

# RUNTASTIC





MAY 26, 2023

# GitOps & Terraform: A Match Made in Cloud Heaven

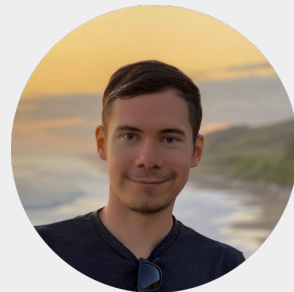
**Name:** Alexander Lackner



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# ALEXANDER LACKNER

- Joined Runtastic in March 2020
- Infrastructure Engineer
- Passionate about **Automation** and **Cloud Computing**
- Loves to **Run**, **Hike** and **Game** 🎮



**ALEXANDER LACKNER**

Infrastructure Engineer

<https://github.com/al-lac>

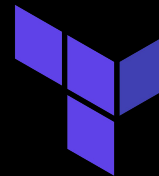
[alexander.lackner@runtastic.com](mailto:alexander.lackner@runtastic.com)



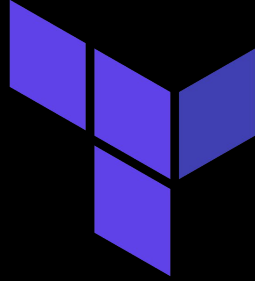
**Flux Terraform  
Controller**



**Atlantis**



**Terraform  
Cloud**

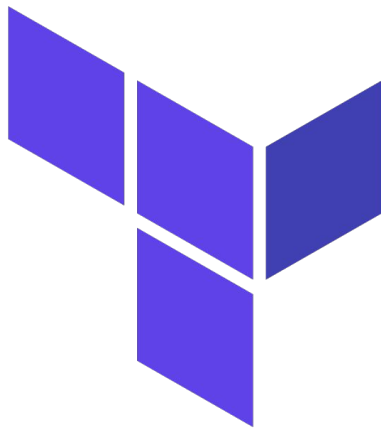


# **Infrastructure as Code (IaC) with Terraform**

# Infrastructure as Code (IaC)

- **Terraform**

- **Open Source**
- Multi-Cloud
- Lots of **providers**
- Add existing infrastructure with **terraformer**
- Reusable **modules**
- Stateful
- Prevents **errors** that happen due to manual changes



# Infrastructure as Code (IaC)

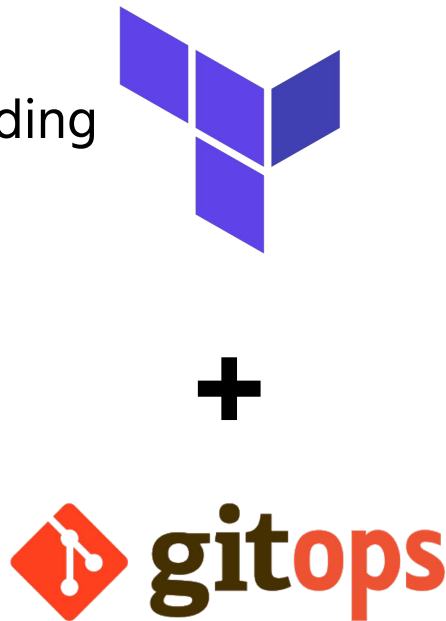
- **Other tools:**

- Ansible
- Chef
- Puppet
- AWS CloudFormation
- Azure Resource Manager (ARM) / Bicep



# Why GitOps for Terraform?

- No **local** environment needed -> easier on-boarding
- Better **collaboration** between **Dev** and **Ops**
- **Automated** Deployments
- **Auditing** and **Documentation**
- **Drift Detection**







# **Flux GitOps Terraform Controller**



# Flux Terraform Controller

- Runs on **kubernetes (k8s)** with **flux**
- Uses **k8s resources** like **secrets** for the state
- Can **automatically apply** terraform plans
- Built-in **drift detection**
- Easy to deploy with **helm**
- CLI Tool **tfctl**




# Flux Terraform Controller

```
root@k3s-2:~  
[root@k3s-2 ~]# tfctl get  
NAMESPACE      NAME      READY  MESSAGE                                                                 PLAN PENDING  AGE  
flux-system     tf-aws    True   No drift: main@sha1:8d26605679eb6d8dbfb4b3578e0654c2dae70033  false 1 day  
flux-system     helloworld True   No drift: main@sha1:f028eb689725e356e7f98d530345acf732fd151e  false 1 day  
[root@k3s-2 ~]#
```



# Flux Terraform Controller

- Developed by **weaveworks**  (creators of flux)
- Still **early** in development
- Upcoming features:
  - Write back and show plan in **PRs**
  - **Selectable** TF versions (fixed right now)
  - Cloud **cost** estimation
- **Note:** Some file extensions are excluded by default

**DEMO**



**Atlantis**




# Atlantis

- Lots of ways of **deploying**
  - Server, Docker, k8s
- Integrates into most **version control systems**
  - Bitbucket, GitHub, GitLab, ...
- Provides an easy to understand **Pull Request** flow
  - **atlantis** plan, **atlantis** apply
- Configure with **atlantis.yaml** in repository

# Atlantis






**atlantis-for-tf-aws** bot commented 11 hours ago

Ran Plan for dir: `atlantis` workspace: `default`

► Show Output

Plan: 1 to add, 0 to change, 0 to destroy.

- ▶ To apply all unapplied plans from this pull request, comment:
  - `atlantis apply`
- 🗑 To delete all plans and locks for the PR, comment:
  - `atlantis unlock`







# Atlantis

- Really **stable** and already used in our **production** environment
- Easy to use for **Devs** and **Ops**
- Some differences to flux tf-controller:
  - No support for **drift detection**
  - No **automatic applies**
  - Selectable Terraform Versions

**DEMO**



**Terraform Cloud**



# Terraform Cloud

- Provided by the **creators** of **Terraform** -> **Hashicorp**
- **No infrastructure** needed to start
- **Cloud** or **local** agents
- **On-Premise** version (**Enterprise**)
- **Automatic apply** feature
- **Drift Detection (Premium Feature)**



# Terraform Cloud



< Workspaces

tf-aws

Overview

Runs

States

Variables

Settings >

iamroot-at

iamroot-at / Projects & workspaces / tf-aws / Overview

## tf-aws

ID: ws-JGPdLBiZfMjrpvAs

Workspace for managing resources in AWS

Unlocked

| Resources | Terraform version | Updated      |
|-----------|-------------------|--------------|
| 8         | 1.5.1             | 13 hours ago |

Actions ▾

### Latest Run

View all runs

Triggered via UI Applied

lackneralex triggered a run 13 hours ago via UI 8e2da1e

| Policy checks | Estimated cost change | Plan & apply duration |
|---------------|-----------------------|-----------------------|
| Add           | None                  | Less than a minute    |

Resources changed  
**+3** ~0 -0

See details

al-lac/tf-aws

Working directory: [tf-cloud](#)

Execution mode: [Remote](#)

Auto apply: [Off](#)  
Project: aws

### Metrics (last 8 runs)


Average plan duration < 1 min

CNCF Linz Meetup / JUNE 27, 2023

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# Terraform Cloud

- Great place to **try out** Terraform with GitOps
- Lots of **features** and continued **updates**
- Support by **Hashicorp**
- Integrated **Sentinel** policy support
- Can be used in **combination** with **Atlantis** 
- **Free** for the first **500 resources**, then about **10 cents per resource/month**

**DEMO**



## Other tools

- **GitHub** Actions
- **GitLab** CI/CD
- **Crossplane**
- **Spacelift**
- **AWX**







# Summary

- GitOps increases **collaboration**
- Various tools for **different use cases**
- Better visibility of the **actual state**
- **Automated** Rollouts
- **Auditing** and **Documentation**
- **Policies** and **approvals**



**QUESTIONS?**

**RUNTASTIC**

**THANK YOU**  
AND HAVE A GREAT EVENING



[runtastic.com/career](https://runtastic.com/career)

# LINKS



- **Terraform AWS GitOps Repository**

<https://github.com/al-lac/tf-aws>



- **Flux Infra Repository**

<https://github.com/al-lac/flux-infra>

