What’s New with Oracle Database 12c on Windows
On-Premises and in the Cloud

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Oracle Database 12.1.0.2 on Windows Released!!

Certified on Windows Server 2012 R2
Hyper-V with Windows Server 2012
R2 guest OS for RAC and single instance
Program Agenda

1. Windows Platform Support
2. Security
3. Performance and Clustering
4. Azure
5. .NET
Windows Platform Support
Windows 8.1 and Windows Server 2012 R2

Supported Editions

• Windows 8.1 Editions
  – Pro
  – Enterprise

• Windows Server 2012 R2 Editions
  – Essentials
  – Foundation
  – Standard
  – Datacenter
# Windows 32-bit Platform Support

<table>
<thead>
<tr>
<th>OS</th>
<th>11gR1</th>
<th>11gR2 #1</th>
<th>12cR1 client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 7</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows Server 2008</td>
<td>11.1.0.7</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows Server 2008 R2</td>
<td>11.1.0.7</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows 8</td>
<td>No</td>
<td>11.2.0.4</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows 8.1</td>
<td>No</td>
<td>11.2.0.4</td>
<td>12.1.0.2</td>
</tr>
<tr>
<td>Windows Server 2012</td>
<td>No</td>
<td>11.2.0.4</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#1 RAC not supported for 32-bit Windows in 11gR2 and later
## Windows 64-bit (x64) Platform Support

<table>
<thead>
<tr>
<th>OS</th>
<th>11gR1</th>
<th>11gR2</th>
<th>12cR1</th>
</tr>
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<tr>
<td>Windows 7 #1</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows Server 2008</td>
<td>11.1.0.7</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows Server 2008 R2</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows 8 #1</td>
<td>No</td>
<td>11.2.0.4</td>
<td>Yes</td>
</tr>
<tr>
<td>Windows 8.1 #1</td>
<td>No</td>
<td>11.2.0.4</td>
<td>12.1.0.2</td>
</tr>
<tr>
<td>Windows Server 2012</td>
<td>No</td>
<td>11.2.0.4</td>
<td>12.1.0.2</td>
</tr>
<tr>
<td>Windows Server 2012 R2</td>
<td>No</td>
<td>11.2.0.4 (Planned #2)</td>
<td>12.1.0.2</td>
</tr>
</tbody>
</table>

#1 RAC and some other features not supported on Windows client

#2 Single Instance and Client support now; RAC support planned in CY2014

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Oracle Client (Windows 32-bit version) is also supported on Windows x64 systems
Hyper-V Certification

• Windows Server 2012
  – DB 12.1 (Single Instance) and DB 11.2.0.4 (Single Instance)
    • Certified on Windows 2012 guest OS
    • Certified on Windows 2008 R2 guest OS

• Windows Server 2012 R2
  – DB 12.1.0.2 (SI and RAC)
    • Certified on Windows 2012 R2 guest OS
  – DB 11.2.0.4 (SI and RAC)
    • Planned certification on Windows 2012 R2 guest OS
Security
Security

• Oracle Home User support
• Windows Native Authentication
• Kerberos and ASM enhancements
Oracle Home User Support

- Run Windows Services for Oracle using a standard Windows account
- Specify a standard (not an administrator) Windows User Account as Oracle Home User during install and upgrade
Oracle Home User

• Different from Oracle Installation User who must have OS administration privileges
• Services for the Oracle Home run with this user name
• Can be Windows Built-in Account or a standard Windows User Account
• Can not be changed post install
• Have similarities with ‘oracle’ user on Linux, though you can not log in as the Oracle Home User on Windows and perform administration tasks (e.g. Create DB, Install, Upgrade)
## Install

- Only OS Administrators can install Oracle

<table>
<thead>
<tr>
<th>Windows Account option for Oracle Home User</th>
<th>DB Server (SI)</th>
<th>DB Client</th>
<th>DB Server (RAC)</th>
<th>Grid Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in Account</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Local User Account (Enter user id and password)</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Managed Services Account (Enter user id only)</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Domain Account (Enter user id and password)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
For Built-in Account option, Windows Services run under LocalService (not LocalSystem) for Database Client
Oracle Grid Infrastructure Install

Specify Oracle Home User

Oracle recommends that you specify a standard Windows User Account (not an Administrator account) to install and configure the Oracle Home for enhanced security. This account is used for running the Windows Services for the Oracle Home. Do not log in using this account to perform administrative tasks.

- **Existing Windows User**
  - **User Name:**
  - **Password:**

- **Create New Windows User**
  - **User Name:**
  - **Password:**
  - **Confirm Password:**

  The newly created user is denied Windows logon privileges.

- **Use Windows Built-in Account**
Oracle Database Services on Windows

Windows Services
- Oracle Listener Service
- Oracle Database Service

File System ACLs
- ORACLE HOME
- ORACLE BASE
- Other Files
- Databases

- Services run as a Windows User (e.g. domain1\frank)
- Each service also has a unique Service SID (e.g. Database sid orcl has service SID: NT AUTHORITY\OracleServiceORCL)
- Either user name or Service SID can be used to grant privileges or set ACLs for file system access
- Oracle sets appropriate ACLs for Oracle Home and Oracle Base
- For customer specific files/directories in non-standard locations, ACLs may need to be changed to make them accessible to Oracle Services

Please check Oracle Database Platform Guide 12.1 for Microsoft Windows for more information.
Database Creation

• Database Configuration Assistant (DBCA) is used to create or modify Oracle Database as a part of install or as post install action

• Administrator, invoking the tools, need to be an OS Administrator and should have appropriate database privileges

• Use the icon *Database Configuration Assistant* (the icon is set up to “run as administrator”) to invoke DBCA

• As Windows Service creation requires both user id and password, DBCA will ask for the password of Oracle Home User (if needed) in order to create the Windows Service
  • For Single Instance DB, password is needed for Windows Local User and Domain User
  • For RAC, the customer has the option to store password in wallet; if not stored, the password needs to be input for Windows Domain User
Oracle Database Upgrade
Oracle Home and Database Upgrade

• Database Upgrade Assistant (DBUA) is used for database upgrade across Oracle Homes as a part of install or as post install action
• Administrator, invoking the tools, needs to be an OS Administrator and should have appropriate database privileges
• Use the icon Database Upgrade Assistant (the icon is set up to “run as administrator”)
• Requirement to enter Oracle Home User and Password is similar to Database creation
  • When a database is upgraded, it will ask for password of Oracle Home User (if needed)
Administration Tools

• All GUI tools (e.g. DBCA, NETCA) enhanced to support Oracle Home User and ask for password if needed

• All command line tools (e.g. ORADIM, LSNRCTL, CMCTL) enhanced to accept Oracle Home User name and password through stdin for service creation

• Silent Install and Cloning enhanced to support Oracle Home User

• CRSCTL can be used to create wallet for storing password of Oracle Home User (RAC environment)

• Enterprise Manager support of Oracle Home User for provisioning, patching, and service creation
Management of Oracle Home User

- As it is a standard Windows user, Windows tools can be used to manage the Windows account (e.g. add privileges, change password)
- For changing password of the Oracle Home User account
  - Use Windows tools to change the password
  - Windows also requires all Windows Services to be updated to use the new password
  - For all Windows Services used by Oracle, you can use the icon Update Password for Oracle Home User to:
    - update password for all Windows services used by Oracle on a computer (Single Instance Database or Client)
    - change password in Oracle wallet and update password for all Windows services used by Oracle in a cluster (for RAC)

You can also use the tool Oracle Home User Control (orahomeuserctl) in command line (run as administrator)
Security

• Oracle Home User support
• Windows Native Authentication
• Kerberos and ASM enhancements
Windows Native Authentication (NTS)

- Enabled by default and can work across Windows systems
- Windows user logon credentials used for database authentication
- Windows Explorer or Oracle Administration Assistant can be used to manage user authentication and role authorization
- Works for Pluggable Databases
- New client-side parameter in sqlnet.ora:
  - "no_ntlm", which may be set to true for security reasons.
  (This only works for domain users)

Examples:  CONNECT / AS SYSDBA
            CONNECT /
Windows Native Authentication
SYSDBA and SYSOPER Privileges

- **ORA_DBA**
  - SYSDBA privileges for all Oracle Databases on the system

- **ORA_OPER**
  - SYSOPER privileges for all Oracle Databases on the system

- **ORA_<HomeName>_DBA (12cR1)**
  - SYSDBA privileges for Oracle Databases on a specific Oracle Home

- **ORA_<HomeName>_OPER (12cR1)**
  - SYSOPER privileges for Oracle Databases on a specific Oracle Home

All the groups are on the server system
Windows Native Authentication
Administrative Privileges for ASM Instance

- ORA_ASMADMIN (12cR1)
  - SYSASM administration privileges on the computer
- ORA_ASMDBA (12cR1)
  - SYSDBA privileges for ASM Instance on the computer
- ORA_ASMOPER (12cR1)
  - SYSOPER privileges for ASM Instance on the computer

ORA_DBA and ORA_OPER group members no longer get privileges for ASM instance

All the groups are on the server system
Windows Native Authentication
Separation of Privileges

- ORA_<HomeName>_SYSBACKUP (12cR1)
  - Backup privileges (SYSBACKUP) for databases of a specific Oracle Home
- ORA_<HomeName>_SYSDG (12cR1)
  - Data Guard Privileges (SYSDG) for databases of a specific Oracle Home
- ORA_<HomeName>_SYSKM (12cR1)
  - Encryption Key Management privileges (SYSKM) for databases of a specific Oracle Home

All the groups are on the server system
Security

• Oracle Home User support
• Windows Native Authentication
• Kerberos and ASM enhancements
Kerberos and ASM Enhancements

• Kerberos
  • Security enhancements that were introduced in the MIT Kerberos Release 1.8 distribution
  • In sqlnet.ora, set SQLNET.KERBEROS5_CC_NAME = MSLSA: (instead of OSMSFT:)

• ASM file access control
  • Restrict access of database files to the owner of the database home
Performance & Clustering
Large Pages Support

• Improve performance with large pages support
  • 2 MB Page size (instead of 4 KB)
• If Oracle Home User is a standard Windows account, the administrator must grant the "Lock pages in memory" privilege to Oracle Home User or Service SID of Oracle Database Service (NTAUTHORITY\OracleService<sid>)
Large Pages Support

- Under HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\KEY_HOMENAME
  - Create ORA_LPENABLE or ORA_SID_LPENABLE
  - Set the value to 1 for regular mode and 2 for mixed mode
  - Mixed mode is the new option to allow use of large pages but fall back to small pages if OS is not able to allocate large pages
  - ORA_SID_LPMAXTIME is the optional time parameter for mixed mode
    (if a server has been running for some time and memory is fragmented, OS may fail to allocate large pages; mixed mode can be used to ensure that DB comes up in such cases)
Support of Multiple Processor Groups

• Support a max of 10 processor groups with up to 64 CPUs in each group in 12.1.0.2 (12.1.0.1 supports 4 processor groups)

• ORACLE_AFFINITY enhanced to enable affinity of Oracle threads to cpus in multiple processor groups
  • `processorgroup` is an optional parameter designating Windows CPU group. On systems with 64+ logical CPUs, Windows divides all available CPUs into 4 groups (0,1,2,3) with each group containing no more than 64 logical CPUs

*Details in Oracle® Database Platform Guide 12c Release 1 (12.1) for Microsoft Windows*
Oracle RAC 12c provides:

1. Better Business Continuity and High Availability (HA)
2. Agility and Scalability
3. Cost-effective Workload Management
Oracle Database 12c

Oracle Fail Safe Release 4.1

• New in this release
  – Database 12c support, including Oracle Home User
  – Integrated with Microsoft Management Console (MMC)
  – Compliant with Microsoft PowerShell scripting environment

• Software is available in Database CD pack or may be downloaded from Oracle Technology Network (OTN)

• See OTN for more information:
Windows Azure Certification and Licensing

• Azure fully supported and certified public cloud environment for deploying the Oracle stack
• Hyper-V supported and certified by Oracle
• Oracle software on Windows Server Hyper-V and Microsoft Azure
  – Licensing
    • Bring Your Own License (BYOL) – Windows and Linux
    • BYOL with pre-configured VM – Linux
    • License-included VM – Windows
  – Oracle offers Oracle Linux on Microsoft Azure
Oracle Database on Azure
Key Considerations: Oracle Database

Considerations:

- Standalone Oracle DB, Data Guard, and GoldenGate available
- Recommended DB size <10GB for data on System Disk
- Attach disk(s) for flexibility and improved performance
- 16 TB disk available per VM for Oracle Database
- Configure & capture a customized image or deploy your own for rapid provisioning and automation
- Consider Virtual Networking to capture an IP & VPN for connectivity to on-premise datacenter

Caution:

- Oracle RAC is not currently supported
- Current disk limit ~500 IOps max per disk (non-striped)
Available Oracle 12c .NET Features

**ODP.NET**
- Managed ODP.NET – 100% .NET code with no Oracle dependencies
- Transaction Guard
- Planned Outage
- Global Data Services

**Oracle Developer Tools for Visual Studio**
- Oracle Multitenant
- Schema Compare
- Visual Studio 2013
New Oracle .NET Beta (ODAC 12c R3) Features

• Entity Framework 6
  – Certification
  – Code First and Code First Migrations

• .NET Framework 4.5.2
  – Certification
  – Distributed transactions
    • Easier deployment
    • Oracle.ManagedDataAccessDTC.dll no longer needed

• NuGet – planned
Questions and Answers
Upcoming Windows Sessions and Demogrounds

• Best Practices for Oracle Database Performance on Windows
  – Wednesday - 10:15 AM - 11:00 AM Moscone South - 308

• Microsoft Active Directory and Windows Security Integration with Oracle Database
  – Wednesday - 4:45 PM - 5:30 PM Moscone South – 308

• Visit Windows experts at the Demogrounds:
  Oracle Database 12c on Windows
  – Monday through Wednesday
  – Moscone South Exhibition Hall, Far Left Middle in Oracle Database Section
  – Booth SLD-164
Upcoming .NET Sessions

• Getting Started with Oracle and .NET
  – Tuesday - 12:00 PM - 12:45 PM Moscone North - 131

• ALM with Visual Studio: SQL and PL/SQL Development, Source Control, and Deployment
  – Tuesday - 5:00 PM - 5:45 PM Moscone South - 309

• Meet the Experts: .NET Development for Oracle Database
  – Tuesday - 7:00 PM - 7:45 PM Moscone South - 307

• Oracle and .NET: Best Practices for Performance and Deployment
  – Thursday - 9:30 AM - 10:15 AM Moscone South – 308

• PL/SQL Programming for .NET Developers: Tips, Tricks, and Debugging
  – Thursday - 1:15 PM - 2:00 PM Moscone South – 308
Visit .NET Experts at the Demogrounds

• .NET Development for Oracle Database 12c
  – Monday through Wednesday
  – Moscone South Exhibition Hall, Far Left Middle in Oracle Database Section
  – Booth SLD-169
Safe Harbor Statement

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Engineered to Work Together