



Autonomous Database Overview

Deliver better solutions faster



Alexandre Fagundes

Cloud Architect, Oracle Latin America

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

Lower costs with Autonomous Database

FIGURE 5
Total IT Staff Time Impact, 5 Years

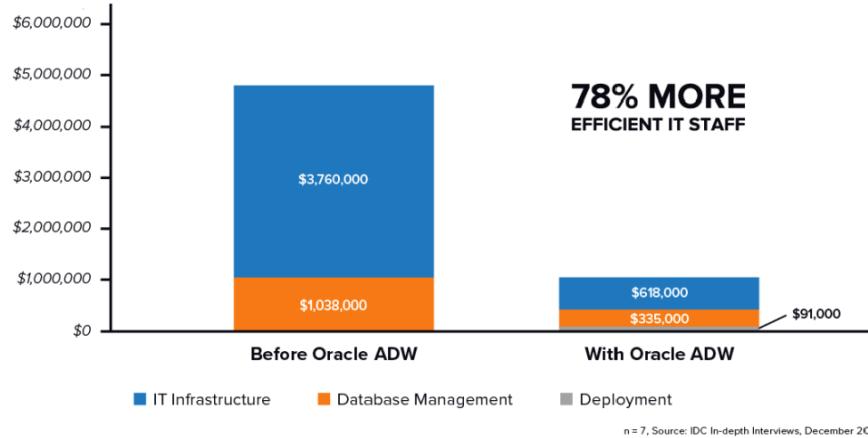
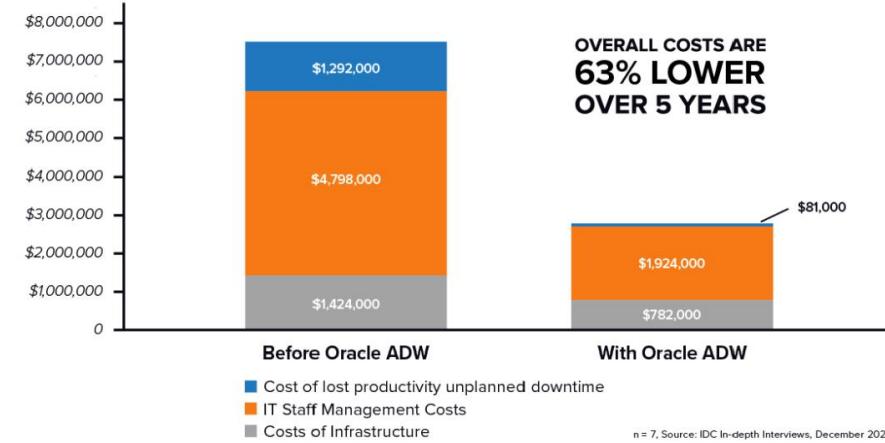


FIGURE 8
Total Cost of Operations



Business Value Highlights

- 417% five-year ROI
- 63% reduced total cost of operations
- 68% more efficient database administrators
- 84% more efficient IT infrastructure management

- 5 months to payback
- 45% reduction in IT infrastructure costs
- 94% reduction in unplanned downtime
- 33% more productive application developers

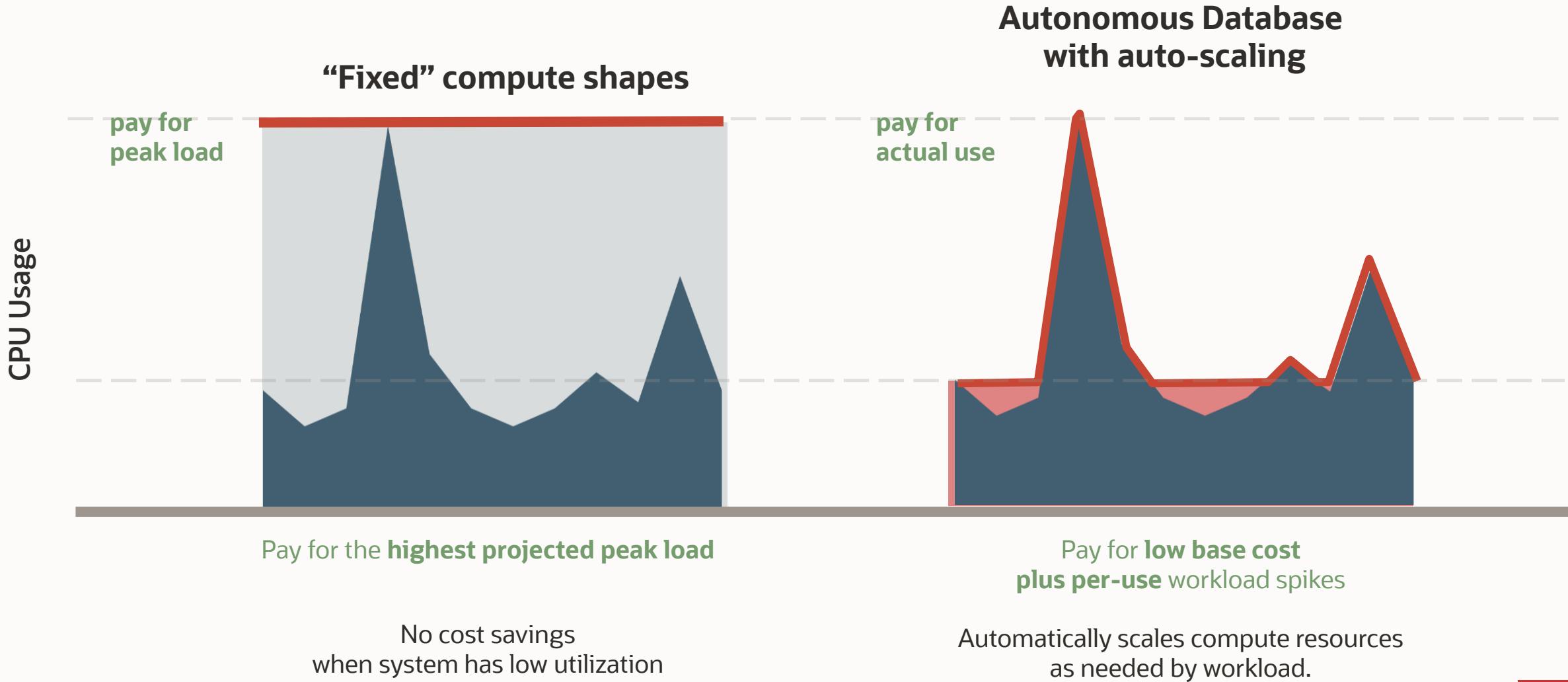
Source: IDC The Real-World Business Value of Oracle Autonomous Data Warehouse, Dec 2020
<https://www.oracle.com/autonomous-database/business-value-of-autonomous-data-warehouse/>

Deploy new data platforms 84% faster* with 85% less staff time*



Lower costs with elastic resources and pay-for-use billing

Comparing fixed compute shapes to auto-scaling



Lower costs with flexible licensing

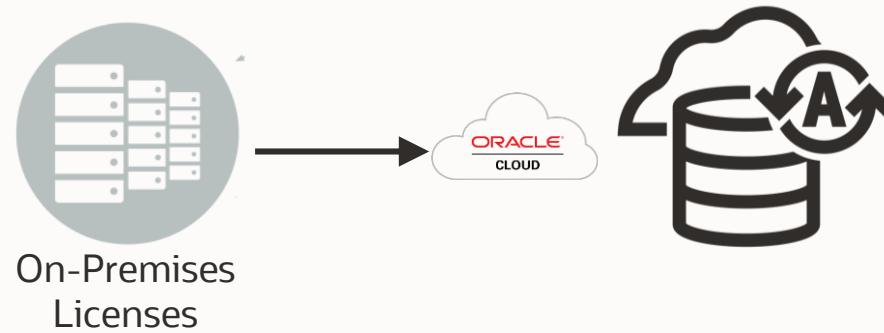
Up to **75% cost savings**



Everything is built in

1. License Included

- Ideal for organizations seeking to build new applications or expand functionality
- Includes Oracle Database, analytics, operations and management packs at one low price
- **Pay-per-use pricing, all paid using Universal Credits**



2. Bring Your Own License

- **Ideal for organizations moving existing workloads**
- Utilize **existing on-premises licenses** and benefit from 75% cost savings
- **Oracle Support Rewards** further reduces OCI costs
 - Cloud consumption provides credits toward technology support
- Includes Transparent Data Encryption, Data Safe, Partitioning, Advanced Compression, and select management packs at **no additional cost**

Lower operating costs: Everything you need is built-in to the platform

Deploy in minutes with nothing else to install



REST
Services



Data
Modeling



Low-code
APEX



SQL
Worksheet



Notebooks



JSON
Worksheet



Data
Safe



Database
Vault



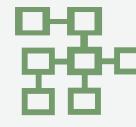
Data
Catalog



Data
Sharing



Data
Integration



Semantic
Modeling



Data
Analysis



ML
Modeling



Graph
Modeling



Spatial

Guaranteed high availability

99.995%

Availability SLA
with Autonomous Data Guard

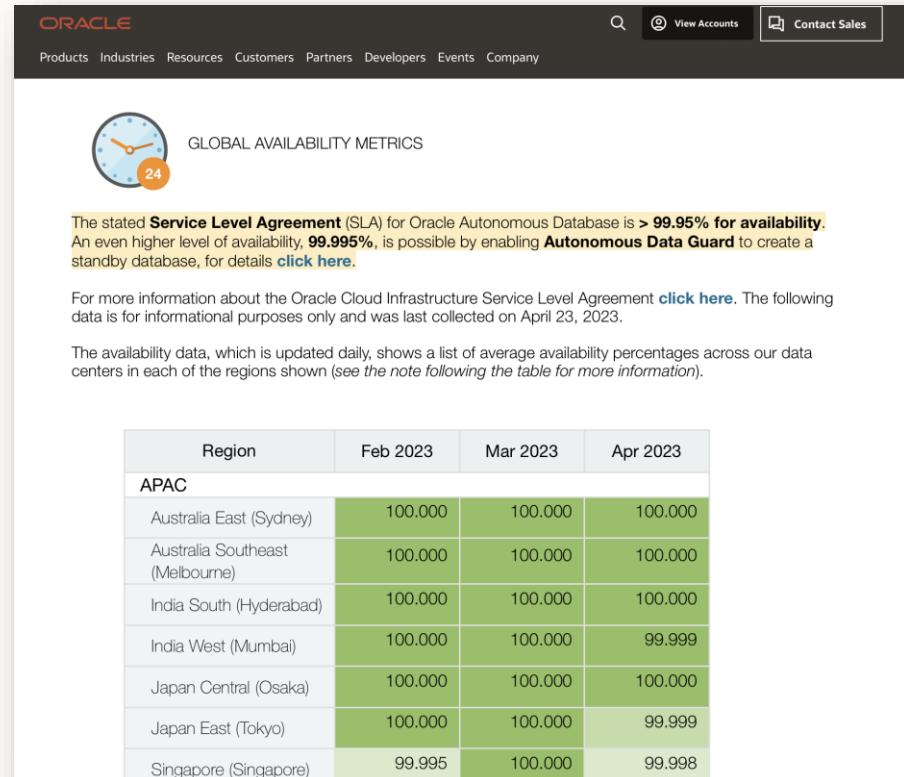
99.95%

Availability SLA

SLA metrics include:

- Full-cloud, infrastructure and software stack
- All maintenance and patching

Published availability metrics updated daily:



The screenshot shows a table of global availability metrics for Oracle Autonomous Database across different regions and months. The table has four columns: Region, Feb 2023, Mar 2023, and Apr 2023. The data is as follows:

Region	Feb 2023	Mar 2023	Apr 2023
APAC			
Australia East (Sydney)	100.000	100.000	100.000
Australia Southeast (Melbourne)	100.000	100.000	100.000
India South (Hyderabad)	100.000	100.000	100.000
India West (Mumbai)	100.000	100.000	99.999
Japan Central (Osaka)	100.000	100.000	100.000
Japan East (Tokyo)	100.000	100.000	99.999
Singapore (Singapore)	99.995	100.000	99.998

<https://www.oracle.com/autonomous-database/adb-global-database-metrics.html>

Lower costs and reduced risk through automation

Top autonomous capabilities that drive benefit

1 Auto-Provisioning

Automatically deploys mission-critical databases (RAC on Exadata infrastructure) which are fault-tolerant and highly available. Enables seamless scale-out, protection in case of a server failure and allows updates to be applied in a rolling fashion, while apps continue to run.

2 Auto-Configuration

Automatically configures the database to optimize for specific workloads. Everything from the memory configuration, the data formats, and access structures are optimized to improve performance. Customers can simply load data and go.

3 Auto-Backups

Automatic daily backup of database or on-demand. Restore or recover a database to any point-in-time you specify in the last 60 days.

4 Auto-Scaling

Automatically scales compute resources when needed by workload. All scaling occurs online, while the application continuously runs. Enables true pay per use.

5 Auto-Indexing

Automatically monitors workload and detects missing indexes that could accelerate applications. It validates each index to ensure its benefit, before implementing it and uses machine learning to learn from its own mistakes.

6 Automated Security

Automatic encryption for the entire database, backups and all network connections. No access to OS or admin privileges prevents phishing attacks. Protects the system from both cloud operations and any malicious internal users.

7 Automatic Failover

Automatic failover with zero-data loss to standby. It's completely transparent to end-user applications. Provides 99.995% SLA.

8 Automated Detection and Resolution

Using pattern recognition, hardware failures are automatically predicted without long timeouts. IOs are immediately redirected around unhealthy devices to avoid database hangs. Continuous monitoring for each database automatically generates service requests for any deviation.

9 Automated Hardware and Software Upgrades

Hardware upgrades occur automatically and transparently. Major database upgrades are automated and scheduled by the customer.

10 Auto-Patching

Automatically patch or upgrade with zero downtime. Applications continue to run as patching occurs in a round-robin fashion across RAC nodes or servers.



Fully automated data protection supporting different SLOs

Highly available out of the box with 99.95% SLA and with Autonomous Data Guard 99.995% SLA

Built-in protection



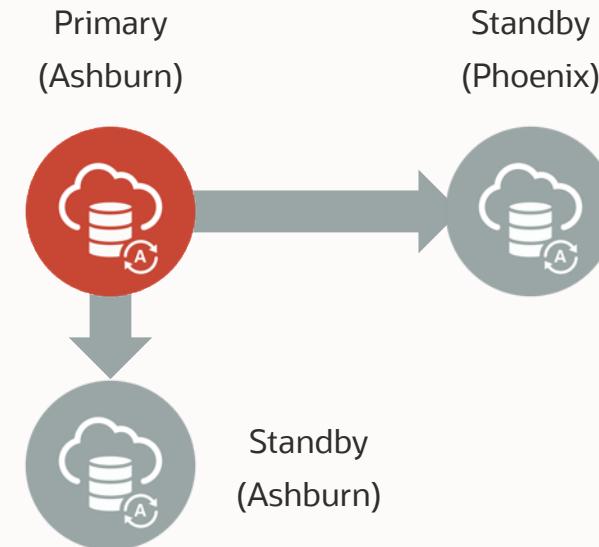
Built-in highly-available, self-healing infrastructure

Automatic recovery for server/storage failures

99.95% SLA

> 21mins 45s allowed downtime/month

Autonomous Data Guard



Enhanced protection against disasters

Multiple standby instances, including cross-region standby

99.995% SLA

> 2mins 10s allowed downtime/month

Maximizing reliability with automated proactive monitoring

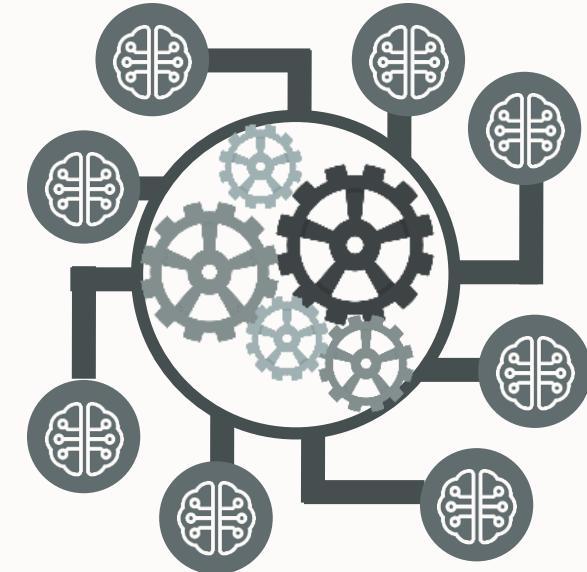
Autonomous Database finds the problems before you do

Oracle Cloud Operations uses continuous monitoring for each database: **8000+ metrics and 1500+ alarms**

- Much broader than any on-premises customer
- Consolidated monitoring of entire stack: infrastructure, load balancer, connection manager, database, ORDS, APEX, OML

Automatic service requests are generated for each deviation

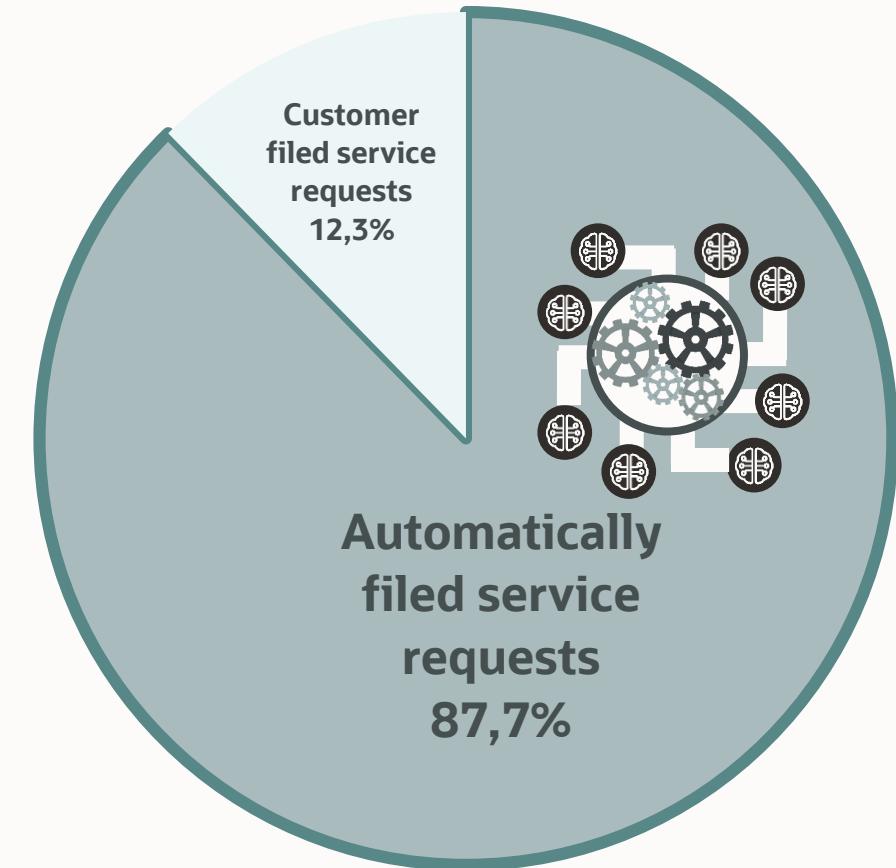
- Immediate investigation and resolution by cloud ops
- Root cause analysis for every issue
- Zero customer actions required



Maximizing reliability with proactive monitoring

Quantifying the benefits

- Detects 87.7% of issues automatically with zero customer action required
- Resolves service requests 4x faster than on-prem
- Keeps environment **more secure** since known vulnerabilities patched quickly
- Applies fixes almost continuously – **updates every week**



7 out of every 8 issues are automatically resolved with zero customer actions required

Maximize reliability with automated upgrades and patching

Top reasons why automated patching beats customer-managed patching

1 No customer actions required

No need to schedule patches, track patch contents or request one-off patches

2 Zero downtime

Application Continuity can further ensure no application disconnections

3 Always up-to-date security fixes

Frequent patches to meet compliance requirements

4 Full-stack patching

Includes database and all cloud infrastructure

5 Continuous delivery of new cloud features

Multiple new features available every month

Seamless improvements

Automated updates delivered over 170 new features in last 12 months

Proven quality

Fewer service requests than customer-managed databases

Patching in Autonomous Database

Customer experience

Patches are applied with **zero-downtime** within a scheduled weekly maintenance window:

- Coming soon: Customers can **choose the maintenance window** (from a list of available windows)

Maintenance ⓘ

Patch Level: Regular ⓘ

Next Maintenance: Sat, Jun 18, 2022, 19:00:00 UTC - 21:00:00 UTC [View History](#)

Customer Contacts: Configured ⓘ [Manage](#)

Customers can create databases with **early patches for test/dev systems**

- ‘Early patch’ databases are patched one week prior to production databases

Event notifications are available for the beginning and end of database patches

- Accessible via REST and SDK's for integration into other frameworks

Patch history and contents are fully available:

Maintenance History						
Autonomous Database: MyDatabase						
Title	Maintenance Type	Resource Type	State	Start Time	End Time	⋮
ADBS-22.6.1.2	Planned	Database	● Succeeded	Sat, Jun 4, 2022, 19:00:00 UTC	Sat, Jun 4, 2022, 19:32:41 UTC	⋮
ADBS-22.5.4.2	Planned	Database	● Succeeded	Sat, May 28, 2022, 19:00:16 UTC	Sat, May 28, 2022, 20:09:11 UTC	⋮
ADBS-22.5.3.2	Planned	Database	● Succeeded	Sat, May 21, 2022, 19:00:01 UTC	Sat, May 21, 2022, 19:28:54 UTC	⋮
ADBS-22.5.2.2	Planned	Database	● Succeeded	Sat, May 14, 2022, 19:00:14 UTC	Sat, May 14, 2022, 20:10:53 UTC	⋮
ADBS-22.5.1.2	Planned	Database	● Succeeded	Sat, May 7, 2022, 19:00:00 UTC	Sat, May 7, 2022, 19:46:59 UTC	

Patching in Autonomous Database

Ensuring customer reliability and mitigating patch risks

Continuous, in-depth testing of patch releases

- Tens of thousands of tests run daily
- Dozens of workloads are run around the clock to detect performance regressions

“Early Patch” databases address customer issues prior to production

- Customers can test their own applications prior to production patches

Rapid detection of patch regressions through in-depth monitoring

- Unexpected new errors will pause patch process for remaining fleet
- Advanced anomaly detection finds all types of error conditions

Automation of emergency mitigation measures

- Patch pauses and rollbacks are automated and tested

COMING SOON: Complete end-to-end automation for the full patch testing lifecycle:

1. Intelligently capture workload from production database
2. Create “early patch” clone of production database
3. Run workload on “early patch” database
4. Analyze results and automatically file service requests



Minimize risk with **automated backups**

Top reasons why automated backups beat customer-managed backups

1 No customer action required

Fully automated daily backup

Configurable retention from 0 to 60 days

Point in time recovery

2 Automated backup testing

Validation ensures future data restoration

3 Optional long-term backup retention

Up to 10 years for regulatory compliance

4 Create a new database from backup

Deploy to any cloud region

Restore to any point in time

Backup timestamp	State	Type	Retention period	Database version
Fri, May 26, 2023 at 09:13:26 UTC	Active	Auto Backup	60 days	19c
Thu, May 25, 2023 at 12:33:57 UTC	Active	Auto Backup	60 days	19c
Wed, May 24, 2023 at 15:21:16 UTC	Active	Auto Backup	60 days	19c
Tue, May 23, 2023 at 18:03:44 UTC	Active	Auto Backup	60 days	19c
Mon, May 22, 2023 at 20:52:21 UTC	Active	Auto Backup	60 days	19c
Mon, May 22, 2023 at 17:20:49 UTC	Active	Long-term	545 days	19c
Sun, May 21, 2023 at 21:00:03 UTC	Backup	60 days		19c
Sun, May 21, 2023 at 03:03:44 UTC	Auto Backup	60 days		19c
Sat, May 20, 2023 at 17:20:49 UTC	Active	Auto Backup	60 days	19c
Fri, May 19, 2023 at 03:03:44 UTC	Active	Auto Backup	60 days	19c
Thu, May 18, 2023 at 17:20:49 UTC	Active	Auto Backup	60 days	19c
Wed, May 17, 2023 at 03:03:44 UTC	Active	Auto Backup	60 days	19c
Tue, May 16, 2023 at 17:20:49 UTC	Active	Long-term	545 days	19c
Mon, May 15, 2023 at 03:03:44 UTC	Active	Auto Backup	60 days	19c
Sun, May 14, 2023 at 17:20:49 UTC	Active	Auto Backup	60 days	19c
Sat, May 13, 2023 at 03:03:44 UTC	Backup	60 days		19c

Simple way to set retention periods for long term backups

Compliance and regulatory requirements

Healthcare industry retains patient records for a minimum of seven years. Financial industry retains financial records for at least six years.

Legal and contractual obligations

You may need to keep records for a specific period to comply with a contract or litigation.

Historical analysis

Historical data can be valuable for trend analysis, forecasting, and decision-making

Business continuity

Provides a way to recover from accidental deletion, data corruption, or other types of data loss, minimizing downtime and ensure that business operations can continue with minimal disruption.

The screenshot shows the Oracle Cloud interface for managing backups. On the left, there's a sidebar with 'Metrics' and a main area with 'Backups (87)'. A modal window titled 'Create long-term backup' is open. It contains fields for 'Years (365 days)' (set to 1), 'Months (30 days)' (set to 0), and 'Days' (set to 0). Below these fields, it says 'You have selected retention period of 365 days.' and has a checked checkbox for 'Schedule long-term backup'. A section for 'Backup schedule' shows a dropdown menu with 'Weekly', 'Monthly', and 'Yearly' options, where 'Yearly' is selected. A note below says 'Backup storage is billed in addition to database storage. [Learn more about how backup storage is billed](#)'. At the bottom of the modal are 'Create' and 'Cancel' buttons. The footer of the page includes 'Terms of Use and Privacy' and 'Cookie Preferences' links, along with a copyright notice: 'Copyright © 2023, Oracle and/or its affiliates. All rights reserved.'



Business Continuity with Autonomous Database

	Self-healing Cloud Infrastructure	Backup-Based Disaster Recovery	Autonomous Data Guard	
	Built-in HA architecture for the most common faults	Low-cost DR solution	Highest level of protection	
Provides protection from following types of failures:	<ul style="list-style-type: none"> Storage (disk and flash) failures Storage server failures Database instance failures Database server failures Exadata cluster network fabric failures Periodic software and hardware maintenance updates 	<ul style="list-style-type: none"> Data corruptions Full database failures Complete storage failures Availability Domain or Region failure 	<ul style="list-style-type: none"> Data corruptions Full database failures Complete storage failures Availability Domain or Region failure 	
Downtime (RTO)	Zero or Near Zero	1 hour + (1 hour per 5 TB)	<u>Local (Cross-AD)</u> 2 minutes	<u>Cross-Region</u> 15 minutes
Potential Data Loss (RPO):	Zero	1 minute	1 minute	
Included for all ADB Serverless databases	Yes	Yes <i>Optional (additional cost) for cross-region</i>	Optional (additional cost)	



Summary: 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

Value Scale



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



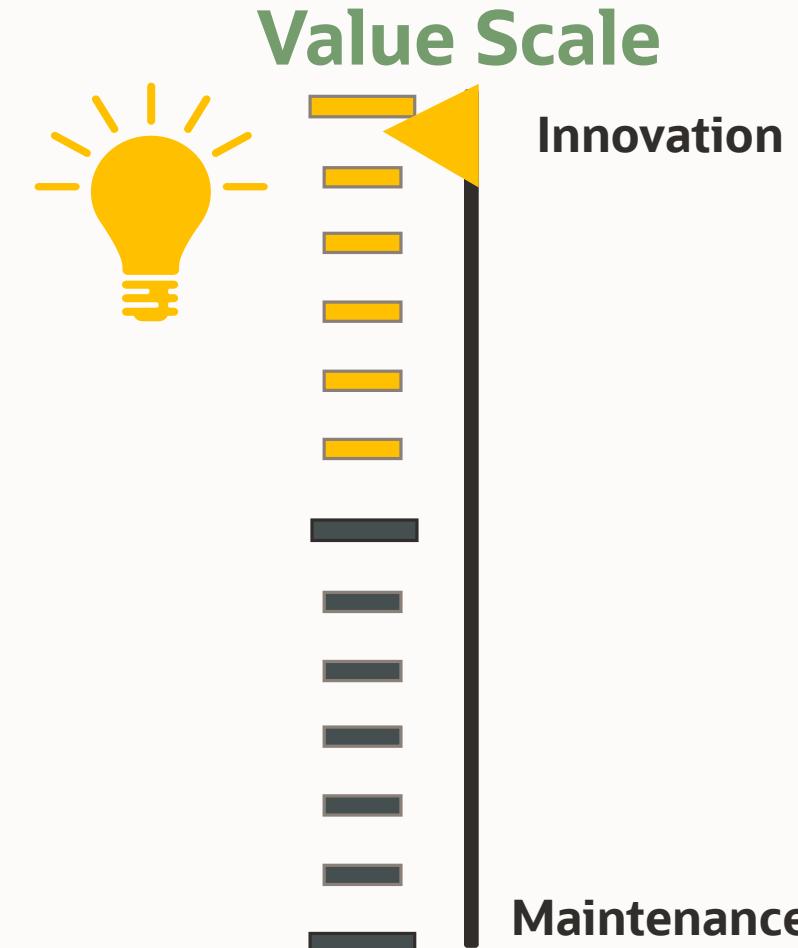
Maintenance

Automation removes time spent on operational tasks

DBA's now focus on innovation and increasing business value

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

Welcome to the future: Autonomous Database

Reduce risk with regulatory compliance

Supports a comprehensive set of international and industry-specific compliance standards

HIPA Health Insurance Portability and Accountability Act	ISO/IEC 27017:2015 Code of Practice for Information Security Controls Based on ISO/IEC 27002 for Cloud Services
PCI DSS Payment Card Industry Data Security Standard is a set of requirements intended to ensure that all companies that process, store, or transmit credit card information maintain a secure environment	ISO/IEC 27018:2014 Code of Practice for Protection of Personally Identifiable Information (PII) In Public Clouds Acting as PII Processors
SOC 1 System and Organization Controls 1	ISO 9001 Intended “to help organizations demonstrate its ability to consistently provide customers good quality products and services.”
SOC 2 System and Organization Controls 2	GDPR Applies to all entities processing data about EU residents, regardless of company location and /or locale of data storage.
SOC 3 System and Organization Controls 2	CSA STAR The Cloud Security Alliance (CSA) is an organization that promotes best practices for providing security assurance in cloud computing
ISO/IEC 27001:2013 International Organization for Standardization 27001	MeitY IT Security Guidelines Ministry of Electronics and Information Technology (MeitY) Information Technology (IT) Security Guidelines

More information on regulatory compliance certification is here: <https://bit.ly/adb-compliance>



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

Reduce risks with always-on security

Start with strong perimeter controls

Secure by default

- Customers are unable to disable security configurations
- No access to O/S, only access to database

Always up-to-date security patches

- Eliminates the largest security risk in current customer-managed systems

End-to-end encryption

- Full encryption for entire database, backups and all network connections

Infrastructure-level network isolation

- Customer Controlled CIDR
- Private or Public Subnet
- Security Lists and Gateways
- Network Security Groups, fully-managed firewalls

Cloud compartment/IAM controls

- LOB separation of duties
- Granular access controls to all ADB resource types

Customer configurable Access Control Lists

- ADB level isolation
- custom IP Address lists
- CIDR ranges

Database auditing always on

- Login failures and modifications to user accounts or database structures recorded
- No highly privileged access (system/sysdba/sysoper)



Reduced risk with always-on platform auditing

Oracle Unified Audit captures all security-relevant activity

- Login failures
- Changes to users, including creation of new accounts, grants of privileges or roles
- Changes to database structures, including tables, procedures, and synonyms

Customers have access to all audit data



Reduce risk with Data Safe

Database security posture management for all of your Oracle Databases



Security Assessment

Checks database configuration, analyzes user roles and privileges, and identifies which security controls are (and importantly are NOT) in use



User Assessment

Assesses the database and highlights accounts that could pose a risk.



Activity Auditing

Manage audit trails, alerts, and report on audit data.



Sensitive Data Discovery

Prioritizes security efforts by finding the location, type and amount of sensitive data

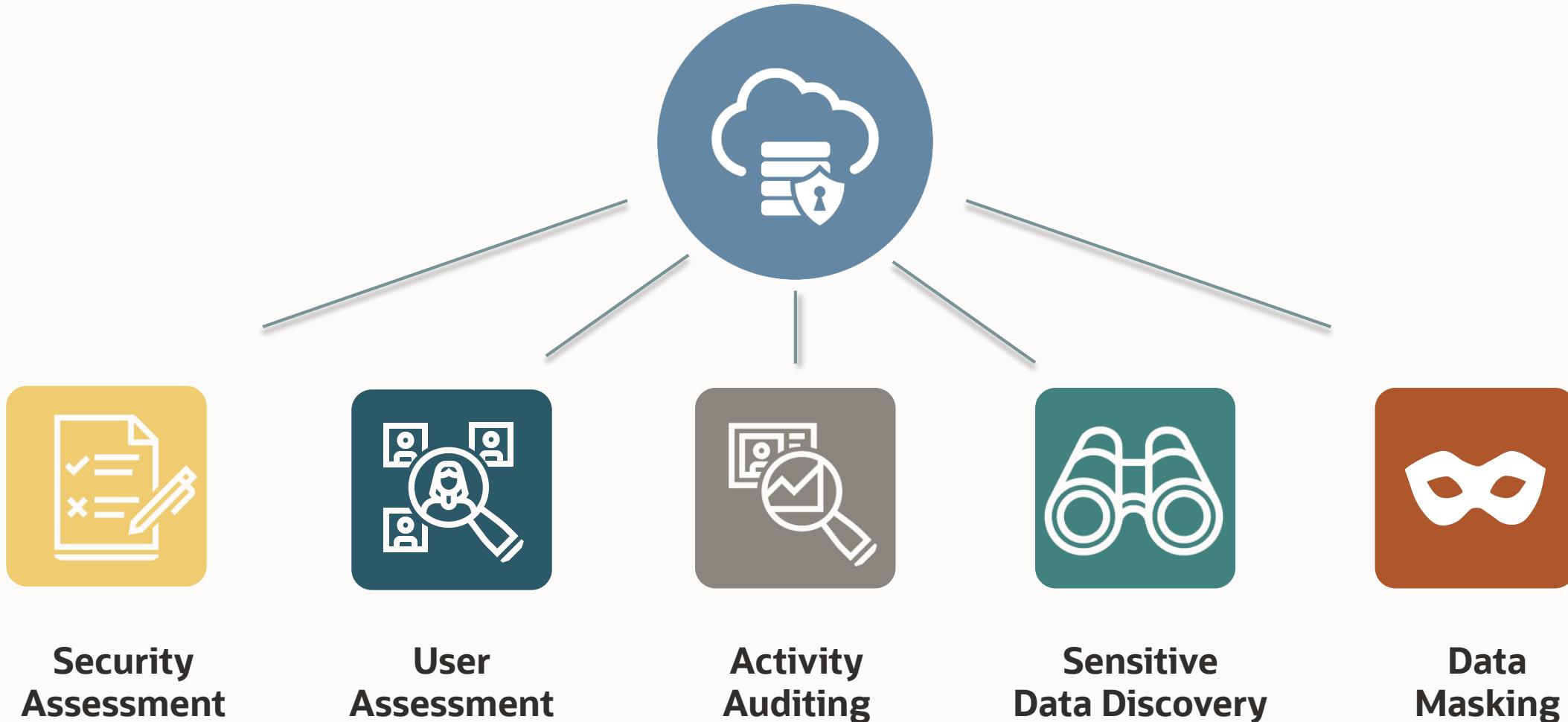


Data Masking

Remove risk from non-production environments by anonymizing sensitive data.

Reduce risk with **comprehensive security management**

Data Safe security control center enabled with single click



**Security
Assessment**

**User
Assessment**

**Activity
Auditing**

**Sensitive
Data Discovery**

**Data
Masking**

Sensitive Data Discovery

125+ Pre-defined Sensitive Types



Identification	Biographic	IT	Financial	Healthcare	Employment	Academic
SSN	Age	IP Address	Credit Card	Provider	Employee ID	College Name
Name	Gender	User ID	CC Security PIN	Insurance	Job Title	Grade
Email	Race	Password	Bank Name	Height	Department	Student ID
Phone	Citizenship	Hostname	Bank Account	Blood Type	Hire Date	Financial Aid
Passport	Address	GPS location	IBAN	Disability	Salary	Admission Date
DL	Family Data	...	Swift Code	Pregnancy	Stock	Graduation Date
Tax ID	Date of Birth		...	Test Results	...	Attendance
...	Place of Birth			ICD Code		...
		

Autonomous Database



Simplify your work

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

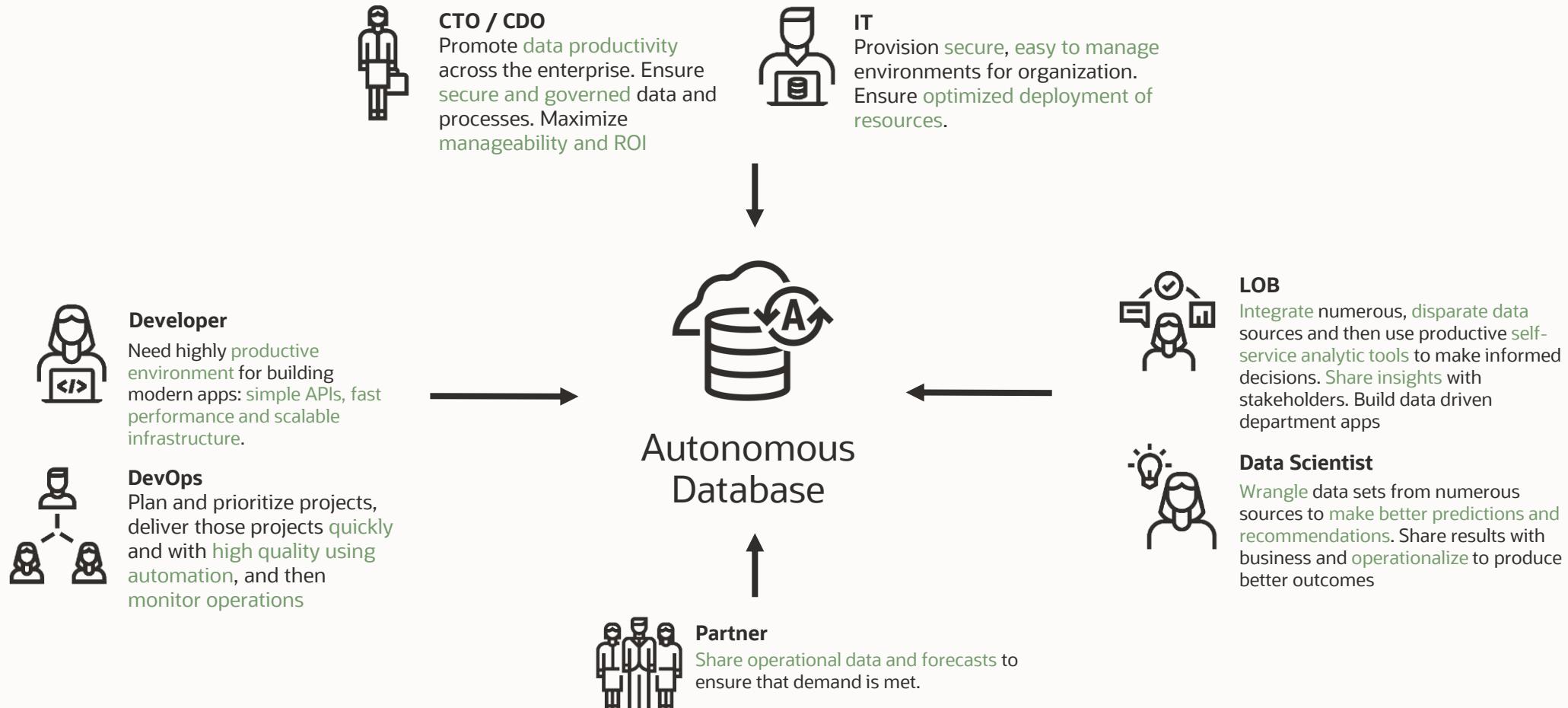
Developers and analysts can reduce their dependency on IT and focus on delivering strategic solutions.

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.

Simplify innovation and prototyping

Minutes to deploy multi-workload, converged platform



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

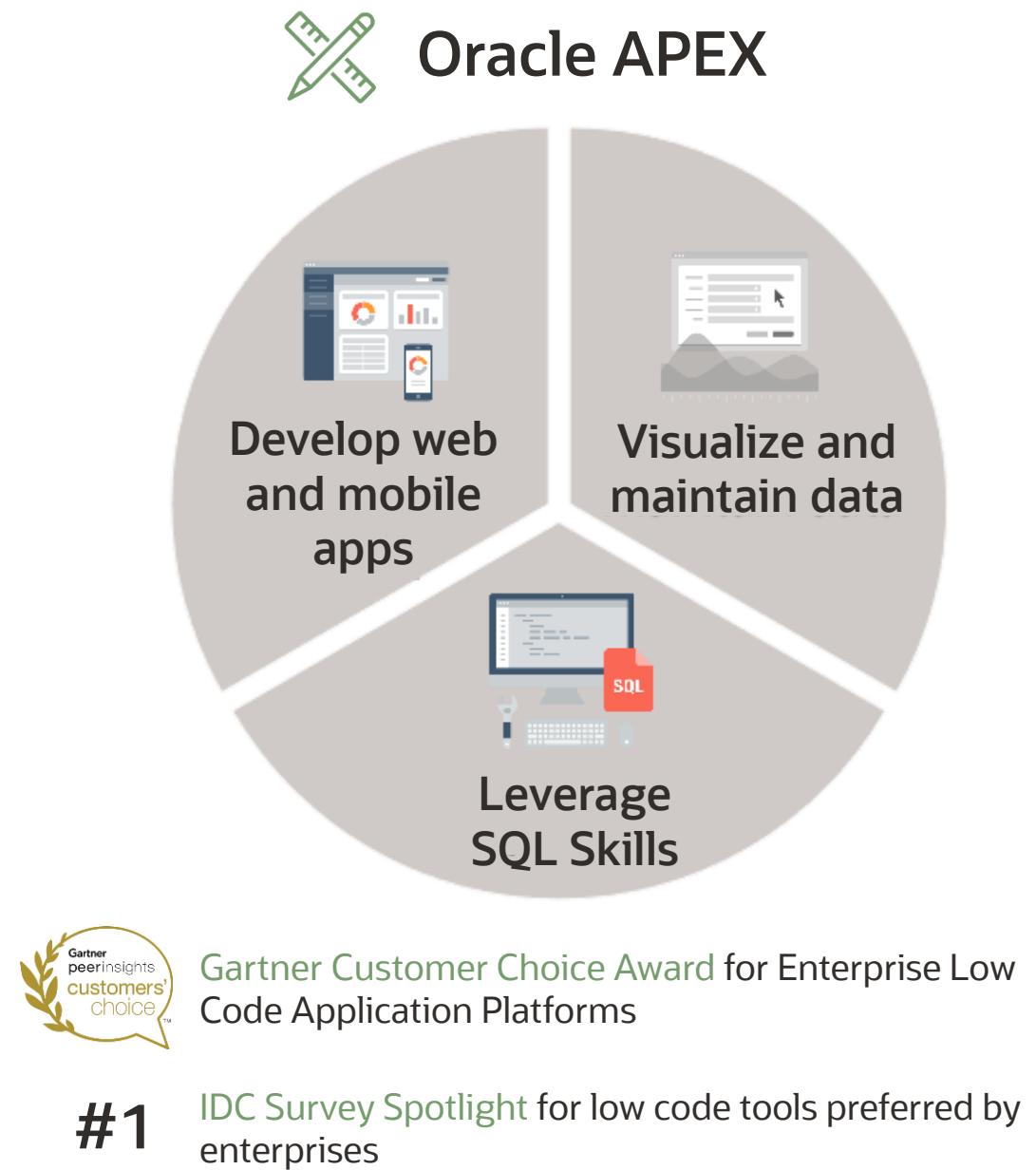


Data Integration

Simplify building modern apps

Deliver apps **20x faster** with **100x less code**

- Build responsive apps, design data models, and create REST APIs in your browser
- Use rich, data-driven components like Faceted Search and Interactive Reports
- Jump start development with pre-built productivity and sample apps
- Extend apps with standard JavaScript, HTML5, CSS, SQL and REST
- Efficient runtime execution with zero latency data access
- Globalization and localization



Simplify development using your favorite tools

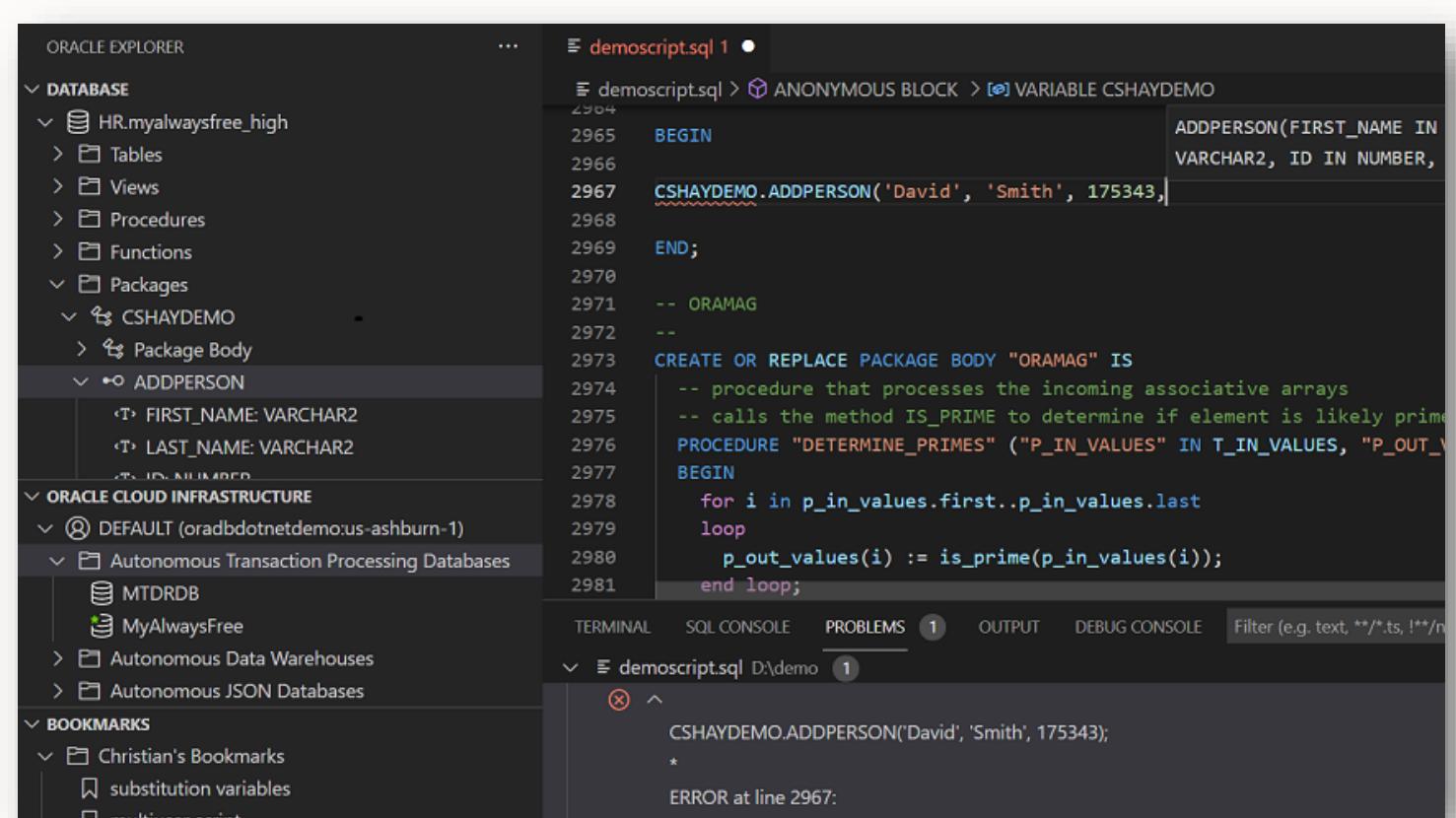
Example: Microsoft Visual Studio Code + Free Oracle Developer Tools plugin

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



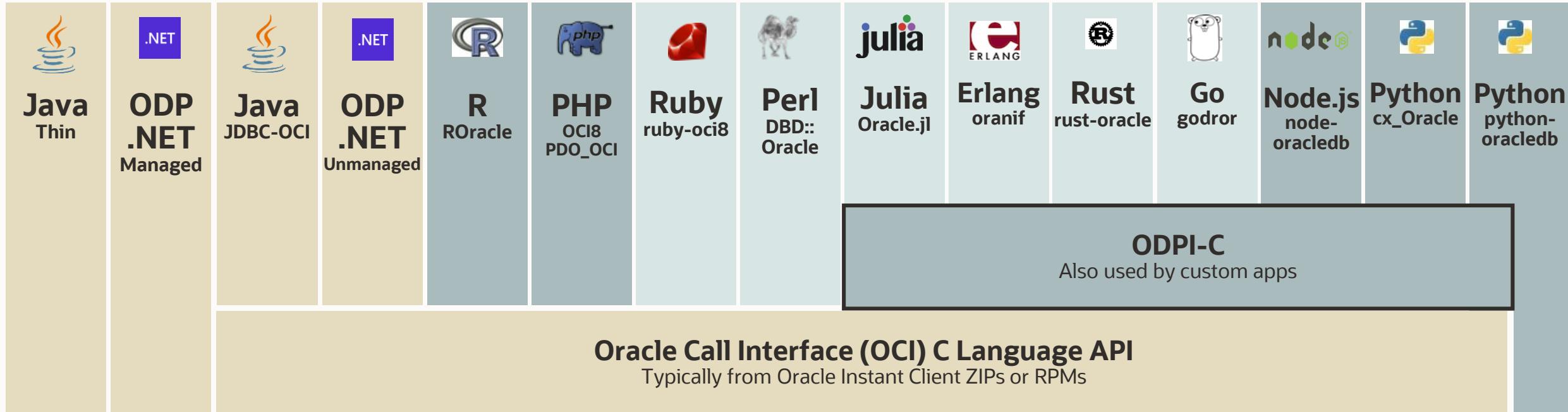
The screenshot shows the Microsoft Visual Studio Code interface with the Oracle Developer Tools plugin installed. On the left, the Oracle Explorer sidebar displays database structures like HR.myalwaysfree_high, CSHAYDEMO, and ADDPERSON, along with Oracle Cloud Infrastructure and Bookmarks sections. The main editor area shows a script named 'demoscript.sql' with the following content:

```
2965 BEGIN
2966
2967 CSHAYDEMO.ADDPERSON('David', 'Smith', 175343,
2968
2969 END;
2970
2971 -- ORAMAG
2972 --
2973 CREATE OR REPLACE PACKAGE BODY "ORAMAG" IS
2974   -- procedure that processes the incoming associative arrays
2975   -- calls the method IS_PRIME to determine if element is likely prime
2976 PROCEDURE "DETERMINE_PRIMES" ("P_IN_VALUES" IN T_IN_VALUES, "P_OUT_VALUES" OUT T_OUT_VALUES)
2977 BEGIN
2978   for i in p_in_values.first..p_in_values.last
2979   loop
2980     p_out_values(i) := is_prime(p_in_values(i));
2981   end loop;

```

The code editor has syntax highlighting for SQL and PL/SQL. Below the editor, the 'PROBLEMS' tab shows one error: 'CSHAYDEMO.ADDPERSON('David', 'Smith', 175343);'. The status bar at the bottom indicates the file is 'D:\demo'.

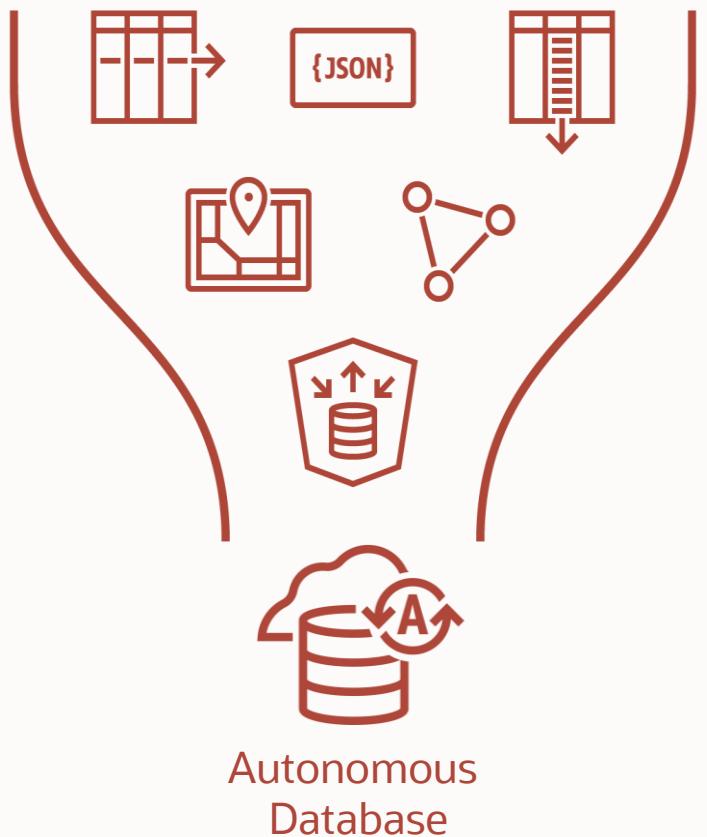
Use your favorite language with high performance drivers



Oracle maintains key driver APIs and works closely with driver communities

Simplify developing modern apps

Use multiple data types and analytics for intelligent applications



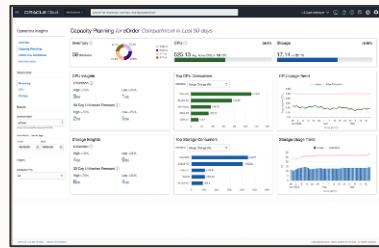
Derive those insights in a **single, mixed-workload** data platform:

- **Eliminate administrative overhead**; no need to deploy specialized analytic engines
- **Build applications faster** by reducing data integration complexity
- **Minimize security risks** introduced by moving data to specialized engines
- **Reduce latency** by bringing algorithms to the data
- Use your favorite tools and frameworks to develop the solution

Simplify management

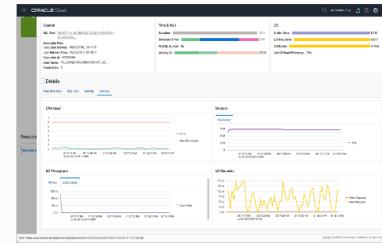
Focus on what's needed - manage by exception

OCI Events



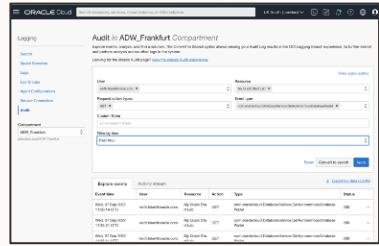
Get notified for maintenance windows, ADMIN password expiry, New IP address database logon...

Performance Hub



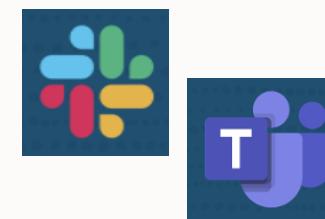
Analyze and drill down SQL performance

Service Metrics



Alarm on exceptions based on service metrics - CPU, Sessions, IO...

Notifications



Notify stakeholders using Slack, Teams, email and more

Integrate data from over 100 different sources across your enterprise

Relational database



Cloud data warehouse

Enterprise applications



Big Data

MARTECH



Custom

Back office



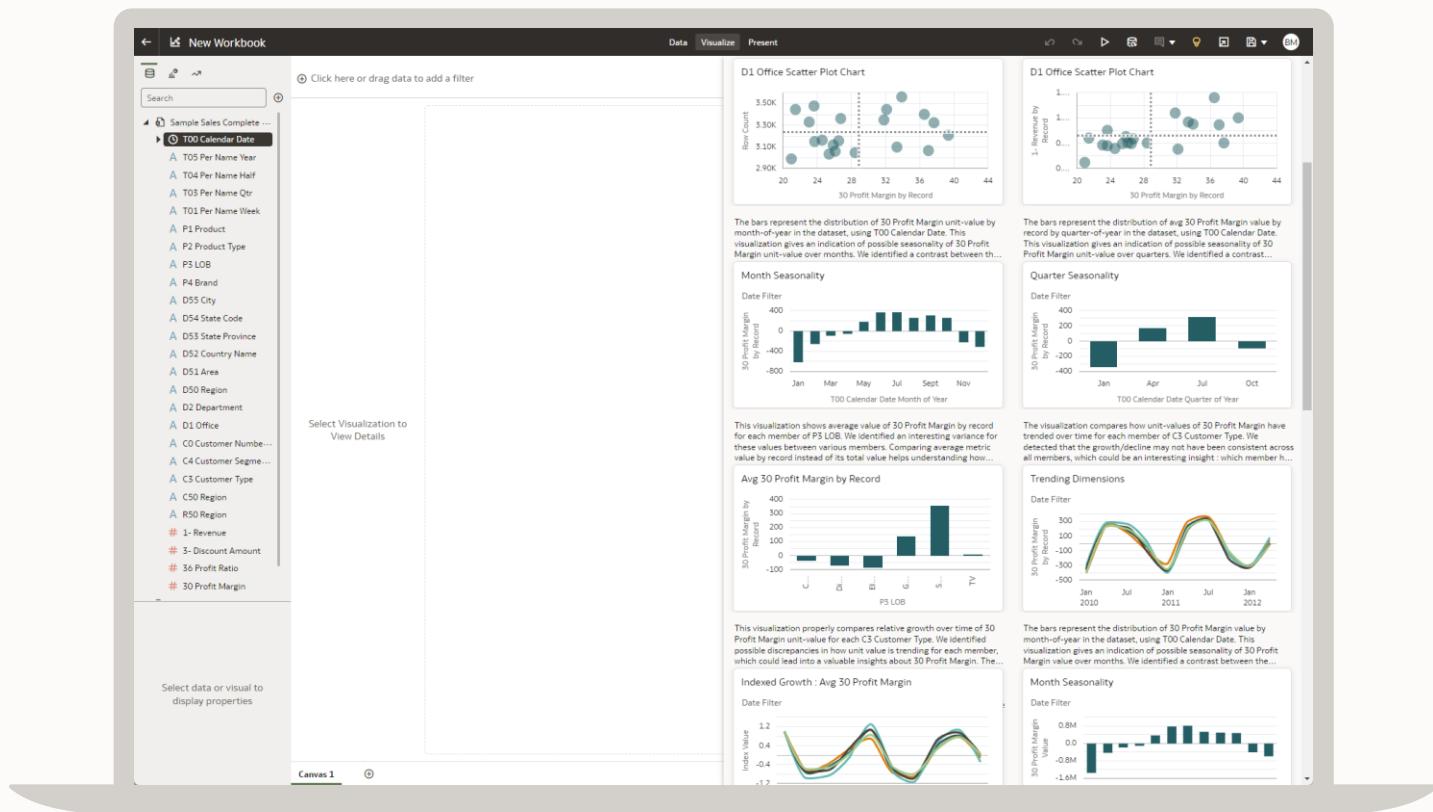
DEVOPS



Simplify analytics with Oracle Analytics Cloud

Working with Autonomous Database to improve your analytics

- Offers a comprehensive suite of analytic capabilities
- Interactive data visualizations, advanced data exploration and self-service data preparation
- Leverages the power of machine learning and advanced analytics for data in Autonomous Database



Native capabilities of Autonomous Data Warehouse ecosystem

Competitors' services require additional components to address functional deficiencies

	ADW	Redshift	Synapse	Snowflake	BigQuery
Built-in ER data modeler	✓	✗	✗	✗	✗
Built-in declarative data transformation library	✓	✗ Requires AWS Glue	✗ Requires Azure Data Factory	✗ Requires 3rd party tools	✗ Requires Google DataFlow
Built-in library of data/application connectors and integrated data loading	✓	✗ Requires AWS Glue	✗ Requires Azure Data Factory	✗ Requires 3rd party tools	✗ Requires Google Connectors + Google Application Integration
Built-in analytic semantic layer	✓	✗ Requires Amazon Quicksight	✗ Requires PowerBI/SSAS	✗	✗
Built-in anomaly detection	✓	✗	✗	✗	✗
Built-in machine learning	✓	✗ Requires Data Export to S3 and AWS SageMaker	✗ Requires Azure Data Factory and Spark Pools/SQL Pools/SynapseML	✗ Requires 3rd party tools	✗ Requires BigQuery ML service
Built-in advanced spatial types, models, and analytics	✓	✗ Requires additional AWS services or 3rd party tools	✗ Requires additional Azure services or 3rd party tools	✗ Requires 3rd party tools	✗ Quotas -limits apply to loading, querying, copying spatial data.
Built-in support for storing and querying knowledge and property graphs	✓	✗ Requires AWS Neptune or 3rd party tools	✗ Requires additional Azure services or 3rd party tools	✗ Requires 3rd party tools	✗ Requires Google Knowledge Graph Search API
Add-ins for Excel and Google Sheets	✓	Excel – ✓ Google – ✗	Excel – ✓ Google – ✗	Excel – ✓ Google - ✗	✓



Native capabilities of Autonomous Data Warehouse ecosystem

Competitors' services require additional components to address functional deficiencies

	ADW	Redshift	Synapse	Snowflake	BigQuery
Built-in ER data modeler					
Built-in declarative data transformation library		 Requires AWS Glue	 Requires Azure Data Factory	 Requires 3rd party tools	 Requires Google DataFlow
Built-in library of data/application connectors and integrated data loading		 Requires AWS Glue	 Requires Azure Data Factory	 Requires 3rd party tools	 Requires Google Connectors + Google Application Integration
Built-in analytic semantic layer		 Requires Amazon Quicksight	 Requires PowerBI/SSAS		
Built-in anomaly detection					
Built-in machine learning		 Requires Data Export to S3 and AWS SageMaker	 Requires Azure Data Factory and Spark Pools/SQL Pools/SynapseML	 Requires 3rd party tools	 Requires BigQuery ML service
Built-in advanced spatial types, models, and spatial analytic functions		 Requires additional AWS services or 3rd party tools	 Requires additional Azure services or 3rd party tools	 Limited data types + requires 3rd party tools	 Quotas -limits apply to loading, querying, copying spatial data.
Built-in support for storing and querying knowledge and property graphs		 Requires AWS Neptune or 3rd party tools	 Requires additional Azure services or 3rd party tools	 Requires 3rd party tools	 Requires Google Knowledge Graph Search API
Includes add-ins for Excel and Google Sheets		Excel Google Sheets	Excel Google Sheets	Excel Google Sheets	



Autonomous Database



Accelerate success

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

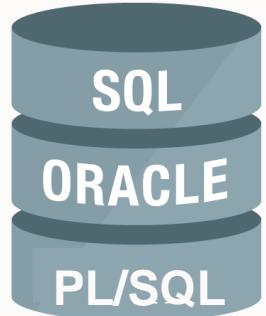
Easily **migrate** existing on-premises **applications** to cloud

Run Oracle Applications and **extend** with new capabilities

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

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



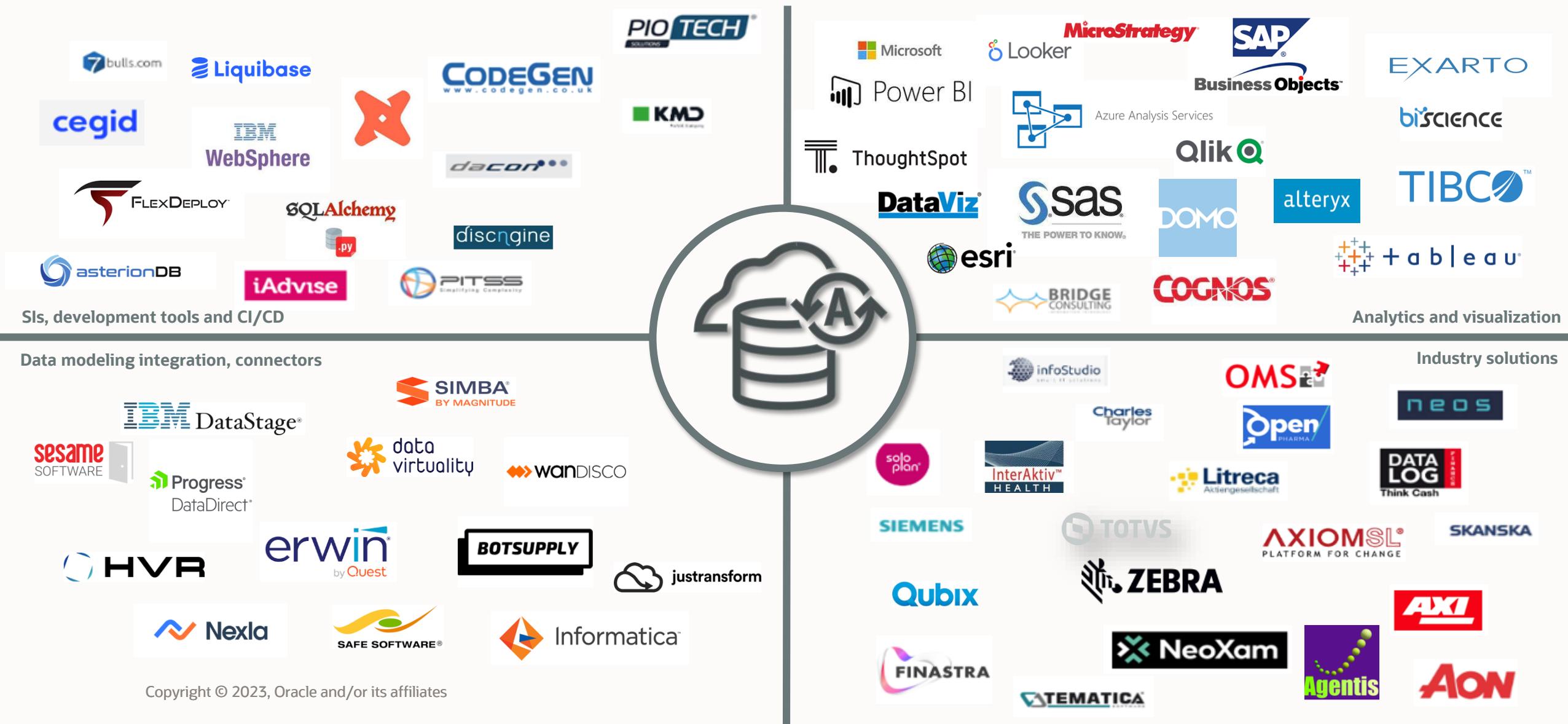
Supports existing workloads and apps from on-premise deployments (Oracle Apps, APEX apps, custom apps, data marts, EDWs, etc)

Migrate with zero-downtime



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

Support from major partners accelerates migration to Autonomous Database



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

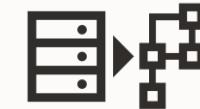
vs.

Cloud Lift Services

3. Leverage migration tools



Zero Downtime Migration (ZDM)



Database Migration Service (DMS)

4. Execute migration



Accelerate success – Run all your Oracle Apps better on ADB

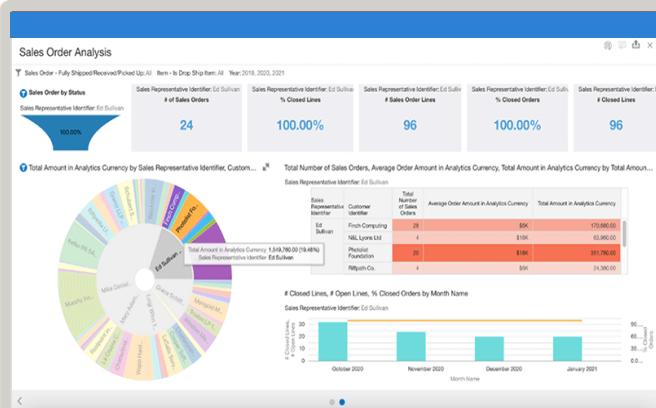
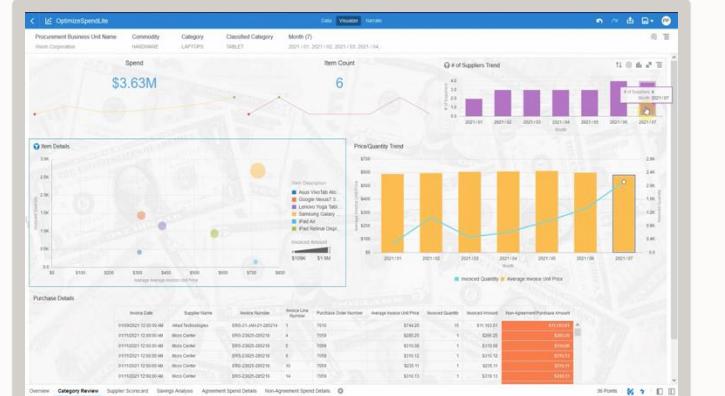
Complete portfolio of Oracle Apps now certified



- 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

Accelerate insights with Data Model Accelerators

Prebuilt solutions fast-track developing models, pipelines, KPIs and dashboards



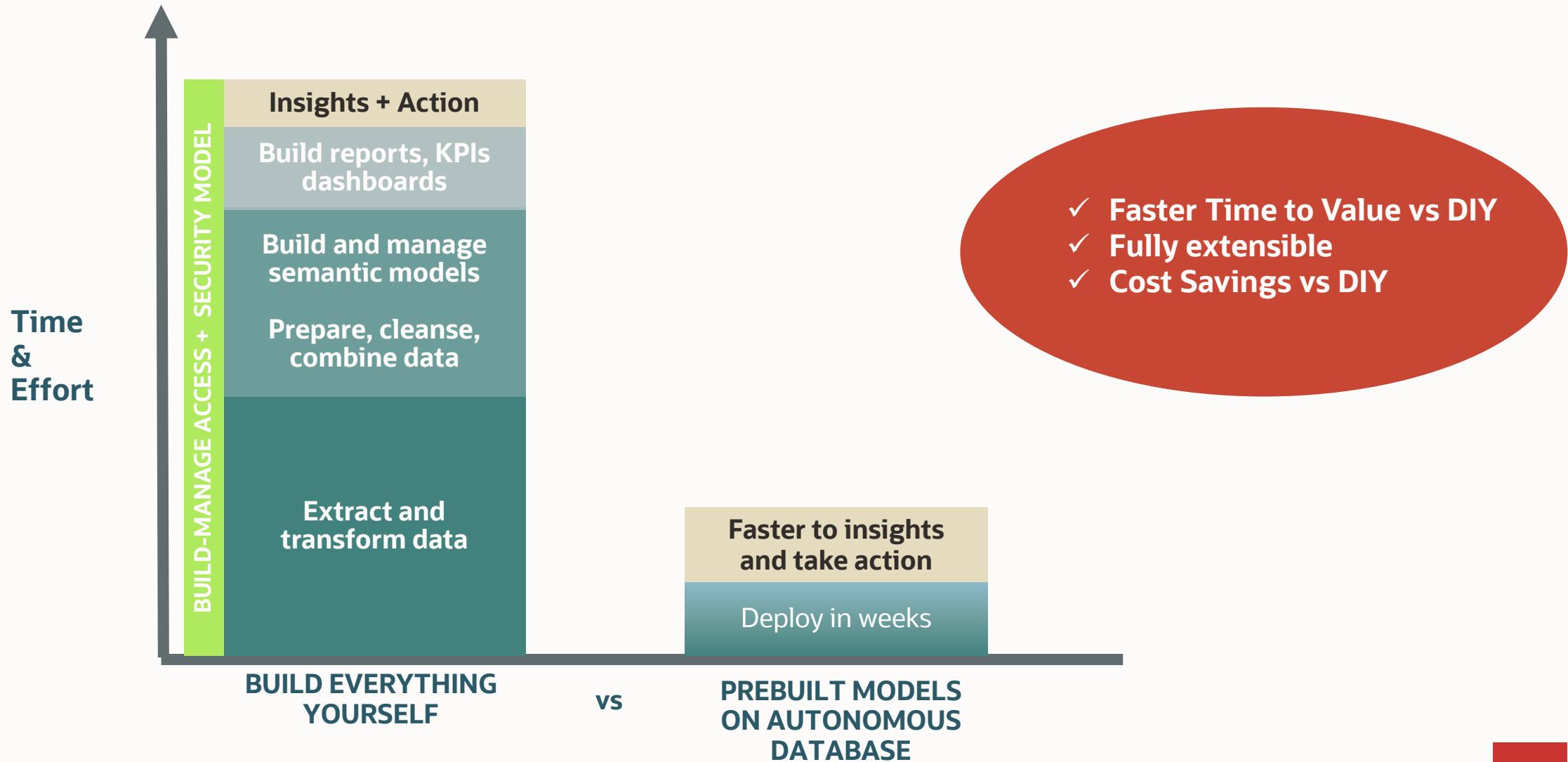
**NetSuite Data Warehouse
Accelerator for Autonomous
Database**

**E-Business Analytics Accelerator
for Autonomous Database**

**Manufacturing Data Platform
Accelerator
for Autonomous Database**

Accelerate insights with prebuilt analytic solutions for Oracle Apps

Reducing time and effort



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

What are the implications of working in a multi-cloud environment?

Direct access to data wherever it is stored

Each cloud has its own object storage service with its own resource policies to govern access



Need data access APIs that can operate across different object storage services and adhere to local resource security policies

Integrate with SaaS apps and databases

Cloud-specific SaaS applications and other transactional services running on different clouds



Data integration services must provide easy-to-connect bridges across each cloud platform

Operational communications

Teams use multiple collaboration platforms running on different clouds



Ability to push operational information and query results to a range of different collaboration services

Data Catalog integration

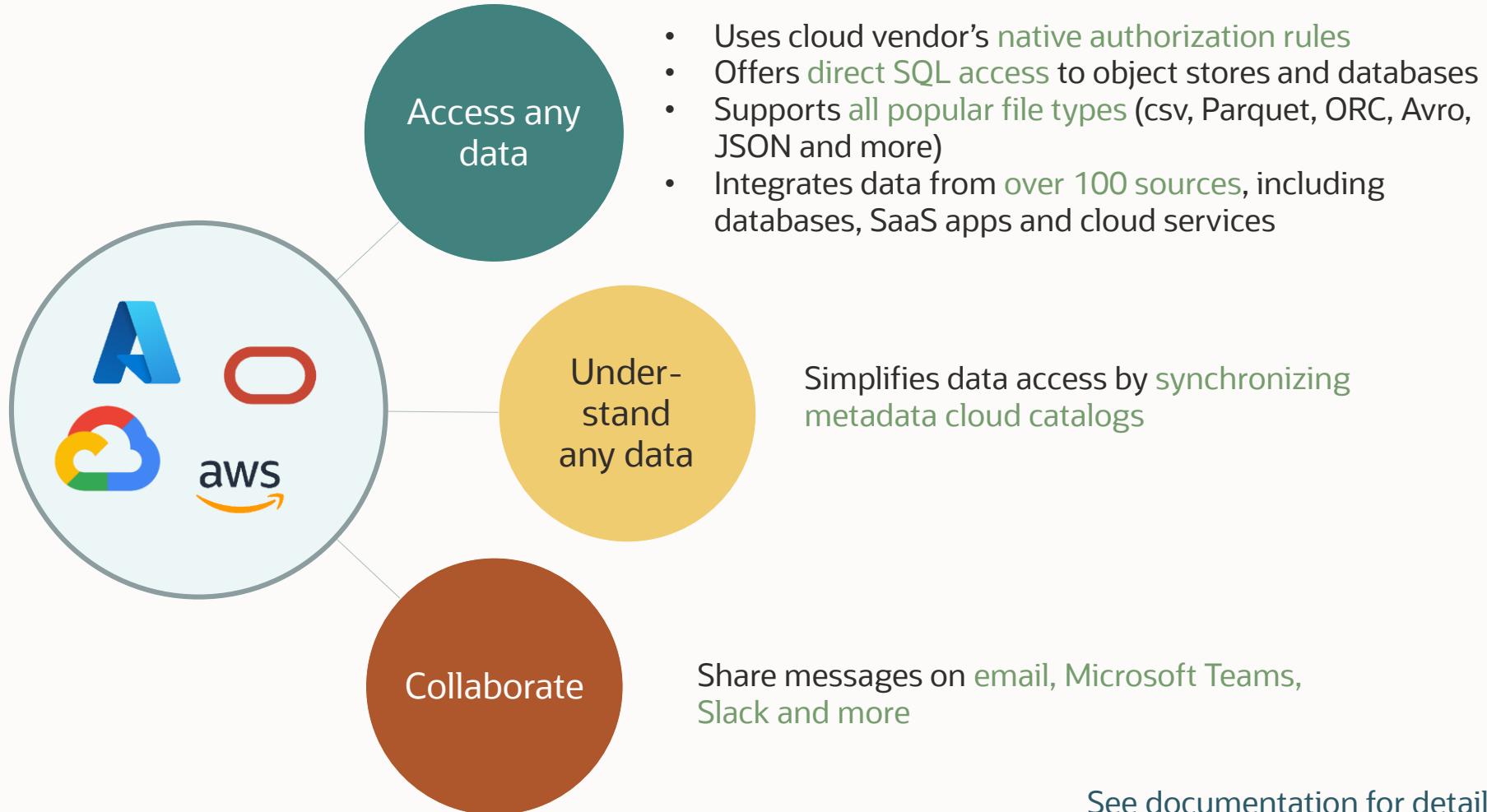
Each cloud has its own metadata catalog service



Synchronization of data-related metadata across different catalog services

Autonomous Database **simplifies** multi-cloud solutions

Deep integration with native cloud services abstracts differences



[See documentation for details on support](#)

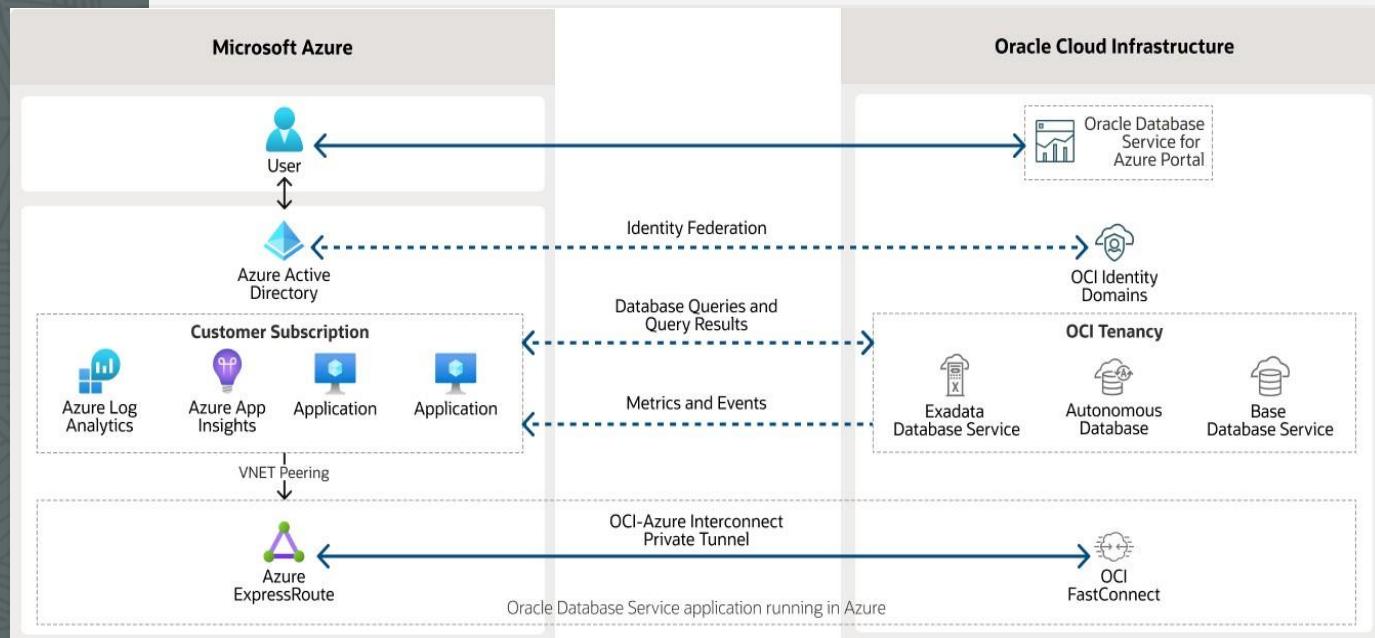


Summary of Autonomous Database multi-cloud integration



Simplify Autonomous Database management in Microsoft Azure

- Simplifies Microsoft Azure app and service access to Autonomous Database
- Manage Autonomous Database as you would other Azure services
- High-speed connection between 12 Azure and OCI data center regions
- Integration with Azure Active Directory to simplify access and authentication
- Azure customers can deploy and manage:
 - Oracle Autonomous Database
 - Exadata Database Service
 - Base Database Service

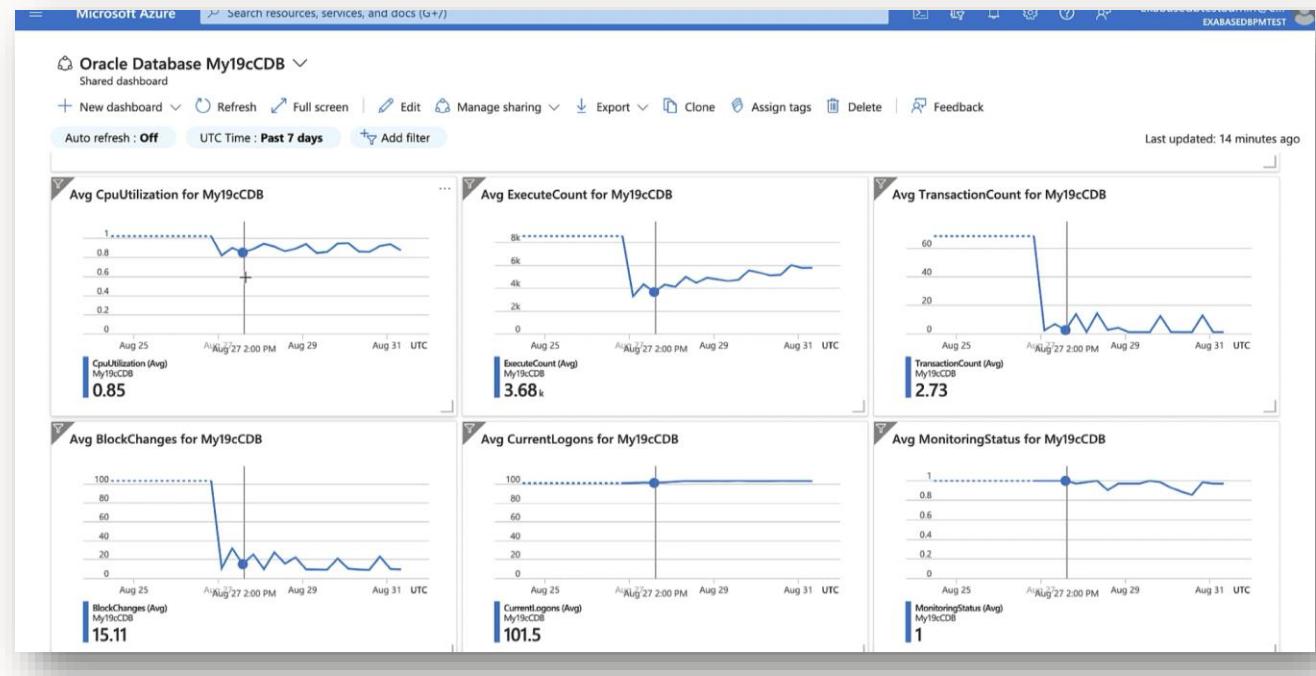


Simplify Autonomous Database management in Microsoft Azure

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**

bit.ly/adb-demos



**Sign up for “what's
new” announcements**

bit.ly/adb-announcements



**Join us on
LinkedIn**

bit.ly/linkedin-adb



**Follow us on
Twitter**

twitter.com/AutonomousDW



**Got a question? We
are on stackoverflow**

bit.ly/adb-stackoverflow