

# Upgrade to Oracle Database 19c

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dohdatabase



@dohdatabase



<https://dohdatabase.com>



### Episode 1

#### Release and Patching Strategy

105 minutes – Feb 4, 2021



### Episode 2

#### AutoUpgrade to Oracle Database 19c

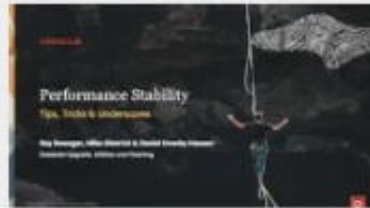
115 minutes – Feb 20, 2021



### Episode 3

#### Performance Stability, Tips and Tricks and Underscores

120 minutes – Mar 4, 2021



### Episode 4

#### Migration to Oracle Multitenant

120 minutes – Mar 16, 2021



### Episode 5

#### Migration Strategies – Insights, Tips and Secrets

120 minutes – Mar 25, 2021



### Episode 6

#### Move to the Cloud – Not only for techies

115 minutes – Apr 8, 2021



## Recorded Web Seminars

<https://MikeDietrichDE.com/videos>

# DEMO





Upgrade using

# AutoUpgrade

complete  
**AUTOMATION**

rich on  
**FEATURES**

fleet  
**SCALE**

highly  
**RECOMMENDED**





Always use the latest  
version of AutoUpgrade

Download from My Oracle Support (2485457.1)

# Backwards Compatible

```
$ java -jar autoupgrade.jar -version
```

```
build.version 22.5.221011
```

```
build.date 2022/10/11 14:23:59 -0400
```

```
build.hash e9428661
```

```
build.hash_date 2022/10/11 12:55:45 -0400
```

```
build.supported_target_versions 12.2,18,19,21
```

```
build.type production
```

# AutoUpgrade

## Fleet Scale

One or many  
All types  
All platforms  
All architectures

RAC

Parameters

Data Guard

Scripts

Encryption



# Fleet Scale

You can upgrade one or many databases



```
upg1.sid=DB  
upg1.source_home=/u01/app/oracle/12.2.0.1  
upg1.target_home=/u01/app/oracle/19.0.0.0
```



```
upg1.sid=DB  
upg1.source_home=/u01/app/oracle/12.2.0.1  
upg1.target_home=/u01/app/oracle/19.0.0.0  
  
upg2.sid=CDB1  
upg2.source_home=/u01/app/oracle/12.2.0.1  
upg2.target_home=/u01/app/oracle/19.0.0.0  
  
sales.sid=SALESPROD  
sales.source_home=/u01/app/oracle/12.2.0.1  
sales.target_home=/u01/app/oracle/19.0.0.0
```

# Fleet Scale



## Non-CDB

Upgrade  
PDB conversion



## CDB

Entire CDB  
Selected PDBs



## PDB

Unplug-plug upgrade  
Via database link  
Via Refreshable Clone



# AutoUpgrade

Fleet Scale

RAC

Parameters

## Data Guard

Fully supported  
Two methods  
Data Guard broker

Scripts

Encryption



Data Guard is fully supported



# Data Guard

- Detected by AutoUpgrade automatically
- Works for broker-managed and manual Data Guard environments
- Primary database handled by AutoUpgrade  
Standby database handled manually

Pro tip: Get more details on  
[doehdatabase.com/upgrade-data-guard](https://doehdatabase.com/upgrade-data-guard)

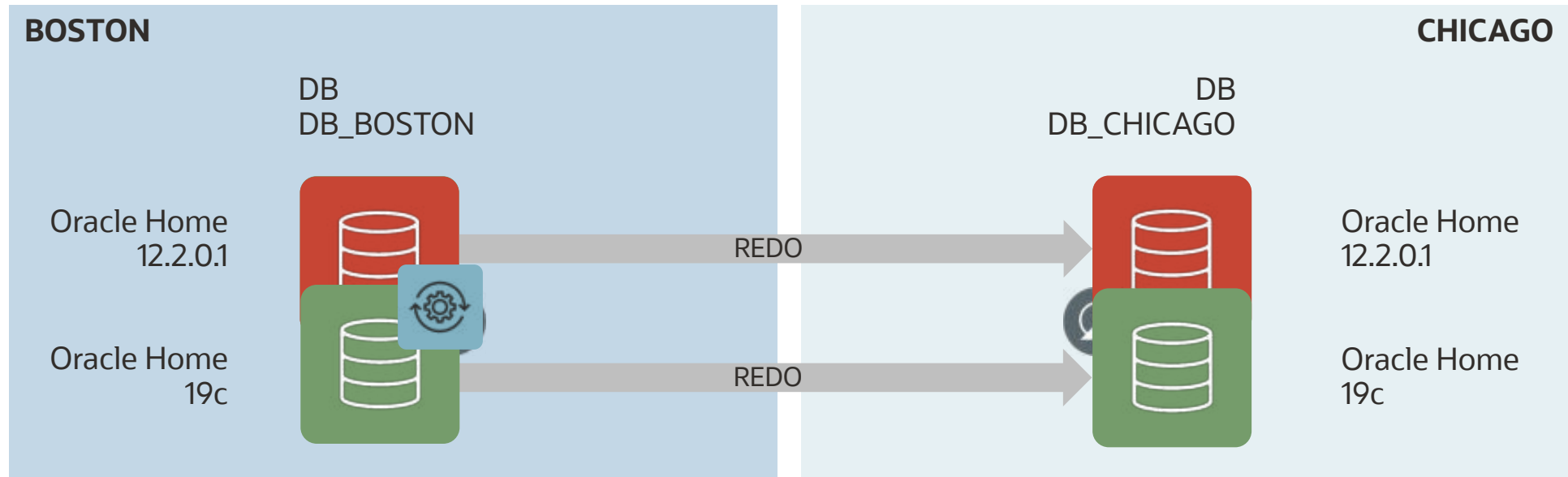




# Redo is applied on standby databases continuously during upgrade

- Complies with MAA recommendations

# Data Guard



```
$ java -jar autoupgrade.jar ... -mode deploy
```

- Restore point
- Start in new Oracle Home
- Upgrade

```
$ srvctl stop database -d $ORACLE_UNQNAME
```

```
$ #switch to new Oracle Home
```

```
$ srvctl upgrade database -d $ORACLE_UNQNAME
```

```
$ srvctl start database -d $ORACLE_UNQNAME \  
-startoption mount
```

# MAA

`defer_standby_log_shipping=yes`

Minimum downtime

Redo log transport enabled

Redo apply active

Protected by guaranteed restore point

DEFAULT

# Standby Offline

`defer_standby_log_shipping=no`

Maximum protection

Redo log transport deferred

Redo apply stopped

Protected by disconnected standby  
and guaranteed restore point

# AutoUpgrade

Fleet Scale

**RAC**

Fully supported  
Distributed Upgrades  
PDB availability

Parameters

Data Guard

Scripts

Encryption



# RAC is fully supported

- Except on Windows







... and it works completely out-of-the-box

- No special configuration
- AutoUpgrade handles all nodes
  - `CLUSTER_DATABASE=FALSE`
  - Grid Infrastructure commands
  - File copying





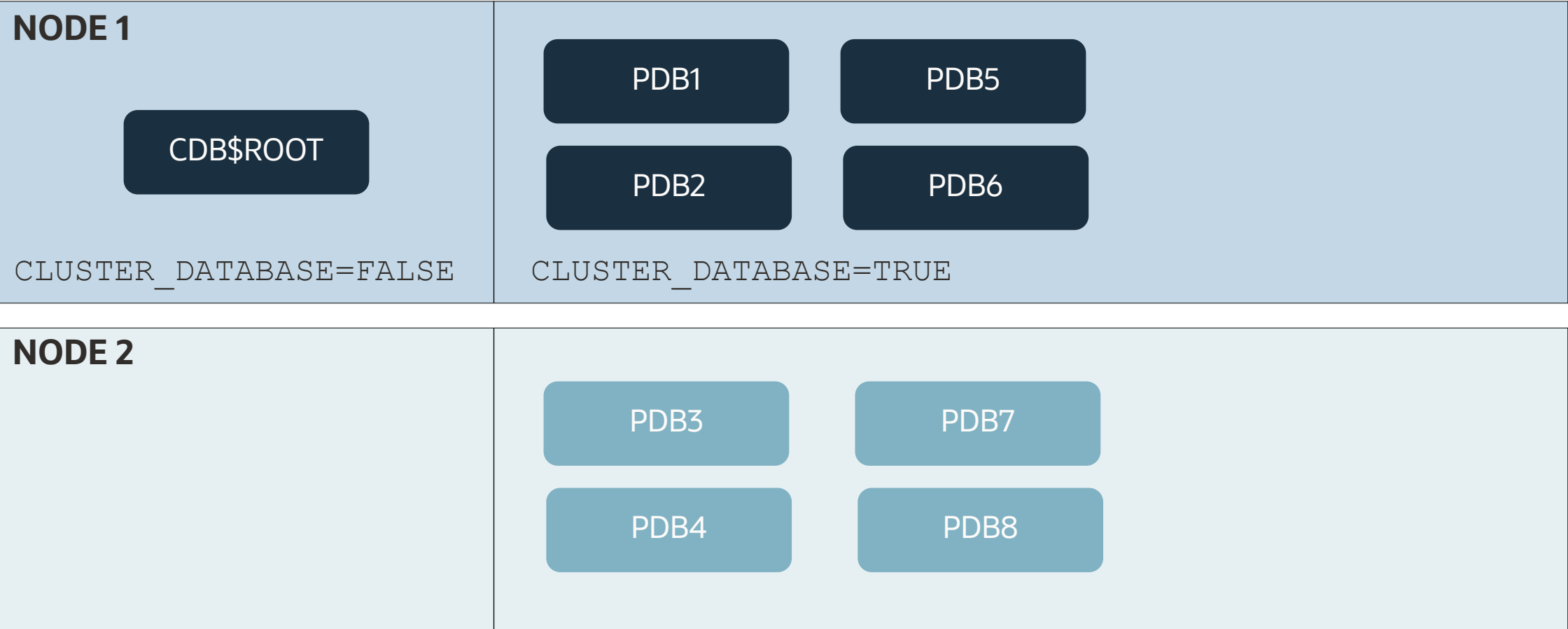
Distributed upgrade uses all nodes  
resulting in faster upgrades of CDBs



# RAC | Distributed Upgrade



# RAC | Distributed Upgrade



# RAC | Distributed Upgrade

- To enable distributed upgrade:

```
$ cat RACDB.cfg

global.autoupg_log_dir=/u01/app/oracle/cfgtoollogs/autoupgrade
upg1.log_dir=/u01/app/oracle/cfgtoollogs/autoupgrade/ RACDB
upg1.source_home=/u01/app/oracle/product/12.2.0.1
upg1.target_home=/u01/app/oracle/product/19
upg1.sid= RACDB
upg1.tune_setting=proactive_fixups=true,distributed_upgrade=true

$ java -jar autoupgrade.jar -config RACDB.cfg -mode deploy
```



# RAC

# 41%

In benchmark, time saved by using distributed upgrade

- 2 node RAC database
- 4 CPUs each
- CDB with 8 PDBs

# AutoUpgrade

Fleet Scale

RAC

Parameters

Data Guard

**Scripts**

Encryption

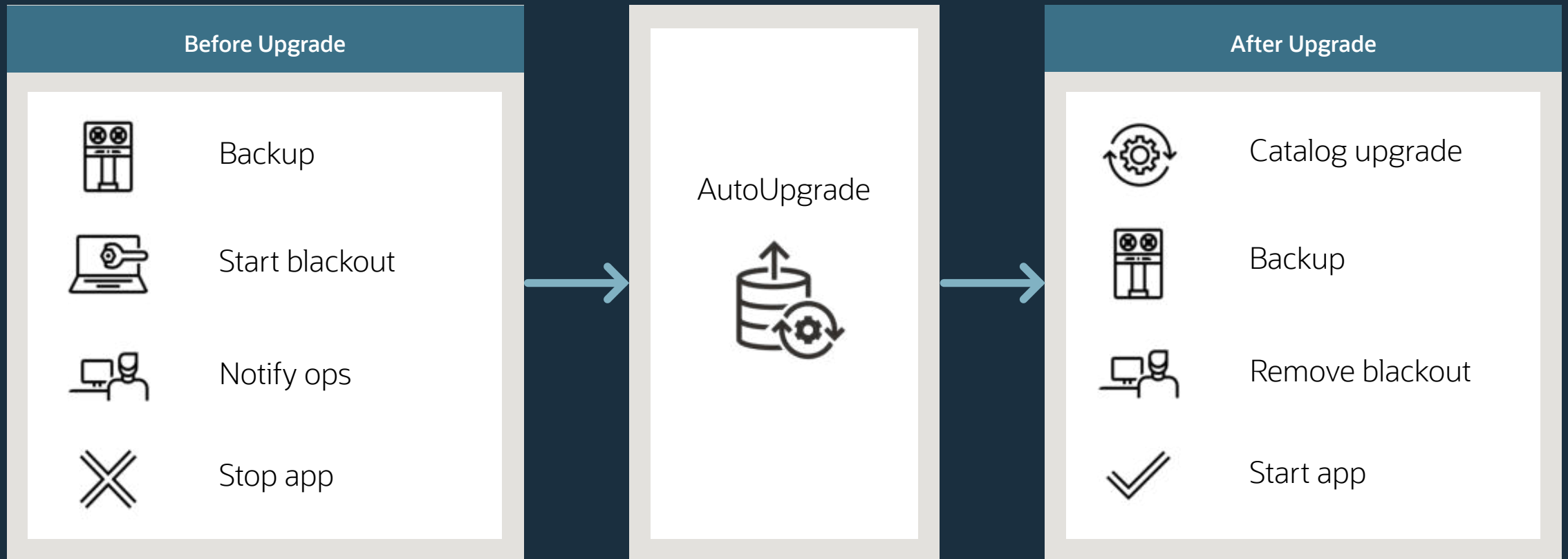
Customize workflow  
Own scripts  
Turbo-boost automation

# Upgrade of the database is just a part of the show

Run your own script before and after the upgrade

# Scripts

Examples of upgrade related activities



# Scripts | Syntax

- To run a script before and after *deploy*:

```
$ cat DB.cfg

...
upg1.before_action=/home/oracle/scripts/DB/before.sh
upg1.after_action=/home/oracle/scripts/DB/after.sh
```

- Optionally, halt on non-zero exit code
- Run on all or one database
- Similar parameters available for before and after restoration



# AutoUpgrade

Fleet Scale

RAC

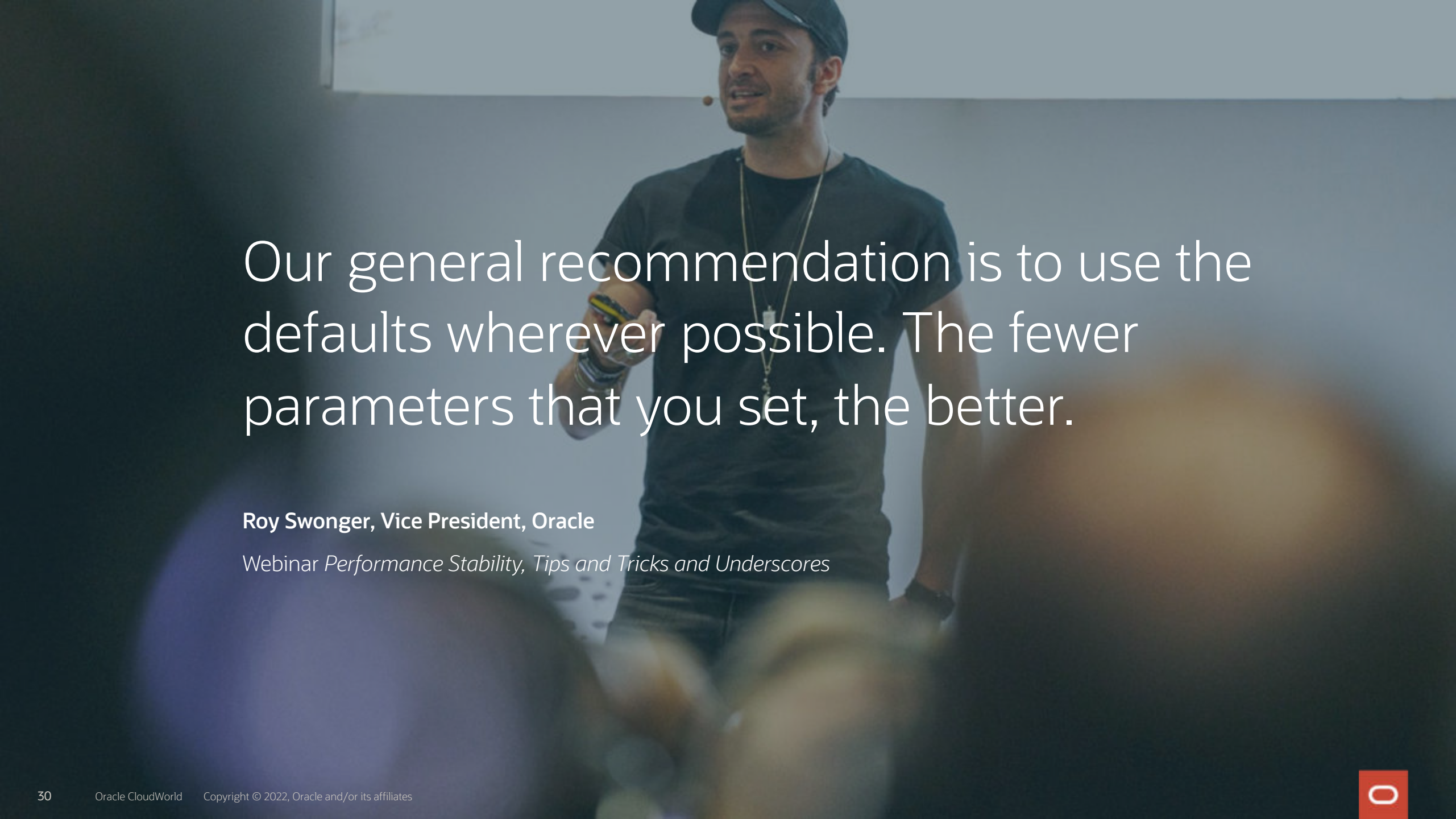
## Parameters

Change initialization parameters  
Remove underscores  
Compatible

Data Guard

Scripts

Encryption

A man wearing a black t-shirt, a black cap, and a lanyard is speaking into a microphone. He is holding a small object in his right hand. The background is a blurred audience.

Our general recommendation is to use the defaults wherever possible. The fewer parameters that you set, the better.

**Roy Swonger, Vice President, Oracle**

*Webinar Performance Stability, Tips and Tricks and Underscores*

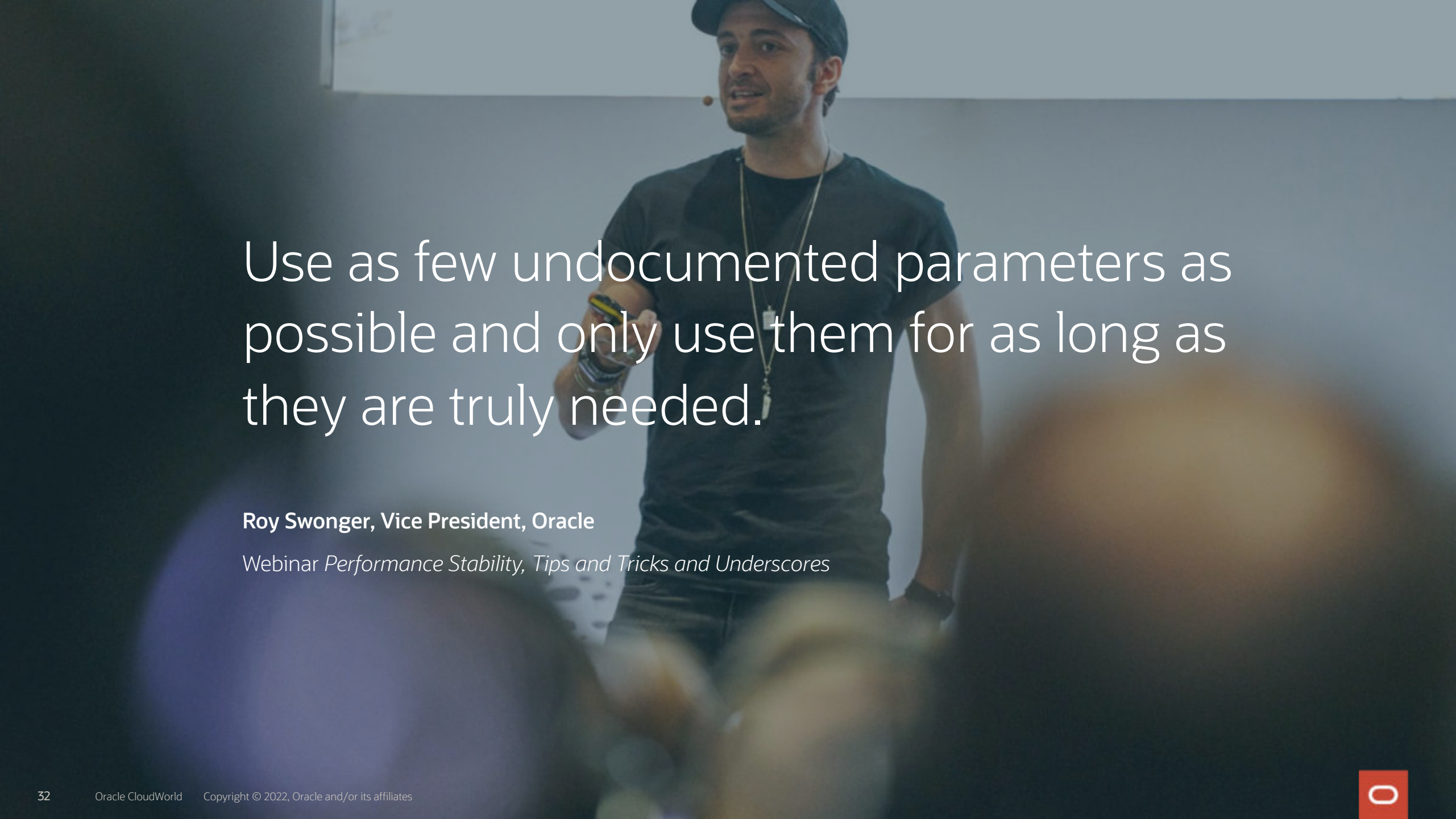
# Parameters

- To add or remove parameters after the upgrade

```
$ cat DB.cfg

...
upg1.add_after_upgrade_pfile=/home/oracle/DB/parm_to_add
upg1.del_after_upgrade_pfile=/home/oracle/DB/parm_to_remove
```

- Parameters can be added and remove during upgrade as well

A man with a beard and a black cap is speaking at a conference. He is wearing a black t-shirt and a lanyard. He is holding a small object in his right hand. The background is a blurred audience.

Use as few undocumented parameters as possible and only use them for as long as they are truly needed.

**Roy Swonger, Vice President, Oracle**

*Webinar Performance Stability, Tips and Tricks and Underscores*

# Parameters | Underscores

- To remove all underscore parameters

```
$ cat DB.cfg  
  
...  
upg1.remove_underscore_parameters=yes
```

- The default value is no
- To remove underscore parameters during upgrade only, use `del_during_upgrade_pfile`
- To remove events, use `del_during_upgrade_pfile` and `del_after_upgrade_pfile`



# Compatible

## Recommendation

Change `compatible`  
1-2 weeks after an upgrade

## AutoUpgrade

By default, does not  
raise `compatible`  
as part of an upgrade

## Downtime

A database restart is needed  
to raise `compatible`

# Parameters | Underscores

- To raise `compatible` following an upgrade:

```
$ cat DB.cfg  
  
...  
upg1.raise_compatible=yes  
upg1.drop_grp_after_upgrade=yes
```

- The default value is `no`
- `compatible` is raised only after a successful upgrade
- Always set to the default value of a given release

```
SQL> alter system set compatible='19.0.0' scope=spfile;
```

# AutoUpgrade

Fleet Scale

RAC

Parameters

Data Guard

Scripts

**Encryption**

Fully supported

TDE Tablespace Encryption

Dedicated keystore





Upgrading and converting  
encrypted databases are fully supported



# Encryption

- Certain database operations require passwords or secrets

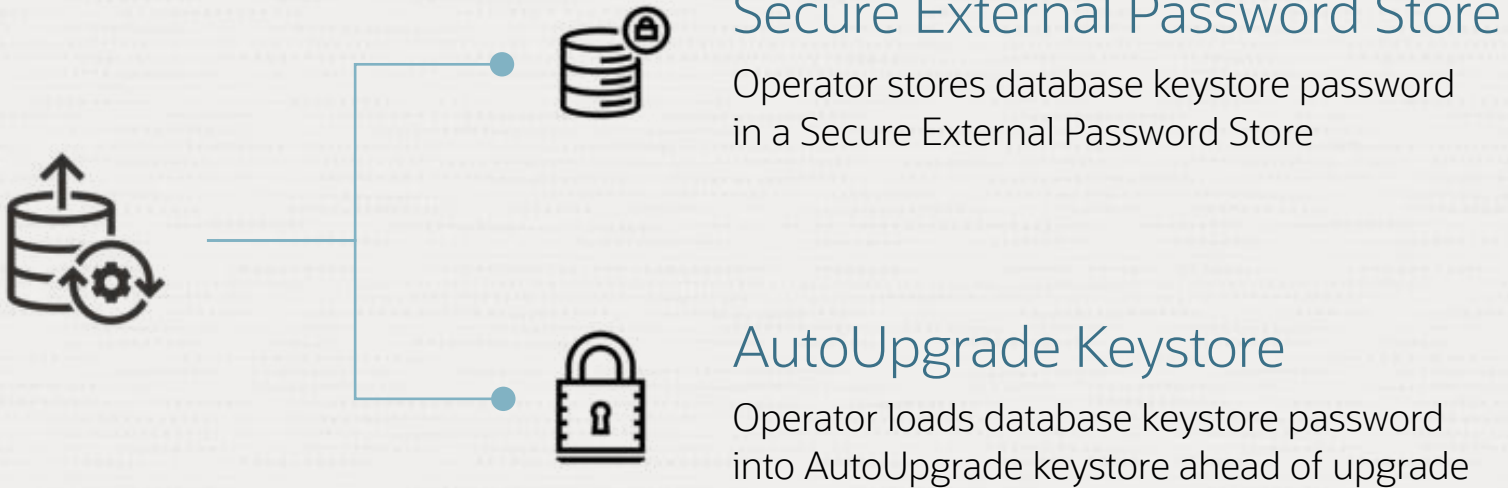
```
CREATE PLUGGABLE DATABASE ... KEYSTORE IDENTIFIED BY <password>
```

```
ALTER PLUGGABLE DATABASE ... UNPLUG INTO ... ENCRYPT USING <secret>
```

```
CREATE PLUGGABLE DATABASE ... DECRYPT USING <secret>
```

```
ADMINISTER KEY MANAGEMENT ... KEYSTORE IDENTIFIED BY <password>
```

# Encryption



# Encryption | Configuration

- To configure an AutoUpgrade keystore

```
$ cat DB12.cfg  
  
...  
global.keystore=/etc/oracle/keystores/autoupgrade/DB12  
  
$ ls -l /etc/oracle/keystores/autoupgrade/DB12  
  
-rw-----. 1 oracle dba 720 Mar 28 14:56 ewallet.p12
```

# Encryption | Analysis

- Analyze the PDB for upgrade readiness

```
$ java -jar autoupgrade.jar -config PDB1.cfg -mode analyze
```

- Summary report will show which keystore passwords are needed:

## REQUIRED ACTIONS

=====

1. Perform the specified action ...

ORACLE\_SID

Action Required

-----

-----

CDB1

Add TDE password

CDB2

Add TDE password



# DEMO

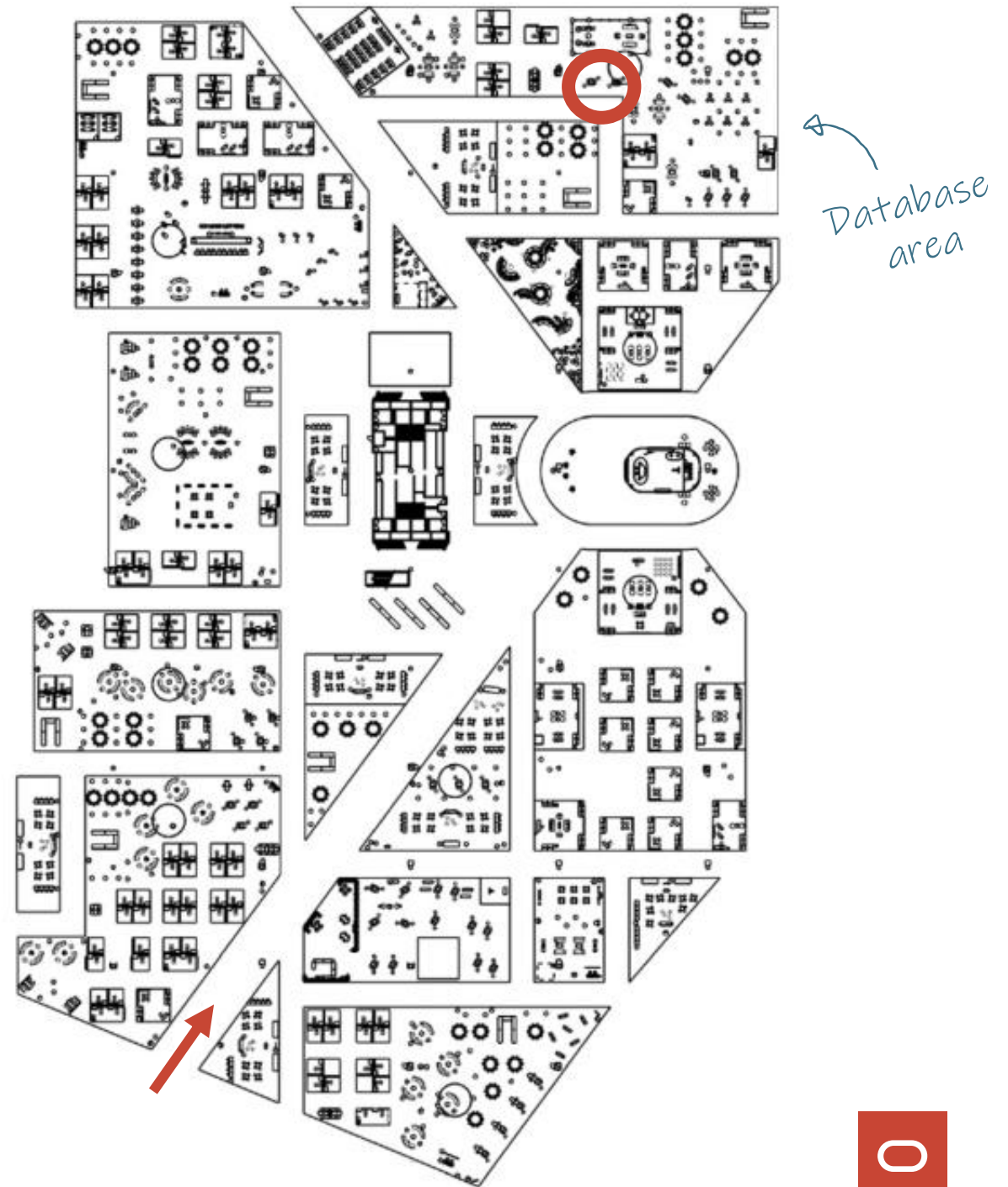


# Visit our **DEMO BOOTH**

## **DB-18**

Oracle CloudWorld Hub

Tuesday	13-19
Wednesday	08-18
Thursday	08-14



## Hitchhiker's Guide for Upgrading to Oracle Database 19c

HOL3999      Wednesday 09:00      Titian 2201A, The Venetian, Level 2

## From SR to Patch - Insider Insights into the Oracle Database Development Process

LRN1506      Wednesday 15:45      Murano 3202, The Venetian, Level 3

## No Slide Zone - Database Patching Insights

HOL4093      Thursday 09:00      Bellini 2001A , The Venetian, Level 2

HOL4093      Thursday 11:00      Bellini 2001A , The Venetian, Level 2

## Oracle Data Pump Deep Dive with Development

LRN3501      Thursday 11:30      Murano 3202, The Venetian, Level 3

## AutoUpgrade 2.0: Internals and New Features

LRN3500      Thursday 13:15      Murano 3202, The Venetian, Level 3

## Cloud Premigration Advisor Tool - Your Cloud Premigration Advisor

LIT4104      Thursday 13:40      Ascend Lounge, CloudWorld Hub, The Venetian





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CloudWorld

Thank you

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