# Linux KVM

## How to install

- https://linuxize.com/post/how-to-install-kvm-on-ubuntu-20-04/

## How to boot Dual Boot Windows Partition

- https://jianmin.dev/2020/jul/19/boot-your-windows-partition-from-linux-using-kvm/
- http://disq.us/p/2ltujmy

### Windows Partition Dual Mount

- https://superuser.com/a/1010125

### Spoof BIOS & Mainboard to avoid re-activation

- https://www.remembertheusers.com/2021/06/0758-windows-10-p2v.html

## GPU Acceleration

- https://wiki.archlinux.org/title/QEMU/Guest_graphics_acceleration
- https://arccompute.com/blog/libvfio-commodity-gpu-multiplexing/
- https://github.com/Arc-Compute/LibVF.IO/
  - https://github.com/manalito/LibVF.IO
- https://askubuntu.com/a/1389829
- https://www.spice-space.org/download.html (spice-guest-tools)
- https://github.com/mysteryx93/GPU-Passthrough-with-Optimus-Manager-Guide
- https://forum.level1techs.com/t/solved-unable-to-isolate-gpu-for-vfio-workaround/196250/69?page=4
- https://github.com/tuh8888/libvirt_win10_vm
- https://github.com/QaidVoid/Complete-Single-GPU-Passthrough
- https://superuser.com/questions/1804067/how-do-i-get-a-multi-display-virgl-3d-accelerated-qemu-vm-on-a-nvidia-card-in-vi

Due to NVIDIA GPUs needing a license to be able to use vGPU it's currently not really recommended to passthrough a vGPU but instead the whole GPU. The best approach for a desktop machine is to use the single GPU passthrough approach which stops the X server and starts up a pre-configured virtual machine.

# Seamless Windows

- https://github.com/Fmstrat/winapps
  - Newer/More up-to-date: https://github.com/winapps-org/winapps
- https://github.com/Xpra-org/xpra
  - Snap does not work inside xpra (or so it seems).
  - https://www.baeldung.com/linux/snap-remove-disable

# Input Passthrough

- https://passthroughpo.st/using-evdev-passthrough-seamless-vm-input/

# Hooks

- https://github.com/portellam/libvirt-hooks/tree/master
- https://github.com/PassthroughPOST/VFIO-Tools/tree/master

# Drivers

## NVIDIA

- https://www.nvidia.com/download/driverResults.aspx/213194/en-us/
- https://cloud.google.com/compute/docs/gpus/grid-drivers-table
- https://foxi.buduanwang.vip/pan/vGPU/vgpu_unlock/drivers/

### 535.129.03

- https://us.download.nvidia.com/XFree86/Linux-x86_64/535.129.03/NVIDIA-Linux-x86_64-535.129.03.run
- https://storage.googleapis.com/nvidia-drivers-us-public/GRID/vGPU16.2/NVIDIA-Linux-x86_64-535.129.03-grid.run
- https://foxi.buduanwang.vip/pan/vGPU/vgpu_unlock/drivers/NVIDIA-Linux-x86_64-535.129.03-vgpu-kvm-custom.run

# Sample Configurations

## Old Notebook

g500s

win11.xml

```
<domain type="kvm">
  <name>win11</name>
  <uuid>4d99fd4a-4ffc-486f-8cf8-652c23f07b46</uuid>
  <metadata>
    <libosinfo:libosinfo
xmlns:libosinfo="http://libosinfo.org/xmlns/libvirt/domain/1.0">
      <libosinfo:os id="http://microsoft.com/win/11"/>
    </libosinfo:libosinfo>
  </metadata>
  <memory unit="KiB">7168000</memory>
  <currentMemory unit="KiB">7168000</currentMemory>
  <memoryBacking>
    <source type="memfd"/>
    <access mode="shared"/>
  </memoryBacking>
  <vcpu placement="static">4</vcpu>
  <os firmware="efi">
    <type arch="x86_64" machine="pc-q35-6.2">hvm</type>
    <boot dev="hd"/>
  </os>
  <features>
    <acpi/>
    <apic/>
    <hyperv mode="custom">
      <relaxed state="on"/>
      <vapic state="on"/>
      <spinlocks state="on" retries="8191"/>
    </hyperv>
    <vmport state="off"/>
  </features>
  <cpu mode="host-passthrough" check="none" migratable="on"/>
  <clock offset="localtime">
    <timer name="rtc" tickpolicy="catchup"/>
    <timer name="pit" tickpolicy="delay"/>
    <timer name="hpet" present="no"/>
    <timer name="hypervclock" present="yes"/>
  </clock>
  <on_poweroff>destroy</on_poweroff>
  <on_reboot>restart</on_reboot>
  <on_crash>destroy</on_crash>
  <pm>
    <suspend-to-mem enabled="no"/>
    <suspend-to-disk enabled="no"/>
  </pm>
  <devices>
    <emulator>/usr/bin/qemu-system-x86_64</emulator>
    <disk type="block" device="disk">
      <driver name="qemu" type="raw" cache="none" io="native"/>
      <source dev="/dev/md0"/>
```

```
      <target dev="sdb" bus="sata"/>
      <address type="drive" controller="0" bus="0" target="0"
unit="1"/>
    </disk>
    <controller type="sata" index="0">
      <address type="pci" domain="0x0000" bus="0x00" slot="0x1f"
function="0x2"/>
    </controller>
    <controller type="usb" index="0" model="qemu-xhci" ports="15">
      <address type="pci" domain="0x0000" bus="0x02" slot="0x00"
function="0x0"/>
    </controller>
    <controller type="pci" index="0" model="pcie-root"/>
    <controller type="pci" index="1" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="1" port="0x10"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x0" multifunction="on"/>
    </controller>
    <controller type="pci" index="2" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="2" port="0x11"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x1"/>
    </controller>
    <controller type="pci" index="3" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="3" port="0x12"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x2"/>
    </controller>
    <controller type="pci" index="4" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="4" port="0x13"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x3"/>
    </controller>
    <controller type="pci" index="5" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="5" port="0x14"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x4"/>
    </controller>
    <controller type="pci" index="6" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="6" port="0x15"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x5"/>
    </controller>
    <controller type="pci" index="7" model="pcie-root-port">
```

```
      <model name="pcie-root-port"/>
      <target chassis="7" port="0x16"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x6"/>
    </controller>
    <controller type="pci" index="8" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="8" port="0x17"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x7"/>
    </controller>
    <controller type="pci" index="9" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="9" port="0x18"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x0" multifunction="on"/>
    </controller>
    <controller type="pci" index="10" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="10" port="0x19"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x1"/>
    </controller>
    <controller type="pci" index="11" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="11" port="0x1a"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x2"/>
    </controller>
    <controller type="pci" index="12" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="12" port="0x1b"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x3"/>
    </controller>
    <controller type="pci" index="13" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="13" port="0x1c"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x4"/>
    </controller>
    <controller type="pci" index="14" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="14" port="0x1d"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x5"/>
    </controller>
    <controller type="pci" index="15" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="15" port="0x1e"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
```

```
function="0x6"/>
    </controller>
    <controller type="pci" index="16" model="pcie-to-pci-bridge">
      <model name="pcie-pci-bridge"/>
      <address type="pci" domain="0x0000" bus="0x05" slot="0x00"
function="0x0"/>
    </controller>
    <controller type="virtio-serial" index="0">
      <address type="pci" domain="0x0000" bus="0x03" slot="0x00"
function="0x0"/>
    </controller>
    <interface type="network">
      <mac address="52:54:00:0f:45:19"/>
      <source network="default"/>
      <model type="e1000e"/>
      <address type="pci" domain="0x0000" bus="0x01" slot="0x00"
function="0x0"/>
    </interface>
    <channel type="unix">
      <target type="virtio" name="org.qemu.guest_agent.0"/>
      <address type="virtio-serial" controller="0" bus="0" port="2"/>
    </channel>
    <channel type="spicevmc">
      <target type="virtio" name="com.redhat.spice.0"/>
      <address type="virtio-serial" controller="0" bus="0" port="1"/>
    </channel>
    <input type="tablet" bus="usb">
      <address type="usb" bus="0" port="1"/>
    </input>
    <input type="mouse" bus="ps2"/>
    <input type="keyboard" bus="ps2"/>
    <tpm model="tpm-crb">
      <backend type="emulator" version="2.0"/>
    </tpm>
    <graphics type="spice">
      <listen type="none"/>
      <image compression="off"/>
      <gl enable="yes" rendernode="/dev/dri/by-path/pci-0000:00:02.0-
render"/>
    </graphics>
    <sound model="ich9">
      <address type="pci" domain="0x0000" bus="0x00" slot="0x1b"
function="0x0"/>
    </sound>
    <audio id="1" type="spice"/>
    <video>
      <model type="virtio" heads="1" primary="yes">
        <acceleration accel3d="yes"/>
      </model>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x01"
```

```
function="0x0"/>
    </video>
    <redirdev bus="usb" type="spicevmc">
      <address type="usb" bus="0" port="2"/>
    </redirdev>
    <redirdev bus="usb" type="spicevmc">
      <address type="usb" bus="0" port="3"/>
    </redirdev>
    <memballoon model="virtio">
      <address type="pci" domain="0x0000" bus="0x04" slot="0x00"
function="0x0"/>
    </memballoon>
  </devices>
</domain>
```

## Desktop

kiryu

win11-gpu.xml

```
<domain xmlns:qemu="http://libvirt.org/schemas/domain/qemu/1.0"
type="kvm">
  <name>win11-gpu</name>
  <uuid>6b1631e5-82b1-4667-ae10-d3fa5d436a2b</uuid>
  <metadata>
    <libosinfo:libosinfo
xmlns:libosinfo="http://libosinfo.org/xmlns/libvirt/domain/1.0">
      <libosinfo:os id="http://microsoft.com/win/11"/>
    </libosinfo:libosinfo>
  </metadata>
  <memory unit="KiB">20971520</memory>
  <currentMemory unit="KiB">20971520</currentMemory>
  <memoryBacking>
    <source type="memfd"/>
    <access mode="shared"/>
  </memoryBacking>
  <vcpu placement="static">20</vcpu>
  <os firmware="efi">
    <type arch="x86_64" machine="pc-q35-6.2">hvm</type>
    <bootmenu enable="no"/>
  </os>
  <features>
    <acpi/>
    <apic/>
    <hyperv mode="custom">
      <relaxed state="on"/>
      <vapic state="on"/>
```

```
      <spinlocks state="on" retries="8191"/>
      <vendor_id state="on" value="fuckyou"/>
    </hyperv>
    <kvm>
      <hidden state="on"/>
    </kvm>
    <vmport state="off"/>
  </features>
  <cpu mode="host-passthrough" check="none" migratable="on">
    <topology sockets="1" dies="1" cores="20" threads="1"/>
    <feature policy="disable" name="smep"/>
  </cpu>
  <clock offset="localtime">
    <timer name="rtc" tickpolicy="catchup"/>
    <timer name="pit" tickpolicy="delay"/>
    <timer name="hpet" present="no"/>
    <timer name="hypervclock" present="yes"/>
  </clock>
  <on_poweroff>destroy</on_poweroff>
  <on_reboot>restart</on_reboot>
  <on_crash>destroy</on_crash>
  <pm>
    <suspend-to-mem enabled="no"/>
    <suspend-to-disk enabled="no"/>
  </pm>
  <devices>
    <emulator>/usr/bin/qemu-system-x86_64</emulator>
    <disk type="block" device="disk">
      <driver name="qemu" type="raw"/>
      <source dev="/dev/sdf"/>
      <target dev="sdb" bus="sata"/>
      <boot order="2"/>
      <address type="drive" controller="0" bus="0" target="0"
unit="1"/>
    </disk>
    <controller type="usb" index="0" model="qemu-xhci" ports="15">
      <address type="pci" domain="0x0000" bus="0x02" slot="0x00"
function="0x0"/>
    </controller>
    <controller type="pci" index="0" model="pcie-root"/>
    <controller type="pci" index="1" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="1" port="0x10"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x0" multifunction="on"/>
    </controller>
    <controller type="pci" index="2" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="2" port="0x11"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
```

```
function="0x1"/>
    </controller>
    <controller type="pci" index="3" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="3" port="0x12"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x2"/>
    </controller>
    <controller type="pci" index="4" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="4" port="0x13"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x3"/>
    </controller>
    <controller type="pci" index="5" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="5" port="0x14"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x4"/>
    </controller>
    <controller type="pci" index="6" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="6" port="0x15"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x5"/>
    </controller>
    <controller type="pci" index="7" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="7" port="0x16"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x6"/>
    </controller>
    <controller type="pci" index="8" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="8" port="0x17"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x02"
function="0x7"/>
    </controller>
    <controller type="pci" index="9" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="9" port="0x18"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x0" multifunction="on"/>
    </controller>
    <controller type="pci" index="10" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="10" port="0x19"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x1"/>
    </controller>
    <controller type="pci" index="11" model="pcie-root-port">
```

```
      <model name="pcie-root-port"/>
      <target chassis="11" port="0x1a"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x2"/>
    </controller>
    <controller type="pci" index="12" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="12" port="0x1b"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x3"/>
    </controller>
    <controller type="pci" index="13" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="13" port="0x1c"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x4"/>
    </controller>
    <controller type="pci" index="14" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="14" port="0x1d"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x5"/>
    </controller>
    <controller type="pci" index="15" model="pcie-root-port">
      <model name="pcie-root-port"/>
      <target chassis="15" port="0x1e"/>
      <address type="pci" domain="0x0000" bus="0x00" slot="0x03"
function="0x6"/>
    </controller>
    <controller type="pci" index="16" model="pcie-to-pci-bridge">
      <model name="pcie-pci-bridge"/>
      <address type="pci" domain="0x0000" bus="0x06" slot="0x00"
function="0x0"/>
    </controller>
    <controller type="sata" index="0">
      <address type="pci" domain="0x0000" bus="0x00" slot="0x1f"
function="0x2"/>
    </controller>
    <controller type="virtio-serial" index="0">
      <address type="pci" domain="0x0000" bus="0x03" slot="0x00"
function="0x0"/>
    </controller>
    <interface type="network">
      <mac address="52:54:00:5c:d0:4a"/>
      <source network="default"/>
      <model type="e1000e"/>
      <address type="pci" domain="0x0000" bus="0x01" slot="0x00"
function="0x0"/>
    </interface>
    <channel type="unix">
```

```
      <target type="virtio" name="org.qemu.guest_agent.0"/>
      <address type="virtio-serial" controller="0" bus="0" port="2"/>
    </channel>
    <input type="mouse" bus="virtio">
      <address type="pci" domain="0x0000" bus="0x07" slot="0x00"
function="0x0"/>
    </input>
    <input type="keyboard" bus="virtio">
      <address type="pci" domain="0x0000" bus="0x08" slot="0x00"
function="0x0"/>
    </input>
    <input type="mouse" bus="ps2"/>
    <input type="keyboard" bus="ps2"/>
    <tpm model="tpm-crb">
      <backend type="emulator" version="2.0"/>
    </tpm>
    <audio id="1" type="spice"/>
    <hostdev mode="subsystem" type="pci" managed="yes">
      <source>
        <address domain="0x0000" bus="0x01" slot="0x00"
function="0x0"/>
      </source>
      <rom file="/usr/share/vgabios/gtx2070-vbios.rom"/>
      <address type="pci" domain="0x0000" bus="0x05" slot="0x00"
function="0x0"/>
    </hostdev>
    <hostdev mode="subsystem" type="pci" managed="yes">
      <source>
        <address domain="0x0000" bus="0x01" slot="0x00"
function="0x1"/>
      </source>
      <rom file="/usr/share/vgabios/gtx2070-vbios.rom"/>
      <address type="pci" domain="0x0000" bus="0x09" slot="0x00"
function="0x0"/>
    </hostdev>
    <hostdev mode="subsystem" type="pci" managed="yes">
      <source>
        <address domain="0x0000" bus="0x01" slot="0x00"
function="0x2"/>
      </source>
      <rom file="/usr/share/vgabios/gtx2070-vbios.rom"/>
      <address type="pci" domain="0x0000" bus="0x0a" slot="0x00"
function="0x0"/>
    </hostdev>
    <hostdev mode="subsystem" type="pci" managed="yes">
      <source>
        <address domain="0x0000" bus="0x01" slot="0x00"
function="0x3"/>
      </source>
      <rom file="/usr/share/vgabios/gtx2070-vbios.rom"/>
      <address type="pci" domain="0x0000" bus="0x0b" slot="0x00"
```

```
function="0x0"/>
    </hostdev>
    <hostdev mode="subsystem" type="usb" managed="yes">
      <source>
        <vendor id="0x046d"/>
        <product id="0xc32b"/>
      </source>
      <address type="usb" bus="0" port="2"/>
    </hostdev>
    <hostdev mode="subsystem" type="usb" managed="yes">
      <source>
        <vendor id="0x1050"/>
        <product id="0x0407"/>
      </source>
      <address type="usb" bus="0" port="3"/>
    </hostdev>
    <hostdev mode="subsystem" type="usb" managed="yes">
      <source>
        <vendor id="0x046d"/>
        <product id="0xc539"/>
      </source>
      <address type="usb" bus="0" port="1"/>
    </hostdev>
    <memballoon model="virtio">
      <address type="pci" domain="0x0000" bus="0x04" slot="0x00"
function="0x0"/>
    </memballoon>
  </devices>
  <qemu:commandline>
    <qemu:arg value="-device"/>
    <qemu:arg value="ich9-intel-hda,bus=pcie.0,addr=0x1b"/>
    <qemu:arg value="-device"/>
    <qemu:arg value="hda-micro,audiodev=hda"/>
    <qemu:arg value="-audiodev"/>
    <qemu:arg value="pa,id=hda,server=/tmp/pulse-socket"/>
  </qemu:commandline>
</domain>
```

/etc/libvirt/hooks/qemu

```
#!/bin/bash

GUEST_NAME="$1"
HOOK_NAME="$2"
STATE_NAME="$3"
MISC="${@:4}"

BASEDIR="$(dirname $0)"
```

```
HOOKPATH="$BASEDIR/qemu.d/$GUEST_NAME/$HOOK_NAME/$STATE_NAME"
set -e # If a script exits with an error, we should as well.

echo "QEMU hook: $GUEST_NAME/$HOOK_NAME/$STATE_NAME" >>
/var/log/libvirt/custom_hooks.log

if [ -f "$HOOKPATH" ]; then
eval \""$HOOKPATH"\" "$@" >> /var/log/libvirt/custom_hooks.log
elif [ -d "$HOOKPATH" ]; then
while read file; do
  eval \""$file"\" "$@" >> /var/log/libvirt/custom_hooks.log
done <<< "$(find -L "$HOOKPATH" -maxdepth 1 -type f -executable -
print;)"
fi
```

/etc/libvirt/hooks/qemu.d/win11-gpu/prepare/begin/start.sh

```
#!/bin/bash
set -x

# Stop display manager
systemctl stop display-manager
# systemctl --user -M YOUR_USERNAME@ stop plasma*

# Unbind VTconsoles: might not be needed
echo 0 > /sys/class/vtconsole/vtcon0/bind
echo 0 > /sys/class/vtconsole/vtcon1/bind

# Unbind EFI Framebuffer
echo efi-framebuffer.0 > /sys/bus/platform/drivers/efi-
framebuffer/unbind

# Unload NVIDIA kernel modules
modprobe -r nvidia_drm nvidia_modeset nvidia_uvm nvidia

# Unload AMD kernel module
# modprobe -r amdgpu

# Detach GPU devices from host
# Use your GPU and HDMI Audio PCI host device
virsh nodedev-detach pci_0000_01_00_0
virsh nodedev-detach pci_0000_01_00_1
virsh nodedev-detach pci_0000_01_00_2
virsh nodedev-detach pci_0000_01_00_3

# Load vfio module
modprobe vfio-pci
```

/etc/libvirt/hooks/qemu.d/win11-gpu/release/end/stop.sh

```
#!/bin/bash
set -x

# Attach GPU devices to host
# Use your GPU and HDMI Audio PCI host device
virsh nodedev-reattach pci_0000_01_00_0
virsh nodedev-reattach pci_0000_01_00_1
virsh nodedev-reattach pci_0000_01_00_2
virsh nodedev-reattach pci_0000_01_00_3

# Unload vfio module
modprobe -r vfio-pci

# Load AMD kernel module
#modprobe amdgpu

# Rebind framebuffer to host
echo "efi-framebuffer.0" > /sys/bus/platform/drivers/efi-
framebuffer/bind

# Load NVIDIA kernel modules
modprobe nvidia_drm
modprobe nvidia_modeset
modprobe nvidia_uvm
modprobe nvidia

# Bind VTconsoles: might not be needed
echo 1 > /sys/class/vtconsole/vtcon0/bind
echo 1 > /sys/class/vtconsole/vtcon1/bind

# Restart Display Manager
systemctl start display-manager
```