

# MyBlockchainExperts

*Advancement through blockchain*



**Updated 02/03/2020**

## **MiniKube on Compute Engine**

Sometimes as a developer we just need to have a place to call our own for learning and/or development on a separate cluster away from it all.

This remote isolated cluster allows us to get away from the development and test environments effectively. To accomplish this we may want to for example run MiniKube on GCP.

Minikube is a tool that makes it easy to run a single node Kubernetes cluster locally on our desktop or in our cloud environment.

Minikube effectively run by booting up a single-node Kubernetes cluster inside a Virtual Machine (VM) on your laptop or in this case Google Cloud Platform

*Note that nested virtualization is required and must be enabled when creating your VM. Nested Virtualization adds support for*

*Intel VT-x processor virtualization instructions to Compute Engine VMs.*

*Using nested virtualization, you start a VM instance as normal on Compute Engine and then install a KVM-compatible hypervisor on the VM instance so you can run another VM instance on top of that hypervisor.*

## **Overview of process**

To install MiniKube on GCP Compute Engine is a multifolded effort. The tasks at a high level are as follows.

1. Determine a supported GCP region. Needs to support Intel Haswell or newer.
2. Create Boot Disk to copy image
3. Enable Nested Virtualization
4. Select a supported VM image in Compute Engine.
5. Install MiniKube
6. Login and get to work

## **Process Workflow**

### **Determine Zonal support for Intel Haswell**

As expected to get started on GCP we must of course login and ensure billing is enabled.

Note that you can create this deployment via the gcloud CLI or the Cloud Console. We will use the CLI for this exercise.

1. Validate that the Haswell platform is supported in your region by running

***gcloud compute zones describe us-east1-b***

```
jholbrook2019@cloudshell:~ (cloud-developer-253215)$ gcloud compute zones describe us-east1-b
availableCpuPlatforms:
- Intel Cascade Lake
- Intel Skylake
- Intel Broadwell
- Intel Haswell
creationTimestamp: '1969-12-31T16:00:00.000-08:00'
description: us-east1-b
```

Intel Haswell is there in the list so we may proceed with the install in the specified region/zone **US-East1-b**

2. Create a boot disk which is really a staging disk.

The following should be simple enough

***gcloud compute disks create stagingdisk --image-project centos-cloud --image-family centos-7 --zone us-east1-b***

```
jholbrook2019@cloudshell:~ (cloud-developer-253215)$ gcloud compute disks create stagingdisk --image-project centos-cloud --image-family centos-7 --zone us-east1-b
Created [https://www.googleapis.com/compute/v1/projects/cloud-developer-253215/zones/us-east1-b/disks/stagingdisk].
```

NAME	ZONE	SIZE GB	TYPE	STATUS
stagingdisk	us-east1-b	10	pd-standard	READY

3. Create a nested VM. Syntax is below.

***gcloud compute images create nested-vm-image --source-disk=disk1 --source-disk-zone=us-east1-b --licenses=https://www.googleapis.com/compute/v1/projects/vm-options/global/licenses/enable-vmx***

```
jholbrook2019@cloudshell:~ (cloud-developer-253215)$ gcloud compute images create nestimage --source-disk=stagingdisk --source-disk-zone=us-east1-b --licenses=https://www.googleapis.com/compute/v1/projects/vm-options/global/licenses/enable-vmx
Created [https://www.googleapis.com/compute/v1/projects/cloud-developer-253215/global/images/nestimage].
```

NAME	PROJECT	FAMILY	DEPRECATED	STATUS
nestimage	cloud-developer-253215			READY

4. Now we may want to delete the source disk we created temporarily as a staging disk.

***gcloud compute disks delete stagingdisk --zone us-east1-b***

```
jholbrook2019@cloudshell:~ (cloud-developer-253215)$ gcloud compute disks delete stagingdisk --zone us-east1-b
The following disks will be deleted:
- [stagingdisk] in [us-east1-b]

Do you want to continue (Y/n)? y

Deleted [https://www.googleapis.com/compute/v1/projects/cloud-developer-253215/zones/us-east1-b/disks/stagingdisk].
```

## 5. Create Image

***gcloud compute instances create nested-vm-image1 --zone us-east1-b --min-cpu-platform "Intel Haswell" --machine-type n1-standard-4 --image nested-vm-image***

```
jholbrook2019@cloudshell:~ (cloud-developer-253215)$ gcloud compute instances create nested-vm-image1 --zone us-east1-b --min-cpu-platform "Intel Haswell" --machine-type n1-standard-4 --image nested-vm-image
Created [https://www.googleapis.com/compute/v1/projects/cloud-developer-253215/zones/us-east1-b/instances/nested-vm-image1].
```

NAME	ZONE	MACHINE_TYPE	PREEMPTIBLE	INTERNAL_IP	EXTERNAL_IP	STATUS
nested-vm-image1	us-east1-b	n1-standard-4		10.142.0.4	35.227.117.22	RUNNING


We now need to verify the VM is available. You can view in Cloud Console or SSH. If you did not login before then you would want to view in Cloud Console and then Select an SSH option.

VM instances   [CREATE INSTANCE](#)   [IMPORT VM](#)   [REFRESH](#)   [▶ START](#)   [■ STOP](#)   [🔄 RESET](#)   [🗑 DELETE](#)   [SHOW INFO PANEL](#)

Columns ▾

<input type="checkbox"/> Name ^	Zone	Creation time	Machine type	Recommendation	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>  nested-vm-image1	us-east1-b	Feb 3, 2020, 7:04:17 PM	4 vCPUs, 15 GB			10.142.0.4 (nic0)	35.227.117.22	SSH ▾ ⋮

6. Connect to VM, I am selecting Open in Browser window.

<input type="checkbox"/> Name ^	Zone	Creation time	Machine type	Recommendation	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>  nested-vm-image1	us-east1-b	Feb 3, 2020, 7:04:17 PM	4 vCPUs, 15 GB			10.142.0.4 (nic0)	35.227.117.22	SSH ▾

Open in browser window

Open in browser window on custom port

Open in browser window using provided private SSH key

View gcloud command

Use another SSH client

7. Verify the VM is online

***grep -cw vmx /proc/cpuinfo***

```

Connected, host fingerprint: ssh-rsa 0 8A:DE:73:A9:69:58:F0:0C:EC:09:79:ED:BD:E0
:31:7C:79:67:E4:F7:45:CA:09:A2:9E:5A:91:09:D8:B1:DB:82
[jholbrook2019@nested-vm-image1 ~]$ grep -cw vmx /proc/cpuinfo
4
[jholbrook2019@nested-vm-image1 ~]$ █

```

## Install Kubectl

### 8. Install kubectl

```
sudo yum install -y kubectl
```

```

Package Arch Version Repository Size
Installing:
 kubectl x86_64 1.17.2-0 google-cloud-sdk 9.4 M
Transaction Summary
Install 1 Package
Total download size: 9.4 M
Installed size: 41 M
Downloading packages:
b44630896c69cd41ldb53be1d5cb5ae899a40aba7c0766317ea904390fcfc45b-kubectl-1.17.2-0.x86_64.rpm | 9.4 MB 00:00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : kubectl-1.17.2-0.x86_64

```

### 9. Make a directory

***mkdir kubectl***

10 . Change Permissions as needed.

***chmod +x kubectl***

11. Move to your /usr/bin directory

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

```
[jholbrook2019@nested-vm-image1 ~]$ mkdir kubectl  
[jholbrook2019@nested-vm-image1 ~]$ chmod +x kubectl  
[jholbrook2019@nested-vm-image1 ~]$ sudo mv ./kubectl /usr/local/bin/kubectl
```

## **Install Virtualbox**

12. Install Virtualbox kernel

***sudo yum install kernel-devel kernel-headers make patch gcc  
wget***

***There are several screens to go thru. Note that on first screen  
you need to select y to proceed.***



```
[jholbrook2019@nested-vm-image1 bin]$ sudo yum install kernel-devel kernel-headers make patch gcc wget
```

```
Loaded plugins: fastestmirror
```

```
Loading mirror speeds from cached hostfile
```

```
* base: mirror.ash.fastserv.com
```

```
* epel: mirror.umd.edu
```

```
* extras: mirror.ash.fastserv.com
```

```
* updates: mirror.ash.fastserv.com
```

```
Package 1:make-3.82-24.el7.x86_64 already installed and latest version
```

```
Resolving Dependencies
```

```
--> Running transaction check
```

```
--> Package gcc.x86_64 0:4.8.5-39.el7 will be installed
```

```
--> Processing Dependency: cpp = 4.8.5-39.el7 for package: gcc-4.8.5-39.el7.x86_64
```

```
--> Processing Dependency: glibc-devel >= 2.2.90-12 for package: gcc-4.8.5-39.el7.x86_64
```

```
--> Processing Dependency: libmpfr.so.4()(64bit) for package: gcc-4.8.5-39.el7.x86_64
```

```
--> Processing Dependency: libmpc.so.3()(64bit) for package: gcc-4.8.5-39.el7.x86_64
```

```
--> Package kernel-devel.x86_64 0:3.10.0-1062.9.1.el7 will be installed
```

```
--> Package kernel-headers.x86_64 0:3.10.0-1062.9.1.el7 will be installed
```

```
--> Package patch.x86_64 0:2.7.1-12.el7_7 will be installed
```

```
--> Package wget.x86_64 0:1.14-18.el7_6.1 will be installed
```

```
--> Running transaction check
```

```
--> Package cpp.x86_64 0:4.8.5-39.el7 will be installed
```

```
--> Package glibc-devel.x86_64 0:2.17-292.el7 will be installed
```

```
--> Processing Dependency: glibc-headers = 2.17-292.el7 for package: glibc-devel-2.17-292.el7.x86_64
```

```
--> Processing Dependency: glibc-headers for package: glibc-devel-2.17-292.el7.x86_64
```

```
--> Package libmpc.x86_64 0:1.0.1-3.el7 will be installed
```

```
--> Package mpfr.x86_64 0:3.1.1-4.el7 will be installed
```

```
--> Running transaction check
```

```
--> Package glibc-headers.x86_64 0:2.17-292.el7 will be installed
```

```
--> Finished Dependency Resolution
```

```
Dependencies Resolved
```

Package	Arch	Version	Repository	Size
---------	------	---------	------------	------

```
Installing:
```

```
Dependencies Resolved
```

Package	Arch	Version	Repository	Size
Installing:				
gcc	x86_64	4.8.5-39.el7	base	16 M
kernel-devel	x86_64	3.10.0-1062.9.1.el7	updates	18 M
kernel-headers	x86_64	3.10.0-1062.9.1.el7	updates	8.7 M
patch	x86_64	2.7.1-12.el7_7	updates	111 k
wget	x86_64	1.14-18.el7_6.1	base	547 k
Installing for dependencies:				
cpp	x86_64	4.8.5-39.el7	base	5.9 M
glibc-devel	x86_64	2.17-292.el7	base	1.1 M
glibc-headers	x86_64	2.17-292.el7	base	687 k
libmpc	x86_64	1.0.1-3.el7	base	51 k
mpfr	x86_64	3.1.1-4.el7	base	203 k

```
Transaction Summary
```

```
Install 5 Packages (+5 Dependent packages)
```

```
Total download size: 51 M
```

```
Installed size: 100 M
```

```

Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : mpfr-3.1.1-4.el7.x86_64 1/10
  Installing : libmpc-1.0.1-3.el7.x86_64 2/10
  Installing : cpp-4.8.5-39.el7.x86_64 3/10
  Installing : kernel-headers-3.10.0-1062.9.1.el7.x86_64 4/10
  Installing : glibc-headers-2.17-292.el7.x86_64 5/10
  Installing : glibc-devel-2.17-292.el7.x86_64 6/10
  Installing : gcc-4.8.5-39.el7.x86_64 7/10
  Installing : kernel-devel-3.10.0-1062.9.1.el7.x86_64 8/10
  Installing : wget-1.14-18.el7_6.1.x86_64 9/10
  Installing : patch-2.7.1-12.el7_7.x86_64 10/10
  Verifying : patch-2.7.1-12.el7_7.x86_64 1/10
  Verifying : glibc-devel-2.17-292.el7.x86_64 2/10
  Verifying : wget-1.14-18.el7_6.1.x86_64 3/10
  Verifying : kernel-devel-3.10.0-1062.9.1.el7.x86_64 4/10
  Verifying : mpfr-3.1.1-4.el7.x86_64 5/10
  Verifying : libmpc-1.0.1-3.el7.x86_64 6/10
  Verifying : kernel-headers-3.10.0-1062.9.1.el7.x86_64 7/10
  Verifying : cpp-4.8.5-39.el7.x86_64 8/10
  Verifying : gcc-4.8.5-39.el7.x86_64 9/10
  Verifying : glibc-headers-2.17-292.el7.x86_64 10/10

Installed:
gcc.x86_64 0:4.8.5-39.el7          kernel-devel.x86_64 0:3.10.0-1062.9.1.el7          kernel-headers.x86_64 0:3.10.0-1062.9.1.el7
patch.x86_64 0:2.7.1-12.el7_7      wget.x86_64 0:1.14-18.el7_6.1

Dependency Installed:
cpp.x86_64 0:4.8.5-39.el7          glibc-devel.x86_64 0:2.17-292.el7          glibc-headers.x86_64 0:2.17-292.el7          libmpc.x86_64 0:1.0.1-3.el7
mpfr.x86_64 0:3.1.1-4.el7

Complete!
[jholbrook2019@nested-vm-image1 bin]$

```

## 12. Download Virtualbox

*sudo wget*

*[https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.r](https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo)*  
*epo -P /etc/yum.repos.d*

```

[jholbrook2019@nested-vm-image1 bin]$ sudo wget https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo -P /etc/yum.repos.d
--2020-02-04 00:37:41-- https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo
Resolving download.virtualbox.org (download.virtualbox.org)... 23.46.200.39
Connecting to download.virtualbox.org (download.virtualbox.org)|23.46.200.39|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 259 [text/plain]
Saving to: '/etc/yum.repos.d/virtualbox.repo'

100%[=====>] 259          --.-K/s  in 0s

2020-02-04 00:37:41 (4.49 MB/s) - '/etc/yum.repos.d/virtualbox.repo' saved [259/259]

[jholbrook2019@nested-vm-image1 bin]$

```

## 13. Install Virtualbox

*sudo yum install VirtualBox-6.0*

*Note that there are screens you will be prompted to enter Y.*

*Select Y*

```
[jholbrook2019@nested-vm-image1 bin]$ sudo yum install VirtualBox-6.0
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.ash.fastserv.com
 * epel: mirror.umd.edu
 * extras: mirror.ash.fastserv.com
 * updates: mirror.ash.fastserv.com
virtualbox/7/x86_64/signature | 181 B 00:00:00
Retrieving key from https://www.virtualbox.org/download/oracle_vbox.asc
Importing GPG key 0x98AB5139:
Userid : "Oracle Corporation (VirtualBox archive signing key) <info@virtualbox.org>"
Fingerprint: 7b0f ab3a 13b9 0743 5925 d9c9 5442 2a4b 98ab 5139
From : https://www.virtualbox.org/download/oracle_vbox.asc
Is this ok [y/N]: y
```

*Select Y*

```
VirtualBox-6.0      x86_64      6.0.16_135674_e17-1      virtualbox      115 M
Installing for dependencies:
SDL                x86_64      1.2.15-15.e17_7          updates        205 k
dejavu-fonts-common      noarch      2.33-6.e17               base           64 k
dejavu-sans-fonts        noarch      2.33-6.e17               base           1.4 M
fontconfig            x86_64      2.13.0-4.3.e17           base           254 k
fontpackages-filesystem noarch      1.44-8.e17               base           9.9 k
libICE                x86_64      1.0.9-9.e17              base           66 k
libSM                 x86_64      1.2.2-2.e17              base           39 k
libX11                x86_64      1.6.7-2.e17              base           607 k
libX11-common          noarch      1.6.7-2.e17              base           164 k
libXau                x86_64      1.0.0-2.1.e17            base           29 k
libXcursor            x86_64      1.1.15-1.e17             base           30 k
libXdamage             x86_64      1.1.4-4.1.e17            base           20 k
libXext                x86_64      1.3.3-3.e17              base           35 k
libXfixes              x86_64      5.0.3-1.e17              base           18 k
libXmu                 x86_64      1.1.2-2.e17              base           71 k
libXrender             x86_64      0.9.10-1.e17             base           26 k
libXt                  x86_64      1.1.5-3.e17              base           173 k
libXxf86vm             x86_64      1.1.4-1.e17              base           18 k
libglvnd               x86_64      1:1.0.1-0.8.git5baale5.e17 base           89 k
libglvnd-glx           x86_64      1:1.0.1-0.8.git5baale5.e17 base           125 k
libvpx                 x86_64      1.3.0-5.e17_0            base           498 k
libxcb                 x86_64      1.13-1.e17               base           214 k
libxshmfence           x86_64      1.2-1.e17                base           7.2 k
mesa-libGL             x86_64      18.3.4-5.e17             base           165 k
mesa-libglapi          x86_64      18.3.4-5.e17             base           45 k
opus                   x86_64      1.0.2-6.e17              base           630 k

Transaction Summary
Install 1 Package (+26 Dependent packages)

Total download size: 115 M
Installed size: 245 M
Is this ok [y/d/N]: y
```

*Select Y*

```

(3/27): fontconfig-2.13.0-4.3.el7.x86_64.rpm | 254 kB 00:00:00
(4/27): fontpackages-filesystem-1.44-8.el7.noarch.rpm | 9.9 kB 00:00:00
(5/27): libICE-1.0.9-9.el7.x86_64.rpm | 66 kB 00:00:00
(6/27): dejavu-sans-fonts-2.33-6.el7.noarch.rpm | 1.4 MB 00:00:00
(7/27): libSM-1.2.2-2.el7.x86_64.rpm | 39 kB 00:00:00
(8/27): libX11-common-1.6.7-2.el7.noarch.rpm | 164 kB 00:00:00
(9/27): libX11-1.6.7-2.el7.x86_64.rpm | 607 kB 00:00:00
(10/27): libXau-1.0.8-2.1.el7.x86_64.rpm | 29 kB 00:00:00
(11/27): libXcursor-1.1.15-1.el7.x86_64.rpm | 30 kB 00:00:00
(12/27): libXdamage-1.1.4-4.1.el7.x86_64.rpm | 20 kB 00:00:00
(13/27): libXext-1.3.3-3.el7.x86_64.rpm | 39 kB 00:00:00
(14/27): libXfixes-5.0.3-1.el7.x86_64.rpm | 18 kB 00:00:00
(15/27): libXmu-1.1.2-2.el7.x86_64.rpm | 71 kB 00:00:00
(16/27): libXrender-0.9.10-1.el7.x86_64.rpm | 26 kB 00:00:00
(17/27): libXt-1.1.5-3.el7.x86_64.rpm | 173 kB 00:00:00
(18/27): libXxf86vm-1.1.4-1.el7.x86_64.rpm | 18 kB 00:00:00
(19/27): libglvnd-1.0.1-0.8.git5baa1e5.el7.x86_64.rpm | 89 kB 00:00:00
(20/27): libglvnd-glx-1.0.1-0.8.git5baa1e5.el7.x86_64.rpm | 125 kB 00:00:00
(21/27): libxcb-1.13-1.el7.x86_64.rpm | 214 kB 00:00:00
(22/27): libvpx-1.3.0-5.el7_0.x86_64.rpm | 498 kB 00:00:00
(23/27): libxshmfence-1.2-1.el7.x86_64.rpm | 7.2 kB 00:00:00
(24/27): mesa-libGL-18.3.4-5.el7.x86_64.rpm | 165 kB 00:00:00
(25/27): mesa-libglapi-18.3.4-5.el7.x86_64.rpm | 45 kB 00:00:00
(26/27): opus-1.0.2-6.el7.x86_64.rpm | 630 kB 00:00:00
warning: /var/cache/yum/x86_64/7/virtualbox/packages/VirtualBox-6.0-6.0.16_135674_el7-1.x86_64.rpm: Header V4 DSA/SHA1 Signature, key
ID 98ab5139: NOKEY
Public key for VirtualBox-6.0-6.0.16_135674_el7-1.x86_64.rpm is not installed
(27/27): VirtualBox-6.0-6.0.16_135674_el7-1.x86_64.rpm | 110 MB 00:00:12

Total 8.9 MB/s | 115 MB 00:00:12
Retrieving key from https://www.virtualbox.org/download/oracle_vbox.asc
Importing GPG key 0x98AB5139:
  Userid : *Oracle Corporation (VirtualBox archive signing key) <info@virtualbox.org>
  Fingerprint: 7b0f ab3a 13b9 0743 5925 d9c9 5442 2a4b 98ab 5139
  From : https://www.virtualbox.org/download/oracle_vbox.asc
Is this ok [y/N]: y

```

Continue on.

```

Verifying : libICE-1.0.9-9.el7.x86_64 10/27
Verifying : fontpackages-filesystem-1.44-8.el7.noarch 11/27
Verifying : opus-1.0.2-6.el7.x86_64 12/27
Verifying : SDL-1.2.15-15.el7_7.x86_64 12/27
Verifying : mesa-libGL-18.3.4-5.el7.x86_64 13/27
Verifying : dejavu-fonts-common-2.33-6.el7.noarch 14/27
Verifying : libX11-1.6.7-2.el7.x86_64 15/27
Verifying : libX11-common-1.6.7-2.el7.noarch 16/27
Verifying : libxcb-1.13-1.el7.x86_64 17/27
Verifying : libglvnd-1.0.1-0.8.git5baa1e5.el7.x86_64 18/27
Verifying : dejavu-sans-fonts-2.33-6.el7.noarch 19/27
Verifying : libXmu-1.1.2-2.el7.x86_64 20/27
Verifying : mesa-libglapi-18.3.4-5.el7.x86_64 21/27
Verifying : libxshmfence-1.2-1.el7.x86_64 22/27
Verifying : libXau-1.0.8-2.1.el7.x86_64 23/27
Verifying : libSM-1.2.2-2.el7.x86_64 24/27
Verifying : libXdamage-1.1.4-4.1.el7.x86_64 25/27
Verifying : libXfixes-5.0.3-1.el7.x86_64 26/27
Verifying : libvpx-1.3.0-5.el7_0.x86_64 27/27

Installed:
  VirtualBox-6.0.x86_64 0:6.0.16_135674_el7-1

Dependency Installed:
  SDL.x86_64 0:1.2.15-15.el7_7      dejavu-fonts-common.noarch 0:2.33-6.el7      dejavu-sans-fonts.noarch 0:2.33-6.el7
  fontconfig.x86_64 0:2.13.0-4.3.el7  fontpackages-filesystem.noarch 0:1.44-8.el7  libICE.x86_64 0:1.0.9-9.el7
  libSM.x86_64 0:1.2.2-2.el7        libX11.x86_64 0:1.6.7-2.el7        libX11-common.noarch 0:1.6.7-2.el7
  libXau.x86_64 0:1.0.8-2.1.el7     libXcursor.x86_64 0:1.1.15-1.el7    libXdamage.x86_64 0:1.1.4-4.1.el7
  libXext.x86_64 0:1.3.3-3.el7      libXfixes.x86_64 0:5.0.3-1.el7     libXmu.x86_64 0:1.1.2-2.el7
  libXrender.x86_64 0:0.9.10-1.el7  libXt.x86_64 0:1.1.5-3.el7        libXxf86vm.x86_64 0:1.1.4-1.el7
  libglvnd.x86_64 1:1.0.1-0.8.git5baa1e5.el7  libglvnd-glx.x86_64 1:1.0.1-0.8.git5baa1e5.el7  libvpx.x86_64 0:1.3.0-5.el7_0
  libxcb.x86_64 0:1.13-1.el7        libxshmfence.x86_64 0:1.2-1.el7        mesa-libGL.x86_64 0:18.3.4-5.el7
  mesa-libglapi.x86_64 0:18.3.4-5.el7  opus.x86_64 0:1.0.2-6.el7

Complete!
[ihobbrook2019@nested-vm-image1 bin]$

```

The install takes about 5 minutes with all the prompts.

Validate our Virtualbox is up and running.

***systemctl status vboxdrv***

## ***Install MiniKube***

14. Download and Install Minikube

`curl -Lo minikube`

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

```
[jholbrook2019@nested-vm-image1 ~]$ curl -Lo minikube https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64
% Total    % Received % Xferd Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left  Speed
100 206 100 206 0 0 813 0 --:--:-- --:--:-- --:--:-- 817
[jholbrook2019@nested-vm-image1 ~]$
```

15. CP to directory.

***sudo cp minikube /usr/bin/***

16. Docker needs to be installed

***sudo yum install docker***

Here is another multistep part where you need to Select Y

```

[jholbrook2019@nested-vm-image1 ~]$ sudo cp minikube /usr/bin/
[jholbrook2019@nested-vm-image1 ~]$ sudo yum install docker
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.ash.fastserv.com
 * epel: mirror.umd.edu
 * extras: mirror.ash.fastserv.com
 * updates: mirror.ash.fastserv.com
Resolving Dependencies
--> Running transaction check
--> Package docker.x86_64 2:1.13.1-108.git4ef4b30.el7.centos will be installed
--> Processing Dependency: docker-common = 2:1.13.1-108.git4ef4b30.el7.centos for package: 2:docker-1.13.1-108.git4ef4b30.el7.centos.x86_64
--> Processing Dependency: docker-client = 2:1.13.1-108.git4ef4b30.el7.centos for package: 2:docker-1.13.1-108.git4ef4b30.el7.centos.x86_64
--> Processing Dependency: subscription-manager-rhsm-certificates for package: 2:docker-1.13.1-108.git4ef4b30.el7.centos.x86_64
--> Running transaction check
--> Package docker-client.x86_64 2:1.13.1-108.git4ef4b30.el7.centos will be installed
--> Package docker-common.x86_64 2:1.13.1-108.git4ef4b30.el7.centos will be installed
--> Processing Dependency: skopeo-containers >= 1:0.1.26-2 for package: 2:docker-common-1.13.1-108.git4ef4b30.el7.centos.x86_64

```

## Select Y

```

Verifying : libyaml-0.1.4-11.el7_0.x86_64 5/21
Verifying : 7:lvmlib-2.02.185-2.el7_7.2.x86_64 6/21
Verifying : device-mapper-persistent-data-0.8.5-1.el7.x86_64 7/21
Verifying : 1:oci-systemd-hook-0.2.0-1.git05e6923.el7_6.x86_64 8/21
Verifying : container-storage-setup-0.11.0-2.git5eaf76c.el7.noarch 9/21
Verifying : 1:oci-register-machine-0-6.git2b44233.el7.x86_64 10/21
Verifying : 1:containers-common-0.1.37-3.el7.centos.x86_64 11/21
Verifying : 2:oci-umount-2.5-3.el7.x86_64 12/21
Verifying : 2:docker-common-1.13.1-108.git4ef4b30.el7.centos.x86_64 13/21
Verifying : 2:docker-1.13.1-108.git4ef4b30.el7.centos.x86_64 14/21
Verifying : 2:container-selinux-2.107-3.el7.noarch 15/21
Verifying : 7:lvmlib-2.02.185-2.el7_7.2.x86_64 16/21
Verifying : PyYAML-3.10-11.el7.x86_64 17/21
Verifying : python-pytoml-0.1.14-1.git7dea353.el7.noarch 18/21
Verifying : 1:atomic-registries-1.22.1-29.gitb507039.el7.x86_64 19/21
Verifying : libaio-0.3.109-13.el7.x86_64 20/21
Verifying : 2:docker-client-1.13.1-108.git4ef4b30.el7.centos.x86_64 21/21
Verifying : subscription-manager-rhsm-certificates-1.24.13-3.el7.centos.x86_64

Installed:
  docker.x86_64 2:1.13.1-108.git4ef4b30.el7.centos

Dependency Installed:
  PyYAML.x86_64 0:3.10-11.el7
  container-selinux.noarch 2:2.107-3.el7
  containers-common.x86_64 1:0.1.37-3.el7.centos
  device-mapper-event-libs.x86_64 7:1.02.158-2.el7_7.2
  docker-client.x86_64 2:1.13.1-108.git4ef4b30.el7.centos
  libaio.x86_64 0:0.3.109-13.el7
  lvmlib.x86_64 7:2.02.185-2.el7_7.2
  oci-register-machine.x86_64 1:0-6.git2b44233.el7
  oci-umount.x86_64 2:2.5-3.el7
  subscription-manager-rhsm-certificates.x86_64 0:1.24.13-3.el7.centos
  atomic-registries.x86_64 1:1.22.1-29.gitb507039.el7
  container-storage-setup.noarch 0:0.11.0-2.git5eaf76c.el7
  device-mapper-event.x86_64 7:1.02.158-2.el7_7.2
  device-mapper-persistent-data.x86_64 0:0.8.5-1.el7
  docker-common.x86_64 2:1.13.1-108.git4ef4b30.el7.centos
  libyaml.x86_64 0:0.1.4-11.el7_0
  lvmlib-libs.x86_64 7:2.02.185-2.el7_7.2
  oci-systemd-hook.x86_64 1:0.2.0-1.git05e6923.el7_6
  python-pytoml.noarch 0:0.1.14-1.git7dea353.el7
 yajl.x86_64 0:2.0.4-4.el7

complete!
[jholbrook2019@nested-vm-image1 ~]$

```



## Start the MiniKube Cluster

17. Ensure you start with proper driver.

*Change to the directory where minikube binaries files are located.*

```
cd /usr/local/bin/
```

```
sudo -E ./minikube start --vm-driver=none
```

18. Start MiniKube

```
sudo -E ./minikube start --vm-driver=none
```

```
[root@nested-vm-image1 bin]# sudo -E ./minikube start --vm-driver=none
🌻 minikube v1.6.2 on Centos 7.7.1908
🌟 Selecting 'none' driver from user configuration (alternates: [virtualbox])
❑ Running on localhost (CPUs=4, Memory=14877MB, Disk=10229MB) ...
i OS release is CentOS Linux 7 (Core)
⚠ VM may be unable to resolve external DNS records
👤 Preparing Kubernetes v1.17.0 on Docker '1.13.1' ...
📦 Downloading kubelet v1.17.0
📦 Downloading kubeadm v1.17.0
❑ Pulling images ...
```

Check your cluster info.

*gcloud container clusters list*

*kubectl cluster-info*