ORACLE

Autonomous Database Overview

Deliver better solutions faster

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How should databases be managed in the future?

What if your cloud database could do the following:

- Make it **trivial** to patch and upgrade thousands of databases
- **Remove** need to track versions + one-off patches for every database
- **Automatically** deploy critical security bug fixes into production databases as soon as they are available
- **Simplify** planning of hardware capacity for workloads to meet all future business requirements
- **Simplify** maintaining and testing disaster-recovery infrastructure
- Fully **automate** processes for database lifecycle operations
- Provide **24x7 support** for every database availability issue
- **Automatically** file service requests + gather all diagnostics information for every database issue
- Significantly **reduce** operational and licensing costs

Welcome to the future: **AUTONOMOUS DATABASE**

Maximize your opportunity using Autonomous Database

Reduce cost & risk

Lower IT costs, improve security and eliminate human error with automation

Simplify your work

Increase productivity with an end-to-end cloud data ecosystem

Accelerate success

Start today: modernize on-prem databases, create new apps and integrate across all your clouds

Autonomous Database

Reduce costs & risks

Autonomous Database lowers IT costs by automating the entire lifecycle of database administration and always-on security.

Simple, cost-effective licensing bundles all required tools and services, per-second billing etc.

End-to-end automation lowers IT costs and helps ensure the highest availability and reliability for mission critical apps

Reduce risk – global certifications, always on-security, fully compliant

Reduce risk with clear separation of duties

Oracle never has access to your data

Security managed by Oracle

- Network security and monitoring
- OS and platform security
- Database patches and upgrades
- Administrative separation of duties
- Data encryption by default

Security managed by customer

- Ongoing security assessments
- User roles & privileges
- Sensitive data discovery
- Data protection
- Activity auditing

Autonomous Database

Simplify your work

Increase productivity with an end-to-end cloud data ecosystem

Developers and analysts can reduce their dependency on IT and focus on delivering strategic solutions.

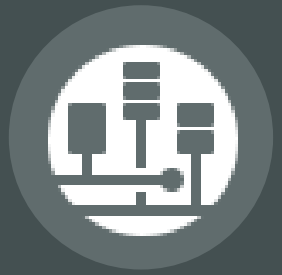
Build applications the way you want with low code or open-source frameworks.

Use built-in, self-service data integration and analytic tools to generate better insights and predictions.

Oracle Database – Choice of Deployment

DB installed on Generic HW on premises

DB installed on Oracle Exadata on premises



DB on Oracle Cloud Infrastructure

DBaaS – BM/VM

Exadata Cloud Service or Exadata Cloud at Customer

Oracle Autonomous Database

Most Manual **Most Autonomous**

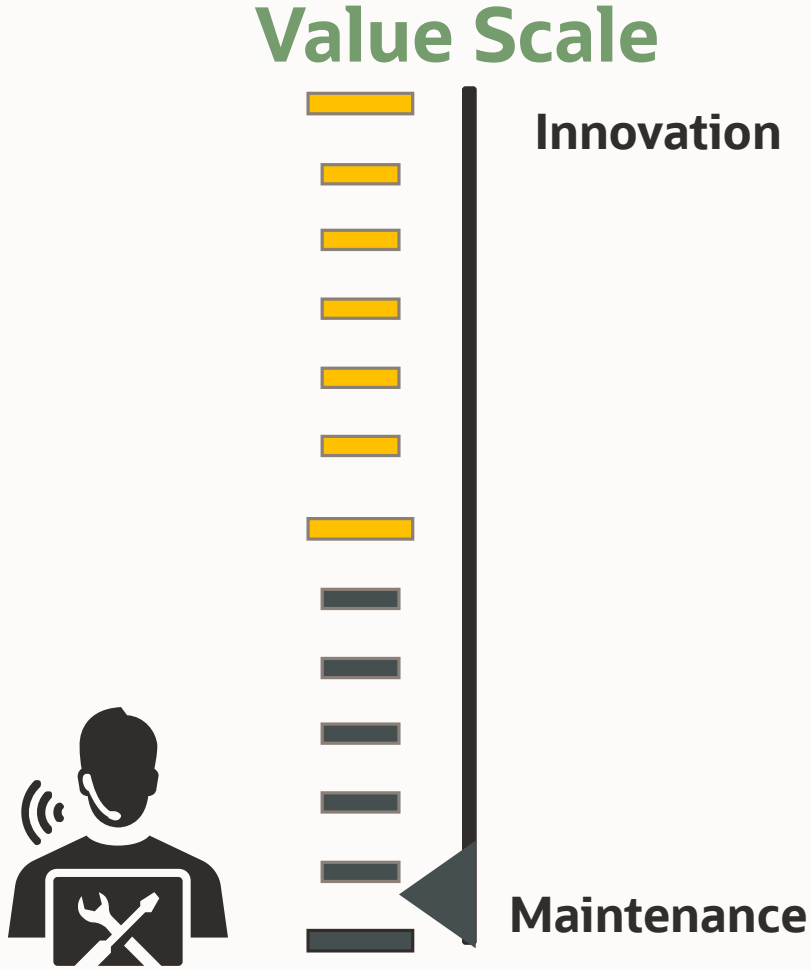
Traditional Responsibilities of the Database Administrator

Tasks and responsibilities to **generate business value**

- Architecture, planning, data modeling
- Data security and lifecycle management
- Application related tuning
- End-to-end service level management

Tasks and responsibilities for **maintenance and administration**

- Configuration and tuning of systems, network, storage
- Database provisioning, patching
- Database backups, H/A, disaster recovery
- Internal helpdesk and call center



Autonomous Database

Accelerate success

Autonomous Database can help you today, regardless of your starting point.

Easily migrate existing on-premises applications to cloud

Run Oracle Applications and extend with new capabilities

Deliver multi-cloud solutions that seamlessly span across other public clouds

Autonomous Database is already creating new opportunities for customers

22,000

New databases created each month

Typical provisioning time: 2-3 minutes

8.8 billion

Queries per hour running globally across all data centers

Simplify innovation and prototyping

Immediately start developing using cloud native tools; nothing to install

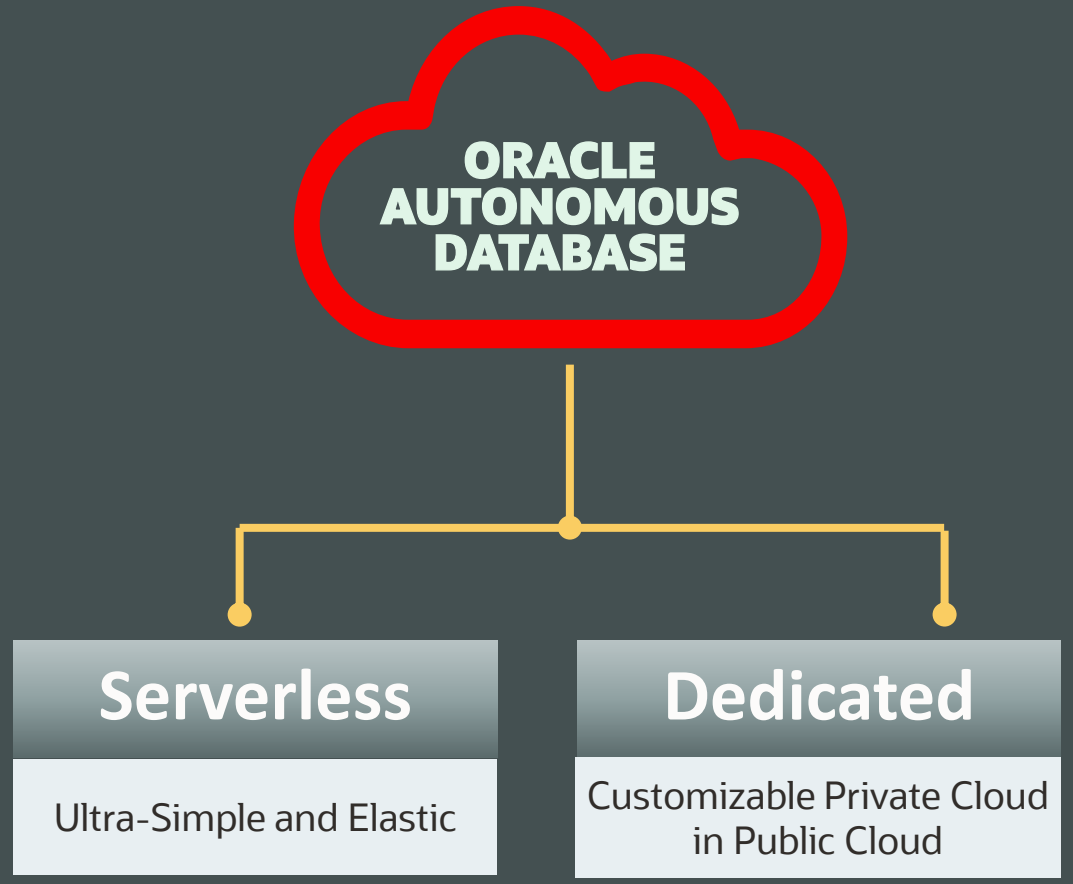
Deploy in minutes

Autonomous Database

Data Modeling	Low-code APEX	Notebooks	Data Analysis
SQL Worksheet	REST Services	ML Modeling	Data Sharing
JSON Worksheet	Data Catalog	Graph Modeling	Data Integration

Types of Deployment

- Oracle Autonomous Database is a family of products with each member of the family optimized by workload.
- Autonomous Data Warehouse (ADW), has been optimized for analytic workloads, such as data warehouse, data marts or as part of a data lake.
- ATP is optimized for transaction processing or mixed workload environments and makes an excellent platform for new application development.
- Autonomous JSON – JSON files



ADB Serverless vs Dedicated

Serverless – Primary Goals/Benefits

Simple

- Oracle automates and manages everything
  - Deployment, lifecycle, software updates, etc.
- Customer just chooses database compute, storage, and region

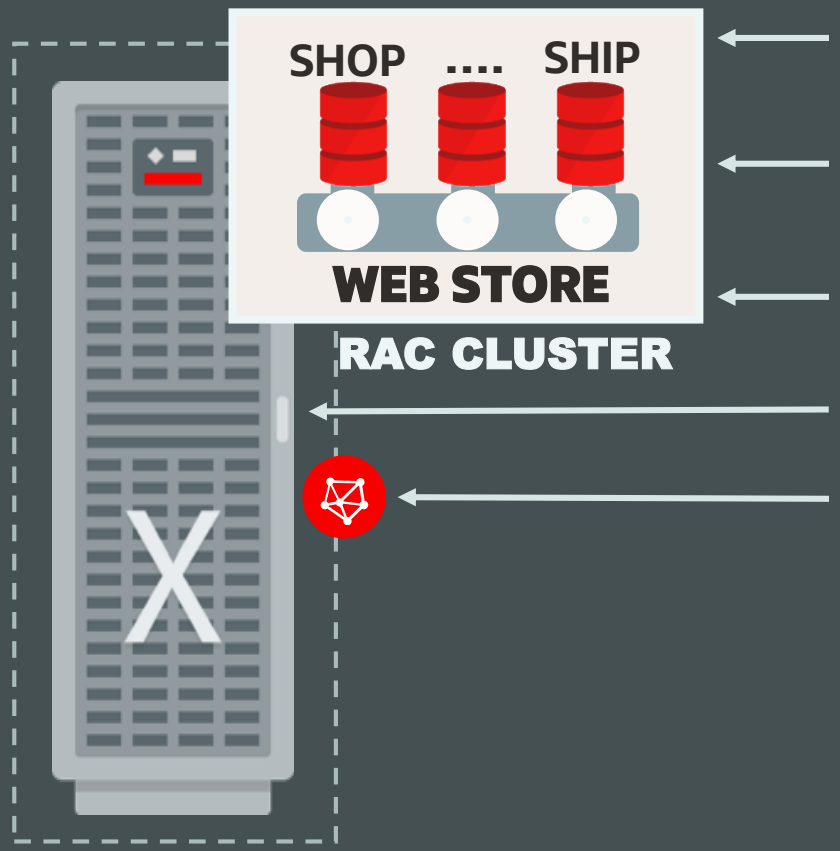
Elastic

- Low minimum size - 1 OCPU and 1 TB of storage
- Low minimum time commitment - 1 hour
- Instantly grow or shrink online, pay for what you use

Dedicated – Primary Goals/Benefits

- Provides a **Private Database Cloud running** on dedicated Exadata Infrastructure in the Public Cloud
  - Runs all your databases - any size, scale, or criticality
- Highest **Isolation**
  - Multiple levels of isolation protect from noisy or hostile neighbors
- Customizable **Operational Policies**
  - Control of provisioning, software updates, availability, density

ADB– Dedicated Security -Isolation



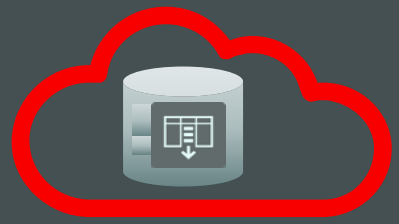
Dedicated allows multiple levels of isolation

- Database (DB)
- Container database (CDB)
- Cluster of VMs
- Separate Hardware (Exadata Infrastructure)
- Hardware Enforced Private Network (VCN)

The level of security and performance isolation can be tailored to the needs of each database

Implementing isolation is normally complex but in autonomous you just specify what you want

Autonomous vs Automated



Autonomous Database

- All database operations fully automated
- User runs SQL, no access to OS or CDB
- Exadata Performance and Availability
- Customizable for DW or TP Workload

Serverless

Ultra-Simple & Elastic

Dedicated

Customizable Private Cloud

Automated DB Services

- Database lifecycle automation provided
- User operates, has DBA and OS root access
- Runs older database versions
- ALL database features (e.g. Java, etc)

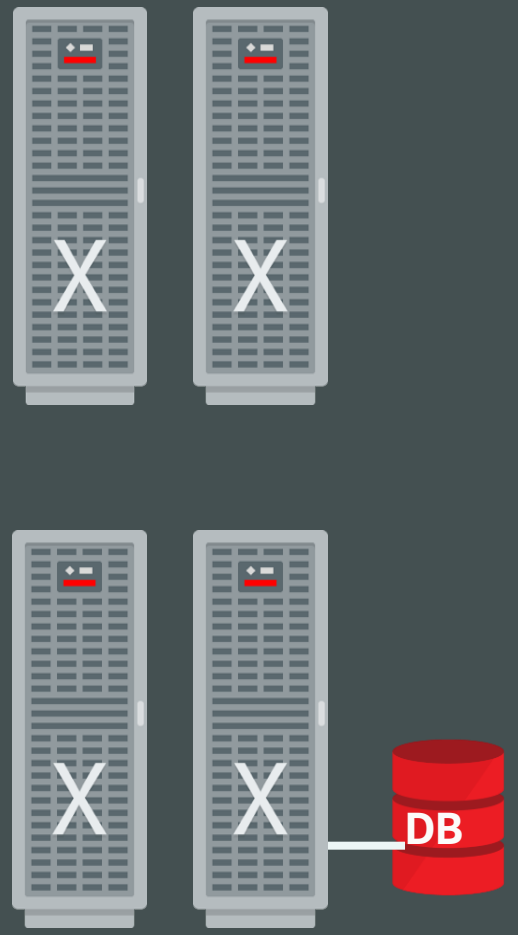
ExaCS

Scale, Performance, Availability

DBCS

VM or bare metal, single server or RAC

Serverless ADB



- Database is placed on Exadata Cloud Infrastructure based on Region
- Oracle completely manages and controls all placement, patching, software versions, and isolation
  - Zero customer administration required
- RAC cluster enables rolling upgrades and fast failover
- Low minimum size/cost - 1 OCPU and 1 TB of storage
- Low minimum time commitment – 1 hour
- Designed for Common compliance apps or Public cloud apps

Autonomous Database -IAM setup

Create separation of responsibility for Fleet vs Database Administration

An OCI Autonomous **RESOURCE** can be one of:

- **autonomous-exadata-infrastructures** – dedicated hardware resources
- **autonomous-container-databases** – runtime environments that meet specific SLAs
- **autonomous-databases** – application databases
- **autonomous-backups** – data archives

"Keep in Mind"

GROUP is a set of users with the same privileges

POLICY is used to bind privileges for a GROUP to a specific set of resources in a COMPARTMENT

COMPARTMENT is an operating context for a specific set of service resources only accessible to GROUPs who are explicitly granted access.

Autonomous Database- Database Admin

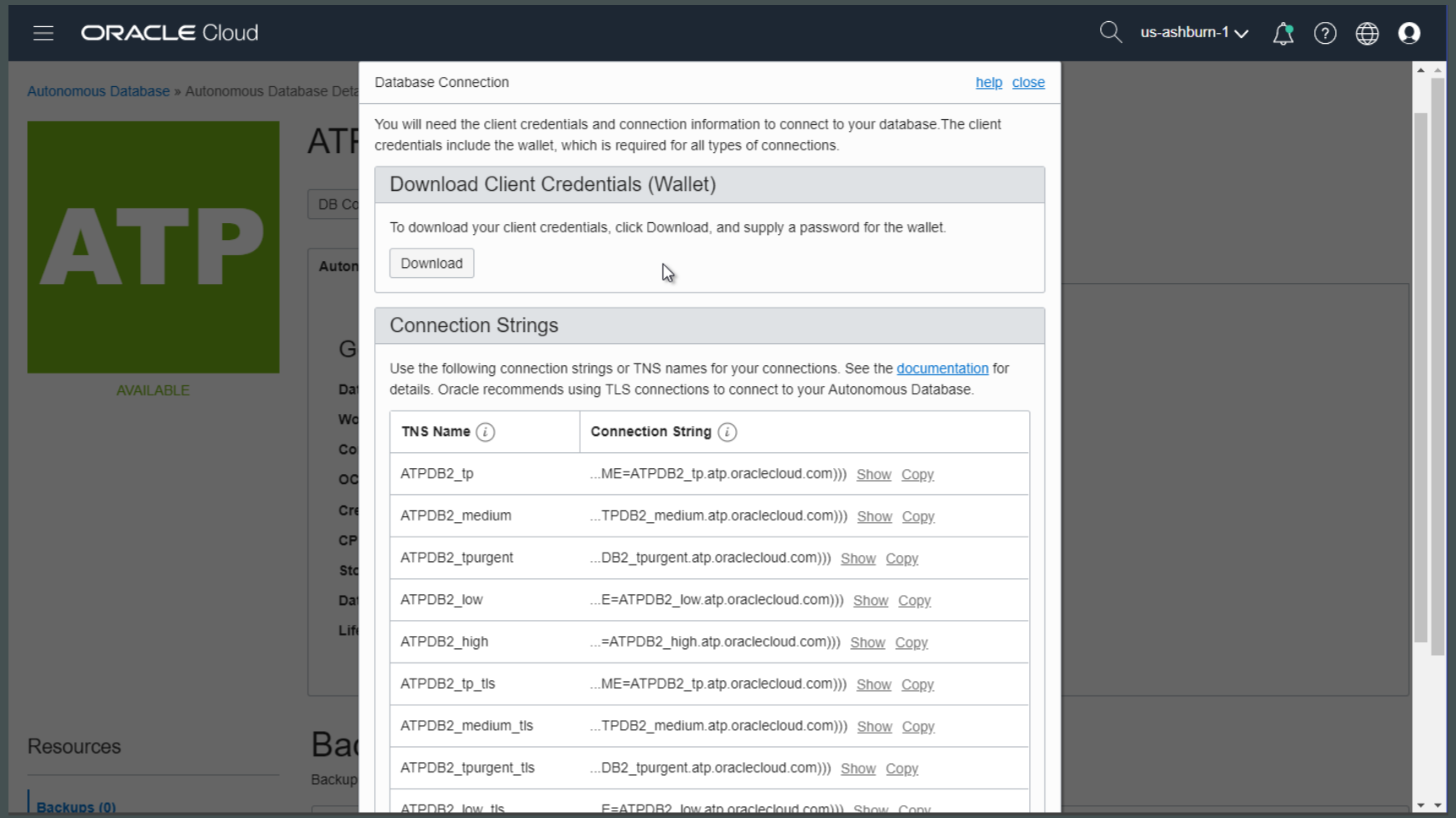
- DB Admin easily creates new databases. Same as serverless, just select:
  - DB **type** - ATP or ADW
  - DB **CPU** count - really performance
  - DB **storage** size limit
  - **Container DB** that contains the DB – specific to dedicated
  - Then creates database users and schemas
- Performance resources allocated proportionally to number of CPUs chosen
  - Example – if a DB gets 15% of CPUs in Exadata servers, then it gets 15% of memory
  - Same for IOs per second, Storage CPUs, Flash Cache
  - CPU and Memory allocated to a CDB grows dynamically as PDB CPUs are added to it
  - No need to specify sessions, files, processes, buffer cache, PGA, etc. - all are automatic

DB Admin

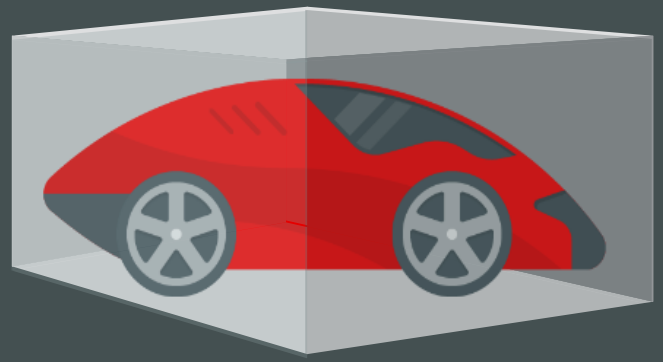
Security in ADB

- No highly privileged access - no Root or SYSDBA that means No login allowed to OS or CDB
  - No callouts to OS allowed
  - Prevents installing or modifying any software on system
- Secure Configuration deployed at all levels – Network, OS, DB, storage, etc.
- Databases run in customer's Virtual Cloud Network where ADB can be deployed in Private subnet.
- Databases always encrypted, additionally Network encryption is available.
- Automatic protection of customer data from Oracle operations staff
  - Database Vault's new Operations Control feature
- Oracle automatically applies security updates for the entire stack
  - Quarterly, or off-cycle for high-impact security vulnerability
  - Customer can separately use Database Vault for their own user data isolation

ADB Client Connections- Credential Wallet



Autonomous Database is Highly Available



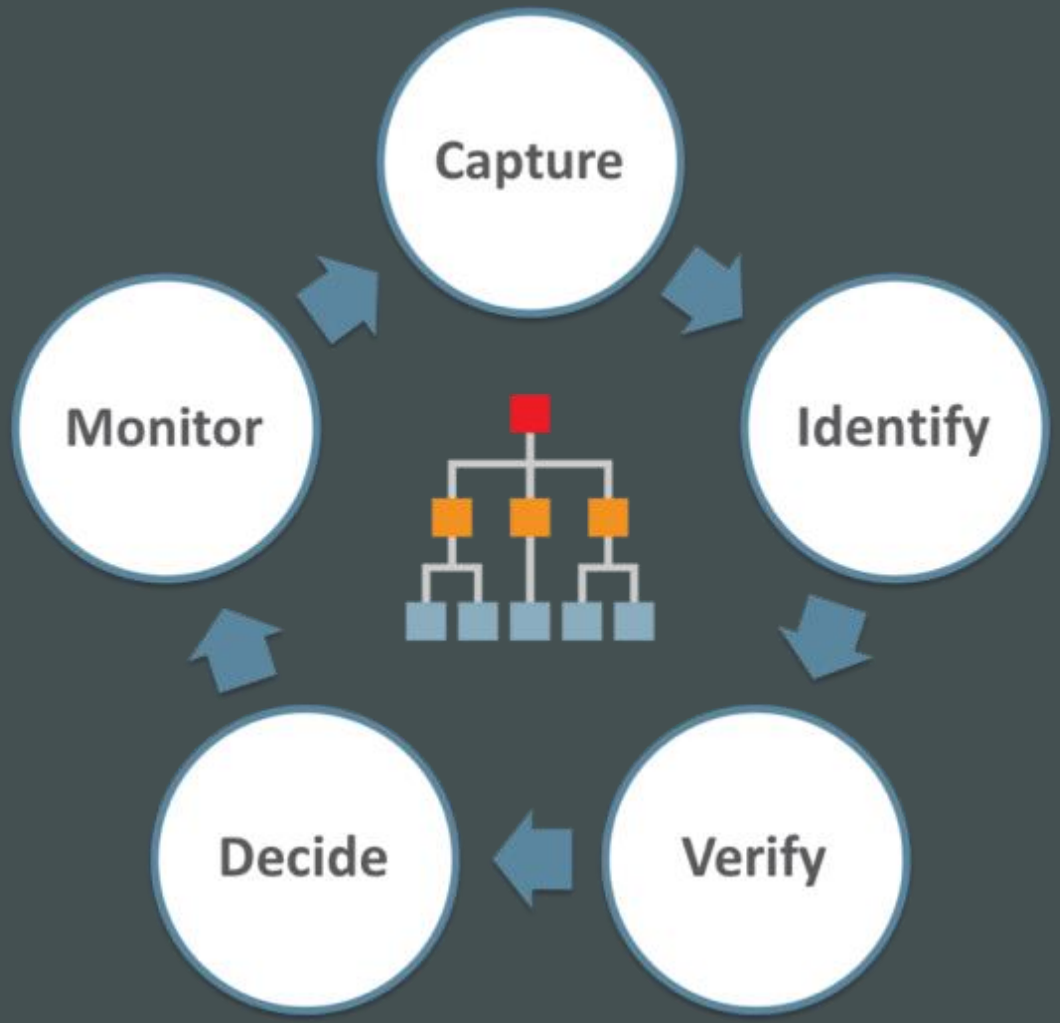
- Automatically protects from **all** types of downtime
- Features unique to Oracle

Failures	– Exadata, RAC
Site Outages	– Active Data Guard
Maintenance	– RAC Rolling Updates, **Transparent** App Continuity
Changes	– **Auto-Indexing**, **Edition Based Redefinition**
User Errors	– Flashback Database , Table , Query

No ridiculous exclusions to availability in fine print

- Other CSPs excludes planned downtime, database bugs, regional outages, etc.

Automatic Indexing



- Indexes implemented using Machine Learning
- **Reinforcement Learning** allows it to learn from its own actions as all candidate indexes are **validated** before being **implementing**
- The entire process is continuous and fully automatic
- Indexing activities are viewable, controllable, and auditable
- Real-time optimizer statistics gathering ensures plans stay current

Autonomous Database is always available, always fast, always secure

Focus on working with data – not managing infrastructure

Automatic Tuning

Auto-Indexing, Auto-SPM, Auto-Partitioning tunes database performance for the developer

Automatic Scaling

Up to 3X automatic, elastic scaling helps you avoid overprovisioning resources.

Automatic Updating

Automatic online rolling patching and updating with configurable scheduling.

Automatic Provisioning

Automatic deployment of new database architectures without additional DBA work – Support Dev/Ops cycles.

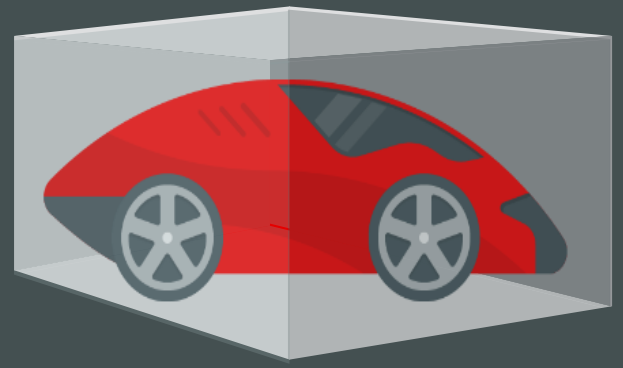
Automatic Encryption

Native, built-in data protection that meets organizational security requirements without code complexity.

Automatic Configuration

Built-in best practices for specific workloads and native application connection services for HA, parallelism, request prioritization .

Dedicated Backup Policy



Serverless

- Fully automated daily backups to OSS, on demand backups, Flashback to 24 hours, etc

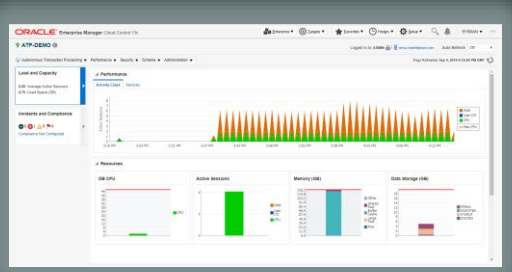
Dedicated adds ....

- Backup of archive logs performed every hour (will be 15 minutes in v2)
- Retention time for CDB backups is configurable (7-60 days)
- Currently, on demand backup retention same as CDB -indefinite retention would be supported.
- Zero Data Loss Recovery Cloud Service will be used for backups

Mgmt Choices of Tools for Various Personas

All these tools are bundled with ADB .

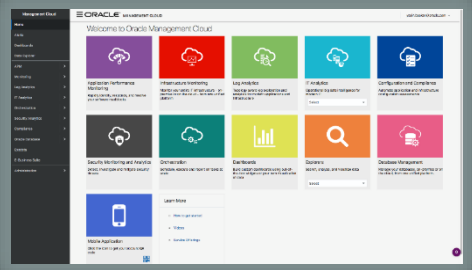
Enterprise Manager



Hybrid Cloud Administrators

Managing multiple DB instances across On-premises and heterogeneous Cloud – needs a consolidated view

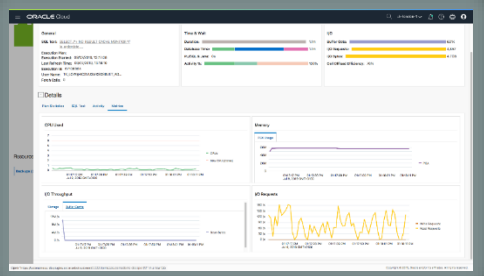
Oracle Management Cloud



Hybrid Cloud Administrators

Managing multiple DB instances across On-premises and Oracle Cloud – needs a consolidated view

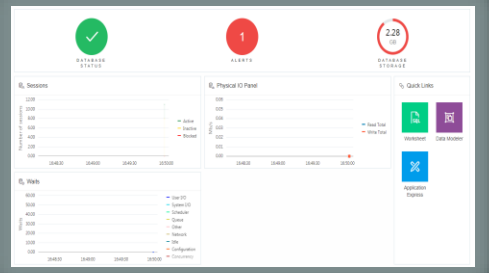
SQL Developer Web



Cloud Administrators

Managing multiple departmental ADB instances – needs a quick access to performance data across their instances

OCI Console / DB Mgmt Service



Technical Developers

Working across multiple ADB instances (dev, text, QA etc.) – needs access to SQL performance data

Simplify development using your favorite tools

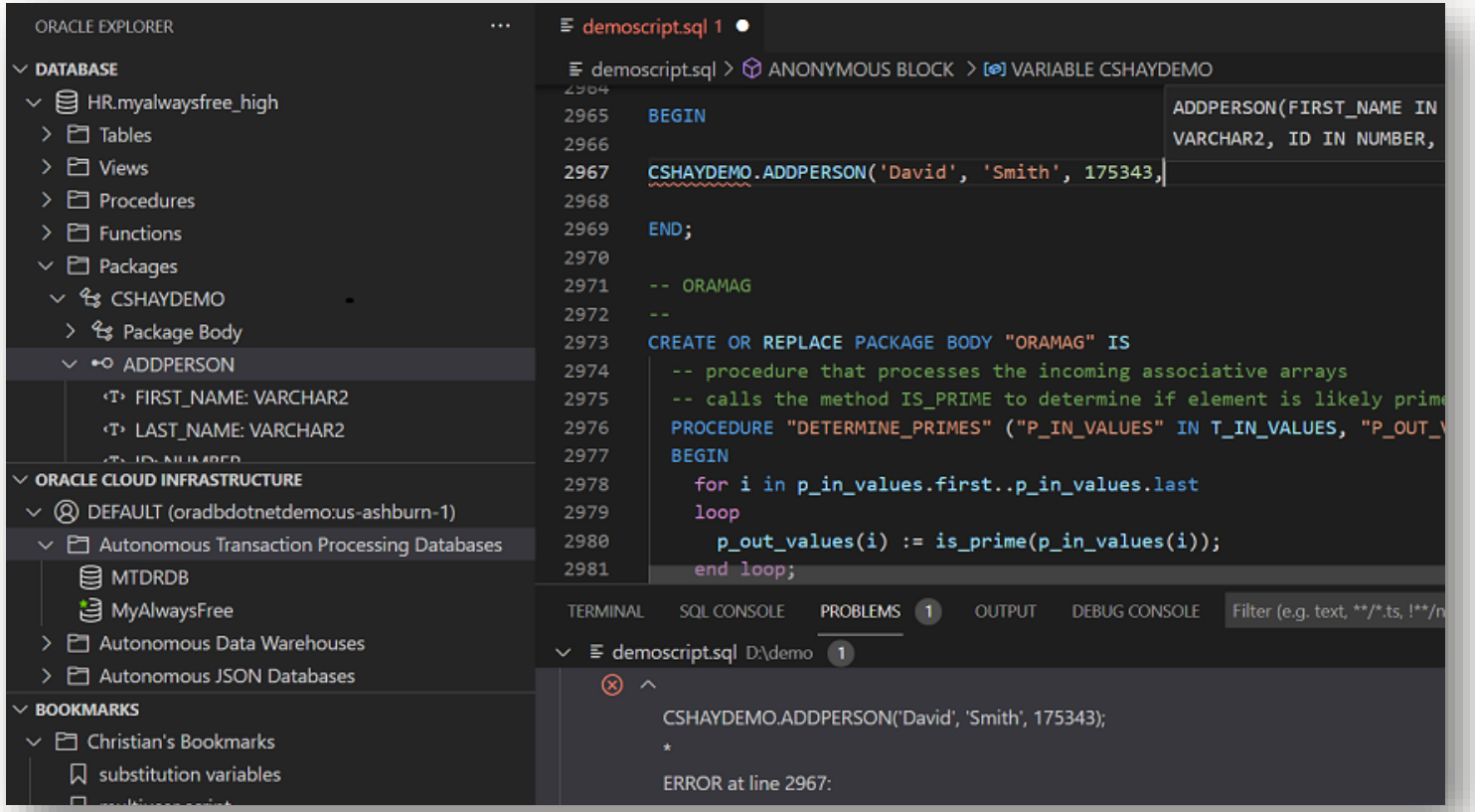
Example: Microsoft Visual Studio Code + Free Oracle Developer Tools plugin

Lifecycle management of Oracle Autonomous Database

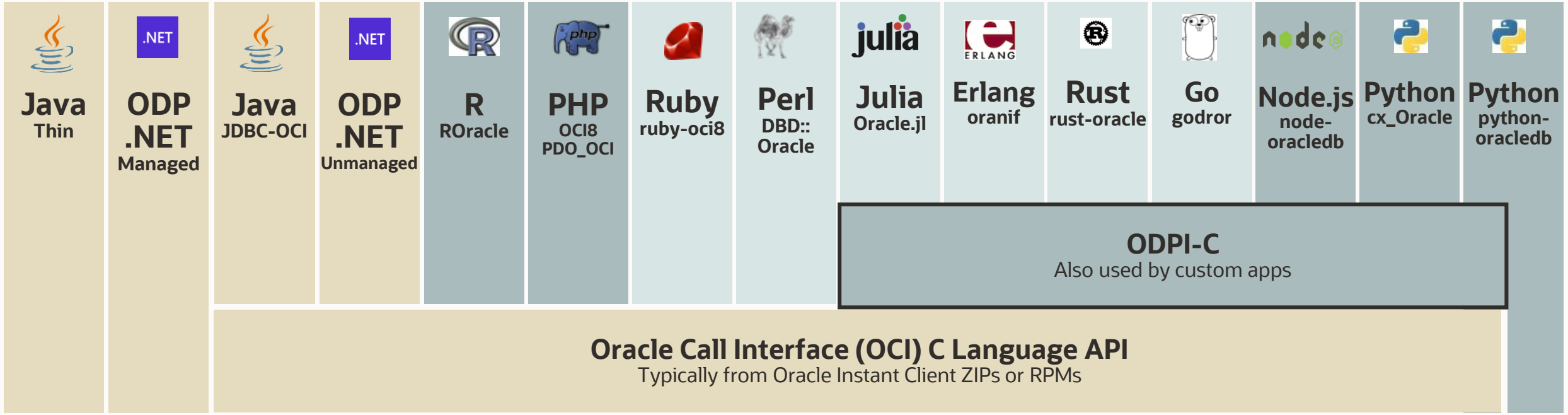
- Oracle Cloud Infrastructure Explorer
- Create, Start, Stop, Terminate ADBs
- Simple database connections

Develop database apps

- Edit and Execute SQL and PLSQL
- Format results in CSV, JSON…
- Autocomplete and Intellisense
- SQL history and bookmarks
- Syntax highlighting/Code Snippets



Use your favorite language with high performance drivers

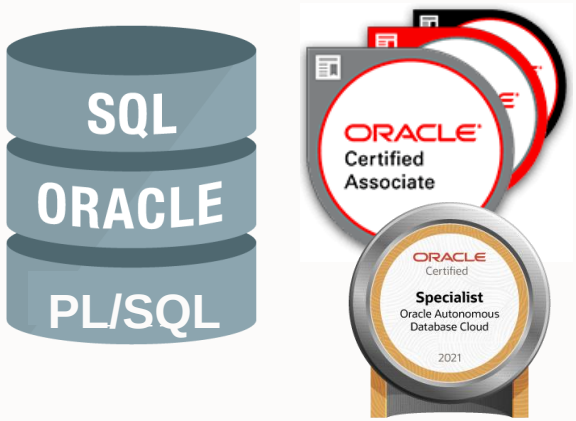


Oracle Proprietary Drivers Third Party Open Source Drivers Oracle Open Source Drivers

Oracle maintains key driver APIs and works closely with driver communities

Accelerate migration of existing workloads to the cloud

Use your existing skills



No need to learn new database skills or languages because Autonomous Database fully supports all of SQL and PL/SQL.

Compatible with existing apps

Supports existing workloads and apps from on-premise deployments (Oracle Apps, APEX apps, custom apps, data marts, EDWs, etc)

Migrate with zero-downtime

Migrate your database with no downtime using Zero Downtime Database Migration Service

Accelerate moving to cloud – low risk, no disruption, zero downtime

Reduced risk - 100% portability and compatibility with on-premise Oracle databases

1. Assess and evaluate

2. Plan migration resources

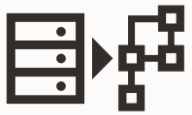
DIY

vs.

Cloud Lift Services

3. Leverage migration tools

Zero Downtime Migration (ZDM)



Database Migration Service (DMS)

4. Execute migration

Accelerate moving to cloud – low risk, no disruption, zero downtime

100% portability and compatibility with on-premises Oracle databases

Solutions to manage migration process

- Oracle Zero Downtime Migration (ZDM)
- Oracle Cloud Infrastructure Database Migration Service

Fully managed services built on best practices

- Oracle Cloud LIFT Services
- Oracle Support Rewards

Compatibility means faster lift & shift process

- No application or data changes
- Same database features/functionality
- Same (or better) service levels

Accelerate success – Run all your Oracle Apps better on ADB

Complete portfolio of Oracle Apps now certified

ORACLE E-BUSINESS SUITE

ORACLE JD Edwards

ORACLE SIEBEL

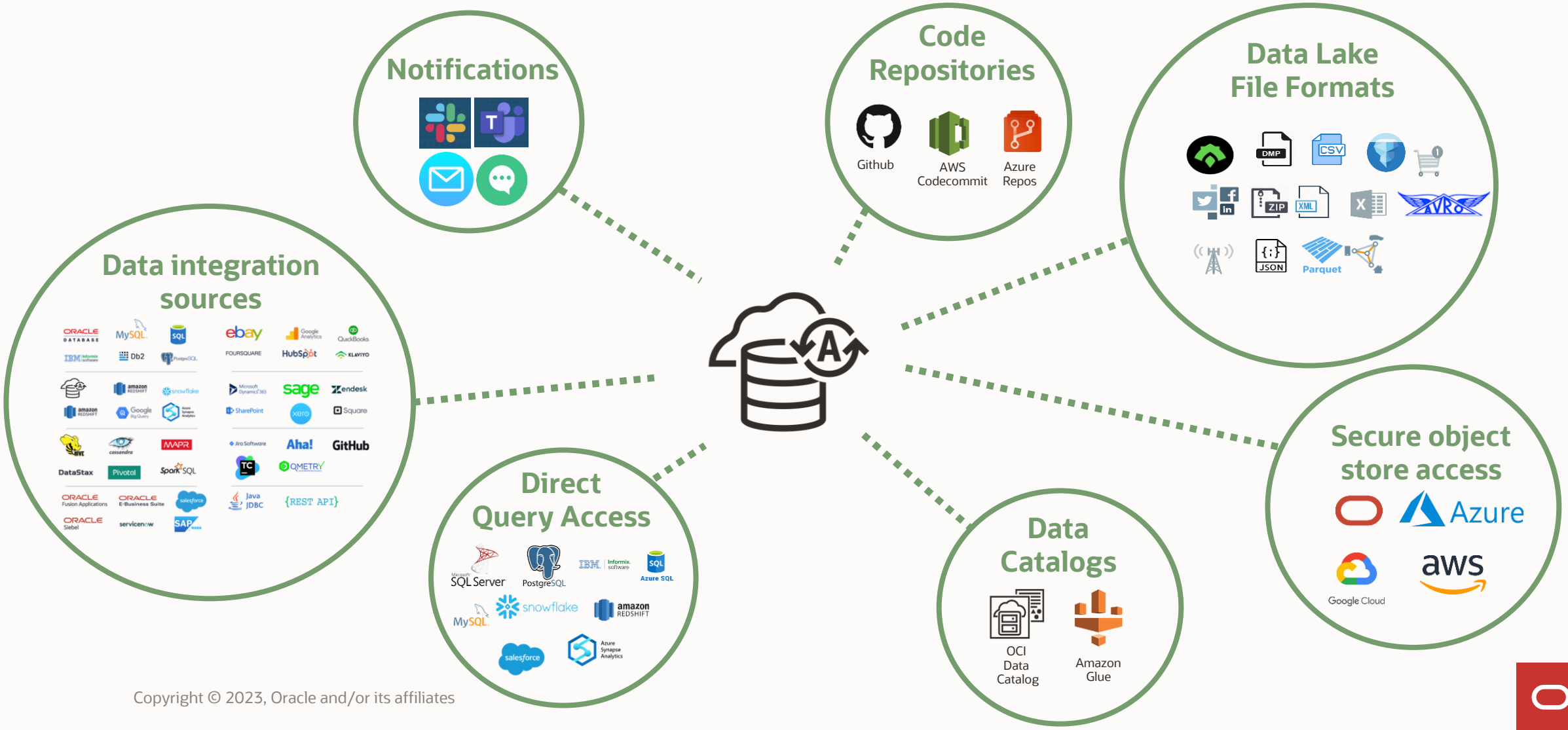
ORACLE PEOPLESOFT

1 **Simplify managing applications**
Take advantage of Autonomous Database full managed operations

2 **Lower costs and risks**
Only pay for the resources you use with auto-scaling. Backup, restore, and cloning of Oracle E-Business suite environments

3 **Fast-track getting started**
Use certified procedures for migrating to Autonomous Database

Autonomous Database multi-cloud integration



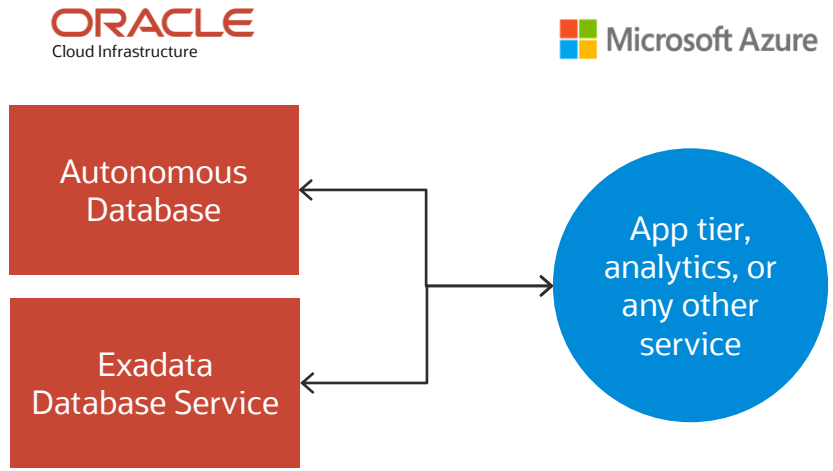
Oracle Database Service for Azure benefits

Seamless and secure interoperability

- Private interconnect and networking
- Use Microsoft Azure services with OCI databases together
- Collaborative support

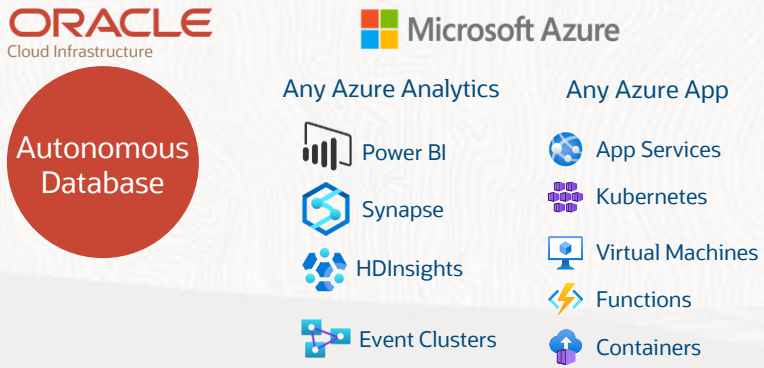
Enterprise-grade cloud services

- Combine OLTP, OLAP, and ML into DBaaS Autonomous Database
- Database Consolidation & Convergence

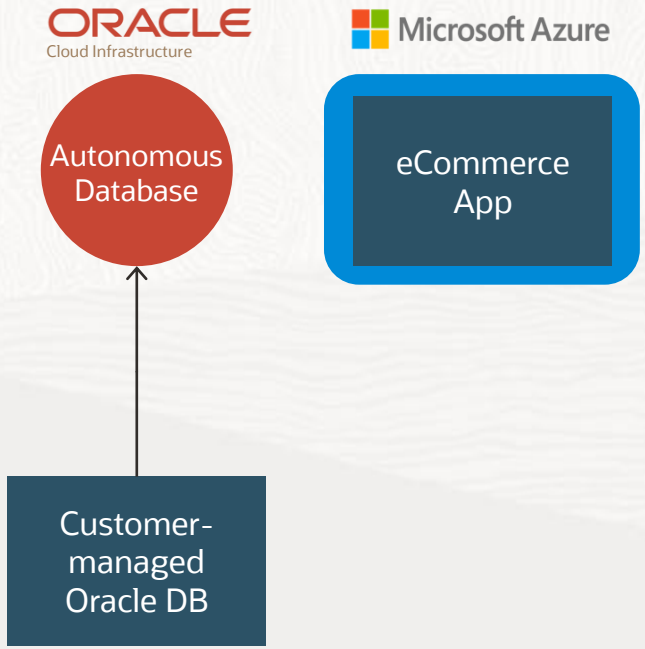


ODSA creates more options for customers to harness cloud innovation

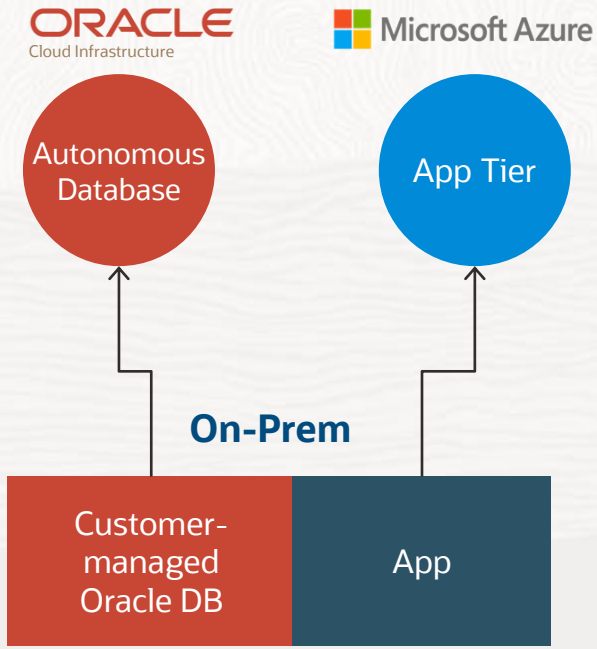
Build with the best of OCI and Azure services



Use fully managed Oracle Databases with Azure



Run exclusive OCI database services with Azure

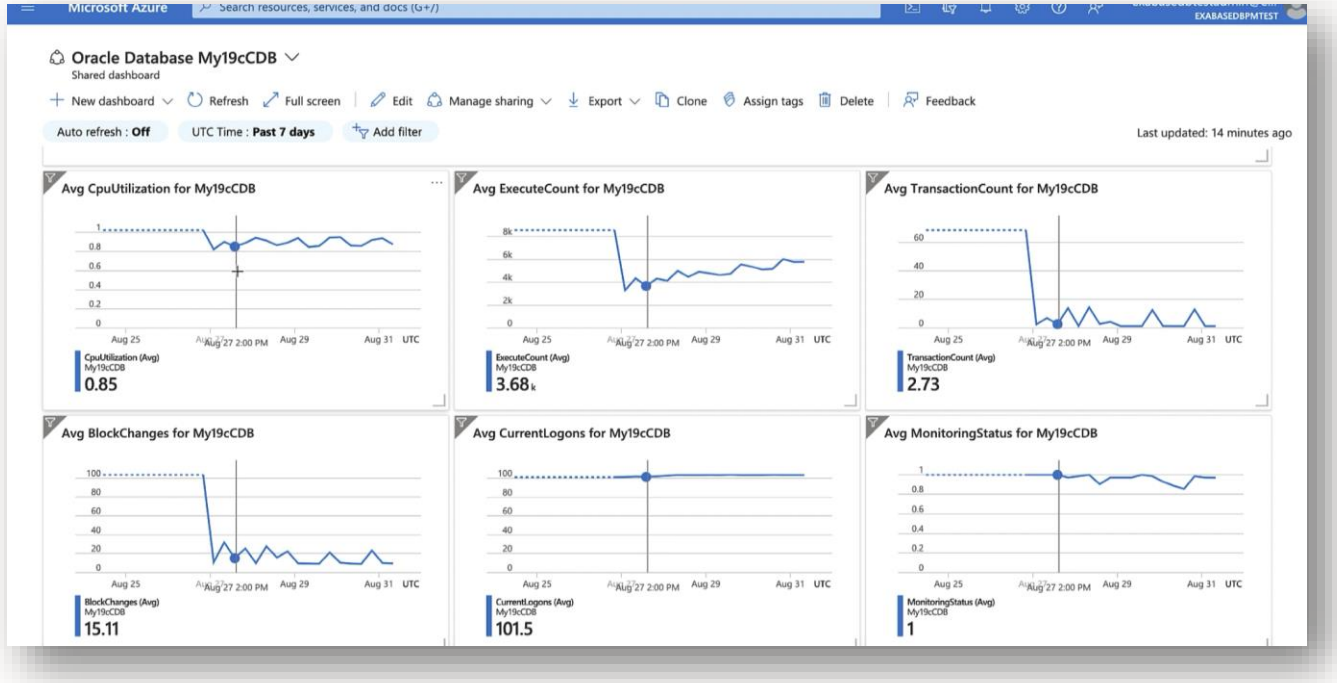


Simplify Autonomous Database management in Microsoft Azure

ADB Metrics and Events integrated into Azure Console

Seamless integration into key Azure Console services:

- Custom dashboard
- Azure Application Insights
- Azure Event Grid
- Azure Log Analytics



Azure users view Oracle Database metrics, events and logs alongside Azure data, for unified telemetry and monitoring

Maximize your opportunity using Autonomous Database

Reduce cost & risk

Lower IT costs, improve security and eliminate human error with automation

Simplify your work

Increase productivity with an end-to-end cloud data ecosystem

Accelerate success

Start today: modernize on-prem databases, create new apps and integrate across all your clouds

Get started today!

Sign-up for a free Oracle Cloud Account

bit.ly/adb-free-trial

Review the getting started guide

bit.ly/get-started-adb

Visit our library of free workshops

bit.ly/adb-workshops

Watch our demo videos

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Sign up for “what’s new” announcements

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Join us on LinkedIn

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Follow us on Twitter

twitter.com/AutonomousDW

Got a question? We are on stackoverflow

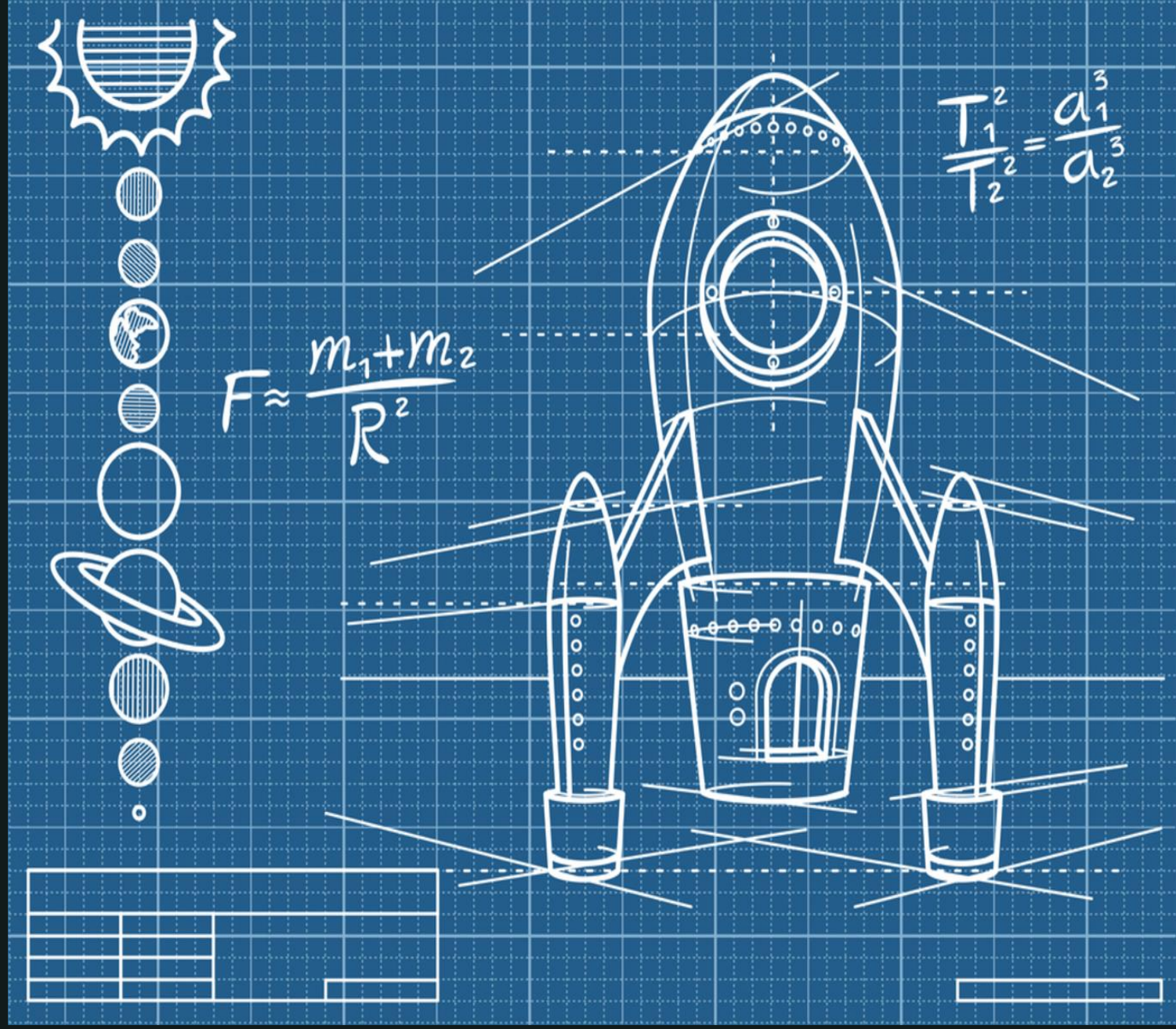
bit.ly/adb-stackoverflow

Performance

Oracle Autonomous Database through good Database Design

Benchmarks

- Total transactions per second (TPS)
- AVG elapsed time in seconds (ELA)
- Cumulative breakdown of
  the 8 sessions utilized the elapsed time



Performance Benchmarks

Benchmark 1: Launches 8 parallel sessions

Benchmark 2: 1 + Reduces DML triggers (table creation with DEFAULT ON NULL)

Benchmark 3: 2 + Improve sequences CACHE, drop few indexes

Benchmark 4: 3 + Partitioning

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Any doubts? Please let us know

Ping me

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