





SAE – Automation, s.r.o. Nová Dubnica Solid And Effective partner at development of your products and industry automation Learning and trying the SAEAUT SNMP OPC Server functionality using SAEAUT SNMP Agent

Introduction

In typical SNMP usage, there are some devices to be managed, and one or more devices managing them. A software component called **agent** runs on each **managed device** and reports information via SNMP communication protocol to the **managing application**. Data contained in the agent database depends on the specific functionality of the devices. Communication with a device can be initiated by **SNMP manager** by sending of **SNMP commands SET or GET** or by the **SNMP agent** using a SNMP **TRAP command**.

Product SAEAUT SNMP OPC Server (*Figure 1*) contains a SNMP manager. It intermediates data from/to this manager SNMP to systems containing an **OPC client** – for example to different SCADA systems. Variables from SNMP agent databases can be mapped OPC items placed in address space of the OPC server.

SAEAUT SNMP Agent is a companion software product to the SAEAUT SNMP OPC Server¹.

It was designed to enable learning and testing of the configuring SNMP/OPC software applications without having real devices with running SNMP agents. It was also used for the compliance testing of the SAEAUT SNMP OPC Server with OPC DA2.05A and OPC DA3.0 specifications from OPC Foundation.



Figure 1: Simple block schema of usage manager and agent application.

SAEAUT SNMP Agent provides a set of SNMP variables. Part of them are passive – it means that they are not changed by SNMP Agent itself but only from outside, part of them is

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¹ However, it can be used for testing by any SNMP manager cmmunicating according to the SNMP v2c protocol

changing directly in the agent according to a given algorithm. Some variables are periodically sent within a TRAP message.

Together with SAEAUT SNMP Agent, a configuration for SAEAUT SNMP OPC Server is installed. There are all variables accessible on the agent mapped to the OPC items. You can open the configuration and see the communication of the SNMP agent with the OPC client built into the configuration application of the SAEAUT SNMP OPC Server (Figure 5). However, you can create also your own configuration by using of on-line MIB browsing functionality (Figure 4) in the configuration application of the SAEAUT SNMP OPC Server.

SAEAUT SNMP Agent uses SNMP Service and SNMP Trap Service which are delivered with MS Windows operating systems. They are not automatically installed by standard OS installation. Therefore, both services must be installed and activated on the same computer as that agent.

Traps

SAEAUT SNMP Agent generates trap messages that are then sent to a trap destination. Trap destinations are identified by a computer name, IP address, or IPX address of the "host" in LANt.

The SAEAUT SNMP Agent can generate traps, if the item StartStopSendTraps (.1.3.6.1.4.1.33.0.3.17) is set to 1. User can specify a time limit for sending traps by setting the item TrapsTimeoutMs (.1.3.6.1.4.1.33.0.3.18). The trap message includes a new value of the following three items:

- TrapCounter (.1.3.6.1.4.1.33.0.2.3),
- IntRandom (.1.3.6.1.4.1.33.0.2.5),
- Gauge32Random (.1.3.6.1.4.1.33.0.2.7).

To ensure that the SAEAUT SNMP Agent will send traps to right destination, please do the following:

- 1. Click on the Windows Start ⇔ Control Panel ⇔ Administrative tools ⇔ Services.
- 2. Scroll through the right frame to locate SNMP Service.
- 3. Right-click on SNMP Service and choose Properties.
- 4. Choose the Traps tab.
- 5. Add a new Community name if needed; The community "public" is the default.
- 6. Add to the Trap destination a host or hosts.
- 7. Choose the Security tab.
- 8. Check the Send authentication trap.
- 9. Add any new names under Accepted Community Names.
- 10. Click on OK button.

SNMP Se	rvice Pr	operties	(Local (Comput	er)		?×
General	Log On	Recovery	Agent	Traps	Security	Dependent	cies
The SNMP Service provides network management over TCP/IP and IPX/SPX protocols. If traps are required, one or more community names must be specified. Trap destinations may be host names, IP addresses or IPX addresses.							
pu	blic			•	Add	to list	
					Remov	e from list	
Trap	destinatio	ns:					
12 19 54	27.0.0.1 02.198.116 AE123	5.31					
	Add.		Edit		Remove	•	
			01		Cance		pply

Figure 2: The SNMP Service Properties dialog – Traps tab.

SNMP Service Properties (Local Computer)			
General Log On Recovery Agent Traps Security Dependencies			
Send authentication trap Accepted community names			
Community Hights public READ WRITE			
Add Edit Remove			
Accept SNMP packets from any host Accept SNMP packets from these hosts			
Add Edit Remove			
OK Cancel Apply			

Figure 3: The SNMP Service Properties dialog – Security tab.

Description of the SNMP variable in agent

SNMP variables are identified by OID identifiers which are ordered in a hierarchical namespace. Each OID identifies a variable that can be read or set via SNMP commands. All OIDs defined in the SAEAUT SNMP Agent start with predefined prefix .1.3.6.1.4.1.33. Their descriptions are in tables below.

.1.3.6.1.4.1.33.0.2.1	
Name	ProductName
OID	.1.3.6.1.4.1.33.0.2.1
Syntax	Octet String
Access	Read-only
Description	The product name: SAEAUT SNMP Agent

.1.3.6.1.4.1.33.0.2.2	
Name	CompanyName
OID	.1.3.6.1.4.1.33.0.2.2
Syntax	Octet String
Access	Read-only
Description	The company name: SAE-Automation, s.r.o.

.1.3.6.1.4.1.33.0.2.3	
Name	TrapCounter
OID	.1.3.6.1.4.1.33.0.2.3
Syntax	Integer32
Access	Read-only
Description	The number of Traps fired from agent.
Trap	This item will every 3 seconds generate a new value. The value will be sent from agent to manager as TRAP.

.1.3.6.1.4.1.33.0.3.4	
Name	IntVar
OID	.1.3.6.1.4.1.33.0.3.4
Syntax	Integer32
Access	Read-write
Description	The item for testing of "Integer32" values.

IntRandom
.1.3.6.1.4.1.33.0.2.5
Integer32
Read-only
The item values are randomly generated.
This item will generate a new value every 3 seconds. The value will be sent from agent to manager as TRAP

.1.3.6.1.4.1.33.0.2.6	
Name	GetReqCounter
OID	.1.3.6.1.4.1.33.0.2.6
Syntax	Counter32
Access	Read-only
Description	The number of GET requests.

.1.3.6.1.4.1.33.0.2.7	
Name	Gauge32Random

OID	.1.3.6.1.4.1.33.0.2.7
Syntax	Gauge32
Access	Read-only
Description	The item values are randomly generated.
Trap	This item will generate a new value every 3 seconds. The value will be
	sent from agent to manager as TRAP.

.1.3.6.1.4.1.33.0.2.8		
Name	Time	
OID	.1.3.6.1.4.1.33.0.2.8	
Syntax	Timetick	
Access	Read-only	
Description	The number of milliseconds that have elapsed since the system was	
	started.	
.1.3.6.1.4.1.33.0.3.9		
Name	UIntVar	
OID	.1.3.6.1.4.1.33.0.3.9	
Syntax	Unsigned32	
Access	Read-write	
Description	The item for testing of "Unsigned32" values.	

.1.3.6.1.4.1.33.0.3.10	
Name	StringVar
OID	.1.3.6.1.4.1.33.0.3.10
Syntax	Octet String
Access	Read-write
Description	The item for testing of "Octet string" values. E.g. "Hello world!"

.1.3.6.1.4.1.33.0.3.11	
Name	ObjectVar
OID	.1.3.6.1.4.1.33.0.3.11
Syntax	Object Identifier
Access	Read-write
Description	The item for testing of "Object Identifier" values. E.g. "1.3.6.1.4.1.33"

.1.3.6.1.4.1.33.0.3.12	
Name	IPAddressVar
OID	.1.3.6.1.4.1.33.0.3.12
Syntax	IP Adress
Access	Read-write
Description	The item for testing of "IP Address" values. E.g. "127.0.0.1"

.1.3.6.1.4.1.33.0.3.13	
Name	OpaqueVar
OID	.1.3.6.1.4.1.33.0.3.13
Syntax	Opaque
Access	Read-write
Description	The item for testing of "Opaque" values. E.g. "opaque"

.1.3.6.1.4.1.33.0.3.14	
Name	BitsVar
OID	.1.3.6.1.4.1.33.0.3.14
Syntax	Bits
Access	Read-write
Description	The item for testing of "Bits" values.

.1.3.6.1.4.1.33.0.2.15	
Name	IntVarReadOnly
OID	.1.3.6.1.4.1.33.0.2.15
Syntax	Integer32
Access	Read-only
Description	The item for testing of "Integer32" value for read-only.

.1.3.6.1.4.1.33.0.2.16	
Name	UIntVarReadOnly
OID	.1.3.6.1.4.1.33.0.2.16
Syntax	Unsigned32
Access	Read-only
Description	The item for testing of "Unsigned32" value for read-only.

.1.3.6.1.4.1.33.0.3.17	
Name	StartStopSendTraps
OID	.1.3.6.1.4.1.33.0.3.17
Syntax	Integer32
Access	Read-write
Description	The value of the item can be set only to 0 or 1.
Trap	The item for start or stop sending traps. If is set to 1 traps are sent. If is
	set to 0 traps are not sent.

.1.3.6.1.4.1.33.0.3.18	
Name	TrapsTimeoutMs
OID	.1.3.6.1.4.1.33.0.3.18
Syntax	Unsigned32
Access	Read-write
Description	You can specify a time limit for sending traps. The value of the item must
	be greater than 100.
Trap	You can specify a time limit for sending traps.

MIB Browser - Load data from device (ON-LINE)				\mathbf{X}
SNMP MIB (objects)	Device			
🖃 🏢 TestDevice	Name:	TestDevice	Community:	public
iso	IP address:	127.0.0.1		Load MIB (Op-Lipe)
eren org	Default OID:	1361		
	Derauk OID;	11.5.0.1		
i mgmt	Object			
	OID:	.1.3.6.1.4.1.33.0.2.1		
enterprises	Syntax:	ASN_OCTETSTRING		
ab 33.0.2.1	Syntaxi			
ab 33.0.2.2	Derived:			
A 33.0.2.5	Value:	SAEAUT SNMP Agent		
▲ 33.0.2.6	Access:			
A 33.0.2.7	Status			
A 33.0.2.15	Description			
33.0.2.16	boschpdom			
A 33.0.3.4				
a 33.0.3.10				
ab 33.0.3.11		<		>
ab 33.0.3.12 ab 33.0.3.13	- How to transfe	er objects to the SAEAUT SNMD ODC Ser	ior configurat	ion?
	SNMP of SIMPING	er objects to the DALACT DRIVE OFC DEF	zer coningurac	
→ 🕅 33.0.3.17	1			
·····[/A] 33.0.3.18	The MIB Objects listed in the SNMP MIB can be transfered into YOUR SAEAUT SNMP OPC Server configuration			
	keeping the level structure specified by browsing.			
	To transfer an object, multiple objects or entire branche of objects please select them via a mouse left-button and dick on the "Transfer object(c) to configuration" button. The button is possible to use enough several			
	times.	ino mansion object(s) to configuration i	Accorn The D	action is possible to use chough several
Transfer object(s) to configuration				Close
Transfer object(s) to configuration				close

Figure 4: Adding of MIB items to an existing configuration file.



Figure 5: The SAEAUT SNMP OPC Server communicates with SAEAUT SNMP Agent.

In the demo configuration (Figure 5),, variables TrapCounter (.1.3.6.1.4.1.33.0.2.3), IntRandom (.1.3.6.1.4.1.33.0.2.5), and Gauge32Random (.1.3.6.1.4.1.33.0.2.7). are mapped to the OPC items 2 times. One set of these variables is put in the folder "OnlyForRead" and the second in the folder "Trap1". The second set differs from the first by the check on setting of the check box "Notification (Use SNMP TRAPS)". This way, it is provided that the OPC items are actualized according to the incoming TRAPs instead of periodical sending of the SNMP GET to the SNMP agent.

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