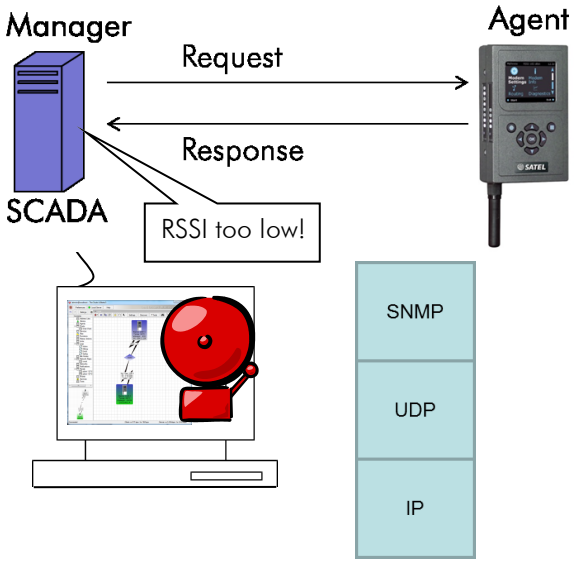
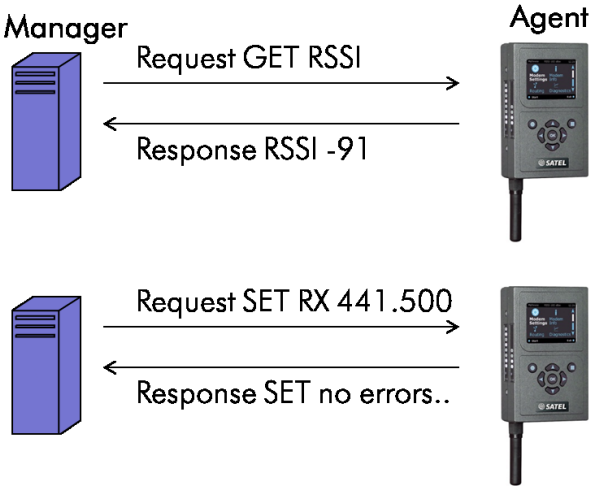
SIMPLE NETWORK MANAGEMENT PROTOCOL
SATELLAR MANAGEMENT WITH SNMP GET AND SET

THE SNMP PROTOCOL

The SIMPLE NETWORK MANAGEMENT PROTOCOL, SNMP is a widely used management protocol that operates on top of IP and UDP protocols. In the basic mode of operation the SNMP is a Request / Response protocol. The requesting, controlling process is called the Manager and the process responsible for providing the responses is called the Agent. In the SATELLAR use case, the SATELLAR modem will act as a SNMP Agent and the monitoring PC or SCADA would be the SNMP Manager.





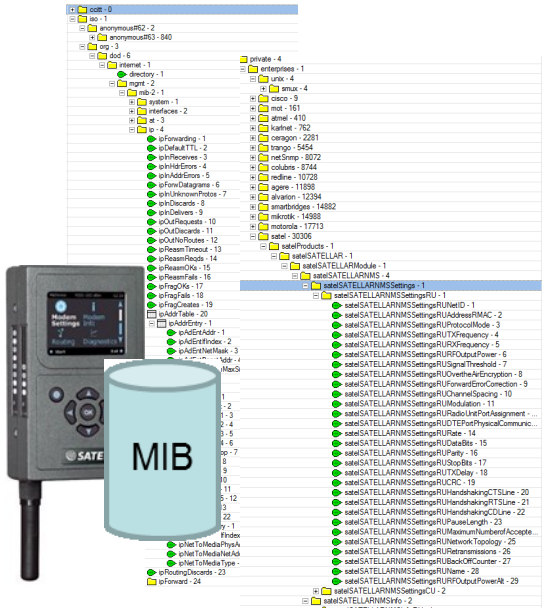
THE SNMP REQUEST

SNMP requests can be either Get or Set type. The Get request queries for a value of the parameter from the managed device and the Set writes a new value for the parameter.

The requested parameters are identified with OID (Object Identifier). For example, the value for the device temperature would be identified by the OID: 1.3.6.1.4.1.30306.1.1.1.4.2.1.1.0 .

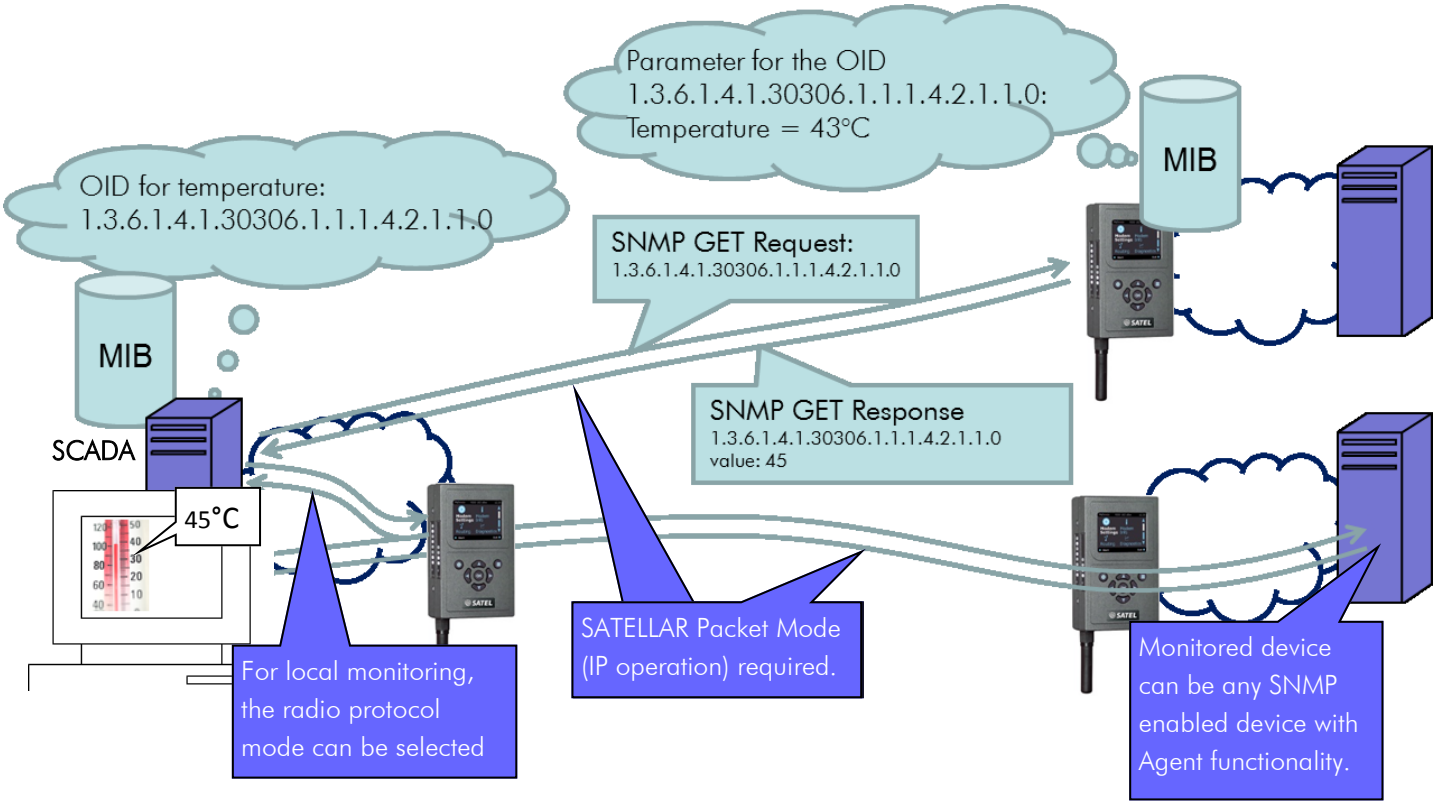
MIB

Mappings between OID numbers and parameters are stored in a tree formatted hierarchical database called Management Information Base, MIB. To enable SNMP query of a certain parameter, both the Manager and the Agent must have respective OID available in their MIB. For SATELLAR-2DS/20DS modem, the MIB database contents for SATELLAR related parameters are available for download at SATEL web pages. After download, they can be installed or imported to the Manager MIB.



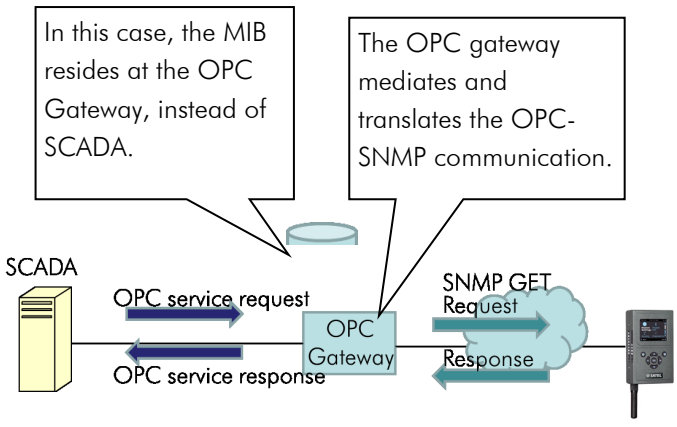
SNMP GET OPERATION

The following drawing illustrates the SNMP Get operation in more detail. The SCADA system has been configured to periodically monitor the temperature of the SATELLAR modems in the network. The SCADA system has a MIB entry stored for the SATELLAR specific parameter, so the SCADA will be able to map the temperature parameter to the correct OID. This OID is then included in the request. When the request is received by the SATELLAR, it will map the OID to the requested parameter of temperature. The internal logic in the SATELLAR reads the temperature value and sends it in the SNMP response back to SCADA. Again, in the response the identifier for the requested parameter is the OID. The monitored SATELLAR device can be either locally connected or remote modem behind the IP radio interface. The SATELLAR network must be configured to operate in the Packet Mode. However, if it is sufficient to monitor only locally connected modem, radio protocol mode can be selected freely.



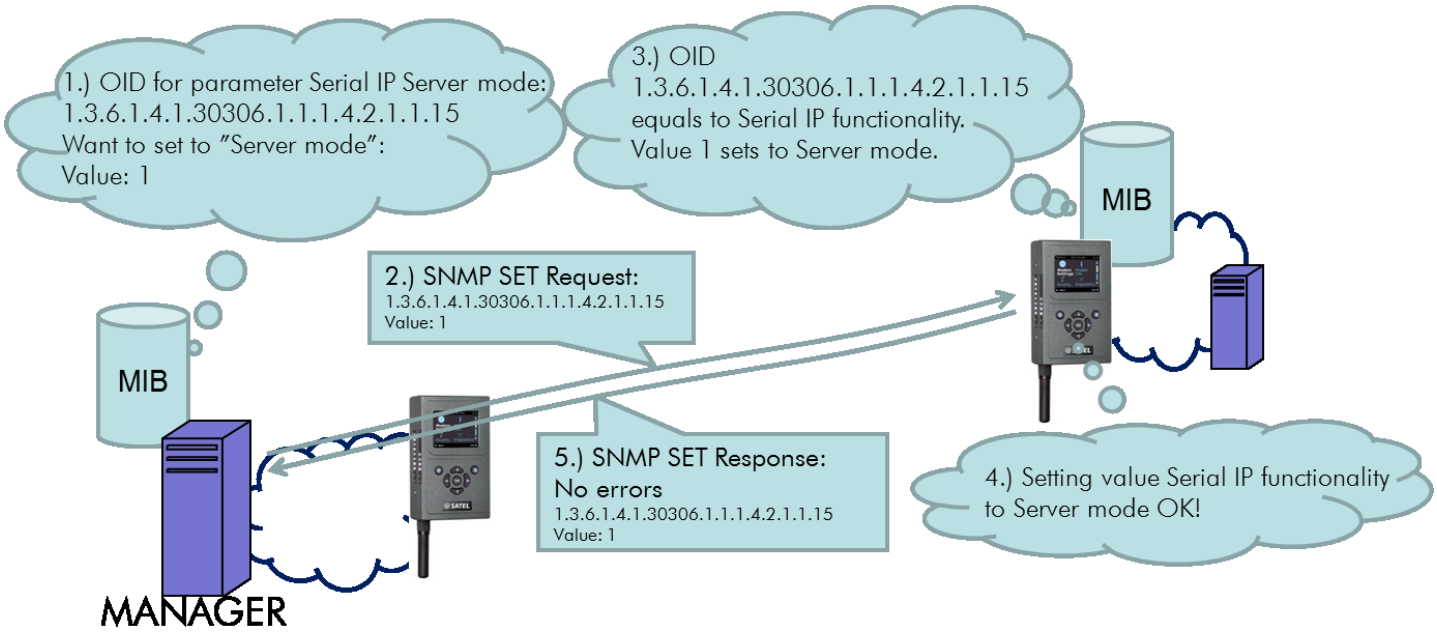
SCADA SUPPORT

Many SCADA solutions have a built-in support for the SNMP. Also, many SCADA providers recommend SNMP usage by adding a protocol gateway to the system. The protocol gateway will convert the SCADA supported protocol to SNMP queries and vice versa. For example ABB Microscada supports the SNMP operation via the SNMP-OPC (Open Connectivity via Open Standards) gateway. See the following drawing for the illustration for the gateway operation.



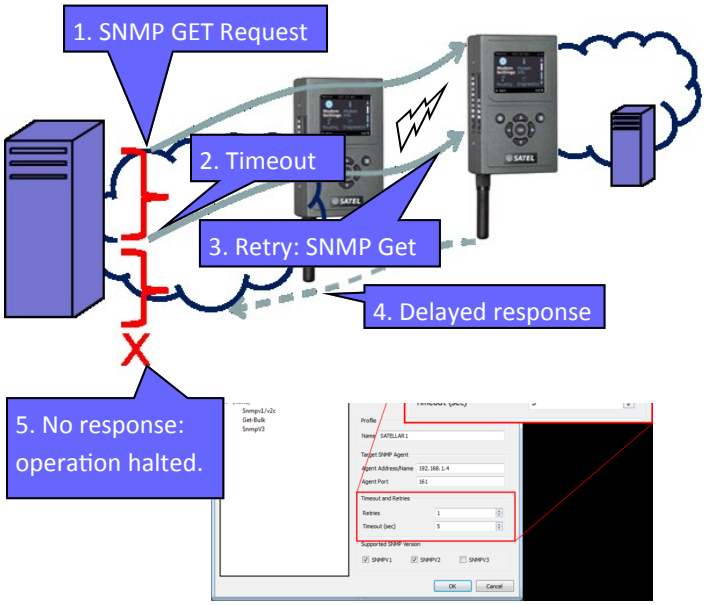
SNMP SET OPERATION

The following drawing illustrates the SNMP Set operation in more detail. The user wants to enable the Serial IP functionality of the remote SATELLAR by setting the Serial IP to Server mode. The management PC has the MIB configured and thus it is able to map the correct parameter to the OID, together with the desired value. In the following example, this is the step 1.): Serial IP mode is identified by the OID 1.3.6.1.4.1.30306.1.1.1.4.2.1.1.15 and the "Server mode" is represented by the value 1. The manager sends this information to the SNMP Agent running in the remote SATELLAR, and issues the parameter value change with SNMP SET request, as illustrated in the step 2.). In the step 3.), the SNMP Agent receives the Set request and again, maps the OID to the correct parameter, together with the received value 1. In this example, MIB query was successful, as well as setting the parameter in the step 4.). Therefore, the SNMP Agent at the remote SATELLAR replies to the Manager by sending the SNMP SET Response, together with the status indication (no errors), the changed OID, and the value. Remote configuration with SNMP Set protocol was successful.



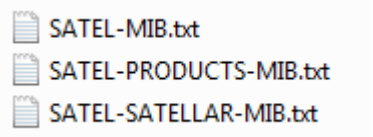
SNMP TIMEOUT

When the SNMP Get or Set Request has been sent by the Manager application, the Manager expects the Response to arrive within a specified time, SNMP Timeout. **If there is no response received, the SNMP Manager application stops the communication with the agent**. Therefore, in SATELLAR networks with radio links, it is recommended to increase the timeout value set in the Manager. How this is done, depends on the application.



ENABLING SNMP OPERATION

First step to enable SNMP operation in SATELLAR is to download the MIB files from the SATEL web pages, from Support, Downloads, Firmware section (April 7, 2014: http://www.satel.com/support/downloads/firmware). Import all the MIB files to the Manager application. The details on how this is done fully depend on the selected manager application. Files needed are:



Next, configure the SNMP parameters with a web browser connection to SATELLAR IP–address. Required parameters are in **Modem Settings** tab, on the **Services** page as well as on the **SNMP** configuration page.

SNMP PARAMETERS IN THE SATELLAR

Services

SNMPD State:
Turns the SNMP functionality on or off.

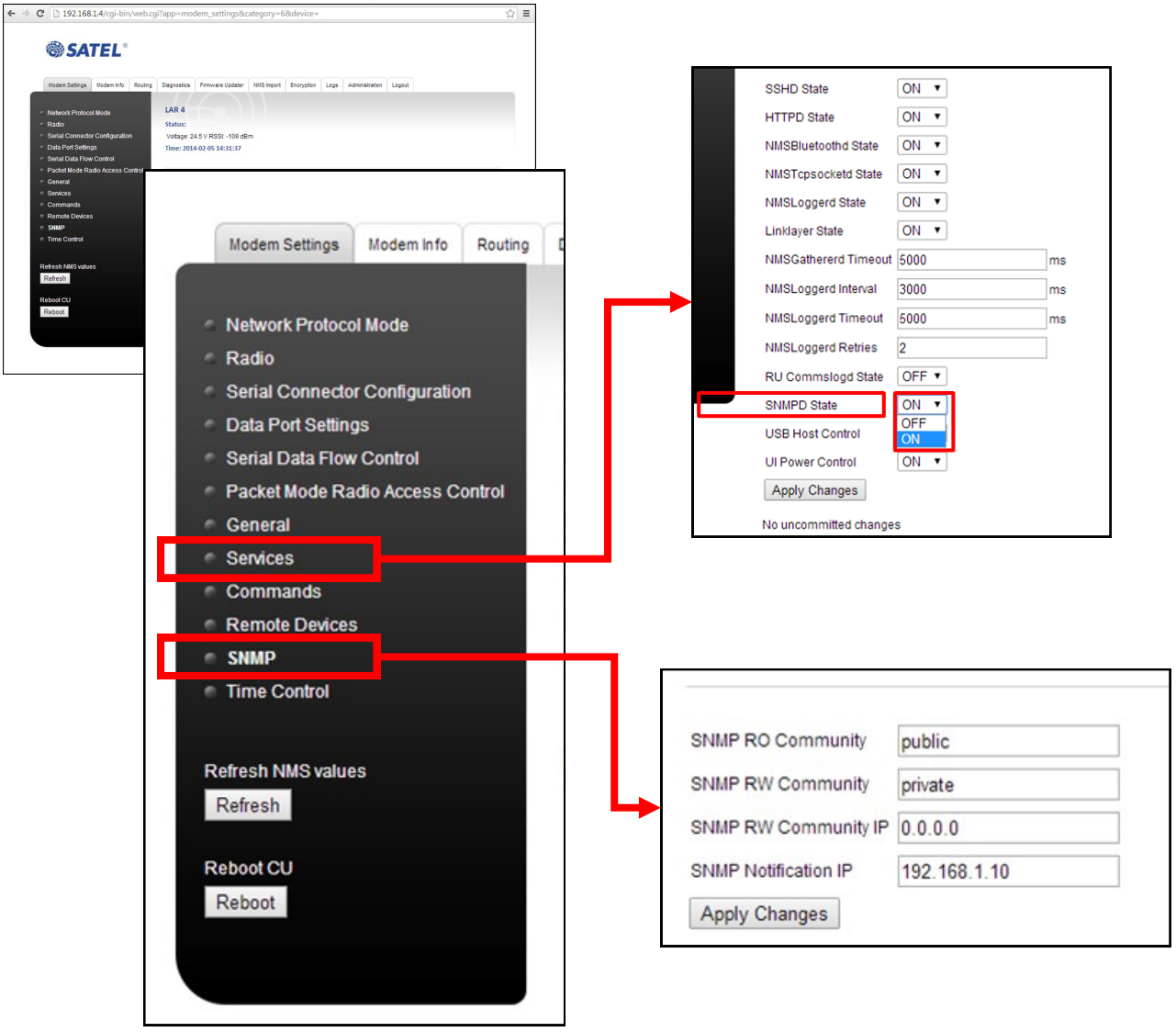
SNMP

SNMP RO Community:
Password to query values from this device with SNMP Get commands. The Manager side configuration must be set to match with this string.

SNMP RW Community:
Password to set values to this device with SNMP Set commands. The Manager side configuration must be set to match with this string.

SNMP RW Community IP:
IP address range that is allowed to send Set commands to this device.

SNMP Notification IP:
The IP address of the destination that his device sends the SNMP notifications to, when such a notification is available.



3RD PARTY MANAGER APPLICATIONS

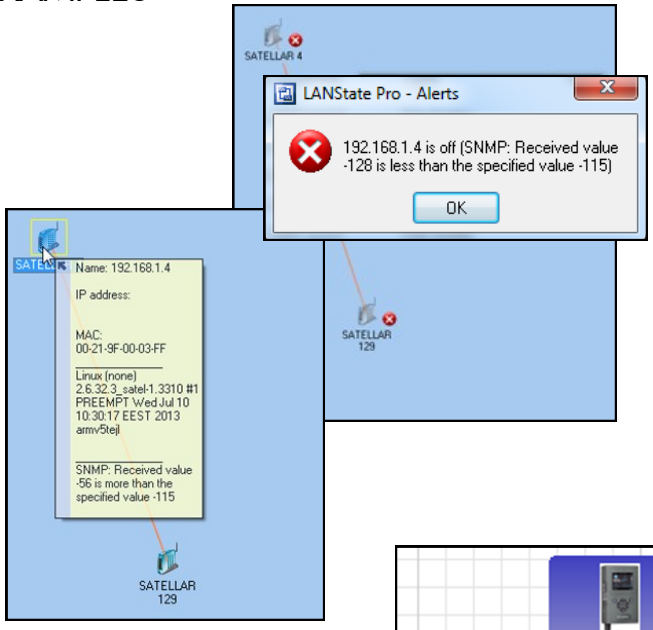
SATEL does not currently provide any SNMP Manager applications. One reason for this is that many systems already have an operational SNMP Manager. However, if the 3rd party SNMP manager is required, several options can be found from the Internet. Available software varies a lot. Many of them are complex and heavy solutions with full of features and functionality that would not be needed in the SATELLAR network management. This makes the usage of the application clumsy and slow. Some applications also often lack of the visual presentation of the network and the monitoring state. Another issue with many applications is that they are sending extensive amount of SNMP Get queries for values that one might not be interested about. And in many cases there is no way to suppress these messages or control which SNMP requests to send and how often.

According to the SATEL testing of SNMP Managers, currently the most interesting ones seem to be applications called "LAN State Pro" and "The Dude."

FEW SNMP MONITORING SOFTWARE EXAMPLES

LAN State Pro

- Commercial monitoring tool
- Designed for large IP networks
- Restricted set of SNMP functionality
- Controllable set: no extra messaging
- Visual monitoring available
- Viewing normal values requires mouse over
- Working and extensive alarm functionality
- Free 30-day trial



The Dude

- Free and open monitoring tool
- Extensive set of SNMP functionality
- Some functionalities generate additional messaging and cannot be turned off
- Configurable and extensive visual monitoring
- Working and extensive alarm functionality
- Scripting functionality