

Test report - Deployment of Arktos Cluster with Mizar CNI-On Prem:

We have followed (user guide to deploy arktos cluster with Mizar as CNI) using arktos-up script

Date:27.09.2021

Create an instance on premise

Created instance on on-prem (Used 8 CPU and 32GB RAM and the storage size is 128GB).

SSH instance with credentials:

```
• MobaXterm 20.6 •
(SSH client, X-server and networking tools)

> SSH session to demo@192.168.4.9
• SSH compression : ✓
• SSH-browser      : ✓
• X11-forwarding   : ✓ (remote display is forwarded through SSH)
• DISPLAY          : ✓ (automatically set on remote server)

> For more info, ctrl+click on help or visit our website

Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 4.15.0-112-generic x86_64)

* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:       https://ubuntu.com/advantage

System information as of Mon Sep 27 06:04:45 UTC 2021

System load:  0.05          Processes:           214
Usage of /:    15.3% of 62.25GB   Users logged in:     1
Memory usage:  0%             IP address for ens160: 192.168.4.9
Swap usage:    0%

0 packages can be updated.
0 updates are security updates.

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

Last login: Mon Sep 27 14:01:08 2021
/usr/bin/xauth: file /home/demo/.Xauthority does not exist
demo@master:~$
```

Step-1: Update kernel (If required)

To check kernel, run following command

uname -a

output:

```
demo@master:~$ uname -a
Linux master 4.15.0-112-generic #113-Ubuntu SMP Thu Jul 9 23:41:39 UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
demo@master:~$
```

Here kernel version is 4.15.0-112-generic which is less than the required kernel version, so to update the kernel version to 5.6.0-rc2, we used the following steps :

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

output :

```
Length: 56427036 (54M) [application/x-www-form-urlencoded]
Saving to: './linux-5.6.0-rc2/linux-image-5.6.0-rc2_5.6.0-rc2-1_amd64.deb'

linux-image-5.6.0-rc2_5.6.0-rc2-1_amd64.deb 100%[=====] 53.81M 10.3MB/s in 6.9s

2021-09-27 06:12:11 (7.75 MB/s) - './linux-5.6.0-rc2/linux-image-5.6.0-rc2_5.6.0-rc2-1_amd64.deb' saved [56427036/56427036]

--2021-09-27 06:12:11-- https://mizar.s3.amazonaws.com/linux-5.6-rc2/linux-libc-dev_5.6.0-rc2-1_amd64.deb
Resolving mizar.s3.amazonaws.com (mizar.s3.amazonaws.com)... 52.217.90.204
Connecting to mizar.s3.amazonaws.com (mizar.s3.amazonaws.com)[52.217.90.204]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1082248 (1.0M) []
Saving to: './linux-5.6.0-rc2/linux-libc-dev_5.6.0-rc2-1_amd64.deb'

linux-libc-dev_5.6.0-rc2-1_amd64.deb 100%[=====] 1.03M 799KB/s in 1.3s

2021-09-27 06:12:13 (799 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 ... 67087 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-4.15.0-112-generic
Replacing config file /run/grub/menu.lst with new version
Found kernel: /vmlinuz-5.6.0-rc2
Found kernel: /vmlinuz-4.15.0-112-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-4.15.0-112-generic
Found initrd image: /boot/initrd.img-4.15.0-112-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
```

Step-2: Install dependencies

Relogin and run the following steps to install dependencies required for arktos deployment:

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

output:

```
demo@master:~$ 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: 104406, done.
remote: Counting objects: 100% (1069/1069), done.
remote: Compressing objects: 100% (639/639), done.
remote: Total 104406 (delta 527), reused 592 (delta 415), pack-reused 103337
Receiving objects: 100% (104406/104406), 332.77 MiB | 13.12 MiB/s, done.
Resolving deltas: 100% (63163/63163), done.
Checking out files: 100% (20762/20762), done.
```

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

output:

```

Setting up libbinutils:amd64 (2.30-21ubuntu1~18.04.5) ...
Setting up libcilkrts5:amd64 (7.5.0-3ubuntu1~18.04) ...
Setting up libubsan0:amd64 (7.5.0-3ubuntu1~18.04) ...
Setting up libgcc-7-dev:amd64 (7.5.0-3ubuntu1~18.04) ...
Setting up cpp-7 (7.5.0-3ubuntu1~18.04) ...
Setting up binutils-x86-64-linux-gnu (2.30-21ubuntu1~18.04.5) ...
Setting up cpp (4:7.4.0-1ubuntu2.3) ...
Setting up binutils (2.30-21ubuntu1~18.04.5) ...
Setting up gcc-7 (7.5.0-3ubuntu1~18.04) ...
Setting up gcc (4:7.4.0-1ubuntu2.3) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libjq1 libonig4
The following NEW packages will be installed:
  jq libjq1 libonig4
0 upgraded, 3 newly installed, 0 to remove and 167 not upgraded.
Need to get 276 kB of archives.
After this operation, 930 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libonig4 amd64 6.7.0-1 [119 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libjq1 amd64 1.5+dfsg-2 [111 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic/universe amd64 jq amd64 1.5+dfsg-2 [45.6 kB]
Fetched 276 kB in 1s (194 kB/s)
Selecting previously unselected package libonig4:amd64.
(Reading database ... 102272 files and directories currently installed.)
Preparing to unpack .../libonig4_6.7.0-1_amd64.deb ...
Unpacking libonig4:amd64 (6.7.0-1) ...
Selecting previously unselected package libjq1:amd64.
Preparing to unpack .../libjq1_1.5+dfsg-2_amd64.deb ...
Unpacking libjq1:amd64 (1.5+dfsg-2) ...
Selecting previously unselected package jq.
Preparing to unpack .../jq_1.5+dfsg-2_amd64.deb ...
Unpacking jq (1.5+dfsg-2) ...
Setting up libonig4:amd64 (6.7.0-1) ...
Setting up libjq1:amd64 (1.5+dfsg-2) ...
Setting up jq (1.5+dfsg-2) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
Install complete.
--2021-09-27 06:55:21-- https://dl.google.com/go/go1.13.9.linux-amd64.tar.gz
Resolving dl.google.com (dl.google.com)... 142.250.183.14, 2404:6800:4009:820::200e
Connecting to dl.google.com (dl.google.com)|142.250.183.14|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 120139686 (115M) [application/octet-stream]
Saving to: '/tmp/go1.13.9.linux-amd64.tar.gz'

go1.13.9.linux-amd64.tar.gz 100%[=====] 114.57M 14.6
2021-09-27 06:55:30 (12.6 MB/s) - '/tmp/go1.13.9.linux-amd64.tar.gz' saved [120139686/120139686]

Done.
Please run and add 'export PATH=$PATH:/usr/local/go/bin' into your shell profile.
You can proceed to run arktos-up.sh if you want to launch a single-node cluster.
demo@master:~$

```

```
echo export PATH=$PATH:/usr/local/go/bin\ >> ~/.profile
```

```
echo cd \${HOME}/go/src/k8s.io/arktos >> ~/.profile
```

```
source ~/.profile
```

output:

```

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

```

Step-3: Start Arktos cluster

Run following steps to deploy arktos cluster with Mizar as CNI:

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

Finally we got following output, which indicates that arktos cluster created successfully with Mizar as CNI

Output:

```

serviceaccount/virtlet created
NAME      DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
virtlet   0         0         0       0            0           <none>          0s
clusterrole.rbac.authorization.k8s.io/system:arktos-network-reader created
clusterrolebinding.rbac.authorization.k8s.io/system:kubelet-network-reader created

Arkτος Setup done.
*****
Setup Kata Containers components ...
* Install Kata components
2021-09-27T07:22:38Z INFO Waiting for automatic snapd restart...
Kata: containers 2.2.1 from Kata Containers (katacontainers-) Unstalled
* Checking Kata compatibility
No newer release available time="2021-09-27T07:25:45Z" level=error msg="CPU property not found" arch=amd64 description="Virtualization support" name=vmx pid=14008 source=runtime type=flag time="2021-09-27T07:25:45Z" 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 name=kata-runtime pid=14008 source=runtime time="2021-09-27T07:25:45Z" level=error msg="kernel property not found" arch=amd64 description="kernel-based Virtual Machine" name=kvm pid=14008 source=runtime type=module time="2021-09-27T07:25:45Z" 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=14008 source=runtime time="2021-09-27T07:25:45Z" level=error msg="kernel property not found" arch=amd64 description="Host kernel accelerator for virtio" name=vhost pid=14008 source=runtime type=module time="2021-09-27T07:25:45Z" 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_net name=kata-runtime pid=14008 source=runtime type=module time="2021-09-27T07:25:45Z" level=error msg="Module is not loaded and it can not be inserted. Please consider running with sudo or as root" arch=amd64 module=vsock name=kata-runtime pid=14008 source=runtime time="2021-09-27T07:25:45Z" level=error msg="kernel property not found" arch=amd64 description="Host Support for Linux VM Sockets" name=vhost_vsock pid=14008 source=runtime type=module time="2021-09-27T07:25:45Z" 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=14008 source=runtime time="2021-09-27T07:25:45Z" level=error msg="kernel property not found" arch=amd64 description="Intel KVM" name=kvm_intel pid=14008 source=runtime type=module time="2021-09-27T07:25:45Z" level=error msg="ERROR: System is not capable of running Kata Containers" arch=amd64 name=kata-runtime pid=14008 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/admin(N=0,1,...).kubeconfig
cluster/kubect1.sh

Alternatively, you can write to the default kubeconfig:
export KUBERNETES_PROVIDER=local
cluster/kubect1.sh config set-cluster local --server=https://master:6443 --certificate-authority=/var/run/kubernetes/server-ca.crt
cluster/kubect1.sh config set-credentials myself --client-key=/var/run/kubernetes/client-admin.key --client-certificate=/var/run/kubernetes/client-admin.crt
cluster/kubect1.sh config set-context local --cluster=local --user=myself
cluster/kubect1.sh config use-context local
cluster/kubect1.sh

```

Leave this terminal here as it is (do not close the terminal) and open new terminal of same instance

Step-4 Check Cluster health

Open new terminal for same instance and run following commands:

- 1) Check node status

```
./cluster/kubect1.sh get nodes -Ao wide
```

Output

```

demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubect1.sh get nodes -Ao wide
NAME      STATUS   ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP   OS-IMAGE           KERNEL-VERSION   CONTAINER-RUNTIME
master    Ready    <none>    31m   v0.7.0    192.168.1.143 <none>         Ubuntu 18.04.5 LTS 5.6.0-rc2         containerd://1.4.0-beta.1-29-g70b0d3cf

```

- 2) Check pods status

```
./cluster/kubect1.sh get pods -Ao wide
```

Output

```

demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubect1.sh get pods -Ao wide
NAMESPACE   NAME                                     HASHKEY          READY   STATUS      RESTARTS   AGE   IP           NODE   NOMINATED NODE   READINESS GATES
default     mizar-daemon-n9zsf                     7891419395696758534 1/1     Running    0          26m   192.168.4.9   master <none>          <none>
default     mizar-operator-6985d77546-kxb5n        8135389375691133040 1/1     Running    0          16m   192.168.4.9   master <none>          <none>
kube-system coredns-default-6cfddc6766-nhbg6       8003625039412241676 0/1     ContainerCreating 0          26m   <none>        master <none>          <none>
kube-system kube-dns-7f4bf79dc-hbkhx          98688878299310215   0/3     ContainerCreating 0          26m   <none>        master <none>          <none>
kube-system virtlet-c6p8r               350329463018768294 3/3     Running    0          12m   192.168.4.9   master <none>          <none>
demo@master:~/go/src/k8s.io/arktos$

```

3) Check vpcs status

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

Output

```
demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubectl.sh get vpc -Ao wide
NAMESPACE  NAME  IP      PREFIX  VNI  DIVIDERS  STATUS  CREATETIME  PROVISIONDELAY
default    vpc0  20.0.0.0  8       1    1         Init   2021-09-27T07:13:31.424617
```

4) Check subnets

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

Output

```
demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubectl.sh get subnets -Ao wide
NAMESPACE  NAME  IP      PREFIX  VNI  VPC  STATUS  BOUNCERS  CREATETIME  PROVISIONDELAY
default    net0  20.0.0.0  8       1    vpc0  Init   1         2021-09-27T07:13:31.533877
```

5) Check net

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

Output

```
demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubectl.sh get net -Ao wide
NAME      TYPE      VPC                      PHASE  DNS
default   mizar     system-default-network   Ready  10.0.0.64
demo@master:~/go/src/k8s.io/arktos$
```

6) Check dividers

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

Output

```
demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubectl.sh get dividers -Ao wide
No resources found.
demo@master:~/go/src/k8s.io/arktos$
```

7) Check bouncers

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

Output

```
demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubectrl.sh get bouncers -Ao wide
No resources found.
demo@master:~/go/src/k8s.io/arktos$
```

8) Pod deployment:

Output

```
demo@master:~/go/src/k8s.io/arktos$ ./cluster/kubectrl.sh get pods -Ao wide
NAMESPACE   NAME                                     HASHKEY   READY   STATUS      RESTARTS   AGE   IP           NODE   NOMINATED NODE   READINESS GATES
default     mizar-daemon-n9zsf                     7891419395696758534   1/1     Running     0          31m   192.168.4.9   master <none>         <none>
default     mizar-operator-6985d77546-kxb5n        8135389375691133040   1/1     Running     0          21m   192.168.4.9   master <none>         <none>
default     nginx-68dccb55d-klnds                   4431599355315713865   0/1     ContainerCreating 0        31s   <none>         master <none>         <none>
kube-system coredns-default-6cfd6c6766-nhbg6       8003625039412241676   0/1     ContainerCreating 0        31m   <none>         master <none>         <none>
kube-system kube-dns-7f4bf79dc-hbkhx       98688878299310215     0/3     ContainerCreating 0        31m   <none>         master <none>         <none>
kube-system virtlet-c6p8r                   350329463018769294    3/3     Running      0         17m   192.168.4.9   master <none>         <none>
```

Pods are getting stuck in **ContainerCreating** state.