# Northbridge and Southbridge

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06/05/2024

Northbridge and Southbridge in a CPU/Computer

1. Research on Northbridge and Southbridge:

The Northbridge and Southbridge are two key components that make up the chipset in a computer's motherboard. They act as communication bridges between the different subsystems and components within the computer.

2. Report answering the questions:

a. What are these bridges and what functions do they perform?

The Northbridge is responsible for high-speed communication and interfacing with the CPU, main memory, and the graphics processing unit (GPU). It handles tasks like memory management, PCI Express bus control, and communication with the Southbridge.

The Southbridge is responsible for managing lower-speed I/O devices and peripherals. It handles interfaces like SATA for storage drives, USB for input devices, PCI for expansion cards, and other legacy interfaces like PS/2 for keyboards and mice.

b. Why are there 2 bridges?

Separating the high-speed and low-speed components into the Northbridge and Southbridge allows for more efficient and scalable design. The Northbridge can focus on optimizing the critical high-speed paths, while the Southbridge handles the ancillary I/O devices. This division of responsibilities improves overall system performance and allows for more modular and flexible motherboard designs.

c. What I/O devices are handled in each bridge?

The Northbridge typically interfaces with:

- CPU

- Main system memory

- Graphics processing unit (GPU)

- High-speed expansion slots like PCI Express

The Southbridge typically interfaces with:

- SATA storage devices

- USB ports for input devices

- PCI slots for expansion cards

- Legacy interfaces like PS/2, parallel, and serial ports

- Audio and networking controllers

d. Where do components like a DMA controller fit into the bridges?

The DMA (Direct Memory Access) controller is typically integrated into the Northbridge. The DMA controller allows I/O devices to access system memory directly, without going through the CPU. This offloads data transfer tasks from the CPU, improving overall system performance.

e. How are devices like a keyboard, mouse, network, and hard disk handled?

Keyboard and mouse are connected to the Southbridge, which provides the necessary PS/2 or USB interfaces.

Network controllers, which handle wired or wireless network connectivity, are also connected to the Southbridge.

Hard disk drives and solid-state drives are connected to the Southbridge via SATA or other storage interfaces.

In summary, the Northbridge and Southbridge work together to manage the communication and data flow between the CPU, memory, high-speed components, and lower-speed I/O devices in a computer system. This division of responsibilities allows for optimized performance and a more modular and scalable design.

A screenshot of a computer program

Description automatically generated

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Description automatically generated

let's go through the results of running this Bash script:

a. Script that takes a single argument and uses if conditional logic:

* If you run the script with an argument less than 50, e.g., ./script.sh 25, it will output: "The number 25 is less than 50."
* If you run the script with an argument equal to 50, e.g., ./script.sh 50, it will output: "The number 50 is equal to 50."
* If you run the script with an argument greater than 50, e.g., ./script.sh 75, it will output: "The number 75 is greater than 50."

b. Script that uses a for loop to display numbers 1 through 10:

* When you run this part of the script, it will output the numbers 1 through 10, one per line.

c. Script that uses a for loop to print all the files from the ls list command:

* When you run this part of the script, it will output all the files in the current directory, one per line.

d. Script that uses a while loop to display numbers 1 through 10:

* When you run this part of the script, it will output the numbers 1 through 10, one per line.

e. Script that uses a for loop to print all sorted names from a text file and searches for a desired name:

* For this part, you'll need to have a file named names.txt in the same directory as the script, containing a list of names.
* The script will first sort the names in the file, then loop through the sorted list and print each name.
* If the desired name ("John" in this case) is found in the list, it will also print "Found John in the list."

Note that the results will depend on the contents of the names.txt file and the argument passed to the script in part (a).