Practice

Preparing Practice Environment

Practice Target

In this practice you will prepare an environment that you will use in the course practices. In this practice, you will install Oracle VirtualBox in your PC and build up the following three virtual machines:

- Seed vm with Oracle Linux 7 x86-64 (OL7). It will be used in the future whenever we want to build up a fresh Linux vm.
- Linux-based vm (which you will clone from the seed vm). It will be used later in the course for installing Oracle database for Linux.
- Windows-based vm with Windows Server 2016 Evaluation Edition. It will used later in the course for installing Oracle database for Windows.

Practice Overview

In high level, in this practice, you will perform the following tasks:

- Download and install the software products required for the practice
- Create an Oracle VirtualBox Appliance (vm), Linux-based machine named srv1
- Configure a connection to srv1 in Putty
- Create a Windows-based Virtual Machine (vm)

Practice Requirements

The practice requires a PC with a connection to the Internet and at least the following specifications:

OS: Windows 10 or 11, 64-bit
Memory: 16 GB or more
Storage free space: at least 150 GB

Note: This PC will be referred to in the course practices as the **hosting PC**.

Note: In Oracle VirtualBox terms, the term “appliance” is equivalent to the term “virtual machine”.

Downloading the Required Software Products

Download the following software products:

Item	Download link	Description
Oracle VirtualBox, release 6.1.32 or later	Link Mirror	Software to create virtual machines. Virtual Machines created in VirtualBox are called virtual appliances, and sometimes referred to as vms (which stands for virtual machines).
Putty	Link	A program which provides a command line prompt to connect to a Linux server from Windows
Java Runtime 1.8 for Windows 64-bit	Link	Select the option "**Windows Offline (64-bit)**"

Creating and Configuring Oracle VirtualBox Appliance

A. Install the Software on the Hosting PC

1. Install the following software in **the hosting PC**:
   - Oracle VirtualBox, release 6.1.32 or later.
   - Putty
   - Java Runtime 1.8 (for Windows 64-bit)

B. Create an Oracle Linux 7 64-bit VirtualBox Seed Appliance

In the following steps, you will create an Oracle VirtualBox Linux appliance by importing a vm from my website. This vm will be the seed to create more vms in the course practices.

2. Download the pre-built appliance from my website from this link. It is a compressed file containing an .ova file that can be imported into VirtualBox. It is a vm with Linux 7 x86-64 installed in it.

   Please read the **readme file** on the download page to obtain details about the appliance including the root password.

   Note: Because in real life Oracle databases are mostly running in Linux or Unix-like machines, we will mostly concentrate on using Linux vms in the course practices.

3. Decompress the downloaded file.

4. Start Oracle vm VirtualBox Manager.

5. Click on **File** > **Import** Appliance

   > in the **File** field, enter the full patch of the extracted .ova file > click **Next**

   > change the Name to "**Linux7-seed**"

   > make sure the "**Base Folder**" is set to the folder of your choice. Make sure the disk drive has enough free space to accommodate the vm files. Its initial size is 6 GB but it will grow up later when we install the software and create the database in it.

   > in the "Mac Address Policy" drop list, select the option "**Generate new MAC Addresses for all network adapters**"

   > Click on **Import** button

6. Change the vm Adapter Name: In Oracle vm VirtualBox Manager > select the imported vm "**Linux7-seed**" > open the settings (shortcut `[Ctrl]+[s]`)

   > on the left pane, click on **Network**

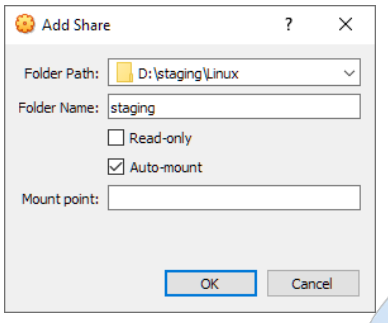
   > on the right pane, change the adapter **Name** to match the name of the network adapter in your PC.

7. Configure a shared folder: Shared folders is a convenient way to exchange files between the vms and the hosting PC. In the settings window of the vm, perform the following steps to configure it:

   > on the left pane, click on the "**Shared Folder**"

   > on the right pane, click on the Add button

   > Fill-in the fields as follows. Modify the "**Folder Path**" to the folder of your choice. The Folder Name should be "**staging**" (because this is the name used in the course practice code). Mark the checkbox "Auto-mount".



   > click on **OK** button and close the settings window.

8. Start the vm.

   In Oracle vm VirtualBox Manager > select the imported vm "**Linux7-seed**" > click on Start button

9. In the VirtualBox window of the vm, login as root

   In the login screen, click on "**not listed**" link, enter the root as username then press Enter.

10. Update the Guest Additions.

    In the VirtualBox window of the vm, click on **Devices** > "**Insert Gest Additions CD Image**" > In the popup message, click on **Run** > wait for the installation to finish > close the terminal window when it prompted to

11. Eject the VBox CD.

12. Reboot the vm

    Press on the power **button** in the right corner > press on the **power** button > click on **Restart**

C. Setting Network Configuration

In the following steps, you will verify that the network settings of the vm is compatible with your network.

13. Login to the vm as root

14. Open the network settings of the vm.

Click on **Applications** > **System Tools** > **Settings** > **Network** > under the **Wired** section **Gear button**.

Observe that the DHCP is enabled for the network adapter. This means its current IP address is taken from the network router.

15. Obtain the IP address currently assigned to the network adapter. You should see it under the **Details** tab.

16. In the hosting PC, open a command line window and ping the IP address of the vm. Make sure it is seen by the Hosting PC.

If it is not seen, make sure the firewall is turned off in the hosting PC and in the vm.

The firewall is turned off already in the pre-built vm.

Note: In Oracle VirtualBox, there's a problem with the Bridged Network setting when you're using a Wi-Fi connection. If your network adapter is set to Bridged Network and it's Wi-Fi, you might not be able to connect to the internet or your main computer. If this happens, you have two choices: either plug your computer directly into the router with a cable or switch to using two different adapters called NAT and Host Only instead of Bridged. You can learn more about this fix in the following article: https://www.ahmedbaraka.com/handling-bridged-network/

17. Add oracle to vboxsf group. This group has the privilege to access the shared folder.

a. Open a terminal window and execute the following command: to make sure the shared folder is seen by the appliance:

```
ls -ld /media/sf_staging
```

b. Add oracle to vboxsf group.

```
usermod -a -G vboxsf oracle
```

Note: In all the course practices, the directory that you created in this section is referred to as the **shared folder**.

Note: Feel free to delete the downloaded ova file, if you want to.

18. Shutdown the vm.

Now we have a seed vm. Whenever we want to create a new vm, we can just clone this seed vm.

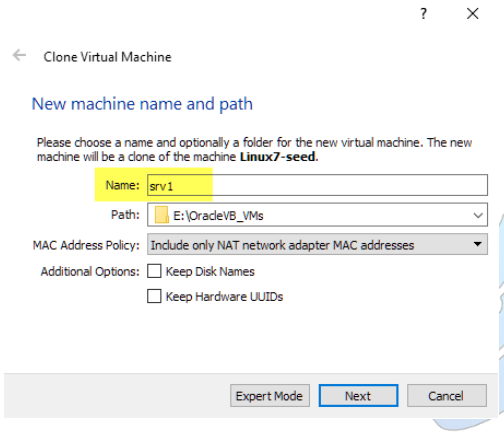
D. Cloning the Seed vm

In this practice sub-section, you will clone the seed vm to create a new vm. We will use this vm in the course for deploying Oracle databases.

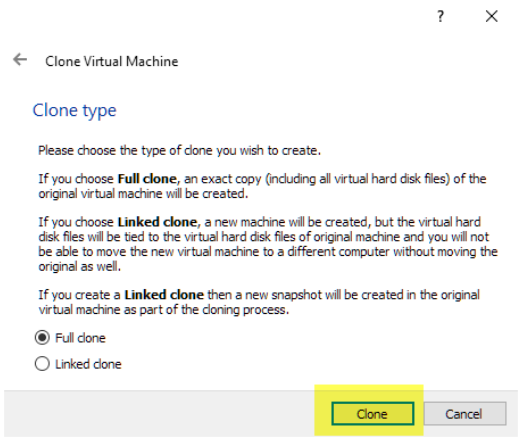
19. In Oracle VirtualBox, make sure the vm "**Linux-7 seed**" is turned off.

20. Right click on the vm and select **Clone** command (shortcut `[Ctrl]+[o]`)

21. Change the **Name** to **srv1** then click on **Next**.

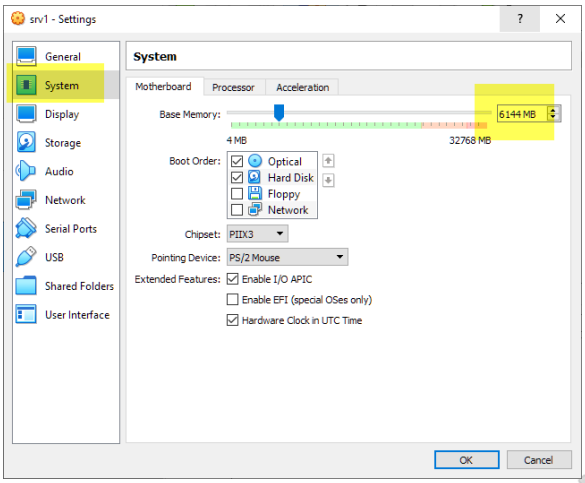


22. Click on Clone button.



23. After the cloning is finished, open the settings of the cloned mv

24. Change its allocated memory size to 6 GB, as follows:



25. Start `srv1`

26. Login to `srv1` as `root`

27. Open the network settings of the vm. Obtain the IP address assigned to the vm. Make it a static IP address.

Click on **Applications** > **System Tools** > **Settings** > **Network** > under the **Wired** section

> if the network card is turned off, turn it on

> click on the **Gear button**

> make sure the "**Connect Automatically**" checkbox is marked

> highlight the IP address from the under the Details tab > right-click on the highlighted IP and select **Copy** command

> click on **IPv4** tab > IPv4 Method to **Manual** > Paste the IP address into the **Address** field > set the **Netmask** to 255.255.255.0 > and the **Gateway** to 192.168.1.1

> click on **Apply** button

28. Turn off the network adapter then turn it on again, then close the Settings window.

29. In the hosting PC, open the command prompt and ping the vm IP address to make sure it is seen by the PC.

30. In `srv1`, open a terminal window then open the `hosts` file with `vi` editor.

Tip: In `vi` editor, to insert text, to turn into the insert mode, press on [i]. To save the changes, press on [Esc] button then type `:\s` then press on [Enter]. To quit, press on [Esc] button then type `:\q` then press on [Enter]. To quit without saving, replace "q" with "q!". To save and quit, replace "q" with "wq".

```
vi /etc/hosts
```

31. Insert into it the following line. Replace the <ip address> with the IP address of `srv1`

```
<ip address> srv1 srv1.localdomain
```

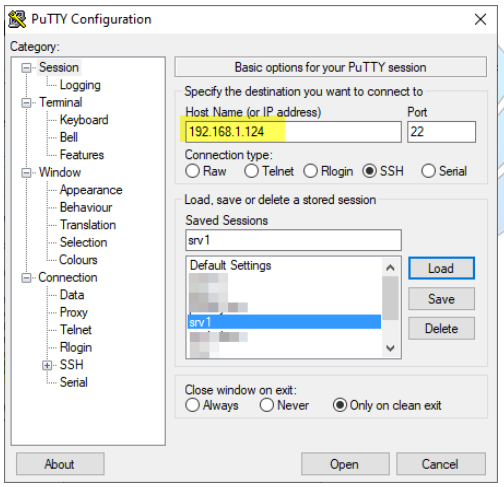
32. Ping `srv1` to make sure the changes take effect.

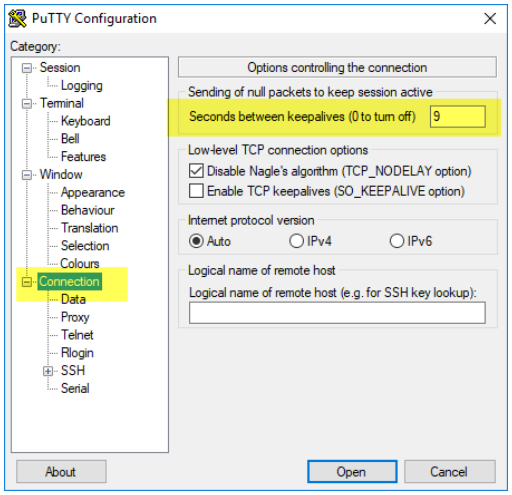
```
ping -c 3 srv1
```

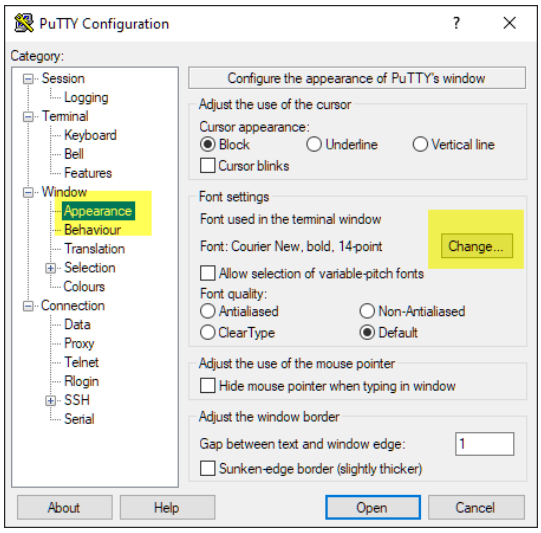
E. Configuring a Connection to srv1 in Putty

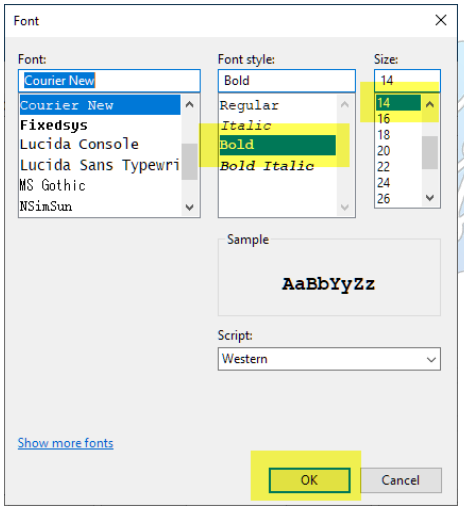
In this practice sub-section, you will make a Putty connection for `srv1` and save it.

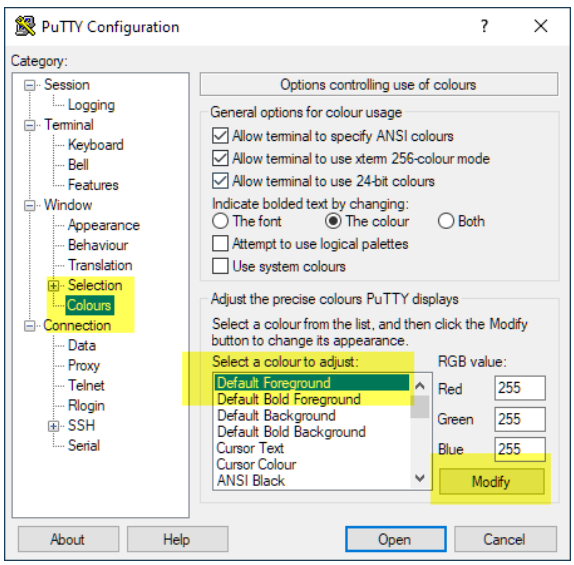
33. Open PuTTY, perform the actions as per the following screenshots:

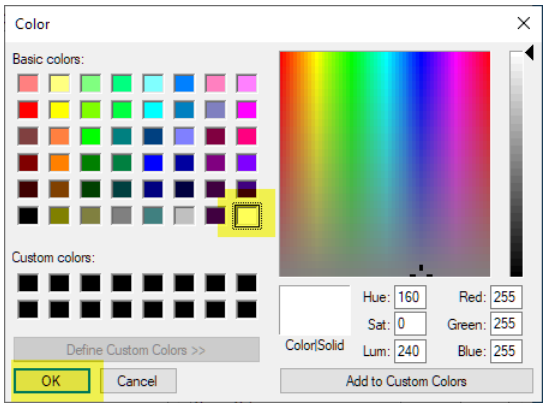


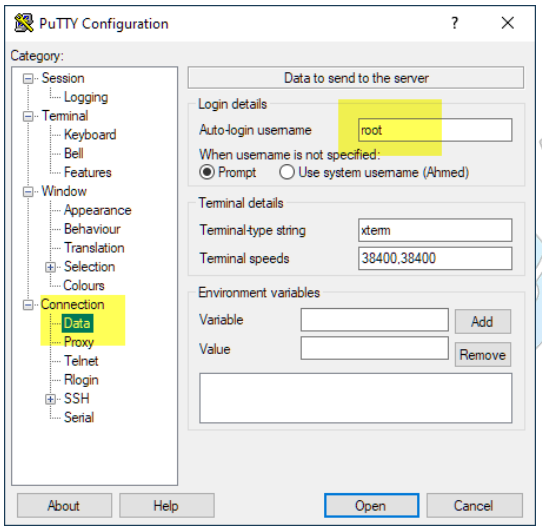












34. **Save** the connection configuration.

35. Open the connection and test it by connecting to `srv1` as `root`

The username will be automatically provided. The connection asks you to enter only the password.

Note: Putty has a nice copy/paste feature. When we highlight the code in its window with the mouse, Putty automatically makes a copy of the highlighted characters to the clipboard. You do **not** have to press on [Ctrl]+[c] to copy the selected characters.

Creating a Windows-based Virtual Machine

In the following steps, you will create a windows-based virtual machine.

Note: If you already have a Windows-based VirtualBox appliance that you can use for this course, you can use it and skip this section of the practice.

36. Download the windows-based vm OVA file from this link. This is a VirtualBox appliance with Windows Server 2016 Evaluation installed in it. The administrator password is: Oracle@dba

Note: This vm was created using Oracle VirtualBox version 6.1.32. It cannot be used in a VirtualBox environment older than this release.

37. Decompress the downloaded file into any folder in the hosting PC.

38. Import the extracted OVA file into the VirtualBox.

From my experience, the anticipated time shown in the import wizard is unrealistic. Usually, the import is finished quicker than anticipated.

After the import is finished, feel free to delete the downloaded OVA file or save it in an archive storage for future usage.

39. Before starting the vm, go to its **settings** Change the memory size assigned to the vm to 6 G (60144 M).

From my testing, Oracle database can run on a Windows vm with a memory size of 4G. However, with this little size, the vm becomes sluggish. I highly recommend going for 6GB memory.

40. Check the **Network** settings. Modify the **Adapter 1 name** so that it matches the name of the adapter name in your hosting PC.

41. Configure a shared folder in the vm. I recommend to make it the same as the shared folder configured for `srv1` to make easy for exchanging the files between the two vms.

42. Change the vm name to `winsrv`

In the left panel, click on **General** > under the **Basic** tab, type the name in the **Name** field.

43. Start the vm and login to it as Administrator.

In Oracle VirtualBox, to send the `[Ctrl]+[Alt]+[Del]` to the vm, press on `[right Ctrl] + [DEL]` buttons. Alternatively, click on Input > Keyboard > Insert `[Ctrl]+[Alt]+[Del]`

44. If your Oracle VirtualBox release is later than 6.1.32, update the Guest Additions on the machine. Restart the vm after updating the Guest Additions.

Click on **Devices** > select "**Insert Guest Additions CD image**" > the installation virtual CD will be attached > open **File Explorer** > go to E drive (or whatever drive letter assigned to the CD) > run VBoxWindowsAdditions-x86 > after the installation is finished, restart the vm > login to the vm > Eject the CD

This vm is shipped with Windows Server 2016 Standard Evaluation edition. This Windows copy must be expired by the time you are using it. To re-activate the expire license, you can re-arm the Windows license so that it become active again for 180 days. We can re-arm an expired Windows sever license for maximum 6 times. In the following step, you will re-arm the Windows server license in the vm.

Note: If you do not re-arm the Windows license and keep the license expired, Windows shuts down the server automatically by itself every now and then.

45. Login to the vm as administrator, search for the **Powershell** app. Run it **as administrator**.

46. In the Powershell command line, run the following commands:

```
# this command check the installed current version of Windows.
slmgr -dlv
# to re-arm Windows
slmgr -rearm
# restart the machine:
Restart-Computer
```

In the following steps, you will perform the required network configurations.

47. Login to the vm, open command line window, and then issue the following command to obtain its hostname.

Observe the hostname is `winsrv2`

```
hostname
```

48. Rename the vm hostname to `winsrv`.

Open the File Explorer (shortcut [⊞]+[e]) > right-click on **This PC** > select **Properties** > click on **Advanced System Settings** link > click on **Computer Name** tab > click on **Change** button > in the **Computer Name** field enter **winsrv** > click on OK button > restart the vm

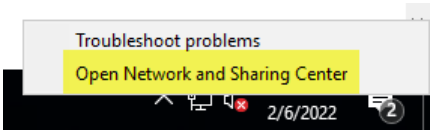
49. Make the IP address assigned to `winsrv` as static IP address and add a entry for it in the `hosts` file:

a. Open a command prompt window and type the following command to obtain the IP address assigned to the machine.

```
ipconfig
```

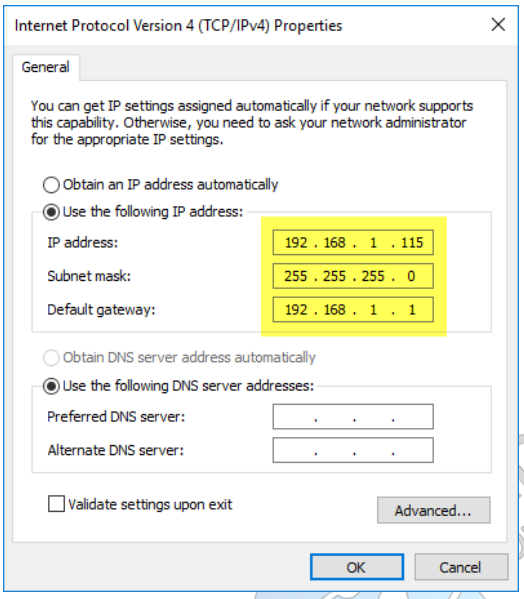
b. Make a copy of the IP address.

c. In the right down corner, right-click on the Network icon and select “Open Network and Sharing Center”



d. In the left side, click on **Change adapter settings** link

e. Right-click on the **Ethernet** icon > **Properties** > double click on "**Internet Protocol Version 4 (TCP/IPv4)**" > fill in the form as follows (change the IP address in the form to match the one returned by the ipconfig command):



f. Click on Windows icon (normally in the left lower corner of the screen)

g. Type "**Notepad**" > a shortcut for Notepad is displayed > right-click on it and select "**Start as Administrator**" > in Notepad, click on **File** > **Open** > type c:\windows\system32\drivers\etc\hosts

h. Add the following to the file:

```
<ip address> winsrv winsrv
```

i. Add to the file the hostname and IP address of `srv1`:

```
<ip address> srv1 srv1.localdomain
```

j. In the command prompt window, ping `winsrv` and `srv1`

```
ping -4 winsrv
ping srv1
```

50. In `srv1` session, open `/etc/hosts` file. Add to it the hostname and IP addresses of `srv1` and `winsrv`.

```
vi /etc/hosts
```

```
192.168.1.152 srv1 srv1.localdomain
192.168.1.115 winsrv winsrv
```

51. Verify that the entered settings are correct.

```
ping -c 3 srv1
ping -c 3 winsrv
```

52. Shutdown `srv1` by issuing the following command as `root`

```
shutdown -h now
```

53. In `winsrv`, download and install the latest Windows updates (recommended)

Click on Windows icon in the left down corner > Settings > Update and Security > check for updates

54. Shutdown `winsrv`

Summary

By the end of this practice, you should two virtual machines. One is used as a seed vm and the other will be used in course practices for installing Oracle databases.