

Oracle Autonomous Database Autonomous Development Advantage

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Barriers to **Developer Adoption**

Oracle Database is perceived as:

- Powerful, but difficult to Get Started - relies on IT and DBA for set up
- Best in Class, but Costly – license cost, hinders learning
- High Performance, but Complex - requires DBA knowledge to tune
- Relational only, not designed for modern data types , workloads, or Cloud
- **Autonomous** Oracle Database Services will change downside perceptions

Powerful, Best in Class, High Performance, Relational, Easy to access, Affordable, Simple to operate, Modern

Artificial Intelligence Revolution

Autonomous Database is the application of artificial intelligence to database systems

It's a database industry wide change, the revolution is inevitable

Given database technology superiority from significant enterprise capability investments, Oracle leads by a decade

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Ragtime

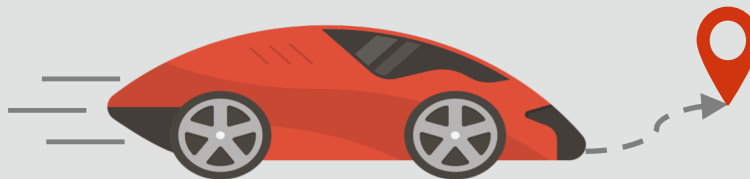
There's no denying that Artificial Intelligence is set to have significant and far-reaching consequences on our future lives. To try and map out just how extensive that is, we've produced this infographic to illustrate the concrete ways in which Artificial Intelligence either has disrupted, or will disrupt, across a wide range of sectors. May the AI revolution begin!

Autonomous Database Services

Automates everything:

- Provisioning of IaaS and Database
- Scale-Up and Scale-Out
- Performance Tuning over time
- Security and Patching
- Fault Tolerance

Uses **Machine Learning** to enable reliability and high performance



Mission Critical, Simple, Low Risk, Low Cost

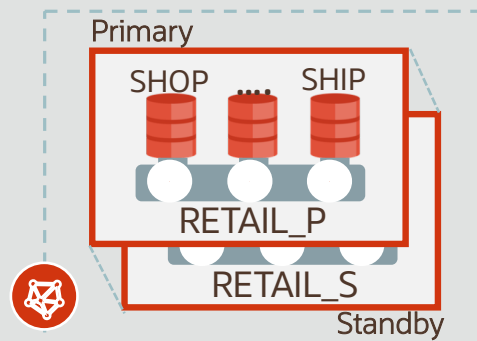
Autonomous – Effortless Operational Excellence

Database Infrastructure



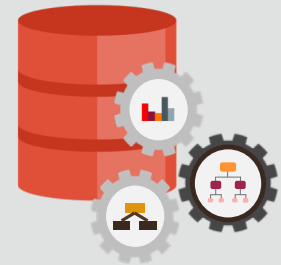
Detection and recovery of failed/sick server, storage and network switch/link

Database Operations



Hang Management
Anomaly Detection and Switchover
Error Identification and Prioritization

Workload Optimizations



Query Optimization
Real-time statistics
Automatic Indexing

Machine Learning based Diagnostics, Recovery and Optimization

Autonomous – Effortless Extreme Performance

- Runs on Exadata – world's fastest database platform
 - World's first **Non-Monolithic Distributed Database Architecture**
 - Fastest storage - latest NVMe flash
 - Fastest communication - RDMA over InfiniBand
 - Smart offload of queries to columnar cache in Exadata Storage
 - Transparent elastic scaling for both OLTP and Analytics
- Uses world's most proven database technologies
 - Real Application Clusters for Scale-Out, **Online Operations**
 - Active Data Guard for database aware Disaster Recovery, Zero Data Loss Protection
 - Parallel SQL, Database Containers, In-Memory, Database Vault and more





Shared

Ultra-Simple and Elastic

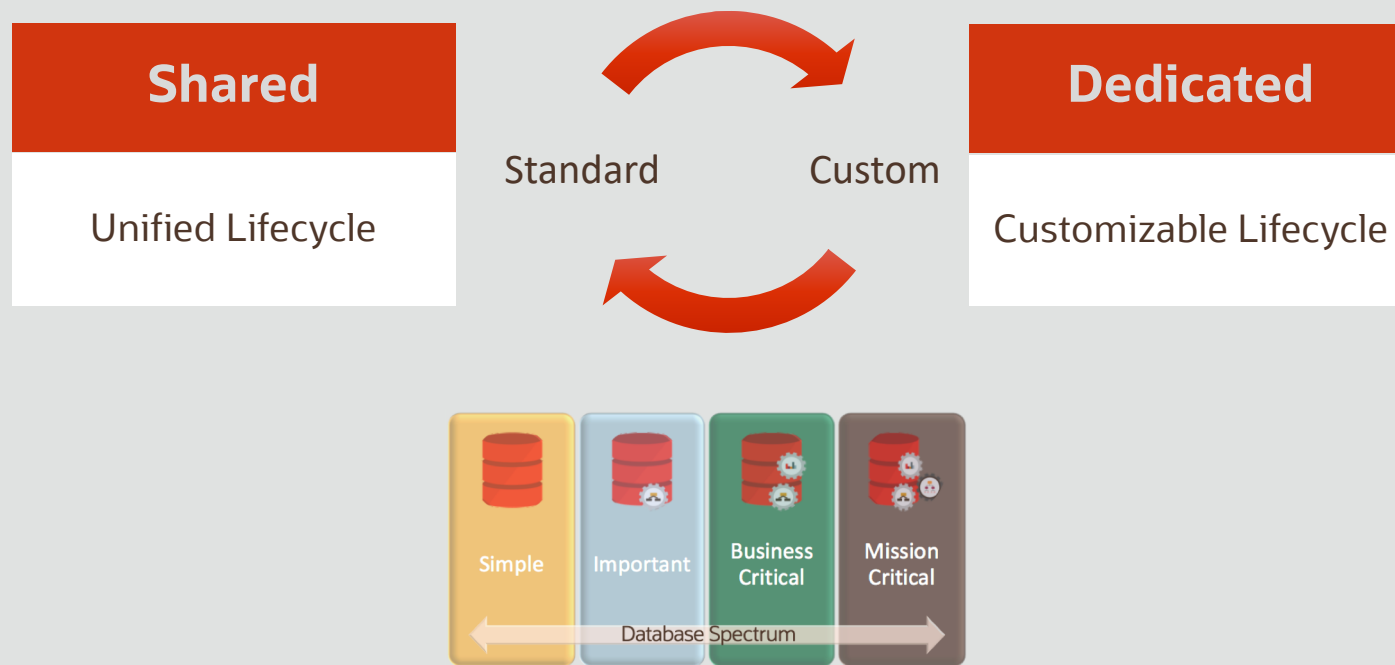
Dedicated

Customizable Private
Database Cloud

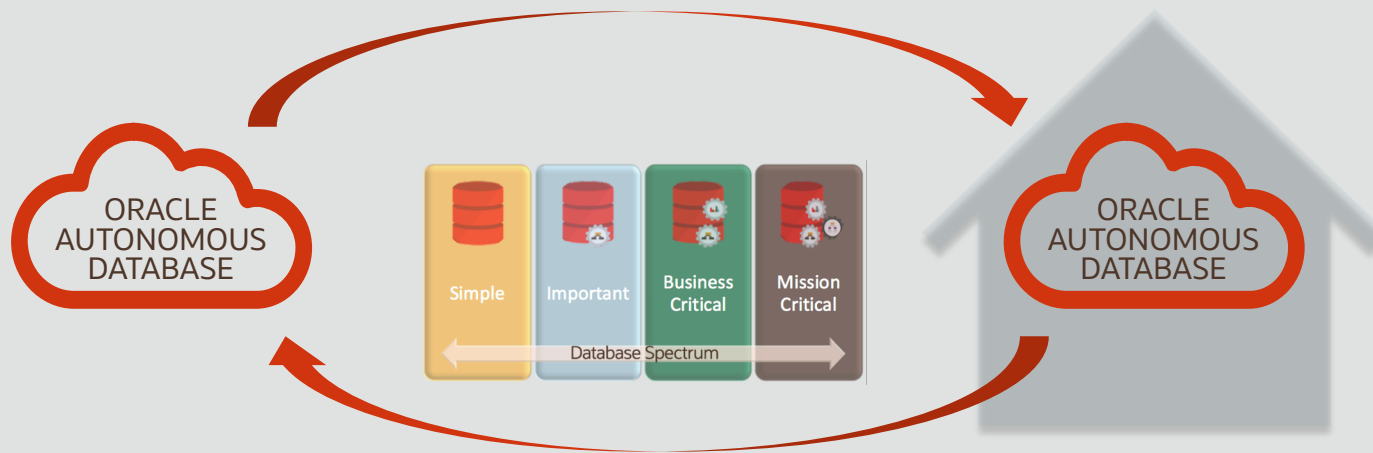
One Autonomous Database

Two Infrastructure Choices

The Enterprise Journey to **Autonomous Database**



The Enterprise Journey to Autonomous Database – Cloud at Customer



Autonomous Journey: Cloud at Customer (CY20)

Cloud at Customer: Dedicated
Hybrid: Dev-Test Cloud, Prod On-Prem

Autonomous Database Provisioning Demo

The screenshot displays the Oracle Cloud console interface. At the top, the header includes the Oracle Cloud logo, a search icon, the region 'US East (Ashburn)', and various utility icons (notifications, help, chat, globe, user). The main content area is divided into two primary sections: 'Quick Actions' and 'Solutions'.

Quick Actions: This section features six cards, each representing a different service and its associated task, with estimated completion times:

- COMPUTE:** 'Create a VM instance' (2-6 mins)
- AUTONOMOUS TRANSACTION PROCESSING:** 'Create an ATP database' (3-5 mins)
- AUTONOMOUS DATA WAREHOUSE:** 'Create an ADW database' (3-5 mins)
- NETWORKING:** 'Set up a network with a wizard' (2-3 mins)
- OBJECT STORAGE:** 'Store data' (2-6 mins)
- NETWORKING:** 'Set up a load balancer' (5 mins)

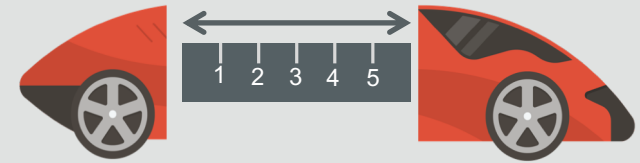
Solutions: This section displays a horizontal row of four images showing diverse professionals (men and women) working together at computers in office settings.

Right Sidebar: This panel provides system status and updates:

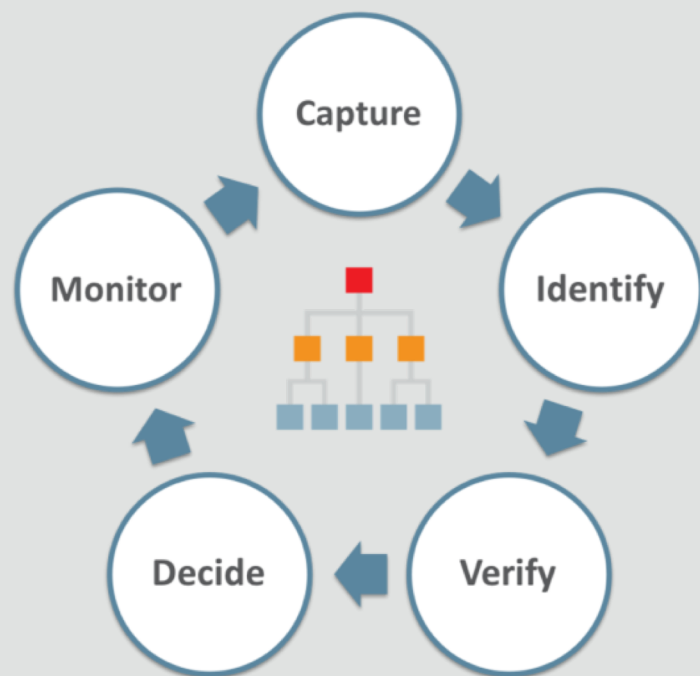
- All systems operational:** A green status bar with a heart icon and a link to 'View health dashboard'.
- Action Center:** A section for user management, including a link to 'Add a user to your tenancy'.
- What's New:** A list of recent updates with dates:
 - 'Copying boot volume backups across regions' (Dec 17, 2019)
 - 'Key Management enhancements' (Dec 17, 2019)
 - 'OS Management Service Released' (Dec 17, 2019)
 - 'Oracle Autonomous Linux available as a platform image' (Dec 16, 2019)
 - 'Block Volume multiple-instance attachments for read/write volumes' (Dec 16, 2019)

Elastic Scaling

- Instant scaling online for highest performance and lowest cost
- Scale compute or storage independently
- All scaling operation occur online – while the application continuous to run
- Scaling actions are exposed through Cloud UI and REST APIs
- Automatic or Manual Scaling



Automatic Indexing



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

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

The entire process is fully automatic

Transparency is equally important as sophisticated automation

All tuning activities are auditable

Native **Highly Available** Applications

Real Application Clusters

Online maintenance operations and protection from server failures

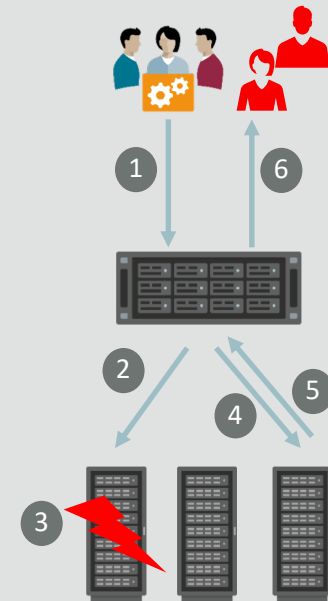
Transparent Application Continuity

Tracks and records session and transaction state

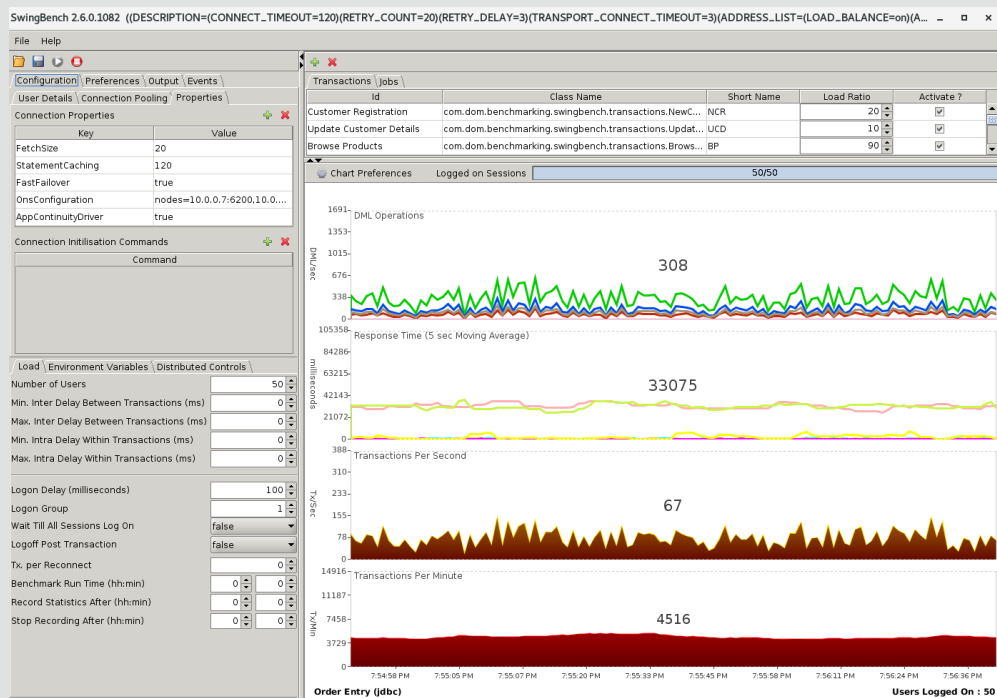
Recovers and replays in the event of unplanned outage

Proactively drains services before maintenance

Hides planned switchover and/or failure events



Transparent Application Continuity Demo



ConfigurationPreferencesOutputEvents

User DetailsConnection PoolingProperties

Username

soe

Password

.....

Connect String

{ME=SBATP3_tp.atp.oraclecloud.com}})

Driver Type

Oracle jdbc Driver

☒ Connect to Oracle Cloud Service

Credential File

/home/opc/wallet/Wallet_sbtp3.zip

☐ Collect Database Statistics

☐ Take AWR Snapshot at Start and End

Admin Username

Admin Password

LoadEnvironment VariablesDistributed Controls

Number of Users

50

Min. Inter Delay Between Transactions (ms)

0

Max. Inter Delay Between Transactions (ms)

0

Min. Intra Delay Within Transactions (ms)

0

Max. Intra Delay Within Transactions (ms)

0

Logon Delay (milliseconds)

100

Logon Group

1

Wait Till All Sessions Log On

false

Logoff Post Transaction

false

Tx. per Reconnect

0

Benchmark Run Time (hh:min)

0

0

Record Statistics After (hh:min)

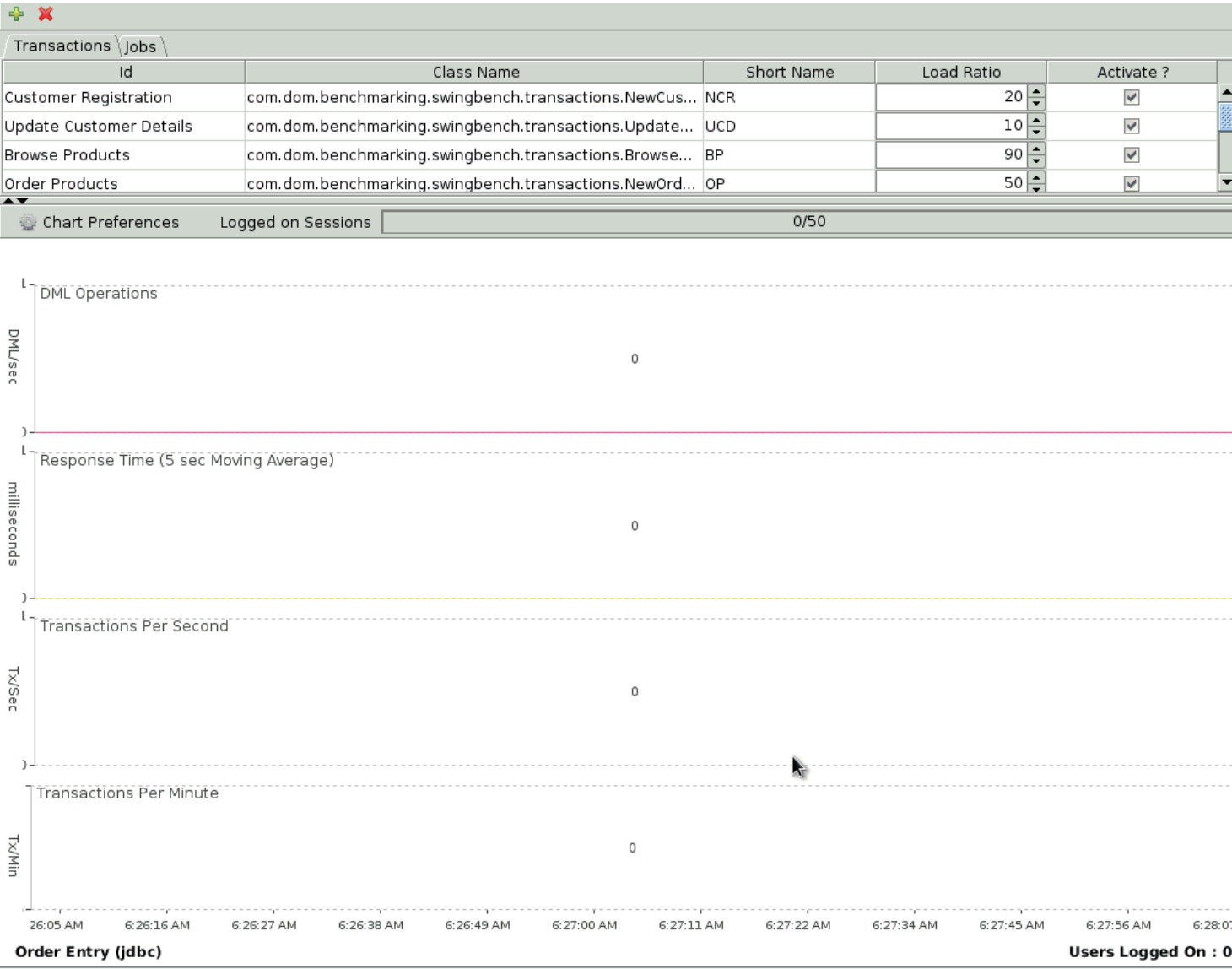
0

0

Stop Recording After (hh:min)

0

0



Developer Ready for Low Code Development

- **Application Express (APEX)**
 - Rapid Database Application Development
- **REST Data Services (ORDS)**
 - REST interfaces to database tables and procedures
- **SQL Developer Web**
 - Data Modeling and SQL Development
- **Performance Hub**
 - Database Monitoring



REST APIs and CLI commands for all ADB Operations

ORACLE[®] Cloud

Try for FreeEstimateMy Services

Applications | Platform | Infrastructure | Resources | Documentation

Infrastructure User Guides

API Reference Home

- Amazon S3 Compatibility API
- Audit API
- Container Engine for Kubernetes API
- Core Services API
- Database Service API
 - Database Service API Home
 - AutonomousDatabase
 - AutonomousDatabase Reference
 - CreateAutonomousDatabase
 - DeleteAutonomousDatabase
 - GetAutonomousDatabase
 - ListAutonomousDatabases
 - RestoreAutonomousDatabase
 - StartAutonomousDatabase
 - StopAutonomousDatabase
 - UpdateAutonomousDatabase
 - AutonomousDatabaseBackup
 - AutonomousDataWarehouse
 - AutonomousDataWarehouseBackup

Database Service API > AutonomousDatabase > UpdateAutonomousDatabase

UpdateAutonomousDatabase

PUT /20160918/autonomousDatabases/{autonomousDatabaseId}

Updates the specified Autonomous Database with a new CPU core count and size.

Request

UpdateAutonomousDatabase

Parameters

Name	Where	Description
if-match	header	Required: no Type: string For optimistic concurrency control. In the PUT or DELETE call for a resource, set the if-match parameter to the value of the etag from a previous GET or POST response for that resource. The resource will be updated or deleted only if the etag you provide matches the resource's current etag value.
autonomousDatabaseId	path	Required: yes Type: string Minimum: 1 Maximum: 255 The database OCID .

Body


Database Service API








API Version
20160918

Language
English (en)

Search
Search Database Service API

Operational Notifications

 ORACLE Cloud

 US East (Ashburn)      

Notifications

Topics

Subscriptions

List Scope

COMPARTMENT

AppCompartment

atpdpview2 (root)/AppCompartment

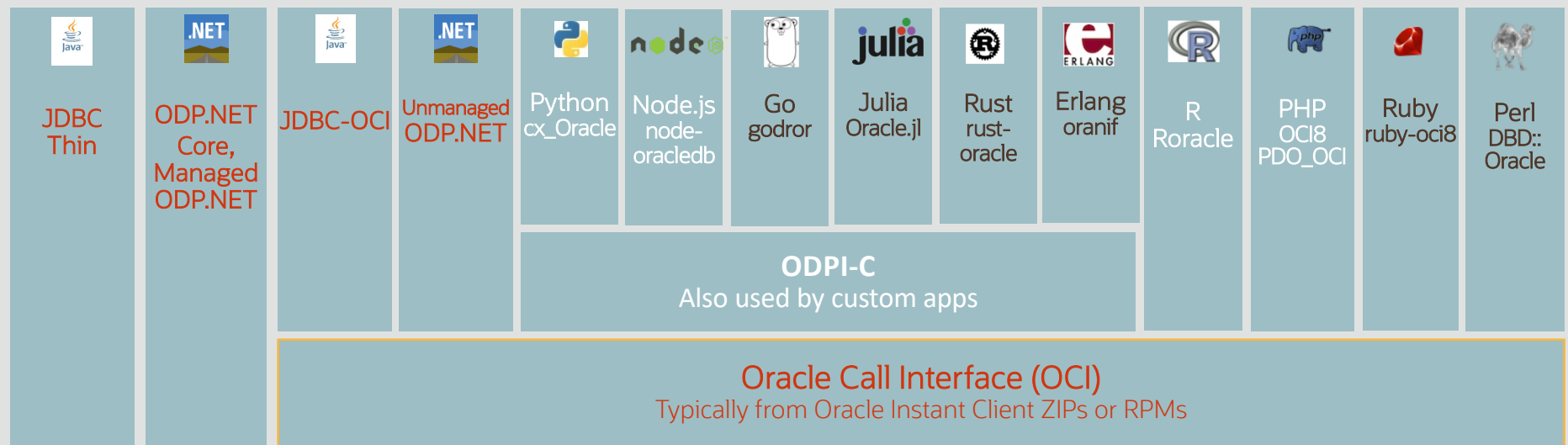
Topics *in* AppCompartment *Compartment*

Create Topic

Name	Description	State	Topic OCID	Created	
SoftwareUpdateCompliance	A topic for monitoring activities related to software maintenance.	● Active	...syhbn6dshq Show Copy	Sun, Oct 6, 2019, 10:08:31 PM UTC	⋮
BackupTopic	A topic for people who want to subscribe to backup activity notifications	● Active	...6o6w64q5hq Show Copy	Thu, Sep 26, 2019, 2:56:53 AM UTC	⋮

Showing 2 Items < Page 1 >

Oracle Database Drivers



- ☐ Oracle Open Source Drivers
- ☒ Third Party Open Source Drivers

- ☒ Oracle Proprietary Drivers
Oracle Call Interface, Oracle C++ Call Interface, ODBC, JDBC, ODP.NET, Pro*C, Pro*COBOL, SQLJ, OLE DB, OLE DB for OLAP

Client Connections Best Practices

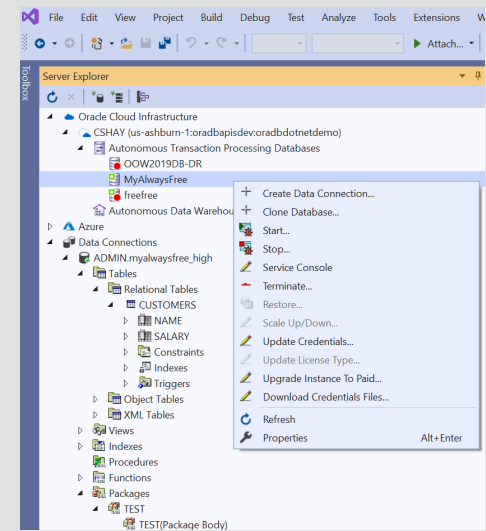
- Connect to Services for Workload Prioritization and Maintenance
- Applications connect to a pre-defined **database service** to control:
 - SQL parallelism, relative priority, max concurrently executing users

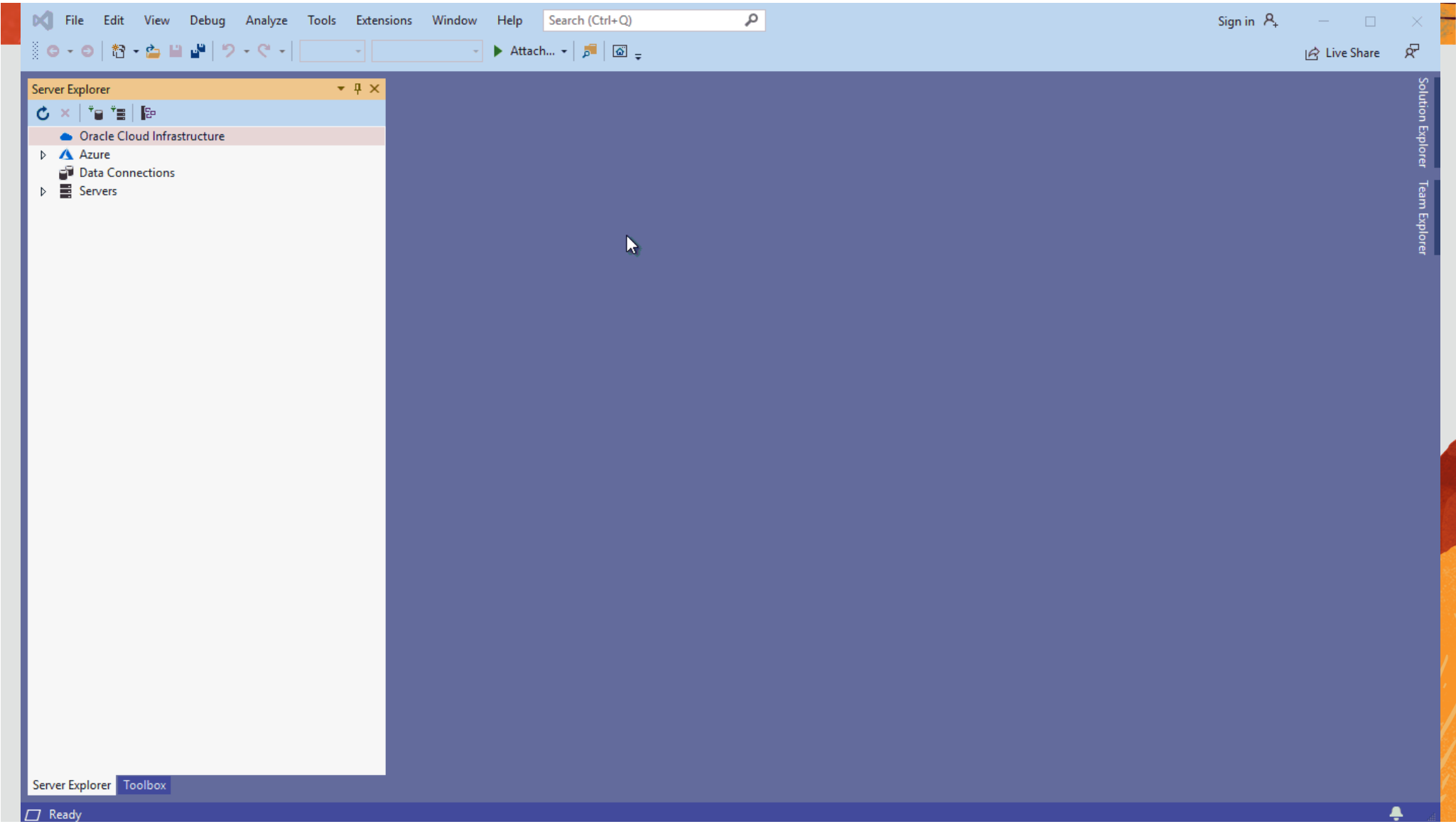
	SERVICE	DEFAULT SQL PARALLELISM	SHARE OF RESOURCES	CONCURRENCY BEFORE QUEUEING
OLTP	TPURGENT	MANUAL	12	100 X CPUs
	TP	1	8	100 X CPUs
DW, Batch, Reporting	HIGH	CPUs	4	3
	MEDIUM	4	2	1.25 X CPUs
	LOW	1	1	100 X CPUs

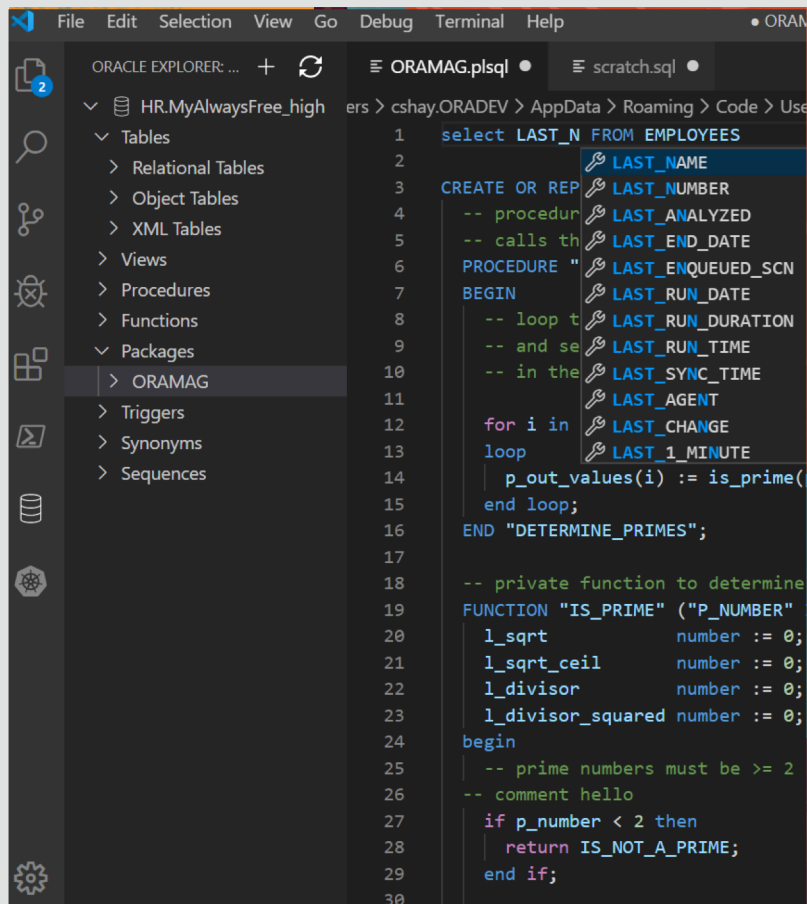
- Key Considerations
 - DW Query Parallelism, OLTP Concurrency, Overall Request Prioritization

IDE Integrations Demo

- Oracle Developer Tools for VS Code
- Oracle Developer Tools for Visual Studio
- Oracle Cloud Infrastructure Toolkit for Eclipse
- NetBeans ... coming







Oracle Developer Tools for VS Code

Free on [Visual Studio Code Marketplace](#)

Linux, macOS, Windows

Connect to Oracle Autonomous Database and Oracle Database

Edit and Execute SQL and PL/SQL

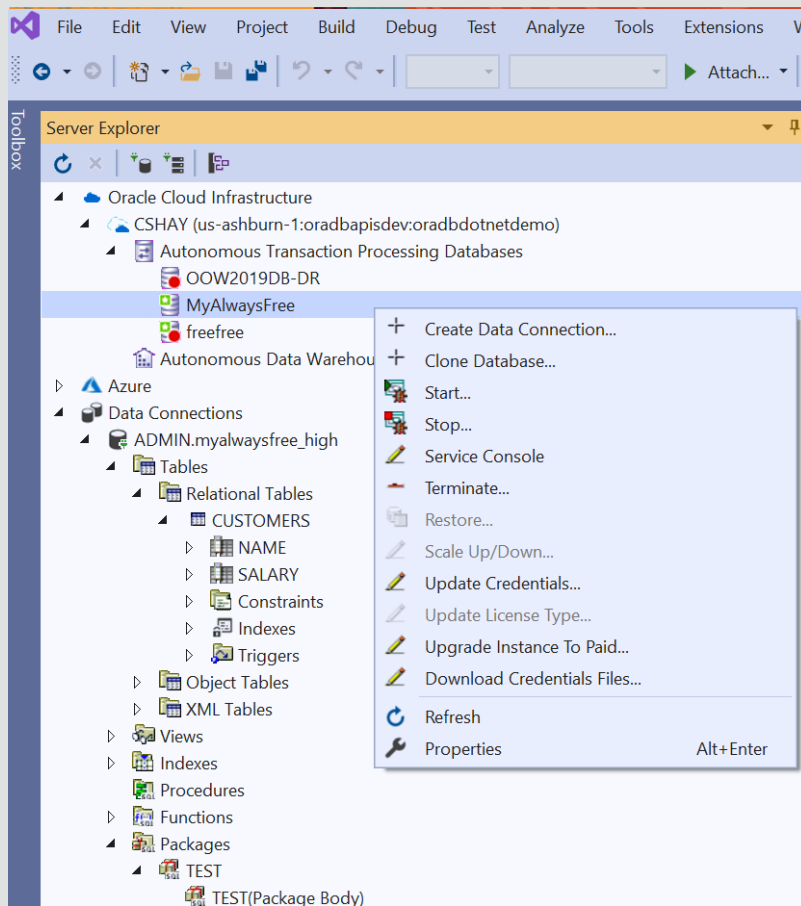
View result sets and save in .CSV and JSON

Autocompletion and intellisense

Code Snippets

Oracle Explorer Tree Control

Visit the [Quickstart](#) to get started



Oracle Developer Tools for Visual Studio

Free - Available for Visual Studio 2019 and 2017

Cloud Explorer for Autonomous Database Resources

Browse, Create, Manage ,Terminate, Connect

Oracle Designers (Table, View, Stored Procs, etc.)

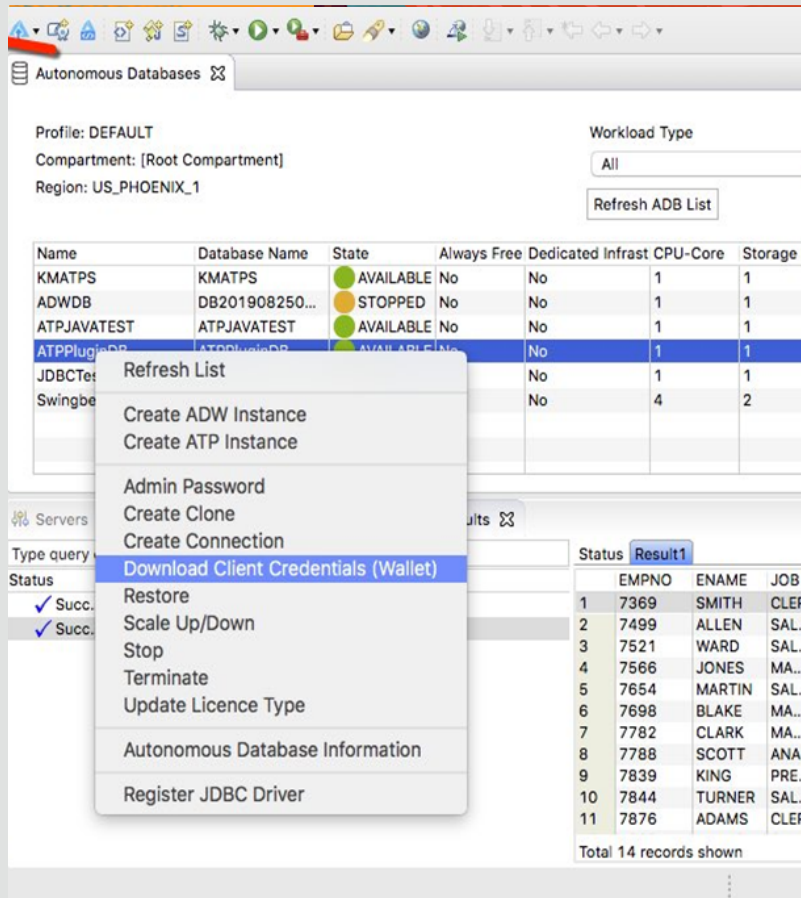
SQL Script & PL/SQL Editing/Debugging

Schema Comparison Tools

Offline Database Project with Source control integration

Product Page:

<https://www.oracle.com/database/technologies/developer-tools/visual-studio/>



Oracle Cloud Infrastructure Toolkit for Eclipse

Free - Available on GitHub

<https://github.com/oracle/oci-toolkit-eclipse/releases>

Support Autonomous Database Services (ATP/ADW)

Create/Terminate, Start/Stop, Clone, Restore Database

Scale up/down, change admin password, update license type etc.

Connect and browse schema

Blog

[New Eclipse Plugin for Accessing Autonomous Database](#)

Orchestration & Developer SDKs

- Terraform Orchestration
 - OCI Provider: <https://www.terraform.io/downloads.html>
- Language SDKs and IDE toolkits
 - Java, Python, Ruby, & Go: <https://docs.cloud.oracle.com/iaas/Content/API/Concepts/sdks.htm>
 - Eclipse Toolkit: <https://docs.cloud.oracle.com/iaas/Content/API/SDKDocs/eclipsetoolkit.htm>
- Containers
 - Using Docker with ATP example:
<https://github.com/oracle/learning-library/blob/master/workshops/autonomous-transaction-processing/LabGuide800BuildingMicroservicesOnATP.md>
- Client Compute for Database in Oracle Cloud Marketplace
 - Oracle demo client image, configured during OCI Compute Provisioning

ORACLE
Linux

Oracle Cloud Developer Image

Oracle Cloud Developer Image

Always **Free** Services



Autonomous
Database

*2 x Databases
20GB Storage Each*



Compute

*2 x VM
1GB Memory Each*



Storage

*2 x 50GB Block
10GB Object
10GB Archive*



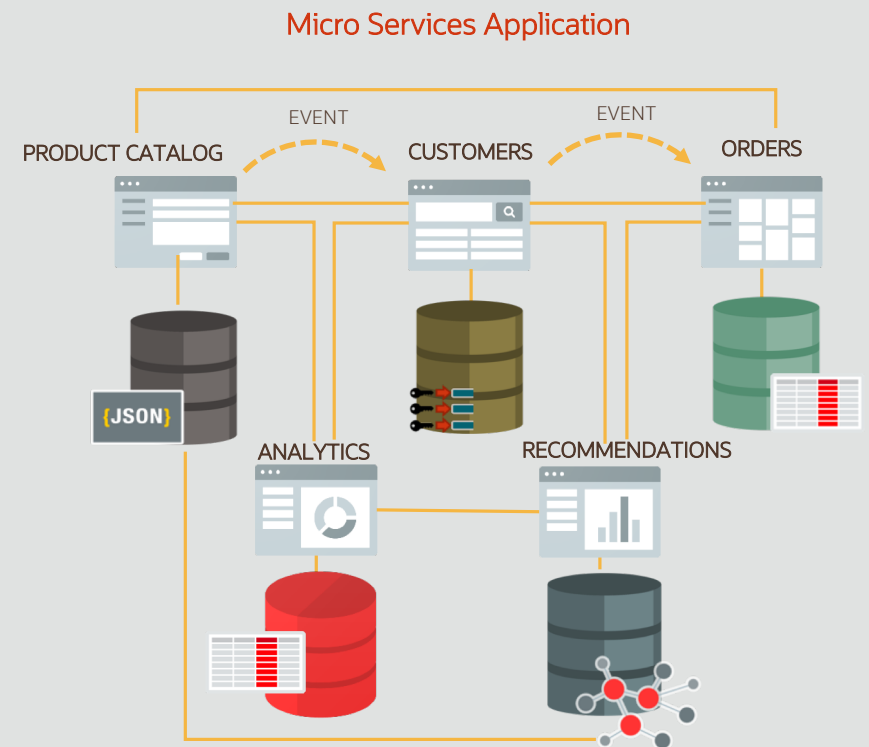
Load
Balancing

*10 Mbps
Bandwidth
Shape*

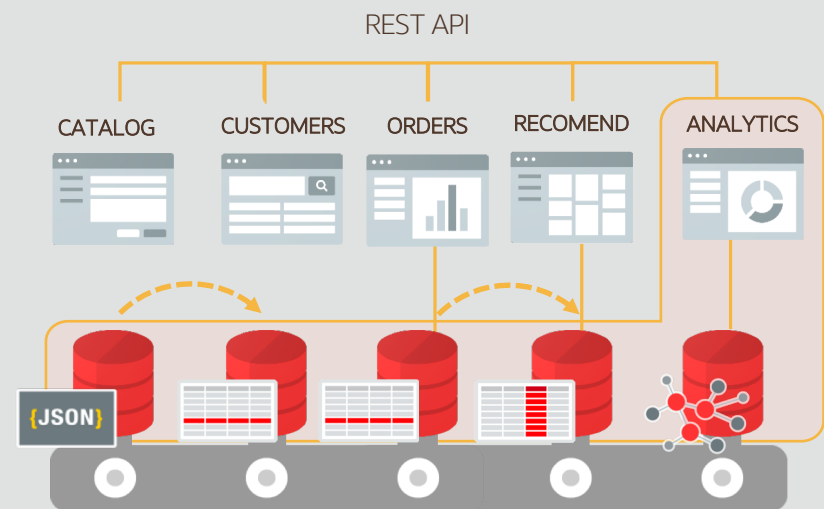
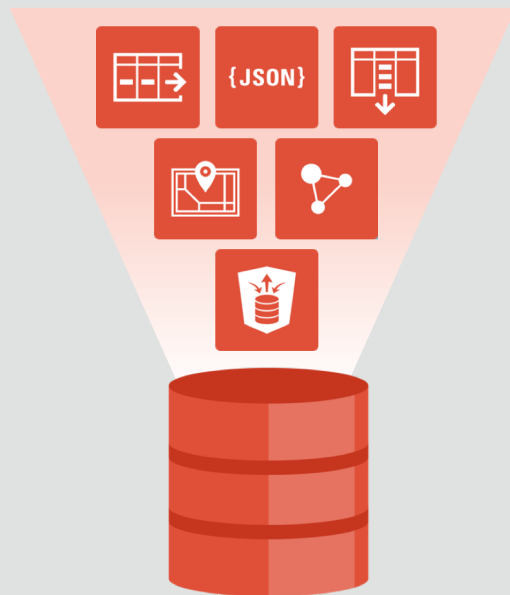
Learn, explore, and build for free!

Micro Services Architecture

- Separate best of breed database for each service
- Data store separation comes with tradeoffs and complexities
 - data consistency/data sharing
 - security/governance
 - proprietary APIs/cloud services
 - high availability/scalability configurations
 - overall complexity
- Analytics requires the federation of data from the various services



Micro Services Architecture



Autonomous Database eliminates complexity for Developers

Fastest time to usage

Rapid provisioning, online elastic scaling

No DBA support required for

Performance tuning, patching, or cloning

One database service for all developer requirements

Relational, JSON, Spatial, Graph, Text, etc.

Industry standard compliant; ISO SQL, JDBC, PEP249 etc.

RESTful data access, IDE support

APEX for low-code application development

Free Tier for testing and learning



Thank You

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Safe Harbor

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