Oracle Database Upgrade
Fallback Strategies In Action

GLOC
Great Lakes Oracle Conference

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Upgrade your Database – NOW!

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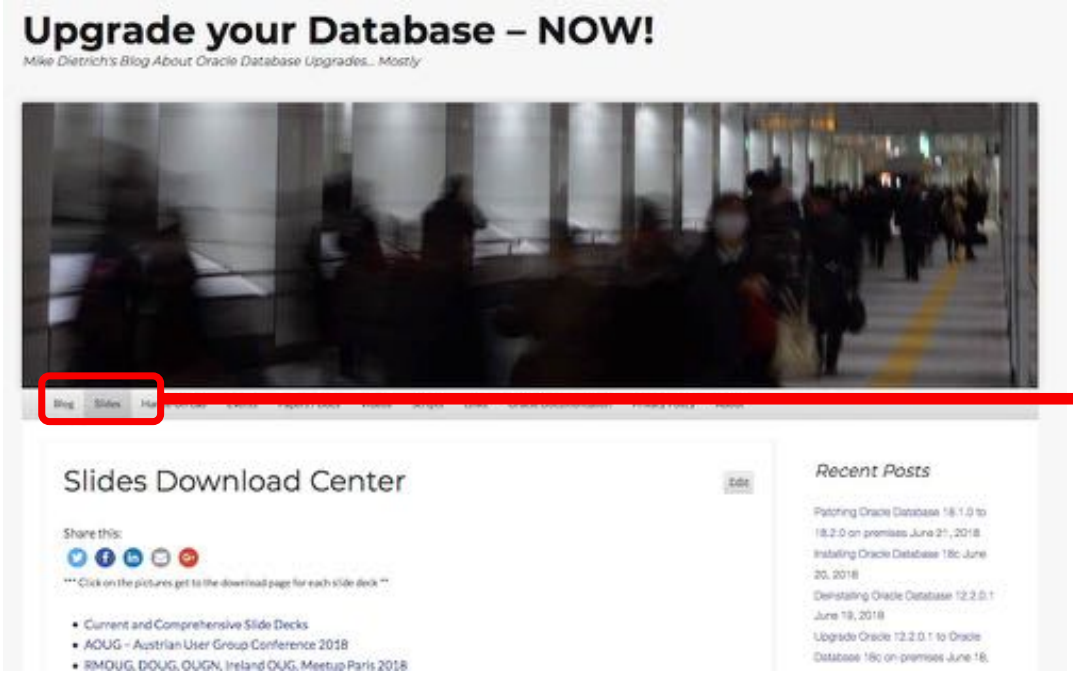
Slides and more | https://MikeDietrichDE.com



Fallback Strategies

Live in Action

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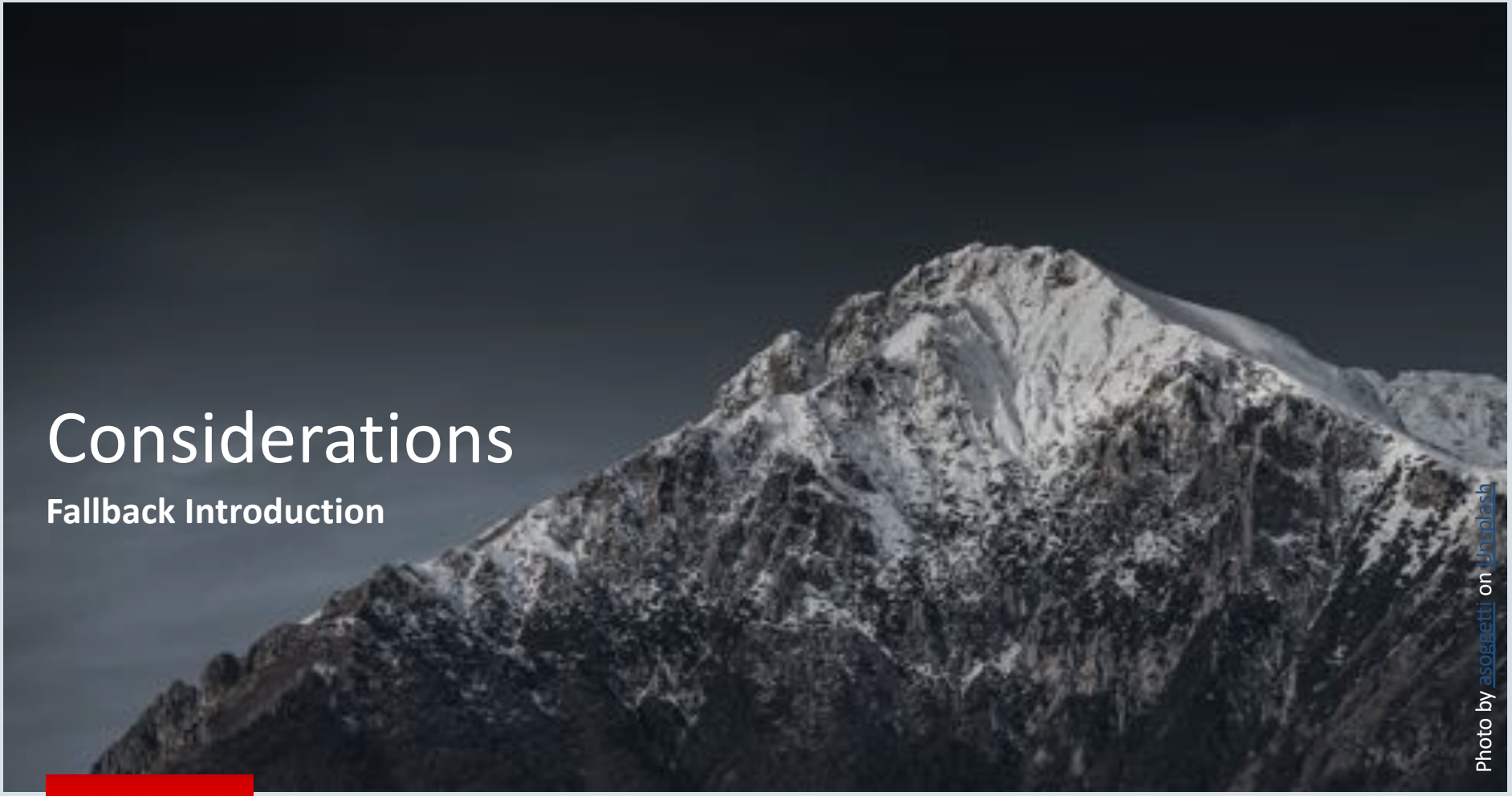

Considerations

Fallback Introduction

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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

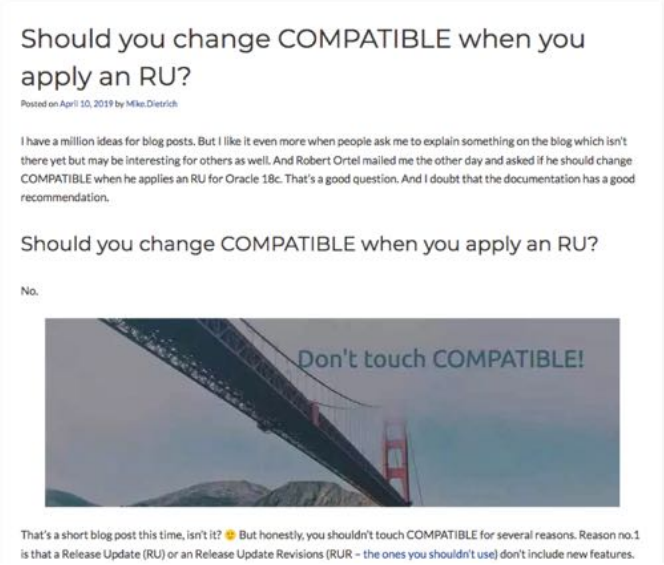
- When should you change COMPATIBLE?
  - https://mikedietrichde.com/2019/04/17/when-and-how-should-you-change-compatible/

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://mikedietrichde.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

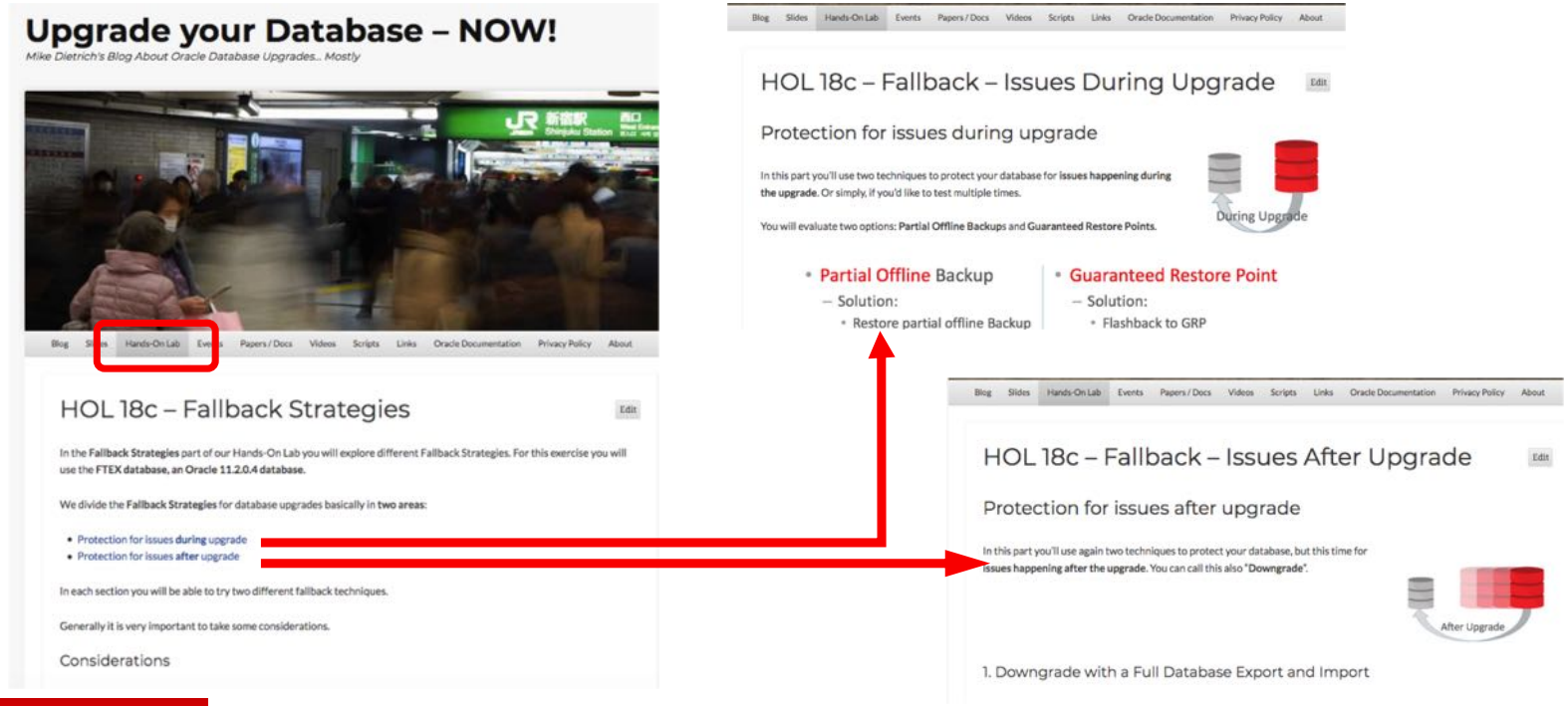
- Complex
- Error prone
- Shorter down-time and maintenance window
- Built-in Fallback
- No standardization

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

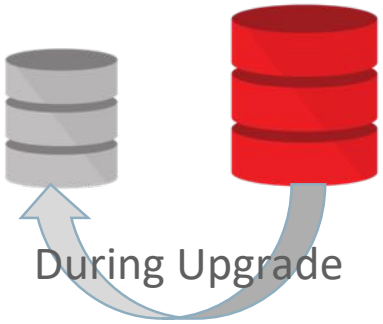
Database Upgrade Blog | Fallback Exercises

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



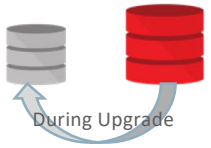
Protection

- 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

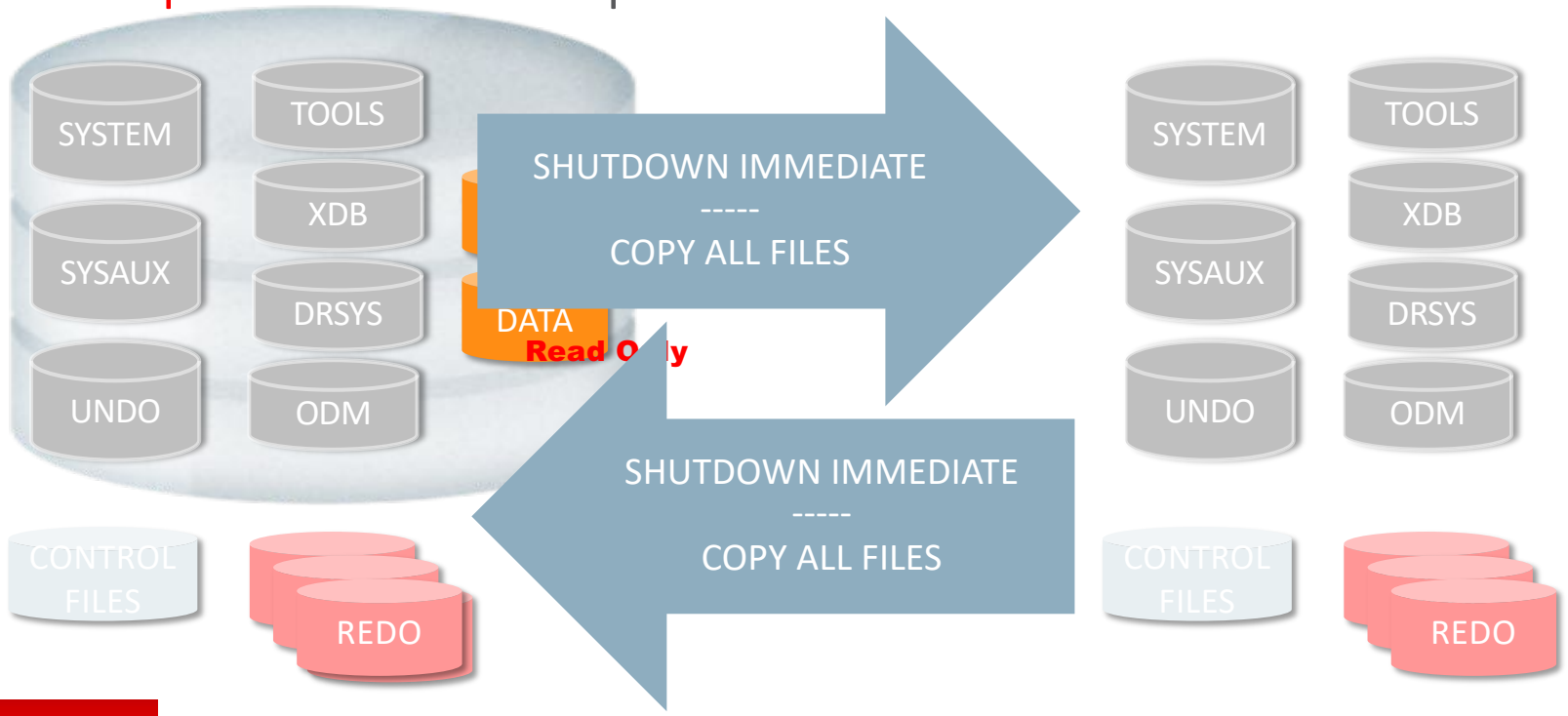
Fallback | Online Backup

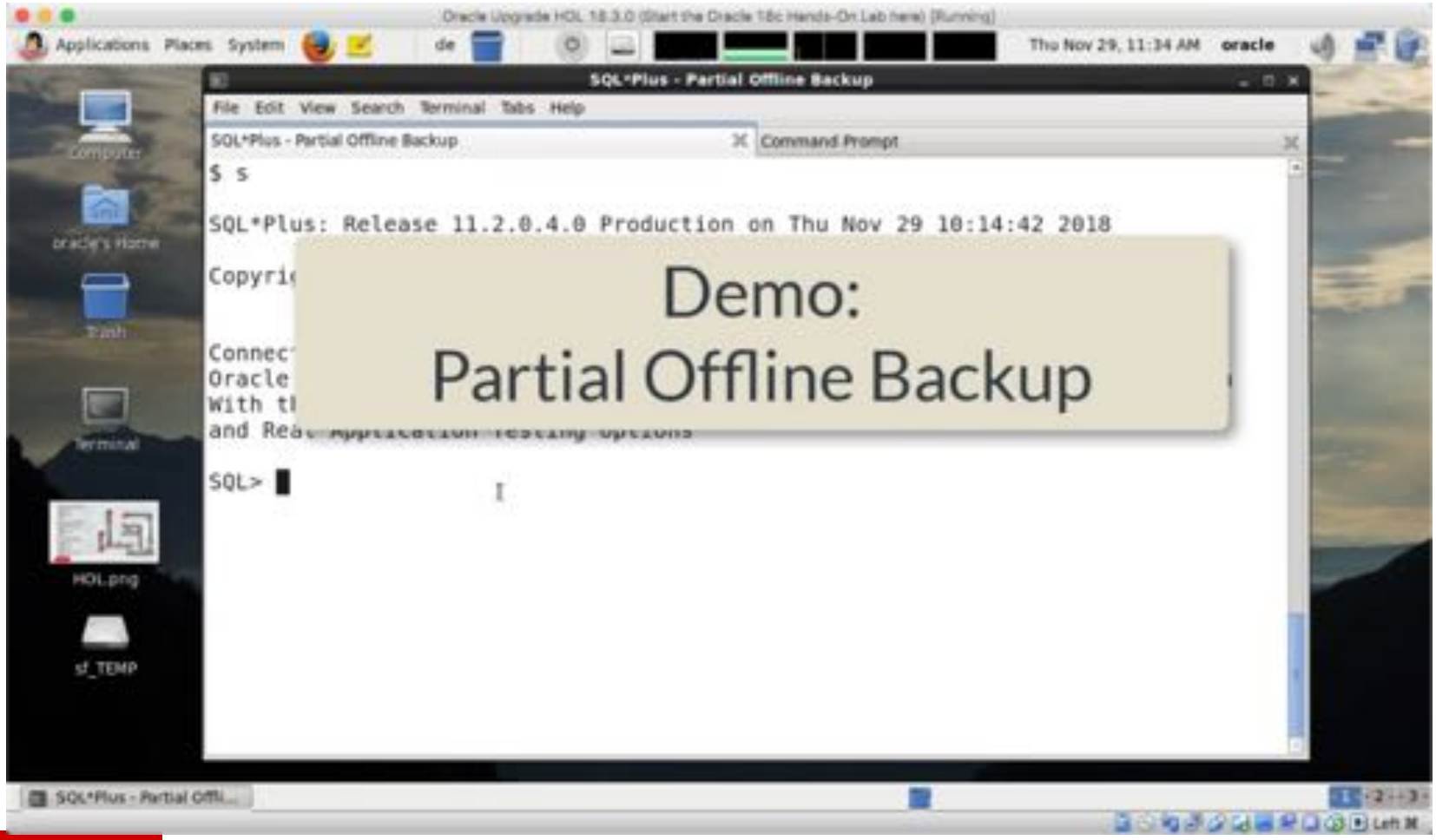
- Strategy: Restore a backup and recover
  - Complete online backup (RMAN)
  - Please verify:
    - Where is your backup located? Tapes, HD, off site...
    - Does the restore work?
    - How long will the restore take?
    - How long will the recovery take?

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

Fallback | Offline Backup

- Restore a partial offline backup

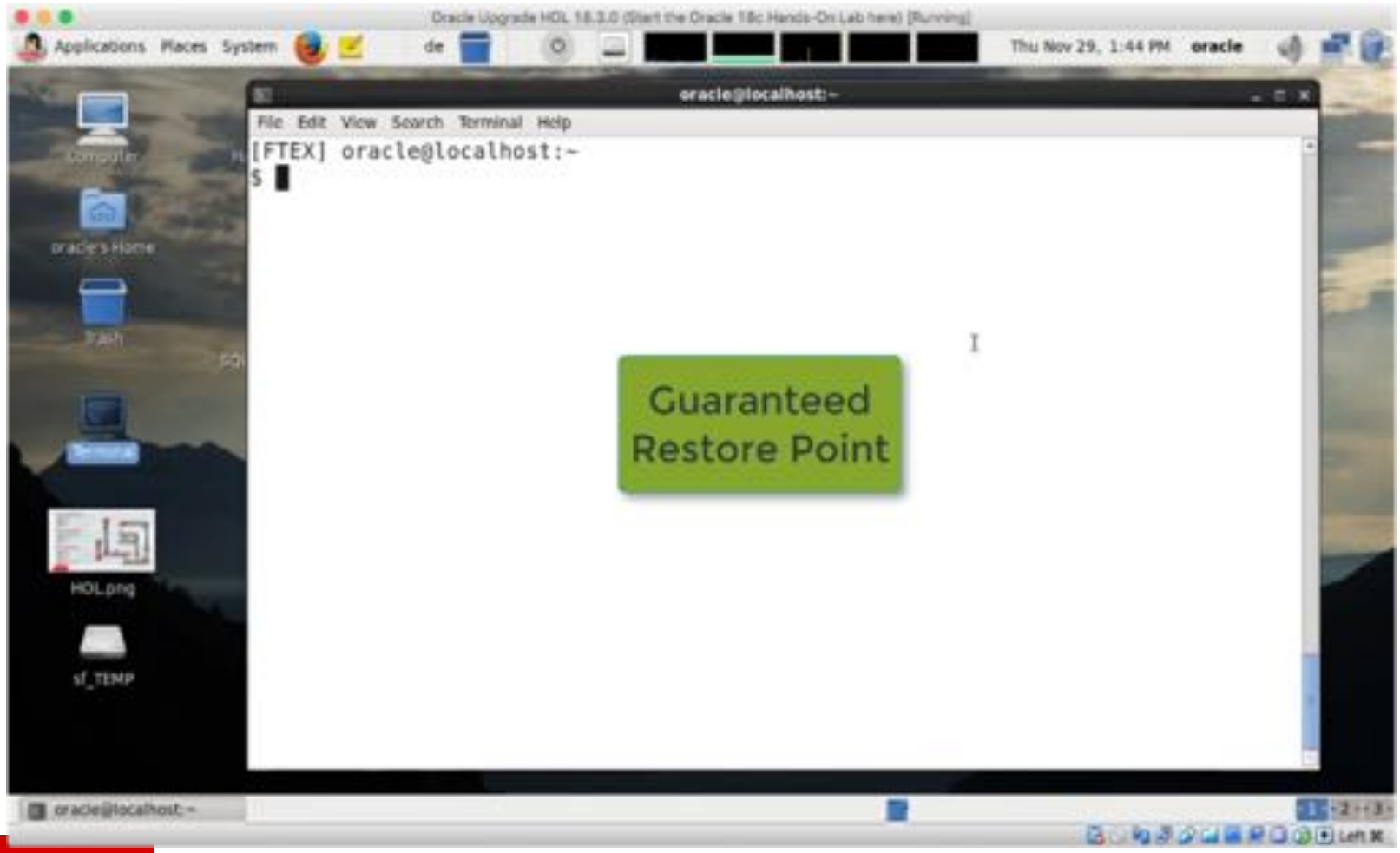




Fallback | Guaranteed Restore Point

- COMPATIBLE must not be changed

Pre Upgrade Environment	Post Upgrade Environment
CREATE RESTORE POINT **grpt** GUARANTEE FLASHBACK DATABASE;	
UPGRADE	
	SHUTDOWN IMMEDIATE
	STARTUP MOUNT;
	FLASHBACK DATABASE TO RESTORE POINT **grpt**;
	SHUTDOWN IMMEDIATE
STARTUP MOUNT;	
ALTER DATABASE OPEN RESETLOGS;	
DROP RESTORE POINT **grpt**;	



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

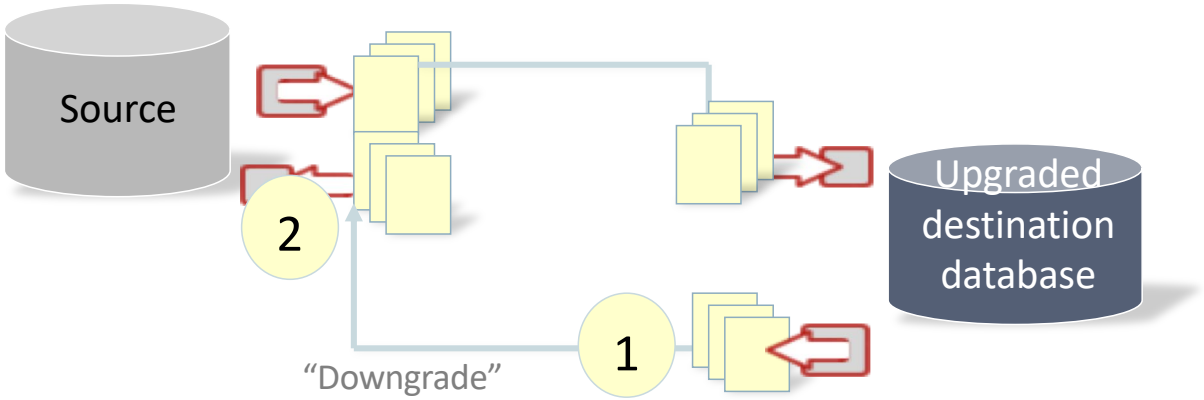
Overview of Data Pump dumpfile compatibility.

Export From Source Database With COMPATIBLE	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):					
	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:

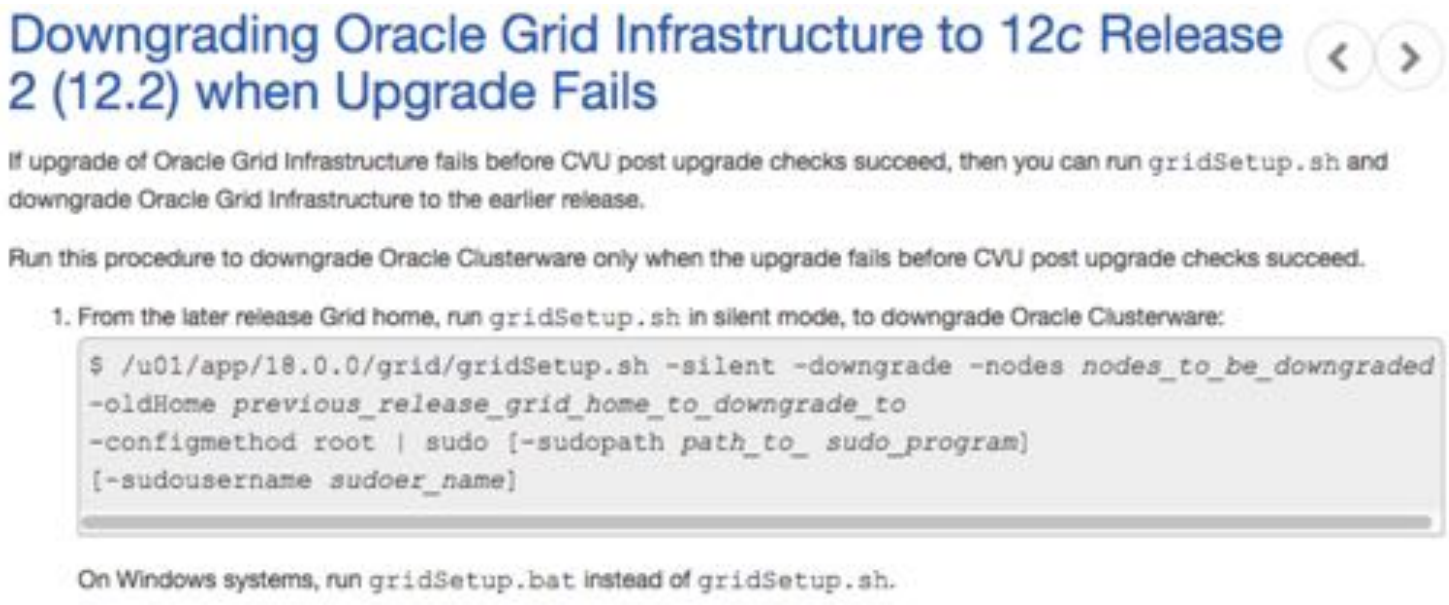
```
SQL> SPOOL /tmp/downgrade.log
SQL> STARTUP DOWNGRADE
SQL> @catdwgrd.sql
SQL> SHUTDOWN IMMEDIATE
SQL> SPOOL OFF
```

  - 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
```


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

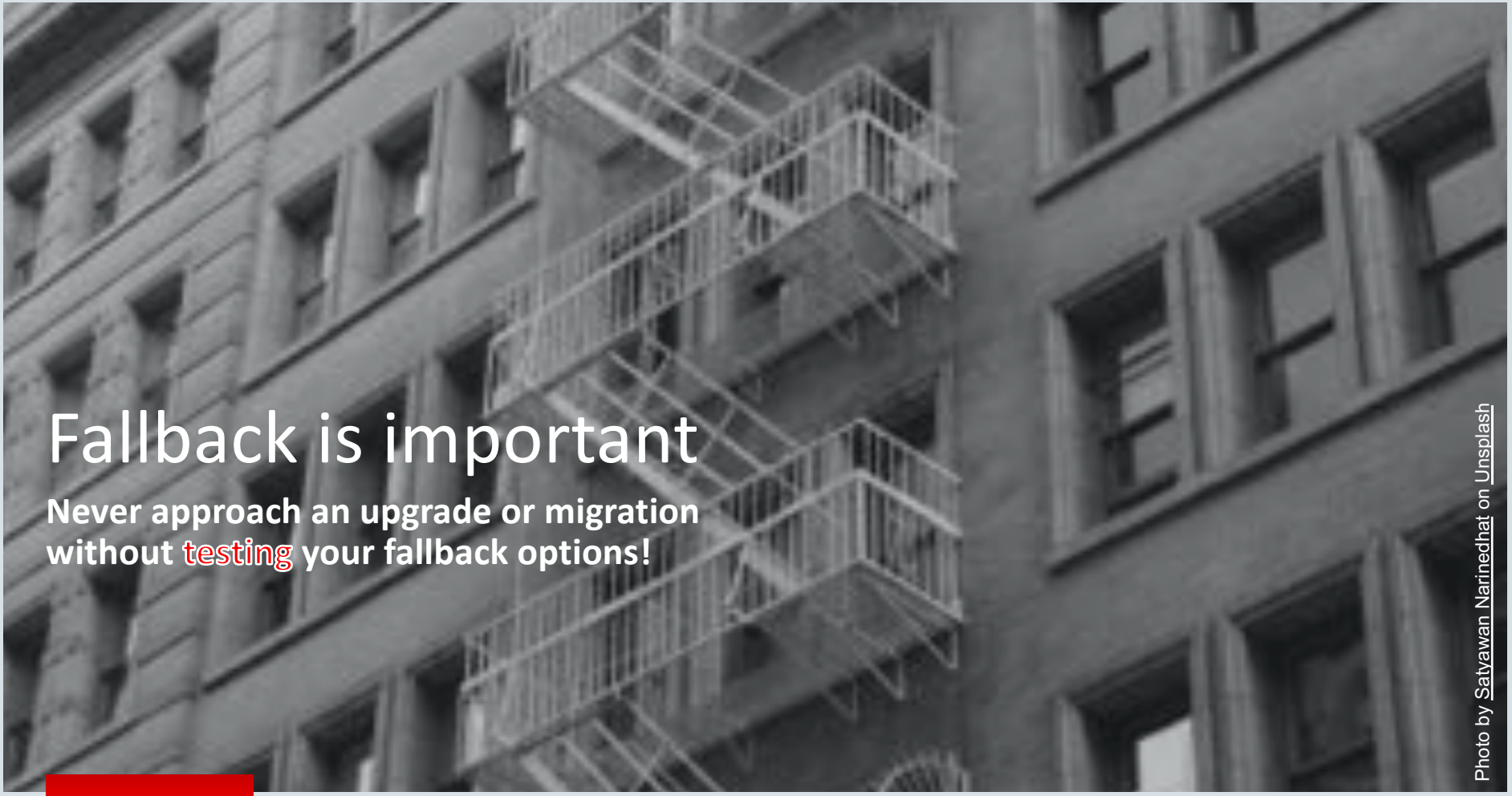
If upgrade of Oracle Grid Infrastructure fails before CVU post upgrade checks succeed, then you can run `gridSetup.sh` and downgrade Oracle Grid Infrastructure to the earlier release.

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`.



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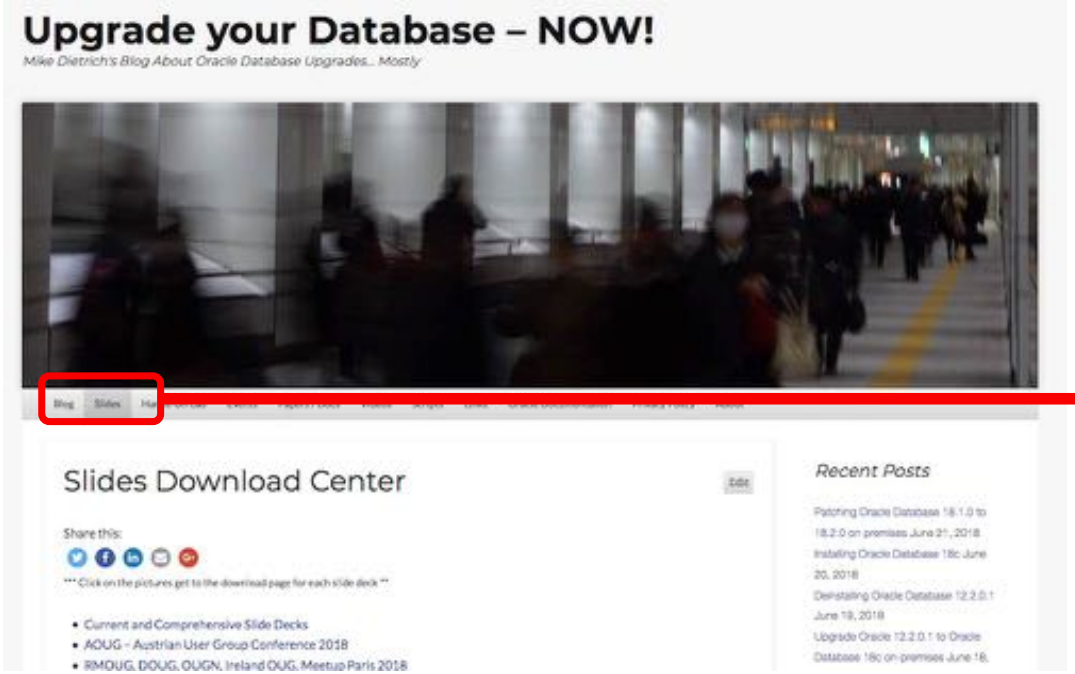
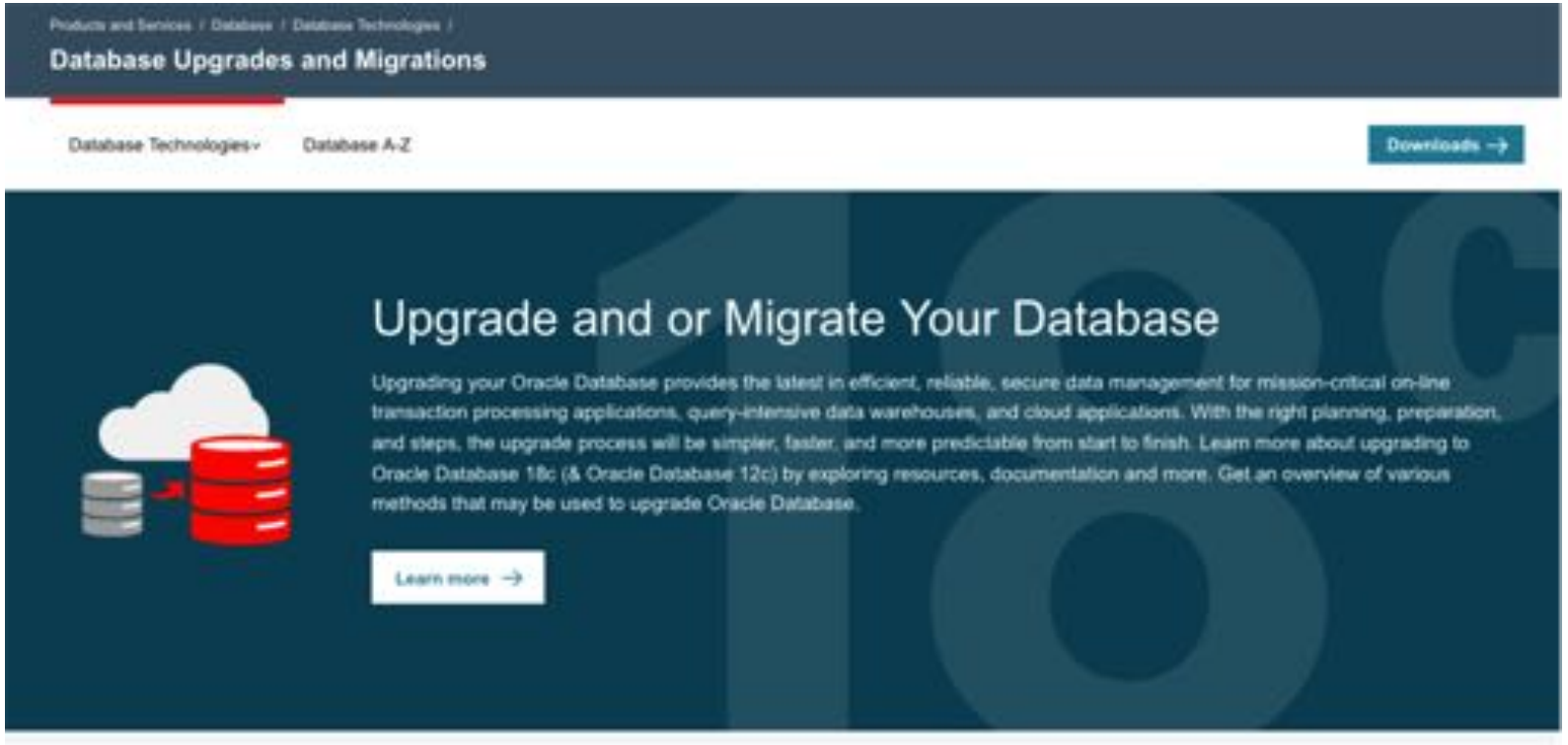
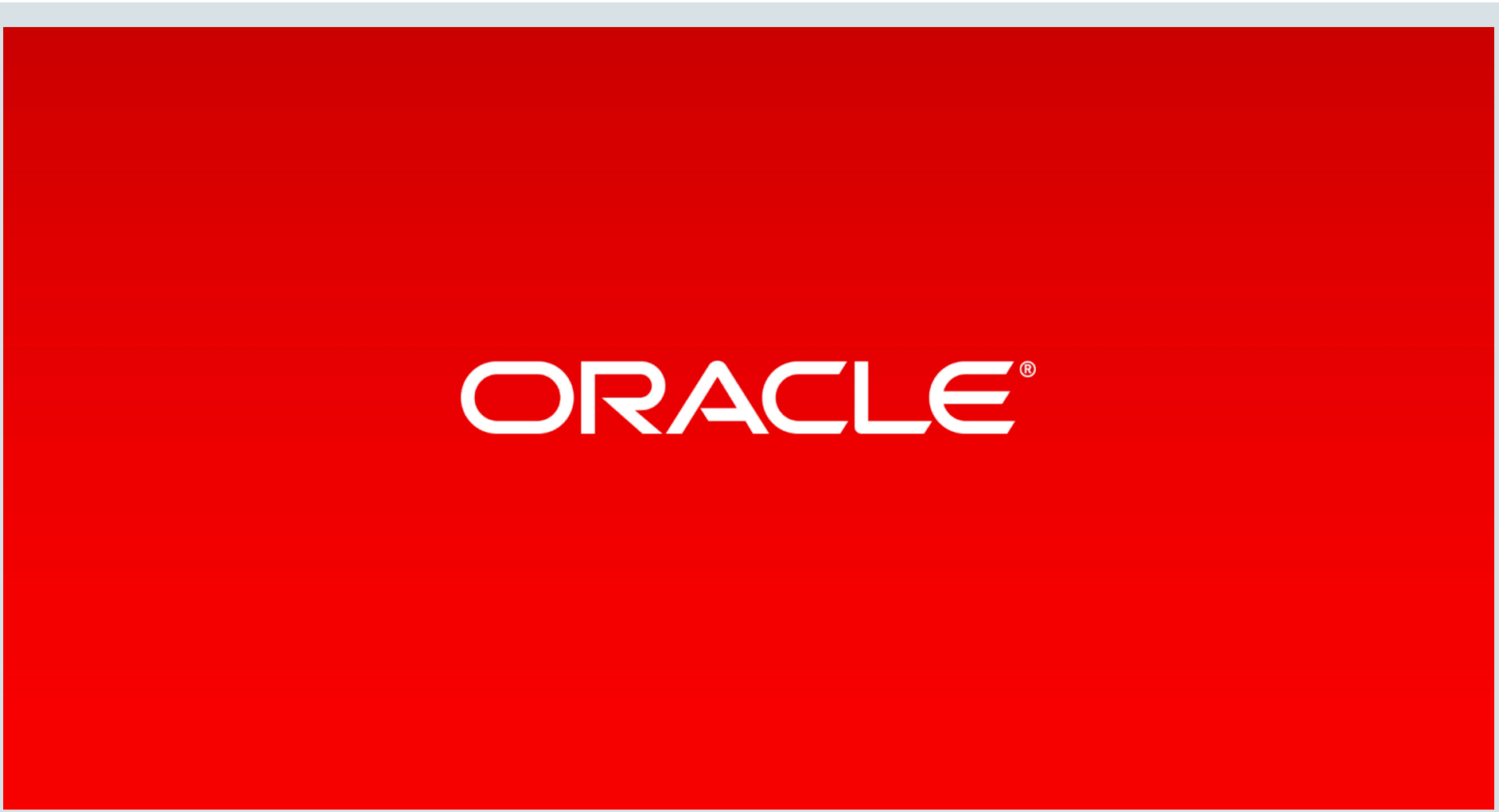


More Information | www.oracle.com/goto/upgrade



Integrated Cloud

Applications & Platform Services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