PCI Bus

Understand a PCI Address

The PCI address is a series of numbers like 0000:04:00.0. The full form is **<domain>:<bus>:<device>.<function>**.

The bus, device, and function numbers specify the device's location on the bus. We can break the device string "0000:04:00.0" down as follows:

- 0000 : PCI domain (each domain can contain up to 256 PCI buses)
- 04 : The bus number the device is attached to
- 00 : The device number
- .0 : PCI device function

Understand PCI Bus Structure

The 'lspci -tv' command shows a tree structure with limited verbosity.

```
# lspci -tv

-[0000:00]-+-00.0  Intel Corporation 8th Gen Core Processor Host Bridge/DRAM
Registers
           +-02.0  Intel Corporation CoffeeLake-S GT2 [UHD Graphics 630]
           +-08.0  Intel Corporation Xeon E3-1200 v5/v6 / E3-1500 v5 /
6th/7th/8th Gen Core Processor Gaussian Mixture Model
           +-12.0  Intel Corporation Cannon Lake PCH Thermal Controller
           +-14.0  Intel Corporation Cannon Lake PCH USB 3.1 xHCI Host
Controller
           +-14.2  Intel Corporation Cannon Lake PCH Shared SRAM
           +-16.0  Intel Corporation Cannon Lake PCH HECI Controller
           +-17.0  Intel Corporation Cannon Lake PCH SATA AHCI Controller
           +-1c.0-[01]----00.0  Realtek Semiconductor Co., Ltd.
RTL8111/8168/8211/8411 PCI Express Gigabit Ethernet Controller
           +-1d.0-[02]----00.0  Micron Technology Inc 2200S NVMe SSD
[Cassandra]
           +-1f.0  Intel Corporation H370 Chipset LPC/eSPI Controller
           +-1f.3  Intel Corporation Cannon Lake PCH cAVS
           +-1f.4  Intel Corporation Cannon Lake PCH SMBus Controller
           \-1f.5  Intel Corporation Cannon Lake PCH SPI Controller
```

The portion in brackets on the first line (*[0000:00]-+-00.0*) is the domain and bus that everything under this point in the tree is on. This is domain 0000 and bus 00, which is generally the root of the PCIe topology. Going along, we get to my first NVMe drive:

sysfs PCI support

The Linux kernel represents PCI devices as pseudo-devices in the sysfs file system. Linux lists these devices in ***/sys/bus/pci/devices***.

```
# ls -al /sys/bus/pci/devices

total 0
drwxr-xr-x 2 root root 0 20 sep 14:25 .
drwxr-xr-x 5 root root 0 20 sep 13:53 ..
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:00.0 ->
../../../devices/pci0000:00/0000:00:00.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:02.0 ->
../../../devices/pci0000:00/0000:00:02.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:08.0 ->
../../../devices/pci0000:00/0000:00:08.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:12.0 ->
../../../devices/pci0000:00/0000:00:12.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:14.0 ->
../../../devices/pci0000:00/0000:00:14.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:14.2 ->
../../../devices/pci0000:00/0000:00:14.2
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:16.0 ->
../../../devices/pci0000:00/0000:00:16.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:17.0 ->
../../../devices/pci0000:00/0000:00:17.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:1c.0 ->
../../../devices/pci0000:00/0000:00:1c.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:1d.0 ->
../../../devices/pci0000:00/0000:00:1d.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:1f.0 ->
../../../devices/pci0000:00/0000:00:1f.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:1f.3 ->
../../../devices/pci0000:00/0000:00:1f.3
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:1f.4 ->
../../../devices/pci0000:00/0000:00:1f.4
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:00:1f.5 ->
../../../devices/pci0000:00/0000:00:1f.5
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:01:00.0 ->
../../../devices/pci0000:00/0000:00:1c.0/0000:01:00.0
lrwxrwxrwx 1 root root 0 20 sep 13:53 0000:02:00.0 ->
../../../devices/pci0000:00/0000:00:1d.0/0000:02:00.0
```

From:
<https://wiki.oscardegroot.nl/> - **HomeWiki**

Permanent link:
[https://wiki.oscardegroot.nl/doku.php?id=linux:system:pcibus:pcibus&rev =1758381668](https://wiki.oscardegroot.nl/doku.php?id=linux:system:pcibus:pcibus&rev=1758381668)

Last update: **2025/09/20 15:21**