

Whole Server Migration

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1 Introduction

The aim of this post is to implement whole server migration on the architecture created in [1]. This feature is described in Oracle [2] as a mechanism to allow the migration of a managed server from one machine to another in case the managed server cannot be restarted on its original machine. In fact, Oracle [2] states “*Upon failure, a migratable server is automatically restarted on the same machine if possible. If the migratable server cannot be restarted on the machine where it failed, it is migrated to another machine.*”

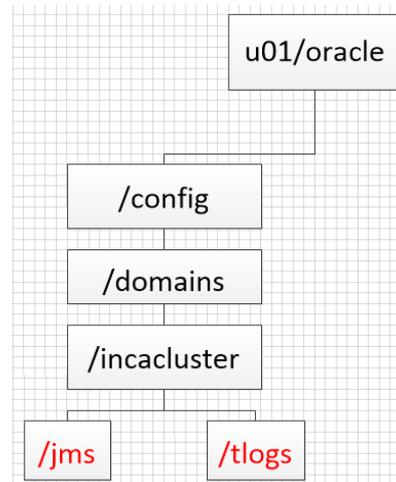
This document will not provide detailed definitions related to whole server migration since they could be reviewed on Oracle [2]. This document will show a practical demonstration about configuring that feature. With this in mind, the following section will show how to configure TLOG persistent stores. After that two ways to configure the whole server migration will be exposed to finalize with the conclusions of this exercise.

2 Configuring the TLOG persistent stores

This section will show you how to configure TLOG persistent stores. Before configuring those it is important to state that according to Oracle [3] there are two ways to do it. The first one is based on a directory and is called File Store and the second one is made using a database and is called JDBC-accessible Stores. In addition, since the configuration of this environment is made thinking about high availability, Oracle [3] describes two ways of reach it:

- Applying persistent store migration
- High availability storage solution. In this case there are two options; using file based stores deployed on hardware solutions such as Storage Area Network to share files between several physical machines. The other option is using JDBC-accessible stores that save the information on databases that support high availability configurations such as Oracle RAC.

Just to remember, in [1] an architecture with shared storages was created. The following picture show part of the directories created for this architecture.



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In the previous picture the folders remarked in red will be created in the folder `incacluster`. This folder is located on a shared storage that is attached to the two machines that are part of the cluster. With this in mind, these are the steps to configure the file based store.

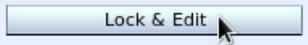
- Access any of the machines that are part of the cluster to create the folders `jms` and `tlogs`. The servers used in [1] are: `weblogic01.sysco.no` and `weblogic02.sysco.no`, in this case `weblogic01.sysco.no` will be used

```
[oracle@weblogic01 /]$ cd /u01/oracle/config/domains/incadomain/incacluster
[oracle@weblogic01 incacluster]$ mkdir jms
[oracle@weblogic01 incacluster]$ mkdir tlogs
[oracle@weblogic01 incacluster]$
```

Verify from `weblogic02.sysco.no` that those directories were created

```
storagehost.sysco.no:/export/fsapp 25185280 1024 25184256 1% /u01
storagehost.sysco.no:/export/fscluster 25185280 1024 25184256 1% /u01
[oracle@weblogic02 bin]$ cd /u01/oracle/config/domains/incadomain/incacluster
[oracle@weblogic02 incacluster]$
[oracle@weblogic02 incacluster]$
[oracle@weblogic02 incacluster]$ ls
jms tlogs
```

The previous picture shows that both machines have access to the shared storage.

- On the Admin Console, after pressing  select one of the managed servers. In this case `WLS_01`.

<input type="checkbox"/>	Name 	Type	Cluster
<input type="checkbox"/>	AdminServer(admin)	Configured	
<input type="checkbox"/>	<u>WLS_01</u>	Configured	WLCluster_01

- Select `Configuration>Services` and fill the default store box with this value: `/u01/oracle/config/domains/incacluster/tlogs`

Home > Summary of Servers > WLS_01

Settings for WLS_01

Configuration Protocols Logging Debug Monitoring Control Deployments

General Cluster **Services** Keystores SSL Federation Services Deploymer

Health Monitoring Server Start Web Services Coherence

Save

Use this page to set WebLogic service configuration settings that are specific to this server

— JMS Configuration —

 Enable Default Connection Factories

— Default Store —

 Directory:

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- Click on Save and click on Activate Changes
- Do the same steps for WLS_02.
- Restart WLS_01 and WLS_02

3 Configuring whole server migration

According to [2] there are two ways to configure whole server migration high-availability database leasing and non-database consensus leasing. It is important to remark that [2] states that for a production environment the **database leasing must be deployed on a high-availability database such as Oracle RAC since the unavailability of the database impacts managed servers negatively**. These are the steps for both configurations.

First of all the following steps are common for both kinds of configurations (databases leasing and non-database consensus leasing).

a. Modifying the node manager's properties file

This changes must be applied on the managed server machines weblogic01.sysco.no and weblogic02.sysco.no

- i. Verifying that the `StartScriptEnabled` property was set in true. Open the `nodemanager.properties` file located in `/u02/oracle/config/domains/incadomain/nodemanager`

```
[oracle@weblogic01 nodemanager]$ cat nodemanager.properties
#Tue Sep 01 06:40:03 GMT-02:00 2015
#Node manager properties
#Mon Aug 31 12:07:05 GMT-02:00 2015
DomainsFile=/u02/oracle/config/domains/incadomain/nodemanager/nodemanager.domains
LogLimit=0
PropertiesVersion=12.1.3
AuthenticationEnabled=true
NodeManagerHome=/u02/oracle/config/domains/incadomain/nodemanager
JavaHome=/u01/oracle/products/jdk1.7.0_55
LogLevel=INFO
DomainsFileEnabled=true
StartScriptName=startWebLogic.sh
ListenAddress=weblogic01.sysco.no
NativeVersionEnabled=true
ListenPort=5556
LogToStderr=true
SecureListener=true
LogCount=1
StopScriptEnabled=false
QuitEnabled=false
LogAppend=true
StateCheckInterval=500
CrashRecoveryEnabled=false
StartScriptEnabled=true
logFile=/u02/oracle/config/domains/incadomain/nodemanager/nodemanager.log
LogFormatter=weblogic.nodemanager.server.LogFormatter
ListenBacklog=50
```

- ii. Add the following lines to the `nodemanager.properties` file [4]
 - Interface=<Interface name for the floating IP>
 - Netmask=<Netmask for the previous interface>
 - UseMACBroadcast=true

```

#Tue Sep 01 06:40:03 GMT-02:00 2015
#Node manager properties
#Mon Aug 31 12:07:05 GMT-02:00 2015
DomainsFile=/u02/oracle/config/domains/incadomain/nodemanager/nodemanager.domains
LogLimit=0
PropertiesVersion=12.1.3
AuthenticationEnabled=true
NodeManagerHome=/u02/oracle/config/domains/incadomain/nodemanager
JavaHome=/u01/oracle/products/jdk1.7.0_55
LogLevel=INFO
DomainsFileEnabled=true
StartScriptName=startWebLogic.sh
ListenAddress=weblogic01.sysco.no
NativeVersionEnabled=true
ListenPort=5556
LogToStderr=true
SecureListener=true
LogCount=1
StopScriptEnabled=false
QuitEnabled=false
LogAppend=true
StateCheckInterval=500
CrashRecoveryEnabled=false
StartScriptEnabled=true
LogFile=/u02/oracle/config/domains/incadomain/nodemanager/nodemanager.log
LogFormatter=weblogic.nodemanager.server.LogFormatter
ListenBacklog=5
~
Interface=eth0
NetMask=255.255.255.0
UseHACBroadcast=true

```

iii. Restart node manager.

b. Setting the path for the wlsifconfig.sh script

This changes must be applied on the managed server machines weblogic01.sysco.no and weblogic02.sysco.no

i. Open the file /etc/profile to include the following paths

Variable	Value for this environment	File
<code>MSERVER_HOME/bin/server_migration</code>	<code>/u02/oracle/config/domains/incadomain/bin/server_migration</code>	<code>wlsifconfig.sh</code>
<code>WL_HOME/common/bin</code>	<code>/u01/oracle/products/fm1213/wlserver/common/bin</code>	<code>wlscontrol.sh</code>
<code>MSERVER_HOME/nodemanager</code>	<code>/u02/oracle/config/domains/incadomain/nodemanager</code>	<code>nodemanager.domains</code>

```

pathmunge /sbin after
fi
HOSTNAME=/bin/hostname 2>/dev/null
HISTSIZE=1000
if [ "${HISTCONTROL}" = "ignoreSpace" ]; then
    export HISTCONTROL=ignoreboth
else
    export HISTCONTROL=ignoredups
fi
export PATH USER LOGNAME MAIL HOSTNAME HISTSIZE HISTCONTROL
export PATH=$PATH:/u02/oracle/config/domains/incadomain/bin/server_migration:/u01/oracle/products/fm1213/wlserver/common/bin:/u02/oracle/config/domains/incadomain/nodemanager
# By default, we want umask to get set. This sets it for login shell
# Current threshold for system reserved uid/gids is 200
# You could check uidgid reservation validity in
# /usr/share/doc/setup-*/uidgid file
if [ $UID -gt 199 ] && [ "id -gn" = "id -un" ]; then
    umask 002
else
    umask 022
fi

```

c. Configuring privileges for wlsifconfig.sh script

According to [4] it is necessary to modify /etc/sudoers to include these lines.

```

Defaults:oracle !requiretty
oracle ALL=NOPASSWD: /sbin/ifconfig,/sbin/arping

```

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This modification has to be applied on all the servers that are part of the cluster. In this case weblogic01.sysco.no and weblogic02.sysco.no

Use visudo to do it!

```
## Allows members of the users group to shutdown this host
# %users localhost=/sbin/shutdown -h now

## Read drop-in files from /etc/sudoers.d (the # here indicates that they should
#includedir /etc/sudoers.d

Defaults:oracle !requiretty
oracle ALL=NOPASSWD: /sbin/ifconfig,/sbin/arping
```

d. Testing scripts

These lines are useful to test the configuration

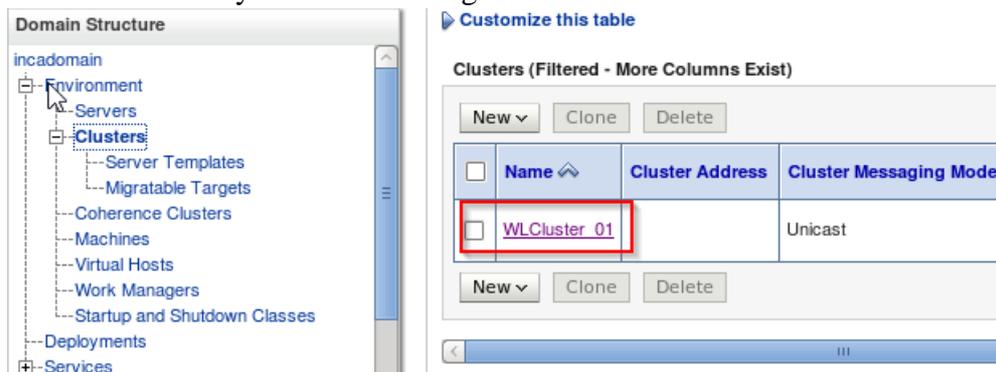
```
export ServerDir=/tmp
wlsifconfig.sh -listif eth0
wlsifconfig.sh -addif eth0 192.180.56.17 255.255.255.0
/sbin/ifconfig
wlsifconfig.sh -removeif eth0 192.180.56.17
```

Now it is time to show how to configure non-database and database leasing.

4 Non-database consensus leasing

The following steps are used to configure the automatic migration based on consensus.

- Enter to the Admin Console and click **Lock and Edit**.
- Select the cluster you want to configure.



Domain Structure

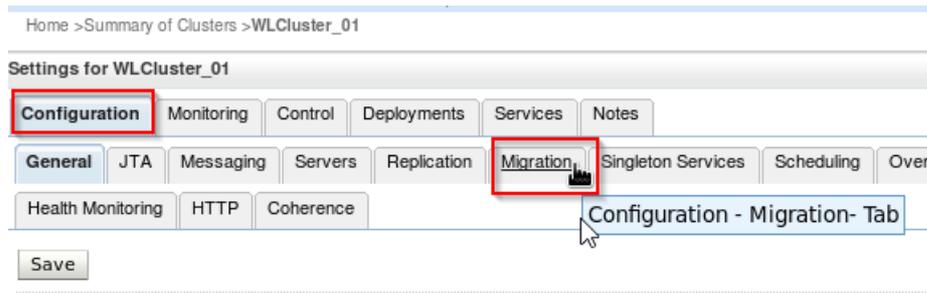
- incadomain
 - Environment
 - Servers
 - Clusters**
 - Server Templates
 - Migratable Targets
 - Coherence Clusters
 - Machines
 - Virtual Hosts
 - Work Managers
 - Startup and Shutdown Classes
 - Deployments
 - Services

Clusters (Filtered - More Columns Exist)

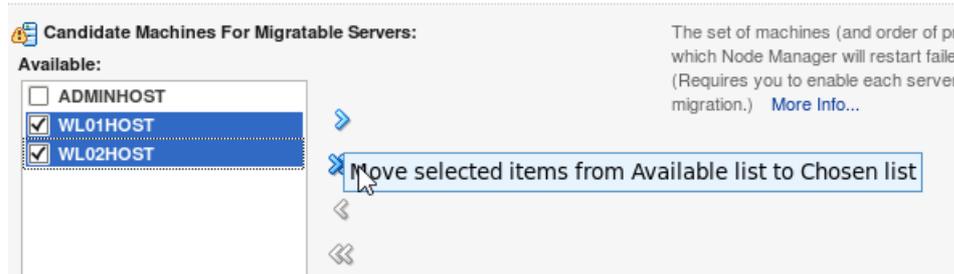
<input type="checkbox"/>	Name	Cluster Address	Cluster Messaging Mode
<input type="checkbox"/>	WLCluster_01		Unicast

- Click on Configuration and click on Migration

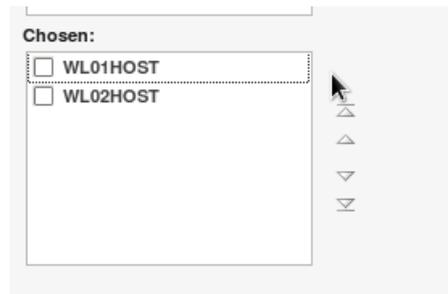
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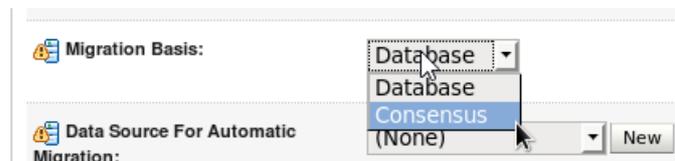
d. Select the candidate machines and click on the arrow



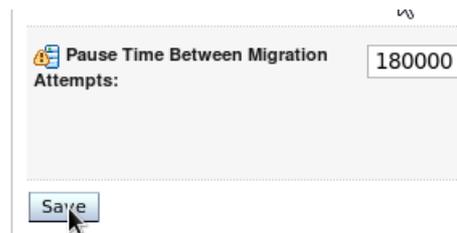
They are moved to chosen



e. Select the migration basis. Consensus for this example.



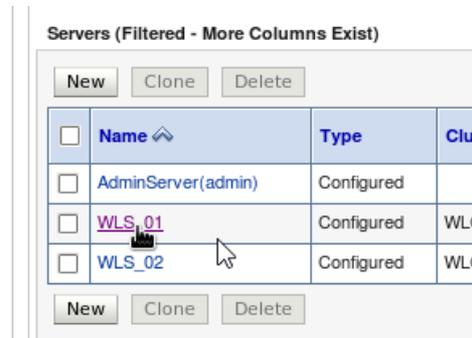
f. Click Save.



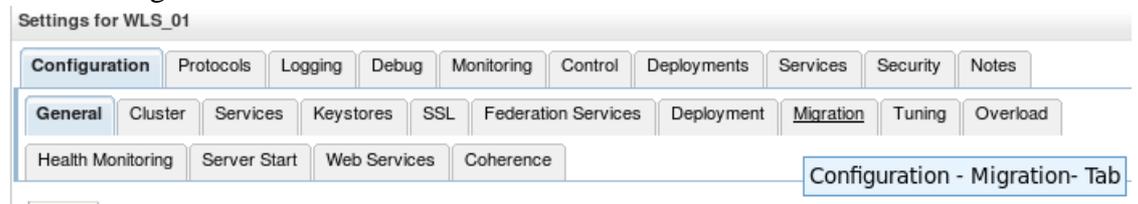
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Now it is time to configure each managed server with the following steps

- a. In the Admin Console select one of the cluster managed servers. In this case WLS_01.



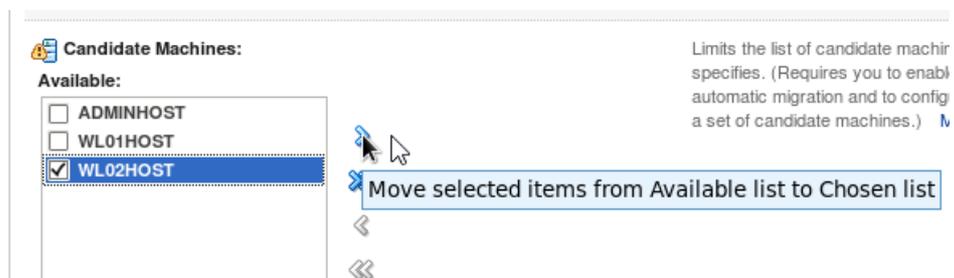
- b. Click on Configuration tab.
- c. Click on Migration tab.



- d. Mark the check Automatic Server Migration Enabled.

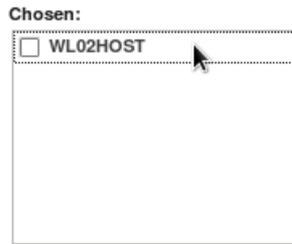


- e. Select the machine where the managed server should be migrated in case of problems. In this case WLS02HOST.



- f. The machine appear in the chosen list

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- g. Click on Save.
- h. Repeat the steps described in this section (g) for all the other managed server. In this case WLS_02.
- i. Click on Activate Changes.
- j. Restart the Admin Server and server WLS_01 and WLS_02.
- k. Bug detected,**

After restarting both servers one of them did not start and the nodemanager.log showed this message:

```
<Oct 22, 2015 11:05:37 AM GMT-02:00> <WARNING> <Server migration not supported on this platform>
<Oct 22, 2015 11:05:37 AM GMT-02:00> <WARNING> <Unknown interface eth0>
<Oct 22, 2015 11:05:37 AM GMT-02:00> <WARNING> <Cannot remove 192.180.56.11 - not brought online>
<Oct 22, 2015 11:05:37 AM GMT-02:00> <WARNING> <Exception while executing 'PostStop' ExecutableCallbacks>
java.io.IOException: Exception while executing 'PostStop' ExecutableCallbacks
    at weblogic.nodemanager.server.NMPProcess$MultiExecuteCallbackHook.execute(NMPProcess.java:250)
    at weblogic.nodemanager.server.NMPProcess.executePostStopHooks(NMPProcess.java:199)
    at weblogic.nodemanager.server.NMPProcess.start(NMPProcess.java:150)
    at weblogic.nodemanager.server.ServerMonitor.startProcess(ServerMonitor.java:441)
    at weblogic.nodemanager.server.ServerMonitor.start(ServerMonitor.java:93)
    at weblogic.nodemanager.server.ServerManager.startServer(ServerManager.java:289)
    at weblogic.nodemanager.server.ServerManager.start(ServerManager.java:270)
    at weblogic.nodemanager.server.Handler.handleStart(Handler.java:634)
    at weblogic.nodemanager.server.Handler.handleCommand(Handler.java:154)
    at weblogic.nodemanager.server.Handler.run(Handler.java:81)
    at java.lang.Thread.run(Thread.java:745)
Caused by: weblogic.nodemanager.util.MultiException:
There are 1 nested errors:
java.io.IOException: Command '/u02/oracle/config/domains/incadomain/bin/server_migration/wlsifconfig.sh - removei
    at weblogic.nodemanager.server.NMHelper$.execute(NMHelper.java:384)
    at weblogic.nodemanager.server.NMPProcess$MultiExecuteCallbackHook.execute(NMPProcess.java:270)
    at weblogic.nodemanager.server.NMPProcess$MultiExecuteCallbackHook.executeWithContinueOnFailure(NMPProcess
```

In order to solve it you have to follow the steps stated in *“WLS Managed Server Fails to Start with 'Server migration not supported on this platform' on Linux 3.x Kernel (Doc ID 2020472.1)”*

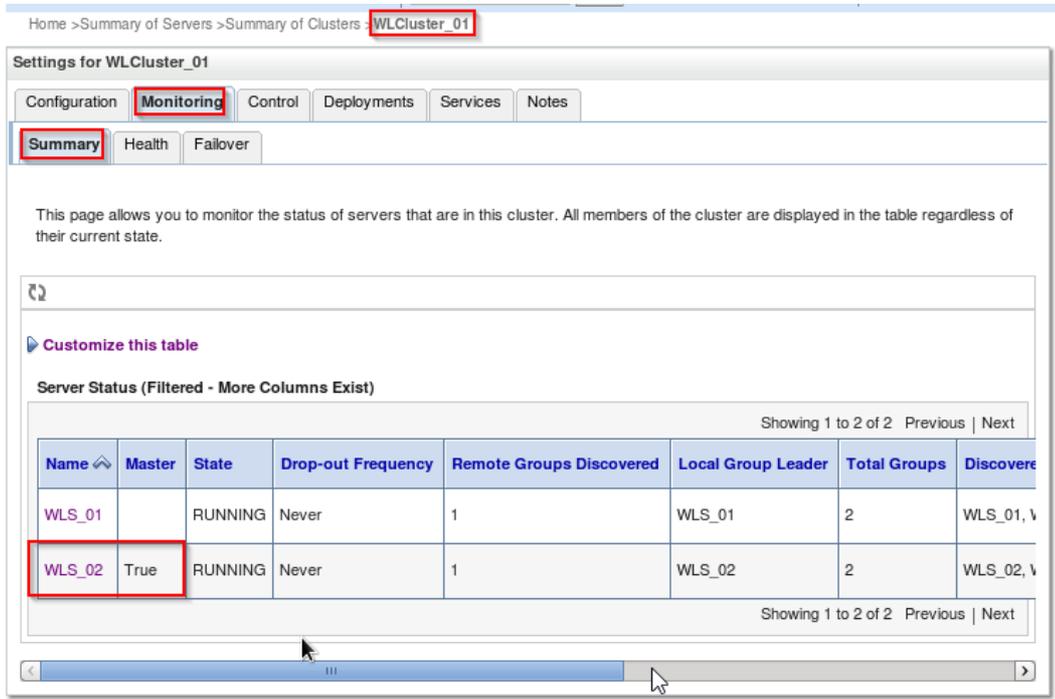
After that servers were started without problems

```
<Oct 22, 2015 11:05:37 AM GMT-02:00> <WARNING> <Server start command for WebLogic server 'WLS_01' failed d
returned an unsuccessful exit code '1'. Check NM logs for script output.]. Please check Node Manager log
<Oct 22, 2015 11:40:35 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Boot identity properties saved to "/u02/
<Oct 22, 2015 11:40:35 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Startup configuration properties saved t
<Oct 22, 2015 11:40:35 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Rotated server output log to "/u02/orac
<Oct 22, 2015 11:40:35 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Server error log also redirected to ser
<Oct 22, 2015 11:40:35 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Starting WebLogic server with command l
<Oct 22, 2015 11:40:36 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Working directory is '/u02/oracle/confi
<Oct 22, 2015 11:40:36 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <Server output log file is '/u02/oracle/c
<Oct 22, 2015 11:40:36 AM GMT-02:00> <WARNING> <192.180.56.11 already online on eth0. Please make sure th
<Oct 22, 2015 11:42:57 AM GMT-02:00> <INFO> <incadomain> <WLS_01> <The server 'WLS_01' is running now.>
```

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5 Testing the whole server migration process for non-database consensus leasing

First of all, I have to remark that this domain only have two hosts and two managed servers. Therefore, before testing the whole server migration process, I have to determine who the cluster master is. You can do it using the Admin Console as can be seen in the following picture.



Home > Summary of Servers > Summary of Clusters > WLCluster_01

Settings for WLCluster_01

Configuration **Monitoring** Control Deployments Services Notes

Summary Health Failover

This page allows you to monitor the status of servers that are in this cluster. All members of the cluster are displayed in the table regardless of their current state.

Customize this table

Server Status (Filtered - More Columns Exist)

Showing 1 to 2 of 2 Previous | Next

Name	Master	State	Drop-out Frequency	Remote Groups Discovered	Local Group Leader	Total Groups	Discoveries
WLS_01		RUNNING	Never	1	WLS_01	2	WLS_01, WLS_02
WLS_02	True	RUNNING	Never	1	WLS_02	2	WLS_02, WLS_01

Showing 1 to 2 of 2 Previous | Next

This information is important because Oracle states the following [5]:

“Note:

*If your cluster **only contains two server instances**, the cluster leader will be the majority partition if a network partition occurs. If the cluster leader fails, the surviving server instance will attempt to verify its status through Node Manager. If the surviving server instance is able to determine the status of the failed cluster leader, it assumes the role of cluster leader. If the surviving server instance cannot check the status of the cluster leader, due to machine failure or a network partition, it will voluntarily shut down as it cannot reliably determine if it is in the majority.*

To avoid this scenario, Oracle recommends using a minimum of three server instances running on different machines.”

Therefore, in this test, I will kill the managed server WLS_01 (weblogic01.sysco.no) because it is not the cluster master. The following lines show the testing process executed.

- Read the file startup.properties to get the number of restarts executed by the node manager before trying the migration process.

```
cd /u02/oracle/config/domains/incadomain/servers/WLS_01/
data/nodemanager
```

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cat startup.properties

```
#Server startup properties
#Fri Oct 23 09:07:00 GMT-02:00 2015
SSLArguments=-Dweblogic.security.SSL.ignore
RestartMax=2
ServerIP=192.180.56.11
RestartDelaySeconds=30
FileTimeSpan=24
RestartInterval=3600
FileTimeSpanFactor=3600000
RotatedFileCount=100
RotationType=bySize
AdminURL=http://admhost.sysco.no:9001
NumberOfFilesLimited=true
AutoRestart=true
RotationTimeStart=00:00
FileSizeKB=5000
[oracle@weblogic01 nodemanager]$
```

Then the process has to be killed twice to cause the whole server migration.

- b. Find the process id using this command

ps -fea | grep WLS_01

```
[oracle@weblogic01 bin]$ ps -fea | grep WLS_01
oracle 3101 3048 1 06:51 ? 00:00:59 /u01/oracle/
ic.policy -Dweblogic.ProductionModeEnabled=true -Dweblogic.s
tionEnabled=true -Dweblogic.security.SSL.ignoreHostnameVerif
ules/endorsed -Dweblogic.t3.ConnectTimeout=30 -Djava.net.pre
host.sysco.no:9001 -Dweblogic.utils.cmm.lowertier.ServiceDis
oracle 3822 3790 0 08:13 pts/3 00:00:00 grep WLS_01
[oracle@weblogic01 bin]$
```

- c. Kill the process

kill -9 3101

I got these messages in the nodemanager.log on weblogic01.sysco.no
The virtual IP is removed and the process sleeps for 30 seconds before attempting to restart the server

```
<Dec 4, 2015 12:26:52 PM GMT-02:00> <INFO> <incadomain> <WLS_01> <The server WLS_01 with process id 7472 is no longer alive; waiting for the process to die.>
<Dec 4, 2015 12:26:52 PM GMT-02:00> <INFO> <incadomain> <Successfully removed 192.180.56.11 netmask from eth0:4.>
<Dec 4, 2015 12:26:52 PM GMT-02:00> <FINEST> <incadomain> <WLS_01> <Process died.>
<Dec 4, 2015 12:26:52 PM GMT-02:00> <FINEST> <incadomain> <WLS_01> <get latest startup configuration before deciding/trying to restart the server>
<Dec 4, 2015 12:26:52 PM GMT-02:00> <INFO> <incadomain> <WLS_01> <Server failed so attempting to restart (restart count = 1)>
<Dec 4, 2015 12:26:52 PM GMT-02:00> <INFO> <incadomain> <WLS_01> <Sleeping for 30 seconds before attempting to restart server>
```

After 30 seconds the virtual IP is added again and the server WLS_01 is started

```
<Dec 4, 2015 12:27:26 PM GMT-02:00> <FINE> <incadomain> <Coherence States = {}>
<Dec 4, 2015 12:27:26 PM GMT-02:00> <INFO> <Successfully brought 192.180.56.11 netmask 255.255.255.0 online on eth0:4>
<Dec 4, 2015 12:27:26 PM GMT-02:00> <FINEST> <incadomain> <WLS_01> <Wrote process id 8751>
<Dec 4, 2015 12:27:36 PM GMT-02:00> <FINE> <incadomain> <State5 = {domain_bak=UNKNOWN, WLS_02=UNKNOWN, WLS_01=STARTING}>
<Dec 4, 2015 12:27:36 PM GMT-02:00> <FINE> <incadomain> <Coherence States = {}>
```

I killed the process again and this time the nodemanager.log states the server will not be restarted again on this machine

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```

Dec 4, 2015 12:28:10 PM GMT-02:00 <FINE> <incadomain> <Coherence States = {}>
Dec 4, 2015 12:28:10 PM GMT-02:00 <FINE> <incadomain> <Coherence States = {}>
Dec 4, 2015 12:28:16 PM GMT-02:00 <INFO> <incadomain> <WLS_01> <The server 'WLS_01' with process id 8751 is no longer alive; waiting for the process to die.>
Dec 4, 2015 12:28:16 PM GMT-02:00 <INFO> <incadomain> <Successfully removed 192.180.56.11 netmask from eth0:4.>
Dec 4, 2015 12:28:16 PM GMT-02:00 <FINEST> <incadomain> <WLS_01> <Process died.>
Dec 4, 2015 12:28:16 PM GMT-02:00 <INFO> <incadomain> <WLS_01> <Server failed during startup so will not be restarted.>
Dec 4, 2015 12:28:16 PM GMT-02:00 <FINEST> <incadomain> <WLS_02> <Stunmonitor returned; security finished due to unconfiguring waiters?>
Dec 4, 2015 12:28:16 PM GMT-02:00 <FINE> <incadomain> <States = {domain_bak=UNKNOWN, WLS_02=UNKNOWN, WLS_01=FAILED_NOT_RESTARTABLE}>
Dec 4, 2015 12:28:16 PM GMT-02:00 <FINE> <incadomain> <Coherence States = {}>

```

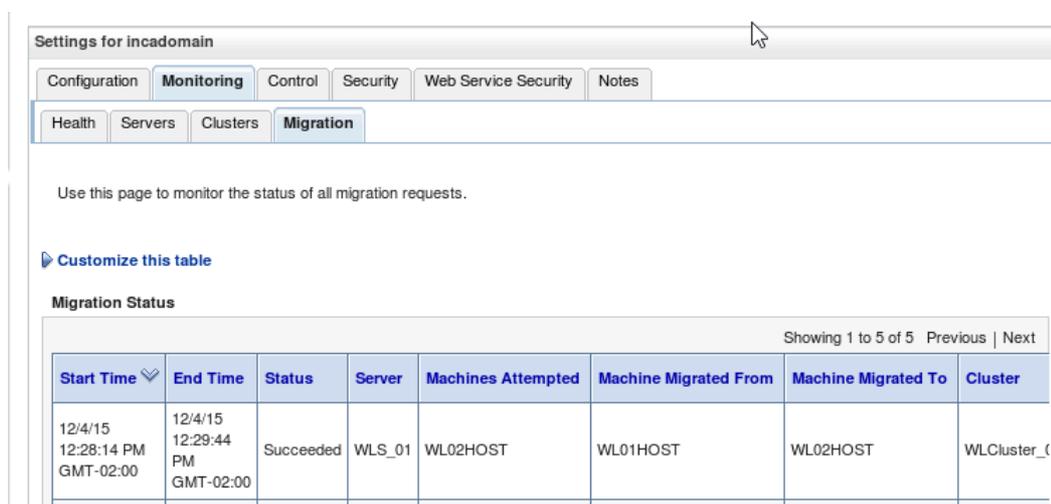
This is the nodemanager.log on weblogic02.sysco.no. The virtual IP 192.180.56.11 is configured on this machine and the server WLS_01 is migrated.

```

Dec 4, 2015 12:28:15 PM GMT-02:00 <FINEST> <incadomain> <WLS_01> <Environment: KONSOLE_DEBUG_SERVICE=L68>
Dec 4, 2015 12:28:15 PM GMT-02:00 <FINEST> <incadomain> <WLS_01> <Environment: ORBIT_SOCKETDIR=/tmp/orbit-oracle>
Dec 4, 2015 12:28:15 PM GMT-02:00 <FINEST> <incadomain> <WLS_01> <Environment: LANG=en_US.UTF-8>
Dec 4, 2015 12:28:15 PM GMT-02:00 <INFO> <incadomain> <WLS_01> <Working directory is '/u02/oracle/config/domains/incadomain'>
Dec 4, 2015 12:28:15 PM GMT-02:00 <INFO> <incadomain> <WLS_01> <Server output log file is '/u02/oracle/config/domains/incadomain/servers/WLS_01/logs/WLS_01.out'>
Dec 4, 2015 12:28:15 PM GMT-02:00 <INFO> <incadomain> <Generated command - sudo /sbin/ifconfig eth0:3 192.180.56.11 netmask 255.255.255.255.>
Dec 4, 2015 12:28:19 PM GMT-02:00 <INFO> <incadomain> <Successfully brought 192.180.56.11 netmask 255.255.255.0 online on eth0:3>
Dec 4, 2015 12:28:19 PM GMT-02:00 <FINEST> <incadomain> <WLS_01> <Wrote process id 8968>
Dec 4, 2015 12:28:23 PM GMT-02:00 <FINE> <incadomain> <States = {domain_bak=UNKNOWN, WLS_02=RUNNING, WLS_01=STARTING}>
Dec 4, 2015 12:28:23 PM GMT-02:00 <FINE> <incadomain> <Coherence States = {}>

```

In addition, the Admin Console show the migration was completed without problems



The screenshot shows the 'Settings for incadomain' page with the 'Migration' tab selected. The 'Migration Status' table displays a single successful migration record.

Start Time	End Time	Status	Server	Machines Attempted	Machine Migrated From	Machine Migrated To	Cluster
12/4/15 12:28:14 PM GMT-02:00	12/4/15 12:29:44 PM GMT-02:00	Succeeded	WLS_01	WL02HOST	WL01HOST	WL02HOST	WLCluster_0

6 Killing the master within non-database consensus leasing.

Even though Oracle recommends at least 3 machines to use this configuration. I managed to kill the master without problems, the server was migrated and the other took the role of master. However, I think it happens because the nodemanager is able to communicate itself with the other machines, but what happens when the whole machines is stopped or when the machine is disconnected from the network is shown in the following section.

Created by: [Raúl Castillo](#)

Customize this table

Server Status (Filtered - More Columns Exist)

Showing 1 to 2 of 2 Previous | Next

Name	Master	State	Drop-out Frequency	Remote Groups Discovered	Local Group Leader	Total Groups	Disco
WLS_01	True	RUNNING	Never	1	WLS_01	2	WLS_C
WLS_02		STARTING		0		0	

Showing 1 to 2 of 2 Previous | Next

The previous picture shows how WLS_01 assumed the role of Master after killing the WLS_02 managed server.

Settings for incadomain

Configuration **Monitoring** Control Security Web Service Security Notes

Health Servers Clusters **Migration**

Use this page to monitor the status of all migration requests.

Customize this table

Migration Status

Showing 1 to 6 of 6 Previous | Next

Start Time	End Time	Status	Server	Machines Attempted	Machine Migrated From	Machine Migrated To	Cluster
12/4/15 12:52:36 PM GMT-02:00	12/4/15 12:55:20 PM GMT-02:00	Succeeded	WLS_02	WL01HOST	WL02HOST	WL01HOST	WLCluster_c

The previous picture shows how the server WLS_02, which was the master, is migrated from WL02HOST to WL01HOST.

7 Disconnecting a machine from the network within non-database consensus leasing.

First of all, I will disconnect the machine that does not have the master role. In this case is the server WLS_02.

Created by: [Raúl Castillo](#)

Settings for WLCluster_01

Configuration **Monitoring** Control Deployments Services Notes

Summary Health Failover

This page allows you to monitor the status of servers that are in this cluster. All members of the cluster are displayed in the table regardless of their current state.

Customize this table

Server Status (Filtered - More Columns Exist) Showing 1 to 2 of 2 Previous | Next

Name	Master	State	Drop-out Frequency	Remote Groups Discovered	Local Group Leader	Total Groups	Discover
WLS_01	True	RUNNING	Never	1	WLS_01	2	WLS_01, WLS_02
WLS_02		RUNNING	Never	1	WLS_02	2	WLS_02, WLS_01

Disconnecting the server.

After disconnecting the server this is the message shown by the nodemanager.log in weblogic01.sysco.no

```

<Dec 9, 2015 6:12:50 AM GMT-02:00> <FINEST> <incadomain> <WLS_02> <Environment: KONSOLE_DRUS_SERVICE=:1.68>
<Dec 9, 2015 6:12:50 AM GMT-02:00> <FINEST> <incadomain> <WLS_02> <Environment: ORBIT_SOCKETDIR=/tmp/orbit-oracle>
<Dec 9, 2015 6:12:50 AM GMT-02:00> <FINEST> <incadomain> <WLS_02> <Environment: LANG=en_US.UTF-8>
<Dec 9, 2015 6:12:50 AM GMT-02:00> <INFO> <incadomain> <WLS_02> <Working directory is /u02/oracle/config/domains/incadomain>
<Dec 9, 2015 6:12:50 AM GMT-02:00> <INFO> <incadomain> <WLS_02> <Server output log file is /u02/oracle/config/domains/incadomain/servers/WLS_02/logs/WLS_02.out>
<Dec 9, 2015 6:12:51 AM GMT-02:00> <INFO> <Generated command - sudo /sbin/ifconfig eth0:3 192.180.56.12 netmask 255.255.255.0>
<Dec 9, 2015 6:12:55 AM GMT-02:00> <INFO> <Successfully brought 192.180.56.12 netmask 255.255.255.0 online on eth0:3>
<Dec 9, 2015 6:12:55 AM GMT-02:00> <FINEST> <incadomain> <WLS_02> <Wrote process id 3940>
<Dec 9, 2015 6:12:56 AM GMT-02:00> <FINE> <incadomain> <States = {domain_bak=UNKNOWN, WLS_02=STARTING, WLS_01=RUNNING}>
<Dec 9, 2015 6:12:56 AM GMT-02:00> <FINE> <incadomain> <Coherence States = {}>
<Dec 9, 2015 6:12:56 AM GMT-02:00> <FINE> <incadomain> <States = {domain_bak=UNKNOWN, WLS_02=STARTING, WLS_01=RUNNING}>
<Dec 9, 2015 6:12:56 AM GMT-02:00> <FINE> <incadomain> <Coherence States = {}>
<Dec 9, 2015 6:13:11 AM GMT-02:00> <FINE> <incadomain> <States = {domain_bak=UNKNOWN, WLS_02=STARTING, WLS_01=RUNNING}>
<Dec 9, 2015 6:13:11 AM GMT-02:00> <FINE> <incadomain> <Coherence States = {}>
<Dec 9, 2015 6:13:11 AM GMT-02:00> <FINE> <incadomain> <States = {domain_bak=UNKNOWN, WLS_02=STARTING, WLS_01=RUNNING}>
<Dec 9, 2015 6:13:11 AM GMT-02:00> <FINE> <incadomain> <Coherence States = {}>

```

In addition, the log file WLS_01.out (master) also shows details about the migration process.

```

<Dec 9, 2015 6:12:02 AM GMT-02:00> <Warning> <RJVM> <BEA-000573> <RequestTimeout for message id 33 with message: RJVM response from 'weblogic.rjvm.RJVMImpl@77a19741 - id: 1]':incadomain:WLS_02' connect time: 'Wed Dec 09 06:07:52 GMT-02:00 2015'' for 'process(Lweblogic.cluster.messaging.internal.ClusterMessage;)' timed out after: 5000ms.>
<Dec 9, 2015 6:12:07 AM GMT-02:00> <Warning> <com.oracle.coherence> <BEA-000000> <2015-12-09 06:12:07.954/365.232 Oracle Coherence GE 12.1.3.0.0 <Warning> (thread=ClusterMigrator) timeout: Members Membership (Size=1
  Member {id=2, Timestamp=2015-12-09 06:07:26.111, Address=192.180.56.12:9991, MachineId=63935, Location=site: machine:WL02HOST,process:3428,member:WLS_02, Role=WebLogicServer=0.0432, Threshold=1976, Paused=true, Deferring=true, OutstandingPackets=1, DeferredPackets=3, ReadyPackets=0, LastIn=53624ms, LastOut=144ms, LastSlow=/a)
} are suspect.>
<Dec 9, 2015 6:12:07 AM GMT-02:00> <Warning> <com.oracle.coherence> <BEA-000000> <2015-12-09 06:12:07.957/365.235 Oracle Coherence GE 12.1.3.0.0 <Warning> (thread=ClusterMigrator) will be removed.>
<Dec 9, 2015 6:12:17 AM GMT-02:00> <Warning> <RJVM> <BEA-000573> <RequestTimeout for message id 34 with message: RJVM response from 'weblogic.rjvm.RJVMImpl@77a19741 - id: 1]':incadomain:WLS_02' connect time: 'Wed Dec 09 06:07:52 GMT-02:00 2015'' for 'process(Lweblogic.cluster.messaging.internal.ClusterMessage;)' timed out after: 5000ms.>
<MigratableServerState> Merged candidate machine list is:
<MigratableServerState> WL02HOST
<MigratableServerState> WL01HOST
<MigratableServersMonitorImpl> Sending server-unresponsive to WLS_02 on WL02HOST
<MigratableServerState> Restarting server WLS_02
<MigratableServerState> Current status of WLS_02 on WL02HOST is UNKNOWN
<MigratableServerState> Current status of WLS_02 on WL02HOST is UNKNOWN
<MigratableServerState> WLS_02 on WL02HOST is restartable? true
<MigratableServerState> WLS_02 is migrating from WL02HOST to WL01HOST
<MigratableServersMonitorImpl> Got a report: WLS_02 is now on WL01HOST
<MigratableServerState> Sending start command to nm for WLS_02
<MigratableServersMonitorImpl> Sending server-unresponsive to WLS_02 on WL01HOST
<MigratableServersMonitorImpl> Got a report: WLS_02 is now on ADMNHOST

```

The admin console shows the migration process result.

Created by: [Raúl Castillo](#)

Settings for incadomain

Configuration **Monitoring** Control Security Web Service Security Notes

Health Servers Clusters **Migration**

Use this page to monitor the status of all migration requests.

[Customize this table](#)

Migration Status

Showing 1 to 1 of 1 Previous | Next

Start Time	End Time	Status	Server	Machines Attempted	Machine Migrated From	Machine Migrated To	Cluster
12/9/15 6:12:49 AM GMT-02:00	12/9/15 6:13:57 AM GMT-02:00	Succeeded	WLS_02	WL01HOST	WL02HOST	WL01HOST	WLCluster_(

Showing 1 to 1 of 1 Previous | Next

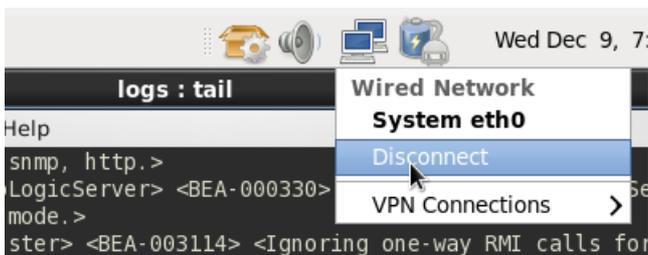
Now, I do the same test, but this time the machine where the master managed server is running will be disconnected. This time the master is WLS_02

Server Status (Filtered - More Columns Exist)

Showing 1 to 2 of 2

Name	Master	State	Drop-out Frequency	Remote Groups Discovered	Local Group Leader
WLS_01		RUNNING	Never	1	WLS_01
WLS_02	True	RUNNING	Never	1	WLS_02

Therefore, the server weblogic02.sysco.no will be disconnected.



logs : tail

Help

snmp, http.>

LogicServer> <BEA-000330>

mode.>

ster> <BEA-003114> <Ignoring one-way RMI calls for

Wired Network
System eth0
Disconnect
VPN Connections >

In this case the migration process does not work, which makes sense with the Oracle recommendation about having at least 3 machines to use the non-database consensus leasing.

8 Database leasing

According to [4] you have to execute the following steps.

a. Create the tablespace

```
SQL> create tablespace Leasing datafile '/u01/app/oracle/oradata/tauro/Leasing.dbf' size 32m AUTOEXTEND on next 32m maxsize 2048m extent management local;
Tablespace created.
```

Created by: [Raúl Castillo](#)

b. Create the username Leasing

```
SQL> create user Leasing identified by database01;
User created.

SQL> grant create table to Leasing;
Grant succeeded.

SQL> grant create session to Leasing;
Grant succeeded.

SQL> alter user Leasing default tablespace Leasing;
User altered.

SQL> alter user Leasing quota unlimited on Leasing;
User altered.
```

c. Create the leasing table

In this case we have to copy the script called leasing.ddl located in the following path to the database host.

```
[oracle@weblogic01 ~]$ scp /u01/oracle/products/fml213/vlserver/server/db/oracle/920/leasing.ddl oracle@database01.sysco.no:/u01/oracle/scriptLeasing
The authenticity of host 'database01.sysco.no (192.186.96.180)' can't be established.
RSA key fingerprint is 0d:ba:12:19:78:bf:e4:af:f5:c7:22:ed:ef:c4:08:4a.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'database01.sysco.no' (RSA) to the list of known hosts.
oracle@database01.sysco.no's password:
leasing.ddl
```

Execute the script with the user **Leasing**

```
Enter user-name: leasing
Enter password:

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.
With the Partitioning, OLAP, Advanced Analytics and Re

SQL> @/u01/oracle/scriptLeasing/leasing.ddl;
DROP TABLE ACTIVE
*
ERROR at line 1:
ORA-00942: table or view does not exist

Table created.
```

d. Create the data source to connect to the Leasing table

These are the steps

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Change Center

View changes and restarts

No pending changes exist. Click the Release Configuration button to allow others to edit the domain.

Lock & Edit

Release Configuration

Domain Structure

- incadomain
 - Environment
 - Deployments
 - Services
 - Messaging
 - Data Sources
 - Persistent Stores
 - Foreign Data Sources, Level 2, 2 o
 - Work Contexts
 - XML Registries
 - XML Entity Caches
 - jCOM
 - Mail Sessions
 - File T3

[Customize this table](#)

Data Sources (Filtered - More Columns Exist)

New

- Generic Data Source
- GridLink Data Source
- Multi Data Source

New

Create a New JDBC Data Source

Back Next Finish Cancel

JDBC Data Source Properties

The following properties will be used to identify your new JDBC data source.
* Indicates required fields

What would you like to name your new JDBC data source?

Name:

What JNDI name would you like to assign to your new JDBC Data Source?

JNDI Name:

What database type would you like to select?

Database Type:

Back Next Finish Cancel

Created by: [Raúl Castillo](#)

Create a New JDBC Data Source

Back Next Finish Cancel

JDBC Data Source Properties

The following properties will be used to identify your new JDBC data source.

Database Oracle
Type:

What database driver would you like to use to create database connections? Note: * indicates that the driver is explicitly supported by the WebLogic Server.

Database Driver:

Back Next Finish Cancel

Create a New JDBC Data Source

Back Next Finish Cancel

Transaction Options

You have selected non-XA JDBC driver to create database connection in your new data source.

Does this data source support global transactions? If yes, please choose the transaction processing mode.

Supports Global Transactions

Select this option if you want to enable non-XA JDBC connections from the data source to participate in global transactions. Recommended in place of Emulate Two-Phase Commit.

Logging Last Resource

Select this option if you want to enable non-XA JDBC connections from the data source to participate in global transactions. Select this option only if your application can tolerate heuristic conditions.

Emulate Two-Phase Commit

Select this option if you want to enable non-XA JDBC connections from the data source to participate in global transactions. With this option, no other resources can participate in the global transaction processing.

One-Phase Commit

Back Next Finish Cancel

Created by: [Raúl Castillo](#)**Connection Properties**

Define Connection Properties.

What is the name of the database you would like to connect to?

Database Name:

What is the name or IP address of the database server?

Host Name:

What is the port on the database server used to connect to the database?

Port:

What database account user name do you want to use to create database connections?

Database User Name:

What is the database account password to use to create database connections?

Password: **Confirm Password:**

Additional Connection Properties:

oracle.jdbc.DRCPConnectionClass: **System Properties:**

What table name or SQL statement would you like to use to test database conn

Test Table Name:

Created by: [Raúl Castillo](#)

Create a New JDBC Data Source

Back Next Finish Cancel

Select Targets

You can select one or more targets to deploy your new JDBC data source. If you deployed. You will need to deploy the data source at a later time.

Servers

AdminServer

Clusters

WLCluster_01

- All servers in the cluster
- Part of the cluster

WLS_02

WLS_01

Back Next Finish Cancel

Change Center

[View changes and restarts](#)

Pending changes exist. They must be activated to take effect.

9 Modifying the configuration to use database instead of non-database consensus leasing.

In this case, I have to go to Clusters > WLCluster_01 > Configuration > Migration to modify the following fields.

Migration Basis: Database

Data Source For Automatic Migration: Leasing

Auto Migration Table Name: ACTIVE

Member Death Detector Enabled

Member Discovery Timeout: 30

Leader Heartbeat Period: 10

Additional Migration Attempts: 3

Save and activate changes. Restart managed servers.

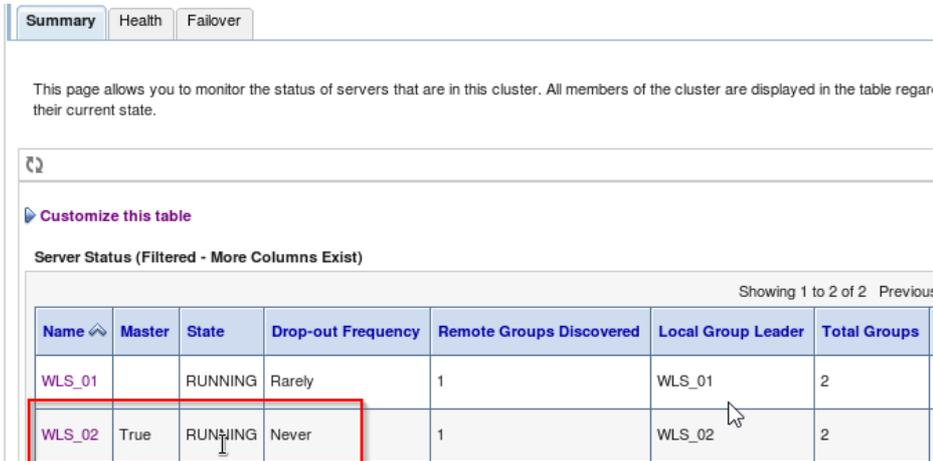
Created by: [Raúl Castillo](#)

10 Testing the whole server migration for database leasing.

Killing the master managed server.

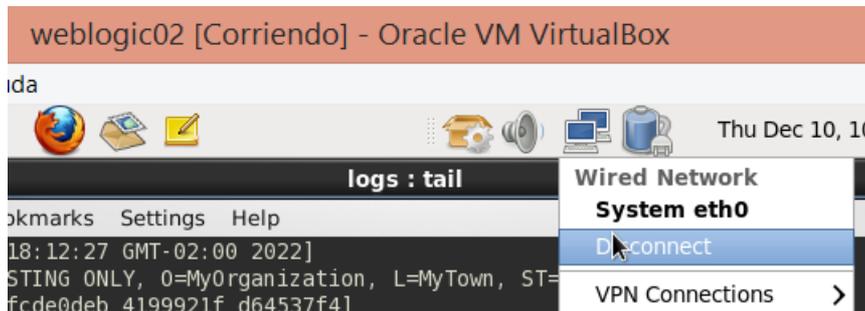
This test is similar to the test made previously these are the screens that I got during the process.

First of all, I need to know who the master is



Name	Master	State	Drop-out Frequency	Remote Groups Discovered	Local Group Leader	Total Groups
WLS_01		RUNNING	Rarely	1	WLS_01	2
WLS_02	True	RUNNING	Never	1	WLS_02	2

Therefore, I disconnect the machine weblogic02.sysco.no from the network



The nodemanager.log in weblogic01.sysco.no shows that the managed server WLS_02 is migrated to this machine.

```

<Dec 10, 2015 10:53:37 AM GMT-02:00> <FINEST> <incadomain> <WLS_02> <Environment: ORBIT_SOCKETDIR=/tmp/orbit-oracle>
<Dec 10, 2015 10:53:37 AM GMT-02:00> <FINEST> <incadomain> <WLS_02> <Environment: LANG=en_US.UTF-8>
<Dec 10, 2015 10:53:37 AM GMT-02:00> <INFO> <incadomain> <WLS_02> <Working directory is "/u02/oracle/config/domains/incadomain">
<Dec 10, 2015 10:53:37 AM GMT-02:00> <INFO> <incadomain> <WLS_02> <Server output log file is "/u02/oracle/config/domains/incadomain/servers/WLS_02/Logs/WLS_02.out">
<Dec 10, 2015 10:53:37 AM GMT-02:00> <INFO> <incadomain> <WLS_02> <Generated command - sudo /sbin/ifconfig eth0:3 192.168.56.12 netmask 255.255.255.0>
<Dec 10, 2015 10:53:41 AM GMT-02:00> <INFO> <incadomain> <WLS_02> <Successfully brought 192.168.56.12 netmask 255.255.255.0 online on eth0:3>
<Dec 10, 2015 10:53:41 AM GMT-02:00> <FINES> <incadomain> <WLS_02> <Wrote process id 4333>

```

Now the managed server WLS_01 is the new master.

Created by: [Raúl Castillo](#)

Customize this table

Server Status (Filtered - More Columns Exist)

Showing 1 t

Name	Master	State	Drop-out Frequency	Remote Groups Discovered	Local Group Leader
WLS_01	True	RUNNING	Never	1	WLS_01
WLS_02		RUNNING	Rarely	1	WLS_02

In addition, the admin console shows details about the migration process.

Settings for Incadomain

Configuration Monitoring Control Security Web Service Security Notes

Health Servers Clusters Migration

Use this page to monitor the status of all migration requests.

Customize this table

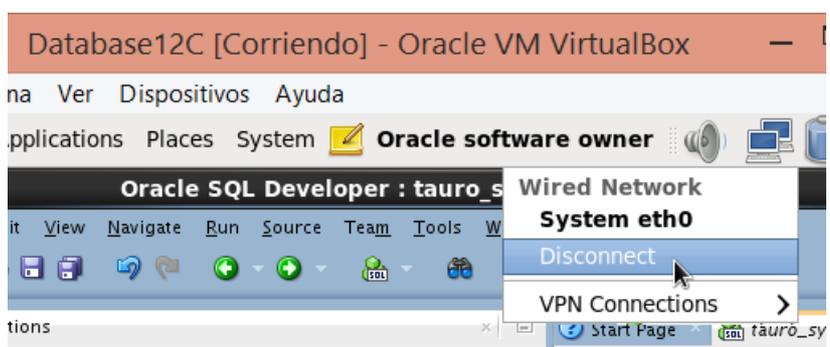
Migration Status

Showing 1 to 1 of 1 Previous | Next

Start Time	End Time	Status	Server	Machines Attempted	Machine Migrated From	Machine Migrated To	Cluster
12/10/15 10:53:35 AM GMT-02:00	12/10/15 10:55:36 AM GMT-02:00	Succeeded	WLS_02	WL01HOST	WL02HOST	WL01HOST	WLSCluster_0

Showing 1 to 1 of 1 Previous | Next

It looks better than non-database consensus leasing since I do not need at least three machines. However, according to Oracle, we need a high available database to avoid potential problems caused by the database unavailability. I will disconnect the database from the network just to see what happen.



After some seconds I got this message

```

-Dec 10, 2015 11:05:04 AM GMT-02:00: <Error> <WebLogicServer> <BEA-000383> <A critical service failed. The server will shut itself down.>
-Dec 10, 2015 11:05:04 AM GMT-02:00: <Notice> <WebLogicServer> <BEA-000365> <Server state changed to FORCE_SHUTTING_DOWN.>
-Dec 10, 2015 11:05:04 AM GMT-02:00: <Notice> <Cluster> <BEA-000163> <Stopping "async" replication services>
- MigratableServerService: MigratableServerService.notifyClusterMastersShutdown server: WLS_01 - ClusterMaster: weblogic.ClusterSingleton.ClusterMaster@50323255
-Dec 10, 2015 11:05:04 AM GMT-02:00: <Notice> <Server> <BEA-002607> <Channel "Default", listening on 192.180.56.11:9003, was shut down.>
-Dec 10, 2015 11:05:04 AM weblogic.wsee.WseeCoreMessages LogWseeServiceHalting
INFO: The Wsee Service is halting
-Dec 10, 2015 11:05:04 AM GMT-02:00: <Error> <Cluster> <BEA-000186> <An error was encountered while migrating CLUSTER_MASTER: findOwner()
findOwner()
    at weblogic.cluster.singleton.LeaseManager.findOwner(LeaseManager.java:221)
    at weblogic.cluster.singleton.SingletonMonitor.checkRegisteredSingletons(SingletonMonitor.java:269)
    at weblogic.cluster.singleton.SingletonMonitor.timerExpired(SingletonMonitor.java:378)
    at weblogic.timers.internal.TimerImpl.run(TimerImpl.java:304)
    at weblogic.work.SelfTuningWorkManagerImpl$WorkAdapterImpl.run(SelfTuningWorkManagerImpl.java:548)
Truncated. see log file for complete stacktrace
Caused By: java.io.IOException: weblogic.common.resourcepool.ResourceDisabledException: Pool Leasing is Suspended, cannot allocate resources to applications..
    at weblogic.cluster.singleton.DatabaseLeasingBasis.executeQuery(DatabaseLeasingBasis.java:792)
    at weblogic.cluster.singleton.DatabaseLeasingBasis.findOwner(DatabaseLeasingBasis.java:317)
    at weblogic.cluster.singleton.LeaseManager.findOwner(LeaseManager.java:219)
    at weblogic.cluster.singleton.SingletonMonitor.checkRegisteredSingletons(SingletonMonitor.java:269)
    at weblogic.cluster.singleton.SingletonMonitor.timerExpired(SingletonMonitor.java:378)
Truncated. see log file for complete stacktrace
java.sql.SQLRecoverableException: IO Error: The Network Adapter could not establish the connection

```

Created by: [Raúl Castillo](#)

Therefore, it is clear that **we must use a high available database in order to implement this approach on production.**

11 Conclusion

This document showed two ways to configure whole server migration, using non-database consensus leasing and using database leasing. Something I have seen during my experience as a Weblogic Administrator is that even though many businesses have the resources to execute this configuration, they do not use it because of the lack of documentation, experience or since many of people do not know its advantages.

You should test and use this configuration since it is a valuable method to reduce the impact of incidents on production environments and as can be seen it is not so complex.

Furthermore, do not forget the advantages and disadvantages of both schemas

- **Non-database consensus leasing: you need at least three machines.**
- **Database leasing: you need a high available database such as Oracle RAC.**

12 References list

[1] Castillo Raul (2015) Implementing a Weblogic Architecture with High Availability [Online document] Available from: <http://blog.sysco.no/files/guides/VirtualEnvironmentV2.1.pdf> (Accessed: October 12th 2015)

[2] Oracle (2015) Fusion Middleware Using Clusters for Oracle WebLogic Server [Online document] Available from: http://docs.oracle.com/cd/E24329_01/web.1211/e24425/migration.htm#CLUST273 (Accessed: October 12th 2015)

[3] Oracle (2015) Using the WebLogic Persistent Store [Online document] Available from: <http://docs.oracle.com/middleware/1213/wls/CNFGD/store.htm#CNFGD233> (Accessed: October 12th 2015)

[4] Oracle (2015) Oracle® Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite [Online document] Available from: <https://docs.oracle.com/middleware/1213/soasuite/SOEDG/> (Accessed: October 19th 2015)

[5] Oracle (2015) Non-database Consensus Leasing [Online document] Available from: <http://docs.oracle.com/middleware/1213/wls/CLUST/migration.htm#CLUST270> (Accessed: October 19th 2015)