Synology DiskStation

MIB Guide

2018-12-06

Synology®

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Introduction

Synology DiskStation Manager (DSM) allows users to monitor the status of their Synology NAS through Network Management Systems (NMS) via Simple Network Management Protocol (SNMP). However, Synology DSM does not provide SNMP trap capability.

This document introduces Management Information Base (MIB) files of Synology NAS. It focuses on which MIB files are supported by DSM, while also describes how Object Identifiers (OIDs) in Synology MIBs are used with your preferred NMS software. Users are encouraged to have experience and knowledge of NMS and SNMP before consulting this document.

Supported MIB Files

DSM supports numerous MIB files that can help users monitor different information on their Synology NAS. Table 1 shows the MIBs supported by DSM.

These MIB files can be separated into two types: general SNMP MIB and Synology MIB. General SNMP MIB files are equipped on NMS clients natively. This document does not explain the OIDs of general SNMP MIB files. If you would like to learn more about OIDs in general SNMP MIB files, please visit this website.

Synology MIB files can provide specific data about a Synology NAS's system, disks, RAID, and connected UPS devices. Please see the "Synology MIB Files" section below for more Synology MIB information.

To download the Synology MIB file, please use the link below:

● https://global.download.synology.com/download/Document/MIBGuide/Synology_MIB_File.zip

Table 1. General MIB Files Supported by DSM

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

MIB	Explanation
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
SYNOLOGY-DISK-MIB	For Synology disk information (Synology only)
SYNOLOGY-EBOX-MIB	For Synology ebox information (Synology only)
SYNOLOGY-NFS-MIB	For Synology NFS information (Synology only)
SYNOLOGY-RAID-MIB	For Synology RAID information (Synology only)
SYNOLOGY-SYSTEM-MIB	For Synology system information (Synology only)
SYNOLOGY-UPS-MIB	For Synology UPS information (Synology only)
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

Synology MIB Files

The following Synology MIB files are provided in DSM. These MIB files are the child-nodes of OID (Object Identifier) 1.3.6.1.4.1.6574. Table 2 shows the exact OID of each MIB. Please note that the MIB files are mutually dependent. Before your NMS can monitor any of the items in these MIB files, please make sure that all of them have been imported together.

Table 2. OID of Synology MIBs

OID	Name	File Name
.1.3.6.1.4.1.6574.1	synoSystem	SYNOLOGY-SYSTEM-MIB.txt
.1.3.6.1.4.1.6574.2	synoDisk	SYNOLOGY-DISK-MIB.txt

OID	Name	File Name
.1.3.6.1.4.1.6574.3	synoRaid	SYNOLOGY-RAID-MIB.txt
.1.3.6.1.4.1.6574.4	synoUPS	SYNOLOGY-UPS-MIB.txt
.1.3.6.1.4.1.6574.5	synologyDiskSMART	SYNOLOGY-SMART-MIB.txt
.1.3.6.1.4.1.6574.6	synologyService	SYNOLOGY-SERVICES-MIB.txt
.1.3.6.1.4.1.6574.101	storageIO	SYNOLOGY-STORAGEIO-MIB.txt
.1.3.6.1.4.1.6574.102	spaceIO	SYNOLOGY-SPACEIO-MIB.txt
.1.3.6.1.4.1.6574.104	synologyiSCSILUN	SYNOLOGY-ISCSILUN-MIB.txt
.1.3.6.1.4.1.6574.105	synologyEbox	SYNOLOGY-EBOX-MIB
.1.3.6.1.4.1.6574.107	synologyNFS	SYNOLOGY-NFS-MIB.txt

Synology System MIB

The Synology System MIB displays all system statuses, including temperature and fan status. Users can monitor this MIB for system functionality. Table 3 shows information provided in the System MIB.

Table 3. System MIB

OID	Name	Type	Status Type	Explanation
.1	systemStatus	Integer	Normal(1) Failed(2)	System partition status
.2	temperature	Integer	–	Temperature of this NAS
.3	powerStatus	Integer	Normal(1) Failed(2)	Returns error if power supplies fail
.4.1	systemFanStatus	Integer	Normal(1) Failed(2)	Returns error if system fan fails
.4.2	cpuFanStatus	Integer	Normal(1) Failed(2)	Returns error if CPU fan fails
.5.1	modelName	String	–	Model name of this NAS
.5.2	serialNumber	String	–	Model serial number
.5.3	version	String	–	The version of DSM
.5.4	upgradeAvailable	Integer	Available(1) Unavailable(2) Connecting(3) Disconnected(4) Others(5)	Checks whether a new version or update of DSM is available

Synology Disk MIB

The Synology Disk MIB contains several types of information regarding hard drives, including ID, type and so on, as listed in Table 4. This MIB is a table in SNMP. As such, it can increase or decrease in size when disks are inserted or removed. For example, if a disk is inserted, an additional row containing relevant information will emerge. The OID DiskIndex (.1) is reserved for an index of table rows and cannot be accessed. Table 5 describes the contents of each DiskStatus in detail.

Table 4. Disk MIB

OID	Name	Type	Status Type	Explanation
.1	diskIndex	Integer	–	Used internally for SNMP table and not accessible
.2	diskID	String	–	Disk name in DSM
.3	diskModel	String	–	Disk model
.4	diskType	String	–	Disk type, e.g. SATA, SSD
.5	diskStatus	Integer	Normal(1)*	Current disk status
.6	diskTemperature	Integer	–	Disk temperature

* For DiskStatus details, please see Table 5.

Table 5. DiskStatus Explanation

Status	Explanation
Normal(1)	The disk is functioning normally
Initialized(2)	The disk has system partitions but no data
NotInitialized(3)	The disk is not partitioned
SystemPartitionFailed(4)	Partitions on the disk are damaged
Crashed(5)	The disk is damaged

Synology RAID MIB

In addition to the disk MIB, Synology also provides an MIB for monitoring RAID status. This MIB is similar to the disk MIB in that rows will appear or disappear to reflect RAID creation and deletion. Table 6 lists the contents of the RAID MIB. Table 7 describes each RAID status in detail.

Table 6. RAID MIB

OID	Name	Type	Status Type	Explanation
.1	raidIndex	Integer	–	Used internally for SNMP table and not accessible
.2	raidName	String	–	The name of each RAID in DSM
.3	raidStatus	Integer	Normal(1)*	It shows the RAID status right now
.4	raidFreeSize	Counter64	–	The free size of volume / disk group

OID	Name	Type	Status Type	Explanation
.5	raidTotalSize	Counter64	–	The total size of volume / disk group

* For RAID status details, please see Table 7.

Table 7. RAID Status Explanation

Status	Explanation
Normal(1)	RAID is functioning normally
Repairing(2) Migrating(3) Expanding(4) Deleting(5) Creating(6) RaidSyncing(7) RaidParityChecking(8) RaidAssembling(9) Canceling(10)	These statuses are shown when RAID is created or deleted
Degrade(11)	Degrade is shown when a tolerable failure of disk(s) occurs
Crashed(12)	RAID has crashed and is now read-only
DataScrubbing (13)	RAID is DataScrubbing
RaidDeploying (14)	RAID is deploying Single volume on pool
RaidUnDeploying (15)	RAID is not deploying Single volume on pool
RaidMountCache (16)	RAID is mounting SSD cache
RaidUnmountCache (17)	RAID is not mounting SSD cache
RaidExpandingUnfinishedSHR (18)	RAID continue expanding SHR if interrupted
RaidConvertSHRToPool (19)	RAID is converting Single volume on SHR to multiple volume on SHR
RaidMigrateSHR1ToSHR2 (20)	RAID is migrating SHR1 to SHR2
RaidUnknownStatus (21)	RAID status is not included in the status above

Synology UPS MIB

The Synology UPS MIB provides the ability to monitor the status of a UPS device connected to the Synology NAS. Please note that the 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. Table 8 shows a partial UPS MIB table only. If you are interested in all OIDs, please refer to the MIB file SYNOLOGY-UPS-MIB.txt.

Table 8. Partial UPS MIB

OID	Name	Type	Status Type	Explanation
.1.1	upsDeviceModel	String	–	UPS device model
.1.2	upsDeviceManufacturer	String	–	UPS device manufacturer
.1.3	upsDeviceSerial	String	–	UPS device serial number
.2.1	upsInfoStatus	String	–	UPS device status
.2.6.2	upsInfoMfrDate	String	–	UPS device manufacturing date
.2.12.1	upsInfoLoadValue	Float	–	Load on UPS device (percent)
.3.1.1	upsBatteryChargeValue	Float	–	Battery charge
.3.1.4	upsBatteryChargeWarning	Float	–	Battery level at which UPS switches to Warning state (percent)
.3.12	upsBatteryType	Float	–	Battery chemistry

Synology SMART MIB

The Synology SMART MIB provides the SMART information of each disk same as Storage Manager does. Because every disk may have different SMART attributes, one OID records one SMART attribute and has diskSMARTInfoDevName to indicate which disk it belongs to.

Table 9. SMART MIB

OID	Name	Type	Status Type	Explanation
.1	diskSMARTInfoIndex	Integer	–	Used internally for SNMP table and not accessible
.2	diskSMARTInfoDevName	String	–	Describes the disk to which this SMART info belongs to
.3	diskSMARTAttrName	String	–	The name of the SMART info attribute, e.g. Raw_Read_Error_Rate
.4	diskSMARTAttrId	Integer	–	SMART attribute ID number
.5	diskSMARTAttrCurrent	Integer	–	SMART attribute current value
.6	diskSMARTAttrWorst	Integer	–	SMART attribute worst value
.7	diskSMARTAttrThreshold	Integer	–	SMART attribute threshold value

OID	Name	Type	Status Type	Explanation
.8	diskSMARTAttrRaw	Integer	–	SMART attribute raw value
.9	diskSMARTAttrStatus	String	–	Status of this SMART info

Synology Services MIB

The Synology Services MIB monitors the number of users logging in via HTTP, CIFS, AFP, NFS, FTP, SFTP, TELNET, and SSH.

Table 10. Services MIB

OID	Name	Type	Status Type	Explanation
.1	serviceInfoIndex	Integer	–	Used internally for services table and not accessible
.2	serviceName	String	–	The name of the service
.3	serviceUsers	Integer	–	The number of users using this service

Synology Storageio MIB

The Synology Storageio MIB has I/O information of disks.

Table 11. Storageio MIB

OID	Name	Type	Status Type	Explanation
.1	storageIOIndex	Integer	–	Used internally for storageio table and not accessible
.2	storageIODevice	String	–	The name of the device we are counting/checking
.3	storageIONRead	Counter32	–	The number of bytes read from this device since boot (32 bit VER.)
.4	storageIONWritten	Counter32	–	The number of bytes written to this device since boot (32 bit VER.)
.5	storageIOReads	Counter32	–	The number of read accesses from this device since boot
.6	storageIOWrites	Counter32	–	The number of write accesses to this device since boot
.8	storageIOLA	Integer	–	The load of disk (%)
.9	storageIOLA1	Integer	–	The 1-minute average load of disk (%)
.10	storageIOLA5	Integer	–	The 5-minute average load of disk (%)

OID	Name	Type	Status Type	Explanation
.11	storageIOLA15	Integer	-	The-15 minute average load of disk (%)
.12	storageIONReadX	Counter64	-	The number of bytes read from this device since boot (64 bit VER.)
.13	storageIONWrittenX	Counter64	-	The number of bytes written to this device since boot (64 bit VER.)

Synology Spaceio MIB

The Synology Spaceio MIB has I/O information of volumes.

Table 12. Spaceio MIB

OID	Name	Type	Status Type	Explanation
.1	spaceIOIndex	Integer	-	Used internally for spaceio table and not-accessible
.2	spaceIODevice	String	-	The name of the device this volume mounted on
.3	spaceIONRead	Counter32	-	The number of bytes read from this volume since boot (32 bit VER.)
.4	spaceIONWritten	Counter32	-	The number of bytes written to this volume since boot (32 bit VER.)
.5	spaceIOReads	Counter32	-	The number of read accesses from this volume since boot
.6	spaceIOWrites	Counter32	-	The number of write accesses to this volume since boot
.8	spaceIOLA	Integer	-	The load of disk in the volume (%)
.9	spaceIOLA1	Integer	-	The 1 minute average load of disk in the volume (%)
.10	spaceIOLA5	Integer	-	The 5 minute average load of disk in the volume (%)
.11	spaceIOLA15	Integer	-	The 15 minute average load of disk in the volume (%)
.12	spaceIONReadX	Counter64	-	The number of bytes read from this volume since boot (64 bit VER.)
.13	spaceIONWrittenX	Counter64	-	The number of bytes written to this volume since boot (64 bit VER.)

Synology iSCSI LUN MIB

The Synology iSCSI LUN MIB can list all the loaded LUNs and show their running information. If a LUN has been created but not loaded (e.g. when linked to a target), it will not appear in this list. The throughput value may be over int32 range, so we use two i to record it.

Table 13. iSCSI LUN MIB

OID	Name	Type	Status Type	Explanation
.1	iSCSILUNInfoIndex	Integer	–	Used internally for iSCSI LUN table and not accessible
.2	iSCSILUNUUID	String	–	LUN uuid
.3	iSCSILUNName	String	–	LUN name
.4	iSCSILUNThroughputReadHigh	Integer	–	The higher 32 bit of read throughput
.5	iSCSILUNThroughputReadLow	Integer	–	The lower 32 bit of read throughput
.6	iSCSILUNThroughputWriteHigh	Integer	–	The higher 32 bit of write throughput
.7	iSCSILUNThroughputWriteLow	Integer	–	The lower 32 bit of write throughput
.8	iSCSILUNIopsRead	Integer	–	LUN read iops
.9	iSCSILUNIopsWrite	Integer	–	LUN write iops
.10	iSCSILUNDiskLatencyRead	Integer	–	LUN read disk latency
.11	iSCSILUNDiskLatencyWrite	Integer	–	LUN write disk latency
.12	iSCSILUNNetworkLatencyTx	Integer	–	LUN network tx latency
.13	iSCSILUNNetworkLatencyRx	Integer	–	LUN network rx latency
.10	iSCSILUNIoSizeRead	Integer	–	LUN read average i/o size
.11	iSCSILUNIoSizeWrite	Integer	–	LUN write average i/o size
.12	iSCSILUNQueueDepth	Integer	–	Number of iSCSI commands in LUN queue
.13	iSCSILUNType	String	–	LUN type (advanced lun, block lun, etc.)

Synology Ebox MIB

The Synology Ebox MIB provides the power status of expansion unit connected to Synology NAS. Table 14 shows the information provided in ebox MIB. Table 15 describes the content of each eboxPower and eboxRedundantPower status in detail.

Table 14. Ebox MIB

OID	Name	Type	Status Type	Explanation
.1	eboxIndex	Integer	–	Expansion unit Index
.2	eboxModel	String	–	Expansion unit model
.3	eboxPower	Integer	Normal (1)*	Power status of expansion unit
.4	eboxRedundantPower	Integer	Normal (1)*	Redundant power status of expansion unit (if the ebox has no redundant power interface, this OID will not appear)

*For eboxPower and eboxRedundantPower details, please see Table 15.

Table 15. Ebox Power and Redundant Power Status Explanation

Status	Explanation
Normal (1)	The power supplies well
Poor (2)	The power supplies badly
Disconnection (3)	The power is not connected

Synology NFS MIB

The Synology NFS MIB monitors the maximum latency and operations of NFS. Every value will be cached for 3 seconds. Therefore, if you access a value twice within 3 seconds, you will get the same value. The maximum latency will always clear the cache and recount the value once the value has been updated.

Table 16. NFS MIB

OID	Name	Type	Status Type	Explanation
.1	nfsIndex	Integer	–	Used internally for NFS table and not accessible
.2	nfsName	String	–	The name of NFS
.3	nfsTotalMaxLatency	Integer	–	Maximum latency of all the NFS operations

OID	Name	Type	Status Type	Explanation
.4	nfsReadMaxLatency	Integer	–	Maximum latency of the NFS read operations
.5	nfsWriteMaxLatency	Integer		Maximum latency of the NFS write operations
.6	nfsTotalOPS	Counter64		Accumulated counts of all the NFS operations
.7	nfsReadOPS	Counter64		Accumulated counts of the NFS read operations
.8	nfsWriteOPS	Counter64		Accumulated counts of the NFS write operations

Useful OIDs

Although there are many native MIB files supported by Synology, user may be interested in specific information about the Synology NAS, such as CPU, memory and so on. The tables below list the native OIDs related to load, CPU, memory, network and disk for gathering useful device's data easily.

Table 16. CPU-Related OID

OID	Name	Explanation
.1.3.6.1.4.1.2021.11.9.0	ssCpuUser	The percentage of CPU time spent processing user-level code
.1.3.6.1.4.1.2021.11.10.0	ssCpuSystem	The percentage of CPU time spent processing system-level code, calculated over the last minute
.1.3.6.1.4.1.2021.11.11.0	ssCpuIdle	The percentage of processor time spent idle, calculated over the last minute
.1.3.6.1.4.1.2021.10.1.5.1	laLoadInt.1	1 minute Load
.1.3.6.1.4.1.2021.10.1.5.2	laLoadInt.2	5 minute Load
.1.3.6.1.4.1.2021.10.1.5.3	laLoadInt.3	15 minute Load

Table17. Memory-Related OID

OID	Name	Explanation
.1.3.6.1.4.1.2021.4.3.0	memTotalSwap	The total amount of swap space configured for this host
.1.3.6.1.4.1.2021.4.4.0	memAvailSwap	The amount of swap space currently unused or available
.1.3.6.1.4.1.2021.4.5.0	memTotalReal	The total amount of real/physical memory installed on this host
.1.3.6.1.4.1.2021.4.6.0	memAvailReal	The amount of real/physical memory currently unused or available

OID	Name	Explanation
.1.3.6.1.4.1.2021.4.11.0	memTotalFree	The total amount of memory free or available for use on this host
.1.3.6.1.4.1.2021.4.13.0	memShared	The total amount of real or virtual memory currently allocated for use as shared memory
.1.3.6.1.4.1.2021.4.14.0	memBuffer	The total amount of real or virtual memory currently allocated for use as memory buffers
.1.3.6.1.4.1.2021.4.15.0	memCached	The total amount of real or virtual memory currently allocated for use as cached memory

Table 18. Network-Related OID

OID	Name	Explanation
.1.3.6.1.2.1.31.1.1.1.1	ifName	The textual name of the interface
.1.3.6.1.2.1.31.1.1.1.6	ifHCInOctets	The total number of octets received on the interface
.1.3.6.1.2.1.31.1.1.1.10	ifHCOutOctets	The total number of octets transmitted out of the interface

Table 19. Disk-Related OID

OID	Type	Explanation
.1.3.6.1.2.1.25.2.3.1.3	hrStorageDescr	A description of the type and instance of the storage described by this entry
.1.3.6.1.2.1.25.2.3.1.4	hrStorageAllocationUnits	The size, in bytes, of the data objects allocated from this pool
.1.3.6.1.2.1.25.2.3.1.5	hrStorageSize	The size of the storage represented by this entry, in units of hrStorageAllocationUnits
.1.3.6.1.2.1.25.2.3.1.6	hrStorageUsed	The amount of the storage represented by this entry
.1.3.6.1.4.1.2021.13.15.1.1.2	diskIODevice	The name of the device we are counting/checking
.1.3.6.1.4.1.2021.13.15.1.1.12	diskIONReadX	The number of bytes read from this device since boot
.1.3.6.1.4.1.2021.13.15.1.1.13	diskIONWrittenX	The number of bytes written to this device since boot

OID	Type	Explanation
.1.3.6.1.4.1.6574.2	synoDisk	For Synology disk information (Synology only)

Table 20. System-Related OID

OID	Type	Explanation
.1.3.6.1.4.1.6574.1	synoSystem	For Synology system information (Synology only)

Table 21. RAID-Related OID

OID	Type	Explanation
.1.3.6.1.4.1.6574.3	synoRaid	For Synology RAID information (Synology only)

Table 22. UPS-Related OID

OID	Type	Explanation
.1.3.6.1.4.1.6574.4	synoUPS	For Synology UPS information (Synology only)

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 the means of operating different kinds of NMS may vary, the process of OID monitoring is similar. The overall procedure is as follows.

1. Import MIB file into NMS.

2. Set up the NMS to monitor specific OIDs.

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

Import MIB Files

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

1. Download Paessler MIB Importer from http://www.paessler.com/tools/mibimporter and install it on

   your computer.

2. Go to **Import** > **MIB Files**.

3. Choose **all the Synology MIB file together** and click **Open File**.

   All MIB files (cf. Table 2) must be imported together as they are mutually dependent and Paessler MIB Importer cannot load them individually. If the import is successful, a window as shown in Figure 1 should appear. Detailed information is shown in Figure 2.
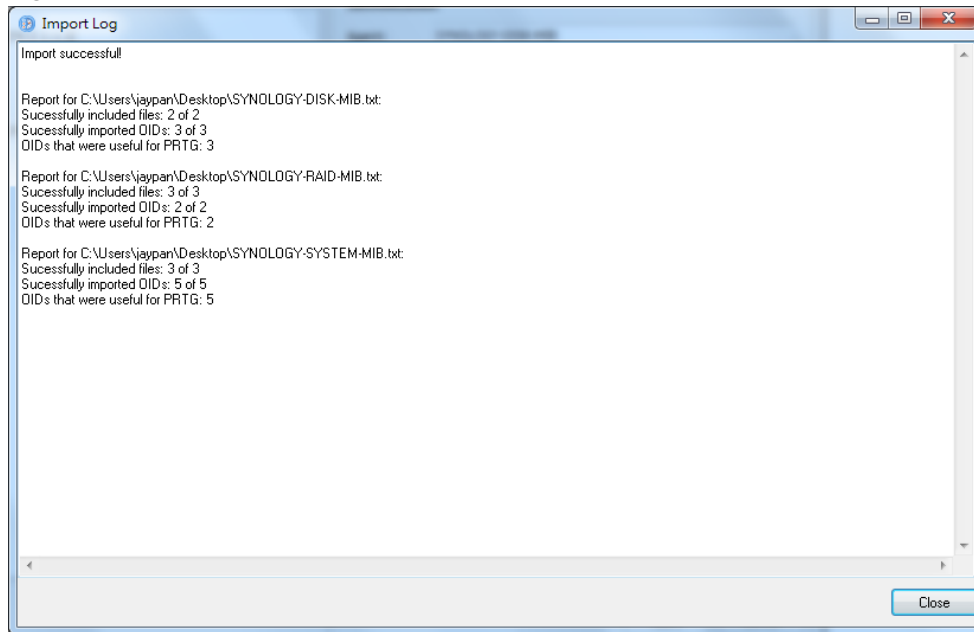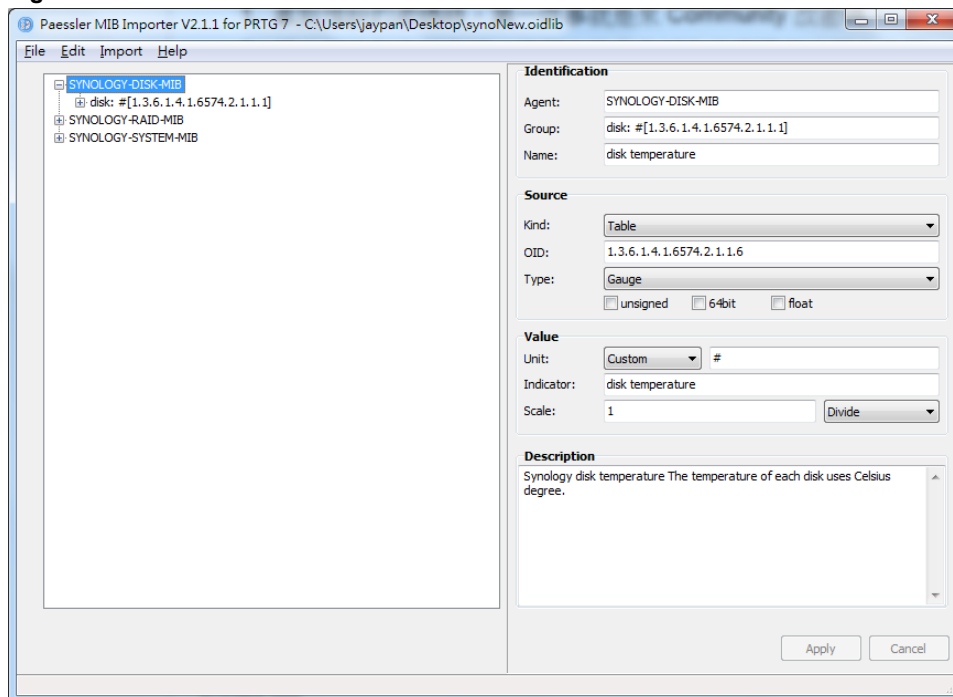
Figure 1. Import MIB: Successful

Figure 2. Detailed Information on MIB


4. Go to **File > Save As** to export to the PRTG-supported format.

A PRTG-supported library containing the MIB information will then be generated.

Set up the NMS

The PRTG-supported library containing the MIB files in question should be placed into the folder: "snmplibs". Once this has been done, specific OIDs can be set up for monitoring in PRTG. This guide assumes that your Synology NAS has already been added to the devices list and focuses only on how to add OIDs for monitoring.
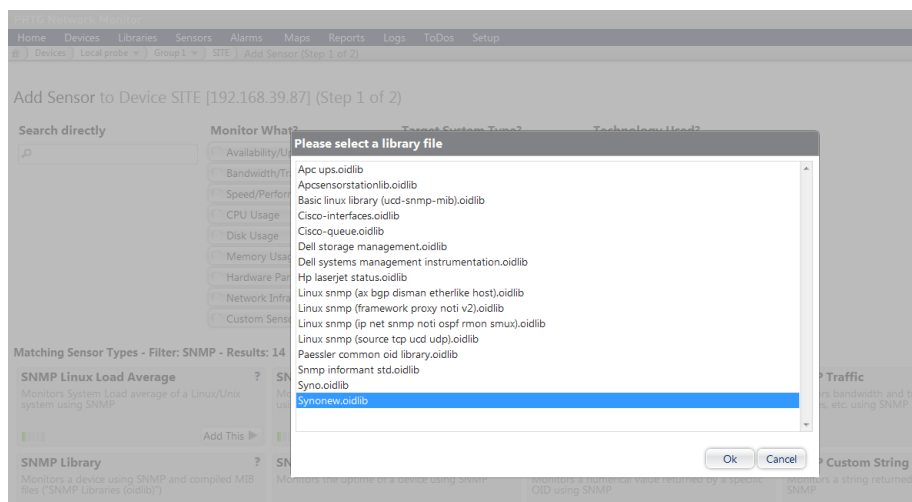
1. **Enter** the PRTG Network Monitor.
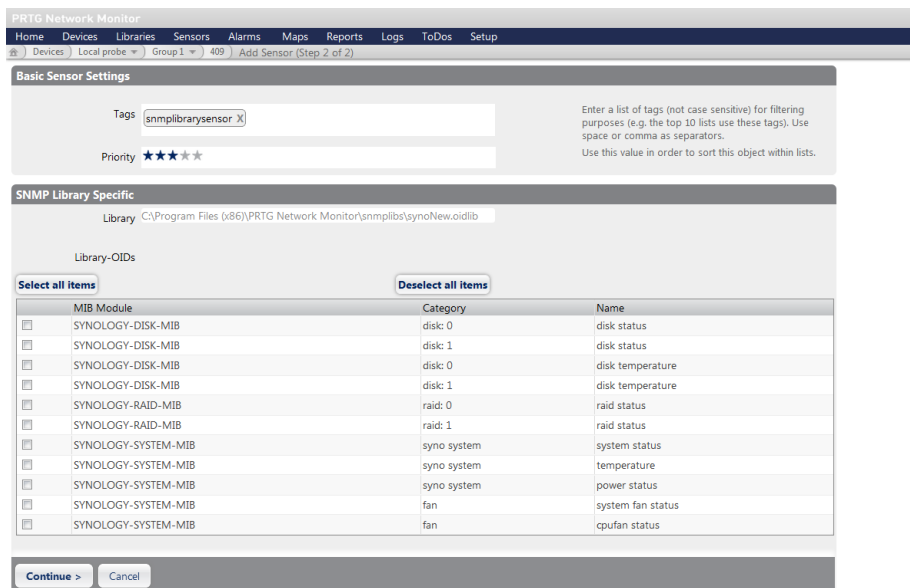
2. Go to **Sensors > Add Sensor**.
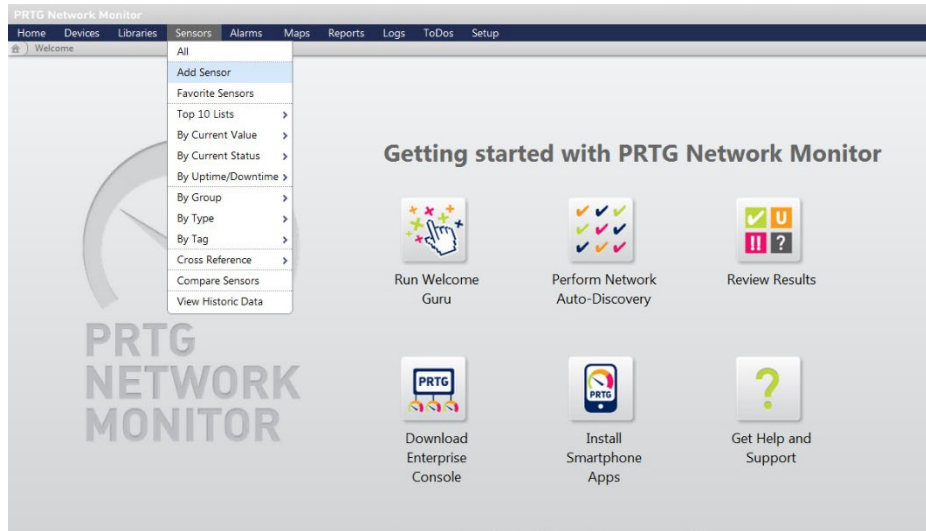
3. Click **Add sensor to an existing device** and **choose a device**.
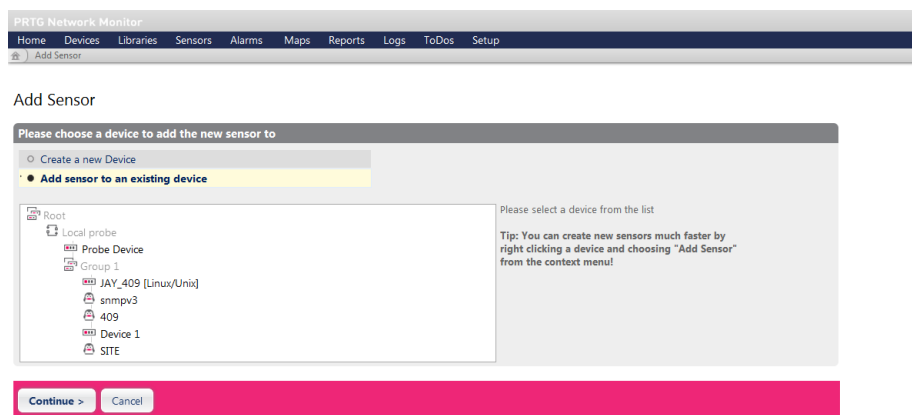
4. Choose **SNMP Library** and **the library exported in the previous section**.

5. Select items for monitoring.

Document Revision History

This table describes the revisions made to Synology NAS MIB Guide.

Table 23. Document Revision History

Date	Note
2012-07-19	Document created
2013-10-29	Modified OID name and added UPS MIB
2013-11-04	Added more MIBs and useful OID
2016-10-31	Added more MIBs
2018-06-30	Added Ebox MIB Added useful OIDs in RAID MIB
2018-12-06	Added NFS MIB