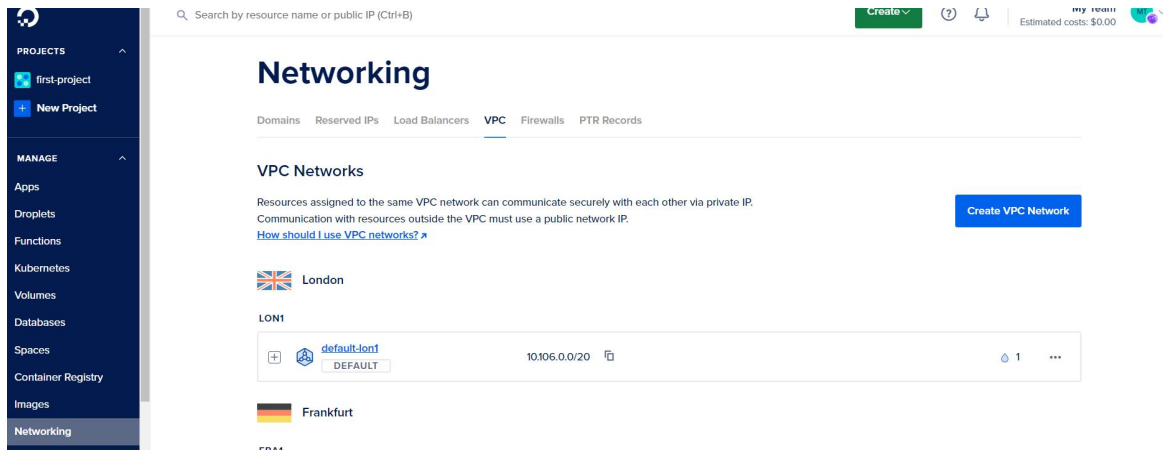


DigitalOcean Node Setup procedure

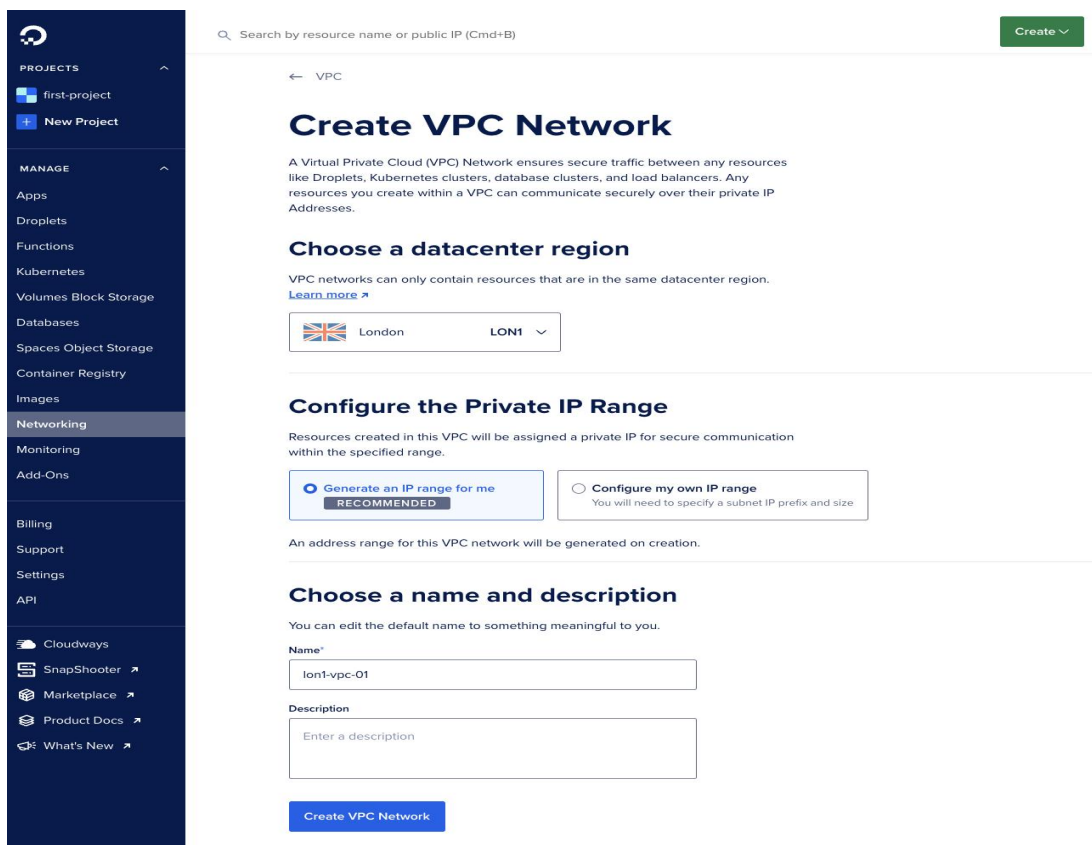
Log on to your digitalocean console.

Click on MANAGE->Networking and Select VPC , click on Create VPC Network



The screenshot shows the DigitalOcean console's Networking section. The left sidebar has a 'MANAGE' menu with 'Networking' selected. The main content area is titled 'Networking' and has tabs for Domains, Reserved IPs, Load Balancers, VPC (selected), Firewalls, and PTR Records. Under 'VPC Networks', there is a description and a 'Create VPC Network' button. Below this, two regions are listed: London (LON1) and Frankfurt (FRA1). The London region shows a default VPC network named 'default-lon1' with a public IP range of 10.106.0.0/20.

Select London Region



The screenshot shows the 'Create VPC Network' wizard in the DigitalOcean console. The left sidebar has 'Networking' selected. The main content area is titled 'Create VPC Network' and has a 'Create' button in the top right. The wizard steps are: 1. 'Choose a datacenter region' where 'London' (LON1) is selected. 2. 'Configure the Private IP Range' where 'Generate an IP range for me' is selected (marked as 'RECOMMENDED'). 3. 'Choose a name and description' where the name 'lon1-vpc-01' is entered. A 'Create VPC Network' button is at the bottom.

Choose a name and description. Click on “Create VPC Network”. VPC is created now.

Networking

Domains Reserved IPs Load Balancers **VPC** Firewalls PTR Records

VPC Networks

Resources assigned to the same VPC network can communicate securely with each other via private IP.
Communication with resources outside the VPC must use a public network IP.

[How should I use VPC networks?](#)

Create VPC Network



London

LON1



[nms-vpc-01](#)
VPC created for NMS application

10.106.16.0/20

No resources



Staying in “Networking”, click on Firewalls to create Firewall rules

PROJECTS

first-project

+ New Project

MANAGE

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Search by resource name or public IP (Ctrl+B)

Create

?

🔔

Networking

Domains Reserved IPs Load Balancers VPC **Firewalls** PTR records

Firewalls

Firewalls allow you to easily secure your infrastructure by explicitly defining which type of traffic is allowed to reach it. Use tags to organize your infrastr and apply Firewall rules to multiple resources.

Create Firewall

Click on Create Firewall

Give a name for the Firewall Rule

Add inbound Rules as shown below for a **Guardian Node**

Create Firewall

Name

Name	nms-firewall-01	✓
------	-----------------	---

Inbound Rules

Set the Firewall rules for incoming traffic. Only the specified ports will accept inbound connections. All other traffic will be dropped.

Type	Protocol	Port Range	Sources	
SSH	TCP	22	All IPv4 All IPv6	Delete
Custom	TCP	Ports 8000-8001 ?	All IPv4 All IPv6	Delete
Custom	TCP	Ports 9000 ?	All IPv4 All IPv6	Delete
Custom	TCP	Ports 9065-9066 ?	All IPv4 All IPv6	Delete
New rule				

or add inbound Rules as shown below for a **Master node**

Create Firewall

Name

Name	nms-firewall-01	✓
------	-----------------	---

Inbound Rules

Set the Firewall rules for incoming traffic. Only the specified ports will accept inbound connections. All other traffic will be dropped.

Type	Protocol	Port Range	Sources	
SSH	TCP	22	All IPv4 All IPv6	Delete
Custom	TCP	Ports 8000-8001 ?	All IPv4 All IPv6	Delete
Custom	TCP	Ports 9000 ?	All IPv4 All IPv6	Delete
Custom	TCP	Ports 19001-19004 ?	All IPv4 All IPv6	Delete
New rule				

for both Guardian or Master Nodes, please keep the default values in the Outbound rules

Outbound Rules

Set the Firewall rules for outbound traffic. Outbound traffic will only be allowed to the specified ports. All other traffic will be blocked.

Type	Protocol	Port Range	Destinations	
ICMP	ICMP		All IPv4 All IPv6	Delete
All TCP	TCP	All ports	All IPv4 All IPv6	Delete
All UDP	UDP	All ports	All IPv4 All IPv6	Delete
New rule				

Apply to Droplets

Select Droplets to apply your Firewall rules to.

Create Firewall

Click on Create Firewall

Networking

Domains Reserved IPs Load Balancers VPC **Firewalls** PTR records

				Create Firewall
Name	Droplets	Rules	Created	
 nms-firewall-01	0	7	Just now	More

Your Firewall should now have been created and shown in the list.

Click on MANAGE->DROPLETS in the navigation bar.

Click on CREATE droplet

PROJECTS

first-project

New Project

MANAGE

Apps

Search by resource name or public IP (Ctrl+B)

Create

?

🔔

My Team

Estimated costs: \$155

Droplets

Search by Droplet name

Create Droplet

Name

ID

Architecture

Created










Time

Now select the London region.

Create Droplets

Droplets are virtual machines that anyone can setup in seconds. You can use droplets, either standalone or as part of a larger, cloud based infrastructure.

Choose Region

 New York	 San Francisco	 Amsterdam
 Singapore	 London	 Frankfurt
 Toronto	 Bangalore	 Sydney

Datacenter

London • Datacenter 1 • LON1

💡 **Tip:** Select the datacenter closest to you or your users
Avoid any potential latency by selecting a region closest to you - a region is a geographic area where we have one or more datacenters.

[Dismiss](#)

In the “VPC Network” dropdown, chose the VPC created in the previous step

VPC Network

nms-vpc-01
VPC created for NMS application







10.106.16.0/20

This resource can communicate over Private IP address only with other resources in the same VPC network. [Learn more](#)

Now choose “Ubuntu” and “**Version 20.04 (LTS) x64**” as shown below

Choose an image

OS Marketplace Custom images

 Ubuntu	 Fedora	 Debian	 CentOS	 AlmaLinux	 Rocky Linux
---	---	---	---	---	--

Version

20.04 (LTS) x64

Now choose the options as shown below (8Cpu and 16GB Ram)

Droplet Type

SHARED CPU	DEDICATED CPU			
Basic (Plan selected)	General Purpose	CPU-Optimized	Memory-Optimized	Storage-Optimized

Basic virtual machines with a mix of memory and compute resources. Best for small projects that can handle variable levels of CPU performance, like blogs, web apps and dev/test environments.

CPU options

☒ **Regular**
Disk type: SSD

☐ **Premium Intel**
Disk: NVMe SSD

☐ **Premium AMD**
Disk: NVMe SSD

\$6/mo \$0.009/hour 1 GB / 1 CPU 25 GB SSD Disk 1000 GB transfer	\$12/mo \$0.018/hour 2 GB / 1 CPU 50 GB SSD Disk 2 TB transfer	\$18/mo \$0.027/hour 2 GB / 2 CPUs 60 GB SSD Disk 3 TB transfer	\$24/mo \$0.036/hour 4 GB / 2 CPUs 80 GB SSD Disk 4 TB transfer	\$48/mo \$0.071/hour 8 GB / 4 CPUs 160 GB SSD Disk 5 TB transfer	\$96/mo \$0.143/hour 16 GB / 8 CPUs 320 GB SSD Disk 6 TB transfer
---	---	--	--	---	--

Choose “SSH Key” as the Authentication method

Choose Authentication Method ?

☒ **SSH Key**
Connect to your Droplet with an SSH key pair

☐ **Password**
Connect to your Droplet as the "root" user via password

Add a public SSH key

SSH keys are a more secure method of logging into an SSH server, because they are not vulnerable to common brute-force password hacking attacks.

i We can walk you through setting up your first SSH key [Add SSH Key](#)

We recommend these options

Click on “Add SSH Key” or “New SSH Key” and follow the instructions given under “Create a new key pair, if needed”

Create a new key pair

When on a MAC / Linux

Note:

ssh-keygen -f alkimi_key

Note: If you want to protect the key, choose a passphrase when prompted.(This is optional)

This will create the keys

```
Last login: Thu Oct 19 13:40:56 on console
[bhargav@Bhargavs-MacBook-Pro ~ % ssh-keygen -f alkimi_key
Generating public/private rsa key pair.
[Enter passphrase (empty for no passphrase):
[Enter same passphrase again:
Your identification has been saved in alkimi_key.
Your public key has been saved in alkimi_key.pub.
The key fingerprint is:
SHA256:EFDuinExlvS6sTKQLTu+0U9Um4bubsXnE5yZyt1HnyQ bhargav@Bhargavs-MacBook-Pro.local
The key's randomart image is:
+----[RSA 3072]-----+
|      ooo      |
|     . + .     |
|    = +.       |
|   o . =o.o    |
|+ o +oo+S +   |
|+.+o=.o B E . |
|o.+.+oo * o + .|
|...o+. + + . o|
| o. o+   o     |
+----[SHA256]-----+
[bhargav@Bhargavs-MacBook-Pro ~ % ls -ltr alkimi*
-rw-----  1 bhargav  staff  2622  1 Nov 13:06 alkimi_key
-rw-r--r--  1 bhargav  staff   588  1 Nov 13:06 alkimi_key.pub
bhargav@Bhargavs-MacBook-Pro ~ %
```

On Windows 10 or above

Open the command line by typing "cmd" in the "search" bar in windows left hand bottom side.

```
ssh-keygen -f alkimi_key
```

Note: If you want to protect the key, choose a passphrase when prompted.(This is optional)

This will create the keys

alkimi_key - private key file

alkimi_key.pub - public key file

cmd Command Prompt

```
C:\Users\preet>ssh-keygen -f alkimi_key
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in alkimi_key
Your public key has been saved in alkimi_key.pub
The key fingerprint is:
SHA256:AQSydivdPN6f53C8mYNXKK3DUrdwUZg6burd3/kED+0 preet@LAPTOP-23STRS01
The key's randomart image is:
+---[RSA 3072]-----+
|  . .oo      o      |
|  o   .   o .      |
|  o .   .   .      |
|  . o +   .o .   .  |
|  . o + S. o oo .   |
|  . . o  *. = . =   |
|  . =.Boo  E       |
|      oo==+ o.      |
|      ...+=*o..+    |
+-----[SHA256]-----+

C:\Users\preet>dir alkimi_key*
Volume in drive C is Acer
Volume Serial Number is 7C00-3660

Directory of C:\Users\preet

01/11/2023  13:00                2,610 alkimi_key
01/11/2023  13:00                576 alkimi_key.pub
                2 File(s)              3,186 bytes
                0 Dir(s)  276,281,565,184 bytes free

C:\Users\preet>
```

Copy the contents of the file alkimi_key.pub.
Paste your SSH key and give it a name

resource name or public IP (Ctrl+B)

Create

Add public SSH key

Copy your public SSH key and paste it in the space below. For instructions on how, follow the steps on the right.

SSH key content

```

kpvlf2bwVY0euuZ2RnlydSPGLJw4vzWkdDSNhCsTpDHh9W2o9pEKagKuA
BVhr8LIWWs/81BOa3UjDrADmyYWpm4IIYeCANSskB8pQxsGVOIoA3EPiMS
5y8xfKhZ3DzazTErubprZw/Og96jN+gs4UJ5mHKnps9136I0e9O4dtOA3xPKy
B/JMx8M17PbVM696mr226gpbCvXMon0MtIOT1FoajH4LUoEsJ/DtUb7jaD9
CVkQfA4e1CxUDQ76haf4P9UVFV8jiSCn5Pvx+pFa+EVOpigl0eMh9H3Oo5X
TDwP0mfPS5ETfdblPjal4FnLrQAgyGBkxC8UobkzoviBsfBHeVWXmqAqSB
AA9B6sctK1r48FBFJTPaJ97ZRTCkwb6hwBlvTfL0urPqTcG6CClzc6iccAdOI4
OaPOil/M= preet@LAPTOP-23STRSO1

```

Name

SeshaLaptop

Add SSH Key

SSH Keys

Follow these instructions to create or add SSH keys on Linux, MacOS & Windows. Windows users without OpenSSH [can install and use PuTTY](#) instead.

Create a new key pair, if needed

Open a terminal and run the following command:

```
ssh-keygen
```

Copy

You will be prompted to save and name the key.

```
Generating public/private rsa key pair. Enter file in which to save
```

Ignore any additional options.

Under Finalise Details, enter your preferred Hostname

Finalize Details

Quantity

Deploy multiple Droplets with the same configuration.

—

1 Droplet

+

Hostname

Give your Droplets an identifying name you will remember them by.

nms-node

Tags

Type tags here

Project

first-project

▼

\$96.00/month

\$0.143/hour

CREATE VIA COMMAND LINE

Create Droplet

Now click on Create Droplet.

Search by resource name or public IP (Ctrl+B)

Create

?

🔔

my team

Estimated costs: \$1.55

first-project

DEFAULT

Update your project information under Settings

Move Resources

Resources

Activity

Settings

DROPLETS (2)

nms-node-london

144.126.232.203

+👁


+🔗

...

Droplet is now created.

Add Droplet to Firewall rules.

Click on MANAGE->Networking and Select Firewall , which shows the firewall created earlier



PROJECTS

first-project

+ New Project

MANAGE

Apps

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Functions

Kubernetes

Volumes Block Storage

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Spaces Object Storage

Container Registry

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Networking


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Add-Ons

Search by resource name or public IP (Ctrl+B)


Networking

DomainsReserved IPsLoad BalancersVPCFirewallsPTR records

Name	Droplets	Rules
 nms-firewall-01	0	7

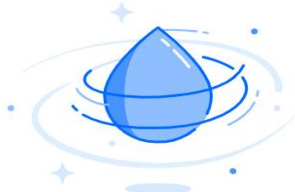
Click on Firewall name and click on Droplets as shown below

← Firewalls



nms-firewall-01
7 Rules / 0 Droplets

RulesDropletsDestroy




Choose Droplets
Your Firewall isn't applied to any Droplet. Select to which ones it should apply or use tags to select groups of Droplets.

Add Droplets

Click on Add Droplets

×

Add Droplet


 nms-node-london

Search for a Droplet or a tag

Add Droplet

Enter the droplet name created earlier as shown above and click on Add Droplet

← Firewalls




nms-firewall-01

7 Rules / 1 Droplet

Rules

Droplets

Destroy

Name	IP Address	State	Added
<div> nms-node-london 1 GB / 25 GB / LON1</div>	167.71.138.20	Up-to-date	Just now


Droplet is now added to the firewall.

Now follow instructions to setup NMS.

[NMS Install Procedure \(DigitalOcean\).](#)


Click on Droplet from droplet dashboard.

Search by resource name or public IP (Ctrl+B) Create ? 🔔 my team
Estimated costs: \$1.55



 **first-project** DEFAULT
Update your project information under Settings → Move Resources


Resources Activity Settings

DROPLETS (2)

 nms-node-london	144.126.232.203	+📧 +🔑 ...
--	-----------------	--

Now Click on “Console” at the top right to logon to droplet.

 **nms-node-london**
in  **first-project** / 1 GB Memory / 25 GB Disk / LON1 - Ubuntu 22.04 (LTS) x64 ON

ipv4: 144.126.232.203 ipv6: [Enable now](#) Private IP: 10.106.0.3 Reserved IP: [Enable now](#) Console:  ?

nms-node-london - DigitalOcean Droplet Web Console - Google Chrome

cloud.digitalocean.com/droplets/368415178/terminal/ui/

```
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.15.0-67-generic x86_64)

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

System information as of Fri Aug  4 08:40:06 UTC 2023

System load:  0.25390625      Users logged in:      0
Usage of /:   6.7% of 24.05GB IPv4 address for eth0: 144.126.232.203
Memory usage: 23%           IPv4 address for eth0: 10.16.0.6
Swap usage:   0%             IPv4 address for eth1: 10.106.0.3
Processes:   97

Expanded Security Maintenance for Applications is not enabled.

116 updates can be applied immediately.
73 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

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

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.

root@nms-node-london:~#
```

Now run commands:

useradd -m ubuntu -s /bin/bash

usermod -aG sudo ubuntu

echo "ubuntu ALL=(ALL) NOPASSWD:ALL" >> /etc/sudoers

sudo su - ubuntu

```
root@nms-node:~# useradd -m ubuntu -s /bin/bash
root@nms-node:~# usermod -aG sudo ubuntu
root@nms-node:~# echo "ubuntu ALL=(ALL) NOPASSWD:ALL" >> /etc/sudoers
root@nms-node:~# sudo su - ubuntu
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@nms-node:~$ █
```

sudo apt-get update

```
root@nms-node-london:~# sudo apt-get update
Hit:1 http://mirrors.digitalocean.com/ubuntu jammy InRelease
Hit:2 https://repos-droplet.digitalocean.com/apt/droplet-agent main InRelease
Hit:3 http://mirrors.digitalocean.com/ubuntu jammy-updates InRelease
Hit:4 http://mirrors.digitalocean.com/ubuntu jammy-backports InRelease
Hit:5 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
root@nms-node-london:~# █
```

Now run command

sudo apt-get upgrade -y

Simply hit **Enter** to confirm (OK) in case any dialog box appears, do not change any options.

```
Processing triggers for initramfs-tools (0.136ubuntu6.7) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-122-generic
Processing triggers for libc-bin (2.31-0ubuntu9.12) ...
Processing triggers for rsyslog (8.2001.0-1ubuntu1.3) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for plymouth-theme-ubuntu-text (0.9.4git20200323-0ubuntu6.2) ...
update-initramfs: deferring update (trigger activated)
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for ca-certificates (20230311ubuntu0.20.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
Processing triggers for initramfs-tools (0.136ubuntu6.7) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-122-generic
ubuntu@NPTestHost:~$ █
```

Now run command

sudo apt-get install git -y

```
root@nms-node-london:~# sudo apt-get install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
  git-daemon-run | git-daemon-sysvinit git-doc git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
The following packages will be upgraded:
  git
1 upgraded, 0 newly installed, 0 to remove and 121 not upgraded.
Need to get 3166 kB of archives.
After this operation, 123 kB of additional disk space will be used.
Get:1 http://mirrors.digitalocean.com/ubuntu jammy-updates/main amd64 git amd64 1:2.34.1-1ubuntu1.9 [3166 kB]
Fetched 3166 kB in 0s (22.7 MB/s)
(Reading database ... 64224 files and directories currently installed.)
Preparing to unpack .../git_1%3a2.34.1-1ubuntu1.9_amd64.deb ...
Unpacking git (1:2.34.1-1ubuntu1.9) over (1:2.34.1-1ubuntu1.8) ...
Setting up git (1:2.34.1-1ubuntu1.9) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
systemctl restart packagekit.service
Service restarts being deferred:
systemctl restart unattended-upgrades.service

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.
root@nms-node-london:~#
```

Simply hit **Enter** to confirm (OK) in case any dialog box appears, do not change any options.