ORACLE

OCI – Functions: Quick Start

Setup your OCI environment to start using OCI Functions

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Florian Bonneville

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2 Create a Virtual Cloud Network

In this scenario I create a dedicated VCN because my function doesn't need to communicate with my other applications.

This VCN will host two components:

- An OCI compute instance (VM) which will be used to publish my function
- The OCI Function

Start the VCN Wizard:

- Networking > Virtual Cloud Network

3 Create the Function_Server instance

3.1 Launch instance

Start compute instance creation

- Compute > Instances
- Use an Oracle Linux image
- You can select any shape available
- Connect the instance to the public subnet of the VCN created previously

3.2 Configure instance

Connect to the instance using SSH.

These steps will configure an Oracle Linux instance with all the components required to build your Dev environment.

Connect to your instance using ssh:

```
sudo dnf update -y
sudo dnf install git -y
git clone https://github.com/Olygo/OCI-FN_IMDS-Watcher.git
python3 -m pip install pip --upgrade --user
python3 -m pip install wheel --upgrade --user
python3 -m pip install oci --upgrade --user
python3 -m pip install oci-cli --upgrade --user
sudo dnf config-manager --add-repo=https://download.docker.com/linux/centos/docker-ce.repo -y
sudo dnf install -y docker-ce --nobest -y
sudo systemctl enable docker.service
sudo systemctl start docker.service
sudo usermod -a -G docker opc
curl -LSs https://raw.githubusercontent.com/fnproject/cli/master/install | sh
fn version
shutdown -r now
```

4 Create Dynamic Groups

Dynamic groups will be used to authenticate the FN_Server and the function across OCI APIs.

Create 2 Dynamic Groups:

- **DG_FN_SERVER**
  - This dynamic group will authenticate the Function Server
- **DG_FUNCTIONS**
  - This dynamic group will authenticate your OCI Function

4.1 Dynamic Group for the Function Server

Create a dynamic group (e.g. DG_FN_SERVER)that includes the compute instance hosting your Function Server.

If you don't create a dynamic group and the appropriate policy, you must then create an API-key attached to your user account and configure your Function Server using

"oci setup config" command.

4.2 Create a Dynamic Group for the Function Server

- Identity > Domains > *your identity domain* > Dynamic groups
- Add the following rule **using the OCID of the compute instance hosting your function server**

```
ALL {instance.id = 'ocid1.instance.oc1.xxxxxxxxxxxxxxxx'}
```

4.3 Create a Dynamic Group for the function

Now, create a dynamic group (e.g. DG_FUNCTIONS) to allow the function authenticating to OCI APIs

If you don't create a dynamic group and the appropriate policy, your function will not have the proper rights to manage your OCI resources.

- Add the following rule **using the OCID of your function**

```
ALL {resource.id = 'ocid1.fnfunc.oc1.xxxxxxxxxxxxxxxx'}
```

https://docs.oracle.com/en-us/iaas/Content/Functions/Tasks/functionsaccessingociresources.htm

Because the function has not been created yet, paste above example, then you will update the Dynamic group with the real function' ocid after its creation.

You will get the function ocid through:

- Function > Applications > ***function_app_name*** > ***function_name***

If you have multiples Functions in the same compartment, you can use the following statement:

- Identity & Security > Identity > Dynamic Groups
- Add the following rule **using the OCID of your Function compartment**

```
All {resource.type = 'fnfunction', resource.compartment.id = 'ocid1.compartment.oc1.xxxxxxx'}
```

https://docs.oracle.com/en-us/iaas/Content/Identity/dynamicgroups/Writing Matching Rules to Define Dynamic Groups.htm

5 Create OCI Policy

- Identity & Security > Identity > Policies

- **IN THE ROOT COMPARTMENT:**
  - To allow the DG_FN_SERVER dynamic group access to function resources, network resources, and Oracle Cloud Infrastructure Registry (OCIR) at the tenancy level

```
Allow service FaaS to read repos in tenancy
Allow service FaaS to use virtual-network-family in tenancy

Allow dynamic-group 'YourIdentityDomain'/'DG_FN_SERVER' to manage functions-family in tenancy
Allow dynamic-group 'YourIdentityDomain'/'DG_FN_SERVER' to manage repos in tenancy
Allow dynamic-group 'YourIdentityDomain'/'DG_FN_SERVER' to use virtual-network-family in tenancy

Allow dynamic-group 'YourIdentityDomain'/'DG_FUNCTIONS' to manage instance-family in tenancy
```

- **IN A CHILD COMPARTMENT:**
  - To restrict access to a specific compartment

```
Allow service FaaS to read repos in compartment xxxx
Allow service FaaS to use virtual-network-family in compartment xxxx

Allow dynamic-group 'YourIdentityDomain'/'DG_FN_SERVER' to manage functions-family in compartment xxxx
Allow dynamic-group 'YourIdentityDomain'/'DG_FN_SERVER' to manage repos in compartment xxxx
Allow dynamic-group 'YourIdentityDomain'/'DG_FN_SERVER' to use virtual-network-family in compartment xxxx

Allow dynamic-group 'YourIdentityDomain'/'DG_FUNCTIONS' to manage instance-family in compartment xxxx
```

Adapt the scope of your statements according to your security constraints.

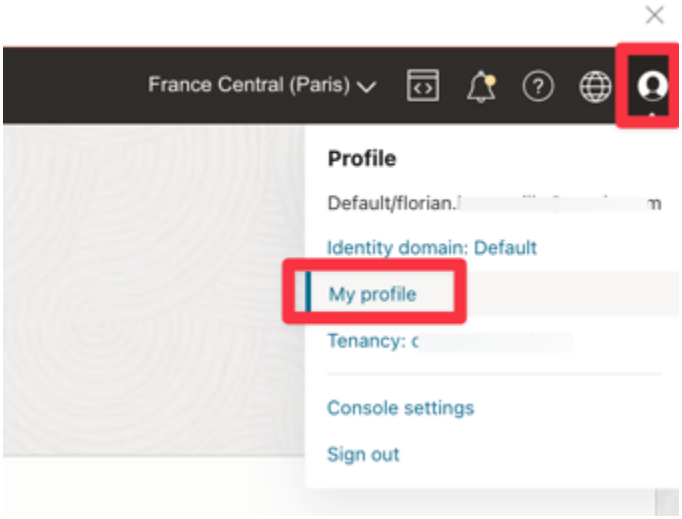
https://docs.oracle.com/en-us/iaas/Content/Functions/Tasks/functionsrestrictinguseraccess.htm

6 Create an Auth Token

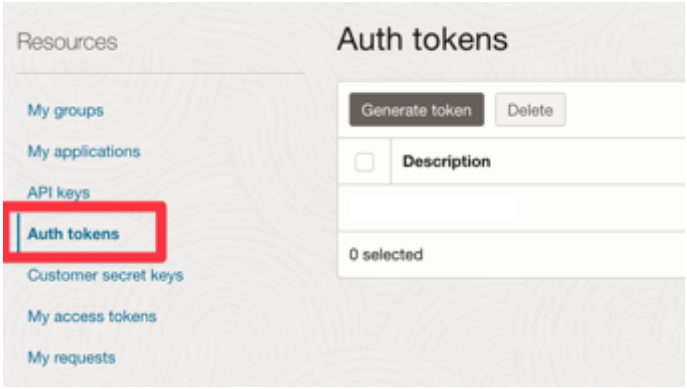
The Auth Token will be used to connect to your Container Registry (OCIR) which will host your docker container.
This token will be required later for the docker login command.

6.1 Go to your account profile

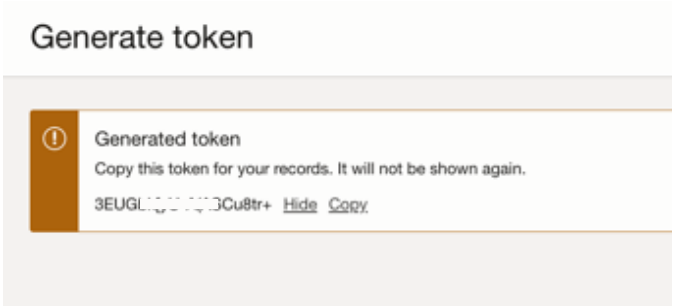
- Click Profile (top right) > My profile



6.2 Generate a new Auth Token



6.3 Save your Auth Token

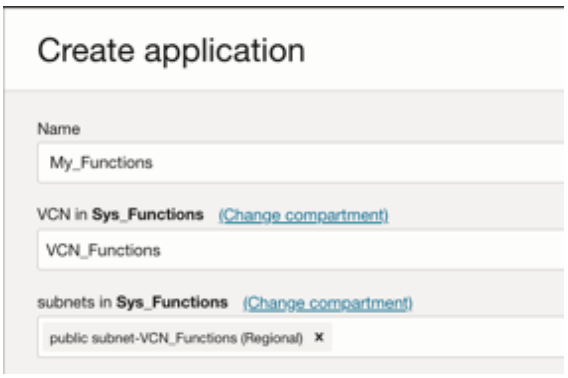


Save your auth token in your notes or personal vault for later use.

7 Create and deploy your function application

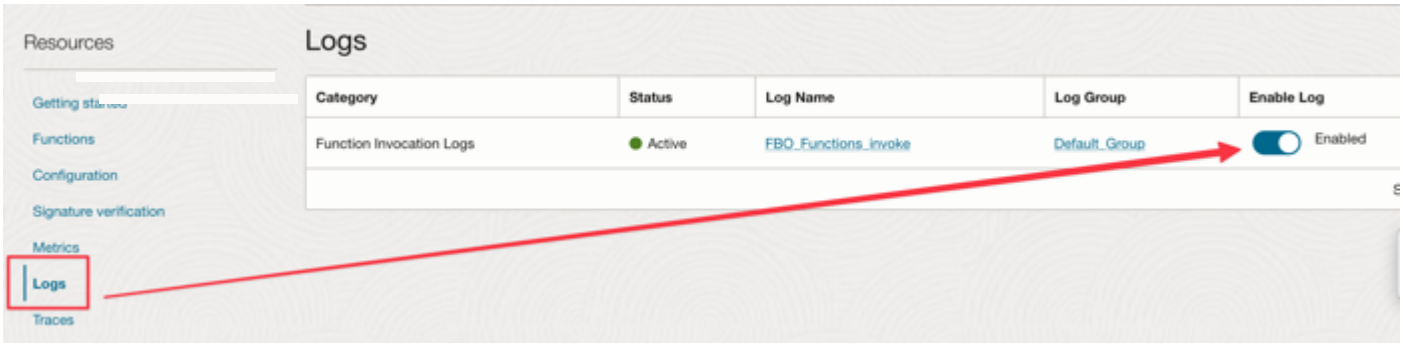
7.1 Create an application from the OCI Console

- `Developer Services > Functions > Applications`

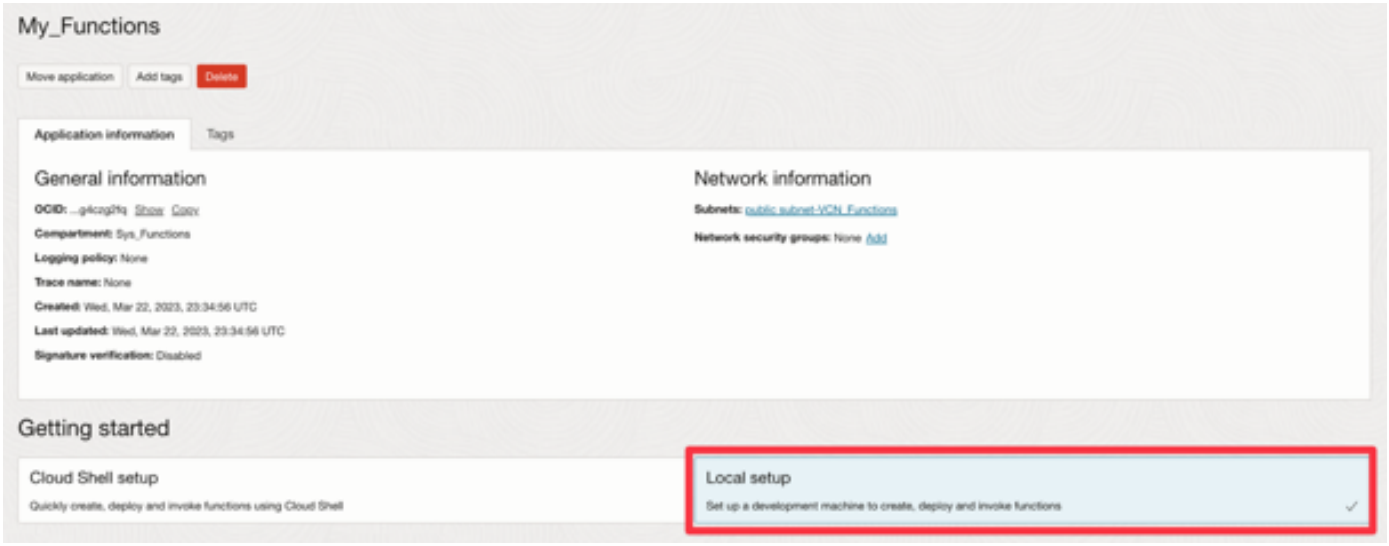


7.2 Enable Function logging

- `Developer Services > Functions > Applications > YourApplication`



7.3 Configure your Function_Server using “Local setup”



Steps 1 & 2 are not required here **if you have previously downloaded** the function's code through git clone above.

Jump into the function folder

- cd ./OCI-FN_IMDS-Watcher

Now run function setup commands from the **Local Setup** section:

Step 3: Context name can be anything:

/!\ DO NOT USE: **--provider oracle** USE: **--provider oracle-ip**

- "--provider oracle":
  - authenticates a user with a local oci-cli config file
- "--provider oracle-ip":
  - authenticates an instance with instance_principals (through a dynamic-group)

```
fn create context YourContextName --provider oracle-ip
fn use context YourContextName
```

Step 4: Compartment hosting your function (use tenancy ocid for Root compartment), API endpoint reflects your OCI region:

```
fn update context oracle.compartment-id ocid1.tenancy.oc1..xxxxxxxxxxx
fn update context api-url https://functions.RegionName.oraclecloud.com
```

Step 5: Choose a name for the container registry repository (OCIR), it can be anything in lower cases without spaces: [repo-name-prefix]

```
fn update context registry RegionCode.ocir.io/TenantNamespace/my-repo-name
```

Step 6: log into OCIR using docker login and your **Auth Token** created previously:

```
docker login -u 'TenantNamespace/YourIdentityDomain/me@company.com' RegionCode.ocir.io
```

Step 7: Push the local function code to your OCI Application and OCIR repository:

```
Fn deploy --app YourApplicationName
```

7.4 Shell Output:

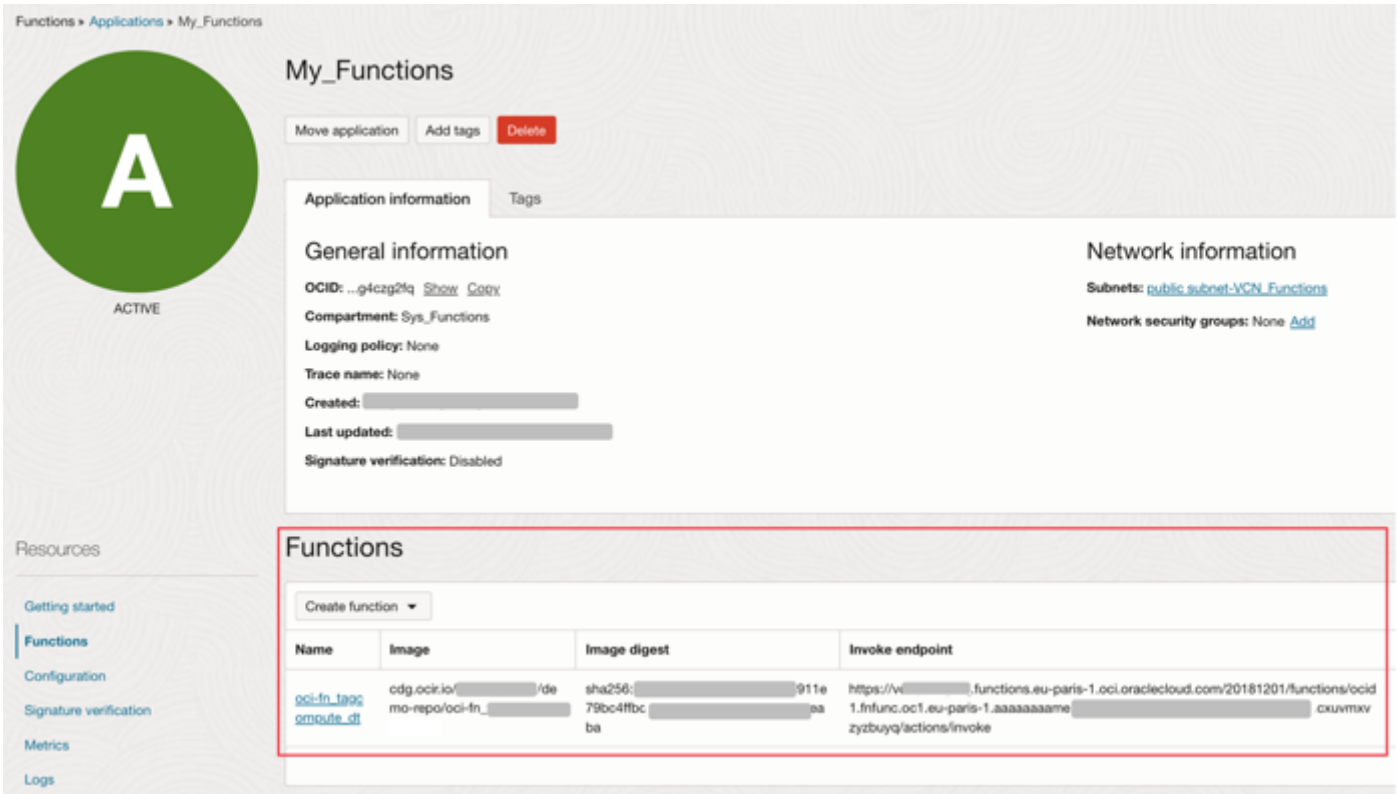
```
[opc@inst-func-build-142296 OCI-FN_                ]$ fn create context Sys_Functions --provider oracle-ip
Successfully created context: Sys_Functions
[opc@inst-func-build-142296 OCI-FN_                ]$ fn use context Sys_Functions
Now using context: Sys_Functions
[opc@inst-func-build-142296 OCI-FN_                ]$ fn update context oracle.compartment-id ocid1.compartment.oc1..aaaaaaaabn

Current context updated oracle.compartment-id with ocid1.compartment.oc1..aaaaaaaabnvnka5s
[opc@inst-func-build-142296 OCI-FN_                ]$ fn update context api-url https://functions.eu-paris-1.oraclecloud.com
Current context updated api-url with https://functions.eu-paris-1.oraclecloud.com
[opc@inst-func-build-142296 OCI-FN_                ]$ fn update context registry cdg.ocir.io/a>'"  _  " a/demo-repo
Current context updated registry with cdg.ocir.io/          /demo-repo
[opc@inst-func-build-142296 OCI-FN_TagCompute_DT]$ docker login -u '          /florian                .com' cdg.ocir.io
Password:
WARNING! Your password will be stored unencrypted in /home/opc/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[opc@inst-func-build-142296 OCI-FN_                ]$ fn deploy --app My_Functions
Deploying oci-fn_                to app: My_Functions
Bumped to version 0.0.1
Using Container engine docker
Building image cdg.ocir.io/          /demo-repo/oci-fn_          0.0.1 .....................................
Parts:  [cdg.ocir.io          demo-repo oci-fn_          0.0.1]
Using Container engine docker to push
Pushing cdg.ocir.io/          /demo-repo/oci-fn_          :0.0.1 to docker registry...The push refers to repository [cd
          ]
753aa253c2e1: Pushed
1466c8241698: Pushed
eb5011488c70: Pushed
64297c36ab1d: Pushed
0059976a0ea6: Pushed
e76ab7648bea: Pushed
f46abc7ec396: Pushed
0.0.1: digest: sha256:4bbf2fff28d8da9df79e70                                  c3ceaba size: 1782
Updating function oci-fn_          using image cdg.ocir.io/          /demo-repo/oci-fn          0.0.1...
Successfully created function: oci-fn_          with cdg.ocir.io/          /demo-repo/oci-fn_          :0.0.1
```

7.5 Output from your OCI console :

Your function has been published into your Application:



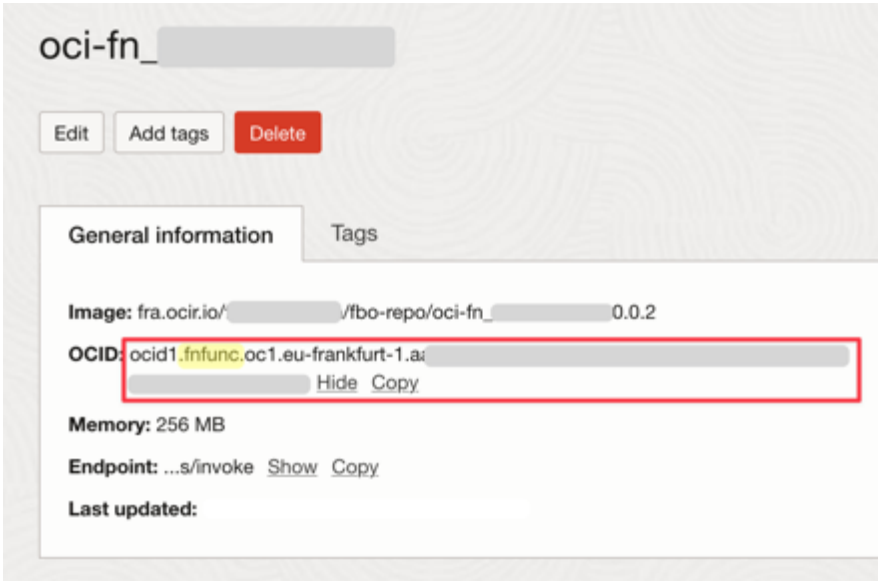
Your container function has been stored into your container registry:

- Containers & Artifacts > Containers & Artifacts > Container Registry

By default, the repository is created in the root compartment, you can move it to another compartment using: Action > Move compartment.

8 Update Dynamic Group and Policy

8.1 Retrieve Function OCID



8.2 Update DG_FUNCTIONS

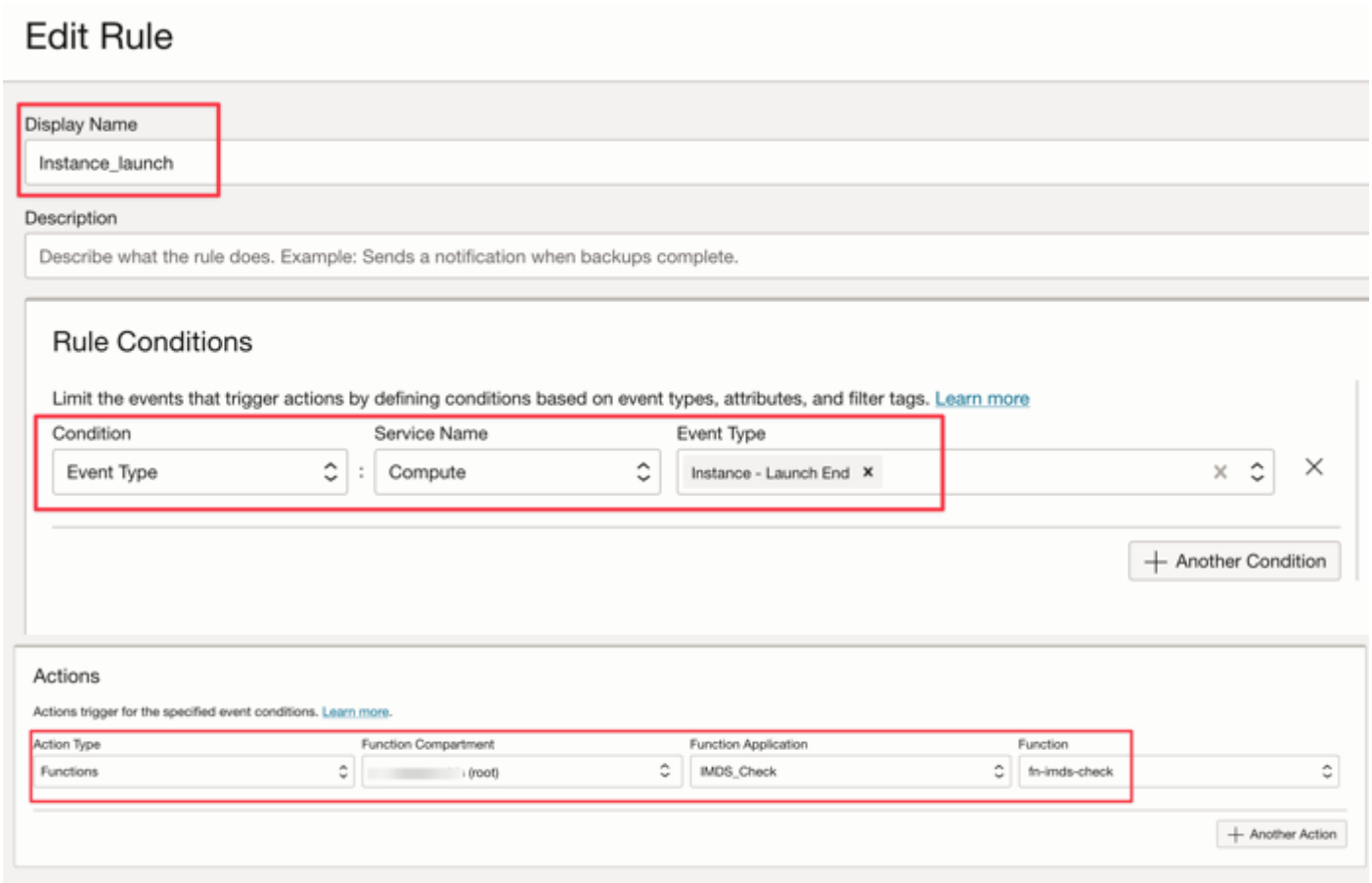
```
ALL {resource.id = 'ocid1.fnfunc.oc1.xxxxxxxxxxxxxxxx'}
```

9 Setup Event Service

9.1 Create a rule to detect 'Instance – Launch End'

Create this rule in your ROOT Compartment to receive notifications from any instance in your tenancy.

- Observability & Management > Event Service > Rules



This function will now be invoked and executed after each instance is launched.

10 Review Function logs:

Launch a new instance and check the function logs