

HANDS ON WORKSHOP

Deploy Your Application at Scale in Kubernetes

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What we'll discuss today

- Deployment - Imperative and Declarative
- Fundamental of scaling
- Metrics and monitoring
- Auto scaling based on metrics
- Quick Demo
- QnA


Target Audience

- Beginners to Kubernetes

Takeaways for Attendees

- Basic understanding of deploying and scaling applications on Kubernetes.

\$ whoami

- Focusing on **Ansible** Automation, Containerization (**OpenShift & Kubernetes**) and Infrastructure as Code (**Terraform**)
- Published a book, **Ansible for Real-Life Automation** (ansiblehandbook.com)
- Write at  **techbeatly** and **Red Hat #EnableSysadmin**



Gineesh Madapparambath  (He/Him)
Author of "Ansible for Real Life Automation" | Helping on Automation and Containerization using Ansible, OpenShift, Kubernetes and Terraform | techbeatly.com/youtube | socialkonf.com
Talks about #devops, #ansible, #openshift, #kubernetes, and #opensource

 **Red Hat**
 **Teesside University**

What is Kubernetes?

- **Kubernetes**, often abbreviated as K8s, is an open-source container orchestration platform.
- It automates the deployment, scaling, and management of containerized applications, making it easier to manage containerized workloads.

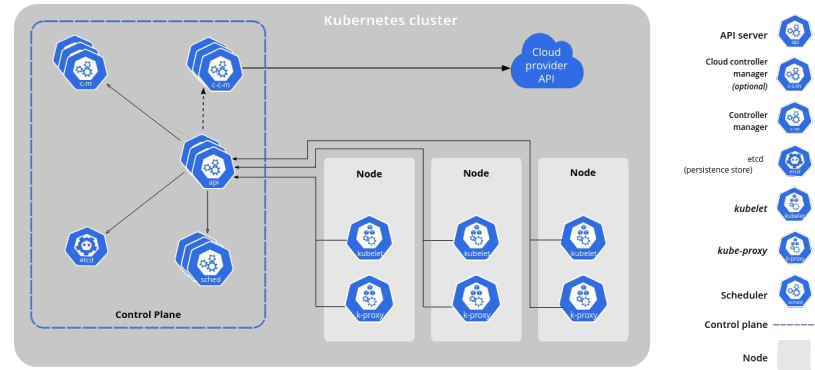


Image source: kubernetes.io/docs/concepts/overview/components

What is a Pod?

- In Kubernetes, a Pod is the smallest and simplest unit.
- It represents a single instance of a running process in a cluster.
- Pods are used to deploy and manage containers, sharing the same network namespace and storage, enabling easy communication.



Deployment vs ReplicaSet vs Replication Controller

Deployment

- Manages the deployment and scaling of a set of Pods.
- Allows declarative updates to applications.
- Provides rolling updates and rollbacks.

ReplicaSet

- Ensures a specified number of replicas of a Pod are running at all times.
- Often managed by Deployments.
- Provides high availability and scalability.

Replication Controller

- Legacy concept, mostly replaced by ReplicaSets and Deployments.
- Ensures a specified number of replicas of a Pod are running.
- Does not support rolling updates and other advanced deployment strategies.

The Deployment Methods

```
$ kubectl run mypod --image=nginx \
  --restart=Never
```

```
apiVersion: v1
kind: Pod
metadata:
  name: mypod
spec:
  containers:
  - name: nginx-container
    image: nginx
    restartPolicy: Never
```



Imperative

Fast but not useful when repeat

Chance for error

Declarative

Prepare in advance and apply

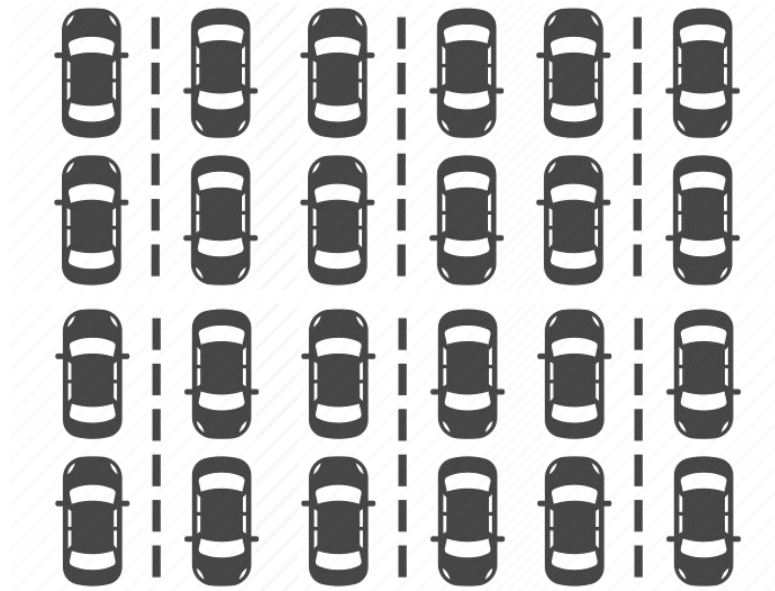
Easy to recreate



The need for Scaling Application

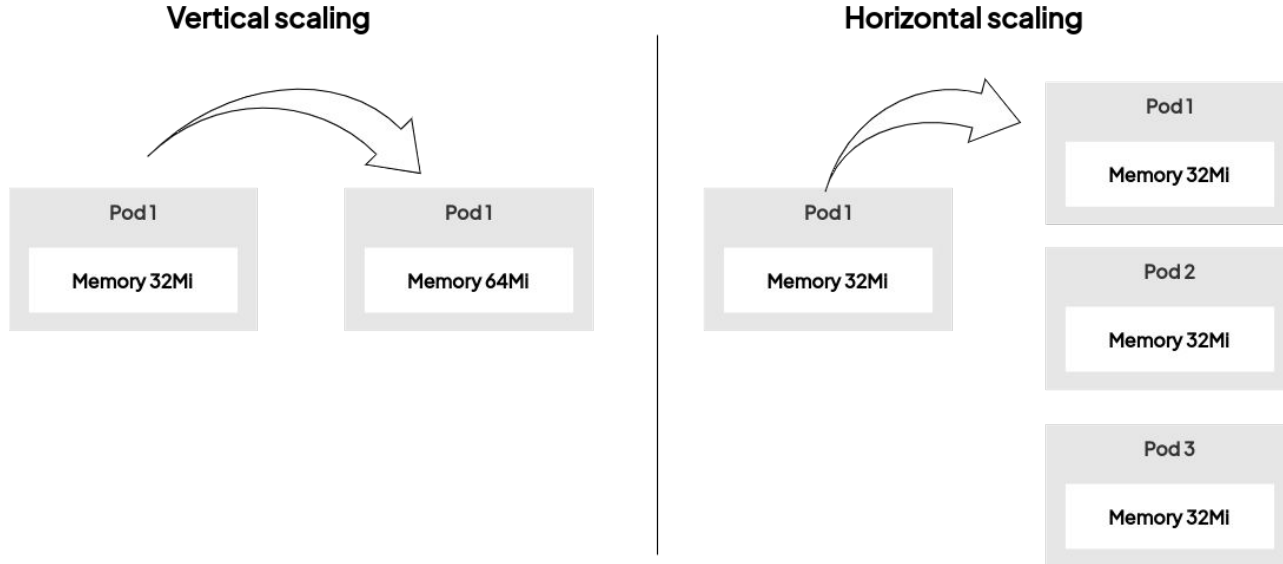


Expected Traffic



Planned Scaling

Vertical Scaling vs. Horizontal Scaling

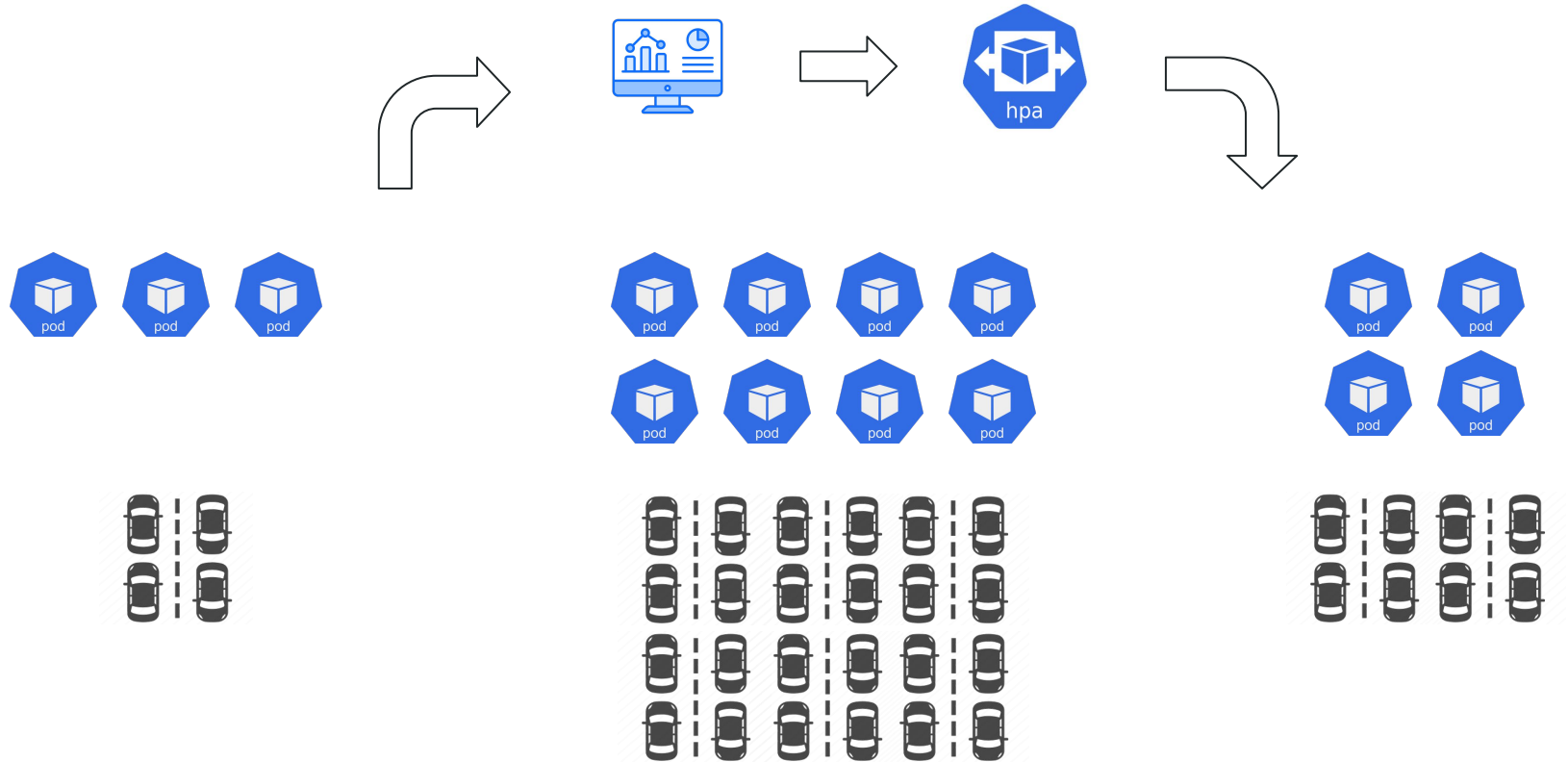


How do we know the traffic and load?

- Metrics for nodes
- Metrics for pods
- Metrics for applications



Autoscaling Pods




Let us see them in Action

Demo

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1 # ... (previous code) ...
2 def _initialize_experiment(experiment):
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```

Prerequisites

- A working **Kubernetes** Cluster (single node minikube for the demonstration).
- **kubect**l installed and configured.
- Access to the demo **repository**
(github.com/iamgini/workshops-demos/tree/main/Kubernetes-Deploy-Your-Application-at-Scale)



Questions & Feedback

References

Workshop instructions

workshops.techbeatly.com/docs/containers/Kubernetes-Deploy-Your-Application-at-Scale-in-K8S

Sample repo for deployment YAML

github.com/iamgini/workshops-demos/tree/main/Kubernetes-Deploy-Your-Application-at-Scale

How to practice Kubernetes


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