

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:

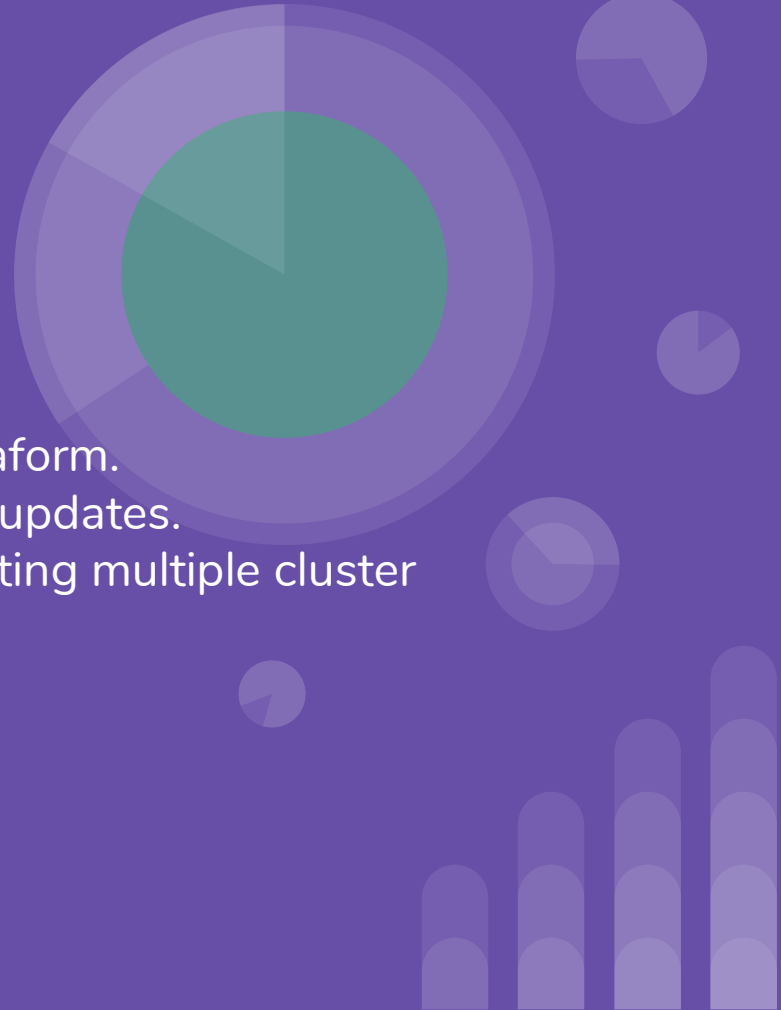
- Deploy clusters to existing virtual private clouds (VPC) or create a new VPC from scratch.
- Provision single or multiple master clusters.
- Provides configurable bastion machines for SSH access to individual cluster nodes.



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

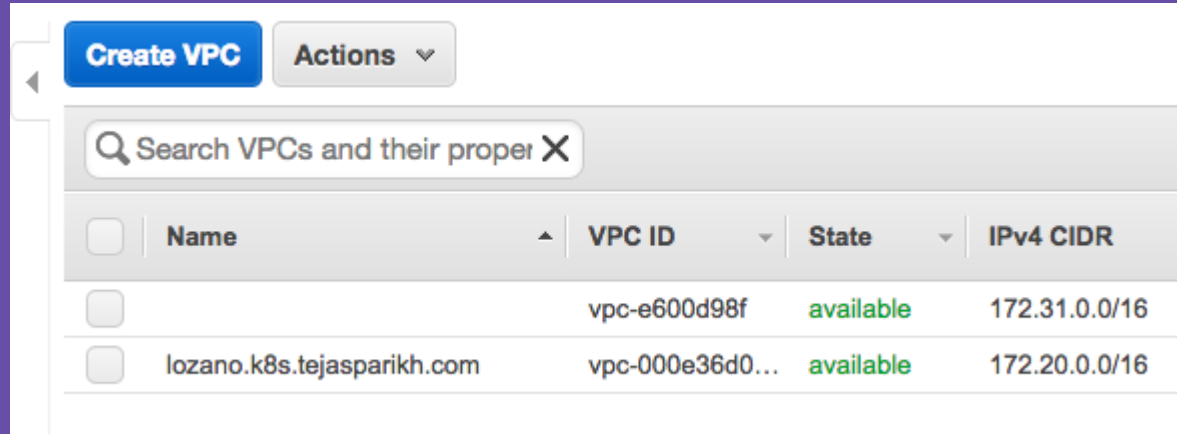
Default Configuration

- 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`
-
1. `kops create cluster`
 - `--zones us-east-1a`
 - `--node-size t2.medium`
 - `--master-size t2.medium`
 - `$NAME`
 2. `kops update cluster $NAME --yes`

VPC



The screenshot shows the AWS VPC console interface. At the top, there is a blue 'Create VPC' button and a grey 'Actions' dropdown menu. Below these is a search bar with the placeholder text 'Search VPCs and their proper X'. The main content is a table listing VPCs. The table has columns for 'Name', 'VPC ID', 'State', and 'IPv4 CIDR'. There are two VPCs listed: one with ID 'vpc-e600d98f' and state 'available' with CIDR '172.31.0.0/16', and another with ID 'vpc-000e36d0...' and state 'available' with CIDR '172.20.0.0/16'. Each row has a checkbox on the left.

<input type="checkbox"/>	Name	VPC ID	State	IPv4 CIDR
<input type="checkbox"/>		vpc-e600d98f	available	172.31.0.0/16
<input type="checkbox"/>	lozano.k8s.tejasparikh.com	vpc-000e36d0...	available	172.20.0.0/16

EC2 (Master and Worker node instances)

<input type="checkbox"/>	Name	Instance ID	Instance Type	Availability Zone
<input type="checkbox"/>	nodes.lozano.k8s.tejasparikh.com	i-06a08977c4e2421a9	t2.medium	us-east-2a
<input type="checkbox"/>	master-us-east-2a.masters.lozano.k8s.tejasparikh.com	i-08b7185a71c6e9cb0	t2.medium	us-east-2a
<input type="checkbox"/>	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

1 VPCDHCPOptionsAssociation

1 Subnet

12 Security Group Rules

1 SSH Key

2 Security Groups

2

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

1

Route
Route Table
Route Table Association

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!

