Basic and Advanced Thresholds in NMIS8

NMIS8 includes powerful capabilities for performance and operational thresholding, which greatly enhance network management capabilities. These thresholds result in alerts/events/notifications which NMIS can send when it sees a threshold breached. The thresholds have very granular controls which by default have been configured fairly broadly.

A list of standard thresholds NMIS includes is available in NMIS Threshold Configuration

A simple example of this is that you will likely need to be notified when the CPU is high on a Core device, vs an Access switch in Timbuktu. This is part of the NMIS idea of relevance of information in general, not all devices are created equal, some devices deserve better alerting, people of course are created equal.

If you want to just modify and add new thresholds read the first section "Using the NMIS GUI to Configure Thresholds", the second section "About Threshold Controls" goes into more details about thresholds.

As always thanks to our commercial customers who support everyone who use NMIS8, including the creation of documentation and these great features, if you are interested in commercial support, please email contact@opmantek.com

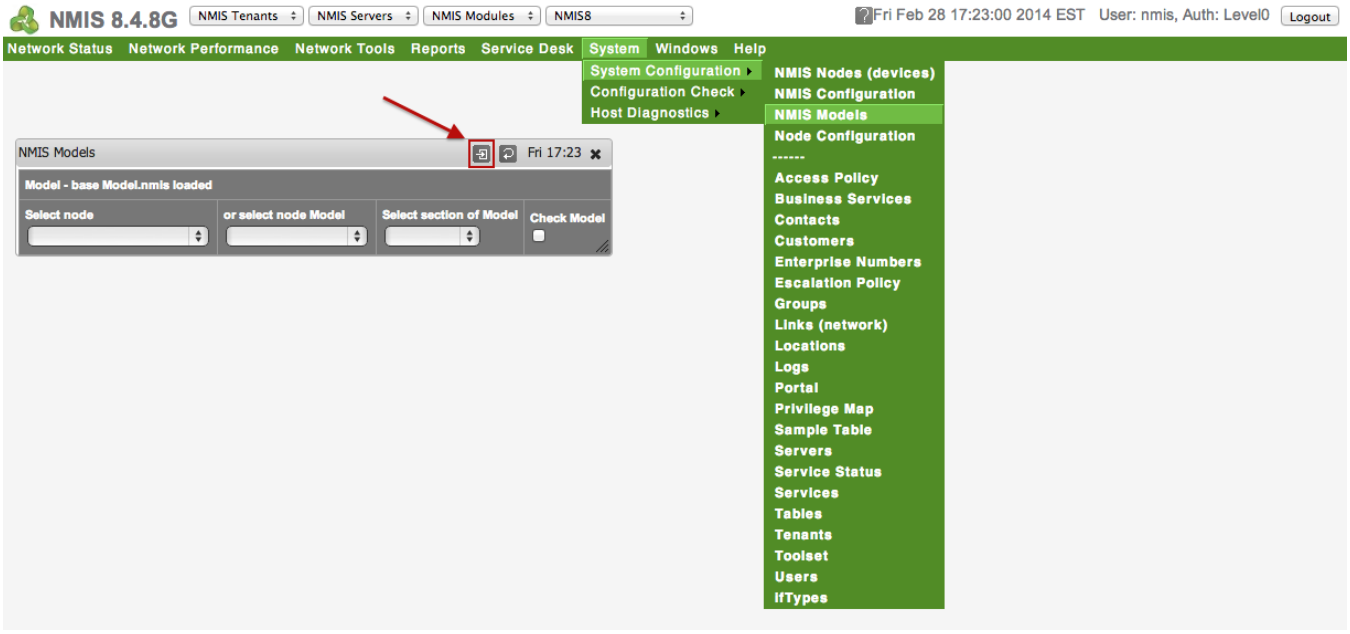
- Using the NMIS GUI to Configure Thresholds
  - Access the NMIS Models GUI
    - NMIS 8.4 Example
    - NMIS 8.6 Example
  - Select the Section to Modify
  - Select the Threshold to Add a Controlled Select
  - Editing the Control
  - A New Control is Available
  - Changing a Threshold
  - Updated Threshold for Warning
  - Applying the Thresholds
  - Adding a New Select Block
  - Setting the Order and Thresholds
  - Adding a Control
  - New Threshold Select Added
- About Threshold Controls
  - Simple Thresholds
  - Have a set of thresholds for Core CPU
  - Advanced Thresholds with Controls
  - Advanced Control Options
  - Sample Controls
  - Threshold Dampening in NMIS

Using the NMIS GUI to Configure Thresholds

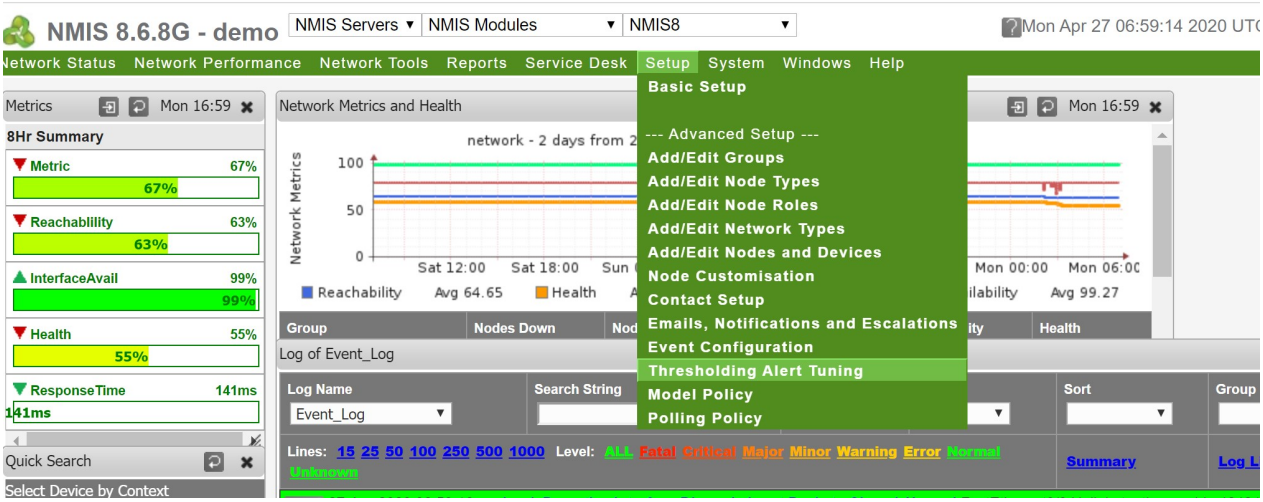
Access the NMIS Models GUI

Access the GUI by clicking on the menu "System -> System Configuration -> NMIS Models", the "NMIS Models" widget will be displayed as shown below. Now this is a BIG form, so clicking on the POP OUT button will place it in its own browser TAB/Window. This is applicable in NMIS 8.4.8G and onwards.

NMIS 8.4 Example



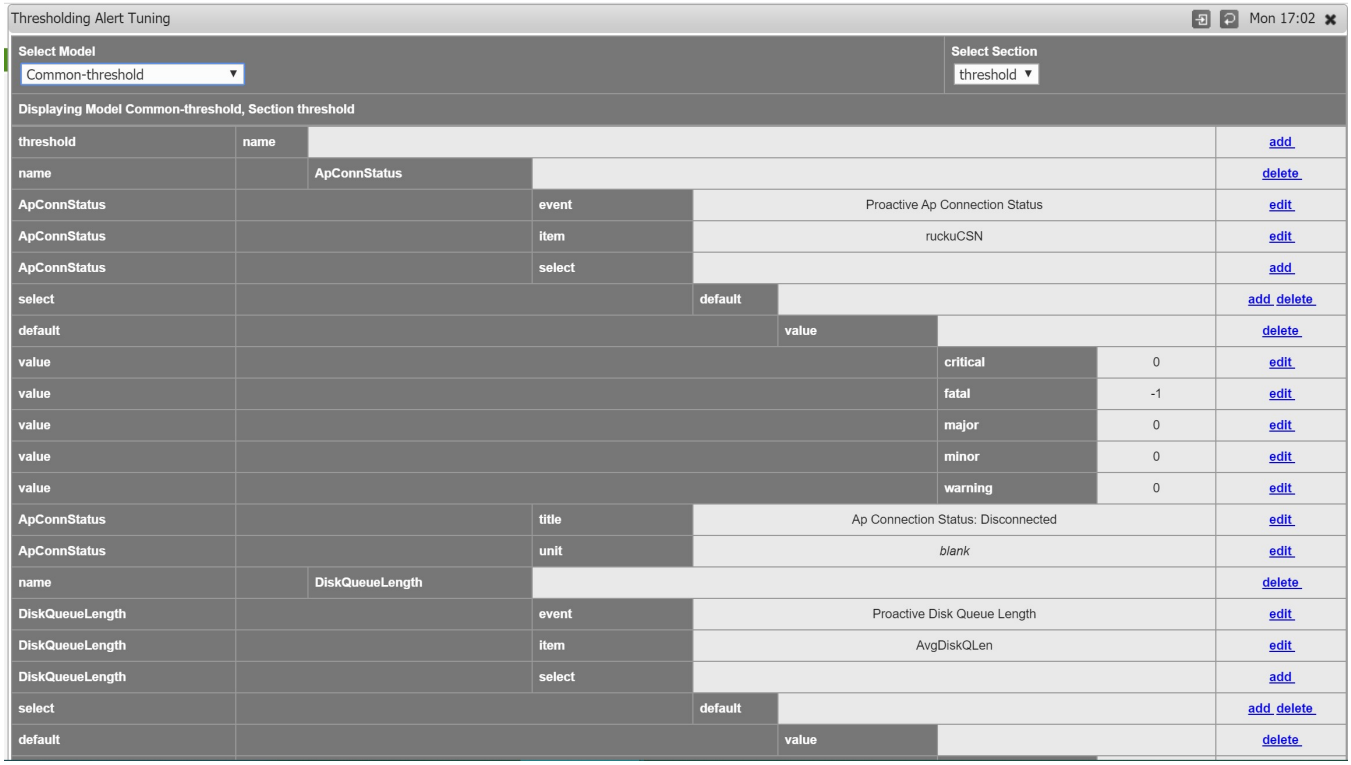
NMIS 8.6 Example



Select the Section to Modify

I have selected NMIS 8.6 Common-threshold.nmis to edit, we now just search for the "item" we want to change the threshold for.

Note: in older model formats e.g NMIS8.4 and before and in some older Modelling of devices you need to select the Nodes Model- file and the threshold section



Thresholding Alert Tuning — Mon 17:02

Select Model: Common-threshold — Select Section: threshold

Displaying Model Common-threshold, Section threshold

threshold	name						add
name		ApConnStatus					delete
ApConnStatus			event	Proactive Ap Connection Status			edit
ApConnStatus			item	ruckuCSN			edit
ApConnStatus			select				add
select				default			add delete
default					value		delete
value						critical 0	edit
value						fatal -1	edit
value						major 0	edit
value						minor 0	edit
value						warning 0	edit
ApConnStatus			title	Ap Connection Status: Disconnected			edit
ApConnStatus			unit	*blank*			edit
name		DiskQueueLength					delete
DiskQueueLength			event	Proactive Disk Queue Length			edit
DiskQueueLength			item	AvgDiskQLen			edit
DiskQueueLength			select				add
select				default			add delete
default					value		delete

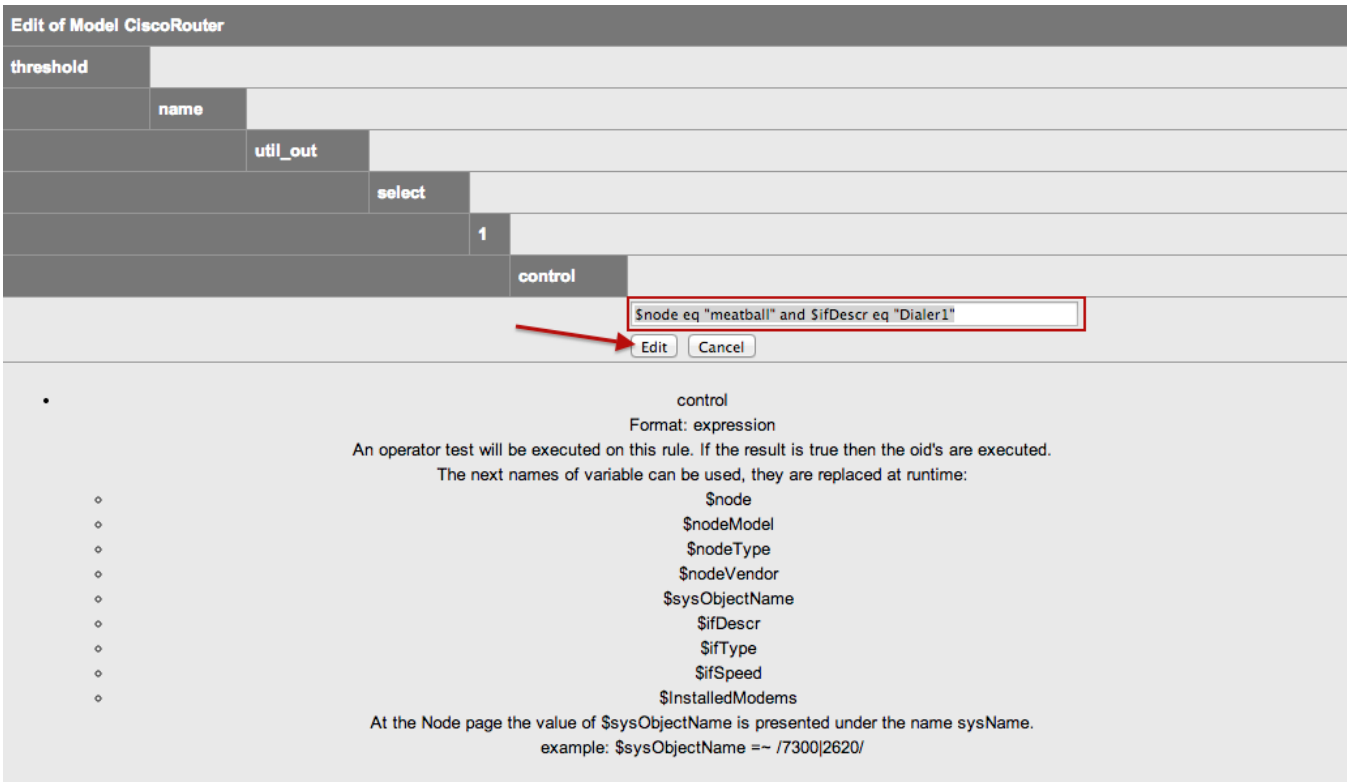
Select the Threshold to Add a Controlled Select

In this example we will add a select section, which will be controlled to only work on a specific device named "meatball" and the interface is "Dialer1". To do this we are going to hi-jack the threshold in the first position and edit the control. This is because these selects are executed in order and we need ours to be first, this is like an access list on a router or firewall. We will add another in position 10 when we are done. I will also update the default models to have gaps in the orders.....

threshold		util_out					delete
threshold			event	Proactive Interface Output Utilisation			edit
threshold			item	outputUtil			edit
threshold			select				add
threshold				1			add delete
threshold					control (if true)	$ifSpeed <= 5000000 and $ifSpeed >= 1000000	edit
threshold					value		
threshold						critical 90	edit
threshold						fatal 95	edit
threshold						major 80	edit
threshold						minor 70	edit
threshold						warning 60	edit
threshold				2			add delete
threshold					control (if true)	$ifSpeed == 10000000	edit
threshold					value		

Editing the Control

Now we just change the control to be the string "$node eq "meatball" and $ifDescr eq "Dialer1"" and click "Edit".



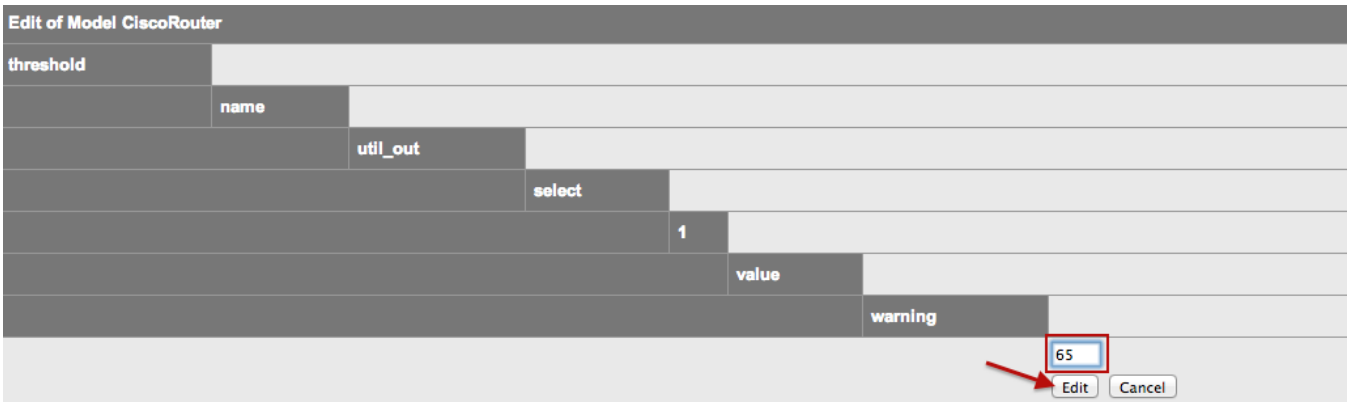
A New Control is Available

Now we can tune the thresholds by clicking "edit" on the one we want to change,

threshold	util_out					delete
threshold	event	Proactive Interface Output Utilisation				edit
threshold	item	outputUtil				edit
threshold	select					add
threshold	1					add delete
threshold	control (if true)	$node eq "meatball" and $ifDescr eq "Dialer1"				edit
threshold	value					
threshold	critical	90				edit
threshold	fatal	95				edit
threshold	major	80				edit
threshold	minor	70				edit
threshold	warning	60				edit

Changing a Threshold

Lets change the warning to be 65%, then click "Edit"



Updated Threshold for Warning

Now the warning level is set to 65%

threshold		util_out				delete
threshold			event	Proactive Interface Output Utilisation		edit
threshold			Item	outputUtil		edit
threshold			select			add
threshold				1		add delete
threshold				control (if true)	$node eq "meatball" and $ifDescr eq "Dialer1"	edit
threshold				value		
threshold					critical 90	edit
threshold					fatal 95	edit
threshold					major 80	edit
threshold					minor 70	edit
threshold					warning 65	edit

Applying the Thresholds

The thresholds will be run on the next poll cycle or when they have been configured to run. You can run them on demand from the command line, with the following command (meatball is my router here, so change for your device).

```
/usr/local/nmis8/bin/nmis.pl type=threshold debug=true node=meatball
```

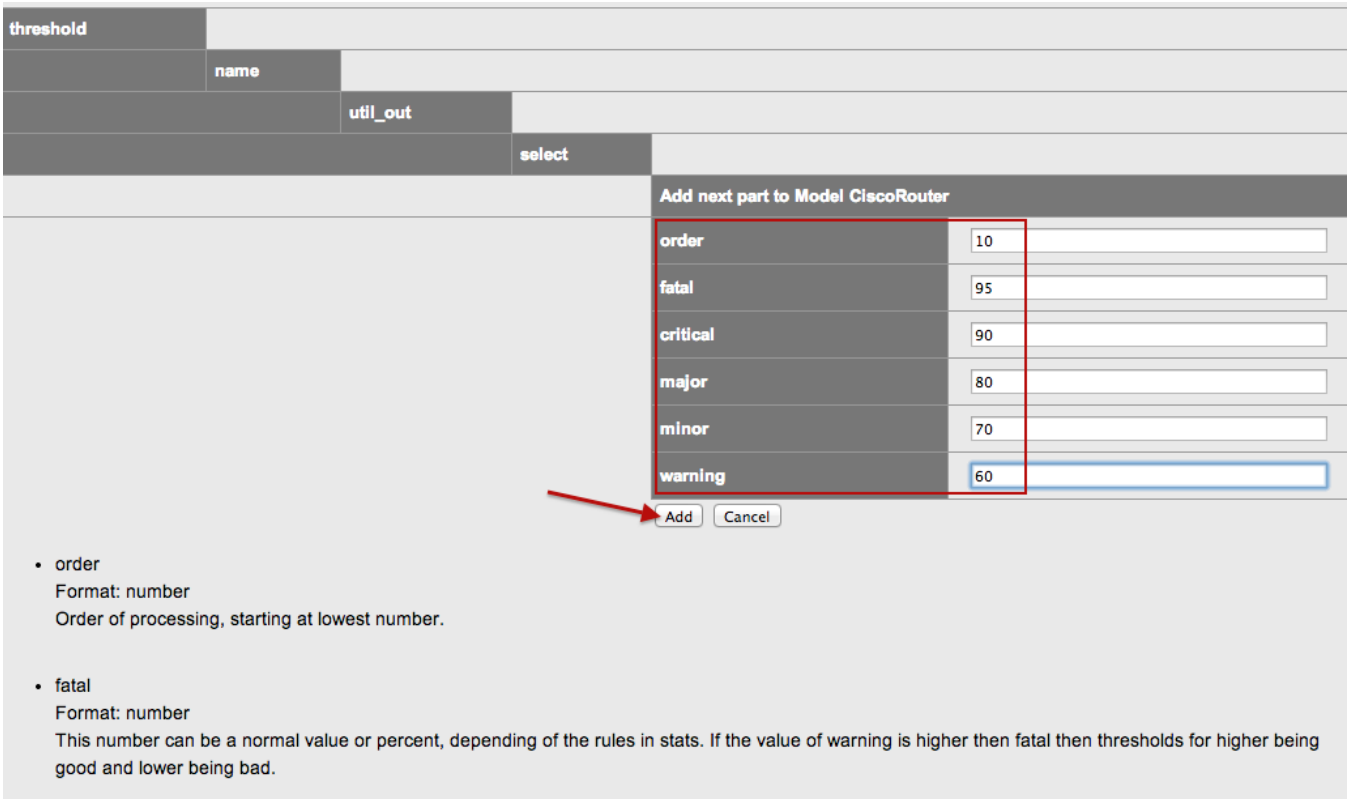
Adding a New Select Block

Now we need to add back the one we hi-jacked. So we add a new select block, click "add".

threshold		util_out				delete
threshold			event	Proactive Interface Output Utilisation		edit
threshold			item	outputUtil		edit
threshold			select			add
threshold				1		add delete
threshold				control (if true)	$node eq "meatball" and $ifDescr eq "Dialer1"	edit
threshold				value		
threshold					critical 90	edit
threshold					fatal 95	edit
threshold					major 80	edit
threshold					minor 70	edit
threshold					warning 65	edit

Setting the Order and Thresholds

I am going to set this one as 10, it will happen after the others but before the default, complete all the details you require in the form and click "Edit"



- order
  Format: number
  Order of processing, starting at lowest number.

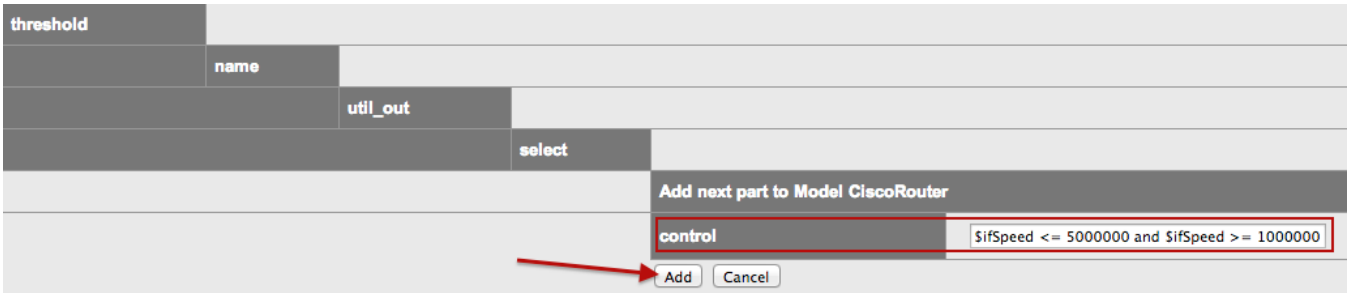
- fatal
  Format: number
  This number can be a normal value or percent, depending of the rules in stats. If the value of warning is higher then fatal then thresholds for higher being good and lower being bad.

Adding a Control

We need to add a control field now, so on the new select section 10, click add

threshold		10			add delete
threshold		value			
threshold			critical	90	edit
threshold			fatal	95	edit
threshold			major	80	edit
threshold			minor	70	edit
threshold			warning	60	edit

Complete the details in the control "$ifSpeed <= 5000000 and $ifSpeed >= 1000000" and click add.



- control
  Format: expression
  An operator test will be executed on this rule. If the result is true then the oid's are executed.
  The next names of variable can be used, they are replaced at runtime:
  - $node
  - $nodeModel
  - $nodeType
  - $nodeVendor
  - $sysObjectName
  - $ifDescr
  - $ifType
  - $ifSpeed
  - $InstalledModems

  At the Node page the value of $sysObjectName is presented under the name sysName.
  example: $sysObjectName =~ /7300|2620/

New Threshold Select Added

Now we have the old hi-jacked threshold created anew ready for low speed thresholding.

threshold		10			add delete
threshold		control (if true)	$ifSpeed <= 5000000 and $ifSpeed >= 1000000		edit
threshold		value			
threshold			critical	90	edit
threshold			fatal	95	edit
threshold			major	80	edit
threshold			minor	70	edit
threshold			warning	60	edit

About Threshold Controls

Simple Thresholds

In NMIS a simple threshold is defined by the following:

- the name
- the event name (which **must** begin with the phrase "`Proactive`" for correct event handling)
- a select (with a default and optionally more)
- default threshold values

In the file /usr/local/nmis8/models/Common-threshold.nmis this looks like this:

```
'cpu' => {
  'item' => 'avgBusy5min',
  'event' => 'Proactive CPU',
  'select' => {
    'default' => {
      'value' => {
        'critical' => '70',
        'fatal' => '80',
        'minor' => '50',
        'warning' => '40',
        'major' => '60'
      }
    }
  }
},
```

Have a set of thresholds for Core CPU

BUT Core devices are more sensitive to CPU Load. So we want to use a different set of threshold values. Something like:

- 'critical' => '60',
- 'fatal' => '70',
- 'minor' => '40',
- 'warning' => '30',
- 'major' => '50'

But how to make these apply just to Core devices?

Advanced Thresholds with Controls

For example, different thresholds for core devices. Looking in Common-thresholds will give you some ideas, but you can add many “selects” and have properties like:

- $name
- $node
- $host
- $group
- $roleType
- $nodeModel
- $nodeType
- $nodeVendor
- $sysDescr
- $sysObjectName
- others for interface
- Almost unlimited possibilities.

So we can create a more specific threshold for core devices (NMIS has this already configured by default).

```
'cpu' => {
  'item' => 'avgBusy5min',
  'event' => 'Proactive CPU',
  'select' => {
    '10' => {
      'value' => {
        'critical' => '60',
        'fatal' => '70',
        'minor' => '40',
        'warning' => '30',
        'major' => '50'
      },
      'control' => '$roleType =~ /core/'
    },
    --snip--
    'default' => {
      'value' => {
        'critical' => '70',
        'fatal' => '80',
        'minor' => '50',
        'warning' => '40',
        'major' => '60'
      }
    }
  }
},
```

These are executed in the select order, and if no control is matched, then the default set is used.

Advanced Control Options

The following are the available control options

Node Properties

- $name
- $node
- $host
- $group
- $roleType
- $nodeModel
- $nodeType
- $nodeVendor
- $sysDescr
- $sysObjectName

Indexed Objects like interfaces

- $ifAlias
- $Description
- $ifDescr
- $ifType
- $ifSpeed
- $ifMaxOctets
- $maxBytes
- $maxPackets
- $entPhysicalDescr

Newly added indexed objects in NMIS 8.6G

- $hrStorageDescr
- $hrStorageType
- $hrStorageUnits (disk block size)
- $hrStorageSize (disk size in blocks)
- $hrStorageUsed (disk used in blocks)
- $hrDiskSize (disk size in bytes, hrStorageSize * hrStorageUnits)
- $hrDiskUsed (disk used in bytes, hrStorageUsed * hrStorageUnits)
- $hrDiskFree (disk free in bytes)

Sample Controls

The controls are little pieces of code which will be evaluated when needed, so you might want to do the following sorts of things

Result	Control
Apply the threshold to all devices in the group "Sales"	$group eq "Sales"
Apply the threshold to all devices starting with the IP address 192.168	$host =~ /192\.168/
Apply the threshold to all Cisco IOS devices	$sysDescr =~ /Cisco IOS/
Use this threshold if the interface speed is between 1 and 5 megabits/second	$ifSpeed <= 5000000 and $ifSpeed >= 1000000
Use this threshold if the interface speed is 10 megabits	$ifSpeed == 10000000
Use this threshold if the interface speed is 100 megabits	$ifSpeed == 100000000
Use this threshold if the interface speed is 1 gigabits	$ifSpeed == 1000000000
Use this threshold if the disk is larger than 100 gigabytes	$hrDiskSize >= 104857600000

Threshold Dampening in NMIS

We have a feature in NMIS called threshold dampening, NMIS will only clear a threshold event when it passes the threshold + the dampening factor, this is configured with the configuration options threshold_rising_reset_dampening and threshold_falling_reset_dampening.

We added this feature because many times the threshold would drop a little, and clear the threshold, and then rise again, causing a new threshold event. So we provided an threshold clearing dampening factor to prevent the flaps.

There are two choices here, reduce the damping setting to a lower level, e.g. 1% which should be enough or disable the feature. You can edit this in the GUI it is in the section globals, or modify the Configuration directly nmis8/conf/Config.nmis

To reduce it to 1%, change the config values to be:

threshold_falling_reset_dampening = 1.01
threshold_rising_reset_dampening = 0.99

To disable it completely:

threshold_falling_reset_dampening = 1.0
threshold_rising_reset_dampening = 1.0

- Basic and Advanced Thresholds in NMIS8