Part III: Persistence

**Chap 35: A Dialogue on Persistence**

Making information persist, despite computer crashes, disk failures, or power outages is a tough and interesting challenge.

**Chap 36: I/O Devices**

We will discuss **input/output (I/O) device** and how OS interact with such identity.

**36.1 System Architecture**

Diagram

Description automatically generated

The CPU is attached to the main memory of the system through the **memory bus** or interconnect. Some devices (e.g., graphics) are connected to the system via a general **I/O bus**, which many systems called **PCI**. Lower down, we have a peripheral bus, such as SCSI, SATA, USB. These connect slow devices to the system, including disks, mice, and keyboards.

We put them in a hierarchical structure because of physics and cost. The faster the bus, the shorter it must be. Thus, high-performance memory bus does not have much room to plug devices and such into it. In addition, high performance bus is costly. Thus, components that demand high performance are nearer to the CPU. The further away, the lower the performance.

Figure 36.2 shows the diagram of Intel Z270 chipset. The CPU connects most closely to the memory system and the graphics card. The CPU connects to an I/O chip via **DMI (Direct Media Interface)**. The rest are connected to this I/O chip via different interconnects (eSATA or external SATA, ATA or AT attachment, SATA or serial ATA).

Below the I/O chip are a number of **USB (Universal Serial Bus)** connections, which in this depiction enable a keyboard and mouse to be attached to the computer.

On the left of the system is where higher performance devices can be connected via **PCIe (Peripheral Component Interconnect Express)**.

Diagram

Description automatically generated

**36.2 A Canonical Device**