# KubeOperator – Hop onto the sailing of Kubernetes

[![License](http://img.shields.io/badge/license-apache%20v2-blue.svg)](https://github.com/KubeOperatpr/KubeOperatpr/blob/master/LICENSE)

[![Python3](https://img.shields.io/badge/python-3.6-green.svg?style=plastic)](https://www.python.org/)

[![Django](https://img.shields.io/badge/django-2.1-brightgreen.svg?style=plastic)](https://www.djangoproject.com/)

[![Ansible](https://img.shields.io/badge/ansible-2.6.5-blue.svg?style=plastic)](https://www.ansible.com/)

[![Angular]([https://img.shields.io/badge/angular-7.0.4-red.svg?style=plastic)](https://www.angular.cn/](https://img.shields.io/badge/angular-7.0.4-red.svg?style=plastic)%5d(https://www.angular.cn/))

## What is KubeOperator?

KubeOperator is an open-source light-weighted Kubernetes distribution that focuses on helping enterprises plan, deploy, and operate production-grade Kubernetes clusters in an offline network environment. It has a graphic Web UI that fasten up the process of software lifecycle in this current rapid cloud age.

## How it works?

KubeOperator uses Terraform to auto-build infrastructure on LaaS platform (vSphere, OpenStack, user can also use their resources, e.g. VMs or On-premise). It also implements automated deployment and allows changing operation through Ansible, supporting Kubernetes clusters a full life-cycle self-defined management from Day 0 planning, Day 1 deployment, to Day 2 operating. KubeOperator really achieves the idea of Kubernetes as a service.

The following image is the whole architecture of KubeOperator:

![Architecture](<https://kubeoperator.io/images/screenshot/ko-framework.svg>) (or the new translated one)

> Note: KubeOperator passed the [Certified Kubernetes Conformance Program] (https://landscape.cncf.io/selected=kube-operator) provided by CNCF (Cloud Native Computing Foundation)

## Screenshot of the Web UI

![Web UI](<https://kubeoperator.io/images/screenshot/6.png>)

> [More features screenshot of KubeOperator](<https://docs.kubeoperator.io/kubeoperator-v2.2/screenshot>)

## Technology Advantages

- Easy to Use: Using a visible Web UI that significantly lower down the difficulty of K8s deployment and management, built-in with Webkubectl.

- Offline Support: Continue updating Kubernetes and common components of the offline pack

- Build by demand: Calling cloud platform API, build and deploy Kubernetes cluster in just a click

- Scale by demand: Swiftly scale Kubernetes clusters and improve resources utilization

- Patch by demand: rapid update, patch Kubernetes cluster and being up to date with the community version

- Self Repair: Through rebuilding malfunction node to confirm the usability of the cluster

- Full-Stack Monitoring: Full record of events, monitoring, warning and journaling from node, pod, to cluster

- Multi-AZ Support: Master nodes are distributed in different failure domain to make sure the high usability

- Marketplace: built-in with KubeApps Plus marketplace. Able to deploy and manage common apps quickly

- GPU Support: Support with GPU nodes which help operating high computation applications such as machine learning

## Features List

<table class=”subscription-level-table”>

<tr class=”subscription-level-tr-border”>

<td class=”features-first-td-background-style” rowspan=”15”>Day 0 Planning

</td>

<td class=”features-third-td-background-style” rowspan=”2”>Cluster Model

</td>

<td class=”features-third-td-background-style”>1 master node with N number of worker nodes : suitable for develop testing purpose

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<tr class=”subscription-level-tr-border”>

<td class=”features-third-td-background-style”>3 master nodes with N number of worker nodes : suitable for production-grade purpose

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<tr class=”subscription-level-tr-border”>

<td class=”features-third-td-background-style” rowspan=”3”>Calculation Scheme

</td>

<td class=”features-third-td-background-style”>Independent Host : support self-prepared VMs, public clouds or physical machines

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<tr class=”subscription-level-tr-border”>

<td class=”features-third-td-background-style”>vSphere Platform : Support auto-build host (using Terraform)

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<td class=”features-third-td-background-style”>OpenStack Platform : Support auto-build host (using Terraform)

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<td class=”features-third-td-background-style” rowspan=”3”>Storage Scheme

</td>

<td class=”features-third-td-background-style”>Independent host : Support NFS / Ceph RBD / Local Volume

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<tr class=”subscription-level-tr-border”>

<td class=”features-third-td-background-style”>vSphere Platform : Support vSphere Datastore (Centralized storage that compatible with vSAN & vSphere)

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<td class=”features-third-td-background-style”>OpenStack Platform : Support OpenStack Cinder (Centralized storage that compatible with Ceph & Cinder)

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<td class=”features-third-td-background-style” rowspan=”4”>Network Scheme

</td>

<td class="features-third-td-background-style">Support Flannel / Calico Network Plug-ins

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style"> Support internet expose service through F5 Big IP

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style">Support Traefik / Ingress-Nginx

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style">Support CoreDNS

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<td class="features-third-td-background-style">GPU Scheme

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<td class="features-third-td-background-style">Support NVIDIA GPU

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style">Operating System

</td>

<td class="features-third-td-background-style">Support RHEL/CentOS 7.4+

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<td class="features-third-td-background-style">Running on Container

</td>

<td class="features-third-td-background-style">Support Docker / containerd

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<tr class="subscription-level-tr-border">

<td class="features-first-td-background-style" rowspan="3">Day 1 Deploying

</td>

<td class="features-third-td-background-style" rowspan="3">Deployment

</td>

<td class="features-third-td-background-style">Provide full installation package in an offline environment

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<td class="features-third-td-background-style">Support a visible screen of the deploying process

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<td class="features-third-td-background-style">Support one-click automation deployment (using Ansible)

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<tr class="subscription-level-tr-border">

<td class="features-first-td-background-style" rowspan="21">Day 2 Operating

</td>

<td class="features-third-td-background-style" rowspan="9">Management

</td>

<td class="features-third-td-background-style"> Support project-centralized hierarchical authorization management

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<td class="features-third-td-background-style">3 roles: system admin, project admin and read-access user

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<td class="features-third-td-background-style">Support docking with LDAP/AD

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<td class="features-third-td-background-style">Expose with REST API

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style"> Install K8s Dashboard Management app through Kubeapps+

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style"> Install Weave Scope Management app through Kubeapps+

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style">Support Web Kubectl UI

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<td class="features-third-td-background-style">Built-in with Helm

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<td class="features-third-td-background-style">Constant updating certificate

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<td class="features-third-td-background-style" rowspan="4">Observable

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<td class="features-third-td-background-style">Built-in with Promethus, support fully monitoring & alarming of clusters, pods, nodes, and container

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<td class="features-third-td-background-style">Built-in with Loki log system

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<td class="features-third-td-background-style">Built-in with Grafana for monitoring & logs display

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<td class="features-third-td-background-style"> Support notification center, signaling various cluster unusual events through DingTalk or WeChat

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<td class="features-third-td-background-style">Upgrade

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<td class="features-third-td-background-style">Support whole cluster promotion

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<td class="features-third-td-background-style">Scale

</td>

<td class="features-third-td-background-style">Support flexible number of worker nodes

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<td class="features-third-td-background-style">Backup

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<td class="features-third-td-background-style">Support periodical backup for etcd

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<td class="features-third-td-background-style" rowspan="2">Safety compliance

</td>

<td class="features-third-td-background-style">Support score system for cluster’s health condition

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<tr class="subscription-level-tr-border">

<td class="features-third-td-background-style">Support CSI Safe Scan

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<td class="features-third-td-background-style" rowspan="2">Kubeapps+

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<td class="features-third-td-background-style">Support CI/CD tools, e.g. GitLab, Jenkins, Harbor, Argo CD

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<td class="features-third-td-background-style">Support Machine Learning/AI applications like TensorFlow

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Complete Roadmap of versions history : [Roadmap](<https://github.com/KubeOperator/KubeOperator/blob/master/ROADMAP.md>)

## PowerPoint, Demo video, and Docs

- [:books: PowerPoint]( ./KubeOperator\_Intro.pdf) : Introduction of KubeOperator (should change the link to translated version)

- [:tv: A short 8 mins demo]( <https://kubeoperator-1256577600.file.myqcloud.com/video/KubeOperator2.1.mp4>)

: Clearly explain the functionality of KubeOperator (maybe someone makes an English version?)

- [:books: Installation & Doc](<https://docs.kubeoperator.io/>) : Docs about How to install KubeOperator, How to use, Features, Common Q&A etc

## Kubernetes offline installation package

KubeOperator provides a complete offline installation package (includes Kubernetes, Docker, etcd, Dashboard, Prometheus, OS patches, etc). Each installation package will be built as an independent container image for use by KubeOperator. Details : [k8s-package](<https://github.com/KubeOperator/k8s-package>)

## Community (Currently it’s only supported in Chinese)

- technical exchange QQ 群：825046920

- WeChat group： Search for WeChat ID wzk727912172，add friend，Remarks（City-GitHub username）, join in after verification

- technical consulting：<https://jinshuju.net/f/QrZJpt>

## Thanks to (Credits)

- [Terraform](<https://github.com/hashicorp/terraform>): Allowing to auto-build VMs；

- [Clarity](<https://github.com/vmware/clarity/>): Using as a front-end web framework；

- [Ansible](<https://github.com/ansible/ansible>): Using as an automated deployment tool；

- [kubeasz](https://github.com/easzlab/kubeasz): Providing various Kubernetes Ansible scripts；

- [Kubeapps](https://github.com/kubeapps/kubeapps): Creating a marketplace based on Kubeapps；

## License

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