32-BIT AND 64-BIT OPERATING SYSTEMS

In computing, there are two types of processors existing, i.e., 32-bit and 64-bit processors. These types of processors tell us how much memory a processor can access from a CPU register. For instance,

A 32-bit system can access 232 different memory addresses, i.e 4 GB of RAM or physical memory ideally, it can access more than 4 GB of RAM also.

A 64-bit system can access 264 different memory addresses, i.e actually 18-Quintillion bytes of RAM. In short, any amount of memory greater than 4 GB can be easily handled by it.

32 Bit

Most computers made in the 1990s and early 2000s were 32-bit machines. The CPU register stores memory addresses, which is how the processor accesses data from RAM. One bit in the register can reference an individual byte in memory, so a 32-bit system can address a maximum of 4 GB (4,294,967,296 bytes) of RAM. The actual limit is often less than around 3.5 GB since part of the register is used to store other temporary values besides memory addresses. Most computers released over the past two decades were built on a 32-bit architecture, hence most operating systems were designed to run on a 32-bit processor.

64 Bit

A 64-bit register can theoretically reference 18,446,744,073,709,551,616 bytes, or 17,179,869,184 GB (16 exabytes) of memory. This is several million times more than an average workstation would need to access. What's important is that a 64-bit computer (which means it has a 64-bit processor) can access more than 4 GB of RAM. If a computer has 8 GB of RAM, it better has a 64-bit processor. Otherwise, at least 4 GB of the memory will be inaccessible by the CPU.

A major difference between 32-bit processors and 64-bit processors is the number of calculations per second they can perform, which affects the speed at which they can complete tasks. 64-bit processors can come in dual-core, quad-core, six-core, and eight-core versions for home computing. Multiple cores allow for an increased number of calculations per second that can be performed, which can increase the processing power and help make a computer run faster. Software programs that require many calculations to function smoothly can operate faster and more efficiently on the multi-core 64-bit processors, for the most part.

Advantages of 64-bit over 32-bit

Using 64-bit one can do a lot in multi-tasking, user can easily switch between various applications without any windows hanging problems.

Gamers can easily play High graphical games like Modern Warfare, GTA V, or use high-end software like Photoshop or CAD which takes a lot of memory since it makes multi-tasking with big software, easy and efficient for users. However, upgrading the video card instead of getting a 64-bit processor would be more beneficial.

A computer with a 64-bit processor can have a 64-bit or 32-bit version of an operating system installed. However, with a 32-bit operating system, the 64-bit processor would not run at its full capability.

On a computer with a 64-bit processor, we can't run a 16-bit legacy program. Many 32-bit programs will work with a 64-bit processor and operating system, but some older 32-bit programs may not function properly, or at all, due to limited or no compatibility.