SNMP
Using SNMP Traps with GENESIS64

APPLICATION NOTE

September 2013

Description: Guide to configuring the machine and the SNMP servers to receive SNMP Traps as OPC AE alarms in the AlarmWorX64 Viewer.
OS Requirement: Vista x64/ Windows 7 x64/ Windows 8 x64/ Windows Server 2008 x64/ Windows Server 2008 R2 x64/ Windows Server 2012.
General Requirement: SNMP Service installed and running, SNMP Trap Server installed.

Introduction

SNMP Traps are special events generated by devices that are sent over the network. They can be compared to OPC Alarms. Starting in GENESIS64 version 10.7 we included a special OPC AE server that receives SNMP Traps and converts them into OPC Alarms such that they can be visualized in an AlarmWorX64 Viewer as well as logged by AlarmWorX64 Logger. In this guide we will cover the following

- Setting Up the Machine to Receive Traps
- Setting Up the SNMP Configuration to Filter SNMP Traps
- Configuring SNMP Traps and SNMP Variables
- Creating a Subscription to the SNMP Trap A&E Server

Setting Up the Machine to Receive Traps

1. Open the Windows Services Control Panel and look for the SNMP Service.
2. If the SNMP Service is not found, go to Control Panel → Programs and Features → Turn Windows features on or off.
   a. In Windows Server 2008, Server 2008 R2, or Server 2012, go to Features → Add Features, check "SNMP Services" and follow the wizard to install.
   b. In Windows Vista, Windows 7, or Windows 8, check the box "Simple Network Management Protocol (SNMP)".
3. If you just installed the SNMP Service, close and reopen the Services Control Panel. (A refresh will not be sufficient – the Security and Traps tabs mentioned later will not appear unless the Services Control Panel is restarted now.)
4. Double-click on the SMTP Service.

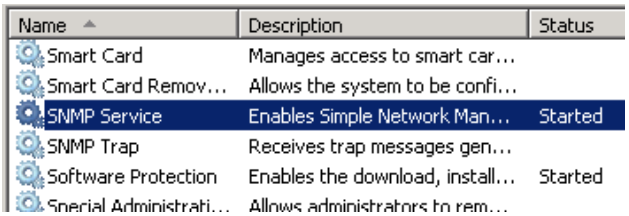

Figure 1 – SMTP Service in the Services Control Panel

5. Click on the Security tab and select "Accept SNMP packets from any host".

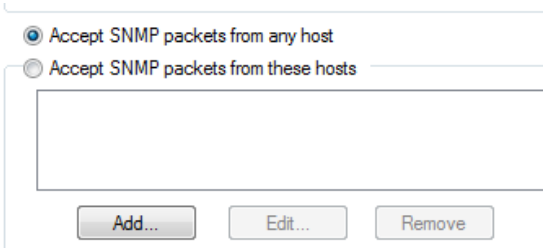

Figure 2 - SNMP Server Properties

6. If you want, you can also configure the machine to send traps to itself. You can use the same method to configure other machines to send traps to the server. Go to the Traps tab and specify an SNMP community as well as the list of devices where you want to send the trap

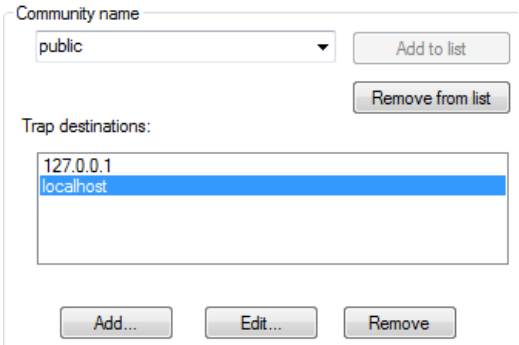

Figure 3 - SNMP Properties: Community

7. Click OK.
8. Back in the Services Control Panel, make sure that the SNMP Trap Service is stopped and disabled. The SNMP uses the default UDP port 161 for receiving general SNMP messages and UDP port 162 for receiving SNMP Traps, thus if it's already used by the Windows SNMP Trap service, the ICONICS SNMP Trap Server will not be able to receive the traps.

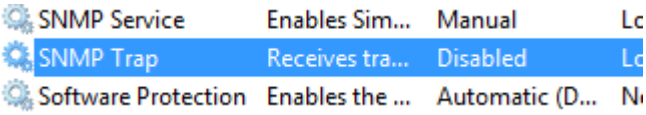

Figure 4 - Disable the SNMP Trap service

Setting Up the SNMP Configuration to Filter SNMP Traps

1. Open Workbench and go to the SNMP provider. Expand the "SNMP" tree. Here you will find a list of networks and for each network a list of devices. If you want to receive traps from a device you must add it to the configuration, specifying its IP Address.

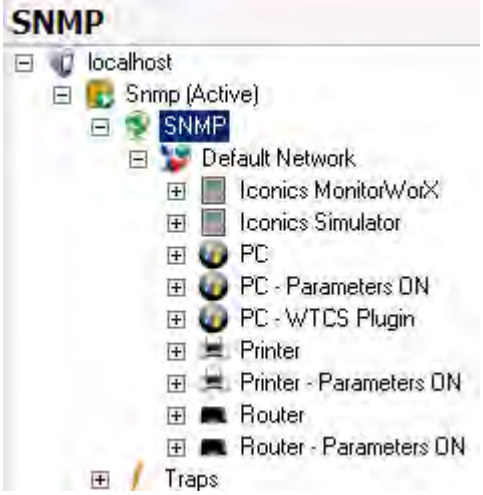

Figure 5 - SNMP Provider in the Project Explorer

2. You can use SNMP Explorer to import the devices automatically in the configuration. Once the devices are added to the configuration, double-click on each one of them. A configuration form will open. Check the "Receive Traps Checkbox".

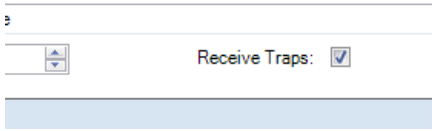

Figure 6 - Receive Traps Option

3. If you don't want to set up each device individually, it's possible to receive traps from all the devices in a network. In this case double-click on the network. Then select the "Receive SNMP Traps from all devices in this Network" checkbox.

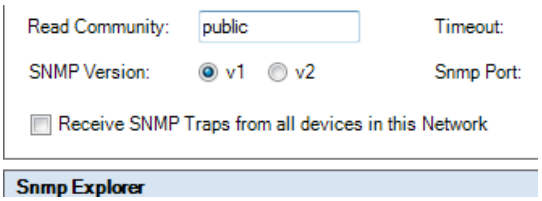

Figure 7 - Receive SNMP Traps from All Devices in the Network

4. You can create different networks and use them to organize your devices.

Configuring SNMP Traps and SNMP Variables

Now that we have specified the devices from which we want to receive the traps we can specify which specific traps we want to receive. Usually traps are defined in MIB files, which are usually delivered by the company that produces the SNMP device. It's possible to import them automatically using the MIB parser.

1. Double-click on the MIB node in the tree. A dialog will appear. Click on the "Add" button and select the MIB Files where the traps are defined.

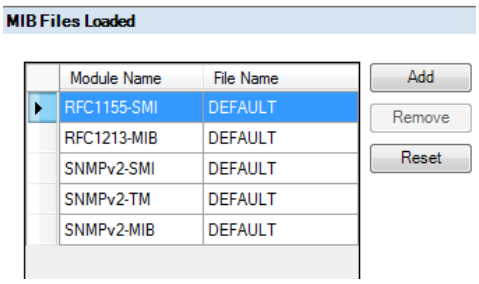

Figure 8 - MIB Files

2. Traps will be automatically imported in the database. You can also create your own traps if you don't have the MIB file. In this case right click on the "Trap" node and select "Add Trap".

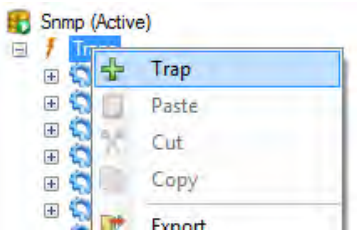

Figure 9 - Manual Creation of Traps

3. The trap is identified by an OID. The device will send a message containing the OID, a timestamp, and a list of variables. The purpose of the SNMP Trap AE Server is to receive the OID, translate it into a Human Readable name and add some information such as the severity or a useful description. In the Trap form it's possible to specify all these parameters.

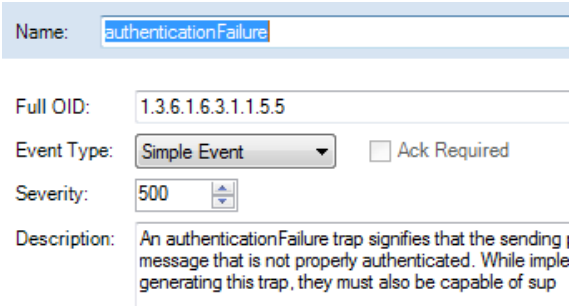

Figure 10 - Trap Definition

4. If you imported the trap using MIB Files, all the fields will be automatically filled for you. It's up to you to specify a different Severity depending on your settings, or to give the trap a different name, if desired.
5. Along with the basic trap information, the device sends a list of variables. We can show these variables in the "Attributes" of the Alarm or Event. It's possible to add custom Trap Variables by right-clicking on the trap node and selecting "+ Trap Variable".

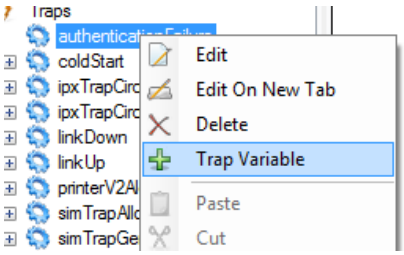

Figure 11 - Define Custom Trap Variable

NOTE: Trap Variables are automatically imported into the database if you imported your traps from MIB Files.

6. It's also possible to edit trap variables by double-clicking on them. The SNMP Trap Variable form will appear.

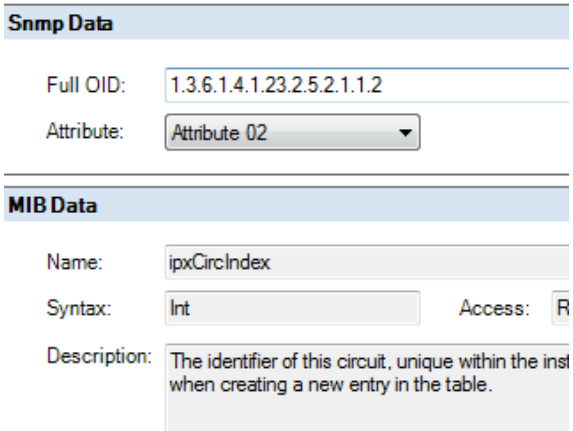

Figure 12 - Trap Variable Configuration Form

7. Trap Variables are also identified by an OID. It's possible to customize the OID in the SNMP Data panel. In the same panel, it's possible to specify in which attribute you want to put the Trap Variable when a Trap is received. One and only one Trap Variable is allowed for each numbered Attribute.
8. In the MIB Data panel, you can see information coming from the MIB tree that explains the Trap Variable. The MIB information is retrieved using the Full OID of the Trap Variable.

Creating a Subscription to the SNMP Trap A&E Server

Now that the configuration is completed, we will try to visualize traps in AlarmWorX64 Viewer.

1. Open GraphWorX64 and insert a new AlarmWorX64 Viewer Control in the display.
2. Double-click on the AlarmWorX64 Viewer to open the configuration window.
3. Select the grid node in the tree and select the "Source" tab on the right-hand pane.

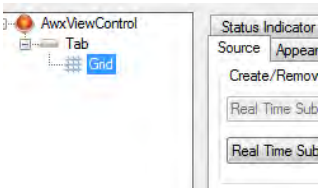

Figure 13 - Alarm Viewer Configuration

4. Create a new Subscription by clicking on the "+" button in the "Create/Remove Subscriptions" section and choose Real

Time Subscription. Insert a name (such as "Trap Subscription").

5. Click on the "Local Alarm Server" and delete it clicking on the "Minus" button on the left. Then click on the "Plus" button to add a new Event Point. Browse to OPC Classic Servers → My Server → SNMP Trap Server and press the OK button.

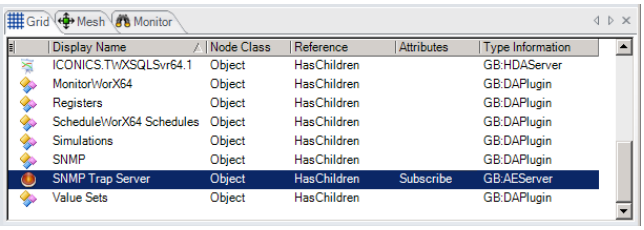

Figure 14 - The ICONICS SNMP Trap Server

6. To customize the fields available to the viewer, click on "Edit the fields of the subscription".

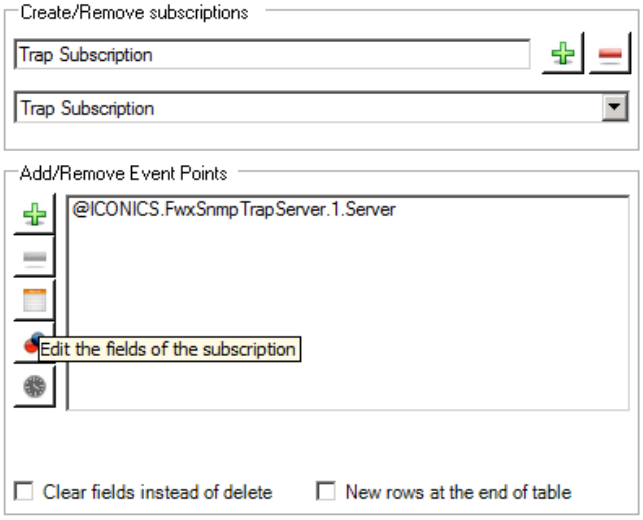

Figure 15 - Edit Subscription Fields

7. A new dialog will appear. Here you can select all the event server attributes that you need to show the trap variables in the grid.

   NOTE: To log your traps, configure the same subscription in the AlarmWorX64 Logger.

8. Once you are done click on OK, then close the configure dialog by clicking on the "Close" button.
9. Go into runtime. You will see your traps coming in the AlarmWorX64 Viewer.