Implementing a Weblogic Architecture with High Availability

Contents

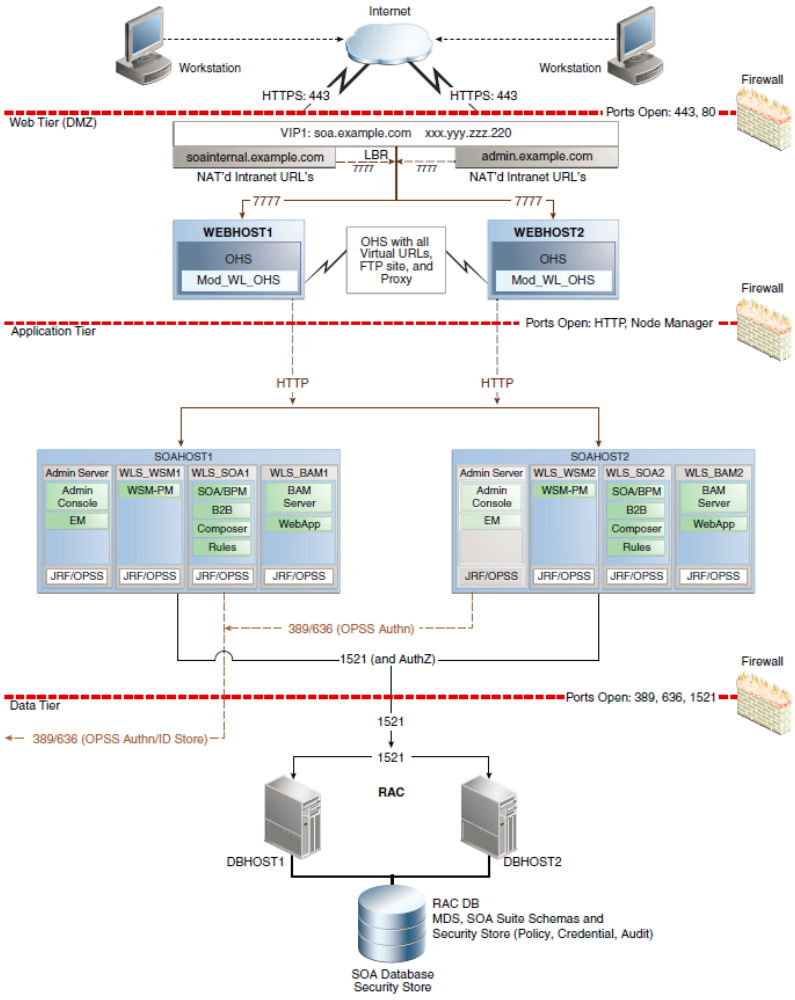
1. Introduction

As a system administrator, I faced the challenge of building several application server architectures with high availability. This kind of work is a challenge because it compromises several layers and professionals. However, one of the most important problems is the lack of documents that allow new system administrators the revision of the whole process. With this in mind, the purpose of this document is to show several of the most important phases to deploy an architecture like this.

2. Topology

2.1. Limitations

Before showing the topology, it is important to remark that this document is based on the design presented in [1]. Thus, the following model is used as a reference.



Architecture designed by Oracle [1]

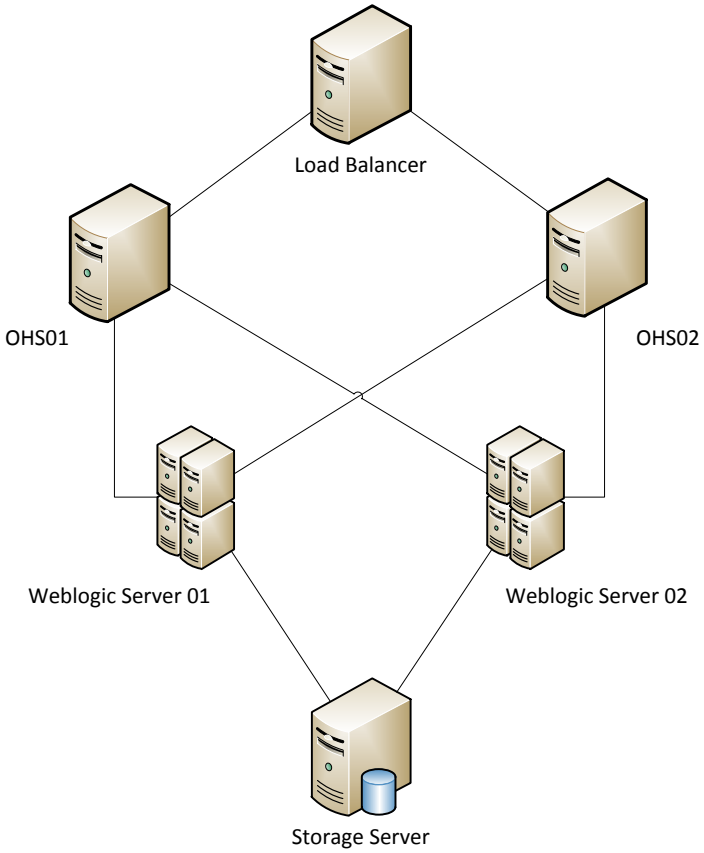
However, because of the resources limitations given by implementing a virtual environment on a laptop. These components will not be used:

- Domain Name Servers
- Firewalls
- The database

In addition, the architecture deployed in this post will not implement Oracle SOA. Thus, this is the topology used in this document.

2.2. Servers diagram

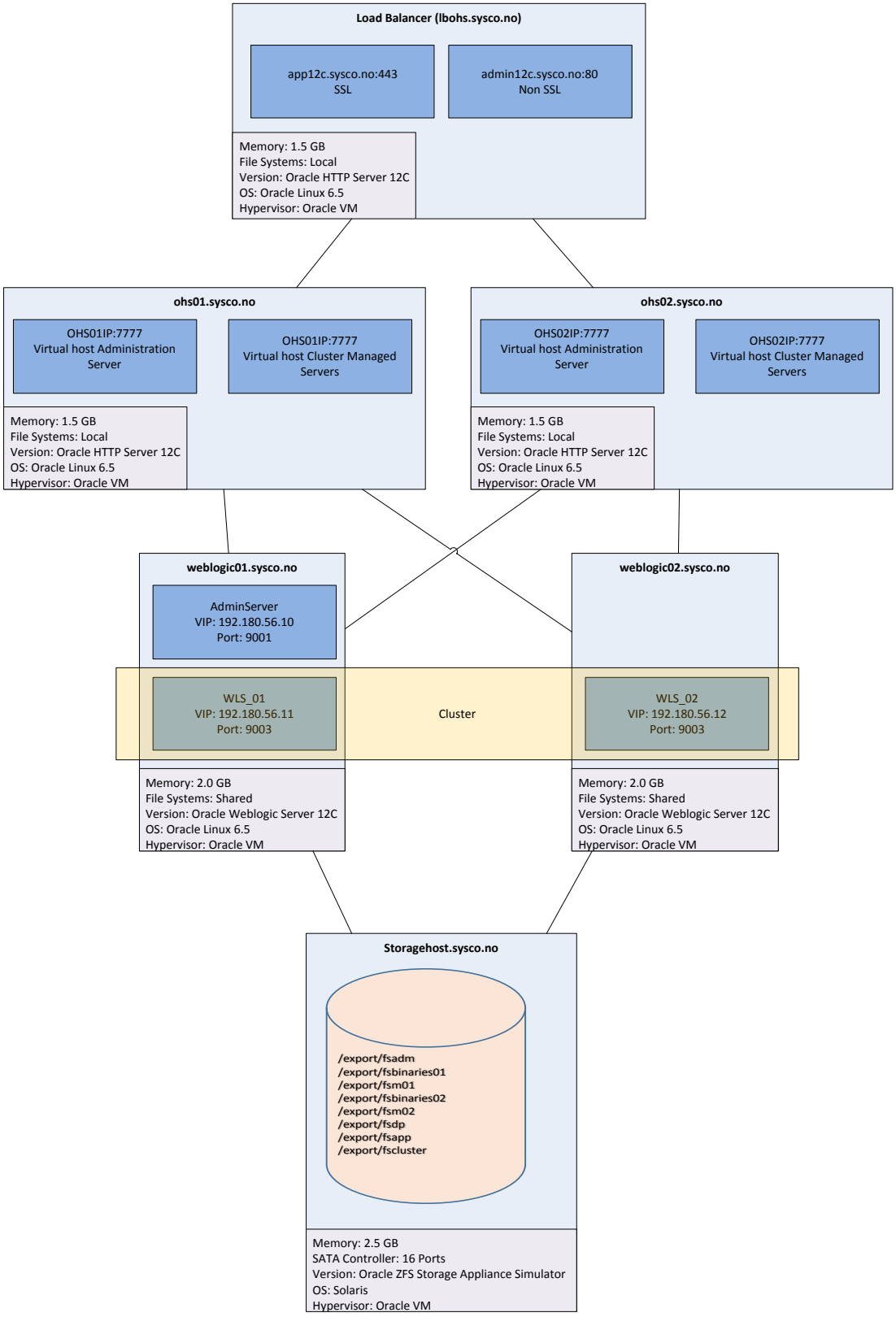
This is a high-level design of the servers used in this document. The load balancer is implemented using Oracle HTTP Server. All the servers shown in the diagram are virtual servers on Oracle VM.



2.3. Weblogic diagram

The following diagram shows more details about the Weblogic architecture implemented in this document. In general, it is composed by

- A load balancer,
- Two web servers,
- An administration server,
- Two managed server conforming a cluster distributed within two machines
- A storage server based on the Oracle ZFS simulator to demonstrate how to configure the architecture using shared storages.


Load Balancer (lbohs.sysco.no)
app12c.sysco.no:443
SSL
admin12c.sysco.no:80
Non SSL
Memory: 1.5 GB
File Systems: Local
Version: Oracle HTTP Server 12C
OS: Oracle Linux 6.5
Hypervisor: Oracle VM
ohs01.sysco.no
OHS01IP:7777
Virtual host Administration Server
OHS01IP:7777
Virtual host Cluster Managed Servers
Memory: 1.5 GB
File Systems: Local
Version: Oracle HTTP Server 12C
OS: Oracle Linux 6.5
Hypervisor: Oracle VM
ohs02.sysco.no
OHS02IP:7777
Virtual host Administration Server
OHS02IP:7777
Virtual host Cluster Managed Servers
Memory: 1.5 GB
File Systems: Local
Version: Oracle HTTP Server 12C
OS: Oracle Linux 6.5
Hypervisor: Oracle VM
weblogic01.sysco.no
AdminServer
VIP: 192.180.56.10
Port: 9001
WLS_01
VIP: 192.180.56.11
Port: 9003
Cluster
Memory: 2.0 GB
File Systems: Shared
Version: Oracle Weblogic Server 12C
OS: Oracle Linux 6.5
Hypervisor: Oracle VM
weblogic02.sysco.no
WLS_02
VIP: 192.180.56.12
Port: 9003
Memory: 2.0 GB
File Systems: Shared
Version: Oracle Weblogic Server 12C
OS: Oracle Linux 6.5
Hypervisor: Oracle VM
Storagehost.sysco.no
/export/fsadm
/export/fsbinaries01
/export/fsm01
/export/fsbinaries02
/export/fsm02
/export/fsdp
/export/fsapp
/export/fscluster
Memory: 2.5 GB
SATA Controller: 16 Ports
Version: Oracle ZFS Storage Appliance Simulator
OS: Solaris
Hypervisor: Oracle VM

3. Components

This architecture is deployed on a laptop using Oracle Virtual VM and Oracle Linux so these are the components.

3.1. Hardware

Laptop

Memory: 16 GB
Processor: 1 socket, 4 cores and 2 threads so there are 8 VCPUs.
Speed: 2.49 GHz

Virtual servers

SERVER	IP	Description	Memory in GB	OS
lbohs.sysco.no	192.180.56.190	Load balancer	1.5	Oracle Linux 6.5
ohs01.sysco.no	192.180.56.191	Web server	1.5	Oracle Linux 6.5
ohs02.sysco.no	192.180.56.192	Web server	1.5	Oracle Linux 6.5
weblogic01.sysco.no	192.180.56.200	Application server	2.0	Oracle Linux 6.5
weblogic02.sysco.no	192.180.56.201	Application server	2.0	Oracle Linux 6.5
storagehost.sysco.no	192.180.56.100	Storage	2.5	Solaris

File system

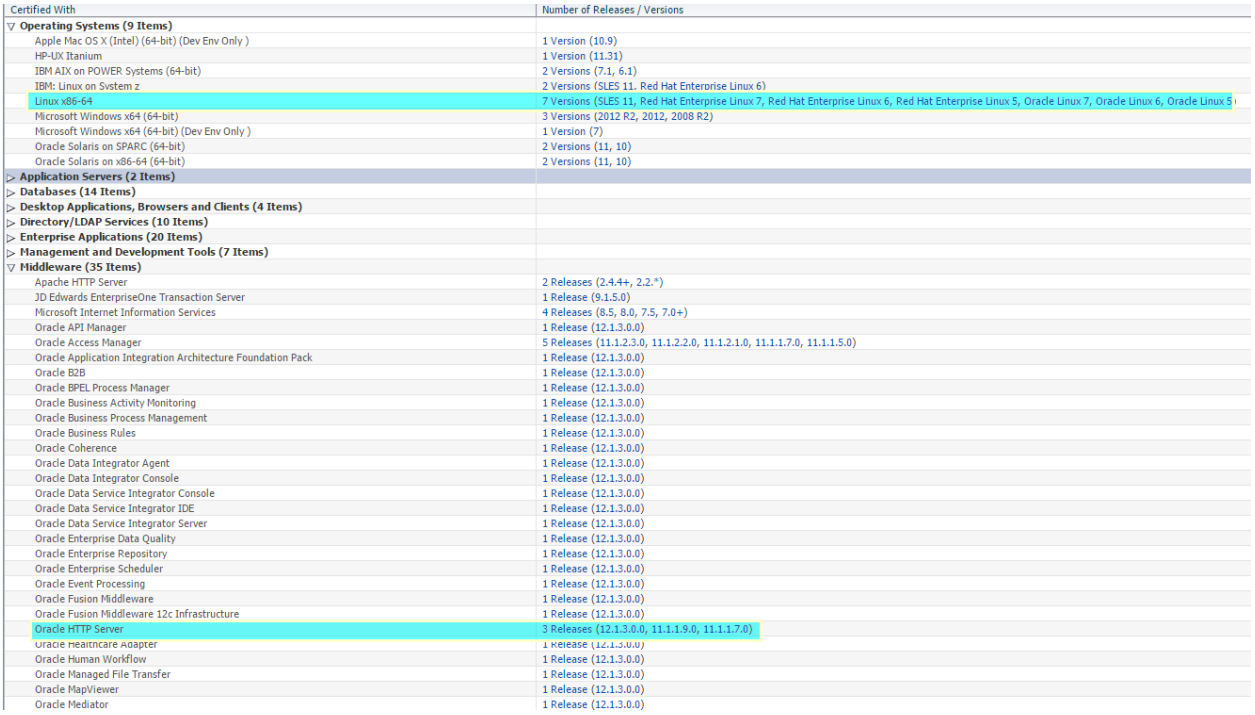
It is important to remark that in order to simulate the high availability of the Administration Server the Oracle ZFS simulator is used as a shared storage. In addition binaries and managed servers will be installed on these file systems [2].

3.2. Software

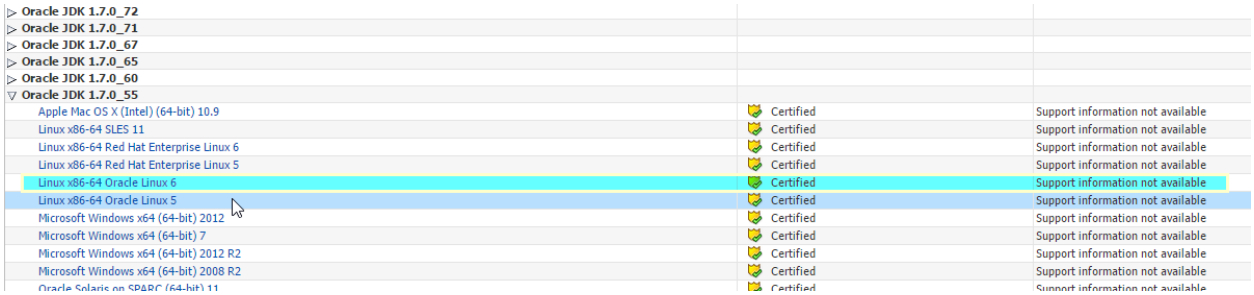
This is the list of products to install.

Product	Version	Installer
Oracle Weblogic Server	12.1.3	V44413-01.zip (fmw_12.1.3.0.0_wls.jar)
Java Development Kit	7u55	jdk-7u55-linux-x64.gz
Oracle HTTP Server	12.1.3	V44417-01.zip (fmw_12.1.3.0.0_ohs_linux64.bin)
Operating System Packages		compat-libcap1-1.10 compat-libstdc++-33-3.2.3 libstdc++-devel gcc-c++ libaio-devel-0.3.107

Before installing review the certification. According to [5] this configuration is supported by Oracle as can be seen in the following screens.



Certified With	Number of Releases / Versions
Operating Systems (9 Items)	
Apple Mac OS X (Intel) (64-bit) (Dev Env Only)	1 Version (10.9)
HP-UX Itanium	1 Version (11.31)
IBM AIX on POWER Systems (64-bit)	2 Versions (7.1, 6.1)
IBM: Linux on System z	2 Versions (SLES 11. Red Hat Enterprise Linux 6)
Linux x86-64	7 Versions (SLES 11, Red Hat Enterprise Linux 7, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 5, Oracle Linux 7, Oracle Linux 6, Oracle Linux 5
Microsoft Windows x64 (64-bit)	3 Versions (2012 R2, 2012, 2008 R2)
Microsoft Windows x64 (64-bit) (Dev Env Only)	1 Version (7)
Oracle Solaris on SPARC (64-bit)	2 Versions (11, 10)
Oracle Solaris on x86-64 (64-bit)	2 Versions (11, 10)
Application Servers (2 Items)	
Databases (14 Items)	
Desktop Applications, Browsers and Clients (4 Items)	
Directory/LDAP Services (10 Items)	
Enterprise Applications (20 Items)	
Management and Development Tools (7 Items)	
Middleware (35 Items)	
Apache HTTP Server	2 Releases (2.4.4+, 2.2.*)
JD Edwards EnterpriseOne Transaction Server	1 Release (9.1.5.0)
Microsoft Internet Information Services	4 Releases (8.5, 8.0, 7.5, 7.0+)
Oracle API Manager	1 Release (12.1.3.0.0)
Oracle Access Manager	5 Releases (11.1.2.3.0, 11.1.2.2.0, 11.1.2.1.0, 11.1.1.7.0, 11.1.1.5.0)
Oracle Application Integration Architecture Foundation Pack	1 Release (12.1.3.0.0)
Oracle B2B	1 Release (12.1.3.0.0)
Oracle BPEL Process Manager	1 Release (12.1.3.0.0)
Oracle Business Activity Monitoring	1 Release (12.1.3.0.0)
Oracle Business Process Management	1 Release (12.1.3.0.0)
Oracle Business Rules	1 Release (12.1.3.0.0)
Oracle Coherence	1 Release (12.1.3.0.0)
Oracle Data Integrator Agent	1 Release (12.1.3.0.0)
Oracle Data Integrator Console	1 Release (12.1.3.0.0)
Oracle Data Service Integrator Console	1 Release (12.1.3.0.0)
Oracle Data Service Integrator IDE	1 Release (12.1.3.0.0)
Oracle Data Service Integrator Server	1 Release (12.1.3.0.0)
Oracle Enterprise Data Quality	1 Release (12.1.3.0.0)
Oracle Enterprise Repository	1 Release (12.1.3.0.0)
Oracle Enterprise Scheduler	1 Release (12.1.3.0.0)
Oracle Event Processing	1 Release (12.1.3.0.0)
Oracle Fusion Middleware	1 Release (12.1.3.0.0)
Oracle Fusion Middleware 12c Infrastructure	1 Release (12.1.3.0.0)
Oracle HTTP Server	3 Releases (12.1.3.0.0, 11.1.1.9.0, 11.1.1.7.0)
Oracle Healthcare Adapter	1 Release (12.1.3.0.0)
Oracle Human Workflow	1 Release (12.1.3.0.0)
Oracle Managed File Transfer	1 Release (12.1.3.0.0)
Oracle MapViewer	1 Release (12.1.3.0.0)
Oracle Mediator	1 Release (12.1.3.0.0)



Oracle JDK 1.7.0_72		
Oracle JDK 1.7.0_71		
Oracle JDK 1.7.0_67		
Oracle JDK 1.7.0_65		
Oracle JDK 1.7.0_60		
Oracle JDK 1.7.0_55		
Apple Mac OS X (Intel) (64-bit) 10.9	Certified	Support information not available
Linux x86-64 SLES 11	Certified	Support information not available
Linux x86-64 Red Hat Enterprise Linux 6	Certified	Support information not available
Linux x86-64 Red Hat Enterprise Linux 5	Certified	Support information not available
Linux x86-64 Oracle Linux 6	Certified	Support information not available
Linux x86-64 Oracle Linux 5	Certified	Support information not available
Microsoft Windows x64 (64-bit) 2012	Certified	Support information not available
Microsoft Windows x64 (64-bit) 7	Certified	Support information not available
Microsoft Windows x64 (64-bit) 2012 R2	Certified	Support information not available
Microsoft Windows x64 (64-bit) 2008 R2	Certified	Support information not available
Oracle Solaris on SPARC (64-bit) 11	Certified	Support information not available

3.3. Domains

The configuration of Oracle HTTP Server 12C is similar to the Weblogic server configuration. In previous versions like 11G Oracle HTTP Server did not need a domain. These domains are defined within this document.

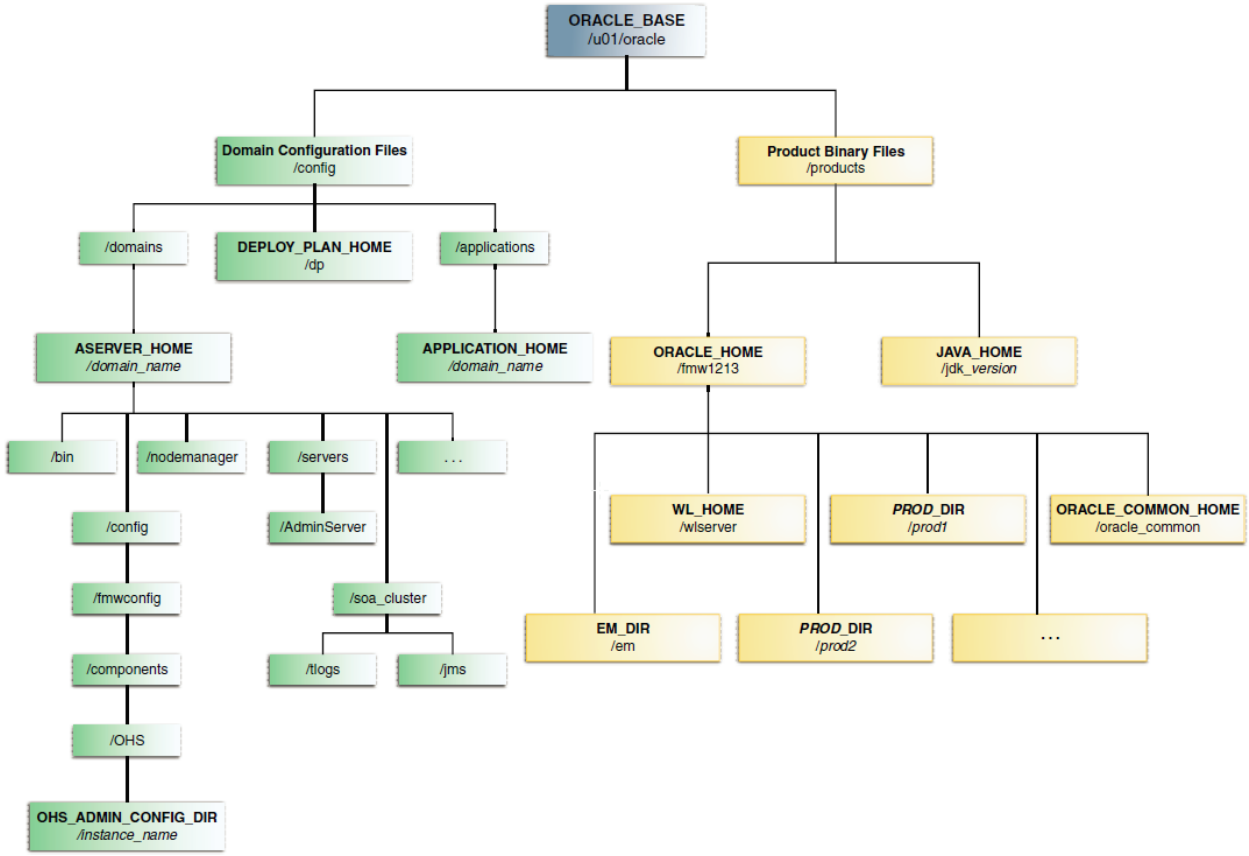
- The load balancer
- The ohs1 as part of the web layer
- The ohs2 as part of the web layer
- The domain for the application layer

All of these domains use the same name “incadomain”

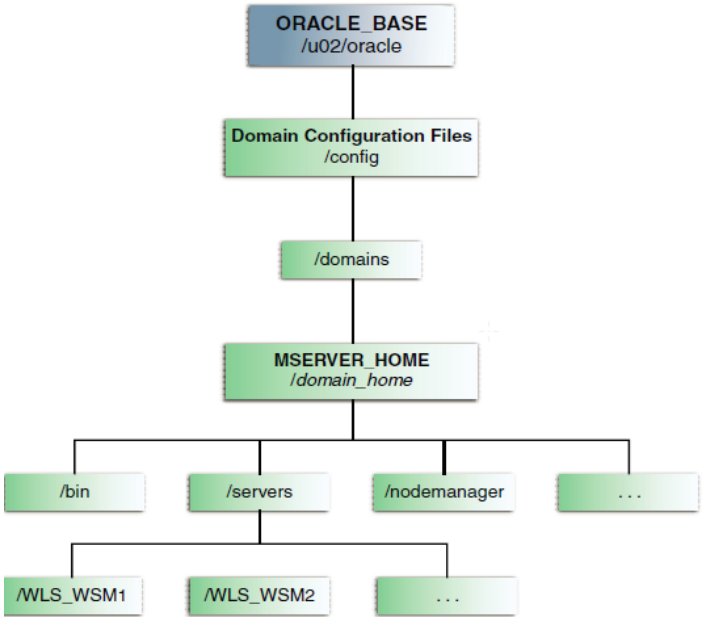
4. File system preparation

According to [1] these is a suitable structure to implement a Weblogic server with high availability.

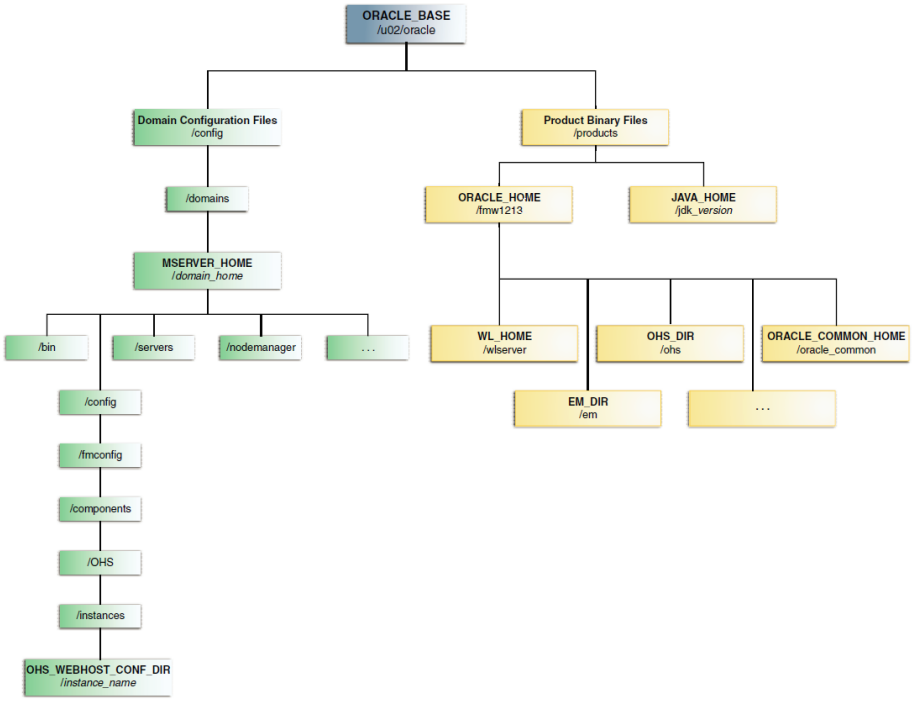
“Recommended Shared Storage Directory Structure for an Enterprise Deployment” [1]



"Recommended Local Storage Directory Structure for an Application Tier Host Computer in an Enterprise Deployment" [1]



"Recommended Local Storage Directory Structure for a Web Tier Host Computer in an Enterprise Deployment" [1]



The difference between the topology developed in this document and that proposed by [1] is that application tier host (managed servers) use shared storages. These are the steps to configure the file systems.

4.1. Oracle ZFS configuration

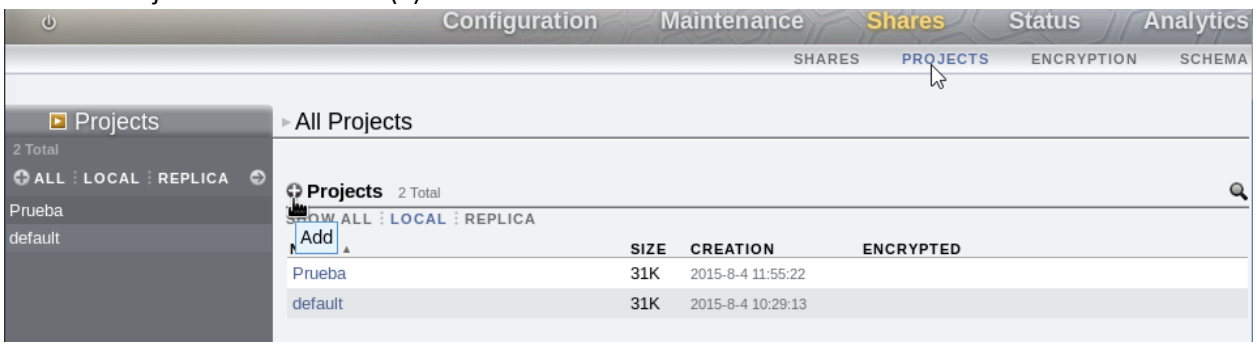
After analyzing the structures provided by Oracle in [1] and taking into account that managed server will use shared storages. This is the list of file systems created on the Oracle ZFS storage simulator.

File System	MACHINE	DESCRIPTION	U	Comments
fsbinaries01	weblogic01	Products	u01	Products binary files
fsms01	weblogic01	Config	u02	Managed Server
fsbinaries02	weblogic02	Products	u01	Products binary files
fsms02	weblogic02	Config	u02	Managed Server
fsadm	weblogic01 (contingency weblogic02)	Config	u01	Administration Server
fsapp	weblogic01, weblogic02	Applications	u01	Applications developed
fsdp	weblogic01, weblogic02	Deployment plans	u01	Deployment plans
fscluster	weblogic01, weblogic02	JMS, Tlogs	u01	JMS, Tlogs

The recommended protocol to implement this architecture is NFS V4 [2] and the instruction to create these file systems were taken from [3]. Thus, these are the screens related to these tasks.

1. Create a new project

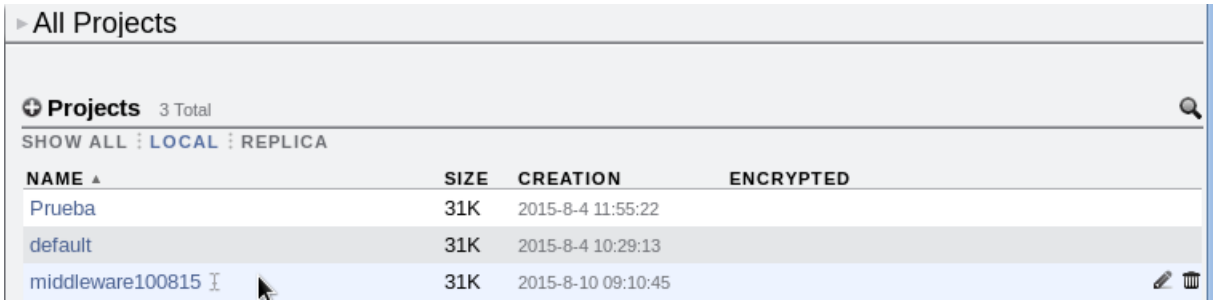
Shares > Projects > Click on Add (+)



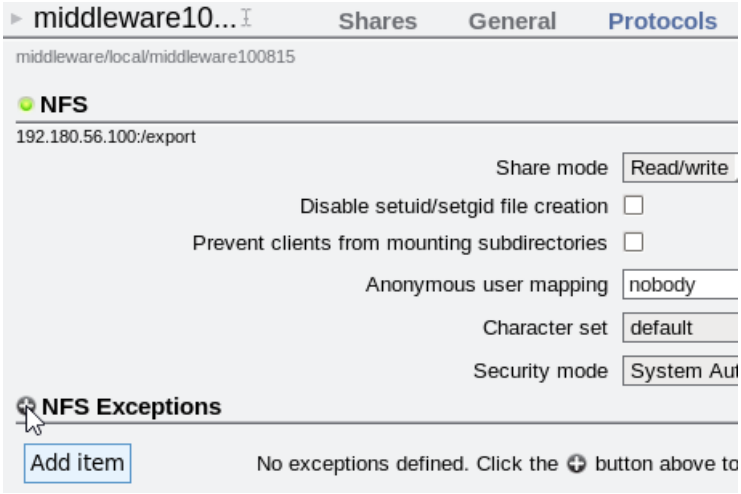
In this case the name is middleware 100815. Click on Apply

2. Changing the project's properties

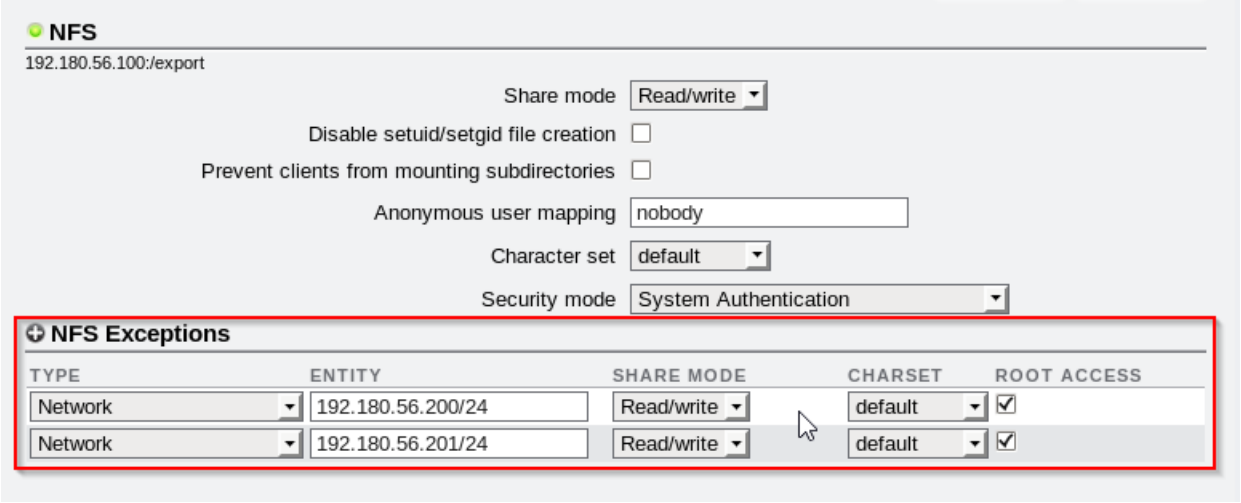
Double click on the project that has just created



Click on Protocols > NFS Exceptions

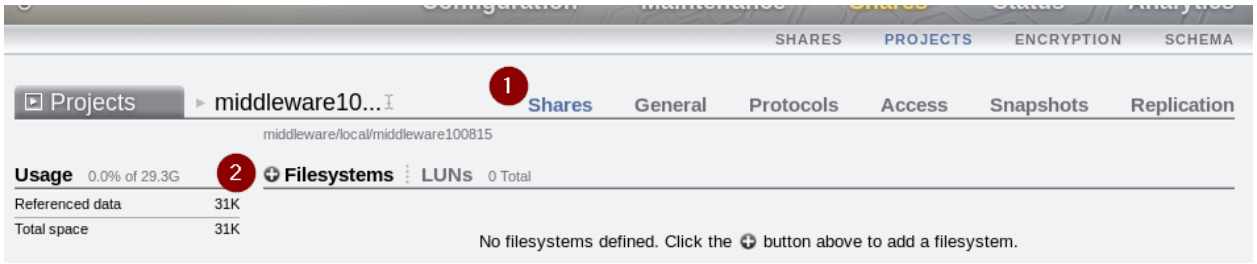


Adding servers that will access to the storage

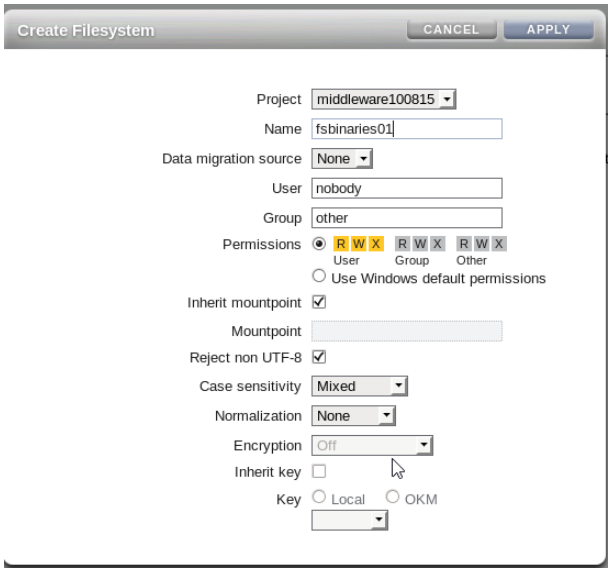


3. Creating file systems

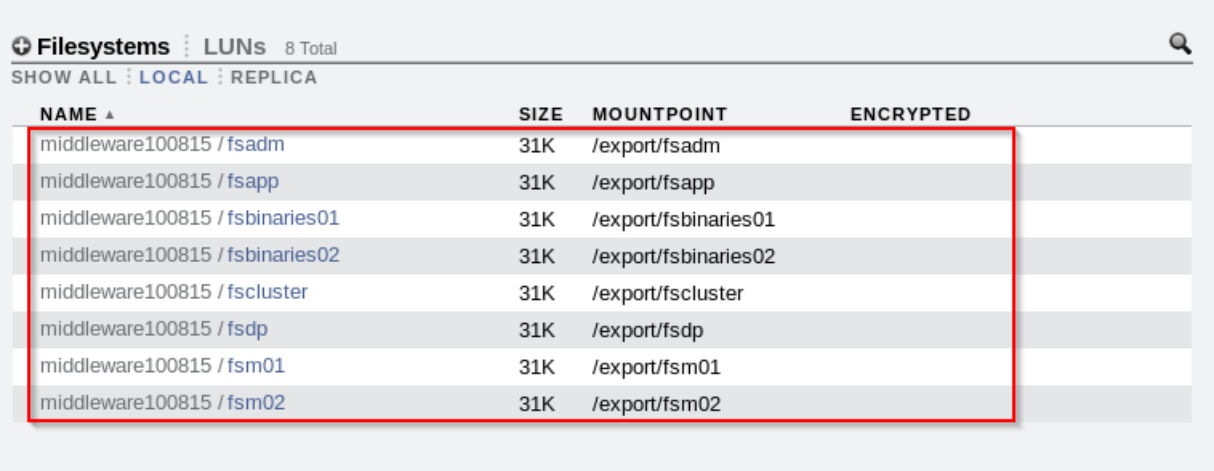
Click on Shares > Filesystems



Fill this form in a similar way and click on Apply.



At the end this the list of file systems created.



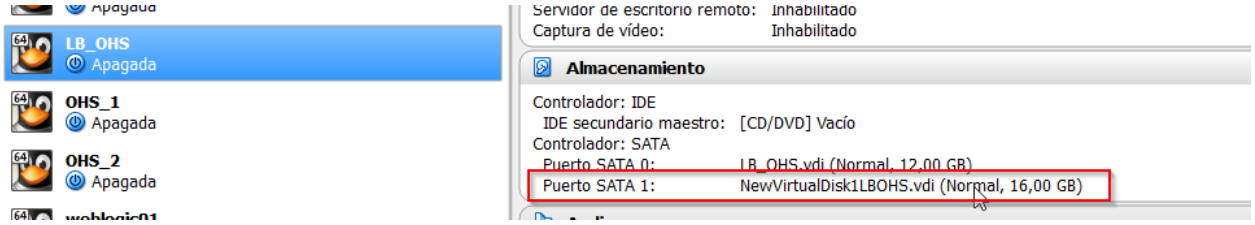
In this section, the file systems were created on the shared storage. In further activities they will be mounted on weblogic01.sysco.no and weblogic02.sysco.no.

4.2. Local storage configuration

The load balancer and web layer use Oracle HTTP Server so they are installed on local disks. In order to avoid competition with the Operating System an additional virtual disk is added for each one of the following severs.

- lbohs.sysco.no
- ohs01.sysco.no
- ohs02.sysco.no

These virtual disks has to be formatted and mounted on each one of these machines. For example, lbohs.sysco.no has



In order to format that disk, you have to use the root user to run:

```
fdisk /dev/sdb
```

The same procedure is applied on ohs01.sysco.no and ohs02.sysco.no.

5. Machines preparation

This section includes the activities done on the machines in order to support the installation of configuration of the topology.

5.1. Networking configuration

As was stated in 2.1 there is not a DNS so machine names have to be registered in the hosts files.

SERVER	IP	Description
lbohs.sysco.no	192.180.56.190	Load balancer
ohs01.sysco.no	192.180.56.191	Web server
ohs02.sysco.no	192.180.56.192	Web server
weblogic01.sysco.no	192.180.56.200	Application server
weblogic02.sysco.no	192.180.56.201	Application server
storagehost.sysco.no	192.180.56.100	Storage

In addition, a set of virtual IPs are used to implement the Administration Server high availability and the possibility of configuring whole server migration. Just to remember *"A virtual IP address is an unused IP Address which belongs to the same subnet as the host's primary IP address. It is assigned to a host manually. Individual Managed Servers within the Oracle WebLogic Server domain are configured to listen on this IP Address."* [1]. This is the list of virtual IPs.

Machine	Virtual IP	Virtual host name	Weblogic server	Comments
weblogic01.sysco.no	192.180.56.10	admvhost.sysco.no	AdminServer	Administration server
weblogic01.sysco.no	192.180.56.11	ms01vhost.sysco.no	WLS_01	Managed server 01
weblogic02.sysco.no	192.180.56.12	ms02vhost.sysco.no	WLS_02	Managed server 02

Furthermore, two additional virtual IPs are defined to create a load balancer.

Machine	Virtual IP	Virtual host name	Comments
lbohs.sysco.no	192.180.56.20	admin12c.sysco.no	Administration server requests
lbohs.sysco.no	192.180.56.21	app12c.sysco.no	Applications requests

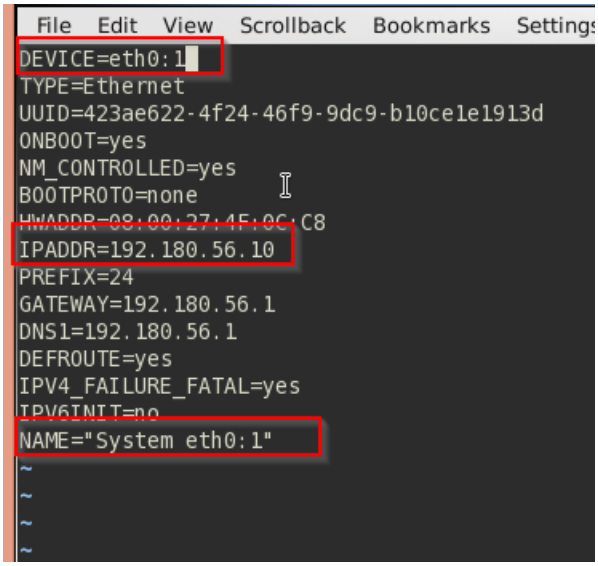
5.1.1. Configuring virtual IPs

According to the previous section, this is the configuration for each server.

For weblogic01.sysco.no

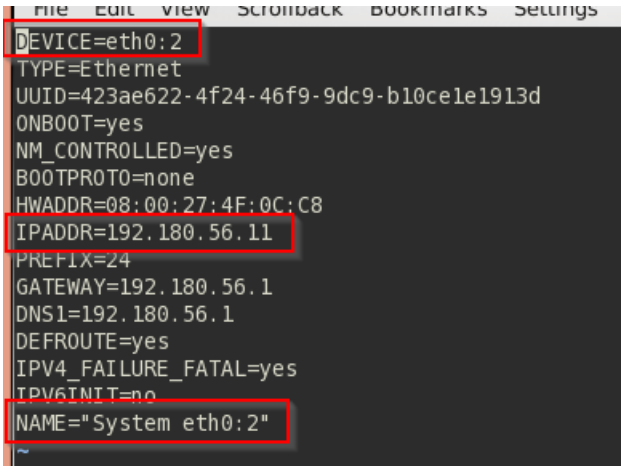
```
cd /etc/sysconfig/network-scripts
cp ifcfg-eth0 ifcfg-eth0\:1
vi ifcfg-eth0:1
```

Modify the file according to this picture to set the DEVICE, IPPADDR and NAME.




```
cd /etc/sysconfig/network-scripts
cp ifcfg-eth0 ifcfg-eth0\:2
vi ifcfg-eth0:2
```

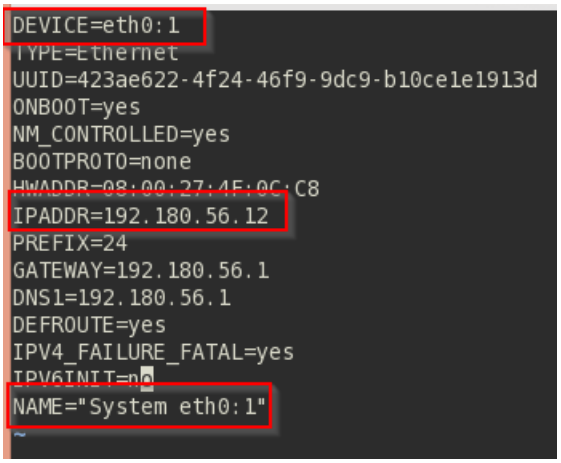
Modify the file according to this picture to set the DEVICE, IPPADDR and NAME.



For weblogic02.sysco.no

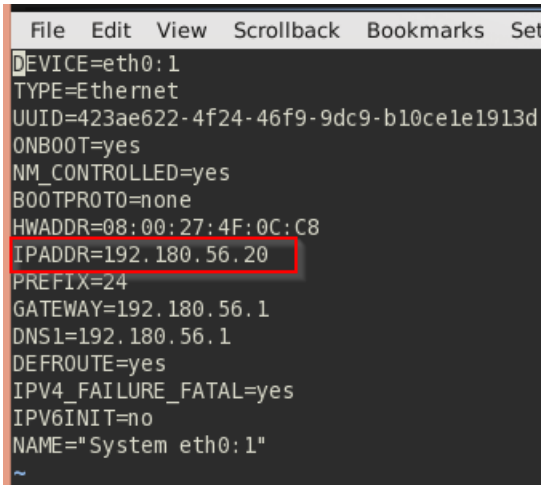
```
cd /etc/sysconfig/network-scripts
cp ifcfg-eth0 ifcfg-eth0\:1
```

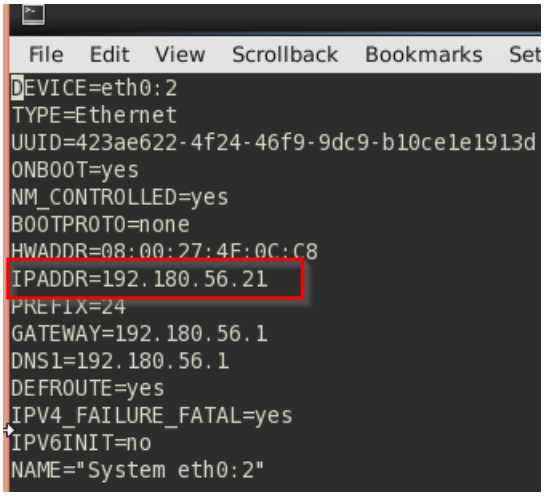
```
vi ifcfg-eth0:1
```



For lbohs.sysco.no

The same steps are executed, these are the results.





5.1.2. Modifying host files

In this section host files are modified because of the lack of a DNS server. These are the results.

lbohs.sysco.no

```
[root@lbohs ~]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.180.56.190   lbohs.sysco.no
192.180.56.191   ohs01.sysco.no
192.180.56.192   ohs02.sysco.no
192.180.56.20    admin12c.sysco.no
192.180.56.21    app12c.sysco.no
[root@lbohs ~]#
```

ohs01.sysco.no

```
[root@ohs01 network-scripts]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.180.56.191    ohs01.sysco.no
192.180.56.190    lbohs.sysco.no
192.180.56.192    ohs02.sysco.no
192.180.56.200    weblogic01.sysco.no
192.180.56.201    weblogic02.sysco.no
192.180.56.10     admvhost.sysco.no
192.180.56.11     ms01vhost.sysco.no
192.180.56.12     ms02vhost.sysco.no
192.180.56.20     admin12c.sysco.no
192.180.56.21     app12c.sysco.no
```

ohs02.sysco.no

```
[root@ohs02 ~]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.180.56.192    ohs02.sysco.no
192.180.56.190    lbohs.sysco.no
192.180.56.191    ohs01.sysco.no
192.180.56.200    weblogic01.sysco.no
192.180.56.201    weblogic02.sysco.no
192.180.56.10     admvhost.sysco.no
192.180.56.11     ms01vhost.sysco.no
192.180.56.12     ms02vhost.sysco.no
192.180.56.20     admin12c.sysco.no
192.180.56.21     app12c.sysco.no
```

weblogic01.sysco.no

```
[root@weblogic01 network-scripts]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.180.56.201    weblogic02.sysco.no
192.180.56.200    weblogic01.sysco.no
192.180.56.191    ohs01.sysco.no
192.180.56.192    ohs02.sysco.no
192.180.56.100    storagehost.sysco.no
192.180.56.10     admvhost.sysco.no
192.180.56.11     ms01vhost.sysco.no
192.180.56.12     ms02vhost.sysco.no
192.180.56.20     admin12c.sysco.no
192.180.56.21     app12c.sysco.no
```

weblogic02.sysco.no

```
[root@weblogic02 network-scripts]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.180.56.201    weblogic02.sysco.no
192.180.56.200    weblogic01.sysco.no
192.180.56.191    ohs01.sysco.no
192.180.56.192    ohs02.sysco.no
192.180.56.100    storagehost.sysco.no
192.180.56.10     admvhost.sysco.no
192.180.56.11     ms01vhost.sysco.no
192.180.56.12     ms02vhost.sysco.no
192.180.56.20     admin12c.sysco.no
192.180.56.21     app12c.sysco.no
```

5.2. Creating directories

In section 4, a distribution of directories is shown. These directories are implemented locally for web servers and on shared storages for application servers. These are the directories created in this document using the root user.

For weblogic01.sysco.no

```
/u01/oracle/config
/u01/oracle/products
/u02/oracle/config
/u01/oracle/config/dp
/u01/oracle/config/applications/incadomain
```

For weblogic02.sysco.no

```
/u02/oracle/config
/u01/oracle/products
/u01/oracle/config/dp
/u01/oracle/config/applications/incadomain
/u01/oracle/config/domains/incadomain/incacluster
```

For lbohs.sysco.no, ohs01.sysco.no and ohs02.sysco.no

```
/u02/oracle/config
/u02/oracle/products
/u02/oracle/config/domains
/u02/oracle/config/domains/incadomain
```

5.3. Mounting file systems

In this section, the process of mounting file systems is show for each one of the machines. These activities are executed using the root user.

For weblogic01.sysco.no

Modify the /etc/fstab file to include these lines

```
#
# /etc/fstab
# Created by anaconda on Mon Aug  3 09:42:37 2015
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/vg_weblogic01-lv_root /                       ext4    defaults        1 1
UUID=ad237def-badd-44a8-a182-a6c30d029db9 /boot                   ext4    defaults        1 2
/dev/mapper/vg_weblogic01-lv_swap swap                    swap    defaults        0 0
tmpfs                   /dev/shm                tmpfs   defaults        0 0
devpts                  /dev/pts                devpts  gid=5,mode=620  0 0
sysfs                   /sys                    sysfs   defaults        0 0
proc                    /proc                   proc    defaults        0 0
storagehost.sysco.no:/export/fsadm /u01/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsbinaries01 /u01/oracle/products nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsm01 /u02/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsdp /u01/oracle/config/dp nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsapp /u01/oracle/config/applications/incadomain nfs4 rw,bg,hard,nointr,proto=tcp
```

IMPORTANT: For weblogic01.sysco.no the folder /u01/oracle/config/domains/incadomain/incacluster will be created after creating the Domain. For that reason, in the previous picture, there is not any reference to the cluster folder

Execute this command

```
mount -a
```

For weblogic02.sysco.no

Modify the /etc/fstab file to include these lines

```
#
# /etc/fstab
# Created by anaconda on Mon Aug  3 09:42:37 2015
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/vg_weblogic01-lv_root /                       ext4    defaults        1 1
UUID=ad237def-badd-44a8-a182-a6c30d029db9 /boot                   ext4    defaults        1 2
/dev/mapper/vg_weblogic01-lv_swap swap                    swap    defaults        0 0
tmpfs                   /dev/shm                tmpfs   defaults        0 0
devpts                  /dev/pts                devpts  gid=5,mode=620  0 0
sysfs                   /sys                    sysfs   defaults        0 0
proc                    /proc                   proc    defaults        0 0
storagehost.sysco.no:/export/fsbinaries02 /u01/oracle/products nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsm02 /u02/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsdp /u01/oracle/config/dp nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsapp /u01/oracle/config/applications/incadomain nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fscluster /u01/oracle/config/domains/incadomain/incacluster nfs4 rw,bg,hard,nointr,proto=tcp
```

IMPORTANT: For weblogic02.sysco.no the cluster folder can be mounted without any problem as is shown in the previous picture. That is because in that machine the domain will be unpacked on /u02/oracle/config

Execute this command

```
mount -a
```

For ohs01.sysco.no, ohs02.sysco.no and lbohs.sysco.no

Modify the /etc/fstab file to include the remarked line.

```
#
# /etc/fstab
# Created by anaconda on Mon Aug  3 09:42:37 2015
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/vg_weblogic01-lv_root /                       ext4    defaults        1 1
UUID=ad237def-badd-44a8-a182-a6c30d029db9 /boot                   ext4    defaults        1 2
/dev/mapper/vg_weblogic01-lv_swap swap                    swap    defaults        0 0
tmpfs                   /dev/shm                tmpfs   defaults        0 0
devpts                  /dev/pts                devpts  gid=5,mode=620  0 0
sysfs                   /sys                    sysfs   defaults        0 0
proc                    /proc                   proc    defaults        0 0
/dev/sdb1               /u02/oracle             ext4    defaults        0 0
```

Execute this command

```
mount -a
```

5.4. Creating users, groups and giving privileges

In this section the oracle user and groups dba and oinstall are created. In addition, privileges for users and groups are given.

5.4.1. Creating operating system users and groups

According to [1] the oracle user and the groups called dba and oinstall must be created on each node. In addition, these users and groups must have the same ID in each machine. This table shows users and groups:

Name	Type	ID
oracle	User	501
oinstall	Group	502
dba	Group	503

Oracle will be member of oinstall and dba groups where oinstall is the main group.

Execute these commands on all the nodes: ohs01.sysco.no, ohs02.sysco.no, weblogic01.sysco.no, weblogic02.sysco.no, lbohs.sysco.no to create the user and groups [4].

```
groupadd -g 502 oinstall
groupadd -g 503 dba
useradd -c "Oracle software owner" -g oinstall -G dba oracle -u 501
passwd oracle
```

5.4.2. Setting privileges

In this section privileges are set for each server

lbohs.sysco.no

```
chown -R oracle:oinstall /u02/oracle
chmod -R 775 /u02/oracle
ls -ld /u02/oracle
```

ohs1.sysco.no

```
chown -R oracle:oinstall /u02/oracle
chmod -R 775 /u02/oracle
ls -ld /u02/oracle
```

ohs2.sysco.no

```
chown -R oracle:oinstall /u01/oracle
chmod -R 775 /u01/oracle
ls -ld /u01/oracle
```

weblogic01.sysco.no

```
chown -R oracle:oinstall /u01/oracle
chmod -R 775 /u01/oracle
ls -ld /u01/oracle

chown -R oracle:oinstall /u02/oracle
chmod -R 775 /u02/oracle
ls -ld /u02/oracle
```

weblogic02.sysco.no

```
chown -R oracle:oinstall /u01/oracle
chmod -R 775 /u01/oracle
ls -ld /u01/oracle

chown -R oracle:oinstall /u02/oracle
chmod -R 775 /u02/oracle
ls -ld /u02/oracle
```

6. Products Installation

6.1. JDKs

Previously 2 file systems (fsbinaries01 and fsbinaries02) were defined in order to install products. In this case we will work on this part of the file system. In addition, three local systems were defined for the web layer and balancer.

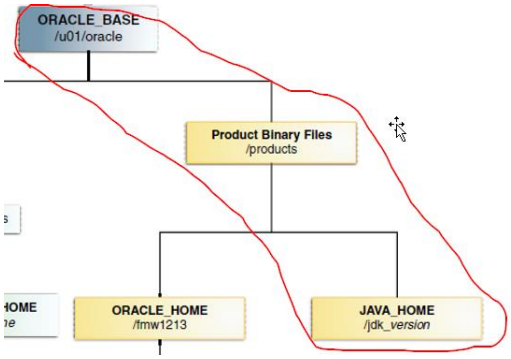


Figure that shows the path where JDK is installed

Machine	Mount Point	NFS
weblogic01.sysco.no	/u01/oracle/products	/export/fsbinaries01
weblogic02.sysco.no	/u01/oracle/products	/export/fsbinaries02
lbohs.sysco.no ohs01.sysco.no ohs02.sysco.no	/u02/oracle/products	Local file system

Table of file systems where products will be installed

In order to install the JDK execute these steps on weblogic01.sysco.no, weblogic02.sysco.no, lbohs.sysco.no, ohs01.sysco.no and ohs02.sysco.no.

a. Login with the Oracle user

b. Go to the directory where the product will be installed

```
cd /u0[1|2]/oracle/products/
```

c. Unpack the installer

```
tar zxvf [Installer path]/jdk-7u55-linux-x64.gz
```

6.2. Weblogic

This product is installed on weblogic01 and weblogic02. Execute the following steps in both machines.

Important: Take into account each server uses different storages to store products. Thus, copying inventories between servers is not necessary.

a. Create the ORACLE_HOME directory

```
mkdir /u01/oracle/products/fm1213
```

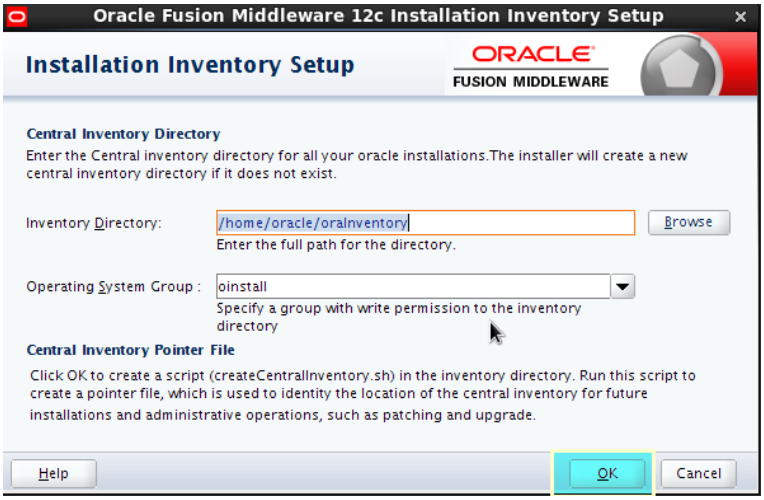
b. Set the JDK variables

```
export JAVA_HOME=/u01/oracle/products/jdk1.7.0_55
export PATH=$JAVA_HOME/bin:$PATH
```

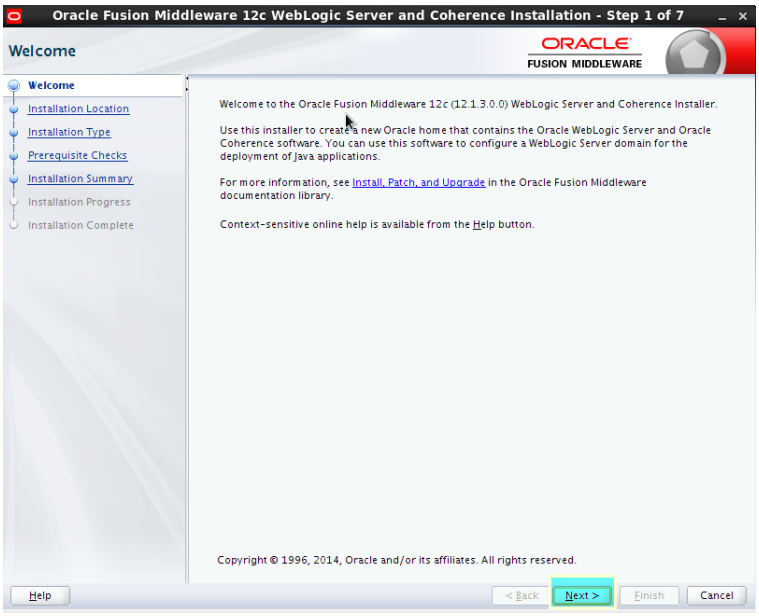
c. Run the weblogic installer.

```
java -d64 -jar [Installer path]/fmw_12.1.3.0.0_wls.jar
```

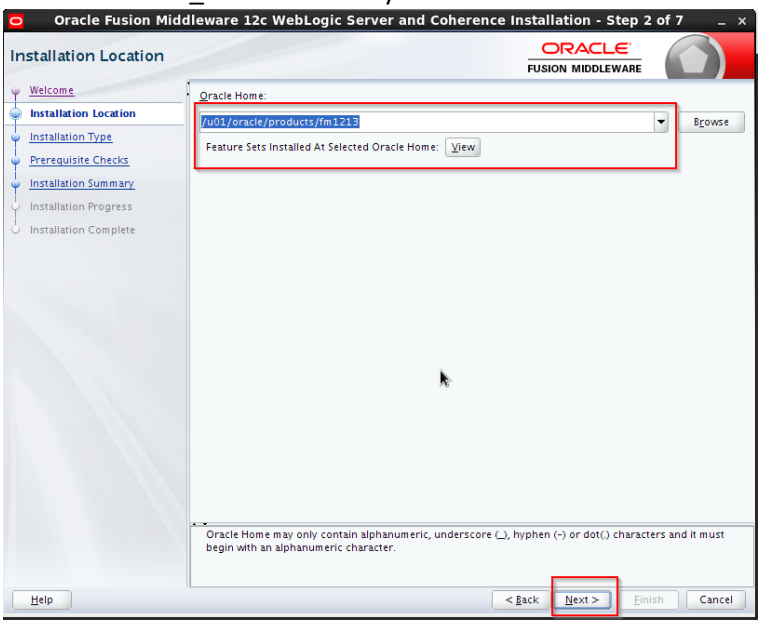
d. Select the inventory directory, the OS group and click on Ok



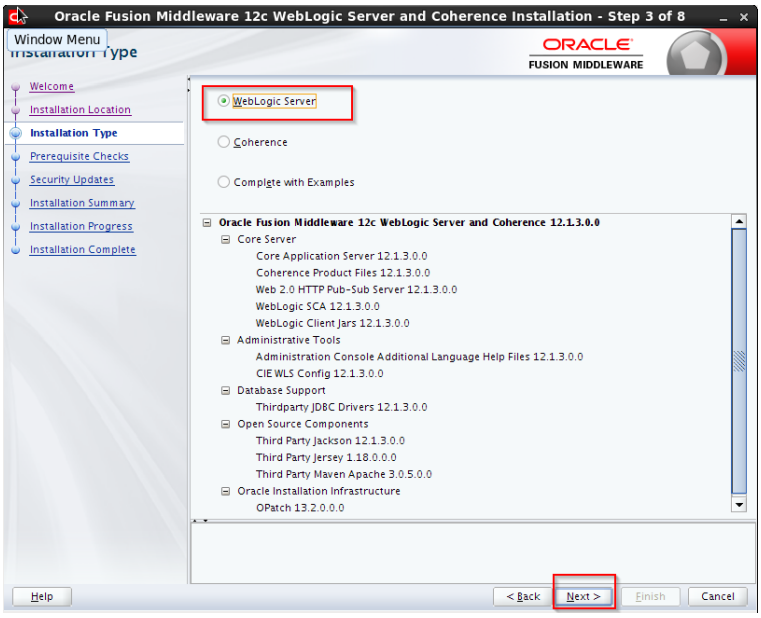
e. Click on Next



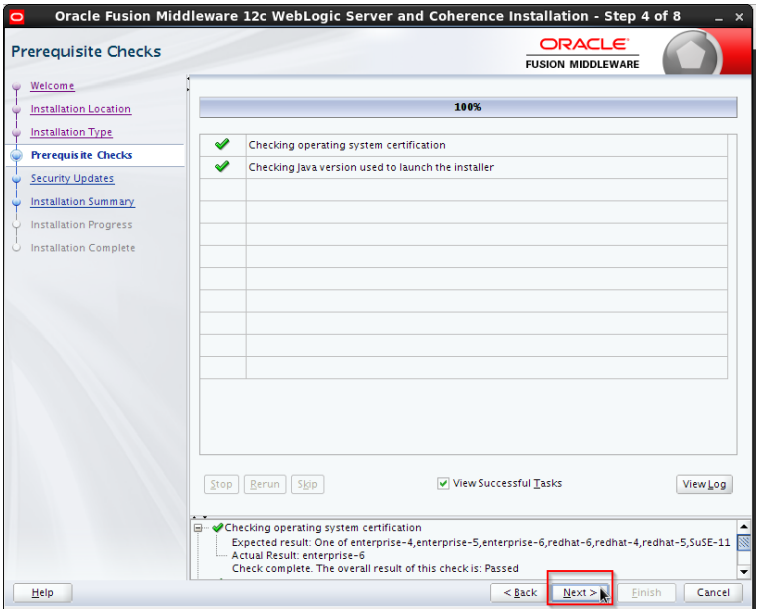
f. Set the ORACLE_HOME directory and click on Next



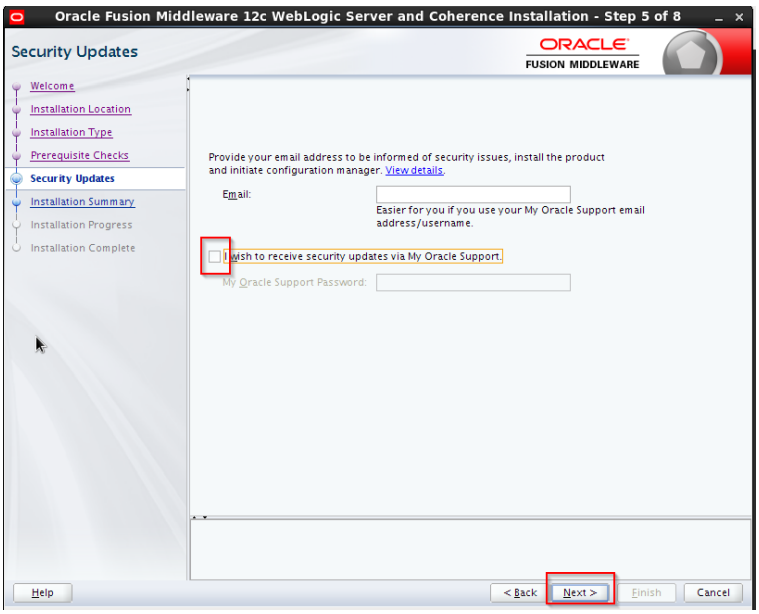
g. Select Weblogic Server and click on Next



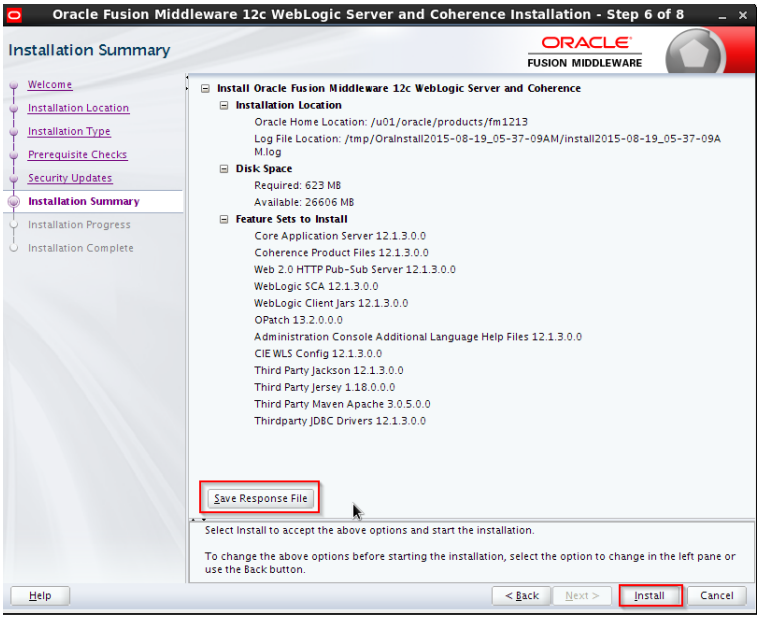
h. Click on Next



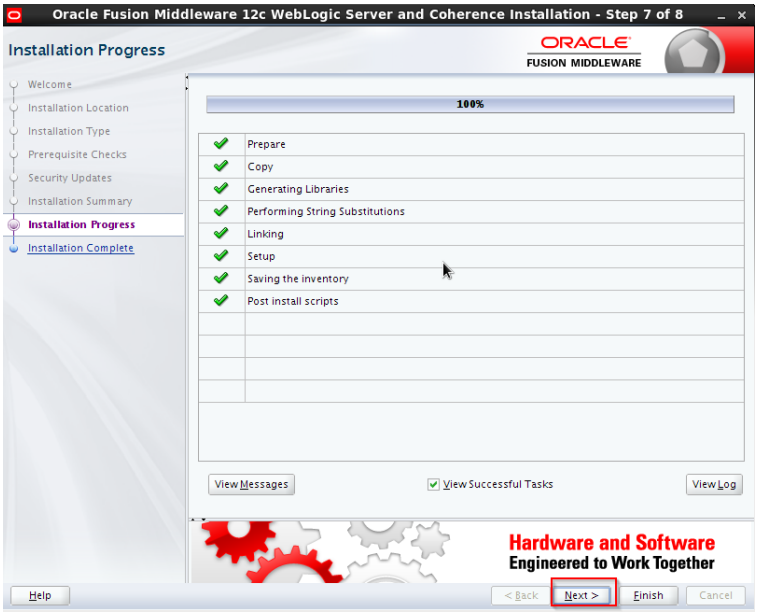
i. Uncheck the checkbox and click on Next



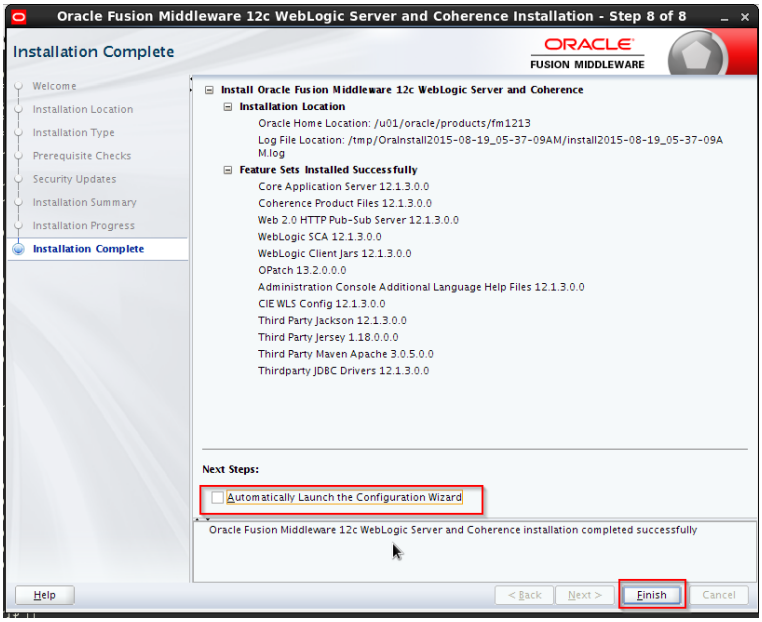
j. Click on Save Response File (it will be useful to automate future installations) and click on Install



k. Click on Next



l. Uncheck the checkbox and click on Finish



m. Make a backup of the installation

6.3. Oracle Http Server

This product is installed on ohs01.sysco.no, ohs02.sysco.no and lbohs.sysco.no. Execute the following steps in these machines.

a. Use the root user account to install operating system packages.

```
yum install compat-libcap1-1.10
yum install compat-libstdc++-33-3.2.3
yum install libstdc++-devel
yum install gcc-c++
```

```
yum install libaio-devel-0.3.107
```

b. After installing operating system packages, use the oracle user account to create the ORACLE_HOME.

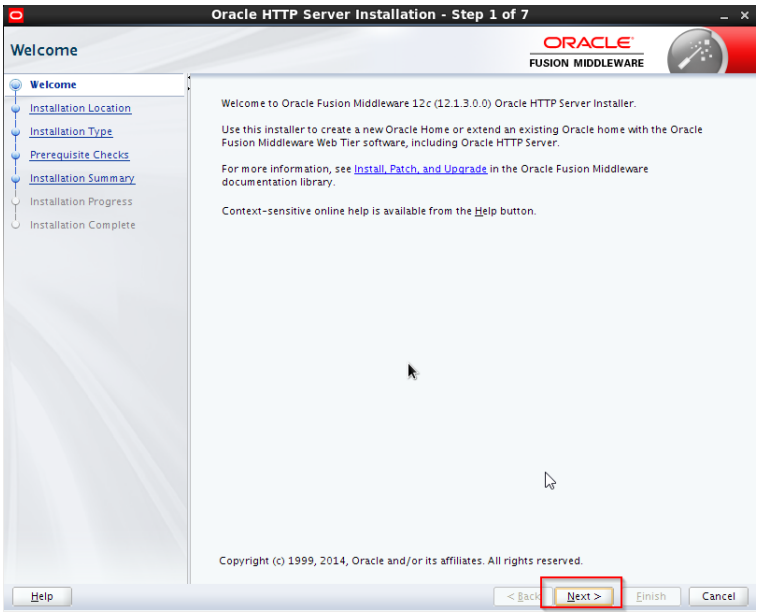
```
mkdir /u02/oracle/products/fm1213
```

c. Execute the installer

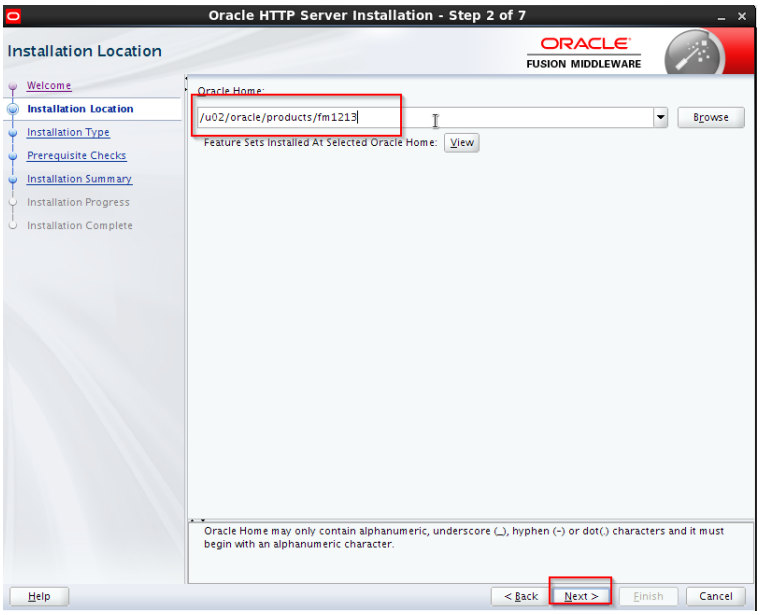
```
./fmw_12.1.3.0.0_ohs_linux64.bin
```

d. Click on Ok

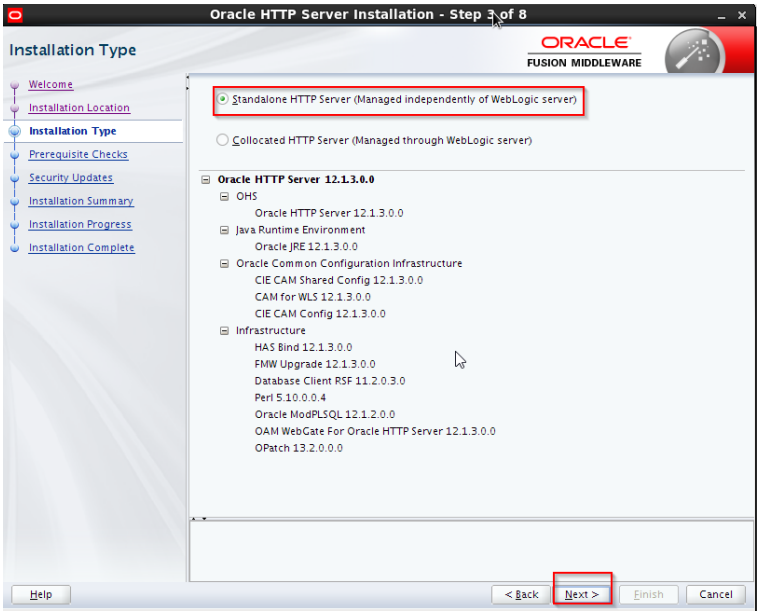
e. Click on Next



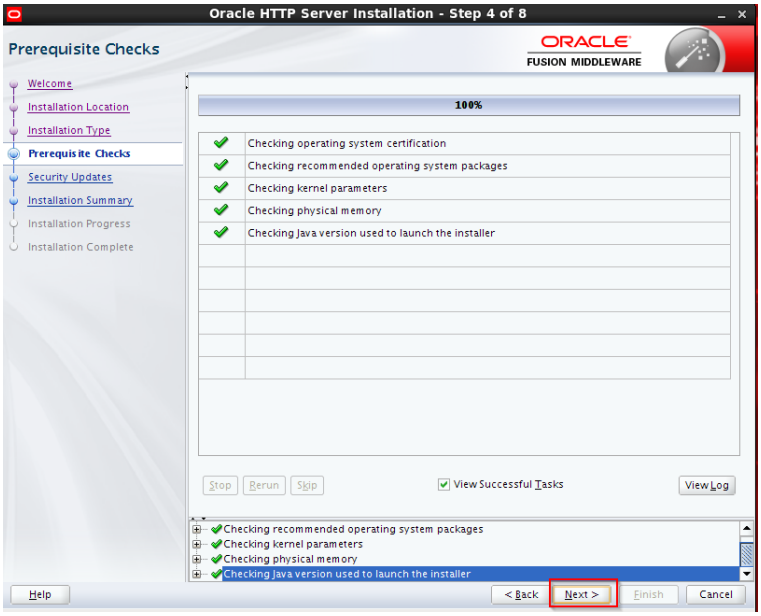
f. Set the ORACLE_HOME path and click on Next



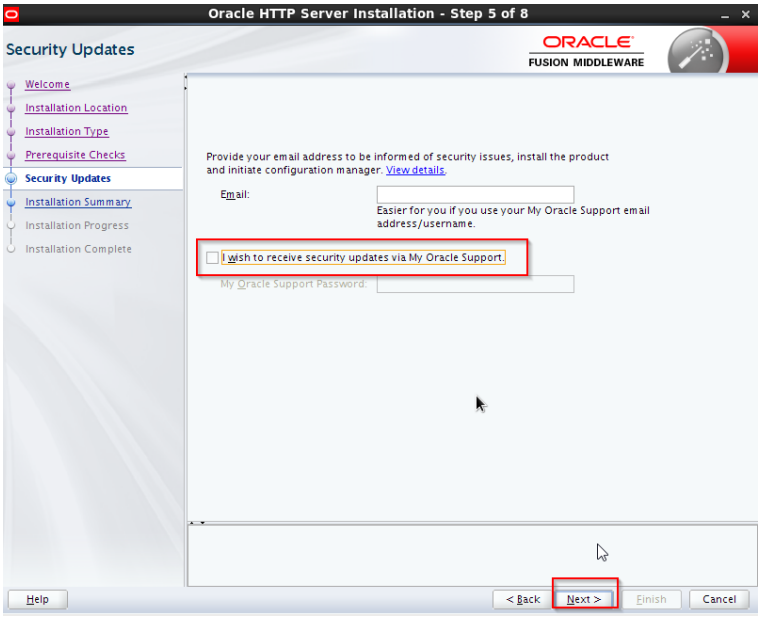
g. Select Standalone HTTP Server and click on Next



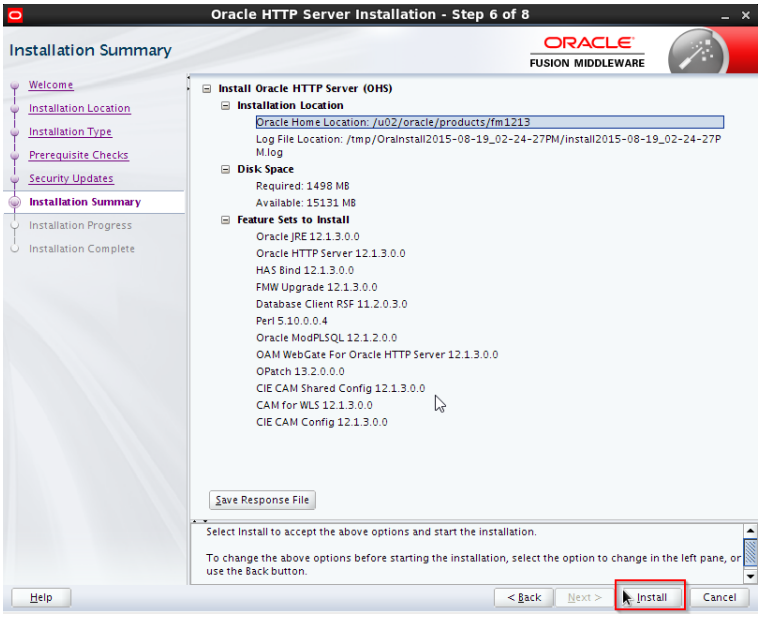
h. Click on Next



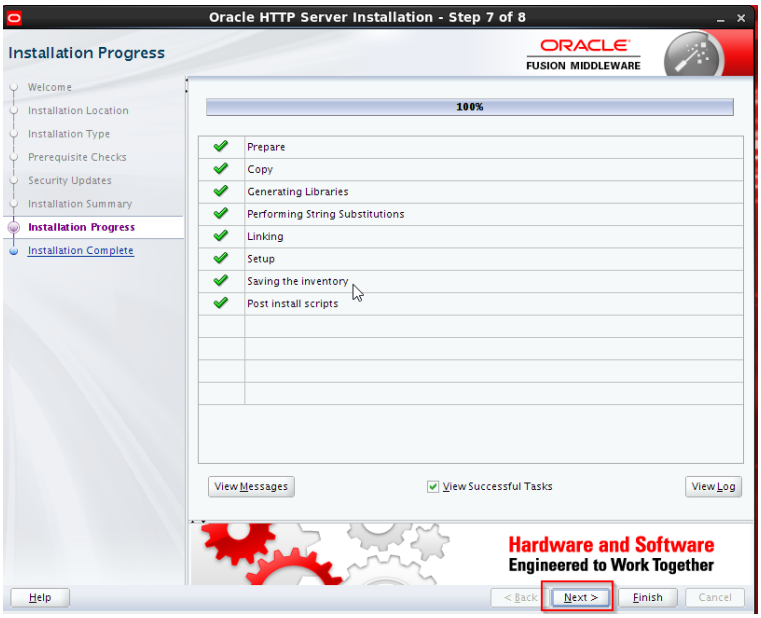
i. Uncheck the checkbox and click on Next



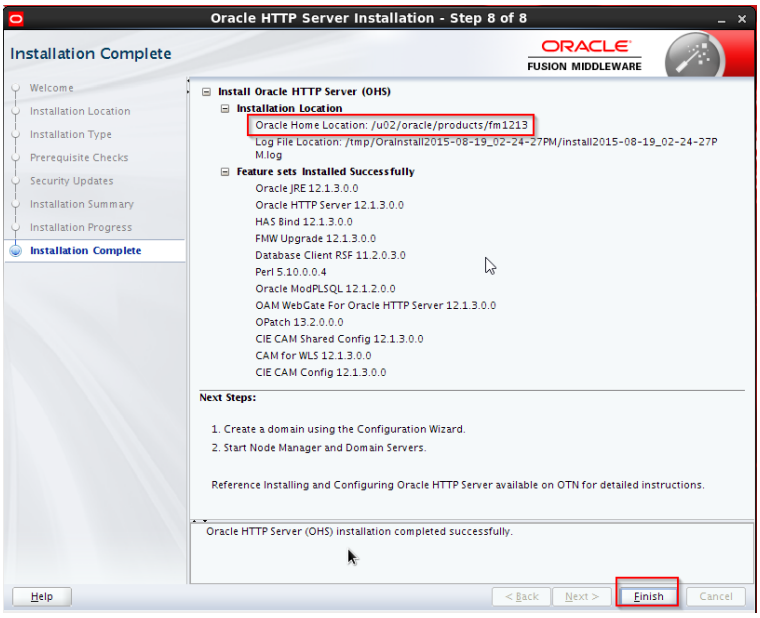
j. Click on Install



k. Click on Next



l. Click on Finish



m. Make a backup of the installation

7. Creating domains

7.1. Creating the load balancer domain

In this section a machine will be configured as a load balancer. The machine is **lbohs.sysco.no** and the OHS was installed in the previous section. In addition, a JVM was also installed because the Oracle HTTP Server 12C is configured to use an Oracle Weblogic Domain, which is different from previous versions like 11G.

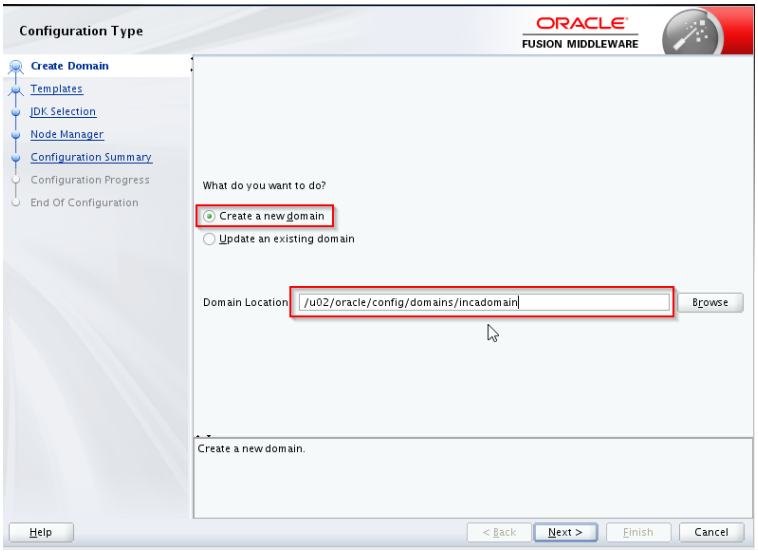
In order to configure the domain follow these steps.

a. Login with the oracle user account on **lbohs**.sysco.no**.**

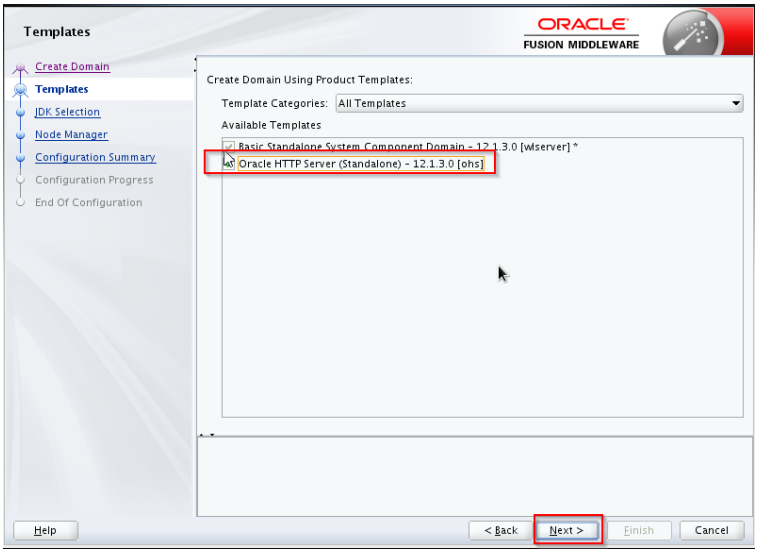
b. Run the configuration wizard

```
/u02/oracle/products/fm1213/oracle_common/common/bin/./config.sh
```

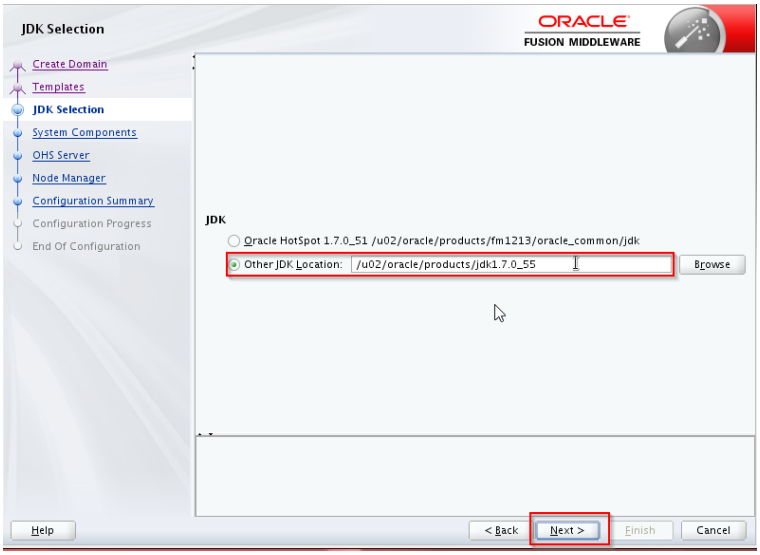
c. Select the option Create a new domain, set the domain location and click on Next.



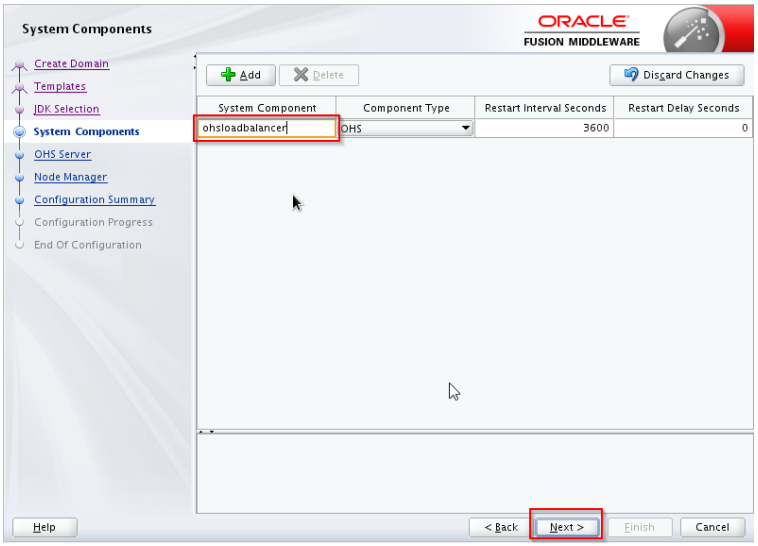
d. Mark the checkbox and click on Next



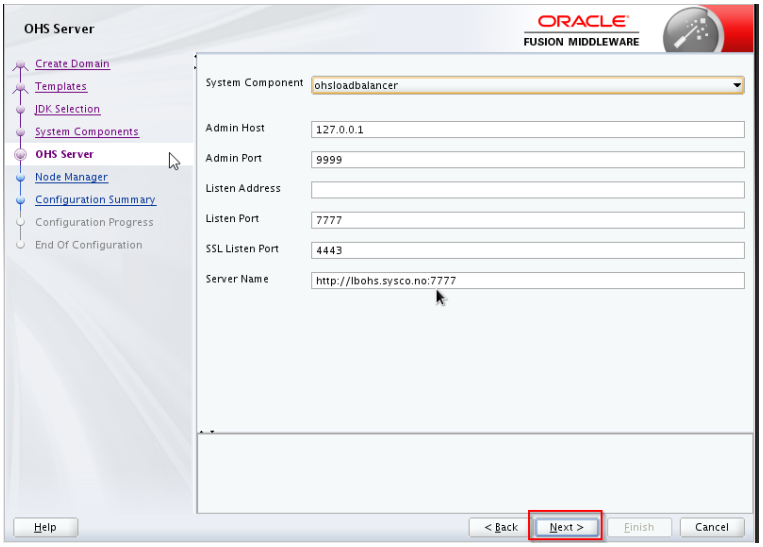
e. Specify the JDK location and click on Next



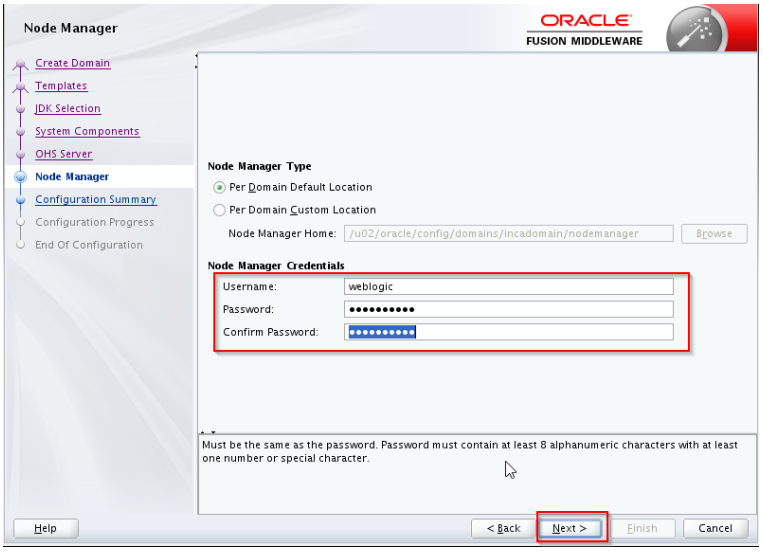
f. Specify a system component name and click on Next.



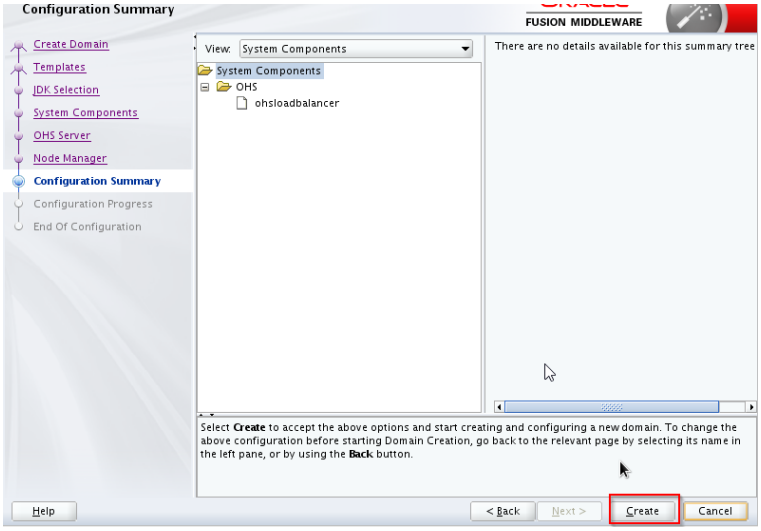
g. Modify values according to your needs and click on Next



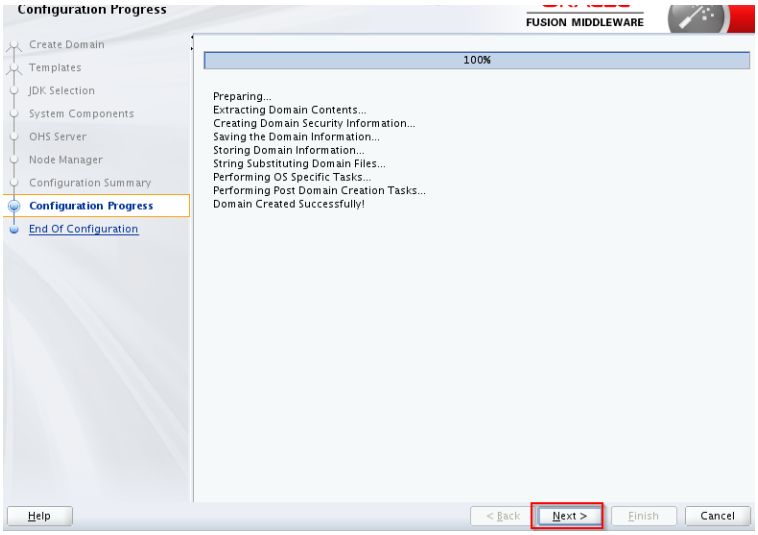
h. Set the node manager user and password and click on Next.



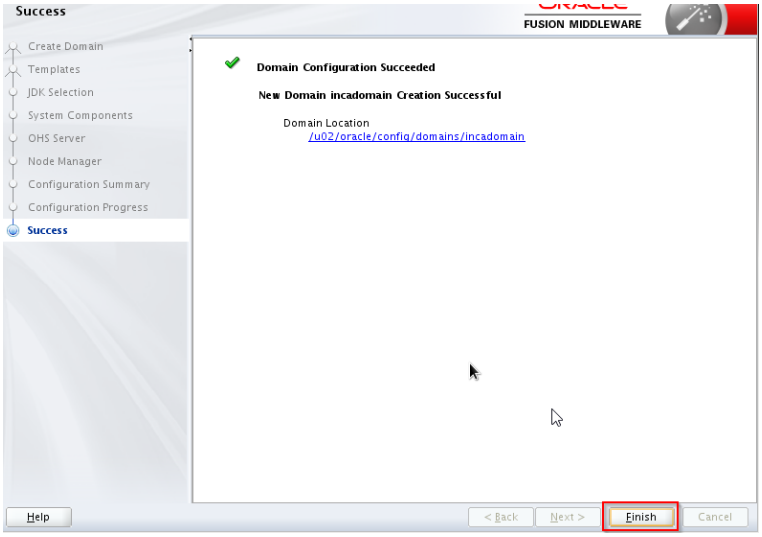
i. Click on Create



j. Click on Next



k. Click on Finish



l. Startup the node manager

```
cd /u02/oracle/config/domains/incadomain/bin
nohup ./startNodeManager.sh > nm.out&
```

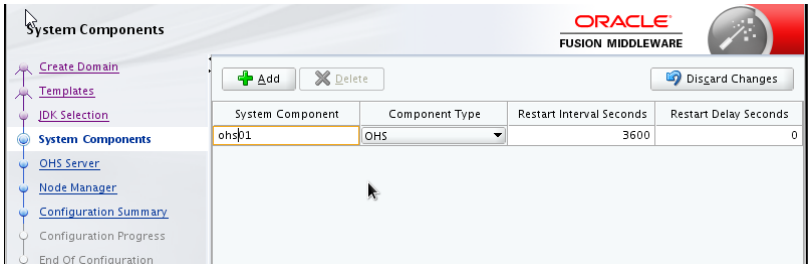
m. Startup the Oracle HTTP Server

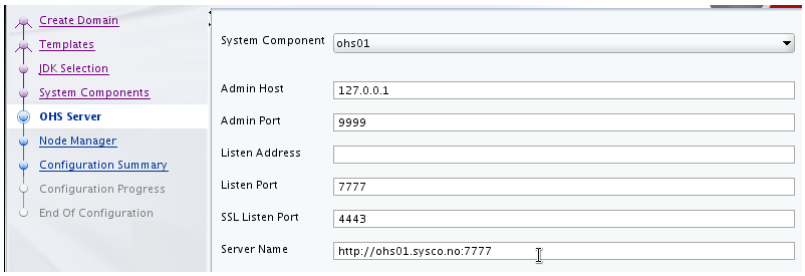
```
cd /u02/oracle/config/domains/incadomain/bin
./startComponent.sh ohsloadbalancer
```

7.2. Creating the web layer domain

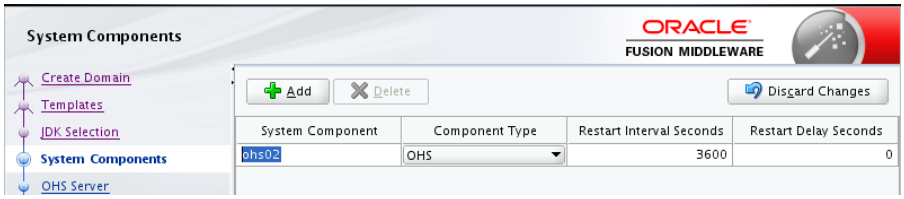
In order to create the web layer domain apply the same steps shown in the previous case (load balancer domain) on these machines **ohs01.sysco.no and ohs02.sysco.no**. The following screen shows two relevant screens for each configuration where system component names and port are set.

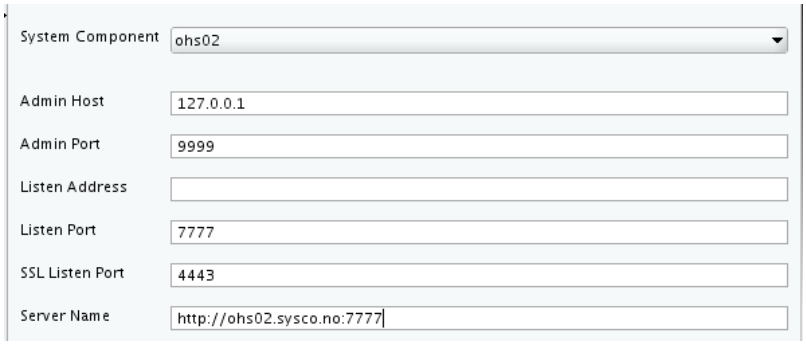
ohs01.sysco.no





ohs02.sysco.no





7.3. Applications domain

The aim of this section is to create a domain composed by an administration server and two managed servers that are part of a cluster. This section is based on the information available in [1]. In this case, the process starts in the machine weblogic01.sysco.no and these are the steps.

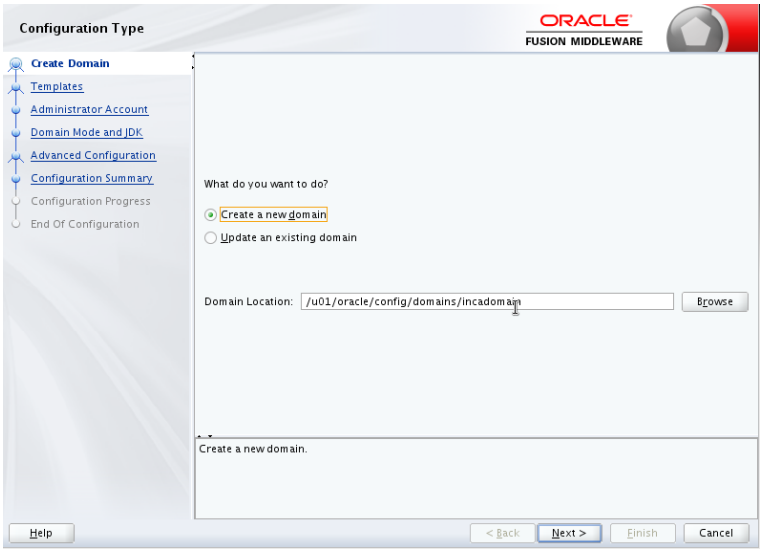
7.3.1. Domain creation

a. Login with the oracle user account on **weblogic01.sysco.no**

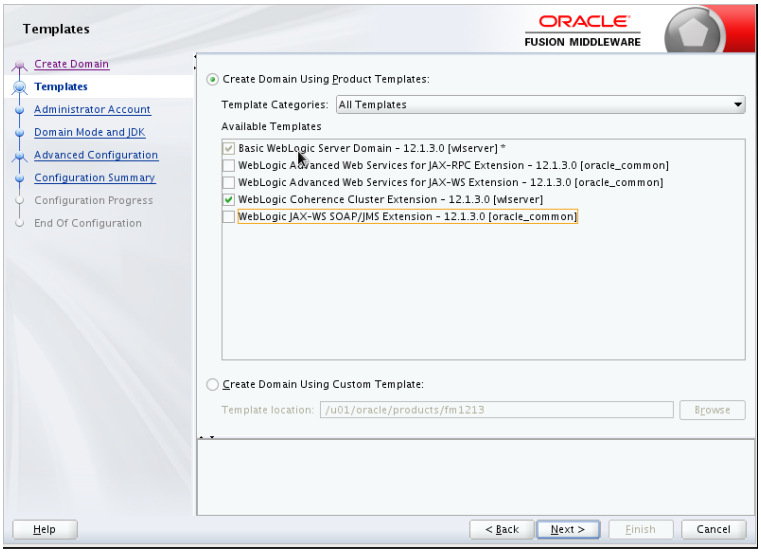
b. Run the configuration wizard

```
/u01/oracle/products/fm1213/oracle_common/common/bin/./config.sh
```

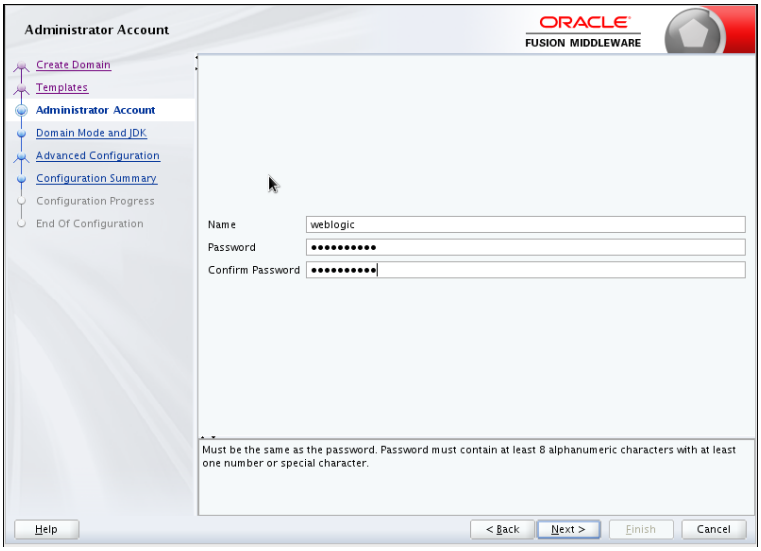
c. Select the option Create a new domain, give the domain location and click on Next.



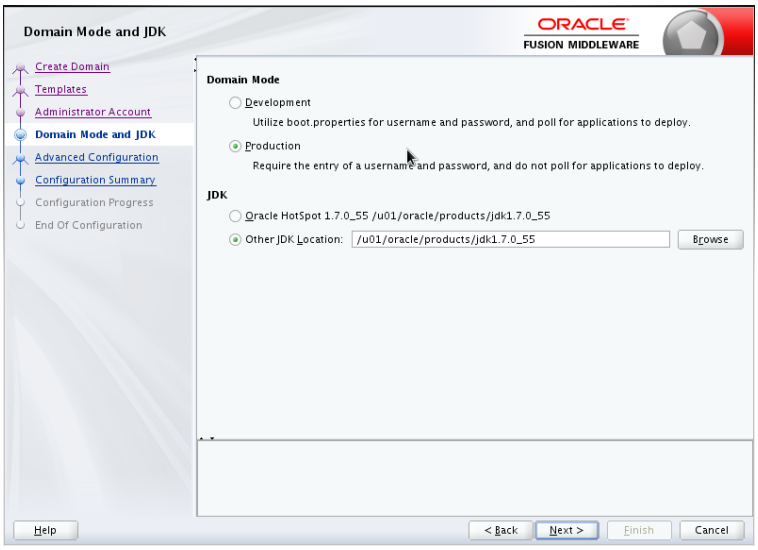
d. Select the checkbox Weblogic Coherence Cluster Extension and click on Next



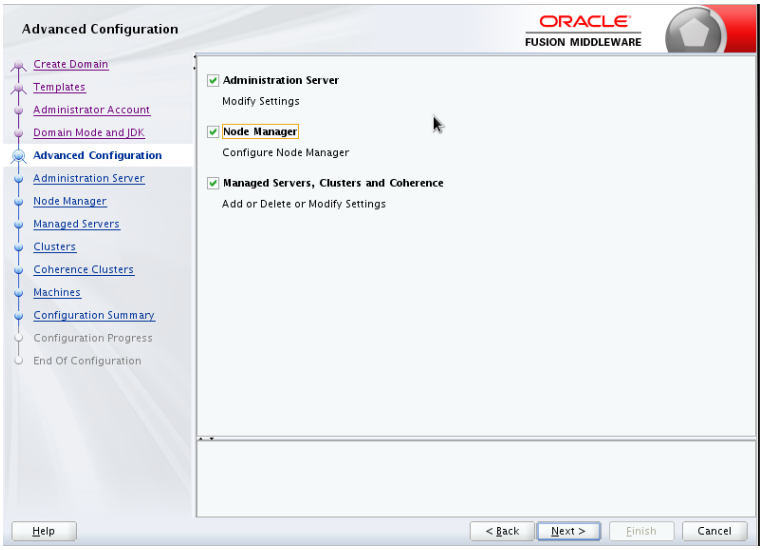
e. Select a username and password for the Administrator Account and click on Next.



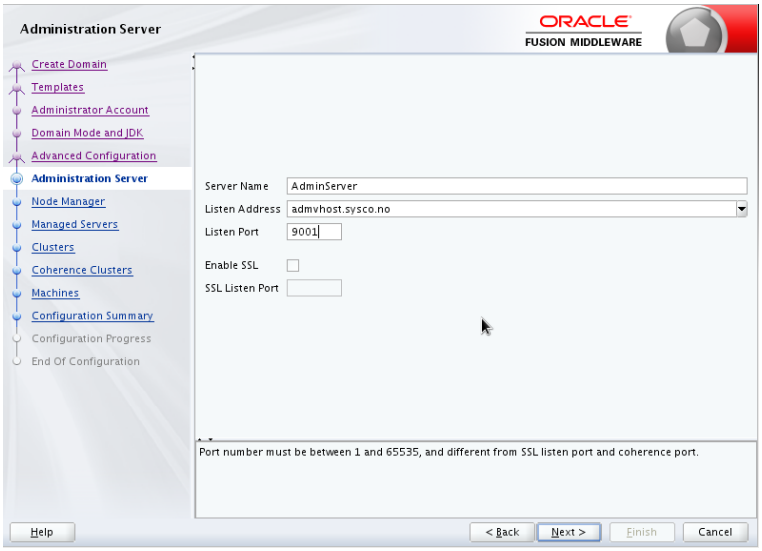
f. Select the Domain Mode (in this case is Production), set the JDK path and click on Next.



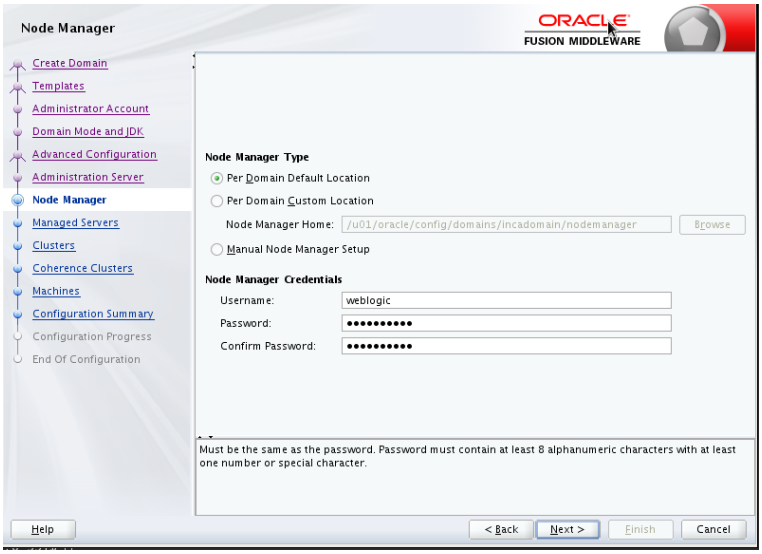
g. Mark the three checkboxes and click on Next.



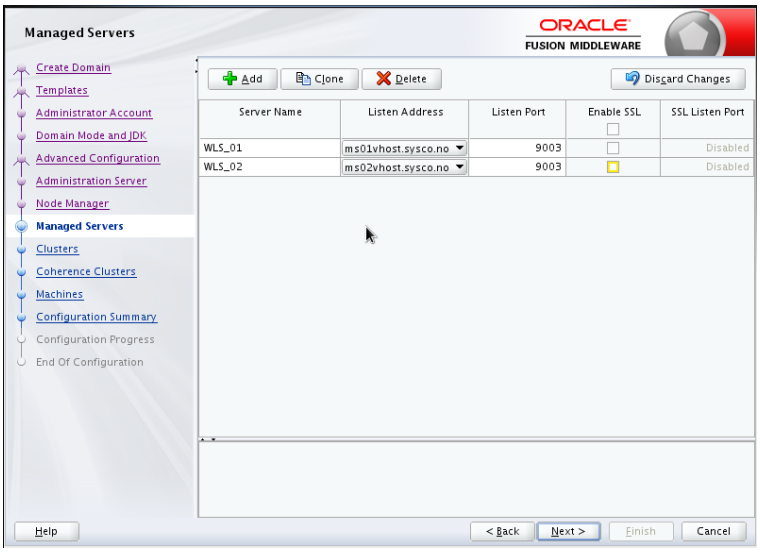
h. Set the Administration Server Listen Address and its Listen Port. It is important to remark that in this case that hostname (admvhost.sysco.no) represents a virtual IP in order to configure the AdminServer high availability in future steps.



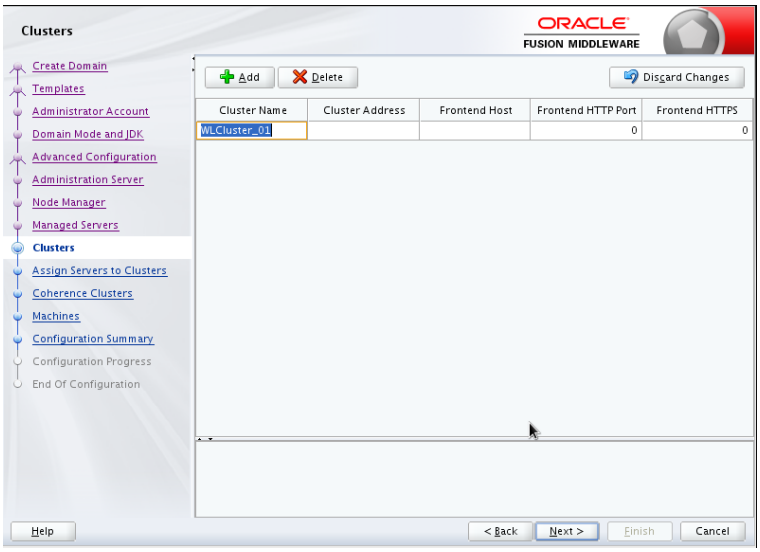
i. Choose a node manager type (in this case Per Domain Default Location), set the node manager credentials and click on Next.



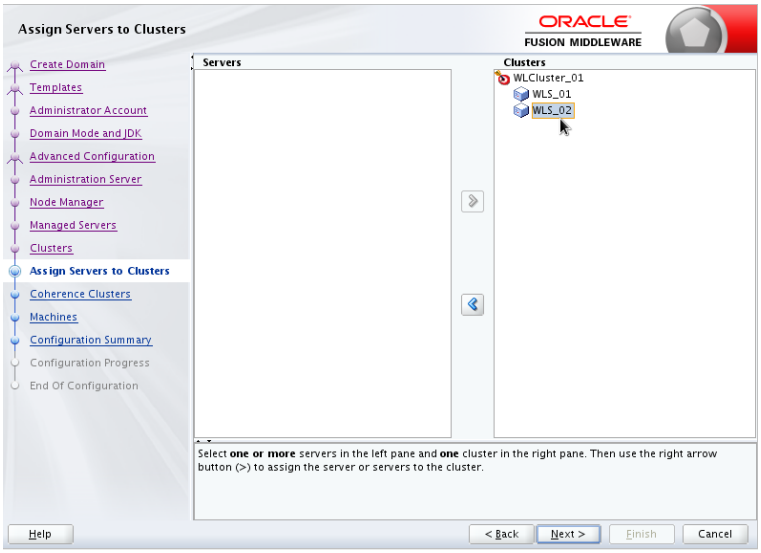
j. Add two managed server, these server are configured to use virtual IPs in order to configure the whole server migration further.



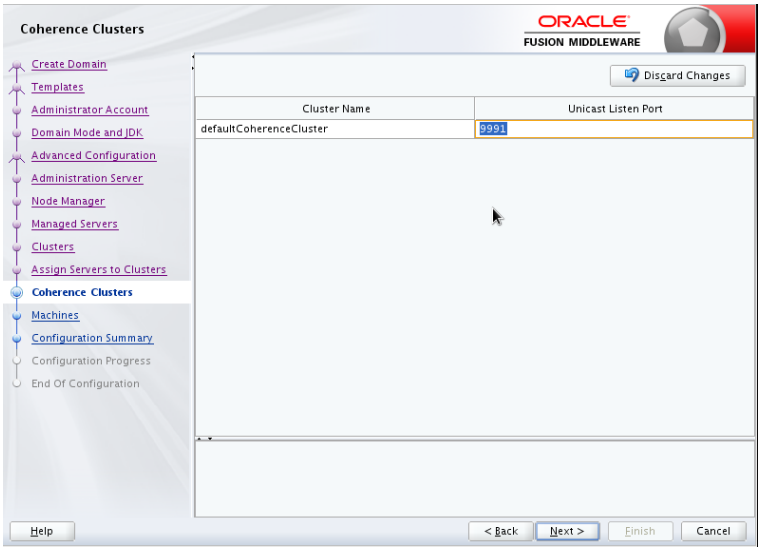
k. Set a name for the cluster and click on Next.



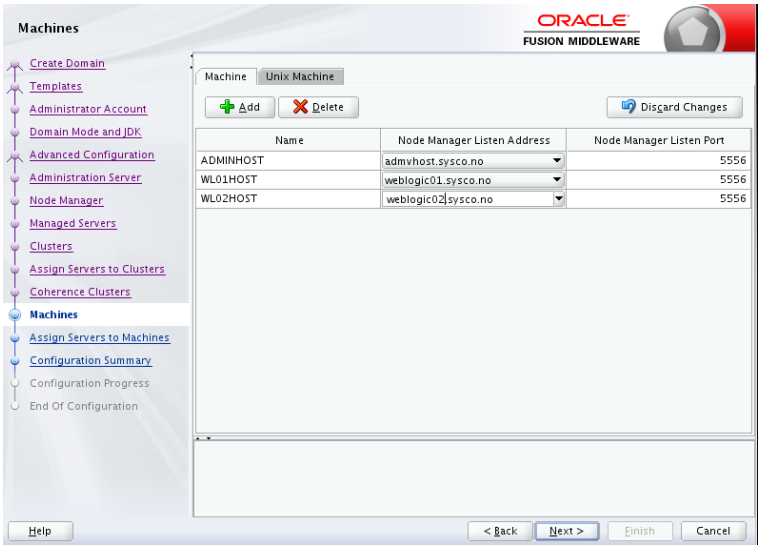
l. Assign managed servers to the cluster and click on Next.



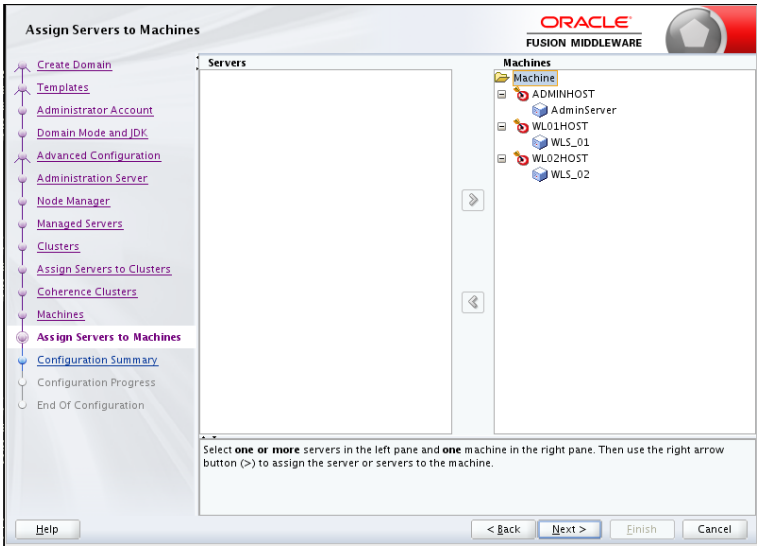
m. Set the value for the coherence cluster port and click on Next.



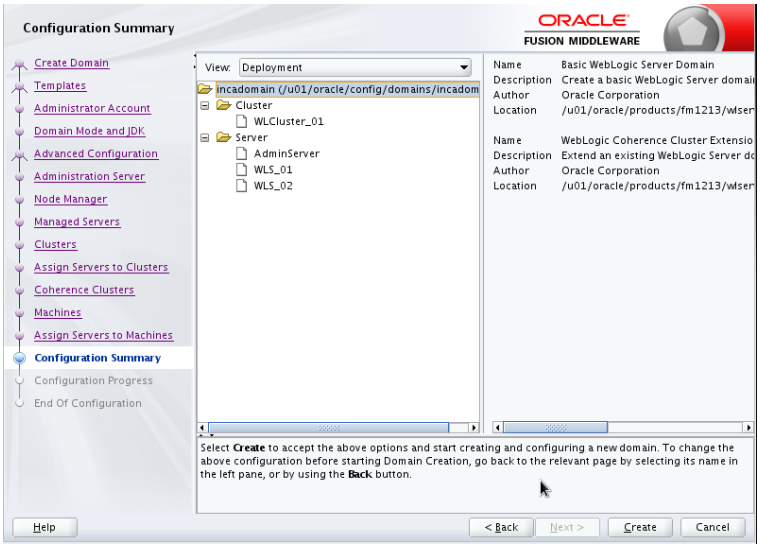
n. Define three machines, the first one is the Administration Server machine and is tied to the virtual IP. In addition, there are two machines for each managed server.



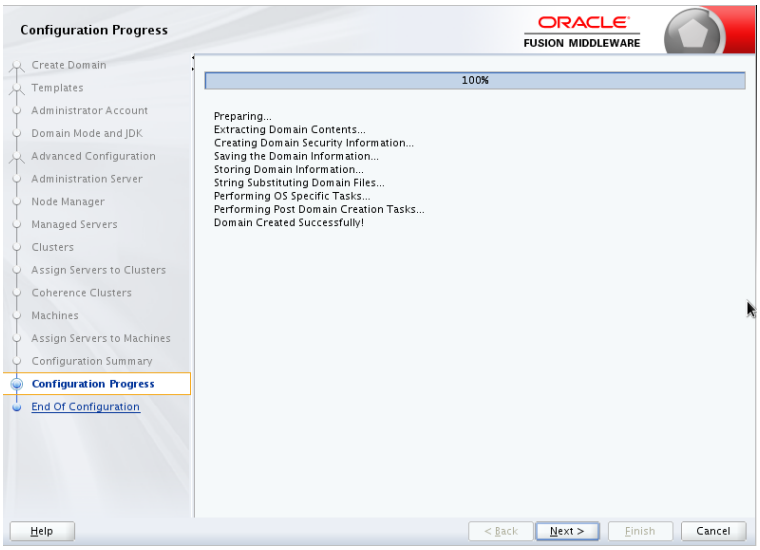
o. Assign servers to machines and click on Next



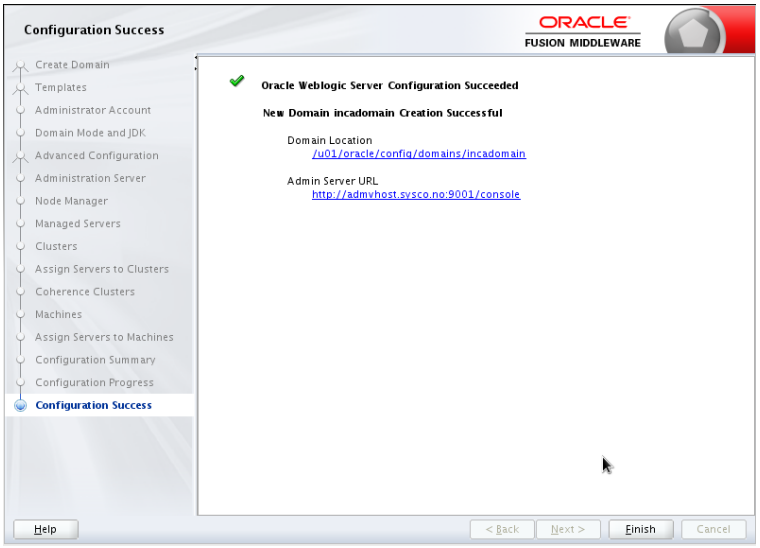
p. Review the configuration and click on Create.



q. Click on Next



r. Click on Finish



7.3.2. Extending the domain to create the managed server WLS_01 on weblogic01.sysco.no

Even though the domain was created on this server, it is necessary to extend the domain (using commands pack and unpack) to create the managed server (WLS_01) in a different domain directory on the same host.

Just to remember

Domain path ***ASERVER_HOME***

/u01/oracle/config/domains/incadomain -> ***it was configured during the domain creation***

Domain path ***MSERVER_HOME***

/u02/oracle/config/domains/incadomain -> ***it is configured in this section***

These are the steps to create the WLS_01 managed server

a. Login with the oracle user account on **weblogic01.sysco.no**

b. Create the domain directory

```
mkdir –p /u02/oracle/config/domains/incadomain
```

c. Run the pack command to create a template

```
cd ORACLE_COMMON_HOME/common/bin
```

In this installation is:

```
cd /u01/oracle/products/fm1213/oracle_common/common/bin
```

According to [1] this the pack command

```
./pack.sh –managed=true
-domain=ASERVER_HOME
-template=soadomaintemplate.jar
              -template_name=soa_domain_template
```

In this installation is:

```
./pack.sh –managed=true –domain=/u01/oracle/config/domains/incadomain –
template=incadomaintemplate01.jar –template_name=inca_domain_template
```

d. Run the unpack command

```
cd /u01/oracle/products/fm1213/oracle_common/common/bin
```

```
./unpack.sh –domain=/u02/oracle/config/domains/incadomain –
overwrite_domain=true –template=incadomaintemplate01.jar –
log_priority=DEBUG –log=unpack01.log –
app_dir=/u01/oracle/config/applications/incadomain
```

In this case -domain means the directory of managed servers (/u02/oracle/…) and app_dir means the common directory applications that is shared between two machines.

e. Creating the boot properties file

```
mkdir -p ASERVER_HOME/servers/AdminServer/security
```

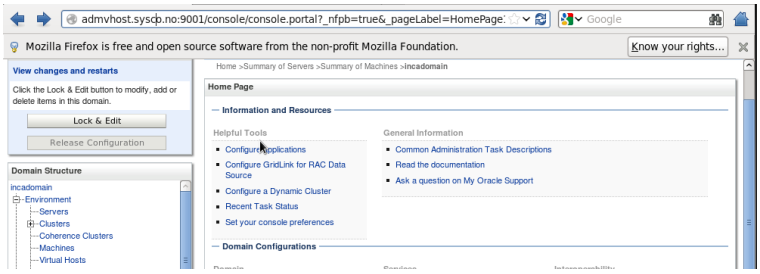
Create the boot.properties file with the Administration Server Credentials

```
username=weblogic
password=password
```

f. Starting up the AdminServer

```
cd /u01/oracle/config/domains/incadomain/bin
nohup ./startWeblogic.sh > wlAdminServer.out&
```

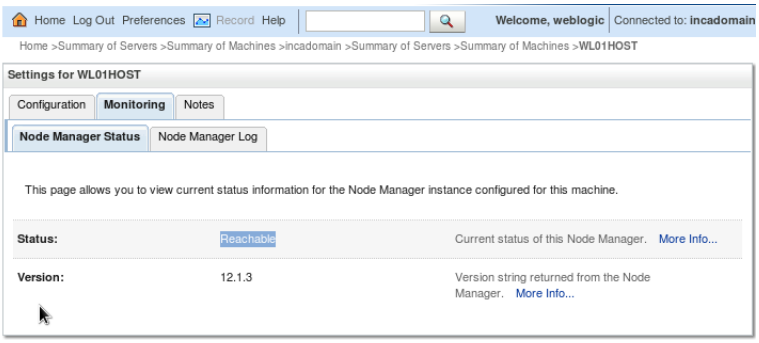
g. Test the console: http://admvhost.sysco.no:9001/console



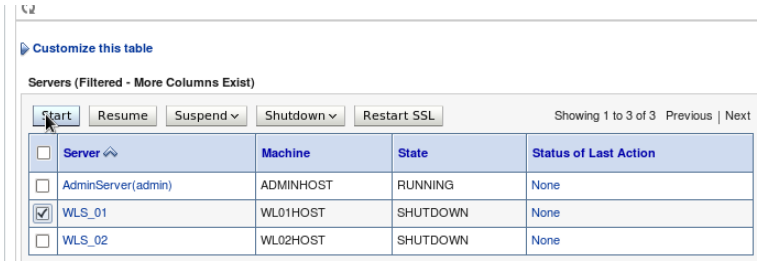
h. Start the node manager related to the managed server (WLS_01) on weblogic01.sysco.no

```
cd /u02/oracle/config/domains/incadomain/bin

nohup ./startNodeManager.sh > nodeManager.out&
```

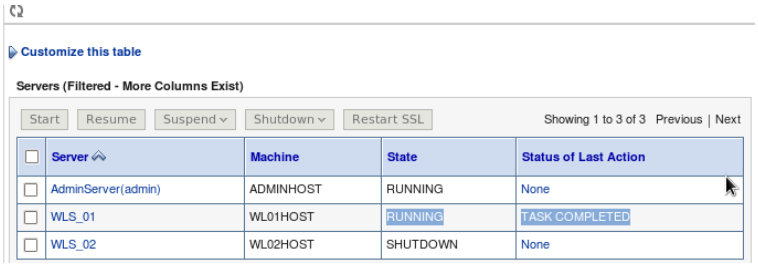
It is possible to review the node manager status using the admin console.



i. Use the admin console to startup the managed server WLS_01



The server is running!



j. Shutdown all the services and make a backup of the installation before extending the domain to the server weblogic02.sysco.no

7.3.3. Creating the cluster directory

In section 5.2 was not possible to create the folder `/u01/oracle/config/domains/incadomain/incacluster` because the configuration wizard requires an empty directory. In this section, this directory is created and mounted within the shared storage.

a. Stop all the weblogic services running on weblogic01.sysco.no

b. Login into weblogic01.sysco.no with the root user account.

c. Create the directory

```
mkdir /u01/oracle/config/domains/incadomain/incacluster
```

d. Take a backup of the file /etc/fstab

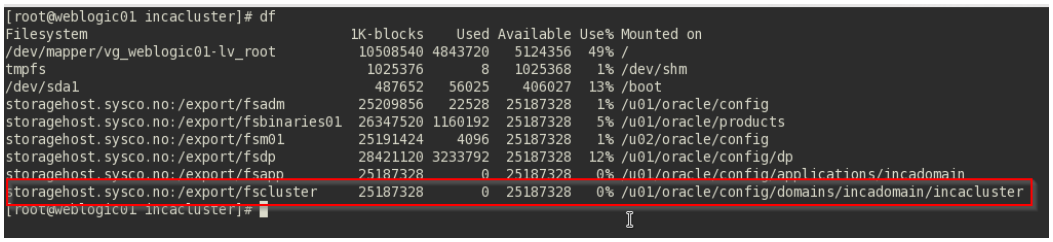
e. Modify the file /etc/fstab to include the cluster shared storage (with the root user account)

```
# /etc/fstab
# Created by anaconda on Mon Aug  3 09:42:37 2015
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/vg_weblogic01-lv_root /                       ext4    defaults        1 1
UUID=ad237def-badd-44a8-a182-a6c30d029db9 /boot                   ext4    defaults        1 2
/dev/mapper/vg_weblogic01-lv_swap swap                    swap    defaults        0 0
tmpfs                   /dev/shm                tmpfs   defaults        0 0
devpts                  /dev/pts                devpts  gid=5,mode=620  0 0
sysfs                   /sys                    sysfs   defaults        0 0
proc                    /proc                   proc    defaults        0 0
storagehost.sysco.no:/export/fsadm /u01/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsbinaries01 /u01/oracle/products nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsm01 /u02/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsdp /u01/oracle/config/dp nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsapp /u01/oracle/config/applications/incadomain nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fscluster /u01/oracle/config/domains/incadomain/incacluster nfs4 rw,bg,hard,nointr,proto=tcp
~
~
```

f. Run this command (with the root user account)

```
mount -a
```

g. After running the `df` command, it is possible to see the new shared storage



7.3.4. Extending the domain to create the managed server WLS_02 on weblogic02.sysco.no

It is necessary to extend the domain (using commands pack and unpack) to create the managed server (WLS_02) in a different host.

Just to remember

Domain path **ASERVER_HOME** in this case is:

/u01/oracle/config/domains/incadomain -> **it was configured during the domain creation on weblogic01.sysco.no**

Domain path **MSERVER_HOME** in this case is

/u02/oracle/config/domains/incadomain -> **it is configured in this section on weblogic02.sysco.no**

These are the steps to create the WLS_02 managed server

a. Login with the **oracle** user account on **weblogic02.sysco.no**

b. Create the domain directory

```
mkdir -p /u02/oracle/config/domains/incadomain
```

c. Run the pack command on weblogic01.sysco.no

```
./pack.sh -managed=true -domain=/u01/oracle/config/domains/incadomain -
template=incadomaintemplate02.jar -template_name=inca_domain_template
```

d. Copy `incadomaintemplate02.jar` into weblogic02.sysco.no

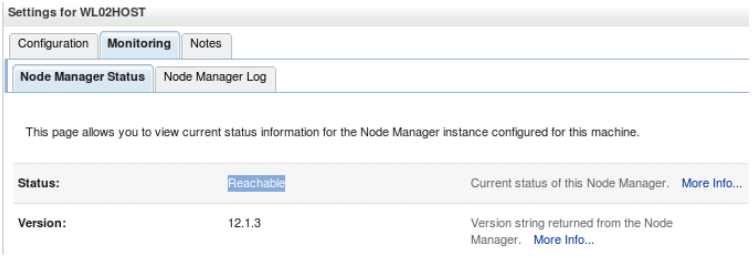
e. Run the unpack command

```
cd /u01/oracle/products/fm1213/oracle_common/common/bin

./unpack.sh -domain=/u02/oracle/config/domains/incadomain -
overwrite_domain=true -template=incadomaintemplate02.jar -
log_priority=DEBUG -log=unpack02.log -
app_dir=/u01/oracle/config/applications/incadomain
```

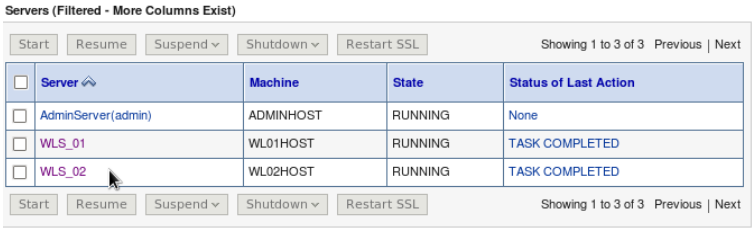
f. Start the node manager related to the managed server on weblogic02.sysco.no

```
cd /u02/oracle/config/domains/incadomain/bin

nohup ./startNodeManager.sh > nodeManager.out&
```

It is possible to review the node manager status using the admin console.



g. Use the admin console to startup the managed server WLS_02



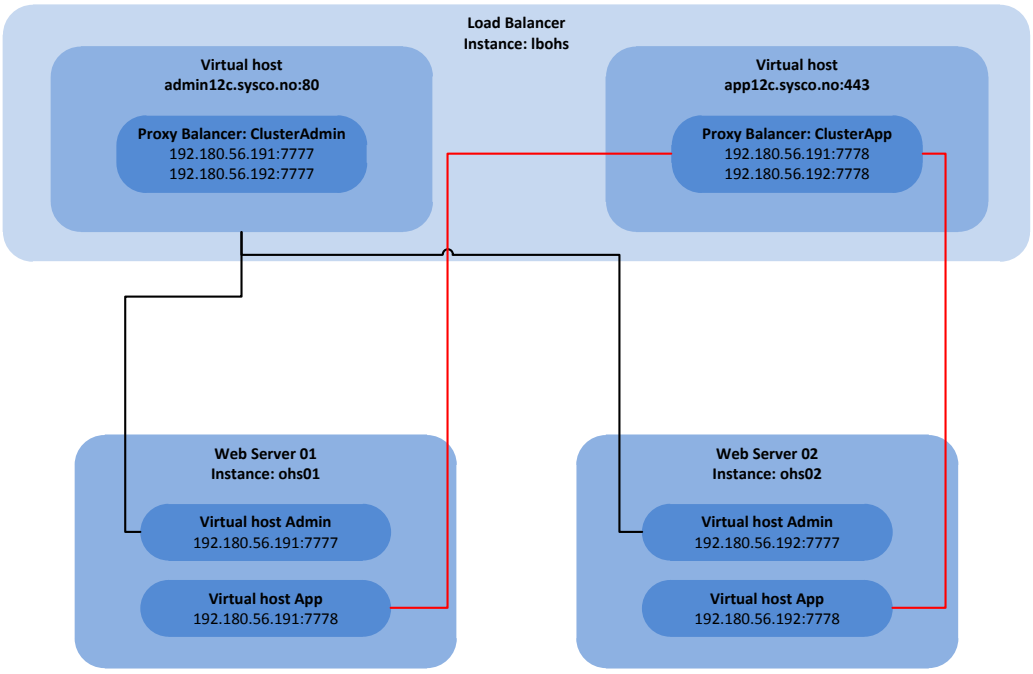
h. Shutdown all the services and make a backup of the installation

8. Configuring the load balancer

In this section, one of the Oracle HTTP Server installations (lbohs.sysco.no) is configured as a load balancer. Two virtual addresses have been created to use the load balancer, these are:

Machine	Virtual IP	Virtual host name	Comments
lbohs.sysco.no	192.180.56.20	admin12c.sysco.no	Administration server requests
lbohs.sysco.no	192.180.56.21	app12c.sysco.no	Applications requests

These addresses will be configured as virtual hosts in the Oracle HTTP Server installed in lbohs.sysco.no. In addition, each virtual host will have a cluster to redirect requests towards instances ohs01 and ohs02. Furthermore, virtual hosts to direct the traffic from instances osh01 and oh02 to the AdminServer and managed server will be created. The following graph depicts the configuration.



In order to create the configuration shown in the previous picture, follow these steps.

a. Login into the server lbohs.sysco.no with the oracle user.
b. Create this file

```
cd
/u02/oracle/config/domains/incadomain/config/fmwconfig/components/OHS/instances/ohsloadba
lancer/moduleconf

touch loadbalancer.conf
```

c. Add this configuration to the file

```
<VirtualHost app12c.sysco.no:443>
 ProxyRequests off

 ServerName app12cLBOHS

  <IfModule ossl_module>
  SSLEngine on
  SSLProtocol nzos_Version_1_0 nzos_Version_3_0_With_2_0_Hello
nzos_Version_3_0
  SSLCipherSuite
SSL_RSA_WITH_RC4_128_MD5,SSL_RSA_WITH_RC4_128_SHA,SSL_RSA_WITH_3DES_EDE_CBC
_SHA,SSL_RSA_WITH_DES_CBC_SHA,TLS_RSA_WITH_AES_128_CBC_SHA,TLS_RSA_WITH_AES
_256_CBC_SHA
  SSLVerifyClient none
  SSLWallet
"${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/instances
/${COMPONENT_NAME}/keystores/default"
  SSLCRLCheck Off
 </IfModule>

 <Proxy balancer://ClusterApp>
```

```
 # WebHead1
 BalancerMember http://ohs01.sysco.no:7778
 BalancerMember http://ohs02.sysco.no:7778

 # Security "technically we aren't blocking
 # anyone but this the place to make those
 # chages
 Order Deny,Allow
 Deny from none
 Allow from all

 # Load Balancer Settings
 # We will be configuring a simple Round
 # Robin style load balancer.  This means
 # that all webheads take an equal share of
 # of the load.
 ProxySet lbmethod=byrequests

</Proxy>

# balancer-manager
# This tool is built into the mod_proxy_balancer
# module and will allow you to do some simple
# modifications to the balanced group via a gui
# web interface.
<Location /balancer-manager>
 SetHandler balancer-manager

 # I recommend locking this one down to your
 # your office
 Order deny,allow
 Allow from all
</Location>

# Point of Balance
# This setting will allow to explicitly name the
# the location in the site that we want to be
# balanced, in this example we will balance "/"
# or everything in the site.
ProxyPass /balancer-manager !
ProxyPass / balancer://ClusterApp/



</VirtualHost>

<VirtualHost admin12c.sysco.no:80>
 ProxyRequests off

 ServerName Admin12cLBOHS

 <Proxy balancer://ClusterAdmin>
  # WebHead1
  BalancerMember http://ohs01.sysco.no:7777
  BalancerMember http://ohs01.sysco.no:7777

  # Security "technically we aren't blocking
  # anyone but this the place to make those
```

```
 # chages
 Order Deny,Allow
 Deny from none
 Allow from all

 # Load Balancer Settings
 # We will be configuring a simple Round
 # Robin style load balancer.  This means
 # that all webheads take an equal share of
 # of the load.
 ProxySet lbmethod=byrequests

</Proxy>

# balancer-manager
# This tool is built into the mod_proxy_balancer
# module and will allow you to do some simple
# modifications to the balanced group via a gui
# web interface.
<Location /balancer-manager>
 SetHandler balancer-manager

 # I recommend locking this one down to your
 # your office
 Order deny,allow
 Allow from all
</Location>

# Point of Balance
# This setting will allow to explicitly name the
# the location in the site that we want to be
# balanced, in this example we will balance "/"
# or everything in the site.
ProxyPass /balancer-manager !
ProxyPass / balancer://ClusterAdmin/

<IfModule ossl_module>
 SSLEngine off
</IfModule>

</VirtualHost>
```

d. The previous configuration uses ports 80 and 443 so we have to activate these ports. Before changing ports, use these articles to apply a patch and to set privileges to start the service in privileged ports.

IMPORTANT:

OHS 12c Fails to Start With the Error "Permission denied: make_sock: could not bind to address" on Linux6 (Doc ID 1599750.1)

http://docs.oracle.com/middleware/1213/webtier/HSADM/getstart.htm#HSADM848 [Starting Oracle HTTP Server Instances on a Privileged Port (UNIX Only)]

e. Changing ports

```
cd
/u02/oracle/config/domains/incadomain/config/fmwconfig/components/OHS/instances/oh
sloadbalancer/moduleconf

vi httpd.conf
```

```
#
# Listen: Allows you to bind Apache to specific IP addresses and/or
# ports, instead of the default. See also the <VirtualHost>
# directive.
#
# Change this to Listen on specific IP addresses as shown below to
# prevent Apache from glomming onto all bound IP addresses (0.0.0.0)
#
# Listen 12.34.56.78:80
# The Listen directive below has a comment following it that is used at OHS provisioning time.
# The below comment can be deleted from the file in an OHS instance, but *DO NOT* delete the comment at $PRODUCT_HOME/templat
es/conf/httpd.conf
#Listen 7777   #OHS_LISTEN_PORT
Listen 80
Listen 443
#
```

f. Start the Oracle Http Server on lbohs.sysco.no with these commands.

```
cd /u02/oracle/config/domains/incadomain/bin
nohup ./startNodeManager.sh > nm.out&

cd /u02/oracle/config/domains/incadomain/bin
./startComponent.sh [INSTANCE_NAME] (For example ohsloadbalancer or ohs01)
```

g. Test the port 80

Obviously, the OHS services on ohs01.sysco.no and ohs02.sysco.no are up and listening to requests on port 7777.

9. Configuring virtual hosts on ohs01 and ohs02 instance

In the section two virtual hosts are configured, they will use the same IP (physical IP) and different port according to this table.

SERVER	Instance	IP	Virtual Host	Port Virtual Host	Redirect to
ohs01.sysco.no	ohs01	192.180.56.191	Admin	7777	admvhost.sysco.no:9001
ohs01.sysco.no	ohs01	192.180.56.191	App	7778	ms01vhost.sysco.no:9003, ms02vhost.sysco.no:9003
ohs02.sysco.no	ohs02	192.180.56.192	Admin	7777	admvhost.sysco.no:9001
ohs02.sysco.no	ohs02	192.180.56.192	App	7778	ms01vhost.sysco.no:9003, ms02vhost.sysco.no:9003

These are the steps to create these virtual hosts.

a. Login into the server ohs01.sysco.no with the oracle user.
b. Create these files

```
cd
/u02/oracle/config/domains/incadomain/config/fmwconfig/components/OHS/instances/ohs01/moduleconf

touch admVhost.conf
touch appVhost.conf
```

c. Configure these files as is shown in the following pictures

admVhost.conf

```
<VirtualHost ohs01.sysco.no:7777>
 ServerName admin12cVirtualHost
 ServerAdmin example@example.com
 RewriteEngine On
 RewriteOptions inherit

 <Location /console>
  SetHandler weblogic-handler
  WeblogicHost admvhost.sysco.no
  WeblogicPort 9001
 </Location>

 <Location /consolehelp>
  SetHandler weblogic-handler
  WeblogicHost admvhost.sysco.no
  WeblogicPort 9001
 </Location>

</VirtualHost>
```

appVhost.conf

```
<VirtualHost ohs01.sysco.no:7778>
 ServerName app12cVirtualHost
 ServerAdmin example@example.com
 RewriteEngine On
 RewriteOptions inherit

</VirtualHost>
~
```

d. Modify the httpd.conf to add the port 7778

```
Listen 7777    #OHS_LISTEN_PORT
Listen 7778

#
# Dynamic Shared Object (DSO) Support
#
# To be able to use the functionality o
# have to place corresponding `LoadModu
# directives contained in it are actual
# Statically compiled modules (those li
# to be loaded here.
#
# Example:
# LoadModule foo_module "${PRODUCT_HOME
```

h. Start the Oracle Http Server on ohs01.sysco.no with these commands.

```
cd /u02/oracle/config/domains/incadomain/bin
nohup ./startNodeManager.sh > nm.out&

cd /u02/oracle/config/domains/incadomain/bin
./startComponent.sh [INSTANCE_NAME] (For example ohsloadbalancer or ohs01)
```

i. Test the applications URL from the load balancer

j. Copy the following files from ohs01.sysco.no to ohs02.sysco.no and modify the remarked values

admVhost.conf

```
<VirtualHost ohs02.sysco.no:7777>
 ServerName admin12cVirtualHost02
 ServerAdmin example@example.com
 RewriteEngine On
 RewriteOptions inherit

 <Location /console>
  SetHandler weblogic-handler
  WeblogicHost admvhost.sysco.no
  WeblogicPort 9001
 </Location>

 <Location /consolehelp>
  SetHandler weblogic-handler
  WeblogicHost admvhost.sysco.no
  WeblogicPort 9001
 </Location>

</VirtualHost>
```

appVhost.conf

```
<VirtualHost ohs02.sysco.no:7778>
 ServerName app12cVirtualHost02
 ServerAdmin example@example.com
 RewriteEngine On
 RewriteOptions inherit


</VirtualHost>
~
```

k. Modify the httpd.conf (on the server ohs02.sysco.no) to add the port 7778

```
Listen 7777    #OHS_LISTEN_PORT
Listen 7778

#
# Dynamic Shared Object (DSO) Support
#
# To be able to use the functionality o
# have to place corresponding `LoadModu
# directives contained in it are actual
# Statically compiled modules (those li
# to be loaded here.
#
# Example:
# LoadModule foo_module "${PRODUCT_HOME
```

l. Start the Oracle Http Server on ohs02.sysco.no with these commands.

```
cd /u02/oracle/config/domains/incadomain/bin
nohup ./startNodeManager.sh > nm.out&

cd /u02/oracle/config/domains/incadomain/bin
./startComponent.sh [INSTANCE_NAME] (For example ohsloadbalancer or ohs01)
```

m. Shutdown the server ohs01.syco.no and test URLs from the load balancer. In this case it works.

10. Configuring the frontend host and the frontend http port

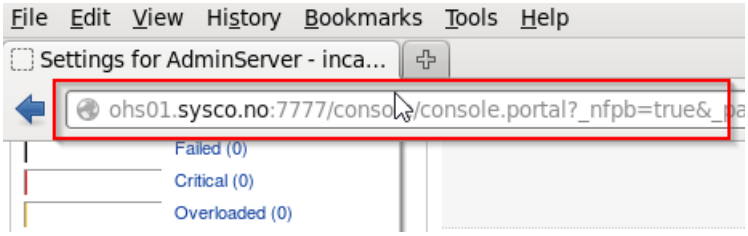
Configure the frontend host and the frontend http port the cluster and for the AdminServer in order to use those ports configured in the load balancer.

10.1. Configuring the cluster WLCluster_01

Follow these steps

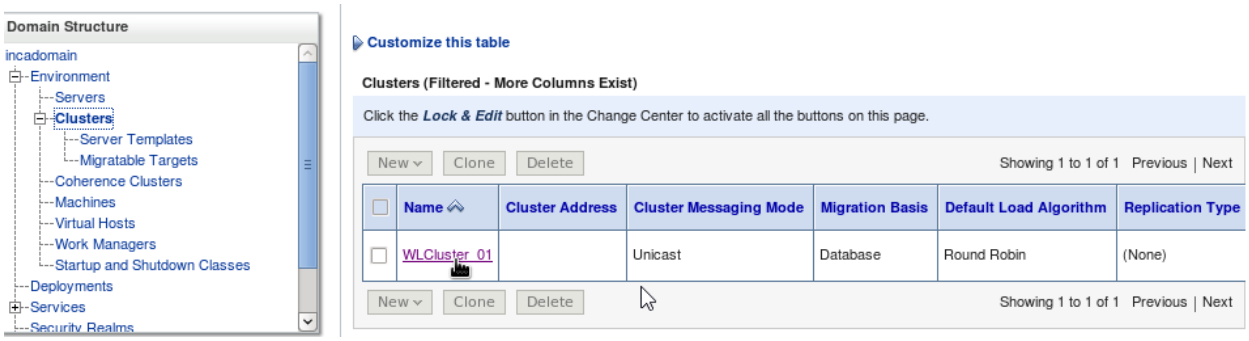
a. Login into the AdminServer with this URL: http://admin12c.sysco.no/console

b. The system will redirect the request towards one of the Oracle HTTP Servers.

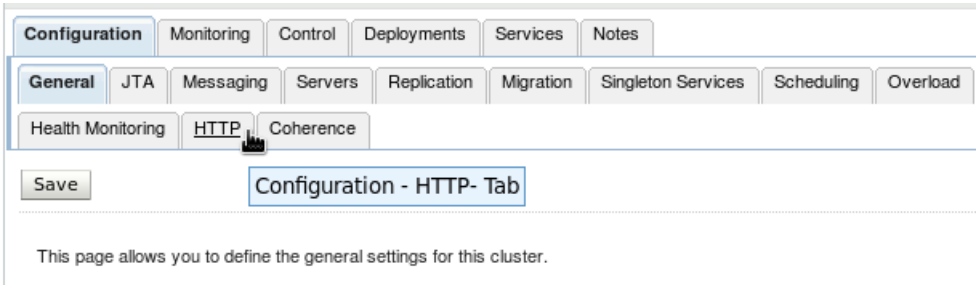


The following steps will avoid this kind of redirection

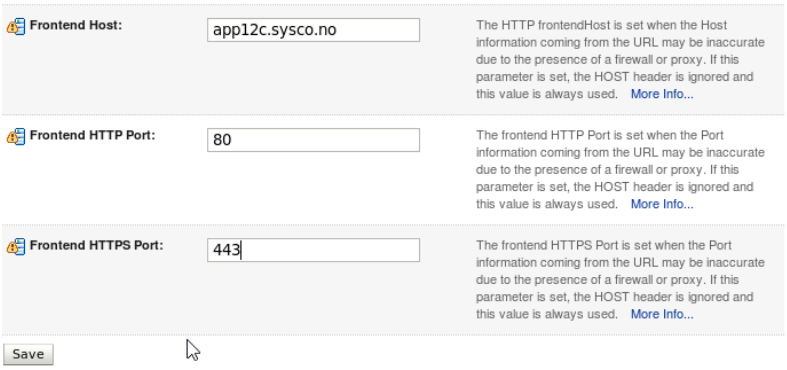
c. Click con WLCluster_01 as can be seen in the picture



d. Click on HTTP tab



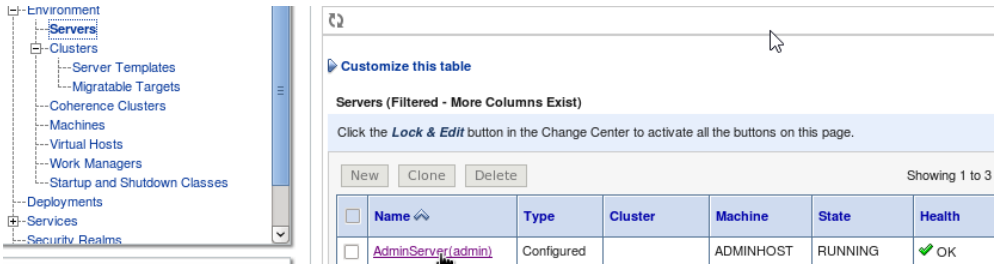
e. Set the following values and click on save



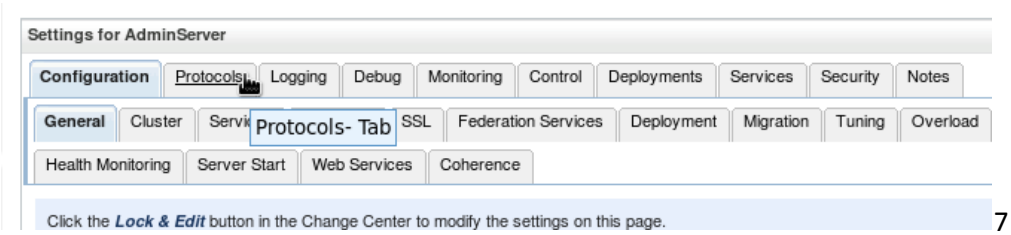
10.2. Configuring the AdminServer

Follow these steps

a. Click on AdminServer

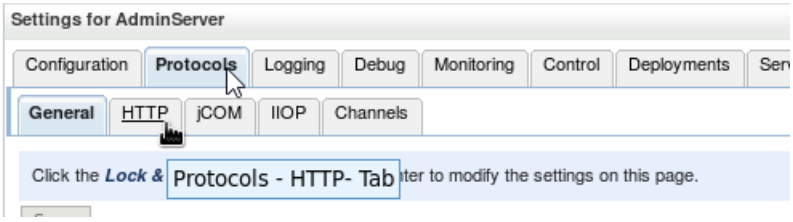


b. Click on Protocols

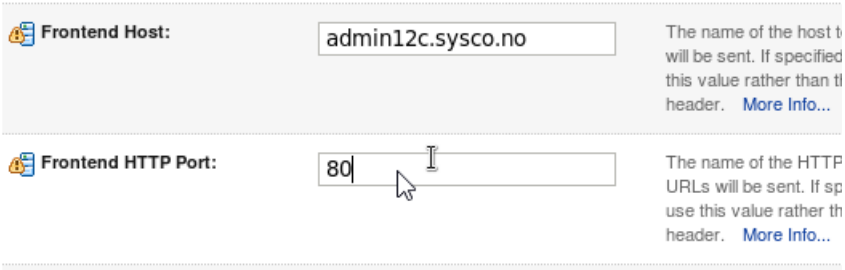


7

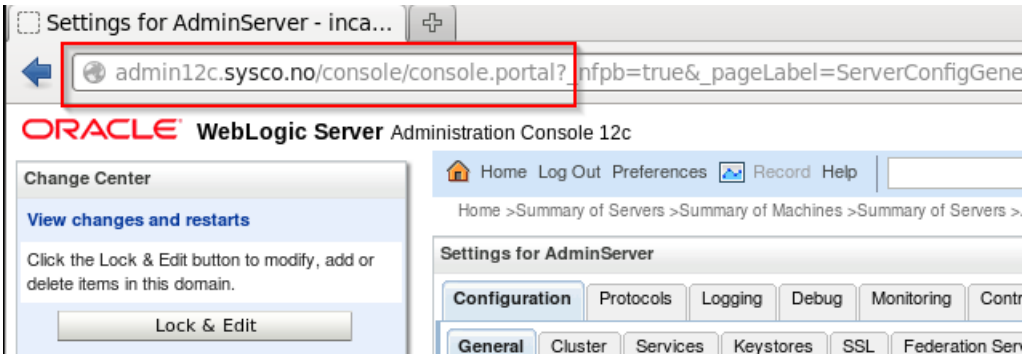
c. Click on HTTP



d. Set the following values and click on Save



e. Log out of the Amin Console and log in again. Now the address used by the Admin Console is that defined on the load balancer.



11. Testing the Administration Server high availability

With the previous a high available architecture was create according to the Oracle recommendations. Therefore, this architecture can be used to show how to start the admin serve in another machine. In this way, a contingency server is used in case the Admin Server machine has problems. It is important to remark that this work is possible because the Admin Server domain was created on a shared storage and it is using virtual IPs.

This is the relevant information for this testing:

Virtual IPs

Machine	Virtual IP	Virtual host name	Weblogic server	Comments
weblogic01.sysco.no	**192.180.56.10**	**admvhost.sysco.no**	**AdminServer**	**Administration server**
weblogic01.sysco.no	192.180.56.11	ms01vhost.sysco.no	WLS_01	Managed server 01
weblogic02.sysco.no	192.180.56.12	ms02vhost.sysco.no	WLS_02	Managed server 02

File system

File System	MACHINE	DESCRIPTION	Comments
fsbinaries01	weblogic01	Products	Products binary files
fsms01	weblogic01	Config	Managed Server
fsbinaries02	weblogic02	Products	Products binary files

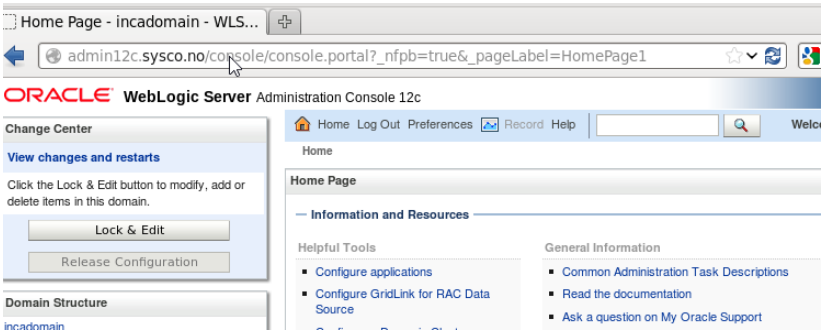
fsms02	weblogic02	Config	Managed Server
fsadm	**weblogic01 (contingency weblogic02)**	**Config**	**Administration Server**
fsapp	weblogic01, weblogic02	Applications	Applications developed
fsdp	weblogic01, weblogic02	Deployment plans	Deployment plans
fscluster	weblogic01, weblogic02	JMS, Tlogs	JMS, Tlogs

Fstab weblogic01.sysco.no

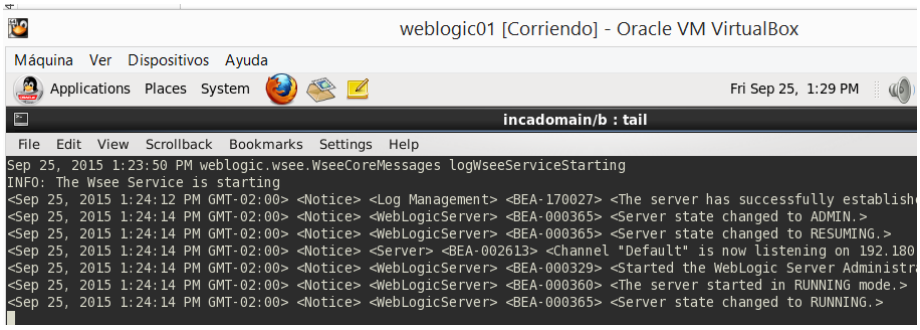
```
proc                    /proc                   proc    defaults        0 0
storagehost.sysco.no:/export/fsadm /u01/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsbinaries01 /u01/oracle/products nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsm01 /u02/oracle/config nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsdp /u01/oracle/config/dp nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fsapp /u01/oracle/config/applications/incadomain nfs4 rw,bg,hard,nointr,proto=tcp
storagehost.sysco.no:/export/fscluster /u01/oracle/config/domains/incadomain/incacluster nfs4 rw,bg,hard,nointr,proto=tcp
~
~
```

The following steps show how to do this configuration

a. Review that the Weblogic Admin server is running

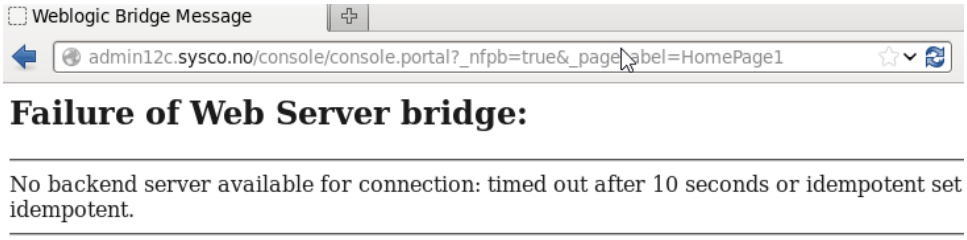


As can be seen the server is running on weblogic01.sysco.no

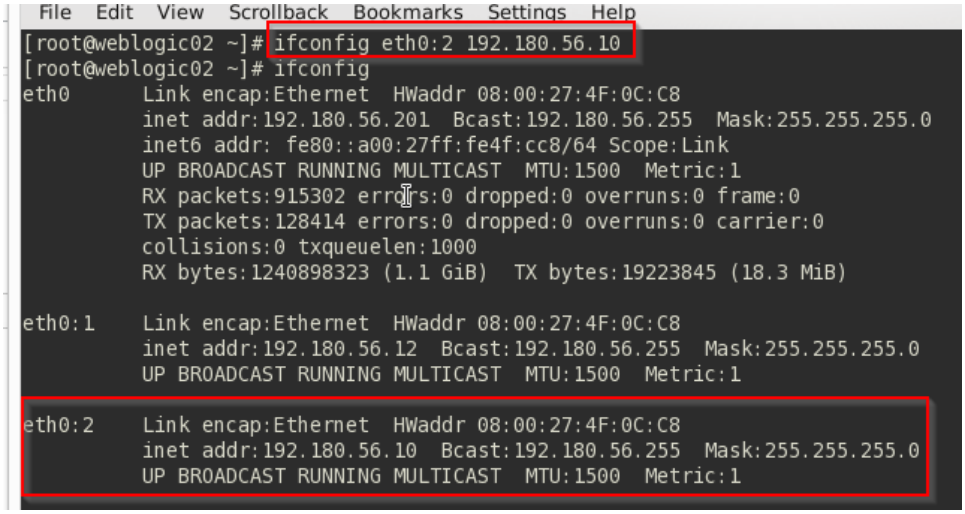


b. Shutdown the virtual machine weblogic01.sysco.no

c. Test the Admin Server, the following picture shows that now it is not working.

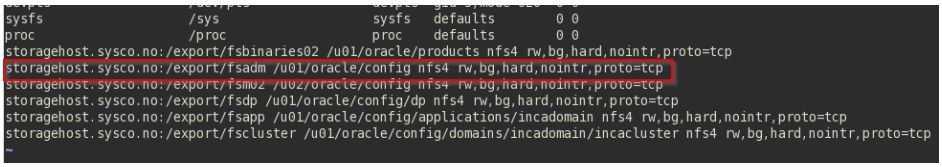


d. Configure the virtual IP **192.180.56.10** on the server weblogic02.sysco.no using the root user account



e. Make a backup of the file /etc/fstab

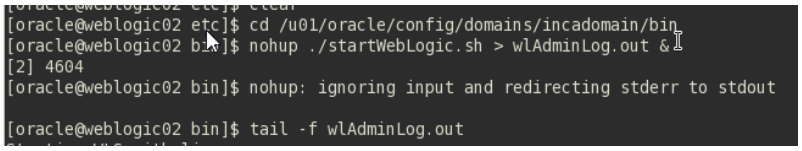
f. Add the following line in the file /etc/fstab using the root user account



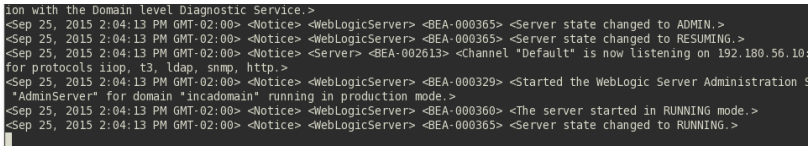
g. Run the following command using the root user account

```
mount –a
```

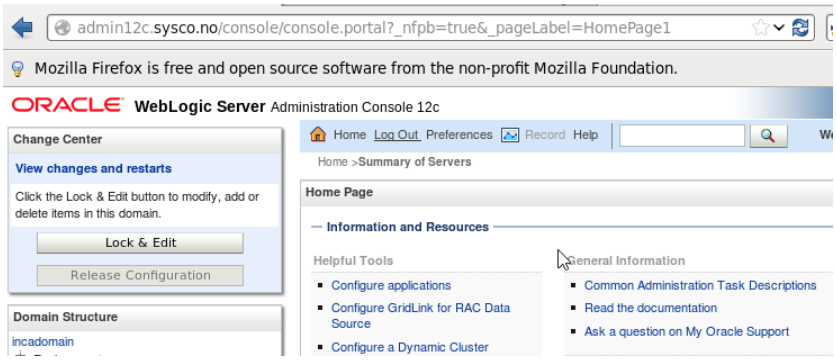
h. Start the Admin Server using the oracle user account



i. The log file shows the server is running



j. Test the Admin Console again



As can be seen in the previous picture, the Admin Console is working again, but on other server.

12. Conclusions

This document shows a comprehensive process to construct an architecture with high availability that demonstrates how useful is in order to do tasks such as the recovery of the Administration Server in other machine. Even though, the whole server migration of managed servers is not configured in this guide, the architecture is ready to apply this configuration because of the use of virtual IPs and shared storages. In fact the directories that allow this work are also create. For example, the path `/u01/oracle/config/domains/incadomain/incacluster` is created to store the JMS and TLOG files. This document can be used to learn how to do this configuration and to apply this knowledge to other cases such SOA and OSB.

13. References list

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[2] Oracle (2013) Oracle WebLogic on Shared Storage: Best Practices [Online document] Available from: http://www.oracle.com/technetwork/database/availability/maa-fmwsharedstoragebestpractices-402094.pdf (Accessed: 10 August 2015)

[3] Oracle (2010) Oracle® E-Business Suite 11i Deployment Guide Using Oracle's Sun Storage 7000 Unified Storage Systems [Online document] Available from: http://www.oracle.com/technetwork/articles/systems-hardware-architecture/ebusinesssuiteandss7k-163843.pdf (Accessed: 07 August 2015)

[4] RedHat (n.d) Chapter 23. Creating Oracle User Accounts [Online document] Available from: https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/5/html/Tuning_and_Optimizing_Red_Hat_Enterprise_Linux_for_Oracle_9i_and_10g_Databases/chap-Oracle_9i_and_10g_Tuning_Guide-Creating_Oracle_User_Accounts.html (Accessed: 13 August 2015)

[5] Oracle (2015) Certifications>Search Results: Oracle Weblogic Server 12.1.3.0.0 [Online document] Available from: https://support.oracle.com/ (Accessed: 17 August 2015)
[6] Oracle (2014) JDK 7 Installation for Linux Platforms [Online document] Available from: https://docs.oracle.com/javase/7/docs/webnotes/install/linux/linux-jdk.html (Accessed: 18 August 2015)