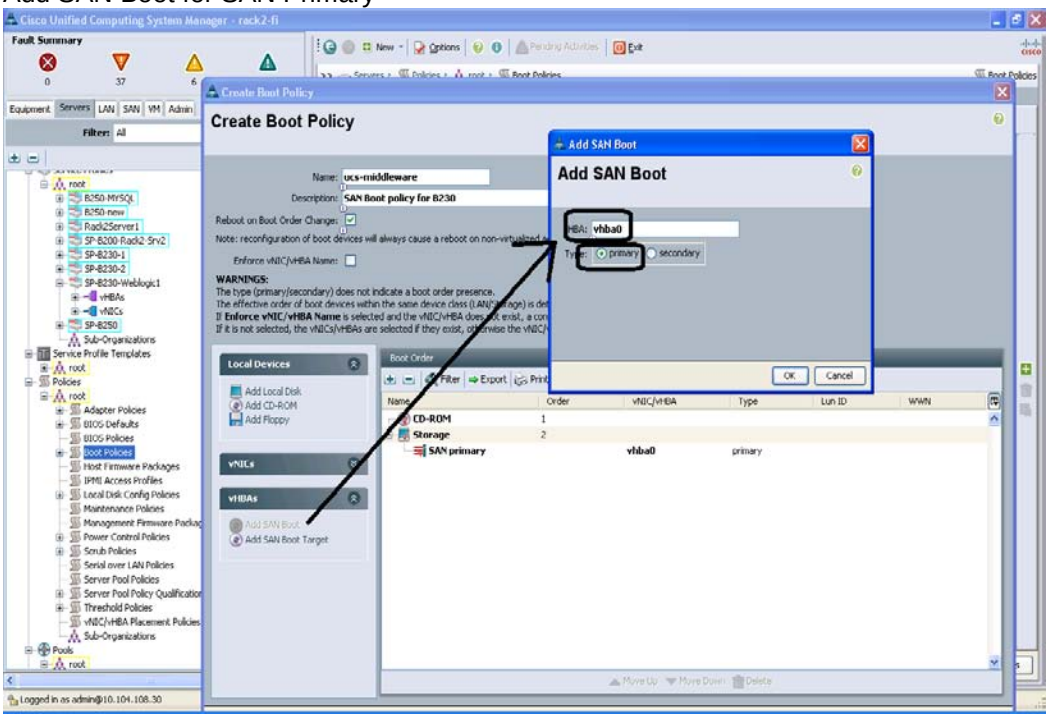
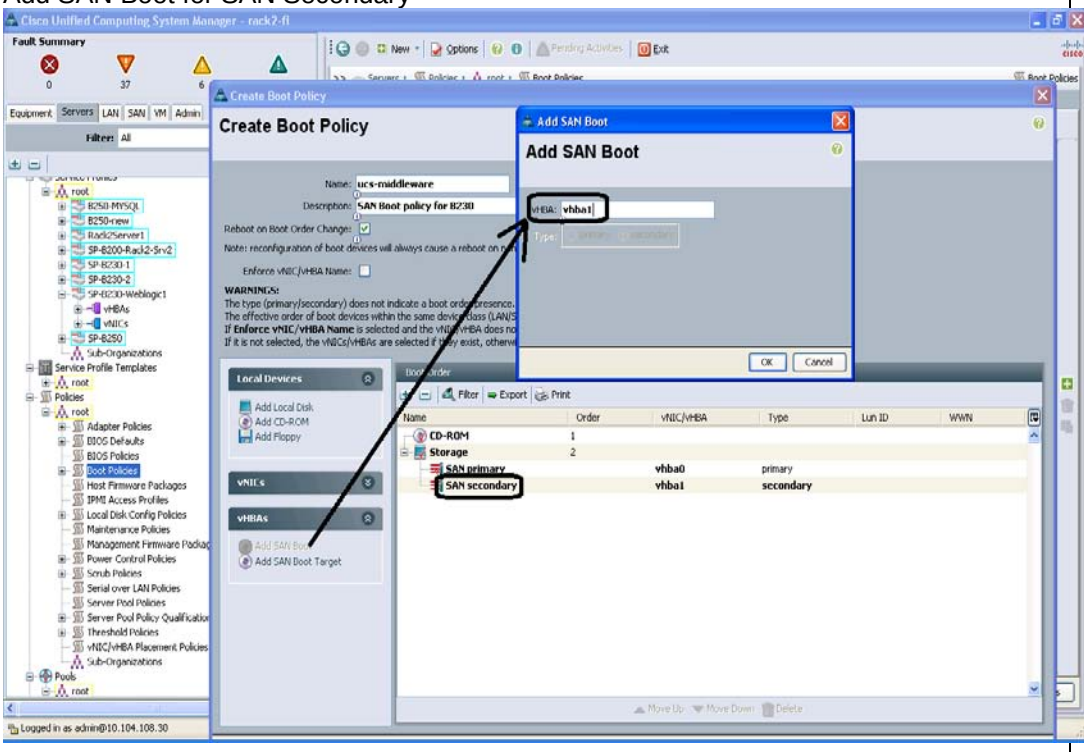
	
3.	Create Storage Group and Assign the provisioned LUN to the Storage Group. 
4	Configure Boot policy in Cisco UCS Service Profile and re-visit Storage Array to register host. You need have configured Storage Group which has a 50GLUN configured with RAID1. You need to identify the Host ID from the configured OS installation LUN. This Host ID is mapped to LUN ID during addition of SAN Boot Target in Boot Policy of Cisco UCS

	Service Profile. This can be identified by the following workflow: 

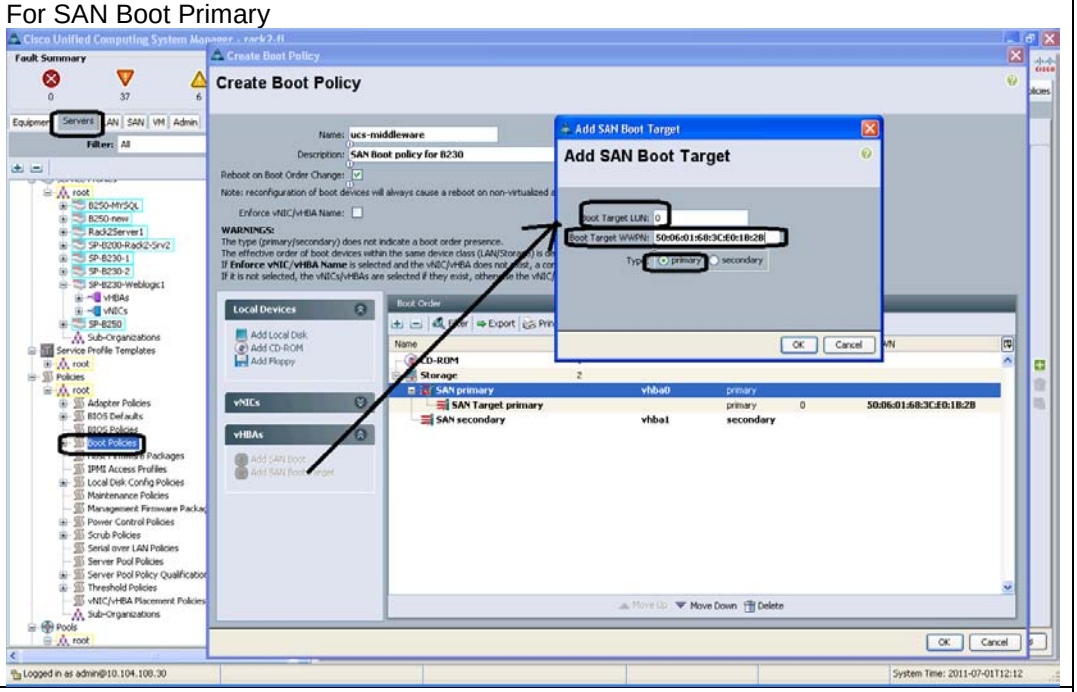
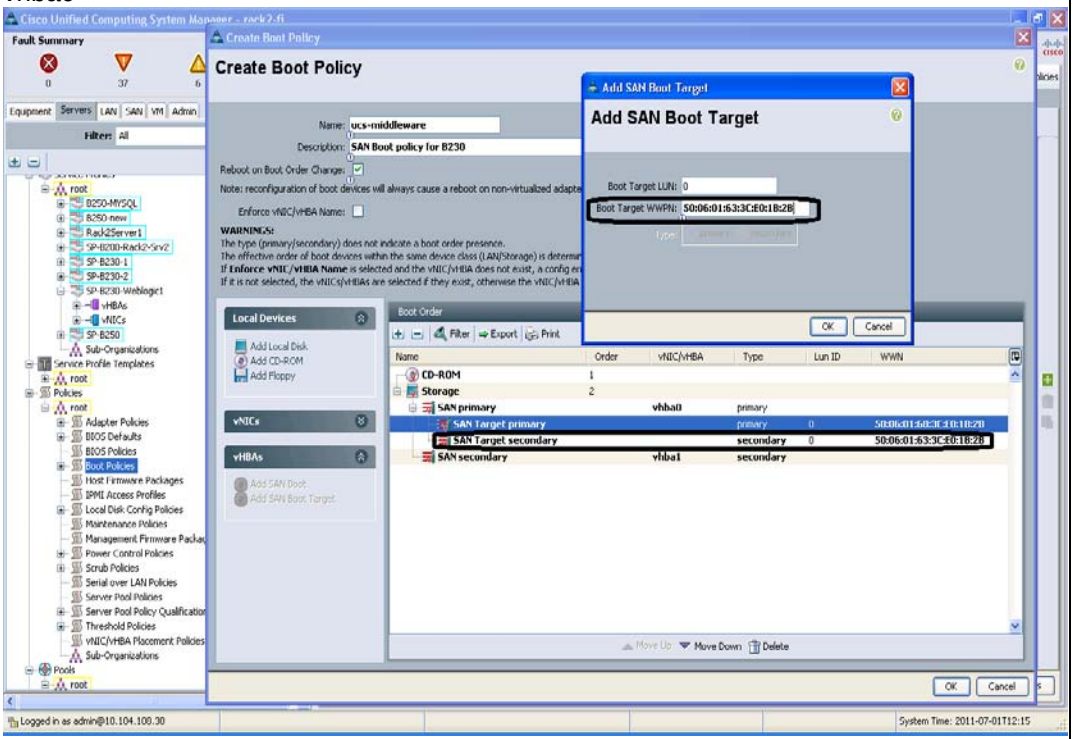
4.3.2 Cisco UCS Manager Configuration

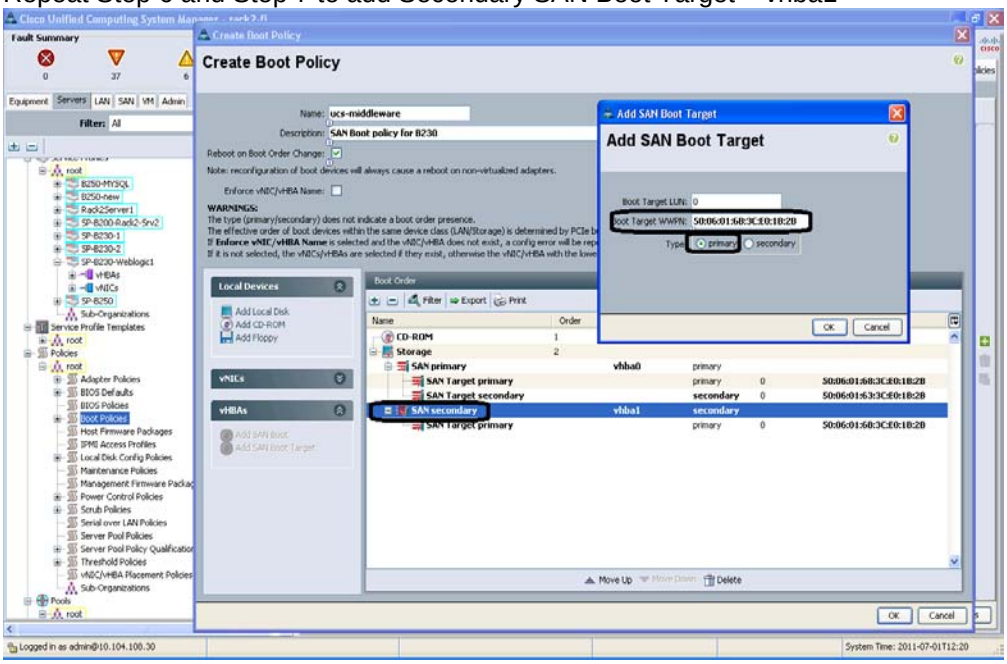
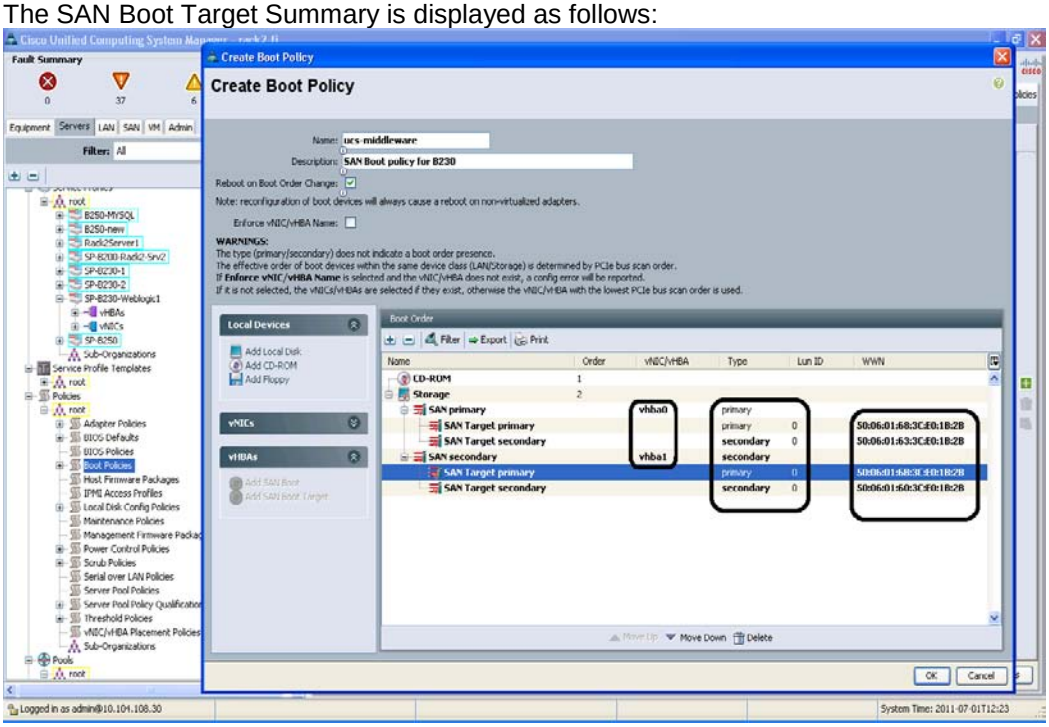
To enable boot from SAN from a Cisco UCS Manager perspective, do the following:

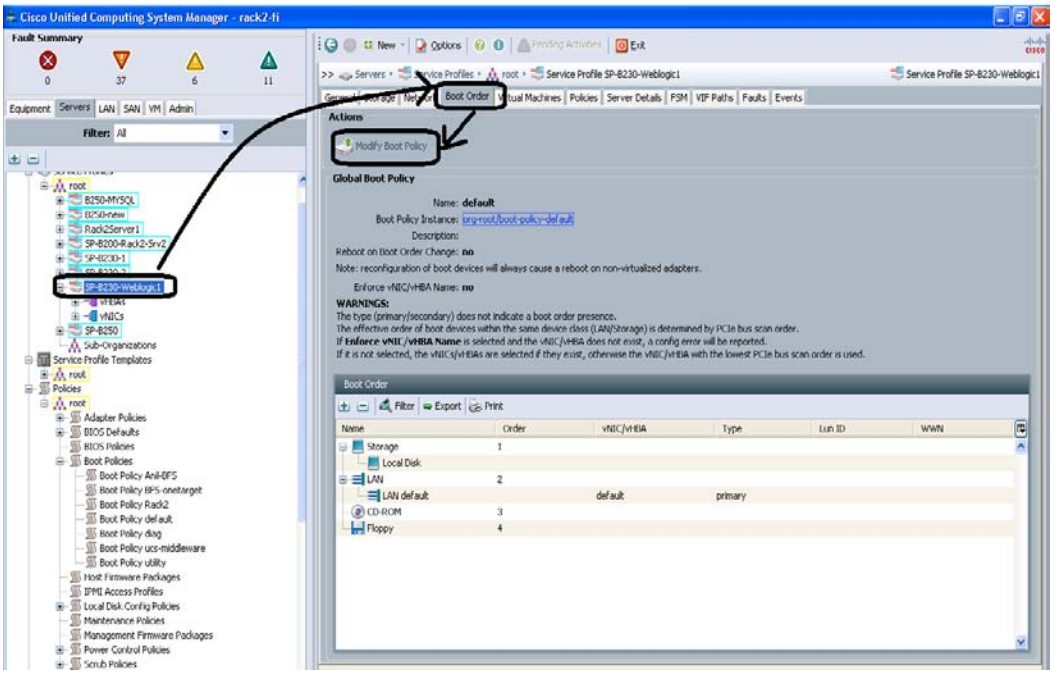
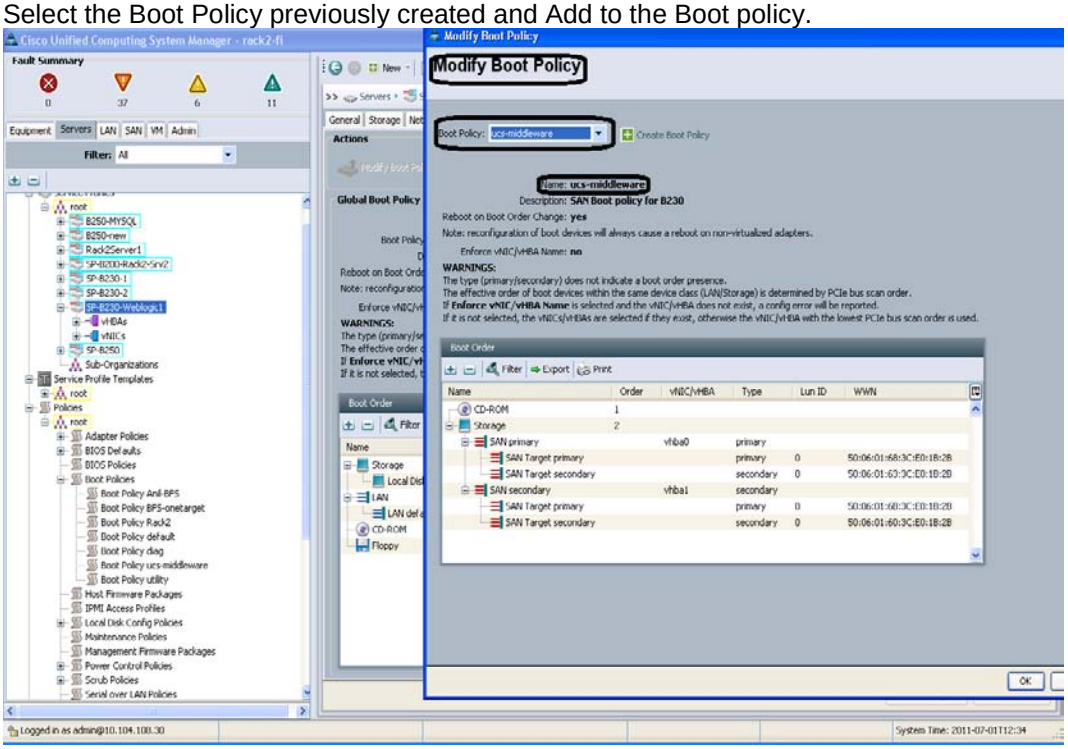
Tasks #	Task Description
1.	Create a boot policy in the “Servers” tab. To do this, Select the policies and on the right plane select boot policies and select “Add” button. Enter name, select reboot on change, and don’t select “enforce vHBA name”. 
2.	Add the first target as CD-ROM, this enablesyou to install Operating System through KVM Console 

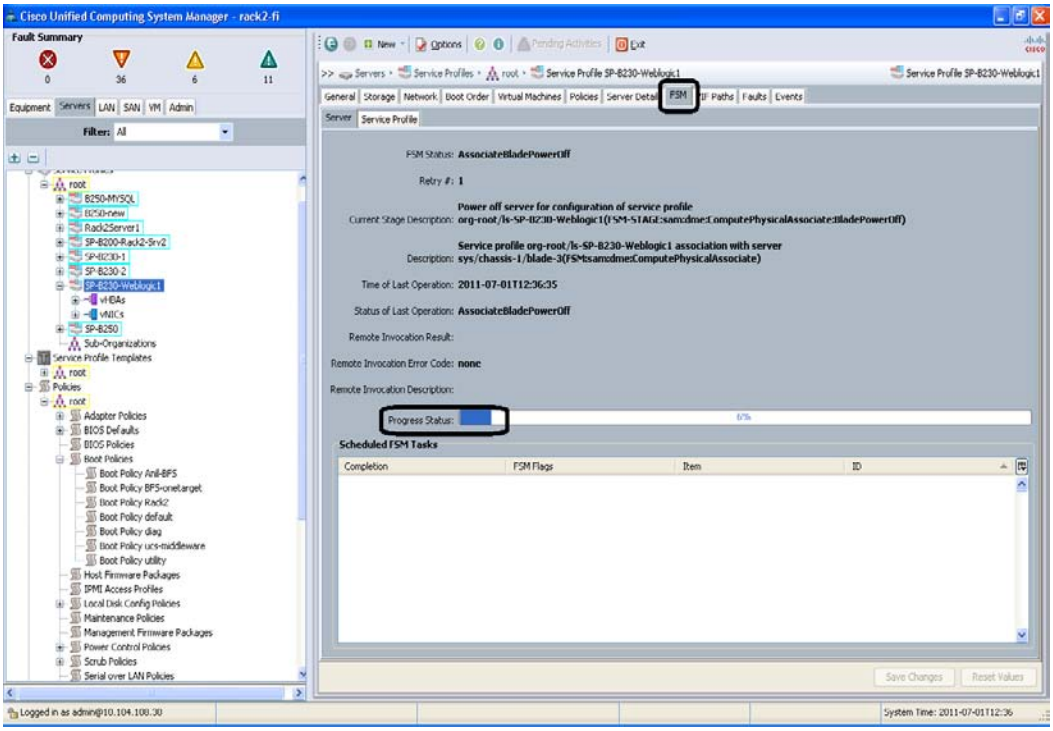
3.	Add SAN Boot for SAN Primary 
4	Add SAN Boot for SAN Secondary 

5.	You will be usingvhba0 and vhba1 for SAN Boot and the other two configured HBA's for example,vhba2 and vhba3 for WebLogic application server installation. Identify SAN WWPN ports. So the SAN Boot Target which would be added are vhba0 – – – Storage Port SP-B0 - Primary Target Storage Port SP-A3 - Secondary Target vhba1 – – – Storage Port SP-B3 – Primary Target Storage Port SP-A0 – Secondary Target Properly note the WWPN for all the four CX4 port. **rk3-N5k-1#** shflogi database --- INTERFACE VSANFCID PORT NAME NODE NAME --- fc2/1 1 0x1f00ef50:06:01:61:3c:e0:1b:f850:06:01:60:bc:e0:1b:f8 fc2/4 8 0x9b000320:43:00:05:73:a2:97:4020:08:00:05:73:a2:97:41 **fc2/5 8 0x9b02ef50:06:01:63:3c:e0:1b:2b50:06:01:60:bc:e0:1b:2b** **fc2/6 8 0x9b01ef50:06:01:68:3c:e0:1b:2b50:06:01:60:bc:e0:1b:2b** vfc18 8 0x9b000020:00:58:8d:09:0f:2b:2010:00:58:8d:09:0f:2b:20 **rk3-N5K-2#** shflogi database --- INTERFACE VSANFCID PORT NAME NODE NAME --- fc2/1 1 0x7a00ef50:06:01:69:3c:e0:1b:f850:06:01:60:bc:e0:1b:f8 fc2/4 8 0x44000220:43:00:05:73:a2:c2:c020:08:00:05:73:a2:c2:c1 **fc2/5 8 0x4402ef50:06:01:6b:3c:e0:1b:2b50:06:01:60:bc:e0:1b:2b** **fc2/6 8 0x4401ef50:06:01:60:3c:e0:1b:2b50:06:01:60:bc:e0:1b:2b** vfc20 8 0x44000020:00:58:8d:09:0f:2b:1f10:00:58:8d:09:0f:2b:1f Total number of flogi = 5. The final mapping looks like as follows vhba0 – – – Storage Port SP-B0 - Primary Target – **50:06:01:68:3c:e0:1b:2b** Storage Port SP-A3 - Secondary Target- **50:06:01:63:3c:e0:1b:2b** vhba1 – – – Storage Port SP-B3 – Primary Target - **50:06:01:6b:3c:e0:1b:2b** Storage Port SP-A0 – Secondary Target - **50:06:01:60:3c:e0:1b:2b**

6.	Now Add San Boot Target. For SAN Boot Primary 
7.	Now Add a secondary to the previously created Primary SAN Boot Target. This is under vhba0  Note: From the above screenshot, the Boot *Target LUN ID* has been identified from the *host id* of the LUN created for SAN Boot in the corresponding host's Storage Group.

8.	Repeat Step 6 and Step 7 to add Secondary SAN Boot Target – vhba1 
9.	Follow the same step to Add Secondary SAN Boot Target. The SAN Boot Target Summary is displayed as follows: 

10.	Associate this Boot Policy to the Service profile created for WebLogic Server under section **4.2.1 Service Profile Configuration** 
11.	Select the Boot Policy previously created and Add to the Boot policy. 

12.	Service Profile Modification can be viewed under the FSM tab. 

13.	When the Server is rebooted, you can view the WWPNof vhba0 and vhba1 visible in N5K1 and N5K2. 

4.3.3 Zone Configuration

The following are the steps to configure VSAN and add zones in Nexus 5010 for VHBA configured in service profile of B230 server.

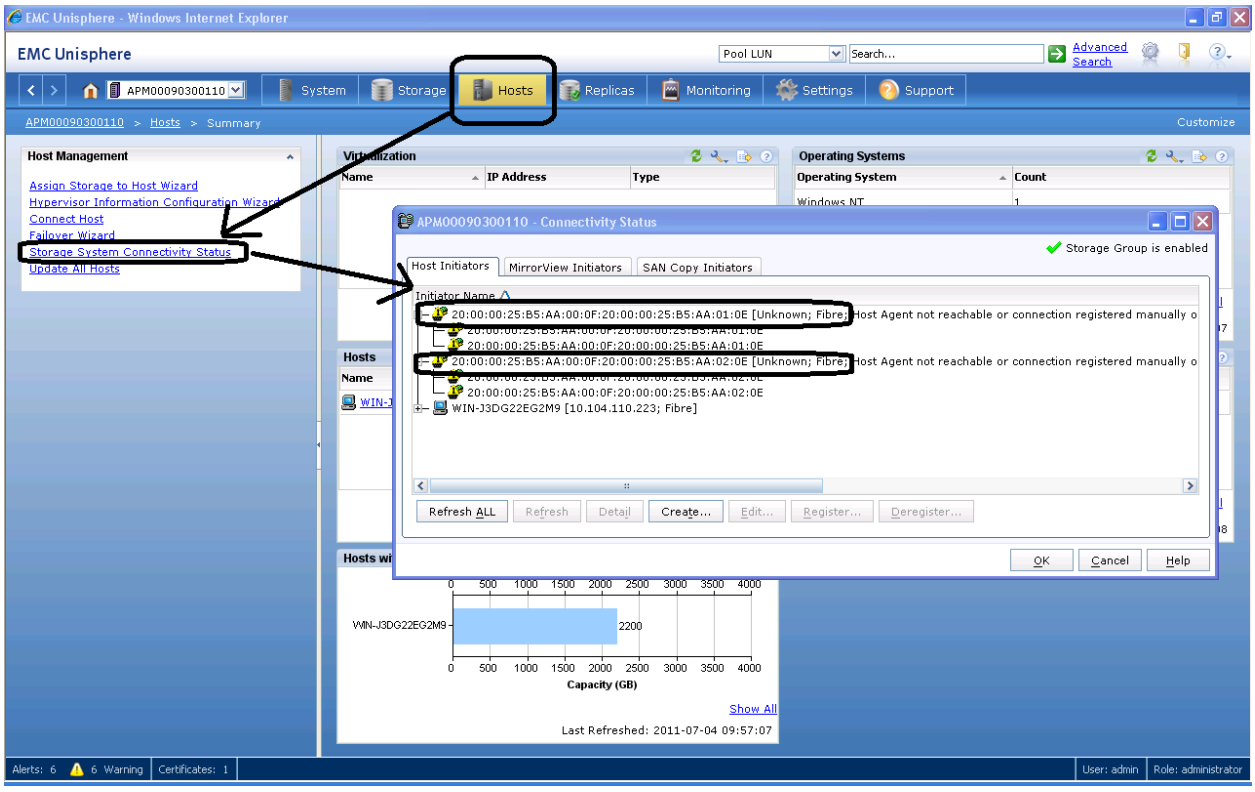
```
1) Create VSAN for Storage target ports and Server initiator ports
rk3-N5k-1# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
rk3-N5k-1(config)# v
vlan   vrf    vsan
rk3-N5k-1(config)# vsan database
rk3-N5k-1(config-vsan-db)# vsan 8 → This is the same VSAN which we have in UCS Manager VSAN
rk3-N5k-1(config-vsan-db)#Vsan 8 interface fc2/5
rk3-N5k-1(config-vsan-db)# Vsan 8 interface fc2/6
rk3-N5k-1(config-vsan-db)# Vsan 8 interface fc2/4

2) Modify server port fc2/4 as F port of N5K
rk3-N5k-1(config)# interface fc2/4
rk3-N5k-1(config)# switchport mode F
rk3-N5k-1(config)# exit

3) Above defined steps need to be done on N5K2 as well

4) Add zone & zoneset
rk3-N5k-1# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
rk3-N5k-1(config)# exit
rk3-N5k-1# sh flogi database
--------------------------------------------------------------------------------
INTERFACE        VSAN    FCID           PORT NAME               NODE NAME
--------------------------------------------------------------------------------
fc2/1            4     0x5302ef  50:06:01:69:3c:e0:1b:f8 50:06:01:60:bc:e0:1b:f8
fc2/2            4     0x530001  20:41:00:05:73:a3:17:40 20:04:00:05:73:a3:17:41
fc2/3            4     0x5301ef  50:06:01:60:3c:e0:1b:f8 50:06:01:60:bc:e0:1b:f8
fc2/4            8     0x9b0003  20:43:00:05:73:a2:97:40 20:08:00:05:73:a2:97:41
fc2/4            8     0x9b0005  20:00:00:25:b5:aa:01:0e 20:00:00:25:b5:aa:00:0f→ WWPN of vhba0
fc2/5            8     0x9b02ef  50:06:01:63:3c:e0:1b:2b 50:06:01:60:bc:e0:1b:2b→Storage port
fc2/6            8     0x9b01ef  50:06:01:68:3c:e0:1b:2b 50:06:01:60:bc:e0:1b:2b→ Storage port
vfc18            8     0x9b0000  20:00:58:8d:09:0f:2b:20 10:00:58:8d:09:0f:2b:20

Total number of flogi = 8.

rk3-N5k-1# conf t
Enter configuration commands, one per line.  End with CNTL/Z.

rk3-N5k-1(config)# zone name b230-WebLogic1-vhba0 vsan 8→ Add zone name
rk3-N5k-1(config-zone)# member pwwn 20:00:00:25:b5:aa:01:0e
rk3-N5k-1(config-zone)# member pwwn 50:06:01:63:3c:e0:1b:2b→ WWPN of SP-A3
rk3-N5k-1(config-zone)# member pwwn 50:06:01:68:3c:e0:1b:2b→ WWPN of SP-B0
rk3-N5k-1(config-zone)# exit
rk3-N5k-1(config)# zone
zone                    zone-attribute-group   zoneset
rk3-N5k-1(config)# zoneset name WebLogic1 vsan 8→ Add zoneset name
rk3-N5k-1(config-zoneset)# member b230-WebLogic1-vhba0→ Add zone in zoneset
rk3-N5k-1(config-zoneset)# zoneset activate name WebLogic1 vsan 8→ activate zoneset
rk3-N5k-1(config)# copy r s

rk3-N5k-1(config)# show zoneset active vsan 8
zoneset name WebLogic1 vsan 8
  zone name sql vsan 8
  * fcid 0x9b01ef [pwwn 50:06:01:68:3c:e0:1b:2b]
  * fcid 0x9b0000 [pwwn 20:00:58:8d:09:0f:2b:20]
  * fcid 0x9b02ef [pwwn 50:06:01:63:3c:e0:1b:2b]
```

```
zone name b230-WebLogic1-vhba0 vsan 8→ Active zoneset
  * fcid 0x9b02ef [pwwn 50:06:01:63:3c:e0:1b:2b]
  * fcid 0x9b01ef [pwwn 50:06:01:68:3c:e0:1b:2b]
  * fcid 0x9b0005 [pwwn 20:00:00:25:b5:aa:01:0e]
```

The addition of WWPN of vhba1 and Storage ports SP-A0 and SP-B0 has to be done for N5K2.

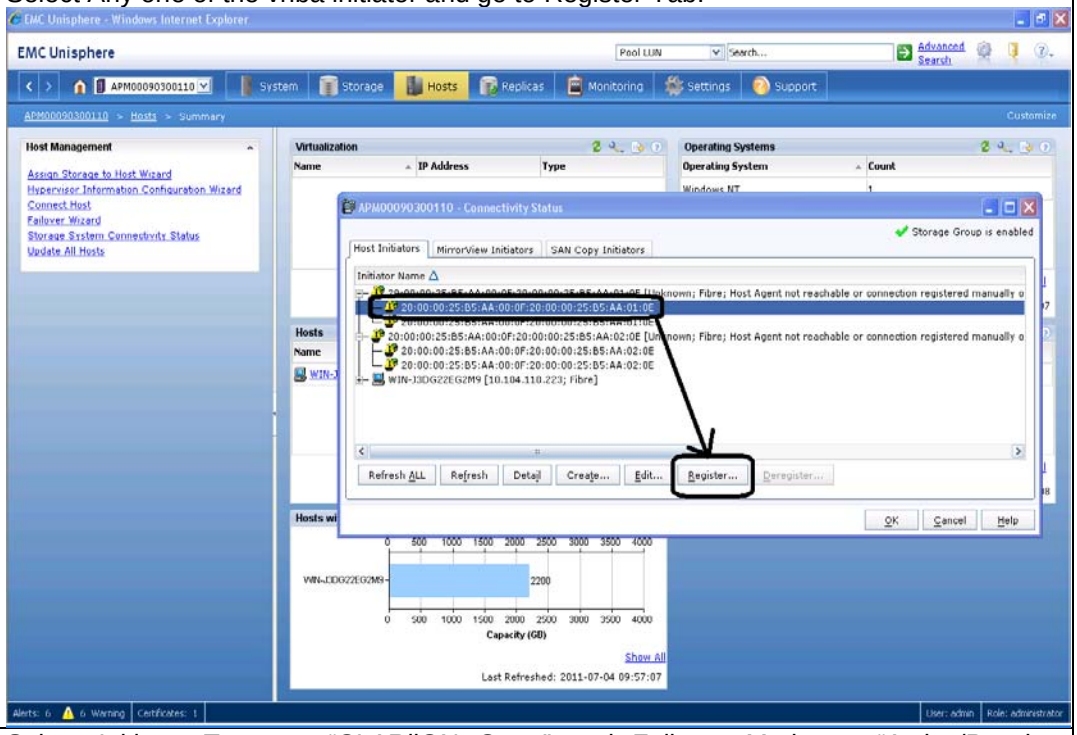
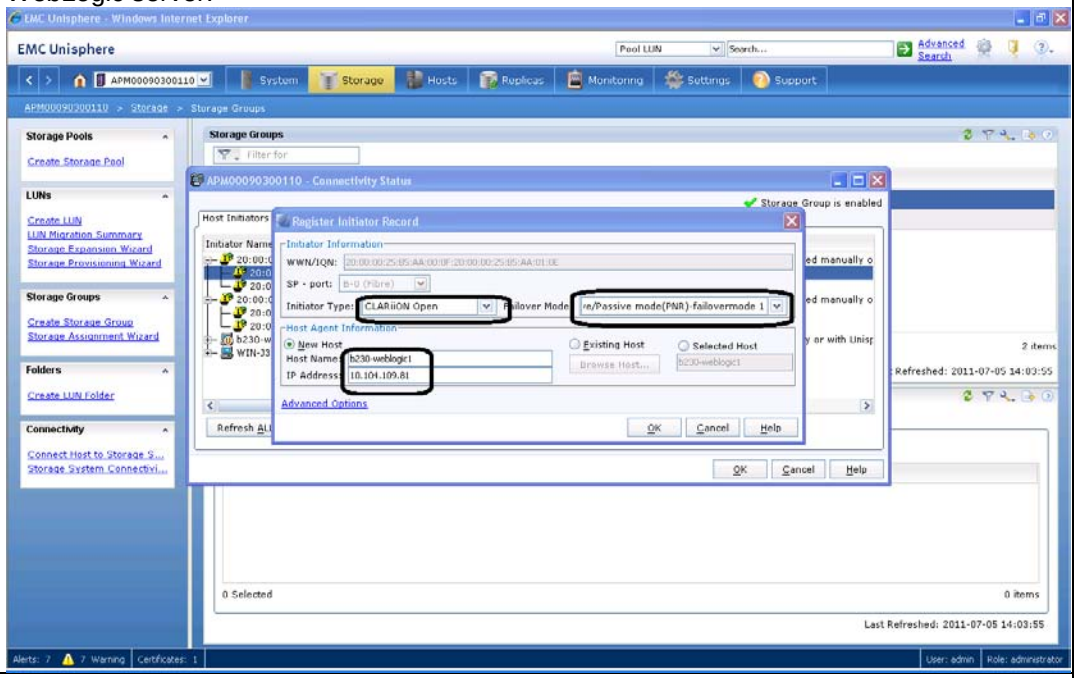
```
N5K2 configuration

rk3-N5K-2# show zoneset active vsan 8
zoneset name WebLogic1 vsan 8
  zone name sql vsan 8
  * fcid 0x440000 [pwwn 20:00:58:8d:09:0f:2b:1f]
  * fcid 0x4401ef [pwwn 50:06:01:60:3c:e0:1b:2b]
  * fcid 0x4402ef [pwwn 50:06:01:6b:3c:e0:1b:2b]

zone name b230-WebLogic1-vhba1 vsan 8
  * fcid 0x4401ef [pwwn 50:06:01:60:3c:e0:1b:2b]→ WWPN of SP-A0
  * fcid 0x4402ef [pwwn 50:06:01:6b:3c:e0:1b:2b]→ WWPN of SP-B3
  * fcid 0x440003 [pwwn 20:00:00:25:b5:aa:02:0e]→ WWPN of vhba1
```

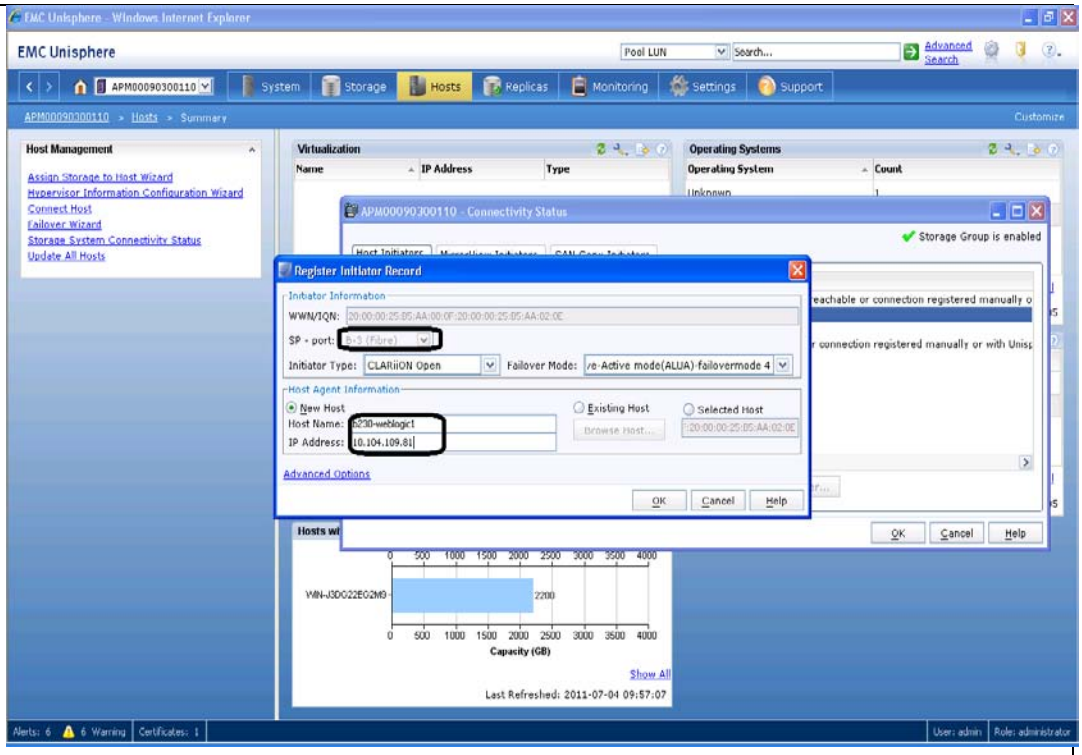
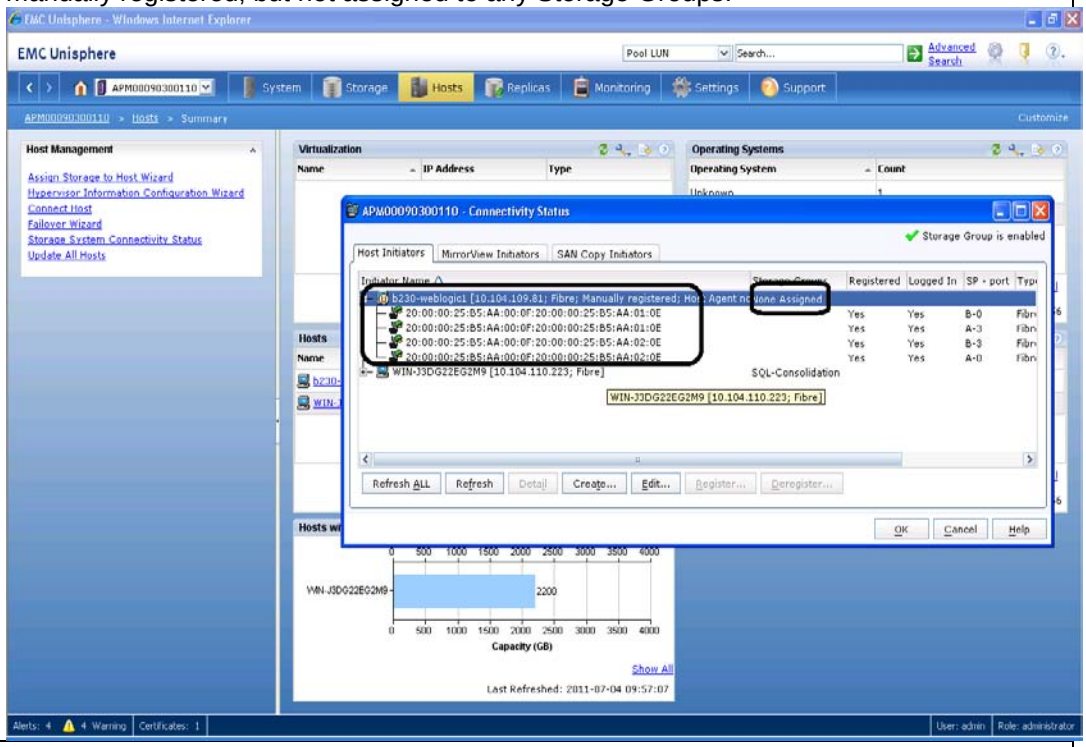
When the zone is configured, you can view the both VHBA's (vhba0&vhba1) of B230 WebLogic server logged in Storage Array.

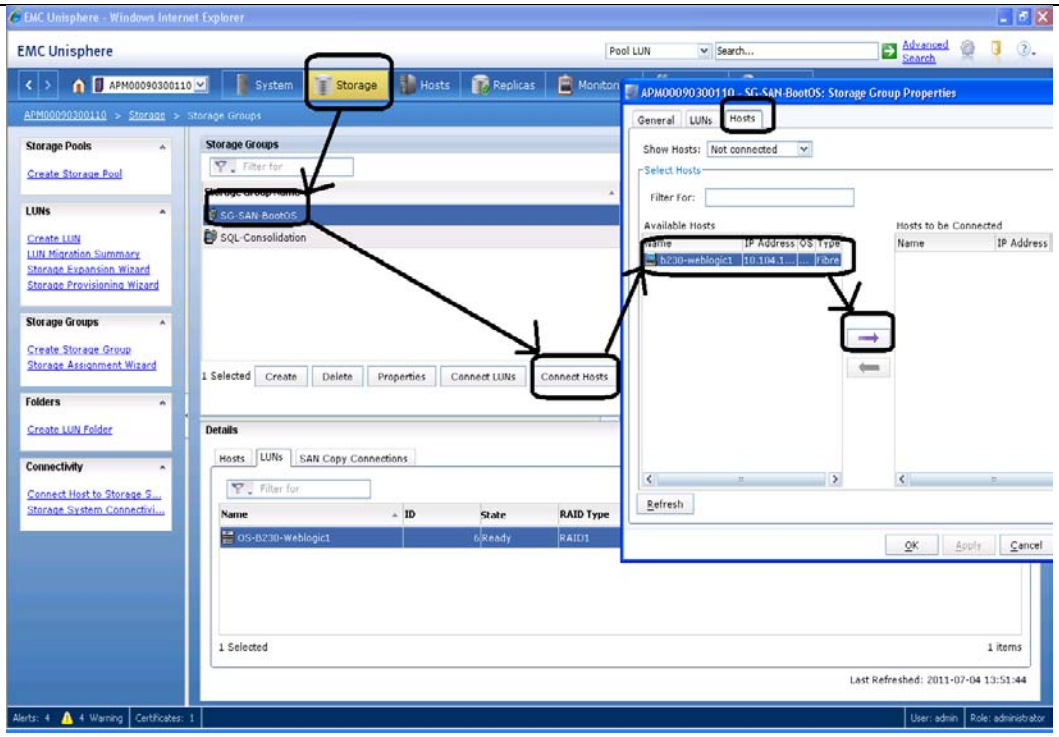
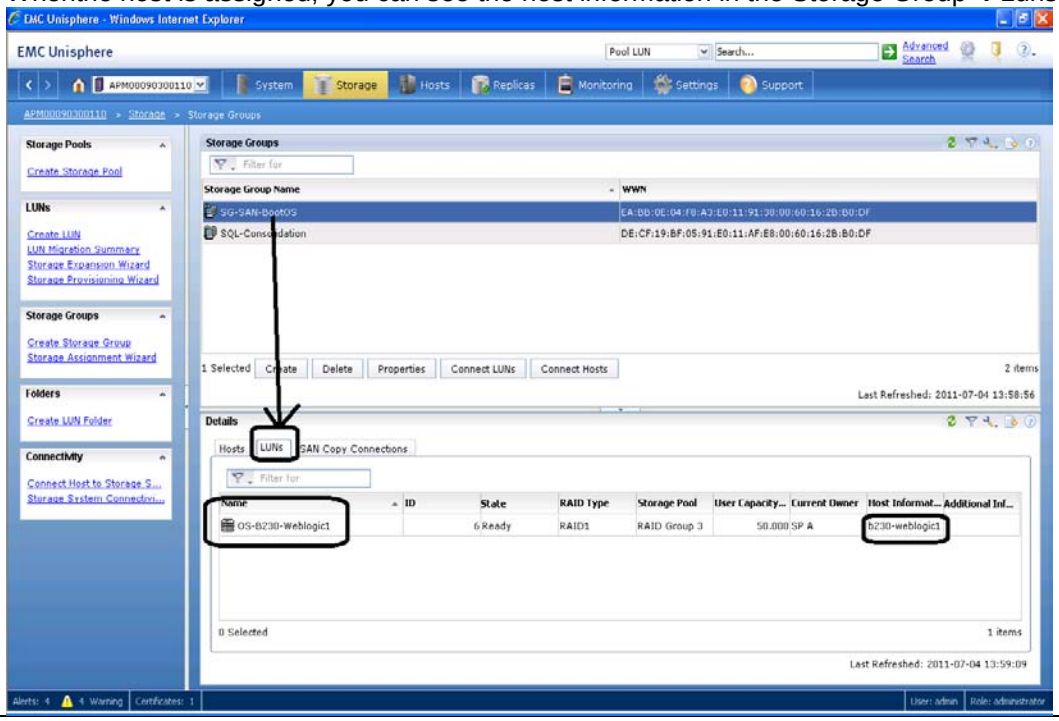


4.3.4 Host Registration on Storage

When the login status of the Cisco UCS B230 server is verified on Storage array, register the host to the server vhba initiators.

Tasks #	Task Description
1.	Select Any one of the vhba initiator and go to Register Tab. 
2.	Select Initiator Type as “CLARiiON Open” and Failover Mode as “Active/Passive mode(PNR)-failovermode 1”. Define hostname and IP address to be allocated to the WebLogic server. 
3.	Register the other vhbaWWPN with the same host and IP address. Select same Failover Mode as “Active/Passive mode(PNR)-failovermode 1”

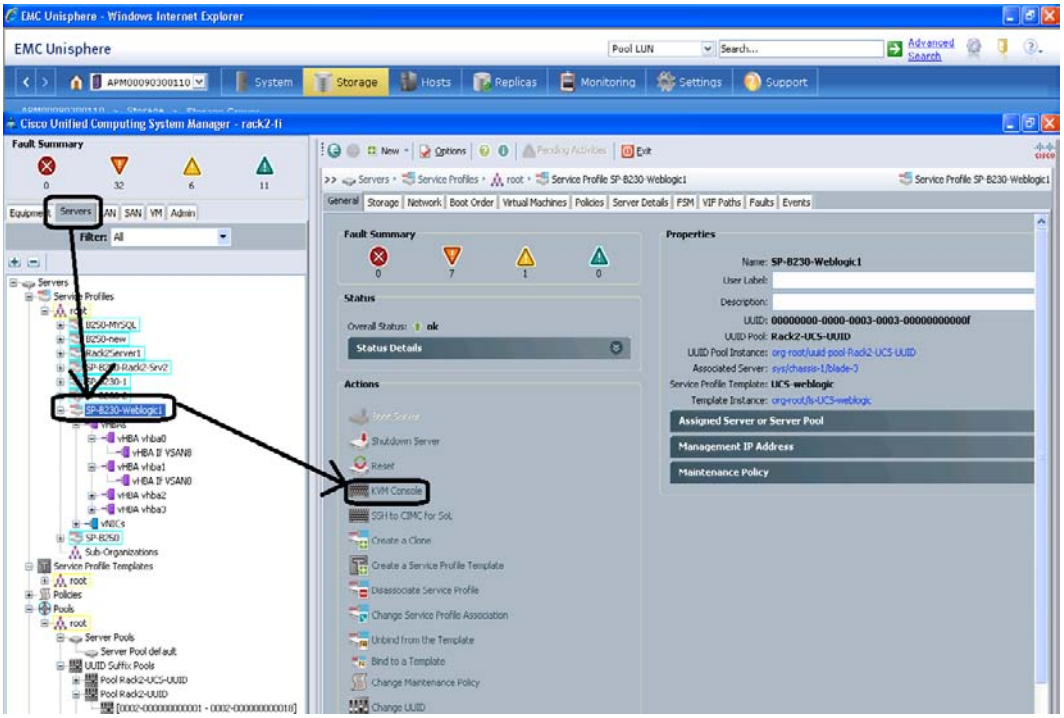
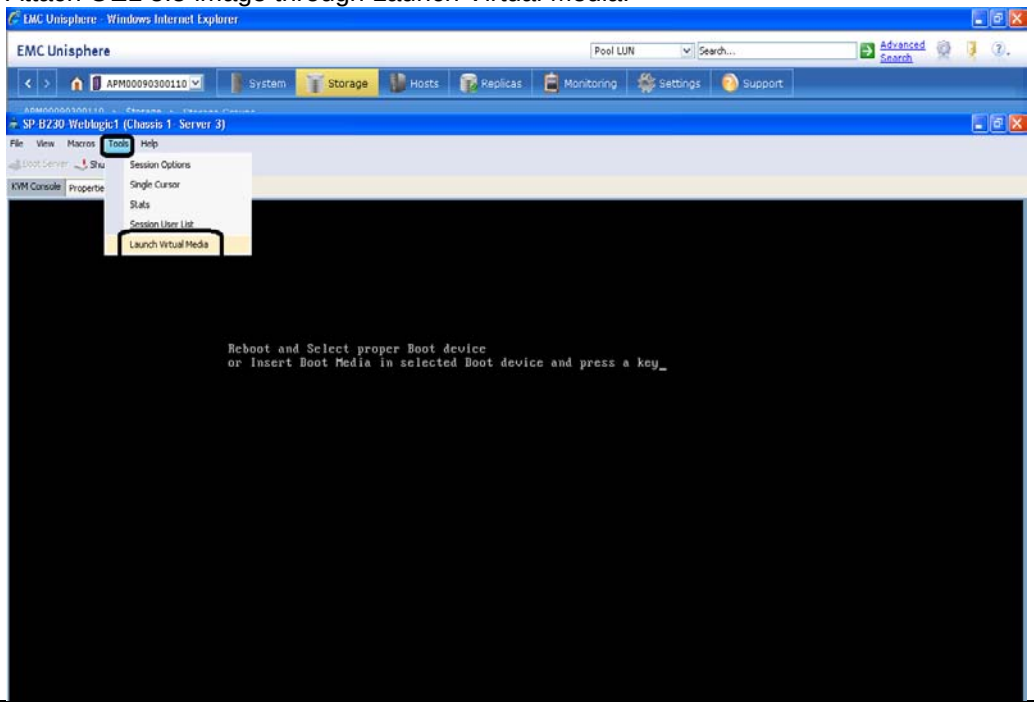
	
4.	When the initiators are registered with the storage ports, you can see the new host manually registered, but not assigned to any Storage Groups. 
5.	You have already created a Storage Group, now you need to assign the created host “b230-WebLogic1” to the Storage Group.

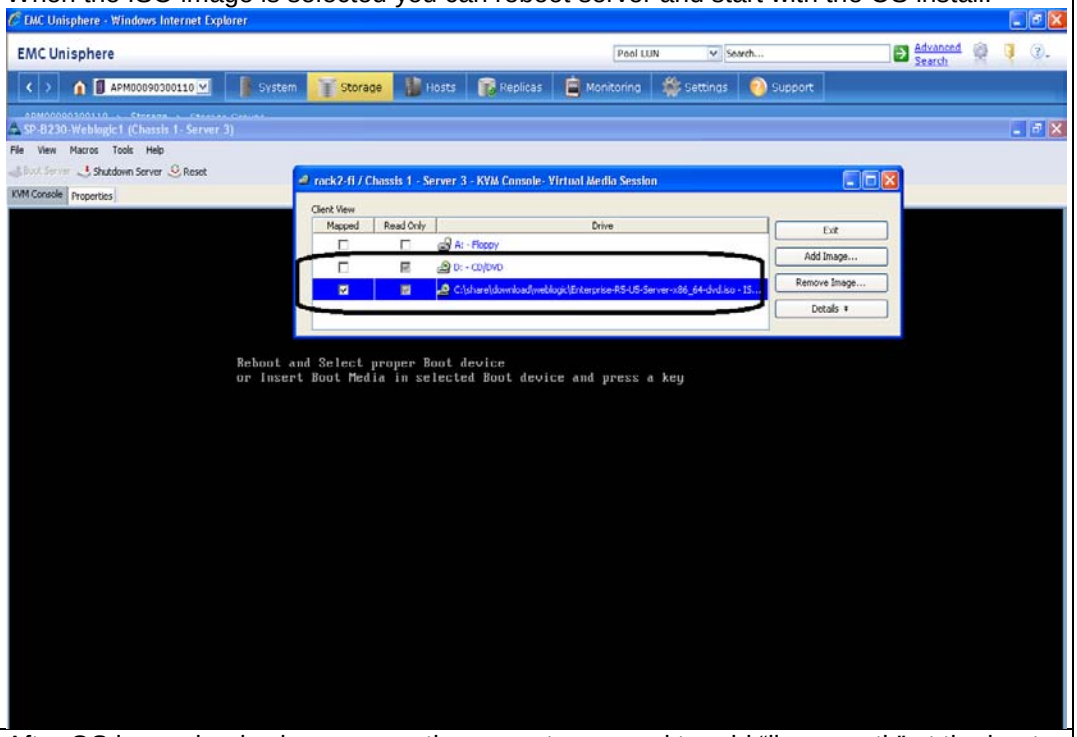
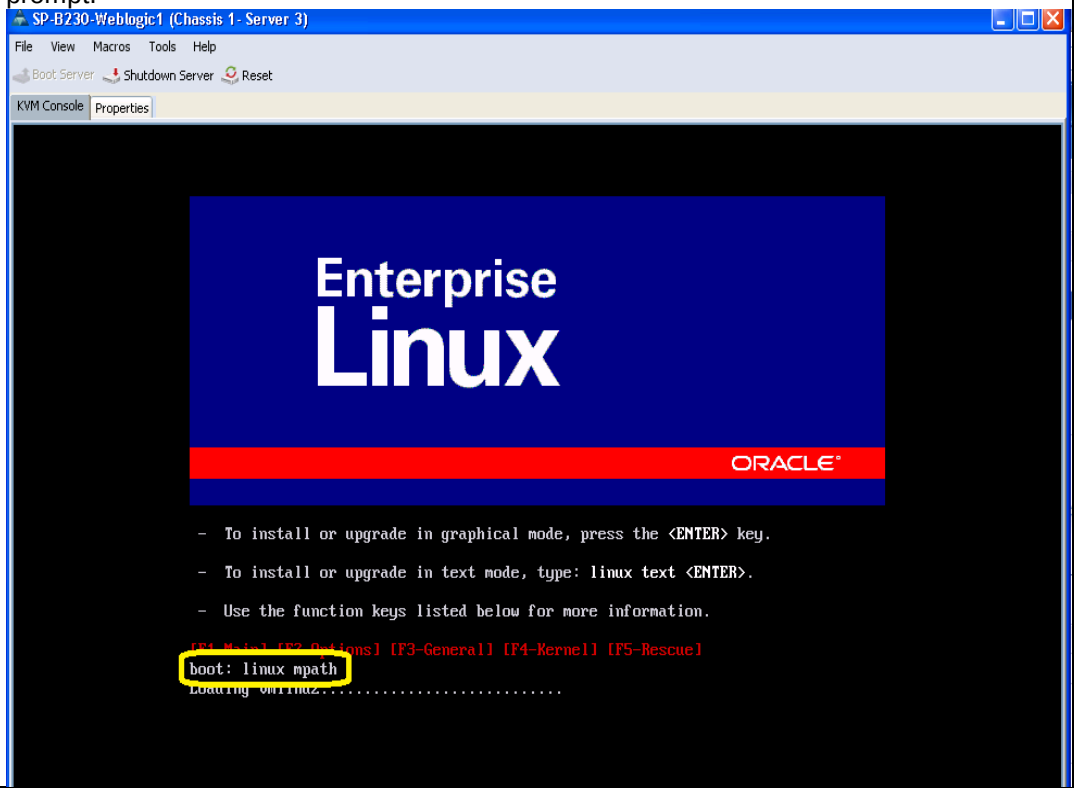
	
6.	Whenthe host is assigned, you can see the host information in the Storage Group →Luns 

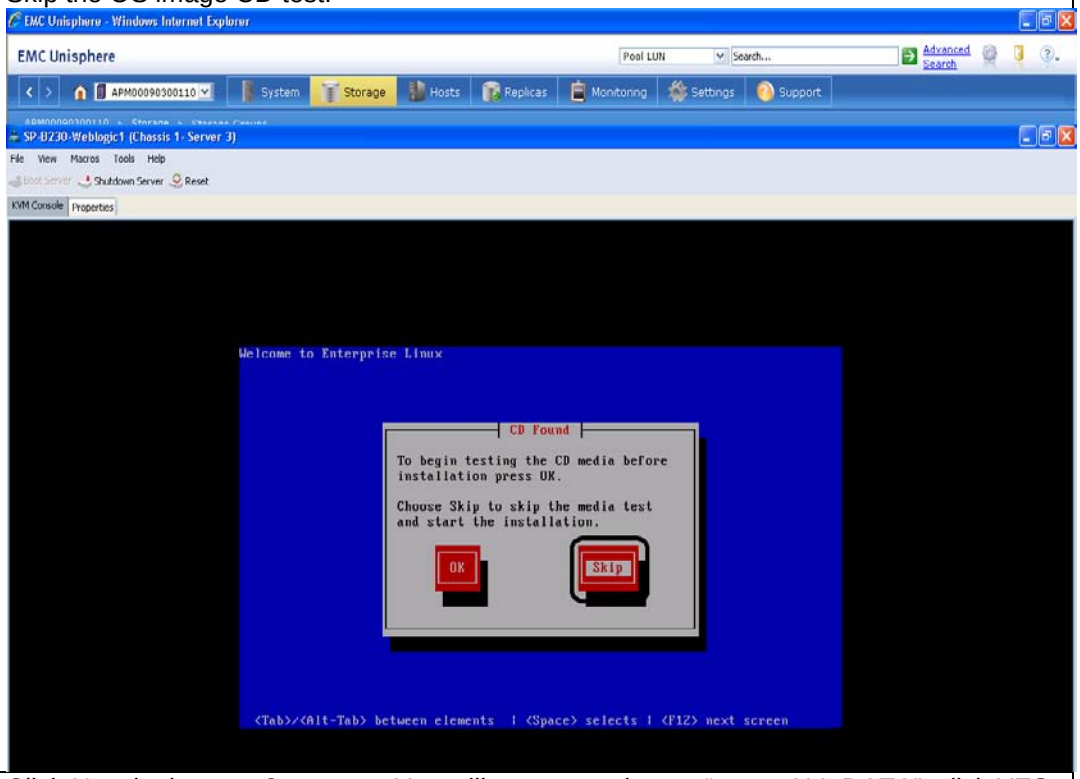
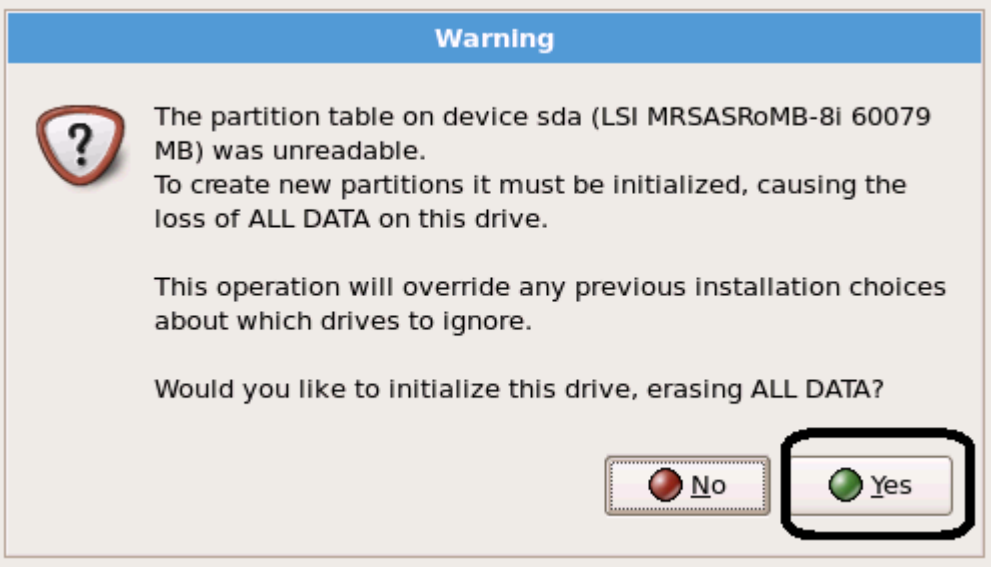
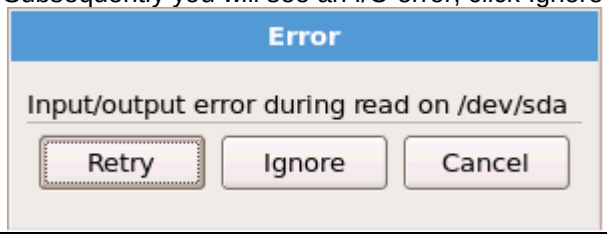
4.4 OEL installation on SAN

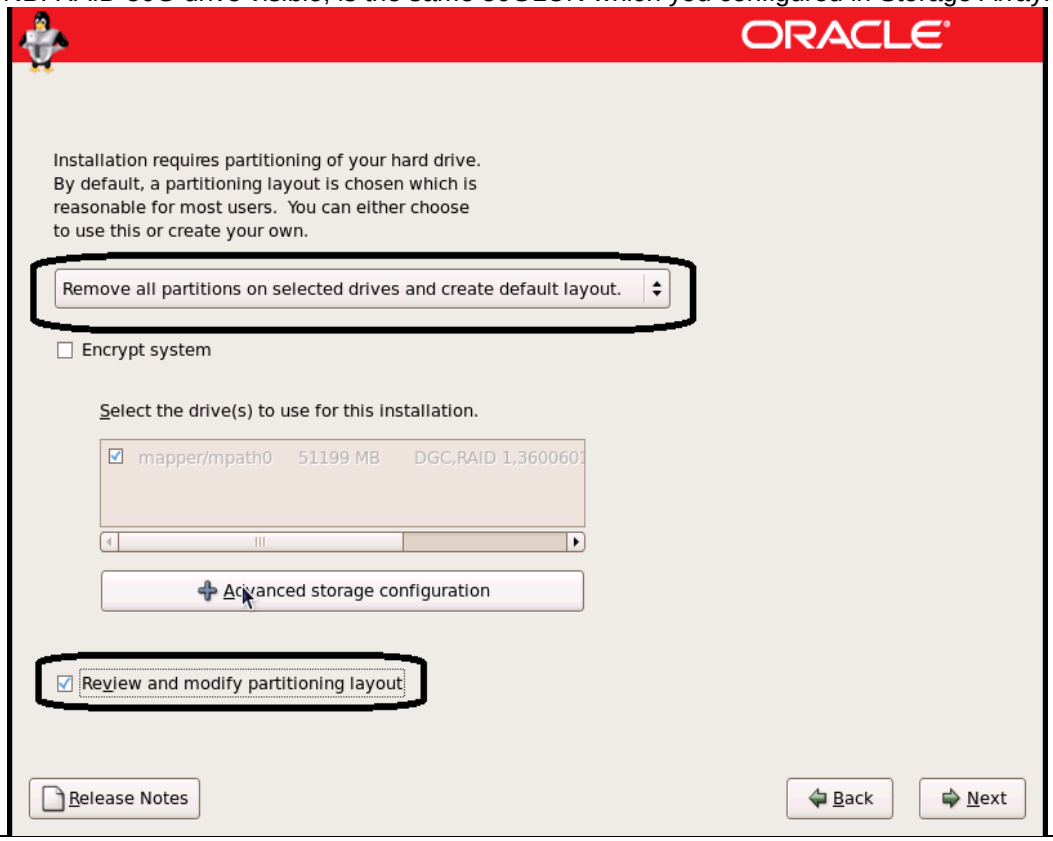
When the SAN and Service Profile configuration for Boot from SAN is completed, start the OEL installation process.

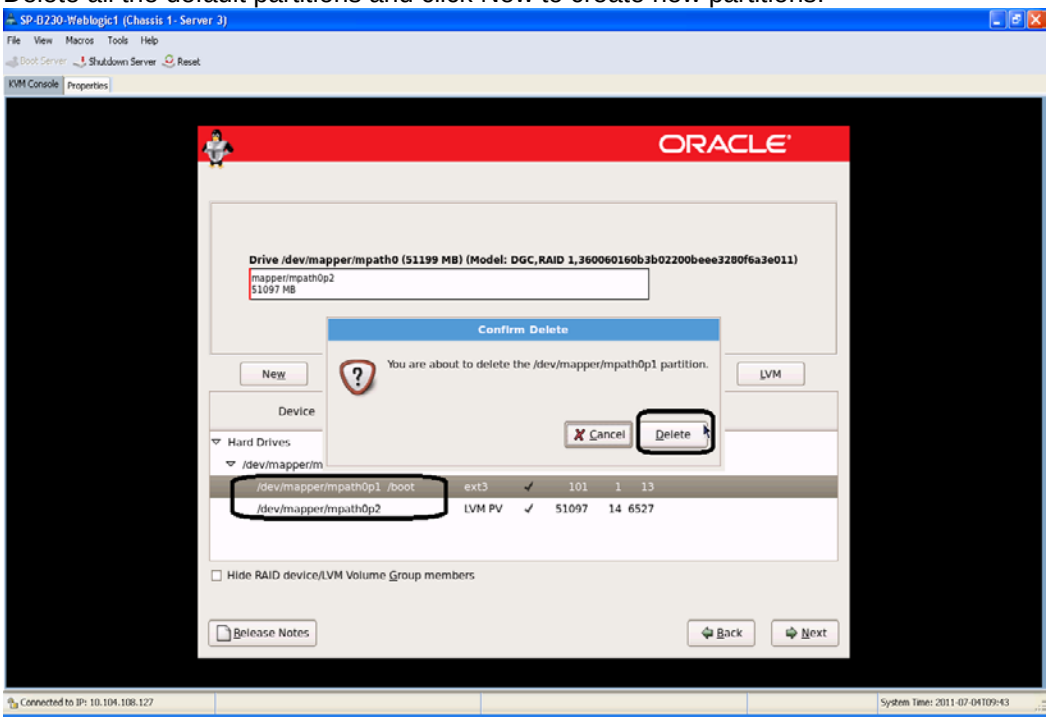
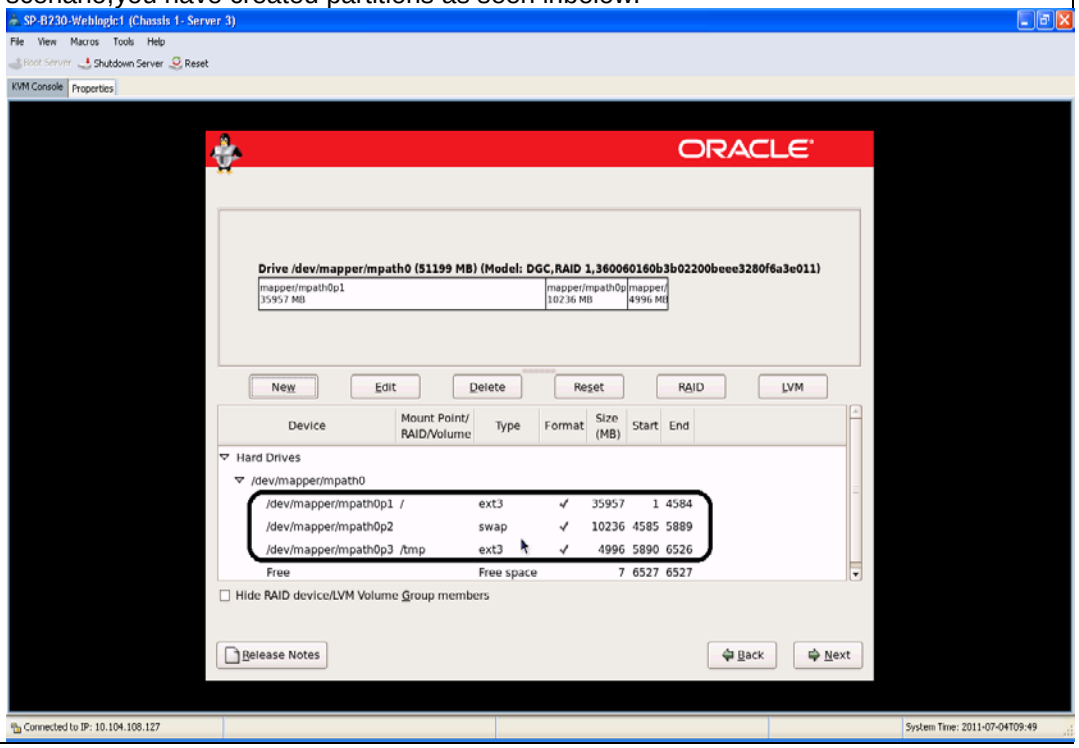
Tasks #	Task Description

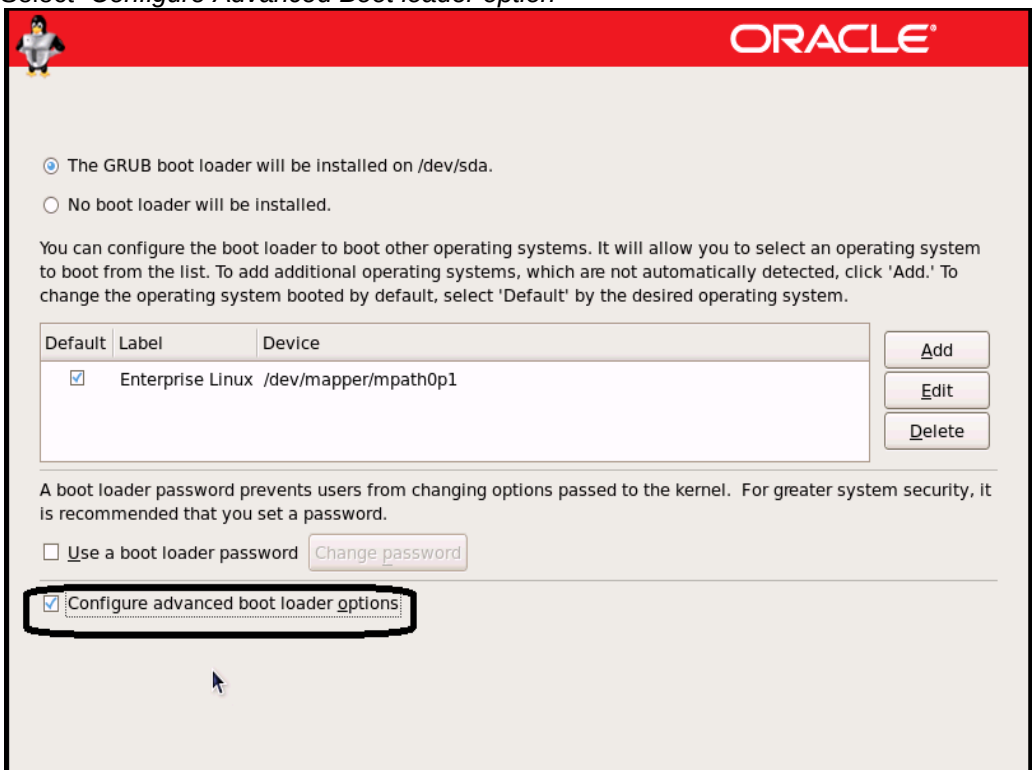
1.	Go to UCS Manager –> Service Profile and Connect to the server, through KVM Console. 
2.	Attach OEL 5.5 image through Launch Virtual Media. 

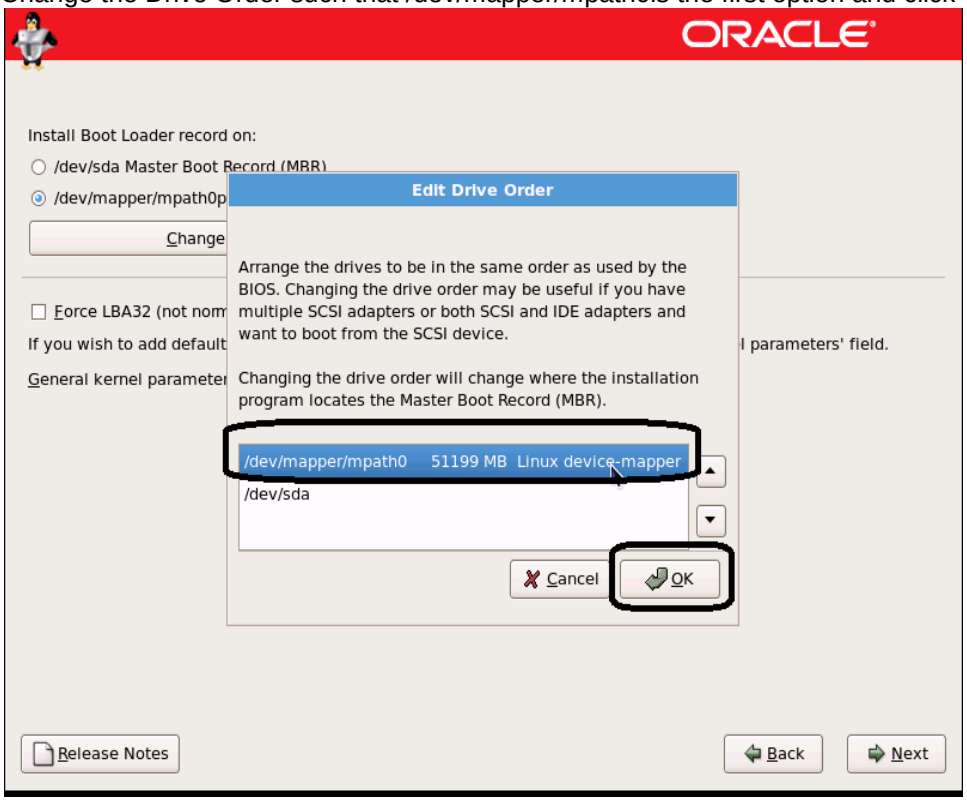
3.	When the ISO image is selected you can reboot server and start with the OS install. 
4.	After OS image load, whenyou see the prompt you need to add “linuxmpath” at the boot prompt. 

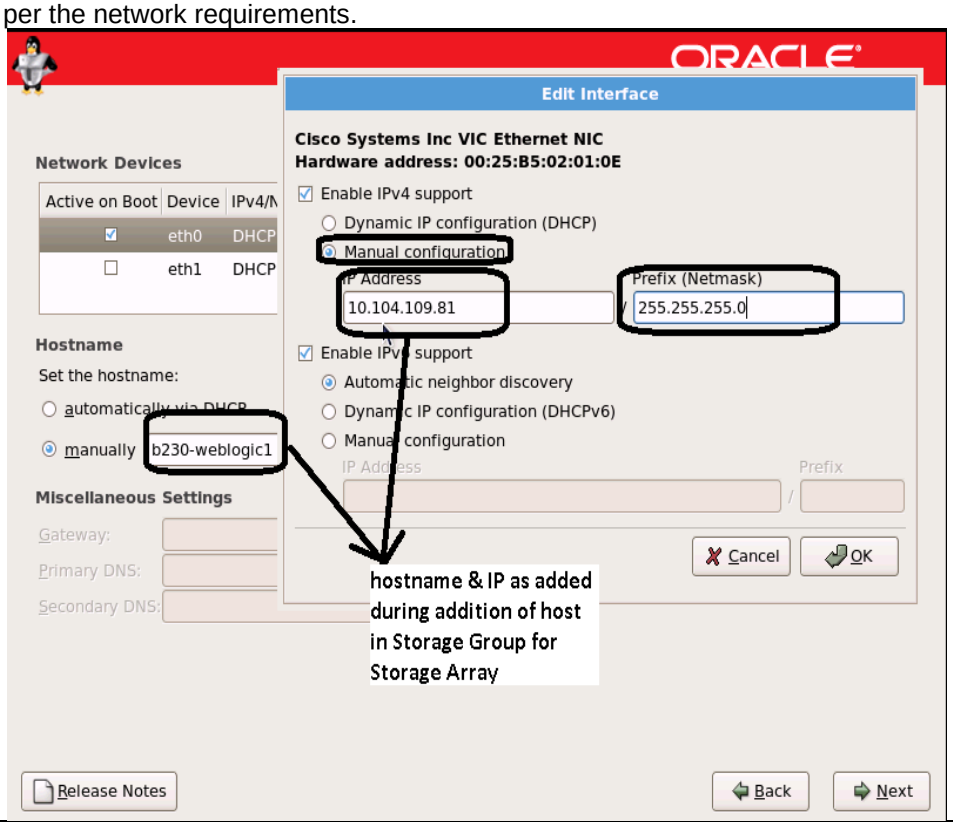
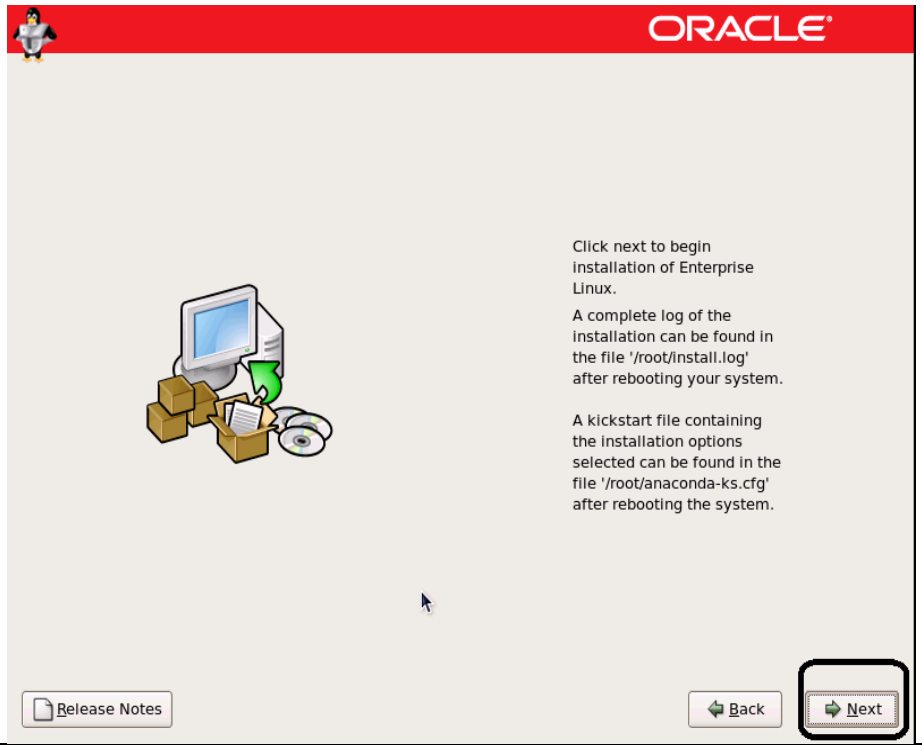
5.	Skip the OS image CD test. 
6.	Click Next in the next 2 screens. You will see a warning to “erase ALL DATA”, click YES and continue. 
7.	Subsequently you will see an I/O error; click Ignore and continue. 

8.	In the next screen , Select "*Remove all partitions on selected drives and create default layout*" Select "*Review and modify partitioning layout*" If at all /dev/sda (mapped to HDD) is selected , just uncheck that and go to Next Screen. NB: RAID 50G drive visible, is the same 50GLUN which you configured in Storage Array. 

9.	Delete all the default partitions and click New to create new partitions. 
10.	New partitions can be created per the deployment requirements, in the present scenario,you have created partitions as seen inbelow. 

11.	Select "*Configure Advanced Boot loader option*" 
12.	On the next screen , Select the mpath which you configured during disk partitioning configuration and go to "*Change Drive Order*" 

13.	Change the Drive Order such that /dev/mapper/mpath0is the first option and click OK. 

14.	In the network devices screen, add the IP and hostname which you added in SAN Configuration during addition of host to Storage Group. Add Gateway and Primary DNS per the network requirements. 
15.	Change Time Zone, configure OEL password and customize default software packages. Start the OEL installation. 

16.	WhenOEL installation completes, you can restart which would boot the OEL5.5from SAN.

4.5 WebLogic11gR1 installation

Whenthe OEL5.5 boot from SAN is completed, start the installation of Oracle WebLogic Server. The WebLogic Server installation is as follows:

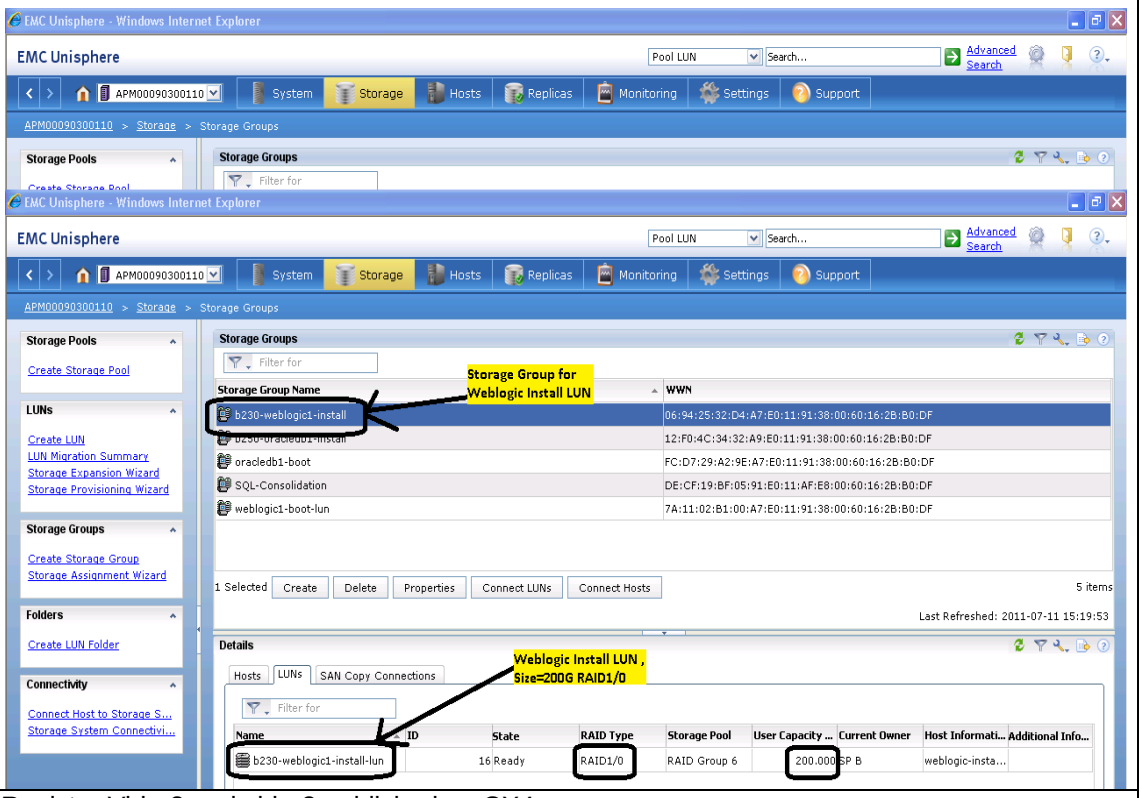
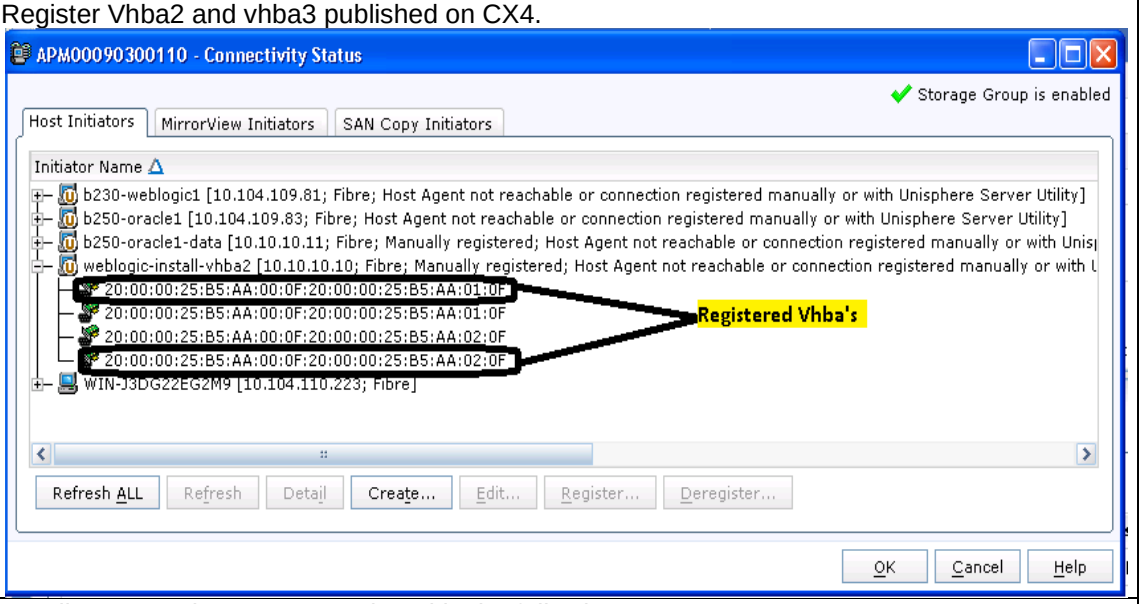
- Configuration of WebLogic install LUN on CX4
- JRockit 64 bit installation
- Oracle WebLogic Server base install
- Cluster Configuration

4.5.1 Configuration of WebLogic Install LUN on CX4

In the this setup, you have configured vhba0&vhba1 with Storage Group of CX4 having SAN Boot LUN and vhba2 and vhba3 with Storage Group of CX4 having WebLogic install LUN.

The procedure to configure the same, is detailed in the subsequent table:

Tasks #	Task Description
1.	WWPN of vhba2 and vhba3 are zoned in clustered Nexus 5010 **For N5K1** **rk3-N5k-1#** sh zoneset active vsan 8 zoneset name WebLogic1 vsan 8 **zone name b230-WebLogic1-vhba0 vsan 8→ OS install** * fcid 0x9b02ef [pwwn 50:06:01:63:3c:e0:1b:2b] * fcid 0x9b01ef [pwwn 50:06:01:68:3c:e0:1b:2b] * **fcid 0x9b0005 [pwwn 20:00:00:25:b5:aa:01:0e]** **zone name b230-WebLogic1-data-vhba2 vsan 8→WebLogic Install** * **fcid 0x9b0006 [pwwn 20:00:00:25:b5:aa:01:0f]** * fcid 0x9b02ef [pwwn 50:06:01:63:3c:e0:1b:2b] * fcid 0x9b01ef [pwwn 50:06:01:68:3c:e0:1b:2b] **For N5K2** **rk3-N5K-2#** sh zoneset active vsan 8 zoneset name WebLogic1 vsan 8 **zone name b230-WebLogic1-vhba1 vsan 8→ OS install** * fcid 0x4401ef [pwwn 50:06:01:60:3c:e0:1b:2b] * fcid 0x4402ef [pwwn 50:06:01:6b:3c:e0:1b:2b] *** fcid 0x440003 [pwwn 20:00:00:25:b5:aa:02:0e]** **zone name b230-WebLogic1-data-vhba3 vsan** 8**→WebLogic Install** * fcid 0x440004 [pwwn 20:00:00:25:b5:aa:02:0f] * fcid 0x4402ef [pwwn 50:06:01:6b:3c:e0:1b:2b] * **fcid 0x4401ef [pwwn 50:06:01:60:3c:e0:1b:2b]**

2.	Add WebLogic install LUN to Storage Group. 
3.	Register Vhba2 and vhba3 published on CX4. 
4.	Install EMC NaviAgent as mentioned in the following steps i. Edit the linux hosts file (/etc/hosts) with weblogic server hostname and IP ii. Install EMC NaviAgent `rpm -ivh NaviHostAgent-Linux-64-x86-en_US-6.29.6.0.35-1.x86_64.rpm` iii. verify HostIDFile.txt is created under /var/log with the server IP populated in the mentioned file

5.	Install EMC power path and mount WebLogic install LUN on server.

```
[root@b230-weblogic1 ~]# powermt display dev=all
Pseudo name=emcpowerb
CLARiiON ID=APM00090300110 [weblogic1-boot-lun]
Logical device ID=60060160B3B0220008CE391ED4A7E011 [b230-weblogic1-install-lun]
state=alive; policy=BasicFailover; priority=0; queued-IOs=0;
Owner: default=SP B, current=SP B       Array failover mode: 1
==============================================================================
--------------- Host ---------------   - Stor -   -- I/O Path --  -- Stats ---
###  HW Path               I/O Paths    Interf.   Mode    State   Q-IOs Errors
==============================================================================
   0 fnic                    sdd       SP A3     unlic   alive       0      0
   0 fnic                    sdf       SP B0     unlic   alive       0      0
   1 fnic                    sdl       SP B3     active  alive       0      0
   1 fnic                    sdn       SP A0     active  alive       0      0

Pseudo name=emcpowera
CLARiiON ID=APM00090300110 [weblogic1-boot-lun]
Logical device ID=60060160B3B02200BEEE3280F6A3E011 [OS-B230-Weblogic1]
state=alive; policy=BasicFailover; priority=0; queued-IOs=0;
Owner: default=SP A, current=SP A       Array failover mode: 1
==============================================================================
--------------- Host ---------------   - Stor -   -- I/O Path --  -- Stats ---
###  HW Path               I/O Paths    Interf.   Mode    State   Q-IOs Errors
==============================================================================
   0 fnic                    sdc       SP A3     unlic   alive       0      0
   0 fnic                    sde       SP B0     unlic   alive       0      0
   1 fnic                    sdk       SP B3     active  alive       0      0
   1 fnic                    sdm       SP A0     active  alive       0      0

[root@b230-WebLogic1 ~]# df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup00-LogVol00
                       25G  5.6G   18G  25% /
/dev/mapper/mpath0p1   99M   17M   78M  18% /boot
tmpfs                  63G     0   63G   0% /dev/shm
/dev/emcpowerb1       197G  408M  187G   1% /u01
[root@b230-WebLogic1 ~]#
```

4.5.2 JRockit 64-bit Installation

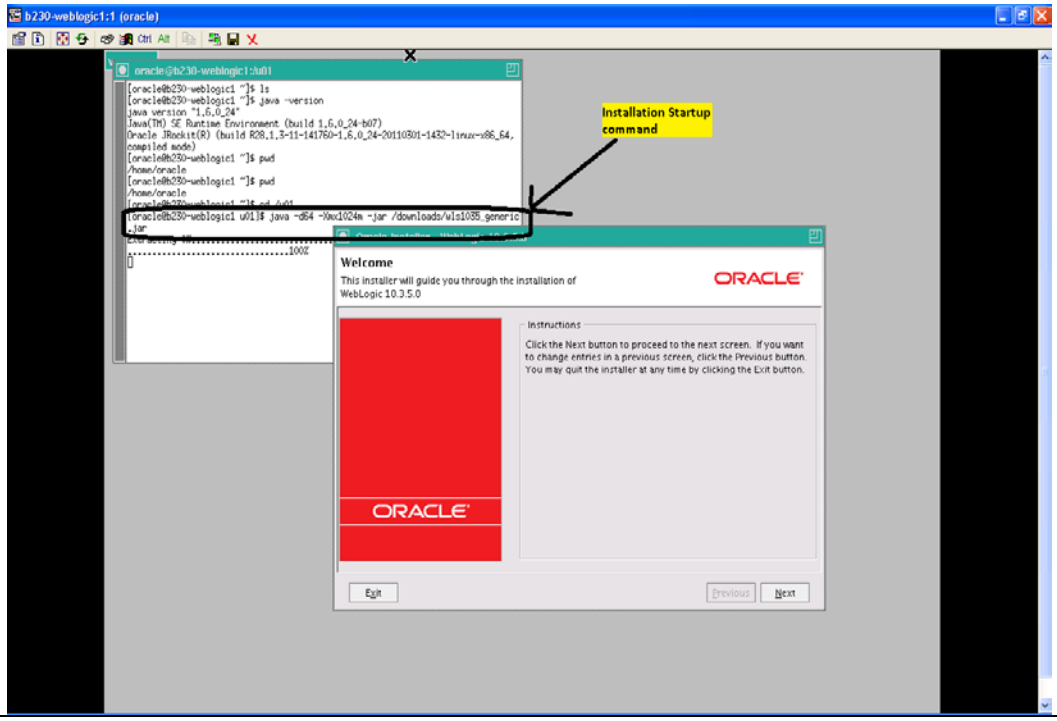
Install 64 bit JVM. (WebLogic Installation recommends JRockit for production deployment of Oracle WebLogic Server).

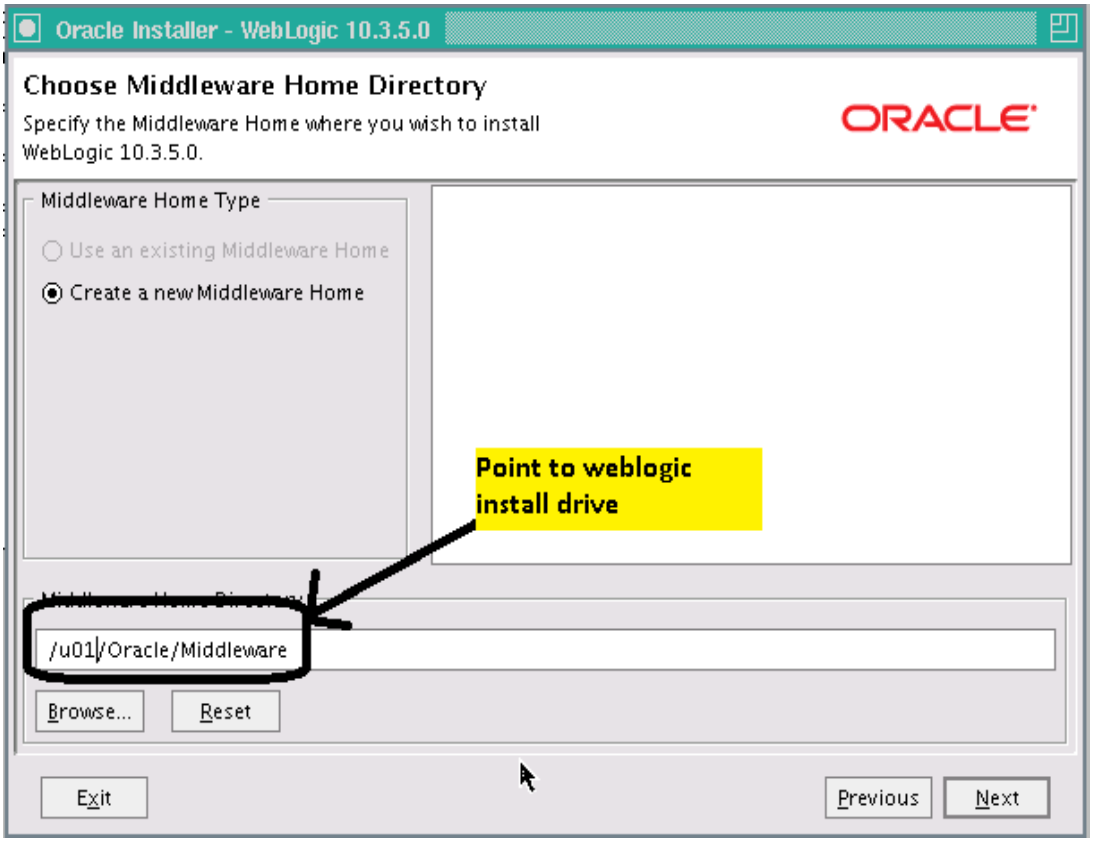
```
[root@b230-WebLogic1 ~]# java -version
java version "1.6.0_24"
Java(TM) SE Runtime Environment (build 1.6.0_24-b07)
Oracle JRockit(R) (build R28.1.3-11-141760-1.6.0_24-20110301-1432-linux-x86_64, compiled mode)
```

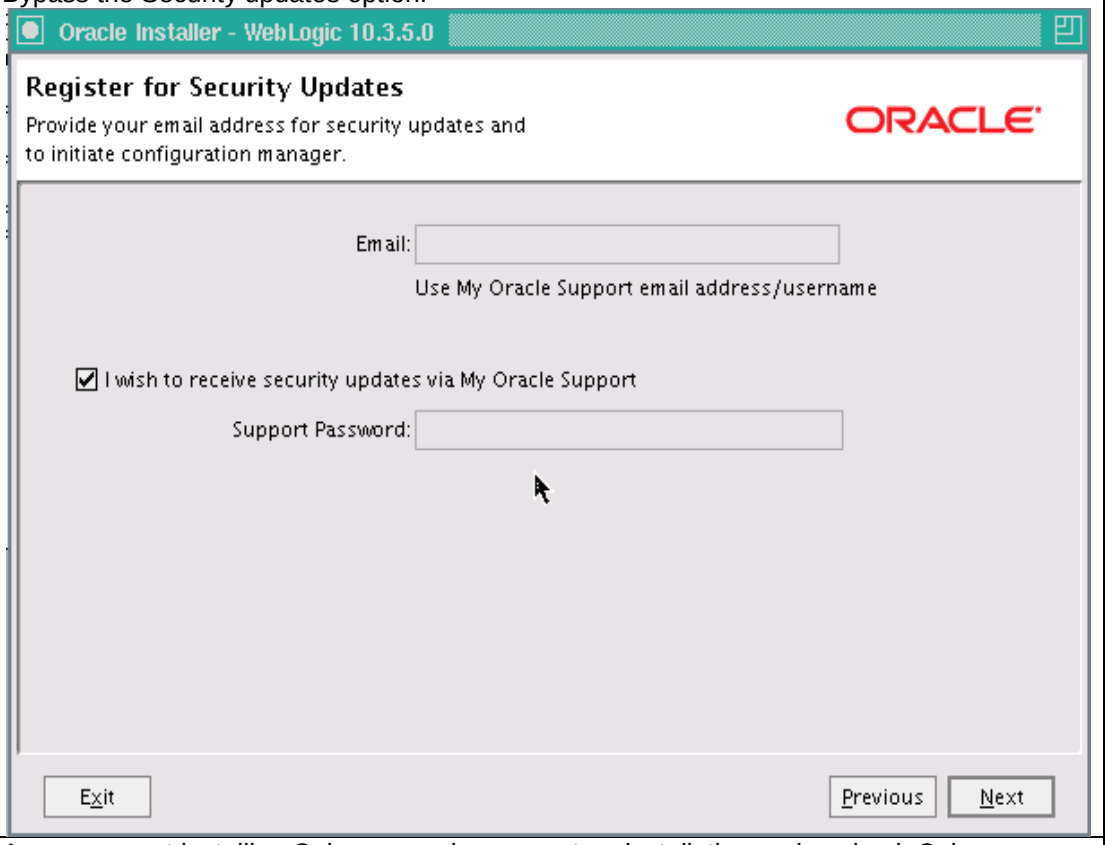
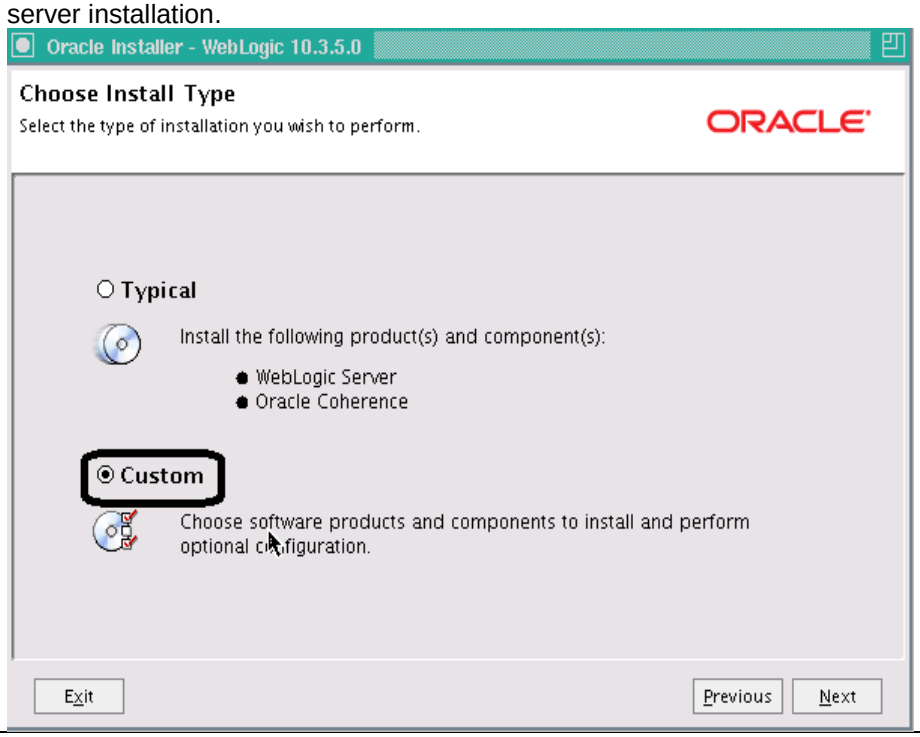
4.5.3 Oracle WebLogic Server Installation

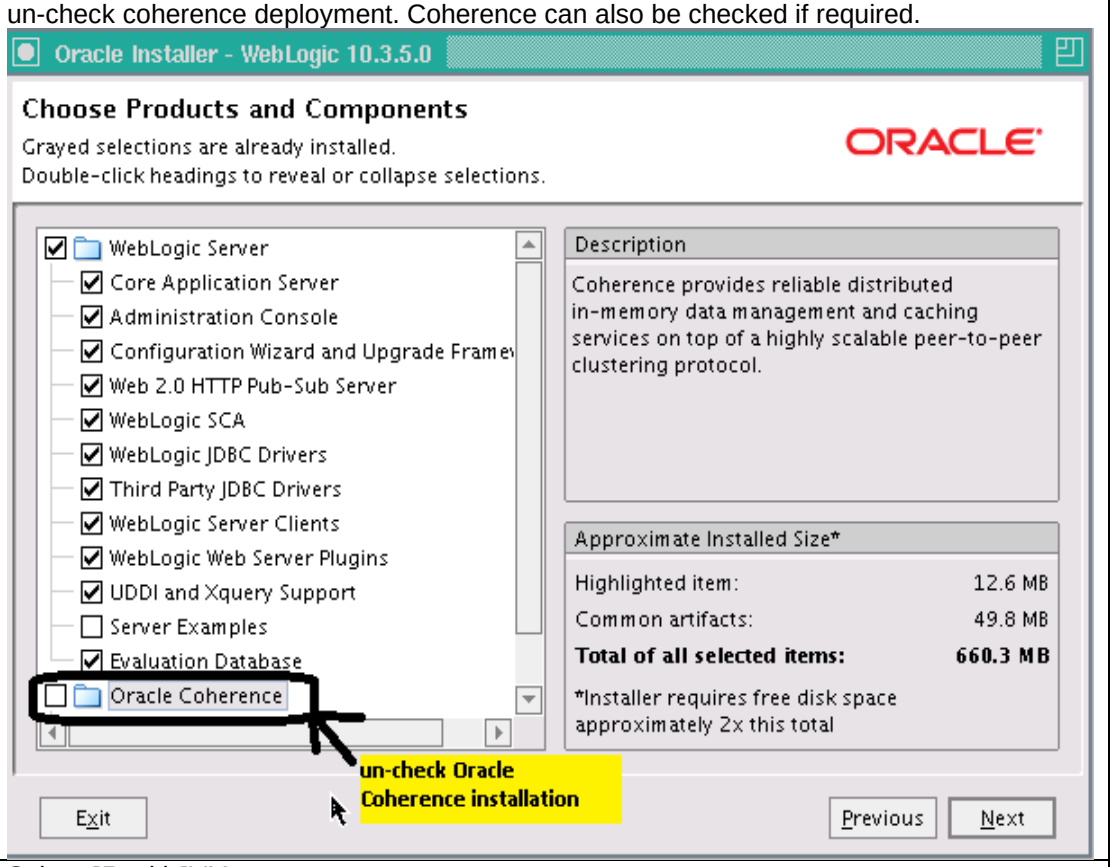
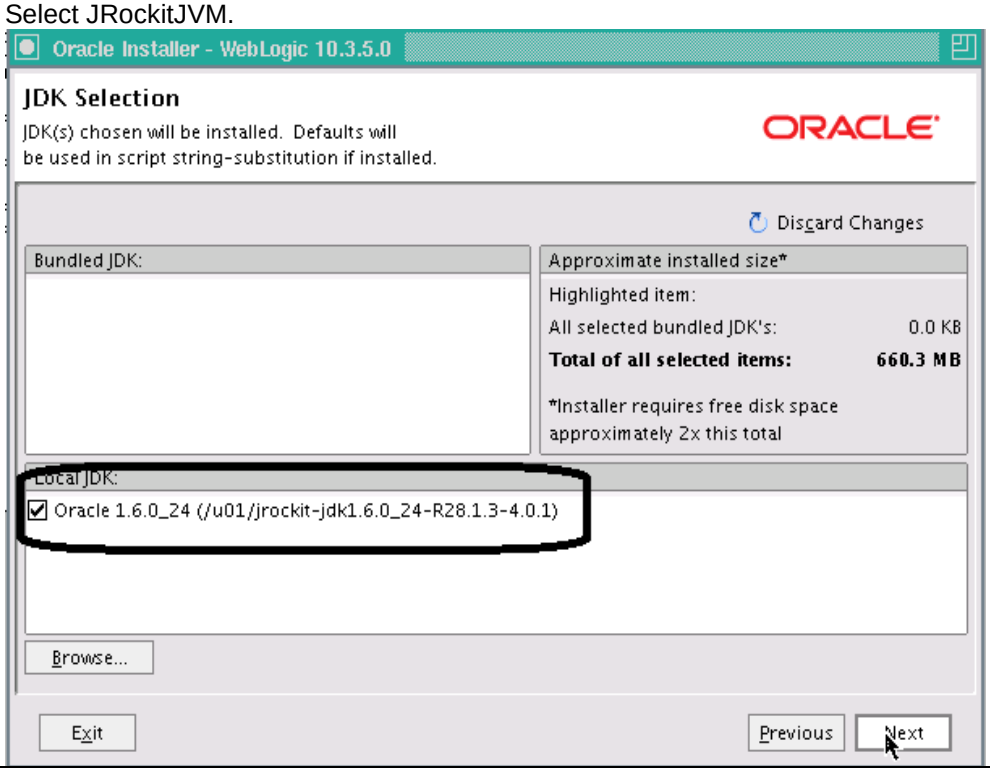
When the WebLogic Install LUN and 64-bit JRockitJVMis configured, install the Oracle WebLogic Server 10.3.5. In the this setup,a generic WebLogic installer (wls1035_generic.jar) was used, whichis compatible with 64 bit platforms.

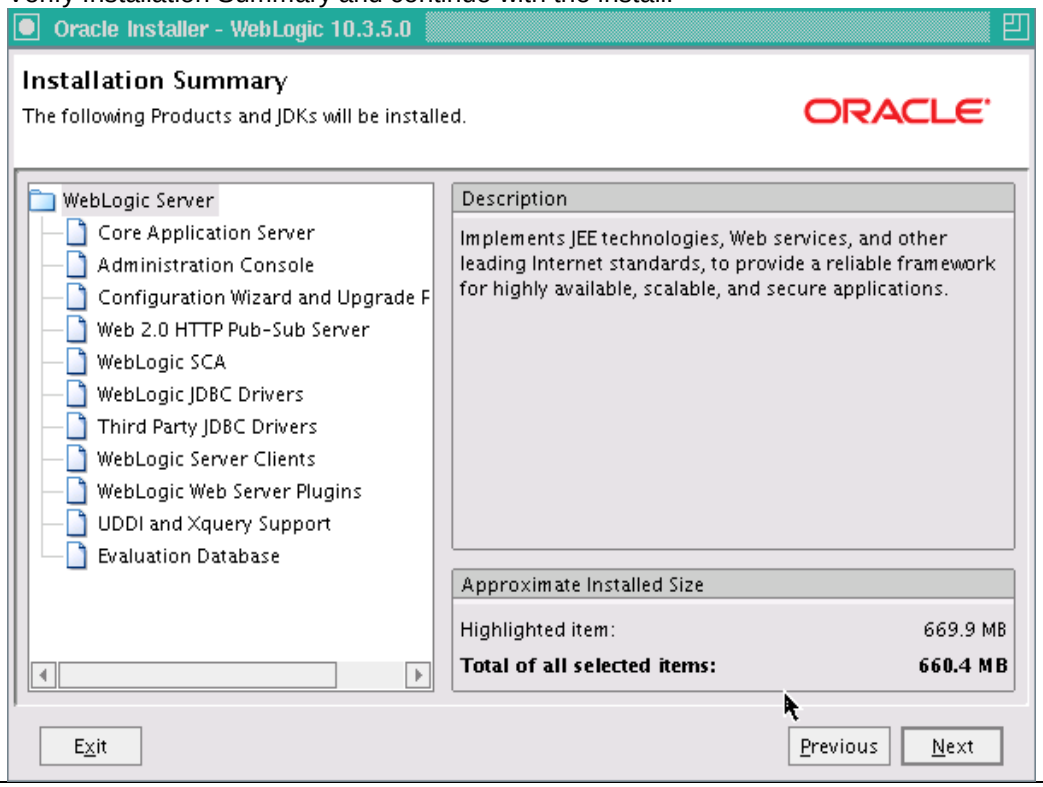
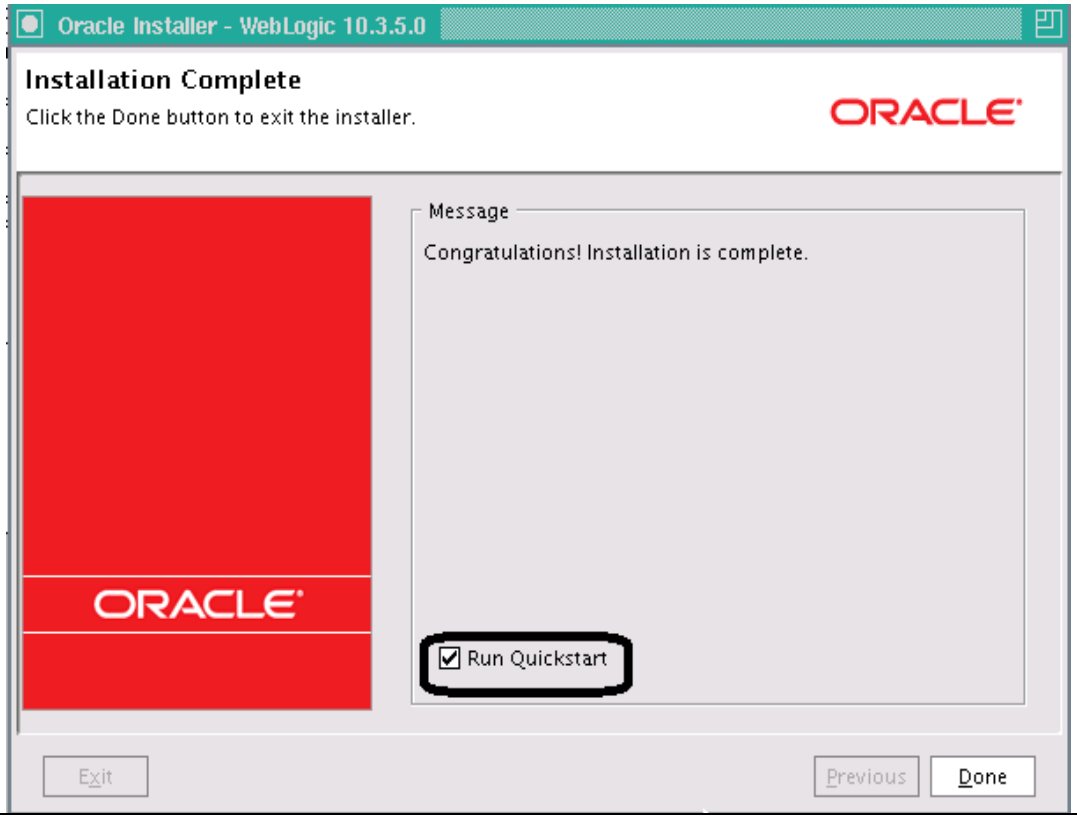
Tasks #	Task Description
1.	Create user: oracle under group : dba groupadddba -g 500 useradd oracle –u 501 –g 500 Use this user for WebLogic Server installation Change the installation directory user ownership chown -R oracle: /u01
2.	Start vncserver with user oracle [oracle@b230-WebLogic1 ~]$ vncserver You will require a password to access your desktops. Password: Verify: xauth: creating new authority file /home/oracle/.Xauthority New 'b230-WebLogic1:1 (oracle)' desktop is b230-WebLogic1:1 Creating default startup script /home/oracle/.vnc/xstartup Starting applications specified in /home/oracle/.vnc/xstartup Log file is /home/oracle/.vnc/b230-WebLogic1:1.log VNC enables to execute the Oracle WebLogic GUI installer

3.	Execute the installer with –d64 option [oracle@b230-WebLogic1u01]$ java -d64 -Xmx1024m -jar /downloads/wls1035_generic.jar 

4.	Define the WebLogic install directory. For example, configure a RAID1/0 LUN with vhba2&vhba3 mounted as /u01. 

5.	Bypass the Security updates option. 
6.	As you are not installing Coherence, choose custom installation and uncheck Coherence server installation. 

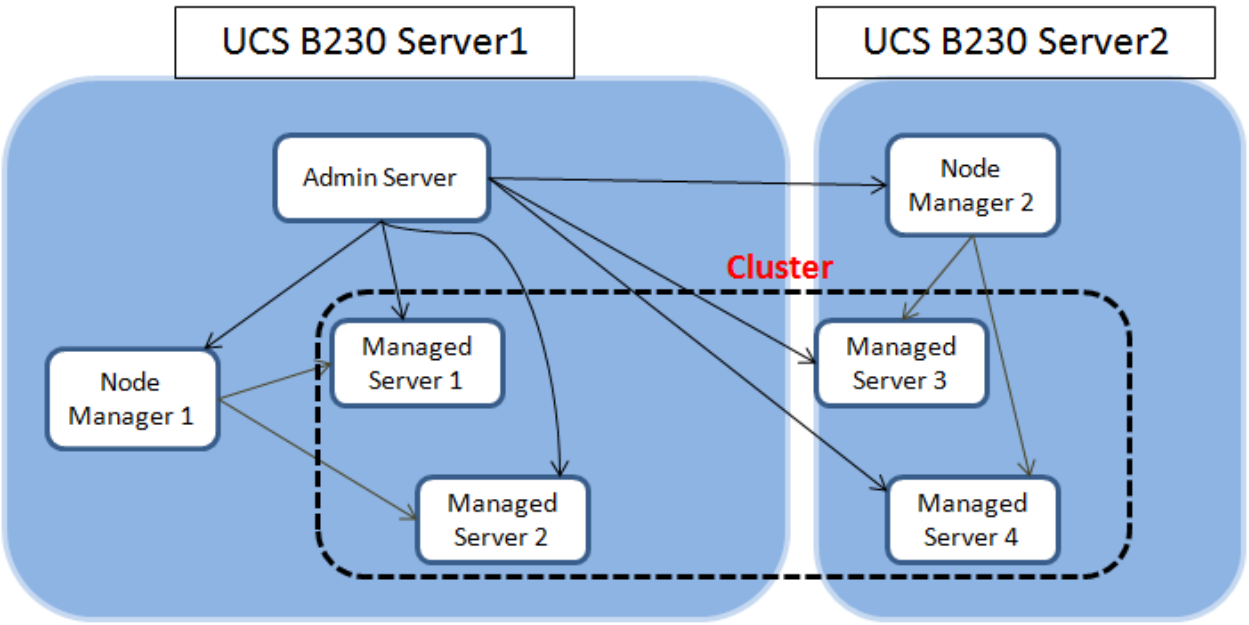
7.	In the present setup, we are demonstrating a WebLogic Cluster deployment and chose to un-check coherence deployment. Coherence can also be checked if required. 
8.	Select JRockitJVM. 

9.	Verify Installation Summary and continue with the install. 
10.	When you see the “Installation Complete” screen, check the Quick Start option and continue. This verifies the installation. 

4.5.4 Oracle WebLogic Cluster Configuration

In the previous section, we discussed the base installation of Oracle WebLogic Server 10.3.5. When the basic configuration is completed, you can start the quick start UI, which would enable you to configure WebLogic Admin Server, Node Manager and WebLogic domain which would include WebLogic Managed Servers.

Figure 19. Cluster Configuration

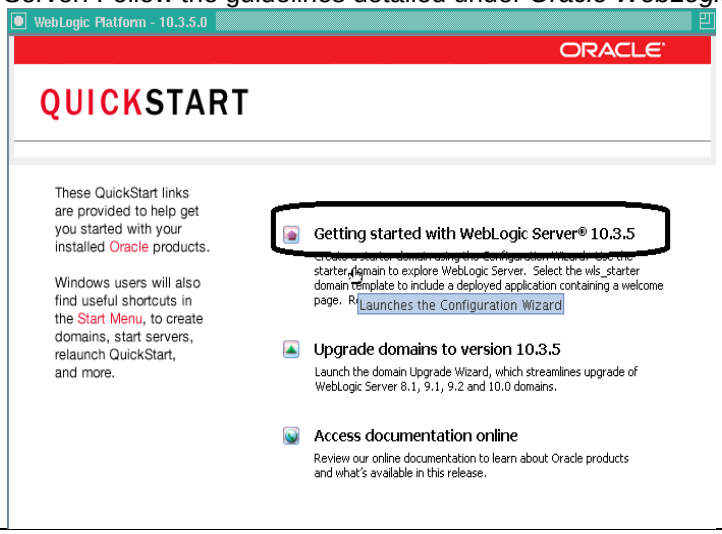
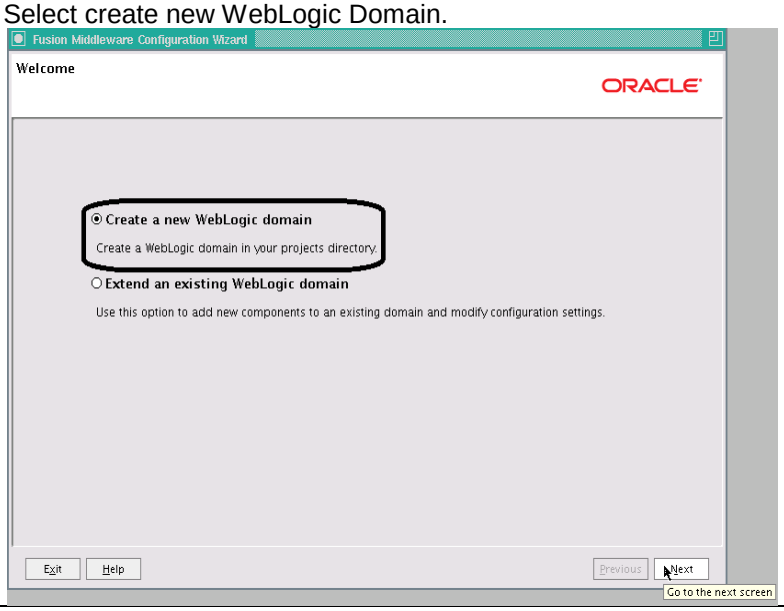


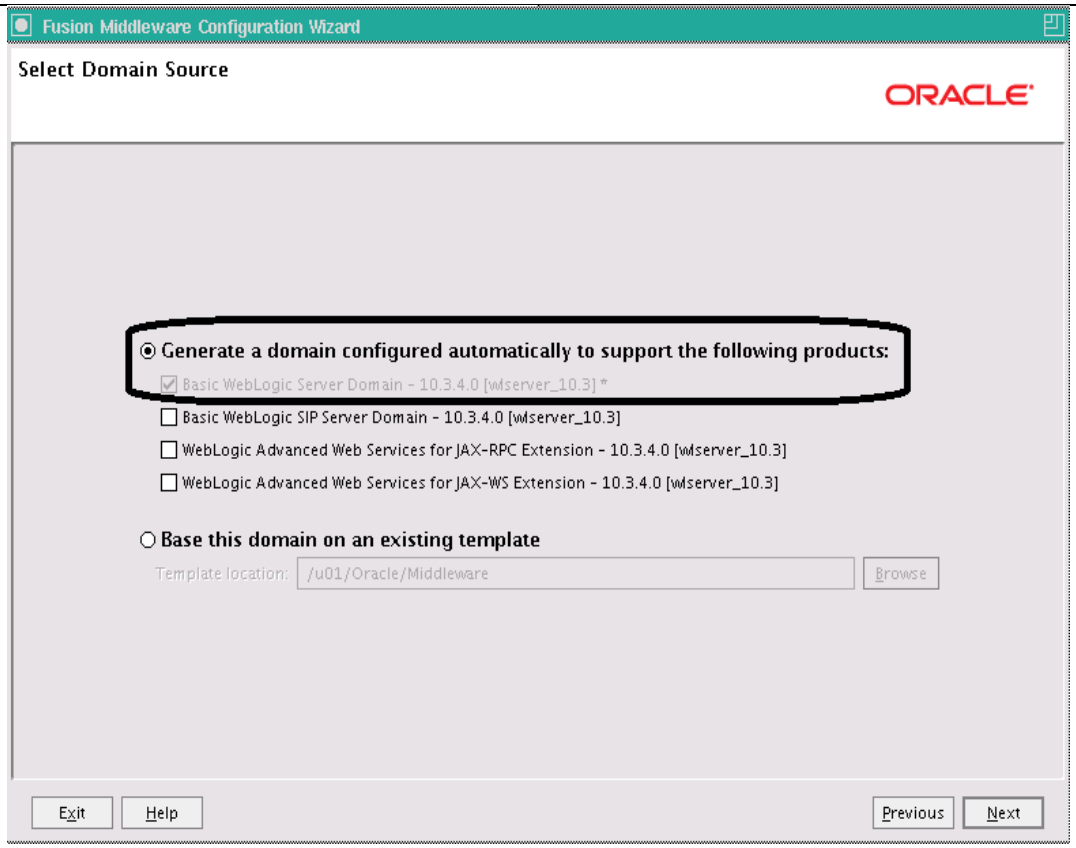
Oracle WebLogic Cluster can be deployed either on a single physical server or on multiple physical servers. In the event of hardware failure of either of the physical servers, deployment of cluster on multiple physical servers help ensures Failover and thus high availability of the deployed system. In the present setup,you have configured a vertical scaling scenario, where several instances of WebLogic managed servers are deployed on a cluster, within a single physical server.

In the this setup, you use two physical servers for Oracle WebLogic Cluster configuration. Each of the physical serverswill have multiple managed servers and a NodeManager. The Node Manager on a machine that hosts Managed Serversenablesthe start and stop of Managed Servers remotely using the Administration Console or from the command line.WebLogic AdminConsole resides on one of the physical servers. Figure 19 shows the WebLogic Cluster deployment.

Some of the important steps to cluster Oracle WebLogic Server are as follows:

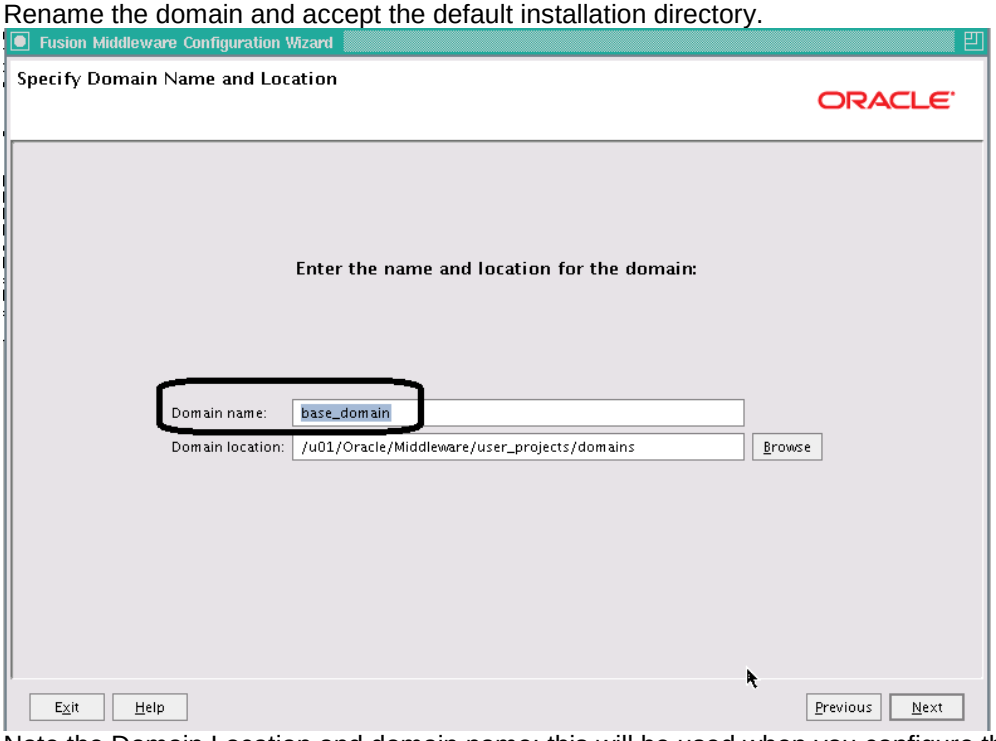
- Create domain , Admin Server and Node Manager on UCS B230Server1
- Create domain and Node Manager in UCS B230Server2
- Register Node Managers to Admin Server on UCS B230Server1
- Configure Managed Server on UCS B230Server1 and Server2
- Register Managed Servers to respective Node Managers
- Create a Cluster through AdminConsole and Assign Managed Server

Tasks	Task Description
1	Before starting the cluster configuration, install the WebLogic Base server on the second B230 Server. Follow the guidelines detailed under *Oracle WebLogic Server Installation.* 
2	Create a new WebLogic Domain, which is used in creating a WebLogic Server Cluster. Select create new WebLogic Domain. 
3	Select Generate WebLogic Basic Domain.

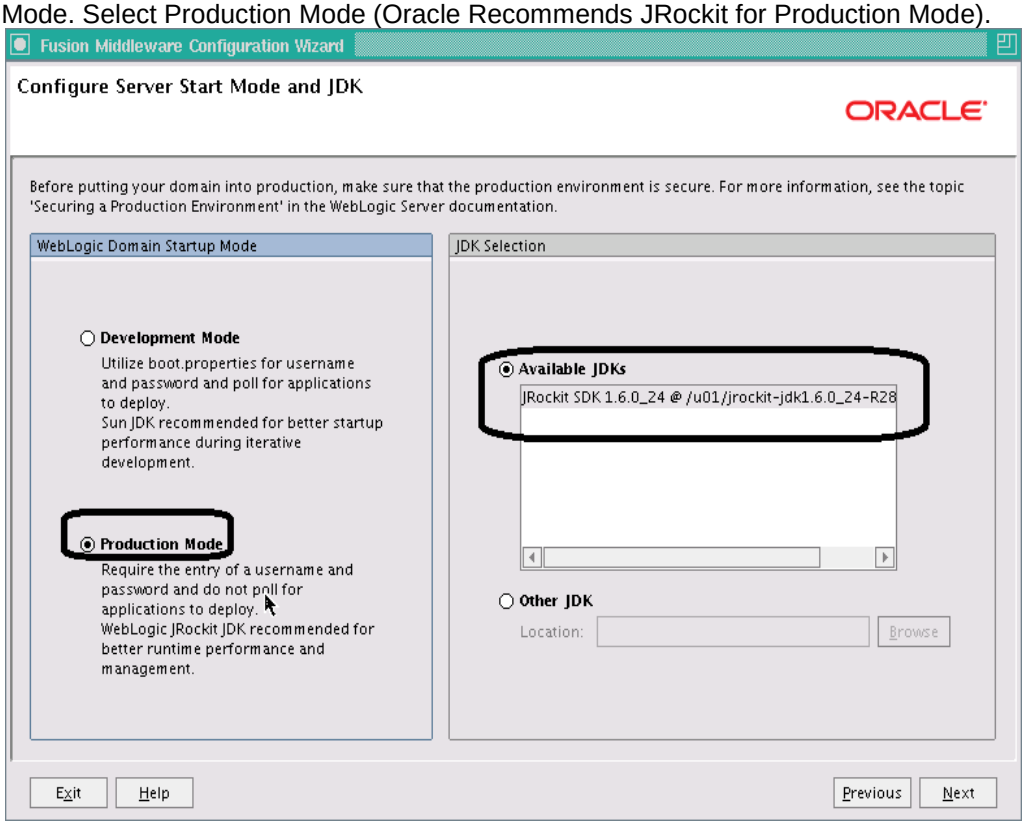


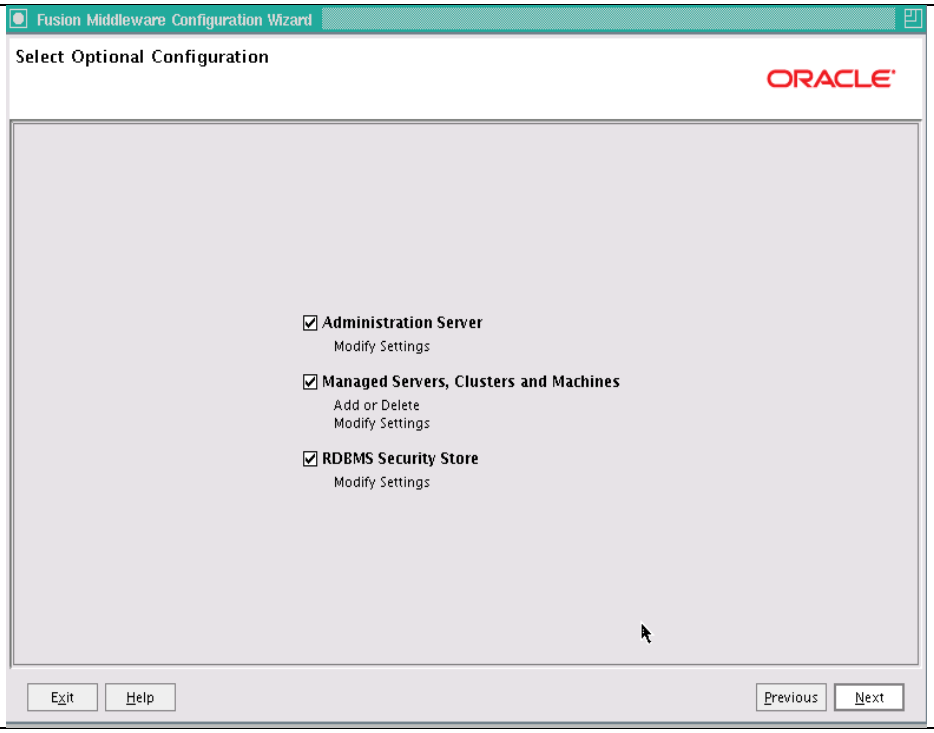
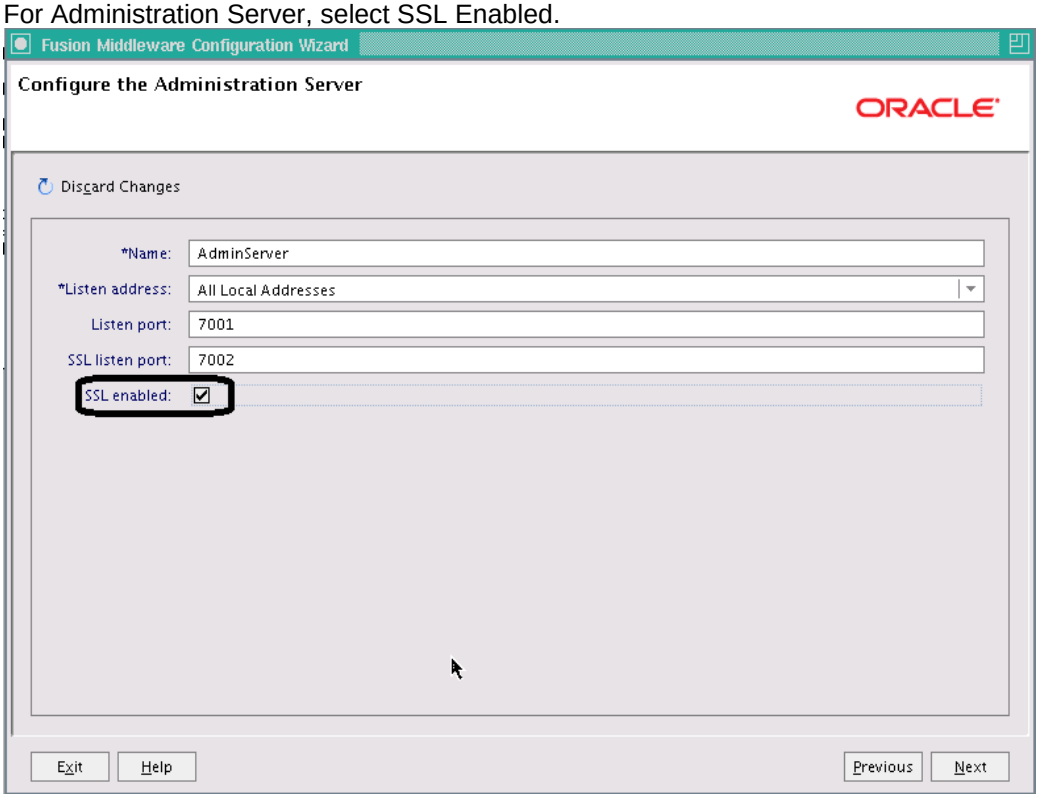
We can choose SIP Server domain , JAX-RPC and JAX-WS extensions , but for illustration we have opted for Basic Weblogic Server Domain

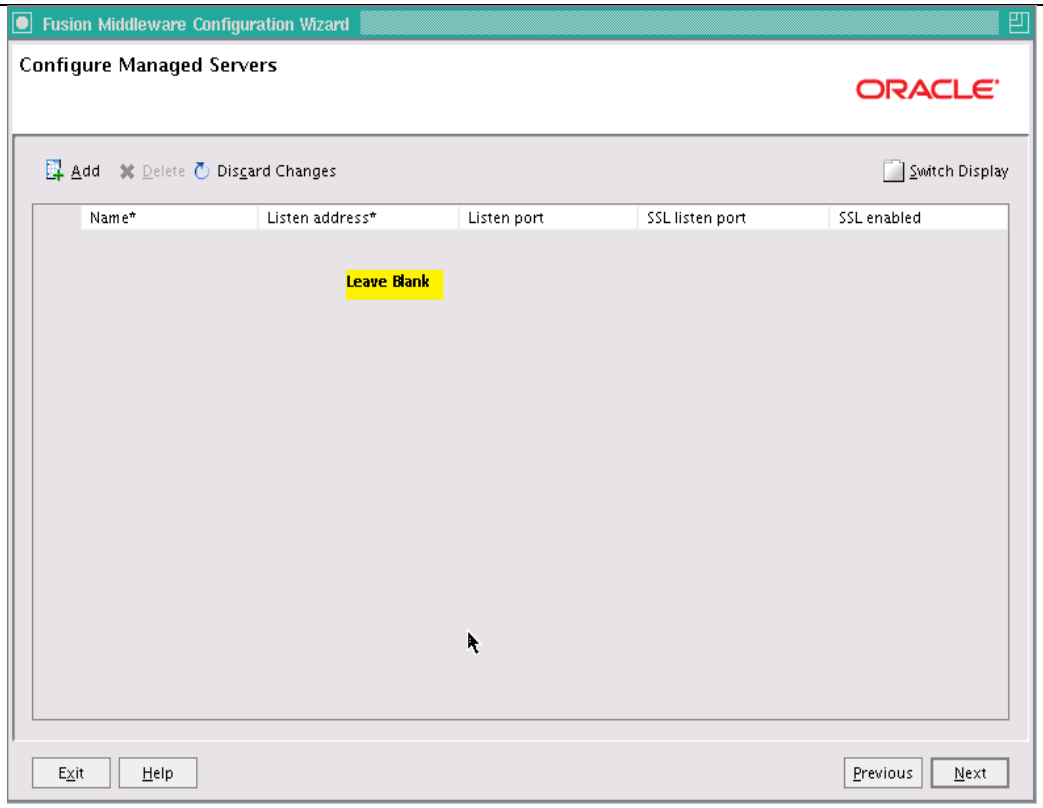
4 Rename the domain and accept the default installation directory.



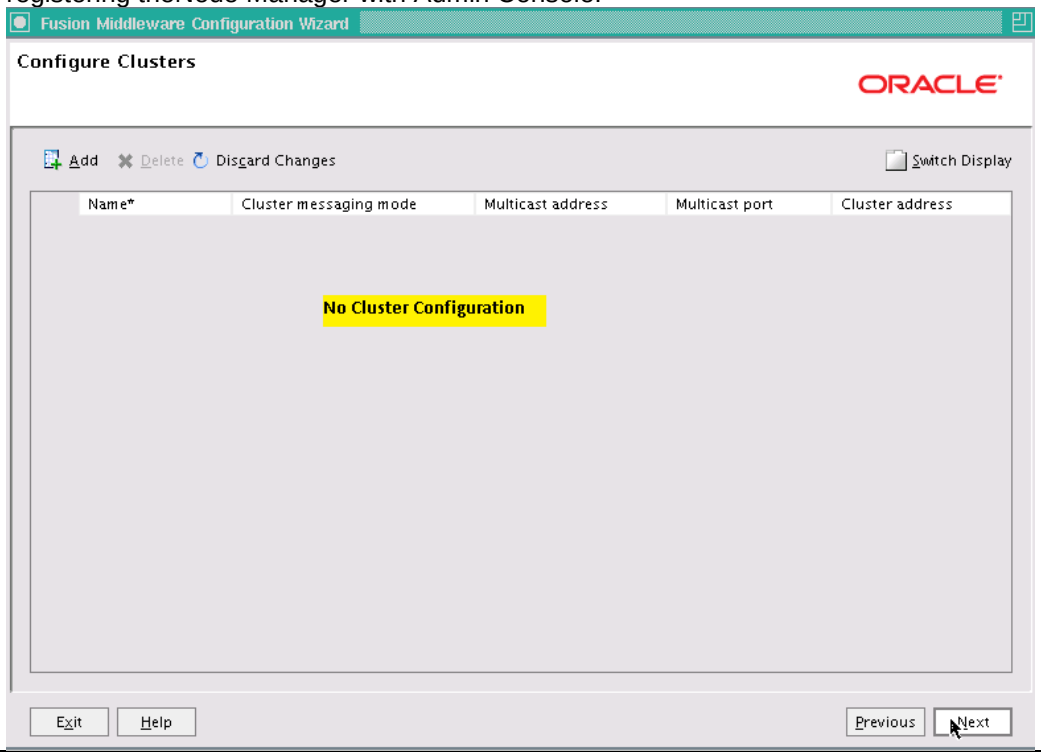
Note the Domain Location and domain name; this will be used when you configure the second

	physical server.
5	In the next screen, define a password for WebLogic domain and continue with domain Startup Mode. Select Production Mode (Oracle Recommends JRockit for Production Mode). 
6	On the Configuration Screen, go through the Administration Server setting, Managed Server, cluster Setting, and RDBMS Security Store Settings. Presently we would just configure a Machine during the setup, and further would configure Managed Server and Clusters through Admin Console

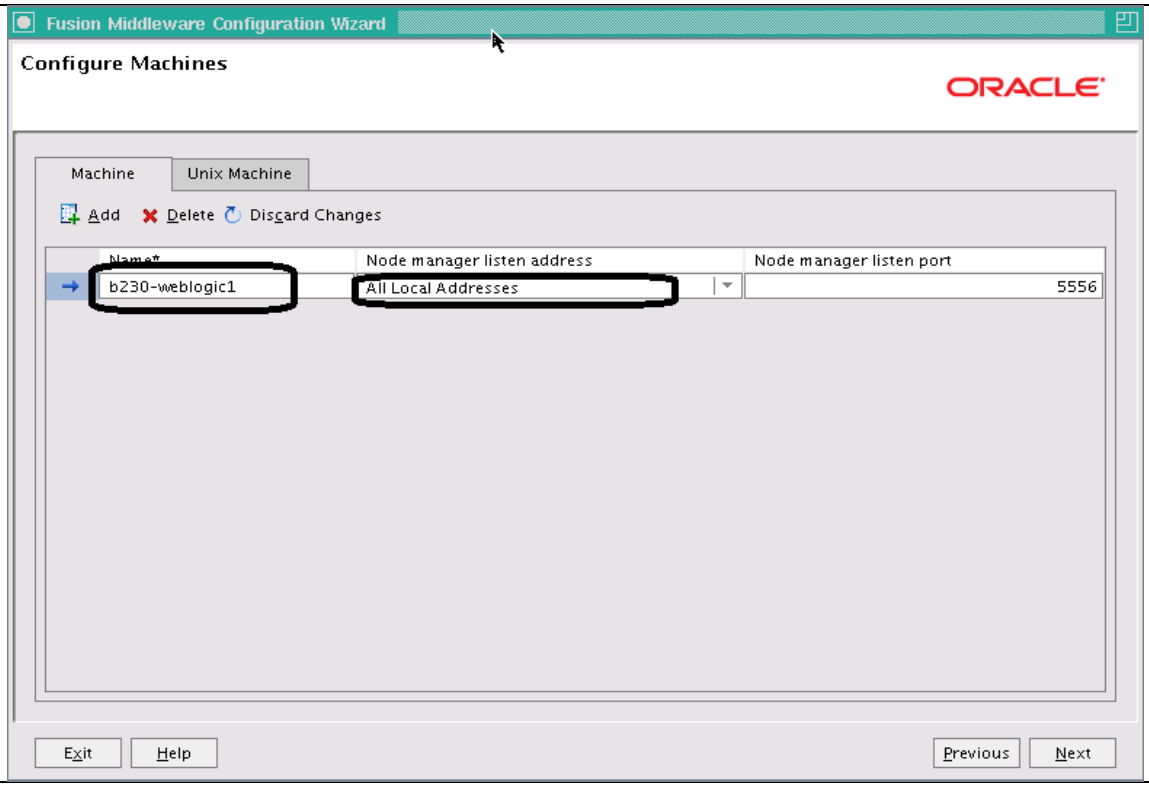
	
7	For Administration Server, select SSL Enabled. 
8	Do not add any Managed Servers. These are added afterthe Clusters are configured, through the Admin Console.



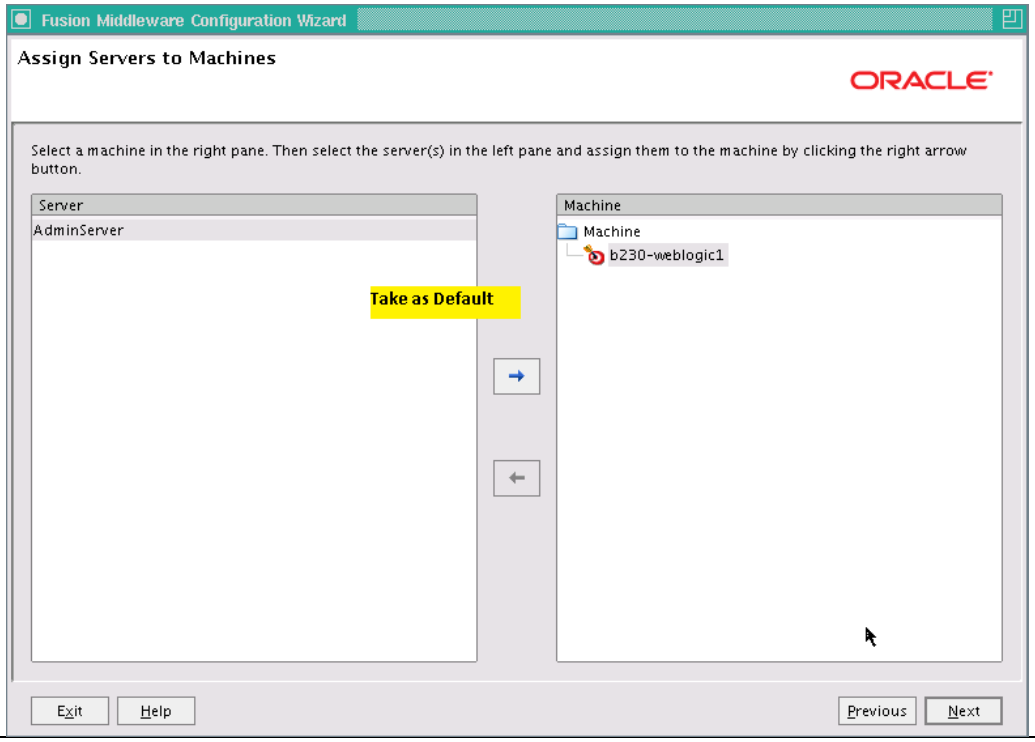
9 Donot add any cluster configuration. This would be done through the Admin Console, after registering theNode Manager with Admin Console.



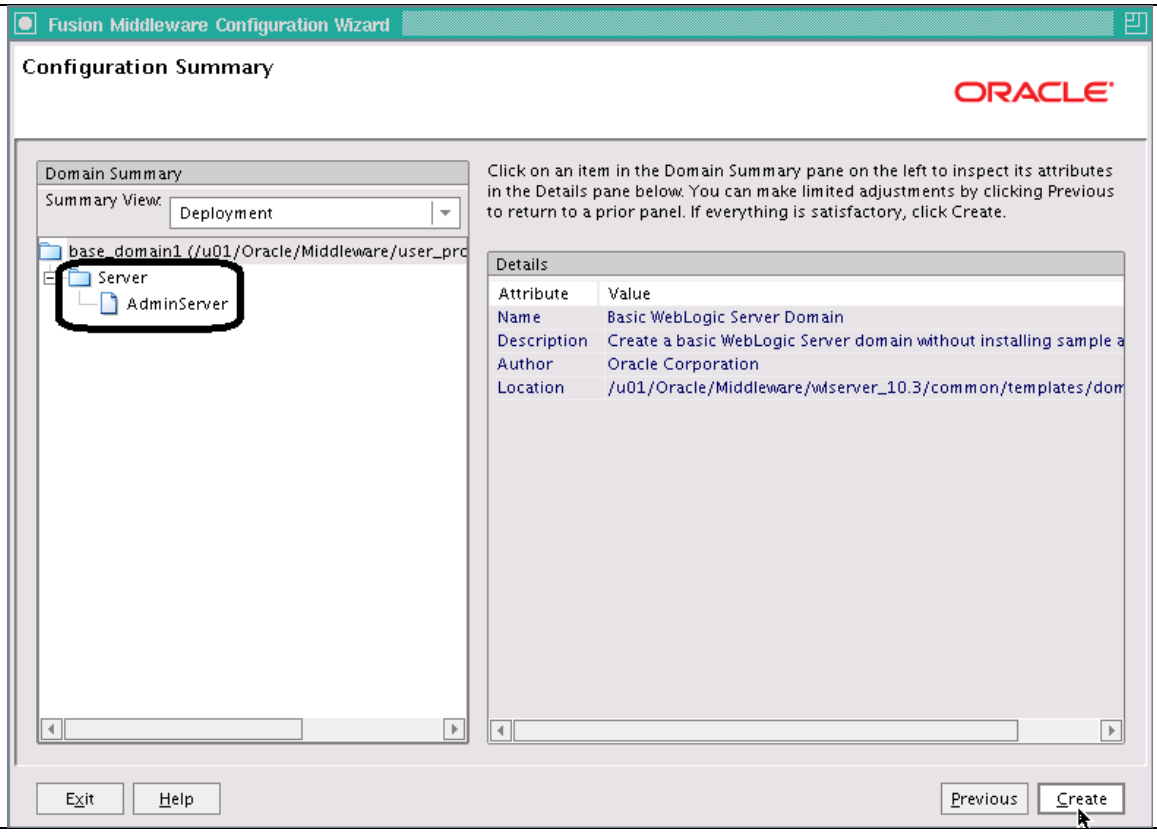
10 Add Node Manager details.



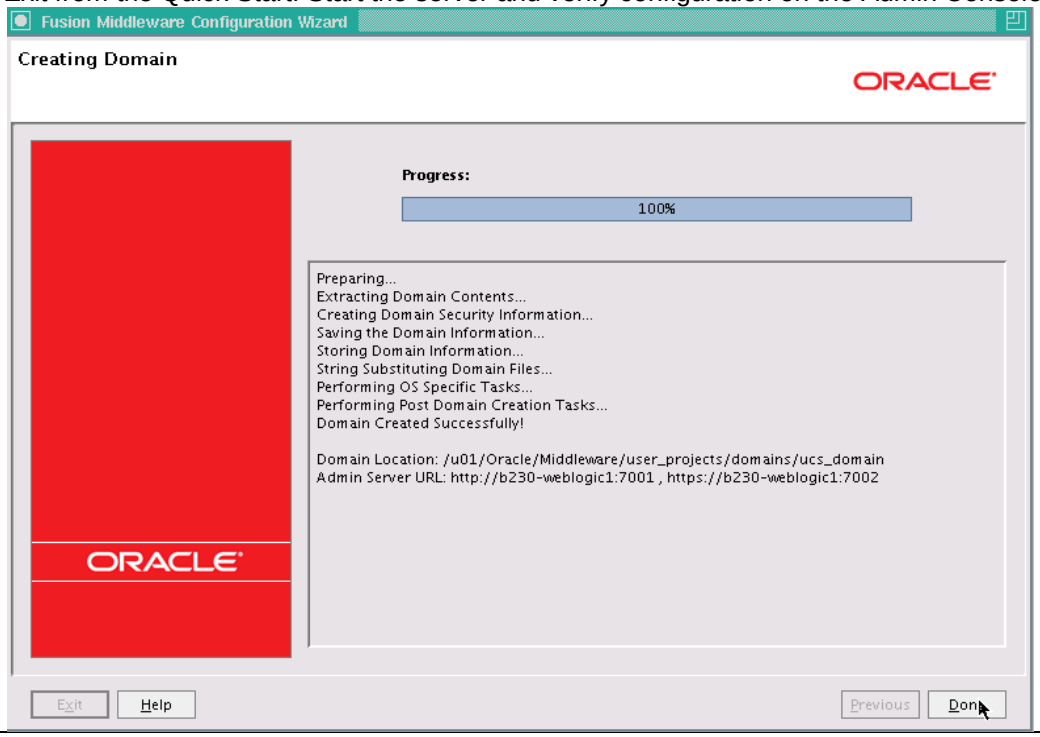
11 No ManagedServers were created, so accept the default configuration, under Assign Servers to Machine screen.



12 Verify the Domain Configuration Summary.



13 Exit from the Quick Start. Start the server and verify configuration on the Admin Console.



14 Repeat Steps 1 through 12 for the second physical server. Note for the second physical server, configure the NodeManager. You do not need to run theAdminConsole for the second physical server, since it is managed by Admin Server configured for b230-weblogic1.

15	Start AdminConsole in b230-weblogic1 [oracle@b230-weblogic1 ucs_domain]$ pwd /u01/Oracle/Middleware/user_projects/domains/ucs_domain [oracle@b230-weblogic1 ucs_domain]$ ./startWebLogic.sh
16	Register Node Manager in b230-weblogic1 with AdminConsole through WebLogic Scripting Tool. Node Manager is a Java utility that runs as separate process from WebLogic Server and allows performing, common operations tasks for a Managed Server, regardless of its location with respect to its Administration Server. Node Manager on a machine enables hosts Managed Servers, to start and stop the Managed Servers remotely using the Administration Console or from the command line. **[oracle@b230-weblogic1 bin]$ ./wlst.sh→WLST tool** CLASSPATH=/u01/Oracle/Middleware/patch_wls1035/profiles/default/sys_manifest_classpath/weblogic_patch.jar:/usr/jrockit-jdk1.6.0_24-R28.1.3-4.0.1/lib/tools.jar:/u01/Oracle/Middleware/wlserver_10.3/server/lib/weblogic_sp.jar:/u01/Oracle/Middleware/wlserver_10.3/server/lib/weblogic.jar:/u01/Oracle/Middleware/modules/features/weblogic.server.modules_10.3.5.0.jar:/u01/Oracle/Middleware/wlserver_10.3/server/lib/webservices.jar:/u01/Oracle/Middleware/modules/org.apache.ant_1.7.1/lib/ant-all.jar:/u01/Oracle/Middleware/modules/net.sf.antcontrib_1.1.0.0_1-0b2/lib/ant-contrib.jar: PATH=/u01/Oracle/Middleware/wlserver_10.3/server/bin:/u01/Oracle/Middleware/modules/org.apache.ant_1.7.1/bin:/usr/jrockit-jdk1.6.0_24-R28.1.3-4.0.1/jre/bin:/usr/jrockit-jdk1.6.0_24-R28.1.3-4.0.1/bin:/usr/java/bin:/usr/lib64/qt-3.3/bin:/usr/kerberos/bin:/usr/java/bin:/usr/local/bin:/bin:/usr/bin:/etc/opt/emcpower/bin:/home/oracle/bin:/etc/opt/emcpower/bin:/home/oracle/bin Your environment has been set. CLASSPATH=/u01/Oracle/Middleware/patch_wls1035/profiles/default/sys_manifest_classpath/weblogic_patch.jar:/usr/jrockit-jdk1.6.0_24-R28.1.3-4.0.1/lib/tools.jar:/u01/Oracle/Middleware/wlserver_10.3/server/lib/weblogic_sp.jar:/u01/Oracle/Middleware/wlserver_10.3/server/lib/weblogic.jar:/u01/Oracle/Middleware/modules/features/weblogic.server.modules_10.3.5.0.jar:/u01/Oracle/Middleware/wlserver_10.3/server/lib/webservices.jar:/u01/Oracle/Middleware/modules/org.apache.ant_1.7.1/lib/ant-all.jar:/u01/Oracle/Middleware/modules/net.sf.antcontrib_1.1.0.0_1-0b2/lib/ant-contrib.jar::/u01/Oracle/Middleware/utils/config/10.3/config-launch.jar::/u01/Oracle/Middleware/wlserver_10.3/common/derby/lib/derbynet.jar:/u01/Oracle/Middleware/wlserver_10.3/common/derby/lib/derbyclient.jar:/u01/Oracle/Middleware/wlserver_10.3/common/derby/lib/derbytools.jar:: Initializing WebLogic Scripting Tool (WLST) ... Jython scans all the jar files it can find at first startup. Depending on the system, this process may take a few minutes to complete, and WLST may not return a prompt right away. Welcome to WebLogic Server Administration Scripting Shell Type help() for help on available command **wls:/offline> connect ('weblogic','weblogic1','t3://10.104.109.84:7001')→AdminConsole Connection** Connecting to t3://10.104.109.84:7001 with userid weblogic ... Successfully connected to Admin Server 'AdminServer' that belongs to domain 'base_domain'.

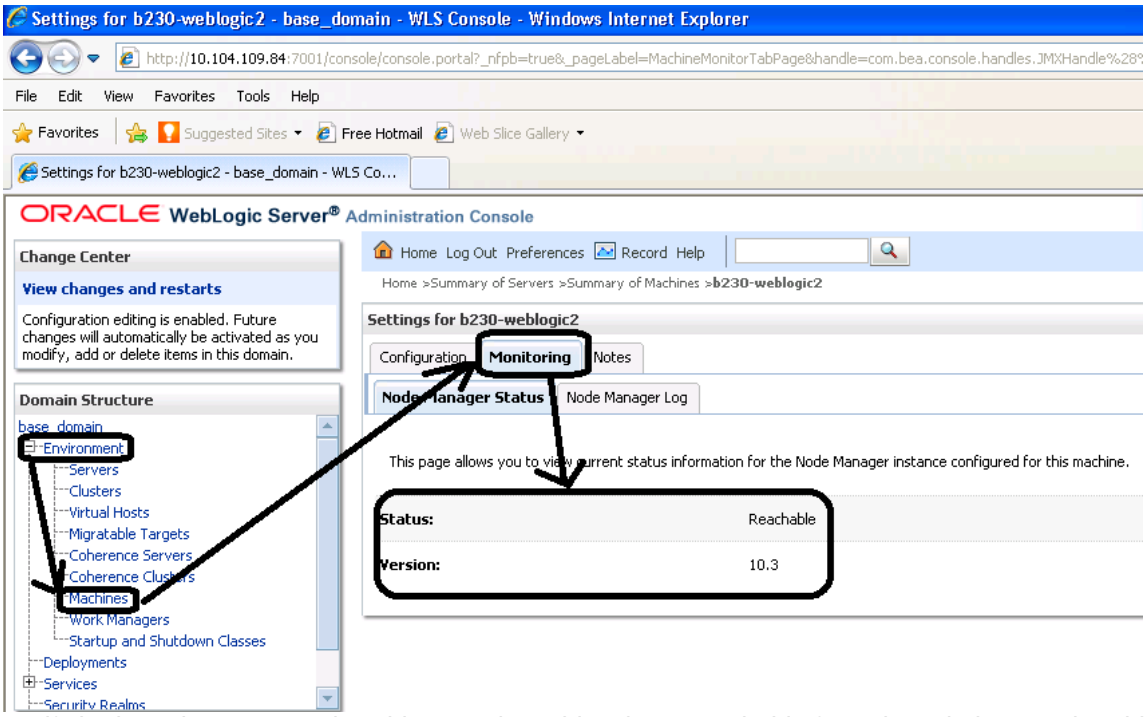
```
Warning: An insecure protocol was used to connect to the
server. To ensure on-the-wire security, the SSL port or
Admin port should be used instead.

wls:/base_domain/serverConfig>
nmEnroll('/u01/Oracle/Middleware/user_projects/domains/base_domain',
'/u01/Oracle/Middleware/wlserver_10.3/common/nodemanager')→Registering NodeManager
Enrolling this machine with the domain directory at
/u01/Oracle/Middleware/user_projects/domains/base_domain ...
Successfully enrolled this machine with the domain directory at
/u01/Oracle/Middleware/user_projects/domains/base_domain.


[oracle@b230-weblogic1 ucs_domain]$ pwd
```

Do the same for Machine 2, for example b230-weblogic2Node Manager. Registration of Node Manager has to be done with same AdminConsole (http://10.104.109.84:7001)

17 Start Node Manager on both of the physical servers.

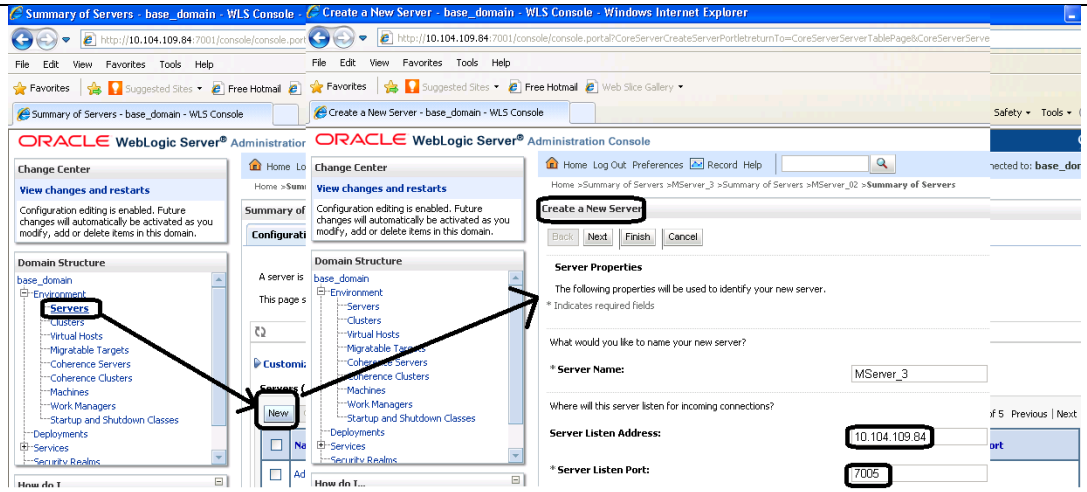
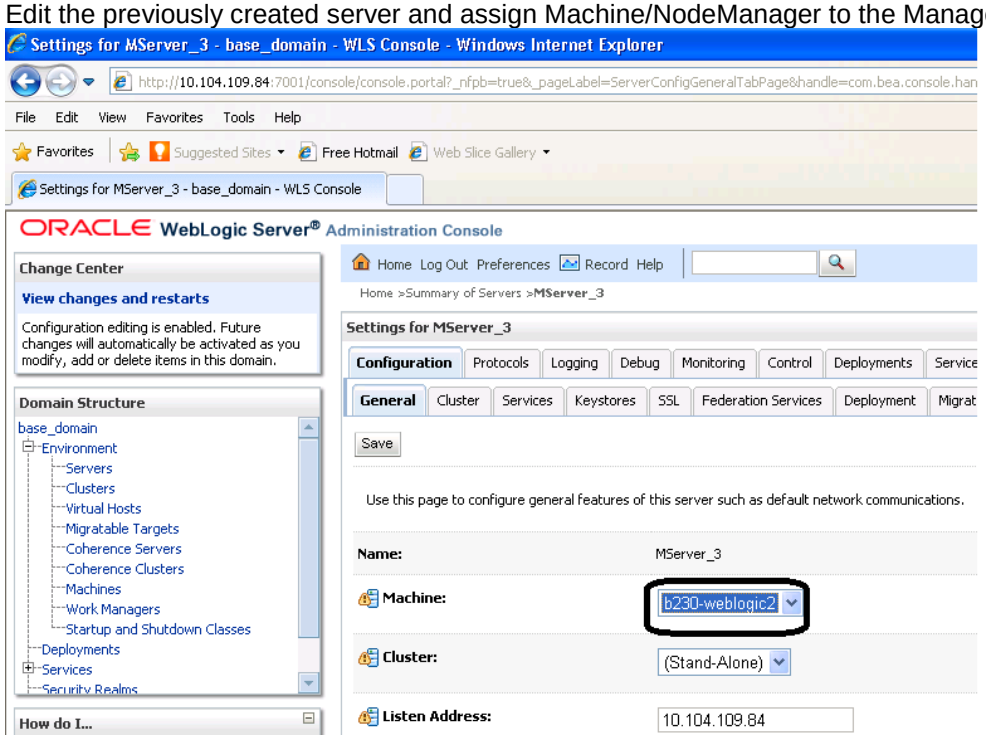
```
[oracle@b230-weblogic2 bin]$ pwd
/u01/Oracle/Middleware/wlserver_10.3/server/bin
[oracle@b230-weblogic2 bin]$ ./startNodeManager.sh
```

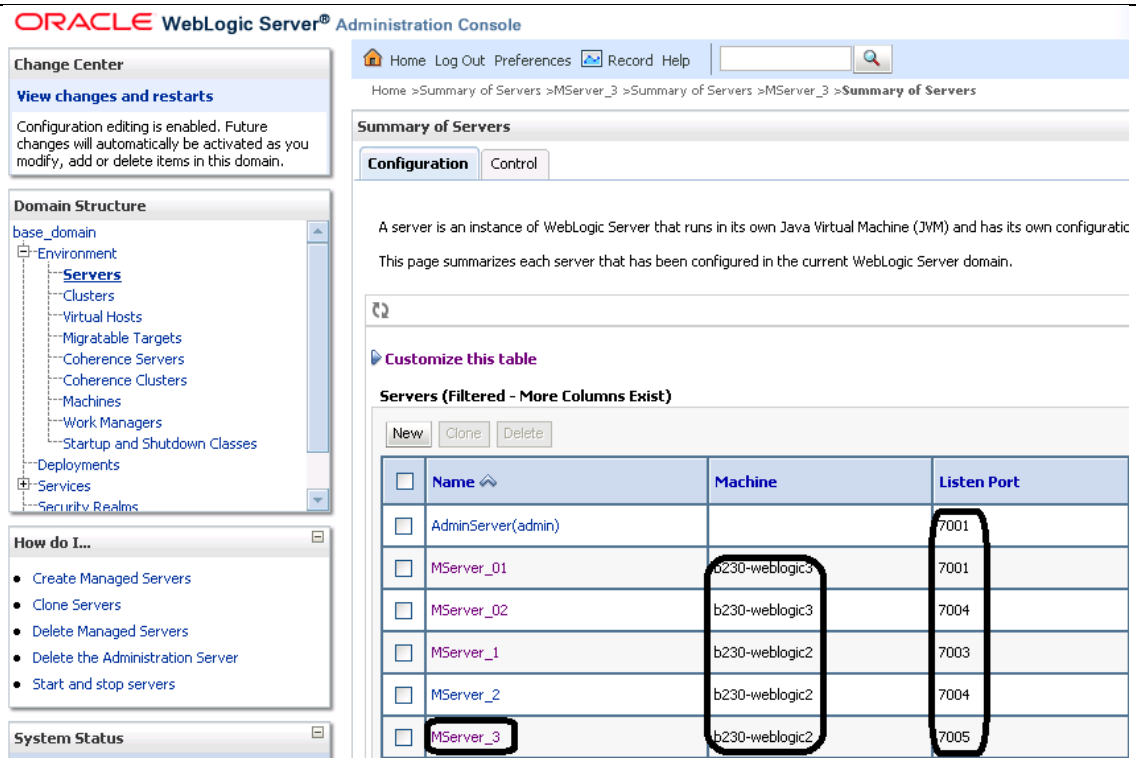
18 Login to AdminConsole and verify registration of NodeManager with AdminConsole.
http://<server-name>:<port>/console



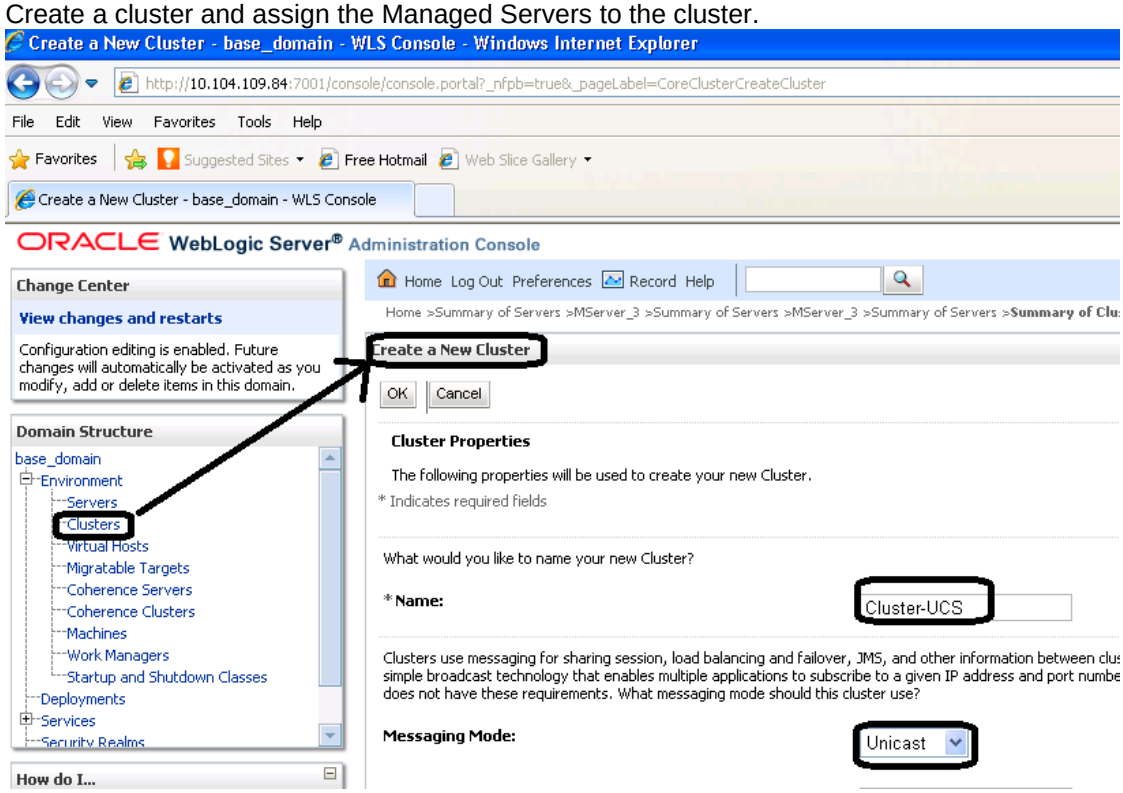
Verify both NodeManagers (Machine1 and Machine2) are reachable from the AdminConsole. This helps to create Managed Servers on either of the physical servers from single AdminConsole.

19 From the AdminConsole, create two Managed Servers on each of the physical servers and create a cluster having all the four Managed Servers.

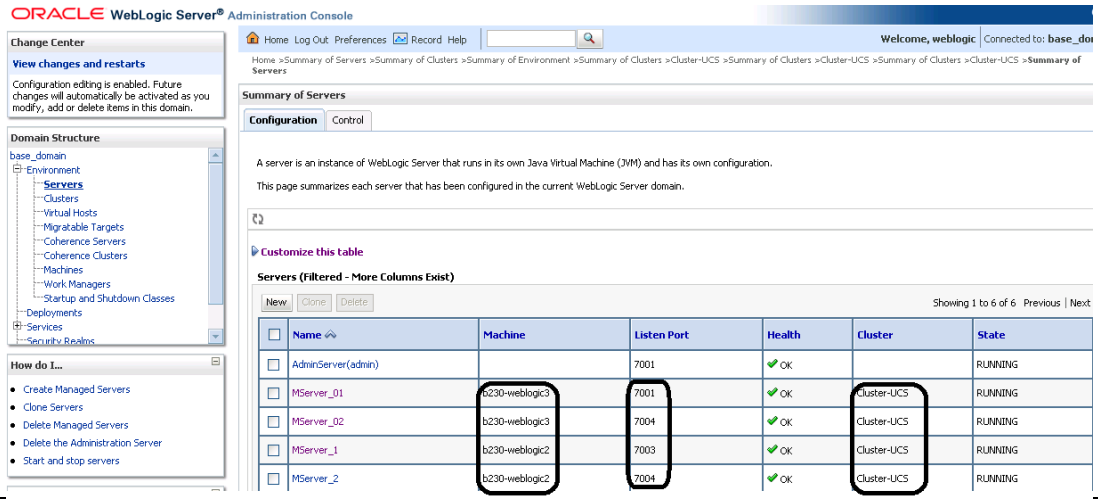
	
20	Edit the previously created server and assign Machine/NodeManager to the ManagedServer. 
21	Repeat steps 18 and 19 to add other three servers, with appropriate IP and machine/NodeManager Name. The Server screen displays as follows:



22 Create a cluster and assign the Managed Servers to the cluster.



Add a cluster name and IP and select unicast cluster messaging mode.
Oracle recommends unicase messaging mode (ref:

	http://download.oracle.com/docs/cd/E11035_01/wls100/cluster/features.html) **Note:** When creating a new cluster, it is recommended that you use unicast for messaging within a cluster. For backward compatibility with previous versions, WebLogic Server you must use multicast for communications between clusters. In Unicast messaging mode, cluster members are split into groups and every group has a group leader. Cluster members communicate to the group leader when they need to send a broadcast message which is usually the heartbeat message. When the cluster members detect the failure of a group leader, the next oldest member becomes the group leader. All group leaders are connected to each other
23	When a Cluster is created you can start the servers and view the server status and verify machine and cluster assignment. You can also start the servers from command prompt , for example: /u01/Oracle/Middleware/user_projects/domains/ucs_domain/bin/startManagedWebLogic.sh **MServer_1**http://<admin-server>:7001 /u01/Oracle/Middleware/user_projects/domains/ucs_domain/bin/startManagedWebLogic.sh **MServer_2**http://<admin-server>:7001 

24	Some of the important steps to deploy an application on WebLogic cluster are detailed below. In the this setup, you have used MedRec application which is part of samples of WebLogic Server installation.
	`#Deployment on Clustered Weblogic Server`
	`(Deployment of application is executed from WebLogic Admin Console)`
	
	`1) Confgure DataSource with JNDI Name = jdbc/MedRecGlobalDataSourceXA, driver = Oracle Driver (Thin XA) and target as WebLogic Cluster`
	
	`2) Goto Services → Messaging`
	`a) Add JMS Server`
	`b) Configure JMSModule with Target as WebLogic Cluster`
	`c) Add Queues to JMS Module`
	`3) Goto Domain → Deployment`
	`a) Install jsf and jstl libraries (deploy as libraries)`
	`b) Install browser-starter.war , physician.ear and medrec.ear`

```
          c) In broweser-starter.war edit the context root to /browser-starter
          d) On Medrec Overview tab , edit the Deployment Order to “1”
          e) Ensure all targets point to previously created cluster
4) Start the application . Presently we can access the application to each of the configrd
Weblogic Cluster. In next section we would use Apache HTTP Server with Weblogic HTTP plugin and
define the cluster configuration
```

When the Oracle WebLogic Cluster is configured, interface it with Apache 2.2 HTTP Server by using Apache HTTP Server Plug-in for WebLogic 10.3.5.

4.5.5 Apache HTTP Server Plug-in

Apache HTTP Server Plug-In allows requests to be routed from an Apache HTTP Server to WebLogic Cluster.The plug-in is intended for use in an environment where an Apache Server serves static pages, and dynamic part of web-page (HTTP Servlets or JSP's) is delegated to WebLogic Server, which may be operating in a different process, possibly on a different host.

Tasks #	Task Description
1.	Copy the Apache2.2-WebLogic (mod_wl_22.so) plug-in from $WL_HOME/server/plugin/linux/x86_64 to $Apache_Home/modules

2.	Edit $Apache_Home/conf/httpd.conf with following parameters:
	
	`#Load WebLogic plug-in module`
	`LoadModule WebLogic_module modules/mod_wl_22.so`
	
	`# SetHandler specifies the handler for the Apache HTTP Server Plug-In module`
	`.Presently we have are proxing all request to WebLogic.`
	
	`<Location /medrec>→ We have clustered WebLogic MedRec application and defined the`
	`loationSetHandler WebLogic-handler`
	`</Location>`
	
	`# Add an IfModule block that defines WebLogic Cluster`
	
	`<IfModule mod_WebLogic.c>`
	`WebLogicCluster MServer_1:7003,MServer_2:7004,MServer_01:7001,MServer_02:7004`
	`</IfModule>`

3.	Restart apache, and we have a Apache 2.2 proxying requests to Oracle WebLogic Cluster. Access http://<Apache-Server>/medrec/ to ensure that you can access the clustered application.

4.6 Cisco UCS Statelessness

As elaborated in the previous sections, Cisco Unified Computing System enables data center servers to be stateless, for example a server’s identity (using MAC or WWN addressing or UIDs) as well as build and operational policy information such as firmware and BIOS revisions and network and storage connectivity profiles can be dynamically provisioned or migrated to any physical server in the system.

Cisco UCS Service profiles, in combination with the stateless nature of Cisco Unified Computing System servers, provide the underlying mechanism that allows the use of a common pool of spare servers that can be quickly repurposed for nearly any requirement. For most organization and applications, this feature can result in an immediate reduction in capital expenditures (CapEx) because required spare and overflow capacity can be shared

among multiple departments and applications. Users can tailor the cost and acceptable risk by varying the size of these shared resource pools.

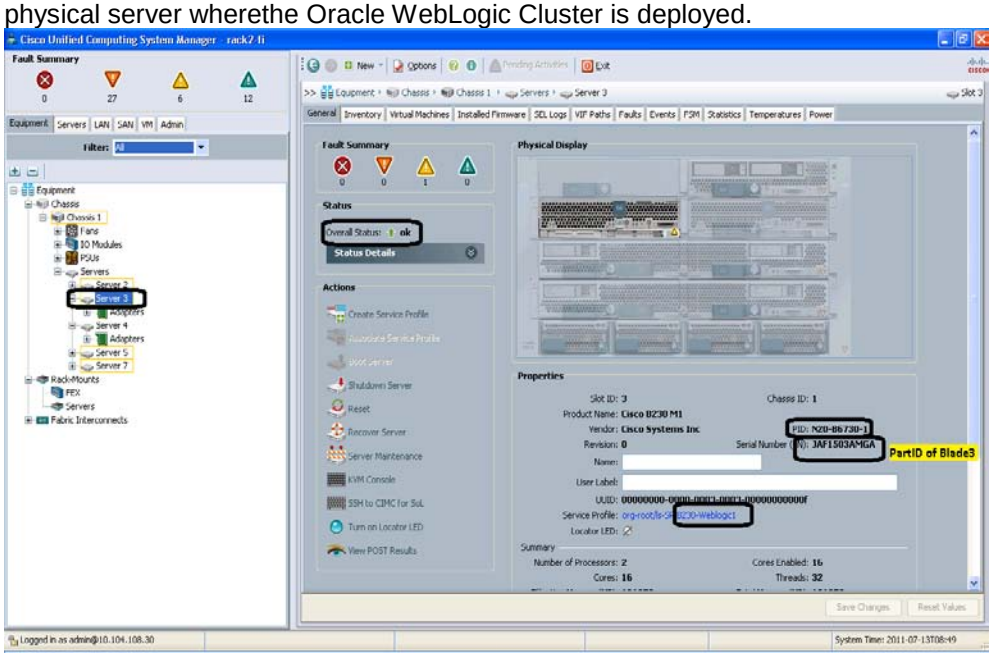
The subsequent sections detail the migration of Service Profile created for Oracle WebLogic Server hardware, thus utilizing the statelessness benefits of the Cisco Unified Computing System.

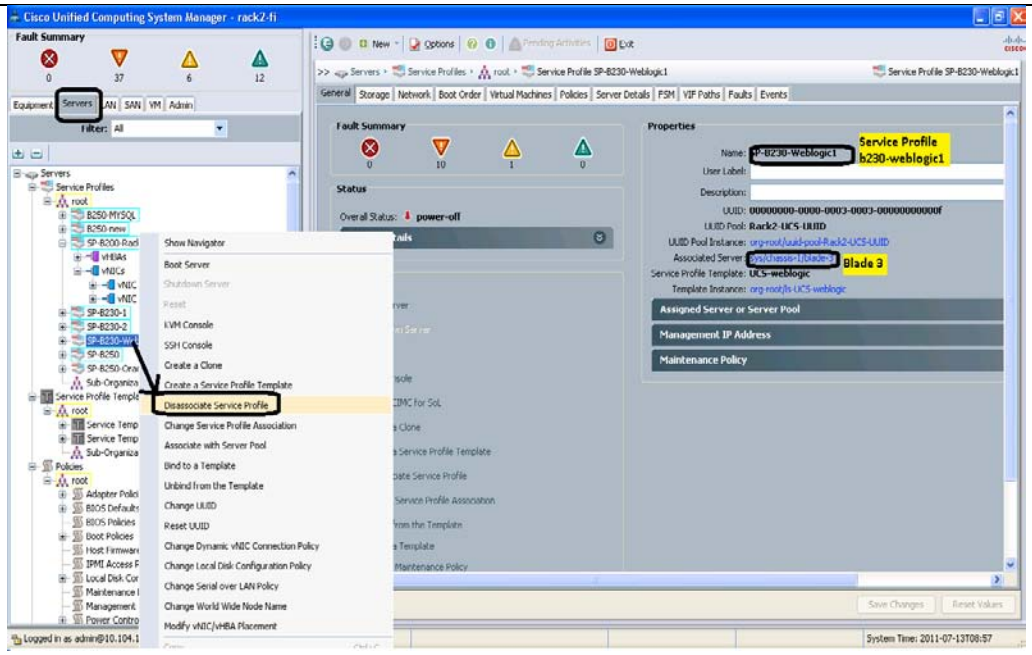
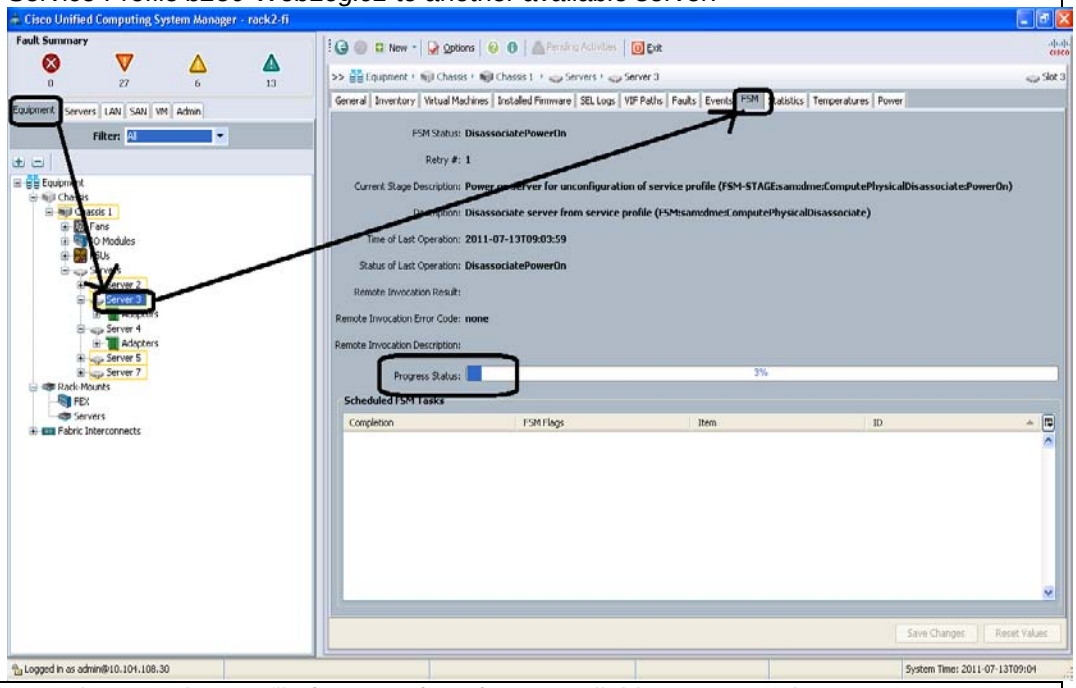
4.6.1 Service Profile Migration

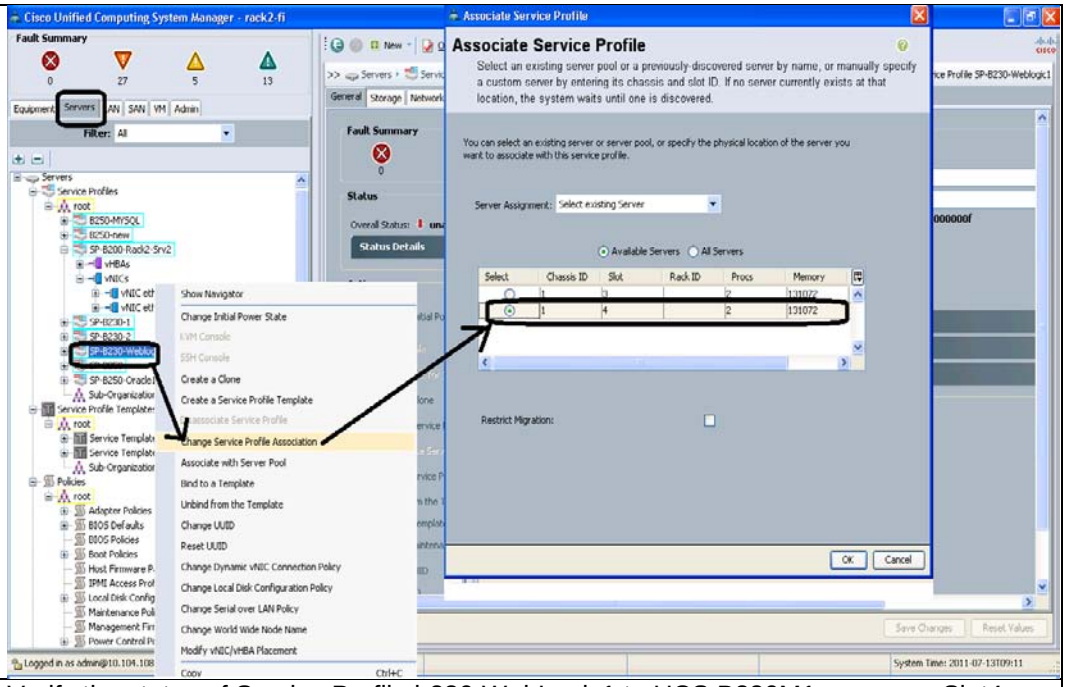
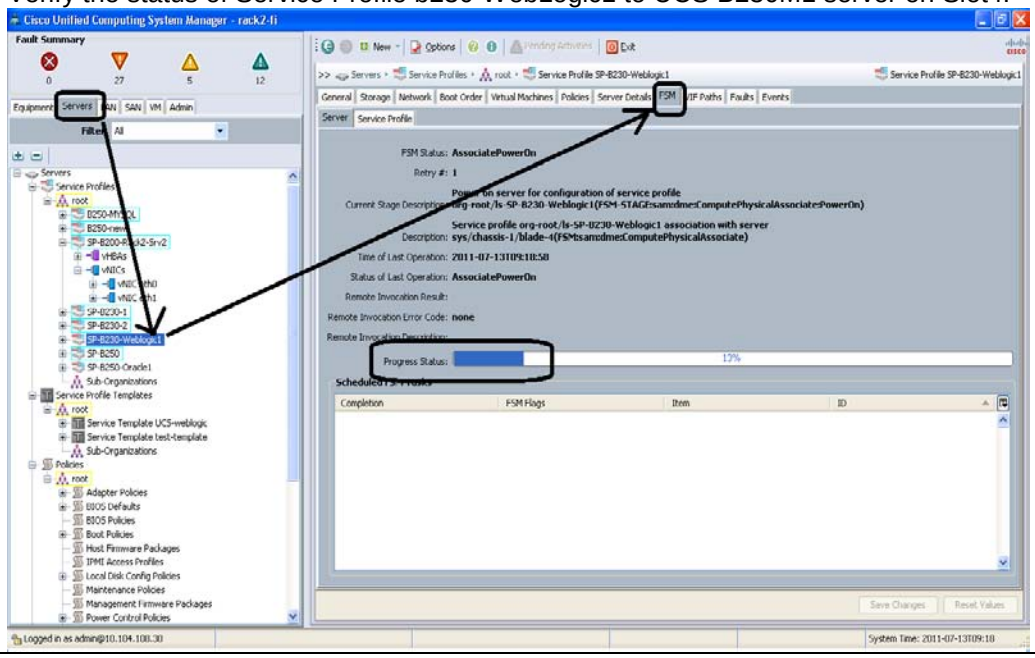
In the present setup, there is a single Oracle WebLogic server hardware, with multiple WebLogic Managed Servers instantiated in a WebLogic Cluster. In the event of hardware failure, migrate the Service profile of WebLogic Server hardware to another server, which would help ensure minimal downtime for application server environment and faster deployment of new hardware deployed with WebLogic Server Cluster.

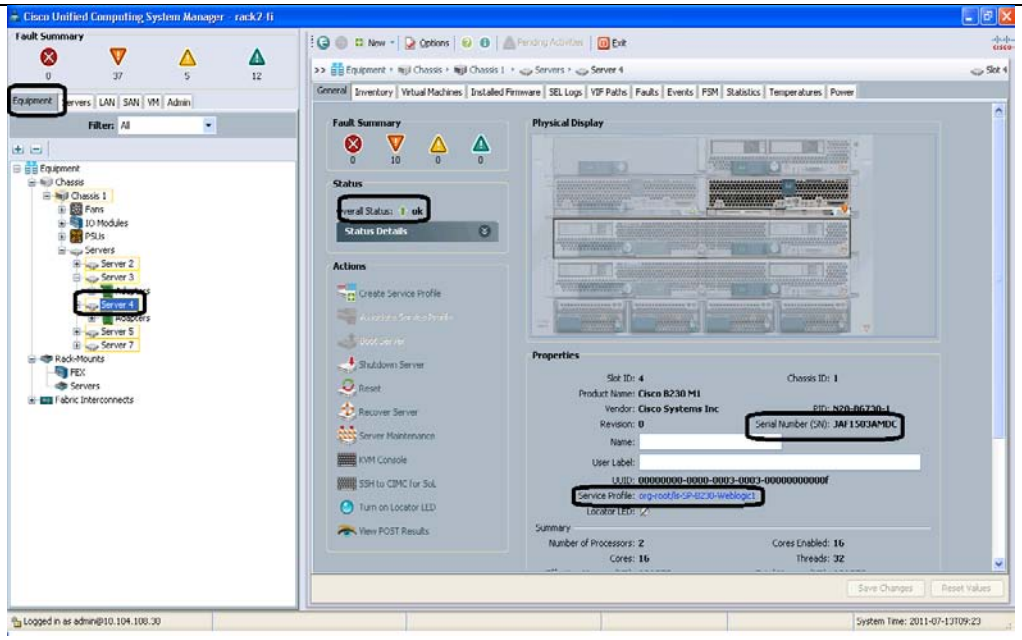
In the event of multiple physical servers for WebLogic Cluster deployment, youwill achieve lossless end-user services, as Service Profile of failed physical server would be migrated to the redundant physical server.

The pre-requisites to successfully migrate the failed WebLogic Cluster physical server to a available stand-by areSANBoot of OEL5.5.

Tasks #	Task Description
1.	Verify Setup. We have Slot 3 assigned to Service Profile*b230-WebLogic1*.This is the physical server wherethe Oracle WebLogic Cluster is deployed.  Verify the partID of Blade3 = *JAF1503AMGA*
2.	On event of Server Failure we would migrate this Service Profile of Server3 to Server4 (stand-by server) and verify status of WebLogic Cluster. Disassociate Service profile *b230-WebLogic1.*

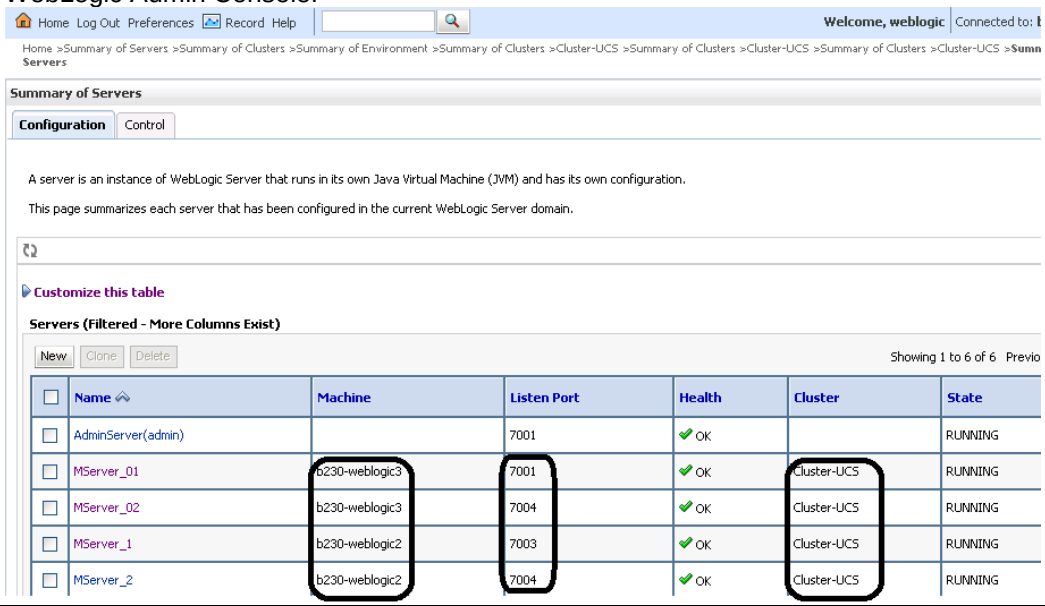
	
3.	Verify the dis-association status in FSM. When it is 100 percent,you can associate the Service Profile *b230-WebLogic1* to another available server. 
4.	Associate Service Profile *b230-WebLogic1* to Available server at Slot4.

	
5.	Verify the status of Service Profile b230-WebLogic1 to UCS B230M1 server on Slot4. 
6.	When Service Profile b230-WebLogic1 is associated, you can verify the status of new physical server.



Verify that PartIDis changed to *JAF1503AMDC.*

7. When physical server is migrated, start the Oracle WebLogic Server and verify from the WebLogic Admin Console.



As stated above, the service profile migration successfully migrates the failed physical server to a stand-by server pool, without changing any configuration on the new Cisco UCS B230 blade sever. This demonstrates the power of the statelessness characteristic of the Cisco Unified Computing System.

5. Future Considerations

5.1 Server Failure Detection and Automated Service Profile Migration

This deployment guide detailed the stateless behavior of Cisco UCS Service profile and its benefits in the data center. Defined is a methodology to migrate a service profile from a failed physical server to a stand-by server. Cisco UCSManager, with its API's can be configured for an automated service profile migration, during physical server hardware failure.

The next step is automated scripts which would enable this behavior. A deployed Cisco UCS service profile would move over to a available server in a stand-by server pool without manual intervention.

5.2 Performance and Scalability Analysis for WebLogic on a Cisco UCS Blade Server

To explore the performance and scalability benefits of a Cisco UCS B230blade server deployed with Oracle WebLogic Cluster, you would deploy a Java EE benchmark application and evaluate over Cisco UCS and evaluate Cisco Unified Computing System on three important criteria:

- Throughput–Maximum transaction/sec achieved from the deployed application with the condition of acceptable application response time or saturation of available system resources
- Response Time–Time taken to execute deployed application transaction.
- Multi-Instance Application Server Cluster–Performance improvement either on basis of maximum throughput or lower response time achieved by deploying multiple instances or nodes in Oracle WebLogic application server cluster.

6. For More Information

http://www.cisco.com/en/US/products/ps10280/index.html

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