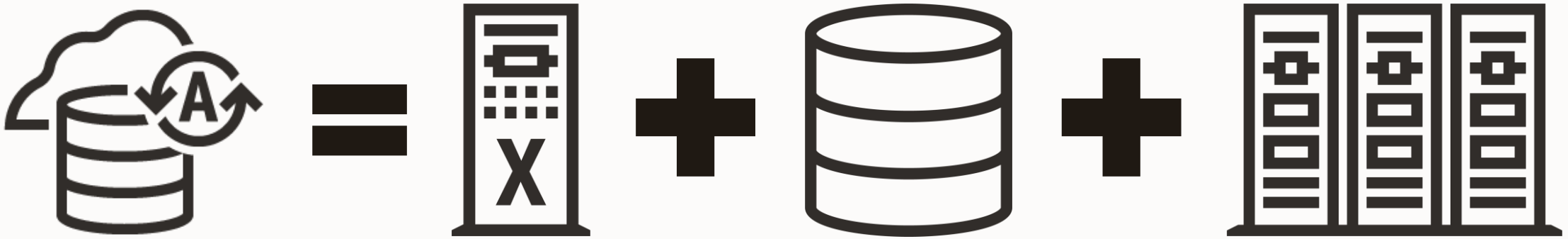
ORACLE

Autonomous Database

A fully autonomous, mission-critical Oracle Database service that runs all workloads

What is Oracle Autonomous Database?

Using the cloud to eliminate all the complexity of mission critical databases



Oracle Autonomous Database = **Complete Infrastructure Automation** + **Complete Database Automation** + **Automated Data Center Operations**

Common Platform - Optimized For Specific Workloads

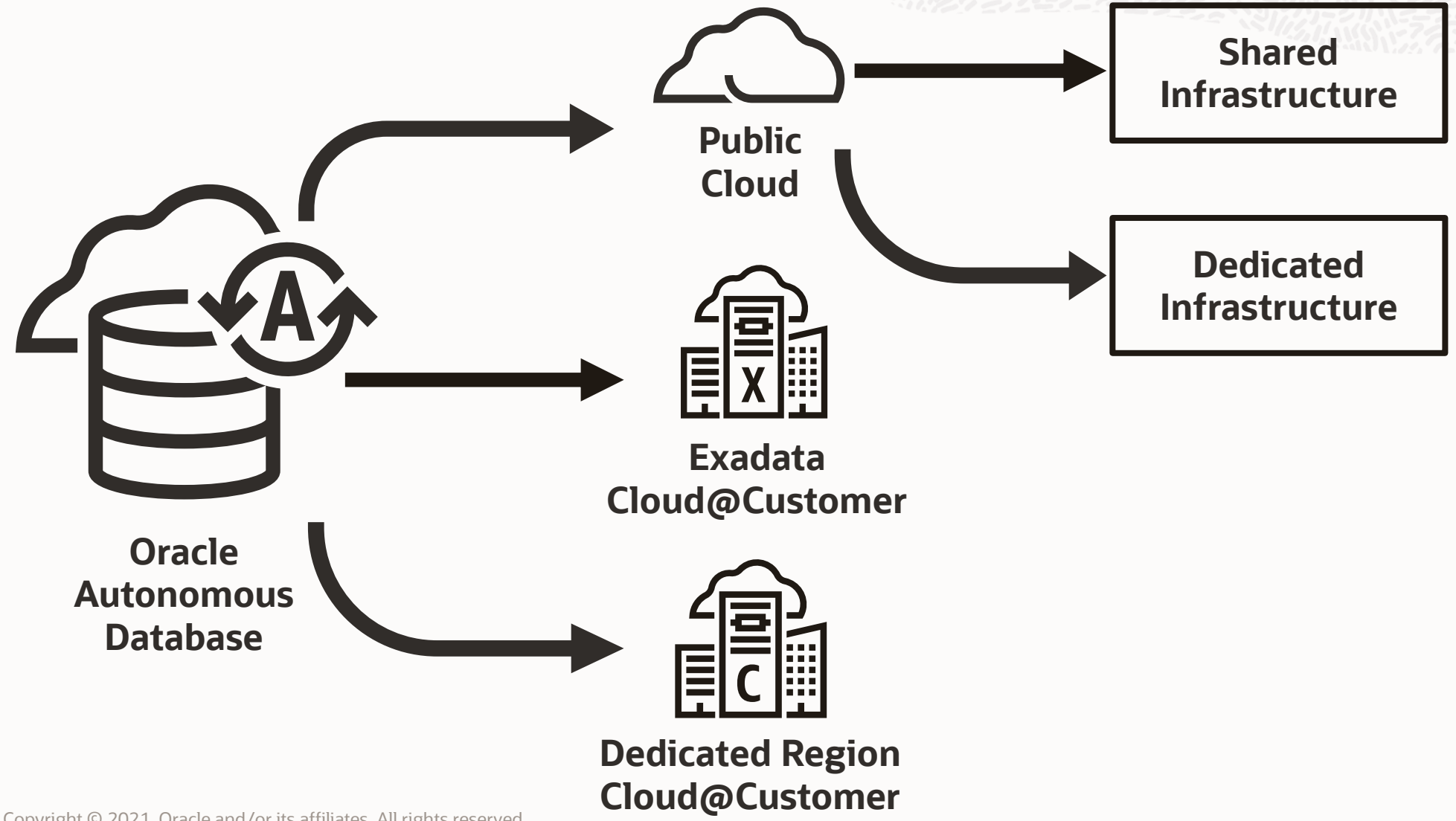
Autonomous
Data Warehouse

Autonomous
Transaction Processing

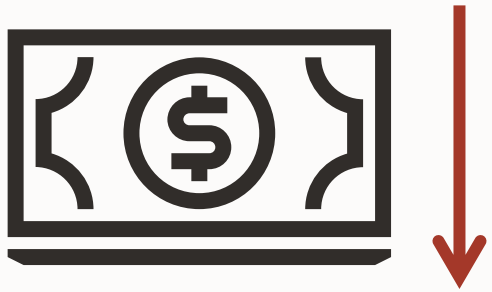
Optimized
for Low-Code

Optimized
for JSON

Multiple Deployment Choices

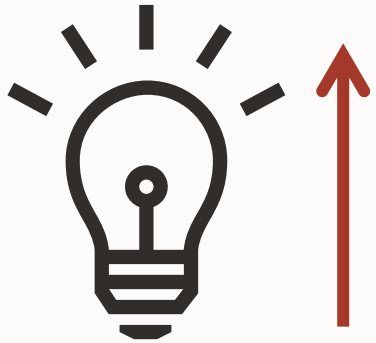


Key Benefits of Autonomous Database?



Spend Less

- Reduce administration cost
- Reduce runtime cost



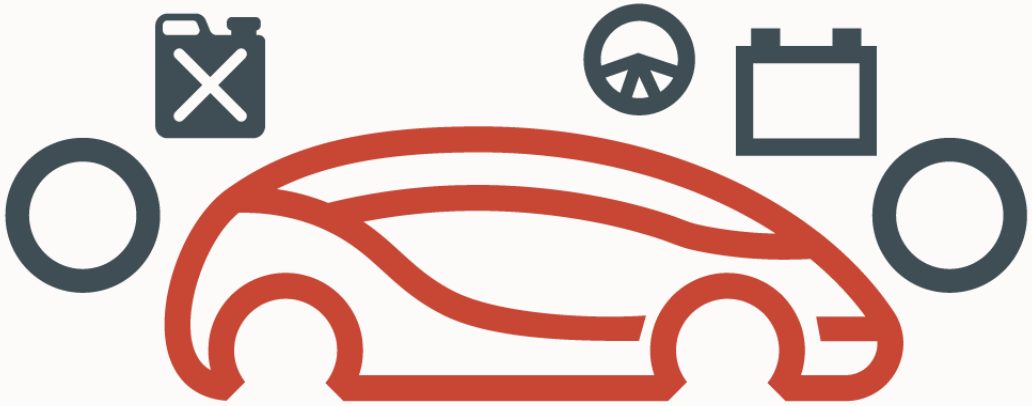
Innovate More

- Refocus talent
- Develop faster

Reduce Risk

- Prevent cyber-attacks
- Always available
- Proven, ease of migration

1. SIMPLIFIED PROVISIONING



Rapidly and easily creates mission critical databases:

- Select precise OCPUs and storage requirements
- Creates **Exadata**[+] Cloud Infrastructure
- **Real Application Clusters**[+] scale-out database

TARGET AUDIENCE

Non-technical LOB users, application developers, data scientists

IT teams that only need an oversight role

BUSINESS VALUE

5-steps - deploy a fully functional database in minutes

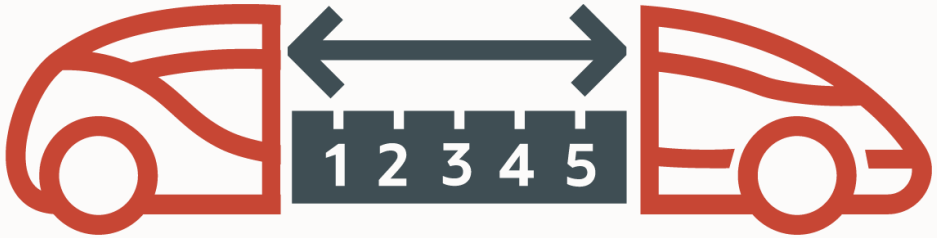
Comes complete with suite of built-in self-service tools

Match OCPU + storage resources to requirements

Independently scale OPCUs and/or storage

[+] Unique to Oracle

2. AUTOMATED SCALING – True pay-per-use+



Scales online for highest performance and lowest cost:

- **Instant online elasticity+**
  of **serverless** compute and storage
- enables **true pay-per-use+**

TARGET AUDIENCE

Non-technical LOB users, application developers, data scientists

BUSINESS VALUE

Enabled by default so no extra work needed

Nothing to manage or monitor

Completely transparent to applications/tools

No over-provisioning, over-charging

More information on EINSTEIN

+ Unique to Oracle

3. OPTIMZE By Workload+

Optimally runs workloads without human direction

- Automatically optimizes **data formats**, **parallelism**+ memory, and plans for each workload

TARGET AUDIENCE

Non-technical LOB users, application developers, data scientists

BUSINESS VALUE

Automated management of query resources

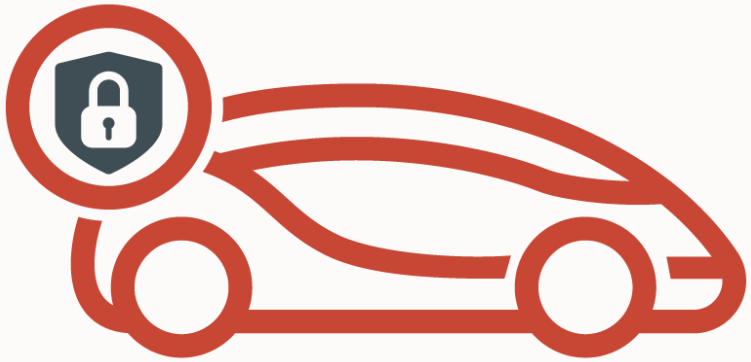
Doesn't require an "ACE DBA"

Built-in automated query optimization features

- Auto Indexing
- Auto Partitioning

+ Unique to Oracle

4. SECURE – Automated Protection+



Protects data from all external and internal threats

- Continuous threat detection
- Applies security **updates online**+
- Prevents admin snooping, **encrypts** all data
- Database Vault built-in
- Expand data protection with Data Safe

TARGET AUDIENCE

Cloud architects, fleet admins, cloud admins, Security teams

Non-technical teams don't need to be security SMEs

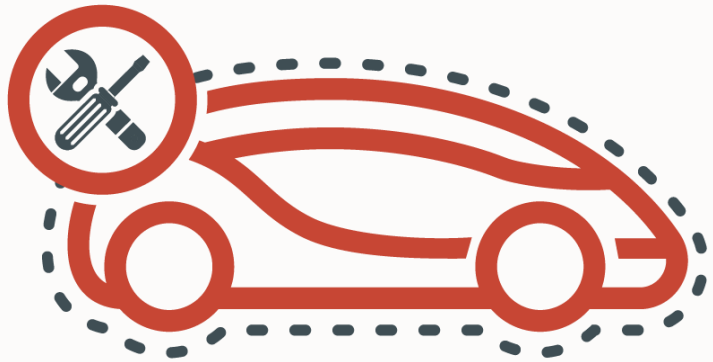
BUSINESS VALUE

ADB leverages the decades of security expertise that Oracle has built-in to the Oracle Database

Oracle is #1 in major analyst security reviews of database market

Data Safe automates process of protecting sensitive data

5. PROTECT – Highest Levels Of Automation And Transparency



Recovers from any failure without downtime

- Automates backup, restore, **application transparent**+ cluster failover, diagnoses and repairs **errors**+
- Extend protection levels with Autonomous Data Guard

TARGET AUDIENCE

Cloud architects, fleet admins, cloud admins, Security teams

For non-technical users – everything is transparent

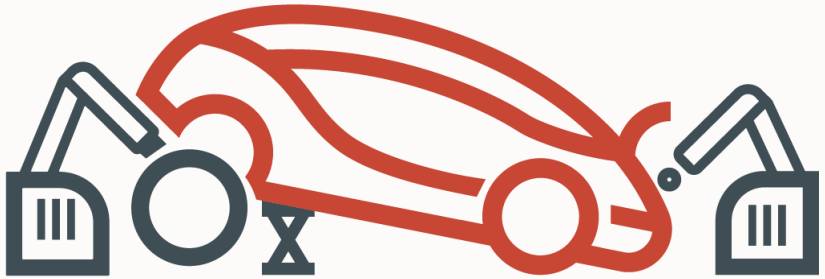
BUSINESS VALUE

ADB leverages the decades of MAA expertise that Oracle has built-in to Oracle Database + Exadata

Autonomous Data Guard takes protection to next level

+ Unique to Oracle

6. MANAGE: Full Lifecycle Automation+



Automates all infrastructure and database maintenance:

- Patches all software **online**+
- Tunes settings
- Performs **all OS and SYSDBA** operations

TARGET AUDIENCE

For non-technical users – everything is automated

For IT – focus on adding value not basic database tasks

BUSINESS VALUE

Business users can be self-sufficient

Technical users can focus on built-in analytics

+ Unique to Oracle

Innovate More = Built-In, Self-Service Tools Expand Autonomous Vision

An Complete Ecosystem Empowering Business Users To Do More With Their Data

Oracle + Partner
Visualization Services/Tools

NEW
Graph Studio

ML Notebooks

APEX

Oracle + Partner
Development Services/Tools

NEW
Data Loading

NEW
Transformations

NEW
Business Modeling

NEW
Data Insights

DATABASE ACTIONS TOOLS

Graph Analytics

Spatial Analytics

Machine Learning Models

NEW
Data Lake Accelerator

Oracle + 3rd Party
Applications

Oracle + 3rd Party
Databases

Files

Oracle + 3rd Party
Streaming Services

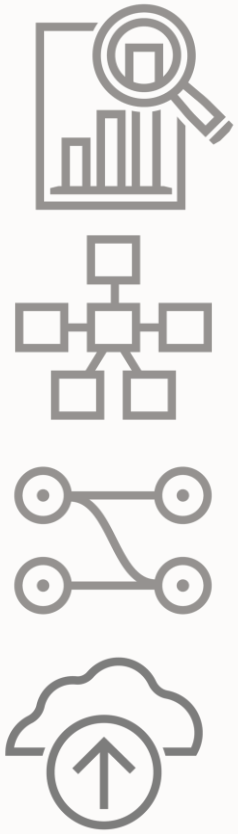
Data Lakes over
Object Stores

New Features

Driving Innovation With Autonomous Database

1 Data Lake Accelerator

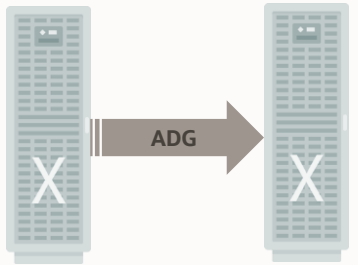
2 Self-Service Tools



3 Graph Studio

4 Automating ML

5 Smarter Automation



WHATS NEW IN ADB

1 Data Lake Accelerator

Making queries over data in Object Storage even faster

Data Management – Two Approaches

Data Warehouse

Solves the problem of **analyzing transactional data**

Focus on **curated data** with known value that is well understood

Data Lake

Handles data that is **raw and un-curated**. Unknown value or low value

Open-source tools for processing, analysis and more

Each approach creates its own data silos

The Lake House

Integrate data warehouse and data lake
handle integrated analysis for all data

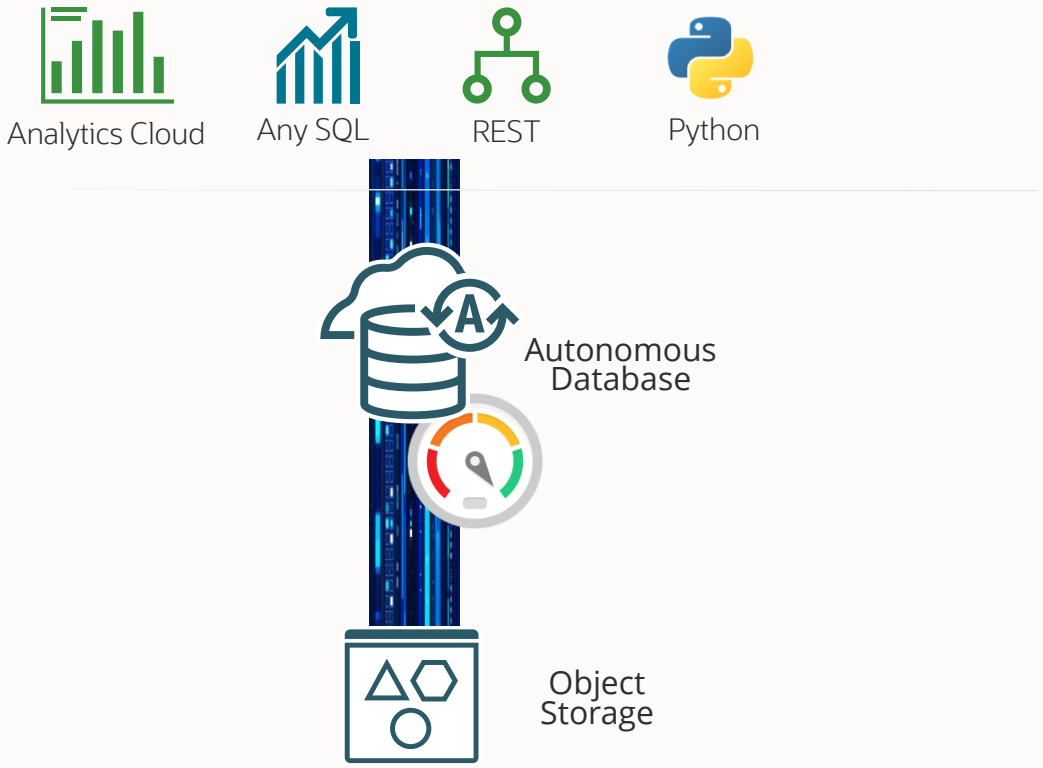
Eliminate the data silos
data will move between warehouse and lake as needed

Both open source and commercial tools must support both environments
support both user choice and all data

A lake house architecture can answer those questions

Data Lake Accelerator: Analyze Data At Scale

Object Store queries just get better / smarter



Scale out queries against Object Storage

- Specialized, object storage processing
- Scans, filters and aggregates data

Automatic and transparent

- Engages only when necessary
- Uses auto-scale to augment database compute for the life of the query

Reduce impact on your database workload

- Object store processing is isolated from database cores

WHATS NEW IN ADB

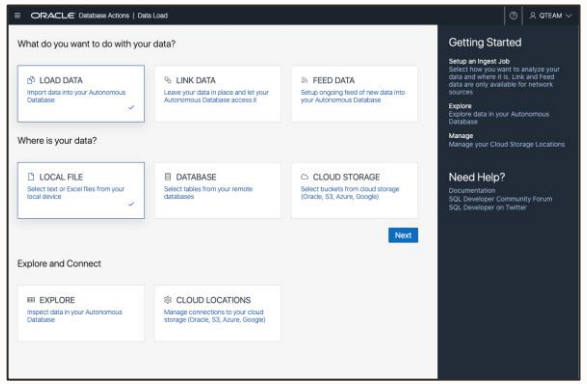
2 Self-Service Tools For LOBs

Automating typical data-centric tasks to make everyone more productive

NEW Self-Service Tools for Data Analysts

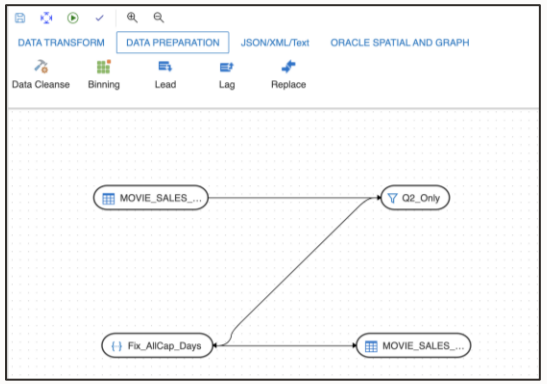
From data to insights with built-in self-service data tools

NEW Load



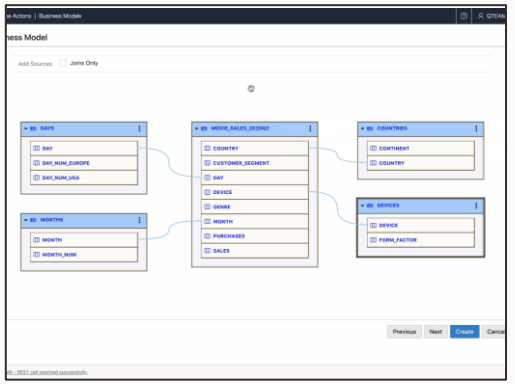
Simple drag & drop loading

NEW Transforms



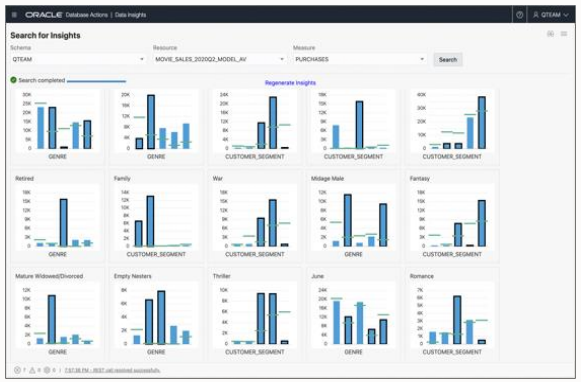
Declarative transformations and data cleansing

NEW Business Model



Automatically create business models

NEW Data Insights



Automatically discover hidden patterns and anomalies

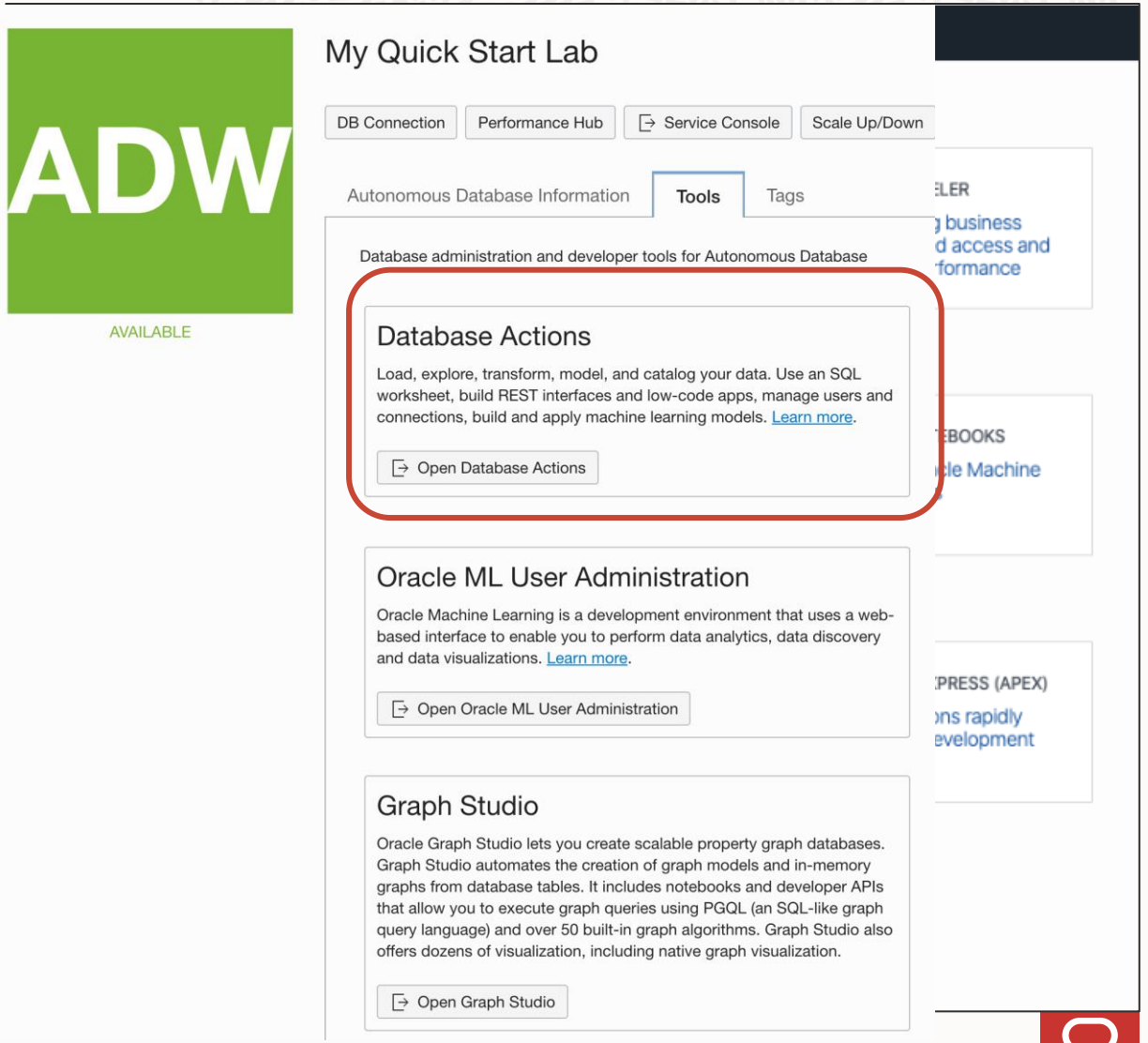
Extending The Scope Of Autonomous Database

Goal:

- Help Data Analysts and Data Scientists to use Autonomous Database to more easily gain insights into their data

Solution:

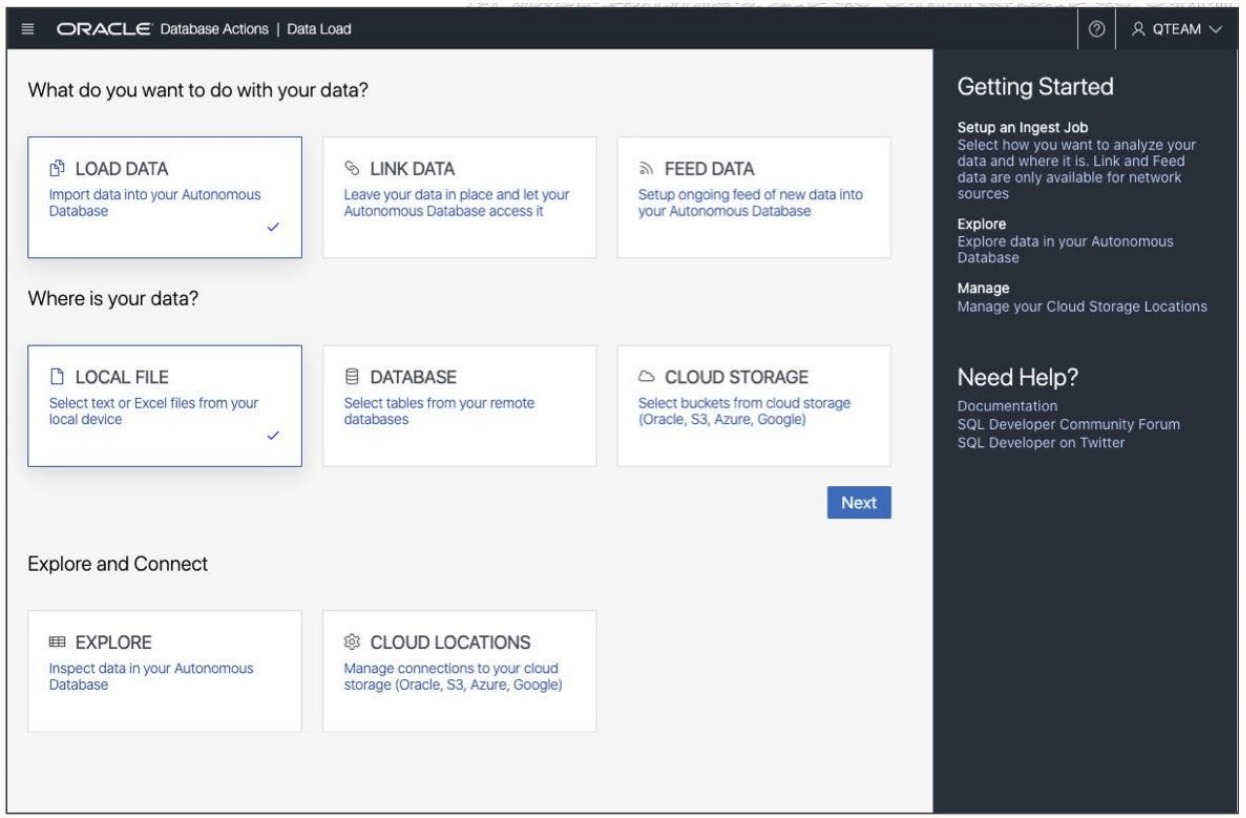
- Extend Autonomous Database for:
  Data ingestion and transformations
  Business modelling and analysis
  Machine learning and automatic insights



Self-Service Data Loading From Anywhere

Simple ‘Drag and Drop’ Data Loading

- Files on local computer
- Files in Object Storage (incl AWS S3, Azure Blob Storage, Google… + AWS-S3 compliant store)
- Oracle Databases (on-prem and cloud)

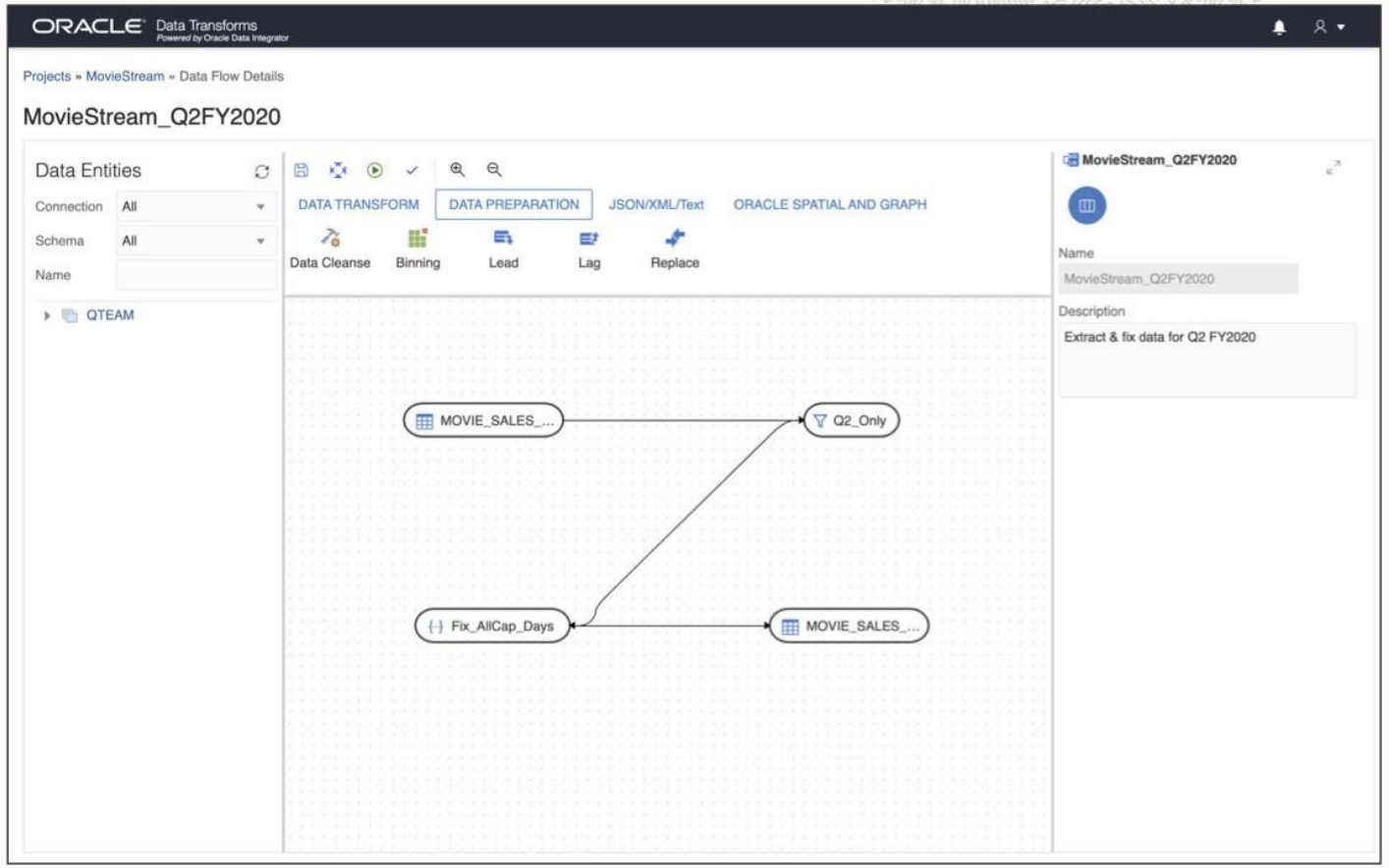


Self-Service Zero-Code Data Transforms

Declarative, no-code development
- New, easy-to-use cloud UI
- ‘Drag and Drop’ to create Maps

Rich set of transformation operators
- Transform, Quality, Analytic, Spatial, ML
- All DB Operators

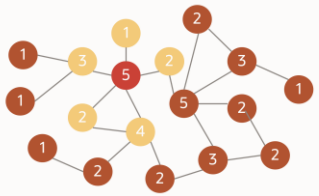
Autonomous discovery
- Discover relationships, recommend actions
- Auto code generation



WHATS NEW IN ADB

3 Graph Studio

Making it faster and easier to find connections within data sets



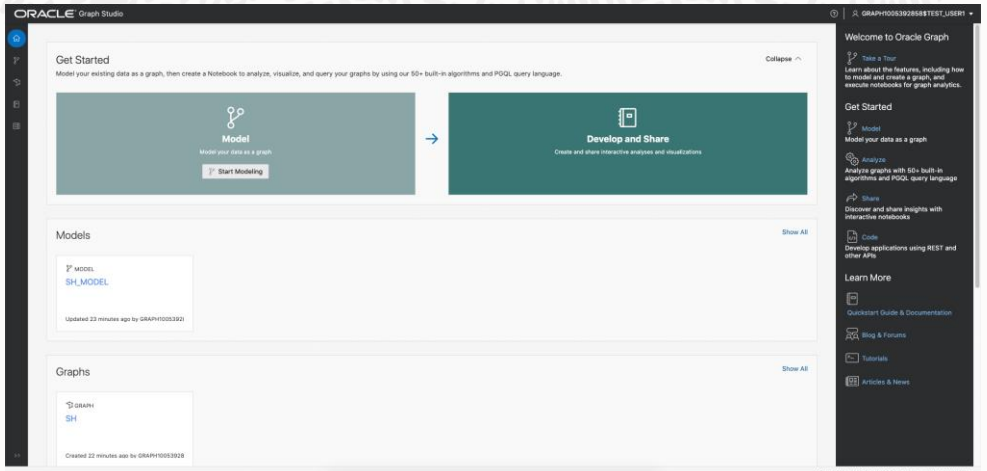
Graph Studio Now Fully GA

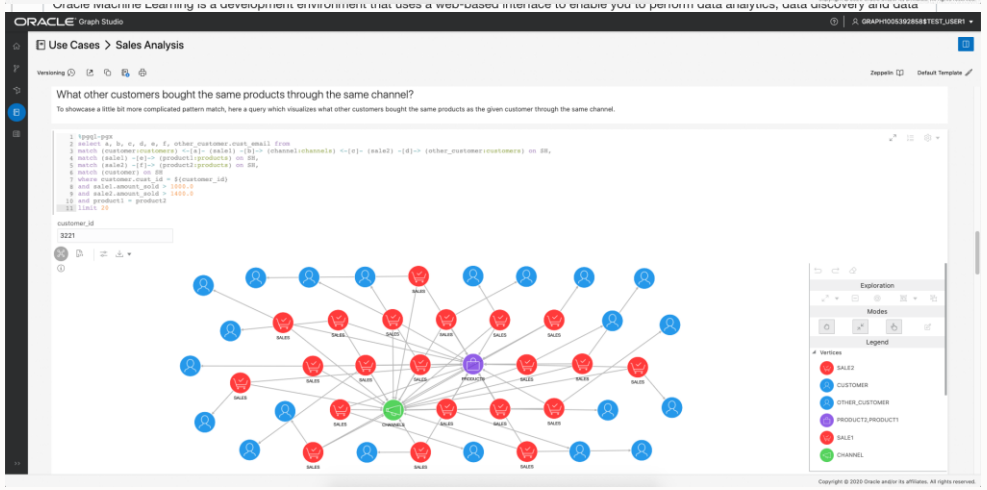
One-click start to analyzing with graphs in Oracle Autonomous Database

Graph Studio provides comprehensive set of features:

- Graph modeling tool to map relational data to graphs
- Launched directly from OCI Console

- Browser-based notebooks for interactive analysis and collaboration
- Integrated graph visualization
- PGQL: SQL-like property graph query language
- Nearly 60 pre-built property graph algorithms
  - PageRank, Community Detection, Shortest path, etc.





WHATS NEW IN ADB

4 Automating Machine Learning with Auto-ML

Making everyone a data scientist through automation of machine learning

OML AutoML UI

No-code AutoML-based user interface supporting automated machine learning

Powerful, easy to use UI

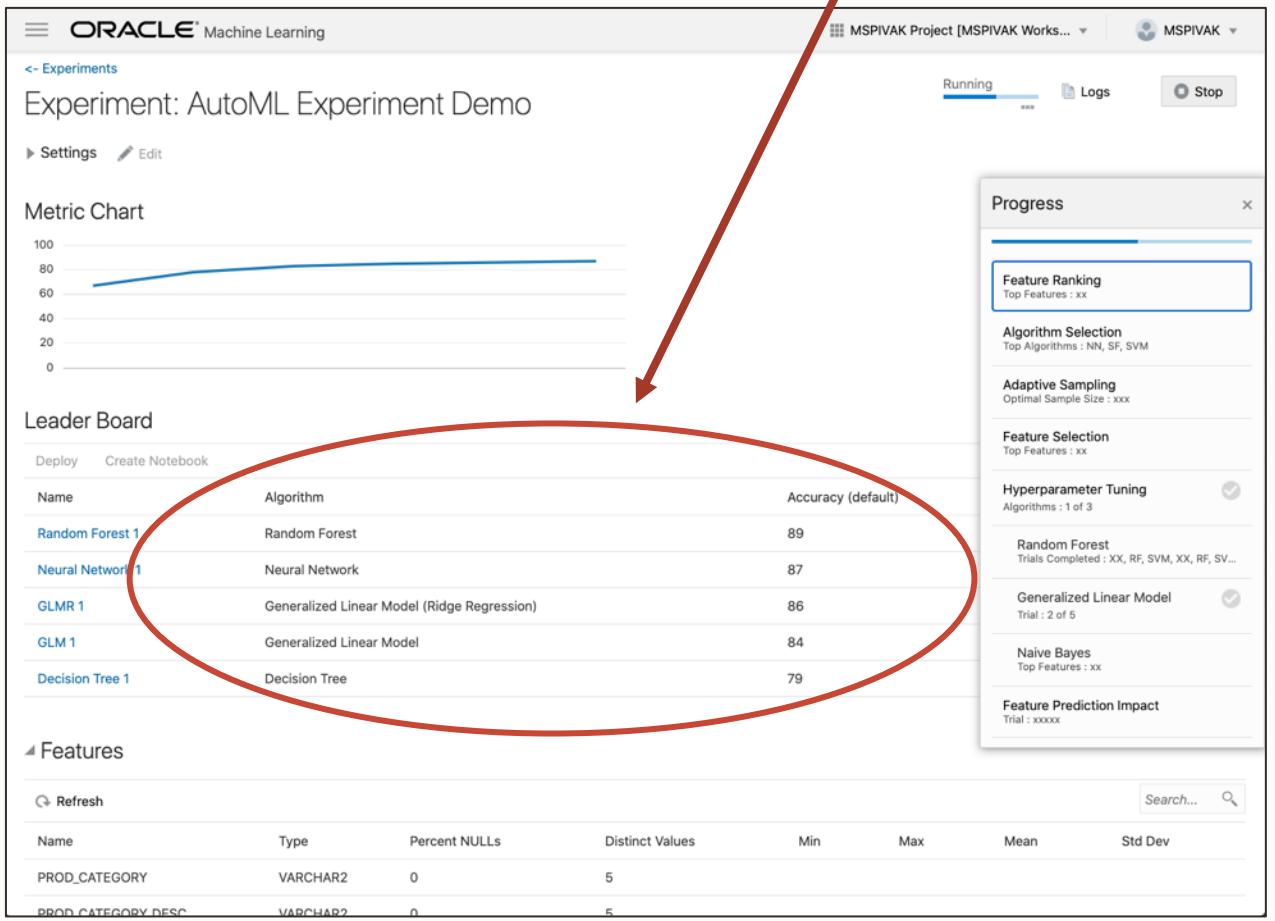
Automates model building, tuning, and deployment

- Supports model management
- Enhance data scientist productivity
- Empower data professionals who are not ML experts

Featuring

- Minimal user input: data, target
- Model leaderboard
- Model deployment via REST endpoints
- Generate OML4Py notebooks from models

Multiple algorithms compared and best is selected



Oracle Machine Learning on ADB-S

OML4SQL – new algorithms and features in Database 21c

eXtreme Gradient Boosting Trees (XGBoost)

- Classification, regression, ranking
- Highly popular and powerful algorithm for speed and model accuracy

Multivariate State Estimation Technique- Sequential Probability Ratio Test (MSET-SPRT)

- Anomaly detection for sensors, IoT data sources
- Detects subtle anomalies while producing minimal false alarms

Neural Network

- Adam Solver - A minibatch solver – computationally efficient, requires little memory, well-suited to larger data
- RELU activation function – enables easier to train models with better performance

Enhanced prediction details

- Enables even higher quality understanding of factors that most contribute to a prediction
- For Support Vector Machine, Generalized Linear Model, Neural Network, k-Means

WHATS NEW IN ADB

5

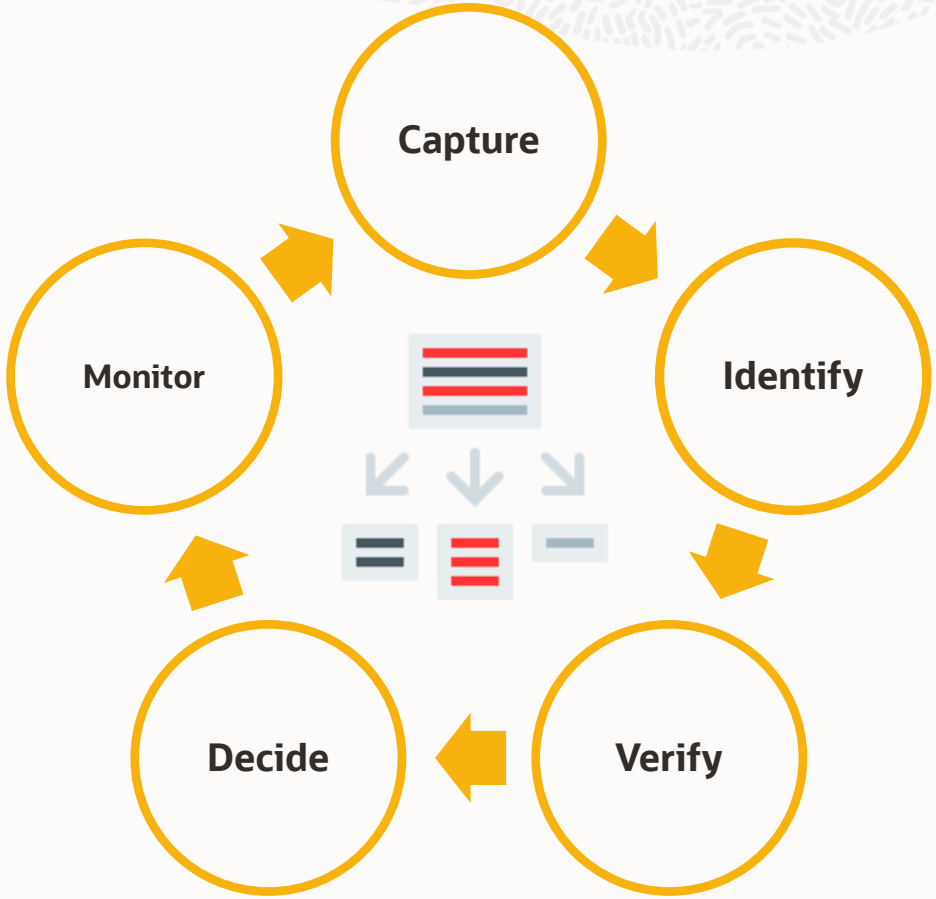
Smarter Automation: Auto Partitioning

Automating the intelligent setup and management of partitioning within an ADB schema

Methodology For Automatic Partitioning

An Expert System

- Implements partitioning methods based on what a performance engineer skilled would do
- Identifies candidate partitioning methods and validates them
- Entire process can be fully automatic
- Transparency is equally important as sophisticated automation
- All *recommendations* are auditable via reporting



WHATS NEW IN ADB

5

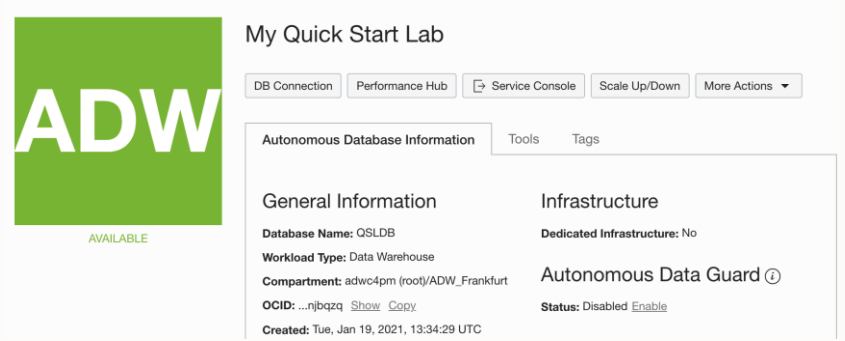
Smarter Automation: Cross-Region ADG

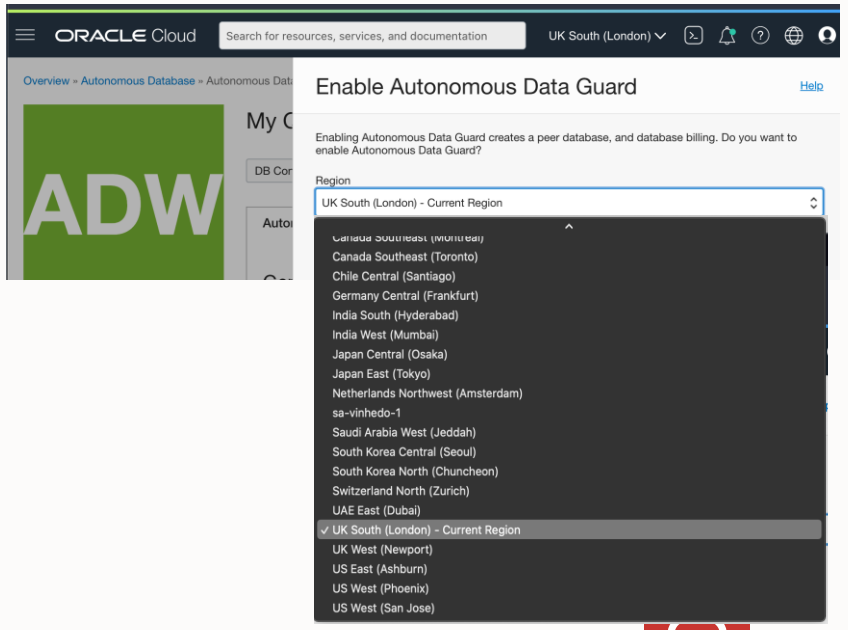
Automation of standby database in a different geographic data center

Automated Data Protection - Autonomous Data Guard on ADB

- One-click enable
- Simple and transparent data protection
- Fully-managed standby database
- Completely transparent to customer applications
- Automated failover for zero-data loss scenarios
- User initiated failover for other scenarios

- Seamless reconnection - no new wallet or network configuration required
- RPO: 5 mins, RTO: 2 mins
- Cross Exadata machine or Availability Domain (AD)
- Cross Region





Use Cases And Customer References

Key Use Cases For Autonomous Database?

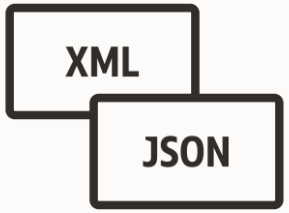
Single Converged Database
Runs Any Workload
or Mix of Workloads at Any Scale

OLTP

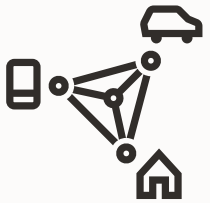
Analytics

Microservices

Structured

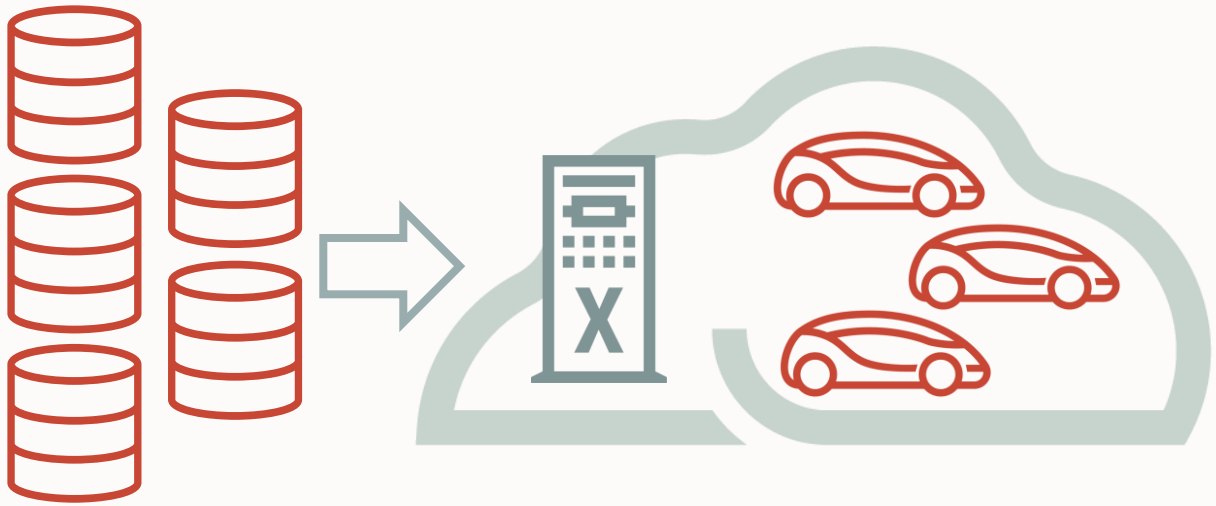


Unstructured



IoT

Consolidation,
Cloud Transformation,
Database as a Service

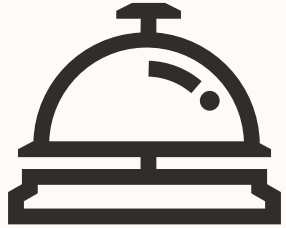


Which industries does Oracle Autonomous Database help?

Communications

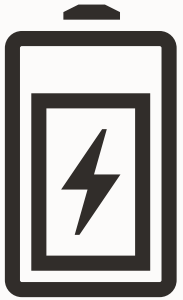
Media

Finance
& Banking

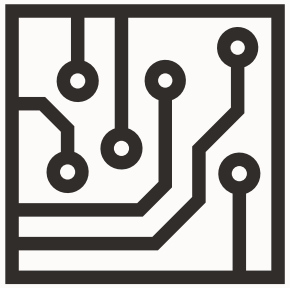


Services

Insurance
& Health



Energy &
Industrial



Technology

Autonomous Database - Delivers Real-World Business Benefits

Lower costs, faster implementations and more data insights across thousands of customers

40%
Growth in mobile app usage

1000s
Concurrent users with rapid scale

1/3
OCPUs with 5X-10x faster, complex queries

10%
Reduction in fraud using real-time scoring

50+
Data integrations with improved performance

100+
Attributes analyzed using machine learning

90%
Reduction in time to market for SAS app

60%
Infrastructure cost savings

90%
Administration eliminated

90%
Administration eliminated

3x
Improvement in customer retention due to improved analytics

200%
Increase in profits with 42% growth in revenue

Autonomous Database

- **Simple** – Easy to start, stop and accelerate. Provision in minutes, self-optimizing, self-tuning
- **Scalable** - From workgroup, to department & enterprise, scales as usage grows
- **Optimized –**for analytical workloads. Leverage decades of Exadata database optimizations, no tuning required
- **Secure -** Fully encrypted, policy-based access, high availability, automated backups
- **High-performance** - Supports multi-user access and high-concurrency workload demands
- **Low cost** - Elastic scalability, pay only for what is used, scale up or down as needed