SOFASTACK™ KUBESPHERE

KUSION STACK

KusionStack 实践探秘

柴树杉（青河）

蚂蚁·可信原生技术部

大纲

- 你好, Nginx
- KCL: 配置编程化
- Kusion 技术架构
- 不同角色和最佳实践
- 蚂蚁内部实践
- 展望

01 你好, Nginx

K8s: Nginx 上云(main.yml)

- 通过 YAML 配置来编程配置参数
- YAML是机器友好和人友好的折中
- 但是YAML不利于复杂配置的管理和复用
- 云原生的刀耕火种时代(汇编语言)

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.14.2
        ports:
        - containerPort: 80
```

https://kubernetes.io/zh-cn/docs/concepts/workloads/controllers/deployment/

K8s: Nginx 上云(Kusion: main.k)

```
import base.pkg.kusion_models.kube.frontend

# Application Configuration
appConfiguration: frontend.Server {
    # Main Container Configuration
    mainContainer.ports = [
        {containerPort = 80}
    ]
    image = "nginx:1.7.8"
}
```

- 通过编程语言来输出配置参数
- 通过编程语言屏蔽K8S等后端差异
- 通过编程领域的技术优化复用和安全
- 云原生进入高级编程语言时代

https://kubernetes.io/zh-cn/docs/concepts/workloads/controllers/deployment/

02 | KCL: 配置编程化

KCL 配置语言设计目标


简单


稳定


协同编写


工程化


高性能

https://kusionstack.io/docs/user_docs/concepts/kcl-lang

KCL 配置编程化: 静态类型

SOFASTACK™ KUBESPHERE

```
schema Deployment:
    apiVersion: str = "apps/v1"
    kind: str = 123  # 类型错误

schema ContainerPort:
    name?: str  # 可选属性
    protocol: "TCP" | "UDP" | "SCTP" = "TCP"
    containerPort: int
```

KCL 配置编程化: 运行时检查（部署前）

SOFASTACK™ KUBESPHERE

```
schema App:
    domainType: "Standard" | "Customized" | "Global"
    containerPort: int
    volumes: [Volume]
    services: [Service]

    check:
        1 <= containerPort <= 65535, "containerPort must be between 1 and 65535"
        all service in services {
            service.clusterIP == "None" if service.type == "ClusterIP"
        }
        all volume in volumes {
            volume.mountPath not in ["/", "/boot", "/home", "dev", "/etc", "root"]
        }
```

KUSION STACK

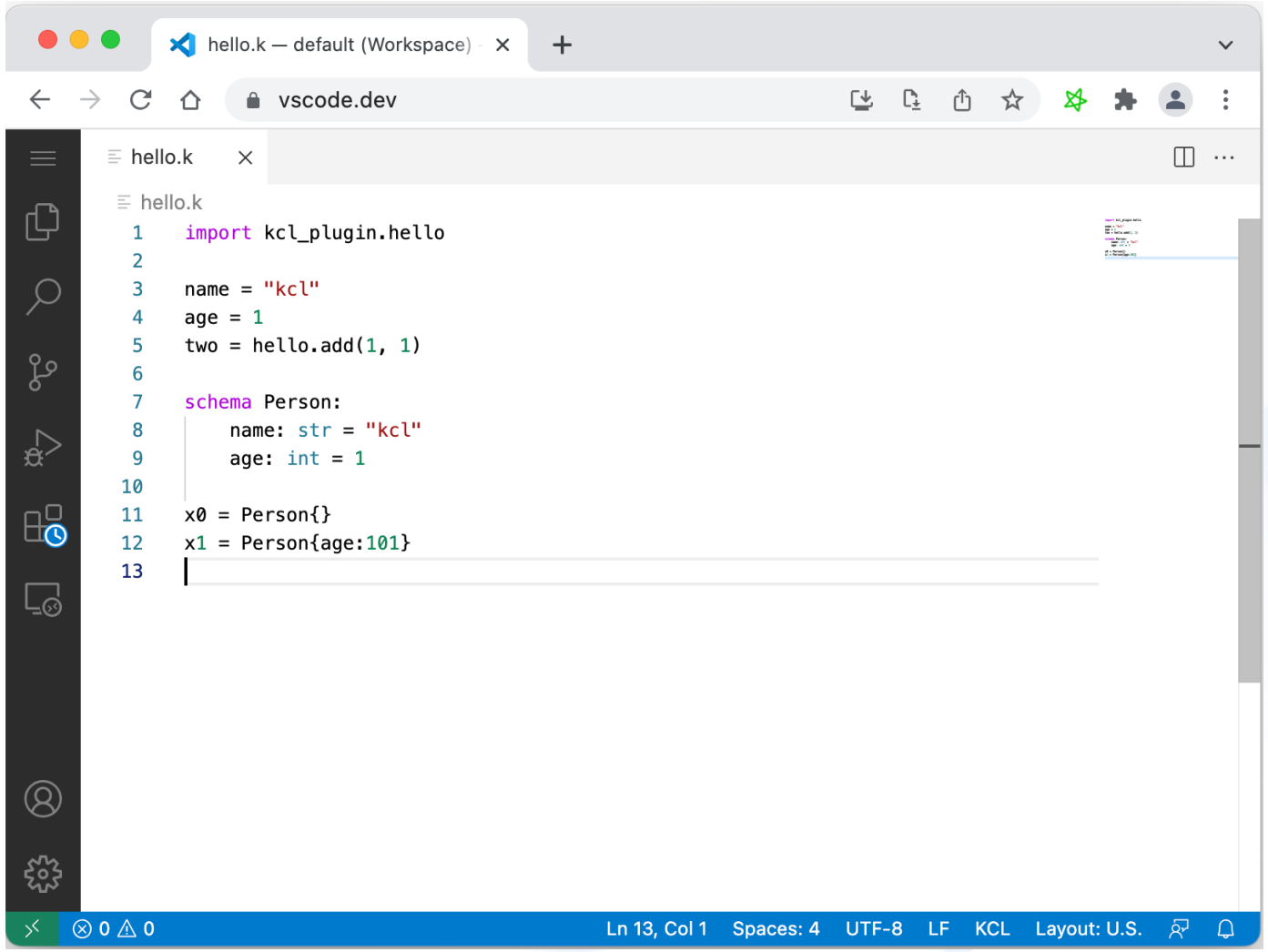
KCL 配置编程化: 成熟的配套工具

SOFASTACK™ KUBESPHERE

```
schema Person:
    name: str = "kcl"
    age: int = 1
```

```
schema TestPerson:
    a = Person {}
    assert a.name == 'kcl'

schema TestPerson_age:
    a = Person {}
    assert a.age == 1
```

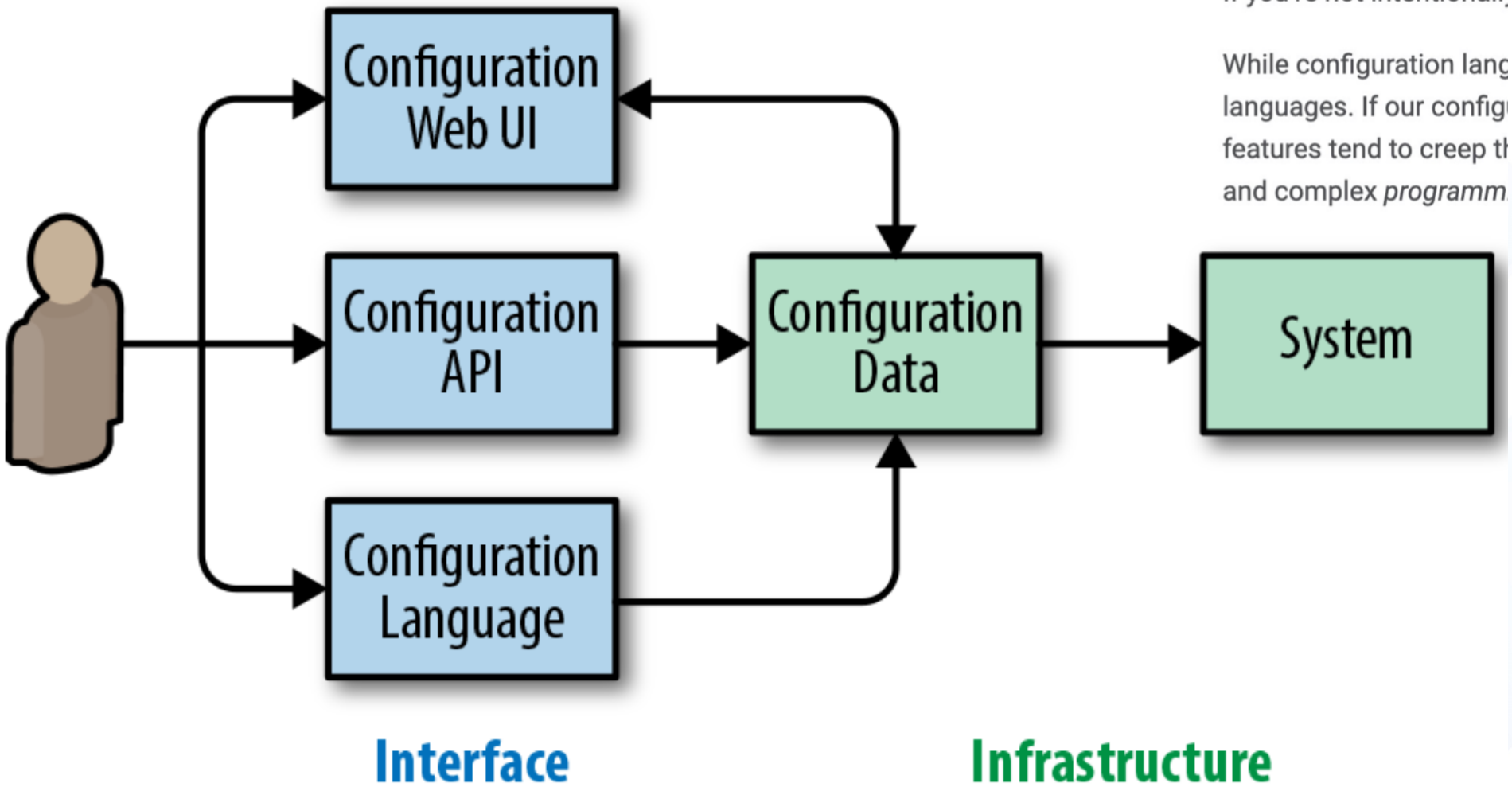


KUSION STACK

03 | Kusion技术架构

KUSION STACK

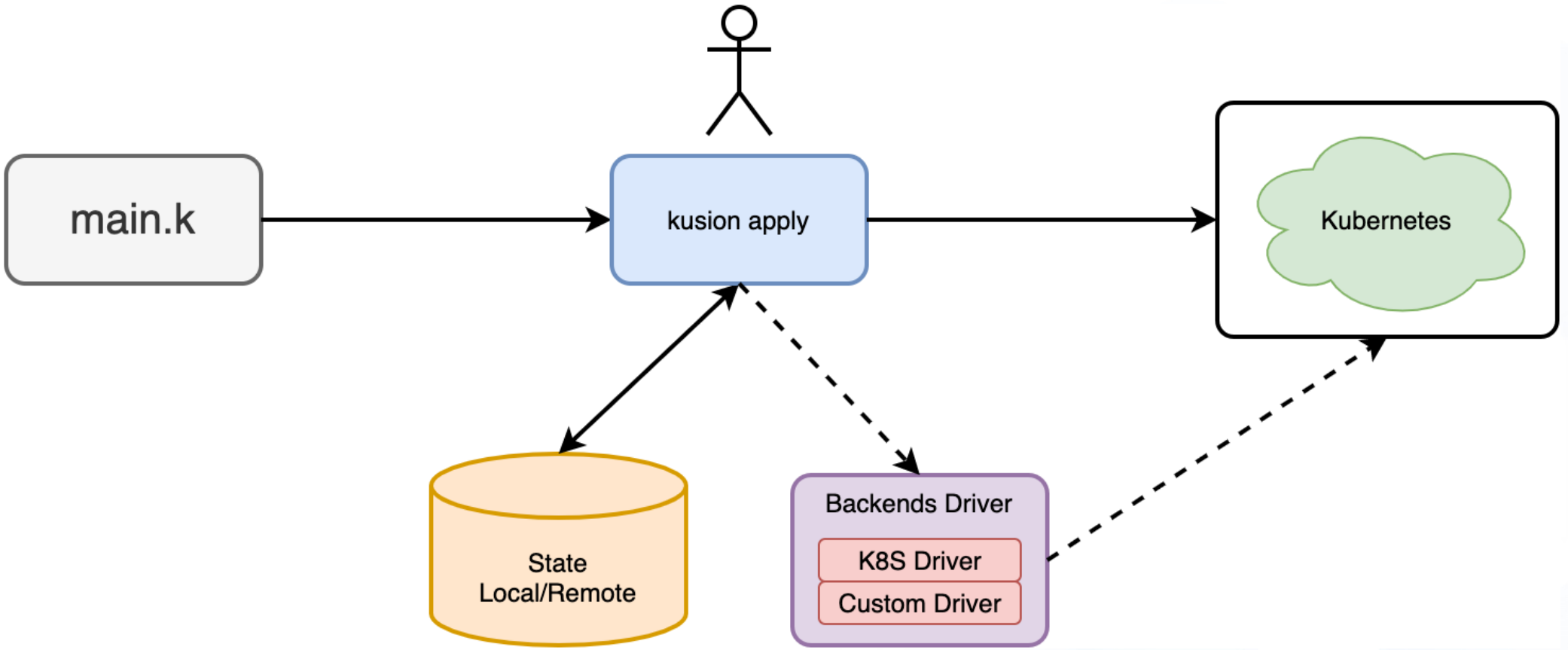
配置渲染流程（Google SRE Book）



If you're not intentionall

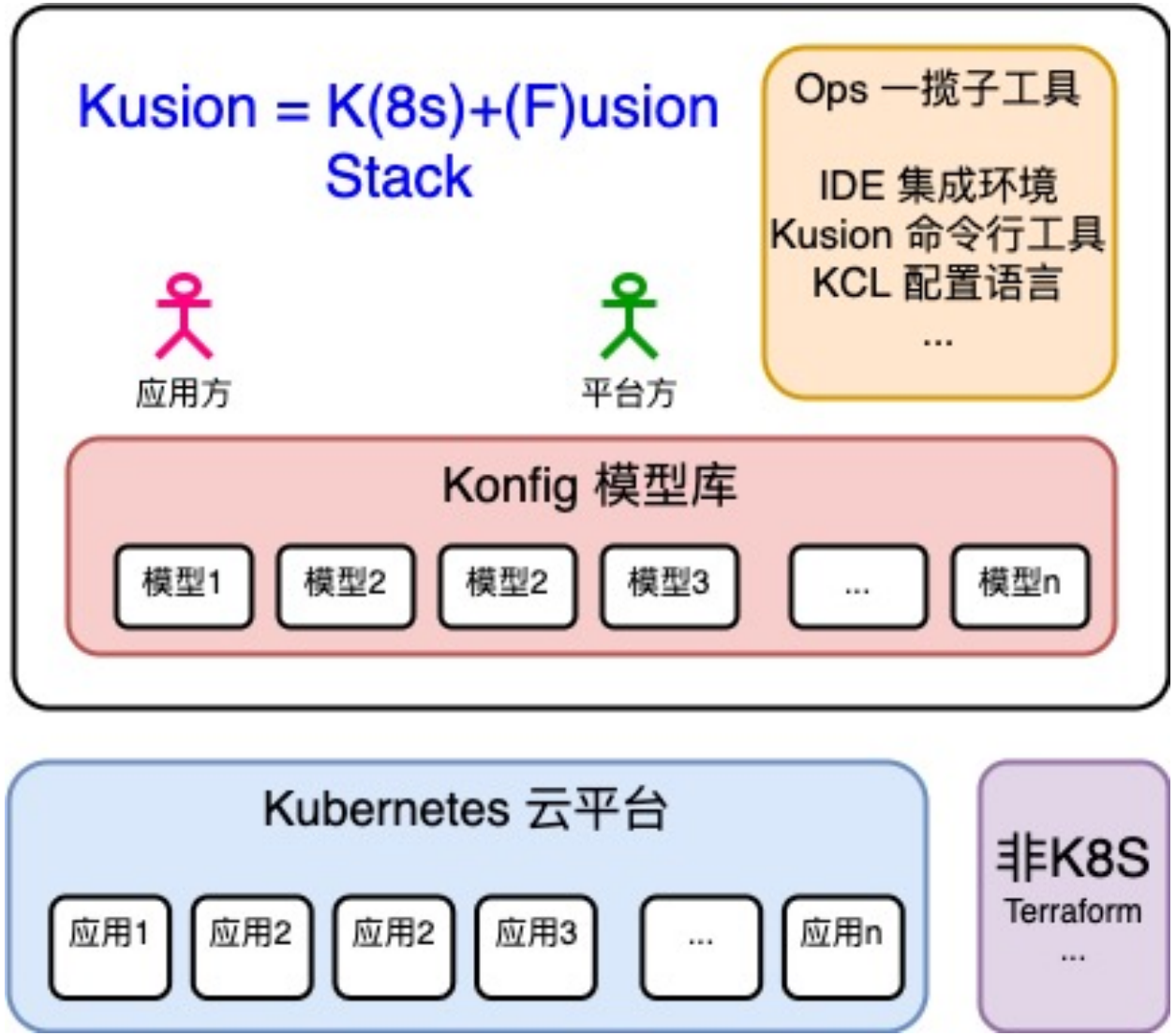
While configuration lang
languages. If our config
features tend to creep t
and complex *programm*

Kusion 命令执行流程



KCL 语言作为前端，解耦 app 模型；Kusion 引擎驱动解耦后端云平台！

Kusion = K8s + 融合一揽子 Ops 工具

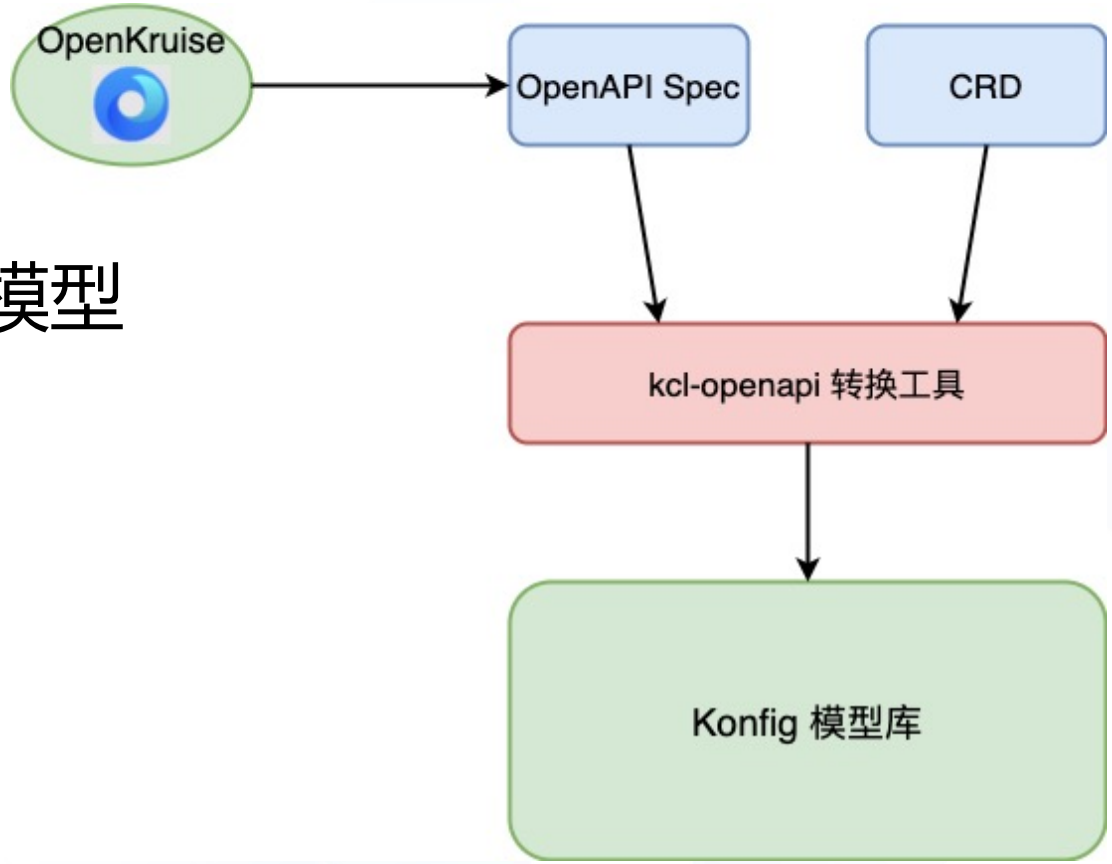


- **融合: 应用方+平台方, DevOps**
- **融合: 融合 K8S/TF 生态**
- **融合: 一揽子Ops工具**

- **Konfig模型库是统一工作平面**
- **建模是最核心的工作**

04 角色和实践

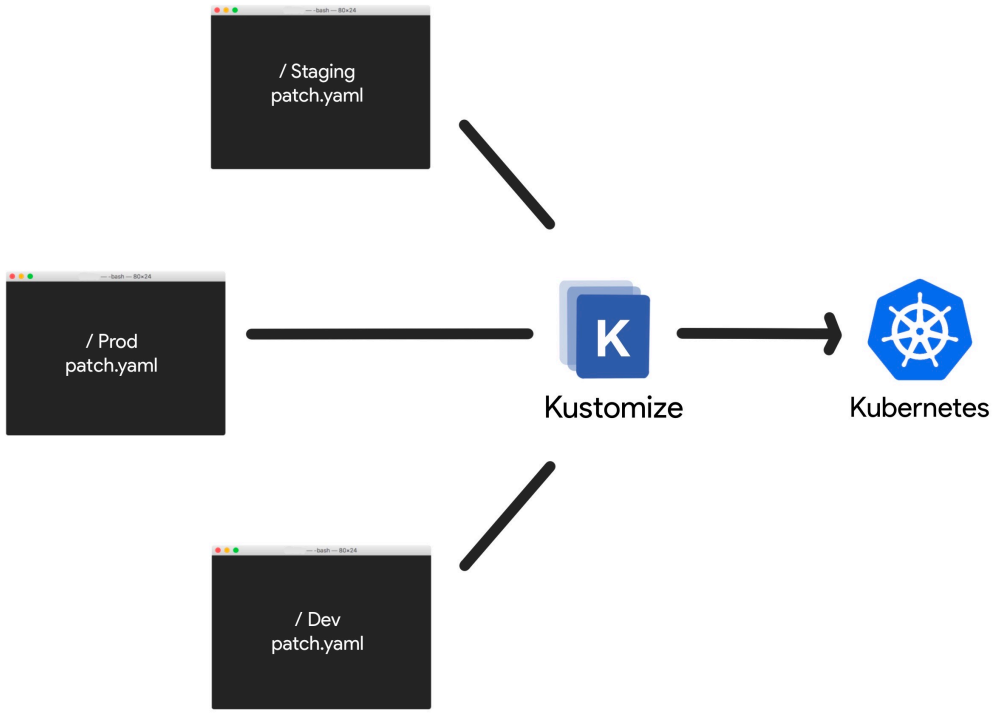
平台方: OpenKruise – @有赞

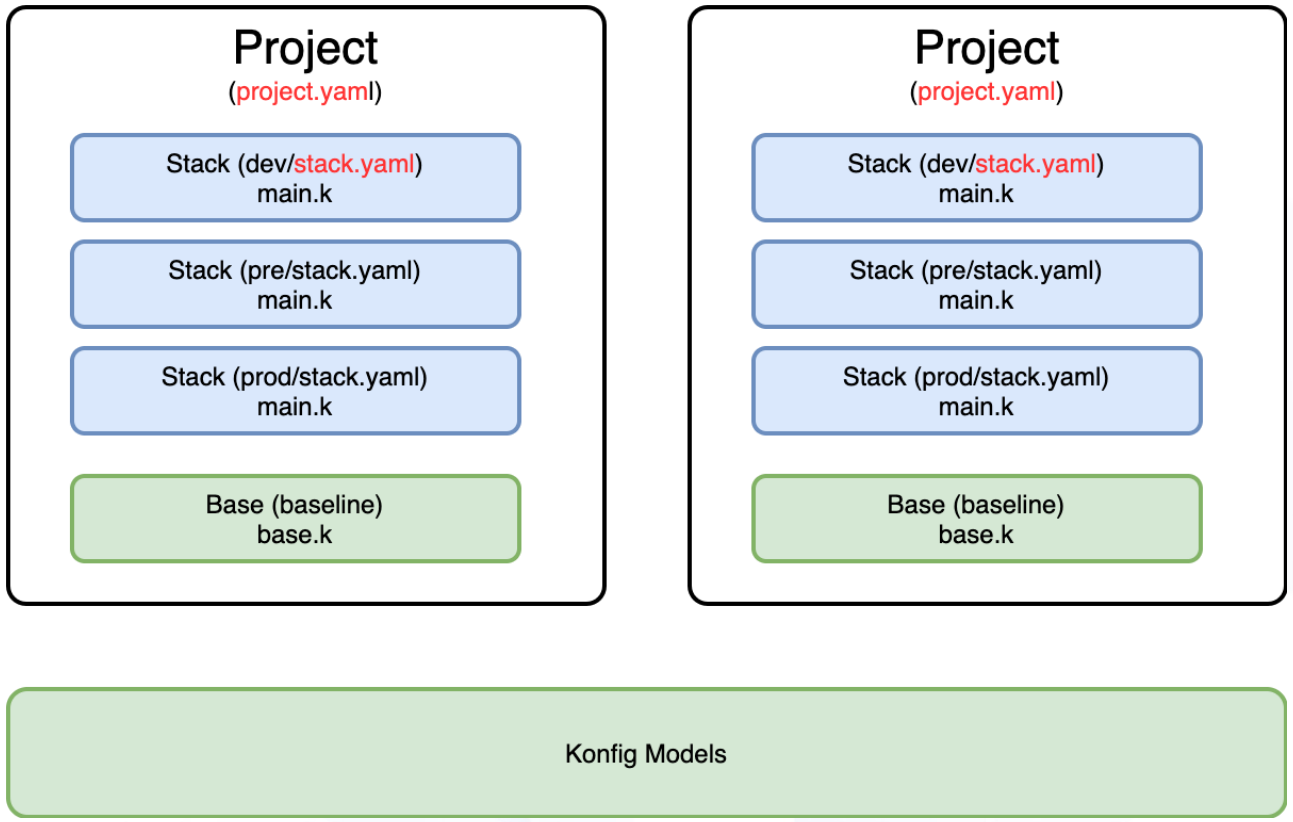


- Kcl-openapi 导入 OpenKruise 模型
- 平台方提供更多的功能给应用方

https://github.com/KusionStack/konfig/pull/13/files
https://github.com/openkruise/kruise/tree/v1.2.0/hack/gen-openapi-spec

应用方: Kustomize 基线实践





KCL 灵活的多语言配置方式天然支持 Project&Stack 这类最佳实践。
模板基线、Web 服务基线均可以通过 KCL 语言以及 Plugin 扩展实现。

协同开发配置-Mixin

```
schema ServerBackend[inputConfig: server.Server]:
    """ServerBackend converts the user-written front-end model `Server` into a
    collection of kubernetes resources and places the resource collection into
    the `kubernetes` attribute.
    """
    mixin [
        # Resource builder mixin
        mixins.NamespaceMixin,
        mixins.ConfigMapMixin,
        mixins.SecretMixin,
        mixins.ServiceMixin,
        mixins.IngressMixin,
        mixins.ServiceAccountMixin,

        # Monitor mixin
        pod_monitor_mixin.PodMonitorMixin,
        mixins.OutputTypeMixin
    ]
```

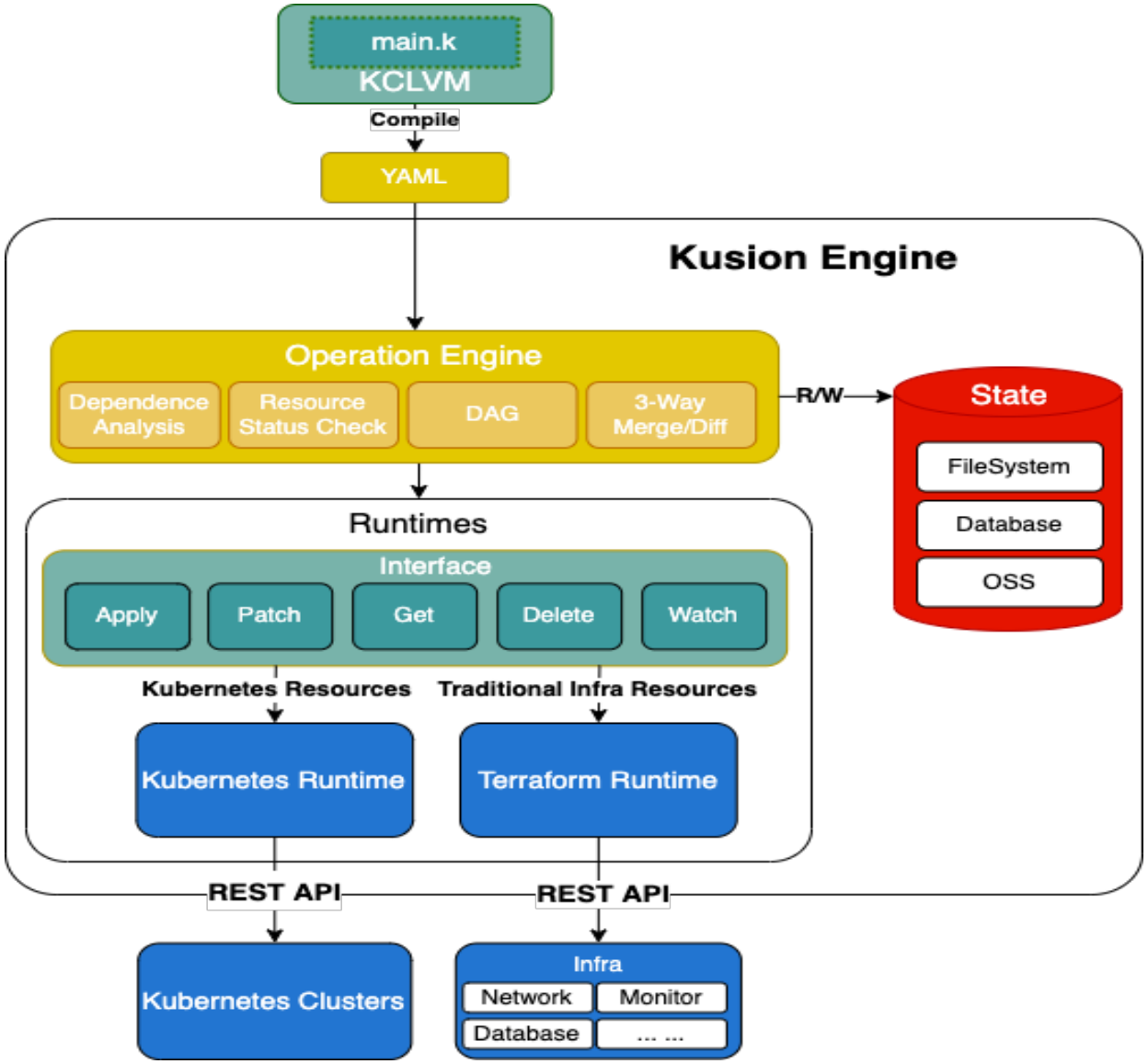
- 不同团队维护自己领域配置
- 通过 Minx 特性聚合不同类配置
- 通过协同配置合并同类配置
- 使用者按需 Mixin

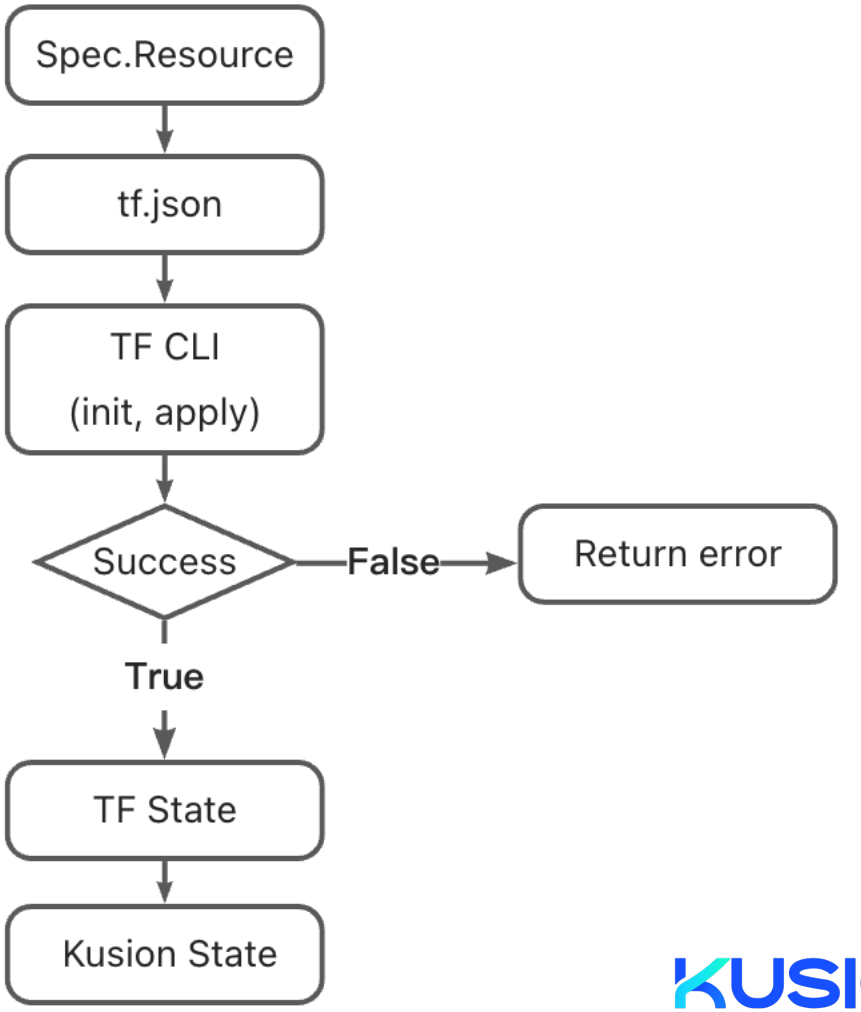
通过自动化提效

- 通过Kusion引擎提供API服务
- DevOps通过集成API服务自动化(比如更新image)
- 在蚂蚁内部, 很多 PR 是机器人提交的

05 内部实践

Kusion引擎(下半年开源)





Practice (Up to 2022.7.31)

SOFASTACK™ KUBESPHERE

10+
AppConfiguration

100+
日均配置变更评审
（MR）

350+
贡献者

1,500+
Project

50,000+
主干配置代码提交
（Commit）

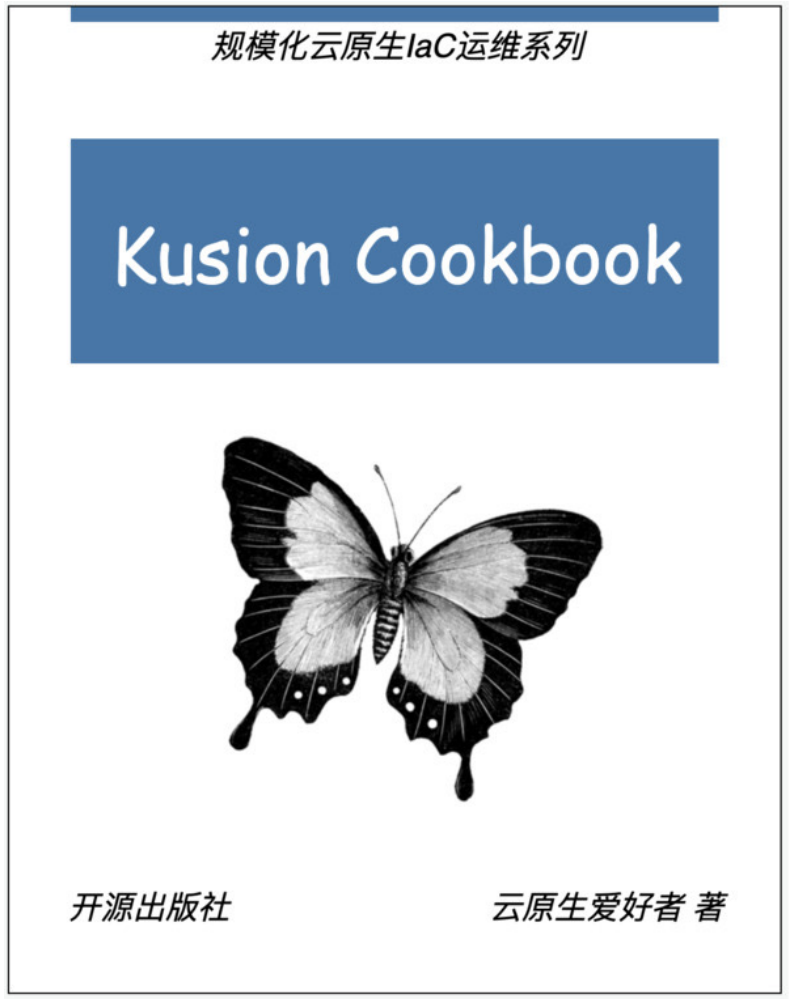
450,000+
KCL 代码

KUSION STACK

Practice (Up to 2022.7.31)

06 展望

社区共建



- 社区共建完善文档、案例
- Konfig更丰富的模型库
- Kusion功能改进和完善

- https://github.com/KusionStack/kusion
- https://github.com/awesome-kusion

Thank You

柴树杉(青河)

蚂蚁·可信原生技术部