# Plan a Creative and Efficient Upgrade to 12c for your Enterprise Wide Databases.

Reduce downtime, eliminate mistakes

Presented by

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## datAvail

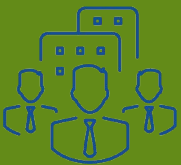BI/Analytics • Applications • Databases

# Agenda

- Digital Marketing Upgrade of 20 databases

- Coordinate upgrade with application during a small maintenance window

- Challenge

- Potential Solutions

- Designing an approach that works

- Implementing the Solution

- Reduce Downtime, Eliminate Errors

# Our Business Partner
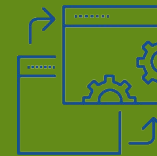
Digital Marketing Company

Our customer supports 2,500 clients

Sends over 4 billion emails a year

Needed to Upgrade 20 databases

The databases were on version 11.2.0.4 with a goal to get to 12.1.0.2

# Challenge

Coordinate 20 database upgrades with application upgrade during a relatively small maintenance window

Need a solution that was

- Fast

- Efficient

- Error Free

# Potential Solutions - OEM Upgrade

**Pro**

- Oracle recommends using OEM

- Steps are automated

**Con**

- Due to the other maintenance happening during the window our network access would be compromised. OEM would not reliably be available

# Potential Solutions - OEM Upgrade

## More CONS

- Mass upgrade of RAC databases not supported by DB Wizard in OEM

- 13C – also supports only one database upgrade at a time

  https://docs.oracle.com/cd/E63000_01/EMLCM/upgrade_db.htm#EMLCM11253

### Note

Since mass upgrade of Oracle RAC database is not supported at the moment, Oracle recommends that you use the wizard described in this section to upgrade one Oracle RAC database instance at a time.

# Potential Solutions - Manual Upgrade

## Pro

- Could do work on server and not rely on the network

## Con

- Risk for errors if steps are not automated

- Requires DBA to be familiar with process or use a checklist listing each step

- Time Consuming

# Potential Solutions - Upgrade serially

## Pro

- Allow DBA to focus on one database at a time

## Con

- Estimated time for upgrades would be 20+ hours

# Potential Solutions - Scripted approach to be run in parallel

## Pro

- Allow DBAs to manage more than one database at a time

- Automate error checking and notifications

- Reduce Errors

- Decrease time frame

# The Winner

- Scripted approach to upgrade databases in parallel

- To upgrade one at a time would have taken 20-25 hours

- Had 8 hour window

- Needed to be able to run in parallel

- Upgrade databases without access to OEM

- Needed every database upgrade to be a success to support application upgrade that was happening at the same time

# Designing an approach that works

- Custom scripts written in bash and run at the server level

- Build in logging

- Build in error checking

- Build process  - number and name scripts

# Designing an approach that works

## Operating system

- Scripts were written for the Linux operating system

- Later rewritten to run on Solaris

# Designing an approach that works

- 14 total scripts – 10 upgrade scripts and 4 rollback scripts

| Pre-Upgrade Tasks |
| --- |
| Pre Upgrade 1 |
| Pre Upgrade 2 |
| **Upgrade Tasks** |
| Upgrade Precheck |
| Upgrade Restore Point |
| Database Upgrade |

| Post-Upgrade Tasks |
| --- |
| Post Upgrade 1 |
| Post Upgrade 2 |
| Drop Restore Point |
| **Post verifications** |
| Post Verify 1 |
| Verify compatible set to 12.1.0.2 |

# Designing an approach that works

## Script details

- Each script had a name and number

- Number reminds you the order in which it should be run

- Name reminds you of the step that is being executed

- Don't forget your rollback scripts!

# Testing

- The scripts were repeatedly tested and adjusted to account for issues

- Over time we have used these scripts for upgrades across the enterprise

    **10.2.0.5 to 11.2.0.3**

    **11.2.0.3 to 11.2.0.4**

    **11.2.0.4 to 12.1.0.2**

## Issues accounted

POOR PERFORMANCE WHILE ACCESSING  V$RMAN_BACKUP_JOB_DETAILS (Doc ID 420200.1)

Invalid Object FILE_LOCK After Upgrade (Doc ID 1520436.1)

Invalid X_$ Views & Synonyms After Upgrading to 11g (Doc ID 878623.1)

# Upgrade

4 DBAs upgraded 5 databases at a time

1 DBA coordinating

# Were we …

- Fast ?

- Error Free ?

- Efficient?

# Fast?

## Yes

**20 databases upgraded from**

- 11.2.0.4 to 12.1.0.2

- Process start to finish was 8 hours, down from an initial estimate of 20-25.

# Error Free?

- Does any upgrade happen without a "glitch" somewhere?

- ORA-600/Recyclebin purge issue

- Error checking in script alerted DBAs to the problem

- Adjustments made and work progressed

# Efficient?

## Yes

- Because the process was so automated, any DBA could have stepped in to run the steps

- Error checking in the scripts allowed us to know immediately when there was a problem
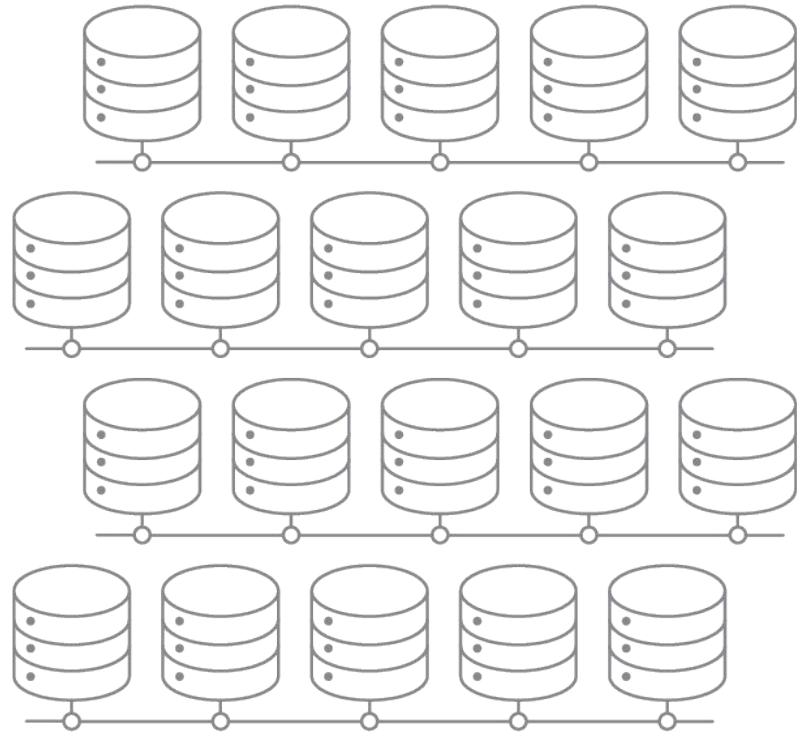
# Conclusion

Taking Oracles manual upgrade process and turning it into a set of scripts was the best was to upgrade 20 databases in an 8 hour maintenance window

# Questions ?

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