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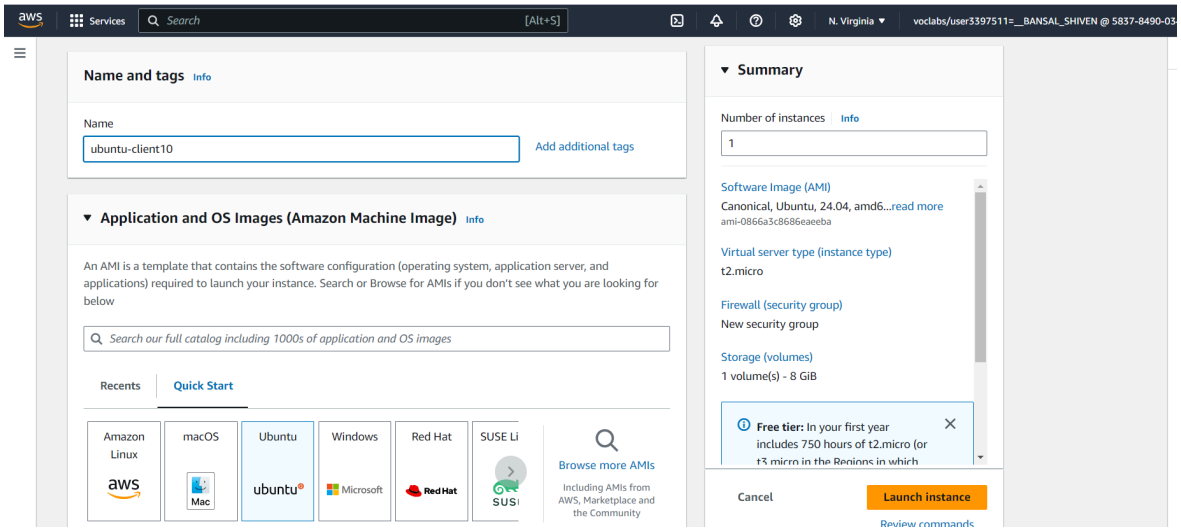
# Experiment 10

**Aim:** To perform Port, Service monitoring, Windows/Linux server monitoring using Nagios.

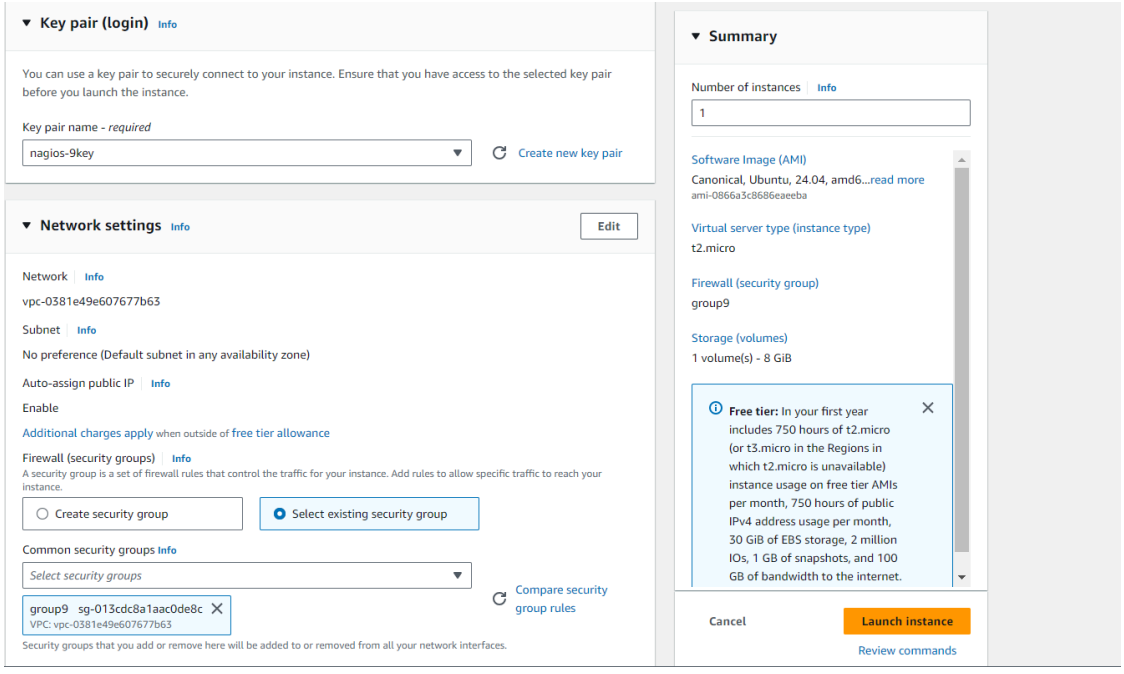
**Prerequisites:** An Amazon Linux instance with nagios (nagios-server) is already set up.

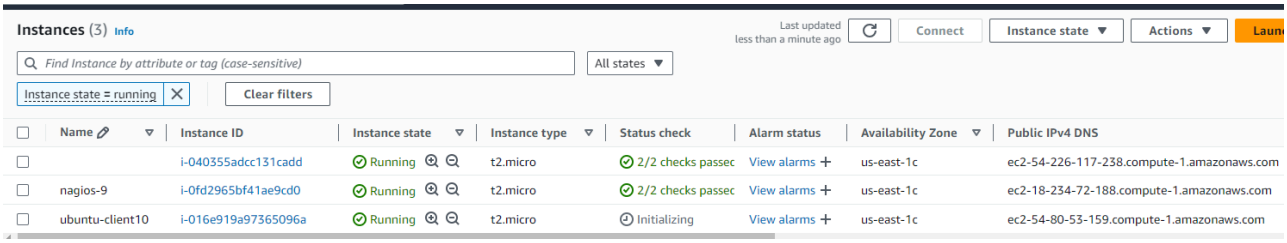
**Steps:**

Step 1: Navigate to EC2 on the AWS console using the ‘Services’ section and click on ‘Create instance’. Give your instance a name and choose ‘Ubuntu’ as the instance type.




Ensure that you choose the same key pair and security group for the Ubuntu client instance as you did for the Nagios host instance. Then, click on ‘Create instance’.






Your Ubuntu client instance gets created along with the Nagios host instance.

Step 2: Click on the instance ID of your nagios-server instance and click on ‘Connect’. Then, click on ‘SSH client’ and copy the command under ‘Example’. Then, open the terminal in the folder where the .pem file for your instance’s key pair is located and paste the SSH command that you just copied. This connects your instance to your local terminal using SSH.

Step 3: ps -ef | grep nagios
Run the above command on the nagios-host instance. This verifies whether the nagios service is running or not.

```
[ec2-user@ip-172-31-35-113 ~]$ ps -ef | grep nagios
nagios     64399       1  0 13:48 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
nagios     64401   64399  0 13:48 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     64402   64399  0 13:48 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     64403   64399  0 13:48 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     64404   64399  0 13:48 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     64447   64399  0 13:48 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
ec2-user   65271   65245  0 14:01 pts/0    00:00:00 grep --color=auto nagio
[ec2-user@ip-172-31-35-113 ~]$
```

Step 4: sudo su
mkdir -p /usr/local/nagios/etc/objects/monitorhosts
mkdir -p /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
This makes you the root user and creates two folders with the above paths.

```
[ec2-user@ip-172-31-35-113 ~]$ sudo su
mkdir -p /usr/local/nagios/etc/objects/monitorhosts
mkdir -p /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
[root@ip-172-31-35-113 ec2-user]#
```

Step 5: We need to create a config file in this folder. So, copy the contents of the existing localhost config to the new file ‘linuxserver.cfg’.
cp /usr/local/nagios/etc/objects/localhost.cfg
/usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg

```
[root@ip-172-31-88-33 ec2-user]# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/monitorhos
ts/linuxhosts/linuxserver.cfg
```

Step 6: We need to make some changes in this config file. Open it using nano editor:-
nano /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg

1. Change hostname and alias from ‘hostname’ to ‘linuxserver’.
2. Change address to the public ip address of the ubuntu-client instance.

```
  GNU nano 5.8                          /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg
##############################################################################
# LOCALHOST.CFG - SAMPLE OBJECT CONFIG FILE FOR MONITORING THIS MACHINE
#
#
# NOTE: This config file is intended to serve as an *extremely* simple
#       example of how you can create configuration entries to monitor
#       the local (Linux) machine.
#
##############################################################################



##############################################################################
#
# HOST DEFINITION
#
##############################################################################

# Define a host for the local machine

define host {

    use                     linux-server            ; Name of host template to use
                                                    ; This host definition will inherit all variables that are defined
                                                    ; in (or inherited by) the linux-server host template definition.
    host_name               linuxserver
    alias                   linuxserver
    address                 54.80.53.159
}
```

Change hostgroup_name to ‘linux-servers1’.

```
define hostgroup {

    hostgroup_name          linux-servers1          ; The name of the hostgroup
    alias                   Linux Servers           ; Long name of the group
    members                 linuxserver             ; Comma separated list of hosts that belong to this group
}
```

Change all the subsequent occurrences of hostname in the file from ‘localhost’ to ‘linuxserver’.

Step 7: Open the Nagios config file using the following command:
nano /usr/local/nagios/etc/nagios.cfg
Then, add the following line to the config file:
cfg_dir=/usr/local/nagios/etc/objects/monitorhosts/

```
  GNU nano 5.8                                  /usr/local/nagios/etc/nagios.cfg

# Definitions for monitoring the local (Linux) host
cfg_file=/usr/local/nagios/etc/objects/localhost.cfg

# Definitions for monitoring a Windows machine
#cfg_file=/usr/local/nagios/etc/objects/windows.cfg

# Definitions for monitoring a router/switch
#cfg_file=/usr/local/nagios/etc/objects/switch.cfg

# Definitions for monitoring a network printer
#cfg_file=/usr/local/nagios/etc/objects/printer.cfg


# You can also tell Nagios to process all config files (with a .cfg
# extension) in a particular directory by using the cfg_dir
# directive as shown below:

#cfg_dir=/usr/local/nagios/etc/servers
#cfg_dir=/usr/local/nagios/etc/printers
#cfg_dir=/usr/local/nagios/etc/switches
#cfg_dir=/usr/local/nagios/etc/routers
cfg_dir=/usr/local/nagios/etc/objects/monitorhosts/


^G Help      ^O Write Out   ^W Where Is   ^K Cut         ^T Execute     ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File   ^\ Replace    ^U Paste       ^J Justify     ^/ Go To Line M-E Redo      M-6 Copy
```

Step 8: Now we verify the configuration files and check that they contain no errors using the following command:
/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg

```
[root@ip-172-31-35-113 ec2-user]# /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg

Nagios Core 4.5.5
Copyright (c) 2009-present Nagios Core Development Team and Community Contributors
Copyright (c) 1999-2009 Ethan Galstad
Last Modified: 2024-09-17
License: GPL

Website: https://www.nagios.org
Reading configuration data...
   Read main config file okay...
```

```
Checking objects...
        Checked 8 services.
        Checked 2 hosts.
        Checked 2 host groups.
        Checked 0 service groups.
        Checked 1 contacts.
        Checked 1 contact groups.
        Checked 24 commands.
        Checked 5 time periods.
        Checked 0 host escalations.
        Checked 0 service escalations.
Checking for circular paths...
        Checked 2 hosts
        Checked 0 service dependencies
        Checked 0 host dependencies
        Checked 5 timeperiods
Checking global event handlers...
Checking obsessive compulsive processor commands...
Checking misc settings...

Total Warnings: 0
Total Errors:   0

Things look okay - No serious problems were detected during the pre-flight check
```

Step 9: Once the files are verified and it is confirmed that there are no errors, we must restart the server.
service nagios restart

```
[root@ip-172-31-88-33 ec2-user]# service nagios restart
Redirecting to /bin/systemctl restart nagios.service
```

Step 10: systemctl status nagios

Using the above command, we check the status of the nagios server and ensure that it is active (running).

```
[root@ip-172-31-88-33 ec2-user]# systemctl status nagios
● nagios.service - Nagios Core 4.5.5
     Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: disabled)
     Active: active (running) since Sun 2024-09-29 12:11:40 UTC; 1min 12s ago
       Docs: https://www.nagios.org/documentation
    Process: 70244 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0>
    Process: 70245 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SU>
   Main PID: 70246 (nagios)
      Tasks: 6 (limit: 1112)
     Memory: 4.0M
        CPU: 38ms
     CGroup: /system.slice/nagios.service
             ├─70246 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
             ├─70247 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─70248 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─70249 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─70250 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             └─70251 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: qh: Socket '/usr/local/nagios/var/rw/nagios.qh' successfull>
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: qh: core query handler registered
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: qh: echo service query handler registered
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: qh: help for the query handler registered
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: wproc: Successfully registered manager as @wproc with query>
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: wproc: Registry request: name=Core Worker 70250;pid=70250
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: wproc: Registry request: name=Core Worker 70249;pid=70249
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: wproc: Registry request: name=Core Worker 70248;pid=70248
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: wproc: Registry request: name=Core Worker 70247;pid=70247
Sep 29 12:11:40 ip-172-31-88-33.ec2.internal nagios[70246]: Successfully launched command file worker with pid 70251
```

Step 11: Connect your ubuntu-client instance to your local terminal using SSH in the same way as you connected the nagios-host instance to your local terminal using SSH (follow Step 2)

```
PS C:\Users\ADMIN> cd .\Downloads\
PS C:\Users\ADMIN\Downloads> ssh -i "nagios-9key.pem" ubuntu@ec2-54-80-53-159.compute-1.amazonaws.com
The authenticity of host 'ec2-54-80-53-159.compute-1.amazonaws.com (54.80.53.159)' can't be established.
ED25519 key fingerprint is SHA256:ictbLzP1p2YFXqDXkAH4CzoAWhCOQfhqnoXYFJGZ5q8.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-54-80-53-159.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-1016-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Mon Oct  7 14:15:43 UTC 2024

  System load:  0.0               Processes:             104
  Usage of /:   22.8% of 6.71GB   Users logged in:       0
  Memory usage: 20%               IPv4 address for enX0: 172.31.38.70
  Swap usage:   0%
```

```
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-38-70:~$
```

Step 12: On your ubuntu-client instance, run the following commands:-
sudo apt update -y
sudo apt install gcc -y
sudo apt install -y nagios-nrpe-server nagios-plugins
The above commands check for any new updates and then install gcc, Nagios NRPE server and Nagios plugins.

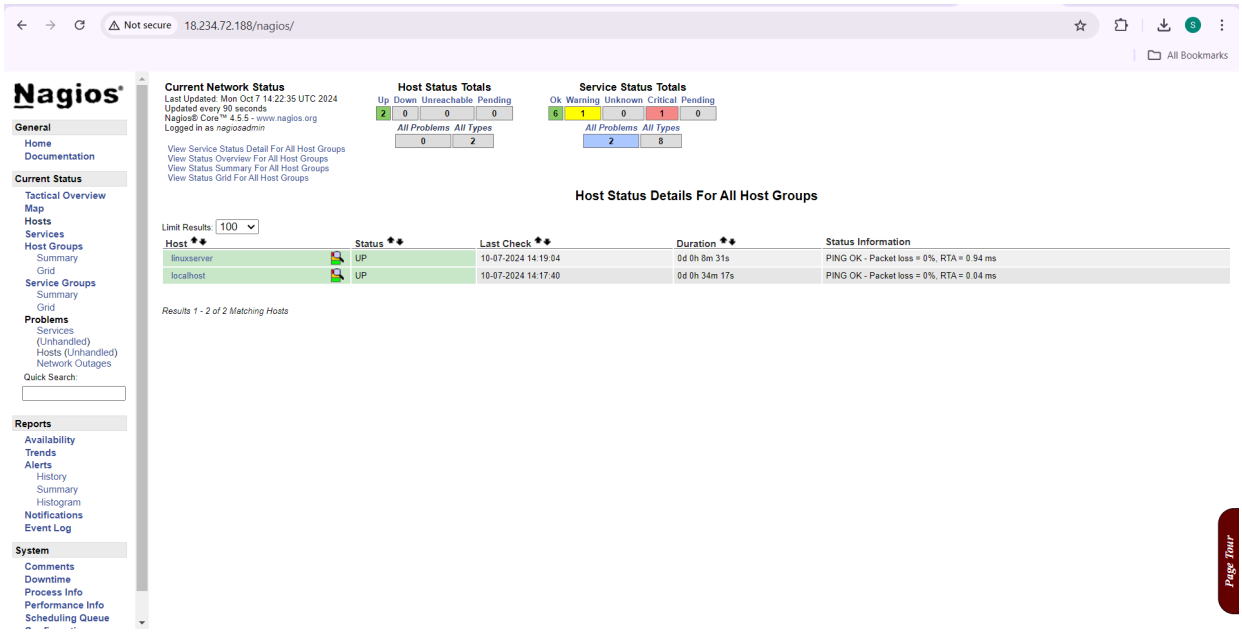
```
ubuntu@ip-172-31-38-70:~$ sudo apt update -y
sudo apt install gcc -y
sudo apt install -y nagios-nrpe-server nagios-plugins
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [382 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
```

```
Setting up samba-dsdb-modules:amd64 (2:4.19.5+dfsg-4ubuntu9) ...
Setting up libsmbclient0:amd64 (2:4.19.5+dfsg-4ubuntu9) ...
Setting up libcups2t64:amd64 (2.4.7-1.2ubuntu7.3) ...
Setting up python3-samba (2:4.19.5+dfsg-4ubuntu9) ...
Setting up smbclient (2:4.19.5+dfsg-4ubuntu9) ...
Setting up samba-common-bin (2:4.19.5+dfsg-4ubuntu9) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.3) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-38-70:~$
```

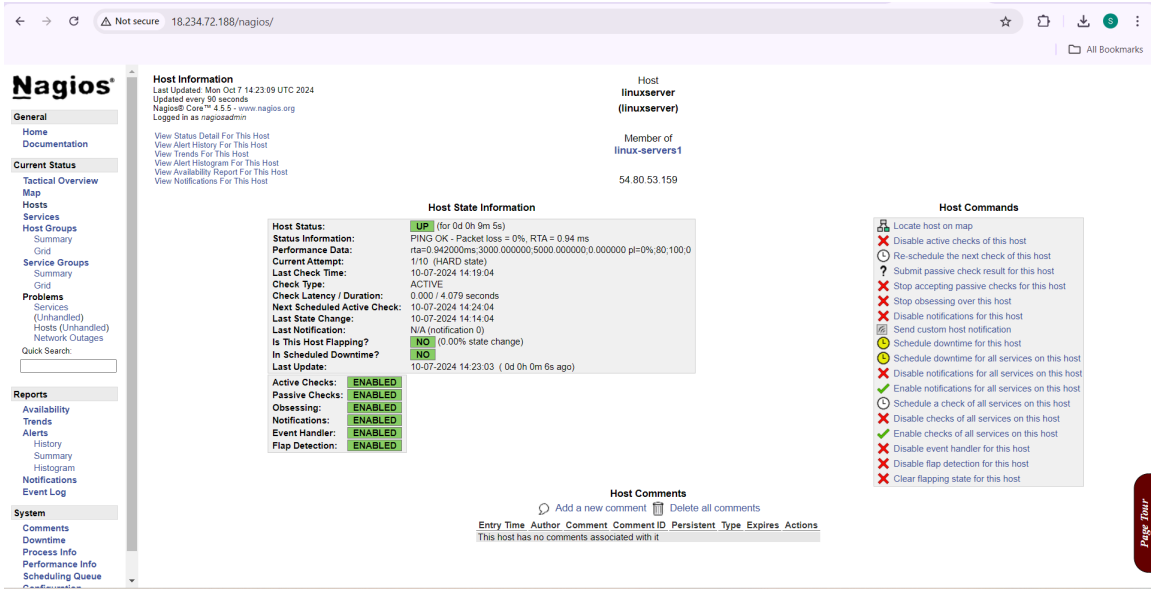
Step 13: Run the following command:
sudo nano /etc/nagios/nrpe.cfg
The above command opens the NRPE config file. Here, we need to add the public IP address of our host nagios-host instance to the NRPE configuration file.
Under allowed_hosts, add the nagios-host public IPv4 address.

```
  GNU nano 7.2                                                /etc/nagios/nrpe.cfg *
# NOTE: This option is ignored if NRPE is running under either inetd or xinetd

nrpe_group=nagios



# ALLOWED HOST ADDRESSES
# This is an optional comma-delimited list of IP address or hostnames
# that are allowed to talk to the NRPE daemon. Network addresses with a bit mask
# (i.e. 192.168.1.0/24) are also supported. Hostname wildcards are not currently
# supported.
#
# Note: The daemon only does rudimentary checking of the client's IP
# address.  I would highly recommend adding entries in your /etc/hosts.allow
# file to allow only the specified host to connect to the port
# you are running this daemon on.
#
# NOTE: This option is ignored if NRPE is running under either inetd or xinetd

allowed_hosts=127.0.0.1,18.234.72.188



# COMMAND ARGUMENT PROCESSING
# This option determines whether or not the NRPE daemon will allow clients
# to specify arguments to commands that are executed.  This option only works
# if the daemon was configured with the --enable-command-args configure script
# option.
```

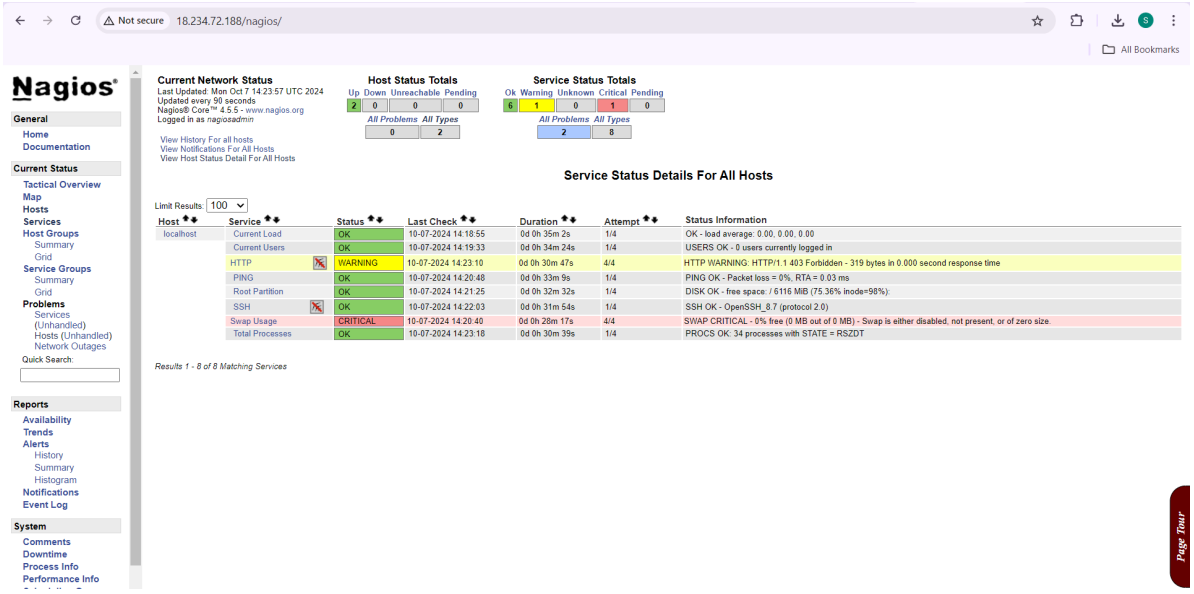
Step 14: Navigate to the Nagios dashboard. Click on ‘hosts’. We see that linuxserver has been added as a host.



Click on ‘linuxserver’. Here, we can access all information about the ‘linuxserver’ host.




Click on ‘Services’. Here, we can see all the services that are being monitored by ‘linuxserver’.




**Conclusion** : In this experiment, we explored how to monitor ports, services, and both Windows and Linux servers using Nagios. To achieve this, we launched a Nagios-hosted EC2 Linux instance, which served as the platform for running the Nagios server and dashboard. Additionally, we deployed an Ubuntu client instance that connected to the Nagios host.

We configured the necessary settings on the Linux instance, including adding the Ubuntu client’s public IP address. Similarly, we made configuration changes on the Ubuntu client, where we added the IP address of the Nagios-hosted Linux instance. We also ensured that the Linux server instance was permitted as an authorized host on the Ubuntu client. After restarting the NRPE service, we verified that the ‘linuxserver’ host was successfully added for monitoring.