This supplementary PDF is intended to compliment the RAC Attack documentation (racattack.org)

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Introduction

Current RAC Attack documentation is written for an environment with Windows as a host OS and VMware Server as the virtualisation software. This document provides instructions to be used along side the information at racattack.org in order to setup a 2 node Oracle RAC database on Mac OS X in an almost identical configuration as for Windows users.

These instructions will very likely translate well for Linux users too, but have not been tested. If you use them on Linux and wish to provide feedback or additional material then please do so.

It is the intention that this information will ultimately be included in with the main wikibooks RAC Attack material, so if you're reading this please check racattack.org for more up to date material.

Overview

It is important to note that the only differences between following RAC Attack on Windows with VMware and Mac OS X/Linux with VirtualBox (or Windows with VirtualBox) are in the host OS and virtualisation layer. This might sound obvious, but is something you should be mindful of when following the main RAC Attack documentation along side this PDF.

- If an instruction relates to running a command in a virtual machine (VM) then it will be the same regardless of your chosen configuration.
- For anything else the follow rule ***should*** apply: website for Windows or VMware, PDF for Mac or VirtualBox

If you're reading an instruction that relates to something you can't see or find in your system then you're probably looking in the wrong place :-)

Step-by-Step

Hardware Requirements

The starting point for RAC Attack is: http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Hardware_and_Windows_Minimum_Requirements, but we're not running Windows so the method of verifying if you have enough power is different. You are strongly encouraged to read the following sections of the page:

- Hardware Minimum Requirements (ignore the final bullet point – Mac is covered here)

To check that your Mac has sufficient resources use Apple Menu → About This Mac as shown below:

You may want to create a new user on your Mac for RAC Attack, but this is not a requirement and will not be covered here.

Install VirtualBox

This section is in place of http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Install_VMware_Server

Download the appropriate software from: https://www.virtualbox.org/wiki/Downloads

Follow these instructions, if required: https://www.virtualbox.org/manual/ch02.html

Setup Virtual Networks

These steps are in place of http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Setup_Virtual_Networks

There are many ways that network could be set up when building a virtualised 2 node RAC database and you will be able to find instructions on the internet that differ from these. As there are many options there are also many “right ways” to do it. If you are familiar with networking then feel free to deviate from these instructions and those in the RAC Attack wikibook, otherwise it is wise to follow the details provide accurately.

The IP addresses used in this PDF match those used in the RAC Attack wikibook. However, there are sections of the VMware network configuration that have not been directly translated here, and likewise, sections of this document that don't have a direct relation to a section of the wikibook. If

you get stuck then please ask your tutor or contact the RAC Attack team.

The tables below give a summary of the network configuration used in the lab exercises.

Virtual Machine Network Configuration Details:

Machine	Public IP Address	VIP Address	Private IP Address
collabn1	192.168.78.51	192.168.78.61	172.16.100.51
collabn2	192.168.78.52	192.168.78.62	172.16.100.52

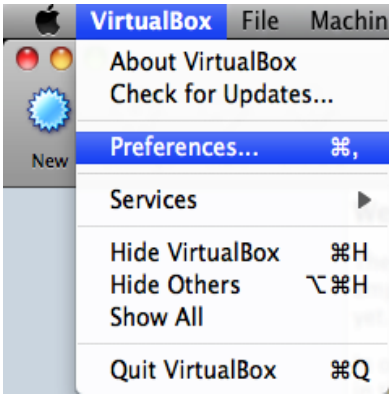
Additional Network Addresses

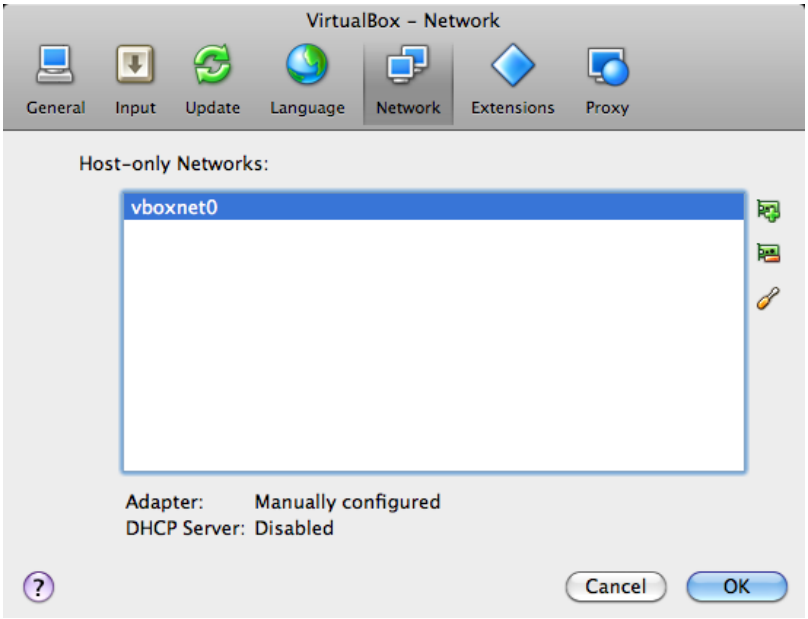
Description	Name	IP Address
SCAN Address	collab-scan	192.168.78.250
GNS	collab-gns	192.168.78.251

Before creating any VMs some changes need to be made to the default VirtualBox environment in order to match the RAC Attack wikibook details:

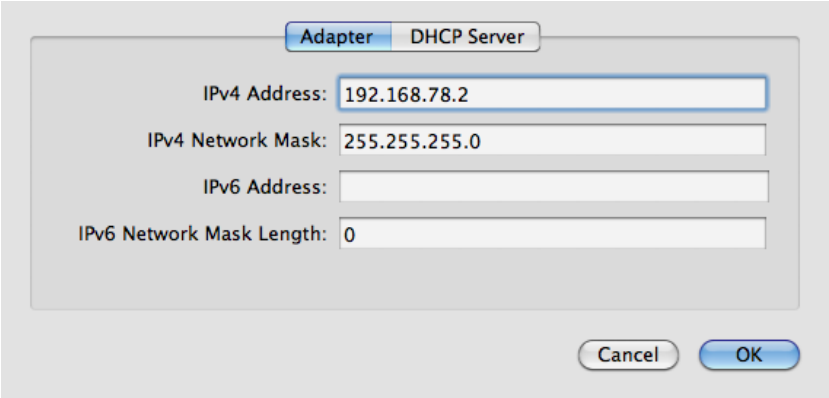
Configuration of "Host-only" network

VirtualBox → Preferences...

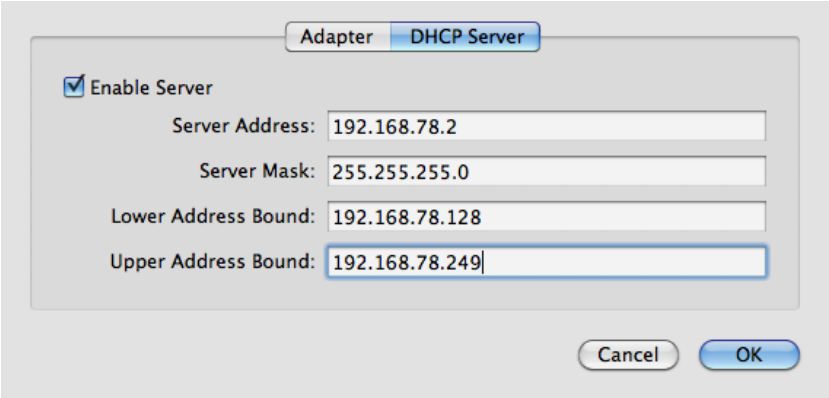




Adjust the settings to match below



Adjust the settings to match below



Setup Virtual Storage

This section is in place of http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Setup_Virtual_Storage

VMware and VirtualBox are used slightly differently in with respect to storage, so you don't need to create a “Local Datastore” or anything similar in VirtualBox. However, the point made at the top of the page is highly relevant:

> *RAC Attack is carefully designed to use three directories and spread out I/O for the best possible responsiveness during labs. Create these three directories in the destinations that you chose in Hardware and Windows Minimum Requirements, taking the guidelines into consideration.*

In summary you should aim to use you local hard drive for the virtual disks that hold the operating system (OS) for each of your VMs and use your external hard drive to hold the ISO images used during installation and to hold the shared virtual disks that will be used for ASM.

Download Oracle Enterprise Linux

As in RAC Attack wikibook

Create VM

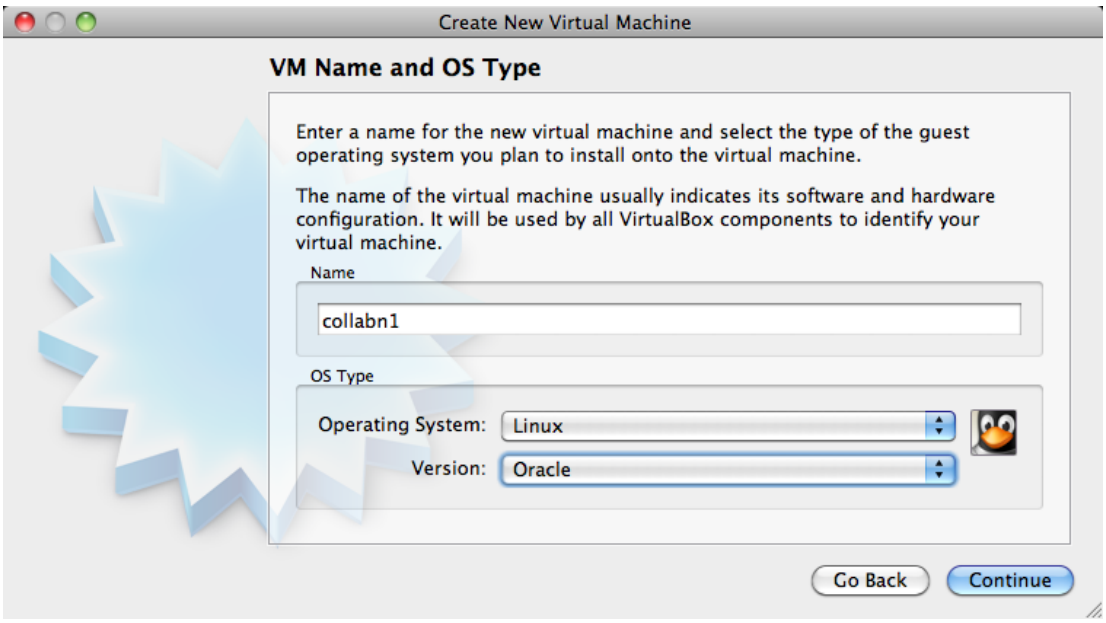
This section is in place of **http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Create_VM** and accounts for the vast majority of the

deviation from the RAC Attack wikibook when chosing to use VirtualBox on Mac deviation rather than VMware on Windows.

Open VirtualBox

Click “New”

Click “Continue”

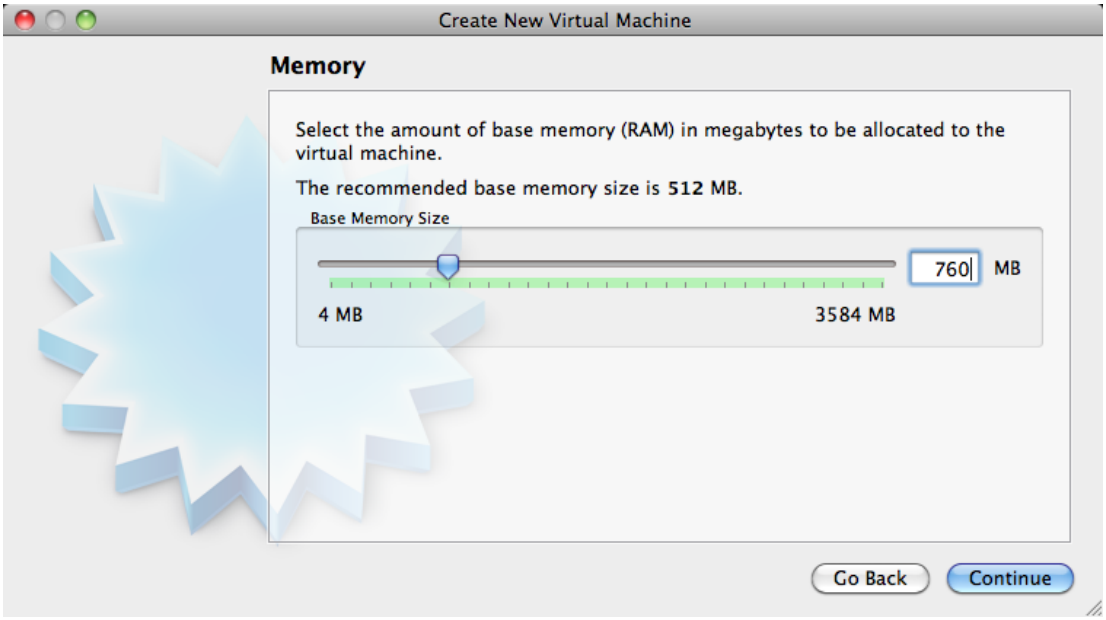


Use the following:

Name:	collabn1
Operating System:	Linux
Version:	Oracle

Note that RAC Attack uses 32 bit versions of OS and Oracle Software to minimise memory requirements. Also, collabn1 comes from "**C**ollaborate **n**ode 1" as RAC Attack started at Collaborate 2008. You can use any other name you like, but will need to replace collabn1 and collabn2 with the hostnames you chose as you follow the instructions.

Click "Continue"



Set "Base Memory Size" to 760MB

Click "Continue"

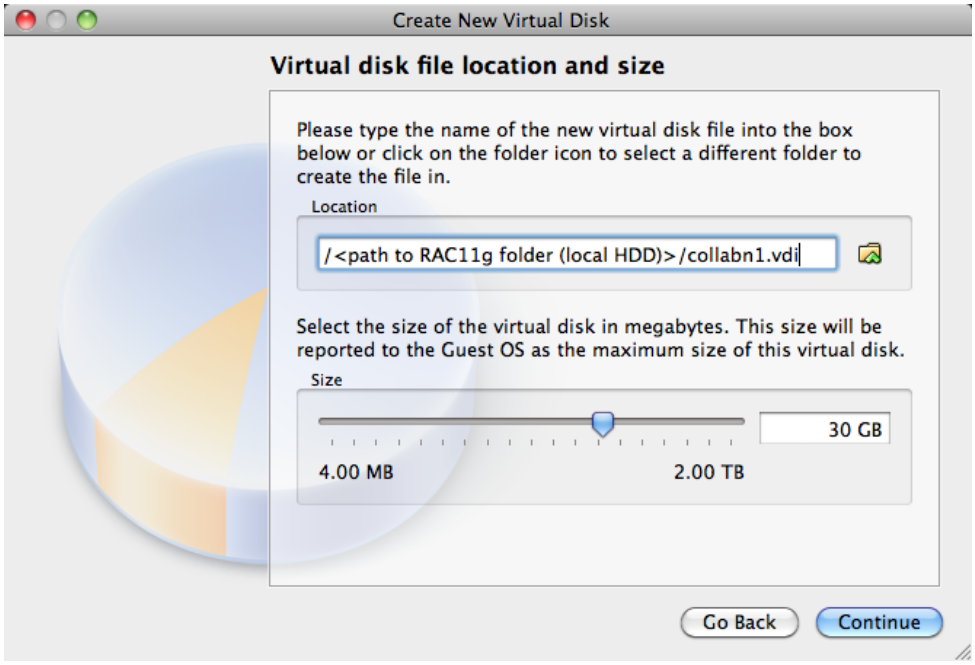
Ensure “Start-up Disk” and “Create new hard disk” are selected

Click “Continue”

It shouldn't actually matter what “File type” you use for this virtual disk, but it is recommended that you use “VDI” as this has been tested.

Use “Dynamically allocated”

Click “Continue”

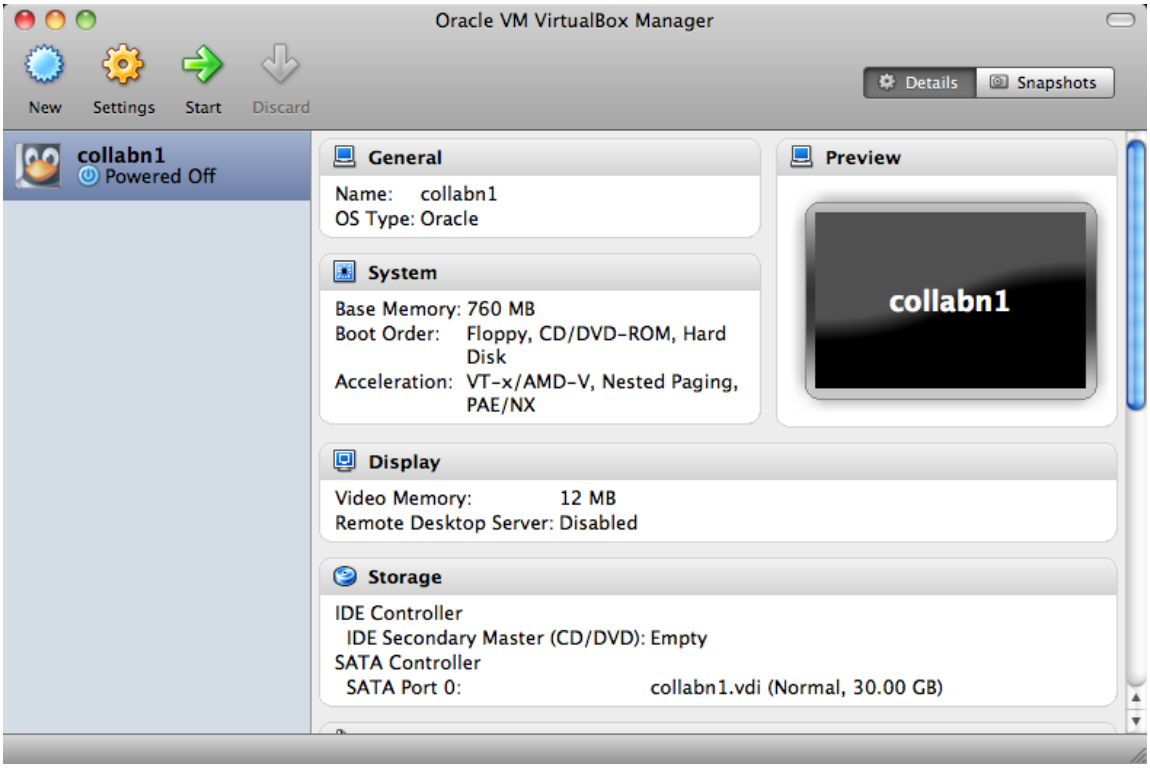


Click “Continue”

Review the “Summary” screen checking the following:

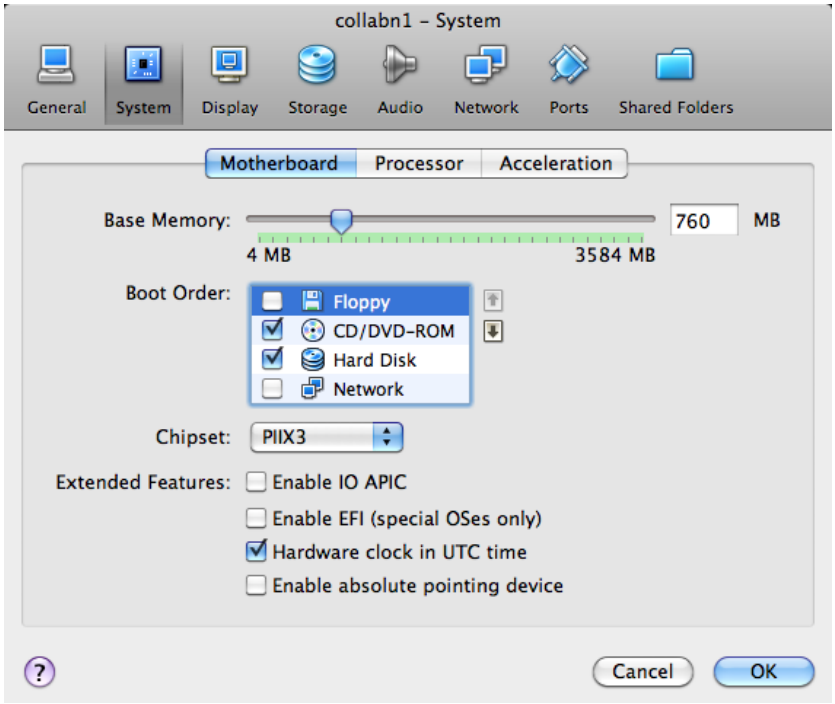
Location:	This should be the RAC11g directory/folder on your local disk
Size:	30.00 GB

Click “Create”



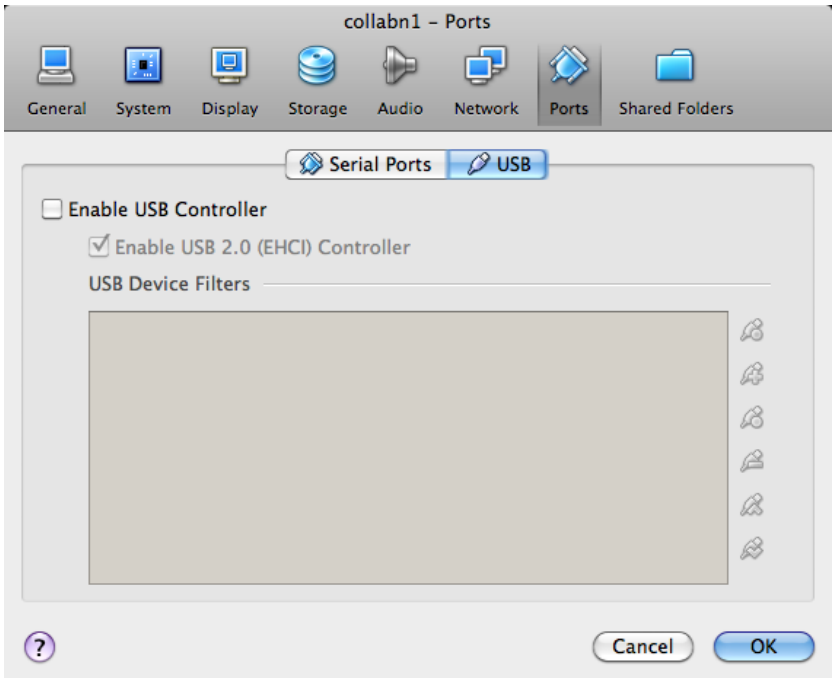
Optional cleaning up...

Remove “Floppy”



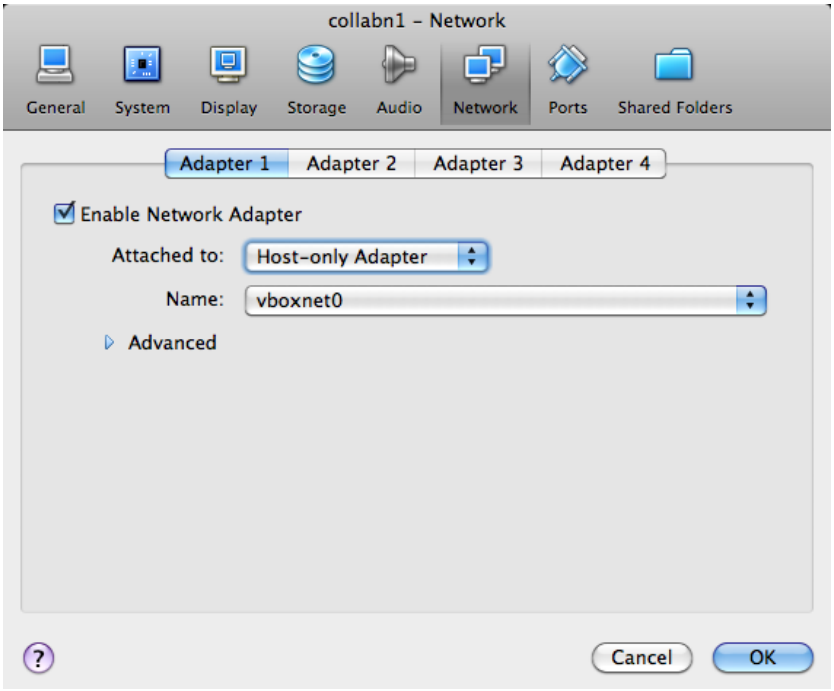
Disable audio

Disable USB



End of optional clean up

Change Network Configuration for interface 1

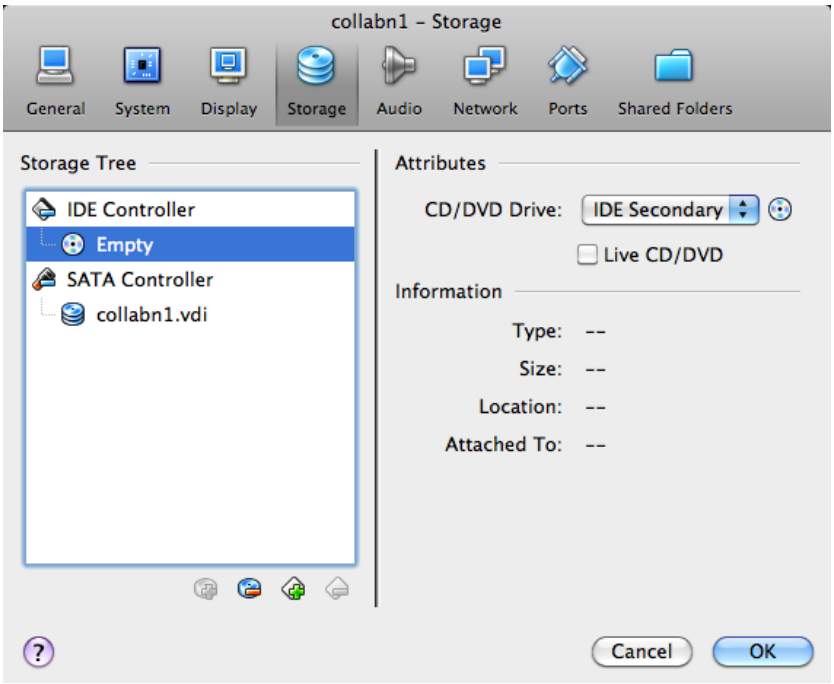


Change network card 1 to:

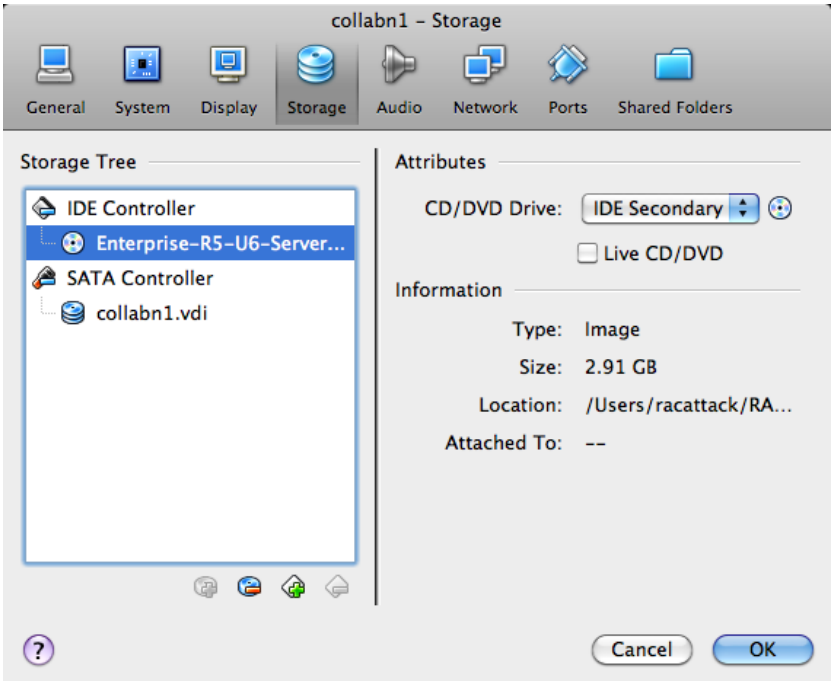
Attached to:	Host-only
Name:	vboxnet0

Do not add additional network cards at this point

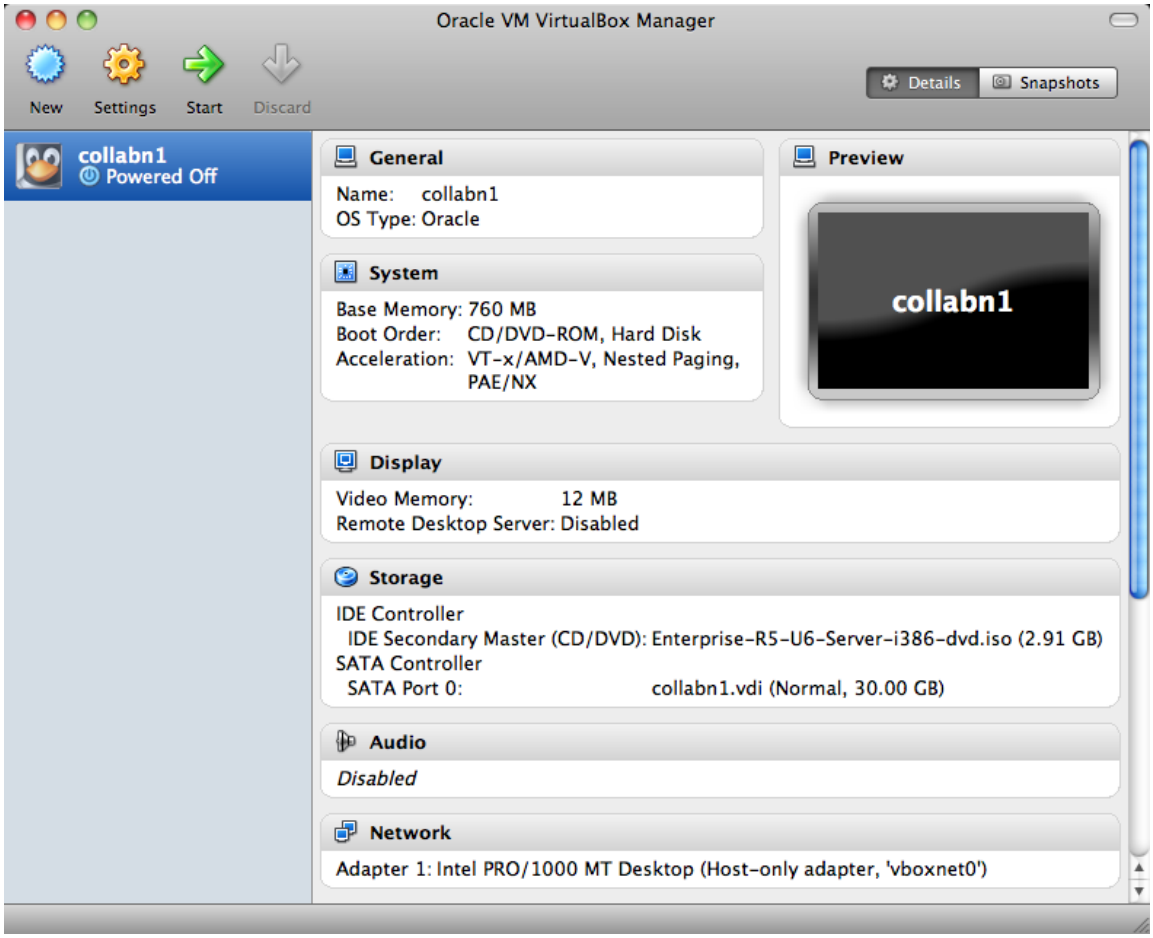
Attach Oracle Enterprise Linux ISO



Under “Storage” → “Attributes” click the image of a CD/DVD under “Attributes” and navigate to the appropriate ISO file for Oracle Enterprise Linux 5 update 6 in the RAC11g-iso directory created earlier.



Click "OK"



Start "collabn1" using the green start arrow and return to following the RAC Attack wikibook at step 4 on http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/OS_Installation for the installation of Oracle Enterprise Linux 5 update 6

Wrap-up OS Installation

Perform the steps in http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Wrap-up_OS_Installation ignoring the anything specific to VMware, but installing VirtualBox guest additions if you want (not required)

Internet Access from VMs (VirtualBox specific)

Due to a difference in how VMware and VirtualBox handle networking you will want to perform the following in order for your VMs to be able to see the internet.

Find out the “nameserver(s)” currently used by your Mac (beware that these will likely come from the DHCP server you got your IP address from and are therefore liable to change when you connect a different network.

In the Terminal application type “grep nameserver /etc/resolv.conf” and you will get output similar to below:

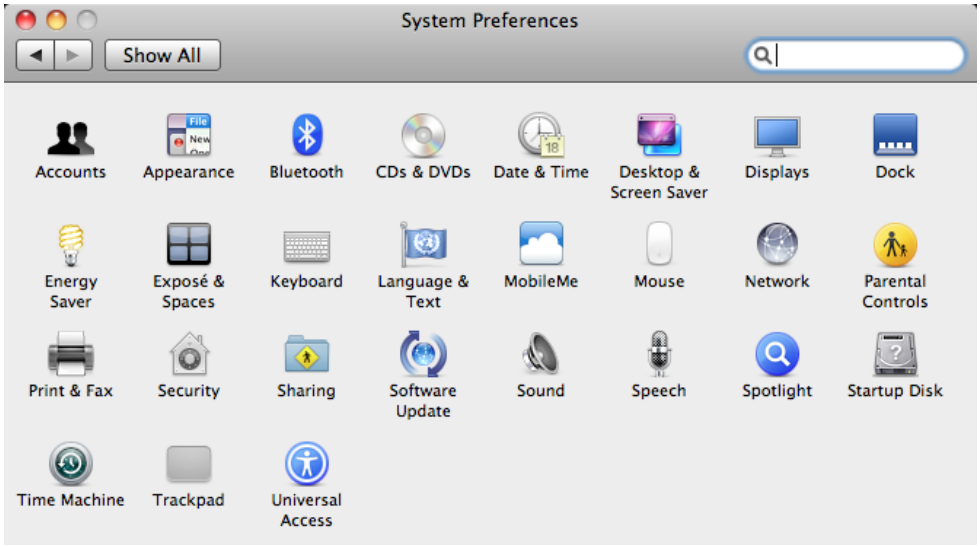
```
$ grep nameserver /etc/resolv.conf
nameserver 194.168.4.100
nameserver 194.168.8.100
$
```

Add the nameserver lines to /etc/resolv.conf in the VM and add a default route to direct traffic from the VM to the Mac using the “route add” command as shown:

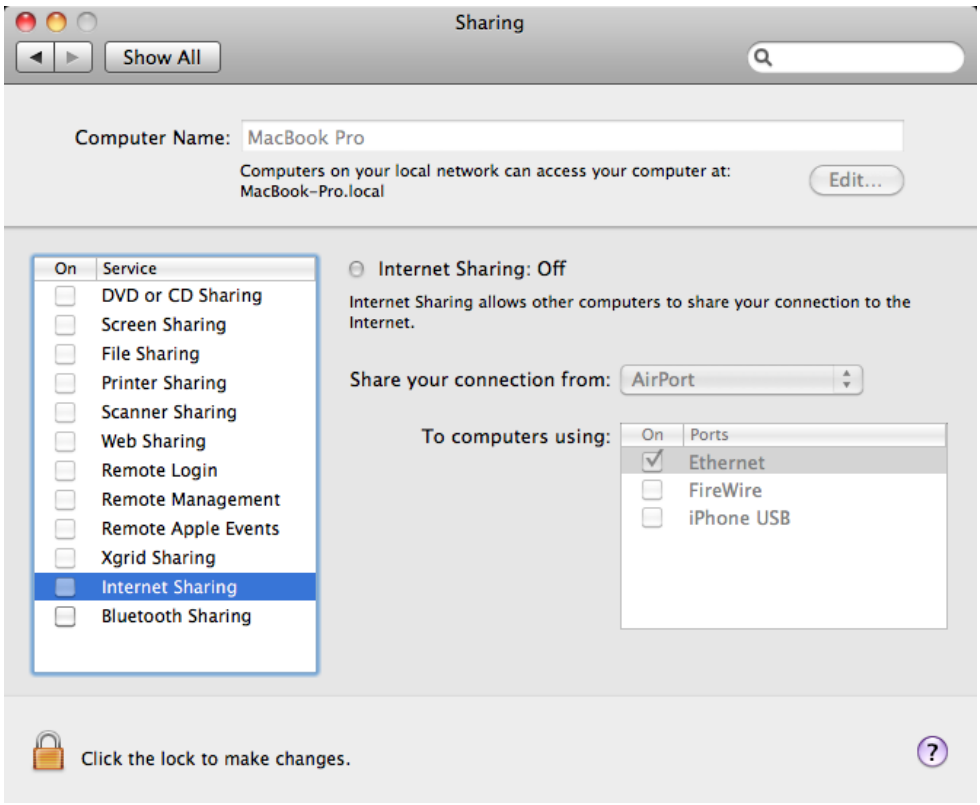
```
[root@collabn1 ~]# route add default gw 192.168.78.2 eth0
```

And finally, enable internet sharing on the Mac

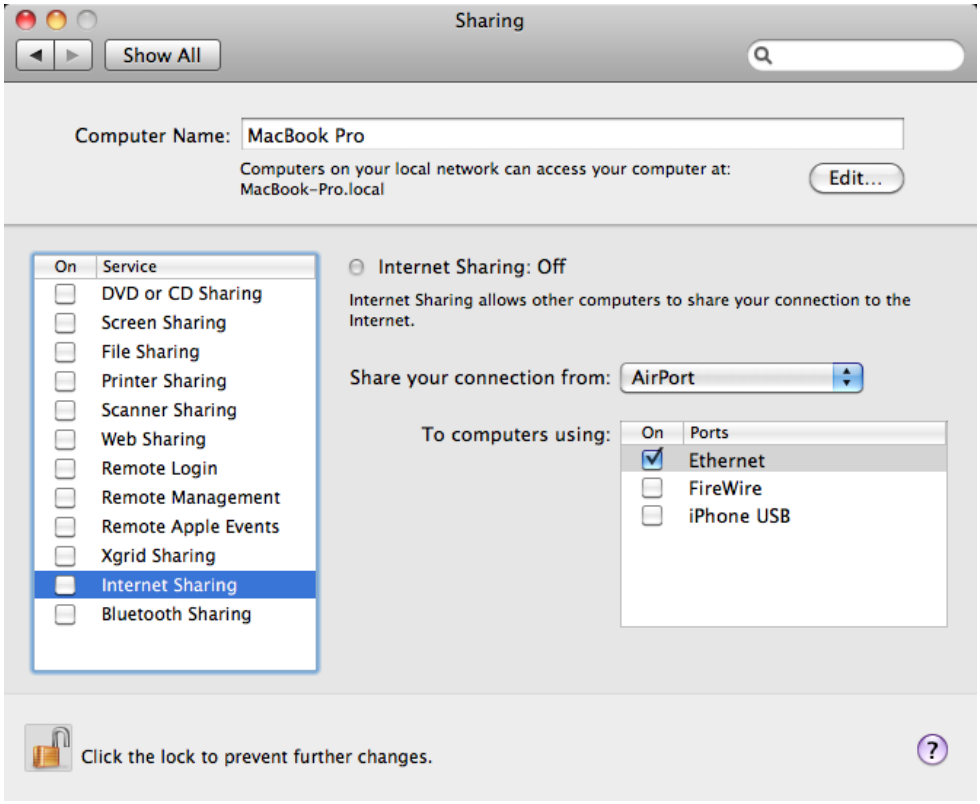
System Preferences



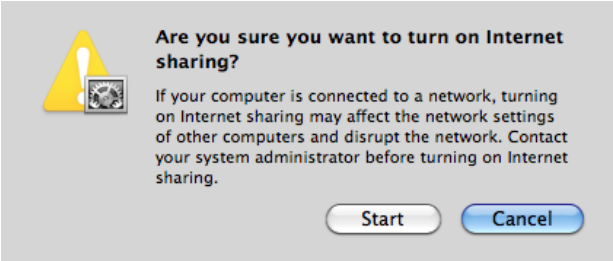
Sharing



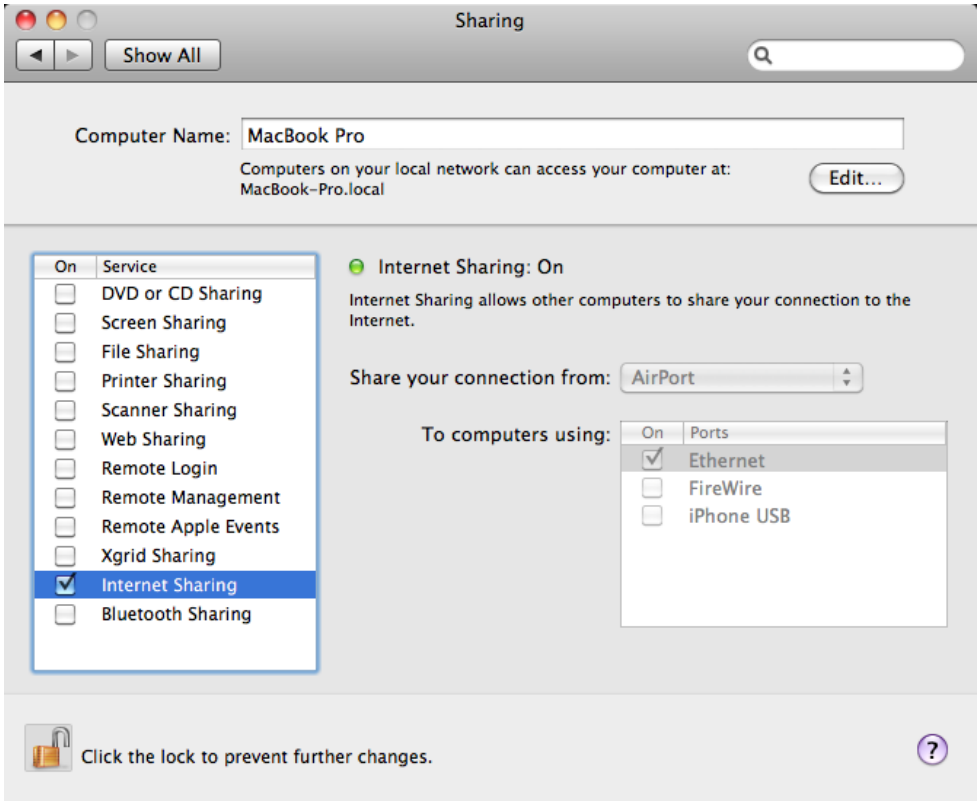
Unlock the settings (if the lock symbol indicates that they are locked as shown)



Check “Internet Sharing”



Click “Start”



From my experience with this configuration it does not matter which interfaces you enable, but I have not tested this exhaustively.

Verification

Run a few quick tests from within the VM to confirm connectivity with the outside world.

192.168.0.1 is the IP address of the router that my laptop is connected to

```
[root@collabn1 ~]# ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=63 time=1.44 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=63 time=3.13 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=63 time=5.34 ms

--- 192.168.0.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2053ms
rtt min/avg/max/mdev = 1.448/3.310/5.349/1.598 ms

[root@collabn1 ~]# nslookup www.google.com
Server:         194.168.4.100
Address:        194.168.4.100#53

Non-authoritative answer:
www.google.com canonical name = www.l.google.com.
Name:   www.l.google.com
Address: 173.194.66.106
Name:   www.l.google.com
```

```
Address: 173.194.66.105
Name:   www.l.google.com
Address: 173.194.66.104
Name:   www.l.google.com
Address: 173.194.66.103
Name:   www.l.google.com
Address: 173.194.66.99
Name:   www.l.google.com
Address: 173.194.66.147

[root@collabn1 ~]#
```

Now we have full connectivity to the outside world.

Create RAC Attack DVD

As in RAC Attack wikibook with the additional note that the -k option was needed for curl, i.e.:

```
curl -Lk github.com/ardentperf/racattack/tarball/master | tar xz
```

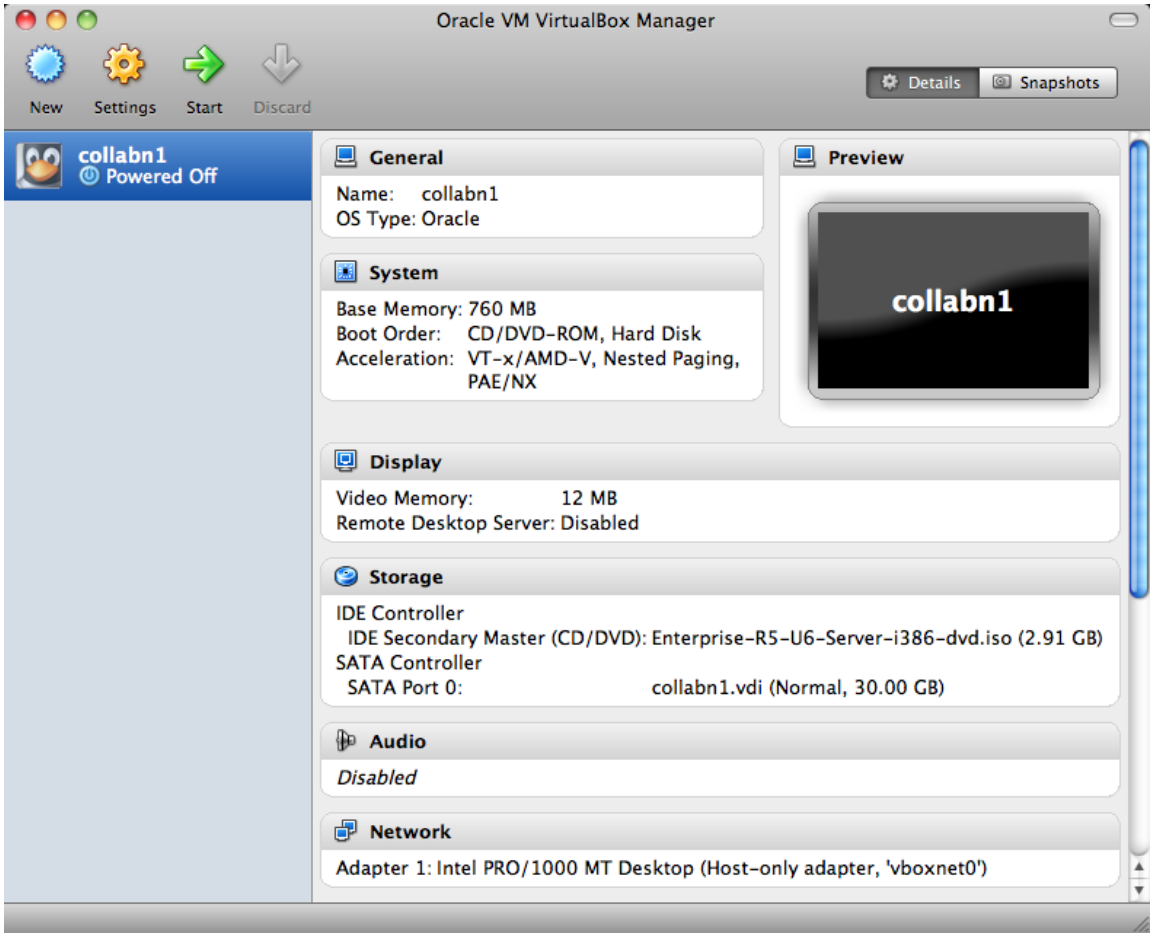
Prep for Oracle

As in RAC Attack wikibook

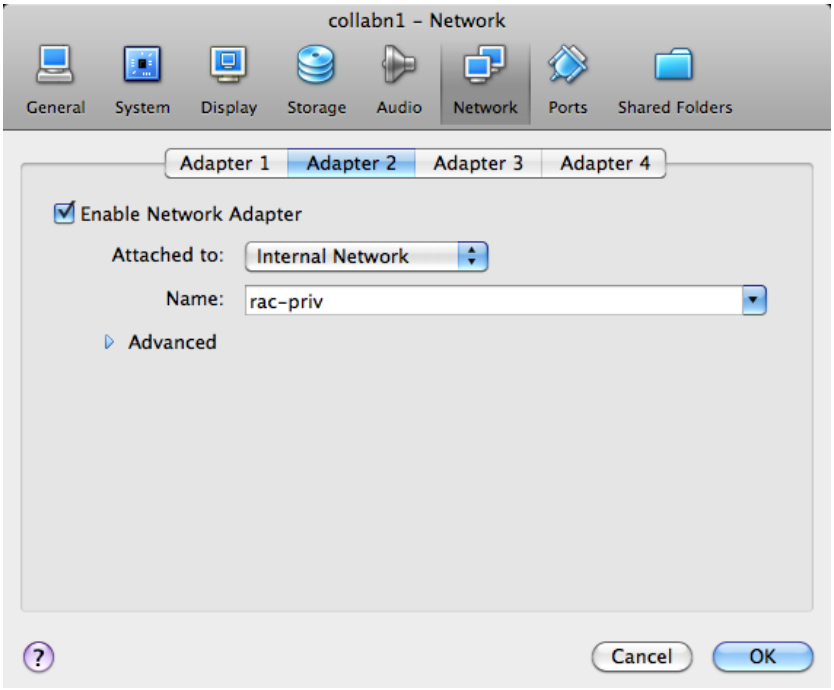
Create Interconnect

Come back to this document when you get to: http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Create_Interconnect (which is when the instructions return to VMware)

Select collabn1 in VirtualBox Manager



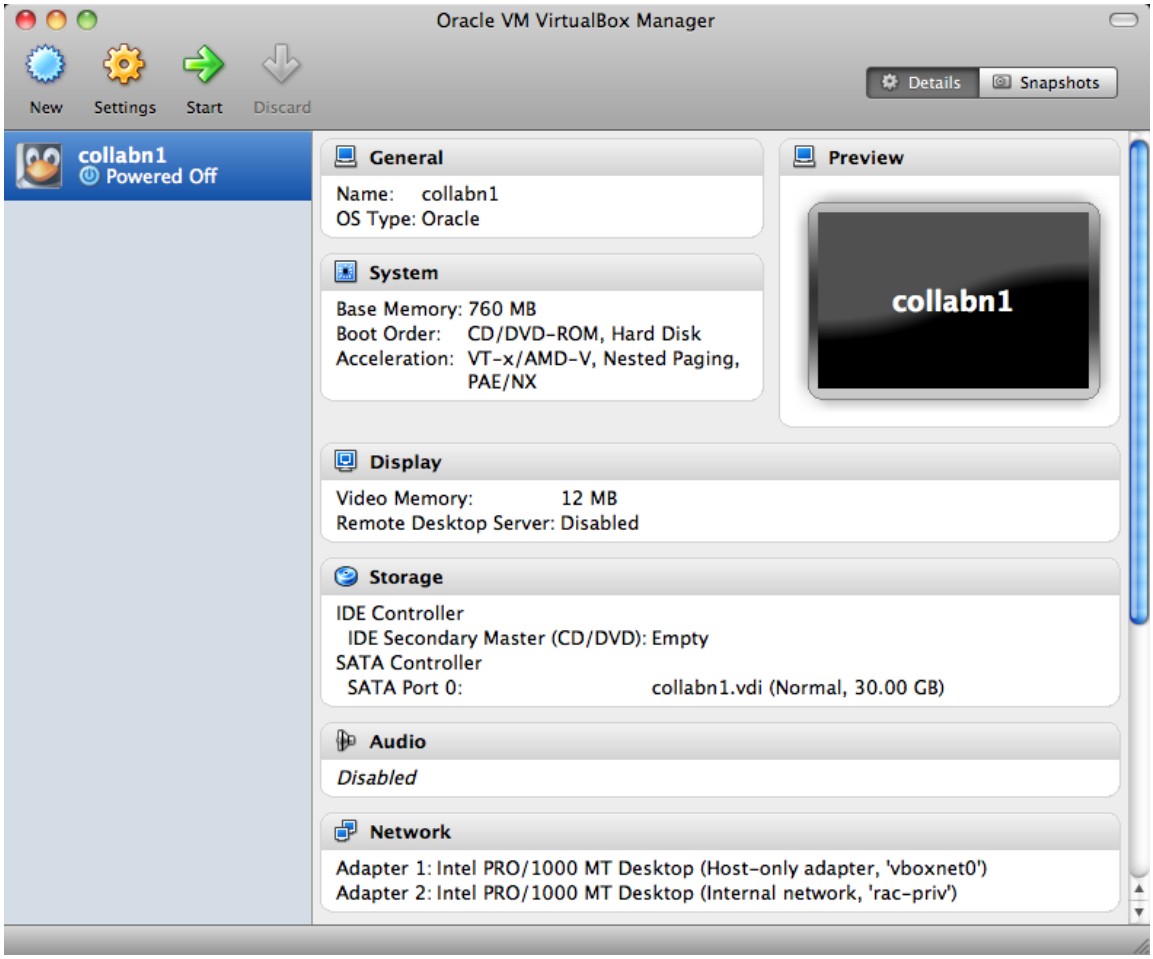
Click “Settings” and select the “Network” tab



Set the following:

Attached to:	Internal Network
Name:	rac-priv

Click “OK” to save the settings



Create Shared Disks

This section replaces http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Create_Shared_Disks

Creating shared disks

```
$ cd <path to RAC11g-shared (External Disk)>
$ VBoxManage createhd --filename data.vdi --size 3328 --variant Fixed
0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
Disk image created. UUID: 900ad501-17ba-4e34-b173-e7041029ecb8
$ VBoxManage createhd --filename backup.vdi --size 3328 --variant Fixed
0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
Disk image created. UUID: 21fbe2d0-84fd-4c43-94a8-1355ff8f7f0d
$
```

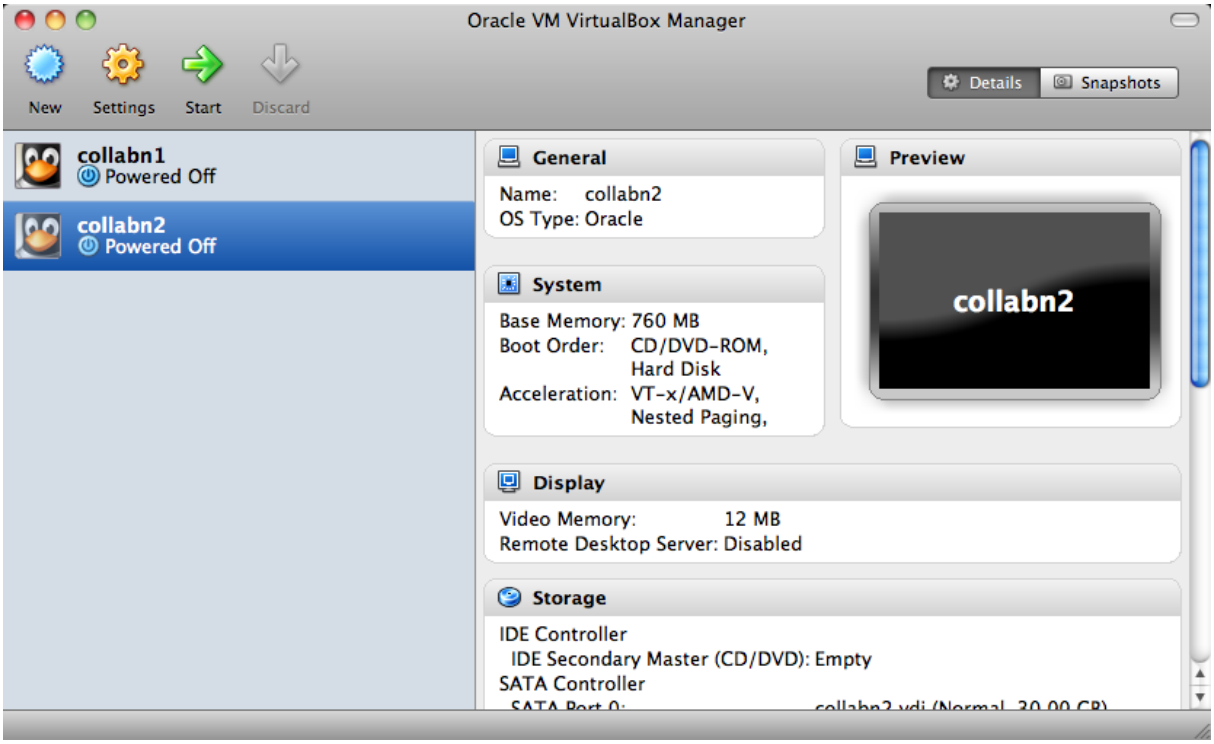
Note that we're not going to attach the disks until we have cloned the VM to create collabn2, which is http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Copy_VM in the wikibook

Copy VM

This section replaces http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Copy_VM

```
$ VboxManage clonevm collabn1 --name collabn2 --register
0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
Machine has been successfully cloned as "collabn2"
$
```

You will now have a new VM in VirtualBox Manager...



As part of the cloning new MAC addresses will have been assigned to the NICs, which will be configured for each node shortly.

Attach Shared Storage

This is an additional step performed at a different point when using VMware

Attach disks to both VMs

Note that the commands are a single line

```
$ cd <path to RAC11g-shared (External Disk)>
$ VBoxManage storageattach collabn1 --storagectl "SATA Controller" --port 1 --device 0 --type hdd --medium
data.vdi --mtype shareable
$ VBoxManage storageattach collabn1 --storagectl "SATA Controller" --port 2 --device 0 --type hdd --medium
backup.vdi --mtype shareable
$ VBoxManage storageattach collabn2 --storagectl "SATA Controller" --port 1 --device 0 --type hdd --medium
data.vdi --mtype shareable
$ VBoxManage storageattach collabn2 --storagectl "SATA Controller" --port 2 --device 0 --type hdd --medium
backup.vdi --mtype shareable
$
```

Configure Disks

For steps 1 and 2 on http://en.wikibooks.org/wiki/RAC_Attack_-_Oracle_Cluster_Database_at_Home/Configure_Disks the process if different as you are using VirtualBox, but from step 3 the steps are the same.

*Only start 1 of the VMs if you want to make the most of your limited resources and as these are shared disks you only need to perform the actions on 1 node.

Configure Node 1

As for RAC Attack wikibook with the addition that /etc/resolv.conf needed to be updated, but this was already performed and will only need re-applying if the file has been automatically updated by DHCP.

Configure Node 1

As for RAC Attack wikibook with the addition that /etc/resolv.conf needed to be updated, but this was already performed and will only need re-applying if the file has been automatically updated by DHCP.

From this point on the instructions in the RAC Attack wikibook can be followed