OpenNMS 101

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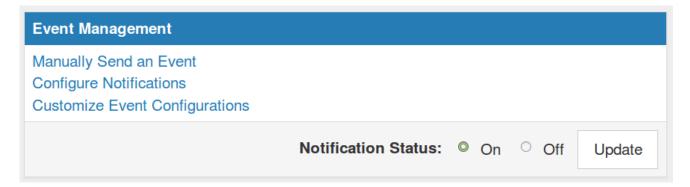http://www.opennms.org/Training

Module 4-1: Notifications

Notices Tell People What's Happening

- Notices bring events to others attention
- Events can trigger notices
  - The event happens
  - A notice is triggered
  - It "walks a path"
- Those along the path get notified
- Escalations can insure notices get attention.
- Not a replacement for a Trouble Ticketing system.

Built-In Notifications

- A number of notices are built-in: nodeDown, interfaceDown, nodeLostService, nodeAdded, interfaceDeleted and thresholds.
- Notices are off by default, and should be turned off during restarts.
- Turn Notices On.
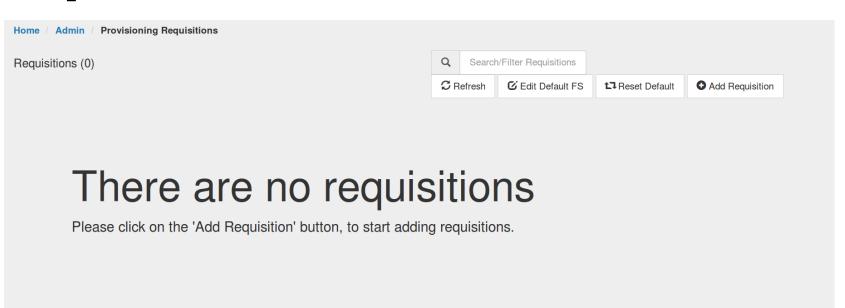
Time to Add a Node

- Provisioning, the act of adding Nodes, is a key part of OpenNMS
- There are two main methods:
  - Automated Discovery
  - Directed Discovery
- Directed Discovery is recommended, and can be augmented with a number of adapters and the ReST interface.

Create a Requisition

Navigate to Configure → Manage Provisioning Requisitions.

Add a Requisition

Add a new requisition called "Class".

Please enter the name for the new requisition   ✕

Class

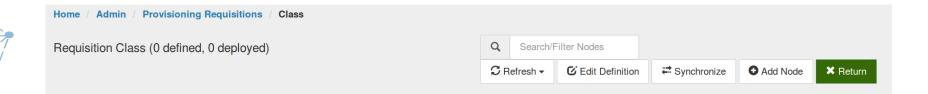Cancel   OK

Key Attributes of a Requisition

- The name of the requisition
- The last time it was modified
- The last time it was imported
- Nodes in the requisition and nodes in the DB
- Actions:

  - Edit the requisition
  - Edit detectors and policies
  - Clone detectors and policies
  - Synchronize

  - Refresh
  - Delete Nodes
  - Delete the Requisition

Edit the Requisition

Home / Admin / Provisioning Requisitions / Class

Requisition Class (0 defined, 0 deployed)

🔍 Search/Filter Nodes

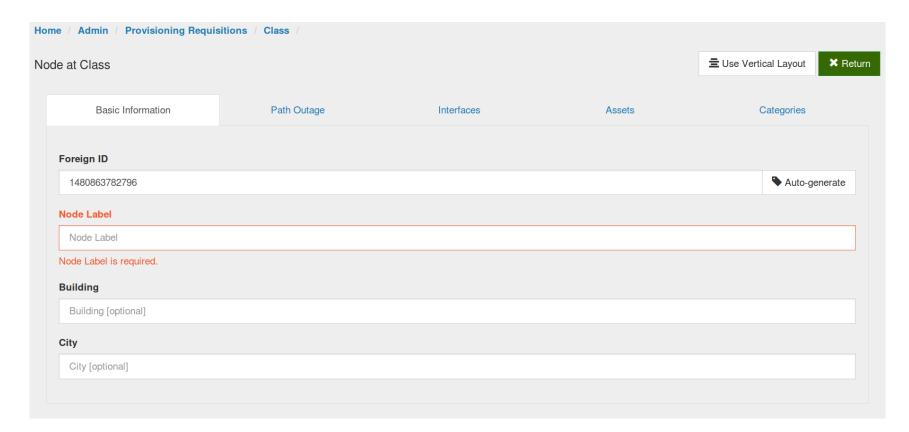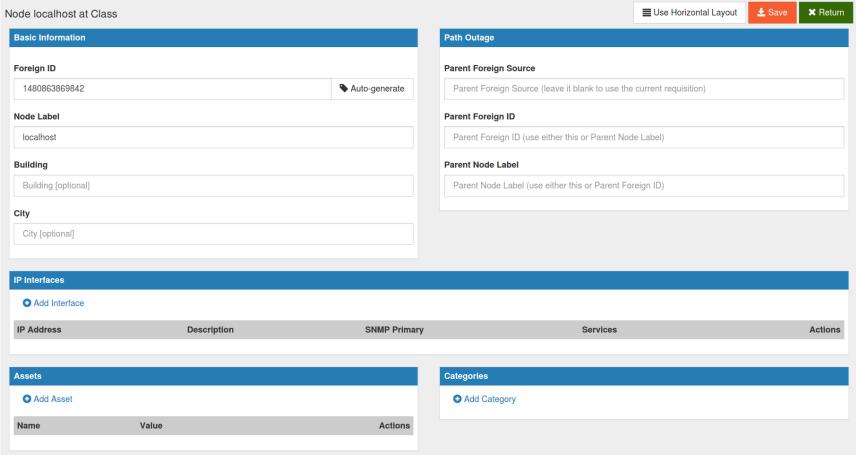↻ Refresh ▾   ☑ Edit Definition   ⇄ Synchronize   ⊕ Add Node   ✖ Return

There are no nodes on the Class

Please click on the 'Add' button, to start adding nodes into this requisition.

Add a Node – Horizontal Layout

Node at Class

☰ Use Vertical Layout   ✖ Return

| Basic Information | Path Outage | Interfaces | Assets | Categories |

Foreign ID

1480863782796   🏷 Auto-generate

Node Label

Node Label

Node Label is required.

Building

Building [optional]

City

City [optional]

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localhost Node – Vertical Layout

Node localhost at Class

≡ Use Horizontal Layout | ⬇ Save | ✖ Return

Basic Information

Foreign ID

| 1480863869842 | 🏷 Auto-generate |

Node Label

localhost

Building

Building [optional]

City

City [optional]

Path Outage

Parent Foreign Source

Parent Foreign Source (leave it blank to use the current requisition)

Parent Foreign ID

Parent Foreign ID (use either this or Parent Node Label)

Parent Node Label

Parent Node Label (use either this or Parent Foreign ID)

IP Interfaces

⊕ Add Interface

IP Address	Description	SNMP Primary	Services	Actions

Assets

⊕ Add Asset

Name	Value	Actions

Categories

⊕ Add Category

localhost Node – Add Interface

Interface

IP Address

127.0.0.1

Description

lo0

SNMP Primary

P

Services

✏️ ICMP | 🗑️

[Add Service] [Save] [Cancel]

Save and Synchronize

Click "Save" then "Return" and then
"Synchronize"

Node Label	Foreign ID	Building	City	IP Addresses	# Assets	# Categories	Has Parent	Actions
localhost	1480863869842	N/A	N/A	127.0.0.1 (P)	0	0	No	✏️ 🗑️

Then "Return" again

Requisition Name	Last Update	Last Import	Nodes Defined	Nodes in Database	Actions
Class	04-12-16 10:10:52	04-12-16 10:11:45	1	1	✏️ 🗐 ⤬ ⇄ ↻ ⊗ 🗑️

Voila! A Notice

Notifications

👤 You have 1 outstanding notice

👥 There are 1 outstanding notice

📅 On-Call Schedule

▼ ID	Event ID	Severity	Sent Time	Responder	Respond Time	Node	Interface	Service
☐ 1	48	Warning	Dec 5, 2016 12:30:20 AM			localhost ⊞ ⊟		
			OpenNMS has discovered a new node named localhost. Please be advised.					

35	Normal ⊕⊖	Dec 5, 2016 12:11:58 AM ◀ ▶	localhost ⊕⊖		
	uei.opennms.org/internal/provisiond/nodeScanCompleted ⊕⊖ Edit notifications for event				
	The Node with Id: 1; ForeignSource: Class; ForeignId:1480863869842 has completed.				
34	Warning ⊕⊖	Dec 5, 2016 12:11:51 AM ◀ ▶	localhost ⊕⊖	127.0.0.1 ⊕⊖	SMTP ⊕⊖
	uei.opennms.org/nodes/nodeGainedService ⊕⊖ Edit notifications for event				
	The SMTP service has been discovered on interface 127.0.0.1.				
33	Warning ⊕⊖	Dec 5, 2016 12:11:51 AM ◀ ▶	localhost ⊕⊖	127.0.0.1 ⊕⊖	SSH ⊕⊖
	uei.opennms.org/nodes/nodeGainedService ⊕⊖ Edit notifications for event				
	The SSH service has been discovered on interface 127.0.0.1.				
32	Warning ⊕⊖	Dec 5, 2016 12:11:50 AM ◀ ▶	localhost ⊕⊖	127.0.0.1 ⊕⊖	OpenNMS-JVM ⊕⊖
	uei.opennms.org/nodes/nodeGainedService ⊕⊖ Edit notifications for event				
	The OpenNMS-JVM service has been discovered on interface 127.0.0.1.				
31	Warning ⊕⊖	Dec 5, 2016 12:11:49 AM ◀ ▶	localhost ⊕⊖	127.0.0.1 ⊕⊖	ICMP ⊕⊖
	uei.opennms.org/nodes/nodeGainedService ⊕⊖ Edit notifications for event				
	The ICMP service has been discovered on interface 127.0.0.1.				
30	Warning ⊕⊖	Dec 5, 2016 12:11:49 AM ◀ ▶	localhost ⊕⊖		
	uei.opennms.org/nodes/nodeAdded ⊕⊖ Edit notifications for event				
	A new node (localhost) was discovered by OpenNMS.				
29	Warning ⊕⊖	Dec 5, 2016 12:11:49 AM ◀ ▶	localhost ⊕⊖	127.0.0.1 ⊕⊖	
	uei.opennms.org/nodes/nodeGainedInterface ⊕⊖ Edit notifications for event				
	Interface 127.0.0.1 has been associated with Node #1.				
28	Normal ⊕⊖	Dec 5, 2016 12:11:49 AM ◀ ▶			
	uei.opennms.org/internal/importer/importSuccessful ⊕⊖ Edit notifications for event				
	This event indicates the model-importer process has completed successfully from resource: file:/opt/opennms/etc/imports/pending/Class.xml.1480864252078				
27	Normal ⊕⊖	Dec 5, 2016 12:11:44 AM ◀ ▶			
	uei.opennms.org/internal/importer/importStarted ⊕⊖ Edit notifications for event				
	This event indicates the model-importer process has started from resource: file [/opt/opennms/etc/imports/pending/Class.xml.1480864252078]				
26	Normal ⊕⊖	Dec 5, 2016 12:11:44 AM ◀ ▶			
	uei.opennms.org/internal/importer/reloadImport ⊕⊖ Edit notifications for event				
	A request had been made to run the model-import process with the parms: url="file:/opt/opennms/etc/imports/pending/Class.xml.1480864252078" importRescanExisting="true".				

So, What Just Happened?

- Provisioning a node created a "nodeAdded" event
- Since notices were on globally, it was checked against the notification configuration
- There was a nodeAdded event notice, and it was on, so it was triggered.
- The event passed the filter, so it was sent
- It followed the Destination Path defined in the notice, with the configuration of the notice.

Let's Look at the Notice

Navigate to Configure → Configure Notifications → Configure Event Notifications

Event Notifications

Actions			Notification	Event	UEI
Edit	Delete	○ Off ◉ On	High Threshold	OpenNMS-defined threshold event: highThresholdExceeded	uei.opennms.org/threshold/highThresholdExceeded
Edit	Delete	○ Off ◉ On	High Threshold Rearmed	OpenNMS-defined threshold event: highThresholdRearmed	uei.opennms.org/threshold/highThresholdRearmed
Edit	Delete	○ Off ◉ On	Low Threshold	OpenNMS-defined threshold event: lowThresholdExceeded	uei.opennms.org/threshold/lowThresholdExceeded
Edit	Delete	○ Off ◉ On	Low Threshold Rearmed	OpenNMS-defined threshold event: lowThresholdRearmed	uei.opennms.org/threshold/lowThresholdRearmed
Edit	Delete	○ Off ◉ On	interfaceDeleted	OpenNMS-defined node event: interfaceDeleted	uei.opennms.org/nodes/interfaceDeleted
Edit	Delete	○ Off ◉ On	interfaceDown	OpenNMS-defined node event: interfaceDown	uei.opennms.org/nodes/interfaceDown
Edit	Delete	○ Off ◉ On	nodeAdded	OpenNMS-defined node event: nodeAdded	uei.opennms.org/nodes/nodeAdded
Edit	Delete	○ Off ◉ On	nodeDown	OpenNMS-defined node event: nodeDown	uei.opennms.org/nodes/nodeDown
Edit	Delete	○ Off ◉ On	nodeLostService	OpenNMS-defined node event: nodeLostService	uei.opennms.org/nodes/nodeLostService

nodeAdded Event Trigger

Editing notice: nodeAdded

Choose the event UEI that will trigger this notification.

Events

Filter displayed events...

OpenNMS-defined internal event: rtc unsubscribe
OpenNMS-defined internal event: scehduled outage configuration changed
OpenNMS-defined internal event: serviceManaged
OpenNMS-defined internal event: serviceUnmanaged
OpenNMS-defined internal event: suspect scan completed
OpenNMS-defined internal event: threshold configuration changed
OpenNMS-defined internal event: unknownServiceStatus
OpenNMS-defined linkd event: Data Link Failed
OpenNMS-defined linkd event: Data Link Restored
OpenNMS-defined linkd event: Data Link Unmanaged
OpenNMS-defined node event: DemandPoll
OpenNMS-defined node event: assetInfoChanged
OpenNMS-defined node event: componentResolved
OpenNMS-defined node event: deleteService
OpenNMS-defined node event: duplicateNodeDeleted
OpenNMS-defined node event: interfaceDeleted
OpenNMS-defined node event: interfaceDown
OpenNMS-defined node event: interfaceIPHostNameChanged
OpenNMS-defined node event: interfaceIndexChanged
OpenNMS-defined node event: interfaceReparented
OpenNMS-defined node event: interfaceUp
OpenNMS-defined node event: nodeAdded

Apply Filters (if any)

Current Rule:

IPADDR != '0.0.0.0'

Select each service you would like to filter on in conjunction with the TCP/IP address in the previous column. For example highlighting both HTTP and FTP will match TCP/IP addresses that support HTTP **OR** FTP.

Select each service you would like to do a NOT filter on in conjunction with the TCP/IP address. Highlighting multiple items ANDs them--for example, highlighting HTTP and FTP will match events (NOT on HTTP) AND (NOT on FTP).

Services:

ICMP
OpenNMS-JVM
SSH
SMTP

"NOT" Services:

ICMP
OpenNMS-JVM
SSH
SMTP

Define the Notice

Editing notice: nodeAdded

Choose the destination path and enter the information to send via the notification

Name: nodeAdded

Description:

Parameter: **Name:** **Value:**

Choose A Path: Email-Admin

Text Message: OpenNMS has discovered a new node named %parm[nodelabel]%. Please be advised.

Short Message: 111-%noticeid%

Email Subject: Notice #%noticeid%: %parm[nodelabel]% discovered.

Special Values: Can be used in both the text message and email subject:

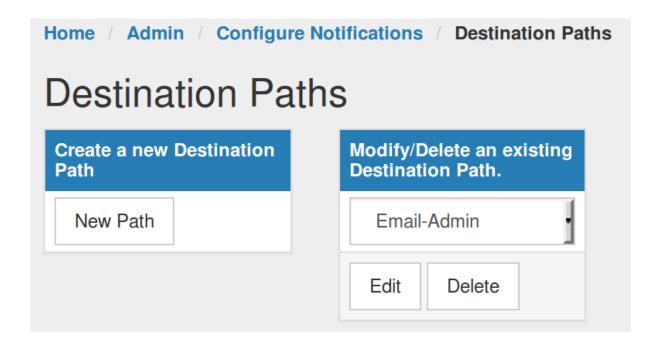|		
%noticeid% = Notification ID number	%time% = Time sent	%severity% = Event severity
%nodelabel% = May be IP address or empty	%interface% = IP address, may be empty	%service% = Service name, may be empty
%eventid% = Event ID, may be empty	%parm[a_parm_name]% = Value of a named event parameter	%parm[#N]% = Value of the event parameter at index N
%ifalias% = SNMP ifAlias of affected interface	%interfaceresolve% = Reverse DNS name of interface IP address	%operinstruct% = Operator instructions from event definition

A Word About the Database

Access the database with: `psql -U opennms opennms`

```
opennms=# \x
Expanded display is on.
opennms=# select * from events where eventid=30;
-[ RECORD 1 ]-----------------------------------------------------------------
eventid             | 30
eventuei            | uei.opennms.org/nodes/nodeAdded
nodeid              | 1
eventtime           | 2016-12-05 00:11:49.853+09
eventhost           |
eventsource         | Provisiond
ipaddr              |
eventsnmphost       |
serviceid           |
eventsnmp           |
eventparms          | nodelabel=localhost(string,text);nodelabelsource=U(string,text)
eventcreatetime     | 2016-12-05 00:11:49.95+09
eventdescr          | <p>A new node (localhost) was discovered by
                    |        OpenNMS.</p>
eventloggroup       |
eventlogmsg         | A new node (localhost) was discovered by OpenNMS.
eventseverity       | 4
```

Destination Paths

Navigate to Configure → Configure Notifications → Configure Destination Paths

Edit Email-Admin

Editing path: Email-Admin

Choose the piece of the path that you want to edit from below. When all editing is complete click the *Finish* button. No changes will be permanent until the *Finish* button has been clicked.

Name: Email-Admin

Initial Delay: 0s

Initial Targets

Admin

[Edit]

[Add Escalation]

[Finish] [Cancel]

Path Targets

Editing path: Email-Admin

Choose the users and groups to send the notice to.

Send to Selected Users:

Highlight each user that needs to receive the notice.

```
admin
```

Send to Selected Groups:

Highlight each group that needs to receive the notice. Each user in the group will receive the notice.

```
Admin
Remoting Users
```

Send to Selected Roles:

Highlight each role that needs to receive the notice. The users scheduled for the time that the notification comes in will receive the notice.

Send to Email Addresses:

Add any email addresses you want the notice to be sent to.

Add Address

Remove Address

Group Delay

Action to Take

javamail-configuration.properties

```
# This property defines system sender account.
#
# The default setting is root@[127.0.0.1]
#org.opennms.core.utils.fromAddress=root@[127.0.0.1]


#
# These properties define the SMTP Host.
#
#org.opennms.core.utils.mailHost=127.0.0.1
#org.opennms.core.utils.mailer=smtpsend
#org.opennms.core.utils.transport=smtp
#org.opennms.core.utils.debug=true
#org.opennms.core.utils.smtpport=25
#org.opennms.core.utils.smtpssl.enable=false
#org.opennms.core.utils.quitwait=true
#
# This property controls the use of the JMTA
# if it is true, mailHost will be ignored
org.opennms.core.utils.useJMTA=false
#
# These properties define the Mail authentication.
#
#org.opennms.core.utils.authenticate=false
#org.opennms.core.utils.authenticateUser=opennms
#org.opennms.core.utils.authenticatePassword=opennms
#org.opennms.core.utils.starttls.enable=false


#
# These properties configure message content
#
#org.opennms.core.utils.messageContentType=text/plain
#org.opennms.core.utils.charset=us-ascii
```
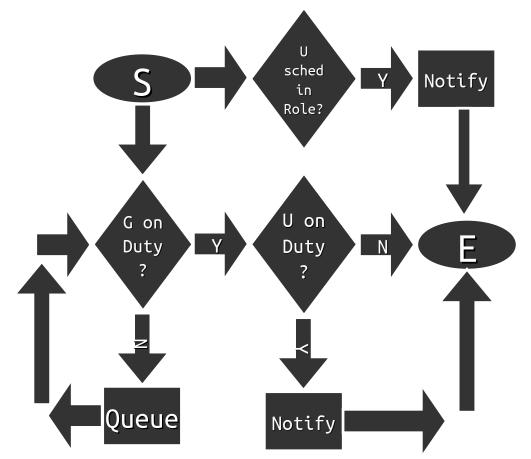
An Example Using GMail

```
org.opennms.core.utils.transport=smtps
org.opennms.core.utils.mailHost=smtp.gmail.com
org.opennms.core.utils.smtpport=465
org.opennms.core.utils.smtpssl.enable=true
org.opennms.core.utils.authenticate=true
org.opennms.core.utils.authenticateUser=myuser@gmail.com
org.opennms.core.utils.authenticatePassword=xxxxxxxx
org.opennms.core.utils.starttls.enable=true
org.opennms.core.utils.messageContentType=text/html
org.opennms.core.utils.charset=UTF-8
```

Duty Schedules

- Users can have duty schedules
  - No notices when not on duty
  - Multiple schedules can exist
- Groups can have duty schedules
  - Outstanding notices sent when back on duty
  - Overridden by users
- On-Call roles always get notices

Duty Schedule Flowchart

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Path Outages

- Path Outages can suppress notices for "downstream" nodes

- When a nodeDown event is received, the "parent" is pinged for availability. If that fails, the notice based on that nodeDown event is not sent.

- A default "parent" can be set in `opennms-server.xml`

```
<local-server server-name="nms1"
    defaultCriticalPathIp="192.168.0.1"
    defaultCriticalPathService="ICMP"
    defaultCriticalPathTimeout="1000"
    defaultCriticalPathRetries="1"
    verify-server="false">
</local-server>
```

Exercise #4-1: Create an New Notice

- Create a new "unhappiness" event
- Create a new On-Call role
- Create a new Destination Path
- Send to On-Call
- Send to Group
- Send to User
- Create a notice on the new event
- Generate the event and test

Get the new `Class.events.xml` File

- First, `cd /opt/opennms/etc/events`
- Then:

`wget -N https://www.opennms.org/Training/Config/Exercise%204/Class.events.xml`

```
<event>
    <uei>uei.opennms.org/class/unhappiness</uei>
    <event-label>OpenNMS defined event: The OpenNMS Class is not happy</event-label>
    <descr>
      &lt;p&gt;This event is sent when the OpenNMS Class is unhappy.&lt;/p&gt;
      &lt;ul&gt;
      &lt;li&gt;I can't get no&lt;/li&gt;
      &lt;li&gt;I can't get no&lt;/li&gt;
      &lt;li&gt;I can't get no&lt;/li&gt;
      &lt;li&gt;Satisfaction&lt;/li&gt;
      &lt;/ul&gt;
    </descr>
    <logmsg dest='logndisplay'>
      &lt;p&gt;OpenNMS Class is NOT Happy! &lt;/p&gt;
    </logmsg>
    <severity>Major</severity>
  </event>
```

Reload `eventd` and Send Event

```
$ send-event.pl
  uei.opennms.org/internal/reloadDaemonConfig -p 'daemonName Eventd'

$ send-event.pl uei.opennms.org/class/unhappiness
```
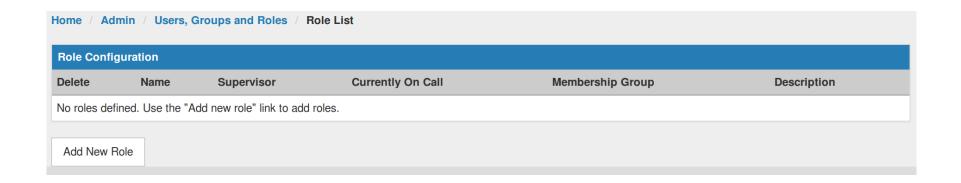

58	Major ⊞ ⊟	Dec 5, 2016 1:51:55 AM ◀ ▶
		uei.opennms.org/class/unhappiness ⊞ ⊟ Edit notifications for event
		OpenNMS Class is NOT Happy!

On-Call Rolls

Navigate to Configure → Configure Users, Groups and On-Call Roles → Configure Roles

Add New Role

Edit Role

Name	OnCall
Currently On Call	
Supervisor	admin
Membership Group	Admin
Description	Example On-Call Role for Class

Save   Cancel

On Call Role Calendar

View Role

Name	OnCall	Currently On Call	admin
Supervisor	admin	Membership Group	Admin
Description	Example On-Call Role for Class		

Value Details

Done

Role Schedule

‹‹‹ December 2016 ›››

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 ⊕ 00:00: unscheduled	2 ⊕ 00:00: unscheduled	3 ⊕ 00:00: unscheduled
4 ⊕ 00:00: unscheduled	5 ⊕ 00:00: unscheduled 09:00: tarus	6 ⊕ 00:00: tarus	7 ⊕ 00:00: tarus	8 ⊕ 00:00: tarus	9 ⊕ 00:00: tarus 15:00: unscheduled	10 ⊕ 00:00: unscheduled
11 ⊕ 00:00: unscheduled	12 ⊕ 00:00: unscheduled	13 ⊕ 00:00: unscheduled	14 ⊕ 00:00: unscheduled	15 ⊕ 00:00: unscheduled	16 ⊕ 00:00: unscheduled	17 ⊕ 00:00: unscheduled
18 ⊕ 00:00: unscheduled	19 ⊕ 00:00: unscheduled	20 ⊕ 00:00: unscheduled	21 ⊕ 00:00: unscheduled	22 ⊕ 00:00: unscheduled	23 ⊕ 00:00: unscheduled	24 ⊕ 00:00: unscheduled
25 ⊕ 00:00: unscheduled	26 ⊕ 00:00: unscheduled	27 ⊕ 00:00: unscheduled	28 ⊕ 00:00: unscheduled	29 ⊕ 00:00: unscheduled	30 ⊕ 00:00: unscheduled	31 ⊕ 00:00: unscheduled

Create a New Path: Path4Class

- Navigate to Configure → Configure Notification → Configure Destination Paths
- Add New Path

Name: Path4Class

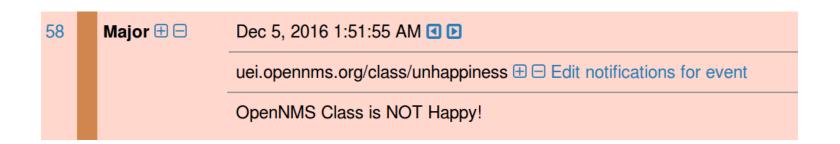**Initial Delay:** 0s

Initial Targets   Edit

Add Escalation

Escalations

- Escalations insure notices get seen
- Once a notice is acknowledged, escalations stop
- The initial delay provides for "auto-acknowledged" notices to be cleared

Initial Delay: 0s

Initial Targets Edit

OnCall

Add Escalation

Escalation #1 Edit
Delay:
1m Remove

Admin

Add Escalation

Escalation #2 Edit
Delay:
1m Remove

tarus

Add Escalation

Create a New Notice

- Go back and find the new event
- Select "Edit notifications for event"
- "Skip results validation" on the next screen

New Notice

- **Name:** A unique name for the notice
- **Description:** describe the notice
- **Parameter:** an optional parameter match
- **Path:** required destination path
- **Text Message:** information included with the notice
- **Short Message:** information designed for SMS
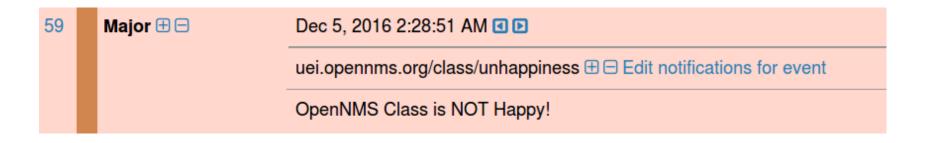- **Email Subject:** subject line of e-mail

Choose the destination path and enter the information to send via the notification

Name: Class Is Unhappy Example

Description: This notice gets sent when and "unhappy" event arrives

Parameter: Name: | Value:

Choose A Path: Path4Class

Text Message: The class is unhappy. Perhaps they would be happier updating their Google + page.

Short Message: %noticeid%: The Class is Unhappy

Email Subject: Notice #%noticeid%: The Class is Unhappy

Special Values: Can be used in both the text message and email subject:

%noticeid% = Notification ID number	%time% = Time sent	%severity% = Event severity
%nodelabel% = May be IP address or empty	%interface% = IP address, may be empty	%service% = Service name, may be empty
%eventid% = Event ID, may be empty	%parm[a_parm_name]% = Value of a named event parameter	%parm[#N]% = Value of the event parameter at index N
%ifalias% = SNMP ifAlias of affected interface	%interfaceresolve% = Reverse DNS name of interface IP address	%operinstruct% = Operator instructions from event definition

Finish

Send the Event

Send the event and watch what happens:

```
send-event.pl uei.opennms.org/class/unhappiness
```

View Notice and Escalations

Notice 2 from Event 59

Notification Time	Dec 5, 2016 2:28:52 AM	Time Replied		Responder	
Node		Interface		Service	

Numeric Message

2: The Class is Unhappy

Text Message

The class is unhappy. Perhaps they would be happier updating their Google + page.

Users Notified

Sent To	Sent At	Media	Contact Info
admin	Dec 5, 2016 2:28:53 AM	javaEmail	
tarus	Dec 5, 2016 2:29:53 AM	javaEmail	
admin	Dec 5, 2016 2:29:53 AM	javaEmail	
tarus	Dec 5, 2016 2:30:53 AM	javaEmail	