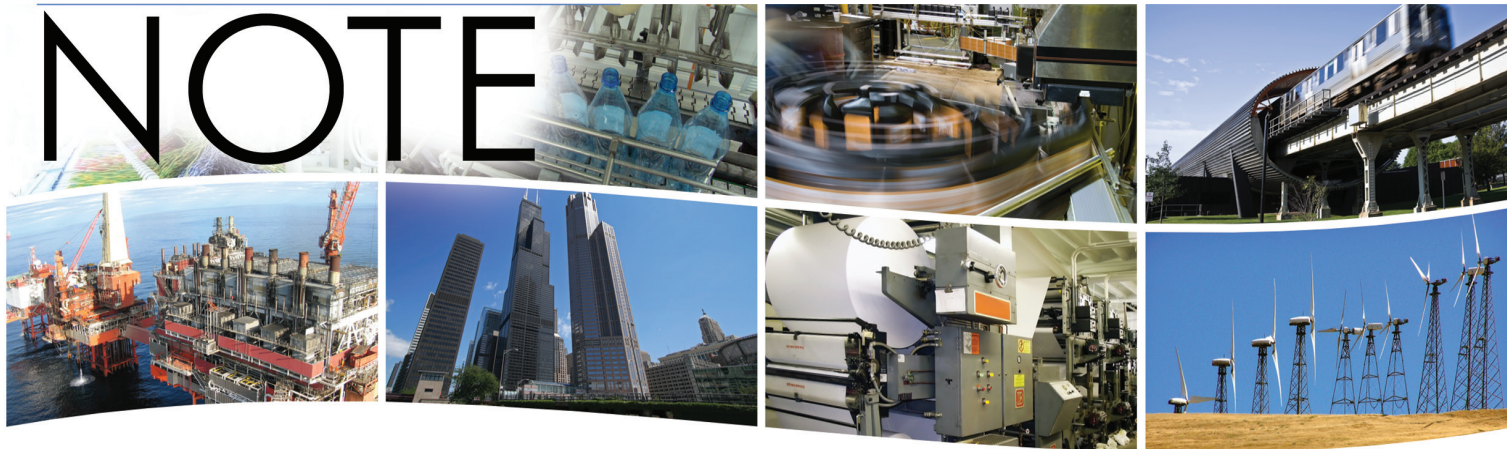a p p l i c a t i o n
NOTE

Have your JACE *also* monitor your Ethernet network

It may not be well known that besides monitoring/ controlling your HVAC systems, your lights, your security systems, etc. your JACE can also be used to monitor your Ethernet network. Most managed Ethernet switches support the Simple Network Management Protocol or SNMP. SNMP is the IT world's version of BACnet. Although Ethernet switches do not have any "points", they do have "binary inputs" in the status of each Ethernet port — something is or is not connected to the port. They also have "analog inputs" in the port statistics they collect. Managed switches will collect the quantity of various types of messages flowing through their ports. They will also provide the number of errors seen on each port.

SNMP also has its own version of an alarm. This is called an **SNMP trap**. When the switch has its power cycled it will send an SNMP trap when it regains power. This is called a **cold start** trap. If a port on the switch loses connection the switch will send a **link down** trap. When the port sees a new connection the switch will send a **link up** trap.

By loading the SNMP driver in the JACE it can now receive these trap alarms and have them appear along with all other alarms. The JACE can also poll the port status of the switch and put this into its trends/history. The JACE can also monitor the number of errors on each port and the number of bytes carried by each port. All of this information can be used to monitor the status of your Ethernet network.

All managed switches from Contemporary Controls fully support SNMP. These switches can vary from, the low cost, 8-port, 0° to 60°C, EISK8M-100T to the 24-port, –40° to +75°C, EIDX24M-100T models. These can be seen at **http://www.ccontrols.com/ ctrlink/manswitches.htm**.

MIBs

In SNMP each piece of data is called a Management Information Base or MIB. These are addressed through a series of hierarchical values called the Object Identifier or OID. For example, the number of seconds that the switch has been powered has an OID of 1.3.6.1.2.1.1.3.0. The number of errors seen on a port will have an OID of 1.3.6.1.2.1.2.2.1.20.x where x = the port number. With the JACE you do not need to know the OIDs. You bring in the MIB file from the manufacturer of the switch and then "walk the MIBs". This allows the JACE to discover the MIBs within your device. Then you select the MIBs you wish to monitor and bring these into your point database. The JACE will also show you a description of each MIB. Our MIB files can be found at **http:// www.ccontrols.com/support/managedswitches.htm**.

One application that has been found to be popular with our managed switches is creating a RapidRing® redundant ring network. In a RapidRing network if one cable fails the rest of the network will continue to operate (see **www.RapidRing.com**). This has been found useful in critical HVAC systems. The JACE can

be used to monitor the status of this network as all of our managed switches will report the status of the RapidRing via SNMP private MIBs.

To utilize SNMP on your JACE you will need to install the SNMP driver. Once this is installed you can add Ethernet switches by double-clicking the driver and selecting New and fill out the information requested (see Figure 1). You will need to provide the SNMP version (1 for Contemporary Controls managed switches), the IP address of the switch and the Community string. The Community String is a "password" for the switch — "public" is the default used on most managed switches, but this can be modified and must match what is used on the switch.
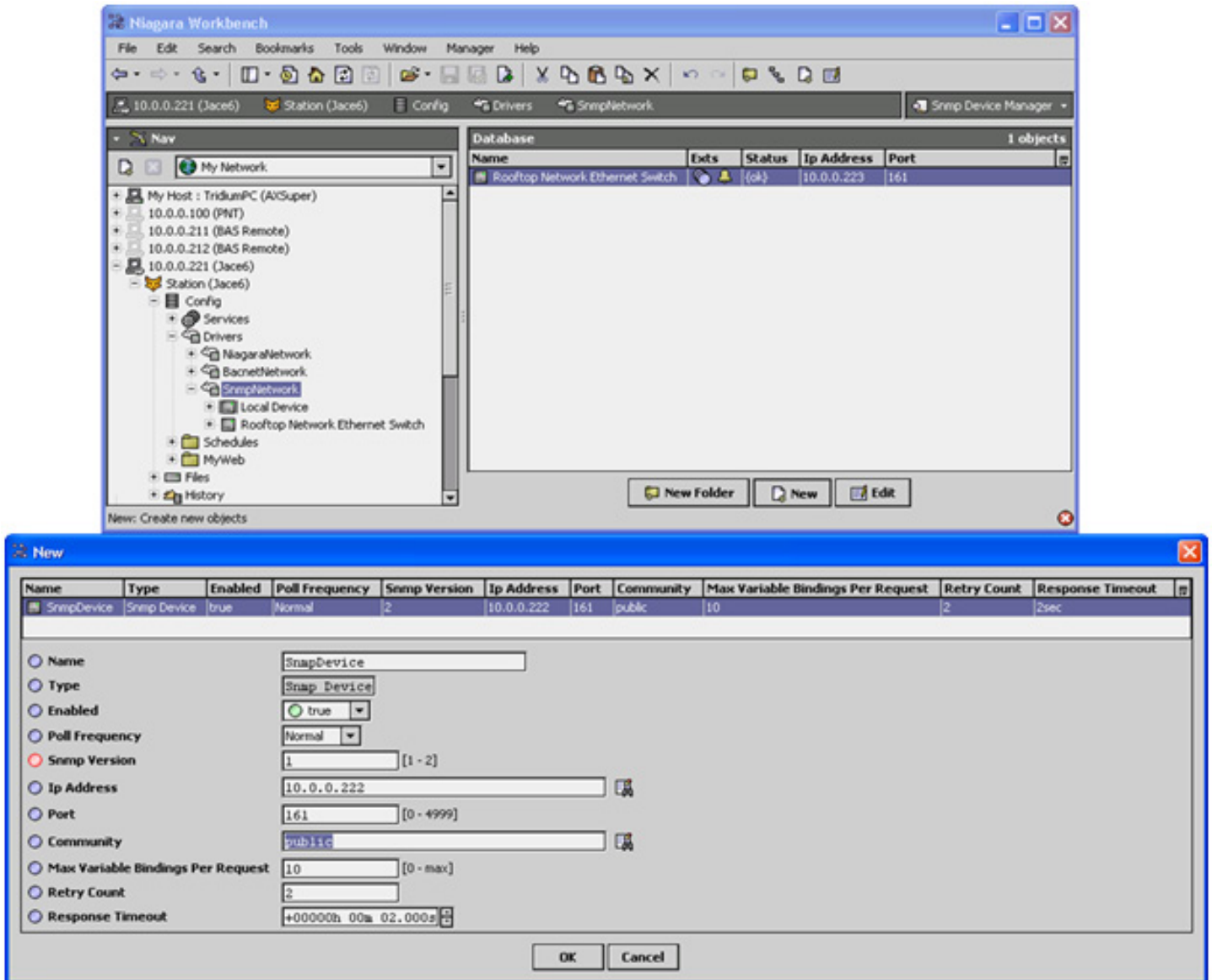
Figure 1

Once the Ethernet switch is in the JACE you can then bring in points by double-clicking the points folder and performing a discovery. It will ask for a MIB file. Select the "Walk MIB" option. See Figure 2.
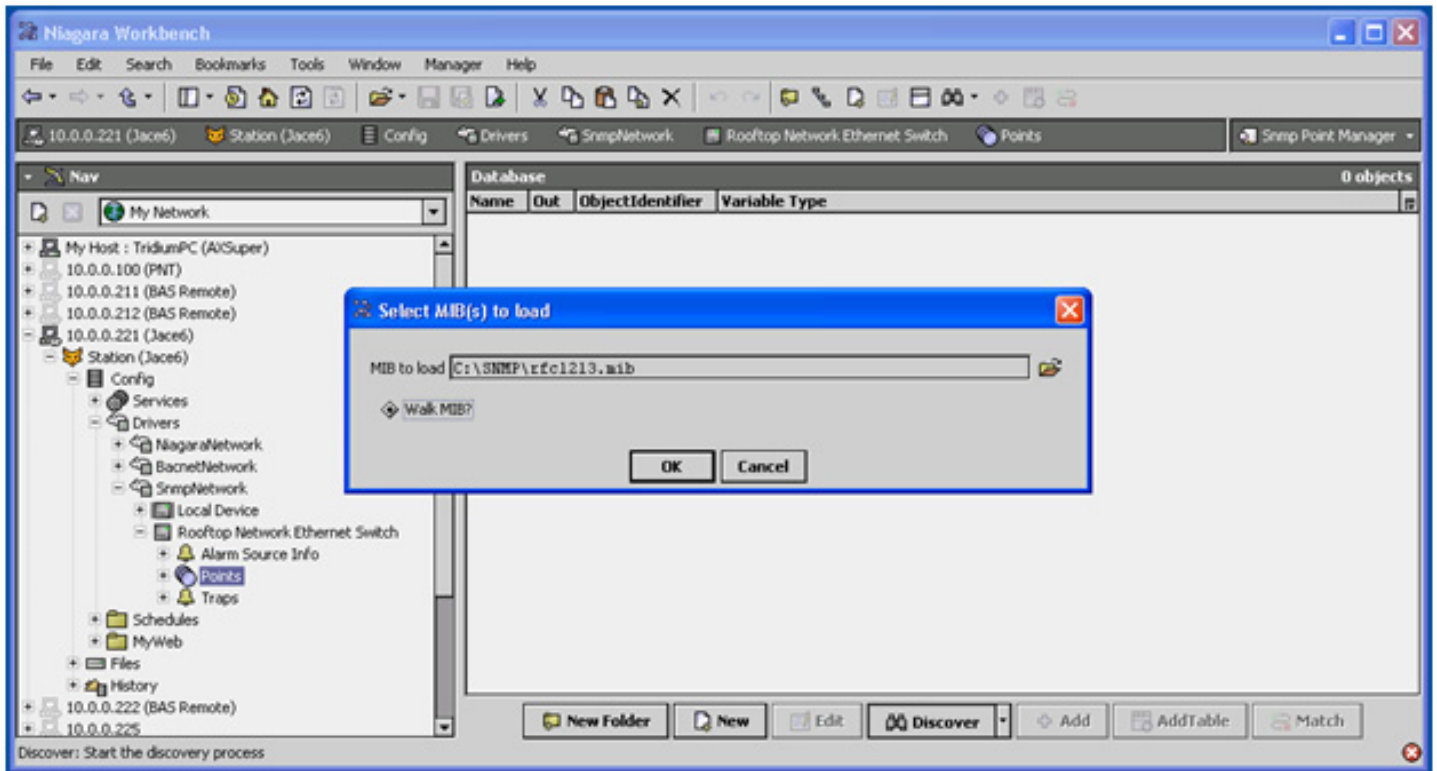
Figure 2

Once it has discovered the points you can bring them into your database for polling. Some interesting SNMP MIBs are:

- ***sysUpTime*** – This is the amount of time the switch has been powered up. This can tell you if the switch experienced a recent power cycle.

- ***ifOperStatus*** – This is the Boolean status of one port – up or down. There is one of these for each port of the switch. This will tell you if there is a good electrical connection between this port and the device to which it is connected. If this status is down, when there should be a connection , then you either have a bad cable or the other device at the end of the cable has lost power.

- ***ifInOctets*** – This is the number of octets or bytes received by one port of the switch. There is one of these for each port of the switch. This can be useful to indicate if there is an unusually large number of messages being sent through this port or if there is an unusually low number of messages. Both conditions could indicate problems.

- ***ifInUcastPkts*** – This is the number of unicast (directed message) packets received by the port. This can be helpful to monitor to verify the traffic load is normal.

- ***ifInNUCastPkts*** – This is the number of non-unicast packets (broadcast or multicast) packets received by the port. If there are a large number of broadcast messages per second then you could have an active loop in your network and this could cause communication problems for some devices.

- ***ifInErrors*** – This is the number of packets that have errors. This can be used to diagnose cable problems.

- The input points also have corresponding output MIBs such as ***ifOutOctets***, ***ifOutUcastPkts***, ***ifOutNUcastPkts*** and ***ifOutErrors***. These can be monitored as well.

The JACE will also provide descriptions for each MIB from the MIB file provided by the switch manufacturer.
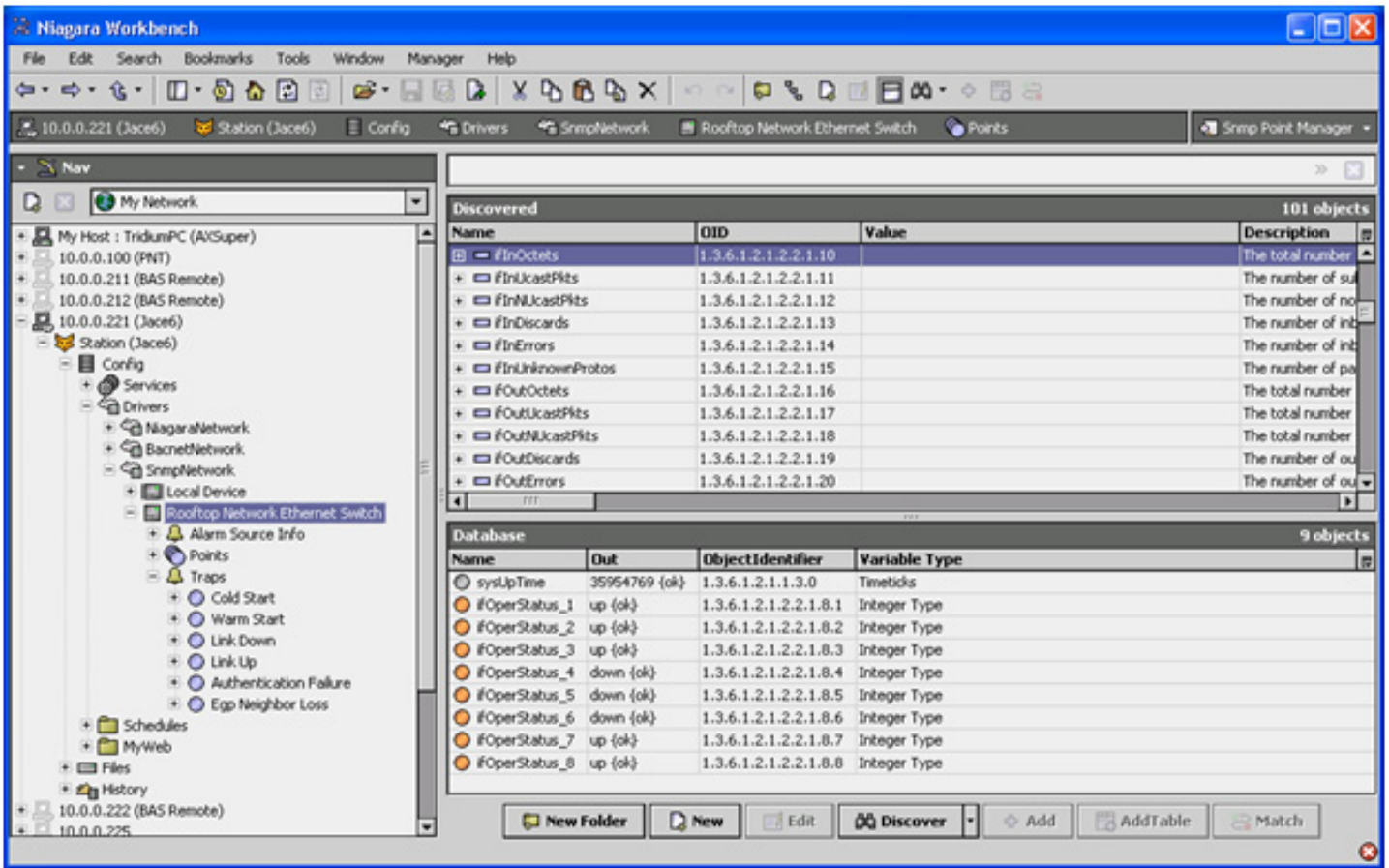
Figure 3

SNMP Traps

You must first enable SNMP traps to be sent to the JACE (see Figure 4). Here we have the configuration screen for our managed switch. The *Community* string has been set to "public" and one *Trap Receiver* has been set to "10.0.0.221" (the address of our JACE) and it has been marked as valid.
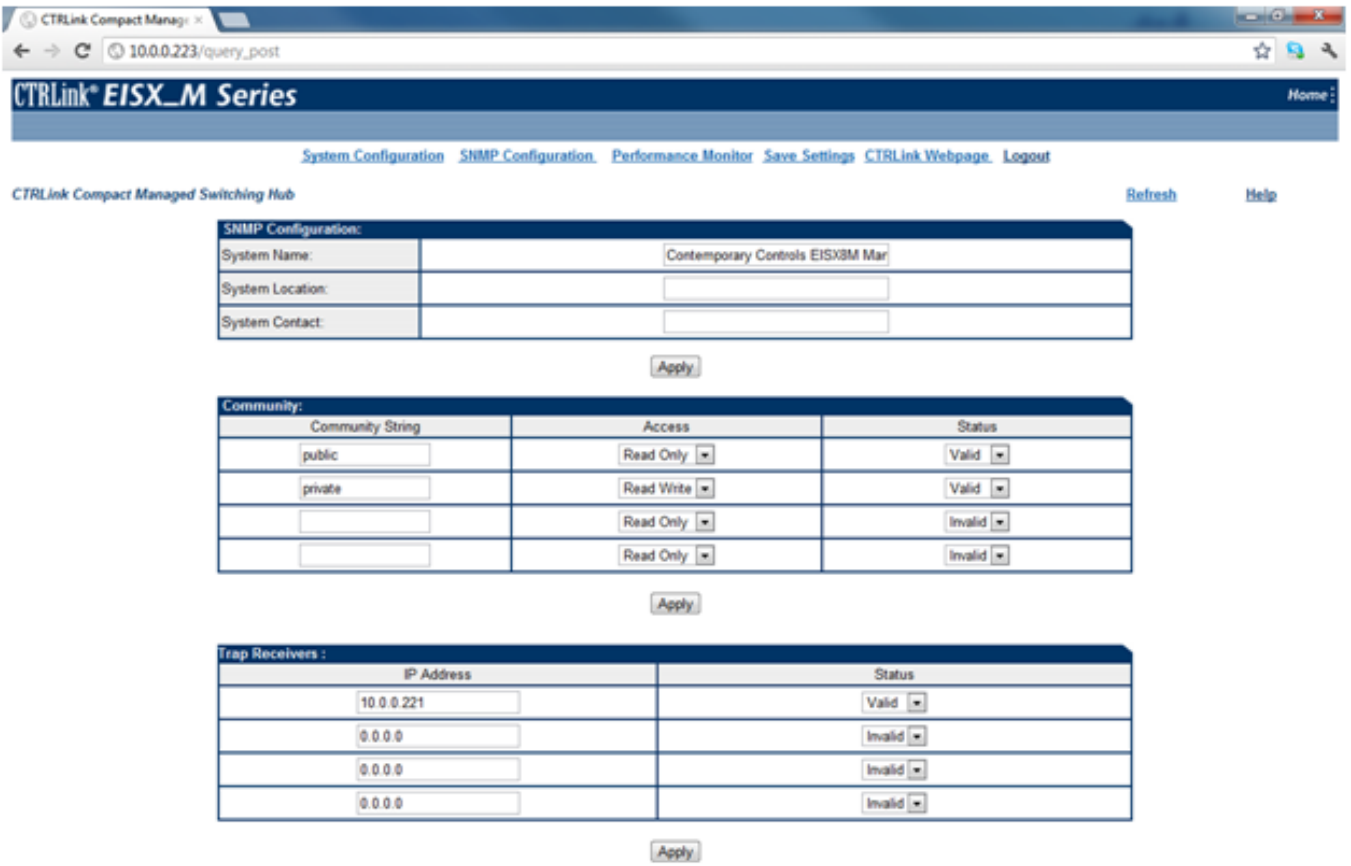
CONTEMPORARY CONTROLS®

Figure 4

Once the switch has been configured, the JACE must be configured for SNMP traps. View the property sheet for the SNMP driver and make sure the "SNMP Receive Traps" option is set to *true*. All other properties should have their default settings. You can configure a description for the trap message by double-clicking the trap in the database and entering your own description (see Figure 5). This will appear for all traps of this type for this device.
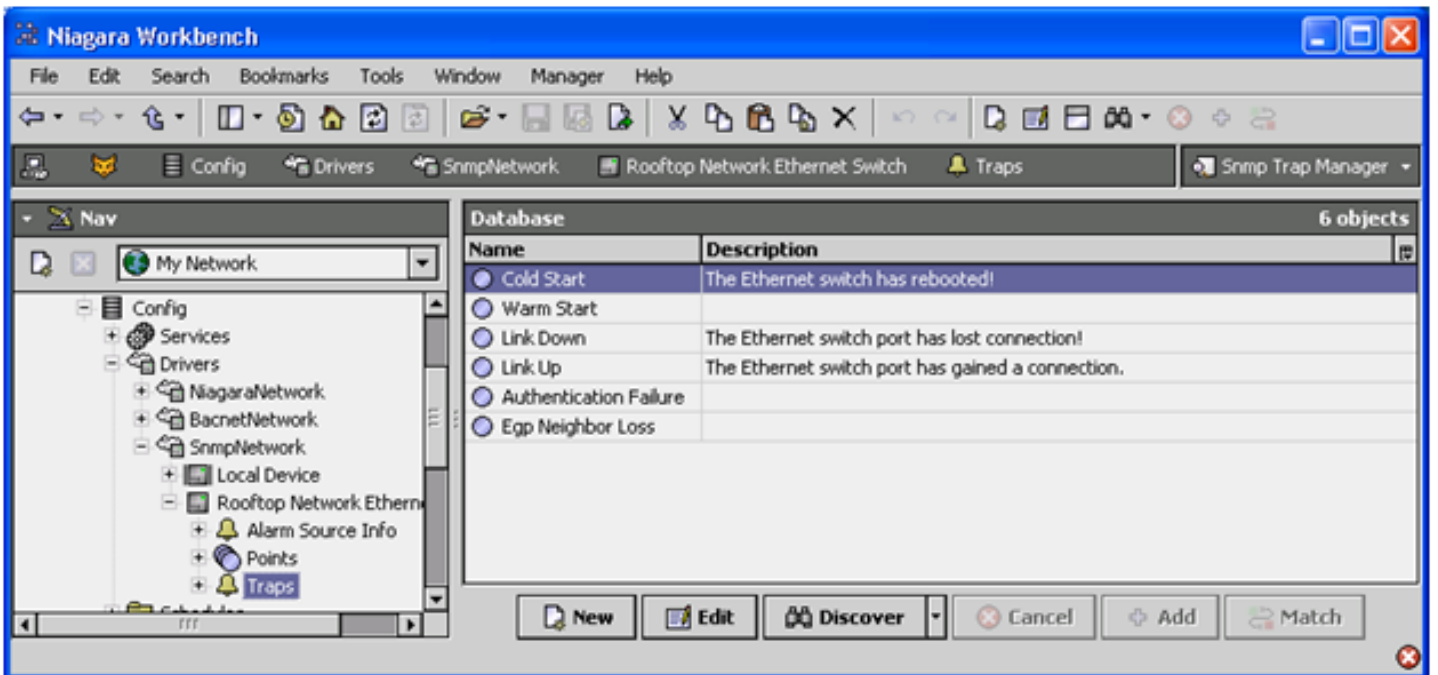
Figure 5

The Ethernet switch traps can be viewed along with your standard alarms. Your description will appear in the details of the alarm record. The port number can be viewed in the details in the displayed *Variables* value. For example "5 (OID: 1.3.6.1.2.1.2.2.1.1.5)" indicates port 5 (see Figure 6).

Figure 6