ATIX

The Linux **&** Open Source Company

Welcome

OpenTofu

Transforming Infrastructure as Code

About me

- Dr. Pascal Fries

- Senior IT Consultant, High Energy Physicist

- **Publications**: GitOps, Kubernetes

- **Speaker**: Pipelining and Container Platform Architecture

- **Trainer**: Containers, Kubernetes, Infrastructure as Code

About us

The Linux- & Open Source Company

- With over 30 years of experience, the leading Linux system house in German-speaking countries

- Experts for open source and automation in data centers as well as customized solutions

- We offer three core areas individually:
  - IT consulting
  - orcharhino
  - Training

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ATIX PROFESSIONAL SERVICES

Linux Platform
Operations

Infrastructure
Automation

Container Platform
and Cloud

DevOps

Cloud Native
Software

Agenda

1. How did we get here?
    1. Why Infrastructure as Code?
    2. What is Terraform?
    3. What happened to Terraform?

2. OpenTofu
    1. What is OpenTofu?
    2. Who is OpenTofu?
    3. How to migrate from Terraform?

3. Divergences: Terraform and OpenTofu

4. Q&A

How did we get here?

# Wishlist for infrastructure management

- Repeatable

- Recoverable

- Automateable

- Modular

- Completely documentated

- Avoid configuration drift

What is Infrastructure as Code?

- **Documentation first**: Write target state as readable code

- **Plan**: Fetch state of reality and compare with target state

- **Reconcile**: Take action to match reality and target state

- **Modularise**: Define parameterised common infra

What is Infrastructure as Code?

- **Documentation first**: Write target state as readable code
- **Plan**: Fetch state of reality and compare with target state
- **Reconcile**: Take action to match reality and target state
- **Modularise**: Define parameterised common infra
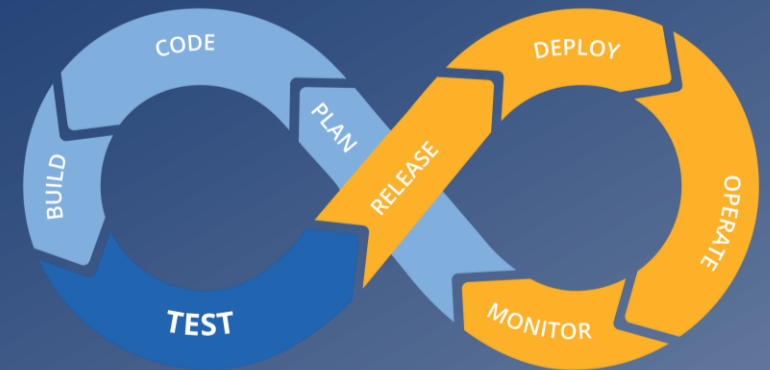
What is Terraform?

- Configuration Language (HCL)
- Console tool (terraform)
- API Integrations (provider plugins)
- Modularisation framework (terraform modules)

What is Terraform?

```
resource "azurerm_container_registry" "abc_01" {
  name                      = "acr-westeu-abc-01"
  resource_group_name       = "rg-westeu-example"
  Location                  = "westeu"
  sku                       = "Standard"
  anonymous_pull_enabled    = false
  admin_enabled             = false
  network_rule_bypass_option = "AzureServices"
}
```

What is Terraform?

Worflow

1. Write Code

2. `terraform plan`

3. `terraform apply`

4. Modularise

What is Terraform?

Worflow

1. Write Code
2. terraform plan
3. (debug)
4. terraform apply
5. (debug)
6. Modularise

Open source, closed source, or ...?

- **Before August 2023**: Mozilla Public License 2.0 (MPL 2.0)

- **After August 2023**: Business Source License 1.1 (BUSL 1.1)

- Only console tool and associated libraries affected

- Restrictions:
  - "Source Available" as opposed to "Open Source"
  - "Competitive offerings" are prohibited

https://www.hashicorp.com/license-faq

What happened next?

What happened next?

- Last MPL release of Terraform was 1.5.7

- Soooooooooooo....

What is OpenTofu?

- Fork of Terraform 1.5.7
- Open Source (MPL 2.0)
- Community maintained
- > 100 companies backing
- > 100 contributors
- > 20 000 GitHub Stars

What is OpenTofu?

- Fork of the console tool
- Fork of the language spec
- Fork of the provider plugin spec
- Registry for Providers / Modules

Who is OpenTofu?
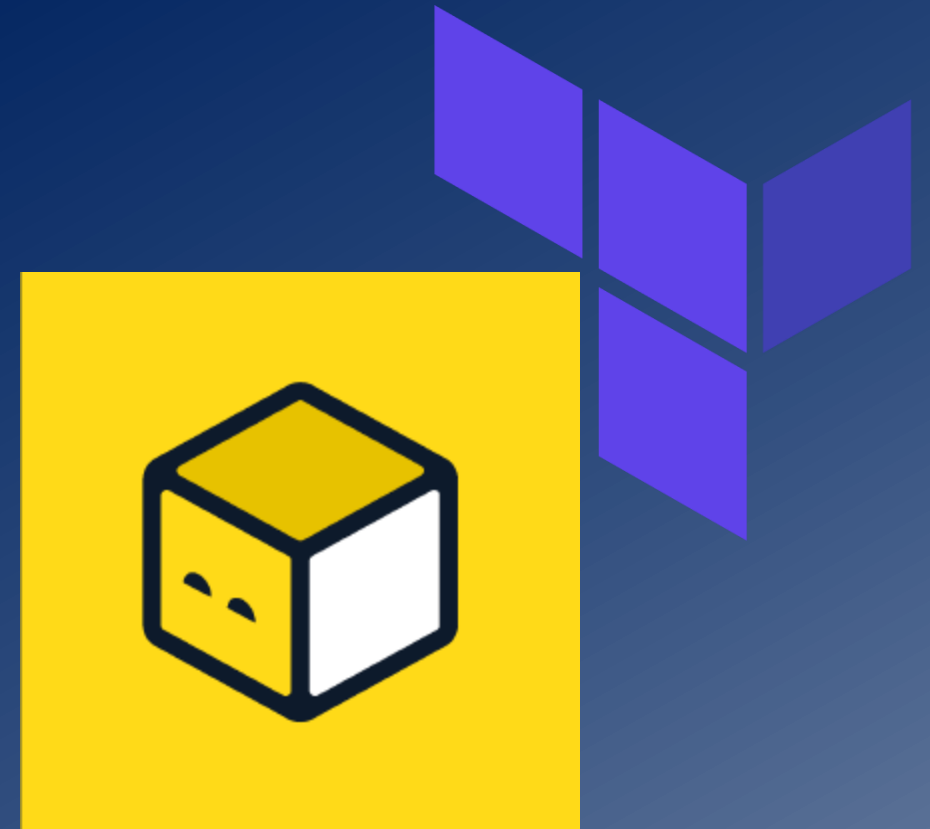
- Harness
- Spacelift
- Env0
- Scalr
- Gruntwork
- ...

Migrating to OpenTofu

- Download tofu console tool

- If your code base is not to recent, thats it.

- Tofu uses registry.opentofu.org by default, so you may need a

  ```
  tofu init --upgrade
  ```

OpenTofu / Terraform

- Fork was at 1.5.7

- Now 1.8 (Tofu) / 1.9 (TF)

- language and features are still almost identical

- Tofu more ambitious

OpenTofu > Terraform

State / Plan encryption

```
variable "state_passphrase" { sensitive = true }

terraform {
  encryption {
    key_provider "pbkdf2" "this" {
      passphrase = var.state_passphrase
    }

    method "aes_gcm" "this" {
      keys = key_provider.pbkdf2.this
    }

    state {
      method   = method.aes_gcm.this
      enforced = true
    }
  }
}
```
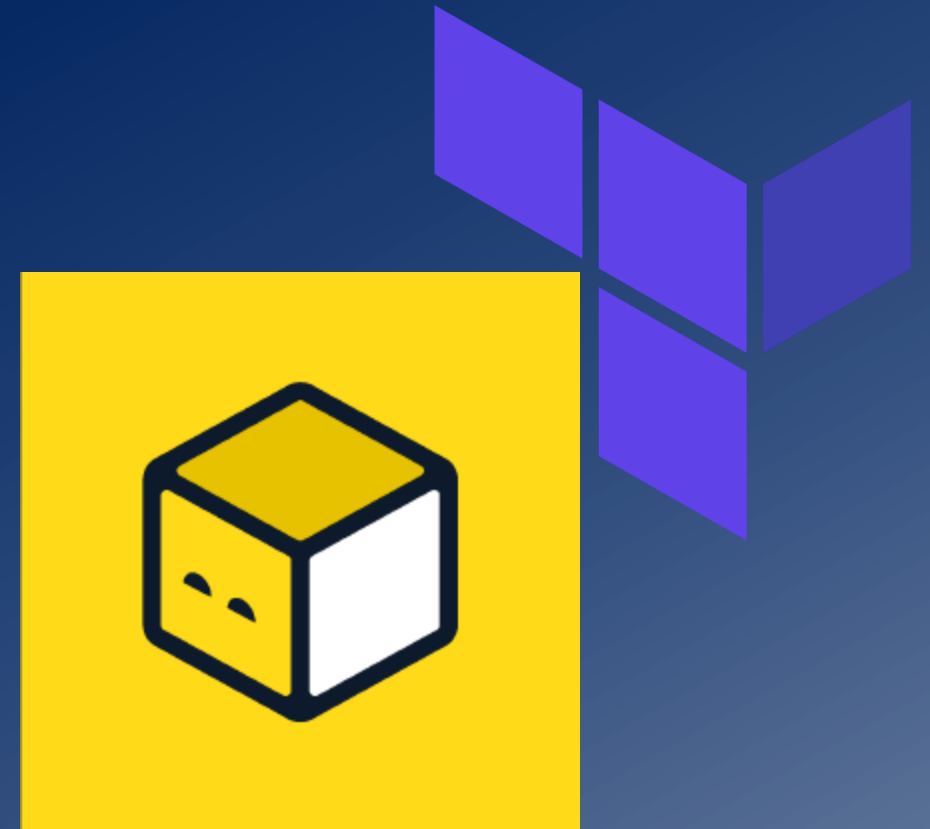
OpenTofu > Terraform

Early variable evaluation

```
locals {
    aws_module_version = "5.6.1"
}

module "webserver" {
    source  = "terraform-aws-modules/ec2-
instance/aws"
    version = local.aws_module_version

    // Other ec2_instance options
}
```

This will also work for providers in Tofu 1.9 :D

Summary

- Terraform went "Source available" (BUSL)
- OpenTofu is a community maintained (MPL) fork
- Both are still largely compatible
- Tofu has promising features regarding modularisation

Questions?

Thank you for your attention!

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Upcoming Webinars

Live-Coding Session – Erstellen eines simplen
Microservice mit Go (Golang)

Michael Morlock

Wednesday, December 4th 2024, 3pm

atix.de/en/events/webinars/

Thank you for your attention!

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Upcoming Trainings

- Ansible
- Kubernetes
- Container
- Infrastructure as Code
- and many more :D

atix.de/en/trainings/

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Thank You

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