Installing Kubernetes

Kubernetes can be installed using different configurations.

Localhost Installation

- Minikube - single-node local Kubernetes cluster
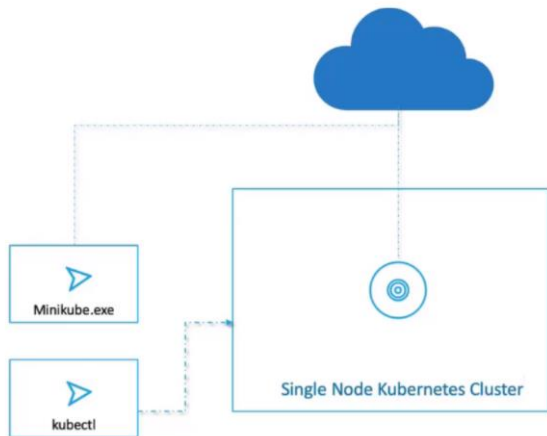- Docker Desktop - single-node local Kubernetes cluster for Windows and Mac

> Minikube is the preferred and recommended way to create an all-in-one Kubernetes setup locally.

Cloud Installation

- **Hosted Solutions :** Google Kubernetes Engine (GKE), Azure Kubernetes Service (AKS), Amazon Elastic Container Service for Kubernetes (EKS), DigitalOcean Kubernetes, OpenShift Dedicated, Platform9, IBM Cloud Kubernetes Service.
- **Turnkey Cloud Solutions :** Google Compute Engine (GCE), Amazon AWS (AWS EC2), Microsoft Azure (AKS).
- **Turnkey On-Premise Solutions :** GKE On-Prem by Google Cloud, IBM Cloud Private, OpenShift Container Platform by Red Hat.

On-Premise Installation

- **On-Premise Bare Metal :** Kubernetes can be installed on on-premise bare metal, on top of different operating systems, like RHEL, CoreOS, CentOS, Fedora, Ubuntu, etc. Most of the tools used to install Kubernetes on VMs can be used with bare metal installations as well.
- **On-Premise VMs :** Kubernetes can be installed on VMs created via Vagrant, VMware vSphere, KVM, or another Configuration Management (CM) tool in conjunction with a hypervisor software. There are different tools available to automate the installation, such as Ansible or kubeadm.

Install MiniKube: https://kubernetes.io/docs/tasks/tools/install-minikube/

VirtualBox: https://www.virtualbox.org/wiki/Downloads

MiniKube Download page for Windows:
https://github.com/kubernetes/minikube/releases

Install kubectl

- The Kubernetes command-line tool, kubectl, allows you to run commands against Kubernetes clusters. You can use kubectl to deploy applications, inspect and manage cluster resources, and view logs.

Install kubectl on Windows

1. Download the latest release v1.18.0 from this link.
   (https://storage.googleapis.com/kubernetes-release/release/v1.18.0/bin/windows/amd64/kubectl.exe)

2. Or if you have curl installed, use this command:

```
curl -LO https://storage.googleapis.com/kubernetes-release/release/v1.18.0/bin/windows/amd64/kubectl.exe
```

3. Test to ensure the version of kubectl is the same as downloaded:

```
kubectl version --client
```

Install kubectl on Linux

1. Download the latest release with the command:

```
curl -LO https://storage.googleapis.com/kubernetes-release/release/`curl -s https://storage.googleapis.com/kubernetes-release/release/stable.txt`/bin/linux/amd64/kubectl
```

2. Make the kubectl binary executable.

```
chmod +x ./kubectl
```

3. Move the binary in to your PATH.

```
sudo mv ./kubectl /usr/local/bin/kubectl
```

4. Test to ensure the version you installed is up-to-date:

```
kubectl version --client
```

Install kubectl on macOS

1. Download the latest release:

```
curl -LO "https://storage.googleapis.com/kubernetes-release/release/$(curl -s https://storage.googleapis.com/kubernetes-release/release/stable.txt)/bin/darwin/amd64/kubectl"
```

2. Make the kubectl binary executable.

```
chmod +x ./kubectl
```

3. Move the binary in to your PATH.

```
sudo mv ./kubectl /usr/local/bin/kubectl
```

4. Test to ensure the version you installed is up-to-date:

```
kubectl version --client
```

What is minikube?

Minikube is a tool that makes it easy to run Kubernetes locally. Minikube runs a single-node Kubernetes cluster inside a Virtual Machine (VM) on your laptop for users looking to try out Kubernetes or develop with it day-to-day.

Installing Minikube

> 💡**Before you begin:**
> - **Linux** To check if virtualization is supported on Linux, run the following command and verify that the output is non-empty:
>   ```
>   grep -E --color 'vmx|svm' /proc/cpuinfo
>   ```
> - **macOS** To check if virtualization is supported on macOS, run the following command on your terminal:
>   ```
>   sysctl -a | grep -E --color 'machdep.cpu.features|VMX'
>   ```
>   If you see VMX in the output (should be colored), the VT-x feature is enabled in your machine.
> - **Windows**
>   - To check if virtualization is supported on Windows 8 and above, run the following command on your Windows terminal or command prompt.
>     ```
>     systeminfo
>     ```
>   - If you see the following output, virtualization is supported on Windows.
>     ```
>     Hyper-V Requirements: VM Monitor Mode Extensions: Yes Virtualization Enabled In Firmware: Yes Second Level Address Translation: Yes Data Execution Prevention Available: Yes
>     ```
>   - If you see the following output, your system already has a Hypervisor installed and you can skip the next step.
>     ```
>     Hyper-V Requirements: A hypervisor has been detected. Features required for Hyper-V will not be displayed.
>     ```

Installing Minikube on Linux

Install a Hypervisor

If you do not already have a hypervisor installed, install one of these now:

- KVM, which also uses QEMU
- VirtualBox

> Minikube also supports a --driver=none option that runs the Kubernetes components on the host and not in a VM. Using this driver requires Docker and a Linux environment but not a hypervisor.
>
> If you're using the none driver in Debian or a derivative, use the .deb packages for Docker rather than the snap package, which does not work with Minikube. You can download .deb packages from Docker.

Install Minikube via direct download

```
curl -Lo minikube https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64 \ && chmod +x minikube
```

- Here's an easy way to add the Minikube executable to your path:

```
sudo mkdir -p /usr/local/bin/
sudo install minikube /usr/local/bin/
```

Installing Minikube on macOS

Install a Hypervisor

If you do not already have a hypervisor installed, install one of these now:

- HyperKit
- VirtualBox
- VMware Fusion

Install Minikube

- The easiest way to install Minikube on macOS is using Homebrew:

```
brew install minikube
```

- You can also install it on macOS by downloading a stand-alone binary:

```
curl -Lo minikube https://storage.googleapis.com/minikube/releases/latest/minikube-darwin-amd64 \ && chmod +x minikube
```

- Here's an easy way to add the Minikube executable to your path:

```
sudo mv minikube /usr/local/bin sudo mv minikube /usr/local/bin
```

Installing Minikube on Windows

Install a Hypervisor

If you do not already have a hypervisor installed, install one of these now:

- Hyper-V
- VirtualBox

> Hyper-V can run on three versions of Windows 10: Windows 10 Enterprise, Windows 10 Professional, and Windows 10 Education.

Install Minikube using Chocolatey

- The easiest way to install Minikube on Windows is using Chocolatey (run as an administrator):

```
choco install minikube
```

- After Minikube has finished installing, close the current CLI session and restart. Minikube should have been added to your path automatically.

Install Minikube using an installer executable

- To install Minikube manually on Windows using Windows Installer, download minikube-installer.exe and execute the installer.

Install Minikube via direct download

- To install Minikube manually on Windows, download minikube-windows-amd64, rename it to minikube.exe, and add it to your path.

Confirm Installation

- To confirm successful installation of both a hypervisor and Minikube, you can run the following command to start up a local Kubernetes cluster:

```
PS C:\Users\Clarusway>minikube start
```

```
PS C:\Users\Clarusway>minikube status
```

> If your cluster is running, the output from minikube status should be similar to:

```
PS C:\Users\Clarusway> minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured
```

- After you have confirmed whether Minikube is working with your chosen hypervisor, you can continue to use Minikube or you can stop your cluster. To stop your cluster, run:

```
PS C:\Users\Clarusway>minikube stop
```

Complementary Interactive Lesson about Installing Kubernetes