

Prague AWS User Group

Kubernetes as a managed service on AWS:
Amazon Elastic Container Service for
Kubernetes (EKS)

Vladimir Simek, Senior Solutions Architect, AWS
7th of March, 2018



kubernetes

What is Kubernetes?



Open source container management platform



Helps you run containers at scale



Gives you primitives
for building
modern applications



WHY DEVELOPERS LOVE KUBERNETES

MAX.
TARE.
NET
CU.CAP.

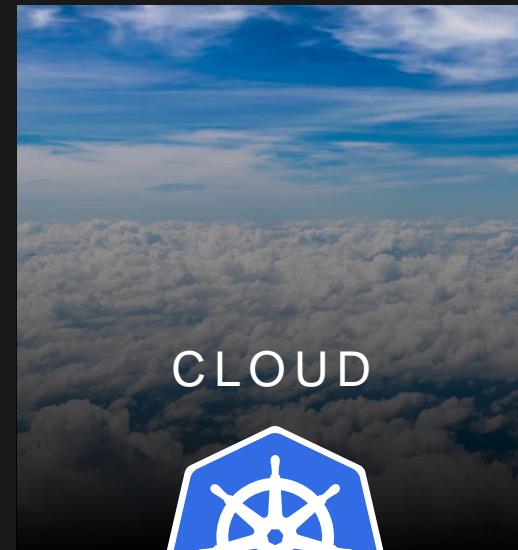


Why developers love Kubernetes

Vibrant and growing community
of users and contributors

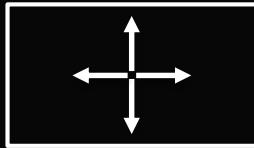
Why developers love Kubernetes

Kubernetes can be run anywhere

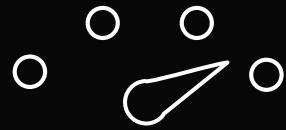


Why developers love Kubernetes

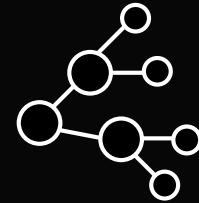
A single extensible API



SCALE

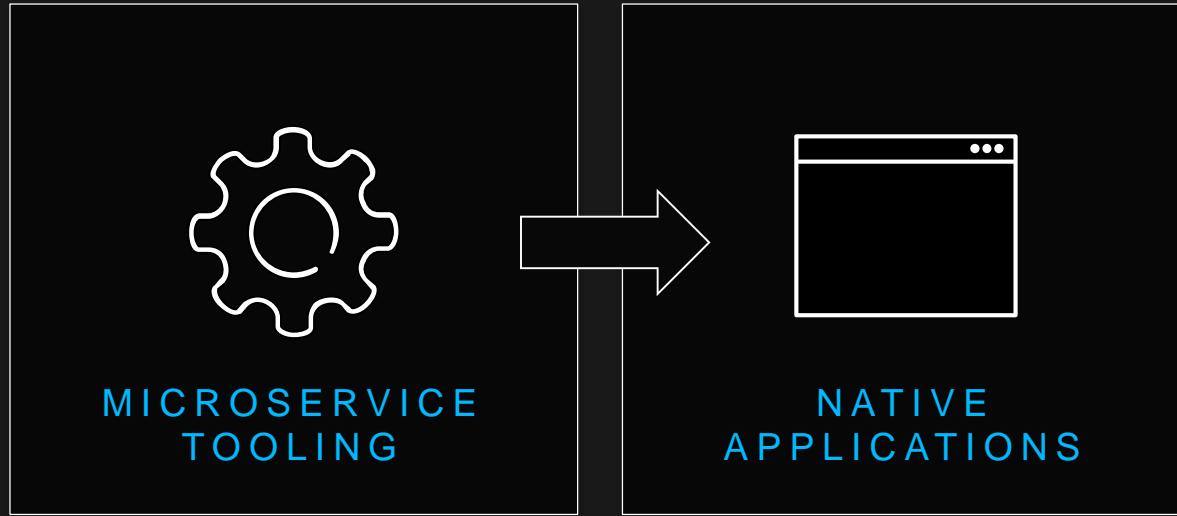


PERFORMANCE

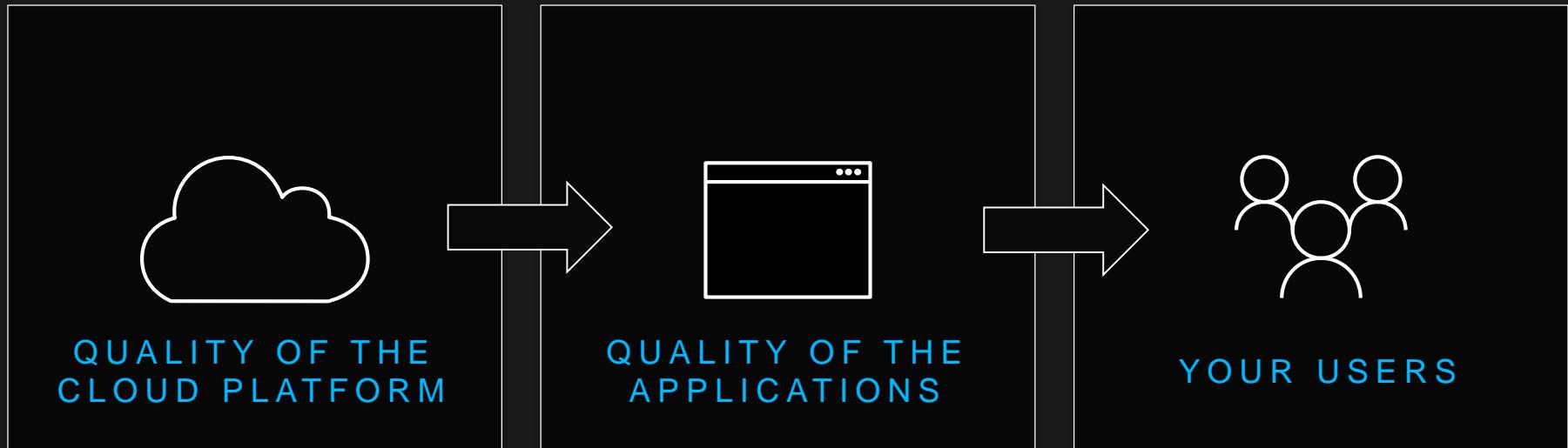


BREADTH

Cloud-native applications



But where you run K8s matters





63%

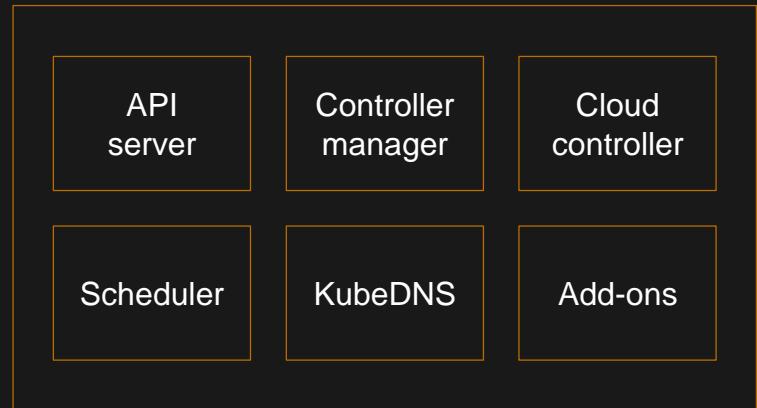
of Kubernetes workloads
run on AWS today
—CNCF survey

Kubernetes on AWS



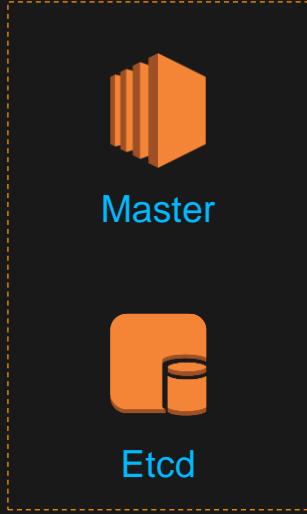
3x Kubernetes masters for HA

Kubernetes master





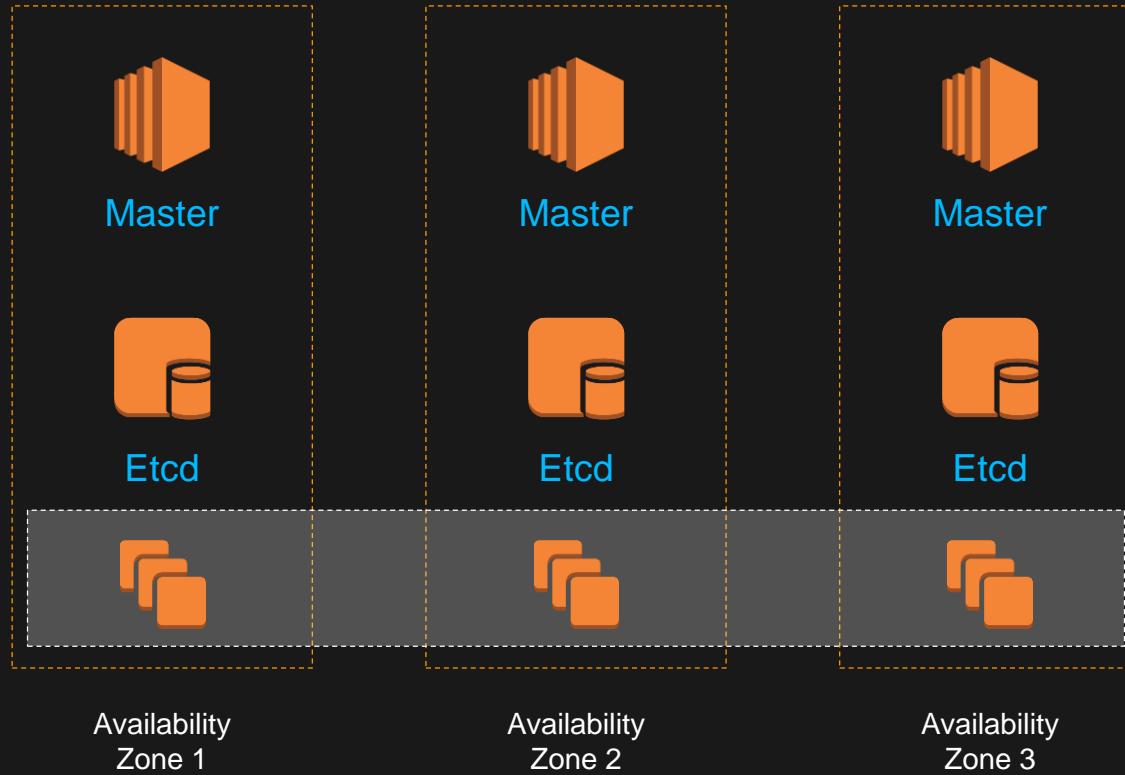
Availability
Zone 1



Availability
Zone 2



Availability
Zone 3



"Lets look which tools are available to
build a K8s Cluster on AWS"

Kubernetes on Amazon Web Services

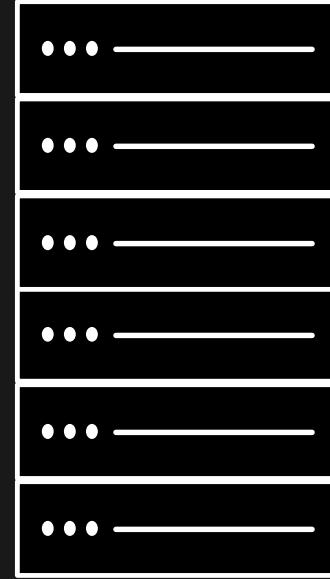
This page lists different options, in alphabetic order, of starting a Kubernetes cluster on Amazon Web Services.

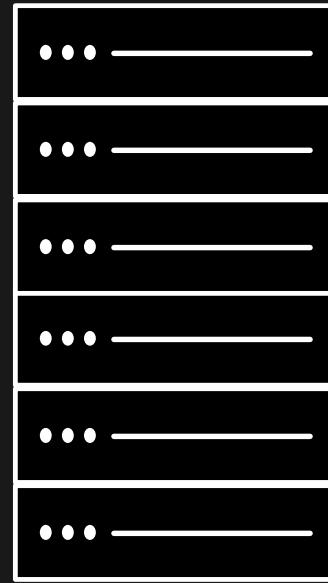
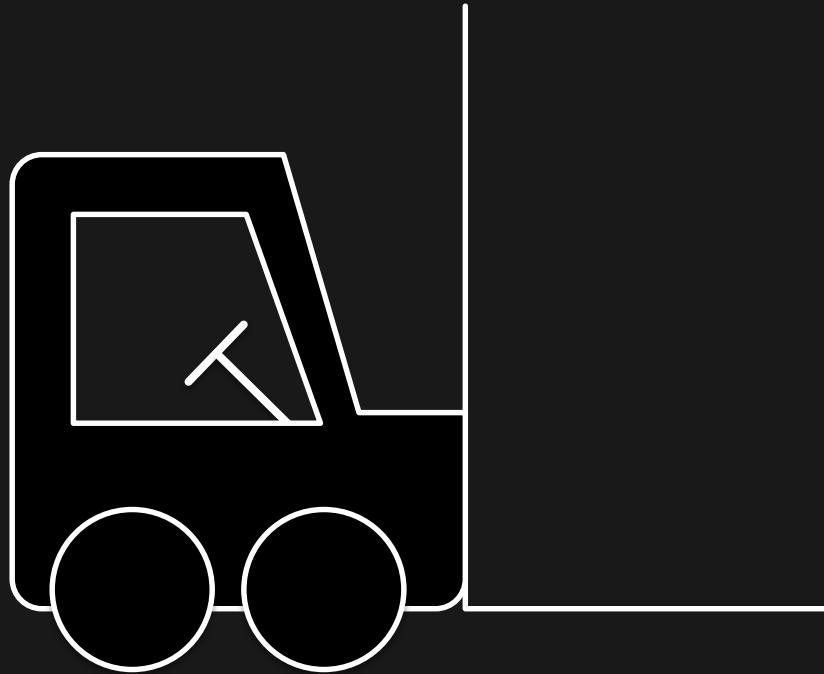
- Clocker: <http://www.clocker.io/tutorials/kubernetes-cluster.html>
- Heptio: <https://github.com/aws-quickstart/quickstart-heptio>
- Juju Charms: <https://jujucharms.com/canonical-kubernetes/>
- KAT - Kubernetes cluster on AWS with Terraform: <https://github.com/xuwang/kube-aws-terraform>
- Kargo: <https://github.com/kubernetes-incubator/kargo>
- Kismatic Enterprise Toolkit: <https://github.com/apprenda/kismatic>
- Kraken 2: <https://github.com/samsung-cnct/k2>
- kube-aws: <https://github.com/kubernetes-incubator/kube-aws>
- Kubeadm Quickstart: <https://github.com/upmc-enterprises/kubeadm-aws>
- Kubernetes on AWS: <https://github.com/zalando-incubator/kubernetes-on-aws/>
- Kubernetes Operations (kops): <https://github.com/kubernetes/kops>
- OpenShift: <https://access.redhat.com/articles/2623521>
- Stackpoint.io: <https://stackpoint.io>
- Tack: <https://github.com/kz8s/tack>
- Tectonic: <http://github.com/coreos/tectonic-installer>
- Weaveworks AMI: <https://github.com/weaveworks/kubernetes-ami>

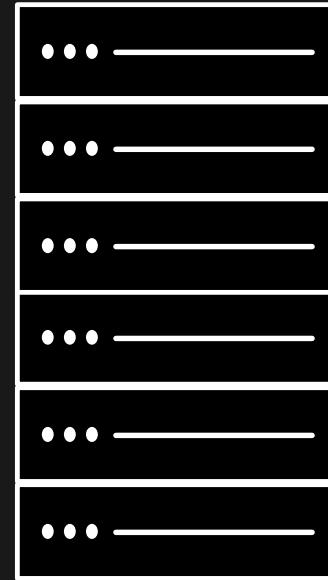
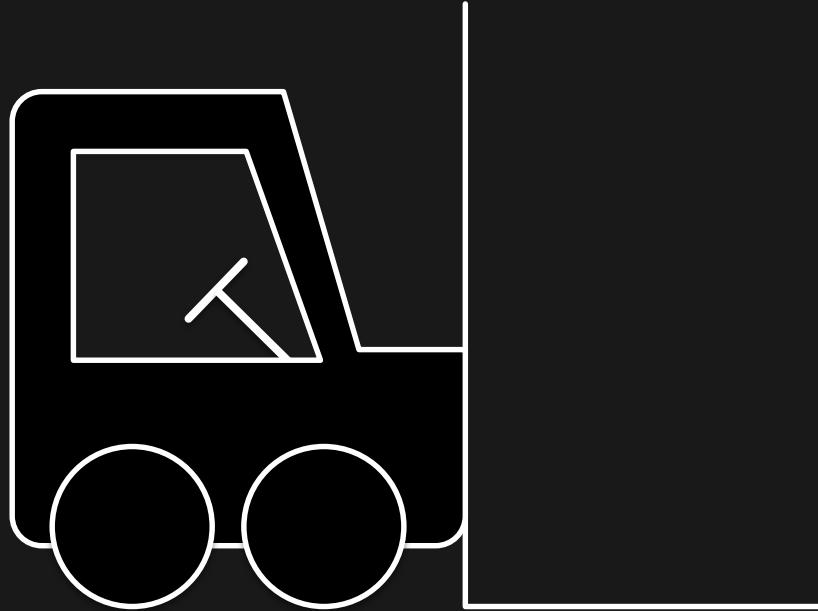
"Lets look an excellent Community Tool,
KOPS, to build a K8s Cluster on AWS"

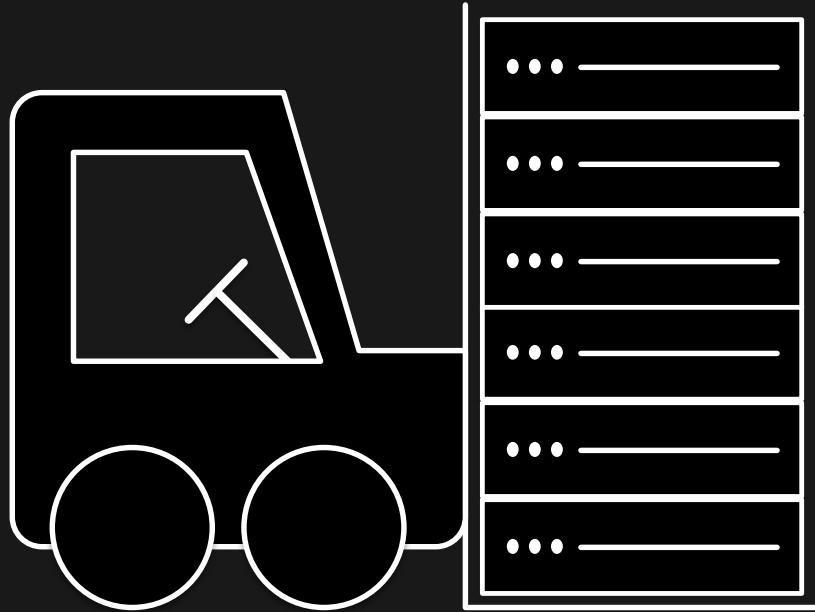
1. Install Binaries & Tools: `kops`, AWS CLI tools, `kubectl`
2. Set IAM User to “`kops`”
3. Allow “`kops`” user Full access to EC2, Route53, S3, IAM, VPC
4. Configure AWS client to new IAM user “`kops`”
5. Configure DNS (or) Deploy a gossip-based cluster:
 - We hosted the subdomain “`dnishi.k8sdemolabs.com`” in Route53
6. Create a S3 bucket to save cluster config: “`dnishi-kops-store`”
7. Set the “`kops environmental variables`”
8. Create cluster: “`kops create cluster`” and “`kops validate cluster`”

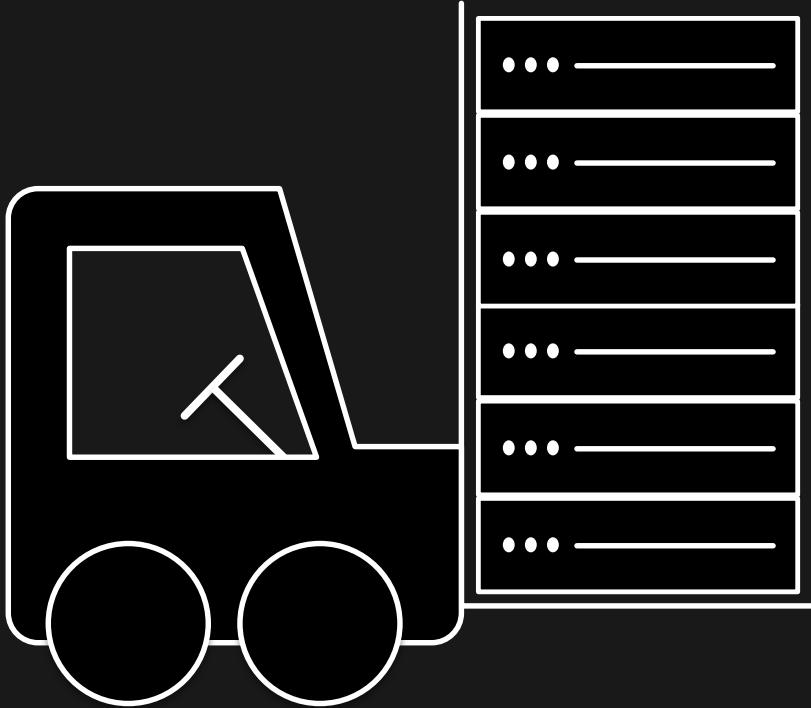




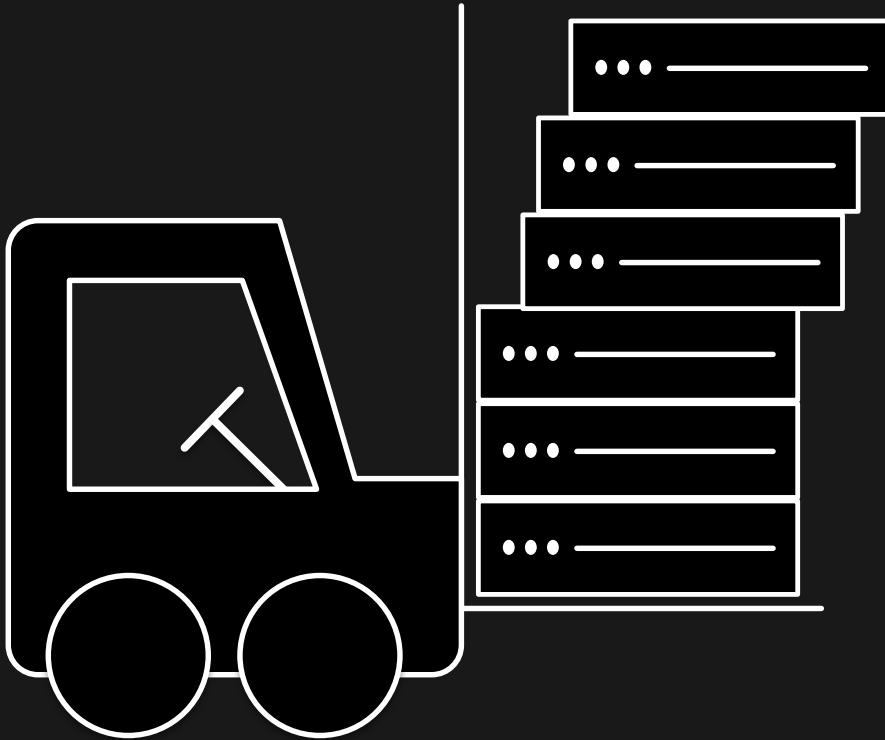




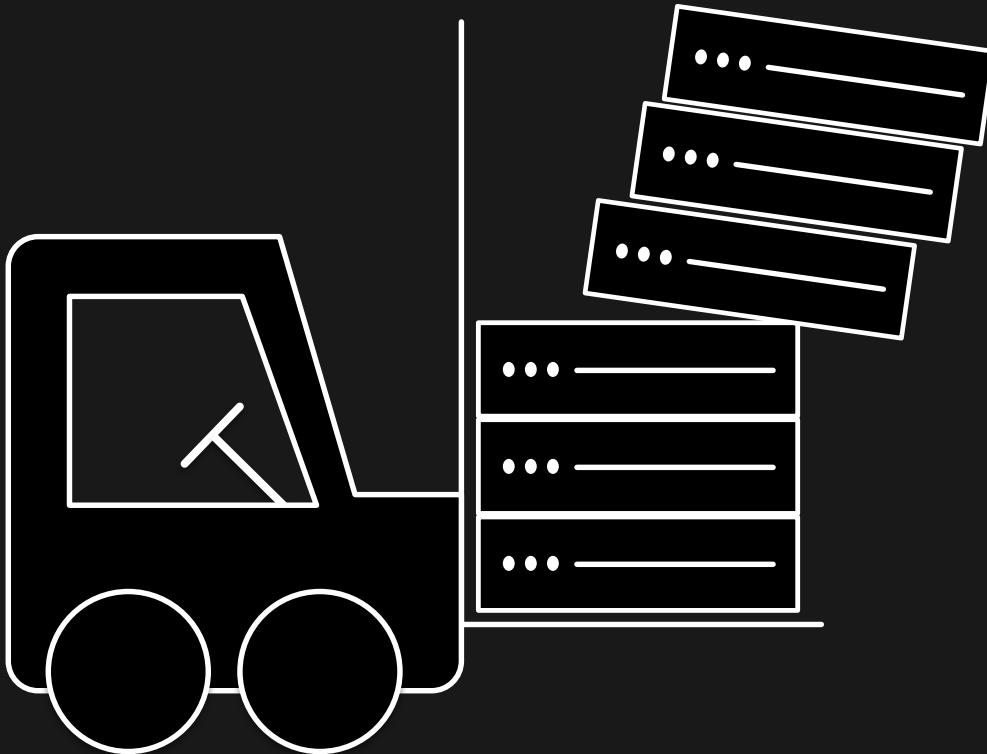




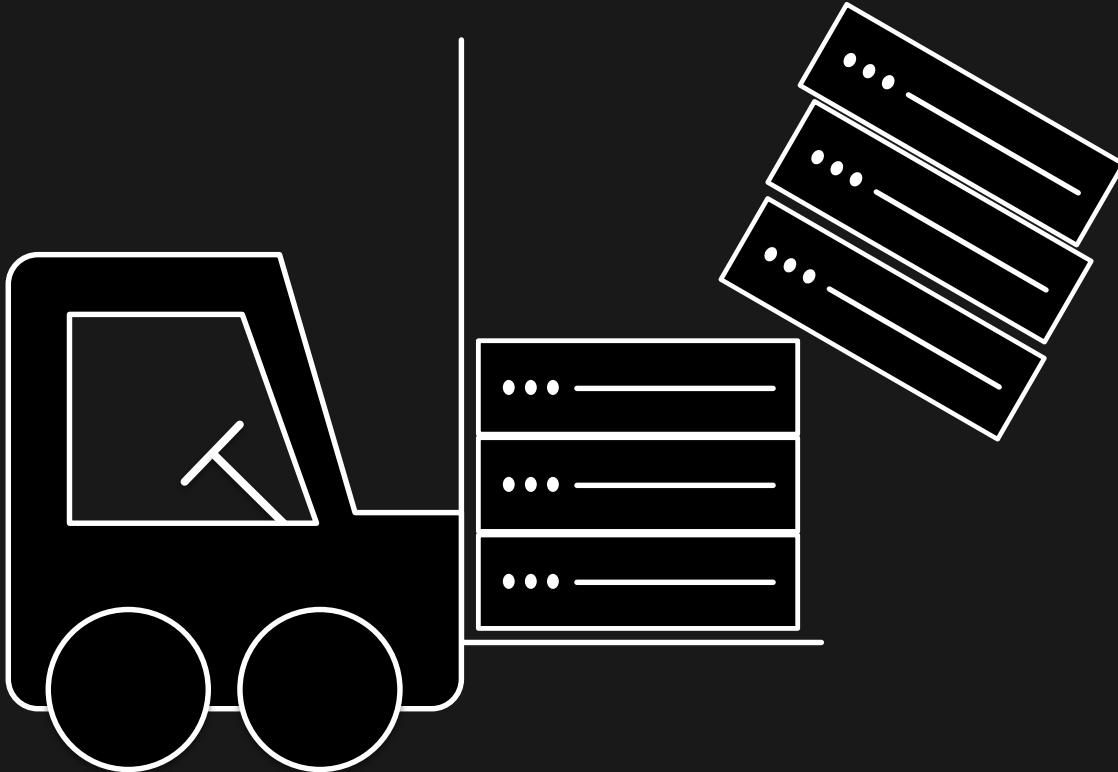
aws



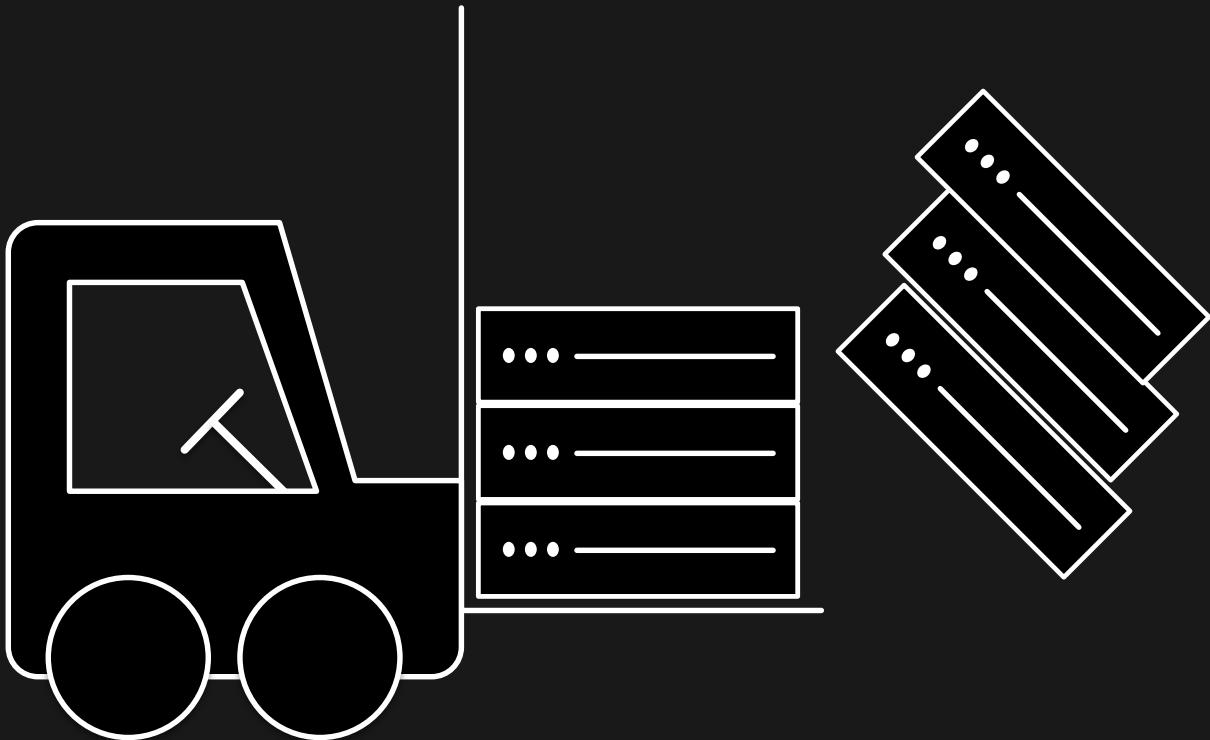
aws

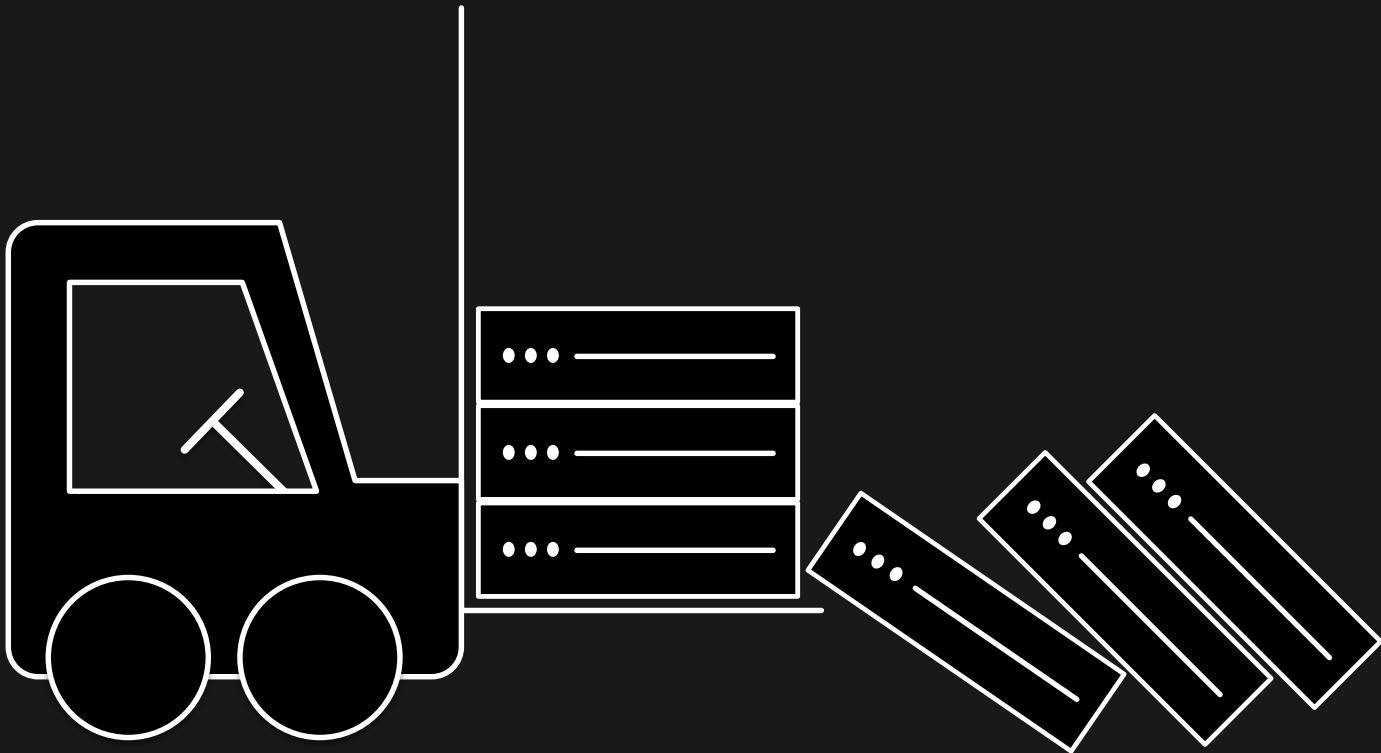


aws



aws







“Run Kubernetes for me.”



“Native AWS Integrations.”



"An Open Source Kubernetes Experience."



Amazon EKS

ELASTIC CONTAINER SERVICE FOR KUBERNETES
(EKS)



Tenet 1

EKS is a platform for enterprises
to run production-grade workloads

Tenet 2

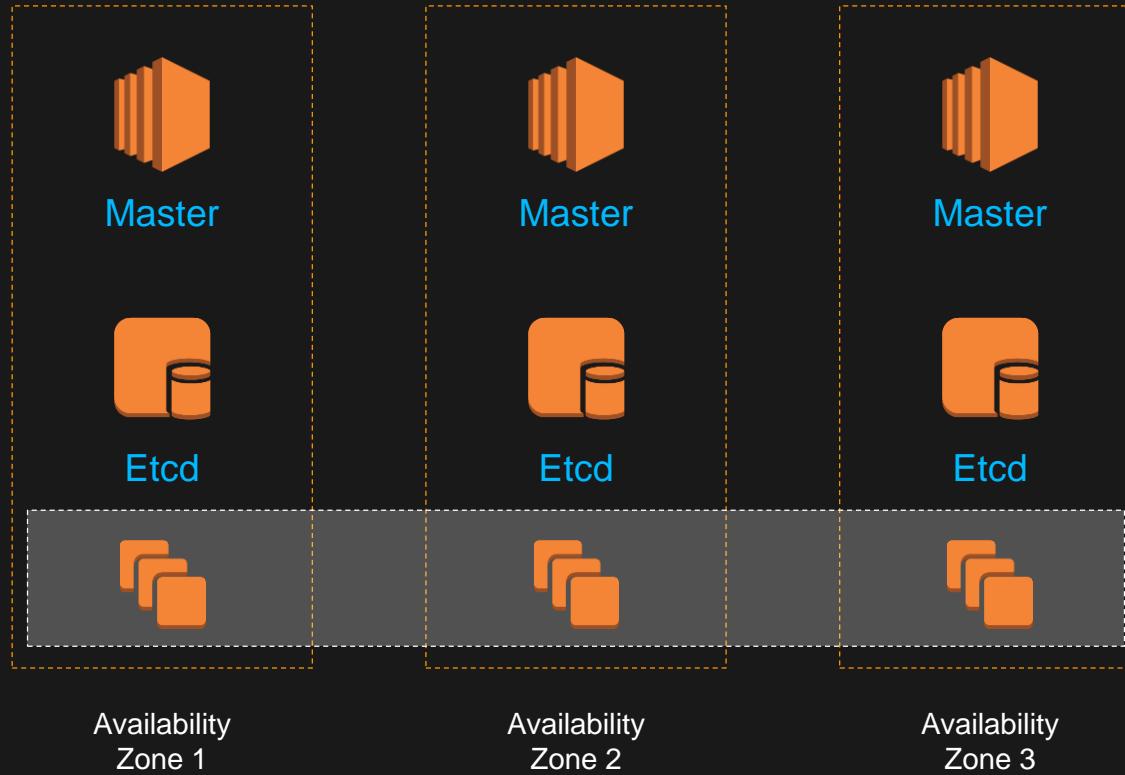
EKS provides a native and upstream Kubernetes experience

Tenet 3

If EKS customers want to use additional AWS services, the integrations are seamless and eliminate undifferentiated heavy lifting

Tenet 4

EKS team actively contributes
to the Kubernetes project





Kubectl



mycluster.eks.amazonaws.com



Availability
Zone 1

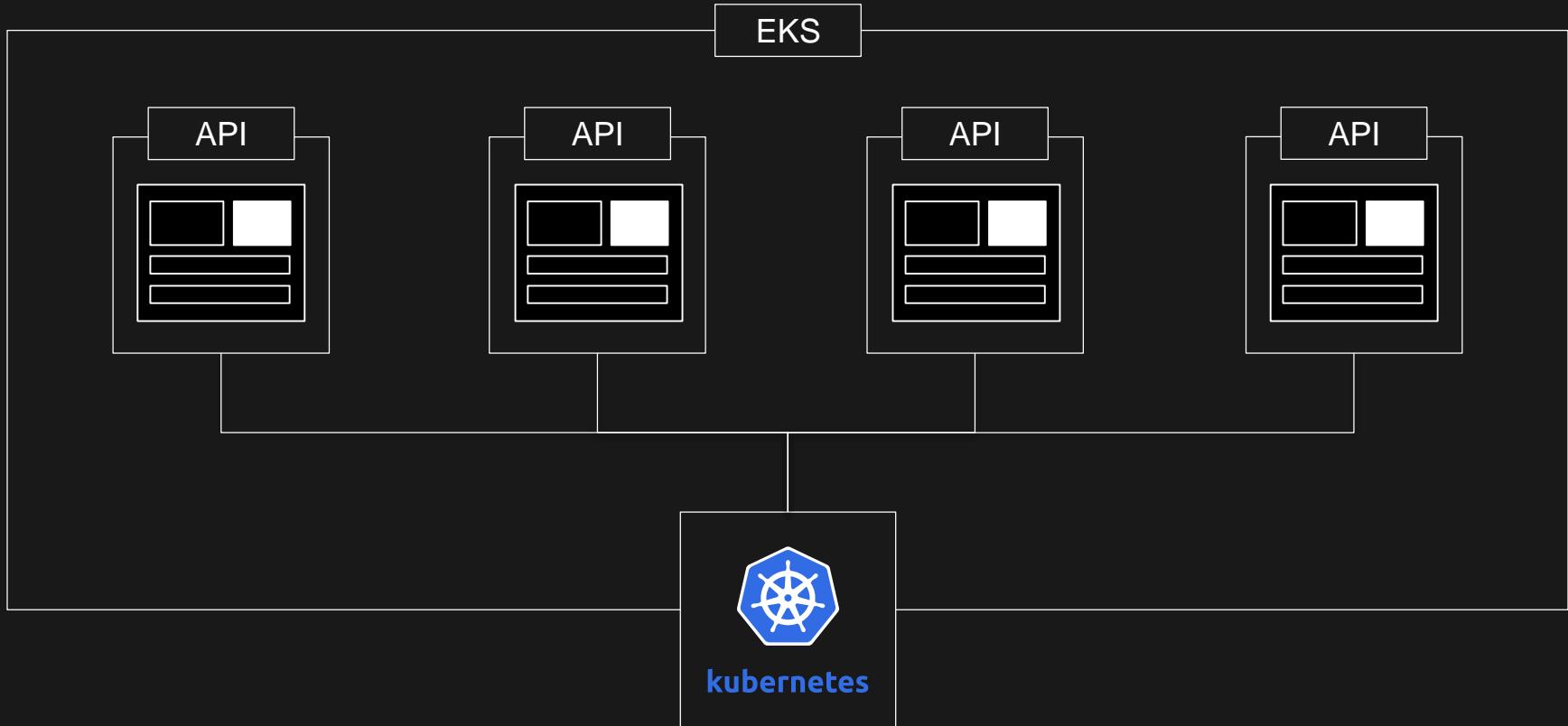


Availability
Zone 2



Availability
Zone 3





```
aws eks create-cluster -cluster-name k8conference -desired-master-version  
1.7.1 -role-arn arn:aws:iam::account-id:role/role-name
```

```
aws eks create-cluster
```

HTTP/1.1 200 Content-type:
application/json

```
{ "cluster":  
  {  
    "clusterName": "string",  
    "createdAt": number,  
    "currentMasterVersion": "string",  
    "desiredMasterVersion": "string",  
    "masterEndpoint": "string",  
    "roleArn": "string",  
    "status": "string",  
    "statusMessage": "string"  
  }  
}
```



```
aws eks describe-cluster --cluster-name k8conference
```

```
aws eks describe-cluster --cluster-name k8conference
```

HTTP/1.1 200 Content-type:
application/json

```
{ "cluster":  
  { "clusterName": "string",  
    "createdAt": number,  
    "currentMasterVersion": "string",  
    "desiredMasterVersion": "string",  
    "masterEndpoint": "string",  
    "roleArn": "string",  
    "status": "string",  
    "statusMessage": "string" }  
}
```



```
aws eks list-clusters
```

```
aws eks list-clusters
```

HTTP/1.1 200

Content-type: application/json

```
{  
  "clusterArns": [ "string" ],  
  "nextToken": "string"  
}
```

```
aws eks delete-cluster --cluster-name  
k8conference
```

```
aws eks delete-cluster --cluster-name k8conference
```

HTTP/1.1 200 Content-type:
application/json

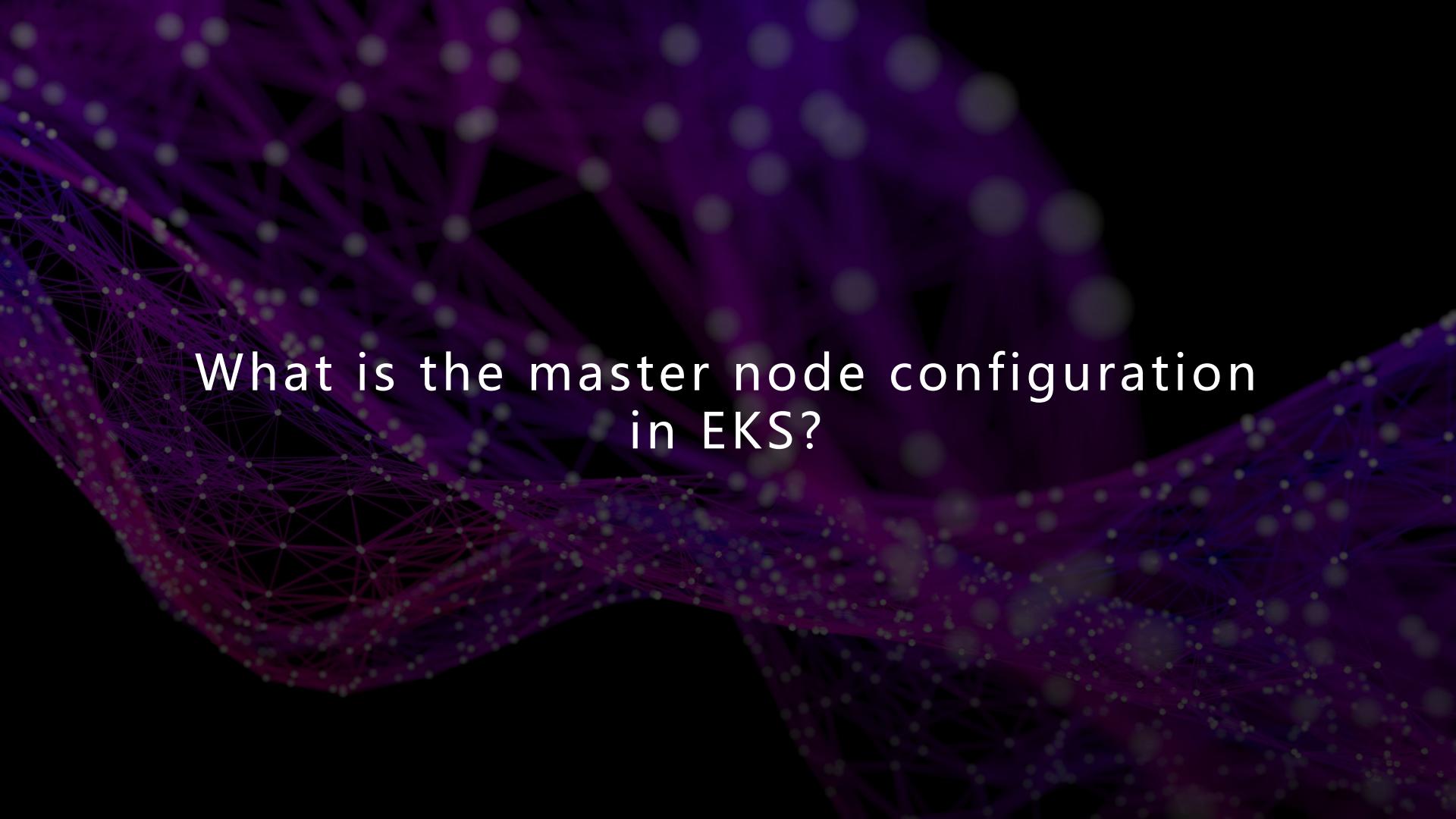
```
{ "cluster":  
  { "clusterName": "string",  
    "createdAt": number,  
    "currentMasterVersion": "string",  
    "desiredMasterVersion": "string",  
    "masterEndpoint": "string",  
    "roleArn": "string",  
    "status": "string",  
    "statusMessage": "string" }  
}
```



DEMO



How is EKS
architected?

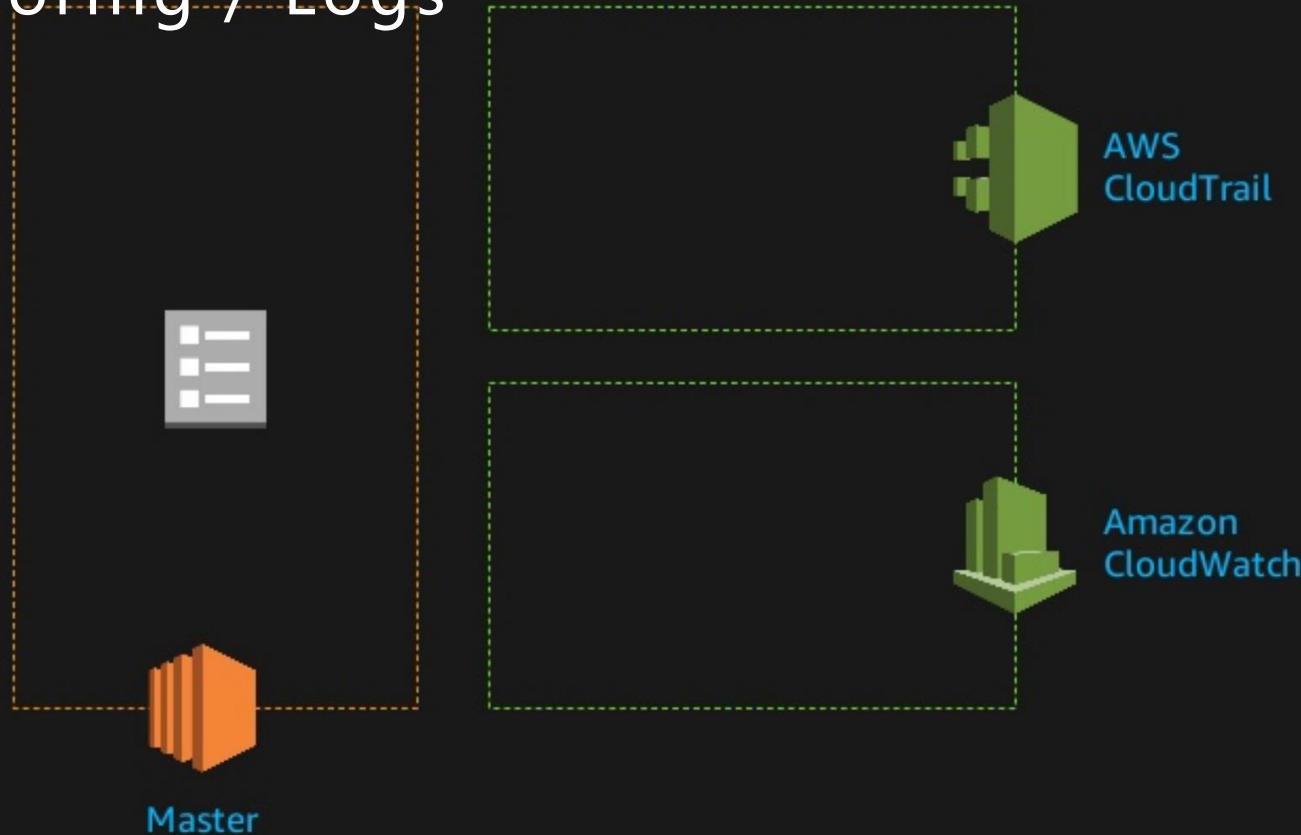
The background of the slide features a complex, abstract network structure composed of numerous small, glowing purple dots connected by thin, dark lines. This pattern creates a sense of depth and connectivity, resembling a neural network or a molecular lattice. It is set against a dark, solid background.

What is the master node configuration
in EKS?

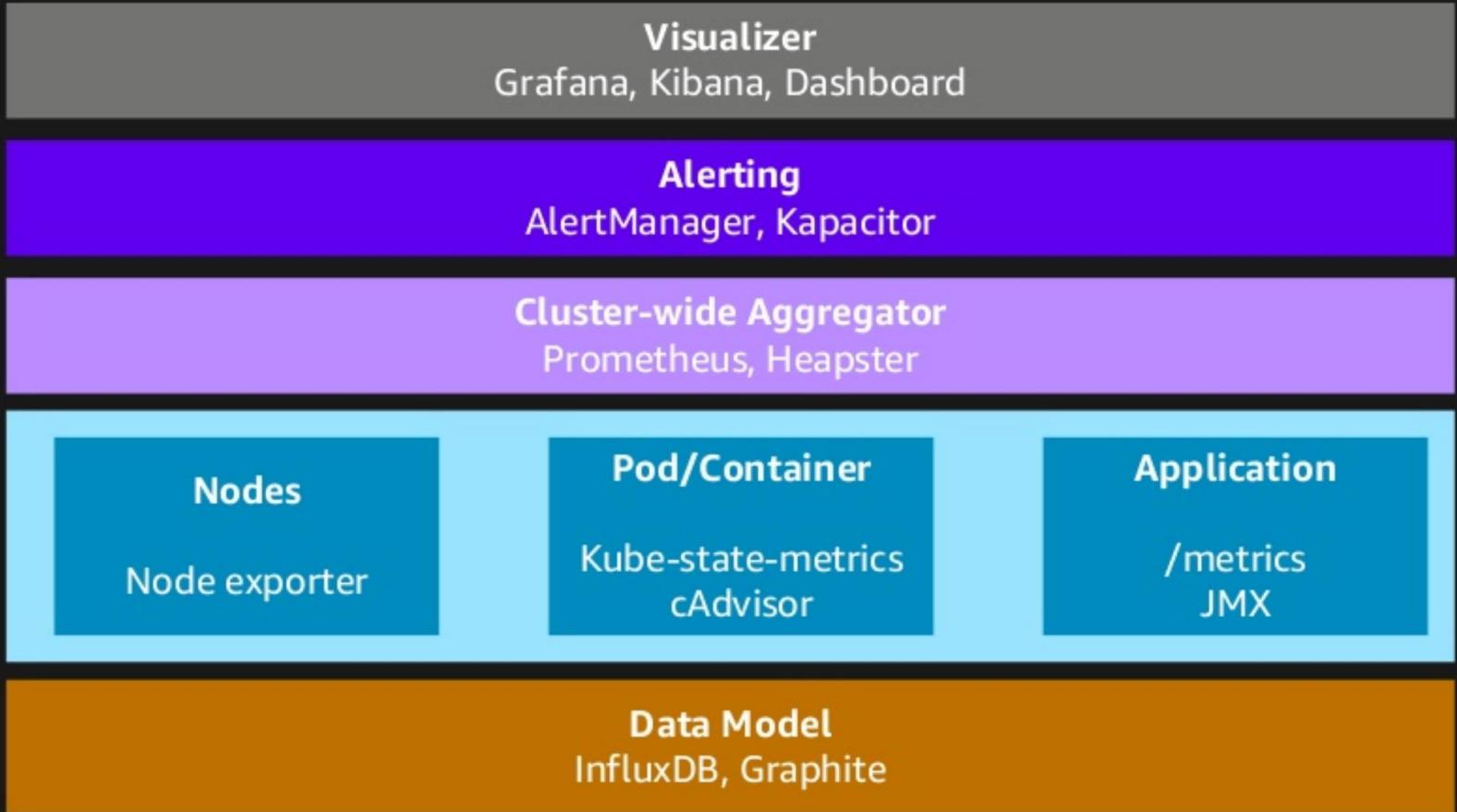
How do I get visibility into my EKS Masters?

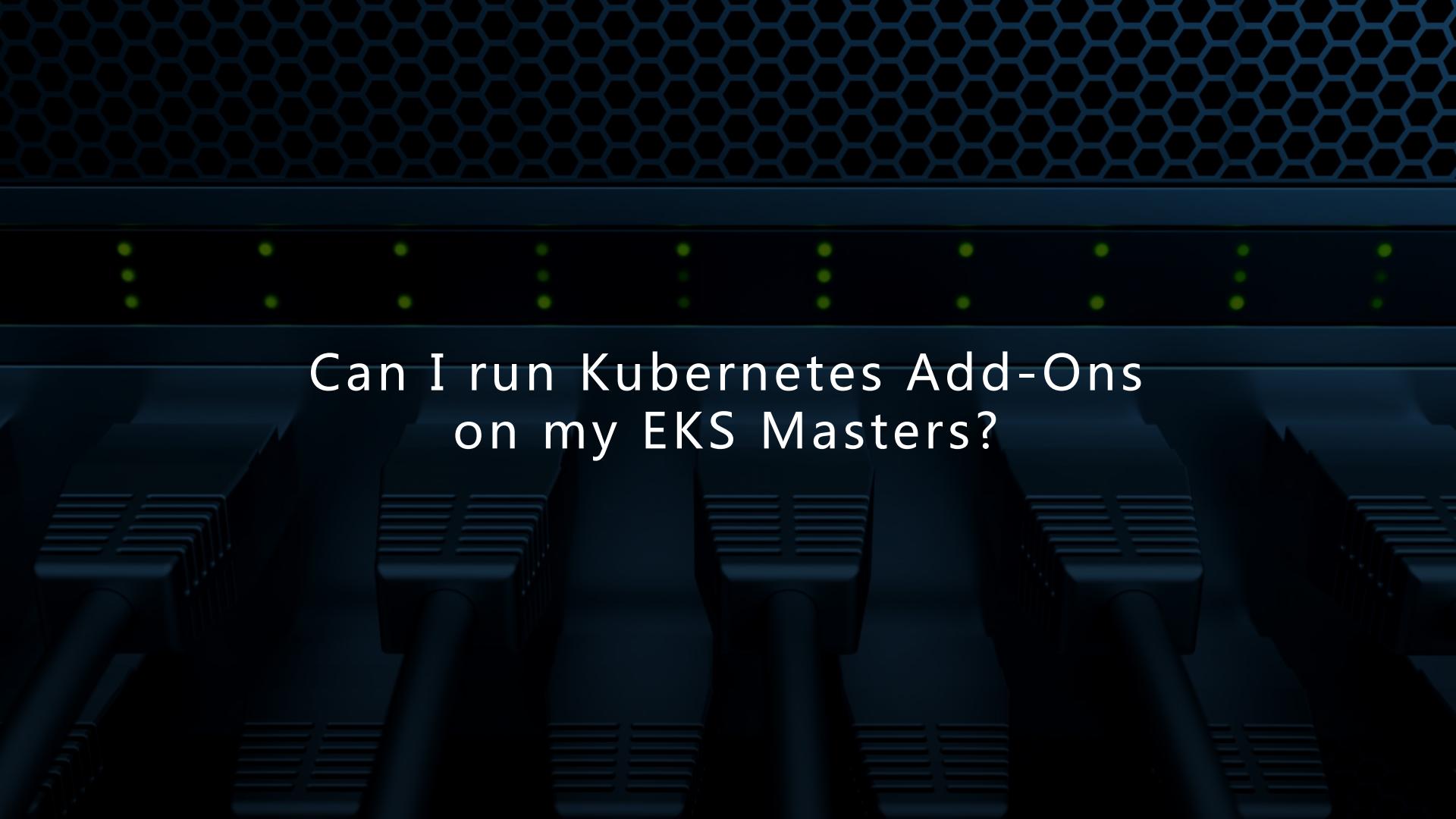
```
if operation == "MIRROR_X":  
    mirror_mod.use_x = False  
    mirror_mod.use_y = True  
    mirror_mod.use_z = False  
elif operation == "MIRROR_Z":  
    mirror_mod.use_x = False  
    mirror_mod.use_y = False  
    mirror_mod.use_z = True  
  
#selection at the end - add back the deselected mirror modifier object  
modifier_ob.select= 1  
modifier_ob.select= 0  
bpy.context.scene.objects.active = modifier_ob  
print("Selected" + str(modifier_ob)) # modifier ob is the active ob  
#mirror_ob.select = 0  
#one = bpy.context.selected_objects  
#one.data.materials.append(mate
```

Monitoring / Logs



Metrics

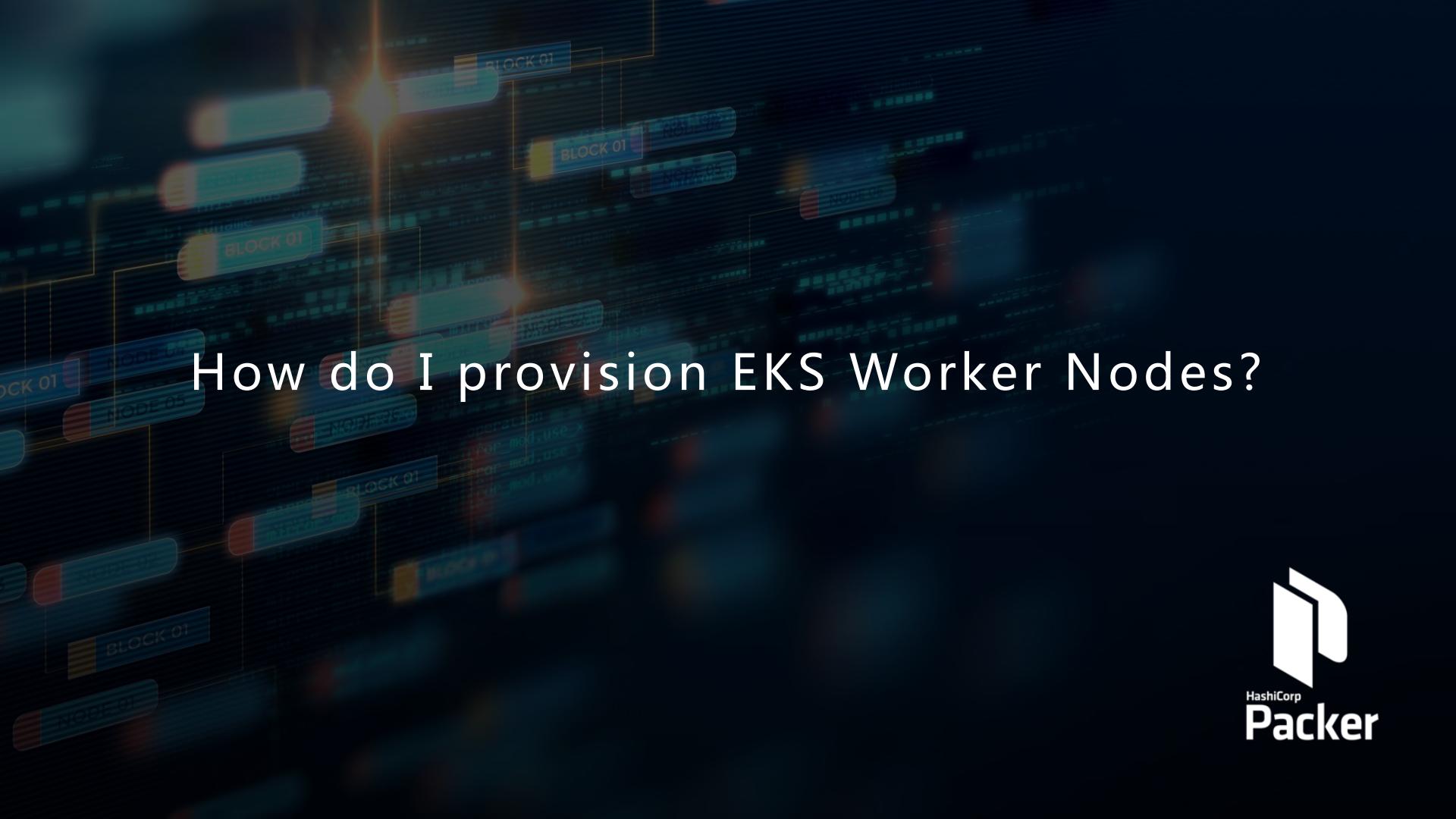




Can I run Kubernetes Add-Ons
on my EKS Masters?

A close-up photograph of a person's hand plugging a server blade into a rack. The server blade has a black faceplate with a circular badge and a blue handle. The rack contains several other server blades, each with a green and yellow striped top section. The background is dark, suggesting a server room.

EKS Worker Nodes



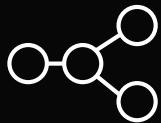
How do I provision EKS Worker Nodes?



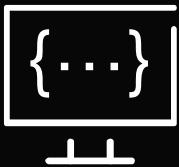
What is the networking configuration for EKS?



CNI



Native VPC networking
with CNI plugin



Pods have the same VPC
address inside the pod
as on the VPC



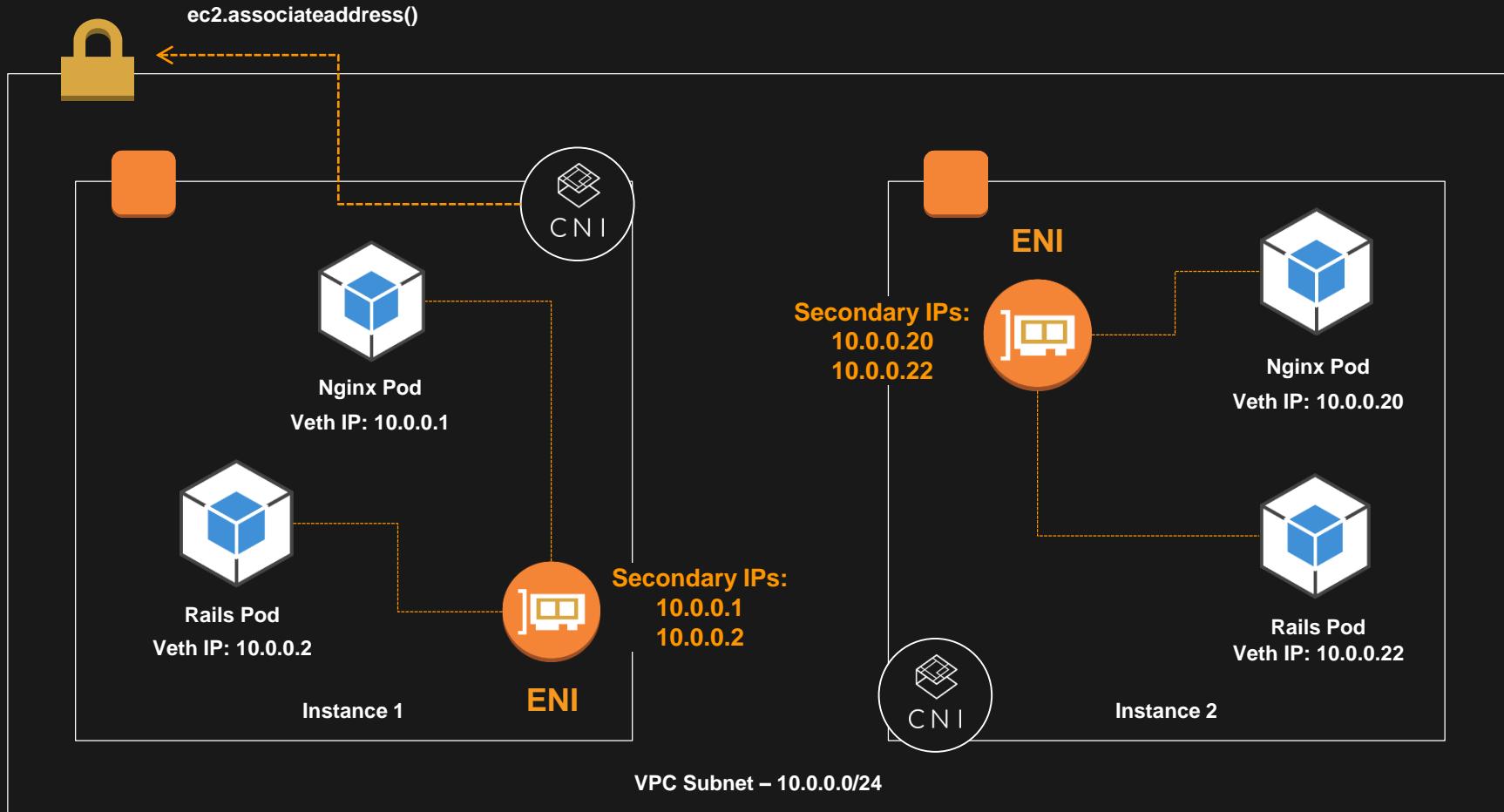
Simple, secure networking



Open source and
on Github

<https://github.com/aws/amazon-vpc-cni-k8s>







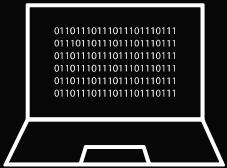
How do I configure network security with EKS?



Kubernetes Network Policies enforce network security rules



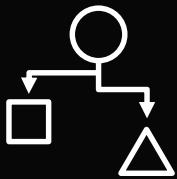
Calico is the leading implementation of the network policy API



Open source, active development (>100 contributors)

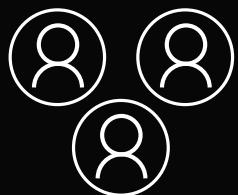


Commercial support available from Tigera



STAGE SEPARATION

Isolate dev, test, and prod



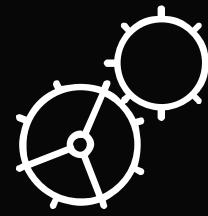
“TENANT” SEPARATION

E.g., typically use namespaces for different teams within a company—but without network policy, they are not network isolated



FINE-GRAINED FIREWALLS

Reduce attack surface within microservice-based applications



COMPLIANCE

E.g., PCI, HIPAA



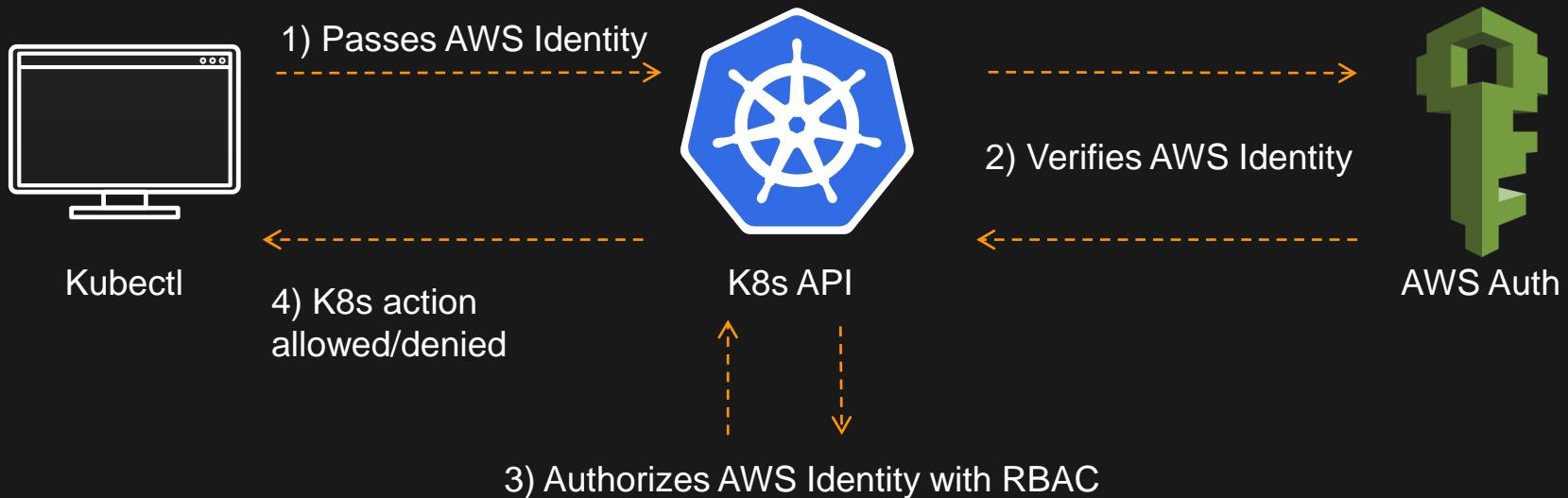
How does IAM authentication
work with Kubernetes?

Heptio IAM Authenticator

<https://github.com/heptiolabs/kubernetes-aws-authenticator>

An open source approach to integrating
AWS IAM authentication with Kubernetes



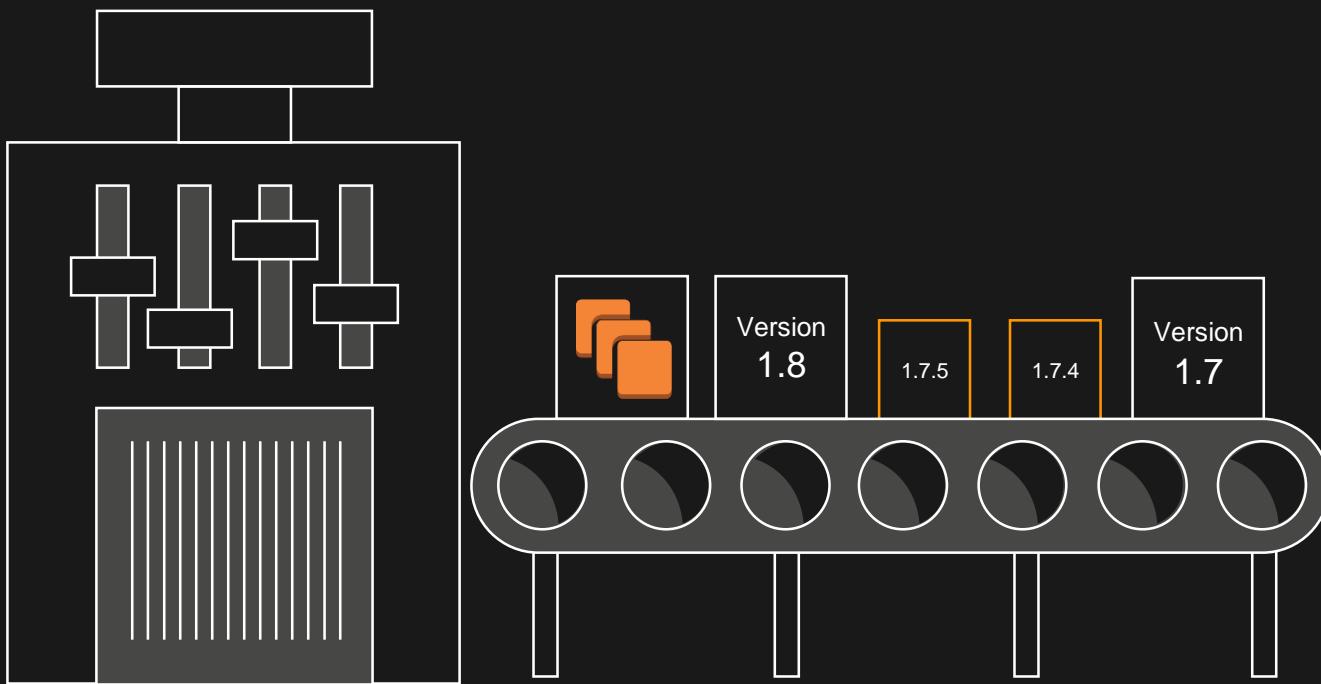


The background of the slide features a photograph of a vast wind farm at dusk or dawn. The sky is filled with warm orange and yellow hues, transitioning into darker blues and purples. Numerous wind turbines are silhouetted against the bright sky, their blades visible. In the foreground, there's a mix of dry, scrubby vegetation and some small, spiky desert plants like Joshua trees.

What version of Kubernetes
does EKS support?



kubernetes

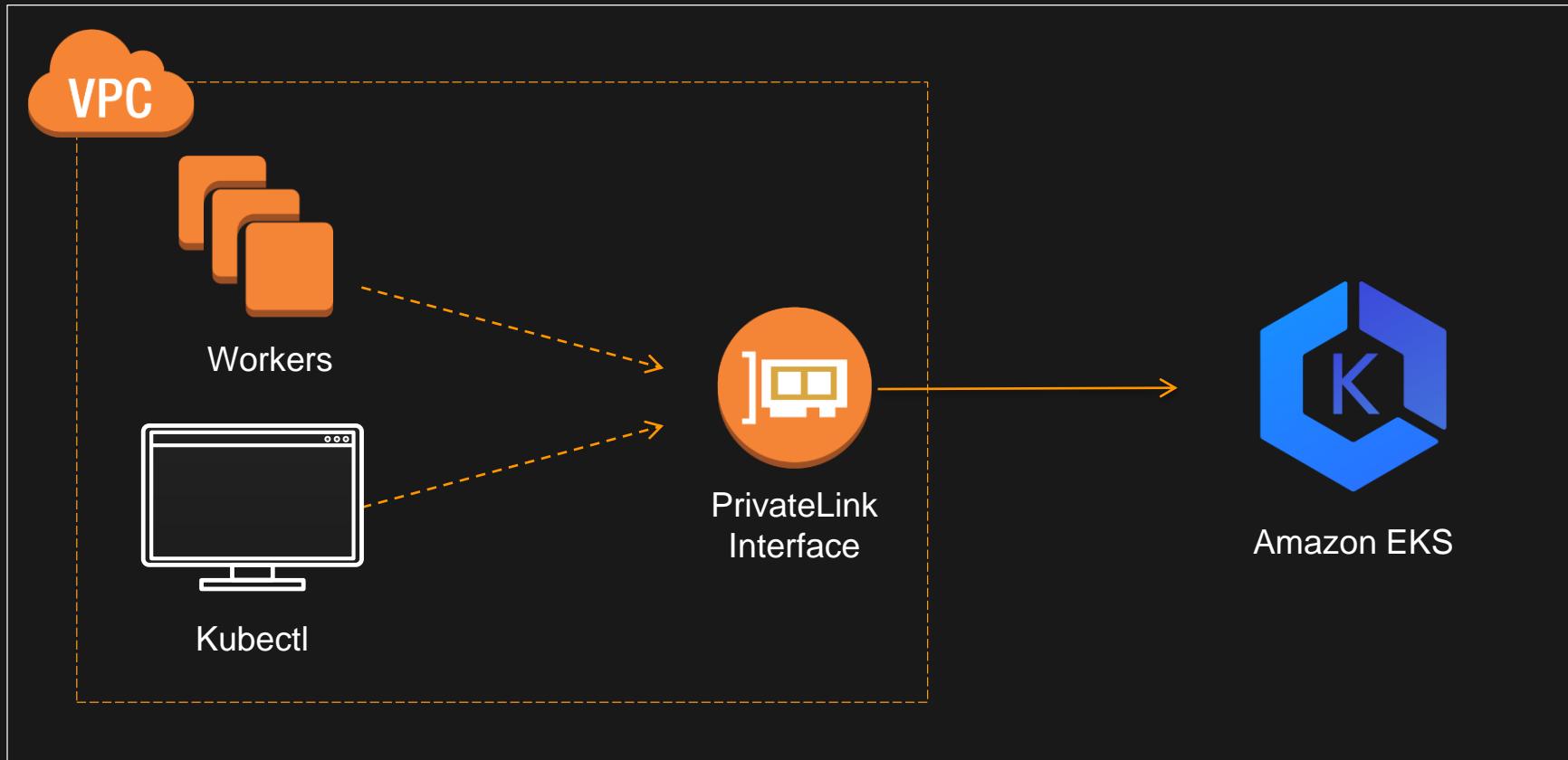




Can I use autoscaling with Amazon EKS?



Can I use PrivateLink Endpoints with EKS?



Roadmap

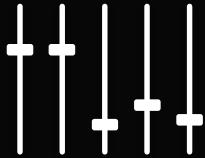


Fargate

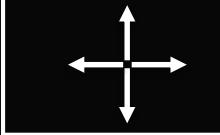
What is Fargate?



NO INFRA



MANAGE
EVERYTHING AT
THE CONTAINER



LAUNCH EASILY,
SCALE QUICKLY



RESOURCE
BASED PRICING

PLANNED FOR 2018...



Fargate



Amazon EKS



Prioritizing open source

CNI plugin

Allow Kubernetes users to take advantage of native
VPC networking in their Kubernetes pods



Open source Kubernetes community



CODE
REVIEWS



FIXING
BUGS



IMPLEMENTING
NEW FEATURES

What's next?

SIGN-UP FOR
PREVIEW!

GENERALLY
AVAILABLE 2018

LEARN MORE:
[AWS.AMAZON.
COM/EKS/
PREVIEW](https://aws.amazon.com/eks/)

Kubernetes on AWS Workshop

github.com/aws-samples/aws-workshop-for-kubernetes

Q & A

Thank you!