Technical Note

Stand-Alone SNMP

The stand-alone SNMP agent operates like the NV9000's SNMP agent, but resides in, and executes on, a PC connected to an NV9000 router control system (and thereby, to its routers and other devices).

Steps must be taken to make the stand-alone SNMP agent take over the role of NV9000 SNMP agent. The stand-alone SNMP agent must have access to the system's routers and, if desired, the system controller.

Contact Miranda customer service to obtain the stand-alone SNMP agent. It is probable that you will have to purchase the EC9600 software before you can install and operate the stand-alone SNMP agent.

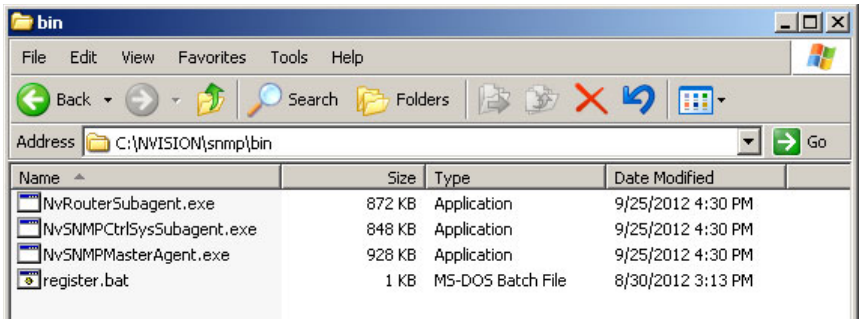
Overview

SNMP's control system sub-agent (`NvNSNMPCtrlSysSubagent.exe`) can probe one system controller or the active controller of a redundant pair of system controllers, through its virtual IP address. Be aware that SNMP will monitor only the active system controller of the pair. There is no NV9000 redundancy model in this software. If the requirement is to monitor multiple system controllers, the SNMP listening device must point to the system controllers and the system controllers must be set up accordingly.

The SNMP agent for NVISION routers (`NvRouterSubagent.exe`) can probe each router through its Ethernet connections. (These are the routers' control card connections.) The current model for defining to which ports to connect is straightforward and simply uses a CSV (comma-separated values) file that can be created or opened in Excel. The location of this file is:

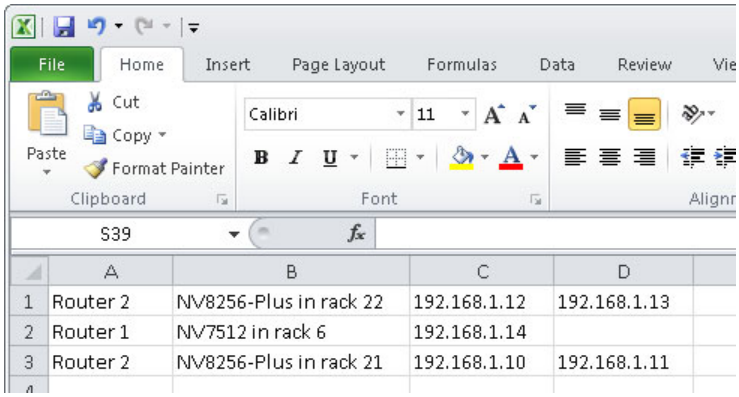
```
C:\nvision\snmp\config\nvRouters.csv
```

after the software is installed on your PC. Whereas the `nvRouters.csv` file is a configuration file, the agents, which are executable files, reside in SNMP's bin folder:



When `NVRouterSubagent` starts up, it looks in the "config" folder to see whether a CSV file exists, and if it does not, the agent does nothing. When a CSV file becomes available, the agent must be restarted. If the configuration file is changed, for any reason, the agent must again be restarted to read in the new parameters and IP addresses.

The CSV file contains what the SNMP agent uses to aggregate specified frames into router groups and to configure their IP addresses so that each router control card can be queried. (The data shown here are just samples. Your data will differ.):



Column A is for the names you want to give your routers. Column B is for textual descriptions of those routers. Columns C and D represent the IP addresses of the router's primary and secondary control cards, respectively. If the router does not have a second control card, the "secondary" (or D) field should be blank.

This example shows two distinct router frames with the same name. The SNMP agent will group those two frames together as a single "expanded" (or "-Plus") router. Therefore, the SNMP agent's MIB would, in this example, have two entries in its router table, Router 1, and Router 2.

Installation

Step 1

Because the SNMP agent is running on a PC, you must add registry keys (to the PC). Windows XP and Windows 7 differ:

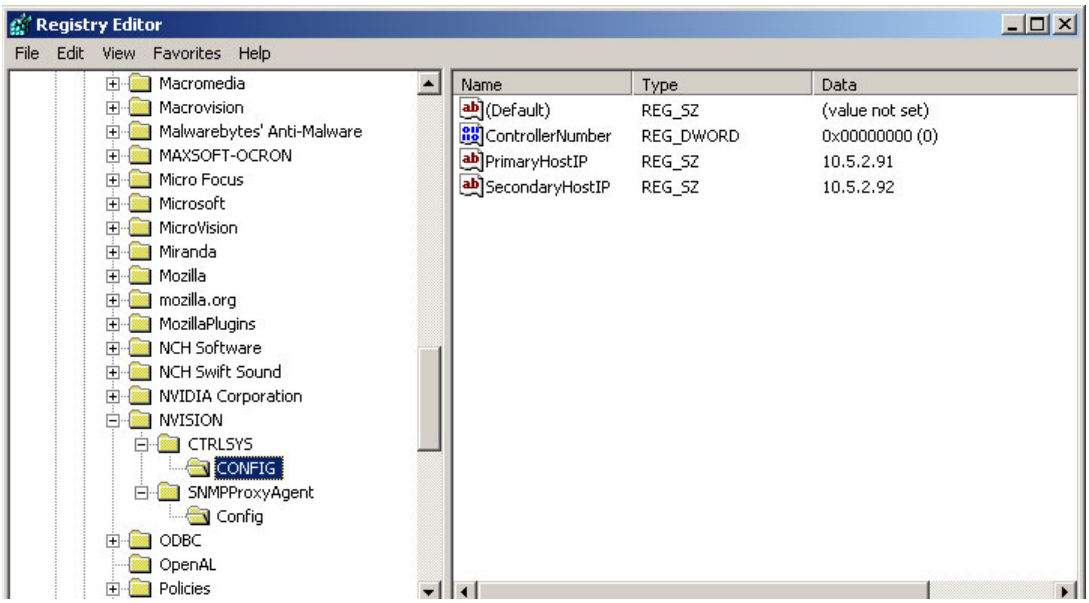
- Under Windows XP, locate `HKEY_LOCAL_MACHINE/SOFTWARE/` in the registry.
- Under Windows 7, locate `HKEY_LOCAL_MACHINE/SOFTWARE/Wow6432Node/` in the registry.

In the key you selected, add a new key named `NVISION`. In `NVISION`, add a new key named `CTRLSYS`. In `CTRLSYS`, add a new key named `CONFIG`.

In the `CONFIG` key, add the following values:

- `ControllerNumber`. (DWORD value: 0).
- `PrimaryHostIP`. (string, the IP address of the primary NV9000).
- `SecondaryHostIP`. (string, the IP address of the secondary NV9000, if one is present).

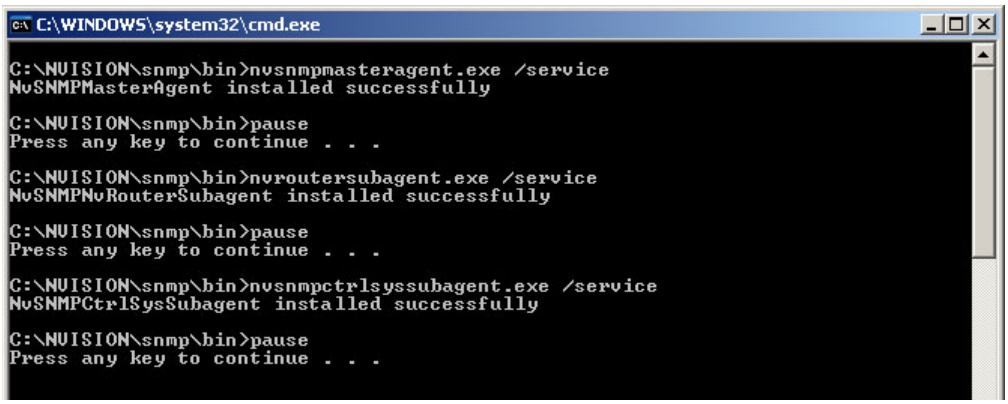
This is a typical result:



Step 2

Locate and execute the EC9600.msi file on your PC. This will create folders and install the binaries.

Browse to `C:\nvision\snmp\bin\` and double-click `register.bat`. This batch file executes in a Windows "DOS box" with these results:



Verify that all three agents report that they have been installed successfully. If they report that they are removed, run the `.bat` file again. (That they reported "removed" means there were existing agents.)

Caution: Do not attempt to close the `register.bat` file! After all three services are either installed or uninstalled, it will close automatically. Wait for the process to finish. Early termination will result in some of the services being out of sync with the other services.

Note: If `NvSNMPCtrlsysSubagent.exe` takes a long time (a minute or more) to install, you probably skipped step 1. There is no problem, even so.

Step 3

Edit the `nvrouters.csv` file to include the routers to be monitored. The pathname of this file is:

```
C:\nvision\snmp\config\nvRouters.csv
```

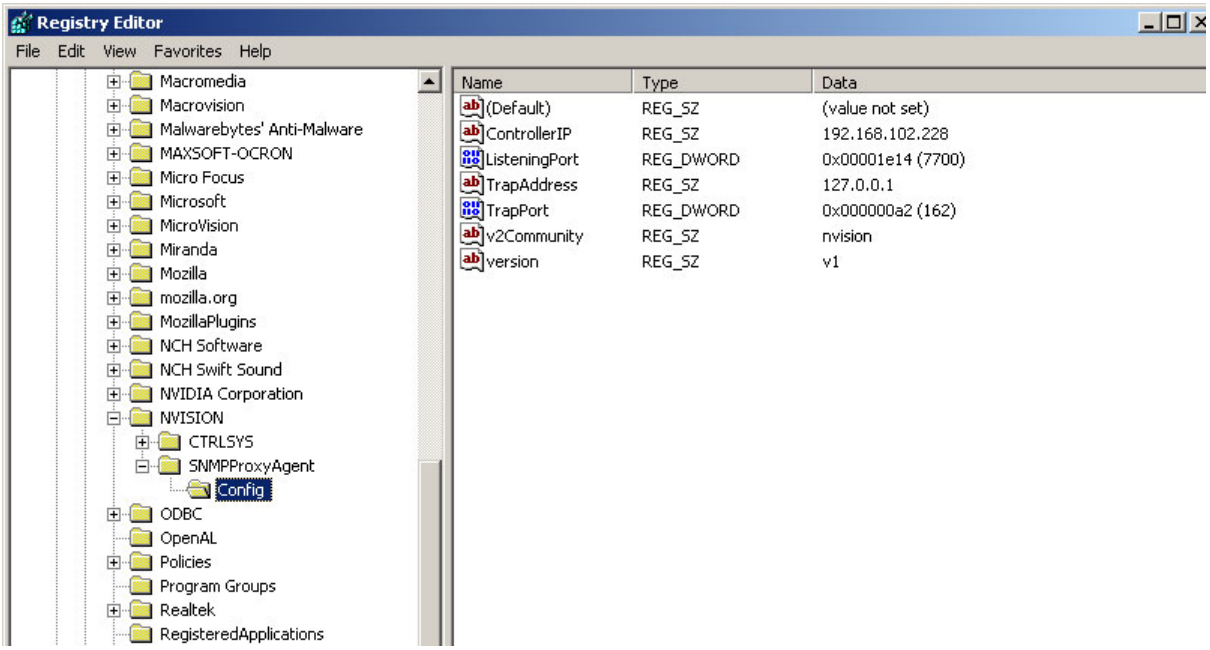
Refer to the discussion in the Overview on page 2.

Step 4

Use the Windows services manager to change all three services from ‘disabled’ to ‘automatic’. Set the recovery to ‘restart the service’ for 1st, 2nd, and subsequent failures. To perform this task, right-click on the services and select properties:

Right-click `NvSNMPMasterAgent` in the services manager window and choose ‘Start’ to start the master agent. The first time this agent runs, it will create the default registry entries that provide the basic interface parameters.

After the registry entries are created, and if you examine the registry, you should see the entries as they appear here:



Note that in Windows 7, the default registry entries are located under

```
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\NVISION
```

These are the registry entries:

- `ControllerIP`

  The IP address of the system controller to be monitored. Keep in mind that SNMP can monitor only one system controller.

- `ListeningPort`

  (7700 decimal) so that it will not interfere with the Microsoft agent at port 161, allowing both agents to be used.

- `TrapAddress`

  The IP address of the SNMP manager (i.e., IControl).

- `TrapPort`

  This should be 162 (decimal).

- `v2Community`

  Any name is acceptable.

- `version`

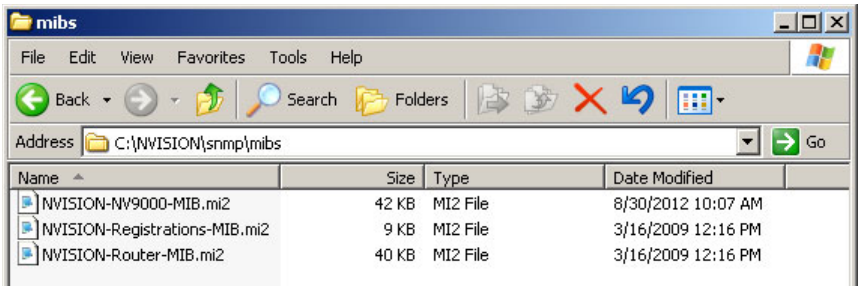
  This should be either `v1` or `v2c`.

Restart `NvSNMPMasterAgent` after any changes.

Start `NvSNMPCtrlSysAgent` after the master agent.

Start `NvRouterSubagent` after you have edited your `nvRouters.csv` file. Logs for all agents are written to `C:\nvision\snmp\`. These provide an indication of the behavior of the agents. For routers, the log also shows the raw frame status, Changes in frame status cause trap generation.

The Router MIB is provided in the `c:\nvision\snmp\mib\` directory:



Miranda's NVISION Router and Router Control System Traps

The SNMP agents monitor system health and provide asynchronous notification (about system health) and tables of health information that are available by polling. Reported router information includes:

- Connection health (of the communications link).
- Various frame attributes such as power supply health, the presence of a reference signal, and so on.
- Information from, and about, the router's various cards.

Router Attributes that stimulate SNMP traps

Frame attributes vary with the control card in use and with the type of router frame. These are commonly reported elements:

- TDM reference alarm
- Fans/temperature alarm
- Power supply temperature
- Video reference
- Control card health alarm
- Power supply fan alarm
- AES reference/clock alarm
- Power supply presence
- Frame cooling fan alarm

Reporting Levels

These are alarms that can generate warning traps:

- Redundant power supply failure
- Fans, one fan below tach threshold
- Either video reference missing
- Control card health, reporting offline.
- Temperature alarms, minor event threshold met
- Either AES reference missing

These are alarms that can generate critical traps:

- Non-redundant Power supply failure
- Fans, two or more below tach threshold
- Both Video references missing
- Temperature Alarms, major event threshold met
- Control Card Health Problem
- Frame communications connection problem
- Both AES references missing

Information type traps are generally sent when an alarm condition clears.

From the Router Subagent

Frame Connection Traps

These traps contain name, frame description, frame model, number of connections and connection health state.

- nvFrameConnectionHealthInfoEv nvRouterMIB.2.0.1
- nvFrameConnectionHealthWarnEv nvRouterMIB.2.0.2
- nv FrameConnectionHealthCriticalEv nvRouterMIB.2.0.3

Frame Attribute Traps

These traps contain name, frame description, frame model, frame attribute name, attribute health description, attribute health state, attribute value description and attribute value.

- nvFrameAttributeHealthInfoEv nvRouterMIB.2.0.4
- nvFrameAttributeHealthWarnEv nvRouterMIB.2.0.5
- nvFrameAttributeHealthCriticalEv nvRouterMIB.2.0.6

Module Health Traps

These traps contain name, frame description, frame model, module name and module health state.

- nvModuleHealthInfoEv nvRouterMIB.2.0.7
- nvModuleHealthWarnEv nvRouterMIB.2.0.8
- nvModuleHealthCriticalEv nvRouterMIB.2.0.9

Module Attribute Traps:

These traps contain name, frame description, frame model, module attribute name, module attribute health description, module attribute health state, module attribute value description and module attribute value.

- nvModuleAttributeHealthInfoEv nvRouterMIB.2.0.10
- nvModuleAttributeHealthWarnEv nvRouterMIB.2.0.11
- nvModuleAttributeHealthCriticalEv nvRouterMIB.2.0.12

Here are a few samples of router frame attribute tables for various routers. These give a better idea of the information available than reading the MIB alone.

nvRouterFrameAttributeName	nvRouterFrameAttributeHealthDescr	nvRouterFrameAttributeHealthState
Major Alarm	Off	healthy(1)
Minor Alarm	On	critical(5)
Power Supply/TDM Reference Alarm	On	critical(5)
Video Reference Alarm	On	critical(5)
AES Reference/Clock Alarm	Off	healthy(1)
Fans/Temperature Alarm	Off	healthy(1)
Card Health Alarm	Off	healthy(1)
Power Supply 1	Left side: Missing	warn(2)
Power Supply Temperature 1	Ok	healthy(1)
Power Supply 2	Right side: Present	healthy(1)
Power Supply Temperature 2	Ok	healthy(1)
Fan 1	Top tray, fan on left: Present	healthy(1)
Fan 2	Top tray, fan in middle: Present	healthy(1)
Fan 3	Top tray, fan on right: Present	healthy(1)
Video Reference 1	Present	healthy(1)
Video Reference 2	Missing	critical(5)

Figure 1. An NV5128 multi-format router

mvRouterFrameAttributeName	mvRouterFrameAttributeHealthDescr	mvRouterFrameAttributeHealthState
Major Alarm	On	critical(5)
Minor Alarm	On	critical(5)
Power Supply/TDM Reference Alarm	Off	healthy(1)
Video Reference Alarm	Off	healthy(1)
AES Reference/Clock Alarm	Off	healthy(1)
Fans/Temperature Alarm	On	critical(5)
Card Health Alarm	Off	healthy(1)
Power Supply 1	Left side, slot 1 (top): Present	healthy(1)
Power Supply Temperature 1	Ok	healthy(1)
Power Supply 2	Right side, slot 2 (top): Does not apply	warn(2)
Power Supply Temperature 2	Unknown	warn(2)
Fan 1	Top tray, front fan on left: Problem	critical(5)
Fan 2	Top tray, front fan in middle: Problem	critical(5)
Fan 3	Top tray, front fan on right: Problem	critical(5)
Fan 4	Top tray, rear fan on right: Problem	critical(5)
Fan 5	Top tray, rear fan on left: Problem	critical(5)
Video Reference 1	Present	healthy(1)
Video Reference 2	Present	healthy(1)

Figure 2. An NV8144 router

mvRouterFrameAttributeName	mvRouterFrameAttributeHealthDescr	mvRouterFrameAttributeHealthState
Major Alarm	On	critical(5)
Minor Alarm	On	critical(5)
Power Supply/TDM Reference Alarm	On	critical(5)
Video Reference Alarm	On	critical(5)
AES Reference/Clock Alarm	Off	healthy(1)
Fans/Temperature Alarm	On	critical(5)
Card Health Alarm	On	critical(5)
Power Supply 1	Left side, slot 1 (top): Missing	critical(5)
Power Supply Temperature 1	Ok	healthy(1)
Power Supply 2	Right side, slot 2 (top): Missing	critical(5)
Power Supply Temperature 2	Ok	healthy(1)
Power Supply 3	Left side, slot 3 (bottom): Missing	critical(5)
Power Supply Temperature 3	Ok	healthy(1)
Power Supply 4	Right side, slot 4 (bottom): Missing	critical(5)
Power Supply Temperature 4	Ok	healthy(1)
Power Supply 5	Left side, slot 1 (top 2nd frame): Missing	critical(5)
Power Supply Temperature 5	Ok	healthy(1)
Power Supply 6	Right side, slot 2 (top 2nd frame): Missing	critical(5)
Power Supply Temperature 6	Ok	healthy(1)
Power Supply 7	Left side, slot 3 (bottom 2nd frame): Missi...	critical(5)
Power Supply Temperature 7	Ok	healthy(1)
Power Supply 8	Right side, slot 4 (bottom 2nd frame): Mis...	critical(5)
Power Supply Temperature 8	Ok	healthy(1)
Fan 1	Top tray, front fan on left: Problem	critical(5)
Fan 2	Top tray, front fan on right: Problem	critical(5)
Fan 3	Top tray, rear fan on left: Problem	critical(5)
Fan 4	Top tray, rear fan in middle: Problem	critical(5)
Fan 5	Top tray, rear fan on right: Problem	critical(5)
Fan 6	Bottom tray, front fan on left: Problem	critical(5)
Fan 7	Bottom tray, front fan on right: Problem	critical(5)
Fan 8	Bottom tray, rear fan on right: Problem	critical(5)
Fan 9	Bottom tray, rear fan in middle: Problem	critical(5)
Fan 10	Bottom tray, rear fan on left: Problem	critical(5)
Video Reference 1	Missing	critical(5)
Video Reference 2	Missing	critical(5)

Figure 3. An NV8576 router

From the Control System Subagent

NV9000 Running Traps

These traps contain model name, configuration description, location and system running indication.

- nv9000SystemIsRunningInfoEv nv9000MIB.2.0.1
- nv9000SystemIsRunningCriticalEv nv9000MIB.2.0.2

NV9000 Health Traps

These trap contain model name, configuration description, location, host name and host health state.

- nv9000SystemHealthInfoEv nv9000MIB.2.0.3
- nv9000SystemHealthWarnEv nv9000MIB.2.0.4
- nv9000SystemHealthCriticalEv nv9000MIB.2.0.5

Router Health Traps

These traps contain router name, router ID, router is online flag, active on primary, has redundant host and communications protocol.

- nv9000RtrHealthInfoEv nv9000MIB.2.1.6
- nv9000RtrHealthWarnEv nv9000MIB.2.2.7
- nv9000RtrHealthCriticalEv nv9000MIB.2.2.8

Control Panel Traps

These traps contain host name, server app ID, CP description, Err mnemonic, Err ID, IP address, model, description and Err severity.

- nv9000CpErrInfoEv nv9000MIB.2.2.9
- nv9000CpErrWarnEv nv9000MIB.2.2.10
- nv9000CpErrCriticalEv nv9000MIB.2.2.11