KubeOne

Kubernetes Cluster Lifecycle Management Tool

Who are we?

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Agenda

- Introduction to KubeOne
- Core concepts and architecture
- Demo: Manage Kubernetes HA cluster on AWS
- Demo: Configure the cluster and explore KubeOne features

Introduction

What is KubeOne?

- A tool for **managing** Kubernetes **cluster lifecycle**
  - Installs and provisions Kubernetes, upgrades, un-provisions the cluster
- **Open source** and **vendor neutral**
- Works on the most popular **cloud providers**, on **on-prem** and on **bare metal**
- Supports **1.13+ Highly-Available** clusters

Why we built KubeOne?

- Kubernetes brought us a new way for managing our workload...
- but managing Kubernetes clusters is still a hard task.
- We want to apply lessons learned managing workload to clusters.

In a search for a **feature-complete** solution, we decided to build **KubeOne**

Why KubeOne?

- Uses the **latest technologies** to bring **many features** in an **easy to consume** manner
- Brings **declarative** cluster representation
- Provides **ready to use** cluster
- Optionally configures various features on the provisioning time:
  - PodSecurityPolicy, DynamicAuditLog, metrics-server and more
- Ability to integrate KubeOne with **infrastructure provisioning tools**

Supported providers

- KubeOne is supposed to work on **any** provider, including on-prem and bare metal
- Officially supported providers enjoy **additional features** such as:
  - Support for managing worker nodes using Kubermatic machine-controller
  - Automatically deploy cloud provider specific features like external CCM
  - Use Terraform integration to pick up information about infrastructure from the Terraform state
- Officially supported providers include AWS, GCE, DigitalOcean, Hetzner, Packet, OpenStack and VMware vSphere
- Support for Microsoft Azure is coming up soon

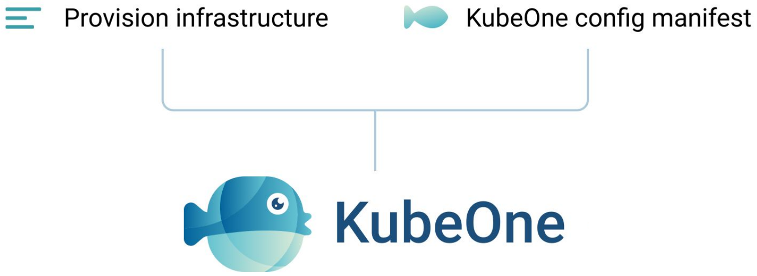
Architecture

Architecture

- KubeOne uses many tools/solutions as **building blocks**
  - kubeadm is used to provision and join **control plane nodes** and handle **cluster upgrades**
  - Kubermatic machine-controller based on Cluster-API is used to manage **worker nodes**
- The environment is prepared over SSH
  - Including installing and upgrading binaries, configuring components and running kubeadm
- client-go is used for deploying various cluster features such as CNI

Installation process

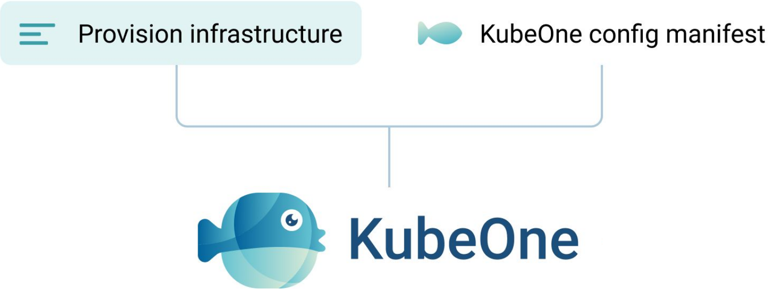
Installation process



Provision infrastructure

KubeOne config manifest

Installation process



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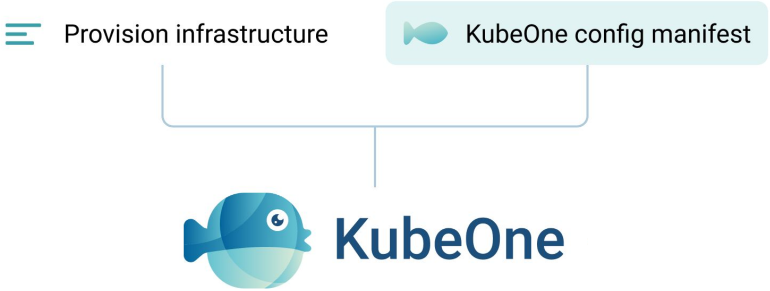

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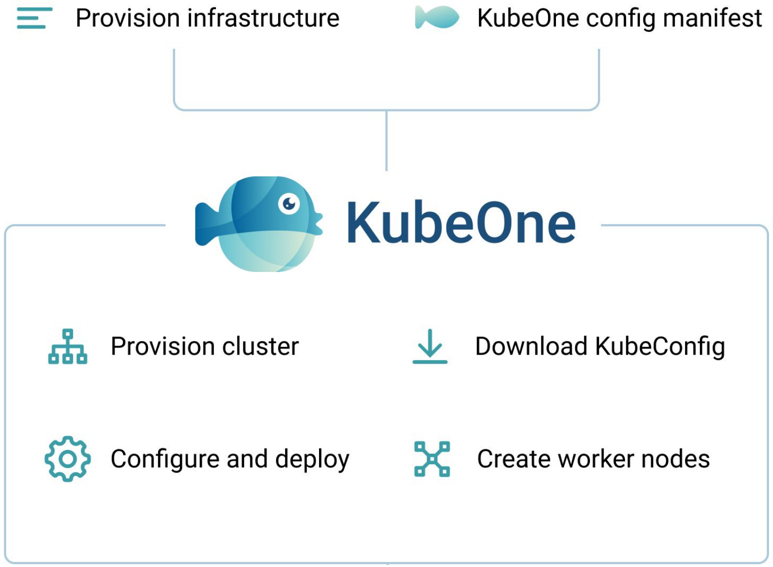


Provision infrastructure

KubeOne config manifest

KubeOne

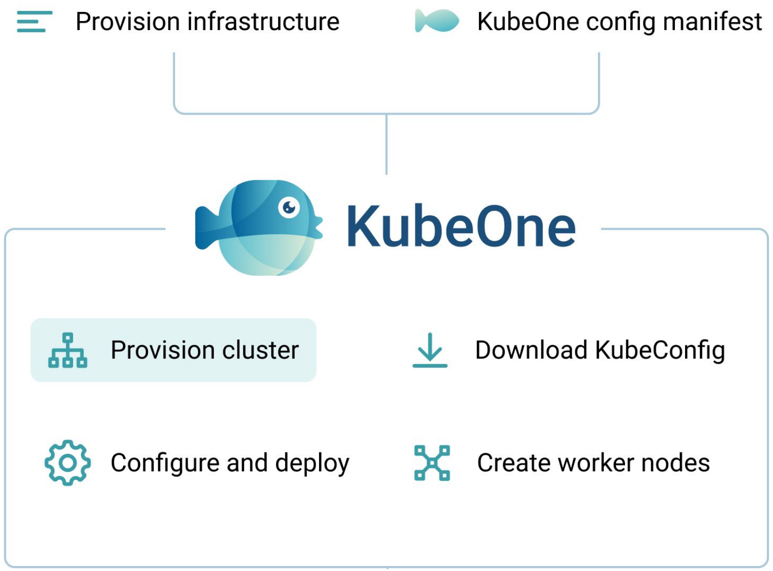
Provision cluster

Download KubeConfig

Configure and deploy

Create worker nodes

Installation process



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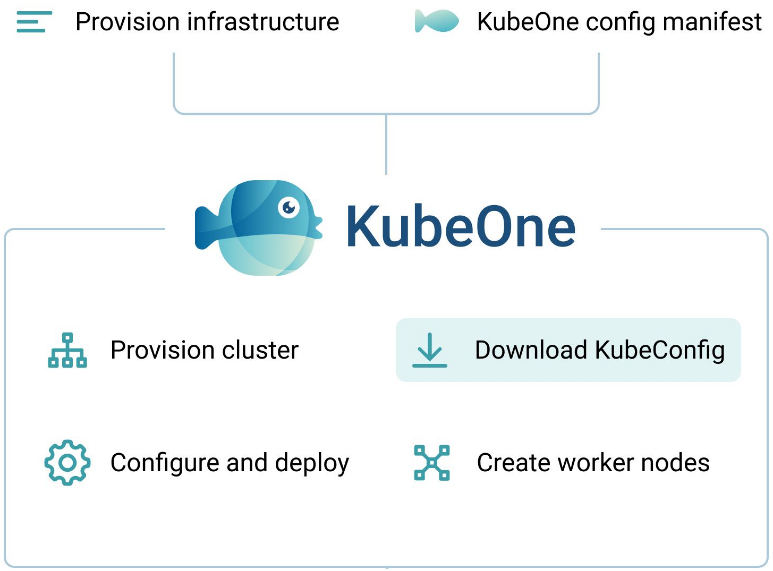

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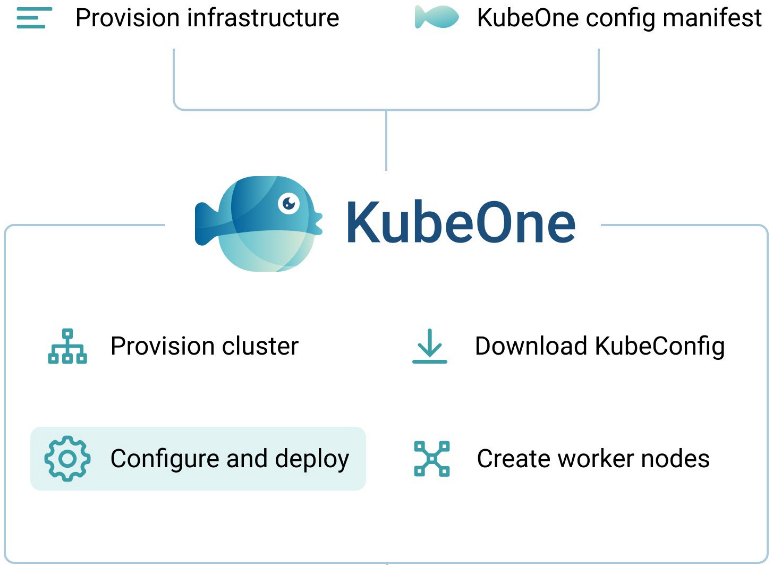

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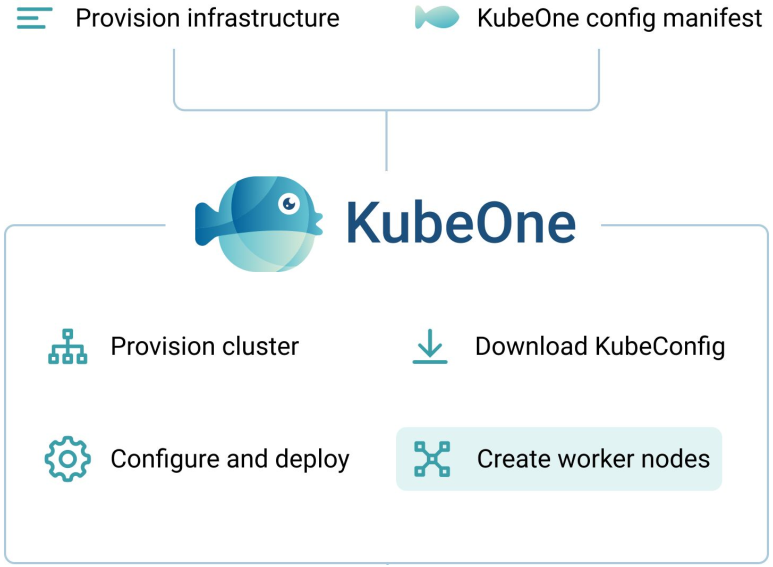

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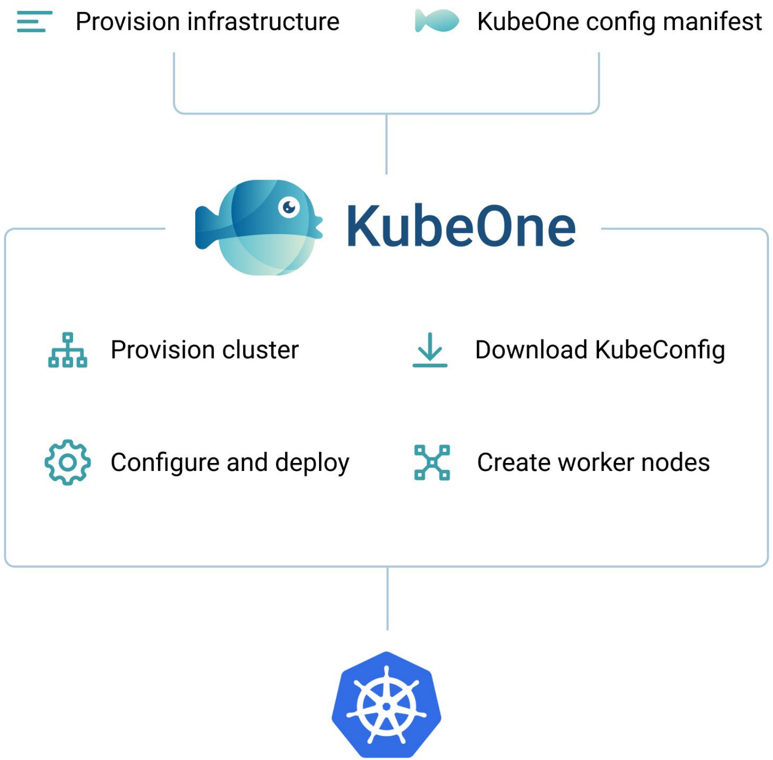

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Provision cluster

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Configure and deploy

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Demo time!

Create cluster on AWS

Create cluster on AWS

- Step 1: Create instances and infrastructure to be used by Kubernetes
  - KubeOne comes with example Terraform scripts that can be used to get started
- Step 2: Build KubeOne configuration manifest
  - Defines what Kubernetes version will be installed, what machines will be used, how the cluster will be provisioned…
- Step 3: Run `` `kubeone install` `` command
- Step 4: Enjoy!

Building KubeOne Cluster manifest

```yaml
apiVersion: kubeone.io/v1alpha1
kind: KubeOneCluster
versions:
  kubernetes: 1.14.2
cloudProvider:
  name: aws
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Upgrade process

Upgrade process

- The control plane nodes are upgraded **in-place**
- Upgrading control plane nodes include upgrading:
  - Kubernetes binaries
  - core Kubernetes components
  - all components deployed by KubeOne
- Worker nodes are upgraded by **rolling out** MachineDeployment

Conclusion

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KubeOne is a tool for **managing** Kubernetes **cluster lifecycle**

- Find KubeOne on GitHub: **https://github.com/kubermatic/kubeone**
- Follow us on Twitter: @Loodse, @xmudrii, @kron4eg
- Check out Loodse blog: https://loodse.com/blog
- Join `#kubeone` on Kubermatic Slack: http://slack.kubermatic.io

Thank you for your time!