



# Certified Kubernetes Administrator Prep

API Primitives & Cluster Architecture

# API Primitives

- Persistent entities in the Kubernetes System.
- Uses these to represent state of the cluster.
- Describe:
  - What applications are running.
  - Which nodes those applications are running on.
  - Policies around those applications.
- Kubernetes Objects are “records of intent.”



# API Primitives

## Object Spec:

- Provided to Kubernetes.
- Describes desired state of objects.

## Object Status:

- Provided by Kubernetes.
- Describes the actual state of the object.



# Kubernetes Yaml

```
apiVersion: v1
kind: Pod
metadata:
  name: busybox
spec:
  containers:
  - name: busybox
    image: busybox
    command:
      - sleep
      - "3600"
```



# Common Kubernetes Objects

- Nodes
- Pods
- Deployments
- Services
- ConfigMaps



# Names and UIDs

## Names

- All objects have a unique name.
- Client provided.
- Can be reused.
- Maximum length of 253 characters.
- Lower case alphanumeric characters.
- - and . allowed

## UIDs

- All objects have a unique UID.
- Generated by Kubernetes.
- Spatially and temporally unique.



# Namespaces

- Multiple virtual clusters back by the same virtual cluster.
- Generally for large deployments.
- Provide scope for names.
- Easy way to divide cluster resources.
- Allows for multiple teams of users.
- Allows for resource quotas.
- Special “kube-system” namespace.
  - Used to differentiate system pods from user pods.



# Nodes

- Might be a VM or physical machine.
- Services necessary to run pods.
- Managed by the master.
- Services necessary:
  - Container runtime
  - Kubelet
  - Kube-proxy
- Not inherently created by Kubernetes, but by the Cloud Provider.
- Kubernetes checks the node for validity.





# Cloud Controller Managers

- Route controller (gce clusters only)
- Service Controller
- PersistentVolumeLabels controller



# Node Controller

- Assigns CIDR block to a newly registered node.
- Keeps track of the nodes.
- Monitors the node health.
- Evicts pods from unhealthy nodes.
- Can taint nodes based on current conditions in more recent versions.



# Conclusion

- **API Primitives (Kubernetes Objects)**
  - How to interact with them
  - How to describe them
  - What they are
- **Cluster Architecture**

