Arktos deployment with Mizar CNI

Prepared On-Premises lab machine with below Configuration

- Processor: x86_64
- Cores: 8
- Memory: 16 GB RAM
- Hard Disk: 128 GB HDD
- Network: One network adapter with active Internet connection
- Operating System: Ubuntu 18.04 LTS 64-bit

Step-1 Check the kernel version & update the kernel

uname -a

wget https://raw.githubusercontent.com/CentaurusInfra/mizar/dev-next/kernelupdate.sh

sudo bash kernelupdate.sh

Output

```
demo@demo:~$ uname -a
Linux demo 4.15.0-156-generic #163-Ubuntu SMP Thu Aug 19 23:31:58 UTC 2021 x86_64 x86_64 x86_64 GNU/Linux
demo@demo:~$ wget https://raw.githubusercontent.com/CentaurusInfra/mizar/dev-next/kernelupdate.sh
--2021-09-24 07:26:38--  https://raw.githubusercontent.com/CentaurusInfra/mizar/dev-next/kernelupdate.sh
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.108.133, 185.199.109.133, 185.199.110.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 791 [text/plain]
Saving to: 'kernelupdate.sh'

kernelupdate.sh               100%[===============================================>]     791  --.-KB/s    in 0s

2021-09-24 07:26:39 (26.8 MB/s) - 'kernelupdate.sh' saved [791/791]

demo@demo:~$ sudo bash kernelupdate.sh
[sudo] password for demo:
--2021-09-24 07:26:49--  https://mizar.s3.amazonaws.com/linux-5.6-rc2/linux-headers-5.6.0-rc2_5.6.0-rc2-1_amd64.deb
Resolving mizar.s3.amazonaws.com (mizar.s3.amazonaws.com)... 52.216.110.251
Connecting to mizar.s3.amazonaws.com (mizar.s3.amazonaws.com)|52.216.110.251|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 7621020 (7.3M) []
Saving to: '../linux-5.6-rc2/linux-headers-5.6.0-rc2_5.6.0-rc2-1_amd64.deb'

linux-headers-5.6.0-rc2_5.6.0- 100%[===============================================>]   7.27M  3.52MB/s    in 2.1s

2021-09-24 07:26:53 (3.52 MB/s) - '../linux-5.6-rc2/linux-headers-5.6.0-rc2_5.6.0-rc2-1_amd64.deb' saved [7621020/7621020]

--2021-09-24 07:26:53--  https://mizar.s3.amazonaws.com/linux-5.6-rc2/linux-image-5.6.0-rc2-dbg_5.6.0-rc2-1_amd64.deb
Resolving mizar.s3.amazonaws.com (mizar.s3.amazonaws.com)... 52.217.139.145
Connecting to mizar.s3.amazonaws.com (mizar.s3.amazonaws.com)|52.217.139.145|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 857827912 (818M) [application/x-www-form-urlencoded]
Saving to: '../linux-5.6-rc2/linux-image-5.6.0-rc2-dbg_5.6.0-rc2-1_amd64.deb'
```

```
2021-09-24 07:29:14 (801 KB/s) - '../linux-5.6-rc2/linux-libc-dev_5.6.0-rc2-1_amd64.deb' saved [1082248/1082248]

Continue kernel update (y/n)?y
Updating kernel
Selecting previously unselected package linux-headers-5.6.0-rc2.
(Reading database ... 67145 files and directories currently installed.)
Preparing to unpack .../linux-headers-5.6.0-rc2_5.6.0-rc2-1_amd64.deb ...
Unpacking linux-headers-5.6.0-rc2 (5.6.0-rc2-1) ...
Selecting previously unselected package linux-image-5.6.0-rc2.
Preparing to unpack .../linux-image-5.6.0-rc2_5.6.0-rc2-1_amd64.deb ...
Unpacking linux-image-5.6.0-rc2 (5.6.0-rc2-1) ...
Selecting previously unselected package linux-image-5.6.0-rc2-dbg.
Preparing to unpack .../linux-image-5.6.0-rc2-dbg_5.6.0-rc2-1_amd64.deb ...
Unpacking linux-image-5.6.0-rc2-dbg (5.6.0-rc2-1) ...
Selecting previously unselected package linux-libc-dev:amd64.
Preparing to unpack .../linux-libc-dev_5.6.0-rc2-1_amd64.deb ...
Unpacking linux-libc-dev:amd64 (5.6.0-rc2-1) ...
Setting up linux-headers-5.6.0-rc2 (5.6.0-rc2-1) ...
Setting up linux-image-5.6.0-rc2 (5.6.0-rc2-1) ...
update-initramfs: Generating /boot/initrd.img-5.6.0-rc2
Searching for GRUB installation directory ... found: /boot/grub
Searching for default file ... found: /boot/grub/default
Testing for an existing GRUB menu.lst file ... found: /boot/grub/menu.lst
Searching for splash image ... none found, skipping ...
Found kernel: /vmlinuz-4.15.0-156-generic
Replacing config file /run/grub/menu.lst with new version
Found kernel: /vmlinuz-5.6.0-rc2
Found kernel: /vmlinuz-4.15.0-156-generic
Replacing config file /run/grub/menu.lst with new version
Updating /boot/grub/menu.lst ... done

Sourcing file `/etc/default/grub'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.6.0-rc2
Found initrd image: /boot/initrd.img-5.6.0-rc2
Found linux image: /boot/vmlinuz-4.15.0-156-generic
Found initrd image: /boot/initrd.img-4.15.0-156-generic
done
Setting up linux-image-5.6.0-rc2-dbg (5.6.0-rc2-1) ...
Setting up linux-libc-dev:amd64 (5.6.0-rc2-1) ...
Reboot host (y/n)?y
Rebooting
```

Kernel updated successfully.

Step-2 Clone the Arktos repository and install the required dependencies:

```
git clone https://github.com/Click2Cloud-Centaurus/arktos.git
~/go/src/k8s.io/arktos -b default-cni-mizar

sudo bash $HOME/go/src/k8s.io/arktos/hack/setup-dev-node.sh
```

Output

```
Last login: Fri Sep 24 07:23:42 2021 from 192.168.1.1
demo@demo:~$ git clone https://github.com/Click2Cloud-Centaurus/arktos.git ~/go/src/k8s.io/arktos -b default-cni-mizar
Cloning into '/home/demo/go/src/k8s.io/arktos'...
remote: Enumerating objects: 104392, done.
remote: Counting objects: 100% (1055/1055), done.
remote: Compressing objects: 100% (625/625), done.
remote: Total 104392 (delta 518), reused 608 (delta 415), pack-reused 103337
Receiving objects: 100% (104392/104392), 333.07 MiB | 7.81 MiB/s, done.
Resolving deltas: 100% (63105/63105), done.
Checking out files: 100% (20762/20762), done.
demo@demo:~$ sudo bash $HOME/go/src/k8s.io/arktos/hack/setup-dev-node.sh
[sudo] password for demo:
The script is to help install prerequisites of Arktos development environment
on a fresh Linux installation.
It's been tested on Ubuntu 16.04 LTS and 18.04 LTS.
Update apt.
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [2,224 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [435 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [472 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu bionic-updates/restricted Translation-en [64.0 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1,749 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [375 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu bionic-security/main amd64 Packages [1,879 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu bionic-security/main Translation-en [342 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [448 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu bionic-security/restricted Translation-en [60.3 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [1,138 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu bionic-security/universe Translation-en [259 kB]
```

echo export PATH=$PATH:/usr/local/go/bin\ >> ~/.profile
echo cd \$HOME/go/src/k8s.io/arktos >> ~/.profile
source ~/.profile

```
2021-09-24 07:46:06 (10.8 MB/s) - '/tmp/go1.13.9.linux-amd64.tar.gz' saved [120139686/120139686]

Done.
Please run and add 'export PATH=$PATH:/usr/local/go/bin' into your shell profile.
You can proceed to run arktos-up.sh if you want to launch a single-node cluster.
demo@demo:~$ echo export PATH=$PATH:/usr/local/go/bin\ >> ~/.profile
demo@demo:~$ echo cd \$HOME/go/src/k8s.io/arktos >> ~/.profile
demo@demo:~$ source ~/.profile
demo@demo:~/go/src/k8s.io/arktos$ CNIPLUGIN=mizar ./hack/arktos-up.sh
```

Step-3 Start Arktos cluster

CNIPLUGIN=mizar ./hack/arktos-up.sh

Output

Failed due to containerd is not running…

```
demo@demo:~/go/src/k8s.io/arktos$ CNIPLUGIN=mizar ./hack/arktos-up.sh
DBG: Flannel CNI plugin will be installed AFTER cluster is up
DBG: effective feature gates AllAlpha=false,WorkloadInfoDefaulting=true,QPSDoubleGCController=true,QPSDoubleRSController=t
rue,MandatoryArktosNetwork=true
DBG: effective disabling admission plugins
DBG: effective default network template file is /home/demo/go/src/k8s.io/arktos/hack/testdata/default-flat-network.tmpl
DBG: kubelet arg RESOLV_CONF is /run/systemd/resolve/resolv.conf
WARNING : The kubelet is configured to not fail even if swap is enabled; production deployments should disable swap.
WARNING : This script MAY be run as root for docker socket / iptables functionality; if failures occur, retry as root.
Containerd is required for Arktos
demo@demo:~/go/src/k8s.io/arktos$ sudo systemclt start containerd
sudo: systemclt: command not found
demo@demo:~/go/src/k8s.io/arktos$ sudo systemctl start containerd
demo@demo:~/go/src/k8s.io/arktos$ CNIPLUGIN=mizar ./hack/arktos-up.sh
DBG: Flannel CNI plugin will be installed AFTER cluster is up
DBG: effective feature gates AllAlpha=false,WorkloadInfoDefaulting=true,QPSDoubleGCController=true,QPSDoubleRSController=t
rue,MandatoryArktosNetwork=true
```

Started **containerd** Manually by using command:- **sudo systemctl start containerd and run script again**

CNIPLUGIN=mizar ./hack/arktos-up.sh

```
demo@demo:~/go/src/k8s.io/arktos$ CNIPLUGIN=mizar ./hack/arktos-up.sh
DBG: Flannel CNI plugin will be installed AFTER cluster is up
DBG: effective feature gates AllAlpha=false,WorkloadInfoDefaulting=true,QPSDoubleGCController=true,QPSDoubleRSController=t
rue,MandatoryArktosNetwork=true
DBG: effective disabling admission plugins
DBG: effective default network template file is /home/demo/go/src/k8s.io/arktos/hack/testdata/default-flat-network.tmpl
DBG: kubelet arg RESOLV_CONF is /run/systemd/resolve/resolv.conf
WARNING : The kubelet is configured to not fail even if swap is enabled; production deployments should disable swap.
WARNING : This script MAY be run as root for docker socket / iptables functionality; if failures occur, retry as root.
cni plugin is mizar; arktos will use mizar to provision pod network
Checking arktos containerd...
arktos containerd not found...
--2021-09-24 07:47:18--  https://github.com/containerd/containerd/releases/download/v1.4.2/containerd-1.4.2-linux-amd64.ta
r.gz
Resolving github.com (github.com)... 13.234.210.38
Connecting to github.com (github.com)|13.234.210.38|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://github-releases.githubusercontent.com/46089560/5cad0000-2fc0-11eb-8e3a-ed435a7b945c?X-Amz-Algorithm=AWS4
-HMAC-SHA256&X-Amz-Credential=AKIAIWNJYAX4CSVEH53A%2F20210924%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20210924T074718Z&
X-Amz-Expires=300&X-Amz-Signature=9afed567c489659e066ed751808d90520a4e380ea467a5b12aa838d0021f8bbe&X-Amz-SignedHeaders=hos
t&actor_id=0&key_id=0&repo_id=46089560&response-content-disposition=attachment%3B%20filename%3Dcontainerd-1.4.2-linux-amd6
4.tar.gz&response-content-type=application%2Foctet-stream [following]
--2021-09-24 07:47:18--  https://github-releases.githubusercontent.com/46089560/5cad0000-2fc0-11eb-8e3a-ed435a7b945c?X-Amz
-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNJYAX4CSVEH53A%2F20210924%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20
210924T074718Z&X-Amz-Expires=300&X-Amz-Signature=9afed567c489659e066ed751808d90520a4e380ea467a5b12aa838d0021f8bbe&X-Amz-Si
gnedHeaders=host&actor_id=0&key_id=0&repo_id=46089560&response-content-disposition=attachment%3B%20filename%3Dcontainerd-1
.4.2-linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving github-releases.githubusercontent.com (github-releases.githubusercontent.com)... 185.199.109.154, 185.199.110.15
4, 185.199.108.154, ...
Connecting to github-releases.githubusercontent.com (github-releases.githubusercontent.com)|185.199.109.154|:443... connec
ted.
```

Deployment Successfully done.

Output

```
****************************************
Setup Kata Containers components ...
* Install Kata components
[sudo] password for demo:
2021-09-24T08:34:21Z INFO Waiting for automatic snapd restart...
kata-containers 2.2.0-1 from Kata Containers (katacontainers✓) installed
* Checking Kata compatibility
No newer release available time="2021-09-24T08:35:27Z" level=error msg="CPU property not found" arch=amd64 description="Virtualization support" nam
e=vmx pid=7562 source=runtime type=flag time="2021-09-24T08:35:27Z" level=error msg="Module is not loaded and it can not be inserted. Please consid
er running with sudo or as root" arch=amd64 module=kvm name=kata-runtime pid=7562 source=runtime time="2021-09-24T08:35:27Z" level=error msg="kerne
l property not found" arch=amd64 description="Kernel-based Virtual Machine" name=kvm pid=7562 source=runtime type=module time="2021-09-24T08:35:27Z
" level=error msg="Module is not loaded and it can not be inserted. Please consider running with sudo or as root" arch=amd64 module=vhost name=kata
-runtime pid=7562 source=runtime time="2021-09-24T08:35:27Z" level=error msg="kernel property not found" arch=amd64 description="Host kernel accele
rator for virtio" name=vhost pid=7562 source=runtime type=module time="2021-09-24T08:35:27Z" level=error msg="Module is not loaded and it can not b
e inserted. Please consider running with sudo or as root" arch=amd64 module=vhost_net name=kata-runtime pid=7562 source=runtime time="2021-09-24T08
:35:27Z" level=error msg="kernel property not found" arch=amd64 description="Host kernel accelerator for virtio network" name=vhost_net pid=7562 so
urce=runtime type=module time="2021-09-24T08:35:27Z" level=error msg="Module is not loaded and it can not be inserted. Please consider running with
 sudo or as root" arch=amd64 module=vhost_vsock name=kata-runtime pid=7562 source=runtime time="2021-09-24T08:35:27Z" level=error msg="kernel prope
rty not found" arch=amd64 description="Host Support for Linux VM Sockets" name=vhost_vsock pid=7562 source=runtime type=module time="2021-09-24T08:
35:27Z" level=error msg="Module is not loaded and it can not be inserted. Please consider running with sudo or as root" arch=amd64 module=kvm_intel
 name=kata-runtime pid=7562 source=runtime time="2021-09-24T08:35:27Z" level=error msg="kernel property not found" arch=amd64 description="Intel KV
M" name=kvm_intel pid=7562 source=runtime type=module time="2021-09-24T08:35:27Z" level=error msg="ERROR: System is not capable of running Kata Con
tainers" arch=amd64 name=kata-runtime pid=7562 source=runtime ERROR: System is not capable of running Kata Containers
Aborted. Current system does not support Kata Containers.
Kata Setup done.
****************************************
Local Kubernetes cluster is running. Press Ctrl-C to shut it down.

Logs:
  /tmp/kube-apiserver0.log
  /tmp/kube-controller-manager.log


  /tmp/kube-proxy.log
  /tmp/kube-scheduler.log
  /tmp/kubelet.log

To start using your cluster, you can open up another terminal/tab and run:

  export KUBECONFIG=/var/run/kubernetes/admin.kubeconfig
Or
  export KUBECONFIG=/var/run/kubernetes/adminN(N=0,1,...).kubeconfig

  cluster/kubectl.sh

Alternatively, you can write to the default kubeconfig:

  export KUBERNETES_PROVIDER=local

  cluster/kubectl.sh config set-cluster local --server=https://demo:6443 --certificate-authority=/var/run/kubernetes/server-ca.crt
  cluster/kubectl.sh config set-credentials myself --client-key=/var/run/kubernetes/client-admin.key --client-certificate=/var/run/kubernetes/clien
t-admin.crt
  cluster/kubectl.sh config set-context local --cluster=local --user=myself
  cluster/kubectl.sh config use-context local
  cluster/kubectl.sh
```

Step-4 Check Cluster health

Open new terminal for same instance and run following commands:

Check node, Pods, Vpc, Subnet, dividers & , bouncers, Net status

```
./cluster/kubectl.sh get nodes

./cluster/kubectl.sh get pods -Ao wide

 ./cluster/kubectl.sh get vpc -Ao wide

./cluster/kubectl.sh get subnet -Ao wide

./cluster/kubectl.sh get dividers -Ao wide

./cluster/kubectl.sh get bouncers -Ao wide

./cluster/kubectl.sh get net -Ao wide
```