AMAZON KUBERNETES SERVICES

Kubernetes is open source software that allows you to deploy and manage containerized applications at scale. Kubernetes manages clusters of Amazon EC2 compute instances and runs containers on those instances with processes for deployment, maintenance, and scaling.

In Kubernetes, a Service is an abstraction which defines a logical set of Pods and a policy by which to access them (sometimes this pattern is called a micro-service). The set of Pods targeted by a Service is usually determined by a selector.

Both Amazon EC2 Container Service (ECS) and Kubernetes are fast, highly scalable solutions for container management that allow you to run containerized applications in a cluster of managed servers. ... After the Kubernetes 0.1 release in July 2015, Google donated Kubernetes to the Cloud Native Computing Foundation.

Getting started with Amazon EKS is easy: Create an Amazon EKS cluster in the AWS Management Console or with the AWS CLI or one of the AWS SDKs. Launch managed or self-managed nodes that register with the Amazon EKS cluster. We provide you with an AWS CloudFormation template that automatically configures your nodes.

A fundamental difference between Kubernetes and Docker is that Kubernetes is meant to run across a cluster while Docker runs on a single node. Kubernetes is more extensive than Docker Swarm and is meant to coordinate clusters of nodes at scale in production in an efficient manner.

Kubernetes distributions leading the container revolution

- **CoreOS Tectonic/Red Hat CoreOS.**
- **Canonical Distribution of Kubernetes.**
- **Docker Community Edition / Docker Enterprise.**
- **Heptio Kubernetes Subscription.**
- **Kontena Pharos.**

- **Pivotal Container Service (PKS)**
- **Rancher 2.0.**
- **Red Hat OpenShift.**

Kubernetes is open source, financially backed by hundreds of organizations, and is managed by the Cloud Native Computing Foundation. Kubernetes isn't a PaaS, it's a foundation on which to build a PaaS. Think of Kubernetes and the cloud native community as a set of building blocks.

Unlike other systems you may have used in the past, Kubernetes doesn't run containers directly; instead it wraps one or more containers into a higher-level structure called a pod. Any containers in the same pod will share the same resources and local network. Pods are used as the unit of replication in Kubernetes.

Quite the contrary; Kubernetes can run without Docker and Docker can function without Kubernetes. But Kubernetes can (and does) benefit greatly from Docker and vice versa. Docker is a standalone software that can be installed on any computer to run containerized applications. Kubernetes turns it up to 11, so to speak.

If you are new to containers and are looking for a simple way to set up and deploy clusters, perhaps ECS is the easier choice. On the other hand, if you are experienced and are looking for a better way to scale your clusters and avoid vendor lock-in, perhaps EKS is the solution for you.

Amazon Elastic Kubernetes Service (EKS) is a managed Kubernetes service that makes it easy for you to run Kubernetes on AWS without needing to install, operate, and maintain your own Kubernetes control plane

With the widespread adoption of containers among organizations, Kubernetes, the container-centric management software, has become the de facto standard to deploy and operate containerized applications. Google Cloud is the home

of Kubernetes—originally developed at Google and released as open source in 2014.

Advertisements. Secrets can be defined as Kubernetes objects used to store sensitive data such as user name and passwords with encryption. There are multiple ways of creating secrets in Kubernetes.

Learn Kubernetes in simple, easy and fun way with hands-on coding exercises. Kubernetes is an open-source system for automating deployment, scaling and management of containerized applications that was originally designed by Google and now maintained by the Cloud Native Computing Foundation.

EKS runs the Kubernetes management infrastructure across multiple AWS Availability Zones, automatically detects and replaces unhealthy control plane nodes, and provides on-demand, zero downtime upgrades and patching.

Create a Service to expose your Deployment

1. **In the Deployment details page, click Expose.**
2. **In the New port mapping box, set Port to 80, and set Target port to 8080**
3. **From the Service type drop-down menu, select Cluster IP.**
4. **For Service name, enter my-cip-service.**
5. **Click Expose.**

When deploying Kubernetes in AWS, you can configure and manage your deployment by yourself for full flexibility and control. You also have the option of using either AWS-provided services or third-party services to manage your implementation.

ALTERNATIVES TO SELF-MANAGEMENT INCLUDE

KOPS

an open source tool you can use to automate the provisioning and management of clusters in AWS. Although not a managed tool, kops does enable you to simplify deployment and maintenance processes. It is officially supported by AWS.

AMAZON ELASTIC KUBERNETES SERVICE(EKS)

A managed service offered by AWS. EKS uses automatically provisioned instances and provides a managed control plane for your deployment.

RANCHER

A complete enterprise computing platform to deploy Kubernetes clusters everywhere: on-premises, in the cloud and at the edge. Rancher unifies these clusters to ensure consistent operations, workload management and enterprise-grade security.

CREATING A KUBERNETES CLUSTER ON AWS WITH KOPS

Kops lets you create Kubernetes clusters in a few simple steps.Prerequisites for kops:

- **Create an AWS account**
- **Install the AWS CLI**
- **Install kops and kubectl**
- **Create a dedicated user for kops in IAM**
- **You can set up DNS for the cluster, or, as an easy alternative, create a gossip-based cluster by having the cluster name end with k8s.local**

CREATING A KUBERNETES CLUSTER WITH ELASTIC KUBERNETES SERVICE

EKS helps manage cluster set up and creation. It offers multi-AZ support and provides automatic replacement of failed or nodes. It also enables on-demand patches and upgrades to clusters. EKS automatically creates three master nodes

for each cluster, spread out across three availability zones, as illustrated below. This prevents single points of failure and provides high availability out of the box.

A few prerequisites for creating a cluster on EKS:

- **Create an AWS account**
- **Create an IAM role that Kubernetes can use to create new AWS resources**
- **Create a VPC & security group for your Kubernetes cluster – Amazon strongly recommend creating a separate VPC and security group for each cluster**
- **Install kubectl – see instructions for installing the Amazon EKS-vended version**
- **Install the Amazon CLI**

CREATING A KEBERNETES CLUSTER WITH RANCHER ON EKS

Using Rancher, you can manage Kubernetes clusters directly on AWS, within the EKS service or across hybrid or multi-cloud systems. Rancher enables you to centrally manage your cluster policies and helps ensure consistent and reliable container access. Rancher provides the following additional capabilities not fully available in plain Amazon EKS:

- **Centralized user authentication & RBAC - you can integrate Rancher with LDAP, Active Directory or SAML-based authentication services. This enables you to consistently enforce role-based access control (RBAC) policies across your environments. Centralized RBAC is the preferred way to manage access and permissions as it reduces administrative requirements and makes management of permissions easier.**
- **UI in a single pane of glass - you manage Rancher from an intuitive web interface. This enables DevOps teams to easily deploy and troubleshoot workloads and operations teams to smoothly release and link services and applications across environments. Simplified management also eliminates**

the need to know specifics of your infrastructure of Kubernetes distribution and promotes greater workflow efficiency.

- **Enhanced cluster security - Rancher enables you to centrally define security policies and procedures. Security teams can set policies dictating how users are allowed to interact with clusters and how workloads operate across infrastructures. These policies can then be immediately pushed to any clusters as needed.**
- **Multi and hybrid-cloud support - included with Rancher are global application catalogs that you can use across Kubernetes clusters, regardless of location. These catalogs provide access to apps ready for immediate deployment, creating standardized application configurations across your services. Using these apps, you can significantly reduce the load on your operations and development teams.**
- **Tools integration - Rancher includes built-in integrations with the Istio service mesh, Prometheus and Grafana for monitoring, Fluentd for logging. In combination, these integrations help you manage deployments across clouds regardless of service variations.**