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# Oracle 11g New Features

This article will discuss key features in the Oracle 11g.

**Oracle 11g Highlights**

- Grid Computing.
- Security and Compliance.
- Data Warehousing and Partitioning.
- Solid enhancements in RAC, RMAN, Data Guard and Data Pump.
- Solid enhancements in Java, PL/SQL, XML and PHP.
- Diagnostics.
- Content Management.
- Change Assurance.
- Install/Deinstalls.
- Significant enhancements in database manageability and reducing cost of ownership.
- Information Lifecycle Management.

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- Changing Skill sets for Oracle DBAs



George J. Trujillo, Jr.

The skills sets required to be an Oracle DBA and Developer are changing.

DBAs with RAC, Data Guard, Streams, Security are in much higher demand.

Data Infrastructure Administrators with enterprise infrastructure management across multiple tiers are in high demand.

Middle ware skills with Application Servers, Identity Management, SOA, XML, Web Services, XML, J2EE and ADF are in hot demand today.

Oracle 11g helps us understand where Oracle technology is going and what areas Oracle are being emphasized.

### Assiduus usus uni rei deditus et ingenium et artem saepe vincit

I have been working with Oracle since version 4, so I've seen a lot of new releases. I still remember having to install over 20 5.25" floppy disks, when referential integrity was only declared and not enforced, as well as the old max extent limit of 121. The old days weren't always the good old

days. I have helped customers with the rollouts of new Oracle software versions for a good part of my career.



This includes internal rollouts to Oracle Corporation for 5.5 years. I was a lead in the internal rollouts of Oracle 8.0, 8i, 9i, JDeveloper, RAC, Streams and new



releases of the Oracle Application Server. Since then I have had a leadership role in the Oracle Beta program for Oracle 10g and 11g.

Reasons why you should care about features in a new release of the Oracle database:

- It is very important that a company understand how features in a new release of the Oracle database server will impact their current database management practices and decisions.
- The correct decisions made today will reduce migration issues in the future.
- The only way to make the right decisions today, is by understanding where database management is going in the future.
- Understanding current and future skill sets needed for IT staff.
- I believe you don't always have to be moving in the right direction, but you should always try to be pointed in the right direction.

For the most part, DBAs have been a little frustrated by the number of bugs and feature restrictions in Oracle 6, 7, 8 and 9i in the first releases of each version.

- The issues with previous first releases of a major version of Oracle database software has taught DBAs to historically stay away from the first release and to be very careful when using new features.
- I think Oracle put too much advertising in the Object-Relational features of the Oracle 8 database

when the object features were not mature enough in the first release instead of focusing on features that would help DBAs in their day to day jobs.

- Oracle did the same thing with Java in the database with Oracle 9i. Although Java in the database has turned into a fantastic feature especially for Oracle product and feature development, most DBAs didn't initially see the value of Java in the database.

However, Oracle 10g was by far the most stable release of a new version of Oracle software. Oracle 10g also had a large number of bug fixes for Oracle 9i, so Oracle 10g was even a more stable version of Oracle 9i. Oracle 10g also had a lot of enhancements and bug fixes for advanced features of Oracle such as RAC, Data Guard, Streams, etc. The Oracle Enterprise Manager (OEM) took a gigantic leap from a tool in Oracle 9i that most DBAs snickered at, to a strong Enterprise solution with Grid Control in Oracle 10g. DBAs should have been moving to Oracle 10g to take advantage of the important new features and increased stability, instead they were using the old pattern of moving slowly to a new release and to using the new features of a new release.

Oracle 10g has by far more new features that should be used out of the box than any previous release of Oracle. The features in Oracle 10g are so significant, the Oracle 10g features should change the way DBAs are managing their systems. Yet, DBAs have been very slow in



adopting these new features. If you look at a lot of Oracle 10g shops, they are running their databases closer to Oracle 7 features than Oracle 10g features. The release of Oracle 10g added tremendous functionality to database environments that Oracle DBAs need to leverage.

I have been involved with Oracle 11 since the summer of 2006, so I can tell you the upcoming release of Oracle 11 is very interesting. Its amazing how many new features there are in Oracle 11. There are brand new features, existing feature enhancements and a lot of enhancements to make Oracle faster. Oracle 11 has added some very interesting enhancements in RMAN, Streams, Data Guard, RAC, diagnosability, XML, security, Java, PL/SQL, Data Pump, tables, tablespaces, partitioning, performance and management to name a few area highlights.

As I looked at the Oracle 11 release of the database server one thing stood out to me. Organizations really need to look at their database management strategies and how they are going to manage all their databases in their environment. I think it is VERY important that companies leverage the new features in a database and tie the use of the new features into their best practices. I have a tendency to buy the hottest high technology gadgets but historically I never use more than 10 percent of the features. I find most customers are the same way with their databases. This is bad because the new features in Oracle10g can significantly reduce their cost of ownership if organizations would use

them correctly. I cannot state strongly enough that as organizations move to the Oracle 10 and Oracle 11 database server they really need to look out how they are going to tie these new features into their database management practices and leverage these features to minimize down time and reduce their cost of ownership.

As our multi-tiered database environments get more complex we need enhanced tools for managing these environments and for improving performance as our databases get bigger. There is also a strong need for improving the management of advanced database features such as RAC, Data Guard and Streams. Oracle 11 strongly addresses these areas.

This is not a comprehensive list of all of the new features in Oracle 11. Below is more of a summary of key areas I like in Oracle 11 of the database server.

### **High Availability (RAC, Data Guard, LifeCycle Management)**

- Fast-Start Failover for maximum performance mode in a Data Guard configuration.
- Compression of redo traffic (for Gap Resolution) over the network in a Data Guard Configuration.
- Real-Time query of a physical standby database while redo apply is active.
- Dynamic setting of Oracle Data Guard SQL apply parameters.
- A physical standby database can be opened temporarily for reporting and testing. Redo is still ap-



plied while database is in this state.

- Online database upgrades for data guard physical standby. Can upgrade logical standby database, then run both in parallel, then switch them.
- Can take standby databases, and take them out of standby to do testing and can then move them back into standby modes.
- RAC enhancements in OEM for monitoring and diagnostics. A lot of nice enhancements.
- Improved metrics.
- Next generation RAC cache fusion is even more scalable.
- Query results caches
- Fast caching of query/function results for read-mostly data
- Good enhancements to ADDM for diagnosing and tuning an entire RAC cluster as well as individual instances.. This includes improved diagnostics with Global cache interconnect issues and global resource contention, I/O bandwidth and hot blocks.

### **RMAN**

- A Virtual Private Catalog can now make sure an RMAN user can only see databases they are authorized to use.
- Archive log management for Streams and Data Guard
- Network aware DUPLICATE
- Optimized undo backup
- Improved corrupt block detection

### **Manageability**

- A new MEMORY\_TARGET parameter that will improve the automatic memory management across shared and private memory areas.
- Simplified Temp Space Management
- Enhanced OFA Support
- Server side connection pooling.
- Secure configuration install option
- Stronger Password Protection
- Improved statistics generation for partitioned objects.
- Security enhancements with transparent tablespace and LOB encryption.
- SQL Repair Advisor
- Automatic Diagnostic Repository (ADR)
- Fast ANALYZE: Finding Table-Index Corruptions
- Automatic SQL Tuning with Self-Learning Capabilities that can identify top SQL statements and tunes them automatically by creating SQL profiles.
- Better SQL plan management allows the optimizer to maintain a history of execution plans for a SQL statement. The optimizer can move to a new plan when it able to verify it is more efficient than an old plan.
- Streams management improves with automated alerts for Streams, a new DBMS\_COMPARISON package than can help evaluate the consistency of data across databases, splitting and remerging of streams, LCR marking and tracking for diagnosing configuration issues, views and interfaces for understanding a Streams to-



pology and a Streams Performance Advisor.

- Migration of DBMS\_JOB jobs to the Oracle scheduler.
- SQL Test Case Builder
- Automatic Health Monitoring
- Manage and schedule jobs across multiple databases. This includes external jobs (i.e. shell scripts).

### **Automatic fault diagnostics**

- New facilities to capture and manage relevant information for incidents to speed support processes
- Support workbench.
- Repair advisors (coming in future releases)
- Speed analysis of root cause for faults
- Advice dbas on repair strategy
- The goal is to cut down on the trace files that are sent to Oracle.

### **Enterprise Manager Enhancements**

- Support for ASM File Access Control, ASM Manageability, ASM Rolling Migrations, OCR and Voting, Disk in ASM, Disk Resync, Disk Zones, and Infrastructure. Security enhancements with ACL and Security Classes.
- Database cloning enhancements.
- Expected enhancements to the Database Home Page and Performance change as well as improved metrics, archiving and purging tracing and alert files, group copy of tnsnames.ora and viewing trace files, management of Oracle Text Indexes,
- New LogMiner enhancements in Enterprise Manager.

- Fine-Grained Access Control on Network Call-outs from the Database. New packages DBMS\_TCP\_AMIN and
- DBMS\_IMADDR\_ADMIN can control which hosts on the Internet an Oracle user can access with PL/SQL packages.
- Secure service registration with the listener out of the box.

**Performance** - Some areas that stand out as getting faster in Oracle 11 include:

- Faster Data Guard.
- Faster simple SQL operations. Faster SQL with caching of frequently used SQL results.
- Faster DML triggers.
- Faster upgrades.
- Faster PL/SQL and Java (auto native compilation). Caching of frequently used procedures and functions results.
- Faster statistics generation.
- Faster sort operations.
- Faster SQL with the caching of frequently used SQL results.

### **Java, PL/SQL, XML, .NET, PHP, APEX**

- PL/SQL Native Compilation Without Needing a Third-Party C Compiler.
- Native PL/SQL use of Seq.Nextval in a PL/SQL program.
- PL/SQL can use CLOBs to get around 32KB limitation of SQL character strings.
- Enhanced PL/SQL warnings and error messages.



- PLSTIMER identifies hotspots and performance tuning opportunities in PL/SQL.
- New package DBMS\_HPROF controls the recording of raw PLSTIMER data.
- Continued support of standards with JDBC 4.0 and JVM 5.0. Capability to upgrade to JVM 6.0 will be available in the future.
- Oracle JVM JIT supports transparent native Java compilation without a C Compiler.
- Significant performance improvements with JDBC performance especially with Advanced Queuing.
- JDBC supports server side result cache alone with OCI client side result cache. Additional things I liked included the "big" improvements in the JIT and RAC support for JDBC.
- New command line interface to Oracle JVM making it a lot easier to work with the JDK in the database.
- Support for database resident JARs.
- JDBC support for starting and shutting down the database.
- Performance enhancements to XPath query for Java.
- XML applications can now process larger XML documents by loading and saving .
- DOM nodes in memory and using a page manager for physical binary data management.
- Unified Java API for XML allows mid-tier Java programs to leverage lazily loading by allowing a disconnected mode of operation

that allows a XMLType to be used with a session pool model of connection management.

- APEX will be standard with an embedded PL/SQL gateway.
- APEX will have an application packager for packaging and deployment of APEX applications.

**Data Pump Enhancements** to use when you're moving data

- Compression and encryption enhancements
- Support for XML Schemas and schema-based tables.
- Transportable partitions

**Data Warehousing and Analytics** to use on a Friday night

- New DETECT option for unusual records.
- New MAP option for detecting profiles.
- New PROFILE feature for find defined patterns.
- New analytics and data mining

**Partitioning Enhancements** that you'll like

- Partition by parent/child reference
- Partition orders and order\_lines together
- Virtual column partitioning
- Partition on virtual order status, active, less active, derived from multiple status fields in order record
- Referential partitioning
- More composite partitioning
- List/range, range/range, list/hash, list/list



- Ex: order status/month, month/day
- Automatic interval partitioning supports the automatic creation of time-based partitions.
- Single partition transport tablespace

### **Automatic Storage Management**

- Convert Single-Instance ASM to Clustered ASM by allowing ASM to be configured on all nodes.
- ASM gets even better in Oracle 11. Some of the new features include:
- A new SYSASM role allows the separation of database management and storage management responsibilities.
- ASM Fast Disk Resync brings a repaired ASM disk on line in a much shorter time.
- ASM manageability gets better with enhancements to the ASMCMD utility, a new mount mode for rebalance performance, disk group metadata backup and improved disk group compatibility across software versions.
- Support for ASM Rolling Migrations for different versions of Oracle 11g and upward.

### **Change assurance** (important for saving money during testing)

- Database replay "captures actual production workload and replays it on a test system.
- SQL performance analyzer "finds and fixes SQL performance degradations
- 10gR2 will have a patch set, that will allow the replay to occur.

### **Secure Files** (Next generation LOBS)

- Eliminates need for file systems. Very fast access of files.
- Just as fast as file systems with all the capabilities of the Oracle database (it's a new LOB type). It is very fast. It is fast as accessing the files from a file system, oracle believes they will make it faster.
- Store all your data in the database with one consistent: Security and auditing model
- Backup and recovery mechanism
- Storage management (ASM)
- Transaction and concurrency model
- Interface and protocol
- Values added services like encryption, compression, and deduplication

### **LOBS**

- Fast bulk data transfers
- LOB prefetch (where was this in Oracle 8 when we needed it)
- InterMedia enhancements to LOBs
- SecureFiles compression, encryption and optimization
- Installs/Deinstalls and other fun on weekends

### **XML DB**

- XML index enhancements ( very important!)
- XSLT performance enhancements
- NFS v4.0 support
- Enable the XDB HTTP Server for SOA (the Oracle database is a service)
- Updates to registered XML Schemas



- Optimizations for XQuery and XPATH
- XML DB repository trigger
- Recursive XML Schema handling
- Support of SQL/XML standards (SQL 2005)
- XBRL validation and XLink validation
- Binary xml storage
- Enhanced xml indexing
- Schema evolution

### Miscellaneous Enhancements

- Virtual columns (functions) on tables. Indexes on virtual columns.
- Enhancements to DBMS\_SQL supporting LOBS, user-defined types and bulk operations.

### Security

- Enhanced passwords (case sensitive and enhanced password algorithm).
- Security on ports and URLs for FGAC (i.e. UTL\_HTTP, UTL\_SMTP, UTL\_TCP).

### Installs/Deinstalls

- 9iR2 <-> 11g upgrade/downgrade
- 10gR1 <-> 11g upgrade/downgrade
- 10gR2 <-> 11g upgrade/downgrade

Although you may not be moving to Oracle 11g anytime soon having an understanding of future Oracle directions is important.

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Oracle database training in RAC, Streams, ASM, Oracle Clusterware, Data Guard, DBA I, DBA II, Performance Tuning, Partitioning, ...



Oracle Fusion training Oracle Application Server, J2EE, Web Services, ADF, TopLink, SOA, XML, ...



Training in Linux, Solaris, Unix, SQL Server, Java, ...

This spring, Trubix will be launching **Tru iLearning**, a True Interactive Learning system containing visual, video, audio and instructor interaction in a self-based online environment. Highlights of the Tru iLearning launch will be:

- Oracle DBA Fusion training track.
- Oracle Developer Fusion training track.
- Oracle 10g RAC offerings available in English and Spanish.
- Oracle 10g DBA Workshop for Application Vendors.

Beta customers are currently working with Tru iLearning solutions. Watch for details of our launch for this exciting product.