

RUNTASTIC





MAY 26, 2023

GitOps & Terraform: A Match Made in Cloud Heaven

Name: Alexander Lackner



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



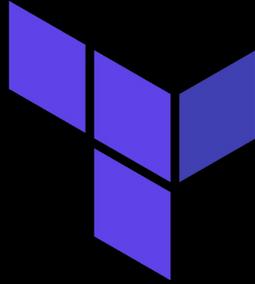
**Flux Terraform
Controller**



Atlantis



**Terraform
Cloud**

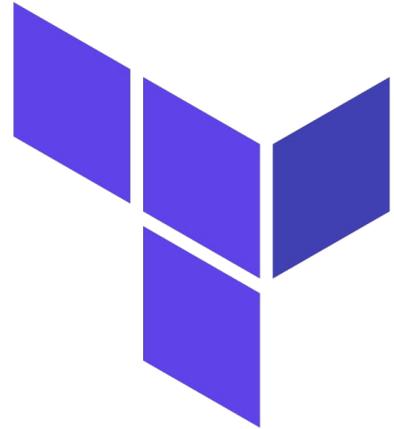


Infrastructure as Code (IaC) with Terraform

Infrastructure as Code (IaC)

- **Terraform**

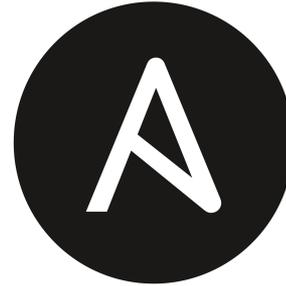
- **Open Source**
- Multi-Cloud
- Lots of **providers**
- Add existing infrastructure with **terraformer**
- Reusable **modules**
- Stateful
- Prevents **errors** that happen due to manual changes



Infrastructure as Code (IaC)

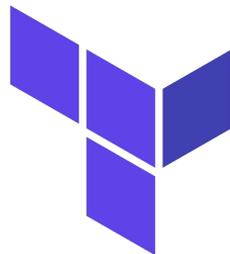
- **Other tools:**

- 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

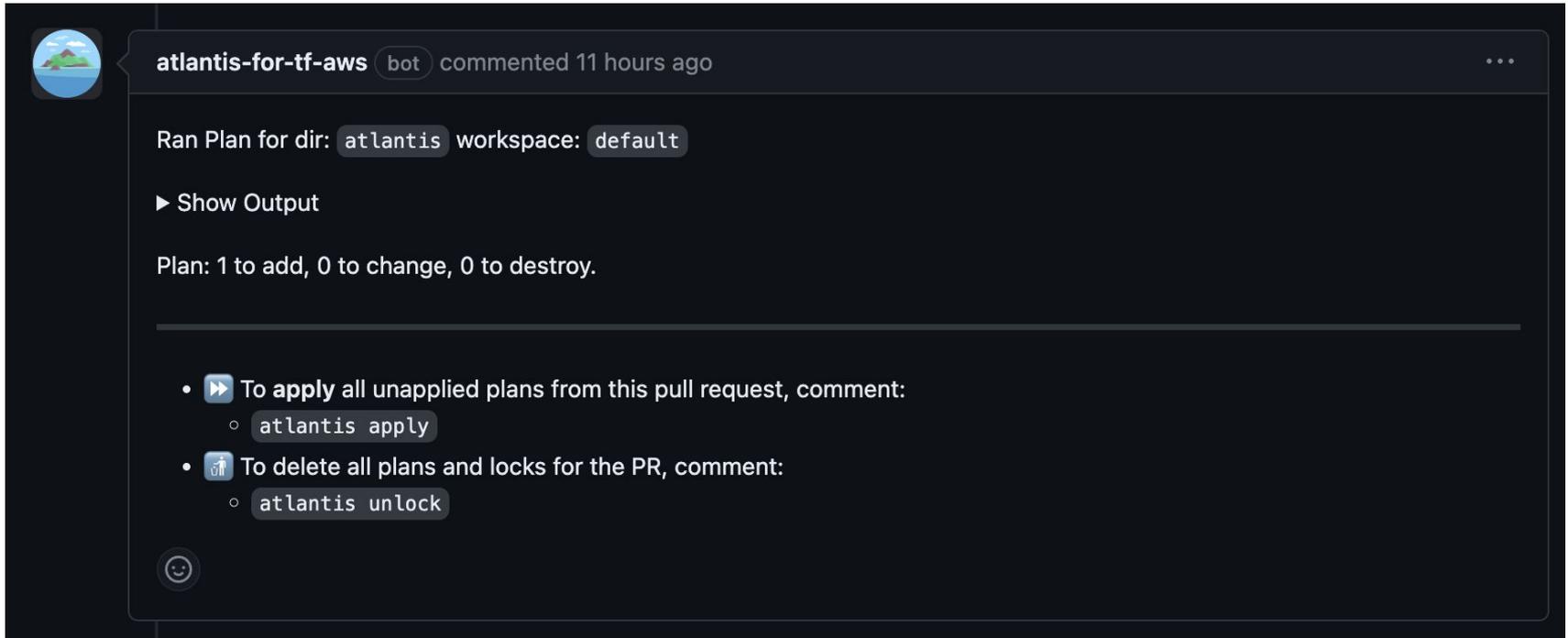


Atlantis

- 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



The sidebar navigation is dark-themed and contains the following items from top to bottom: the Terraform logo, search, help, and profile icons; a back arrow and the text 'Workspaces'; the workspace name 'tf-aws'; a highlighted 'Overview' button; and menu items for 'Runs', 'States', 'Variables', and 'Settings' with a right-pointing chevron. At the bottom, it shows the user 'iamroot-at' and a refresh icon.

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



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

LINKS



- **Terraform AWS GitOps Repository**

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

- **Flux Infra Repository**

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

