

CICLO FORMATIVO DE GRADO SUPERIOR: DESARROLLO DE APLICACIONES MULTIPLATAFORMA

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TRABAJO

MÁQUINAS VIRTUALES

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1. Análisis de las aplicaciones de virtualización existentes en la actualidad.

	ORACLE VM VirtualBox	Microsoft Hyper-V	QEMU	Parallels	VMware	XEN	Proxmox
SO que permite instalar	FreeBSD GNU/Linux OpenBSD OS/2 Warp Windows Solaris MS-DOS Genode ...	Windows FreeBSD GNU/Linux	Windows Solaris Linux FreeBSD NetBSD OpenBSD Mac OS X ZETA BeOS	FreeBSD Linux OpenBSD OS/2 Windows Solaris MS-DOS Mac OS X eComStation	Windows Linux SUSE CentOS	Linux Windows	GNU/Linux CentOS
SO sobre los que se puede instalar	GNU/Linux Mac OS X Windows Solaris/OpenSolaris	Todos desde Windows Vista en adelante	Windows Linux Mac OS X	Mac OS X	Windows Linux Mac OS X Solaris	Linux CentOS	Windows Linux Mac OS X
Requisitos	512 MB RAM 7.5 GB Espacio libre	Windows 10 Pro 64 bits, Enterprise o Education 4GB RAM	128MB RAM 4GB espacio libre	4GB RAM 600MB espacio libre	2GB RAM 2GB espacio libre	4G RAM Procesador doble núcleo 50GB espacio libre	1GB RAM CPU 64 bits
Soporte USB	USB 2.0 y 3.0	No	USB 2.0 y 3.0	USB 2.0	USB 2.0 y 3.0	USB 2.0	USB 2.0
Licencias	GPL 2 privada GPL de uso personal	Gratis	LGPL	GNU privada	ESXi gratuita Privadas: Standard Enterprise Enterprise plus	GPL 2 privada	Código abierto
Web Oficial	https://www.oracle.com	https://docs.microsoft.com/es-es/virtualization/hyper-v-on-windows/index	https://www.qemu.org/	https://www.parallels.com/products/desktop/	https://www.vmware.com/es.html	https://xenproject.org/	https://www.proxmox.com/en/proxmox-ve
Página para descargar	https://www.oracle.com/technetwork/server-storage/virtualbox/downloads/index.html	https://www.microsoft.com/en-us/evalcenter/evaluate-hyper-v-server-2019	https://www.qemu.org/download/	https://www.parallels.com/products/desktop/trial/	https://my.vmware.com/en/web/vmware/downloads	https://xenproject.org/downloads/xenproject-archives/xenproject-4-11-series/	https://www.proxmox.com/en/downloads/item/proxmox-ve-5-3-iso-installer
Comentario Personal / MEJOR?	El más completo sería el entorno de virtualización VMware, por lo que sería el más recomendado de usar con licencia privativa. Si se busca licencia gratuita, el más usado es Oracle VirtualBox. Para Windows, Hyper-V viene incluido en el sistema, siendo también muy cómodo de instalar.						

2. Uso de VMware

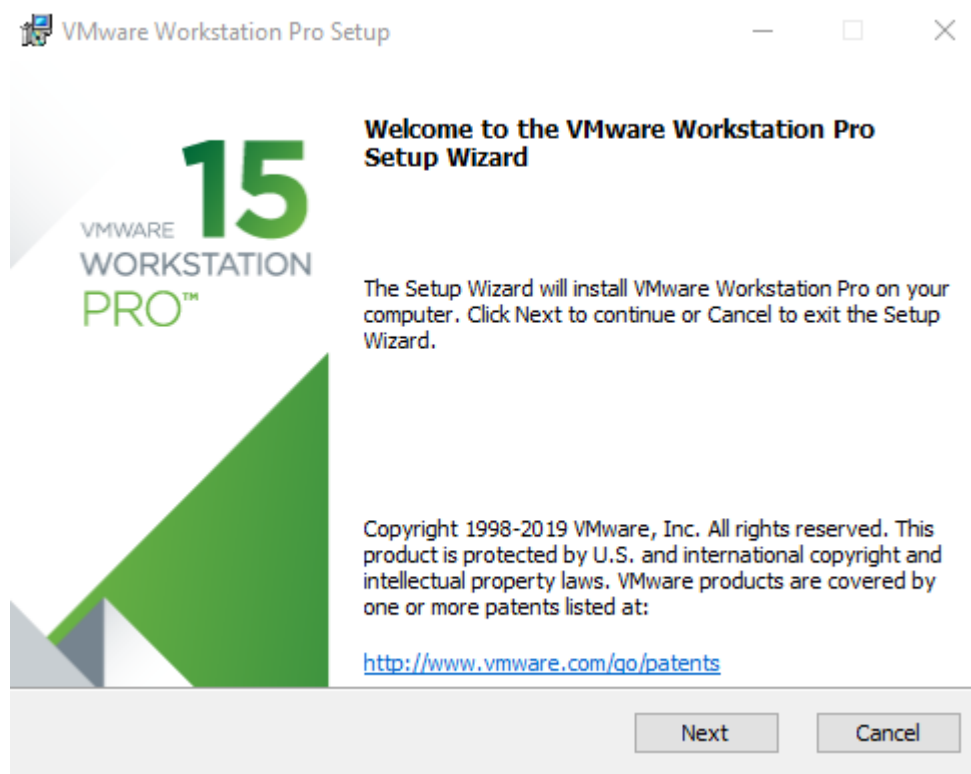
2.1. Instalación de la aplicación *VMware*

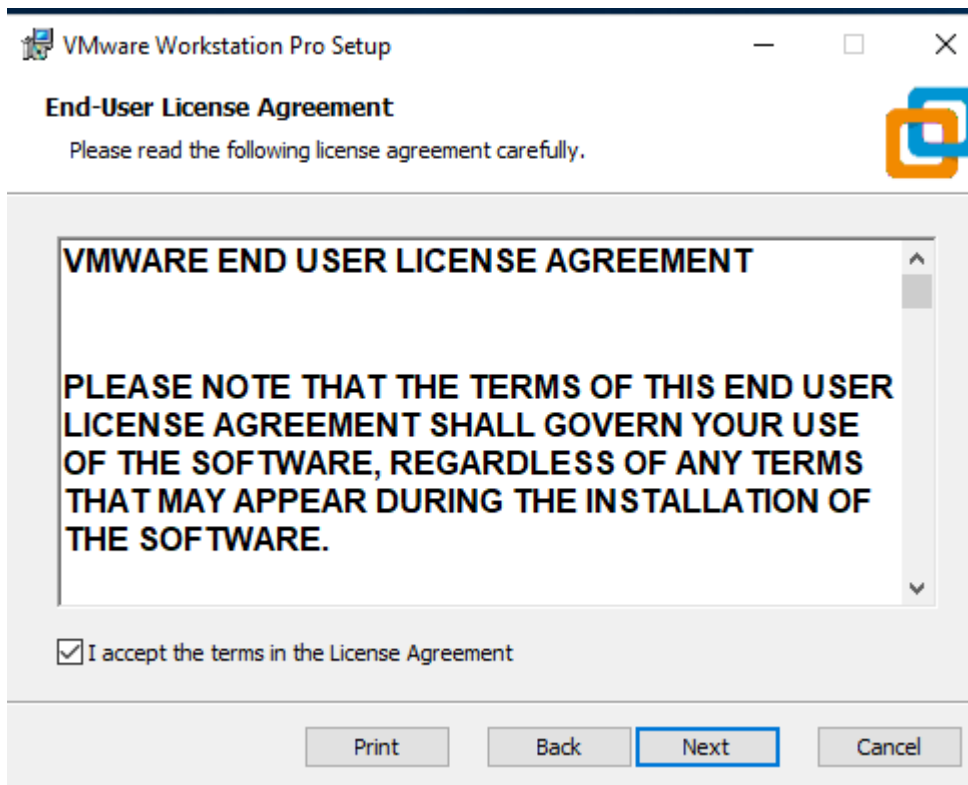
Procedamos a instalar VMware para Windows. Lo primero, descargarlo de este enlace:

<https://www.vmware.com/go/getworkstation-win>

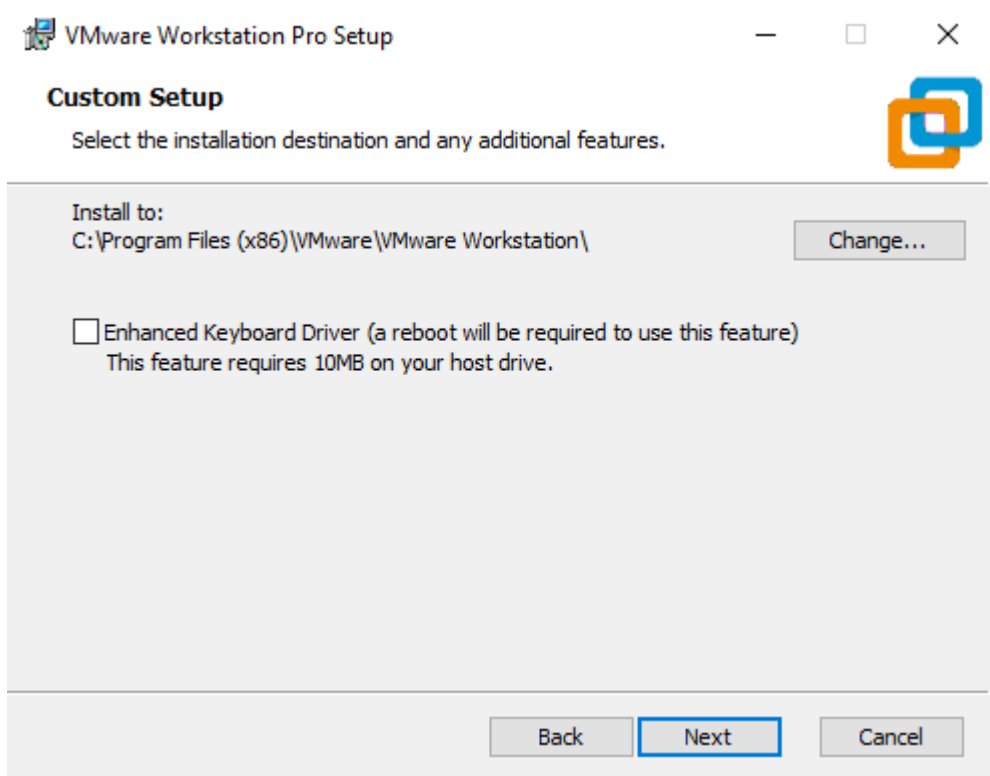
Escogemos la versión de prueba de 15 días para este caso.

Ejecutamos el archivo descargado:

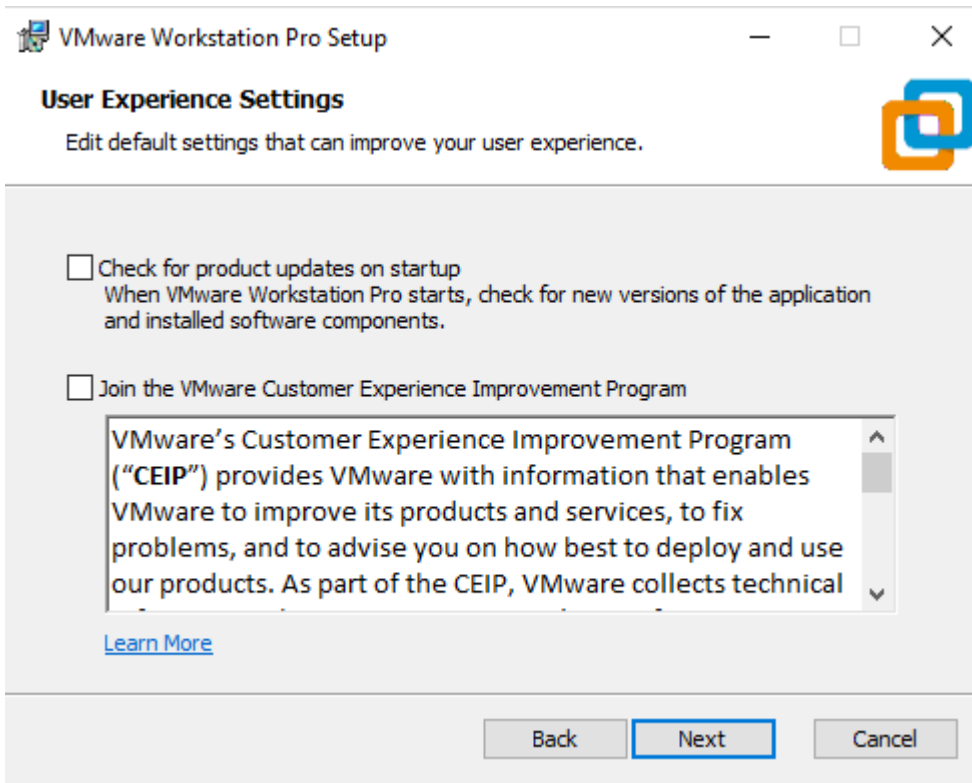




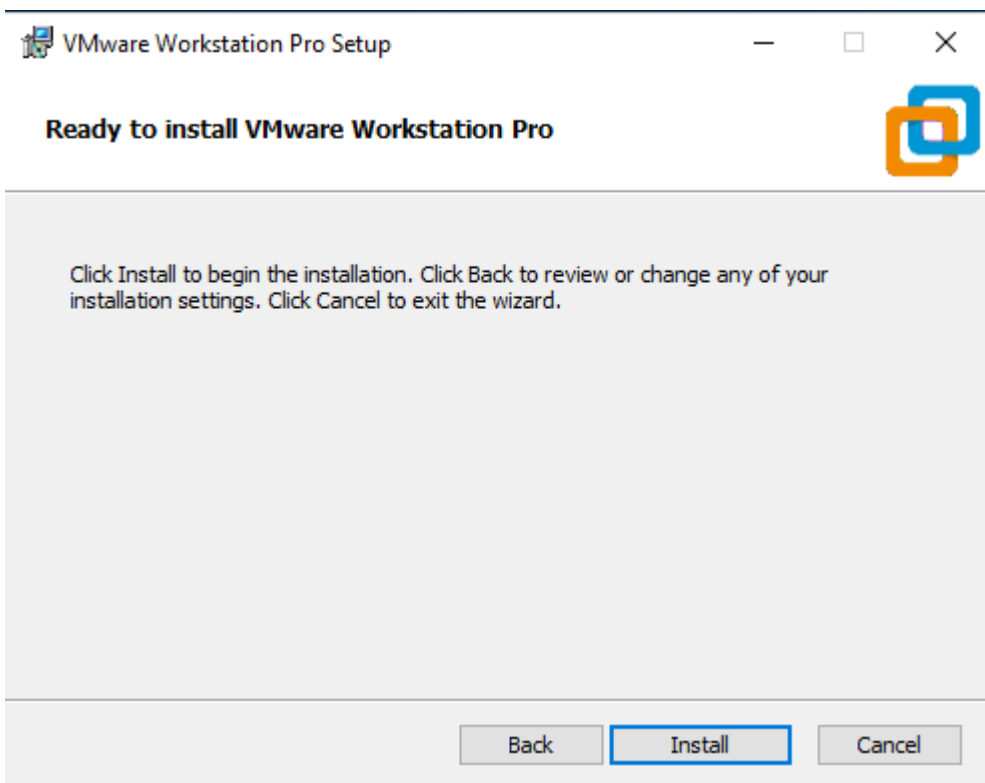
Acepto y Next :



Next :



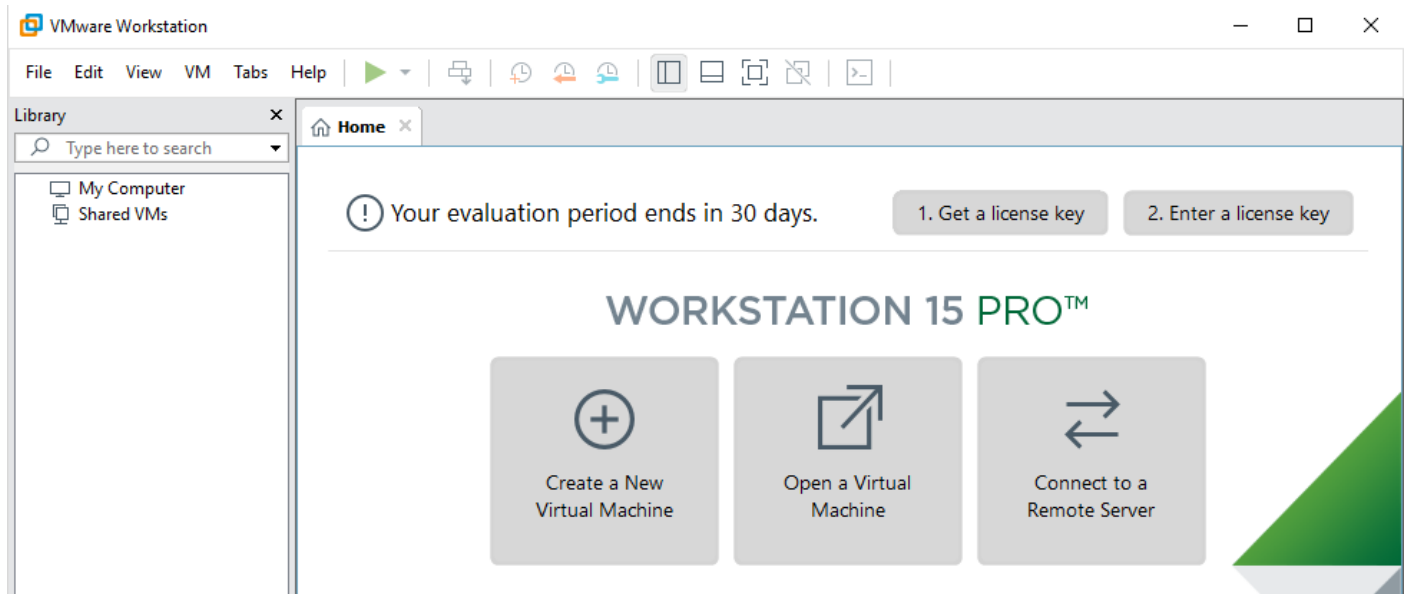
Le damos a instalar:



Finalizada la instalación, procedemos a ejecutar el programa con el acceso directo creado en el escritorio:



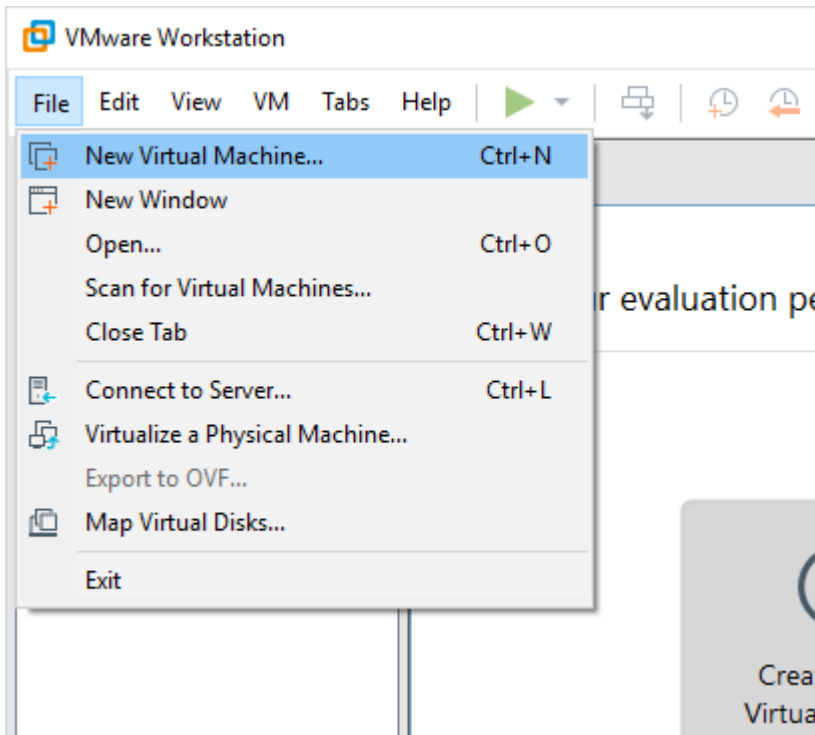
Clicamos en usar la versión de prueba, y ya tendríamos instalado nuestro programa:



2.2. Creación de una máquina virtual en VMware

Para crear una máquina virtual, seguiremos los siguientes pasos:

Le damos a New virtual machine:



Instalación típica, y next:



Seleccionamos "Instalaré el SO más tarde"

New Virtual Machine Wizard ✕

Guest Operating System Installation
A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

☐ Installer disc:
No drives available

☐ Installer disc image file (iso):
Browse...

☒ I will install the operating system later.
The virtual machine will be created with a blank hard disk.

Help < Back **Next >** Cancel

Seleccionamos el SO que instalaremos después (Escogemos Windows 10 x64):

New Virtual Machine Wizard ✕

Select a Guest Operating System
Which operating system will be installed on this virtual machine?

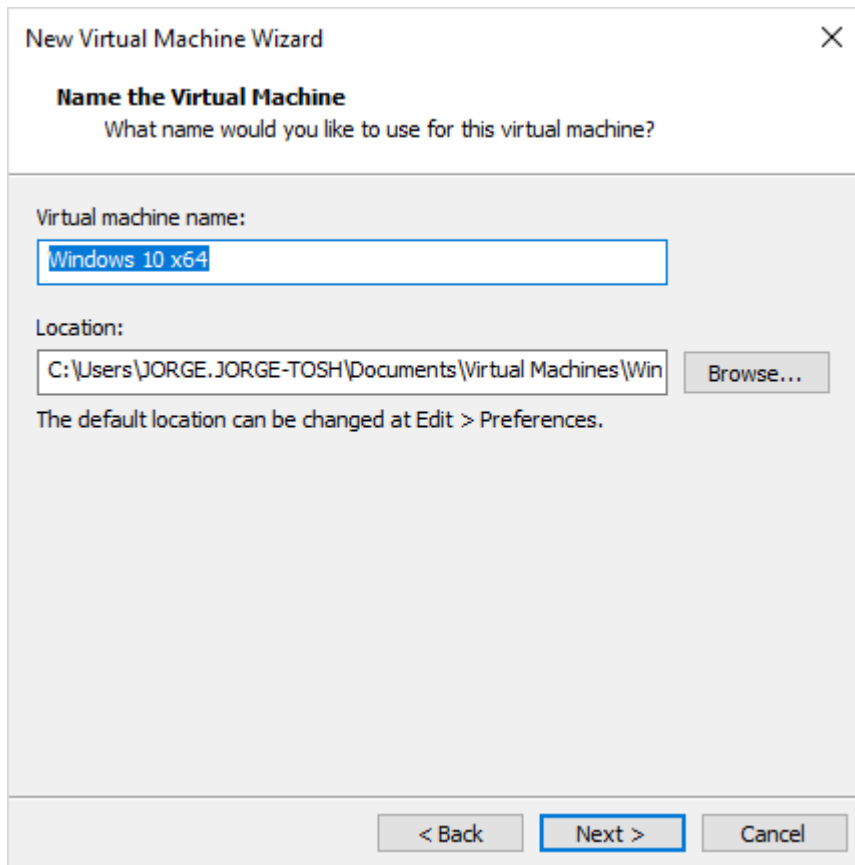
Guest operating system

☒ Microsoft Windows
☐ Linux
☐ VMware ESX
☐ Other

Version
Windows 10 x64

Help < Back **Next >** Cancel

Nombre de la máquina:



New Virtual Machine Wizard [X]

Name the Virtual Machine
What name would you like to use for this virtual machine?

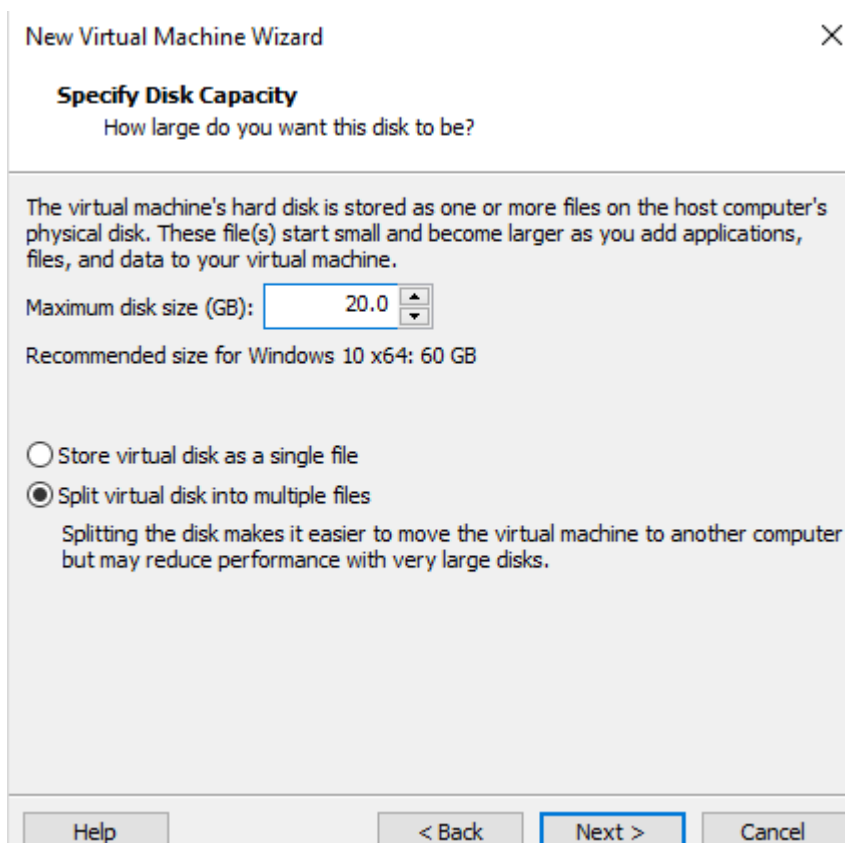
Virtual machine name:

Location:

The default location can be changed at Edit > Preferences.

< Back **Next >** Cancel

Pondremos 20GB de memoria, y que se divida en múltiples archivos:



New Virtual Machine Wizard [X]

Specify Disk Capacity
How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB):

Recommended size for Windows 10 x64: 60 GB

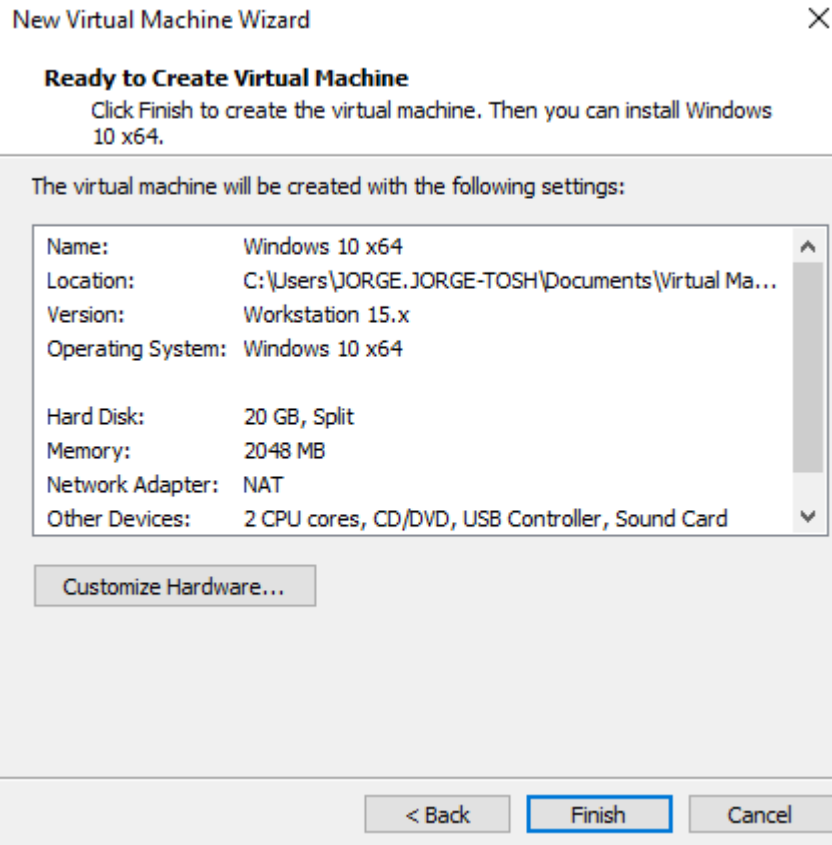
☐ Store virtual disk as a single file

☒ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help < Back **Next >** Cancel

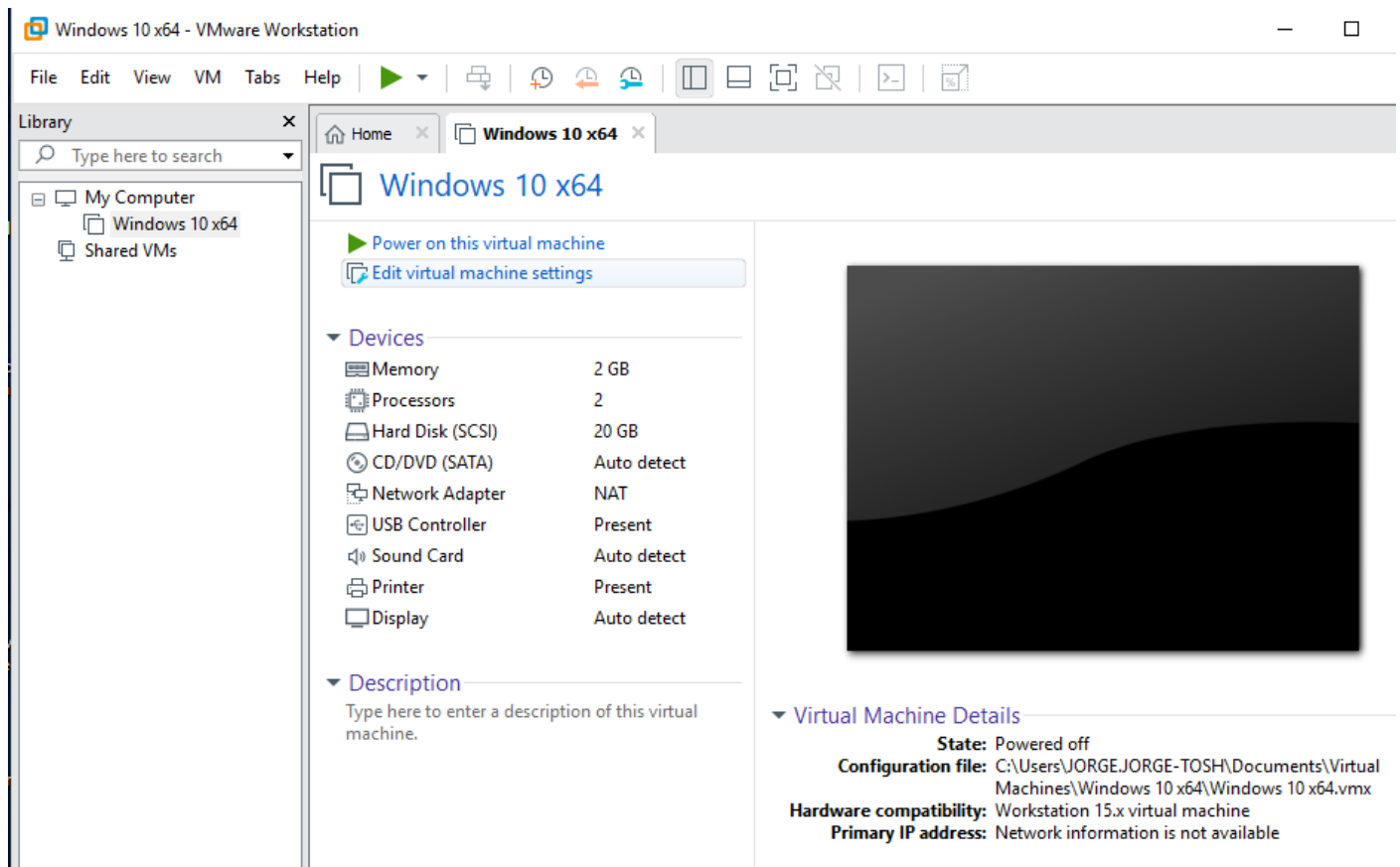
Muestra un resumen de lo que vamos a instalar, y aceptamos:



2.2.1. Configuración de las máquinas virtuales

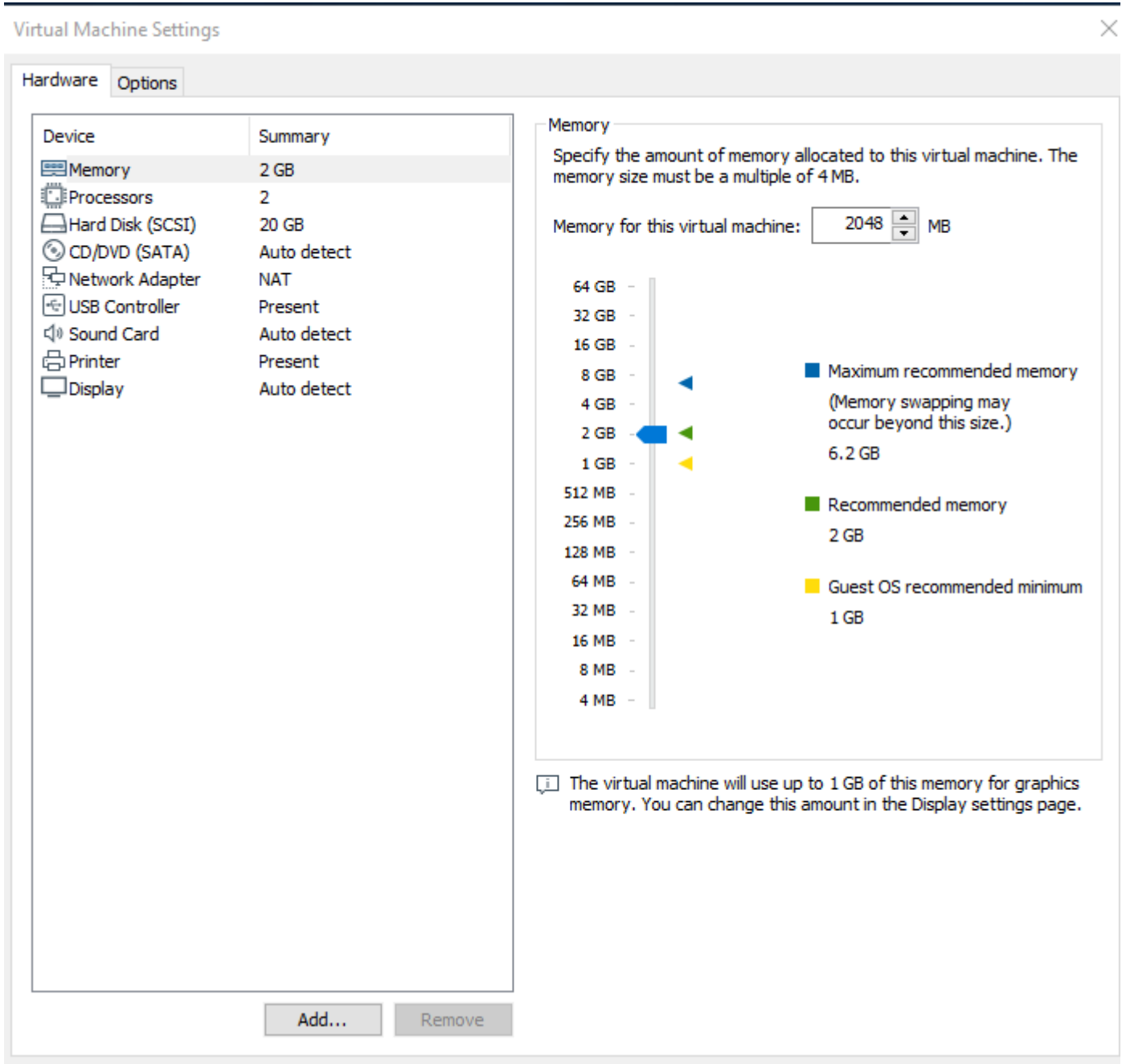
En este apartado, veremos cómo podemos modificar la configuración de la máquina virtual ya creada:

Hacemos click en Edit virtual machine settings:



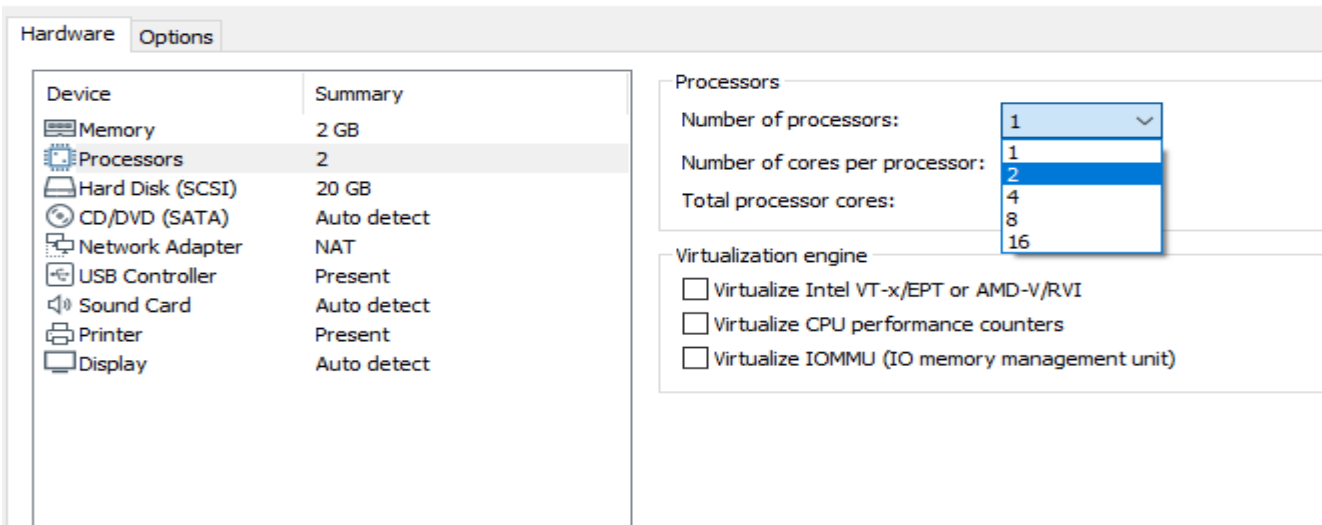
En la Ventana que se nos abre, podremos cambiar la configuración de todos los elementos que queramos, como:

- La RAM, moviendo la flechita o introduciendo un valor en el cuadro:



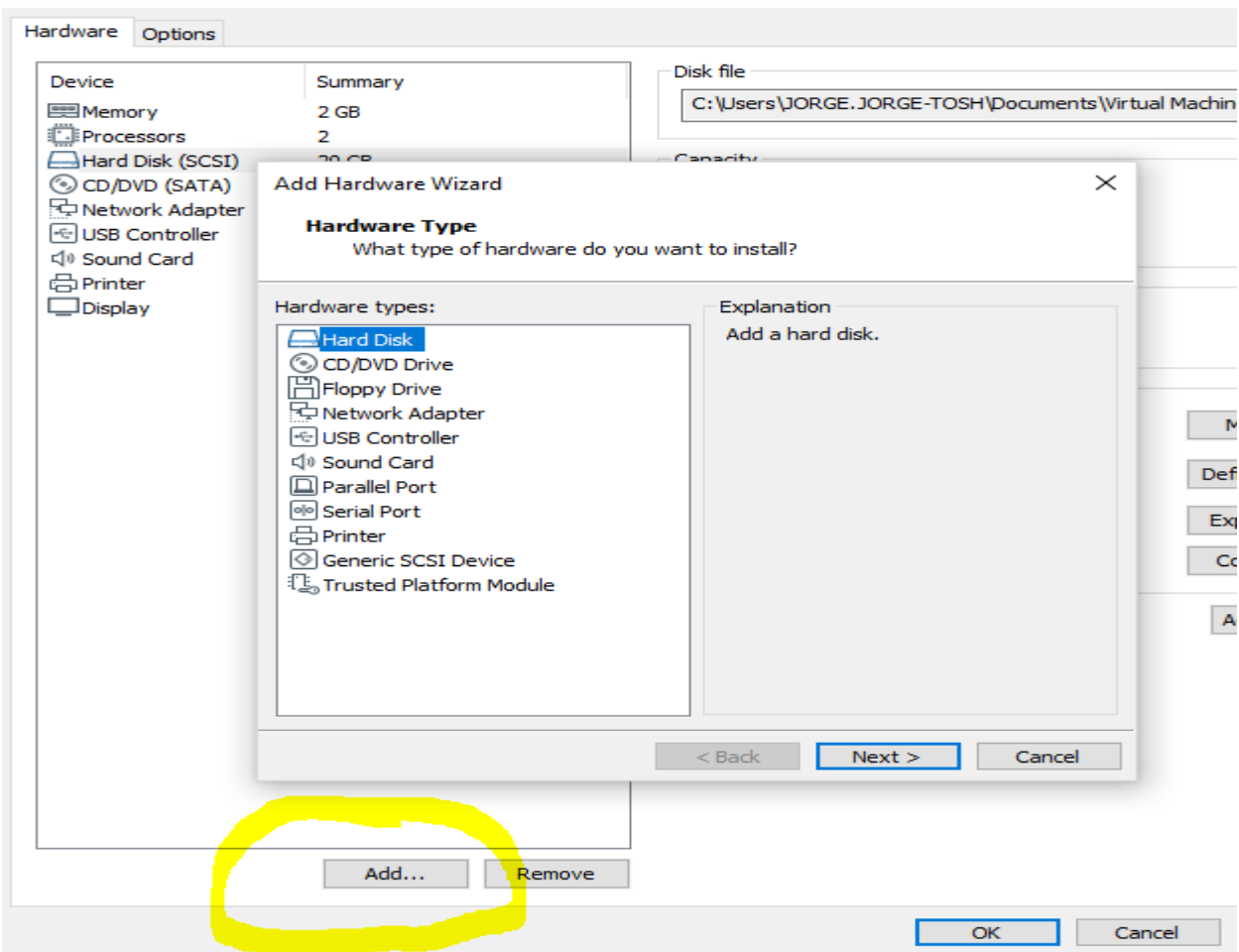
- Aquí cambio el número de procesadores a utilizar:

Virtual Machine Settings



- Si pinchamos en ADD... podremos añadir discos duros, cd's, adaptadores de red, ...

Virtual Machine Settings



Pinchamos en Next para probar a añadir un disco duro SATA:

Add Hardware Wizard ×

Select a Disk Type
What kind of disk do you want to create?

Virtual disk type

☐ IDE

☐ SCSI (Recommended)

☒ SATA

☐ NVMe

< Back **Next >** Cancel

Creamos uno nuevo:

Add Hardware Wizard ×

Select a Disk
Which disk do you want to use?

Disk

☒ Create a new virtual disk
A virtual disk is composed of one or more files on the host file system, which will appear as a single hard disk to the guest operating system. Virtual disks can easily be copied or moved on the same host or between hosts.

☐ Use an existing virtual disk
Choose this option to reuse a previously configured disk.

☐ Use a physical disk (for advanced users)
Choose this option to give the virtual machine direct access to a local hard disk. Requires administrator privileges.

< Back **Next >** Cancel

Add Hardware Wizard

**Specify Disk Capacity**

How large do you want this disk to be?

Maximum disk size (GB):

Recommended size for Windows 10 x64: 60 GB

☐ Allocate all disk space now.

Allocating the full capacity can enhance performance but requires all of the physical disk space to be available right now. If you do not allocate all the space now, the virtual disk starts small and grows as you add data to it.

☐ Store virtual disk as a single file☒ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

< Back

Next >

Cancel

Pinchamos en finalizar, y hemos creado nuestro segundo disco duro virtual:

Add Hardware Wizard

**Specify Disk File**

Where would you like to store the disk file?

Disk file

A 10 GB virtual disk be created using multiple disk files. The disk files will be automatically named based on this file name.

Browse...

< Back

Finish

Cancel

- Para cambiar el tipo de red, seleccionamos Bridged (por cable) o NAT (la cual comparte nuestra dirección IP que usamos en el equipo host):

Virtual Machine Settings

The screenshot shows the 'Options' tab of the 'Virtual Machine Settings' window. On the left, a list of devices is shown with 'Network Adapter' selected. The summary for the Network Adapter is 'NAT'. On the right, the 'Device status' section has 'Connect at power on' checked. The 'Network connection' section has 'NAT: Used to share the host's IP address' selected. Below this, a dropdown menu shows 'VMnet0'. At the bottom right, there are buttons for 'LAN Segments...' and 'Advanced...'.

Device	Summary
Memory	2 GB
Processors	2
Hard Disk (SCSI)	20 GB
CD/DVD (SATA)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Device status

☐ Connected

☒ Connect at power on

Network connection

☐ Bridged: Connected directly to the physical network

☐ Replicate physical network connection state

☒ NAT: Used to share the host's IP address

☐ Host-only: A private network shared with the host

☐ Custom: Specific virtual network

VMnet0

☐ LAN segment:

LAN Segments... Advanced...

- Seleccionamos USB 3.0 para una experiencia óptima:

Virtual Machine Settings

The screenshot shows the 'Options' tab of the 'Virtual Machine Settings' window. On the left, a list of devices is shown with 'USB Controller' selected. The summary for the USB Controller is 'Present'. On the right, the 'Connections' section has 'USB compatibility' set to 'USB 3.0'. Below this, there are checkboxes for 'Show all USB input devices' (unchecked) and 'Share Bluetooth devices with the virtual machine' (checked).

Device	Summary
Memory	2 GB
Processors	2
Hard Disk (SCSI)	20 GB
CD/DVD (SATA)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Connections

USB compatibility: USB 3.0

☐ Show all USB input devices

☒ Share Bluetooth devices with the virtual machine

- En el apartado Display, podemos modificar la memoria usada para gráficos:

Virtual Machine Settings

Hardware Options

Device	Summary
Memory	2 GB
Processors	2
Hard Disk (SCSI)	20 GB
CD/DVD (SATA)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

3D graphics

☒ Accelerate 3D graphics

⚠ You must update Tools to enable 3D acceleration in this virtual machine.

Monitors

☒ Use host setting for monitors

☐ Specify monitor settings:

Number of monitors:

1

Maximum resolution of any one monitor:

2560 x 1600

Graphics memory

Maximum amount of guest memory that can be used for graphics memory:

1 GB (recommended)

32 MB

64 MB

128 MB

256 MB

512 MB

768 MB

1 GB (recommended)

2 GB

3 GB

- Dentro del apartado options, en Shared folders, puedo añadir una carpeta compartida:

Virtual Machine Settings

The screenshot shows the 'Options' tab of the 'Virtual Machine Settings' window. On the left, a list of settings categories is shown, with 'Shared Folders' selected. The main area displays the 'Folder sharing' section, which includes a warning triangle and text: 'Shared folders expose your files to programs in the virtual machine. This may put your computer and your data at risk. Only enable shared folders if you trust the virtual machine with your data.' Below this, there are three radio buttons: 'Disabled', 'Always enabled' (which is selected), and 'Enabled until next power off or suspend'. There is also a checkbox for 'Map as a network drive in Windows guests'. At the bottom, there is a 'Folders' section with a table with two columns: 'Name' and 'Host Path'. Below the table are three buttons: 'Add...', 'Remove', and 'Properties'.

- En el apartado general, podría cambiar el tipo de SO usado, el nombre de la máquina, directorio del disco duro, ...

Virtual Machine Settings

The screenshot shows the 'Options' tab of the 'Virtual Machine Settings' window. On the left, a list of settings categories is shown, with 'General' selected. The main area displays the 'Virtual machine name' section, which includes a text field with the value 'Windows 10 x64'. Below this, there is a 'Guest operating system' section with four radio buttons: 'Microsoft Windows' (which is selected), 'Linux', 'VMware ESX', and 'Other'. There is also a 'Version:' section with a dropdown menu showing 'Windows 10 x64'. Below this, there is a 'Working directory' section with a text field containing 'C:\Users\JORGE.JORGE-TOSH\Documents\Virtual' and a 'Browse...' button. Below the text field, there is a warning triangle and text: 'Suspend and snapshot files will be stored here.' At the bottom, there is an 'Enhanced keyboard' section with a dropdown menu showing 'Off' and a warning triangle and text: 'The VMware enhanced keyboard driver is not installed on the host.'

- Para modificar el orden de arranque, primero cambio que arranque por la BIOS:

Virtual Machine Settings



Hardware Options

Settings Summary

- General Windows 10 x64
- Power
- Shared Folders Enabled
- Snapshots
- AutoProtect Disabled
- Guest Isolation
- Access Control Not encrypted
- VMware Tools Time sync off
- VNC Connections Disabled
- Unity
- Appliance View
- Autologin Not available
- Advanced Default/Default**

Process priorities

Input grabbed: Default

Input ungrabbed: Default

The default settings are specified in Edit > Preferences > Priority.

Settings

Gather debugging information: Default

- ☐ Disable memory page trimming
- ☐ Log virtual machine progress periodically
- ☐ Enable Template mode (to be used for cloning)
- ☐ Gather verbose USB debugging information
- ☐ Clean up disks after shutting down this virtual machine
- ☐ Enable VBS (Virtualization Based Security) support

Firmware type

⚠ Changing firmware might cause the installed guest operating system to become unbootable.

☒ BIOS

☐ UEFI

☐ Enable secure boot

File locations

Configuration: C:\Users\JORGE.JORGE-TOSH\Documents\Virtual M

Log: C:\Users\JORGE.JORGE-TOSH\Documents\Virtual M

Después, arranco la máquina, y con F2 me meto en la BIOS:

Windows 10 x64 - VMware Workstation

File Edit View VM Tabs Help

Library

Type here to search

- My Computer
- Windows 10 x64
- Shared VMs

PhoenixBIOS Setup Utility

Main Advanced Security Boot Exit

System Time: [15:45:49]

System Date: [03/20/2019]

Legacy Diskette A: [Disabled]

Legacy Diskette B: [Disabled]

► Primary Master [None]

► Primary Slave [None]

► Secondary Master [None]

► Secondary Slave [None]

► Keyboard Features

System Memory: 640 KB

Extended Memory: 2096128 KB

Boot-time Diagnostic Screen: [Disabled]

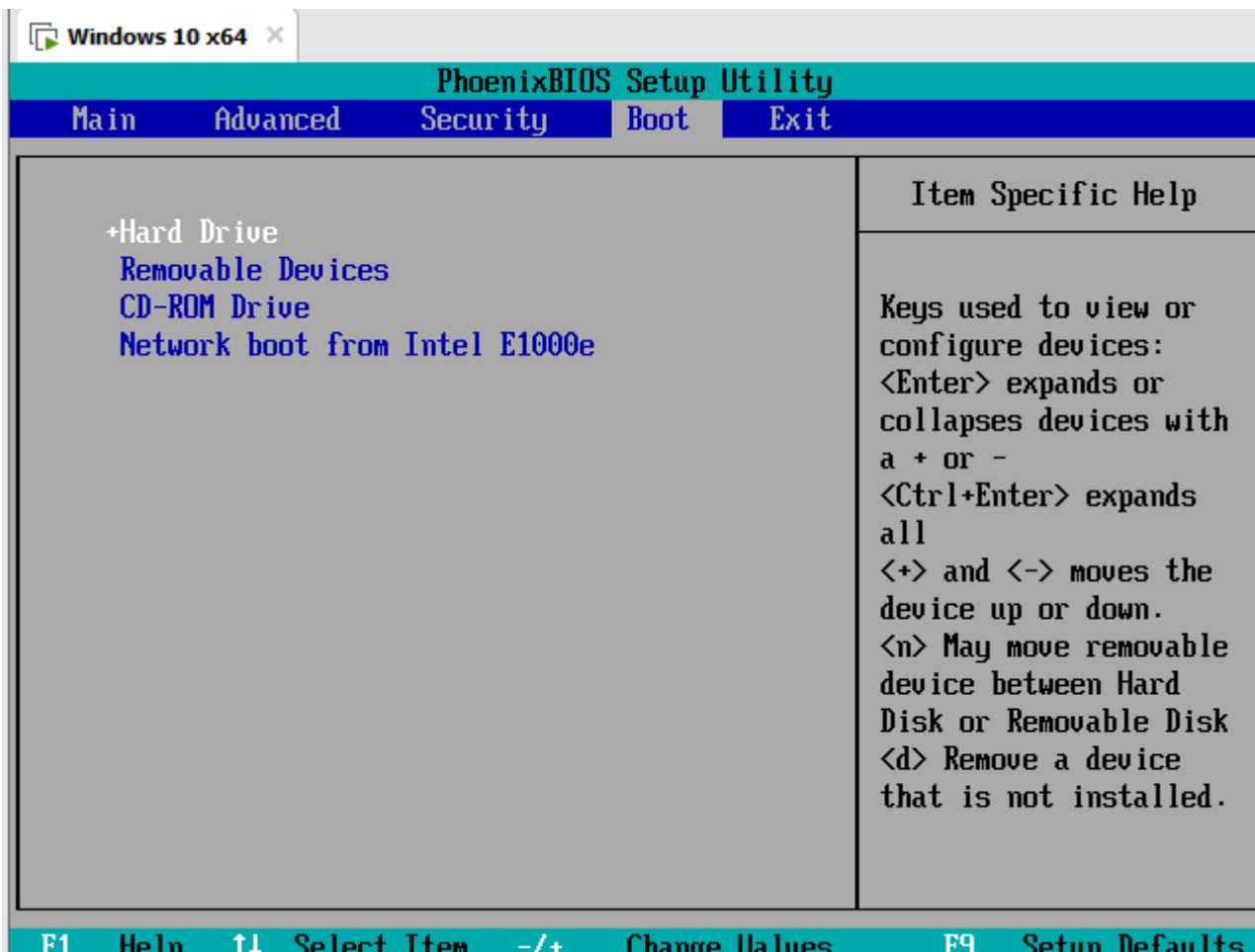
Item Specific Help

<Tab>, <Shift-Tab>, or <Enter> selects field.

F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults

Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit

Aquí, pongo que el disco duro sea el primero en iniciar:



2.3. Instalación de Sistemas Operativos en VMware

2.3.1. Instalación de un sistema operativo Windows

Procedamos a instalar un SO Windows 10 x64. Seleccionamos instalar un archivo de imagen ISO, en el apartado de crear nueva máquina virtual:

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Guest Operating System Installation' step. The window title is 'New Virtual Machine Wizard' with a close button (X) in the top right corner. Below the title bar, the section is titled 'Guest Operating System Installation' with a subtitle: 'A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?'. The main area is labeled 'Install from:' and contains three radio button options. The first option is 'Installer disc:', which is currently unselected; below it is a dropdown menu showing 'No drives available'. The second option is 'Installer disc image file (iso):', which is selected. Below this option is a text box containing the path 'C:\Users\JORGE.JORGE-TOSH\Desktop\SW_DVD5_Wi' and a 'Browse...' button. Below the text box is an information icon (i) followed by the text 'Windows 10 x64 detected. This operating system will use Easy Install. [\(What's this?\)](#)'. The third option is 'I will install the operating system later.', which is unselected; below it is the text 'The virtual machine will be created with a blank hard disk.' At the bottom of the window, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'.

New Virtual Machine Wizard

Guest Operating System Installation
A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

☐ Installer disc:
No drives available

☒ Installer disc image file (iso):
C:\Users\JORGE.JORGE-TOSH\Desktop\SW_DVD5_Wi [Browse...](#)

i Windows 10 x64 detected.
This operating system will use Easy Install. [\(What's this?\)](#)

☐ I will install the operating system later.
The virtual machine will be created with a blank hard disk.

Help < Back Next > Cancel

New Virtual Machine Wizard ✕

Easy Install Information
This is used to install Windows 10 x64.

Windows product key
VK7JG-NPHTM-C97JM-9MPGT-3V66T

Version of Windows to install
Windows 10 Pro

Personalize Windows

Full name: JORGE

Password: (optional)

Confirm:

☐ Log on automatically (requires a password)

Help < Back Next > Cancel

A partir de aquí, repetimos los pasos anteriormente vistos:

New Virtual Machine Wizard ✕

Name the Virtual Machine
What name would you like to use for this virtual machine?

Virtual machine name:
Windows 10

Location:
C:\Users\JORGE.JORGE-TOSH\Documents\Virtual Machines\Win Browse...

The default location can be changed at Edit > Preferences.

< Back Next > Cancel

New Virtual Machine Wizard

**Specify Disk Capacity**

How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB):

Recommended size for Windows 10 x64: 60 GB

- ☐ Store virtual disk as a single file
- ☒ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help

< Back

Next >

Cancel

New Virtual Machine Wizard

**Ready to Create Virtual Machine**

Click Finish to create the virtual machine and start installing Windows 10 x64 and then VMware Tools.

The virtual machine will be created with the following settings:

Name:	Windows 10
Location:	C:\Users\JORGE.JORGE-TOSH\Documents\Virtual Ma...
Version:	Workstation 15.x
Operating System:	Windows 10 x64
Hard Disk:	20 GB, Split
Memory:	2048 MB
Network Adapter:	NAT
Other Devices:	2 CPU cores, CD/DVD, USB Controller, Printer, Sound...

Customize Hardware...

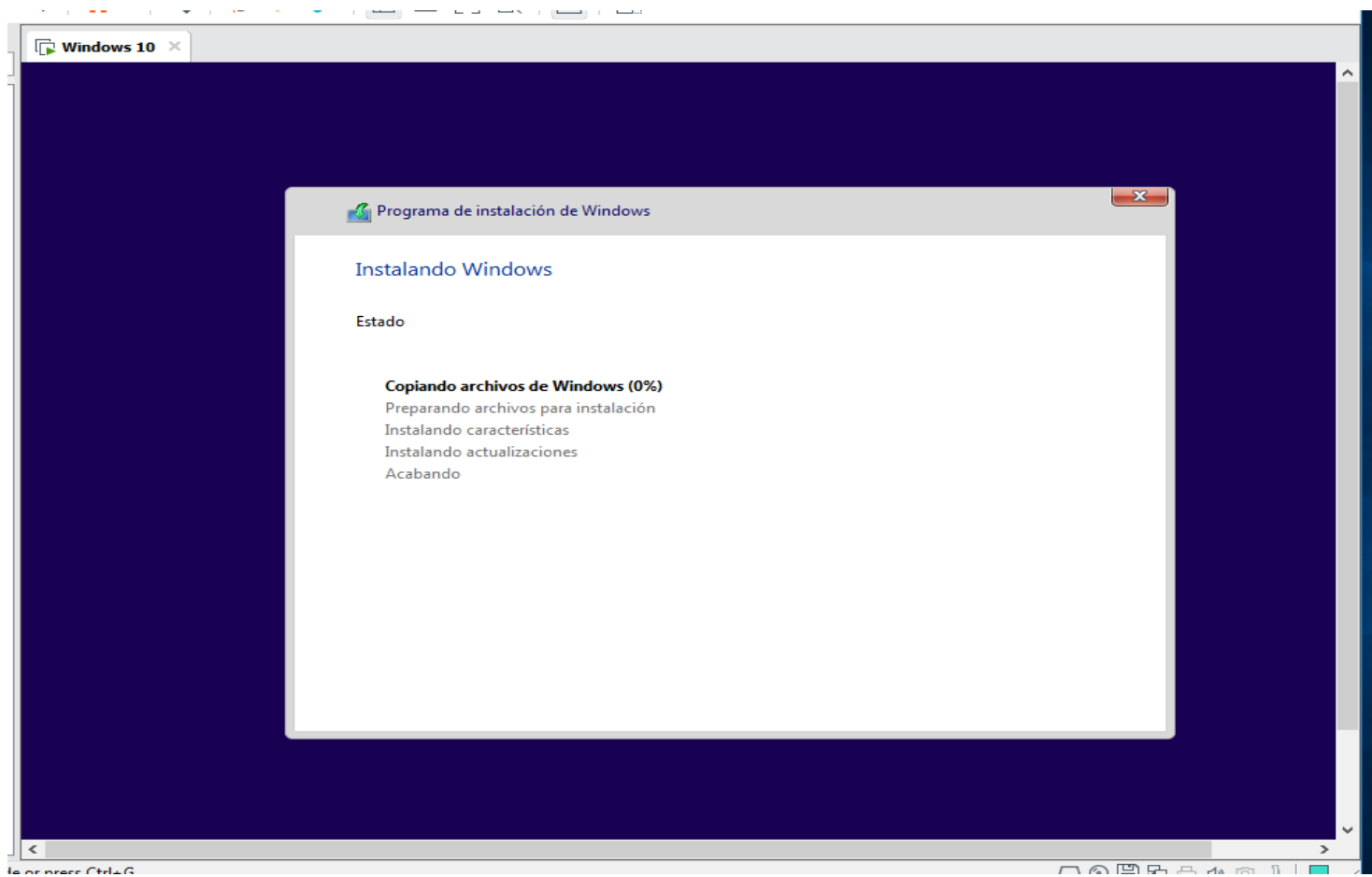
☒ Power on this virtual machine after creation

< Back

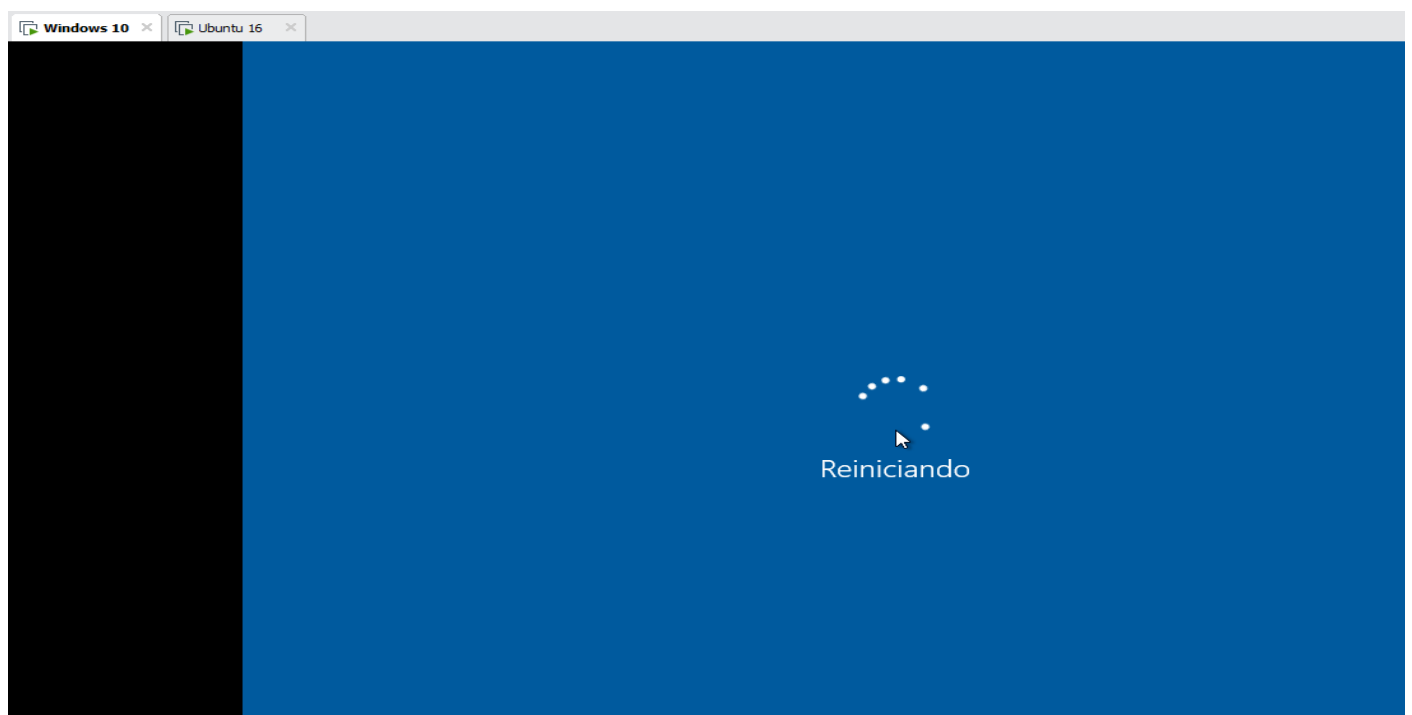
Finish

Cancel

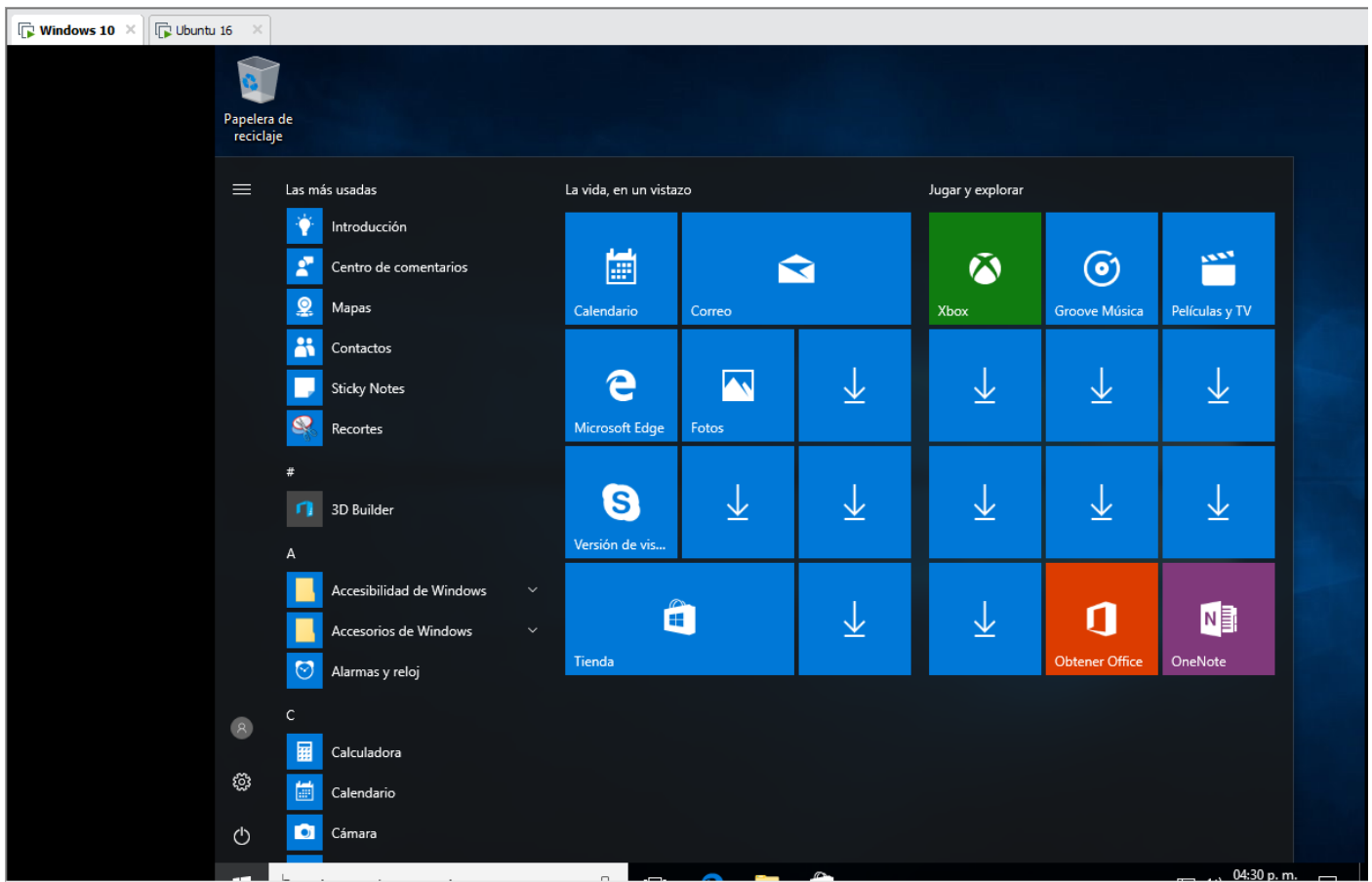
Ahora, procedamos a arrancar la máquina virtual, y arrancará directamente la instalación de Windows:



Acabado el proceso, se reinicia automáticamente, y tras un rato de instalación, se vuelve a reiniciar:



Tras un largo rato de espera, finalmente, tendríamos instalado Windows 10:



Hay que resaltar que VMware ha realizado el proceso de instalación sin ningún parón gracias a que nos pidió por adelantado un nombre de usuario, contraseña, etc.

2.3.2. Instalación de un sistema operativo Linux

Procedamos a instalar un SO Linux Ubuntu 16. Seleccionamos instalar un archivo de imagen ISO, en el apartado de crear nueva máquina virtual:

The screenshot shows the 'New Virtual Machine Wizard' window with the title bar 'New Virtual Machine Wizard' and a close button. The main heading is 'Guest Operating System Installation' with a subtitle: 'A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?'. Below this, the 'Install from:' section has three radio button options. The first is 'Installer disc:' with a dropdown menu showing 'No drives available'. The second is 'Installer disc image file (iso):' which is selected; it has a text box containing 'C:\Users\JORGE.JORGE-TOSH\Desktop\ubuntu-16.04' and a 'Browse...' button. Below this text box is an information icon and the text 'Ubuntu 64-bit 16.04.6 detected. This operating system will use Easy Install. (What's this?)'. The third option is 'I will install the operating system later.' with the note 'The virtual machine will be created with a blank hard disk.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >' (which is highlighted with a blue border), and 'Cancel'.

En Linux, poner contraseña es obligatorio:

The screenshot shows the 'New Virtual Machine Wizard' window with the title bar 'New Virtual Machine Wizard' and a close button. The main heading is 'Easy Install Information' with a subtitle: 'This is used to install Ubuntu 64-bit.' Below this, the 'Personalize Linux' section contains four text input fields: 'Full name:' with 'Jorge B', 'User name:' with 'jorgecnj', 'Password:' with masked characters '••••••••', and 'Confirm:' with masked characters '••••••••'. At the bottom, there are four buttons: 'Help', '< Back', 'Next >' (which is highlighted with a blue border), and 'Cancel'.

New Virtual Machine Wizard

**Name the Virtual Machine**

What name would you like to use for this virtual machine?

Virtual machine name:

Ubuntu 16

Location:

C:\Users\JORGE.JORGE-TOSH\Documents\Virtual Machines\Ubu

Browse...

The default location can be changed at Edit > Preferences.

< Back

Next >

Cancel

New Virtual Machine Wizard

**Specify Disk Capacity**

How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB): 20.0

Recommended size for Ubuntu 64-bit: 20 GB

☐ Store virtual disk as a single file☒ Split virtual disk into multiple files

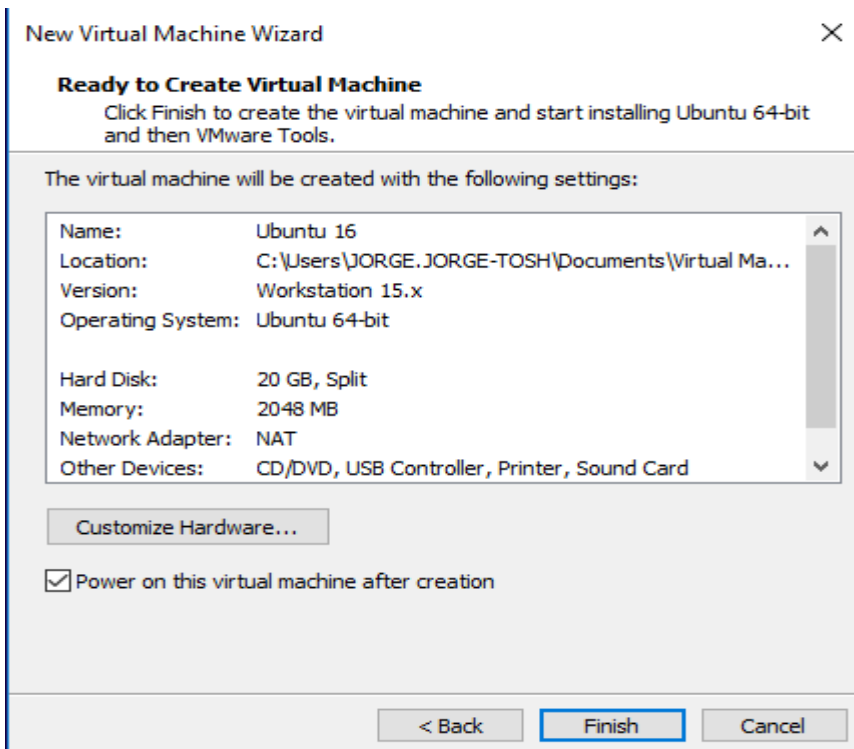
Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help

< Back

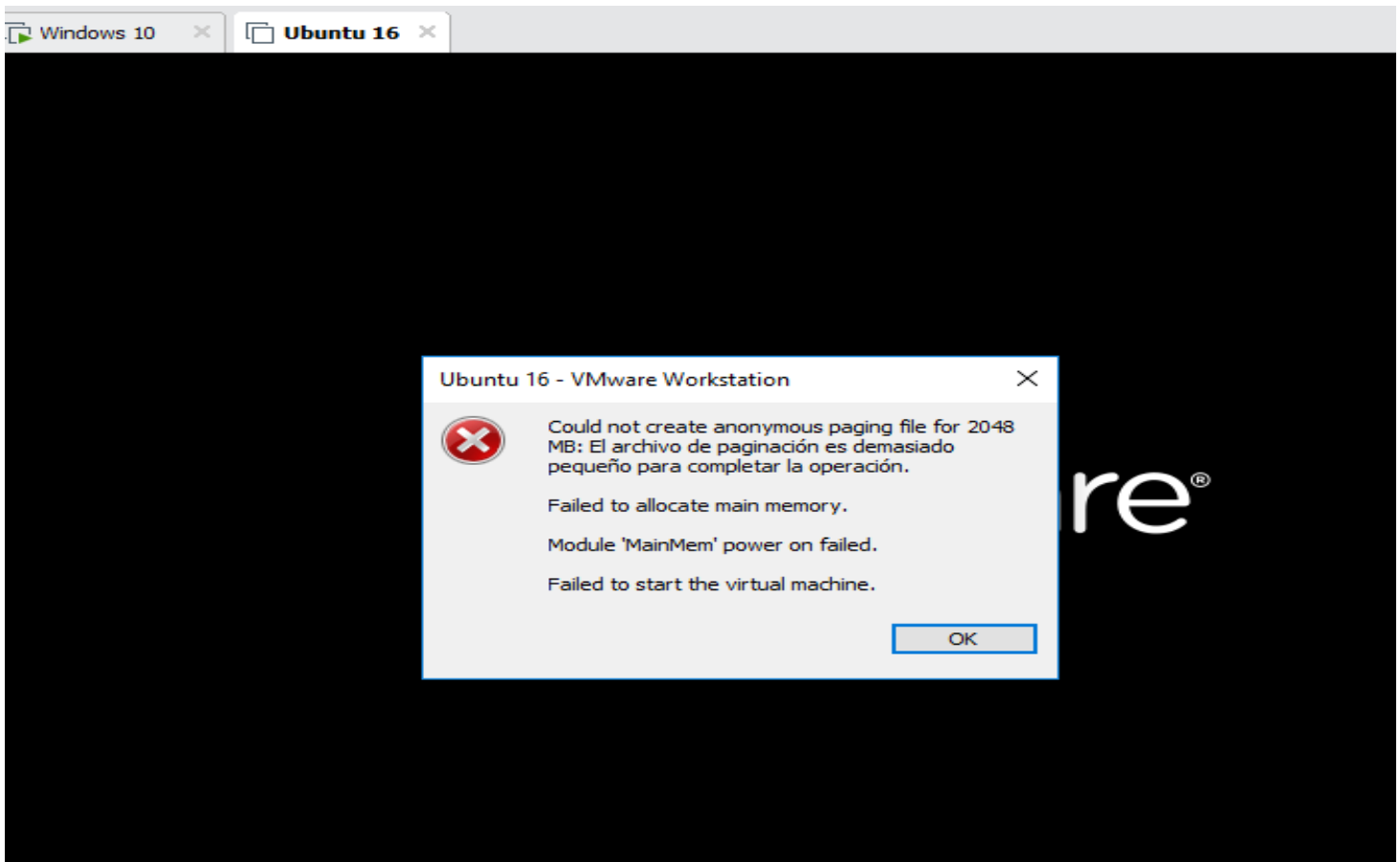
Next >

Cancel

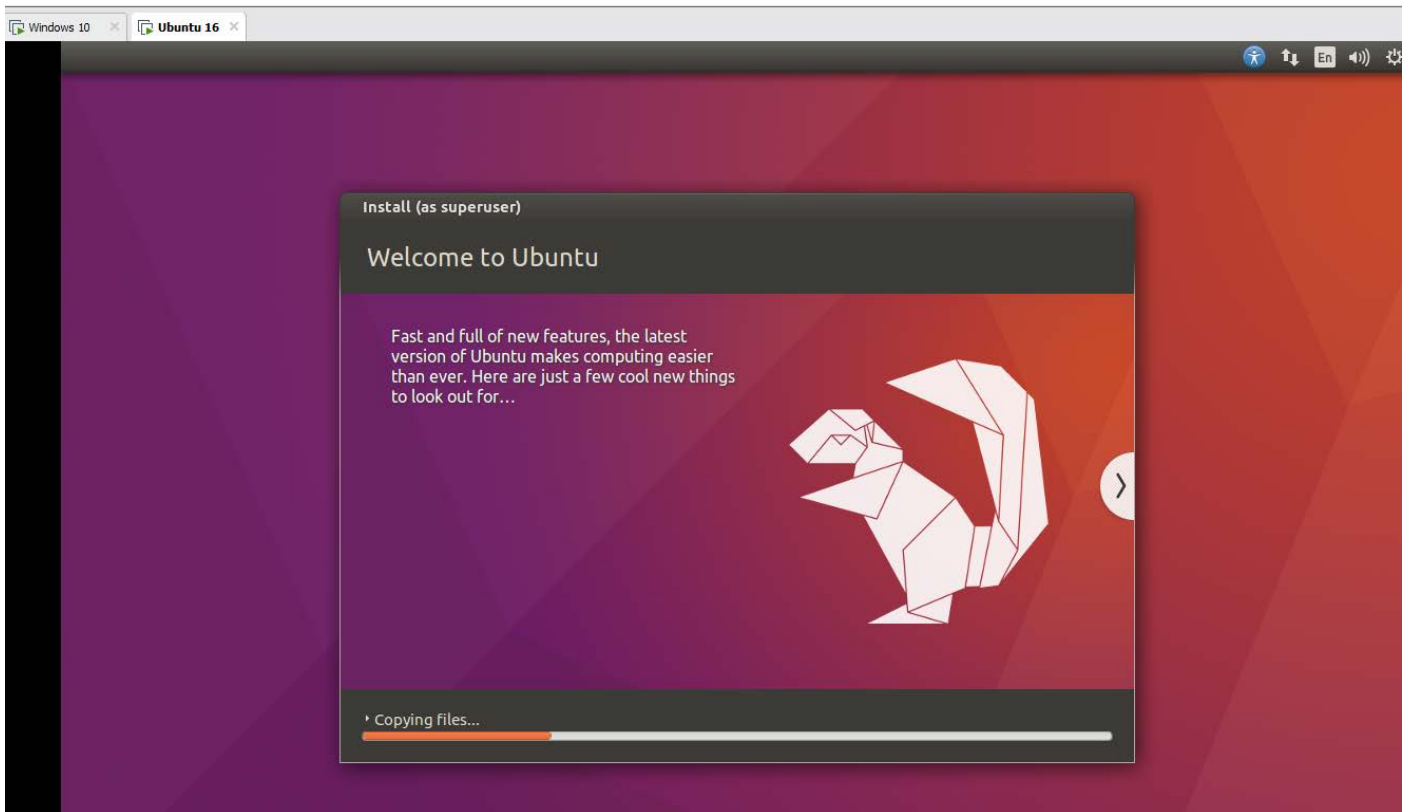


Ahora procedamos a arrancar la máquina virtual, y se ejecutará la instalación directamente.

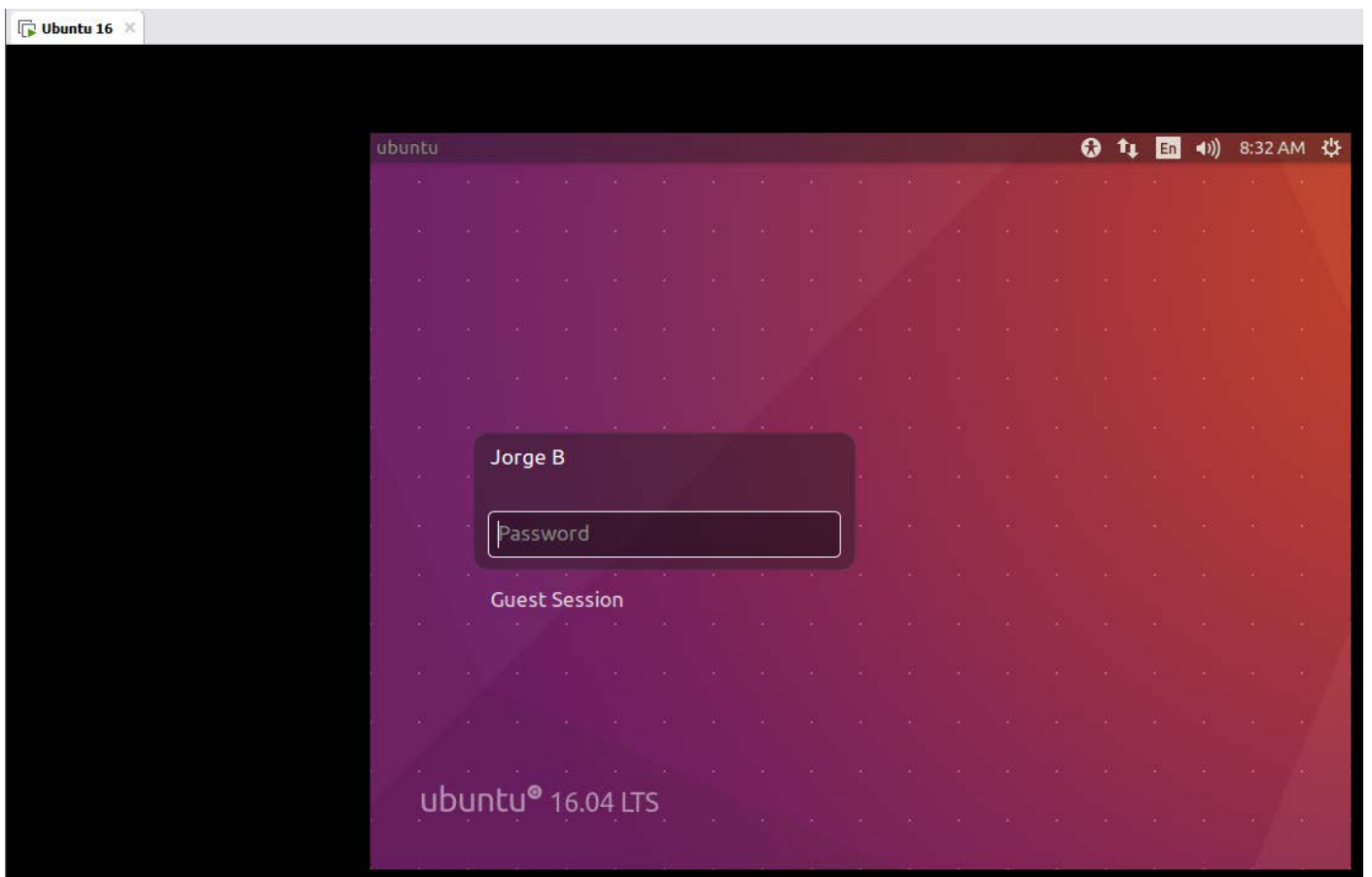
**En el caso de que de error al iniciar, bajaremos la memoria RAM virtual utilizada a 1GB:



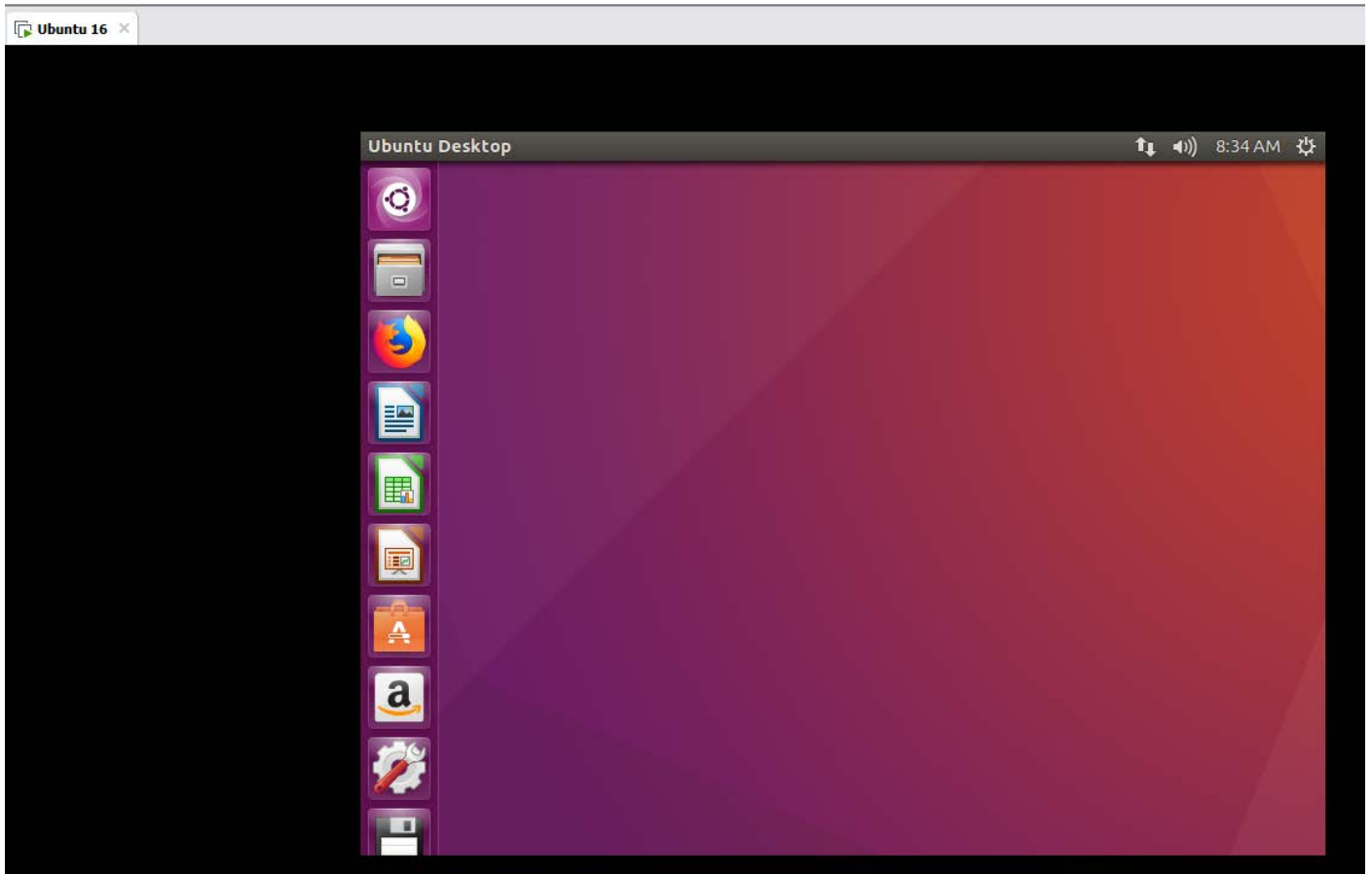
Arrancamos la máquina virtual, arrancando la instalación desde el archivo ISO automáticamente:



Tras un rato, nos pide la contraseña:



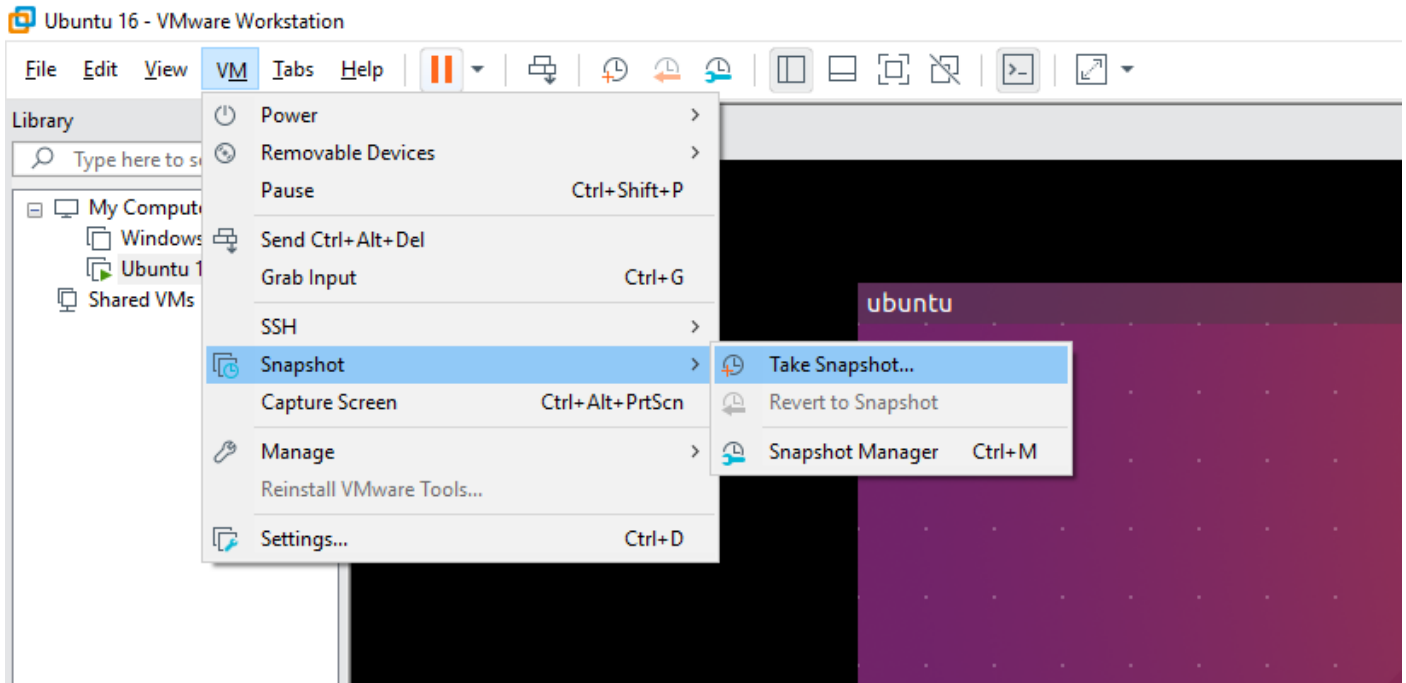
De nuevo, gracias a VMware, la instalación ha sido continua, ya que nos pidió por adelantado un nombre de usuario, contraseña, etc.:



2.4. Utilidades de VMware

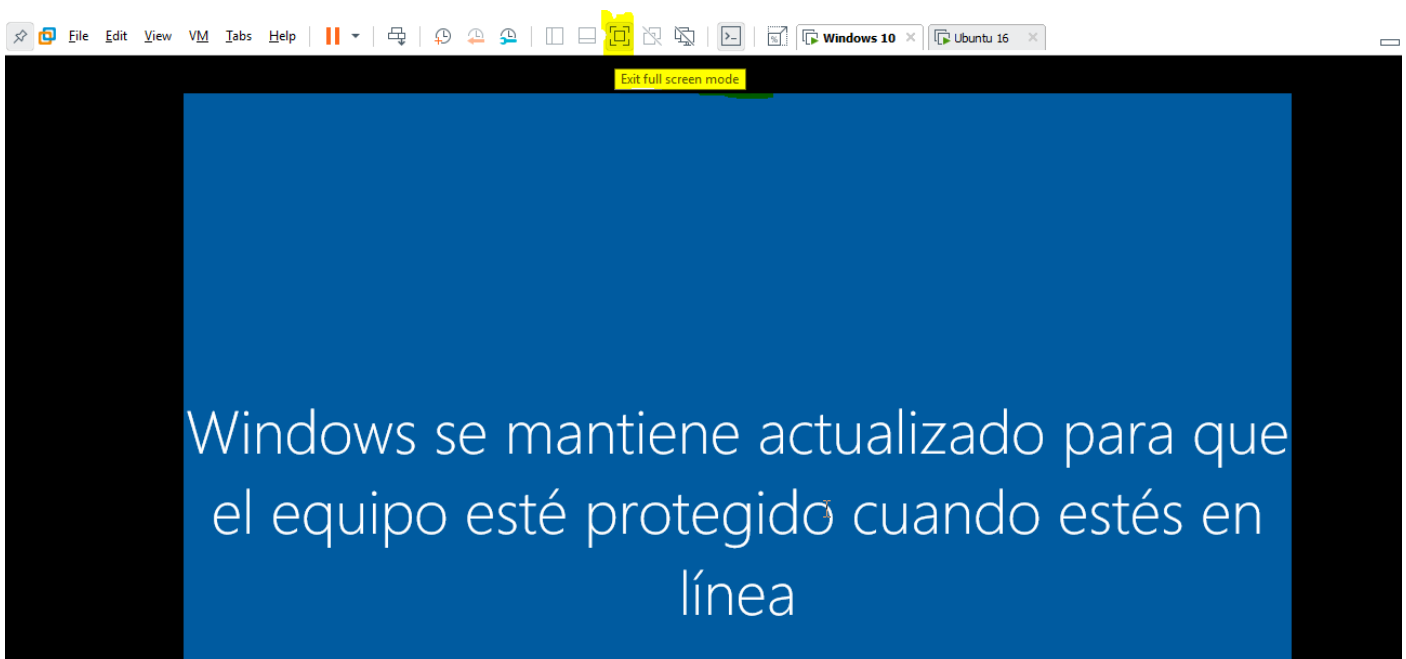
- *Cómo podemos capturar la pantalla de la máquina virtual:*

En VM, apartado Snapshots, podemos crear una captura del sistema para volver a ese punto si hay un problema:



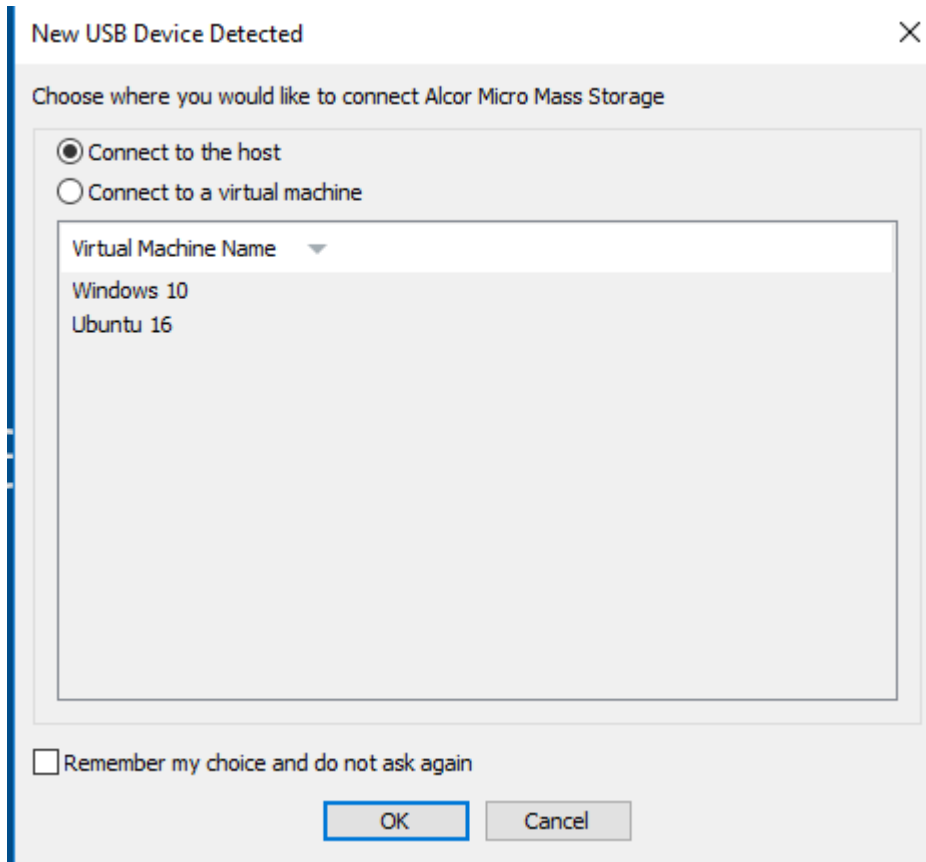
- *Cómo poner pantalla completa:*

Hacemos click en Enable full screen mode

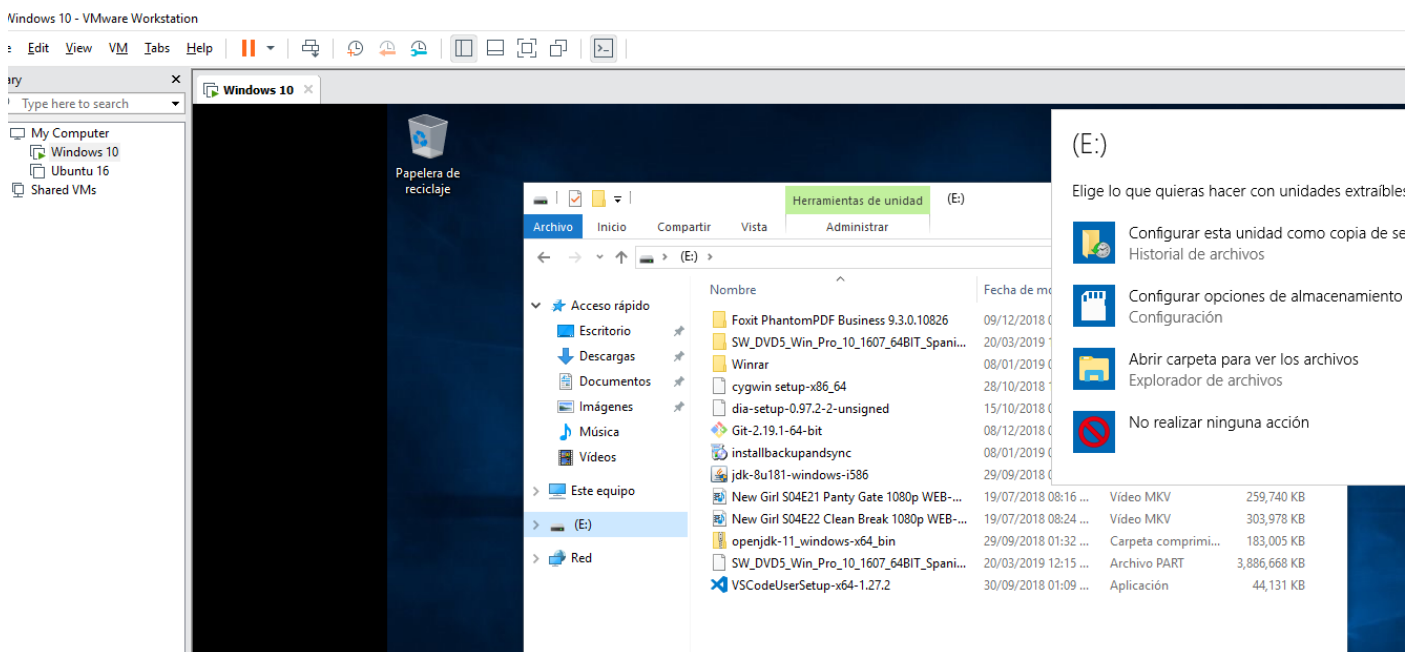
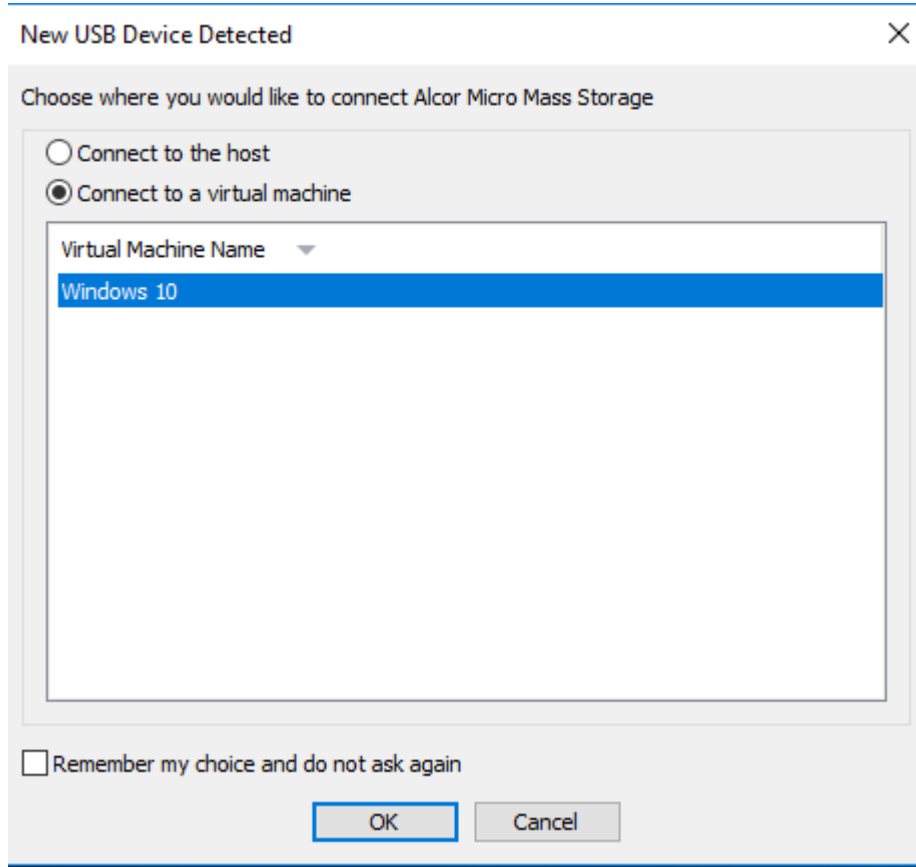


- *Cómo utilizar USB:*

Como en el apartado de configuración le dimos a utilizar USB, al conectar uno, nos aparece la siguiente ventana (en caso de que tengamos 2 máquinas corriendo a la vez):



Seleccionamos Windows 10 para utilizarlo aquí:



3.Sistemas Operativos de las Tablet

3.1. Análisis de los sistemas operativos de las Tablet.

Los 3 Sistemas operativos dominantes en el mercado actual son:

Windows
Android
iOS

- **Windows:** Sistema desarrollado por Microsoft, el cual lo implementa en sus tablets llamadas "Surface". Es el mismo sistema operativo para los ordenadores (Windows 10), el cual posee un modo "Tablet" y el modo escritorio normal. Acepta entrada táctil, incorpora el asistente de voz "Cortana", puertos USB...
En cuanto al modo Tablet, cambia completamente el menú tradicional, transformándolo en "tiles" para ser más accesibles al hacer click con el dedo, incorpora teclado virtual, centro de actividades para ver las notificaciones, tienda de aplicaciones, etc.
Los requisitos mínimos son 1GB de RAM y 16GB de espacio de almacenamiento, algo que cumplen de sobra las tablets del mercado actuales.



- **Android:** sistema operativo móvil desarrollado por Google, basado en el Kernel de Linux y otros softwares de código abierto. Fue diseñado directamente para dispositivos con pantalla táctil en 2007, y es el sistema operativo móvil más utilizado del mundo. Es multi-táctil, y es instalado por multitud de fabricantes además del propio Google con su gama "Nexus".
Al ser código abierto, cualquier usuario puede acceder al código fuente y reportar problemas, siendo esto clave para la continua mejora del sistema operativo.
Tiene las tiendas de aplicaciones Google play y Android play, donde se descargan aplicaciones de extensión APK.
Requisitos mínimos: 1GB RAM y 8GB de almacenamiento



- **iOS:** sistema operativo móvil fabricado por la compañía Apple Inc. Originalmente fue desarrollado para su gama de móviles "iPhone", y después ha sido utilizado en dispositivos como el iPod y el iPad, su Tablet.
Sistema fluido y bastante básico para el usuario intermedio, con multitud de gestos táctiles incorporados. Una pega que tiene este sistema es que no permite la instalación de software de terceros que no tengan aplicaciones en la App store.

Apple tiene muy controlado el tema de interactuar con otros dispositivos, y exige para estas tablets conectores personalizados (conector lightning), compartir archivos solo entre dispositivos con sistema operativo iOS, no trabaja con java y con Adobe Flash (compatibilidad escasa, usa HTML5), y no se puede acceder al sistema de archivos interno. Requerimientos: 1GB de RAM y 10 GB de espacio de almacenamiento.



✓ Elección:

Valorando los diferentes sistemas operativos, nos decantaríamos por **Android** debido a:

Sistema operativo bastante fiable y de bajos requerimientos de hardware, a diferencia de Windows con multitud de consumo de memoria.

Sistema de código abierto, a diferencia de iOS.

Puertos abiertos a cualquier hardware. En este punto Windows se lleva el primer puesto, debido a que posee puertos USB 3.0 en su hardware.