Move to Oracle Database 11g – The whole Story

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Database Upgrade & Utilities
ORACLE Corporation
Welcome!!!
Upgrade Development Group

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Director, Software Development
Directs: 4 Total: 16

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Directs: 3 Total: 3

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Principal Member Technical Staff

Cindy Lim
Principal Member of Technical Staff

Brian McCarthy
Principal Member of Technical Staff
Agenda

- Preparation
- Upgrade
- News and Task List
- Tuning
- Performance Testing
- Best Practices
Agenda

- Preparation
  - Support Policy
  - Patches
  - Certification
  - Documentation
  - Upgrade paths
  - Installation
  - Editions
- Upgrade
- News and Task List
- Tuning
- Performance Testing
- Best Practices
Lifetime Support Policy


Oracle Database Releases

<table>
<thead>
<tr>
<th>Release</th>
<th>GA Date</th>
<th>Premier Support Ends</th>
<th>Extended Support Ends</th>
<th>Sustaining Support Ends</th>
</tr>
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<tbody>
<tr>
<td>8.1.7</td>
<td>Sep 2000</td>
<td>Dec 2004</td>
<td>Dec 2006</td>
<td>Indefinite</td>
</tr>
<tr>
<td>10.1</td>
<td>Jan 2004</td>
<td>Jan 2009</td>
<td>Jan 2012</td>
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<tr>
<td>10.2</td>
<td>Jul 2005</td>
<td>Jul 2010</td>
<td>Jul 2013</td>
<td>Indefinite</td>
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</table>

Extended Support is only offered against the terminal patchset for a release. Customers using Oracle Database 9.2 on Fujitsu Siemens BS2000 will receive a fee waiver for Extended Support until December 2009.
Releases – Support-SRs

Support SRs - Mix of DB Versions

- 8i
- 9i
- 10g
- 11g

9%
Upgrade to Oracle Database 11g

Oracle

7.3
≥ 7.3.4
≥ 8.0.6
≥ 8.1.7.4
≥ 9.0.1.4

Oracle 8

9i
R2
≥ 9.2.0.4
≥ 9.0.1.4
≥ 8.1.7.4
≥ 8.0.6
≥ 7.3.4

11g
DATABASE

Oracle 10g

DATABASE

10g R2
≥ 9.2.0.4
≥ 9.0.1.4
≥ 8.1.7.4
≥ 8.0.6
≥ 7.3.4

Oracle 9i

INTERNET

8i
DATABASE

Oracle 8i

7.3
Recommended Patches

- Simple Search
- Advanced Search
- Quick Links to: Latest Patchsets, Mini Packs and Maintenance Packs
- Recommended Patches
  - Oracle eBusiness Suite R12
  - Oracle eBusiness Suite 11i
  - Oracle Database
  - Oracle Fusion Middleware
- Your Saved Searches
## Important Alerts?

- **Note: 161818.1**

### Oracle Server Releases Status Summary

<table>
<thead>
<tr>
<th>Release (Click to see Details)</th>
<th>Current Patch Set</th>
<th>Next Patch Set</th>
<th>Premier Support Ends</th>
<th>Extended Support Ends</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.1.0.X</td>
<td>None</td>
<td>TBD</td>
<td>-</td>
<td>-</td>
<td>Base release is 11.1.0.6</td>
</tr>
<tr>
<td>10.2.0.X</td>
<td>10.2.0.3</td>
<td>TBD</td>
<td>Jul-2010</td>
<td>Jul-2013</td>
<td>10.1.0.5 is the terminal 10.1 Patch Set</td>
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<tr>
<td>10.1.0.X</td>
<td>10.1.0.5</td>
<td>None</td>
<td>Jan-2009</td>
<td>Jan-2012</td>
<td>9.2.0.8 is terminal 9.2 Patch Set</td>
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<tr>
<td>9.2.0.X</td>
<td>9.2.0.8</td>
<td>None</td>
<td>Jul-2007</td>
<td>Jul-2010 Extended Support is free for 9.2</td>
<td>9.2.0.8 is terminal 9.2 Patch Set</td>
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</table>

### Key to coloring of above table:

- **Premier Support**
- **Extended Support**
- **Fixes only possible where noted**
- **Sustaining Support**
Upgrade Information / Alerts

- **Note: 454507.1**
  Support Status and Alerts for Oracle 11g Release 1 (11.1.0.X)

### Patch Sets

This section gives a summary of the patch sets available for Oracle 11g Release 1. Note that the BASE release of Oracle 11g Release 1 is 11.1.0.6.

<table>
<thead>
<tr>
<th>Release</th>
<th>Comments</th>
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<tbody>
<tr>
<td>11.1.0.7</td>
<td>First (current) Patch Set</td>
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<tr>
<td></td>
<td><em>List of fixes included in 11.1.0.7</em></td>
</tr>
<tr>
<td></td>
<td><strong>Availability and Known issues for 11.1.0.7</strong></td>
</tr>
<tr>
<td></td>
<td><a href="#">Note 738538.1</a></td>
</tr>
<tr>
<td>11.1.0.6</td>
<td>Oracle 11g Release 1 Base Release.</td>
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<tr>
<td></td>
<td><em>Availability and Known issues for 11.1.0.6</em></td>
</tr>
<tr>
<td></td>
<td><a href="#">Note 454506.1</a></td>
</tr>
</tbody>
</table>
Upgrade Information / Alerts

- **Note 738538.1** Known Issues specific to the 11.1.0.7 Patch Set

### 11.1.0.7 Alerts / Issues

This section lists alerts and important issues relevant to 11.1.0.7.

#### General Alerts / Issues

<table>
<thead>
<tr>
<th>Note</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>756435.1*</td>
<td>Block change tracking on physical standby can cause incorrect backups</td>
</tr>
<tr>
<td>731599.1P*</td>
<td>Linux: Random node reboots in RAC induced by OCSSD</td>
</tr>
</tbody>
</table>

#### Upgrade Issues

<table>
<thead>
<tr>
<th>Note</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>742647.1*</td>
<td>ASM rolling upgrade to 11.1.0.7 fails in RAC environments</td>
</tr>
</tbody>
</table>

### Issues introduced in 11.1.0.7

This section lists bugs *introduced in* 11.1.0.7 (if any). Such issues may be either serious or trivial but the aim is to list them all to help customers assess the risk of applying the Patch Set on top of 11.1.0.6

<table>
<thead>
<tr>
<th>Note</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7272646P</td>
<td>Linux-x86_64: ORA-27103 on startup when MEMORY_TARGET &gt; 3g</td>
</tr>
<tr>
<td>7213937</td>
<td>Various OERI using Resource Manager</td>
</tr>
<tr>
<td>7211965</td>
<td>Different default cost for BETWEEN</td>
</tr>
<tr>
<td>7113299</td>
<td>Dump [kkslnl] with fix for bug 6163785</td>
</tr>
</tbody>
</table>
Timezone Patches

• Why DST timezone patches? (DST: Daylight Savings Time)
  • The date for moving to DST has been changed for 7 different timezones since 2007
    • HST - EST - MST - EST5EDT - MST7MDT - CST6CDT - PST8PDT
  • Current DST definitions are included from within the following patch set
    • 10.2.0.4
  • Oracle Database 11g requires timezone version V.4
    • Oracle 9i: Timezone V1
    • Oracle 10g: Timezone V2

• Without timezone V4 no upgrade to Oracle Database 11g will be possible!!!
Timezone Patches

Summary – 4 important ML notes:

- **Note: 414590.1**: FAQ and Issues
- **Note: 413671.1**: Timezone V4 - Checks and Links to the Patches
- **Note: 359145.1**: Links to download utltzuv2.sql
- **Note: 396387.1**: Explanations
  - Run script `utltzuv2.sql` to recognize TIMESTAMP WITH TIMEZONE
  - Files `timezone.dat` and `timezlrg.dat` will be applied

### Timezone V4 - Checks and Links to the Patches

<table>
<thead>
<tr>
<th>Version</th>
<th>9.2.0.1 - 9.2.0.7</th>
<th>9.2.0.8</th>
<th>10.1.0.2 - 10.1.0.4</th>
<th>10.1.0.5</th>
<th>10.2.0.1</th>
<th>10.2.0.2</th>
<th>10.2.0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solaris SPARC 32 bit</td>
<td>9.2.0.7 Available for others manually install 9.2.0.8 patch using <strong>Note 396387.1</strong></td>
<td>Available</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>Not Supported</td>
</tr>
<tr>
<td>Solaris SPARC 64 bit</td>
<td>9.2.0.4 Available 9.2.0.6 Available 9.2.0.7 Available for others manually install 9.2.0.6 patch</td>
<td>Available</td>
<td>10.1.0.4 Available for others manually install 10.1.0.6 patch using <strong>Note 396387.1</strong></td>
<td>Available</td>
<td>Manually install 10.2.0.3 patch using <strong>Note 396387.1</strong></td>
<td>Available</td>
<td>Available</td>
</tr>
</tbody>
</table>

### Links to download utltzuv2.sql

- [Download utltzuv2.sql](#)

### Explanations

- Run script `utltzuv2.sql` to recognize TIMESTAMP WITH TIMEZONE
- Files `timezone.dat` and `timezlrg.dat` will be applied
Timezone Patches

Timezone How To:

- Download the right patch according to the table in Note 413671.1

<table>
<thead>
<tr>
<th>Version</th>
<th>9.2.0.1 - 9.2.0.7</th>
<th>9.2.0.8</th>
<th>10.1.02 - 10.1.04</th>
<th>10.1.06</th>
<th>10.2.0.1</th>
<th>10.2.0.2</th>
<th>10.2.0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solaris SPARC 32 bit</td>
<td>9.2.0.7 Available</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td></td>
</tr>
<tr>
<td>Solaris SPARC 64 bit</td>
<td>9.2.0.4 Available</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
<td>Manually install 10.2.0.3 patch using Note 396387.1</td>
<td>Available</td>
<td></td>
</tr>
</tbody>
</table>

- Download the script utltzuv2.sql according to Note 359145.1

<table>
<thead>
<tr>
<th>Version</th>
<th>9.2.0.1</th>
<th>Not directly available: use 5726045 patch for 9.2.0.8 through manual install method of Note 396382.1</th>
</tr>
</thead>
</table>

- Run the script utltzuv2.sql in your current source database
- Apply files timezone.dat and timezlrg.dat to the source $ORACLE_HOME/oracore/zoneinfo directory with either Opatch or manually and restart the database
Verify Database Creation Wordsize - 10.2.0.3

• Has the database been created originally in a 32-bit environment and **is now** on a 64-bit platform?

  ```sql
  select decode(instr(metadata,'B023'),0,'64bit Database','32bit Database') "DB Creation"
  from kopm$;
  ```

• Happens in 10.2.0.3 - see Note:412271.1
  • Apply patch:5871314 and patch:5892355 if:
    • `KOPM$ . METADATA contains 'B023'
      ➔ created in **32-bit** env
  • **Don't apply patch if:**
    • `KOPM$ . METADATA contains 'B047'
      ➔ created in 64-bit env
  • Database version is 10.2.0.4
Related to Database Creation Wordsize - 11gR1

• Database upgrade to 11.1.0.6:
  • Delete orphan rows from KOTTD$
  • Apply patch 6770913
• Database upgrade to 11.1.0.7:
  • Delete orphan rows from KOTTD$
  • No patches necessary

```sql
select sys_nc_oid$ from kottd$ where sys_nc_oid$
not in (select oid$ from obj$ where type#=13);
```

• If result is not null:

```sql
delete from kottd$ where sys_nc_oid$ not in
(select oid$ from obj$ where type#=13);
commit;
```

• See Note:579523.1 - bug:6770913
Oracle Certification

Certify - Oracle's Certification Matrices, Desupport Notices & Product Availability
Welcome to Certify! This application provides product certification information, including patches and workarounds, for Oracle and non-Oracle products. For assistance with this application, please review our online documentation.

Please forward all Certify and Product Availability inquiries to CERTADMIN_US@oracle.com and all Desupport Notices inquiries to OBSSUPP_US@oracle.com.

To best view the matrices, it is recommended that you maximize your browser window.

1. View Certifications by Product
2. View Certifications by Platform
3. View Product Availability

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Recommended OS patches

• **Note: 169706.1**
  - AIX
  - HP-UX (PA-RISC and Itanium)
  - Linux x86
  - Linux x86-64
  - Linux Itanium
  - Linux on Power
  - Linux on zSeries
  - Mac OS X
  - 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

• **Note: 401705.1** specifically for Linux
Upgrade is easier!

• The upgrade to Oracle Database 11g is much easier than any upgrades to earlier Oracle releases

• Size of Upgrade guides:
  • 8.1.7 - 512 pages
  • 9.0.1 - 484 pages – 111 steps for an RDBMS with 9 components
  • 9.2.0 - 344 pages
  • 10.1.0 - 170 pages - only 6 steps!!!
  • 10.2.0 - 140 pages
  • 11.1.0 - 186 pages - now detailed explanations and information about new options included
Upgrade Length

• How long will the upgrade take to complete?
  • Independent of:
    • Size of the database
    • Used datatypes
  • Dependent on:
    • The number of objects needing upgrading and recompilation
      • Thus: the number of installed options/components
    • The number of synonyms – they’ll get recompiled
    • Valid and non-stale data dictionary statistics
    • At a very low rate:
      • Number of datafiles
      • Size of redo logs
Documentation

• **Note: 466181.1** Upgrade Companion 10gR2

Welcome to the Oracle Upgrade Companion. This Upgrade Companion helps you upgrade from Oracle9i Release 2 (9.2) to Oracle Database 10g Release 2 (10.2), including guidance on pre-upgrade, upgrade, and post-upgrade steps. This web site is instructional only, and does not supply automation tools.

**NOTE:** This document is not a replacement for the Oracle Database 10g Upgrade Guide. It should be used as a companion document to the Oracle Database documentation.

• **Note: 601807.1** Upgrade Companion 11g

Welcome to the Oracle Database 11g Upgrade Companion. This Upgrade Companion helps you to upgrade from either Oracle9i Release 2 (9.2) or Oracle Database 10g to Oracle Database 11g, and includes pre-upgrade, upgrade, and post-upgrade guidance. Oracle continually updates this document as new information becomes available. Please check this document prior to performing any upgrade.
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: 601807.1** Upgrade Companion 11g

This section documents important changes in behavior between Oracle 9i 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 Oracle 9i Release 2/Oracle Database 10g to Oracle Database 11g.

- Architecture
- Optimizer
- Initialization Parameters
- Performance and Monitoring
- Administration
- Streams
- Security
Documentation

- Upgrade Guide

- **Note: 429825.1**
  Complete Checklist for Manual Upgrades to 11gR1

- **Note: 421191.1**
  Complete checklist for manual upgrades from X to Y
Database.us.oracle.com: Upgrade Page

http://database.us.oracle.com
OTN Upgrade Page


Upgrading to Oracle Database 11g 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.

**Latest (November 2008)**

- Upgrade Oracle 9i->11g: A Customer Experience (November 2008)
- Hitchhikers Guide to Database Upgrade (OpenWorld 2008)
- Benefits of Upgrading to Oracle Database 11g (July 2008)
- Database Rolling Upgrade Using Transient Logical Standby: Oracle Data Guard 11g (June 2008)
- Database Rolling Upgrade Using Data Guard SQL Apply - Oracle Database 11g and 10gR2 (April 2008)
- Database Replay (RAT) DBUA for Upgrade (May 2008)

**Technical Information**

- Different Upgrade Methods for Upgrading your Database
- Complete Checklist for Manual Upgrades - 11gR1
- Complete Checklist for Upgrades - 11gR1 Using DBUA
- Database Server Upgrade/Downgrade Compatibility Matrix

**Upgrade Resources/Papers**

- Best Practices - Upgrading to Oracle Database 11g (Nov. 2007)
- Interoperability Notes E-Business Suite R12/Oracle Database 11gR1 (Metalink) (Oct. 2008)
- Upgrade to Oracle RAC 11g - Linux (OTN) (Oct. 2007)
- Innovate Faster with Oracle
OTN Upgrade Forum


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<th>Thread</th>
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<tbody>
<tr>
<td>OTN Database Upgrade Page</td>
</tr>
<tr>
<td>Posted By: Brian McCarthy - Aug 4, 2008 11:44 PM</td>
</tr>
<tr>
<td>11 client installed, 10 client still uses - which client is in use?</td>
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<tr>
<td>Upgrade from 10.2.0.1.0 x64 to 10.2.0.4.0 x64</td>
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<td>How to Upgrade the DB through exp/imp utility</td>
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<td>Using DBUA to migrate Oracle 9i to Oracle 11g</td>
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<td>Migrating Report from 10.7 to 11i Apps (data bases 7.6 to 11.2)</td>
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<td>9.2.0.7 to 10.2.0.3 upgrade with DBUA do I need 2 change the Spfile manually</td>
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<td>trigger problem</td>
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<td>upgrade oracle 10.2.3.0 patchset2 to 10.2.3.0 patchset</td>
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# External 11g References

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<th>Ref.</th>
<th>Name ▲</th>
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<th>Industry</th>
<th>Releases</th>
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<th>Systems</th>
<th>Platforms</th>
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<tbody>
<tr>
<td>✔️</td>
<td>1-800-Flowers (BloomNet)</td>
<td>United States</td>
<td>Consumer/Retail/Distribution</td>
<td>11gR1</td>
<td>1</td>
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<td>Comic Relief - RND05</td>
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<td>2</td>
<td>3</td>
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<td>Healthcare</td>
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<td>HP</td>
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<td>ASM</td>
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<td>NCPA</td>
<td>United States</td>
<td>Public Services</td>
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<tr>
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<td>National Ignition Facility</td>
<td>United States</td>
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<td>HP</td>
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<tr>
<td>✔️</td>
<td>RTL (Radio Television Luxemburg)</td>
<td>France</td>
<td>Communications and Media</td>
<td>11gR1</td>
<td>2</td>
<td>1</td>
<td>Sun</td>
<td>Solaris</td>
<td>-</td>
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<tr>
<td>✔️</td>
<td>Rakuten Travel</td>
<td>Japan</td>
<td>Communications and Media</td>
<td>11gR1</td>
<td>10</td>
<td>1</td>
<td>IBM</td>
<td>AIX</td>
<td>ASM</td>
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<tr>
<td>✔️</td>
<td>SPH Search Servicio Electronico de Pago, S.A.</td>
<td>Argentina</td>
<td>Services</td>
<td>11gR1</td>
<td>2</td>
<td>1</td>
<td>IBM</td>
<td>AIX</td>
<td>-</td>
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<tr>
<td>✔️</td>
<td>Spatial Eye Trivadis</td>
<td>Netherlands</td>
<td>High Technology</td>
<td>11gR1</td>
<td>1</td>
<td>1</td>
<td>Dell</td>
<td>Windows</td>
<td>-</td>
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<tr>
<td>✔️</td>
<td>Turkcell</td>
<td>Switzerland</td>
<td>High Technology</td>
<td>11gR1</td>
<td>2</td>
<td>3</td>
<td>Dell</td>
<td>Windows</td>
<td>-</td>
</tr>
<tr>
<td>✔️</td>
<td>Verizon Wireless</td>
<td>Turkey</td>
<td>Telecommunications</td>
<td>11gR1</td>
<td>1</td>
<td>6</td>
<td>HP</td>
<td>HP-UX</td>
<td>ASM</td>
</tr>
<tr>
<td>✔️</td>
<td></td>
<td>United States</td>
<td>Telecommunications</td>
<td>11gR1</td>
<td>2</td>
<td>2</td>
<td>HP</td>
<td>Linux</td>
<td>ASM</td>
</tr>
</tbody>
</table>
Upgrade Paths

1. Export/Import
   - CTAS, COPY
     - SQL Apply
       - Oracle Streams
         - Transportable Tablespaces
           - Transportable Database
         - ORACLE Streams
       - ORACLE recommended
     - Downtime >45min?
       - Y
         - DBUA
           - SQL> @catupgrd
       - N
         - CLI
           - ORACLE recommended
   - UPGRADE
     - OS Change?
       - Y
         - Export/Import
       - N
         - Downtime >45min?
           - Y
             - DBUA
               - SQL> @catupgrd
           - N
             - CLI
               - ORACLE recommended
Preparation

• Get INVALID Objects:
  
  SQL> SELECT UNIQUE object_name, object_type, owner
  FROM dba_objects WHERE status='INVALID';

Recompile invalid objects in SYS and SYSTEM with `utlrp.sql`

• Compare invalid objects from before and after the upgrade
  • Beginning with 11.1.0.7 the comparison has been automated
  • `registry$sys_inv_objs, registry$nonsys_inv_objs` => `utluiobj.sql`

• 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!!!
Preparation

- Possibilities for performance analysis:
  - STATSPACK – export Perfstat user!!!
    - Note:394937.1 STATSPACK guide
  - AWR - extract the AWR
    - Do AWR diff reports comparing before/after upgrade
  - Real Application Testing
    - SQL Performance Analyzer
    - Database Replay
Preparation

- Create dictionary statistics prior to the upgrade - otherwise it will take significantly longer

```sql
SQL> EXECUTE dbms_stats.gather_schema_stats
   (    'SYS',
       options          => 'GATHER',
       estimate_percent => DBMS_STATS.AUTO_SAMPLE_SIZE,
       method_opt       => 'FOR ALL COLUMNS SIZE AUTO',
       cascade          => TRUE);
SQL> EXECUTE dbms_stats.gather_dictionary_stats;
```

- Detailed scripts can be found here: [Oracle® Database Upgrade Guide Appendix B](#)

- Or in `/`: ```sql
   SQL> EXECUTE dbms_stats.gather_dictionary_stats;
```
Preparation

• Switch off DATABASE VAULT (if used/installed)
  • Oracle® Database Vault Administrator's Guide: Appendix B
  • Unix: (simplified)
    • Relinking without Database Vault
      [$ make -f ins_rdbms.mk dv_off ]
    • $ dvca -action disable ...
  • Windows:
    • Rename oradv10.dll in ORACLE_HOME\bin
    • Upon restart:
      $ dvca -action disable ...
  • After upgrading relink with dv_on or rename the DLL and enable Database Vault again:
    $ dvca -action enable ...
Preparation

• Drop `SYS.PLAN_TABLE$` and `SYS.PLAN_TABLE`
  • See Note: 605317.1 and Note:736353.1
  • Otherwise the component "Oracle Server" can be INVALID after the upgrade
    • Introduced with DBMS_SQLPA
  • Steps to solve this issue if it has happened:
    • `@catplan.sql` -- recreate the plan table
      `@dbmsxpln.sql` -- reload dbms_xplan spec
      `@prvtxpln.plb` -- reload dbms_xplan implementation
      `@prvtspxao.plb` -- reload dbms_sqlpa
Installation

• Space / resource requirements
  • Software installation:
    • 150-200 MB in /tmp or \TEMP necessary

• Seed database: $\geq$ 1.6 GB
  • Seed databases are always prebuilt EE databases with all options!!!

• RAM: $\geq$ 1GB

  • Swapspace
    • RAM between 513Mb and 2048Mb $\rightarrow$ 1.5x RAM
    • RAM between 2049Mb and 8192Mb $\rightarrow$ 1x RAM
    • RAM more than 8192Mb $\rightarrow$ 0.75x RAM

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Requirement for Software Files (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Edition</td>
<td>3.47</td>
</tr>
<tr>
<td>Standard Edition</td>
<td>3.22</td>
</tr>
<tr>
<td>Custom (maximum)</td>
<td>3.45</td>
</tr>
</tbody>
</table>
Installation

• How to access the software?
  • Download from OTN:  
    http://otn.oracle.com/software/index.html
  • Metalink:
    [Image of Oracle MetaLink]
  • http://edelivery.oracle.com/
Installation

• Download from OTN:

  Download the Complete Files
  • `linux_11gR1_database.zip` (1,844,533,232 bytes) (cksum - 4231932775)

  Directions
  1. All files are in the .zip format. There is an unzip utility [here](#) if you need one.
  2. Installation guides and general Oracle Database 11g documentation are [here](#).
  3. Review the certification matrix for this product [here](#).

  **Oracle Database 11g Release 1 Client (11.1.0.6.0) for Linux x86**
  • `linux_11gR1_client.zip` (458,677,395 bytes) (cksum - 2693183676)

  **Oracle Database 11g Examples (formerly Companion)**
  • `linux_11gR1_examples.zip` (457,209,469 bytes) (cksum - 606940067)

  **Oracle Clusterware Release 1 (11.1.0.6.0) for Linux x86**
  • `linux_11gR1_clusterware.zip` (244,854,895 bytes) (cksum - 3625236068)

  **Oracle Database Gateways 11g Release 1 (11.1.0.6.0) for Linux x86**
  • `linux_11gR1_gateways.zip` (451,061,474 bytes) (cksum - 1541243104)
Installation

• DVD contents?
  • Database
    • Enterprise Edition
    • Standard Edition
    • Personal Edition (Windows)
  • Client
  • Clusterware
• Extra: Examples (formerly known as companion)
  • Required Products
  • Oracle Globalization Support Demos
  • Oracle Multimedia Demos
  • Oracle Precompiler Demos
  • Oracle Spatial Demos
  • Oracle SQLJ Demos
  • Oracle XML Demos
  • Oracle JDBC Development Drivers
  • Oracle Text Knowledge Base
Installation

- Pre-installation checks:
  - Warning: 500MB swap space needed – also on Windows!!

- Ask support before installing with:
  
  ./runInstaller -ignoreSysPrereqs
Installation - Loopback Adapter for DBcontrol

- Launch the Windows Add Hardware Wizard
- Choose Yes, I've already connected the hardware ...
- Scoll down to Add a new hardware device
- Choose Install the hardware that I manually select ...
- Select Network Adapters:
- Click on Manufacturer Microsoft
- Install the Loopback Adapter
- Make the Loopback Adapter the FIRST network card in TCP/IP properties!!
Installation

**Oracle Database 11g**
Installs an optional preconfigured starter database, product options, management tools, networking services, utilities, and basic client software for an Oracle Database server. This option also supports Automatic Storage Management database configuration.

**Oracle Client**
Installs enterprise management tools, networking services, utilities, development tools and precompilers, and basic client software.

**Oracle Clusterware**
Installs the Oracle Clusterware components that provide the required infrastructure for Oracle Real Application Clusters. Oracle Clusterware also enables the management of Oracle Database and other applications within the cluster.
Installation

Select Installation Type
Oracle Database 11g 11.1.0.6.0

What type of installation do you want?

- Enterprise Edition (2.69GB)
  Oracle Database 11g Enterprise Edition, the first database designed for the grid, is a self-managing database that has the scalability, performance, high availability and security features required to run the most demanding, mission critical applications.

- Standard Edition (2.67GB)
  Oracle Database 11g Standard Edition is ideal for workgroups, departments and small-to-medium sized businesses looking for a lower-cost offering.

- Personal Edition (2.69GB)
  Supports single user development and deployment that require full compatibility with Oracle Enterprise Edition 11g and Oracle Standard Edition 11g.

- Custom
  Enables you to choose individual components to install.
Installation

**Important:**

"CUSTOM" ALWAYS installs Enterprise Edition
Installation

• Custom installation:
  • 10gR2 doc installation guide
    
    **Note:**
    If you purchased a Standard Edition license, and you perform a Custom installation, then ensure that you install only the components covered by the Standard Edition license.

  • 11gR1 doc installation guide
    
    **Note:**
    If you perform a Custom Installation, then ensure that you install only the components covered by your license. You can not install Standard Edition using Custom Installation.
Patch Set Installation

- Install patch sets and patches before you start the upgrade
Unattended Installation/Configuration

- Two options:
  - **Oracle Universal Installer OUI**
    - `./runInstaller -record -destinationFile ...`
    - `./runInstaller -silent -noconsole -responseFile ...`
    - But this has to be done for a patch set, too
  - **Home Cloning (script or Provisioning Pack)**
    - Prepare a fully patched Oracle Home
    - Create an archive consisting of all files
      - Exclude *log, *dbf, tnsnames/listener/sqlnet.ora
      - `./runInstaller -silent -clone -...
  - **Listener Configuration**
    - `./netca /silent /responseFile ...`
Installation

• Overview on differences of database editions and available options by edition
  • Feature differences:
    Note:465465.1 Differences Between Enterprise, Standard and Personal Editions on Oracle 10.2
  
  • Oracle® Database Licensing Information
    11g Release 1 (11.1)
    Part Number B28287-01
    http://download.oracle.com/docs/cd/B28359_01/license.111/b28287/editions.htm
Installation

• Windows OS - Home Selector:

![Oracle Universal Installer: Web](image)

**Welcome**

The Oracle Universal Installer: Web

Click "Installed Products...".
Listener Configuration

- Best Practices:
  Create a new listener environment with NETCA:
HANDS-ON

• OS Users:
  • oracle/oracle, root/welcome

• Install Image
  • 11.1.0.6 and 11.1.0.7
    • home/oracle/11g_image

• Environment variable files
  • 9.2.0.8: /home/oracle/.orac-92
  • 11g: /home/oracle/.orac-11g

• Oracle Users
  • sys/oracle, system/oracle

• Timezone patches have already applied on 9.2.0.8
• Don't create an 11g database - there's already an 9i db!
Agenda

- Preparation
- Upgrade
  - Database Upgrade Assistant
  - Command Line Upgrade
  - Post Upgrade
  - Alternatives
  - CRS Upgrade
  - ASM Upgrade
  - Migration
- Tuning
- Performance Testing
- Best Practice
Database Upgrade Assistant (GUI)

• Features:
  • Graphically led upgrade
  • Lots of important checks
  • RAC aware - inclusion of all nodes
    • for RAC (almost) a must !!!
  • Offline Backup and Restore possible
  • ASM upgrade
  • Oracle XE upgrade
  • Patch upgrades

• Logs:
  • $ORACLE_HOME/cfgtools/dbua

• Documentation:
  • Oracle® Database Upgrade Guide
Database Upgrade Assistant (GUI)

- Silent mode:
  - `$ dbua -help` shows all valid options
  - See doc: http://download.oracle.com/docs/cd/B28359_01/server.111/b28300/upgrade.htm
Database Upgrade Assistant (GUI)

- dbua [ -silent ] [ -sid SID ] [-oracleHome home_name]
  [-oracleBase base_name] [-diagnosticDest diagnostic_destination]
  [-sysDBAUserName SYSDBA_user] [-sysDBAPassword SYSDBA_pwd]
  [-upgradeASM] [-autoextendFiles] [-newGlobalDbName db_name]
  [-newSid new_SID] [-generateMapFile] [-useASM]
  [-commonFileLocation common_files] [-omfLocation omf_area]
  [-databaseMapFile map_file_name] [-newRecoveryArea recover_area]
  [-newRecoveryAreaSize recover_size] [-apexAdminPassword apex_pwd]
  [-disableUpgradeScriptLogging] [-backupLocation directory]
  [-sysauxTablespace -datafileName name -datafileSize size]
  [ -datafileSizeNext size -datafileSizeMax size]
  [-postUpgradeScripts script [,script ] ... ]
  [-initParam parameter=value [,parameter=value ] ... ]
  [-disableArchiveLogMode] [-recompile_invalid_objects true | false]
  [-degree_of_parallelism cpu_number]
  [-emConfiguration {CENTRAL|LOCAL|ALL|NOBACKUP|NOEMAIL|NONE}]
  -dbsnmpPassword password -sysmanPassword password
  -asmPassword password -hostUserName hostname
  -hostUserPassword password -backupSchedule hh:mm
  [-smtpServer server_name -emailAddress address]
  [-centralAgent location] [-localRacSid SID]]
  [-recoveryAreaDestination directory]
  [-h|-help]
Database Upgrade Assistant (GUI)

• Example:

```bash
dbu a -silent -sid dwh
-oracleHome /opt/oracle/product/RDBMS10g
-diagnosticDest /opt/oracle/diag
 -sysDBAUserName sys
 -sysDBAPassword manager
-recompile_invalid_objects true
 -degree_of_parallelism 4
-emConfiguration LOCAL
 -dbsnmpPassword manager
 -sysmanPassword manager
```
Database Upgrade Assistant (GUI)

• Before you start DBUA:
  • Run `?/rdbms/admin/utlu111i.sql` in your current environment
  • Check especially the components status in DBA_REGISTRY
    • To remove (or reinstall) components manually:
      Note:472937.1 Information On Installed Database Components
      Note:753041.1 How to diagnose Components with NON VALID status
Database Upgrade Assistant (GUI)

The Database Upgrade Assistant (DBUA) interactively steps you through upgrading your database to Oracle Database 11g Release 1 (11.1).

It can be used to perform major release upgrades from previous versions (Oracle9i Release 9.2.0, Oracle10g Release 10.1.0 and Oracle 10g Release 10.2.0) as well as apply new patchsets. Additionally, DBUA can be used to upgrades databases created using any edition of the Oracle Database software, including Express Edition (XE) databases.
Database Upgrade Assistant (GUI)

Select the operation that you want to perform:

- Upgrade a Database
  This operation upgrades the database to 11g Release 1 (11.1).

- Upgrade Automatic Storage Management Instance
  This operation upgrades only the Automatic Storage Management Instance on the system to 11g Release 1 (11.1)

[Image of database upgrade assistant]
Database Upgrade Assistant (GUI)

Select the database that you want to upgrade. If you do not see the database that you want, make sure that an entry with the database name exists in the /var/opt/oracle/oratab file.

Available Databases:

<table>
<thead>
<tr>
<th>Select</th>
<th>Database</th>
<th>Oracle Home</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ora10gR2</td>
<td>/export/orabase/product/10.2.0</td>
</tr>
<tr>
<td></td>
<td>ora10gR1</td>
<td>/export/orabase/product/10.1.0</td>
</tr>
<tr>
<td></td>
<td>ora91R2</td>
<td>/export/orabase/product/9.2.0</td>
</tr>
<tr>
<td></td>
<td>ora817</td>
<td>/export/orabase/product/8.1.7</td>
</tr>
<tr>
<td></td>
<td>MGO</td>
<td>/export/orabase/product/10.2.0</td>
</tr>
<tr>
<td></td>
<td>STBY</td>
<td>/export/orabase/product/10.2.0</td>
</tr>
<tr>
<td></td>
<td>beta11gR1</td>
<td>/export/orabase/product/11.1.0-beta</td>
</tr>
<tr>
<td></td>
<td>UPGRD</td>
<td>/export/orabase/product/9.2.0</td>
</tr>
</tbody>
</table>
Database Upgrade Assistant (GUI)

Select the database that you want to upgrade. If you do not see the database that you want, make sure that an entry with the database name exists in the /var/opt/oracle/oratab file.

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<td>ora10gR2</td>
<td>/export/orabase/product/10.2.0</td>
</tr>
<tr>
<td></td>
<td>ora10gR1</td>
<td>/export/orabase/product/10.1.0</td>
</tr>
<tr>
<td></td>
<td>ora9iR2</td>
<td>/export/orabase/product/9.2.0</td>
</tr>
</tbody>
</table>

Getting database information. Please wait...
Oracle Corporation strongly recommends that the following issues be resolved in the database "UPGRD" before you start the database upgrade:

The instance version does not match the dictionary version which is possible when the database is not patched to the release. Execute catpatch.sql from source OracleHome/dbms/admin/ before you start the upgrade process, to resolve this conflict.

Default privileges granted to the CONNECT role have been reduced for security reasons. As a result, users who have been granted the CONNECT role will only have the "CREATE SESSION" privilege after upgrade. If you wish to ensure that users do not lose any privileges that they were granted previously via the connect role, you will need to grant them manually after upgrade.

Database contains schemas with objects dependent on network packages. Refer to the 11g Upgrade Guide for instructions to configure Network ACLs.

Database contains stale optimizer statistics. Refer to the Upgrade Guide for instructions to update statistics prior to upgrading the database.

Do you want to continue with upgrade?
Specify if you want to move the database files during the upgrade process.

- Do Not Move Database Files as Part of Upgrade
- Move Database Files during Upgrade

Select the storage mechanism you would like to use for the database.

- File System
  Use the File System for Database storage.

- Automatic Storage Management (ASM)
  Automatic Storage Management simplifies database storage administration and optimizes database layout for I/O performance. To use this option, an ASM instance should exist on this host with configured disk groups, otherwise, please use DBCA to create an ASM instance and necessary disk groups on this host then re-start the DBUA.
Specify if you want to move the database files during the upgrade process.

- Do Not Move Database Files as Part of Upgrade
- Move Database Files during Upgrade

Select the storage mechanism you would like to use for the database.

- File System
  - Use the File System for Database storage.

**Automatic Storage Management (ASM)**

Automatic Storage Management simplifies database storage administration and optimizes database layout for I/O performance. To use this option, an ASM instance should exist on this host with configured disk groups, otherwise, please use DBCA to create an ASM instance and necessary disk groups on this host then re-start the DBUA.
Database Upgrade Assistant (GUI)

Specify locations for the Database files to be created:

- Use Common Location for All Database Files
  - Database Files Location: C:\oracle\oradata

- Use Oracle-Managed Files
  - Database Area:
  - Browse...
  - Multiplex Redo Logs and Control Files...

- Use a Mapping File to Specify Location of Database Files
  - Mapping File:
  - Browse...

If you want to specify different locations for database files, choose 'Use a Mapping File to Specify Location of Database Files' option. A sample mapping file has been generated in the logging location. You could edit the property values of the mapping file to specify a location for each database file.
**Database Upgrade Assistant (GUI)**

**ORACLE_BASE** specifies the top level directory for OFA-compliant installations.

**Oracle Base:** /export/orabase

Diagnostic destination is the default location to store Oracle trace and diagnostic files. It replaces the initialization parameter settings for background dump destination, user dump destination and core dump destination from earlier releases.

**Diagnostic Destination:** /export/orabase
Database Upgrade Assistant (GUI)

Flash Recovery Area is an Oracle managed disk location used for storing backup and recovery related files. Oracle strongly recommends configuring a flash recovery area as it significantly enhances speed, reliability and manageability of the database recovery process.

- Specify Flash Recovery Area
  - Oracle recommends that the database files and recovery files be located on physically different disks for data protection and performance.

Flash Recovery Area: /export/oradata/UPGRD:flash_recover
Flash Recovery Area Size: 1000 MBytes

[Image of Oracle Database Upgrade Assistant GUI]

[Button options: Cancel, Help, Back, Next]
Database Upgrade Assistant (GUI)

Oracle Database 11g requires a SYSAUX tablespace that serves as an auxiliary tablespace to the SYSTEM tablespace. Most of the SYSAUX tablespace properties are set automatically and cannot be modified. However, you can specify the following properties:

- **Datafile**: `/export/orabase/oradata/UPGRD/sysaux01.dbf`
- **Reuse Existing File Name**
- **Size**: 200 MBytes
- **Automatically extend datafile when full (AUTOEXTEND)**
  - **Increment**: 1 MBytes
  - **Maximum Size**
    - **Unlimited**
    - **Value**: 0 MBytes
Database Upgrade Assistant (GUI)

Each Oracle database may be managed centrally using the Oracle Enterprise Manager Grid Control or locally using the Oracle Enterprise Manager Database Control. Choose the management option that you would like to use to manage this database.

- **Configure the Database with Enterprise Manager**
- **Register with Grid Control for centralized management**
  - Management Service: No Agents Found
- **Configure Database Control for local management**
- **Enable Alert Notifications**
- **Outgoing Mail (SMTP) Server:**
- **Recipient Email Address:**
- **Enable Daily Disk Backup to Recovery Area**
  - Backup Start Time: 02:00 AM
  - OS Username: oracle
  - Password: ******

From 11g on always SECURE
Database Upgrade Assistant (GUI)

<table>
<thead>
<tr>
<th>Policy</th>
<th>Security Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable computer and user accounts to be trusted...</td>
<td>Administrators</td>
</tr>
<tr>
<td>Force shutdown from a remote system</td>
<td>Administrators</td>
</tr>
<tr>
<td>Generate security audits</td>
<td>LOCAL SERVICE,NETWORK...</td>
</tr>
<tr>
<td>Impersonate a client after authentication</td>
<td>ASPNET,Administrators,SE...</td>
</tr>
<tr>
<td>Increase scheduling priority</td>
<td>Administrators</td>
</tr>
<tr>
<td>Load and unload device drivers</td>
<td>Administrators</td>
</tr>
<tr>
<td>Lock pages in memory</td>
<td>Administrators</td>
</tr>
<tr>
<td>Log on as a batch job</td>
<td>ASPNET</td>
</tr>
<tr>
<td>Log on as a service</td>
<td>NETWORK SERVICE,ASPNET</td>
</tr>
<tr>
<td>Log on locally</td>
<td>_vmware__Guest,Admini...</td>
</tr>
<tr>
<td>Manage auditing and security log</td>
<td>Administrators</td>
</tr>
<tr>
<td>Modify firmware environment values</td>
<td>Administrators</td>
</tr>
<tr>
<td>Perform volume maintenance tasks</td>
<td>Administrators</td>
</tr>
<tr>
<td>Profile single process</td>
<td>Administrators,Power Users</td>
</tr>
<tr>
<td>Profile system performance</td>
<td>Administrators</td>
</tr>
<tr>
<td>Remove computer from docking station</td>
<td>Administrators,Users,Powe...</td>
</tr>
<tr>
<td>Replace a process level token</td>
<td>LOCAL SERVICE,NETWORK...</td>
</tr>
<tr>
<td>Restore files and directories</td>
<td>Administrators,Backup Ope...</td>
</tr>
<tr>
<td>Shut down the system</td>
<td>Administrators,Users,Powe...</td>
</tr>
<tr>
<td>Synchronize directory service data</td>
<td>Administrators</td>
</tr>
<tr>
<td>Take ownership of files or other objects</td>
<td>Administrators</td>
</tr>
</tbody>
</table>
Database Upgrade Assistant (GUI)

For security reasons, you must specify passwords for the following user accounts.
Note: DBSNMP user password will be modified if the account already exists in the database.

- Use Different Passwords

<table>
<thead>
<tr>
<th>User Name</th>
<th>Password</th>
<th>Confirm Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBSNMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSMAN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Use the Same Password for All Accounts

Password:  [Field]
Confirm Password:  [Field]
Upgrade process will invalidate objects in the database. You may recompile invalid objects during upgrade. Doing so will increase db upgrade time but minimizes subsequent latencies caused by on-demand automatic recompilation at runtime. Oracle recommends recompiling of invalid objects as a part of upgrade.

☑ Recompile invalid objects at the end of upgrade

Parallel recompilation reduces the time taken to recompile invalid objects. Based on the number of CPUs detected, Oracle has set the following default degree of parallelism.

Degree of Parallelism:

1
2
3
4
Database Upgrade Assistant (GUI)

Oracle strongly recommends that you back up your database before starting the upgrade. If errors occur during the upgrade, you may need to restore the database from the backup.

Would you like to backup your database?

- [x] Backup database

If you select this option, the Database Upgrade Assistant will perform an offline backup of the database. A script will be created to restore the database. All files will be placed in the specified backup directory.

Backup Directory:
/export/orabase/admin/UPGRD/backups

Browse...
Database Upgrade Assistant (GUI)

Database Upgrade Summary

<table>
<thead>
<tr>
<th>Database</th>
<th>Target Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>UPGRD</td>
</tr>
<tr>
<td>Version:</td>
<td>9.2.0.1.0</td>
</tr>
<tr>
<td>Oracle Home:</td>
<td>/export/orabase/product/9.2.0</td>
</tr>
</tbody>
</table>

**Warnings Ignored**

- The instance version does not match the dictionary version which is possible when the database is not patched to the release. Execute catpatch.sql from source OracleHome/dtms/admin/ before you start the upgrade process, to resolve this conflict.
- Default privileges granted to the CONNECT role have been reduced for security reasons. As a result, users who have been granted the CONNECT role will only have the "CREATE SESSION" privilege after upgrade. If you wish to ensure that users do not lose any privileges that they were granted previously via the connect role, you will need to grant them manually after upgrade.
- Database contains schemas with objects dependent on network packages. Refer to the 11g Upgrade Guide for instructions to configure Network ACLs.
- Database contains stale optimizer statistics. Refer to the Upgrade Guide for instructions to update statistics prior to...
Database Upgrade Assistant (GUI)

DBUA will shutdown the database during the upgrade process. The Database will not be available for general use during the upgrade process.

Database Components to be Upgraded

Database Components
- Oracle Server
- JServer JAVA Virtual Machine
- Oracle XDK for Java
- Oracle Workspace Manager
- OLAP Analytic Workspace
- OLAP Catalog
- Oracle Text
- Oracle XML Database
- Oracle Java Packages
- Oracle InterMedia
- Spatial
- Data Mining
- Oracle Ultra Search
- Oracle OLAP API

Finish
Database Upgrade Assistant (GUI)

DBUA will shutdown the database during the upgrade process. The Database will not be available for general use during the upgrade process.

**Initialization Parameter changes**

The following changes will be made in the initialization parameters:

**Parameters to be added:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>diagnostic_dest</td>
<td>/export/oradata/UPGRD</td>
</tr>
<tr>
<td>db_recovery_file_dest</td>
<td>/export/oradata/UPGRD/flash_recovery_area</td>
</tr>
<tr>
<td>db_recovery_file_dest_size</td>
<td>1048576000</td>
</tr>
</tbody>
</table>

**Parameters to be updated:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Old Value</th>
<th>New Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>shared_pool_size</td>
<td>117440512</td>
<td>492854067</td>
</tr>
<tr>
<td>java_pool_size</td>
<td>33554432</td>
<td>134217728</td>
</tr>
<tr>
<td>compatible</td>
<td>9.2.0.0.0</td>
<td>10.1.0</td>
</tr>
</tbody>
</table>

**Obsolete Parameters to be removed:**

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>hash_join_enabled</td>
</tr>
</tbody>
</table>
Database Upgrade Assistant (GUI)

- Upgrading database "UPGRD" from Oracle version "9.2.0.1.0" ("/export/orabase/product/9.2.0") to Oracle version "11.1.0.6" ("/export/orabase/product/11.1.0-beta").
- Performing Pre Upgrade:
  - Upgrading Oracle Server
  - Upgrading JServer JAVA Virtual Machine
  - Upgrading Oracle XDK for Java
  - Upgrading Oracle Workspace Manager
  - Upgrading OLAP Analytic Workspace
  - Upgrading OUII Catalog

Oracle database upgrade in progress

Log files for the current operation are located at:
/export/orabase/cfgbollogs/dbua/UPGRD/upgrade2
Database Upgrade Assistant (GUI)

DBUA will shutdown the database during the upgrade process. The Database will not be available for general use during the upgrade process.

Upgrading database "SOURCE" from Oracle version "10.2.0.1.0" ("c:\oracle\ora102") to Oracle version "11.1.0.6" ("C:\oracle\ora11g").

- Performing Pre Upgrade
- Upgrading Oracle Server
- Upgrading Oracle Workspace Manager
- Creating Enterprise Manager Repository
- Performing Post Upgrade
- Configuring Database with Enterprise Manager
- Generating Summary

100%

Log files for the current operation are located at:
C:\oracle\cfgtoollogs\dubual\SOURCE\upgrade1

Upgrade is complete. Click "Ok" to see the results of the upgrade.
Agenda

- Preparation
- Upgrade
  - Database Upgrade Assistant
  - Command Line Upgrade
- News and Task List
- Tuning
  - Post Upgrade
  - Alternatives
  - CRS Upgrade
  - ASM Upgrade
  - Migration
- Performance Testing
- Best Practice
Command Line Upgrade

- E.g. changing to a new server

1) Install Oracle11g software
2) Copy utlu111i.sql
3) Run utlu111i.sql
4) Shutdown database
5) Copy all relevant files
6) Apply suggested changes
7) Start the upgrade process
Command Line Upgrade

- Command line upgrade step-by-step:
  1. Complete online backup of the database
  2. Install 11g Oracle software
  3. Analyze the DB using `utlu111i.sql` and follow all requirements given by the script
  4. Create a new listener with NETCA
  5. Switch to the new environment, startup the DB (`startup upgrade`) and create the `SYSAUX` tablespace (if source db is an Oracle 9i db)
  6. Run upgrade script `catupgrd.sql` and afterwards recompile: `utlrp.sql`
  7. Check the post upgrade status: `utlu111s.sql`
  8. Run `catuppst.sql` if you are upgrading from 10g
Command Line Upgrade

- Upgrade information script: `utlu111i.sql`
  - Run in the environment of the source database
  - Checks all init parameters and displays warnings for obsolete and deprecated parameters
- Checks
  - Components
  - Tablespace SYSAUX
  - Characterset
  - Timezone file version check
  - Cluster check
**Command Line Upgrade**

- **utlu111i.sql**: DB info and time zone check? (see also PREPARATION)

  1. Database: 
  **-- name: SOURCE**  
  **-- version: 10.2.0.1.0**  
  **-- compatible: 10.2.0.1.0**  
  **-- blocksize: 8192**  
  **-- platform: Microsoft Windows IA (32-bit)**  
  **-- timezone file: V2**

- DST (Daylight Savings Time) patches for Version V4 have to be applied as a requirement for the upgrade to Oracle Database 11g

  2. **REGISTRY$DATABASE ==> TZ_VERSION=4**

  Database: 
  **-- name: SOURCE**  
  **-- version: 10.2.0.1.0**  
  **-- compatible: 10.2.0.1.0**  
  **-- blocksize: 8192**  
  **-- platform: Microsoft Windows IA (32-bit)**  
  **-- timezone file: V4**
Command Line Upgrade

• `utlu111i.sql`: Tablespace adequate size?

```
Tablespaces: [make adjustments in the current environment]
--- SYSTEM tablespace is adequate for the upgrade.
.... minimum required size: 326 MB
.... AUTOEXTEND additional space required: 26 MB
--- UNDOTBS1 tablespace is adequate for the upgrade.
.... minimum required size: 343 MB
.... AUTOEXTEND additional space required: 218 MB
--- SYSAUX tablespace is adequate for the upgrade.
.... minimum required size: 86 MB
--- TEMP tablespace is adequate for the upgrade.
.... minimum required size: 61 MB
.... AUTOEXTEND additional space required: 41 MB
```
Command Line Upgrade

• `<utlu111i.sql>`: Init parameter changes?

  1. Update Parameters: [Update Oracle Database 11.1 init.ora or spfile]
     WARNING: --> "sga_target" needs to be increased to at least 336 MB

  2. Renamed Parameters: [Update Oracle Database 11.1 init.ora or spfile]
     -- No renamed parameters found. No changes are required.

  3. Obsolete/Deprecated Parameters: [Update Oracle Database 11.1 init.ora or spfile]
     --> "background_dump_dest" replaced by "diagnostic_dest"
     --> "user_dump_dest" replaced by "diagnostic_dest"
     --> "core_dump_dest" replaced by "diagnostic_dest"
Command Line Upgrade

- **utlu111i.sql**: Components and options?

  5 **Components**: [The following database components will be upgraded or installed]
  
<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Catalog Views</td>
<td>upgrade</td>
<td>VALID</td>
</tr>
<tr>
<td>Oracle Packages and Types</td>
<td>upgrade</td>
<td>VALID</td>
</tr>
<tr>
<td>Oracle Workspace Manager</td>
<td>upgrade</td>
<td>VALID</td>
</tr>
</tbody>
</table>

- **Annotation:**
  You'll have to install all options installed for the release you are upgrading from – otherwise some components can’t be upgraded

- To remove (or reinstall) components manually:
  Note:472937.1 Information On Installed Database Components
  Note:753041.1 How to diagnose Components with NON VALID status
Command Line Upgrade - 10gR2

- **utlu102i.sql**: Typical pitfalls

```sql
Components: [The following database components will be upgraded or installed]

--- Oracle Catalog Views [upgrade]
--- Oracle Packages and Types [upgrade]

--- JServer JAVA Virtual Machine [upgrade]
...The 'JServer JAVA Virtual Machine' JAccelerator (NCOMP)
...is required to be installed from the 10g Companion CD.

--- Oracle ADK for Java [upgrade]
--- Oracle Java Packages [install]
--- Oracle Text [upgrade]
--- Oracle XMT Database [install]

--- Oracle interMedia [upgrade]
...The 'Oracle interMedia Image Accelerator' is
...required to be installed from the 10g Companion CD.
--- Spatial [upgrade]
```

- Ideally include the Companion-CD's "Oracle Database Products" in all installations:

![Oracle 10gR2 Installation Components](image)
Command Line Upgrade

- Create Dictionary statistics
- Shutdown the database (IMMEDIATE/NORMAL)
- Adjust init parameters:
  - COMPATIBLE $\geq 10.1.0$
  - SGA_TARGET $\geq 340$MB (32-bit) ... $\geq 640$MB (64-bit)
  - PGA_AGGREGATE_TARGET $\geq 25$MB
  - LOG_ARCHIVE_FORMAT must contain %s, %t and %r

- Move init.ora/SPFILE and PWDsid.ora to their new location
- Create a new 11g-Listener (use the NETCA)
- Change environment to point to the new $\$ORACLE\_HOME$
Command Line Upgrade

- Windows only:
  - Delete the old Service:
    > oradim -DELETE -SID ORCL
  - Create a new Service:
    > oradim -NEW
      -SID ORCL
      -SYSPWD passwd
      -STARTMODE a
      -PFILE initfile

ORADIM creates a logfile in %ORACLE_HOME%\database
Command Line Upgrade

SQL> STARTUP UPGRADE;

ALTER SYSTEM enable restricted session;
ALTER SYSTEM SET _system_trig_enabled=FALSE SCOPE=MEMORY;
ALTER SYSTEM SET aq_tm_processes=0 SCOPE=MEMORY;
MMNL started with pid=12, OS id=336
ALTER SYSTEM SET resource_manager_plan='' SCOPE=MEMORY;
replication_dependency_tracking turned off (no async multimaster replication found)
Completed: ALTER DATABASE OPEN MIGRATE

• Supresses unnecessary error messages like ORA-00942: table or view does not exist - thus logfiles will be easier to read and check
Command Line Upgrade

• Create tablespace SYSAUX (only if source is a 9i db):

```
SQL> CREATE TABLESPACE sysaux
        DATAFILE 'file' SIZE 500M
        EXTENT MANAGEMENT LOCAL
        SEGMENT SPACE MANAGEMENT AUTO
        ONLINE;
```
Command Line Upgrade

• One upgrade scripts for all releases and all components:

  SQL> @catupgrd.sql

• Useful:

  SQL> SPOOL c:\temp\upgrade.log
Command Line Upgrade

• Recompilation:
  • `utlprp.sql`
    • Calls `utlprp.sql` with CPU_COUNT-1
    • Determines automatically if serial or parallel recompilation with multiple threads can be done
    • Recompiles all INVALID objects
    • Utilizes package `utl_recomp`
    • Re-enables functional indexes automatically
      • `utlprp.sql` can be called directly like:
        • SQL> @utlprp 7
        • This can be useful to minimize CPU usage
Command Line Upgrade

• Progress during recompilation:

1. Query returning the number of invalid objects remaining. This number should decrease with time.
   
   ```sql
   SELECT COUNT(*) FROM obj$ WHERE status IN (4, 5, 6);
   ```

2. Query returning the number of objects compiled so far. This number should increase with time.
   
   ```sql
   SELECT COUNT(*) FROM UTL_RECOMP_COMPILED;
   ```

3. Query showing jobs created by UTL_RECOMP.
   
   ```sql
   SELECT job_name FROM dba_scheduler_jobs
   WHERE job_name like 'UTL_RECOMP_SLAVE_%';
   ```

4. Query showing UTL_RECOMP jobs that are running.
   
   ```sql
   SELECT job_name FROM dba_scheduler_running_jobs
   WHERE job_name like 'UTL_RECOMP_SLAVE_%';
   ```
Command Line Upgrade

- Post upgrade script: `utlu111s.sql`
  - Run against new database in 11g environment
  - Checks the upgrade results according to `DBA_REGISTRY`
  - Displays duration of the upgrade per component and in total
Command Line Upgrade

• Post upgrade script: \texttt{utlu111s.sql}

```
SQL> @utlu111s.sql
Oracle Database 11.1 Post-Upgrade Status Tool 08-14-2007 13:45:23

\begin{tabular}{|l|l|l|l|}
\hline
Component & Status & Version & HH:MM:SS \\
\hline
Oracle Server & VALID & 11.1.0.6.0 & 00:33:34 \\
Oracle Workspace Manager & VALID & 11.1.0.6.0 & 00:01:09 \\
Gathering Statistics & & & 00:02:45 \\
\hline
\end{tabular}

\textbf{Total Upgrade Time: 00:37:30}
```
HANDS-ON

- Run utlu111i.sql and check for time zone version:
  - \texttt{REGISTRY$DATABASE} \Rightarrow \texttt{TZ\_VERSION=4}
- Check for invalid objects
  - Recompile with utlrp.sql if any invalid objects in SYS/SYSTEM
- Create dictionary statistics
- Drop possibly existing \texttt{SYS\_PLAN\_TABLE$} and \texttt{SYS\_PLAN\_TABLE}
- Start the upgrade either with \texttt{DBUA} or on the command line
Agenda

- Preparation
- Upgrade: Database Upgrade Assistant, Command Line Upgrade
- News and Task List
- Tuning: Post Upgrade Alternatives, CRS Upgrade, ASM Upgrade, Migration
- Performance Testing
- Best Practice
Post Upgrade - SPFILE

- Always create an editable init.ora from the current SPFILE after the upgrade has been finished
- SPFILE is:
  - It’s a binary file!!!
  - Default since Oracle 9.0
  - It simply exists after using DBUA or DBCA
  - Parameter can be changed by:
    
    SQL> alter system set PARAMETER=VALUE scope=both;

or:

    SQL> create pfile from spfile;
    Now edit init.ora with an editor:
    SQL> startup force pfile=initDB.ora
    SQL> create spfile from pfile;
Post Upgrade

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

```sql
SQL> EXECUTE dbms_stats.gather_system_stats('start');
...
SQL> EXECUTE dbms_stats.gather_system_stats('stop');
...
SQL> select pname NAME, pval1 VALUE, pval2 INFO
         from aux_stats$;
```

<table>
<thead>
<tr>
<th>NAME</th>
<th>VALUE</th>
<th>INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td></td>
<td>COMPLETED</td>
</tr>
<tr>
<td>DSTART</td>
<td>04-03-2008 12:30</td>
<td></td>
</tr>
<tr>
<td>DSTOP</td>
<td>05-03-2008 12:30</td>
<td></td>
</tr>
<tr>
<td>FLAGS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CPUSPEEDNW</td>
<td>1392.39</td>
<td></td>
</tr>
<tr>
<td>IOSEEKTIM</td>
<td>11,405</td>
<td></td>
</tr>
<tr>
<td>IOTFRSPEED</td>
<td>25595.605</td>
<td></td>
</tr>
</tbody>
</table>
Post Upgrade

• Create **fixed table statistics** soon after the upgrade:

```
SQL> execute
       dbms_stats.gather_fixed_objects_stats;
```
HANDS-ON

- Create a writable copy of your SPFILE
- Create system statistics
  - Check aux_stats$
  - Create system statistics without 'start' and 'stop'
  - Create system statistics with 'start' and 'stop'
- Create fixed table statistics