

LanSafe 5 and UPS Groups

Installation, configuration, and features in network environments

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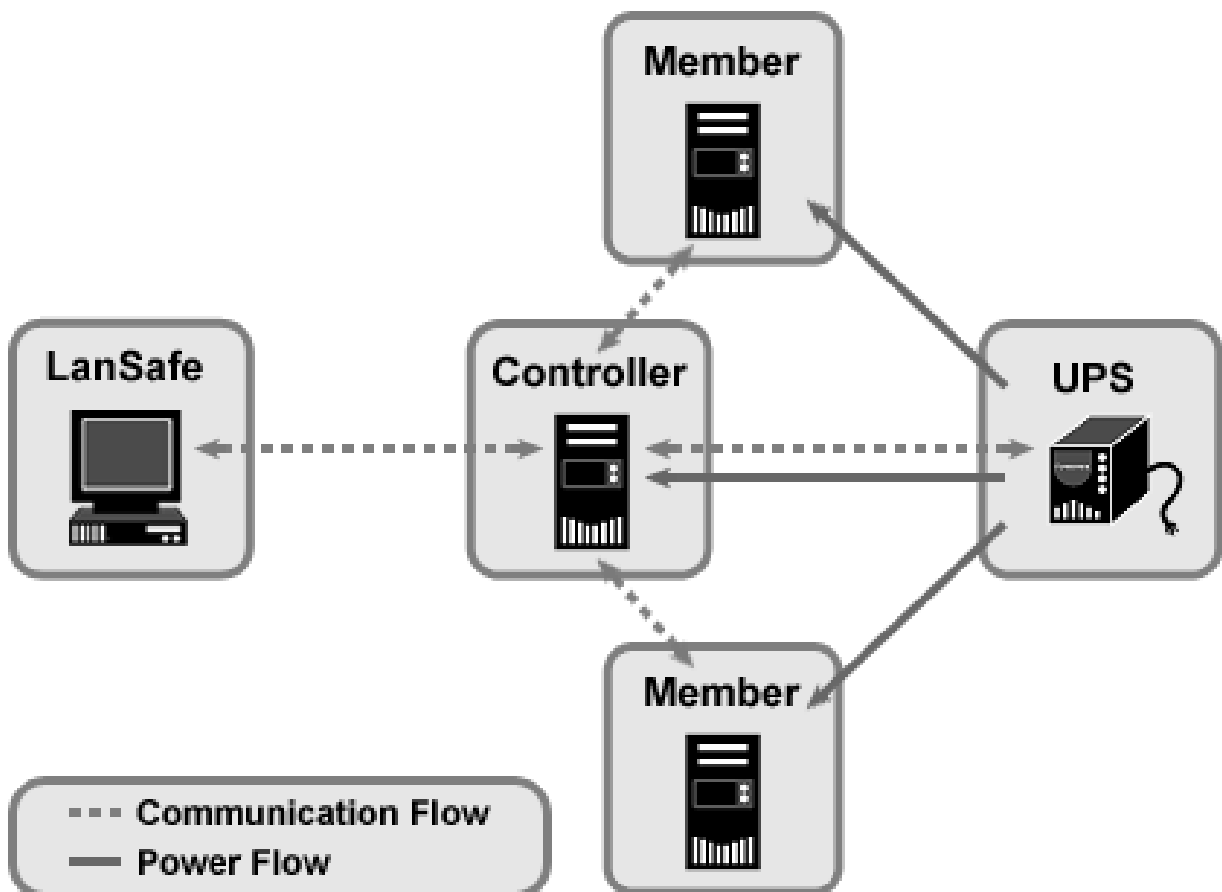
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1. Scope

This white paper describes LanSafe's UPS Group capability. The purpose is to describe the behavior and configuration of the UPS Group Controller ("Controller") and UPS Group Members ("Members"). The white paper also demonstrates features of LanSafe's UPS Groups and how these features can be set up and used to gain optimal advantages from your Powerware software and hardware.

2. Description

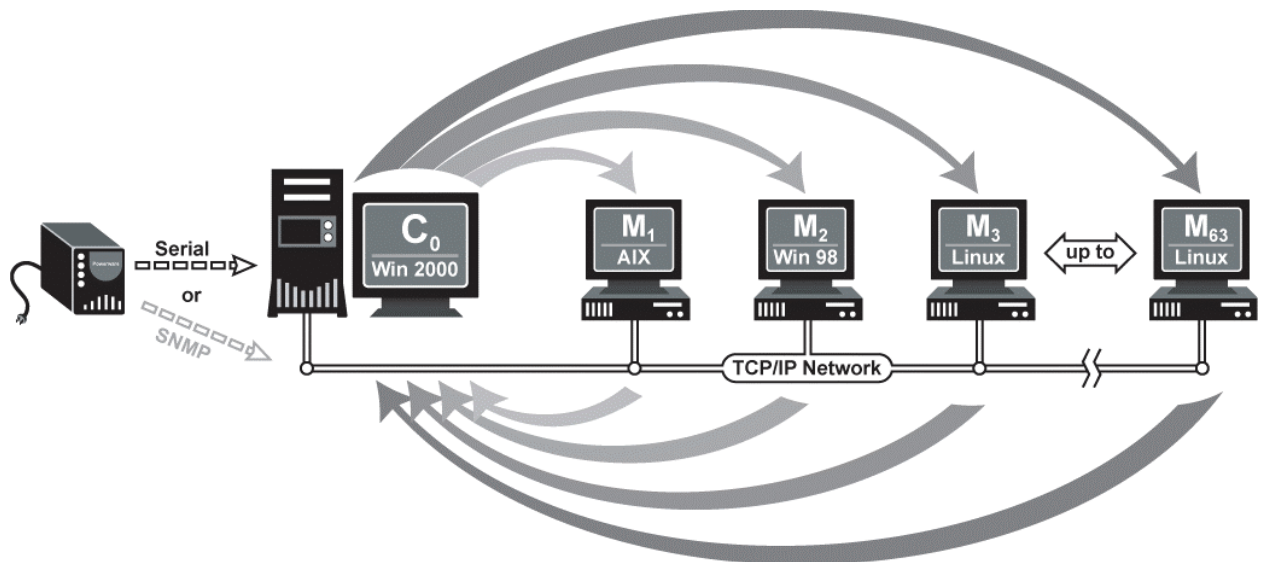
Computers in a UPS Group are all physically dependent on the same UPS for their power source. UPS Group Members do not receive messages about the UPS's status and actions directly from the UPS; instead messages about UPS status and actions are routed to the UPS Group Members from the UPS Group Controller via the network. However, the UPS Group Members behave as though they are connected directly to a UPS. The Controller is the computer that communicates directly with the UPS via the serial port, USB port, or the SNMP network interface. The Controller is responsible for sending the UPS status and actions out on the network to the Members.



3. Capacities and Limitations

3.1. MAXIMUM NUMBER OF UPS GROUP MEMBERS

A UPS Group consists of a maximum of 64 computers; 1 must serve as the Controller and the others participate in the Group as Members. The UPS must have enough power capacity to support the computers and equipment that use it as their power source.



3.2. TCP/IP NETWORKING

All computers in the UPS Group must have TCP/IP networking installed and operating.

3.3. COMPUTERS ON THE SAME NETWORK

All computers in the UPS Group must be on the same network. Multiple network connections in any single computer are fine so long as each computer in the UPS Group can use the same IP address or hostname to contact the Controller.

3.4. SAME LANSAFE MAJOR SOFTWARE VERSION

All computers in the UPS Group must run LanSafe v5.x in order to communicate properly (e.g. 5.x, where 5 is the major version number.) If any systems are running earlier versions of LanSafe, all earlier LanSafe software should be uninstalled prior to installing the new versions on computers in the UPS Group. If possible, it is best to have all LanSafe installation versions match exactly. Although highly recommended, this is not required unless stated specifically in the Release Notes or readme file for a particular version.

4. Benefits

4.1. REDUCTION IN UPS EXPENDATURES

Creating UPS Groups by connecting multiple computers to a single UPS reduces expenditures on power protection equipment. Money can be saved by purchasing larger capacity UPSs to protect multiple computers.

4.2. REDUCES EQUIPMENT COMPLEXITY AND MAINTENANCE

Creating UPS Groups also reduces equipment complexity so that IT personnel need to monitor and maintain fewer UPS locations.

4.3. SEQUENTIAL SHUTDOWN CONTROL

UPS Groups allow administrators to control system shutdowns in a sequential manner. They are able to have less critical computers shutdown earlier, leaving the more important systems up and running longer.

4.4. LOAD SEGMENT LEVEL CONTROL

Using the load segments on the UPS and configuring LanSafe to utilize them allows administrators even greater control; they can place equipment that requires no formal shutdown together on a load segment that remains on as long as there is battery power. They can place their computer systems that need graceful shutdowns on other load segments which can be configured to turn off and back on at different times.

4.5. POWER ON DELAYS PREVENTS SPIKES AND SAVE ENERGY

By setting a load segment to turn on with a power-on delay, administrators can allow the most critical equipment to come online first. This reduces the initial power drainage on the facility's electrical system. Less essential equipment can be brought online a few minutes later, allowing a smoother transition of electrical power usage.

4.6. ORGANIZATION OF DEVICES

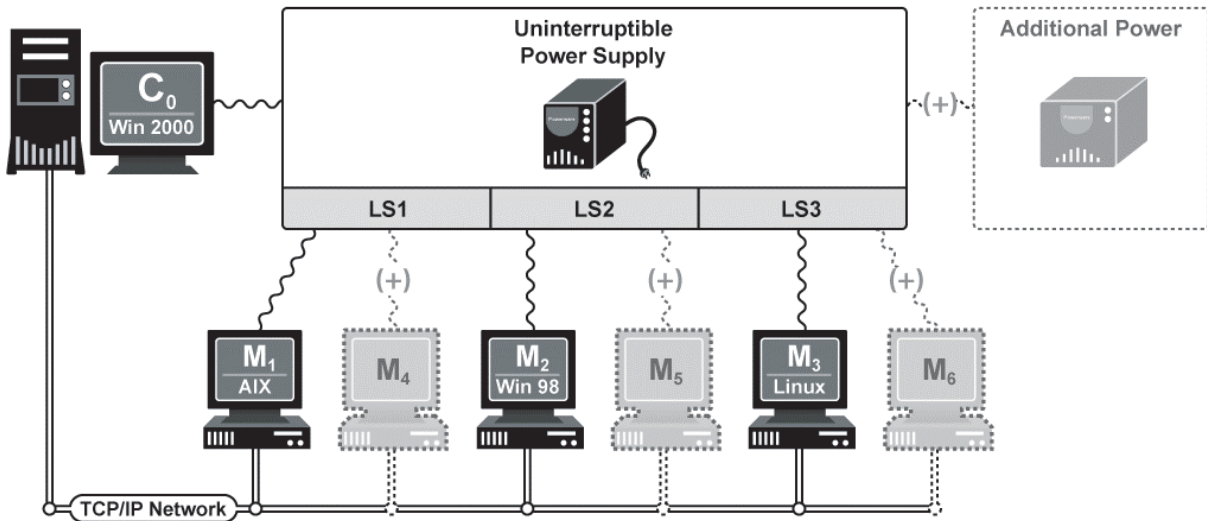
Use of load segments and sequential timings in LanSafe allows administrators better understanding of their equipment layout and needs. When their system shutdowns and power-on delays are thought through and well-planned there is better overall understanding of the goals to be accomplished by power protection.

4.7. LOAD SEGMENTS AND SYSTEM MAINTENANCE

Utilization of load segment level control allows administrators to bring a subset of the UPS Group down for maintenance if needed while leaving other systems up and operational.

4.8. UPS GROUPS ARE SCALABLE

A UPS Group can be increased in size until it reaches 64 computers. Of course, the UPS must meet the power needs of all the devices for which it supplies power, therefore adding computers to a UPS Group may require additional batteries and possibly an upgraded UPS. The system should be evaluated for any equipment upgrades needed due to the additional computers.



5. Typical Configuration Examples

5.1. SMALL UPS GROUP AND POWER OFF/ON SEQUENCING

The computers in the UPS Group diagrammed below can consist of any mix of supported Microsoft Windows and Unix platforms. In this example the system shutdown times and power-off times are sequenced so that they occur at different times. Note that the Controller computer must be set to remain on the longest amount of time.

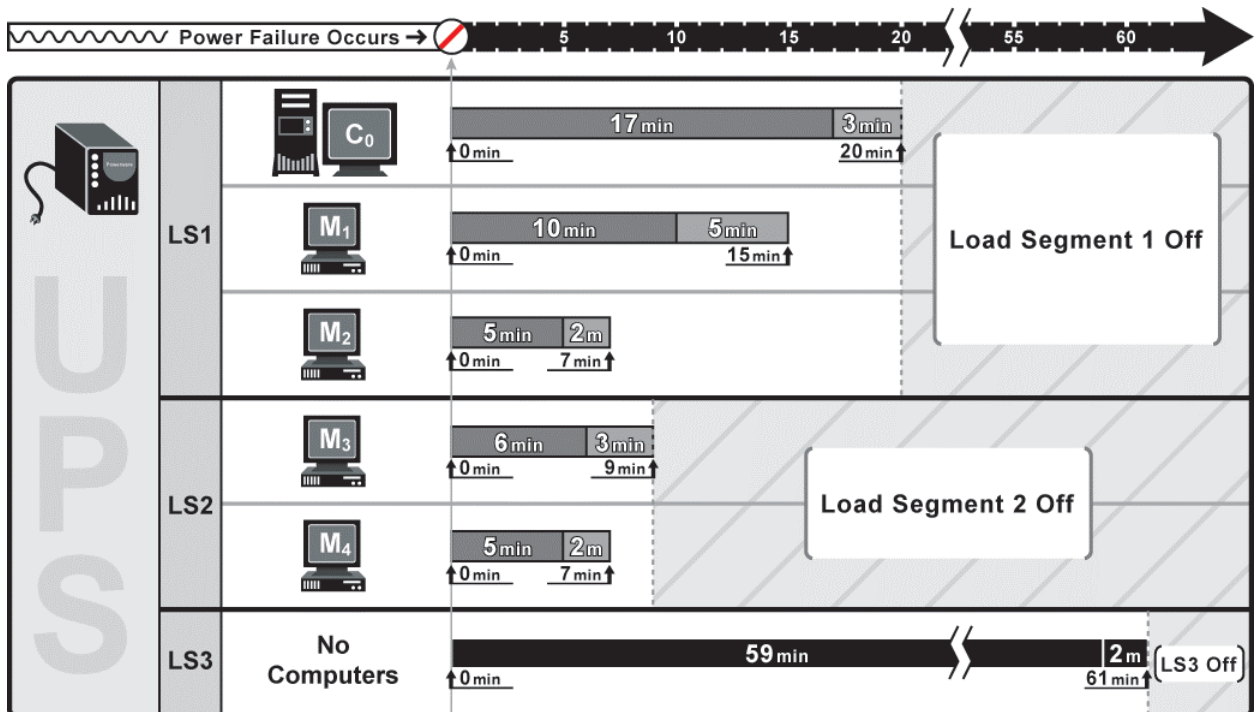
In the diagram, Load Segment 3 does not contain any computer devices that require a graceful shutdown. Therefore, if desired, it can be left on indefinitely.

5.2. LOAD SHEDDING

In the diagram below, when Load Segment 2 turns off, additional power that had been consumed by its attached devices is returned to the UPS to power Load Segments 1 and 3.

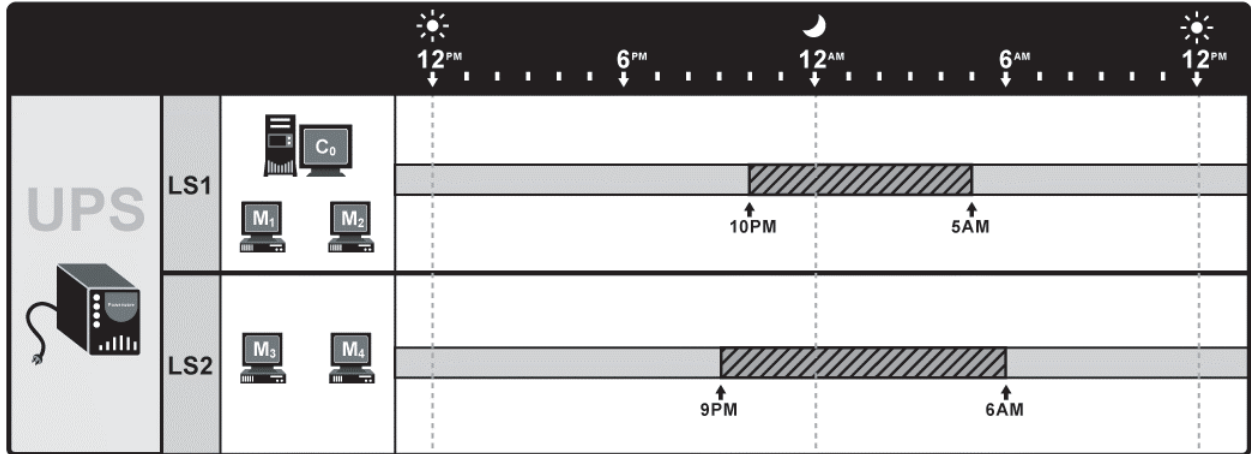
5.3. DIFFERENT TIMINGS ON SAME LOAD SEGMENT

In the diagram below, several computers are attached to Load Segments 1 and 2. On each of these load segments, the computers have been set to turn off at different times. Note that LanSafe will not turn the power off to the load segment until the computer set to stay on the longest has safely shutdown.



5.4. SCHEDULED SHUTDOWN OVERNIGHT OFF/ON BY LOAD SEGMENT

The diagram below demonstrates a scheduled shutdown that occurs every night. Note that the computers on Load Segment 1 turn off later and start up earlier than those on Load Segment 2.



6. Recommended Installation and Setup Procedures

Step 1. Uninstall all old versions of LanSafe Controller and Member software.

Step 2. Allow the LanSafe Installer to detect the UPS model, protocol, and number of load segments.

Step 3. Install the Controller first and determine the Controller's hostname or IP address.

Step 4. Verify that the Controller and its UPS operate properly; test it with a Power Failure Shutdown at a convenient time under controlled circumstances.

Step 5. Install a Member and re-verify that a Power Failure Shutdown works properly.

Step 6. Install additional Members.

Step 7. Make sure to consistently use the same hostname or IP address of the Controller for every Member that you install; hostname is preferred.

Step 8. Make sure you are using a UPS with enough power capacity.

Step 9. The default settings simply place the Controller and Members on the entire UPS ("Unassigned" in Management Settings) without regard to load segments.

Step 10. From LanSafe's Configuration pull-down menu, choose Management Settings to configure the computers onto the load segments to which they are physically attached (computers can be dragged and dropped to the desired load segments.)

Management Settings Notes

NOTE 1: If it is desired that the UPS does NOT turn off after all computers have been shutdown, use the Options button on the Management Settings dialog to tell LanSafe to never power off the UPS; if this feature is used, computers cannot be moved to individual load segments because this feature is moot if the UPS is to remain on.

NOTE 2: If individual load segment on and off timing is desired, move the computers in the UPS Group to the load segments to which they are physically attached.

NOTE 3: If desired, reset the countdown timing (how many minutes to count down before beginning the shutdown) or system shutdown timing (once the shutdown begins, how many minutes the system needs to close applications and shut the operating system down gracefully) for any of the computers in the UPS Group, making sure the Controller has the longest amount of time before it shuts down; this can be done by dragging the timing bars to the right of the desired computer or by changing the numeric values in the Power Monitor run time area of the Management Settings dialog.

NOTE 4: Load segment on and off delays for non-computer load segments (those without computers assigned to them) can be set by clicking on the desired load segment and changing the power on and power off delays; note that load segments with computers assigned have their power off delay set by default to that of the computer requiring the largest amount of time to countdown and complete shutdown.

NOTE 5: Note that if any computer is left behind on the Unassigned setting, none of the individual load segment settings will be utilized; all computers must be assigned either to Unassigned or all must be assigned to any combination of load segments.

Step 11: Verify the UPS Group by creating a Power Failure Shutdown at a convenient time under controlled circumstances. Check that computers and load segments power on and off at the expected times and make any adjustments needed and re-verify.

7. Typical Issues that May be Encountered on Unix or Windows Platforms

7.1. WHAT TO DO IF CONTROLLER OR MEMBER'S PHYSICAL COMPUTER IS CHANGED

7.1.1 Member physical computer is replaced but network address stays the same

Install LanSafe as a Member and set the Controller's network address the same as it was set on the old computer. Make sure the computer's power is plugged into the same load segment on the UPS where the old computer was located. When LanSafe starts up on the new computer that uses the same network address as the old one, it makes contact with the Controller, causing the Controller to send network messages to it about the status of the UPS.

7.1.2 Member physical computer is replaced and network address is changed

Install LanSafe as a Member and set the Controller's network address the same as it was set on the old computer. Make sure the computer's power is plugged into a load

segment on the UPS and use LanSafe to set up the Management Settings for the Member computer. When LanSafe starts up on the new computer, it makes contact with the Controller, causing the Controller to send network messages to it about the status of the UPS.

NOTE: If the old computer is left on the network but no longer uses the UPS as its power source, make sure to uninstall the LanSafe Member software because it cannot be turned off or rebooted in the event of a planned or power failure shutdown.

7.1.3 Controller physical computer is replaced but network address stays the same

It is recommended but not required that you stop the LanSafe services running on the Member computers; if left running while the Controller is offline, they will generate an alert that they cannot contact the Controller (which will resolve as soon as the Controller comes back online and the Members again make contact with it.) Install LanSafe as the Controller on the new computer. Make sure the computer's power is plugged into the same load segment on the UPS where the old computer was located. When LanSafe starts up on the new computer, the Members will reestablish contact with it, and the new Controller computer will again send network messages to the Members about the status of the UPS.

7.1.4 Controller physical computer is replaced and network address is changed

If possible, take a screen shot or jot down the UPS Group configurations from the Management Settings dialog before replacing the Controller computer. Stop and uninstall the LanSafe services running on the Member computers. Install LanSafe as the Controller on the new computer. Make sure the new computer's power is plugged into the same load segment on the UPS where the old computer was located. Install LanSafe on the Member computers using the new IP or hostname for the new Controller computer. When LanSafe starts up on the new Controller computer, the Members will establish contact with it, and the new Controller computer will send network messages to the Members. Use the Management Settings dialog to reset any UPS load segment and Member configuration that you desire from the previous UPS Group configuration.

7.2. DHCP CONFIGURATIONS, MULTIPLE NETWORKS, AND HOSTNAMES

Dynamic Host Configuration Protocol (DHCP) is a Transmission Control Protocol/Internet Protocol (TCP/IP) that enables a network connected to the Internet to automatically assign a temporary Internet protocol (IP) address to a host when the host connects to the network. Many computer networks use DHCP to help manage complex networks where computers have addresses on several networks simultaneously. The computers are found via their hostnames, allowing their IP addresses on their various networks to change without incident to software that uses hostname addresses.

Therefore, when setting up a UPS Group, it is advised the hostname of the Controller be used rather than its IP address, unless the IP address is statically assigned and will not change. During installation of UPS Group Members, the hostname of the Controller should be specified when it is requested during the installation of the LanSafe software.

7.3. UPS COMMUNICATIONS CONNECTION TYPES

Powerware UPSs can be connected to the UPS for status monitoring and control communications via intelligent serial RS-232, relay or dry contact serial RS-232, USB, or SNMP network interfaces. Depending on the particular UPS, one or more of these interfaces will be available either as a built in option or as an add-on. Remember, ONLY the UPS Group Controller needs a UPS communication connection for monitoring and control; the UPS Group Controller sends monitoring and control information on behalf of the UPS to the UPS Groups Members over the network.

UPS communications method settings are made at installation, and some communications methods and settings can be changed at runtime via LanSafe's Configuration pull-down menu's Communications Settings dialog.

NOTE: If a UPS is being replaced, it is recommended that LanSafe be reinstalled so that the new UPS's capabilities and configuration are assured of being properly set.

7.3.1 Intelligent serial RS-232

The intelligent serial RS-232 interface is the most common type of connection used and is available on all operating system platforms. The best baud rate is selected from those supported by the device at installation or detection from LanSafe's Communications Settings dialog available from the Configurations pull-down menu. If the baud rate on the UPS is changed, use Communications Settings to re-detect the UPS.

If the intelligent serial communications port is changed, or the UPS has been replaced, use the Detect button on the Communications Settings dialog to find the UPS and determine UPS information directly from the UPS. If the communications port is known, the user can select it from a drop down list. If a custom communications port is desired that does not appear in the drop down list, the user can enter it on the Communications Settings dialog. The user should then have the UPS detected by LanSafe by pressing the Detect button.

7.3.2 Relay or dry contact serial RS-232

Many Powerware UPSs utilize a relay or dry contact serial RS-232 interface. With this interface, signals are sent via the pins on the RS-232 cable, limiting the sophistication of the status and control of the UPS. The signals available are low battery and on battery. In this mode, the UPS is not able to be detected via the Detect button on the Communications Settings dialog. The comm port can be changed there; if so, wait after saving the change and verify that LanSafe is able to communicate with the UPS at the different location.

7.3.3 SNMP network interface

The SNMP network interface can be used on any operating system. If a UPS is physically configured with a network interface, it has its own unique IP address, and possibly a hostname, on that network. If you do not know the IP address or hostname, read-only community string, and read-write community string of the SNMP network adapter connected to the UPS serving as the UPS Group Controller, see your System Administrator. Set the IP address/hostname in the Communications Settings dialog and

use the Detect button to verify that the UPS is in fact at that location. Once verified, the SNMP network adapter setting can be selected as the desired communications method.

7.3.4 USB

The USB interface can be used on the Microsoft Windows platforms. Powerware's USB driver must first be installed. First connect the Powerware UPS to a compatible Microsoft Windows computer and have the UPS device detected. Once detected, install the Powerware UPS driver. Next install LanSafe and choose the USB communications option. USB settings are managed by the operating system and there are no available settings to be changed from within LanSafe.

7.3.5 Interchangeability between intelligent serial RS-232 and SNMP network interfaces

The intelligent serial RS-232 and SNMP network interface communications methods can be interchanged without reinstallation if the UPS is employing both connections simultaneously. However, LanSafe will use only ONE of the available communications methods. The user can change the current communications method via the Configuration pull-down menu's Communications Settings dialog as previously described above under each method's description.

7.4. FIREWALL / NETWORK ISSUES AND UDP/IP PORTS THAT NEED TO BE ENABLED

When using LanSafe through a firewall or across networks, you must ensure that network ports 3068, 3069, and 7015 are enabled. These ports are used to request and gather information about LanSafe installations on the network and to access Status@aGlance.

Also, ensure routers/gateways/etc. are configured to not filter UDP/IP broadcasts on any of the IP ports used by LanSafe. To verify that the ports have been enabled properly, use a port scanner to verify that the network will be receptive to LanSafe. There are many free port scanner utilities available on the web.

You may also need to enable Internet standard SNMP ports 161 and 162 in order to communicate with Web/SNMP cards or the SNMP Proxy Agent. Standard SNMP sends responses to management requests over UDP port 161 and trap information over UDP port 162.

8. Tips and Tricks

8.1. CUSTOMIZED EVENT ACTIONS TAKE PLACE ON CONTROLLERS ONLY

When LanSafe is run from a Member computer, the Controller's Power Monitor is accessed, not the Power Monitor of the Member. Therefore, customized events configuration changes are sent to the Controller's Power Monitor.

8.2. USER SCHEDULED MONTHLY SHUTDOWN CONFLICTS

If a monthly scheduled shutdown is set and another scheduled shutdown is set to occur during the time the UPS or the applicable load segment(s) will be shutdown, the system will not warn of the conflict. However, the shutdown and power-on will occur at the times set for the first scheduled shutdown that is to occur during the conflict.

8.3. LANSAFE PASSWORD ON LOCAL MACHINE

LanSafe access passwords are not required when viewing LanSafe on the same computer as the Controller you are monitoring. It is assumed the local user has the permission to do so. However, when viewing the Controller from a Member computer, which is what occurs when LanSafe is run on a Member computer, the initial menus areas are enabled with read-only access. To enable read-write access, the access password for the Controller must be entered from the File pull-down menu's Re-enter Password option. The same must be done if viewing a Controller from another Controller computer on the network.

8.4. LOAD SEGMENTS TURN ON AUTOMATICALLY AFTER A MANUAL SHUTDOWN

Load Segments turn on automatically at the same time when they power on after a manual shutdown. When the manual shutdown is configured the load segments can be set as a group to turn on immediately, at a delayed amount of time, or to remain off. Sometimes manual shutdown times are confused with the settings made for power-on in Management Settings; however, Management Settings configures times for unattended power failures and scheduled shutdowns, not for one time manual shutdowns.

8.5. HOW TO AWAKEN THE UPS AND LOAD SEGMENTS FROM A SCHEDULED SHUTDOWN

8.5.1 If Controller computer is online because it is not on a load segment that is shutdown

View LanSafe for the Controller computer. From the Shutdown pull-down menu, choose Manual Shutdown. Choose the load segment you are interested in. Select Power on delay after a delay of 1 minute, and then press the Shutdown button. The load segment will turn on again in 1-2 minutes. This applies both to load segments that have computers assigned and those that do not.

8.5.2 If Controller computer is offline because it is on a load segment that is shutdown

The UPS will have to be manually rebooted by pressing the power-on switch.