ORACLE

Autonomous Database Update

Oracle Global Leaders – EMEA Summer Event

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Engin Şenel
Consulting Member of Technical Staff
DW & Big Data Development
Global Leaders Program

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Oracle Database Services on Cloud

Autonomous Database

- Shared Infrasructure
- Dedicated Infrastructure

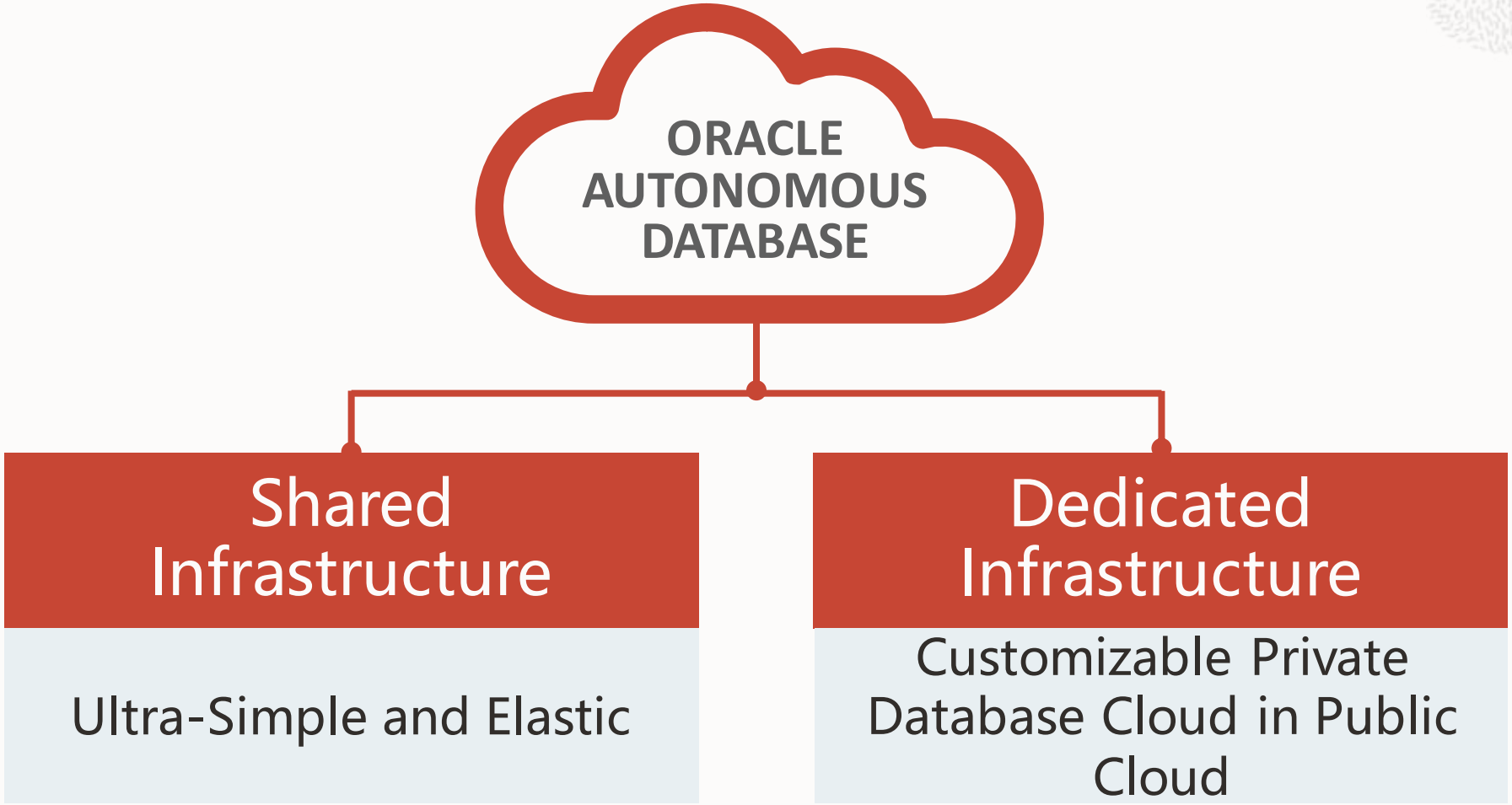
Database Cloud Service

- VM
- Bare Metal

Exadata Cloud Service

Exadata Cloud at Customer

One Autonomous Database – Two Deployment Choices



One Autonomous Database – Optimized by Workload

Autonomous Data Warehouse - ADW

Best for all Analytic Workloads:
- Data Warehouse, Data Mart
- Data Lake, Machine Learning

Autonomous Transaction Processing - ATP

Best for TP and Mixed Workloads:
- Transactions, Batch, Reporting
- IoT, Machine Learning

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

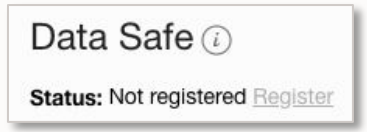
Private Endpoints

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

* For more details, see ADB Documentation

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

Available with Oracle Cloud Databases at no additional cost

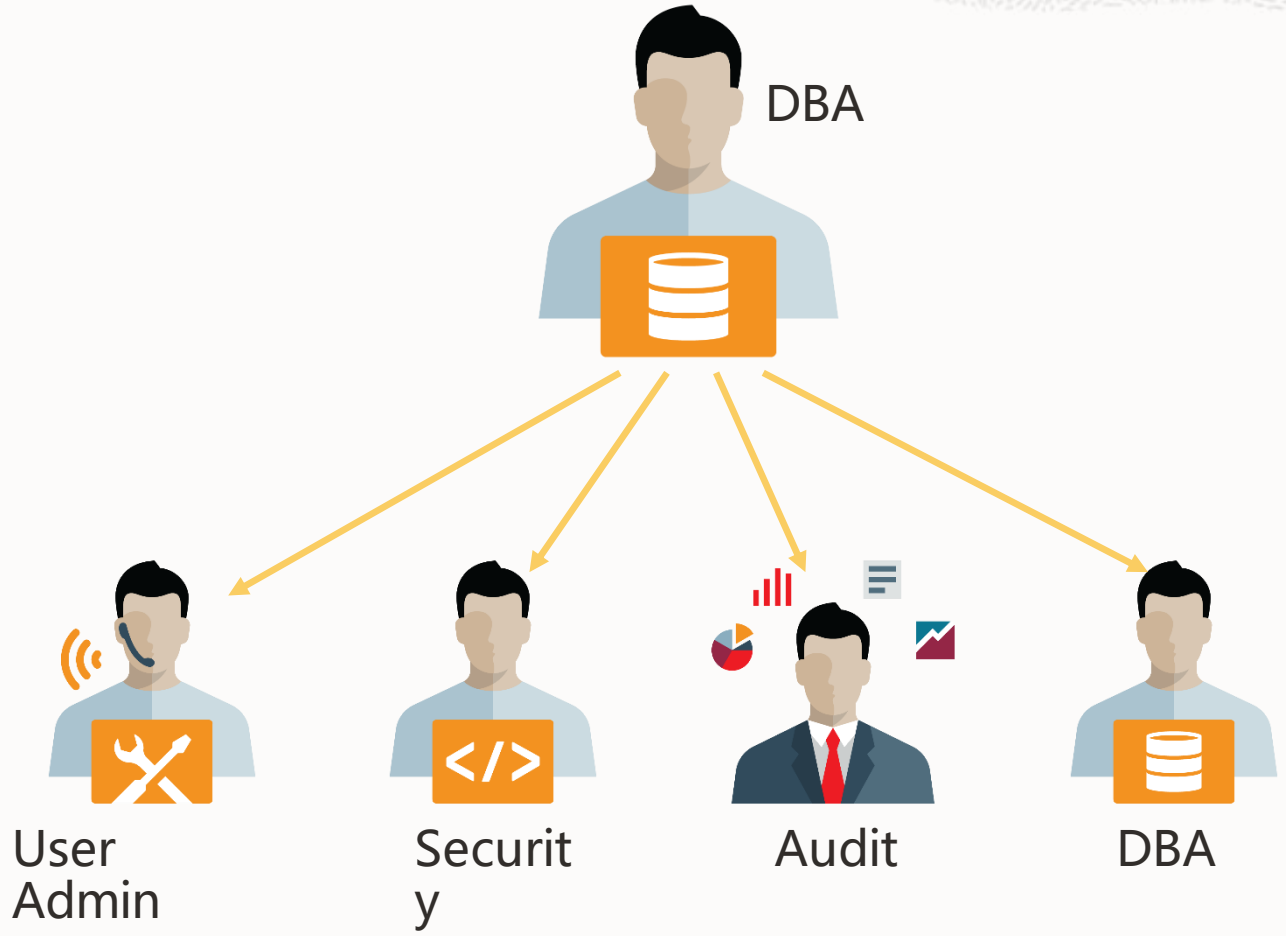
* For more details, see ADB Documentation

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



* For more details, see ADB

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

* For more details, see this Blog Article

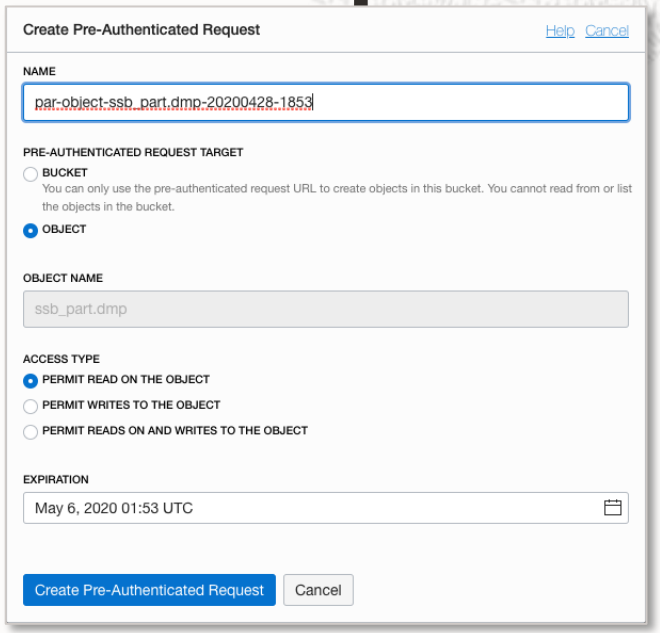
Data Pump Enhancements

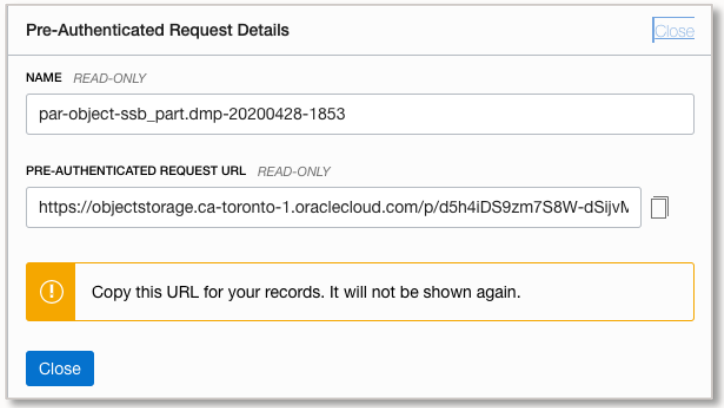
Pre-Authenticated URL support for Data Pump

- 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





* For more details about pre-authenticated URLs, see OCI Documentation

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
```


* For more details, see ADB Documentation

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
```


* For more details, see ADB Documentation

Oracle Database 19c

Autonomous Database in Oracle Database 19c

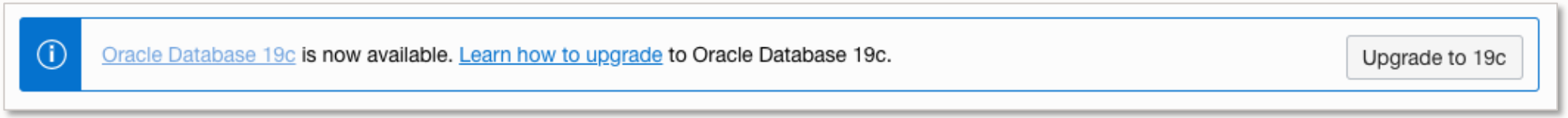
- Automated Indexing
- Enhanced real-time statistics
- Hybrid Partitioned Tables
- Automatic SQL Plan Management
- Application Express 19.2
- Query results from statistics
- Quarantine run-away SQL statements
- Automated resolution of SQL Plan regression
- Resource management enhancements
  - Enhanced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

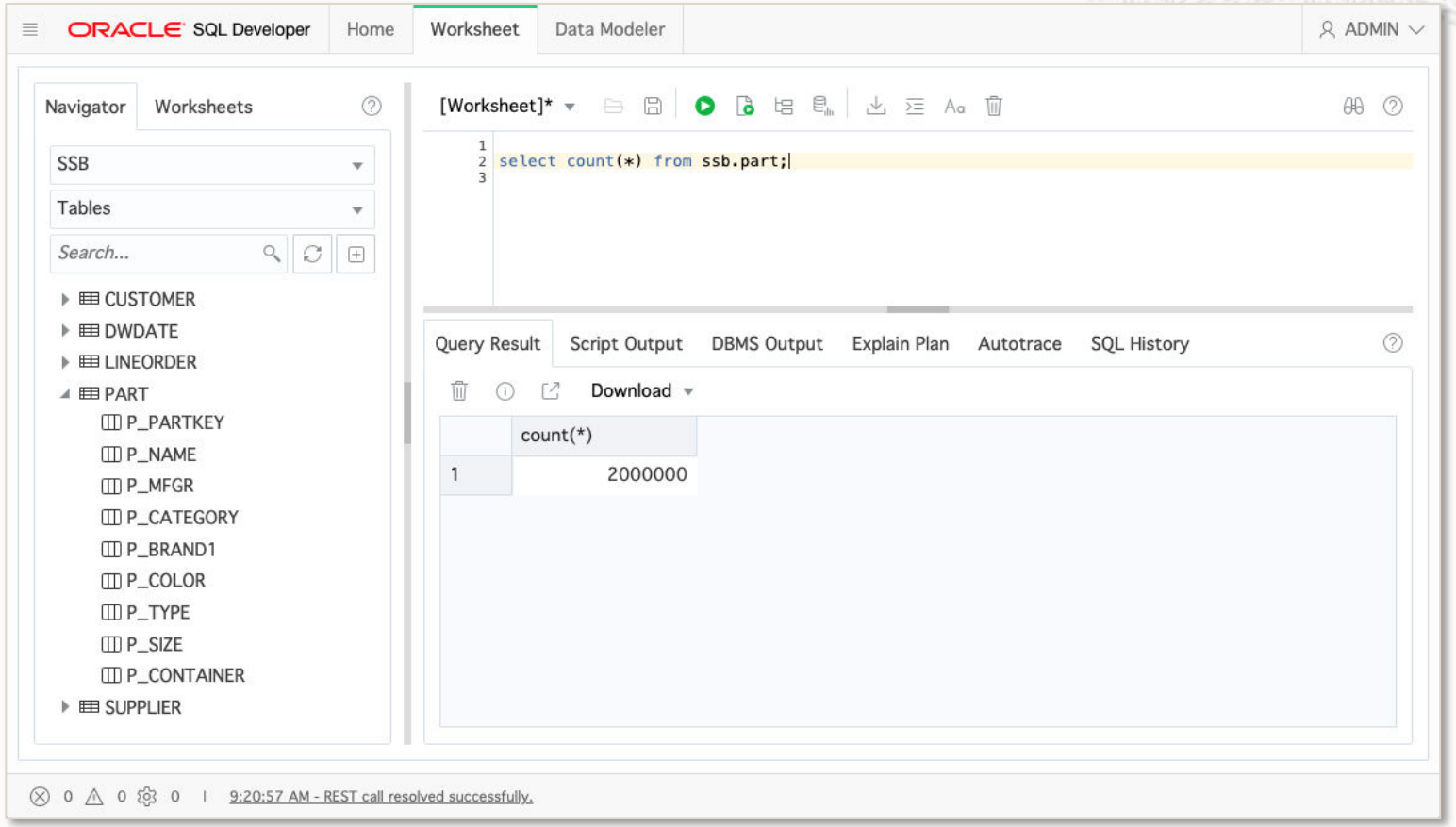
- HTTPS access directly to database tables and procedures

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 …



Oracle ML Notebooks

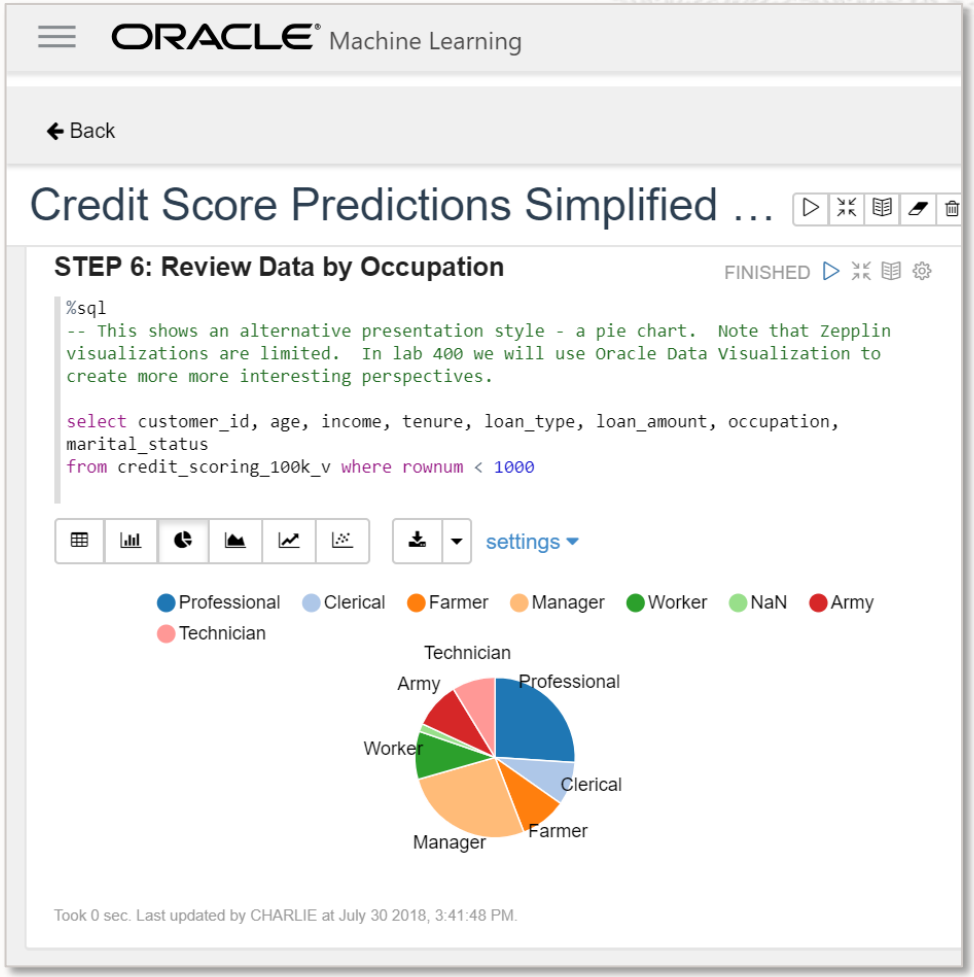
Autonomous Database as a Data Science Platform

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

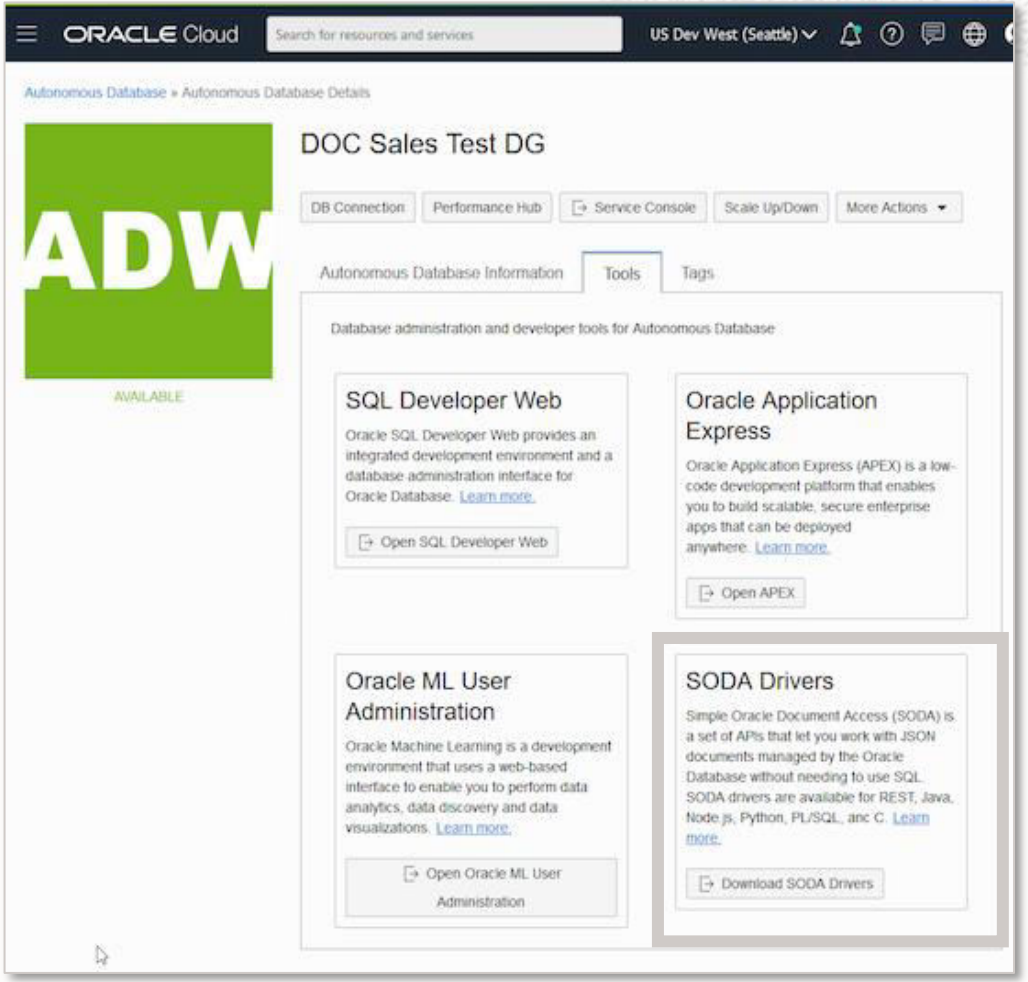
Included with Autonomous Database

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



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



* For more details, see ADB Documentation

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

* For more details, see ADB Documentation

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

* For more details, see ADB Documentation

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

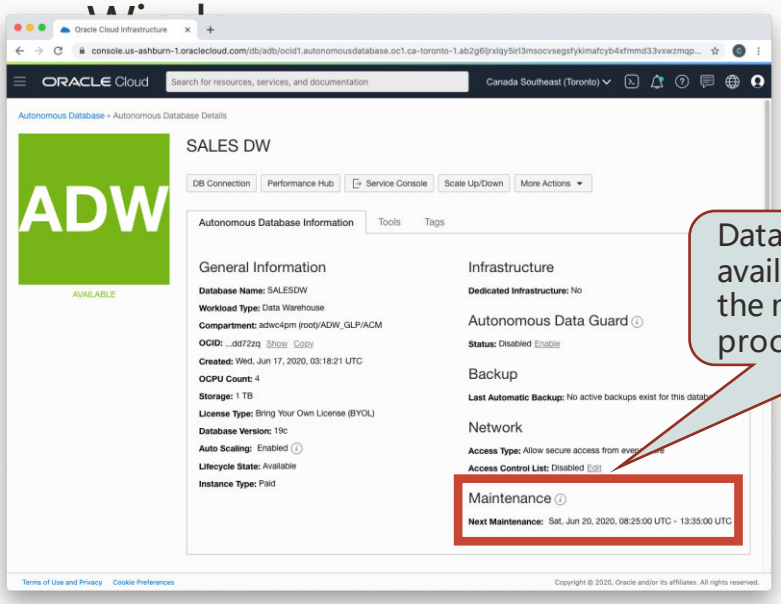
- Now you can get all the details needed with a simple query

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

CLOUD_IDENTITY
--------------------------------------------------------------------------------------------------------------------
{
  "DATABASE_NAME" : "XXYYZ19",
  "REGION" : "ca-toronto-1",
  "TENANT_OCID" : "OCID1.TENANCY.OC1..AAAAAAAAFCUE47PQMRF4VIGNEEBGBCMMOY5RCJQQGE32EWNRCYX2A",
  "DATABASE_OCID" : "OCID1.AUTONOMOUSDATABASE.OC1.CA-TORONTO-1.AB2G6LJRGUXFMDT4V66LBBNIY6TEHSMAIVLUMUHJVVDXQA",
  "COMPARTMENT_OCID" : "ocid1.compartment.oc1..aaaaaaaardmulcugapvmb4hckstksf5lne7xqhzkvpsqhdc3m4neq"
}
```

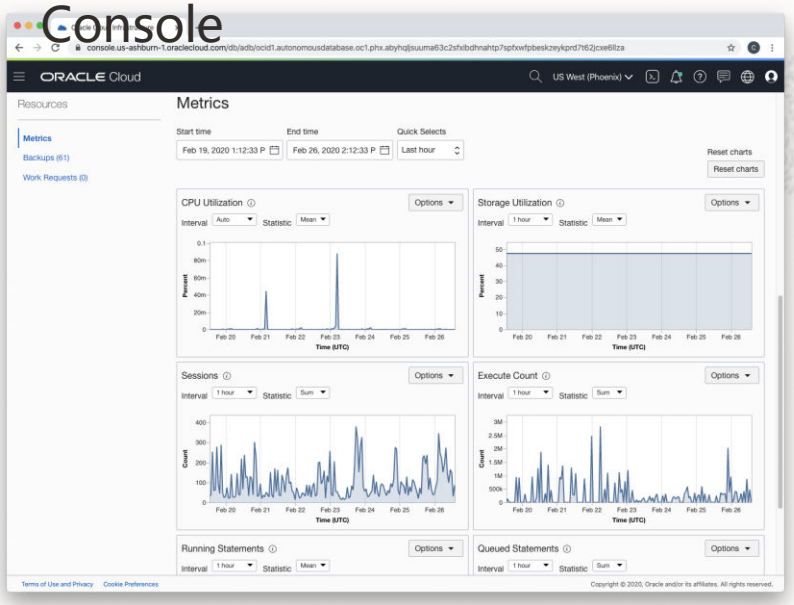
UI Enhancements

Next Maintenance Window

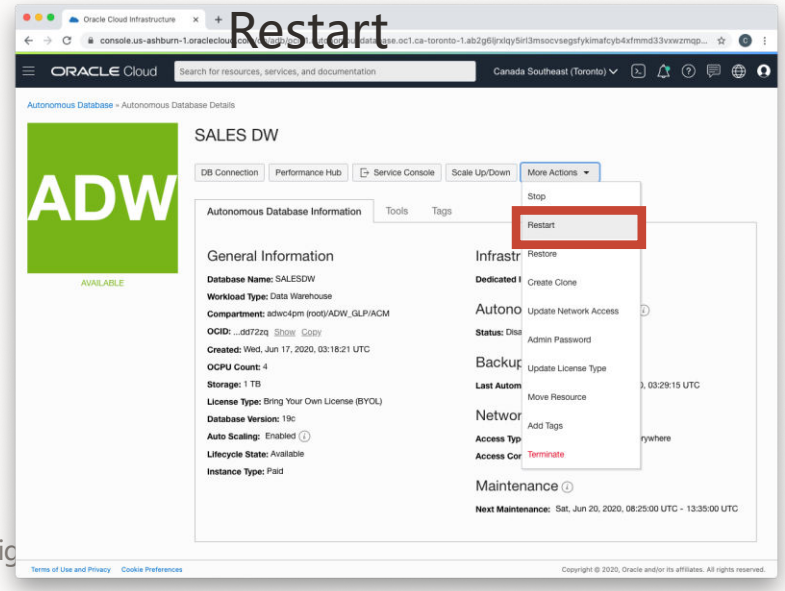


Database remains available throughout the maintenance process

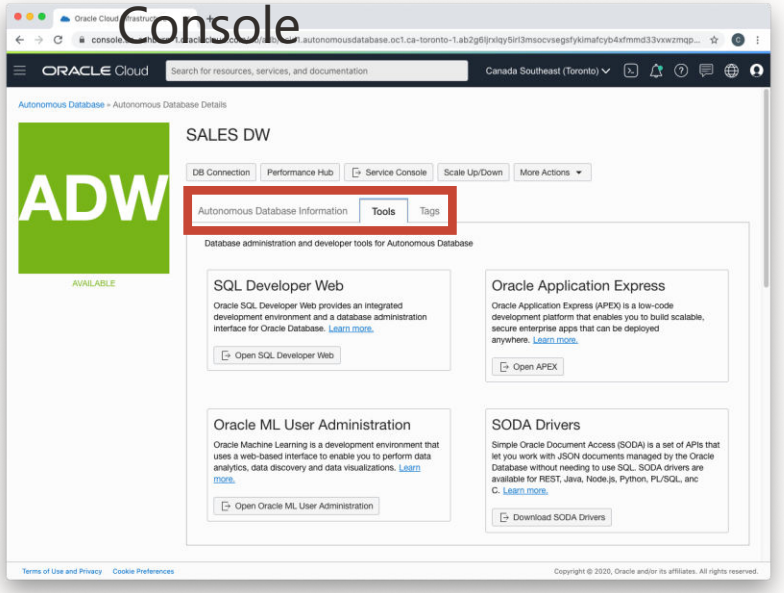
Database Metrics in OCI Console



Database Restart



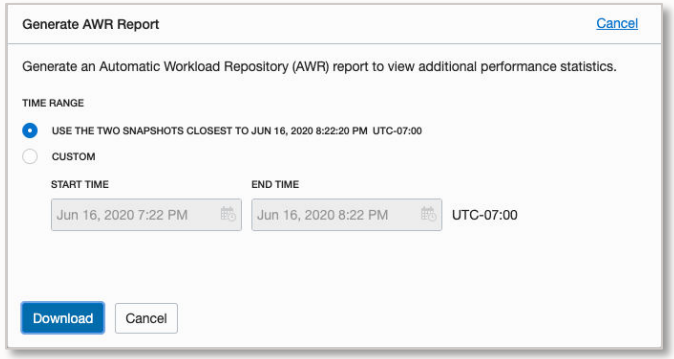
Tools Tab in OCI Console



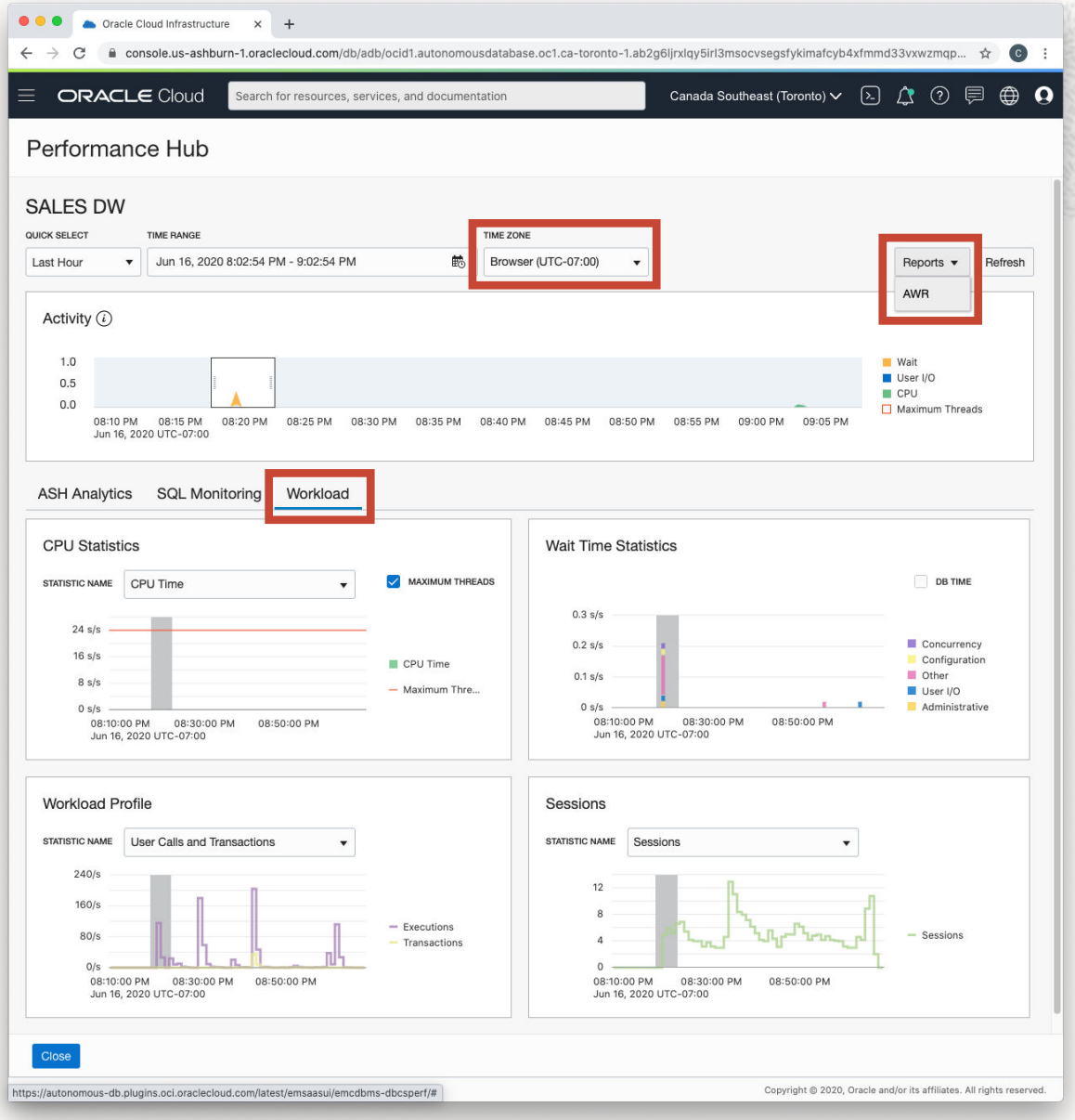
Monitoring Enhancements

Performance Hub

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



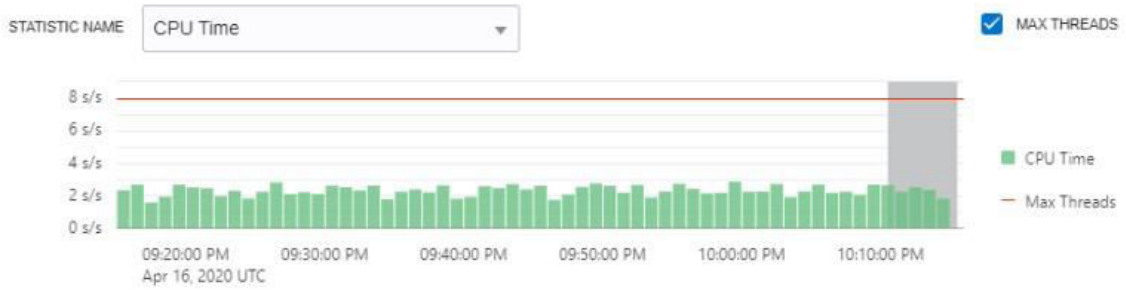
- You can see some key workload metrics



Performance Hub

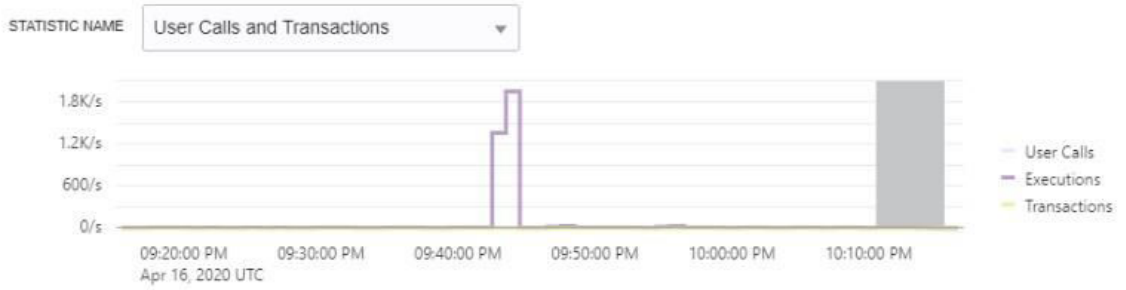
ASH Analytics | SQL Monitoring | Workload

CPU Statistics



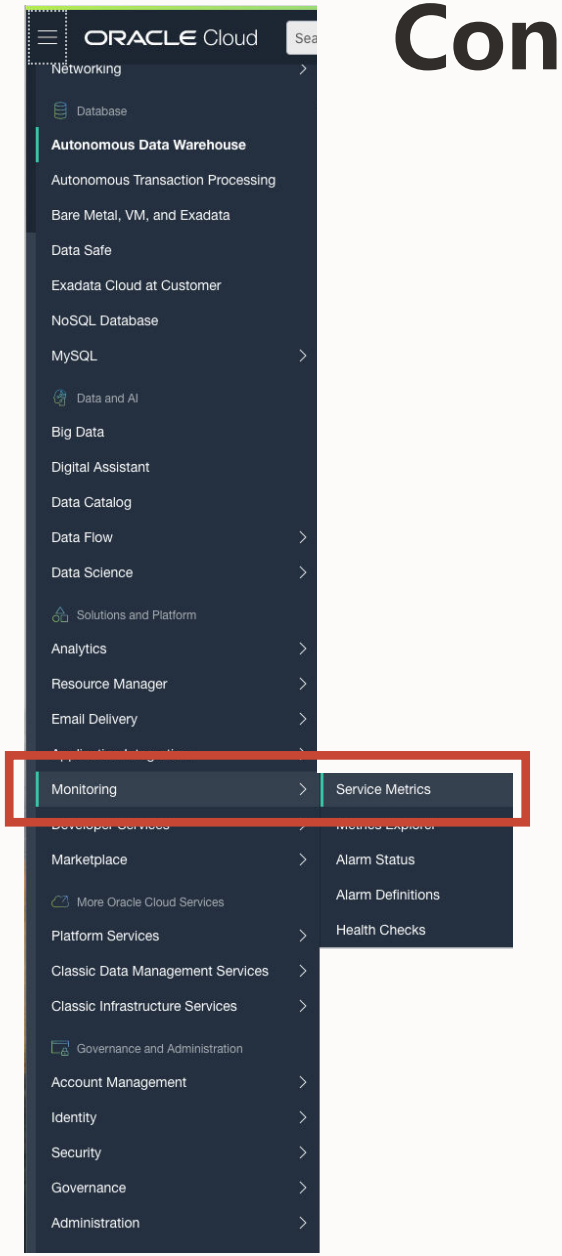
Wait Time Statistics

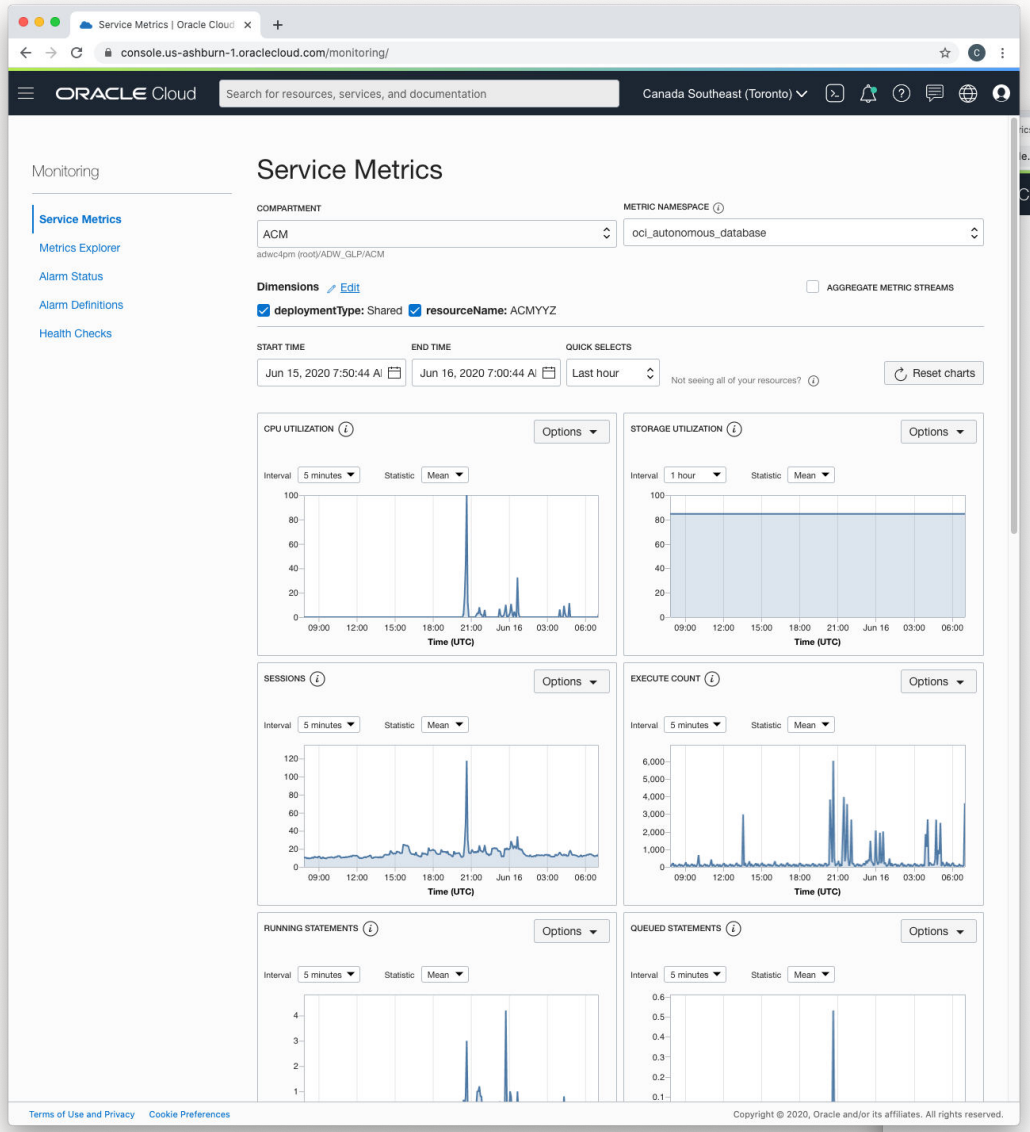
Workload Profile

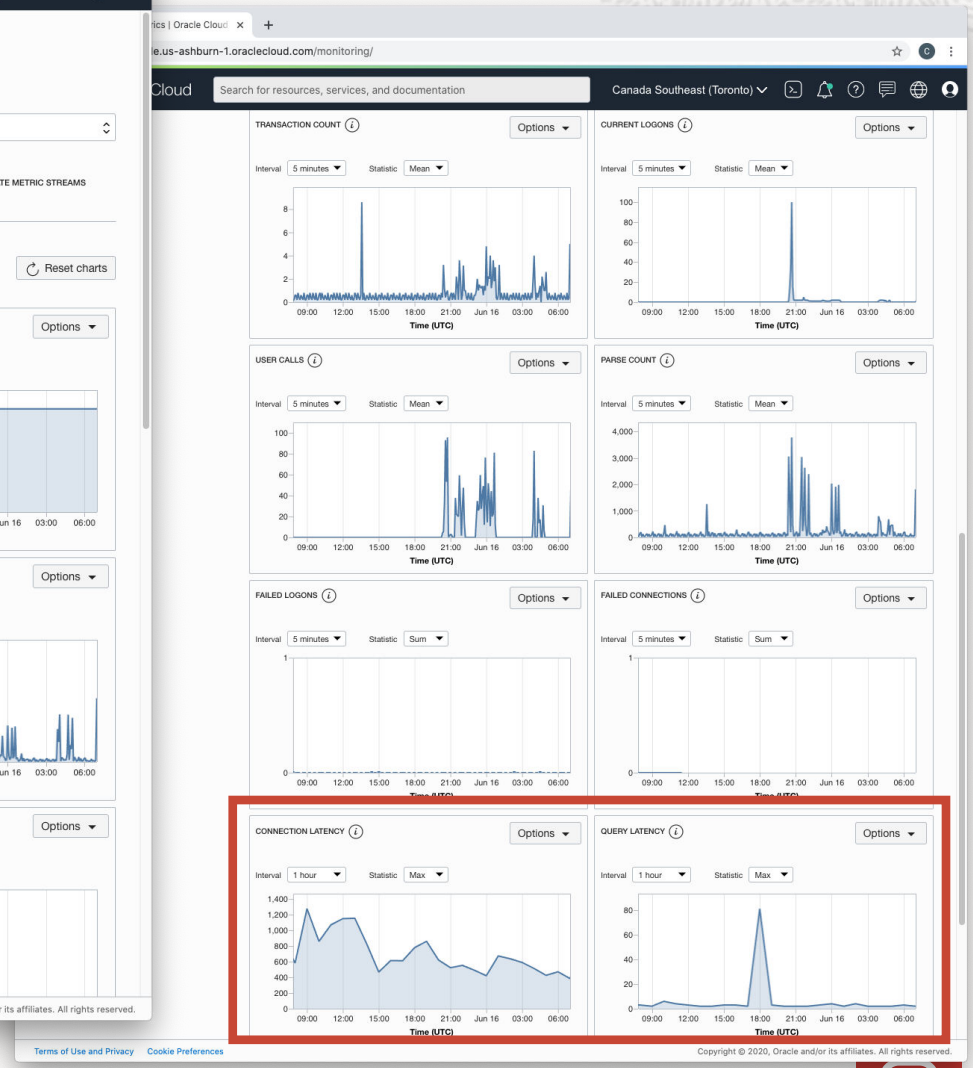


Sessions

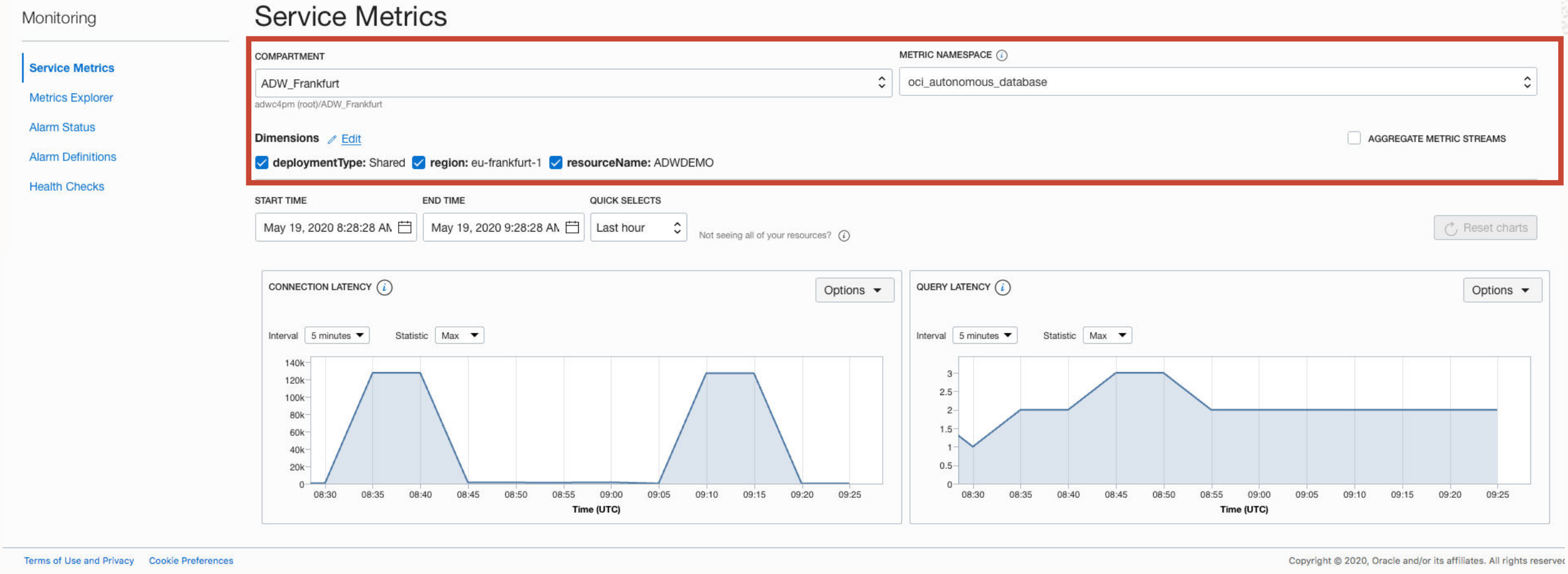
New Service Metrics in OCI Console





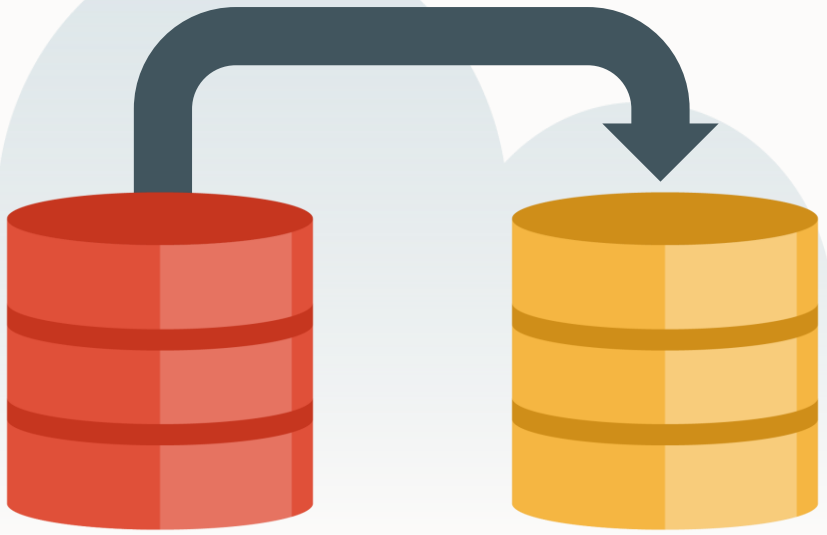


* For more details, see OCI Documentation



Cloning Enhancements

Cloning in Autonomous Database

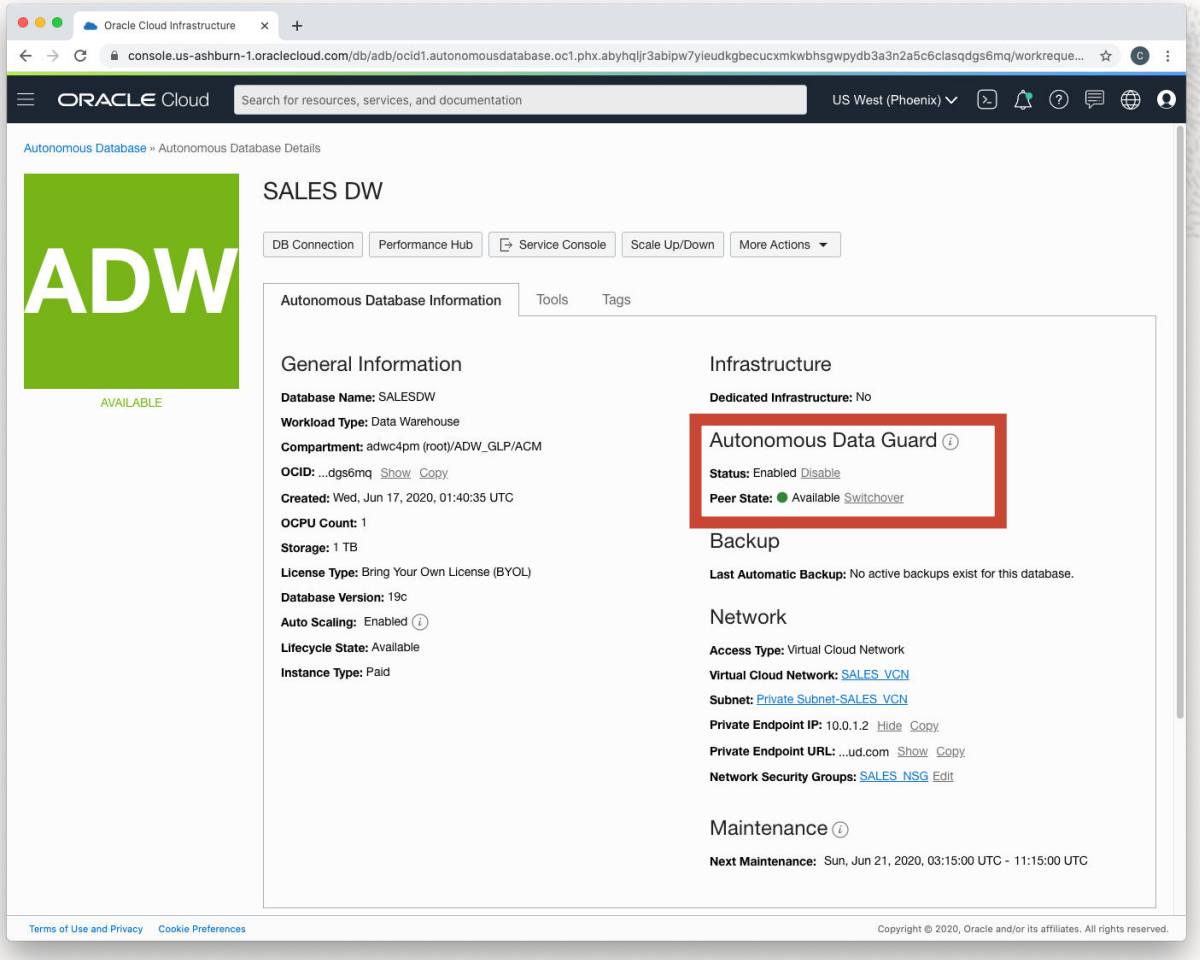


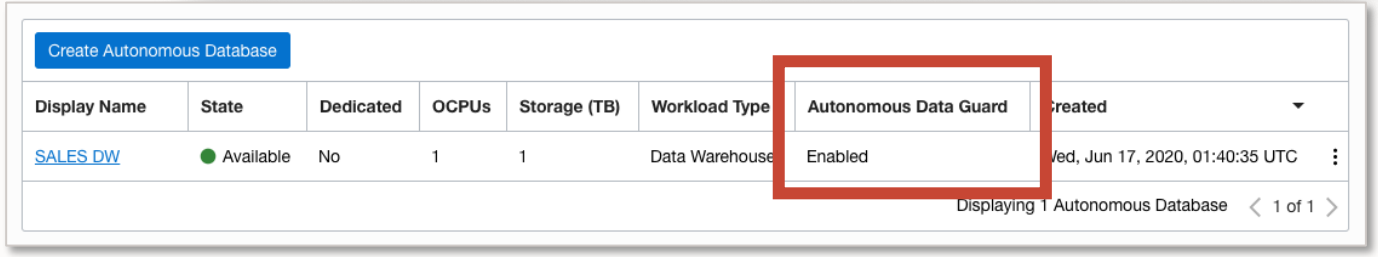
- Easy and fast cloning
- Today:
  - Full clone
  - Metadata-only clone
  - **Clone from backup**
    - **Choose a specific backup**
    - **Choose point-in-time**
- Coming soon:
  - Refreshable clone
  - Cross Regional clone

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





* For more details, see ADB Documentation

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
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