

# Linux Server Deployment & Configuration Within VirtualBox

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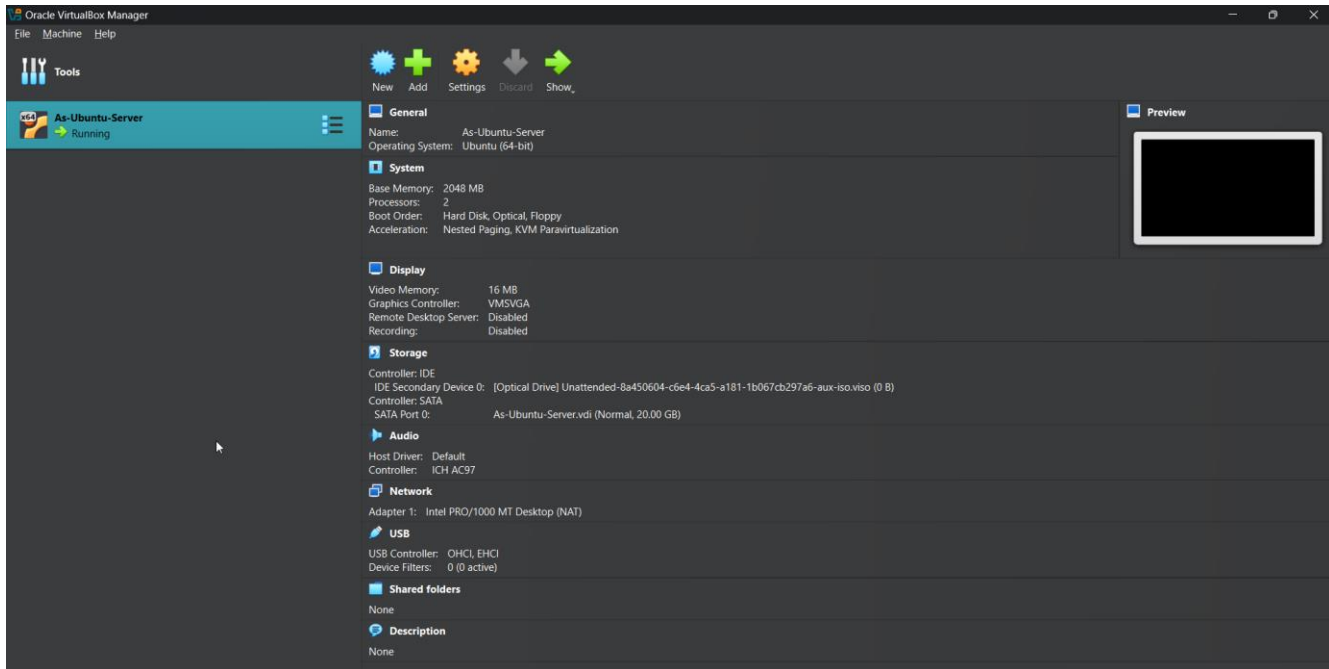
## Summary:

This documentation covers the step-by-step process of setting up a Linux server in a VirtualBox environment. It includes downloading and installing Ubuntu Server, configuring basic packages and system upgrades, setting up essential tools, adding users, configuring a firewall, enabling SSH access, enhancing security with Fail2Ban, installing a GUI and Docker, and deploying Portainer and Netdata containers. Screenshots and commands are provided throughout to support replication.

## Skills Demonstrated:

- Virtualization
- Linux server installation and configuration
- Package management with APT
- User and permission management
- Firewall configuration with UFW
- SSH setup and remote access using PuTTY
- Fail2Ban setup for intrusion prevention
- GUI installation and configuration
- Docker and container management
- Monitoring tools (Neofetch, htop, iptraf, Netdata)
- Networking concepts (port forwarding, local-only access)

1. First i Download VirtualBox & Ubuntu server iso to begin my project.



2. The next step was to Update the environment to begin working on it, i used the following comands:

- `sudo apt update && sudo apt upgrade -y`
- `Sudo apt install unattended-upgrades`
- `Sudo dpkg-reconfigure --priority=low unattended-upgrades`

3. Then I installed several tools and repositories to enhance system monitoring, file transfers, graphical support, access to extra software and user conveyence.

-neofetch, htop, Curl, wget, xorg, tldr, dust, Multiverse/Universe and restricted extras

## Neofetch

```
As@As-Ubuntu-Server:~$ neofetch
```

```

.-/+00SSSS00+/- .
  `:+SSSSSSSSSSSSSSSSSS+:`
    -+SSSSSSSSSSSSSSSSSSyySSSS+-
      .0SSSSSSSSSSSSSSSSSSdMMMMNySSSSO.
        /SSSSSSSSSSShdmmNNmmyNMMMMHSSSSSS/
          +SSSSSSSSShmydMMMMMMMMNddddySSSSSSSS+
            /SSSSSSSShNMMMyhhyyyyhmNMMMMNhSSSSSSSS/
              .SSSSSSSSdMMMNhSSSSSSSSShNMMMdSSSSSSSS.
                +SSSShhhyNMMNySSSSSSSSSSSSyNMMMySSSSSSSS+
                  bSSyNMMMNyMMhSSSSSSSSSSSSShmmmhSSSSSSSSO
                    bSSyNMMMNyMMhSSSSSSSSSSSSShmmmhSSSSSSSSO
                      +SSSShhhyNMMNySSSSSSSSSSSSyNMMMySSSSSSSS+
                        .SSSSSSSSdMMMNhSSSSSSSSShNMMMdSSSSSSSS.
                          /SSSSSSSShNMMMyhhyyyyhdNMMMMNhSSSSSSSS/
                            +SSSSSSSSdmydMMMMMMMMMddddySSSSSSSS+
                              /SSSSSSSSSSShdmNNNNmyNMMMMHSSSSSS/
                                .0SSSSSSSSSSSSSSSSSSdMMMMNySSSSO.
                                  -+SSSSSSSSSSSSSSSSSSyyySSSS+-
                                    `:+SSSSSSSSSSSSSSSSSS+:`
                                      .-/+00SSSS00+/- .

```

```
As@As-Ubuntu-Server
```

```
-----
```

```
OS: Ubuntu 24.04.2 LTS x86_64
```

```
Host: VirtualBox 1.2
```

```
Kernel: 6.8.0-60-generic
```

```
Uptime: 4 mins
```

```
Packages: 818 (dpkg)
```

```
Shell: bash 5.2.21
```

```
Resolution: 1280x800
```

```
Terminal: /dev/tty1
```

```
CPU: Intel i7-10750H (2) @ 2.592GHz
```

```
GPU: 00:02.0 VMware SVGA II Adapter
```

```
Memory: 200MiB / 1967MiB
```



## htop

0%									
1%									
Mem[     ]									
Sup[ ]									
0.0% Tasks: 21, 33 thr, 88 kthr; 1 running									
0.0% Load average: 0.00 0.02 0.00									
188M/1.92G Uptime: 00:15:09									
0K/0K									
Main	I/O	PID	USER	PRI	NI	VIRT	RES	SHR	S
		1	root	20	0	22428	13284	9316	S
		302	root	19	-1	66828	17020	15996	S
		356	root	RT	0	282M	27136	8704	S
		366	root	20	0	29216	7808	4992	S
		368	root	20	0	282M	27136	8704	S
		369	root	RT	0	282M	27136	8704	S
		370	root	RT	0	282M	27136	8704	S
		371	root	RT	0	282M	27136	8704	S
		372	root	RT	0	282M	27136	8704	S
		373	root	RT	0	282M	27136	8704	S
		419	systemd-re	20	0	21580	12800	10624	S
		451	systemd-ne	20	0	18992	9472	8320	S
		581	messagebus	20	0	9772	5376	4608	S
		588	polkitd	20	0	374M	9744	7424	S
		599	root	20	0	18124	8704	7680	S
		602	root	20	0	457M	13312	11264	S
		621	root	20	0	457M	13312	11264	S
		622	root	20	0	457M	13312	11264	S
		625	root	20	0	457M	13312	11264	S
		632	root	20	0	107M	22912	13568	S
		644	syslog	20	0	217M	6144	4608	S
		646	polkitd	20	0	374M	9744	7424	S
		647	polkitd	20	0	374M	9744	7424	S
		648	polkitd	20	0	374M	9744	7424	S
		661	root	20	0	457M	13312	11264	S
		667	root	20	0	382M	12928	10880	S
		686	root	20	0	457M	13312	11264	S
		690	root	20	0	382M	12928	10880	S
		692	syslog	20	0	217M	6144	4608	S
		693	syslog	20	0	217M	6144	4608	S
		694	syslog	20	0	217M	6144	4608	S
		696	syslog	20	0	382M	12928	10880	S
		698	root	20	0	382M	12928	10880	S
		720	root	20	0	107M	22912	13568	S
		969	root	20	0	280M	2560	2432	S
		971	root	20	0	286M	3596	3200	S
		975	root	20	0	280M	2560	2432	S
		976	root	16	-4	280M	2560	2432	S
		977	root	20	0	286M	3596	3200	S
		978	root	20	0	286M	3596	3200	S
		979	root	20	0	280M	2560	2432	S

```
F1Help F2Setup F3Search F4Filter F5Tree F6SortBy F7Nice F8Nice + F9Kill F10Quit
```

4. Next created 2 other users and added them to groups to replicate the management of permissions and access control.

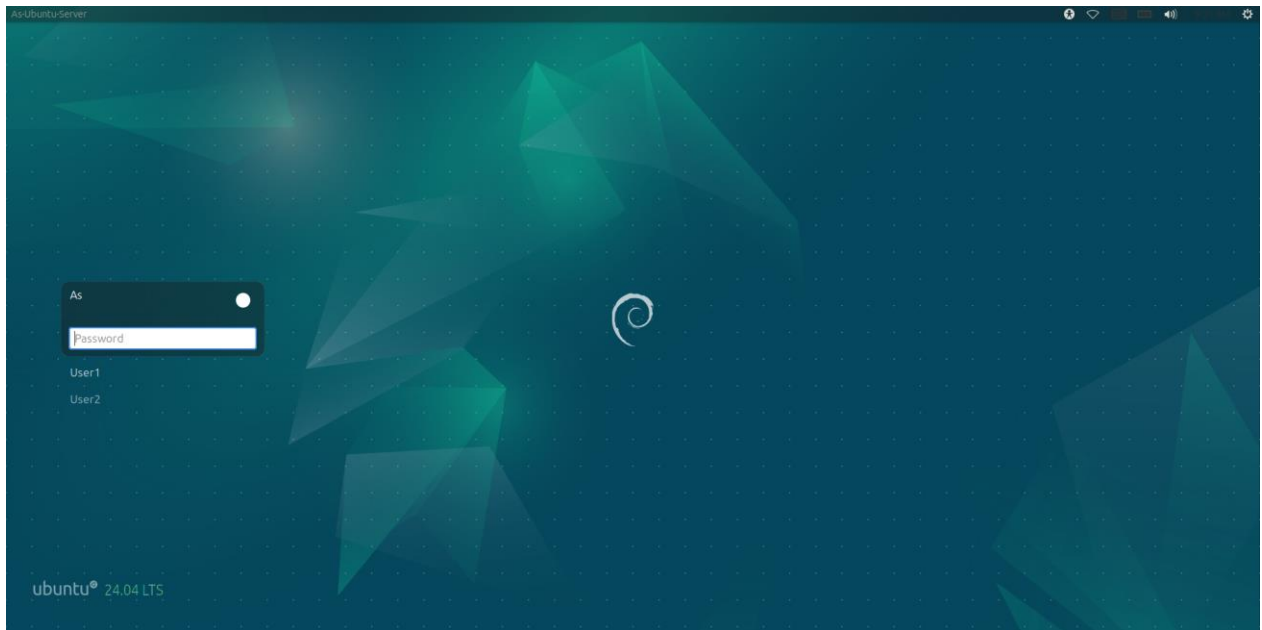
```
As@As-Ubuntu-Server:~$ groups
As sudo vboxsf
As@As-Ubuntu-Server:~$ groups user1
user1 : user1 users
As@As-Ubuntu-Server:~$ groups user2
user2 : user2 guest
```

5. Then i proceeded to Attached Guest additions to enable better integration between my host and Vm using the following steps:

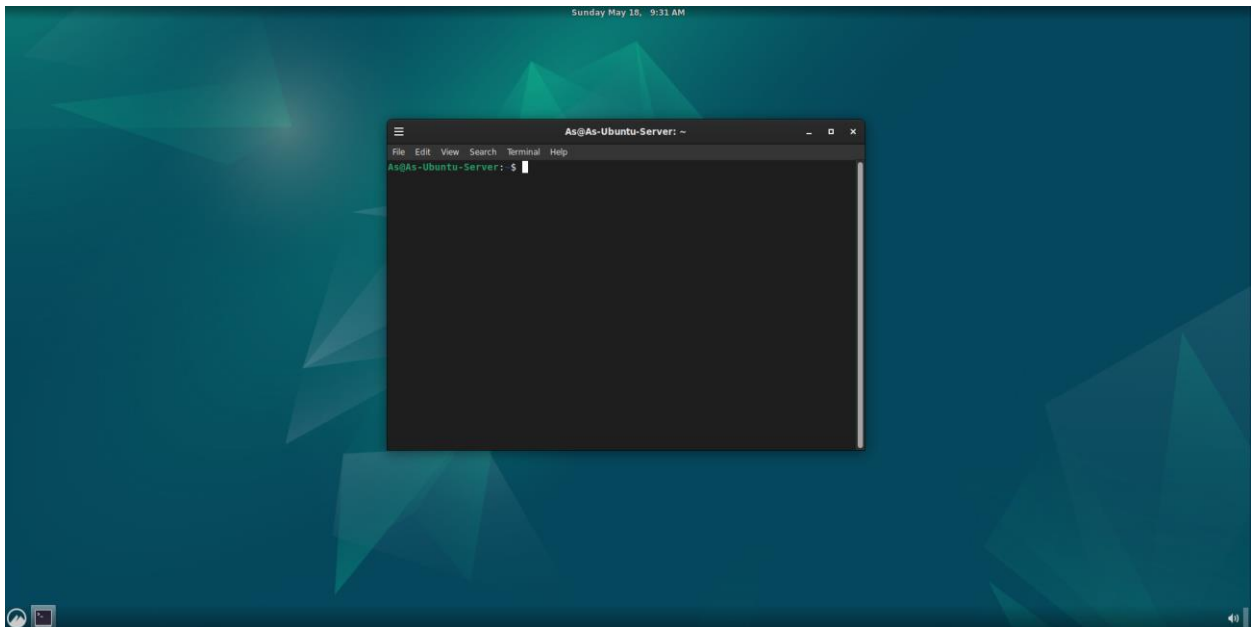
- In virtualBox attached the guest additions iso
- in the VM menu Display > insert Guest additions Image
- sudo apt install build-essential dkms linux-headers-\$(uname -r)
- sudo mkdir -p /mnt/cdrom
- sudo mount /dev/cdrom /mnt/cdrom
- sudo sh /mnt/cdrom/VBoxLinuxAdditions.run

6. Next Installed a Gui (cinnamon core) and a display manager (lightdm) to make it user friendly.

## Lightdm



## Cinnamon-core



7. Next i Configured the firewall to Deny incoming, allow outgoing, allow ssh from local network, logging on to controll network traffic.

```
As@As-Ubuntu-Server: ~  
File Edit View Search Terminal Help  
As@As-Ubuntu-Server:~$ sudo ufw status verbose  
  
Status: active  
Logging: on (low)  
Default: deny (incoming), allow (outgoing), deny (routed)  
New profiles: skip  
  
To Action From  
--  
22 ALLOW IN 10.0.0.0/8
```

8. Then i proceeded to Install OpenSSH set up port forwarding in VirtualBox then shelledin from my host to the Vm through putty to securely manage the server remotley

Port Forwarding Rules					
Name	Protocol	Host IP	Host Port	Guest IP	Guest Port
SSH	TCP		2222		22

**PuTTY Configuration**

Category:

- Session
  - Logging
- Terminal
  - Keyboard
  - Bell
  - Features
- Window
  - Appearance
  - Behaviour
  - Translation
- Selection
  - Colours
- Connection
  - Data
  - Proxy
  - SSH
    - Serial
    - Telnet
    - Rlogin
    - SUPDUP

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): localhost Port: 2222

Connection type: ☒ SSH ☐ Serial ☐ Other: Telnet

Load, save or delete a stored session

Saved Sessions

Default Settings

Load Save Delete

Close window on exit: ☐ Always ☐ Never ☒ Only on clean exit

About Help Open Cancel

```
As@As-Ubuntu-Server: ~
login as: As
As@localhost's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-60-generic x86_64)

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

System information as of Fri May 16 01:43:41 AM UTC 2025

System load:          0.0
Usage of /:           18.6% of 19.51GB
Memory usage:         12%
Swap usage:           0%
Processes:            116
Users logged in:      1
IPv4 address for enp0s3: 10.0.2.15
IPv6 address for enp0s3: fd17:625c:f037:2:a00:27ff:fe24:afdc

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
  just raised the bar for easy, resilient and secure K8s cluster deployment.

  https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

11 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

Last login: Fri May 16 01:42:38 2025 from 10.0.2.2
As@As-Ubuntu-Server:~$
```

9. Then i installed and configured Fail2ban to guard against intrusion Attempts. using the following comands i installed, configured and tested it:

-Sudo apt install fail2ban -y

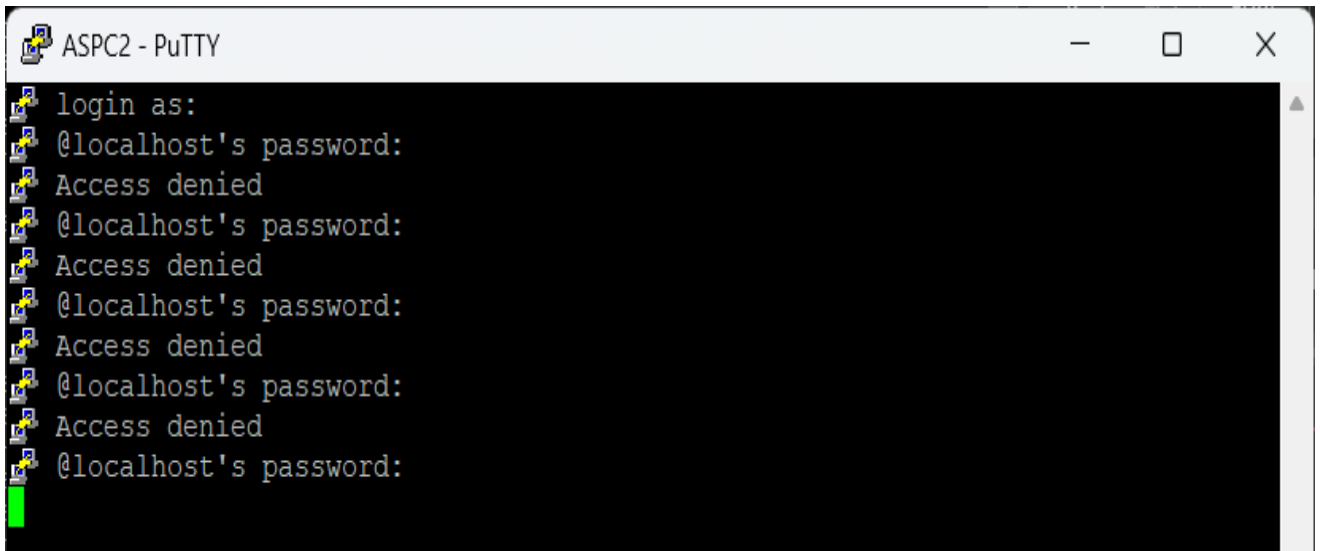
-sudo cp /etc/fail2ban/jail.conf /etc/fail2ban/jail.local

-sudo nano /etc/fail2ban/jail.local

**I Made this edit in the jail.local file under sshd**

```
[sshd]
enabled=true
port      = ssh
logpath   = %(sshd_log)s
maxretry  = 5
findtime  = 300
bantime   = 300
backend   = systemd
#Enables SSH monitor (port 22) & ban Failed login attempts afterfor 5 min after 5 tries
```

I Incorrectly input credentials then viewed the sshd status on Server to test

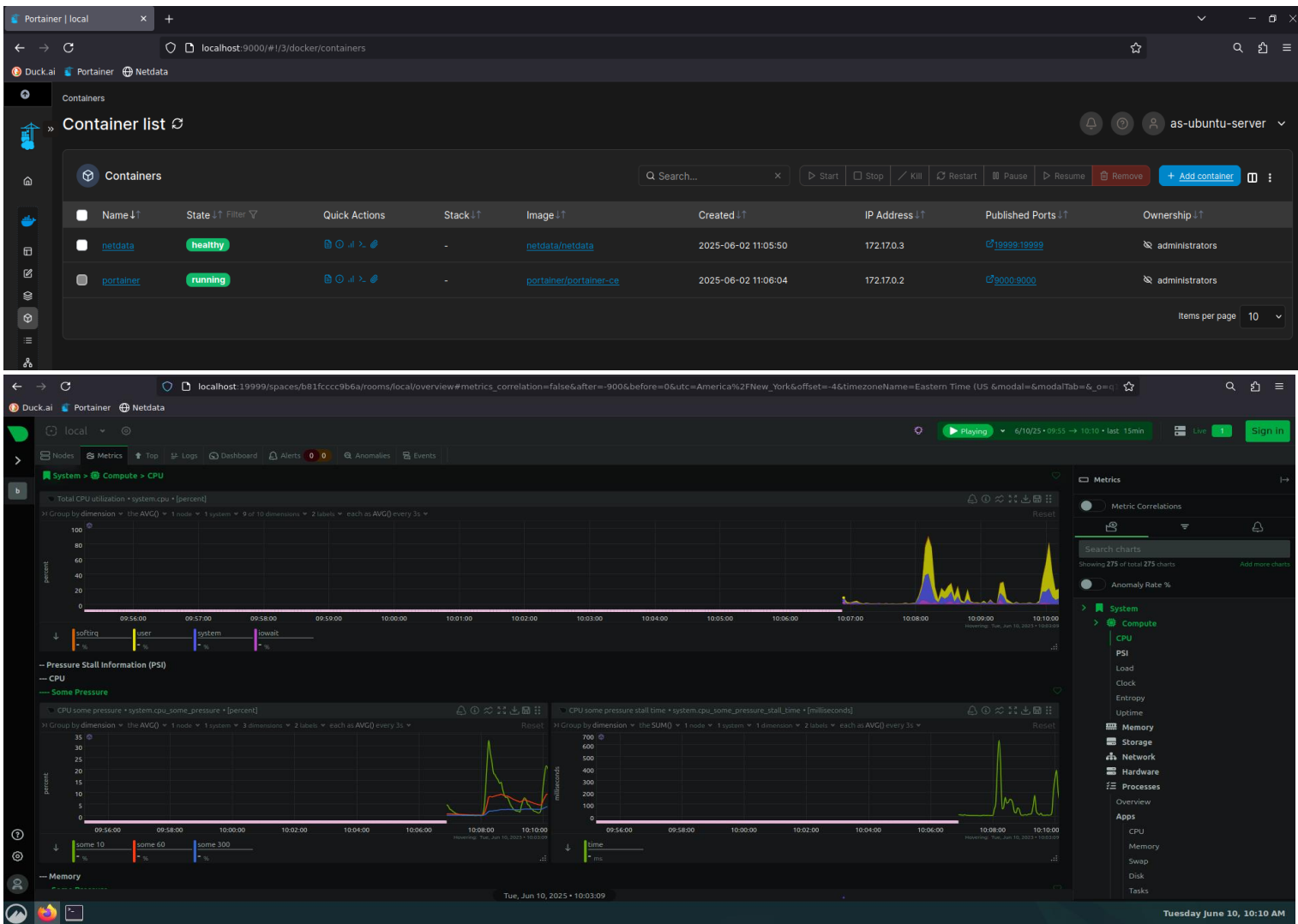


```
ASPC2 - PuTTY
login as:
@localhost's password:
Access denied
@localhost's password:
Access denied
@localhost's password:
Access denied
@localhost's password:
Access denied
@localhost's password:
Access denied
@localhost's password:
```

```
As@As-Ubuntu-Server:~$ sudo fail2ban-client status sshd
Status for the jail: sshd
|- Filter
|   |- Currently failed: 0
|   |- Total failed:     5
|   \- Journal matches:  _SYSTEMD_UNIT=sshd.service + _COMM=sshd
- Actions
  |- Currently banned: 1
  |- Total banned:     1
  \- Banned IP list:   10.0.2.2
As@As-Ubuntu-Server:~$
```

10. Next installed docker and set up a container with portainer then another for netdata. for a user friendly Gui for monitering systems and container performace in real time.





11. Then proceeded to updated firewall Rules to only allow local host to access the containers to restrict external connections and enhance security.

```
As@As-Ubuntu-Server: ~  
File Edit View Search Terminal Help  
As@As-Ubuntu-Server:~$ sudo ufw status verbose  
  
Status: active  
Logging: on (low)  
Default: deny (incoming), allow (outgoing), deny (routed)  
New profiles: skip  
  
To Action From  
--  
22 ALLOW IN 10.0.0.0/8  
  
19999 ALLOW IN 127.0.0.1  
  
9000 ALLOW IN 127.0.0.1
```

12. Finally Installed iptraf to monitor packets in real time.

```
As@As-Ubuntu-Server: ~
File Edit View Search Terminal Help
iptraf-ng 1.2.1
Statistics for enp0s3

Total      Total      Incoming  Incoming  Outgoing  Outgoing
Packets    Bytes     Packets   Bytes     Packets   Bytes
Total:      23        2353      9         994       14        1359
IPv4:       20        2057      8         890       12        1167
IPv6:       3         288       1         96        2         192
TCP:        8         813       2         84        6         729
UDP:       12        1244      6         806       6         438
ICMP:       1         96        1         96        0         0
Other IP:   2         192       0         0         2         192
Non-IP:     0         0         0         0         0         0
Broadcast:  0         0         0         0         0         0

Total rates:      2.11 kbps      Broadcast rates:      0.00 kbps
                  1 pps                        0 pps

Incoming rates:   0.72 kbps
                  0 pps

Outgoing rates:   1.38 kbps
                  0 pps

IP checksum errors: 0

Time: 0:02 Drops: 0
X-exit
```

## After Action Summary:

I started up my project by installing VirtualBox and Ubuntu Server, I configured the VM, updated the system, and installed key tools and repositories for monitoring, file transfer, and user convenience. I created additional users for permission management, integrated Guest Additions, and installed a GUI with LightDM for easier use. Security was enhanced by configuring the firewall, enabling remote management via OpenSSH, and setting up Fail2ban. I deployed Docker containers for Portainer and Netdata, restricted container access to localhost, and concluded by adding Iptraf for real-time network monitoring.