



Oracle Database Upgrade Fallback Strategies In Action

Roy Swonger
Vice President
Database Upgrade and Utilities
Oracle Corporation

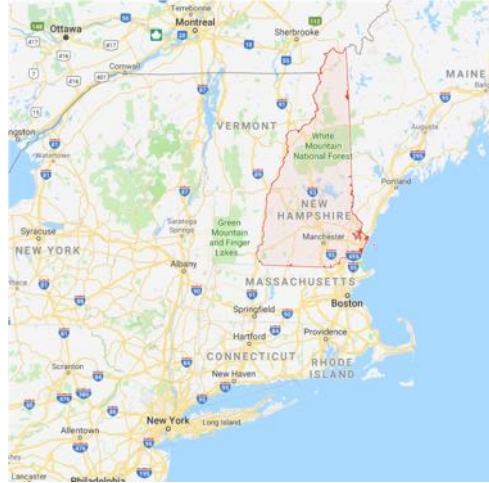


Updated: 5-MAY-2019

ORACLE®

Copyright © 2019, Oracle and/or its affiliates. All rights reserved. | Upgrade / Migrate / Consolidate to Oracle 19c

Photo by [DJ Johnson](#) on [Unsplash](#)



Roy F. Swonger

Vice President

Oracle Database Upgrade and Utilities



[RoyFSwonger](https://twitter.com/RoyFSwonger)

Slides and more | <https://MikeDietrichDE.com>

Upgrade your Database – NOW!

Mike Dietrich's Blog About Oracle Database Upgrades... Mostly



Slides Download Center

Share this:



*** Click on the pictures get to the download page for each slide deck ***

- Current and Comprehensive Slide Decks
- AOUG - Austrian User Group Conference 2018
- RMOUG, DOUG, OUGN, Ireland OUG, Meetup Paris 2018

Recent Posts

- Patching Oracle Database 18.1.0 to 18.2.0 on premise June 21, 2018
- Installing Oracle Database 19c June 20, 2018
- Deinstalling Oracle Database 12.2.0.1 June 19, 2018
- Upgrade Oracle 12.2.0.1 to Oracle Database 19c on premise June 18,



A photograph of a firefighter on a tall metal ladder, spraying a powerful stream of water into a large, dark fire. The scene is dramatic, with thick smoke and bright flames in the background. The firefighter is silhouetted against the fire, and the water jets create a stark contrast with the dark smoke.

Fallback Strategies

Live in Action

ORACLE®

Copyright © 2019, Oracle and/or its affiliates. All rights reserved. | Upgrade / Migrate / Consolidate to Oracle 19c

Photo by [Hermes Rivera](#) on [Unsplash](#)

Considerations

Fallback Introduction

Photo by [asoggetti](#) on [Unsplash](#)

ORACLE®

Considerations

- Service Level Agreements



- COMPATIBLE Change?



Fallback Strategy | COMPATIBLE



- Recommendation:
 - Update COMPATIBLE **7-10 days** after upgrade
- Why wait?
 - Allows fallback options: downgrade, flashback
- Why change?
 - Enable new features (e.g. online datafile move, sharding etc)
 - Minimum COMPATIBLE for 18c is 11.0.0
 - COMPATIBLE is independent of OPTIMIZER_FEATURES_ENABLE
- How?
 - `alter system set compatible='19.0.0' scope=spfile;`



Fallback Strategy | COMPATIBLE



- When should you change COMPATIBLE?
 - <https://mikedietchde.com/2019/04/17/when-and-how-should-you-change-compatible/>

When and how should you change COMPATIBLE?

Posted on April 17, 2019 by Mike Dietrich



COMPATIBLE is an almost *mystic* parameter. It has a default setting for each release. But if you try to find more information what it *really* does, you won't be very happy. And in reply to my previous blog post about whether you need to change COMPATIBLE when you apply an RU, I received the following question: **When and how should you change COMPATIBLE?**

- Should you change COMPATIBLE when you apply an RU?
 - <https://mikedietchde.com/2019/04/10/should-you-change-compatible-when-you-apply-an-ru/>

Should you change COMPATIBLE when you apply an RU?

Posted on April 10, 2019 by Mike Dietrich

I have a million ideas for blog posts. But I like it even more when people ask me to explain something on the blog which isn't there yet but may be interesting for others as well. And Robert Ortel mailed me the other day and asked if he should change COMPATIBLE when he applies an RU for Oracle 18c. That's a good question. And I doubt that the documentation has a good recommendation.

Should you change COMPATIBLE when you apply an RU?

No.



That's a short blog post this time, isn't it? 🙄 But honestly, you shouldn't touch COMPATIBLE for several reasons. Reason no.1 is that a Release Update (RU) or an Release Update Revisions (RUR - the ones you shouldn't use) don't include new features.

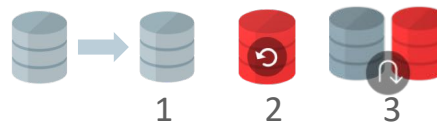
Fallback Strategy | Install and Patching

Update in Place

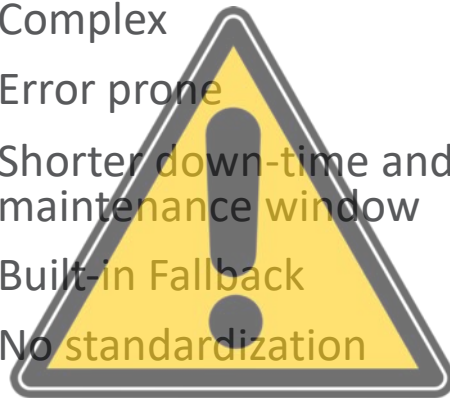


- Complex
- Error prone
- Longest down-time and maintenance window
- No fallback
- No standardization

Clone, Update and Switch



- Complex
- Error prone
- Shorter down-time and maintenance window
- Built-in Fallback
- No standardization



Deploy Gold Image, Switch



- Build gold image once, use everywhere
- Fewest steps, simplest process
- Shorter down-time and maintenance window
- Built-in Fallback
- Built-in standardization




Database Upgrade Blog | **Fallback Exercises**

- <https://MikeDietrichDE.com/hands-on-lab/hol-18c-fallback-strategies/>

Upgrade your Database – NOW!

Mike Dietrich's Blog About Oracle Database Upgrades... Mostly



Blog Slides Hands-On Lab Events Papers / Docs Videos Scripts Links Oracle Documentation Privacy Policy About

HOL 18c – Fallback Strategies

In the **Fallback Strategies** part of our Hands-On Lab you will explore different Fallback Strategies. For this exercise you will use the FTEx database, an Oracle 11.2.0.4 database.

We divide the Fallback Strategies for database upgrades basically in two areas:

- Protection for issues during upgrade
- Protection for issues after upgrade

In each section you will be able to try two different fallback techniques.

Generally it is very important to take some considerations.


Considerations

Blog Slides Hands-On Lab Events Papers / Docs Videos Scripts Links Oracle Documentation Privacy Policy About

HOL 18c – Fallback – Issues During Upgrade

Protection for issues during upgrade

In this part you'll use two techniques to protect your database for issues happening during the upgrade. Or simply, if you'd like to test multiple times.



You will evaluate two options: Partial Offline Backups and Guaranteed Restore Points.

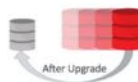
- **Partial Offline Backup**
 - Solution:
 - Restore partial offline Backup
- **Guaranteed Restore Point**
 - Solution:
 - Flashback to GRP

Blog Slides Hands-On Lab Events Papers / Docs Videos Scripts Links Oracle Documentation Privacy Policy About

HOL 18c – Fallback – Issues After Upgrade

Protection for issues after upgrade

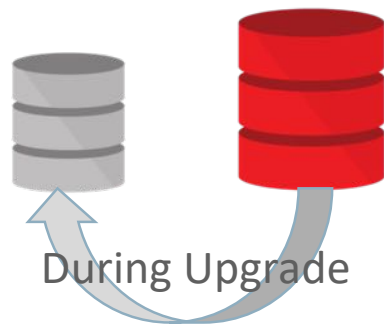
In this part you'll use again two techniques to protect your database, but this time for issues happening after the upgrade. You can call this also "Downgrade".



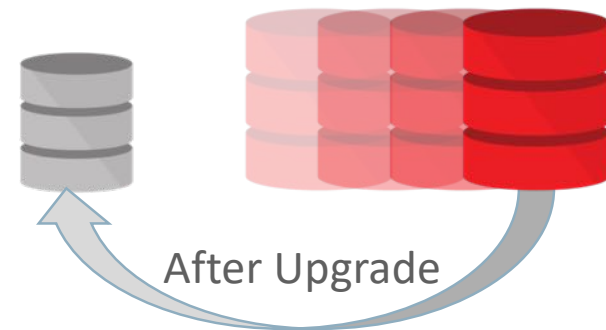
1. Downgrade with a Full Database Export and Import

Protection

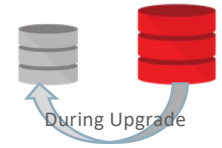
- Issues **during** upgrade



- Issues **after** upgrade



Fallback Strategy | Issues **during** upgrade



- **Online Backup**

- Solution:
 - Restore online backup
- Recommendation:
 - Mandatory strategy



- **Partial Offline Backup**

- Solution:
 - Restore partial offline Backup
- Recommendation:
 - Only for VLDBs and databases in NOARCHIVELOG mode
 - For Standard Edition DBs



- **Guaranteed Restore Point**

- Solution:
 - Flashback to GRP
- Recommendation:
 - Very fast, simply - but EE only



Fallback | Online Backup

- Strategy: Restore a backup and recover

- Complete online backup (RMAN)

- Please verify:

- Where is your backup located? Tapes, HD, off site...
 - Does the restore work?
 - How long will the restore take?
 - How long will the recovery take?

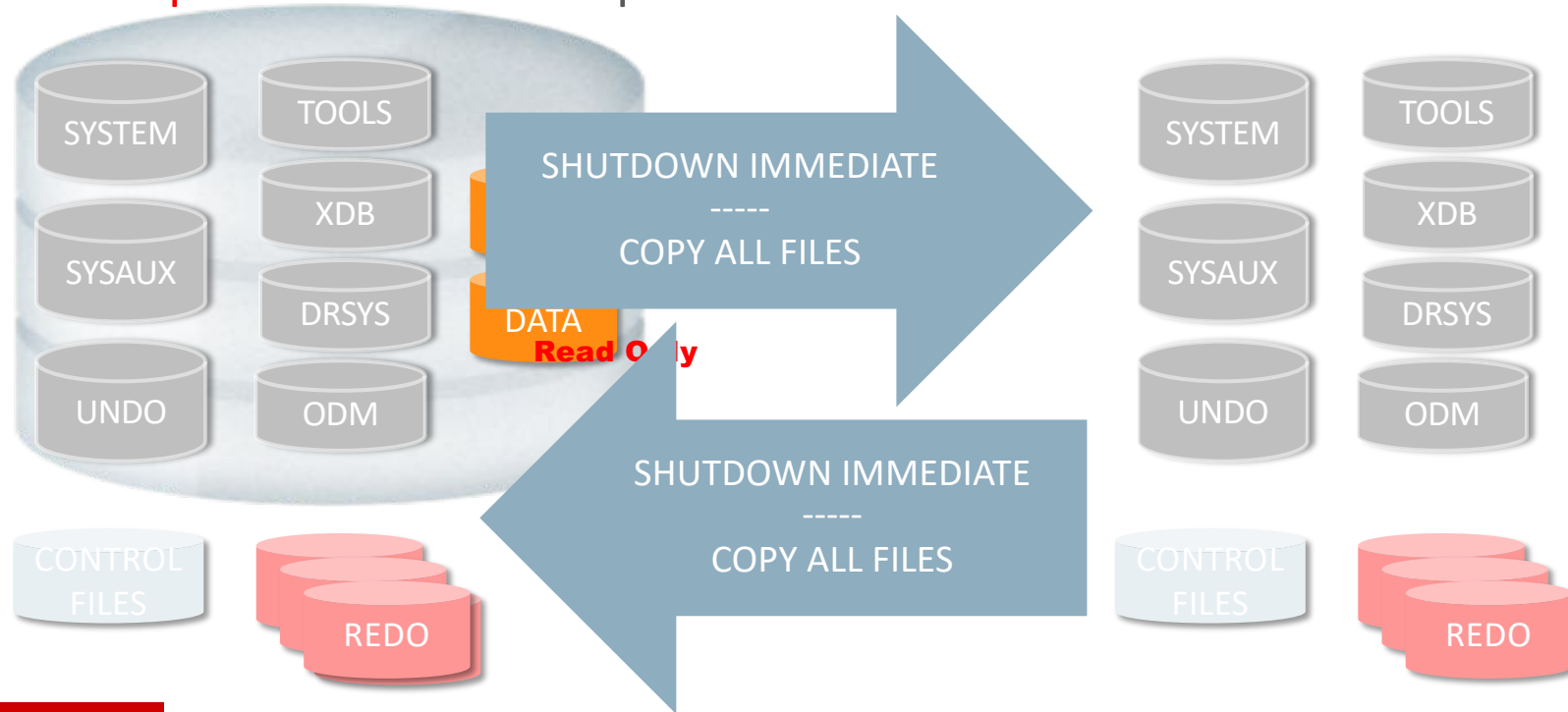


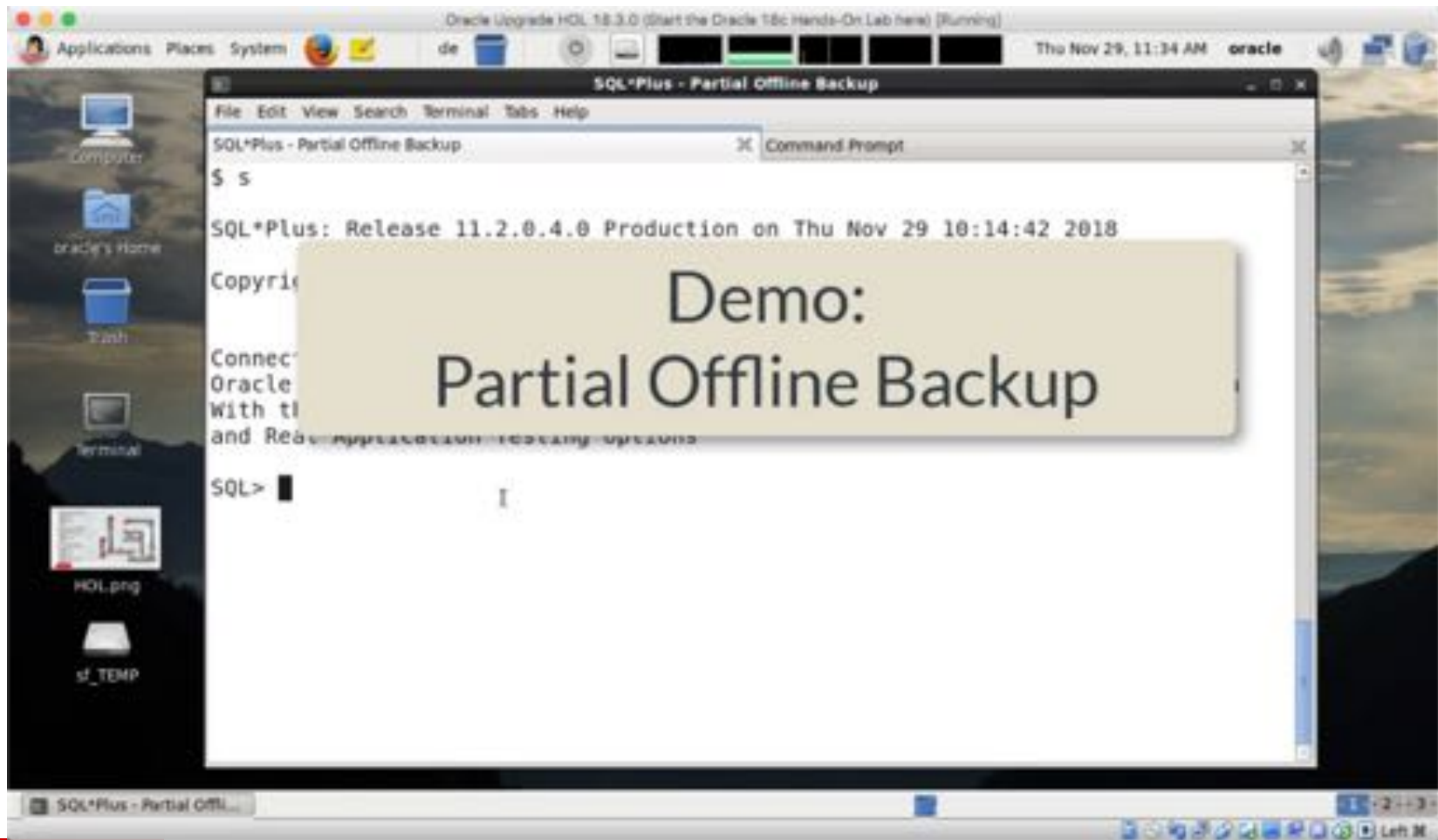
- Recommendation:

- Have a valid online backup in any case – **and test the restore/recovery!!!**

Fallback | Offline Backup


- Restore a **partial** offline backup

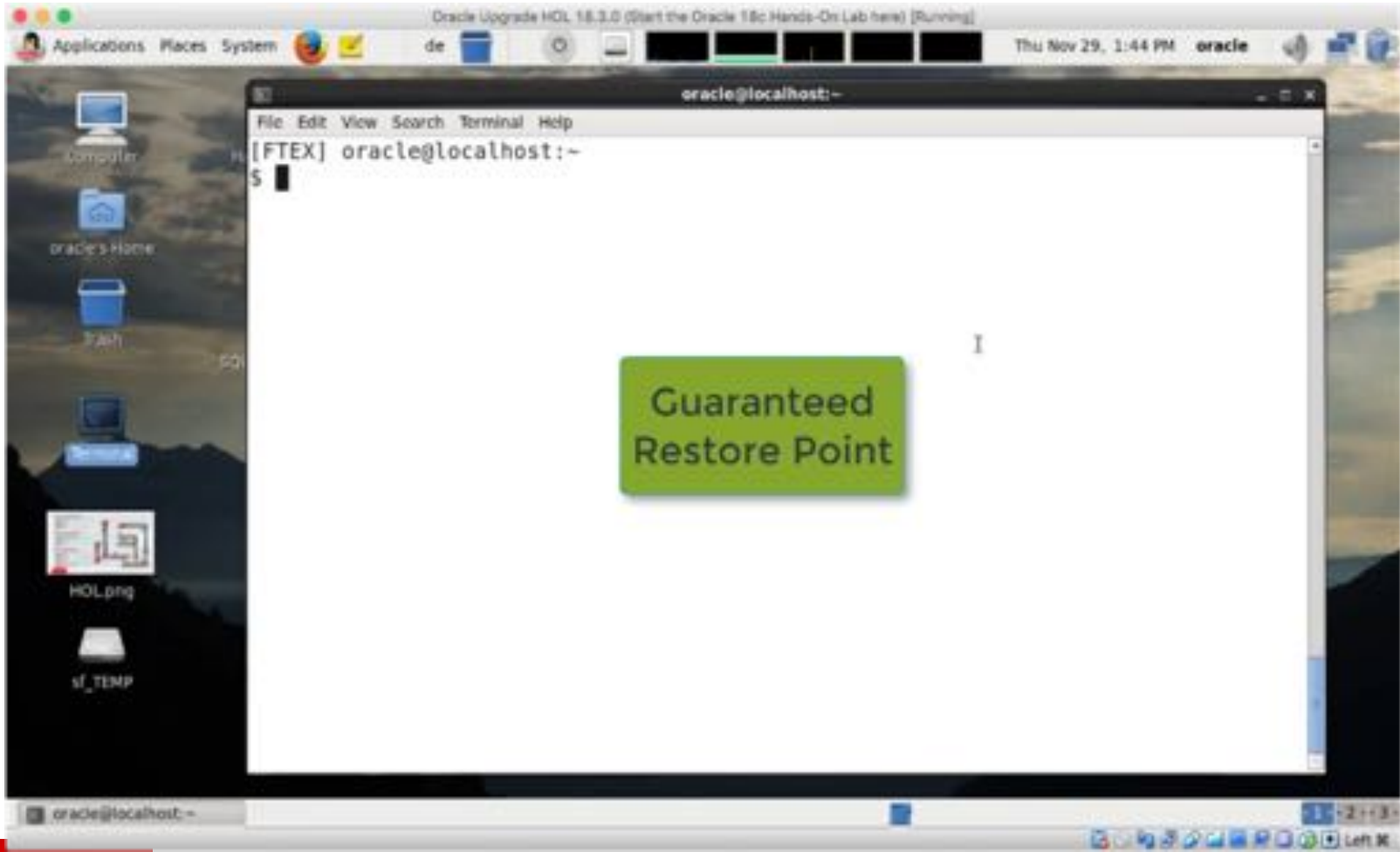




Fallback | Guaranteed Restore Point

- **COMPATIBLE** must not be changed

Pre Upgrade Environment	Post Upgrade Environment
<pre>CREATE RESTORE POINT grpt GUARANTEE FLASHBACK DATABASE;</pre>	
	
	<pre>SHUTDOWN IMMEDIATE STARTUP MOUNT; FLASHBACK DATABASE TO RESTORE POINT grpt; SHUTDOWN IMMEDIATE</pre>
<pre>STARTUP MOUNT;</pre>	
<pre>ALTER DATABASE OPEN RESETLOGS;</pre>	
<pre>DROP RESTORE POINT grpt;</pre>	



Fallback Strategy | Issues **after** upgrade



- **Data Pump**

- Solution:
 - Reimport data
- Recommendation:
 - Simple but potentially slow



- **Oracle GoldenGate**

- Solution:
 - Apply changes to previous system
- Recommendation:
 - Fastest and best solution



- **Downgrade**

- COMPATIBLE change: **No**
- Solution:
 - Run the downgrade scripts
- Recommendation:
 - Fast and easy



Fallback | Data Pump

- Downgrade with `expdp/impdp`
- [MOS Note:553337.1](#)
 - Prepare an empty database for the import “just in case”
 - Then:
 - Run `expdp` from the 12.1 database home with the `VERSION` parameter equal to the target database `COMPATIBLE` setting
 - Import using `impdp` from the target database home
 - `NETWORK_LINK` can be used for downgrades as well

Overview of Data Pump dumpfile compatibility.

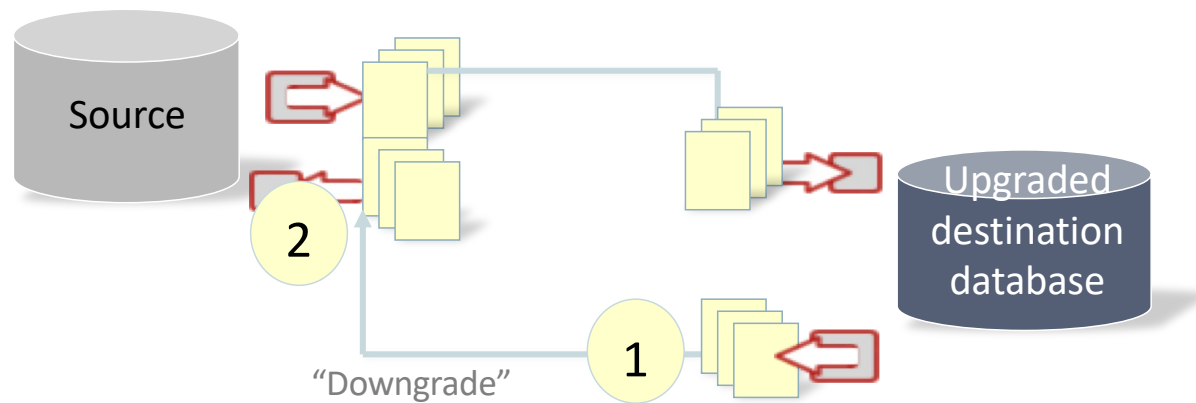
Export From Source Database With	Use Export Data Pump parameter VERSION=... if dumpfile needs to be imported into a Target Database with compatibility level (value of init.ora/spfile parameter COMPATIBLE):					
COMPATIBLE	10.1.0.x.y	10.2.0.x.y	11.1.0.x.y	11.2.0.x.y	12.1.0.x.y	12.2.0.x.y
10.1.0.x.y	-	-	-	-	-	-
10.2.0.x.y	VERSION=10.1	-	-	-	-	-
11.1.0.x.y	VERSION=10.1	VERSION=10.2	-	-	-	-
11.2.0.x.y	VERSION=10.1	VERSION=10.2	VERSION=11.1	-	-	-
12.1.0.x.y	VERSION=10.1	VERSION=10.2	VERSION=11.1	VERSION=11.2	-	-
12.2.0.x.y	VERSION=10.1	VERSION=10.2	VERSION=11.1	VERSION=11.2	VERSION=12.1	-

Fallback | Data Pump



Fallback | GoldenGate

- Downgrade with Oracle GoldenGate
 - Version/platform independent





Fallback | Database Downgrade

- Downgrade with `catdwgrd.sql`
- Resources:
 - Upgrade Guide – Downgrading a database to an earlier release:
<https://docs.oracle.com/en/database/oracle/oracle-database/18/upgrd/downgrading-oracle-db-after-upgrade.html>
 - MOS Notes about downgrade:
 - Oracle DB 18c - How to Downgrade a 18c Non CDB Database to Previous Release ([Doc ID 2416661.1](#))
 - Oracle 18c - How to Downgrade a Single Pluggable Oracle Database (PDB) from 18c Database to previous release ([Doc ID 2421060.1](#))
- Downgrade possible to:
 - Oracle 11.2.0.4 and up (for non-CDB) and Oracle 12.1.0.2 and up (CDB/PDB)
- **Do not change** COMPATIBLE

Fallback | Database Downgrade

- Basic steps to downgrade with `catdwgrd.sql`
 - In Oracle Database 18c environment:

```
SQL> SPOOL /tmp/downgrade.log
SQL> STARTUP DOWNGRADE
SQL> @catdwgrd.sql
SQL> SHUTDOWN IMMEDIATE
SQL> SPOOL OFF
```

- In Oracle Database 11.2.0.3 - 12.2.0.1 environment:

```
SQL> STARTUP UPGRADE
SQL> SPOOL /tmp/reload.log
SQL> @catrelod.sql
SQL> SPOOL OFF
```



ORACLE®

Copyright © 2019, Oracle and/or its affiliates. All rights reserved. |

Fallback | Grid Infrastructure Downgrade

- For details see:

<https://docs.oracle.com/en/database/oracle/oracle-database/18/cwlin/downgrading-oracle-grid-infrastructure-using-oui.html#GUID-2ED50A65-202C-48FA-9BAF-8E84ECEBCC58>

Downgrading Oracle Grid Infrastructure to 12c Release 2 (12.2) when Upgrade Fails



If upgrade of Oracle Grid Infrastructure fails before CVU post upgrade checks succeed, then you can run `gridSetup.sh` and downgrade Oracle Grid Infrastructure to the earlier release.

Run this procedure to downgrade Oracle Clusterware only when the upgrade fails before CVU post upgrade checks succeed.

1. From the later release Grid home, run `gridSetup.sh` in silent mode, to downgrade Oracle Clusterware:

```
$ /u01/app/18.0.0/grid/gridSetup.sh -silent -downgrade -nodes nodes_to_be_downgraded
-oldHome previous_release_grid_home_to_downgrade_to
-configmethod root | sudo [-sudopath path_to_sudo_program]
[-sudousername sudoer_name]
```

On Windows systems, run `gridSetup.bat` instead of `gridSetup.sh`.



Fallback is important

Never approach an upgrade or migration without **testing** your fallback options!

Photo by [Satyawan Narinedhat](#) on [Unsplash](#)

ORACLE®

Copyright © 2019, Oracle and/or its affiliates. All rights reserved. | Upgrade / Migrate / Consolidate to Oracle 19c

Slides and more | <https://MikeDietrichDE.com>

Upgrade your Database – NOW!

Mike Dietrich's Blog About Oracle Database Upgrades... Mostly



Slides Download Center

Share this:



*** Click on the pictures get to the download page for each slide deck ***

- Current and Comprehensive Slide Decks
- AOUG - Austrian User Group Conference 2018
- RMOUG, DOUG, OUGN, Ireland OUG, Meetup Paris 2018

Recent Posts

- Patching Oracle Database 18.1.0 to 18.2.0 on premise June 21, 2018
- Installing Oracle Database 19c June 20, 2018
- Deinstalling Oracle Database 12.2.0.1 June 19, 2018
- Upgrade Oracle 12.2.0.1 to Oracle Database 19c on premise June 18,




More Information | www.oracle.com/goto/upgrade

Products and Services / Database / Database Technologies /

Database Upgrades and Migrations

Database Technologies ▾ Database A-Z Downloads →



Upgrade and or Migrate Your Database

Upgrading your Oracle Database provides the latest in efficient, reliable, secure data management for mission-critical on-line transaction processing applications, query-intensive data warehouses, and cloud applications. With the right planning, preparation, and steps, the upgrade process will be simpler, faster, and more predictable from start to finish. Learn more about upgrading to Oracle Database 18c (& Oracle Database 12c) by exploring resources, documentation and more. Get an overview of various methods that may be used to upgrade Oracle Database.

[Learn more →](#)

Integrated Cloud

Applications & Platform Services

ORACLE®