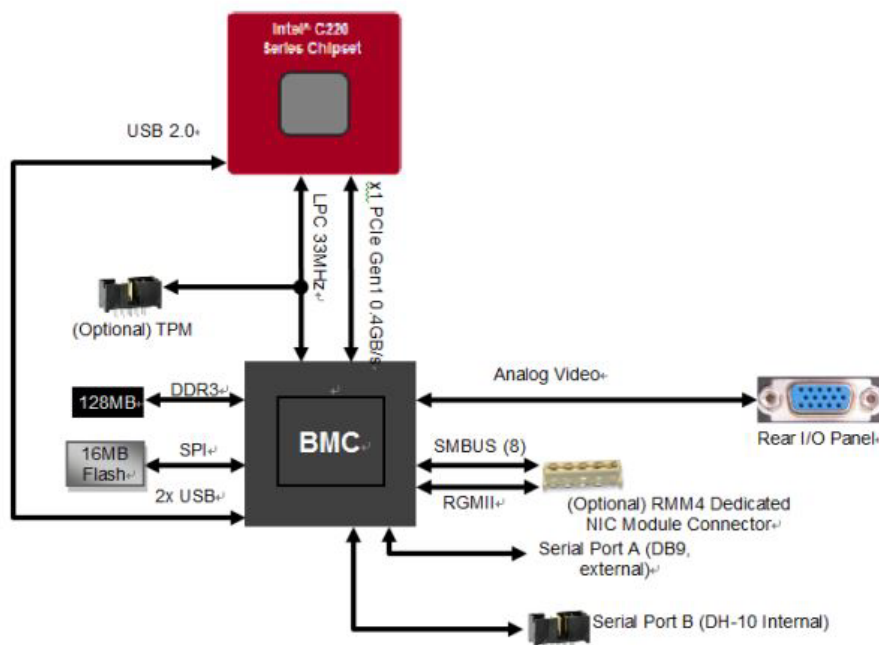# The Baseboard Management Controller (BMC) in Servers

A Baseboard Management Controller, or BMC, is a small computer that sits on virtually every server motherboard. Apart from servers, other components such as higher-end switches, JBODs*, JBOFs**, and other devices now include BMCs as well. The BMC is usually an ARM-based SoC with graphics and control logic built-in. These chips are often found on motherboards alongside some nominal amount of DRAM, accompanied by flash storage onboard, and various I/O.

Below is an illustration of how BMC interacts with the other major function blocks in a typical server.

BMC are used in servers to perform the tasks that an administrator would otherwise need to physically visit the racked server to accomplish. Some of the more common use cases are power cycling a server and monitoring fan speeds/ component temperatures, and hardware failures. Either NOR Flash or eMMC memory is used to store boot-code, settings and embedded Linux OS. DDR3/DDR4 DRAM is used to load & buffer the data.

BMCs are important because they allow not just single server administration. When armed with IPMI (Intelligent Platform Mgt Interface) and Redfish API (server/storage/infrastructure management protocol), it has the ability to manage clusters of servers at a time. For example, when a cloud provisioning system needs to reboot a server, nowadays it does so via an automated call to the BMC on that server.
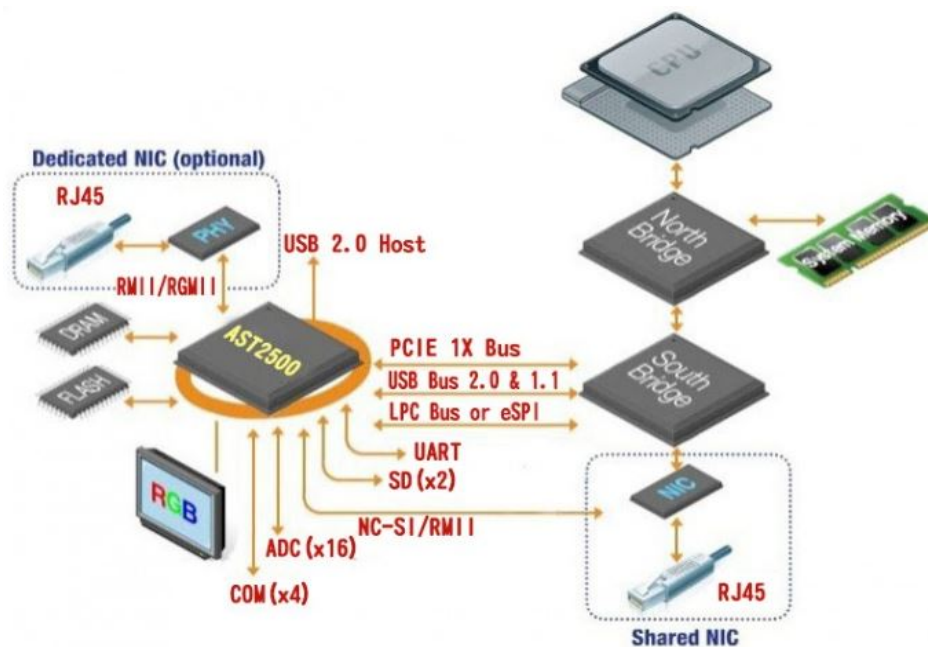
*JBOD stands for Just a Bunch of Disks   **JBOF stands for Just a Bunch of Flash

The largest vendor for BMCs today is ASPEED whose AST2400 BMC is pictured below. ASPEED has more than 80% of the BMC market TAM.

The newest AST2500 series controller from ASPEED (shown below) is used in servers from all major OEMs to hyper-scale switches in the datacenters.

The following Serial NOR Flash from ISSI are qualified with the AST2500 series controller:

- 256Mb/3V/SOIC-16 (IS25LP256E-RMLE),
- 512Mb/3V/SOIC-16 (IS25LP512M-RMLE),
- 1Gb/3V/BGA-24   (IS25LP01G-RILE),

and, working on 8G and 16G DDR4 DRAM qualification.