NAS 271
ASUSTOR NAS MIB Guide

Introduces the basics of ASUSTOR NAS MIB files

ASUSTOR COLLEGE

COURSE OBJECTIVE

Upon completion of this course you should be able to:

1. Know the basics of ASUSTOR NAS MIB files
2. Use PRTG to monitor ASUSTOR NAS status

PREREQUISITES

Course Prerequisites:
None

Students are expected to have a working knowledge of:
SNMP, NMS

OUTLINE

1. Introduction

ASUSTOR Data Master (ADM) supports SNMP (Simple Network Management Protocol) since 2.4.0. Network administrators can use any SNMP-based NMS (Network Management System) to monitor the status of ASUSTOR NAS. With SNMP trap capability provided, ASUSTOR NAS can send notification to NMS actively when the pre-defined levels of events occur.

A SNMP MIB (Management Information Base) is a hierarchy of information used to define managed objects in a network device. This document introduces the supported MIB files on ASUSTOR ADM, while also describing how OIDs (Object Identifiers) in ASUSTOR MIBs are used. Users are encouraged to have experience and knowledge of NMS and SNMP prior to consulting this document.

2. Requirements

- ASUSTOR NAS with ADM 2.4.0 or later
- A SNMP-based NMS

3. Supported MIB files

There are two types of MIB files supported on ASUSTOR ADM: standard and ASUSTOR-specific. The table below shows all the MIBs supported by ASUSTOR ADM.

Standard MIB	Explanation
DISMAN-EVENT-MIB	For defining event triggers and actions for network management purposes
DISMAN-SCHEDULE-MIB	For scheduling SNMP set operations periodically or at specific points in time
HOST-RESOURCES-MIB	For use in managing host systems
IF-MIB	For describing network interface sub-layers
IP-FORWARD-MIB	For the management of CIDR multipath IP Routes
IP-MIB	For IP and ICMP management objects
IPV6-ICMP-MIB	For entities implementing the ICMPv6
IPV6-MIB	For entities implementing the IPv6 protocol
IPV6-TCP-MIB	For entities implementing TCP over IPv6
IPV6-UDP-MIB	For entities implementing UDP over IPv6
NET-SNMP-AGENT-MIB	For monitoring structures for the Net-SNMP agent
NET-SNMP-EXTEND-MIB	For scripted extensions for the Net-SNMP agent
NET-SNMP-VACM-MIB	Defines Net-SNMP extensions to the standard VACM view table
NOTIFICATION-LOG-MIB	For logging SNMP Notifications
SNMP-COMMUNITY-MIB	To help support coexistence between SNMPv1, SNMPv2c, and SNMPv3
SNMP-FRAMEWORK-MIB	The SNMP Management Architecture MIB
SNMP-MPD-MIB	For Message Processing and Dispatching

SNMP-USER-BASED-SM-MIB	For the SNMP User-based Security Model
SNMP-VIEW-BASED-ACM-MIB	For the View-based Access Control Model for SNMP
SNMPv2-MIB	For SNMP entities
TCP-MIB	For managing TCP implementations
UCD-DISKIO-MIB	For disk IO statistics
UCD-DLMOD-MIB	For dynamic loadable MIB modules
UCD-SNMP-MIB	For private UCD SNMP MIB extensions
UDP-MIB	For managing UDP implementations
ASUSTOR-specific MIB	Explanation
ASUSTOR-SYSTEM-MIB	For ASUSTOR system information
ASUSTOR-DISK-MIB	For ASUSTOR disk information
ASUSTOR-UPS-MIB	For ASUSTOR UPS information

Depending on the vendor, many standard MIBs are delivered with the NMS software. You can also download the standard MIBs from the IETF website, www.ietf.org, and compile them into your NMS, if necessary. The OIDs of standard SNMP MIB files will not be explained in this document.

4.   ASUSTOR MIB files

ASUSTOR MIB files can provide specific data about a ASUSTOR NAS's system, disks, and connected UPS. To obtain the ASUSTOR MIB files, please go to **ADM** > **Services** > **SNMP** and click on the hyperlink to download.
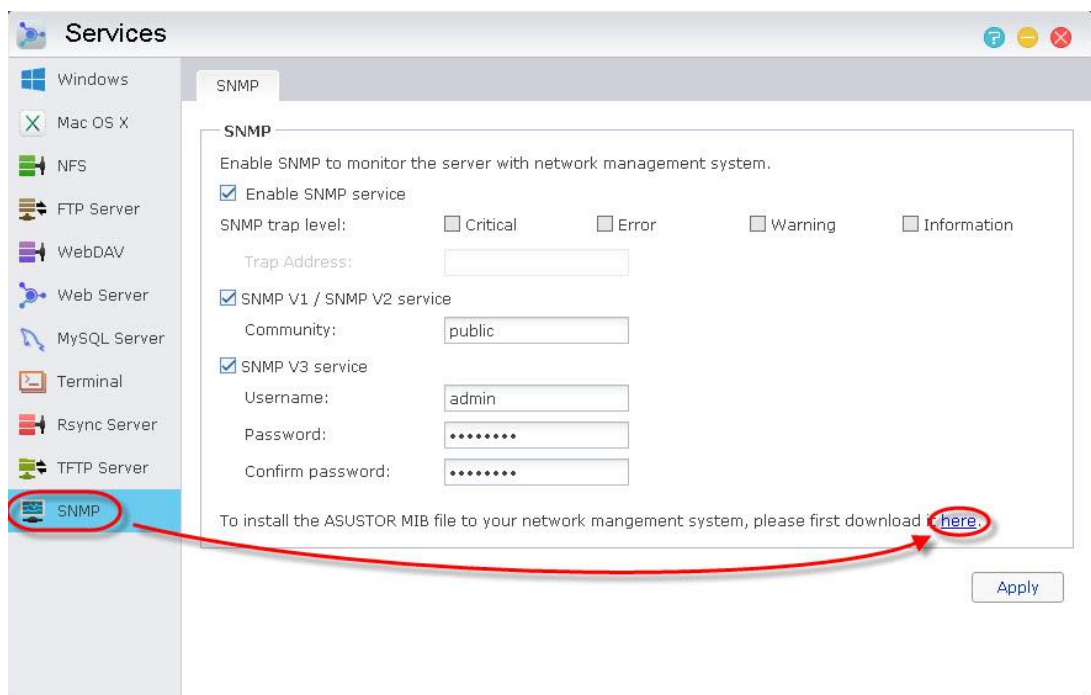
ADM provides 3 ASUSTOR MIB files. Please check table below for details:

OID	Group	File Name
.1.3.6.1.4.1.44738.1	asustor system	ASUSTOR-SYSTEM-MIB
.1.3.6.1.4.1.44738.2	asustor hardware	

.1.3.6.1.4.1.44738.3	net	
.1.3.6.1.4.1.44738.4	disk	ASUSTOR-DISK-MIB
.1.3.6.1.4.1.44738.5	volume	
.1.3.6.1.4.1.44738.6	asustor ups	ASUSTOR-UPS-MIB

These MIB files are the child-nodes of OID 1.3.6.1.4.44738. Please note that the MIB files are mutually dependent. You have to import all of them together to your NMS first, and then you can monitor any of the items on NMS.

4.1 ASUSTOR SYSTEM MIB

The ASUSTOR System MIB displays all system statuses, including CPU, fan, and network status. Users can monitor this MIB for system operation. The tables below show information provided in the System MIB.

The child-nodes of asustor system group (.1.3.6.1.4.1.44738.1)

OID	Name	Type	Status Type	Explanation
.1.0	sysSerialNumber	String	-	The serial number of this NAS
.2.0	sysADMVersion	String	-	The ADM version of this NAS
.3.0	sysBiosVersion	String	-	The BIOS version of this NAS
.4.0	sysUptime	String	-	The uptime of this NAS
.5.0	sysTime	String	-	The current time of this NAS
.6.0	sysTimeZone	String	-	The time zone of this NAS
.7.0	sysAsustorID	String	Available Unavailable	Checks whether there is a newer ADM for upgrade

The child-nodes of asustor hardware group (.1.3.6.1.4.1.44738.2)

OID	Name	Type	Status Type	Explanation
.1.0	hwModelName	String	-	The model name of this NAS
.2.0	hwSysTemperature	Integer	-	The system temperature in Celsius degree
.3.0	hwCPUTemperature	Integer	-	The CPU temperature in Celsius degree
.4.0	hwTotalMem	Integer	-	The system total memory capacity in megabyte(MB)
.5.0	hwFreeMem	Integer	-	The system free memory capacity in megabyte(MB)
.6.0	hwProcessor	String	-	The model name of the CPU
.7.1.1.1	cpuIndex	Integer	-	Used internally for SNMP table and non-accessible
.7.1.1.2	cpuUsage	Integer	-	The percentage of CPU usage
.8.1.1.1	fanIndex	Integer	-	Used internally for SNMP table and non-accessible
.8.1.1.2	fanSpeed	Integer	-	The fan speed in RPM

The child-nodes of net group (.1.3.6.1.4.1.44738.3)

OID	Name	Type	Status Type	Explanation
.1.1.1	netIndex	Integer	-	Used internally for SNMP table and non-accessible
.1.1.2	netInterface	Integer	-	The network interface
.1.1.3	netMacAddress	String	-	The MAC address of the network interface
.1.1.4	netIPv4Address	String	-	The IPv4 address of the network interface
.1.1.5	netIPv6Address	String	-	The IPv6 address of the network interface
.1.1.6	netPacketSent	Integer	-	The outgoing packets in kilobyte(KB)
.1.1.7	netPacketReceived	Integer	-	The incoming packets in kilobyte(KB)

4.2 ASUSTOR DISK MIB

The ASUSTOR Disk MIB contains two tables for disk and volume respectively. As such, the tables can increase or decrease in size when disks or volumes are added or removed. For example, if a disk is inserted, an additional row containing relevant information will emerge. The OIDs DiskIndex and VolumeIndex are reserved for indexes of table rows and cannot be accessed. The tables below describe information provided in the Disk MIB.

The child-nodes of disk group (.1.3.6.1.4.1.44738.4)

OID	Name	Type	Status Type	Explanation
.1.1.1	diskIndex	Integer	-	Used internally for SNMP table and non-accessible
.1.1.2	diskID	String	-	The ID of the disk bay
.1.1.3	diskModel	String	-	The disk model name
1.1.4	diskType	String	SATA SSD	The disk type
1.1.5	diskStatus	String	Healthy Normal Risky Dangerous Bad	The S.M.A.R.T status of the disk
1.1.6	diskTemperature	Integer	-	The disk temperature in Celsius degree
1.1.7	diskSize	Integer	-	The disk size in gigabyte (GB)
1.1.8	diskSmartInfo	String	-	The S.M.A.R.T info of the disk

The child-nodes of volume group (.1.3.6.1.4.1.44738.5)

OID	Name	Type	Status Type	Explanation
.1.1.1	volumeIndex	Integer	-	Used internally for SNMP table and non-accessible
.1.1.2	volumeName	String	-	The volume name
.1.1.3	volumeLevel	String	Single JBOD	The volume level

			Raid0 Raid1 Raid10 Raid5 Raid6	
.1.1.4	volumeStatus	String	Healthy Clean Active Resyncing Recovering Reshaping Appending Migrating fsExpanding fsIniting Degraded Failed Inactive	The volume status
.1.1.5	volumeFileSystem	String	-	The volume file system type
.1.1.6	volumeTotalSize	Integer	-	The volume total size in gigabyte (GB)
.1.1.7	volumeFreeSize	Integer	-	The volume free size in gigabyte (GB)

4.3 ASUSTOR UPS MIB

ASUSTOR UPS MIB provides the ability to monitor the status of a UPS device connected to the ASUSTOR NAS. Please note that available OIDs of the UPS MIB depend on what information is provided by the UPS device. If a UPS device does not provide data for a certain OID, that OID will not appear in the NMS software. The table below describes partial information provided in the UPS MIB. If you are interested in all OIDs, please refer to the MIB file ASUSTOR-UPS-MIB.txt.

The partial child-nodes of asustor ups group (.1.3.6.1.4.1.44738.6)

OID	Name	Type	Status Type	Explanation
.1.0	upsManufacturer	String	-	The UPS manufacturer
.2.0	upsModel	String	-	The UPS model name
.4.0	upsVendorID	String	-	The UPS vendor ID
.6.0	upsStatus	String	OL: On line OB: On battery LB: Low battery	The UPS status
.7.0	upsBatteryChargePercentage	Integer	-	The battery charged percentage
.8.0	upsBatteryChargeLowPercentage	Integer	-	Remaining battery level in percentage when UPS switches to LB
.13.0	upsInputSensitivity	String	-	The UPS input power sensitivity
16.0	upsInputVoltage	Integer	-	The UPS input voltage

5.   Monitor specific OIDs

In any NMS, particular MIB files are needed in order to capture data through SNMP. Users need to import all MIB files to ensure that the NMS can resolve specific OIDs. Once imported, data can be captured by setting up the NMS. Although means of operating different kinds of NMS vary, the process of OID monitoring is similar. The overall procedure is as follows.

1. Import MIB file into NMS.
2. Setup the NMS to monitor specific OIDs.

The following guide demonstrates the use of PRTG (a type of NMS) including how to import MIB files and setup monitoring for the OIDs provided. For further help regarding PRTG, please consult PRTG documentation, as the following is only intended to be a brief description of OID monitoring.

5.1 Import MIB file

As PRTG cannot import MIB files directly, Paessler MIB Importer is required to convert MIB files into the PRTG format:

1. Download and Install Paessler MIB Importer. Download from
http://www.paessler.com/tools/mibimporter, and install on your computer.

2. Go to **File** > **Import MIB File**
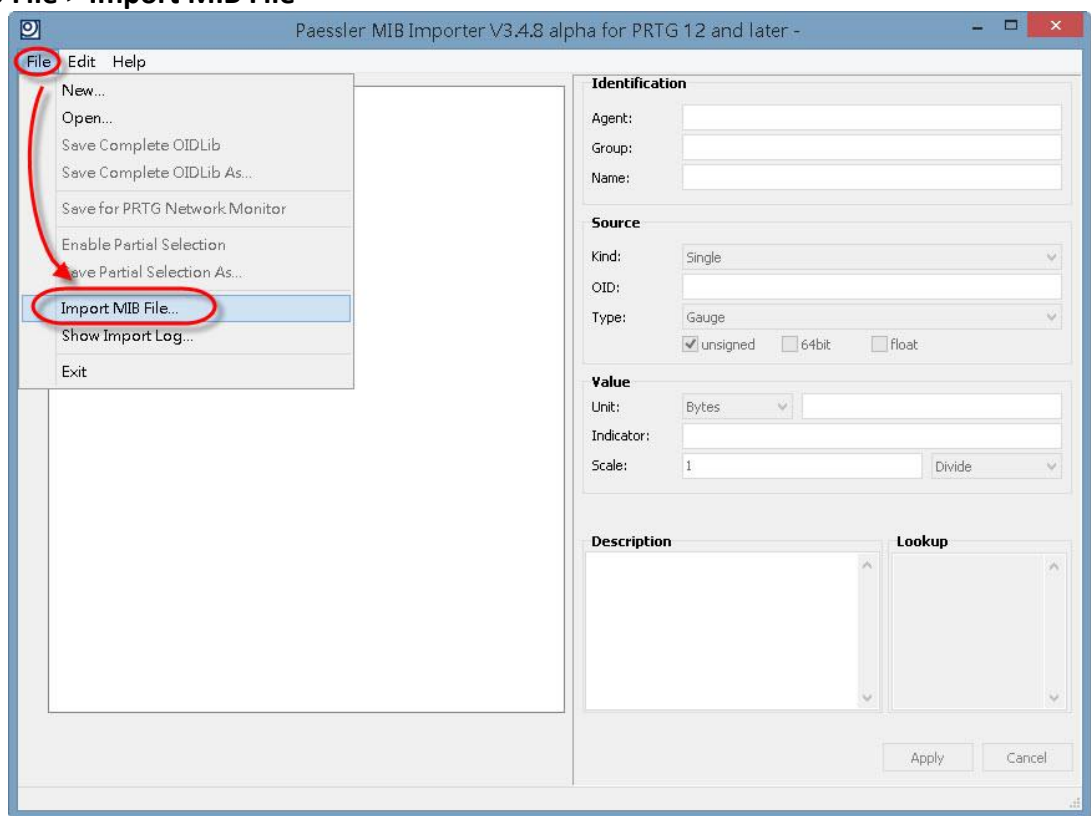
3. Choose all the ASUSTOR MIB file together and click **Open File**

The three MIB files: ASUSTOR-SYSTEM-MIB.txt, ASUSTOR-DISK-MIB.txt and ASUSTOR-UPS-MIB.txt, must be import together as they are mutually dependent and Paessler MIB Importer cannot load them individually. If the import is successful, a window should appear as shown below.
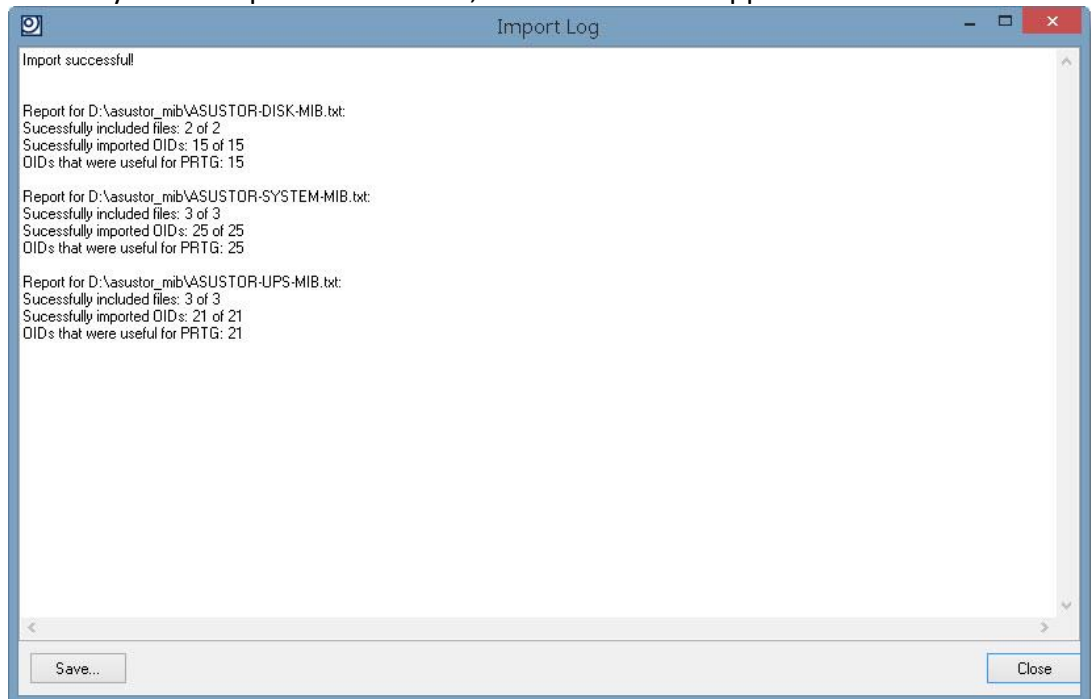
Detailed information is shown as below.
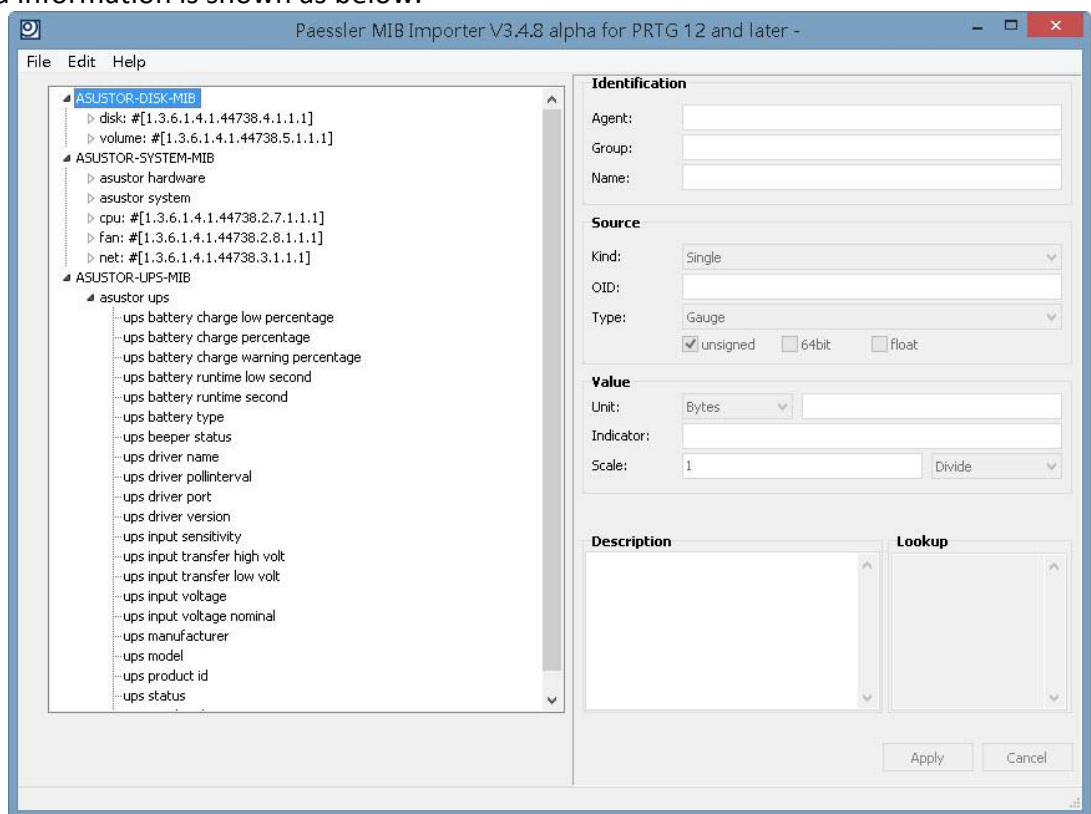
4. Go to **File** > **Save Complete OIDLib as…** to export the MIB files to the PRTG supported format
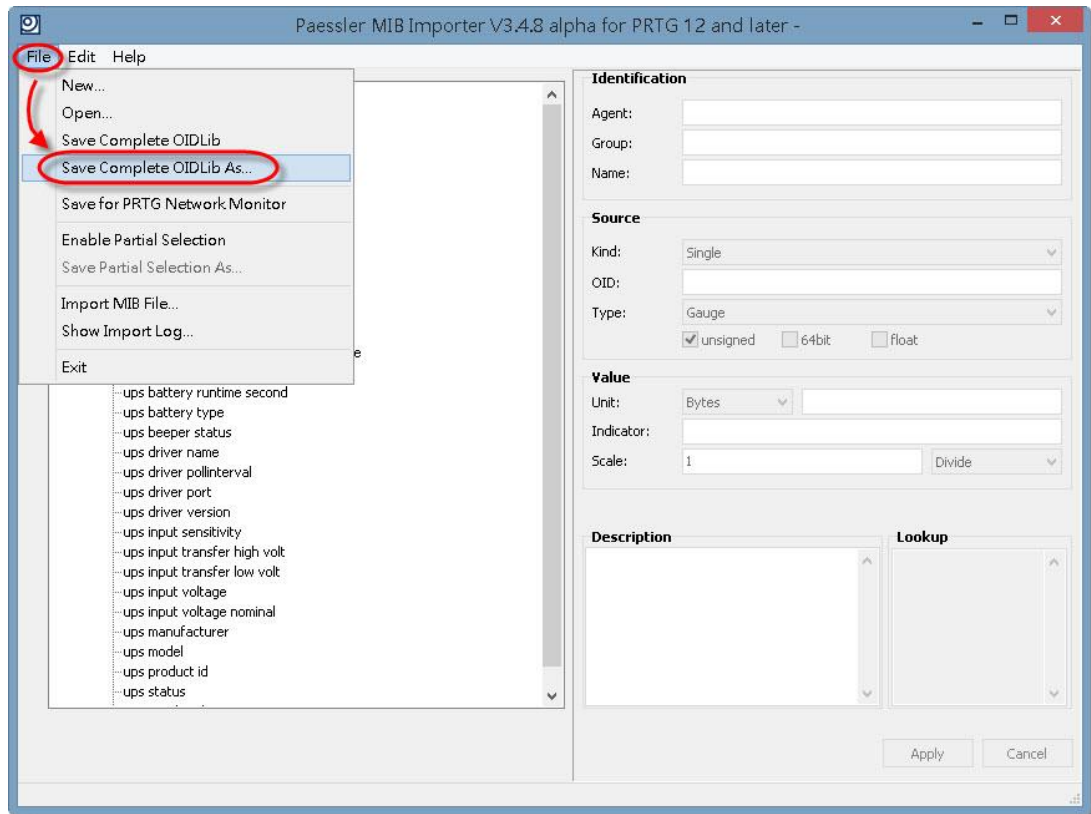
A PRTG-supported library containing the MIB information will then be generated.

5.2 Setup the NMS

When PRTG is installed, it will create a folder "**PRTG Network Monitor**" for storing all the required files. The PRTG-supported library containing the MIB files in question should be placed into the subfolder "**snmplibs**" in folder "**PRTG Network Monitor**". Once this has been done, specific OIDs can be set up for monitoring in PRTG. This guide assumes that ASUSTOR NAS have already been added to the devices list and focuses only on how to add OIDs for monitoring.

1. **Open** the PRTG Network Monitor

2. Go to **Sensors** > **Add Sensor**
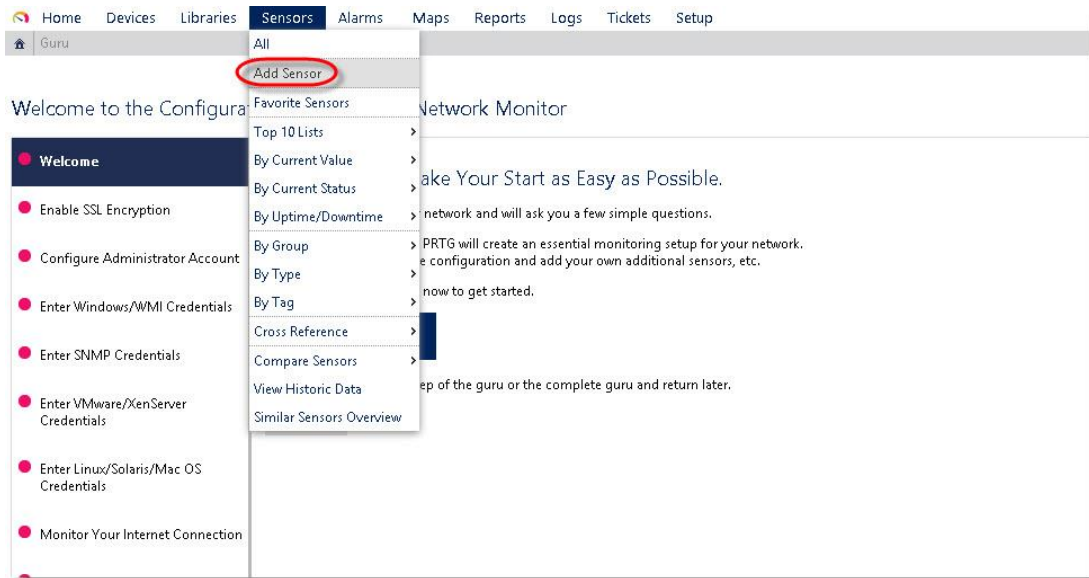
3. Click **Add sensor to an existing device**, choose an ASUSTOR NAS from the list, click **Continue**
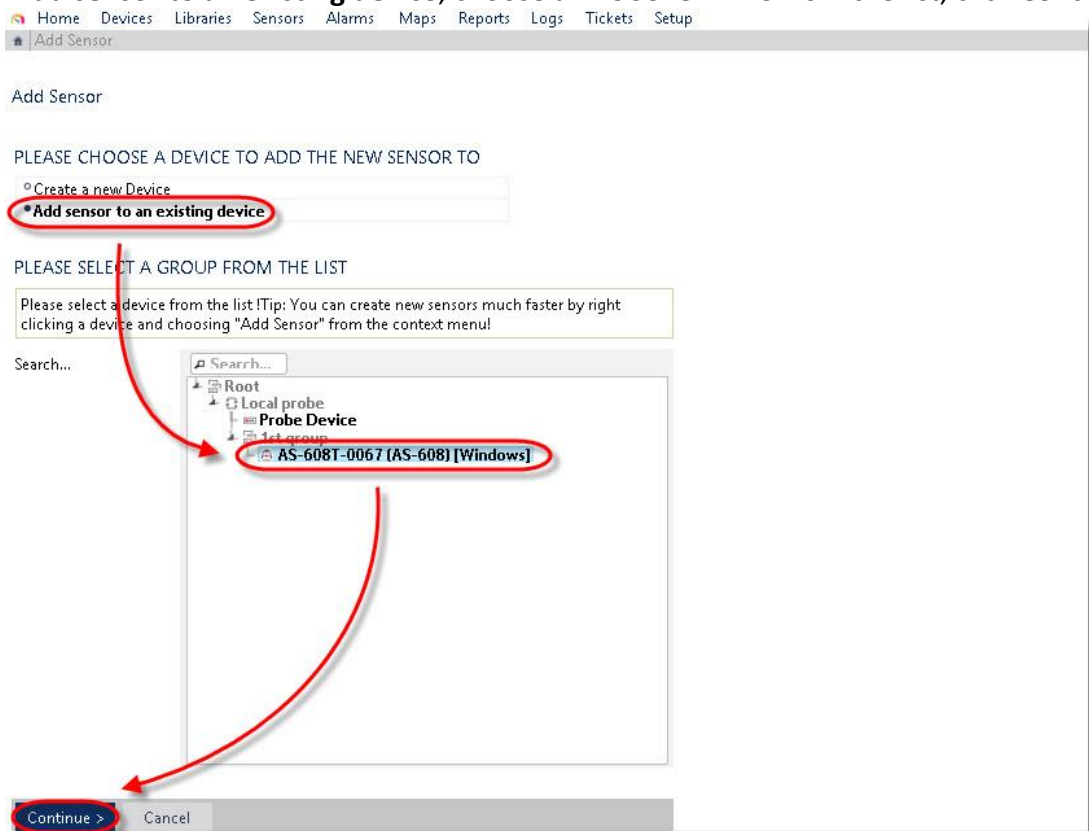
4. Select **Custom Sensors** > **SNMP Library**
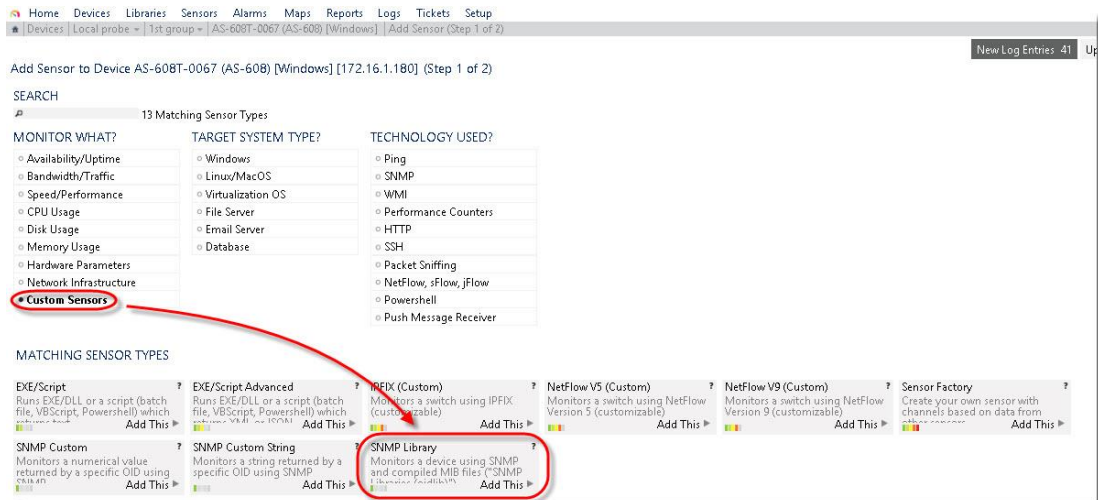
5. Select the previously exported ASUSTOR library file and click **OK**
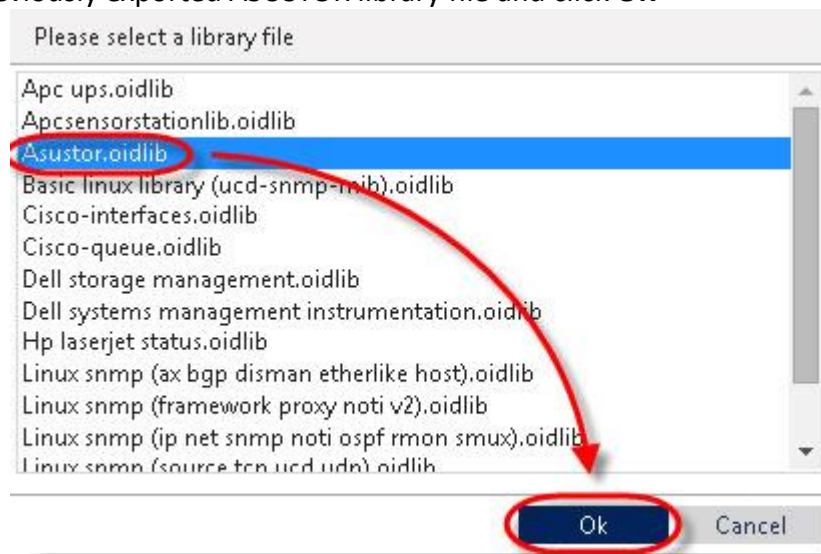
6. Choose items for monitoring

7. You can start monitoring the ASUSTOR NAS status on NMS now!