codecentric

Infrastructure-as-Code with Pulumi

Better than all the others (like Ansible)?

Jonas Hecht | Senior IT-Nerd | github.com/jonashackt

@jonashackt

https://jonashackt.io

codecentric

jonashackt.io

4+1

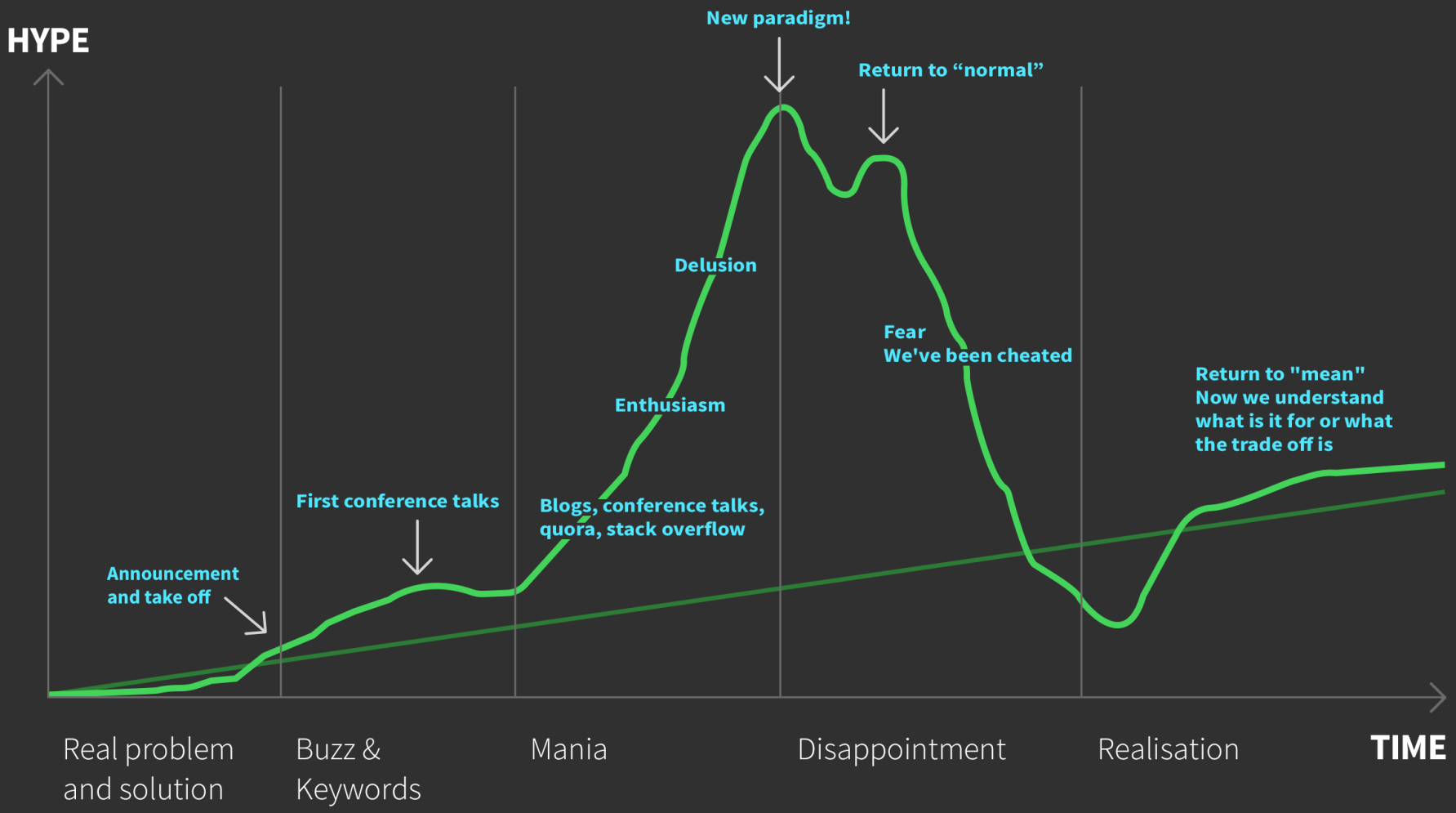
IoT Thüringen

FACHHOCHSCHULE ERFURT UNIVERSITY OF APPLIED SCIENCES
Angewandte Informatik

Bauhaus-Universität Weimar

Dev Ops Thüringen

Our industry is like...



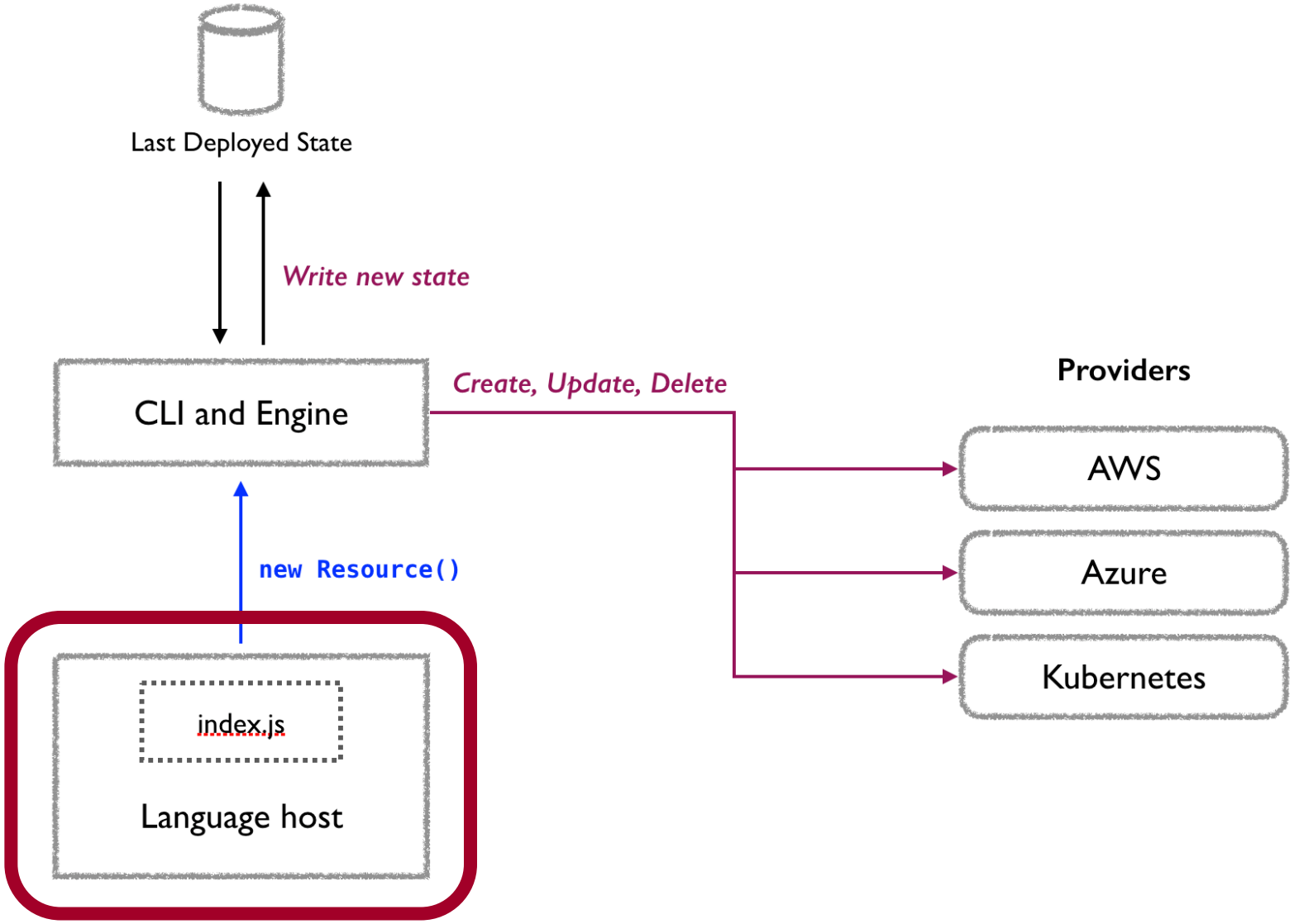
blog.daftcode.pl/hype-driven-development-3469fc2e9b22

Pulumi?

= YOUNG!

published June 2018

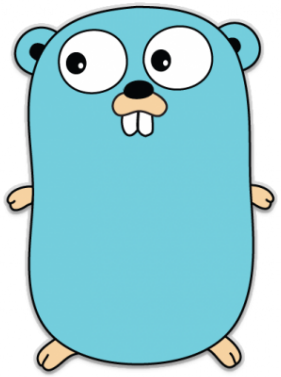
1.0 September 2019



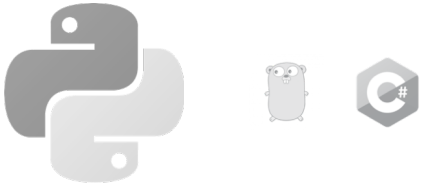
pulumi.com/docs/intro/concepts/how-pulumi-works/

Pulumi is **language agnostic** to support multiple programming languages at the same time

pulumi.com/docs/intro/languages

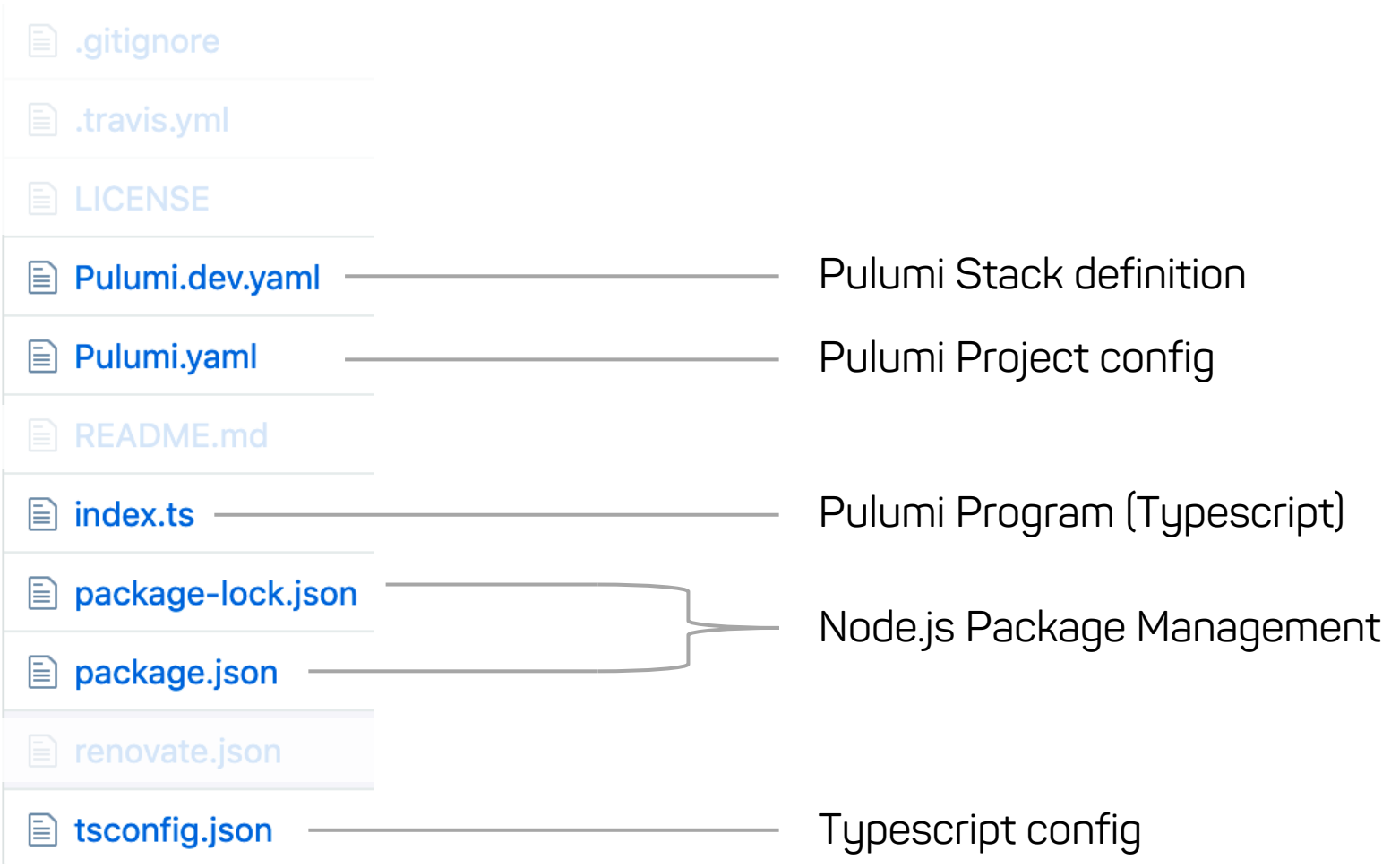




pulumi.com/docs/intro/languages



API reference: pulumi.com/docs/reference/pkg

Examples: github.com/pulumi/examples



github.com/jonashackt/pulumi-typescript-aws-fargate

Pulumi program example

index.ts

```ts
import * as aws from "@pulumi/aws";

// Create an AWS resource (S3 Bucket)
const bucket = new aws.s3.Bucket( name: "container-conf-bucket");

// Export the name of the bucket
export const bucketName = bucket.id;
```

Create projects

```
~/dev mkdir containerconf && cd containerconf
~/dev/containerconf pulumi new aws-typescript
```

Multicloud?

Google Cloud Platform

kubernetes

pulumi.com/docs/intro/cloud-providers

kubernetes

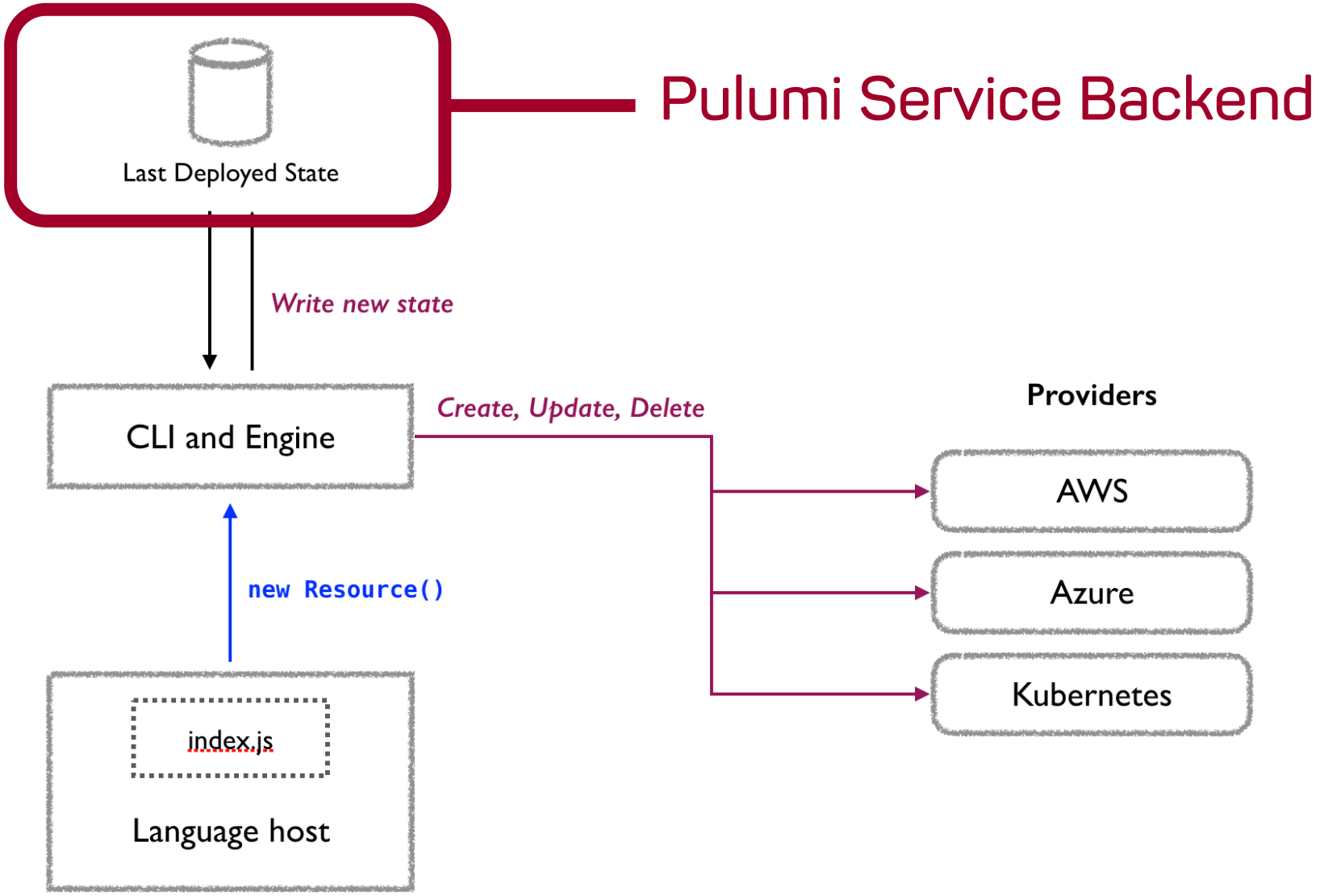
github.com/pulumi/examples

State

State

is stored in the Pulumi

Service Backend



pulumi.com/docs/intro/concepts/how-pulumi-works

Service Backend options

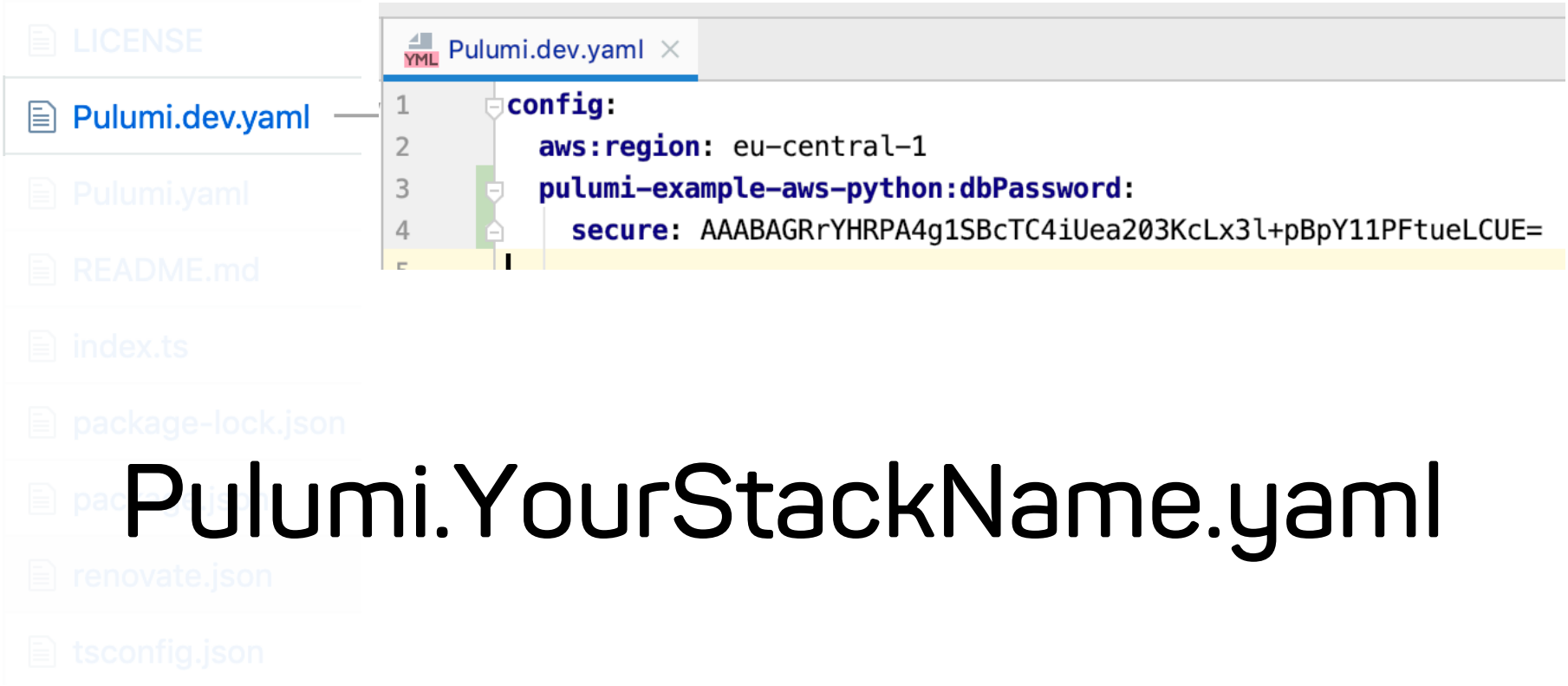
- app.pulumi.com
- Self-managed backend
- on-premise app.pulumi.com
  (Enterprise version only)

pulumi.com/docs/intro/concepts/state/

A Stack defines the State

of a Pulumi project

Example: app.pulumi.com/jonashackt



Pulumi.YourStackName.yaml

Resource Providers
aka
„Terraform Wrappers“

https://www.pulumi.com/docs/reference/pkg/nodejs/pulumi/aws/elasticsearch/

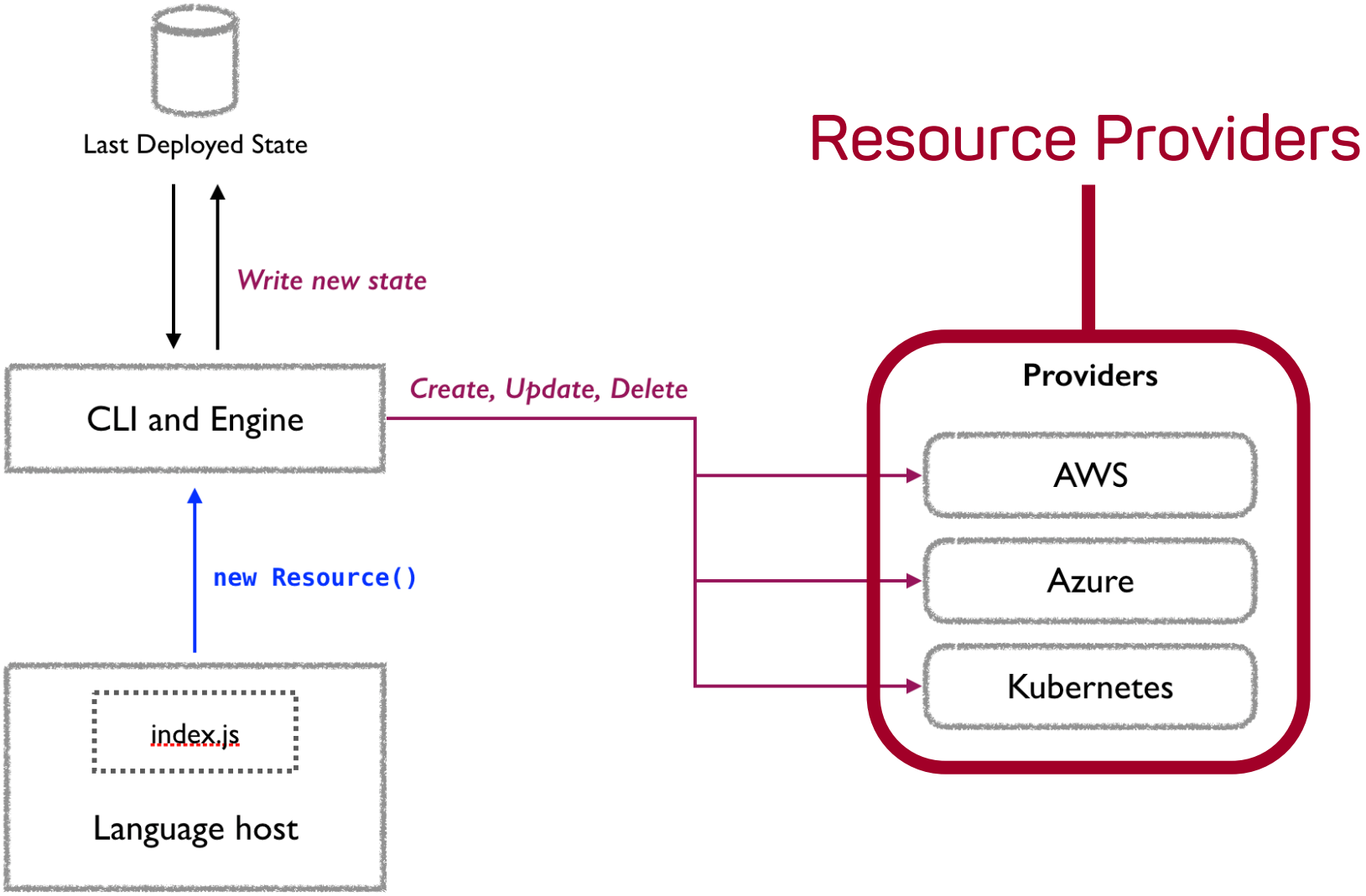
Search

PRODUCTS PRICING DOCS BLOG WHY PULUMI ABOUT

Docs / Reference / API / @pulumi/aws / elasticsearch

Module elasticsearch

> This provider is a derived work of the Terraform Provider distributed under MPL 2.0. If you encounter a bug or missing feature, first check the `pulumi/pulumi-aws` repo; however, if that doesn't turn up anything, please consult the source `terraform-providers/terraform-provider-aws` repo.



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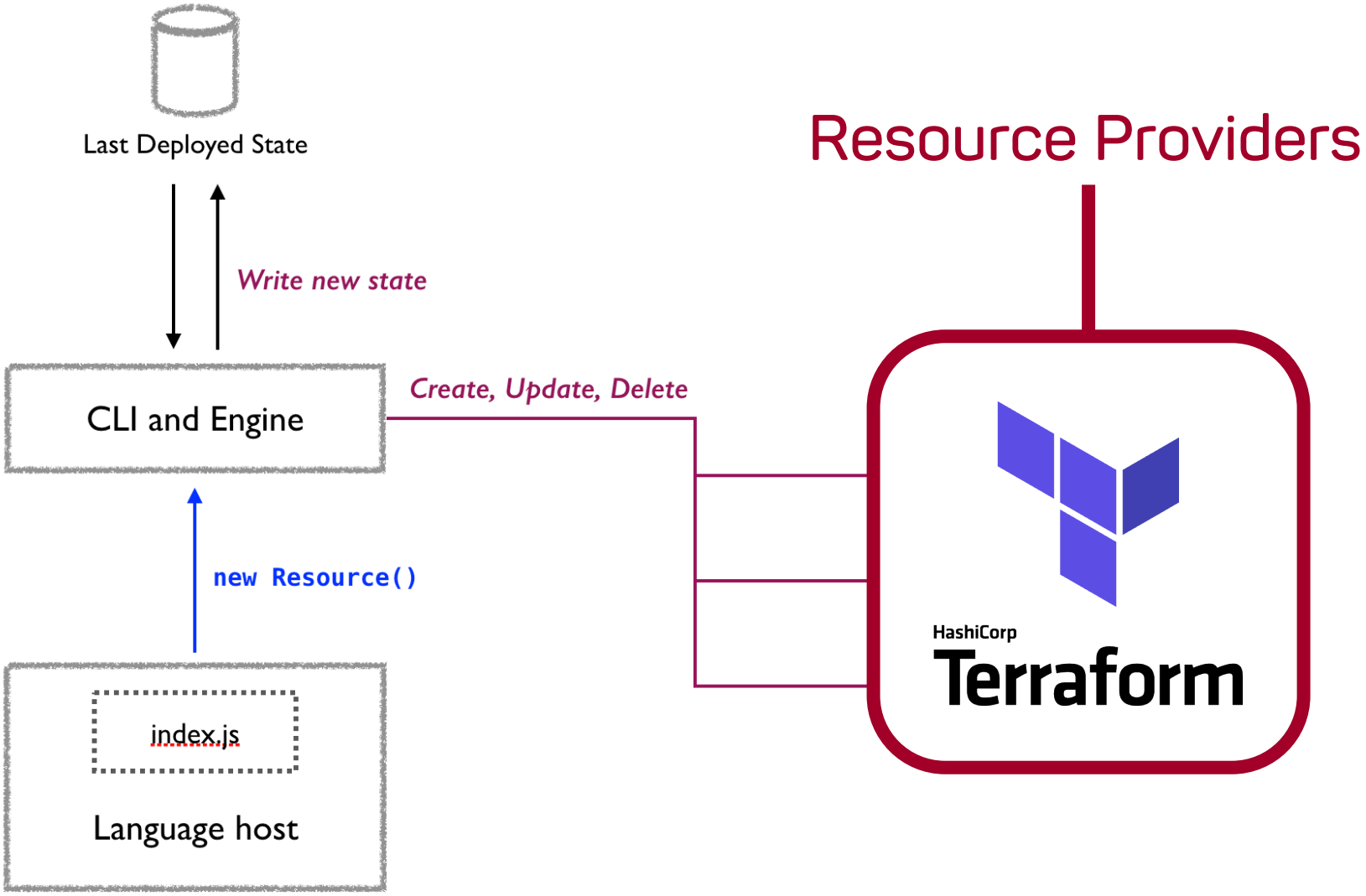


pulumi.com/docs/intro/concepts/how-pulumi-works

= „Terraform Wrapper“

2019!

pulumi.com/docs/intro/vs/terraform/#converting-from-terraform

M30 (December 2019)

- [ ] Custom update and delete hooks (e.g. provisioners)
- [ ] .NET Support
- [ ] Gated Deployments

Backlog

- tf2pulumi support for Python
- Complete support for Go
- Java Support
- High level libraries (like `awsx`) for Azure and GCP
- High level libraries (like `awsx`) for Python
- Overhaul `cloud` for true cross-cloud infrastructure definition
- Native Pulumi providers for AWS/Azure/GCP

github.com/pulumi/pulumi/wiki/Roadmap

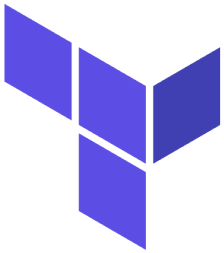
Pulumi vs. X


pulumi


CHEF


SALTSTACK


ANSIBLE




puppet


HashiCorp
Terraform


CloudFormation

vs.

1. Academic comparison
2. Handle configuration drift
3. Current state of my infrastructure?
4. Tools shouldn't suck! (no master!, no agents!)
5. Able to do the job! (all major Clouds & on-premise)

1. Academic comparison

Configuration Management

Provisioning

docs.ansible.com/ansible/latest/modules/list_of_cloud_modules.html

Pulumi is fundamentally different than these tools and works great alongside them

pulumi.com/docs/intro/vs/

Configuration Management

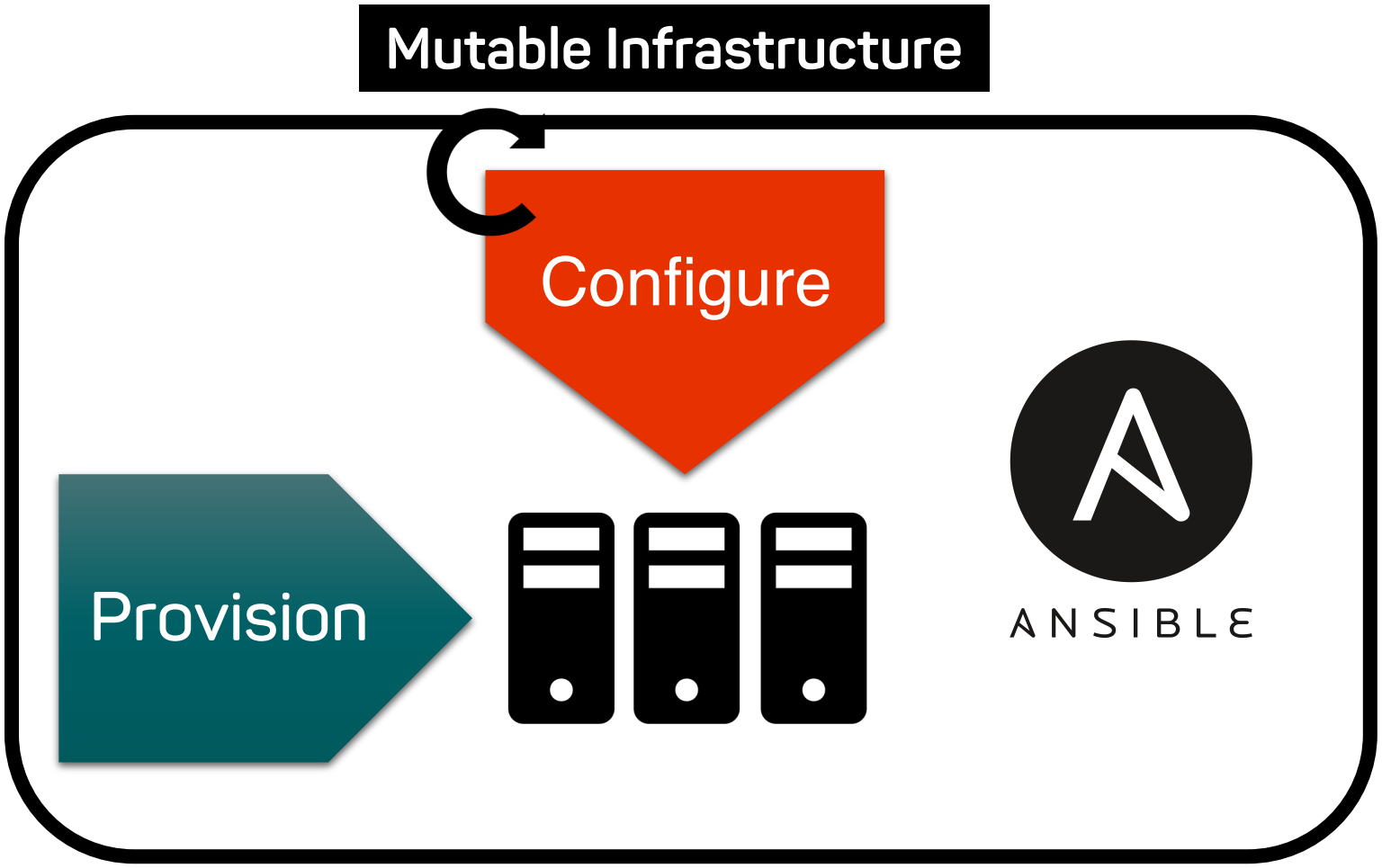
Provisioning

+

2. How do they handle configuration drift?

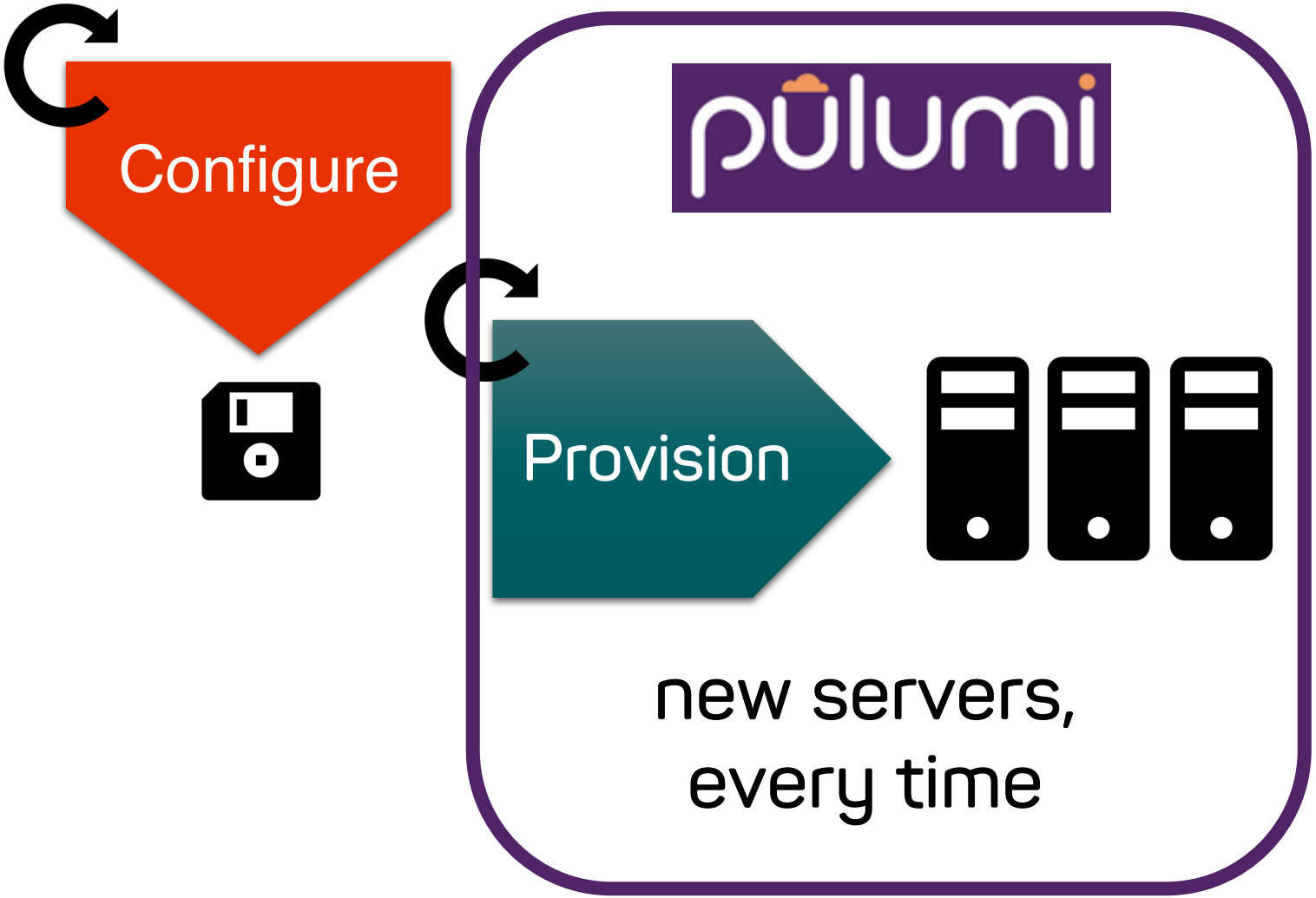
the state of the machine drifts from the baseline due to manual changes and updates

shadow-soft.com/ansible-idempotency-configuration-drift



same servers,
changed every time

Immutable Infrastructure



What if we don't allow „manual changes"?

Use software engineering practices like

Continuous Integration

for your infrastructure code!

Mutable Infrastructure

Immutable Infrastructure

Running our Infrastructure code in CI/CD pipelines, this comparison become less relevant!

Demo time!

github.com/jonashackt/pulumi-python-aws-ansible

3. Current state of my infrastructure?

There's this 3rd comparison called Procedural vs. Declarative...

But remember the

Continuous Integration

thingy?

4. Tools shouldn‘t suck

(no master!, no agents!)

master

- central place to see status of your infrastructure
- continuously enforce configuration in the background

- extra infrastructure!
- needs to be maintained
- client-2-master & master-2-servers communication needs ports & security

no master

Remember the

Continuous Integration

Thingy again?

master

puppet

CHEF

SALTSTACK

pulumi

no master

HashiCorp Terraform

CloudFormation

ANSIBLE

Agent needs to be installed on the server

puppet

CHEF

SALTSTACK

No Agent needed

HashiCorp Terraform

ANSIBLE

pulumi

5. Able to do the job!

(all major Clouds & on-premise)


ANSIBLE


pulumi

Ansible	Terraform	Pulumi
5K Stacks	2.3K Stacks	22 Stacks
Stacks: 5K	Stacks: 2.3K	Stacks: 22
Followers: 3.6K	Followers: 1.5K	Followers: 28
Votes: 1.2K	Votes: 253	Votes: 2
484	153	
1.3K	103	
11.8K	3.8K	49
40.1K	19.4K	3.9K
17.3K	5.2K	200
1h	1d	7h

stackshare.io/stackups/ansible-vs-terraform-vs-pulumi

 google.com 🥺

 stackoverflow.com 🥺

 documentation 🥺

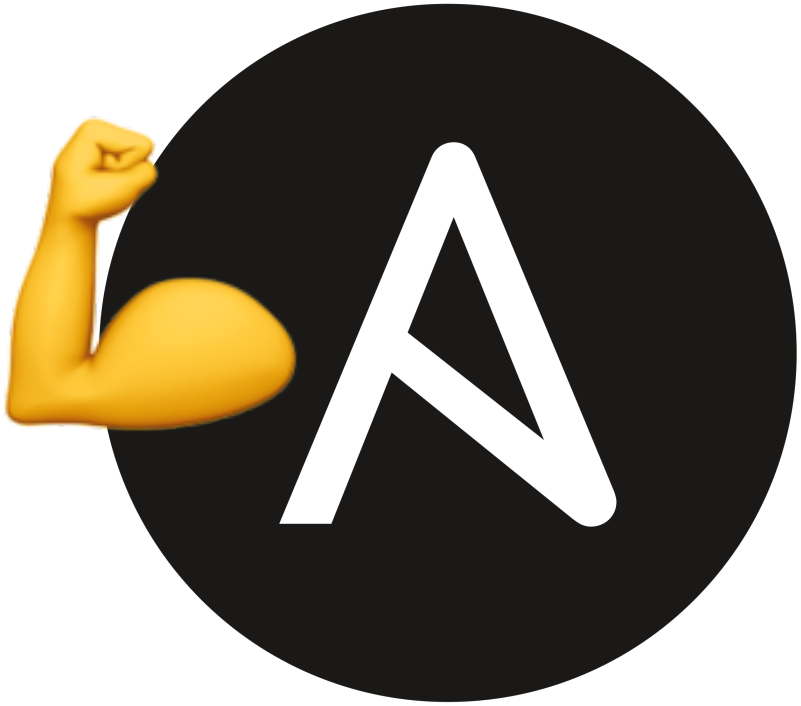
 blog & articles count 🥺

 community size 🥺

 on-premise also 🥺

 Both config mgt. & provisioning 🥺

48,130 commits



4,738 contributors

4,046 commits

pulumi

51 contributors


One more thing...

pulumi crosswalk

FOR AMAZON WEB SERVICES (AWS)

JS

”

Crosswalk for AWS supports “day one” tasks, such as creating your initial container-based workloads using ECS/Fargate/EKS & serverless workloads (API Gateway / Lambda)

pulumi.com/docs/guides/crosswalk/aws

APPLICATION
DELIVERY
Go to production with containers and serverless.

INFRASTRUCTURE
PATTERNS
Well-Architected infrastructure for modern applications.

FOUNDATION
ALL OF AWS
Unopinionated infrastructure as code for all AWS resources and features.

pulumi.com/docs/guides/crosswalk/aws

pulumi crosswalk

FOR AMAZON WEB SERVICES (AWS)

JS

github.com/jonashackt/pulumi-typescript-aws-fargate

App: github.com/jonashackt/spring-boot-vuejs

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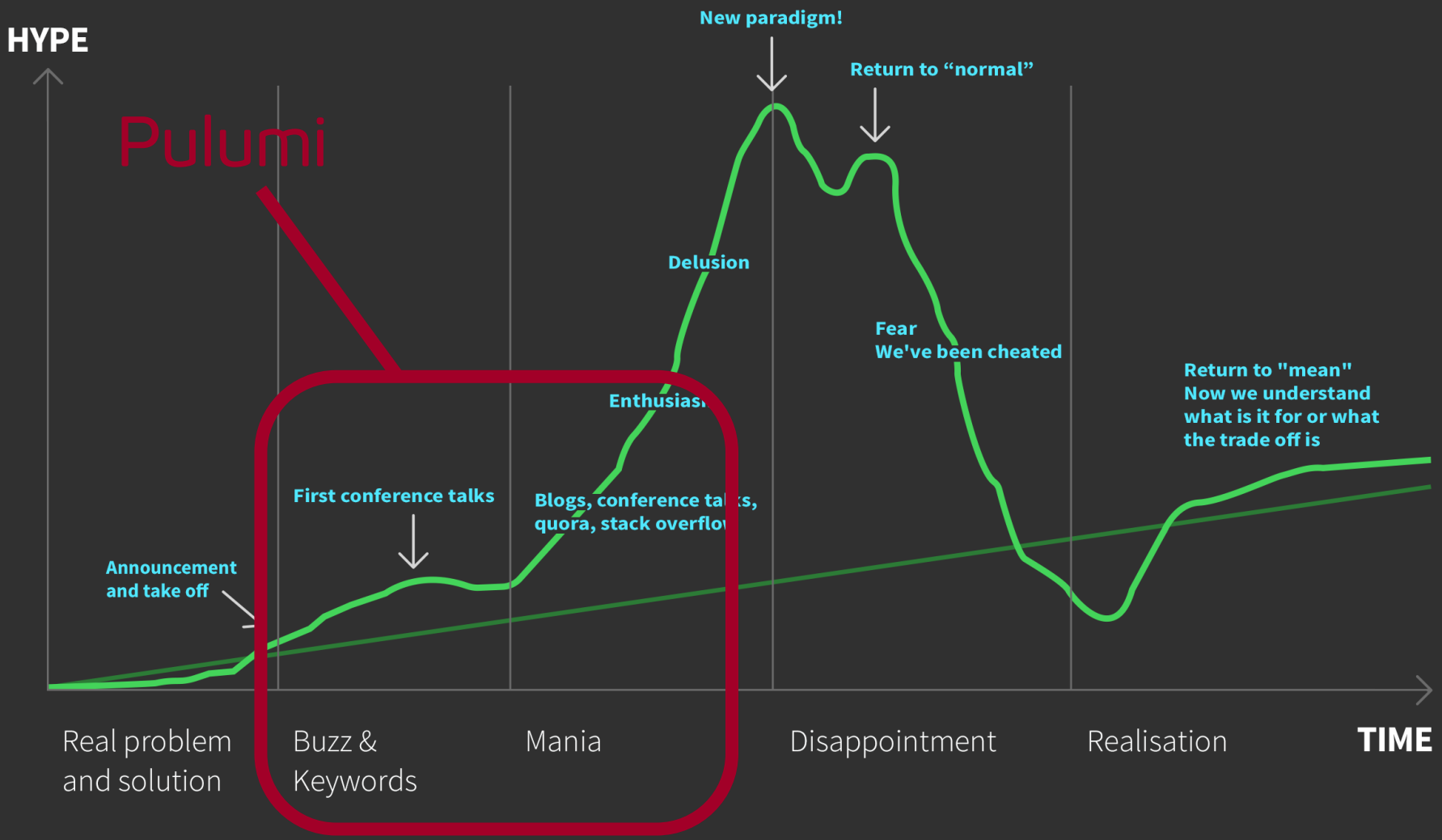
Summary



blog.daftcode.pl/hype-driven-development-3469fc2e9b22

HashiCorp
Terraform

pulumi
crosswalk
FOR AMAZON WEB SERVICES (AWS)

No matter what IaC tool you use...

Treat your infrastructure code
AS CODE!

Use Testframeworks – or even do **TDD!**

Run Tests automatically - in your Continuous Integration Pipeline!

Run your infrastructure code **frequently!** (scheduled CI jobs)

Always aim for **reproducible builds** (aka dependency management)

Automatically update dependencies (e.g. renovatebot)