

**Aim:** To Understand Continuous monitoring and Installation and configuration of Nagios Core, Nagios Plugins and NRPE (Nagios Remote Plugin Executor) on Linux Machine.

### **Theory:**

#### **What is Nagios?**

Nagios is an open-source software for continuous monitoring of systems, networks, and infrastructures. It runs plugins stored on a server that is connected with a host or another server on your network or the Internet. In case of any failure, Nagios alerts about the issues so that the technical team can perform the recovery process immediately.

Nagios is used for continuous monitoring of systems, applications, service and business processes in a DevOps culture.

#### **Why We Need Nagios tool?**

Here are the important reasons to use Nagios monitoring tool:

- Detects all types of network or server issues
- Helps you to find the root cause of the problem which allows you to get the permanent solution to the problem
- Active monitoring of your entire infrastructure and business processes
- Allows you to monitor and troubleshoot server performance issues
- Helps you to plan for infrastructure upgrades before outdated systems create failures
- You can maintain the security and availability of the service
- Automatically fix problems in a panic situation

#### **Features of Nagios**

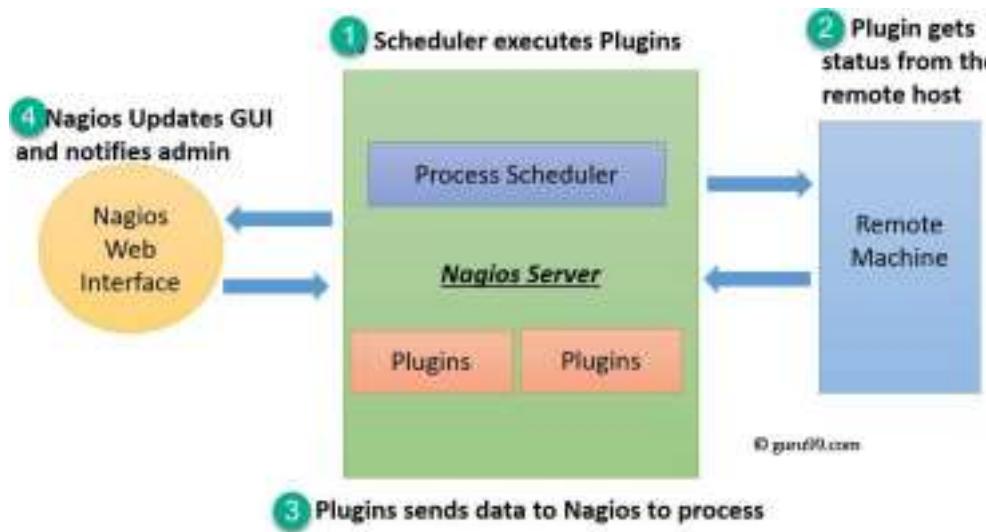
Following are the important features of Nagios monitoring tool:

- Relatively scalable, Manageable, and Secure
- Good log and database system
- Informative and attractive web interfaces
- Automatically send alerts if condition changes
- If the services are running fine, then there is no need to do check that host is an alive
- Helps you to detect network errors or server crashes
- You can troubleshoot the performance issues of the server.
- The issues, if any, can be fixed automatically as they are identified during the monitoring process
- You can monitor the entire business process and IT infrastructure with a single pass
- The product's architecture is easy to write new plugins in the language of your choice
- Nagios allows you to read its configuration from an entire directory which helps you to decide how to define individual files

- Utilizes topology to determine dependencies
- Monitor network services like HTTP, SMTP, HTTP, SNMP, FTP, SSH, POP, etc.
- Helps you to define network host hierarchy using parent hosts
- Ability to define event handlers that runs during service or host events for proactive problem resolution
- Support for implementing redundant monitoring hosts

## Nagios Architecture

Nagios is a client-server architecture. Usually, on a network, a Nagios server is running on a host, and plugins are running on all the remote hosts which should be monitored.



1. The scheduler is a component of the server part of Nagios. It sends a signal to execute the plugins at the remote host.

2. The plugin gets the status from the remote host
3. The plugin sends the data to the process scheduler
4. The process scheduler updates the GUI and notifications are sent to admins.

## Installation of Nagios

### Prerequisites: AWS Free Tier

Steps:

1. Create an Amazon Linux EC2 Instance in AWS and name it - nagios-host

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with links like EC2 Dashboard, EC2 Global View, Events, Console-to-Code Preview, and Instances. The Instances section is expanded, showing a table with one row. The row details an instance named 'nagios-host' with the ID 'i-028182fbe9c070820'. The instance is listed as 'Running' with a green status icon, type 't2.micro', and a status check that is currently 'Initializing'. There are buttons for 'Actions' and 'Launch instances' at the top right of the table.

- Under Security Group, make sure HTTP, HTTPS, SSH, ICMP are open from everywhere.  
You have to edit the inbound rules of the specified Security Group for this.

The screenshot shows the 'Inbound rules' section of a security group. It lists four rules:

- SSH (TCP, port 22, Source 0.0.0.0/0)
- HTTP (TCP, port 80, Source 0.0.0.0/0)
- HTTPS (TCP, port 443, Source 0.0.0.0/0)
- All ICMP - IPv4 (ICMP, All, Source 0.0.0.0/0)

A warning message at the bottom states: "Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only." At the bottom right are 'Cancel', 'Preview changes', and 'Save rules' buttons.

- SSH into Your EC2 instance or simply use EC2 Instance Connect from the browser.



4. Update the package indices and install the following packages using yum

```
sudo yum update
sudo yum install httpd php
sudo yum install gcc glibc glibc-common
sudo yum install gd gd-devel
yum install: error: unrecognized arguments: -uy
[ec2-user@ip-172-31-38-150 ~]$ sudo yum install gd gd-devel -y
Last metadata expiration check: 0:05:12 ago on Sun Oct 6 11:15:04 2024.
Dependencies resolved.
```

| Package                         | Architecture | Version                 | Repository  | Size |
|---------------------------------|--------------|-------------------------|-------------|------|
| <b>Installing:</b>              |              |                         |             |      |
| gd                              | x86_64       | 2.3.3-5.amzn2023.0.3    | amazonlinux | 139  |
| gd-devel                        | x86_64       | 2.3.3-5.amzn2023.0.3    | amazonlinux | 38   |
| <b>Installing dependencies:</b> |              |                         |             |      |
| brotli                          | x86_64       | 1.0.9-4.amzn2023.0.2    | amazonlinux | 314  |
| brotli-devel                    | x86_64       | 1.0.9-4.amzn2023.0.2    | amazonlinux | 31   |
| bzip2-devel                     | x86_64       | 1.0.8-6.amzn2023.0.2    | amazonlinux | 214  |
| cairo                           | x86_64       | 1.17.6-2.amzn2023.0.1   | amazonlinux | 684  |
| cmake-filesystem                | x86_64       | 3.22.2-1.amzn2023.0.4   | amazonlinux | 16   |
| fontconfig                      | x86_64       | 2.13.94-2.amzn2023.0.2  | amazonlinux | 273  |
| fontconfig-devel                | x86_64       | 2.13.94-2.amzn2023.0.2  | amazonlinux | 128  |
| fonts-filesystem                | noarch       | 1:2.0.5-12.amzn2023.0.2 | amazonlinux | 9.5  |
| freetype                        | x86_64       | 2.13.2-5.amzn2023.0.1   | amazonlinux | 423  |
| freetype-devel                  | x86_64       | 2.13.2-5.amzn2023.0.1   | amazonlinux | 912  |
| glib2-devel                     | x86_64       | 2.74.7-689.amzn2023.0.2 | amazonlinux | 486  |
| google-noto-fonts-common        | noarch       | 20201206-2.amzn2023.0.2 | amazonlinux | 15   |
| google-noto-sans-vf-fonts       | noarch       | 20201206-2.amzn2023.0.2 | amazonlinux | 492  |
| graphite2                       | x86_64       | 1.3.14-7.amzn2023.0.2   | amazonlinux | 97   |
| graphite2-devel                 | x86_64       | 1.3.14-7.amzn2023.0.2   | amazonlinux | 21   |
| harfbuzz                        | x86_64       | 7.0.0-2.amzn2023.0.1    | amazonlinux | 868  |
| harfbuzz-devel                  | x86_64       | 7.0.0-2.amzn2023.0.1    | amazonlinux | 404  |
| harfbuzz-icu                    | x86_64       | 7.0.0-2.amzn2023.0.1    | amazonlinux | 18   |
| jbigkit-libs                    | x86_64       | 2.1-21.amzn2023.0.2     | amazonlinux | 54   |
| langpacks-core-font-en          | noarch       | 3.0-21.amzn2023.0.4     | amazonlinux | 10   |
| libICE                          | x86_64       | 1.0.10-6.amzn2023.0.2   | amazonlinux | 71   |
| libSM                           | x86_64       | 1.2.3-8.amzn2023.0.2    | amazonlinux | 42   |

5. Create a new Nagios User with its password. You'll have to enter the password twice for confirmation.

```
sudo adduser -m nagios
sudo passwd nagios
```

```
Complete!
[ec2-user@ip-172-31-38-150 ~]$ sudo adduser -m nagios
[ec2-user@ip-172-31-38-150 ~]$ sudo passwd nagios
Changing password for user nagios.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-38-150 ~]$
```

6. Create a new user group

```
sudo groupadd nagcmd
```

7. Use these commands so that you don't have to use sudo for Apache and Nagios

```
sudo usermod -a -G nagcmd nagios
sudo usermod -a -G nagcmd apache
```

8. Create a new directory for Nagios downloads

```
mkdir ~/downloads
cd ~/downloads
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-38-150 ~]$ sudo groupadd nagcmd
[ec2-user@ip-172-31-38-150 ~]$ sudo usermod -a -G nagcmd nagios
[ec2-user@ip-172-31-38-150 ~]$ sudo usermod -a -G nagcmd apache
[ec2-user@ip-172-31-38-150 ~]$ mkdir ~/downloads
[ec2-user@ip-172-31-38-150 ~]$ cd ~/downloads
[ec2-user@ip-172-31-38-150 downloads]$ wget https://go.nagios.org/24-09-17/6kqcx
```

9. Use wget to download the source zip files.

```
wget https://go.nagios.org/1/975333/2024-09-17/6kqcx
wget https://nagios-plugins.org/download/nagios-plugins-2.4.11.tar.gz
```

```
[ec2-user@ip-172-31-38-150 ~]$ wget https://go.nagios.org/24-09-17/6kqcx
--2024-10-06 11:23:50-- https://go.nagios.org/1/975333/2024-09-17/6kqcx
Resolving go.nagios.org (go.nagios.org) ... 3.92.127.219, ...
Connecting to go.nagios.org (go.nagios.org) |3.92.1|
HTTP request sent, awaiting response... 302 Found
Location: http://assets.nagios.com/downloads/nagios.tar.gz?utm_source=Nagios.org&utm_content=Download+5+Download+&pi_content=1e9662c93afb2ed6bd2e3f3cc3
```

10. Use tar to unzip and change to that directory.

```
tar zxvf nagios-4.5.5.tar.gz
cd nagios-4.5.5
--2024-10-06 11:23:50-- https://go.nagios.org/1/975333/2024-09-17/6kqcx
Resolving go.nagios.org (go.nagios.org) ... 3.92.120.28, 52.54.96.194, 3.215.72.219, ...
Connecting to go.nagios.org (go.nagios.org) |3.92.120.28|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: http://assets.nagios.com/downloads/nagioscore/releases/nagios-4.5.tar.gz?utm_source=Nagios.org&utm_content=Download+Form&utm_campaign=Core+4.5+Download+&pi_content=1e9662c93afb2ed6bd2e3f3cc38771a7f01125e969f2a75b0e24439d4a81d8 [following]
--2024-10-06 11:23:50-- http://assets.nagios.com/downloads/nagioscore/releases/nagios-4.5.5.tar.gz?utm_source=Nagios.org&utm_content=Download+Form&utm_campaign=Core+4.5.5+Download+&pi_content=1e9662c93afb2ed6bd2e3f3cc38771a7f011e969f2a75b0e2254439d4a81d8
Resolving assets.nagios.com (assets.nagios.com) ... 45.79.49.120, 2600:3c00:03c:92ff:fef7:45ce
Connecting to assets.nagios.com (assets.nagios.com) |45.79.49.120|:80... con
```

11. Run the configuration script with the same group name you previously created.

```
./configure --with-command-group=nagcmd
```

12. Compile the source code.

```
make all
```

```
Command Prompt
*** Configuration summary for nagios 4.5.5 2024-09-17 ***

General Options:
Nagios executable: nagios
Nagios user/group: nagios,nagios
Command user/group: nagios,nagcmd
Event Broker: yes
Install ${prefix}: /usr/local/nagios
Install ${includedir}: /usr/local/nagios/include/nagios
Lock file: /run/nagios.lock
Check result directory: /usr/local/nagios/var/spool/checkresults
Init directory: /lib/systemd/system
Apache conf.d directory: /etc/httpd/conf.d
Mail program: /bin/mail
Host OS: linux-gnu
IOBroker Method: epoll

Web Interface Options:
HTML URL: http://localhost/nagios/
CGI URL: http://localhost/nagios/cgi-bin/
Traceroute (used by WAP): /usr/bin/traceroute

Review the options above for accuracy. If they look okay,
type 'make all' to compile the main program and CGIs.

[ec2-user@ip-172-31-80-195 nagios-4.5.5]$ make all
cd ./base && make
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.5.5/base'
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o nagios.o ./nagios.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o broker.o broker.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o nebmod.o nebmod.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o ../common/shared.o ../common/shared.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o query-handler.o query-handler.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o workers.o workers.c
In function 'get_worker',
  inlined from 'get_worker' at workers.c:277:12:
workers.c:253:17: warning: '%s' directive argument is null [-Wformat-overflow=]
  253 |         log_debug_info(DEBUG_C_CHECKS, 1, "Found specialized worker(s) for '%s'", (slash && *slash != '/') ? slash : cmd_name);
  |
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o checks.o checks.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o config.o config.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o commands.o commands.c
gcc -Wall -I.. -I. -I..../include -I..../include -I.. -g -O2 -DHAVE_CONFIG_H -DSCORE -c -o events.o events.c
```

13. Install binaries, init script and sample config files. Lastly, set permissions on the external command directory.

```
sudo make install
sudo make install-init
sudo make install-config
sudo make install-commandmode
```

```
[ec2-user@ip-172-31-38-150 nagios-4.4.6]$ sudo make install-webconf
/usr/bin/install -c -m 644 sample-config/httpd.conf /etc/httpd/conf.d/nagio
s.conf
if [ 0 -eq 1 ]; then \
    ln -s /etc/httpd/conf.d/nagios.conf /etc/apache2/sites-enabled/nagi
os.conf; \
fi

*** Nagios/Apache conf file installed ***

[ec2-user@ip-172-31-38-150 nagios-4.4.6]$
```

```
sudo nano /usr/local/nagios/etc/objects/contacts.cfg
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$ sudo yum install openssl
Last metadata expiration check: 0:13:31 ago on Sun Oct  6 11:15:04 2024.
Dependencies resolved.
=====
=====
Package          Architecture      Version
Repository      Size
=====
=====
Installing:
openssl-devel      x86_64        1:3.0.8-1.amzn2023.0.14
amazonlinux       3.0 M
Transaction Summary
```

#### 14. Configure the web interface.

```
sudo make install-webconf
```

```
[ec2-user@ip-172-31-38-150 nagios-4.4.6]$ sudo make install-webconf
/usr/bin/install -c -m 644 sample-config/httpd.conf /etc/httpd/conf.d/nagio
s.conf
if [ 0 -eq 1 ]; then \
    ln -s /etc/httpd/conf.d/nagios.conf /etc/apache2/sites-enabled/nagi
os.conf; \
fi

*** Nagios/Apache conf file installed ***

[ec2-user@ip-172-31-38-150 nagios-4.4.6]$
```

#### 15. Create a nagiosadmin account for nagios login along with password. You'll have to specify the password twice.

```
sudo htpasswd -c /usr/local/nagios/etc/htpasswd.users nagiosadmin
```

```
[ec2-user@ip-172-31-38-150 nagios-4.4.6]$ sudo htpasswd -c /usr/local/nagios/etc/htpasswd.users nagiosadmin
[sudo] password for ec2-user:
[sudo] password for ec2-user:
New password:
Re-type new password:
Adding password for user nagiosadmin
[ec2-user@ip-172-31-38-150 nagios-4.4.6]$
```

#### 16. Restart Apache

```
sudo service httpd restart
```

```
[ec2-user@ip-172-31-38-150 nagios-4.4.6]$ sudo service httpd restart
Redirecting to /bin/systemctl restart httpd.service
[ec2-user@ip-172-31-38-150 nagios-4.4.6]$
```

#### 17. Go back to the downloads folder and unzip the plugins zip file.

```
cd ~/downloads
tar zxvf nagios-plugins-2.4.11.tar.gz
[ec2-user@ip-172-31-38-150 downloads]$ tar zxvf nagios-plugins-2.4.11.tar.gz
nagios-plugins-2.4.11/
nagios-plugins-2.4.11/build-aux/
nagios-plugins-2.4.11/build-aux/compile
nagios-plugins-2.4.11/build-aux/config.guess
nagios-plugins-2.4.11/build-aux/config.rpath
nagios-plugins-2.4.11/build-aux/config.sub
nagios-plugins-2.4.11/build-aux/install-sh
nagios-plugins-2.4.11/build-aux/ltmain.sh
nagios-plugins-2.4.11/build-aux/missing
nagios-plugins-2.4.11/build-aux/mkinstalldirs
```

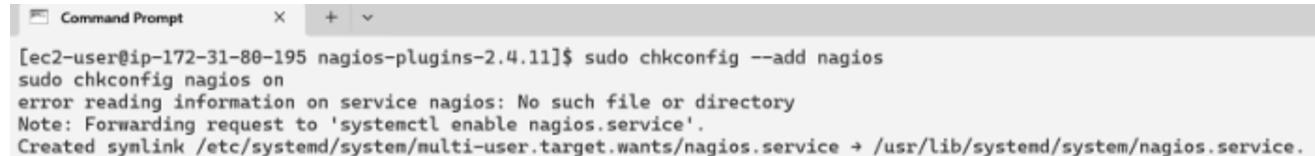
#### 18. Compile and install plugins

```
cd nagios-plugins-2.4.11
./configure --with-nagios-user=nagios --with-nagios-group=nagios
make
sudo make install
[ec2-user@ip-172-31-38-150 downloads]$ cd nagios-plugins-2.4.11
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$ ./configure --with-nagios-user=nagios
--with-nagios-group=nagios
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$ ./configure --with-nagios-user=nagios
--with-nagios-group=nagios
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
checking whether make supports nested variables... yes
checking whether to enable maintainer-specific portions of Makefiles... yes
```

## 19. Start Nagios

Add Nagios to the list of system services

```
sudo chkconfig --add nagios  
sudo chkconfig nagios on
```



```
[ec2-user@ip-172-31-80-195 nagios-plugins-2.4.11]$ sudo chkconfig --add nagios  
sudo chkconfig nagios on  
error reading information on service nagios: No such file or directory  
Note: Forwarding request to 'systemctl enable nagios.service'.  
Created symlink /etc/systemd/system/multi-user.target.wants/nagios.service → /usr/lib/systemd/system/nagios.service.
```

Verify the sample configuration files

```
sudo /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg
```

```
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$ sudo /usr/local/nagios/bin/nagios -v  
/usr/local/nagios/etc/nagios.cfg  
/usr/local/nagios/etc/nagios.cfg  
  
Nagios Core 4.4.6  
Copyright (c) 2009-present Nagios Core Development Team and Community Contributors  
Copyright (c) 1999-2009 Ethan Galstad  
Last Modified: 2020-04-28  
License: GPL  
  
Website: https://www.nagios.org  
Reading configuration data...  
    Read main config file okay...  
    Read object config files okay...  
  
Running pre-flight check on configuration data...  
  
Checking objects...  
    Checked 8 services.  
    Checked 1 hosts.  
    Checked 1 host groups.  
    Checked 0 service groups.  
    Checked 1 contacts.  
    Checked 1 contact groups.  
    Checked 24 commands.  
    Checked 5 time periods.
```

If there are no errors, you can go ahead and start Nagios.

```
sudo service nagios start
```

```
Things look okay - No serious problems were detected during the pre-flight check  
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$ sudo service nagios start  
Redirecting to /bin/systemctl start nagios.service  
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$
```

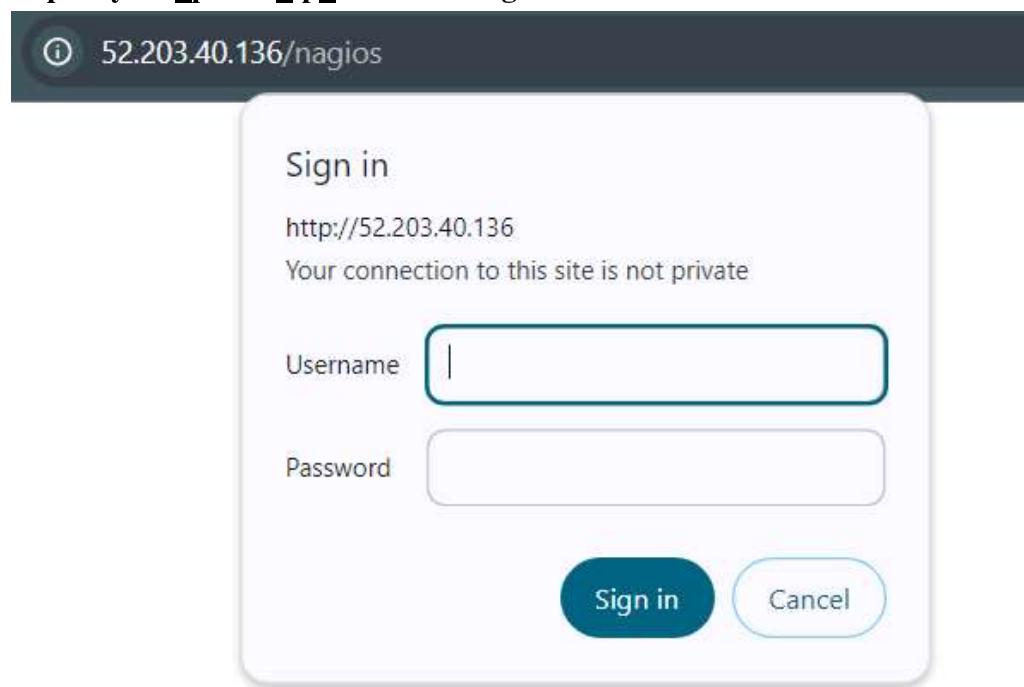
20. Check the status of Nagios

```
sudo systemctl status nagios
Redirecting to /bin/systemctl start nagios.service
[ec2-user@ip-172-31-38-150 nagios-plugins-2.4.11]$ sudo systemctl status nagios
● nagios.service - Nagios Core 4.4.6
    Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: disabled)
    Active: active (running) since Sun 2024-10-06 11:51:46 UTC; 1min 33s ago
      Docs: https://www.nagios.org/documentation
      Main PID: 89956 (nagios)
        Tasks: 6 (limit: 1112)
       Memory: 2.4M
          CPU: 36ms
         CGroup: /system.slice/nagios.service
                 └─89956 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
                    ├─89957 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                    ├─89958 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                    ├─89959 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                    ├─89960 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                    └─89961 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Oct 06 11:51:46 ip-172-31-38-150.ec2.internal nagios[89956]: qh: Socket '/usr/local/nagios/var/rw/nagios.qh' successfull
Oct 06 11:51:46 ip-172-31-38-150.ec2.internal nagios[89956]: qh: core memory handler re
```

21. Go back to EC2 Console and copy the Public IP address of this instance

22. Open up your browser and look for  
[http://<your\\_public\\_ip\\_address>/nagios](http://<your_public_ip_address>/nagios)



Enter username as nagiosadmin and password which you set in Step 16.

23. After entering the correct credentials, you will see this page.



The screenshot shows the Nagios Core 4.4.6 dashboard. At the top right, it displays "Nagios® Core™ Version 4.4.6" and the date "April 28, 2020". A prominent green checkmark indicates "Daemon running with PID 89956". Below this, a blue box announces "A new version of Nagios Core is available! Visit [nagios.org](http://nagios.org) to download Nagios 4.5.5." On the left sidebar, under "General", there are links for Home and Documentation. Under "Current Status", there are links for Tactical Overview, Map (Legacy), Hosts, Services, Host Groups (Summary and Grid), Service Groups (Summary and Grid), and Problems (Services, Hosts, Network Outages). A "Quick Search" input field is also present. Under "Reports", there are links for Availability, Trends (Legacy), Alerts (History and Summary), Histogram (Legacy), Notifications, and Event Log.

This means that Nagios was correctly installed and configured with its plugins so far.

**Conclusion:** We have successfully installed and configured Nagios Core, Nagios Plugins, and NRPE on a Linux machine. This enables us to effectively manage system performance and proactively address potential issues.