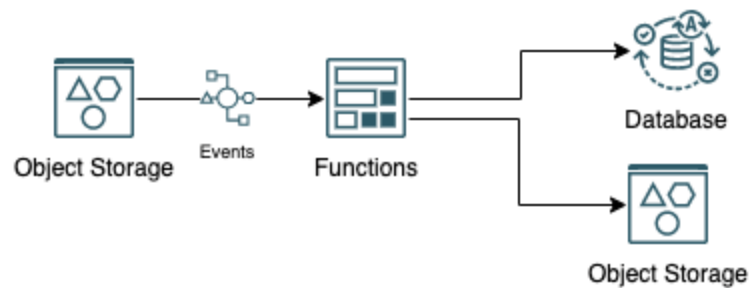


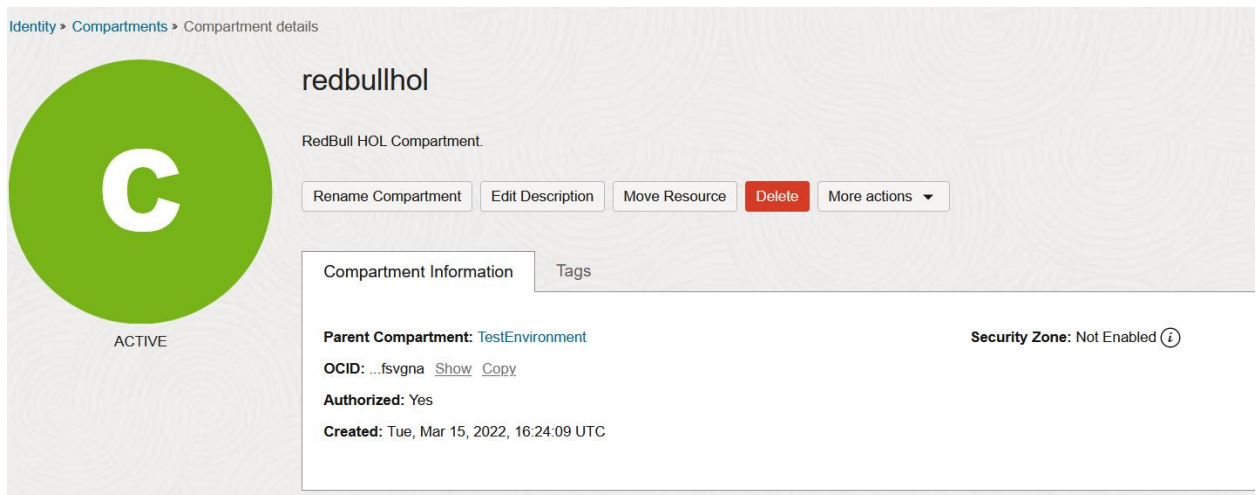
LABORATORIO CONSTRUCCIÓN DE APLICACIONES ORACLE CLOUD SERVERLESS

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, dicha aplicación tendra la siguiente aquitectura:



PRE-REQUISITOS

1. Usar el compartiment 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.

The screenshot shows the 'Dynamic group details' page in the OCI Identity console. The breadcrumb trail is 'Identity > Domains > Default domain > Dynamic groups > Dynamic group details'. A large blue circle with 'DG' is on the left. The group name 'FunctionGroup' is at the top, with buttons for 'Edit dynamic group', 'Add tags', and 'Delete'. Below this, there are tabs for 'Dynamic group information' and 'Tags'. The 'Dynamic group information' tab is active, showing the OCID as 'ocid1.dynamic-group.oc1..aaaaaaaou64z8xbgw3f4x5cbbkdrkegn5ctuxraptlwqjo553kd5kpa' and the creation time as 'Sun, May 22, 2022, 19:30:03 UTC'. There is also a 'Description' field. On the left sidebar, under 'Resources', the 'Matching rules' section is selected. The 'Matching rules' section shows a button 'Edit all matching rules' and a list of rules. One rule is visible: 'ALL {resource.type = 'fnfunc', resource.compartment.id = 'ocid1.compartment.oc1..aaaaaaaou64z8xbgw3f4x5cbbkdrkegn5ctuxraptlwqjo553kd5kpa'}'.

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.aaaaaaaaaaaaaaaaaaaaaaaaaaaa'}
```

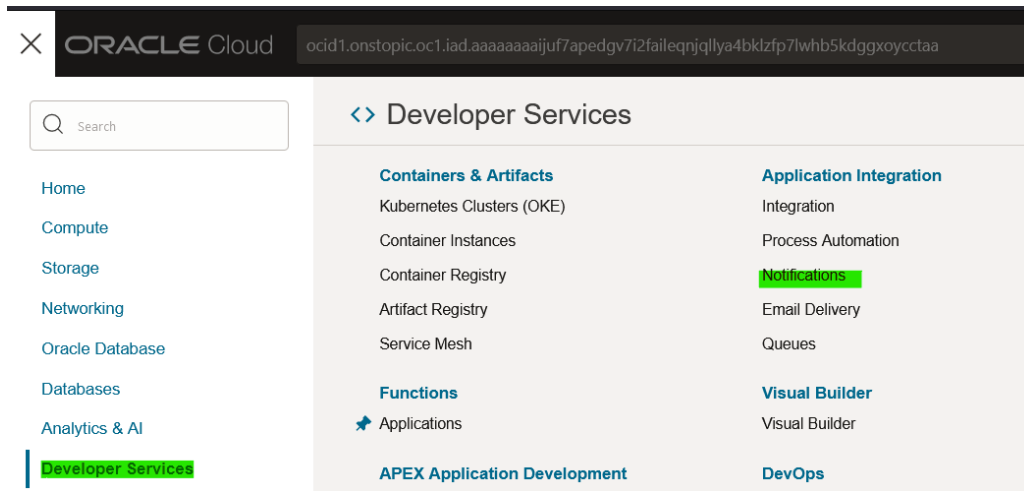
- Definición de políticas IAM para la para manipulación de la infraestructura OCI por parte de la función serverless.

The screenshot shows the 'Create Policy' page in the OCI Identity console. The 'Name' field is 'FunctionPolicies'. The 'Description' field is 'Permisos Serverless'. The 'Compartment' field is 'cxmleammon (root)'. The 'Policy Builder' section is active, showing a list of permissions: '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', and 'Allow dynamic-group FunctionGroup to use ons-topics in tenancy'. At the bottom, there are buttons for 'Create', 'Cancel', and a checkbox for '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](#)

Info Once the topic is created, an administrator must configure 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](#)

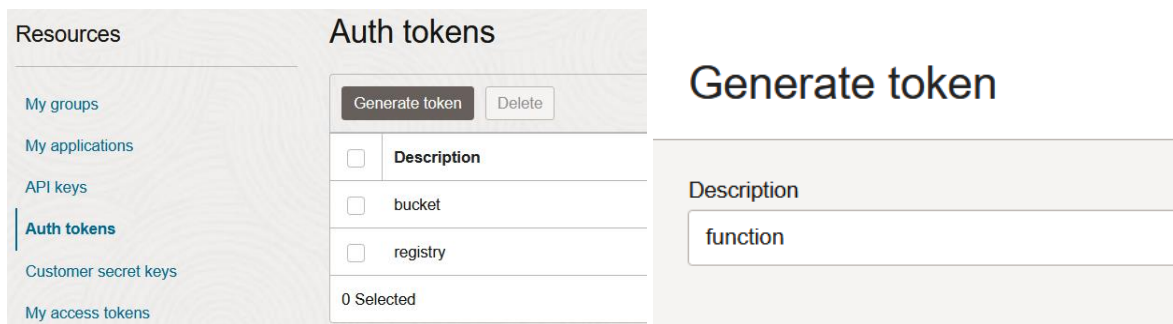
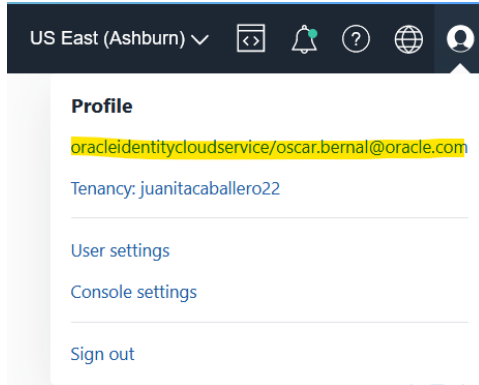
Show advanced options

Create

[Cancel](#)

GENERAR AUTH TOKEN

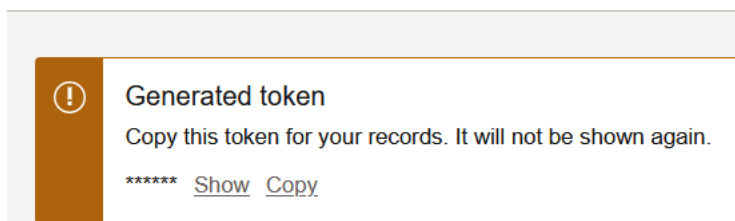
En la esquina superior derecha del portal encontremos el profile del usuario donde podremos generar el token de autenticación:



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

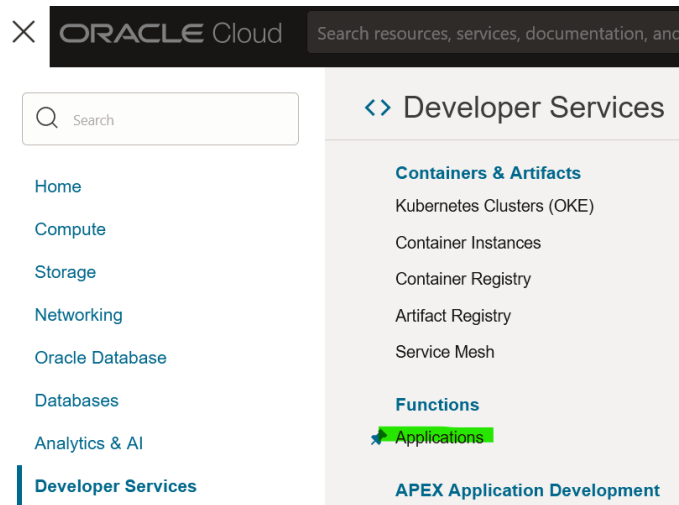
Ejemplo: v#1iD<8Ycx+)Z+XUR5av

Generate token



CREACION APLICACIÓN SERVERLESS & SETUP CLOUD SHELL ENVIROMENT

1. Creación de Aplicación Serverless



Crear una aplicación con el nombre OCI-Lab

Create application

Name

OCI-Lab

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

RedBullVCN

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

Private Subnet-RedBullVCN (Regional) ✕

Tagging options

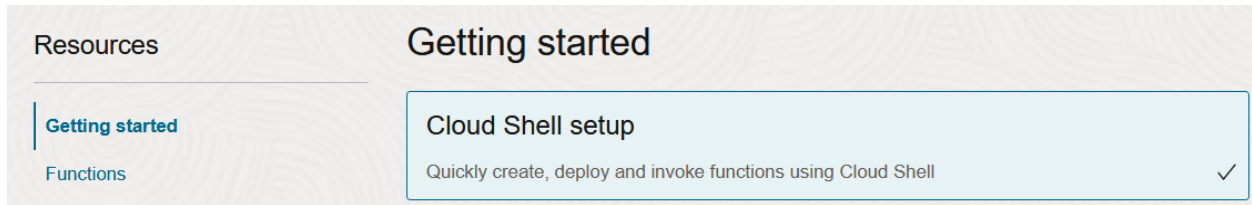
Add tags to organize your resources. [What can I](#)

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:

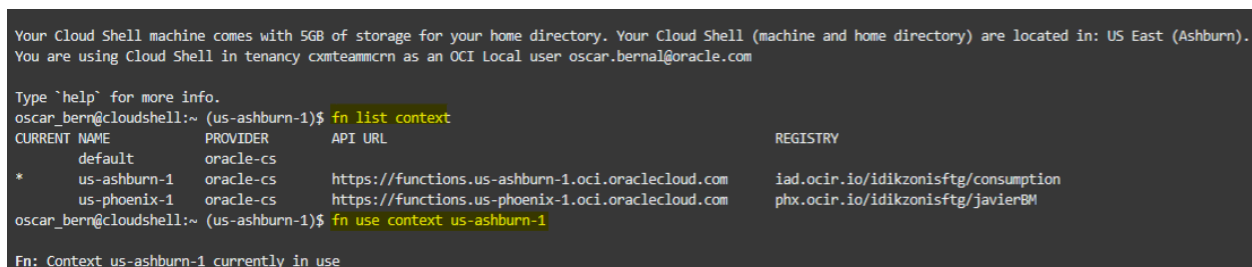
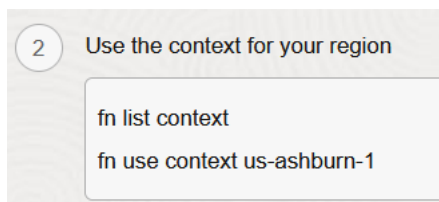


Aquí un ejemplo de los comandos y el resultado de cada una de las ejecuciones en CloudShell:

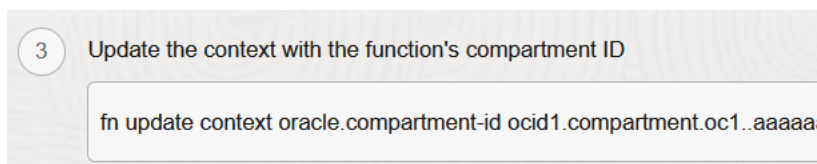
Dara clic en el botón “Launch Cloud Shell”



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



Actualizar el contexto para ser usado




```
oscar_bern@cloudshell:~ (us-ashburn-1)$ fn update context oracle.compartment-id ocid1.compart
Current context updated oracle.compartment-id with ocid1.compartment.oc1..aaaaaaaas76tcr4yeb6
```

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

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

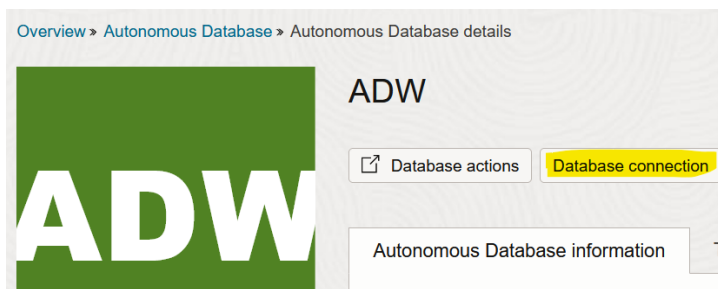
3. Ajustar el archivo de configuración de aplicación de acuerdo a mi ambiente (conexiones, base de datos, passwords), para la cual editaremos el archivo func.yaml con el editor de Linux Nano:

```
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: 0.0.113
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.yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy
  COMPANY: ACME CORP XXXXXXXXXXXXXXXX
  DBPWD: XXXXXXXXXXXY2121**
  DBSVC: ZZZZZZ_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: XXXYYY_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 shows the Oracle Cloud console interface for a function named 'RedBullApp'. The function is in an 'ACTIVE' state. The 'Logs' section shows 'Function Invocation Logs' with a toggle switch set to 'Not Enabled'. An 'Enable Log' dialog is open on the right, allowing configuration of logging for the function.

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

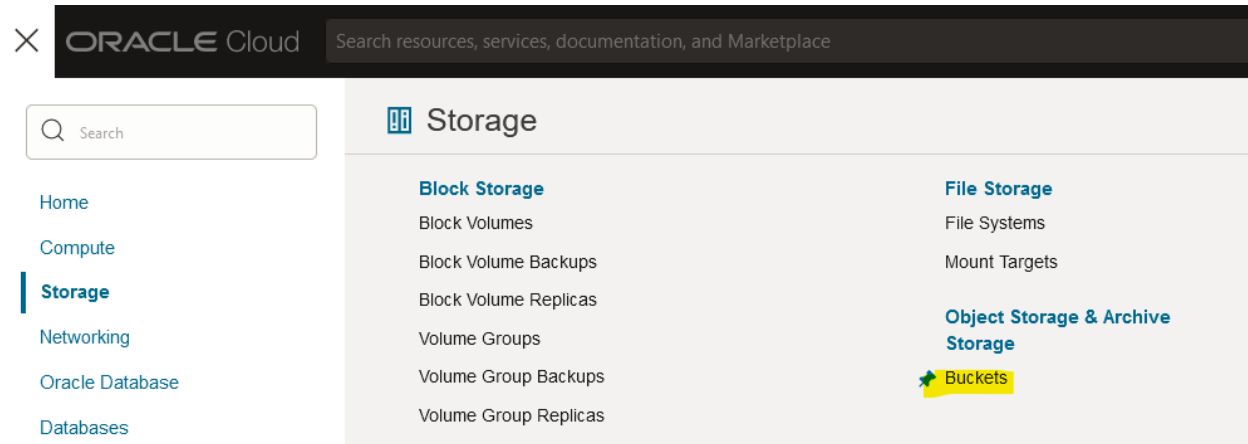
1 month (default)

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.

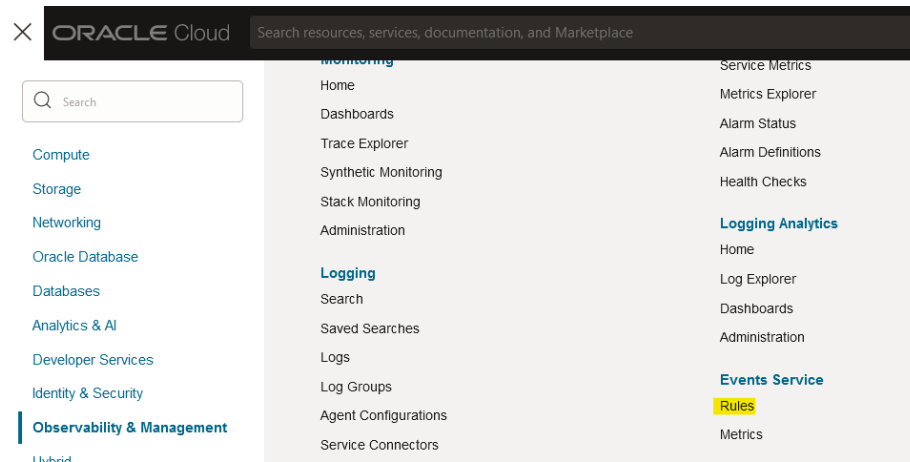
☐ Encrypt using customer-managed keys
Requires a valid key from a vault that you have access to. [Learn more](#)

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

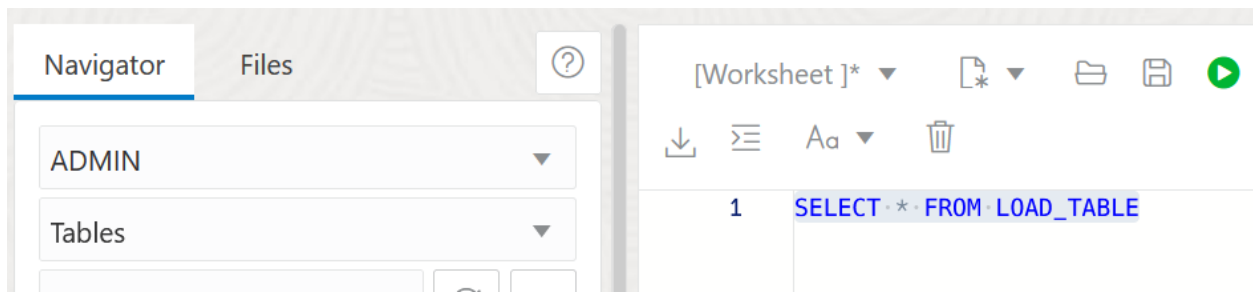
Finalmente puedes probar tu aplicación únicamente cargando el archivo en el bucket del object storage:

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

The screenshot shows the Oracle Cloud Object Storage interface. On the left, the 'Bucket Details' page for a bucket named 'B' is visible. It includes a 'Files' section with buttons for 'Edit Visibility', 'Move Resource', 'Re-encrypt', 'Add tags', and 'Delete'. Below this, the 'General' tab shows bucket information: Namespace: idikzonisftg, Compartment: redbullhol, Created: Thu, Feb 9, 2023, 19:06:03 UTC, ETag: 414fd376-04c0-444a-8745-8702ac26a90, and OCID: ...7bsz2phq. The 'Usage' section shows 1 object and 128 bytes. On the right, the 'Upload Objects' dialog 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. Below the file list, it says '1 files, 128 bytes total' and has a link to 'Show Optional Response Headers and Metadata'. At the bottom of the dialog 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. On the left, the 'Overview' page for an ADW instance is visible. It includes a large 'ADW' logo and a 'Database actions' button. Below this, the 'General information' section shows the 'Database name: ADW'. On the right, the 'Development' section is visible, featuring an 'SQL' icon and the text 'Execute queries and scripts, browse and manage your database object...'



The screenshot shows the 'Query Result' pane of the Oracle SQL Developer. It displays the results of the query `SELECT * FROM LOAD_TABLE`. The execution time is 0.003 seconds. The results are shown in a table with four columns: ID, NAME, and LAST_NAME. The table contains six rows of data.

	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>