ORACLE

OCI-How to Install and Configure KVM Guest in Oracle Cloud Infrastructure

May 2023, Version 1.1

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Prerequisites

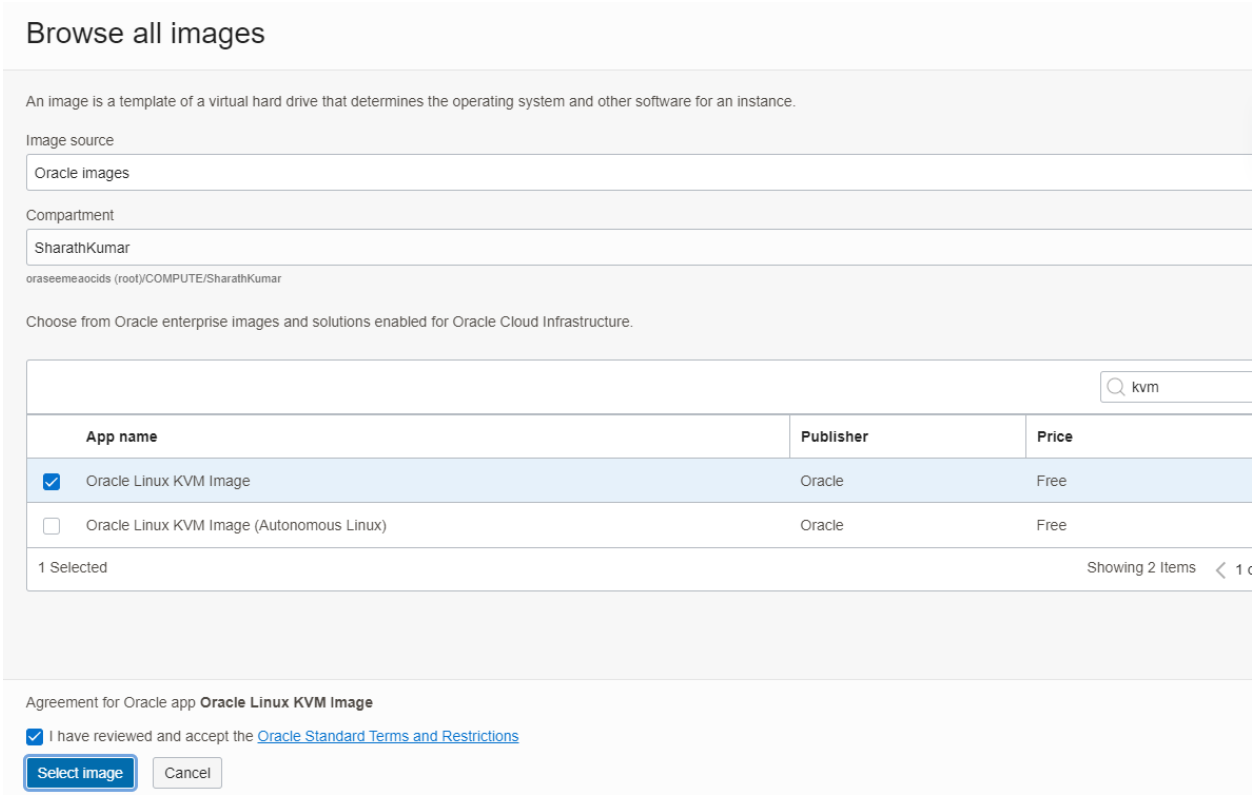
You have proper VCN ready and fully configured the related security rules like allow SSH and ensure KVM hypervisor can access the internet.

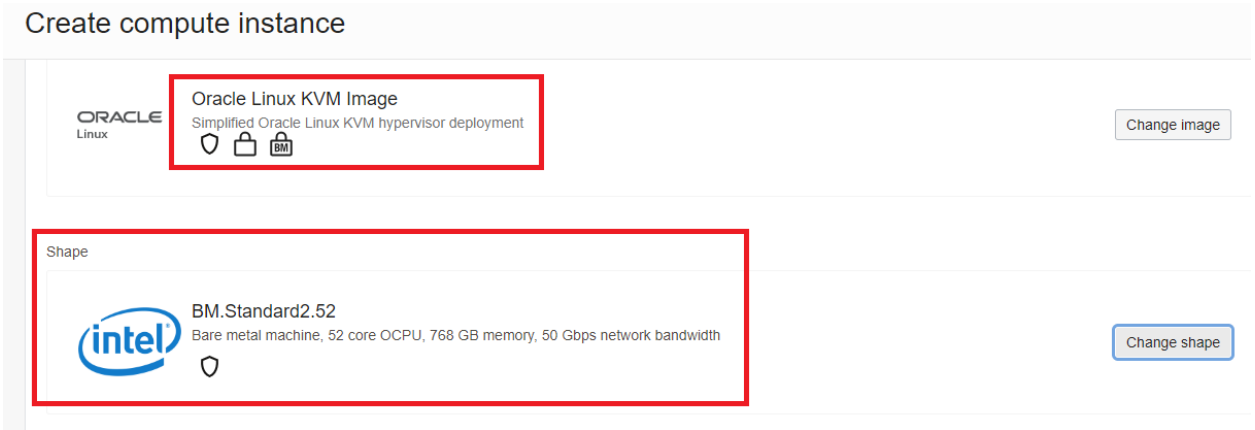
You understand how to install an operating system as a guest, or you know how to copy a virtual disk image between systems.

Steps

Launch the KVM hypervisor host instance

[1] Review the OCI public documentation(https://docs.oracle.com/en-us/iaas/Content/Compute/Tasks/launchinginstance.htm) for current options and features you can use in the environment then select Oracle Images "Oracle Linux KVM Image and a BM shape for the KVM hypervisor host based on the workload requirements and provision it.





By default, the KVM image has included required KVM packages. You can also check if those packages are properly installed and configured:

```
[opc@j-kvm-host ~]$ rpm -q libvirt

libvirt-3.9.0-14.el7_5.5.x86_64

[opc@j-kvm-host ~]$ systemctl status libvirtd

● libvirtd.service - Virtualization daemon
```

KVM related modules:

```
[root@j-kvm-host opc]# modinfo kvm_intel |grep modules

filename: /lib/modules/4.1.12-124.15.2.el7uek.x86_64/kernel/arch/x86/kvm/kvm-intel.ko

[root@j-kvm-host opc]# modinfo kvm |grep modules

filename: /lib/modules/4.1.12-124.15.2.el7uek.x86_64/kernel/arch/x86/kvm/kvm.ko
```

The intel_iommu for SR-IOV pass-through (pt) mode in the kernel has configured enabled:

"intel_iommu=on" has added into GRUB command line:

```
[root@j-kvm-host opc]# cat /etc/default/grub

...

GRUB_CMDLINE_LINUX="crashkernel=auto LANG=en_US.UTF-8 transparent_hugepage=never console=tty0
console=ttyS0,9600 rd.luks=0 rd.lvm=0 rd.md=0 rd.dm=0 netroot=iscsi:169.254.0.2:::1:iqn.2015-
02.oracle.boot:uefi iscsi_param=node.session.timeo.replacement_timeout=6000 net.ifnames=1
nvme_core.shutdown_timeout=10 ipmi_si.tryacpi=0 ipmi_si.trydmi=0 ipmi_si.trydefaults=0 network-
config=e2NvbmZpZzogZGlzYWJsZWR9Cg== intel_iommu=on"  >>>>>>>>>>
```

[root@j-kvm-host opc]# dmesg | grep -e DMAR -e IOMMU

[0.000000] ACPI: DMAR 0x000000006D1B9EC8 000260 (v01 ORACLE X7-2C 46040600 INTL 20091013)

[0.000000] Intel-IOMMU: enabled

Tuned service has been enabled for performance optimization:

[root@j-kvm-host opc]# **systemctl status tuned**

tuned.service - Dynamic System Tuning Daemon

Loaded: loaded (/usr/lib/systemd/system/tuned.service; enabled; vendor preset: enabled)

Active: active (running) since Wed 2019-03-06 04:31:29 GMT; 2h 8min ago

Docs: man:tuned(8)

man:tuned.conf(5)

man:tuned-adm(8)

Main PID: 3757 (tuned)

CGroup: /system.slice/tuned.service

└─3757 /usr/bin/python -Es /usr/sbin/tuned -l –

oci-utils package has been installed and ocid.service is enabled by default:

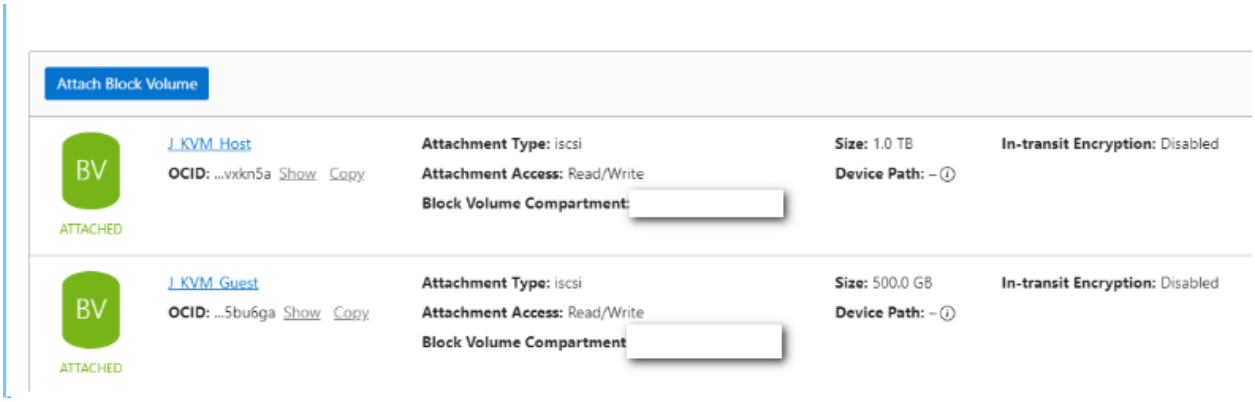
[root@j-kvm-host opc]**# rpm -q oci-utils**
oci-utils-0.6-34.el7.noarch

[root@j-kvm-host opc]**# systemctl status ocid.service**
ocid.service - Oracle Cloud Infrastructure utilities daemon
Loaded: loaded (/etc/systemd/system/ocid.service; enabled; vendor preset: enabled)

Attach block volumes for KVM hypervisor and Guest further usage

Follow below document steps to attach two block volumes(one for KVM host and another for KVM Guest) and mount them:

https://docs.oracle.com/en-us/iaas/Content/Block/Tasks/attachingavolume.htm



Examine Storage: In the KVM host, use the oci-iscsi-config -s command to display attached Block Volumes:

```
[root@j-kvm-host opc]# oci-iscsi-config -s
```

```
[root@j-kvm-host opc]# oci-iscsi-config -s
Currently attached iSCSI devices:
Target iqn.2015-12.com.oracleiaas:d3b517a5-5f28-4914-85b0-d26ca1860bb0
Persistent portal: 169.254.2.3:3260
Current portal: 169.254.2.3:3260
State: LOGGED_IN
Attached device: sdc
Size: 500G
File system type: Unknown
Mountpoint: Not mounted
Target iqn.2015-12.com.oracleiaas:bbd692ef-9822-4b43-9206-34913a5be5b4
Persistent portal: 169.254.2.2:3260
Current portal: 169.254.2.2:3260
State: LOGGED_IN
Attached device: sdb
Size: 1T
File system type: Unknown
Mountpoint: Not mounted
```

Create lvm on the block volume and put the guest ISO on it:

[root@j-kvm-host opc]# ls -hl /mnt/myhostlv1/

total 3.2G

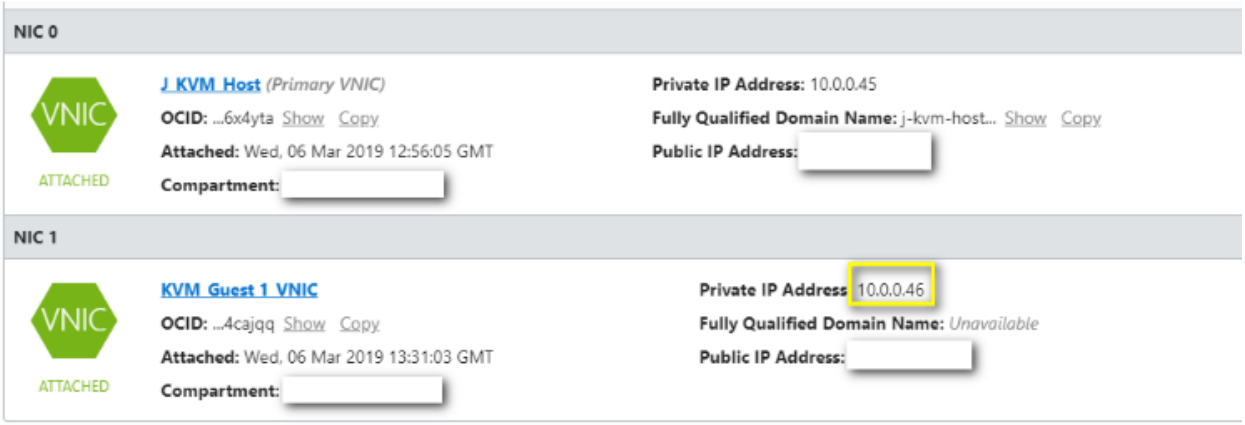
drwx------. 2 root root 16K 14:04 lost+found
-rw-r--r--. 1 qemu qemu 3.2G 14:21 OracleLinux-R9-U0-Server-x86_64-dvd.iso

Create a secondary vNIC on the KVM hypervisor host for the KVM guest to use

Follow below document steps to add the second VNIC:

OCI: How to configure a secondary VNICs in OL7 Instance via oci-network-config (Doc ID 2487934.1)

Note down the ***"MAC Address"*** and "***IP Address"*** information here which will be used in later.



Examine VNICs: In the KVM host, use the command sudo oci-network-config -s to display the VNICs.

[root@j-kvm-host opc]# **oci-network-config -s|column -t**

```
[root@j-kvm-host opc]# oci-network-config -s|column -t

CONFIG ADDR SPREFIX SBITS VIRTRT NS IND IFACE VLTAG VLAN STATE MAC VNIC

- 10.0.0.45 10.0.0.0 24 10.0.0.1 - 1 eno2 0 - UP 00:10:e0:e5:2e:84
ocid1.vnic.oc1.iad.abuwcljrol5eyleobsqjcaqsq5vbl6vxl7zed3l4h2q7oewrif642n6x4yta

ADD 10.0.0.46 10.0.0.0 24 10.0.0.1 - 2 eno3d1 0 - UP 00:10:e0:e5:2e:85
ocid1.vnic.oc1.iad.abuwcljrm4osymxnrnnfrmloznwo6rgkskkva3q7bxcise2jxdofph4cajqq

[root@j-kvm-host images]# ifconfig

eno2: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 9000

inet 10.0.0.45 netmask 255.255.255.0 broadcast 10.0.0.255

ether xx.xx.xx.xx txqueuelen 1000 (Ethernet)

RX packets 3055676 bytes 4011517595 (3.7 GiB)

RX errors 0 dropped 0 overruns 0 frame 0

TX packets 1931520 bytes 10300725519 (9.5 GiB)

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

eno3d1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500

ether <MAC ADDR> txqueuelen 1000 (Ethernet)

RX packets 60 bytes 3832 (3.7 KiB)

RX errors 0 dropped 0 overruns 0 frame 0
```

Note: -

If more than one secondary VNIC's are attached, oci-network-config utility will not add IFACE Name and it will be empty.

Check output of command "oci-network-config -s|column -t" and IFACE column will be empty for additional secondary NIC.

Please be noted for the first secondary VNIC it will be proper, problem can be witnessed for subsequent secondary VNIC addition.

KVM instance cannot be created using that interface, so IFACE name has to be manually updated.

#ip link add link <physical nic interface name> name <new vnic name> address <mac address> type vlan id <vlan id>

Create the KVM Guest VM

There are two ways to install KVM guest:

virsh-install command

This article will mainly focus on this method.

Use **oci-kvm**

oci-kvm is a tool provided by Oracle KVM image to install and remove KVM guests on OCI instances. This article won't focus on this method but will give an exmaple usages for oci-kvm:

oci-kvm create -D J_KVM_GUEST1 -V --vcpu 4 --memory 8192 --boot cdrom,hd --location /u01/OracleLinux-R6-U0-Server-x86_64-dvd.iso --nographics --console pty,target_type=virtio --noautoconsole --os-variant=rhel6 --extra-args "console=tty0 console=ttyS0,115200n8 serial"

virsh-install command

Create the KVM guest via virsh-install command. Create the domain, attach the network device following the appropriate network type which will be hostdev for KVM BM hypervisor and direct networking for KVM VM hypervisor:

virt-install --name=J_KVM_GUEST1 --memory=8196 --vcpus=1 --location=/mnt/myhostlv1/OracleLinux-R6-U0-Server-x86_64-dvd.iso --disk /mnt/myguestlv1/images/J_KVM_GUEST1_ol6.qcow2,device=disk,bus=virtio,size=8 --network type=direct,source=eno3d1,source_mode=passthrough,mac=00:10:E0:E5:2E:85 --os-type=linux --os-variant=rhel6 --nographics --console pty,target_type=serial --extra-args='console=ttyo console=ttyS0,115200n8 serial"

After KVM guest is created, check network connection:

From hypervisor:

[root@j-kvm-host opc]# virsh domiflist J_KVM_GUEST1

```
Interface Type Source Model MAC

-------------------------------------------------------

macvtap0 direct eno3d1 virtio 00:10:e0:e5:2e:85
```

```
[root@j-kvm-host opc]# ip -d link show macvtap0
```

57: macvtap0@eno3d1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN mode DEFAULT group default qlen 500
link/ether <MAC ADDR> brd ff:ff:ff:ff:ff:ff promiscuity 0
macvtap mode passthru addrgenmode eui64 numtxqueues 1 numrxqueues 1

[root@j-kvm-host opc]**# virsh dumpxml J_KVM_GUEST1 |grep "interface type" -A4**

interface type='direct'>
<mac address='<MAC ADDR>'/>
<source dev='eno3d1' mode='passthrough'/>
<target dev='macvtap0'/>
<model type='virtio'/>

From KVM guest

[root@localhost ~]# **ifconfig**

lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
Associating your BMCS vNIC with your KVM VM by editing /etc/sysconfig/network-scripts/ifcfg-etho and resolv.conf and add the below information:

root@localhost ~]**# cat /etc/sysconfig/network-scripts/ifcfg-etho**

HWADDR="<MAC ADDR>" >>>>>>>>>BMCS second VNIC MAC
DEVICE="etho"
BOOTPROTO=static
IPADDR=10.0.0.46 >>>>>>>>>>BMCS second VNIC IP Address
NETMASK=255.255.255.0
GATEWAY=10.0.0.1
#NM_CONTROLLED="yes"
ONBOOT="yes"

[root@localhost ~]**# cat /etc/resolv.conf**
nameserver 169.254.169.254

Restart KVM guest network service:

[root@localhost ~]# **service network restart**

Shutting down loopback interface: [OK]
IPv6 over IPv4 tunneling driver
sit0: Disabled Privacy Extensions
Bringing up loopback interface: lo: Disabled Privacy Extensions
[OK]

[root@localhost ~]# **ip a**
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue state UNKNOWN
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
inet6 ::1/128 scope host
valid_lft forever preferred_lft forever

Do ping test to the hypervisor and Internet from KVM guest:

root@localhost ~]# **ping 10.0.0.45**
PING 10.0.0.45 (10.0.0.45) 56(84) bytes of data.
64 bytes from 10.0.0.45: icmp_seq=1 ttl=64 time=0.828 ms
64 bytes from 10.0.0.45: icmp_seq=2 ttl=64 time=0.366 ms
--- 10.0.0.45 ping statistics ---

2 packets transmitted, 2 received, 0% packet loss, time 1921ms
rtt min/avg/max/mdev = 0.366/0.597/0.828/0.231 ms

[root@localhost ~]# **ping 8.8.8.8**
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=123 time=14.9 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=123 time=14.5 ms

[root@localhost ~]# **ping www.google.com**
PING www.google.com (172.217.164.68) 56(84) bytes of data.
64 bytes from atl26s18-in-f4.1e100.net (172.217.164.68): icmp_seq=1 ttl=54 time=28.3 ms

Do ping test from hypervisor to the KVM guest:

[root@j-kvm-host opc]# **ping 10.0.0.46**
PING 10.0.0.46 (10.0.0.46) 56(84) bytes of data.
64 bytes from 10.0.0.46: icmp_seq=1 ttl=64 time=1.01 ms
64 bytes from 10.0.0.46: icmp_seq=2 ttl=64 time=0.351 ms

Attaching the secondary vnic after KVM guest installation complete

As aforementioned, you can also configure the network after KVM guest installation complete with --nonetwork parameter. The steps are as follows:

Virsh install the KVM guest:

virt-install --name=J_KVM_GUEST1 --memory=8196 --vcpus=1 --location=/mnt/myhostlv1/OracleLinux-R6-U0-Server-x86_64-dvd.iso --disk /mnt/myguestlv1/images/J_KVM_GUEST1_ol6.qcow2,device=disk,bus=virtio,size=8 --nonetwork --os-type=linux --os-variant=rhel6 --nographics --console pty,target_type=serial --extra-args='console=tty0 console=ttyS0,115200n8 serial'

Once installation done and make sure there is no network available in the guest, destroying the VM:

virsh destroy J_KVM_GUEST1

Create a xml file with information of the new added vnic for attaching the secondary vnic:

cat /tmp/kvm-vmcli-vnic-attach.xml
<interface type='direct'>
<mac address='<MAC ADDR>'/>
<source dev='ens4' mode='passthrough'/>
<model type='virtio'/>
</interface

virsh attach-device J_KVM_GUEST1 /tmp/kvm-vmcli-vnic-attach.xml –config

Start and login the VM, checking if the new vnic is added (eth0):

virsh start J_KVM_GUEST1

Configuring the network of eth0:

vi /etc/sysconfig/network-scripts/ifcfg-eth0

```
# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE="eth0"
HWADDR="<MAC ADDR>" >>>>>>>>>BMCS second VNIC MAC
BOOTPROTO=static
IPADDR=10.0.0.46 >>>>>>>>>>BMCS second VNIC IP Address
NETMASK=255.255.255.0
GATEWAY=10.0.0.1
#NM_CONTROLLED="yes"
ONBOOT="yes"
```

Restart KVM guest network service:

service network restart

Do the same ping tests as above to check network access.