Nautalex News

Network Solutions for Business *Summer 1999*

More on Power Problems

In our Summer 1998 newsletter we discussed some of the issues around the supply - or its lack- of clean electric power to your computers. Power problems continue, and we felt another discussion was warranted.

Clean, dependable power is an increasingly critical part of information technology systems. Yet, with the increasing number of computers, printers, copiers, and other power-hungry devices that we plug into the wall, the power that is typically available from the standard office power outlet is declining in quality. Add to this the fact that overall city-wide demand for power has grown faster than the available supply, and the result is poor power – often unacceptably poor for computer use.

There are at least nine different kinds of power problems:

Power Failure	A total loss of utility power
Power Sag	Short term low voltage
Power Surge	Short term high voltage above 110% of normal
Brownout	Reduced line voltage for extended periods of a few minutes to a few days.
Electrical Line Noise	High frequency waveform caused by RFI or EMI interference
High Voltage Spike	Instant and dramatic increase in line voltage that can be in excess of 6,000 volts
Frequency Variation	A change in frequency stability.
Switching Transient	Instantaneous high voltage increase in the range on nanoseconds
Harmonic Distortion	Distortion of the normal waveform generally transmitted by nonlinear loads

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An uninterruptible power supply (UPS) does not necessarily protect against all these risks. In fact, the earliest UPS systems only addressed the first and most obvious problem – complete power failure – through the inline supply of a 110 volt battery. The other eight problems fall into the domain of line conditioners and surge protectors. It is rare (and expensive) to find a device to protect against all.

Our general advice is to separate the battery (UPS) function from the line quality functions – you shouldn't have to buy a large battery in order to have good line conditioning. Bear in mind, too, that a full protection system, such as those sold by Exide, Alpha, and some others, can cost as much as $5,000 per unit.

Ultimately, you have to decide how much to spend on something that is, after all, insurance. And that comes down to the central questions in the computer industry: how valuable is your data and what should you do to protect it?

Anti-Virus Protection: Are you truly protected?

Gaps in your anti-virus protection can lead to very expensive downtime and repairs. Check your organization on the following points:

o Anti-virus software is installed on EVERY workstation in your organization. *Unprotected workstations are vulnerable, and time-consuming to repair.*

o Anti-virus signature or data files on the workstations are updated at least monthly. *Anti-virus software providers generally have a web site from which you can download the latest updates. If you have more than 5 or 10 workstations, it is worth automating the update. Contact Nautalex for more information.*

o Your workstations are automatically scanned at least weekly. *Most anti-virus programs have a scheduling utility which allows you to set up regular, automatic scans.*

o An anti-virus program is installed on your server, or you scan your server drives on a scheduled basis. *Don't neglect your server. Update it as mentioned above.*

Disk Defragmentation

Many agree that defragmentation benefits every major performance feature on today's computers. But some are surprised at the reasons for this. The following is based on the article "Why Diskeeper?" written by Craig Jensen, Chairman and CEO of Executive Software, providers of ***Diskeeper defragmentation software for NT.***

Three important components affecting the speed of a PC are the CPU (Central Processor Unit), memory, and hard drive.

The main component in a computer is the CPU, responsible for actual computation. The "300" on a PC means the CPU completes 300 million operations per second.

The second component, memory – used for short-term, volatile storage - today operates at a 60 nanosecond cycle time. This means you can access it – read or write - in 60 billionths of a second. That works out to about 16.7 million memory operations per second. Fast, yet the "slowness" of the memory holds back the CPU from operating as fast as it ought to all the time.

The third major component in a computer is the hard disk, used for long-term "permanent" storage. It is much bigger than memory, often measured in gigabytes (billions of bytes) as opposed to megabytes (millions of bytes) of memory. However, relatively speaking, the disk is S-L-O-W. The fastest disks today have average access times of 8 to 9 milliseconds. That's 8 thousandths of a second to get one unit of information off the disk. But at a rate of 8 milliseconds, that's only 125 operations a second. S-L-O-W.

So if CPUs are capable of 300 million operations a second, and memory is capable of 16.7 million operations per second and disks are capable of no more than 125 operations a second, where do you think the performance bottleneck is in a computer? That's right, it's the disk, which is 100,000 times slower than the memory and over a million times slower than the CPU. In other words if your computer program requires any information to be read from or written to the disk, it is going to be sitting there waiting (and waiting, and waiting) while the S-L-O-W disk processes the disk input and output.

Now, introduce fragmentation into this picture. A contiguous file can be read by your program with a single disk access. A file fragmented into two pieces requires TWO accesses to get the same information. With files fragmented into two pieces on average, your 125 disk operations a second is suddenly reduced to an effective rate of 67.5 operations a second -- half the expected speed -- and S-L-O-W just got magnified by a factor of two. Imagine a program trying to read information from a file fragmented into 125 pieces (not uncommon). It would take a WHOLE SECOND to read the same information that should only take 1/125th of a second.

If you step back and take a look at this in perspective, it really doesn't matter a how fast your CPU is or how fast your memory is if that disk is fragmented. Every extra fragment (per file, average) is going to slow down that computer so much, the machine is set back a generation or two in terms of power. Because the disk is the slowest component and therefore the #1 potential bottleneck, the disk should be kept in peak operating condition at all times. Only then should you worry about memory and CPU speeds.

So, in other words, defragmentation really allows your hardware to perform at its most optimum levels.

Open House Winners

In March 1999, Nautalex held an open house to celebrate our 5th year in business, and our move to new premises. Thanks again to all of you who joined us.

All participants were winners, enjoying a buffet, refreshments, and taking away gifts from our suppliers. Special congratulations to our door prize winners:

- Bev Trothen of Edward Jones won an Acer "Ergo" ergonomic keyboard donated by Nautalex.
- Gordon McSevney of Matlow, Miller, Harris, Thrasher won a Microsoft "Age of Empires" game donated by EMJ.

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