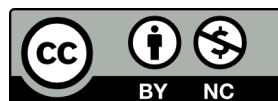


Business 4720

Installing and Using a Virtual Machine

Joerg Evermann



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1 Introduction

A virtual machine provides a "computer within the computer". That is, it is a complete "guest" computer system with its own hard drive space that can run as an application on a "host" computer system. This makes it ideal to deliver a fixed environment with software packages and data sets fully installed and configured.

A virtual machine is specific to a particular type of computer hardware (processor chip/CPU) and the guest system hardware should be the same as the host system hardware. Hence, when choosing how to proceed, it is important to determine the real computer's hardware. As of this writing, there are two major processor chip/CPU types in use.

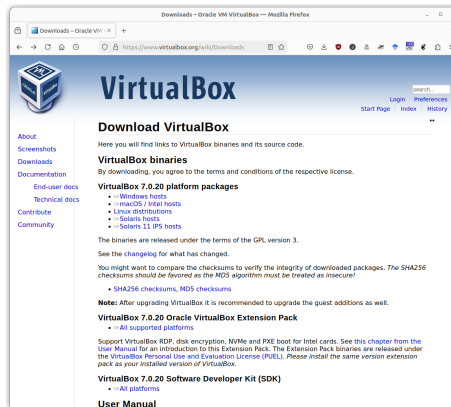
- *Intel and the fully compatible AMD chips* are used primarily with the Windows operating system. However, they were also used by Apple Mac computers until approximately 2021.
- *ARM chips* are used in current Apple Mac computers (since approximately 2021, using the Apple M1, M2, or M3 processors/CPU), but are also used in a number of recent Windows laptops (since approximately 2023, using the Qualcomm processors/CPU).

The virtual machine for this course is available for Intel/AMD processors running Windows or MacOS, as well as for ARM processors running MacOS. ARM processors running Windows have not been tested.

2 VirtualBox on Windows

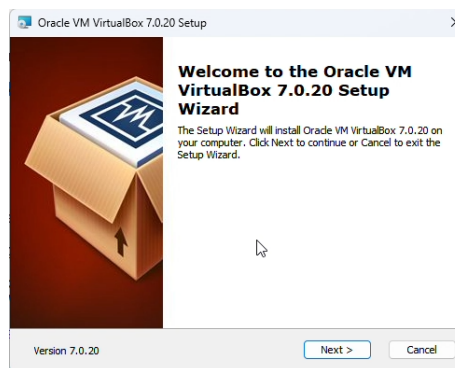
The virtual machine for use on Intel and AMD processors (CPUs) uses the Oracle VirtualBox virtual machine software application. Oracle VirtualBox is free and open-source software that is available at no cost. It comes packaged as a virtual box appliance for import into the VirtualBox software. To install the virtual machine, follow these steps:

1. Ensure you have approximately 80GB of hard drive space available (30GB to download the virtual box appliance file, and 50GB to install it).
2. Download Oracle VirtualBox from its [website](#). Choose the version for your operating system (Windows or MacOS). The virtual machine was developed with VirtualBox version 6.1 but should work with newer versions of VirtualBox.

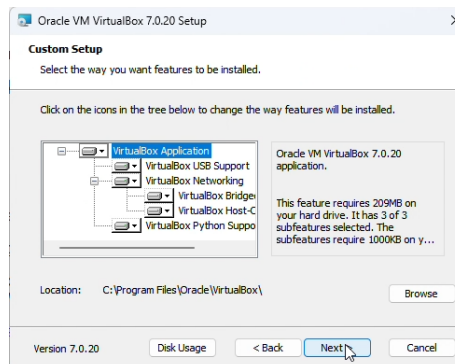


3. Follow the [general installation instructions](#) or the [detailed instructions for Windows](#) or the [detailed instructions for MacOS](#). The following screen shots guide you through the installation of VirtualBox on Windows:

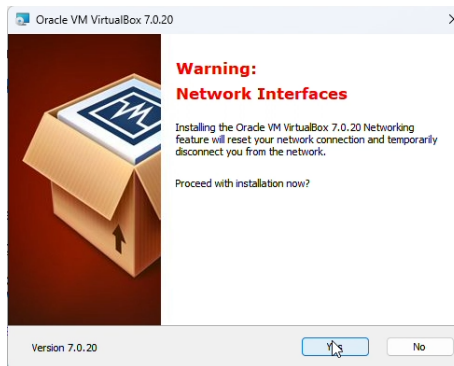
- The setup wizard guides you through the setup process. You should confirm default choices:



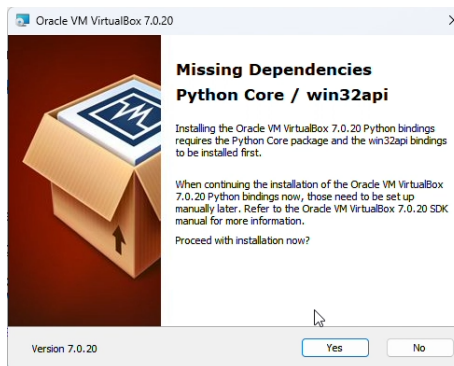
- Confirm the default features to install:



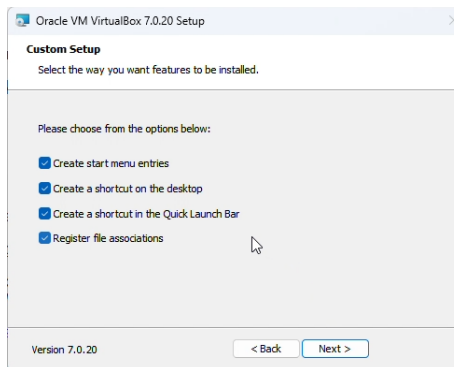
- Confirm the warning about temporary network disconnect:



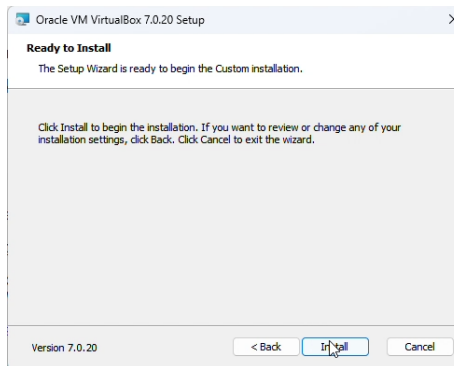
- Ignore the warning about missing Python dependencies:



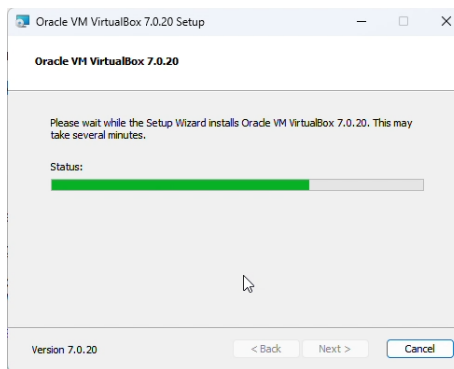
- Select which menu entries and shortcuts to create according to your preferences:



- Confirm the installation:



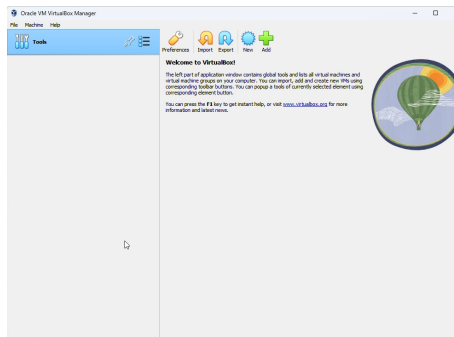
- Wait for the installation to finish:



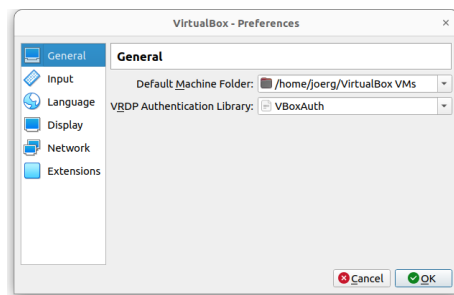
- Finish the installation, start VirtualBox, and exit the setup wizard:



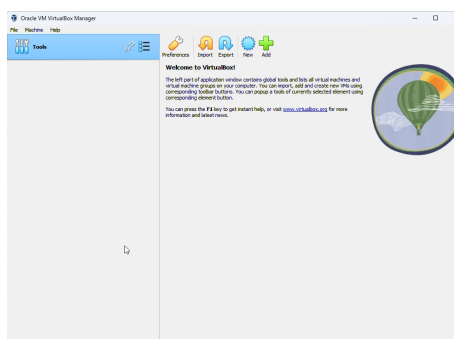
- You will see the VirtualBox Manager screen:



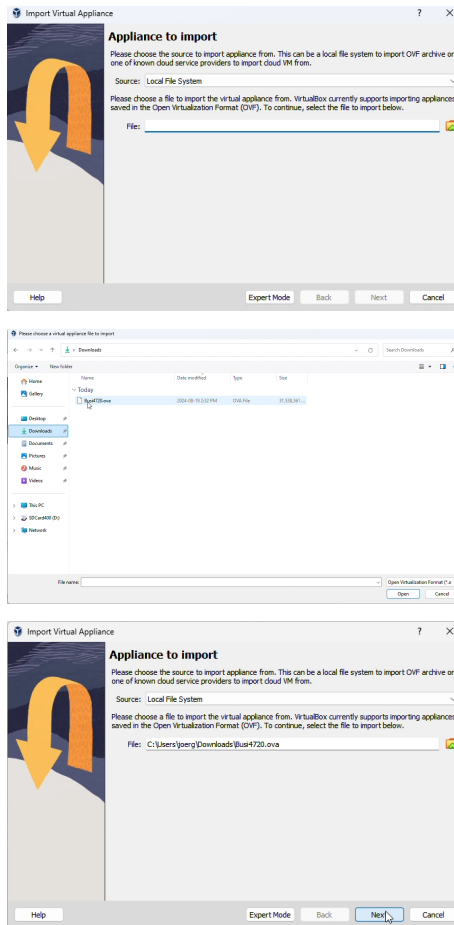
- Press the "Preferences" button. In the general preferences, specify the location for VirtualBox to store the virtual machines. Ensure at least 50GB of hard drive space is available in that location:



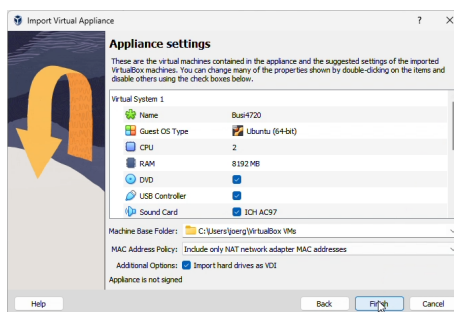
- An overview of the VirtualBox user interface is found in [chapter 1 of the user manual](#).
4. Download the [virtual appliance file](#). *Warning:* This is a 30GB file and will take some time to download.
 5. Import the virtual appliance into the VirtualBox software.
 - On the VirtualBox Manager main screen, select "Import"



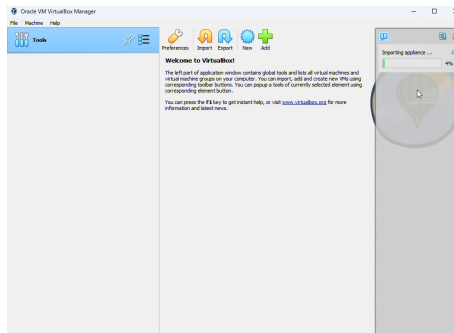
- Select the virtual appliance file you have downloaded. This is most likely in your "Downloads" folder



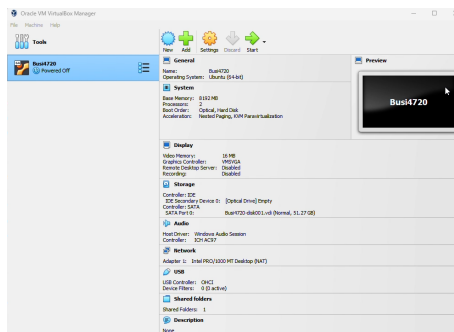
- Confirm the appliance settings. At this point, you may also choose a different folder than the default one for storing the virtual machine:



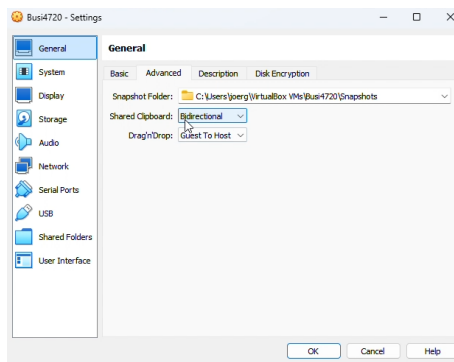
- Wait for the import to complete. This may take a few minutes.



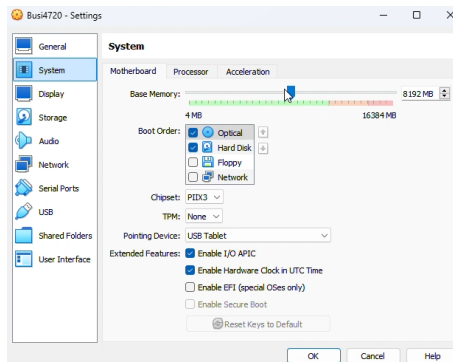
- When the import is complete, the virtual machine settings will be displayed. Press the "Settings" button to change settings for the virtual machine.



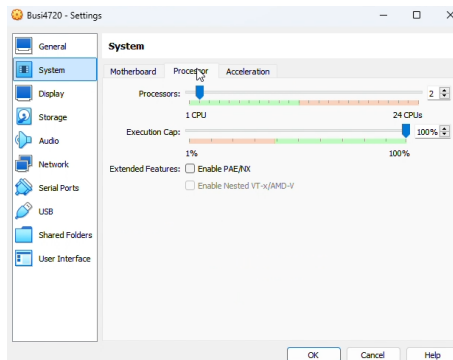
- In the General settings, you may choose whether to share the clipboard for copy/paste between guest and host, and whether to enable drag-and-drop operations between guest and host.



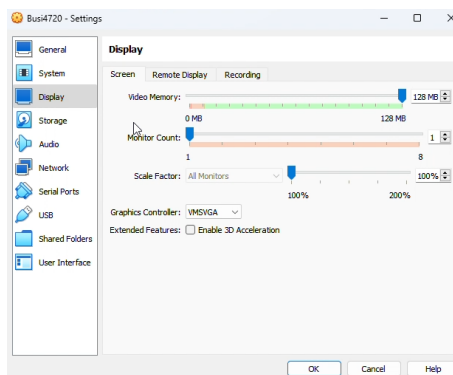
- In the Systems settings, you may choose how much memory to allocate to the virtual machine. You should allocate around 8000 MB, but ensure that enough memory is left over for the host computer to work smoothly.



- In the Processor tab of the Systems settings, you may choose how many processor chips/CPU's to allocate to the virtual machine. Ensure that enough are left over for the host computer to work smoothly.

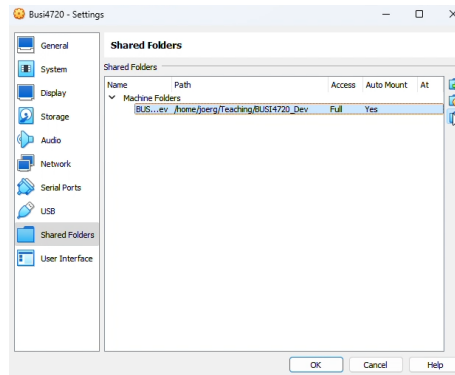


- In the Display settings, you should allocate all the maximum video memory to the virtual machine. You may also choose a scaling factor. This may be useful if you are working on a very high resolution monitor like an Apple Macbook Retina display.



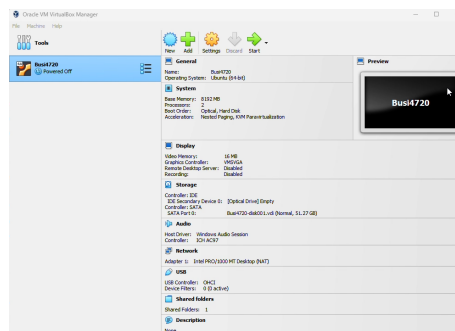
- In the Shared Folders settings, you should remove any existing shared fold-

ers.

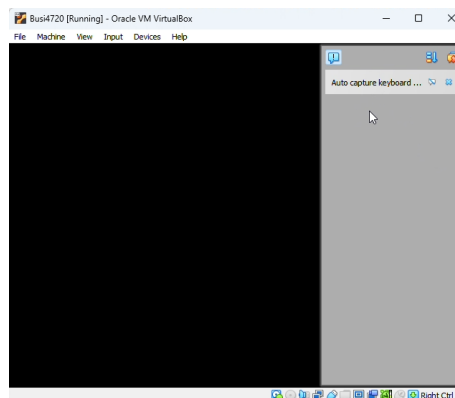


6. Start the virtual machine.

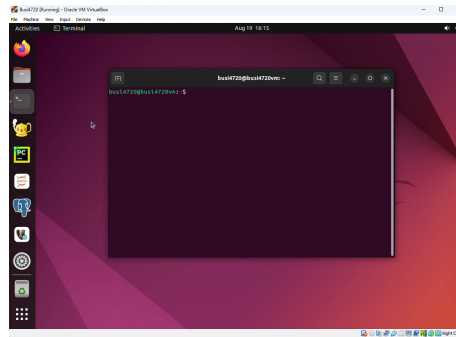
- Press the "Start" button on the virtual machine settings overview.



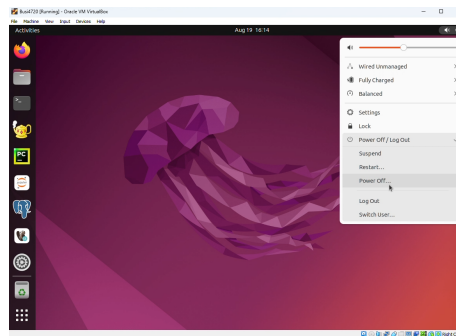
- The virtual machine will start and notify you about keyboard and mouse integration. This means your keyboard and mouse inputs will automatically be forwarded from the host to guest system. You can dismiss these messages



- Once the virtual machine has started, you will see the desktop user interface. Popular software applications are accessible via the dock on the left side of the screen. The most important application for working with this book is the Terminal window application.



- To shut down the virtual machine, select "Power Off..." from the system menu in the top right and shut down the machine.



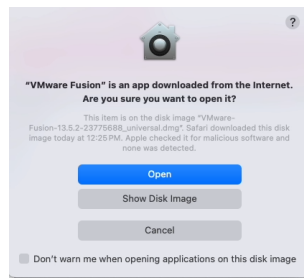
3 VMWare Fusion on MacOS

The virtual machine for use on ARM processors (CPUs) uses the VMWare Fusion Pro virtual machine software. VMWare was acquired by Broadcom in 2023. While VMWare Fusion is proprietary software, Broadcom makes it available at no cost for personal use. To install the virtual machine, follow these steps:

1. Ensure you have approximately 70GB of hard drive space available (20GB to download the virtual machine file, and 50GB to install it).
2. Download VMWare Fusion Pro from its [website](#). You may need to register for a free Broadcom account and login.
 - Choose the latest version of VMWare Fusion Pro for Personal Use. The virtual machine was created with version 13.5.2.



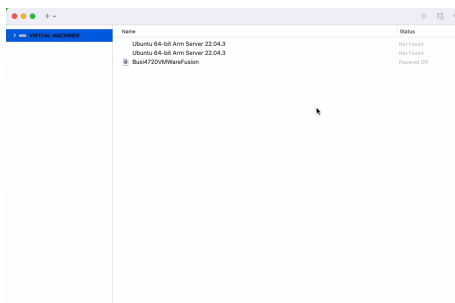
- Confirm that you wish to open the application. You may be asked to enter your password to allow this.



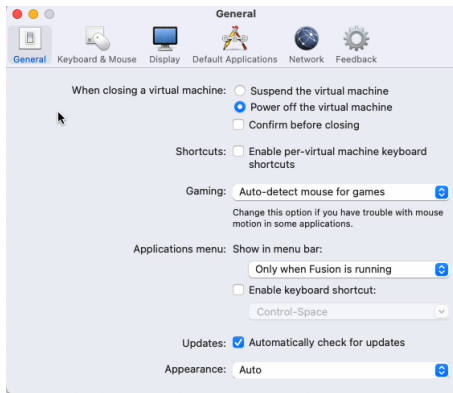
- Installation of VMWare Fusion may take a few minutes.



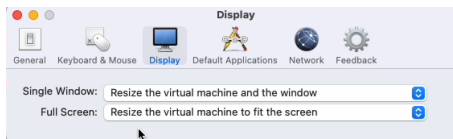
- When installation is complete, VMWare Fusion Pro is launched and will present you with a list of virtual machines or a welcome screen if there are none on your computer.



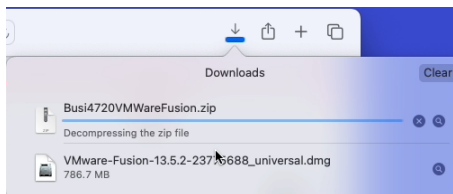
- Select "Settings..." from the VMWare Fusion main menu bar.



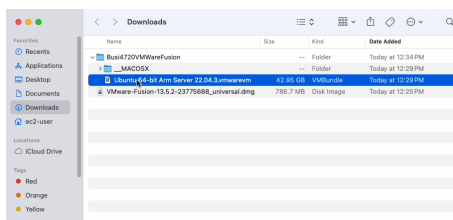
- In the Display settings, ensure that resizing the virtual machine is selected both for single window and full screen modes.



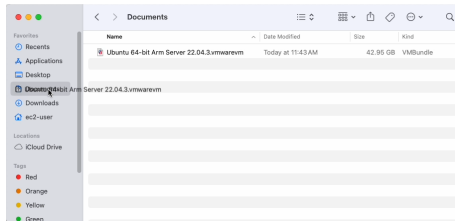
4. Download the [virtual machine file](#). *Warning:* This is a 15GB compressed zip file and will take some time to download.
 - Once the download is complete, the file will be decompressed automatically. This will also take a few minutes of time.



- Once the file is downloaded and decompressed, you will be able to see it in your Downloads folder. Expand the "Busi4720VMWareFusion" folder to see the uncompressed virtual machine VMBundle.

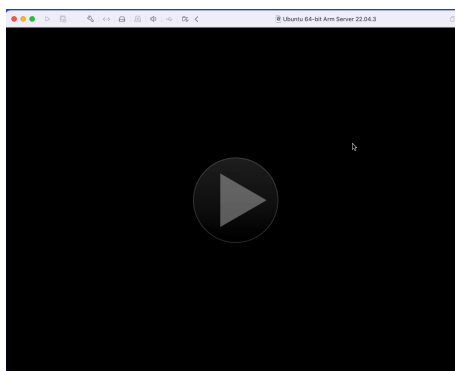


- Move this file to a permanent location, for example, to the Documents or Desktop folder.

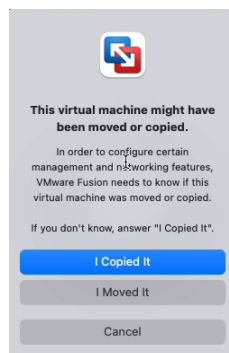


5. Start the virtual machine.

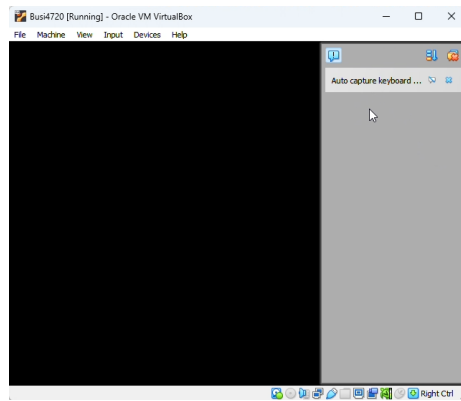
- Double-click on the virtual machine file. This will open the virtual machine in VMWare Fusion Pro.



- Press the start button to start the virtual machine. The first time you do this, you may be asked whether you copied or moved the machine. Select "I Copied It".



- Once the virtual machine has started, you will see the desktop user interface. Popular software applications are accessible via the dock on the left side of the screen. The most important application for working with this book is the Terminal window application.



- To shut down the virtual machine, select "Power Off..." from the system menu in the top right and shut down the machine.

