# IA 643 Individual Project (IP) #2
# Oracle Database Installation and Configuration

*Due before 5:30pm on September 20, 2023 Points:100*

**Submission:** A word document of 9 screenshots. You must make sure your screenshots are (1) labeled as indicated below; (2) are human eye readable. *Turn in a paper copy of the word document to me in class.*

## Objectives:

In this assignment you will learn how to install, configure, and connect to Oracle 19c database server. The database will be installed on top of an AWS EC2 Windows 2022 Server virtual machine. The Oracle Database server will be accessed (from anywhere) via Oracle SQL Developer.

## Lab sessions:

Your lab session will run for a maximum of 4 hours at once. AWS will automatically save your ongoing work/server status and stop the lab environment after 4 hours. You can stop your lab at any time by clicking **End Lab** in your *Learner Lab* environment. The current status of your work/server will be stored.
When restarting a Learner Lab session, your VM will restart with a different public IP address, so you will have to download a new RDP-file to make a connection (Step I.14→20).
You can take a break during this project after every major title (I, II, III, IV) and temporarily stop your lab environment, but we advise you to go through it in one sitting (approx. 2.5 hours).

## Instructions:

## I. Login to AWS Academy and Create a Windows 2022 Server VM

1. Set up your AWS Academy account by responding to your email invitation and clicking **Get Started**.
2. Register with **canvas** before you participate in the class. Use the email address that received the email invitation for the email field. If you already registered a canvas account, login with your password.
3. In the AWS Academy Dashboard, click on the **AWS Academy Learner lab[53566]**. Select **Modules**. Click on **Launch AWS Academy Learner Lab**.
4. Start the lab by selecting **Start lab**. When the dot next to AWS turns green, your lab environment is ready to use (it may take about 5 min.). Click **AWS** to launch the AWS Console in a new tab.
5. From the AWS console, drop down **Services** menu, and select EC2 (under **Compute** category).
6. Click, **Launch Instance**.
7. Type your name in the **Name** box (e.g. *BNoble*). In **Application and OS Images (Amazon Machine Image)** under quick start, select **Windows** and make sure it shows "**Microsoft Windows Server 2022 Base**" Free tier eligible under Amazon Machine Image (AMI). **Take a screenshot #1 (must include your name on the top left).**

8. In **Instance Type** select **t2.medium**
9. In **key pair(login)** click **Create new key pair**. Type: **Key_Yourname** (e.g *Key_Jchen*) in key pair name and click **Create key pair.**
   Open the downloaded file and **take a screenshot #2**
10. **Save** the downloaded file on your computer.
11. In **Network Settings** choose **Create security group** and select **Allow RDP traffic from.** Leave the **Anywhere** option as is.
12. In **Configure Storage** select storage size as **45(GiB).**
13. In **Summary** on the right, check carefully **t2-medium** and **45 GiB** storage are displayed. Click **Launch Instance** wait for few minutes before you try to access the VM.
14. Click on **Services** menu from the top Navigation bar and choose **EC2** (under **Compute**).
15. Under **Resources** you should see **Instances (running)** is **1**. Click on it.
16. Wait until the status of your instance is • running then select the instance and click on **Connect** or **Actions → Connect**
17. Click on **RDP client → Download remote desktop file**. Save it on your computer's desktop. Ignore the warning.
18. Go down to the page, click on **Get password**. Click **Upload private key file** and browse to the location to find the *Key_Yourname.pem* file. Click **Decrypt Password**. (If you have saved the private key in step 9 in a different format/file, you can copy/paste in the textbox & decrypt it.)
19. Copy the password to Clipboard. Save your password in a safe place for future use. Click **Cancel**.
20. Execute the **Remote Desktop File** you downloaded earlier to remotely access your VM. Leave username as *Administrator* and paste your password from the previous step and click **Connect**. **Take a screenshot of your virtual machine desktop #3**

## II. Downloading, Installing and configuring Oracle Database and locally connect to it.

a. On the VM open **Edge** and go to: https://www.oracle.com/database/technologies/oracle-database-software-downloads.html#db_free
b. Download **Oracle Database 19c for Microsoft Windows x64 (64-bit)**. Accept the **Oracle License Agreement** and click **Download WINDOWS.X64_193000_db_home.zip**.
c. If the file does not download automatically, then go to the link bellow, follow the instructions under Resolution section and restart your VM instance.
   https://aws.amazon.com/premiumsupport/knowledge-center/ec2-windows-file-download-ie/
d. Create an Account with Oracle if you do not have one and sign in to download. Save the file on your *Desktop* or in *Downloads* (default). Create a folder "Oracle" on drive C: Extract the contents of the downloaded zip-file to the new *Oracle* folder.
   ➔ This step can take 30 minutes or more, do not interrupt this procedure by ending the lab, or you will have to restart.
e. Execute the *setup.exe* application (or it may start automatically).
f. From Configuration options, choose **create and configure a single instance database** then click **Next.**
g. From System Class, choose **Server Class** then click **Next.**
h. From Install type select **Typical Install** then click **Next.**

i. From Specify Oracle Home User, Select **Use Virtual Account** then click **Next**.
j. From Typical Install Configuration, set **Oracle base** to **C:\app** (create folder **app**) and leave **orcl** as Global database name or change it to your choice.
k. Type a Password and Confirm password (used for sys and system built-in accounts). Check **Create as Container database**, type **IA643** as the Pluggable database name, click **Next**.
Ignore the memory warning if you do get one!

**Note: Carefully record the Global database name, the Password, and Pluggable database name in a safe place for future reference.**

l. The installer will perform a prerequisite check and show the installation Summary. Click **Install.**
m. The installer starts installing Oracle database. It will take 30 minutes or so to complete. When the installation is successfully completed, close the installer.
n. Go to the folder where you unzipped the oracle 19c installer ("Oracle"), then navigate to: \network\admin and open **listener.ora** using notepad. Find the listener and remove the listed IP address and save. The address line of the file after modification should look like: *(ADDRESS = (PROTOCOL = TCP)(HOST = )(PORT = 1521))*
o. Now open **tnsnames.ora** and remove the IP address in **all** listeners and save the file.
p. Click on the Search field located in lower left corner of your computer screen. Type **services** to search services app. Start the services app. Scroll down the service list until you see the following two services: ***OracleoraDB19Home1TNSlistner*** and ***OracleserviceORCL***. **Restart** the two services.
(Repeat this step whenever you modify the **listener.ora** and **tnsnames.ora** files.)
q. Download SQL Developer from the link below and extract it on your VM desktop or any location of your choice. Go into the extracted files folder and locate ***sqldeveloper*** application file (with green colored arrow) and send a shortcut to the desktop.
https://www.oracle.com/tools/downloads/sqldev-v191-downloads.html
r. Run SQL Developer on the EC2 virtual machine.
s. Create a new connection as follows:
Connection Name → AWS_Root_SYS (or your choice of name)
Username → sys | Password → your password from Step k of Part II
Role → SYSDBA | Hostname → localhost
Port → 1521 | **SID → orcl** (or what you entered in Stepj Part II)
Save connection and click **connect.** Once logged in, type following commands:

```
SHOW USER;
SHOW CON_NAME;
ALTER PLUGGABLE DATABASE IA643 OPEN;
ALTER PLUGGABLE DATABASE IA643 SAVE STATE;
```

Then click the **Run Script** button (small green arrow)
**Resize the output window so you can see the four executed commands and their results and take a screenshot #4** (showing the commands and the output).
t. Close SQL Developer; Logoff from the Virtual Machine. End Lab if you need a break!.

# III. Connecting to Oracle 19c Server from other Locations

## A. Configure the VM's Firewall

Go back to your AWS console and view your EC2 instance description. Under **Security** click on the security groups(e.g., launch-wizard-1). From here, click **Edit inbound rules** from the **Actions** menu. Create a new inbound rule to allow your database to be accessed from anywhere. The new rule type should be Oracle-RDS.
**Take a screenshot #5**

## B. Configure Windows Firewall

1. On the VM go **Start** menu, click **Search icon**, type **WF.msc**, and then click **OK**.
2. In the **Windows Defender Firewall with Advanced Security**, in the left pane, select and right-
   click **Inbound Rules**, and then click **New Rule** in the action pane (upper left corner).
3. In the Rule Type dialog box, select **Port**, and then click **Next**.
4. In the Protocol and Ports dialog box, select **TCP**. Select Specific local ports, and then type the port number of the instance of the Database Engine, default is **1521**. Click **Next**.
5. In the Action dialog box, select **Allow the connection**, and then click **Next**.
6. In the Profile dialog box, Turn domain, private and public on. Then click **Next**.
7. In the Name dialog box, type "**Your full name Oracle SQL 1521 Inbound**". Then click **Finish**. **Take a screenshot #6** to show the new rule in the list.

## C. Connect to the Oracle database via SQL Developer installed on your own computer (rather than the SQL Developer on the AWS virtual machine)

1. Go to this link to download SQL Developer if you do not have it already on your own machine: https://www.oracle.com/tools/downloads/sqldev-v191-downloads.html
2. Run **SQL Developer** and choose Create a connection:
   Connection Name → AWS_Root_SYS (or your choice of name)
   Username → sys | Password → your_password from Step k Part
   Role → SYSDBA | Hostname → your VM's public domain name (DNS)***
   Port → 1521 | **SID → orcl** (or what you entered in Step j Part II)

   *** *Something that looks like: ec2-52-55-59-220.compute-1.amazonaws.com*

3. Click on Test. Once the status on connection shows "Success", **take a screenshot #7**
4. Create another connection to connect to IA643 pluggable database
   Connection Name → AWS_IA643_SYS (or your choice of name)
   Username → sys | Password → your_password from Step k Part II
   Role → SYSDBA | Hostname → your VM's public domain name (DNS)
   Port → 1521 | **Service name → IA643**
5. Click on Test. Once the status on connection shows "Success", **take a screenshot #8**

## IV. Create an administrative database user and grant the DBA database role

a. Connect to IA643 pluggable database as user sys and execute the following code:
***SHOW CON_NAME;***
→ This command shows you which database you are in.
Output should be "IA643"
***CREATE USER DBA643 IDENTIFIED BY msIA643_Fall;***
***GRANT DBA TO DBA643;***
→ These commands create a user named DBA643 with password msIA643_Fall.
The user is granted the DBA role.

b. Create a connection to connect to the DBA643 account:
Connection Name → AWS_IA643_DBA643 (or your choice of name)
Username → DBA643 | Password → msIA643_Fall
**Role → default** | Hostname → your VM's public domain name (DNS)
Port → 1521 | **Service name → IA643**

c. Click on Test. Once the status on connection shows "Success", **take a screenshot #9**

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## Grading Policy:

**A) Login to AWS Academy and Create a Windows 2019 Server VM** **25 Points**

**B) Downloading, Installing and configuring Oracle Database and locally connect to it.** **25 Points**

**C) Connecting to Oracle 19c Server from other Locations using sqldeveloper** **25 points**

**D) Create a database user and grant a database role** **10 points**

**E) Base points (for effort):** **15 points**

**I may randomly call you in the class meetings to demonstrate running Oracle SQL commands on your virtual machine.**