

Advantech
SNMP Subagent
Docker Image
User Guide
For Linux

Version <0.08>

Advantech SNMP Subagent Docker Image	Version: <0.08>
User Guide	Date: <01/15/2020>

Revision History

Date	Version	Description	Author
2020/01/15	0.08	<p>Changes and Bug Fixes:</p> <ol style="list-style-type: none"> 1.Support docker container image ,the initial version of docker image is v0.08 2. Support Advantech Platforms MIB: fan information, cpu usage traps 3.mount all disk partitions in container 4.Support SUSI HWM 	Annie.Lin
2017/8/14	1.01	<p>Changes and Bug Fixes:</p> <ol style="list-style-type: none"> 5.Modify the format of the harddiskObj hdIndex. 6.Modify the format of the harddiskObj hdsRAWValue. 7.Support advantech Common MIB: system information, snmp trap server, pci information. 8.Support advantech Platforms MIB: current information, current usage traps, storage information, storage usage traps, removable device information, removable device traps. 9.Support UNO-2272G,TPC-xx51T. 1.Support SNMP V3. 	zhang.yang
2017/3/10	1.00	<p>Changes and Bug Fixes:</p> <ol style="list-style-type: none"> 2.Support preference settings. 3.Support the judgment threshold. <p>Strengthen the stability of the SNMP-subagent about getting/setting a value.</p>	zhang.yang
2017/2/28	0.01	Initial draft	zhang.yang

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User Guide

1. Introduction

1.1 Advantech SNMP Subagent Docker Image

The Advantech SNMP Subagent Docker Image provides the ability to Advantech SNMP Subagent. The Advantech SNMP Subagent allows you to communicate Simple Network Management Protocol (SNMP) with the common or platform Subagent on the managed system. With the Advantech SNMP Subagent, you can use SNMP SETs, GETs, and TRAPS to manage supported platforms.

1.2 Supported Advantech Platforms

The current version of Advantech SNMP Subagent Docker Image supports the Advantech hardware platform product.

1.3 Supported Operating Systems

The Advantech SNMP Subagent docker image supports the following operating systems:

- Linux-x86 OS

1.4 System Requirements

1.4.1 SNMP sub- Agent Docker Image

Please see README for more details.

1.4.2 Latest Drivers

The Advantech SNMP Subagent Docker Image requires the latest Advantech drivers including the following.

- Advantech EC Drivers
- Advantech Hwmon Drivers
- Advantech PSU Drivers (If applicable)

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2. Advantech SNMP Subagents Overview

Advantech SNMP Subagents are SNMP extension agents that provide interfaces for retrieving Linux x86 hardware and software information and monitoring the health status on the network using the SNMP protocol. Table 2-1 is the basic information of Advantech SNMP Subagents.

Table 2-1 Advantech SNMP Subagents

Name	MIB file	Supported Region
ADVANTECH	ADVANTECH-PLATFORMS-MIB.mib	iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).
Platform Agent	advantech-common-mib.mib	advantech(10297).advantechPlatformsMIB(200)

2.1 MIB and OID

SNMP works with basic components OIDs (Object Identifier) and MIBs (Management Information Base). User gets information by querying “Objects”. A MIB (Management Information Base) is a database including many objects and it is as a tree structure shown as Figure 2-1; each node is addressed through an object identifier (OID) and it maps to an entity in a communications network. OIDs are always written in a numerical form instead of a text one. Therefore, the top three object levels are written as “1.3.1” rather than “iso\org\dod” and the OIDs of Advantech is 1.3.6.1.4.1.10297

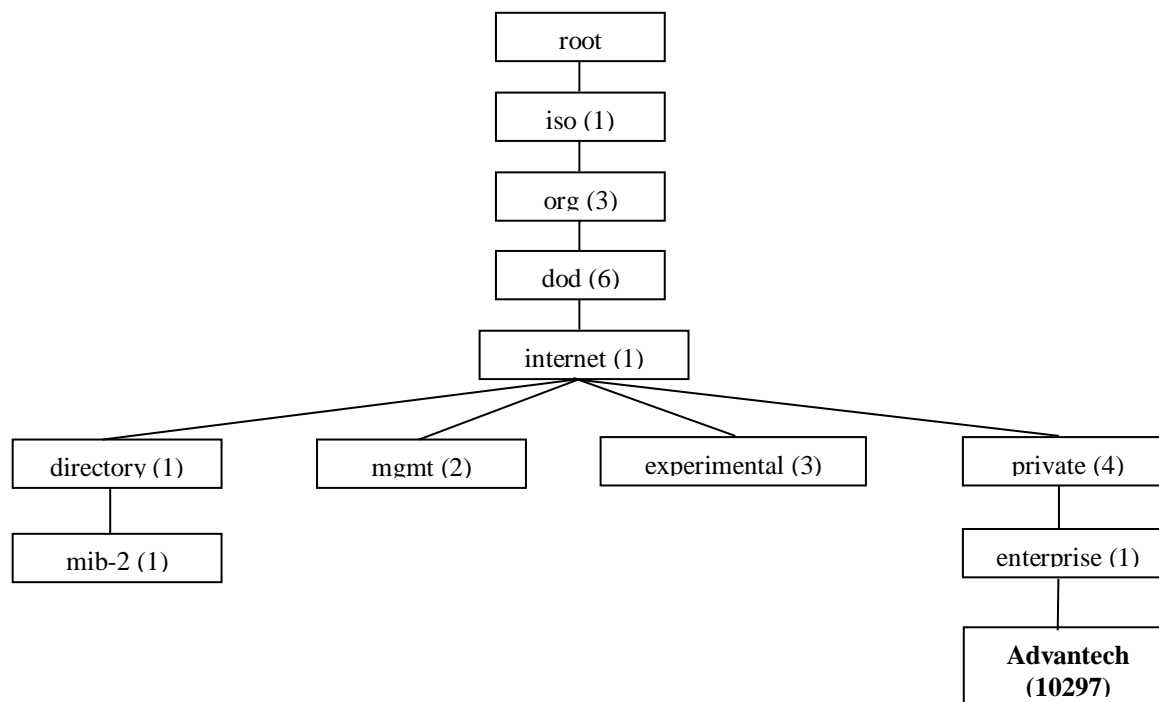


Figure 2-1 MIB and OID

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2.2 Architecture

Network Management Station (NMS) can communicate with subagents by the OIDs defined in the MIB files.

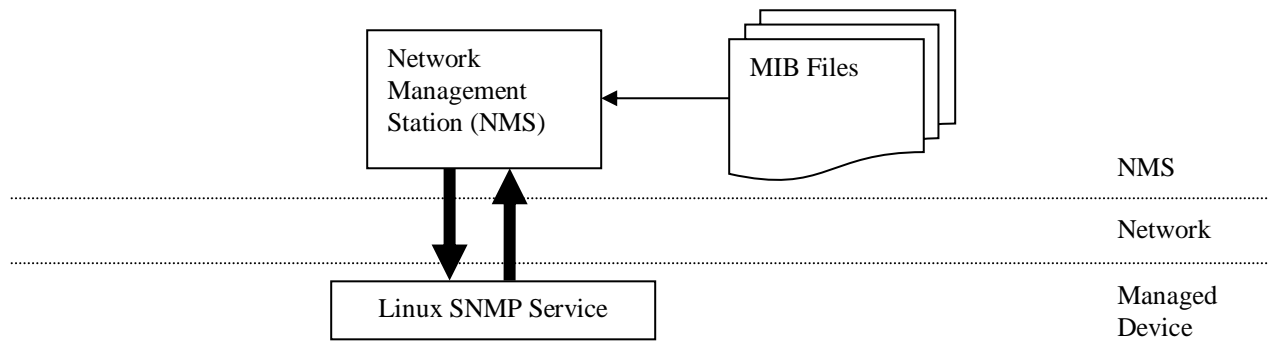


Figure 2-1 Architecture

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2.3 Advantech SNMP Subagents

The Advantech SNMP Subagents provides the functions as listed.

advantech Common MIB: system information, snmp trap server, pci information.

advantech Platforms MIB: temperature, voltage, current, memory, cpuloading, storage, fan ,power state, hard disk information, watchdog information, nvram information, hardwareDetect information.

2.3.1 Platform Information

You can **get** the system information of the managed device, such as *model name*, *image version*, *image release date*, *system first boot time*, *system boot time*, and *boot count*.

If there are multiple identical devices, you can **set** an *alias name* or a *description* of each device.

2.3.2 PCI Information

You **can** get the PCI information (table) of the managed device, such as *Vendor ID*, *Device ID*, *IRQ*, *Description*, *Base Address* ... etc.

2.3.3 Trap Management

You can **set** the *destination IP* of NMS or trap management tool.

2.3.4 Monitor Group: temperature, voltage, memory, cpuloading, current, storage, power state

- You can **get** the *Temperature*, *Voltage*, *Current* ,*Fan* which are handled by *Advantech Driver*.
- You can **set** *high*, *low*, *high-high*, and *low-low* threshold values of each *Temperature*, *Voltage*, *Current* ,*Fan*. You can also set a **null** value to disable the threshold.
When the threshold has been set, the monitored *value* will be divided into 5 levels, cleared(1), critical-low(2), low(3), high(4), and critical-high(5).
 - If the *Value* is greater than *high-high* threshold and *high-high* threshold is not disabled (null), the level is **critical-high**(5).
 - If the *Value* is greater than *high* threshold and less than or equal to *high-high* threshold and *high* threshold is not disabled (null), the level is **high**(4).
 - If the *Value* is greater than *low-low* threshold and less than or equal to *low* threshold and *low* threshold is not disabled (null), the level is **low**(3).If the *Value* is less than *low-low* threshold and *low-low* threshold is not disabled (null), the level is **critical-low**(2).
 - Otherwise, the level is **cleared**(1).
- You can also enable monitoring state when the value is out of bound, it will send a trap to NMS.
- You can **get** the current *CPU Loading*, current *CPU Speed*, *CPU Maximum Speed*, *memory size*, *memory usage percentage* of the managed device, and *storage size*, *storage usage percentage* of the managed device.
There are 4 threshold values UsageTh1 ~ UsageTh4 which splits the usage into 5 severities, cleared(1), notice(2), warning(3), critical(4), and emergency(5) if the threshold value is not disabled (-1).
 - If the *usage* is greater than *UsageTh1* and less than or equal to *Usage Th2* and *UsageTh1* is not disabled(-1), the severity is **notice**(2)

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- If the *usage* is greater than *UsageTh2* and less than or equal to *Usage Th3* and *UsageTh2* is not disabled(-1), the severity is **warning**(3)
- If the *usage* is greater than *UsageTh3* and less than or equal to *Usage Th4* and *UsageTh3* is not disabled(-1), the severity is **critical**(4)
- If the *usage* is greater than *UsageTh4* and *UsageTh4* is not disabled(-1), the severity is **emergency**(5)
- Otherwise, the severity is **cleared**(1)
- You can **get** the power state **pwr_normal**(1) or **pwr_redundancylost** (2) and the power state severity including **cleared**(1), **notice**(2), **warning**(3), **critical**(4), and **emergency**(5) if the target platform support these features. You can also enable the power monitoring state when the power state changed, it will send a trap to the NMS.

2.3.5 Peripheral Group: Hard Disk

You can **get** the *hard disk information* and the *S.M.A.R.T.* (Self-Monitoring, Analysis and Reporting Technology) information of it.

2.3.6 Peripheral Group: Watchdog

You can **get** the current Watchdog *configuration* and the current *state*. (If applicable)

2.3.7 Peripheral Group: Hardware Detection

If hardware is inserted or removed, the SNMP subagent will record the information. If the “hardware detect trap” is **enabled**, the SNMP subagent will also send a trap (alarm) to the NMS. The hardwareDetectObj supports the below types of hardware with related hwdClassGUID

- USBRawDevice : {a5dcbf10-6530-11d2-901f-00c04fb951ed}
- DiskDevice : {53f56307-b6bf-11d0-94f2-00a0c91efb8b}
- HumanInterfaceDevice (HID) :{4d1e55b2-f16f-11cf-88cb-001111000030}

2.3.8 Trap

The *Advantech SNMP Subagents* currently support 12 types of Traps.

- Temperature is out of range
- Temperature becomes normal
- Voltage is out of range
- Voltage becomes normal
- Fan is out of range
- Fan becomes normal
- Memory Usage exceeds the threshold value
- Memory Usage becomes normal
- Current is out of range
- Current becomes normal
- CPU Usage exceeds the threshold value
- CPU Usage becomes normal
- Storage Usage exceeds the threshold value
- Storage Usage becomes normal
- Hardware insertion and removal

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- Power State is changed

2.4 SNMP Configuration

```

master agentx
rocommunity public
rwcommunity private

createUser advantech MD5 "advantech"
iquerySecName advantech
rwuser advantech

#authenticationTrap
authtrapenable 1

#linkUpDownTrap
notificationEvent linkUpTrap linkUp ifIndex ifAdminStatus ifOperStatus
notificationEvent linkDownTrap linkDown ifIndex ifAdminStatus ifOperStatus

monitor -r 1 -e linkUpTrap "Generate linkUpTrap" ifOperStatus != 2
monitor -r 1 -e linkDownTrap "Generate linkDownTrap" ifOperStatus == 2

#destinations of sendTrap
trapsink 0.0.0.0 public 162
trapsink 0.0.0.0 public 162
trapsink 0.0.0.0 public 162
trapsink 0.0.0.0 public 162

```

Figure 2-3 the snmpd.conf of SNMP

2.4.1 the configuration of SNMP V1

In the SNMP V1, the Community Strings are similar to passwords. They are used to allow authorized you to access the SNMP agent on a device.

Community Strings can be configured as read-only (RO) or read-write (RW). As the name implies, read-only strings only allow information to be pulled from the agent. However, read-write strings are much more powerful and can allow re-configuration of many device properties. In general, the default community strings are set to be “public” for read-only (RO), and “private” for read-write (RW).

2.4.2 the configuration of SNMP V3

Currently, the SNMP subagent already supports V3. In the SNMP V3, the Default user name and MD5 key is “advantech” and the keyword “rwuser” represent the read-write mode. You can use it with the Figure 3-4 configuration.

Note: Of course, you can also choose one of SNMP V1 and SNMP V3.

2.4.3 traps of SNMP service

The *Trap Community* will be applied to the *Traps* tab of *SNMP Service Properties* as shown in Figure 2-3. In the */etc/snmp/snmpd.conf* you can modify the original 0.0.0.0 or add more *Trap destinations* in the *Traps* tab of *SNMP Service Properties* if need, and then you need restart your device.

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3. Appendix

3.1 Third-Party MIB Browser

The Advantech SNMP Subagent has been tested with the following MIB Browser.

- iReasoning MIB browser
<http://ireasoning.com>

iReasoning MIB browser

Download Link: <http://ireasoning.com/mibbrowser.shtml>

1. Once running iReasoning MIB browser in the *client platform*, please load MIB files first.

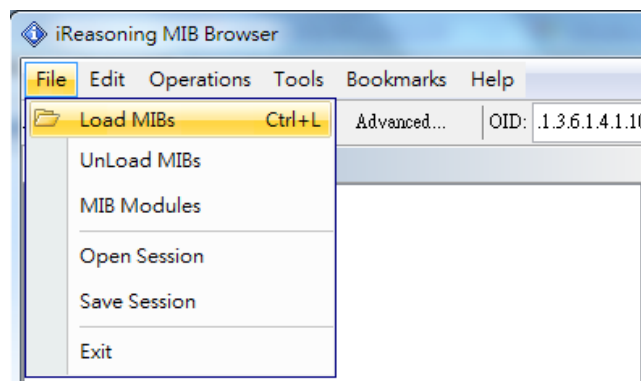


Figure 3-1 Load MIBs

Load ADVANTECH-PLATFORMS-MIB.mib. They are available after you installed the *Advantech SNMP Subagent*. (e.g., /usr/src/advantech/advSNMPsubagent/mib/). Copy these the files to your *client platform* in advance.

2. Enter the IP address of the *target platform* where *Advantech SNMP Subagent* was installed.

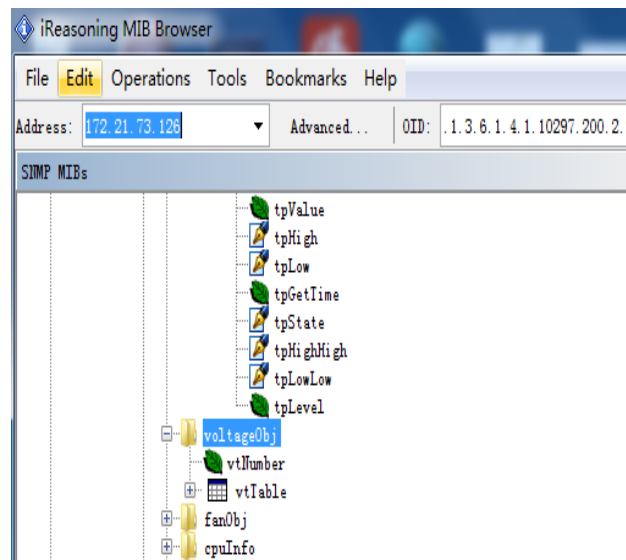


Figure 3-2 Enter IP address

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3. You can enter the *Read-Only, Read-Write Community* or *USM user, Security Level , Auth Password* which will be matched to the SNMP V1 or V3 service.

Advanced Properties of SNMP Agent

Address: 172.21.73.126

Port: 161

Read Community: public

Write Community: private

SNMP Version: 1

Ok Cancel

Figure 3-3 SNMP V1 Configuration

Advanced Properties of SNMP Agent

Address: 172.21.73.126

Port: 161

Read Community: *****

Write Community: *****

SNMP Version: 3

SNMPv3

USM User: advantech

Security Level: auth, no priv

Auth Algorithm: MD5

Auth Password: *****

Privacy Algorithm: DES

Privacy Password:

Context Name:

Engine ID:

Localized Auth Key:

Localized Priv Key:

Ok Cancel

Figure 3-4 SNMP V3 Configuration

4. And then, you can find vtName as following Figure 3-5, and there is also a description at the bottom of window.

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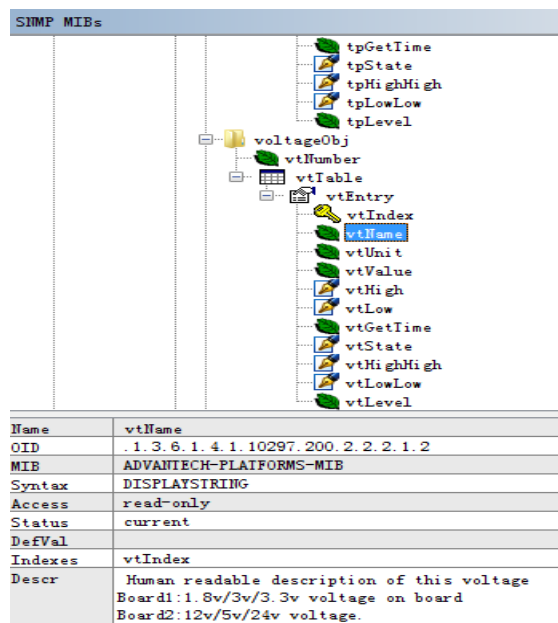


Figure 3-5 vtName

5. Double click on vtName. *Target platform* will reply the voltage name message at the right side of window.

Name/OID	Value	Type	IP:Port
vtName.1	VBAT	OctetString	172.21.73...
vtName.2	5VSB	OctetString	172.21.73...
vtName.3	VIN	OctetString	172.21.73...
vtName.4	VCORE	OctetString	172.21.73...

Figure 3-6 SNMP GET vtName

6. *Advantech SNMP Subagent* also provides TRAP functions which will notify the *client platform* if alarm events happened in the *target platform*. For example, if the voltage is abnormal, SNMP will automatically send a trap to notify user.

7. Find **vtTable**, right-click on it then click **Table View**.

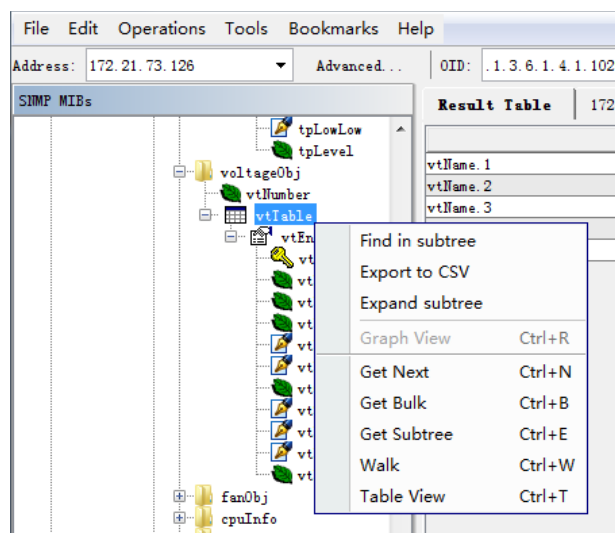
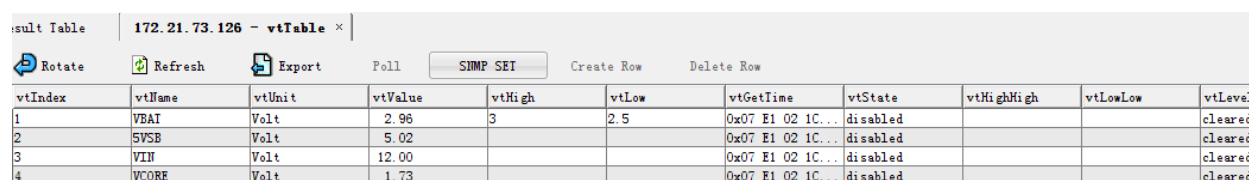


Figure 3-7 vtTable

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8. The vtTable will show up at the right side of the window. You can update them with your *client platforms* or *NMS* vtHigh, vtLow, vtHighHigh, vtLowLow by *SNMP SET* command as shown in Figure 3-8.



vtIndex	vtName	vtUnit	vtValue	vtHigh	vtLow	vtGetTime	vtState	vtHighHigh	vtLowLow	vtLevel
1	VBAT	Volt	2.96	3	2.5	0x07 E1 02 1C...	disabled			cleared
2	SVSB	Volt	5.02			0x07 E1 02 1C...	disabled			cleared
3	VIN	Volt	12.00			0x07 E1 02 1C...	disabled			cleared
4	VCORE	Volt	1.73			0x07 E1 02 1C...	disabled			cleared

Figure 3-8 Set properties

9. This message box “SET succeeded” is supposed to be showed up.

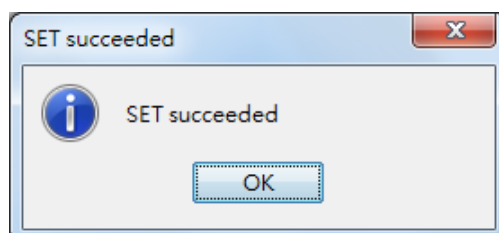


Figure 3-9 SET succeeded

10. Tools → Trap Receiver.

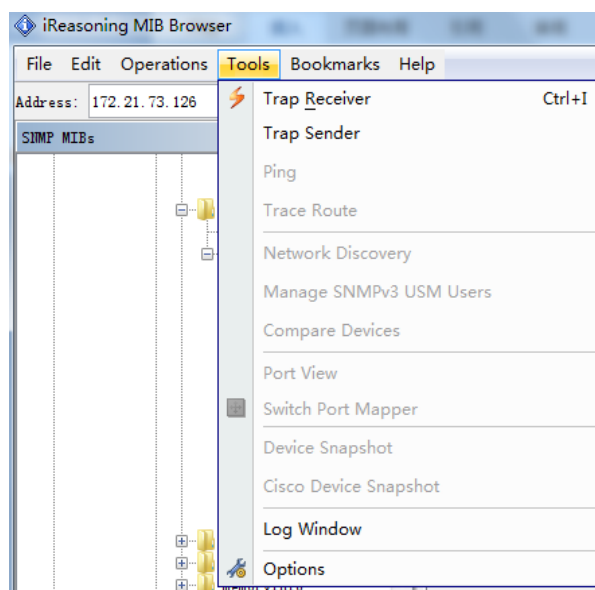


Figure 3-10 Trap Receiver

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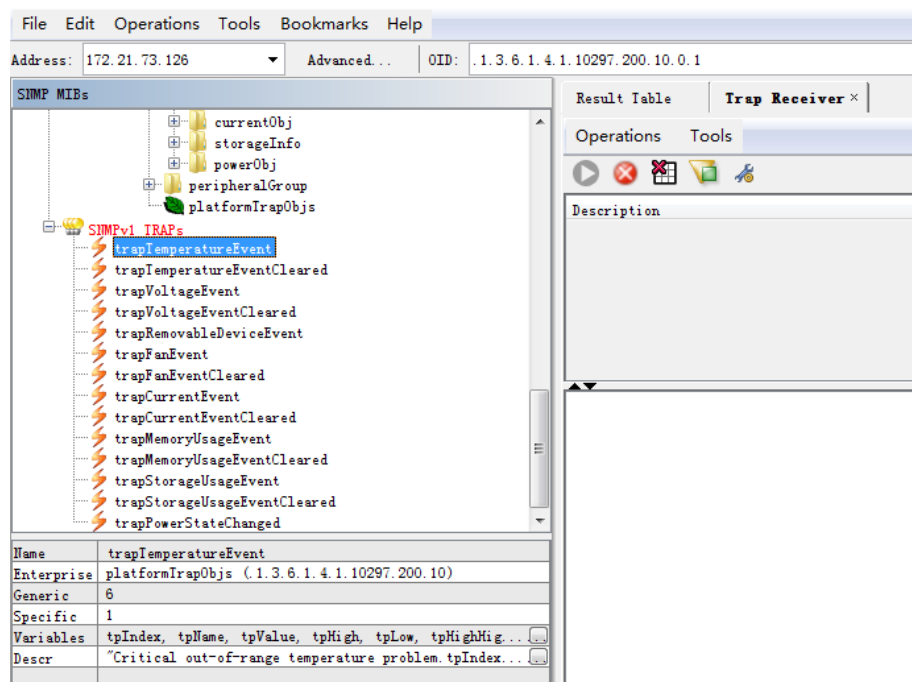


Figure 3-11 Trap Receiver Window

11. In the example of the voltage trap, set **vtHigh** to **11.99**, set **vtLow** to **11.00**, set **vtState** to be **enabled**.

12. Now you will receive a trap which notifies you that the voltage is abnormal.

Result Table		
172.21.73.126 - vtTable		
Trap Receiver ×		
Operations		
Tools		
Description	Source	Time
trapVoltageEventCleared	172.21.73.126	2017-02-28 16:03:39
trapVoltageEvent	172.21.73.126	2017-02-28 16:03:39
trapVoltageEventCleared	172.21.73.126	2017-02-28 16:03:39
trapVoltageEvent	172.21.73.126	2017-02-28 16:03:33
coldStart	172.21.73.126	2017-02-28 16:02:46
Variable Bindings:		
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtIndex	
Value:	[Integer] 3	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtName	
Value:	[OctetString] VIN	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtValue	
Value:	[OctetString] 12.00	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtHigh	
Value:	[OctetString] 11.99	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtLow	
Value:	[OctetString] 11.00	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtHighHigh	
Value:	[OctetString]	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtLowLow	
Value:	[OctetString]	
Name:	iso.org.dod.internet.private.enterprises.advantech.advantechPlatformsMIB.monitorGroup.voltageObj.vtTable.vtEntry.vtLevel	
Value:	[Integer] high (4)	
Description:	"Critical out-of-range voltage problem. vtIndex, vtName, vtValue, vtHigh, vtLow, vtHighHigh, vtLowLow, vtLevel"	

Figure 3-22 trapVoltageEvent