# VIRTUAL MACHINES MADE EASY

In Part One of my Tech Made Easy Series, I tackle the all-important (and all-confusing) virtual machine. #techmadeeasy

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Virtual machines are computer architectures which provide the functionality of a physical computer.

The above definition is technically correct, but what does it mean? Let's find out together. This is going to be abstract, and it might get weird, but here we go!

## WHAT ARE VIRTUAL MACHINES?

If you look for a definition of virtual machines online, you'll find jargon – if you try to define the jargon, you may find more jargon.

Thankfully, virtual machines don't have to be difficult. You have entered a space free of complicated phrasing and unnecessary detail. Are you ready?

The first thing you must know is virtual machines are NOT computers. Virtual machines don't physically exist. Look at your phone or laptop or computer and see how it takes up space. These are items that have weight and size and presence. Virtual

machines don't have such luxuries. You can't take a virtual machine to a tech store and have them open it up to see why it stopped working.

Virtual machines are "guests" on a computer or host. They need a physical computer to function, and there's no way for them to exist without a computer. If you don't have a computer, you don't have a virtual machine. A virtual machine acts like a small computer within its larger host. On a lousy Monday, you can't accidentally spill coffee on your virtual machine. You can only spill coffee on the computer hosting the virtual machine.

If you're hungry like me, you can think of the virtual machine as a slice of pie. No, it is not the whole pie, but it's a slice that will taste like the rest of the pie.

A virtual machine is a piece of your computer that functions separately from the other pieces. It's a small bit of the overall machine, and though it is a mere chunk, it acts like it's whole. It has all the abilities of your computer, but it doesn't have access to the rest of your computer, the same way a slice of pie won't have as many calories as the whole pie.

Scrumptious slice of pumpkin pie
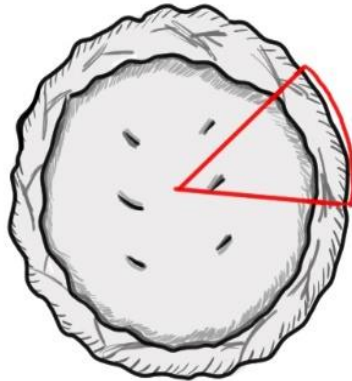
Virtual Machine
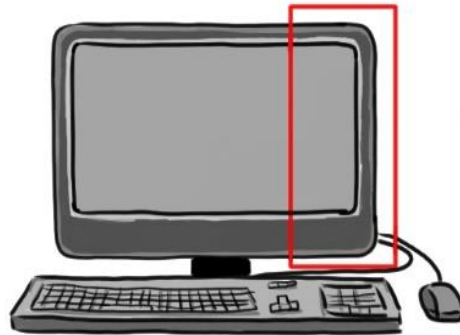
A virtual machine is a computer within a Computer, or a slice of pie. It is a piece of a whole. You take your pie slice from the whole pie – so to are virtual machines sectioned from their computer. But both parts act/taste the same.

If the pie metaphor confused you (or made you even hungrier), I'm going to bring in a more in-depth analogy:

Your computer is to a house what a virtual machine is to a mother-in-law suite. Your computer is the large, sweeping mansion with six bedrooms, three walk-in closets, and two ovens. It's where most your life happens. Your computer is where you store your photos, your word documents, and the power point you cobbled together a day before your important meeting. Your computer is full of files the same way your mansion is full of rooms. Your mansion/computer has everything you could ever need at your fingertips. It is perfect.

Your virtual machine is the mother-in-law suite. This smaller home has the basic amenities of a full house. There's a space in which to make meals. There's a bedroom and bathroom and a washer and dryer. What makes the mother-in-law-suite different from a house is that it is part of the mansion's property. It isn't a small starting home, but an attachment to the mansion itself.

An important note about this amenity: you the mansion owner get to determine how it functions. You can save the mother-in-law suite for any visiting relatives, or you can rent it out, or you can allow your mother-in-law to live there. So too can you use virtual machines for multiple purposes.

Yes, the mansion and suite are technically houses. You can live in both, or make food in both, but the mother-in-law-suite relies on the mansion to exist. Otherwise it would be a small house next to a large house.
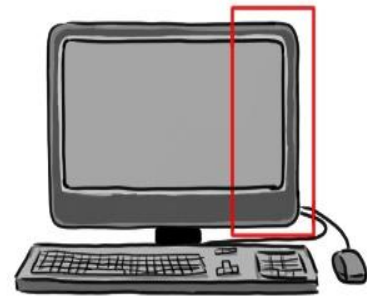
Your beautiful mansion     Mother-in-law Suite     Virtual machine

A virtual machine is like a mother-in-law suite. The computer is the big, important mansion where most the living occurs. The virtual machine is a usable side piece that has all the basic amenities offered by the giant computer.

So we've established how virtual machines act like mother-in-law suites. With this fancy analogy, let's talk about two different types of virtual machines.

## A CLOSER LOOK AT VIRTUAL MACHINES

In the previous section, you learned that virtual machines are like pieces of pie and mother-in-law suites. It's time to dive further into these analogies. If the world of tech is a rainstorm, these metaphors are your umbrella.

Let's start with the easiest version of a virtual machine. *System* Virtual Machines operate as though they are an entire computer on their own – they're the quintessential virtual machine we've already discussed. It's like having a piece of

a computer that looks, acts, and functions like it's the real deal. This system is used by large corporations and businesses.

System virtual machines are like apartments. Everyone lives in a smaller section, and these sections comprise the apartment complex. While the overall complex may have special amenities, such as an exercise room, a rooftop space, or a courtyard, everything you need is right within your apartment. Sure, the dog washing station provides some excitement, but the real reason you picked your apartment was because it fit your needs and budget, right? It didn't make sense to buy the entire complex, so you purchased a piece that met all your home needs - so did your neighbor, and the neighbor to the left, and the neighbor upstairs who only moves between 1 and 6 AM. Through your small slivers, you comprise the community. You comprise the computer.
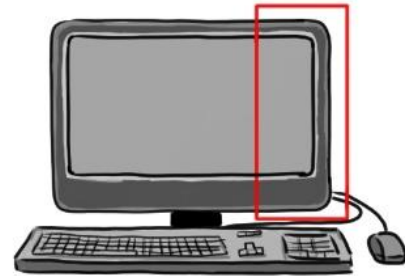
| Apartment complex | Your apartment | Virtual machine |
|---|---|---|
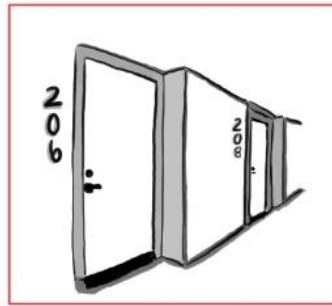
System virtual machines are like apartments.
If the computer is the complex, each apartment is a
virtual machine designed to fit the exact needs of
the person using it, whether it's to try out new
software, test a video game, or avoid a computer virus.

Like the apartment complex, one computer can run multiple virtual machines, either with the same purpose or different purposes. If you consider each virtual machine an apartment, you'll find the options are almost endless. Some apartments may have a den or two bedrooms or a big tub. Virtual machines come in hundreds of configurations and can serve different purposes even if they're on the same computer.

The second type is called a *Process* Virtual Machine. In the house analogy, Process Virtual Machines act like a Bed and Breakfast. You have your private bedroom and bathroom. You also have a communal living room, which is almost like your own at home, and the kitchen serves delicious meals three times a day. However, you don't live in this space. You are using the B&B for a specific purpose, whether it's a romantic weekend or a homey alternative to a hotel during a business trip. What

matters is that it acts like a house, and it may feel like a house, but it is not yours.

Eventually, your outing will end, and you will return home, and the B&B will cease to play a role in your life. Process Virtual Machines work the same way. You open the virtual machine for a specific purpose, and the machine is executed once the process is complete. Process virtual machines are generally used for programmers who wish to create code free of their computer's restraints. By creating a new environment, they can run a small program. Unlike system virtual machines, though, process virtual machines do not run indefinitely. Hence the apartment and B&B distinction.

## Adorable Bed and Breakfast

## Virtual Machine
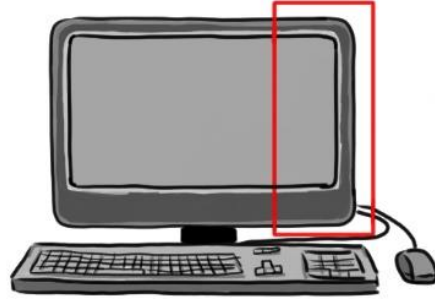
Process virtual machines serve a single purpose. These virtual machines are generally used by programmers when attempting new code or programs. Like a quaint oceanside B&B, you will not use it forever.

# HOW ARE THEY USEFUL?

In day-to-day life, you probably won't use a virtual machine hands-on unless your job calls for it. That doesn't mean they're useless, though. Virtual Machines are beginning to play a major role in businesses and tech companies. Most big websites you access, such as Google and Microsoft, bring you everything you could need on virtual machines. Even if you don't directly interact with a machine, you've used one without knowing.

Many businesses utilize system virtual machines. (These are your apartment buildings, if you recall. They act as tiny homes, but they're part of a much bigger, functioning complex.) Virtual machines are useful for anyone who needs to test software on multiple devices. A simple example relies on video game developers.

Using a virtual machine, developers can play the game as if they were using a PC, a Mac, or even a mobile device. Instead of having to find three devices to use, you can use one and access the other two using a virtual machine.

Tech companies can use virtual machines to test pieces of software. Rather than deploy a new program and hope it has no effect on the rest of the computer, they can create a safe testing environment using a virtual machine. Virtual machines are also useful in the event of a power outage – by creating multiple virtual machines on different computers, you can ensure that if one computer stops functioning, all the others will have access to the same information.

Video game testing on multiple platforms
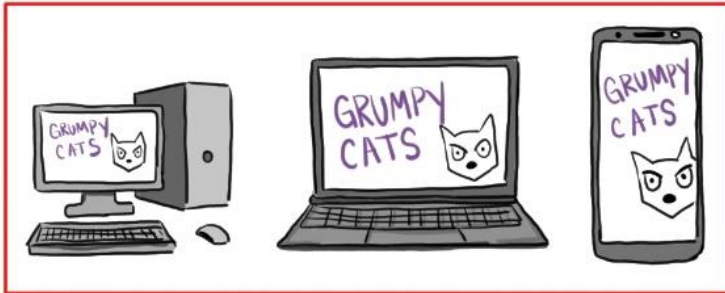
Virtual Machine
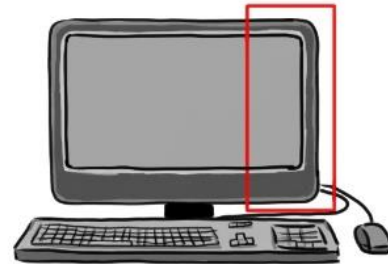
Virtual machines are mostly useful for big businesses, programmers, or people who want to make a fancy world on Minecraft.

# WRAPPING UP VIRTUAL MACHINES

You have survived and gained inside knowledge on virtual machines!

To conclude our adventure: Virtual machines are a computer within a computer. They are a mother-in-law suite that relies on the mansion for its existence, but like the mansion, they have the power to function as a cozy home. Virtual machines provide a layer of security and convenience for programmers, and as such they're becoming more popular as we continue to test the abilities of our computers.

Tune in next week to learn how you can create your own virtual machine! Because how else would you spend a free Saturday?

If you would like to dive further into the logistics behind virtual machines, check out the links below!

**The architecture of virtual machines**

**What is a virtual machine?**

**Technopedia**

**VMWare**