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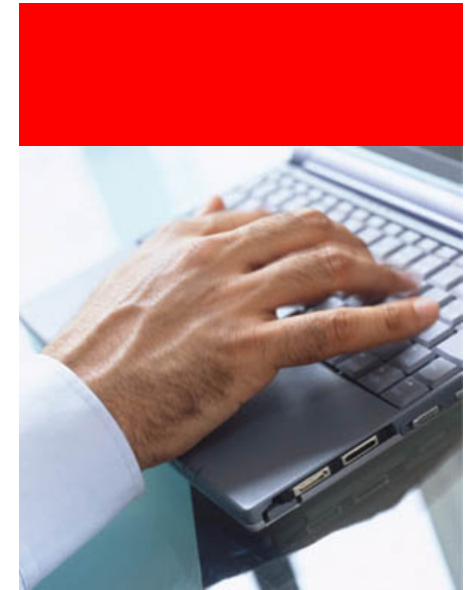
## **Best Practices for Upgrading to Oracle Database 11g Release 2**

Roy F. Swonger  
Senior Director, Database Upgrade & Utilities  
20-MAY-2010



# Agenda

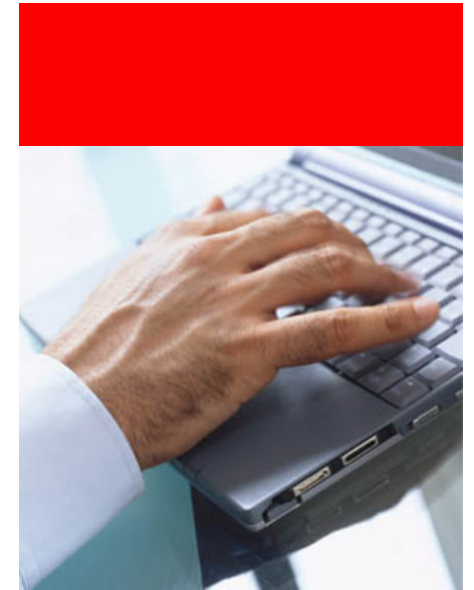
- Best Practices
- FAQ
- Summary





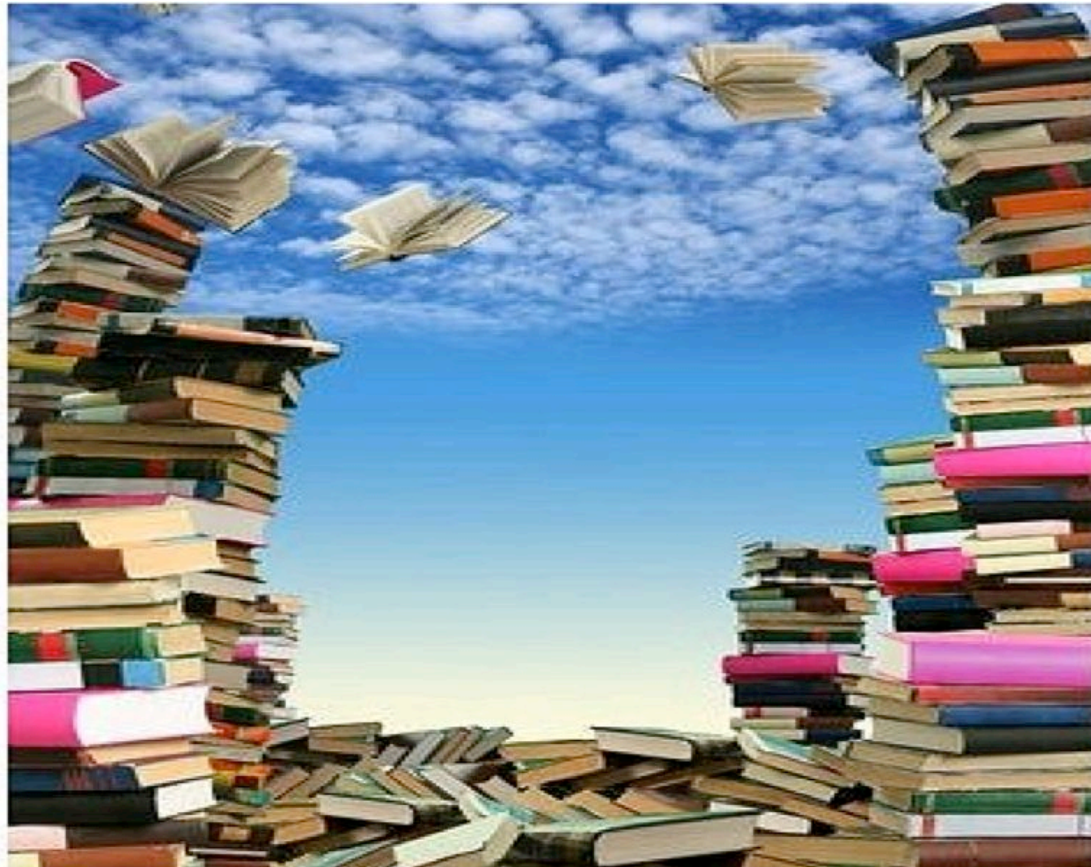
# Agenda

- Best Practices
- FAQ
- Summary



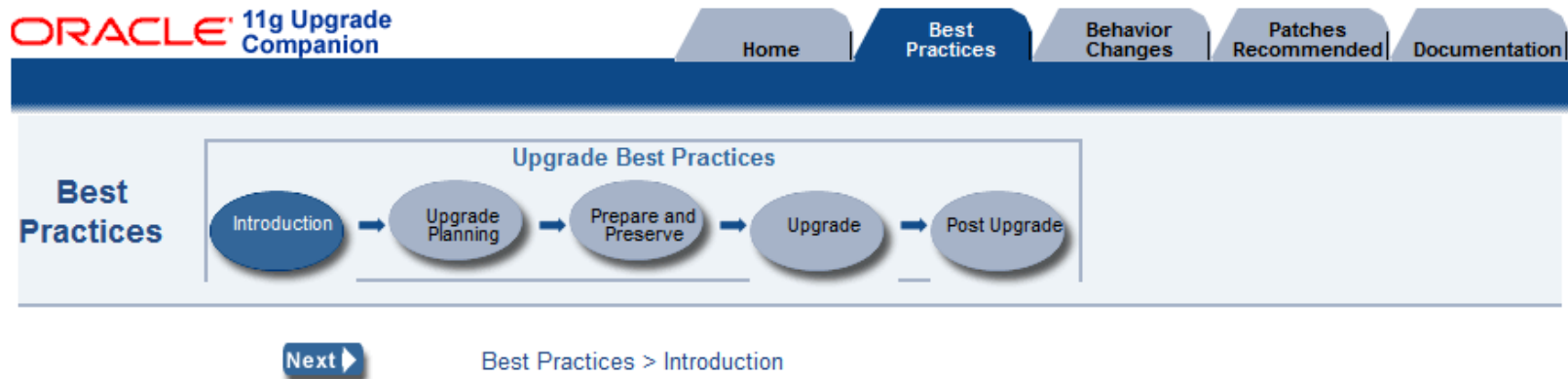
# Best Practice #1

- Read the **FRIENDLY** manuals!



# Documentation

- [Note:785351.1](#) Upgrade Companion 11g Release 2



## Introduction

The Best Practices section is not a replacement for the *Oracle Database Upgrade Guide* but rather a companion document that emphasizes and elaborates on database upgrade recommendations and requirements. The Best Practices are derived by Oracle technical staff and offer an accumulation of real-world knowledge and experience obtained while working with our customers.

## Usage

The Best Practices tab is organized by the following major steps in the Upgrade Methodology:

- **Upgrade Planning:** Important information related to planning the DB configuration, and testing
- **Prepare and Preserve:** Information related to preserving and preparing the source environment for the Oracle Database 11g Upgrade
- **Upgrade:** Final reminders and information required for the actual upgrade
- **Post Upgrade:** Testing and analysis which should be performed after upgrading your test and production databases to Oracle Database 11g

# Documentation

- [Note:785351.1](#) Upgrade Companion 11g Release 2

**ORACLE** 11g Upgrade Companion

Home Best Practices **Behavior Changes** Patches Recommended Documentation

## Behavior Changes

Behavior Changes

This section documents important changes in behavior between Oracle9i Release 2 (9.2)/Oracle Database 10g and Oracle Database 11g. This section focuses on behavior changes that require a DBA to make an informed decision to minimize the risks that may be introduced by the changes. This section does not describe all changed behavior or new features in Oracle Database 11g. For a complete list of all new features introduced in Oracle Database 11g, see the [Oracle Database New Features Guide 11g](#)

This page is an accumulation of real-world knowledge and experience obtained from Support and Development engineers and working with Oracle customers on different upgrade scenarios. Pay careful attention to these Behavior Changes to avoid the most common issues when upgrading from Oracle9i Release 2/Oracle Database 10g to Oracle Database 11g.

- + **Architecture**
- + **Optimizer**
- + **Initialization Parameters**
- + **Performance and Monitoring**
- + **Administration**
- + **Streams**
- + **Security**



# Documentation

- Upgrade Guides

- **Oracle® Database**  
Upgrade Guide  
11g Release 2 (11.2)  
**E10819-02**

[http://download.oracle.com/docs/cd/E11882\\_01/server.112/e10819/toc.htm](http://download.oracle.com/docs/cd/E11882_01/server.112/e10819/toc.htm)

- [Note:837570.1](#)  
Complete Checklist for Manual Upgrades to 11g Release 2
- [Note: 421191.1](#)  
Complete checklist for manual upgrades from X to Y





# OTN Upgrade Page

- <http://www.oracle.com/technology/products/database/oracle11g/upgrade/index.html>

**ORACLE** Welcome Roy (Account | Help | Sign Out) United States ▾ Communities ▾ I am a... ▾ I want to... ▾ Secure Search 🔍

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Products and Services > Oracle Database

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- Standard Edition
- Standard Edition One
- Express Edition
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- Database Lite
- MySQL
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**Oracle Database**

**WHY ORACLE?**

The innovation continues with Oracle Database 11g Release 2 to lower IT costs and deliver a higher quality of service by:

- Consolidating business applications onto fast, reliable and scalable [database grids](#)
- Maximizing [availability](#) and eliminating [idle data center redundancy](#)
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- Edison: Oracle is easier to manage than [DB2](#) and [SQL Server](#)
- Gartner: [Oracle RAC Moved to Mainstream Use](#)
- IDC: [Cost-Effective Data Leak Prevention Starts at the Source](#)
- Benchmarks: World record [performance](#) and [price/performance](#)

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- Express Edition

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- Global contacts
- Oracle Database Twitter

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- Oracle Database 11g
- Upgrading to Oracle Database 11g



# OTN Upgrade Page

- Or simply ... 😊

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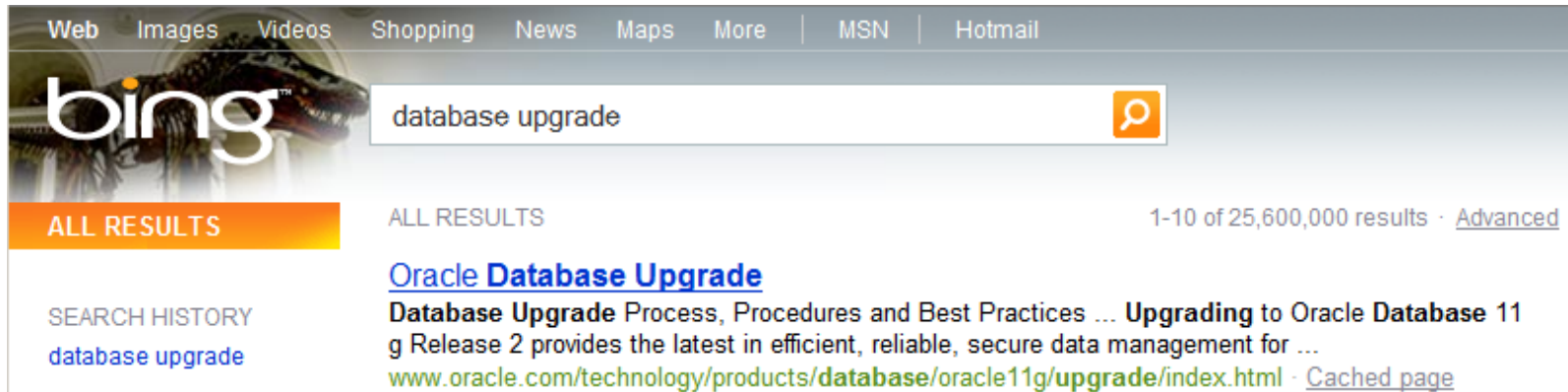
## [Oracle Database Upgrade](#)

Database Upgrade Process, Procedures and Best Practices.

[www.oracle.com/technology/.../database/.../upgrade/index.html](http://www.oracle.com/technology/.../database/.../upgrade/index.html) - [Cached](#) - [Similar](#)

# OTN Upgrade Page

- By the way ... works with other search engines as well 😊



The screenshot shows a Bing search results page. At the top, there are navigation links for Web, Images, Videos, Shopping, News, Maps, More, MSN, and Hotmail. The search bar contains the text "database upgrade" and a magnifying glass icon. Below the search bar, the text "ALL RESULTS" is displayed in a blue bar. To the right, it says "1-10 of 25,600,000 results" and "Advanced". On the left side, there is a "SEARCH HISTORY" section with the entry "database upgrade". The main search results area shows a link titled "Oracle Database Upgrade" in blue. Below the link, the text reads: "Database Upgrade Process, Procedures and Best Practices ... Upgrading to Oracle Database 11g Release 2 provides the latest in efficient, reliable, secure data management for ...". The URL "www.oracle.com/technology/products/database/oracle11g/upgrade/index.html" is shown in green, followed by a "Cached page" link.

# OTN Upgrade Page

- <http://www.oracle.com/technology/products/database/oracle11g/upgrade/index.html>

**shortcuts** GETTING STARTED DOWNLOADS DOCUMENTATION FORUMS ARTICLES SAMPLE CODE TUTORIALS

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## ORACLE DATABASE 11<sup>g</sup> Oracle Database Upgrade

Upgrading to Oracle Database 11g Release 2 provides the latest in efficient, reliable, secure data management for mission-critical on-line transaction processing applications, query-intensive data warehouses, and content management and Web2.0 applications. The right planning, preparation, and upgrade steps will make the upgrade process simpler, faster, and more predictable from start to finish.

### Thank You!

The entire Upgrade Team would like to thank all the attendees of the free workshops given on October 8th and 9th. We would also like to thank those customers who took part in the OpenWorld 2009 Hands On Lab, visited our booth or attended our talk. We hope the experience was a positive one.

#### Latest (October 2009)

- [Is your Database Ready for an Upgrade? Oracle Database Pre-Upgrade Script](#) (My Oracle Support)
- [11g Release 2 Upgrade Workshop Presentation](#)
  - Part 1 of 2 (~5.9M)
  - Part 2 of 2 (~3.5M)
- [11g Release 1 Upgrade Workshop Presentation](#)
  - Part 1 of 2 (~5.7M)
  - Part 2 of 2 (~3.2M)
- [Fujitsu SPARC Enterprise: Migrating from Oracle9i Database to Oracle Database 11g](#)
- [Upgrade Oracle 9i-> 11g: A Customer Experience](#) (November 2008)

#### Technical Information

- [Methods for Upgrading to Oracle Database 11g Release 2](#)
- [Checklist for Manual Upgrades - 11g Release 2](#) (My Oracle Support)
- [Checklist for Upgrades to 11g Release 2 using DBUA](#) (My Oracle Support)
- [Database Server Upgrade/Downgrade Compatibility Matrix](#) (My Oracle Support)

#### Documentation

- [11g Release 2 Upgrade Companion](#) (My Oracle Support)
- [11g Release 2 Documentation](#)
- [11g Release 2 Upgrade Guide](#)

#### OpenWorld 2009

- [OpenWorld 2009 Website](#)
- [Hands On Lab Instructions](#)
- [Upgrade Secrets Slides](#)
- [Bielefeld University - Transient Logical Standby Talk](#)
- [Database Upgrade Talks at Oracle OpenWorld](#)

#### Upgrade Resources/Papers

- [Upgrade BLOG by Mike Dietrich](#)
- [Discussion Forum](#)
- [Benefits of Upgrading to Oracle Database 11g](#) (July 2009)
- [Database Rolling Upgrade Using Transient Logical Standby: Oracle](#)

# OTN Upgrade Forum

- <http://forums.oracle.com/forums/forum.jspa?forumID=583&start=0>



[Forum Home](#) » [Database](#) » [Database - Upgrade](#)

## Forum: Database - Upgrade

Discuss all aspects of database upgrade from planning and testing through execution and troubleshooting. Also, information about helpful tools and utilities, documentation, and other information to make your database upgrade easier, faster, and less risky.

[Post New Thread](#)   [Back to Category](#)

Messages: 4,711 - Threads: 1,069 - Filter:  Pages: 72 [ [1](#) | [2](#) | [3](#) | [4](#) | [5](#) | [Next](#) ]

	Thread	Author	Views	Replies	Last Post
	<b>OTN Database Upgrade Page</b> Posted By: <a href="#">Brian.McCarthy</a> -- Aug 4, 2008 2:44 PM				
	<a href="#">Upgrade from SE 10g to EE 10g -- hp-ux --Confused on a step</a>	<a href="#">S. Garewal</a>	253	13	May 18, 2010 6:10 AM Last Post By: <a href="#">schavali</a> »
	<a href="#">seconf.sql .Will it be executed for upgrades or only for new Databases?</a>	<a href="#">user11902835</a>	11	0	May 18, 2010 5:38 AM Last Post By: <a href="#">user11902835</a> »
	<a href="#">11.1.0.7 upgrade on windows 2003 server 32-bit</a>	<a href="#">user988772</a>	36	3	May 18, 2010 2:17 AM Last Post By: <a href="#">Rajesh Lathwal</a> »
	<a href="#">insufficient memory for string storage Context is:</a>	<a href="#">user564785</a>	41	1	May 18, 2010 12:09 AM Last Post By: <a href="#">Satish Kandi</a> »
	<a href="#">Document Needed for Upgrading a database from 11.1.0.6.0 to 11.2.0.1</a>	<a href="#">user10274248</a>	50	1	May 17, 2010 10:56 PM Last Post By: <a href="#">Rajesh Lathwal</a> »
	<a href="#">change db block size duplicating a DB with RMAN</a>	<a href="#">user577554</a>	37	1	May 17, 2010 7:14 AM Last Post By: <a href="#">cgs Wong</a> »
	<a href="#">Agile Upgrade</a>	<a href="#">user10970286</a>	72	1	May 15, 2010 1:33 PM Last Post By: <a href="#">schavali</a> »

### Welcome, Guest

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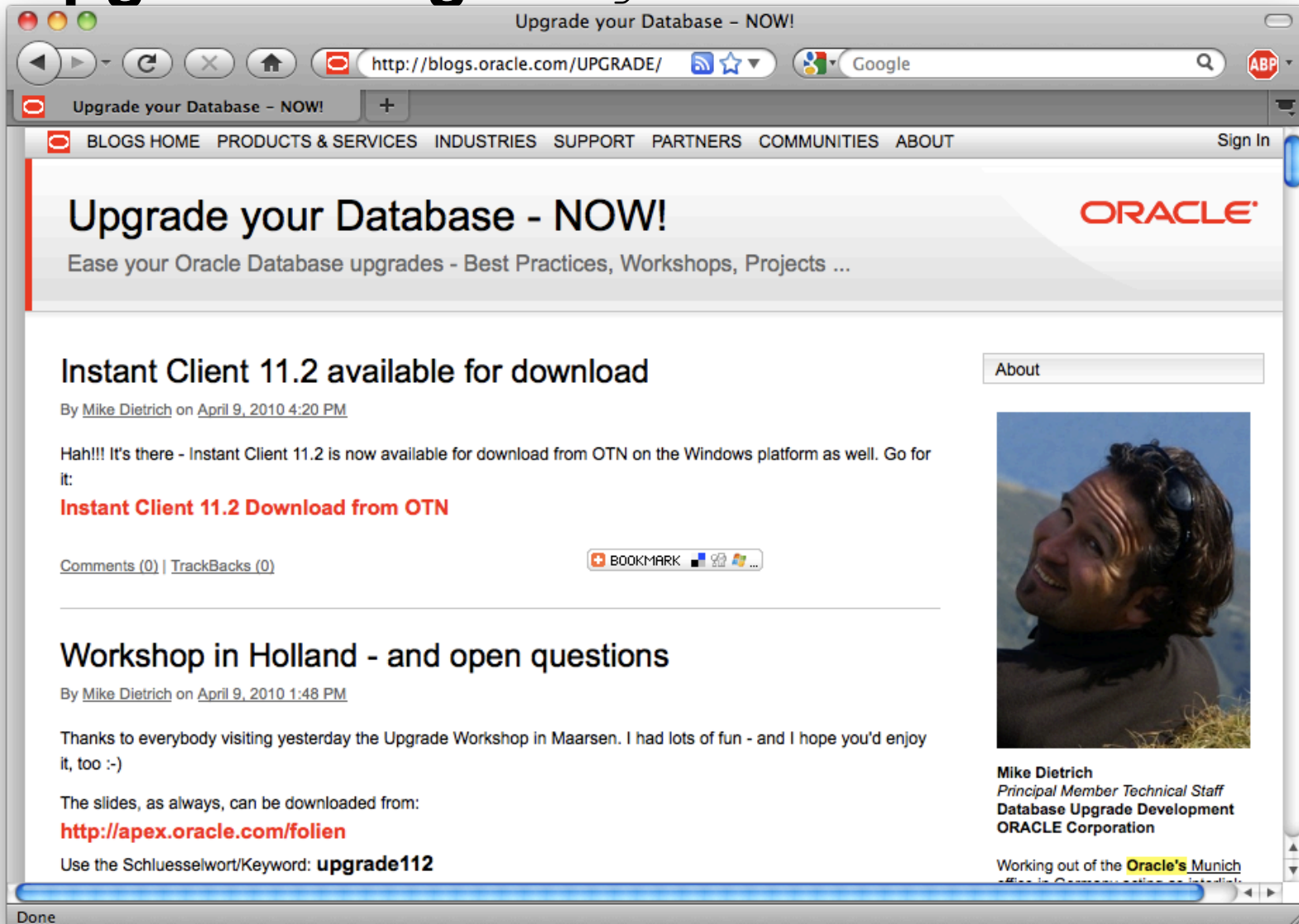
### Search Forum

### Top Users in Forum

- [schavali](#) (465)
- [Satish Kandi](#) (270)
- [oradba](#) (160)
- [Mike Dietrich](#) (155)
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- [damorgan](#) (105)
- [Bobcatalog](#) (90)
- [Laura Gaigala](#) (70)
- [P. Forstmann](#) (65)
- [roy.swonger](#) (65)



# Upgrade Blog: [blogs.oracle.com/UPGRADE](http://blogs.oracle.com/UPGRADE)



The screenshot shows a browser window titled "Upgrade your Database - NOW!". The address bar contains the URL <http://blogs.oracle.com/UPGRADE/>. The page header includes navigation links: BLOGS HOME, PRODUCTS & SERVICES, INDUSTRIES, SUPPORT, PARTNERS, COMMUNITIES, ABOUT, and a Sign In link. The main content area features a large heading "Upgrade your Database - NOW!" with the Oracle logo to the right. Below this is a sub-heading "Ease your Oracle Database upgrades - Best Practices, Workshops, Projects ...". The first article is titled "Instant Client 11.2 available for download" by Mike Dietrich, dated April 9, 2010 4:20 PM. The article text says "Hah!!! It's there - Instant Client 11.2 is now available for download from OTN on the Windows platform as well. Go for it:" followed by a link "Instant Client 11.2 Download from OTN". There are also links for "Comments (0)" and "TrackBacks (0)", and a "BOOKMARK" button. The second article is titled "Workshop in Holland - and open questions" by Mike Dietrich, dated April 9, 2010 1:48 PM. The text says "Thanks to everybody visiting yesterday the Upgrade Workshop in Maarsen. I had lots of fun - and I hope you'd enjoy it, too :-)" and "The slides, as always, can be downloaded from: <http://apex.oracle.com/folien>". It also mentions "Use the Schlüsselwort/Keyword: **upgrade112**". On the right side, there is an "About" section with a photo of Mike Dietrich and his title: "Mike Dietrich, Principal Member Technical Staff, Database Upgrade Development, ORACLE Corporation". Below the photo, it says "Working out of the Oracle's Munich office in Germany, acting as internal link". The browser status bar at the bottom shows "Done".



## Best Practice #2

- Patch your **new** \$ORACLE\_HOME **before** you upgrade





# Recommended Patches

## Oracle Recommended Patches -- Oracle Database (Doc ID **756671.1**)


Modified: 14-APR-2010 Type: ANNOUNCEMENT

### Oracle Recommended Patches -- Oracle Database

- [Target Configurations](#)
- [Patch Availability](#)
- [Current Recommended Patches](#)
  - [11.2.0.1 Current Recommended Patches](#)
  - [11.1.0.7 Current Recommended Patches](#)
  - [11.1.0.6 Current Recommended Patches](#)
  - [10.2.0.4 Current Recommended Patches](#)
  - [10.2.0.3 Current Recommended Patches](#)
- [Conflict Resolution](#)
- [On Request](#)
- [Known Issues](#)
- [References](#)

Beginning with release 10.2.0.3, Oracle releases Recommended Patches for Oracle Database. For an introduction to Recommended Patches, see [Note:756388.1](#).





# Patch Set Update (PSU) Installation

- Install **PSUs** as well
  - [Note:854428.1](#): Introduction to Database Patch Set Updates
  - Database PSUs include:
    - Fixes for critical issues that may affect a large number of customers and that are already proven in the field
    - Critical Patch Update (CPU) fixes
  - Database PSUs do not include:
    - Changes that require re-certification
    - Fixes that require configuration changes
  - Typically **50-100 new bug fixes - cumulative**
  - Guaranteed to be **RAC rolling installable**
  - Will be released 4x per year such as CPUs on the same schedule
    - Platforms:  
Solaris SPARC64, Linux x86 and x86-64, HP-UX PA-RISC, HP Itanium, IBM AIX

# Important Alerts?

- Note 161818.1

**Oracle Server Releases Status Summary**

<a href="#">Release</a> <i>(Click to see Details)</i>	<a href="#">Current Patch Set</a>	<a href="#">Next Patch Set</a>	<a href="#">Premier Support Ends</a>	<a href="#">Extended Support Ends</a>	Notes
<a href="#">11.2.0.X</a>	11.2.0.1	11.2.0.2	-	-	Base release is 11.2.0.1
<a href="#">11.1.0.X</a>	11.1.0.7	None	Aug-2012	Aug-2015	Base release is 11.1.0.6
<a href="#">10.2.0.X</a>	10.2.0.4	10.2.0.5	Jul-2010	Jul-2013 First year of Extended Support to be free of charge.	
<a href="#">10.1.0.X</a>	10.1.0.5	None	Jan-2009	Jan-2012	10.1.0.5 is the <a href="#">terminal</a> 10.1 Patch Set. 10.1 is now in Extended Support - see <<Note:761713.1>>
<a href="#">9.2.0.X</a>	9.2.0.8	None	Jul-2007	Jul-2010 <a href="#">First year Extended Support was free for 9.2</a>	9.2.0.8 is <a href="#">terminal</a> 9.2 Patch Set. The Free Extended Support period ended on 31-Jul-2008. See <<Note:392222.1>>

Key to coloring of above table:

<a href="#">Premier Support</a>
<a href="#">Extended Support</a>



# Upgrade Information / Alerts

- [Note:880782.1](#) Support Status and Alerts for Oracle 11g Release 2 (11.1.0.X)

## Patch Sets

This section gives a summary of the patch sets available for Oracle 11g Release 2.  
Note that the BASE release of Oracle 11g Release 2 is 11.2.0.1 .

- | Release  | Comments  |
|----------|---|
| 11.2.0.1 | Oracle 11g Release 2 Base Release.<br><b>Availability and Known issues for 11.2.0.1</b> <a href="#">Note:880707.1</a> |

# Upgrade Information / Alerts

- [Note 880707.1](#) Known Issues specific to the 11.2.0.1 Base Release

## 11.2 Alerts / Issues

This section lists alerts and important issues relevant to 11.2 .

### General Alerts / Issues

<a href="#">Note:1066229.1</a> *	OERI[25027]/OERI[4097]/OERI[4000] in plugged datafile after CREATE CONTROLFILE in 11g
<a href="#">Note 1078406.1</a> *	Corrupt blocks in 11.2 in table with unique key. OERI[kdBlkCheckError] by block check

### Latest Critical Patch Update

For information about Critical Patch Updates see the Oracle Technology Network page here: [Critical Patch Updates and Security Alerts](#)

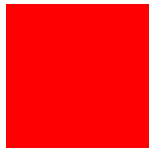
Document	Summary
<a href="#">Note:467881.1</a>	Critical Patch Update Advisory (Apr 2010)
<a href="#">Note:1060989.1</a>	Critical Patch Update for Database Products (Apr 2010)

### Current Recommended Patches

For information about Recommended Patches for the RDBMS see [Note:756671.1](#) .

### Patch Set Updates

Document	Description	Rolling RAC	Patch Download
<a href="#">Note:9352237.8</a>	11.2.0.1.1 Patch Set Update	Yes	<a href="#">Patch:9352237</a>



# Upgrade Information / Alerts

- [Note 880707.1](#) Known Issues specific to the 11.2.0.1 Base Release

## Notable fixes included in 11.2

This section lists fixes / enhancements in 11.2 which may cause a notable change in behaviour.

## Issues introduced in 11.2

This section lists bugs **introduced** in 11.2 (if any). As this is a base release only notable regressions in behaviour are listed.

<a href="#">Note 1078406.1*</a>	Corrupt blocks in 11.2 in table with unique key. OERI[kdBlkCheckError] by block check
<a href="#">9382101</a>	Unnecessary trigger traces "Dumping Sorted Master Trigger List"
<a href="#">9217629</a>	Dump / wrong results with fix for bug 6467270 and encryption
<a href="#">9052506</a>	Null-Aware Anti Join (NAAJ) is not used on DML

## 11.2.0.1 Availability

The following 11.2.0.1 Base Releases are currently available:

### HPUX Itanium 64bit

11.2.0.1 » Available

### IBM AIX 5L Based Systems (64 bit)



# Recommended OS patches

- [Note169706.1](#) OS Installation and Configuration

## Oracle Database on Unix AIX,HP-UX,Linux,Mac OS X,Solaris,Tru64 Unix Operating Systems Installation and C

Jump to:

[AIX](#)

[HP-UX \(PA-RISC and Itanium\)](#)

[Linux x86](#)

[Linux x86-64](#)

[Linux Itanium](#)

[Linux on Power](#)

[Linux on zSeries](#)

[Mac OS X \(PowerPC and x86-64\)](#)

[Solaris \(SPARC and x86-64\)](#)

[Tru64](#)

[Pre-Installation Scripts](#)

[OPatch](#)

[Related Documents](#)

[OS Specific Commands](#)

[Change History](#)

[Note 43208.1](#) Certified Compilers

[Note 223718.1](#) Oracle Server Availability and Certification MATRIX

[@Linux Project Group - Browse The Contents of Linux Brands ISOs](#)

PURPOSE

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This bulletin is produced to provide a central source for all the primary installation settings for the various mainstream unix platforms, e.g. IBM AIX, HP-UX, Sun Solaris, T

Careful comparison of the Installation Guide and the applicable release note for an OS/Oracle version has been done to ensure that this bulletin provides the most comple

Keeping the OS kernel current helps stabilize the system. Production systems should never run an out dated OS kernel version. As a best practice, Oracle recommends

NOTE: Pre-compilers requirements are no longer addressed in this note, for a single source note that addresses Pre-compiler/Compiler requirements, please refer to:

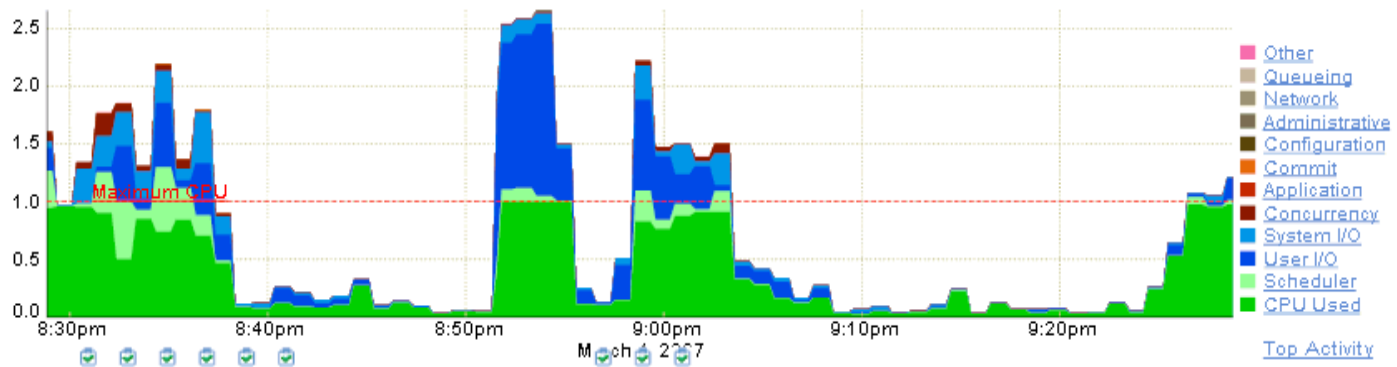
[Note 43208.1](#) Certified Compilers

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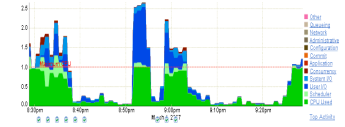


# Best Practice #3

- Preserve performance statistics



# Performance Statistics



- Preserve performance statistics
  - Get accurate performance statistics
    - Comparison: before ↔ after
    - Time specific queries and batches
  - Test upgrade of the database
    - Functional tests
    - Performance tests with real life loads!!!
      - Real Application Testing
        - SQL Performance Analyzer
        - Database Replay



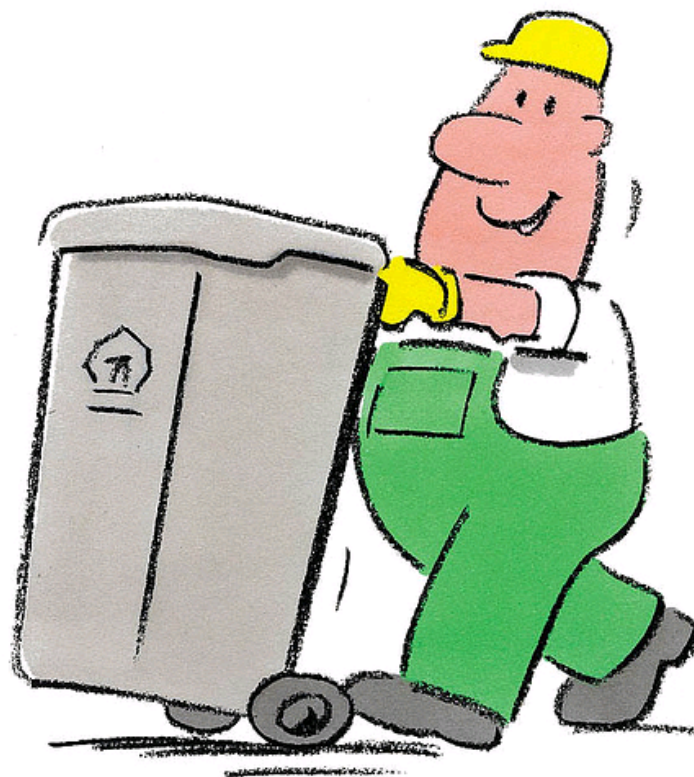


# Performance Statistics

- Collecting sufficient performance data prior to the upgrade is of vital importance
  - Sufficient means: Starting at least 4 weeks before the upgrade
  - Gather accurate performance statistics
  - In Oracle 8i/9i:
    - Use STATSPACK
      - Export the PERFSTAT user right before the upgrade
      - [Note:466350.1](#) STATSPACK before/after upgrade
  - In Oracle 10g/11g:
    - Use AWR
      - Snapshots every 30-60 minutes – retention: >30 days
      - Export the AWR with [DBMS\\_SWRF\\_INTERNAL.AWR\\_EXTRACT](#)
      - Use ADR DIFF reports to compare before & after upgrade performance:  
[DBMS\\_WORKLOAD\\_REPOSITORY.AWR\\_DIFF\\_REPORT\\_HTML](#)

## Best Practice #4

- Pre-upgrade **Sanity** operations





# Invalid Objects

- Always check for INVALID objects:

```
SQL> SELECT UNIQUE object_name, object_type, owner  
      FROM dba_objects WHERE status='INVALID';
```

- There should be no invalid objects in SYS and SYSTEM user schema
  - Recompile invalid objects with `utlrp.sql`
  - Compare invalid objects from before and after the upgrade
    - Beginning with 11.1.0.7 the comparison has been automated
    - Find invalid objects in `registry$sys_inv_objs` and `registry$nonsys_inv_objs`
    - Compare before-after: `utluiobj.sql`
    - The view `dba_invalid_objs` contains a list of invalid objects after the upgrade

# Recycle bin



- If upgrading from 10g or 11g, purge the **recycle bin** before the upgrade.

```
SQL> purge DBA_RECYCLEBIN;
```

## Best Practice #5

- **Always** run the pre-upgrade script:
  - Upgrade to Oracle Database 11.2: `utlu112i.sql`



# Pre-Upgrade Check

- Run `utlu112i.sql` in your current environment

```
Oracle Database 11.2 Pre-Upgrade Information Tool      09-21-2009 22:33:20
*****
Database:
*****
--> name:          ORCL
--> version:       10.2.0.3.0
--> compatible:    10.2.0.3.0
--> blocksize:     8192
--> platform:      Linux IA (32-bit)
--> timezone file: V4

[.]

*****
Update Parameters: [Update Oracle Database 11.2 init.ora or spfile]
*****
WARNING: --> "java_pool_size" needs to be increased to at least 64 MB

[.]

*****
Miscellaneous Warnings
*****
WARNING: --> Database is using a timezone file older than version 11.
.... After the release migration, it is recommended that DBMS_DST package
.... be used to upgrade the 10.2.0.3.0 database timezone version
.... to the latest version which comes with the new release.
```



# Pre-Upgrade Check

- Get the latest version of utlu1nmi.sql
  - Download it
  - [Note:884522.1](#)

Coming From Version	Upgrade Target Version
9.2.0 (9.2.0.8 and beyond), 10.1.0, 10.2.0, 11.1.0	11gR2 - utlu112i.sql
9.2.0 (9.2.0.4 and beyond), 10.1.0,10.2.0	11gR1- utlu111i.sql
8.1.7, 9.0.1, 9.2.0 (9.2.0.4 and beyond), 10.1.0	10gR2 - utlu102i.sql



## Best Practice #6

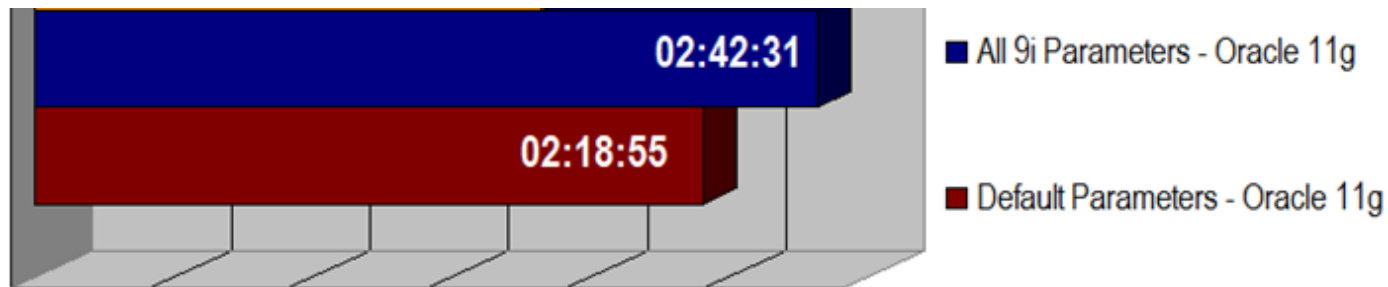
- Remove "old" parameters, underscores and events from your init.ora/spfile
  - Examples:

```
init.ora:  
<...>  
_always_semi_join=off  
_unnest_subquery=false  
<...>  
optimizer_features_enable=9.0.1  
<...>  
event = "10061 trace name context forever, level 10"  
<...>
```



# Remove Old Parameters

- Example: customer workload



- Conclusion:
  - It is recommended to remove relics from previous releases and start with the 11g defaults

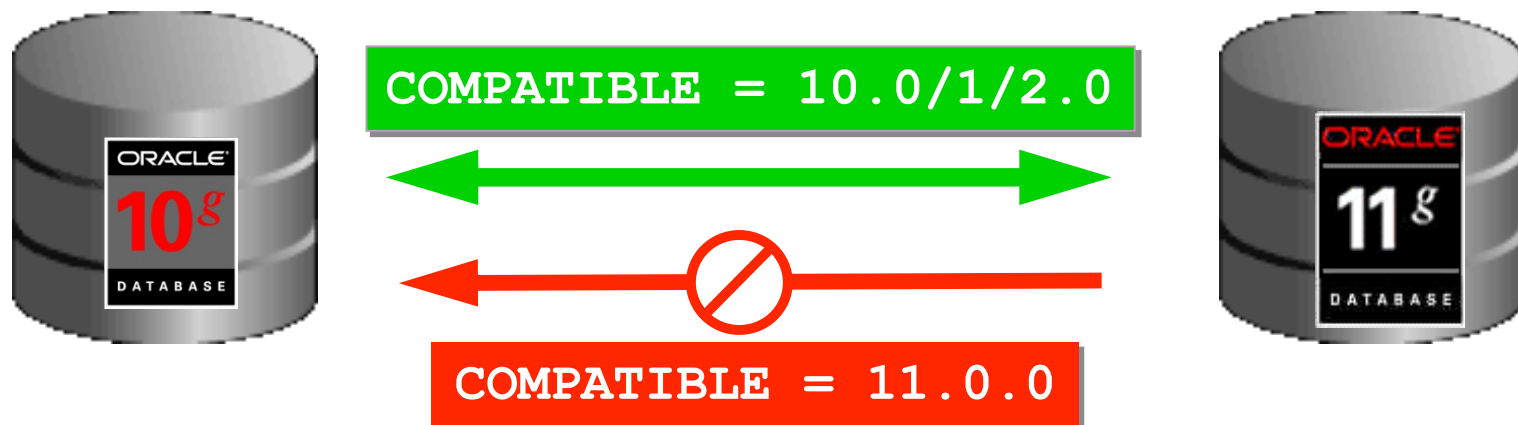
## Best Practice #7

- Leave COMPATIBLE at the original value for a week **before** changing to 11.2.



# Parameter COMPATIBLE

- COMPATIBLE has to be at least 10.1.0 for an 11g database
- No way back once  $\geq 11.1.0$  has been enabled
  - Supported release downgrade to 10.1.0.5,  $\geq 10.2.0.2$ ,  $\geq 11.1.0.6$
  - No ALTER DATABASE RESET COMPATIBILITY command anymore



# Parameter COMPATIBLE

- DBUA raises COMPATIBLE only for 9i databases
- To enable new features after the upgrade:

- 11.1: 

```
SQL> alter system  
set compatible='11.1.0' scope=spfile;
```

- 11.2: 

```
SQL> alter system  
set compatible='11.2.0' scope=spfile;
```

- Afterwards: **restart** the database
  - New features will be enabled
  - Datafile headers will be adjusted
  - Redologfiles will be adjusted during first access



## Best Practice #8

- Test your **fallback strategy!**





# Fallback Strategy

- In any case: Take a backup!!!
- Then decide:
  - If anything unforeseen happens and you'll have to step back, will you be allowed to lose data?  
(i.e. changes done to the data in the system after the upgrade):  
YES or NO?
    - If **YES**: restore a backup, flashback (since 10g)
    - If **NO**: export/import, downgrade



# Fallback Strategy: `catdwgrd.sql`

- Downgrade with `catdwgrd.sql`
  - [Note:443890.1](#)
    - Downgrade to the release you've upgraded from
      - 10.1.0.5
      - 10.2.0.2/3/4
      - 11.1.0.6/7
    - Only possible **if COMPATIBLE hasn't been raised!!!**
      - **Please note:**  
A downgrade will only be possible to the release you've upgraded from - so if a patch set has been applied always apply it before the upgrade starts - otherwise you'll only be able to downgrade to the release you've patched

# Fallback Strategy: catdwgrd.sql

- Downgrade with `catdwgrd.sql` to 10g
  - Task in 11g environment:

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

- Switch to your **pre-upgrade** 10g environment:

```
SQL> STARTUP UPGRADE
SQL> SPOOL /tmp/reload.log
SQL> @catrelod.sql
-- The catrelod.sql script reloads the appropriate version of
-- all of the database components in the downgraded database.
SQL> SPOOL OFF
```

- Please note: additional steps are required if EM repository resides in the database - please see chapter 6 **Downgrading a Database** in the Oracle 11g Upgrade Guide





## Best Practice #9

- **After** the upgrade ...



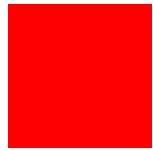
# Post Upgrade

- Create **system statistics** during a regular workload period - otherwise non-appropriate values for the CBO will be used:

```
SQL> exec DBMS_STATS.GATHER_SYSTEM_STATS('start');  
... - gather statistics while running a typical workload  
SQL> exec DBMS_STATS.GATHER_SYSTEM_STATS('stop');
```

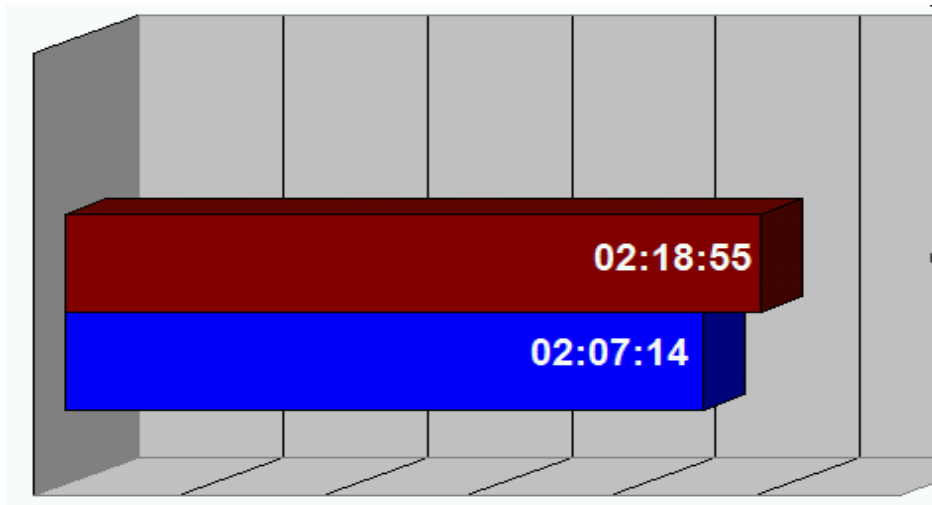
```
SQL> select pname NAME, pval1 VALUE, pval2 INFO  
       from aux_stats$;
```

NAME	VALUE	INFO
-----	-----	-----
STATUS		COMPLETED
DSTART		04-03-2009 12:30
DSTOP		05-03-2009 12:30
FLAGS		1
CPUSPEEDNW	1392.39	
IOSEEKTIM	8.405	
IOTFRSPEED	255945.605	
...		



# Post Upgrade

- Example: customer OLTP workload
  - Runtime **without** system statistics: 2:19h
  - Runtime **with** system statistics: 2:07h
    - => 9% faster





# Post Upgrade

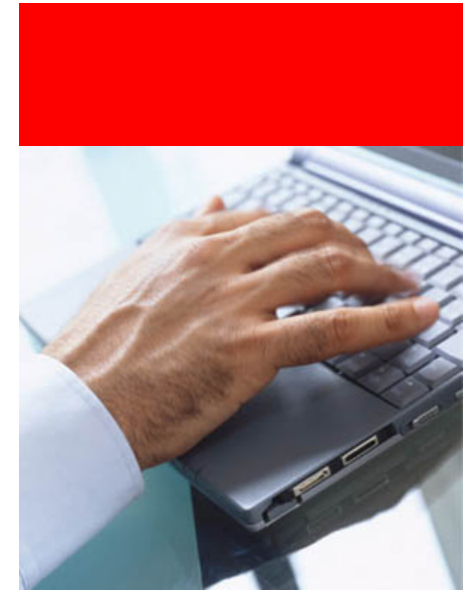
- Create **fixed table statistics**
  - Directly after `catupgrd.sql` has been completed
    - This will speed up processing for recompilation with `utlrp.sql`
- Create fixed table statistics again after a week with regular production workload
- This task should be done only a few times per year

```
SQL> exec DBMS_STATS.GATHER_FIXED_OBJECTS_STATS;
```

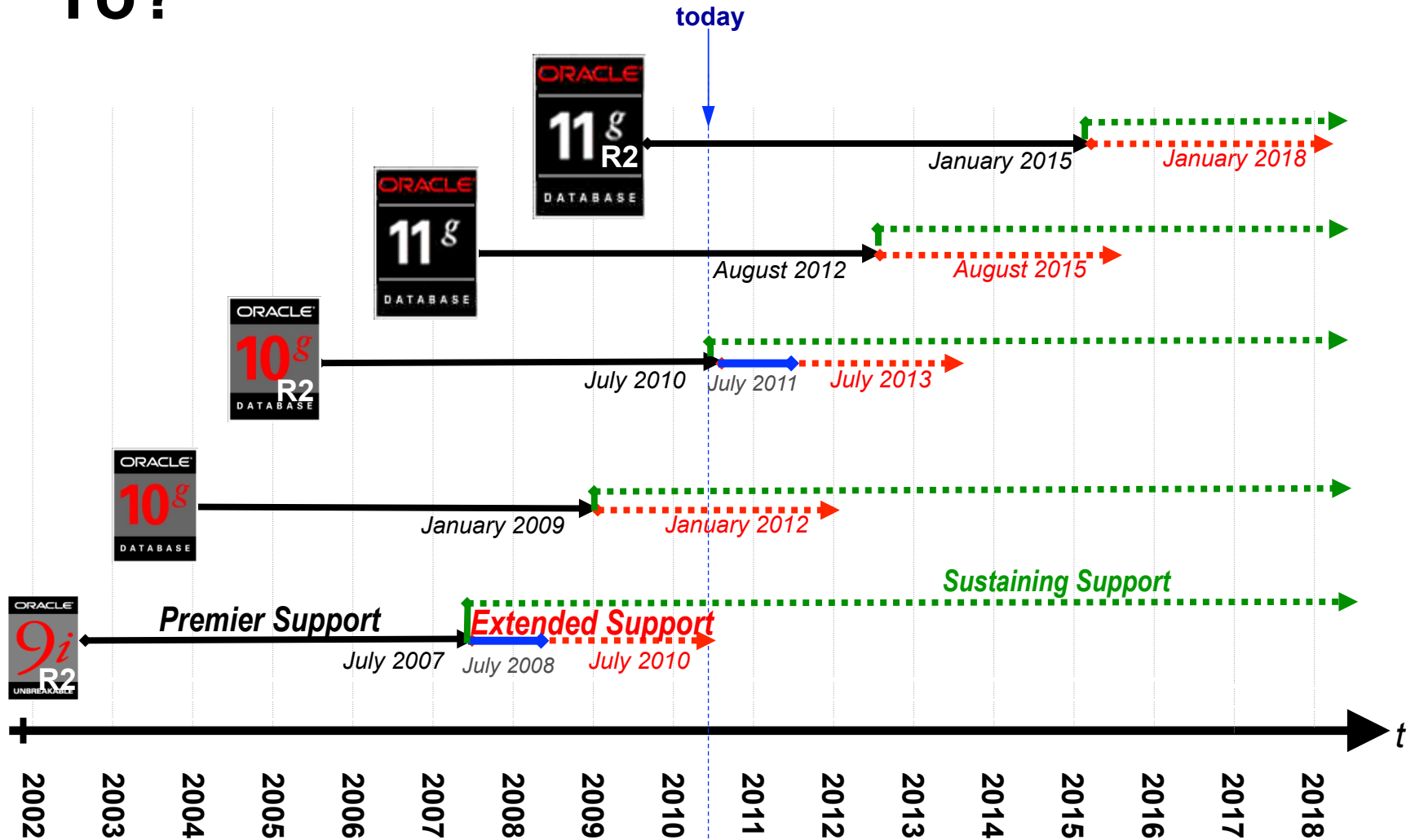


# Agenda

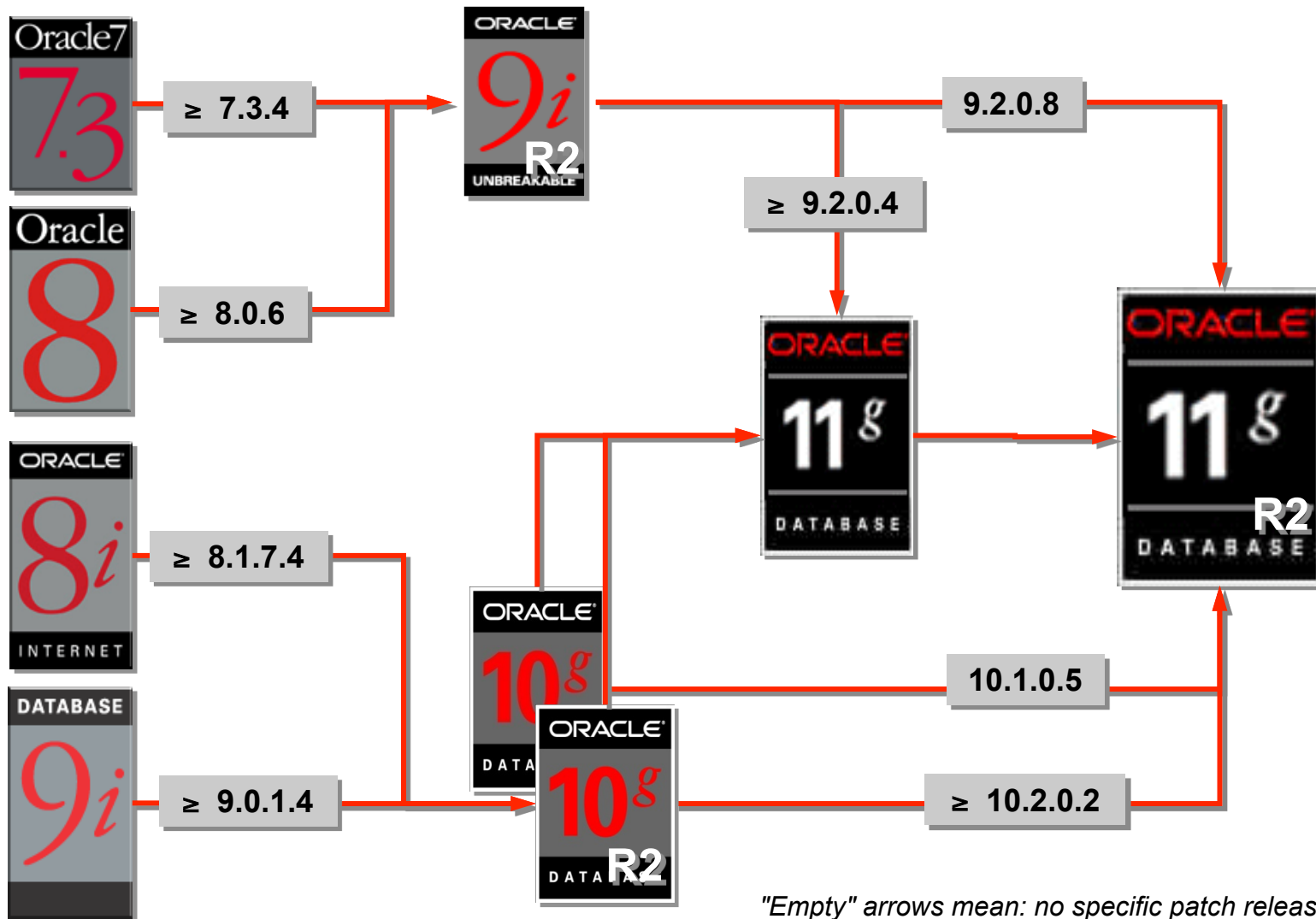
- Best Practices
- FAQ
- Summary



# FAQ: Which Version Should I Upgrade To?



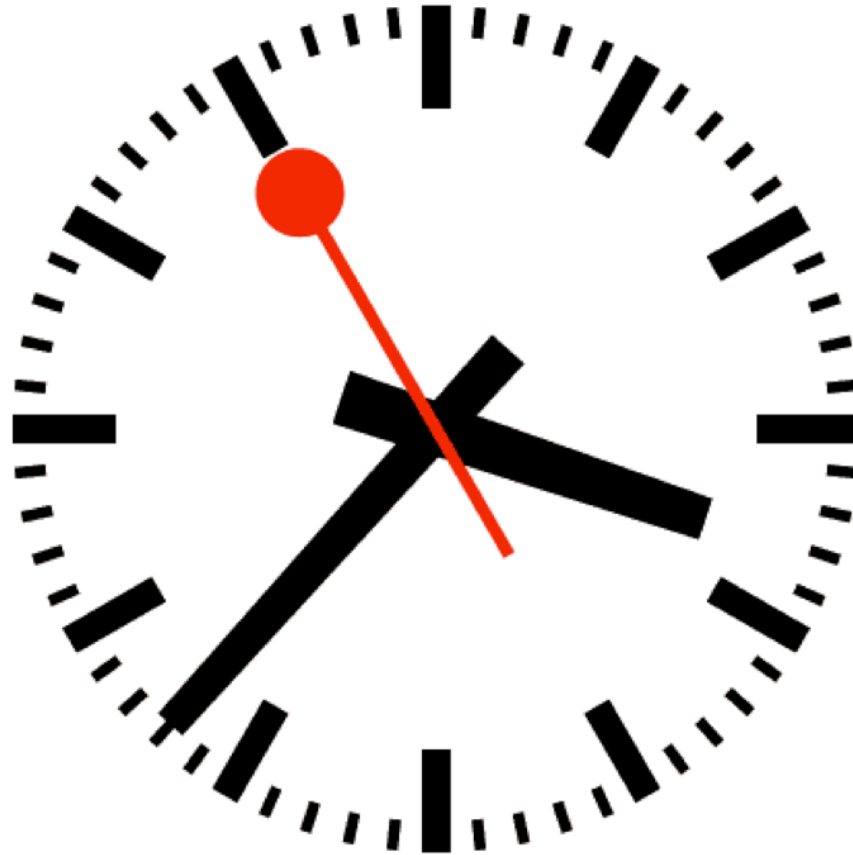
# Upgrade to Oracle Database 11g Release 2



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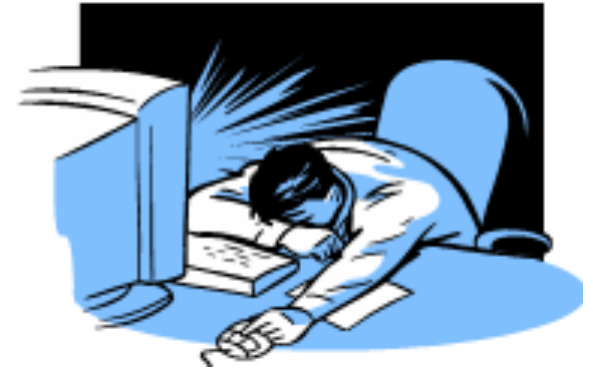
# FAQ: How long will the upgrade take?





# Upgrade Length

- How long will the upgrade take to complete?
  - **Independent** of:
    - Size of the database
    - Used datatypes
  - **Dependent** mainly on:
    - The number of installed components and options
    - Valid and non-stale data dictionary statistics
    - Number of synonyms – they'll get recompiled (upgrade from 9i)
    - Number of objects in XDB
    - At a very low rate, if `COMPATIBLE` is increased:
      - Number of datafiles
      - Size of redo logs



# Example: Database Upgrade Time

- Usually between ~30 and ~90 minutes
  - Dependent mainly on installed options and components
  - \*Actual times may vary...

Component	HH:MM:SS
Oracle Server	00:16:17
JServer JAVA Virtual Machine	00:05:19
Oracle Workspace Manager	00:01:01
Oracle Enterprise Manager	00:10:13
Oracle XDK	00:00:48
Oracle Text	00:00:58
Oracle XML Database	00:04:09
Oracle Database Java Packages	00:00:33
Oracle Multimedia	00:07:43
Oracle Expression Filter	00:00:18
Oracle Rule Manager	00:00:12
Gathering Statistics	00:04:53

**Total Upgrade Time: 00:52:31**

# Upgrade Length

- Speed up your upgrade performance by:
  - Truncating the auditing table SYS.AUD\$

```
SQL> truncate SYS.AUD$;
```

- Note: If you must preserve auditing records, move them temporarily to a user tablespace before truncating. Then move the records back after the upgrade.
- **Creating dictionary statistics** right before the upgrade

- Oracle 9i:

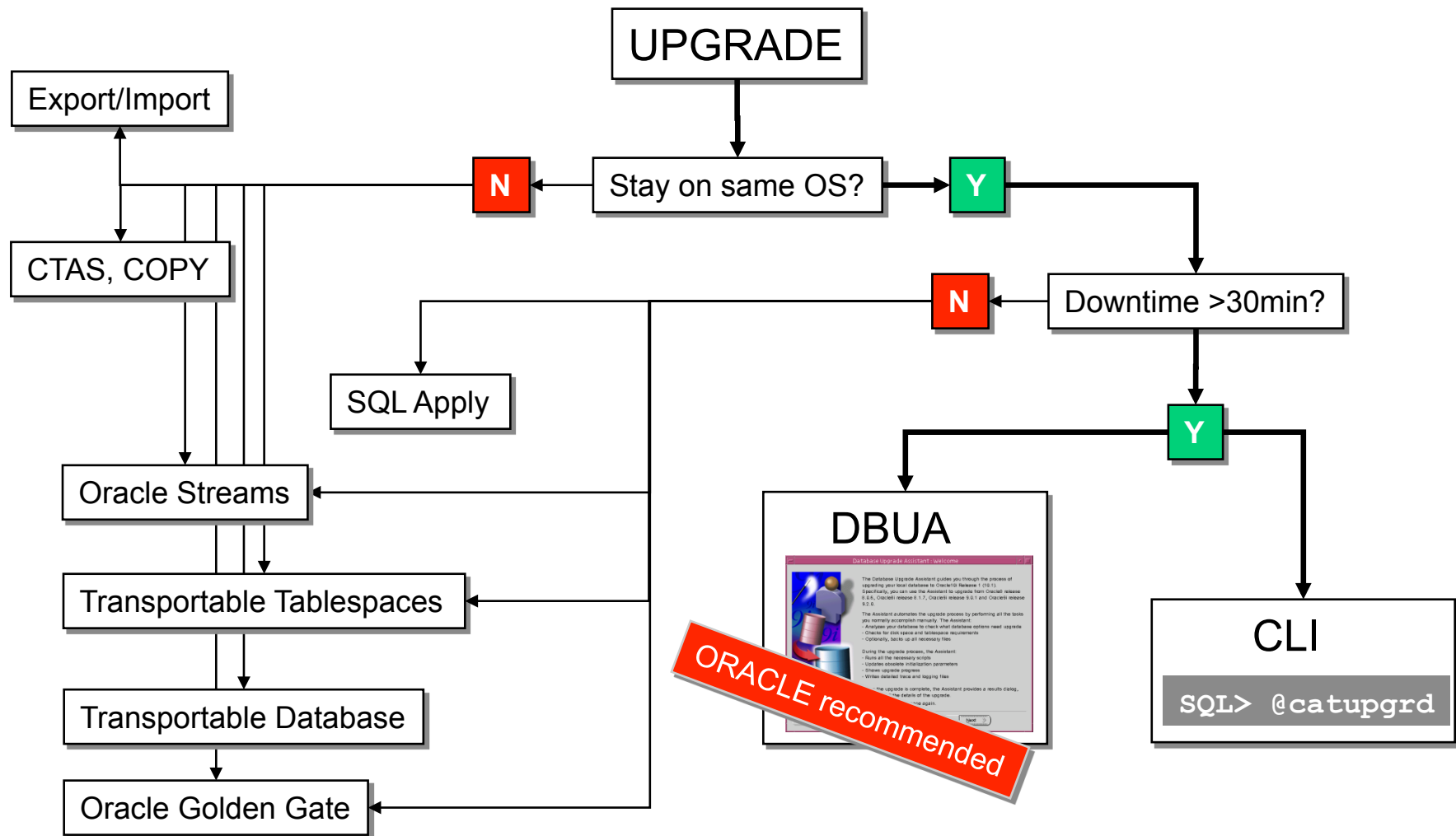
```
SQL> exec DBMS_STATS.GATHER_SCHEMA_STATS  
('SYS', options => 'GATHER', estimate_percent =>  
DBMS_STATS.AUTO_SAMPLE_SIZE, method_opt => 'FOR  
ALL COLUMNS SIZE AUTO', cascade => TRUE);
```

- Oracle 10g/11g:

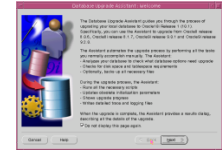
```
SQL> exec DBMS_STATS.GATHER_DICTIONARY_STATS;
```

- Switching off archiving, if business rules allow

# FAQ: Which Method Should I Use?



# When to Choose the DBUA



- Can afford 30 – 90 minutes average downtime
- Operating system remains the same
- GUI is preferred over manual command line interface
  - Automatically performs useful pre-upgrade checks
  - Less error-prone / less manual effort
- Existing database is at least 9.2.0.8
- Note: especially useful for RAC databases
- Consideration:
  - Source and target Oracle Homes must be on the same system
  - Cannot be re-run if an error is encountered mid-upgrade



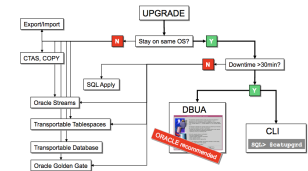
# When to Choose Command-Line

```
SQL> spool upgrade.log  
SQL> @catupgrd.sql
```

- Can afford 30-90 minutes average downtime
- Manual command-line interface is preferred over GUI
- Existing database is at least 9.2.0.8
- Migrating to a new hardware platform with same OS
- Consideration
  - Cannot upgrade to a system with a different operating system architecture
  - More manual steps required
  - Potential for errors due to typos, missed details

# When to Choose an Alternative Method

- Alternative methods include
  - Original exp/imp or Data Pump expdp/impdp)
  - Oracle Streams or Oracle Golden Gate
  - Data Guard (SQL Apply)
  - Transportable Tablespaces, Transportable Database
  - Moving data via CREATE TABLE AS SELECT or other techniques
- Alternative methods **must** be used when
  - Moving to a different operating system platform (32- and 64-bit versions of an OS are considered “the same platform” in this case)
  - Upgrading from a release older than 9.2.0.8
- Alternative methods **may** be a good option when
  - Minimal downtime (<30 minutes) required or desired
  - Re-organizing database storage or schemas



# FAQ: Is anybody really live on 11.2?





# 26 External 11.2 References (1/2)

Ref	Name	Country	Industry	System Name	Platform	OS	Release	Nodes	System Status	Application Provider
✓	<a href="#">Allegro Group</a>	Poland	Consumer/Retail /Distribution	SUN DB MACHINE	Sun	Linux	11gR2	8	Production	-
✓	<a href="#">Avea</a>	Turkey	Telecommunications	Avea Database Machine 1	Sun	Linux	11gR2	8	Project Initiation	Custom
✓	<a href="#">Banca Transilvania / Romania</a>	Romania	Financial Services	BANCA TRANSILVANIA S.A. - SUN DB MACHINE - 1/2 SAS RACK	Sun	Linux	11gR2	4	Installation	-
✓	<a href="#">Commonwealth Bank of Australia</a>	Australia	Financial Services	COMMONWEALTH BANK OF AUSTRALIA - SUN DB MACHINE - 1/2 RACK SAS	Sun	Linux	11gR2	4	Installation	-
✓	<a href="#">Commonwealth Bank of Australia</a>	Australia	Financial Services	Peoplesoft / Oracle as a Service	Sun	Linux	11gR2	4	Test	Peoplesoft
✓	<a href="#">Interhyp</a>	Germany	Financial Services	TSUN	HP	Linux	11gR2	3	Test	Custom OLTP
✓	<a href="#">Jung von Matt</a>	Germany	Communications and Media	MAIL	Dell	Linux	11gR2	8	Test	Oracle Collaboration Suite
✓	<a href="#">OOCL us</a>	United States	Travel and Transportation	MOBILE CARGO TRACKING	HP	Linux	11gR2	2	Test	-
✓	<a href="#">PHILIPPINE SAVINGS BANK</a>	Philippines	Financial Services	PHILIPPINE SAVINGS BANK - SUN DB MACHINE - 1/2 SAS RACK	Sun	Linux	11gR2	4	Installation	Custom
✓	<a href="#">Provincia Autonoma di Bolzano – autonomous province of Bozen</a>	Italy	Government	newGIS	Dell	Linux	11gR2	1	Pilot	Custom
✓	<a href="#">SI Mobile</a>	Slovenia	Telecommunications	SI Mobile DBM 1	Sun	Linux	11gR2	2	Project Initiation	-
✓	<a href="#">SOGEI</a>	Italy	Government	GeoPOI	Sun	Solaris	11gR2	1	Production	Custom
✓	<a href="#">Sharp HealthCare</a>	United States	Healthcare	Data Warehouse - financial data, medical records and clinical research data	IBM	AIX	11gR2	1	Production	-
✓	<a href="#">Sistema informativo agricolo nazionale (SIAN)</a>	Italy	Government	Geo Datawarehouse Condizionalità	IBM	AIX	11gR2	2	Pilot	-
✓	<a href="#">TARGUSinfo</a>	United States	Services	ElementOne	Dell	Linux	11gR2	1	Production	TARGUSInfo

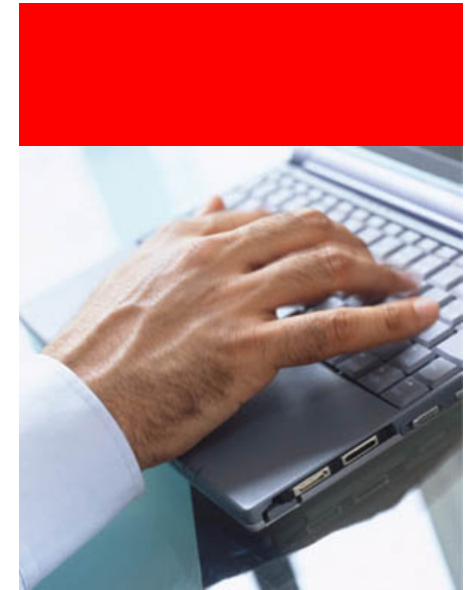
## 26 External 11.2 References (2/2)

Ref	Name	Country	Industry	System Name	Platform	OS	Release	Nodes	System Status	Application Provider
✓	<a href="#">TDS Telecommunications Corp</a>	United States	Telecommunications	Product Applications	HP	Linux	11gR2	4	Production	Custom
✓	<a href="#">TUI Nederland</a>	Netherlands	Travel and Transportation	Exadata2	Sun	Linux	11gR2	8	Production	Custom
✓	<a href="#">TUI Nederland</a>	Netherlands	Travel and Transportation	TUI NEDERLAND N.V. - SUN DB MACHINE - FULL RACK SAS	Sun	Linux	11gR2	8	Installation	-
✓	<a href="#">Tim w.e.</a>	Portugal	Communications and Media	TIM W.E. - SUN DB MACHINE - 1/4 RACK SAS	Sun	Linux	11gR2	2	Installation	-
✓	<a href="#">Turkcell</a>	Turkey	Telecommunications	Turkcell Database Machine 1	Sun	Linux	11gR2	8	Test	-
✓	<a href="#">Turkcell</a>	Turkey	Telecommunications	Turkcell Database Machine 2	Sun	Linux	11gR2	2	Test	Custom
✓	<a href="#">University of Phoenix</a>	United States	Education	Documentum 6.5	Other Vendor	Linux	11gR2	4	Production	Documentum
✓	<a href="#">University of Phoenix</a>	United States	Education	Osiris	Other Vendor	Linux	11gR2	3	Production	Custom
✓	<a href="#">University of Phoenix</a>	United States	Education	Sabrix	Other Vendor	Linux	11gR2	2	Production	Sabrix
✓	<a href="#">Verizon Wireless</a>	United States	Telecommunications	Verizon Wireless	HP	Linux	11gR2	3	Production	Custom
✓	<a href="#">eDialog</a>	United States	High Technology	EDIALOG - SUN DB MACHINE - FULL RACK SAS	Sun	Linux	11gR2	8	Installation	-



# Agenda

- Best Practices
- FAQ
- Summary





# Summary

- Preparation and Planning are the keys to a successful upgrade
- Choose the right upgrade method for your technical scenario and business requirements
- Have a fallback strategy, and please test it
- Oracle Database 11.2 is a stable release with lots of great features. Let's go!
  
- FAQ: Where can I get a copy of these slides?
  - <http://blogs.oracle.com/UPGRADE>



# Q & A

**Questions  
&  
Answers**

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