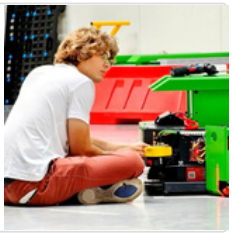
KVM Bridged mode: Harness the Power of Clustering Potential

Check GitHub for helpful DevOps tools:

Michael Robotics

Hi, I'm Michal. I'm a Robotics Engineer and DevOps enthusiast. My mission is to create skill-learning platform that combats information overload by adhering to the set of principles: simplify, prioritize, and execute.

https://github.com/MichaelRobotics



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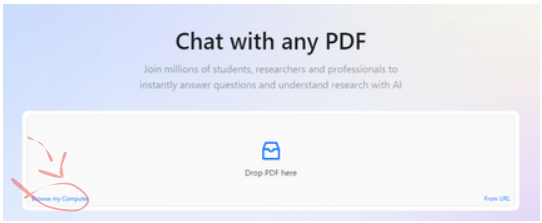

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Complety new to VM’s and Networking?

If you are completely new to this topic, using a document assistant to understand the many definitions can be helpful. However, the best way to start is by watching this video, which I believe provides the best explanation for beginners starting their journey with Linux and virtualization:

QEMU/KVM for absolute beginners

On this episode of Veronica Explains, I explain the absolute basics of hypervisors generally, KVM specifically, and virt-manager graphically.

https://youtu.be/VeronicaExplains

Essential for this PDF is a thorough knowledge of networking. I highly recommend the HTB platform's networking module, which offers extensive information to help build a comprehensive understanding.

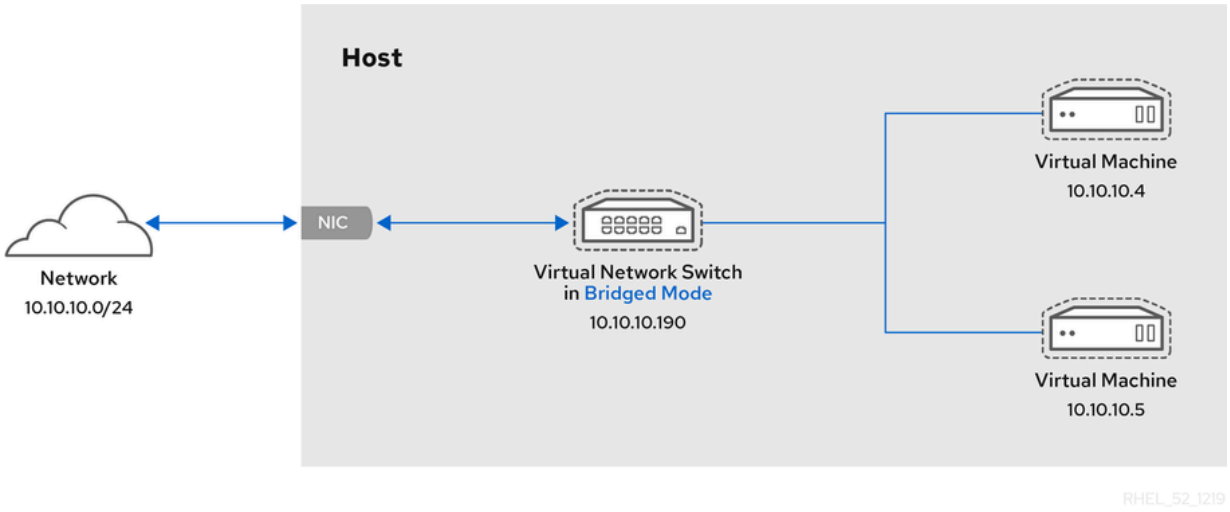
HTB - Your Cyber Performance Center

We provide a human-first platform creating and maintaining high performing cybersecurity individuals and organizations.

https://www.hackthebox.com/

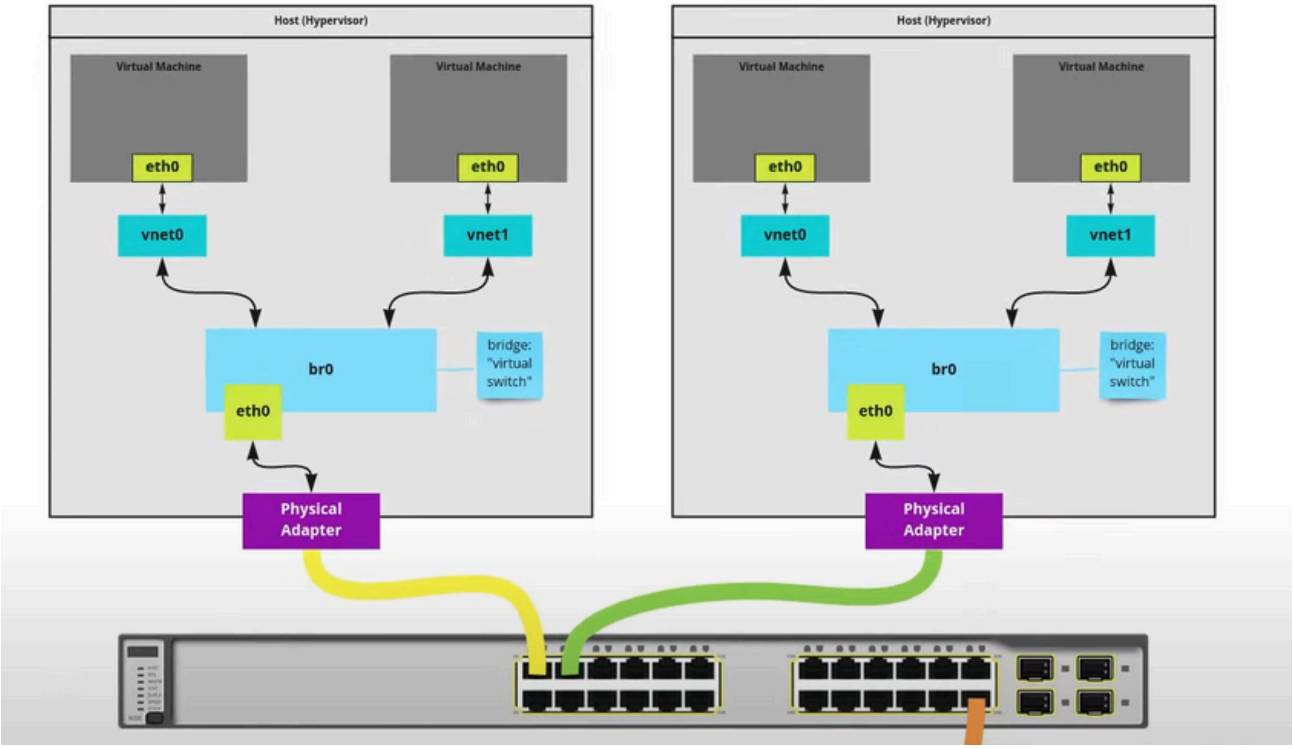
What is KVM bridged mode?

A KVM bridged mode is a virtual network switch represented as a network interface on a host machine, enabling guest virtual machines to appear within the same subnet as the host and be accessible to other physical machines on the same network. This bridging operates at Layer 2 of the OSI model, allowing seamless network communication between virtual and physical machines.



How KVM bridged mode work?

In KVM bridge mode, each virtual machine has its own (eth0)network interface, connected to a dedicated virtual interface (vnet0) on the host. These vnet interfaces are linked to a bridge (b0) on the host, which is connected to the host's eth0 interface, facilitating seamless communication between the host's network and the virtual network interfaces of the VMs.



KVM bridged mode: Why and When

KVM bridge mode is ideal for horizontal scaling when a single machine lacks sufficient resources, allowing VMs to seamlessly integrate into the host network. This direct access to the local network is best suited for high-performance environments like web servers, database clusters, and development setups.

Typical Use Case: Deploying guest virtual machines within an existing network alongside physical machines, allowing users to interact with both virtual and physical systems as if they were part of a unified network without noticing any differences.

System Requirements

- At least 2 hosts connected by LAN

On each host:

- 8 gb ram
- 50 free gb storage
- ubuntu 22.04

If you want to install it on a different Linux distro, ask in the comments and I will write an Ansible playbook or bash script.

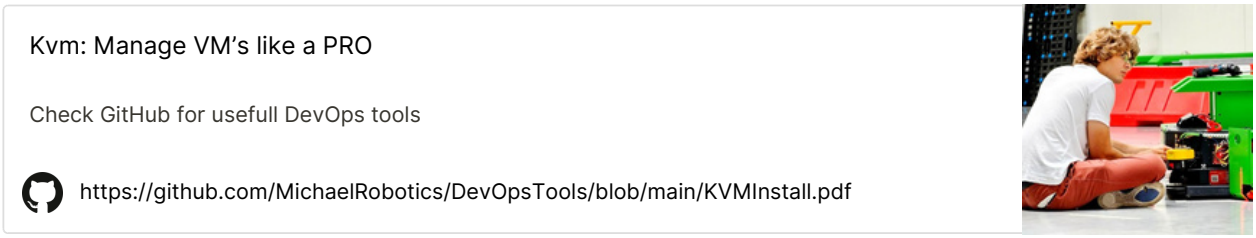
KVM bridged mode: Main components & packages

- libvirt-daemon - runs virtualization in background
- qemu-kvm – An opensource emulator and virtualization package that provides hardware emulation.
- virt-manager – A Qt-based graphical interface for managing virtual machines via the libvirt daemon.
- libvirt-daemon-system – A package that provides configuration files required to run the libvirt daemon.
- virtinst – A set of command-line utilities for provisioning and modifying virtual machines.
- libvirt-clients – A set of client-side libraries and APIs for managing and controlling virtual machines & hypervisors from the command line.
- bridge-utils – A set of tools for creating and managing bridge devices.

KVM bridged mode: How to setup

1) Install KVM on hosts

I've made a post with PDF about this. Follow instructions and then come back.



2) Setup Network bridge using nmcli tool

Check the name of your network interface connected to the LAN (mine is enp1s0). Then, create a network bridge named br0.

```
$ sudo nmcli conn add type bridge con-name br0 ifname br0
```

Then add the Ethernet interface as a port in the bridge as shown.

```
$ sudo nmcli conn add type ethernet slave-type bridge con-name bridge-br0 ifname enp1s0 master br0
```

Next, confirm that the bridge has been created by showing all network connections.

```
$ sudo nmcli conn show --active
```

```
aaronk@tecmint:~$ sudo nmcli conn show --active
NAME                UUID                                  TYPE      DEVICE
Ethernet connection 1  525284a9-60d9-4396-a1c1-a37914d43eff  ethernet  enp1s0
br0                 e7385b2d-0e93-4a8e-b9a0-5793e5a1fda3  bridge    br0
aaronk@tecmint:~$
```

Next, activate the **bridge** connection as follows

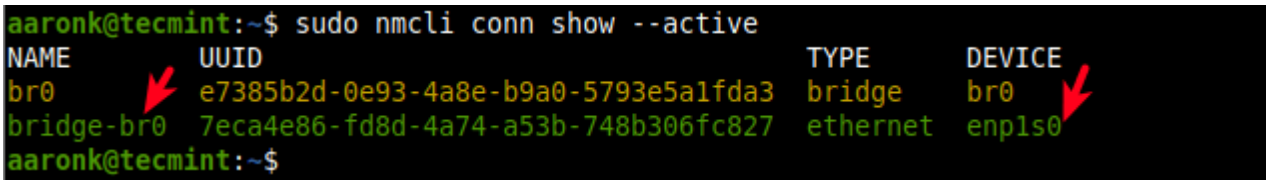
```
$ sudo nmcli conn up br0
```

Next, deactivate the Ethernet interface or connection (mine is Ethernet connection 1).

```
sudo nmcli conn down Ethernet\ connection\ 1
```

Now try to view active connections once more, the **Ethernet** interface should now be a slave in the **bridge** connection as shown in the following screenshot.

```
$ sudo nmcli conn show --active
```



How to create VM connected to KVM bridged mode in GUI (Like SysAdmin)

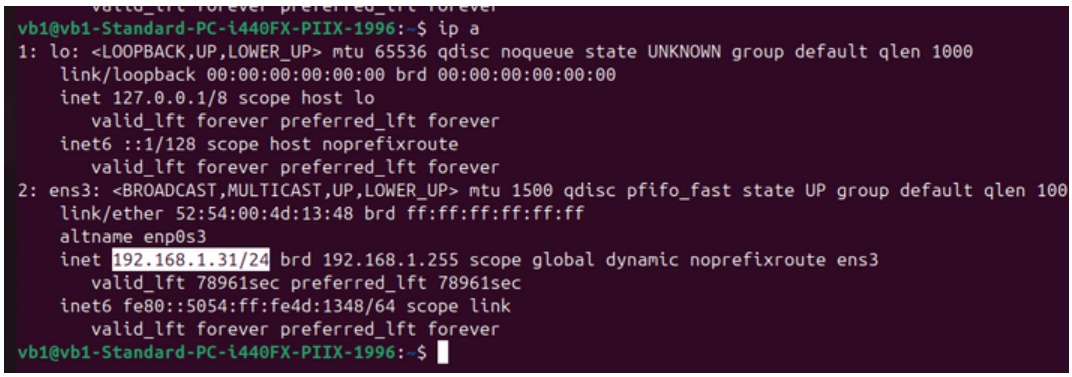
1) Create a VM with a connection to the bridge and follow configuration process

```
$ virt-install \
 --name guest1-ubuntu24.04 \
 --memory 8192 \
 --vcpus 2 \
 --bridge=br0 \
 --disk path=/media/qemu/ubuntu-vm.qcow2,size=15 \
 --cdrom /media/isos/ubuntu-24.04-desktop-amd64.iso \
```

1) Check connection

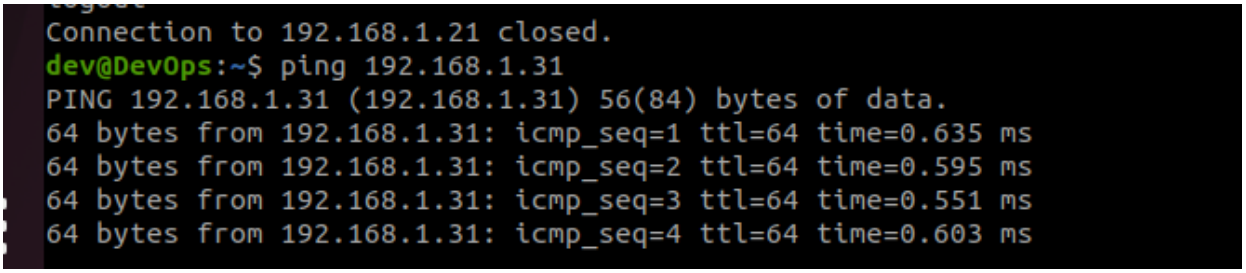
For example, my VM ip is 192.168.1.31

```
$ ip a
```



Now log in other host in same LAN and ping VM to check if is reachable

```
$ ping 192.168.1.31
```



if you encounter any problems, check the **common troubleshooting** section

How to create VM connected to KVM bridged mode in GUI (Casual way)

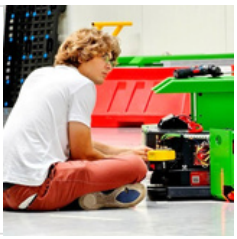
Most common virtual machine manager is VirtualBox, and it compares poorly to KVM virt-manager. QEMU, especially when combined with KVM, provides extensive architecture support and near-native performance.

Check my last post about KVM installation, how to use-virt manager.

Kvm: Manage VM's like a PRO

Check GitHub for usefull DevOps tools

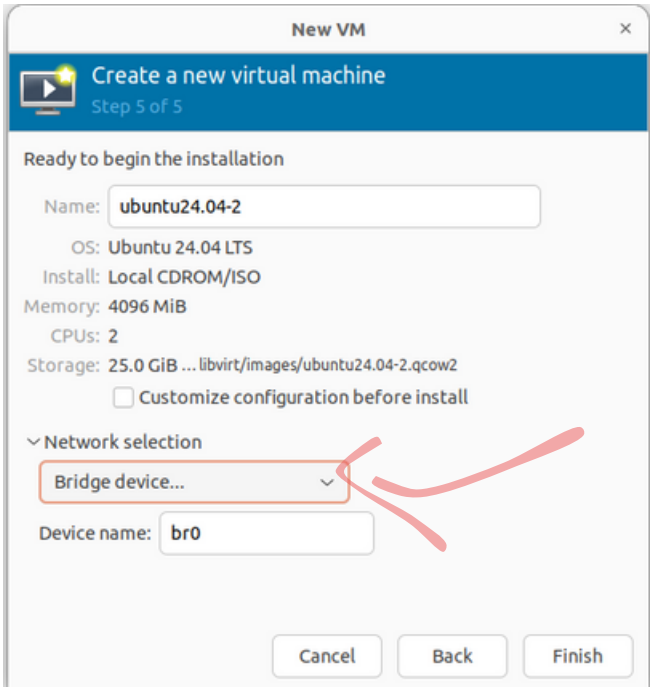
https://github.com/MichaelRobotics/DevOpsTools/blob/main/KVMInstall.pdf



To add a bridge during VM creation:

1. Expand the Network section.
2. At the last step of VM creation, choose b0 as the device name.

If b0 doesn't appear, refer to the common troubleshooting section.



Common troubleshooting

1) Permission, connection errors

Make sure that you followed all the steps in my previous KVM installation post. Additionally, check the physical connections to ensure cables haven't come loose from the PC.

2) Bridge networking interface does not show up

Great thread, look for answers:

Dedoimedo - A Place to Learn a Lot About a Lot

Troubleshooting common KVM problems

https://www.dedoimedo.com/computers/kvm-troubleshooting.html

3) **Check the nmcli man page**

4) **If everything is a complete mess**

Remove the bridge and revert the configuration to its previous state.

KVM bridged mode: How to remove

1) Activate old network connection configuration

my was named "Wired connection 1"

```
$ sudo nmcli conn up Wired\ connection\ 1
```

2) Deactivate the bridge "br0".

```
$ sudo nmcli conn down br0
```

3) Delete bridge "br0"

```
$ sudo nmcli conn del br0
```

4) Delete the network connection configuration named "bridge-br0".

```
$ sudo nmcli conn del bridge-br0
```

Learn more about KVM

Check RedHat, they have great docs

Virtualization Deployment and Administration Guide

Installing, configuring, and managing virtual machines on a RHEL physical machine

https://docs.redhat.com/en

Explore different methods for setting up bridge mode by reviewing this great article:

Tecmint - Linux blog

How to Configure Network Bridge in Ubuntu

https://www.tecmint.com

Share, comment, DM and check GitHub for scripts & playbooks created to automate process.

Check my GitHub

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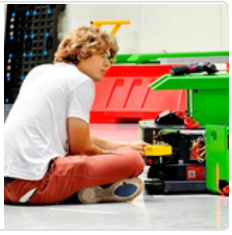

PS.

If you need a playbook or bash script to manage KVM on a specific Linux distribution, feel free to ask me in the comments or send a direct message!