Advanced DevOps Lab
Experiment 10

Name: Yash Rahate
Class: D15B
Roll No.: 48

Aim:

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

Theory:

Port and Service Monitoring:
Port and service monitoring is essential in maintaining the performance and security of a network. Ports are communication endpoints for various services running on a machine, and monitoring them ensures that critical services like SSH, HTTP, and others are active and functioning properly. Service monitoring tracks the status and availability of different services to ensure uninterrupted operations.

Nagios and NRPE:
Nagios is an open-source tool used for monitoring servers, networks, and infrastructure. It can detect system failures and performance issues, making it vital for real-time monitoring. NRPE (Nagios Remote Plugin Executor) extends Nagios' capabilities by enabling monitoring of remote Linux/Windows servers. It allows the Nagios server to execute monitoring scripts (plugins) on remote machines to gather data about system health, services, and ports.

Windows and Linux Server Monitoring:
Monitoring Windows and Linux servers is crucial in both large and small IT environments. Each server's health, including CPU usage, memory, disk space, and running services, must be constantly tracked to prevent downtimes. Nagios can be set up to monitor servers across platforms, offering insights into specific system parameters such as swap usage, active processes, and running ports, helping to avoid system overload or failures.

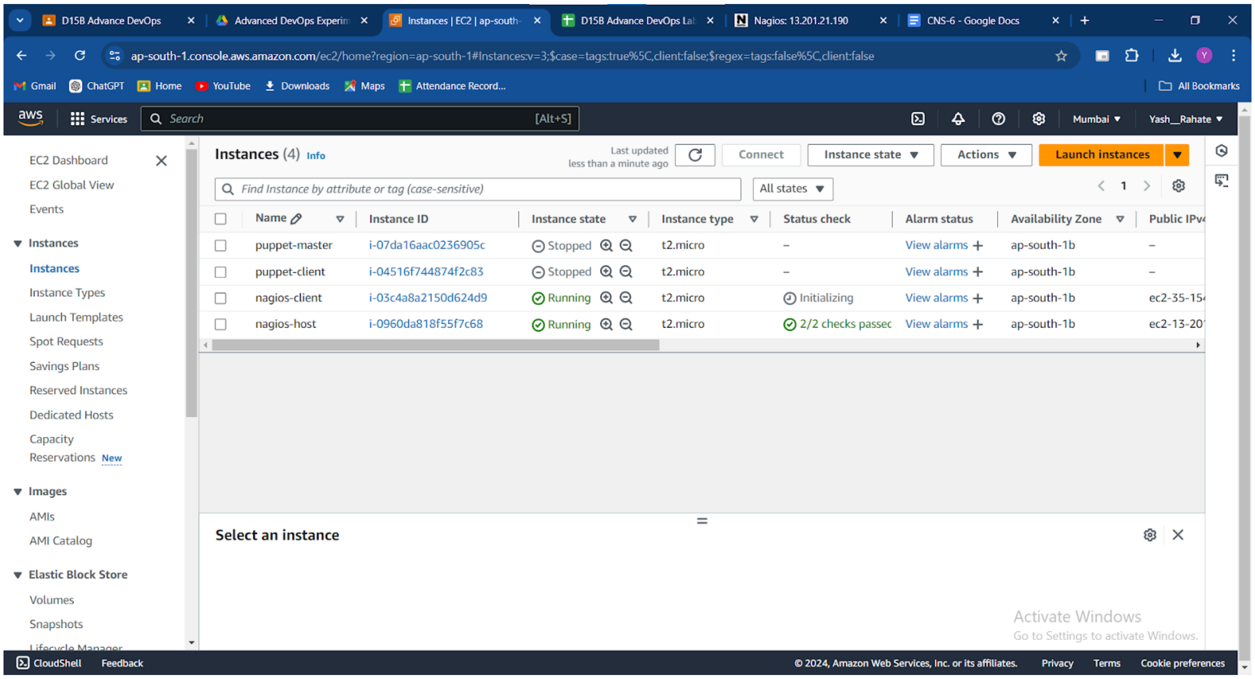
Ports and Services Monitored:

- SSH (Port 22): Monitored for secure remote access to the server.
- HTTP (Port 80): Monitored to check the availability of web servers and their services.
- Services Monitoring: Apart from ports, Nagios helps monitor key server services like user status, system load, total processes, and the state of critical system partitions (e.g., root partition).

Alerts and Notifications:

Nagios, along with NRPE, continuously monitors these parameters and sends alerts to administrators when thresholds are breached or if a service is down. This proactive approach enables quick resolution before an issue escalates, minimizing system downtime and performance degradation.

Steps:



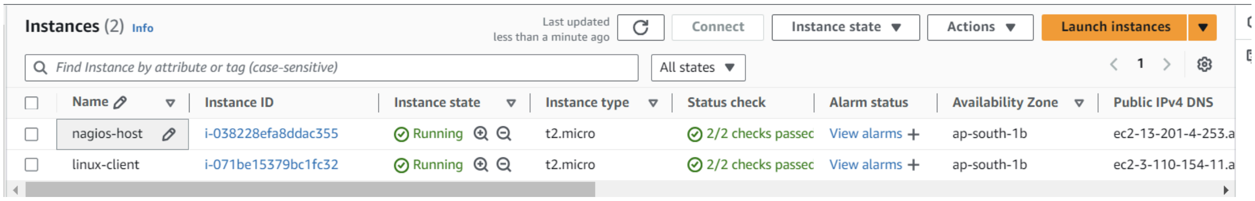
ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#Instances:v=3;$case=tags:true%5C,client:false;$regex=tags:false%5C,client:false

Instances (4) Info

Last updated less than a minute ago

Find Instance by attribute or tag (case-sensitive)

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4
□	puppet-master	i-07da16aac0236905c	Stopped	t2.micro	–	View alarms +	ap-south-1b	–
□	puppet-client	i-04516f744874f2c83	Stopped	t2.micro	–	View alarms +	ap-south-1b	–
□	nagios-client	i-03c4a8a2150d624d9	Running	t2.micro	Initializing	View alarms +	ap-south-1b	ec2-35-15
□	nagios-host	i-0960da818f55f7c68	Running	t2.micro	2/2 checks passec	View alarms +	ap-south-1b	ec2-13-20

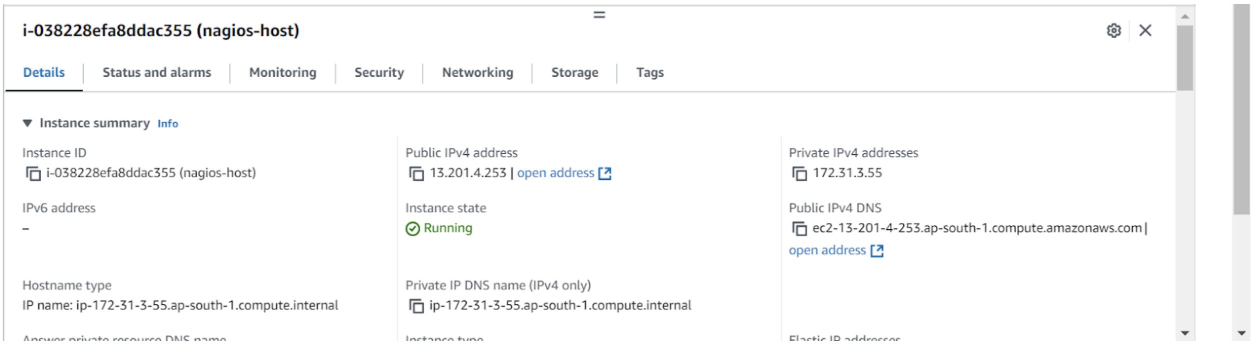


Instances (2) Info

Last updated less than a minute ago

Find Instance by attribute or tag (case-sensitive)

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
□	nagios-host	i-038228efa8ddac355	Running	t2.micro	2/2 checks passec	View alarms +	ap-south-1b	ec2-13-201-4-253.a
□	linux-client	i-071be15379bc1fc32	Running	t2.micro	2/2 checks passec	View alarms +	ap-south-1b	ec2-3-110-154-11.a



i-038228efa8ddac355 (nagios-host)

Instance summary Info

Instance ID
i-038228efa8ddac355 (nagios-host)

Public IPv4 address
13.201.4.253 | open address

Private IPv4 addresses
172.31.3.55

IPv6 address
–

Instance state
Running

Public IPv4 DNS
ec2-13-201-4-253.ap-south-1.compute.amazonaws.com | open address

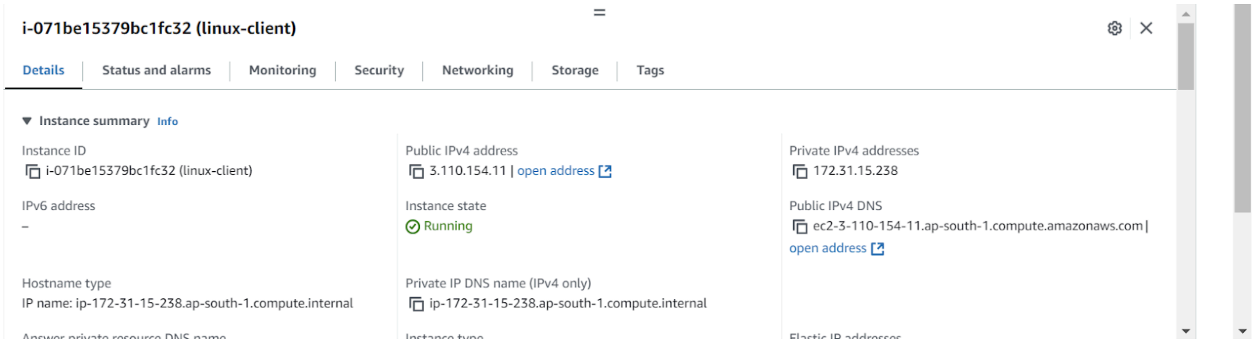
Hostname type
IP name: ip-172-31-3-55.ap-south-1.compute.internal

Private IP DNS name (IPv4 only)
ip-172-31-3-55.ap-south-1.compute.internal

Answer private resource DNS name

Instance type

Elastic IP addresses



i-071be15379bc1fc32 (linux-client)

▼ Instance summary Info

Instance ID
i-071be15379bc1fc32 (linux-client)

Public IPv4 address
3.110.154.11 | open address

Private IPv4 addresses
172.31.15.238

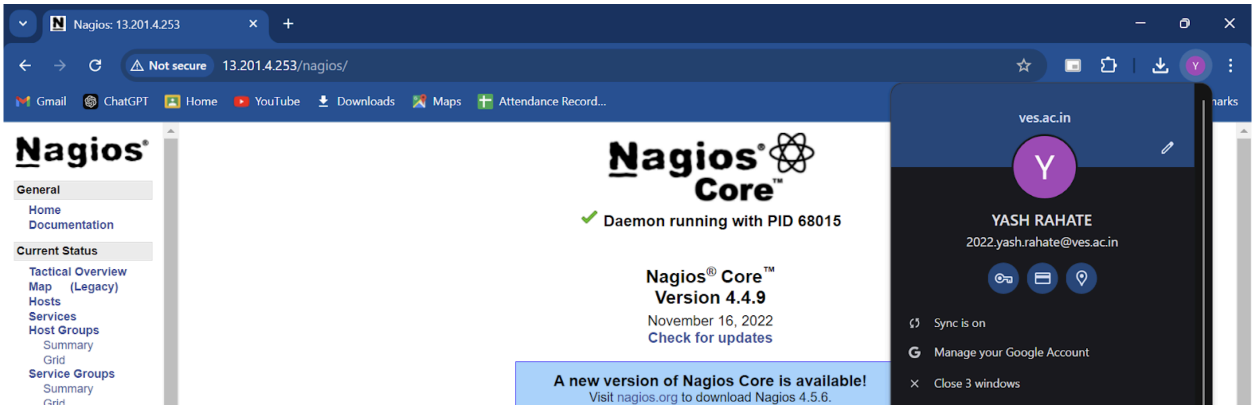
IPv6 address
–

Instance state
Running

Public IPv4 DNS
ec2-3-110-154-11.ap-south-1.compute.amazonaws.com | open address

Hostname type
IP name: ip-172-31-15-238.ap-south-1.compute.internal

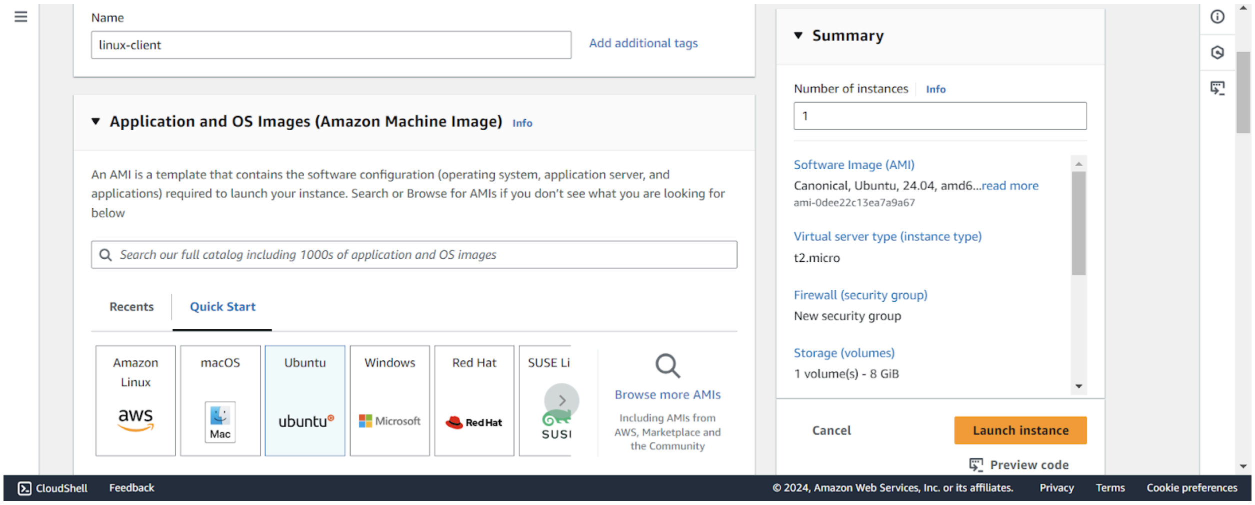
Private IP DNS name (IPv4 only)
ip-172-31-15-238.ap-south-1.compute.internal



✓ Daemon running with PID 68015

Nagios® Core™
Version 4.4.9
November 16, 2022
Check for updates

A new version of Nagios Core is available!
Visit nagios.org to download Nagios 4.5.6.



Name

linux-client

Add additional tags

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Summary

Number of instances Info

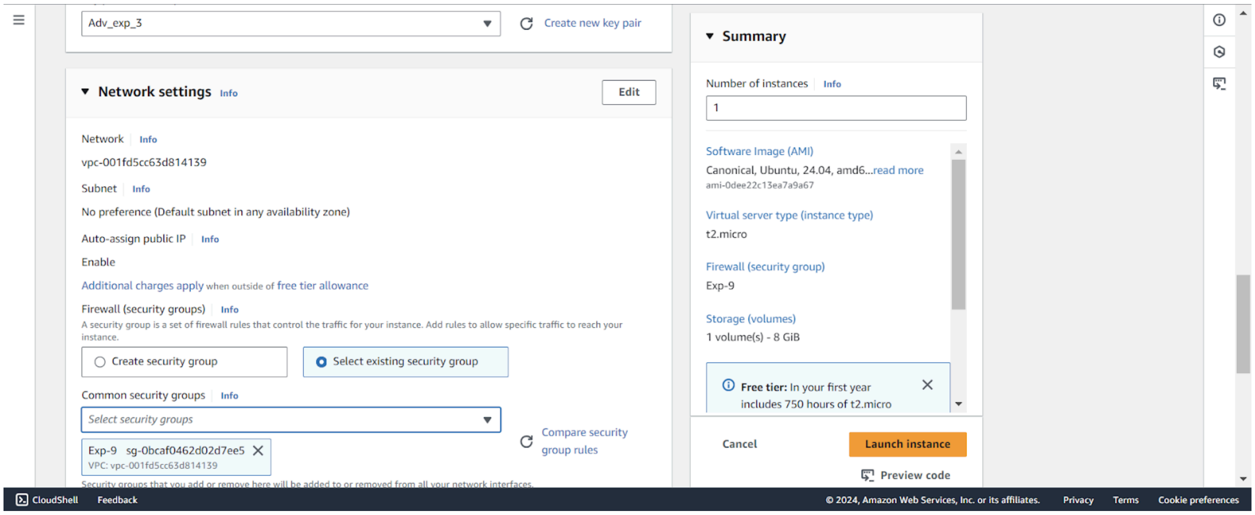
1

Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-0dee22c13ea7a9a67

Virtual server type (instance type)
t2.micro

Firewall (security group)
New security group

Storage (volumes)
1 volume(s) - 8 GiB



Adv_exp_3

Network settings Info

Network Info
vpc-001fd5cc63d814139

Subnet Info
No preference (Default subnet in any availability zone)

Auto-assign public IP Info
Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

○ Create security group ● Select existing security group

Common security groups Info

Select security groups

Exp-9 sg-0bcaf0462d02d7ee5
VPC: vpc-001fd5cc63d814139

Security groups that you add or remove here will be added to or removed from all your network interfaces.

Summary

Number of instances Info

1

Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-0dee22c13ea7a9a67

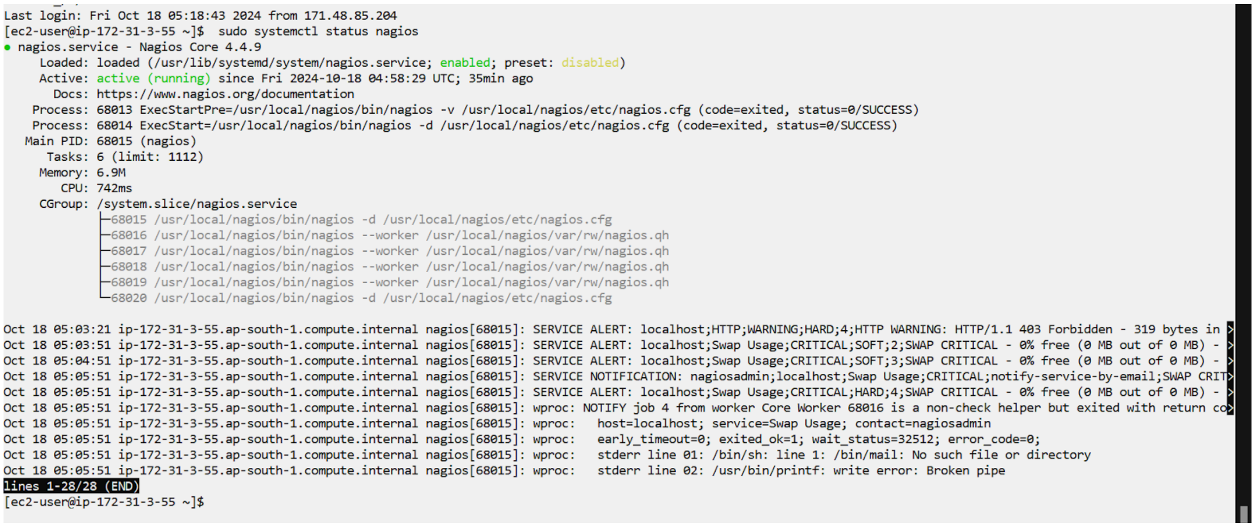
Virtual server type (instance type)
t2.micro

Firewall (security group)
Exp-9

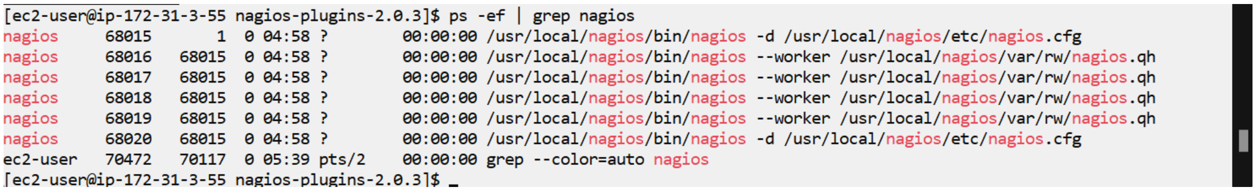
Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro

On host:

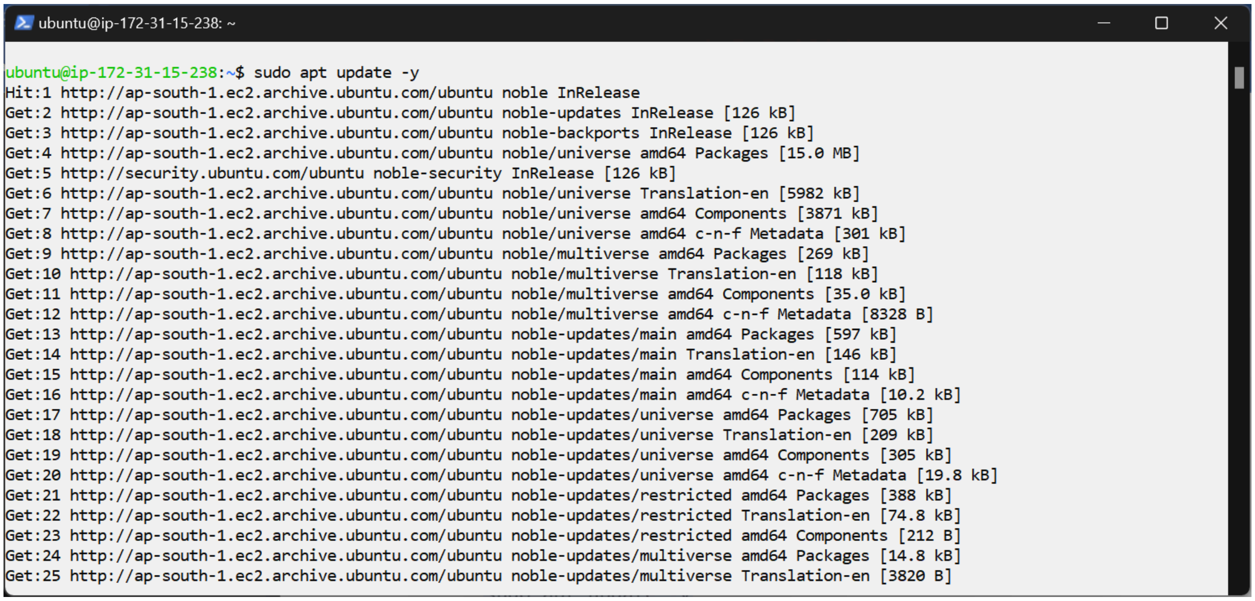


```
Last login: Fri Oct 18 05:18:43 2024 from 171.48.85.204
[ec2-user@ip-172-31-3-55 ~]$  sudo systemctl status nagios
● nagios.service - Nagios Core 4.4.9
     Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: disabled)
     Active: active (running) since Fri 2024-10-18 04:58:29 UTC; 35min ago
       Docs: https://www.nagios.org/documentation
    Process: 68013 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
    Process: 68014 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
   Main PID: 68015 (nagios)
      Tasks: 6 (limit: 1112)
     Memory: 6.9M
        CPU: 742ms
     CGroup: /system.slice/nagios.service
             ├─68015 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
             ├─68016 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─68017 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─68018 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─68019 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             └─68020 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Oct 18 05:03:21 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: SERVICE ALERT: localhost;HTTP;WARNING;HARD;4;HTTP WARNING: HTTP/1.1 403 Forbidden - 319 bytes in >
Oct 18 05:03:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: SERVICE ALERT: localhost;Swap Usage;CRITICAL;SOFT;2;SWAP CRITICAL - 0% free (0 MB out of 0 MB) - >
Oct 18 05:04:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: SERVICE ALERT: localhost;Swap Usage;CRITICAL;SOFT;3;SWAP CRITICAL - 0% free (0 MB out of 0 MB) - >
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: SERVICE NOTIFICATION: nagiosadmin;localhost;Swap Usage;CRITICAL;notify-service-by-email;SWAP CRIT>
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: SERVICE ALERT: localhost;Swap Usage;CRITICAL;HARD;4;SWAP CRITICAL - 0% free (0 MB out of 0 MB) - >
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: wproc: NOTIFY job 4 from worker Core Worker 68016 is a non-check helper but exited with return co>
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: wproc:   host=localhost; service=Swap Usage; contact=nagiosadmin
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: wproc:   early_timeout=0; exited_ok=1; wait_status=32512; error_code=0;
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: wproc:   stderr line 01: /bin/sh: line 1: /bin/mail: No such file or directory
Oct 18 05:05:51 ip-172-31-3-55.ap-south-1.compute.internal nagios[68015]: wproc:   stderr line 02: /usr/bin/printf: write error: Broken pipe
lines 1-28/28 (END)
[ec2-user@ip-172-31-3-55 ~]$
```



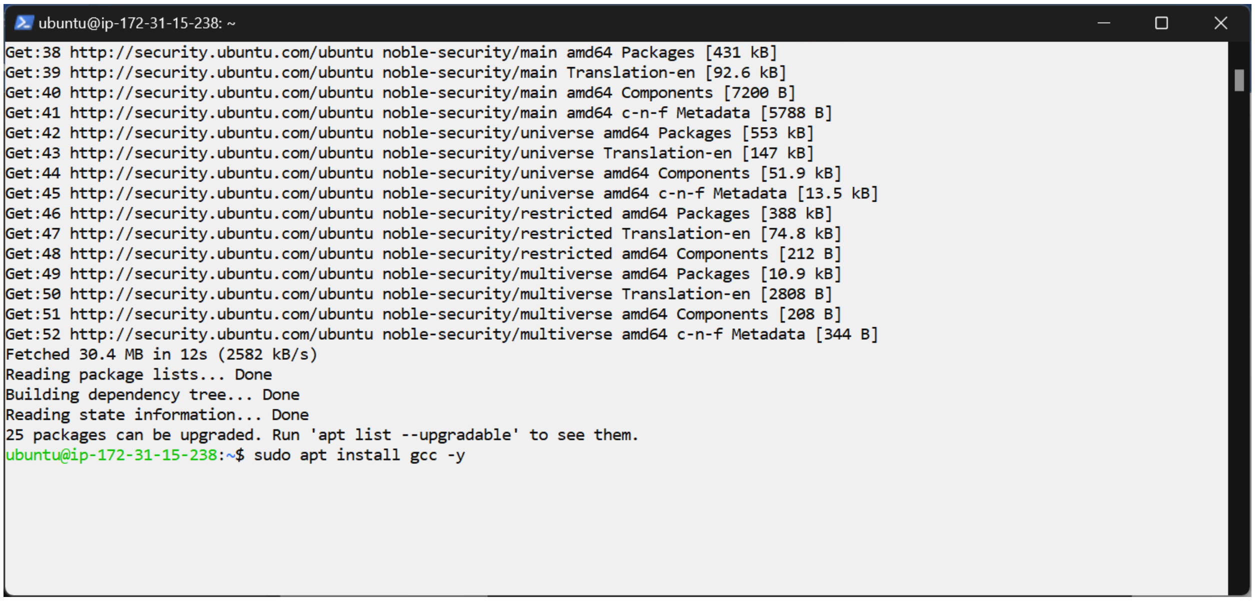
```
[ec2-user@ip-172-31-3-55 nagios-plugins-2.0.3]$ ps -ef | grep nagios
nagios     68015       1  0 04:58 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
nagios     68016   68015  0 04:58 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     68017   68015  0 04:58 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     68018   68015  0 04:58 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     68019   68015  0 04:58 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     68020   68015  0 04:58 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
ec2-user   70472   70117  0 05:39 pts/2    00:00:00 grep --color=auto nagios
[ec2-user@ip-172-31-3-55 nagios-plugins-2.0.3]$ _
```

On client:

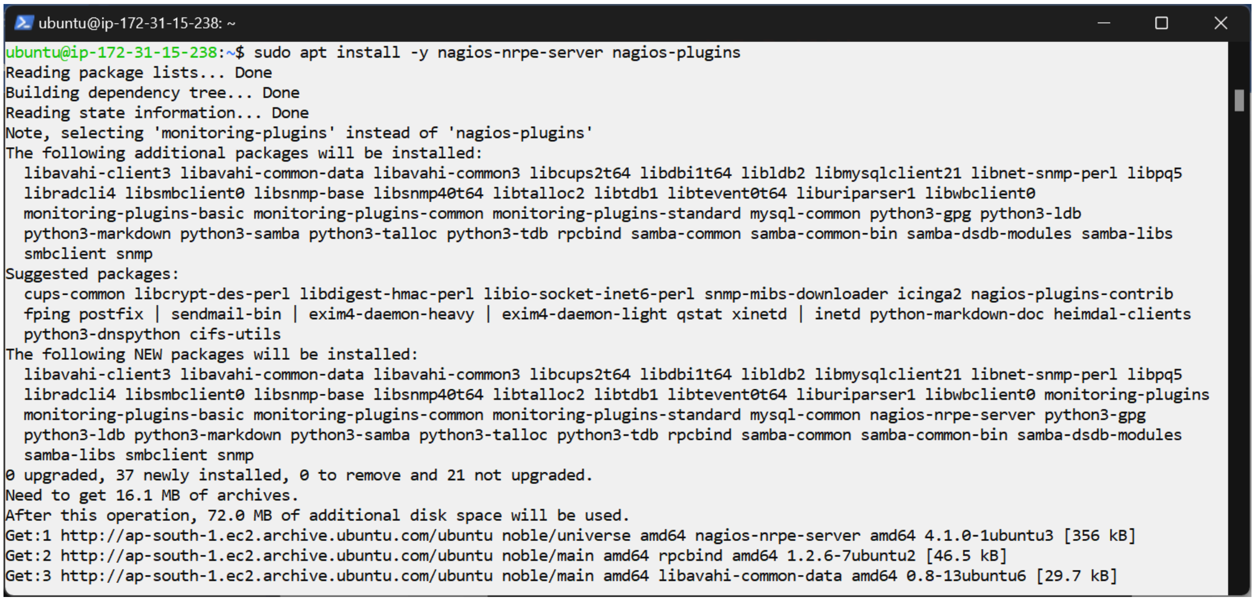


ubuntu@ip-172-31-15-238: ~

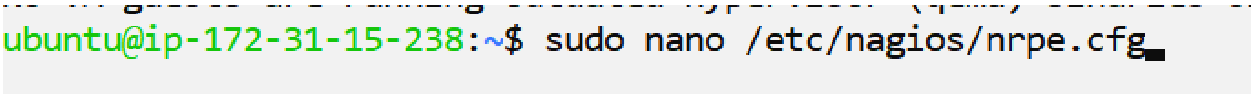
```
ubuntu@ip-172-31-15-238:~$ sudo apt update -y
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:5 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:8 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [597 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [146 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [114 kB]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [10.2 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [705 kB]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [209 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [305 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [19.8 kB]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [388 kB]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [74.8 kB]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [14.8 kB]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [3820 B]
```



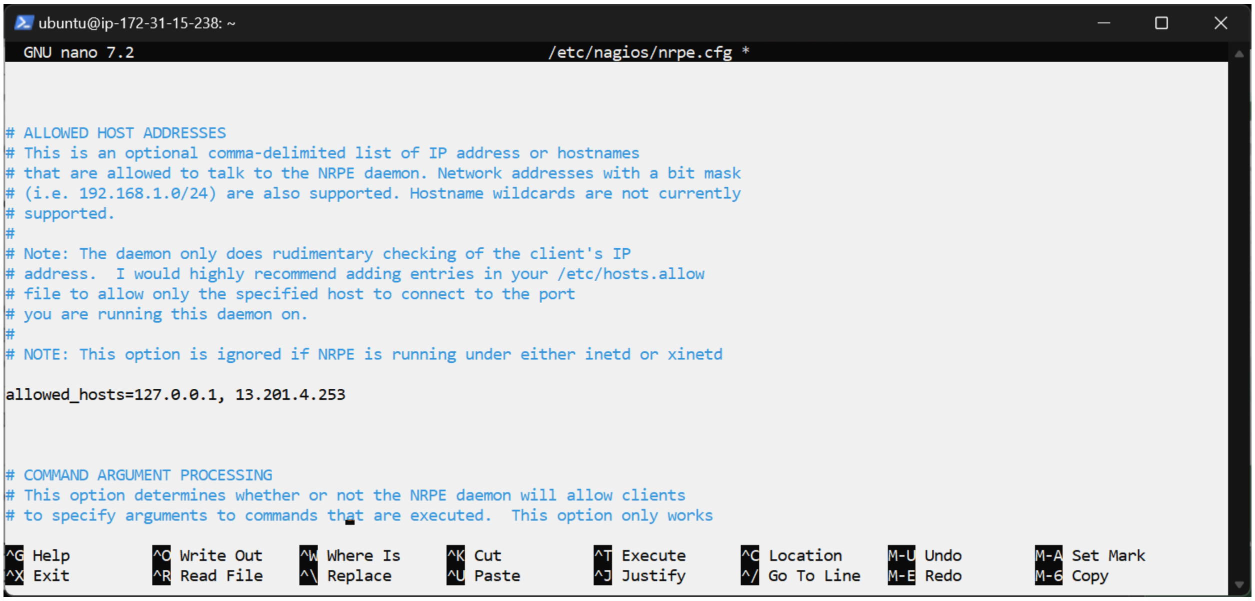
```
Get:38 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [431 kB]
Get:39 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [92.6 kB]
Get:40 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [7200 B]
Get:41 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [5788 B]
Get:42 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [553 kB]
Get:43 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [147 kB]
Get:44 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [51.9 kB]
Get:45 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [13.5 kB]
Get:46 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [388 kB]
Get:47 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [74.8 kB]
Get:48 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:49 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [10.9 kB]
Get:50 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [2808 B]
Get:51 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:52 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [344 B]
Fetched 30.4 MB in 12s (2582 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
25 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-15-238:~$ sudo apt install gcc -y
```



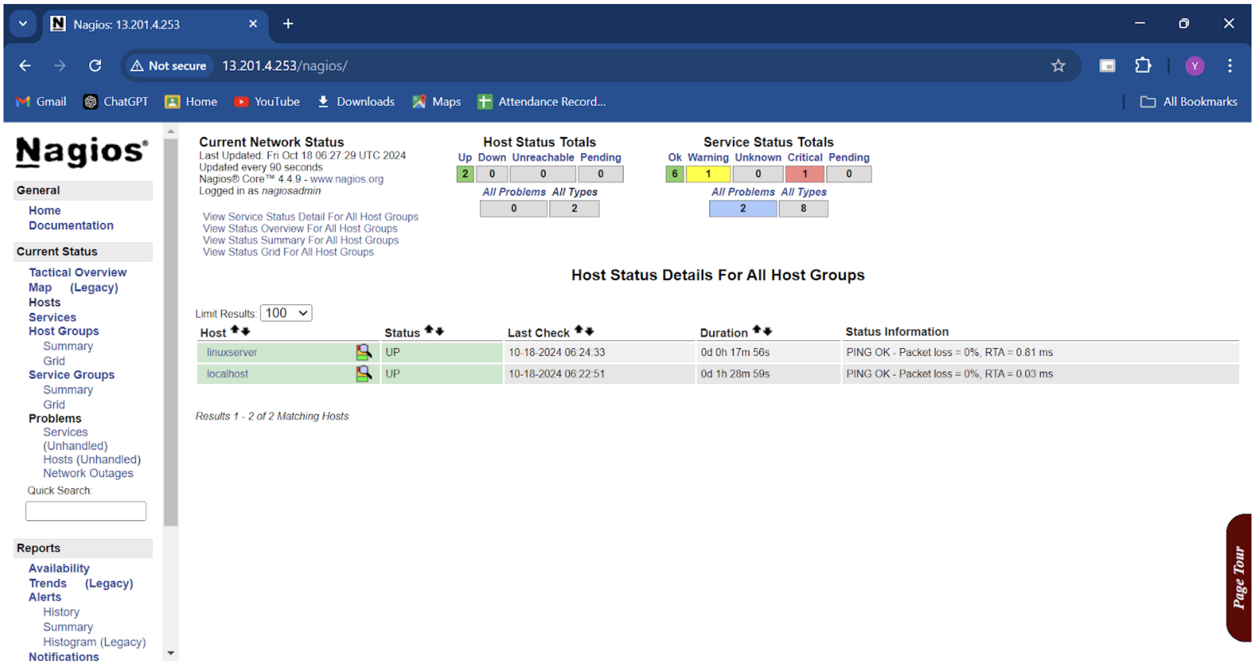
```
ubuntu@ip-172-31-15-238:~$ sudo apt install -y nagios-nrpe-server nagios-plugins
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'monitoring-plugins' instead of 'nagios-plugins'
The following additional packages will be installed:
  libavahi-client3 libavahi-common-data libavahi-common3 libcups2t64 libdbi1t64 libldb2 libmysqlclient21 libnet-snmp-perl libpq5
  libradcli4 libsmbclient0 libsnmp-base libsnmp40t64 libtalloc2 libtdb1 libtevent0t64 liburiparser1 libwbclient0
  monitoring-plugins-basic monitoring-plugins-common monitoring-plugins-standard mysql-common python3-gpg python3-ldb
  python3-markdown python3-samba python3-talloc python3-tdb rpcbind samba-common samba-common-bin samba-dsdb-modules samba-libs
  smbclient snmp
Suggested packages:
  cups-common libcrypt-des-perl libdigest-hmac-perl libio-socket-inet6-perl snmp-mibs-downloader icinga2 nagios-plugins-contrib
  fping postfix | sendmail-bin | exim4-daemon-heavy | exim4-daemon-light qstat xinetd | inetd python-markdown-doc heimdal-clients
  python3-dnspython cifs-utils
The following NEW packages will be installed:
  libavahi-client3 libavahi-common-data libavahi-common3 libcups2t64 libdbi1t64 libldb2 libmysqlclient21 libnet-snmp-perl libpq5
  libradcli4 libsmbclient0 libsnmp-base libsnmp40t64 libtalloc2 libtdb1 libtevent0t64 liburiparser1 libwbclient0 monitoring-plugins
  monitoring-plugins-basic monitoring-plugins-common monitoring-plugins-standard mysql-common nagios-nrpe-server python3-gpg
  python3-ldb python3-markdown python3-samba python3-talloc python3-tdb rpcbind samba-common samba-common-bin samba-dsdb-modules
  samba-libs smbclient snmp
0 upgraded, 37 newly installed, 0 to remove and 21 not upgraded.
Need to get 16.1 MB of archives.
After this operation, 72.0 MB of additional disk space will be used.
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 nagios-nrpe-server amd64 4.1.0-1ubuntu3 [356 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 rpcbind amd64 1.2.6-7ubuntu2 [46.5 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libavahi-common-data amd64 0.8-13ubuntu6 [29.7 kB]
```



```
ubuntu@ip-172-31-15-238:~$ sudo nano /etc/nagios/nrpe.cfg
```



```
GNU nano 7.2                                   /etc/nagios/nrpe.cfg *


# 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, 13.201.4.253



# 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

^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
```



Current Network Status
Last Updated: Fri Oct 18 06:27:29 UTC 2024
Updated every 90 seconds
Nagios® Core™ 4.4.9 - www.nagios.org
Logged in as *nagiosadmin*

View Service Status Detail For All Host Groups
View Status Overview For All Host Groups
View Status Summary For All Host Groups
View Status Grid For All Host Groups

Host Status Totals

Up	Down	Unreachable	Pending
2	0	0	0

All Problems	*All Types*
0	2

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
6	1	0	1	0

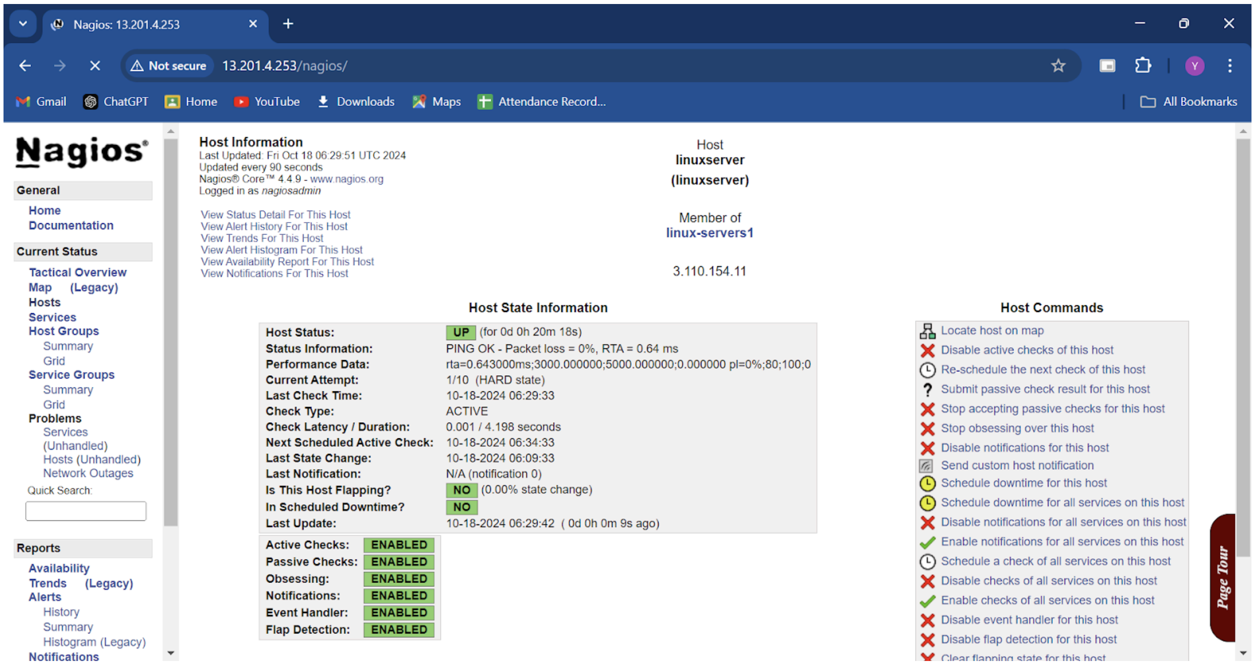
All Problems	*All Types*
2	8

Host Status Details For All Host Groups

Limit Results: 100

Host	Status	Last Check	Duration	Status Information
linuxserver	UP	10-18-2024 06:24:33	0d 0h 17m 56s	PING OK - Packet loss = 0%, RTA = 0.81 ms
localhost	UP	10-18-2024 06:22:51	0d 1h 28m 59s	PING OK - Packet loss = 0%, RTA = 0.03 ms

Results 1 - 2 of 2 Matching Hosts



Host Information
Last Updated: Fri Oct 18 06:29:51 UTC 2024
Updated every 90 seconds
Nagios® Core™ 4.4.9 - www.nagios.org
Logged in as *nagiosadmin*

View Status Detail For This Host
View Alert History For This Host
View Trends For This Host
View Alert Histogram For This Host
View Availability Report For This Host
View Notifications For This Host

Host
linuxserver
(linuxserver)

Member of
linux-servers1

3.110.154.11

Host State Information

Host Status:	UP (for 0d 0h 20m 18s)
Status Information:	PING OK - Packet loss = 0%, RTA = 0.64 ms
Performance Data:	rta=0.643000ms;3000.000000;5000.000000;0.000000 pl=0%;80;100;0
Current Attempt:	1/10 (HARD state)
Last Check Time:	10-18-2024 06:29:33
Check Type:	ACTIVE
Check Latency / Duration:	0.001 / 4.198 seconds
Next Scheduled Active Check:	10-18-2024 06:34:33
Last State Change:	10-18-2024 06:09:33
Last Notification:	N/A (notification 0)
Is This Host Flapping?	NO (0.00% state change)
In Scheduled Downtime?	NO
Last Update:	10-18-2024 06:29:42 (0d 0h 0m 9s ago)

Active Checks:	ENABLED
Passive Checks:	ENABLED
Obsessing:	ENABLED
Notifications:	ENABLED
Event Handler:	ENABLED
Flap Detection:	ENABLED

Host Commands

- 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
- ✗ Clear flapping state for this host

Conclusion:

Thus, we learned about port and service monitoring using Nagios and successfully monitored a Linux server. Using Nagios and NRPE, we were able to track server performance and monitor key services and ports effectively.