Accordance ARAID SNMP Agent

User Manual



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Overview

ARAID99 1000L RAID Support

RAID 1, known as "Disk Mirroring" provides **redundancy** by writing twice - once to each drive. If one drive fails, the other contains an exact duplicate of the data and the RAID can switch to using the mirror drive with **no lapse in user accessibility**. The disadvantages of mirroring are no improvement in data access speed, and higher cost, since twice the number of drives are required. However, it **provides the best protection of data** since the array management software will simply direct all application requests to the surviving disk members when a member of disk fails.

With the **dramatic reduction in hard drive prices** in recent times combined with the **massive storage capacity** of these lower price disks, RAID 1 has become a very affordable solution to ensuring the survivability of massive amounts of data. The **Accordance ARAID99 1000L** provides a seamless solution for both Windows and Linux platforms.

The **typical workplace** in this era of low-priced, high-end desktop computers features **numerous, networked desktop PCs**. This network of PCs is typically managed and administered by a few individuals responsible for the function and integrity of the networked solution. The Accordance ARAID99 1000L provides, not only an affordable RAID level 1 solution on a per-PC basis but, **SNMP** (Simple Network Management Protocol) agent access to the devices within the network. Network administrators are able to **configure and monitor the health and function** of the installed ARAID devices, including the physical hard drives that are RAID-protected via the Accordance device.

SNMP Agent Description

The SNMP agent that is distributed with this release of the ARAID99 1000L features, not only access to the configurable items of the Accordance device and notifications (traps) from the device but also, standard MIB-II support and Host Resources MIB support (as well as other support MIBs). Once installed on the system to be managed, any SNMPv2-compliant SNMP manager can be used to remotely manage this SNMP-equipped network element.

System Requirements

- ARAID99 1000L or ARAID99 T1000LM installed on the workstation.
- Serial connection cable (included with the ARAID99).
- Windows NT, 2000 or XP platform.
- The SNMP Agent requires less than 5 MB of RAM.
- Typical available hard-disk space required is approximately 30 MB. Logging system status may require additional space beyond basic initialization.
- Available COM port.
- Network adapter card
- Ethernet LAN connection

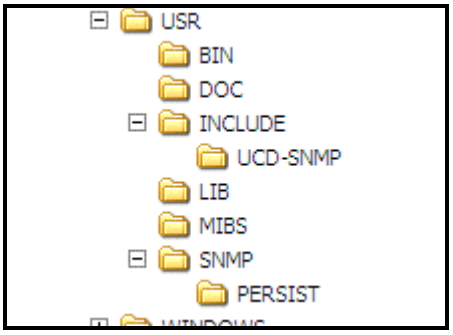
Installation

Installing the Software

The SNMP agent installation procedure is very simple for Windows. The installation disk has only one file on it named setup.exe. Execute this file by double-clicking the filename in either *Windows Explorer* or via the *My Computer* view of your CD drive. Accept all defaults in the current install version.

The setup.exe file can be placed on a Fileserver and invoked from the fileserver disk by the desired workstations as an alternative to CD-ROM installation on each machine.

The installation process creates various folders beneath a top-level folder named \USR. The diagram below shows the resulting folder hierarchy



Various programs are distributed in this release along with the agent executable file. All executable programs are located in the \USR\BIN folder. These programs are the agent (snmpd_d.exe) and a number of utility programs for performing command line SNMP Management operations. This SNMP agent was constructed using the NetSNMP agent toolkit which is distributed with sources for these utility functions. For your convenience, Accordance Systems has ported these functions to the Windows environment and included the executables in this distribution. A tutorial on the use of these utilities is provided at http://www.netsnmp.org/tutorial-5/commands/index.html

The various documents associated with this product are found in the \USR\DOC folder (including this document).

All supported MIBs can be found in the \USR\MIBS folder including the ACCORDANCE ARAID99 1000L MIB. These MIB files can be used to configure your SNMP Manager software to support this agent implementation. Please see the documentation for your specific SNMP Management software for details on configuring and programming the SNMP Manager.

Configuring the Hardware

Perform the following steps to install and configure the hardware for use with the SNMP Agent.

1. Install the ARAID99 as described in the ARAID99 1000L or T100LM Product Manual.

2. The internal model requires that the RS232 serial port is brought to the back of the PC. Connect the included ribbon cable to the ARAID99 and mount the port connector in an available slot.

3. Connect the included RS232 cable to the ARAID99 connector and to an available COM port on the PC. Screw the connectors together so that the cable is firmly attached.

4. No further configuration is necessary if the ARAID99 is connected to COM1. If COM2 is used, the file \USR\BIN\araid.cfg must be modified to select the appropriate COM port. Edit the file using notepad to comment out the COM1 line and enable the COM2 line. This section in the araid.cfg file should appears as follows:

   #port: COM1
   port: COM2

5. Save the file and exit notepad.

Configuring the Software

The \USR\SNMP\PERSIST folder contains the snmpd.local.conf file. You will modify this file to configure your agent. Review the README.TXT document in the \USR\DOC folder for additional information. Details of the format of the snmpd.local.conf file can be found at http://www.netsnmp.org/man/snmpd.conf.html. Most of the work is done for you, you simply need to review and modify as needed. Do not modify the snmpd.conf file in that folder (only the snmpd.local.conf)

Use notepad to change the \usr\snmp\persist\snmpd.local.conf file. Change the strings associated with the following keywords:

1. **syslocation** – The default string is "Accordance Corp.". Change this string to uniquely identify this workstation's location. You could use "Accounting Department", for example. You will use this

value to determine the location of the workstation when accessing it through a central management station.

2. **syscontact** – The default string is "Administrator". Leave the string as is, or change it to the name of a contact person responsible for managing this workstation.

3. **trapsink** & **trap2sink** - The default value is 10.0.0.1. Change both of these strings to the IP address of the workstation where the SNMP management software is running. You can determine the IP address of a workstation by typing "ipconfig" at a command prompt. System alerts, such as temperature alarms, fan failures, disk failures, etc. are sent to the workstation with this IP address.

Save your changes and exit Notepad. Configuration of the basic SNMP agent is complete.

Running the Agent

Start the SNMP Agent by double-clicking on the "ARAID 1000L SNMP Agent" icon on the desk top or by using Windows Explorer to navigate to the \usr\bin folder and double-clicking on snmp_d.exe.

A command window should open, displaying status information similar to the following:

1. Communication link running on port COM1:
2. Set Buzzer
3. Fan Alert Response
4. Read System Information
5. NET-SNMP version 5.1
6. Read HW Model & Firmware
7. Read Disk Model & Capacity

Line 1 indicates the COM port connected to the ARAID99. Refer to the section *Configure the Hardware* if the wrong COM port is selected. Lines 2 & 3 initialize specific SNMP objects. Line 4 indicates that communication is occurring with the ARAID99 over the serial port. Line 5 indicates that the SNMP agent has initialized correctly. Lines 6, 7 and subsequent lines indicate that the agent is requesting specific SNMP information from the ARAID99.

Errors appearing in this window generally indicate a communications problem between the agent and the ARAID99. Resolve these types of problems by checking the serial cable and verifying the software configuration.

You will want to add the SNMP Agent to the Windows Startup once you have verified that it is working correctly. To automatically start the agent at boot, do the following:

1. Log into the system as an "Administrator".

2. Select *Task Bar & Start Menu* from the *Settings* entry on the *Start* menu.

3. Click the *Advance* tab.
4. Click the *Advanced…* button.
5. Open the "\Documents and Settings\All Users\Start Menu\Programs\Startup" folder
6. Drag the ARAID1000L SNMP Agent Icon on the Desk Top to the above folder.
7. Close the browser and the *Task Bar & Start Menu* dialog.
8. Restart the system and verify that the SNMP agent starts.

SNMP Agent Software Features

The SNMP agent completely implements the details specified in the ACCORDANCE-ARAID1000L-MIB which is provided as a result of installation of the software (Refer to the installation section in this document). The following table itemizes the variables from this MIB and their meanings. The SNMP OID (Object Identifier) is included for convenience.

The first section of the table details the traps (notifications). Traps are the SNMP mechanism for relaying unsolicited information from the agent to the SNMP Manager program. Usually, a trap is issued from the agent when the agent detects an extraordinary system condition. The trap can contain additional data (beyond trap type) which further describes the extraordinary event. The data items associated with the trap are defined in the MIB.

The remainder of the diagram describes the non-indexed (scalar) and table variables defined by the MIB and implemented in this agent. Most of the variables described are accessible by SNMP GET operations. In other words, they are readable. There are various writeable variables which provided manager access to modify configurable system parameters. These writeable variables are denoted within the diagram by an asterisk immediately following the name.

Variable	Description	SNMP OID
TRAPS		
diskError	An error occurred on designated disk	1.3.6.1.4.1.18159.1.1.1.0.1
diskInserted	Designated disk was inserted into ARAID	1.3.6.1.4.1.18159.1.1.1.0.2
sensorTempOver	Designated Sensor Overheating	1.3.6.1.4.1.18159.1.1.1.0.3
fanError	Designated fan had an error	1.3.6.1.4.1.18159.1.1.1.0.4
systemFatalError	Fatal System Error Occurred	1.3.6.1.4.1.18159.1.1.1.0.5
diskRebuildPct	Periodic notification during rebuild	1.3.6.1.4.1.18159.1.1.1.0.6
diskRebuildComplete	Rebuild Complete	1.3.6.1.4.1.18159.1.1.1.0.7

ARAID System Info		
modelName	ARAID Model Name	1.3.6.1.4.1.18159.1.1.1.1.1.1
firmwareVersion	Firmware Version	1.3.6.1.4.1.18159.1.1.1.1.1.2
systemHDDCapacity	System Disk Capacity	1.3.6.1.4.1.18159.1.1.1.1.1.3
chipEdition	Chip Edition	1.3.6.1.4.1.18159.1.1.1.1.1.4
masterSlaveSetting	ARAID is Master or Slave	1.3.6.1.4.1.18159.1.1.1.1.2
operatingMode	RAID Level etc	1.3.6.1.4.1.18159.1.1.1.1.3
accordanceSN	Serial Number	1.3.6.1.4.1.18159.1.1.1.1.4
buzzerState*	Buzzer on or off	1.3.6.1.4.1.18159.1.1.1.1.5
lastFailTime	Timestamp of last system failure	1.3.6.1.4.1.18159.1.1.1.1.6
FAN Info		
fanSpeedMonCaps	Number of Fans	1.3.6.1.4.1.18159.1.1.1.2.1
fanAlertSetting*	Half Speed or full stop	1.3.6.1.4.1.18159.1.1.1.2.2
FAN Table		
fanID	Fan Identifier	1.3.6.1.4.1.18159.1.1.1.2.3.1.1
fanSpeed	Fan Speed in RPM	1.3.6.1.4.1.18159.1.1.1.2.3.1.2
Sensor Info		
tempMonitorCaps	Number of sensors	1.3.6.1.4.1.18159.1.1.1.3.1
sensorAlertTemperature*	Alert setting	1.3.6.1.4.1.18159.1.1.1.3.2
Sensor Table		
sensorID	Sensor Identifier	1.3.6.1.4.1.18159.1.1.1.3.3.1.1
sensorTemperature	Temp in degrees centigrade	1.3.6.1.4.1.18159.1.1.1.3.3.1.2

Disk Info		
rebuildSrcDisk	ID of rebuild source	1.3.6.1.4.1.18159.1.1.1.4.1
diskRebuildPercent	Percentage complete	1.3.6.1.4.1.18159.1.1.1.4.2
diskRebuildTrapFreq*	Percentage multiple criteria for issuing trap	1.3.6.1.4.1.18159.1.1.1.4.4
Disk Table		
diskDriveID	Disk Drive Identifier	1.3.6.1.4.1.18159.1.1.1.4.3.1.1
diskMasterState	Present, absent,failed	1.3.6.1.4.1.18159.1.1.1.4.3.1.2
diskModelName	Disk Drive Model Name	1.3.6.1.4.1.18159.1.1.1.4.3.1.3
diskCapacity	Disk Drive Capacity in MB	1.3.6.1.4.1.18159.1.1.1.4.3.1.4
diskMode	Rebuilding, single-drive	1.3.6.1.4.1.18159.1.1.1.4.3.1.5
diskLastErrorTime	Timestamp of last fail	1.3.6.1.4.1.18159.1.1.1.4.3.1.6
diskInsertedTime	Timestamp of insertion	1.3.6.1.4.1.18159.1.1.1.4.3.1.7

Four of the SNMP variables are writable by the SNMP Management Station. These variables affect the operation and reporting capabilities of the SNMP Agent and the ARAID99 disk array.

buzzerState

Enables/Disables the ARAID99 audio alarm. Writing a value of "1" enables the alarm, while a value of "2" disables the alarm. The alarm may also be disable by a button on the front panel of the ARAID99. The SNMP Agent sets the buzzerState to on at strartup.

fanAlertSetting

An SNMP trap is sent to the management station when a fan failure is detected. Setting fanAlertSetting to "1" configures the Agent to send the trap when the fan speed is reduced to half of normal operating speed. A value of "2" indicates that the trap is sent only if the fan comes to a complete stop. The SNMP Agent sets the fanAlertSetting to "2" at startup.

sensorAlertTemperature

The sensorAlertTemperature sets an upper temperature threshold, which generates a temperature over trap if exceeded. The sensorAlertTemperature may be set to a temperature in the range 30 to 65 degrees Celsius, using increments of 5 degrees. (30, 35, 40 …) The SNMP Agent sets the sensorAlertTemperature to 65 at startup.

diskRebuildTrapFreq

Traps are sent to the management station to indicate the rebuild progress of a disk inserted into the ARAID99. The diskRebuildTrapFreq variable determines how frequent these traps are sent to the management station. The default is "10", which instructs the agent to send a rebuild trap each time 10% of the rebuild is completed.

Appendix A

Using OpManager 4

AdventNet's OpManager is a comprehensive Network, Systems and Applications monitoring software that provides operators an integrated console for monitoring the performance of routers, servers, switches and printers. OpManager offers integrated fault and performance management functionality. It provides out-of-the-box graphs and reports, which give a wealth of information to the operators about the health of their networks, servers and applications.

This section provides a "Quick Start" guide to using OpManager with the Accordance SNMP Agent. It assumes the that you have installed OpManager and are familiar with its operation. Refer to the OpManager user's manual for detailed information.

Perform the following steps to configure OpManager:

1. Verify that the SNMP Agent is running and that the trapsink and trap2sink parameters in snmpd.local.conf have been set to the IP address of the management station. Also verify that the community strings in snmpd.local.conf have not been changed from their initial values of "public". Refer to the section *Configuring the Software* for additional information.

2. Copy the Accordance MIB files (ACCORDANCE-ARAID1000L-MIB.txt & ACCORDANCE-CORP-MIB.txt) from the \usr\mib directory to the OpManager MIB directory (\Program Files\AdventNet\ME\OpManager\mibs)

3. Start the OpManager server and client.

4. Click on the *Servers* option under the *OPManager SmartView* menu. Verify that the computer running the SNMP Agent appears in the server window. If the Agent computer does not appear, you may need to run the "New Device" option from the *Discover* menu.

5. Double click on the Agent Computer. Scroll down to the SNMP entry in the *Categories* window. Verify that the "Device is SNMP enabled" checkbox is marked, the port is set to 161 and both community fields contain the string "public". Make the appropriate changes and click OK.

6. Select "SNMP Trap Processors" from the *Configure* menu. Click *Add*.

7. Click the v2c/v3 button.

8. Type "FanError" in the Trap Processor Name entry box.

9. Click the "…" button next to the "Trap OID" field.

10. Click the "Load MIB" button.

11. Select on "ACCORDANCE-ARAID1000L-MIB.txt" and click *Open*.

12. Expand the ACCORDANCE-ARAID1000L-MIB tree until the accordanceEvent folder is open.

13. Select "FanError" and click OK.

14. Type "Fan Failure" in the Message entry window.

15. Select "Critical" from the Severity drop down list box. Click Save.

16. Repeat steps 6 through 15 for each of the ARAID99 traps (SysErr, TempOver, DiskError, DiskRebuild, DiskInsert, DiskRebuildComplete).

Perform the following steps to monitor the SNMP Agent, once OpManager is configured:

1. Select "Alarms View" from the OpManager SmartView menu.

2. Click on "Network Events". A window is displayed which shows the network events received from all stations currently being monitored. An event will display in this window each time an SNMP trap is received.

3. Click on "Active Alarms". An alarm is displayed when a trap is received from the monitored station. Subsequent alarms, of the same type from the same workstation, are not displayed until the alarm is acknowledged by right clicking on it and selecting "clear".

4. SNMP Agent data may be viewed and in some cases modified by selecting "MIB Browser" from the Tools menu. Select "Load MIB" from the browser's file menu to load the Accordance MIBS (ACCORDANCE-ARAID1000L-MIB.txt & ACCORDANCE-CORP-MIB.txt). Expand the ACCORDANCE-ARAID1000L-MIB tree to see the SNMP Agent variables. Type the host network name or IP address in the host field. Use get and set operations to display and modify Agent data.

Note: One method of testing alarms and network events is to force a temperature over trap by setting the temperature threshold below the current temperature. View the current temperature by using the MIB browser to perform a "get" on *sensorTemperature.1*. If the temperature is above

30, you may force the trap by performing a "set" of *sensorAlertTemperature.0* to 30. There will be a several second delay before the TRAP is received. You may verify that the trap was sent, by viewing the status in the Agent Command Window at the workstation being monitored.

Appendix B

Product Support

Please contact your Accordance representative for questions regarding the SNMP Agent.