

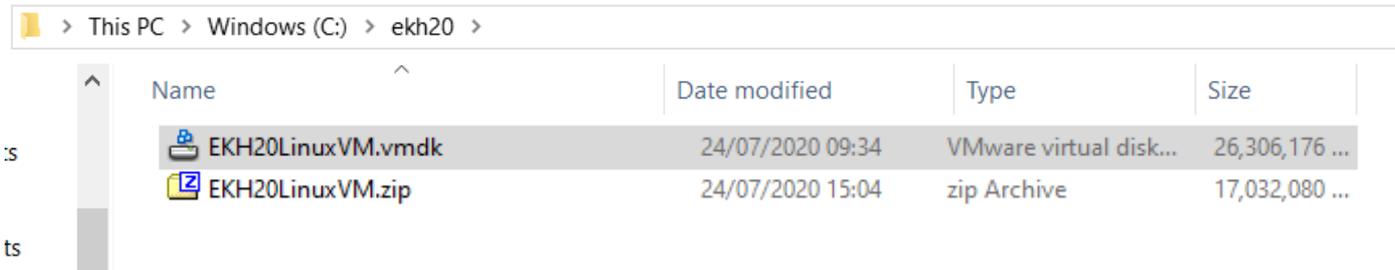
Embedded Linux and Yocto & Linux Security

Virtual Machine Set up Instructions

- This short presentation provides instructions on how to set up the virtual machines used for the practical exercises for the Doulos Embedded KnowHow workshops:
 - Embedded Linux and Yocto Stream
 - Embedded Linux Security Stream
- The VM can be installed using:
 - Oracle VirtualBox
 - VMWare Workstation Player/Pro
- Instructions for both follow....



- 64-bit PC with at least 8GB of RAM and plenty of disk space:
 - Embedded Linux VM requires at least **30GB**
 - Linux Security VM requires at least **15GB**
- Can be installed on external USB3 HDD if required
- Oracle VirtualBox or VMware Workstation Player/Pro installed
- Zip file containing the appropriate VM disk file downloaded and extracted, e.g.

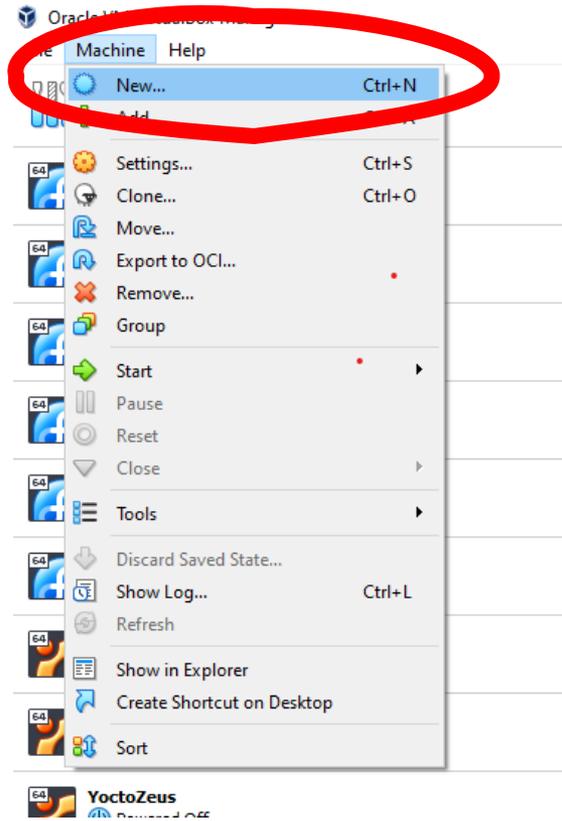


| Name | Date modified | Type | Size |
|-------------------|------------------|------------------------|----------------|
| EKH20LinuxVM.vmdk | 24/07/2020 09:34 | VMware virtual disk... | 26,306,176 ... |
| EKH20LinuxVM.zip | 24/07/2020 15:04 | zip Archive | 17,032,080 ... |

- See your joining instructions for a link to download the appropriate file

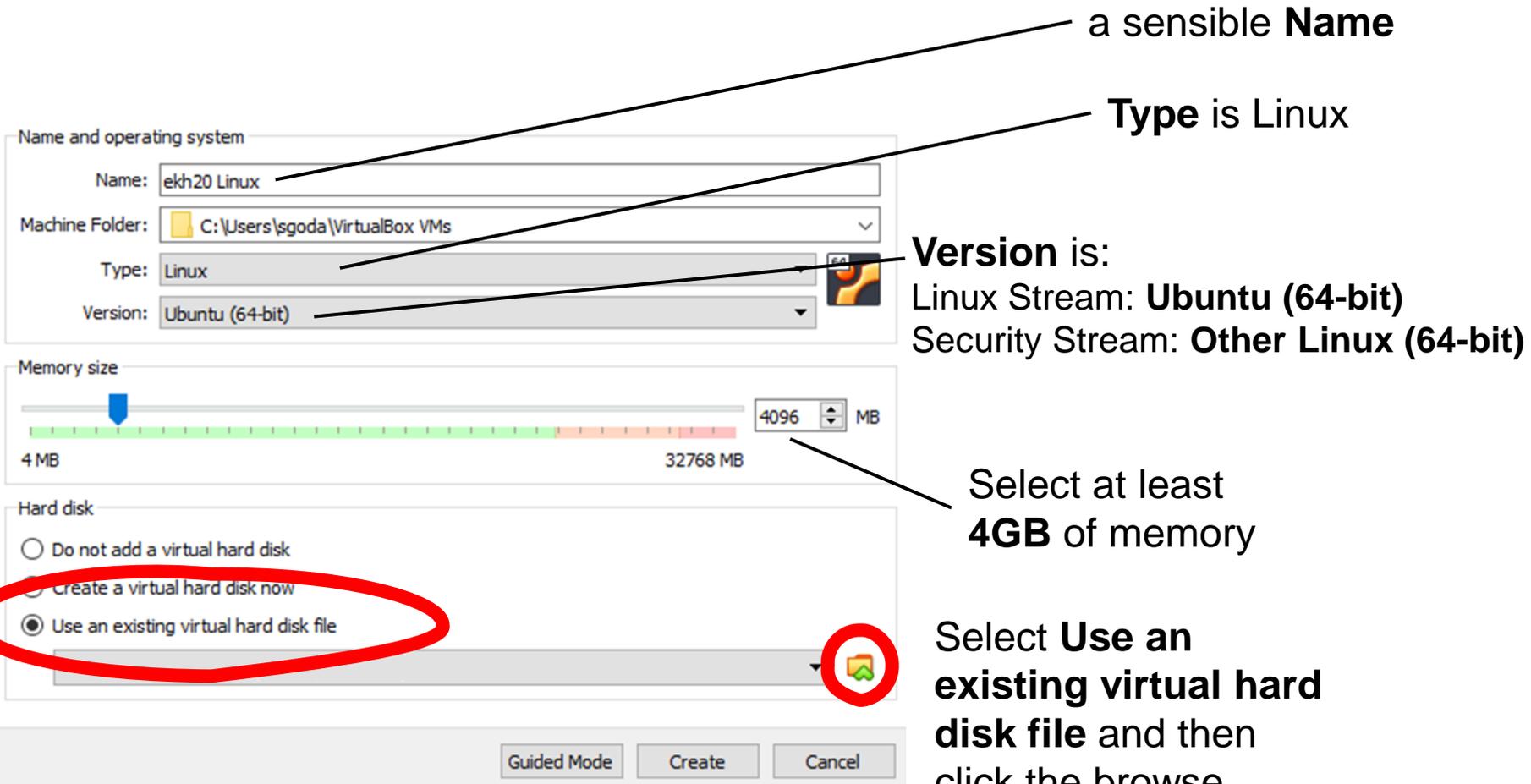
Oracle VirtualBox: Creating the VM

Open VirtualBox and select **Machine > New...** to create the VM:



Oracle VirtualBox: Creating the VM

In the resulting dialog, make the following settings:



The screenshot shows the 'Name and operating system' dialog box in Oracle VM VirtualBox. The 'Name' field contains 'ekh20 Linux', the 'Machine Folder' is 'C:\Users\sgoda\VirtualBox VMs', the 'Type' is 'Linux', and the 'Version' is 'Ubuntu (64-bit)'. The 'Memory size' slider is set to 4096 MB. The 'Hard disk' section has three radio buttons: 'Do not add a virtual hard disk', 'Create a virtual hard disk now', and 'Use an existing virtual hard disk file'. The 'Use an existing virtual hard disk file' option is selected and circled in red. A browse button (folder icon) is also circled in red. At the bottom, there are buttons for 'Guided Mode', 'Create', and 'Cancel'.

a sensible **Name**

Type is Linux

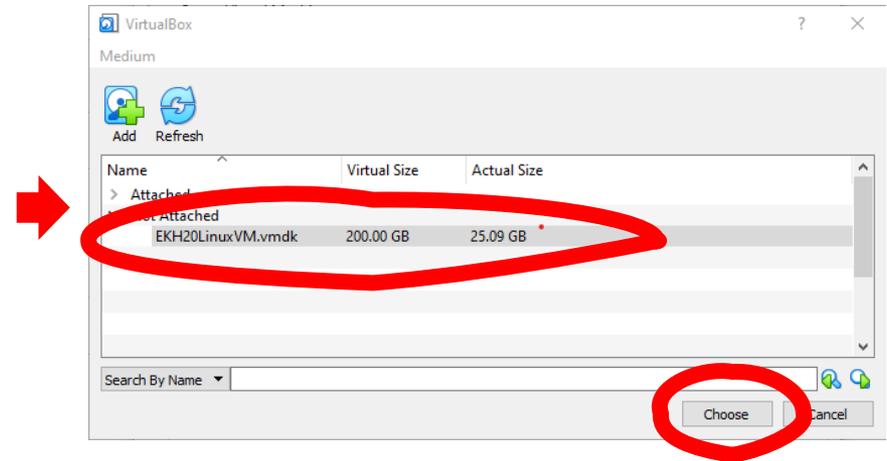
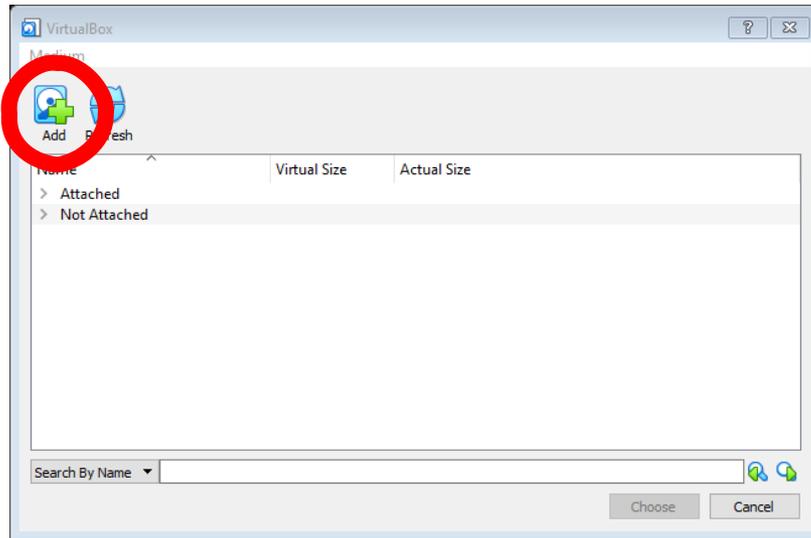
Version is:
Linux Stream: **Ubuntu (64-bit)**
Security Stream: **Other Linux (64-bit)**

Select at least **4GB** of memory

Select **Use an existing virtual hard disk file** and then click the browse button

Oracle VirtualBox: Creating the VM

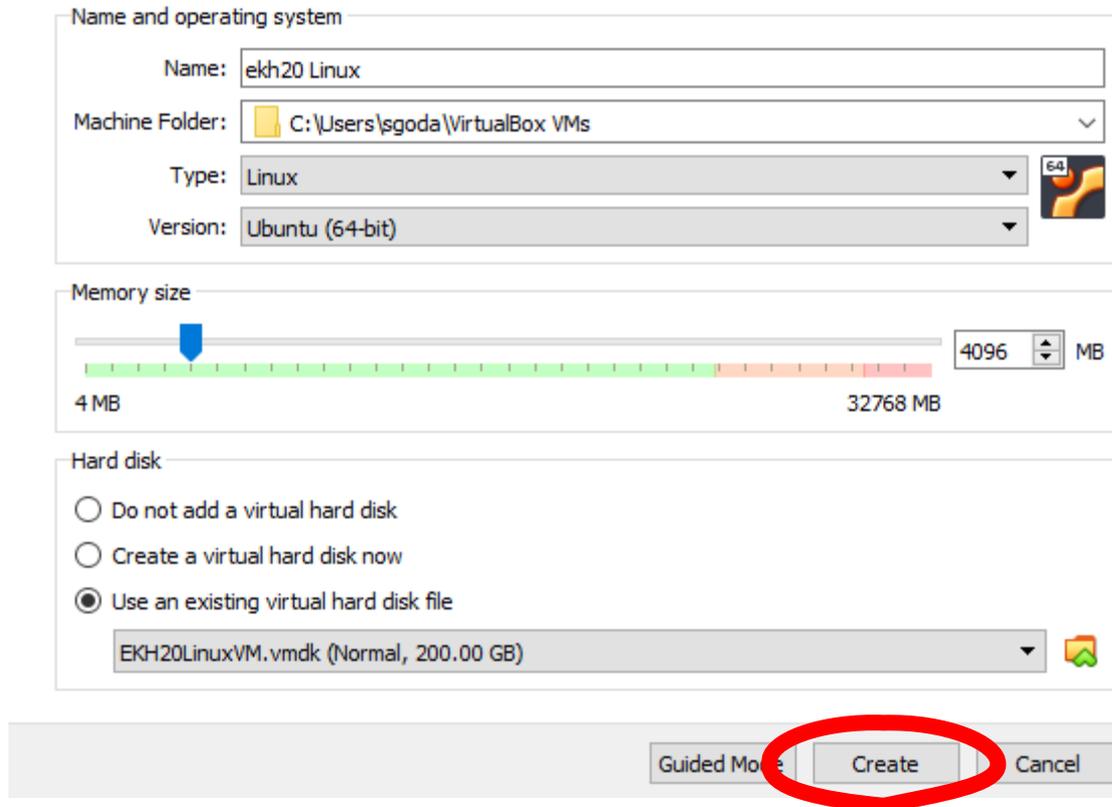
This opens a new dialog - click **Add** to find the VM disk file you downloaded (via the link in the joining instructions):



Select the appropriate .vmdk file and select **Choose**

Oracle VirtualBox: Creating the VM

Now click **Create** to create the VM:

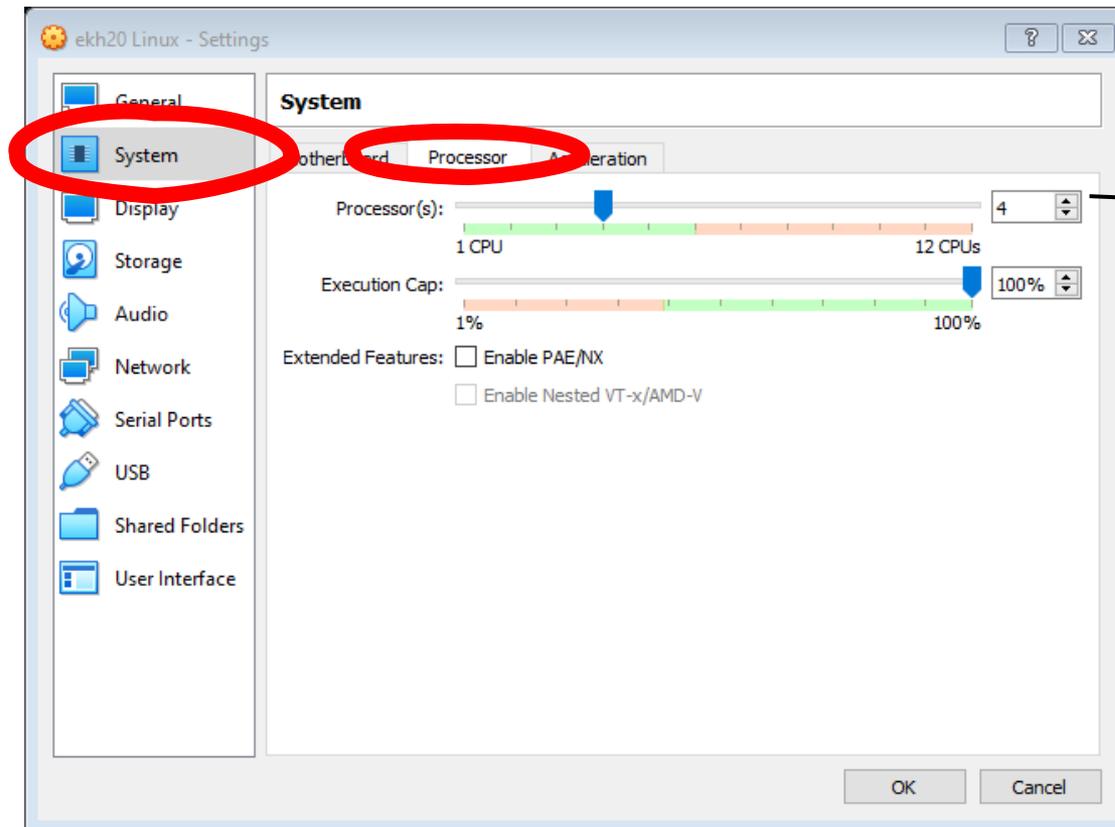


The screenshot shows the 'Name and operating system' dialog box in Oracle VM VirtualBox. The 'Name' field contains 'ekh20 Linux'. The 'Machine Folder' is set to 'C:\Users\sgoda\VirtualBox VMs'. The 'Type' is 'Linux' and the 'Version' is 'Ubuntu (64-bit)'. The 'Memory size' is set to 4096 MB on a scale from 4 MB to 32768 MB. The 'Hard disk' section has three radio buttons: 'Do not add a virtual hard disk', 'Create a virtual hard disk now', and 'Use an existing virtual hard disk file' (which is selected). Below the radio buttons, a dropdown menu shows 'EKH20LinuxVM.vmdk (Normal, 200.00 GB)'. At the bottom of the dialog, there are three buttons: 'Guided Mode', 'Create', and 'Cancel'. The 'Create' button is circled in red.

Oracle VirtualBox: Creating the VM

Now select **Machine > Settings...** to make some further adjustments

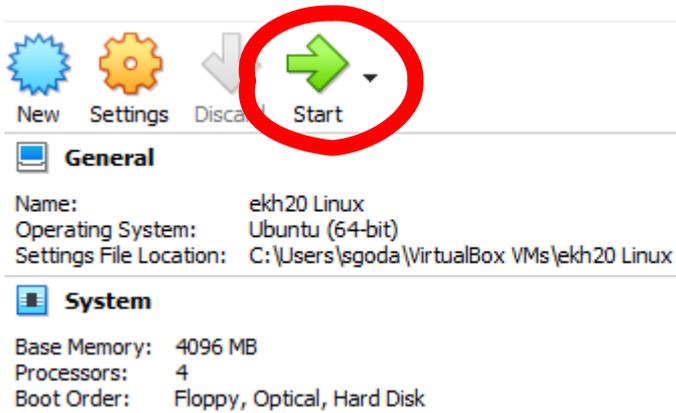
In the resulting dialog select **System** and then the **Processor** tab:



Select at least 4 CPUs if you can, then click **OK**

Oracle VirtualBox: Starting the VM

Click **Start** to open the VM:



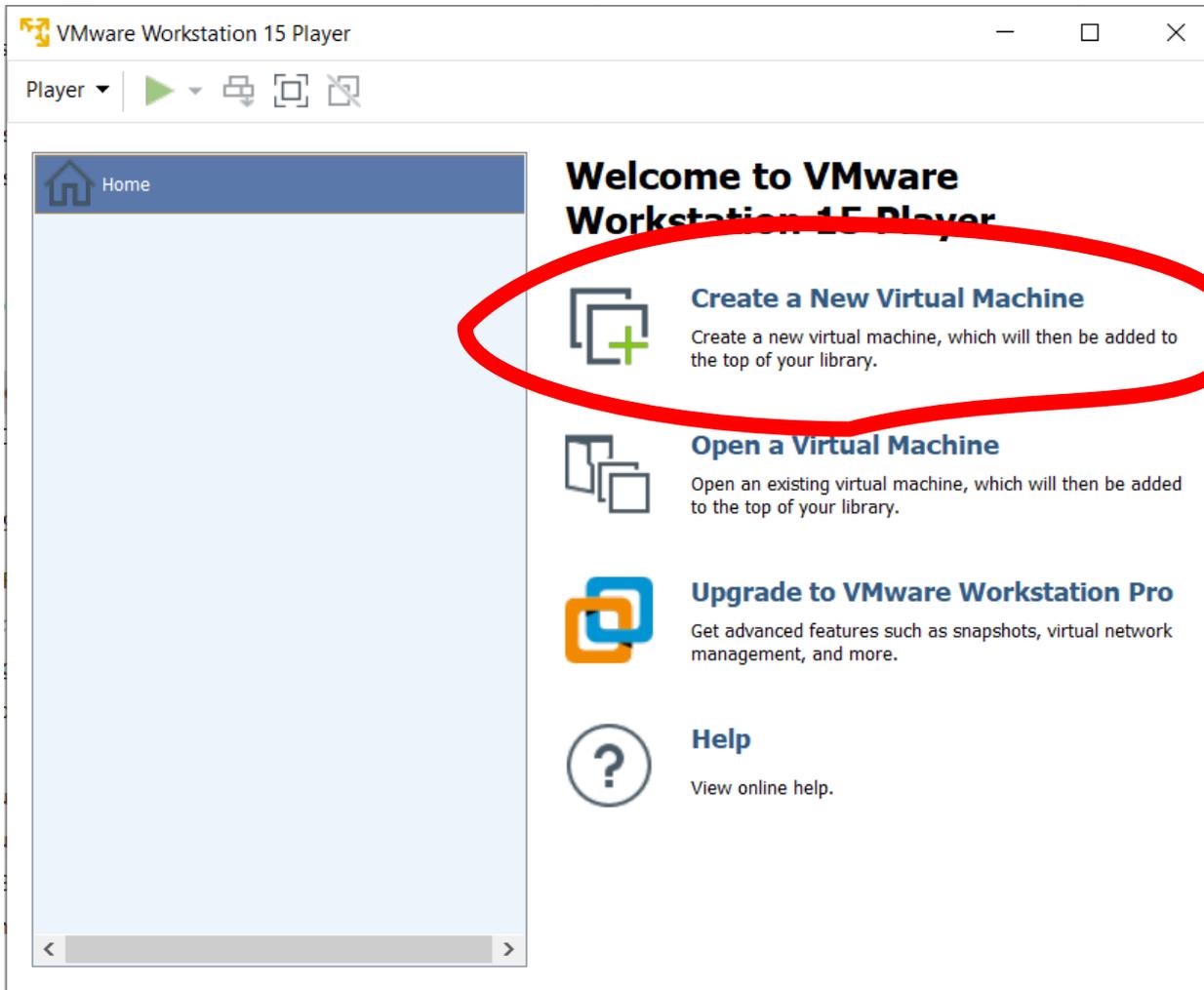
Log in as user **builduser** with password **tux**



- Further VM usage tips:
 - To resize the Linux VM desktop the VirtualBox Guest Additions need to be installed:
 - Select **Devices > Insert Guest Additions CD Image...**
 - Follow the onscreen prompts, entering the 'builduser' password (tux) when prompted
 - You should then be able to expand the VirtualBox window to any size but you may find the VM desktop background doesn't resize correctly
 - You can resolve this by right-clicking in the top left of the desktop and selecting **Change Desktop Background** - and then choose a new image
 - Networking is configured by default in the machine but nothing should need to be downloaded for these exercises
- Refer to the Doulos Workbook for the full instructions for the exercises

VMWare Workstation Player: Creating the VM

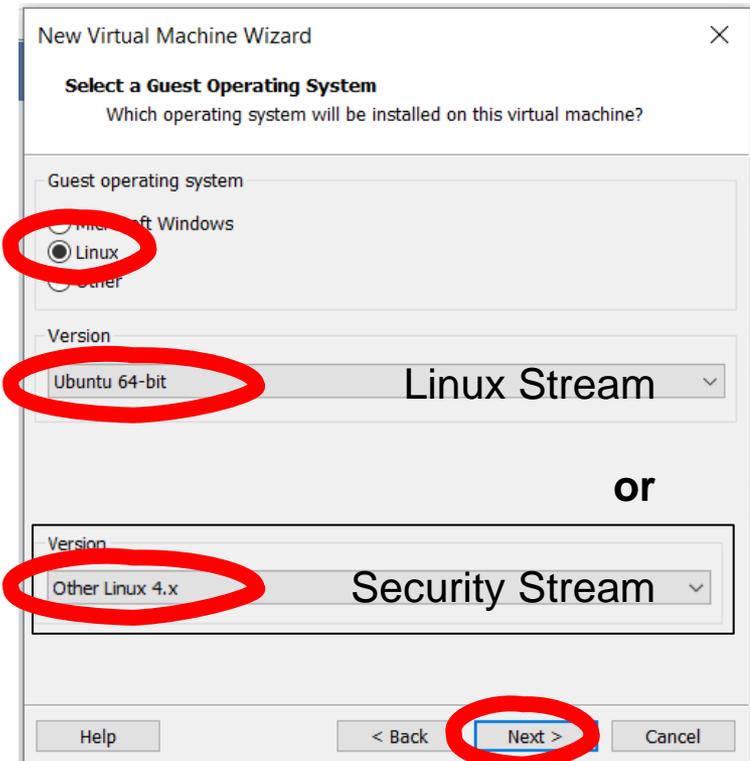
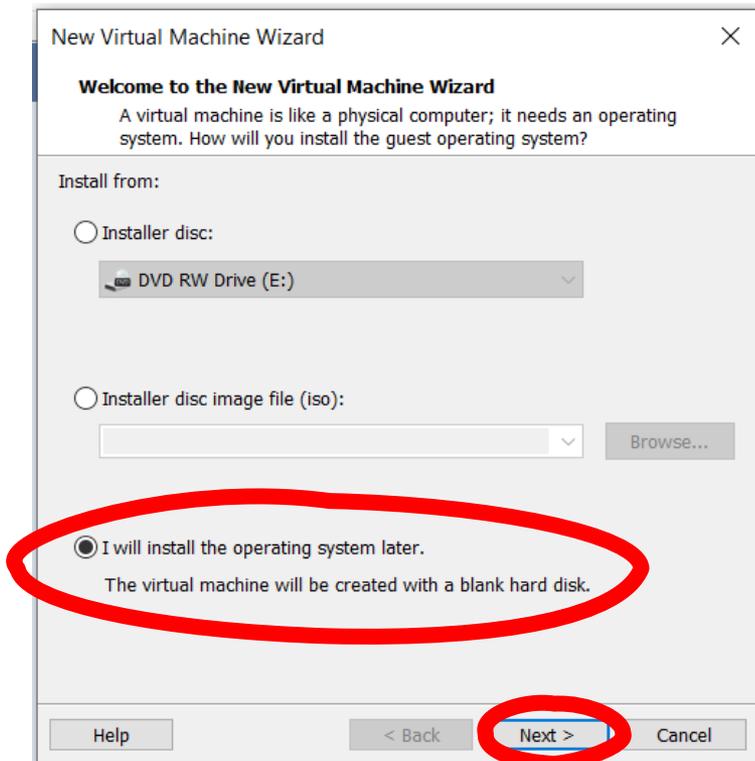
Open VMWare Workstation Player and select **Create a New Virtual Machine**:



VMWare Workstation Player: Creating the VM

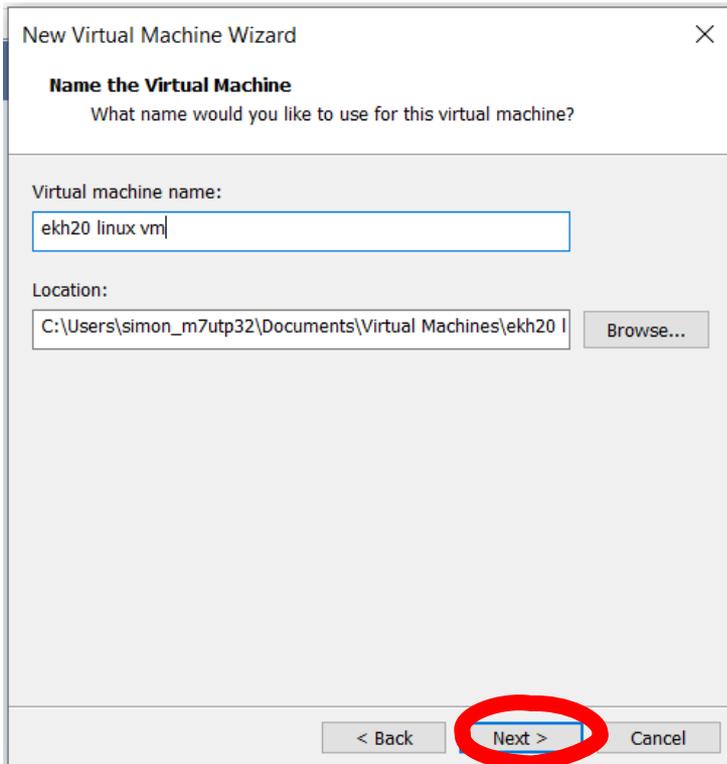
Create the VM with a blank hard disk (we'll replace it later):

The guest OS is:
Linux Stream: **Ubuntu 64-bit Linux**
Security Stream: **Linux Other 4.x**



VMWare Workstation Player: Creating the VM

Change the name and location if you wish:



New Virtual Machine Wizard

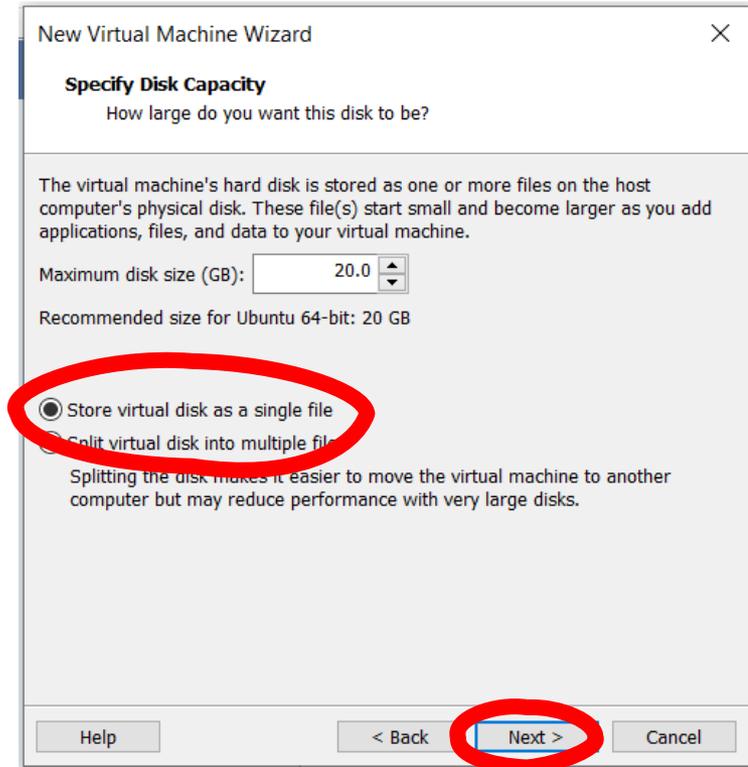
Name the Virtual Machine
What name would you like to use for this virtual machine?

Virtual machine name:
ekh20 linux vm

Location:
C:\Users\simon_m7utp32\Documents\Virtual Machines\ekh20 | Browse...

< Back **Next >** Cancel

Select **Store virtual disk as a single file**:



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

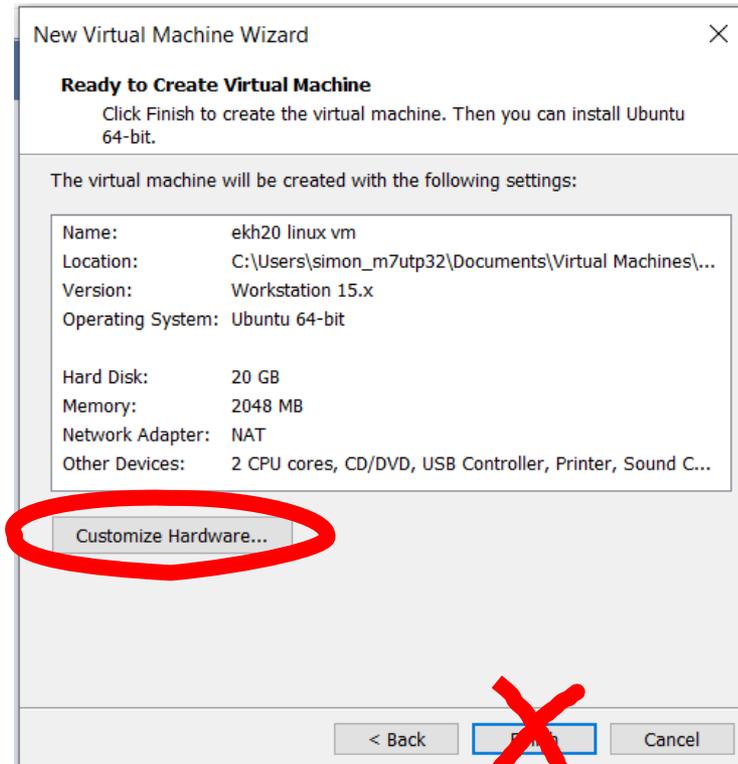
Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help < Back **Next >** Cancel

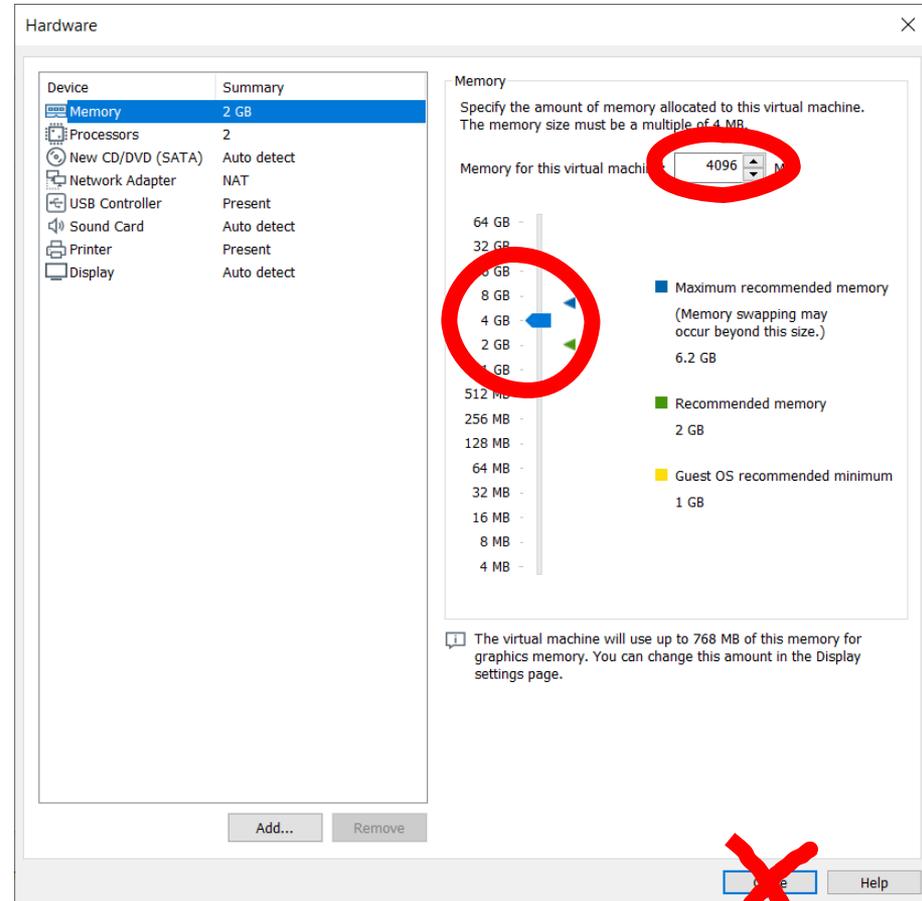


VMWare Workstation Player: Creating the VM

Don't click **Finish**, instead choose **Customize Hardware...**:

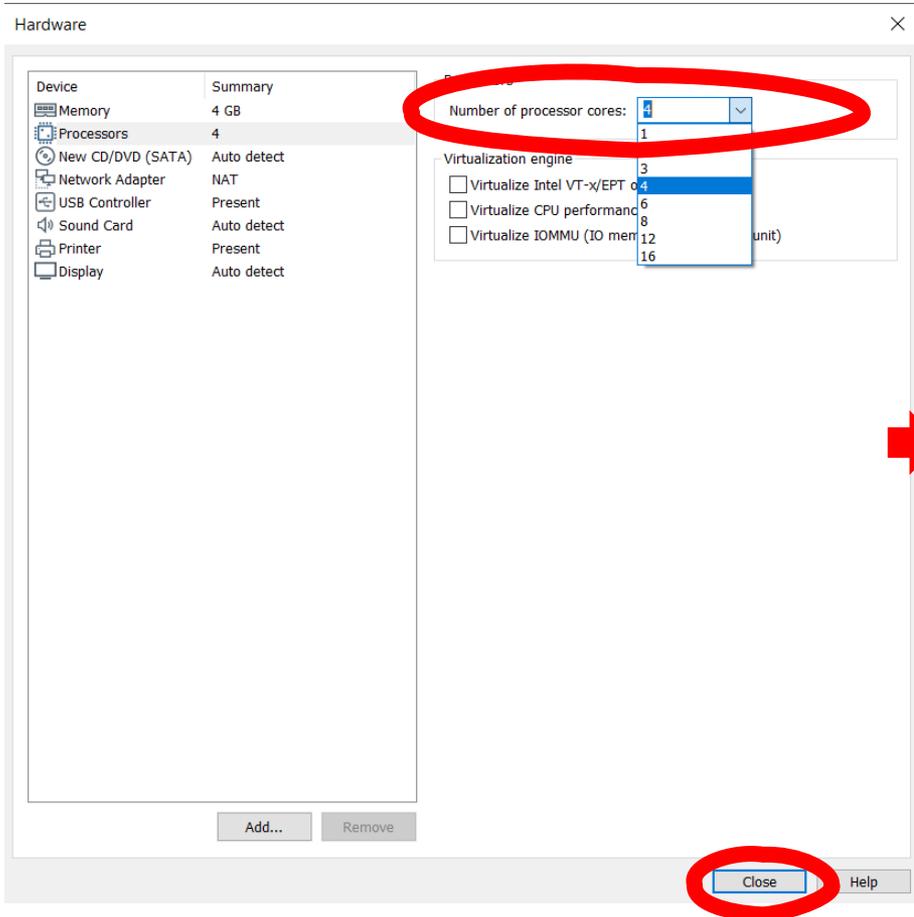


Select at least 4GB of memory (and don't click **Close** yet):

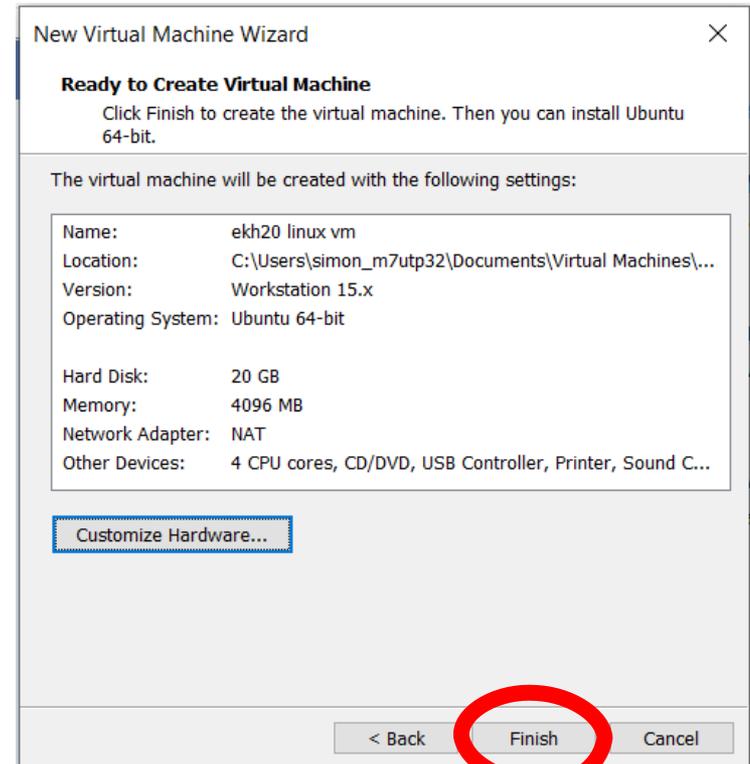


VMWare Workstation Player: Creating the VM

Select at least 4 CPUs if you can, then click **Close**:

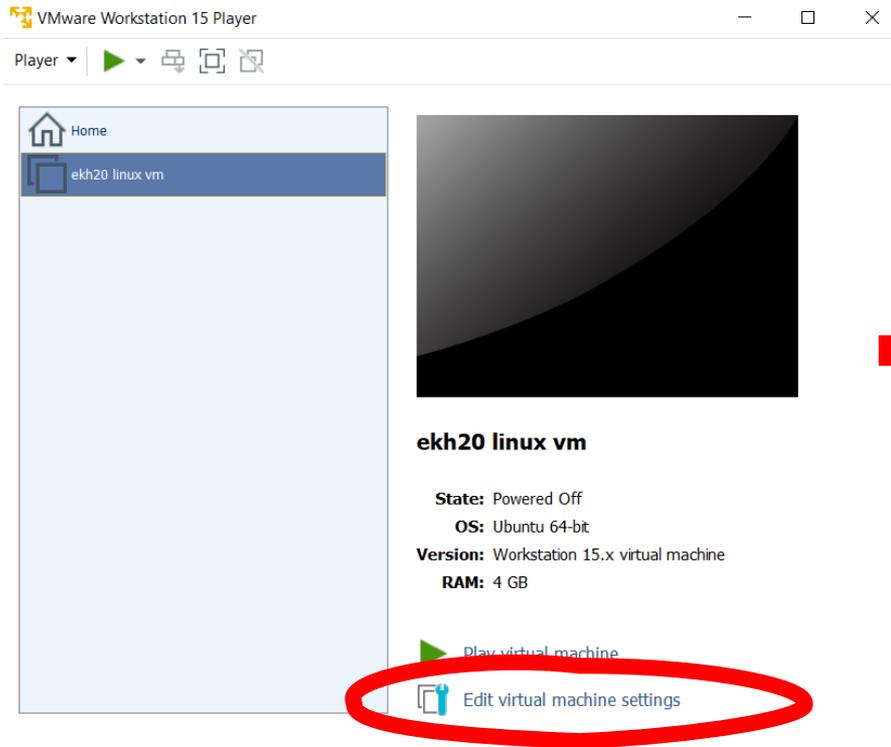


Now click **Finish**:

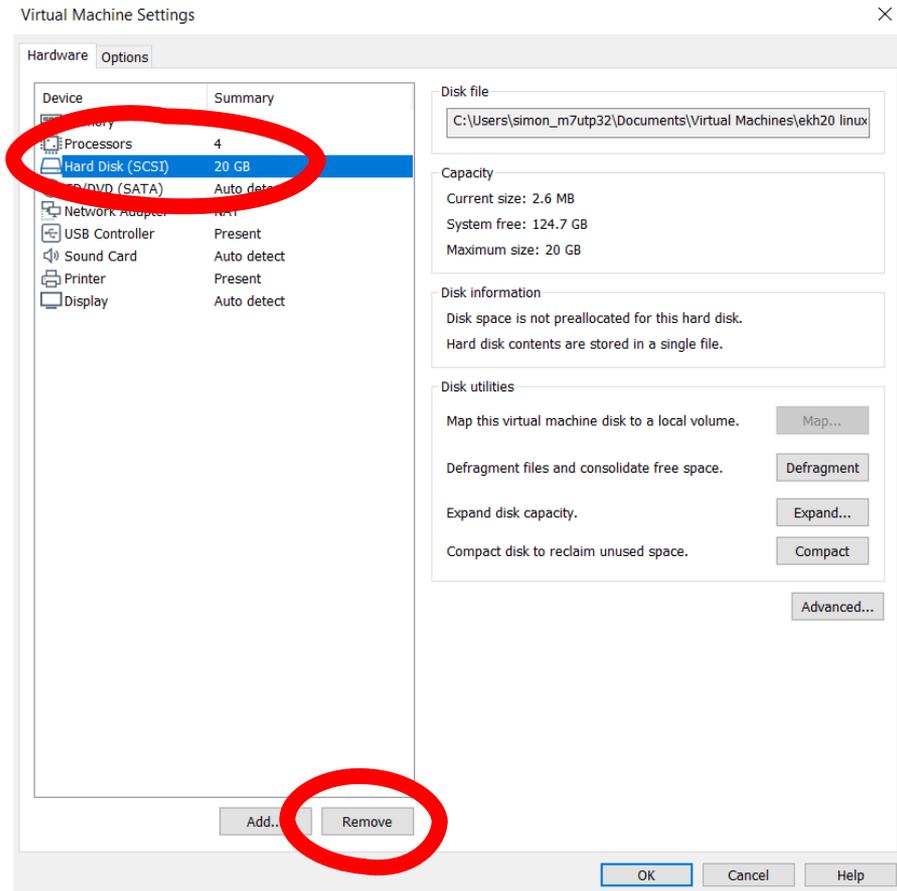


VMWare Workstation Player: Creating the VM

The VM is now created but we need to **Edit virtual machine settings** to swap the disks:

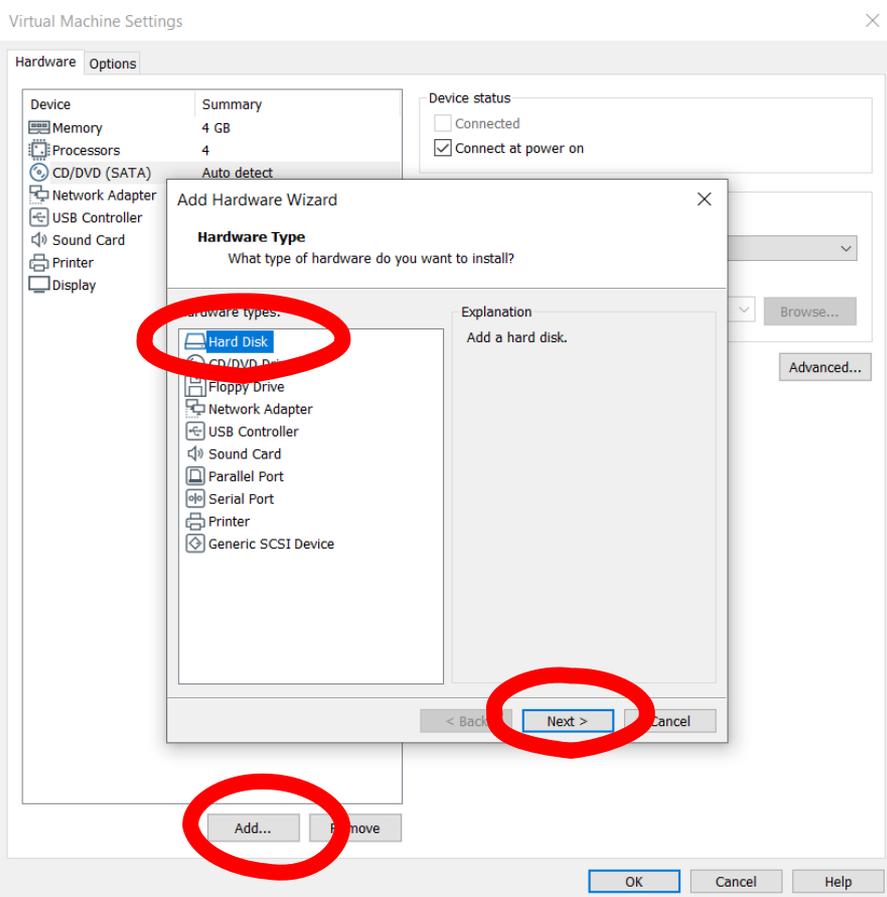


Select the existing 20 GB hard disk and click **Remove**:

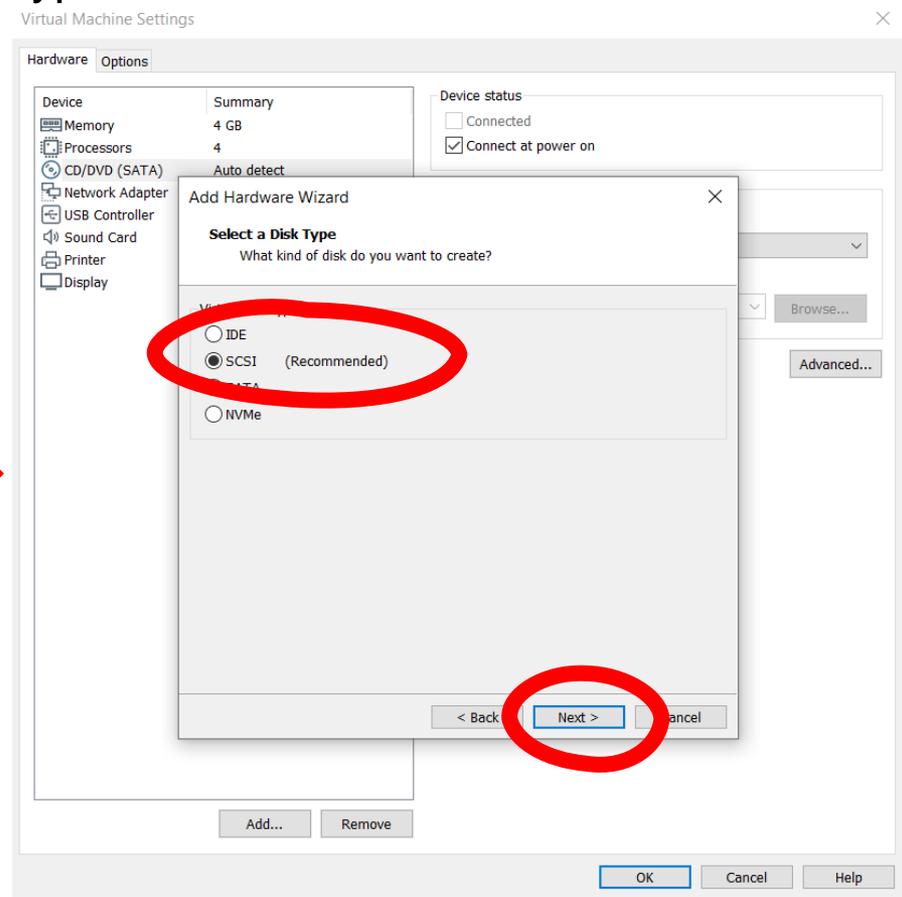


VMWare Workstation Player: Creating the VM

Click **Add...**, select **Hard Disk** and then **Next >**:

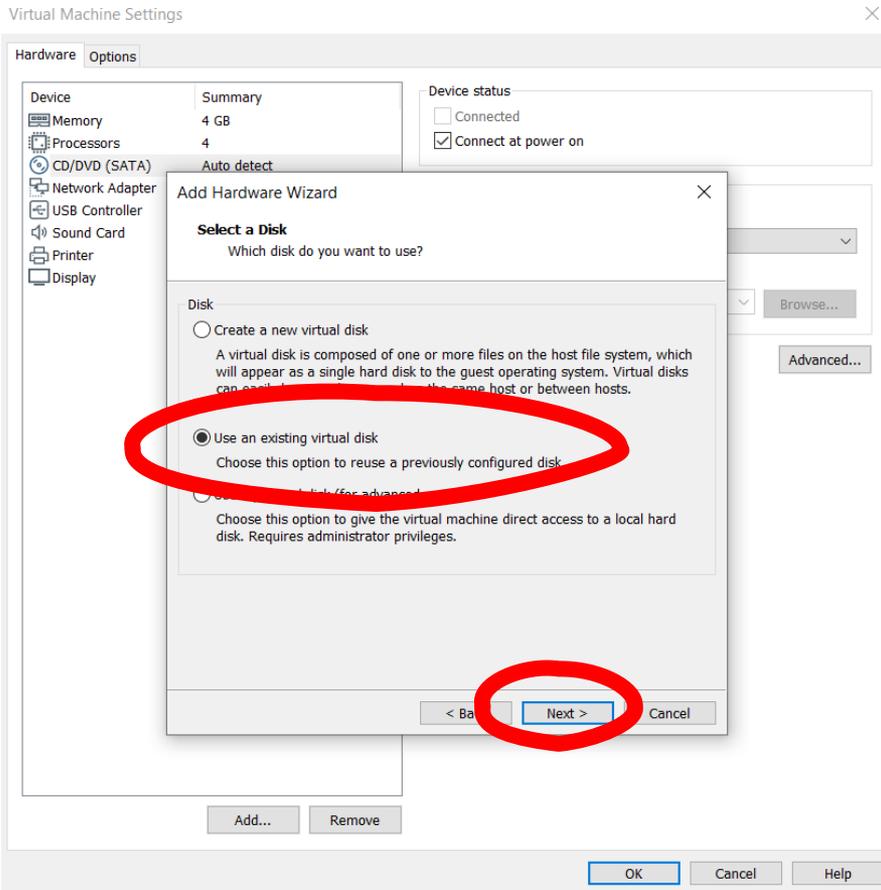


Click **Next >** again to accept **SCSI** disk type:

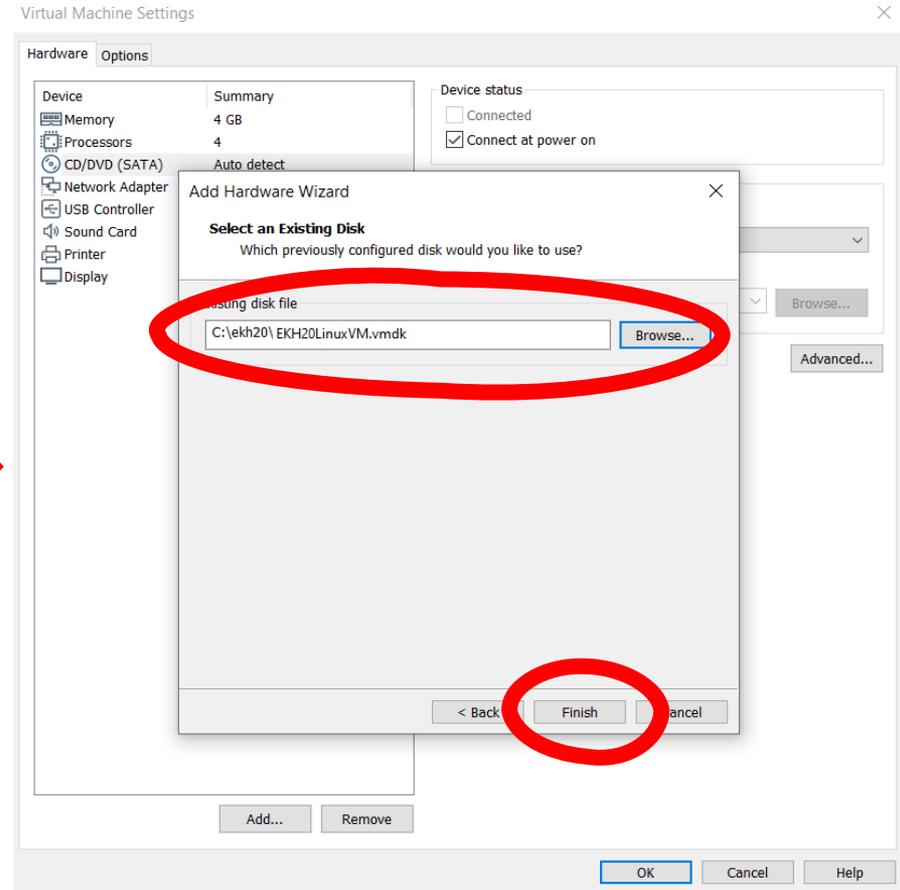


VMWare Workstation Player: Creating the VM

Select **Use an existing virtual disk** and then click **Next >**:

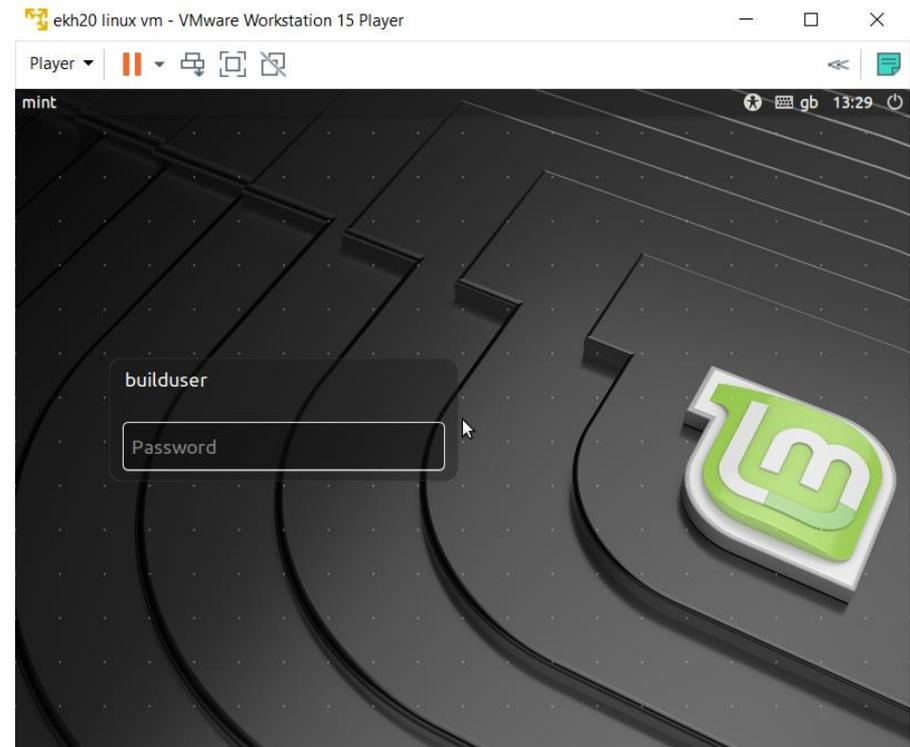
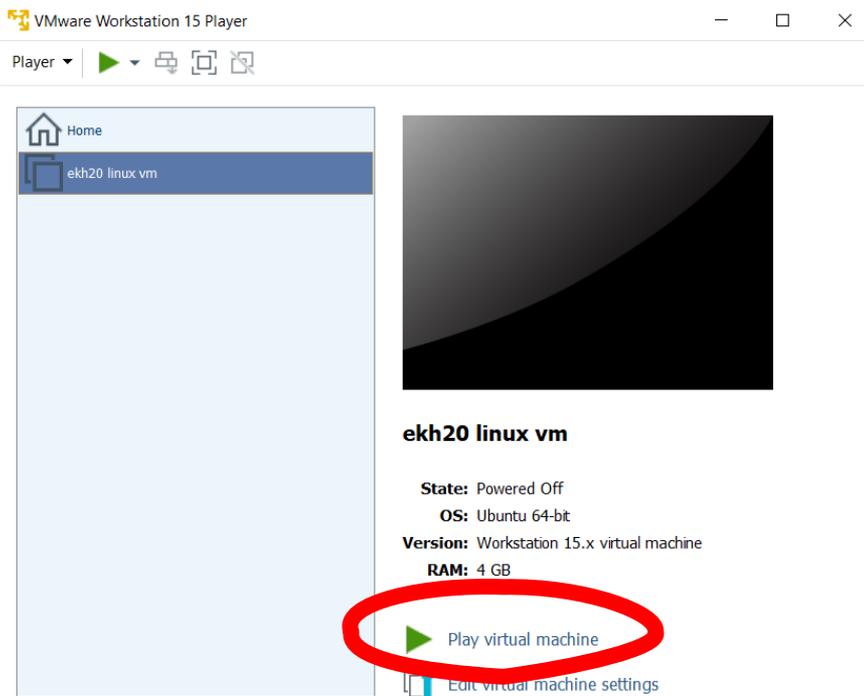


Browse... to the .vmdk file you downloaded, then click **Finish**:



VMWare Workstation Player: Starting the VM

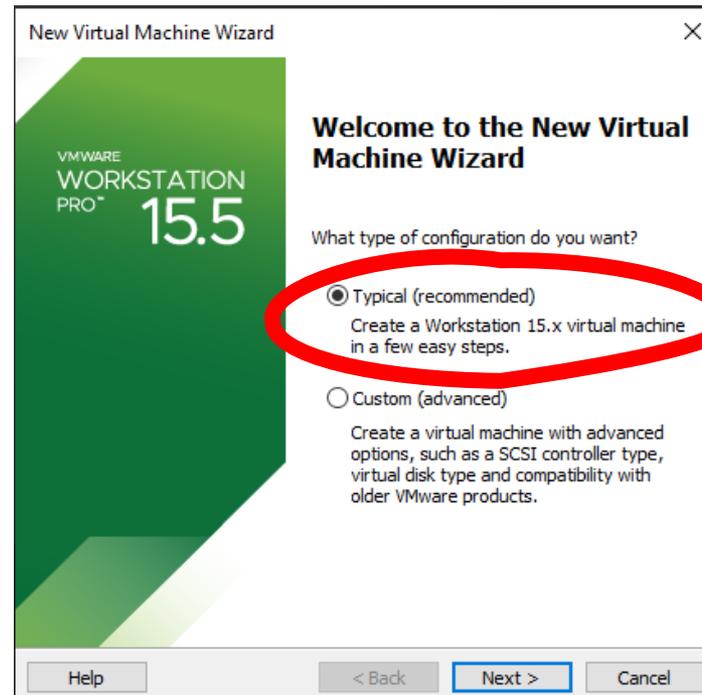
The virtual machine can now be started:



Log in as user **builduser** with password **tux**

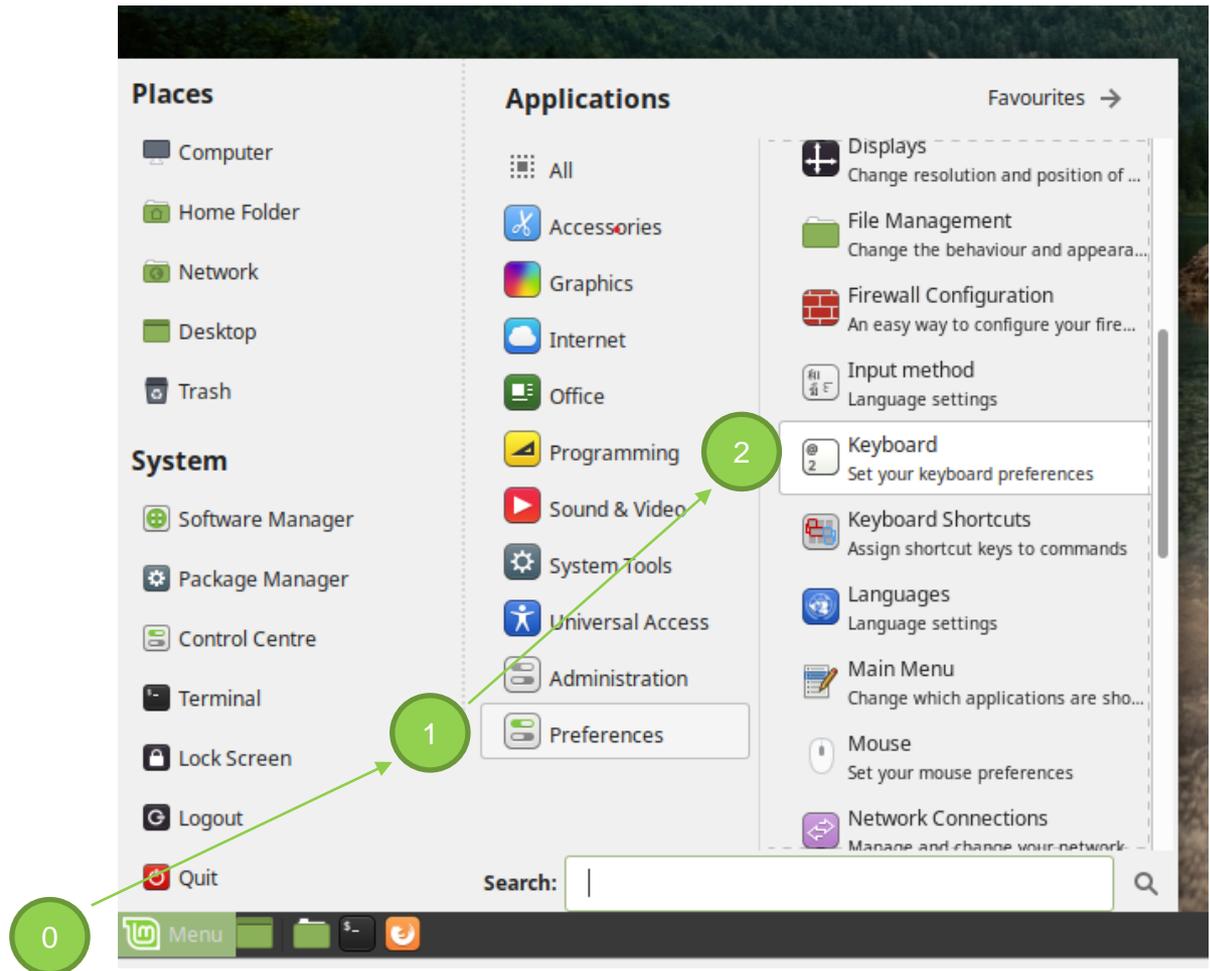
- Further VM usage tips:
 - You will be prompted to download and install the VMware tools - this can be done but is not required for these exercises
 - You can expand the VMware window to any size but you may find the VM desktop background doesn't resize correctly
 - You can resolve this by right-clicking in the top left of the desktop and selecting **Change Desktop Background** - and then choose a new image
 - Networking is configured by default in the machine but nothing should need to be downloaded for these exercises
- Refer to the Doulos Workbook for the full instructions for the exercises

- Creating a new VM in VMWare Workstation Pro follows similar steps as in Workstation Player:
 - Start from **File > New Virtual Machine...**
 - Select a **Typical (recommended)** configuration and then follow the steps as shown for Workstation Player

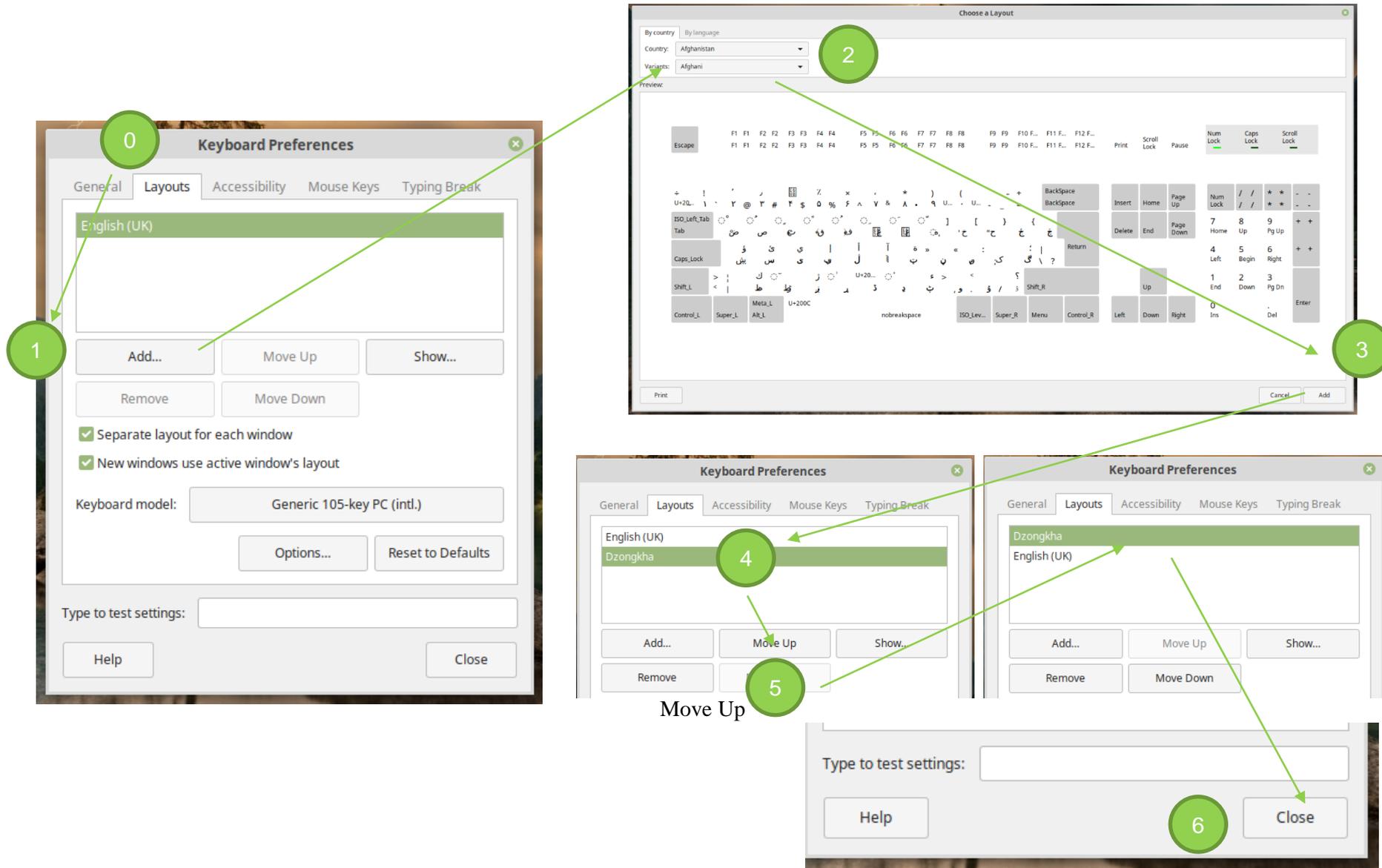


- The following slides show how to change the default keyboard maps within the Linux VMs for the:
 - **Embedded Linux Stream**
 - **Linux Security Stream**

- To change the default keyboard maps within the Linux VM for the **Embedded Linux Stream**



Linux Stream: Changing Keyboard Layout



0

1

2

3

4

5

6

Keyboard Preferences

General Layouts Accessibility Mouse Keys Typing Break

English (UK)

Add... Move Up Show... Remove Move Down

Separate layout for each window
 New windows use active window's layout

Keyboard model: Generic 105-key PC (intl.) Options... Reset to Defaults

Type to test settings: Help Close

Choose a Layout

By country By language

Country: Afghanistan Variants: Afghani

Preview

Print Cancel Add

Keyboard Preferences

General Layouts Accessibility Mouse Keys Typing Break

English (UK) Dzongkha

Add... Move Up Show... Remove Move Down

Move Up

Keyboard Preferences

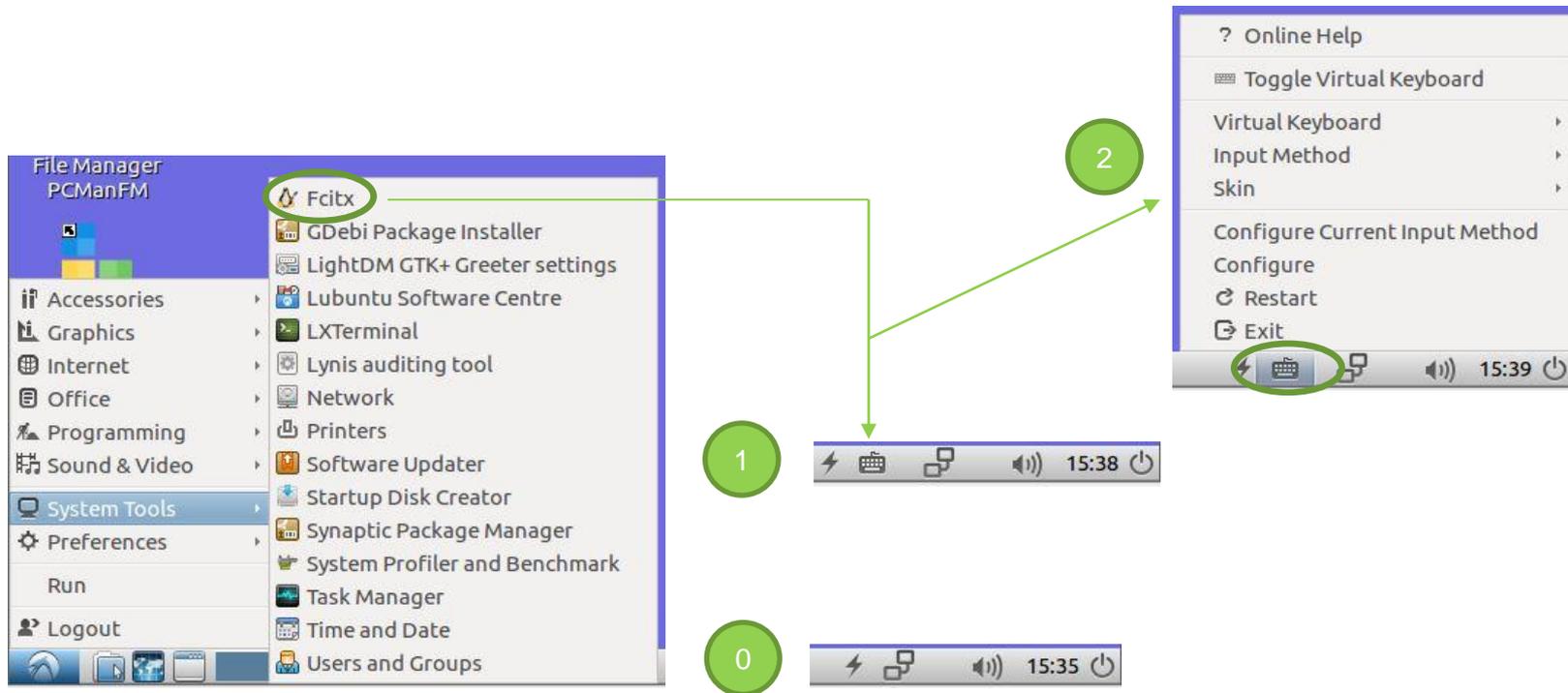
General Layouts Accessibility Mouse Keys Typing Break

Dzongkha English (UK)

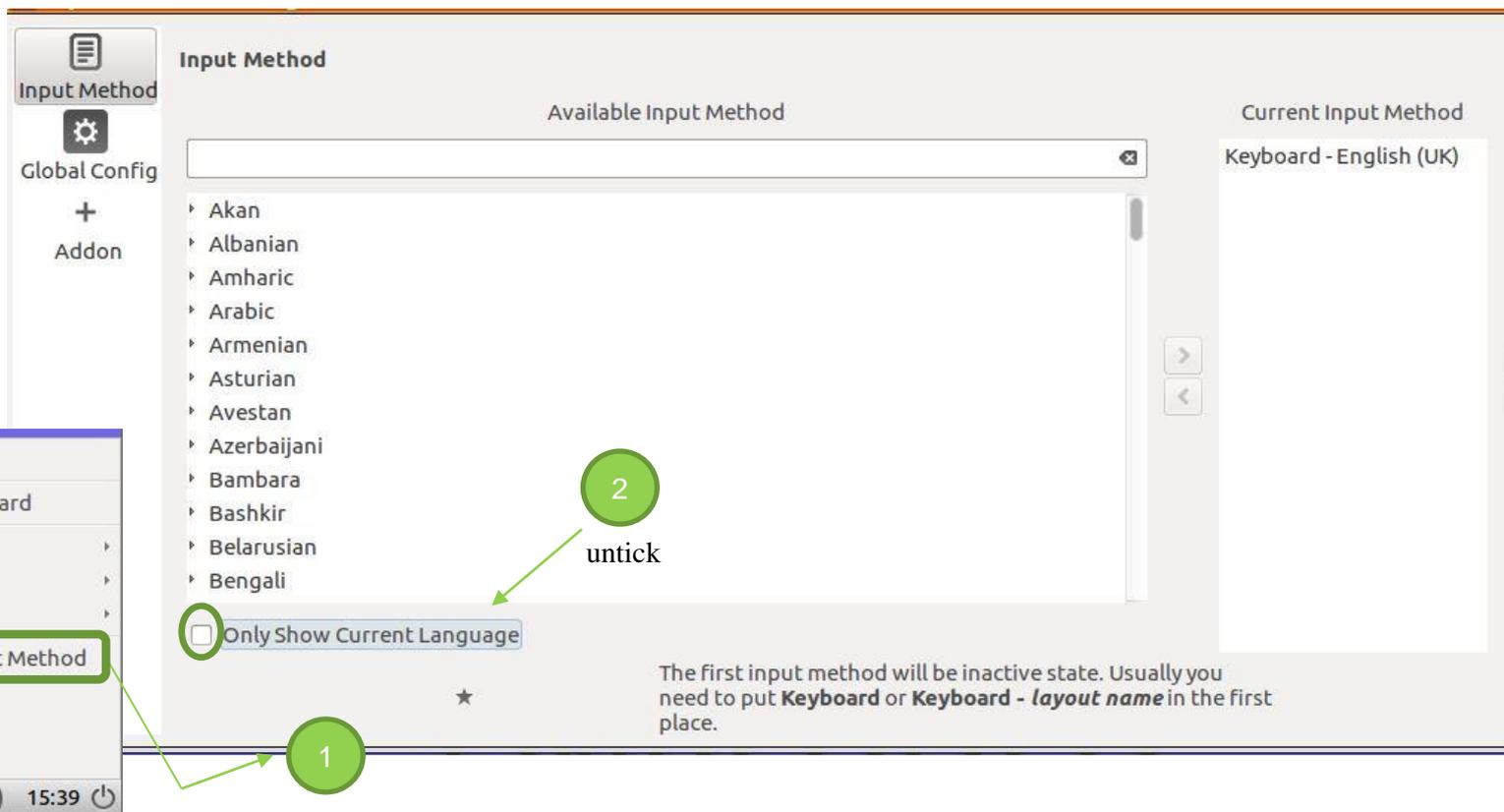
Add... Move Up Show... Remove Move Down

Type to test settings: Help Close

- To change the default keyboard maps within the Linux VMs for the **Linux Security Stream**



Security Stream: Changing Keyboard Layout



The screenshot shows the 'Input Method' configuration window. On the left, a sidebar contains 'Input Method', 'Global Config', and 'Addon'. The main area is titled 'Input Method' and is divided into 'Available Input Method' and 'Current Input Method'. The 'Available Input Method' section contains a list of languages: Akan, Albanian, Amharic, Arabic, Armenian, Asturian, Avestan, Azerbaijani, Bambara, Bashkir, Belarusian, and Bengali. Below this list is an unchecked checkbox labeled 'Only Show Current Language'. The 'Current Input Method' section shows 'Keyboard - English (UK)'. A text box at the bottom right states: 'The first input method will be in inactive state. Usually you need to put **Keyboard** or **Keyboard - layout name** in the first place.'

Annotations:

- 1: Points to the 'Configure Current Input Method' option in the sidebar.
- 2: Points to the 'Only Show Current Language' checkbox with the text 'untick'.

Security Stream: Changing Keyboard Layout

