

Advanced DevOps Lab

Experiment No: 9

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- Helps you to plan for infrastructure upgrades before outdated systems create failures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:

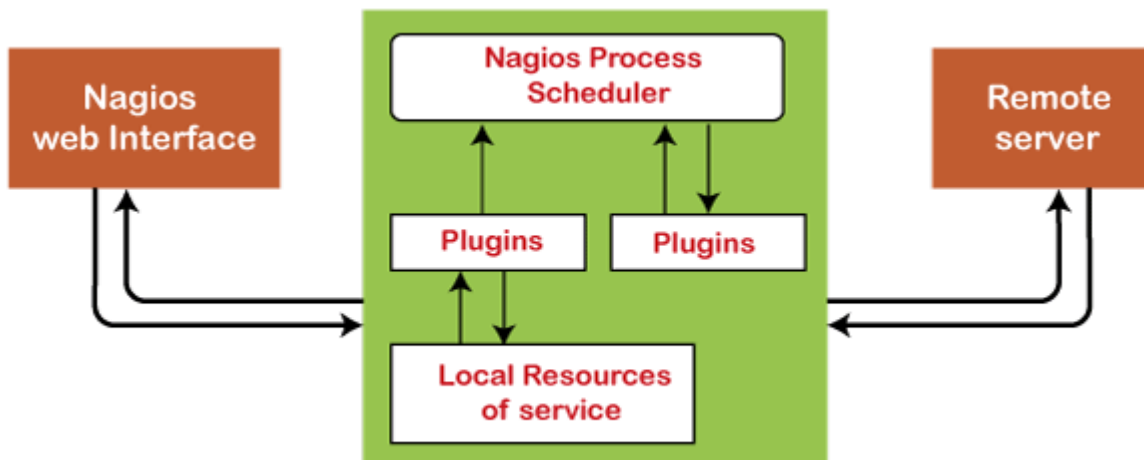
Following are the important features of Nagios monitoring tool:

- 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 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.



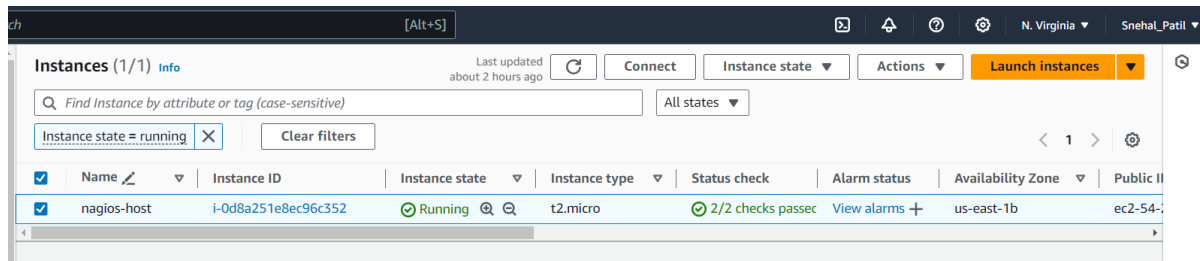
1. The scheduler is a component of the server part of Nagios. It sends a signal to execute the plugins at the remote host.
2. The plugin gets the status from the remote host
3. The plugin sends the data to the process scheduler
4. The process scheduler updates

Installation of Nagios

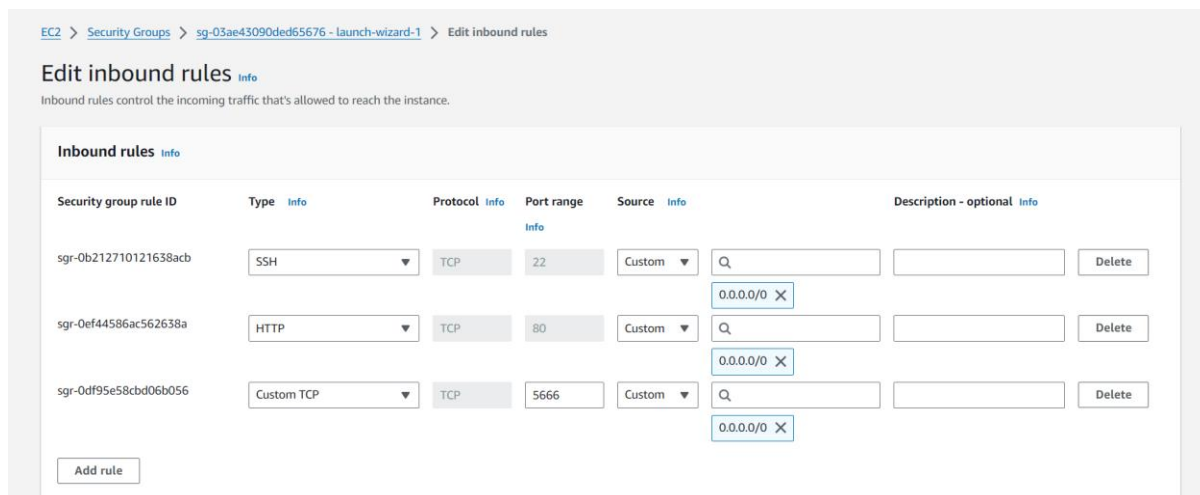
Prerequisites: AWS Free Tier

Steps:

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

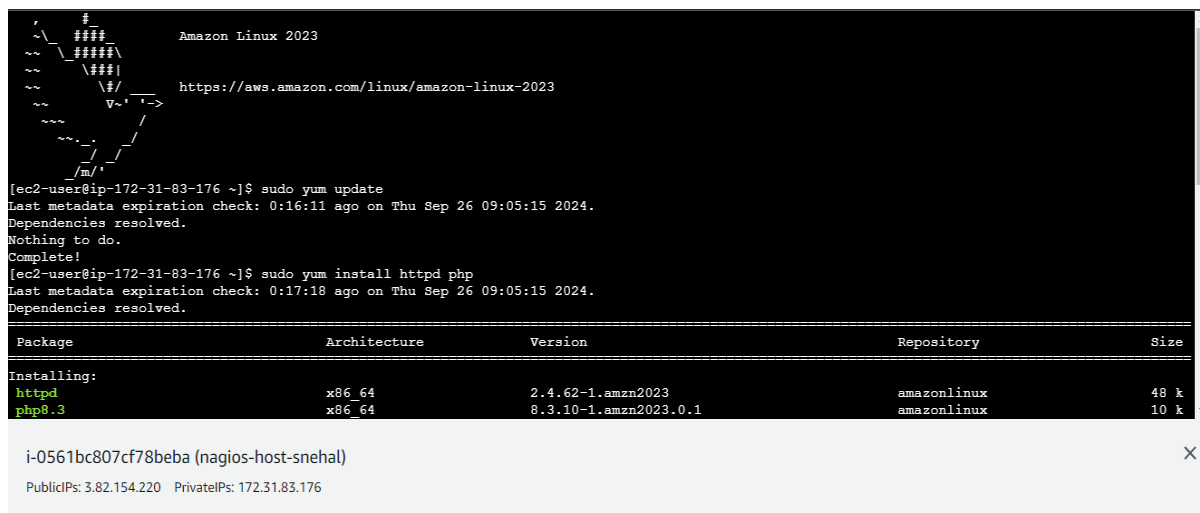


2. Under Security Group, make sure HTTP, HTTPS, SSH, ICMP are open from everywhere.



You have to edit the inbound rules of the specified Security Group for this.

3. 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

```
Verifying      : php8.3-8.3.10-1.amzn2023.0.1.x86_64 16/25
Verifying      : php8.3-cli-8.3.10-1.amzn2023.0.1.x86_64 17/25
Verifying      : php8.3-common-8.3.10-1.amzn2023.0.1.x86_64 18/25
Verifying      : php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64 19/25
Verifying      : php8.3-mbstring-8.3.10-1.amzn2023.0.1.x86_64 20/25
Verifying      : php8.3-opcache-8.3.10-1.amzn2023.0.1.x86_64 21/25
Verifying      : php8.3-pdo-8.3.10-1.amzn2023.0.1.x86_64 22/25
Verifying      : php8.3-process-8.3.10-1.amzn2023.0.1.x86_64 23/25
Verifying      : php8.3-sodium-8.3.10-1.amzn2023.0.1.x86_64 24/25
Verifying      : php8.3-xml-8.3.10-1.amzn2023.0.1.x86_64 25/25

Installed:
apr-1.7.2-2.amzn2023.0.2.x86_64          apr-util-1.6.3-1.amzn2023.0.1.x86_64          apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64
generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch httpd-2.4.62-1.amzn2023.x86_64          httpd-core-2.4.62-1.amzn2023.x86_64
httpd-filesystem-2.4.62-1.amzn2023.noarch  httpd-tools-2.4.62-1.amzn2023.x86_64          libbrotli-1.0.9-4.amzn2023.0.2.x86_64
libsodium-1.0.19-4.amzn2023.x86_64        libxslt-1.1.34-5.amzn2023.0.2.x86_64          mailcap-2.1.49-3.amzn2023.0.3.noarch
mod_http2-2.0.27-1.amzn2023.0.3.x86_64    mod_lua-2.4.62-1.amzn2023.x86_64              nginx-filesystem-1:1.24.0-1.amzn2023.0.4.noarch
php8.3-8.3.10-1.amzn2023.0.1.x86_64       php8.3-cli-8.3.10-1.amzn2023.0.1.x86_64       php8.3-common-8.3.10-1.amzn2023.0.1.x86_64
php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64   php8.3-mbstring-8.3.10-1.amzn2023.0.1.x86_64  php8.3-opcache-8.3.10-1.amzn2023.0.1.x86_64
php8.3-pdo-8.3.10-1.amzn2023.0.1.x86_64   php8.3-process-8.3.10-1.amzn2023.0.1.x86_64  php8.3-sodium-8.3.10-1.amzn2023.0.1.x86_64
php8.3-xml-8.3.10-1.amzn2023.0.1.x86_64

Complete!
[ec2-user@ip-172-31-83-176 ~]$
```

i-0561bc807cf78beba (nagios-host-snehal)

PublicIPs: 3.82.154.220 PrivateIPs: 172.31.83.176

```
Complete!
[ec2-user@ip-172-31-83-176 ~]$ sudo yum install gcc glibc glibc-common
Last metadata expiration check: 0:19:41 ago on Thu Sep 26 09:05:15 2024.
Package glibc-2.34-52.amzn2023.0.11.x86_64 is already installed.
Package glibc-common-2.34-52.amzn2023.0.11.x86_64 is already installed.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
Installing:				
gcc	x86_64	11.4.1-2.amzn2023.0.2	amazonlinux	32 M
Installing dependencies:				
annobin-docs	noarch	10.93-1.amzn2023.0.1	amazonlinux	92 k
annobin-plugin-gcc	x86_64	10.93-1.amzn2023.0.1	amazonlinux	887 k
c++	x86_64	11.4.1-2.amzn2023.0.2	amazonlinux	10 M
gc	x86_64	8.0.4-5.amzn2023.0.2	amazonlinux	105 k
glibc-devel	x86_64	2.34-52.amzn2023.0.11	amazonlinux	27 k
glibc-headers-x86	noarch	2.34-52.amzn2023.0.11	amazonlinux	427 k
guile22	x86_64	2.2.7-2.amzn2023.0.3	amazonlinux	6.4 M
kernel-headers	x86_64	6.1.109-118.189.amzn2023	amazonlinux	1.4 M
libmpc	x86_64	1.2.1-2.amzn2023.0.2	amazonlinux	62 k
libtool-ltdl	x86_64	2.4.7-1.amzn2023.0.3	amazonlinux	38 k
libxcrypt-devel	x86_64	4.4.33-7.amzn2023	amazonlinux	32 k

i-0561bc807cf78beba (nagios-host-snehal)

PublicIPs: 3.82.154.220 PrivateIPs: 172.31.83.176

```
Complete!
[ec2-user@ip-172-31-83-176 ~]$ sudo yum install gd gd-devel
Last metadata expiration check: 0:20:53 ago on Thu Sep 26 09:05:15 2024.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
Installing:				
gd	x86_64	2.3.3-5.amzn2023.0.3	amazonlinux	139 k
gd-devel	x86_64	2.3.3-5.amzn2023.0.3	amazonlinux	38 k
Installing dependencies:				
brotil	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	314 k
brotil-devel	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	31 k
bzip2-devel	x86_64	1.0.8-6.amzn2023.0.2	amazonlinux	214 k
cairo	x86_64	1.17.6-2.amzn2023.0.1	amazonlinux	684 k
cmake-filesystem	x86_64	3.22.6-1.amzn2023.0.4	amazonlinux	16 k
fontconfig	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	273 k
fontconfig-devel	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	128 k
font-filesystem	noarch	1:2.0.5-12.amzn2023.0.2	amazonlinux	9.5 k
freetype	x86_64	2.13.2-5.amzn2023.0.1	amazonlinux	423 k
freetype-devel	x86_64	2.13.2-5.amzn2023.0.1	amazonlinux	912 k
glib2-devel	x86_64	2.74.7-689.amzn2023.0.2	amazonlinux	486 k
google-noto-fonts-common	noarch	20201206-2.amzn2023.0.2	amazonlinux	15 k
google-noto-sans-vf-fonts	noarch	20201206-2.amzn2023.0.2	amazonlinux	492 k

i-0561bc807cf78beba (nagios-host-snehal)

PublicIPs: 3.82.154.220 PrivateIPs: 172.31.83.176

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

```
[ec2-user@ip-172-31-83-176 ~]$ sudo adduser -m nagios
[ec2-user@ip-172-31-83-176 ~]$ sudo passwd nagios
Changing password for user nagios.
New password:
Retype new password:
[ec2-user@ip-172-31-83-176 ~]$ sudo passwd nagios
Changing password for user nagios.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
Sorry, passwords do not match.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-83-176 ~]$
```

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
```

```
[ec2-user@ip-172-31-83-176 ~]$ sudo groupadd nagcmd
[ec2-user@ip-172-31-83-176 ~]$ sudo usermod -a -G nagcmd nagios
[ec2-user@ip-172-31-83-176 ~]$ sudo usermod -a -G nagcmd apache
[ec2-user@ip-172-31-83-176 ~]$
```

8. Create a new directory for Nagios downloads

```
mkdir ~/downloads
```

```
cd ~/downloads
```

```
[ec2-user@ip-172-31-83-176 ~]$ mkdir ~/downloads
[ec2-user@ip-172-31-83-176 ~]$ cd ~/downloads
```

9. Use wget to download the source zip files.

wget

http://prdownloads.sourceforge.net/sourceforge/nagios/nagios-4.0.8.tar.

gz

wget http://nagios-plugins.org/download/nagios-plugins-2.0.3.tar.gz

```
[ec2-user@ip-172-31-83-176 downloads]$ wget
http://prdownloads.sourceforge.net/sourceforge/nagios/nagios-4.0.8.tar.
gz
wget http://nagios-plugins.org/download/nagios-plugins-2.0.3.tar.gz
wget: missing URL.
Usage: wget [OPTION]... [URL]...

Try 'wget --help' for more options.
-bash: http://prdownloads.sourceforge.net/sourceforge/nagios/nagios-4.0.8.tar.: No such file or directory
-bash: gz: command not found
--2024-09-26 09:33:05-- http://nagios-plugins.org/download/nagios-plugins-2.0.3.tar.gz
Resolving nagios-plugins.org (nagios-plugins.org)... 45.56.123.251
Connecting to nagios-plugins.org (nagios-plugins.org)|45.56.123.251|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2659772 (2.5M) [application/x-gzip]
Saving to: 'nagios-plugins-2.0.3.tar.gz'

nagios-plugins-2.0.3.tar.gz 100%[=====>] 2.54M 7.18MB/s in 0.4s

2024-09-26 09:33:06 (7.18 MB/s) - 'nagios-plugins-2.0.3.tar.gz' saved [2659772/2659772]
```

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

tar zxvf nagios-4.0.8.tar.gz

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

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-172-31-91-100 nagioscore-nagios-4.4.6]$ cd /tmp/nagioscore-nagios-4.4.6
make all
sudo make install
sudo make install-init
sudo make install-config
sudo make install-commandmode
cd ./base && make
make[1]: Entering directory '/tmp/nagioscore-nagios-4.4.6/base'
make -C ../lib
make[2]: Entering directory '/tmp/nagioscore-nagios-4.4.6/lib'
make[2]: Nothing to be done for 'all'.
```

```
sudo nano /usr/local/nagios/etc/objects/contacts.cfg
```

```
#####
# Just one contact defined by default - the Nagios admin (that's you)
# This contact definition inherits a lot of default values from the 'generic-contact'
# template which is defined elsewhere.

define contact{
    contact_name      nagiosadmin          ; Short name of user
    use                generic-contact      ; Inherit default values from generic-contact template (defined above)
    alias              Nagios Admin         ; Full name of user

    email              snehalpatil302004@gmail.com ; <***** CHANGE THIS TO YOUR EMAIL ADDRESS *****>
}

#####
```

```
sudo make install-webconf
```

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

17. Restart Apache

```
Adding password for user nagiosadmin
[ec2-user@ip-172-31-83-176 nagios-4.0.8]$ sudo service httpd restart
Redirecting to /bin/systemctl restart httpd.service
[ec2-user@ip-172-31-83-176 nagios-4.0.8]$
```

```
cd ~/downloads
```

```
[ec2-user@ip-172-31-83-176 nagios-4.0.8]$ cd ~/downloads
tar zxvf nagios-plugins-2.0.3.tar.gz
nagios-plugins-2.0.3/
nagios-plugins-2.0.3/perlmods/
nagios-plugins-2.0.3/perlmods/Config-Tiny-2.14.tar.gz
nagios-plugins-2.0.3/perlmods/parent-0.226.tar.gz
nagios-plugins-2.0.3/perlmods/Test-Simple-0.98.tar.gz
nagios-plugins-2.0.3/perlmods/Makefile.in
nagios-plugins-2.0.3/perlmods/version-0.9903.tar.gz
nagios-plugins-2.0.3/perlmods/Makefile.am
nagios-plugins-2.0.3/perlmods/Module-Runtime-0.013.tar.gz
nagios-plugins-2.0.3/perlmods/Module-Metadata-1.000014.tar.gz
nagios-plugins-2.0.3/perlmods/Params-Validate-1.08.tar.gz
```

19. Compile and install plugins

```
cd nagios-plugins-2.0.3
```

```
./configure --with-nagios-user=nagios --with-nagios-group=nagios
```

```
make
```

```
sudo make install
```

20. Start Nagios

Add Nagios to the list of system services

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

```
sudo chkconfig nagios on
```

Verify the sample configuration files

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

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

```
sudo service nagios start
```

```
[ec2-user@ip-172-31-83-176 ~]$ sudo service nagios start
Starting nagios (via systemctl): [ OK ]
[ec2-user@ip-172-31-83-176 ~]$
[ec2-user@ip-172-31-83-176 ~]$ sudo systemctl status nagios
● nagios.service - LSB: Starts and stops the Nagios monitoring server
   Loaded: loaded (/usr/lib/systemd/system/nagios.service; disabled; preset: disabled)
   Active: inactive (dead)
     Docs: https://www.nagios.org/documentation
```

21. Check the status of Nagios

```
sudo systemctl status nagios
```

```
[ec2-user@ip-172-31-91-100 nagioscore-nagios-4.4.6]$ sudo systemctl status nagios
sudo systemctl status httpd
● nagios.service - Nagios Core 4.4.6
   Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: disabled)
   Active: active (running) since Sat 2024-09-28 17:23:08 UTC; 5min ago
     Docs: https://www.nagios.org/documentation
   Main PID: 34305 (nagios)
    Tasks: 6 (limit: 1112)
   Memory: 2.0M
      CPU: 68ms
   CGroup: /system.slice/nagios.service
           └─34305 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
```

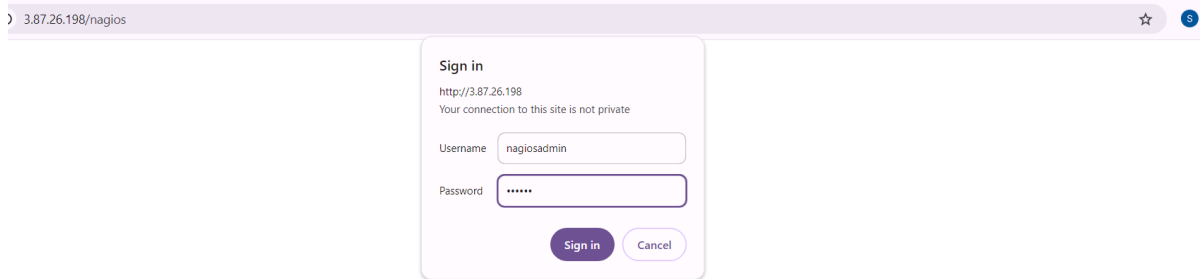
22. Go back to EC2 Console and copy the Public IP address of this instance

<input checked="" type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
<input checked="" type="checkbox"/>	nagios-host	i-0d8a251e8ec96c352	Running	t2.micro	2/2 checks passed	View alarms	us-east-1b	ec2-54-210-192-46

i-0d8a251e8ec96c352 (nagios-host)		
▼ Instance summary Info		
Instance ID	Public IPv4 address	Private IPv4 addresses
i-0d8a251e8ec96c352 (nagios-host)	54.210.192.46 open address	172.31.91.100

23. Open up your browser and look for `http://<your_public_ip_address>/nagios`

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



Extra:

Faced Problem

Permission Forbidden Error

Problem: While accessing the Nagios web interface, I encountered "403 Forbidden" errors.

Solution: This issue typically arises due to improper file permissions or SELinux settings. To resolve it:

Adjust File Permissions: Ensure that the Nagios directory and its files have the correct permissions. Execute the following commands:

```
sudo chown -R nagios:nagios /usr/local/nagios
```

```
sudo chmod -R 755 /usr/local/nagios
```

```
_____/m/'  
[ec2-user@ip-172-31-35-105 ~]$ sudo chown -R nagios:nagios /usr/local/nagios  
sudo chmod -R 755 /usr/local/nagios
```

Configure SELinux (if applicable): If SELinux is enabled on your instance, it might block access. To check the status and modify it:

```
sestatus # Check SELinux status
```

```
sudo setenforce 0 # Temporarily disable SELinux
```

```
[ec2-user@ip-172-31-35-105 ~]$ sestatus # Check SELinux status  
sudo setenforce 0 # Temporarily disable SELinux  
SELinux status:                enabled  
SELinuxfs mount:                /sys/fs/selinux  
SELinux root directory:         /etc/selinux  
Loaded policy name:              targeted  
Current mode:                   permissive  
Mode from config file:          permissive  
Policy MLS status:              enabled  
Policy deny_unknown status:     allowed  
Memory protection checking:     actual (secure)  
Max kernel policy version:      33
```

Apache Configuration: Ensure that the Apache configuration allows access to the Nagios directory. You may need to add the following lines to your `/etc/httpd/conf.d/nagios.conf`:

```
<Directory "/usr/local/nagios/share">
```

```
Options None
```

```
AllowOverride None
```

```
Require all granted
```

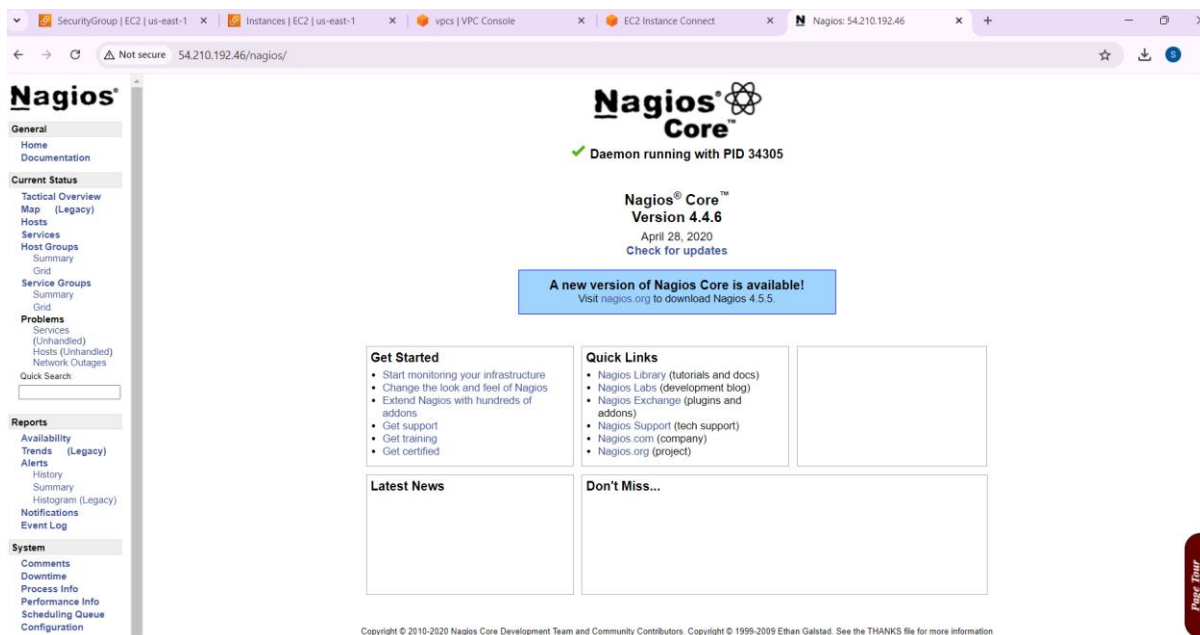
```
</Directory>
```

```
<Directory "/usr/local/nagios/share">
Options None
AllowOverride None
Require all granted
</Directory>
```

After making changes, restart Apache:

```
sudo service httpd restart
```

24. After entering the correct credentials, I am able to see this page.



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

Conclusion:

We successfully installed Nagios on an Amazon Linux EC2 instance in the AWS Free Tier. By configuring the security group, setting up users and groups, and installing the necessary packages, we prepared the environment for Nagios. After downloading and compiling the software, we configured the web interface and authenticated the admin account. Accessing the Nagios dashboard confirmed a successful setup, enabling effective monitoring of systems and services. This installation lays the groundwork for a robust monitoring solution tailored to your needs.