**Northbridge and Southbridge**

The northbridge and southbridge are also known as “chipsets” and are chips on a motherboard that provide linking functionality between the CPU and other components in a computer system. The northbridge is usually located closest to the CPU and utilizes the high speed connection. As such, it is responsible for the high-performance connections such as those to system memory (RAM), PCI express ports (PCI-E) and graphics interfaces (GPU). The southbridge, on the other hand, handles slower processes including PCI control, BIOS, audio, and I/O processing (such as USB ports). One thing to note is that all information must pass through the northbridge regardless of where it is going. If it needs to end up going to the southbridge, it will have to pass through the northbridge first.

The reasoning for having two chips (or a “chipset”) dates back to older computer systems. Prior to a chipset, there were many chips on a motherboard that handled the individual functions of different components. From there, they were massed into two separate sections, the northbridge and southbridge thus creating a chipset. These functions were grouped based on their need to be close to the CPU and have access to high speed transfers. Functions that did not require this (I/O, ethernet, BIOS, etc) could be grouped further away and kept separate in order to ensure that the processes that required speed and performance would have access first. In modern computers, there is a push to complete integration on a motherboard which would have only one controller on a board that would handle all processing for the entire system.

While RAM and the CPU can communicate directly via the Northbridge, connection to the DMA controller is done via the southbridge. The DMA controller handles access to memory address, but not the transfer of memory data itself, so a high speed connection to the CPU is not needed. Instead, a request for an address is made to the DMA controller via the southbridge, the requested address is pulled and sent to the RAM which pulls the data and sends it directly to the CPU via the northbridge. The DMA controller also handles data transfer to external storage devices that are not connected via PCI-E.

Computer peripherals are handled via the I/O controller located in the southbridge. This includes things such as the mouse, keyboard, audio connections (speakers, headsets, etc.), ethernet, and external storage. Modern computers have SSD drives that connect via PCI-E ports on the motherboard. These are considered high performance and are handled by the northbridge. All other storage is handled via the southbridge through the I/O handler.