ORACLE

Database Consolidation

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Cloud Architect, Oracle Latin America

Agenda

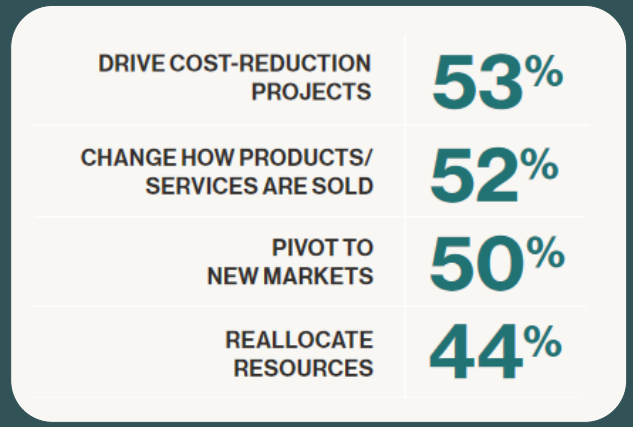
1. What do we hear from customers?
2. Three ways to consolidate Oracle Database
3. How Oracle can help you implement database consolidation
4. Wrap up and next steps

Our customers say they are modernizing to support new business models

80%

of businesses are planning strategic moves that require IT modernization*

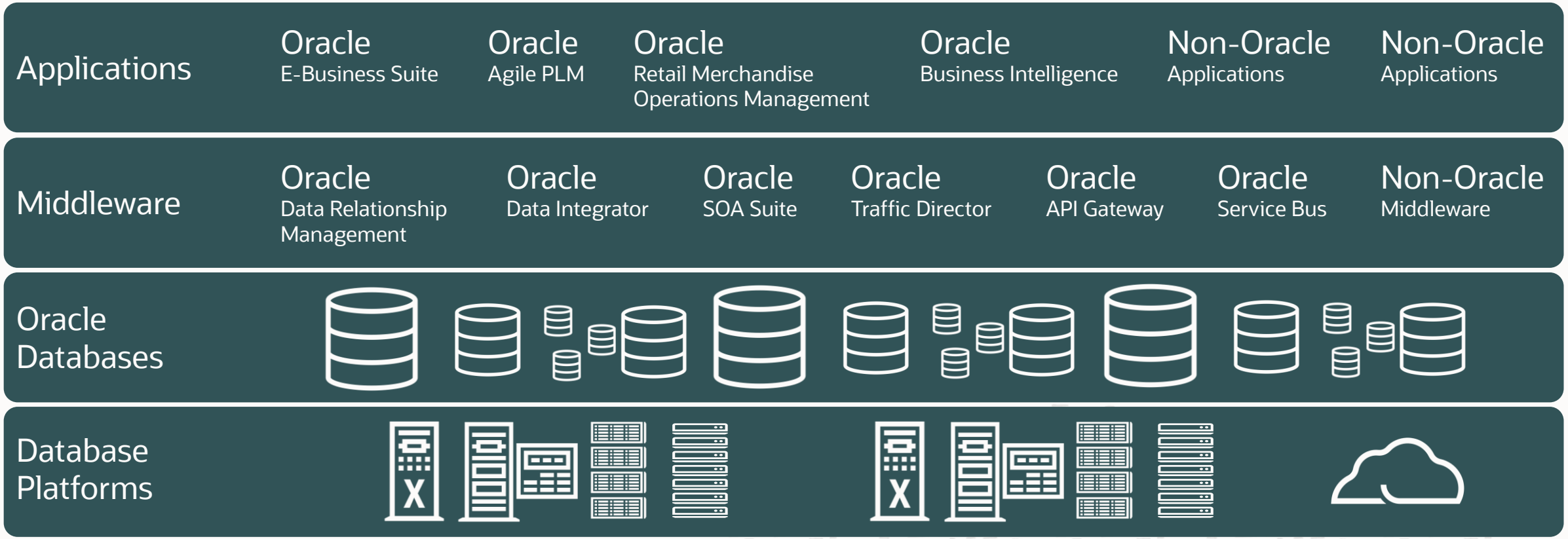
Top reasons for modernizing IT estates*



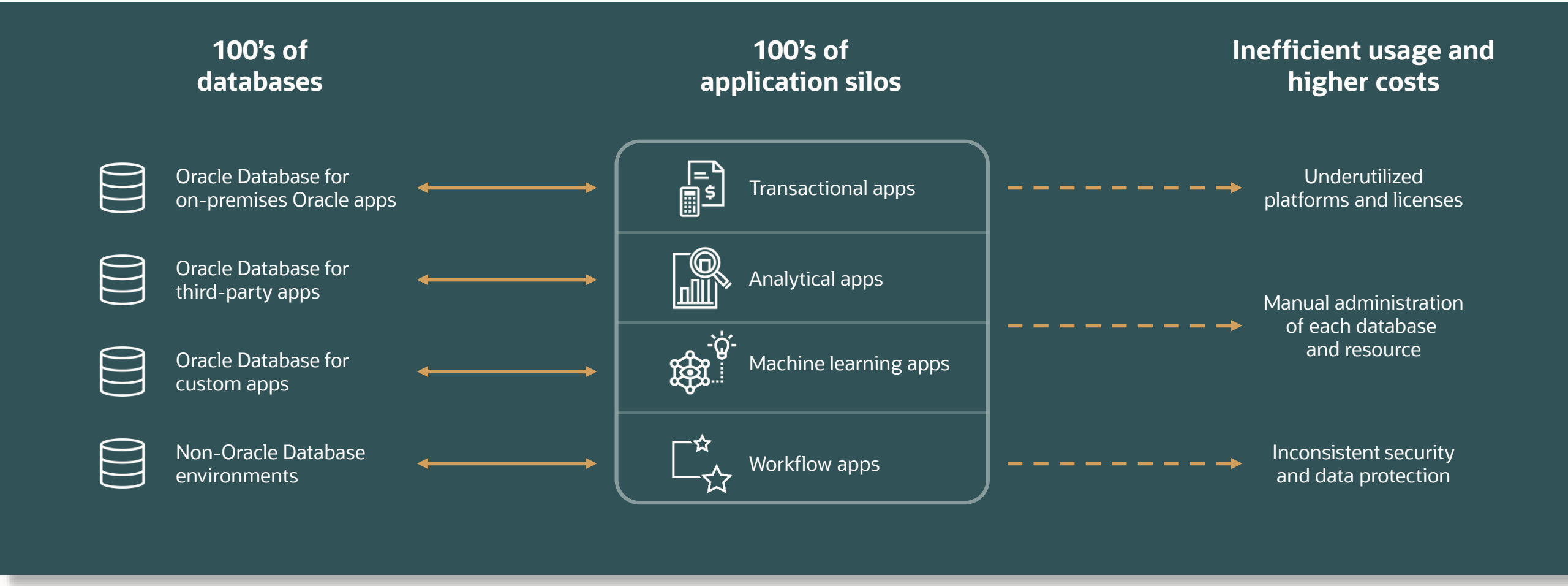
Database consolidation is a core IT strategy used to achieve strategic goals

* MIT Technology Review Insights: New business models, big opportunity

Many organizations have extensive Oracle Database estates



But stand-alone databases limit efficiency and increase costs



Database consolidation increases business value

"Database consolidation is one of the most basic steps to bring the data together, to have two plus two equals five benefits, to be on a modern platform and have the ability to move workloads back and forth between cloud and on-premises to get better and greater insights from a more universal database."

"You must be moving faster than your markets. If you cannot do that, you're at risk of being disrupted. "

Holger Mueller

Vice President and Principal Analyst
Constellation Research

Watch the webcast

Customers have achieved better results with database consolidation

90%

Less time patching

Equinix consolidated databases on **Exadata Database Machine**

- 50% cost savings
- 40% faster, 70% less time tuning
- Higher availability
- 52% fewer databases[1]

EQUINIX

Saving

Triple-digit million €

Deutsche Bank moved to **Exadata Cloud@Customer**

- 10,000 databases, 40 PB of data
- Maintained data residency to meet government regulations
- Lower latency for core banking
- Reduce operational costs[2]

Deutsche Bank

50%

Lower TCO

Eneco moved from on-premises systems to **Exadata Database Service**

- Moved more than 20 mission-critical workloads including SAP to OCI
- Higher availability
- Lower costs with online scale-up and scale-down of database resources[3]

Eneco

1. https://www.oracle.com/customers/equinix/
2. https://www.oracle.com/customers/deutsche-bank/
3. https://www.oracle.com/customers/eneco/

Why hasn't everyone consolidated their databases?

Legacy apps are running fine

There are minimal or no issues, so why change?

Oracle reduces costs for legacy apps

Efficiently run mission-critical applications and analyze results faster

Commodity hardware limits consolidation

Mandated use of generic x86 servers and storage doesn't enable high levels of consolidation

Oracle offers added value and low cost

High performance and efficient use of pooled resources eliminates the cost of over-consuming and over provisioning

Data governance requirements

Databases are separated to meet performance, availability, risk management, or security SLAs

Oracle provides consistent governance

Multiple levels of isolation and resource management help meet SLAs for all Oracle databases

Cloud database services aren't designed for consolidation

Most services lack the functionality, performance, scale, or availability needed for consolidation

Oracle is designed for the cloud

Run consolidated databases with the same or greater speed, scale, and availability in OCI than in on-premises data centers

Different timing and decentralized IT budgets

Multiple LOBs must work together and agree to pool resources and budgets

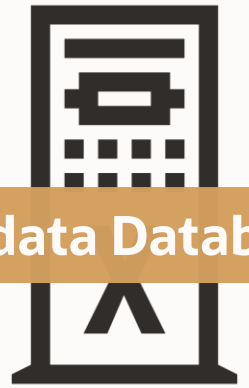
Oracle solutions are scalable

Start small when projects permit and incrementally add resources as consolidation increases

We meet you where you are in your database consolidation journey

On-Premises Traditional

Exadata Database Machine

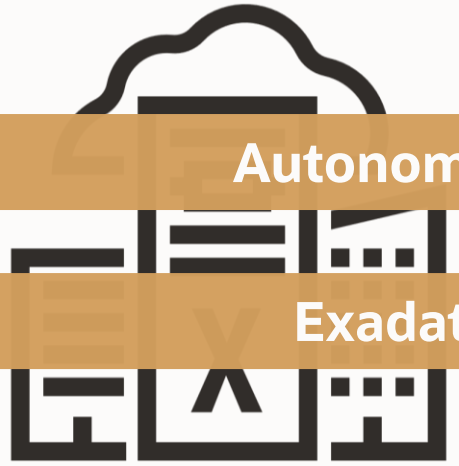


Exadata Database

Customer Data Center
Purchased
Customer Managed

Cloud@Customer

Exadata Cloud@Customer



Autonomous Database Service

Exadata Database Service

Customer Data Center
Subscription
Oracle Managed

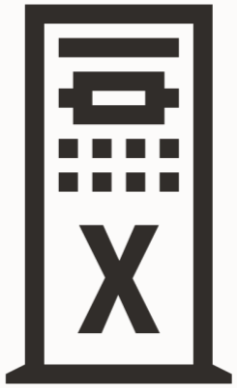
Public Cloud or Dedicated Region

Exadata Cloud Infrastructure

Oracle Cloud
Subscription
Oracle Managed

7-Eleven's 3-step journey to database consolidation on OCI

Consolidated databases on premises



Exadata
Database Machine

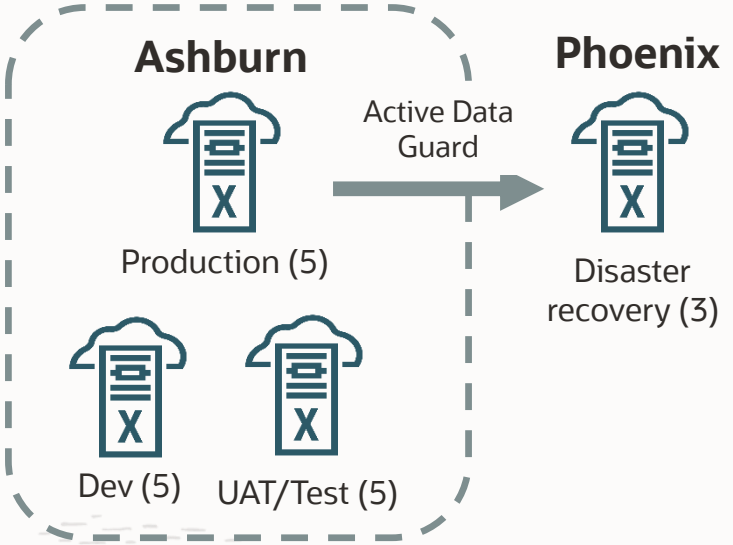
- **Consolidated mission-critical E-Business Suite ecosystem** on Oracle Exadata Database Machine
- Maximum Availability Architecture (MAA) is critical to meeting their corporate SLAs

Added disaster recovery in OCI

Exadata
Database Service

- **Set up cloud DR** to Exadata Database Service with Active Data Guard in13 weeks
- Worked with Oracle Consulting to mirror MAA environment in the cloud
- Started to use DR platform for dev/test

Migrated production databases to OCI

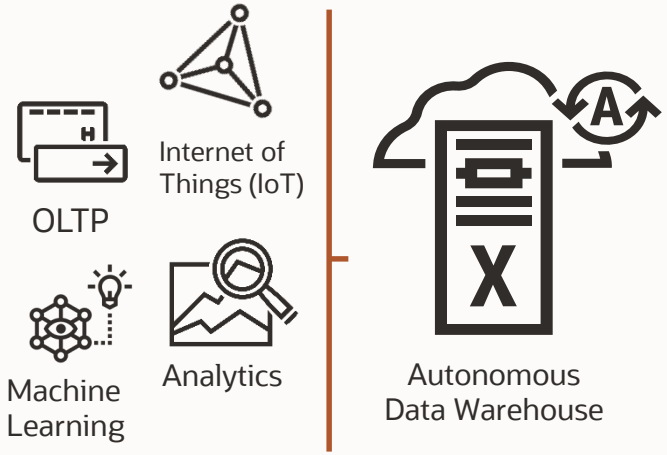


- Moved mission-critical, 2nd tier apps, development, and testing
- **Achieved up to 30x more performance**
- **Decommissioned 60 on-premises services and lowered costs**

Read 7-Eleven's story

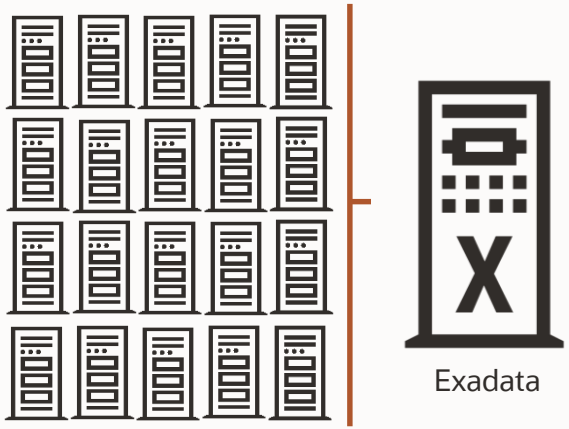
Three ways we've helped organizations with database consolidation

Use fewer databases



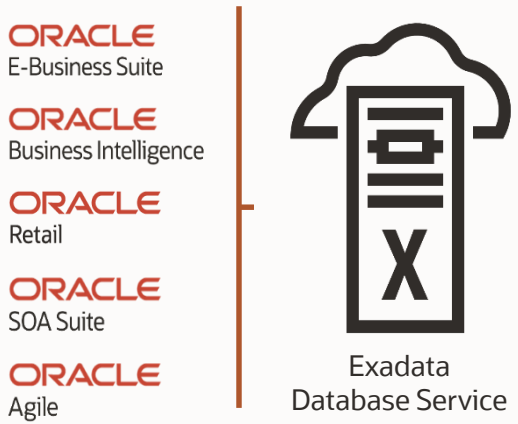
4:1 Consolidation of the type and number of databases

Use fewer platforms

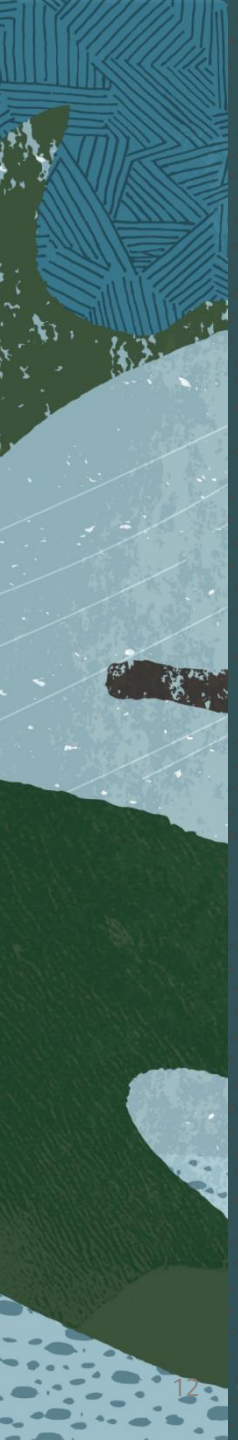


40:1 Platform consolidation with multi-$M savings

Consolidate in the Cloud

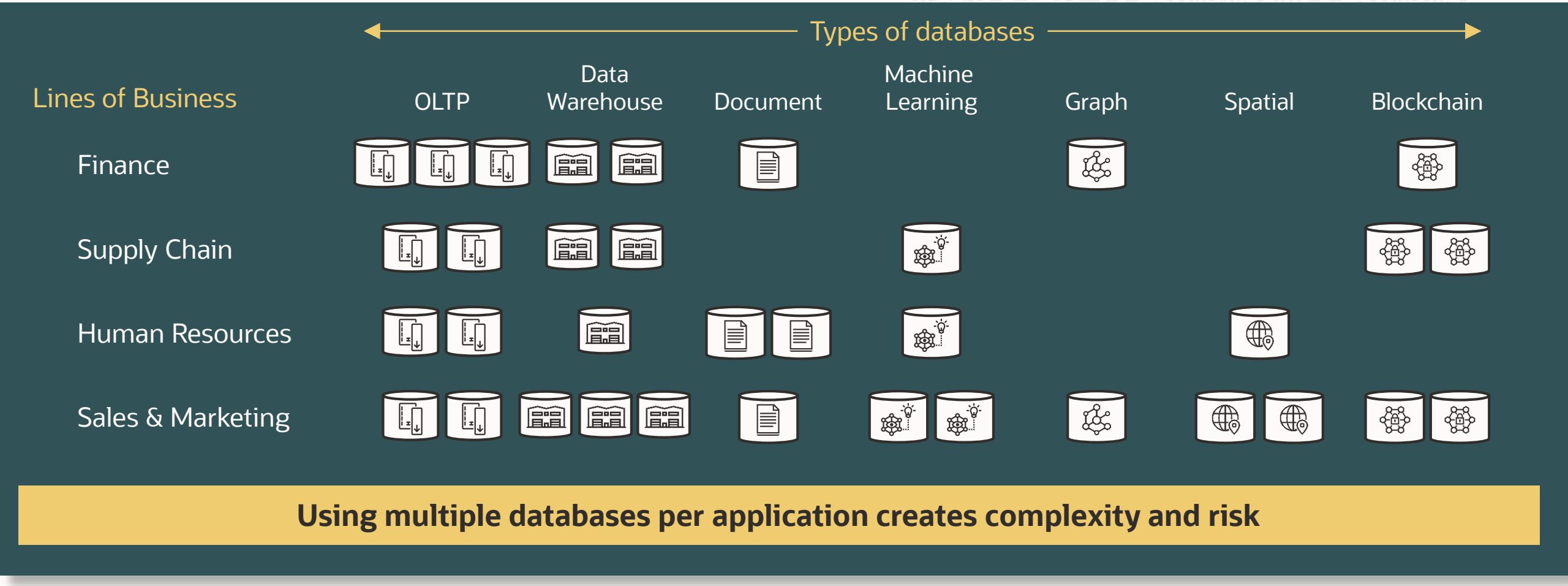


60 Data center services eliminated



Consolidate with fewer databases

Organizations typically use many database silos



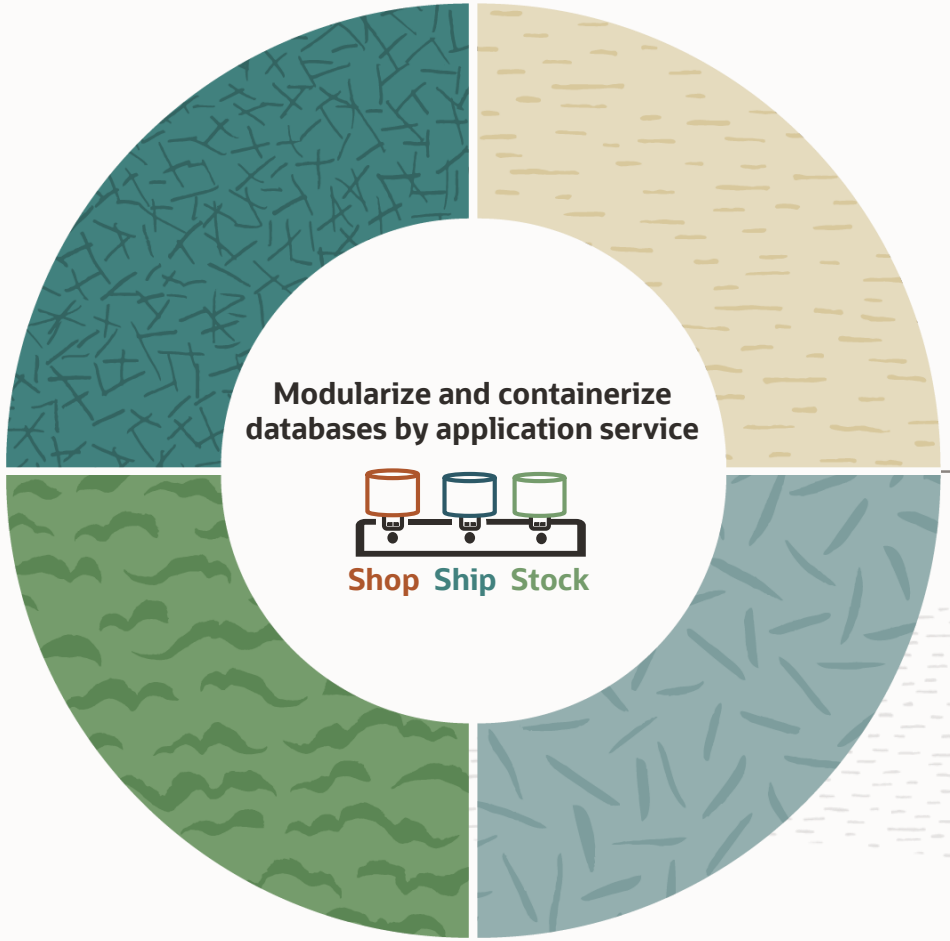
Using multiple databases per application creates complexity and risk

Oracle Database's complete capabilities enable database convergence

Multiple data types

Structured: Relational, Graph, Avro, Parquet, Blockchain

Unstructured: Geospatial, XML, JSON, Text



Multiple workloads

Transactional: OLTP, IOT, distributed, key-value

Analytical: Data warehouse, data lake, operational intelligence, machine learning, multi-dimensional

Mission-critical capabilities

Scaling: Performance, capacity, query parallelism, analytics, multitenant

Risk reduction: Disaster protection, replication, security, zero data loss backup, crypto-security

Multiple development styles

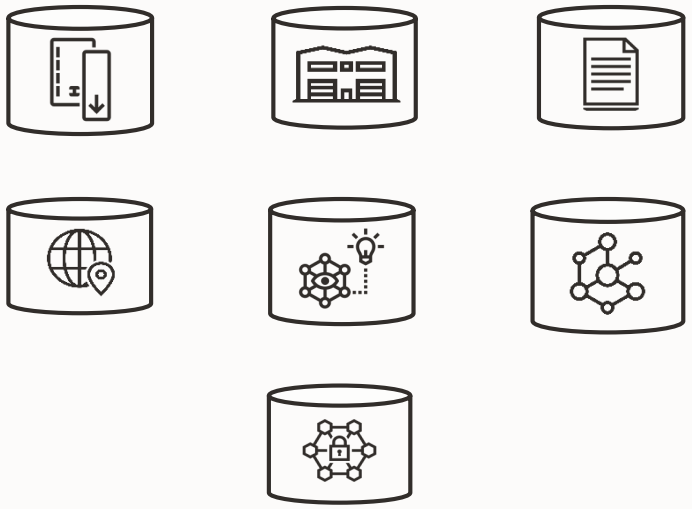
Decentralized: Microservices, events, data mesh, APIs

Accelerated: Low code, data engineering, schema-less, SaaS

Converged capabilities reduce the number of database types you need

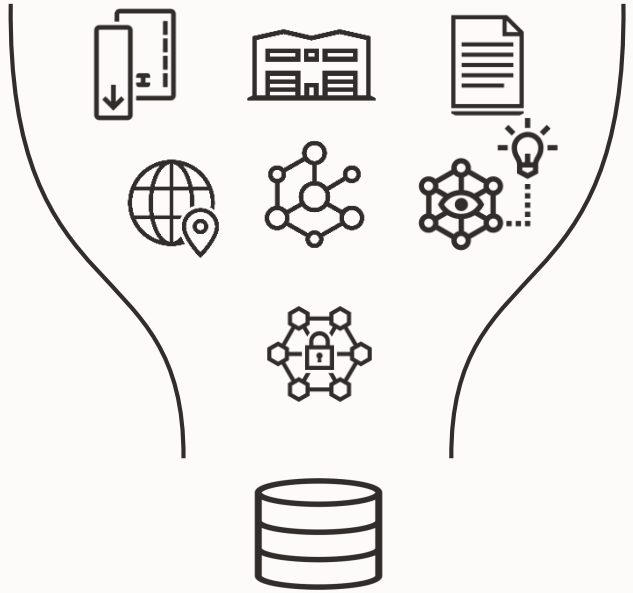
Non-converged databases

Apps integrate multiple database types, one for each type of data



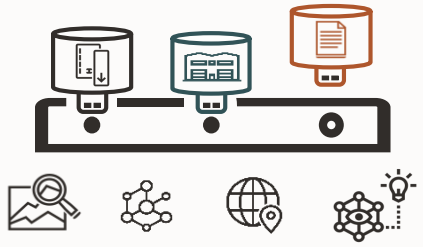
Converged Oracle Database

Apps use one database for all data types and workloads



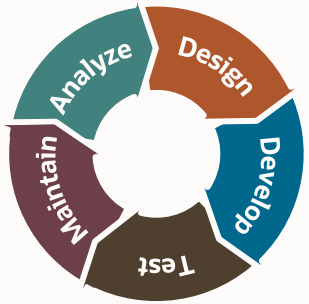
How Oracle improves converged database consolidation

Complete data type and workload support



- Developers use **one database** when working with multiple data types
- Multiple application **databases run and are managed together** using Oracle Multitenant
- **Native JSON** with high performance and scale simplify modern apps
- **Multiple types of analytics** and machine learning eliminate stand-alone services

Automation of the complete dev lifecycle



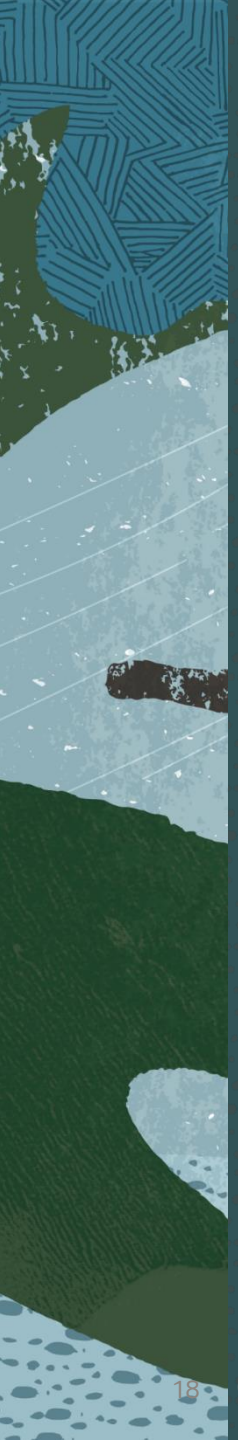
- Point-and-click **cloud native development** using native tools
- **AutoML** helps automate machine learning model creation
- **Autoscaling** eliminates the need for developers to implement scaling inside applications
- **Autoindexing** eliminates the need for DBAs to tune database indexes for greater performance

Mission-critical apps are easy to run

- Automatic performance optimizations on **Exadata** reduce tuning requirements
- **Transparent** query parallelism simplify performance tuning
- **Consistent governance** of self-service databases with fleet management
- Databases run unchanged for **Oracle and 3rd-party apps**

Important data is easy to secure

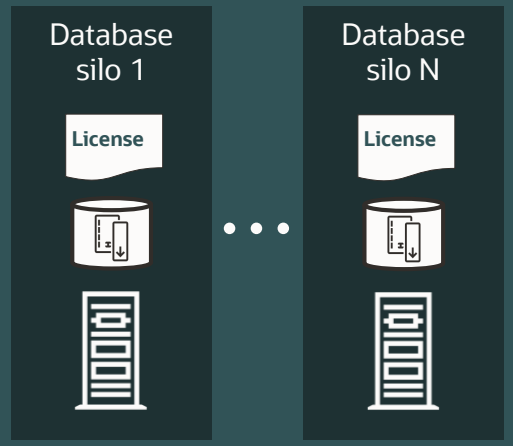
- **Transparent encryption** protects data at rest, in motion, and in backups
- **Data masking and redaction** remove sensitive information
- **Separation of duties** controls administrative access to data, software, and infrastructure
- **Label security** and virtual private databases limit users access to data
- **Blockchain tables** enable tamper-resistant ledgers for centralized apps



Consolidate with fewer database platforms

Database silos exist for good historical reasons

- Different applications, users, and SLAs
- Different budgets and timing
- Different governance requirements
  - Secure
  - Mission-critical
  - Business operations
  - Development and testing
- Predictability with no “noisy neighbors”



This can be complex and risky

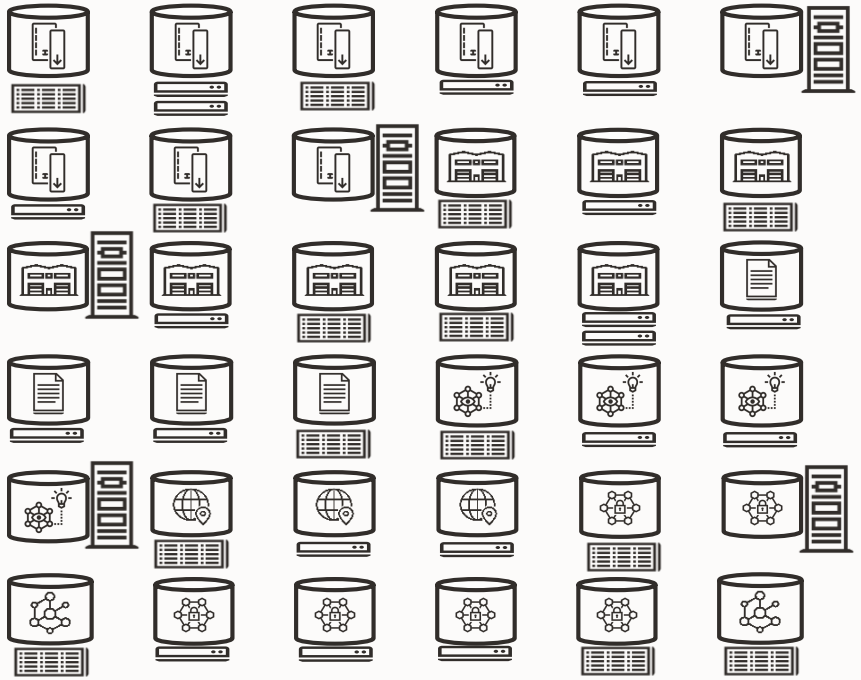
- Different security and management
- Different database patch levels
- Different platforms
- Different availability and disaster recovery SLAs

It can also be expensive

- Platforms must be oversized to meet peak long-term loads
- Databases must be overprovisioned to meet expected short/medium-term loads
- Administrators are needed for each database and platform

Platform-based database consolidation reduces complexity

Before consolidation



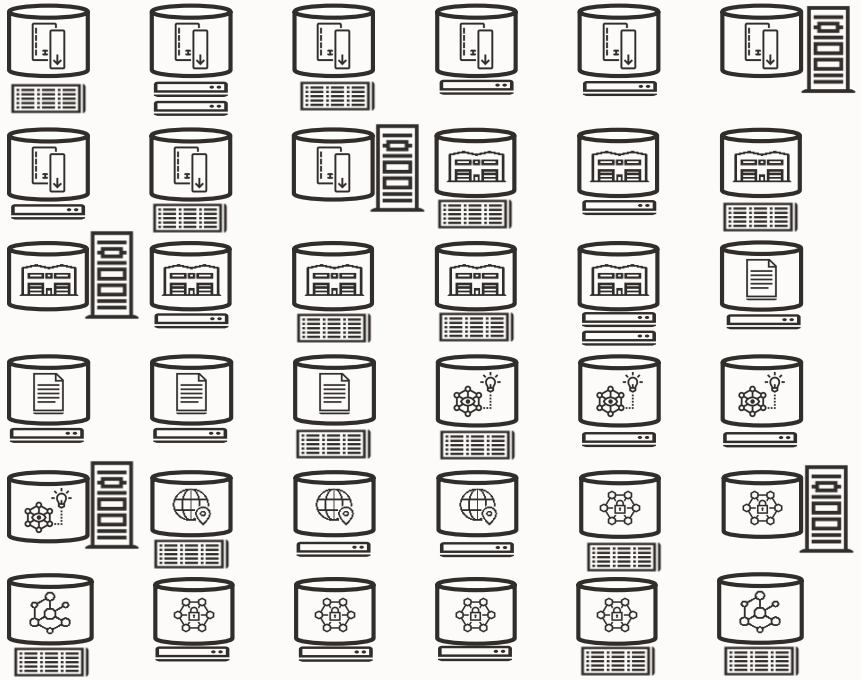
36 databases and 36 platforms to patch and manage

After consolidation

36 database and one platform to patch and manage

Platform-based database consolidation with convergence reduces it more

Before consolidation



36 databases and 36 platforms to patch and manage

After consolidation and convergence

One database and one platform to patch and manage

Business Value Highlights

256% return
on investment

Six months
to breakeven

47% reduced
total cost of operations

69% more
efficient IT infrastructure staff

73% reduction
in unplanned downtime

40% reduction
reduction in IT infrastructure costs

$479,000
additional new revenue gained per year

$1.93 million
total average benefits per year

40% faster
time to market

IDC Customer Business Value Analysis of Oracle Exadata Cloud@Customer

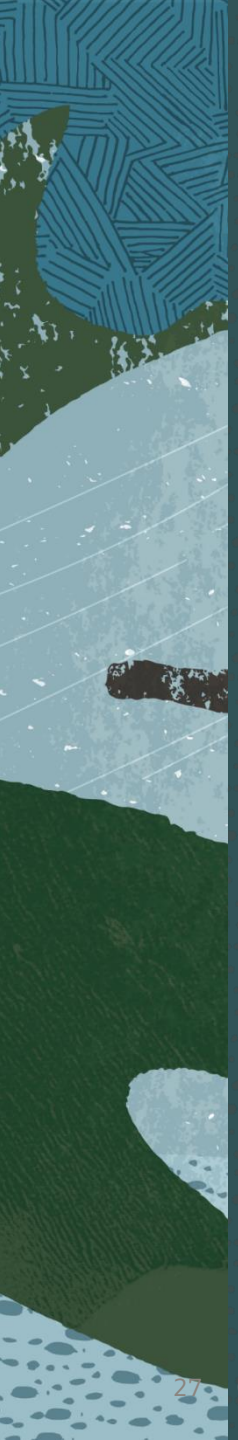
"Exadata Cloud@Customer optimizes database performance, reduces operational costs, and contributes to better business results"

Customer Comments:

More business: "If we didn't have Exadata Cloud@Customer, **we would've lost a business offer worth $10,000 to $200,000 per day**.

Faster performance: "We had a critical financial report that took 12 minutes to run…**It takes 41 seconds now."**

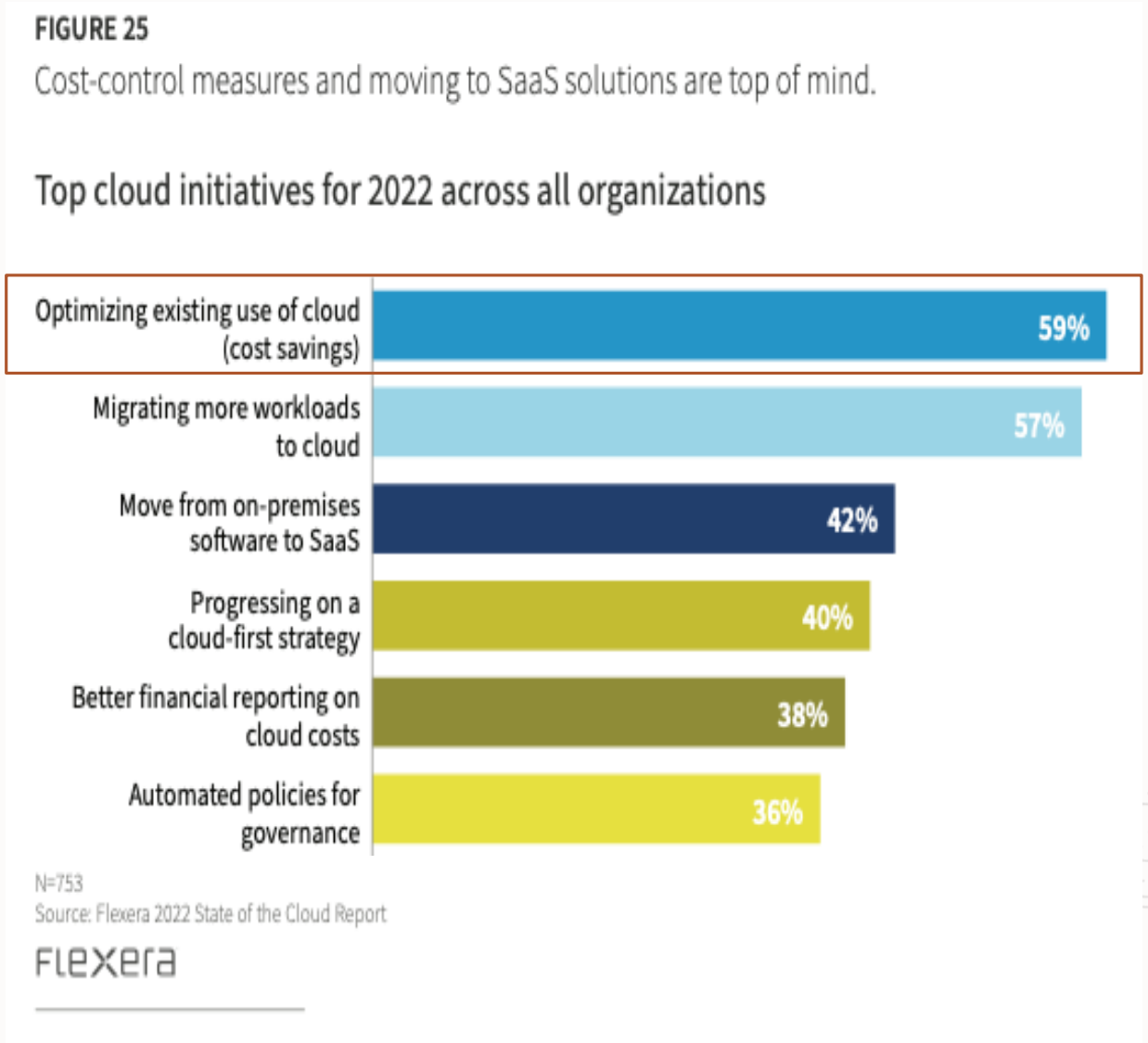
Read IDC's Business Value Analysis



Consolidate in the Cloud

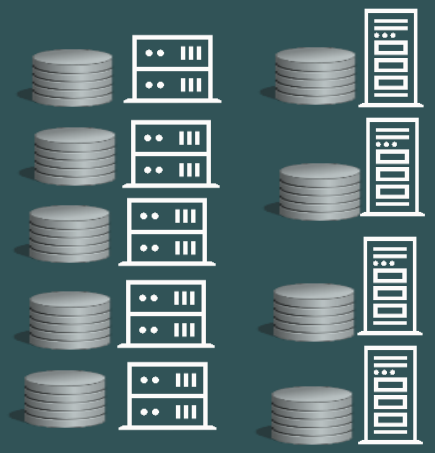
Controlling cloud cost is now a top enterprise initiative

Were on-premises inefficiencies simply moved to the cloud?



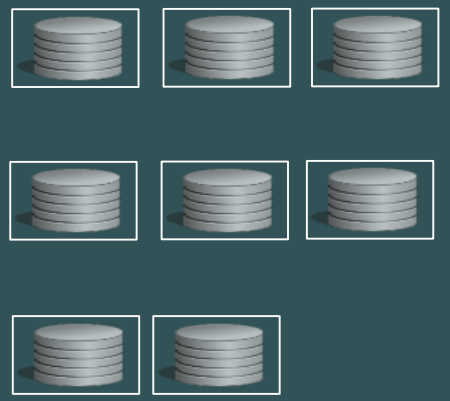
Simply “moving” to the Cloud may not save you money

On-premises databases



Size-for-peak architectures
- License all server CPUs

Typical cloud deployment



Size-for-peak provisioning
- License all vCPUs per shape

One database per cloud service

- Still managing and paying for lots of idle resources—just in case
- Still setting up and tuning the same or more database environments
- Still must move to a bigger environment when workload demands increase
- Still securing and managing each database
- May not provide the performance, availability, and scale of previous on-premises capabilities

Eliminates infrastructure management and **does little to reduce software licensing costs**

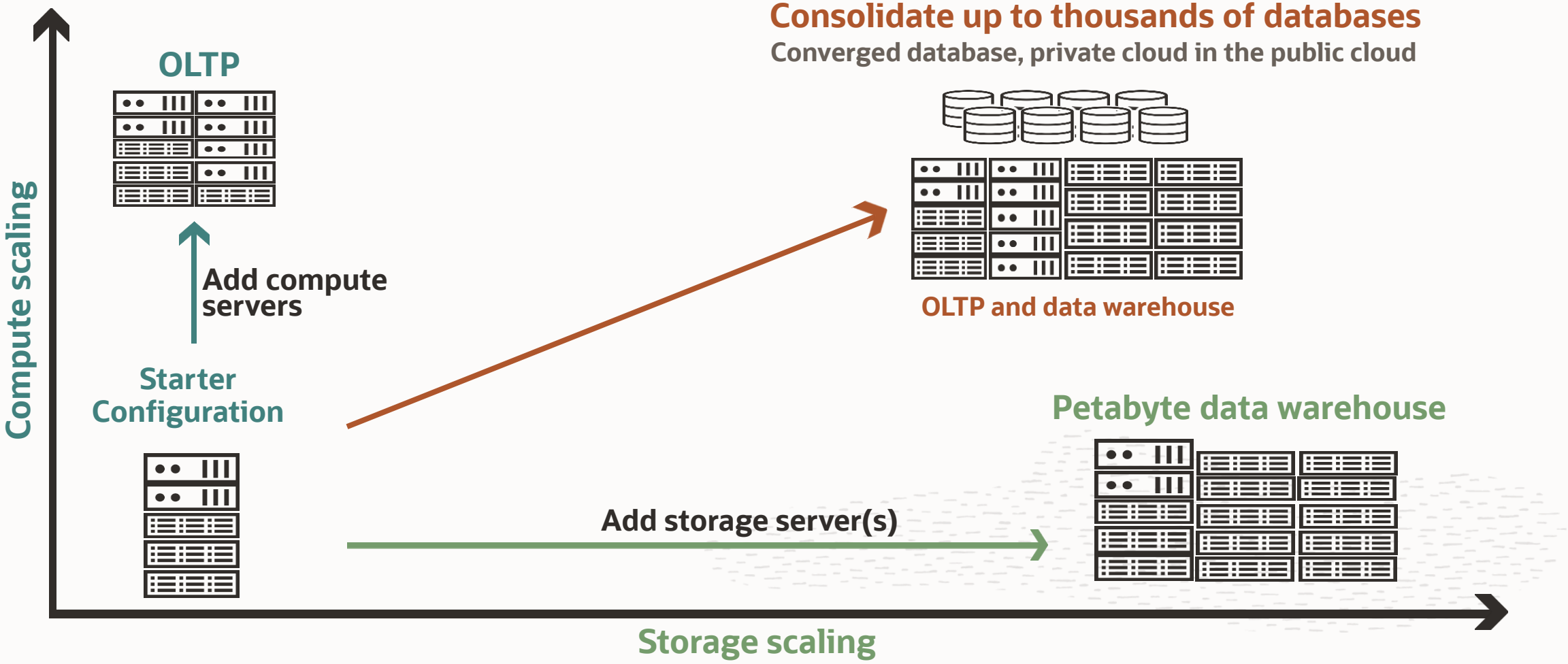
Consolidating databases in OCI reduces complexity and costs

- Pooled resources increase utilization rates
- High scalability, performance, and agility
- Unified management and security

Consolidate databases in one cloud service

- Scale vCPU up / down to meet workload demands
  - Starter configuration allows scaling between 8 and 504 vCPUs
  - No fixed vCPU costs
  - Only pay for what you use
- Maintain continuous operations with online scaling

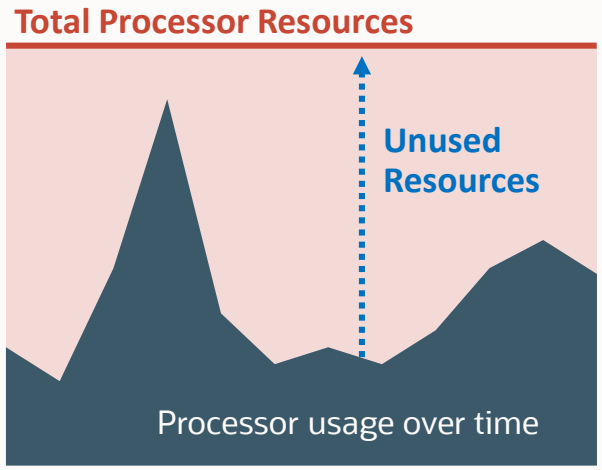
Easily right-size your service by adding compute and storage as needed



Online – No downtime scaling

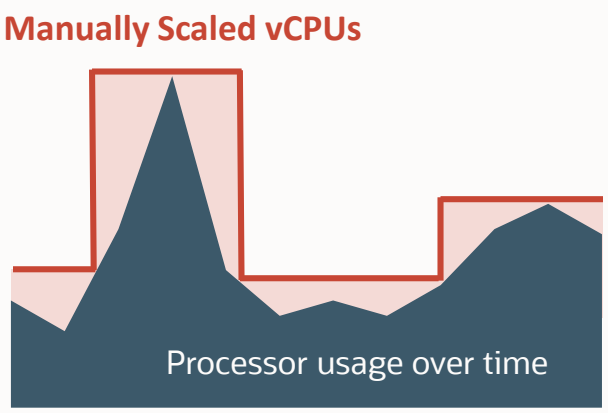
Online, Elastic Scaling with Exadata and Autonomous Database Services

Pay only for what you use, in OCI or your data center



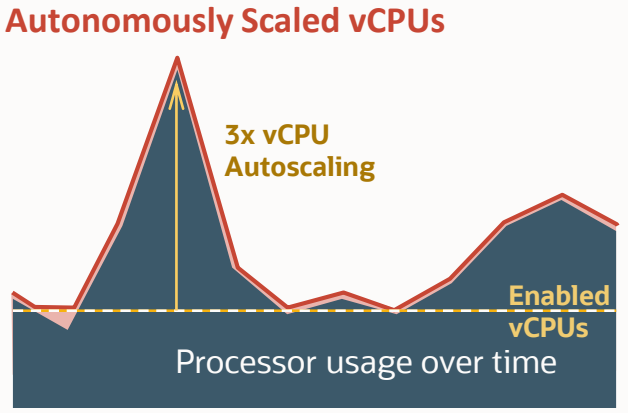
On-Premises & Other Clouds – Static

Purchase server processors and software licenses for **highest projected peak load**



Exadata Cloud – Elastic

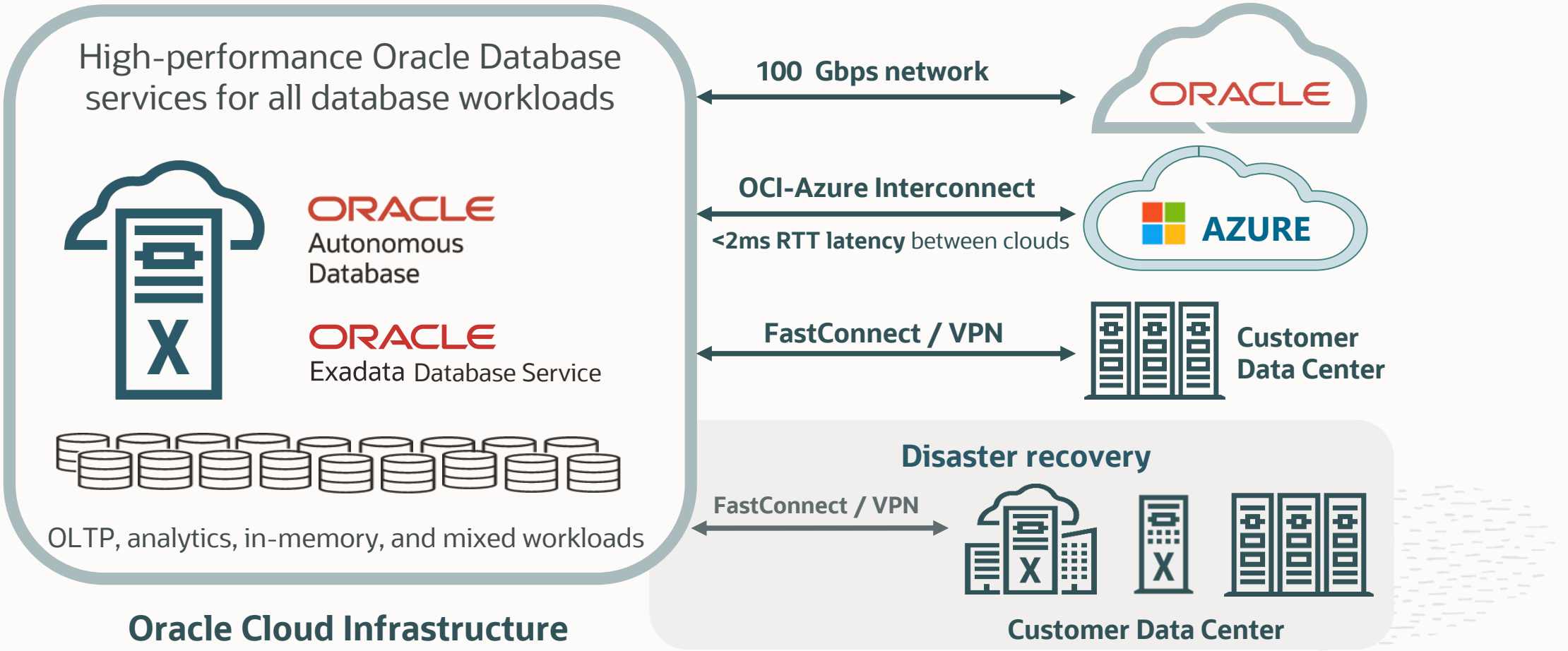
Adjust enabled vCPUs to match **actual workload** via APIs and web UI - vCPUs are charged per second



Autonomous Cloud – Self-scaling

Automatically scales vCPU consumption based on **dynamic workload demands**, in real-time

Unify Oracle Database management in multicloud environments



Consolidated Oracle Databases on OCI using a Multicloud Architecture

"Our proposal is to take the customer's experience to a new level with more efficiency and agility, and always with the highest levels of security. We are the first carrier to promote a change with this dimension, also anticipating initiatives related to governance and sustainability, within a larger project related to an ESG agenda across all of TIM's operation."

Pietro Labriola
CEO, TIM Brasil

Products used:
Oracle Exadata Database Service
OCI Compute and Storage
OCI – Azure Interconnect
Oracle Database Service
VWware services

TIM

Business challenge:
TIM Brasil needed to modernize their infrastructure in order to improve customer experiences while taking efficiency, agility, and security to the next level. They wanted to simplify management, reduce energy use, and cut carbon emissions.

Results:
The Brazilian telecommunications provider is moving critical workloads to a multicloud environment with databases running on Oracle Exadata Database Service and Oracle Database service, VMware in OCI, and other workloads and VDI environments on Azure.

- Run customer billing, Siebel, and Oracle SaaS apps in Oracle Cloud
- Migrate 1,200 databases, 15 petabytes of storage, 7,000 servers
- Run up to 4,000 VMware servers on OCI
- Use a 40 Gbps link to Azure with < 2 mS latency for distributed apps
- Federated identity services with Azure to reduce management

Read story

TIM Brasil's logo courtesy of TIM Brasil, https://www.tim.com.br/

Dialog's 3-step path to database consolidation on OCI

Exadata
Database Machine

- **Consolidated mission-critical databases** on Exadata Database Machine

Exadata
Cloud@Customer

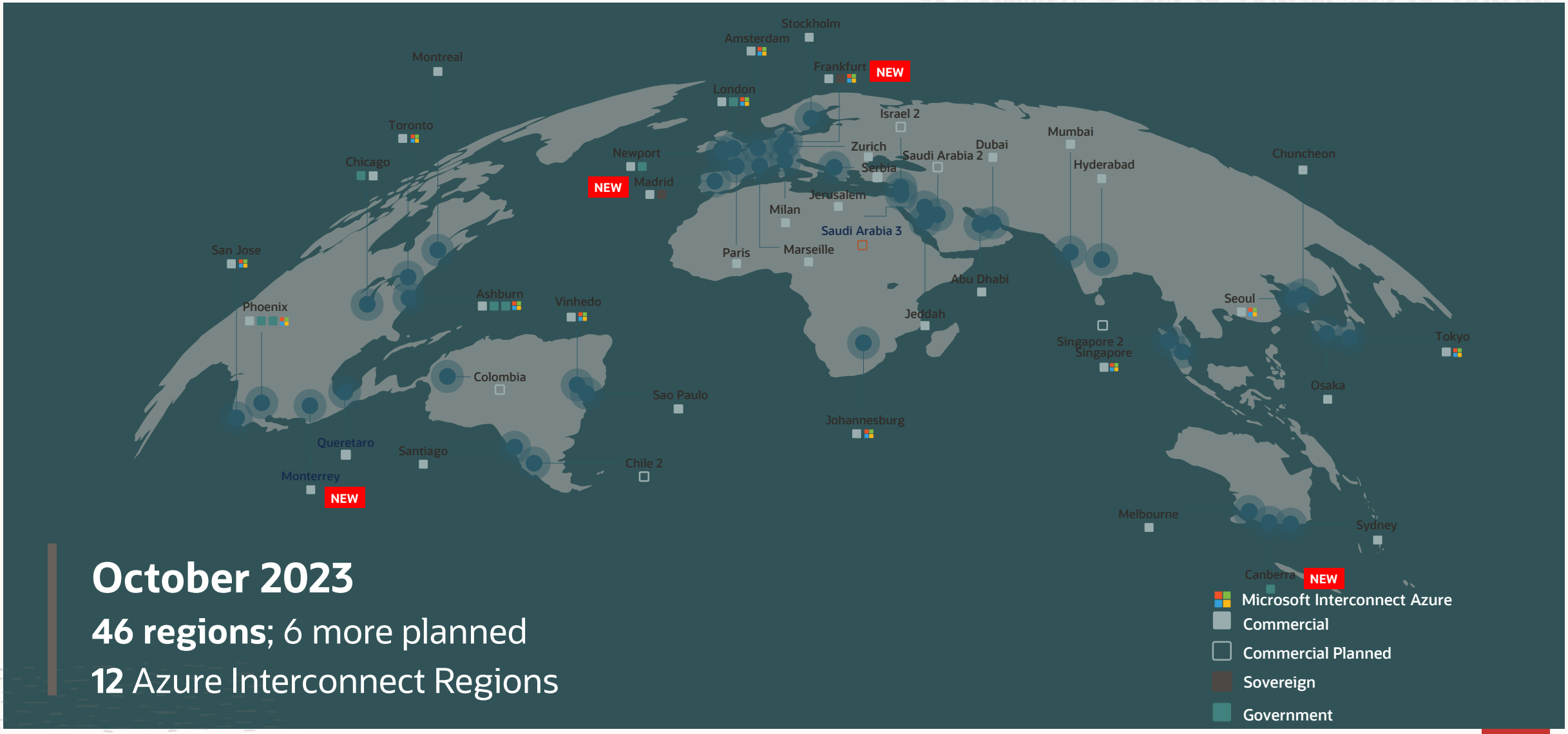
- **Consolidated all Oracle databases** on Exadata Cloud@Customer in their data center
- Developed cloud-based operational procedures to simplify move to OCI
- First step in exiting data centers

Exadata
Database Service

- **Migrated databases and operations to OCI**
- Met requirements for performance, stability, security, and scalability.
- Enabled flexible access to data and applications from anywhere

Read the Dialog story

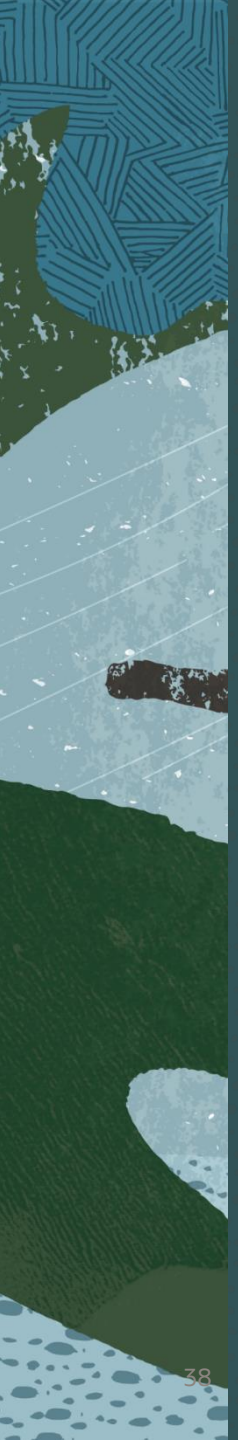
Oracle Cloud Infrastructure Global Footprint



October 2023

46 regions; 6 more planned

12 Azure Interconnect Regions



How Oracle can help you implement database consolidation

Getting started with a consolidation strategy is easier than you may think

We can help

Oracle EM Database Consolidation Workbench

Helps with planning, migrating and validating

OCI Database Migration Service

Fully Orchestrated DB Migration Service

Best practices for database consolidation

White paper written by Oracle Maximum Availability Architecture (MAA) engineers.

Oracle LiveLabs workshop

Learn more about Oracle Multitenant pluggables, clones, and containers.

Oracle Zero Downtime Migration

A simple and automated move to the cloud.

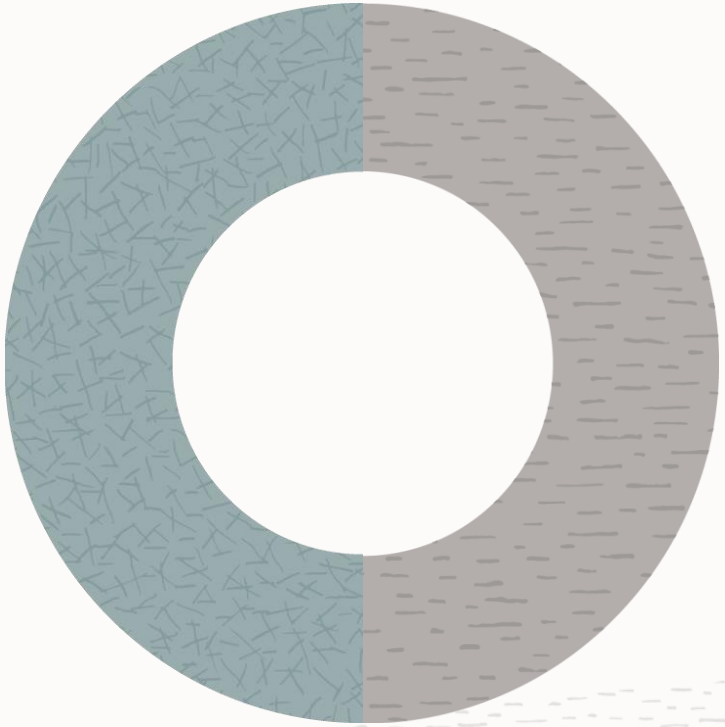
Move existing workloads to the cloud cost-effectively and with guidance

Oracle Cloud Lift Services

Free assistance when migrating to OCI. Guidance from Oracle cloud engineers on:

- Planning
- Architecting
- Prototyping
- Managing cloud migrations

https://www.oracle.com/cloud/cloud-lift/



Oracle Support Rewards

The more customers use Oracle Cloud Infrastructure (OCI) the more they save:

- Earn $0.25 to $0.33 in rewards for every $1 spent on OCI
- Use rewards to reduce tech software license support costs – even down to zero!

https://www.oracle.com/cloud/rewards/

Lots of resources to help along the way

Learn more

Oracle LiveLabs workshops

- On-premises converged database approach for developers
- Simplify microservices with converged Oracle Database
- Learn more about Oracle Multitenant pluggables, clones, and containers

Database consolidation guidance

- Best practices white paper on database consolidation concepts and strategies
- TheCUBE Interview on Database Consolidation
- Blog – Database Consolidation – Why and How
- Blog – A Guide to Why and How to Consolidate Databases

Converged database strategy

- What is a converged database?
- Oracle Converged Database Virtual Event Series
- Converged Oracle Database MAA in the world of hybrid cloud and multicloud deployments

Websites

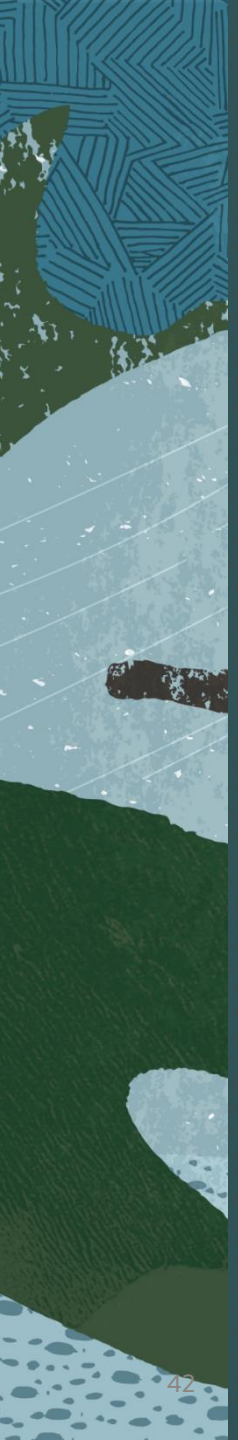
- Exadata family page
- Exadata Database Machine
- Exadata Cloud@Customer
- Exadata Database Service
- Autonomous Database on Exadata Cloud@Customer
- Autonomous Database on Dedicated Exadata Infrastructure in OCI

Multicloud strategies

- Oracle multicloud website
- Databases on OCI and apps on Azure
- Accelerate multicloud adoption with OCI and Azure Interconnect
- Explore multicloud webcast series

Migrating to the cloud

- What is a cloud database?
- How Oracle can help migrate to the cloud
- Oracle PaaS and IaaS Universal Credits Service Descriptions



Wrap up and next steps

Each organization approaches database consolidation differently

Add or improve disaster recovery in the cloud

Consolidate disaster recovery targets in the cloud to improve resilience and economics

Consolidate a few apps on premises and grow

Increase efficiency and lower costs, become familiar with consolidation and grow as infrastructure ages out

Take a multistep path to consolidate in the Cloud

Maximize confidence by consolidating databases on premises, then using to Cloud@Customer, and finally on OCI

Lift and shift to directly in the Cloud

Move entire workloads to the cloud and consolidate databases from aging on-premises platforms

Consolidate shared applications first

Build LOB confidence by uncovering potential issues early in the process and showing success

Oracle can help you implement all of these

Key Benefits of Oracle Database Consolidation on Oracle

1. Consolidate mission-critical databases without refactoring
2. Automate database management
3. Provide higher availability and scaling
4. Zero downtime scaling and maintenance
5. Pay only for vCPUs used instead of all available within the configuration
6. Run databases faster in the Cloud with:
   - Latency as low as19 microseconds
   - Up to 22.4M SQL read IOPS with 8 database servers
   - Up to 2,880 GB/s SQL throughput

Exadata has thousands of critical deployments since 2008

88% of the Fortune Global 100 run Exadata **| 39%** run Exadata Cloud

Virtually all Exadata are used for consolidation

Superior architecture for All database workloads

- **Petabyte warehouses**
- **Mission-critical Systems**
  - Financial trading
  - Process manufacturing
  - E-commerce
- **Diverse Applications**
  - SAP, Oracle, Siebel, PSFT, …
  - Custom applications

What industry analysts are saying about database consolidation on Oracle

[Faster than Fast—Oracle Introduces Exadata X9M Portfolio]

*"Oracle Exadata X9M directly **addresses growing IT and DB decision maker demands for accelerating analytics and increasing DB consolidation."***

— **Daniel Newman,** Founding Partner, Futurum

— **Shelly Kramer,** Principal Analyst Founding Partner, Futurum

— **Ron Westfall,** Lead Analyst Senior Analyst, Futurum

[Oracle Exadata Database Service : No Database or Workload is too Large]

*"**Organizations can take any size or number of Oracle Databases and run them on Exadata Database Service,** where the dynamically scaling architecture automatically adjusts to match changing workloads, **providing true pay per use.**"*

— **Carl W. Olofson**, Research Vice President, Data Management Software, IDC

[Cloud Database Migration Costs: AWS RDS for Oracle vs. Oracle ATP]

*"Wikibon concludes that **Oracle ATP with Exadata on OCI is the best available cloud and on-premises service for mission-critical Oracle Database workloads.**"*

***"Workload consolidation capabilities have dramatically reduced the number of vCPUs** and the number of licenses required to be maintained, dramatically lowering costs."*

— **David Floyer,** Chief Technology Officer, Wikibon

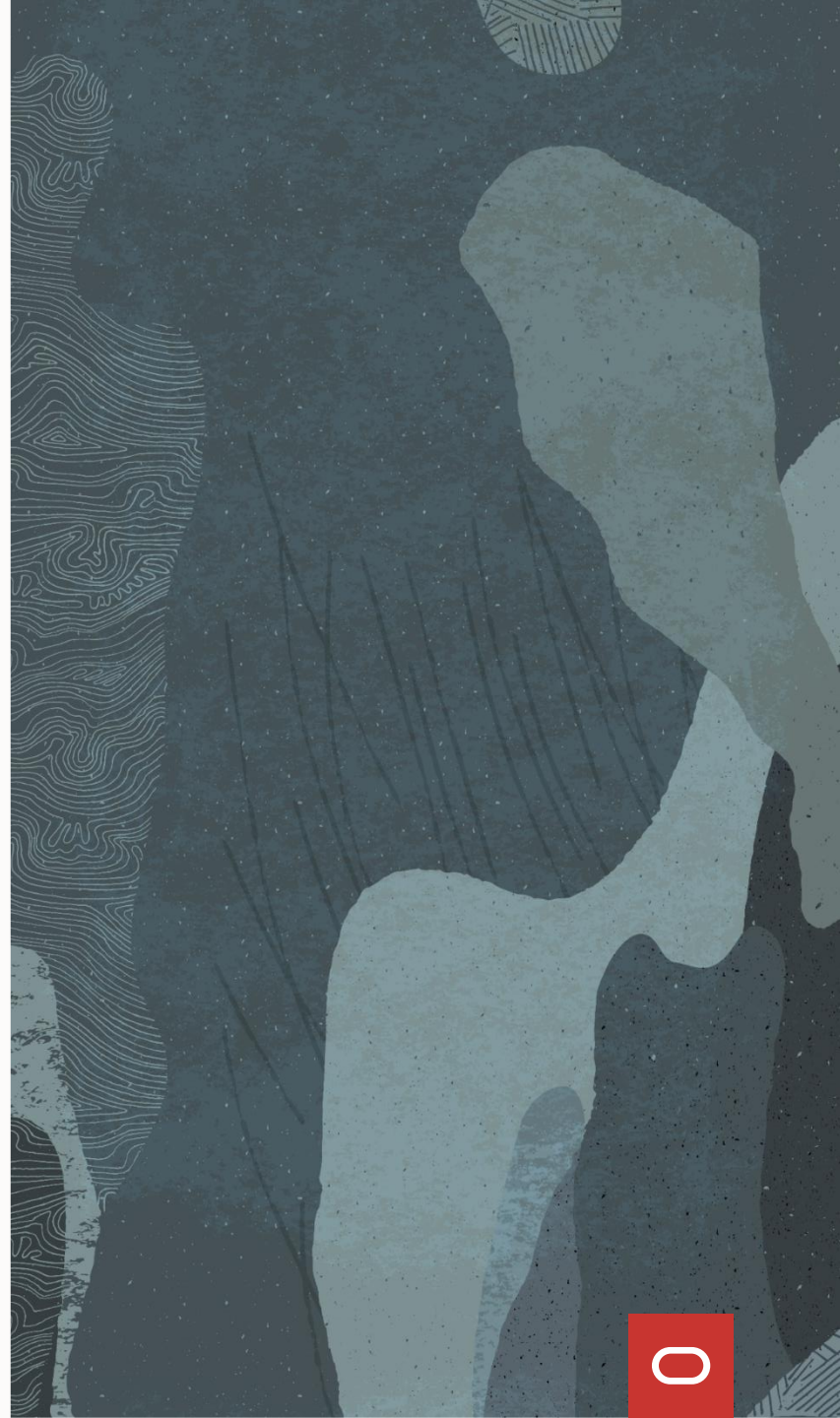
Next steps

- Go to Oracle Exadata website
- Try Oracle Autonomous Database for free
- Read the Oracle Autonomous Database datasheet
- Follow us on social media

  https://twitter.com/OracleDatabase

  https://www.facebook.com/OracleDatabase/

  https://www.linkedin.com/showcase/oracleautonomousdatabase/



Thank you

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