Introduction to Oracle Databases in the Cloud

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OneNeck IT Solutions at a Glance

- Backed by Fortune 500 strength of Telephone and Data Systems
- Hybrid IT
- Nearly 550 employees
- 8 data centers in 6 states, Coast-to-coast presence
About me!

- Principal Solutions Architect with OneNeck IT Solutions
- Over 20 years of Oracle Database development and administration expertise
- Over 10 years of Oracle E-Business Suite Architecture & Tuning expertise
- DBA Website since 1997 - www.bijoos.com
- Oracle ACE Director
Cloud Options for Oracle Database
Cloud Databases (non-Oracle)

- **Amazon**
  - Aurora: A MySQL or PostgreSQL compatible relational database engine.
  - DynamoDB: A fast and flexible NoSQL database service for all applications that need consistent, single-digit millisecond latency at any scale.
  - Redshift: A fast, fully managed, petabyte-scale data warehouse that makes it simple and cost-effective to analyze all your data.

- **Azure**
  - Azure SQL Database

- **Google Cloud**
  - Cloud Datastore: A highly-scalable NoSQL database for web and mobile applications
Amazon RDS for Oracle

• Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud.

• Amazon RDS for Oracle license options
  • License Included (starts at $0.04 per hour)
  • BYOL (starts at $0.025 per hour)

• Managed Deployment, Easy to Scale & Highly Available options
  • Pre-configured set of parameters and configuration
  • Amazon CloudWatch metrics, AWS Management Console for monitoring and metrics
  • DB Event Notifications via SMS or email
  • Automatic Software Patching (optional control provided)
  • Automated backups and DB Snapshots
  • Easy to scale – compute, memory, storage & IOPS
  • Automatic host replacement (h/w failure) & Multi-AZ deployments (standby)
Amazon RDS Restrictions

- No shell access to DB instances – no SSH or Telnet
- No access to SYS or SYSTEM
- Restricts access to certain system procedures and tables
- If your DB instance is going to require specific database parameters, you should create a parameter group before you create the DB instance.
- If your DB instance is going to require specific database options, you should create an option group before you create the DB instance.
- License included model supports only Standard Edition (SE1 or SE2)
- Common DBA activities are performed using API package
  - rdsadmin.rdsadmin_util
- Only supports Oracle Managed Files (OMF)
- RAC not supported natively, use 3rd party FlashGrid

Oracle DB on IaaS

- Hyper scale Public Cloud or Hosted Private Cloud
  - AWS, Azure, Oracle
  - OneNeck
- Hosted Cloud solutions have the power and flexibility of a public cloud, with the security and performance required by enterprises with mission-critical computing needs.
- Advanced disaster recovery capabilities
- Enterprise grade infrastructure with built-in HA
- You install, configure and administer databases (on most Public Cloud) or go with a Cloud provider with managed services and human interaction.

http://www.oneneck.com/cloud/hosted-private-cloud
Oracle Cloud Offerings

- Software-as-a-Service (SaaS)
  - Enterprise Resource Planning
  - Enterprise Performance Management
  - Human Capital Management
  - Talent Management
  - Marketing & Sales
  - Commerce, CPQ, Order Capture
  - Customer Service & Support
  - Supply Chain Management
  - Social Relationship Management

- Infrastructure-as-a-Service (IaaS)
  - Storage
  - Compute
  - Secure Identity
  - Lightweight Queues
  - Notifications
  - Ravello
  - Bare Metal

- Platform-as-a-Service (PaaS)
  - Data Management
  - Java, Developer, Mobile
  - Collaboration, Big Data, Analytics
  - APM

PaaS: Database-as-a-Service (DBaaS)

- Full-featured: 11gR2 or 12cR1 or 12cR2; DB Options
- Secure: Encryption - Network, DB, Backup
- Highly Available: Data Guard, RAC Cluster
- Managed (option): Oracle Backs Up, Patches, Upgrades
- All DB Tools: SQL Loader, Data Pump, JDBC, OCI, Enterprise Manager, Any Third Party Tools
- Full portability: On-premise to Cloud

PaaS: Oracle Database Cloud Backup Service

- Backup Oracle Databases to the Cloud
- 10g to 12c
- Encrypted at source and securely transmitted and stored in cloud
- RMAN interface
Oracle Database Cloud Services

• Oracle Database Cloud Service
  • Automated provision and administer Oracle Database on Oracle Compute Cloud
  • Comes with an integrated Oracle Application Express environment

• Oracle Database Cloud Service – Bare Metal
  • Full power of a dedicated bare metal server without any noisy neighbor or virtualization overhead

• Oracle Database Exadata Cloud Service
  • Includes all the benefits of Exadata performance
  • Customer maintain control of database while Oracle manages the hardware, storage and networking infrastructure

• Oracle Database Exadata Cloud Machine
  • Database cloud to customers who require their databases to be located on-premises.

• Oracle Database Exadata Express Cloud Service – Managed
  • Oracle Database 12c Release 2 Enterprise Edition plus options running on Exadata – A PDB
Oracle Database Cloud Service
DBaaS Adoption

Oracle Database and Infrastructure

On-Premises

1. Procure Data Center Floor space
2. Procure Servers
3. Procure Storage Devices
4. Procure SSL Certificates & Keys
5. Procure HSM Devices (for encryption)
6. Procure OS Licenses
7. Procure Anti-Virus Licenses
8. Procure SIEM Licenses
9. Allocate Storage Admin
10. Allocate System Admin
11. Allocate Database Admin
12. Allocate Network Admin
13. Install Server
14. Cable Server to Network
15. Install SSL Certificates & Keys
16. Acquire Public/Private IP Addresses
17. Acquire Domain Name (from internal DNS)
18. Install Storage Devices
19. Acquire IP Addresses
20. Install SSL Certificates and Keys
21. Create Physical Storage Volumes
22. Register Storage Devices with Server
23. Install Operating System
24. Create System Administrator Accounts
25. Register with Corporate LDAP Directory
26. Register with Audit Software
27. Add Users to System Administration Accounts
28. Register Servers with Redhat Administrative Console
29. Install Hypervisor
30. Create Virtual LAN Partitions
31. Allocate IP Addresses (Private)
32. Carry out Network Address Translation (NAT)
33. Register Virtual LANs with Network Switch
34. Add Users to Hypervisor Administrator Accounts
35. Register Guests with VMWare ESX Console
36. Run Clusterware Pre-requisite checks
37. Run Oracle DBMS Install Pre-requisite checks
38. Read database installation guild
39. Stage Oracle Database software
40. Configure Oracle Database
41. Log in to the system as root
42. Check HW, Memory, System, Disk, software, OS, OS Kernel, package, compiler, and additional software requirements
43. Create required OS Groups and Users, Oracle Inventory group, oracle software owner, OSDBA group, OSOPER group
44. Synchronize groups with LDAP repository
45. Configure Kernel parameters and resource limits, create required directories, configure user
46. Install oracle database; select clusterware/grid installation, specify base installation path name
47. Specify software location, choose file system or ASM, specify file location, specify ASNSNMP password, database edition, OSDBA group, global name
48. Specify database name, database name domain, administrative password, confirm password
49. Verify database is functioning properly
50. Email developers access credentials and configuration details

# On-Premise Vs Database Cloud Comparison

## On-Premises

1. Procure Data Center Floor space
2. Procure Servers
3. Procure Storage Devices
4. Procure SSL Certificates & Keys
5. Procure HSM Devices (for encryption)
6. Procure OS Licenses
7. Procure Anti-Virus Licenses
8. Procure Anti-Virus Licenses
9. Allocate Storage Admin
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13. Install Server
14. Cable Server to Network
15. Install SSL Certificates & Keys
16. Acquire Public/Private IP Addresses
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18. Install Storage Devices
19. Acquire IP Addresses
20. Install SSL Certificates and Keys
21. Create Physical Storage Volumes
22. Register Storage Devices with Server
23. Install Operating System
24. Create System Administrator Accounts
25. Register with Corporate LDAP Directory
26. Register with Audit Software
27. Add users to System Administration Accounts
28. Register Servers with Red Hat Administration Console
29. Install Hypervisor
30. Create Virtual LUN Partitions
31. Allocate IP Addresses (Private)
32. Carry out Network Address Translation (NAT)
33. Register Virtual IPs with Network Switch
34. Add users to Hypervisor Administrator Accounts
35. Register Guest with VMWare ESX Server
36. Run Customers Pre-requisite checks
37. Run Oracle DBMS Install Pre-requisite checks
38. Read database installation guide
39. Stage Oracle Database software
40. Configure Oracle Database
41. Log in to the system as root
42. Check HW, Memory, System, Disk, software, OS, OS kernel, package, compiler, and additional software requirements
43. Create required OS Groups and Users, Oracle Inventory group, oracle software owner, OSDBA group, OSGROUP group
44. Synchronize groups with LDAP repository
45. Configure kernel parameters and resource limits, create required directories, configure user
46. Install oracle database; select datadir/final installation, specify base installation path
47. Specify software location, choose file system or ASM, specify file location, specify ASHANALP password, database edition, ODSDBA group, global name
48. Specify database name, database name domain, administrative password, confirm password
49. Verify database is functioning properly
50. Install and setup access control and configuration details

## Oracle Database Cloud

1. Choose version of DBMS
2. Choose Edition SE, EE, EE High, EE Extreme
3. Choose Shape – storage, cores, memory
4. Choose Backup and Patching windows
5. Upload Public Key
6. Press Go

![Comparison Chart]

Days or Weeks

30 Minutes
Automated Provisioning & Management

Subscription-Based
- Pay-as-you-go with hourly or monthly subscriptions

Choice
- Choose from database versions, editions, and options

Integrated
- Seamless integration with all Oracle Cloud Services

Request for Service
- Allocate Compute
- Allocate Storage
- Provision OS
- Set Keys & Privileges
- Install & Configure Database
- Configure Backups
- Configure Tools
- Configure Access
- Database Ready for Use

Automated DBA and Patching

Backup/Recovery plus HA & DR

Local and Remote Management
High Availability & Security Options

- **Oracle RAC**
  - Limited to a two-node cluster
  - Database Storage is on Oracle ASM and ACFS. (non-RAC storage is on Linux LVM)
  - Oracle Database 12c Release 2 is not yet supported (as of Jan 2017)

- **Data Guard**
  - One primary database and one standby database hosted on two independent compute nodes
  - Oracle Active Data Guard available (Extreme Performance option)

- **Oracle Golden Gate**
  - A virtual machine that provides Golden Gate replication services

- **Oracle Database Vault**
  - Use cloud tooling to configure and enable

- **Tablespace Encryption**
  - All user-created tablespaces are encrypted by default
Database Cloud Service - Options

- Oracle Linux Server release 6.6

- Virtual Image
  - Only /root, /boot and tempfs storage
  - DB Version software is under /scratch/db as a tar file

- Database Cloud Service
  - DB provisioning and Orchestrations
Database Cloud Service - Options

- **Standard Edition**
  - SE1 or SE2

- **Enterprise Edition**
  - EE with TDE
  - Data Guard

- **EE High Performance**
  - EE plus...
  - Multitenant
  - Partitioning
  - RAT, OLAP
  - Adv. Compression
  - Adv. Security
  - Adv. Analytics
  - Database Vault
  - Spatial & Graph
  - Diag + Tuning Pack
  - Lifecycle Mgmt Pack
  - Data Masking Pack
  - Cloud Mgmt Pack

- **EE Extreme Performance**
  - EE High Perf. plus...
  - Active Data Guard
  - RAC
  - In-Memory Database
Database Service - Pricing

Metered: Charged based on the actual usage of the service resources on an hourly or monthly basis.

<table>
<thead>
<tr>
<th>Product (per OCPU)</th>
<th>General Purpose Compute</th>
<th>High-Memory Compute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per Month</td>
<td>Per Hour</td>
</tr>
<tr>
<td>Standard Package</td>
<td>$600.00</td>
<td>$1.01</td>
</tr>
<tr>
<td>Enterprise Package</td>
<td>$3,000.00</td>
<td>$5.04</td>
</tr>
<tr>
<td>High Performance Package</td>
<td>$4,000.00</td>
<td>$6.72</td>
</tr>
<tr>
<td>Extreme Performance Package</td>
<td>$5,000.00</td>
<td>$8.40</td>
</tr>
</tbody>
</table>

Non-Metered: A monthly or annual subscription for a fixed service configuration which you typically cannot change.

<table>
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<th>High-Memory Compute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per Month</td>
<td>Per Month</td>
</tr>
<tr>
<td>Standard Package</td>
<td></td>
<td>$300</td>
</tr>
<tr>
<td>Enterprise Package</td>
<td></td>
<td>$1,500</td>
</tr>
<tr>
<td>High Performance Package</td>
<td></td>
<td>$2,000</td>
</tr>
<tr>
<td>Extreme Performance Package</td>
<td></td>
<td>$2,500</td>
</tr>
</tbody>
</table>

Oracle Database Cloud Service
- Tools
Access Rules

- Access Rules: Control network access to service components
- SSH to the VM is enabled by default, all other access is defined, but disabled initially.
Connection Information

Resources

BTDGP01-dg01
- Public IP: 160.34.12.79
- SID: DGDB1
- PDB Name: DGPDB1
- SQL *Net Port: 1521
- OCPUs: 1
- Memory: 7.5 GB
- Storage: 197 GB

BTDGP01-dg02
- Public IP: 129.144.12.139
- SID: DGDB1
- PDB Name: DGPDB1
- SQL *Net Port: 1521
- OCPUs: 1
- Memory: 7.5 GB
- Storage: 197 GB

Additional Information

Connect String:
(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=160.34.12.79)(PORT=1521)))(ADDRESS=(PROTOCOL=TCP)(HOST=129.144.12.139)(PORT=1521)) (LOAD_BALANCE=OFF)(FAILOVER=ON))(CONNECT_DATA= (SERVICE_NAME=DGPDB1.ustomtrial.oraclecloud.internal)))

Container Name: DGDB1
Standby Database with Data Guard: Yes
Data Guard Configuration: Disaster Recovery

Additional Information

Connect String: CLDB4ACED:1521/PDBHR.btorcloud.oraclecloud.internal
Container Name: CDDDB01
Connecting to Cloud Database

Check out my blog
DBaaS Monitor

- Using Access Rules, open port 443
- Menu
  - Manage: This is the only menu item where you can make any change to the instance. This is where you manage the PDBs.
  - Listener: Listener status and “lsnrctl status” output.
  - Storage: CDB and PDB storage summary as well as tablespace-wise.
  - Backups: RMAN backup status
  - Alerts: Alert log messages in an easy to filter framework.
  - Sessions: Database sessions from CDB and PDB.
  - Waits: Wait events and affected sessions.
  - Parameters: Database parameters
  - Real Time SQL Monitor: Status of SQL statements running in the database
- The OS menu shows Operating System metrics.

Check out my blog
OEM Database Control 12c

- Open port 5500 (if 11g, open port 1158)
Cloud Tooling – dbaascli & raccli

• Perform a variety of life-cycle and administration operations.
  • Start, Stop, Status database and listener
  • Changing the password of the SYS user
  • Checking the status of the Oracle Data Guard configuration
  • Switchover and failover in an Oracle Data Guard configuration
  • Patching the database deployment
  • Database recovery
  • Rotating the master encryption key
  • Configure Data Vault
  • Configure Golden Gate

• Remember to update cloud tooling to latest immediately after provisioning service

Check out my blog
Cloud Tooling - dbpatchmdg

- Perform a variety of patching operations
  - List available patches
  - Check if nodes are ready for patching
  - Apply patches
  - Roll back patches

The oracle-dbcs-cli Utility

- Run on your Linux computer to connect to Oracle Cloud and perform a variety of life-cycle and administration operations
Oracle Database Backup
Cloud Service
Oracle Database Backup Cloud Service

• A secure, scalable, reliable, and on-demand Oracle public cloud storage solution for storing Oracle Database backups
• Offsite Storage
• Easy to deploy
• End-to-end security
• On-demand storage
• Continuous Access
• Provision Test/Dev environments on Oracle Cloud using backup (DR?)
• Database versions: 10.2, 11g, 12c (EE and SE)
Installation & Configuration

• Download the Oracle Database Cloud Backup Module from OTN

• Extract opc_install.jar

• Run the installer
  • `java -jar opc_install.jar -serviceName myService -identityDomain myDomain -opcId 'myAccount@myCompany.com' -opcPass 'myPassword' -walletDir /home/oracle/OPC/wallet -libDir /home/oracle/OPC/lib`

• Setup transparent encryption of backups using Oracle wallet (recommended) or by using a password (not recommended, but simple)
  • SET ENCRYPTION ON IDENTIFIED BY password ONLY;
  • CONFIGURE COMPRESSION ALGORITHM ‘BASIC’;

• Specify Cloud location in RMAN backup
  • `CONFIGURE CHANNEL DEVICE TYPE sbt PARMS='SBT_LIBRARY=/orclhome/lib/libopc.so, SBT_PARMS=(OPC_PFILE=/orclhome/dbs/opctl1.ora)';`
## Cloud Backup Service - Pricing

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
<th>Features</th>
</tr>
</thead>
</table>
| Database Backup Service  | $33.00 / TB / Month | • Unlimited Oracle Database backups  
• Automatic three-way data mirroring  
• Regional data isolation  
• Transparent access via Oracle Database Cloud Backup Module and Recovery Manager (RMAN)  
• RMAN encryption and compression |

Learning New Features – Use Demos PDB

Oracle Database Cloud Service (Database as a Service)

Demos and Hands on Labs

Curious about how the 12c In-Memory feature can speed up your queries? Looking to get started with Oracle APEX? Have some XML you need to store and parse in the database? Included in this page are many demos showcasing the features of Oracle 12c as well as the Database Cloud Service.

Oracle Database Demos:
- In-Memory
- XML DB
- JSON
- SQL Developer
- SQL Developer Data Modeler
- Oracle Advanced Analytics
- Optimizer

Oracle Application Express Track:
- Oracle Application Express

Database as a Service
- Getting Started with Oracle Database Cloud Service

Application Development
- Soup to Nuts of Building an Application

Things to Consider

- Cloud is the direction
  - Dynamic Scalability.
  - Improved security, availability and compliance.
  - Enterprise-class performance.
  - Focus on strategic IT.
  - Lower total cost of ownership (TCO).
  - Increased agility to take advantage of new opportunities quickly.

- IaaS or PaaS or SaaS
  - Workload
  - Application supportability

- Managed or Full-Control
  - Patching & Configuration flexibility
  - IaaS with Managed Services

- Hybrid IT
  - Cost effective
  - Combination of hyper scale public cloud IaaS or DBaaS (test / dev) with hosted private cloud (mission-critical production)
Don’t Forget Licensing

• Authorized Cloud Environments
  • Amazon Web Services – Amazon Elastic Compute Cloud (EC2), Amazon Relational Database Service (RDS)
  • Microsoft Azure Platform

• When counting Oracle Processor license requirements in Authorized Cloud Environments, the Oracle Processor Core Factor Table is not applicable
  • Amazon EC2 and RDS: count two vCPUs as equivalent to one Oracle Processor license if hyper-threading is enabled, and one vCPU as equivalent to one Oracle Processor license if hyper-threading is not enabled.
  • Microsoft Azure – count one Azure CPU Core as equivalent to one Oracle Processor license.

• Oracle Standard Edition One and Standard Edition 2 may only be licensed on Authorized Cloud Environment instances up to eight Amazon vCPUs or four Azure CPU Cores.

Oracle Database Cloud Service
- DEMO
To Read...

- Creating a DBaaS on the Cloud
- Connecting to DBaaS using SQL*Developer
- PDB Management Using aS Monitor Console
- Exploring DBaaS with Data Guard
- Backup DBaaS to Cloud Container
- Apply Patch to DBaaS Instance
- Cloning DBaaS Instance
- Adding Storage to DBaaS Node
- Enabling DBaaS Backups
- Exploring DBaaS File System
- PDB Management Using DBaaS Monitor Console
- Building Oracle EBS Instance
- Amazon Web Services (AWS) : Relational Database Services (RDS) for Oracle
- Fast, Flexible Application Development with Oracle Database Cloud Service
- Oracle Cloud
- OneNeck ReliaCloud
Thank you!

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