

What's New in Oracle Database 19c

Maria Colgan

Master Product Manager

Mission Critical Database Technologies

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19^c



SQL Maria

Safe Harbor Statement

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

Additional Platforms to follow...

19c

Last Release of the 12.2 family of products

12^c

RELEASE 2

12.2.0.1

18^c

12.2.0.2

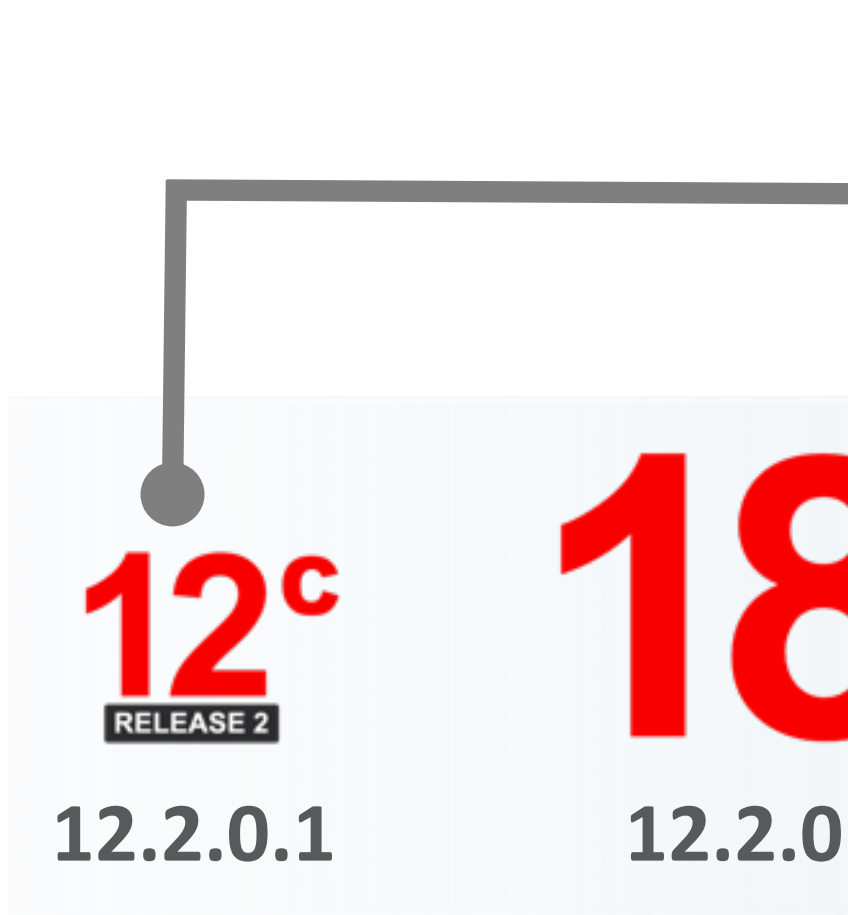
19^c




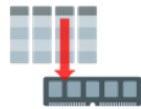

12.2.0.3

19c

Core aims :
Long Term Stability

Continual improvements in each release....



-  Sharding
-  Multitenant, Online Clone and Relocate
-  Autonomous Health Framework
-  New In-Memory Features
-  Online Encryption

C

Continual improvements in each release....

12^c

RELEASE 2

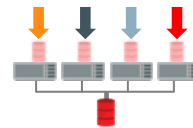
12.2.0.1

18^c

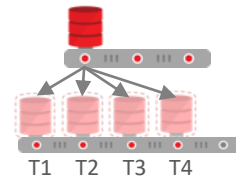
12.2.0.2



Mem Optimized Row Store



Sharded RAC



Multitenant Snapshot
Carousel



Active Directory Integration

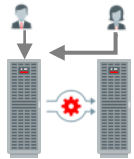


Private Temporary Tables

Continual improvements in each release....



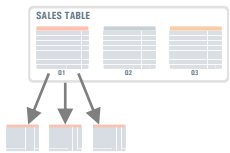
High speed data ingestion



Active Data Guard DML
Redirect



Automatic Indexing



Hybrid Partition Tables



JSON Improvements

19c

12.2.0.3

And Many Many More....

Security Assessment Tool

Unicode 9 Support

Load From Object Stores

Invisible Columns

Property Graph

SQL Plan Management Enhancements

Approximate Functions

Long Identifiers

Online Tablespace Encryption

Quarantine for SQL Plans

Inline External Tables

JSON

Auto Indexing

Schema-only Oracle accounts

Real-Time Statistics

Longer Varchars

Partitioned Hybrid Tables

Polymorphic Table Functions

Integration with Active Directory

Data Guard DML Redirect

Read Only Oracle Home

Index Usage Stats

Index Compression

Live SQL

Top N Queries

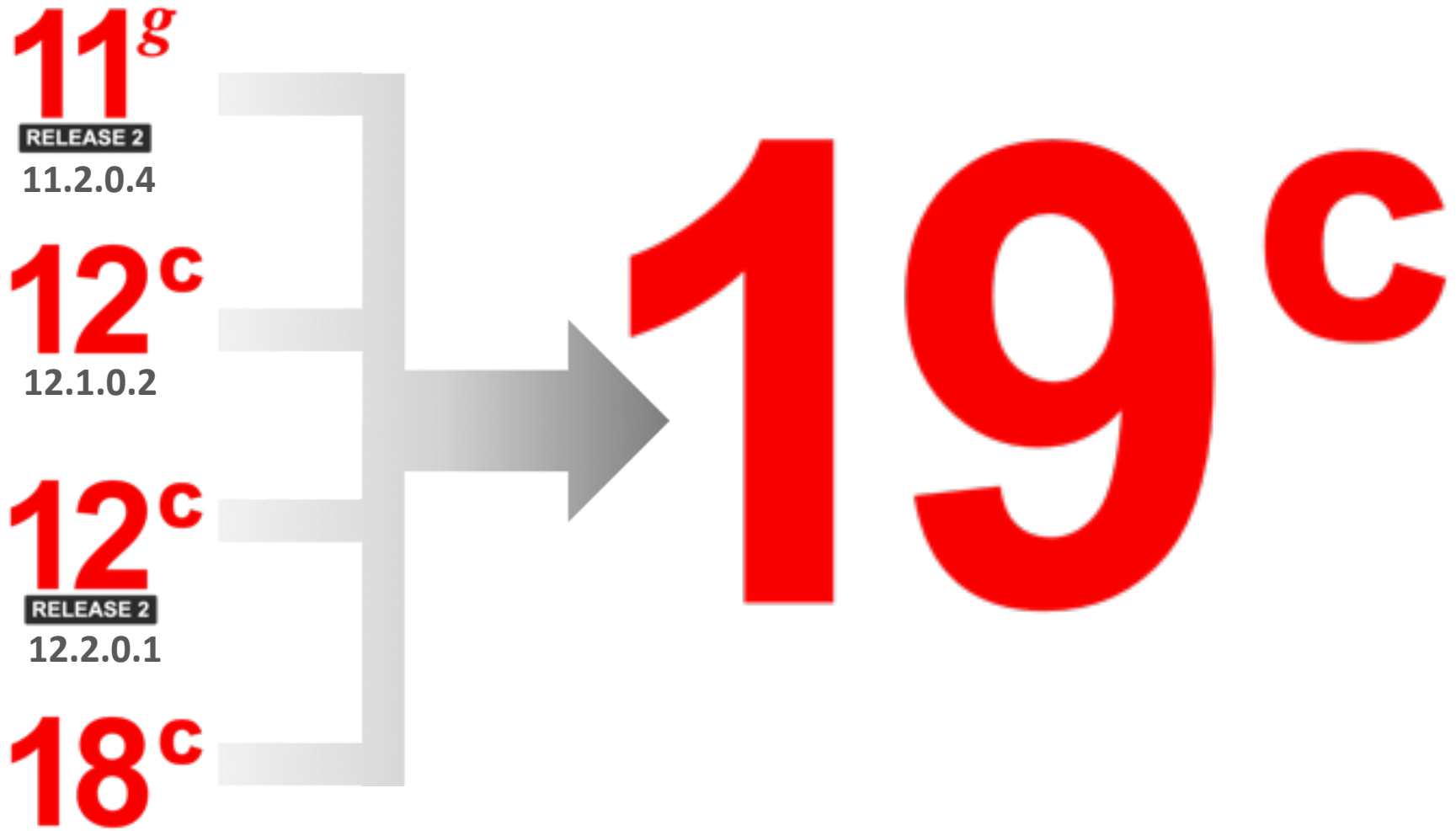
Application Continuity





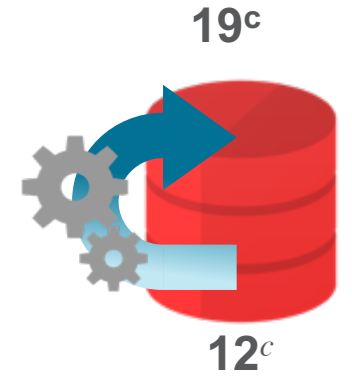
Database Upgrade

Direct Upgrade to Oracle Database 19c



New Auto Upgrade Tool

- Oracle Database Auto Upgrade allows DBAs to upgrade one or many databases without human intervention
- Allows the DBA to upgrade one or many databases without human intervention
- The Auto Upgrade utility identifies issues before upgrades, deploys upgrades, performs post upgrade actions, and brings up the upgraded Oracle Database
- Currently supports 12.2 and 18c



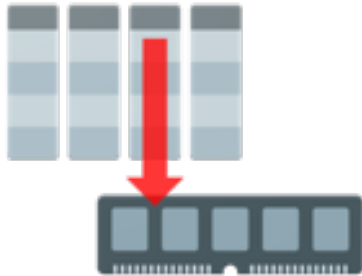
* See MOS Note 2485457.1 for more details

What to expect from Oracle Database 19^c



Performance and Scalability

12.1



- Continuous Innovation and Improvement
 - Row Level Locking, Read Consistency, B-Tree Indexes, Bitmap Indexes, Materialised Views, Parallel Query, Advanced Compression, ASM, Results Cache
- Software in Silicon
- In-Memory Column Store
- **Exadata** provides the best database platform for all workloads

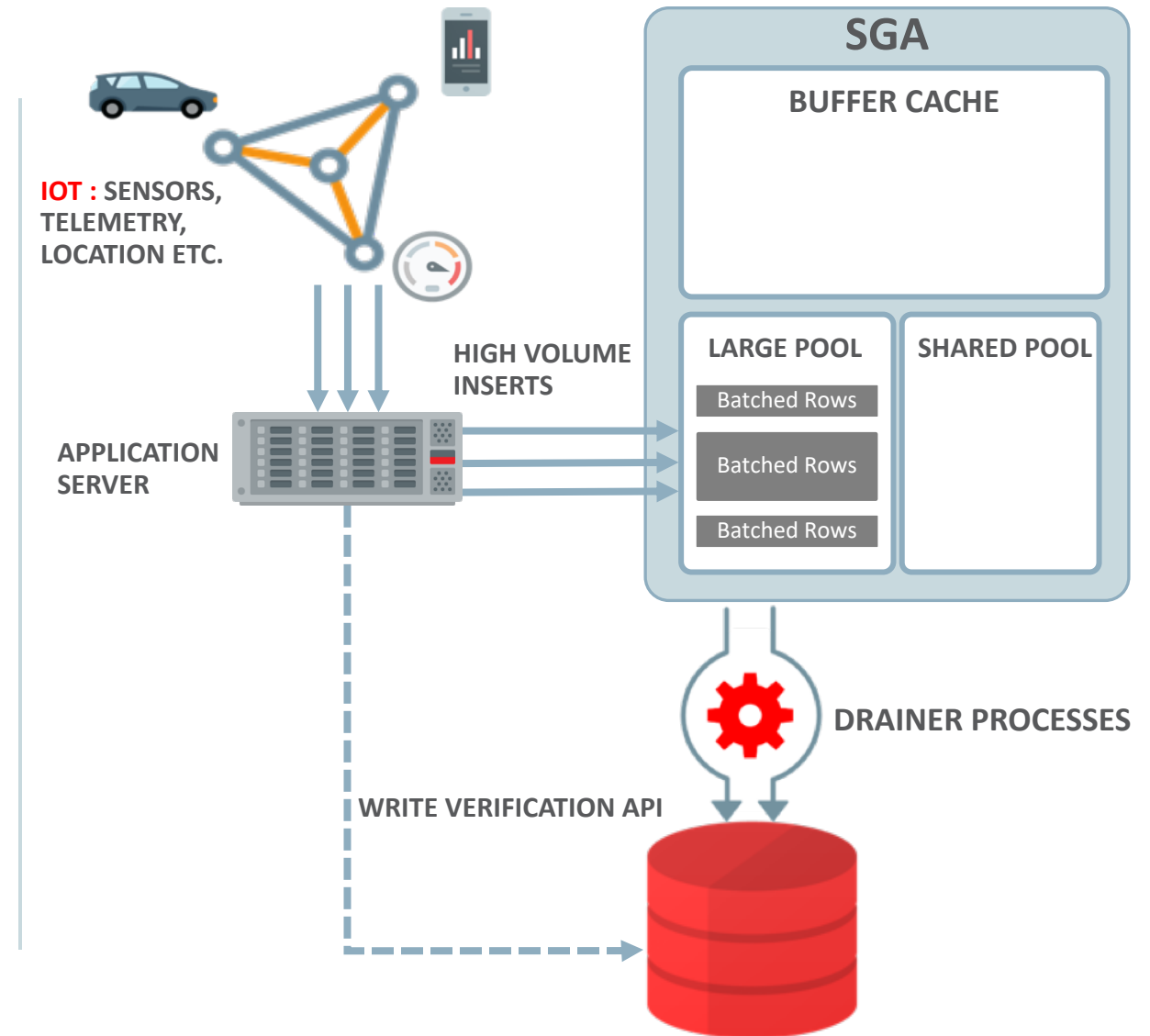
12.2, 18c, 19c



- 12.2
 - In Memory JSON Queries
 - In Memory Active Standby
- 18c
 - Memory Optimized Row Store
- 19c
 - Fast ingest support for IoT type workloads
 - Quarantine for SQL Plans
 - Automatic Indexing

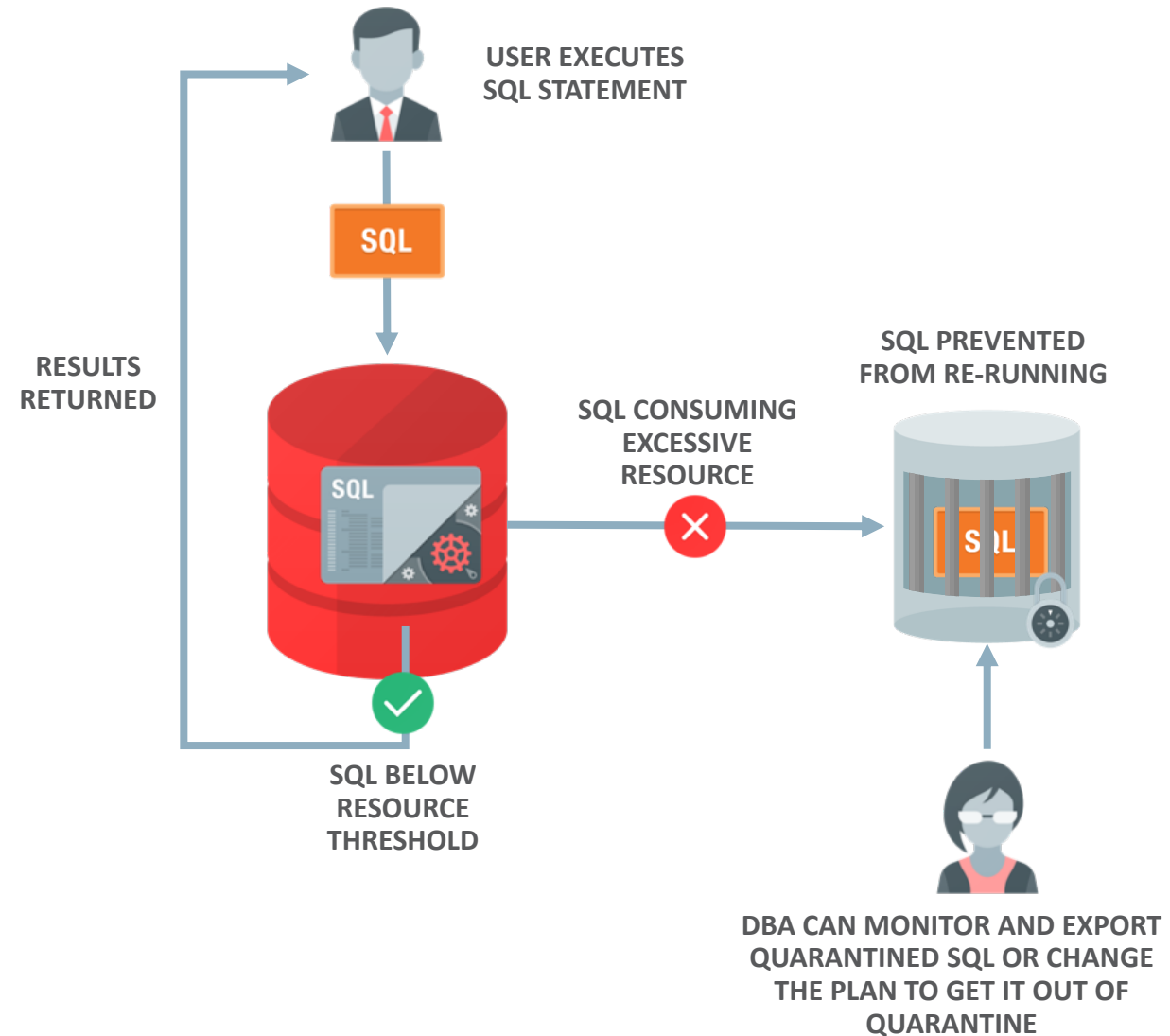
Memoptimized Rowstore : Fast Ingest Support

- A memory optimised mechanism for inserting data into the database
- Ideal for light weight IoT transactions
- Rows are cached in memory and asynchronously drained to disk
- An API allows developers to check on the durability of their inserts
 - Declare table `MEMOPTIMIZE FOR WRITE`
 - Use new hint `MEMOPTIMIZE_WRITE`

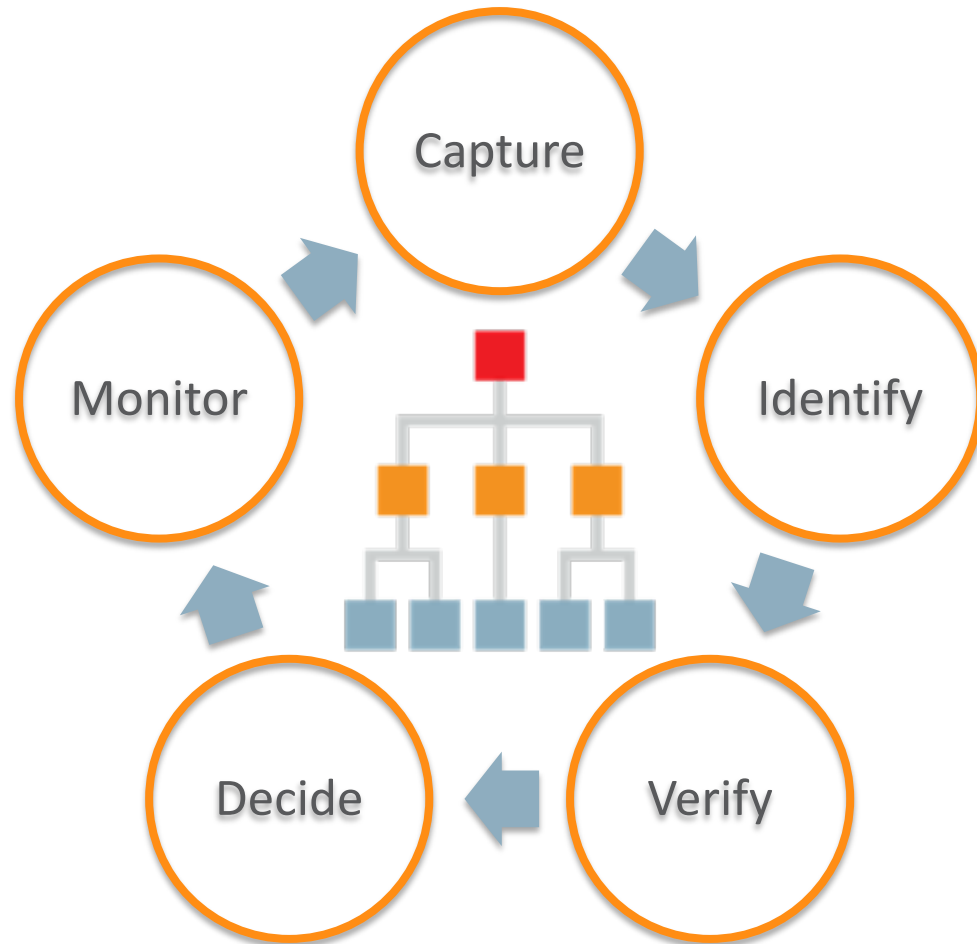


SQL Quarantine

- SQL execution plans consuming excessive resources are quarantined
- It's prevented from executing again
- Improves overall responsiveness of the system by stopping "rogue" SQL statements being continually resubmitted
- DBA can monitor quarantined statements in `V$SQL`
- Controlled by `DBMS_SQLQ` or `DBMS_RESOURCE_MANAGER`



Automatic Indexing



An **expert system** that implements indexes based on what a skilled performance engineer would do

Reinforcement Learning allows it to learn from its own actions as all candidate indexes are **validated** before being **implementing**

The entire process is fully automatic
Transparency is equally important as sophisticated automation

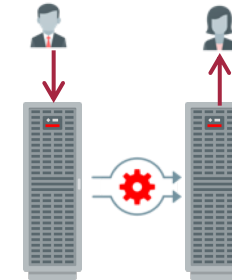
All tuning activities are auditable

High Availability



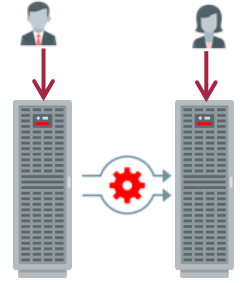
- Comprehensive HA and disaster recovery functionality
 - Real Application Clusters, Active Data Guard, Recovery Appliance
- Oracle GoldenGate for heterogeneous replication

New in 12.2, 18c, 19c



- 12.2
 - Sharding
 - Autonomous Health Framework
- 18c
 - Sharded RAC
- 19c
 - Data Guard DML Redirect
 - Sharding now supports multiple PDB shards in a CDB
 - Improvements to Application Continuity

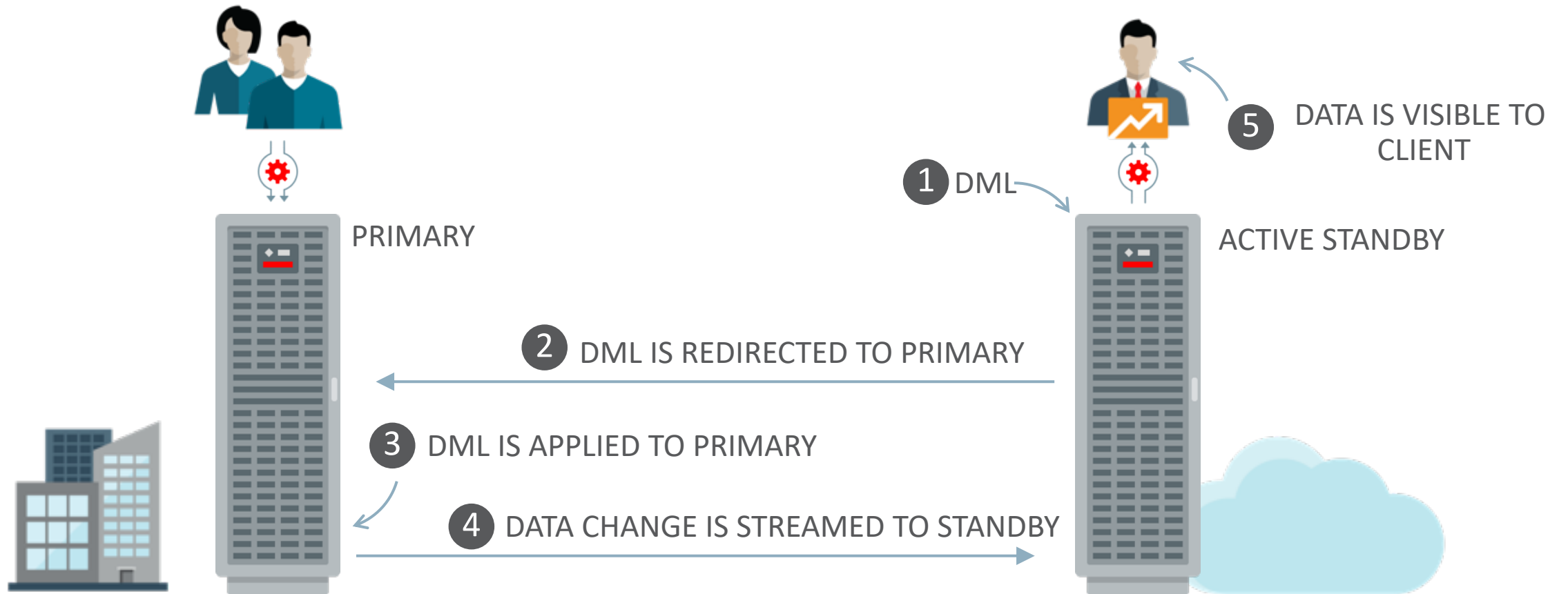
Active Data Guard : DML Redirection



- Allows DML to be executed against the standby database
- On execution the DML operation is passed to the primary database
- The primary database performs the operations and generates the redo
- The redo is then applied to the standby and control returned to the application
- The transaction is fully ACID compliant
- Allows for incidental updates to be run against the standby increasing the overall flexibility of the disaster recovery architecture

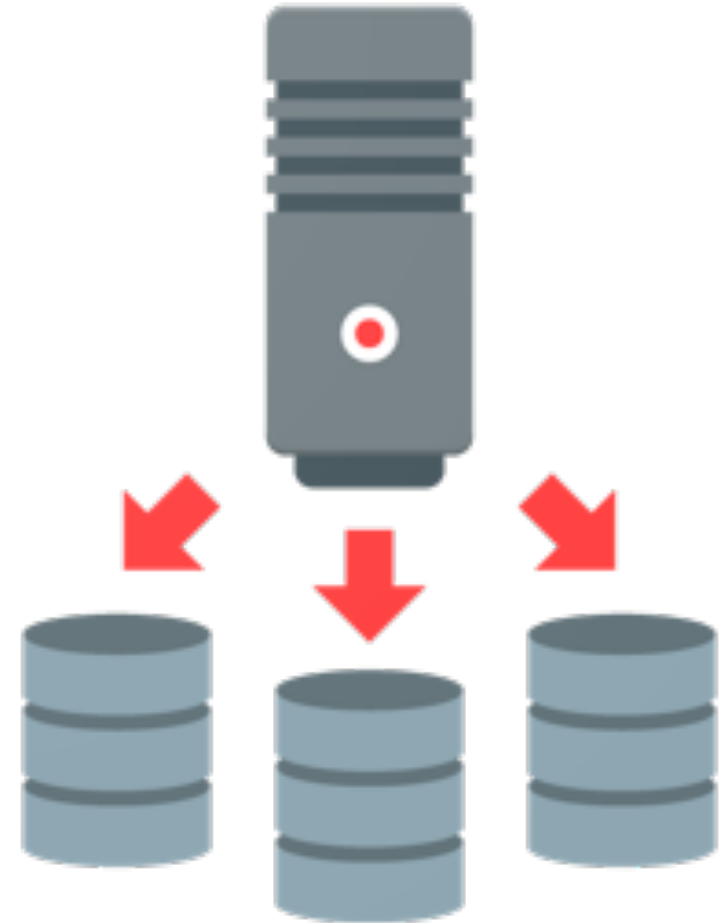
Active Data Guard : DML Redirection

Read Mostly Standby



Sharding Enhancements

- Support multiple PDB-shards in the same CDB
 - Allows consolidation of apps that require separate databases, but share the same system
- Multiple Table Families
 - Support multiple table families where data from different families reside in the same chunk
 - For system-managed sharding method
 - Different apps accessing different table families can now be hosted on one sharded DB
- Propagate parameter setting across shards
 - Centrally manage and propagate "ALTER SYSTEM" parameter setting from shard catalog to all shards



Application Development



- Application Express provides a low code platform for building stunning scalable applications
- SQL Developer IDE & SQLCL provide class leading functionality for both developers and admins
- Comprehensive Language support
 - PL/SQL, SQL , Python, Node.js, PHP, Java, C, .NET, REST
- JSON for schema less development

New in 12.2, 18c, 19c



- 12.2
 - Long Identifiers
 - Case Insensitive Databases
- 18c
 - Improved JSON Support
 - C, Python, Javascript JSON SODA API
 - Private Temporary Tables
- 19c
 - SQL JSON Enhancements
 - Partial JSON Update support



Oracle Database 19c JSON Support

- The Oracle Database provides comprehensive support for JSON
 - Via Standard DML
 - NoSQL APIs (Java, REST, C, Python, JavaScript, PL/SQL)
 - Analytics (Dot Notation Access, Parallel Query, QBE, Columnar Access)
 - JSON Data Guide to analyze the meta data of JSON Collections
- Improvements in Oracle Database 19c include
 - JSON Update operations
 - Materialised View Support for JSON_TABLE
 - JSON Function Simplification

Partial JSON Update Support

- New SQL function `JSON_MERGEPATCH` enables you to update specific portions of a JSON document without have to replace the entire document
- Imagine we need to updates all of the JSON documents in the `po_document` column of the `purchaseorder_tab` table to remove the field "Special Instructions"

```
UPDATE purchaseorder_tab
SET    po_document =
json_mergepatch(
    po_document,
    '{"Special Instructions':null}'
);
```


Data Warehousing and Big Data



- 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 provides an out of the box high performance analytics platform

New in 12.2, 18c, 19c

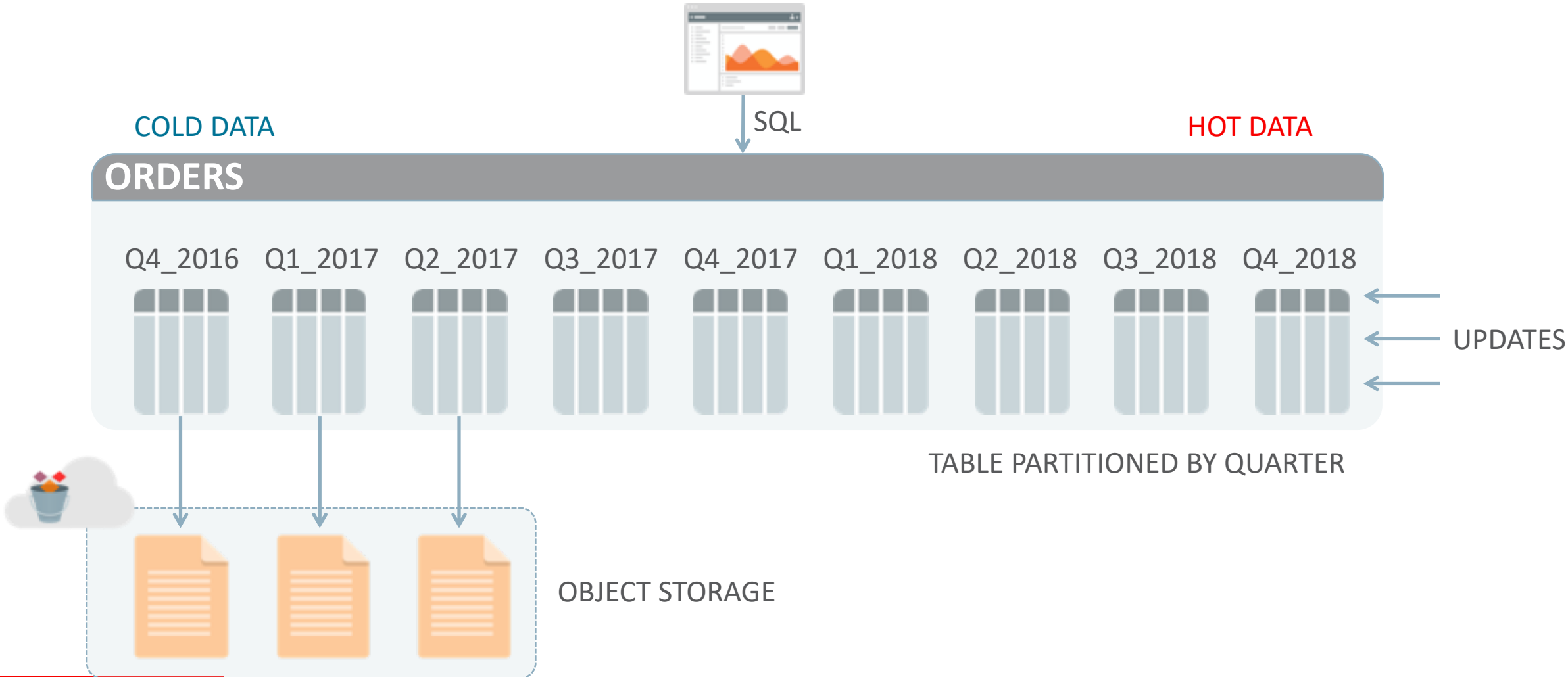


- 12.2
 - Partitioned External Tables
 - Analytical Views
- 18c
 - Neural Network Support
 - In-Memory for external tables
 - Automatic propagation of nologged data to standby
- 19c
 - Partitioned Hybrid Tables
 - Real Time Stats Collection

Hybrid Partitioned Tables

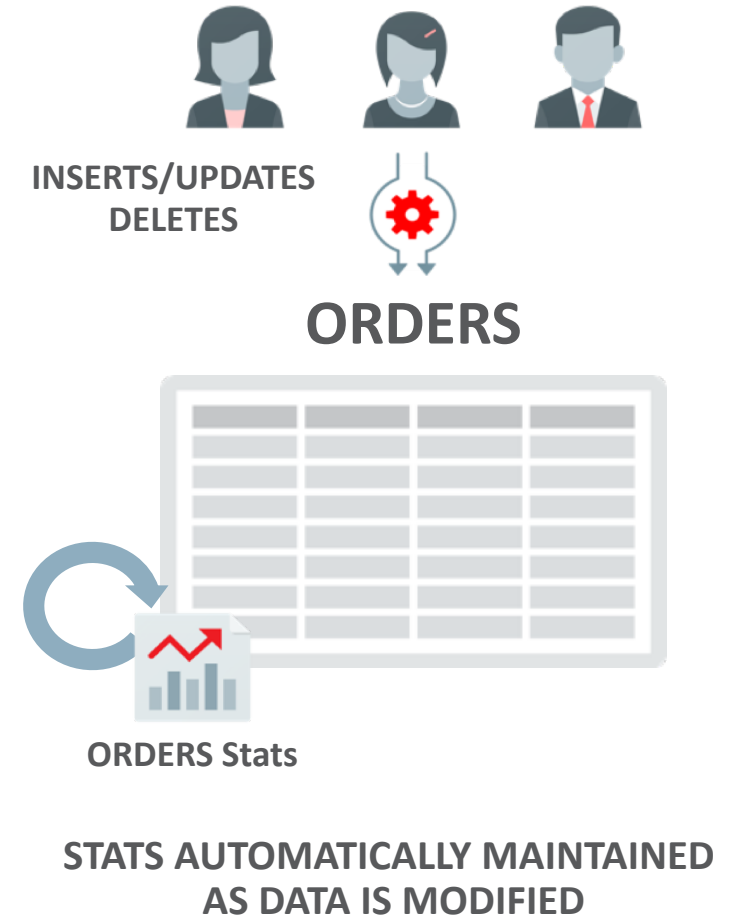
- Extends Oracle Partitioning by enabling partitions to reside in both Oracle Database segments and in external files
- External partitions may reside on standard file systems, HDFS or Object Storage (coming soon).
- This model supports the placement of data for long term archiving on lower cost storage whilst allowing it's continued online access
- Supports long term access to infrequently access data for regulatory requirements

Hybrid Partitioned Tables



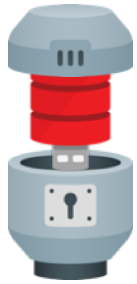
Real-Time Statistics

- Gather statistics as part of conventional DML (Insert/update/merge)
- Statistics gathered during DML needs to be fast with negligible overhead
- Only most essential stats are gathered to avoid catastrophic SQL execution plan performance regressions (e.g. avoiding out-of-range conditions)
 - Min, Max, num_rows, etc.
- Gathering of remaining statistics is deferred
 - Automatic statistics gathering job still kicks in as needed



Security

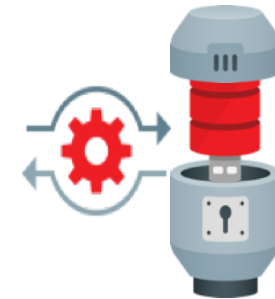
12.1



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

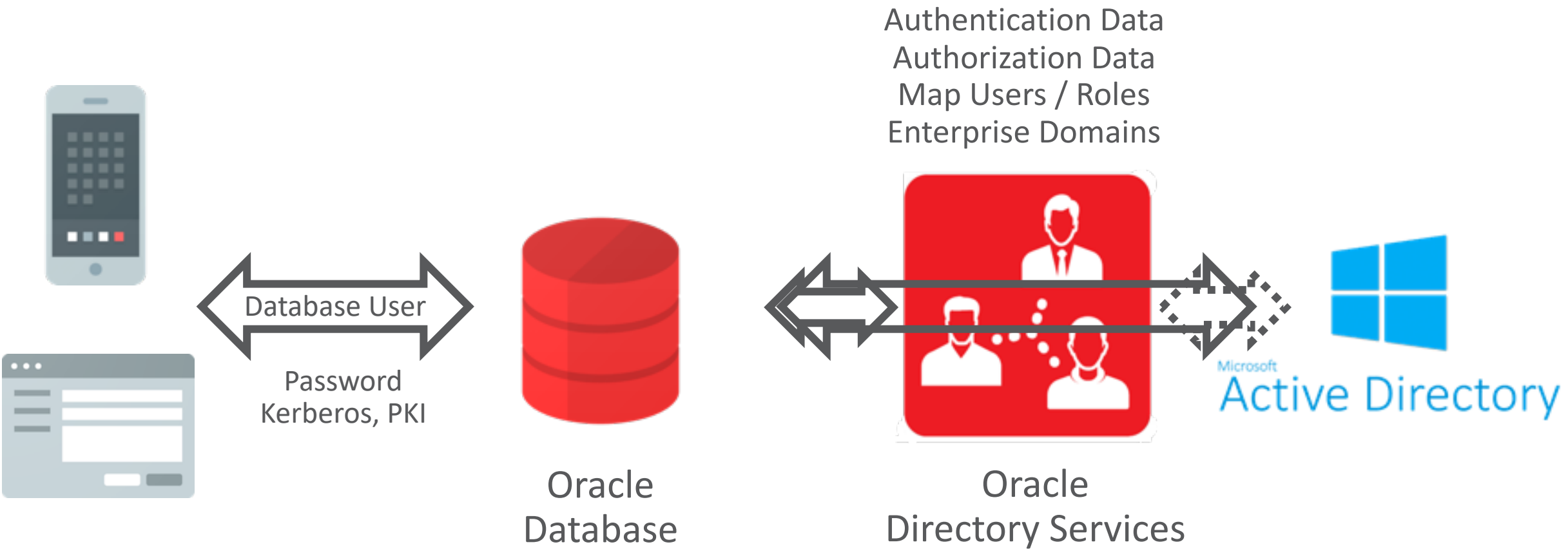
12.2, 18c, 19c

Active Directory



- 12.2
 - Online encryption
- 18c
 - Integration with Active Directory
 - Password-less schema creation
- 19c
 - Schema-only Oracle accounts
 - Database Vault Operations Control

Centrally Managed Users Directly in Active Directory



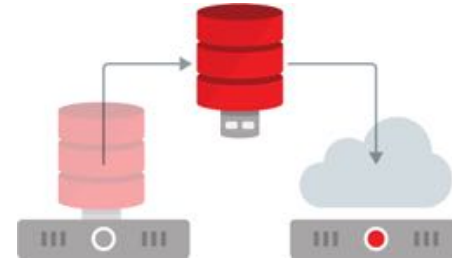
Multitenant

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, 18c, 19c



- 12.2
 - Online cloning & relocation
 - Incremental refresh of test/dev master
 - Application containers
- 18c
 - Transportable backups
 - Snapshot carousel
 - Refreshable PDB switchover
- 19c
 - RAT and ADDM at PDB level

Summary

- Oracle Database 19c is now production and available on premises
- Oracle Database 19c offers an extended support window making it an excellent choice for current and future upgrade plans
- Focus on long term stability

19c