

The Scoop on 64-Bit Computing

By Jason Foutz



While new technology can sometimes be agonizing, moving into the world of 64-bit computing does not have to be distressing. In fact, BASIS makes moving your application into this environment quite simple and rather painless.

This article reveals how the hardware in 64-bit computers provides great performance advantages and explores the kind of operating system support that is necessary to use this new hardware. In addition, readers will learn about the necessary tools BASIS provides developers to install and run their application in a 64-bit environment.

The Benefit

In the past, 32-bit processing was more than adequate for most business applications. Since the amount of RAM (Random Access Memory) is the key to an operating system's and application's performance, adding more RAM at today's lower prices has been a sensible way to improve performance; but only up to a point. A 32-bit system can only handle a maximum of 4 GB of RAM, severely limiting the amount of accessible memory in an existing system. If the system runs many applications at once or supports several simultaneous users, it can begin to run more slowly as it runs out of available RAM. Today's modern applications often use cutting-edge features and require even more memory than their predecessors, compounding the problem further.

When the computer runs out of available RAM, the operating system compensates by using virtual memory on the disk and swapping memory between programs as needed. Although the operating system has found this available virtual RAM on the disk, the operating system and applications typically slow down to a crawl when using virtual memory. The reason is that the virtual memory supplied by the disk, while plentiful, is thousands of times slower than physical RAM. This is because the disk functions with moving parts, whereas RAM is solid-state technology. While more RAM is not essential for building larger applications, it results in a computer that can manage far more information, faster, and for a higher number of users. Today's 64-bit processors abolish the 4 GB RAM limitation and are capable of addressing up to 18 billion GB of RAM.

Another advantage of 64-bit computers is the ability to perform certain kinds of arithmetic much faster compared to their 32-bit counterparts. A 32-bit computer must break up the addition of large numbers into several parts, whereas a 64-bit computer can perform the operation in a single step. Cryptography deals extensively with these large integers, performing arithmetic on them 64-bits at a time. This nets out to be *more* than twice as fast as 32-bits at a time because it eliminates much of the overhead of breaking numbers down and reassembling them. In addition, audio and video encoding benefit from 64-bit operations since translating a video from one encoding format to another is numerically intensive. Essentially, the processor accomplishes much more per clock cycle with 64-bit operations than it does with 32-bit operations.

The Hardware

Some vendors provided a variety of 64-bit processors for many years. Sun Microsystems developed the SPARC system while IBM used the PowerPC in game consoles and in high-end servers. Various versions of UNIX are available for the various 64-bit processors, but the most prominent processor supported belongs to AMD. They took the 32-bit x86 processor and extended it to a 64-bit architecture, adding more registers while maintaining backwards compatibility. The most attractive aspect of AMD's x64 is its reasonable price and product availability. Since both Intel and AMD are producing 64-bit processors, there is no need to spend millions of dollars on a mainframe for access to an enterprise level processor.

The Software

Taking advantage of the 64-bit processors requires special software. AMD's x64 is compatible with 32-bit programs but 32-bit programs do not take full advantage of the processor's capabilities. Microsoft provides a special 64-bit version, the Windows XP Professional x64 Edition. Though this version of Windows is the only way to run 64-bit code, it is capable


of running 32-bit code as well. Linux users must also obtain special versions of their operating system to take advantage of the enhancements of the x64 architecture.

The Support

BASIS helps developers move easily from 32-bit to 64-bit environments, regardless of whether they are using PRO/5® or BBJ®. Both PRO/5 version 6.0 and BBJ 6.0 are [available for several 64-bit operating systems](#). When [installing BBJ](#), developers choose either the 32- or the 64-bit JVM that BBJ will use. BASIS supports developers and facilitates deployment by making all of these options available in the BBJ installation response file. With BBJ, you can even switch between 32- and 64-bit JVMs after installation.

Summary

Clearly, the memory limitation for the 64-bit processor is relatively non-existent for today's application needs and technology. Special versions of Windows and Linux make it possible to take advantage of all the power 64-bit processors can offer. Perhaps more importantly, BASIS supports its developers by giving them control over 32- or 64-bit installations and by running applications identically in either environment. The 64-bit processor really shines in its ability to manage audio and video encoding. As this technology evolves, its ability to pass on these high performance gains will greatly affect day-to-day business applications. The future of 64-bit looks bright.

While experts in the computer industry demonstrate repeatedly that predictions about how much memory someone might need in the future are undependable, most will agree that the memory available with 64-bit processing is a safe range, at least for today. 

Manage far more information, faster, and for a higher number of users.



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