



# Re-Evaluating Digital Technology to Enhance Learning

## Lesson Plan

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<b>Course:</b>	Database Management Systems and Administration
<b>Lesson Title:</b>	Introduction to RMAN (Recovery Manager) of Oracle.
<b>Lesson Duration:</b>	1,5 hours.
<b>Student Age Range:</b>	19 to 30.
<b>Learning Style(s) of students:</b>	Kinesthetic and auditory learners.
<b>Digital Technology Hardware Required:</b>	A Computer with 8GB of RAM
<b>Digital Technology Software Required:</b>	VMWare, Oracle Database 19 c, Google Chrome
<b>Other Equipment Required:</b>	A projector or television.

**Lesson Plan:** The core of the lesson is to understand and consolidate the importance of a tool commonly used by DBAs or Database Administrators to recover and back up database pieces or specific files.

This tool is called Recovery Manager (RMAN) and is an Oracle Database client that performs backup and recovery tasks on your databases and automates administration of your backup strategies.

### Temporalization.

- **Class introduction (5 min):** List of attendance, learning objectives and virtual machine load.
- **Auditory lecture (25 min):** Theory about RMAN is displayed on TV. The lecturer shares the screen for the students to have a visual guide.
- **Period of activity (28 min):** The students have to create a script to configure some parameters in RMAN.
- **Cleaning (2 min):** The students use disinfectant on the tables and hand sanitizer.

In order to have constant communication with our students, this private course is used for educators and trainers to achieve learning goals.

Moodle is just another tool that facilitates learning and it comes with many customizable management features.

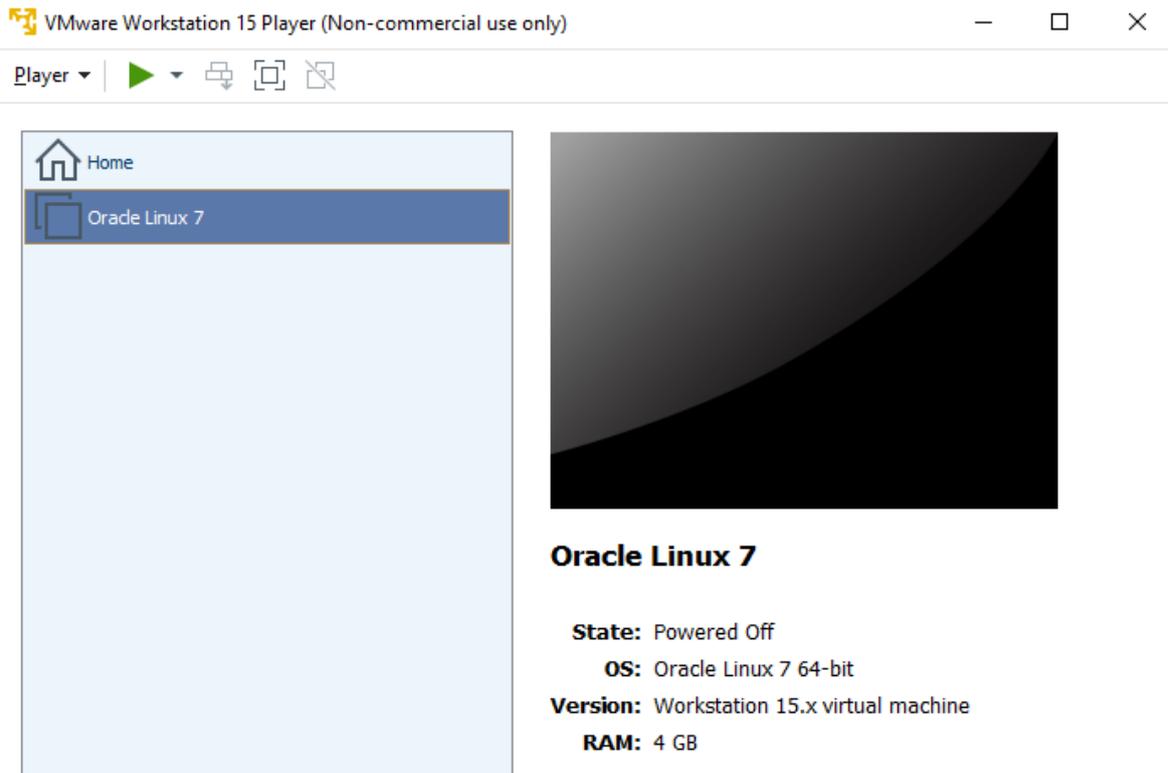
Here is an example of the current course:



The screenshot displays a Moodle course interface with two main units. Unit 0, titled 'Unit 0. Course introduction', contains four items: 'Introducción a sistemas gestores de base de datos', 'What is Database & SQL?', 'Course introduction. Content, deadlines, evaluation, grades, etc.', and 'Unit 0. Initial concepts'. Unit 1, titled 'Unit 1. Installing MySQL', contains several items: 'UT 1. Theory and practice. Completed', 'How to properly install CentOS 7 on VMWare. By Sonia', 'Unit 1. Installing CentOS 7 and MySQL by YUM', 'Quick Guide. YUM installation', 'Installing MySQL 5.1.73 from source code', 'MySQL 5.1.73', 'MySQL 5.1 from source code', and 'Installing MySQL 5.6.16 version coexisting with the version 5.1'.

**Virtual Machine (VM).** It's a software that provides functionality of a physical computer based on an image file. It can run an operating system by using physical system resources, such as the CPU, RAM memory and disk storage,

In our case, we are running Oracle Linux 7, which is an operating system based on Red Hat that integrates Oracle products with ease.



Within Oracle Linux 7, it's very common to take advantage of features, tools and software to enhance the performance of certain applications or activities.

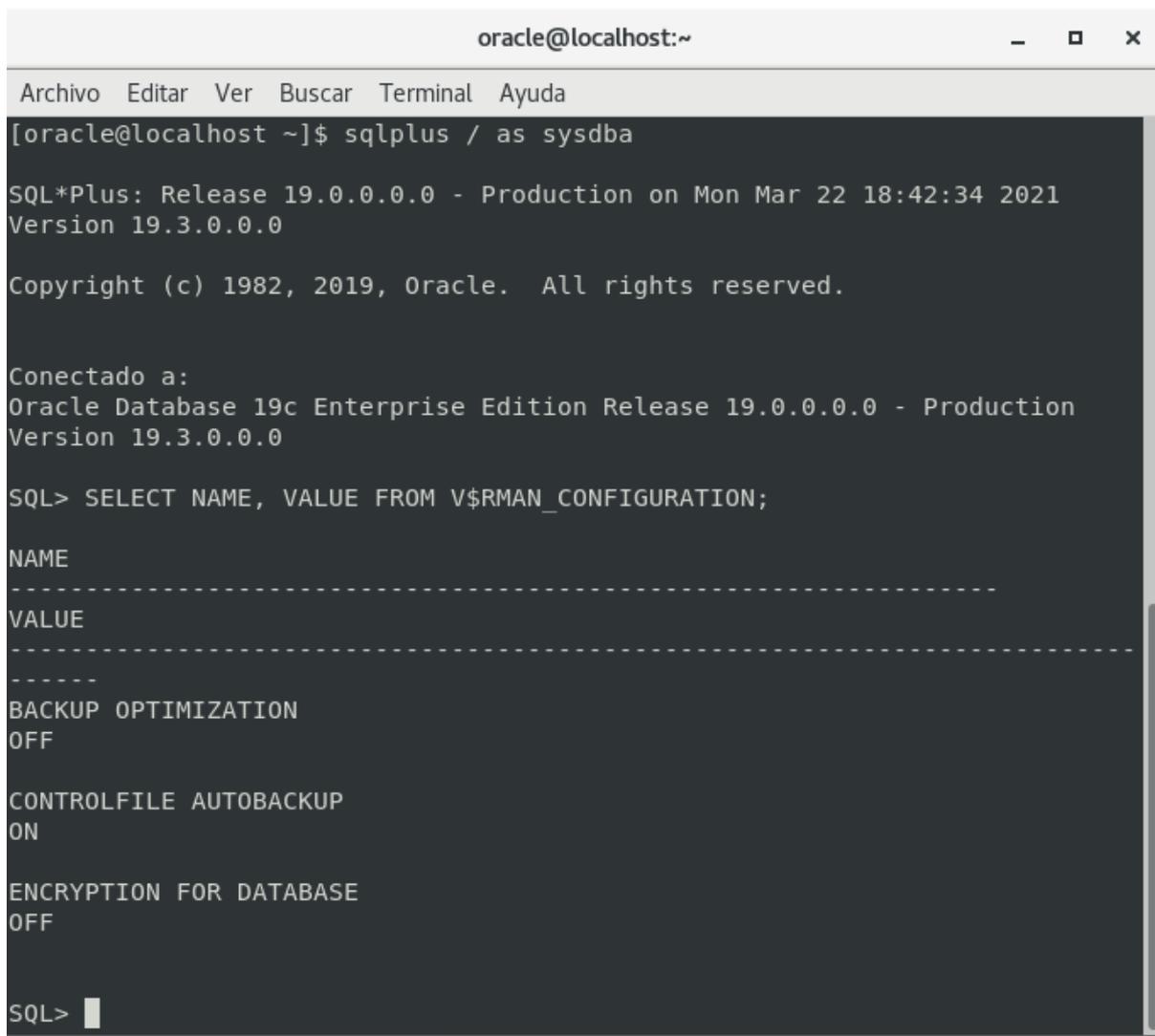
In our case, we are using Oracle Database 19c software as database infrastructure

The image is a screenshot of the Oracle website. At the top, the Oracle logo is on the left, and navigation links for "Products", "Resources", "Support", "Events", and "Developer" are on the right. Below the navigation is a breadcrumb trail: "Oracle UK &gt; Database &gt;". The main heading is "Oracle Database Technologies". Below the heading is a paragraph of text: "Oracle Database offers market-leading performance, scalability, reliability, and security, both on-premises and in the cloud. Oracle Database 19c is the current long term release, and it provides the highest level of release stability and longest time-frame for support and bug fixes." Below this is another paragraph: "Oracle Database 21c, also available for production use today as an innovation release, provides an early insight into the many enhancements and new capabilities. These include improved multimodel support through in-database Javascript and native blockchain tables, and multiworkload improvements such as AutoML and sharding enhancements that will be incorporated into future long term releases."

To be able to manage all the information stored in our database, it's fundamental to understand the use of tools such as SQLPlus, which allows you to interactively enter and execute SQL commands and PL/SQL blocks.

We are able to do this through a terminal console, that is the interface where you type cryptic Linux commands.

Here is an example on how we access SQLPlus by typing a specific command:

A screenshot of a terminal window titled 'oracle@localhost:~'. The window has a menu bar with 'Archivo', 'Editar', 'Ver', 'Buscar', 'Terminal', and 'Ayuda'. The terminal content shows the command '[oracle@localhost ~]\$ sqlplus / as sysdba' being executed. The output includes the SQL\*Plus version information (Release 19.0.0.0.0 - Production on Mon Mar 22 18:42:34 2021, Version 19.3.0.0.0), copyright notice, and connection details for Oracle Database 19c Enterprise Edition. A query is then executed: 'SQL> SELECT NAME, VALUE FROM V\$RMAN\_CONFIGURATION;'. The results are displayed in a table with columns 'NAME' and 'VALUE'. The visible rows are: 'BACKUP OPTIMIZATION OFF', 'CONTROLFILE AUTOBACKUP ON', and 'ENCRYPTION FOR DATABASE OFF'. The prompt 'SQL>' is visible at the bottom of the terminal window.

```
oracle@localhost:~
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
[oracle@localhost ~]$ sqlplus / as sysdba
SQL*Plus: Release 19.0.0.0.0 - Production on Mon Mar 22 18:42:34 2021
Version 19.3.0.0.0

Copyright (c) 1982, 2019, Oracle. All rights reserved.

Conectado a:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0

SQL> SELECT NAME, VALUE FROM V$RMAN_CONFIGURATION;

NAME
-----
VALUE
-----
-----
BACKUP OPTIMIZATION
OFF

CONTROLFILE AUTOBACKUP
ON

ENCRYPTION FOR DATABASE
OFF

SQL> █
```

And now, if you wish to perform backup and recovery tasks on your databases, RMAN is a client tool that can achieve it.

```
oracle@localhost:~  
Archivo Editar Ver Buscar Terminal Ayuda  
[oracle@localhost ~]$ rman target /  
  
Recovery Manager: Release 19.0.0.0.0 - Production on Mon Mar 22 18:45:20 2021  
Version 19.3.0.0.0  
  
Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.  
  
connected to target database: EXAMEN (DBID=3448322556)  
  
RMAN> show all;  
  
using target database control file instead of recovery catalog  
RMAN configuration parameters for database with db_unique_name EXAMEN are:  
CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default  
CONFIGURE BACKUP OPTIMIZATION OFF;  
CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default  
CONFIGURE CONTROLFILE AUTOBACKUP ON;  
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default  
CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default  
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default  
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default  
CONFIGURE MAXSETSIZE TO UNLIMITED; # default  
CONFIGURE ENCRYPTION FOR DATABASE OFF;  
CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default  
CONFIGURE COMPRESSION ALGORITHM 'BASIC' AS OF RELEASE 'DEFAULT' OPTIMIZE FOR LOAD TRUE ; # default
```

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Finally, the philosophy behind this is to be able to agglutinate or integrate all these features and functionalities in a single application or software that facilitates the work environment.

Oracle SQL Developer is a graphical version of SQL\*Plus that gives database developers a convenient way to perform basic tasks. You can browse, create, edit, and delete (drop) database objects; run SQL statements and scripts; edit and debug PL/SQL code; manipulate and export data; and view and create reports.

You can connect to any target Oracle database schema using standard Oracle database authentication. Once connected, you can perform operations on objects in the database.

