# Synology DiskStation MIB Guide



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#### Introduction

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

This document introduces the basics of Synology DiskStation MIB (Management Information Base) files. It focuses on what MIB files Synology DiskStation Manager supports, while also describing how OIDs (Object Identifiers) in Synology MIBs are used with your preferred NMS software. Users are encouraged to have experience and knowledge of NMS and SNMP prior to consulting this document.

## **Supported MIB files**

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

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 doesn't 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:

http://dedl.synology.com/download/Document/MIBGuide/Synology\_MIB\_File.zip

Table 1. General MIB files supported by Synology DiskStation Manager

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-SYSTEM-MIB	For Synology system information. (Synology only)
SYNOLOGY-DISK-MIB	For Synology disk information (Synology only)
SYNOLOGY-RAID-MIB	For Synology RAID 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 below Synology MIB files are provided in DiskStation Manager. 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
.1.3.6.1.4.1.6574.3	synoRaid	SYNOLOGY-RAID-MIB.txt

OID	Name	File Name
.1.3.6.1.4.1.6574.4	synoUPS	SYNOLOGY-UPS-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 Details** 

OID	Name	Туре	Status Type	Explanation
.1	systemStatus	Integer	Normal(1) Failed(2)	System partition status
.2	temperature	Integer	-	DiskStation temperature
.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 -		DiskStation model name of this NAS
.5.2	serialNumber	String	-	DiskStation 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 Details

OID	Name	Туре	Status Type	Explanation
.1	diskIndex	Integer	-	Used internally for SNMP table and non-accessible
.2	diskID	String	-	Disk name in DiskStation Manager
.3	diskModel	String	-	Disk model

OID	Name	Туре	Status Type	Explanation
. 4	diskType	String	-	Disk type, e.g. SATA, SSD
.5	diskStatus	Integer	Normal(1)*	Current disk status
.6	diskTemperature	Integer	-	Disk temperature

<sup>\*</sup> For DiskStatus details please see Table 54.

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 Detail

OID	Name	Туре	Status Type	Explanation
.1	raidIndex	Integer	-	Internal used for SNMP table and not-accessible.
.2	raidName	String	-	The name of each RAID in DiskStation Manager.
.3	raidStatus	Integer	Normal(1)*	It Shows the RAID status right now.

<sup>\*</sup> For RAID status details please see Table 7.

Table 7. RAID Status Explanation.

Status	Explanation
Normal(1)	RAID is functioning normally

Status	Explanation
Repairing(2)	
Migrating(3)	
Expanding(4)	
Deleting(5)	
Creating(6)	These statuses are shown when RAID is created or deleted
RaidSyncing(7)	
RaidParityChecking(8)	
RaidAssembling(9)	
Canceling(10)	
Degrade(11)	Degrade is shown when a tolerable failure of disk(s) occurs
Crashed(12)	RAID has crashed and is now read-only

#### **Synology UPS MIB**

Synology UPS MIB provides the ability to monitor the status of a UPS device connected to the Synology 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. Table 7 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 7. Partial UPS MIB Table.

OID	Name	Туре	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

#### **Useful OIDs**

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

Table 9. 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

Table 10. 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
.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 11. Network Related OID** 

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

Table 12. Disk Related OID

OID	Туре	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
.1.3.6.1.4.1.6574.2	synoDisk	For Synology disk information (Synology only)

#### Table 13. System Related OID

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

#### Table 14. RAID Related OID

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

#### Table 15. UPS Related OID

OID	Туре	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 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.

#### **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 <a href="http://www.paessler.com/tools/mibimporter">http://www.paessler.com/tools/mibimporter</a>, and install on your computer.
- 2. Go to Import > MIB Files
- 3. Choose all the Synology MIB file together and click Open File

The three MIB files: SYNOLOGY-SYSTEM-MIB.txt, SYNOLOGY-DISK-MIB.txt and SYNOLOGY-RAID-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 as shown in Figure 1 should appear. Detailed information is shown as in Figure 2.

Figure 1. Import MIB: Successful.



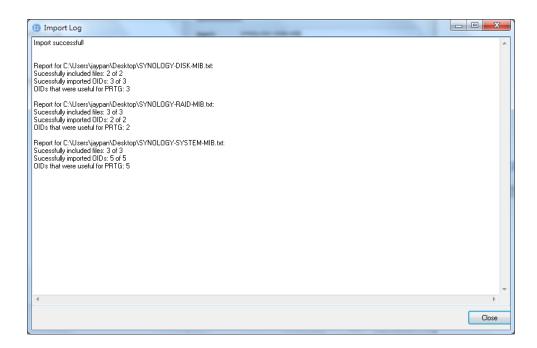
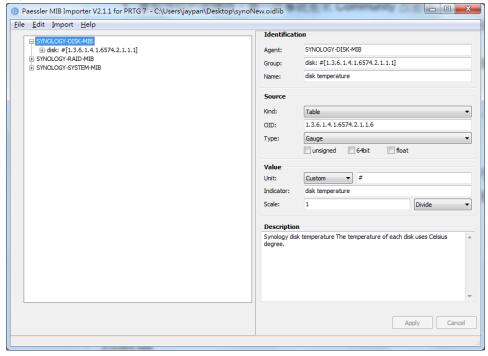
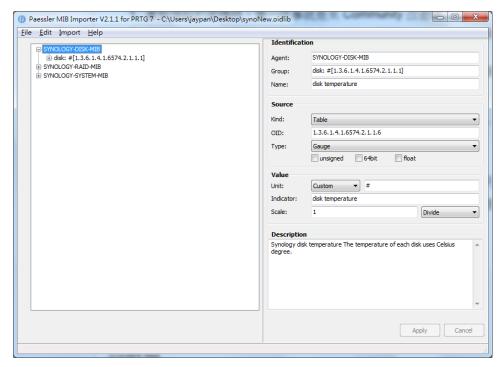


Figure 2. Detail information of MIB.





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

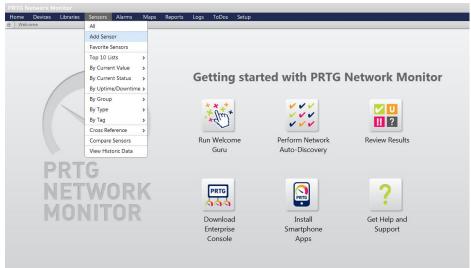
A PRTG-supported library containing the MIB information will then be generated.

#### Setup the NMS

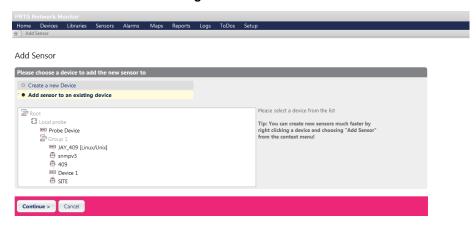
The PRTG-supported library containing the MIB files in question should be placed into the folder: "snmplibs". Once this has been done, specific OIDs can be set up for monitoring in PRTG. This guide assumes that Synology DiskStations have already been added to the devices list and focuses only on how to add OIDs for monitoring.

1. Enter the PRTG Network Monitor.

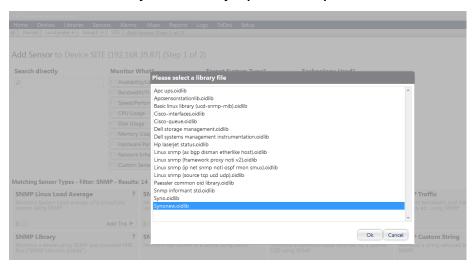




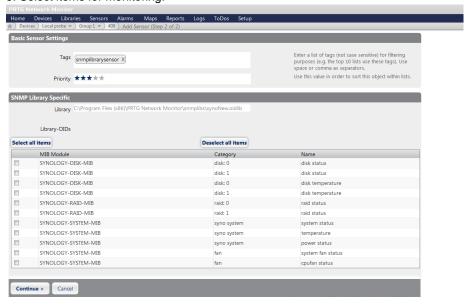
3. Click Add sensor to an existing device and choose a device.



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 to the Synology DiskStation MIB Guide.

Date	Note
2012-7-19	Document created
2013-10-29	Modified OID name and added UPS MIB
2013-11-4	Add MIB supported and useful OID