

Better Network Management Through SNMP

A White Paper Prepared By Liebert Corporation

As we move past the middle of the decade, the trend continues away from host-based to client-server systems. It's no secret this operational migration has caused as many new network management problems as it has answered. Intensified requirements come from all directions: more nodes, more uptime, more communications, more flexibility, more shared resource availability, more desktop capabilities, more reliability. More everything except the standards that have seemingly been left behind in the protected environment of the data center.

Enter the Simple Network Management Protocol (SNMP) framework of interoperable solutions for managing networks. Designed to monitor and control heterogeneous devices across local and wide area networks, SNMP standards have been widely adopted by product manufacturers and network managers alike. How SNMP can help network management become more efficient in the distributed playing field of the 90s - specifically in regards to protecting your network and the sensitive devices attached to it - is the subject of this paper.

SNMP: New Standards For A New Operating Environment

Simply put, Simple Network Management Protocol (SNMP) is a communication de facto protocol that defines how all devices are managed over all networks. It is vendor and platform independent.

This communication standard establishes guidelines for what information will be collected, how it will be structured, and how the messages from the network device to the manager (and back) are formed. Many peripheral categories have their own set of communication rules for interfacing to the standard. Certain groups of network components -- for example, printers, servers, and UPSs - may use the same communication protocols to connect to SNMP.

These network devices then gather operational information into a database called a Management Information Base (MIB). The operating system software uses an SNMP management software subroutine to collect the contents of each MIB and compiles that database into a displayable format. The information is transmitted to the master network console, either automatically or upon request by the network manager.

Once a device standard is written, it is shared among all vendors for that particular product. Since the inception of SNMP, Liebert Corporation has been instrumental in helping to develop and define the UPS protocol for working within SNMP.

Although SNMP was originally designed for use on TCP/IP Ethernet networks, SNMP has gained wide acceptance in the LAN environment. In fact, SNMP is rapidly becoming the foundation on which most local area network management architectures are based. It provides a common interface through which a network administrator can monitor the health of all components in a LAN or WAN from one central point. Today, SNMP's applicability has expanded to include the OSI Fiber Distributed Data Interface (FDDI) network as well.

How exactly can this (relatively) new protocol help manage a network through an SNMP-compatible UPS? Consider the following scenario.

Tom Smith, a network manager, is sitting at a console, noting data flow, computer use, and other activity. Suddenly, an alarm sounds. He looks over and notices that a server in the engineering design section in Building B has locked up. With the touch of a few console keys, he calls up a window that provides information from an uninterruptible power supply (UPS) attached to the server. Seeing no immediate reason for the lock up, Tom presses a few keys that tells the UPS to turn the server off, then back on, to see if that will clear the problem. The server comes back online. He notes the event and schedules a maintenance check when most of the engineering staff has left at the end of the day.

Another alarm sounds. Tom searches through his console windows and learns someone is attempting to access a workstation without the proper authorization code. Tom immediately instructs the UPS to save all information and shut down the workstation, denying access. He then sends security to that office and notes not to turn the system back on via the UPS until he hears from security.

Several hours later, all electricity in the company goes out. Tom checks his UPS-connected console/PC, sees that all UPSs have switched to battery backup, and notes the amount of available backup time for each UPS on the network. He calls the utility company and learns the power outage will last about eight hours, too long to keep everything running on battery backup. From his console, Tom is able to prioritize and then initiate an orderly equipment shutdown.

How SNMP Works With UPSs: Intelligent Communications

The communication capability, remote access to data, and remote control over networked equipment demonstrated above is not fiction. It is all currently possible through SNMP. With SNMP communications on a UPS, the unit can suddenly do much more than power conditioning and protection. It can:

- log and print both events and data
- provide multiple screen views, simple to complex
- continuously monitor power quality
- report on battery status, load and temperature
- remotely reset locked equipment
- perform self-diagnostics

An SNMP-compatible UPS is able to report its status to multiple management consoles and it can be directed to change operating parameters. If the UPS has provisions for individually turning on and off the devices connected to it, the network manager can isolate sections of the network for security purposes, shut down devices to achieve electrical savings, even manage redundant portions of the network.

In short, through SNMP, a UPS can become an intelligent part of a communications network.

Additional Network Management Benefits

The benefits SNMP brings to UPS devices encompass the entire range of network management efficiencies, from preventing, detecting and correcting problems to improving overall power protection to actually managing many network functions from a central location.

The ability to prevent problems. Because UPSs can condition power as well as provide battery back up to attached devices, network disruption due to power outages or brownouts can be drastically reduced.

The ability to detect problems. The UPS's microprocessor can log power disturbances, keep track of battery usage, and alert network managers to low battery problems, track the history of power levels, and more. Through SNMP, this information is available to network managers for immediate analysis and detection of potential problems -- before they occur.

The ability to correct problems. If unauthorized entry is detected, a network manager can shut down those devices protected by a UPS, stopping entry. A UPS also can alert a manager to an imminent power loss, giving the manager the option to initiate orderly shut down procedures or to simply let battery back up take over.

The ability to improve power protection. SNMP allows network managers not only to control the UPS, but also to more efficiently manage the load that is connected to it. By linking several or several dozen UPSs into the network and feeding status data to the central network console, power protection and network control itself becomes that much more efficient.

Customized Power Protection: One Solution Does Not Fit All

Just as the computing environment is a complex and changing issue unique to every organization, communications and control must also be flexible to the needs of every network. While it's true SNMP is indeed a powerful addition to a UPS device, network managers should look for multiple communications options for each level of power protection.

Liebert SNMP-compatible systems range from simple shutdown interfaces to comprehensive SNMP-driven network management, integrating such functions as air conditioning, security, halon, and more.

Specifically, Liebert offers the following options to "customize" network-wide power management to suit the needs of each network or customer.

Shutdown Management: Liebert's SiteNet™ 1 Shutdown Management Kit provides basic UPS unattended shutdown capabilities. This internal option sends simple signals by cable from the UPS to the protected device. SiteNet™ 1 features an on-battery indicator, shutdown warning, and full compatibility with all popular LAN systems and operating software.

Monitoring Capabilities: For monitoring as well as simple shutdown capabilities, Liebert offers SiteNet™ 2 Monitoring and Control Software. This option allows UPS status and alarms to be monitored and logged on a protected device and/or network server. SiteNet™ 2 features an on battery indicator with battery time remaining displayed on an easy-to-read graphical screen.

SNMP Communications: For monitoring and control of the UPS via network management software, Liebert offers SiteNet™ SNMP. This comprehensive communications and control option features an on battery indicator with battery time remaining displayed; remote on/off control of the UPS to reset locked equipment and schedule on/off cycles; and availability in either Ethernet or Token Ring versions.

Advanced Systems Control: For use where protection needs to extend beyond power conditioning and basic UPS functions, Liebert has developed SiteNet Integrator™. Any dry-contact alarm or sensing device can now be connected to the network, allowing network administrators a wider range of information. The SiteNet Integrator™ can monitor up to 10 devices and two temperature/humidity sensors, and can be programmed to activate local audible and visual alarms in addition to network "traps."

Graphical User Interface: A Graphical User Interface that simplifies Network Management system monitoring of a Liebert UPS is available with Liebert's SiteNet Manager. The Manager is easy to install and provides full monitoring, control, and alarm notification without extensive programming.

Managing a network today is a comprehensive, critical task. As networks expand and become more complex, managers need reliable power protection and reliability among network devices, from printer and file servers to routers, hubs, and bridges. Liebert delivers the control and communications ability today's network manager needs with a wide variety of UPSs and SNMP compatibles tailored to virtually any size network. Whether you manage a small or large system, a Liebert solution is available that exactly suits your needs.

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