

CPU Pinning on KVM for Windows 10 Gaming Guest

This guide can be used for different applications but it's important to understand my use case scenario. I have about 10 or so "other" VM's on my system that don't need much resources and 1 main Windows 10 VM w/ GPU Passthrough that needs as much horsepower as I can give it for gaming/workstation uses.

I recently upgraded to the Coffee Lake i7 which has 6 cores + HT for 12 possible Threads. If you only have Quad Core, i'd think twice about CPU Pinning, especially if you run other VM's along side your main guest.

CPU Pinning:

My Plan:

I want to give my WindowsVM 4 cores and the rest to be shared between KVM host + Other VM's.

```
Core 1 & 2 = KVM Host + "Other" VM's
Core 3-6 = Windows 10 Guest
```

Note: I read it's best to give KVM host Core 0.

Isolate Cores that will be directly Pinned to VCpu's: IE: Block host from being able to use them via Grub

You want to use `isolcpus` to block CPU's from being used by the HOST so that they can be assigned to VM Guests.

Find Core Pairs:

```
cat /sys/devices/system/cpu/cpu*/topology/thread_siblings_list | sort | uniq
0,6
1,7
2,8
3,9
4,10
5,11
```

Add to grub, update grub and reboot:

```
isolcpus=2,8,3,9,4,10,5,11
```

Notes:

```
#Of VCpu's = # of THREADS
#Set vcpu 0 & 1 to the same physical core and so forth
#Set CPU's to have 2 Threads per Core
```

```
<vcpu placement='static'>8</vcpu>
<cputune>
<vcupin vcpu='0' cpuset='2' />
<vcupin vcpu='1' cpuset='8' />
<vcupin vcpu='2' cpuset='3' />
<vcupin vcpu='3' cpuset='9' />
<vcupin vcpu='4' cpuset='4' />
<vcupin vcpu='5' cpuset='10' />
<vcupin vcpu='6' cpuset='5' />
<vcupin vcpu='7' cpuset='11' />
<emulatorpin cpuset='0,6' />
</cputune>
<os>
<cpu mode='host-passthrough' check='none'>
<topology sockets='1' cores='4' threads='2' />
</cpu>
```

(4 cores * 2 Threads/Core = 8 VCpu's)

Let's make sure it's working!

<https://unix.stackexchange.com/questions/336017/how-to-detect-if-isolcpus-is-activated>

```
cat /sys/devices/system/cpu/isolated
2-5,8-11
cat /sys/devices/system/cpu/possible
0-11
```

```
virsh vcpupin Windows10
VCPU: CPU Affinity
```

```
-----
0: 2
1: 8
2: 3
3: 9
4: 4
5: 10
6: 5
7: 11
```

- This shows that without setting CPU Pin on other VM's they "think" they have full affinity to use any core, but isolcpu's has blocked my cores 3-6 for Windows so all other VM's end up on cores 1 and 2.

```
virsh vcpuinfo NGinX
[root@kvmatrix ~]# virsh vcpupin NGinX
VCPU: CPU Affinity
-----
0: 0-11
[root@kvmatrix ~]# virsh vcpuinfo NGinX
VCPU: 0
CPU: 1
State: running
CPU time: 9.2s
CPU Affinity: yyyyyyyyyyyy
[root@kvmatrix ~]# virsh vcpuinfo Confluence
VCPU: 0
CPU: 1
State: running
CPU time: 59.1s
CPU Affinity: yyyyyyyyyyyy
VCPU: 1
CPU: 0
State: running
CPU time: 58.6s
CPU Affinity: yyyyyyyyyyyy
```

Sources:

https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/5/html/virtualization/ch33s08

<https://serverfault.com/questions/871053/cpu-pinning-strategy-for-kvm-centos7>

<https://lime-technology.com/forums/topic/47345-performance-improvements-in-vms-by-adjusting-cpu-pinning-and-assignment/>

https://www.reddit.com/r/VFIO/comments/7zcn5g/kvm_windows_10_guest_cpu_pinning_recommended/