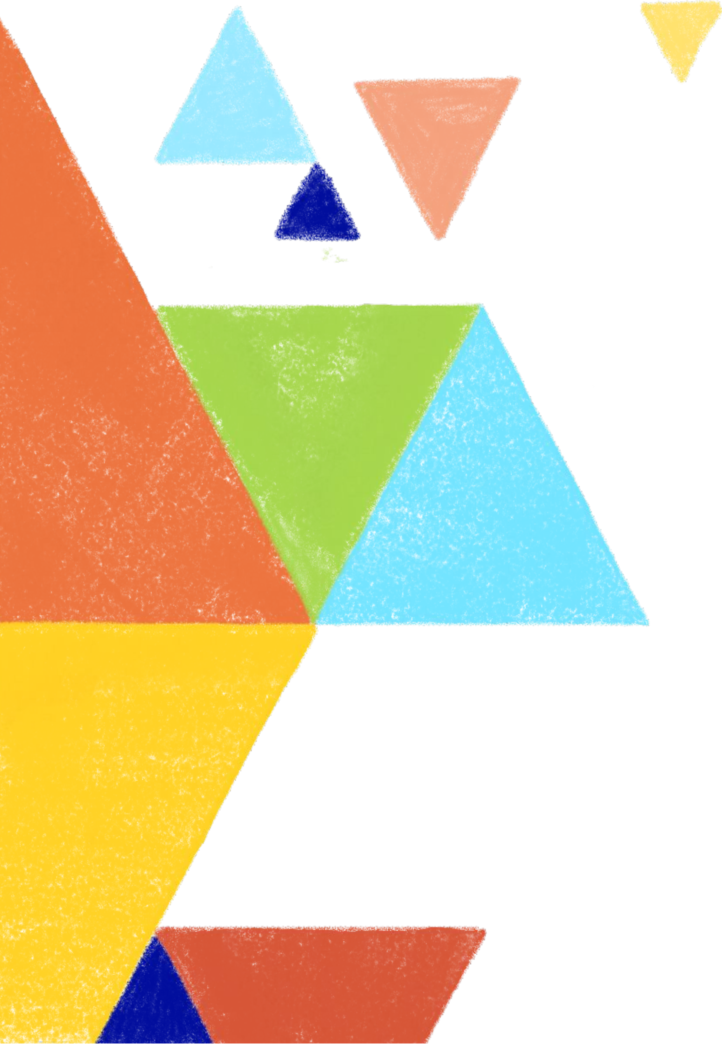
OVHcloud

Config Management Camp

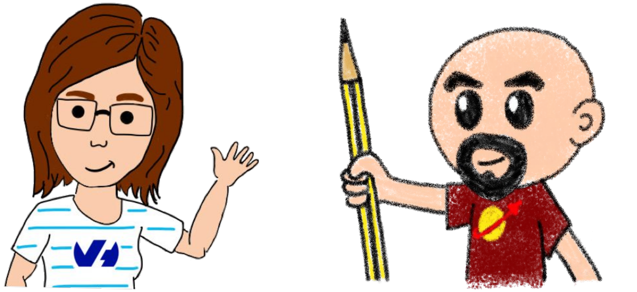


Let's dive into

Terraform provider creation

Aurélie Vache - Horacio Gonzalez

2023-02-06



@AurelieVache @LostInBrittany

Aurélie Vache

@aurelievache

DevRel at OVHcloud

Conferences organizer

Tech visual articles & books

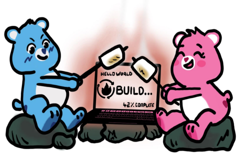
Sketchnoter

… & ❤ Retrogaming

https://www.youtube.com/c/AurelieVache

DEV https://dev.to/aurelievache/

OVHcloud



CLOUD NATIVE COMPUTING FOUNDATION
AMBASSADOR

Experts
2023

docker
CAPTAINS

Les Productions de MOA

Horacio Gonzalez

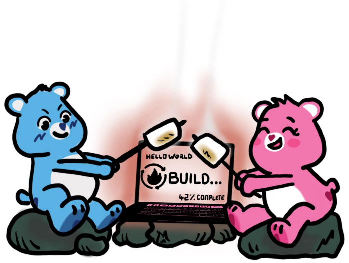
@LostInBrittany

Spaniard lost in Brittany, developer, dreamer and all-around geek

OVHcloud

DevRel Leader

OVHcloud



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2023

Experts
2023

OVHcloud: A global leader

OVHcloud

Web Cloud & Telcom

Private Cloud

Public Cloud

Storage

Network & Security

30 Data Centers
in 12 locations

34 Points of Presence
on a 20 TBPS Bandwidth Network

2200 Employees
worldwide

115K Private Cloud
VMS running

300K Public Cloud
instances running

380K Physical Servers
running in our data centers

1 Million+ Servers
produced since 1999

1.5 Million Customers
across 132 countries

3.8 Million Websites
hosting

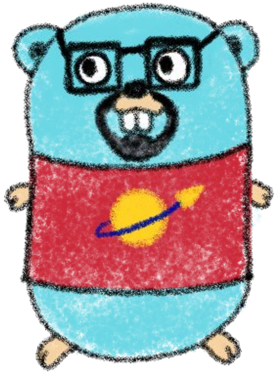
1.5 Billion Euros Invested
since 2016

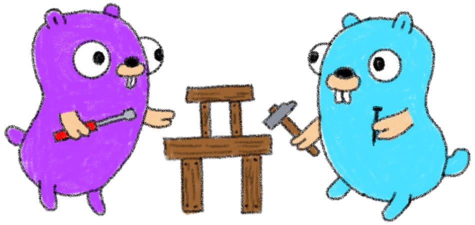
P.U.E. 1.09
Energy efficiency indicator

20+ Years in Business
Disrupting since 1999

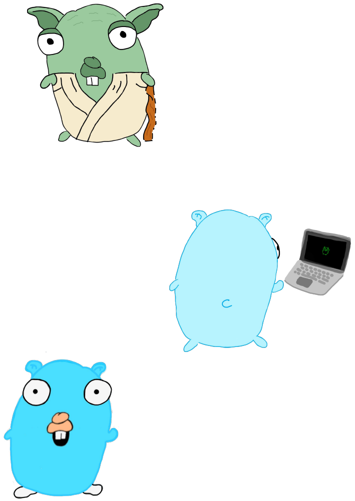
Warning

Gophers, gophers everywhere!

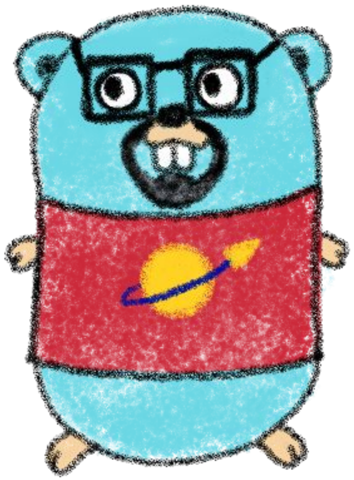




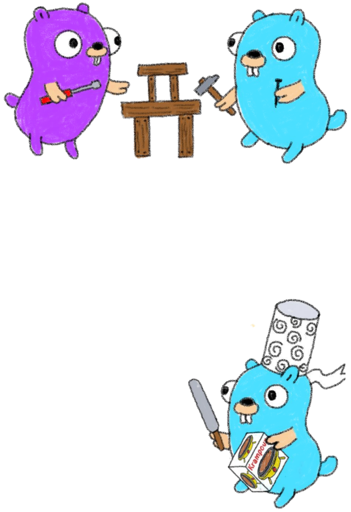
Credit where it is due



@AurelieVache



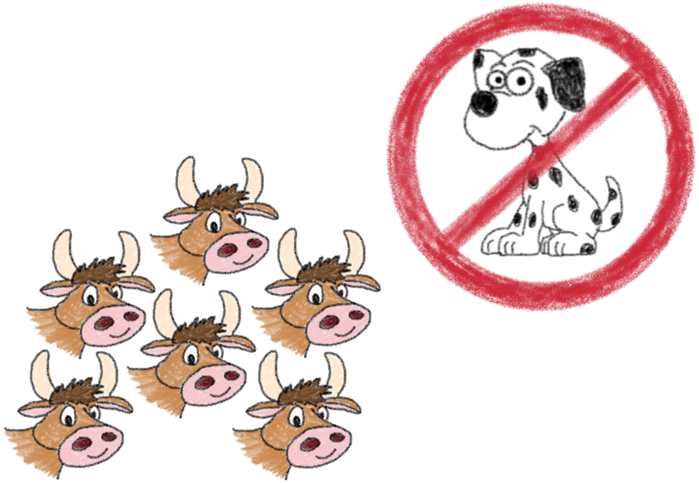
@LostInBrittany



All the gophers you will see are drawn by Aurélie and Horacio, and are based on the Go mascot designed by Renee French which is licensed under CC BY 3.0.

Terraform

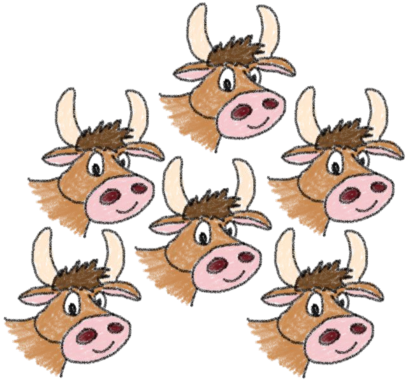
De facto standard for IaC



HashiCorp Terraform

Infrastructure as Code (IaC)

OVHcloud



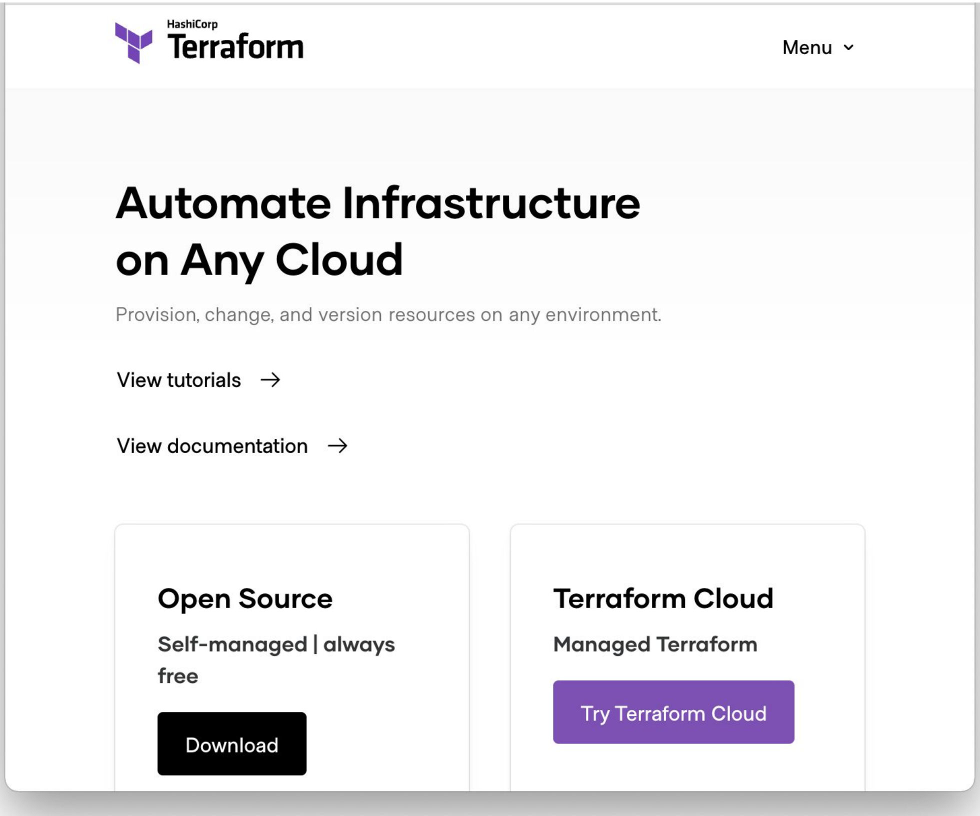
Hey, buddy, we are at Config Management Camp. I think we can reckon they already know what IaC is...

Types of IaC

- Imperative
- Declarative
- Environment Aware

Terraform becoming the de facto standard

HashiCorp Terraform



HashiCorp Terraform

Menu ⌄

Automate Infrastructure on Any Cloud

Provision, change, and version resources on any environment.

View tutorials →

View documentation →

Open Source

Self-managed | always free

Download

Terraform Cloud

Managed Terraform

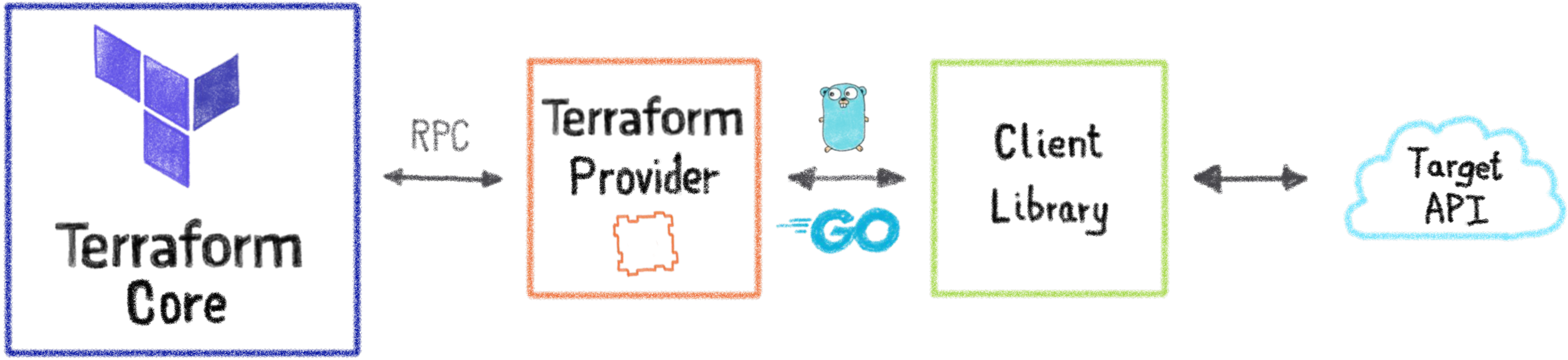
Try Terraform Cloud

Terraform

- Build
- Modify
- Version

your infrastucture

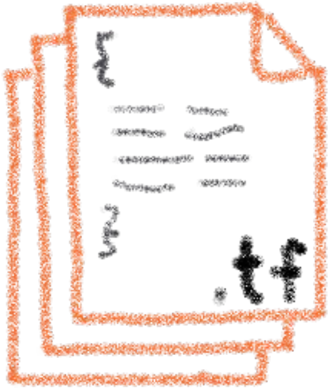
Modular architecture: providers



Configuration packages: modules

Modules :

Collection of configuration files



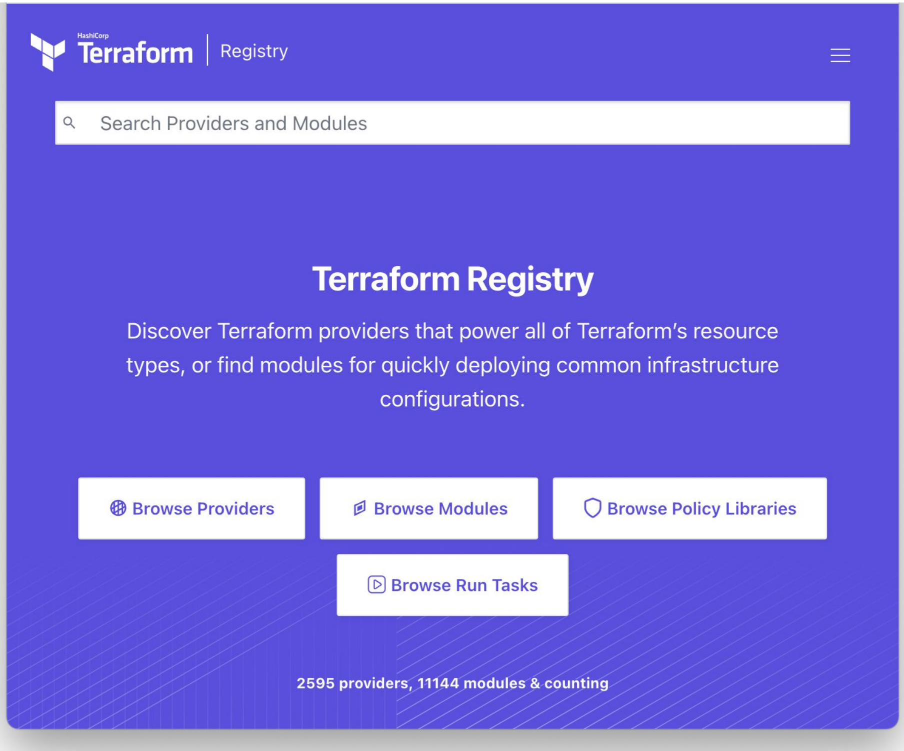
Terraform registry

Terraform Registry

Providers

&

Modules



HashiCorp Terraform | Registry

Search Providers and Modules

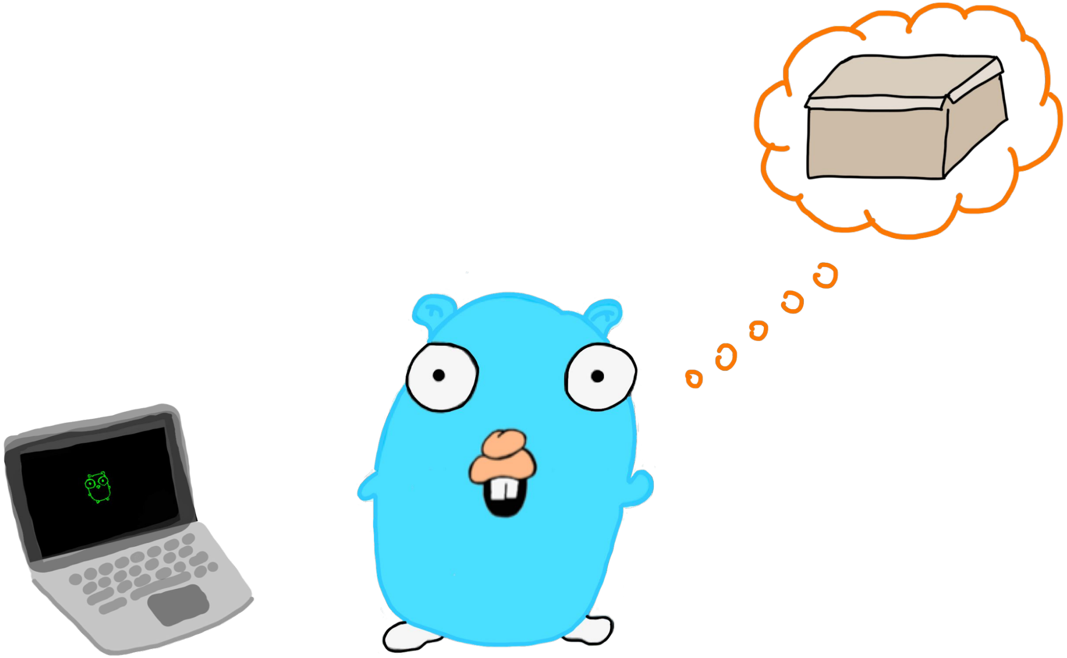
Terraform Registry

Discover Terraform providers that power all of Terraform's resource types, or find modules for quickly deploying common infrastructure configurations.

2595 providers, 11144 modules & counting

Writing Terraform providers

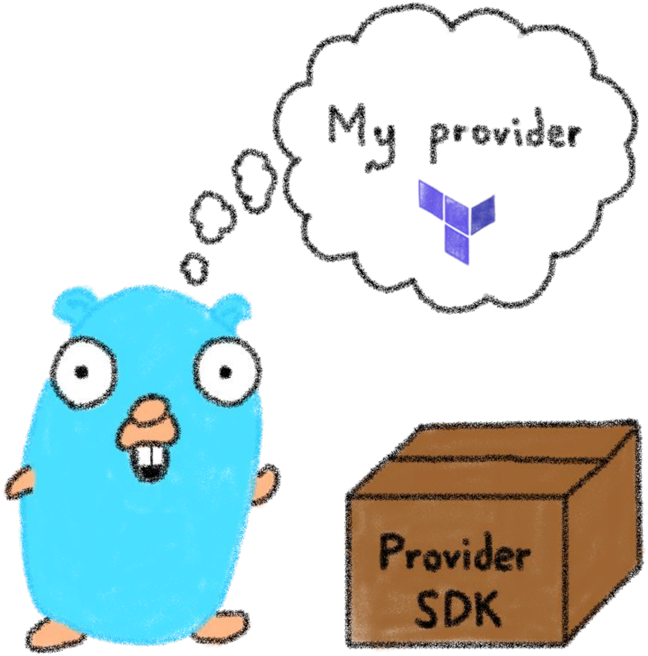
Defining new Terraform resources



Config Management Camp

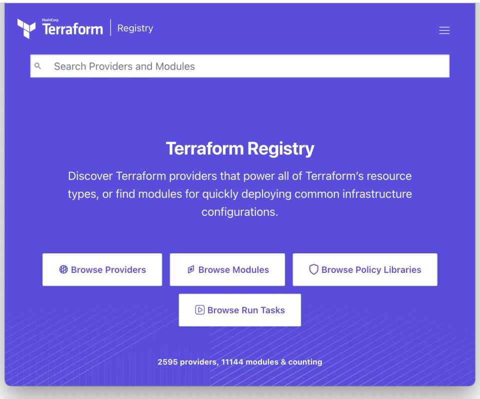
@AurelieVache @LostInBrittany

Provider SDK



https://developer.hashicorp.com/terraform/plugin/sdkv2

Installing Terraform providers



Search Providers and Modules

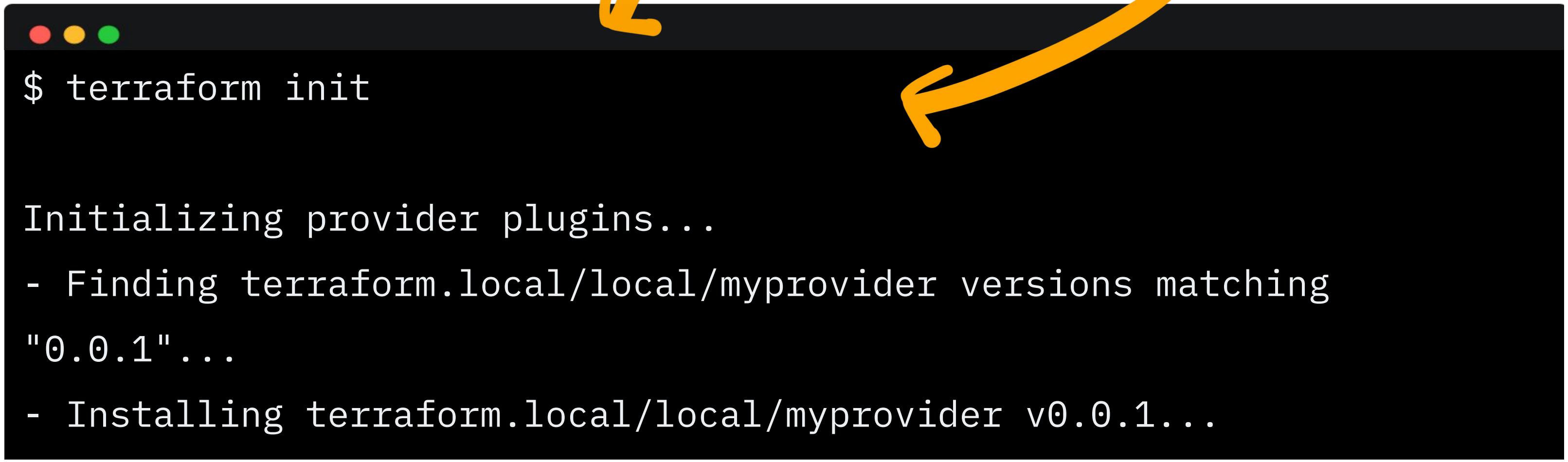
Terraform Registry

Discover Terraform providers that power all of Terraform's resource types, or find modules for quickly deploying common infrastructure configurations.

2595 providers, 11144 modules & counting

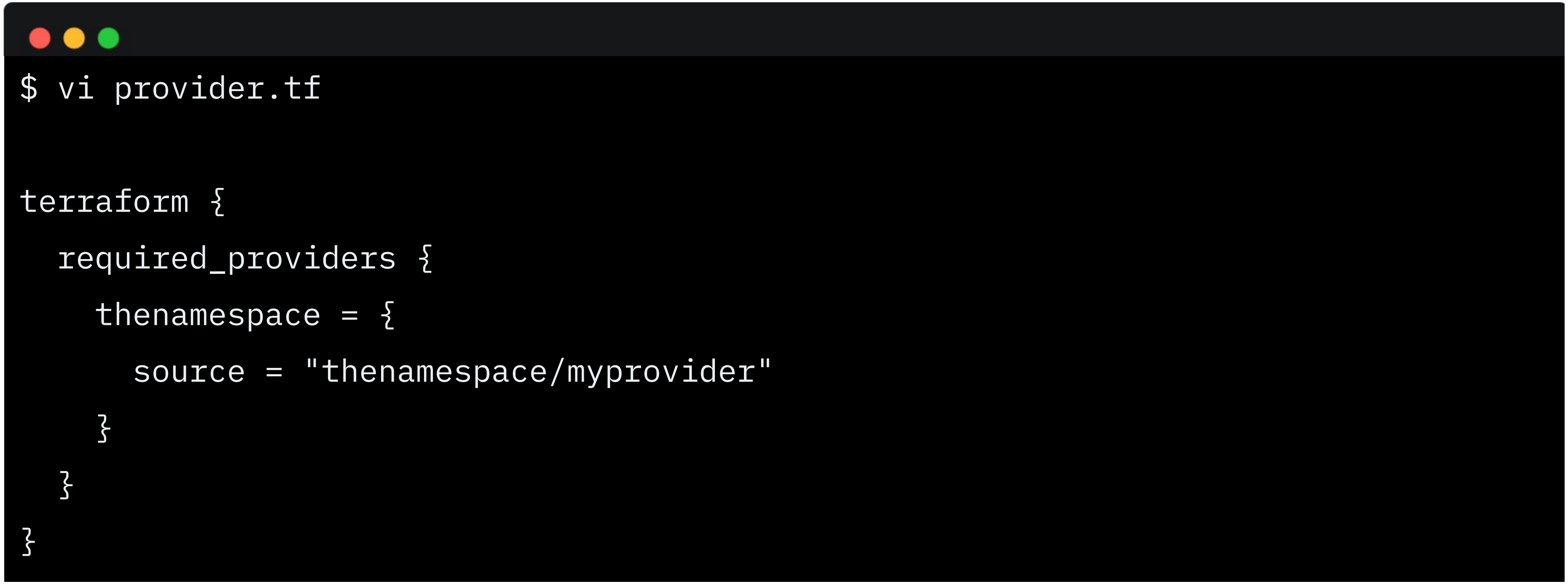
Or

```
package provider
import (
  ...
)
func init() {
  ...
}
func New(version string) func() *sch
  return func() *schema.Prov
  ...
```



```
$ terraform init


Initializing provider plugins...
- Finding terraform.local/local/myprovider versions matching
"0.0.1"...
- Installing terraform.local/local/myprovider v0.0.1...
```

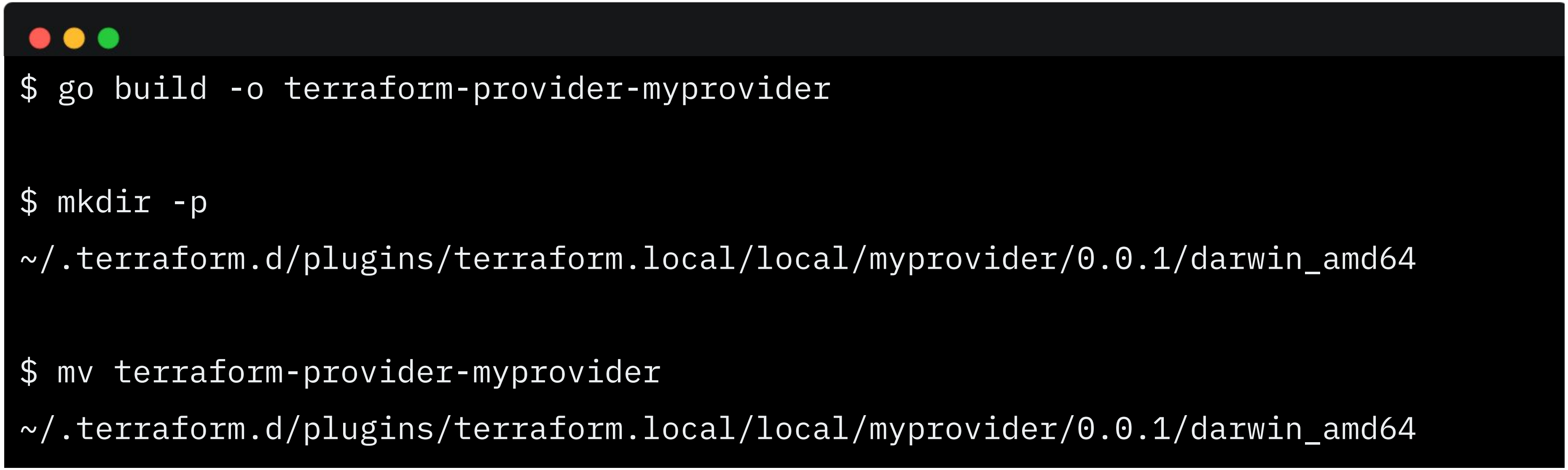
Installing providers from registry



```
$ vi provider.tf


terraform {
  required_providers {
    thenamespace = {
      source = "thenamespace/myprovider"
    }
  }
}
```

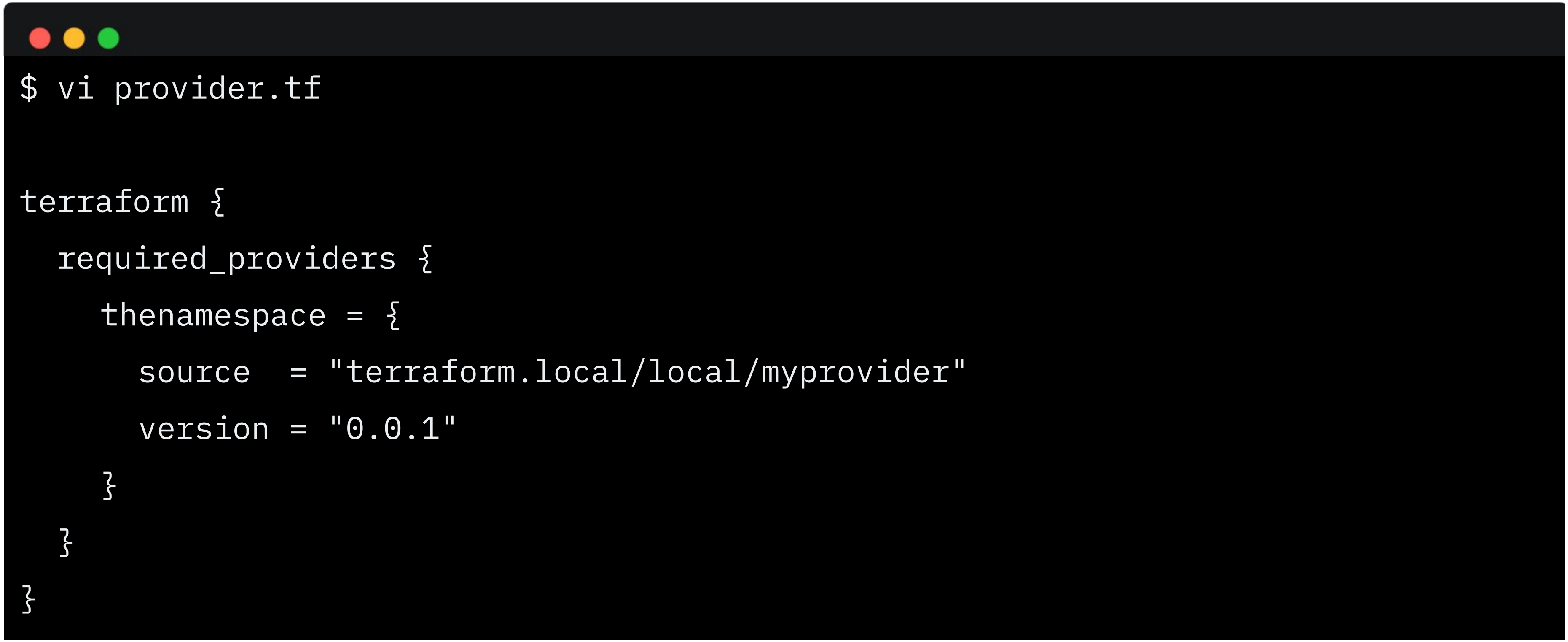
If your provider is on the official registry at
https://registry.terraform.io/providers/thenamespace/myprovider

Installing providers locally



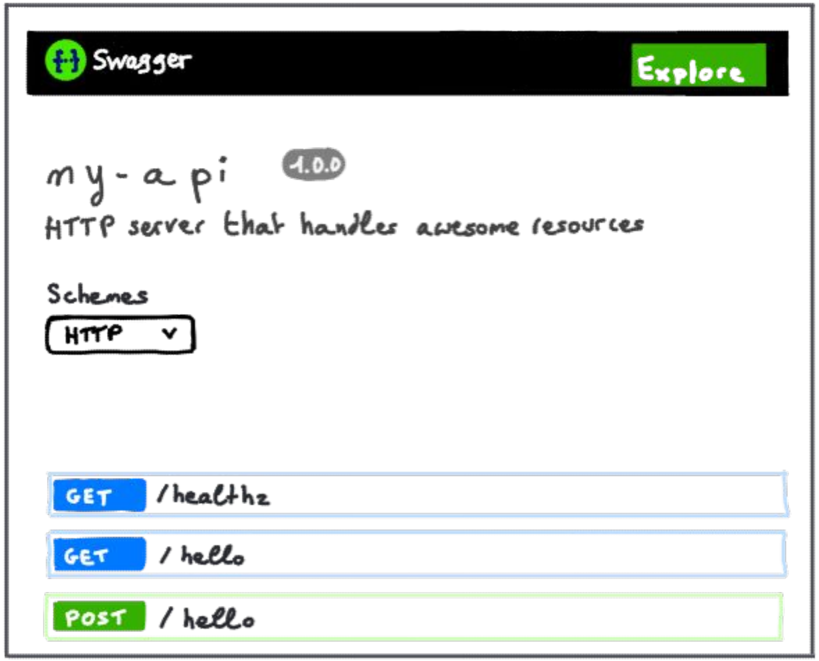
```
$ go build -o terraform-provider-myprovider

$ mkdir -p
~/.terraform.d/plugins/terraform.local/local/myprovider/0.0.1/darwin_amd64

$ mv terraform-provider-myprovider
~/.terraform.d/plugins/terraform.local/local/myprovider/0.0.1/darwin_amd64
```

Installing providers locally



```
$ vi provider.tf


terraform {
  required_providers {
    thenamespace = {
      source  = "terraform.local/local/myprovider"
      version = "0.0.1"
    }
  }
}
```

Do I need a Terraform provider?



Swagger

Explore

my-api 1.0.0

HTTP server that handles awesome resources

Schemes

HTTP ∨

GET /healthz

GET /hello

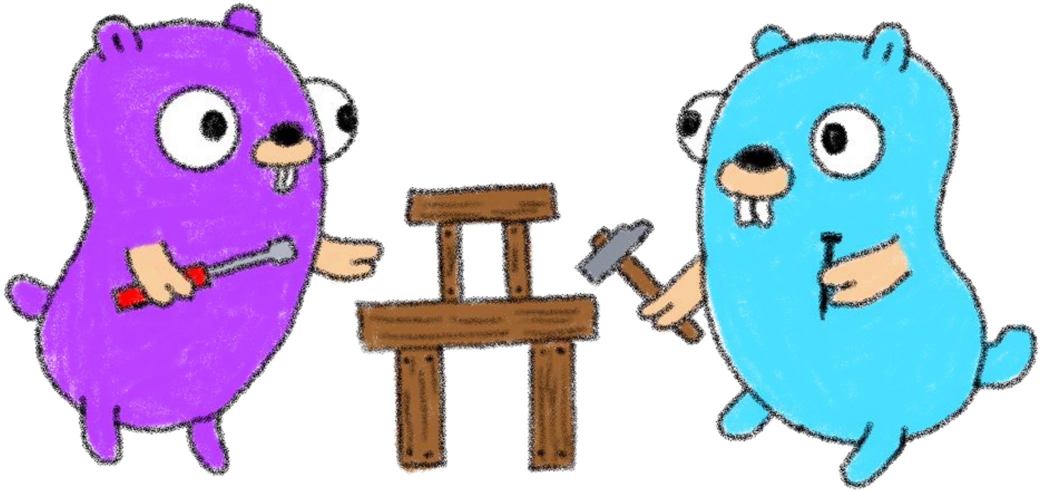
POST /hello

If you have an API,
you should have a Terraform provider

OVHcloud

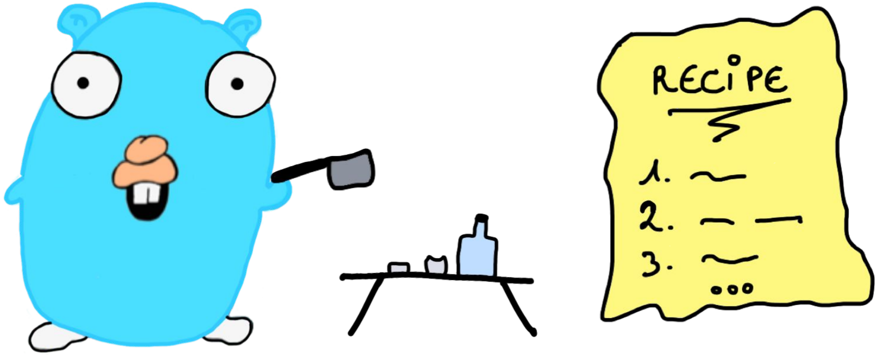
Let’s create a provider!

Step by step

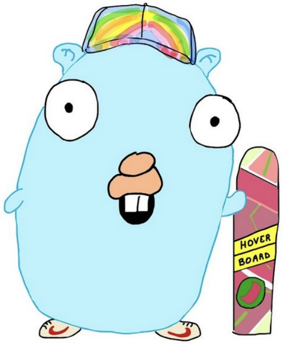


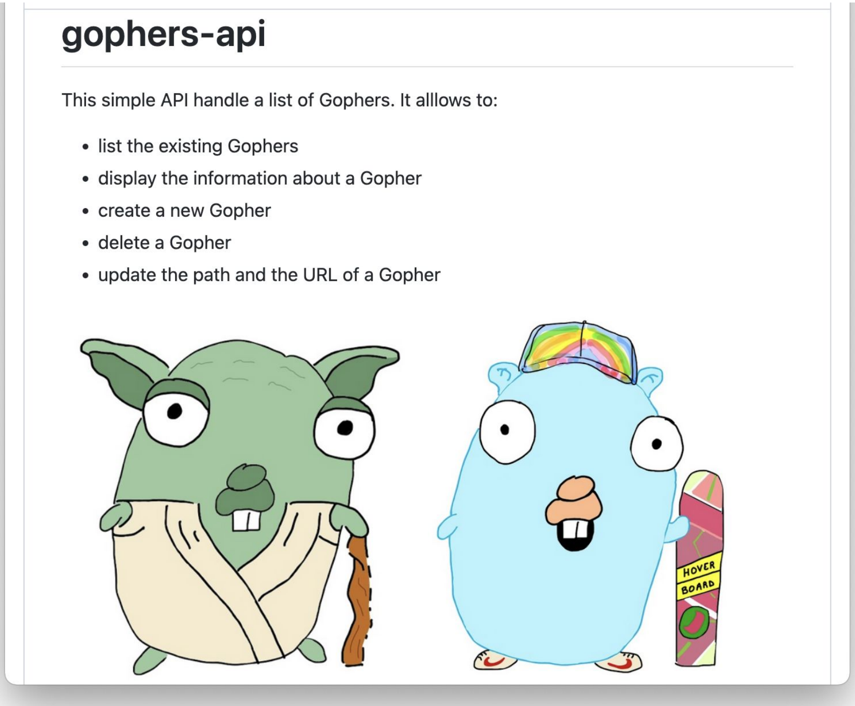
What do we want?

- In a simple and easy Terraform provider
- Handle cute Gophers
- In **Go,** because providers are made in Go 😁



Everything begins with an API

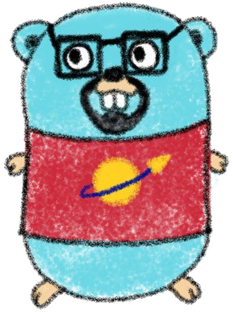




gophers-api

This simple API handle a list of Gophers. It alllows to:

- list the existing Gophers
- display the information about a Gopher
- create a new Gopher
- delete a Gopher
- update the path and the URL of a Gopher

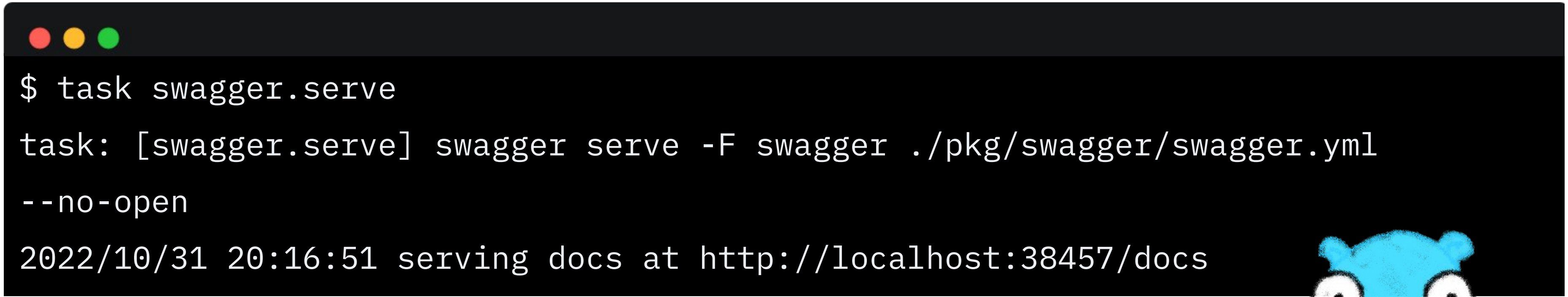


https://github.com/scraly/gophers-api

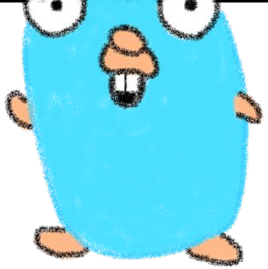
For the demos we will use Gitpod

Automated, ephemeral developer environments
in the web

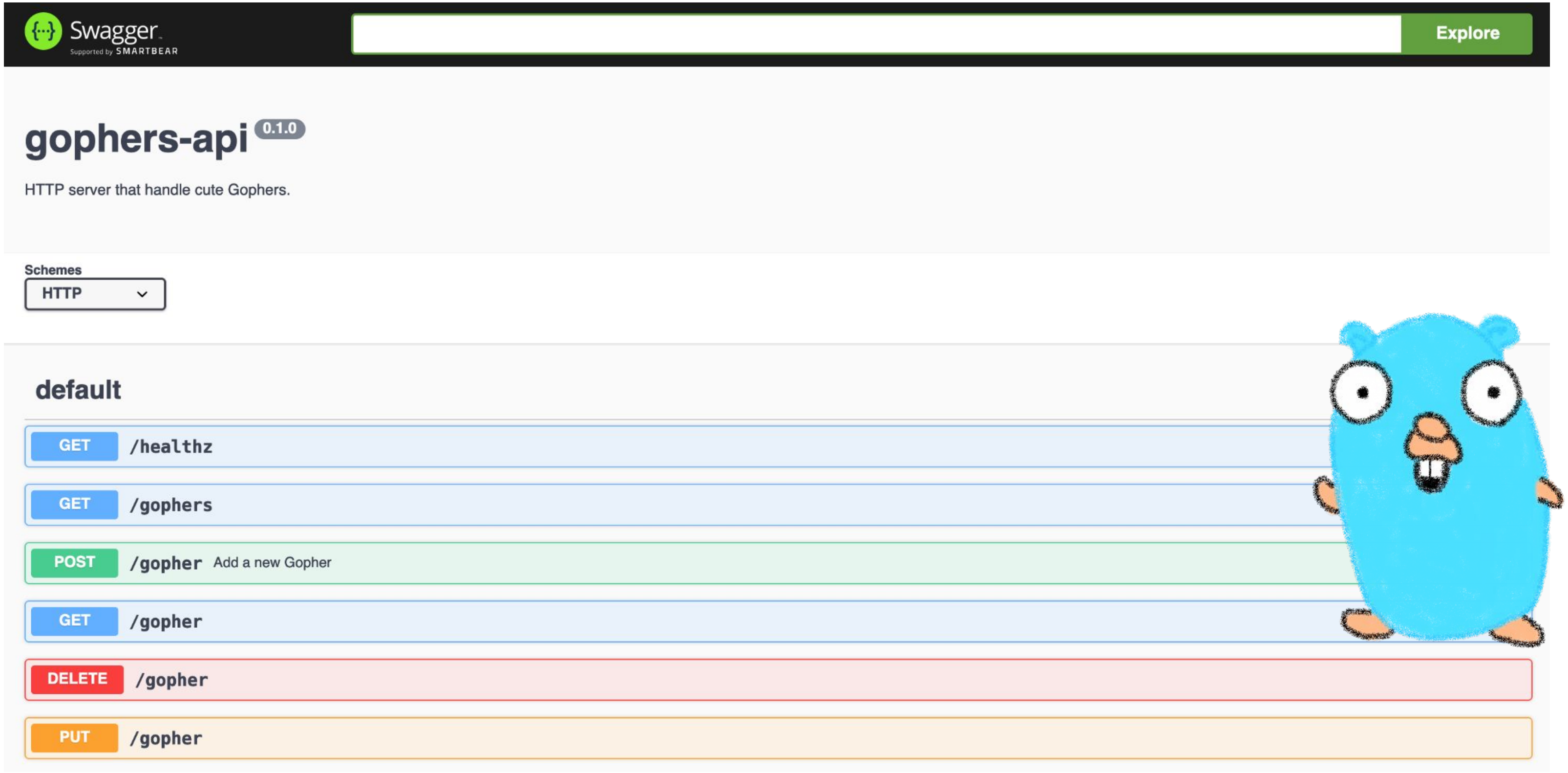
Everything begins with an API



```
$ task swagger.serve
task: [swagger.serve] swagger serve -F swagger ./pkg/swagger/swagger.yml
--no-open
2022/10/31 20:16:51 serving docs at http://localhost:38457/docs
```



Everything begins with an API



Swagger
Supported by SMARTBEAR

Explore

gophers-api 0.1.0

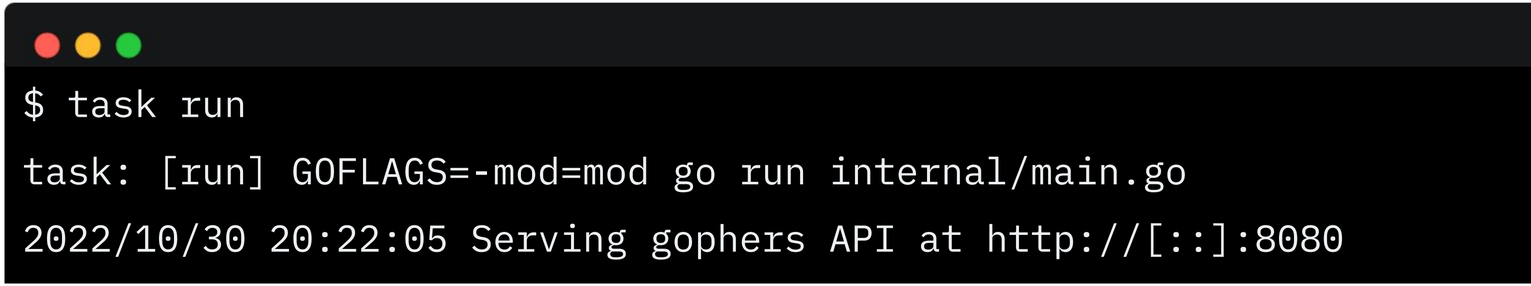
HTTP server that handle cute Gophers.

Schemes
HTTP

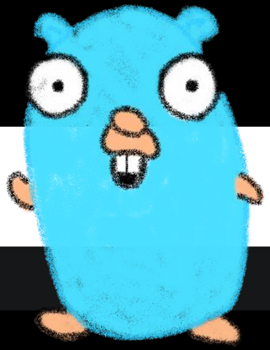
default

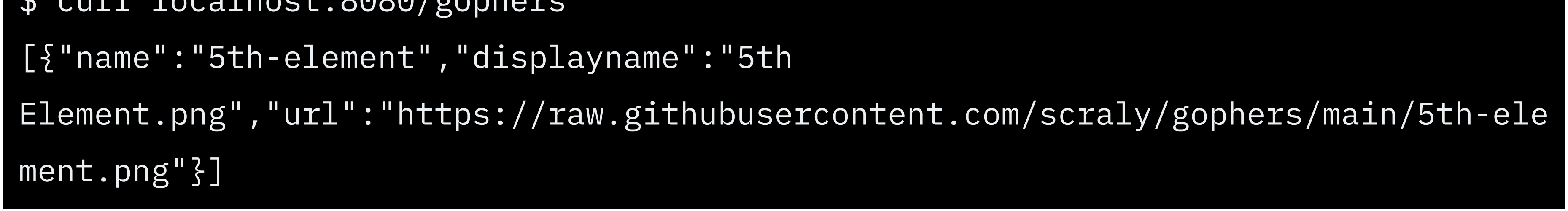
- GET /healthz
- GET /gophers
- POST /gopher Add a new Gopher
- GET /gopher
- DELETE /gopher
- PUT /gopher

Everything begins with an API



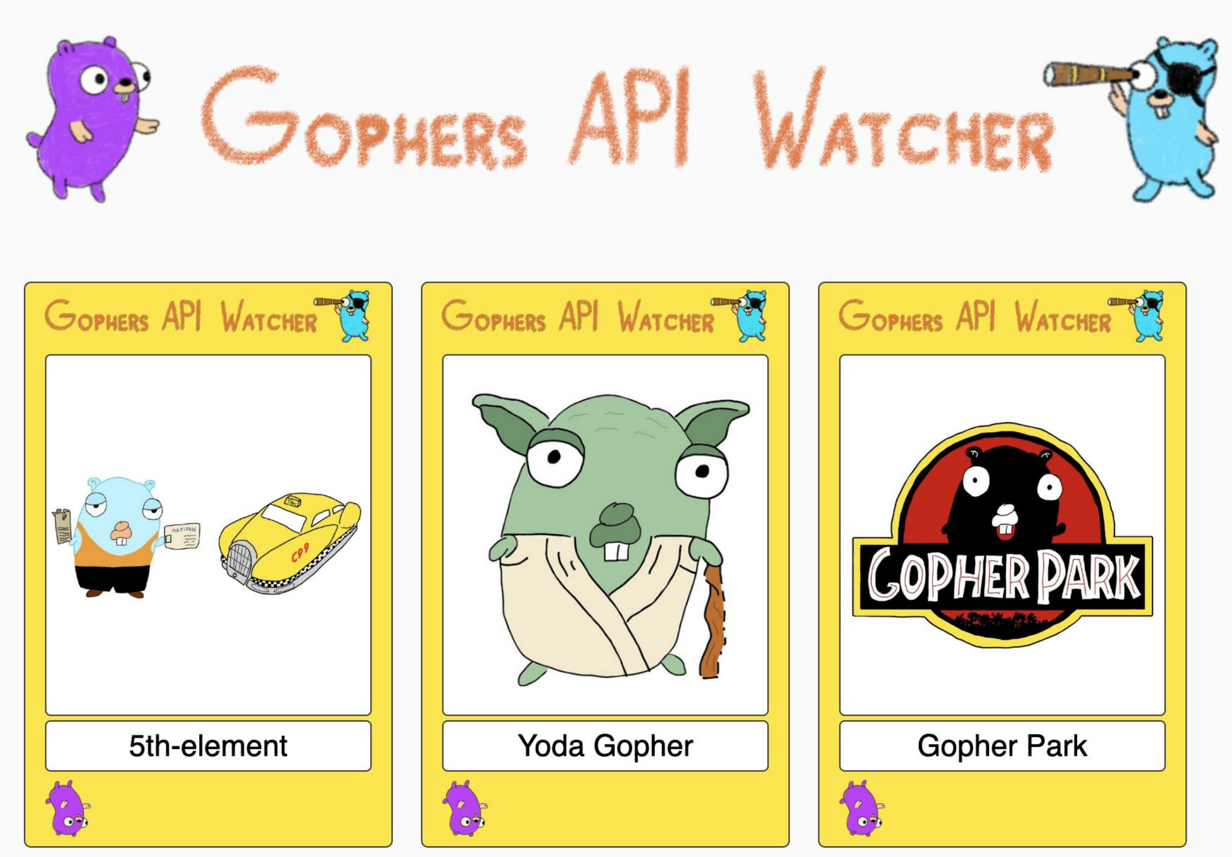
```
$ task run
task: [run] GOFLAGS=-mod=mod go run internal/main.go
2022/10/30 20:22:05 Serving gophers API at http://[::]:8080
```





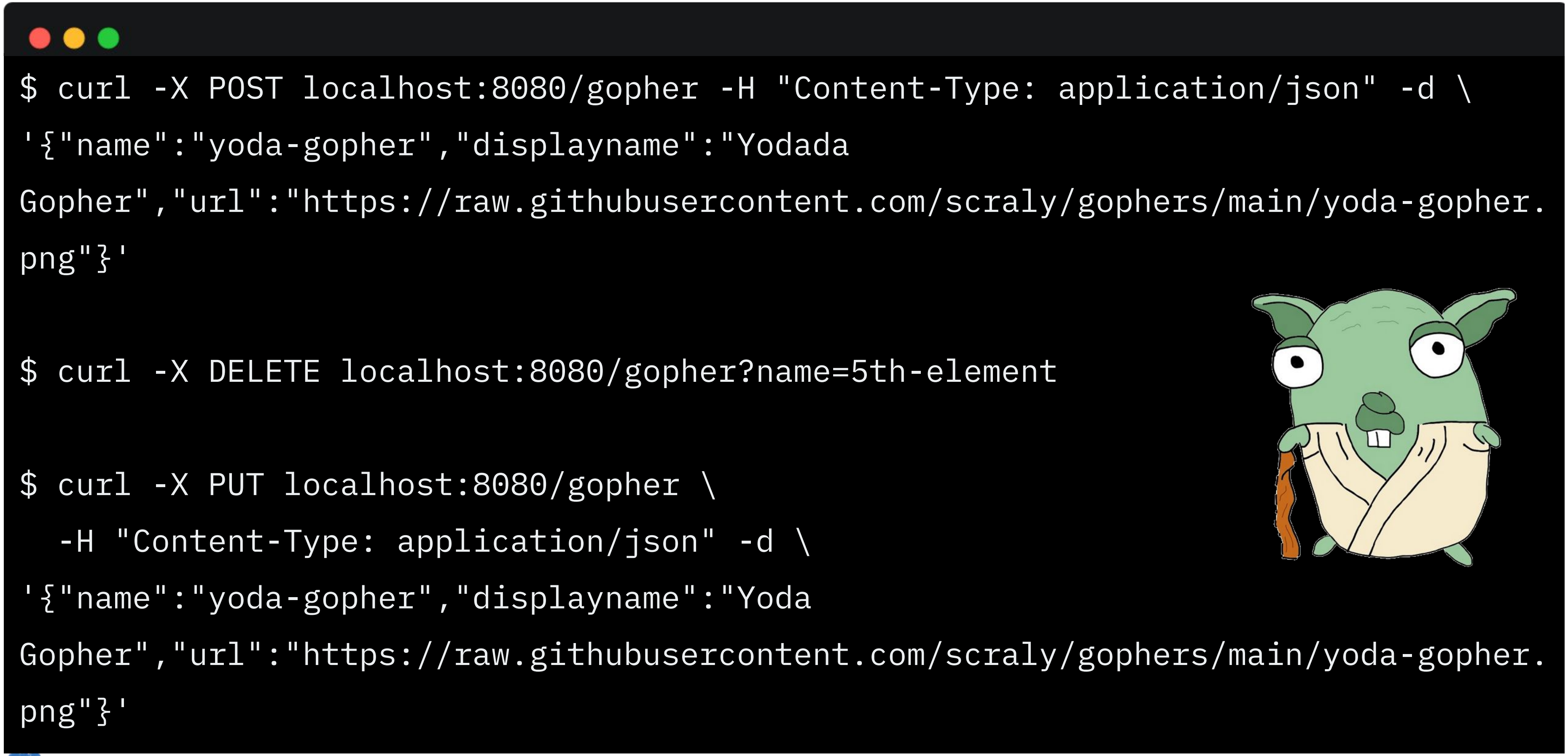
```
$ curl localhost:8080/gophers
[{"name":"5th-element","displayname":"5th
Element.png","url":"https://raw.githubusercontent.com/scraly/gophers/main/5th-ele
ment.png"}]
```

Gophers deserve to be seen



https://github.com/LostInBrittany/gophers-api-watcher

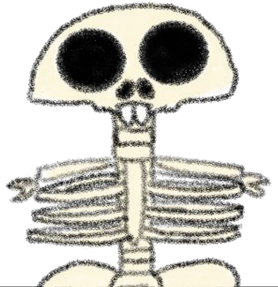
Everything begins with an API

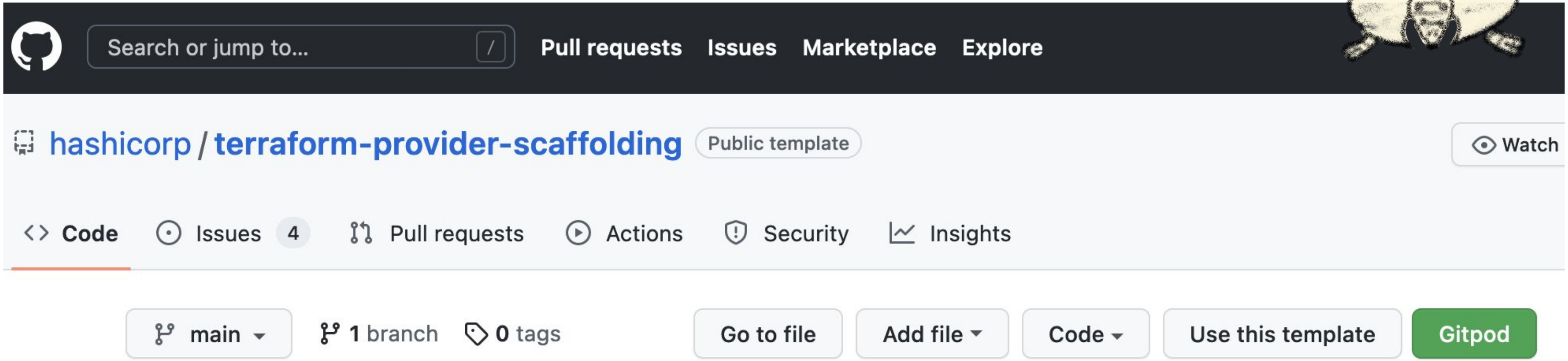


```
$ curl -X POST localhost:8080/gopher -H "Content-Type: application/json" -d \
'{"name":"yoda-gopher","displayname":"Yodada
Gopher","url":"https://raw.githubusercontent.com/scraly/gophers/main/yoda-gopher.
png"}'

$ curl -X DELETE localhost:8080/gopher?name=5th-element

$ curl -X PUT localhost:8080/gopher \
  -H "Content-Type: application/json" -d \
'{"name":"yoda-gopher","displayname":"Yoda
Gopher","url":"https://raw.githubusercontent.com/scraly/gophers/main/yoda-gopher.
png"}'
```

Let's create our provider!

1. Create the skeleton of our provider thanks to scaffolding





Search or jump to... /

Pull requests Issues Marketplace Explore

hashicorp / terraform-provider-scaffolding Public template

Watch

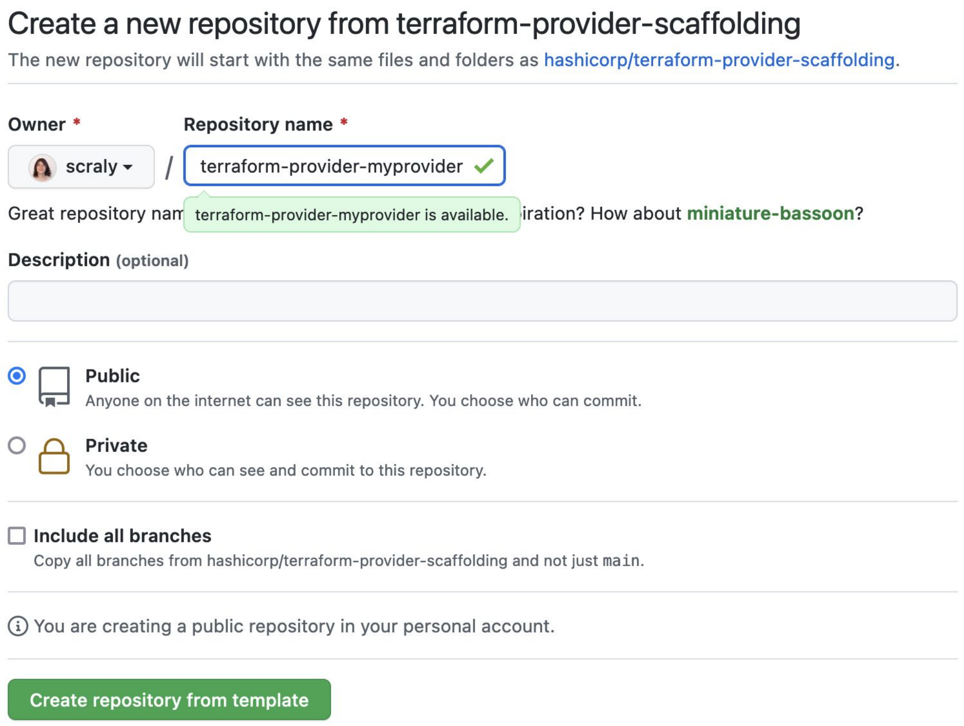
Code Issues 4 Pull requests Actions Security Insights

main 1 branch 0 tags

Go to file Add file Code Use this template Gitpod

https://github.com/hashicorp/terraform-provider-scaffolding

Let's create our provider!



Create a new repository from terraform-provider-scaffolding

The new repository will start with the same files and folders as hashicorp/terraform-provider-scaffolding.

Owner * **Repository name** *

scraly ▾ / terraform-provider-myprovider ✓

Great repository nam terraform-provider-myprovider is available. iration? How about **miniature-bassoon**?

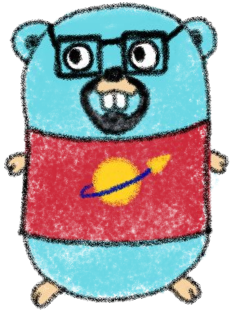
Description (optional)

● **Public**
Anyone on the internet can see this repository. You choose who can commit.

○ **Private**
You choose who can see and commit to this repository.

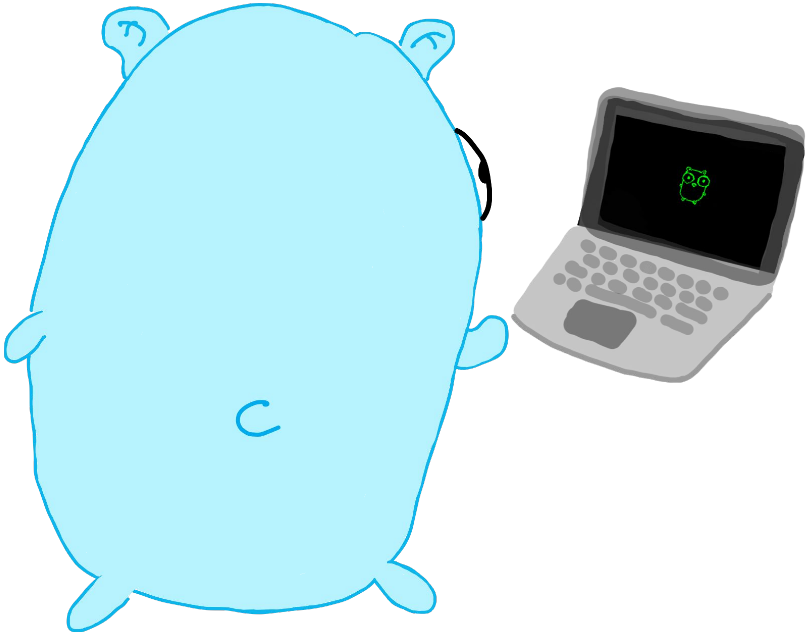
□ **Include all branches**
Copy all branches from hashicorp/terraform-provider-scaffolding and not just `main`.

ⓘ You are creating a public repository in your personal account.

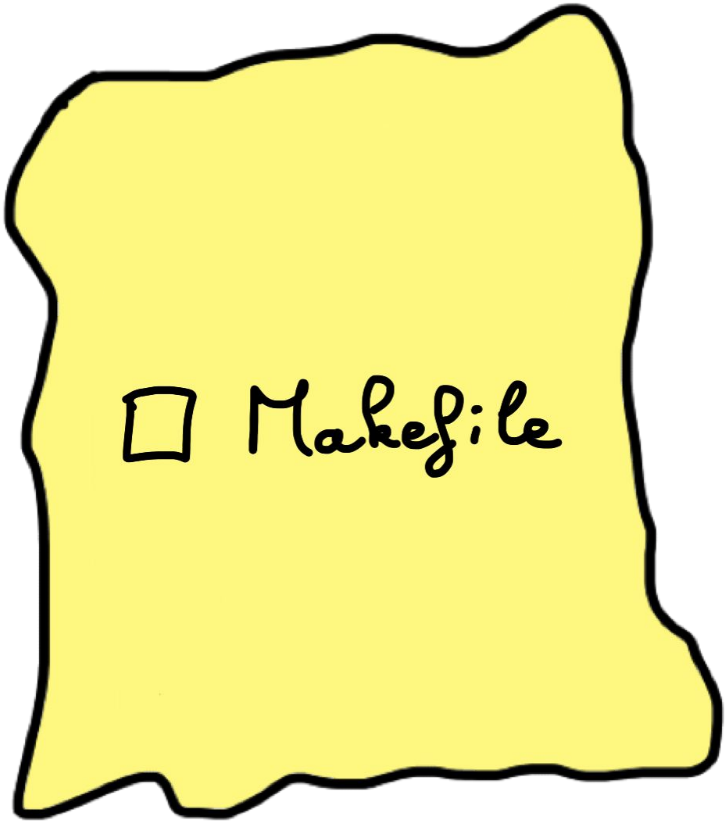


https://github.com/scraly/terraform-provider-gophers

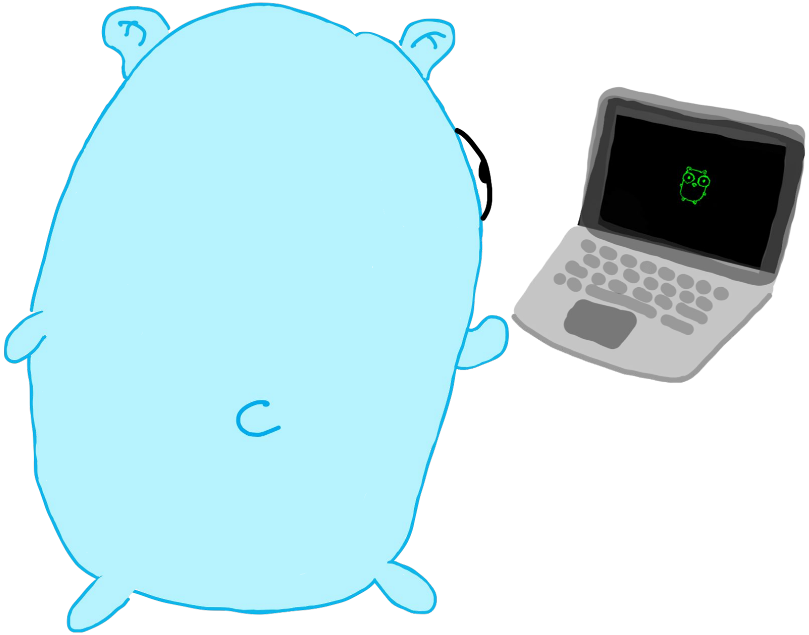
Demo time!



Provider > Makefile



Demo time!



Some concepts to introduce…

OVHcloud

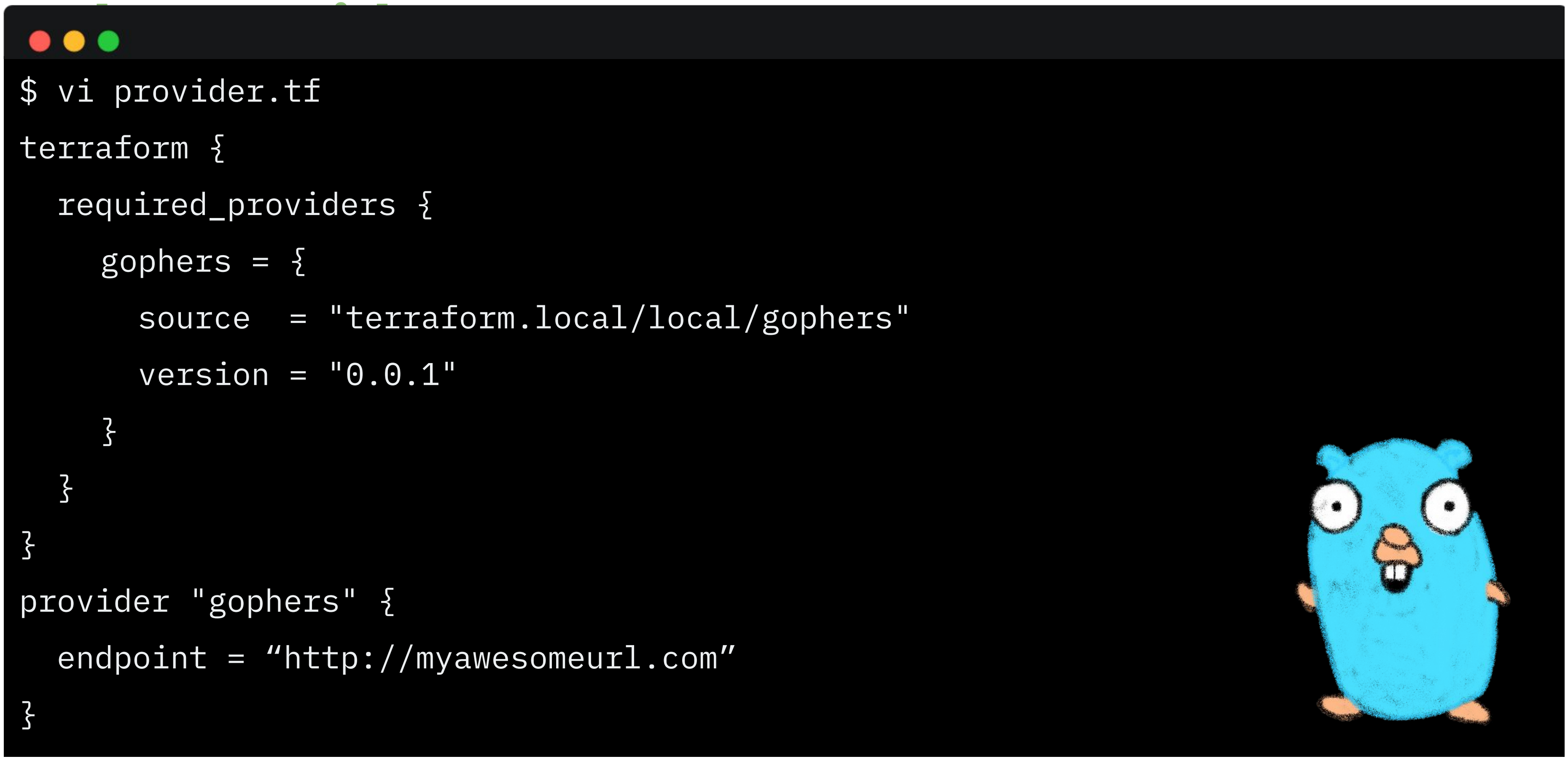
Datasource → GET

Resource → {POST, PUT, DELETE} + GET

Customizing provider definition

□ Customize provider definition

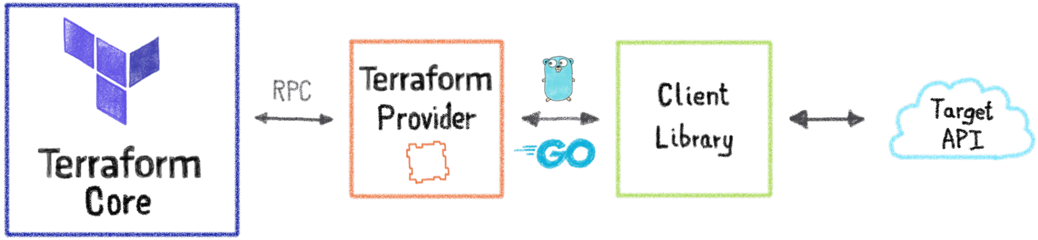
Test it!

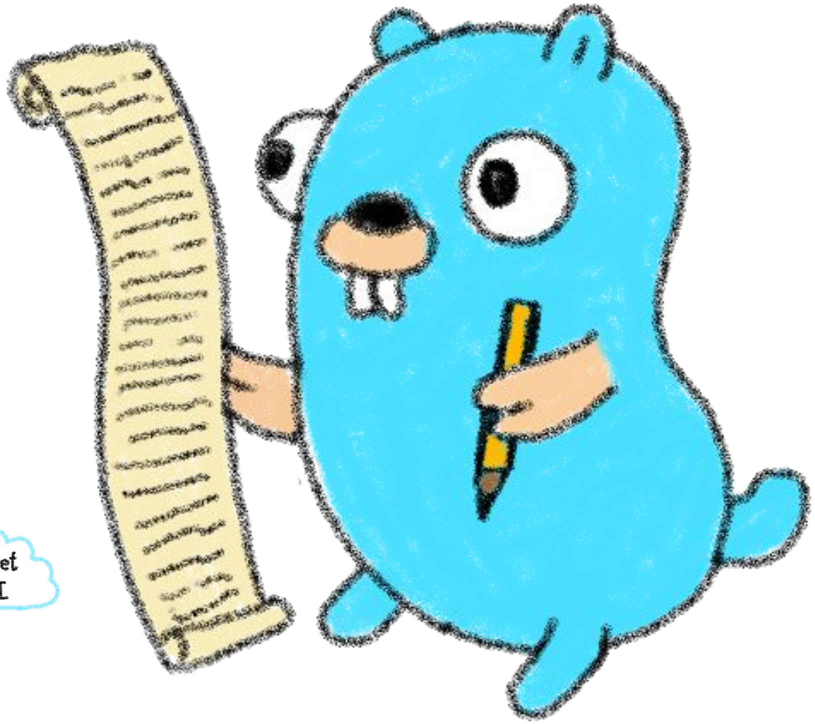


```
$ vi provider.tf
terraform {
  required_providers {
    gophers = {
      source  = "terraform.local/local/gophers"
      version = "0.0.1"
    }
  }
}
provider "gophers" {
  endpoint = “http://myawesomeurl.com”
}
```

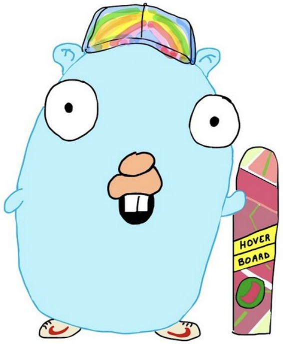
Adding the schema

"Translating" the Swagger into a Go schema

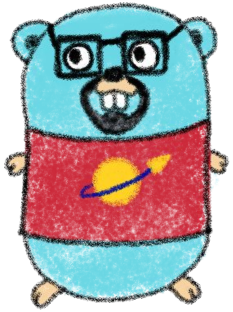




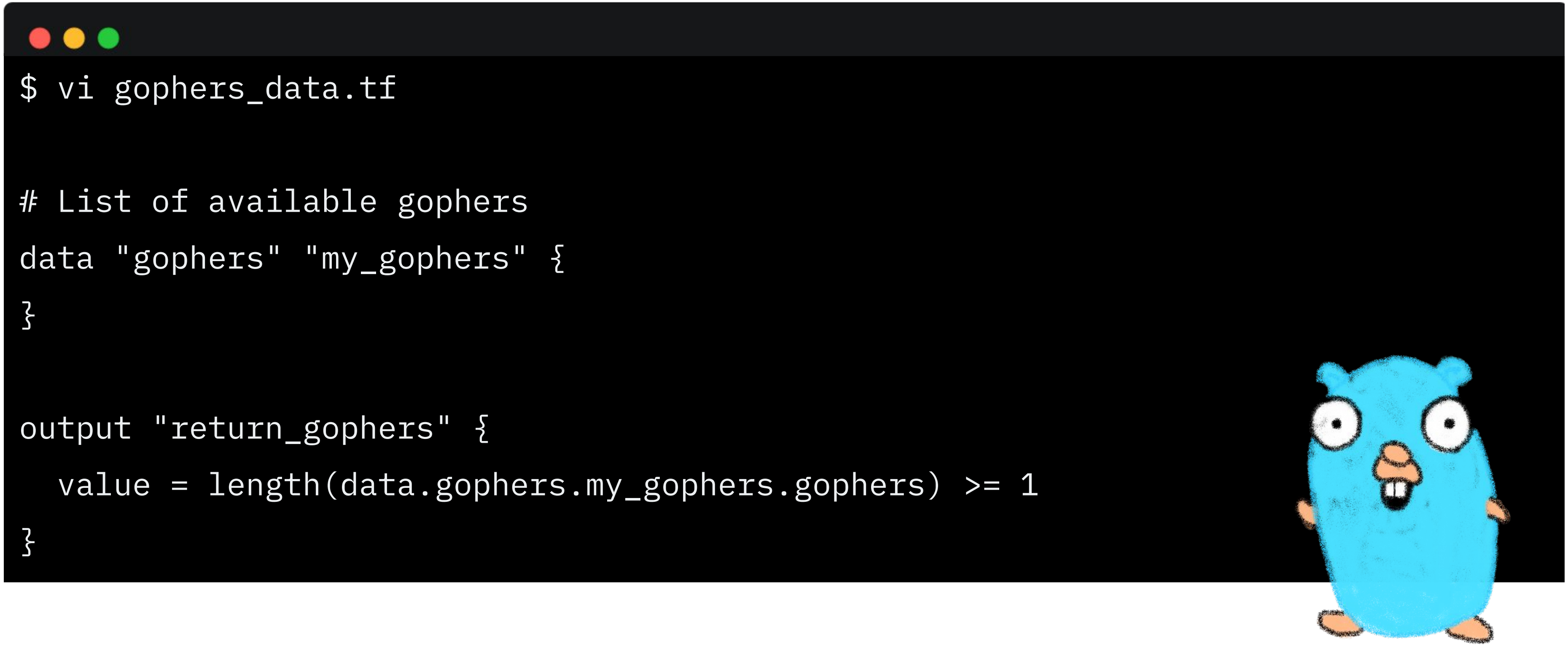
Adding datasource: gophers



□ Add the gophers datasource



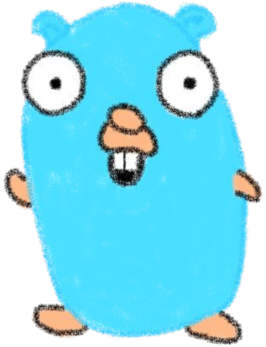
Test it!



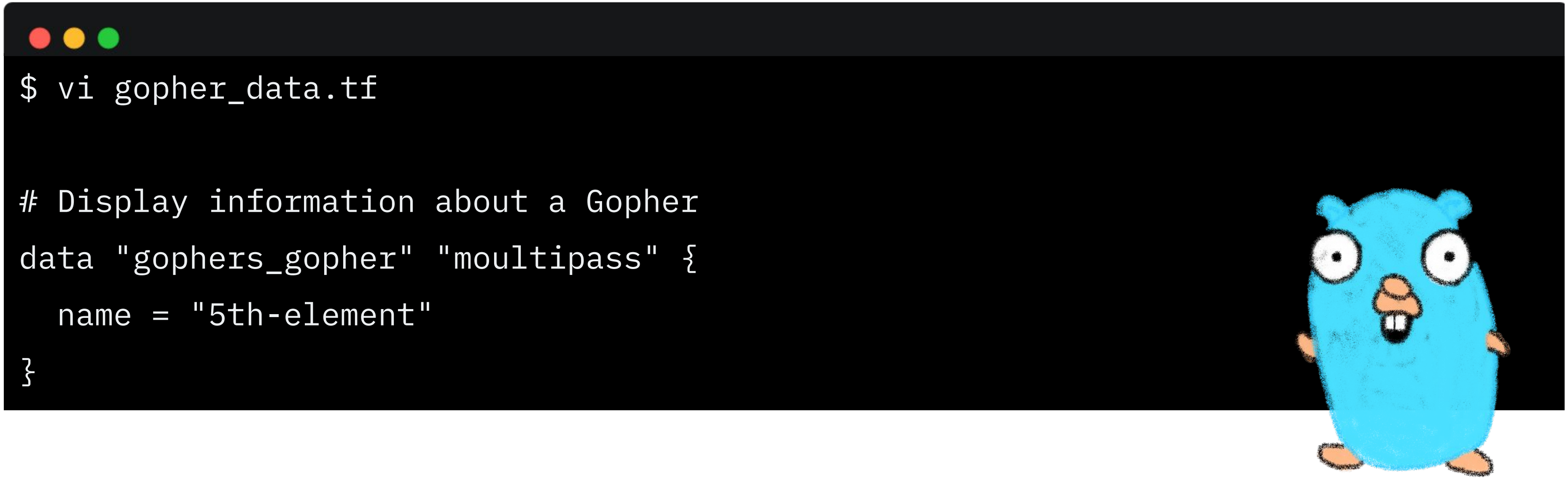
```
$ vi gophers_data.tf


# List of available gophers
data "gophers" "my_gophers" {
}


output "return_gophers" {
  value = length(data.gophers.my_gophers.gophers) >= 1
}
```

Adding datasource: gopher

□ Add the gopher datasource

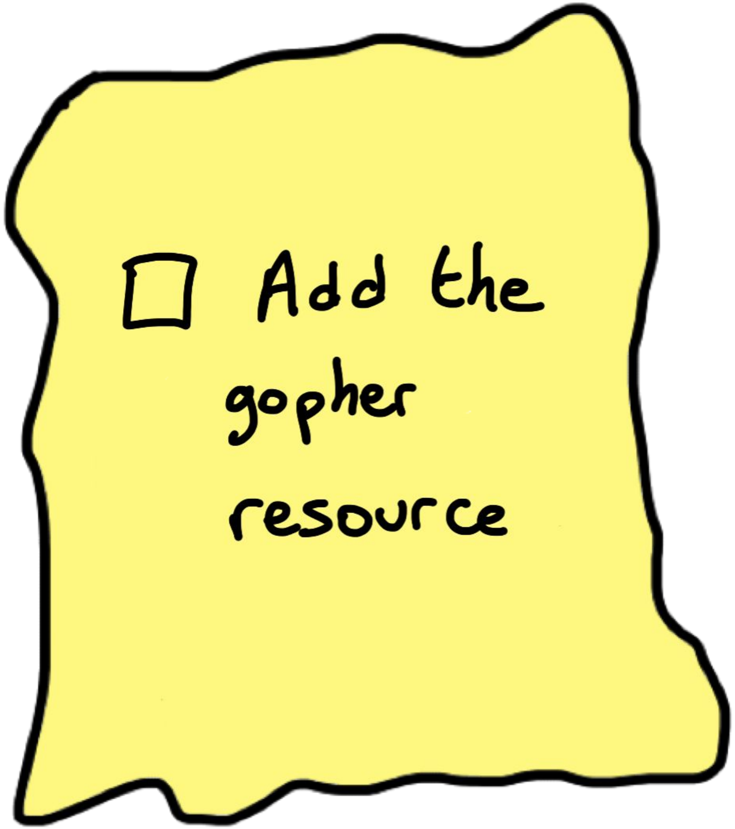


Test it!



```
$ vi gopher_data.tf

# Display information about a Gopher
data "gophers_gopher" "moultipass" {
  name = "5th-element"
}
```

Adding resource: gopher



□ Add the gopher resource

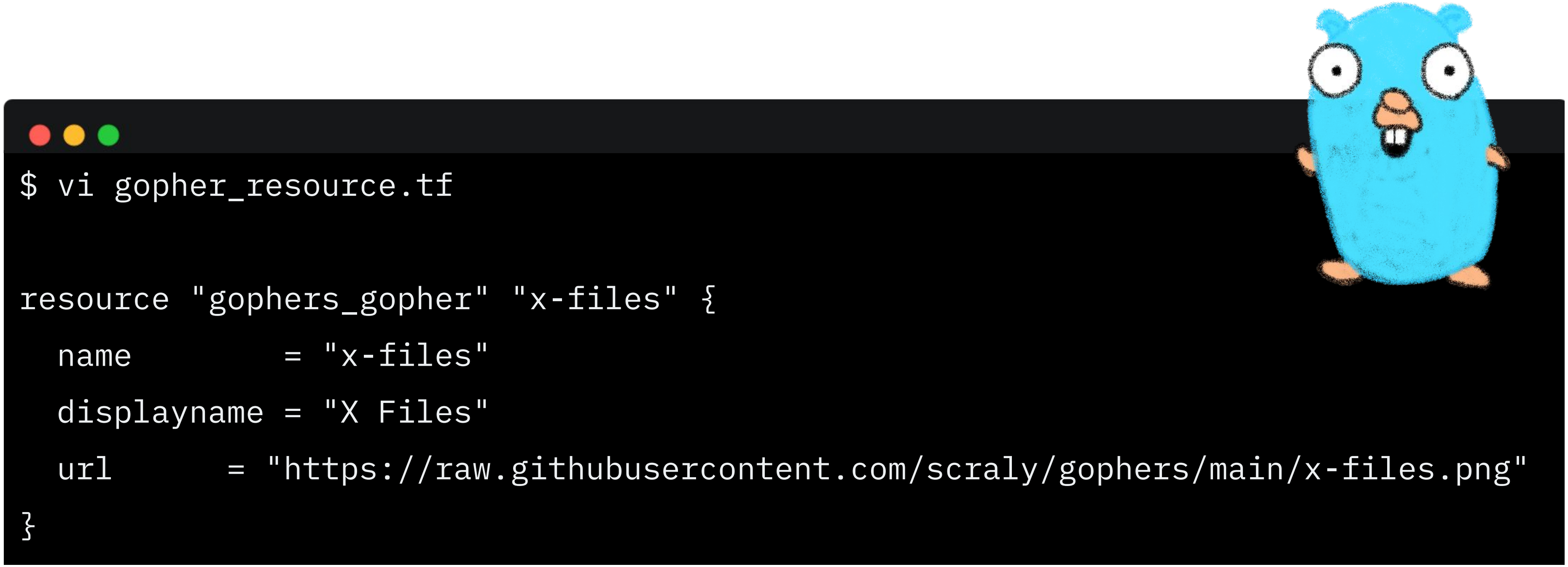
Create

Read

Update

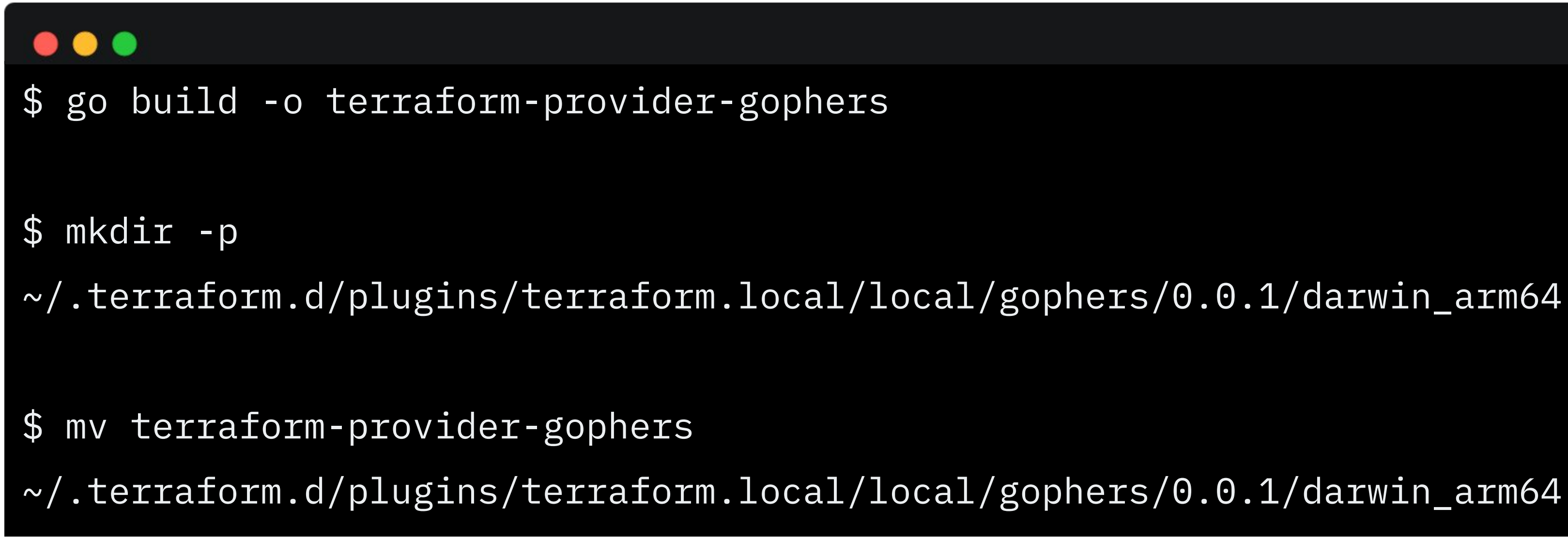
Delete

Test it!

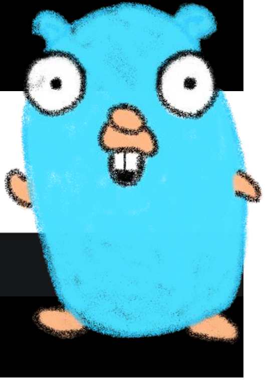


```
$ vi gopher_resource.tf


resource "gophers_gopher" "x-files" {
  name        = "x-files"
  displayname = "X Files"
  url       = "https://raw.githubusercontent.com/scraly/gophers/main/x-files.png"
}
```

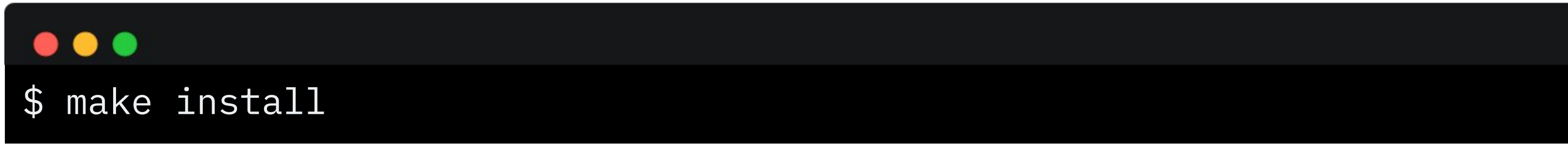
Testing the provider locally



```
$ go build -o terraform-provider-gophers

$ mkdir -p
~/.terraform.d/plugins/terraform.local/local/gophers/0.0.1/darwin_arm64

$ mv terraform-provider-gophers
~/.terraform.d/plugins/terraform.local/local/gophers/0.0.1/darwin_arm64
```

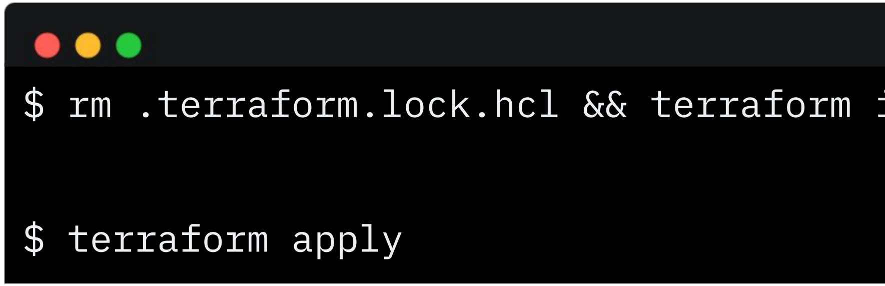


Or

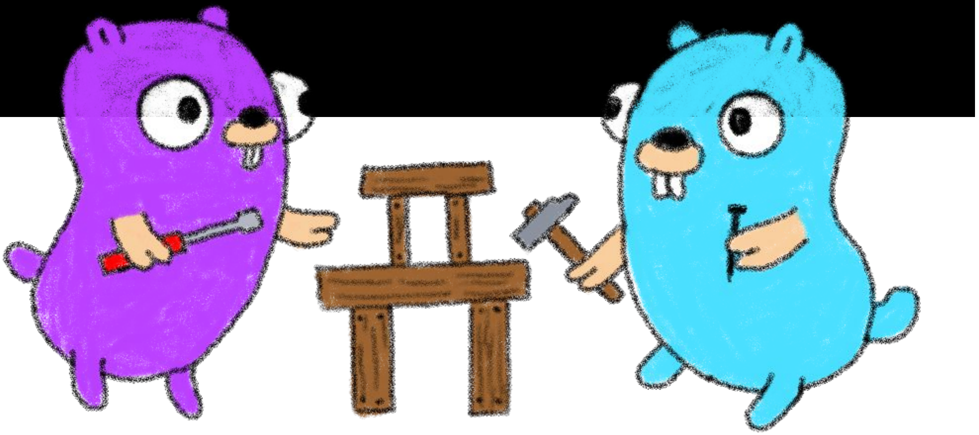


```
$ make install
```

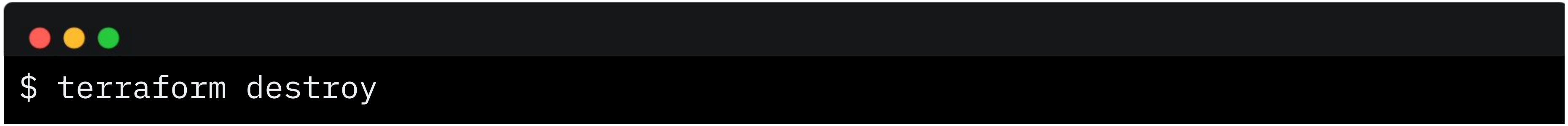
Testing the provider locally



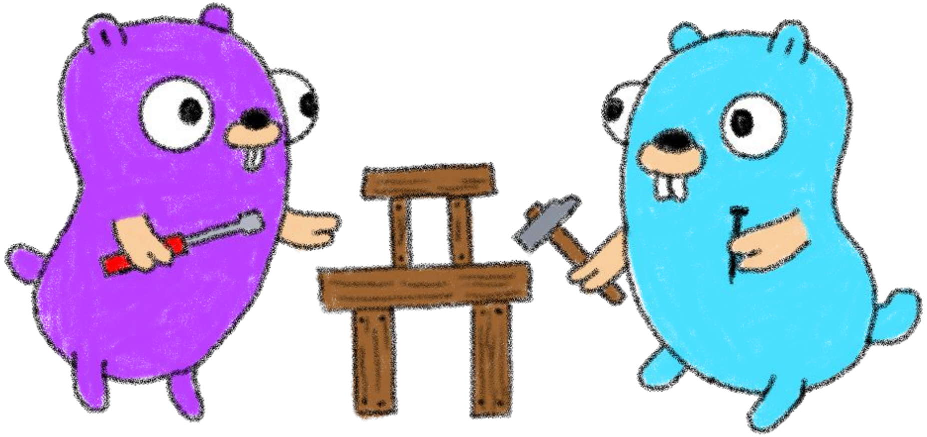
```
$ rm .terraform.lock.hcl && terraform init


$ terraform apply
```

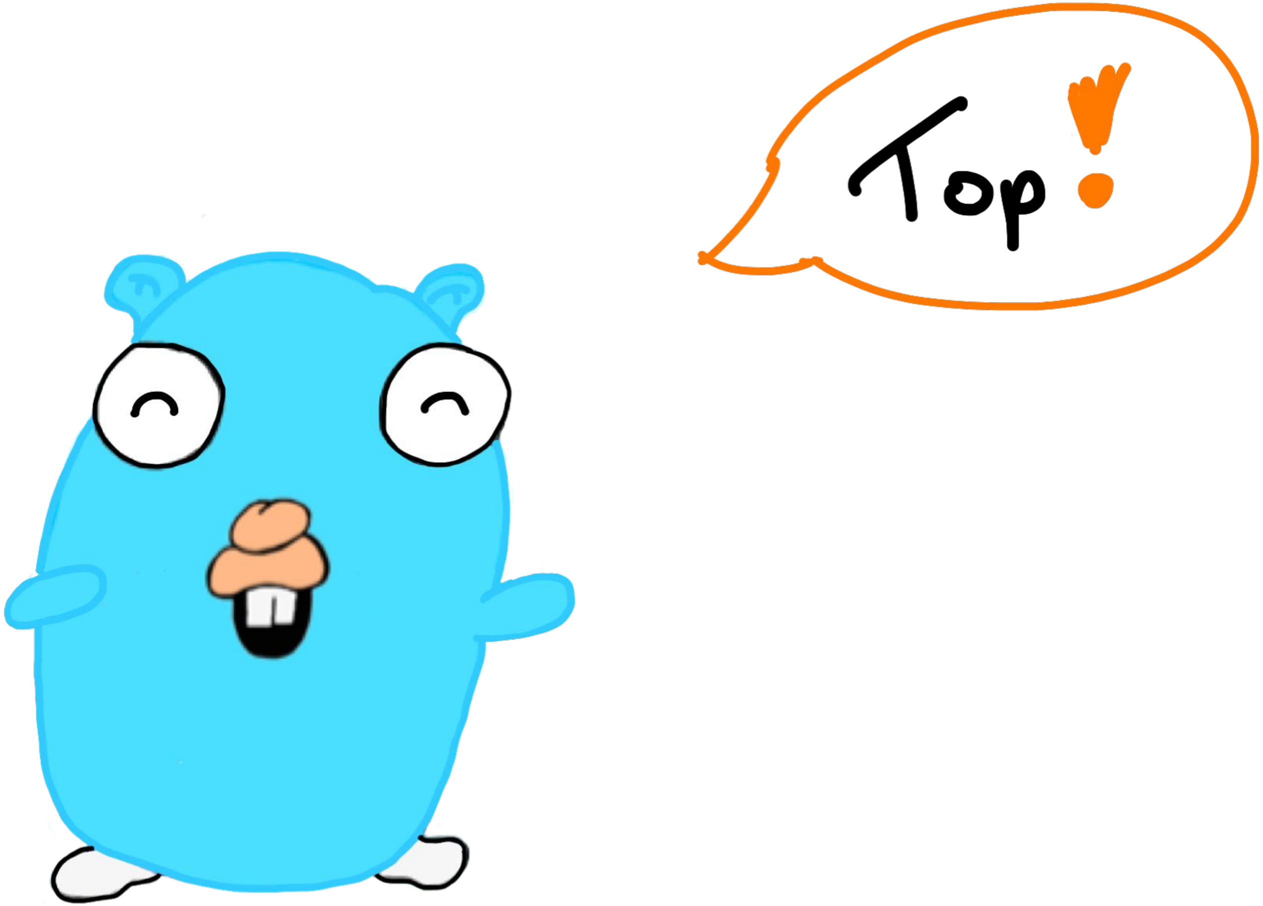


Testing the provider locally



```
$ terraform destroy
```

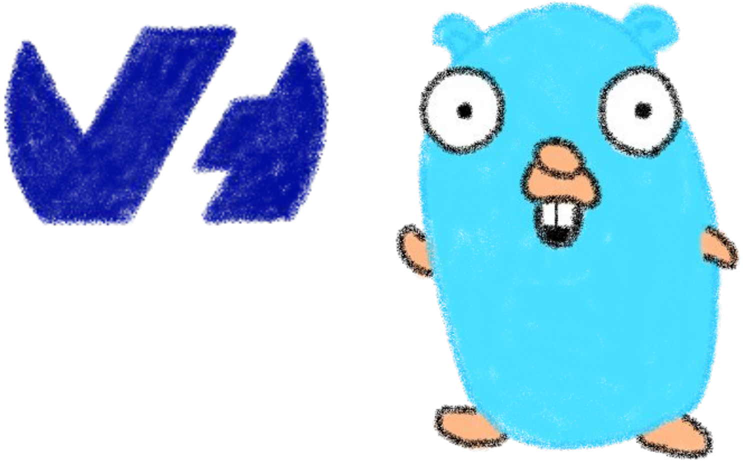



Top!

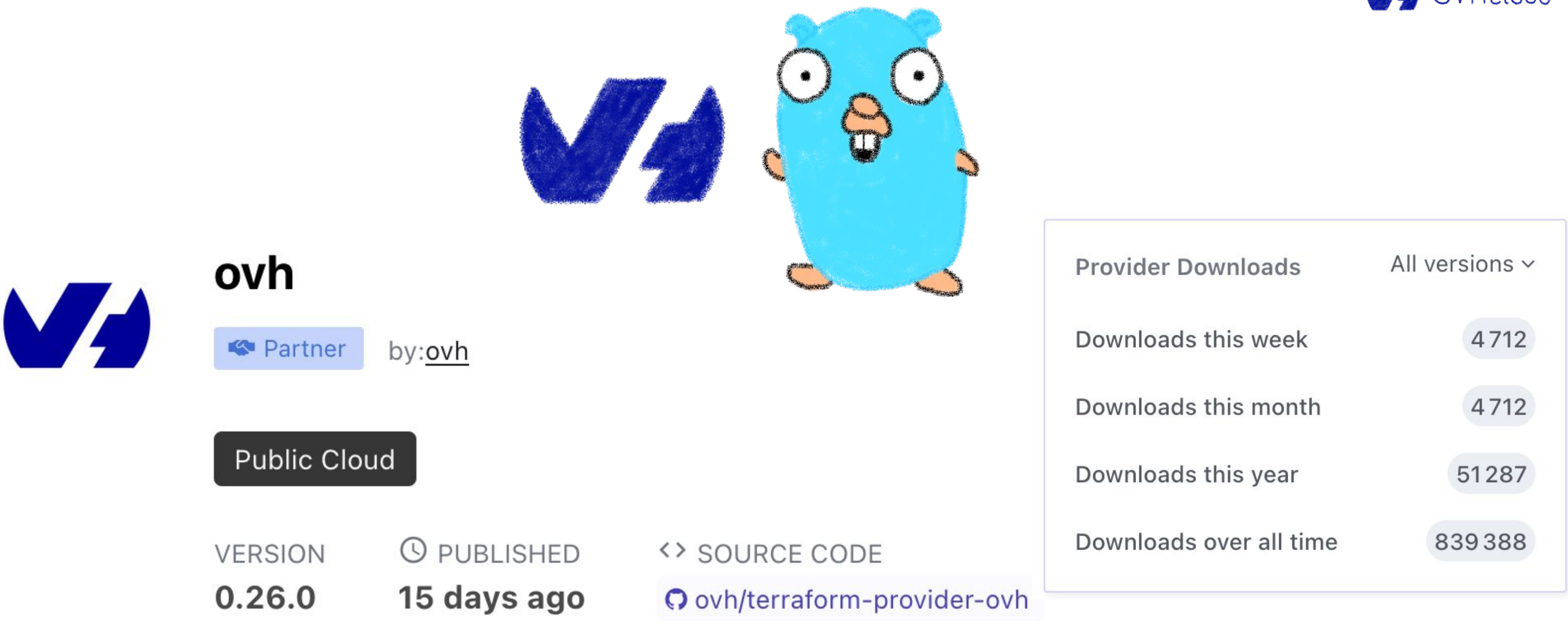
OVHcloud

OVHcloud Terraform Provider

To easily manage OVHcloud products



OVHcloud Terraform Provider



ovh

Partner by:ovh

Public Cloud

VERSION
0.26.0

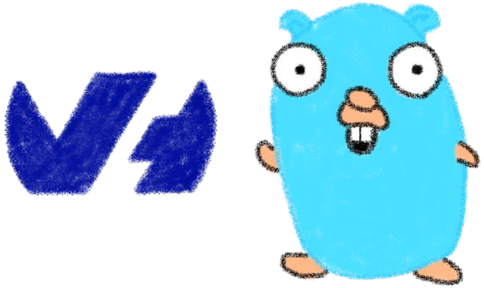
PUBLISHED
15 days ago

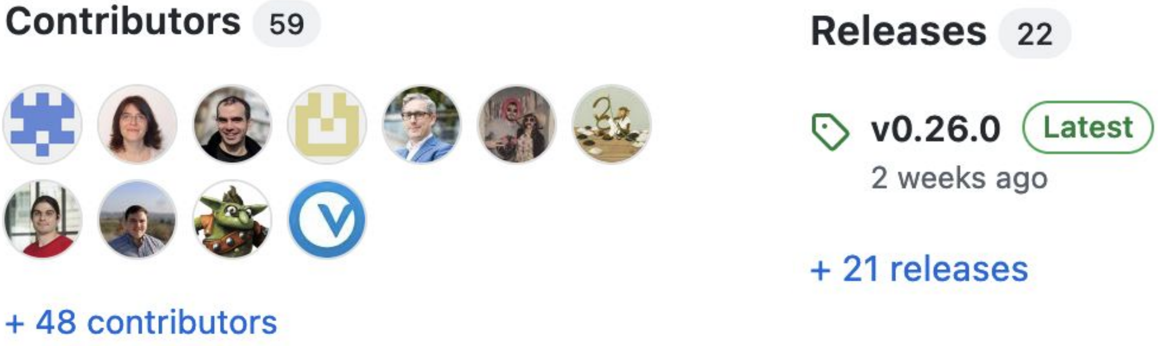
SOURCE CODE
ovh/terraform-provider-ovh

Provider Downloads	All versions
Downloads this week	4 712
Downloads this month	4 712
Downloads this year	51 287
Downloads over all time	839 388

https://registry.terraform.io/providers/ovh/ovh/latest/docs

OVHcloud Terraform Provider





Contributors 59

+ 48 contributors

Releases 22

v0.26.0 Latest

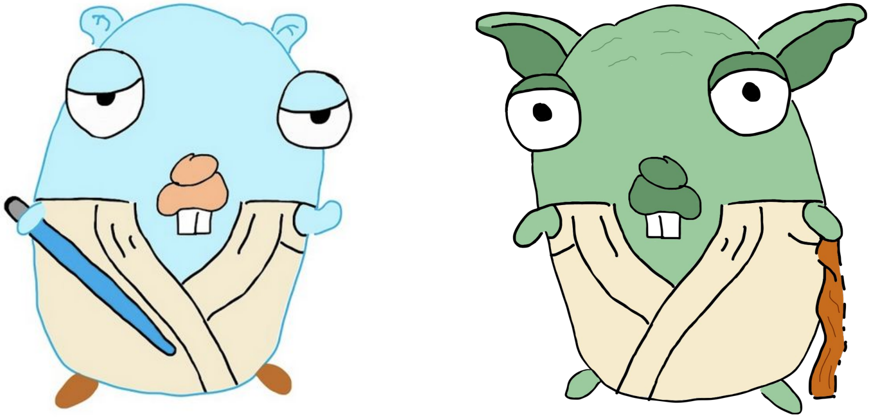
2 weeks ago

+ 21 releases

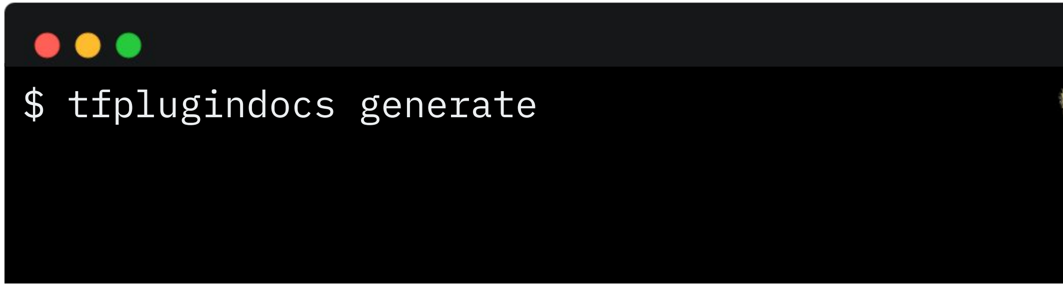
https://github.com/ovh/terraform-provider-ovh

Best practices

But we have learnt with our providers



Doc is not optional



```
$ tfplugindocs generate
```

Generate the doc of your provider.

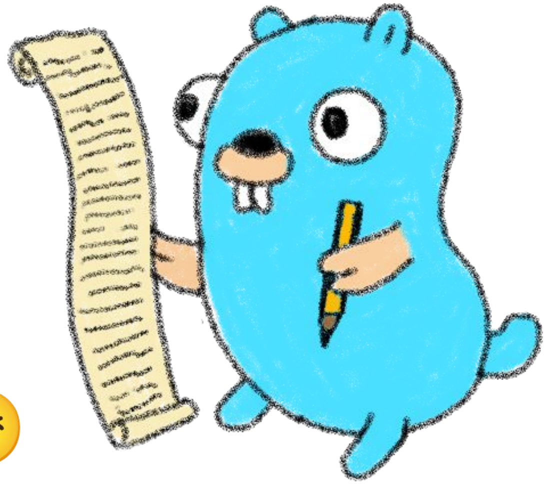
Based on the schema the provider exposes.

https://github.com/hashicorp/terraform-plugin-docs

Write useful examples in your doc

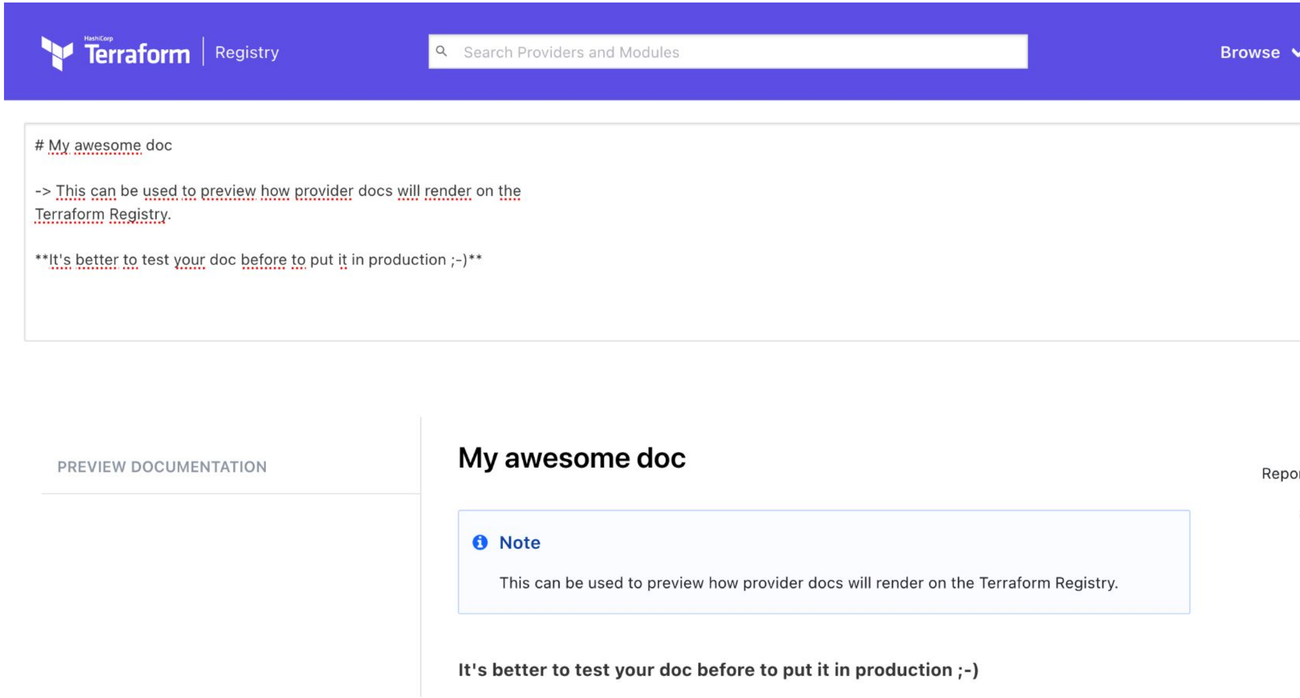
Examples in your documentation should be:

- Useful
- Up-to-date
- Working



Users will copy paste your examples! 😉

And… test your doc!



```
# My awesome doc

-> This can be used to preview how provider docs will render on the
Terraform Registry.

**It's better to test your doc before to put it in production ;-)**
```

My awesome doc

Note

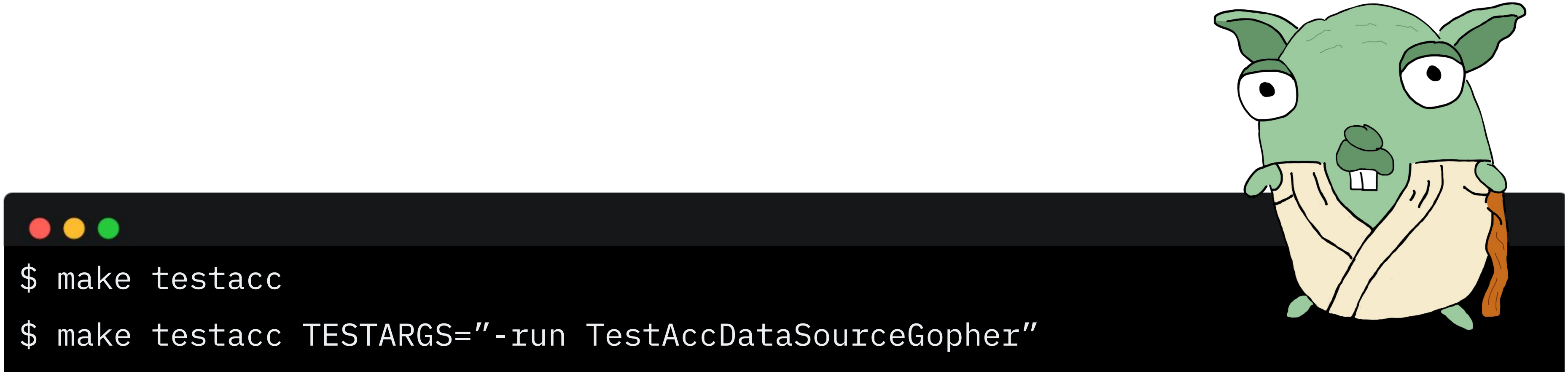
This can be used to preview how provider docs will render on the Terraform Registry.

It's better to test your doc before to put it in production ;-)

Use the doc preview tool

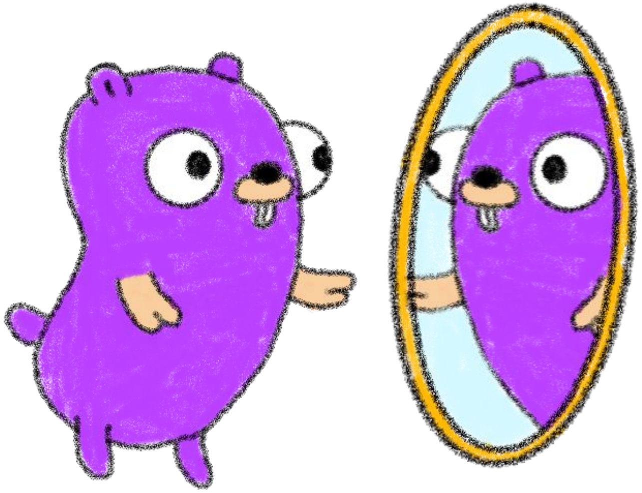
https://registry.terraform.io/tools/doc-preview

Acceptance tests

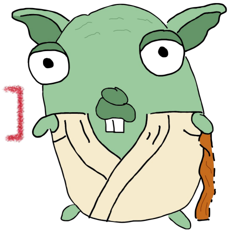


```
$ make testacc
$ make testacc TESTARGS=”-run TestAccDataSourceGopher”
```

Provider is a reflection of your API client

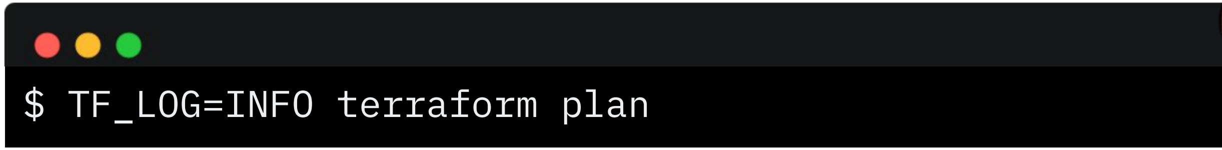


```
{
  "message":
    ["The","simplest","JSON","structures", "you", "use"]
}
```



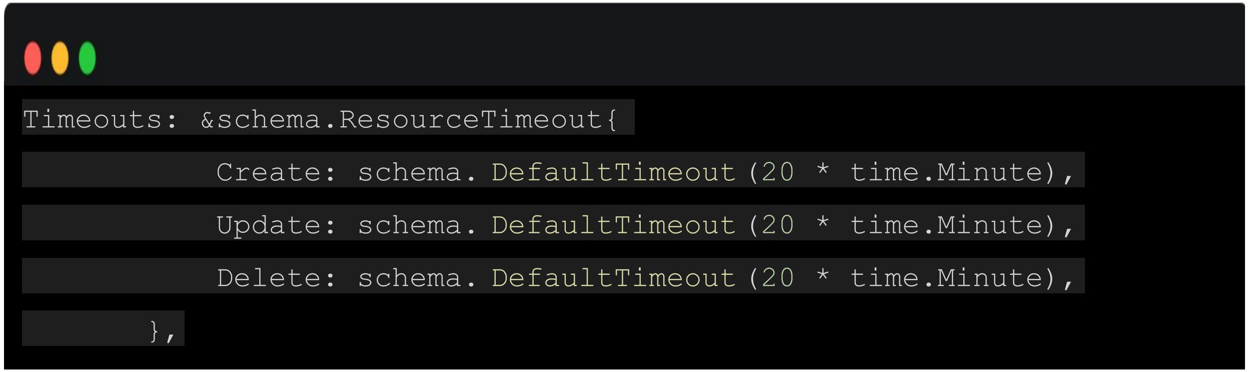
Think about API first design

Use the logs for debugging



```
$ TF_LOG=INFO terraform plan
```

Set timeouts / retry



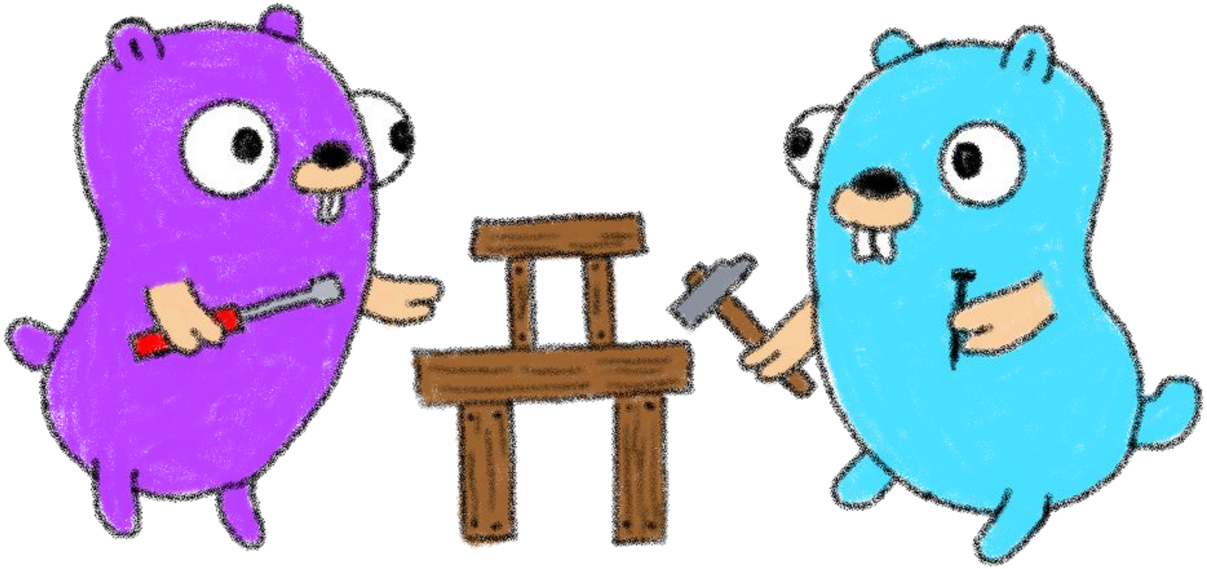
```
Timeouts: &schema.ResourceTimeout{
            Create: schema.DefaultTimeout(20 * time.Minute),
            Update: schema.DefaultTimeout(20 * time.Minute),
            Delete: schema.DefaultTimeout(20 * time.Minute),
        },
```

Timeout/retry par resource

Read the code

See how other open source providers are written

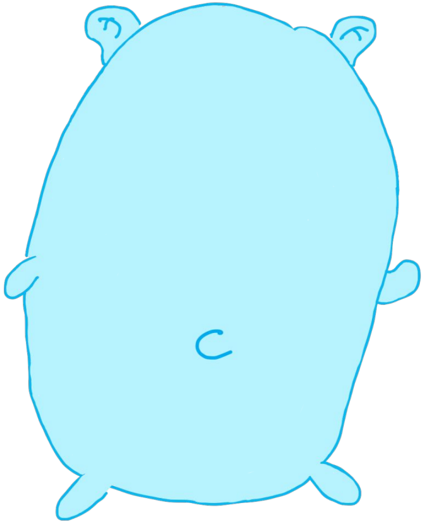
The “3 P” rule



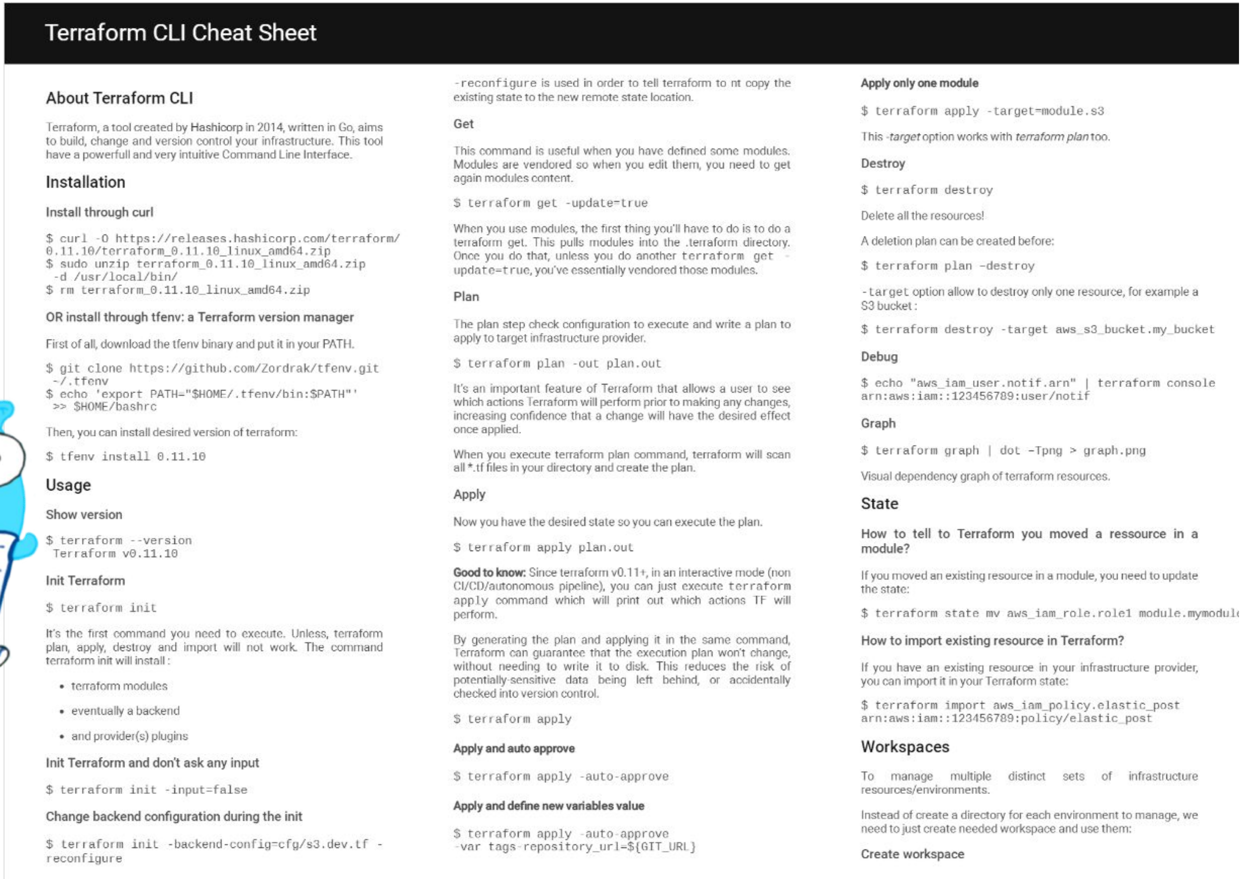
Practice, practice, practice

One more thing…

Or two or three



A handy cheat sheet



Terraform CLI Cheat Sheet

About Terraform CLI

Terraform, a tool created by Hashicorp in 2014, written in Go, aims to build, change and version control your infrastructure. This tool have a powerfull and very intuitive Command Line Interface.

Installation

Install through curl

```
$ curl -O https://releases.hashicorp.com/terraform/
0.11.10/terraform_0.11.10_linux_amd64.zip
$ sudo unzip terraform_0.11.10_linux_amd64.zip
 -d /usr/local/bin/
$ rm terraform_0.11.10_linux_amd64.zip
```

OR install through tfenv: a Terraform version manager

First of all, download the tfenv binary and put it in your PATH.

```
$ git clone https://github.com/Zordrak/tfenv.git
 ~/.tfenv
$ echo 'export PATH="$HOME/.tfenv/bin:$PATH"'
 >> $HOME/bashrc
```

Then, you can install desired version of terraform:

```
$ tfenv install 0.11.10
```

Usage

Show version

```
$ terraform --version
 Terraform v0.11.10
```

Init Terraform

```
$ terraform init
```

It's the first command you need to execute. Unless, terraform plan, apply, destroy and import will not work. The command terraform init will install :

- terraform modules
- eventually a backend
- and provider(s) plugins

Init Terraform and don't ask any input

```
$ terraform init -input=false
```

Change backend configuration during the init

```
$ terraform init -backend-config=cfg/s3.dev.tf -
reconfigure
```

`-reconfigure` is used in order to tell terraform to nt copy the existing state to the new remote state location.

Get

This command is useful when you have defined some modules. Modules are vendored so when you edit them, you need to get again modules content.

```
$ terraform get -update=true
```

When you use modules, the first thing you'll have to do is to do a terraform get. This pulls modules into the .terraform directory. Once you do that, unless you do another `terraform get -update=true`, you've essentially vendored those modules.

Plan

The plan step check configuration to execute and write a plan to apply to target infrastructure provider.

```
$ terraform plan -out plan.out
```

It's an important feature of Terraform that allows a user to see which actions Terraform will perform prior to making any changes, increasing confidence that a change will have the desired effect once applied.

When you execute terraform plan command, terraform will scan all *.tf files in your directory and create the plan.

Apply

Now you have the desired state so you can execute the plan.

```
$ terraform apply plan.out
```

Good to know: Since terraform v0.11+, in an interactive mode (non CI/CD/autonomous pipeline), you can just execute `terraform apply` command which will print out which actions TF will perform.

By generating the plan and applying it in the same command, Terraform can guarantee that the execution plan won't change, without needing to write it to disk. This reduces the risk of potentially-sensitive data being left behind, or accidentally checked into version control.

```
$ terraform apply
```

Apply and auto approve

```
$ terraform apply -auto-approve
```

Apply and define new variables value

```
$ terraform apply -auto-approve
-var tags-repository_url=${GIT_URL}
```

Apply only one module

```
$ terraform apply -target=module.s3
```

This *-target* option works with *terraform plan* too.

Destroy

```
$ terraform destroy
```

Delete all the resources!

A deletion plan can be created before:

```
$ terraform plan -destroy
```

`-target` option allow to destroy only one resource, for example a S3 bucket :

```
$ terraform destroy -target aws_s3_bucket.my_bucket
```

Debug

```
$ echo "aws_iam_user.notif.arn" | terraform console
arn:aws:iam::123456789:user/notif
```

Graph

```
$ terraform graph | dot -Tpng > graph.png
```

Visual dependency graph of terraform resources.

State

How to tell to Terraform you moved a ressource in a module?

If you moved an existing resource in a module, you need to update the state:

```
$ terraform state mv aws_iam_role.role1 module.mymodul
```

How to import existing resource in Terraform?

If you have an existing resource in your infrastructure provider, you can import it in your Terraform state:

```
$ terraform import aws_iam_policy.elastic_post
arn:aws:iam::123456789:policy/elastic_post
```

Workspaces

To manage multiple distinct sets of infrastructure resources/environments.

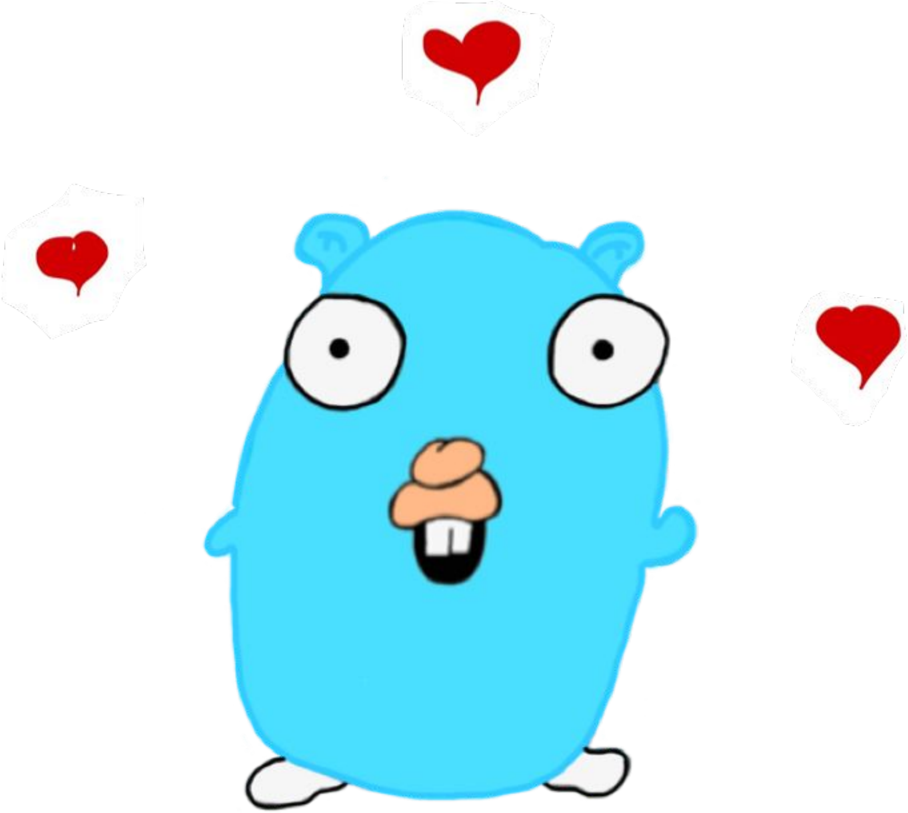
Instead of create a directory for each environment to manage, we need to just create needed workspace and use them:

Create workspace

https://github.com/scraly/terraform-cheat-sheet/

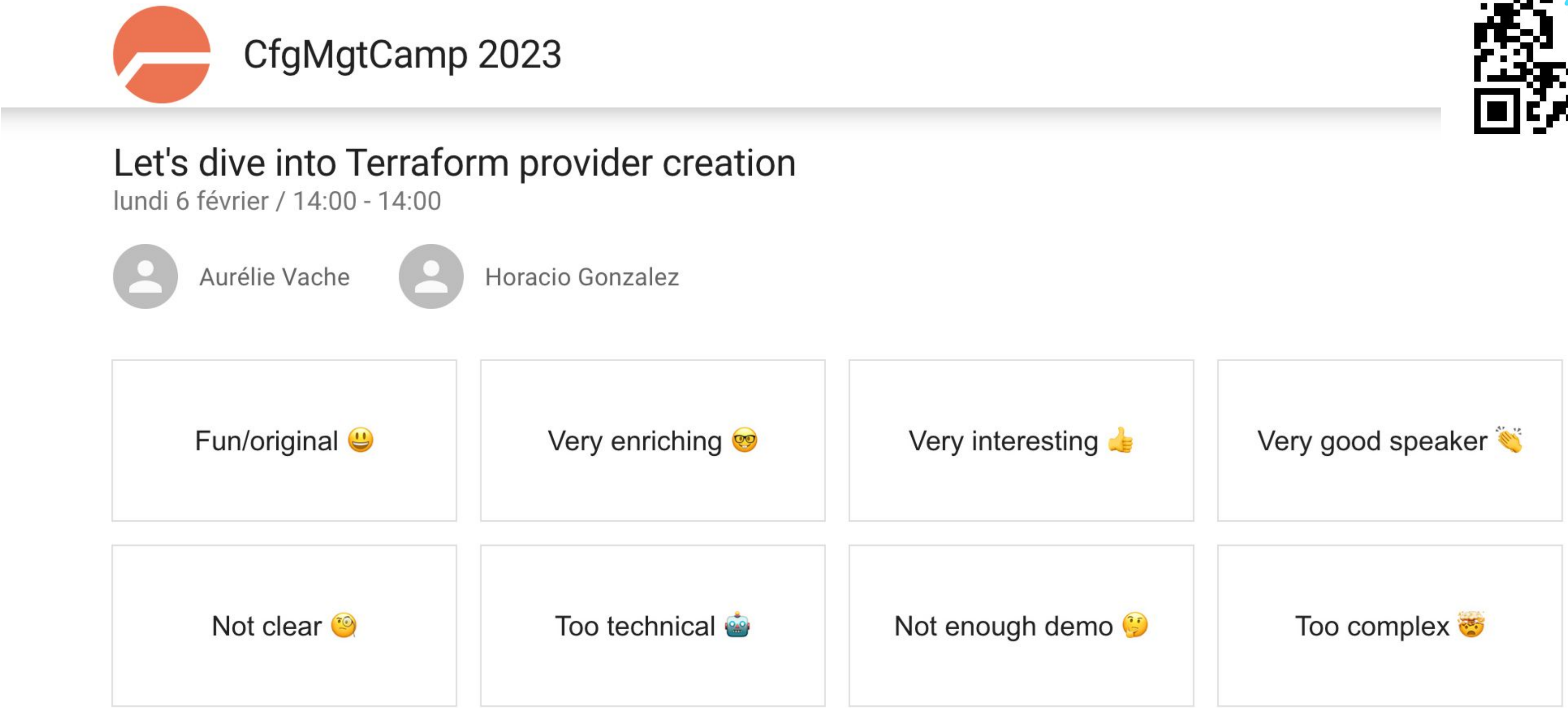
Thank you!

OVHcloud



https://bit.ly/tf-provider-cfgmgtcamp

We ❤️ feedbacks



CfgMgtCamp 2023

Let's dive into Terraform provider creation

lundi 6 février / 14:00 - 14:00

Aurélie Vache   Horacio Gonzalez

Fun/original 😃	Very enriching 🤓	Very interesting 👍	Very good speaker 👏
Not clear 🧐	Too technical 🤖	Not enough demo 🤔	Too complex 🤯

https://bit.ly/vote-tf-provider-cfgmgtcamp