KusionStack Origin, present and future

KusionStack Team

Agenda

01 Origin

02 Overview

03 Solution

04 Tech

05 Scene

06 Practice

07 Future

Origin

Cloud-native technologies

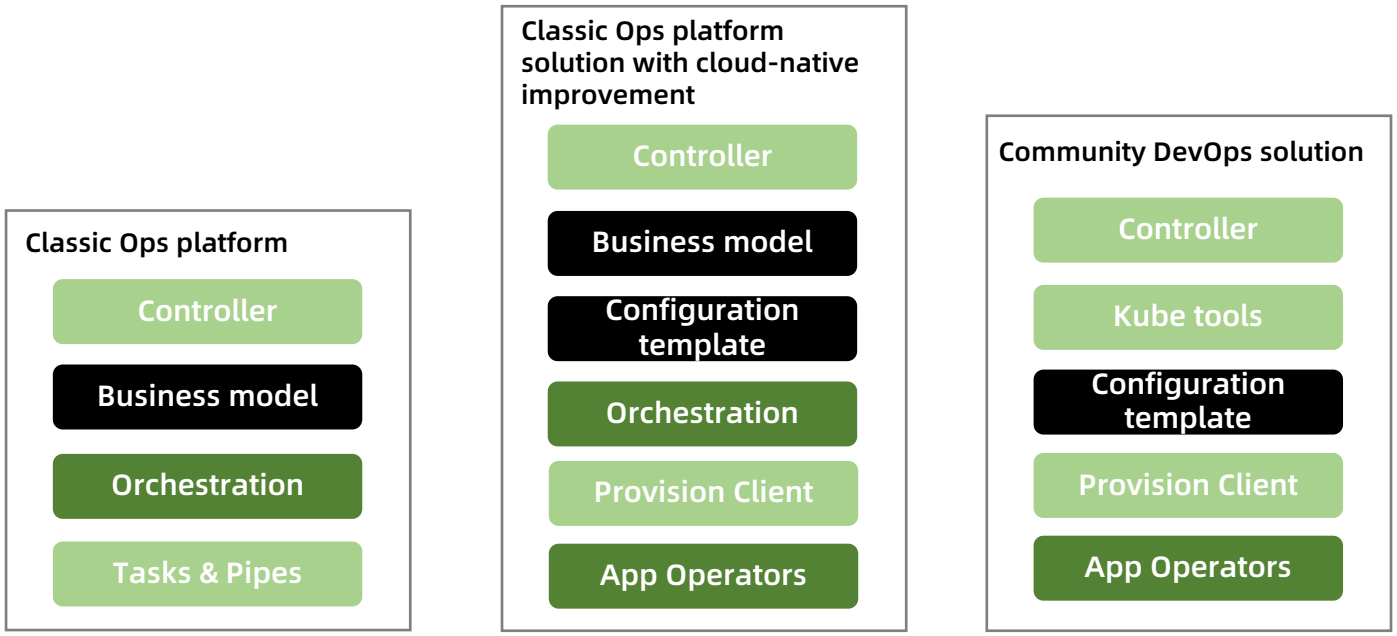
Are eating the world

- Becoming **first-party approach** for enterprises and cloud vendors, forming a global community-driven ecosystem
- Modern applications relies on **hybrid technologies** of cloud-native and non-cloud-native, PaaS and IaaS on multi-clouds
- Collaborative **DevOps** among application, SRE and platform developers is the key to Ops efficiency at scale across multi-phases and multi-envs
- Continuous improvement in **abstraction**, **management** and **user-experience** above the kube ecosystem is undergoing

Diversity, scale and change

Create ongoing challenges

- Classic Ops platform: insufficient **openness**, **flexibility** and **scalability**
- Community DevOps tool: don't meet '**enterprise-grade**' needs

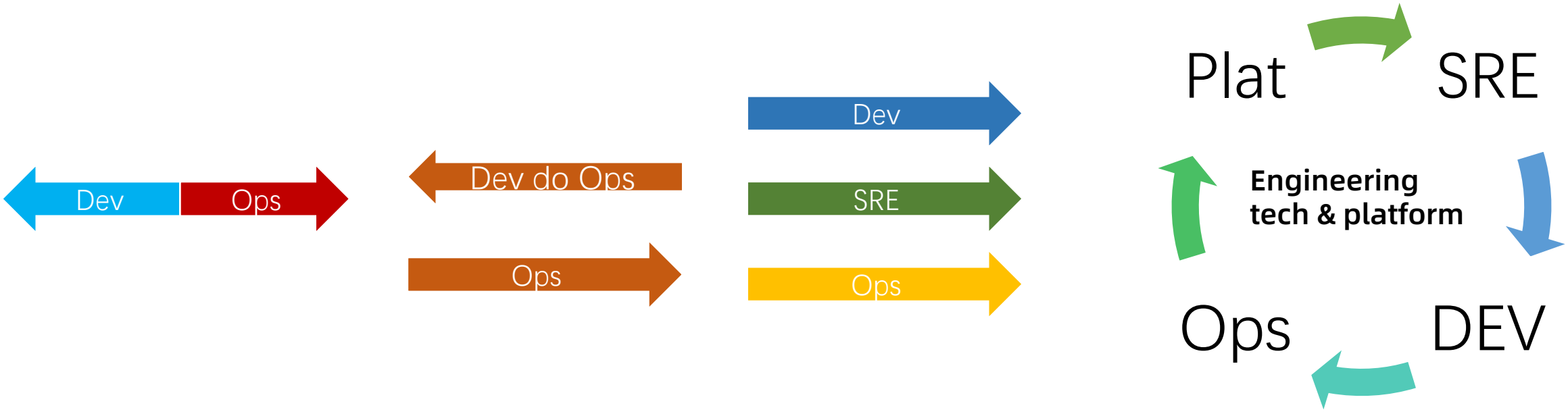


What we tried and not that successful

The darker the part, the more complex, the faster the change

Ops practice and ecology

Are stilling evolving



OVERVIEW

A Stack to Delivery Value

Make scaled delivery agile

Enterprise Declarative DevOps

App Centric Shipping Anywhere

Codify Stack for Platform Engineering

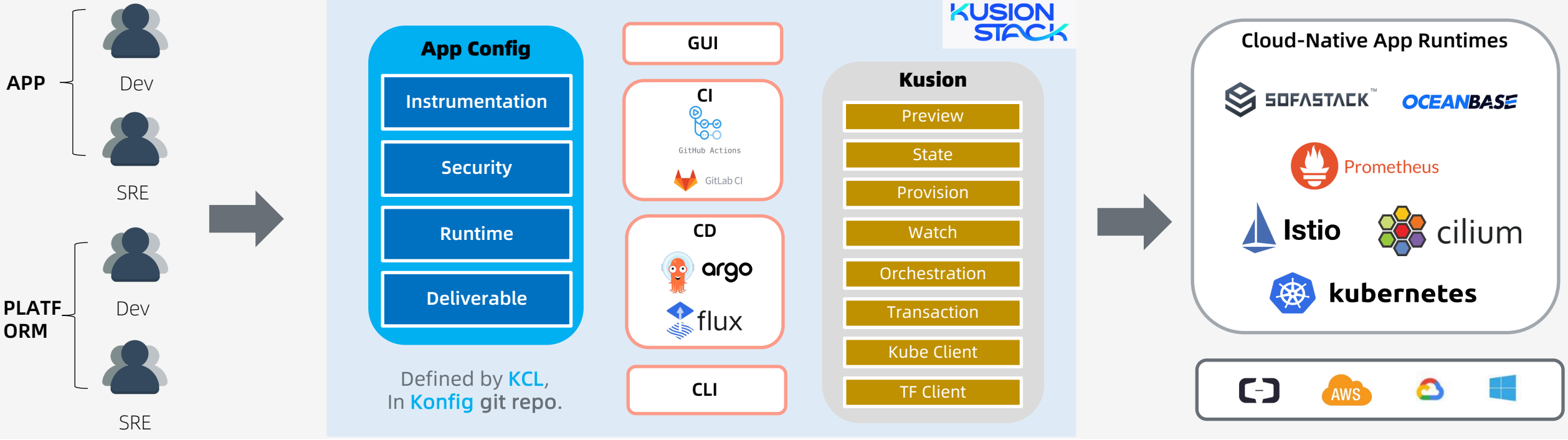
Multi-{Teams, Roles}
Programmable DevOps

App Ops Lifetime Config
Multi-{Tenant, Env} Solution

Collaboration
Diversified Automation

Declarative Ops
Dev-friendly Experience

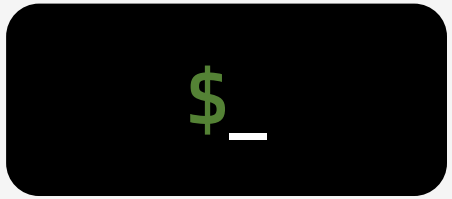
Multi-Runtimes
Multi-Clouds



Unlocking Platform as Code

With modern lang, automation and self-service

Scripting

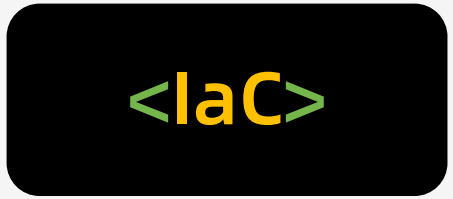


1990's

- Imperative Commands

Infra as Code

(Terraform on Clouds)

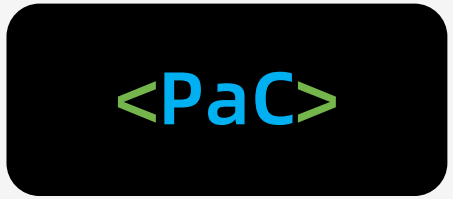


2000's

- Programmable Key-values
- Limited Scalability
- Managed Provision

Platform as Code

K8s, Clouds + KusionStack



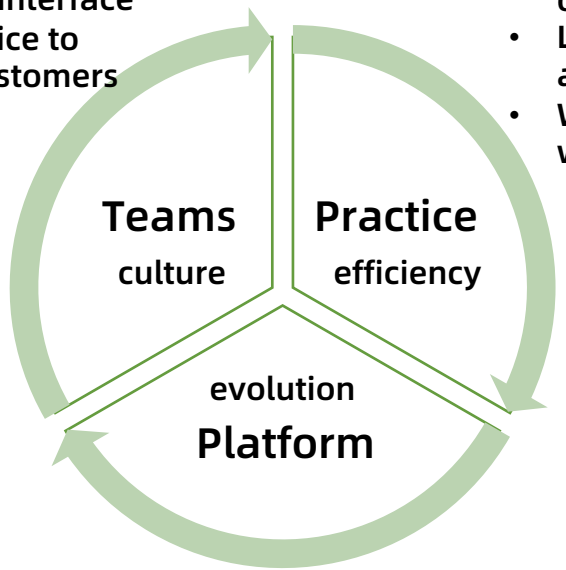
2020's

- **Modern Lang for Developers**
- **Abstraction, Validation, Scalability**
- **Kubernetes Control Plane First**
- **Hybrid Resource Automation**
- **Self-Service**

Collaborate, Automate

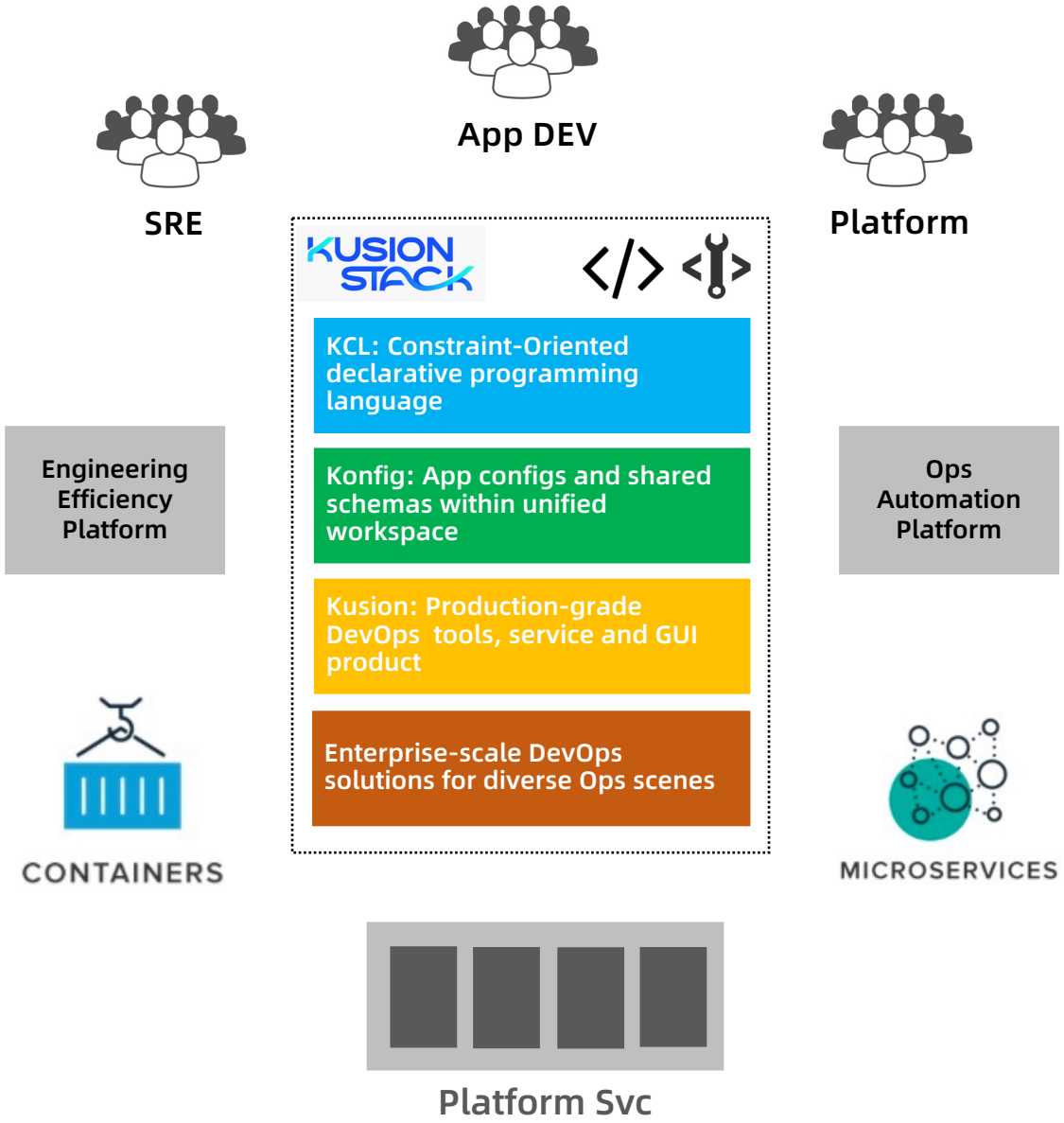
Make scaled DevOps possible

- Collaborate and share across teams
- One-stop working space and interface
- Better service to internal customers



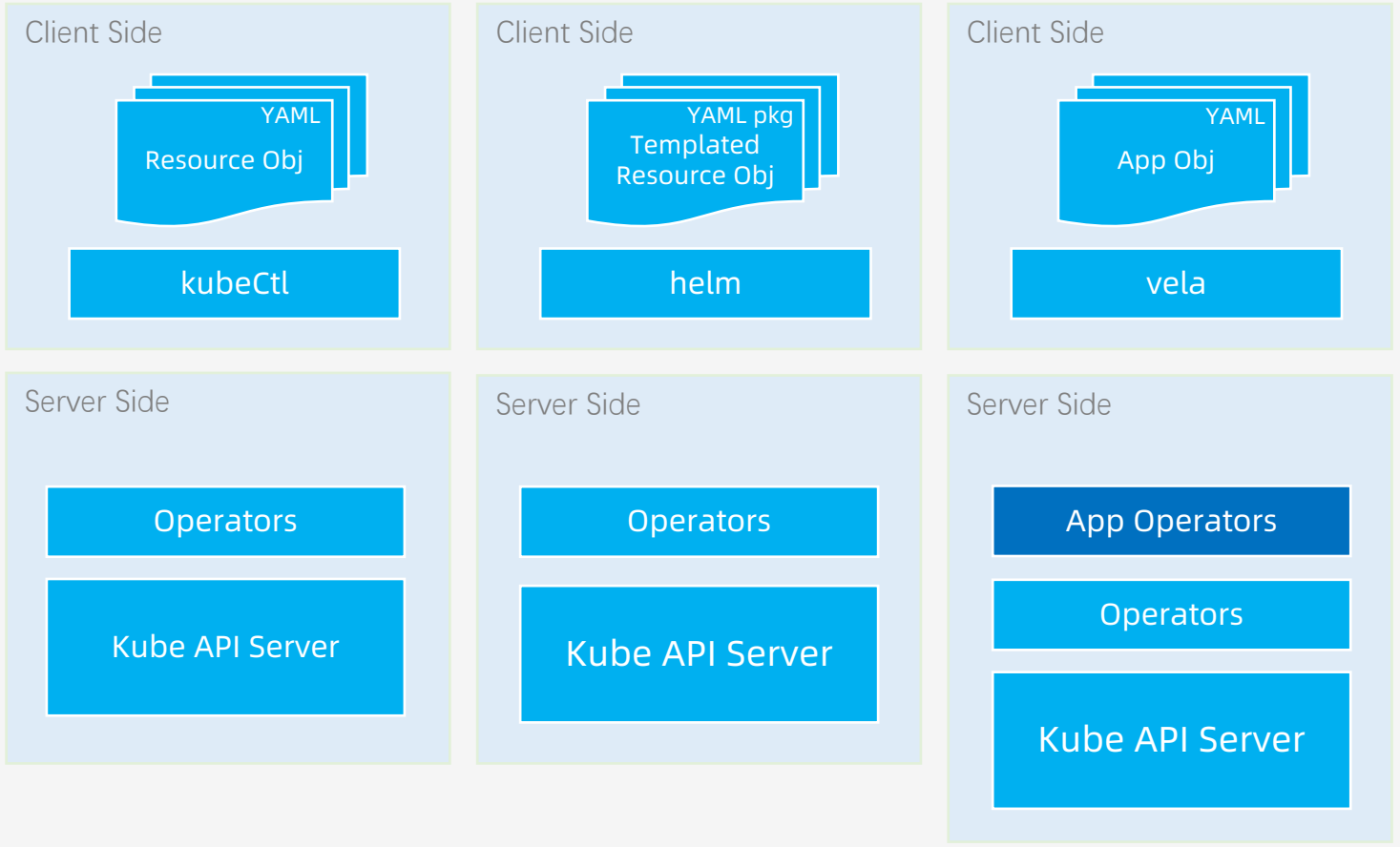
- Coding everything
- Efficient Ops business development
- Manage change based on commit
- Left-shifted inspection and analysis
- Weakening the process with practice

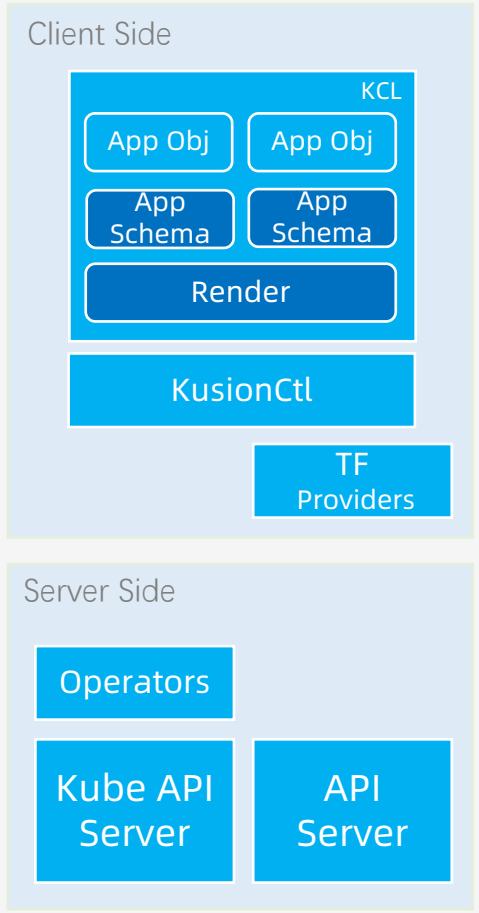
- Highly open CI/CD/CDRA platform
- Unified and single-source ‘fact’ management mechanism
- Extensible to all ops scenarios
- Continue to face new challenges at enterprise scale



Solution

Kube Ops with X





- **App Centric**
  - Modeling
  - Abstraction
  - Customization
  - Combination
  - Policy
- **Pure Client Solution**
  - Coded by KCL
  - Lightweight
  - Flexible
  - Scalable
  - Portable
  - Left-shifted stability
- **Hybrid-platform**
  - On Kube & TF
  - On Multi-Clouds
  - Provision
  - Orchestration
  - Visualization
  - ...
- **E2E Support**
  - Dev
  - CI
  - CD

➢ **Typical tool: Kustomize**

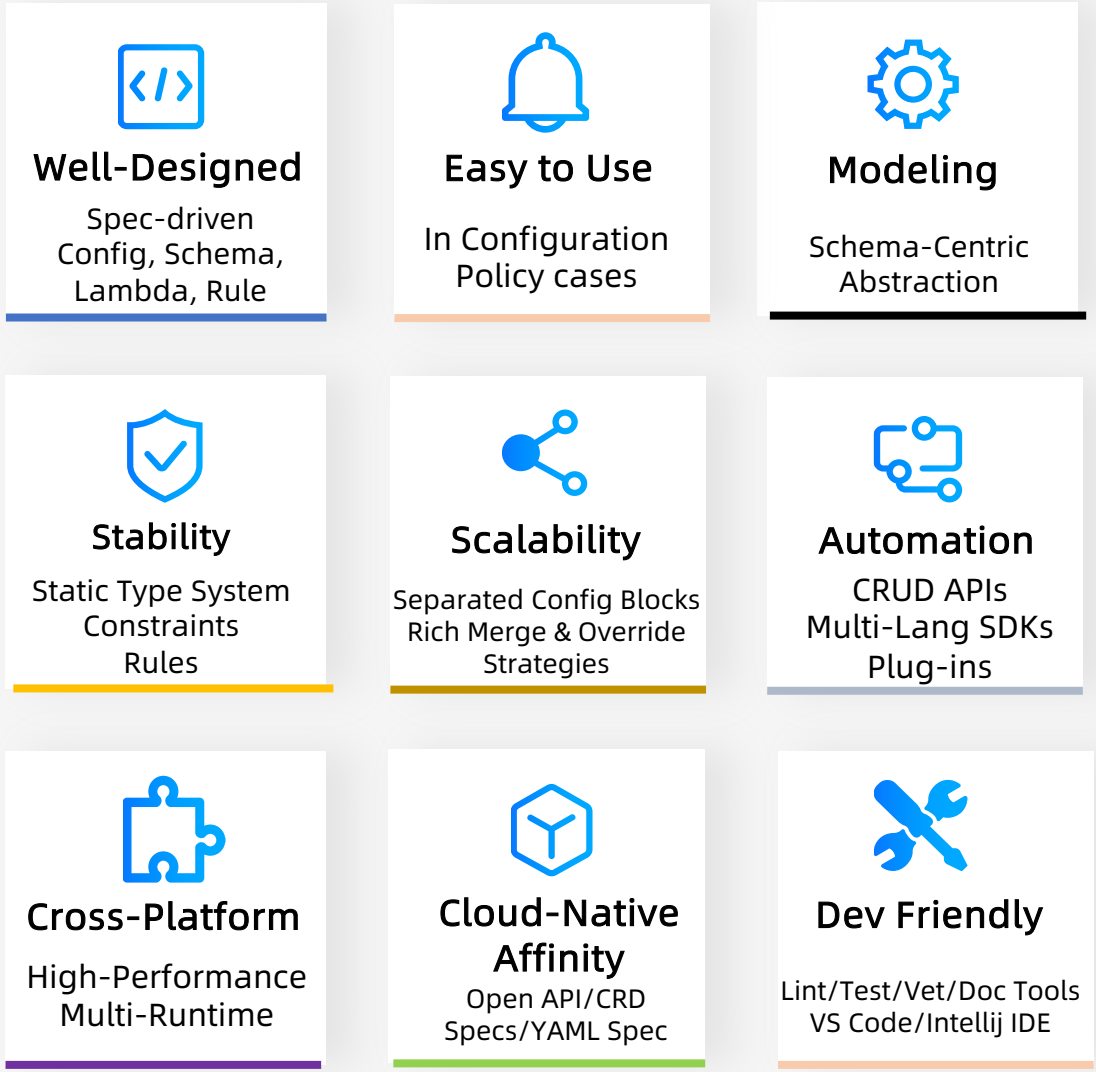
➢ **Typical tool: Helm**

➢ **Typical tool: KubeVela**

➢ **KusionStack**

KusionStack - KCL

KCL - An Open Source Constraint-Based Record & Functional Language



KusionStack - Konfig & Kusion

An abstraction and management layer to deliver modern app

Monorepo

Organize all app confs in one repo with scalable project & stack structure

Vendor Agnostic

Write once, deliver any runtime, any cloud through a consistent workflow

Multiple Hierarchies

Natively support multi-tenant and multi-environment configuration

Lifecycle Management

Manage app from the first code to production-ready across multi-phases

Extendable Models

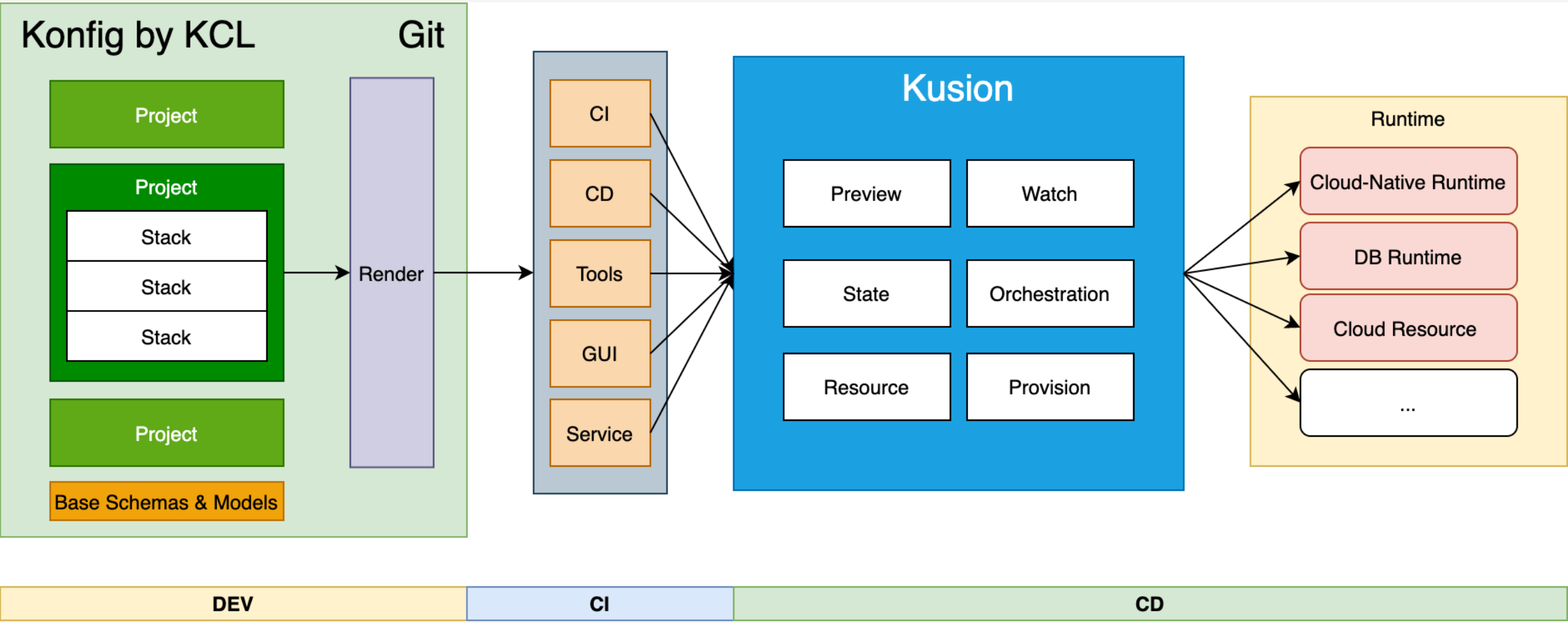
Extendable and reusable modeling by schema, mixin and other KCL mechanisms

Hybrid Resource

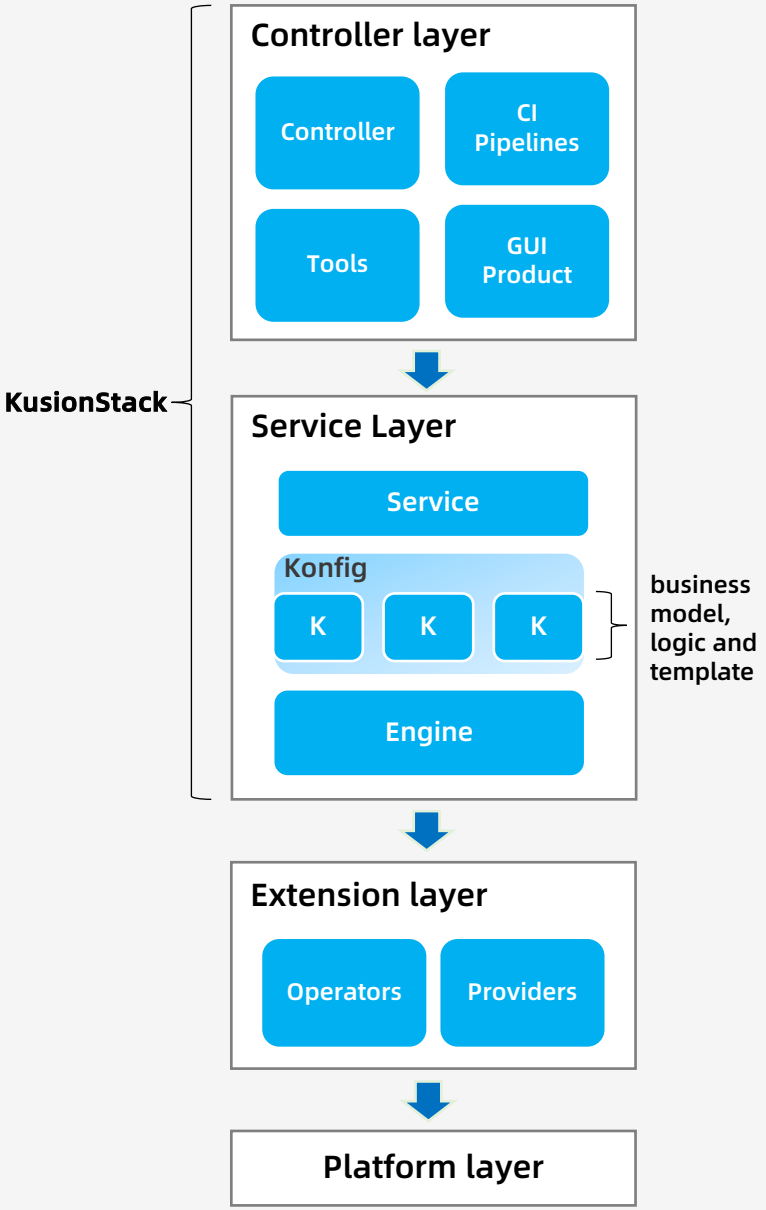
Orchestrate resources on various runtime in a managed manner

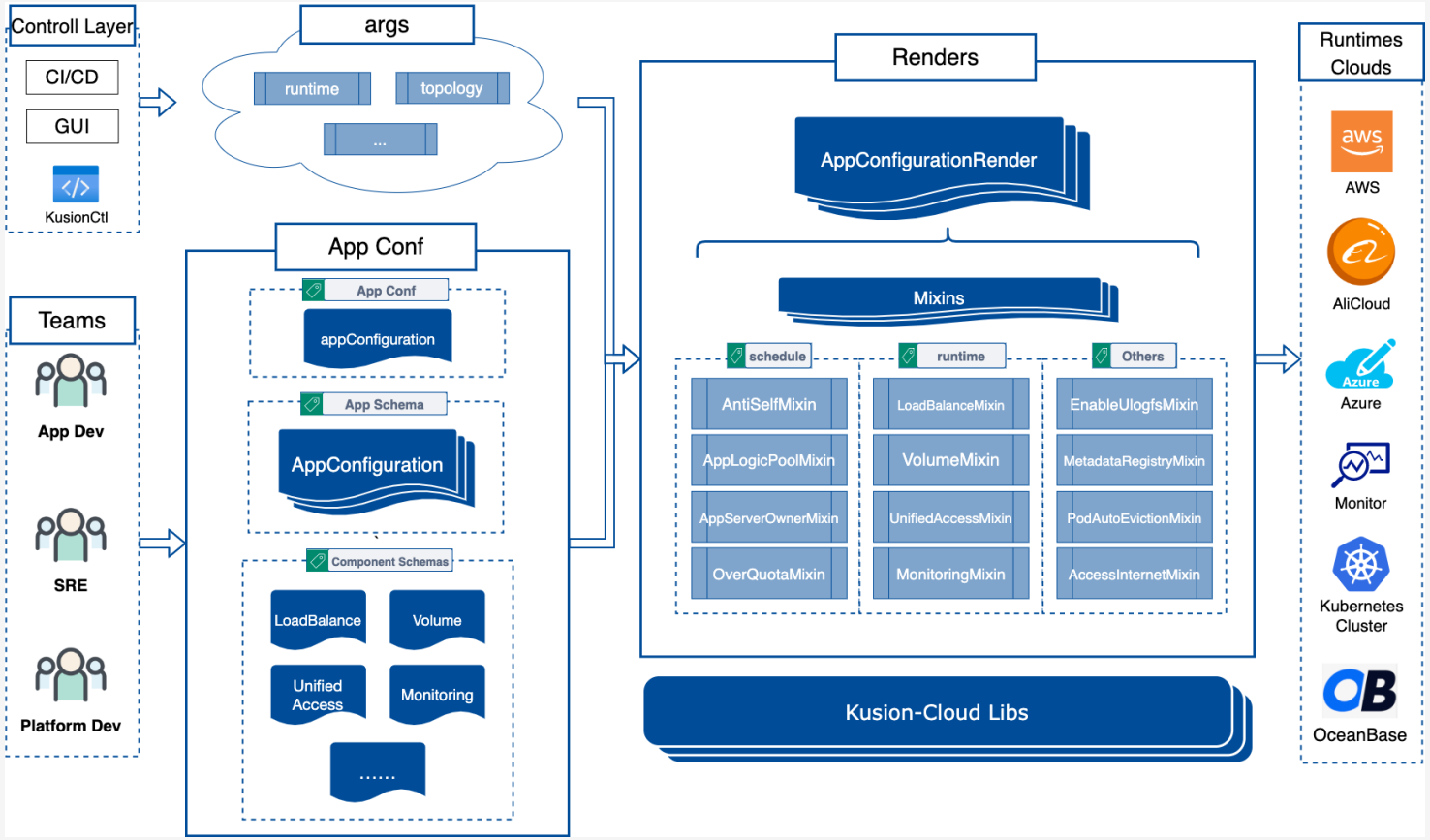
Enterprise Solutions

Scaled and flexible development and automation

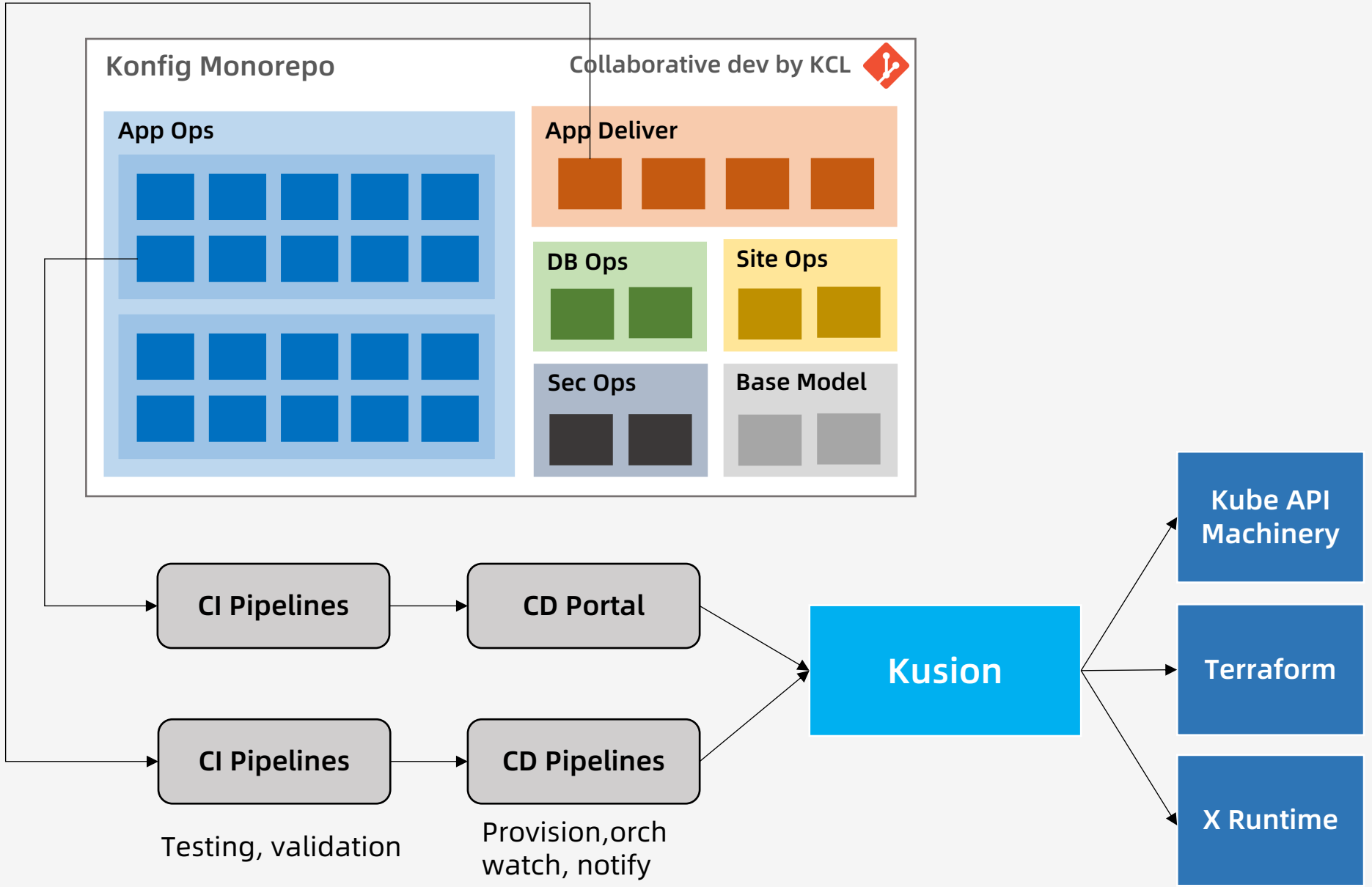


Layers & Collaboration





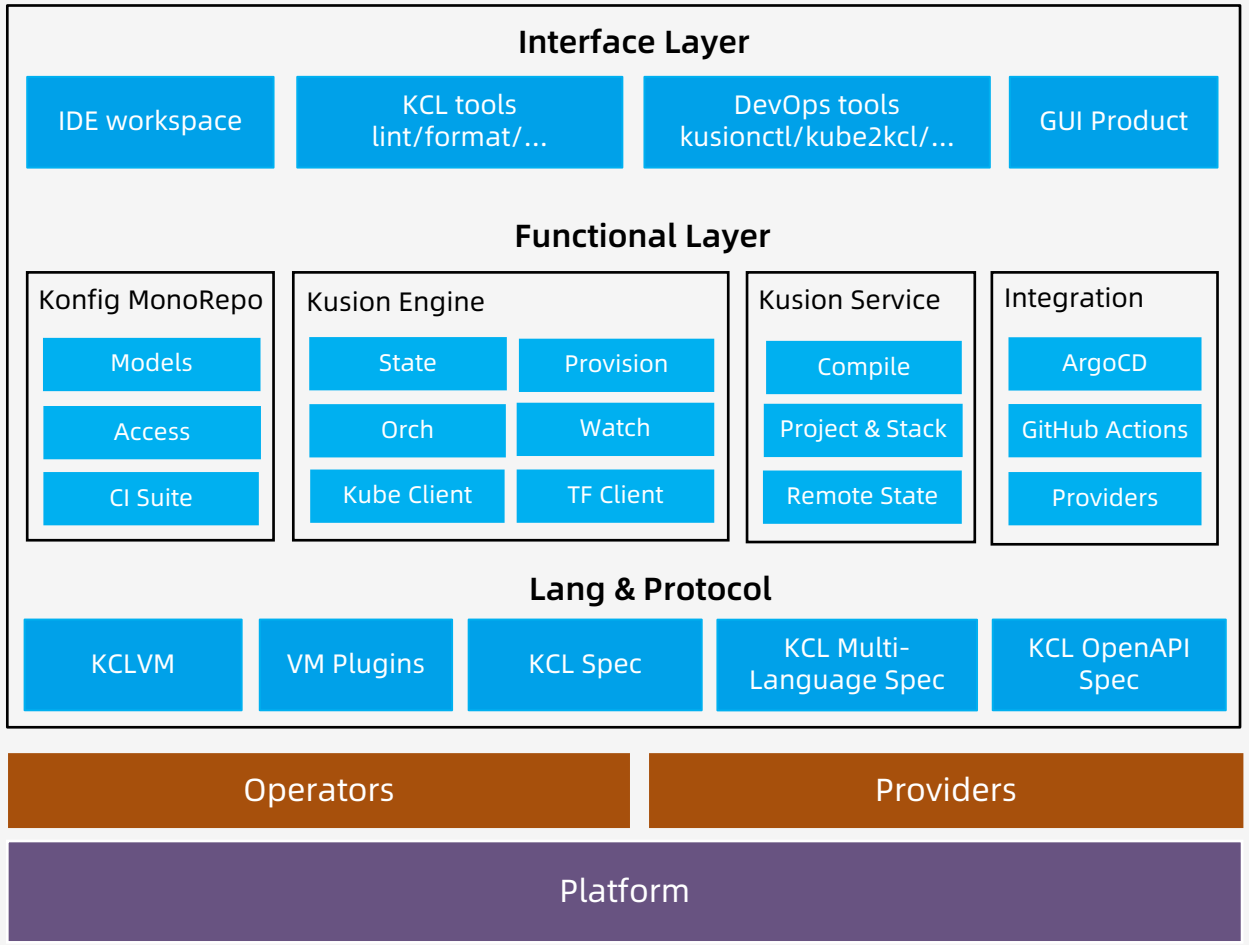
Automation Workflow

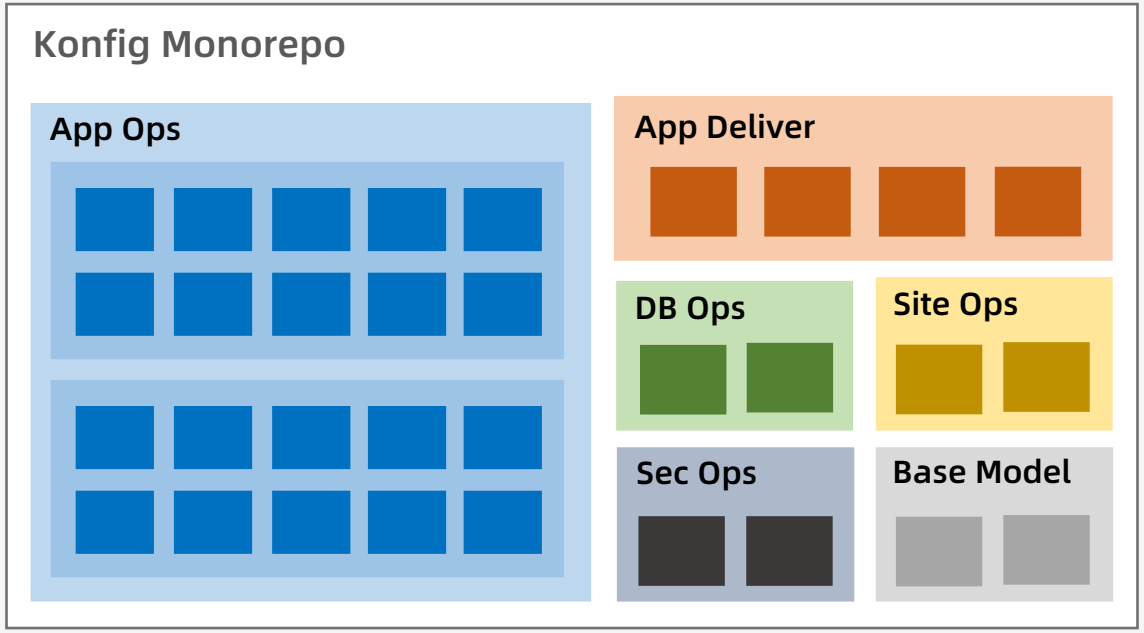


Tech

KusionStack Arch

Lang, tools, interface and workspace





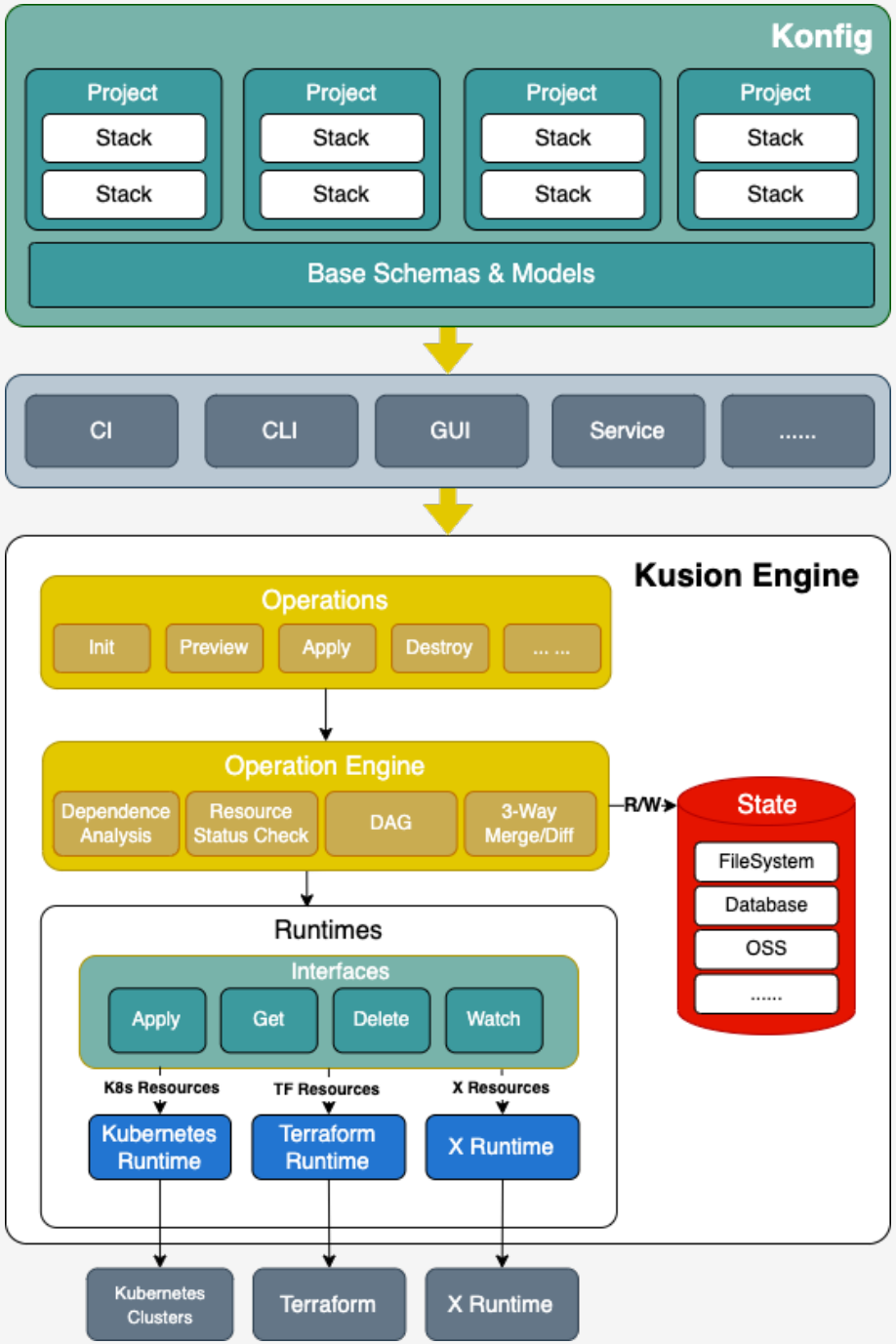
Konfig & Kusion

Managed resource across multiple runtimes

Operation Engine: provide core features to support all Kusion operations

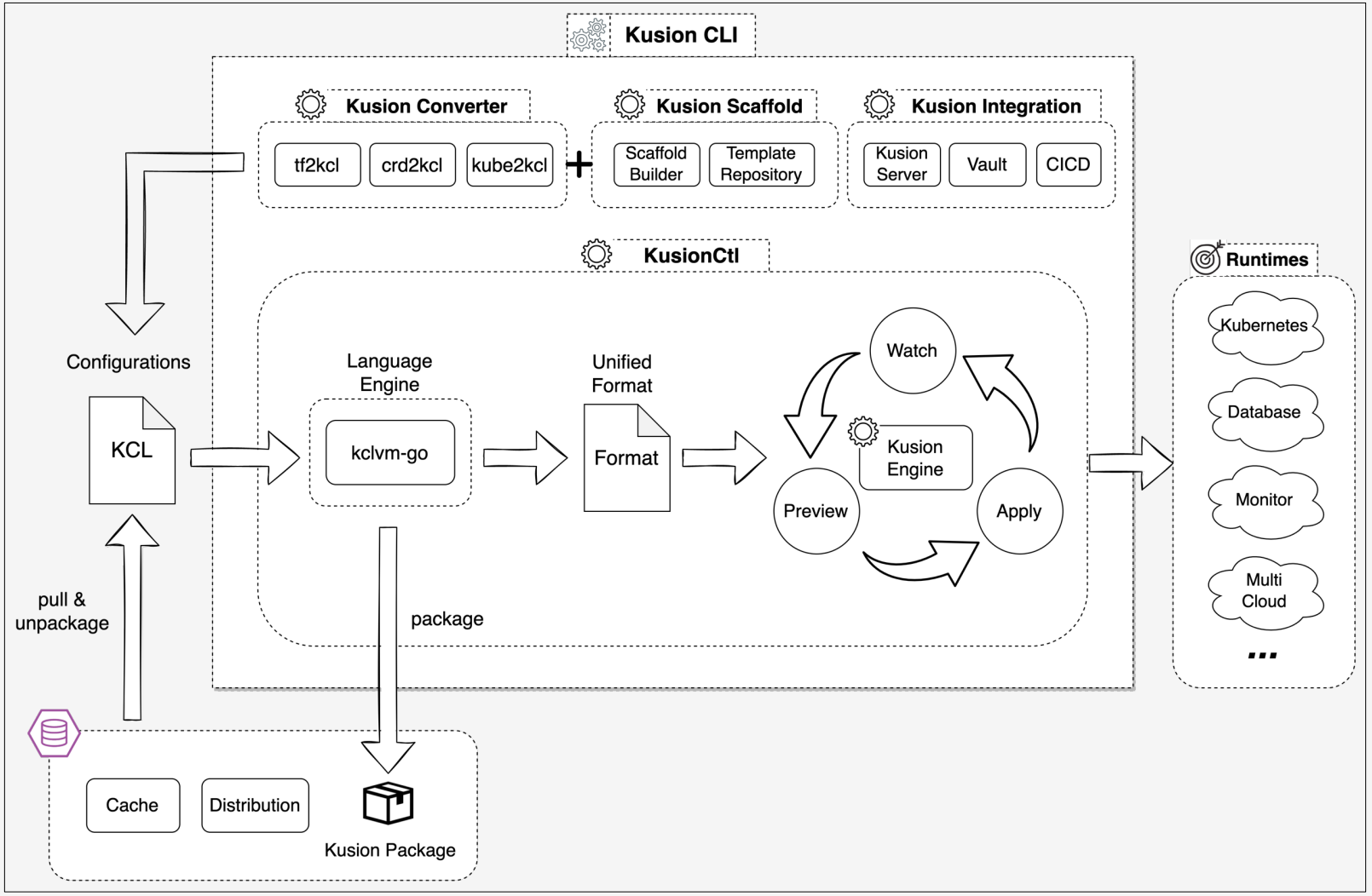
Runtimes: represent actual infrastructure runtimes managed by Kusion.

State: a mapping between resources in Konfig and the actual infra resource



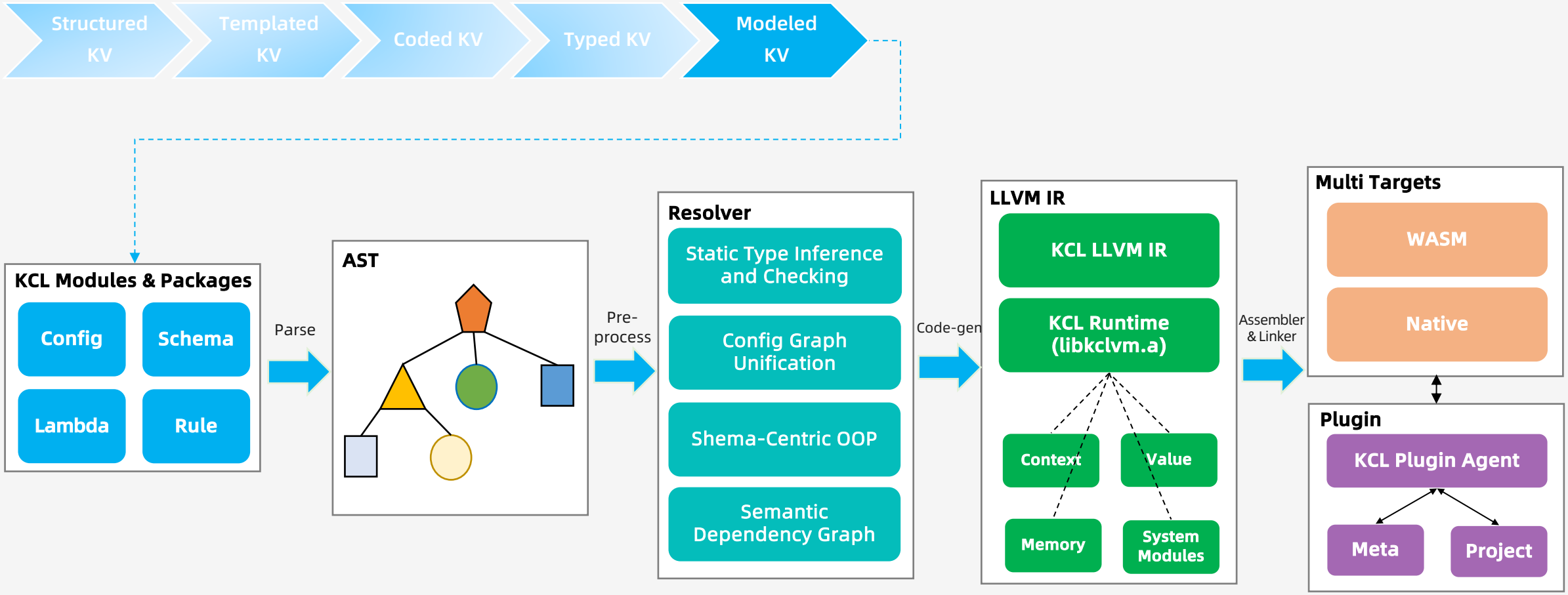
Kusion Tools

Delivery workflow easier



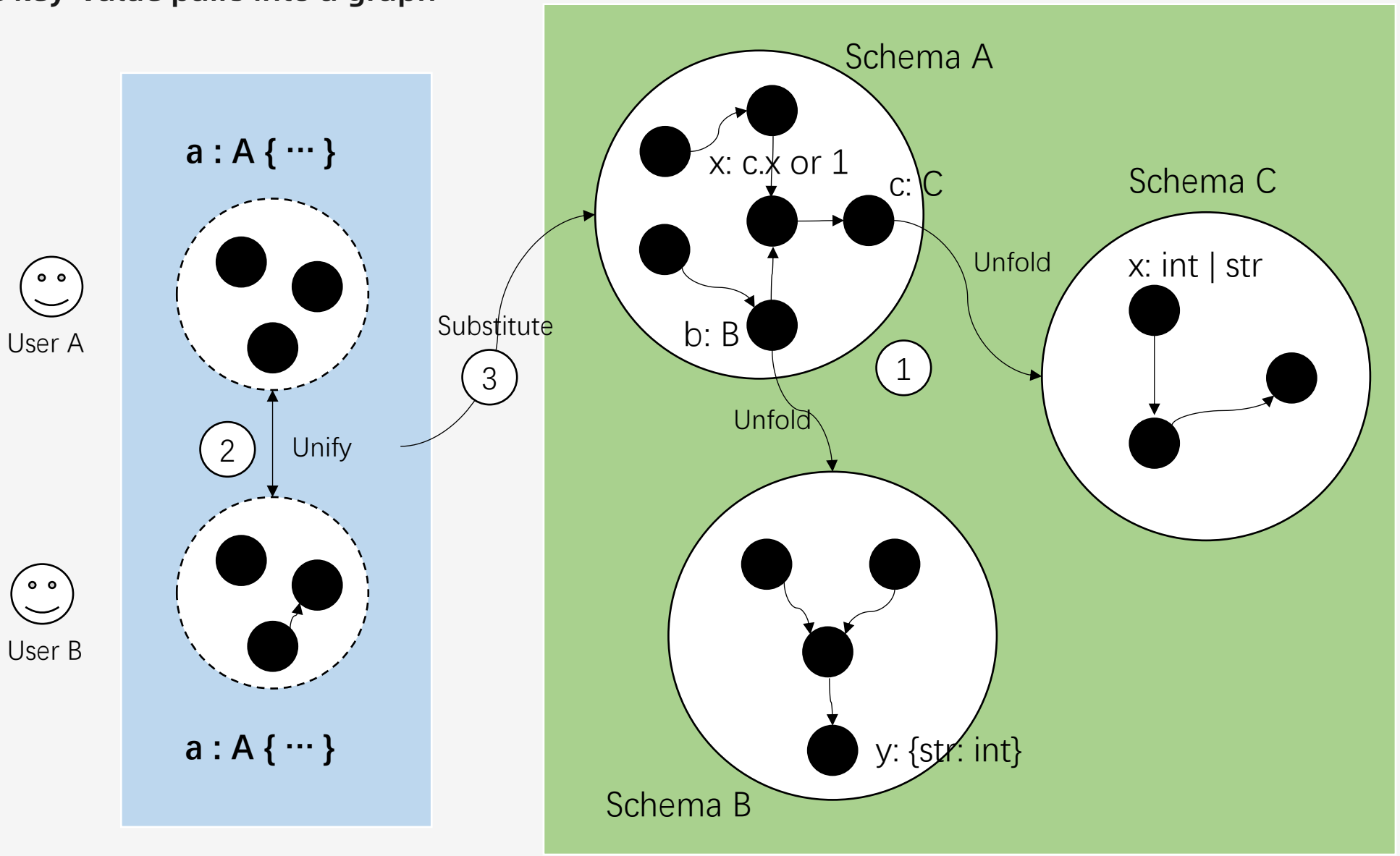
KCL

Config, Schema, Lambda, Rule



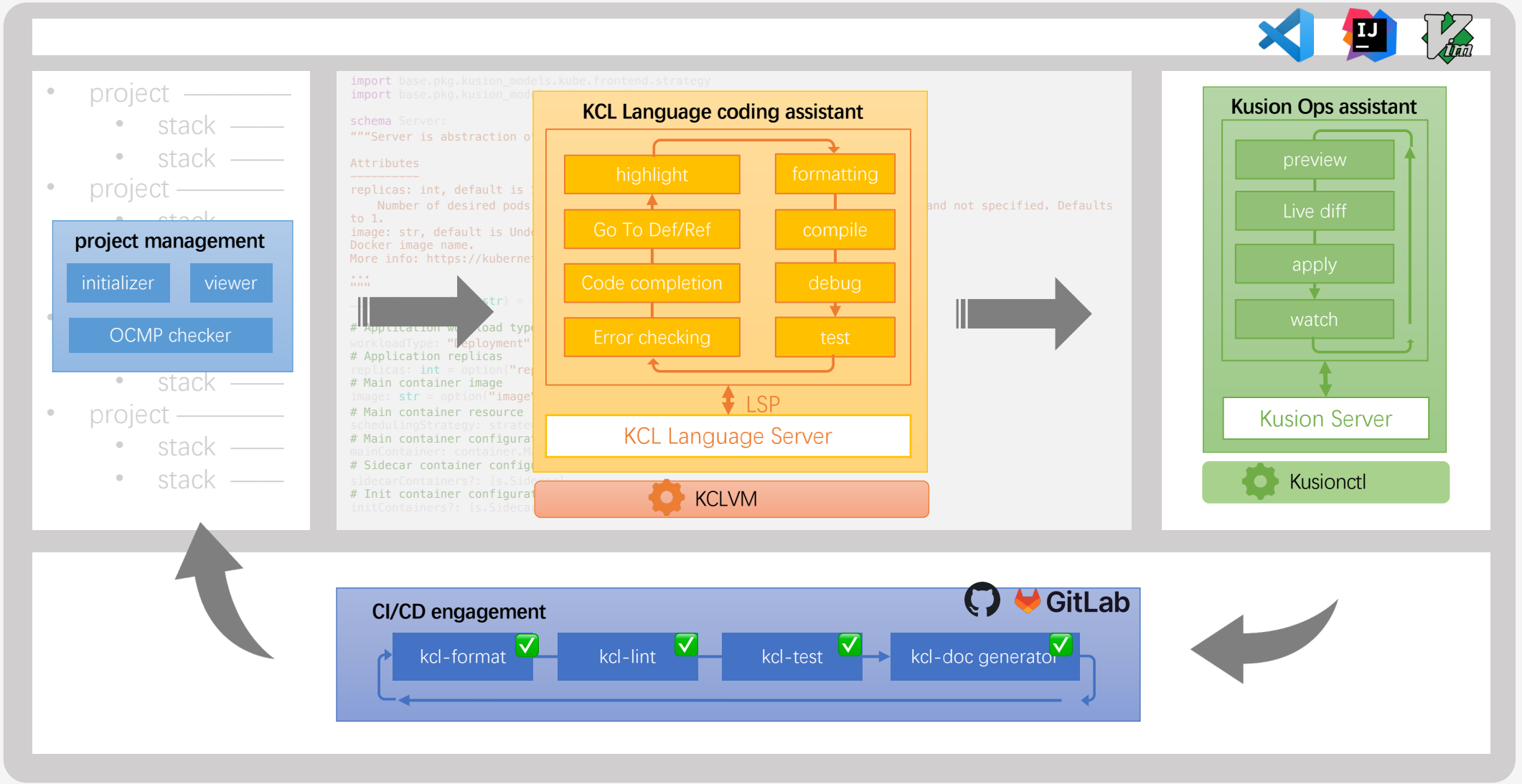
KCL Internal Graph Model

Weave key-value pairs into a graph



KCL Tools & IDE Workspace

Make Ops collaborative coding and work happy



Scene

Users of Kusionized DevOps

App Dev

Roles
- End user

Goals
- Deliver and ops my app easier
- On any desired env and cloud

Favors
- Implicit and app-oriented working interface and process above infrastructure details
- Minimal investment in learning and practice in infrastructure and operation details

Pain points
- Too many fragmented technologies, processes and user interfaces in deliver and ops
- Too many infrastructure-oriented details to learn
- Growing cloud platforms to use

SRE

Roles
- Enabler
- End user

Goals
- Keep infra and ops stable, measurable and manageable

Favors
- Participate directly in the work of platform design and construction to make the infrastructure more reliable and easy-to-use for app developers
- Deliver and manage apps that require high stability through easy-to-use tech and tools

Pain points
- Unable to directly participate in the construction of the platform
- Platform capabilities related to stability cannot be used by app developers faster

Platform Dev

Roles
- Provider & Enabler
- End user

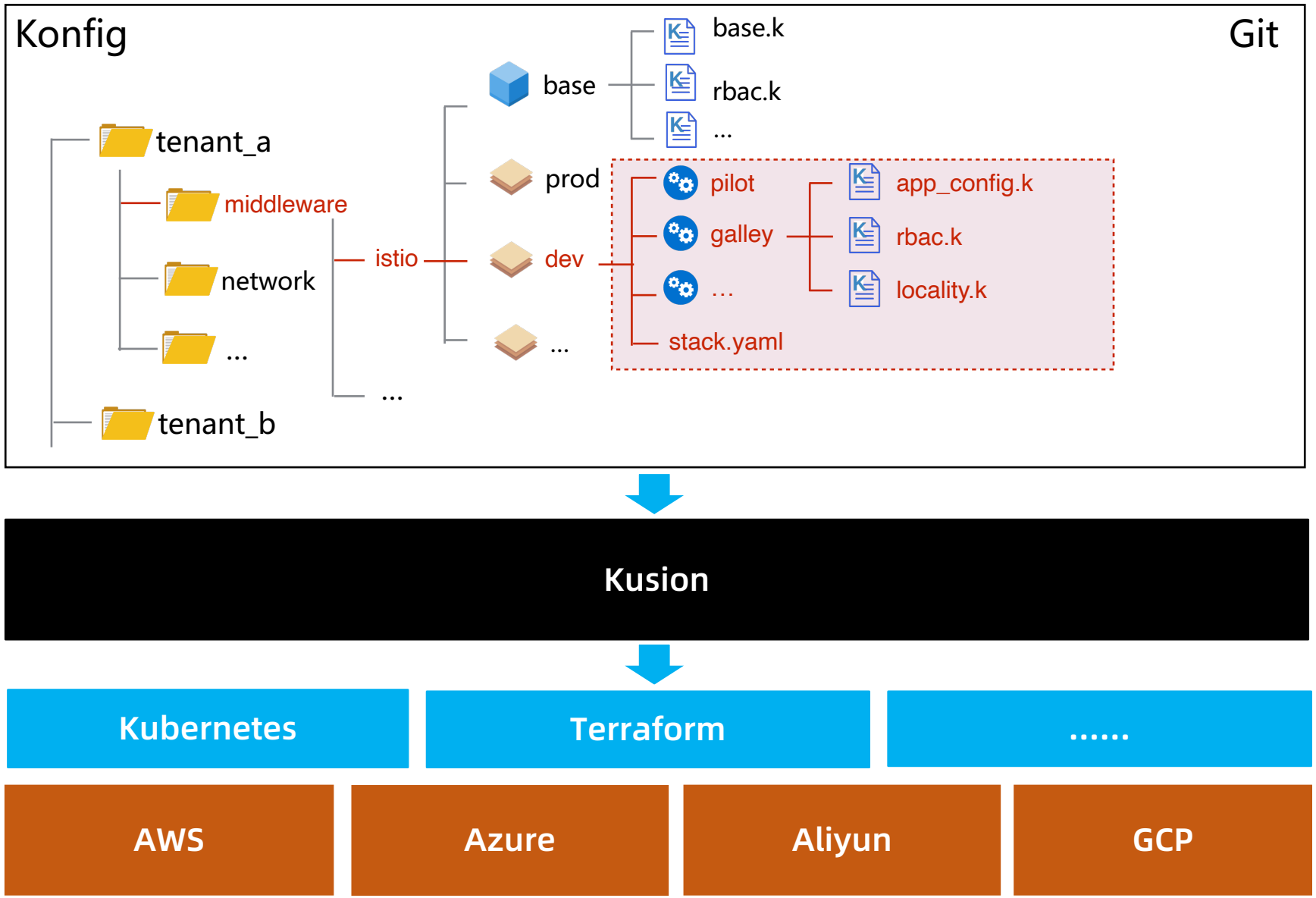
Goals
- Deliver my platform projects to multi-clouds
- Emancipate user-side productivity and reduce ops and service costs

Favors
- Application developers can use platform capabilities in a self-service way
- Deliver platform apps using lightweight and open-source tech and tools in an explicit way

Pain points
- Unable to invest more time in R&D due to user supporting
- Unable to make app developers to access platform capabilities in a uniform, stable and low-cost way

Multi-tenant, Multi- scenario, Multi-cloud

Centrally defined, globally delivery



Practice in AntGroup

Scaled

Ongoing app & infra delivery and ops

1500+

Projects

100+

Clusters

Practice

Efficiently enable business success

1K/day

Pipelines

10 K/day

KCL Compilations

1: 10

Plat: App Dev

6 scenarios

One-Stop

2 hours - 2 day

Feature Dev Period

300 - 400/day

Commits

Dev & SRE

Multi-Role DevOps

Hybrid cloud

Delivery

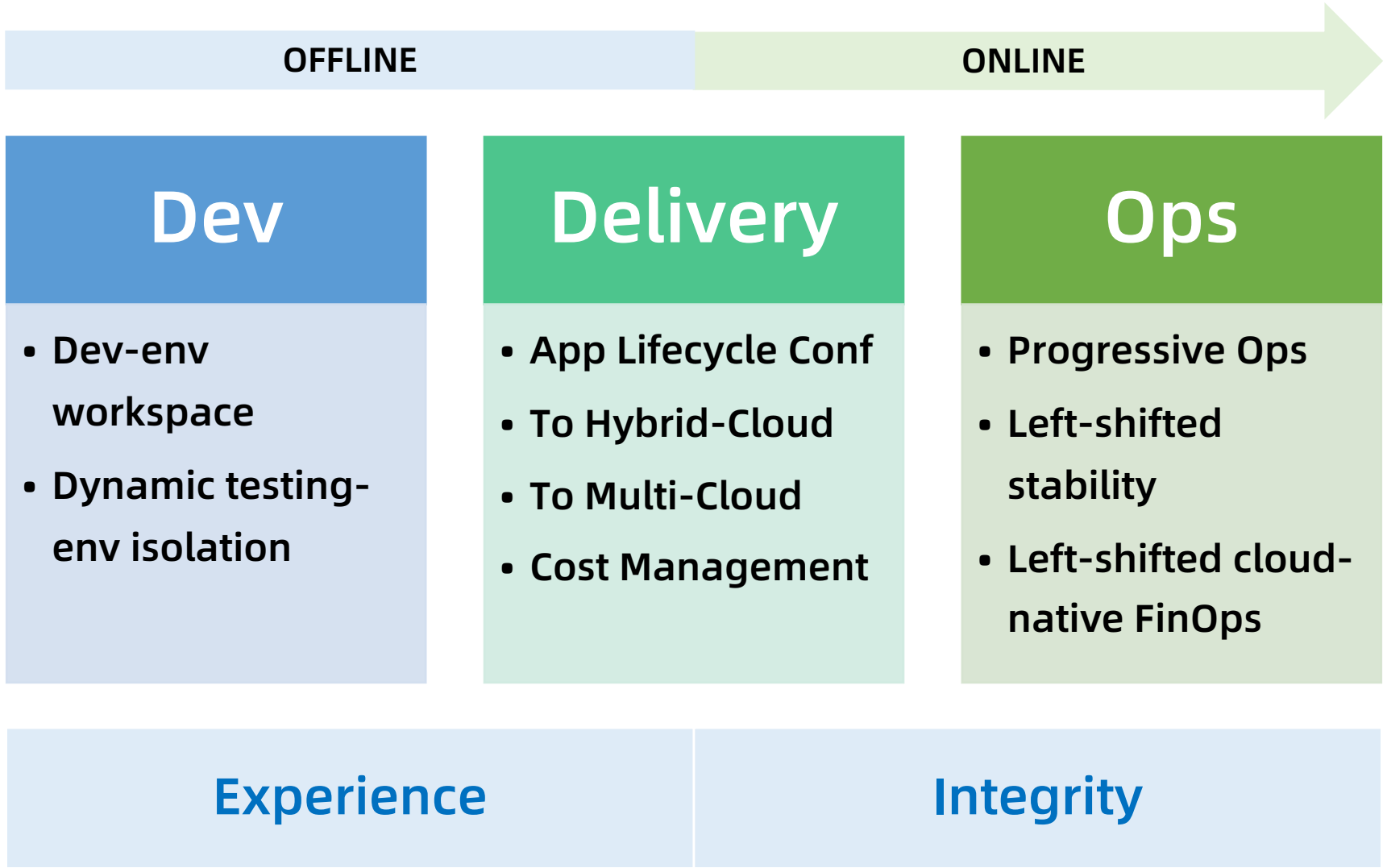
Culture

Precipitate engineer culture, share domain knowledge

~430	80000+	~18000	700000+
Contributors	Commits	PRs	KCL Code

Future

Scene


OFFLINE
ONLINE
Dev
Delivery
Ops
• Dev-env workspace
• Dynamic testing-env isolation
• App Lifecycle Conf
• To Hybrid-Cloud
• To Multi-Cloud
• Cost Management
• Progressive Ops
• Left-shifted stability
• Left-shifted cloud-native FinOps
Experience
Integrity

Tech Roadmap

KCL
- More Friendly for Dev
- Wider Ecological Integration
- Powerful Lang & Compiler Capabilities
- Advanced Technology Exploration

2022.9

v0.4.3

- Lang Simplification Stage 1
- KCL APIs by Rust
- Completely KCL Tools Support: lint, test, ...
- MThe Compiler Natively WASM execution

v0.7

- **Kusion (Resource):** Hybrid resource operation like Terraform and Kubernetes in an unified way
- **Kusion (Resource):** Kubernetes native resource health check
- **Quality :** Kusion E2E test framework

2022.12

v0.5

- Compiler Decorator Extension
- Policy & Flow Capability Enhancement
- Model Registry & Package Management
- More LSP Based IDEs
- Common Domain Language Programming Framework : Compiler-Base Stage 1

v0.8

- **Konfig (Model):** Support Aliyun ACK, ASM, Prometheus
- **Konfig (Toolbox):** Structure validation
- **Kusion (Resource):** Customimze resource health check
- **Security :** KCL Secret Management
- **IDE:** Kusion Operations Integration

2023.3

v0.6

- Lang Simplification Stage 2
- Reverse type inference
- Incremental compilation
- Multi Runtime/Backend

v0.9

- **Konfig (Model):** Support AWS EKS, App Mesh, AMP
- **Konfig (Toolbox):** Dependency analysis
- **Kusion (Operation):** Advanced workflow
- **Security:** Third-party KMS integration

2023.6

v0.7

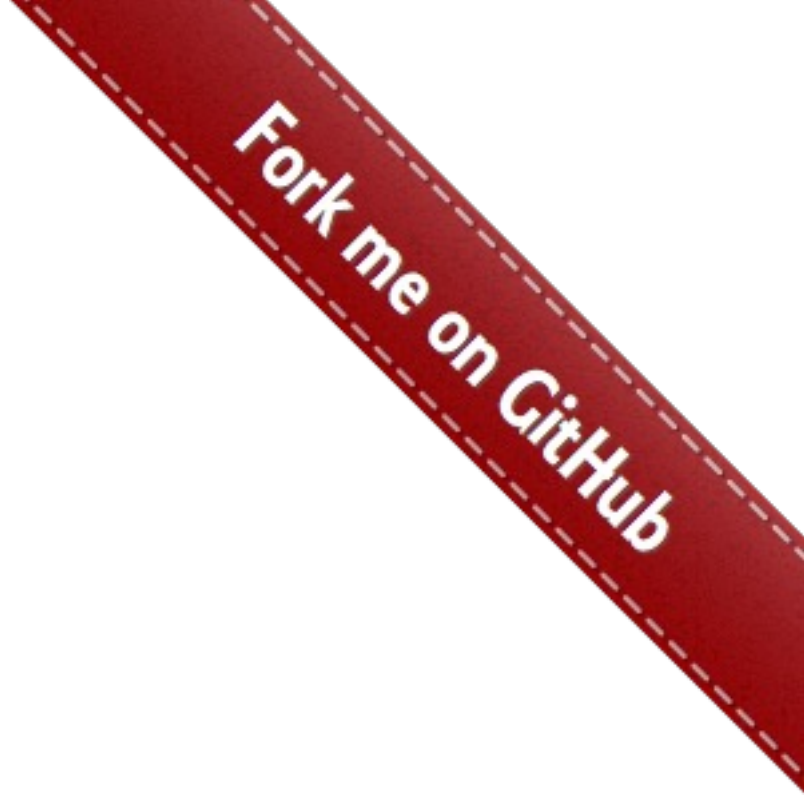
- CFG-Based KCL IR
- Garbage collector
- JIT Compiler
- Compiler-Base Stage 2

v0.10

- **Konfig (Model):** Support Aliyun ECS, SLB, RDS
- **Konfig (Toolbox):** Pipeline Notification
- **Kusion (Operation):** Progressive rollout
- **Kusion (Operation):** Login identity
- **Kusion (Operation):** Pre/Post Hook
- **Kusion (Operation):** Operation REST

Kusion & Konfig

Resources



- Web Site
  - https://kusionstack.io/

- Source Code
  - https://github.com/KusionStack/kusion
  - https://github.com/KusionStack/KCLVM
  - https://github.com/KusionStack/konfig

- Contact
  - https://github.com/KusionStack/community#contact
  - https://github.com/KusionStack/community

- Twitter
  - @KusionStack

Thank you

KusionStack Team