

SISTEMAS OPERATIVOS

Virtual machines

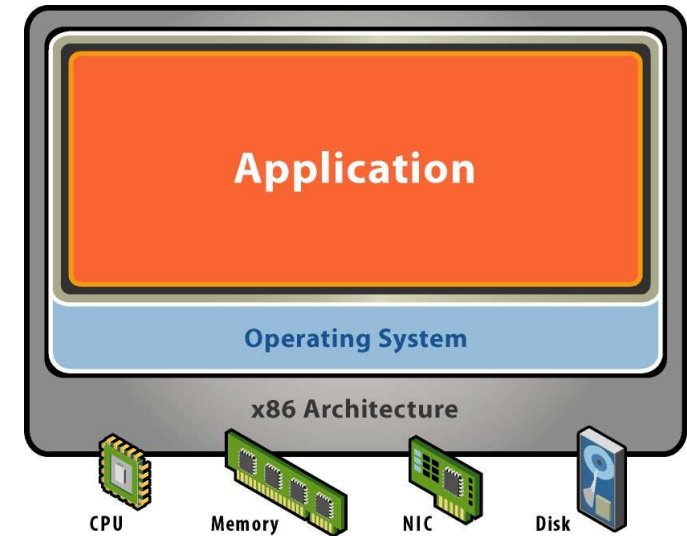
A PHYSICAL MACHINE

Physical Hardware

- Processadores, memória, chipset, I/O devices, etc.
- Recursos frequentemente subutilizados

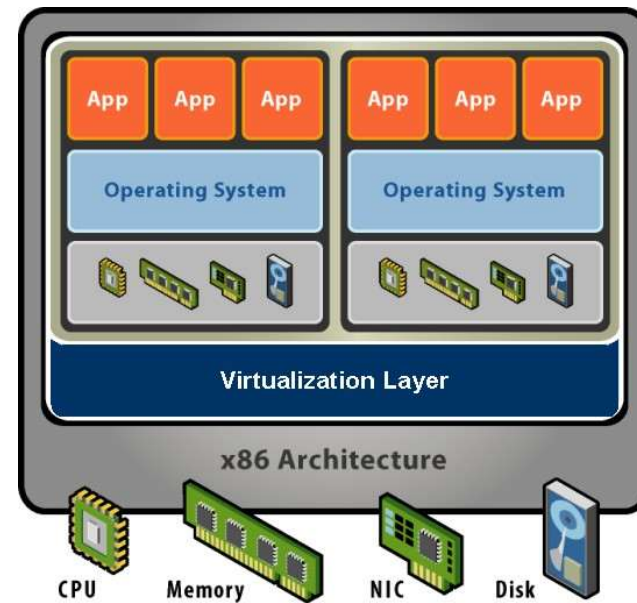
Software

- Fortemente acoplado ao hardware físico
- Única instância ativa do SO
- SO controla hardware

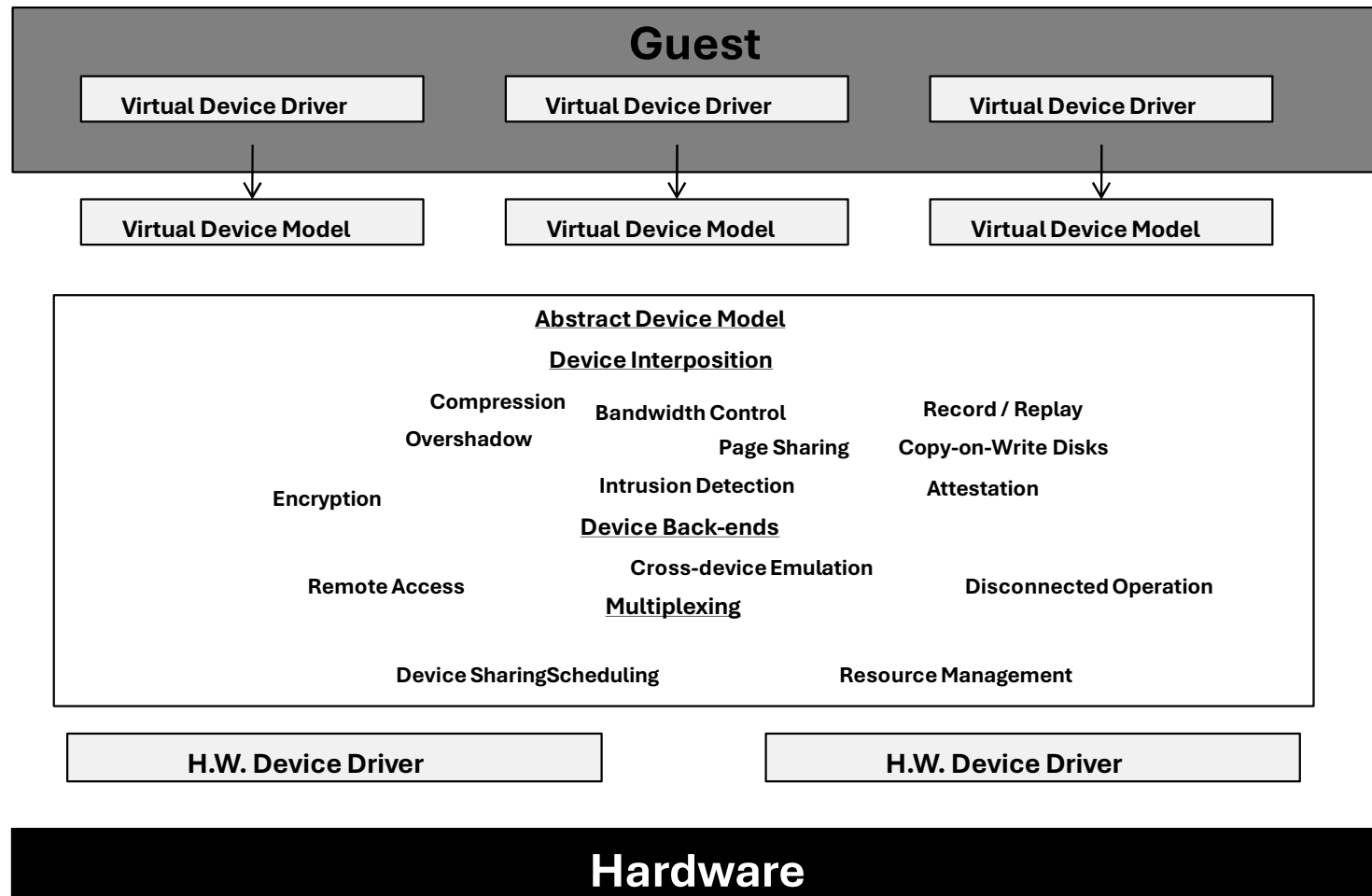


VIRTUAL MACHINE

Uma máquina virtual é um software que cria um ambiente virtualizado entre a plataforma computacional e o utilizador final no qual o utilizador final pode operar o software.



VIRTUAL MACHINE



VIRTUAL MACHINE

Uma máquina virtual fornece uma interface idêntica ao hardware subjacente.

O sistema operativo cria a ilusão de múltiplos processos, cada um executando em seu próprio processador com sua própria memória (virtual).

A virtualização é uma camada de abstração que separa o hardware físico do sistema operativo para fornecer maior utilização e flexibilidade dos recursos de TI.

Permite que várias máquinas virtuais, com sistemas operativos heterogêneos, sejam executados de forma isolada, lado a lado na mesma máquina física.

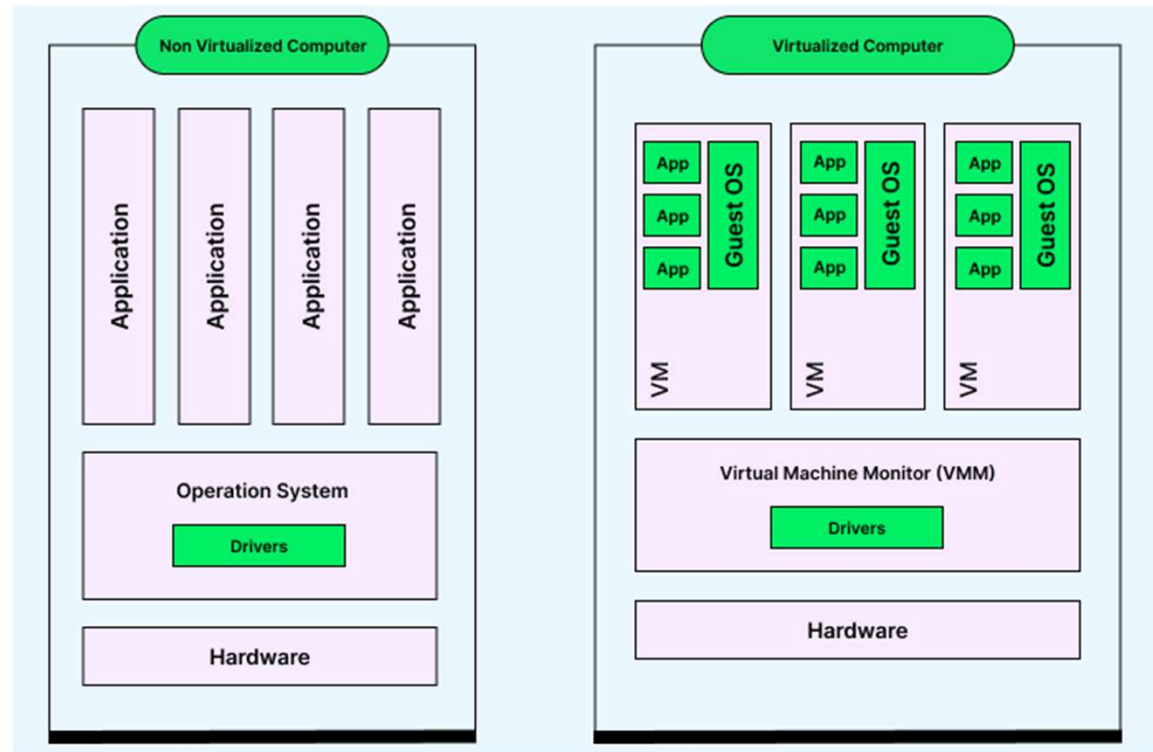
VIRTUALIZAÇÃO

- Cada máquina virtual tem seu próprio conjunto de hardware virtual (por exemplo, RAM, CPU, NIC, etc.) sobre o qual um sistema operativo e aplicativos são carregados.
- O sistema operativo cria a ilusão de vários processos, cada um executando em seu próprio processador com sua própria memória (virtual).

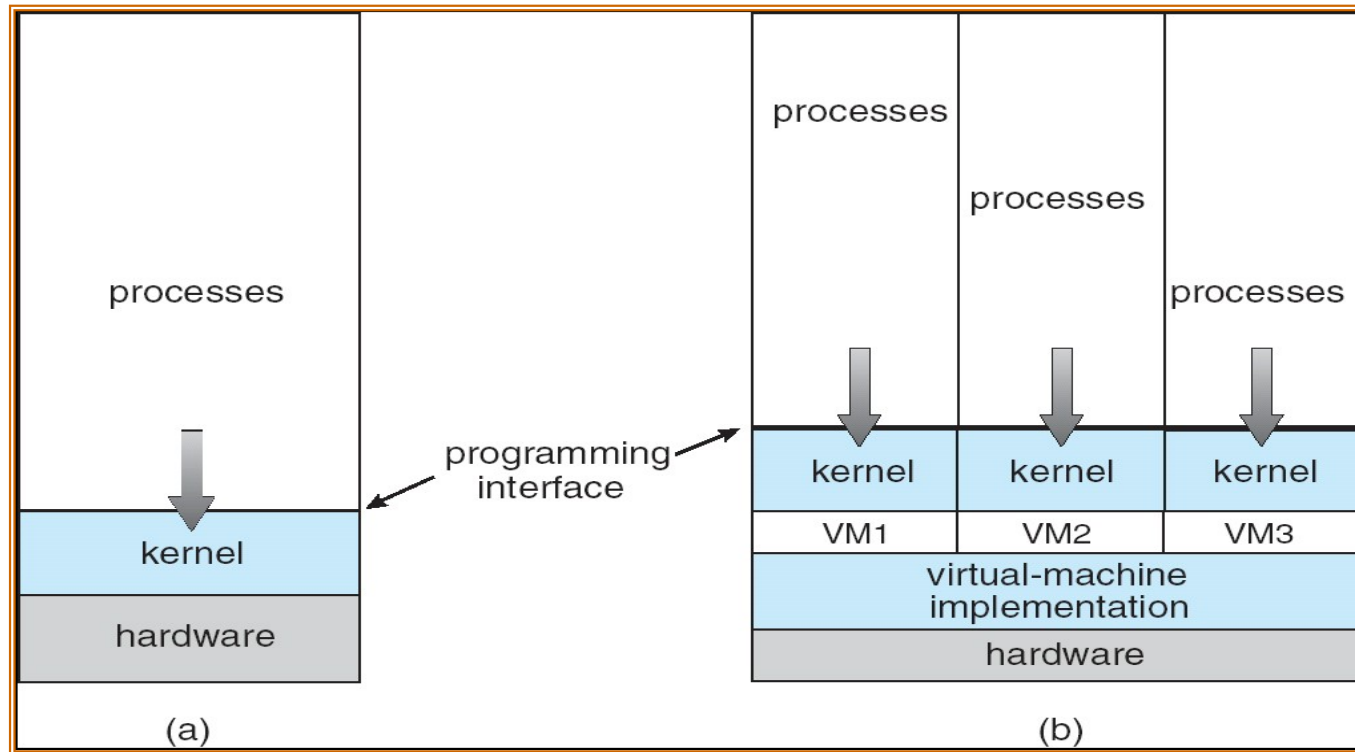
VIRTUAL MACHINE MONITOR

O software host que fornece virtualização é frequentemente referido como monitor de máquina virtual (VMM) ou hipervisor.

O VMM dá a cada máquina virtual a ilusão de um computador completo para si mesmo.



ARQUITETURA



RECURSOS

Cada máquina virtual tem seu próprio conjunto de hardware virtual (por exemplo, RAM, CPU, NIC, etc.) no qual um sistema operativo e aplicativos são carregados.

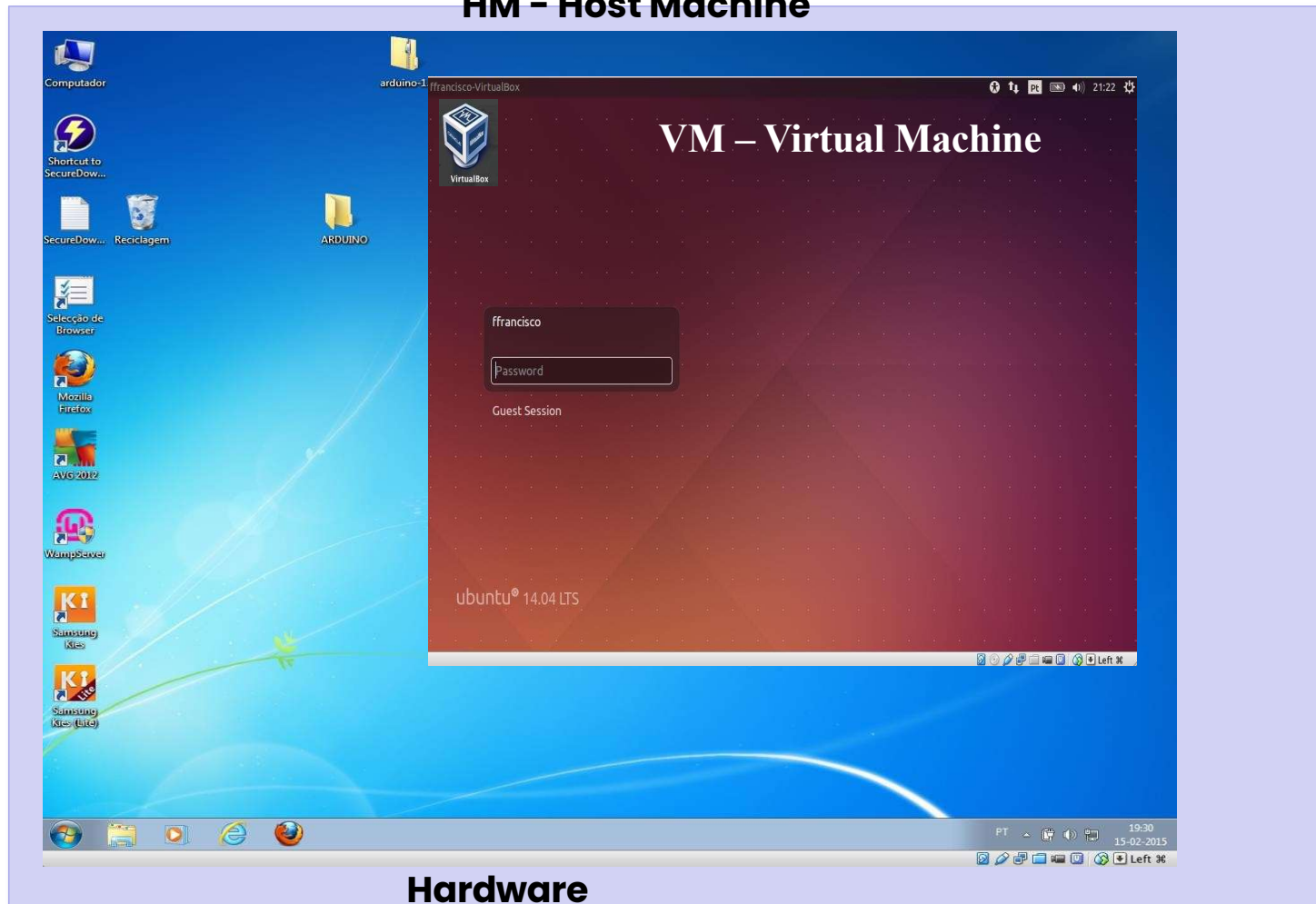
O sistema operativo vê um conjunto consistente e normalizado de hardware, independentemente dos componentes físicos reais do hardware.

Benefícios

- Particionamento
 - Vários aplicativos e sistemas operativos podem ser suportados em um único sistema físico.
 - Não há sobreposição entre a memória, pois cada memória virtual tem seu próprio espaço de memória.
- Isolamento
 - As máquinas virtuais são completamente isoladas da máquina host e de outras máquinas virtuais. Se uma máquina virtual “crachar”, as outras não serão afetadas.
 - Os dados não passam entre máquinas virtuais.

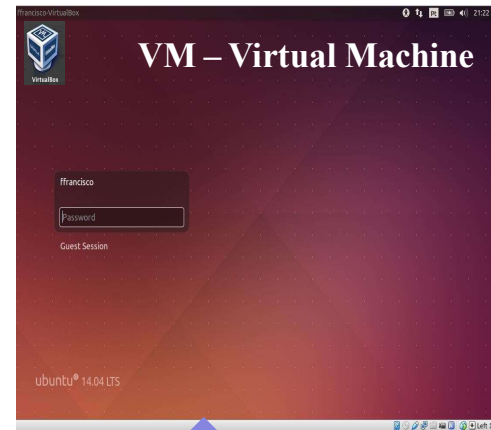
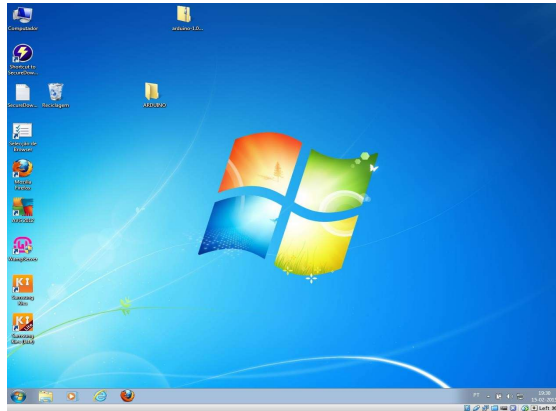
AMBIENTE DE TRABALHO

HM – Host Machine



ARQUITECTURA LÓGICA

HM – Host Machine



IP HM

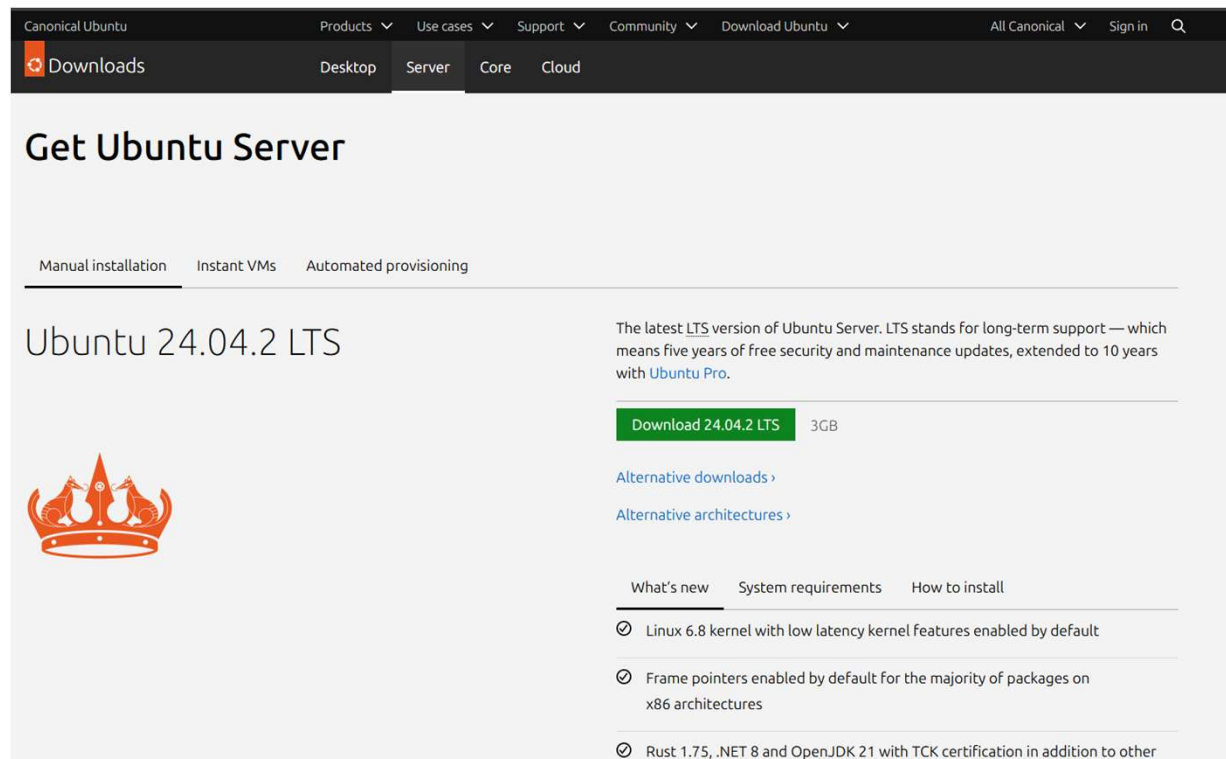
IP VM

Rede de Comunicação

por princípio, a VM(ubuntu 14.04 LTS) será o servidor e a HM(Windows 7) será o cliente

COMO CRIAR UMA MÁQUINA VIRTUAL

- **Download ISO File**
 - **Example: Ubuntu Server 24.04.2 LTS**
 - <https://ubuntu.com/download/server>



The screenshot shows the Ubuntu website's download page for Ubuntu Server 24.04.2 LTS. The page has a dark header with navigation links like 'Products', 'Use cases', 'Support', 'Community', and 'Download Ubuntu'. Below the header, there's a 'Downloads' section with tabs for 'Desktop', 'Server', 'Core', and 'Cloud'. The main heading is 'Get Ubuntu Server'. Underneath, there are tabs for 'Manual installation', 'Instant VMs', and 'Automated provisioning'. The main content area features the text 'Ubuntu 24.04.2 LTS' and a large orange crown icon. To the right, there's a description of the LTS version and a green 'Download 24.04.2 LTS' button with '3GB' next to it. Below the button are links for 'Alternative downloads' and 'Alternative architectures'. At the bottom, there's a 'What's new' section with a list of updates, including 'Linux 6.8 kernel with low latency kernel features enabled by default', 'Frame pointers enabled by default for the majority of packages on x86 architectures', and 'Rust 1.75, .NET 8 and OpenJDK 21 with TCK certification in addition to other'.


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Downloads Desktop **Server** Core Cloud

Get Ubuntu Server

Manual installation Instant VMs Automated provisioning

Ubuntu 24.04.2 LTS



The latest LTS version of Ubuntu Server. LTS stands for long-term support — which means five years of free security and maintenance updates, extended to 10 years with [Ubuntu Pro](#).

Download 24.04.2 LTS 3GB

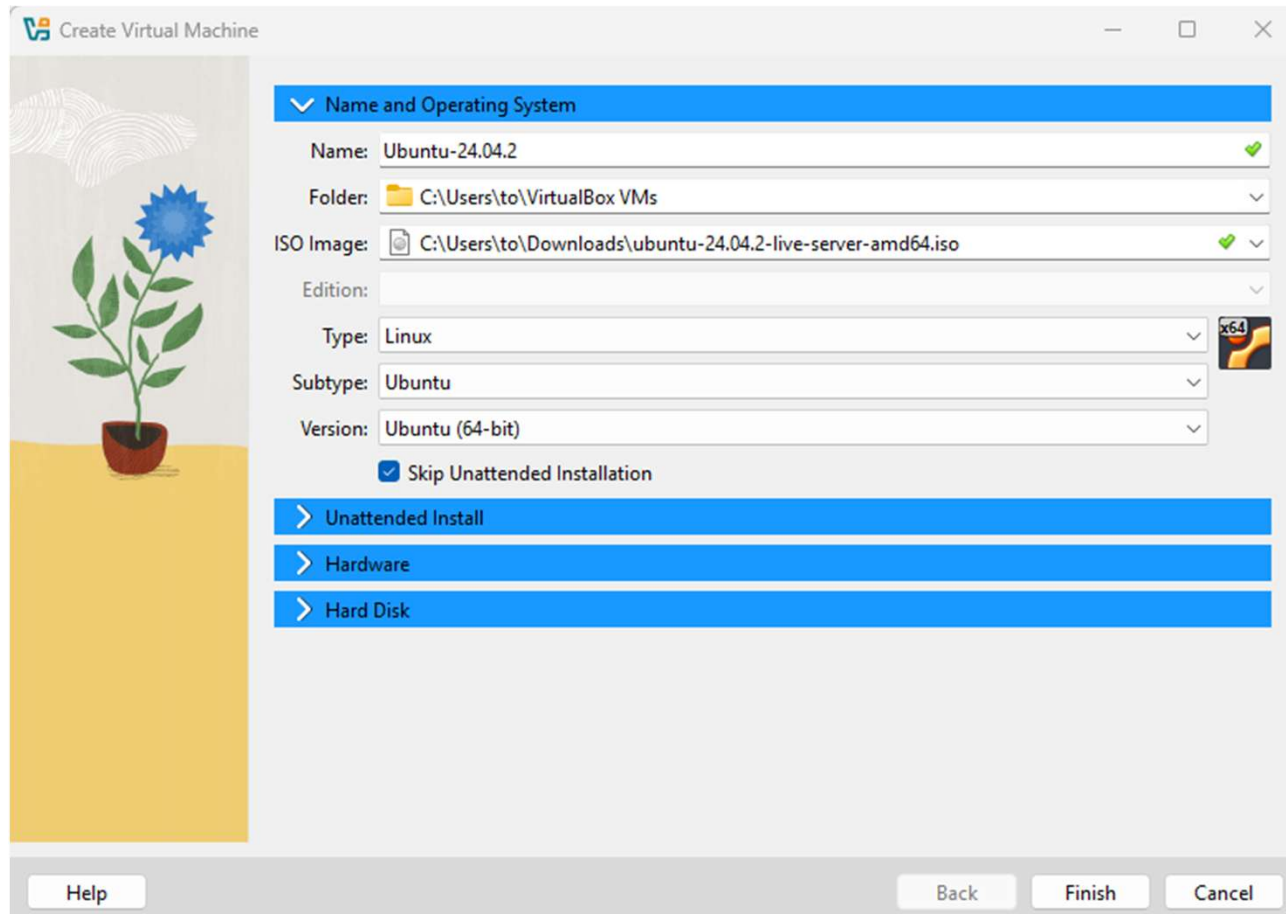
[Alternative downloads](#)

[Alternative architectures](#)

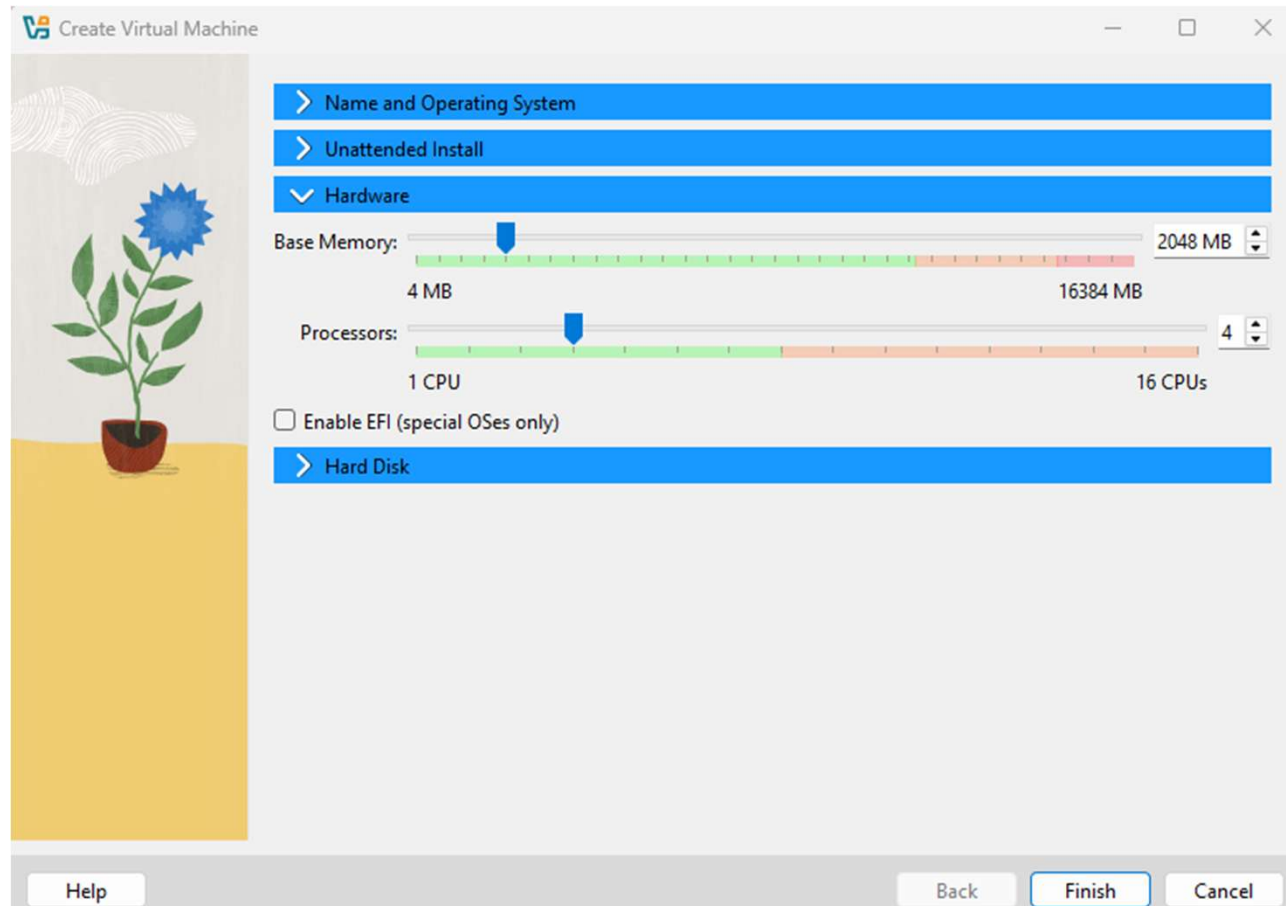
What's new System requirements How to install

- ✓ Linux 6.8 kernel with low latency kernel features enabled by default
- ✓ Frame pointers enabled by default for the majority of packages on x86 architectures
- ✓ Rust 1.75, .NET 8 and OpenJDK 21 with TCK certification in addition to other

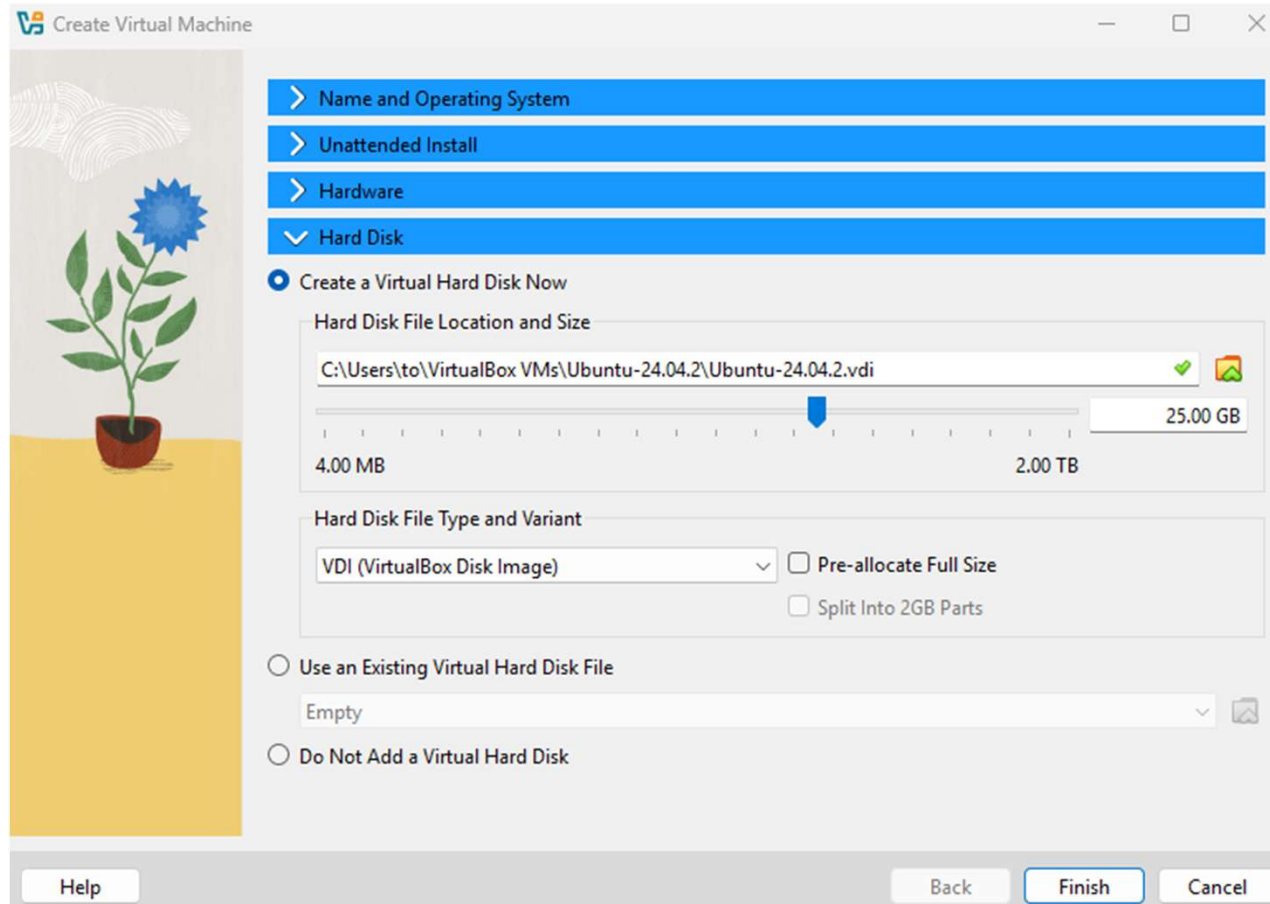
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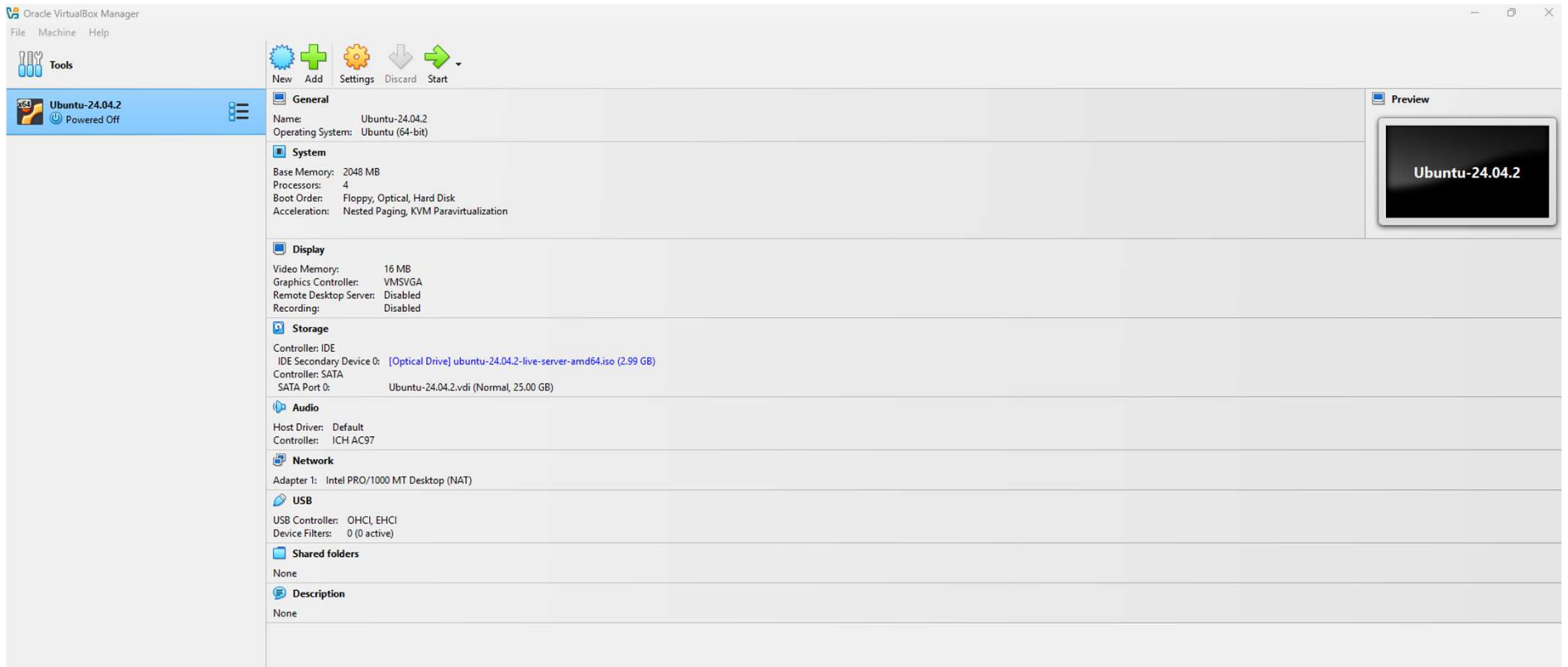
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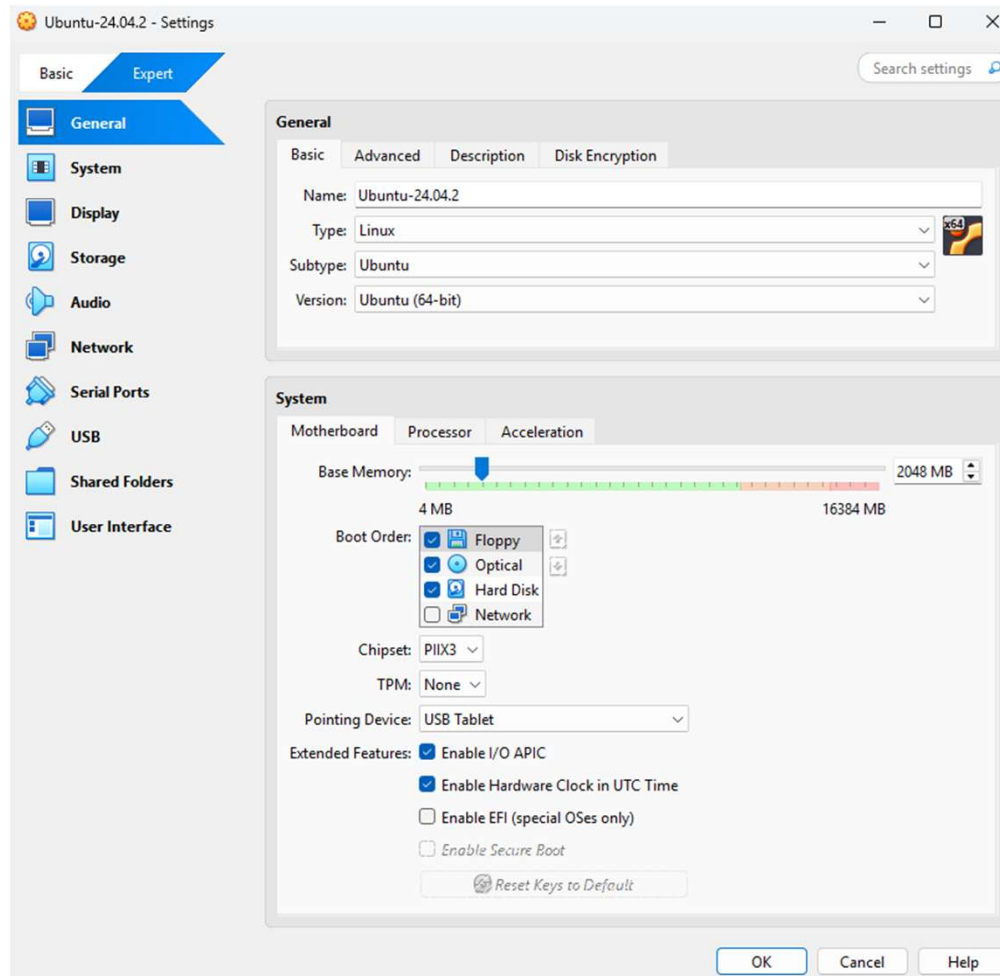
COMO CRIAR UMA MÁQUINA VIRTUAL



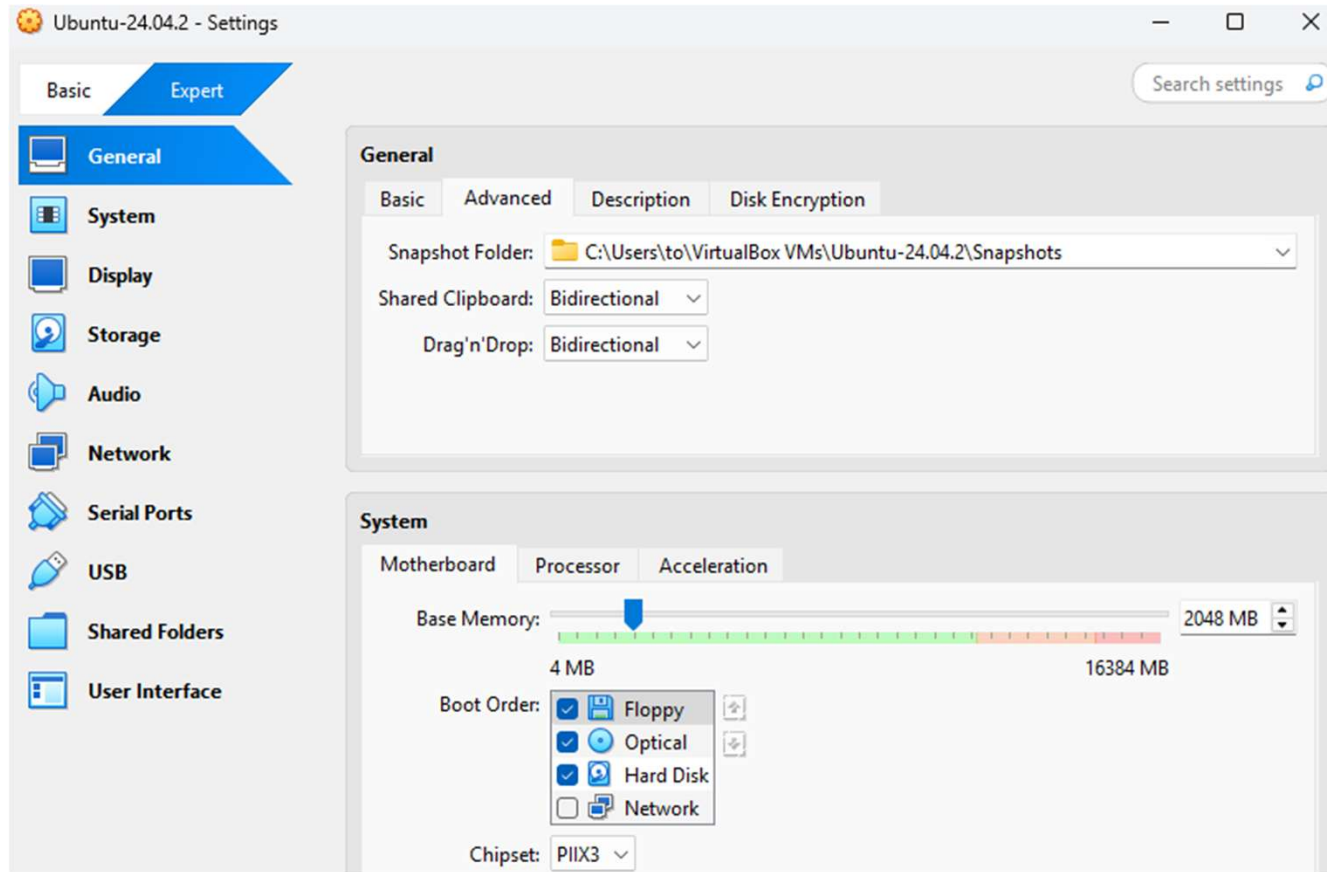
CONSTRUÇÃO VM - CONFIGURAÇÕES



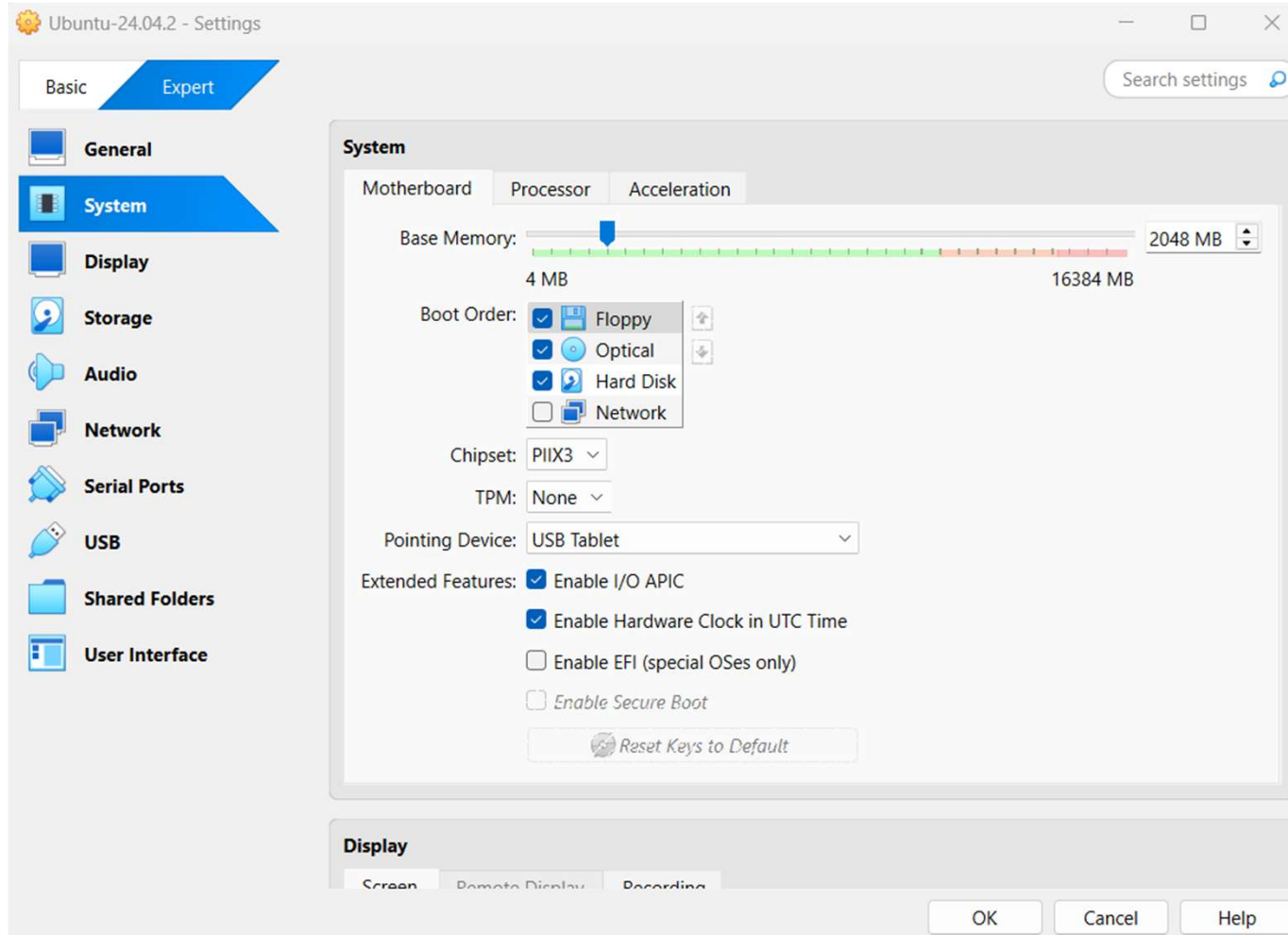
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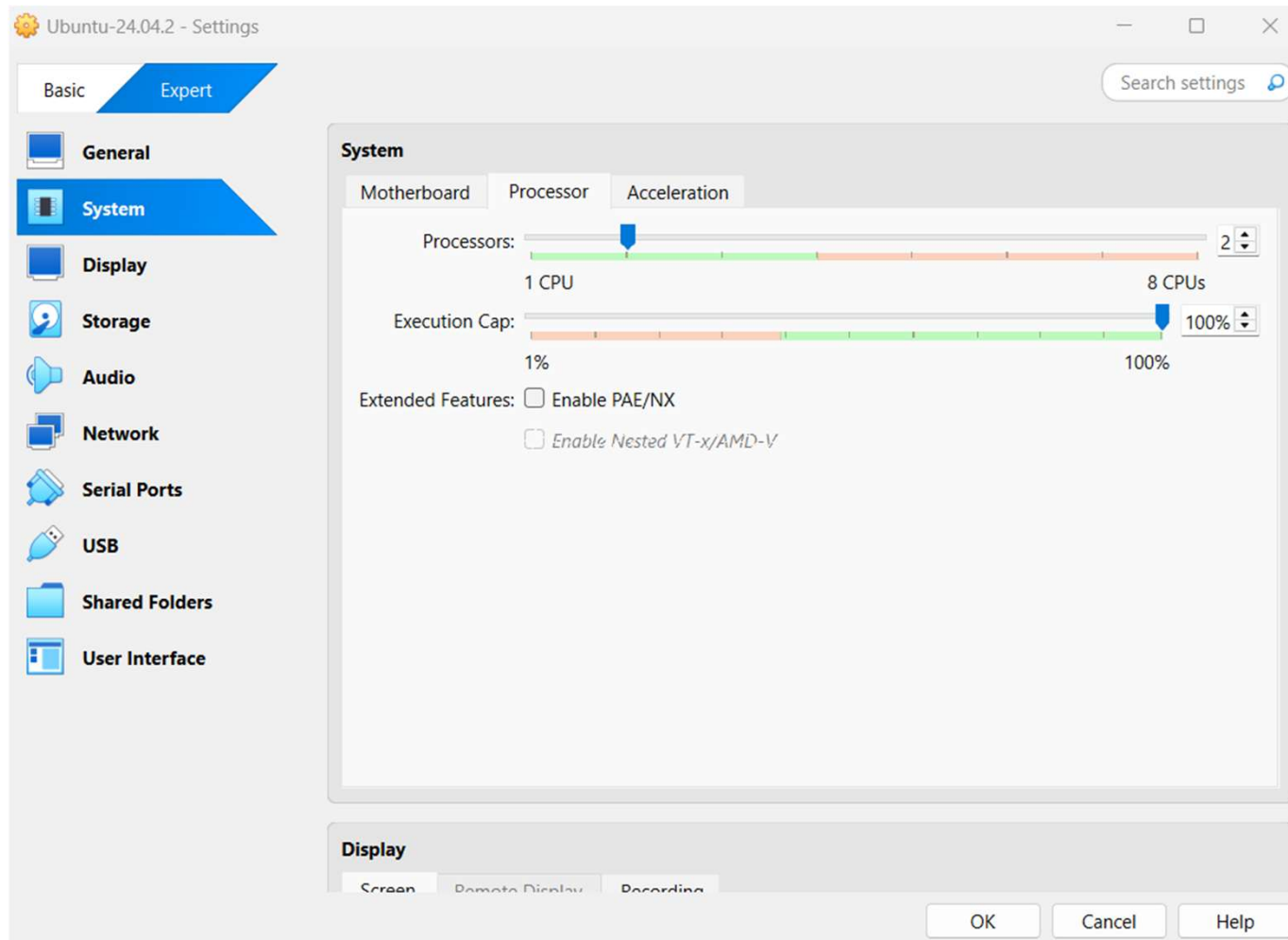
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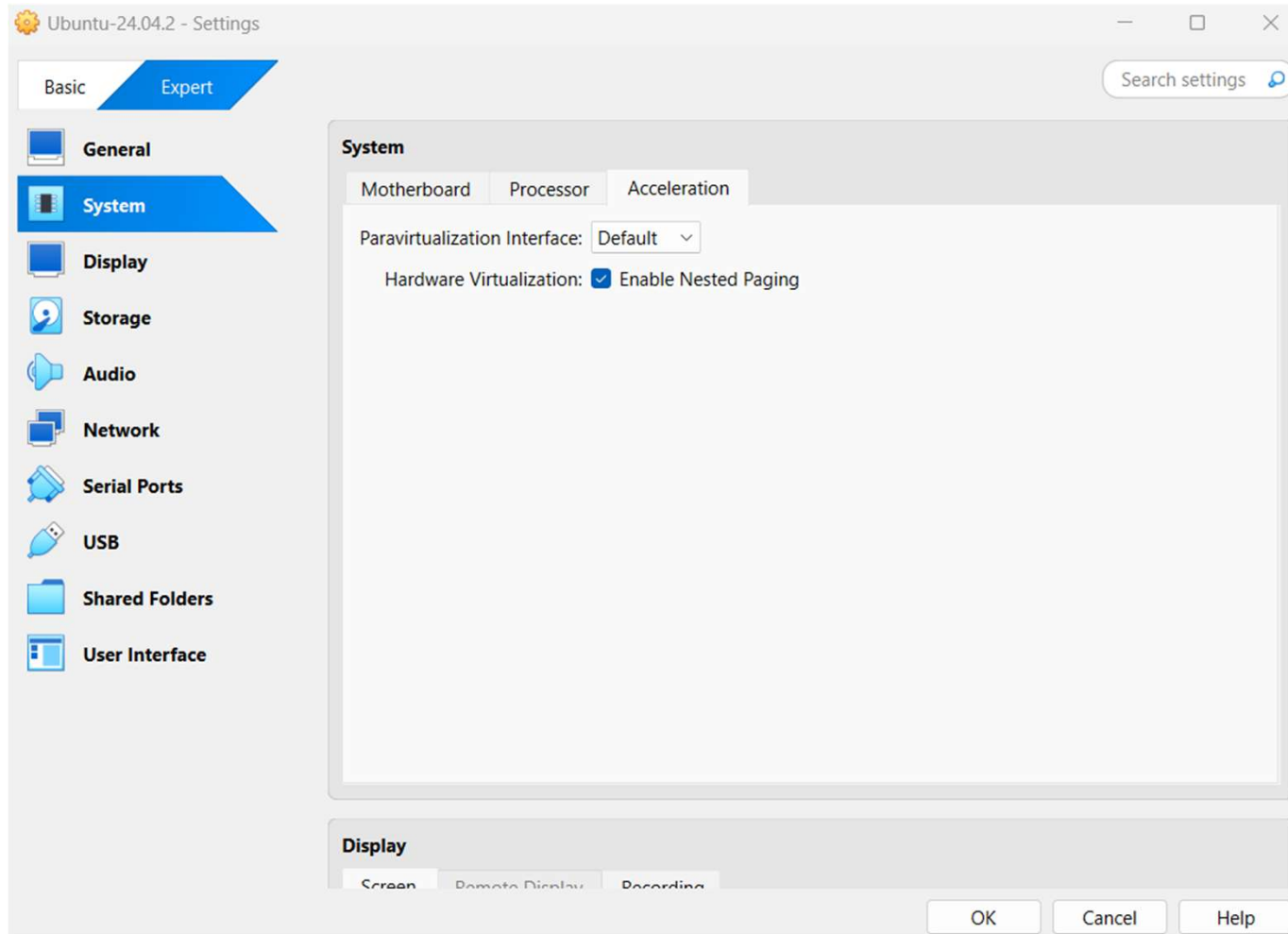
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CONSTRUÇÃO VM - CONFIGURAÇÕES

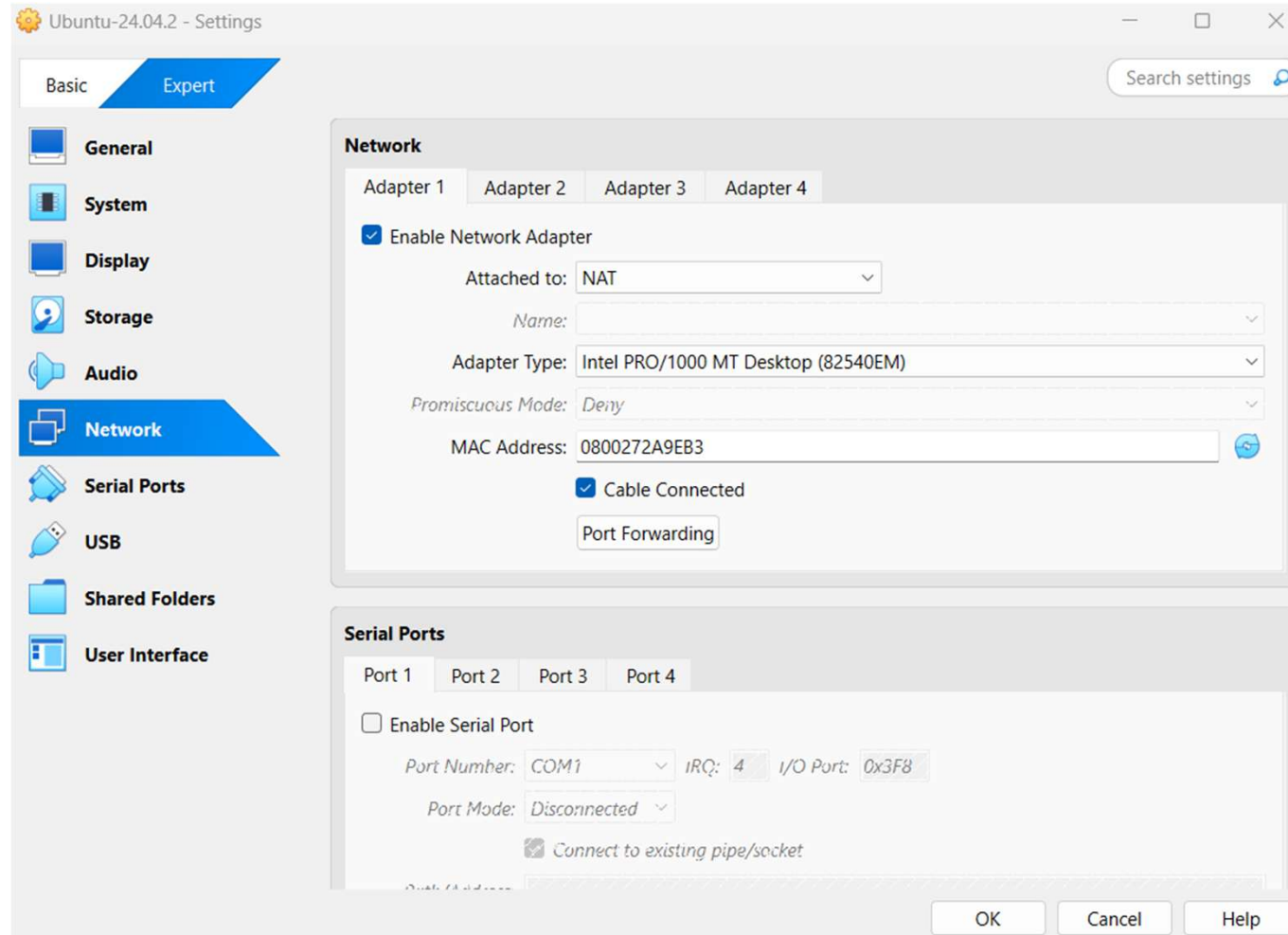


CONSTRUÇÃO VM – CONFIGURAÇÕES



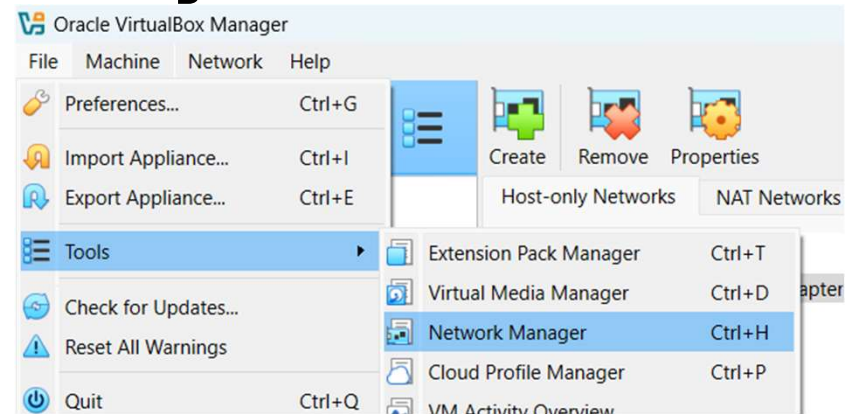
CONSTRUÇÃO VM - CONFIGURAÇÕES

- Pode ser criada uma rede privada para as VM's
- Podem ser adicionados multiplos interfaces de rede, por exemplo, um para NAT para acesso externo e outro na rede privada



CONSTRUÇÃO VM - CONFIGURAÇÕES

- Pode ser criada uma rede privada para as VM's
- Podem ser adicionados multiplos interfaces de rede, por exemplo, um para NAT para acesso externo e outro na rede privada



Oracle VM VirtualBox Manager interface showing network configuration options and details.

Buttons: Create, Remove, Properties

Host-only Networks | NAT Networks | Cloud Networks

Name	IPv4 Prefix	IPv6 Prefix	DHCP Server
VirtualBox Host-Only Ethernet Adapter	192.168.56.1/24		Enabled

Audio

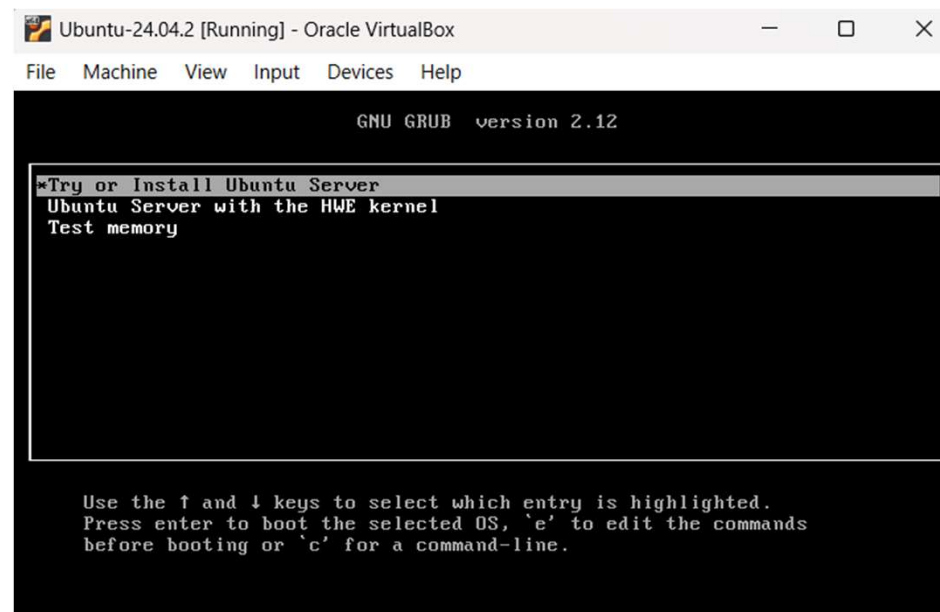
Host Driver: Default
Controller: ICH AC97

Network

Adapter 1: Intel PRO/1000 MT Desktop (NAT)
Adapter 2: Intel PRO/1000 MT Desktop (Host-only Adapter, 'VirtualBox Host-Only Ethernet Adapter')

USB

CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU



CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU

View Input Devices Help

```
Willkommen! Bienvenue! Welcome! Добро пожаловать! Welkom!  
Use UP, DOWN and ENTER keys to select your language.  
  
[ Asturianu ▶ ]  
[ Bahasa Indonesia ▶ ]  
[ Català ▶ ]  
[ Deutsch ▶ ]  
[ English ▶ ]  
[ English (UK) ▶ ]  
[ Español ▶ ]
```

line View Input Devices Help

```
Keyboard configuration  
Please select your keyboard layout below, or select "Identify keyboard" to detect your layout automatically.  
  
Layout: [ Portuguese ▼ ]  
  
Variant: [ Portuguese ▼ ]  
  
[ Identify keyboard ]
```

View Input Devices Help

```
Choose the type of installation  
Choose the base for the installation.  
  
(X) Ubuntu Server  
The default install contains a curated set of packages that  
are useful for servers.  
  
( ) Ubuntu Server (minimized)  
This version has been customized to have a small runtime footprint.  
  
Additional options  
[X] Search for third-party drivers  
This software is subject to license terms included with it.  
It should not be installed on systems that will be used for F
```

CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU

Guided storage configuration

Configure a guided storage layout, or create a custom one:

☐ Use an entire disk

[VBOX_HARDDISK_VBe15dc804-3cffa81f local disk 25.000G ▼]

☒ Set up this disk as an LVM group

☐ Encrypt the LVM group with LUKS

Passphrase:

Confirm passphrase:

☐ Also create a recovery key
The key will be stored as ~/r
/var/log/installer/ in the ta

☒ Custom storage layout

Storage configuration

FILE SYSTEM SUMMARY

MOUNT POINT	SIZE	TYPE	DEVICE TYPE
[/	19.997G	new ext4	new partition of local disk ▶]
[/boot	1.000G	new ext4	new partition of local disk ▶]
[SWAP	4.000G	new swap	new partition of local disk ▶]

AVAILABLE DEVICES

No available devices

[Create software RAID (md) ▶]

[Create volume group (LVM) ▶]

USED DEVICES

DEVICE	TYPE	SIZE
[VBOX_HARDDISK_VBe15dc804-3cffa81f	local disk	25.000G ▶]
partition 1 new, BIOS grub spacer		1.000M ▶
partition 2 new, to be formatted as ext4, mounted at /boot		1.000G ▶
partition 3 new, to be formatted as swap		4.000G ▶
partition 4 new, to be formatted as ext4, mounted at /		19.997G ▶

CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU

Profile configuration

Enter the username and password you will use to log in to the system. You can configure SSH access on a later screen. A root password is still needed for sudo.

Your name:

Your servers name:
The name it uses when it talks to other computers.

Pick a username:

Choose a password:

Confirm your password:

SSH configuration

You can choose to install the OpenSSH server package to enable SSH access to the system.

☒ Install OpenSSH server

☒ Allow password authentication over SSH

[Import SSH key ►]

AUTHORIZED KEYS

No authorized key

```
configuring cloud-init
downloading and installing security updates
curtin command in-target
restoring apt configuration
curtin command in-target
subiquity/Late/run:
```

[View full log]
[Reboot Now]

CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU



The screenshot shows a VirtualBox window titled "Ubuntu-24.04.2 [Running] - Oracle VirtualBox". The window contains a terminal window with the following text:

```
Ubuntu 24.04.2 LTS estgv-so tty1
estgv-so login: to
Password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-64-generic x86_64)

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

System information as of Thu Jul 24 02:32:46 PM UTC 2025

System load:            0.68
Usage of /:              12.4% of 19.51GB
Memory usage:           12%
Swap usage:              0%
Processes:              117
Users logged in:         0
IPv4 address for enp0s3: 10.0.2.15
IPv6 address for enp0s3: fd17:625c:f037:2:a00:27ff:fe2a:9eb3

Expanded Security Maintenance for Applications is not enabled.

81 updates can be applied immediately.
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.

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

to@estgv-so:~$
```

CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU

Dúvidas

CONSTRUÇÃO VM – INSTALAÇÃO SO UBUNTU

Exercícios

- Faça o download do Ubuntu server e o Debian desktop
- Crie uma VM para cada uma das distribuições
- Configure o acesso à Internet para a VM
- Aceda às páginas da ESTGV e Moodle