

# CNCF Annual Survey Results !!



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## Kubernetes Established as the De Facto 'Operating System' for AI

Production use hits **82%**, 2025 CNCF Annual Survey



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# K8s Complexity Tamed

## KubeVela: One Interface To Rule Them All



# Today's Presenters



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# Agenda



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- Problem statement
- Why We Needed Change
- Our Approach
- Looking Ahead
- Q & A



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# The Problem: Platform Fragmentation



# The Complexity Iceberg



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Developers wanted to deploy a service. Instead, they had to master:



## Compute

Deployments, HPA, Pod Disruption



## Networking

Ingress, Mesh, TLS, DNS



## Observability

Prometheus, Grafana



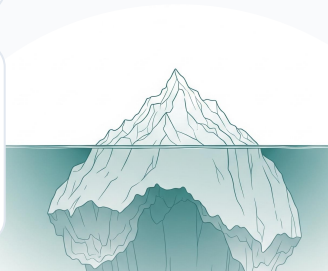
## Security

RBAC, OPA, Secrets, Vault



## IaC (Infrastructure as Code)

IaC, Modules, Statefiles



# Our IaC Model Was Hitting a Ceiling



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## Monolithic State

Massive Terraform state files became unwieldy, significantly extending deployment times and creating fundamental scalability bottlenecks.



## The Drift Dilemma

Live infrastructure constantly diverged from code due to manual changes, eroding confidence and complicating operations.



## The 'Two-Plane' Problem

Developers were forced to juggle two distinct toolchains—kubectI for apps and Terraform for cloud resources.





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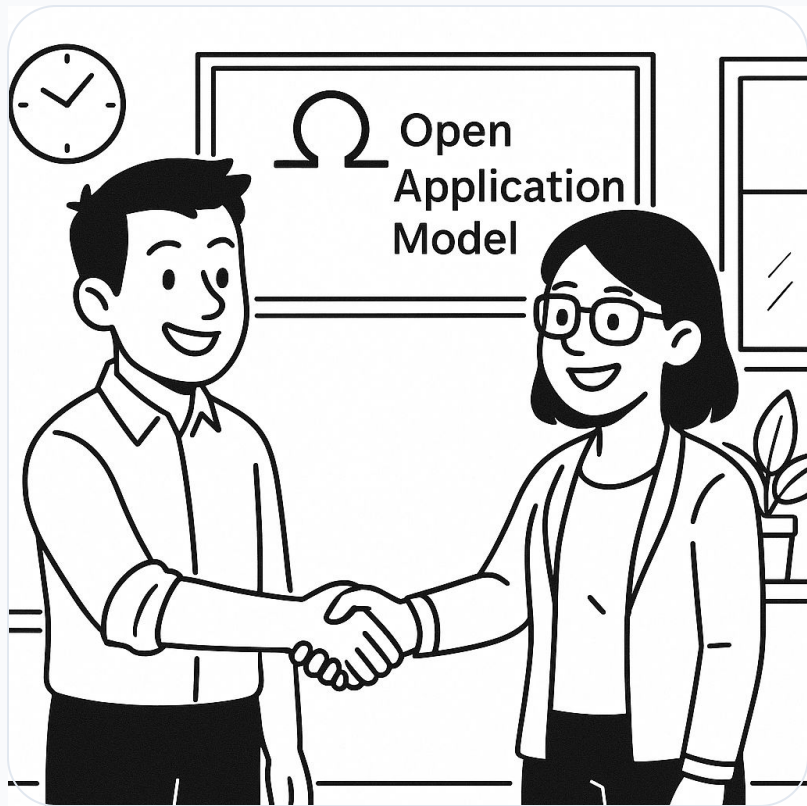


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# The Solution





## From Abstractions to Simplicity

*“OAM is a specification that brings an **application-first** approach to cloud-native systems by clearly separating the concerns of application developers and platform engineers - moving away from the traditional **infrastructure-first** mindset.”*

### User Experience Goal:

e.g., “Deploy this image, expose it, scale it and done.”

# !! OAM Is Just the Blueprint !!



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**A blueprint defines the structure; execution brings it to life.**



# KubeVela

A modern, application-centric continuous delivery control plane built on Kubernetes to implement Open Application Model (OAM) and Build **opinionated** Internal Developer Platforms (IDPs)

# KubeVela Terminology



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Term	Description
<b>Application</b>	Unified deployment and management tying all aspects together.
<b>Component</b>	Deployable unit: microservice, database, messaging, etc.—the core workload.
<b>Trait</b>	Bolt-on operational features (scaling, monitoring, encryption, versioning, etc.).
<b>Workflow</b>	Delivery pipeline/orchestration logic, defines steps and dependencies.
<b>Policy</b>	Rules and constraints at the application level (multi-cluster, security, lifecycle).
<b>Addon</b>	Plug-and-play module for integrating extra capabilities/3rd party (monitoring)

# How It Works



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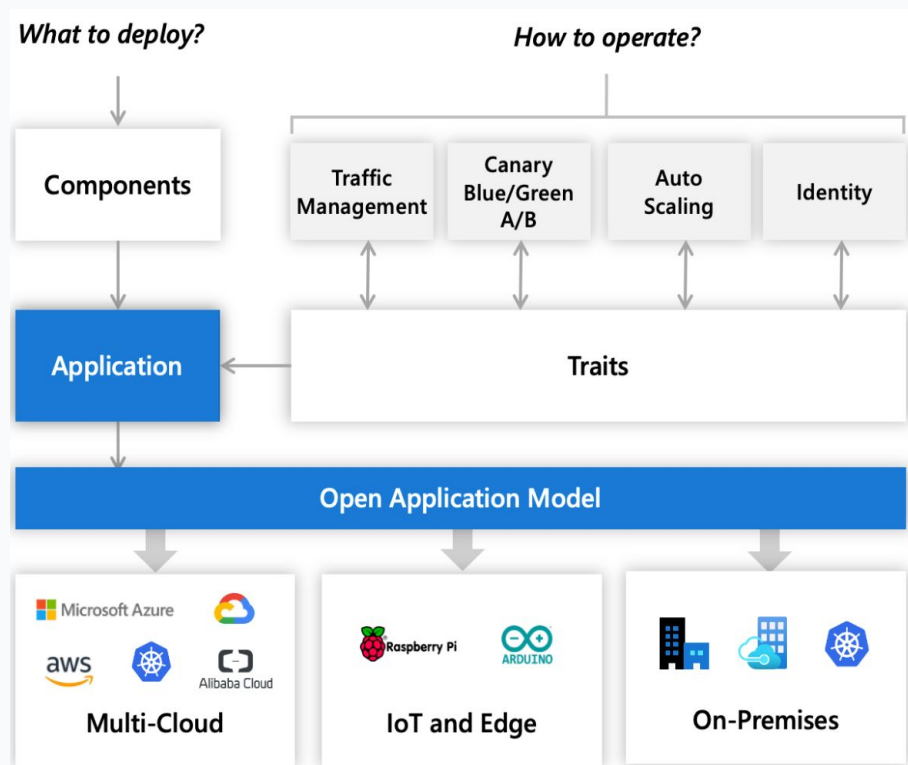
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## 1. Platform Team (The How)

Defines reusable, secure building blocks (OAM Components & Compositions) that encapsulate best practices and governance. They publish these to a central library.

## 2. Application Developer (The What)

Declares application needs in a single, simple YAML file. They "Claim" infrastructure (like a database) without needing to know the underlying cloud-specific implementation details.



# Application

- The higher level abstraction to **model a full application deployment**.
- The application deployment is modeled as a **DAG** (workflow).

## **Policies to enforce**

e.g. security scopes, healthy check policies, firewall rules ... any policies to enforce before deployment happen!

## DAG

```
1 kind: Application
2 spec:
3   components:
4     - name: express-server
5       type: webservice
6       properties:
7         image: demo/hello-world
8         port: 8000
9   traits:
10    - type: ingress
11      properties:
12        domain: testsvc.example.com
13        http:
14          "/": 8000
15  policies:
16    - type: security
17      properties:
18        audit: enabled
19        secretBackend: vault
20    - type: deployment-insights
21      properties:
22        provider: arms | promethues
23        leadTime: enabled
24        frequency: enabled
25        mttr: enabled
26  workflow:
27    - type: blue-green-rollout
28      stage: post-render
29      properties:
30        partition: "50%"
31    - type: traffic-shift
32      properties:
33        partition: "50%"
34    - type: rollout-promotion
35      propertie:
36        manualApproval: true
37        rollbackIfNotApproved: true
```

## **Components to deploy**

e.g. a Helm chart, a Kustomize pkg, a Cloud Formation template, a Terraform module ... literally *anything!*

## **Traits for day 2 operations**

e.g. ingress/route rules, auto-scaling rules ... operational behaviors attached to components!

## **Workflow of the deployment**

e.g. blue-green deploy, progressive traffic shifting, manual approval ... any pipeline style delivery steps!

# The Cloud-Native Solution - Extensibility



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## Crossplane: Eliminating the State File

Crossplane extends Kubernetes to manage external infrastructure — like AWS resources, Datadog, or SaaS tools — as native Kubernetes objects.

### Custom APIs (XRDs)

Define organization-specific infrastructure APIs like "Database" rather than raw cloud primitives.

### Continuous Reconciliation

Actively monitors and enforces desired state, automatically correcting drift unlike Terraform's "apply-once".

### No State Files

Desired state lives in etcd, eliminating the complexity and locking of monolithic state files.

### Unified API

A single interface for AWS, Azure, and GCP, turning Kubernetes into a universal control plane.

***Note: While this scenario uses Crossplane, it can be replaced with other cloud resource orchestrators like ACK or KCC for respective cloud providers.***

# What it brings to the table



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- Helps you build **opinionated** Internal Developer Platforms (IDPs)
- Avoid exposure of platform level configuration to devs, which requires upskilling.
- Abstract boilerplate and redundant platform-level logic.
- Get rid of piles of Yaml files that are error-prone.
- Reduce misconfiguration surface area.
- **One interface** for Application developer to deploy apps and cloud resources



## Application Developer

Just populate minimally exposed configs



WEB SERVICE



AUTOSCALING



GATEWAY



MULTI-CLUSTER



WORKFLOW



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# KubeVela Demo



One Interface To Rule Them  
All - One KubeVela App,  
Three Provisioners, Two  
Clouds

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# Closing thoughts



*One workload definition can deploy code and provision required cloud resources.*



# Looking ahead: The Future is Platform Engineering



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**KubeVela** combined with ACK, KCC, or Crossplane delivers **cloud-agnostic, Kubernetes-native platform engineering**. This shift treats infrastructure as code, eliminating fragmentation and enabling **true self-service**.



## Unified Control

Kubernetes-first infrastructure removes monolithic state complexity.



## Developer Velocity

Application-centric abstractions improve productivity with governance.



## Reliability

Continuous reconciliation ensures state consistency over static tools.



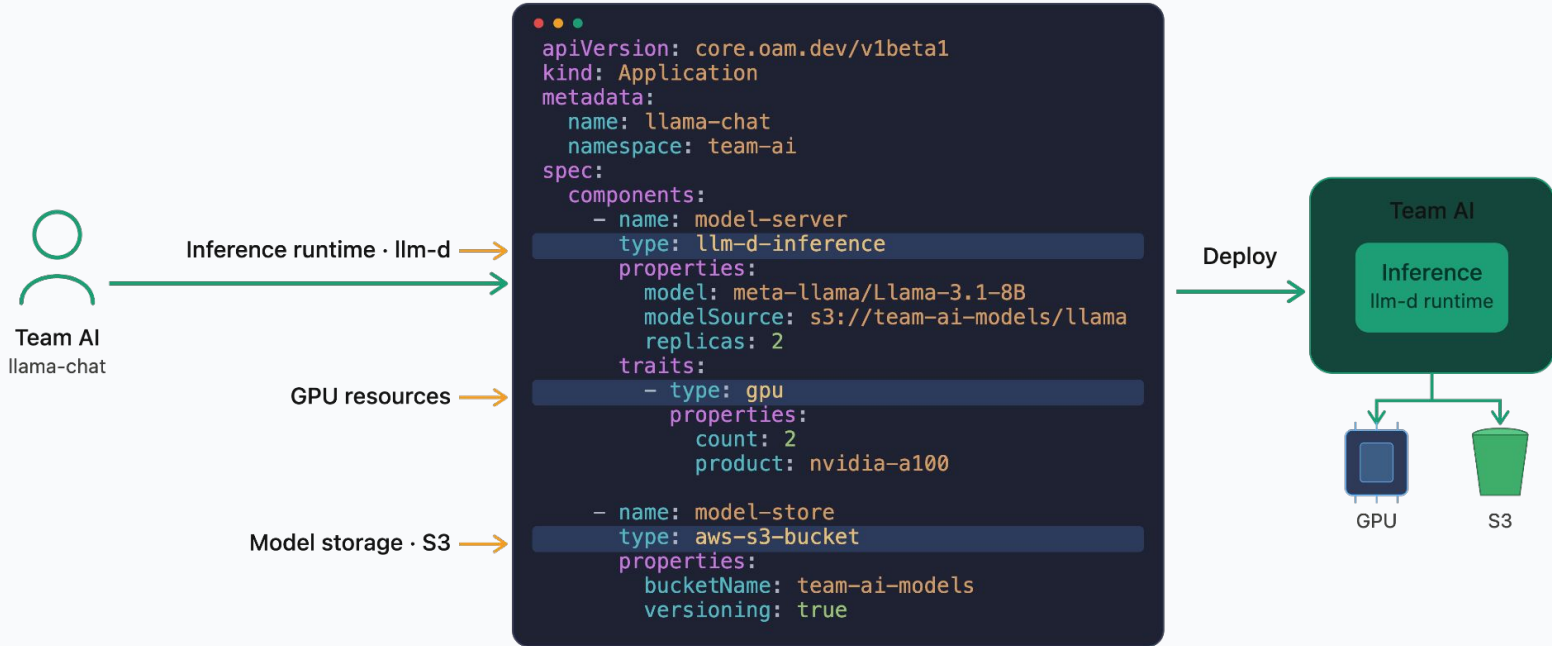
## Scalability

Reusable components allow platform teams to scale impact organization-wide.

*Adopting KubeVela simplifies the integration of future infrastructure into your platform.*

# KubeVela: One Interface - GenAI on Kubernetes

One workload definition deploys the model, runs llm-d inference, and provisions S3 storage



# References

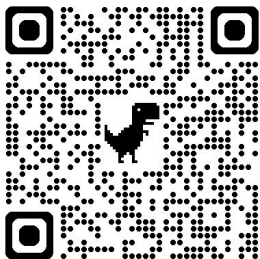
[Demo Repository](#)



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# Thank You!

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