Automating OpenCart Configuration

Being modern developers, we wouldn't write code before writing a test.

What kind of checks/tests would make sense for infrastructure?

Monitoring Driven Development

What are some monitoring tools?

Nagios

- Tool for monitoring infrastructure
- Flexible notification system for alerting
- Popular in many IT Ops groups
- Your organisation likely has it already

N.A.G.I.O.S. is a recursive acronym:

"Nagios Ain't Gonna Insist On Sainthood"

Nagios - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://192.168.130.223/nagios/

Linux-Fibel NLPOS9 Bugzilla Novell Linux Service... Novell: Downloads NLPOS9 InnerWeb

Nagios

Nagios

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	Monitor					
webprod03.	Check Users	OK	01-26-2007 14:58:59	0d 4h 53m 23s	1/4	USERS OK - 1 users currently logged in
	Current Load	OK	01-26-2007 14:59:54	0d 4h 53m 23s	1/4	OK - load average: 0.21, 0.08, 0.05
	Memory Usage	OK	01-26-2007 14:55:29	0d 4h 53m 23s	1/4	OK: Memory Usage 56% - Total: 511 MB, Used: 287 MB, Free: 224 MB
	PING	OK	01-26-2007 14:56:14	0d 4h 50m 23s	1/4	PING OK - Packet loss = 0%, RTA = 0.16 ms
	Root Partition	OK	01-26-2007 14:57:09	0d 4h 50m 33s	1/4	DISK OK [243816 kB (5%) free on /dev/sda2]
	SWAP Usage	OK	01-26-2007 14:57:44	0d 4h 50m 33s	1/4	Swap ok - (null) 0% (0 out of 16386)
	Total Processes	OK	01-26-2007 14:58:29	0d 4h 50m 33s	1/4	OK - 95 processes running
	Xen Virtual Machine Monitor	CRITICAL	01-26-2007 14:59:04	0d 0h 44m 34s	4/4	Critical Xen VMs Usage - Total NB: 0 - detected VMs:
webprod04.	Check Users	OK	01-26-2007 14:59:54	0d 0h 15m 33s	1/4	USERS OK - 2 users currently logged in
	Current Load	OK	01-26-2007 14:55:34	0d 0h 14m 53s	1/4	OK - load average: 0.30, 0.60, 0.44
	Memory Usage	OK	01-26-2007 14:56:19	0d 0h 14m 13s	1/4	OK: Memory Usage 37% - Total: 511 MB, Used: 190 MB, Free: 321 MB
	PING	OK	01-26-2007 14:57:10	0d 0h 13m 23s	1/4	PING OK - Packet loss = 0%, RTA = 0.27 ms
	Root Partition	OK	01-26-2007 14:57:49	0d 0h 12m 43s	1/4	DISK OK [3948940 kB (94%) free on /dev/sda2]
	SWAP Usage	OK	01-26-2007 14:58:34	0d 0h 11m 53s	1/4	Swap ok - (null) 0% (0 out of 16386)
	Total Processes	OK	01-26-2007 14:59:09	0d 0h 16m 22s	1/4	OK - 250 processes running
	Xen Virtual Machine Monitor	WARNING	01-26-2007 14:58:54	0d 0h 1m 33s	4/4	Warning Xen VMs Usage - Total NB: 1 - detected VMs: migrating-xen-vm4
webprod05.	PING	OK	01-26-2007 14:55:39	0d 0h 24m 58s	1/4	PING OK - Packet loss = 0%, RTA = 0.25 ms
	Xen Virtual Machine Monitor	OK	01-26-2007 14:59:54	0d 0h 0m 33s	1/4	OK: Xen Hypervisor "webprod05" is running 4 Xen VMs: xen-vm1 xen-vm2 xen-vm3 xen-vm4
xen-vm1.	Check Users	OK	01-26-2007 14:58:09	0d 0h 17m 23s	1/4	USERS OK - 1 users currently logged in
	Current Load	OK	01-26-2007 14:57:54	0d 3h 16m 21s	1/4	OK - load average: 1.54, 1.09, 0.48
	Memory Usage	OK	01-26-2007 14:58:39	0d 3h 15m 41s	1/4	OK: Memory Usage 8% - Total: 8195 MB, Used: 676 MB, Free: 7519 MB
	PING	OK	01-26-2007 14:59:15	0d 3h 15m 21s	1/4	PING OK - Packet loss = 0%, RTA = 0.49 ms
	Root Partition	OK	01-26-2007 14:59:59	0d 3h 14m 51s	1/4	DISK OK [4196280 kB (99%) free on udev]
	SWAP Usage	OK	01-26-2007 14:55:44	0d 3h 14m 1s	1/4	Swap ok - (null) 0% (0 out of 2055)
	Total Processes	OK	01-26-2007 14:57:29	0d 0h 18m 3s	1/4	OK - 88 processes running
xen-vm2.	Check Users	OK	01-26-2007 14:57:15	0d 3h 7m 41s	1/4	USERS OK - 0 users currently logged in
	Current Load	OK	01-26-2007 14:57:59	0d 3h 7m 1s	1/4	OK - load average: 0.00, 0.00, 0.00
	Memory Usage	OK	01-26-2007 14:58:44	0d 3h 6m 21s	1/4	OK: Memory Usage 6% - Total: 1023 MB, Used: 64 MB, Free: 958 MB
	PING	OK	01-26-2007 14:59:19	0d 0h 48m 14s	1/4	PING OK - Packet loss = 0%, RTA = 0.43 ms
	Root Partition	OK	01-26-2007 15:00:05	0d 1h 15m 4s	1/4	DISK OK [524220 kB (99%) free on udev]
	SWAP Usage	OK	01-26-2007 14:55:49	0d 3h 9m 41s	1/4	Swap ok - (null) 0% (0 out of 2055)
	Total Processes	OK	01-26-2007 14:56:34	0d 3h 9m 1s	1/4	OK - 52 processes running

http://192.168.130.223/nagios/cgi-bin/status.cgi?host=all

Check out your Nagios instance

- *vagrant up monitor*
- Browse http://monitor/nagios3/
  - Username: nagiosadmin
  - Password: nagiospwd
- Click on “Services” link

host

Current Network Status
Last Updated: Mon Jul 4 22:31:17 UTC 2011
Updated every 90 seconds
Nagios® Core™ 3.2.3 - www.nagios.org
Logged in as *nagiosadmin*

View History For all hosts
View Notifications For All Hosts
View Host Status Detail For All Hosts

Host Status Totals

Up	Down	Unreachable	Pending
1	0	0	0

All Problems	All Types
0	1

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
4	0	0	0	2

All Problems	All Types
0	6

Service Status Details For All Hosts

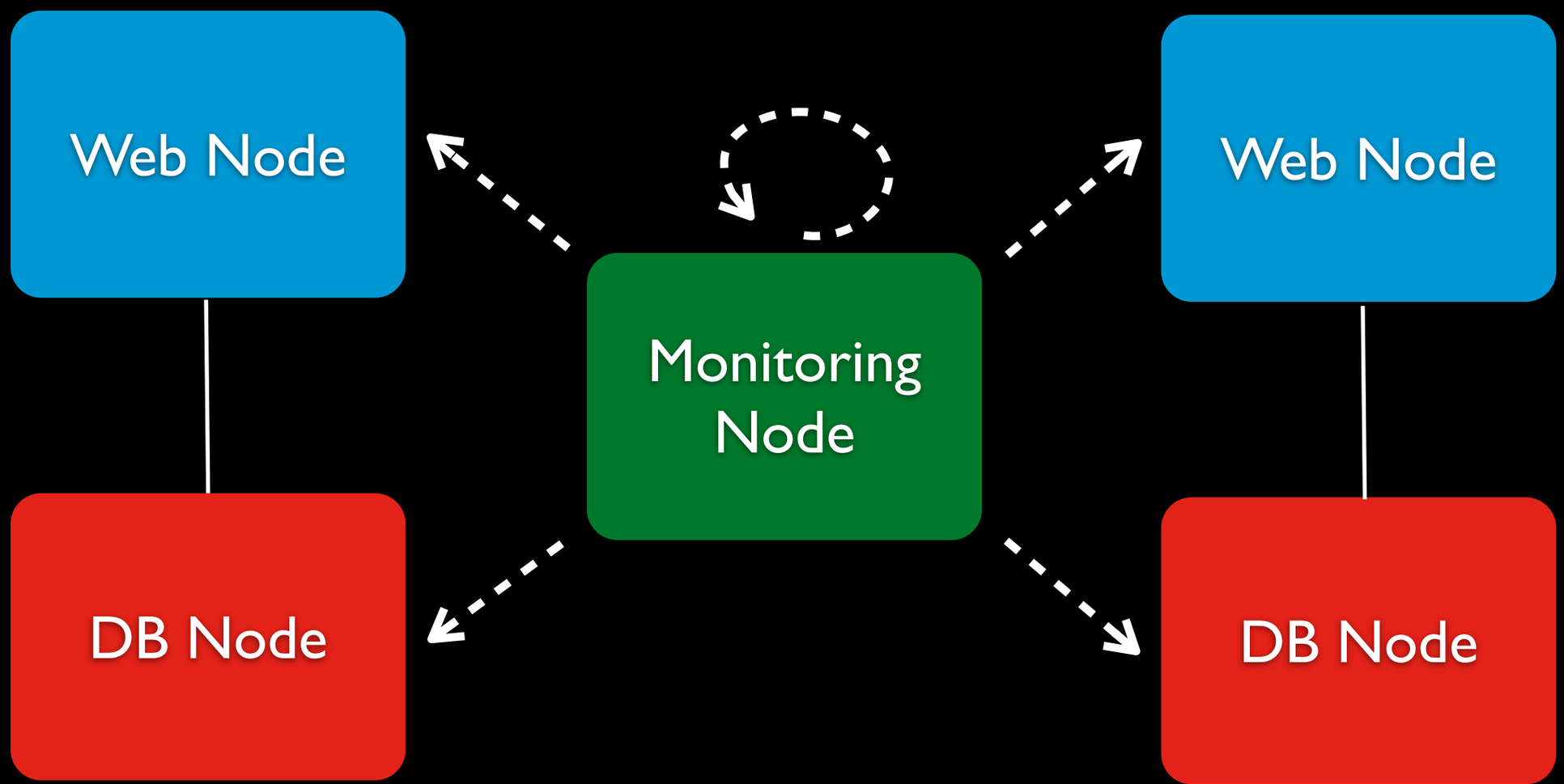
Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	2011-07-04 22:28:29	0d 0h 2m 48s	1/4	OK - load average: 0.47, 0.27, 0.14
	Current Users	OK	2011-07-04 22:29:19	0d 0h 1m 58s	1/4	USERS OK - 1 users currently logged in
	Disk Space	OK	2011-07-04 22:30:09	0d 0h 1m 8s	1/4	DISK OK
	HTTP	OK	2011-07-04 22:30:59	0d 0h 0m 18s	1/4	HTTP OK: HTTP/1.1 200 OK - 452 bytes in 0.001 second response time
	SSH	PENDING	N/A	0d 0h 3m 38s+	1/4	Service check scheduled for Mon Jul 4 22:31:49 UTC 2011
	Total Processes	PENDING	N/A	0d 0h 3m 38s+	1/4	Service check scheduled for Mon Jul 4 22:32:39 UTC 2011

6 Matching Service Entries Displayed

Let's add some checks on the infrastructure we just built to get familiar with Nagios

Part 1
(manual setup)

Part 2
(automated setup)



Basic Nagios Concepts

- Hosts
- Host groups
- Services
- Service Groups

Host

- Physical server
- Virtual machine
- Workstation
- Other IP enabled device

Add Hosts

- *vagrant ssh monitor*
- edit `/etc/nagios3/conf.d/opencart.cfg`
- *alias* is a human readable name for the host

```
define host {
    use             generic-host
    host_name       db
    alias           mysql
    hostgroups      mysql-servers
}

define host {
    use             generic-host
    host_name       web
    hostgroups      web-servers
}
```

monitor

What is generic-host

- generic-host is defined in `templates.cfg`
- it is a partially configured host that is not actually registered
- templates contain shared configuration such as:
  - notification settings
  - monitoring settings

generic-host

```
define host{
        name                            generic-host
        notifications_enabled           1
        event_handler_enabled           1
        flap_detection_enabled          1
        failure_prediction_enabled      1
        process_perf_data               1
        retain_status_information       1
        retain_nonstatus_information    1

        check_command                   check-host-alive
        max_check_attempts              10

        notification_interval           0
        notification_period             24x7
        notification_options            d,u,r
        contact_groups                  admins

        register                        0
}
```

Host Groups

- A collection of related hosts
- Used to simplify configuration of services
- Used to simplify monitoring in dashboard

- How would you group hosts?

Add Host Groups

```
define hostgroup {
        hostgroup_name  mysql-servers
        alias           MySQL servers
}

define hostgroup {
        hostgroup_name  web-servers
        alias           Web servers
}
```

monitor

Service

- Something that runs on one or more hosts
- Sometimes services such as Apache, MySQL
- Can also represent a metric to monitor
  - ex: CPU usage

Add SSH Service Check

```
define service {
        service_description     SSH
        use                     generic-service
        hostgroup_name          mysql-servers,web-servers
        check_command           check_ssh
}
```

monitor

generic-service

```
define service{
        name                            generic-service
        notification_interval           1
        active_checks_enabled           1
        passive_checks_enabled          1
        parallelize_check               1
        obsess_over_service             1
        check_freshness                 0
        notifications_enabled           1
        event_handler_enabled           1
        flap_detection_enabled          1
        failure_prediction_enabled      1
        process_perf_data               1
        retain_status_information       1
        retain_nonstatus_information    1
        is_volatile                     0
        check_period                    24x7
        normal_check_interval           2
        retry_check_interval            1
        max_check_attempts              4
        notification_period             24x7
        notification_options            w,u,c,r
        contact_groups                  admins
        register                        0
}
```

Confirm SSH services are green

```
sudo service nagios3 reload
```

monitor

Check out some of the other views in Nagios

What is check_ssh?

- Nagios command for checking ssh service
- Executes an underlying command-line tool

- Defined in /etc/nagios-plugins/config/ssh.cfg

```
define command {
    command_name   check_ssh
    command_line   /usr/lib/nagios/plugins/check_ssh '$HOSTADDRESS$'
}
```

Execute by hand

```
/usr/lib/nagios/plugins/check_ssh web
```

SSH OK - OpenSSH_5.8p1 Debian-1ubuntu3 (protocol 2.0)

<CHECK> <STATUS> - <some detailed message>

Actual status is determined by exit code:

0 OK
1 WARNING
2 CRITICAL
3 UNKNOWN

monitor

What other things might we check?

Check out other plugins:

```
ls /usr/lib/nagios/plugins
```

monitor

Execute check_http against a node you haven't set up

```
/usr/lib/nagios/plugins/check_http -H web2
```

HTTP CRITICAL - Unable to open TCP socket

monitor

Execute check_load

```
/usr/lib/nagios/plugins/check_load -H web
```

/usr/lib/nagios/plugins/check_load: invalid option -- 'H'

Usage:

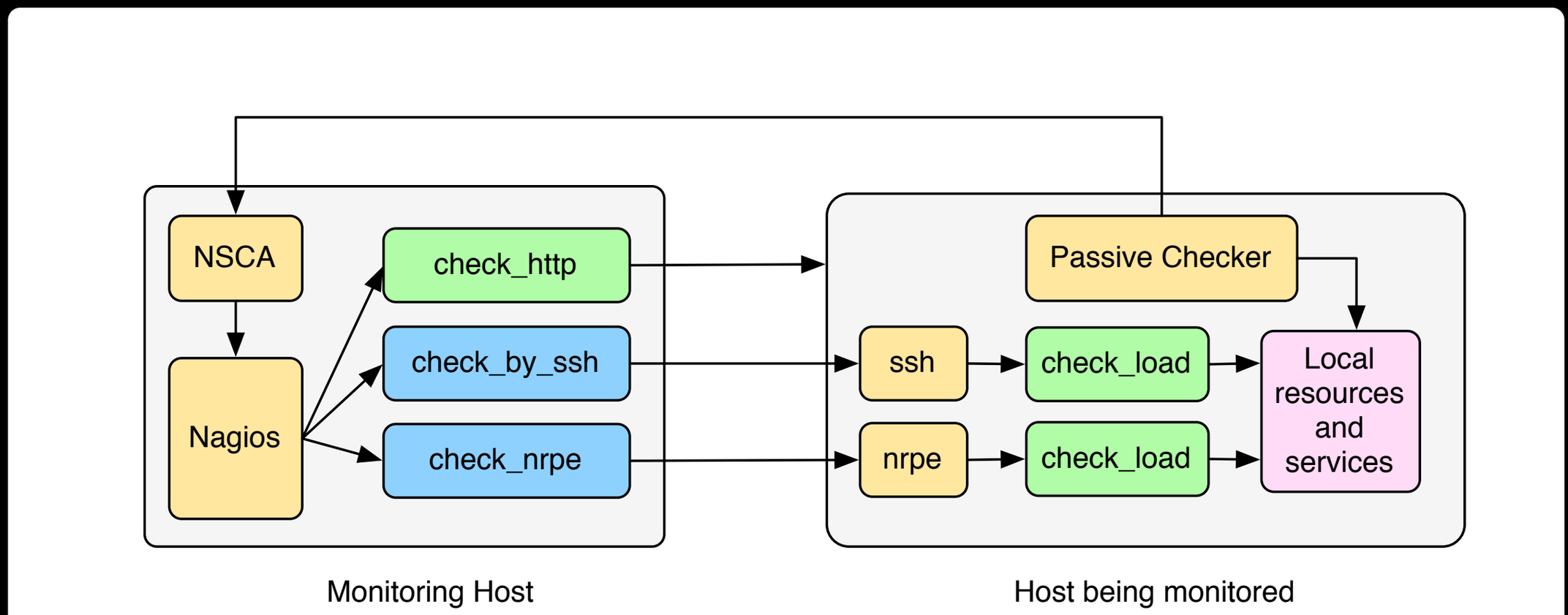
check_load [-r] -w WLOAD1,WLOAD5,WLOAD15 -c CLOAD1,CLOAD5,CLOAD15

monitor

Remote execution of commands

- check_by_ssh
- NRPE
  - Server listens for commands from Nagios
  - Executes local commands and sends results
  - Restricts what commands can be executed
  - Restricts which hosts can contact it
- Passive checks / NSCA
  - Push service information to Nagios server
  - Can be used to bypass firewall restrictions
  - Can be used to scale Nagios checks

Remote execution of commands



Execute check_load

/usr/lib/nagios/plugins/check_load: invalid option -- 'H'

Usage:

check_load [-r] -w WLOAD1,WLOAD5,WLOAD15 -c CLOAD1,CLOAD5,CLOAD15

monitor

Add HTTP check

monitor

Nagios Notifications

- Email
- Pager
- Phone (SMS)
- WinPopup message
- Yahoo, ICQ, or MSN instant message
- Audio alerts
- etc...basically anything you can do from a command line

Let's send sms notifications for our failing http check

notification.cfg

/etc/nagios3/conf.d/notification.cfg

```
define command {
      command_name     notify-by-sms
      command_line     /usr/local/bin/nagios_twilio_sms.py
$CONTACTPAGER$ $NOTIFICATIONTYPE$ $SERVICEDESC$ $HOSTALIAS$
$SERVICESTATE$ $LONGDATETIME$
}
```

monitor

notification.cfg

```
# The classic "24x7" support nightmare. :-)
define timeperiod{
        timeperiod_name 24x7
        alias           24 Hours A Day, 7 Days A Week
        sunday          00:00-24:00
        monday          00:00-24:00
        tuesday         00:00-24:00
        wednesday       00:00-24:00
        thursday        00:00-24:00
        friday          00:00-24:00
        saturday        00:00-24:00
}
```

monitor

notification.cfg

/etc/nagios3/conf.d/notification.cfg

```
define contact{
        contact_name                    ubuntu
        alias                           ubuntu
        email                           ubuntu@localhost
        pager                           +1234567890
        service_notification_options    w,u,c,r
        host_notification_options       d,r
        service_notification_period     24x7
        host_notification_period        24x7
        service_notification_commands   notify-by-sms
        host_notification_commands      notify-by-sms
}
```

```
sudo service nagios3 reload
```

monitor

Nagios Filtering

Filtering is one of the most powerful features of Nagios. It lets you decide who will get notified for what issues, when and how often. This is important to avoid being paged 100x a night.

You can filter on things like:

- scheduled downtime
- flapping
- host or service specific notification options
- time period
- no change in state since prior notification was sent and <notification_interval> has not been exceeded
- contact specific notification options (like we saw)
- escalations

We are going to use
Nagios for MDD.

Traditionally it is used for
monitoring production, but
how else could we use it
on projects?

Getting started with MDD:

We will automate the database node, then the web node.

So let's first set up Nagios to check if MySQL is alive

Add MySQL service checking tcp connection

to /etc/nagios3/conf.d/opencart.cfg

using *check_tcp*

which is defined in /etc/nagios-plugins/config/tcp_udp.cfg

mysql port is 3306

! is separator for passing arguments to command *(check_tcp)*

you don't need to specific named args like $HOSTADDRESS$

monitor

Create a Disturbance

- *vagrant halt db*

host