How To Use The SNMP Walk Wizard and SNMP Walk Jobs Tool In Nagios XI 2024R2.1+

Purpose

This document describes how to use the **SNMP Walk Jobs** tool and the **SNMP Walk Wizard**, and briefly explains SNMP and how to reference a MIB file or OID. SNMP is the acronym for Simple Network Management Protocol. An SNMP Walk is when the Nagios XI server scans a device to see what SNMP objects are available for monitoring.

If you are using a version of Nagios XI 2024 prior to version R2.1, please refer to the old guide here.

SNMP Walk Explained

An SNMP Walk refers to an operating system program that queries a device to see what SNMP objects are available for monitoring.

If you perform an SNMP Walk on a Linux Operating system you will receive 3500+ results, which is probably more than what you need. So how exactly do you know what is available on your device to be monitored, without seeing 3500+ results? Before that can be answered, a brief SNMP explanation is required (without getting too involved):

- SNMP is based on Object Identifiers (OIDs),
    - This is an unambiguous persistent name like 1.3.6.1.4.1.343
    - Explained clearly on Wikipedia: https://en.wikipedia.org/wiki/Object_identifier
    - Identifiers like this do nothing to describe/identify their use.
- Management Information Base (MIB)
    - A MIB is a database that correlates OIDs to an understandable format
    - A manufacturer of a device like a router or UPS can provide you with a MIB file that explains what SNMP OIDs are available on that device.

Your Nagios XI server has SNMP modules installed on it and comes with the standard MIB files that are bundled with the SNMP modules. These MIB files are a collection of the most common generic objects that are implemented in devices running SNMP.

Going back to the question posed earlier, how exactly do you know what is available on your device to be monitored, without seeing 3500+ results? The manufacturer of your device will normally make available a MIB file that is specific to that device. The manufacturers MIB file provides detailed information on the SNMP objects that this device allows you to query.

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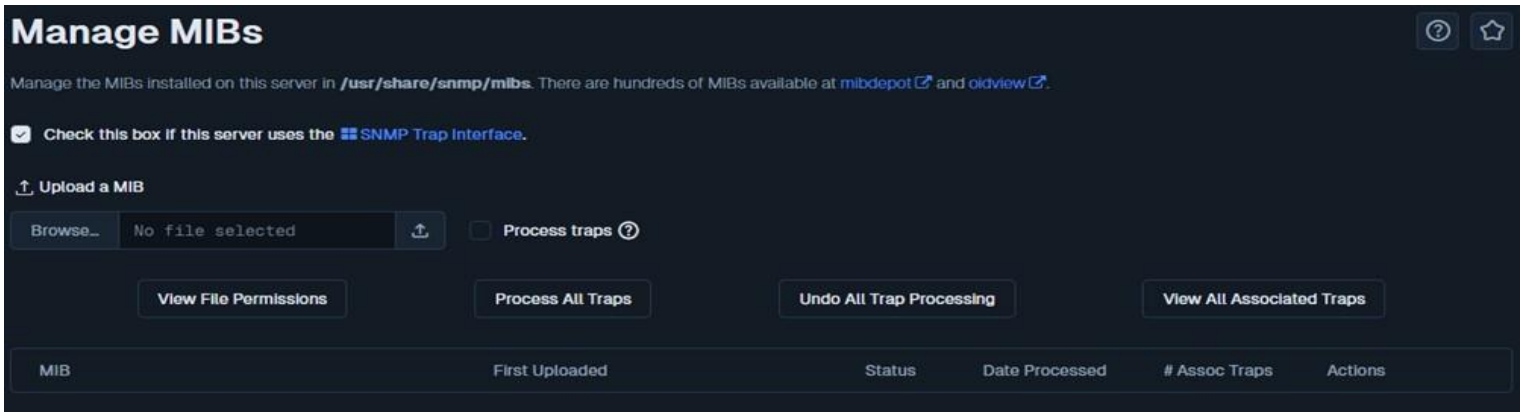
For this documentation to be easily understood, we are going to use one of the MIB files that comes with the Nagios XI server. By using this MIB file you will be able to reproduce what this documentation is demonstrating and then you will be able to understand a MIB file for your specific device.

Managing MIB Files

Nagios XI has a dedicated section for managing MIB files. Navigate to **Admin > System Extensions > Manage MIBs**.



You can use the **Browse and Upload MIB** buttons to upload your own MIBs. Understanding how to read a MIB file can help you get the most out of the SNMP Walk wizard, however it's not required knowledge at this point. The Understanding MIB Files And Objects section in this documentation does explain how to read a MIB file which may be of some help.

SNMP Walk Jobs

Before running the SNMP Walk Wizard, you'll need to set up an SNMP walk job in the **Configure > Configuration Tools > SNMP Walk Jobs** menu. Here you will define all the settings for your SNMP walk jobs, which you can then execute to configure monitoring with the SNMP Walk Wizard.

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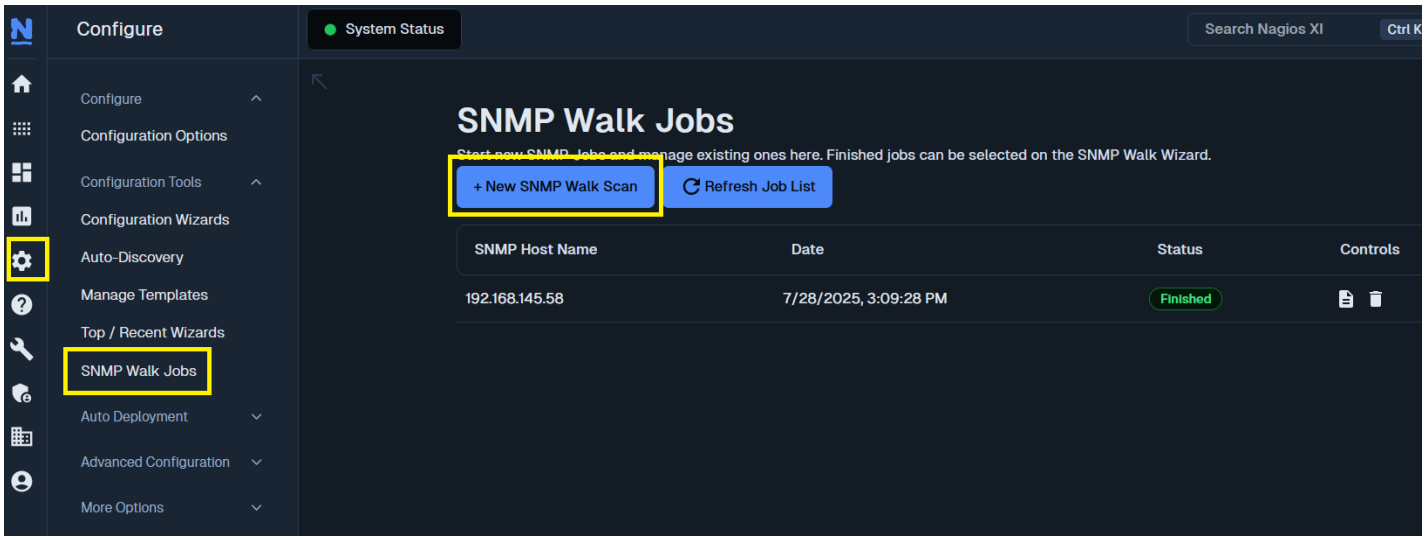
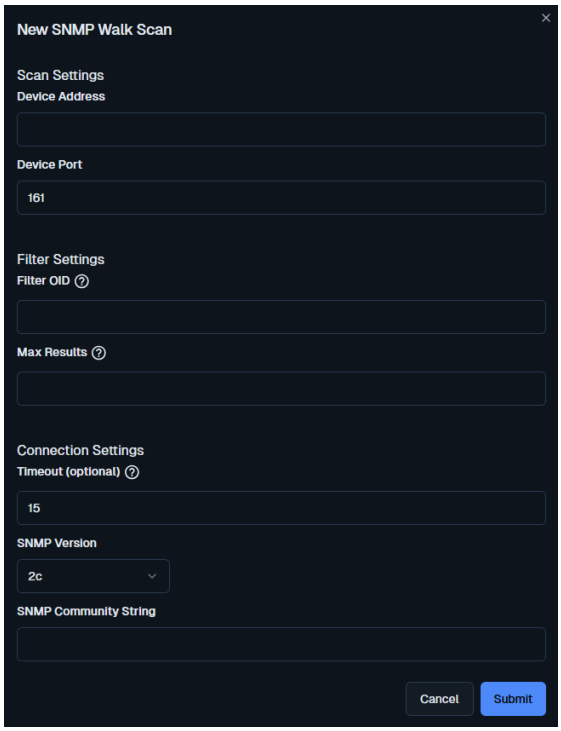
1. Click the **+ New SNMP Walk** Scan button.



2. Enter the necessary SNMP details to connect to your device.

   A few important notes:

   - Nagios XI has some limitations on the characters allowed in the SNMP Community String field, please refer to this KB article for more information: Nagios XI - Special Characters
   - Nagios XI has some limitations on the characters allowed in the **Password** fields, please refer to this KB article for more information: Nagios XI - Special Characters
   - The device being used in this documentation is a CentOS server that accepts SNMP requests. This is purely to make this documentation reproducible for you to test. For detailed instructions on how to configure CentOS to accept SNMP requests please refer to the following documentation: Monitoring Linux Using SNMP.



- **Device Address:** The IP or FQDN of the target device
- **Device Port:** The SNMP port on the device, default is 161
- **Filter OID:** The starting point for the SNMP Walk. If a Filter OID is not defined, the scan will seek all OIDs on the system.

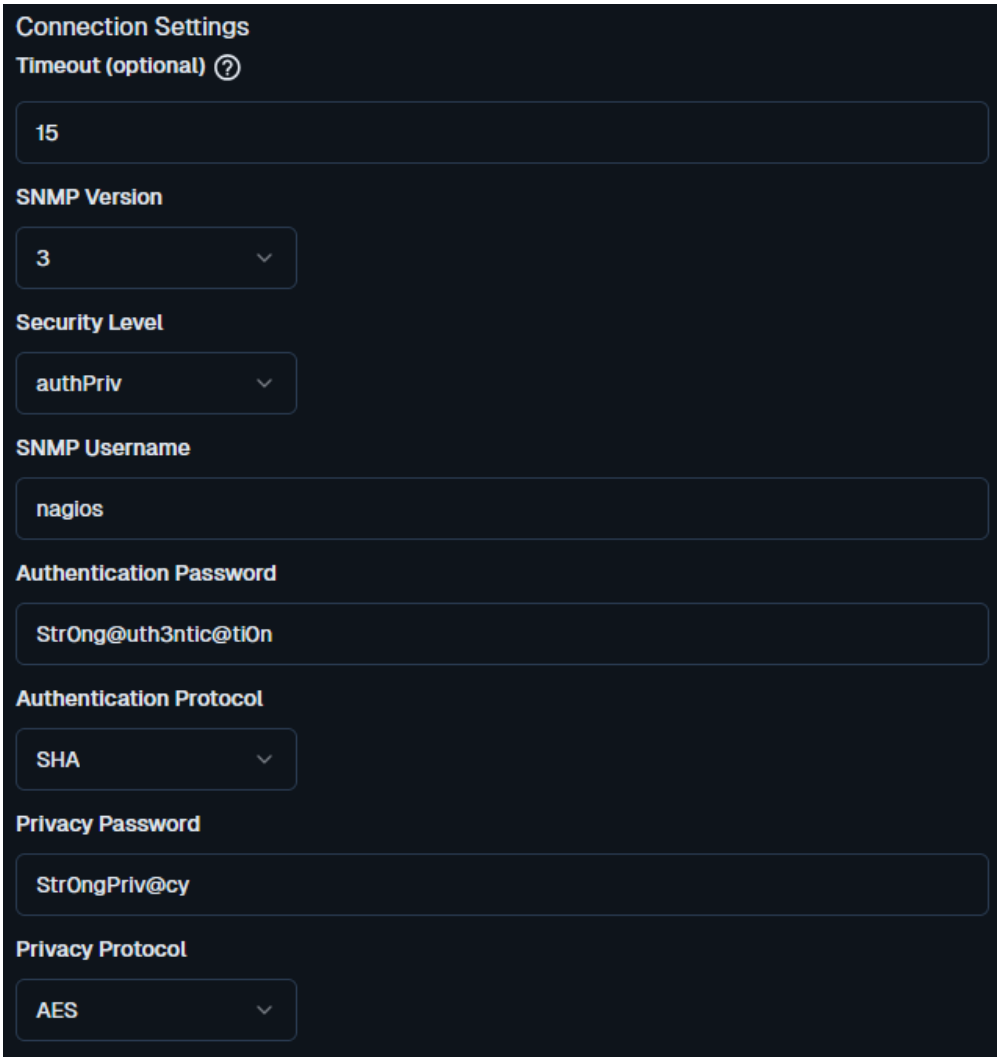
  Examples:

  a) To check memory metrics on a Linux system, you could enter either `.1.3.6.1.4.1.2021.4`, or `memory` to target the top level of the of the **memory** object in the UCD-SNMP-MIB. This is the example we'll use in the SNMP Walk Wizard section of this document.

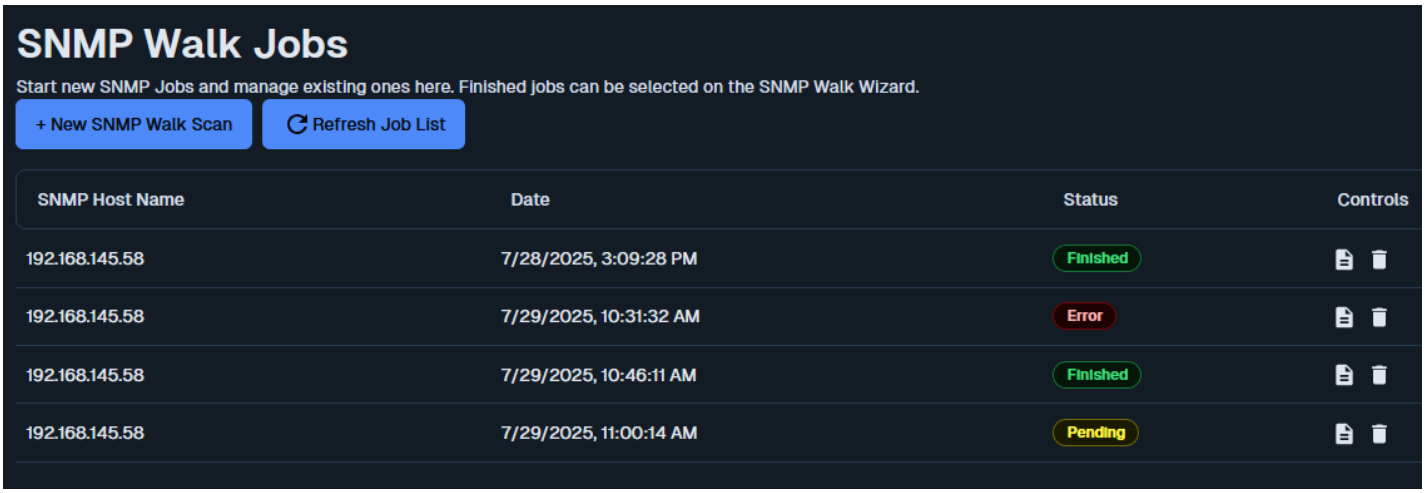
  b) To check the number of users on a Linux system, you could enter `1.3.6.1.2.1.25.1.5` or `hrSystemNumUsers`, an OID in the HOST-RESOURCES-MIB.

  More information on MIBs and OIDs can be found in the Understanding MIB Files And Objects section of this documentation.

- **Max Results:** Limits the scan output to a certain number of rows.
- **Timeout (optional):** The number of seconds to wait for the device to respond initially.
- **SNMP Version:** The SNMP version used to connect to the device. If **2c** is selected, enter a **Community String**. If **v3** is selected, enter all of the necessary data. The following example shows the v3 settings that would be used if you're following the SNMP v3 section of the Monitoring Linux Using SNMP doc:

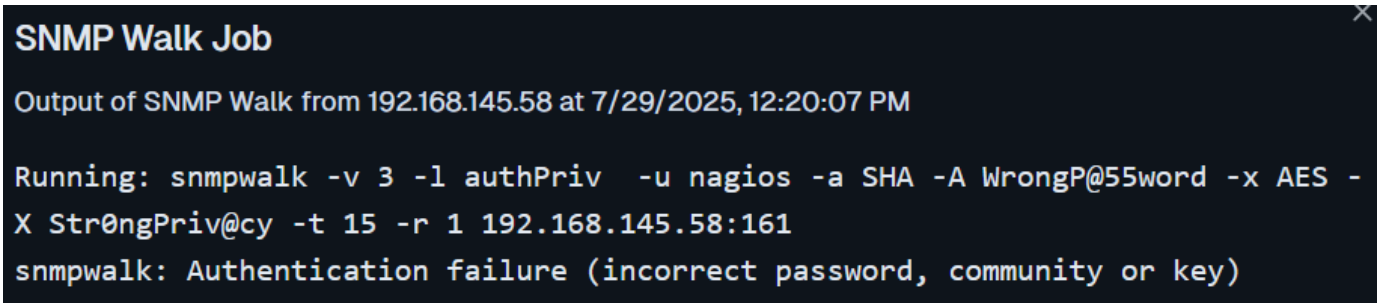


3. Once you've input your settings, click **Submit** at the bottom to save the job and begin the scan. While the scan is running, it will show as Pending (yellow). Once it completes, it will show as Finished (green) if it was successful, or as Error (red) if there was a problem. Here's an example of a few jobs in various statuses:



4. If there is an Error, you can click the View Output icon ( ) in the Controls column to review the scan and see what the problem was.

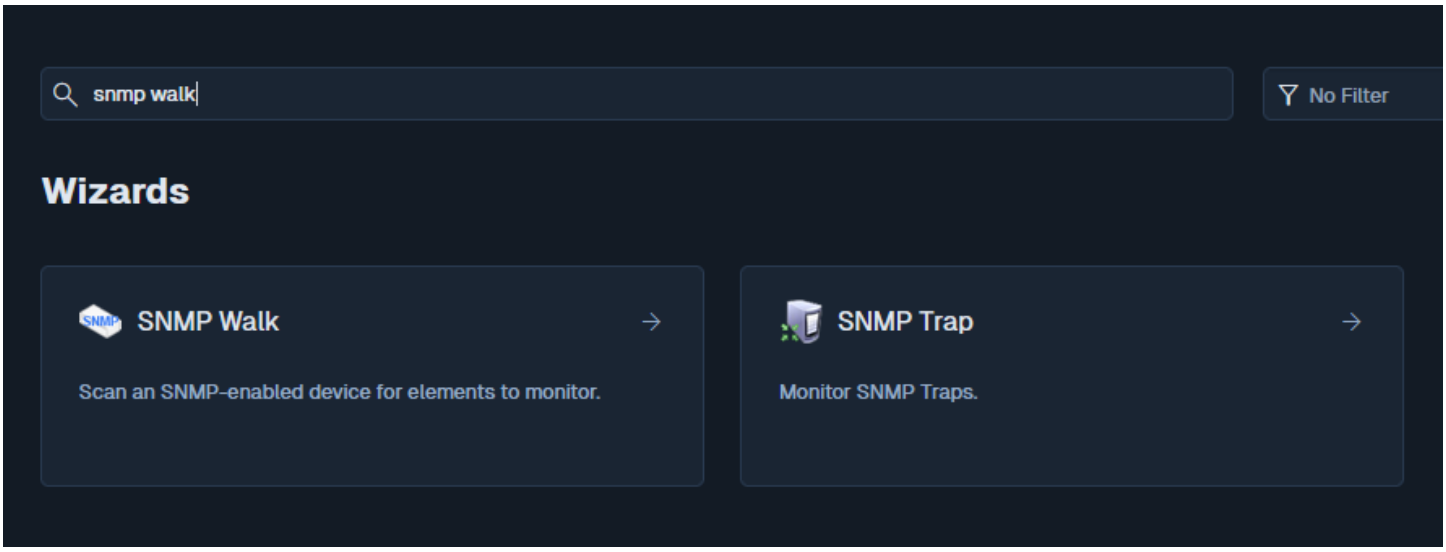
   In this example, there was an issue with our Authentication Password:



5. Once you set up a successful scan, you can proceed to the SNMP Walk Wizard.

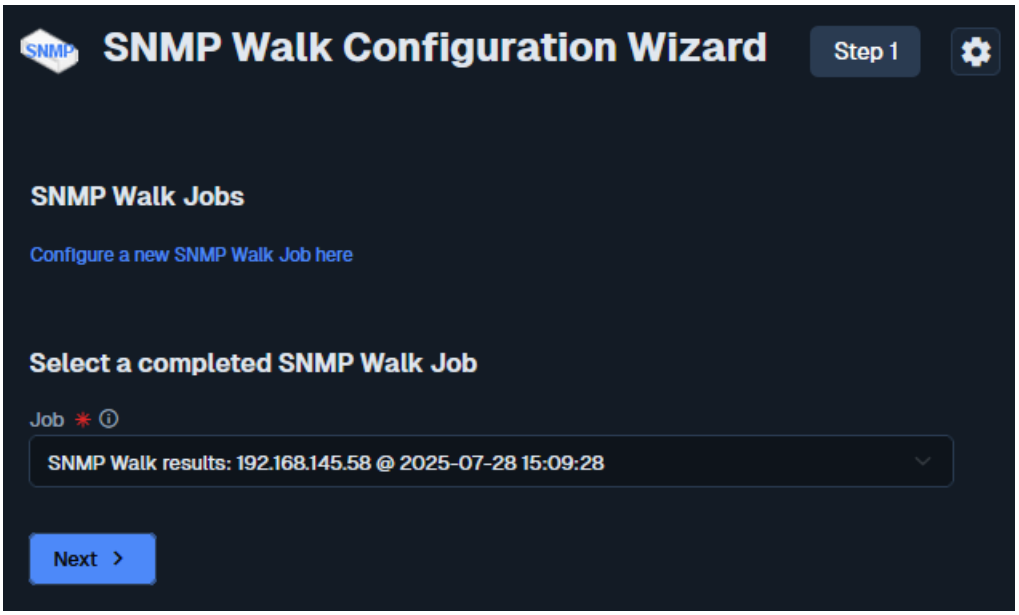
SNMP Walk Wizard

In Nagios XI navigate to **Configure > Configuration Wizards** and select the **SNMP Walk** wizard. In the following screenshot you can see how the search field allows you to quickly find a wizard.



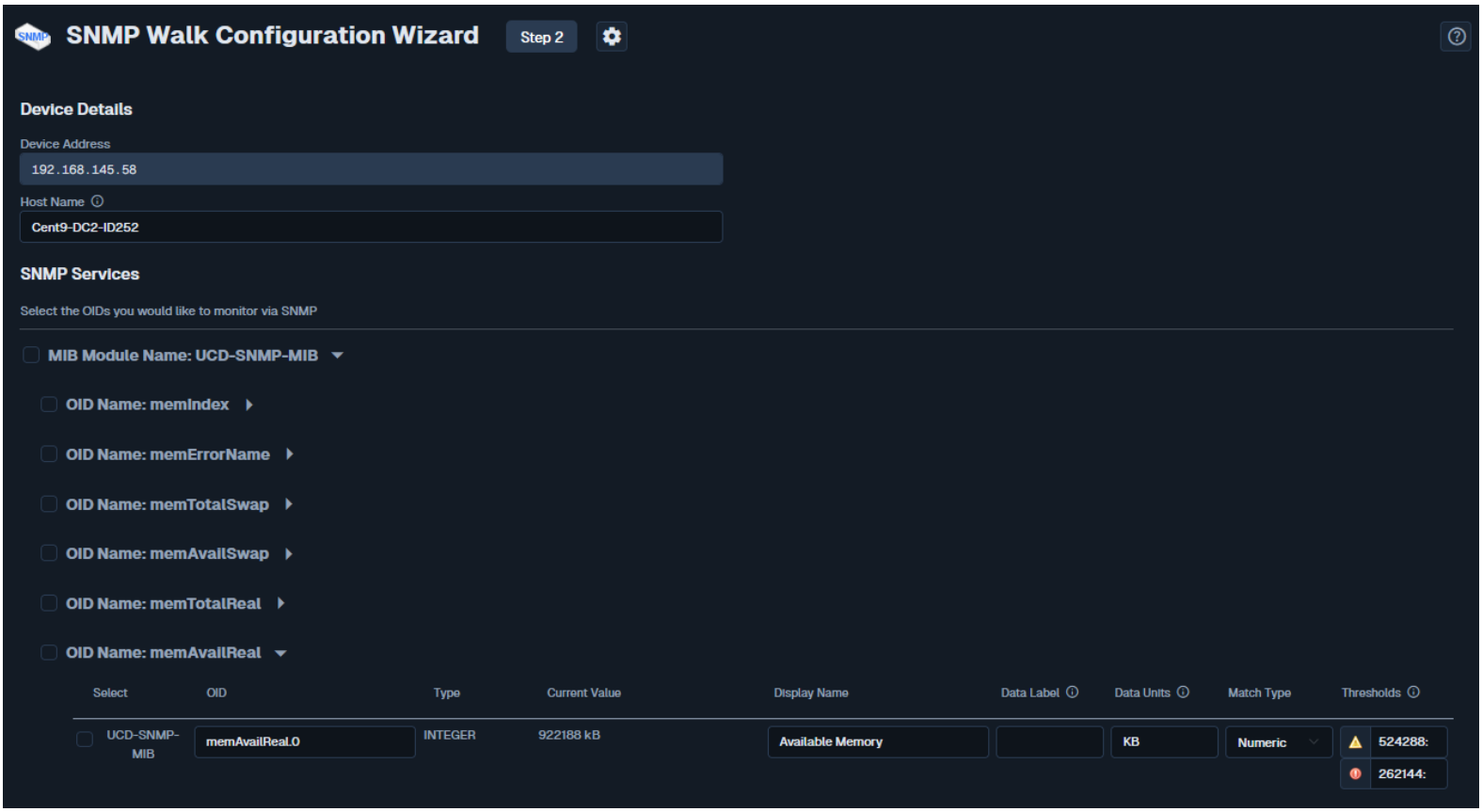
Wizard Step 1

In **Step 1**, select the **Job** you wish to run from the dropdown, then click **Next**.



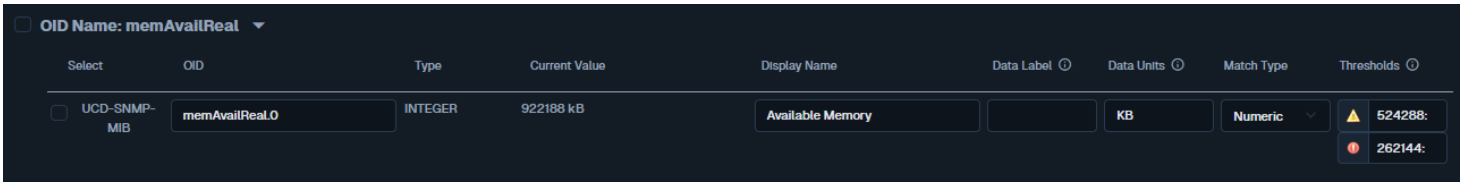
Wizard Step 2

In **Step 2**, begin by entering a **Host Name** for the host, if you'd like it to be something other than the IP address.



Next, choose the OIDs you wish to monitor, and define their settings and thresholds.

Here's an example of a check for available memory on a Linux host using the `memAvailReal` OID:



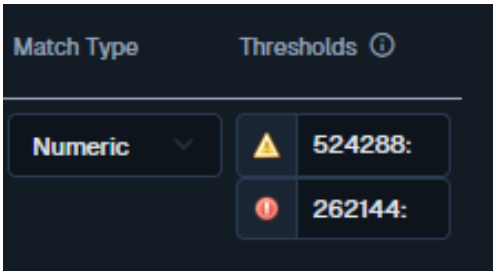
- The checkbox in the left column is how you select this item to be monitored
- **Available Memory** has been entered in the **Display Name** field, defining how this service will be named.
- `memAvailReal.0` is a measurement of Kilobytes (kB).
- The thresholds have been set so that the service will go into a warning state when the server has less than 512 MB/ 524288 kB of available memory, and a critical state when the device has less than 256 MB/ 262144 kB of free available memory.

  To do this:

Match Type = Numeric

Warning = 524288:

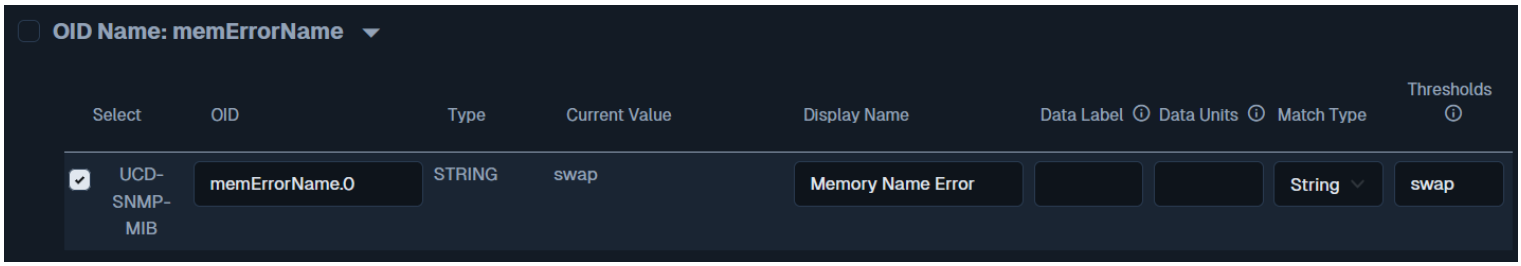
Critical = 262144:



Note the trailing colon after the threshold numbers. This tells Nagios that the result of the check must be less than the threshold value to result in a problem state.

More information on warning and critical thresholds can be found on the Nagios PluginDevelopment Guidelines page: https://nagios-plugins.org/doc/guidelines.html#THRESHOLDFORMAT

Here is another example that demonstrates checking a string:



The purpose of this example is to demonstrate how you can check a string to ensure it to set to the correct value. You might have strict change controls in place and want to make sure a specific Linux boot image has been used to boot the operating system.

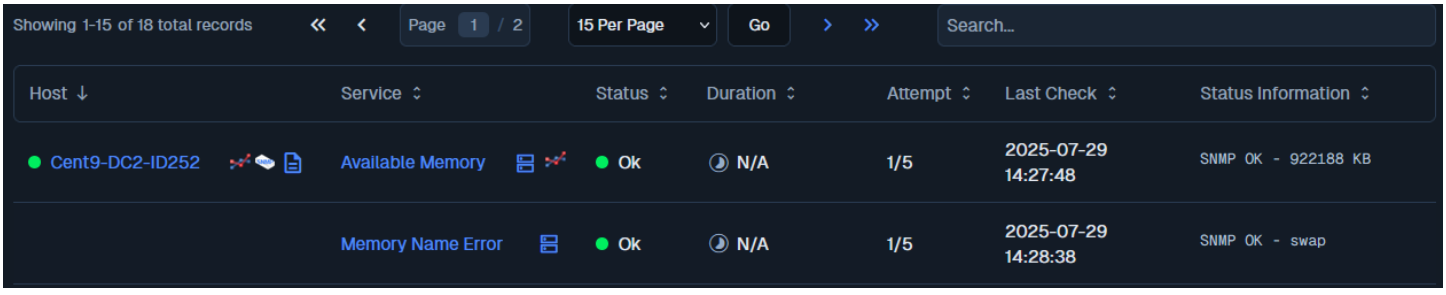
- OID: `memErrorName.0`
- Match Type: String
- String To Match (Threshold column) : `swap`
- With these options, if the memory error name changes the service will go into a critical state.

Wizard Steps 3-5

Once you've finished selecting all the items you wish to monitor click **Next** and then complete the wizard by choosing the required options in **Step 3 - Step 5**.

To finish up, click on **Finish** in the final step of the wizard. This will create new hosts and services and begin monitoring.

Once the wizard applies the configuration, click the **View status** details for <your device> link to see the new host and services that were created.

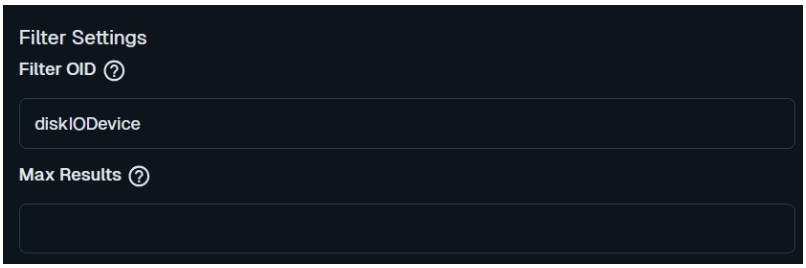


Understanding MIB Files And Objects

In this section we'll use the built-in UCD-DISKIO-MIB MIB file. From the **Manage MIBs** Page you can locate this file in the list and then click the **Download** icon.

You will be prompted to download the file, once downloaded open the file in a text editor like Notepad.

The contents of the MIB file will be explained shortly, but first a screenshot of the Filter Settings section of the SNMP Walk Job setup dialog:



By default, the **Filter OID** field will be blank. When this field is empty the Walk Job will scan for all private OIDs on the device, however this may yield more results than necessary. In the example above you can see the value `diskIODevice` has been used to define where the scan will begin in the MIB tree.

Understanding what value to populate in this field is where the MIB file comes into play. When you look at the MIB file, any line that contains "`OBJECT IDENTIFIER ::=`" will start with a label that identifies a hierarchical level in the MIB tree. Here are some examples:

```
diskIODevice OBJECT-TYPE    ::=          { diskIOEntry 2 }
```

Generally, but not always, the objects in the file are hierarchical as the file continues. In the curly brackets to the right is an identification as to which object this one resides under. You can see that `hrSystem` resides under the `host` object, the same as how the `host`object resides under the `mib-2` object.

In the wizard, the object can be referenced different ways, such as:

- `diskIODevice`
- `diskIOEntry -2.diskIODevice`
- `.1.3.6.1.4.1.2021.13.15.1.1.2`

When the SNMP Walk is performed, the MIB files on your Nagios XI server are searched for the requested object. When it finds that object it will then execute the SNMP Walk. As you can imagine, using an object like host may exist in different MIB files and you might not get the desired results. Whereas `diskIODevice` is more specific and targeted to query the desired objects.

When looking at the MIB file you will have noticed that it's not that easy to read, for example:

```
diskIODevice OBJECT-TYPE
             SYNTAX      DisplayString
             MAX-ACCESS  read-only
             STATUS      current
             DESCRIPTION
                  "The name of the device we are counting/checking."
             ::= { diskIOEntry 2 }
```

If you want to get a list of all the objects in a MIB file you can execute a command to do this. All the MIB files are in the `/usr/share/snmp/mibs` directory.

Establish a terminal session to your Nagios XI server and execute the following command:

```
snmptranslate -Ts -m /usr/share/snmp/mibs/UCD-DISKIO-MIB.txt
```

Here is an extract from that output:

```
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry.diskIOIndex
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry.diskIODevice
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry.diskIONRead
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry.diskIONWritten
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry.diskIOReads
.iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOM
IB.diskIOTable.diskIOEntry.diskIOWrites
```

You can get a list of all OIDs by executing the following command from the command line of your Nagios XI server:

```
snmptranslate -Tz -m /usr/share/snmp/mibs/HOST-RESOURCES-MIB.txt
```

Here is an extract from that output:

```
"diskIOTable"                   "1.3.6.1.4.1.2021.13.15.1"
"diskIOEntry"                   "1.3.6.1.4.1.2021.13.15.1.1"
"diskIOIndex"                   "1.3.6.1.4.1.2021.13.15.1.1.1"
"diskIODevice"                  "1.3.6.1.4.1.2021.13.15.1.1.2"
"diskIONRead"                   "1.3.6.1.4.1.2021.13.15.1.1.3"
"diskIONWritten"                "1.3.6.1.4.1.2021.13.15.1.1.4"
"diskIOReads"                   "1.3.6.1.4.1.2021.13.15.1.1.5"
"diskIOWrites"                  "1.3.6.1.4.1.2021.13.15.1.1.6"
```

This completes the section on understanding MIB files and objects.

More Information:

Using Configuration Wizards

Finishing Up

This completes the documentation on using the SNMP Walk wizard in Nagios XI. If you have additional questions or other support-related questions, please visit us at our Nagios Support Forum, Nagios Knowledge Base, or Nagios Library:

Visit Nagios Support Forum Visit Nagios Knowledge Base Visit Nagios Library