# KOPS

Kubernetes Operations Tool

# KOPS Intro

**KOPS or Kubernetes Operations is an official kubernetes project for managing production grade Kube clusters**

- KOPS is a kubernetes cluster provisioning and tool.
  - Fully Automated
  - Use DNS to identify clusters
  - Support multiple OS support
  - Everything in auto scaling groups
  - High availability support

- It is mainly used to deploy and maintain kubernetes clusters on various cloud service providers like AWS, GCP etc.

# KOPS Intro (Continued)

Key Features:

- Deploy clusters to existing virtual private clouds (VPC) or create a new VPC from scratch.
- Provision single or multiple master clusters.
- Provides configurable bastion machines for SSH access to individual cluster nodes.

# KOPS Intro (Continued)

Other Features:

- Works with both Cloudformation or Terraform.
- Provides ability to perform rolling cluster updates.
- Supports heterogeneous clusters by creating multiple cluster groups.

# KOPS Requirements

Some of the basic requirements to create a kubernetes cluster on AWS using kops are as follows

- IAM Permissions
  - AmazonEC2FullAccess
  - AmazonRoute53FullAccess
  - AmazonS3FullAccess
  - IAMFullAccess
  - AmazonVPCFullAccess
- A S3 bucket for the KOPS_STATE_STORE*
- A configured DNS service with DNS names from Route 53.
- kubectl (kubernetes command line tool)

* Environment variable used by kops to specify S3 bucket

# Default Configuration

- It creates all of the required resources on AWS for you
    - EC2 instances
    - VPC and Subnets
    - DNS entries in Route53
    - Load Balancers
    - Auto Scaling groups
    - Security groups

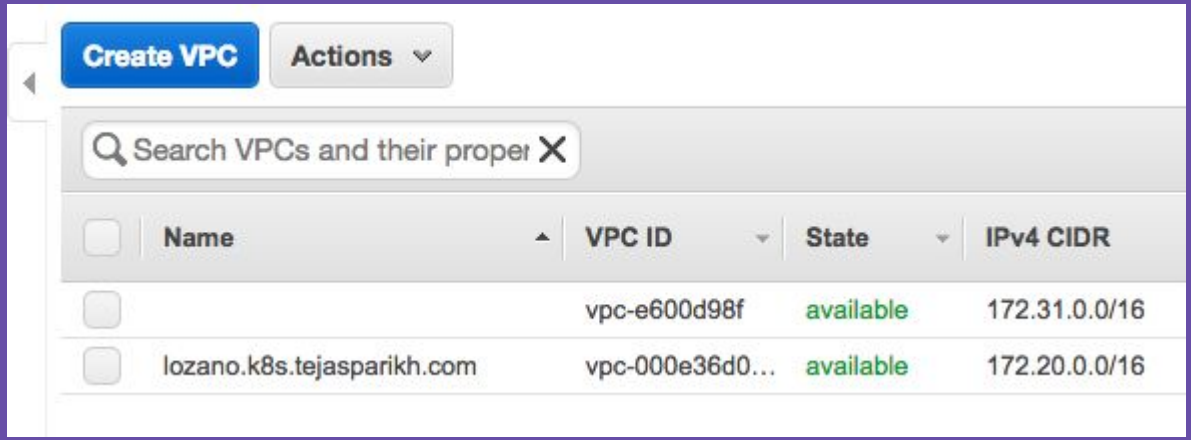
# Kubernetes Cluster

1. export NAME=lozano.k8s.tejasparikh.com
2. export KOPS_STATE_STORE=s3://lozano.k8s.tejasparikh.com

3. kops create cluster
   --zones us-east-1a
   --node-size t2.medium
   --master-size t2.medium
   $NAME

2. kops update cluster $NAME --yes

VPC




EC2 ( Master and Worker node instances )

| Name | Instance ID | Instance Type | Availability Zone |
|---|---|---|---|
| nodes.lozano.k8s.tejasparikh.com | i-06a08977c4e2421a9 | t2.medium | us-east-2a |
| master-us-east-2a.masters.lozano.k8s.tejasparikh.com | i-08b7185a71c6e9cb0 | t2.medium | us-east-2a |
| nodes.lozano.k8s.tejasparikh.com | i-0bce8932d3cd36207 | t2.medium | us-east-2a |

# Is our Cluster Ready ?

# kubectl get node

```
Nathalys-MacBook-Air:~ nathy$ kubectl get nodes
NAME                                         STATUS    ROLES     AGE       VERSION
ip-172-20-43-3.us-east-2.compute.internal    Ready     node      4m        v1.10.3
ip-172-20-53-47.us-east-2.compute.internal   Ready     master    5m        v1.10.3
ip-172-20-55-29.us-east-2.compute.internal   Ready     node      4m        v1.10.3
Nathalys-MacBook-Air:~ nathy$
```

# List of resources created by Kops

# Total: 59 Resources

2 Autoscaling Groups

2 EBS Volumes

2 Launch Configurations

12 Key pairs

10 Managed Files

1 Internet Gateway

1 DHCP Options

1 VPC

2
IAM Instance Profiles
IAM Instance Profile Roles
IAM Roles
IAM Role Policies

1
Route
Route Table
Route Table Association

1 VPCDHCPOptionsAssociation

1 Subnet

12 Security Group Rules

1 SSH Key

2 Security Groups

# Resources

1. https://kubernetes.io/docs/setup/custom-cloud/kops/
2. https://github.com/kubernetes/kops/blob/master/docs/high_availability.md
3. https://cloudacademy.com/blog/kubernetes-operations-with-kops/
4. https://aws.amazon.com/blogs/compute/kubernetes-clusters-aws-kops/

# Thank You!