

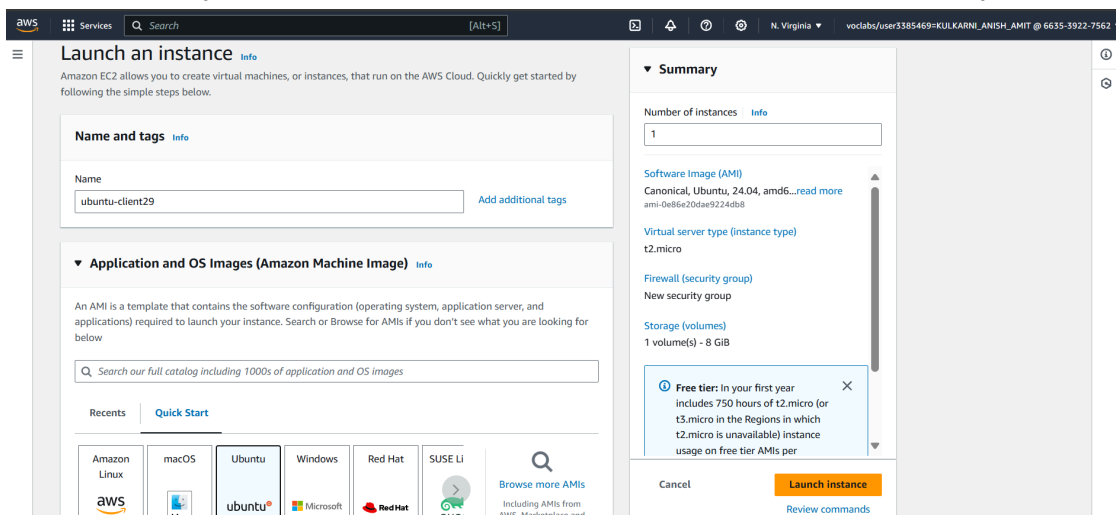
Experiment 10

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

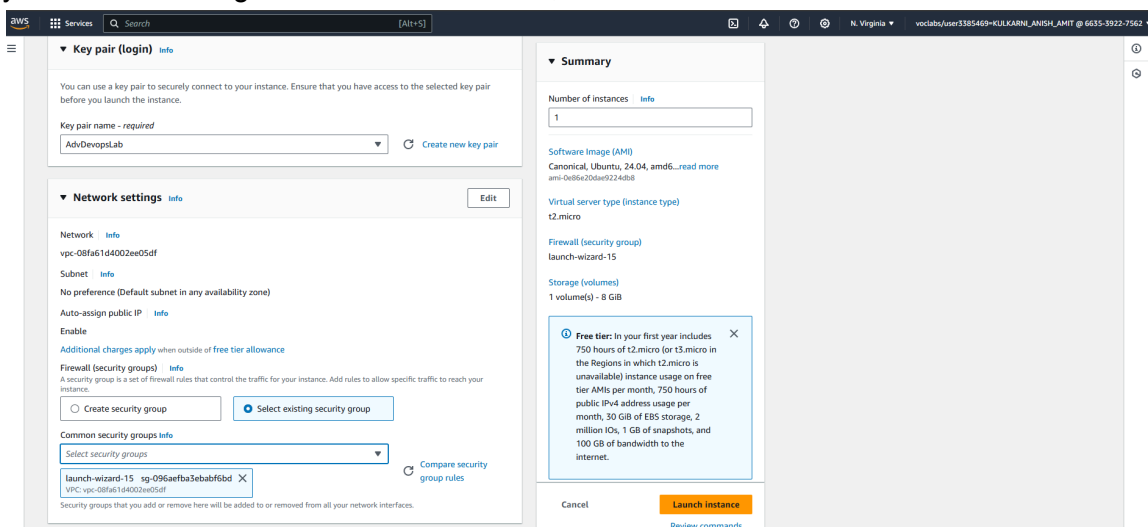
Prerequisites: An Amazon Linux instance with nagios (nagios-server) is already set up.

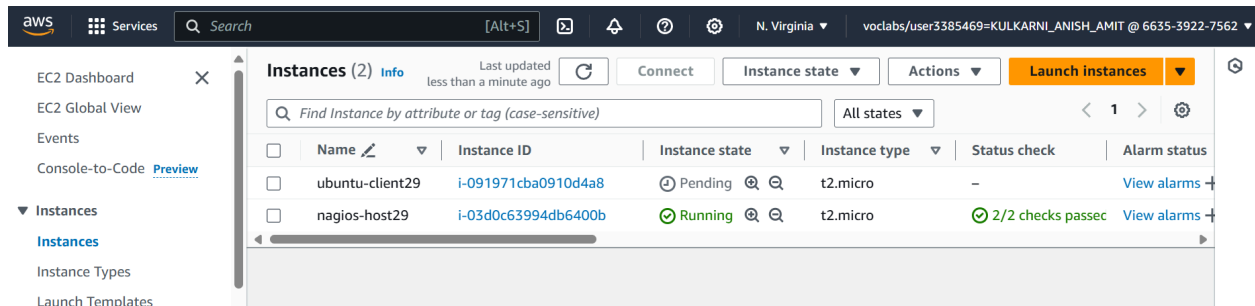
Steps:

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.

```
[root@ip-172-31-88-33 ec2-user]# ps -ef | grep nagios
nagios    67489      1    0 11:25 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
nagios    67490    67489    0 11:25 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagio
s.qh
nagios    67491    67489    0 11:25 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagio
s.qh
nagios    67492    67489    0 11:25 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagio
s.qh
nagios    67493    67489    0 11:25 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagio
s.qh
nagios    67494    67489    0 11:25 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
root      69007    68853    0 11:51 pts/1    00:00:00 grep --color=auto nagios
[root@ip-172-31-88-33 ec2-user]#
```

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.

```
[root@ip-172-31-88-33 ec2-user]# sudo su
mkdir /usr/local/nagios/etc/objects/monitorhosts
mkdir /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
[root@ip-172-31-88-33 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.

```
#####  
#  
# 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            52.91.101.68  
}  
  
#####  
#  
# HOST GROUP DEFINITION
```

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-172-31-88-33 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...
  Read object config files okay...

Running pre-flight check on configuration data...

Checking objects...
  Checked 16 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 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
[root@ip-172-31-88-33 ec2-user]#
```

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/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' successfully
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\anish\Downloads> ssh -i "AdvDevopsLab.pem" ubuntu@ec2-52-91-101-68.compute-1.amazonaws.com
The authenticity of host 'ec2-52-91-101-68.compute-1.amazonaws.com (52.91.101.68)' can't be established.
ED25519 key fingerprint is SHA256:Z6cgJrMFcPL5SxJ9EzJKrB3lt1bYaG1x6Ntu/PKumPw.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-52-91-101-68.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-1012-aws x86_64)

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

System information as of Sun Sep 29 12:15:10 UTC 2024

System load:  0.0          Processes:            105
Usage of /:   22.7% of 6.71GB Users logged in:          0
Memory usage: 19%         IPv4 address for enX0: 172.31.94.199
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
```

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-172-31-94-199:~$ 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 [380 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]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [535 kB]
Get:15 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [82.9 kB]
Get:16 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [4560 B]
```

```
Scanning candidates...
```

```
Scanning linux images...
```

```
Running kernel seems to be up-to-date.
```

```
Restarting services...
```

```
Service restarts being deferred:
```

```
/etc/needrestart/restart.d/dbus.service
```

```
systemctl restart getty@tty1.service
```

```
systemctl restart networkd-dispatcher.service
```

```
systemctl restart serial-getty@ttyS0.service
```

```
systemctl restart systemd-logind.service
```

```
systemctl restart unattended-upgrades.service
```

```
No containers need to be restarted.
```

```
User sessions running outdated binaries:
```

```
ubuntu @ session #4: sshd[1021,1132]
```

```
ubuntu @ user manager service: systemd[1027]
```

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

```
ubuntu@ip-172-31-94-199:~$ |
```

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.

```
#
# 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=127.0.0.1,3.84.19.157
```

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

The screenshot shows the Nagios web interface at the URL `3.84.19.157/nagios/`. The interface includes a sidebar with navigation links and a main content area with several status sections.

Current Network Status
Last Updated: Sun Sep 29 12:21:35 UTC 2024
Updated every 90 seconds
Nagios® Core™ 4.5.5 - www.nagios.org
Logged in as nagiosadmin

Host Status Totals

Up	Down	Unreachable	Pending
2	0	0	0

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
12	1	0	3	0

Host Status Details For All Host Groups

Host	Status	Last Check	Duration	Status Information
linuxserver	UP	09-29-2024 12:21:02	0d 0h 9m 55s	PING OK - Packet loss = 0%, RTA = 1.02 ms
localhost	UP	09-29-2024 12:20:02	0d 0h 55m 54s	PING OK - Packet loss = 0%, RTA = 0.04 ms

Results 1 - 2 of 2 Matching Hosts

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

The screenshot displays the Nagios web interface for the host 'linuxserver'. The left sidebar contains navigation links for General, Current Status, Tactical Overview, Map, Hosts, Services, Host Groups, Service Groups, Problems, Reports, and System. The main content area is divided into several sections:

- Host Information:** Last Updated: Sun Sep 29 12:23:21 UTC 2024, Updated every 90 seconds, Nagios® Core™ 4.5.5 - www.nagios.org, Logged in as nagiosadmin.
- Host State Information:** Host Status: UP (for 0d 0h 11m 41s), Status Information: PING OK - Packet loss = 0%, RTA = 1.02 ms, Performance Data: rta=1.023000ms;3000.000000;5000.000000;0.000000 pi=0%;80;100;0, Current Attempt: 1/10 (HARD state), Last Check Time: 09-29-2024 12:21:02, Check Type: ACTIVE, Check Latency / Duration: 0.000 / 4.122 seconds, Next Scheduled Active Check: 09-29-2024 12:26:02, Last State Change: 09-29-2024 12:11:40, Last Notification: N/A (notification 0), Is This Host Flapping?: NO (0.00% state change), In Scheduled Downtime?: NO, Last Update: 09-29-2024 12:23:19 (0d 0h 0m 2s ago).
- Host Commands:** A list of commands with checkboxes, including 'Locate host on map', 'Disable active checks of this host', 'Re-schedule the next check of this host', 'Submit passive check result for this host', 'Stop accepting passive checks for this host', 'Stop obsessing over this host', 'Disable notifications for this host', 'Send custom host notification', 'Schedule downtime for this host', 'Schedule downtime for all services on this host', 'Disable notifications for all services on this host', 'Enable notifications for all services on this host', 'Schedule a check of all services on this host', 'Disable checks of all services on this host', 'Enable checks of all services on this host', 'Disable event handler for this host', 'Disable flap detection for this host', and 'Clear flapping state for this host'.
- Host Comments:** Add a new comment, Delete all comments.

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

The screenshot displays the Nagios web interface for the 'Services' section of the 'linuxserver' host. The left sidebar is the same as the previous screenshot. The main content area shows:

- Current Network Status:** Last Updated: Sun Sep 29 12:24:32 UTC 2024, Updated every 90 seconds, Nagios® Core™ 4.5.5 - www.nagios.org, Logged in as nagiosadmin.
- Host Status Totals:** Up: 2, Down: 0, Unreachable: 0, Pending: 0.
- Service Status Totals:** OK: 12, Warning: 1, Unknown: 0, Critical: 3, Pending: 0.
- Service Status Details For All Hosts:** A table showing details for the 'linuxserver' host. The table has columns: Host, Service, Status, Last Check, Duration, Attempt, and Status Information. The services listed are Current Load, Current Users, HTTP, PING, Root Partition, SSH, Swap Usage, and Total Processes. The status of each service is indicated by a color-coded icon (green for OK, red for CRITICAL, yellow for WARNING).

Conclusion: In this experiment, we learned how to perform port, service monitoring, Windows/Linux server monitoring using Nagios. To do so, we needed a nagios-host EC2 Linux instance which was used to host the Nagios server and dashboard. We created an Ubuntu client instance to connect to the host. We set up some configurations on the Linux instance and added the public IP address of the Ubuntu instance in it. We

also set up some configurations on the Ubuntu client instance and added the IP address of the Linux server instance in it. Then, we made sure to add the Linux server instance as a 'allowed host' for the Ubuntu client instance. After restarting the NRPE server, we can see the 'linuxserver' host added.