FortiDDoS-F - KVM Deployment Guide

Version 6.1.2

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FortiDDoS-F 6.1.2 KVM Deployment Guide
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Change Log

Date	Change Description
2021-05-12	Initial release of 6.1.2 KVM Deployment Guide

Introduction

This document includes the following information:

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- SR-IOV FortiDDoS KVM Deployment on page 13

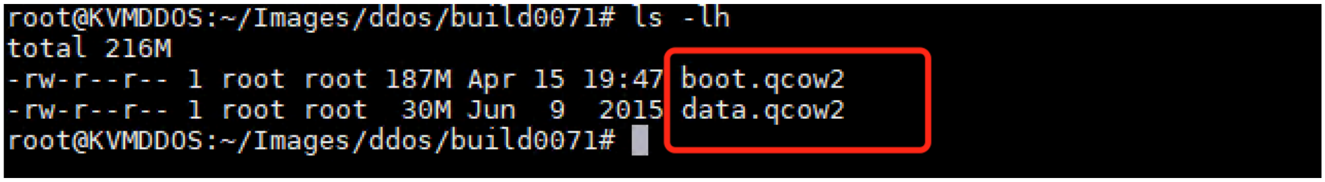
vNIC Support

vNIC Type	FortiDDoS Version	Support Number	Notes
virtio	6.1.2 and later	8; default 8	KVM DDoS default
I40e-vf	6.1.2 and later	2-8	KVM DDoS for SR-IOV support offers best performance

Regular FortiDDoS KVM Deployment

Before you begin:

SSH to your KVM host server and copy the FortiDDoS KVM image(.zip) file to this server and unzip it to one path. There will be two files, displayed similar to the following:

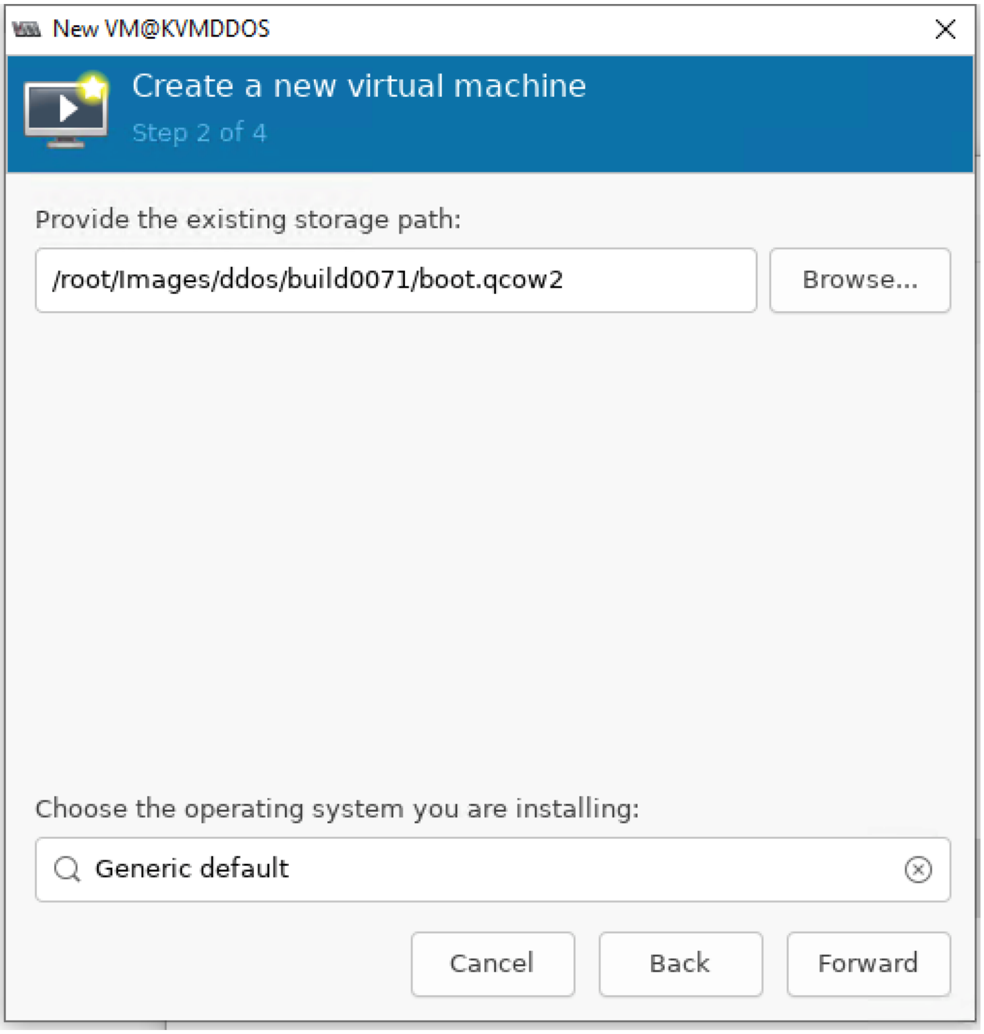


```
root@KVMDDOS:~/Images/ddos/build0071# ls -lh
total 216M
-rw-r--r-- 1 root root 187M Apr 15 19:47 boot.qcow2
-rw-r--r-- 1 root root  30M Jun  9  2015 data.qcow2
root@KVMDDOS:~/Images/ddos/build0071#
```

To deploy the FortiDDoS-VM virtual machine:

1. On the KVM host server, launch the Virtual Machine Manager (virt-manager), and then select *Create a new virtual machine*.
2. Select *Import existing disk image* and click *Forward*.
3. Click *Browse* select `boot.qcow2`.

4. Keep the default value for the operating system type and click *Forward*.



Provide the existing storage path:

/root/Images/ddos/build0071/boot.qcow2

Choose the operating system you are installing:

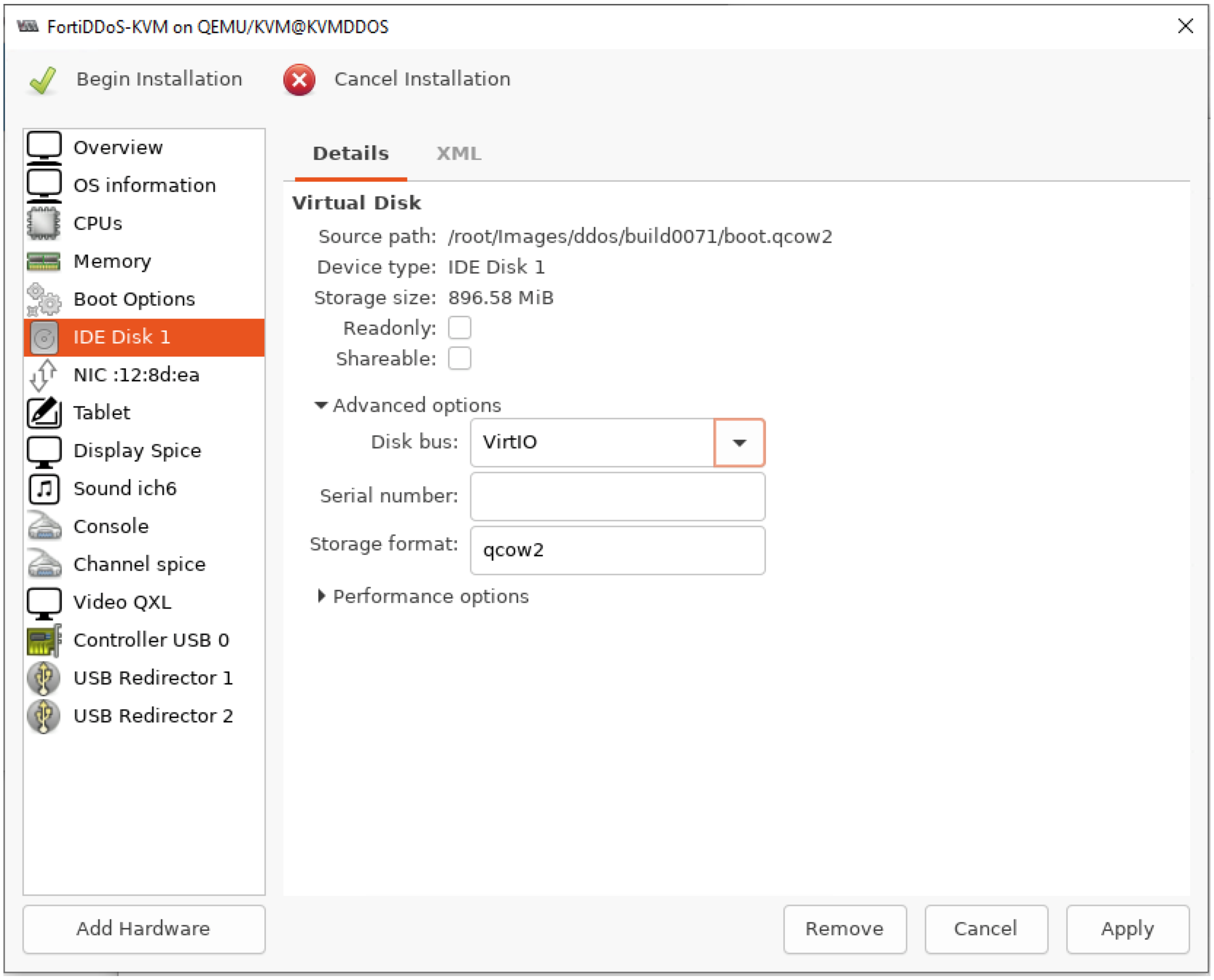
Generic default

5. Specify the amount of memory and number of CPUs to allocate to the virtual machine. Ensure the values do not exceed the maximums for your license. Click *Forward*.

Recommendations:

- KVM04 - 4 CPUs, 16G memory
- KVM08 - 8 CPUs, 16G memory
- KVM16 - 16 CPUs, 42G memory

6. Enter a name for the VM (for example, FortiDDoS-KVM) and select *Customize configuration before install*. Click *Finish*.
7. Create Disk2 and VirtIO adapters.
   - a. Click *IDE Disk 1* and under Advanced options, select *VirtIO* for Disk bus and select *qcow2* for Storage format. Click *Apply*.



Virtual Disk

Source path: /root/Images/ddos/build0071/boot.qcow2

Device type: IDE Disk 1

Storage size: 896.58 MiB

Readonly: □

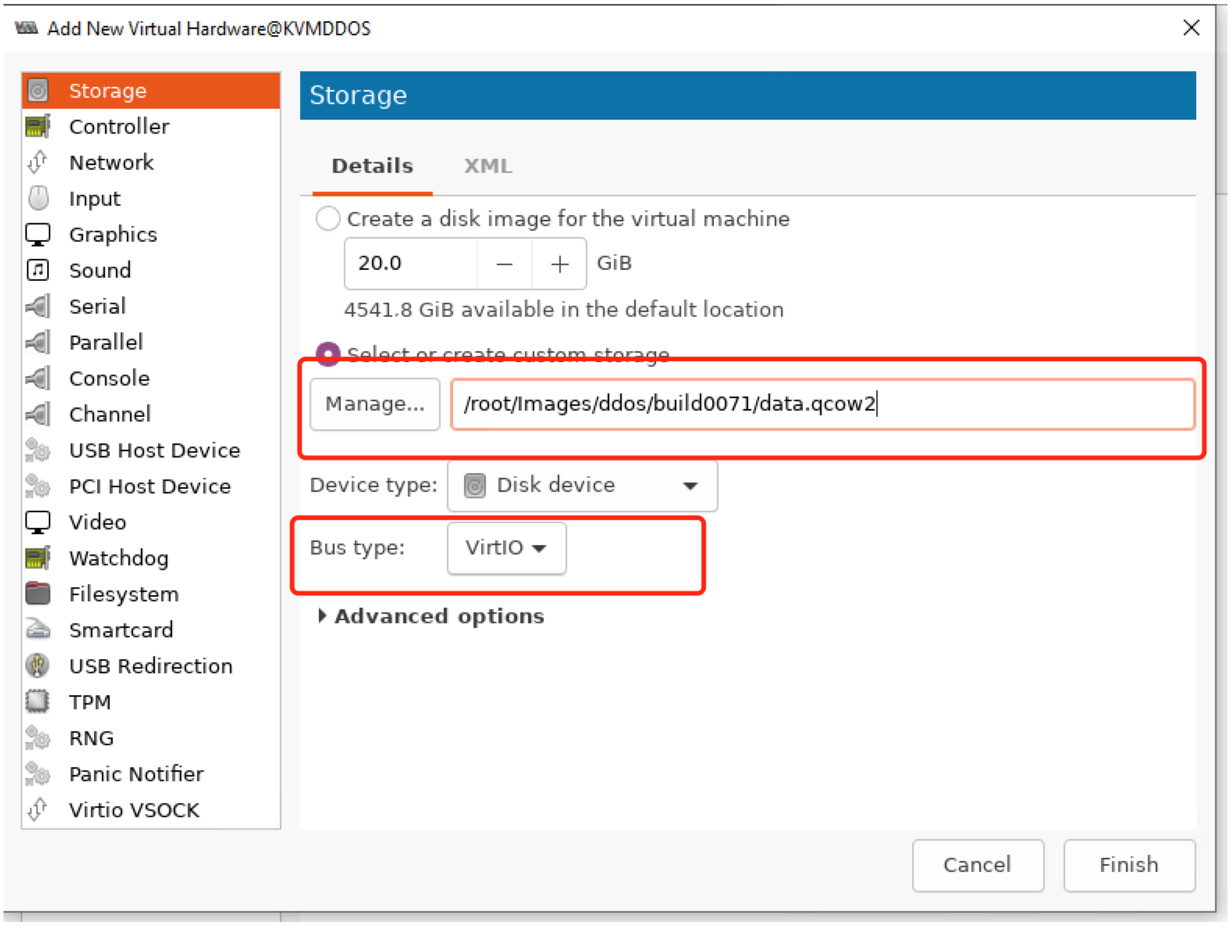
Shareable: □

Disk bus: VirtIO

Serial number:

Storage format: qcow2

b. On the *Storage* Details page, click *Add Hardware* to add another disk. Select *VirtIO* for Bus type and input the full path of `data.qcow2` (same path as boot.qcow2), click *Finish*.



○ Create a disk image for the virtual machine

20.0 GiB

4541.8 GiB available in the default location

● Select or create custom storage

/root/Images/ddos/build0071/data.qcow2

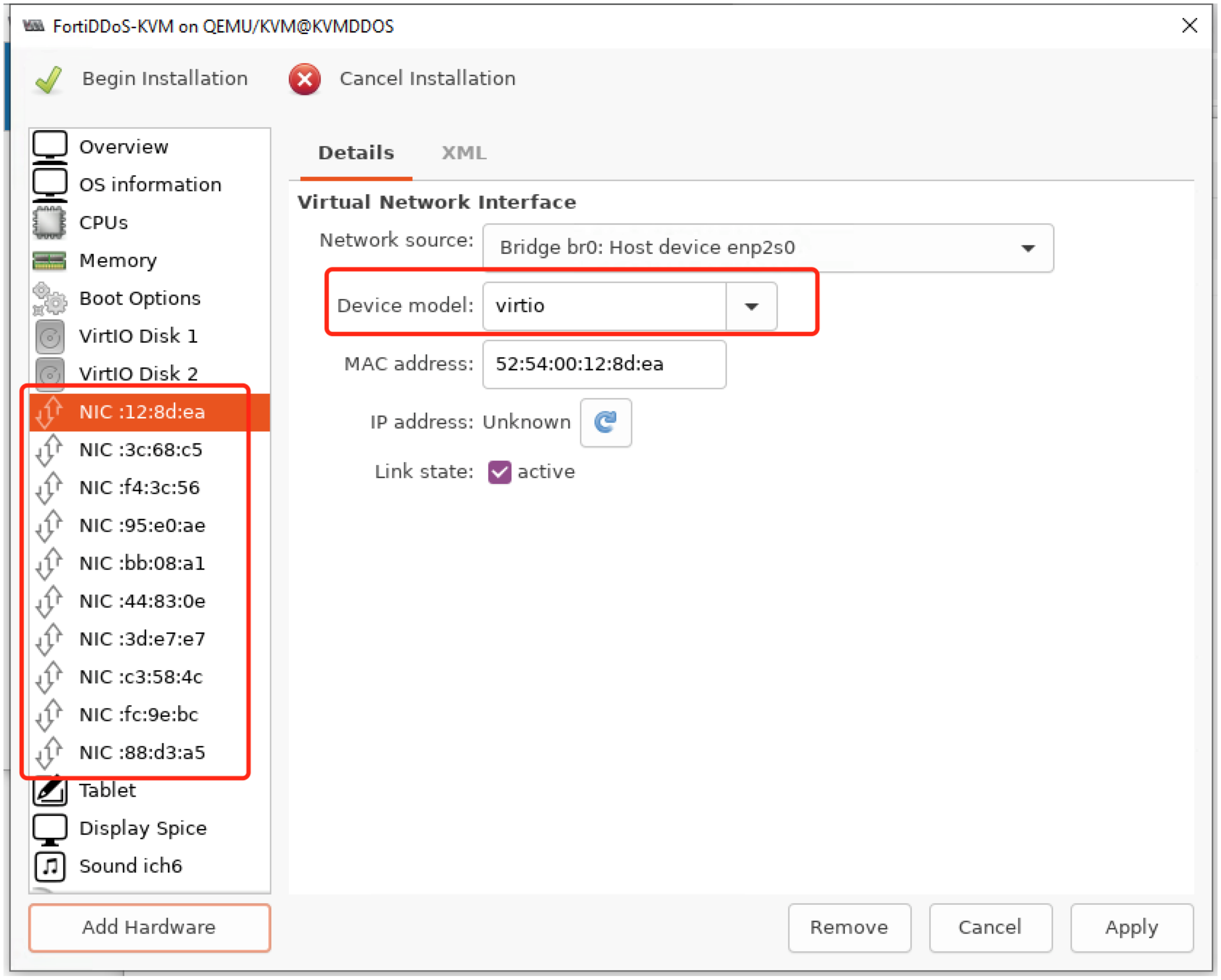
Device type: Disk device

Bus type: VirtIO

c. On the *NIC* Details page, select *virtio* for the Device model.

d. Click *Add Hardware* to add a new VirtIO NIC. On the *Network* Details page, select *virtio* as the Device model.

e. Repeat to add 8 NICs for FortiDDoS Data ports. (The first two NICs are mapped to mgmt1 and mgmt2; the additional 8 ports will be data ports.)



FortiDDoS-KVM on QEMU/KVM@KVMDDOS

Virtual Network Interface

Network source: Bridge br0: Host device enp2s0

Device model: virtio

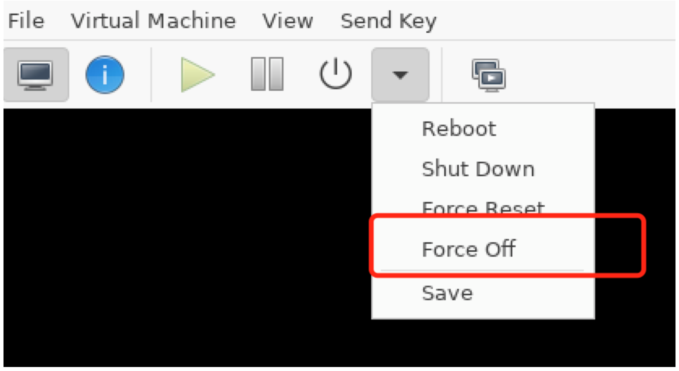
MAC address: 52:54:00:12:8d:ea

IP address: Unknown

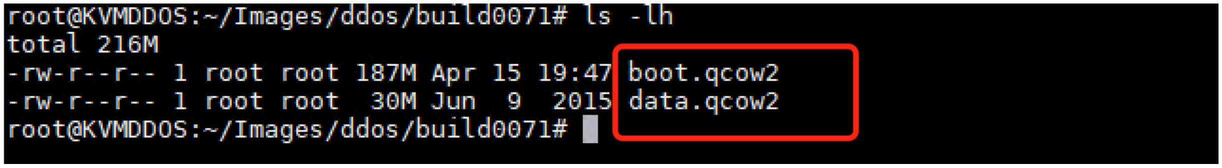
Link state: ☑ active

8. Click *Apply* and *Begin Installation*.
9. After FortiDDoS VM boots up, extend the disk size according to the following steps:

a. Navigate to the power drop-down menu and select the *Force Off* option to close the KVM.



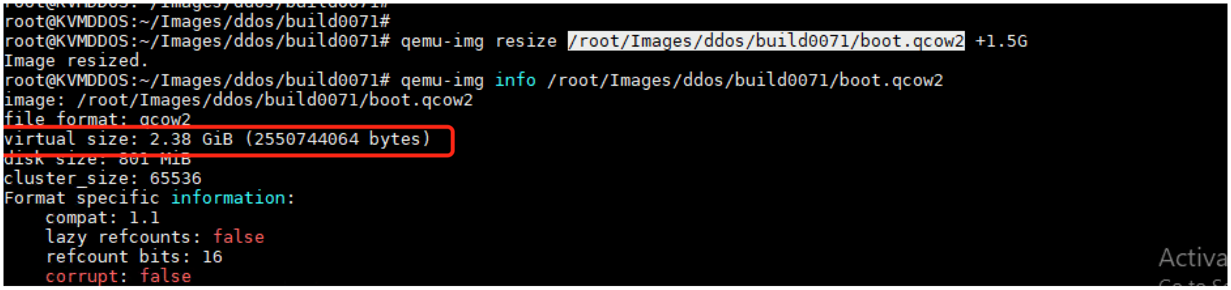
b. Open the KVM server and go to the image path.



```
root@KVMDDOS:~/Images/ddos/build0071# ls -lh
total 216M
-rw-r--r-- 1 root root 187M Apr 15 19:47 boot.qcow2
-rw-r--r-- 1 root root  30M Jun  9  2015 data.qcow2
root@KVMDDOS:~/Images/ddos/build0071#
```

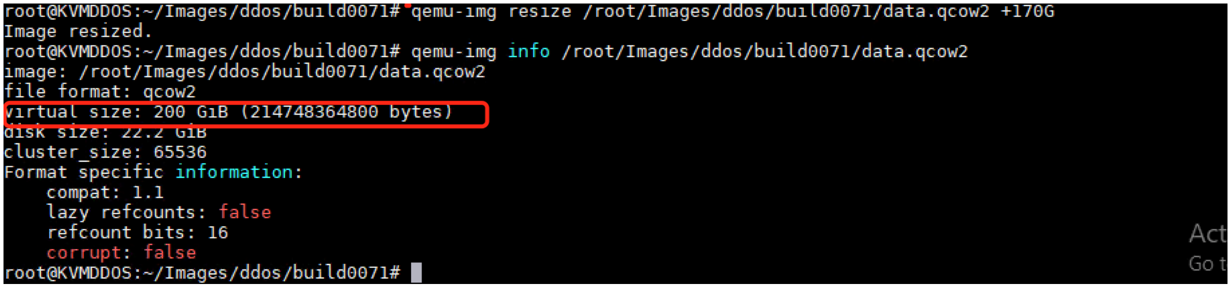
c. Confirm that the VM is off with the command `virsh list`. The list output should not contain FortiDDoS-VM.

d. Enter the command `qemu-img resize /root/Images/ddos/build0071/boot.qcow2 +1.5G` to extend the disk size of boot.qcow2 by 1.5G.



```
root@KVMDDOS:~/Images/ddos/build0071#
root@KVMDDOS:~/Images/ddos/build0071#
root@KVMDDOS:~/Images/ddos/build0071# qemu-img resize /root/Images/ddos/build0071/boot.qcow2 +1.5G
Image resized.
root@KVMDDOS:~/Images/ddos/build0071# qemu-img info /root/Images/ddos/build0071/boot.qcow2
image: /root/Images/ddos/build0071/boot.qcow2
file format: qcow2
virtual size: 2.38 GiB (2550744064 bytes)
disk size: 801 MiB
cluster_size: 65536
Format specific information:
    compat: 1.1
    lazy refcounts: false
    refcount bits: 16
    corrupt: false
```

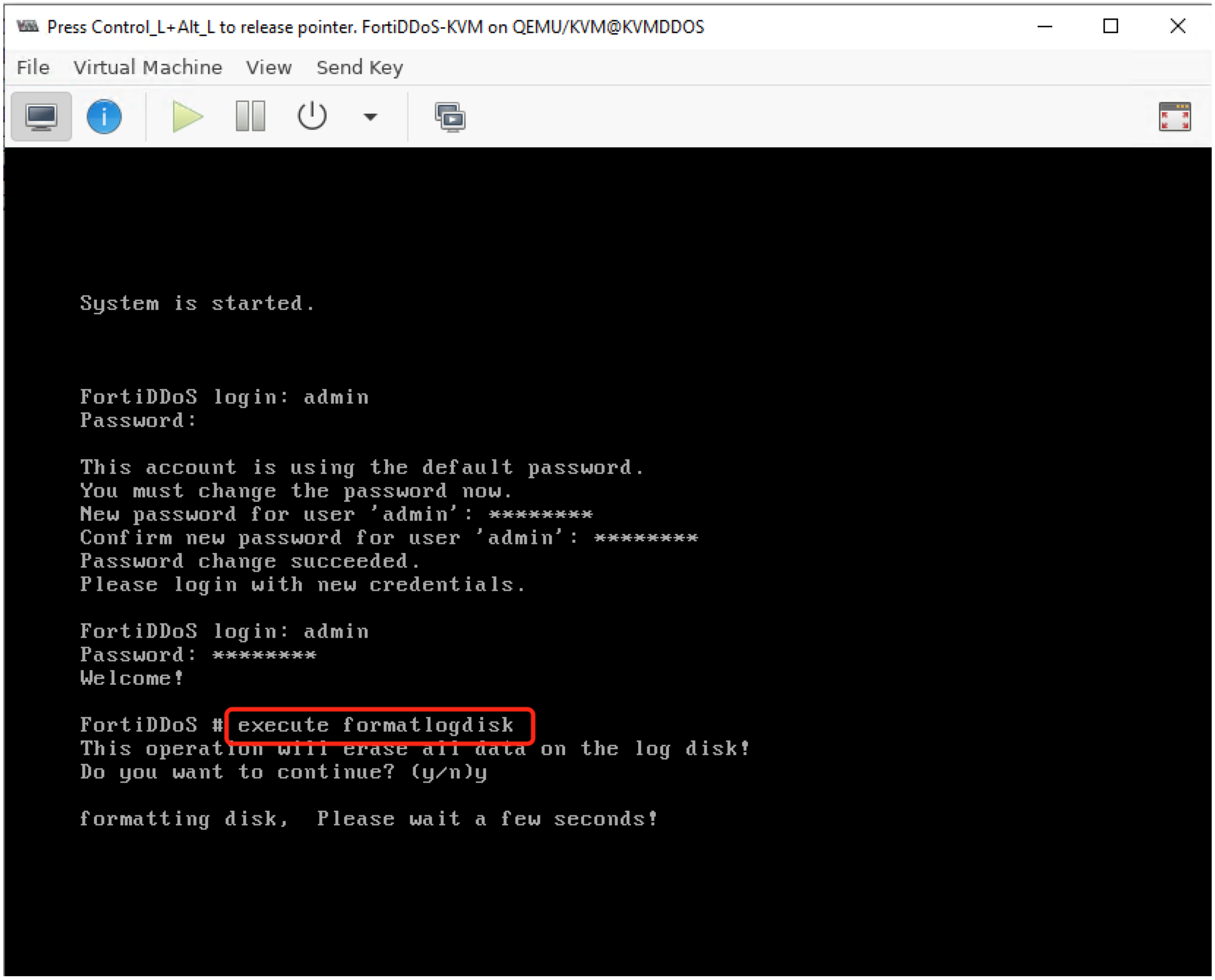
e. Enter the command `qemu-img resize /root/Images/ddos/build0071/data.qcow2 +170G` to extend the disk size of data.qcow2 by 170G.



```
root@KVMDDOS:~/Images/ddos/build0071# qemu-img resize /root/Images/ddos/build0071/data.qcow2 +170G
Image resized.
root@KVMDDOS:~/Images/ddos/build0071# qemu-img info /root/Images/ddos/build0071/data.qcow2
image: /root/Images/ddos/build0071/data.qcow2
file format: qcow2
virtual size: 200 GiB (214748364800 bytes)
disk size: 22.2 GiB
cluster_size: 65536
Format specific information:
    compat: 1.1
    lazy refcounts: false
    refcount bits: 16
    corrupt: false
root@KVMDDOS:~/Images/ddos/build0071#
```

f. After the disk size has been extended, start the VM.

10. Once FortiDDoS Vm is booted up, execute `formatlogdisk`.



Press Control_L+Alt_L to release pointer. FortiDDoS-KVM on QEMU/KVM@KVMDDOS
File
Virtual Machine
View
Send Key

```
System is started.



FortiDDoS login: admin
Password:

This account is using the default password.
You must change the password now.
New password for user 'admin': *********
Confirm new password for user 'admin': ********
Password change succeeded.
Please login with new credentials.

FortiDDoS login: admin
Password: ********
Welcome!

FortiDDoS # execute formatlogdisk
This operation will erase all data on the log disk!
Do you want to continue? (y/n)y

formatting disk,  Please wait a few seconds!
```

The regular FortiDDoS VM installation is now complete.

SR-IOV FortiDDoS KVM Deployment

Before you begin:

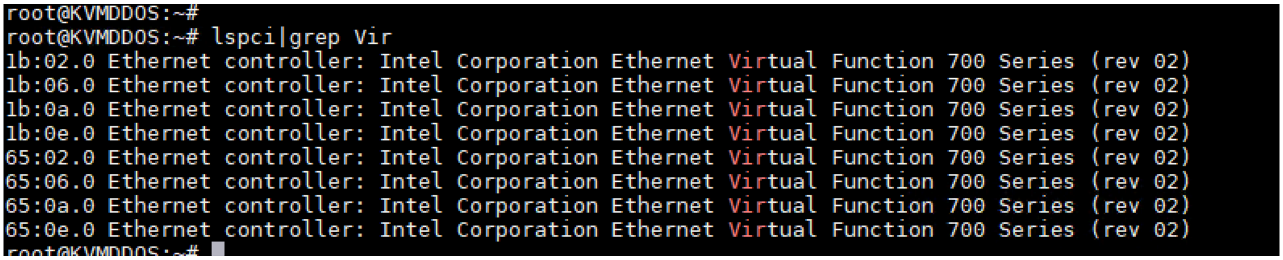
- Have an SR-IOV-compatible network interface card (NIC) installed.
- Enable the Intel Virtualization Technology (VT-x) and VT-d features in BIOS of the KVM Host server.
- Make sure that the physical interface is in the UP state. Verify with `ifconfig <ethname>`. A minimum of 2 interfaces need to be in the UP state.

To deploy the SR-IOV FortiDDoS KVM:

1. SSH to KVM host server with root.
2. Activate Intel VT-d in the kernel by appending the `intel_iommu=on` parameter to the `GRUB_CMDLINE_LINUX` entry in the `/etc/default/grub` configuration file. This setting will allow you to assign SR-IOV VF to FortiDDoS VM.
3. Create VFs by writing an appropriate value to the `sriov_numvfs` parameter via the sysfs interface using the following format:

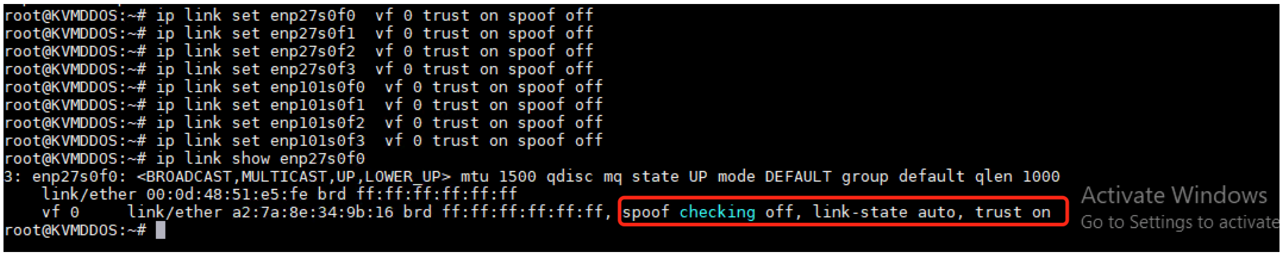
```
echo 1 > /sys/class/net/enp27s0f2/device/sriov_numvfs
echo 1 > /sys/class/net/enp101s0f3/device/sriov_numvfs
echo 1 > /sys/class/net/enp27s0f0/device/sriov_numvfs
```

   Note: Only 1 VF is supported per interface
4. Verify that the VFs have been created using `lspci`, which lists all available Virtual Functions



```
root@KVMDDOS:~#
root@KVMDDOS:~# lspci|grep Vir
1b:02.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
1b:06.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
1b:0a.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
1b:0e.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
65:02.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
65:06.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
65:0a.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
65:0e.0 Ethernet controller: Intel Corporation Ethernet Virtual Function 700 Series (rev 02)
root@KVMDDOS:~#
```

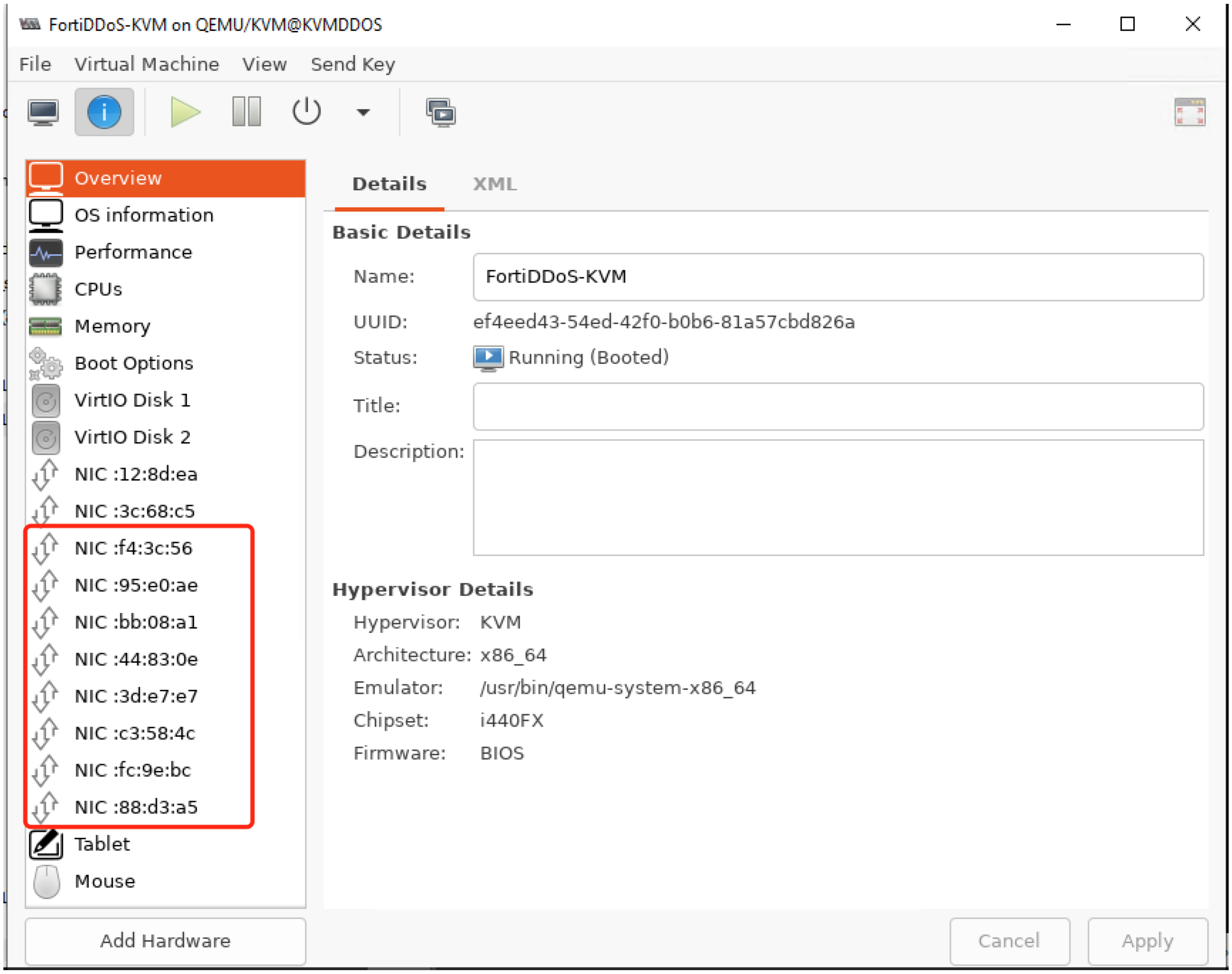
5. Set every VF as trusted and disable spoof checking.
   Use the following command: `ip link set {interface name} vf 0 trust on spoof off`



```
root@KVMDDOS:~# ip link set enp27s0f0  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp27s0f1  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp27s0f2  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp27s0f3  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp101s0f0  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp101s0f1  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp101s0f2  vf 0 trust on spoof off
root@KVMDDOS:~# ip link set enp101s0f3  vf 0 trust on spoof off
root@KVMDDOS:~# ip link show enp27s0f0
3: enp27s0f0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP mode DEFAULT group default qlen 1000
    link/ether 00:0d:48:51:e5:fe brd ff:ff:ff:ff:ff:ff
    vf 0     link/ether a2:7a:8e:34:9b:16 brd ff:ff:ff:ff:ff:ff, spoof checking off, link-state auto, trust on
root@KVMDDOS:~#
```

To assign PCI devices to the FortiDDoS VM:

1. Close the FortiDDoS-VM and then Click VM Detail icon ⓘ to edit.
2. Delete the last 8 NICs.



Basic Details

Name: FortiDDoS-KVM

UUID: ef4eed43-54ed-42f0-b0b6-81a57cbd826a

Status: Running (Booted)

Title:

Description:

Hypervisor Details

Hypervisor: KVM

Architecture: x86_64

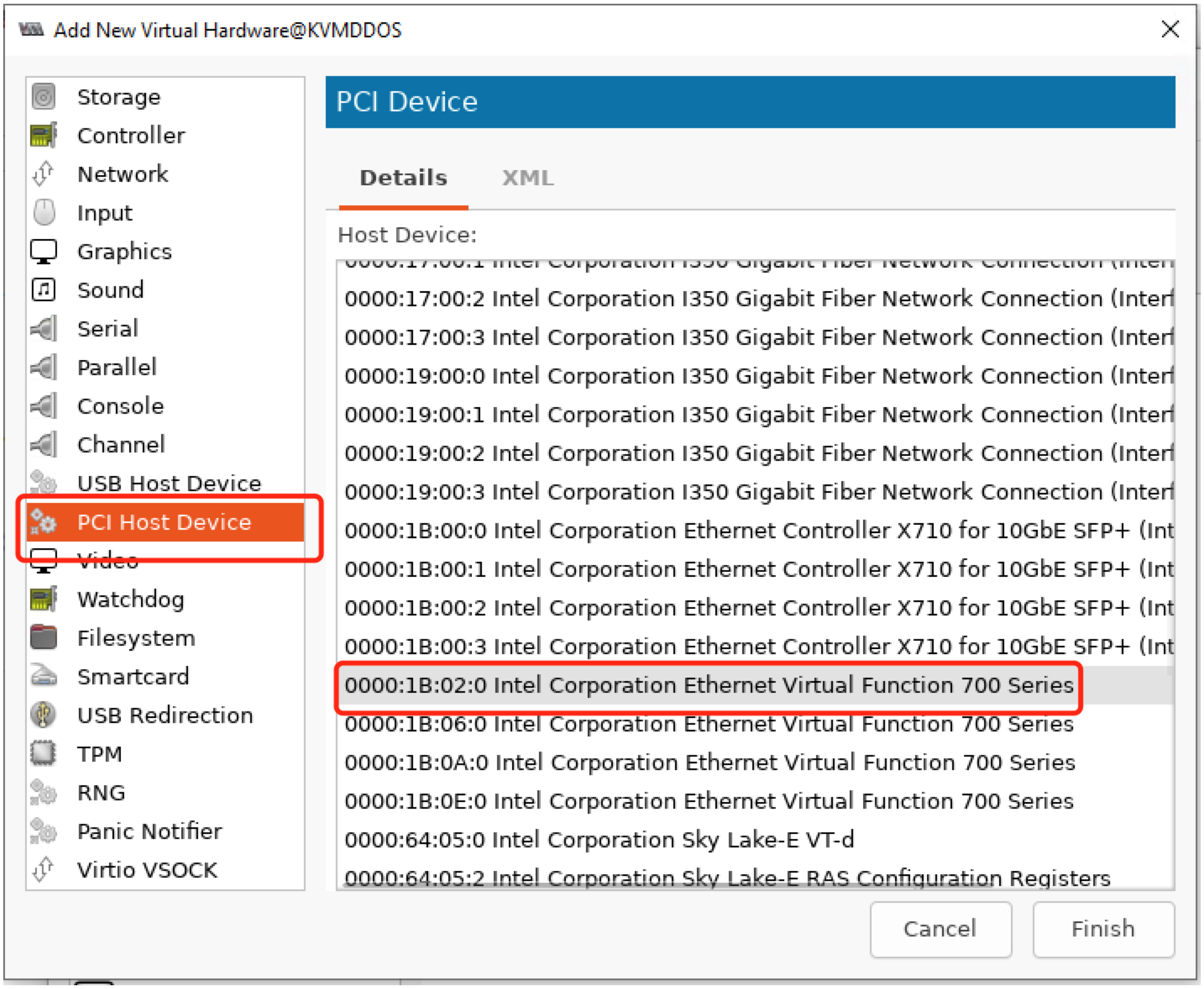
Emulator: /usr/bin/qemu-system-x86_64

Chipset: i440FX

Firmware: BIOS

3. Click *Add Hardware*.

4. Navigate to the *PCI Host Device Details* page. Select the VF based on the VF id in the output of `lspci` and then click Finish.



Host Device:

```
0000:17:00:1 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:17:00:2 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:17:00:3 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:19:00:0 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:19:00:1 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:19:00:2 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:19:00:3 Intel Corporation I350 Gigabit Fiber Network Connection (Interf
0000:1B:00:0 Intel Corporation Ethernet Controller X710 for 10GbE SFP+ (Int
0000:1B:00:1 Intel Corporation Ethernet Controller X710 for 10GbE SFP+ (Int
0000:1B:00:2 Intel Corporation Ethernet Controller X710 for 10GbE SFP+ (Int
0000:1B:00:3 Intel Corporation Ethernet Controller X710 for 10GbE SFP+ (Int
0000:1B:02:0 Intel Corporation Ethernet Virtual Function 700 Series
0000:1B:06:0 Intel Corporation Ethernet Virtual Function 700 Series
0000:1B:0A:0 Intel Corporation Ethernet Virtual Function 700 Series
0000:1B:0E:0 Intel Corporation Ethernet Virtual Function 700 Series
0000:64:05:0 Intel Corporation Sky Lake-E VT-d
0000:64:05:2 Intel Corporation Sky Lake-E RAS Configuration Registers
```

5. Repeat to add the other VFs to the VM.
6. Start the VM.

After FortiDDoS starts up, if the number data ports does not match the number of VFs you added in CLI `execute dataplane show interfaces`, please execute the following command:

```
execute port-remap
```