

# **Upgrading Oracle Databases**

**By Ahmed Baraka**

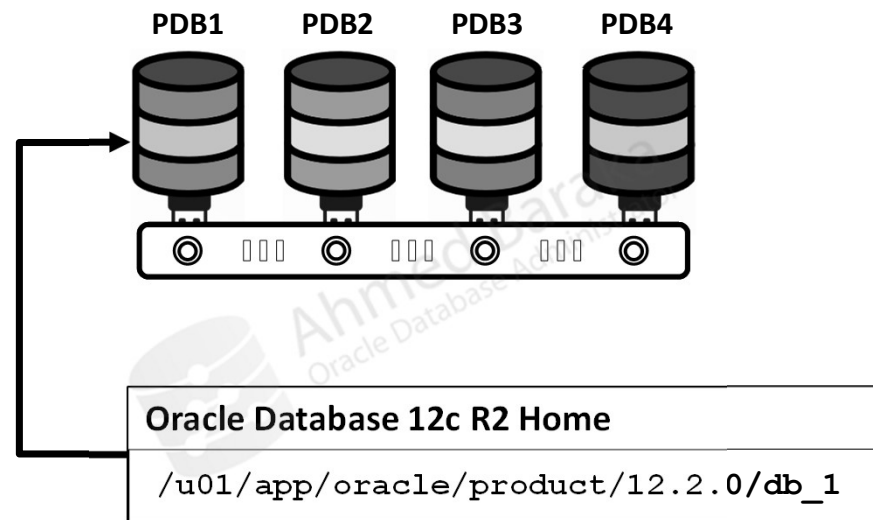
# Objectives

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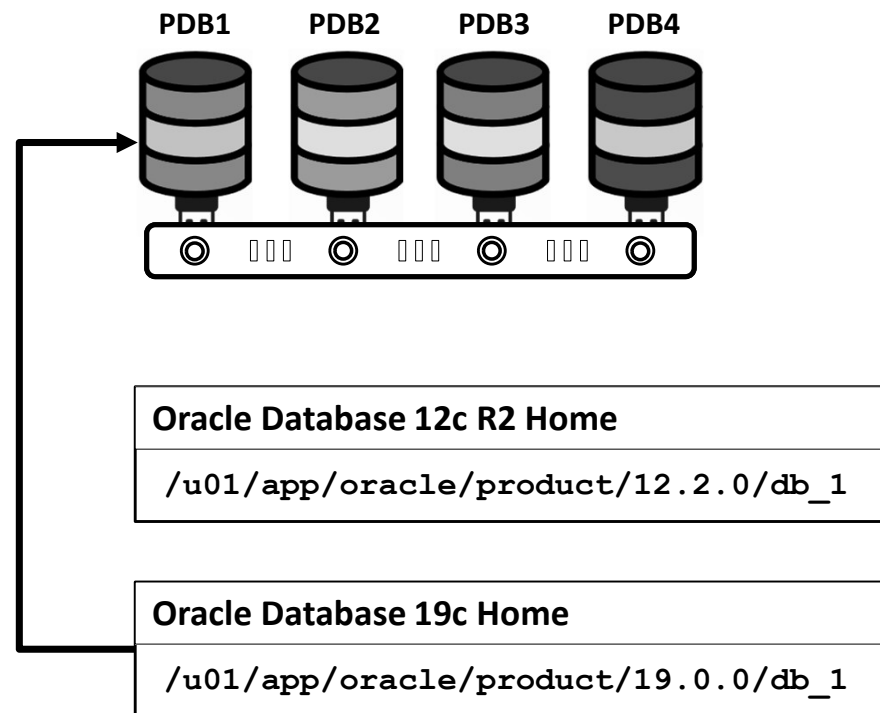
In this lecture, you will learn how to perform the following:

- Describe the upgrade possible methods
- Describe the Oracle database upgrade roadmap
- Prepare the database for upgrades
- List Oracle database upgrade tools
- Describe autoUpgrade features and benefits
- Describe autoUpgrade processing modes and stages
- Upgrade a single-instance database in the same machine
- Monitor autoUpgrade using its console
- Implement post-upgrade actions

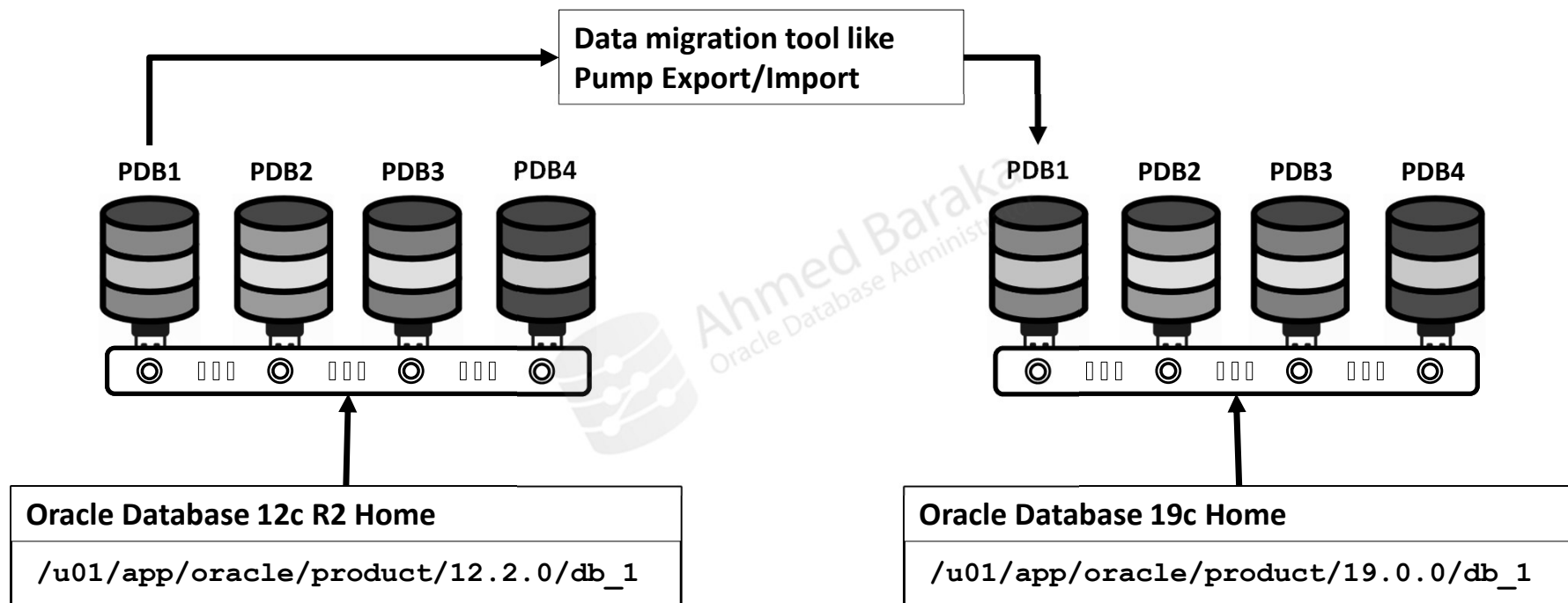
## Database Before Upgrade



## Database After Upgrade



## Data Migration



# Oracle Database Upgrade Methods

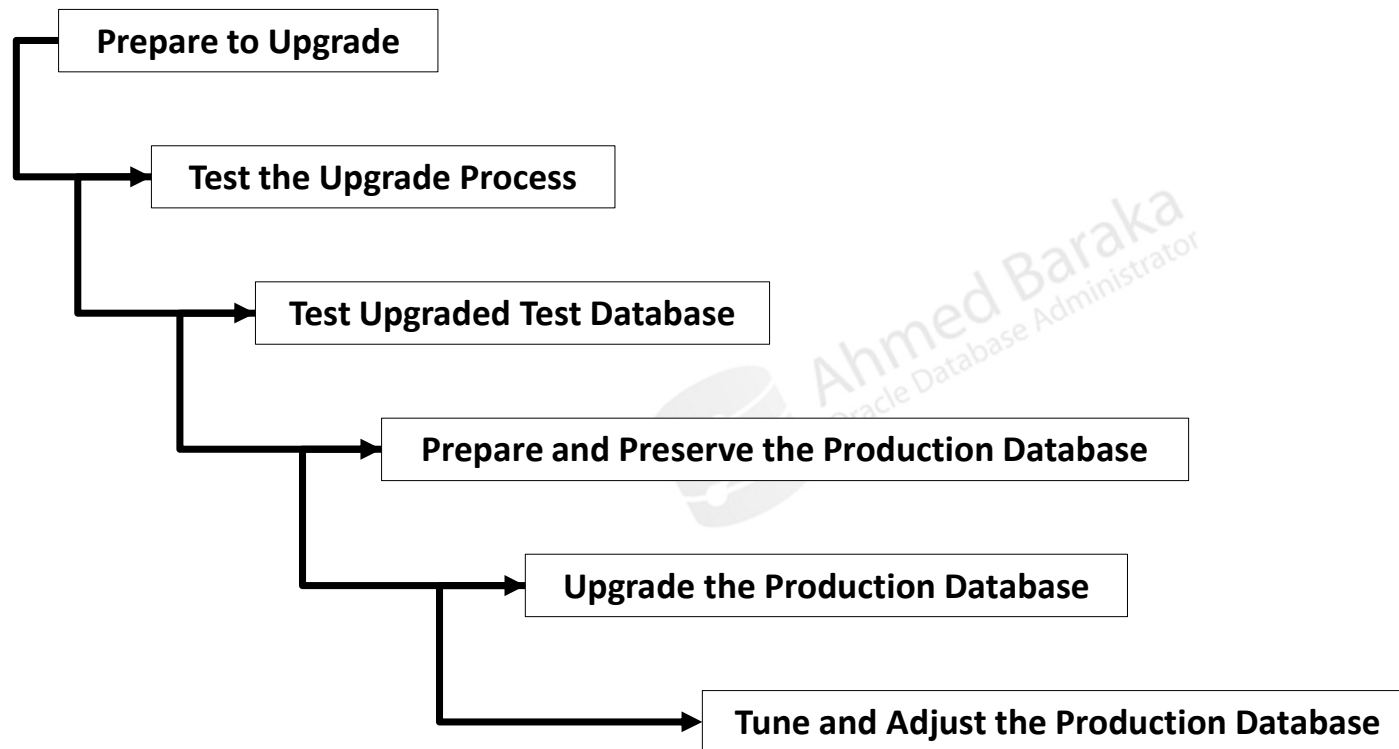
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- **Database direct upgrade:**
  - Install Oracle new release in a separate home
  - Upgrade the database to the new release home using any of the upgrade supported tools
- **Database migration:**
  - Install Oracle new release in a separate home and create a new database
  - Move the data from the old database to the new database

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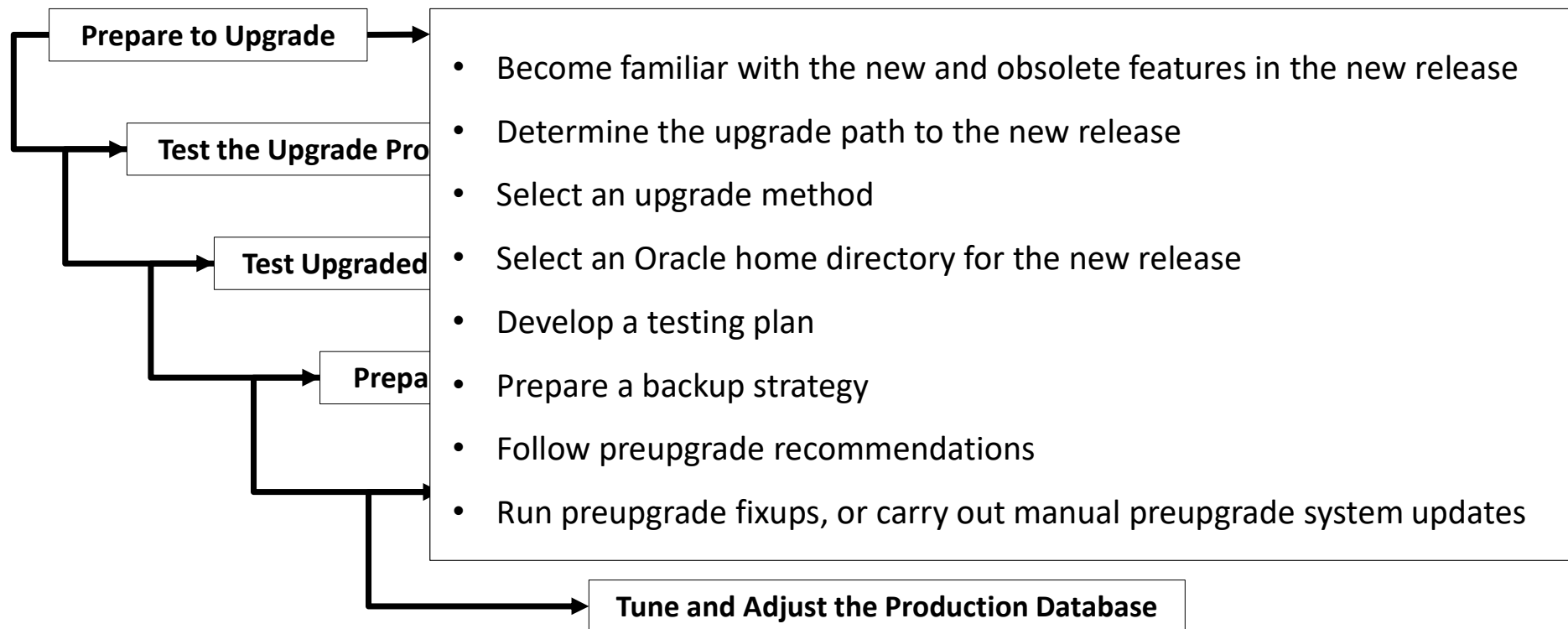
# Oracle Database Upgrade Roadmap

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# Oracle Database Upgrade Workflow

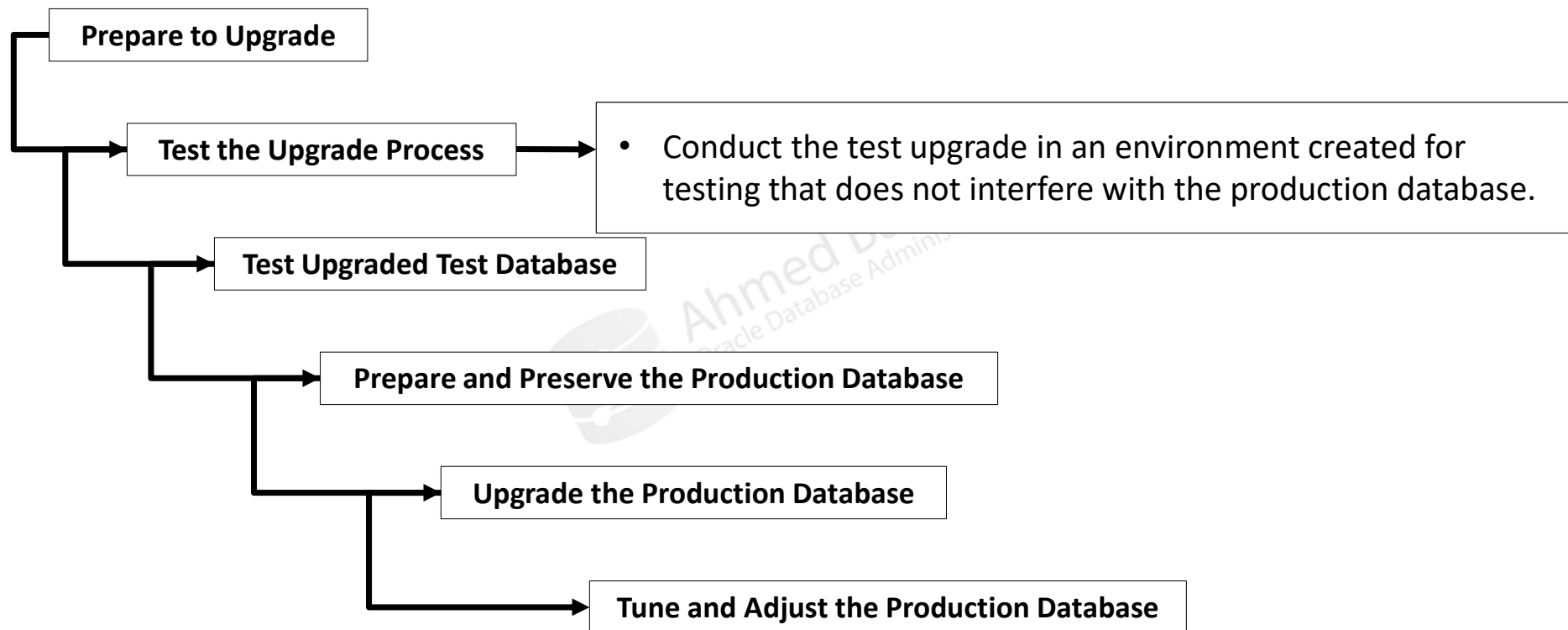
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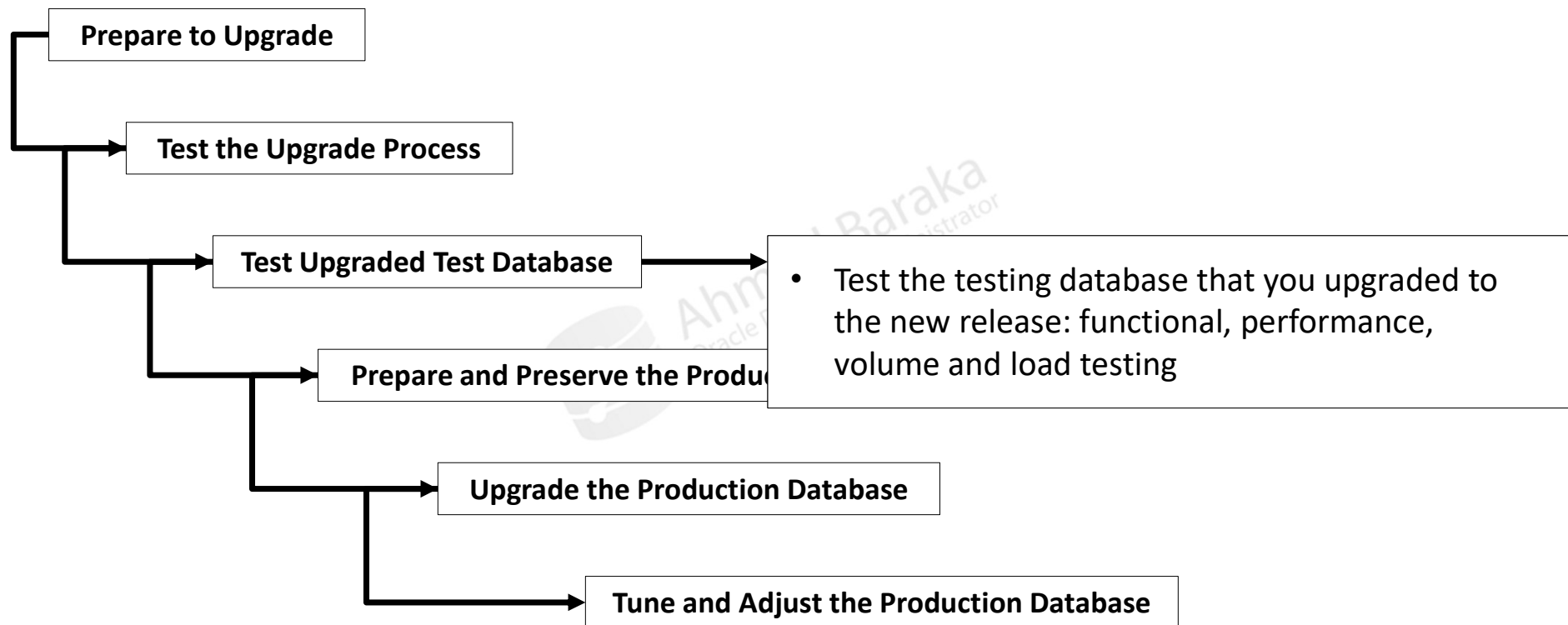
# Oracle Database Upgrade Roadmap

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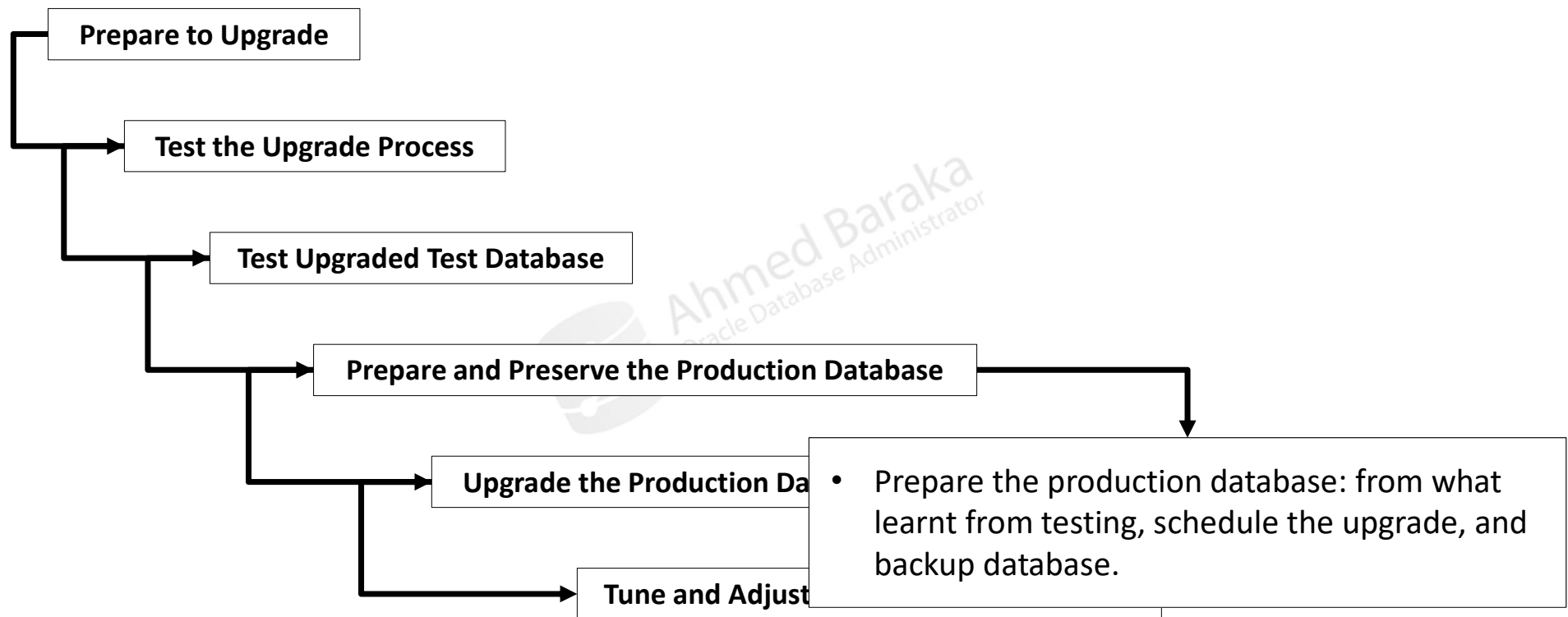
# Oracle Database Upgrade Roadmap

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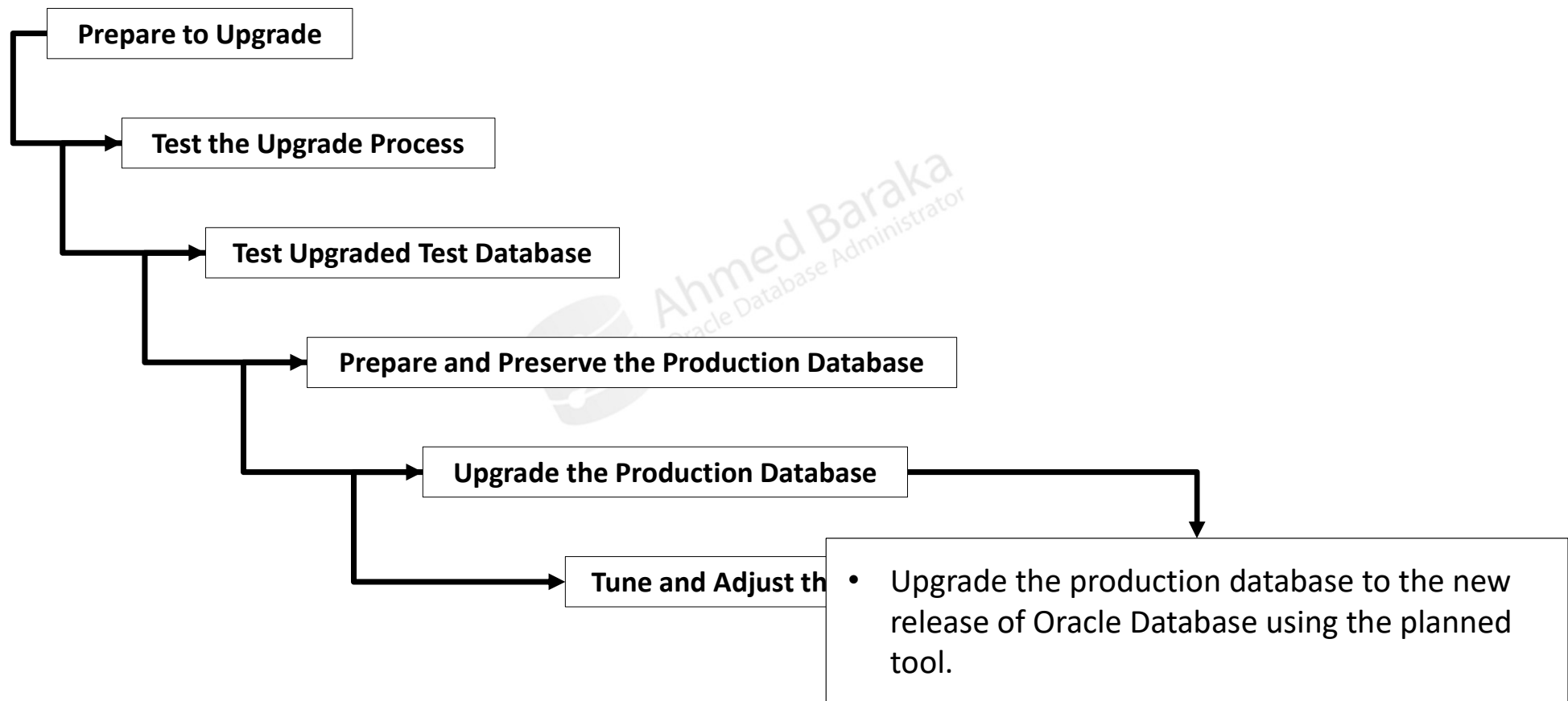
# Oracle Database Upgrade Roadmap

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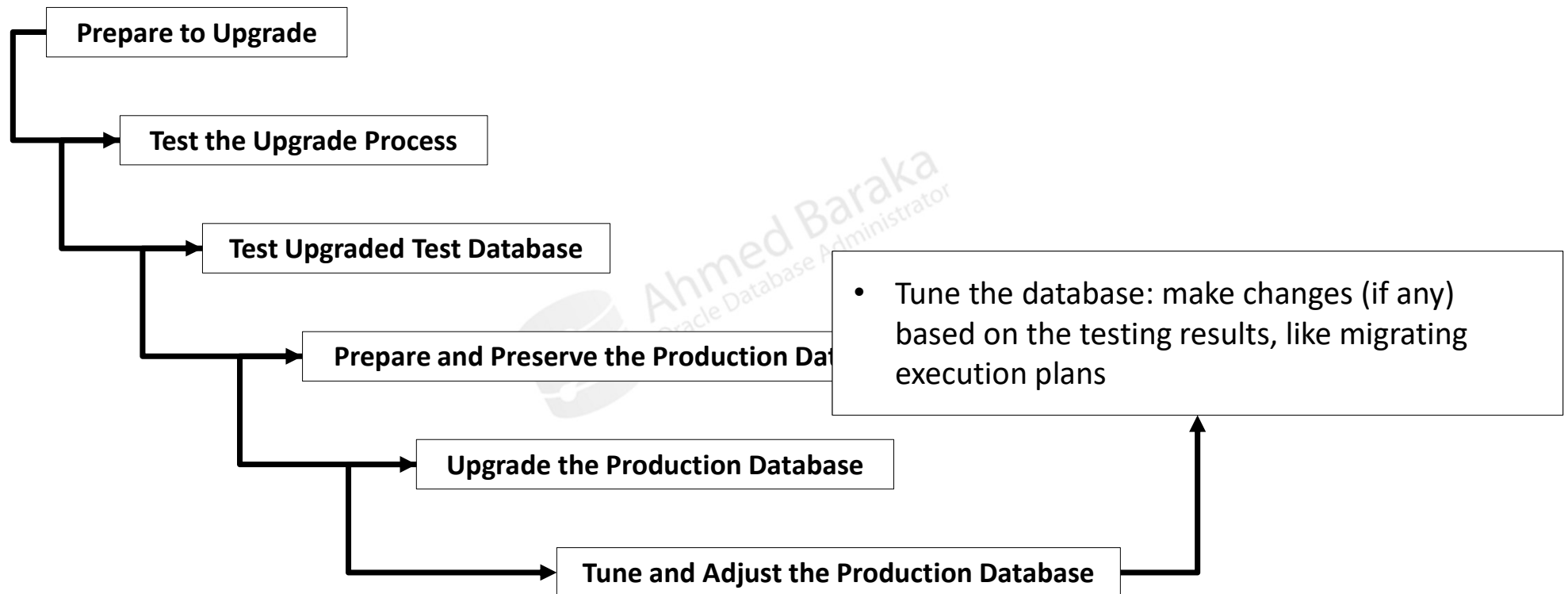
# Oracle Database Upgrade Roadmap

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# Oracle Database Upgrade Roadmap

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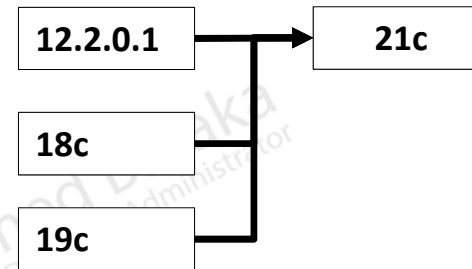
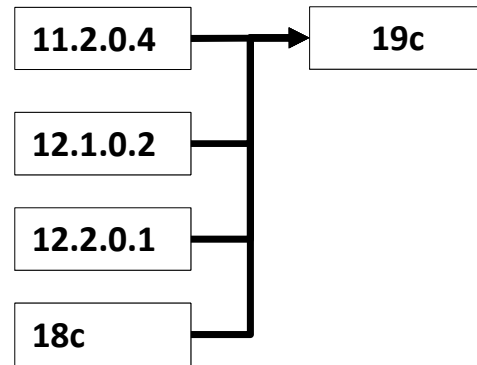
# Database Upgrade References

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- Documentation: **Oracle Database, Database Upgrade Guide**
  - Use the documentation of the Oracle database **target** release
- **MOS Doc ID 2118136.2**: Assistant: Download Reference for Oracle Database/GI Update, Revision, PSU, SPU(CPU), Bundle Patches, Patchsets and Base Releases
- **MOS ID 207303.1**: Client / Server Interoperability Support Matrix for Different Oracle Versions
- **MOS Doc ID 742060.1**: Release Schedule of Current Database Releases
- Mike Dietrich blog:
  - <https://mikedietrichde.com/>

# Oracle Database Releases that Support Direct Upgrade

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# Database Preparation Tasks to Complete Before Starting Oracle Database Upgrades

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- Release Updates and requirements for upgrading Oracle databases
- Create or migrate your password file
- Backup the database
- Install the new Oracle database home
- Configure a Listener from the new Oracle database home
- Refer to the **Oracle Database Upgrade Guide** documentation



# Oracle Database Upgrade Tools (to 21c)

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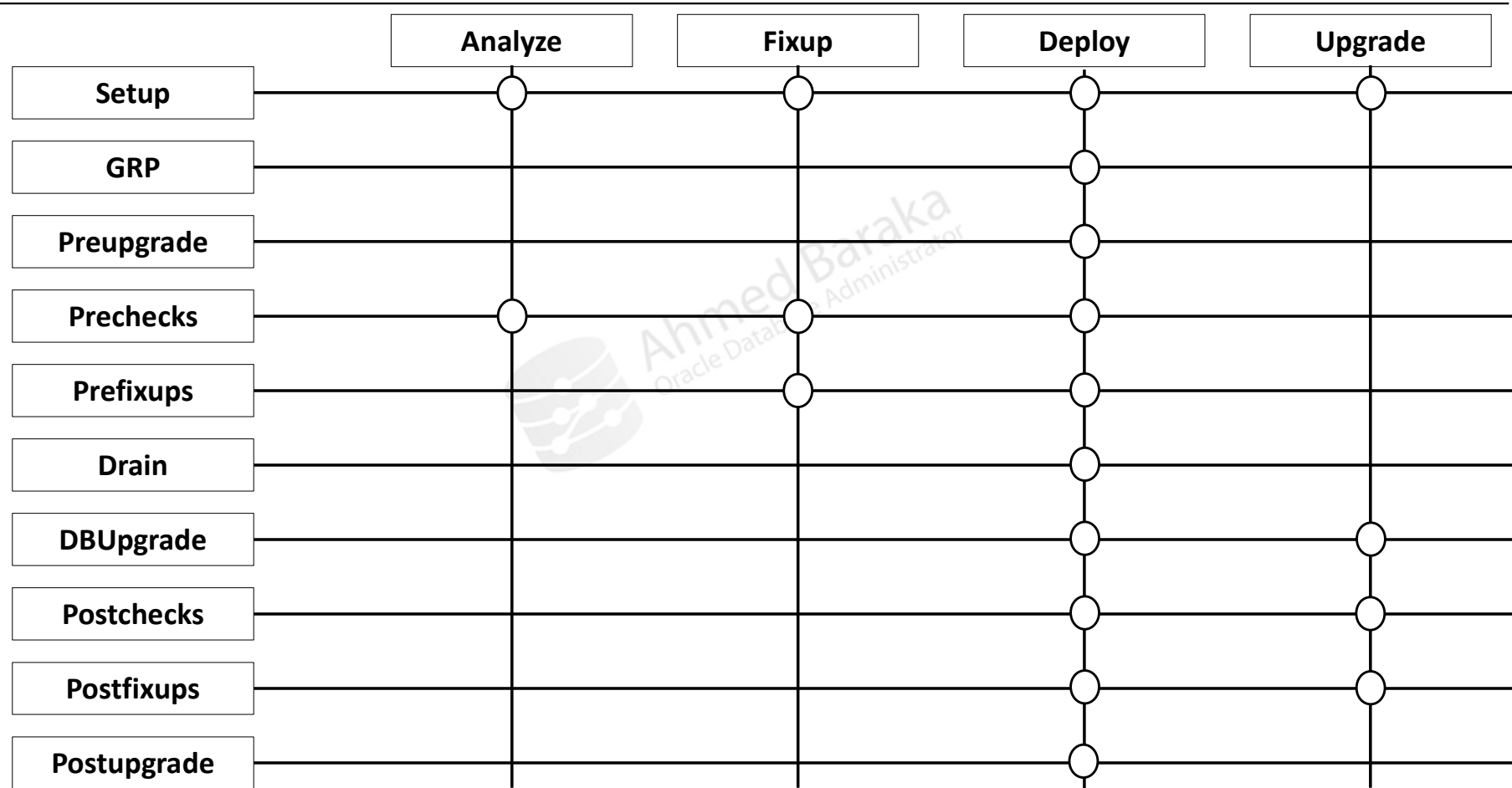
- AutoUpgrade Utility
- Manual upgrade using the Parallel Upgrade Utility (`catct1.pl` and `dbupgrade`)
- Using Fleet Patching and Provisioning (FPP) (formerly known as Rapid Home Provisioning)
- Using Oracle Enterprise Manager: Fleet Maintenance
- Database Upgrade Assistant DBUA

# AutoUpgrade Features and Benefits

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- Can identify issues before upgrade, provide fixups, and implement the fixups
- Can execute the pre-upgrade and post-upgrade actions (not all)
- Easy to use and simplifies the upgrade
- Can upgrade multiple databases at a time
- Supports different architecture conversion ( non-CDB to PDB, PDB to CDB) (not CDB to non-CDB)
- Provides multiple parameters and options to control and tune the upgrade
- Can be upgraded separately

# AutoUpgrade Processing Modes and Stages



# Using AutoUpgrade Utility on Upgrading Single-instance Database in the Same Machine

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1. Obtain the latest version of AutoUpgrade from MOS Doc ID 2485457.1
2. Download the new Oracle Database software and install it in a new separate home directory
3. Create a configuration file for the AutoUpgrade utility
4. Run the AutoUpgrade utility in **ANALYZE** mode
5. Implement the fixups
6. Run the AutoUpgrade utility in **DEPLOY** mode
7. Implement post-upgrade actions

# Writing AutoUpgrade Configuration File

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- Global parameters by default apply to all databases addressed by the configuration file

```
global.<parameter-name>=<parameter-value>
```

- Local configuration parameters override global parameters:

```
<any-config-name>.<parameter-name>=<parameter-value>
```

- Example:

```
global.autoupg_log_dir=/home/oracle/autoupgrade/  
19c21c.source_home=/u01/app/oracle/product/19.0.0/db_1  
19c21c.target_home=/u01/app/oracle/product/21.0.0/db_1  
19c21c.sid=oradb
```

# Running AutoUpgrade in Analyze Mode

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- To run AutoUpgrade in Analyze mode:

```
java -jar autoupgrade.jar -config yourconfig.txt -mode analyze
```



# Running AutoUpgrade in Fixup Mode

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- AutoUpgrade performs the checks ( performed in Analyze mode) then performs all automated fixups
- **Caution:** It may make changes on the database.
- Example:

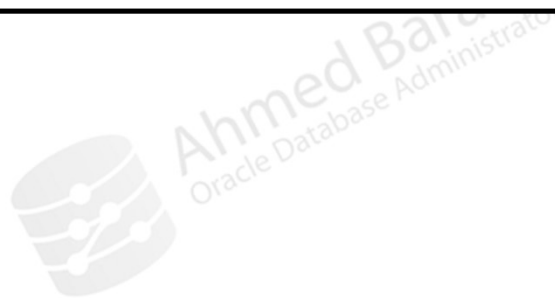
```
java -jar autoupgrade.jar -config yourconfig.txt -mode fixup
```

# Running AutoUpgrade in Deploy Mode

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- Executes all the AutoUpgrade stages
- Example:

```
java -jar autoupgrade.jar -config yourconfig.txt -mode DEPLOY
```





# Monitoring AutoUpgrade Using its Console

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- Console is enabled by default
  - Can be enabled/disabled using the parameters `console` and `noconsole`
- Console commands can be used to monitor AutoUpgrade operations

Command	Description
<code>lsj</code>	Lists the jobs and their status
<code>tasks</code>	Displays the running tasks
<code>status [-job number]</code>	Lists the status of a particular job
<code>logs</code>	Displays all log file locations
<code>abort -job number</code>	Aborts the job specified by the numeric value (number)
<code>clear</code>	Clears the terminal display

# About AutoUpgrade Messages

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- **Operation Messages:**

Message Type	Description
PREPARING	An AutoUpgrade instance is being created, initialized, or called, in preparation for completing an AutoUpgrade stage
EXECUTING	AutoUpgrade is in the process of performing the main workflow of a stage

- **State Messages:**

Message Type	Description
ABORTED	AutoUpgrade stopped performing the stage workflow, in response to a user request
ERROR	An error was encountered while the stage workflow was being performed.
FINISHED	AutoUpgrade successfully completed the workflow for the stage
RUNNING	AutoUpgrade is performing the stage workflow



# Required Tasks to Complete After Upgrading Oracle Database

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- Set environment variables
- Recompile invalid objects in the database
- Check the Oracle Database Inventory:

```
opatch lsinventory -patch
```
- Upgrade tables dependent on Oracle-Maintained Types
- Set the **COMPATIBLE** parameter after a few days of the upgrade
- Consider uninstalling old Oracle database home
- Refer to the **Oracle Database Upgrade Guide** documentation

# Summary

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In this lecture, you should have learnt how to perform the following:

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