



Clusters as Cattle

Using Kubernetes to Orchestrate Resources Managed
by Public Cloud Providers

Illya Chekrygin
Founding Engineer, Upbound



ichekrygin



illya_chekrygin

Cloud Computing

- Predominate
- On demand
- Business oriented
- World-class managed services
- Global scale
- Pay-Per-Use



Cloud Providers

- Competitive
- Open-Source adopters
- Closed-Source offering
- Lock In



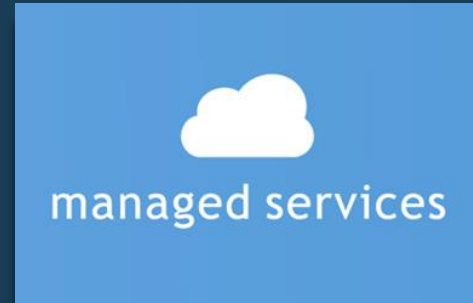
Google Cloud Platform





Managed Services

- Dependencies
- Worry free (almost)
- Hands off (almost)
- You get an SLA
- For which you Pay



Kubernetes Platform Services

- Do not use managed services
- Run containerized alternatives
 - Stateful Workloads
- Domain knowledge



Managed Services Overlap

- Same services
- Different:
 - Provisioning
 - Configuration
 - Scale



Managed Kubernetes

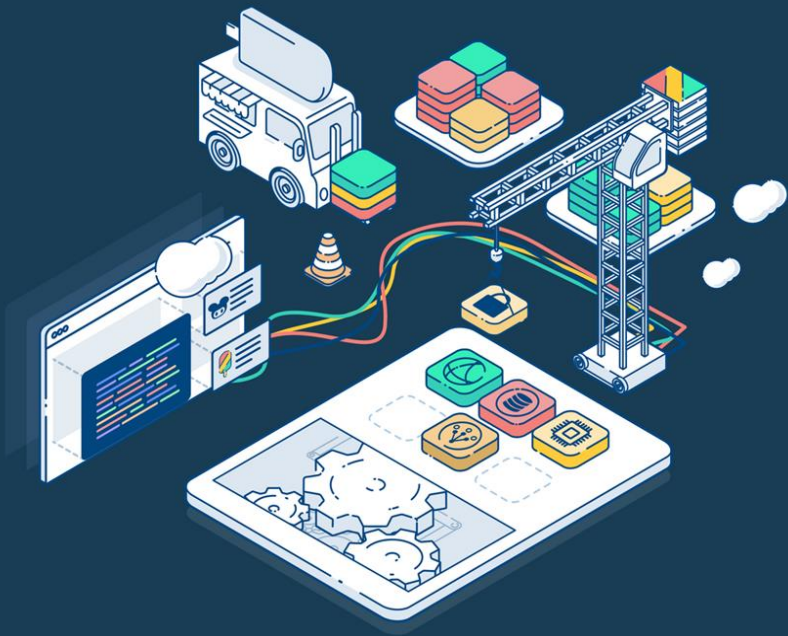
- Many Choices
- Easy to Provision
- Not Consistent



Multicloud

- Is reality
- Missing:
 - Control Plane

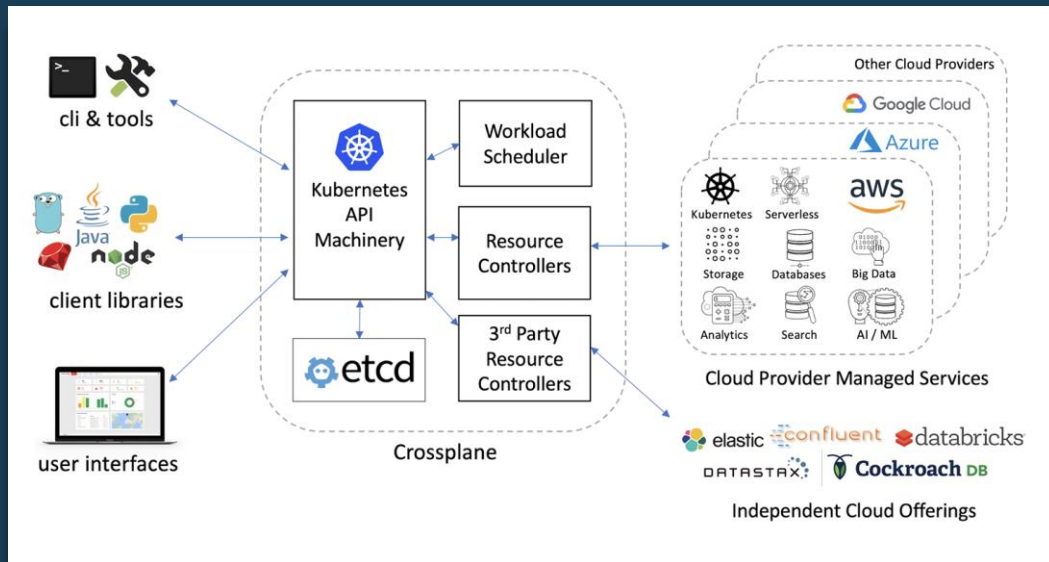




Crossplane

Crossplane

- Declarative API
- Portable Resource Abstractions
- Based on and inspired by Kubernetes
- Separation of Concerns
- Increased reusability





Managed Resources as CRD's

- Cloud Provider
 - AWS, Azure, GCP (initially)
- Managed Resource
 - RDS Instances, Azure Database for MySQL Servers, Cloud SQL Instances
 - EKS, AKS, GKE
 - Buckets
- Resource Classes
- Resource Claims (or Abstract Resources)
 - MySQLInstance, KubernetesCluster

Cloud Provider as a Resource

- Secret to store creds
- Provider with secret references
- Controller
 - validation

```
---
# AWS Admin account credentials
apiVersion: v1
kind: Secret
metadata:
  name: demo-aws-creds
  namespace: crossplane-system
type: Opaque
data:
  credentials: W2RlZVERYlongBase64encodedVaLue
---
# AWS Provider with secret reference
apiVersion: aws.crossplane.io/v1alpha1
kind: Provider
metadata:
  name: demo-aws
  namespace: crossplane-system
spec:
  credentialsSecretRef:
    key: credentials
    name: demo-aws-creds
  region: us-east-1
```

Managed Service as a Resource

- Specific Resource
- Strongly Typed
- Provider Reference
- Controller
 - Provision
 - Connection Secret
 - Track Status

```
apiVersion: database.azure.crossplane.io/v1alpha1
kind: MySQLServer
metadata:
  labels:
    name: crossplane-wordpress-mysql
spec:
  providerRef:
    name: azure-sql-provider
  connectionSecretRef:
    name: demo-database-connection
  resourceGroupName: group-westus-1
  location: West US
  pricingTier:
    tier: Basic
    vcores: 1
    family: Gen4
  storageProfile:
    storageGB: 25
    backupRetentionDays: 7
    geoRedundantBackup: false
  adminLoginName: myadmin
  version: "5.7"
  sslEnforced: false
```



Resource Claims

- Class Reference
- Additional Specifications
- Controller
 - Provision
 - Secret
 - Status

```
apiVersion: compute.crossplane.io/v1alpha1
kind: KubernetesCluster
metadata:
  name: demo-cluster
  namespace: crossplane-system
spec:
  classReference:
    name: standard-cluster
    namespace: crossplane-system
  clusterVersion: "1.11"
```



Resource Claim - MySQLInstance

- Class Reference
- Additional Specifications
- Controller
 - Provision
 - Secret
 - Status

```
## WordPress MySQL Database Instance
apiVersion: storage.crossplane.io/v1alpha1
kind: MySQLInstance
metadata:
  name: demo-cloud-mysql
  namespace: default
spec:
  classReference:
    name: standard-cloud-mysql
    namespace: crossplane-system
  engineVersion: "5.7"
```



Resource Classes

- Provisioner
- Provider Reference
- Properties
- Reclaim Policy

```
apiVersion: core.crossplane.io/v1alpha1
kind: ResourceClass
metadata:
  name: standard-azure-cluster
  namespace: crossplane-system
parameters:
  resourceGroupName: group-westus-1
  location: Central US
  version: "1.11.4"
  nodeCount: "1"
  nodeVMSize: Standard_B2s
  dnsNamePrefix: crossplane-aks
  disableRBAC: "false"
provisioner: akscluster.compute.azure.crossplane.io/v1alpha1
providerRef:
  name: demo-azure
reclaimPolicy: Delete
```

Resource Class - MySQLServer

```
apiVersion: core.crossplane.io/v1alpha1
kind: ResourceClass
metadata:
  name: standard-azure-mysql
  namespace: crossplane-system
parameters:
  adminLoginName: myadmin
  resourceGroupName: group-westus-1
  location: Central US
  sslEnforced: "false"
  tier: Basic
  vcores: "2"
  family: Gen5
  storageGB: "25"
  backupRetentionDays: "7"
  geoRedundantBackup: "false"
provisioner: mysqlserver.database.azure.crossplane.io/v1alpha1
providerRef:
  name: demo-azure
reclaimPolicy: Delete
```

Workload

- Required Resources
 - Secrets
- Destination Cluster
 - Automatic Scheduling (Dynamic)
 - Designated (Assigned)
- Payload
 - Deployment
 - Service



Separation of concerns

Application Owner

ns: default

- Resource Claims
- Workloads



Administrator

ns: crossplane-system

- Resource Classes
- Providers
- Concrete Resources



Crossplane Vision

- Open cloud-computing platform
- Open control plane for open cloud
- More choices
- Extensible
- Inclusive



Thank you

Q & A



github.com/crossplaneio/crossplane



<https://crossplane.io/>



Crossplane_io

