

The Four Classes Of Power Solutions

A White Paper by Liebert

Since computers have been in existence, there's been a need to protect them. Today, when computers are migrating at record speed from the protected data center out into a distributed work environment, the need is more critical than ever.

Power protection used to be as simple as placing all sensitive equipment inside a "glass house" which was connected to a single power protection source. Contemporary power protection strategies must deal with much more. First and foremost there is the increasingly wide range of system configurations. Servers, workstations, routers, hubs, bridges, and other sensitive components must all be taken into consideration.

Second, computer networks have become the productivity tool for many enterprises. As these systems become more and more integral to doing business, even the most minor power glitch can translate into a severe loss of productivity -- from absorbing a half day of an employee's, or even an entire department's, time to re-enter data to sustaining a costly production loss because a power glitch erased the machine control's part program and the machine produced scrap rather than sellable product. In some cases, as in a computerized ordering processing applications, a power problem can completely shut down operations altogether.

The following is an overview of the four basic types of power solutions that address the range of current, often complex power protection needs. Each type is appropriate for some network configurations and wrong for others. Large networks may even require a combination of types. The best solution is one that most closely matches user needs, based on such criteria as load size, application criticality, the proximity of the protected equipment, and the nature of the power problems.

One-On-One

Having grown out of the early stages of distributed computing, this is a relatively common configuration for many small networks. Products available for this configuration can have a wide range, including: standby designs such as the Liebert PowerSure™; the line-interactive technology found in an UPStation D which actually conditions power; or true on-line technology of Liebert's UPStation GX™ which offers extended "ride-through" time.

However, one-on-one protection becomes a negative cost factor as the network grows: adding UPSs, battery replacements, and related functionality such as communications can be expensive down the road. For example, the cost difference between investing in peripheral equipment like printers for each workstation versus strategically placing one or more powerful pieces of equipment to service multiple nodes on the network could be substantial. With one-on-one protection, floorspace is also required at each PC or workstation area.

The situations in which one-on-one protection may be the best solution:

- Single users connected to a network by modem.
- Individual, isolated network nodes that run relatively important applications.
- Peripheral equipment such as plotters and workgroup printers where a shutdown could idle a large group of users.

Clustered Systems

This type of protection allows network nodes located near one another to be protected by one UPS. It is a configuration that works well with small but growing networks where at least some

nodes are clustered together such as co-located file servers, hubs, routers and bridges as well as workstations or PCs within a department or office. If the units are within a few feet of the server or hub, a larger UPS can protect the entire cluster.

The clustered approach may actually offer less expensive protection per node than one-on-one. It also allows network managers the luxury of assigning protection priorities via a combination of UPSs and SNMP communications tools. This level of protection offers superior reliability, testing, and service when compared to one-on-one protection, as well. Fewer battery strings and battery management software simplifies testing and service, while a built-in maintenance bypass allows the UPS to be serviced without disruption of the critical load. The static by-pass improves reliability by automatically transferring the critical load to utility in the event of a malfunction. Yet clustered system products do require more planning and physical installation can be more complicated.

The situations in which clustered protection works the best include:

- Small but growing networks or multiple servers and support equipment in one area.
- Network clusters where mission-critical applications are routinely run.
- Network clusters with access to high speed communications.
- Networks where nodes - or entire clusters - are routinely moved from one location to another.

Integrated Protection

Power fluctuations aren't the only things affecting today's network performance. Problems can come in many forms, from heat and dust to people and vibration, and can adversely affect a network even if the power source is perfect. In addition, as technology and high-speed communications advance, network hardware is experiencing higher levels of sensitivity.

As a result, many organizations need network protection that goes beyond power conditioning and battery-back-up. Systems exist that are ideal for large servers and communication hubs that simply can not be down. For example, the high levels of protection found in a Little Glass House™ or a DataPad™ not only provide power conditioning and battery-backup, they ensure 24-hour operations and feature such advanced security as unauthorized access denial protection in a flexible footprint. DataPad provides air conditioning and filtration, uninterruptible power protection, surge protection, SNMP communications and cable management -- all contained within 2x4 foot modules. DataPad allows users to set up a computer-like raised floor system without constructing a room.

In the Little Glass House, Liebert has combined all of the elements necessary to ensure the long-term viability of network components such as servers, routers, hubs and switches. This totally integrated Little Glass House solution combines precision environmental control, uninterruptible power supply (UPS), access security, SNMP communications, and cable management in a sealed 19" or 24" rack enclosure.

However, the level of protection provided by such systems does come at a higher cost than power protection alone and more planning is required.

The best situations for an integrated power protection solution include:

- Mission-critical or 24-hour servers and communication hubs.
- Factory automated hardware that must be adjacent to the equipment controlled.
- Servers and other equipment vulnerable to physical intrusion.

- Sophisticated, sensitive equipment that must be used in ordinary office environments.

Facility-Wide/Floor-by-Floor Protection

Many facilities today require a network to be an integral component of everyday productivity. For these facilities, the best possible protection from fluctuations of virtually any source is a facility-wide or floor-by-floor protection plan, with the configuration depending on organizational needs. This level of protection is highly effective in handling non-linear loads and provides the highest level of network control available.

An on-line, three-phase UPS like the Liebert Series 600, for example, can supply over 1,000 kVA of protected power to an entire facility. It does require a significant amount of physical floor space. The UPStation S3, on the other hand, offers a space-saving design that has the flexibility to fit into different office environments on a floor-by-floor basis. In either case, the high level of protection generated actually helps reduce electric bills and offers the lowest operating costs and cost per node for large networks.

The most effective scenarios for this kind of comprehensive protection include:

- Facilities that are under construction or extensive renovations.
- Networks that are likely to expand dramatically over a relatively short period of time.
- Facilities that are prone to significant, instantaneous changes in power demands (e.g., a combined office-factory).
- Energy conservation "zones" where reduced electric bills will yield significant dividends.

Conclusion

In the final analysis, there are no hard and fast rules. Every organization must identify what is worth protecting and then devise a plan based on the power classifications outlined above. Isolated workstations may be adequately protected by small stand-alone UPSs. Network nodes that are clustered in the same office may most effectively be protected through connection to larger, full-featured UPSs. Putting a separate UPS on every node not only is often a more costly answer than using larger power protection units, it also can severely compromise the quality of the protection. Today's highly distributed computing environment has yielded a multitude of different system needs and configurations. Protecting these systems from the daily power hazards that can adversely affect some aspect of operations must therefore be a solution configured to each situation. The important thing to remember is that a well-devised power protection solution should fit the network, not the other way around.

###

About the company:

Headquartered in Columbus, Ohio, Liebert Corporation is an independent subsidiary of Emerson Electric Co. Liebert offers the broadest range of products in the power protection industry, from simple surge protection and power conditioning to Uninterruptible Power Supplies (UPSs) in an array of sizes, configurations, and topologies. Represented in 85 countries, Liebert products are widely used in network, telecommunications, medical imaging, and industrial automation applications.

LIEBERT WEB NOTICE AND CONDITIONS

Copyright © 1995 - 2000 Liebert Corporation.

For more information, contact webmaster@liebert.com.