



Challenges of Power

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Hardware suppliers have traditionally competed on several fronts including overall performance, cost, clock speed, cache size, memory capacity, memory and front-side bus speed and number of processing units or cores. The drive towards green computing has broadened this competition by adding two new factors. These factors are power consumption and heat production of the processor (and the system as a whole).

POWER CONSUMPTION - A BATTLEGROUND FOR MICROPROCESSOR DEVELOPERS

Organizations have pushed developers of microprocessors to increase the performance and capacity of their products. The developers have responded by increasing the performance they could offer their customers. To increase the performance, suppliers increased the size of both the system cache and system memory as well as the clock speed of the microprocessor.

As system components were enhanced they often offered greater capacity and performance while shrinking in physical size. In the end, the result was a faster, more powerful, system that consumed greater amounts of power and produced more heat.

This has had an interesting effect upon the datacenter. As the systems shrunk in size, more of them could be housed in a single cabinet. These cabinets, however, often consumed a great deal of power and produced a great deal of heat. They also required more cooling to operate properly.

When asked, many IT and facilities managers would say that what keeps them up at night are concerns about increasing power consumption and the ability to keep the systems at the proper operational temperature when the datacenter is already approaching the limit of what power is available.

The growth of power consumption has outstripped the ability of power providers to build new power plants.

GREEN COMPUTING INCREASES MARKET INTEREST IN POWER CONSUMPTION

A relatively new catch phrase has entered the vocabulary of IT executives, "Green Computing." Like other areas using the label "Green" this means being as efficient as possible in the use of physical resources in order to reduce the overall impact of a specific activity.

In the world of information technology, this refers to, among other things, purchasing power-efficient systems when and wherever possible and then using them in very intelligent ways.

What does this really mean? It means building systems that consume less power, developing software that makes the best use of this new technology and selecting hardware and software with power consumption in mind.

WHAT'S BEING DONE

Achieving greater operational efficiency is the focus of many different groups in the ranks of IT suppliers.

HARDWARE

Suppliers of processors, such as Intel; ISVs, such as Dell*, HP* and IBM*; as well as storage systems, such as EMC*, HP* and Sun*; are all looking for ways to make systems that have greater capacity and are more efficient.

This means finding ways to continue to increase performance and capacity of hardware devices while reducing the use of power and the resulting production of heat.

Some of these suppliers are developing systems that can power down all or part of their subsystems when they're not in use.

SOFTWARE

Suppliers of virtualization technology, such as Cassatt*, DataSynapse*, and Scalent Systems*, are developing technology that has the capability to orchestrate the operations of applications by moving them to a smaller number of physical systems allowing unused systems to be powered down as needed.

Some of these suppliers are also working on ways to segment application processing into multiple execution units so that several smaller, more efficient systems can do the work that previously could only be assigned to large systems that consumed more power and produced more heat.

WHAT IS INTEL DOING?

As an example of the move towards "greener" computing, let's look at some of the things that a leading supplier of processor technology, Intel, is doing.

Intel has focused on finding relief for IT and facilities managers who need to find a way to increase the computing capacity in their datacenters while keeping total costs under control. Intel understands that in many cases datacenter managers have discovered that unless their organizations build their own generating plants, there is no more power available for them to purchase.

The company has been working for quite some time to increase the levels of energy efficiency of its products through new manufacturing techniques, improved processor design and helping systems and software suppliers develop more efficient platforms.

The results of these efforts are beginning to be seen with the introduction of Intel's newest generation of desktop, embedded, laptop, workstation, and server families of processors. In some cases, performance has been boosted by up to 3 times previous generations of processors while the energy efficiency was improved dramatically as well.

Intel is now including support for virtual machine technology in these processors. Helping make it possible for many applications to be encapsulated and run simultaneously on the same physical system means that Intel has helping organizations reduce both their power and heat production.

Furthermore, the Linux community and Intel have gotten together to work on ways to better utilize the power saving capabilities of newer processors and system. More information on this effort can be found at <http://www.lesswatts.org>.

SUMMARY

It is wise for organizations to get their IT and facilities manager to work together to reduce power consumption and heat production. This means insisting that both of these requirements become part of their purchasing criteria when they are selecting laptops, desktops and servers. It should be possible for these new



requirements to be adopted without seeing a negative impact on the more traditional metrics of performance or capacity.

Intel, along with other suppliers of microprocessors, is investing heavily to reduce power consumption and heat production while maintaining competitive levels of performance and capacity.