

ORACLE

Autonomous Database Update

Oracle Global Leaders – EMEA Summer Event

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Safe harbor statement

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Oracle Database Services on Cloud



Autonomous Database

- Shared Infrastructure
- Dedicated Infrastructure



Database Cloud Service

- VM
- Bare Metal

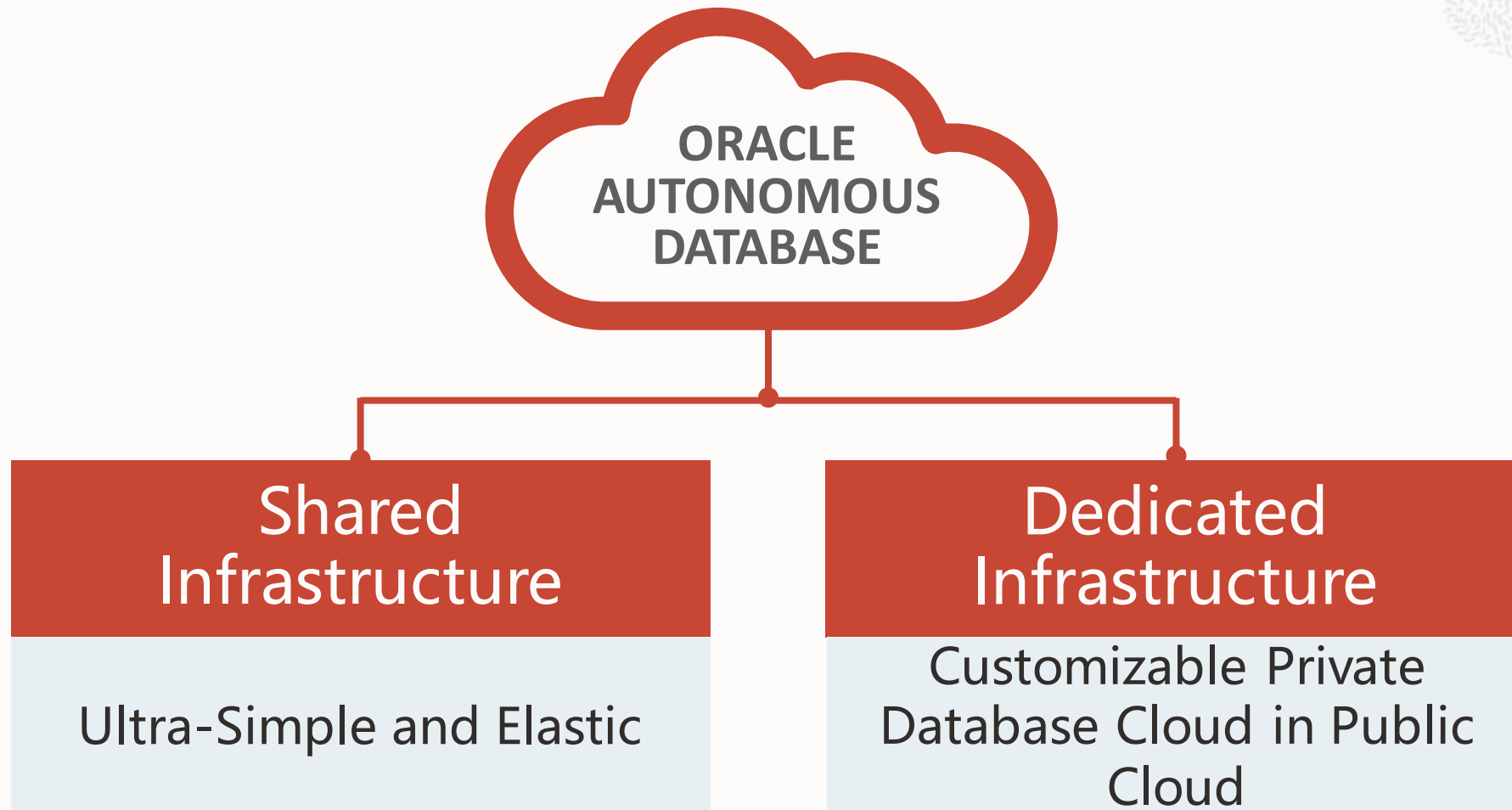


Exadata Cloud Service

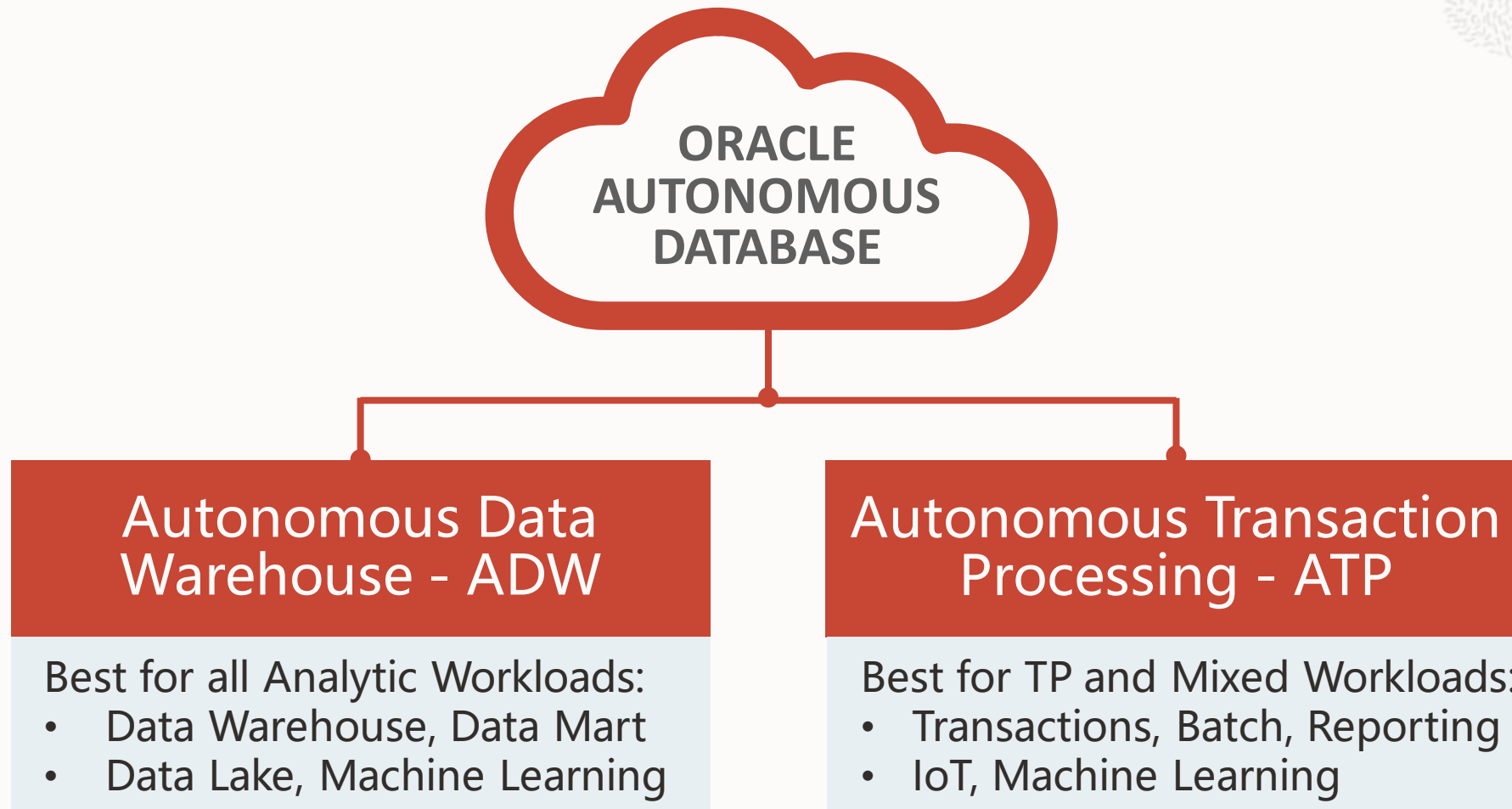


Exadata Cloud at Customer

One Autonomous Database – Two Deployment Choices



One Autonomous Database – Optimized by Workload



Recent Updates on Autonomous Database

Autonomous Database: Recent New Features

NOV	DEC	JAN 2020	FEB	MAR	APR	MAY	June
SQL Dev Web	MS Active Directory Support	Database 19c	APEX 19.2 (Free Tier)	Private Endpoints	Stateful Rule Support in PE	Service Level Agreement	Customer Managed ORDS
ACLs on VCNs	Maintenance Window on Console	Clone from Backup	Multiple DB Support	APEX 19.2 (New 19c Instances)	Per-second billing	19c One-Click Upgrade	SQL access to tenancy details
Tools on OCI Console	PET Support for Avro, Parquet files	Built-in Tools support ACLs	Graph Server Support	Database Restart	Extensions for IDEs	SODA Support	Performance Hub – AWR Reports
	Extensions to DBMS_CLOUD	REST APIs in DBMS_CLOUD	Database Vault	Data Pump Direct Export to Object Store	Data Pump access driver for external tables	Performance Hub – new metrics	
		UTL_SMTP Added	DB Resident Connection Pool Enabled	Data Pump Pre-authenticated URLs for Dump Files	Data Pump access driver for data loading	OCI Metrics Service – new metrics	
			MAX_STRING_SIZE Reset Option	Manual Upgrade Options for 19c	Wallet Enhancements		
			Increase No. Of Concurrent Queries				



Network and Security Enhancements

Networking and Autonomous Database

TLS over Public IP

- Simplest network configuration
- Secure – requires credentials in order to connect to the database

Access Control Lists

- Restrict database access to specific IPs or VCNs
- No communication over public internet
- Service Gateway enables access from private cloud subnets
- On-prem clients can connect via FastConnect or VPN Connect

Private Endpoints

- Autonomous Database appears as an endpoint in private subnet
- Seamless connection from private networks
- Stateless and Stateful security rules



Oracle Data Safe

Autonomous Database | **Now even more Secure**

- One-Click Configuration
- Unified Database Security Control Center
 - Security Configuration Assessment
 - User Risk Assessment
 - User Activity Auditing
 - Sensitive Data Discovery
 - Data Masking
- Saves time and mitigates security risks
- Defense in Depth for all customers
- No special security expertise needed

Data Safe ⓘ

Status: Not registered [Register](#)



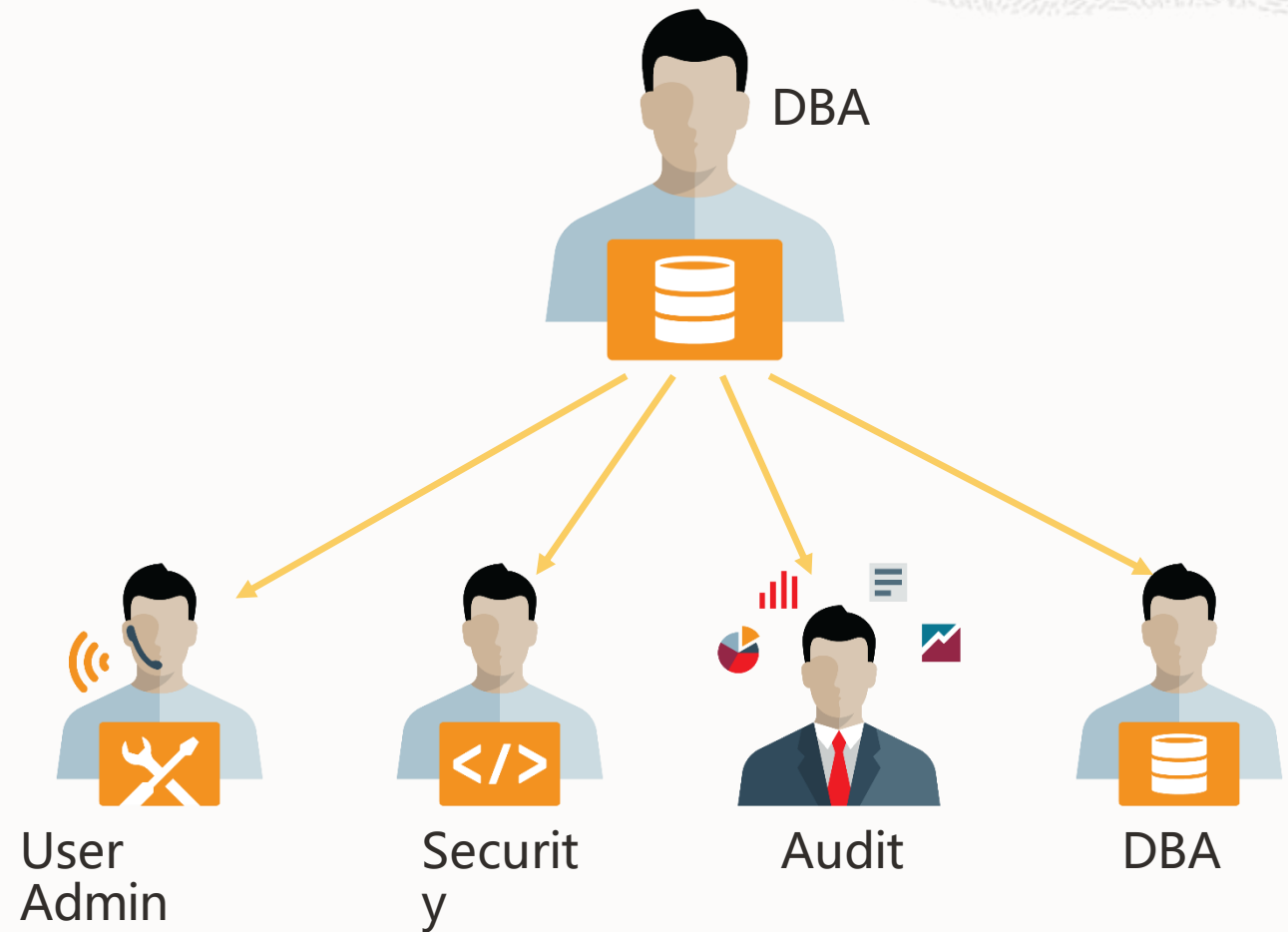
Available with Oracle Cloud Databases at no additional cost



Oracle Database Vault

Enforce Separation of Duties

- Separation of Duties includes
 - User Administration
 - Security Administration
 - Audit administration
 - Database Administration
 - Golden Gate Administration
- Separation of Duties can be relaxed or extended as needed



Wallet Enhancements

- New options for generating DB Connection wallets
 - **Regional Wallets**
 - Wallet for all Autonomous Databases for a given tenant and region
 - Recommended for administrative purposes
 - **Instance Wallets**
 - Wallet for a single database only
 - Recommended for end-users
- New customer managed **wallet rotations**

Wallet Expiry Date

- Each wallet has a separate expiration date
 - Once a wallet expires, you cannot connect to database with it
- Expiration clock starts from the moment you download the wallet (not when DB was created)
 - Some older wallets were valid for 2 years
 - Current wallets are valid for 5 years
- Replace your existing wallets if close to expiration date by downloading a new one
 - No need to rotate the existing wallets. Just downloading a new one is enough.
- New wallets include a README file with the expiration date in it

Wallet Expiry Date

This wallet was **downloaded on 2020-04-26 18:41:24.542 UTC.**

The SSL certificates provided in this wallet **will expire on 2025-04-25 18:36:27.599 UTC.**

In order to avoid any service interruptions due to an expired SSL certificate, you must re-download the wallet before this date.

Billing Enhancements

Per Second Billing

- In the past, OCPU usage was billed per hour and Storage was billed per month
- ADB OCPU and storage usage is now billed per-second (with a one minute minimum)
- Customer Benefits:
 - Benefits LOB customers that only run ADW during work hours and stop instances at end of working day
 - Customers who start-stop their instances to do large overnight batch jobs will also benefit
 - Switch from monthly to per-second billing for storage will benefit customers that have ADB instances with a short lifecycle – sandboxes, QA, training, integration testing instances



Data Pump Enhancements

Pre-Authenticated URL support for Data Pump

- In the past, you needed OCI credentials to access a bucket or a dump file in Object Store
 - Requires having an OCI account in the tenancy
 - Access control managed by OCI Policies
- Now, you can create pre-authenticated URLs for buckets or specific files
 - Access control decided when creating URL
- Pre-authenticated URLs can be generated using:
 - OCI Web Console
 - OCI Cli
 - REST API
 - SDK

The screenshot shows a dialog box titled "Create Pre-Authenticated Request" with a "Help" and "Cancel" link in the top right. The form contains the following fields and options:

- NAME:** A text input field containing "par-object-ssb_part.dmp-20200428-1853".
- PRE-AUTHENTICATED REQUEST TARGET:** Two radio button options: "BUCKET" (unselected) and "OBJECT" (selected). A note below states: "You can only use the pre-authenticated request URL to create objects in this bucket. You cannot read from or list the objects in the bucket."
- OBJECT NAME:** A text input field containing "ssb_part.dmp".
- ACCESS TYPE:** Three radio button options: "PERMIT READ ON THE OBJECT" (selected), "PERMIT WRITES TO THE OBJECT" (unselected), and "PERMIT READS ON AND WRITES TO THE OBJECT" (unselected).
- EXPIRATION:** A date and time picker showing "May 6, 2020 01:53 UTC".
- At the bottom, there are two buttons: "Create Pre-Authenticated Request" (in blue) and "Cancel".

The screenshot shows a dialog box titled "Pre-Authenticated Request Details" with a "Close" link in the top right. The form displays the following information:

- NAME READ-ONLY:** A text input field containing "par-object-ssb_part.dmp-20200428-1853".
- PRE-AUTHENTICATED REQUEST URL READ-ONLY:** A text input field containing "https://objectstorage.ca-toronto-1.oraclecloud.com/p/d5h4iDS9zm7S8W-dSijvM".
- A yellow warning box with an information icon and the text: "Copy this URL for your records. It will not be shown again."
- At the bottom, there is a "Close" button.

Data Pump Export to Object Store

- In the past, you had to export to local OFS directory and then move files to Object Store
- Now, you can directly write the dump file to Object Store
 - Supports OCI Object Storage and OCI Object Storage Classic

```
expdp admin/password@SALESDW_high \  
  filesize=5GB \  
  credential=def_cred_name \  
  dumpfile=https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/adwc4pm/acmbucket/exp%U.dmp \  
  parallel=16 \  
  encryption_pwd_prompt=yes \  
  logfile=export.log \  
  directory=data_pump_dir
```



Data Load/Unload Enhancements

Unloading Data to Object Store in Data Pump format

- You can unload data in ORACLE_DATAPUMP format directly to Object Store
 - Resulting files can be used to create External Tables
 - Can be used for data sharing or data offloading

```
SQL> BEGIN
  DBMS_CLOUD.EXPORT_DATA(
    credential_name => 'DEF_CRED_NAME',
    file_uri_list => 'https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/adwc4pm/acmbucket/exp01.dmp',
    format => json_object('type' value 'datapump'),
    query => 'SELECT * FROM sh.channels WHERE channel_id = 5');
END;
/
```

```
SQL> BEGIN
  DBMS_CLOUD.CREATE_EXTERNAL_TABLE(
    table_name => 'CHANNELS_EXT',
    credential_name => 'DEF_CRED_NAME',
    file_uri_list => 'https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/adwc4pm/acmbucket/exp01.dmp',
    format => json_object('type' value 'datapump'),
    column_list => 'CHANNEL_ID NUMBER, CHANNEL_DESC VARCHAR2(20), CHANNEL_CLASS VARCHAR2(20) ');
END;
/
```

```
SQL> select count(*) from CHANNELS_EXT;
```

```
  COUNT(*)
-----
        1000
```

Load Data from Data Pump Dump Files in Object Store

- You can now load data from dump files in ORACLE_DATAPUMP format

```
SQL> BEGIN
  DBMS_CLOUD.COPY_DATA(
    table_name => 'CHANNELS',
    credential_name => 'DEF_CRED_NAME',
    file_uri_list => 'https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/adwc4pm/acmbucket/exp01.dmp'
    format => json_object('type' value 'datapump'));
END;
/
```

```
SQL> select count(*) from CHANNELS;
```

```
  COUNT(*)
-----
      1000
```

Oracle Database 19c

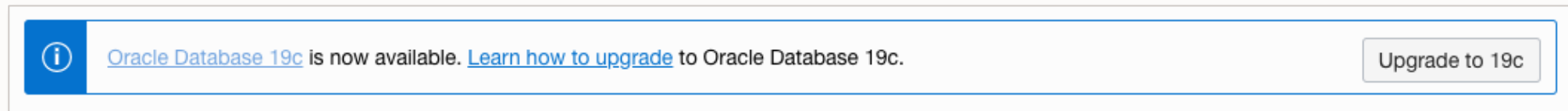
Autonomous Database in Oracle Database 19c

- Automated Indexing
- Enhanced real-time statistics
- Hybrid Partitioned Tables
- Automatic SQL Plan Management
- Application Express 19.2
- Query results from statistics
- Quarantine run-away SQL statements
- Automated resolution of SQL Plan regression
- Resource management enhancements
 - Enhanced dynamic SGA resizing
 - Enhanced dynamic internal resource allocations

19c

Upgrading to 19c

- Upgrade through cloning
 - Clone your existing 18c database as a 19c database
 - Direct your connections to the new 19c database
 - More cautious way for upgrading since it doesn't touch existing database
 - Good way to create a test environment
- **One-Click Upgrade** from OCI Console:



- **In September, remaining databases will start getting automatically upgraded**
 - **Exact date of the upgrade for your database will be preannounced**

Enhancements for Developers

Autonomous Database is Developer ready



APEX

- Low code development framework pre-configured, out of the box
- Enables design, develop and deployment of database-driven applications using only a web browser

Oracle REST Data Services (ORDS)

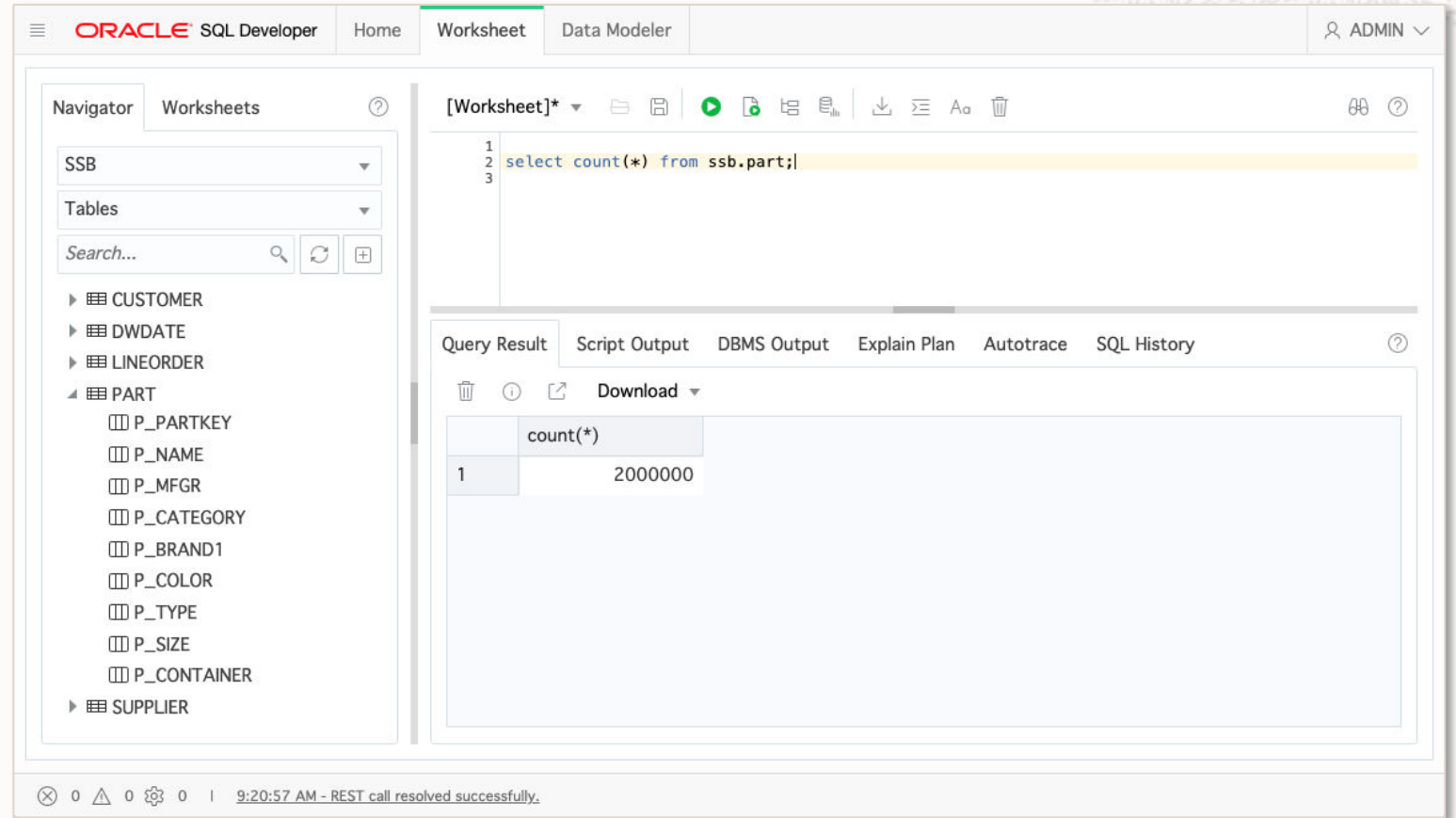
- HTTPS access directly to database tables and procedures

Developer SDKs

- Java, Python, Node, Go, .NET, Ruby

SQL Developer Web

- No installation required
- Provides
 - SQL Worksheet
 - Schema Navigator
 - Data Loader
 - Data Modeler
- More is coming ...



The screenshot displays the Oracle SQL Developer Web interface. The top navigation bar includes 'ORACLE SQL Developer', 'Home', 'Worksheet', and 'Data Modeler'. The user is logged in as 'ADMIN'. The left sidebar shows a 'Navigator' pane with a tree view of the database schema, including tables like CUSTOMER, DWDATA, LINEORDER, and PART (with sub-tables like P_PARTKEY, P_NAME, etc.), and SUPPLIER. The main workspace is a 'Worksheet' containing a SQL query: `select count(*) from ssb.part;`. Below the query, the 'Query Result' pane shows a single row with the column 'count(*)' and the value '2000000'. The status bar at the bottom indicates the time is 9:20:57 AM and a REST call resolved successfully.

Oracle ML Notebooks

Autonomous Database as a Data Science Platform

Collaborative UI

- Supports data scientists, data analysts, application developers, DBAs
- Easy sharing of notebooks and templates with permissions, versioning, and execution scheduling
- Based on Apache Zeppelin

Included with Autonomous Database

- Automatically provisioned, managed, backed up
- In-database machine learning algorithms and analytics functions via SQL

The screenshot shows the Oracle Machine Learning interface. At the top, it says "ORACLE Machine Learning". Below that is a "Back" button. The notebook title is "Credit Score Predictions Simplified ...". The current step is "STEP 6: Review Data by Occupation", which is marked as "FINISHED". The notebook content includes a SQL query and a pie chart visualization. The SQL query is:

```
%sql
-- This shows an alternative presentation style - a pie chart. Note that Zeppelin
visualizations are limited. In lab 400 we will use Oracle Data Visualization to
create more more interesting perspectives.

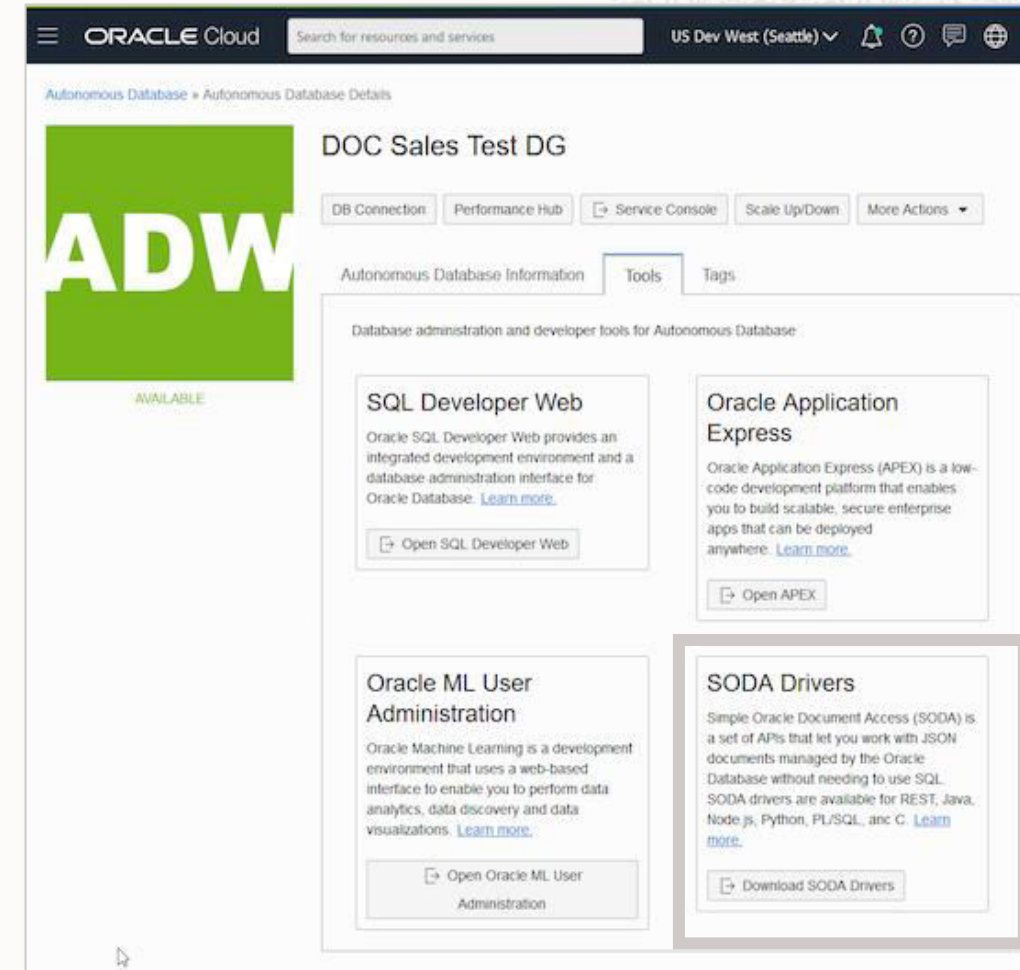
select customer_id, age, income, tenure, loan_type, loan_amount, occupation,
marital_status
from credit_scoring_100k_v where rownum < 1000
```

 The pie chart shows the distribution of occupations: Professional (blue), Clerical (light blue), Farmer (orange), Manager (light orange), Worker (green), NaN (light green), Army (red), and Technician (pink). The chart is titled "Technician" and "Professional". At the bottom, it says "Took 0 sec. Last updated by CHARLIE at July 30 2018, 3:41:48 PM."



Support for SODA Documents and Collections

- ADB now supports SODA documents and collections
- Developers can store, search, and retrieve document collections, typically JSON documents, without using SQL
- Console has been updated with a link to access the SODA drivers for several languages and frameworks:
 - Java, Node.js, Python, Oracle Call Interface and PL/SQL



Customer Managed Oracle REST Data Services (ORDS)

- When you use the default ORDS on Autonomous Database, you cannot modify any of the ORDS configuration options
 - For example, with the default configuration connections for ORDS are preconfigured to use the LOW database service.
- You can now use a customer managed environment if you need to have manual control of the configuration and management of Oracle REST Data Services
- Provides more control over the ORDS configuration options whilst still retaining all the benefits of using the Autonomous Database platform



Microsoft Active Directory Integration

- You can configure Autonomous Database to authenticate and authorize Microsoft Active Directory users and roles
 - Allows Microsoft Active Directory users to access an Autonomous Database using their Active Directory credentials
- Works by mapping Active Directory users and groups to Oracle database users and roles
- Azure Active Directory is not yet supported



ADB Tenancy Details in Database

- To file a service request for ADB, you need to provide tenancy details for the instance
- Tenancy details are available in OCI Console but person opening the SR may not have access
- Now you can get all the details needed with a simple query

```
SQL> SELECT cloud_identity FROM v$pdbs;
```

```
CLOUD_IDENTITY
```

```
-----  
{  
  "DATABASE_NAME" : "XXYYZ19",  
  "REGION" : "ca-toronto-1",  
  "TENANT_OCID" : "OCID1.TENANCY.OC1..AAAAAAAFUCUE47PQMRF4VIGNEEBGBCMMOY5RCJQQGE32EWNRCYX2A",  
  "DATABASE_OCID" : "OCID1.AUTONOMOUSDATABASE.OC1.CA-TORONTO-1.AB2G6LJRGUXFMDT4V66LBBNIY6TEHSMAIVLUMUHJVVDXQA",  
  "COMPARTMENT_OCID" : "ocid1.compartment.oc1..aaaaaaardmulcugapvmb4hckstksf5lne7xqhzkvpsqhdc3m4neq"  
}
```


UI Enhancements

Next Maintenance

Autonomous Database - Autonomous Database Details

SALES DW

ADW AVAILABLE

Autonomous Database Information Tools Tags

General Information

- Database Name: SALES DW
- Workload Type: Data Warehouse
- Compartment: adwoc4pm (root)/ADW_GLP/ACM
- OCID: ...d572zq
- Created: Wed, Jun 17, 2020, 03:18:21 UTC
- OCPU Count: 4
- Storage: 1 TB
- License Type: Bring Your Own License (BYOL)
- Database Version: 19c
- Auto Scaling: Enabled
- Lifecycle State: Available
- Instance Type: Paid

Infrastructure

- Dedicated Infrastructure: No
- Autonomous Data Guard: Disabled
- Backup: Last Automatic Backup: No active backups exist for this database
- Network: Access Type: Allow secure access from everywhere

Maintenance

Next Maintenance: Sat, Jun 20, 2020, 08:25:00 UTC - 13:35:00 UTC

Database remains available throughout the maintenance process

Database Metrics in OCI Console

Autonomous Database - Autonomous Database Details

SALES DW

ADW AVAILABLE

Metrics

Resources

Metrics Backups (61) Work Requests (0)

CPU Utilization

Storage Utilization

Sessions

Execute Count

Running Statements

Queued Statements

Database Restart

Autonomous Database - Autonomous Database Details

SALES DW

ADW AVAILABLE

Autonomous Database Information Tools Tags

General Information

- Database Name: SALES DW
- Workload Type: Data Warehouse
- Compartment: adwoc4pm (root)/ADW_GLP/ACM
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Infrastructure

- Dedicated Infrastructure: No
- Autonomous Data Guard: Disabled
- Backup: Last Automatic Backup: No active backups exist for this database
- Network: Access Type: Allow secure access from everywhere

More Actions

- Stop
- Restart
- Restore
- Create Clone
- Update Network Access
- Admin Password
- Update License Type
- Move Resource
- Add Tags
- Terminate

Maintenance

Next Maintenance: Sat, Jun 20, 2020, 08:25:00 UTC - 13:35:00 UTC

Tools Tab in OCI Console

Autonomous Database - Autonomous Database Details

SALES DW

ADW AVAILABLE

Tools

SQL Developer Web

Oracle Application Express

Oracle ML User Administration

SODA Drivers



Monitoring Enhancements

Performance Hub

- You can see information in UTC, DB Timezone or your local timezone
- You can now download AWR reports

Generate AWR Report Cancel

Generate an Automatic Workload Repository (AWR) report to view additional performance statistics.

TIME RANGE

USE THE TWO SNAPSHOTS CLOSEST TO JUN 16, 2020 8:22:20 PM UTC-07:00

CUSTOM

START TIME: Jun 16, 2020 7:22 PM

END TIME: Jun 16, 2020 8:22 PM UTC-07:00

Download Cancel

- You can see some key workload metrics

The screenshot displays the Oracle Cloud Performance Hub for a database instance named 'SALES DW'. The interface includes a navigation bar with the Oracle Cloud logo and a search bar. The main content area is divided into several sections:

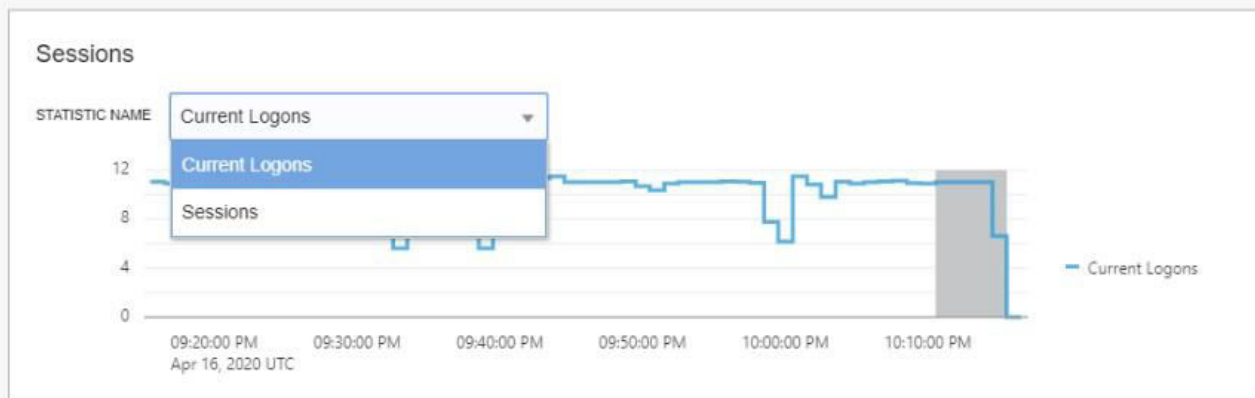
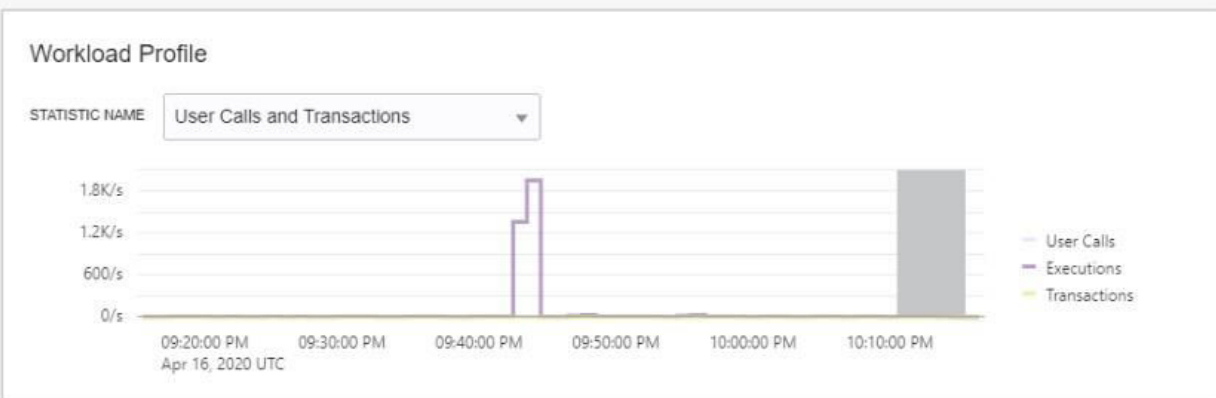
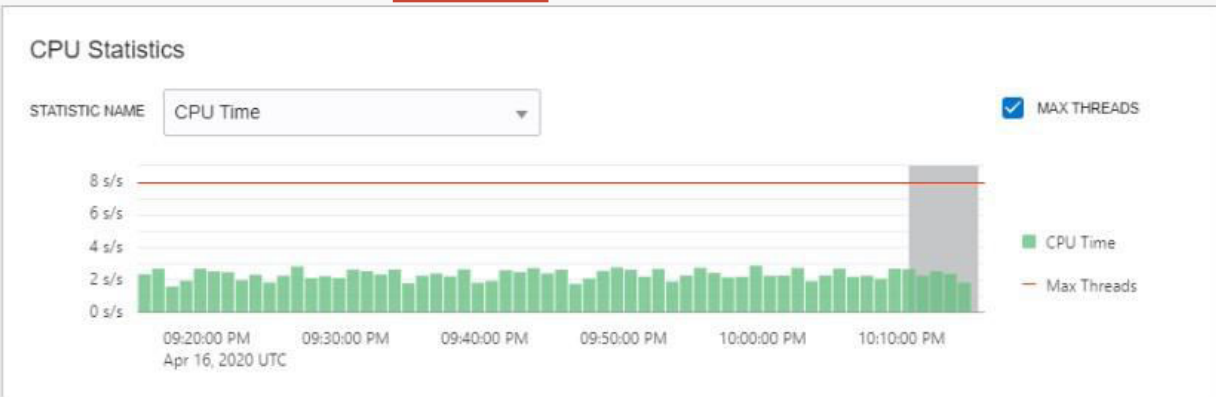
- Performance Hub Header:** Shows 'SALES DW' and navigation options like 'QUICK SELECT' (Last Hour), 'TIME RANGE' (Jun 16, 2020 8:02:54 PM - 9:02:54 PM), and 'TIME ZONE' (Browser (UTC-07:00)).
- Activity:** A bar chart showing activity over time, with a legend for Wait, User I/O, CPU, and Maximum Threads.
- ASH Analytics, SQL Monitoring, Workload:** The 'Workload' tab is selected, showing various performance metrics.
- CPU Statistics:** A bar chart showing CPU Time (s/s) over time, with a legend for Maximum Threads and CPU Time.
- Wait Time Statistics:** A bar chart showing wait time (s/s) over time, with a legend for DB TIME, Concurrency, Configuration, Other, User I/O, and Administrative.
- Workload Profile:** A bar chart showing User Calls and Transactions (s/s) over time, with a legend for Executions and Transactions.
- Sessions:** A line chart showing Sessions over time.

The interface also includes a 'Close' button at the bottom and a footer with the URL <https://autonomous-db.plugins.oci.oraclecloud.com/latest/emaasui/emcdbms-dbcspert/#> and copyright information.

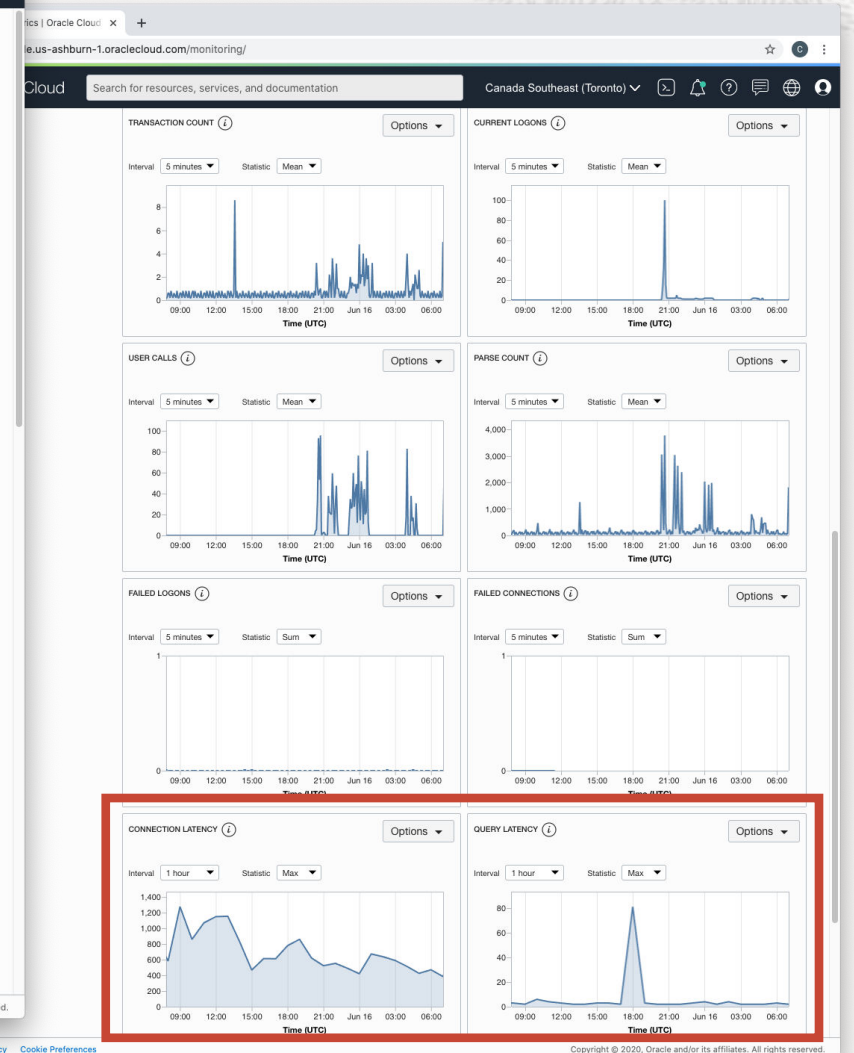
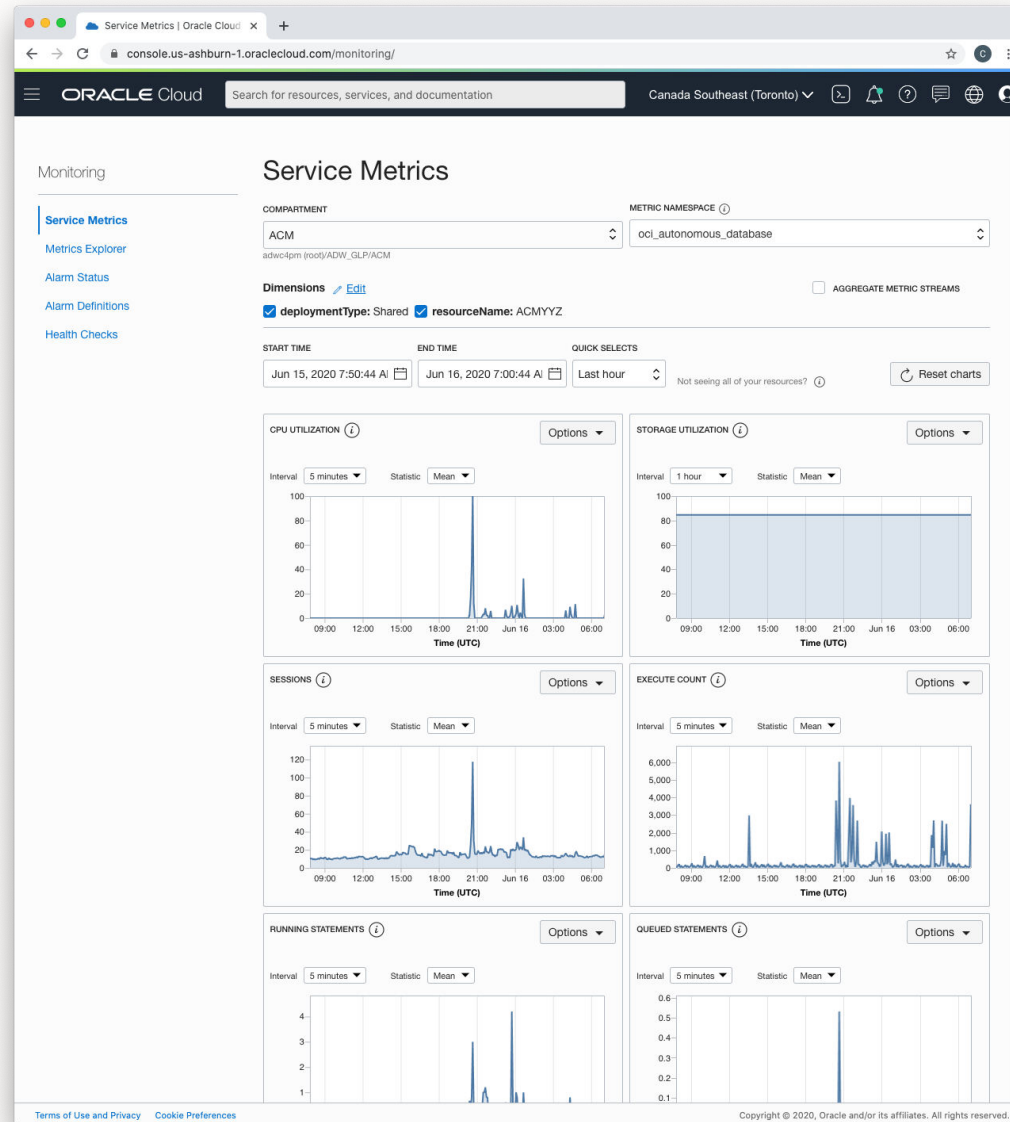
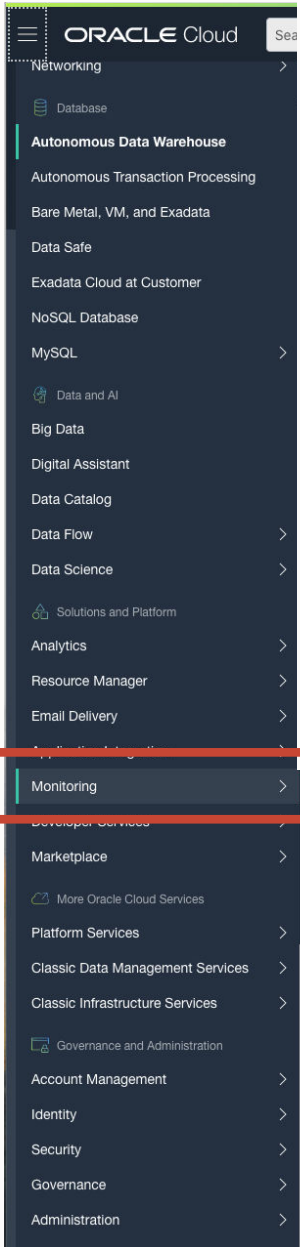


Performance Hub

ASH Analytics SQL Monitoring **Workload**



New Service Metrics in OCI Console



Service Metrics

COMPARTMENT: adwc4pm (root)/ADW_Frankfurt

METRIC NAMESPACE:

Dimensions [Edit](#)

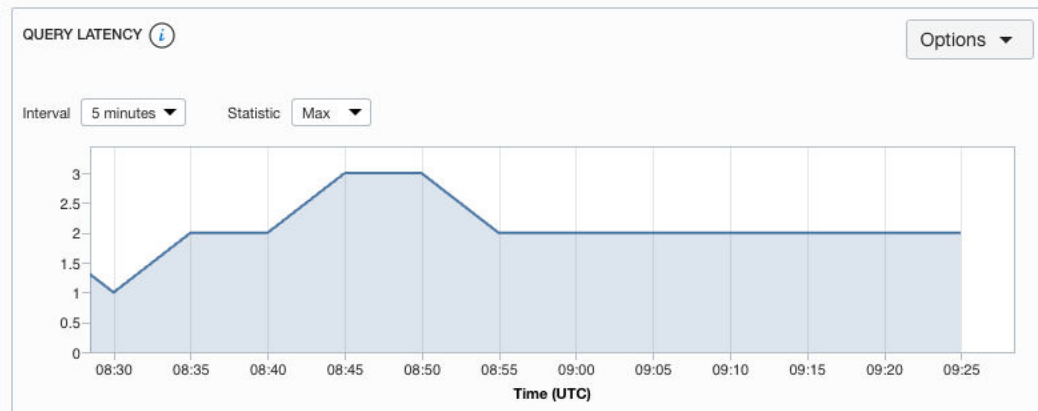
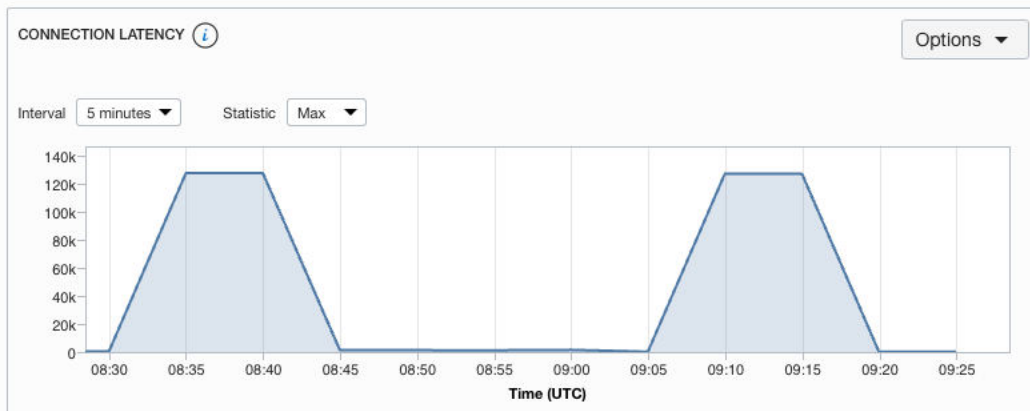
deploymentType: Shared region: eu-frankfurt-1 resourceName: ADWDEMO

AGGREGATE METRIC STREAMS

START TIME:

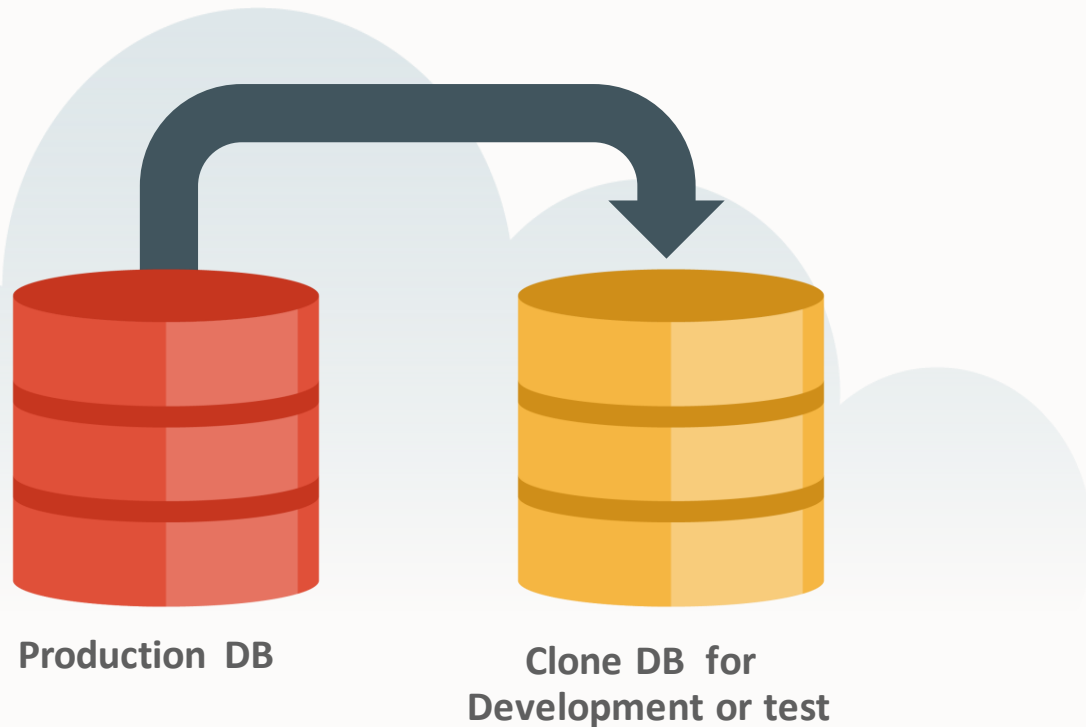
END TIME:

QUICK SELECTS: [Not seeing all of your resources?](#)



Cloning Enhancements

Cloning in Autonomous Database



- Easy and fast cloning
- Today:
 - Full clone
 - Metadata-only clone
 - **Clone from backup**
 - **Choose a specific backup**
 - **Choose point-in-time**
- Coming soon:
 - Refreshable clone
 - Cross Regional clone



Coming Soon...

Autonomous Data Guard

- Hidden standby (peer) database
 - Located in a different Availability Domain
- One-click configuration
- No management required
- One-click switchover
- Automatic failover
 - Transparent to applications
 - Zero-loss failover when possible
 - If not possible, customer decides failover

The screenshot shows the Oracle Cloud console interface for an Autonomous Database (ADW) named 'SALES DW'. The 'Autonomous Data Guard' section is highlighted with a red box, indicating its status as 'Enabled' and 'Available'. The console also displays general information such as the database name, workload type (Data Warehouse), compartment, OCID, creation date, OCPU count, storage, license type, database version, auto scaling, lifecycle state, and instance type. The 'Infrastructure' section shows that dedicated infrastructure is not used, and the 'Backup' section indicates that no active backups exist for this database. The 'Network' section provides details on the access type, virtual cloud network, subnet, private endpoint IP, private endpoint URL, and network security groups. The 'Maintenance' section shows the next maintenance window.

Display Name	State	Dedicated	OCPUs	Storage (TB)	Workload Type	Autonomous Data Guard	Created
SALES DW	● Available	No	1	1	Data Warehouse	Enabled	Wed, Jun 17, 2020, 01:40:35 UTC

Displaying 1 Autonomous Database < 1 of 1 >



Autonomous Database: **New Features Coming...**

Autonomous
Data Guard

Character Set
Change Support

Database
Rename

OML Python
Support

Autonomous
Data Platform

Refreshable
Clones

SYSDATE in
DB Timezone

Database Modes
Read-Only
Restricted

Auto ML

Customer
Managed Keys

Cross Region
Clone & DR

Flexible
password rules

Walletless
Connection with
Private Endpoint

APEX 20.1

ADB as a Source
for Golden Gate

Thank you



Engin Şenel

DW & Big Data Development
Global Leaders Program

