

Integrate SolarWinds NPM into OpsMgr

Integrate your Network health state into SCOM relying on SolarWinds Network Monitoring solution.

Introduction

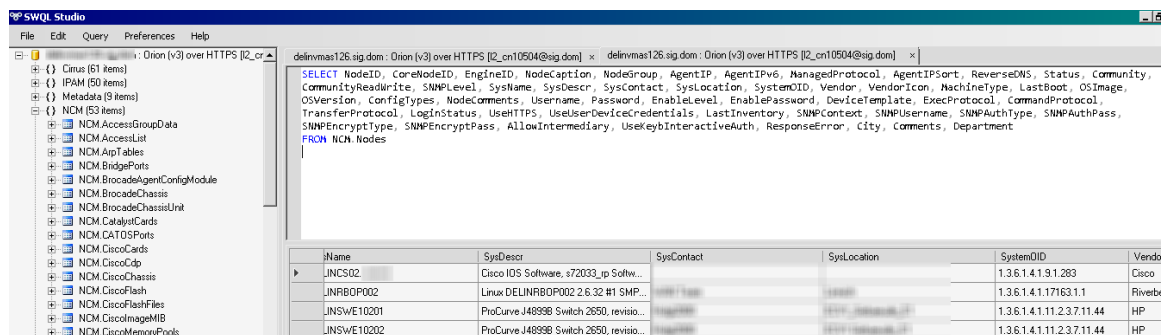
OpsMgr is great for monitoring servers and 'things' which run on servers. Through management pack authoring it is possible to monitor anything which can be contacted through the network.

In principal SCOM can monitor network devices as switches, routers, etc. It fulfils basic demands. Compared to other network - monitoring tools the user interface is slow and ductile. Effort in administration is high and requires a certain skill set.

In contrast SolarWinds NPM is a lightweight and easy to use network monitoring solution. It can be learned in short time and the UI is quiet responsive.

My personal favorite is underlying REST - Web Service which SolarWinds uses for all its network management or monitoring tools. It can be easily queried and responds in JSON.

Queries are formulated in a SQL dialect WSQL and can be tested in the SWQL Studio



The screenshot shows the SWQL Studio interface. The left pane displays a tree view of the Orion (v3) over HTTPS [I2_cr] database schema, including tables like NCM.AccessGroupData, NCM.AccessList, NCM.AipTables, NCM.BridgePorts, NCM.BrocadeAgentConfigModule, NCM.BrocadeChassis, NCM.BrocadeChassisUnit, NCM.CatalystCards, NCM.CATOSPorts, NCM.CiscoCards, NCM.CiscoCdp, NCM.CiscoCdp, NCM.CiscoChassis, NCM.CiscoFlash, NCM.CiscoFlashFiles, NCM.CiscoImageMIB, and NCM.CiscoMemoryPools. The main pane shows a SQL query:

```
SELECT NodeID, CoreNodeID, EngineID, NodeCaption, NodeGroup, AgentIP, AgentIPv6, ManagedProtocol, AgentIPSort, ReverseDNS, Status, Community, CommunityReadWrite, SNMPLevel, SysName, SysDescr, SysContact, SysLocation, SystemOID, Vendor, VendorIcon, MachineType, LastBoot, OSImage, OSVersion, ConfigTypes, NodeComments, Username, Password, EnableLevel, EnablePassword, DeviceTemplate, ExecProtocol, CommandProtocol, TransferProtocol, LogInStatus, UseHTTPS, UserKeyDeviceCredentials, LastInventory, SNMPContext, SNMPUsername, SNMPAuthType, SNMPAuthPass, SNMPEncryptType, SNMPEncryptPass, AllowIntermediary, UseKeyInteractiveAuth, ResponseError, City, Comments, Department
FROM NCM.Nodes
```

The results pane displays a table with the following data:

Name	SysDescr	SysContact	SysLocation	SystemOID	Vendor
JNCS02	Cisco IOS Software, s72033_ip Softw...			1.3.6.1.4.1.9.1.283	Cisco
JNRBOP002	Linux DELUNRBOP002 2.6.32 #1 SMP...			1.3.6.1.4.1.17163.1.1	Finvelb
JNSWE10201	ProCurve J4899B Switch 2650, revisio...			1.3.6.1.4.1.11.2.3.7.11.44	HP
JNSWE10202	ProCurve J4899B Switch 2650, revisio...			1.3.6.1.4.1.11.2.3.7.11.44	HP

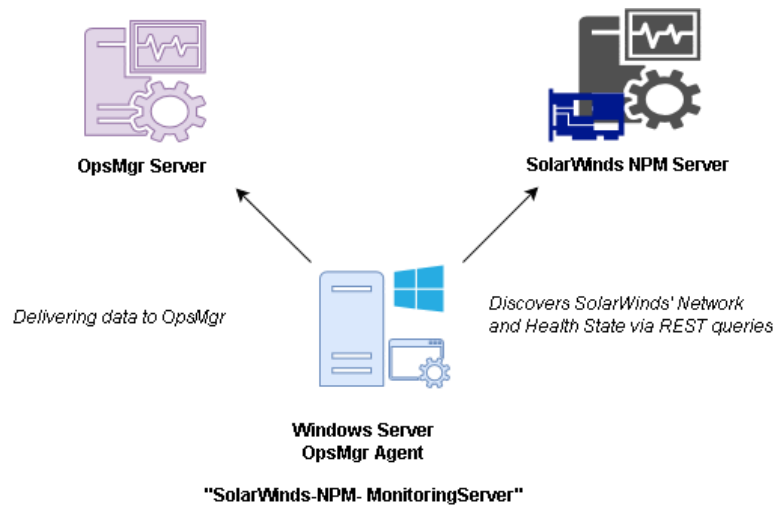
A SDK is available and maintained on github. - <https://github.com/solarwinds/OrionSDK/wiki>

Problem

Get network device information into SCOM, benefiting from SolarWinds NPM.
Having health state of devices available to be further used in Distributed Applications.

Design

A Windows Server, taking the role of 'SolarWinds Monitoring Server'
Scripts inside the Management Pack will query the REST services to pass information about
Topology and Health to OpsMgr.



Configuration

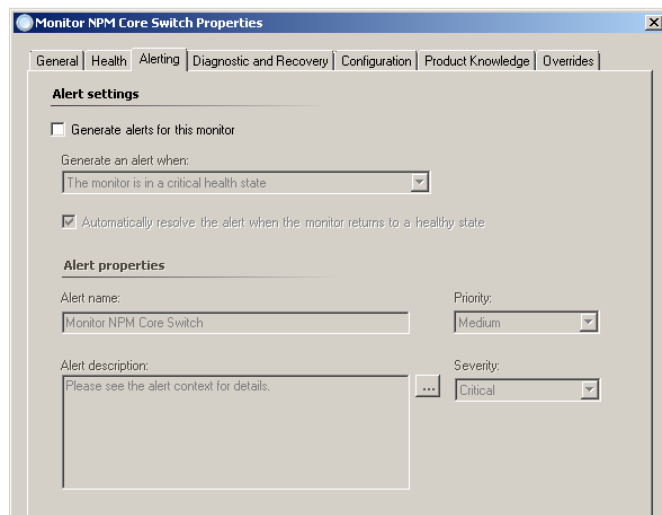
By default, monitoring is enabled, alerting not. If required, overrides can be created and stored in an 'override management pack'.

Monitors

Management pack objects are now scoped to: ArubaController, CoreSwitch, MonitoringServer, FireWall, Node, OtherDevice, Router, ServerRuntimeInfo, Switch Change Scope... ✕

Look for: Find Now Clear ✕

Target	Type	Inherited From	Management Pack	Enabled by
▶ ArubaController				
▶ CoreSwitch				
▶ Entity Health	Aggregate Rollup	Object	Health Library	Yes
▶ Availability	Aggregate Rollup	Object	Health Library	Yes
▶ Monitor NPM Core Switch	ABC.Network.SolarWinds.NPM.TestNode.MonitorType	(Not inherited)	ABC Network SolarWinds NPM	Yes
▶ Configuration	Aggregate Rollup	Object	Health Library	Yes
▶ Performance	Aggregate Rollup	Object	Health Library	Yes
▶ Security	Aggregate Rollup	Object	Health Library	Yes
▶ FireWall				
▶ MonitoringServer				
▶ Node				
▶ OtherDevice				
▶ Router				
▶ ServerRuntimeInfo				
▶ Switch				



The default interval of 5 minutes is used to query SolarWinds NPM. This can be changed as usual.

Network devices are categorized by names. E.g. Switch; name contains 'sw', Router; name contains 'gw' or 'vpn', Firewall; name contains 'fw'

If that does not fit your requirement it can be easily changed in the **DiscoverNPMNodes.ps1** as part of the Visual Studio solution.

```

103     switch -regex ($NodeCaption) {
104         '[a-zA-Z-_0-9\.]*VPN[a-zA-Z-_0-9\.]*GW[a-zA-Z-_0-9\.]*MPLS' { ...
129     }
130     '[a-zA-Z\_0-9\.]{5,5}sw|SW' { ...
154     }
155     '[a-zA-Z\_0-9]{5}CS|cs' { ...
179     }
180     '[a-zA-Z\_0-9\.]{5,5}fw|FW' { ...
204     }
205     '(?i)[a-zA-Z\_0-9\.]{5,5}ARUBA' { ...
229     }
230     default { ...
253     }
254 }

```

The monitoring script, **MonitorNPMNodes.ps1** need to be changed as well.

```

48     switch ($MonitorItem) {
49         'router' {
50             $querySQL = "SELECT+NodeID,NodeCaption,AgentIP,Status,SysContact,SysLocation,"
51             $querySQL += "MachineType,LastBoot,City+FROM+NCH.Nodes+WHERE+NodeCaption+LIKE+'%VPN%' +OR+NodeCaption+LIKE+'%GW%' +OR+NodeCaption+LIKE+'%MPLS%'"
52             break
53         }
54         'switch' {
55             $querySQL = "SELECT+NodeID,NodeCaption,AgentIP,Status,SysContact,SysLocation,"
56             $querySQL += "MachineType,LastBoot,City+FROM+NCH.Nodes+WHERE+NodeCaption+LIKE+'%sw%'"
57             break
58         }
59         'coreswitch' {
60             $querySQL = "SELECT+NodeID,NodeCaption,AgentIP,Status,SysContact,SysLocation,"
61             $querySQL += "MachineType,LastBoot,City+FROM+NCH.Nodes+WHERE+NodeCaption+LIKE+'%cs%'"
62             break
63         }
64         'firewall' {
65             $querySQL = "SELECT+NodeID,NodeCaption,AgentIP,Status,SysContact,SysLocation,"

```

Usage

State view show the state of a particular item:

The screenshot shows the SolarWinds NPM interface. On the left is a navigation tree with categories like Aruba Controller, Core Switch, Firewall, etc. The main area displays a list of switches under the heading 'Switch (251)'. All listed switches have a green checkmark icon and the word 'Healthy' next to them. Below the list is a 'Detail View' for a selected switch. The details include:

Display Name	Switch
Full Path Name	Switch
NodeID	d418368c-a6eb-46bc-a01a-6bac3c2efb3e
NodeCaption	
NodeGroup	.
AgentIP	172.16.2.40
Community	
SysName	
SysDescr	Cisco IOS Software, C2960S Software (C2960S-UNIVERSALK9-M), Version 12.2(55)SE6, RELEASE SOFTWARE (fc1) Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2012 by Cisco Systems, Inc. Compiled Mon 23-Jul-12 13:45 by prod_rel_team
SysContact	
SysLocation	.
SystemOID	1.3.6.1.4.1.9.1.1208
Vendor	Cisco
MachineType	Cisco Catalyst 29xxStack
LastBoot	2016-07-22T03:30:00.0000000
OSImage	C2960S-UNIVERSALK9-M
OSVersion	12.2(55)SE6, RELEASE SOFTWARE (fc1)
ConfigTypes	Running,Startup
LoginStatus	Login OK
City	ATSAA

Diagram view gives detail about the particular item:

The screenshot shows the 'Diagram View' of a router. At the top, there is a diagram of a router icon with a green checkmark, labeled 'Router-ECS-Beyti3_VPN.s...'. Below the diagram is the 'Detail View' for the router, showing the following properties:

Display Name	
NodeID	62b343c0-4d1d-48c0-b39c-df24a6ff13c6
NodeCaption	
NodeGroup	.
AgentIP	10.15.234.1
Community	
SysName	
SysDescr	Cisco IOS Software, C800 Software (C800-UNIVERSALK9-M), Version 15.3(3)M5, RELEASE SOFTWARE (fc3) Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2015 by Cisco Systems, Inc. Compiled Wed 04-Feb-15 11:24 by prod_rel_team
SysContact	.
SysLocation	.

Setup Guide

The following steps are required to setup the SCOM integration for SolarWinds.

- 1) Create a user account in Active Directory and assign 'read only' permissions in SolarWinds' NCM. – As example the account name could be 'NPMQryUsr@nwtraders.msft'

The following permissions worked:

Edit "SIG\DELIN-NPMQryUsr" Account

Account Enabled	<input type="checkbox"/> Yes	Disabled accounts cannot log in.
Account Expires	<input type="text" value="Never"/>	This account cannot log in after this date. Enter "Never" for accounts that should not expire.
Disable Session Timeout	<input type="checkbox"/> No	If session timeout is disabled, this account will stay logged in indefinitely even if the browser is closed. You can still click logout to end your session securely.
Allow Administrator Rights	<input type="checkbox"/> No	Accounts with Admin rights can Add and Edit other Accounts and reset passwords.
Allow Node Management Rights	<input type="checkbox"/> No	Accounts with Node Management role can manage nodes.
Allow Map Management Rights	<input type="checkbox"/> No	Accounts with Map Management role can edit maps.
REPORTS		
Allow Report Management Rights	<input type="checkbox"/> No	Accounts with Report Management role can manage reports.
Report Limitation Category	<input type="text" value="Default"/>	New reports may be assigned to individual accounts by creating Report Limitation Categories in the web console Report Wizard. Legacy reports created in the Report Writer application may be access-limited by saving them into sub-directories of the Reports folder (default location C:\Program Files\SolarWinds\Orion\Reports) on your primary SolarWinds server.
ALERTS		
Allow Alert Management Rights	<input type="checkbox"/> No	Accounts with Alert Management role can manage alerts.
Alert Limitation Category	<input type="text" value="No Limitation"/>	The user account can only view or edit alerts in the selected Alert Limitation Category. Use the Properties page in the Alert editor to set the alert limitation category for each alert.
Allow Account to Customize Views	<input type="checkbox"/> No	Enable this to allow the Account to customize the Views. Any changes made to a View are seen by all Accounts with the same View.
Allow Account to Unmanage Objects	<input type="checkbox"/> No	Account will be allowed to unmanage objects from monitoring.
Allow Account to Disable Actions	<input type="checkbox"/> No	Account will be allowed to disable actions from active alerts.
Allow Account to Disable Alerts	<input type="checkbox"/> No	Account will be allowed to disable alerts.
Allow Account to Disable All Actions	<input type="checkbox"/> No	Account will be allowed to disable all actions from active alerts.
Allow Account to Clear Events, Acknowledge Alerts and Syslogs	<input type="checkbox"/> Yes	Enable this to allow the Account to Acknowledge/Clear Events from the Event Log, as well as Acknowledge Advanced Alerts from the Alerts view and Syslogs Messages from the Syslog view.

Allow Browser Integration	<input type="text" value="No"/>	Browser Integration allows you to utilize tools on the client browser machine with information provided by the web page. Links in most web pages will then be right-clickable, offering you a choice of options to perform on the device that the link represents. Community strings will not be sent to the browser unless "Allow Secure Data on Website" (in the System Manager) is enabled.
Alert Sound	<input type="text" value="No Alert Sounds"/>	Set this to a valid .wav file to enable audible alerts via the web browser.
Number of items in the breadcrumb list	<input type="text" value="50"/>	If this value is set to 0 - all items will be shown within breadcrumbs drop down list.
ACCOUNT LIMITATIONS		
There are no account limitations defined. To create account limitations, click the "Add Limitation" button.		
<input type="button" value="ADD LIMITATION"/>		
DEFAULT MENU BAR AND VIEWS		
Select the menu bar for this account. To view the contents of each menu bar, go to the Customize Menu Bars page.		
IP AddressesTab Menu Bar	<input type="text" value="IPAM_TabMenu"/>	
HomeTab Menu Bar	<input type="text" value="Default"/>	
NetworkTab Menu Bar	<input type="text" value="Network_TabMenu"/>	
ConfigsTab Menu Bar	<input type="text" value="NCM_TabMenu"/>	
Show Alerts Menu	<input type="text" value="Yes"/>	
Show Events Menu	<input type="text" value="Yes"/>	
Show Syslog Menu	<input type="text" value="Yes"/>	
Show Traps Menu	<input type="text" value="Yes"/>	
Show Message Center Menu	<input type="text" value="Yes"/>	
Show Reports Menu	<input type="text" value="Yes"/>	
Tabs ordering	<input type="text" value="IP Addresses"/> <input type="text" value="Home"/> <input type="text" value="Network"/> <input type="text" value="Configs"/>	
Home Page View	<input type="text" value="Orion Summary Home"/>	This view is displayed immediately after the user logs in.
Default Network Device	not selected	This Network Device is automatically selected when the Account logs in. This is only relevant if you have selected a Home Page for this Account that requires a Network Object to be selected (e.g. Node Details or Interface Details). <input type="button" value="EDIT"/>
Default Summary View	<input type="text" value="Orion Summary Home"/>	This is the default Summary view for this account. This view is displayed when the user clicks "Home" on the menu bar.

2) Select one Windows Server that is monitored by SCOM Agent. This machine will become the SolarWinds-Monitoring-Server. Set the following registry settings:

Windows Registry Editor Version 5.00

```
[HKEY_LOCAL_MACHINE\SOFTWARE\ABCIT\NPMMonitoringServer]
"NPMServerName"="servername.nwtraders.msft"
"NPMServerPort"="17778"
"NPMServerProtocoll"="https"
"NPMInformationServiceURL"="SolarWinds/InformationService/v3/Json/Query?"
"NPMQryUsr"="NPMQryUsr@nwtraders.msft"
"NPMQryPwd"="Moody13:50"
```

Management Pack Source:

URL for the Visual Studio – VSAE 2015 solution, fully customizable:

https://github.com/Juanito99/SolarWinds_NPM_OpsMgr/tree/master/ABC.Network.SolarWinds.NPM

URL for the Management Pack file that contains Icons:

https://github.com/Juanito99/SolarWinds_NPM_OpsMgr/blob/master/ABC.Network.SolarWinds.NPM/ABC.Network.SolarWinds.NPM/bin/Debug/ABC.Network.SolarWinds.NPM.mpb

URL for the Management Pack file that doesn't contain Icons, but can be customized:

https://github.com/Juanito99/SolarWinds_NPM_OpsMgr/blob/master/ABC.Network.SolarWinds.NPM/ABC.Network.SolarWinds.NPM/bin/Debug/ABC.Network.SolarWinds.NPM.xml

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