CCTC 2017 中国云计算技术大会
Cloud Computing Technology Conference 2017
CSDN

中国移动PaaS平台技术选型和实践经验分享

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关于我们

中国移动苏州研发中心

- 中国移动全资子公司，注册资本**7**亿，园区占地**480**亩，建筑面积**36**万平方米
- 现有正式员工**700余**人，硕士以上占**73%**，研发人员**86%**，远期规模**4500**人
- **云计算**、**大数据**、**IT支撑系统**以及**部分应用**产品等开发和应用
- 中国移动IT能力内化和业务创新发展的中坚力量
- 已负责总部一级私有云、公有云、性能管理、云化OA等一级平台的建设工作，助力集团加快IT系统1+N两级架构的集中化进程，促进研发运营一体化。

openstack FOUNDATION
GOLD MEMBER

开源

推进开源合作，解决社区Bug并回馈社区：2016主流开源项目贡献超过250个补丁。Openstack社区贡献**国内前10**，全球黄金会员、中国首个 OpenStack SuperUser；Ceph社区贡献**社区第4**；Linux基金会银牌会员，**国内贡献前5**。

内外部奖励

双奖：“科技进步与业务服务创新奖励评选”情况：苏州研发中心获得科技进步类**一等奖1项**（2016），**二等奖1项**（2015），**三等奖2项**（2016）。其中一等奖项目“基于开源社区的定制化Linux操作系统应用与推广”得到李正茂副总裁和与会专家领导的高度评价。

外部奖励：中国通信学会科学技术奖（2014）**二等奖1项**；中国电子学会科学技术奖（2016）**三等奖1项**

中国移动为中国工商银行IT架构转型提供云计算解决方案

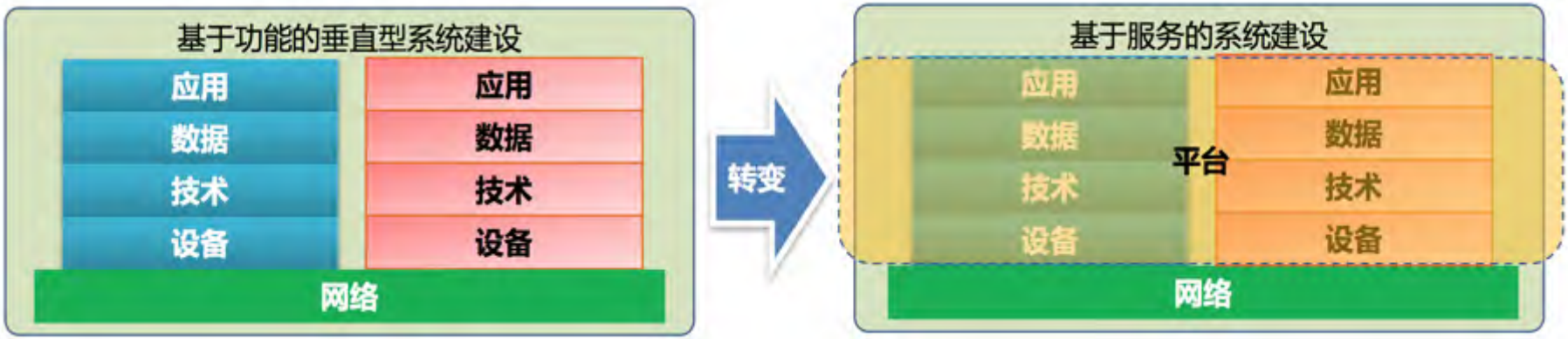
NEW

听众收获

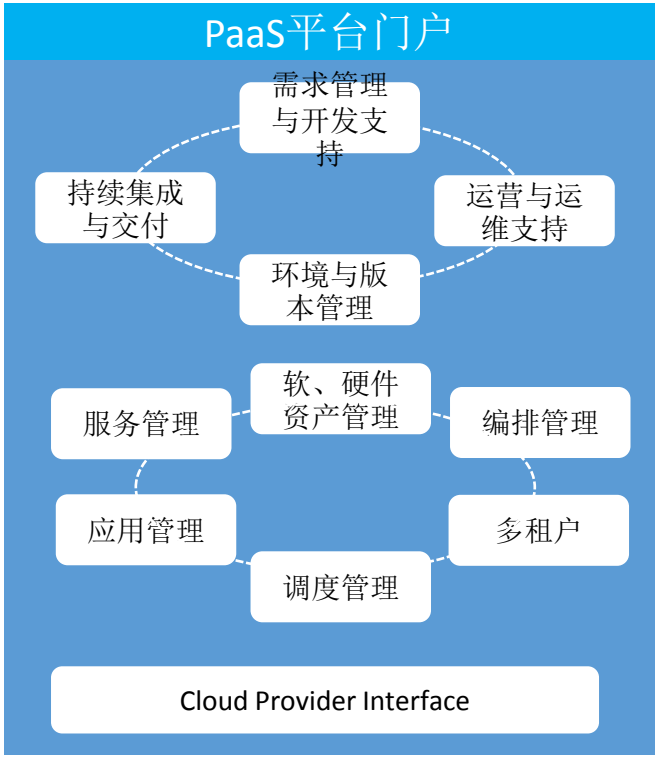
- PaaS技术选型关注点
- 如何构建弹性PaaS？
- 如何丰富PaaS能力、服务？
- 如何在PaaS上共享应用？
- PaaS对开发的支持
- 在实践中碰到的一些不常见的问题

背景

- 公司各大业务系统长期独立规划与建设；
- 长期没有自主的IT研发团队导致开发商较多，架构不统一；
- 应用烟囱式的架构，巨石应用、孤岛系统普遍存在；
- 缺少对公共能力的抽象和复用，造成系统功能重复建设；
- 互联化新常态，“秒杀”、“抢红包”对架构和应用的冲击；



PaaS平台功能



中间件服务

数据服务

大数据服务

能力集成服务

物理机/高性能虚拟机

PaaS功能视图（部分）

Kubernetes + OpenStack

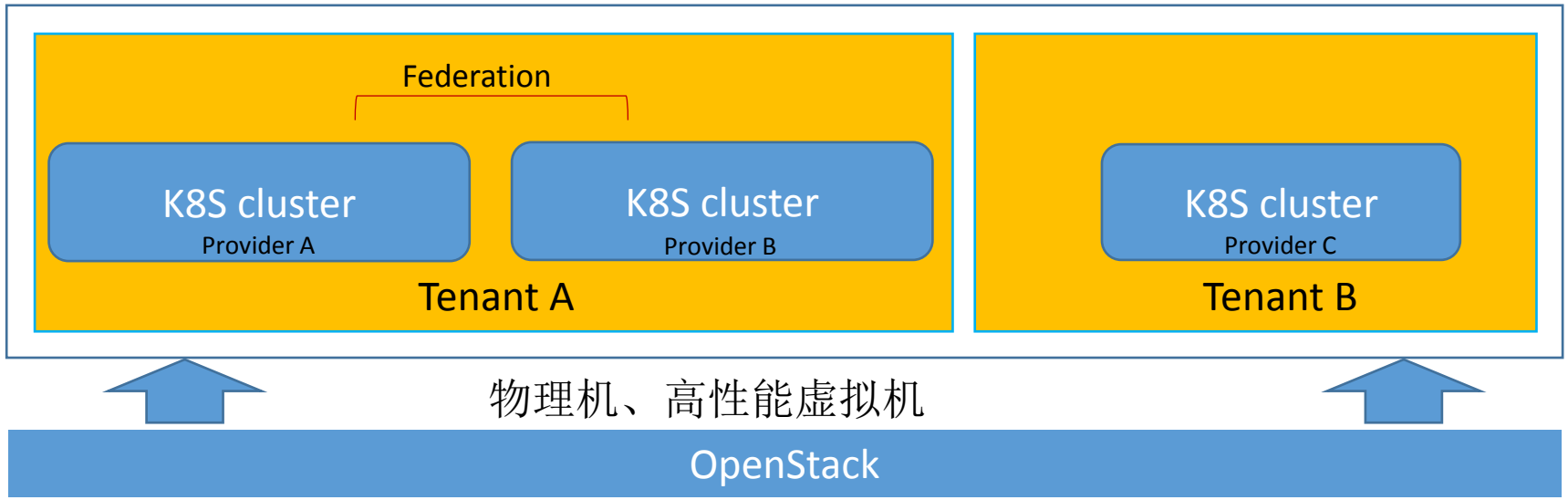
- 社区活跃，支持力度大，Commits: 48,109　1,190 contributors；
- Kubernetes vs Mesos+Marathon；
- Why OpenStack ；
- 使用习惯和特定场景；

https://git.kernel.org/cgit/linux/kernel/git/davem/net-next.git/commit/?id=56ab6b93007e5000a8812985aec1833c4a6a9ce0
https://git.kernel.org/cgit/linux/kernel/git/davem/net-next.git/commit/?id=1946e672c173559155a3e210fe95dbf8b7b8ddf7
https://git.kernel.org/cgit/linux/kernel/git/davem/net-next.git/commit/?id=fee83d097b1620530f23bf6063f4ea251ba9c8c7

机制

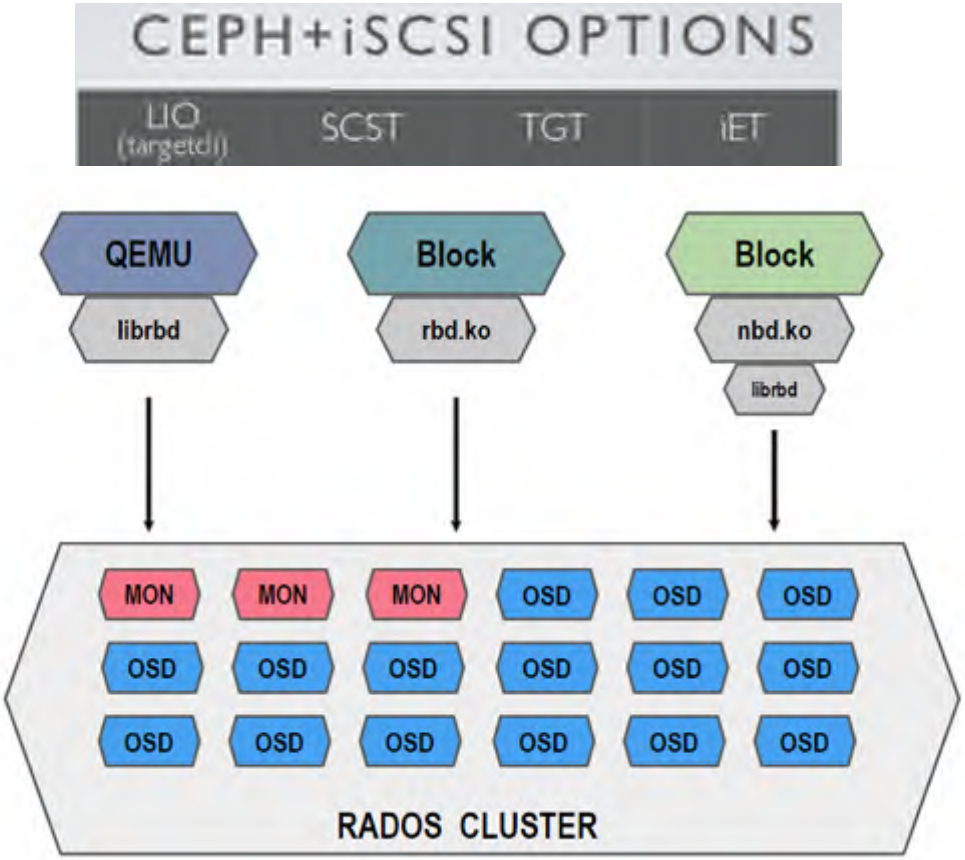
- 弹性计算：Cloud Provider Interface
- 服务目录：Service Catalog
- 应用目录：Application Catalog

- 多租户、多集群、存储、日志、网络等

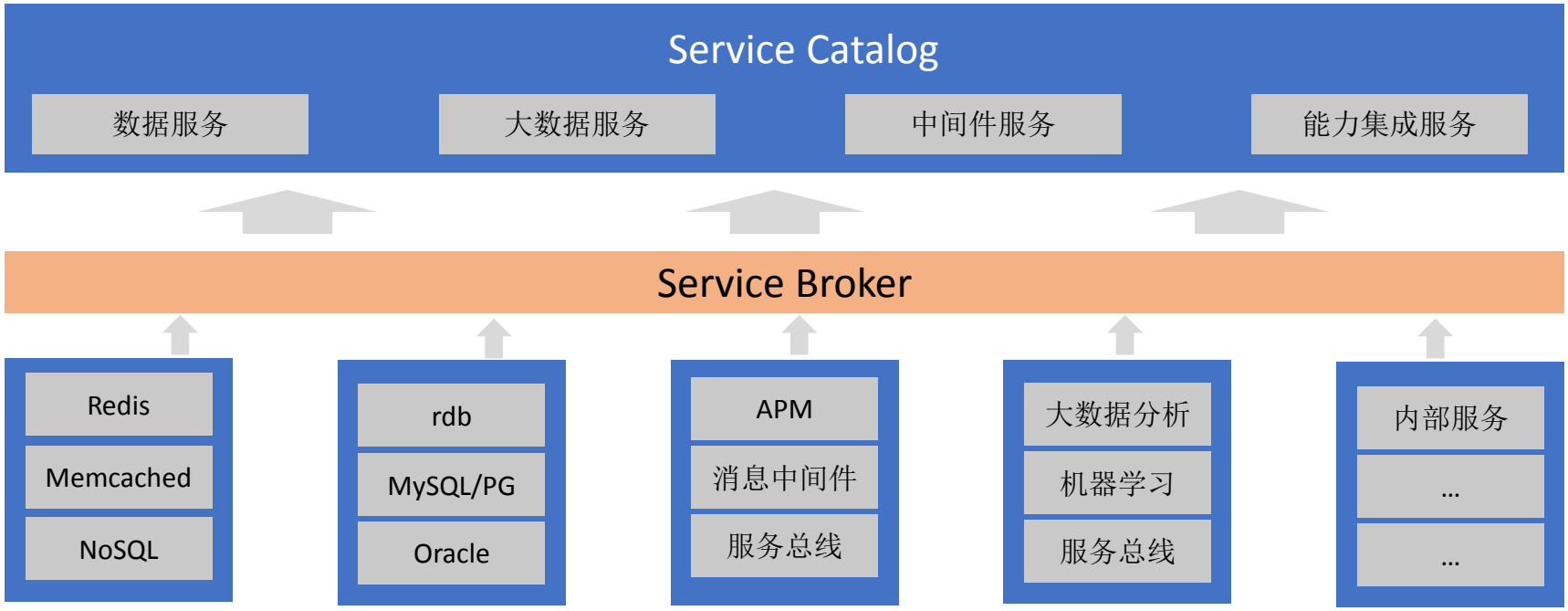



```
type Interface interface {
    LoadBalancer() (LoadBalancer, bool)
    Instances() (Instances, bool)
    Zones() (Zones, bool)
    Clusters() (Clusters, bool)
    Routes() (Routes, bool)
    ProviderName() string
    ScrubDNS(nameservers, searches []string) (nsOut, srchOut []string)
}
```

OpenStack Cinder + Ceph + iSCSI

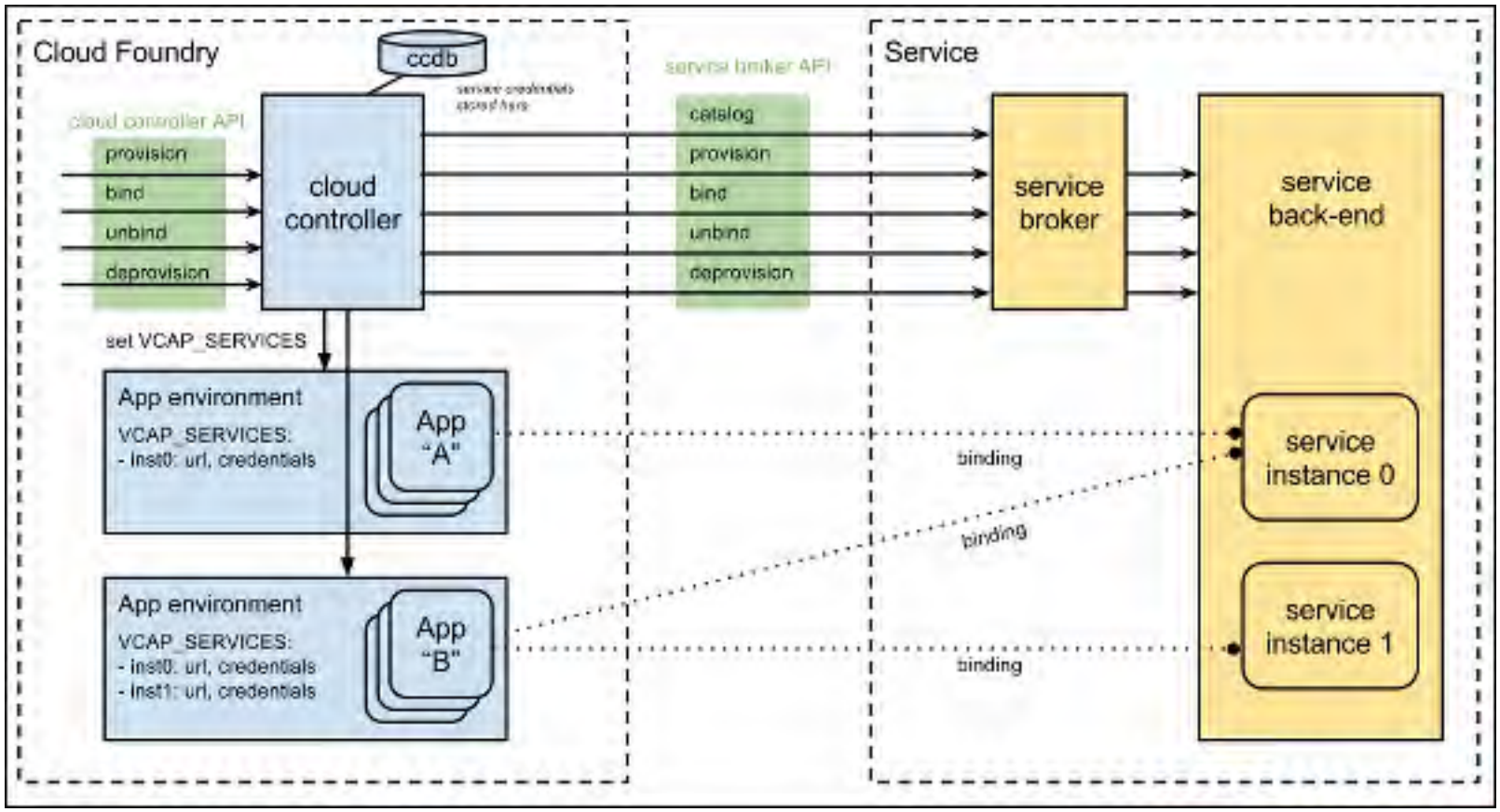


Service Catalog



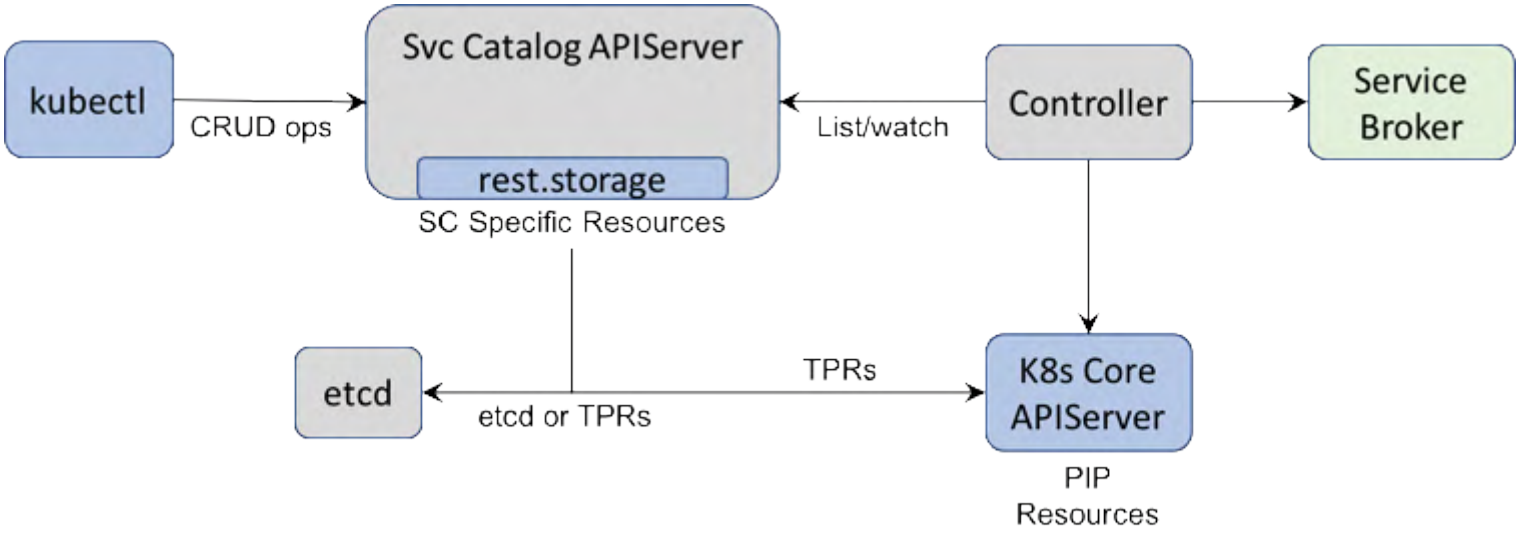

```
type Catalog interface {
    GetCatalog() (*Catalog, error)
}

type Instance interface {
    CreateServiceInstance()
    UpdateServiceInstance()
    DeleteServiceInstance()
}

type Binding interface {
    CreateServiceBinding()
    DeleteServiceBinding()
}
```

Service Catalog



https://docs.cloudfoundry.org/services/overview.html

Service Catalog（社区）



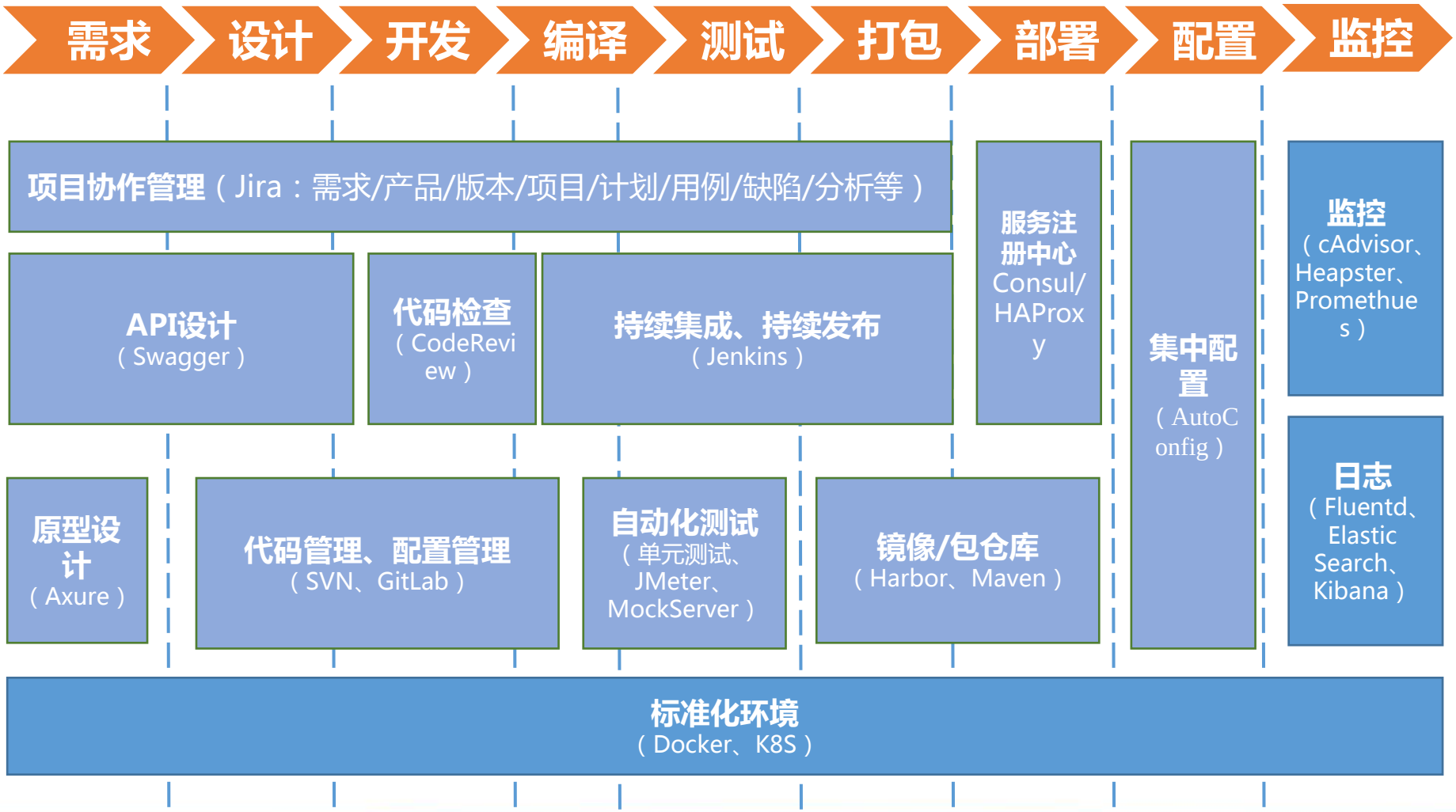
https://github.com/kubernetes-incubator/service-catalog

Application Catalog

Application Catalog ≠ Service Catalog

```
wordpress/
  Chart.yaml          # A YAML file containing information about the chart
  LICENSE             # OPTIONAL: A plain text file containing the license for the chart
  README.md           # OPTIONAL: A human-readable README file
  values.yaml         # The default configuration values for this chart
  charts/             # OPTIONAL: A directory containing any charts upon which this chart depends.
  templates/          # OPTIONAL: A directory of templates that, when combined with values,
                      # will generate valid Kubernetes manifest files.
  templates/NOTES.txt # OPTIONAL: A plain text file containing short usage notes
```

API开发领域需要提供服务能力：

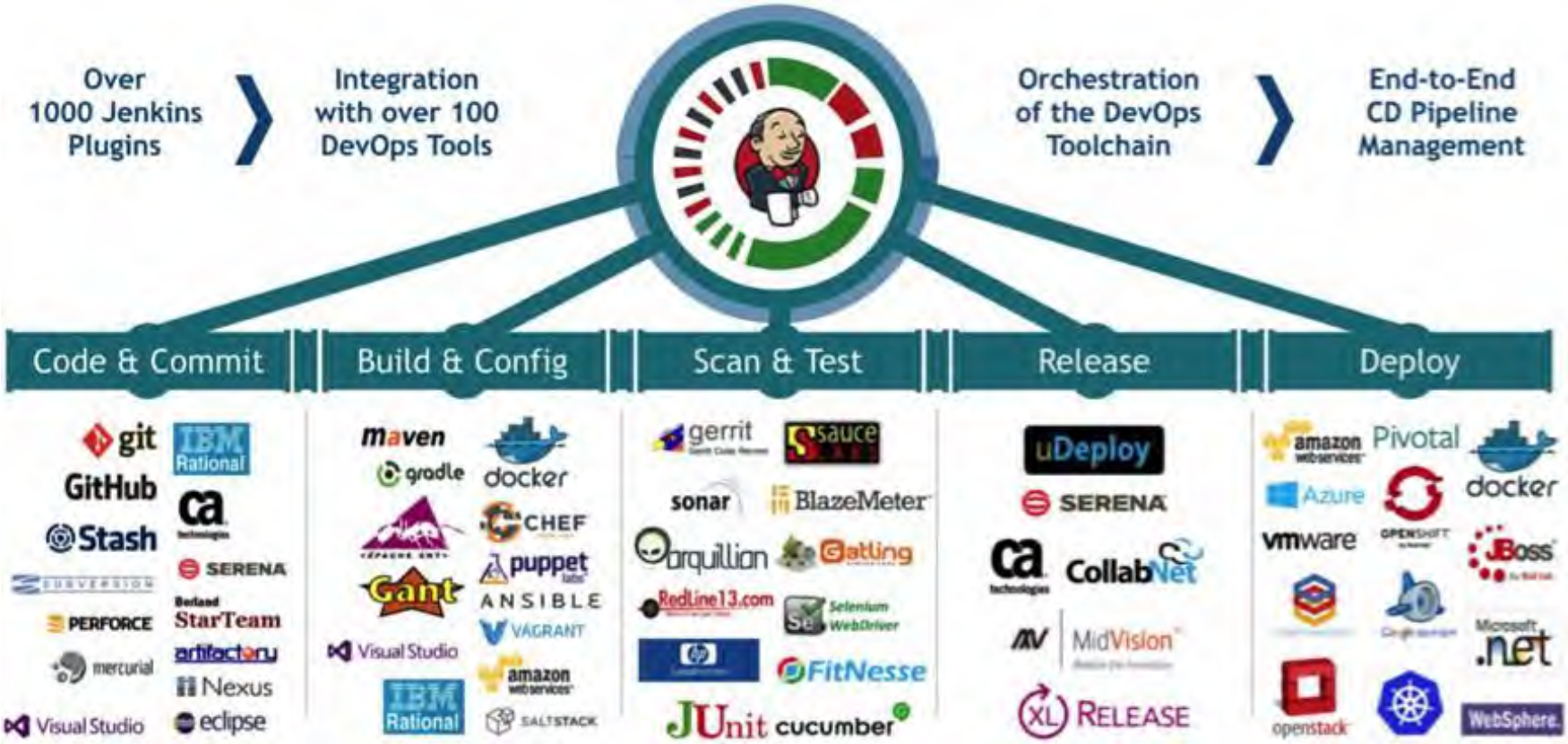


开发框架比较与选型

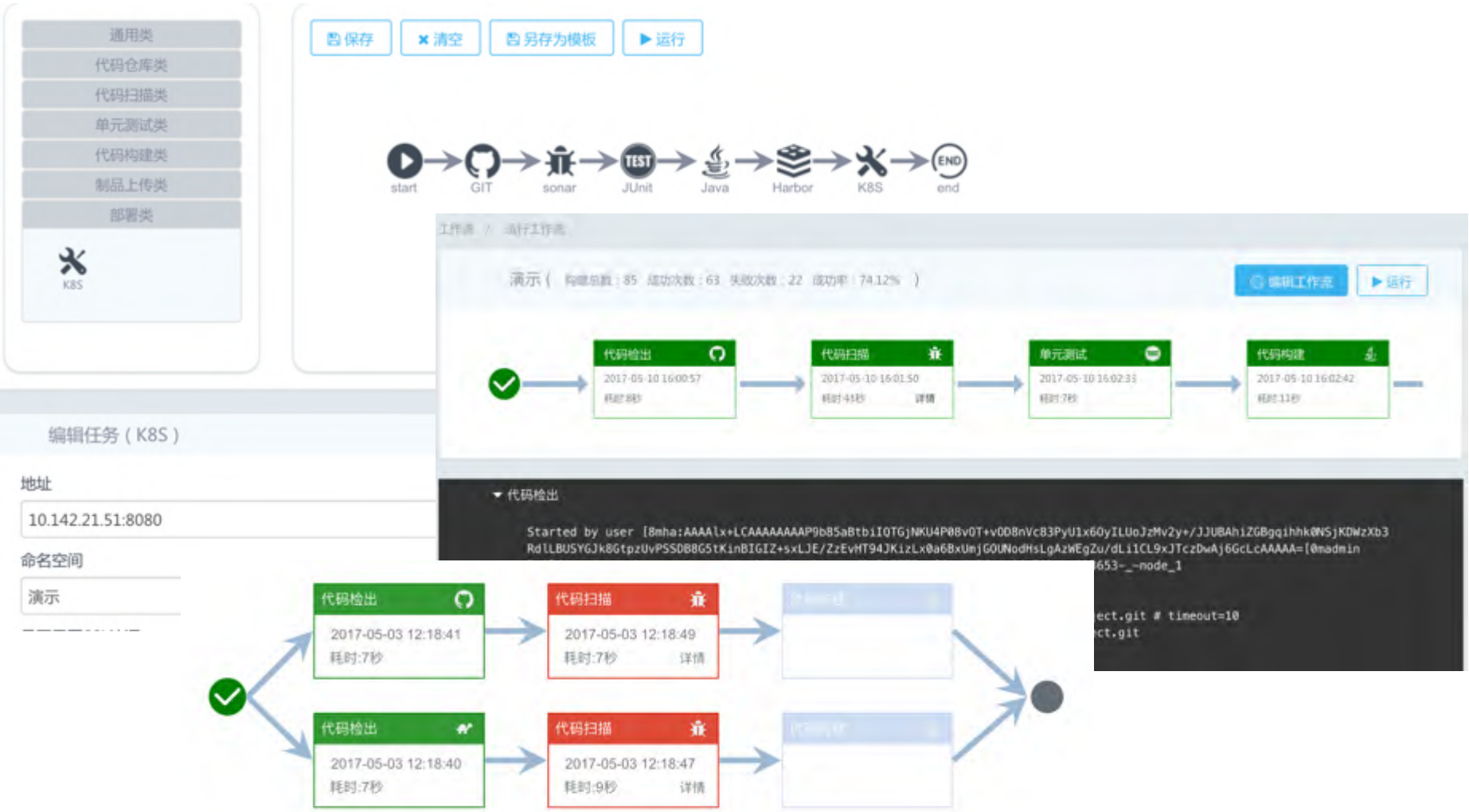
Microservices Concern	Spring Cloud & Netflix OSS	Kubernetes
Configuration Management	Config Server, Consul, Netflix Archaius	Kubernetes ConfigMap & Secrets
Service Discovery	Netflix Eureka, Hashicorp Consul	Kubernetes Service & Ingress Resources
Load Balancing	Netflix Ribbon	Kubernetes Service
API Gateway	Netflix Zuul	Kubernetes Service & Ingress Resources
Service Security	Spring Cloud Security	-
Centralized Logging	ELK Stack (LogStash)	EFK Stack (Fluentd)
Centralized Metrics	Netflix Spectator & Atlas	Heapster, Prometheus, Grafana
Distributed Tracing	Spring Cloud Sleuth, Zipkin	OpenTracing, Zipkin
Resilience & Fault Tolerance	Netflix Hystrix, Turbine & Ribbon	Kubernetes Health Check & resource isolation
Auto Scaling & Self Healing	-	Kubernetes Health Check, Self Healing, Autoscaling
Packaging, Deployment & Scheduling	Spring Boot	Docker/Rkt, Kubernetes Scheduler & Deployment
Job Management	Spring Batch	Kubernetes Jobs & Scheduled Jobs
Singleton Application	Spring Cloud Cluster	Kubernetes Pods

Strengths	Spring Cloud	Weaknesses
Unified programing model with Spring framework		Main functionality limited to Java platform
Feature rich collection of Java libraries		Lot's of responsibility for Java devs and the application stack
Well integrated Java libraries		Does not cover full microservices life cycle
Strengths	**Kubernetes**	**Weaknesses**
Polyglot and generic platform based on containers		A generic platform with coarse grained primitives
Covers full microservices life cycle		Operations focused platform
Cutting edge technology and large community		Actively developed and rapidly changing

持续集成


Over 1000 Jenkins Plugins
Integration with over 100 DevOps Tools
Orchestration of the DevOps Toolchain
End-to-End CD Pipeline Management
Code & Commit
Build & Config
Scan & Test
Release
Deploy
git
GitHub
Stash
SERENA
PERFORCE
mercurial
Visual Studio
IBM Rational
ca
Borland StarTeam
artifactory
Nexus
eclipse
maven
gradle
Gant
Visual Studio
docker
CHEF
puppet
ANSIBLE
VAGRANT
amazon web services
SALTSTACK
gerrit
sonar
Orquillion
Redline13.com
FitNesse
JUnit
cucumber
sauce
BlazeMeter
Gatling
Selenium WebDriver
uDeploy
SERENA
CollabNet
MidVision
RELEASE
amazon web services
Pivotal
Azure
vmware
docker
JBoss
Microsoft .net
openstack
WebSphere

持续集成

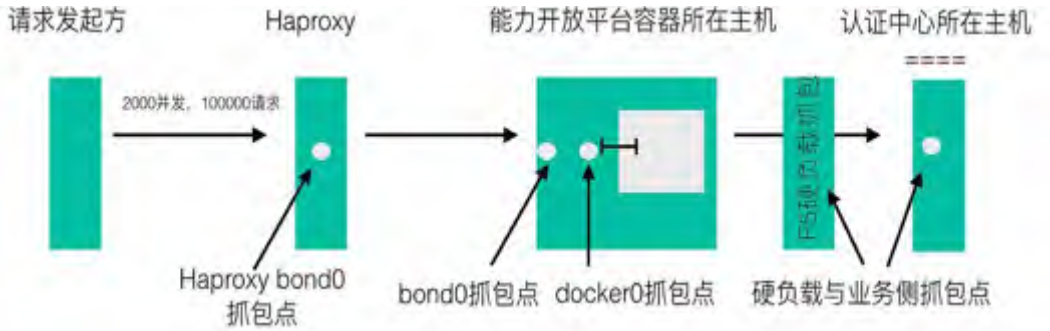

通用类
代码仓库类
代码扫描类
单元测试类
代码构建类
制品上传类
部署类
K8S
保存
清空
另存为模板
运行
start
GIT
sonar
JUnit
Java
Harbor
K8S
end
演示（ 构建总数：85 成功次数：63 失败次数：22 成功率：74.12% ）
编辑工作流
运行
代码检出
2017-05-10 16:00:57
代码扫描
2017-05-10 16:01:50
详情
单元测试
2017-05-10 16:02:33
代码构建
2017-05-10 16:02:42
编辑任务（K8S）
地址
10.142.21.51:8080
命名空间
演示
代码检出
Started by user [8mha:AAAAlx+LCAAAAAAAAP9b85aBtbiIQTGjNKU4P08v0T+v0D8nVcB3PyU1x6OyILUoJzMv2y+/JJUBAhiZGBgqihhk0NSjKDWzXb3
代码检出
2017-05-03 12:18:41
耗时:7秒
代码扫描
2017-05-03 12:18:49
耗时:7秒
详情
代码检出
2017-05-03 12:18:40
耗时:7秒
代码扫描
2017-05-03 12:18:47
耗时:9秒
详情

一些陷阱

内核版本4.9.0不支持Docker容器内修改tcp连接相关的部分参数进行调优，建议版本尽量高

https://git.kernel.org/cgit/linux/kernel/git/davem/net-next.git/commit/?id=56ab6b93007e5000a8812985aec1833c4a6a9ce0
https://git.kernel.org/cgit/linux/kernel/git/davem/net-next.git/commit/?id=1946e672c173559155a3e210fe95dbf8b7b8ddf7
https://git.kernel.org/cgit/linux/kernel/git/davem/net-next.git/commit/?id=fee83d097b1620530f23bf6063f4ea251ba9c8c7

网络拥塞与延迟，需要合理规划，延迟<50ms，flannel无法满足！



近期工作

CCP： Containerized Control Plane

Make Both OpenStack and Kubernetes a Fail-Safe: a.k.a OpenStack on Kubernetes

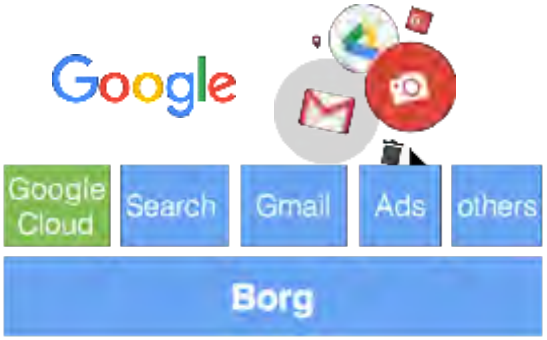
Cloud Native Computing with Kubernetes and OpenStack

Hands-On Workshop: Learn How to Deploy OpenStack on Kubernetes.

OpenStack on Kubernetes: One Year After

多种部署工具

- KPM-stackanetes(jsonnet)
- Fuel-ccp- custom python tooling(jinja)
- Kolla-kubernetes – ansible with jinja + helm
- Openstack-helm – helm(gotpl)



像Google一样管理数据中心

https://coreos.com

总结

- 企业PaaS需提供机制:Service Catalog, Application Catalog, Cloud Provider Interface等；
- 虚拟机和容器当前同样具有需求；
- OpenStack + Kubernetes或许能涵盖企业真正想要的；

谢谢！