

# SNMP Tuning

SNMP is a fairly complex protocol, and the fact that it primarily operates over UDP does not exactly help matters. As a consequence, there are a number of potential problems that affect NMIS' ability to collect information from SNMP agents efficiently and quickly.

- SNMP Global changes using CLI
  - Go to `/usr/local/nmis9/Conf/`
  - vim `Config.nmis`
  - then search for:
  - OBSERVATION: When you do any change on the `Config.nmis` it will apply to all SNMP devices.
- SNMP Global changes using WebUI
- SNMP Changes for a Specific Node
- `snmp_timeout` and `snmp_retries`
- `snmp_max_msg_size`
- `max_repetitions`
- New in NMIS 8.6: Automatic `max_repetitions` adjustment

## SNMP Global changes using CLI

Go to `/usr/local/nmis9/Conf/`

vim `Config.nmis`

then search for:

```
'default' => [  
    'Major',  
    'Minor'  
],  
'distribution' => [  
    'Major',  
    'Minor'  
]  
},  
'snmp_max_msg_size' => 1472,  
'snmp_retries' => 1,  
'snmp_stop_polling_on_error' => 'true',  
'snmp_timeout' => 5,  
'stateless_event_dampening' => 900,  
'threshold_period-default' => '-15 minutes',  
'threshold_period-health' => '-4 hours',  
'threshold_period-interface' => '-15 minutes',  
'threshold_period-pkts' => '-15 minutes',  
'threshold_period-pkts_hc' => '-15 minutes',
```

**OBSERVATION:** When you do any change on the `Config.nmis` it will apply to all SNMP devices.

## SNMP Global changes using WebUI

On NMIS goes to the **System** tab ==> **System Configuration** ==> **NMIS Configuration**

The screenshot shows the NMIS 9.4.0 - localhost interface. The top navigation bar includes tabs for Network Status, Network Performance, Network Tools, Reports, Service Desk, Setup, System, Windows, and Help. The 'System' tab is selected, and a dropdown menu is open, showing 'System Configuration', 'Configuration Check', and 'Host Diagnostics'. The 'System Configuration' option is highlighted, and a sub-menu is visible, listing various configuration options including 'NMIS Nodes (devices)', 'NMIS Configuration', 'NMIS Models', 'Node Configuration', 'Model Policy', 'Hide Groups', 'Access Policy', 'Business Services', 'Contacts', 'Customers', 'Escalation Policy', 'Event Configuration', 'Links (network)', 'Locations', 'Logs', 'Polling Policy', 'Portal', 'Privilege Map', 'Service Status', 'Services', 'Tables', 'Toolset', and 'Users'. The 'NMIS Configuration' option is highlighted in red.

On the NMIS Configuration, select section ==> **system**.

The screenshot shows the NMIS 9.4.0 - localhost interface with the 'NMIS Configuration' window open. The 'Select section' dropdown menu is open, showing a list of sections including 'globals', 'graph', 'gui', 'icons', 'id', 'javascript', 'logging', 'menu', 'metrics', 'mibs', 'modules', 'online', 'overtime\_schedule', 'priority\_schedule', 'schedule', 'sound', 'syslog', 'system', 'tools', and 'url'. The 'system' section is highlighted in blue. The background shows the 'Network Metrics and Health' section with a graph and a table of metrics.

After you selected System, it will show all settings.





|                                 |  |   |
|---------------------------------|--|---|
| model_health_sections           | cpu_cpm,entityMib,diskIOTable,ds3Errors,SONETErrors  | <a href="#">edit</a> <a href="#">delete</a> |
| network_health_view             | Group  | <a href="#">edit</a> <a href="#">delete</a> |
| network_summary_maxgroups       | 30   | <a href="#">edit</a> <a href="#">delete</a> |
| network_viewNode_field_list     | nodestatus,outage,sysName,host_addr,host_address,hostname  | <a href="#">edit</a> <a href="#">delete</a> |
| nmis_executable                 | ((/bin admin installer_hooks conf-default/scripts conf/scripts)/[a-zA-Z0-9_\.~]+ \.pl \.sh /installer)\$ | <a href="#">edit</a> <a href="#">delete</a> |
| nmis_host_protocol              | http   | <a href="#">edit</a> <a href="#">delete</a> |
| node_configuration_events       | Node Configuration Change, Node Reset  | <a href="#">edit</a> <a href="#">delete</a> |
| node_status_uses_status_summary | true   | <a href="#">edit</a> <a href="#">delete</a> |
| node_summary_field_list         | host,uuid,customer,businessService,serviceStatus,ip,hostname   | <a href="#">edit</a> <a href="#">delete</a> |
| non_stateful_events             | Node Configuration Change, Node Configuration Change Detected, Node Reset, NMIS runtime exceeded         | <a href="#">edit</a> <a href="#">delete</a> |
| os_execperm                     | 0770   | <a href="#">edit</a> <a href="#">delete</a> |
| overall_node_status_coarse      | false  | <a href="#">edit</a> <a href="#">delete</a> |
| overall_node_status_level       | Critical   | <a href="#">edit</a> <a href="#">delete</a> |
| plugins_enabled                 | true   | <a href="#">edit</a> <a href="#">delete</a> |
| polling_interval_factor         | 0.95   | <a href="#">edit</a> <a href="#">delete</a> |
| postpone_clashing_schedule      | 30   | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_cron_name              | (^ /)crond?\$  | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_max_collect_age        | 900  | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_max_swap               | 50   | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_max_system_cpu         | 60   | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_max_system_iowait      | 20   | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_max_update_age         | 604800   | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_min_diskfree_mb        | 25   | <a href="#">edit</a> <a href="#">delete</a> |
| selftest_min_diskfree_percent   | 10   | <a href="#">edit</a> <a href="#">delete</a> |
| server_admin                    | root@localhost   | <a href="#">edit</a> <a href="#">delete</a> |
| server_role                     |  | <a href="#">edit</a> <a href="#">delete</a> |
| snmp_max_msg_size               | 1472   | <a href="#">edit</a> <a href="#">delete</a> |
| stateless_event_dampening       | 900  | <a href="#">edit</a> <a href="#">delete</a> |

|                            |                      |   |
|----------------------------|----------------------|---|
| threshold_period-default   | -15 minutes          | <a href="#">edit</a> <a href="#">delete</a> |
| threshold_period-health    | -4 hours             | <a href="#">edit</a> <a href="#">delete</a> |
| threshold_period-interface | -15 minutes          | <a href="#">edit</a> <a href="#">delete</a> |
| threshold_period-pkts      | -15 minutes          | <a href="#">edit</a> <a href="#">delete</a> |
| threshold_period-pkts_hc   | -15 minutes          | <a href="#">edit</a> <a href="#">delete</a> |
| update_interval_factor     | 0.95                 | <a href="#">edit</a> <a href="#">delete</a> |
| upnotify_stateful_events   | down proactive alert | <a href="#">edit</a> <a href="#">delete</a> |

## SNMP Changes for a Specific Node

Select the specific node then "Edit Node".



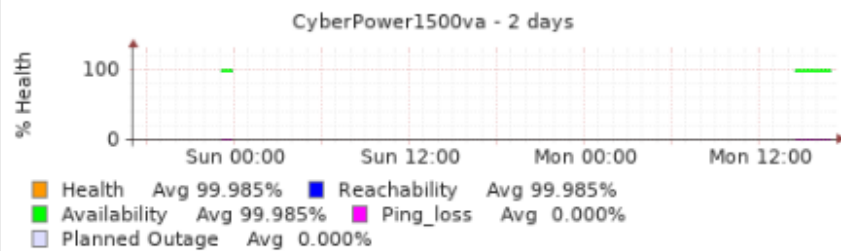
CyberPower1500va

Mon 9:59

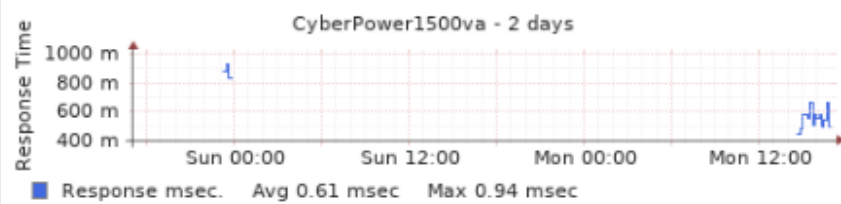
Node CyberPower1500va events outage Diagnostic contact locationNode Details - CyberPower1500va **Edit Node** - Node Configuration - Node Context - SSH to Node

|                   |                         |
|-------------------|-------------------------|
| nodestatus        | reachable               |
| System Name       | RMCARD205               |
| IP Address        | 192.168.0.107           |
| Backup IP Address |                         |
| Group             | NMIS9                   |
| Customer          | Opmantek                |
| Location          | Cloud                   |
| Business Service  |                         |
| Service Status    | Development             |
| Notes             |                         |
| Type              | generic                 |
| Model             | Default                 |
| Polling Policy    | default                 |
| Uptime            | 5 days, 5:04:44         |
| SNMP Location     | Server Room             |
| Contact           | Administrator           |
| Description       | UPS SNMP Card           |
| Interfaces        | 2                       |
| Last Ping         | 23-Jan-2023 16:58:12    |
| Last Collect      | 21-Jan-2023 23:54:06    |
| Last Update       | 23-Jan-2023 14:47:36    |
| Vendor            | Cyber Power System Inc. |
| Object Name       | enterprises.3808.1.1.1  |
| Role              | core                    |
| Net               | wan                     |

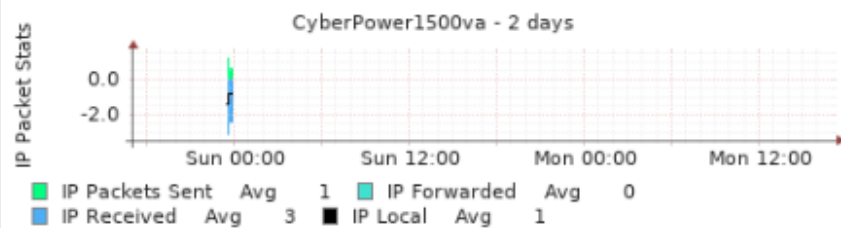
Overall Reachability, Availability and Health



Response Time in milliseconds



IP Utilisation



| SNMP Settings         |        |
|-----------------------|--------|
| SNMP Version          | snmpv1 |
| SNMP Max Message Size | 1472   |
| SNMP Max Repetitions  | 0      |
| SNMP Port             | 161    |
| SNMP Username         |        |
| SNMP Context          |        |
| SNMP Auth Password    |        |
| SNMP Auth Key         |        |
| SNMP Auth Proto       | md5    |
| SNMP Priv Password    |        |
| SNMP Priv Key         |        |
| SNMP Priv Proto       | des    |

\* mandatory fields.

## snmp\_timeout and snmp\_retries

By default, NMIS has a 5 second SNMP timeout and will retry once before it considers SNMP to have failed. The default settings work in 99% of circumstances, some devices and/or networks require increased timeout or retries to work better, so these settings can be increased, however, it is important to remember that when SNMP is not responding the polling process will now have to wait for the multiple of the timeout and retries, so by default 5 seconds. If the retries were set to 3 then 5 seconds and 3 retries would be 15 seconds before NMIS considers that SNMP is down.

For servers with many nodes, it is not recommended for multiple of timeouts and retries to exceed 20 seconds.

## snmp\_max\_msg\_size

The primary tunable NMIS configuration setting for SNMP is `snmp_max_msg_size`, which controls how large a single SNMP packet may be.

This can be set as a system-wide default (in the System menu, under System Configuration), or as a per-host setting (in the Edit Node menu, under Advanced Options).

The default for `snmp_max_msg_size` is 1472 bytes, just below the 1500 byte packet limit for normal Ethernets. In LAN-only scenarios it is possible to increase this past 1500 bytes: this causes IP fragments and packet reassembly, but unless your LAN is saturated and starving for bandwidth fragmentation is not a problem. The benefit of a larger SNMP packet would be that the data to be collected fits into fewer packets.

## max\_repetitions

This option was added in NMIS 8.5G. It controls how many SNMP PDUs will be packaged into a single SNMP packet. The `max_repetitions` setting is named a bit oddly - that comes from the SNMP module that NMIS uses: Net::SNMP calls it `"-maxrepetitions"`.

This option can **only** be set for specific hosts and is not available for SNMP version 1.



Its primary purpose is to overrule Net::SNMP's heuristic for maximizing the efficiency of bulk transfers: the goal is to fit the maximum number of PDUs into each packet, which of course depends on the size of the PDUs (and their sizes are unknown until the operation is attempted). Like any other heuristic, this one can fail under certain circumstances: If large SNMP tables are collected then it may be necessary to reduce this setting to 10-20 (when used with the default packet size). We have observed this problem in a small number of situations, for example when collecting virtual machine info from VMware ESXi hosts - the strings contained in these tables are *really* long.

If you observe SNMP error messages in the logs which look similar to *"SNMP ERROR (X) (Y) The message size exceeded the buffer maxMsgSize of N"*, then you should set a lower `max_repetitions` value (or increase the `snmp_max_msg_size` if you're operating in a LAN-only scenario). Otherwise, a value of 40-50 minimizes the number of SNMP packets and thus speeds up collection. Not setting this option at all leaves it to the Net::SNMP module to guess a suitable value.

There is one special setup for `max_repetitions`: if it is set to 0 it will behave with the default of the NET-SNMP Perl library, which appears to be 25, or if set to 1 the efficient bulk transfer is disabled and a slower but more robust transfer mechanism is employed.

The setting `max_repetitions` should be added to a node entry in the `Nodes.nmis` file and is an option in the NMIS8 GUI when editing nodes.

## New in NMIS 8.6: Automatic `max_repetitions` adjustment

As outlined in the [NMIS 8 Release Notes](#), from version 8.6.0 onwards NMIS will dynamically reduce the `max_repetitions` parameter if necessary.

If a "message size exceeded" error is encountered, the issue is logged and the current `max_repetitions` value is reduced by 25% before the request is retried. If that retry works, the updated value is used for the SNMP session lifetime, i.e. the remainder of this node's collect of update operations. Up to four reduce-and-retry iterations are performed before NMIS gives up on the request and returns an error.

If you have not set a `max_repetitions` value, the first retry will use the value 20.

Whenever such an automatic adjustment is attempted, NMIS logs a warning message similar to this example:

```
"WARNING (servername) SNMP get_table failed with message size exceeded, retrying with maxrepetitions reduced to 36"
```