Proxmox GPU Passthrough

GPU Passthrough

> This configuration worked for me, you might need to change things around

> Keep in mind I have an AMD CPU and Nvidia GPU, if you have other config, you might have to use different commands

> After upgrading Proxmox to 7.2, passthrough wasn't working. To make it work again try resetting your graphics card: Resetting GPU
> OR keep reading, the GRUB parameters have to be changed to make it work again with the latest kernel!

Configuring BIOS

Before doing anything make sure virtualization and IOMMU is enabled in your BIOS, you can't do anything bofore that.
If your motherboard doesn't support IOMMU, then you can't pass through PCI(e) devices to your VMs.

Update the Host configuration

Login to the host and open `/etc/default/grub`. Find the line `GRUB_CMDLINE_LINUX_DEFAULT` and change it from:

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet"
```

to

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet iommu=pt nofb nomodeset initcall_blacklist=nvidiafb_init"
```

Run `update-grub` to append the grub's content to all linux entries in `/boot/grub/grub.cfg`.

Next go to `/etc/modules-load.d`, create a file there called `vfio.conf` and add the followings:

```
vfio
vfio_iommu_type1
```

```
vfio_pci
```

After these changes run the below to refresh the `initramfs`, then restart your server:

`update-initramfs -u -k all`

Once it's restarted, run the below commands to check if IOMMU was successfully enabled:

```
dmesg | grep -e DMAR -e IOMMU -e AMD-Vi
```

It should display that `IOMMU, Directed I/O or Interrupt Remapping is enabled` or something similar, it could be different on your hardware.

Also check that the devices are in different IOMMU groups:

```
find /sys/kernel/iommu_groups/ -type l
```

Device passthrough setup

First find the device Ids that you want to passthrough.
Run

```
lspci -nn
```

which will display all the devices and their Ids in the host. Find yours and write it down.
It looks something like `[1245:4f5a]`, don't forget the copy the audio device's Id + USB Ids as well
Since we want to use a GPU in our VM, we have to passthrough all the devices.

You also have to blacklist your GPU so the host won't utilize it. This is how my `/etc/modprobe.d/pve-blacklist.conf` looks like:

```
# This file contains a list of modules which are not supported by Proxmox VE


# nidiafb see bugreport https://bugzilla.proxmox.com/show_bug.cgi?id=701
blacklist nvidia
blacklist nouveau
blacklist nvidiafb
blacklist i2c_nvidia_gpu
blacklist nova_core
```

Then in your `/etc/modprobe.d/vfio.conf` insert:

```
options vfio-pci ids=10de:2187,10de:1aeb,10de:1aec,10de:1aed
```

Here the Ids are the ones which you copied previously.

Also create `/etc/modprobe.d/kvm.conf` with the below content:

```
options kvm ignore_msrs=1
```

This will allow to use Nvidia cards on Windows when you set the CPU to host.

Create `/etc/modprobe.d/vfio-priority.conf` with this content:

```
softdep nouveau pre: vfio-pci
softdep nvidia pre: vfio-pci
softdep nvidiafb pre: vfio-pci
softdep nova_core pre: vfio-pci
softdep xhci_pci pre: vfio-pci
```

This is so that the drivers are loaded in the proper order.

Apply these changes: `update-initramfs -u -k all` then restart the host.

At this point your host should be ready.

Creating VM

Memory	12.00 GiB
Processors	4 (1 sockets, 4 cores) [kvm64,flags=+aes] [cpuunits=3096]
BIOS	OVMF (UEFI)
Display	none (none)
Machine	q35
SCSI Controller	VirtIO SCSI
CD/DVD Drive (ide2)	none,media=cdrom
Hard Disk (scsi0)	container:136/vm-136-disk-0.qcow2,size=52G
Network Device (net0)	virtio=A2:0B:1E:90:B5:B8,bridge=vmbr0,firewall=1
EFI Disk	container:136/vm-136-disk-1.qcow2,size=128K
USB Device (usb0)	host=046d:c05b,usb3=1
USB Device (usb1)	host=413c:2113,usb3=1
PCI Device (hostpci0)	07:00,pcie=1,x-vga=1

Configuration in a text format:

```
bios: ovmf
bootdisk: scsi0
```

```
cores: 4
cpu: kvm64,flags=+aes
cpuunits: 3096
efidisk0: container:136/vm-136-disk-1.qcow2,size=128K
hostpci0: 07:00,pcie=1,x-vga=1
ide2: none,media=cdrom
machine: q35
memory: 12288
name: ubuntu8
net0: virtio=A2:0B:1E:90:B5:B8,bridge=vmbr0,firewall=1
numa: 0
ostype: l26
scsi0: container:136/vm-136-disk-0.qcow2,size=52G
scsihw: virtio-scsi-pci
smbios1: uuid=b925668d-9785-4941-ab36-4151164248c7
sockets: 1
usb0: host=046d:c05b,usb3=1
usb1: host=413c:2113,usb3=1
vga: none
vmgenid: 9aae2c4f-30ff-4a2b-ac56-805e49c670d5
```

- The `07:00` is my GPU set to `hostpci0`
- vga has to be set to null
- cpu can be kvm64, it doesn't have to be host
- I set cpuunits to higher than default so proxmox will prioritize this VM

Sources:

- https://pve.proxmox.com/wiki/Pci_passthrough
- https://pve.proxmox.com/wiki/PCI(e)_Passthrough
- https://old.reddit.com/r/homelab/comments/b5xpua/the_ultimate_beginners_guide_to_gpu_passthrough/
- https://wiki.archlinux.org/index.php/PCI_passthrough_via_OVMF
- https://www.kernel.org/doc/html/v5.15/admin-guide/kernel-parameters.html
- https://forum.proxmox.com/threads/problem-with-gpu-passthrough.55918/post-478351

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