



Abrupt Power Losses

Associated computer issues

HSB, a Munich Re company, is a technology-driven company built on a foundation of specialty insurance, engineering and technology, all working together to drive innovation in a modern world.

Risks

It is understood that electrical power transients (surges) or other power quality issues can cause physical damage to electronic devices such as computers or monitors. But it is important to know that an abrupt loss of electrical power can also cause a number of issues for a computer. Having a backup power system to allow the computer to shut down in a controlled manner or operate without utility power is critical.

When power to a computer is turned off in the conventional way there is a sequence of activities that occurs. The operating system (OS) controls this process and is the basic software package required to run the computer. The OS ensures that each functional step has been correctly terminated before the computer is de-energized.

When power is abruptly lost, this controlled process does not take place. This causes some functions to improperly execute. Data can be lost or corrupted without obvious signs or indications of the cause. At the high speed that data processing takes place, there can be a substantial loss of data.

Data storage devices are vulnerable to sudden power losses. In the case of disks, the sudden loss of power will cause the read/write head to quickly retract to its resting position. In doing so, the head may meet the disk resulting in a "head crash."

Typical computer rooms may have dedicated air conditioning systems. Computer equipment utilizes cooling fans and other means to control and dissipate the heat generated by the equipment. When power is lost, the cooling system stops functioning. The residual internal heat that has not yet been carried away by the cooling system can cause the components to increase in temperature. Most electronic component manufacturers stipulate maximum operation temperatures for their equipment.

Solutions

In order to protect data, users should regularly perform data backups. Computer systems should be protected with voltage transient (surge) protection and a backup power source. When normal utility power is lost, an uninterpretable power supply (UPS) system will retain operating power using batteries for a designed length of time. For smaller computer systems or servers the UPS allows for an orderly shutdown of the equipment. In a larger computer room installation, the UPS provides a ride-through time of continued power until the standby generator starts. The UPS provides continuous, uninterrupted power to the computer loads. The room cooling units typically are not on the UPS but they are connected to the standby generator. The cooling units may lose power during the short time it takes for the standby generator to start and transfer the loads.

UPS batteries are most often used to provide continuous power for a limited time during an outage. A completely charged UPS can be designed to provide power for several minutes to allow the computer to save the data and complete the OS shutdown process. Depending on the installation, operating conditions and equipment used, the battery life can be reduced to four to five years for an advertised "ten-year-life" battery. Elevated room temperature will shorten the life of the UPS batteries. Owners should routinely inspect the UPS systems to verify that the batteries are charged and that the charging functions are working properly.

Loss example

Normal electric power was lost during a thunderstorm. The site was equipped with a UPS system for bridging utility power and generator service. Sixty percent of the batteries were defective. A transfer to the generator was successful but the diesel engine stalled after running for five minutes due to moisture in the fuel. This loss of generator power and the subsequent discharging of the UPS batteries resulted in a major loss of data.

