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|  |  |  |
| System Center Operations Manager | | |

Network Monitoring Management Pack Generator UI Tool

* *User Guide*

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# Overview

Until System Center 2012 Operations Manager R2, the Network Monitoring feature of Operations Manager provides only two levels of monitoring for network devices

1. **Basic Monitoring** - This would include “*Availability Monitoring*” and “*Port/Interface monitoring*” for all network devices that have implemented the interface MIB (RFC 2863) and MIB-II (RFC 1213) standards.
2. **Extended Monitoring** – This would include monitoring of *Processor* and *Memory* components of the network devices. This level of monitoring is currently available only for network devices certified by Microsoft.

The Network Monitoring Management Pack generation tool resolves these issues by enabling users to generate their own custom Management Pack to add extended monitoring support for their new/existing network devices, without the need of Microsoft device certification.

# Tool Features

Network Monitoring Management Pack generation tool includes a SNMP\_MPGenerator UI tool and a NetMonMPGenerator.exe command line tool.

1. SNMP\_MPGenerator tool has an inbuilt MIB browser. Users can load MIB files, search through the Object Identifiers (OIDs) of the component they wish to add workflows for and create rules and monitors.
2. Users can add monitors and rules for device components such as Processor, Memory, Fan, Temperature Sensor, Power Supply, Voltage Sensor and Custom device components.
3. This tool would also support custom devices in addition to already supported devices like Switch, Router, Firewall and Load Balancer.
4. Users can define monitors and rules for multiple devices in a single project file and generate a single Management Pack for all of their devices.
5. As mentioned above, this tool would also include the command line executive NetMonMPGenerator.exe for users who wish to generate MP through command line interface.

# Workflow

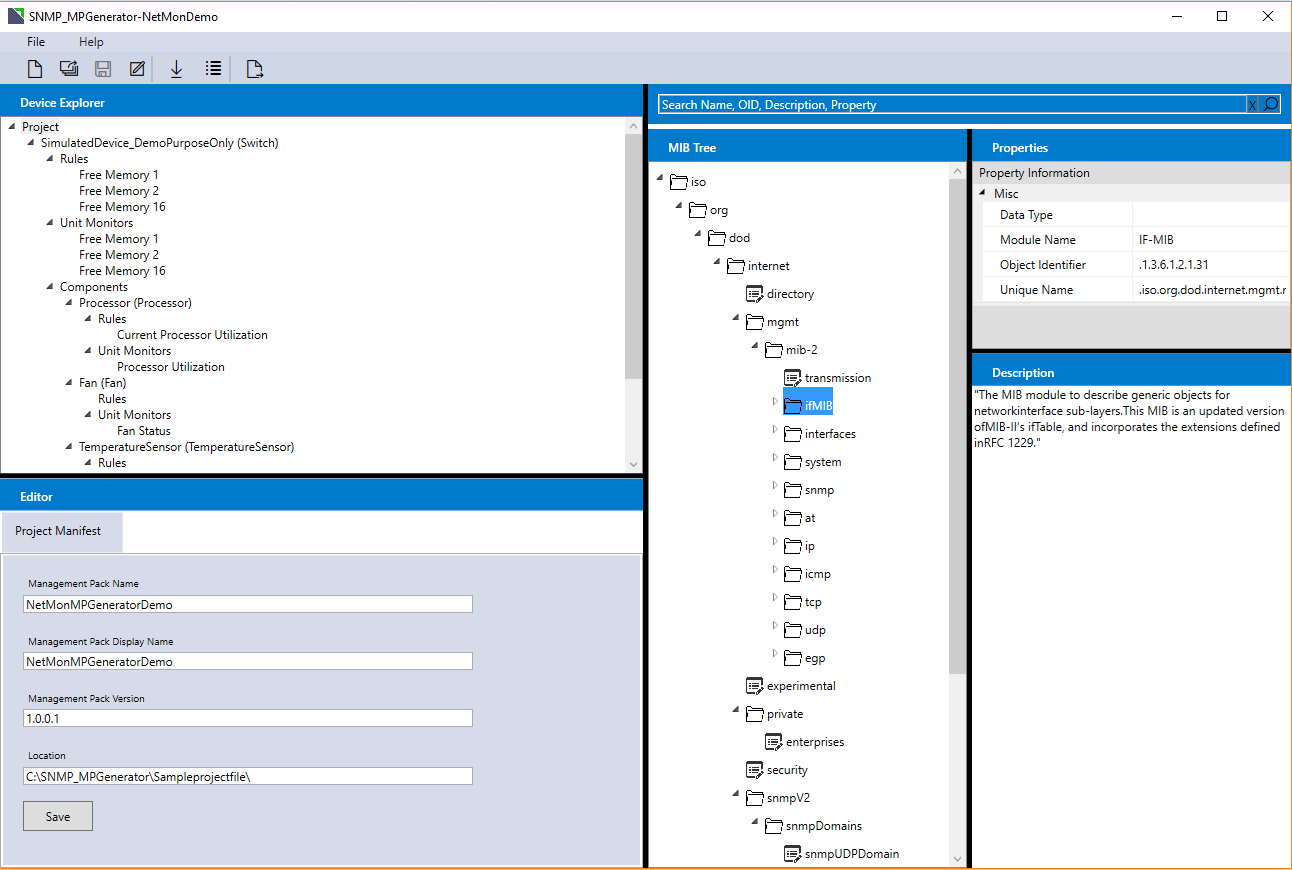
This section describes the steps that customers would need to follow to get extended network monitoring for their devices.

1. Customers need to discover all their network devices in SCOM by creating a discovery rule, as documented in this article - <https://technet.microsoft.com/en-in/library/hh278846.aspx>. Devices can be discovered using SNMP version V2 or V3.
2. Customers would need to generate Management Pack through the SNMP\_MPGenerator tool.
   1. Define the Management Pack information – Name, version, location for the project and Management Pack to be saved.
   2. Add devices that needs to be monitored. Define the device information, which would include the unique System Object Identifier, Device Type, device model and vendor name.
   3. Load the MIB files related to the devices.
   4. Gather Object ID information from traversing or searching the MIB tree, for the device components and the component objects to be monitored.
   5. Add the components to be monitored and the component information – name and component OID.
   6. Create Rules and Monitors – this can be done either at the device level or at the component level.
   7. Repeat the same for all the devices that are to be monitored. Once done, save the project.
   8. Click “Generate MP” to generate the Management pack.
3. Import the Management Pack in SCOM to get extended monitoring for devices.

***Note:*** *The Management Pack would run additional discoveries on the discovered devices, identify them by their unique SysObjId and set the device properties such as model, vendor and certification. It will discover components of each device, if required and apply all the specified rules and monitors on the device and/or its components.*

# SNMP\_MPGenerator tool

## Tool Layout



(2)

(3)

(5)

(1)

(4)

The tool has six main sections

1. ***Device Explorer***

This is the main Project Window. This section displays all the devices and the workflows associated with it in a hierarchical manner. Users would need to work in this section to add new devices, rules or monitors.

1. ***Editor***

The Editor Window opens up when user double-clicks on any node in the device explorer or when user adds new devices/rules/monitors. Editor window displays the forms corresponding to each node to define all relevant information pertaining to the node.

1. ***MIBTree***

This is the inbuilt MIB tree. Users can load MIB files related to the devices. They can traverse through the MIB tree to obtain the Object identifiers of the device components or component object.

1. ***Properties***

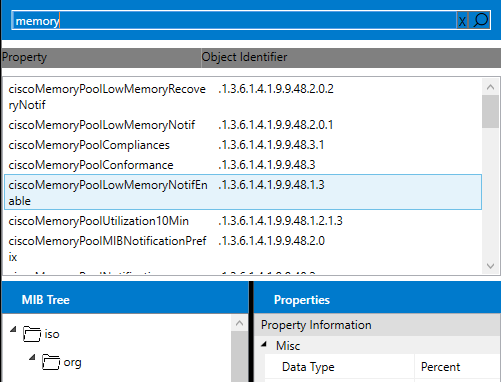
The property section displays the property of the component node selected in the MIB tree or through the Search window.

1. ***Description***

The description section displays the description of the component node selected in the MIB tree or through the Search window.

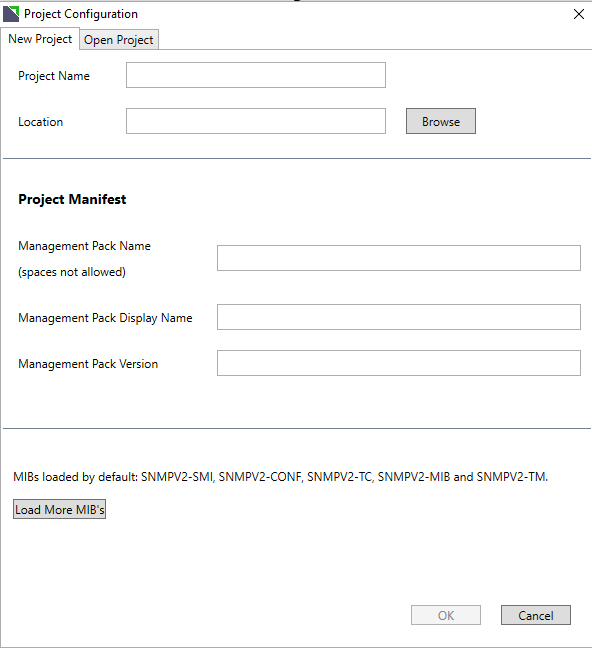
1. ***Search Window***

This section appears only when the user searches the MIB tree for device component information using Name, Object Identifier, keywords in description or property.



## Open/Create Project

When the tool is launched, it provides users two options – to open an existing project or to create a New Project.



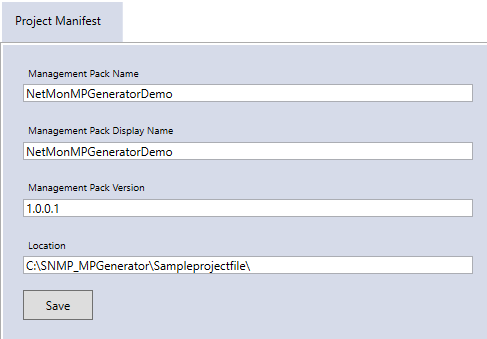
To create New Project, users would need to provide the details as above. The Project Manifest Information would be the name of the Management Pack generated, Management Pack version and the display name of the Management Pack in SCOM console.

Users can load MIB files from this window too. These files would get added to the MIB tree.

## Device Explorer:

### Project Manifest

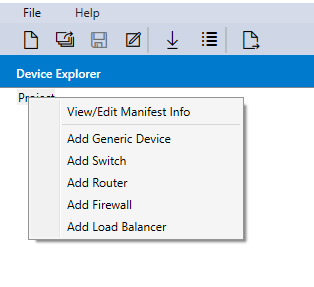
Double click on the top most project node to view/edit Project Manifest information in the “Edit” window. This is the information user would have defined while creating a new project.



### Add New Device

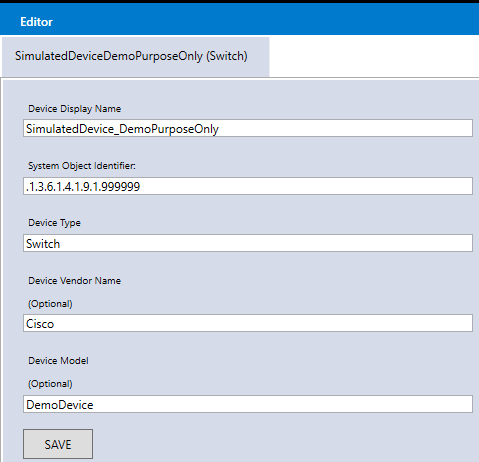
Right Click on the “Project” node to add new devices. Currently the tool supports adding

* + Custom Generic Devices
  + Switch
  + Router
  + Firewall and
  + Load Balancer



Once you add a new device, the device information page would open up in the Editor window. Specify the below mentioned device information

|  |  |  |
| --- | --- | --- |
| **Property** | **Description** | **Mandatory/Optional** |
| SysObjId | System Object Id that uniquely identifies a device model | Mandatory |
| Type | Type of device. Permissible values: Switch, Router, Firewall, LoadBalancer | Mandatory |
| Vendor | Vendor of the device. Example: Cisco, Juniper, Arista etc | Optional |
| Model | Model Name of the device. | Optional |



Click “Save” after updating the device information. Please note that any node will be added to the device explorer and the project only on saving.

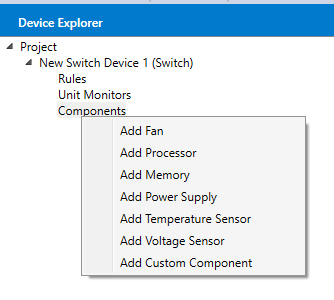
Once the device information is saved, three default placeholders will be added.

### Components

Each Component node would have a type and a name. Currently the following types of components are supported for discovery and monitoring.

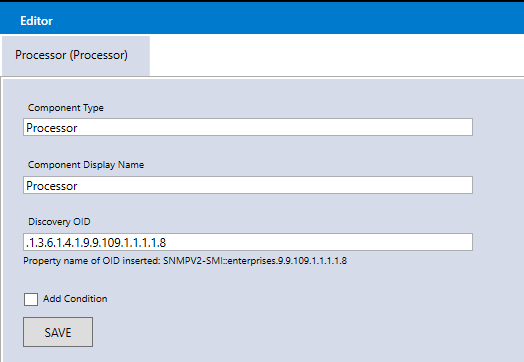
* Memory
* Processor
* Fan
* TemperatureSensor
* VoltageSensor
* PowerSupply
* Custom Component

Name of a component can be an alphanumeric string whitespaces, hyphens (-) and underscores (\_). Each



User needs to provide the below information about the component in addition to component name and type.

* + Object identifier - this will be used to discover the device component. SCOM would do a SNMP walk and determine how many instances of this component exist and discover the index of each. All the rules and monitors defined on the component would be targeted to each of the instances.



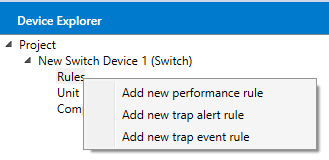
On Save, a new component would be added along with placeholders for Rules and Unit Monitors.

***Note***:

Custom Component type should be alphanumeric starting with an alphabet and should not contain spaces.

### Rules

Rules can be added either at the device level or at the Component level.



Right click rules to add a new

* + ***Performance Rule***

In this section, users can specify one or more performance rules targeted on the device or the component. Name of a performance rule can be an alphanumeric string whitespaces, hyphens (-) and underscores (\_). The SNMP OId can be obtained by either traversing or searching the MIB tree. The MP will probe this OId on the given device and plot a graph with the values returned. This graph will appear under device’s Performance View.

* + ***Trap Alert Rule***

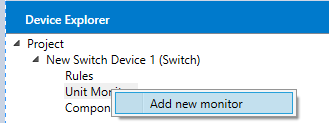
Trap alert rules can be used to register for specific SNMP traps from network devices. SCOM will issue alerts whenever the specified trap is received

* + ***Trap Event Rule***

Trap alert rules can be used to register for specific SNMP traps from network devices. SCOM will generate events whenever the specified trap is received. Please note, with trap event rule, users will only see events under device's event view, there be no alerts generated.

### Unit Monitors

Like Rules, Unit Monitors can be added both at the device level or at the component level.



Right click “Unit Monitor” to add new monitor. This will open a form in the editor pane to get more information on the monitor.

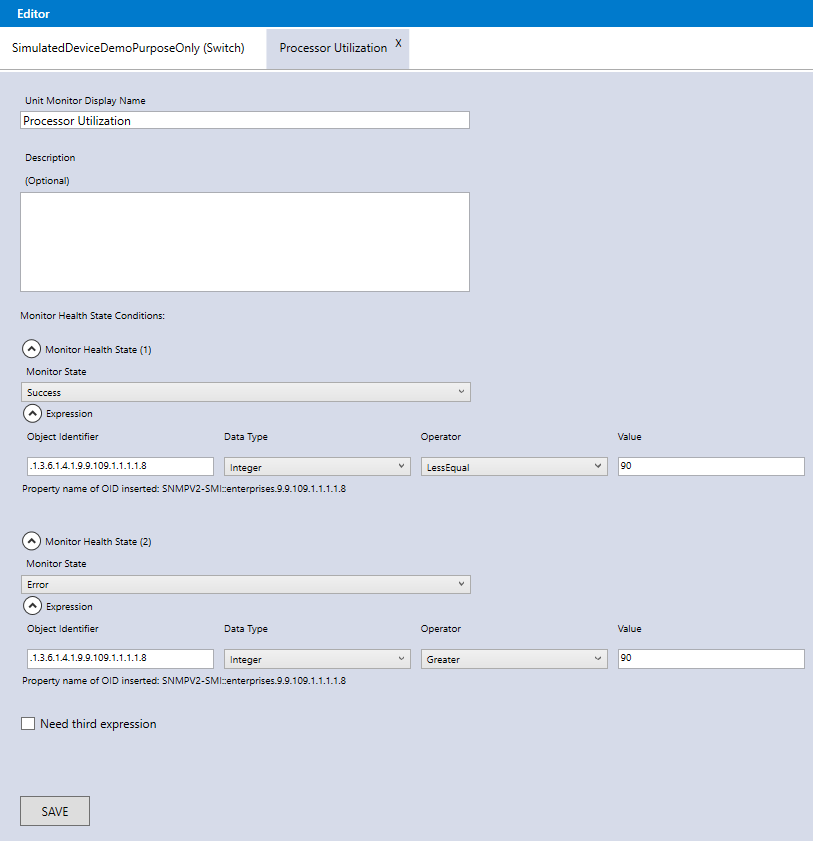
In this section, users can specify one or more unit monitors targeted on the device or component. Currently, three state monitors are supported. Each monitor would have expressions that will define exclusive conditions for those states. A unit monitor will issue an alert when it goes to error state. The alert will be resolved automatically when the monitor returns to healthy state. All the monitors targeted on the device and its components will roll up to the device’s health.

- Name of a Unit Monitor can be an alphanumeric string whitespaces, hyphens (-) and underscores (\_).

- State of an expression can be any of the following: Success, Warning and Error.

Each expression will do an SNMP probe on the OId specified as inner text of Expression node. It will compare the value returned by the SNMP probe against the threshold value. It will use the mentioned operator for this comparison.

|  |  |  |
| --- | --- | --- |
| Attribute | Description | Permissible Values |
| State | State of the monitor when condition specified in the expression evaluates to true. | Success, Warning, Error |
| Operator | Operator to be used for comparison | Equal, NotEqual, Greater, Less, GreaterEqual, LessEqual, ContainsSubstring, MatchesRegularExpression, DoesNotContainSubstring, DoesNotMatchRegularExpression |
| Value | Value against which the SNMP returned value is compared | Any valid value of the given data type |
| DataType | Each monitor expression has to specify the data type of value returned by the SNMP probe. | UnsignedInteger, Double, String |

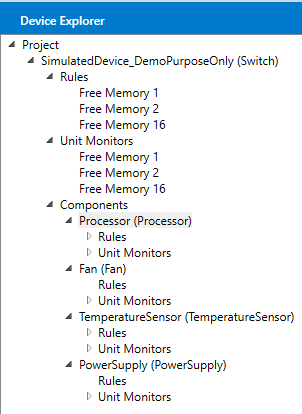


## Complete Project

Continue to add workflows for all the devices that would need extended network monitoring.

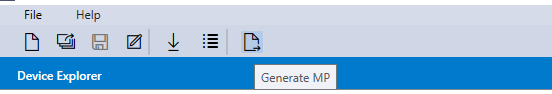
Click “Save”, this would validate the project and display errors, if any.

The final project would look like below. Please note this is for demo purpose only.



## Generate Management Pack

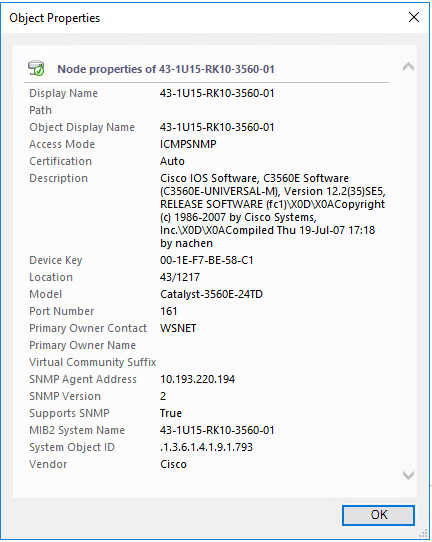
After the project is saved, click “Generate MP” icon on the tool bar to generate the Management Pack. The generated Management Pack would be saved in the same location as the project. Only one management pack would be generated for all the devices defined in the project.



# MP in Action

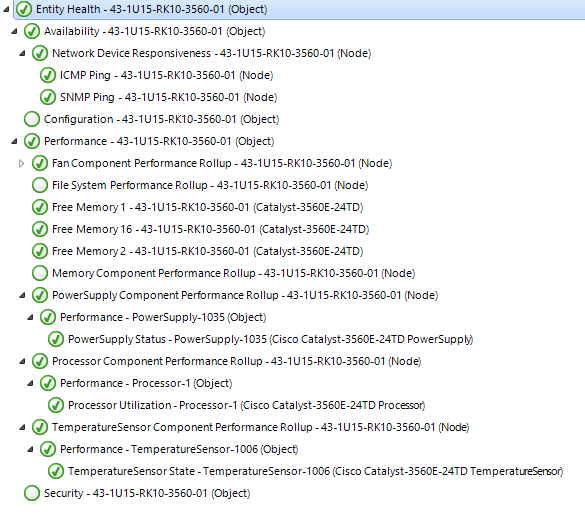
Import the generated Management Pack in SCOM Management Server to get extended network monitoring for your network devices. You can observe the below changes.

**Device Properties**

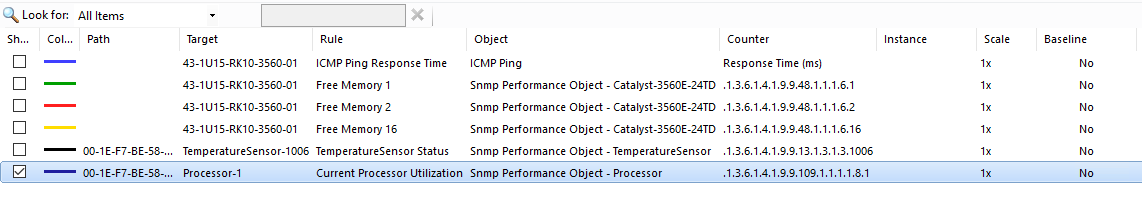


**Health Explorer**

Here is a snapshot of health explorer of a device, which has extended monitoring (Processor, Memory, Fan, Temperature Sensor and Power Supply)



**Performance Rules**



# Feedback

Send us your feedback through the SCOM Feedback site - [http://systemcenterOM.uservoice.com](http://systemcenterom.uservoice.com/)