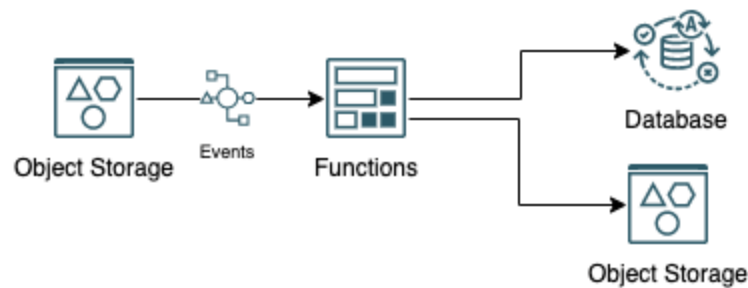


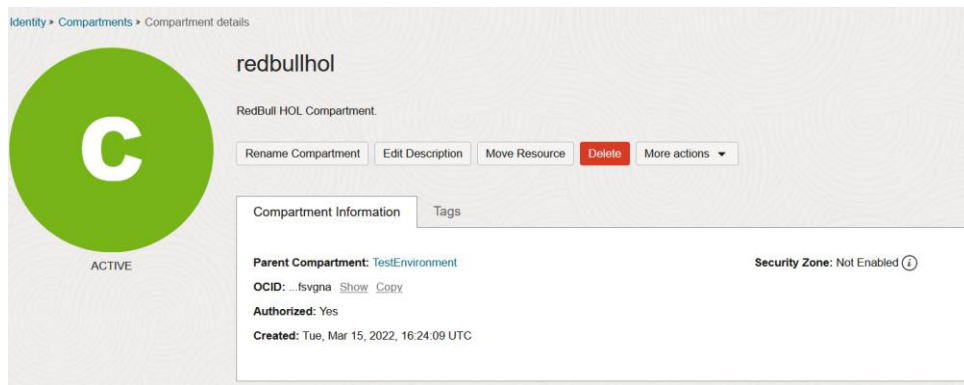
LABORATORIO CONSTRUCCIÓN DE APLICACIONES ORACLE CLOUD SERVERLESS

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 autonomas creada previamente, dicha aplicación 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, para esto **copia el OCID de esta base de datos lo necesitaras más adelante**
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

contteamcom (/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.

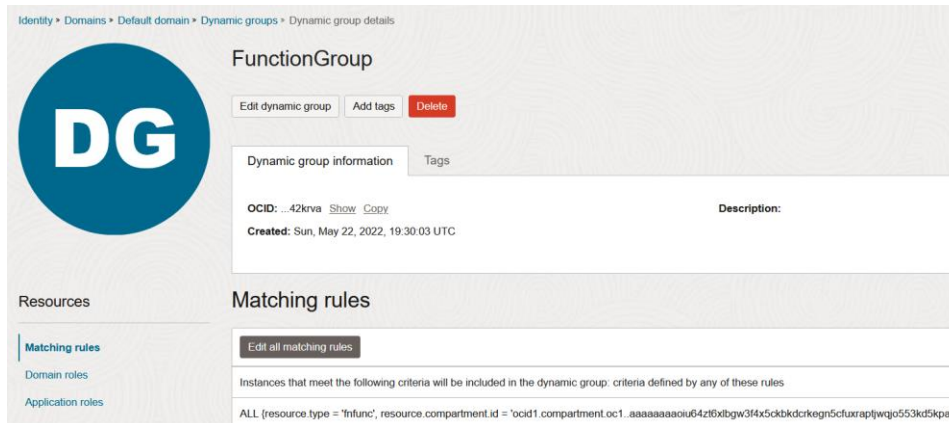
DNS Resolution

☒ 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.xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx**'}

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

Create Policy

Name
FunctionPolicies

Description
Permisos Serverless

Compartment
cxmteamncrn (root)

Policy Builder ☒ Show manual editor

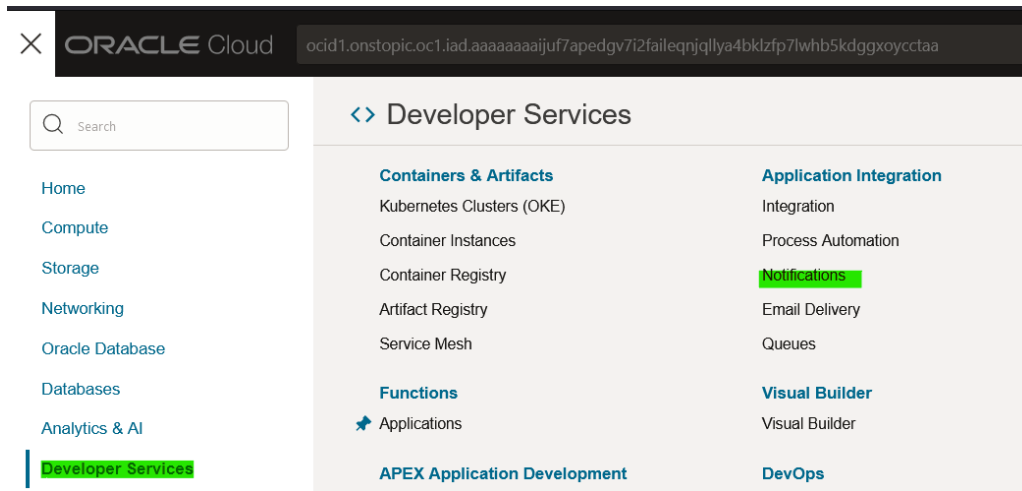
Allow dynamic-group **FunctionGroup** to manage functions-family in tenancy
 Allow dynamic-group **FunctionGroup** to use virtual-network-family in tenancy
 Allow dynamic-group **FunctionGroup** to manage repos in tenancy
 Allow dynamic-group **FunctionGroup** to inspect object-family in tenancy
 Allow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

Create Cancel ☐ 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

TOPIC PARA NOTIFICACIONES

En el menu general debemos ir al menú de notificaciones



Y crear un topic con el nombre de empresa Ejemplo: ACME CORP

Create Topic

To create a topic in a different compartment, [click here](#)


Name


MI-CUENTA-CLOUD

Topic name must contain fewer than 256 characters. Only alphanumeric characters and hyphens are allowed.

Description *Optional*

Description must contain fewer than 256 characters.

 [Show advanced options](#)

 Once the topic is created, an administrator can manage the topic.

[Create](#) [Cancel](#)

Copia el OCID del topic lo necesitaras más adelante

Dentro del TOPIC se debe crear una suscripción para el correo del **COMISARIO DE CARRERA**, a este correo llegarán las notificaciones que serán fundamental para los puntajes y clasificación.

Create Subscription

Create Subscription

View [steps for creating subscriptions](#) and learn about [supported subscription protocols](#)

Configure Subscription

Protocol

Email

Email

CORREO COMISARIO DE CARRERO RACING TO THE CLOUD

❌ Enter a valid email address.



Email notifications use the sender "noreply" at a region-specific notification endpoint.
Example sender: noreply@notification.us-ashburn-1.oci.oraclecloud

[Creating a subscription for Email](#)

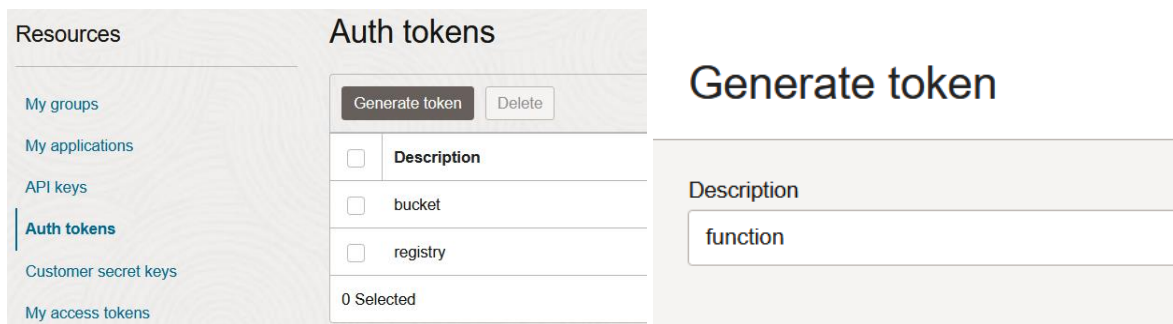
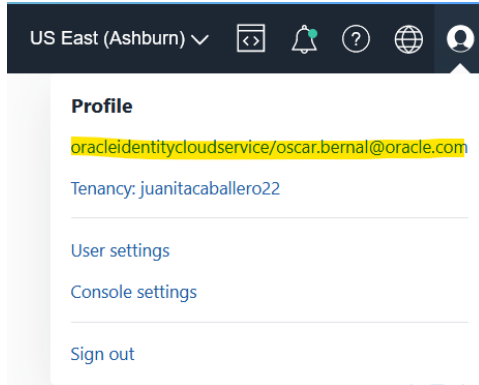
Show advanced options

Create

[Cancel](#)

GENERAR AUTH TOKEN

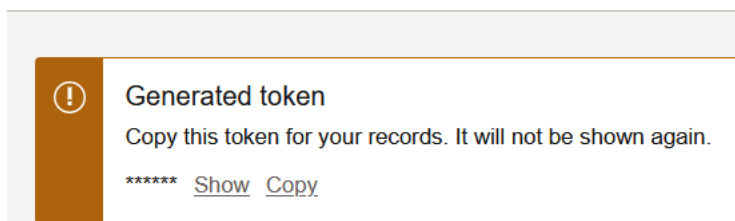
En la esquina superior derecha del portal encontremos el profile del usuario donde podremos generar el token de autenticación:



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

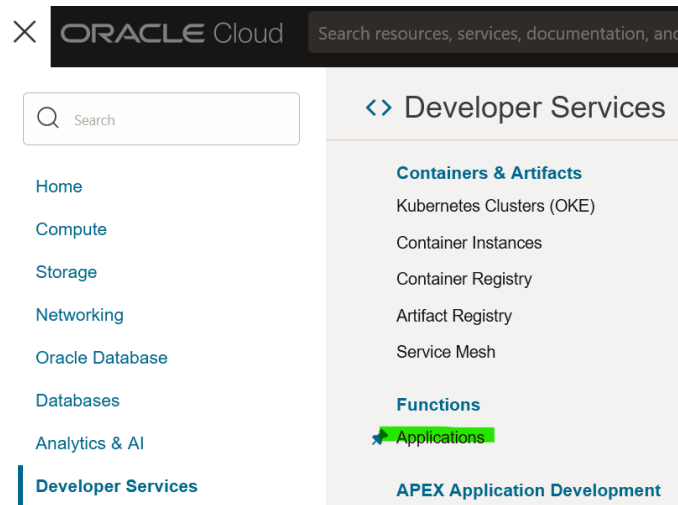
Ejemplo: v#1iD<8Ycx+)Z+XUR5av

Generate token



CREACION APLICACIÓN SERVERLESS & SETUP CLOUD SHELL ENVIROMENT

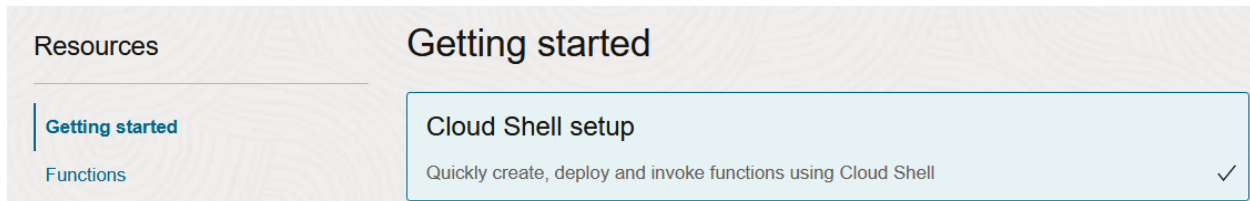
1. Creación de Aplicación Serverless



Crear una aplicación con el nombre **RedBullApp**

The screenshot shows the 'Create application' form. The 'Name' field contains 'RedBullApp' (highlighted with a green box). The 'VCN in redbullhol' dropdown is set to 'RedBullVCN' (with a '(Change compartment)' link). The 'subnets in redbullhol' dropdown is set to 'Select up to 3 Subnets' (with a '(Change compartment)' link). Below these is a 'Tagging options' section with the text 'Add tags to organize your resources. What can I do'. It has two input fields: 'Tag namespace' with a dropdown menu showing 'None (add a free-form tag)' and 'Tag key' which is empty. At the bottom are three buttons: 'Create', 'Save as stack', and 'Cancel'.

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

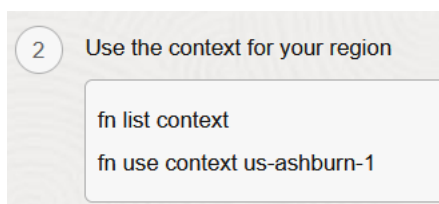


Aquí un ejemplo de los comandos y el resultado de cada una de las ejecuciones en CloudShell:

Dara clic en el botón “Launch Cloud Shell”



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



```
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 cxmtteamcrn 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
default           oracle-cs
* us-ashburn-1     oracle-cs     https://functions.us-ashburn-1.oci.oraclecloud.com
  us-phoenix-1     oracle-cs     https://functions.us-phoenix-1.oci.oraclecloud.com
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn use context us-ashburn-1

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

Actualizar el contexto para ser usado

3 Update the context with the function's compartment ID

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

```
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn update context oracle.compartment-id ocid1.compart
Current context updated oracle.compartment-id with ocid1.compartment.oc1..aaaaaaas76tcr4yeb6
```

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-namespace>/jdoe/hello:0.0.1'

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

[Copy](#)

Establecer el repositorio de imágenes para este caso **debes reemplazar [repo-name-prefix] por redbull**, en el comando dado por la consola quedado así:

```
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, con el siguiente comando: ***cd oci-serverless-python***

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

- 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, con el siguiente comando: **`nano func.yaml`**

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

Debemos editar los valores resaltados recopilados previamente:

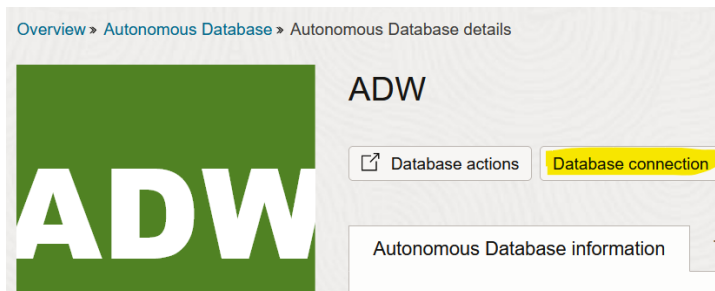
```

GNU nano 2.3.1                                     File:
schema_version: 20180708
name: load-file
version: 0.0.113
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:
TOPIC_OCID: ocid1.onstopic.oc1.iad.aaaaaaaaxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
ADB_OCID: ocid1.autonomousdatabase.oc1.iad.yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy
COMPANY: ACME CORP XXXXXXXXXX
DBPWd: XXXXXXXYYY2121**
DBSVC: ZZZZZ_high
DBUSER: ADMIN
TNS_ADMIN: /tmp/dbwallet

```

TOPIC_OCID es el **tema de notificaciones** que creamos en pasos anteriores, al igual que ADB_OCID(creada en sesiones anteriores)

Para el parámetro **DBSVC** te debes remitir a las conexiones de la base de datos autónomos



Y tomar cualquiera de las disponibles, por ejemplo: **adwdemo_medium** (este valor según corresponda a tu base de datos y lo debes poner en el archivo func.yaml)

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

Después de editar el archivo basta con guardar los cambios con la combinación 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, con el comando: ***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'. The main panel shows the application's general information, including its OCID, compartment, and network details. The 'Logs' section is highlighted in the left sidebar, and a modal window titled 'Enable Log' is open on the right. The modal provides options to enable logging for the 'RedBullApp_invoke' log group, with a default retention of 1 month. The 'Enable Log' button is highlighted in the bottom right corner of the modal.

RedBullApp

Move application Add tags Delete

Application information Tags

General information

OCID: ...6l5spgtq [Show](#) [Copy](#)

Compartment: redbullhol

Logging policy: None

Trace name: None

Created: Fri, Feb 3, 2023, 18:32:59 UTC

Last updated: Fri, Feb 3, 2023, 18:32:59 UTC

Signature verification: Disabled

Network information

Subnets: [Private Subnet-RedBullVCN](#)

Network security groups: None [Add](#)

Resources

- Getting started
- Functions
- Configuration
- Signature verification
- Metrics
- Logs**

Logs

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

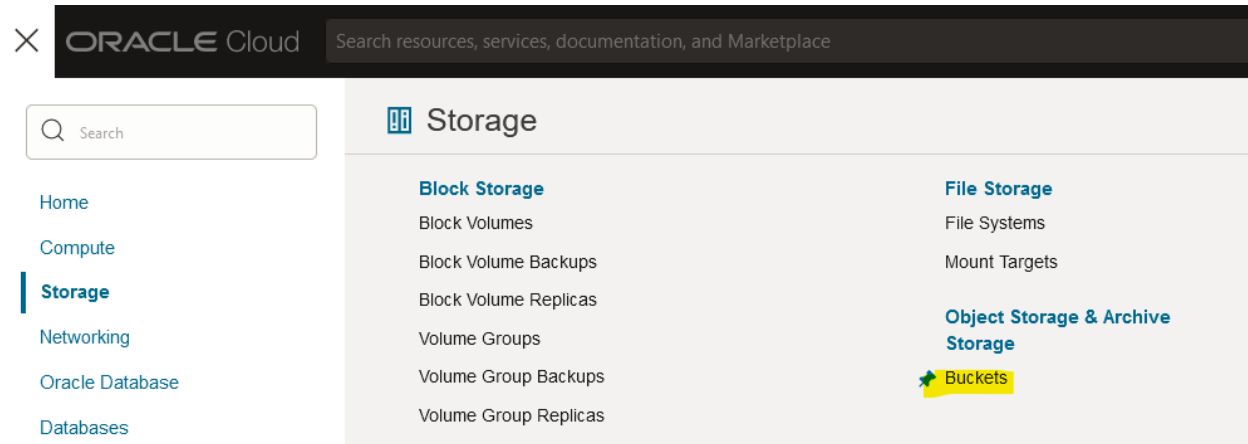
1 month (default)

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.

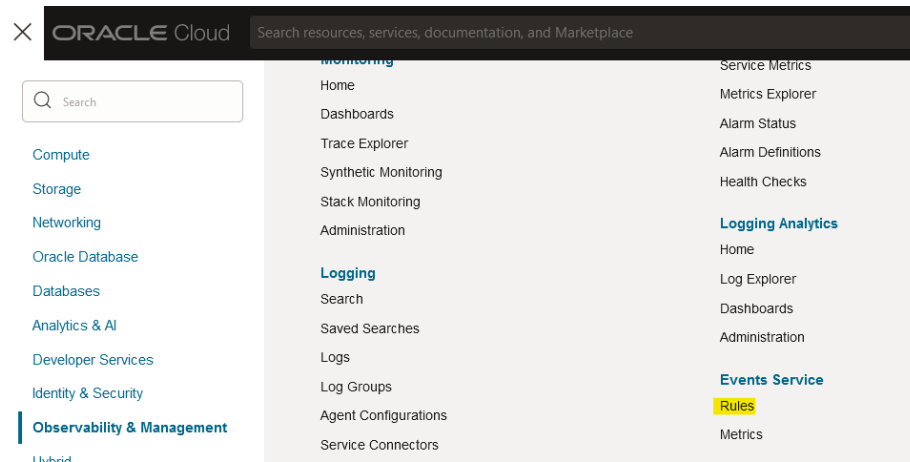
☐ Encrypt using customer-managed keys
Requires a valid key from a vault that you have access to. [Learn more](#)

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
load_files

Description
Describe what the rule does. Example: Sends a notification when backups complete.

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

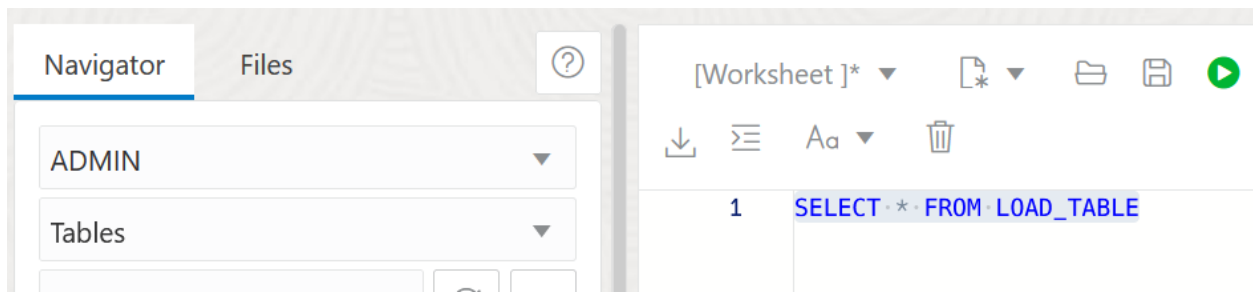
Finalmente puedes probar tu aplicación únicamente cargando el archivo en el bucket del object storage:

<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 visible. It shows general information such as Namespace (idikzonisftg), Compartment (redbullhol), and Usage (1 object, 128 bytes). On the right, an 'Upload Objects' modal is open. It includes 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. Below the file list, it shows '1 files, 128 bytes total' and a link to 'Show Optional Response Headers and Metadata'. 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, titled 'ADW', includes a 'Database actions' button. Below this, there are sections for 'Autonomous Database' and 'General information', with the 'Database name' listed as 'ADW'. The bottom section, titled 'Development', features an 'SQL' icon and a description: 'Execute queries and scripts, browse and manage your database object...'



En el editor digitar la siguiente instrucción SQL: **SELECT * FROM LOAD_TABLE**

	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>