Collaborative Development: Raspberry Pi vs Virtual Machines.

In this document we will be looking at the different versions of the raspberry Pi and the benefits of these different versions as well as the different virtual machines software’s you can use and their difference and finally which one would be overall the best for my specific use in this project.

## Raspberry Pi variations:

Raspberry Pi 5 is the newest in the line of releases and offers the fastest speeds with its improvements from previous models it runs twice as fast as the raspberry pi 4 however there are 2 versions with different price points a 4gb model coming in at £65 and an 8gb version coming in at £76 pound this is where the issue arises as prices always start to arise on newer versions of products and with a steep price of £65 just to do some offline testing on our project I feel like it’s not a worthwhile investigation especially because the faster speeds really make minimum impact as this will be used for a controlled test just for potential vulnerabilities and there is no time constraint of to be discovered as its going to be an in house testing if there was a time constraint however then this faster version would be more desired also the older versions still have pretty impressive specs as well.

Raspberry Pi 400 Is an innovative version of the regular raspberry pi as it is a keyboard that houses a raspberry Pi inside of it adding a lot more functionality to the device without no need for extra peripherals meaning it’s a lot better when having to transport the unit and reduce its setup time now this as well is helpful as I would be able to bring it along so I could test things on the go and it won’t take anytime to set up however with this added feature it does also come with a high price point coming in at £67 making it more expensive the 4gb version of the raspberry 5 4gb however it’s still cheaper than the 8gb version.

A close-up of a keyboard

Description automatically generated

Raspberry Pi 4 is a regular board and will need external peripheral it’s not as fast as the Raspberry Pi 5 however and doesn’t have an all in 1 type layout like the Raspberry 400 however it does still have decent speeds and without an inbuilt keyboard it allows choice of what mouse and keyboard you wish to use adding extra flexibility to the device not only that but with its price point being almost £25 pound cheaper however still being able to perform the tasks that I require of it I believe that this is the most viable option if I were to go with the raspberry Pi and not a virtual machine.

## Virtual Machines

**VMware workstation** is the first application we will be looking at and its functionality and features firstly this software works by creating a fully isolated secure virtual machines and allows each machine to have its own CPU, memory, and I/O devices to create a true virtual machine this software will inherit from the host to allow full hardware support as well.

**The benefits of VMware workstation are:**

VMware workstation has many features however some that really highlight the benefits of this specific software are features like snapshotting, cloning and virtual networking making it have a wide range of uses across the board.

User friendly interface is another benefit this software has had an eye for aesthetic detail and not only does the software look polished its very simple and user-friendly layout make it a pleasure to use which increase its ease of access which allows less advanced users able to interact and use this software as well.

**The negatives of VMware workstation** are:

Where there are positives often come so do negatives and with the very aesthetically pleasing design and along with the extensive features and because it’s such a polished product it does come with a price as it is a commercial product meaning especially for individual users it can be very expensive.

Another report negative of the VMware workstation software is that it’s very resource intensive in comparison to other Virtual machines maybe do to it having to many features that its sort of overloaded causing more strain on people systems.

**Oracle VirtualBox** is a cross-platform virtualization software that will allow the user to host multiple operating systems on one device which is what a virtual machine software does however it does have some specific differences that make more appealing than the other options.

The benefits of **Oracle VirtualBox** are:

One of the largest benefits is its cross compatibility of Oracle VirtualBox which allows it to be used many different operating systems such as windows macOS, Linux and many others.

Another benefit is that its free and open-source meaning that you would be able to use it and edit it as you see fit making it accessible to all people and not hidden behind a paywall which is perfect for individual usage and small businesses.

The negatives of **Oracle VirtualBox** are:

As it is a free software it does have some limited features and performance issues especially in comparison to other VM software especially in terms of graphics and CPU performance.

While it is suitable for personal use however it does lack the enterprise-grade support and features that are available in commercial products and with this it means that many small issues may take longer to solve and some work around may need to be implemented which can decrease production time,

**Microsoft Hyper-V** is a VM software that is created by Microsoft themselves meaning that it is backed and created by a large industry meaning it does have a lot of money and backing behind this software and here are some of the benefits and negatives of this said software.

The benefits of **Microsoft Hyper-V** are:

Due to this application being made by Microsoft it is integrated into windows operating systems which makes it a lot easier to setup and manage virtual machines on the windows servers that have a lot of support and compatibility as it was created to work on a window machines.

Hyper-V is built to allow scalability with features like live migration and dynamic memory allocation which allows users to build and manage large scale VM environments.

The negatives of **Microsoft Hyper-V** are:

Although this has a lot of support for windows systems its severely lacking when it comes to non-windows operating systems unlike others on this list which can be used on all OS’s.

When using these advanced features and being created by a company as vast as Microsoft there are some costs when it comes to licensing meaning that for individuals It might not be the best idea.

In conclusion, I believe that I would prefer to use Oracle VirtualBox due to a few reasons from the features that they provide the specific requirements that would allow me to use for my purposes which would be the installation on my windows laptop and to install a sub type of Linux in order to run pen testing and advanced analysis tools on my Website not only this I have a low budget and I am an individual user there for the fact that this software is free and open source means that Its ideal for me, making this my overall favourite.