

Nagios XI – Introduction to Event Handlers

Purpose

This document describes how to use event handlers in Nagios XI to take predefined actions when the hosts or services you are monitoring change state. Event handlers are used to automate processes taken when there is a state change for a specific host or service. This is useful because it reduces the amount of manual work when something changes in your environment. This document also includes some tips for advanced configurations and scripts.

Note: If you are using Nagios XI 2024, please refer to the [updated document](#).

Prerequisites

This document assumes that Nagios XI is installed and a few hosts and services are setup. Additionally, knowledge of the **Core Config Manager (CCM)** and an understanding of the general Nagios XI workflow will help as well.

What Is An Event Handler?

Event handlers are optional system commands (scripts or executables) that are run when a host or service state change occurs. These commands include, but are not limited to, restarting services, parsing logs, checking other host or service states, making database calls, etc. The possibilities are near limitless.

Essentially, through event handlers, Nagios XI is capable of running any operation that can be performed from the command line with the added ability of utilizing macros passed by Nagios XI.

When Are Event Handlers Executed In Nagios XI?

Event handlers are called whenever a state change occurs. This includes HARD and SOFT state types, as well as OK, WARNING, CRITICAL, and UNKNOWN states. The logic for what actions to take, if any, when a state change occurs is performed by the script or executable that is called by Nagios XI at the moment of the state change. The script can parse these states through macros passed to it by the event handler.

For example, an event handler can be created that restarts a service if and only if that service has entered a HARD CRITICAL state. This is possible passing the script the `$_SERVICESTATE$` (OK, WARNING, UNKNOWN, CRITICAL) macro and the `$_SERVICESTATETYPE$` (HARD, SOFT) macro. It is the responsibility of the person writing the script to make sure the script logic handles the passed macros appropriately.

Nagios XI – Introduction to Event Handlers

What Type Of Macros Can Be Passed By Event Handlers?

Any of the standard Nagios macros can be passed through an Event Handler to a script or binary. Usually the macros are relative to the to the Event Handler's service or host, though you can pass macros to your script that reference other hosts and services. For reference, a list of Nagios macros can be found at:

<https://assets.nagios.com/downloads/nagioscore/docs/nagioscore/4/en/macrolist.html>

Minimum Requirements For A Working Event Handler

Event handlers have a few different parts:

- The check command itself within Nagios XI
- The event handler script called from the check command in Nagios XI

More complex event handlers can also pass macros to the event handler script and reference remote scripts.

Getting Started – Set Up Your First Event Handler In Nagios XI

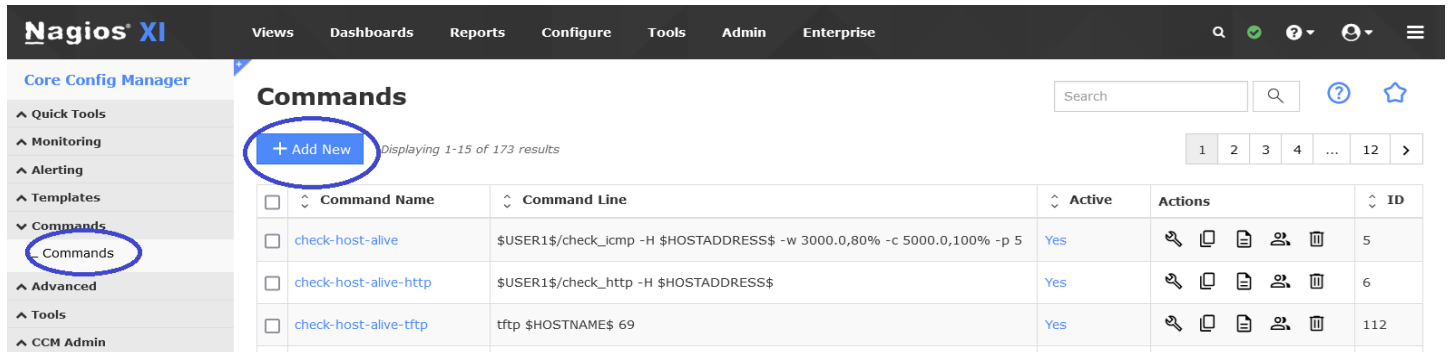
To keep things simple, bash scripts will be used for this document, even though events can run binaries, perl, python, php, and bash scripts among others. The first event handler will be a very simple bash script. It will essentially write host information to a local text file when the host state changes. We will add functionality to this script as the document progresses. This example will follow these general steps:

1. [Create a command in XI for the event handler](#)
2. [Create a dummy host for testing](#)
3. [Create a script in the libexec directory to be run by the handler](#)
4. [Test the event handler](#)
5. [Add advanced features and macros](#)
















Nagios XI – Introduction to Event Handlers

Create A Command In Nagios XI For The Event Handler

In the Nagios XI web interface Navigate to **Configure > Core Config Manager > Commands**.



The screenshot shows the Nagios XI web interface. The top navigation bar includes 'Views', 'Dashboards', 'Reports', 'Configure', 'Tools', 'Admin', and 'Enterprise'. The left sidebar shows 'Core Config Manager' with sub-items: 'Quick Tools', 'Monitoring', 'Alerting', 'Templates', 'Commands', 'Advanced', 'Tools', and 'CCM Admin'. The 'Commands' page is displayed, showing a '+ Add New' button circled in blue. Below the button is a table of existing commands.

<input type="checkbox"/>	Command Name	Command Line	Active	Actions	ID
<input type="checkbox"/>	check-host-alive	\$USER1\$/check_icmp -H \$HOSTADDRESS\$ -w 3000.0,80% -c 5000.0,100% -p 5	Yes	    	5
<input type="checkbox"/>	check-host-alive-http	\$USER1\$/check_http -H \$HOSTADDRESS\$	Yes	    	6
<input type="checkbox"/>	check-host-alive-tftp	tftp \$HOSTNAME\$ 69	Yes	    	112


Click the **Add New** button and you will need to provide the following details:

- **Command Name:** event_handler_test
- **Command Line:** \$USER1\$/event_handler_test.sh
- **Command Type:** misc command

Make sure the **Active** box is checked.

Nagios XI – Introduction to Event Handlers

The final command definition should resemble the screenshot below.

Command Management 


Command Name *


Example: check_example

Command Line *

Example: \$USER1\$/check_example -H \$HOSTADDRESS\$ -P \$ARG1\$ \$ARG2\$

Command Type:

Active 

Available Plugins
 

Click **Save** when finished.

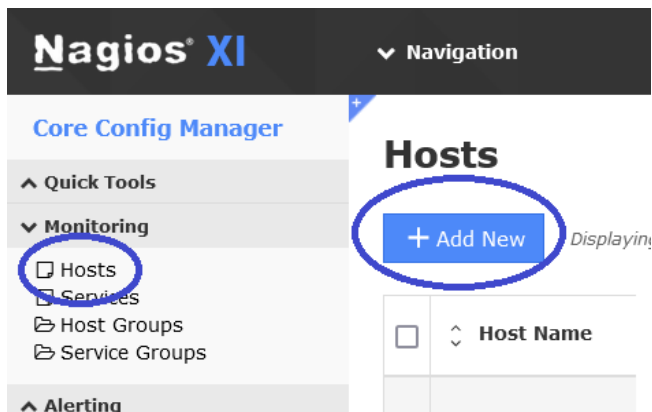
`$USER1$` references the directory `/usr/local/nagios/libexec` from the `resource.cfg` file. This is the default path for plugins and scripts in Nagios XI. We will create a script later on to be used by this command, the name of the script will be `event_handler_test.sh`.

Nagios XI – Introduction to Event Handlers

Create A Dummy Host

In CCM navigate to **Monitoring > Hosts**.

Click the **Add New** button and you will need to provide the following details:



Common Settings tab

Host Name:

event_handler_test

Address: 127.0.0.1

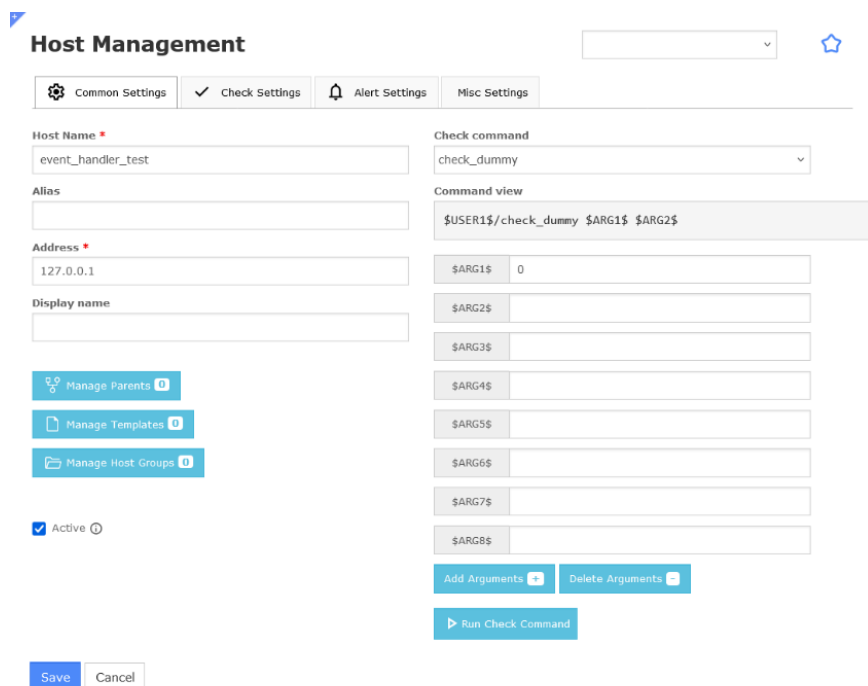
Check command: check_dummy

\$ARG1\$: 0

This forces the check_dummy command to always return 0 (UP)

Clicking **Run Check Command** should output OK. This means you have set up the command correctly.

Check the **Active** checkbox.



Nagios XI – Introduction to Event Handlers

Check Settings tab

Check interval: 5

Retry interval: 1

Max check attempts: 5

Check period: xi_timeperiod_24x7

Event handler: event_handler_test

Event handler enabled: **On**

Host Management

Common Settings Check Settings Alert Settings Misc Settings

Initial state

Obsess over host

Check interval

Event handler

Retry interval

Event handler enabled

Max check attempts *

Low flap threshold
 %

Active checks enabled

High flap threshold
 %

Passive checks enabled

Flap detection enabled

Check period *

Flap detection options

Freshness threshold

Retain status information

Check freshness

Retain non-status information

Process perf data

Nagios XI – Introduction to Event Handlers

Alert Settings tab

Notification period: xi_timeperiod_24x7

Note: You can define the object's directives locally, on the host level (i.e. notification_period) or inherit the values from a host template (i.e. notification_interval, notifications_enabled, etc.) as it is shown in the picture.

Click the **Save** button to create the host.

The screenshot shows the 'Host Management' interface in Nagios XI. At the top, there's a search bar and a star icon. Below that, there are tabs for 'Common Settings', 'Check Settings', 'Alert Settings', and 'Misc Settings'. Under 'Alert Settings', there are two buttons: 'Manage Contacts' and 'Manage Contact Groups'. The main configuration area includes: 'Notification period' set to 'xi_timeperiod_24x7'; 'Notification options' with buttons for 'Down', 'Unreachable', 'Recovery', 'Flapping', and 'Scheduled Downtime'; 'Notification interval' and 'First notification delay' input fields with 'min' units; 'Notification enabled' with buttons for 'On', 'Off', 'Skip', and 'Null'; and 'Stalking options' with buttons for 'Down', 'Up', 'Unreachable', 'Notification', and 'None'. At the bottom, there are 'Save' and 'Cancel' buttons.

Click the **Apply Configuration** button to apply the new configuration so the new event_handler_test host will become active.

Nagios XI – Introduction to Event Handlers

Create A Script To Be Run By The Handler

Now that the Nagios XI event handler and host object are configured, we need to create a script to be run by the handler. The first iteration of the script will just output some very basic information to a text file in the `/tmp/` directory. In the proceeding sections of this document we will add functionality and complexities to the script and command of the handler (mostly macros and script logic). Before we get to the fun stuff, lets make sure the basic script works.

In all of the following steps you will be instructed to create and update the script. This will be done using the **vi** text editor. When using the *vi* editor:

To make changes press `i` on the keyboard first to enter insert mode

Make the required changes

Press **Esc** on the keyboard to exit insert mode

Type `:wq` to save the changes and quit the *vi* editor

Open up a terminal session to your Nagios XI server and log in as the root user and execute the following commands:

```
cd /usr/local/nagios/libexec
touch event_handler_test.sh
chmod +x event_handler_test.sh
```

Now type the following command to edit the file with the *vi* editor:

```
vi event_handler_test.sh
```

Paste the following into the file:

```
#!/bin/bash
DATE=$(date)
echo "The host has changed state at $DATE" > /tmp/hostinfo.txt
```

Save the changes.

Nagios XI – Introduction to Event Handlers

Test The Event Handler

Now that everything is in place, we need to force the dummy host into a down state. By going into a down state the event handler will be triggered to run. This will create the file `/tmp/hostinfo.txt` as this is what the `event_handler_test.sh` script will do. Putting the host into a down state will be done by submitting a passive check with the **Check Result** of **DOWN**.

In the Nagios XI web interface navigate to **Home > Host Status**.

Click the host **event_handler_test**. Keep in mind that the host you added may already be mapped to another host, in this case localhost.

Nagios XI Host Status

All hosts

Up	Down	Unreachable	Pending
62	3	0	1
Unhandled		Problems	All
1		1	9

Last Updated: 2024-12-03 03:38:40

Ok	Warning	Unknown	Critical	Pending
62	15	3	3	7
Unhandled		Problems	All	
33		33	102	

Last Updated: 2024-12-03 03:38:40

Showing 1-1 of 1 total matches for 'localhost'

Page 1 of 1 15 Per Page Go

Host	Status	Duration	Attempt	Last Check	Status Information
localhost	Up	4d 23h 50m 12s	1/10	2024-12-03 03:36:04	OK - 127.0.0.1: rta 0.017ms lost 0%

Nagios XI – Introduction to Event Handlers

Click the **Advanced** tab and under the Commands table click **Submit passive check result**.

Host Status Detail

localhost
Hostgroups: linux-servers

Advanced

Advanced Status Details

Host State:	● Up
Duration:	4d 23h 51m 42s
State Type:	Hard
Current Check:	1 of 10
Last Check:	2024-12-03 03:36:04
Next Check:	2024-12-03 03:41:04
Last State Change:	2024-11-28 03:48:28
Last Notification:	Never
Check Type:	Active
Check Latency:	0.002 seconds
Execution Time:	0.006 seconds
State Change:	0%
Performance Data:	rta=0.017ms;3000.000;5000.000;0; pl=0%;80;100;0;100 rtmax=0.045ms;;; rtmin=0.009ms;;;

Host Attributes

Attribute	State	Action
Active Checks	●	✕
Passive Checks	●	✕
Notifications	●	✕
Flap Detection	●	✕
Event Handler	●	✕
Performance Data	●	
Obsession	●	✕

Commands

- Add comment
- Schedule downtime
- Schedule downtime for all services on this host
- Force immediate check for host and all services
- Submit passive check result**
- Send custom notification
- Delay next notification

More Options

- [View in Nagios Core](#)

The click **Submit passive check result** will appear:

- Check Result: **DOWN**
- Check Output: **TEST**

Click **Submit**.

Submit Passive Check Result

Host Name * localhost

Check Result * DOWN

Check Output * TEST

Performance Data

Submit Cancel

Nagios XI – Introduction to Event Handlers

You should see the host change to a down state after a moment or two. Now lets check to see if the `/tmp/hostinfo.txt` file was created by running the following command from the Nagios XI server terminal session:

```
cat /tmp/hostinfo.txt
```

You should see output resembling:

```
The host has changed state at Tue Nov 29 15:10:01 CST 2024
```

Congratulations, you have created your first event handler. What this demonstrated is that Nagios executed the event handler when the host state changed.

These first sections really just scratch the surface, but it is important to understand all the parts of the event handler system before you attempt to implement some of the advanced features like passing macros and using them in script logic to perform tasks such as restarting services or executing other custom scripts. You can even use event handlers to pass commands back into Nagios through the command pipe. If you are unsure about the previous steps, take a moment to re-read them as things will get much more complicated from this point on.

Continue to the next section of the document to learn about the more advanced features of event handlers.

Nagios XI – Introduction to Event Handlers

Advanced Features And Macros

Now that you have a fully functional event handler setup, you probably want to do something with it. The script we created in the previous steps does not really do much. The next step will show how macros work, as they are key to fully realizing the potential of event handlers. There are a number of macros that can be passed to the event handler script in Nagios, though they are object specific so some macros only work when passed from a service object, others from a host object, and yet others can be passed from both.

The event handler command definition needs to be edited to define which macros will be passed to the event handler script. In the next step we will add a few macros to the `event_handler_test` command and then add some logic to our script to print those macros to the `/tmp/hostinfo.txt` file. The macro list located on the Nagios core documentation website has a fairly comprehensive listing of all the Nagios macros available and which objects can pass them:

<https://assets.nagios.com/downloads/nagioscore/docs/nagioscore/4/en/macrolist.html>

Adding Macros

One thing to note is that you can only pass macros which are supported for your object type, and as we are working with a host check, we are limited to the host object macros. The most important macros that you will in all probability want to include in most, if not all your (host) event scripts, are:

```
$HOSTNAME$  
$HOSTSTATE$  
$HOSTSTATETYPE$  
$HOSTOUTPUT$
```

In Nagios XI navigate to **Configure > Core Config Manager > Commands** and edit the `event_handler_test` command.

Append the above four macros, in order, to the **Command Line**, separating them with spaces

Command Name *

Example: `check_example`

Command Line *

Example: `$USER1$/check_example -H $HOSTADDRESS$ -P $ARG1$ $ARG2$`

Nagios XI – Introduction to Event Handlers

When finished, **Save** and **Apply Configuration**.

Now the script needs updating. Return to the terminal session on the Nagios XI server and type the following command to edit the file with the vi editor:

```
vi event_handler_test.sh
```

Paste the following into the file:

```
#!/bin/bash
HOSTNAME=$1
HOSTSTATE=$2
HOSTSTATETYPE=$3
HOSTOUTPUT=$4 DATE=$(date) echo "The host $HOSTNAME has changed to a
$HOSTSTATETYPE $HOSTSTATE state at $DATE with the error: $HOSTOUTPUT" >
/tmp/hostinfo.txt
```

NOTE: The last two lines are one long line, they are just wrapped in this documentation across two lines.

Save the changes.

Bash will receive the macros as arguments, enumerating them in order, giving them the names \$1, \$2,\$3 and \$4. To make it easier to understand how they work in the script we will assign these to variables, using the original macro names.

As you can see from the changes to the script, a variable is initially defined as a word (HOSTNAME), but it referenced by the echo command with a \$ sign (\$HOSTNAME). You can see from the echo line how we are using the variables to output the data from the variables to the /tmp/hostinfo.txt file.

Force the host into a down state once again by submitting a passive check result (as per the steps in part [Test The Event Handler](#)). After you submit the passive check, wait a moment or two, and then check the contents of the /tmp/hostinfo.txt file:

```
cat /tmp/hostinfo.txt
```

Once again, you should see output resembling:

```
The host event_handler_test has changed to a HARD DOWN state at Tue Nov 29
16:48:57 AEDT 2016 with the error: TEST
```

If your output resembles the line above, congratulations! You can see the data from the macros are in bold to highlight that they were used. You now have a working event handler **with macros**. However,

Nagios XI – Introduction to Event Handlers

we are not finished yet, as this text file still does not do very much. We will need to add some logic to the script to check for certain strings in the macros and perform a task or two.

Adding Logic And Performing Tasks

The first bits of logic that most event handlers need is to separate out the different states of the host or service object. Additionally checking for a HARD or SOFT state is usually a good idea as most handlers are only needed when an object is in a HARD problem state. Most of the time your event handler will fire off an additional script that actually performs the tasks you are concerned about, sometimes passing additional arguments to that script.

On the next page is an updated version of the script that does the following:

- Assigns the received macro values to variables
- Assigns the current date to a variable
- Uses an **if** operator to determine if this is a SOFT state, if it is then the script exits as we don't want to do anything when it's in a SOFT state
- Uses a **case** statement to execute different commands depending if the `$HOSTSTATE` is UP, DOWN, or UNREACHABLE
- In each difference case statement, you can see it is writing to a different file on the disk (`UP.txt`, `DOWN.txt`, or `UNREACHABLE.txt`). While this functionality is basic, it demonstrates the ability to perform different actions depending on the value of a macro that was received from Nagios.

Nagios XI – Introduction to Event Handlers

```
#!/bin/bash
HOSTNAME=$1
HOSTSTATE=$2
HOSTSTATETYPE=$3
HOSTOUTPUT=$4
DATE=$(date)
if [ $HOSTSTATETYPE == 'SOFT' ] then
exit 0
fi
case "$HOSTSTATE" in
UP)
echo "The host $HOSTNAME changed to a $HOSTSTATE state @ $DATE" >
/tmp/UP.txt
;;
DOWN)
echo "The host $HOSTNAME changed to a $HOSTSTATE state @ $DATE" > /tmp/DOWN.txt
;;
UNREACHABLE)
echo "The host $HOSTNAME changed to a $HOSTSTATE state @ $DATE" >
/tmp/UNREACHABLE.txt
;;
esac
```

After making those changes try submitting some more passive check results so you can see how it is writing to different files on the disk.

Event Handler Script Use Case Example

Most often, event handlers just need to run one specific command for a certain state. A good example of this is to restart a service on a Windows or Linux machine if the service is in a critical state. Full working examples can be found in the following documentation:

- [Restarting Windows Services With NCPA](#)
- [Restarting Linux Services With NCPA](#)
- [Restarting Windows Services With NRPE](#)
- [Restarting Linux Services With NRPE](#)

Nagios XI – Introduction to Event Handlers

Running an External Script While Passing Macros

The other most common use case is to use the event handler to pass macros to another external script. This can include scripts that restart certain services, other Nagios plugin scripts (including `check_nrpe` or `check_by_ssh`), or even scripts to communicate to external ticketing systems. Event handlers are only limited by your imagination.

The event handler script below will assume that we want to pass macros to an external script that will prepare alerts for a ticketing system into the syntax that the ticketing system understands. The logic in the below script will only pass problems onto the ticketing system that are **CRITICAL**. Included in the arguments are a few more obscure macros, like `$$$SERVICEPROBLEMID$`, which is a unique number given every problem in Nagios. This is how our ticketing system will track the issues that are reported from Nagios. Like the previous example, this example will be a service event handler. If one wants to open tickets for host problem, another handler will have to be created, or the following script's logic extended.

Emailing to a Ticketing System:

Many Nagios XI administrators already maintain a separate ticketing system for managing technicians for outages. Integrating Nagios XI alerts with these systems usually is done through specially crafted emails. This can be done with an event handler script that sends a custom formatted email with the CLI email utility, "sendmail". Those familiar with core will recognize the general format of sendmail command as it is similar to the core notification handlers. The following event handler and script are just a mock up and you will most definitely need to edit the format of the email for compatibility with your ticketing system.

Ticketing System Service Event Handler command line:

```
$$$USER1$$$event_handler_service_ticket.sh "$$HOSTNAME$" "$$SERVICEDESC$"
$$$SERVICESTATE$ $$$SERVICESTATETYPE$ $$$SERVICEPROBLEMID$
```


Nagios XI – Introduction to Event Handlers

The script `event_handler_ticket.sh` is as follows:

```
#!/bin/bash
DATE=$(date)
HOSTNAME="$1"
SERVICEDESC="$2"
SERVICESTATE=$3
SERVICESTATETYPE=$4
# SERVICEPROBLEMID and HOSTPROBLEMID are unique and are by far the best way
to track issues detected by Nagios SERVICEPROBLEMID=$5
# Set your ticketing system's email below
EMAIL="email@domain.tld"
# The message below is a mock up. You will need to edit the format to one
acceptable to your ticketing system
if [[ "$SERVICESTATETYPE" == "HARD" && "$SERVICESTATE" == "CRITICAL" ]];
then
/usr/bin/printf "%b" "***** Nagios Monitor XI Alert *****\n\nHost:
$HOSTNAME\nState: $SERVICESTATE\n\nDate/Time: $DATE\n" | /bin/mail -s "OPEN
TICKET: $SERVICEPROBLEMID - $SERVICEDESC on $HOSTNAME is $SERVICESTATE "
$EMAIL
exit 0
else
exit 0
fi
```

This script only submits tickets when the service in question is in a HARD, DOWN state. The portion of the `printf` command from `"%b"` to the pipe is the body of the email, while the string from `"/bin/mail -s"` to the `$EMAIL` macro is the subject. Most ticketing systems will look only at the subject of an incoming email to open a ticket, though some can also parse the body of the message.

Nagios XI – Introduction to Event Handlers

Other Notes, Options, And Additional Resources

The event handler system in Nagios XI is robust, extensible, and highly flexible. There are a few, more obscure and often overlooked options in Nagios XI that can be used to extend or alter the behavior of event handlers.

Is Volatile check attribute

This option is located at the bottom of the **Check Settings** tab for any service management page in **CCM**. Enabling this option will force Nagios XI to treat every check for the respective object as a state change. This will essentially run the event handler every time the object is checked, whether it is a scheduled active check, or a received passive check and it is state agnostic (the event handler will always run, no matter the object state). With this option enabled for an object with an event handler, Nagios XI can actually be used as a scheduler for routine maintenance or more specific tasks. More information can be found in the following link:

<https://assets.nagios.com/downloads/nagioscore/docs/nagioscore/4/en/volatileservices.html>

Free variables

Sometimes the vanilla object macros are not enough for your scripting and event handler needs. Nagios XI includes the option to specify object or template specific variable to be used as macros. They are found on the **Misc Settings** tab for the object. Free variables must be prefixed by an underscore to avoid naming collision issues with the vanilla variables/macros. You can use these variables by treating them as macros to be passed to your event handler by referencing them as `$_YOURVARIABLE$` once defined on the object. See the following links for more information:

[Using The Nagios XI Core Config Manager For Host Management](#)

[Using the Nagios XI Core Config Manager For Service Management](#)

[Custom Object Variables](#)

On-Demand Macros (Cross-Object)

Complex event handler scripts occasionally need access to macros from other objects. The use cases include fail-over scenarios, elastic clusters, load-balancing, etc. Usually macros only reference variables that are values of the object in question. Occasionally, a developer will want to check the values of other object macros. For example, in a fail-over scenario, your event handler may want to check the status of a particular service on a different host other than the host that triggered the event.

If you would like to reference values for another host or service in an event handler, you can use what are called "on-demand" macros. On-demand macros look like normal macros, except for the fact that they contain an identifier for the host or service from which they should get their value.

Nagios XI – Introduction to Event Handlers

Here's the basic format for on-demand macros:

```
$HOSTMACRONAME :host_name$  
$SERVICEMACRONAME :host_name:service_description$
```

Note that the macro name is separated from the host or service identifier by a colon (:). For on-demand service macros, the service identifier consists of both a host name and a service description - these are separated by a colon (:) as well. Examples of on-demand host and service macros follow:

```
HOSTDOWNTIME :myhost$  
$SERVICESTATEID:novellserver:DS Database$  
$SERVICESTATEID::CPU Load$
```

More information about on-demand macros can be found at the following link:

<https://assets.nagios.com/downloads/nagioscore/docs/nagioscore/4/en/macros.html>

BASH Scripting Tutorials

Although any programming/scripting language can be used, bash scripts are some of the easiest to create for simple tasks, do not require recompiling, but can still accomplish complex tasks if necessary. Throughout this document, all examples used were done in bash. If you are new to scripting, bash is a good place to start, especially as this document includes a number of script templates for ease of use with event handlers in Nagios XI. If you wish to learn more about bash scripting, you can put your favorite search engine to good use or check out the following links below:

<http://www.tldp.org/LDP/Bash-Beginners-Guide/html/>

<https://help.ubuntu.com/community/Beginners/BashScripting>

Finishing Up

This completes the documentation on how to use event handlers in Nagios XI to take predefined actions when the hosts or services you are monitoring change state.

If you have additional questions or other support-related questions, please visit us at our Nagios Support Forum, Nagios Knowledge Base, or Nagios Library:

[Visit Nagios Support Forum](#)

[Visit Nagios Knowledge Base](#)

[Visit Nagios Library](#)