# Preface

## SNMP

## Management Information Base (MIB)

## Diagnostics and configuration

## Siemens Automation MIB

## Downloading MIB files from the Internet

## Modules and parameters of the Siemens Automation MIB

## Requests for Comments (RFCs)
Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent
damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert
symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are
graded according to the degree of danger.

**DANGER**
indicates that death or severe personal injury will result if proper precautions are not taken.

**WARNING**
indicates that death or severe personal injury may result if proper precautions are not taken.

**CAUTION**
indicates that minor personal injury can result if proper precautions are not taken.

**NOTICE**
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will
be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to
property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific
task in accordance with the relevant documentation, in particular its warning notices and safety instructions.
Qualified personnel are those who, based on their training and experience, are capable of identifying risks and
avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

**WARNING**
Siemens products may only be used for the applications described in the catalog and in the relevant technical
documentation. If products and components from other manufacturers are used, these must be recommended
or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and
maintenance are required to ensure that the products operate safely and without any problems. The permissible
ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication
may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software
described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the
information in this publication is reviewed regularly and any necessary corrections are included in subsequent
editions.
Preface

Validity of the documentation

The following SIMATIC NET devices support SNMP:

- SIMATIC NET Industrial Ethernet switches SCALANCE X, Industrial Ethernet ESM / OSM
- RuggedCom Industrial Ethernet switches
- SIMATIC NET Industrial Wireless LAN components SCALANCE W
- SIMATIC NET Industrial Ethernet Security components SCALANCE S
- SIMATIC NET modems and routers SCALANCE M
- SIMATIC NET Industrial Ethernet S7-300/400-CP, S7-1500-CM/CP
- SIMATIC NET S7-1200-CP with Ethernet interface
- SIMATIC NET Industrial Ethernet PC CP

Other Siemens devices that support SNMP are for example:

- PROFINET devices such as ET200 S
- SIMATIC CPUs

The following are some of the applications that use SNMP:

- SIMATIC NET IE SNMP OPC Server
- SINEMA Server
- SIMATIC STEP 7 uses SNMP for topology discovery (LLDP)

Purpose of the manual

This manual contains basic information on the topics Simple Network Management Protocol (SNMP) and Management Information Base (MIB) as well as details on the MIB files used with the SIMATIC NET devices.

New in this issue

First issue

Current manual release on the Internet

You will also find the current version of this manual on the Internet pages of Siemens Industry Online Support below the directory with the following entry ID:

## Table of contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preface</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>1 SNMP</strong></td>
<td>7</td>
</tr>
<tr>
<td>1.1 Overview of SNMP</td>
<td>7</td>
</tr>
<tr>
<td>1.1.1 Basics</td>
<td>7</td>
</tr>
<tr>
<td>1.1.2 SNMP versions</td>
<td>8</td>
</tr>
<tr>
<td>1.2 How SNMP works</td>
<td>9</td>
</tr>
<tr>
<td>1.2.1 Participants in SNMP communication</td>
<td>9</td>
</tr>
<tr>
<td>1.2.2 Communication</td>
<td>10</td>
</tr>
<tr>
<td>1.2.3 Datagram types</td>
<td>12</td>
</tr>
<tr>
<td>1.2.4 Traps and notifications</td>
<td>13</td>
</tr>
<tr>
<td>1.2.5 Access rights and security aspects</td>
<td>14</td>
</tr>
<tr>
<td>1.2.6 SNMP in SIMATIC NET</td>
<td>15</td>
</tr>
<tr>
<td><strong>2 Management Information Base (MIB)</strong></td>
<td>19</td>
</tr>
<tr>
<td>2.1 Basics</td>
<td>19</td>
</tr>
<tr>
<td>2.1.1 The Management Information Base (MIB) and Object Identifier (OID)</td>
<td>19</td>
</tr>
<tr>
<td>2.1.2 Structure of Management Information (SMI)</td>
<td>21</td>
</tr>
<tr>
<td>2.1.3 MIB variables and groups</td>
<td>22</td>
</tr>
<tr>
<td>2.1.4 Variables of MIB-II</td>
<td>22</td>
</tr>
<tr>
<td>2.2 Standardized and private MIBs</td>
<td>23</td>
</tr>
<tr>
<td>2.2.1 Classification of MIBs</td>
<td>23</td>
</tr>
<tr>
<td>2.2.2 Standardized MIBs</td>
<td>24</td>
</tr>
<tr>
<td>2.2.3 Private MIBs</td>
<td>24</td>
</tr>
<tr>
<td>2.3 Representation and integration of MIBs</td>
<td>25</td>
</tr>
<tr>
<td>2.3.1 MIB browser</td>
<td>25</td>
</tr>
<tr>
<td>2.3.2 MIB compiler for SNMP OPC server</td>
<td>25</td>
</tr>
<tr>
<td><strong>3 Diagnostics and configuration</strong></td>
<td>27</td>
</tr>
<tr>
<td>3.1 Requirements for SNMP communication</td>
<td>27</td>
</tr>
<tr>
<td>3.2 Configuration of SIMATIC NET devices for SNMP communication</td>
<td>27</td>
</tr>
<tr>
<td>3.3 Configuring SNMP users</td>
<td>30</td>
</tr>
<tr>
<td>3.4 Reading out and setting SNMP objects with management systems</td>
<td>30</td>
</tr>
<tr>
<td><strong>4 Siemens Automation MIB</strong></td>
<td>33</td>
</tr>
<tr>
<td>4.1 MIB files of Siemens Automation MIB</td>
<td>33</td>
</tr>
<tr>
<td>4.2 The framework - structure and organization</td>
<td>36</td>
</tr>
<tr>
<td>4.3 AUTOMATION-SMI</td>
<td>38</td>
</tr>
<tr>
<td>4.4 AUTOMATION-SIMATIC-NET</td>
<td>38</td>
</tr>
<tr>
<td>4.5 AUTOMATION-TC</td>
<td>40</td>
</tr>
<tr>
<td>4.6 AUTOMATION SYSTEM</td>
<td>41</td>
</tr>
</tbody>
</table>
# Table of contents

4.7 AUTOMATION-TIME ............................................................................................................. 46
4.8 AUTOMATION-PS ................................................................................................................. 48
4.9 AUTOMATION-BOOTDHCP ................................................................................................. 49
4.10 AUTOMATION-TELNET ...................................................................................................... 50
4.11 AUTOMATION-SMTP .......................................................................................................... 51
4.12 AUTOMATION-SNTP .......................................................................................................... 52

5 Downloading MIB files from the Internet ........................................................................... 55
5.1 Link overview according to product groups ................................................................. 55

A Modules and parameters of the Siemens Automation MIB ............................................. 57
A.1 AUTOMATION-SMI ............................................................................................................... 57
A.2 AUTOMATION-SIMATIC-NET ............................................................................................. 59
A.3 AUTOMATION TC (Textual Convention) ....................................................................... 63
A.4 AUTOMATION-SYSTEM ...................................................................................................... 66
A.5 AUTOMATION-TIME ............................................................................................................. 88
A.6 AUTOMATION-PS ................................................................................................................. 94
A.7 AUTOMATION-BOOTDHCP ............................................................................................... 99
A.8 AUTOMATION-TELNET ..................................................................................................... 103
A.9 AUTOMATION-SMTP ........................................................................................................... 106
A.10 AUTOMATION-SNTP ......................................................................................................... 110

B Requests for Comments (RFCs) ...................................................................................... 117
Glossary ............................................................................................................................... 119
Index ...................................................................................................................................... 121
1.1 Overview of SNMP

1.1.1 Basics

Functions and tasks of SNMP

The Simple Network Management Protocol (SNMP) is a UDP/IP-based, open protocol for the monitoring, control and administration of networks. SNMP was developed to simplify management functions and to allow a transparent exchange of data between different network components. UDP/IP is a simple, connectionless and unreliable protocol of the Internet Protocol Suite.

With the help of SNMP, the following management functions can be performed:

- Monitoring of network components
- Diagnostics of network components
- Error detection and error notification
- Remote configuration of network components

Uses of SNMP

SNMP allows central network management for many network components such as switches, controllers, communications modules, routers, PCs, printers etc.

With SNMP, information about network components can be called up or their parameters changed by a remote Network Management System (NMS). With SNMP, for example, instructions for controlling the devices are possible. This means that a port of a network component can be activated or deactivated using SNMP.

Advantages of SNMP

The advantages of SNMP are as follows:

- Open protocol supported by many vendors.
- Widespread in Ethernet networks
- Many different network components are supported.
- Also supports event-controlled communication with traps. This means less network load due to SNMP communication.
1.1 Overview of SNMP

Management Information Base (MIB)

The Management Information Base (MIB) plays an important role in SNMP. An MIB is a data structure written in a language that does not depend on the target system.

The term MIB is used by various bodies both for the specification of an individual data structure as well as for the entire collection of specifications and also for the current values of a management information system.

In the context of this document the term MIB is use for a defined specification with a defined set of parameters. Here, MIB is not used for the entire collection of specifications on a device or in the network.

Larger MIBs can be divided into modules for different function groups.

MIBs are stored on network components capable of SNMP.

1.1.2 SNMP versions

SNMP versions

SNMP is defined in 3 versions:

- SNMPv1
- SNMPv2c
- SNMPv3

SNMPv1

SNMPv1 provides 4 protocol interactions with which MIB variables can be called up or modified, refer also to the section Datagram types (Page 12):

Get, GetNext, Set, Trap

SNMPv1 has few security mechanisms. Any user who knows the community string can access data and change it with suitable software. The community string is like a password that is sent unencrypted with the request from the SNMP manager to the SNMP agent, refer also to the section Access rights and security aspects (Page 14):

SNMPv2c

When SNMPv2 is mentioned, this normally means SNMPv2c, the community-based SNMP version 2. Like SNMPv1, SNMPv2c also has no security mechanisms. Each user in the network can access and change data using suitable software.

 Compared with SNMPv1, SNMPv2c was expanded by the following functions:

- With the "GetBulk" command, several data records can be called up at once.
- Management stations can communicate with each other.
- With the Notification command, the agent warns the manager about events that occur.
- With the Inform command, the agent sends a message to the manager that must be confirmed by the manager.
SNMPv3

SNMPv3 was developed by the Internet Engineering Task Force (IETF). In contrast to SNMPv1 and SNMPv2, in this version the security mechanisms were significantly expanded.

The security functions are implemented by the following mechanisms:

- Fully encrypted user authentication
- Encryption of the entire data traffic
- Access control of the MIB objects at the user/group level

Community strings with SNMPv3

With SNMPv3, the community string-based access system of SNMPv1/v2c can also be used as an option.

As described in RFC 3548, this access system is also reproduced in the View-based Access Control Model (VACM).

1.2 How SNMP works

1.2.1 Participants in SNMP communication

Client-server model

SNMP works according to the client-server model.

According to the SNMP architecture model, the network consists of the following functional components:

- **Managing unit / Network Management Station (NMS) - Client**
  Synonym: **Manager**
- **Managed devices / Managed Network Entities (MNE) - Server**
  Synonym: **Agent** (with MIB)
- **Protocol**
  The network management protocol SNMP
1.2 How SNMP works

Managing unit (manager/client)

The managing unit is at the center of the network management activities. It requests information about the network components and can change their values. The SNMP manager (client) runs on the managing unit.

Managed devices (agent/server)

Managed devices are network components including their software. Agents (servers) are installed on the managed devices and can detect the status of the device and change values.

Communications principle

The SNMP agent and SNMP manager send their requests and responses to the communications partner. SNMP agents respond to requests of an SNMP manager only if the SNMP functionality is enabled on the devices receiving the request. For SIMATIC NET security modules, SNMP communication can be disabled in the configuration.

For information on how traps work, refer to the section Traps and notifications (Page 13).

How does SNMP access data?

The SNMP agent manages the objects in an MIB. Using SNMP commands, the SNMP manager can read out the MIB of the agent and therefore access its diagnostics data.

1.2.2 Communication

Communication with UDP

SNMP is implemented using the connectionless UDP (User Datagram Protocol).
Interaction between the SNMP agent and SNMP manager

The SNMP manager sends a request to the SNMP agents with a datagram of the Get group: "Get", "GetNext" or "GetBulk".

The SNMP agent reacts with a response datagram that contains either the requested data or an error message.

Request datagram

The request datagram from the Get group is the query of an SNMP manager to an SNMP agent.

Response datagram

The response datagram is a reply from the SNMP agent to the SNMP manager that contains either the requested data or an error message.

Set datagram

With the "Set" datagram, the SNMP manager changes the values of parameters on the managed device. The SNMP agent also replies to this command with a response datagram. See also section Datagram types (Page 12).

Polling

The periodic querying of the status of the device is known as polling. Errors/faults that have occurred become known only with the next poll from the SNMP manager.

Traps and notifications

If the SNMP manager as registered as a trap receiver, the SNMP agent sends a trap datagram unsolicited to the SNMP manager if an error/fault occurs to inform the manager immediately that an error/fault has occurred. See also section Traps and notifications (Page 13).

Ports 161 and 162

SNMP uses the following two ports:

- **Port 161**
  
  Port 161 is used for normal (not event related) communication; in other words, for request and response datagrams.

  When an SNMP manager sends a request datagram to an SNMP agent, it specifies port 161 as the destination port. The response datagram is also sent to port 161 by the SNMP agent.

- **Port 162**
  
  Port 162 is the trap port.

  Trap datagrams are sent and received via port 162 both by the SNMP manager and the SNMP agent.
### 1.2.3 Datagram types

#### Which datagram types are available with SNMP?

For the communication between an SNMP manager and an SNMP agent, SNMP provides the following datagram types:

<table>
<thead>
<tr>
<th>Datagram type</th>
<th>Explanations</th>
<th>Available as of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get</td>
<td>The manager requests managed objects of an MIB. With Get, the network management station requests the status of a monitored device.</td>
<td>V1</td>
</tr>
<tr>
<td>GetNext</td>
<td>With this operation, the manager queries and object identifier and its value that is located lexicographically behind the object identifier specified in the &quot;Get&quot;. GetNext is often used to search tables for managed objects.</td>
<td>V1</td>
</tr>
<tr>
<td>GetBulk</td>
<td>The manager requests several data records. GetBulk is similar to GetNext Burton with the additional option of repeating requests. This makes the analysis of object tables easier.</td>
<td>V2c</td>
</tr>
<tr>
<td>Response</td>
<td>The agent responds to the request of the manager. Response returns the answer to a request. If access was possible, the response contains the data requested by the manager.</td>
<td>V1</td>
</tr>
<tr>
<td>Set</td>
<td>Set is used for configuration. The manager changes data on a managed device. With Set, the manager can assign a value to an MIB variable or change its value.</td>
<td>V1</td>
</tr>
<tr>
<td>Trap</td>
<td>The agent warns the manager if there are special events. Since errors or faults on a managed device can only be made known to the manager with the next request, in some situations a trap message can be sent by the agent to the manager. A trap is a notification triggered by a special event. If such an event occurs, the agent immediately sends a message to the manager without waiting for the next request from the manager. The end of an error/fault can also be transferred to the SNMP manager with a trap. Traps are not confirmed. Traps are sent via port 162.</td>
<td>V1</td>
</tr>
<tr>
<td>Notification</td>
<td>The agent warns the manager of events that occur often. Notification is a generalized trap mechanism.</td>
<td>V2c</td>
</tr>
<tr>
<td>Inform</td>
<td>Datagram of an agent requesting a response from the manager. Inform is a datagram that needs to be confirmed by the recipient. It was introduced to eliminate the problem of lost datagrams occurring due to the unreliability of UDP. Corresponds to a trap with confirmation of receipt.</td>
<td>V2c</td>
</tr>
<tr>
<td>Report</td>
<td>Communication between managed devices. Report can also be used for the exchange of error information between managed devices. Report was already defined in SNMPv2 but not used prior to SNMPv3. Report is not used by SIMATIC NET modules.</td>
<td>V2c</td>
</tr>
</tbody>
</table>
1.2.4 Traps and notifications

Trap datagrams

If certain events occur, SNMP agents can generate datagrams and send them to various management stations. The traps can be displayed on the management station if the corresponding MIB files can be evaluated by the management station.

The events can be configured for devices that support SNMPv3.

Generating traps

If the trap function is enabled, traps are generated by agents if particular events occur. Examples of traffic generation by SIMATIC NET devices:

- **Standard traps (RFC 1157)**
  - After turning on the power supply or restart
  - When changing the network connection; in other words, when the valid connection to the end device on a port is interrupted or re-established
  - If there is an SNMP authentication error; in other words, when a network management station or the Internet browser attempts to access an agent using SNMP requests with the wrong access right (community).

- **RMON traps (RFC 1757)**
  - When values fall below or exceed certain limit values configured previously on the agent by a network management station.

- **Product-specific traps**
  - When the redundancy manager opens/closes a ring topology with a switch, this sends a trap.
  - When there is a failover between a standby master and standby slave on a redundant link
  - When the error status changes
  - When the power supply of an agent is turned on or off during operation

Enabling and disabling the trap function

The sending of traps by the SNMP agents can be enabled and disabled using the management software or, for example using the WBM (see section Diagnostics and configuration (Page 27)). Individual traps can also be enabled and disabled by the agent's own MIB objects.
Disadvantages of traps

- Traps are unreliable when sent because SNMP is based on UDP and the recipient of a trap does not send confirmation of receipt.
- A flood of traps increases network load and can, for example, make the problems indicated by the traps even worse.
- There is no standardized method of configuring trap recipients with SNMPv1 and SNMPv2c.

This deficiency was eliminated only with SNMPv3.

It is therefore recommended that OIDs requiring monitoring should be queried by a network management station. If traps are supported by a network management station, a short agent query interval should also be configured to avoid loss of messages due to unreliable transfer.

1.2.5 Access rights and security aspects

Depending on the SNMP version, there are different procedures relating to access rights and security aspects.

- SNMPv1 and SNMPv2c
  
  Formation of device groups as SNMP communities and simple control of access rights using community strings.

- SNMPv3
  
  Expanded options for implementing security measures.

SNMP communities with SNMPv1 and SNMPv2c

For the simple control of access rights without security aspects, in SNMPv1 and SNMPv2c, devices are grouped together in SNMP communities. SNMP communities are groups of devices that include at least one SNMP agent and one SNMP manager. The name of a group is known as the community string. The community string is transferred as plain text and is used to inform the recipient of the community from which the message is intended. By accepting or rejecting the SNMP message, a managed network component indicates whether or not it belongs to the message’s community.

There are two types of community string:

- Read access; default: "public"
- Read and write access; default: "private"

Note

Changing a community string

When setting up the devices, make sure that you change the default community string for security reasons!

The default community string is generally known and provides no protection against writing since it is usually set to "public" in the factory.
SNMPv3

As of SNMPv3, security during communication is implemented with user names, keywords and keys.

SNMPv3 introduced the User-based Security Model (USM). This expands SNMP with the following security functions:

- **Trustworthiness**
  Ensures that only messages from permitted sources are evaluated.

- **Intactness**
  Ensures that messages are not damaged.

- **Confidentiality**
  Ensures that datagrams cannot be read by unauthorized recipients. This is achieved by appending a character string calculated from the user name and password.

- **Punctuality**
  Ensures that messages are processed within a defined time.

1.2.6 SNMP in SIMATIC NET

SIMATIC NET provides management systems for network management using SNMP and supports the SNMP agent function with many devices.

The following SIMATIC NET components and device families are used:

- **Management end (clients)**
  - SINEMA Server
    SINEMA Server is Web-based network management software for monitoring, diagnostics and management of devices and their statuses in Industrial Ethernet networks.
  - IE SNMP OPC-Server
    The SNMP OPC server allows diagnostics and configuration of any devices capable of SNMP. The data exchange with these devices is handled by the OPC server using the SNMP protocol. All the information can be integrated in OPC-compatible systems, for example in the HMI system WinCC. This makes combined process and network diagnostics possible in the HMI system.

- **Agent end (server)**
  - SIMATIC S7 with connection via the CPU or a SIMATIC NET CM/CP
  - PCs WITH SIMATIC NET CP
  - SCALANCE X / M / W, OSM / ESM
  - SCALANCE S security module
  - Siemens RuggedCom switches
SNMP data exchange

The figure below and the following descriptions provide an overview of the interaction of the components in SNMP communication.

Figure 1-2  Data exchange with SNMP
1.2 How SNMP works

Management end

- **SINEMA Server as SNMP client**
  In its function as server, SINEMA Server includes network management software. This is used to monitor and manage devices and their status in Industrial Ethernet/PROFINET networks.

- **SNMP OPC server as SNMP access for OPC clients**
  Via the SNMP OPC server of SIMATIC NET, OPC client applications have access to SNMP network management functions. To make device-specific MIB data records accessible and interpretable via OPC variables, an MIB compiler is available.
  A typical OPC client application that also uses the SNMP network management functions is, for example, the OPC client of the process visualization system SIMATIC WinCC.

- **NMS systems of other vendors with SNMP management functionality**
  NMS systems of other vendors have access to the reachable Siemens devices in the network with SNMP server functionality.

Agent end

Depending on the device type, SIMATIC NET devices support the SNMP standards SNMPv1, SNMPv2 or SNMPv3.

Information about the properties of devices that can be addressed as SNMP agents is stored in the MIB files of the particular device. A distinction is made between standardized MIBs defined in RFCs (refer to the appendix of the manual) and private MIBs. Private MIBs contain product-specific data that is not included in standard MIBs.

You will find information about the supported standards and MIBs of SIMATIC NET devices in the relevant device documentation.

- **SIMATIC S7-200/300/400/1200/1500**
  Depending on the device type, the interfaces of the CPU or of the S7 CP/CM support management information via SNMP.

- **SIMATIC NET SCALANCE M / X / W OSM/ESM and the security module SCALANCE S**
  The SCALANCE devices support the transfer of management information using the Simple Network Management Protocol (SNMP). To allow this, an SNMP agent is installed on the module that receives and responds to SNMP queries.
1.2 How SNMP works
2.1 Basics

2.1.1 The Management Information Base (MIB) and Object Identifier (OID)

Management Information Base
In the context of the SNMP model, the Management Information Base (MIB) is a collection of all MIB objects that can be called up or modified by the SNMP manager. It manages individual system aspects such as information about the managed nodes or statistical information about the throughput of packets, established connections, error messages etc. The variables to be used for the request from the SNMP manager are written in a language that is independent of the target system. The MIB is managed by an SNMP agent. The SNMP agent is an application implemented on every device to be managed. When requested by the SNMP manager, the MIB objects can be queried and modified by the SNMP agent.

Identification of MIB objects with the Object Identifier (OID)
The MIB objects are organized in a tree structure and formulated uniformly in an "Abstract Syntax Notation One"-based collection of rules, the Structure of Management Information (SMI). The MIB objects are identified by a unique Object Identifier (OID). The OID describes the path through the hierarchically structured MIB tree to the required MIB object.

With standardized MIB objects, the OID is fixed.

Private MIB objects are kept in the "enterprises" subdirectory. Within the private structure, the addresses are left up to the manufacturer. Only the manufacturer number needs to be registered. The OID can be represented as an ASCII character string.

Example: The OID 1.3.6.1.2.1.1.1 is the path to the "sysDescr" object.
Management Information Base (MIB)

2.1 Basics

Diagnostics and configuration with SNMP

Diagnostics Manual, 08/2014, C79000-G8976-C357-01

Figure 2-1 OID path to the "sysDescr" object

Structure of an MIB object

Each MIB object consists of the following:

- A name, the object identifier
- A syntax that defines the abstract data structure of the MIB object
- A coding as a representation of the abstract syntax

Syntax of an MIB

Example of the syntax for an MIB object:

```plaintext
system OBJECT IDENTIFIER ::= { mib-2 1 }
sysDescr OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION
"A textual description of the entity. This value should include the full name and
version identification of the system's hardware type, software operating-system, and
networking software. It is mandatory that this only contain printable ASCII characters."
 ::= { system 1 }
```
Structure of an MIB

The individual objects of a MIB are arranged in groups. These groups can relate to the entire system or to individual protocols in different network layers.

It is not necessary to implement all groups because only the groups relevant in the particular system are required. If a group is implemented, all objects of this group must exist in their entirety.

RFC

The basics of the MIB for network management were specified in the Internet community based on SMIv1 in RFC 1213 as MIB-II. Today, MIB-II defines the basic structure of the MIB. All the definitions of the groups were revised and converted to the SMIv2 representation. To allow further development of the individual groups, their definitions were rewritten in separate RFCs.

2.1.2 Structure of Management Information (SMI)

Structure of Management Information (SMI)

SMI forms the framework for the MIB. Within this framework, the "Structure of Management Information" describes the type of representation of objects and the type of exchange by the protocol in detail.

The SMI specifies the definition of the management data to be converted by SNMP. The SMI describes the syntax of the managed objects and their names and coding. MIB documents written based on SMIv1 can be used with SNMPv1, SNMPv2c and SNMPv3 protocols. SMIv2 defines the "modern" syntax of an MIB document. MIB documents written based on SMIv2 can be used with SNMPv1, SNMPv2c and SNMPv3 protocols.

The SMI contains:

- The usual structures and the identification scheme for the definition of management information used for management of the TCP/IP-based networks.
- The description of the object information model for network management.
- The set of generic types that needs to be used to describe network management information.

The formal description of the structures can be found in the specification "Abstract Syntax Notation One" (ASN. 1). The representation of the data on the network corresponds to the Basic Encoding Rules (BER) of ASN. 1.

RFC 1155 and RFC 1212 contain the requirements for SMI from SNMP Framework V1 (SMIv1).

The SMI of SNMPv2 was defined in RFC 1902 and expanded for SMI-specific data types. SNMPv3 uses the SMI of SNMPv2.
2.1.3 MIB variables and groups

Arrangement of the MIB objects

MIB variables are defined by scalar values or by strings. They can be read out from the MIB using SNMP.

MIB variables are organized in groups. The MIB groups of MIB-II are listed below.

MIB groups of MIB-II

<table>
<thead>
<tr>
<th>MIB group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>system</td>
<td>Configuration information (sysDescr, sysLocation, sysUpTime, ...)</td>
</tr>
<tr>
<td>interfaces</td>
<td>Maximum number of interfaces and table with information on the interfaces</td>
</tr>
<tr>
<td>at</td>
<td>Information on address mapping</td>
</tr>
<tr>
<td></td>
<td>Is not supported by MIB-II.</td>
</tr>
<tr>
<td>ip</td>
<td>Internet protocol-specific information of the network component</td>
</tr>
<tr>
<td>icmp</td>
<td>Statistical information about the ICMP services.</td>
</tr>
<tr>
<td>tcp</td>
<td>Statistical information about the transport layer TCP</td>
</tr>
<tr>
<td>udp</td>
<td>Information about the User Datagram Protocol (UDP)</td>
</tr>
<tr>
<td>egp</td>
<td>Information about the Exterior Gateway Protocol (EGP)</td>
</tr>
<tr>
<td>cmot</td>
<td>Reserved for media-specific information by the test branch (objectidentifier 1.3.6.1.3)</td>
</tr>
<tr>
<td>transmission</td>
<td>Information on the SNMP network data</td>
</tr>
</tbody>
</table>

2.1.4 Variables of MIB-II

Variables

Below, you will find a list with some of the SNMP variables from the MIB-II set for monitoring device status. MIB-II describes all the SNMP variables that are supported by most devices capable of SNMP.

Variables in the "System" directory

<table>
<thead>
<tr>
<th>Variable</th>
<th>Access rights</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sysDescr</td>
<td>Read only</td>
<td>Vendor-specific identification of the device. String with up to 255 characters.</td>
</tr>
<tr>
<td>sysObjectID</td>
<td>Read only</td>
<td>Address (object identifier) under which the device-specific SNMP variables can be reached: 1.3.6.1.4.1.4329.6.1.2.nnn.mmm</td>
</tr>
<tr>
<td>sysUpTime</td>
<td>Read only</td>
<td>Time since the last reset (for example, after restarting). Specified in hundredths of seconds.</td>
</tr>
<tr>
<td>sysContact</td>
<td>Read and write</td>
<td>Optional entry of a contact person. Possible value: String with a maximum of 255 characters. Default setting: Empty string</td>
</tr>
</tbody>
</table>
### Variables in the "Interface" directory

<table>
<thead>
<tr>
<th>Variable</th>
<th>Access rights</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifNumber</td>
<td>Read only</td>
<td>Number of different interfaces available in the component.</td>
</tr>
<tr>
<td>ifDescr</td>
<td>Read only</td>
<td>Description and optional additional information for an interface. Possible values: String with a maximum of 255 characters</td>
</tr>
<tr>
<td>ifType</td>
<td>Read only</td>
<td>For Ethernet ports: csmacd(6)</td>
</tr>
<tr>
<td>ifSpeed</td>
<td>Read only</td>
<td>Transmission speed [bps]</td>
</tr>
<tr>
<td>ifOperStatus</td>
<td>Read only</td>
<td>Status of Ethernet interfaces or ports. Most important values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• up(1): Connection to Ethernet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• down(2): No connection to Ethernet</td>
</tr>
<tr>
<td>ifLastChange</td>
<td>Read only</td>
<td>Time since system startup that an interface is in its current status. Specified in hundredths of seconds.</td>
</tr>
<tr>
<td>ifInErrors</td>
<td>Read only</td>
<td>Number of received frames that were not forwarded to higher protocol layers because of an error.</td>
</tr>
<tr>
<td>ifOutErrors</td>
<td>Read only</td>
<td>Number of frames that were not sent because of an error.</td>
</tr>
</tbody>
</table>

### 2.2 Standardized and private MIBs

#### 2.2.1 Classification of MIBs

**Overview**

Due to the cross-vendor standardization of the MIBs and the access mechanisms, a heterogeneous network with components from different vendors can be monitored and controlled.

If non-standardized data is necessary for component-specific network monitoring, this can be written in private MIBs by the vendors.
Standardized MIBs are defined in RFCs and other standards. In terms of content and organization, private MIBs are based on the structure of the standardized MIBs. They can therefore be incorporated in the entire SNMP model without problems.

2.2.2 Standardized MIBs

Standardized MIBs

Two of the most important standardized MIBs are:

- MIB-II
- LLDP-MIB

MIB-II

MIB-II was defined in RFC 1213.

The objects defined in MIB-II have the following OID prefix:

mib-2 OBJECT IDENTIFIER ::= { 1.3.6.1.2.1 }

2.2.3 Private MIBs

Private MIBs

Private MIBs are MIBs defined by vendors with product-specific expansions that are not included in the standard MIBs. They are based on RFC 1213.

To allow a management station to read private MIBs, these must be made known to the management station.

The options for this are as follows:

- Reading out the MIB from the WBM of the device reachable via the network
- Downloading the MIB from the Internet pages of Siemens Industry Online Support

Note

MIB versions

Make sure that you use the latest MIBs. You will find these on the Internet pages of Siemens Industry Online Support, refer to the section Downloading MIB files from the Internet (Page 55).
2.3 Representation and integration of MIBs

2.3.1 MIB browser

Representation of the MIB objects with the device view

Using device views, the MIB objects can be represented graphically in a management system.

Representation of the MIB objects with MIB browser

If no device view is available for the network component, the objects are represented row-oriented using an MIB browser. MIB browsers are often included in the standard range of network management applications.

The following functions can be performed with an MIB browser:

- Loading an MIB and viewing the MIB objects
- Browsing the nodes of an MIB structure for definitions of objects specified in the MIB
- Calling up values of selected MIB objects of an MIB structure
- Viewing and analysis of incoming traps when using the trap viewer
- Execution of the basic SNMP protocol interactions such as GET, GETNEXT, GETBULK (SNMPv2 and SNMPv3 only) and SET
- Saving the protocol interactions in a text file
- Representation of real-time recordings of SNMP data in a diagram (line and bar diagrams)
- Representation of SNMP data in table form (SNMP table cell)

2.3.2 MIB compiler for SNMP OPC server

What is the MIB compiler used for?

The MIB compiler is used to integrate an MIB in the network. With the MIB compiler of SIMATIC NET OPC servers, SIMATIC NET devices and third-party devices can be integrated. This integration is only possible with an MIB description of the relevant device.

The MIB compiler of SIMATIC NET requires MIB files according to the SMIv1 standard. Although the SMIv2 format is not supported there, most SNMP components provide both MIB formats.
Device profiles

A device profile describes the extent of the variables of the device that are mapped on the OPC server. Only variables that are contained in the device profile can also be integrated in an application.

The SNMP OPC server includes an MIB compiler with which existing device profiles can be adapted or new device profiles created. This is achieved by entering the required SNMP variables from the public and, if applicable, private MIBs in the profile.
Diagnostics and configuration

3.1 Requirements for SNMP communication

Enabling SNMP in the device configuration

For some SIMATIC NET devices, SNMP communication must be enabled explicitly during configuration using the standard configuration tools (e.g. STEP 7). Only then are the ports on these devices enabled for SNMP communication.

Requirement for SNMP communication

For the recognition and use of SNMP, the minimum requirement is that the IP address of the device is configured.

3.2 Configuration of SIMATIC NET devices for SNMP communication

Configuration of devices for operative mode

Before using most SIMATIC NET devices, they first need to be configured for the intended application. During configuration, the properties that the devices will use at their location in the plant are specified. For communications modules, these include, for example, the address, the communications partners, special protocol properties etc. The configuration data is created in various standard configuration tools. Depending on the device type, the configuration data needs to be loaded on the device itself or on the CPU of the station before the device starts up.

Depending on the device type, the following standard configuration tools are available:

- SIMATIC STEP 7
  - STEP 7 V5.5
  - STEP 7 Professional / Basic
- Web Based Management (WBM)
- Command Line Interface (CLI)
Configuring SNMP parameters

Several basic parameters such as the SNMP version or the permitted community strings can be specified in the configuration tools listed above.

Agent SNMP Configuration

<table>
<thead>
<tr>
<th>SNMP Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ SNMPv1v2c/v3</td>
</tr>
<tr>
<td>☐ SNMPv3 Only</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SNMPv1v2c</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Read Only</td>
</tr>
</tbody>
</table>

Read Community String: public
Read/Write Community String: private

| ☐ Traps |

Figure 3-1  SNMP configuration of an agent with the WBM

<table>
<thead>
<tr>
<th>Activate SNMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Use SNMPv1</td>
</tr>
<tr>
<td>☑ Use SNMPv3</td>
</tr>
</tbody>
</table>

SNMPv1
Reading community string: public
Writing community string: private

SNMPv3
Authentication: SHA-1
Encryption algorithm: AES-128

Figure 3-2  Configuration of the SNMP properties of an agent in STEP 7

Depending on the device type, other special parameters for SNMP communication can be configured using the WBM or CLI during the basic configuration.
### Agent Event Configuration

<table>
<thead>
<tr>
<th>Event</th>
<th>E-Mail</th>
<th>Trap</th>
<th>Log Table</th>
<th>Syslog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold/Warm Start</td>
<td>✅</td>
<td></td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Link Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authentication Failure</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMONI Alarm</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RM State Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP/RSTP Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault State Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby State Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loop Deletion State Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PoE State Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Auto State Change</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Signalling Contact

- Signalling Contact Control: [Conventional]
- [ ] Close Signalling Contact

---

**Figure 3-3** Example: SNMP event configuration of an agent with the WBM

Using SNMP itself, only a limited selection of parameters can be configured following device startup. You will find detailed information on this in the following sections.
3.3 Configuring SNMP users

Configuring users

With SIMATIC NET devices, you can configure users and groups for SNMPv3 with the WBM, CLI or by direct access to the MIB objects (recommended only for experts).

![SNMPv3 Users Configuration](image)

Figure 3-4 Configuration of an SNMPv3 user for an agent with the WBM

You will find details of the options and access rights for SNMPv1/v2 or SNMPv3 in the section Access rights and security aspects (Page 14).

3.4 Reading out and setting SNMP objects with management systems

Modifying SNMP parameters

Most SNMP parameters can only be read. Only some SNMP parameters can be configured; in other words, written:

- You will find the writable parameters of MIB-II in the section Variables of MIB-II (Page 22). There, they are marked "Read and write".
- You will find the objects of the Siemens Automation MIB in the section Siemens Automation MIB (Page 33). Writable parameters are marked "read/write".

Parameters are written using the "SET" command, refer to the section Datagram types (Page 12).
Network management systems for SNMP

Various tools are available for configuring SNMP objects and parameters.

The following SIMATIC NET tools are suitable for diagnostics and configuration using SNMP:

- SIMATIC NET SINEMA Server
- SIMATIC NET IE SNMP OPC Server Basic

Information on the products can be found on the Internet pages of Siemens Industry Online Support under the following entry ID:

22592211 (http://support.automation.siemens.com/WW/view/en/22592211)

Reading out and setting SNMP parameters

Below, you will find screenshots of several examples of reading out and setting SNMP parameters in SINEMA Server.

Figure 3-5    Reading out OIDs
### Diagnostics and configuration

#### 3.4 Reading out and setting SNMP objects with management systems

Figure 3-6  Specifying community strings for an SNMP profile

Figure 3-7  Specifying a trap recipient
4.1 MIB files of Siemens Automation MIB

**OID of the Automation MIB**

The MIB objects of the Automation MIB are maintained under the following OID:
```
```

**MIB files**

The MIB files of the Siemens Automation MIB are listed in the following table. They are available on the Internet as an archive file for downloading, refer to the section Downloading MIB files from the Internet (Page 55).

Which Siemens devices support SNMP can be found in the relevant product documentation.

<table>
<thead>
<tr>
<th>File name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>siemensSmi.mib</td>
<td>Object identifier node of Siemens</td>
</tr>
<tr>
<td>automationSmi.mib</td>
<td>Object identifier node of the Siemens Automation MIB</td>
</tr>
<tr>
<td>automationSimaticNet.mib</td>
<td>Object identifier node for the product-specific sub branches for SIMATIC NET products</td>
</tr>
<tr>
<td>automationTc.mib</td>
<td>Definitions of the general textual rules for the Siemens Industry sector</td>
</tr>
<tr>
<td>automationSystem.mib</td>
<td>Definition of the general management objects that describe a Siemens product</td>
</tr>
<tr>
<td>automationBootDhcp.mib</td>
<td>Definitions of the management objects for configuring the parameters of OOTP / DHCP clients</td>
</tr>
<tr>
<td>automationPS.mib</td>
<td>Definition of management objects to manage power supply products</td>
</tr>
<tr>
<td>automationSmtp.mib</td>
<td>Definition of management objects to describe SMTP parameters</td>
</tr>
<tr>
<td>automationSntp.mib</td>
<td>Definition of management objects to describe SNTP parameters</td>
</tr>
<tr>
<td>automationTelnet.mib</td>
<td>Definition of management objects to describe the parameters of the Telnet unit</td>
</tr>
<tr>
<td>automationTime.mib</td>
<td>Definition of management objects to display and modify the system time of an automation product and to manage the Sync mechanisms</td>
</tr>
</tbody>
</table>

**Automation-SMI**

This module contains the basis of the Automation MIB. The structure of the object identifiers for the automation framework is defined here. It contains the definition of the starting point of the Automation MIB, the main groups and the product groups. This module is purely administrative; it contains no definitions of object identifiers that can be read out via the network.
Automation-SIMATIC-NET

This module defines the subgroups in the product-specific part of the SIMATIC NET products. The administrator of the Automation MIB can specify responsibilities for the sub branches of this module. The administrator can, for example, transfer the responsibility for the sub branches of a product family to the project manager.

If the SNMP agent of a product behaves unusually, for example due to restrictions in the extent of the values of an object, due to other access rights or due to the use of product-specific MIBs, the creation of a private branch in the product registration requires an equivalent branch under Capability. The capability area must be structured in exactly the same way as the product registration so that the user can find the properties of a product quickly.

Automation TC (Textual Convention)

It is often practical to create separate syntax definitions for example to represent addresses or version formats. To ensure that the specifications are unique for the entire private Automation MIB, the textual conventions are grouped in a single module. The module is located under the automationModules branch and is a purely administrative module.

Automation System

The Status area contains an error flag that represents the operational status of the entire system. Here, there is a light signal that distinguishes between the "OK", "maintenance required" and "Problem" status.

Some systems allow a restart by SNMP and can reset their configuration to default values. The trigger for such actions, the counter for restart statistics and similar objects are put together in one group as generic parameters.

A device capable of SNMP automatically has an IP configuration. Some systems allow the user to modify this configuration using SNMP. The objects that allow this are put together in the agent configuration group. The parameters for configuration of an out-band connection are also stored in this group if an out-band connection exists. If an out-band connection exists and parameters have been assigned for it, the system can be reached both via the in-band IP address and via the out-band IP address. If a system supports VLANs and this influences the configuration of the agent, this group is not suitable for the entire parameter transfer (assignment) of the agent. Instead the system must make other objects available for the transfer of the VLANs to the IP subnets and for similar functions. It can, however, be assumed that systems with VLAN support do this anyway.

In the last area, the MIB module makes notifications available with which changes to the operational status of a system and configuration changes can be indicated.

The systems located in the Automation area support SNMP to a varying extent. For this reason, different compliance requirements were formulated.

The main requirement (automationSystemBasicCompliance) that all components must meet is conformity with I&M 0. The parameters of the classes I&M 1 and I&M 2 that map the hardware and software configuration of a system can be made available by a system as options. The ability to reset the counters of a system is also optional.

The extended requirement (automationSystemExtCompliance) contains the main requirement [basic compliance] and optional parameters for the configuration of the SNMP
agent. These can be made available by systems that allow the configuration of the agent with SNMP. The other functionalities of the MIB such as the remote restart of a system or the distribution of notifications are optional parameters of this requirement.

**Automation-Time**

In the standard MIBs, there is only the `sysUpTime` object that returns the timeticks since the last system start. For systems within an automation network, this is normally inadequate (they often require absolute times, for example to be able to save the time of the last system modification etc.). This makes synchronization with a manager necessary, for which there are a number of different methods that can be used.

To achieve the greatest possible flexibility, two-phase access was selected. The Automation-Time module (in the `automationMgmt` branch) represents the central point to display the system time and to control time synchronization. It contains a table that lists all synchronization mechanisms. The table is made available by a component via which the mechanisms can be enabled and disabled. The protocols and methods with which synchronization is achieved are managed in separate MIB modules and the agent implements only the ones that are necessary. Systems not intended to synchronize the time of day using SNMP only need to meet the basic conformity of the modules and to make the time available for reading out.

**Automation-PS (Power Supply)**

The power supply units of a system are managed in this module (under the `automationMgmt` branch). It consists of a table containing all PSUs of the system and a notification that signals the status change of one or more units. The conformity of the module requires at least information about the existing power supplies and their status. Enabling the monitoring and support of the event is optional.

**Automation-BootDHCP**

Since there are currently no standard MIBs for DHCP/Bootp clients, this MIB module was created and inserted in the `automationMgmt` branch. Since not only the functions required for layer 2 components should be covered, but also the future layer 3 components, the module contains a table in which a row is reserved for each layer 3 interface of the system. The index of every row is the same as the index in the `ifTable` so that an interface is uniquely recognizable. There is also a control flag that controls the client.

**Automation-Telnet**

This group of the `automationMgmt` branch currently contains two variables with which the administrator can control a timeout of a Telnet session. Conformity requires the support of all objects of the module.
Automations-SMTP

Network components are often in a position to exchange information about certain system events. The settings of the parameters required for this are integrated in the automationMgmt branch. It contains the address of the SMTP server and the corresponding port, the value of the From box of the address and the recipient of the mail. The component that decides whether or not an e-mail is triggered is located in a different module.

Automations-SNTP

The model in the Automation MIB for time-of-day synchronization specifies that the control of the synchronization paths should be created in the Automation-Time MIB. The configuration of the access method is in a separate MIB group. One of the possible synchronization methods is SNTP. The parameters of this protocol are managed by using the Automation-SNTP module in the automationMgmt branch. This includes the address and the port of the SNTP server, the time difference between server and client and the test interval of the client.

4.2 The framework - structure and organization

Structure of the framework

The structure of the framework is defined in the automationSMI. Due to the size, the individual modules of the Automation MIB are organized in separate files. This means that you need to download several files, e.g. using the Web page. If you do not require the entire MIB, you only need to download the MIB files that you actually require.

SMIv2 is used to describe the MIBs. Over and above this, SMIv2 provides options for representing relationships between tables syntactically. SMIv2 specifies conformity reports that describe which objects are obligatory and which are optional. These reports are also used in the Automation Framework. They can always be found at the end of each MIB module.

The MIB files contained in the Siemens Automation MIB describe a framework for SNMP diagnostics and configuration of many Siemens Industry components with network capability.

The Automation MIB can be downloaded from Siemens Industry Online Support, refer to the section Downloading MIB files from the Internet (Page 55).

Structure of the framework

The automation framework is divided into 4 branches:

- automationProducts
- automationModules
- automationMgmt
- automationAgentCapability
automationProducts
The first of these branches, automationProducts, forms the product-specific part. This branch is divided into the following MIBs according to the product families:

- automationPlc
- automationSimaticNet
- automationMotionControl
- automationHmi

The structure in the individual product families is organized in corresponding files. The OID node of such branches is used as the value for the sysObjectID.

automationModules
Administrative modules are inserted in the automationModules branch; in other words, modules without their own management objects.

The automationModules branch contains the following MIBs:

- automationTC

automationMgmt
The core of the automation framework is the automationMgmt branch. This group contains the current management information provided by the device. Objects that belong together in function terms are managed in separate modules in a flat hierarchy under automationMgmt. The automationNotify and automationSystem modules form a general, generic system description. Over and above this, there are files for special protocols for which no standard MIB exists up to now (e.g. IGMP) or special functions of SIMATIC NET devices (e.g. C-PLUG).

The automationMgmt branch contains the following MIBs:

- automationSystem
- automationPS
- automationTime
- automationSMTP

automationAgentCapabilities
An SNMP agent can save its profile in the fourth group. This means that an agent can specify the MIBs that it matches and also whether and which deviations exist. Since the agents were developed for specific products, this part is also product-specific and therefore corresponds to the first MIB group automationProducts in terms of structure.

The automationAgentCapabilities branch contains the following MIBs:

- automationPlcAgentCapability
- automationSimaticNetAgentCapability
- automationMotionControlAgentCapability
4.3 AUTOMATION-SMI

This module contains the basis of the Automation MIB. The structure of the object identifiers for the automation framework is defined here. It contains the definition of the starting point of the Automation MIB, the main groups and the product groups. This module is purely administrative. It contains no definitions of object identifiers that can be read out via the network.

The following access path structure is defined:

<table>
<thead>
<tr>
<th>Object identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automation</td>
<td>1.3.6.1.4.1.4329.6</td>
<td>automationMIB starting point</td>
</tr>
<tr>
<td>automationProducts</td>
<td>1.3.6.1.4.1.4329.6.1</td>
<td>Product-specific sub branches. The root OIDs of the product sub branches are also used as sysObjectID.</td>
</tr>
<tr>
<td>automationPlc</td>
<td>1.3.6.1.4.1.4329.6.1.1</td>
<td>SIMATIC S7 PLC products</td>
</tr>
<tr>
<td>automationSimaticNet</td>
<td>1.3.6.1.4.1.4329.6.1.2</td>
<td>SIMATIC NET products</td>
</tr>
<tr>
<td>automationMotionControl</td>
<td>1.3.6.1.4.1.4329.6.1.3</td>
<td>Motion Control products</td>
</tr>
<tr>
<td>automationHmi</td>
<td>1.3.6.1.4.1.4329.6.1.4</td>
<td>SIMATIC HMI products</td>
</tr>
<tr>
<td>automationSitopPower</td>
<td>1.3.6.1.4.1.4329.6.1.5</td>
<td>Sitop Power products</td>
</tr>
<tr>
<td>automationModules</td>
<td>1.3.6.1.4.1.4329.6.2</td>
<td>Object identifiers assigned administratively (e.g. textual conventions, ...)</td>
</tr>
<tr>
<td>automationMgmt</td>
<td>1.3.6.1.4.1.4329.6.3</td>
<td>Sub branch containing the MIB modules for managing a Siemens automation system.</td>
</tr>
<tr>
<td>automationAgentCapability</td>
<td>1.3.6.1.4.1.4329.6.4</td>
<td>SIMATIC S7 agent profile:</td>
</tr>
<tr>
<td>automationPlcAgentCapability</td>
<td>1.3.6.1.4.1.4329.6.4.1</td>
<td>SIMATIC S7 PLC agent profile</td>
</tr>
<tr>
<td>automationSimaticNetAgentCapability</td>
<td>1.3.6.1.4.1.4329.6.4.2</td>
<td>SIMATIC NET agent profile</td>
</tr>
<tr>
<td>automationMotionControlAgentCapability</td>
<td>1.3.6.1.4.1.4329.6.4.3</td>
<td>Motion Control agent profile</td>
</tr>
<tr>
<td>automationHmiAgentCapability</td>
<td>1.3.6.1.4.1.4329.6.4.4</td>
<td>SIMATIC HMI agent profile</td>
</tr>
<tr>
<td>automationSitopPowerAgentCapability</td>
<td>1.3.6.1.4.1.4329.6.4.5</td>
<td>Sitop Power agent profile</td>
</tr>
</tbody>
</table>

4.4 AUTOMATION-SIMATIC-NET

This module defines the subgroups in the product-specific part of the SIMATIC NET products.

This module is purely administrative; it contains no definitions of object identifiers that can be read via the network.
The following access path structure is defined for the SIMATIC NET product sub branch:

<table>
<thead>
<tr>
<th>Object identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>snScalanceX</td>
<td>1.3.6.1.4.1.4329.6.1.2.1</td>
<td>Product-specific subbranch for SCALANCE X products</td>
</tr>
<tr>
<td>• snScalanceX200</td>
<td>1.3.6.1.4.1.4329.6.1.2.1.2</td>
<td>Product-specific subbranch for SCALANCE X200 products</td>
</tr>
<tr>
<td>• snScalanceX300</td>
<td>1.3.6.1.4.1.4329.6.1.2.1.3</td>
<td>Product-specific subbranch for SCALANCE X300 products</td>
</tr>
<tr>
<td>• snScalanceX400</td>
<td>1.3.6.1.4.1.4329.6.1.2.1.4</td>
<td>Product-specific subbranch for SCALANCE X400 products</td>
</tr>
<tr>
<td>• snScalanceX500</td>
<td>1.3.6.1.4.1.4329.6.1.2.1.5</td>
<td>Product-specific subbranch for SCALANCE X500 products</td>
</tr>
<tr>
<td>snScalanceW</td>
<td>1.3.6.1.4.1.4329.6.1.2.2</td>
<td>Product-specific subbranch for SCALANCE W products</td>
</tr>
<tr>
<td>snScalanceS</td>
<td>1.3.6.1.4.1.4329.6.1.2.3</td>
<td>Product-specific subbranch for SCALANCE S products</td>
</tr>
<tr>
<td>snScalanceM</td>
<td>1.3.6.1.4.1.4329.6.1.2.4</td>
<td>Product-specific subbranch for SCALANCE M products</td>
</tr>
<tr>
<td>snS7CP</td>
<td>1.3.6.1.4.1.4329.6.1.2.5</td>
<td>Product-specific subbranch for S7 CPs</td>
</tr>
<tr>
<td>• snS7CP300</td>
<td>1.3.6.1.4.1.4329.6.1.2.5.1</td>
<td>Product-specific subbranch for S7-300 CPs</td>
</tr>
<tr>
<td>• snS7CP400</td>
<td>1.3.6.1.4.1.4329.6.1.2.5.2</td>
<td>Product-specific subbranch for S7-400 CPs</td>
</tr>
<tr>
<td>• snS7CP1200</td>
<td>1.3.6.1.4.1.4329.6.1.2.5.3</td>
<td>Product-specific subbranch for S7-1200 CPs</td>
</tr>
<tr>
<td>• snS7CP1500</td>
<td>1.3.6.1.4.1.4329.6.1.2.5.4</td>
<td>Product-specific subbranch for S7-1500 CPs</td>
</tr>
<tr>
<td>snPCCP</td>
<td>1.3.6.1.4.1.4329.6.1.2.6</td>
<td>Product-specific subbranch for PC CPs</td>
</tr>
<tr>
<td>snScalanceXCapability</td>
<td>1.3.6.1.4.1.4329.6.4.2.1</td>
<td>Capability subbranch for SCALANCE X products</td>
</tr>
<tr>
<td>• snScalanceX200Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.1.2</td>
<td>Capability subbranch for SCALANCE X200 products</td>
</tr>
<tr>
<td>• snScalanceX300Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.1.3</td>
<td>Capability subbranch for SCALANCE X300 products</td>
</tr>
<tr>
<td>• snScalanceX400Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.1.4</td>
<td>Capability subbranch for SCALANCE X400 products</td>
</tr>
<tr>
<td>• snScalanceX500Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.1.5</td>
<td>Capability subbranch for SCALANCE X500 products</td>
</tr>
<tr>
<td>snScalanceWCapability</td>
<td>1.3.6.1.4.1.4329.6.4.2.2</td>
<td>Capability subbranch for SCALANCE W products</td>
</tr>
<tr>
<td>snScalanceSCapability</td>
<td>1.3.6.1.4.1.4329.6.4.2.3</td>
<td>Capability subbranch for SCALANCE S products</td>
</tr>
<tr>
<td>snScalanceMCapability</td>
<td>1.3.6.1.4.1.4329.6.4.2.4</td>
<td>Capability subbranch for SCALANCE M products</td>
</tr>
<tr>
<td>snS7CPCapability</td>
<td>1.3.6.1.4.1.4329.6.4.2.5</td>
<td>Capability subbranch for S7 CPs</td>
</tr>
<tr>
<td>• snS7CP300Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.5.2</td>
<td>Capability subbranch for S7-300 CPs</td>
</tr>
<tr>
<td>• snS7CP400Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.5.3</td>
<td>Capability subbranch for S7-400 CPs</td>
</tr>
<tr>
<td>• snS7CP1200Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.5.4</td>
<td>Capability subbranch for S7-1200 CPs</td>
</tr>
<tr>
<td>• snS7CP1500Capability</td>
<td>1.3.6.1.4.1.4329.6.4.2.5.5</td>
<td>Capability subbranch for S7-1500 CPs</td>
</tr>
<tr>
<td>snPCPCapability</td>
<td></td>
<td>Capability subbranch for PC CP S products</td>
</tr>
</tbody>
</table>
### 4.5 AUTOMATION-TC

#### Textual conventions

It is often practical to create separate syntax definitions for example to represent addresses or version formats. To ensure that the specifications are unique for the entire private Automation MIB, the textual conventions are grouped in a single module. The module is located under the automationModules branch and is a purely administrative module.

The following textual conventions are defined:

<table>
<thead>
<tr>
<th>Name</th>
<th>Syntax</th>
<th>Screen display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutomationOrderNumberTC</td>
<td>OCTET STRING (SIZE (16..32))</td>
<td>&quot;1a&quot;</td>
<td>Format of the article number of Siemens products</td>
</tr>
<tr>
<td>AutomationSerialNumberTC</td>
<td>OCTET STRING (SIZE (32))</td>
<td>&quot;1a&quot;</td>
<td>Format of the serial numbers of the SIMATIC NET products</td>
</tr>
<tr>
<td>AutomationVersionNumberTC</td>
<td>OCTET STRING (SIZE (0..32))</td>
<td>&quot;1a&quot;</td>
<td>Version format of the Siemens products in a simplified OSLO format: [RCSTBPVKD][0-9][1,2].[0-9][1,2].[0-9][1,2]</td>
</tr>
<tr>
<td>AutomationMacAddressTC</td>
<td>OCTET STRING (SIZE (6))</td>
<td>&quot;1x:&quot;</td>
<td>48-bit string using the hexadecimal display in authorized order, specified by the IEEE standard 802 (overview and architecture, previously IEEE standard 802.1a). If the MAC addresses are shorter than 48 bits, the unused leading eight-bit characters must be set to 0. The 16-bit address AAFF, for example should be represented as 00000000AAFF.</td>
</tr>
<tr>
<td>AutomationIpAddressTC</td>
<td>OCTET STRING</td>
<td>&quot;1a&quot;</td>
<td>An 8-bit string that represents either an IPv4 address, an IPv6 address or a DNS name.</td>
</tr>
<tr>
<td>AutomationStatusTC</td>
<td>INTEGER { invalid(0), enable(1), disable(2) }</td>
<td>---</td>
<td>Uniform representation of a status value</td>
</tr>
<tr>
<td>AutomationTriggerTC</td>
<td>INTEGER { trigger(1), notTriggered(2) }</td>
<td>---</td>
<td>Uniform representation of trigger value</td>
</tr>
<tr>
<td>AutomationFunctionStringTC</td>
<td>OCTET STRING (SIZE (32))</td>
<td>&quot;32a&quot;</td>
<td>The format of function IDs according to IEC 61158-6-10, section 6.2.6.13 IM_Tag_Function. The value should be filled with spaces if it contains less than 32 characters. Non-printable characters are not permitted:</td>
</tr>
<tr>
<td>AutomationLocationStringTC</td>
<td>OCTET STRING (SIZE (22))</td>
<td>&quot;22a&quot;</td>
<td>The format of the function IDs according to IEC 61158-6-10, section 6.2.6.14 IM_Tag_Location. The value should be filled with spaces if it contains less than 32 characters. Non-printable characters are not permitted:</td>
</tr>
</tbody>
</table>
4.6 AUTOMATION SYSTEM

This module represents an expansion of the system group of MIB-II and contains the general system description of a SIMATIC NET component. It is assigned to the automationMgmt branch. The structure of this module is divided into the following subareas:

- System identification
- System status
- Parameters for generic control of the system
- Configuration of the SNMP agent
- General events

automationSystemObjects

automationSystemIdent group

The area of system identification is oriented mainly on the I&M definitions for PROFINET and contains the most important parameters of the I&M classes 0 to 2.

Since the character set for files with ASN.1 notation does not contain the ASCII character 248 "degree" (°), this is replaced by the permitted ASCII character 30 "record separator" (^) in the 'DESCRIPTIONS of the objects for location information'.

The following objects are defined in the automationSystemIdent group:

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax</th>
<th>Range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationManufacturerId</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.1</td>
<td>Unsigned32</td>
<td>(0..65535)</td>
<td>read only</td>
<td>current</td>
<td>A code that identifies the sender of the component.</td>
</tr>
<tr>
<td>automationOrderNumber</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.2</td>
<td>AutomationOrderNumberTC</td>
<td></td>
<td>read only</td>
<td>current</td>
<td>Article number of the system</td>
</tr>
<tr>
<td>automationSerialNumber</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.3</td>
<td>AutomationSerialNumberTC</td>
<td></td>
<td>read only</td>
<td>current</td>
<td>The serial number of the system.</td>
</tr>
<tr>
<td>automationHwRevision</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.4</td>
<td>AutomationVersionNumberTC</td>
<td></td>
<td>read only</td>
<td>current</td>
<td>The hardware version of the system</td>
</tr>
<tr>
<td>automationSwRevision</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.5</td>
<td>AutomationVersionNumberTC</td>
<td></td>
<td>read only</td>
<td>current</td>
<td>The firmware version of the system</td>
</tr>
<tr>
<td>automationRevisionCounter</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.6</td>
<td>Counter32</td>
<td></td>
<td>read only</td>
<td>current</td>
<td>This counter is always incremented by 1 if a value of automationIM0Group or automationTM1Group changes. Default setting: 1 For PROFINET IO devices the value 0 is permitted permanently.</td>
</tr>
</tbody>
</table>
### 4.6 AUTOMATION SYSTEM

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax Range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationRevisionDate</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.7</td>
<td>DateAndTime</td>
<td>read only</td>
<td>current</td>
<td>The time since the last change to a value of automationRevisionCounter. The value starts with the date of the default configuration. If a system does not support absolute time, it must not support the value. If the system supports the Entity MIB, the value of this entry corresponds to entLastChangeTime.</td>
</tr>
<tr>
<td>automationFunctionTag</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.8</td>
<td>AutomationFunctionStringTC</td>
<td>read only</td>
<td>current</td>
<td>A code that describes the function of the component within the system. <em>This value is specified by project planning.</em> It is comparable with 'sysName' of MIB-II but from an automation perspective.</td>
</tr>
<tr>
<td>automationLocationTag</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.1.9</td>
<td>AutomationLocationStringTC</td>
<td>read only</td>
<td>current</td>
<td>A code that describes the location of the installed component within the system. <em>This value is specified by project planning.</em> It is comparable with 'sysLocation' of MIB-II but from an automation perspective.</td>
</tr>
</tbody>
</table>
| automationGeoLatitude  | 1.3.6.1.4.1.4329.6.3.2.1.1.10 | DisplayString          | read/write | current | Geographical latitude of the system displayed in one of the following formats:  
  - DD.DDDDDD^  
  - DD^MM.MMMM'  
  - DD^MM'SS.SS.  
  A leading '+' or the appended letter 'N' indicates a northern latitude, a leading '-' character or the appended letter 'S' indicates a southern latitude.  
  The geodetic reference system is WGS84.  
  There should only be enough written to achieve the required accuracy.  
  Example: 49.025^, 49^01.5224', 49^01'31.343 N, +49^01'31.343 or 49^01'31.343 |
### Name | OID | Syntax | Range of values | Access | Status | Description
--- | --- | --- | --- | --- | --- | ---
automationGeoLongitude | 1.3.6.1.4.1.4329.6.3.2.1.1.11 | DisplayString |  | read/write | current | Geographical latitude of the system displayed in one of the following formats:
- DDD.DDDDD^
- DDD^MM.MMMM'
- DDD^MM'SS.SS
A leading '+' or the appended letter 'O' or 'E' indicates an eastern longitude, a leading '-' character or the appended letter 'W' indicates a western longitude.
The geodetic reference system is WGS84.
There should only be enough written to achieve the required accuracy.
Example: 8.3498^, 8^20.986', 8^20'59.2 E, +8^20'59.2 or 8^20'59.2

automationGeoHeight | 1.3.6.1.4.1.4329.6.3.2.1.1.12 | DisplayString |  | read/write | current | Geographical height of the system in the following format:
- ddddd m (higher order zeros are suppressed)
A leading '-' character indicates a height below zero.
Example: 158 m , - 20 m

automationTimeZoneOffsetHours | 1.3.6.1.4.1.4329.6.3.2.1.1.13 | Integer32 | (-23...23) | read/write | current | Offset (hours) of the local time from the UTC time zone

automationTimeZoneOffsetMinutes | 1.3.6.1.4.1.4329.6.3.2.1.1.14 | Integer32 | (-59...59) | read/write | current | Offset (minutes) of the local time from the UTC time zone

automationSwUser | 1.3.6.1.4.1.4329.6.3.2.1.1.15 | DisplayString |  | read only | current | The name of the user who performed the last firmware update. If the user is not known, the value "unknown" can be assigned.

automationSwDate | 1.3.6.1.4.1.4329.6.3.2.1.1.16 | DateAndTime |  | read only | current | The time since the last firmware update. The value starts with the date of the default configuration. If a system does not support absolute time, it must not support the value.

**automationSystemStatus group**

The status area contains objects that represent the operational status of the application and the system.
The following objects are defined in the automationSystemStatus group:

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationOperState</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.2.1</td>
<td>INTEGER { ok(0), maintenanceRequired(1), maintenanceDemanded(2), fault(3) }</td>
<td>read only</td>
<td>current</td>
<td>Diagnostics status of the component. ok(0) means that the component is working and no errors have occurred. maintenanceRequired(1) means that there are currently no problems. Maintenance is, however, recommended the, for example because a service interval has elapsed or the component detected a software update etc. maintenanceDemanded(2) means that the component is working, however there are problems that could lead to errors. fault(3) means that a fault has occurred on the component. If an error LED is reachable on the front panel, the error display should be synchronized with the error value of automationOperState. If automationOperState indicates an error, the error LED must light up (ON). In all other statuses of automationOperState, the error LED is off.</td>
</tr>
<tr>
<td>automationApplicationOperState</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.2.2</td>
<td>INTEGER { noControl(1), run(2), stop(3) }</td>
<td>read only</td>
<td>current</td>
<td>Operating status of the application within the automation system. This status indicates whether the device context part of an automation system is in operation (run or stop) or not (noControl).</td>
</tr>
</tbody>
</table>

**automationSystemGeneric group**

Some systems allow a restart by SNMP and can reset their configuration to default values. The trigger for such procedures, the counter for restart statistics and similar objects are put together in one group as generic parameters.
The following objects are defined in the automationSystemGeneric group:

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationSystemRestart</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.3.1</td>
<td>INTEGER { noOperation(0),</td>
<td>read/write</td>
<td>current</td>
<td>Restart of the system. Setting the value to 1 causes a cold restart, the value 2 a hot restart. The different reactions to cold restart and hot restart depend on the component and are described in the user manual of the relevant component. If a hot restart is triggered by the values 3 or 4, the settings of the component will be reset to the factory settings. The value 3 means that only the basic parameters are reset, the value 4 causes a complete reset. Which parameters are influenced by this action is described in the manual of the component.</td>
</tr>
<tr>
<td>automationPowerUpCount</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.3.3</td>
<td>Counter32</td>
<td>read only</td>
<td>current</td>
<td>Number of system starts</td>
</tr>
<tr>
<td>automationResetCounters</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.3.4</td>
<td>AutomationTriggerTC</td>
<td>read/write</td>
<td>current</td>
<td>Resets all the statistical counters of the component. With write access only a trigger value is accepted (and causes a reset by the counter of the system); all other values are rejected.</td>
</tr>
<tr>
<td>automationConfigId</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.3.5</td>
<td>OCTET STRING (SIZE(64))</td>
<td>read only</td>
<td>current</td>
<td>Signature of the values of all configuration parameters. The value 0x00 of all bytes shows a temporary status in which no current signature is available, for example while loading the data.</td>
</tr>
<tr>
<td>automationConfigUser</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.3.6</td>
<td>DisplayString</td>
<td>read only</td>
<td>current</td>
<td>The name of the user who made the last change to a parameter of the configuration parameter group. If the user is not known, the value &quot;unknown&quot; can be assigned.</td>
</tr>
<tr>
<td>automationConfigDate</td>
<td>1.3.6.1.4.1.4329.6.3.2.1.3.7</td>
<td>DateAndTime</td>
<td>read only</td>
<td>current</td>
<td>The time since the last change to a value of the configuration parameter group. The value starts with the date of the default configuration. If a system does not support absolute times, the value must not be supported.</td>
</tr>
</tbody>
</table>

**automationSystemIP group**

A device capable of SNMP automatically has an IP configuration. Some systems allow the user to modify this IP configuration with SNMP. The objects that allow this are grouped in the IP configuration group.
The parameters for configuration of an out-band port are also stored in this group if they exist. If an out-band port exists and has transferred IP parameters, the system can be reached via the in-band IP address and the out-band IP address.

If a system supports VLAN and this influences the configuration of the agent, this group is not suitable for the entire parameter transfer of the agent. Instead the system must make other objects available for the transfer of the VLAN to the IP subnet and for similar functions. It is, however assumed that systems with VLAN also support this.

The objects of this branch will be replaced by the IP address objects of the ipMIB of RFC 4293 that are not dependent on the IP version.

### automationSystemNotifications

In this area, the MIB module makes notifications available that indicate changes to the operational system status or changes to the configuration.

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Objects</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationOperStateChanged</td>
<td>1.3.6.1.4.1.4329.6.3.2.2.0.1</td>
<td>automationOperState</td>
<td>current</td>
<td>The system triggers this event if the value of automationOperState changes.</td>
</tr>
<tr>
<td>automationRevisionChanged</td>
<td>1.3.6.1.4.1.4329.6.3.2.2.0.2</td>
<td>-</td>
<td>current</td>
<td>The system triggers this event if there is a change in the configuration, for example when the hardware configuration is changed or firmware is updated.</td>
</tr>
</tbody>
</table>

### 4.7 AUTOMATION-TIME

In MIB-II, there is only the sysUpTime object that returns the time ticks since the last system start. For systems within an automation network, this is, however, inadequate. They often request absolute time values, for example to save the time since the last system change. This requires synchronization with a time master. A number of different methods are available in a network for time-of-day synchronization.

The AUTOMATION-TIME MIB module is located under the automationMgmt branch. It provides the central point for displaying the system time and for controlling time-of-day synchronization.

The following structure of the access paths defines the automationTimeMIB module:

<table>
<thead>
<tr>
<th>Object Identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationTimeMIB</td>
<td>1.3.6.1.4.1.4329.6.3.3</td>
<td>Sub branch for the automationTime MIB</td>
</tr>
<tr>
<td>automationTimeObjects</td>
<td>1.3.6.1.4.1.4329.6.3.3.1</td>
<td>Sub branch for the automationTime objects</td>
</tr>
<tr>
<td>automationTimeNotifications</td>
<td>1.3.6.1.4.1.4329.6.3.3.2</td>
<td>Sub branch for the automationTime messages</td>
</tr>
<tr>
<td>automationTimeNotifica-</td>
<td>1.3.6.1.4.1.4329.6.3.3.2.0</td>
<td>Sub branch for SNMPv2 messages</td>
</tr>
<tr>
<td>tionsV2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>automationTimeConformance</td>
<td>1.3.6.1.4.1.4329.6.3.3.3</td>
<td>Sub branch for automationTime conformity definitions</td>
</tr>
</tbody>
</table>
**automationTimeObjects**

The automationTimeObjects group contains the absolute system time object. It also contains a table that lists all the synchronization mechanisms supported by a component. These mechanisms can be activated and deactivated via an object from this table.

The synchronization protocols and methods are managed in separate MIB modules that are not part of the automationMIB.

The following objects are defined in the automationTimeObjects sub branch:

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax / Range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationTime</td>
<td>1.3.6.1.4.1.4329.6.3.3.1.1</td>
<td>DateAndTime</td>
<td>read only</td>
<td>current</td>
<td>System time (not the operating time)</td>
</tr>
<tr>
<td>automationTimeLastSync</td>
<td>1.3.6.1.4.1.4329.6.3.3.1.2</td>
<td>OBJECT IDENTIFIER</td>
<td>read only</td>
<td>current</td>
<td>A link in the sync table. Identifies the mechanism that was used for the last synchronization.</td>
</tr>
<tr>
<td>automationTimeSyncTable</td>
<td>1.3.6.1.4.1.4329.6.3.3.1.3</td>
<td>Sequence of AutomationTimeSyncEntry</td>
<td>current</td>
<td></td>
<td>The table allows control of the sync mechanism.</td>
</tr>
</tbody>
</table>

The following objects represent a row in the automationTimeSync table:

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax / Range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationTimeSyncIndex</td>
<td>1.3.6.1.4.1.4329.6.3.3.1.3.1.1</td>
<td>Unsigned32</td>
<td>n-a *</td>
<td>current</td>
<td>The unique value that identifies this entry.</td>
</tr>
<tr>
<td>automationTimeSyncName</td>
<td>1.3.6.1.4.1.4329.6.3.3.1.3.1.2</td>
<td>DisplayString</td>
<td>read only</td>
<td>current</td>
<td>The name of the sync mechanism.</td>
</tr>
<tr>
<td>automationTimeAdminStatus</td>
<td>1.3.6.1.4.1.4329.6.3.3.1.3.1.3</td>
<td>AutomationStatusTC</td>
<td>read write</td>
<td>current</td>
<td>This mechanism specifies whether the system accepts synchronization events. Only one TimeSync mechanism can be active at any one time. Attempting to activate a second mechanism causes the error message 'badValue'. This means that changing the TimeSync mechanism requires the two following steps: 1. Disabling the active mechanism 2. Enabling the new mechanism</td>
</tr>
</tbody>
</table>

* n-a: No access

**automationTimeNotifications**

In this area, the MIB module provides messages indicating changes to automationTime.
The following objects are defined in the automationTimeNotificationsV2 group:

<table>
<thead>
<tr>
<th>Name</th>
<th>Objects</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationTimeChanged</td>
<td>automation-TimeSyncName, automationTime</td>
<td>current</td>
<td>The system triggers this event if the value of automationTime was changed. The event contains the new time of the system and the mechanism used to change the value.</td>
</tr>
</tbody>
</table>

### 4.8 AUTOMATION-PS

The AUTOMATION-PS MIB module is located below the automationMgmt branch. The network devices of a system are managed in this module.

The following structure of the access paths is defined in the AUTOMATION-PS MIB modules:

<table>
<thead>
<tr>
<th>Object identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationPSMIB</td>
<td>1.3.6.1.4.1.4329.6.3.5</td>
<td>Sub branch for automationPS MIB</td>
</tr>
<tr>
<td>automationPSObjects</td>
<td>1.3.6.1.4.1.4329.6.3.5.1</td>
<td>Sub branch for automationPS objects</td>
</tr>
<tr>
<td>automationPSNotifications</td>
<td>1.3.6.1.4.1.4329.6.3.5.2</td>
<td>Sub branch for automationPS notifications</td>
</tr>
<tr>
<td>automationPSNotificationsV2</td>
<td>1.3.6.1.4.1.4329.6.3.5.2.0</td>
<td>Sub branch for SNMPv2 notifications</td>
</tr>
<tr>
<td>automationPSConformance</td>
<td>1.3.6.1.4.1.4329.6.3.5.3</td>
<td>Sub branch for automationPS conformance definitions</td>
</tr>
</tbody>
</table>

**automationPSObjects**

The automationPSObjects group consists solely of a table with all the PSUs of the system.

The following object is defined in the automationPSObjects sub branch:

<table>
<thead>
<tr>
<th>Name</th>
<th>Syntax / range of values</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationPSTable</td>
<td>Sequence of AutomationPSEntry</td>
<td>current</td>
<td>A row in the power supply unit table. Entries cannot be created or deleted using SNMP operations.</td>
</tr>
</tbody>
</table>

The following objects form a row in the automationPSTable:

<table>
<thead>
<tr>
<th>Name</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationPSIndex</td>
<td>Unsigned32</td>
<td>n-a *</td>
<td>current</td>
<td>The unique value that identifies this entry.</td>
</tr>
<tr>
<td>automationPSStatus</td>
<td>INTEGER { inactive(1), active(2) }</td>
<td>read only</td>
<td>current</td>
<td>The status of the corresponding PSU.</td>
</tr>
</tbody>
</table>
## 4.9 AUTOMATION-BOOTDHCP

The AUTOMATION BOOTDHCP module is located below the automationMgmt branch. The bootp/DHCP clients of a system are managed in this module.

The following structure of the access paths defines the automationBootDhcpMIB module:

<table>
<thead>
<tr>
<th>Object Identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationBootDhcpMIB</td>
<td>1.3.6.1.4.1.4329.6.3.7</td>
<td>Sub branch for the automationBootDhcp MIB</td>
</tr>
<tr>
<td>automationBootDhcpObjects</td>
<td>1.3.6.1.4.1.4329.6.3.7.1</td>
<td>Sub branch for the automationBootDhcp objects</td>
</tr>
<tr>
<td>automationBootDhcpConformance</td>
<td>1.3.6.1.4.1.4329.6.3.7.3</td>
<td>Sub branch for the automationBootDhcp conformity definitions</td>
</tr>
</tbody>
</table>

### automationBootDhcpObjects

The automationBootDhcpObjects group consists solely of a table for all Bootp/DHCP clients of a system.
The following object is defined in the automationBootDhcpObjects sub branch:

<table>
<thead>
<tr>
<th>mib-2-Name</th>
<th>Syntax / range of values</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>automationBootDhcpTable</td>
<td>1.3.6.1.4.1.4329.6.3.7.1.1</td>
<td>Sequence of AutomationBootDhcpEntry</td>
<td>current</td>
</tr>
</tbody>
</table>

The automationBootDhcpTable contains a row for each layer 3 interface of the system. The index of each row is the same index as in the ifTable, so that each interface can be assigned uniquely. Each row contains an identifier and a client ID that control the behavior of the client.

The following objects form a row in the automationBootDhcpTable:

<table>
<thead>
<tr>
<th>mib-2-Name</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ifIndex</td>
<td>1.3.6.1.2.1.2.2...</td>
<td>InterfaceIndex</td>
<td>n-a</td>
<td>current</td>
</tr>
<tr>
<td>automationBootDhcpControl</td>
<td>1.3.6.1.4.1.4329.6.3.7.1.1.1.1</td>
<td>INTEGER { disabled(0), bootp(1), dhcpViaMacaddress(2), dhcpViaClientId(3), dhcpViaSysname(4)}</td>
<td>read/write</td>
<td>current</td>
</tr>
<tr>
<td>automationBootDhcpClientId</td>
<td>1.3.6.1.4.1.4329.6.3.7.1.1.1.2</td>
<td>DisplayString</td>
<td>read/write</td>
<td>current</td>
</tr>
</tbody>
</table>

* n-a: No access

### 4.10 AUTOMATION-TELNET

The AUTOMATION-TELNET MIB module is located below the automationMgmt branch.

The following structure of the access paths is defined in the automationTelnetMIB module:

<table>
<thead>
<tr>
<th>Object Identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>automationTelnetMIB</td>
<td>1.3.6.1.4.1.4329.6.3.8</td>
<td>Sub branch for the automationTelnet MIB</td>
</tr>
<tr>
<td>automationTelnetObjects</td>
<td>1.3.6.1.4.1.4329.6.3.8.1</td>
<td>Sub branch for the automationTelnet objects</td>
</tr>
<tr>
<td>automationTelnetConformance</td>
<td>1.3.6.1.4.1.4329.6.3.8.3</td>
<td>Sub branch for the automationTelnet conformity definitions</td>
</tr>
</tbody>
</table>

**automationTelnetObjects**

This sub branch contains variables to control the timeout of the Telnet sessions.
The following objects are defined in the automationTelnetObjects sub branch:

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationTelnetAdminStatus</td>
<td>1.3.6.1.4.1.4329.6.3.8.1.1</td>
<td>AutomationStatusTC</td>
<td>read/write</td>
<td>current</td>
<td>Enables / disables the Telnet unit.</td>
</tr>
<tr>
<td>automationTelnetTimeOutStatus</td>
<td>1.3.6.1.4.1.4329.6.3.8.1.2</td>
<td>AutomationStatusTC</td>
<td>read/write</td>
<td>current</td>
<td>Enables or disables the timeout for the console session.</td>
</tr>
<tr>
<td>automationTelnetTimeOut</td>
<td>1.3.6.1.4.1.4329.6.3.8.1.3</td>
<td>Unsigned32 (60..600)</td>
<td>read/write</td>
<td>current</td>
<td>Timeout value for the console session.</td>
</tr>
</tbody>
</table>

4.11 AUTOMATION-SMTP

The AUTOMATION-SMTP MIB module is located below the automationMgmt branch. Network components are often capable of receiving or sending messages if certain system events occur. This functionality can be configured in automationSmtpMIB.

The following list of access paths is defined for the automationSmtpMIB module:

<table>
<thead>
<tr>
<th>Object Identity</th>
<th>OID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationSmtpMIB</td>
<td>1.3.6.1.4.1.4329.6.3.9</td>
<td>Sub branch for the automationSmtp MIB</td>
</tr>
<tr>
<td>automationSmtpObjects</td>
<td>1.3.6.1.4.1.4329.6.3.9.1</td>
<td>Sub branch for the automationSmtp objects</td>
</tr>
<tr>
<td>automationSmtpConformance</td>
<td>1.3.6.1.4.1.4329.6.3.9.3</td>
<td>Sub branch for the automationSmtp conformity definitions</td>
</tr>
</tbody>
</table>

**automationSmtpObjects**

This sub branch contains the address of the SMTP server, the corresponding port and the value of the "from" box of the e-mail address. Several recipients of the e-mail can be specified in a recipient table. The instance that decides whether or not an e-mail is triggered is located in a different module.

The following objects are defined in the automationSmtpObjects sub branch:

<table>
<thead>
<tr>
<th>mib-2-Name</th>
<th>OID</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationSmtpSender</td>
<td>1.3.6.1.4.1.4329.6.3.9.1.1</td>
<td>DisplayString</td>
<td>read/write</td>
<td>current</td>
<td>First part of the &quot;From&quot; box in the e-mail address</td>
</tr>
<tr>
<td>automationSmtpIpAddress</td>
<td>1.3.6.1.4.1.4329.6.3.9.1.2</td>
<td>AutomationIpAddressTC</td>
<td>read/write</td>
<td>current</td>
<td>IP address or host name of the SMTP server</td>
</tr>
<tr>
<td>automationSmtpPort</td>
<td>1.3.6.1.4.1.4329.6.3.9.1.3</td>
<td>Unsigned32 (1..65535)</td>
<td>read/write</td>
<td>current</td>
<td>TCP port</td>
</tr>
<tr>
<td>automationSmtpReceiverTable</td>
<td>1.3.6.1.4.1.4329.6.3.9.1.3</td>
<td>Sequence of AutomationSmtpReceiverEntry</td>
<td>current</td>
<td>A table that contains all recipient addresses for e-mails.</td>
<td></td>
</tr>
</tbody>
</table>
Siemens Automation MIB

4.12 AUTOMATION-SNTP

Diagnostics and configuration with SNMP

52 Diagnostics Manual, 08/2014, C79000-G8976-C357-01

### 4.12 AUTOMATION-SNTP

The model in the for controlling time-of-day synchronization in the Automation MIB specifies that the control of the synchronization paths should be created in the Automation-Time MIB. The configuration of the access method is in a separate MIB group. One of the possible synchronization methods is SNTP. The parameters of this protocol are managed by using the Automation-SNTP module in the automationMgmt branch. This includes the address and the port of the SNTP server, the time difference between server and client and the test interval of the client.

The following structure of the access path is defined for the automationSntpMIB module.

**automationSntpObjects**

This sub branch contains the address and the port of the SNTP server, the time difference between server and client and the sampling interval of the client.

The following objects are defined in the automationSntpObjects sub branch:

<table>
<thead>
<tr>
<th>Name</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationSntpIpAddress</td>
<td>AutomationIpAddressTC</td>
<td>read/write</td>
<td>current</td>
<td>SNTP Server IP Address</td>
</tr>
<tr>
<td>automationSntpPortNumber</td>
<td>Unsigned32</td>
<td>read/write</td>
<td>current</td>
<td>Port of the SNTP server host. The default value is 123.</td>
</tr>
<tr>
<td>automationSntpTimeShift</td>
<td>INTEGER {</td>
<td>read/write</td>
<td>obsolete</td>
<td>Time difference between SNTP server and the system time is 'obsolete' because the granularity is too coarse. Time change is possible with 'automationTimeZoneOffsetHours' and 'automationTimeZoneOffsetMinutes' of the AUTOMATION-SYSTEM MIB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationSmtpReceiverIndex</td>
<td>1.3.6.1.4.1.4329.6.3.9.1.3.1.1</td>
<td>Unsigned32 n-a *</td>
<td>current</td>
<td></td>
<td>The index of the entries</td>
</tr>
<tr>
<td>automationSmtpReceiverAddress</td>
<td>1.3.6.1.4.1.4329.6.3.9.1.3.1.2</td>
<td>DisplayString read/write</td>
<td>current</td>
<td></td>
<td>E-mail address to which messages are sent.</td>
</tr>
</tbody>
</table>

* n-a: No access
<table>
<thead>
<tr>
<th>Name</th>
<th>OID</th>
<th>Syntax / range of values</th>
<th>Access</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationSntpInitSamplingInterval</td>
<td>1.3.6.1.4.1.4329.6.3.11.1.4</td>
<td>Unsigned32 (10..10000)</td>
<td>read/write</td>
<td>current</td>
<td>Sampling interval of the SNTP queries in seconds before a reply is received. Only if 'automationSntpIpAddress' is set.</td>
</tr>
<tr>
<td>automationSntpSamplingInterval</td>
<td>1.3.6.1.4.1.4329.6.3.11.1.5</td>
<td>Unsigned32 (10..10000)</td>
<td>read/write</td>
<td>current</td>
<td>Sampling interval of the SNTP queries in seconds. Only if 'automationSntpIpAddress' is set and if there was ever a reply from the SNTP server.</td>
</tr>
</tbody>
</table>
5.1 Link overview according to product groups

Below, you will find Internet links of Siemens Automation Industry Support for downloading MIB files.

Automation MIB

You will find the Siemens Automation MIB on the following Internet page:


SCALANCE X switches

Among others, the following MIBs are available for SCALANCE X:

- Private MIB SCALANCE X-200/X-200IRT
- Private MIB SCALANCE X-300
- Private MIB SCALANCE X-400

You will find the files on the following Internet page:

22015045 (http://support.automation.siemens.com/WW/view/en/22015045)

RuggedCom switches

You will find a description of the MIBs used and network management with SNMP in the user guide "RUGGEDCOM NMS". You will find the manual on the following Internet page:

NMS (http://www.ruggedcom.com/pdfs/ruggednms/ruggednms_user_guide)

The MIBs supported by the switches are described in the user guides of the relevant devices. You will find the product overview on the following Internet pages:

RuggedCom (http://support.automation.siemens.com/WW/view/en/)


To obtain the MIB files, please contact the RuggedCom customer support:

+1 (866) 922-7975
or
+1 (905) 856-5288

SCALANCE W-700

You will find the private MIB SCALANCE W-700 on the following Internet page:

CP 1616, CP 1604 and SIMATIC-PC with CP 1616

You will find the MIB files and the device profiles for the CP 1616, the CP 1604 and SIMATIC PC with CP 1616 onboard on the following Internet page:

A.1 AUTOMATION-SMI

-- -----------------------------------------------------------------------------
-- automationSmi.mib
--
-- SIEMENS AG
-- Industry Sector
--
-- Industry Automation Division Structure of Management Information
--
-- Copyright (c) 2005-2013 Siemens AG
-- All rights reserved.
-- -----------------------------------------------------------------------------

AUTOMATION-SMI DEFINITIONS ::= BEGIN

IMPORTS
siemens FROM SIEMENS-SMI

automation MODULE-IDENTITY
LAST-UPDATED "201306250000Z"
ORGANIZATION "Siemens AG"
CONTACT-INFO Siemens AG
Industry Sector
I IA AS CTO SYA
SNMP Automation Registration Authority
Postal: Glewitzer Strasse 555
Nuremberg-Moorenbrunn
D-90475
Tel: +49 911 895 0
E-mail: automation-mib.industry@siemens.com

DESCRIPTION
The root object identifier of Siemens automation MIB.
The MIB module provides the structure of management information of Siemens AG, Industry Sector
Industry Automation Division

REVISION "2013062500000Z"
DESCRIPTION "added SitopPower branch"
REVISION "2012072700000Z"
DESCRIPTION "Bugfixes and corrections"
REVISION "2008111000000Z"
DESCRIPTION "Update the contact information"
REVISION "2008060200000Z"
DESCRIPTION "declaration of siemens node will be imported now from SIEMENS-SMI"
REVISION "200804290000Z"
DESCRIPTION "declaration of siemens node moved into declaration of MODULE IDENTITY."
REVISION "200501120000Z"
DESCRIPTION "Initial Version of the MIB module."
::= { siemens 6 }
automationProducts OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "automationProducts is the product specific subtree. The root OIDs of the product subtrees are used as sysObjectID as well."
automationPlc OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for SIMATIC S7 PLC products."
  ::= { automationProducts 1 }
automationSimaticNet OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for SIMATIC NET products."
  ::= { automationProducts 2 }
automationMotionControl OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "automationProducts 3 }
automationHmi OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for SIMATIC HMI products."
  ::= { automationProducts 4 }
automationSitopPower OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for Sitop Power products."
  ::= { automationProducts 5 }
automationModules OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "This subtree is reserved for administratively assigned
OBJECT IDENTIFIERS, i.e. those which are not associated with MIB objects.
These could be TEXTUAL CONVENTIONS, module registration and so on."
  ::= { automation 2 }
automationMgmt OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "The subtree which contains the MIB modules to manage a Siemens automation system."
::= { automation 3 }
automationAgentCapability OBJECT-IDENTITY
  STATUS    current
  DESCRIPTION "Subtree for agent profiles."
:::= { automation 4 }
automationPlcAgentCapability OBJECT-IDENTITY
  STATUS    current
  DESCRIPTION "Subtree for SIMATIC S7 agent profiles."
:::= { automationAgentCapability 1 }
automationSimaticNetAgentCapability OBJECT-IDENTITY
  STATUS    current
  DESCRIPTION "Subtree for SIMATIC NET agent profiles."
:::= { automationAgentCapability 2 }
automationMotionControlAgentCapability OBJECT-IDENTITY
  STATUS    current
  DESCRIPTION "Subtree for motion control agent profiles."
:::= { automationAgentCapability 3 }
automationHmiAgentCapability OBJECT-IDENTITY
  STATUS    current
  DESCRIPTION "Subtree for HMI agent profiles."
:::= { automationAgentCapability 4 }
automationSitopPowerCapability OBJECT-IDENTITY
  STATUS    current
  DESCRIPTION "Subtree for Sitop Power agent profiles."
:::= { automationAgentCapability 5 }

END

A.2 AUTOMATION-SIMATIC-NET

-- -------------------------------
-- automationSimaticNet.mib
--
-- SIEMENS AG
-- Industry Sector
--
-- entry into SIMATIC NET product specific subtrees
--
-- Copyright (c) 2005-2013 Siemens AG
-- All rights reserved.
-- -------------------------------

AUTOMATION-SIMATIC-NET-MIB DEFINITIONS ::= BEGIN
IMPORTS
  automationModules,
Modules and parameters of the Siemens Automation MIB

A.2 AUTOMATION-SIMATIC-NET

automationSimaticNetAgentCapability,

automationSimaticNet FROM AUTOMATION-SMI

MODULE-IDENTITY,

OBJECT-IDENTITY FROM SNMPv2-SMI;

automationSimaticNetModule MODULE-IDENTITY

LAST-UPDATED "201307030000Z"

ORGANIZATION "Siemens AG"

CONTACT-INFO "

Siemens AG

Industry Sector

I IA AS CTO SYA

SNMP Automation Registration Authority

Postal: Gleiwitzer Strasse 555

       Nuremberg-Moorenbrunn

       D-90475

Tel: +49 911 895 0

E-mail: automation-mib.industry@siemens.com

"

DESCRIPTION "

Provides the root OBJECT IDENTIFIER to the product specific subtrees for SIMATIC NET products. The root OIDs of the subtrees are used as sysObjectID values as well.

"

REVISION "20130703000000Z"

DESCRIPTION "Indentation adjusted."

REVISION "20120727000000Z"

DESCRIPTION "Added further SIMATIC NET products."

REVISION "20120601000000Z"

DESCRIPTION "Bugfixes and corrections."

REVISION "20081111000000Z"

DESCRIPTION "Update the contact information."

REVISION "20050112000000Z"

DESCRIPTION "Initial Version of the MIB module."

::= { automationModules 3 }

--
-- scalanceX line switches
--
snScalanceX  OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for ScalanceX products."
  ::= { automationSimaticNet 1 }

snScalanceX200  OBJECT IDENTIFIER ::= { snScalanceX 2 }

snScalanceX300  OBJECT IDENTIFIER ::= { snScalanceX 3 }

snScalanceX400  OBJECT IDENTIFIER ::= { snScalanceX 4 }

snScalanceX500  OBJECT IDENTIFIER ::= { snScalanceX 5 }

snScalanceXCability  OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for ScalanceX agent capability statements."
  ::= { automationSimaticNetAgentCapability 1 }

snScalanceX200Capability  OBJECT IDENTIFIER ::= { snScalanceXCability 2 }

snScalanceX300Capability  OBJECT IDENTIFIER ::= { snScalanceXCability 3 }

snScalanceX400Capability  OBJECT IDENTIFIER ::= { snScalanceXCability 4 }

snScalanceX500Capability  OBJECT IDENTIFIER ::= { snScalanceXCability 5 }
--
-- scalanceW components
--

snScalanceW  OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for ScalanceW products."
  ::= { automationSimaticNet 2 }

snScalanceWCability  OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for ScalanceW agent capability statements."
  ::= { automationSimaticNetAgentCapability 2 }
--
-- scalanceS components
--

snScalanceS  OBJECT-IDENTITY
  STATUS current
  DESCRIPTION "Subtree for ScalanceS products."
::= { automationSimaticNet 3 }

snScalanceSCapability OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for ScalanceS agent capability statements."
::= { automationSimaticNetAgentCapability 3 }

--
-- scalanceM components
--

snScalanceM OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for ScalanceM products."
::= { automationSimaticNet 4 }

snScalanceMCapability OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for ScalanceM agent capability statements."
::= { automationSimaticNetAgentCapability 4 }

--
-- S7 CP product line
--

snS7CP OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for S7 CP products."
::= { automationSimaticNet 5 }

snS7CP300 OBJECT IDENTIFIER ::= { snS7CP 1 }

snS7CP400 OBJECT IDENTIFIER ::= { snS7CP 2 }

snS7CP1200 OBJECT IDENTIFIER ::= { snS7CP 3 }

snS7CP1500 OBJECT IDENTIFIER ::= { snS7CP 4 }

snS7CPCapability OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for S7 CP agent capability statements."
::= { automationSimaticNetAgentCapability 5 }

snS7CP300Capability OBJECT IDENTIFIER ::= { snS7CPCapability 2 }

snS7CP400Capability OBJECT IDENTIFIER ::= { snS7CPCapability 3 }

snS7CP1200Capability OBJECT IDENTIFIER ::= { snS7CPCapability 4 }

snS7CP1500Capability OBJECT IDENTIFIER ::= { snS7CPCapability 5 }
-- PC CP product line

snPCCP OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for PC CP products."
::= { automationSimaticNet 6 }

snPCCPCapability OBJECT-IDENTITY
STATUS current
DESCRIPTION "Subtree for PC CP agent capability statements."
::= { automationSimaticNetAgentCapability 6 }

END

A.3 AUTOMATION TC (Textual Convention)

AUTOMATION-TC DEFINITIONS ::= BEGIN
IMPORTS
  automationModules FROM AUTOMATION-SMI
  MODULE-IDENTITY FROM SNMPv2-SMI
  TEXTUAL-CONVENTION FROM SNMPv2-TC;
automationTcModule MODULE-IDENTITY
LAST-UPDATED "201306300000Z"
ORGANIZATION "Siemens AG"
CONTACT-INFO 

Diagnostics and configuration with SNMP
.Diagnostics Manual, 08/2014, C79000-G8976-C357-01 63
Siemens AG
Industry Sector
I IA AS CTO SYA
SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
Nuremberg-Moorenbrunn
D-90475
Tel:    +49 911 895 0
E-mail: automation-mib.industry@siemens.com

"DESCRIPTION                   "Definition of general TEXTUAL CONVENTIONS
for Siemens Industry Sector."
REVISION                      "201306300000Z"
DESCRIPTION                   "correction of DISPLAY-HINTs."
REVISION                      "201209190000Z"
DESCRIPTION                   "correction of length for AutomationVersionNumberTC."
REVISION                      "201207270000Z"
DESCRIPTION                   "Bugfixes and corrections.
Update contact information"
REVISION                      "200811100000Z"
DESCRIPTION                   "Update the contact information."
REVISION                      "200804290000Z"
DESCRIPTION                   "textual convention for AutomationLocationString
and AutomationFunctionString added according
REVISION                      "200501120000Z"
DESCRIPTION                   "Initial Version of the MIB module."
::= { automationModules 1 }
DISPLAY-HINT                  "1a"
STATUS                        current
DESCRIPTION                   "The format of type identification / order
numbers of Siemens I IA products."
SYNTAX                        OCTET STRING (SIZE (16..32))
DISPLAY-HINT                  "1a"
Siemens I IA products."
SYNTAX                        OCTET STRING (SIZE (32))
DISPLAY-HINT                  "1a"
STATUS current
DESCRIPTION "The version format of Siemens I IA in a
SYNTAX OCTET STRING (SIZE (0..32))
AutomationMacAddressTC ::= TEXTUAL-CONVENTION
DISPLAY-HINT "1x:"
(formerly IEEE Std 802.1a).
AutomationIpAddressTC ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION ""
SYNTAX OCTET STRING
AutomationStatusTC ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION "A uniform representation of status values."
SYNTAX INTEGER { invalid(0), enable(1), disable(2) }
AutomationTriggerTC ::= TEXTUAL-CONVENTION
STATUS current
SYNTAX INTEGER { trigger(1), notTriggered(2) }
AutomationFunctionStringTC ::= TEXTUAL-CONVENTION
DISPLAY-HINT "32a"
STATUS current
DESCRIPTION "The format of function tags according
IEC 61158-6-10, chapter 6.2.6.13 IM_Tag_Function.
The value shall be filled with blanks
if it is shorter than 32.
Non-printable characters and
control sequences are not allowed.
Adopted from DisplayString; see description
in SNMPv2-TC for additional information.
SYNTAX OCTET STRING (SIZE (32))
AutomationLocationStringTC ::= TEXTUAL-CONVENTION
DISPLAY-HINT "22a"
STATUS current
DESCRIPTION "IEC 61158-6-10, chapter 6.2.6.14 IM_Tag_Location.
The value shall be filled with blanks
Adopted from DisplayString; see description
in SNMPv2-TC for additional information.
END
Modules and parameters of the Siemens Automation MIB

A.4 AUTOMATION-SYSTEM

-- ---- automationSystem.mib

-- SIEMENS AG
-- Industry Sector
--
-- general object definitions to identify
-- an Industry Automation Division system
--
-- Copyright (c) 2005-2013 Siemens AG
-- All rights reserved.
--

AUTOMATION-SYSTEM-MIB DEFINITIONS ::= BEGIN

IMPORTS
  automationMgmt FROM AUTOMATION-SMI
  AutomationSerialNumberTC,
  AutomationVersionNumberTC,
  AutomationTriggerTC,
  AutomationOrderNumberTC,
  AutomationFunctionStringTC,
  AutomationLocationStringTC FROM AUTOMATION-TC
  DisplayString,
  DateAndTime FROM SNMPv2-TC
  Counter32,
  IpAddress,
  Unsigned32,
  Integer32,
  OBJECT-TYPE,
  NOTIFICATION-TYPE,
  MODULE-IDENTITY FROM SNMPv2-SMI
  MODULE-COMPLIANCE,
  OBJECT-GROUP,
  NOTIFICATION-GROUP FROM SNMPv2-CONF;

automationSystemMIB MODULE-IDENTITY

Diagnostics and configuration with SNMP
Diagnostics Manual, 08/2014, C79000-G8976-C357-01
Definition of generic management objects which describe a general I IA product.

Assignment of snmp-path for 'automationSwDate' was adjusted.

Added automationSwUser, automationSwDate, automationConfigId, automationConfigUser, automationConfigDate. IpAddress objects are deprecated.
DESCRIPTION "Update the contact information."
REVISION "200804290000Z"
DESCRIPTION "Bugfixes, no changes regarding content."
REVISION "200501120000Z"
DESCRIPTION "Initial Version of the MIB module."
 ::= { automationMgmt 2 }

-- groups of mib module

-- system identification

automationSystemIdent OBJECT IDENTIFIER ::= { automationSystemObjects 1 }
automationManufacturerId OBJECT-TYPE
SYNTAX Unsigned32 (0..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "A code which identifies the vendor of the component (e. g. the specific department or OEM)."
 ::= { automationSystemIdent 1 }

automationOrderNumber OBJECT-TYPE
SYNTAX AutomationOrderNumberTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The type / order number of the system."
 ::= { automationSystemIdent 2 }

automationSerialNumber OBJECT-TYPE
SYNTAX AutomationSerialNumberTC
MAX-ACCESS read-only
DESCRIPTION "The serial number of the system."
 ::= { automationSystemIdent 3 }

automationHwRevision  OBJECT-TYPE
SYNTAX AutomationVersionNumberTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The hardware version of the system."
 ::= { automationSystemIdent 4 }

automationSwRevision  OBJECT-TYPE
SYNTAX AutomationVersionNumberTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The firmware version of the system."
 ::= { automationSystemIdent 5 }

automationRevisionCounter  OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "This value will be incremented every time
one of the other values of
automationIM0Group or automationIM1Group
(cp. conformance statements) changes.
The counter starts with 1
(default configuration).
"
 ::= { automationSystemIdent 6 }

automationRevisionDate  OBJECT-TYPE
SYNTAX DateAndTime
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The time of the last change of the value of
automationRevisionCounter. The value starts
with the date of the default configuration."
If a system doesn't support an absolute time it must not support the value (cp. conformance statements).
If the system supports the ENTITY-MIB the value of this entry correlates to entLastChangeTime.

::= { automationSystemIdent 7 }

automationFunctionTag OBJECT-TYPE
SYNTAX AutomationFunctionStringTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION "A code which describes the function of the component within the plant. This value will be set by the engineering system. It is comparable to the 'sysName' of MIB-II"

DEFVAL {"

 ::= { automationSystemIdent 8 }

automationLocationTag OBJECT-TYPE
SYNTAX AutomationLocationStringTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION "A code which describes the location where the component is installed within the plant. This value will be set by the engineering system. It is comparable to the 'sysLocation' of MIB-II but from the automation point of view."

DEFVAL {"

 ::= { automationSystemIdent 9 }

automationGeoLatitude OBJECT-TYPE
SYNTAX                  DisplayString
MAX-ACCESS              read-write
STATUS                  current
DESCRIPTION             "

geographical latitude of the equipment site
- DD.DDDDDD^no
- DD^MM.MMMM'
- DD^MM'SS.SS.
a leading '+' sign or the trailing letter 'N'
a leading '-' sign or the trailing letter 'S'
The geodesic reference system is WGS84.
Only so many shall be written for fractional

::= { automationSystemIdent 10 }

automationGeoLongitude  OBJECT-TYPE
SYNTAX                  DisplayString
MAX-ACCESS              read-write
STATUS                  current
DESCRIPTION             "

geographical longitude of the equipment site
- DDD.DDDDD^no
- DDD^MM.MMMM'
- DDD^MM'SS.SS
'O' or 'E' indicates eastern longitude,
a leading '-' sign or the trailing letter 'W'
indicates western longitude,
The geodesic reference system is WGS84.
Only so many shall be written for fractional
Examples:  8.3498^,
          8^20.986',
          8^20'59.2 E,
          +8^20'59.2
or 8^20'59.2

::= { automationSystemIdent 11 }

automationGeoHeight     OBJECT-TYPE
Modules and parameters of the Siemens Automation MIB

A.4 AUTOMATION-SYSTEM

SYNTAX               DisplayString
MAX-ACCESS           read-write
DESCRIPTION          "
geographical height of the equipment site
- ddddd m (high-order zeros are suppressed)
a leading sign '-' indicates a height
The geodesic reference system is WGS84.
Examples: 158 m, - 20 m
"

 ::= { automationSystemIdent 12 }

automationTimeZoneOffsetHours OBJECT-TYPE
SYNTAX               Integer32 {-23..23}
MAX-ACCESS           read-write
STATUS               current
DESCRIPTION          "The offset hours of the time zone group's
time zone from UTC.
"

 ::= { automationSystemIdent 13 }

automationTimeZoneOffsetMinutes OBJECT-TYPE
SYNTAX               Integer32 {-59..59}
MAX-ACCESS           read-write
STATUS               current
DESCRIPTION          "The offset minutes of the time zone group's
time zone from UTC.
"

 ::= { automationSystemIdent 14 }

automationSwUser OBJECT-TYPE
SYNTAX               DisplayString
MAX-ACCESS           read-only
STATUS               current
DESCRIPTION          "The name of the user who made the last
firmware update."
The value 'unknown' shall be given, if the user is not known.

::= { automationSystemIdent 15 }

automationSwDate OBJECT-TYPE
SYNTAX DateAndTime
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The time of the last firmware update.
The value starts with the date of the default configuration.
If a system doesn't support an absolute time it must not support the value."

::= { automationSystemIdent 16 }

-- system status
-- ------------------------------------------------------------------------

automationSystemStatus OBJECT IDENTIFIER ::= { automationSystemObjects 2 }

automationOperState OBJECT-TYPE
SYNTAX INTEGER {
ok(0),
maintenanceRequired(1),
maintenanceDemanded(2),
fault(3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "General operational status of the component.
ok(0) indicates that the component works, no errors.
maintenanceRequired(1) indicates, that at
the moment there aren't any problems
but maintenance is required e. g.
because a service interval has expired
or the component determined a software
update and so on.
maintenanceDemanded(2) indicates,
that the component works, but there are
problems which could lead to fault
situations.
fault(3) indicates a failure condition on
the component.
If a fault-LED is available (on front panel),
the fault-LED indication shall be synchronized
with the fault value of automationOperState.
If the automationOperState signals a fault,
the fault-LED must be lit (ON).
In all other states of automationOperState
the fault-LED is off.

::= { automationSystemStatus 1 }

automationApplicationOperState  OBJECT-TYPE
SYNTAX                INTEGER { 
noControl(1),
run(2),
stop(3)
}
MAX-ACCESS           read-only
STATUS               current

Operating status of the application within the
automation system.
This status indicates whether the device
context is part of an automation system that is
in operation (run or stop) or not (no_control).

::= { automationSystemStatus 2 }
--- system generics

---

automationSystemGeneric OBJECT IDENTIFIER
 ::= { automationSystemObjects 3 }

automationSystemRestart OBJECT-TYPE
 SYNTAX        INTEGER {
   noOperation(0),
   coldstart(1),
   warmstart(2),
   restartBasicDefaults(3),
   restartCompleteDefaults(4)
 }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION   
   "Restart the system. Setting the value to 1 causes a coldstart, a value of 2 causes a warmstart. The different behaviour of coldstart and warmstart depends on the component and is described in the user manual of the component. If a warmstart is triggered by the values of 3 or 4 the settings of the component will be reseted to factory defaults. The value of 3 means that only the basic parameters will be reseted, the value of 4 causes a complete reset. Which parameters are affected by this action is described in the components manual.

   If write access is not allowed, no matter what reason must be rejected with error 'noSuchName' (SNMPv1 agents) or 'notWriteable' (SNMPv2 and SNMPv3 agents) respectively."
::= { automationSystemGeneric 1 }

automationPowerUpCount OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of system starts."

::= { automationSystemGeneric 3 }

automationResetCounters OBJECT-TYPE
SYNTAX AutomationTriggerTC
MAX-ACCESS read-write
STATUS current
DESCRIPTION "Reset all statistic counters of the component. On write access only a value of the counters of the system), all other values will be rejected. If write access is not allowed, no matter what reason must be rejected with error 'noSuchName' (SNMPv1 agents) or 'notWriteable' (SNMPv2 and SNMPv3 agents) respectively."

::= { automationSystemGeneric 4 }

automationConfigId OBJECT-TYPE
SYNTAX OCTET STRING(SIZE(64))
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Signature of all configuration parameter values. The special value of all bytes 0x00 denotes the situation of a temporarily not available signature, what might happen during a configuration download while the signature is under construction."
If the ConfigId cannot be built, no matter what reason (e.g. incompatibilities between parameter layout and build algorithm, out of resources, ...), get requestes must be responded with error 'noSuchInstance'.

```::= { automationSystemGeneric 5 }
SYNTAX          DisplayString
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION "The name of the user who made the last change to any parameter of the configuration parameter set. The value 'unknown' shall be given, if the user is not known."
```

```::= { automationSystemGeneric 6 }
automationConfigDate OBJECT-TYPE
SYNTAX          DateAndTime
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION "The time of the last change to a parameter of the configuration parameter set. The value starts with the date of the default configuration. If a system doesn't support an absolute time it must not support the value (cp. conformance statements)."
```

```::= { automationSystemGeneric 7 }
```

-- agent configuration of the system
--
-- Note that if write access is not allowed, no matter what reason (e.g. an active
-- PROFINET configuration), write requests must be rejected with error 'noSuchName'
-- (SNMPv1 agents) or 'notWriteable' (SNMPv2 and SNMPv3 agents) respectively.
--
-- --------------------------------------------------
automationSystemIp              OBJECT IDENTIFIER
::= { automationSystemObjects 4 }
-- --------------------------------------------------
-- The objects of this branch have been deprecated in favor of the IP
-- version neutral ip address objects of the ipMIB of RFC 4293
-- --------------------------------------------------
automationSystemIpAddress       OBJECT-TYPE
SYNTAX                      IpAddress
MAX-ACCESS                  read-write
DESCRIPTION                 
This object contains the IP address of the
system (which is used to connect to the SNMP
agent, the web entity etc.). If the
component features an outbandport, this
object contains the inband IP address.
''
DEFVAL                      { '0000'H }
::= { automationSystemIp 1 }
automationSystemIpSubnetMask    OBJECT-TYPE
SYNTAX                      IpAddress
MAX-ACCESS                  read-write
STATUS                      deprecated
DESCRIPTION                 
This object contains the subnet mask of
the system (which is used to connect to
the SNMP agent, the webentity etc.).
If the component features an outbandport,
this object contains the inband subnet mask.
''
DEFVAL                      { '0000'H }
::= { automationSystemIp 2 }
automationSystemIpGateway OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-write
STATUS deprecated
DESCRIPTION "The default gateway of the system.
DEFVAL { '0000'H }
 ::= { automationSystemIp 3 }

automationSystemOutbandIp OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-write
STATUS deprecated
DESCRIPTION "If the system features an outband port, this object contains its IP address.
DEFVAL { '0000'H }
 ::= { automationSystemIp 4 }

automationSystemOutbandSubnetMask OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-write
STATUS deprecated
DESCRIPTION "If the system features an outband port, this object contains its subnet mask.
DEFVAL { '0000'H }
 ::= { automationSystemIp 5 }

-- general event definitions
-- ------------------------------------------------------------------------

automationSystemNotificationsV2 OBJECT IDENTIFIER
 ::= { automationSystemNotifications 0 }

automationOperStateChanged NOTIFICATION-TYPE
OBJECTS { automationOperState }
STATUS current
DESCRIPTION "The system triggers this event in case the value of automationOperState changed."
::{= { automationSystemNotificationsV2 1 }}

automationRevisionChanged NOTIFICATION-TYPE
STATUS current
DESCRIPTION "The system triggers this event in case the configuration changed (e.g. the hardware configuration, a firmware update or IP parameter)."
::={ automationSystemNotificationsV2 2 }

-- conformance statements
-- MIB groupings
--
automationSystemGroups OBJECT IDENTIFIER ::= { automationSystemConformance 1 }

automationIM0Group OBJECT-GROUP
OBJECTS { automationManufacturerId, automationOrderNumber, automationSerialNumber, automationHwRevision, automationSwRevision, automationRevisionCounter }
STATUS current
DESCRIPTION "This group collects the named parameters"
According to the referenced guideline.

"  
  "

I&M parameters are described in the PROFIBUS Guideline, Profile Guidelines Part 1: Identification & Maintenance Functions, Version 1.2, October 2009

::= { automationSystemGroups 1 }

automationIM1Group OBJECT-GROUP

OBJECTS

{ automationFunctionTag,
  automationLocationTag
}

STATUS current

DESCRIPTION

This group collects the named parameters according to the referenced guideline.

"  
  "

I&M parameters are described in the PROFIBUS Guideline, Profile Guidelines Part 1: Identification & Maintenance Functions, Version 1.2, October 2009

::= { automationSystemGroups 2 }

automationIM2Group OBJECT-GROUP

OBJECTS

{ automationRevisionDate }

STATUS current

DESCRIPTION

This group collects the named parameters according to the referenced guideline.

The revision date is only available if
the system supports an absolute time, therefore this group must be only supported if the absolute time is available.
"
REFERENCE
"
I&M parameters are described in the PROFIBUS Guideline, Profile Guidelines Part 1: Identification & Maintenance Functions, Version 1.2, October 2009
"
 ::= { automationSystemGroups 3 }

automationStatusGroup OBJECT-GROUP
OBJECTS { automationOperState,
automationApplicationOperState

STATUS current
DESCRIPTION "Generic status information."

 ::= { automationSystemGroups 4 }

automationRemoteRestartGroup OBJECT-GROUP
OBJECTS {
automationSystemRestart,
automationPowerUpCount

STATUS current
DESCRIPTION "Allows restart via SNMP."

 ::= { automationSystemGroups 5 }

automationResetCounterGroup OBJECT-GROUP
OBJECTS { automationResetCounters }

STATUS current
DESCRIPTION "Allows reset of all counters."

 ::= { automationSystemGroups 6 }

automationIpGroup OBJECT-GROUP
OBJECTS {
automationSystemIpAddress,
automationSystemIpSubnetMask,
automationSystemIpGateway
}

STATUS deprecated
DESCRIPTION "IP configuration of the agent."
::= { automationSystemGroups 7 }

automationOutbandGroup OBJECT-GROUP

OBJECTS {
automationSystemOutbandIp,
automationSystemOutbandSubnetMask
}

STATUS deprecated
DESCRIPTION "Configuration of the outband port."
::= { automationSystemGroups 8 }

automationStatusEvents NOTIFICATION-GROUP

NOTIFICATIONS { automationOperStateChanged }
STATUS current
DESCRIPTION "Notifications about status changes."
::= { automationSystemGroups 9 }

automationConfigurationEvents NOTIFICATION-GROUP

NOTIFICATIONS { automationRevisionChanged }
STATUS current
DESCRIPTION "Notifications about configuration changes."
::= { automationSystemGroups 10 }

automationGeoLocation OBJECT-GROUP

OBJECTS {
automationGeoLatitude,
automationGeoLongitude,
automationGeoHeight
}

STATUS current
DESCRIPTION "This group collects the named parameters according to the geographical coordinates."
::= { automationSystemGroups 11 }

automationGeoLocationTimeShift OBJECT-GROUP

OBJECTS
{
  automationGeoLatitude,
  automationGeoLongitude,
  automationGeoHeight,
  automationTimeZoneOffsetHours,
  automationTimeZoneOffsetMinutes
}

STATUS          current

DESCRIPTION      "This group collects the named parameters according to the geographical coordinates and the location dependent time shift."

::= { automationSystemGroups 12 }

automationConfigIdGroup OBJECT-GROUP

OBJECTS
{
  automationConfigId,
  automationConfigUser,
  automationConfigDate
}

STATUS          current

DESCRIPTION      "This group collects the named parameters for the support of a config signature."

::= { automationSystemGroups 13 }

automationSwDownloadGroup OBJECT-GROUP

OBJECTS
{
  automationSwUser,
  automationSwDate
}

STATUS          current

DESCRIPTION      ""
This group collects the named parameters for a firmware download.

```plaintext
::= { automationSystemGroups 14 }
```

--
-- compliance specifications
--

automationSystemCompliances OBJECT IDENTIFIER
::= { automationSystemConformance 2 }

automationSystemBasicCompliance MODULE-COMPLIANCE

  STATUS                      current
  DESCRIPTION                 "Minimum implementation requirements for all Industry Automation Division systems

  MODULE                      -- compliance to the containing MIB module
  MANDATORY-GROUPS            { automationIM0Group }

  GROUP                       automationIM1Group
  DESCRIPTION                 "Required if the system provides I&M 1."

  GROUP                       automationIM2Group
  DESCRIPTION                 "Required if the system provides I&M 2."

  GROUP                       automationStatusGroup
  DESCRIPTION                 "Required if the system provides a collective status information."

  GROUP                       automationResetCounterGroup
  DESCRIPTION                 "Required for systems which provide a reset of all their counters."

::= { automationSystemCompliances 1 }

automationSystemExtCompliance MODULE-COMPLIANCE

  STATUS                      deprecated
  DESCRIPTION                 "Extended requirements for Industry Automation Division systems."

  MODULE                      -- compliance to the containing MIB module
  MANDATORY-GROUPS            { automationIM0Group }

  GROUP                       automationIM1Group
A.4 AUTOMATION-SYSTEM

DESCRIPTION  "Required if the system provides I&M 1."
GROUP         automationIM2Group

DESCRIPTION  "Required if the system provides I&M 2."
GROUP         automationIpGroup

DESCRIPTION  "Required if the system allows configuring of the IP parameters via SNMP and no other MIBs are implemented which support management of this parameters."
GROUP         automationOutbandGroup

DESCRIPTION  "Required if the system provides an outband port and management of this port is allowed via SNMP and no other MIBs are implemented which support management of the outband port."
GROUP         automationRemoteRestartGroup

DESCRIPTION  "Required if restart of the system via SNMP allowed."
GROUP         automationStatusGroup

DESCRIPTION  "Required if the system provides a collective status information."
GROUP         automationResetCounterGroup

DESCRIPTION  "Required for systems which provide a reset of all their counters."
GROUP         automationConfigurationEvents

DESCRIPTION  "Required for systems which provide notifications."
GROUP         automationStatusEvents

DESCRIPTION  "Required for systems which provide notifications."
GROUP         automationGeoLocation

DESCRIPTION  "Required for systems which provide geographical coordinates."
GROUP         automationGeoLocationTimeShift

DESCRIPTION  "Required for systems which provide geographical coordinates and time shift."
::= { automationSystemCompliances 2 }

automationSystemExtCompliance2 MODULE-COMPLIANCE

STATUS current

DESCRIPTION "Extended requirements for Industry Automation Division systems."

MANDATORY-GROUPS { automationIM0Group }

GROUP automationIM1Group

DESCRIPTION "Required if the system provides I&M 1."

DESCRIPTION "Required if the system provides I&M 2."

GROUP automationRemoteRestartGroup

DESCRIPTION "Required if restart of the system via SNMP allowed."

GROUP automationStatusGroup

DESCRIPTION "Required if the system provides a collective status information."

GROUP automationResetCounterGroup

DESCRIPTION "Required for systems which provide a reset of all their counters."

GROUP automationConfigurationEvents

DESCRIPTION "Required for systems which provide notifications."

GROUP automationStatusEvents

DESCRIPTION "Required for systems which provide notifications."

GROUP automationGeoLocation

DESCRIPTION "Required for systems which provide geographical coordinates."

GROUP automationGeoLocationTimeShift

DESCRIPTION "Required for systems which provide geographical coordinates and time shift."

GROUP automationConfigIdGroup

DESCRIPTION "Required for systems which provide configuration signatures."

GROUP automationSwDownloadGroup

DESCRIPTION "Required for systems which support
firmware download."

::= { automationSystemCompliances 3 }

END

A.5 AUTOMATION-TIME

-- ------------------------------------------------------------------------
-- automationTime.mib
--
-- SIEMENS AG
-- Industry Sector
--
-- object definitions to manage the
-- system time and time sync
--
-- Copyright (c) 2005-2013 Siemens AG
-- All rights reserved.
-- ------------------------------------------------------------------------

AUTOMATION-TIME-MIB DEFINITIONS ::= BEGIN

IMPORTS
  automationMgmt FROM AUTOMATION-SMI
  AutomationStatusTC FROM AUTOMATION-TC
  DateAndTime,
  DisplayString FROM SNMPv2-TC
  Unsigned32,
  OBJECT-TYPE,
  NOTIFICATION-TYPE,
  MODULE-IDENTITY FROM SNMPv2-SMI
  MODULE-COMPLIANCE,
  OBJECT-GROUP,
  NOTIFICATION-GROUP FROM SNMPv2-CONF;

automationTimeMIB MODULE-IDENTITY
  LAST-UPDATED "201307030000Z"
  ORGANIZATION "Siemens AG"
  CONTACT-INFO ""
Siemens AG
Industry Sector
1 IA AS CTO SYA

SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
Nuremberg-Moorenbrunn
D-90475
Tel: +49 911 895 0
E-mail: automation-mib.industry@siemens.com

DESCRIPTION

Definition of management objects to display and change the system time of an automation product and to manage the sync mechanisms.

REVISION
"201307030000Z"
DESCRIPTION
"Typo corrections."

REVISION
"201207270000Z"
DESCRIPTION
"Bugfixes and corrections."

REVISION
"200811100000Z"

REVISION
"200804290000Z"
automationTimeChanged instead

REVISION
"200511010000Z"
DESCRIPTION
"Initial Version of the MIB module."

::= { automationMgmt 3 }

-- groups of mib module
-- -- time objects

automationTimeObjects OBJECT IDENTIFIER ::= { automationTimeMIB 1 }
automationTimeNotifications OBJECT IDENTIFIER ::= { automationTimeMIB 2 }
automationTimeConformance OBJECT IDENTIFIER ::= { automationTimeMIB 3 }
### Modules and parameters of the Siemens Automation MIB

#### A.5 AUTOMATION-TIME

---

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Syntax</th>
<th>Access</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>automationTime</td>
<td>OBJECT-TYPE</td>
<td>DateAndTime</td>
<td>read-only</td>
<td>current</td>
</tr>
<tr>
<td>automationTimeLastSync</td>
<td>OBJECT IDENTIFIER</td>
<td></td>
<td>read-only</td>
<td>current</td>
</tr>
<tr>
<td>automationTimeSyncTable</td>
<td>OBJECT-TYPE</td>
<td>SEQUENCE OF AutomationTimeSyncEntry</td>
<td>not-accessible</td>
<td>current</td>
</tr>
<tr>
<td>automationTimeSyncEntry</td>
<td>OBJECT-TYPE</td>
<td>AutomationTimeSyncEntry</td>
<td>not-accessible</td>
<td>current</td>
</tr>
</tbody>
</table>

**automationTime**

- **SYNTAX**: DateAndTime
- **MAX-ACCESS**: read-only
- **STATUS**: current
- **DESCRIPTION**: The systems absolute time (not the uptime!).

**automationTimeLastSync**

- **SYNTAX**: OBJECT IDENTIFIER
- **MAX-ACCESS**: read-only
- **STATUS**: current
- **DESCRIPTION**: A link into the sync table. Identifies the mechanism which was used for the last synchronization.

**automationTimeSyncTable**

- **SYNTAX**: SEQUENCE OF AutomationTimeSyncEntry
- **MAX-ACCESS**: not-accessible
- **STATUS**: current
- **DESCRIPTION**: The table allows controlling of the sync.

**automationTimeSyncEntry**

- **SYNTAX**: AutomationTimeSyncEntry
- **MAX-ACCESS**: not-accessible
- **STATUS**: current
- **DESCRIPTION**: A row in the time sync table. Each row represents a sync mechanism and contains objects to monitor and control this.
mechanism.
Entries cannot be created or deleted
via SNMP operations.

INDEX { automationTimeSyncIndex }

::= { automationTimeSyncTable 1 }

AutomationTimeSyncEntry ::= SEQUENCE
 automationTimeSyncIndex Unsigned32,
 automationTimeSyncName DisplayString,
 automationTimeAdminStatus AutomationStatusTC

automationTimeSyncIndex OBJECT-TYPE
 SYNTAX Unsigned32
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION "The unique value which identifies this
 entry."

::= { automationTimeSyncEntry 1 }

automationTimeSyncName OBJECT-TYPE
 SYNTAX DisplayString
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION "The name of the sync mechanism."

::= { automationTimeSyncEntry 2 }

automationTimeAdminStatus OBJECT-TYPE
 SYNTAX AutomationStatusTC
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION "Controls whether the system shall accept If write
 access is not allowed, no matter what reason must
 be rejected with error 'noSuchName' (SNMPv1 agents)
 or 'notWriteable' (SNMPv2 and SNMPv3 agents)
respectively. Only one TimeSync mechanism can be active at a time. Changing the TimeSync mechanism thus requires the two steps: disable active mechanism first, then enable new mechanism.

```::= { automationTimeSyncEntry 3 }
```

```-- events```

```automationTimeNotificationsV2  OBJECT IDENTIFIER
::= { automationTimeNotifications 0 }
```

```automationTimeChanged  NOTIFICATION-TYPE
OBJECTS { automationTimeSyncName, automationTime }
STATUS current
DESCRIPTION "The system triggers this event in case the value of automationTime was changed. The event contains the new time of the system and the mechanism used to change it."
```

```::= { automationTimeNotificationsV2 1 }
```

```-- conformance statements```

```-- MIB groupings```

```automationTimeSyncGroups  OBJECT IDENTIFIER
::= { automationTimeConformance 1 }
```

```automationTimeInfoGroup  OBJECT-GROUP
OBJECTS { automationTime }
STATUS current
DESCRIPTION "The system time."
```

```::= { automationTimeSyncGroups 1 }
```

```automationTimeSyncControlGroup  OBJECT-GROUP
```
OBJECTS
{
  automationTimeLastSync,
  automationTimeSyncName,
  automationTimeAdminStatus
}

STATUS
  current

DESCRIPTION
  "Controlling of the time synchronization."
::= { automationTimeSyncGroups 2 }

automationTimeSyncEvents
  NOTIFICATION-GROUP

NOTIFICATIONS
  { automationTimeChanged }

STATUS
  current

DESCRIPTION
  "Notifications about time changes of
  the system."
::= { automationTimeSyncGroups 3 }

--
--  compliance specifications
--

automationTimeCompliances
  OBJECT IDENTIFIER
::= { automationTimeConformance 2 }

automationTimeInfoCompliance
  MODULE-COMPLIANCE

STATUS
  current

DESCRIPTION
  "Basic requirements, displays only time."

MODULE
-- compliance to the containing MIB module

MANDATORY-GROUPS
  { automationTimeInfoGroup }
::= { automationTimeCompliances 1 }

automationTimeSyncCompliance
  MODULE-COMPLIANCE

STATUS
  current

DESCRIPTION
  "Enables controlling of the time
  synchronization.
  Support of notifications is required."

MODULE
-- compliance to the containing MIB module

MANDATORY-GROUPS
  { automationTimeInfoGroup,
A.6 AUTOMATION-PS

---

IMPORTS
  automationMgmt FROM AUTOMATION-SMI
  DisplayString FROM SNMPv2-TC
  Unsigned32, OBJECT-TYPE,
  NOTIFICATION-TYPE,
  MODULE-IDENTITY FROM SNMPv2-SMI
  MODULE-COMPLIANCE,
  OBJECT-GROUP,
  NOTIFICATION-GROUP FROM SNMPv2-CONF;

automationPSMIB MODULE-IDENTITY
  LAST-UPDATED "201307030000Z"
  ORGANIZATION "Siemens AG"
  CONTACT-INFO "

AUTOMATION-PS-MIB DEFINITIONS ::= BEGIN

 automationTimeSyncControlGroup, automationTimeSyncEvents
}
 ::= { automationTimeCompliances 2 }

END
Siemens AG
Industry Sector
I IA AS CTO SYA
SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
    Nuremberg-Moorenbrunn
    D-90475
Tel:    +49 911 895 0
E-mail: automation-mib.industry@siemens.com

DESCRIPTION                   
"Definition of management objects to
manage the power supply products."

REVISION                      "201307030000Z"
DESCRIPTION                   "Typo correction and indentation."
DESCRIPTION                   "Description for automationPSMask updated."

REVISION                      "201207270000Z"
DESCRIPTION                   "Bugfixes and corrections."
REVISION                      "2008111100000Z"
DESCRIPTION                   "Update the contact information."
REVISION                      "2008042900000Z"
DESCRIPTION                   "Bugfixes, automationPSIndex not in
    automationHwPSStatusChanged anymore."
REVISION                      "2005110100000Z"
DESCRIPTION                   "Initial Version of the MIB module."

 ::= { automationMgmt 5 }

-- groups of mib module

automationPSObjects          OBJECT IDENTIFIER ::= { automationPSMIB 1 }
automationPSNotifications    OBJECT IDENTIFIER ::= { automationPSMIB 2 }
automationPSConformance      OBJECT IDENTIFIER ::= { automationPSMIB 3 }

Diagnosics and configuration with SNMP
Diagnostics Manual, 08/2014, C790000-G8976-C357-01
-- status of the power supply units
-- ---------------------------------------------------------------

automationPSTable OBJECT-TYPE
SYNTAX SEQUENCE OF AutomationPSEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table which contains information about the system's power supplies."
 ::= { automationPSObjects 1 }

AutomationPSEntry OBJECT-TYPE
SYNTAX AutomationPSEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A row in the power supply table. Entries cannot be created or deleted via SNMP operations."
INDEX { automationPSIndex }
 ::= { automationPSTable 1 }

AutomationPSEntry ::= SEQUENCE {
  automationPSIndex Unsigned32,
  automationPSStatus INTEGER,
  automationPSMask INTEGER,
  automationPSVoltageOutput DisplayString
}

automationPSIndex OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The unique value which identifies this
 ::= { automationPSEntry 1 }

automationPSStatus OBJECT-TYPE
SYNTAX INTEGER { inactive(1), active(2) }
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The status of the corresponding PSU."
::= { automationPSEntry 2 }

automationPSMask OBJECT-TYPE
SYNTAX INTEGER { notChecked(1), checked(2) }
MAX-ACCESS read-write
STATUS current
DESCRIPTION "Enables or disables monitoring of the corresponding PSU."
DEFVAL { notChecked }
::= { automationPSEntry 3 }

automationPSVoltageOutput OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The nominal voltage output of the power supply as marked at front panel, e.g. DC24V, AC220V"
::= { automationPSEntry 4 }

-- events
-- ------------------------------------------------------------------------

automationPSNotificationsV2 OBJECT IDENTIFIER
::= { automationPSNotifications 0 }

automationHwPSStatusChanged NOTIFICATION-TYPE
OBJECTS { automationPSStatus }
STATUS current
DESCRIPTION "The system triggers this event in case the status of a PSU changes. The variable bindings contain the status"
of the affected PSU.

::= { automationPSNotificationsV2 1 }

-- conformance statements

-- MIB groupings

--
automationPSGroups OBJECT IDENTIFIER
::= { automationPSConformance 1 }

automationPSInfoGroup OBJECT-GROUP
OBJECTS
{ automationPSStatus, automationPSVoltageOutput }
STATUS current
DESCRIPTION "Status and voltage of a PSU."
::= { automationPSGroups 1 }

automationPSMonitorGroup OBJECT-GROUP
OBJECTS { automationPSMask }
STATUS current
DESCRIPTION "Enable monitoring of power supplies."
::= { automationPSGroups 2 }

automationPSStatusEvents NOTIFICATION-GROUP
NOTIFICATIONS { automationHwPSStatusChanged }
STATUS current
DESCRIPTION "Notifications about status changes of the PSUs."
::= { automationPSGroups 8 }

--
-- compliance specifications

--
automationPSCCompliances OBJECT IDENTIFIER
::= { automationPSConformance 2 }
A.7 AUTOMATION-BOOTDHCP

-- ----------------------------------------------------------
-- automationBootDhcp.mib
--
-- SIEMENS AG
-- Industry Sector
--
-- BOOTP / DHCP client parameters
--
-- Copyright (c) 2005-2013 Siemens AG
-- All rights reserved.
-- ----------------------------------------------------------

AUTOMATION-BOOTDHCP-MIB DEFINITIONS ::= BEGIN
IMPORTS
  automationMgmt FROM AUTOMATION-SMI

automationPSInfoCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION "Basic requirements. Contains read-only objects."
  MODULE -- compliance to the containing MIB module
  MANDATORY-GROUPS { automationPSInfoGroup }
  ::= { automationPSCompliances 1 }

automationPSMonitorCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION "Enables monitoring of power supplies. Support of notifications required."
  MODULE -- compliance to the containing MIB module
  MANDATORY-GROUPS { automationPSInfoGroup,
                     automationPSMonitorGroup,
                     automationPSStatusEvents }
  ::= { automationPSCompliances 2 }
END
ifIndex               FROM IF-MIB
DisplayString         FROM SNMPv2-TC
OBJECT-GROUP,
MODULE-COMPLIANCE    FROM SNMPv2-CONF
OBJECT-TYPE,
MODULE-IDENTITY      FROM SNMPv2-SMI;
automationBootDhcpMIB MODULE-IDENTITY
LAST-UPDATED          "201307030000Z"
ORGANIZATION         "Siemens AG"
CONTACT-INFO          " Siemens AG
Industry Sector
I IA AS CTO SYA
SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
              Nuremberg-Moorenbrunn
              D-90475
Tel:    +49 911 895 0
E-mail: automation-mib.industry@siemens.com
"
DESCRIPTION           "Definition of management objects to configure
BOOTP / DHCP client parameters.
"
REVISION              "201307030000Z"
DESCRIPTION           "Bugfixes and typo corrections."
REVISION              "201207270000Z"
DESCRIPTION           "Bugfixes and corrections."
REVISION              "200811100000Z"
DESCRIPTION           "Error corrections of formal faults."
REVISION              "200501180000Z"
::= { automationMgmt 7 }
Modules and parameters of the Siemens Automation MIB

A.7 AUTOMATION-BOOTDHCP

Diagnostics and configuration with SNMP

Diagnostics Manual, 08/2014, C79000-G8976-C357-01

-- --------------------------------------------------------------------

automationBootDhcpObjects OBJECT IDENTIFIER ::= { automationBootDhcpMIB 1 }

automationBootDhcpConformance OBJECT IDENTIFIER ::= { automationBootDhcpMIB 3 }

automationBootDhcpTable OBJECT-TYPE
SYNTAX SEQUENCE OF AutomationBootDhcpEntry
STATUS current
DESCRIPTION "A table of client BOOTP/DHCP enable/disable parameters per swEND interface. There is an entry available for each possible in-band 'L2/L3 hybrid VLAN' and/or 'L3 only NIC interface'."
::= { automationBootDhcpObjects 1 }

AutomationBootDhcpEntry OBJECT-TYPE
SYNTAX AutomationBootDhcpEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A row in the BOOTP / DHCP table. Entries cannot be created or deleted via SNMP operations."
INDEX { ifIndex }
::= { automationBootDhcpTable 1 }

automationBootDhcpControl INTEGER, { disabled(0),
bootp(1),
dhcpViaMacaddress(2),
dhcpViaClientid(3),
dhcpViaSysname(4) }

Diagnostics and configuration with SNMP
Diagnostics Manual, 08/2014, C79000-G8976-C357-01
This object enables/disables BOOTP / DHCP for the
swEND interface associated with the 'ifIndex'
value for this entry.

A value of disabled(0) disables both BOOTP and DHCP,
dhcp-via-macaddress(2) runs DHCP in a simple mode.
The values dhcp-via-clientid(3) and
dhcp-via-sysname(4) run DHCP with option client id,
the former uses the value of
automationBootDhcpClientId as client id,
the latter uses sysname as client id.

If write access is not allowed, no matter what reason
must be rejected with error 'noSuchName'
(SNMPv1 agents) or 'notWriteable'
(SNMPv2 and SNMPv3 agents) respectively.

::= { automationBootDhcpEntry 1 }

automationBootDhcpClientId OBJECT-TYPE
SYNTAX             DisplayString
MAX-ACCESS         read-write
STATUS             current
DESCRIPTION        

The client ID the agent shall use.
If write access is not allowed, no matter what reason
must be rejected with error 'noSuchName'
(SNMPv1 agents) or 'notWriteable'
(SNMPv2 and SNMPv3 agents) respectively.

DEFVAL              { "" }
::= { automationBootDhcpEntry 2 }
Modules and parameters of the Siemens Automation MIB

A.8 AUTOMATION-TELNET

-- conformance statements

automationBootDhcpGroups OBJECT IDENTIFIER ::= { automationBootDhcpConformance 1 }

automationBootDhcpGroup OBJECT-GROUP

OBJECTS { automationBootDhcpControl,
automationBootDhcpClientId }

STATUS current

DESCRIPTION "Controlling the BOOTP / DHCP client."

::= { automationBootDhcpGroups 1 }

automationBootDhcpCompliances OBJECT IDENTIFIER ::= { automationBootDhcpConformance 2 }

automationBootDhcpCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION "If controlling of the BOOTP / DHCP client via SNMP is supported the agent must provide all objects of this module."

-- compliance to the containing MIB module

MANDATORY-GROUPS { automationBootDhcpGroup }

::= { automationBootDhcpCompliances 1 }

END

A.8 AUTOMATION-TELNET

-- automationTelnet.mib

-- SIEMENS AG

-- Industry Sector

-- telnet parameters

-- Copyright (c) 2005-2013 Siemens AG
AUTOMATION-TELNET-MIB DEFINITIONS ::= BEGIN
IMPORTS
  automationMgmt FROM AUTOMATION-SMI
  AutomationStatusTC FROM AUTOMATION-TC
  OBJECT-GROUP,
  MODULE-COMPLIANCE FROM SNMPv2-CONF
  Unsigned32,
  OBJECT-TYPE,
  MODULE-IDENTITY FROM SNMPv2-SMI;

automationTelnetMIB MODULE-IDENTITY
LAST-UPDATED "201307030000Z"
ORGANIZATION "Siemens AG"
CONTACT-INFO "Siemens AG
Industry Sector
I IA AS CTO SYA
SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
Nuremberg-Moorenbrunn
D-90475
Tel: +49 911 895 0
E-mail: automation-mib.industry@siemens.com"

DESCRIPTION "Definition of management objects to describe the parameters of the telnet entity."

REVISION "201307030000Z"
DESCRIPTION "Indentation adjusted."
REVISION "201207270000Z"
DESCRIPTION "Bugfixes and corrections."
REVISION                      "200811100000Z"
DESCRIPTION                   "Error corrections of formal faults."
REVISION                      "200501180000Z"
DESCRIPTION                   "Initial Version of the MIB module."
 ::= { automationMgmt 8 }

-- object groups of telnet mib module

automationTelnetObjects OBJECT IDENTIFIER ::= { automationTelnetMIB 1 }
automationTelnetConformance OBJECT IDENTIFIER ::= { automationTelnetMIB 3 }
automationTelnetAdminStatus OBJECT-TYPE
SYNTAX                        AutomationStatusTC
MAX-ACCESS                    read-write
STATUS                        current
DESCRIPTION                   "Enables or disables the telnet entity."
DEFVAL                        { enable }
 ::= { automationTelnetObjects 1 }
automationTelnetTimeOutStatus OBJECT-TYPE
SYNTAX                        AutomationStatusTC
MAX-ACCESS                    read-write
STATUS                        current
DESCRIPTION                   "Enables or disables the time out for a console session."
DEFVAL                        { enable }
 ::= { automationTelnetObjects 2 }
automationTelnetTimeOut       OBJECT-TYPE
SYNTAX                        Unsigned32 (60..600)
MAX-ACCESS                    read-write
STATUS                        current
DESCRIPTION                   "Time out value for the console session."
DEFVAL                        { 300 }
 ::= { automationTelnetObjects 3 }

-- object groups of telnet mib module

Diagnostics and configuration with SNMP
Diagnostics Manual, 08/2014, C79000-G8976-C357-01
-- conformance statements
-- ---------------------------------------------------------------------------

automationTelnetGroups OBJECT IDENTIFIER ::= { automationTelnetConformance 1 }

automationTelnetGroup OBJECT-GROUP
OBJECTS {
  automationTelnetAdminStatus,
  automationTelnetTimeOutStatus,
  automationTelnetTimeOut
}

STATUS current
DESCRIPTION "Controlling telnet sessions."
 ::= { automationTelnetGroups 1 }

automationTelnetCompliances OBJECT IDENTIFIER ::= { automationTelnetConformance 2 }

automationTelnetCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION "Requirements for Siemens Industry telnet implementations."

MODULE -- compliance to the containing MIB module
MANDATORY-GROUPS { automationTelnetGroup }
 ::= { automationTelnetCompliances 1 }

END

A.9 AUTOMATION-SMTP

-- conformance statements
-- automationsmtp.mib
--
-- SIEMENS AG
-- Industry Sector
--
-- SMTP parameters
--
-- Copyright (c) 2005-2013 Siemens AG
-- All rights reserved.
AUTOMATION-SMTP-MIB

IMPORTS

automationMgmt FROM AUTOMATION-SMI
AutomationIpAddressTC FROM AUTOMATION-TC
DisplayString FROM SNMPv2-TC
OBJECT-GROUP,
MODULE-COMPLIANCE FROM SNMPv2-CONF
Unsigned32,
OBJECT-TYPE,
MODULE-IDENTITY FROM SNMPv2-SMI;

automationSmtpMIB MODULE-IDENTITY
LAST-UPDATED "201307030000Z"
ORGANIZATION "Siemens AG"
CONTACT-INFO

Siemens AG
Industry Sector
I IA AS CTO SYA
SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
Nuremberg-Moorenbrunn
D-90475
Tel: +49 911 895 0
E-mail: automation-mib.industry@siemens.com

DESCRIPTION

Definition of management objects to describe SMTP

REVISION "201307030000Z"
DESCRIPTION "Typo corrections."
REVISION "201207270000Z"
DESCRIPTION "Bugfixes and corrections."
REVISION "200811100000Z"
DESCRIPTION                  "Error corrections of formal faults."
REVISION                     "200501180000Z"
DESCRIPTION                  "Initial Version of the MIB module."
 ::= { automationMgmt 9 }
-- object groups of SMTP mib module
-- __________________________________________________________

automationSmtpObjects            OBJECT IDENTIFIER ::= { automationSmtpMIB 1 }
automationSmtpConformance        OBJECT IDENTIFIER ::= { automationSmtpMIB 3 }
automationSmtpSender             OBJECT-TYPE
SYNTAX                        DisplayString
MAX-ACCESS                    read-write
STATUS                        current
DESCRIPTION                   "First part of the from field in the E-mail address."
DEFVAL                        { "Not Defined Yet" }
 ::= { automationSmtpObjects 1 }

automationSmtpIpAddress         OBJECT-TYPE
SYNTAX                        AutomationIpAddressTC
MAX-ACCESS                    read-write
STATUS                        current
DESCRIPTION                   "IP address or host name of SMTP server."
DEFVAL                        { "0.0.0.0" }
 ::= { automationSmtpObjects 2 }

automationSmtpPort              OBJECT-TYPE
SYNTAX                        Unsigned32 (1..65535)
MAX-ACCESS                    read-write
STATUS                        current
DESCRIPTION                   "TCP port to which the SMTP server will listen."
DEFVAL                        { 25 }
 ::= { automationSmtpObjects 3 }

automationSmtpReceiverTable     OBJECT-TYPE
SYNTAX                        SEQUENCE OF AutomationSmtpReceiverEntry
MAX-ACCESS                    not-accessible
STATUS                        current
DESCRIPTION                   ""
A table which contains all receiver addresses

::= { automationSmtpObjects 4 }

automationSmtpReceiverEntry OBJECT-TYPE
SYNTAX AutomationSmtpReceiverEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Each entry contains one address."
INDEX { automationSmtpReceiverIndex }

::= { automationSmtpReceiverTable 1 }

AutomationSmtpReceiverEntry ::= SEQUENCE {
  automationSmtpReceiverIndex   Unsigned32,
  automationSmtpReceiverAddress DisplayString
}

automationSmtpReceiverIndex OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The index of the entries."

::= { automationSmtpReceiverEntry 1 }

automationSmtpReceiverAddress OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-write
STATUS current
DESCRIPTION "E-mail address to which messages will be sent."
DEFVAL { "Not Defined Yet" }

::= { automationSmtpReceiverEntry 2 }

-- ---------------------------------------------------------------
-- conformance statements
-- ---------------------------------------------------------------
--
-- object groups
--

automationSmtpGroups OBJECT IDENTIFIER ::= { automationSmtpConformance 1 }

automationSmtpGroup OBJECT-GROUP
A.10 AUTOMATION-SNTP

OBJECTS
{
  automationSmtpSender,
  automationSmtpIpAddress,
  automationSmtpPort,
  automationSmtpReceiverAddress
}

STATUS current
DESCRIPTION "Controlling the SMTP entity of the system."
 ::= { automationSmtpGroups 1 }

-- compliance specifications

--

automationSmtpCompliances OBJECT IDENTIFIER ::= { automationSmtpConformance 2 }

automationSmtpCompliance MODULE-COMPLIANCE

STATUS current
DESCRIPTION "Implementation requirements for SMTP."

MODULE -- compliance to the containing MIB module

MANDATORY-GROUPS { automationSmtpGroup }

 ::= { automationSmtpCompliances 1 }

END

A.10 AUTOMATION-SNTP

-- -----------------------------------------------------------------------------

-- automationSntp.mib

--

-- SIEMENS AG

-- Industry Sector

--

-- SNTP parameters

--

-- Copyright (c) 2005-2013 Siemens AG

-- All rights reserved.

-- -----------------------------------------------------------------------------

AUTOMATION-SNTP-MIB DEFINITIONS ::= BEGIN
IMPORTS
automationMgmt                FROM AUTOMATION-SMI
AutomationIpAddressTC         FROM AUTOMATION-TC
OBJECT-GROUP,
MODULE-COMPLIANCE             FROM SNMPv2-CONF
Unsigned32,
OBJECT-TYPE,
MODULE-IDENTITY               FROM SNMPv2-SMI;

automationSntpMIB               MODULE-IDENTITY
LAST-UPDATED                  "201307030000Z"
ORGANIZATION                  "Siemens AG"
CONTACT-INFO                  "Siemens AG
Industry Sector
SNMP Automation Registration Authority
Postal: Gleiwitzer Strasse 555
Nuremberg-Moorenbrunn
D-90475
Tel:    +49 911 895 0
E-mail: automation-mib.industry@siemens.com"
DESCRIPTION                   "Definition of management objects to describe
SNTP parameters."
DESCRIPTION                   "Indentation adjusted."
DESCRIPTION                   "automationSntpTimeShift obsoleted."
REVISION                      "201206010000Z"
DESCRIPTION                   "Bugfixes and corrections."
REVISION                      "200811100000Z"
DESCRIPTION                   "Error corrections of formal faults."
REVISION                      "200501180000Z"
DESCRIPTION                   "Initial Version of the MIB module."
::= { automationMgmt 11 }
-- object groups of SNTP mib module

automationSntpObjects OBJECT IDENTIFIER ::= { automationSntpMIB 1 }
automationSntpConformance OBJECT IDENTIFIER ::= { automationSntpMIB 3 }

automationSntpIpAddress OBJECT-TYPE
SYNTAX AutomationIpAddressTC
MAX-ACCESS read-write
STATUS current
DESCRIPTION "IP Address of the SNTP server (x.y.z.w)."
DEFVAL { "0.0.0.0" }
 ::= { automationSntpObjects 1 }

automationSntpPortNumber OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION "Port of the SNTP server host. Default value is 123."
DEFVAL { 123 }
 ::= { automationSntpObjects 2 }

automationSntpTimeShift OBJECT-TYPE
SYNTAX INTEGER {
    timeSNTPminus12h (1),
    timeSNTPminus11h (2),
    timeSNTPminus10h (3),
    timeSNTPminus09h (4),
    timeSNTPminus08h (5),
    timeSNTPminus07h (6),
    timeSNTPminus06h (7),
    timeSNTPminus05h (8),
    timeSNTPminus04h (9),
    timeSNTPminus03h (10),
    timeSNTPminus02h (11),
    timeSNTPminus01h (12),
    timeSNTPplusminus00h (13),
}
timeSNTPplus01h (14),
timeSNTPplus02h (15),
timeSNTPplus03h (16),
timeSNTPplus04h (17),
timeSNTPplus05h (18),
timeSNTPplus06h (19),
timeSNTPplus07h (20),
timeSNTPplus08h (21),
timeSNTPplus09h (22),
timeSNTPplus10h (23),
timeSNTPplus11h (24),
timeSNTPplus12h (25),
timeSNTPplus13h (26)
}

MAX-ACCESS read-write
STATUS obsolete
DESCRIPTION "Time difference between SNTP server and system time.

obsolete because granularity is too coarse.
Time shift is available with
'automationTimeZoneOffsetHours'
and 'automationTimeZoneOffsetMinutes' from
AUTOMATION-SYSTEM-MIB,
added near geographical information.
"

DEFVAL { timeSNTPplusminus00h }
::= { automationSntpObjects 3 }

SYNTAX Unsigned32 (10..10000)
MAX-ACCESS read-write
STATUS current
DESCRIPTION "Sampling interval of the SNTP Requests in sec before any response received.
Only if the 'automationSntpIpAddress' is set.
"
::= { automationSntpObjects 4 }

automationSntpSamplingInterval  OBJECT-TYPE
SYNTAX                      Unsigned32 (10..10000)
MAX-ACCESS                   read-write
STATUS                       current
DESCRIPTION                  "'automationSntpIpAddress' is set and there was a response."
DEFVAL                       { 3600 }

::= { automationSntpObjects 5 }

-- conformance statements

-- object groups

--

automationSntpGroups            OBJECT IDENTIFIER ::= { automationSntpConformance 1 }

automationSntpGroup             OBJECT-GROUP
OBJECTS                       {
  automationSntpPortNumber,
  automationSntpTimeShift,
  automationSntpInitSamplingInterval,
  automationSntpSamplingInterval
}

STATUS                       obsolete
DESCRIPTION                  "Controlling the SNTP entity of the system.
Obsoleted because automationSntpTimeShift is obsolete now."

::= { automationSntpGroups 1 }

automationSntpGroupV1           OBJECT-GROUP
OBJECTS                       {

automationSntpIpAddress,
automationSntpPortNumber,
automationSntpInitSamplingInterval,
automationSntpSamplingInterval
}

STATUS
current

DESCRIPTION
"Controlling the SNTP entity of the system without time shift."

::= { automationSntpGroups 2 }

--
-- compliance specifications
--

automationSntpCompliances

OBJECT IDENTIFIER ::= { automationSntpConformance 2 }

automationSntpCompliance

MODULE-COMPLIANCE

STATUS
obsolete

DESCRIPTION
"Implementation requirements for SNTP.
obsoleted because automationSntpTimeShift is obsolete now."

MODULE

-- compliance to the containing MIB module

MANDATORY-GROUPS
{ automationSntpGroup }

::= { automationSntpCompliances 1 }

automationSntpComplianceV1

MODULE-COMPLIANCE

STATUS
current

DESCRIPTION
"Implementation requirements for SNTP."

MODULE

MANDATORY-GROUPS
{ automationSntpGroupV1 }

::= { automationSntpCompliances 2 }

END
Requests for Comments (RFCs)

SNMPv1 was specified in 1988 in the following RFCs:
- RFC 1155 - Structure and Identification of Management Information for TCP/IP-based Internets
- RFC 1156 - Management Information Base for Network Management of TCP/IP-based Internets
- RFC 1157 - A Simple Network Management Protocol
- RFC 1212 - Concise MIB Definitions

SNMPv2c was specified by the following RFCs:
- RFC 1901 - Introduction to Community-based SNMPv2
- RFC 1906 - Transport Mappings for version 2 of the Simple Network Management Protocol

SNMPv3 was specified by the following RFCs:
- RFC 3410 - Introduction and Applicability Statements for Internet-Standard Management Framework
- RFC 3412 - Message Processing and Dispatching for the Simple Network Management Protocol
- RFC 3413 - Simple Network Management Protocol Applications
- RFC 3414 - User-based Security Model (USM) for version 3 of the Simple Network Management Protocol
- RFC 3415 - View-based Access Control Model (VACM) for the Simple Network Management Protocol
- RFC 3417 - Transport Mappings for the Simple Network Management Protocol
- RFC 3418 - Management Information Base (MIB) for the Simple Network Management Protocol
Glossary

MIB
Management Information Base
A standardized data structure written in a language not dependent on the target system. Elements of this data structure are known as MIB objects.

MIB browser
Program for displaying MIB objects. Is normally included in network management applications.

MIB variable
Placeholder for a scalar value or a value defined as a string that is read out of or written to the MIB using SNMP.

OID
Object Identifier
Describes a unique path through the hierarchical MIB structure to the relevant MIB object.

SMI
Structure of Management Information
A definition for the presentation of the data transferred using SNMP based on Abstract Syntax Notation One (ASN1). SMI describes the syntax of the managed objects and their names and coding.

SNMP
UDP-based open network management protocol for monitoring, diagnostics, control and administration of networks.

SNMP agent
Software installed on a managed device that can detect and signal the status of the device. At the request of a manager, the software can also change values on the device.

SNMP manager
Requests information about the connected network components and manages it. The SNMP manager can change some values on SNMP agents with write access (SET datagram).
**VACM**

Viewbased Access Control Model

Defines views with access rights to the object tree that can be assigned to users.

The SNMPv1/v2 read/write community represents 2 views with read or write permission.

**WBM**

Web Based Management

HTTP/HTTPS-based configuration and diagnostics interface of SIMATIC NET devices. The WBM of the device consists of pages with configuration and diagnostics data of the device.

When a client PC with a Web browser connects to a SIMATIC NET device that supports WBM, the HTTP/HTTPS server of the device returns the WBM pages to the client PC. With these WBM pages, diagnostics data can be read from the device and configuration data can be loaded on the device from the client PC.
Index

A
Agent - definition, 9

C
Client - definition, 9
Client-server model, 9
Community string, 8, 14

D
Device profile, 26

F
Framework, 36

M
Managed devices, 9
Management Information Base, 8, 19
Manager - definition, 9
Managing unit, 9
MIB - definition, 8
MIB variables, 22
MIB-II, 24
MIB-II groups, 22

O
OID, 19

P
Polling, 11
Ports 161 and 162, 11

R
Request, 11

S
Server - definition, 9
Siemens Automation MIB, 36
SINEMA Server, 15
SMI, 21
SMIv2, 36
SNMP agent, 9, 11
SNMP communities, 14
SNMP manager, 9, 11
SNMP OPC-Server, 15
SNMPv1, 8
SNMPv2c, 8
SNMPv3, 9

T
Traps, 11, 13

U
User-based Security Model, 15