

Multicloud CI/CD with OpenStack and Kubernetes

FOSDEM 2019

Hi, I'm Maxime

Cloud Consultant

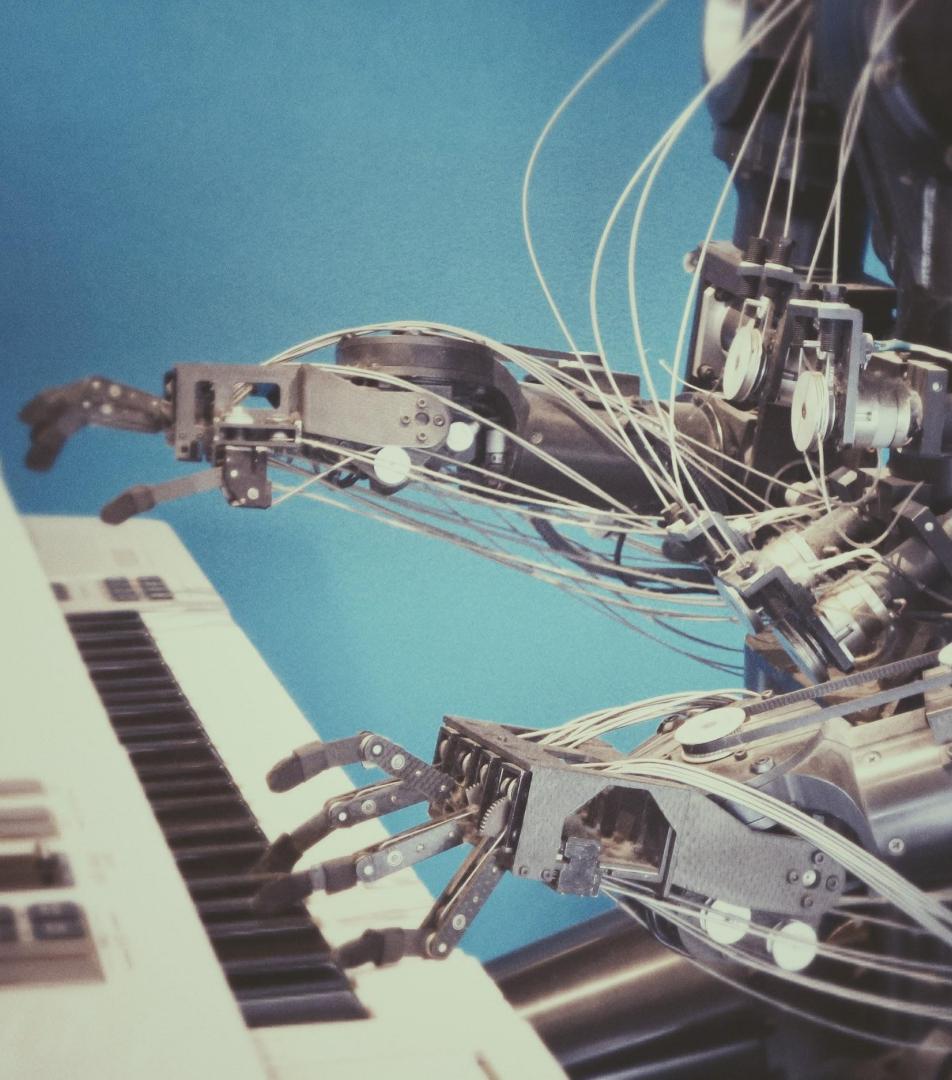
- Public & Private
- OpenStack
- Kubernetes
- Ceph
- CI/CD

Introduction

Multicloud

- Several providers
- Resiliency
- Vendor lock-in
- Cost & Hybrid
- Features
- Locations & Edge





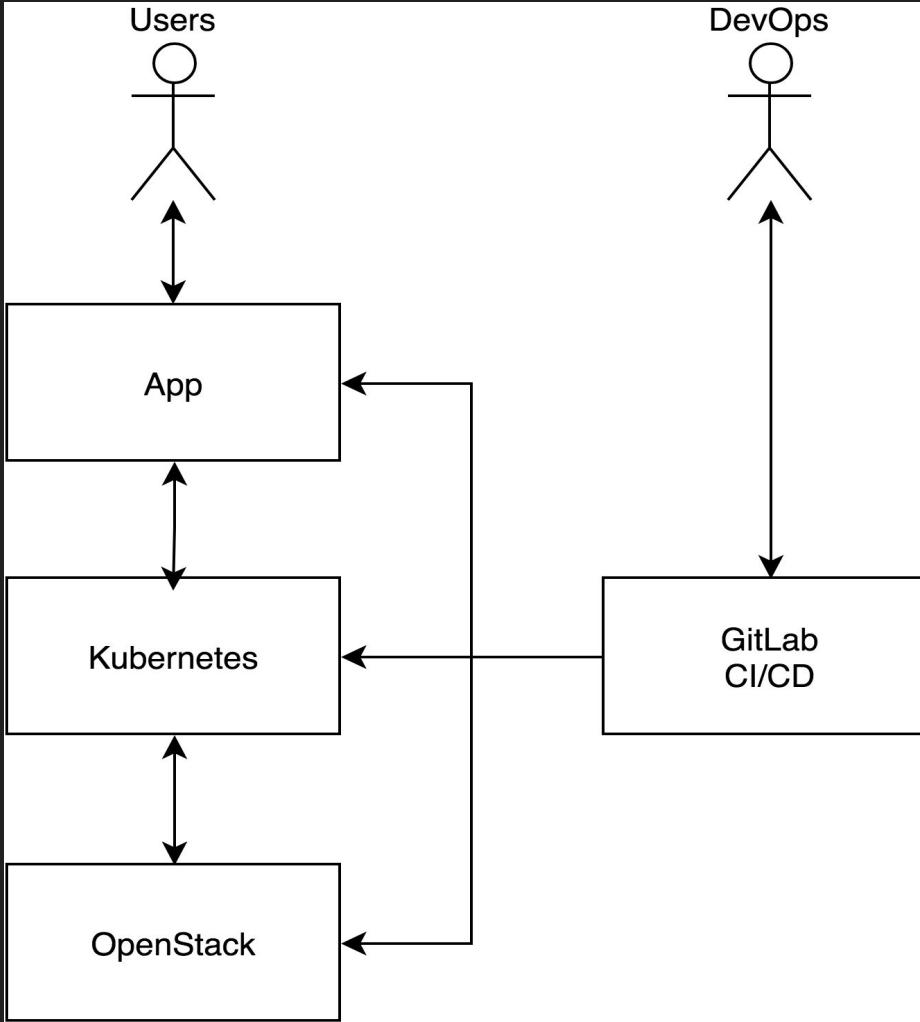
CI/CD

- Fail fast
- Automation
- Consistency

OpenStack & Kubernetes

- OpenStack
 - API driven
 - Open Infrastructure
 - 60 Public cloud AZs
- Kubernetes
 - Container ecosystem
 - Developer centric
 - Reproducible
 - Portable





Overview

App
Business logic

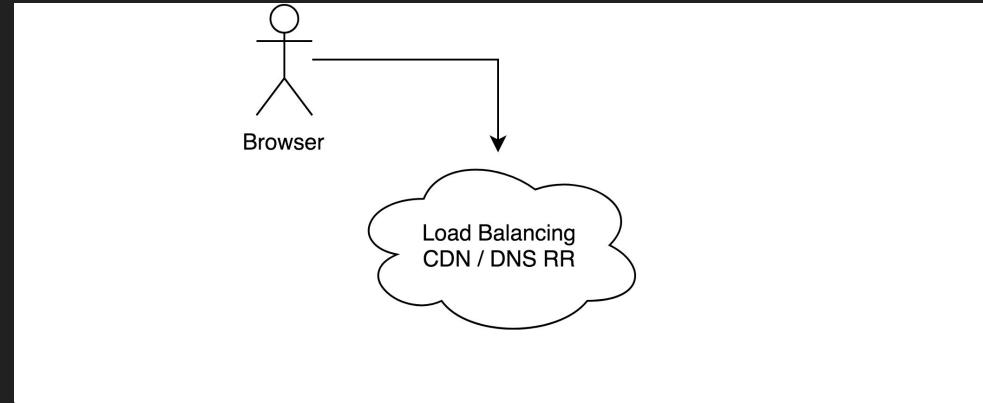
Kubernetes
Container platform

OpenStack
Infrastructure as a Service

Multicloud architecture

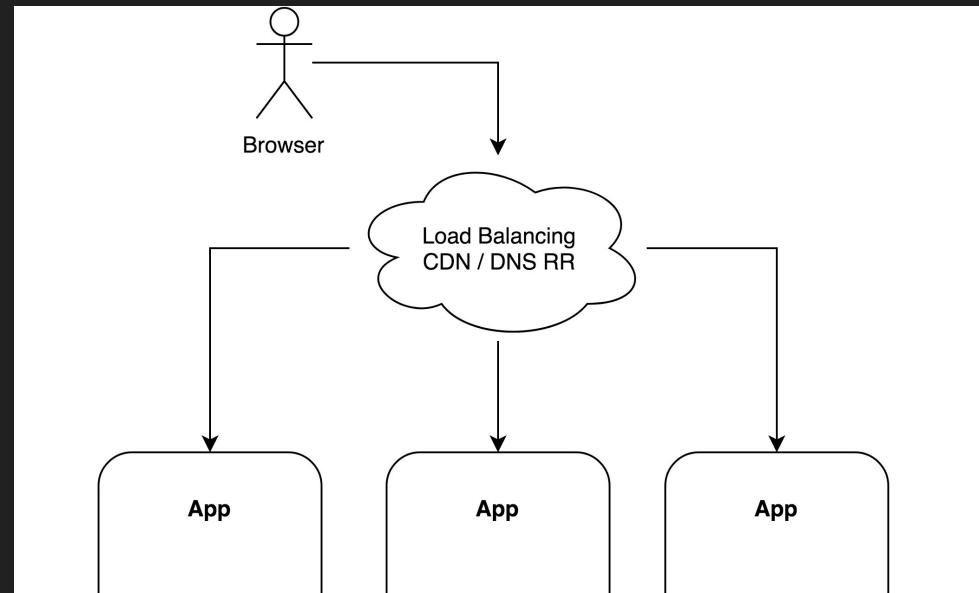
The edge

- DNS name
- Global load balancing
 - CDN
 - DNS
 - Geo routing (Route53, Dyn)
 - DIY Dynamic DNS
 - Round Robin



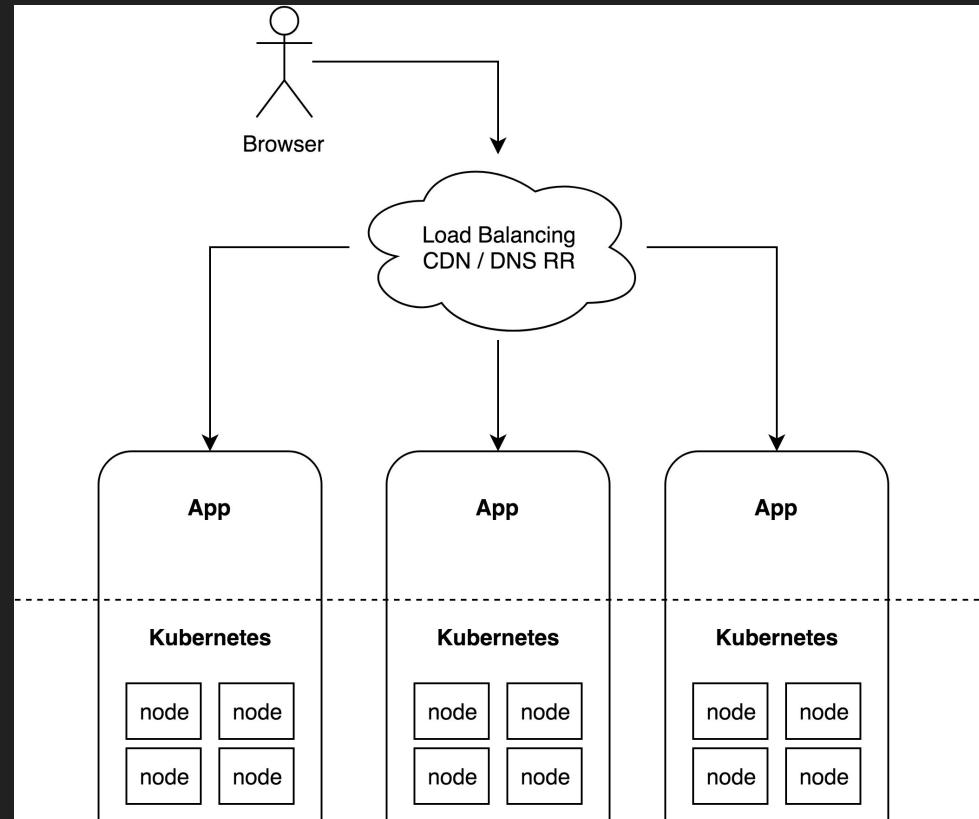
The app

- 12 factor
- Dockerized
- HTTP based
- Distributed



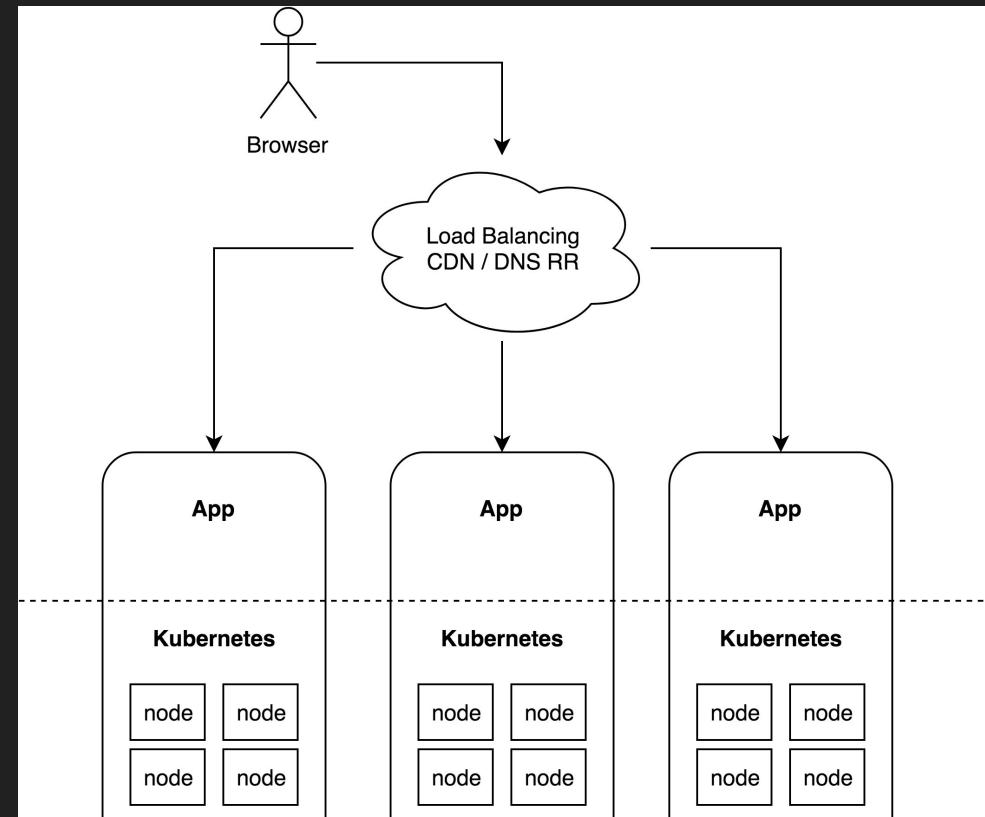
Kubernetes

- Cloud abstraction
- 1 cluster per location
- Ingress
- Federation...



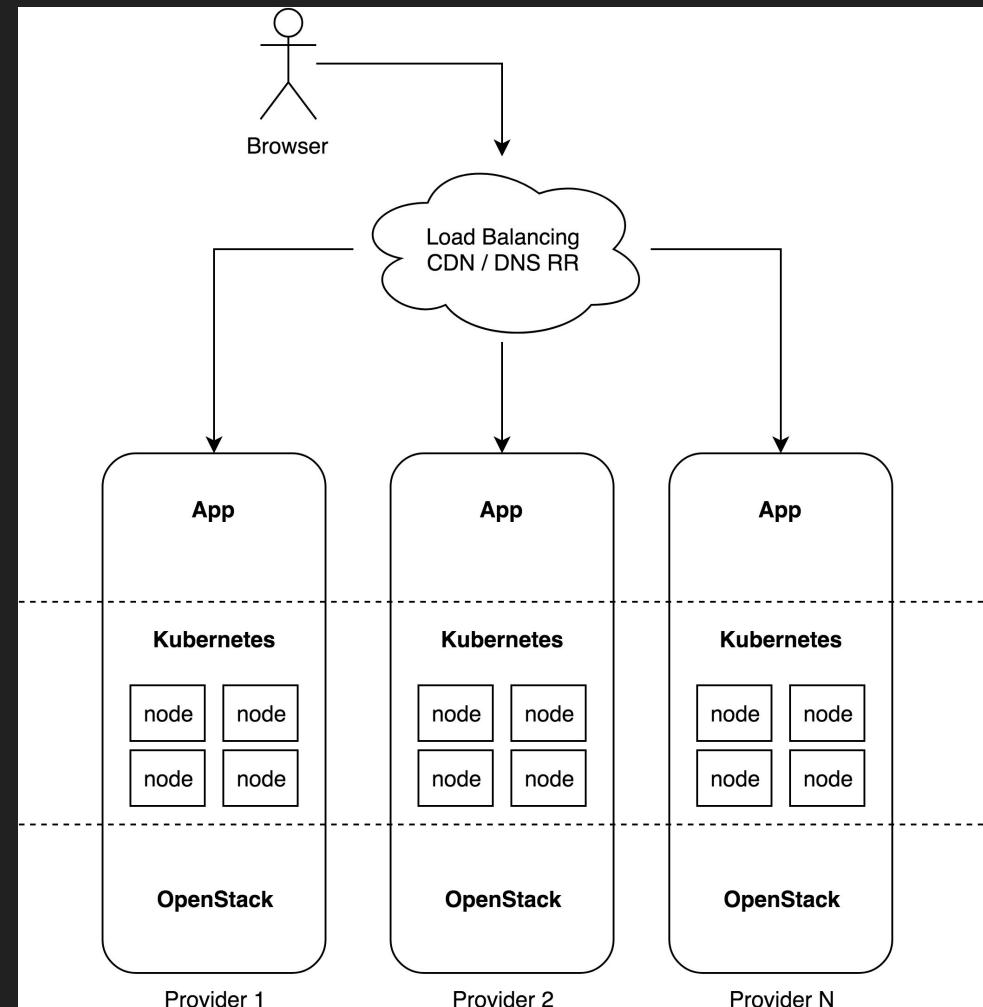
Kubernetes federation

- Authentication federation
 - OpenID or Webhook
 - --oidc-issuer-url
 - --oidc-client-id
 - kubectl --auth-provider=oidc
 - or Kubeross
- Kubefed
 - One API to rule them all
 - V1 discontinued
 - V2 in development
 - Kube v1.11+
 - Beta Q4?
- DIY - GitLab



OpenStack

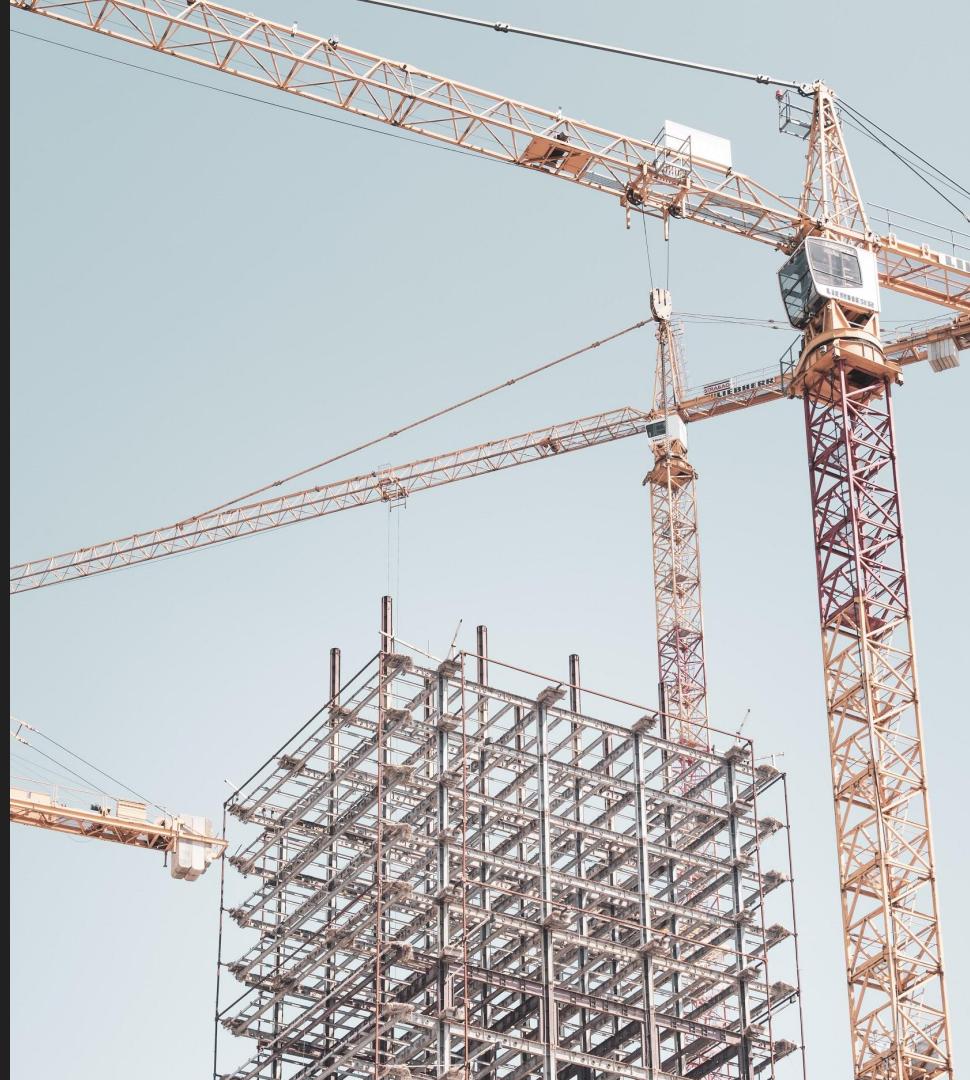
- Nova
 - Servers / Instances
 - Security Groups
 - Key pairs
 - Server Groups (optional)
- Neutron
 - Network & Subnet
 - Router
 - Floating IPs



Cloud agnostic tools

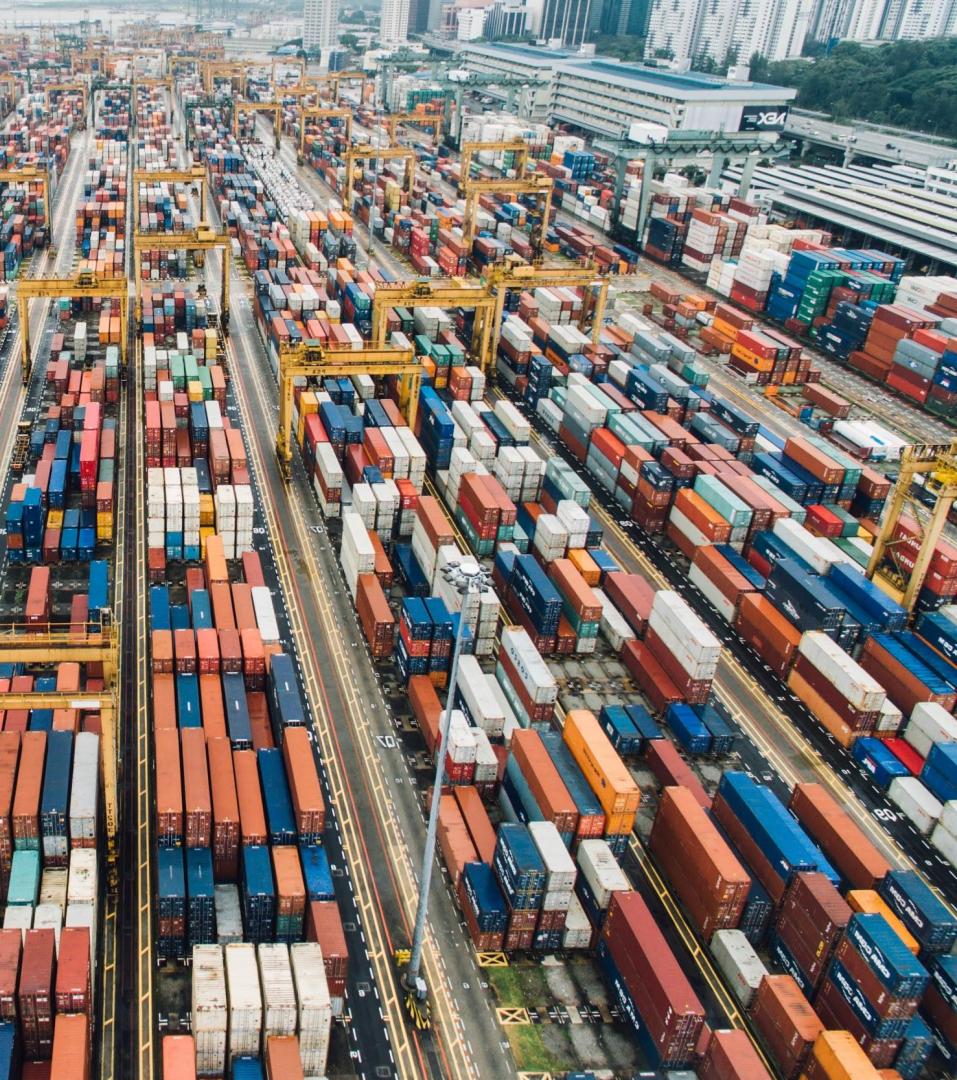
Infra tools

- Heat
 - OpenStack native
 - How about non-openstack clouds?
 - Smaller ecosystem
- Ansible
 - Cloud modules os_server,
os_floating_ip, ...
 - Lots of clouds: AWS, GCP, VMware
- Terraform
 - Infra as a code
 - Execution plan
 - Even more cloud platforms



Kubernetes install tools

- **Magnum**
 - OpenStack only
 - Smaller ecosystem
- **Kops**
 - No OpenStack support, AWS only
- **Rancher**
 - No OpenStack support
- **Kubespray**
 - Support: OpenStack, AWS, Azure, baremetal, VMware, ...
 - Ansible playbook
 - Terraform plans



CI tools

- Jenkins
- GitLab CI
 - Integration with git
 - Merge Requests
- App pipeline
 - Check
 - Build
 - Test
 - Run
- GitOps
 - weave/Flux
 - ArgoCD



Demo

Source: gitlab.com/multicloud-openstack-k8s

Demo setup

- DNS RR
- Kubespray
- Terraform
- GitLab CI w/ Auto DevOps
 - docker build && helm install
- 27 regions
- 18 cloud providers
- Havana to Rocky

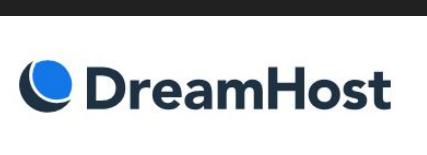
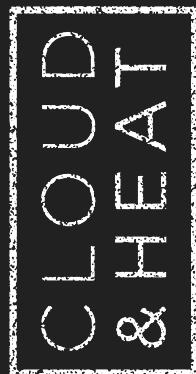
Source: gitlab.com/multicloud-openstack-k8s



Limestone
NETWORKS



packet



Demo

Wrap Up

Wrap Up

- Kubefed v2 is coming
- OpenStack interop is hard
 - Firewall rules
 - Neutron routers
 - Floating IPs
 - Glance images
 - VM flavors
 - Changes over time
- Common denominator vs Exceptions
- Clouds as cattle

Thank you!



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