



CLOUD **X** SUMMIT 2025

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The GitOps Blueprint: Multi-Tenant Kubernetes with Argo CD in 30 Minutes

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Agenda

01

Intro.

Overview of HPA, current architecture and the resulting challenges and requirements

02

Challenge.

No PoC or MVP; the HPA stack needed rapid deployment and seamless integration on target infrastructure while meeting Market standards.

03

Solution.

Kubara - a single binary and unified file - cuts full-stack deployment time from weeks to 30 minutes.

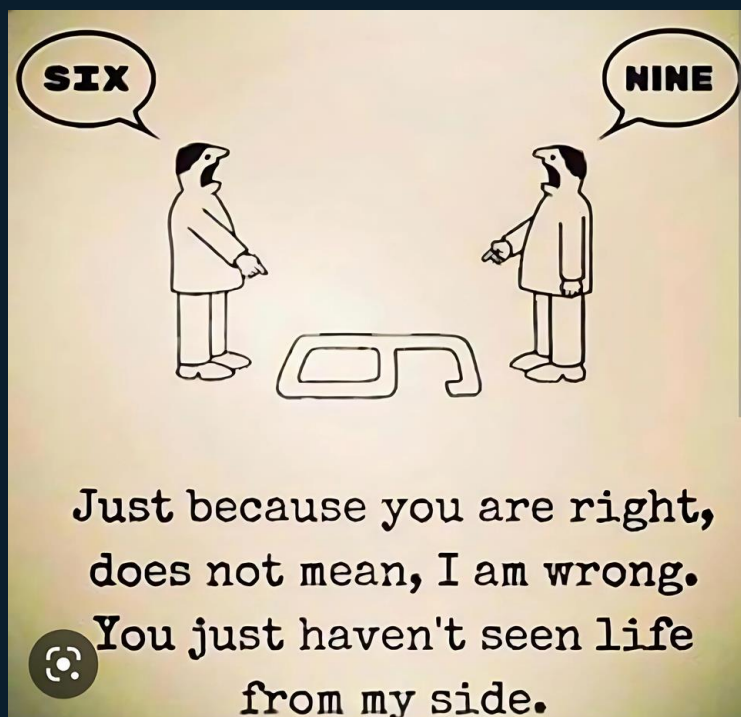
04







Outlook.

- **Who's** already using the blueprint
- **How** to gain access
- **How** to contribute.
- and more..

Common Understanding.

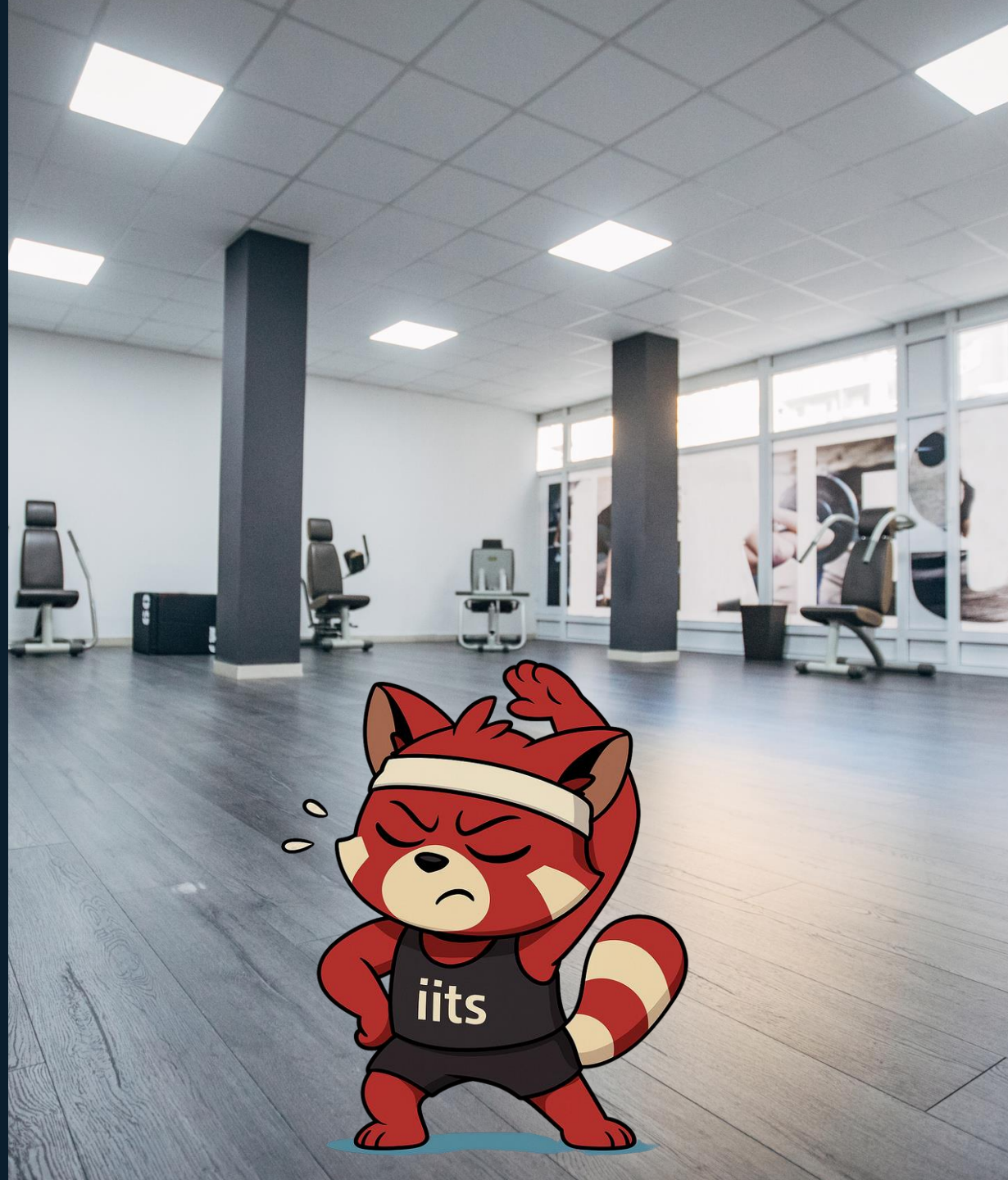
Terminology



- Kubernetes 
- Infrastructure as Code (IaC) 
- GitOps 
- Helm Charts != Catalog 
- ControlPlane 
- Platform = Kubernetes + Ecosystem 

Don't skip the warm-up phase.

01. Intro



Hamburg Port Authority (HPA)

The Hamburg Port Authority (HPA) is a public institution under public law (Anstalt des öffentlichen Rechts AöR), managing and developing the Port of Hamburg, one of Europe's largest and most crucial ports.

It is formally recognized as an operator of critical infrastructure due to its vital role in national and international supply chains.

The HPA's core responsibilities include:

- **Comprehensive Port Management:** Overseeing maritime traffic, port land, the port railway, and real estate.
- **Infrastructure:** Planning, building, and maintaining all essential port infrastructure (quays, bridges, roads, railways, waterways)
- **Traffic Control:** Managing both water and land traffic within the port, ensuring safe and efficient movement.
- **Sustainability:** Promoting environmental standards and sustainable practices across port operations.
- **Innovation:** Driving digitalization and "Smart Port" initiatives to enhance efficiency and security.

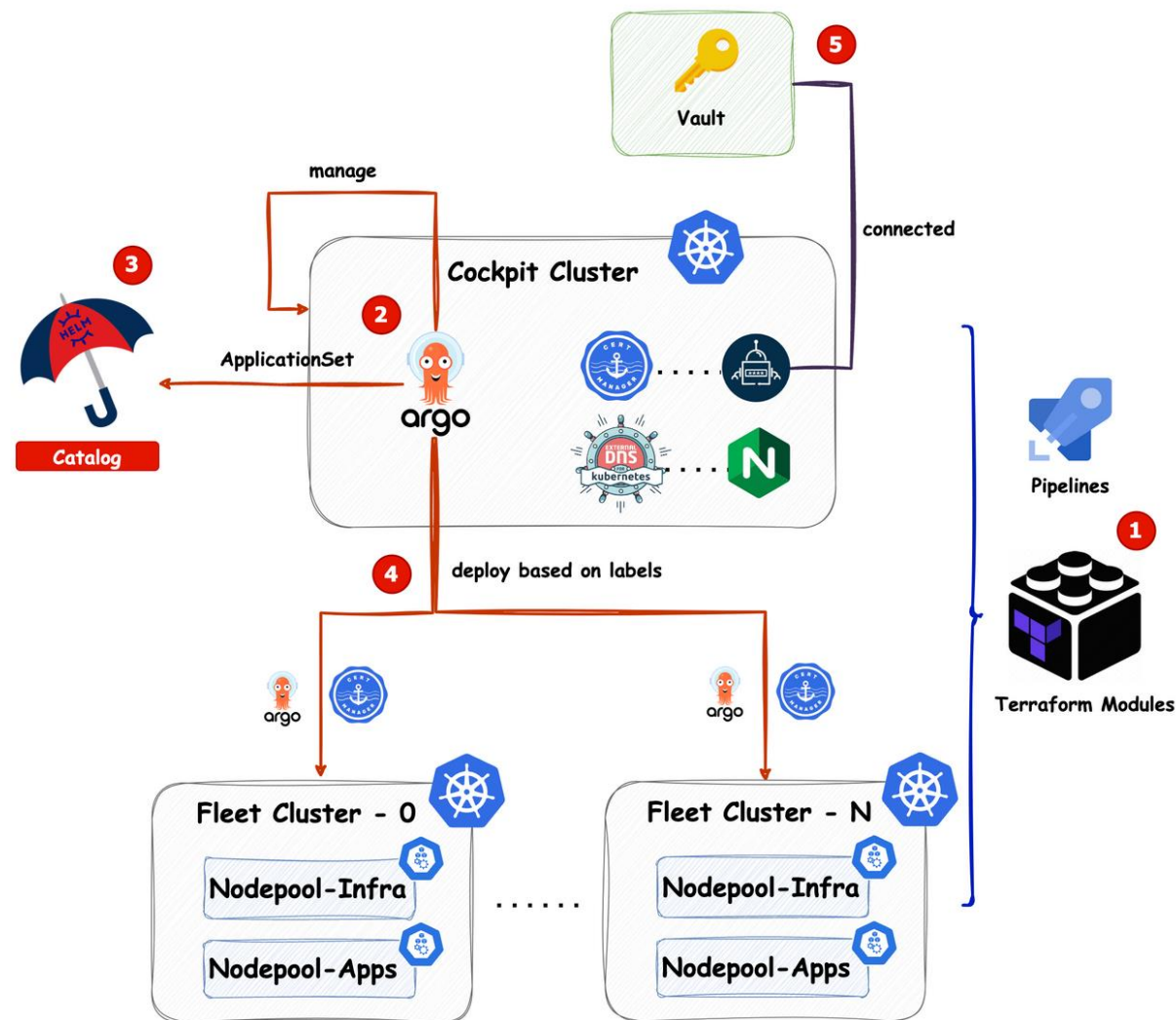


HPA: Setup

The HPA setup already leverages industry standards such as secret management via a Vault instance, pull-based GitOps deployments, enforced encrypted communication, and multi-tenant project isolation.

- **Infrastructure as Code (IaC)** with Terraform
- **CI pipelines** for building, testing, templating and releasing
- **Kubernetes** as orchestrator and cloud-native platform
- **Umbrella Helm Charts** for package management
- **Third-party tool catalog** (security, observability, networking, secret management, etc.)
- **GitOps** as glue for continuous, pull-based deployment

Cockpit and Fleet Approach

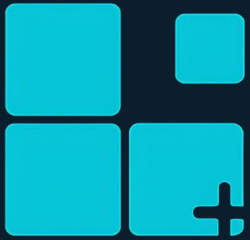


Let's bring in the heavyweights.

02. Challenge



HPA: Requirements.



Extensible

- Easily swap third-party tools
- Vendor-neutral
- Integrates with Terraform (and future Crossplane)



Managed Services

- Vault, databases, DNS, Kubernetes node pools, etc.
- With upcoming RabbitMQ, managed Git and IAM support



Best-practice adoption

- Preconfigured services covering standards and more
- No scattered Helm-chart sprawl.

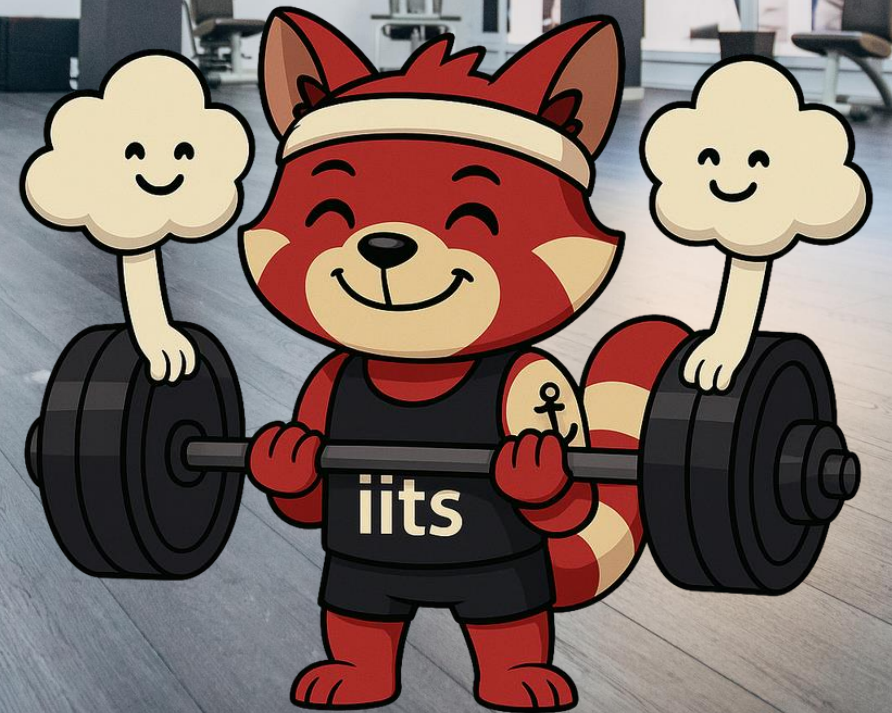


Enhanced reference architecture

- Retains current capabilities while delivering a future-proof, scalable design.

With the right support, it's effortless.

03. Solution



Internal: Requirements.



Extensible

- Edge & cloud support
- Easily swap third-party tools
- Terraform integration (Crossplane-ready)



Managed Services

- Vault integration without Kubernetes
- Edge x Cloud integration
- Cloud x Edge scenarios



Best Practises adopted

- Preconfigured, standards-aligned services
- No Helm-chart sprawl.

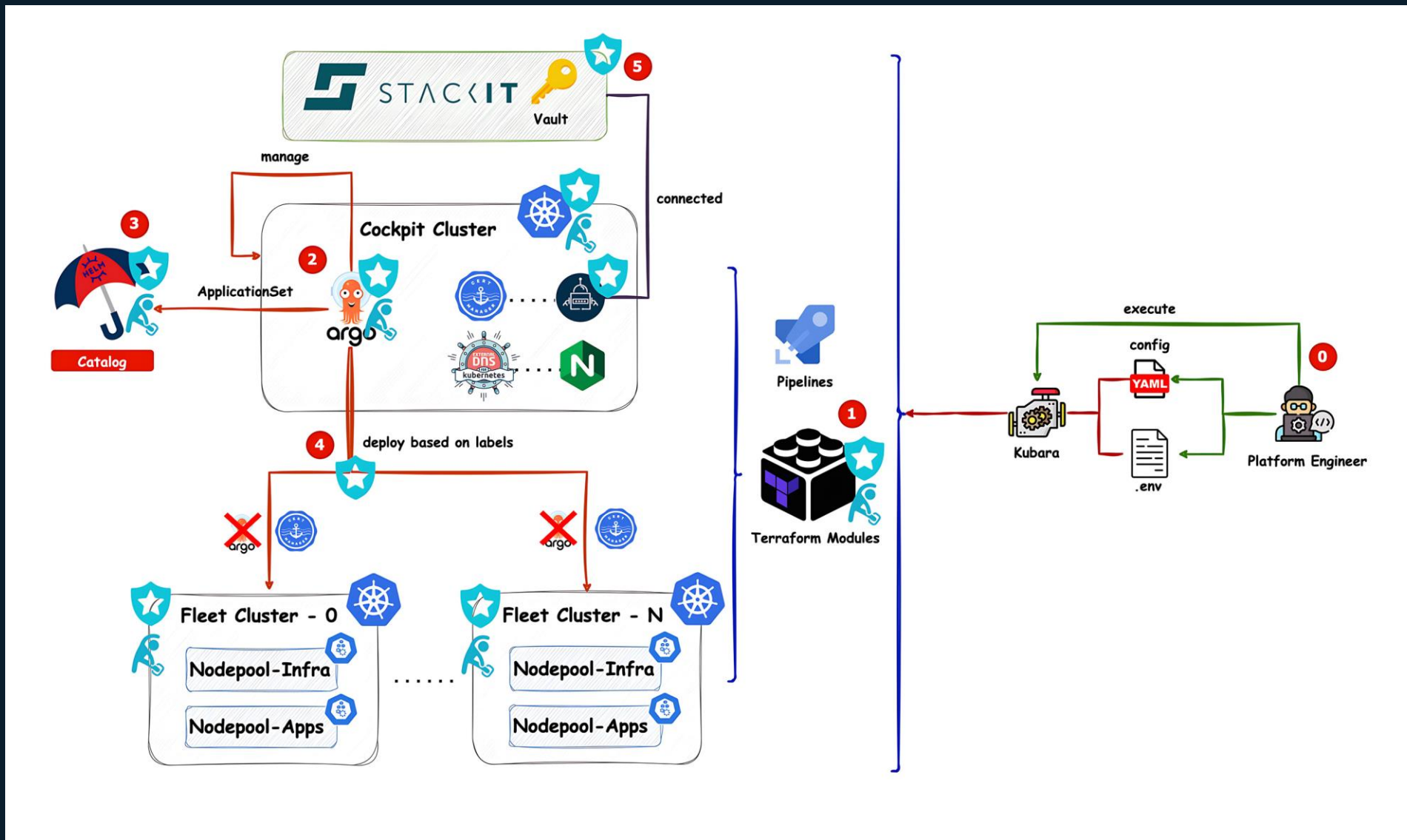


Reference architectures

- Platform bootstrap
- Add new clusters
- Secure, low-overhead deployments

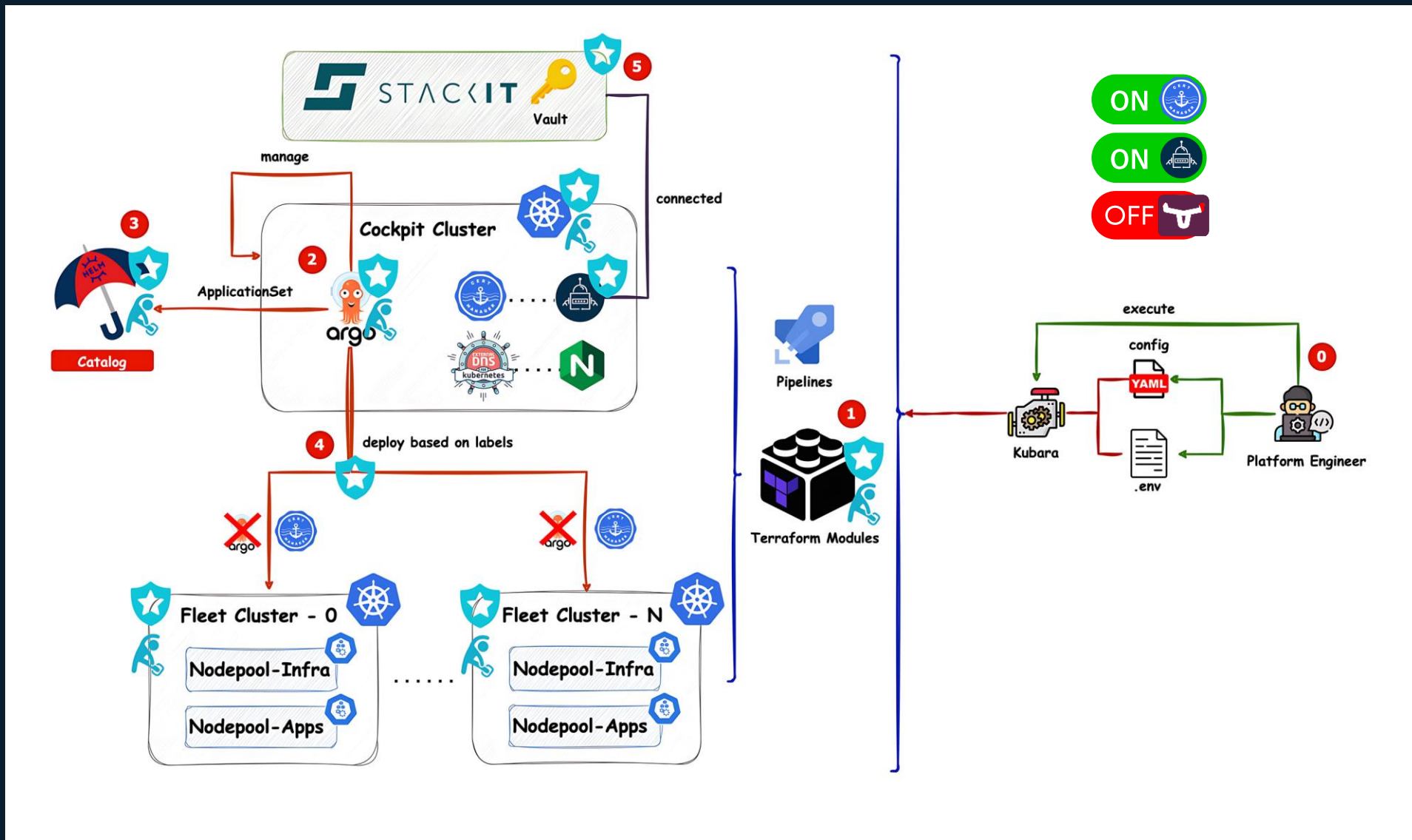
Flexible. Customizable. Opinionated. Widely adopted.

The Solution.



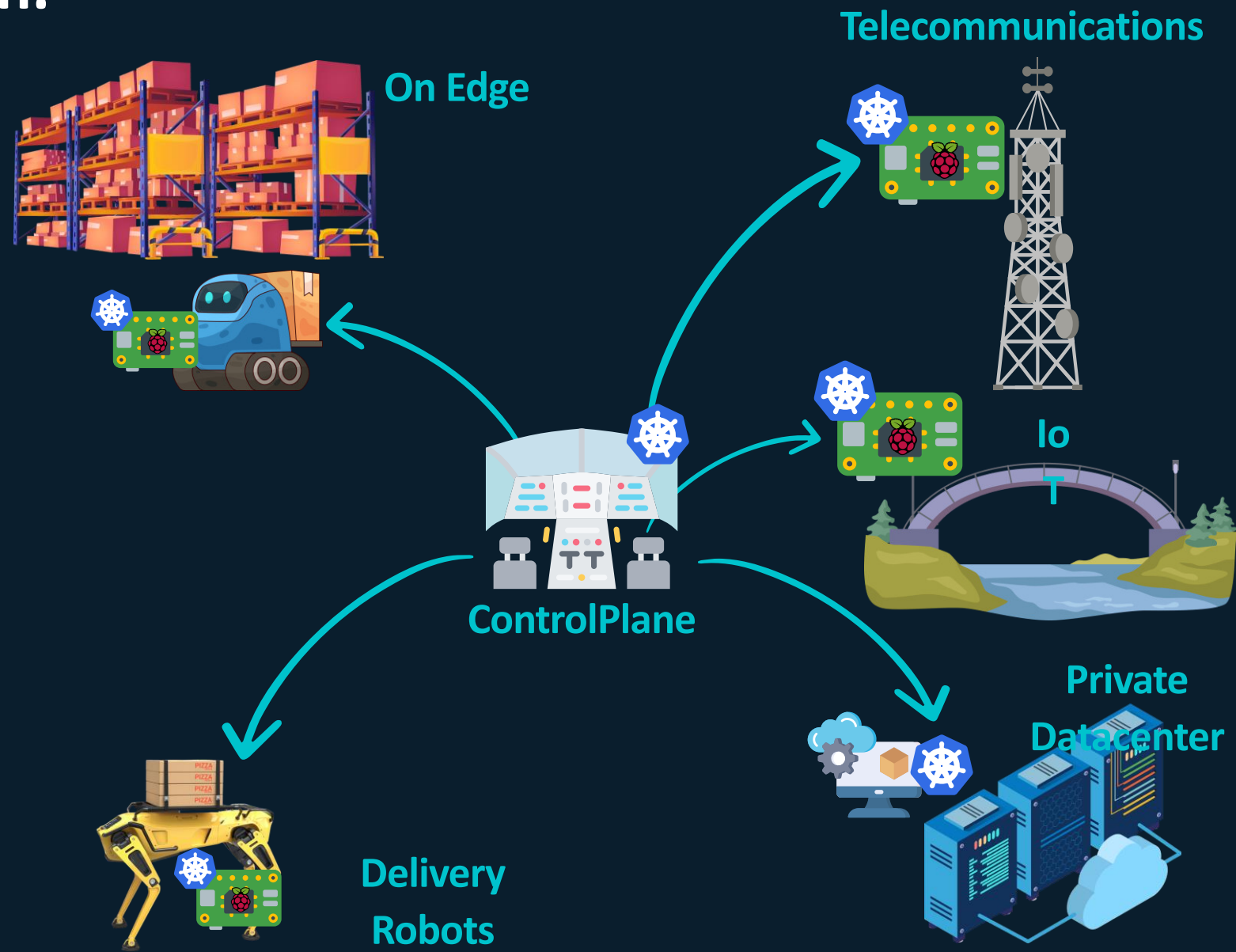
Flexible, label-based on/off toggles.

The Solution.

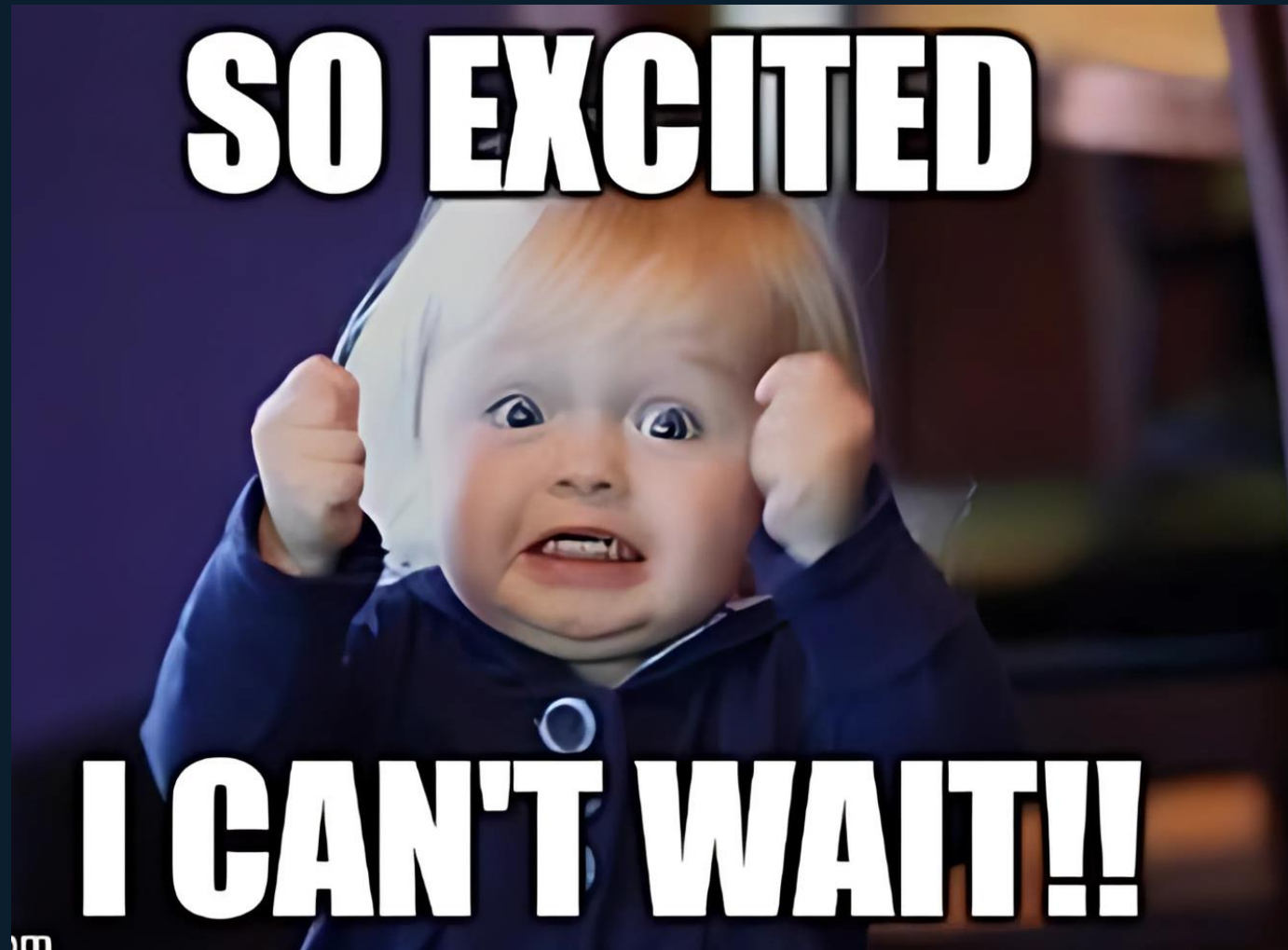


Runs everywhere - edge to cloud.

The Solution.



Demo-0.



Bootstrap ControlPlane.

Demo-0.

The image shows a code editor interface with a file explorer on the left and a terminal window at the bottom. The file explorer shows a project named 'HPA-DEMO' with subdirectories 'customer-service-catalog' and 'managed-service-catalog', and files 'README.md' and 'ske.yaml'. The terminal window shows the execution of 'kubectl get ns' and the output of the command.

```
EXPLORER
  HPA-DEMO
    customer-service-catalog
    managed-service-catalog
    .env
    .gitignore
    config.yaml
    kubara
      README.md
      ske.yaml

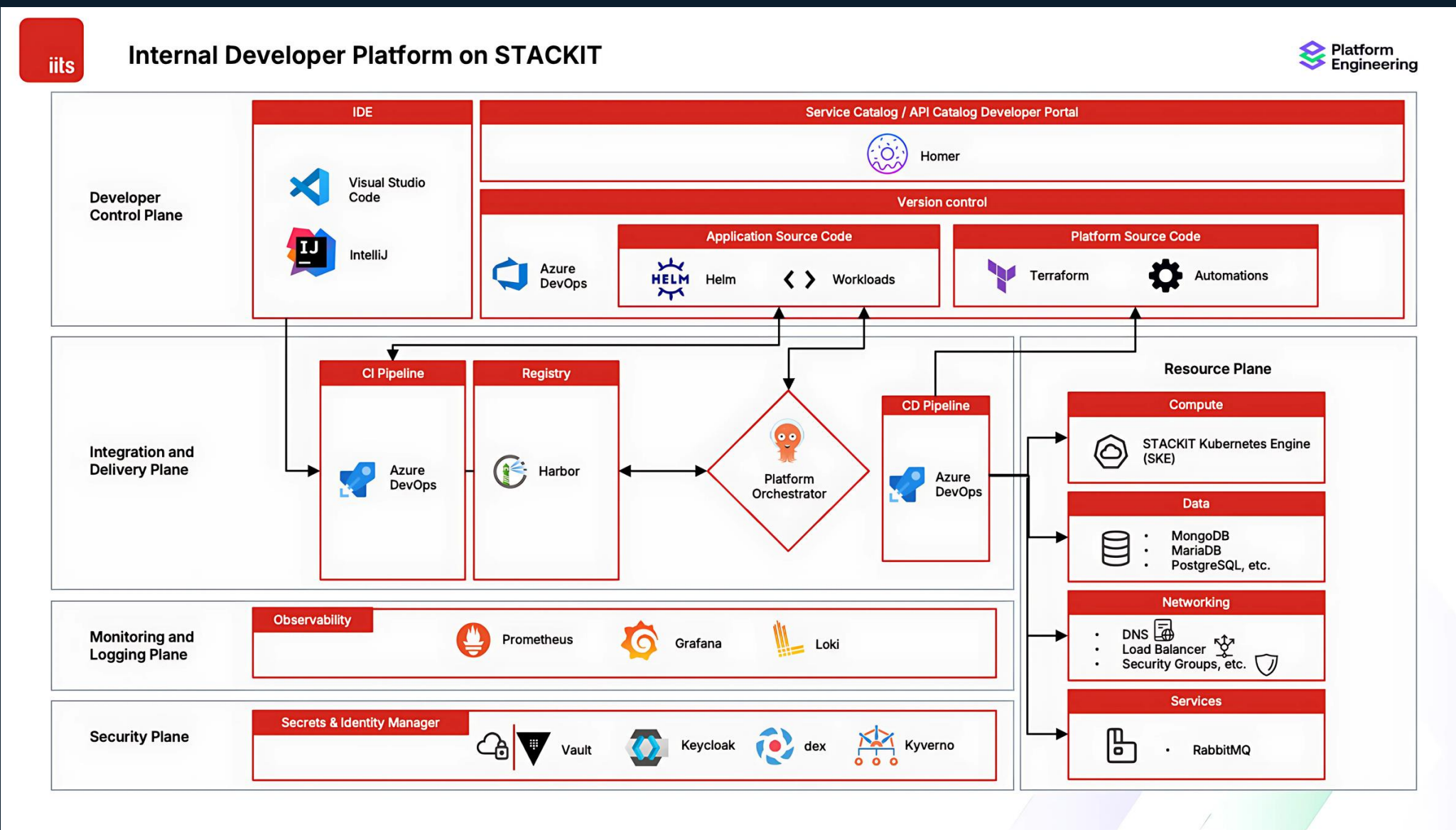
README.md
  # Commands:
  # bootstrap your controlplane!
  #
  # Template catalog part for third-party tools:
  ./kubara --all
  #
  # Initialize a new Git repository
  git add .
  git commit -m "init commit"
  git push origin main
  #
  # bootstrap your controlplane!
  ./kubara --bootstrap-argocd --with-es-crds --with-prometheus-crds --kubeconfig ske.yaml

TERMINAL
  OS: /hpa-demo [?] main
  kubectl get ns
  NAME          STATUS   AGE
  default       Active  11m
  kube-node-lease  Active  11m
  kube-public   Active  11m
  kube-system   Active  11m
```

Demo-0. Reference Architecture.

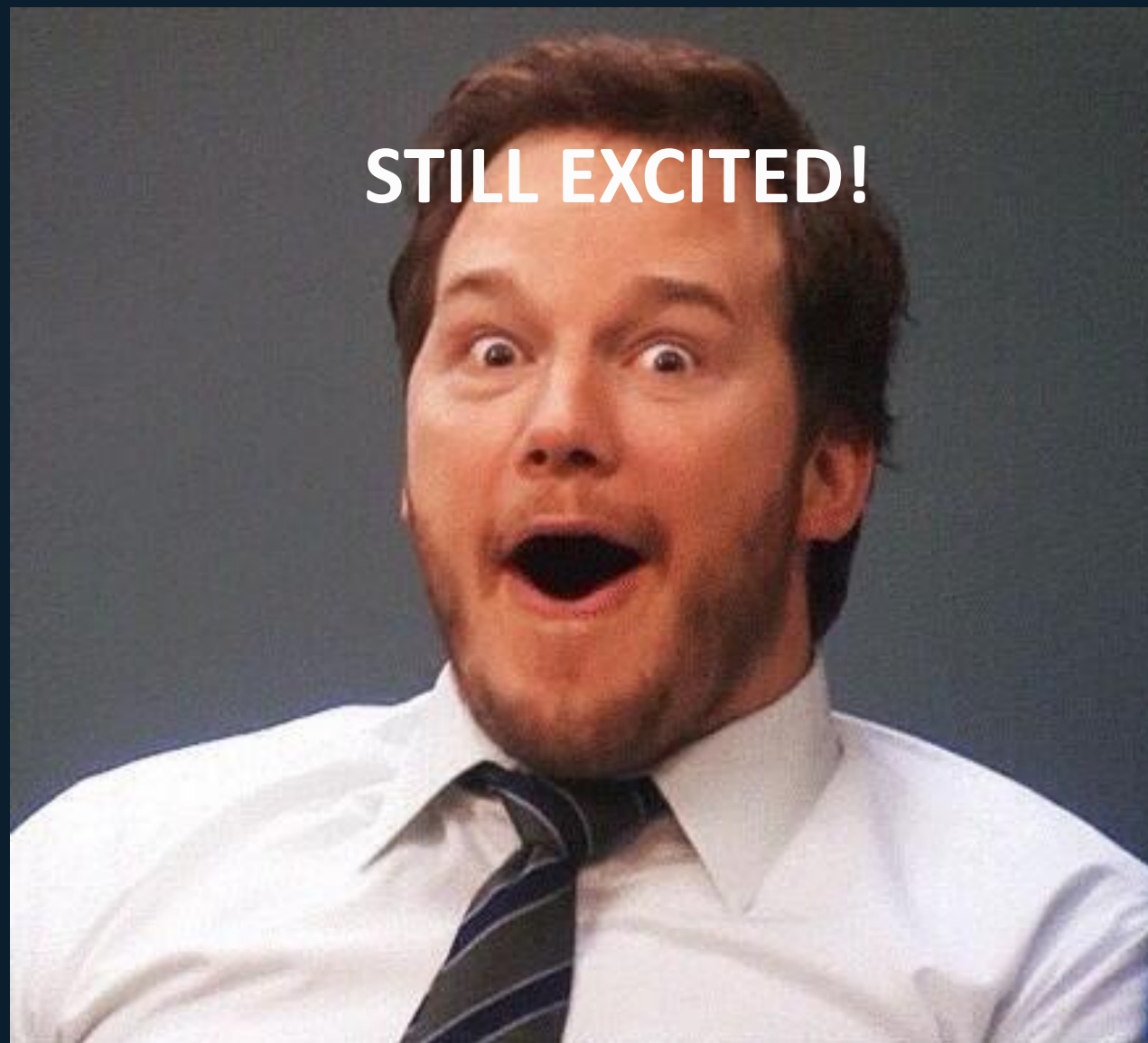


Download Slides!

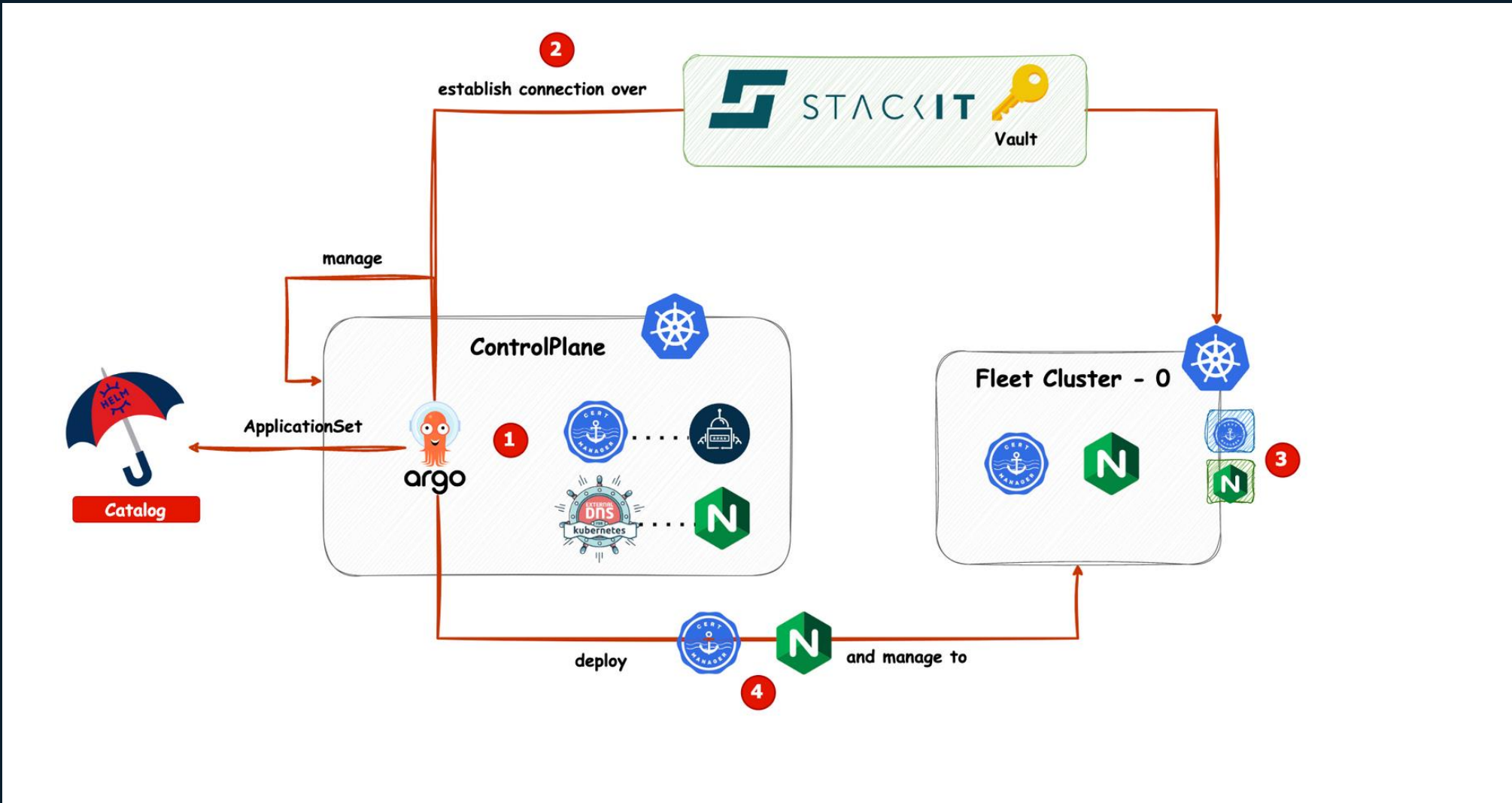


Add workload cluster.

Demo-1.

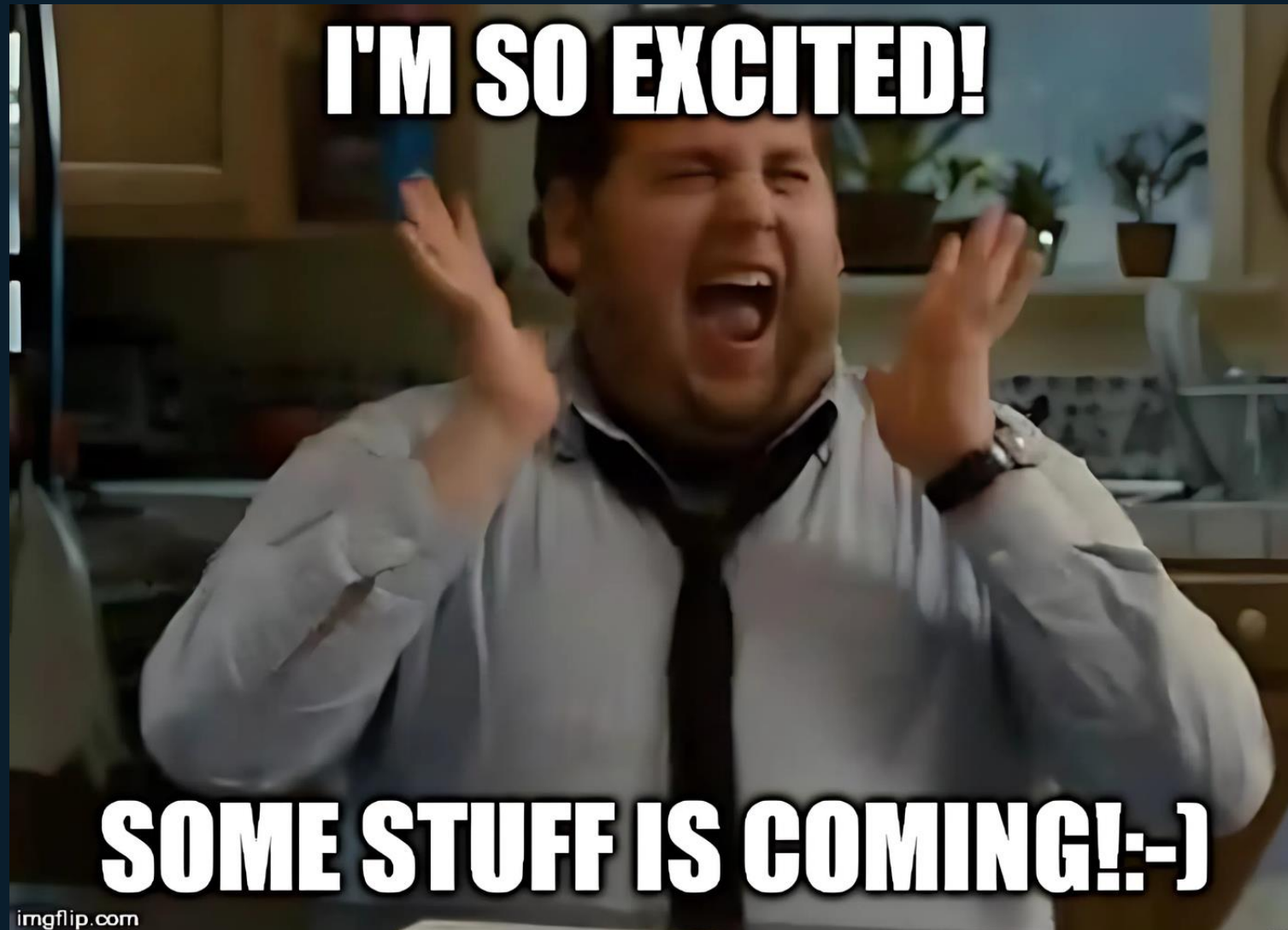


Demo-1.



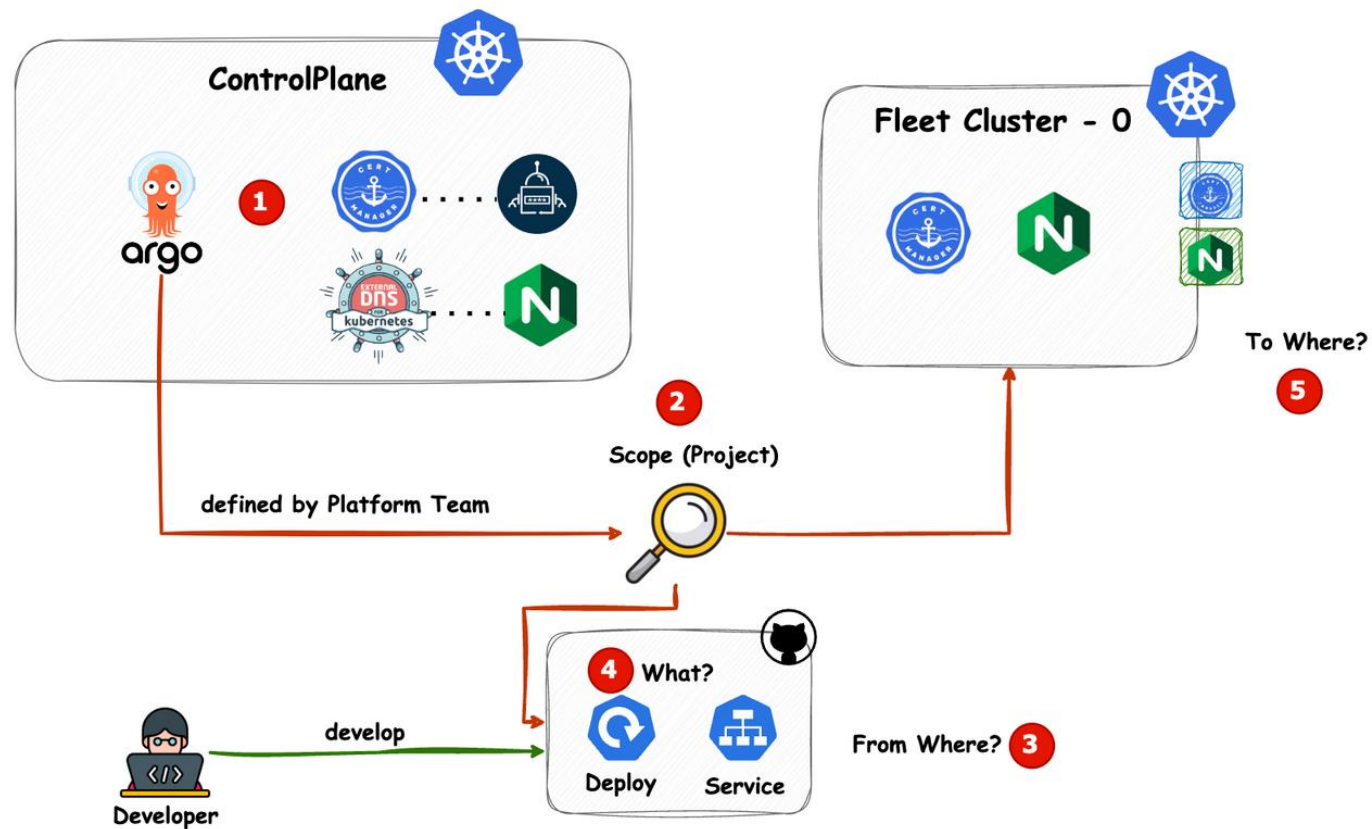
Deploy Business Application to an workload cluster.

Demo-2.



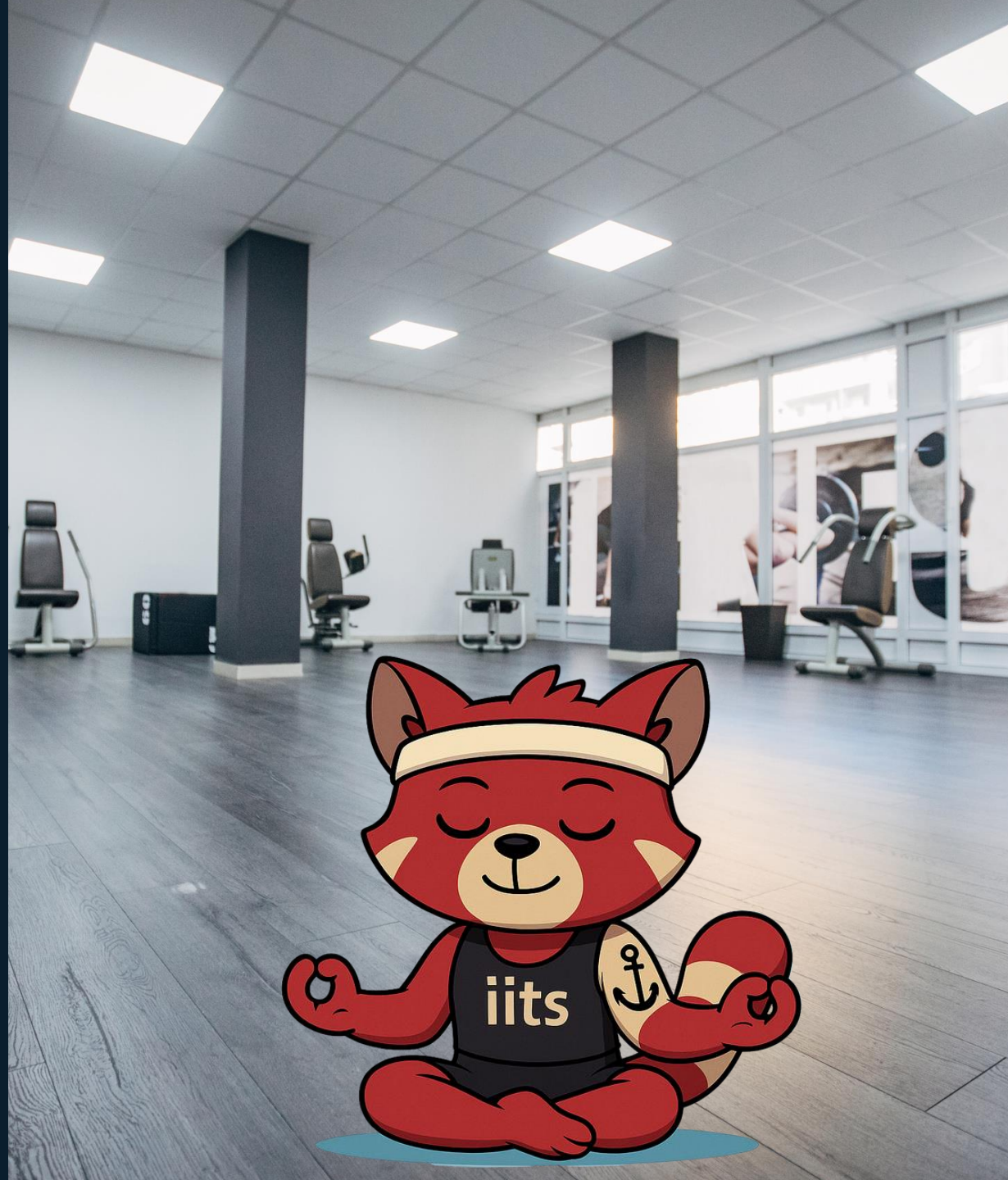
imgflip.com

Demo-2.



Take a breath. Clear your mind.
Chart the path forward.

04. Outlook



Already in use.

Current State & Outlook.

EARLY ADOPTER UND TESTER



Early Adopter and Tester:

- **Schwarz Industry:** in active use
- **Schwarz IT:** onboarding phase
- **HPA:** evaluating cloud solutions
- **D.velop:** planning multi-cloud strategy

UNDER DEVELOPMENT



Under development

- Still under development
- Just released
- Already getting requirements and feature requests

LONG TERM TARGET: OPEN SOURCE



Long Term Target: Open Source

- Community driven
- Multi-cloud provider support
- On-premises & air-gapped ready
- Vendor-independent
- Flavors: Security, HA-Setup, etc.

Thank you for your attention. Any questions?





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