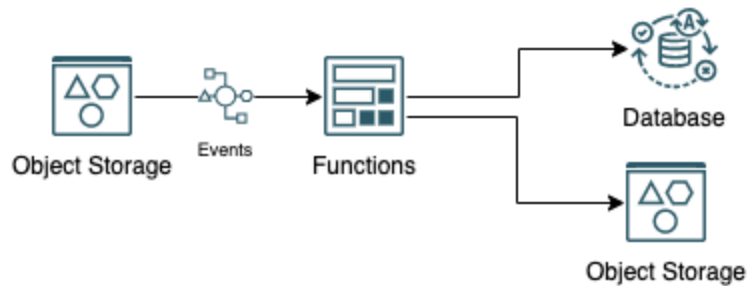


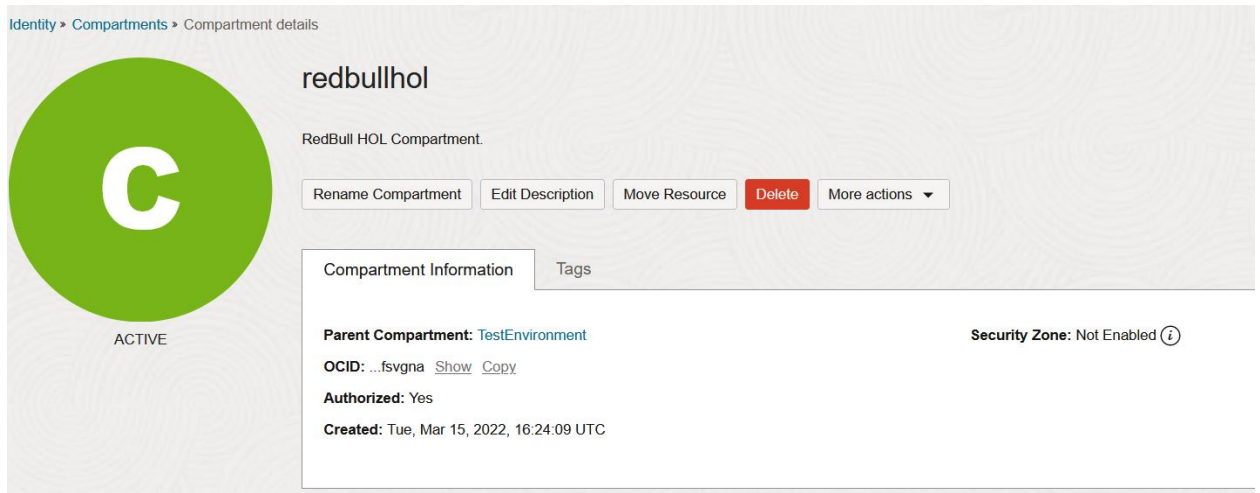
LABORATORIO CONSTRUCCIÓN DE APLICACIONES ORACLE CLOUD SERVERLESS

Este laboratorio esta enfocado a que puedas construir una aplicación Serverless en tu cuenta de Oracle cloud, el objetivo es construir una aplicación que realice la lectura, procesamiento y guardado de un archivo separado por comas(*.csv) en una base de datos autonomos creada previamente, chicha aplicacion tendra la siguiente aquitectura:



PRE-REQUISITOS

1. Usar el compartment existente para agrupar los recursos del laboratorio



2. Crear o usar una base de datos autónoma existente

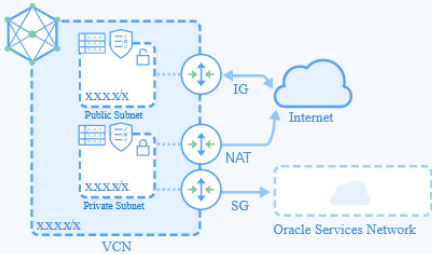
3. Creación o validación de existencias de la capa de red, debe existir una VCN y una subred, si ya tienes creada una VCN puedes usar la existente.

Start VCN Wizard

[Help](#)

☒ Create VCN with Internet Connectivity

☐ Add Internet Connectivity and Site-to-Site VPN to a VCN




Creates a VCN with a public subnet that can be reached from the internet. Also creates a private subnet that can connect to the internet through a NAT gateway, and also privately connect to the Oracle Services Network.

Includes: VCN, public subnet, private subnet, internet gateway (IG), NAT gateway (NAT), service gateway (SG).


Start VCN Wizard

[Cancel](#)


Configuration

 Resource availability checked successfully.

Basic Information

VCN Name 


RedBullVCN

Compartment 

redbullhol


cmteamcom (root)/TestEnvironment/redbullhol

Configure VCN and Subnets

VCN CIDR Block 


10.0.0.0/16

If you plan to peer this VCN with another VCN, the VCNs must not have overlapping CIDRs. [Learn more](#).

Public Subnet CIDR Block 

10.0.0.0/24

The subnet CIDR blocks must not overlap.

Private Subnet CIDR Block 

10.0.1.0/24

The subnet CIDR blocks must not overlap.

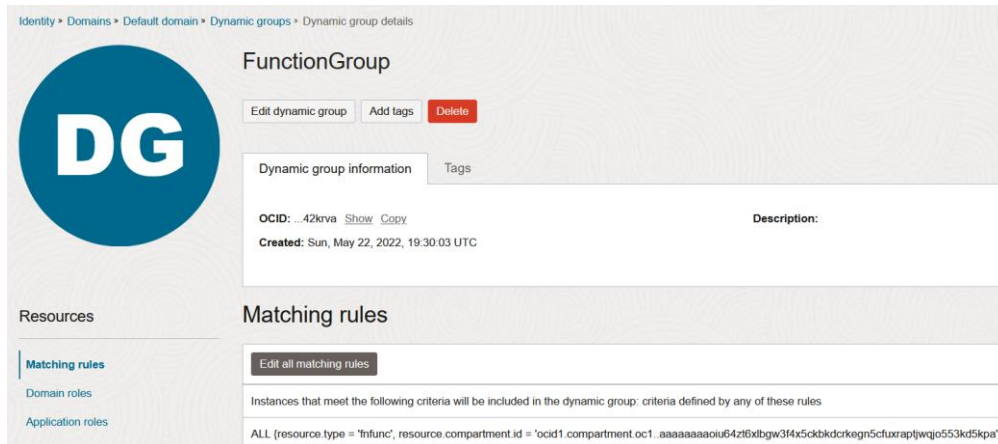
DNS Resolution

☒ Use DNS hostnames in this VCN

Required for Instance hostname assignment if you plan to use VCN DNS or a third-party DNS. This choice cannot be changed after the VCN is created. [Learn more](#).

 [Show Tagging Options](#)

- Creación de grupo dinámico y políticas de seguridad para manipulación de la infraestructura OCI por parte de la función serverless.



Estableciendo la siguiente regla para el grupo dinámico con el respectivo OCID del compartment donde se encuentre localizada la función serverless

```
ALL {resource.type = 'fnfunc', resource.compartment.id =  
'ocid1.compartment.xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx } }
```

- Definición de políticas IAM para la para manipulación de la infraestructura OCI por parte de la función serverless.

Create Policy

Name

FunctionPolicies

No spaces. Only letters, numerals, hyphens, periods, or underscores.

Description

Permisos Serverless

Compartment

cxmteammcrn (root)

Policy Builder Show manual editor ☒

Allow dynamic-group FunctionGroup to manage functions-family in tenancy
Allow dynamic-group FunctionGroup to use virtual-network-family in tenancy
Allow dynamic-group FunctionGroup to manage repos in tenancy
Allow dynamic-group FunctionGroup to inspect object-family in tenancy
Allow dynamic-group FunctionGroup to manage objects in tenancy
Allow dynamic-group FunctionGroup to manage autonomous-database-family in tenancy

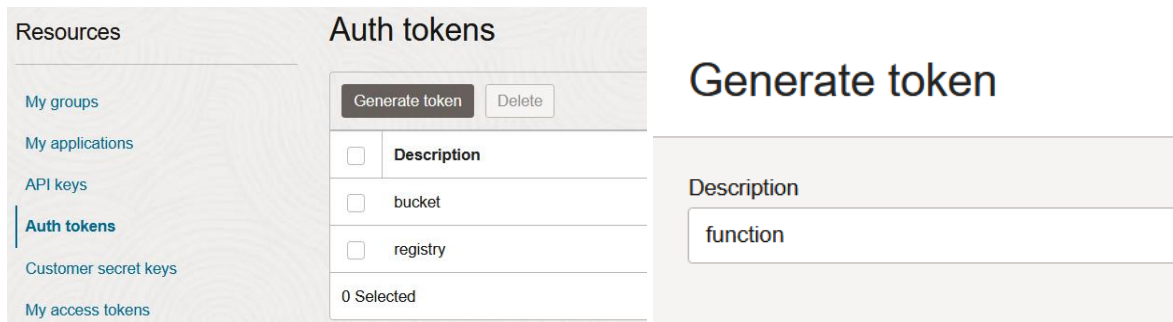
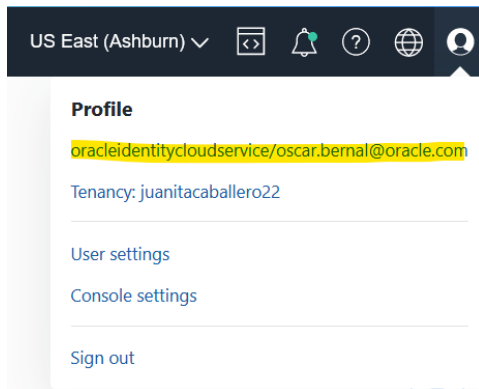
☐ Create Another Policy

Allow dynamic-group FunctionGroup to manage functions-family in tenancy
Allow dynamic-group FunctionGroup to use virtual-network-family in tenancy
Allow dynamic-group FunctionGroup to manage repos in tenancy

- Allow dynamic-group FunctionGroup to inspect object-family in tenancy
- Allow dynamic-group FunctionGroup to manage objects in tenancy
- Allow dynamic-group FunctionGroup to manage autonomous-database-family in tenancy
- Allow dynamic-group FunctionGroup to use ons-topics in tenancy

GENERAR AUTH TOKEN

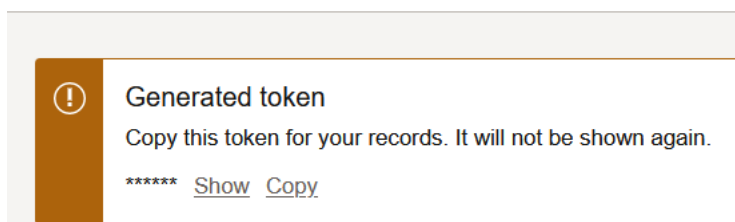
En la esquina superior derecha del portal encontremos el profile del usuario donde podremos generar el token de autenticación:



Guardar el valor generado por la consola el cual debemos usar en los pasos posteriores

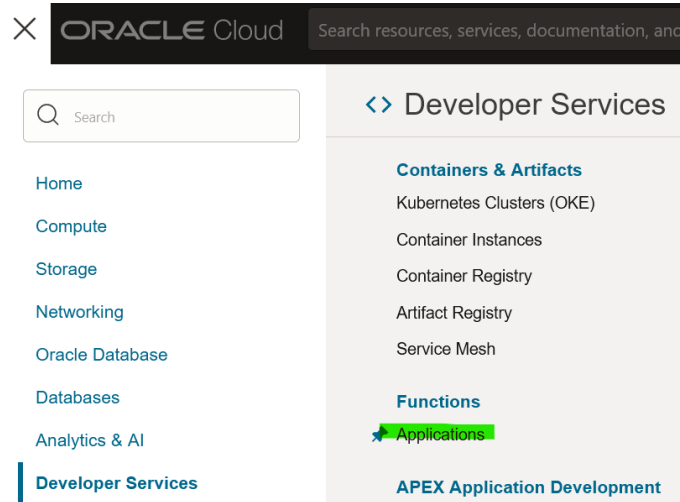
Ejemplo: v#1iD<8Ycx+)Z+XUR5av

Generate token



CREACION APLICACIÓN SERVERLESS & SETUP CLOUD SHELL ENVIROMENT

1. Creación de Aplicación Serverless



Create application

Name

OCI-Lab

VCN in **redbullhol** ([Change Compartment](#))

RedBullVCN

subnets in **redbullhol** ([Change Compartment](#))

Private Subnet-RedBullVCN (Regional) ✕

Tagging options

Add tags to organize your resources. [What can I](#)

Tag namespace

None (add a free-form tag) ⇅

Create Save as stack [Cancel](#)

2. Setup del ambiente cloud Shell para esto se deben seguir las instrucciones dadas en la consola en el siguiente apartado:

Resources

Getting started

Functions

Getting started

Cloud Shell setup

Quickly create, deploy and invoke functions using Cloud Shell

✓

Aquí un ejemplo de los comandos y el resultado de cada una de las ejecuciones en CloudShell:

Begin your Cloud Shell session

[Learn more about Cloud Shell](#)

1

Launch Cloud Shell

Listar los diferentes contextos serverless correspondientes a cada una de las regiones que se esten usando

2

Use the context for your region

```
fn list context
fn use context us-ashburn-1
```

```
Your Cloud Shell machine comes with 5GB of storage for your home directory. Your Cloud Shell (machine and home directory) are located in: US East (Ashburn).
You are using Cloud Shell in tenancy cxteamicrn as an OCI Local user oscar.bernal@oracle.com

Type 'help' for more info.
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn list context
CURRENT NAME      PROVIDER  API URL                                     REGISTRY
default           oracle-cs
* us-ashburn-1     oracle-cs https://functions.us-ashburn-1.oci.oraclecloud.com iad.ocir.io/idikzonisftg/consumption
us-phoenix-1      oracle-cs https://functions.us-phoenix-1.oci.oraclecloud.com phx.ocir.io/idikzonisftg/javierBM
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn use context us-ashburn-1

Fn: Context us-ashburn-1 currently in use
```

Setear el contexto para ser usado

3

Update the context with the function's compartment ID

```
fn update context oracle.compartment-id ocid1.compartment.oc1..aaaaa
```

```
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn update context oracle.compartment-id ocid1.compart
Current context updated oracle.compartment-id with ocid1.compartment.oc1..aaaaaas76tr4yeb6
```

Establecer un pre-fijo para el contexto del repositorio de imágenes Docker

4

Provide a unique repository name prefix to distinguish your function images from other people's. For example, with 'jdoe' as the prefix, the image path for a 'hello' function image is '`<region-key>.ocir.io/<tenancy-name>/jdoe/hello:0.0.1`'

`fn update context registry iad.ocir.io/idikzonisftg/[repo-name-prefix]`

Copy

Para este caso ingresamos el prefijo **redbull**

```
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn update context registry iad.ocir.io/idikzonisftg/redbull
Current context updated registry with iad.ocir.io/idikzonisftg/redbull
oscar_bern@cloudshell:~ (us-ashburn-1)$
```

Como en los pre-requisitos ya tenemos generado el token de autorización el paso 5 lo **omitiremos**

5

[Generate an Auth Token](#)

Establecer conexión al repositorio de imágenes

6

Log into the Registry using the Auth Token as your password

`docker login -u 'idikzonisftg/oscar.bernal@oracle.com' iad.ocir.io`

Debemos ingresar el token creado en pasos previos cuando el sistema nos solicite el password

```
oscar_bern@cloudshell:~ (us-ashburn-1)$ docker login -u 'idikzonisftg/oscar.bernal@oracle.com' iad.ocir.io
Password:
WARNING! Your password will be stored unencrypted in /home/oscar_bern/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store
Login Succeeded
```

Para este ejercicio omitiremos los pasos posteriores ya que en el siguiente repositorio de Gitlab tendremos disponible el código de la aplicación y únicamente tendremos que importarlo y compilarlo en nuestra cuenta cloud.

CONSTRUCCIÓN DE APLICACIÓN

1. En la sesión de CloudShell vamos importar el código de la aplicación, con el siguiente comando:

`git clone https://gitlab.com/oscarbm7/oci-serverless-python.git`

Cloud Shell

```
oscar_bern@cloudshell:~ (us-ashburn-1)$ git clone https://gitlab.com/oscarbm7/oci-serverless-python.git
Cloning into 'oci-serverless-python'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 2.79 KiB | 2.79 MiB/s, done.
oscar_bern@cloudshell:~ (us-ashburn-1)$
```

2. Ingresamos a la carpeta importada

```
oscar_bern@cloudshell:~ (us-ashburn-1)$ cd oci-serverless-python/
```

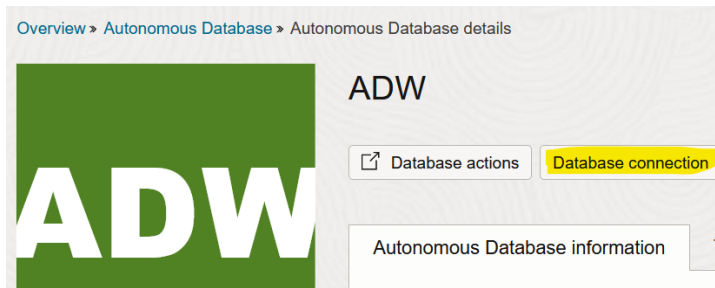
3. Ajustar el archivo de configuración de aplicación de acuerdo a mi ambiente (conexiones, base de datos, passwords), para la cual editaremos el archivo func.yaml con el editor de Linux Nano:

```
oscar_bern@cloudshell:oci-serverless-python (us-ashburn-1)$ nano func.yaml
```

```
GNU nano 2.3.1 File: func.yaml

schema_version: 20180708
name: load-file
version: 0.0.106
runtime: python
build_image: fnproject/python:3.9-dev
run_image: fnproject/python:3.9
entrypoint: /python/bin/fdk /function/func.py handler
memory: 2048
timeout: 300
config:
  ADB_OCID: ocid1.autonomousdatabase.oc1.iad.aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
  DBPWD: YYxxxxxx123***
  DBSVC: XXXYYYYhigh
  DBUSER: ADMIN
  TNS_ADMIN: /tmp/dbwallet
```

Para el parámetro DBSVC se deben remitir a las conexiones de la base de datos autónomos y tomar cualquiera de las disponibles, por ejemplo:



Connection Strings

Use the following connection strings or TNS names for your connections. See the [documentation](#) for details.

TLS Authentication

Mutual TLS

TNS Name ⓘ	Connection String ⓘ
adwdemo_high	...ecurity=(ssl_server_dn_match=yes))) Show Copy
adwdemo_low	...ecurity=(ssl_server_dn_match=yes))) Show Copy
adwdemo_medium	...ecurity=(ssl_server_dn_match=yes))) Show Copy

Despues de editar el archivo basta con guardar los cambios con la combinaci3n de teclas Ctrl +X

4. Validar que el archivo fue actualizado con el comando: `cat func.yaml`

```
oscar_bern@cloudshell:oci-serverless-python (us-ashburn-1)$ cat func.yaml
schema_version: 20180708
name: load-file
version: 0.0.106
runtime: python
build_image: fnproject/python:3.9-dev
run_image: fnproject/python:3.9
entrypoint: /python/bin/fdk /function/func.py handler
memory: 2048
timeout: 300
config:
  ADB_OCID: ocid1.autonomousdatabase.oc1.iad.aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
  DBPWD: YYxxxxxx123***
  DBSVC: XXXYYYY_high
  DBUSER: ADMIN
  TNS_ADMIN: /tmp/dbwallet
```

5. Compilar la aplicación serverless: `fn -v deploy --app RedBullApp`

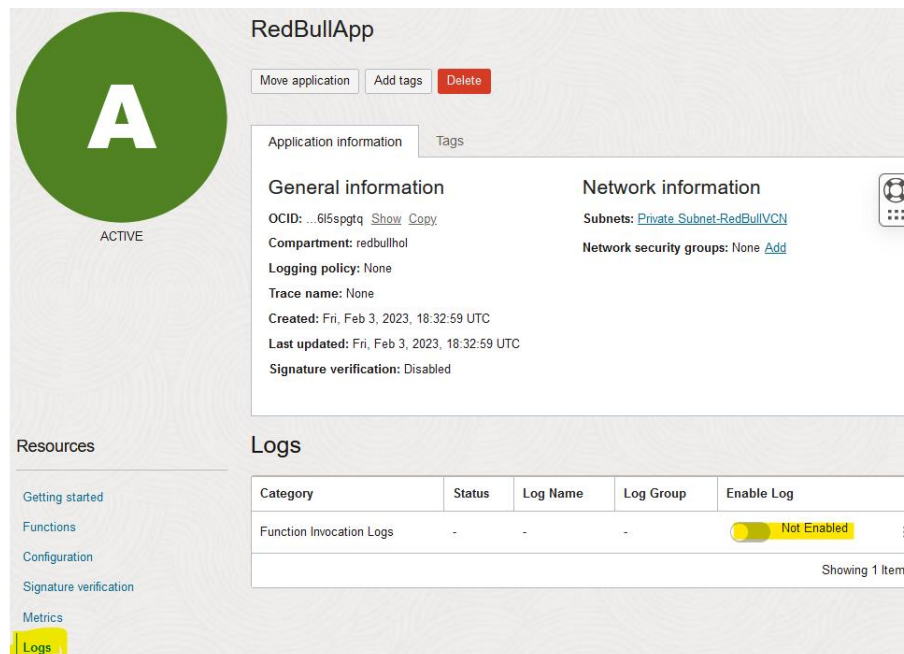
```
oscar_bern@cloudshell:oci-serverless-python (us-ashburn-1)$ fn -v deploy --app RedBullApp
Deploying load-file to app: RedBullApp
Bumped to version 0.0.97
Using Container engine docker
Building image iad.ocir.io/idikzonisftg/redbull/load-file:0.0.97
Dockerfile content
-----
FROM fnproject/python:3.9-dev as build-stage
WORKDIR /function
ADD requirements.txt /function/

RUN pip3 install --target /python/ --no-cache --no-cache-dir -r requirements.txt &&\
    rm -fr ~/.cache/pip /tmp* requirements.txt func.yaml Dockerfile .venv &&\
    chmod -R o+r /python
```

Si todo esta correcto el resultado en el CloudShell debe ser:

Successfully created function

6. Habilitar LOGS para rastreo de errores e información relevante



The screenshot displays the Oracle Cloud Console interface for the 'RedBullApp' function. On the left, a green circle with a white 'A' represents the application icon, with the status 'ACTIVE' below it. The main content area is divided into two tabs: 'Application information' and 'Tags'. The 'Application information' tab is active, showing 'General information' and 'Network information'. The 'General information' section includes fields for OCID, Compartment, Logging policy, Trace name, Created, Last updated, and Signature verification. The 'Network information' section shows Subnets and Network security groups. Below the application information, there is a 'Resources' section with links for Getting started, Functions, Configuration, Signature verification, Metrics, and Logs. The 'Logs' section is highlighted, showing a table with columns for Category, Status, Log Name, Log Group, and Enable Log. The table contains one row for 'Function Invocation Logs' with a status of 'Not Enabled' and a toggle switch to enable it. The bottom right of the logs section indicates 'Showing 1 Item'.

Category	Status	Log Name	Log Group	Enable Log
Function Invocation Logs	-	-	-	Not Enabled

Showing 1 Item

Enable Log

For more information about service logs, see [documentation](#).

Compartment

redbullhol

oxmteamman (root)/TestEnvironment/redbullhol

Log Group ⓘ

Select a log group

☒ Auto-create a default Log Group

☐ Create a new Log Group

Log Name

RedBullApp_invoke

Log Retention

1 month (default)

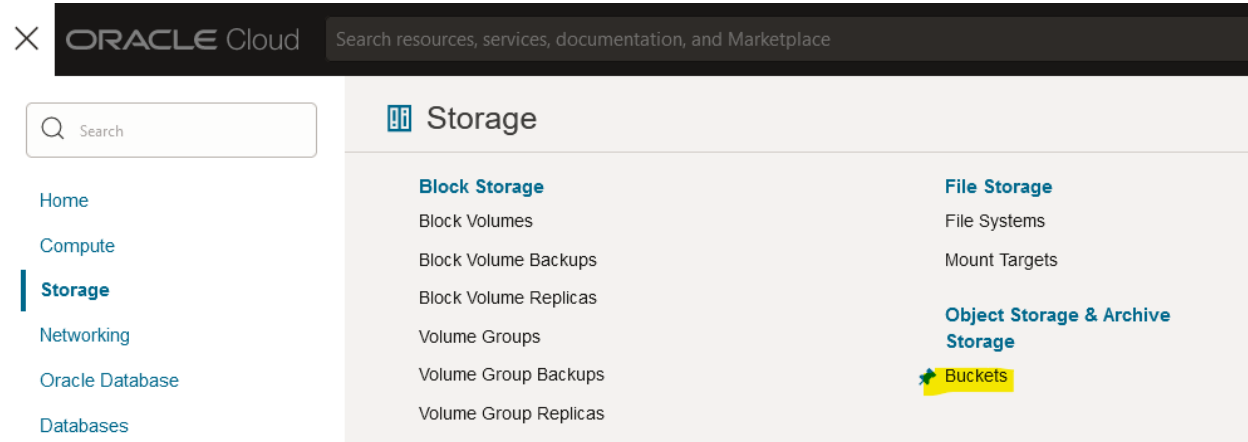
1 month equals to 30 days

Enable Log

[Cancel](#)

CREACION BUCKET PARA ARCHIVOS

1. Crear Bucket en el servicio de Object storage



IMPORTANTE: habilitar la opción de emisión de eventos, ya que esto es lo que ejecutara la función serverless para la carga del respectivo archivo.

Create Bucket

Bucket Name
Files

Default Storage Tier
☒ Standard
☐ Archive

The default storage tier for a bucket can only be specified during creation. Once set, you cannot change it.

☐ Enable Auto-Tiering
Automatically move infrequently accessed objects from the Standard tier to less expensive storage tiers.

☐ Enable Object Versioning
Create an object version when a new object is uploaded, an existing object is overwritten, or an object is deleted.

☒ **Emit Object Events**
Create automation based on object state changes using the [Events Service](#).

☐ Uncommitted Multipart Uploads Cleanup
Create a lifecycle rule to automatically delete uncommitted multipart uploads older than 7 days.

Encryption
☒ Encrypt using Oracle managed keys
Leaves all encryption-related matters to Oracle.

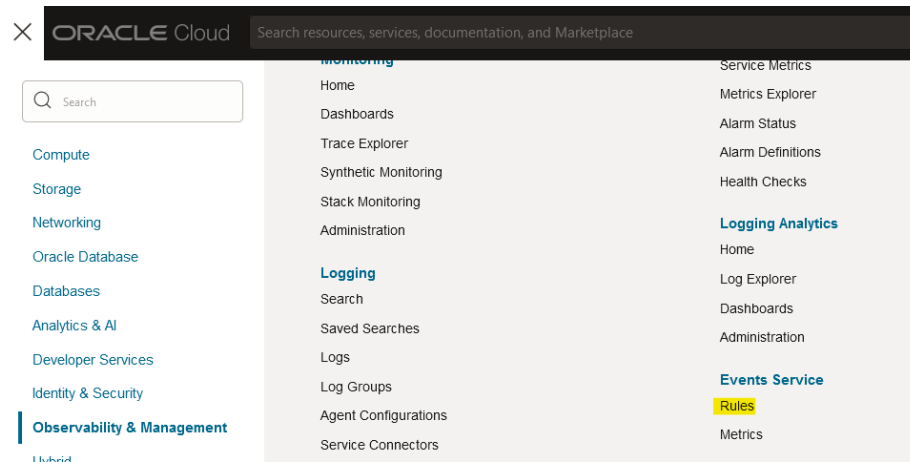
☐ Encrypt using customer-managed keys
Requires a valid key from a vault that you have access to. [Learn more](#)

Tags

Create Cancel

CONFIGURACION SERVICE CONNECTOR HUB

En el módulo de Observability



Crear la regla que ejecutara la función cada vez que se cargue el archivo

Create Rule [Help](#)

Display Name:

Description:

Rule Conditions

Limit the events that trigger actions by defining conditions based on event types, attributes, and filter tags. [Learn more](#)

Condition	Service Name	Event Type
Event Type	Object Storage	Object - Create

To emit events for object state changes, enable Emit Object Events on the bucket details page. [Learn more](#).

Condition	Attribute Name	Attribute Values
Attribute	bucketName	Files

[+ Another Condition](#)

Rule Logic

```
MATCH event WHERE (
  eventType EQUALS ANY OF (
    com.oraclecloud.objectstorage.createobject
  )
  AND (
    bucketName MATCHES ANY OF (
      Files
    )
  )
)
```

[View example events \(JSON\)](#)

[Validate Rule](#)

Actions

Actions trigger for the specified event conditions. [Learn more](#).

Action Type	Function Compartment	Function Application	Function
Functions	redbullhol	RedBullApp	load-file

[Create Rule](#) [Save as stack](#) [Cancel](#)

PROBAR APLICACIÓN

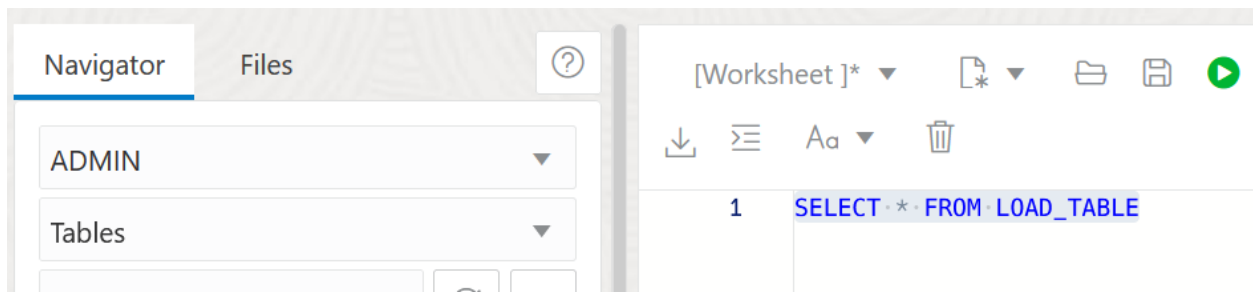
Finalmente puedes probar tu aplicación únicamente cargando el archivo en el bucket del object storage:

<https://objectstorage.us-ashburn-1.oraclecloud.com/p/MSmBkReA-TET1pfUpsvX5ZsC6uTFZpU140p7t7uitURUJ9hwOKOI0z0O5mn7stXJ/n/idikzonisftg/b/DataFile/o/Employees.csv>

The screenshot displays the Oracle Cloud Object Storage interface. On the left, the 'Bucket Details' page for a bucket named 'B' is shown. It includes a 'Files' section with buttons for 'Edit Visibility', 'Move Resource', 'Re-encrypt', 'Add tags', and 'Delete'. Below this, the 'Bucket Information' tab is active, showing details like Namespace, Compartment, Created date, ETag, and OCID. The 'Usage' section shows 1 object and 128 bytes. On the right, the 'Upload Objects' modal is open. It has a text input for 'Object Name Prefix' (optional), a 'Storage Tier' dropdown set to 'Standard', and a 'Choose Files from your Computer' section. A file named 'Employees.csv' (128 bytes) is selected. At the bottom of the modal are 'Upload' and 'Cancel' buttons.

Después de cargado el archivo será procesado por la función Serverless y cargado en la base de datos en la tabla **LOAD_TABLE**

The screenshot shows the Oracle Cloud Autonomous Database (ADW) interface. The top section is titled 'ADW' and includes a 'Database actions' button. Below this, the 'General information' tab is active, showing the 'Database name: ADW'. The bottom section is titled 'Development' and features an 'SQL' icon and the text 'Execute queries and scripts, browse and manage your database object...'. The interface is clean and modern, with a green and white color scheme.



The screenshot shows the 'Query Result' pane in Oracle SQL Developer. The query `SELECT * FROM LOAD_TABLE` has been executed, resulting in a table with 6 rows. The table has columns **ID**, **NAME**, and **LAST_NAME**. The execution time was 0.003 seconds.

	ID	NAME	LAST_NAME
1	1	Javier	Bernal
2	2	Maria	Sarmiento
3	3	Jose	Borda
4	4	Nathaly	Rodriguez
5	5	Carolina	Gomez
6	6	Leonardo	Beltran

Bibliografía:

<https://docs.oracle.com/en-us/iaas/Content/Functions/Concepts/functionoverview.htm>

<https://oracle.github.io/python-oracledb/>

<https://fnproject.io/>

<https://medium.com/oracledevs/an-exploration-using-oci-functions-4c5d4e70d00c>

<https://oracle-cloud-infrastructure-python-sdk.readthedocs.io/en/latest/api>