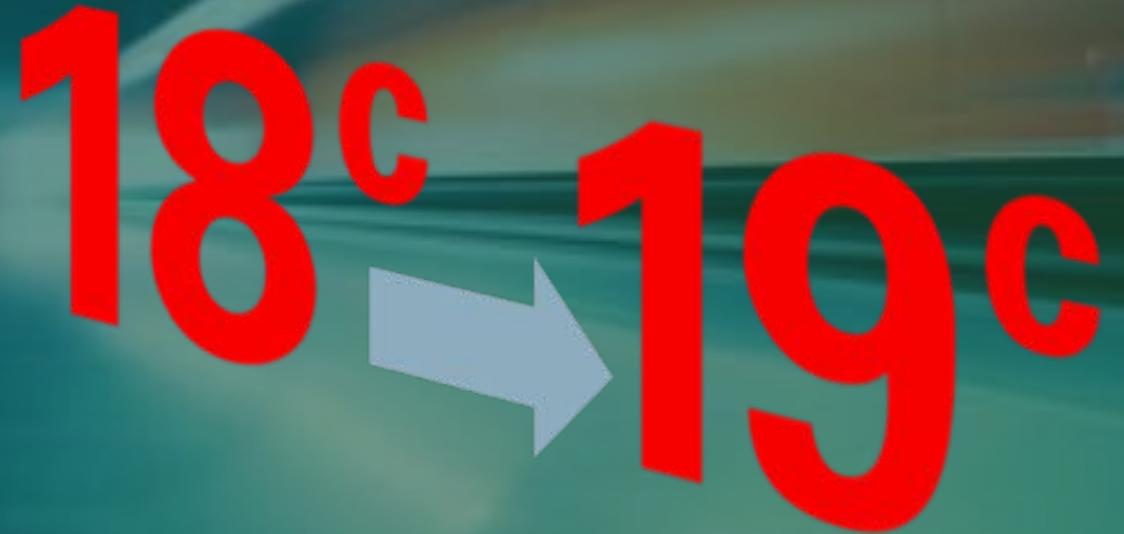


ORACLE®

Oracle Database 19c

What's out now...



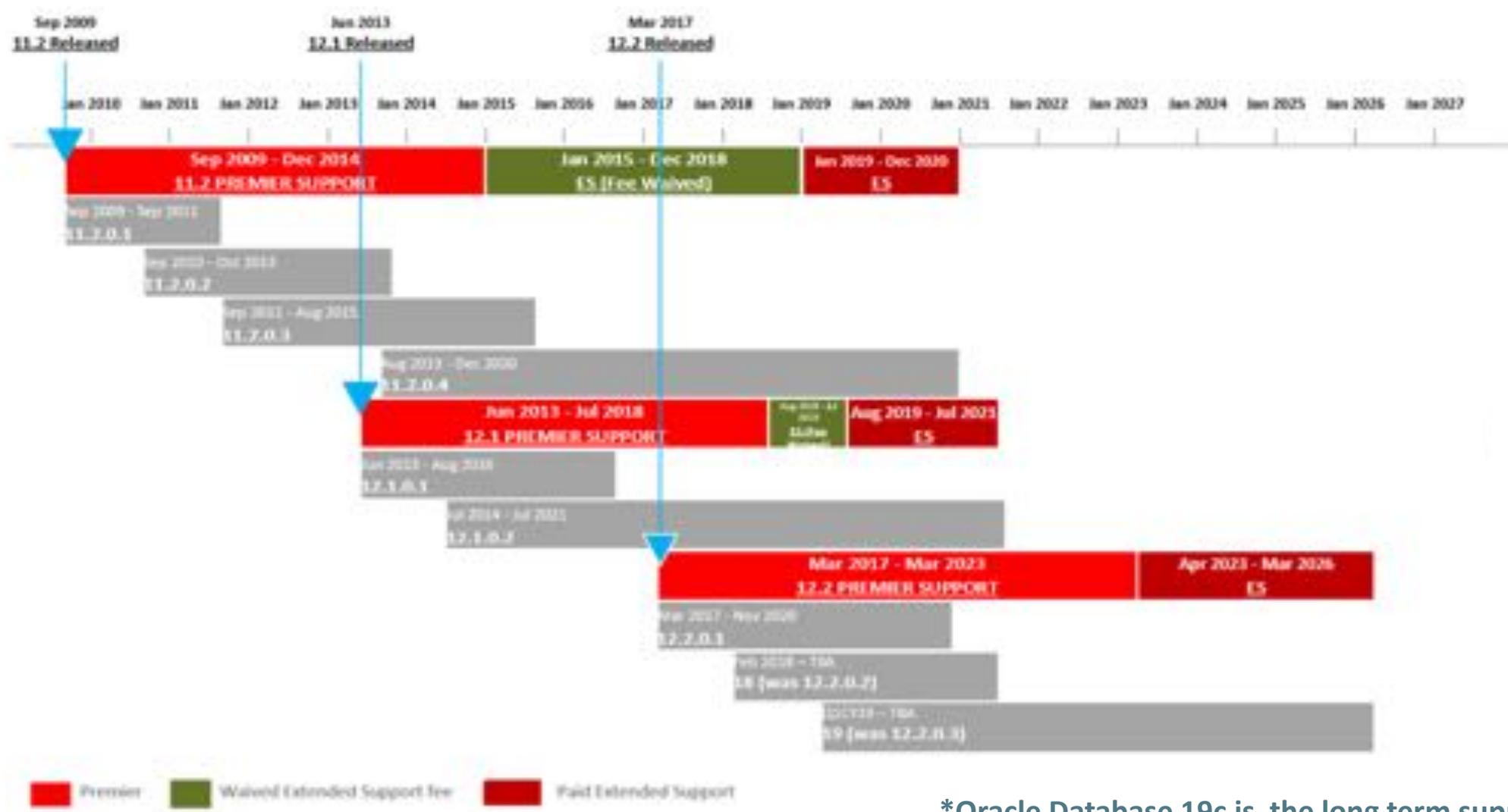
18^c → 19^c

Sean Stacey
Database Product Manager
Oracle Server Technologies
NCOAUG – 1 Aug 2019

Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

Database Release and Support Timelines

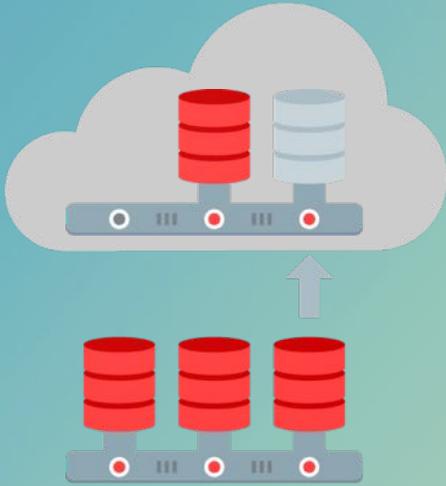


*Oracle Database 19c is the long term support release. Always check [MOS Note 742060.1](#) for the latest schedule.

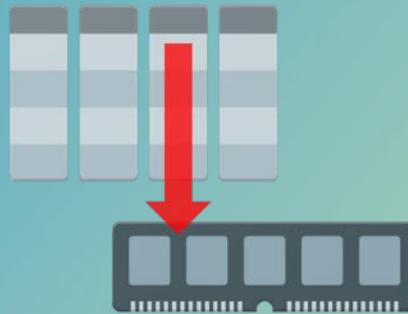


Oracle Database 12c Release 2

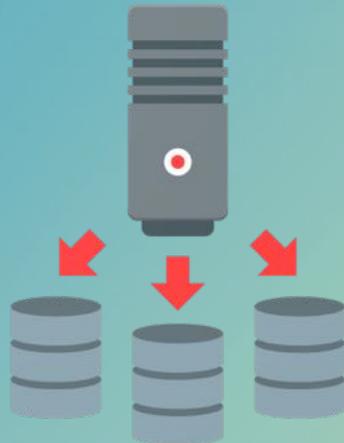
Marquee Features



Massive Cost Savings
and Cloud Agility with
Multitenant



Massive Performance
with **Database In-Memory**



Massive Web Applications
with **Sharding**

Plus more features for better Performance, Availability, Security, Analytics, and Application Development

Oracle Database 12c “Under the Radar” Features

Online Table Move

Live SQL

Property Graph

Invisible Columns

Long Identifiers

Online Tablespace Encryption

Top N Queries

JSON

Application Continuity

Longer Varchars

SQL Plan Management Enhancements

Real Time Materialized Views

Auto Generated Sequences

Auto List Partitioning

Security Assessment Tool

Index Compression

Index Usage Stats



Production on Linux,
Solaris, Windows, AIX
and HP-UX

18c

Oracle Database 18c

Performance

- 5x faster RAC for high contention OLTP
- 2x faster In-Memory row store lookups
- Automatic In-Memory population



Security

- Integration with Active Directory
- Per PDB Key storage
- Password-less schema creation
 - No default passwords



Multitenant

- Per-PDB Switchover
- Snapshot Carousel



Data Warehouse & Big Data

- Polymorphic Table Functions
- Alter Table Merge Partition Online
- Approximate Query Improvements
- Query and load from object stores





Oracle Database 18c

Development

- Additional JSON functionality
- APEX 18c
- Private Temporary Tables



Manageability

- Read Only Oracle Home
- RPM Database Distribution



High Availability

- Shadow Lost Write Protection
- Automatic propagation of no-logged data to standby
- Zero-Downtime Database Upgrade



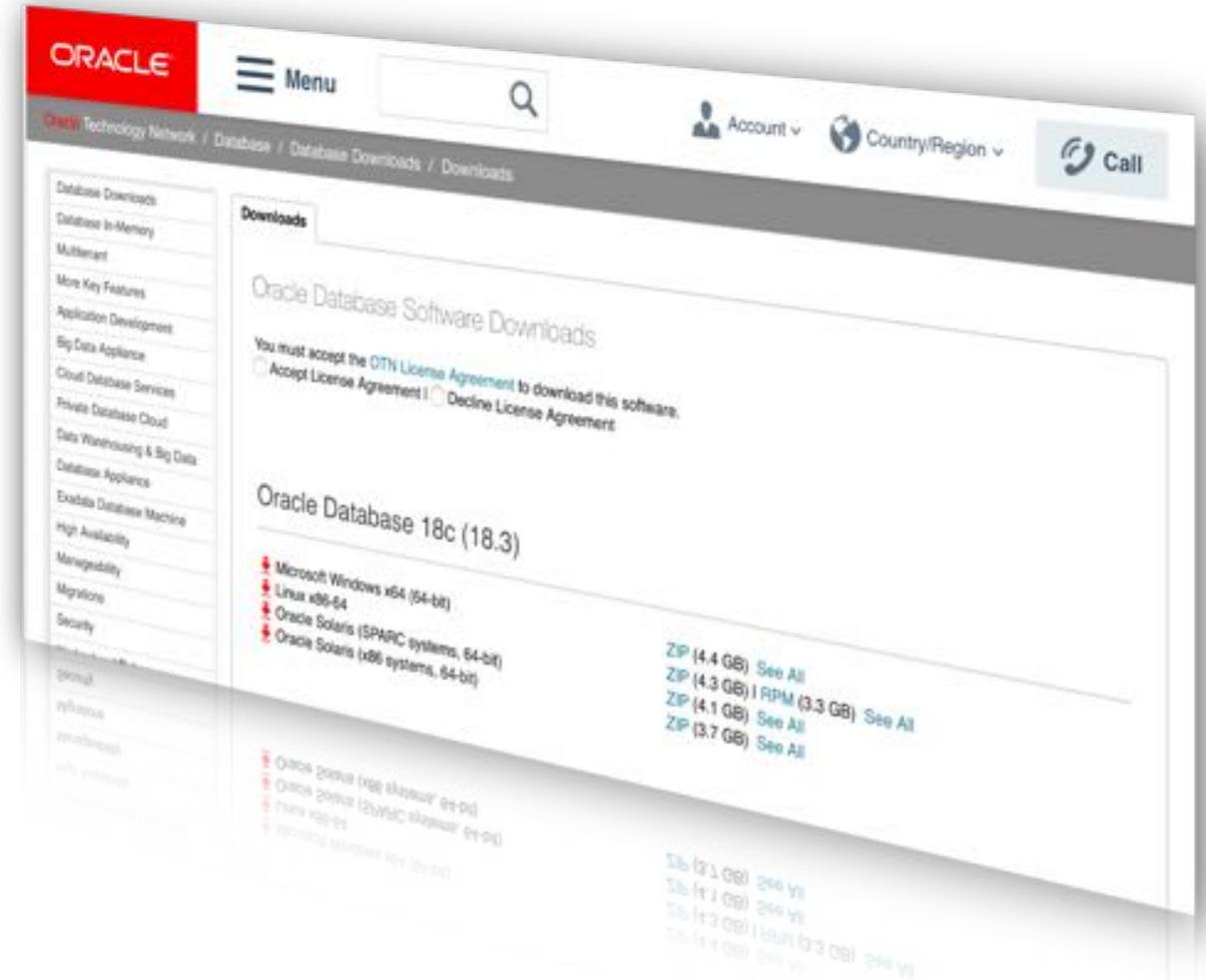
Overall

- Oracle Connection Manager - new Traffic Director Mode
- Unicode 9 Support



New Install Approaches

- Oracle Database 18c RPM Install
 - Yum install from OLN
- Oracle Read Only Homes
- No click through client software install
- Oracle Docker images



Core aims : **Stability**

Terminal Release for the 12.2
family of products

19c

Oracle Database 19c Testing

- Thousands of bugs fixed
- Thousands of human years of regression testing
- Huge farms of servers constantly analyzing all aspects of performance and functionality
- Extensive beta program running to get customer feedback

19^c

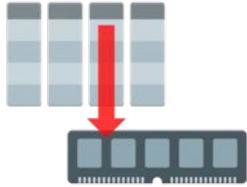


Oracle Database 19c



Performance

12.1, 12.2



- 12.1
 - In-Memory Column Store
 - Engineered Systems
- 12.2
 - In Memory JSON Queries
 - In Memory Active Stand By

18c, 19c



- 18c
 - Memory Optimized Row Store
- 19c
 - Fast ingest support for IoT type workloads
 - Stats Only Queries
 - Improvements for count distinct and group by queries
 - SQL Quarantine

Memoptimized Rowstore

```
alter system set MEMOPTIMIZE_POOL_SIZE = 10G scope=spfile;
```

```
SQL> show parameter MEMOPTIMIZE_POOL_SIZE
NAME                                TYPE                                VALUE
-----                                -                                -
memoptimize_pool_size               big integer                         10G
```

```
CREATE TABLE tbl_fast_lookup
  ( id NUMBER(5) PRIMARY KEY,
    test_col VARCHAR2(15) )
MEMOPTIMIZE FOR READ;
```

```
execute DBMS_MEMOPTIMIZE.POPULATE('soe', 'tbl_fast_lookup');
```

```
CREATE TABLE tbl_fast_ingest
  ( id NUMBER(5) PRIMARY KEY,
    test_col VARCHAR2(15) )
MEMOPTIMIZE FOR WRITE;
```

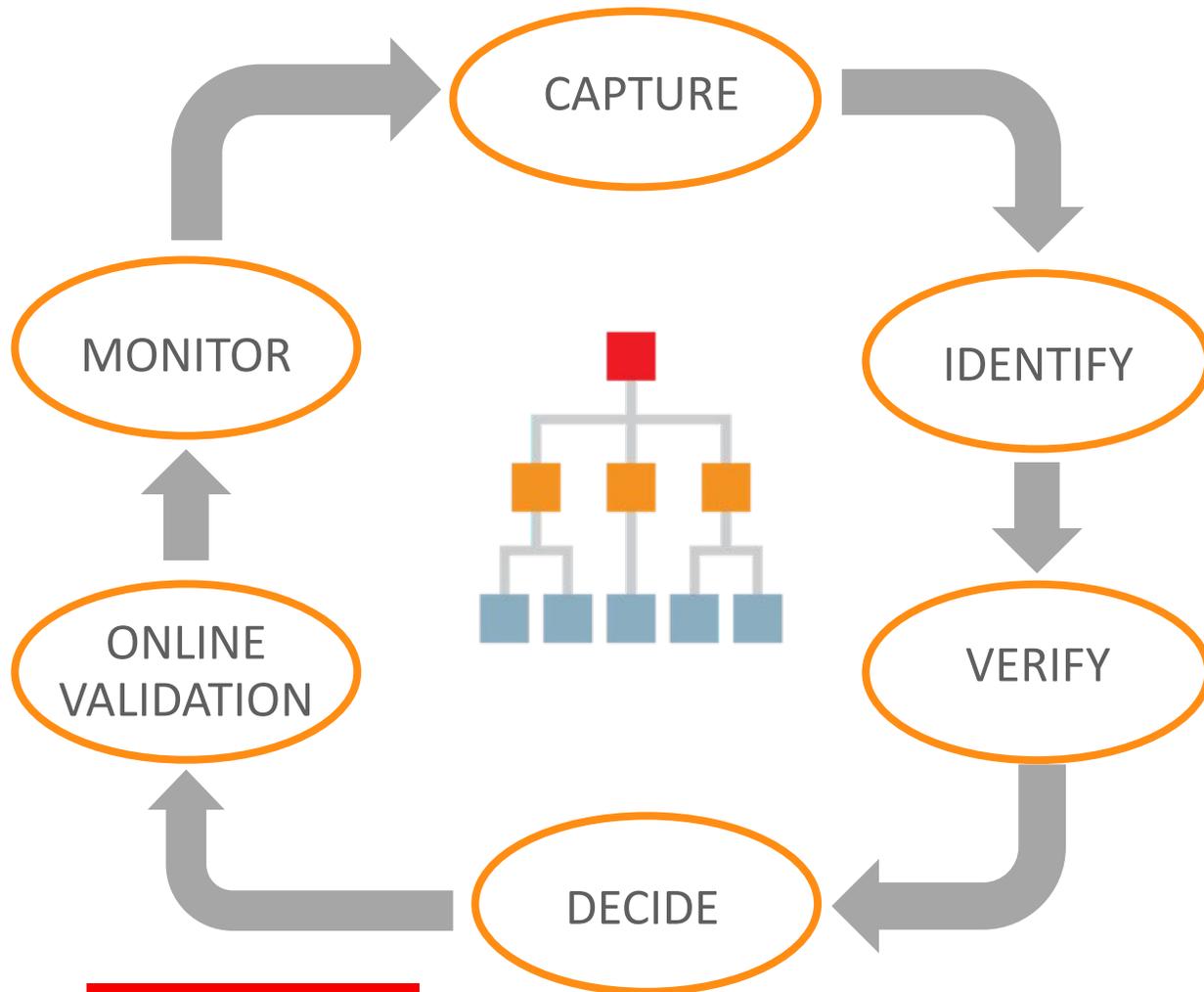
```
INSERT /*+ MEMOPTIMIZE_WRITE */ INTO tbl_fast_ingest VALUES (1,'test');
```

Statistics Collecting

- High Frequency Automatic Statistics Collection
 - Fully automated task
 - Frequently inspects the database to establish if there are any stale statistics
 - If stale statistics are found they will be refreshed
 - Runs independently of the maintenance window
- Real Time Statistics Collection
 - Augments automatic statistics collection operations
 - Statistics are collected during DML operations
 - Most essential optimizer statistics are collected in real time
 - Stored in Memory in real-time, asynchronously written to disk

Technical White Paper- [Best Practices for Gathering Optimizer Statistics With Oracle Database 19c](#)

Automatic Indexing



- The Automatic Indexing methodology is based on a common approach to manual SQL tuning
- It **identifies** candidate indexes and **validates** them before **implementing**
- The entire process is fully automated
- Transparency is equally important as sophisticated automation
 - All tuning activities are auditable via reporting

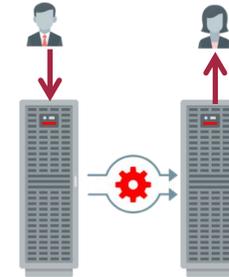
High Availability

12.1, 12.2



- 12.1
 - Comprehensive HA and disaster recovery functionality
 - Real Application Clusters, Active Data Guard, Recovery Appliance
 - Oracle Golden Gate for heterogeneous replication
- 12.2
 - Sharding
 - Autonomous Health Framework

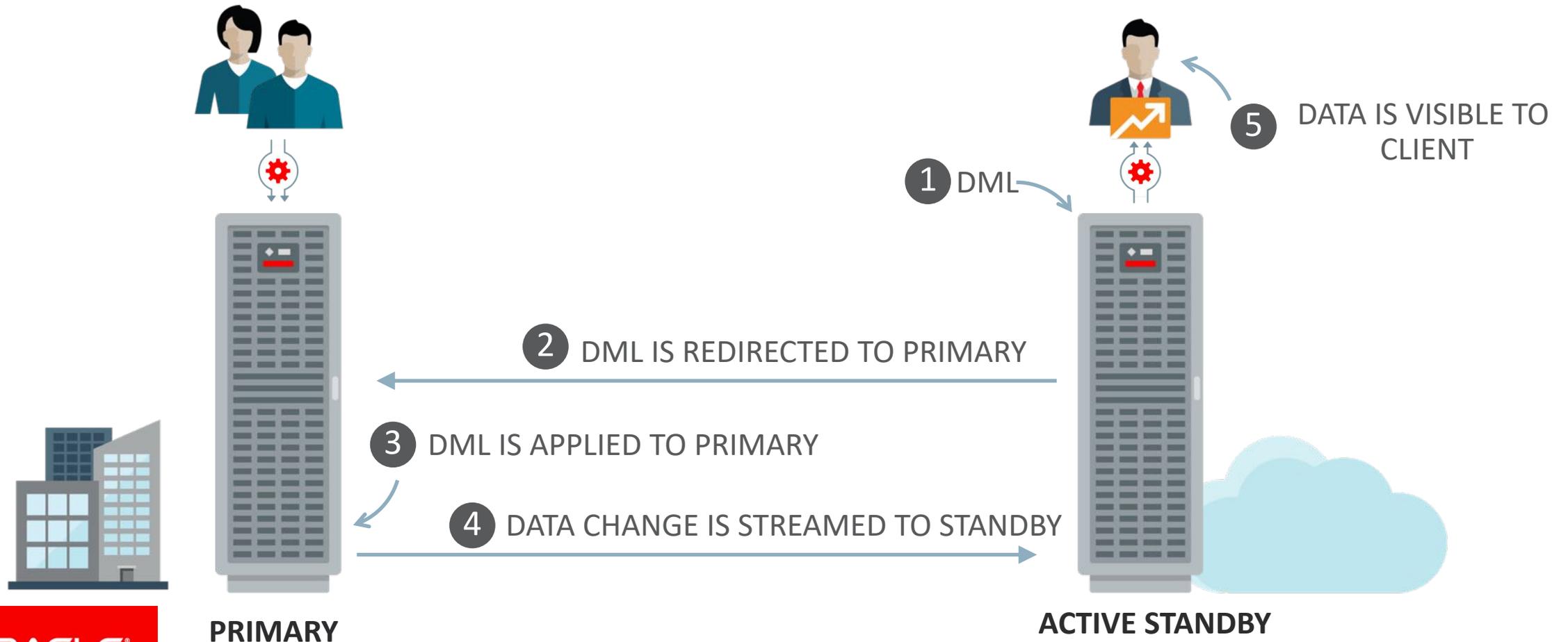
18c, 19c



- 18c
 - Sharded RAC
 - User-defined Sharding Methods
- 19c
 - DataGuard DML Redirect
 - Sharding:
 - Supports multiple PDB shards in a CDB
 - Unique sequence number generation per shard
 - Zero Downtime Grid Infrastructure Patching
 - PDB Recovery Catalog

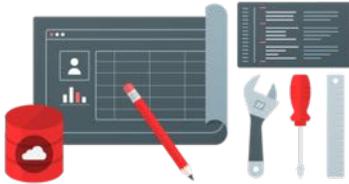
Active Data Guard : DML Redirection

- Read Mostly Standby



Application Development

12.1, 12.2



- 12.1
 - Application Express 5.1
 - SQL Developer & SQLCI
 - Comprehensive Language support
 - PL/SQL, SQL , Python, Node.js, PHP, Java, C, .NET, REST
 - JSON
 - SQL Support
- 12.2
 - Long Identifiers
 - Case Insensitive Databases

18c, 19c

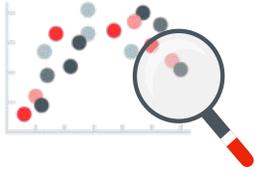


- 18c
 - Improved JSON Support
 - C, Python, Javascript JSON SODA API
 - Private Temporary Tables
- 19c
 - SQL JSON Enhancements
 - Materialized View for JSON_TABLE
 - Partial JSON Update support
 - Realtime SQL Monitoring for Developers

JSON Demo

Data Warehousing and Big Data

12.1, 12.2



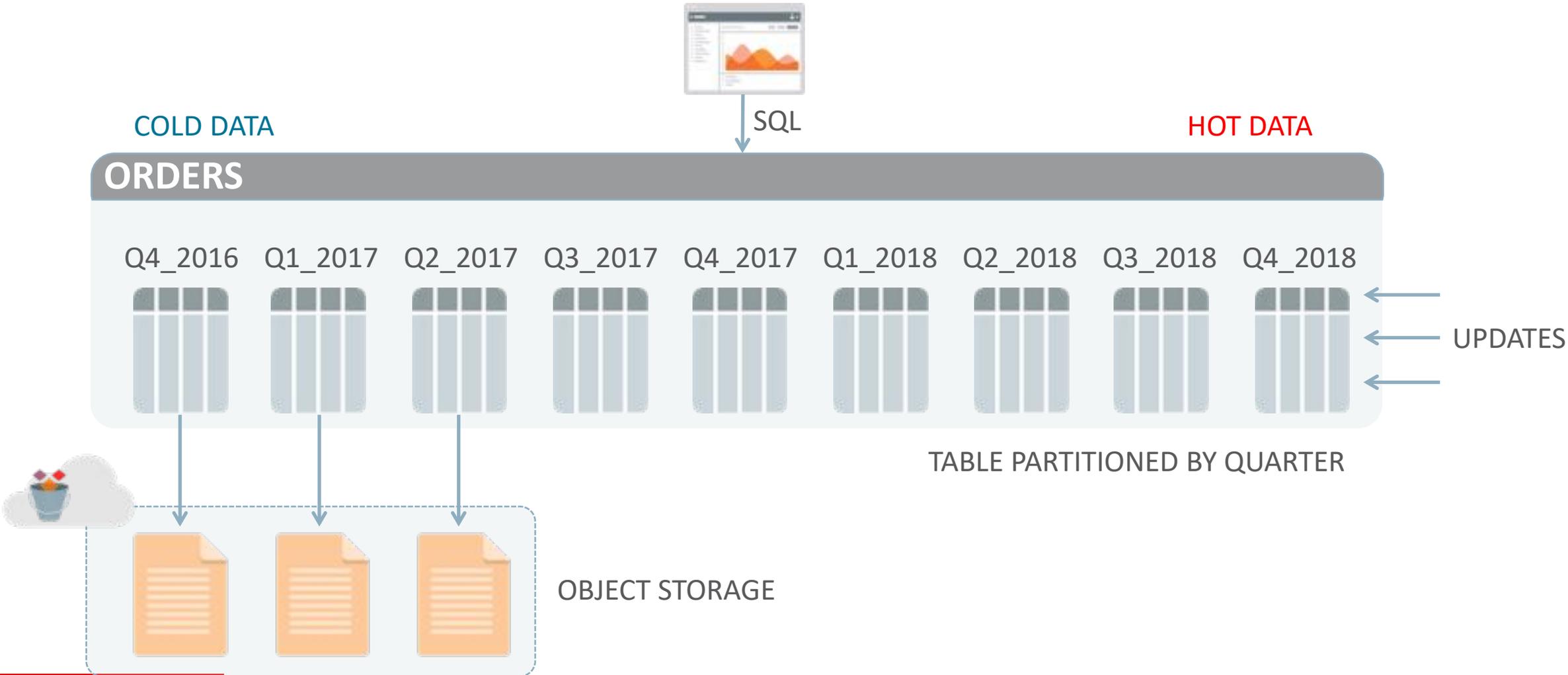
- 12.1
 - The most advanced analytics engine available today
 - Partitioning, Compression, SQL, Analytical Views, Analytical SQL, Data Mining
 - Easily analyze data held in Hadoop with Big Data SQL
 - Big Data Appliance
- 12.2
 - Partitioned External Tables
 - Analytical Views

18c, 19c



- 18c
 - In-Memory for external tables
 - Automatic propagation of nologged data to standby
 - Machine Learning :
 - Random Forrest, Neural Network
- 19c
 - Partitioned Hybrid Tables
 - Stats only Queries

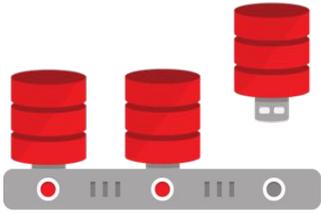
Oracle Hybrid Table



Partitioning Demo

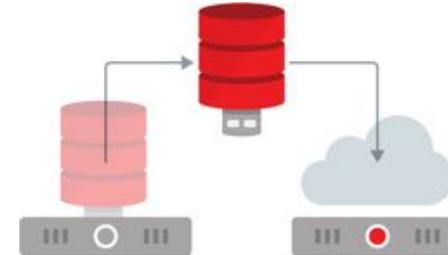
Multitenant

12.1, 12.2



- 12.1
 - Container managed database virtualization
 - Manage Many as one
 - Patching, Backup, Security, Online Cloning, Online Relocation
 - Software as Service
 - Shared metadata, Data location transparency
- 12.2
 - Online cloning & relocation
 - Incremental refresh of test/dev master
 - Application containers

18c, 19c



- 18c
 - Transportable backups
 - Snapshot carousel
 - Refreshable PDB switchover
- 19c
 - DBCA Silent mode operations for PDB
 - RAT and ADDM at PDB level
 - Automated PDB Relocation

Security

12.1, 12.2



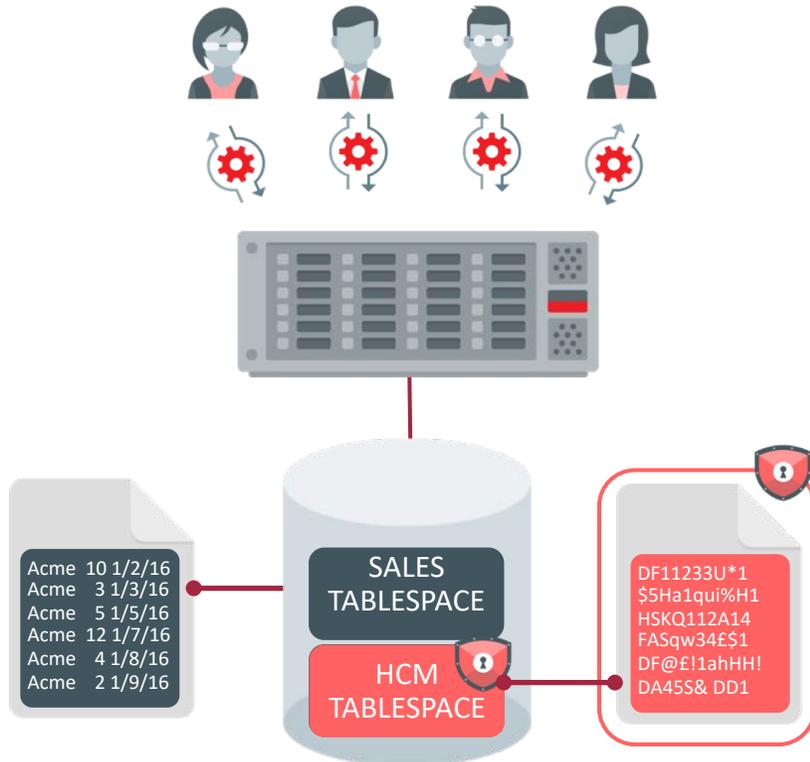
- 12.1
 - Security In-Depth
 - Access Controls, Encryption, Redaction, Masking, Auditing, SQL Firewalls
 - Key Vault
 - Audit Vault Database Firewall
 - Security Assessment Tool
- 12.2
 - Online encryption

18c, 19c



- 18c
 - Integration with Active Directory
 - Password-less schema creation
- 19c
 - Data Dictionary Encryption
 - Password-less Schema-only Oracle accounts
 - Database Vault Operations Control
 - Privilege Analysis available in EE

Online Tablespace Encryption



- Online encryption of existing database tablespace files (18c)
- Auto renaming for Non-managed files
- Closed TDE Key Store has no impact on Managed-tablespaces

...offline Tablespace Encryption now supports additional encryption algorithms:
AES192, AES256, ARIA, GOST and 3DES

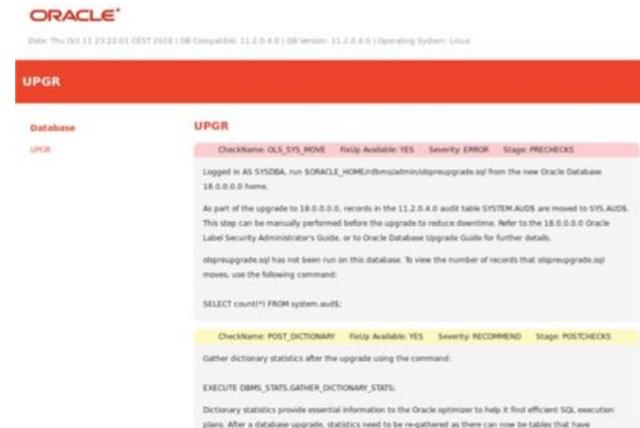
Small Change

Small but important...



Automatic Upgrade

- A utility to automatically upgrade your database
 - Can be run in silent-mode
 - Minimum source database version 11.2.0.4
 - Jar file - 6MB
 - Supports SE, SE2, EE
 - FREE to use
 - Download available at MOS Note: [2485457.1](https://www.oracle.com/technetwork/database/enterprise-education/2485457-1.html)
- Also.... Preupgrade.jar available.



For more information- <https://mikedietrichde.com>

Oracle Database 18c XE

Released Oct 2018

- Free to use
- Includes most EE features
 - no RAC, Data Guard, GoldenGate
- No support – community support
- Resource limited:
 - 2 CPUs for foreground processes
 - 2 GB memory (SGA + PGA)
 - 12 GB user data
 - 3 PDBs



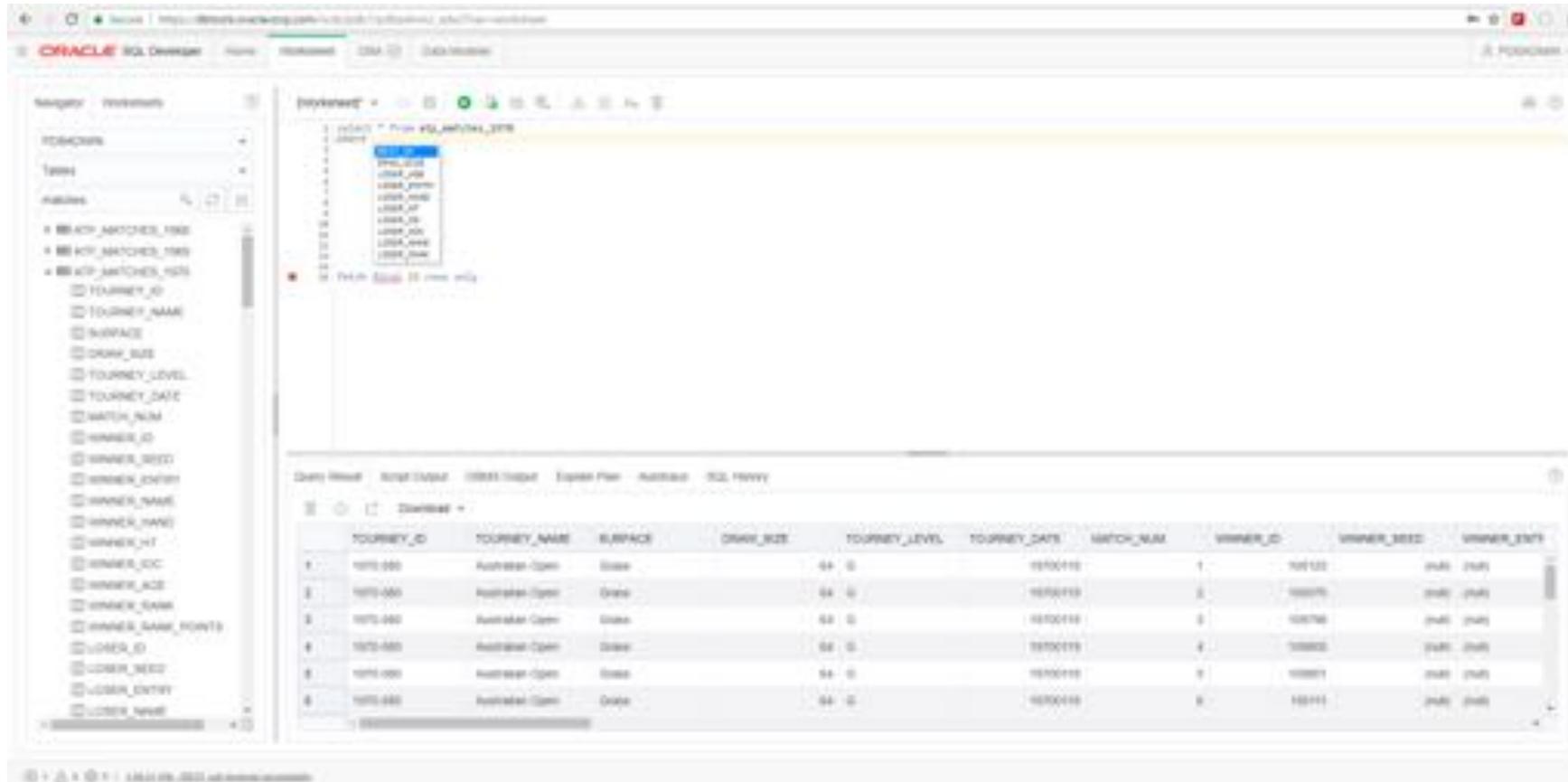
<https://www.oracle.com/database/technologies/appdev/xe.html>

EZConnect Improvements

- Simplification of Easy Connect syntax
- Easy Connect adaptor will now accept a list of name value pairs
 - For example: SDU, RETRY_COUNT, CONNECT_TIMEOUT, etc.)
- Will now enable multiple hosts/ports in the connect string
 - Typically used in load-balancing client connections.

```
$> sqlplus soe/soe@//salesserver1:1521/sales.us.example.com?connect_timeout=60&transport_connect_timeout=30&retry_count=3
```

Web SQLDeveloper



The screenshot displays the Oracle SQL Developer web interface. On the left, a tree view shows a database schema with tables like TOURNEY_ID, TOURNEY_NAME, SURFACE, and WINNER_ID. The main area shows a table with the following data:

TOURNEY_ID	TOURNEY_NAME	SURFACE	COURT_SIZE	TOURNEY_LEVEL	TOURNEY_DATE	MATCH_NUM	WINNER_ID	WINNER_SEED	WINNER_ENTRY
1	Australian Open	Grass	64	0	15700110	1	101102	040	040
2	Australian Open	Grass	64	0	15700110	2	100075	040	040
3	Australian Open	Grass	64	0	15700110	3	100790	040	040
4	Australian Open	Grass	64	0	15700110	4	100802	040	040
5	Australian Open	Grass	64	0	15700110	5	100801	040	040
6	Australian Open	Grass	64	0	15700110	6	100111	040	040



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In/sean-stacey-oracle

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