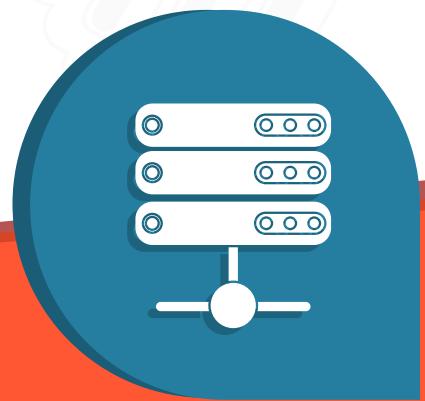




INTRO TO IT

For Beginners

- ✓ Information Technology Basics
- ✓ Networking Basics
- ✓ How to Build a Home IT Lab
- ✓ Windows Server Administration Basics
- ✓ Windows 10 Administration Basics
- ✓ How To Get an IT Job



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INTRODUCTION

The fact that you decided to get this ebook means that you're seriously interested in building a career in IT. Before we get started with providing you valuable information, we want to let you know that you made the right decision by trusting Server Academy. Here's why.

150 000+

SATISFIED STUDENTS

195

COUNTRIES

20 000+

POSITIVE REVIEWS

Years ago, I noticed that there are so many options out there for students who are looking to get IT certificates. I thought to myself, "That's great! But what about those students who are looking to get knowledge and skills that they can apply on the first day of their new job?" The answer was underwhelming.

It turned out that passing a test was the main selling point for these other companies. Don't get me wrong, there's nothing bad about that. There's a market for that offer, and the offer is valuable. But, what about this other target audience, which wanted tangible results and massive confidence that they can get an IT job and that they can get that job done without issues?

Server Academy became my answer to that question. Over the years we've taught over 150,000 satisfied students from all of the 195 countries, getting over 20,000 positive reviews.

What do these stats mean for you, though? Well, they mean that the tools are available, and that if you put in the work and dedicate time to follow our system, there's nothing stopping you from getting ahead. The system goes into much more detail in our membership program, however this ebook will be more than enough to get you started on this journey of mastering the IT field.

We'll guide you through the basics of IT, networking basics, building your own IT lab, Windows Server Administration and Windows 10 Administration. That's just from the technical standpoint, in chapter 7 we will tell you exactly how to get an IT job. That means preparing your resume, applying to IT jobs, the interview process and getting the highest possible salary.

In the final chapter, we'll provide you with some tips and guidance on the best ways to continue your IT journey once you've completed this ebook.

INFORMATION TECHNOLOGY BASICS

So now that you know you are safe learning IT from Server Academy, what is Information Technology, anyway? Let's refer to the Dictionary.com definition:

“ The development, implementation, and maintenance of computer hardware and software systems to organize and communicate information electronically. Abbreviation: IT ”

Basically, IT is all things computers. Why should we care about this industry? Well...maybe because it's nearly worth \$5 trillion. Yeah, IT is a HUGE industry and only growing and this makes it a great place to build a long lasting and well paying career!

Besides just the money, IT is important to business because computers are a commodity, not an option. Any company that needs to utilize computers will also need IT services at some level. Can you think of a company model that doesn't need any of the following?

- Some type of computer (desktop, laptop, tablet, phone, etc...)
- Some type of Email (this is configured by IT, even if you use something like gmail)
- Some type of Network or Internet Connectivity (provided by an ISP that also has an IT team in the backend)

Even the kids outside of my house the other day were running a lemonade stand and guess what... They used their phones (which need an IT team at the service provider to work) to post onto FaceBook (also requires IT). When they purchased their lemonade they went to a store that has a POS (point of sales) system that....you guessed it....backed by IT.

The bottom line is that it is very difficult and inefficient to operate a company without IT, and this is great for you because it means you'll have job security when you work in the IT field!

So if you decide to work in the IT field, what kind of work will you be doing as an IT professional? Well, while it's very common to have some overlap between these categories... most of the time IT roles are split into different categories.

Here are some job titles and median salaries supplied by glassdoor.com. Keep in mind that these salaries are the average for entry level positions. If you have 10 years of experience your salary will be much higher than those shown below...

Help Desk Technician

Median Salary: 51k

As a Help Desk professional you are generally the first point of contact for users who are having problems with anything IT related. That's printers, phones, or computers. Assisting users with email or user password issues are a big part of this role. You will use something known as a ticketing system to track and resolve user issues.

IT Support Specialist

Median Salary: 61k

There is a lot of overlap between this role and the previous Help Desk role, but you can also expect to have more access to Servers and backend infrastructure. You could assist with new server installations, manage updates across your domain, troubleshoot network issues and more.

Windows Server Administrator

Median Salary: 77k

While you will still be expected to answer phones and interact with the customer, generally you are focused more on working on the IT infrastructure of your office. New server installations, basic network routing, Active Directory architecture, deploy software and security policies with Group Policy, manage WSUS, writing scripts to automate redundant task and more.

Senior Systems Administrator

Median Salary: 114k

As a Senior Systems Administrator, the buck stops here. You will be expected to resolve any IT issues that couldn't be solved by lower ranking IT members. You will need to be able to build, administrate, patch and manage an Active Directory domain from the ground up. This job role is the "jack of all trades" type role, so when you're preparing for this you need to be learning as MUCH as you can in ALL aspects of IT.

Pretty cool, right? But how can you get started in the IT field? What exactly are companies looking for in candidates these days? Do you need a four year degree to get started in IT?

The short answer is, No.

Here is why: A college degree or shiny new certificate will definitely help you when searching for an IT job but they are not the secret to getting your start in the IT field. That being said, we've all heard the stories about the IT college graduate with 0 IT experience not being able to get an IT job...

This is known as a catch 22. Not having IT experience so you can't get an IT job... but you also can't get IT experience because you don't have an IT job...

No IT Job = No IT Experience

No IT Experience = No IT Job

You don't want to be that guy or gal stuck in this horrible cycle, especially when you start adding on student loan debt to the equation!

Don't worry though, if you know what to do you will easily avoid this dreaded catch 22 from plaguing your life. All you need to do is start getting IT experience immediately regardless of whether or not you're currently enrolled in college or certificate training program.



You need hands-on experience. You need IT skills written down on your resume BEFORE YOU get your first IT job.

How is this possible?? Easy.

Here is one example: You want to get an IT job administering Windows Server. What skills will you need to get that job? The easiest way to find out would be to hop on your latest job listings site and find related job posting.

When you do that, you'll find you need to be able to do the following; install and configure Windows Server, build a Windows domain, create and manage Active Directory users and computers, manage Group Policy objects, install Windows updates, etc.

Now that you have an idea of what you need to learn, the rest is easy! In fact you can use what you'll learn in this eBook to get the experience you need!

You could create a virtualized IT lab (see How to Build a Home IT Lab section) and install Windows Server and then you'll be able to get all of the experience you need.

You could learn each skill by simply reading Windows Server related books, googling “how to do xyz on Windows Server”, or you could take a more formal and structured approach by enrolling in our IT training program which will teach you everything you need to know!



Some people feel that experience gained on your own time is not valid and cannot be written on a resume and this is simply not true!

Paul Hill (founder of ServerAcademy.com) obtained his first job purely on unpaid, unofficial IT experience gained on his own time.

The bottom line is if you have an IT skill, let's take Installing Windows Server for example, and you can demonstrate that IT skill on the job or at an IT interview then your IT skills will be viewed as valid.

We recommend that you have a “technical skills” section on your resume where you write down everything you have learned on your own personal projects at home. Everything you write down you should be able to demonstrate or explain IN DEPTH. If you can't, you have no business claiming that as a skill on your resume.

It can really help when you're learning these skills from a structured IT program like Server Academy's. We offer perks like IT labs you can run from your web browser as many times as you'd like, structured linear curriculum's, quizzes, instructor Q/A, student to student discussions and much more!

If you want to go the route of learning on your own you can do that too! It's just a little more difficult and you might end up missing important information that you will need later on down the road.

Whichever route you choose, the end result of a long lasting IT career is well worth the effort!



COMPUTER HARDWARE BASICS

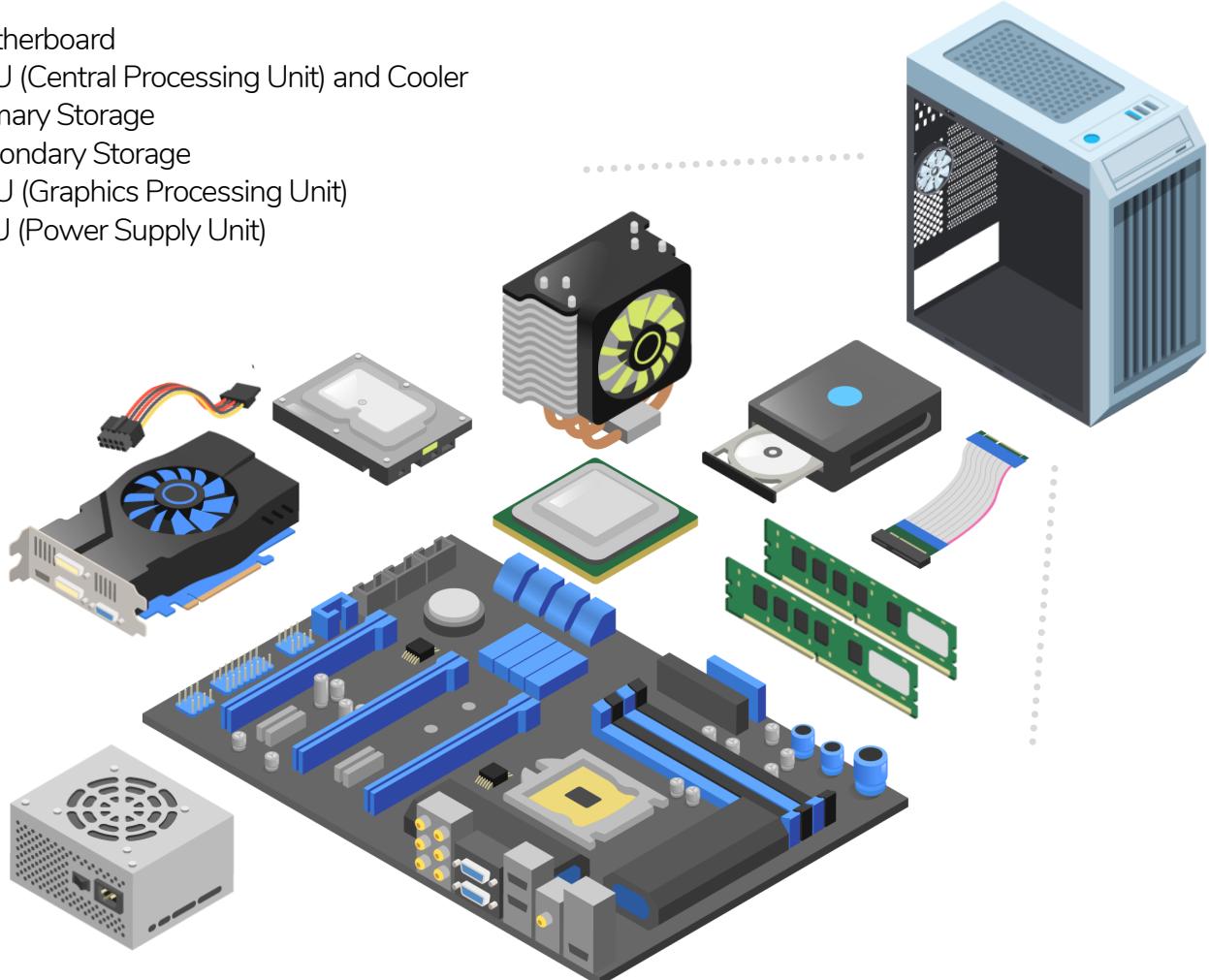
One thing you need to understand, at a high level, are the core components that make up a computer. At some point in time you will need to swap out a few sticks of RAM or an internal HDD, so we want to make sure you know what these are, and where they are located within a computer.

If you remember anything from this section, remember these three rules:

1. NEVER work on your computer's hardware with the power cord plugged in
2. NEVER work on carpet
3. Touch your case to discharge any static electricity before touching any internal components

One thing to keep in mind is that we are mainly going to focus on desktop computers. Other types of computers (servers, storage devices, printers, etc) will use more or less components. Here is an overview the hardware that's inside a desktop computer case:

- Motherboard
- CPU (Central Processing Unit) and Cooler
- Primary Storage
- Secondary Storage
- GPU (Graphics Processing Unit)
- PSU (Power Supply Unit)



The motherboard (sometimes referred to as "mobo") is a printed circuit board and acts like the air traffic controller of your computer. It coordinates all of the processes of your computer and connects all of your computers components together.

The motherboard has several slots that you can connect your other computer components (primary and secondary storage, graphics processing units, power supply units, fans and coolers, the case power switch, and much more).

Most components are either inserted into slots or plugged in with a cable with the exception of the CPU which is inserted into the CPU socket (more on that later).

Header Pins

Header pins are groups of pins used to connect devices or ports to the motherboard. For example, the cases power switch, fans and lights will be connected into these header pins.

PCI/E Slots

This is where you will insert your "Graphics Processing Unit" if you need one.

CMOS Battery

The CMOS battery maintains the time, date and configuration settings of your computer.

CPU Socket

The CPU is inserted into the CPU socket and then the CPU cooler will be attached on top of this CPU. Unlike most components, the cooler is connected to the CPU with thermal paste.

Primary Storage

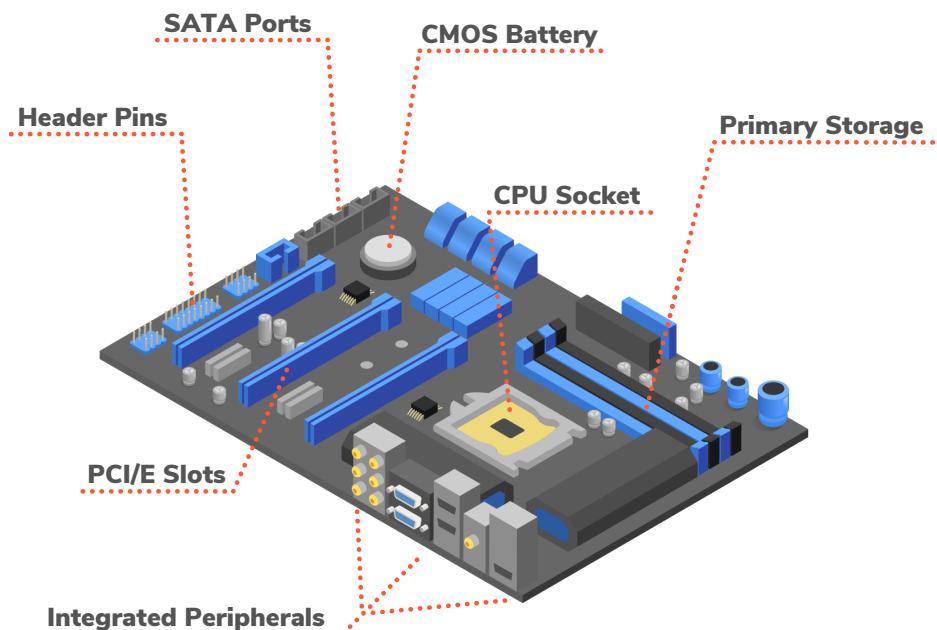
The primary storage slots on your motherboard is where you will find your RAM (random access memory). This is high-speed RAM used for temporary storage.

Integrated Peripherals

Integrated peripherals will include things like audio in / out ports, onboard video, USB ports and more.

SATA Ports

Secondary storage like internal HDDs (hard disk drives) or CD and DVD drives will connect to the SATA ports through a SATA cable.



The CPU (Central Processing Unit) is a small computer chip made up of billions of microscopic transistors that allow for calculations. Essentially your CPU is the brain of your computer.

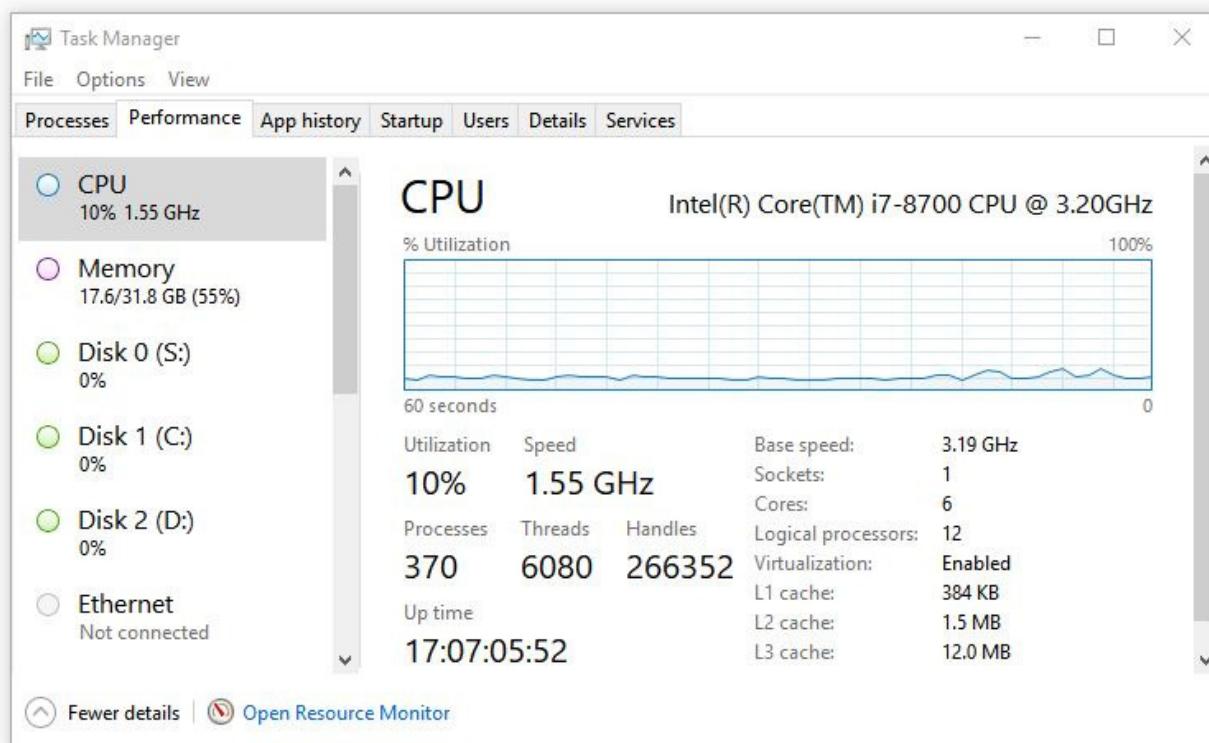
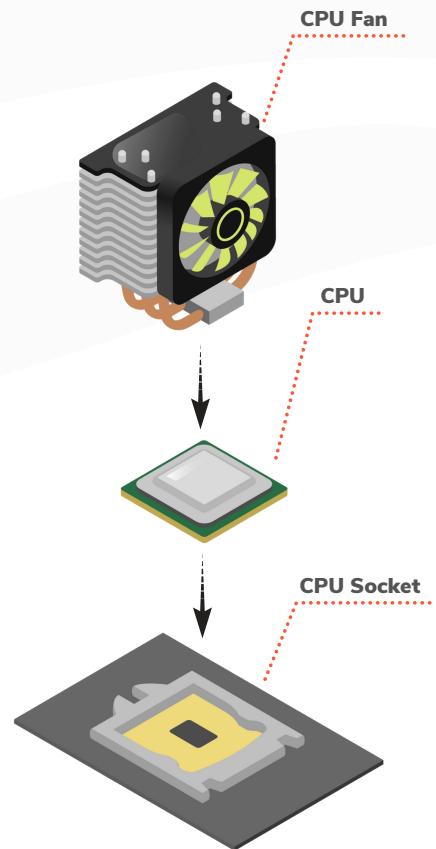
Installing this computer chip on the motherboard is a little more complicated than all the other components because once you insert the CPU into the CPU socket, you then need to apply thermal paste between the CPU and the CPU fan.

When you're dealing with CPUs you will hear terms like dual or quad core processors. A dual core process effectively has two processors in one - meaning that it can run two processes simultaneously.

The same thing applies for quad or eight core CPUs. The more cores they have, the more simultaneous processes can be computed.

You can easily see how many cores your computer has by opening the Windows Task Manager (ctrl + alt + del > Task Manager) and navigating to the Performance tab.

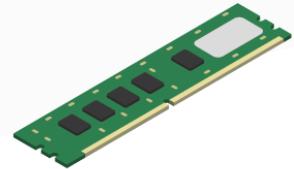
In the bottom right corner you will be able to see how many cores your computer has as well as other performance metrics.



Primary storage is used for temporary, quick access storage. Generally most primary storage is volatile, meaning that when your computer is powered off, the data stored in primary storage is lost.

Examples of primary storage would be RAM (Random Access Memory) or CPU memory (the CPU cache). There are certain types of RAM (MRAM or Magnetic RAM) that are non-volatile but you don't see many of these in use.

Generally primary storage is smaller, and more expensive, but it is much faster.



Secondary storage was designed for long-term storage. It is non-volatile meaning that it does not require power to keep memory storage on the drive.

Examples of external storage would be internal or external HDDs, optical discs, tape backups, etc...

The PSU (Power Supply Unit) is responsible for converting AC (alternating current) to low voltage DC (direct current). The power supply is located at the back of your computer and is the computer component that takes the power cord from that wall to the computer.

Inside of your computer case, there will be several wires running from your power supply to almost all of the connected components. Gaming computers will require higher power, power supplies than office computers or workstations.



Chapter 1. Information Technology Basics

OPERATING SYSTEMS

An OS (operating system) is the most important software running on your computer right now. It's the software platform for your computer applications.

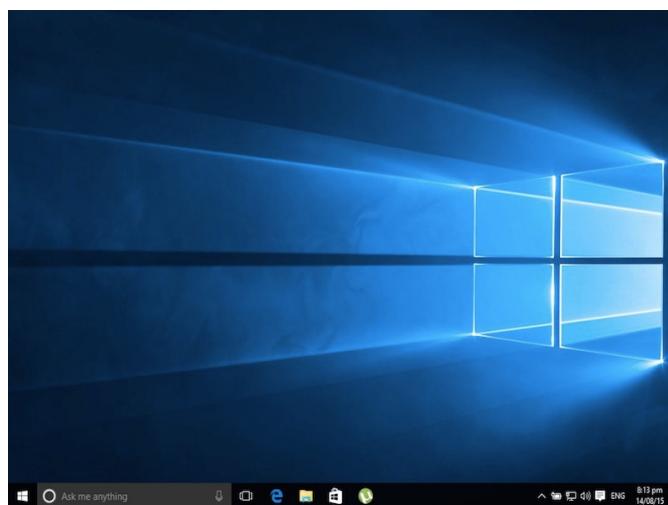
The OS manages hardware resources and it allows interaction between your software and hardware components. Computers, tablets, phones, networking devices and more, all use Operating Systems.

The most popular desktop OS is by far Windows. The next most popular operating system would be OS X (mac), but the family of Windows users is about six times larger than OS X users. This should give you an idea of how Windows is dominating the OS desktop market.

Of course when we talk about smart phone operating systems the clear winner is Android which is about four times as popular by the next runner up which is iOS.

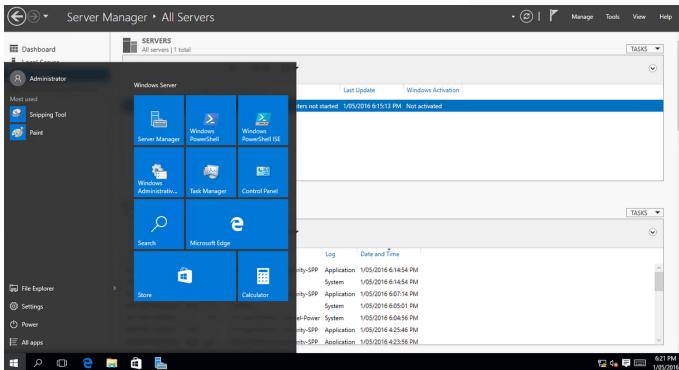
While it can be very interesting to learn exactly how an operating system kernel processes commands and data, it's definitely beyond the scope of this book and probably unnecessary for you to understand unless you intend to develop your own operating systems..

Instead, we are going to settle for a brief overview what you can expect when you are interacting with different operating systems.



Windows 10

Windows 10 is a workstation operating system developed by Microsoft that is designed to be used at home, or at the office.

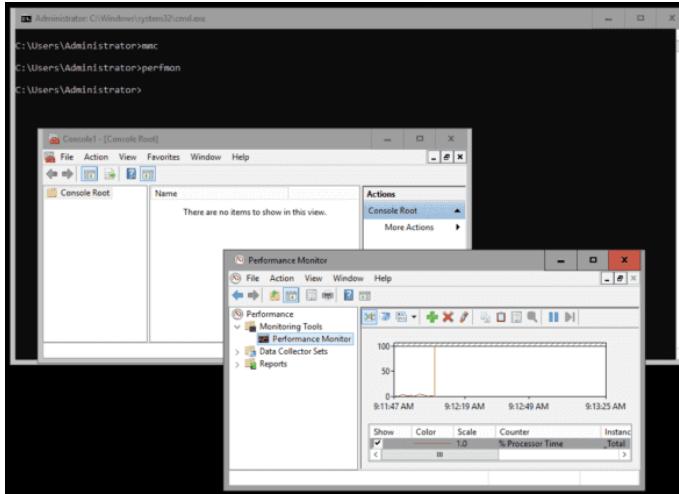


Windows Server Desktop Experience

Windows Server is an operating system designed to support small and big business IT needs.

Windows Server is modular in the fact you can expand its capabilities by installing Server Roles.

Data, applications, communications and IT management is all possible with Windows Server.



Windows Server Core

Windows Server Core is a light weight version of the Desktop Experience.

The main difference is that Server Core doesn't have a graphical user interface and has some role limitations compared to its desktop counterpart.



OS X

The 10th version of the Apple Macintosh OS. This is considerable different to Windows and can sometimes be confusing for new users who are used to Windows based operating systems.

While most of the IT world strongly prefers Windows, you may encounter some users who prefer the Mac OS making it something you should be at least somewhat familiar with.

NETWORKING BASICS

One thing that is absolutely critical to understand, when working in IT, is how computers communicate and network together. A lot of IT support work is making sure your computers stay connected to their networks and the internet, and if you understand the basics, it will make your life much easier.



In order for a computer to communicate, it must have a NIC (Network Interface Card) or a motherboard that has a NIC onboard (included). This allows you to plug in a network cable to connect your computer to your network device.

NICs can take several different types of network cables, common cables you might encounter are listed below:



RJ45 or Cat5e

This is probably the most common type of network cable you will encounter at home or in the office. These cables plug straight into your computer or networking device. These network cables have a max speeds ranging from 10 Mbps to 1000 Mbps.



Fiber Optic

There are TONS of variations for this type of cable and speeds depend on factors like the length of the cable but could be as fast as 100 Gbit/s.

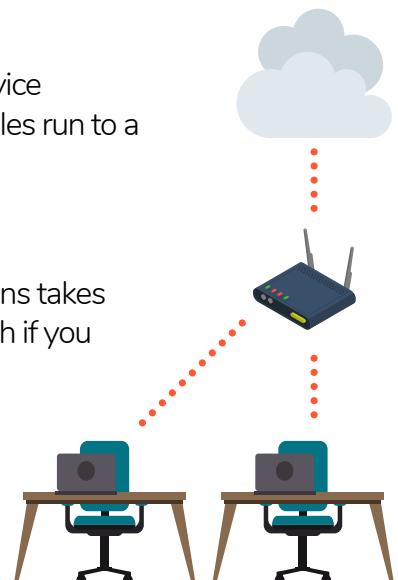


Coaxial

This type of cable is commonly used by ISP (internet service providers) or TV services. You will see these types of cables run to a home modem from your big telecom companies.

Understanding all of the different network cable specifications and configurations takes a lot of time and is critical if you want to be a network specialist, but not so much if you plan to be a Systems Administrator or cloud dev ops professional.

For most computer setups, you will plug your computer into your network device, and your network device will allow you to communicate with other computers who are on the same network as well as allow you to communicate with the internet.



IP ADDRESSING SIMPLIFIED

There are a couple of concepts that you need to understand when you're working in the IT field. Let's start with the basics of IP addressing.

So what exactly is an IP address? Well IP addresses are used just like a physical address. It tells computers where to find another device. An IP is a four groups of numbers (called octets) that range from 0 to 255.

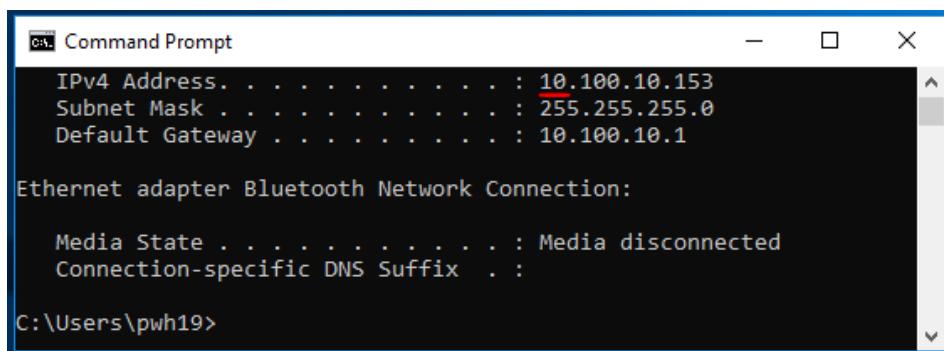
An IP address could look something like this:

192.168.1.1

This is what is referred to as a local IP address. That is, an IP address free for use in your home or office network. External IP addresses need to uniquely identify a host address. This restriction does not extend to internal IP addresses because they are not directly accessible by external computers.

There is a standard called RFC1918 that basically says that any IP that starts with 192, 10, or 172 will be reserved for local networks only. This is why you will never find an internet server that has an IP that starts with one of reserved addresses.

If you launch CMD (see image on right) and type in the command "ipconfig" you will see that your IP address starts with one of those RFC1918 IP addresses listed above. This is your local IP address.



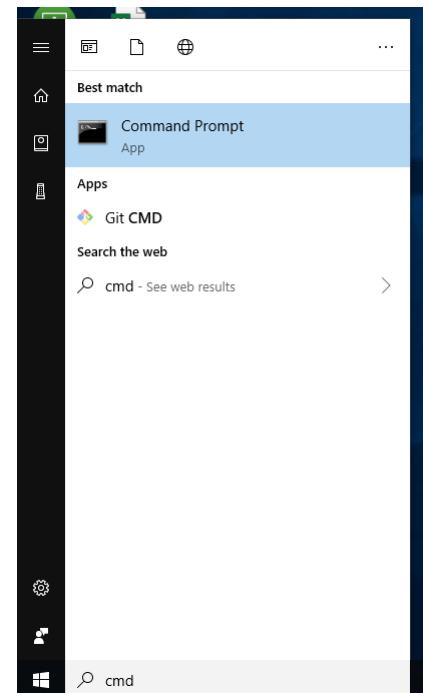
The screenshot shows a Command Prompt window with the title 'Command Prompt'. It displays the following network configuration information:

```
IPv4 Address . . . . . : 10.100.10.153
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.100.10.1

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . :
```

C:\Users\pwh19>



The main thing you should remember right now is the difference between local and external IP addresses.

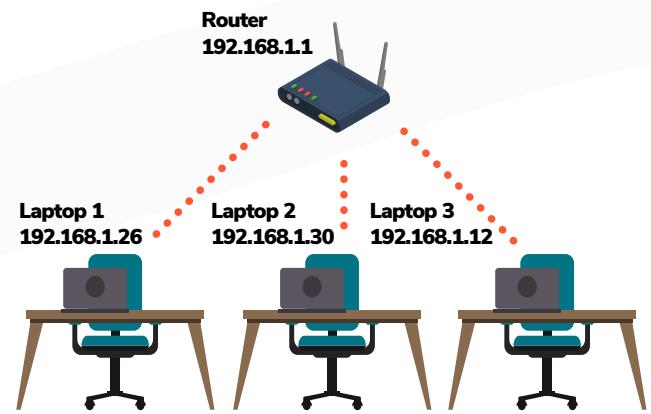
There can always be exceptions, but as a general rule you will never reach an external server or service by using one of the RFC1918 networks (any IP that starts with 10, 172, or 192). These are reserved for computers on your LOCAL (home or office) network.

Let's look at an example of how computers on a local network will communicate. In the example below we have three laptops directly plugged in to our router.

There are four IP addresses associated with this network:

- Laptop 1: 192.168.1.26
- Laptop 2: 192.168.1.30
- Laptop 3: 192.168.1.12
- Router: 192.168.1.26

In this scenario, the router is acting as the default gateway for all the laptops. If Laptop 1 wants to communicate with Laptop 2 then it will send its traffic first to the router, and the router will forward that traffic to Laptop 2.



The same goes for all laptops that want to send traffic to another device. It's important to understand this because when you need to manually configure the computers TCP/IP settings (you need to do this for servers most of the time), you will need to specify the IP address as well as the default gateway.

Another component of an IP configuration that we haven't discussed yet is the subnet mask. An IP address is really split into two separate parts. The first part is the network address and the second is the part of the IP address that is for the hosts.

This can get complicated, but let's keep it simple. A subnet mask is applied over an IP address like this:

Subnet Mask: 255.255.255.0
IP Address: 192.168.1.10

If the subnet mask is 255, that means that part of the IP address is the network address. If the subnet mask is 0, then that part of the IP address is for hosts. So in the example above, the parts of the IP address that is red, is the network portion of the address.

This means that the hosts can only have 255 network devices since we can only use the last octet. So the available range of IPs that we can hand out to our network devices would be:

192.168.1.0 - 192.168.1.255.

Let's take a look at another example:

Subnet Mask: 255.255.0.0
IP Address: 172.128.0.15

This is another local network (or subnet) that uses the first two octets as the network id. Since we have two octets that are not used by the network id, we can use these two octets for host addresses. The total number of hosts would be 255 * 255 (65,025 unique device IP addresses).

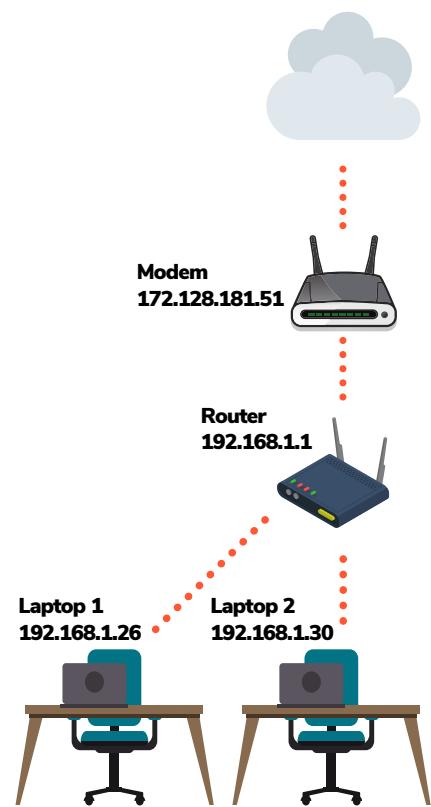
For this network we can use the following IP addresses for network devices:

172.128.0.0 - 172.128.255.255

So the subnet mask really is all about defining how large your network can be. Most home networks use a 255.255.255.0 subnet, but large companies and networks may need more hosts and thus a larger network.

Now let's talk about external IP addresses. You can find your networks external IP address by going to Google.com and searching for "whats my ip."

A screenshot of a search results page from Google. The search bar at the top contains the query "whats my ip". Below the search bar are navigation links for "All", "News", "Shopping", "Maps", "Videos", "More", "Settings", and "Tools". The search results section shows a single result with the title "174.128.181.51" and the subtitle "Your public IP address". Below this, there is a link "Learn more about IP addresses" and a "Feedback" button. The page indicates "About 800,000,000 results (0.43 seconds)".



On the right hand side of the screen we have a diagram that outlines a home network. Note that the IP address that is shown is the IP address that is issued to the modem. You can search "whats my ip" from both Laptop 1 and Laptop 2 and you will get the same result.

This is your external IP and is accessible from the internet. If you were running a web server on Laptop 2, users would access the server from your external IP and NOT your internal IP.

So how would the traffic get routed from the internet (referenced as a cloud), down to Laptop 2? What is preventing the traffic from stopping at the Router, or being forwarded to Laptop 1?

Well that is where port forwarding comes in to play, which we will be discussing that in the next chapter.

FIREWALLS AND PORTS

So when traffic hits an external IP, how does it reach the local hosts on the network? Let's look at the example we used on the previous chapter, but add a web server to their home network with an IP address of 192.168.1.100.

Visiting users from the internet (the cloud represents all of the internet) will need to enter the IP address of the network's modem. This will send the required network traffic from their computer to the modem, and the modem will pass it on to the router.

Most routers have what is called a firewall, which is a security device that decides if it should allow traffic to enter its network or if the traffic should be discarded.

On our router, we would need to configure it to pass web server traffic to our web server (192.168.1.100).

This is how traffic is routed from our modem to our web server. We create a rule that says, any traffic that is looking for a web server should be redirected to the internal IP address of our web server.

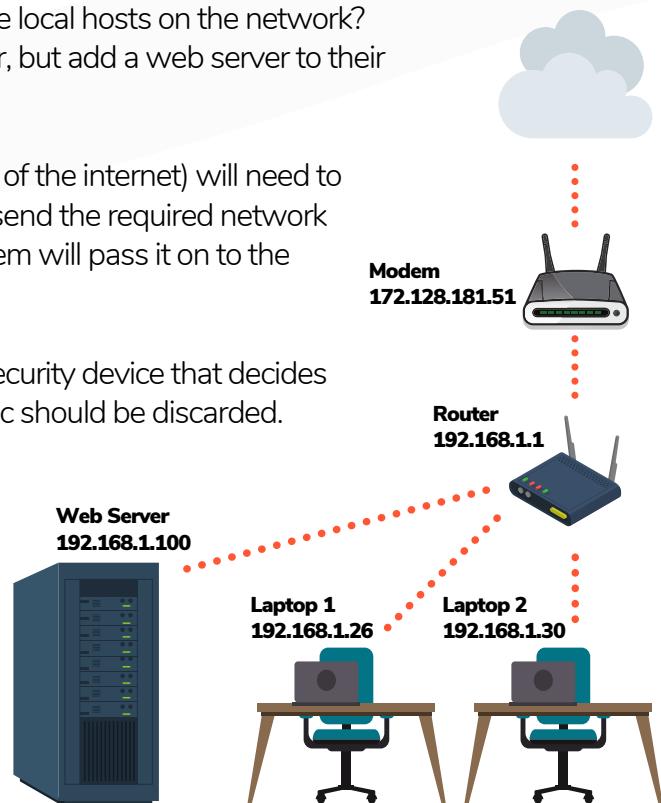
How does the server know that the traffic is for a web server? Well, web traffic generally operates on what is called a port. Ports are connection points for certain types of traffic. Web traffic is generally done on port 80 (although it could be done on 443 or any other port if you wanted to customize the port number).

Now the web server itself would also likely have a firewall, and this would also need to be configured to accept traffic on port 80.

Once you create a port forwarding rule on the router's firewall that will pass traffic on port 80 to 192.168.1.100, and you open port 80 on the web server, then the web server will become accessible to the internet under the external IP address for port 80.

To access our web server from the internet, you would enter 172.128.181.51:80. The ":80" specifies the port number that you want to attempt to connect to and since we have the redirection rule setup on our router, that will forward our traffic to 192.168.1.100:80.

If you open your web browser and type in an IP address, you wouldn't need to enter the port number as a web browser knows the default ports on which most web traffic operates.



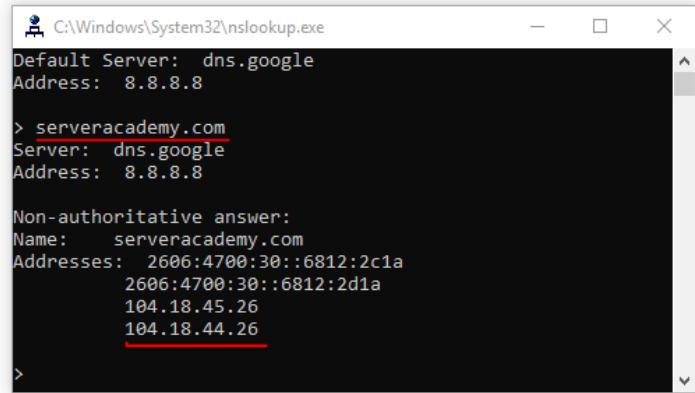
DNS (DOMAIN NAME SYSTEM)

Most of the time you don't need to memorize an IP address thanks to a service known as DNS or Domain Name System. Simply put, DNS provides name resolution for IP addresses.

Your windows computer has a tool you can run called "nslookup". You can launch this tool from command prompt or by pressing win+r and typing "nslookup".

Once nslookup opens, you can query your DNS server and find the IP address behind a DNS name.

So if I lookup serveracademy.com, I can see the IP address of the website is 104.18.45.26.



```
C:\Windows\System32\nslookup.exe
Default Server: dns.google
Address: 8.8.8.8

> serveracademy.com
Server: dns.google
Address: 8.8.8.8

Non-authoritative answer:
Name: serveracademy.com
Addresses: 2606:4700:30::6812:2c1a
           2606:4700:30::6812:2d1a
           104.18.45.26
           104.18.44.26
>
```

Some modern websites block direct IP access (mine does), but if it didn't you could actually open your web browser and navigate to 104.18.45.26 and it would take you to ServerAcademy.com. You are free to run an nslookup query against any domain that you want and find the public / external IP address for that server.

The main take away here is that DNS is responsible for mapping easy to remember names to IP address.

HOW TO BUILD AN IT LAB

In this chapter, you're going to learn step by step, how you can build your own IT lab. First we will talk about the hardware requirements for creating your own IT lab. Next you will learn what virtualization is and how to get started virtualizing with VirtualBox. Finally, alternative lab solutions that you could use besides what we will be showing you in this book.

Let's start with the minimum requirements for running a virtual IT lab:

1

64-bit Processor and OS

Most modern server software (especially Windows Server) will require that you have a 64bit processor and Operating System. If you don't have access to a 64bit processor then your only option is to install older versions of Windows Server (like the 32bit version of Server 2012r2). [You can download a 32bit version of Server 2012 here.](#)

2

Enable Virtualization in your BIOS

In order to create 64-bit VMs, you must enable virtualization in your BIOS. If you run into trouble when creating your VMs you can assume that virtualization is not enabled. For detailed instructions on how to enable virtualization, [click here.](#)

3

Available Storage

You will want to have at least 20gb of free storage space on your hard drive in order to download and install your VM operating systems plus software and updates.

Most modern laptops or desktop computers are good enough to run an IT lab, but if you're working on old hardware you have the option of joining our membership platform and running our internet IT labs that can be run on any hardware with a modern web browser (even if the laptop is ancient).

We will be installing Windows Server 2016 in our lab, so go ahead and download it now at the URL below:

<https://www.microsoft.com/en-us/evalcenter/evaluate-windows-server-2016?filetype=ISO>

What is a VM?

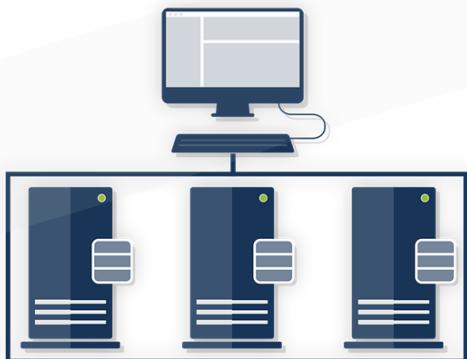
We will be utilizing a concept called virtualization, in which we will create a software-based representation of a server instead of purchasing physical hardware.

In essence, you will be running a virtual computer within your computer. These computers within a computer are referred to as a VM (virtual machine) and depending on the power of your hardware you could run several VM's at one time.

In the illustration on the right, we have an example computer that is running three virtual machines. Again, these are software computers.

Why use a VM?

In the old days if you wanted to setup your own IT lab you actually needed to purchase a server and networking gear which can be quite expensive. Now we can just download some free virtualization software and we will get the same result.



Using a VM also allows you to easily move the VM from computer to computer. A VM is essentially made up from a hard disk file and a virtual machine file – which makes them very easy to copy or move anywhere across the globe. I can assure this is not the same with a 60lb physical server.

A few key terms you need to understand are VM (which you already know) and the Host. The host computer is the computer that “hosts” the VM. Or the computer on which the VM operating.

KEY TERMS

VM - Virtual Machine (software computer)

Host - The physical computer that operates a VM

There are always additional details I could add to take up space, but my courses aren't designed to bore you to death. I have already given you the quick, down and dirty details that you'll need to understand Virtualization – so let's get virtualizing!

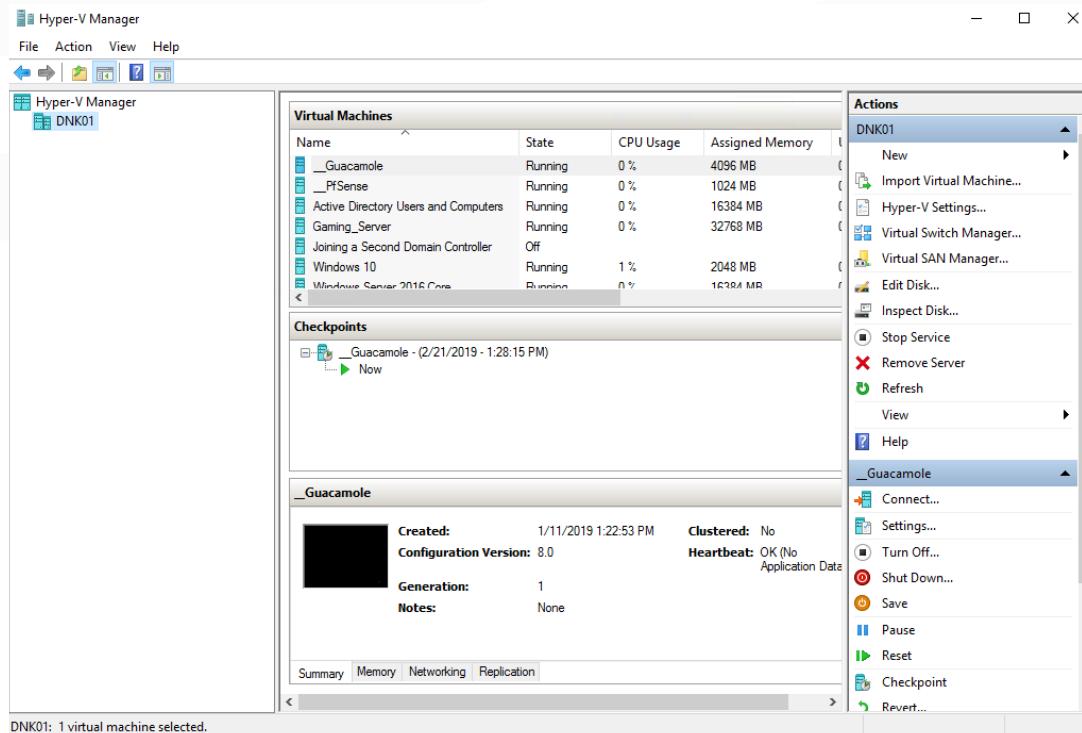
Virtualization Software Options

There are several options available when it comes to free virtualization software and we are going to list only a few options that are available to you. Keep in mind that there so many different options that we could not list all of them here.

Also there is no right or wrong option here and you should probably give them all a try because the experience you will gain will be very valuable. You never know when you will go to a job interview and they will ask you if have any experience with one of these technologies!

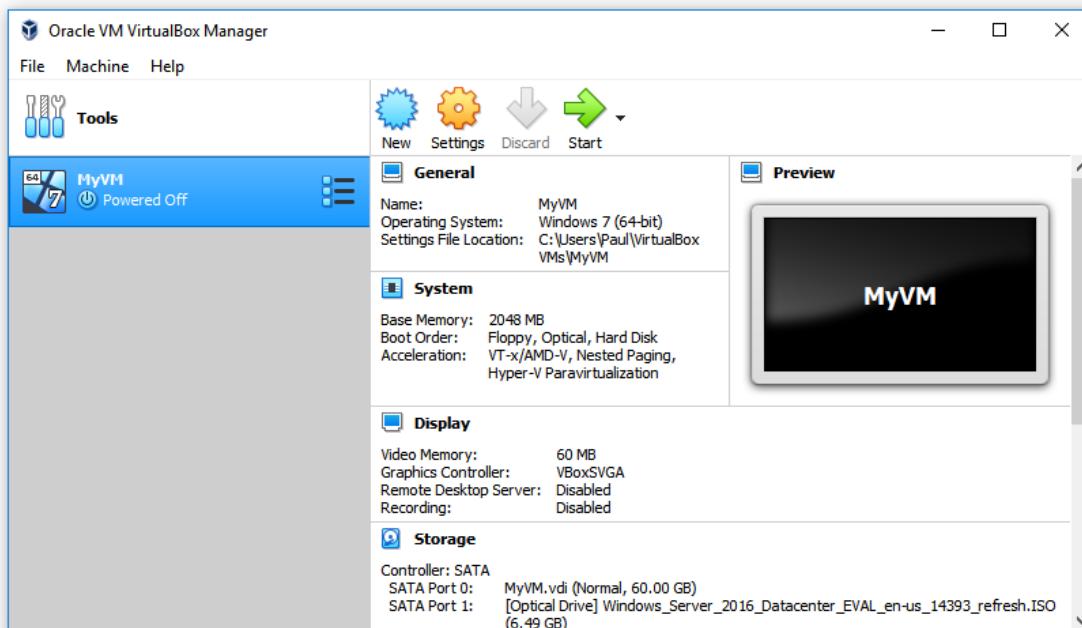
Hyper-V

Hyper-V is a virtualizer that is included with any version of Windows that is at least Windows 8 or Windows Server 2008. This is designed to be used for home labs as well as large IT infrastructure.



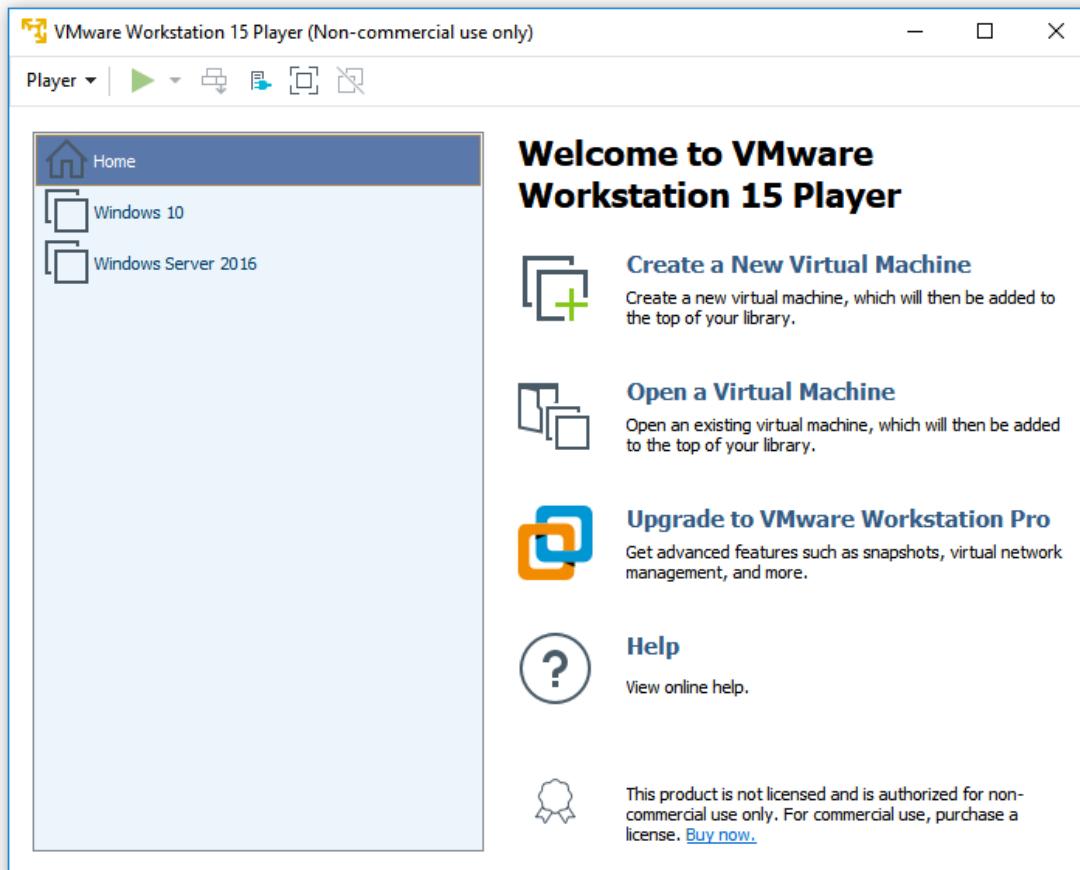
Oracle VM VirtualBox

VirtualBox is a great free option for either Windows or Linux. This could be used to run on a smaller production network, but ideally you would be using this for test or developmental labs.



VMware Workstation Player

Described by VMware as an ideal utility for running a single virtual machine on a Windows or Linux PC. The free version is available for personal / non-profit use.



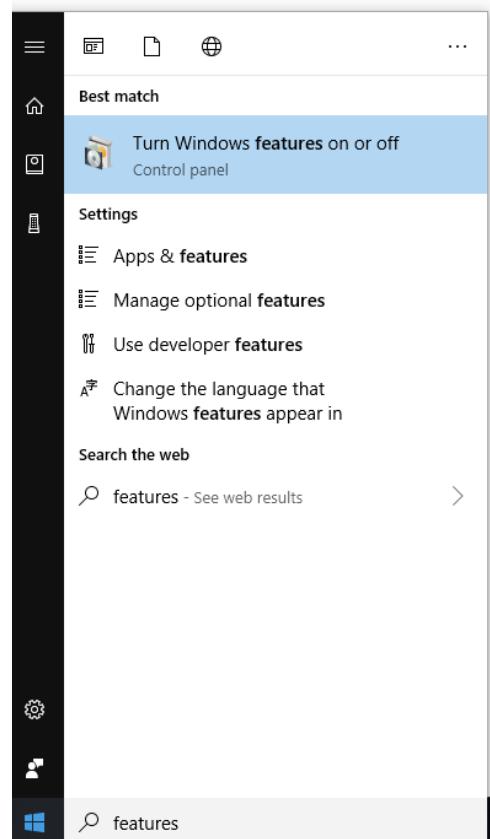
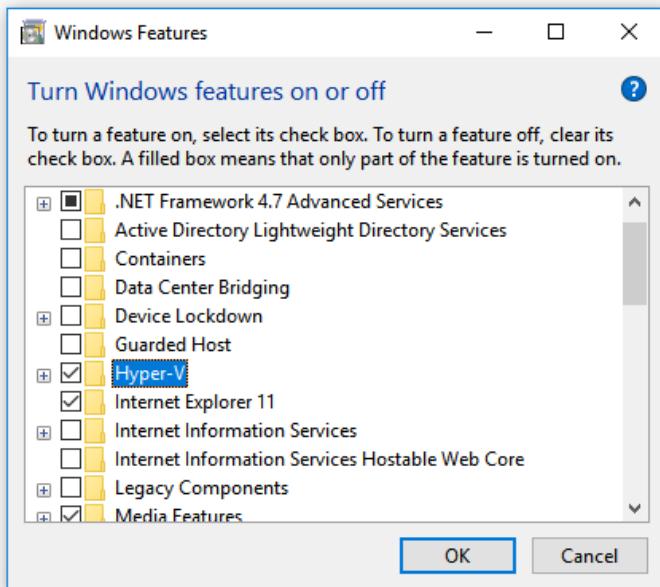
There are MANY more options you could chose and we strongly encourage you to research and find the solution that will work best for you!

CREATING AN IT LAB WITH HYPER-V

To get started with Hyper-V, you first need to make sure you're at least using Windows 8 (preferable at least Windows 10) AND you're using the Pro or Enterprise versions. Hyper-V is not available on the Windows 10 Home edition. If you can't install Hyper-V, please move on to the next chapter and use Virtual Box.

To get started you want to click the Windows button and search for "features". In the results you should see "Turn Windows features on or off" as shown in the image on the right.

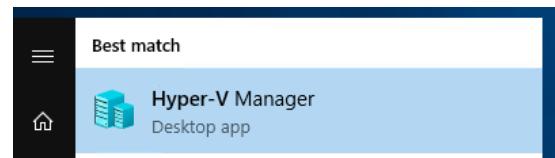
Open this tool and enable the "Hyper-V" checkbox as shown in the image below. This will often require a reboot of your computer to finalize the installation.



NOTE

If you want to use VirtualBox you will need to disable this feature and reboot before installing VirtualBox

Once you reboot your computer Hyper-V will be installed and you can use the Windows button to search for and launch the Hyper-V Console.

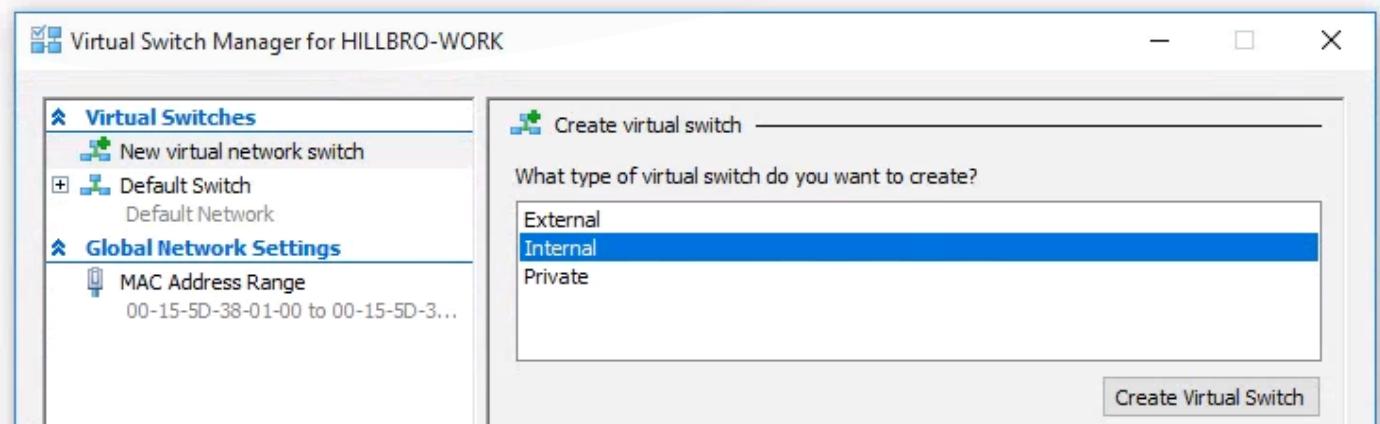
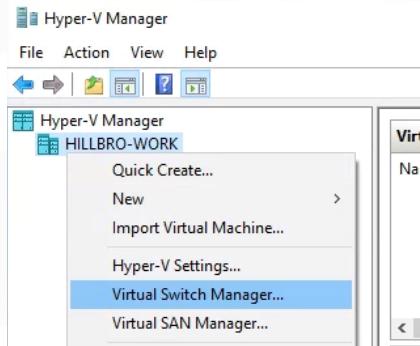


Once the console has been launched, we will need to create a Virtual Machine and a NAT Network which will allow your VMs to share your host PCs internet connection with your VM.

When the console is open, you will want to right-click on your Hyper-V host name and select "Virtual Switch Manager".

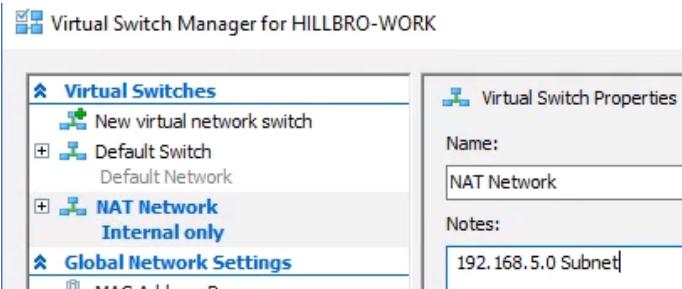
Next we need to create a new internal virtual switch. On the window that appears, select "Internal" and "Create Virtual Switch" (see image below).

This will create a new switch that we can use to network your new VMs together.



Once you create the switch you should change the name and optionally add some notes.

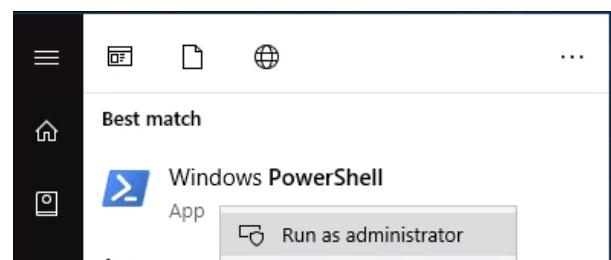
I prefer to add the subnet that I plan to use for that internal network in the notes and this will especially come in handy if you want to create a NAT Network later on.



I am going to use the 192.168.5.0/24 subnet so I will add this to the notes for future reference. Enter the same subnet or whatever subnet you would like to use then click OK to save your new internal switch.

This network, by default, will have no internet connectivity. If you want to share your host computers internet connection with this network, then you will need to work some PowerShell magic (don't worry - all steps are outlined below).

First, launch Windows PowerShell by clicking the Windows button and searching for "PowerShell" (see image on the right). Be sure to hold left-shift and press right-click to launch PowerShell as an administrator.



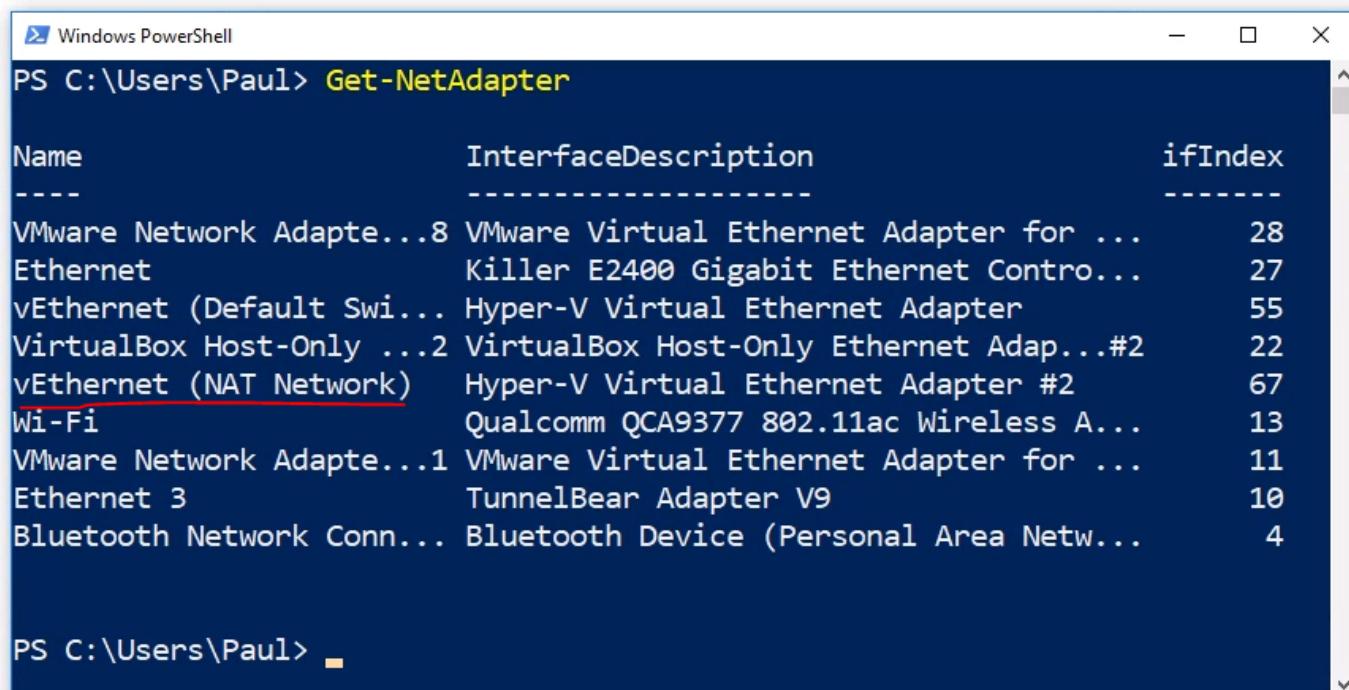
Once PowerShell has launched you need to run the following command:

```
Get-NetAdapter
```

You should be able to identify your network by the name you chose when you created the switch on the previous page.

For example, I created one and named it "NAT Network". When I execute the command above, I can see the switch is listed below.

We are interested in the "ifIndex"

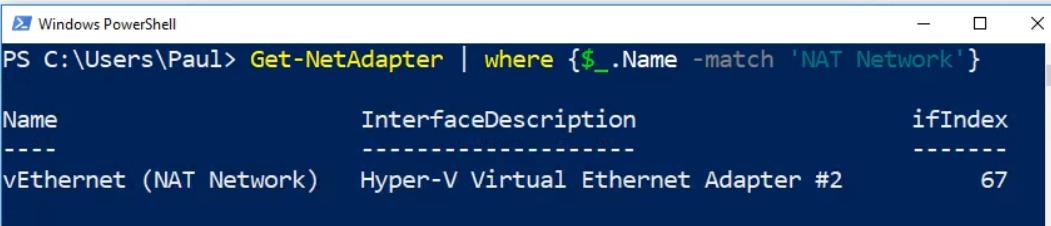


Name	InterfaceDescription	ifIndex
VMware Network Adapter	VMware Virtual Ethernet Adapter for ...	28
Ethernet	Killer E2400 Gigabit Ethernet Control...r	27
vEthernet (Default Switch)	Hyper-V Virtual Ethernet Adapter	55
VirtualBox Host-Only Adapter	VirtualBox Host-Only Ethernet Adapter #2	22
vEthernet (NAT Network)	Hyper-V Virtual Ethernet Adapter #2	67
Wi-Fi	Qualcomm QCA9377 802.11ac Wireless Adapter	13
VMware Network Adapter	VMware Virtual Ethernet Adapter for ...	11
Ethernet 3	TunnelBear Adapter V9	10
Bluetooth Network Connection	Bluetooth Device (Personal Area Network)	4

If you're like me and have a ton of networking adapters, you include a search term for the name of the network adapter (in my case, NAT Network) you are looking for like this:

```
Get-NetAdapter | where {$_.Name -match 'NAT Network'}
```

This will give you a much cleaner result and only show the interface you are actually looking for (see image below)



Name	InterfaceDescription	ifIndex
vEthernet (NAT Network)	Hyper-V Virtual Ethernet Adapter #2	67

Next we need to create a gateway for our virtual switch. Remember the subnet we put into the notes of the virtual switch? We are going to use the 192.168.5.0/24 subnet. This means that all hosts and IP addresses on this network need to start with 192.168.5.X (x being any number from 0 - 255).

Our gateway is going to be .1. And the prefix length is the /24. This basically means the first 24 bits (first three octets) are part of the network address and not usable by hosts.

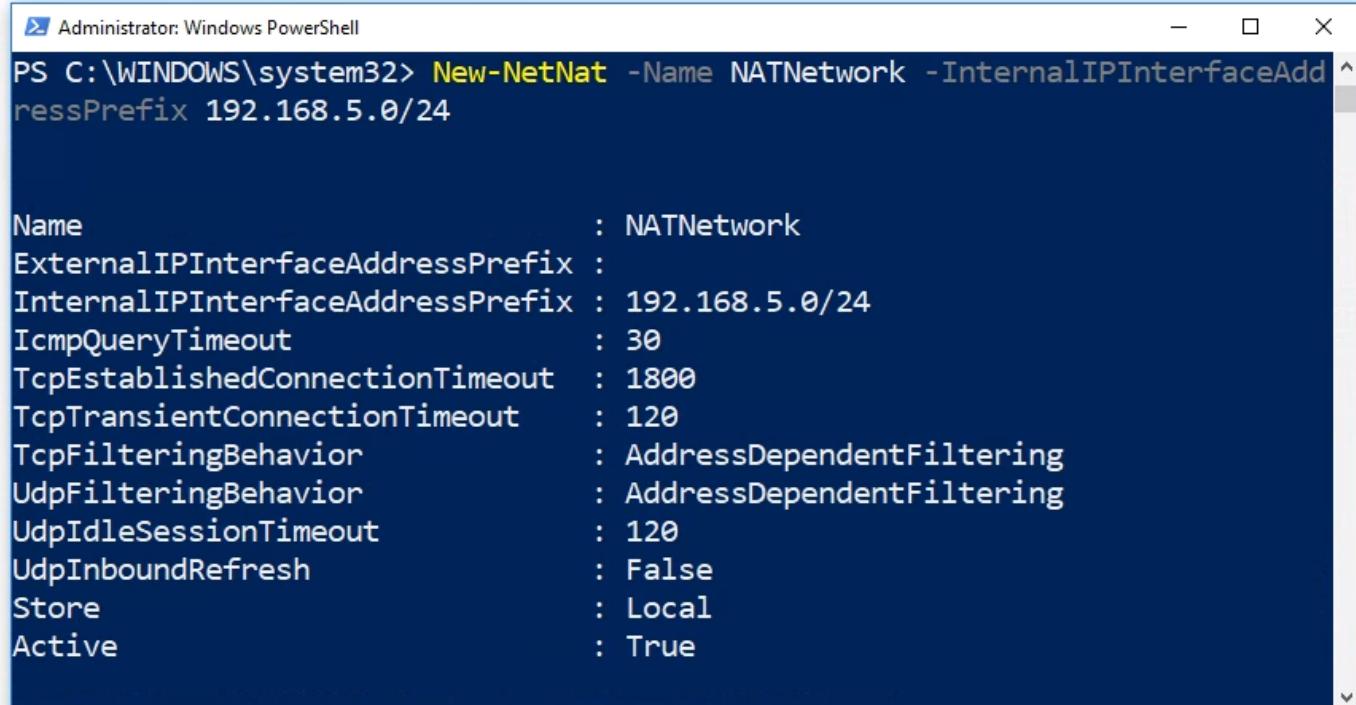
Execute the command below to create the new gateway:

```
New-NetIPAddress -IPAddress 192.168.5.1 -PrefixLength 24 -InterfaceIndex 67
```

Once this command completes, we now need to create the NAT between our gateway and our network. We can do this with the simple command below:

```
New-NetNat -Name NATNetwork -InternalIPInterfaceAddressPrefix 192.168.5.0/24
```

You should see output similar to that shown below:



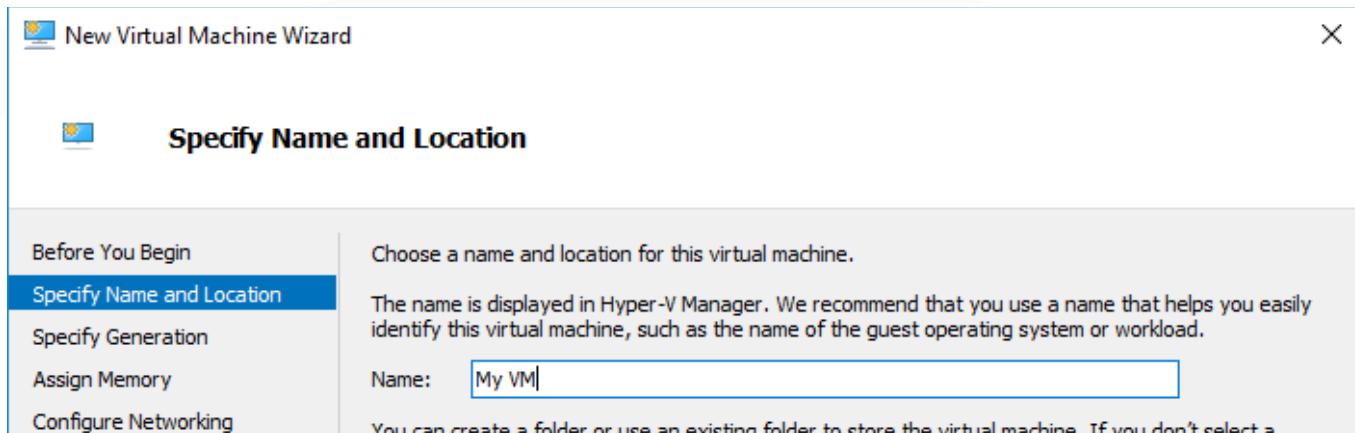
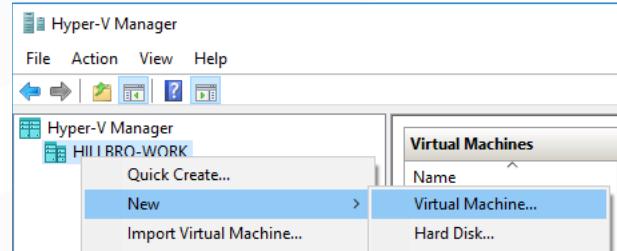
A screenshot of a Windows PowerShell window titled "Administrator: Windows PowerShell". The command entered is "New-NetNat -Name NATNetwork -InternalIPInterfaceAddressPrefix 192.168.5.0/24". Below the command, the resulting configuration parameters are displayed:

Name	:	NATNetwork
ExternalIPInterfaceAddressPrefix	:	
InternalIPInterfaceAddressPrefix	:	192.168.5.0/24
IcmpQueryTimeout	:	30
TcpEstablishedConnectionTimeout	:	1800
TcpTransientConnectionTimeout	:	120
TcpFilteringBehavior	:	AddressDependentFiltering
UdpFilteringBehavior	:	AddressDependentFiltering
UdpIdleSessionTimeout	:	120
UdpInboundRefresh	:	False
Store	:	Local
Active	:	True

When we are configuring our guest VMs that are using our new NAT Network, we will want to make sure that we remember these settings so we can successfully set TCP/IPv4 configurations on the VMs.

We can do this from the Hyper-V Manager by right-clicking on the host computer and selecting New > Virtual Machine.

This is going to open the "New Virtual Machine Wizard". Click next on the first page and enter a VM name and click next.



Most of the time you can use a Generation 1 VM, so you can go with the default settings and click next. On the "Assign Memory" screen you need to chose the amount of memory that you would like your VM to use.

Keep in mind that your VM can only use up to the amount of RAM that your host computer has. The number you pick will also determine how many VMs you wish to run. To make things simple, you could use 2GB of RAM or you could be more calculated about it and use a method like the one outline below.

Let's say our host computer has 10GB of RAM. We will use 70% of the RAM for the VMs and reserve 30% for our host computers. This means we will have 7GB for VMs and 3GB for our host computer.

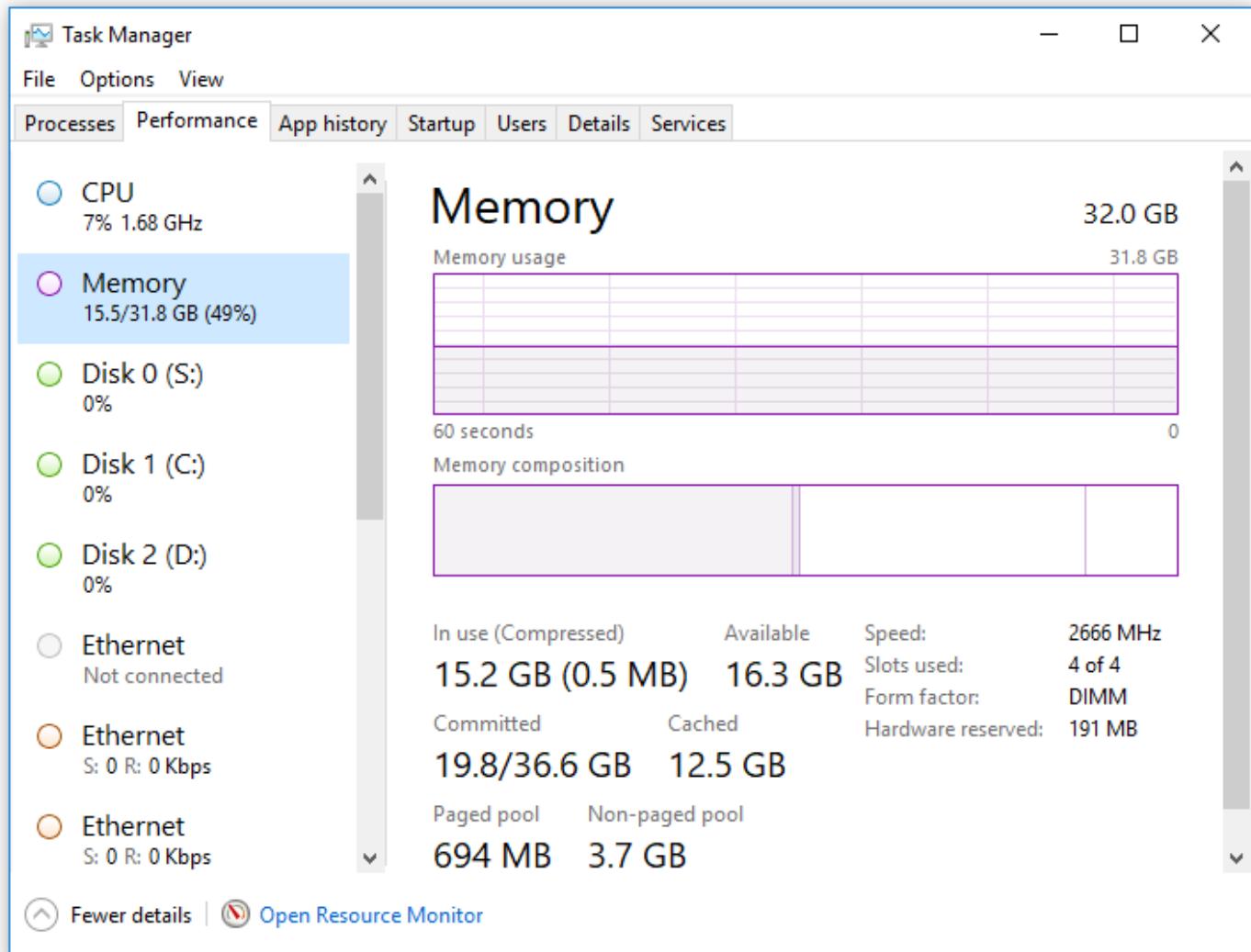
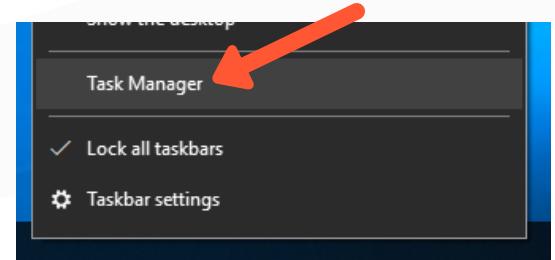
Keep in mind if 70% of your total RAM comes out to a fraction, it's OK to round up or down to keep from using weird numbers (like 3.3333 GB RAM per VM). Below are some examples you could use:

TOTAL RAM	# OF VMS	RAM PER VM	RESERVED RAM
12GB	2	4GB	4GB
12GB	4	2GB	4GB
4GB	1	2GB	2GB
4GB	2	1GB	2GB

Since you will most likely be using Windows 10 Pro to run Hyper-V, you'll notice that we break the 70% rule for the 4GB hosts. This is because Windows 10 requires a minimum of 2GB of RAM to operate - so you need to be aware of your operating systems minimum requirements before allocating memory.

Another easy way to figure out how much ram you should allocate to a VM is to open the task manager by right-clicking on your task bar and selecting "Task Manager".

From here you can navigate to the "Performance" tab and you'll be able to see how much RAM is actually being used by your operating system and how much is available for use.



Here we can see that I have 31.8 available and I am currently using 15.5GB. In this example, we could spare up to 16.3GB for VMs utilization. Simply dividing that number (round it down for some padding) by the number of VMs you want to use in your LAB environment will give you the magic number your host computer can afford to allocate for your VMs.

You should also consider the OS requirements when configuring the minimum amount of RAM for a new VM.

I plan on installing Windows Server which requires at least 800MB for a successful installation, so I will round that number up to 1GB of RAM.

NOTE

1GB of RAM equals 1024MB of RAM

Assign the amount of RAM you would like to use and click "Next". On the next screen you need to select the network you to use.

In the previous sections we setup an internal virtual switch called "NAT Network" that will provide internet connectivity to our VMs. Chose this option and click "Next."

The next screen requires that we configure the virtual hard disk drive we want to use for the VM. We have three options we can chose; Create a new hard disk now, use an existing hard disk or attach one later. Since this is our first VM, we are going to create a new one now.

Notice that the size is set by default to 127GB. You can change this size if you would like. These drives are thin provisioned which means the actual hard disk file will be as small as possible. If you only store 5GB of data on the virtual hard disk, then the hard disk file will only be 5GB - all the way up to a maximum of 127GB.

A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties.

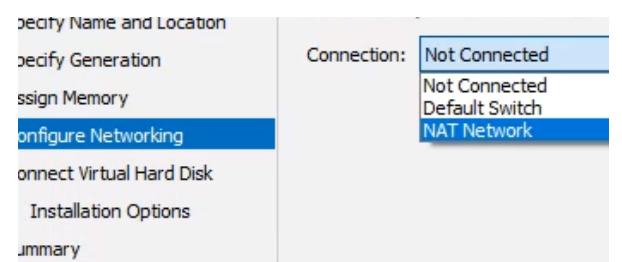
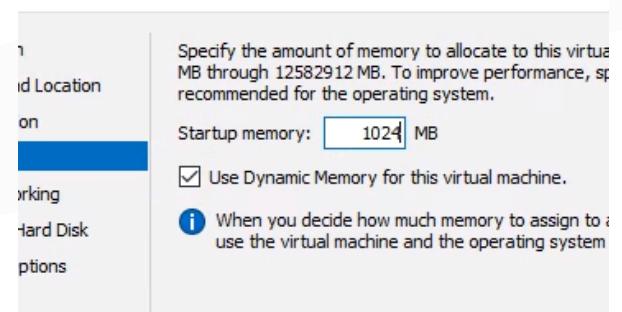
Create a virtual hard disk
Use this option to create a VHDX dynamically expanding virtual hard disk.

Name:
Location:
Size: GB (Maximum: 64 TB)

Use an existing virtual hard disk
Use this option to attach an existing virtual hard disk, either VHD or VHDX format.
Location:

Attach a virtual hard disk later
Use this option to skip this step now and attach an existing virtual hard disk later.

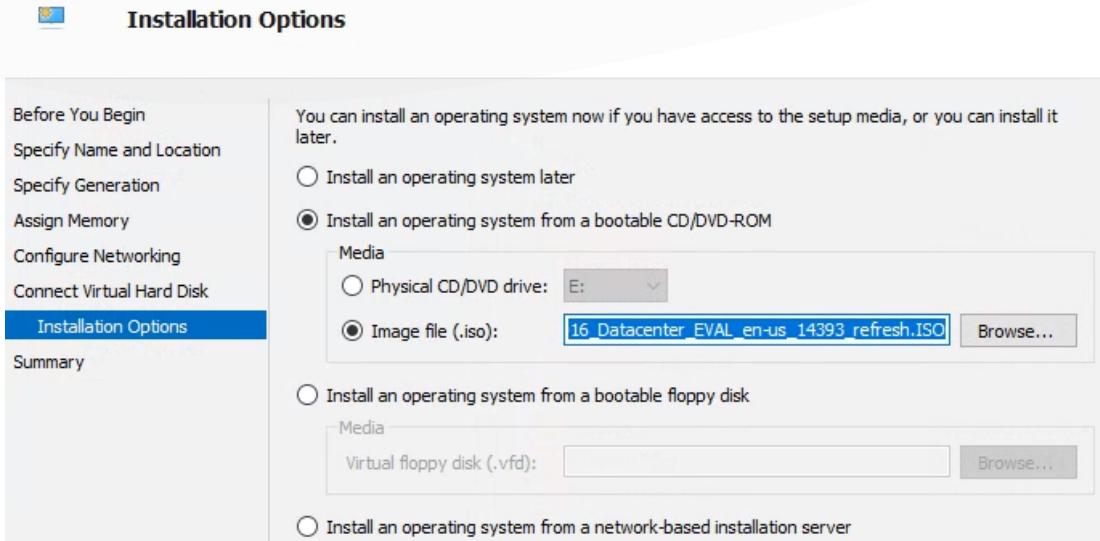
Assign Memory



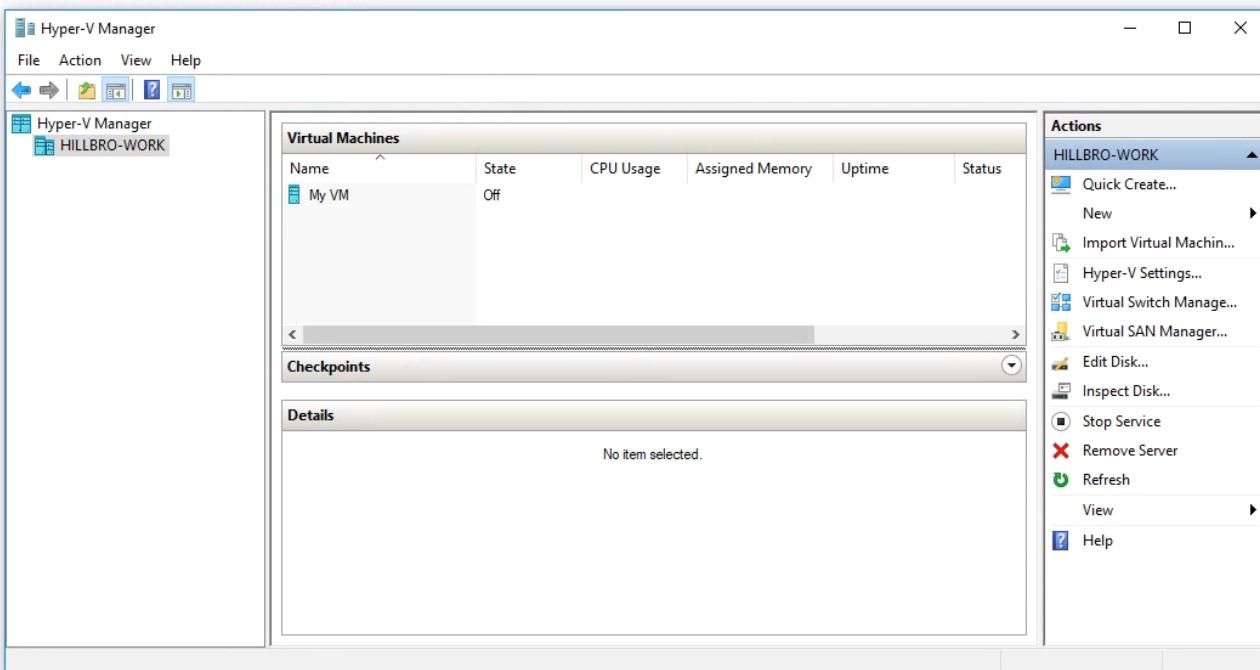
On the "Installation Options" screen you can connect the installation media or ISO of the operating system you wish to install. We have four options shown in the image below. You can chose to install an OS later, from the physical drive on your host computer, or a network-based installation.

You can download the Windows Server 2016 ISO at the URL below:

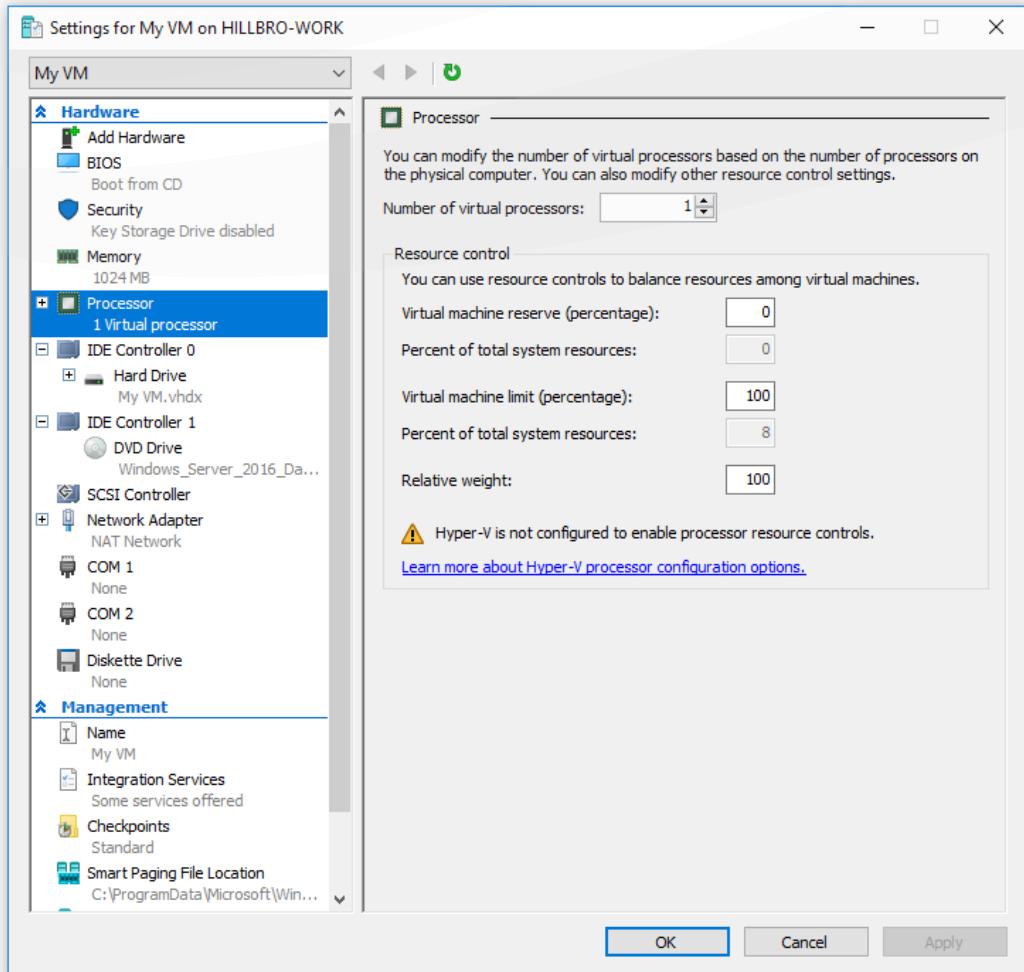
<https://www.microsoft.com/en-us/evalcenter/evaluate-windows-server-2016?filetype=ISO>



We have attached the ISO for Windows Server 2016 and we will click "Next" to move on to the Summary page and then we will click Finish. Now you can see the new VM listed under the Hyper-V Manager.

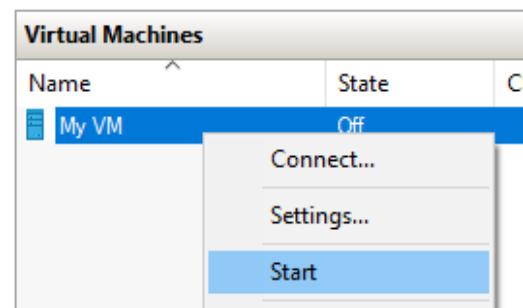


If you want to make further modifications you can do so by right-clicking on the VM and selecting "Settings". One way to improve the performance of your VM is by increasing the number of virtual processors.



Make any additional changes you may want, then click OK. Once you're ready, right-click the VM and select "Start".

At this point you will be ready to install your guest operating system but before we do that, we want to provide an alternative lab solution for those who don't have access to Hyper-V.



CREATING AN IT LAB WITH VIRTUALBOX

In this chapter we are going to discuss how to build an IT lab with VirtualBox. This process is very similar to Hyper-V (as all hypervisors are). If you already set up your lab with Hyper-V, then you may skip on to the next chapter (Installing Windows Server).

NOTE

You need to make sure that the Hyper-V feature is disabled before attempting to use VirtualBox!

You can turn this off by clicking the Windows button and searching for "Features".

This search should return the "Turn Windows Features on or off" which will allow you to uncheck the Hyper-V feature (which may or may not already be enabled). If you turn it off, it will require a reboot.

You can download VirtualBox at this link:

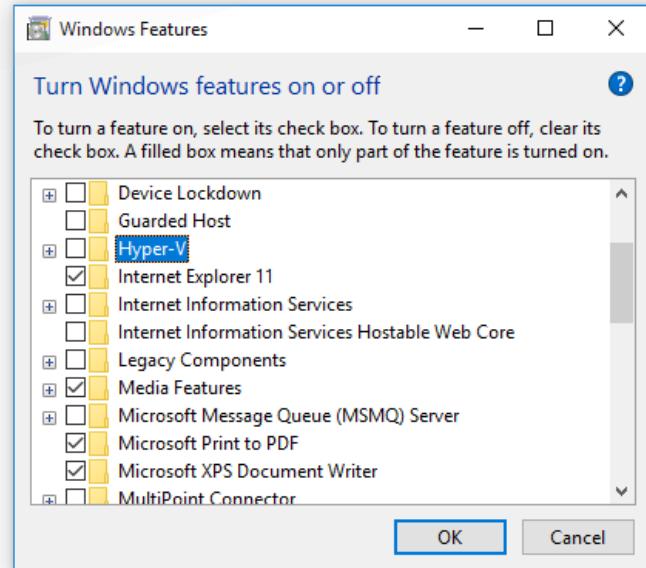
<https://www.virtualbox.org/wiki/Downloads>

From this page you will select the platform that is appropriate for you. We are using Windows 10 so we will select the "Windows hosts" option to start the download.

Launch the installation file once the download is complete. We are going to proceed with the default options and keep clicking next or yes until we finally reach the "Ready to Install" page.

Click Install and proceed with the installation. You may be requested to install or trust device hardware / software - be sure you click yes or install so you won't experience future issues when using VirtualBox.

We are installing version 6.0.10 and there is probably a newer version available by now, but even on newer versions you will be able to follow along with this tutorial.



VirtualBox 6.0.10 platform packages

- ⇒ Windows hosts
- ⇒ OS X hosts
- Linux distributions
- ⇒ Solaris hosts

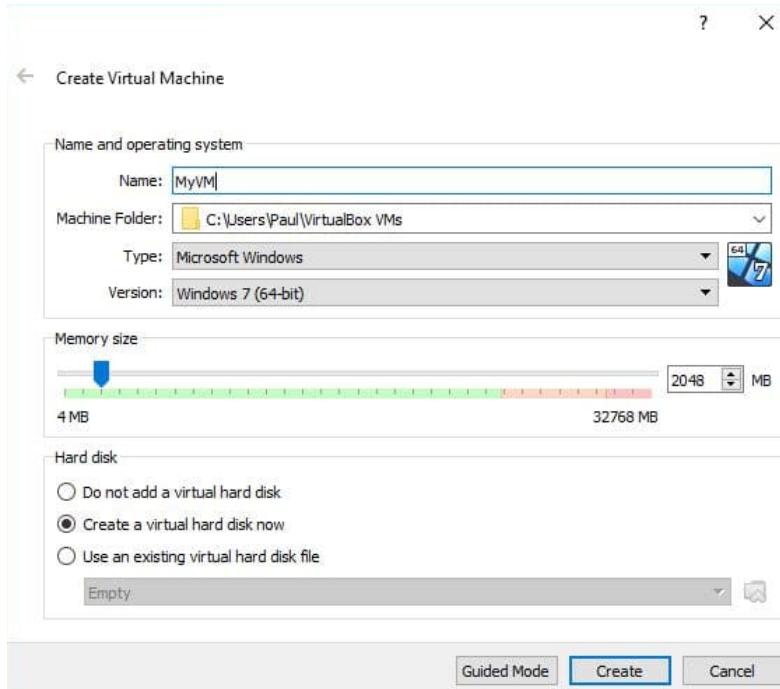


Once the installation is complete, double-click the "Oracle VM VirtualBox" icon to launch VirtualBox.

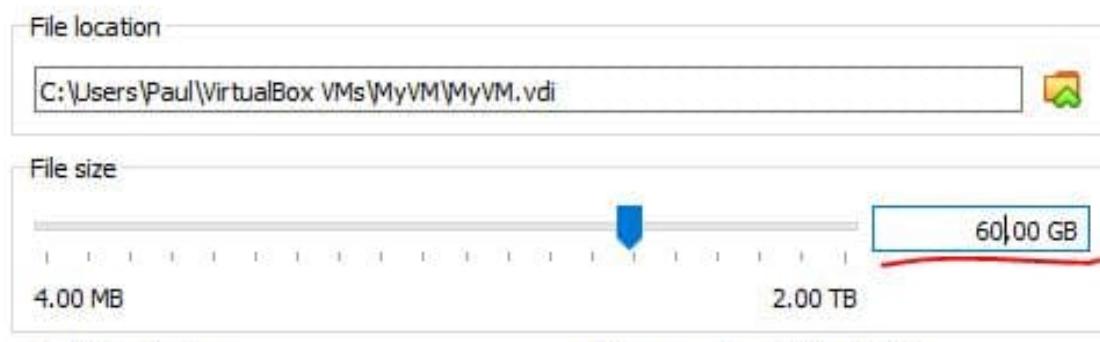
From here, we need to create a new VM. You can do this by clicking the "New" button as shown below:

This will open the "Create Virtual Machine" dialog. The first thing you want to do is click the "Expert Mode" button. This allows us to create a VM in less pages than the default Guided Mode.

From here you can specify the VM Name, RAM and whether or not you want to create a new hard disk. Once you have made all of these selections you can click "Create" to make the Hard Disk.



On the next screen all you need to change is the "File size" of our Hard Disk. I am going to chose 60.00GB and click "Create".



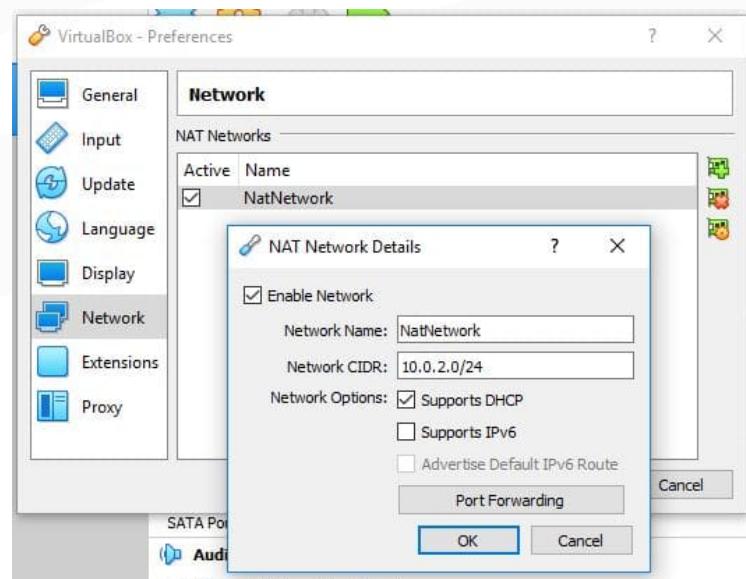
Now you will see the VM listed in your inventory. Just like with Hyper-V, you can right-click on the VM and complete a series of options like Start, Remove, Clone, etc...

Now we need to create a NAT network which is thankfully easier in VirtualBox than Hyper-V. Additionally we are not limited to creating only one VirtualBox.

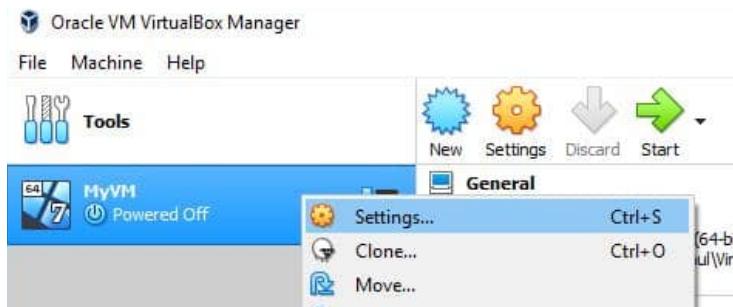
Select File > Preferences and navigate to the "Network" tab. From here, click the green plus button to create a new NAT network.

From here we can specify the name of the network as well as the network subnet (specified as Network CIDR). I am going to use the 10.0.2.0/24 subnet and will leave the "Supports DHCP" checkbox selected then I will click OK.

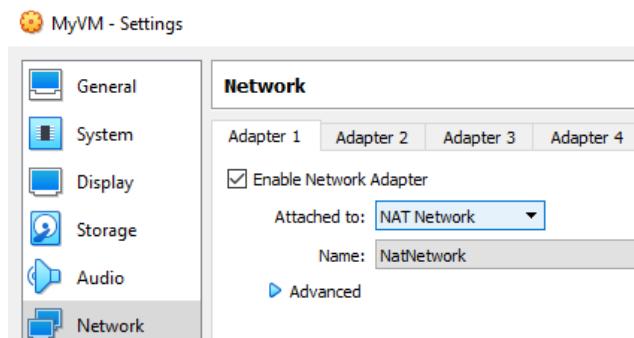
From this point we just need to connect our VM to the NAT Network and attach the installation media (ISO) we want to use for this VM.



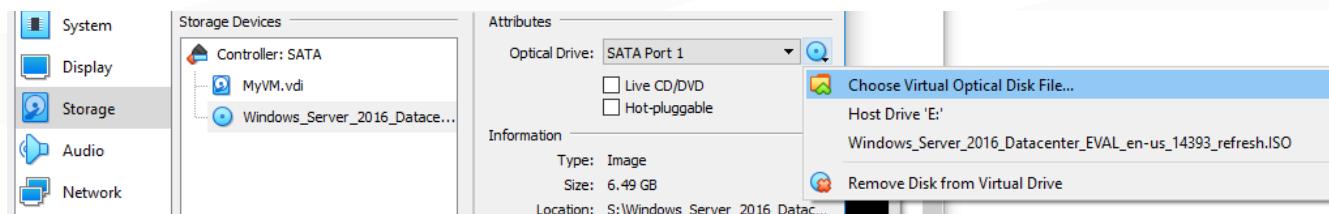
Right-click on the VM and select Settings.



Navigate down to the Network tab and change the "Attached to" drop-down from NAT to NAT Network. Next under the "Name" select the new NAT network you just created.



Under the VM settings, click the Storage tab and select the disk icon (circled in red in the image below) and select "Choose Virtual Optical Disk File..."



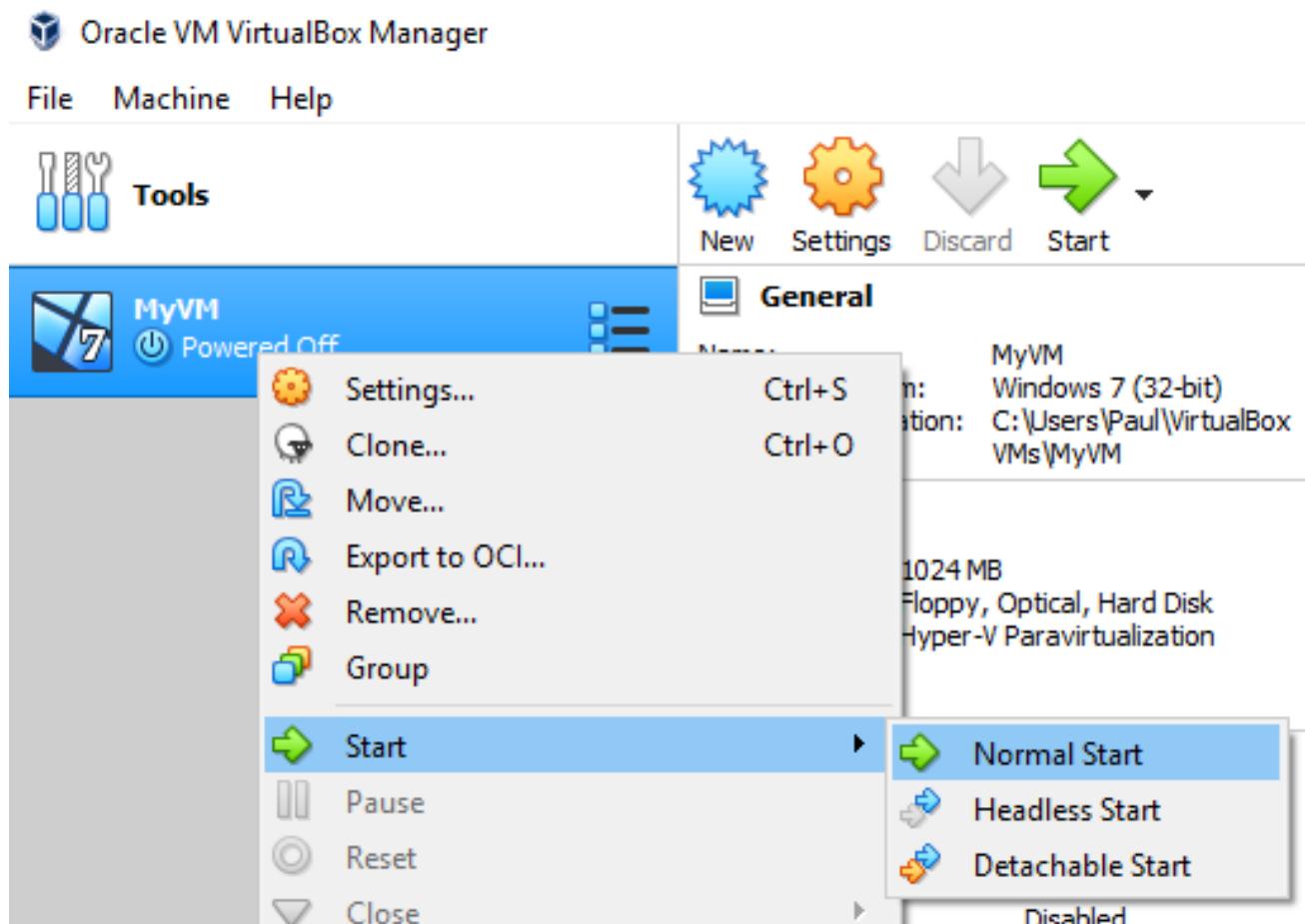
If you haven't downloaded the Windows Server 2016 ISO yet, you can download it at the URL below:

<https://www.microsoft.com/en-us/evalcenter/evaluate-windows-server-2016?filetype=ISO>

From here just navigate to the ISO you wish to mount to the VM. Once you selected the ISO click OK and save the settings.

At this point we are ready to launch the VMs. Regardless of whether you are using VirtualBox, Hyper-V, Windows or Linux, once you launch the VMs the steps covered in the next chapter will be the same.

To start a VM in VirtualBox you just need to right-click on the VM and select Start > Normal Start.

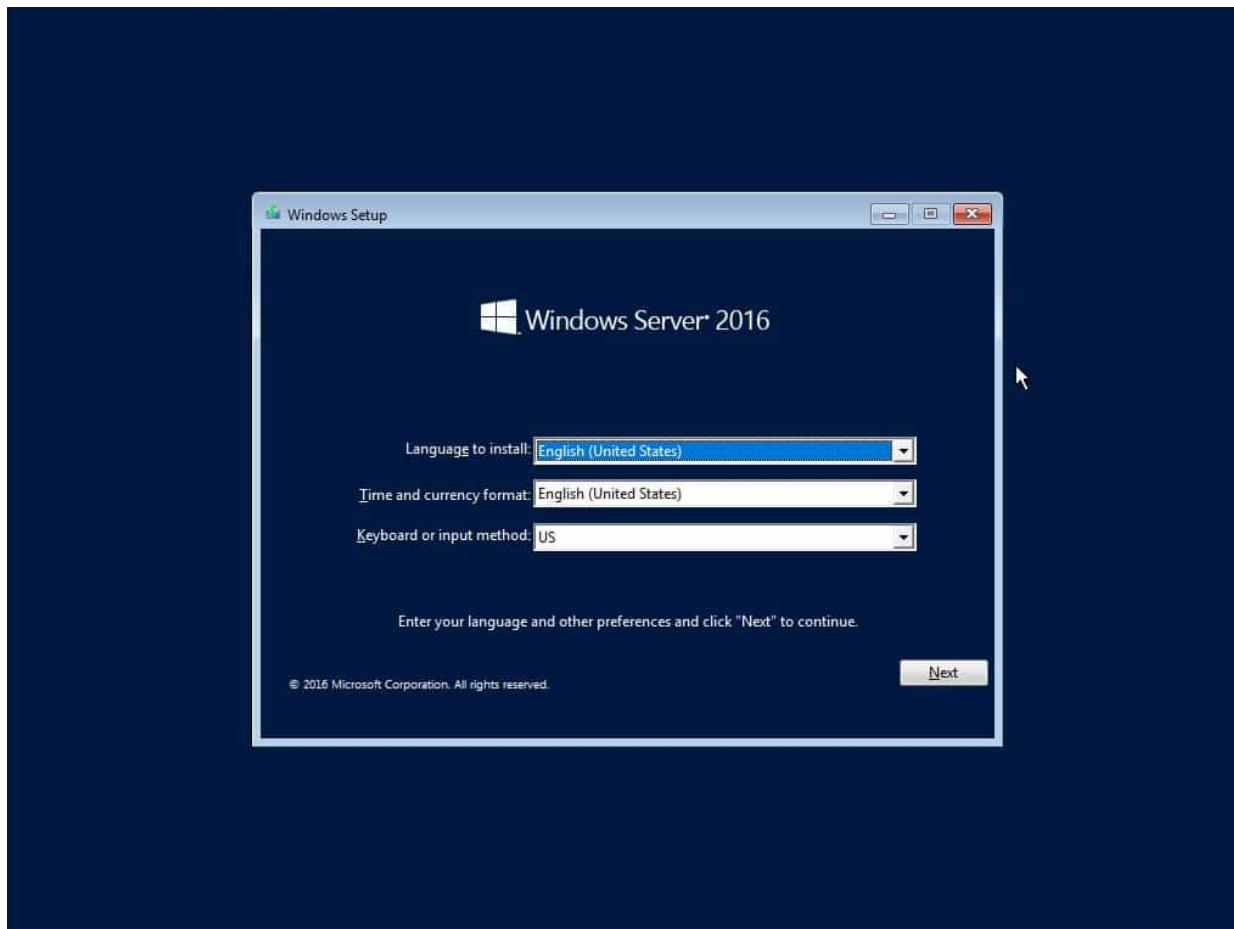


INSTALLING WINDOWS SERVER

Now that you have created your IT lab, it's now time to install Windows Server. You are of course free to install any OS you want and I strongly recommend that you install other operating systems like Centos 7 Server or Ubuntu.

In the previous two sections you learned how to build an IT lab in either Hyper-V or VirtualBox. At this point you should have your VM and virtual network created and configured as well as the Windows Server 2016 ISO mounted to the VM.

Go ahead and start the VM. This will initiate the Windows Server 2016 installation



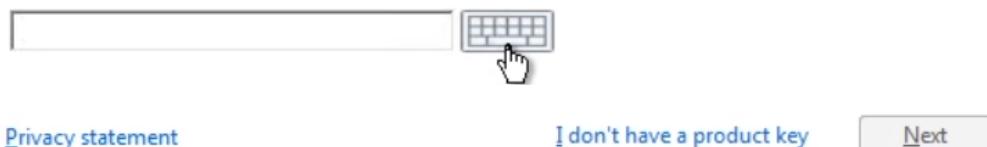
Click "Install Now". On the next screen you can enter your license key if you have one - if not click the "I don't have a product key" text at the bottom of the screen.

Activate Windows

If this is the first time you're installing Windows on this PC (or you're installing a different edition), you need to enter a valid Windows product key. Your product key should be in the confirmation email you received after buying a digital copy of Windows or on a label inside the box that Windows came in.

The product key looks like this: XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

If you're reinstalling Windows, select I don't have a product key. Your copy of Windows will be automatically activated later.



On the next screen you will be asked to select the operating system you want to install.

Select the operating system you want to install

Operating system	Architecture	Date modified
Windows Server 2016 Standard	x64	9/12/2016
Windows Server 2016 Standard (Desktop Experience)	x64	9/12/2016
Windows Server 2016 Datacenter	x64	9/12/2016
Windows Server 2016 Datacenter (Desktop Experience)	x64	9/12/2016

Here is an overview of the different versions you could install:

Standard

The standard version of Windows Server is designed for small businesses.

Datacenter

This is designed for big business and large data center deployments.

Desktop Experience

The desktop experience is the MOST commonly installed version of Windows Server.

Server Core

This is a command-line version only. You install it by selecting anything other than "(Desktop Experience)".

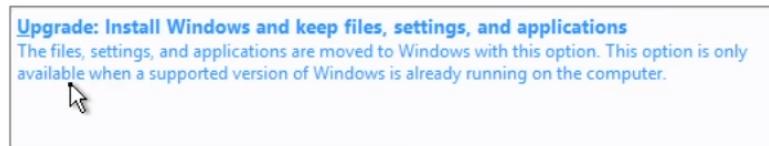
For this tutorial you will want to make sure you install the "Desktop Experience". It doesn't matter if you chose Standard or Data center. That is entirely up to you.

Click Next, and on the next screen accept the license terms and click Next again

On the next screen you need to chose the type of installation you want. Since this is a fresh VM with no previous Windows installation, we cannot chose to complete an Upgrade.

Instead we need to select "Custom" and proceed to the next screen.

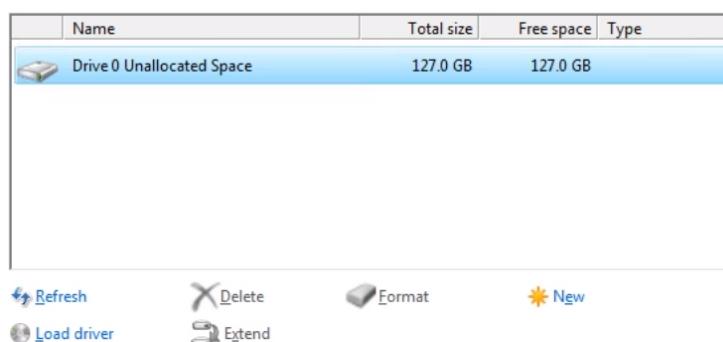
Which type of installation do you want?



Custom: Install Windows only (advanced)
The files, settings, and applications aren't moved to Windows with this option. If you want to make changes to partitions and drives, start the computer using the installation disc. We recommend backing up your files before you continue.

Now you will be able to chose the drive you want to install Windows Server on. You should only have one option available since we only created one hard disk file.

Where do you want to install Windows?



Click Next and now you just need to wait for the installation to finish.

Installing Windows

Status

✓ Copying Windows files
Getting files ready for installation (0%)
Installing features
Installing updates
Finishing up

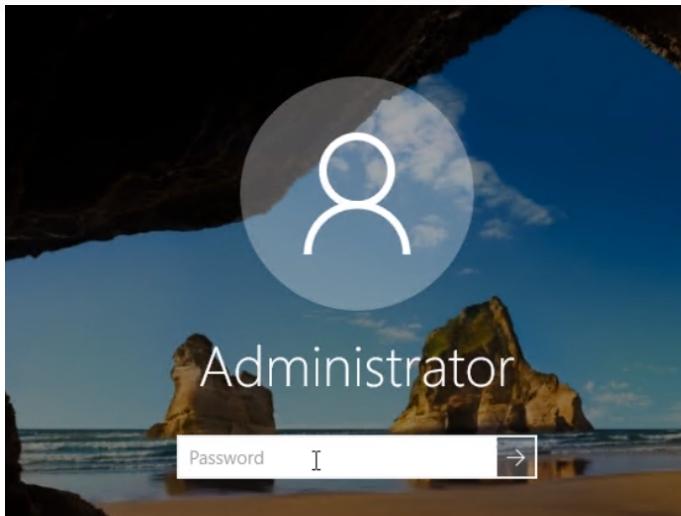
After this process completes, you will be required to configure the password for the default administrator account. This password is extremely important, so be sure you use a password that you will remember in the future.

Customize settings

Type a password for the built-in administrator account that you can use to sign in to this computer.

User name	Administrator
Password	*****
Reenter password	*****

Enter the password you wish to use and click "Finish". Now you can log into the Administrator account with the password you just created.



Once you log in and are brought to the desktop, Server Manager should automatically open. From here we need to complete a couple of actions:

- Change the server name
- Configure the IP settings

From Server Manager, select the "Local Server" tab. Here you can click the blue text to change the "Computer Name" or the "Ethernet" (network configuration). Select the IPv4 as shown in the image below:

 A screenshot of the Microsoft Server Manager interface. The left sidebar shows navigation links: Dashboard, Local Server (which is selected and highlighted in blue), All Servers, and File and Storage Services. The main content area has a title bar "PROPERTIES For WIN-JBQRFL0T7VJ". It displays several configuration items in a table format:

Computer name	WIN-JBQRFL0T7VJ
Workgroup	WORKGROUP
Windows Firewall	Public: On
Remote management	Enabled
Remote Desktop	Disabled
NIC Teaming	Disabled
Ethernet	IPv4 address assigned by DHCP, IPv6 enabled

 A mouse cursor is hovering over the link "IPv4 address assigned by DHCP, IPv6 enabled" under the Ethernet section.

From here, disable "Internet Protocol Version 6" since you will not be using it. Next, select version 4, then click on Properties.

This will allow you to manually configure a static IP address. Since we don't have any type of DHCP server we must assign a static IP address.

If you remember, we created a NAT Network with the following details:

Network ID

10.0.2.0

Subnet Mask

255.255.255.0

Default Gateway

10.0.2.1

We can use this information to fill out the settings on our server. For the IP address field, we need to chose any IP from 10.0.2.1 - 10.0.2.254. I am going to use 10.0.2.10.

Enter the subnet mask and default gateway outlined above.

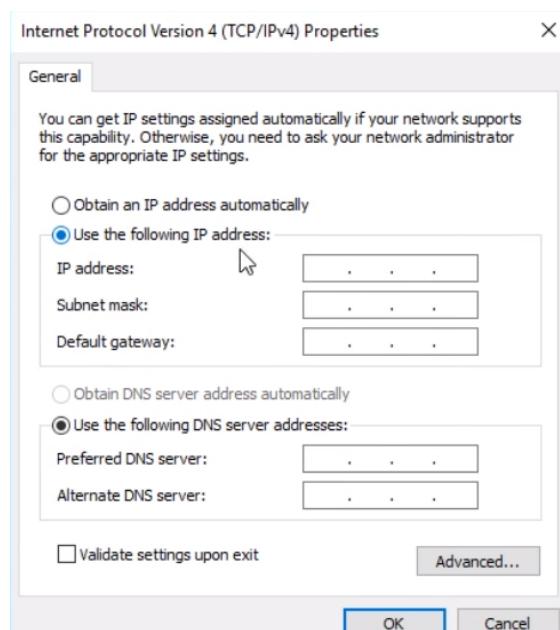
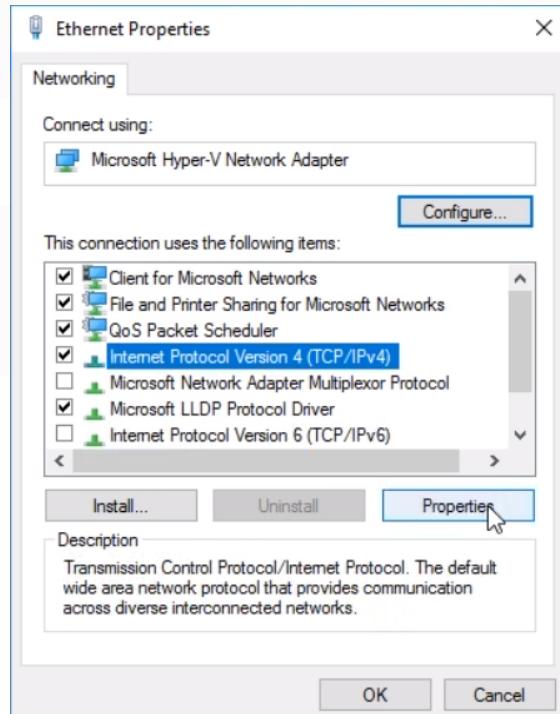
Since we don't have a DNS server configured yet, we can use Google's DNS servers which are 8.8.8.8

We don't need to enter anything into the "Alternative DNS server" field.

Click OK to close the window, and again click OK to close the "Ethernet Properties" window.

You can test the network configuration by clicking "Start" and searching for and launching "CMD". From here, you can type "ipconfig" to verify that the IP address of the server is the same as what you just configured.

Next, run "ping google.com" and make sure you get a response from the server.



```
C:\Users\Administrator>ping google.com

Pinging google.com [172.217.7.206] with 32 bytes of data:
Reply from 172.217.7.206: bytes=32 time=6ms TTL=56
Reply from 172.217.7.206: bytes=32 time=6ms TTL=56
Reply from 172.217.7.206: bytes=32 time=6ms TTL=56
Reply from 172.217.7.206: bytes=32 time=5ms TTL=56

Ping statistics for 172.217.7.206:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

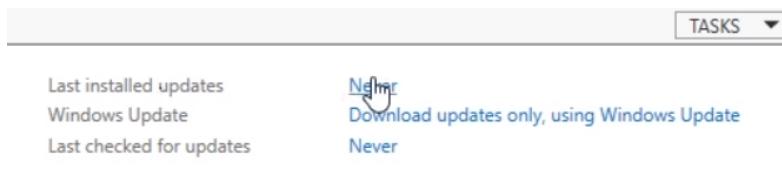
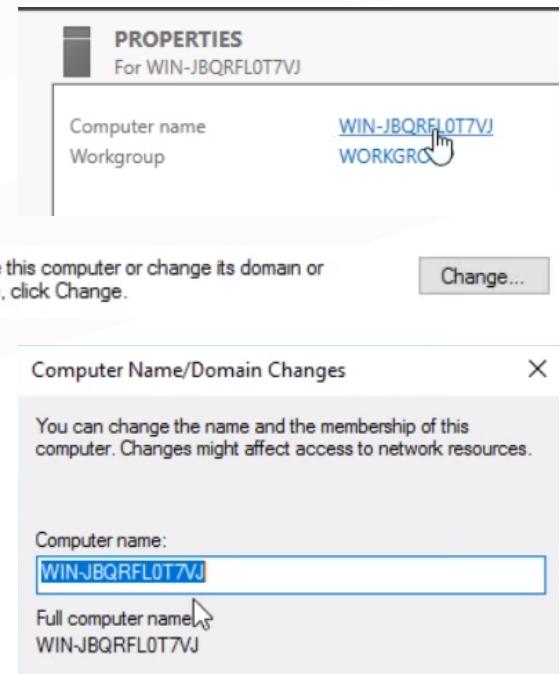
Now we need to rename the computer. Go back to Server Manager and click the blue text near "Computer Name".

This will open the System Properties. From here, click the "Change" button to rename the computer.

From here you can type in a new computer name.

You can also join the computer to a domain or change the workgroup if you would like. We haven't created a domain or a workgroup so you will just change the computer name then click OK.

The last thing you will want to do for your VM is run Windows Update. This can be done by clicking the blue text near "Last installed updates".



Click the "Check for updates" button and Windows will begin to update.

Update status

No updates are available. We'll continue to check daily for newer updates.

[Check for updates](#)

From this point on you have successfully installed Windows Server and created your IT lab! A couple things you can do from this point on is to install and configure some of the following Server Roles:

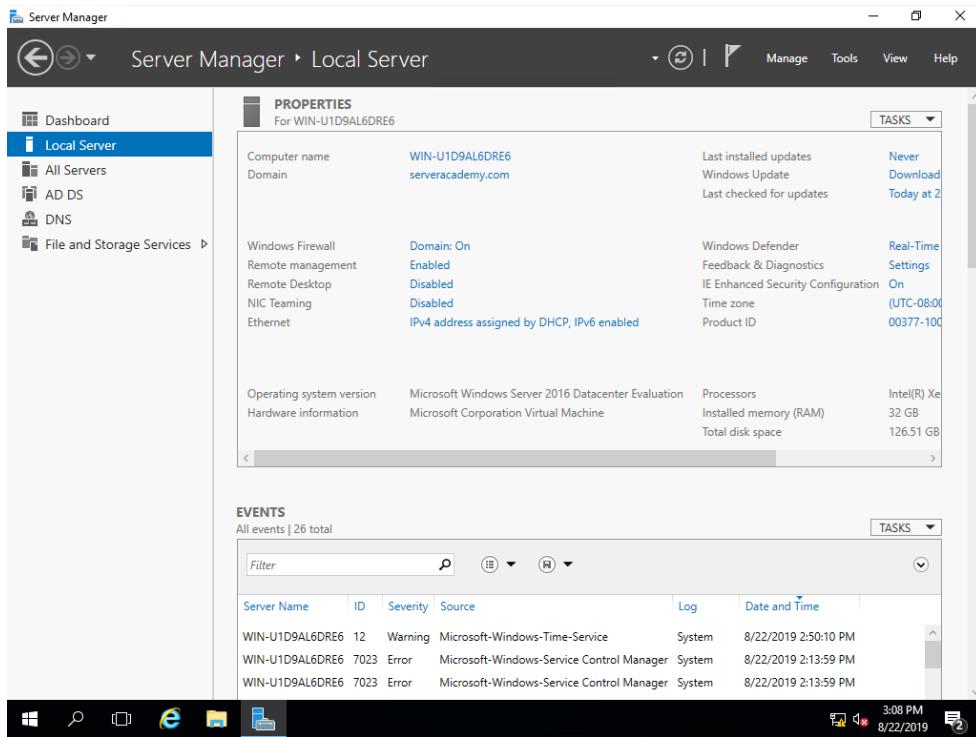
- Active Directory Domain Services (build a Windows domain)
- DNS
- DHCP
- WSUS
- etc...

In later chapters you will learning more about Active Directory and Windows Server administration, but for now we are going to move on to installing and administering Windows 10.

WINDOWS SERVER ADMINISTRATION BASICS

Windows Server is a modular platform for deploying IT services. The basic idea is that you deploy the base operating system, then you add server roles and features to provide more services to your network.

This is all done with a tool called "Server Manager". Server Manager is where you open tools, make configuration changes, stop or restart Windows services, manage remote servers and much more.



The "Local Server" tab is where you can change the name, IP address, firewall and other settings. You can manage remote servers by right-clicking the "All Servers" tab and selecting "Add Servers".



We don't have any remote servers to add - so this is not N/A to us right now.

The other tabs you will see will depend on what server roles you have installed on the Server. We will mostly be spending our time in the "Local Server" tab for this ebook.

INSTALLING SERVER ROLES

In this chapter you are going to learn how to install Server Roles. Before we start, there are some common server roles that you need to be familiar with:

Active Directory Domain Services

The ADDS server role is used to create and manage Windows domains. When you install this role, you build a Windows Domain and the Active Directory and Group Policy tools are installed.

DNS (Domain Name System)

The DNS server role allows computer IP address and name resolution. This server role is automatically installed when you install the AD DS server role. Anytime computers needs to communicate they are likely using DNS.

DHCP (Dynamic Host Configuration Protocol)

The DHCP server role automatically configures computer IP addresses on your network. Generally DHCP will only service workstations or computers and is used to simplify the process of connecting a desktop or laptop to your network.

WSUS (Windows Server Update Services)

The WSUS role allows you to manage and deploy Windows updates to your domain computers. You can do things like force computers to install important security updates and exclude certain updates from being installed on certain computers.

WDS (Windows Deployment Services)

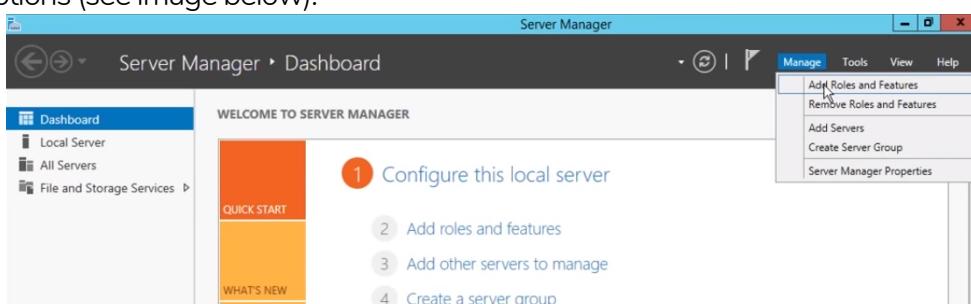
WDS allows you to deploy operating systems remotely. WDS automates most of the installation process and allows the administrator to avoid installing the OS while being physically present at the computer.

IIS (Internet Information Services)

The IIS server role allows your server to host HTTP/s, FTP/s, SMTP and NNTP protocols. This role transforms your server into a Web Server.

Keep in mind that there are many more services that we didn't list here that you will encounter while working in the IT field.

Server roles and features are installed and uninstalled from Server Manager under the Manage drop-down menu options (see image below).



When you open the "Add Roles and Features" window you will need to specify a few things:

Installation Type

You have two options here, Role or feature based or Remote Desktop Services. Nine times out of ten you will be selecting the "Role-based or feature-based installation" type. The "Remote Desktop Services installation" is a specialized option that is out of the scope of this book.

Server Selection

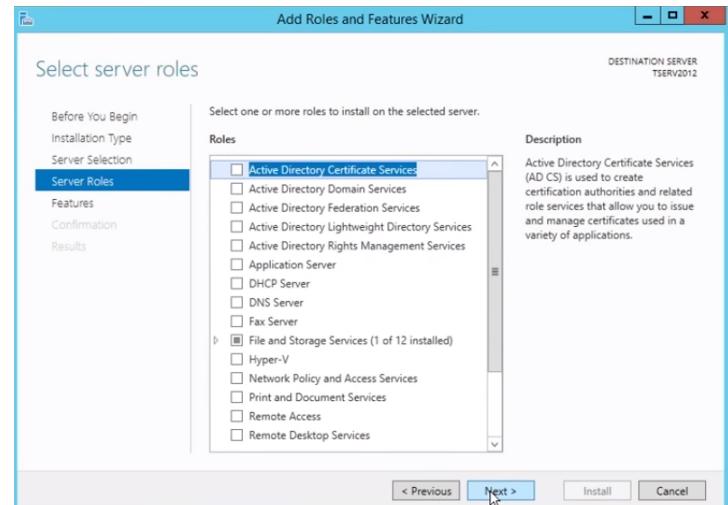
This screen allows you to chose if you want to install roles and features on the local server you are logged into or a remote server. Note that before a remote server will appear in the list you have to configure it under the "All Servers" page of Server Manager.

Server Roles

This is the page where you will select the server roles you want to install on the target server. All you need to do is click a checkbox next to the role you want to add and click Next.

Features

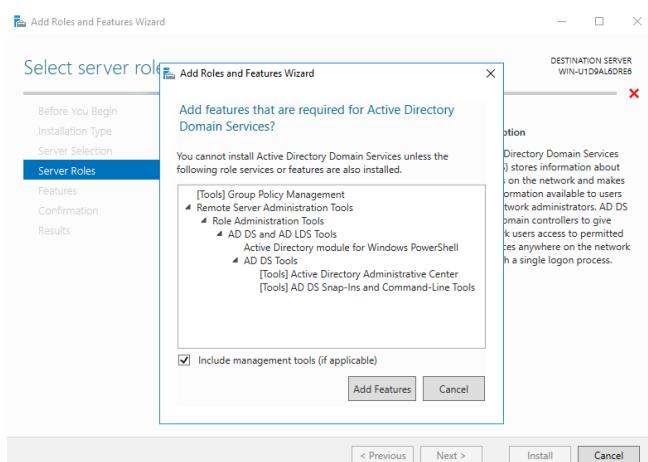
Server features can include things like the .NET framework, BitLocker and the Remote Server Administration Toolset (RSAT) to name a few.



Once you make the selections you want, you simply need to click "Install" and your selected roles and features will be installed on the Server. Some server roles will require a reboot to complete the installation so be prepared for that.

We are going to walk you through installing the ADDS server role so you can get some experience with Active Directory. There is a lot of information that we are going to skip over in this eBook to keep things simple.

Let's get started by opening Server Manager and opening the "Add Roles and Features" wizard, then clicking selecting the "Active Directory Domain Services Role". When you click on the role checkbox, a window will appear asking you to add required features for the role:



All of the items listed are role services or features that are required for the server role to be installed. Click the "Add Features" button then click next until you get to the "Confirmation" page and finally click "Install".

The installation will begin and now we just need to wait for it to complete.

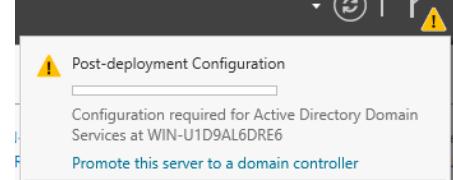
After the installation has completed we will need to launch a post installation configuration wizard to complete our deployment.

Click close on the installation window (the install will run in the background). When it's complete look for a yellow notification triangle at the top of Server Manager (see image on the right):



Click on this triangle and click the blue text "Promote this server to a domain controller".

From here you need to select "Add a new forest" and type in a new domain name. This domain will be local, so you can make it anything you want and it will not be accessible from the internet.



Active Directory Domain Services Configuration Wizard

Deployment Configuration

TARGET SERVER
WIN-U1D9AL6DRE6

Deployment Configuration

- Domain Controller Options
- Additional Options
- Paths
- Review Options
- Prerequisites Check
- Installation
- Results

Select the deployment operation

Add a domain controller to an existing domain

Add a new domain to an existing forest

Add a new forest

Specify the domain information for this operation

Root domain name:

More about deployment configurations

< Previous Next > Install Cancel

I am going to enter "serveracademy.com" and click Next.

On the next screen, type in a Directory Services Restore Mode password and click Next.

Type the Directory Services Restore Mode (DSRM) password

Password:

A password field containing eight black dots.

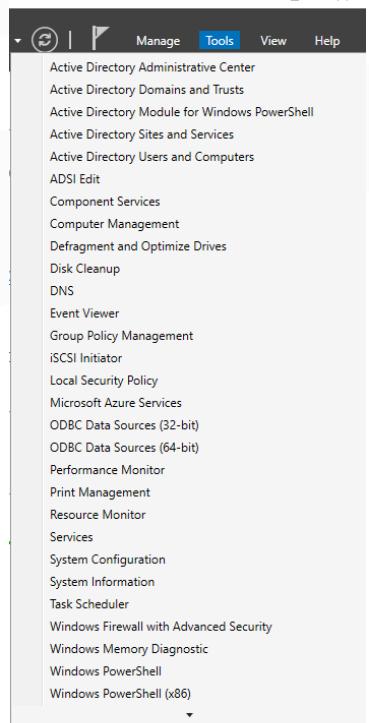
Confirm password:

A password field containing eight black dots.

Now just keep clicking next until you get to the "Prerequisites Check" page. Once the checks are complete, click the "Install" button and wait for the installation to finish.

Once the installation is complete your server will reboot and you will have successfully created a Windows Active Directory domain and configured a domain controller.

You will notice when you open the "Tools" drop down you will see many more tools including Active Directory Users and Computers, Group Policy Management, DNS and much more.



CREATING AND MANAGING ACTIVE DIRECTORY USER ACCOUNTS

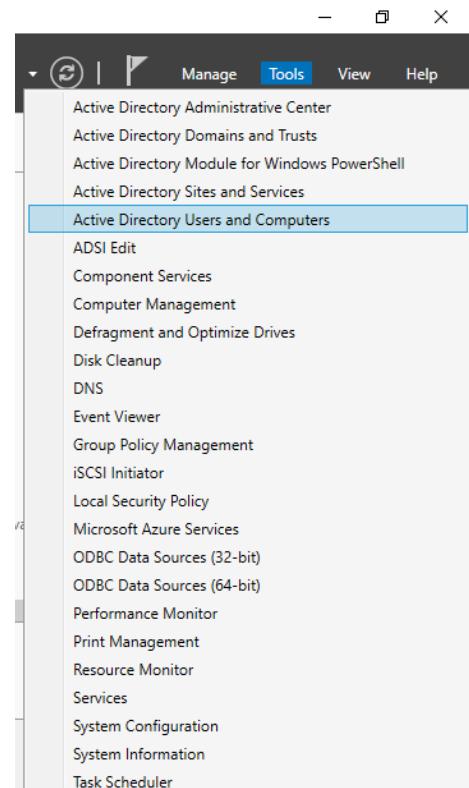
Active Directory is a tool used to administrate your domain users accounts and computers. You can use it to create new user accounts, reset user passwords, manage computer accounts, file shares, shared printers and much more.

Active Directory can be launched from Server Manager by clicking "Active Directory Users and Computers".

The Active Directory console will open. You should see the name of your domain that you created when you installed the ADDS server role. If you expand the domain you will see a series of organizational units and containers.

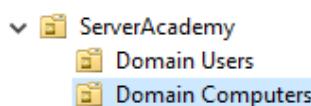
The screenshot shows the Active Directory Users and Computers console. On the left, the navigation pane shows the domain structure under 'serveracademy.com'. Under 'Domain Controllers', there are several containers: Builtin, Computers, Domain Con., ForeignSecu., Managed Se., and Users. The 'Users' container is selected. On the right, a table lists these containers with their names, types, and descriptions.

Name	Type	Description
Builtin	builtInDomain	Default container for up...
Computers	Container	Default container for do...
Domain Con...	Organizational...	Default container for do...
ForeignSecu...	Container	Default container for sec...
Managed Se...	Container	Default container for ma...
Users	Container	Default container for up...



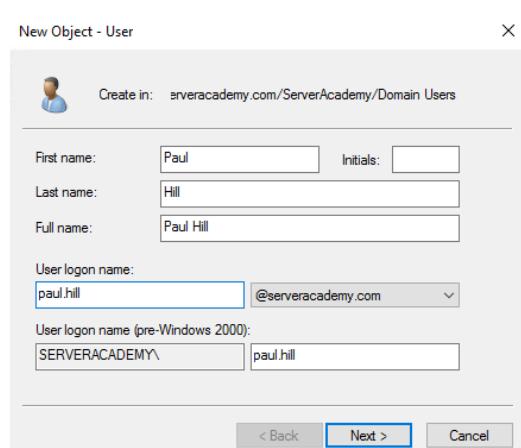
Let's start by creating a few Organizational Units. You can do this by right-clicking your domain name and selecting New > Organizational Unit. Create the following OU structure:

- ServerAcademy
 - Domain Users
 - Domain Computers



Now right-click the ServerAcademy OU and chose New > User. I am going to create a new user called "paul.hill" (see image on the right).

Click next and create a password for the user account. Click next again then finish.



This user account can now be used to access computers that are joined to your domain. Right now our domain is only made up of our domain controller and by default regular user accounts cannot log into Domain Controllers.

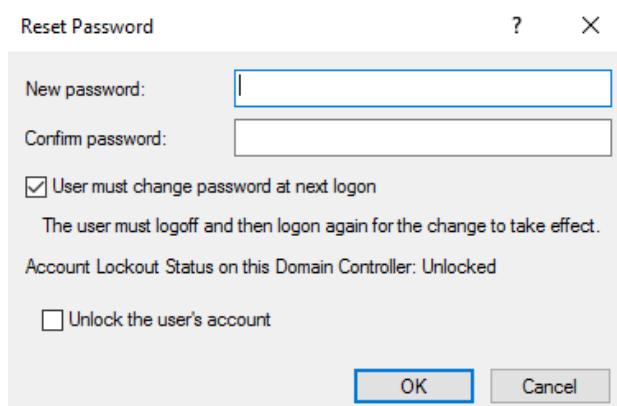
Let's update the user account and add the account to the Domain Admins group. This will allow our new user account to log into the domain controllers as well as having administrative rights over the entire domain. Keep in mind, in the real world you only want to grant this right to privileged users.

Right-click on the user and select "Properties". Next, click the "Member Of" tab.

This is where you can view what groups this user account is a member of. Click the Add button and search for "Domain Admins",

You can click OK to close the Window and now you are free to login using this new user account.

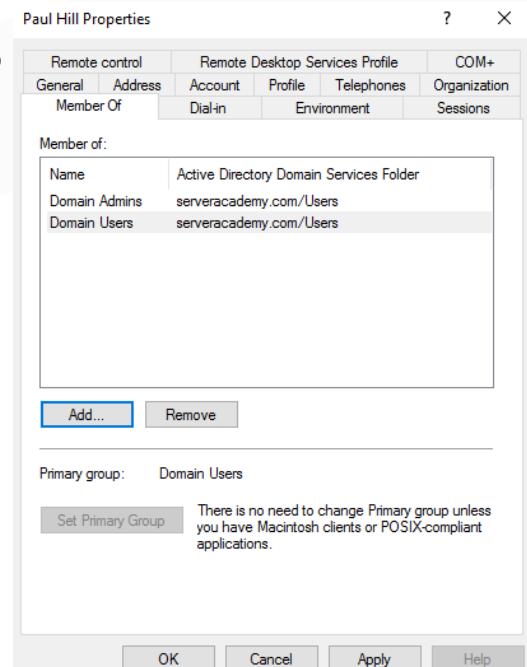
Another very common task that you'll need to complete is resetting user passwords. You can reset a user password by right-clicking on them in Active Directory and selecting "Reset Password".



You need to type in the user password two times (to confirm there were not any errors). There are two checkbox options you can select from this point.

The first will force the user to change their password when they first log in using this password. The second will unlock the account.

User accounts are locked when someone tries to log in with a bad password a number of times.



WINDOWS 10 ADMINISTRATION BASICS

Administering Windows 10 is an essential skill if you plan on working in the IT field. In this chapter you are going to learn how to install the Windows 10 OS.

To follow along in this chapter you will want to create a new VM as described in Chapter 3. Of course instead of installing Windows Server you will be installing Windows 10.

To download Windows 10 you will need a valid Windows 10 license. You will need to visit the URL below and download the Windows 10 media creation tool:

<https://www.microsoft.com/en-us/software-download/windows10>

Once the download is complete go ahead and launch the tool. Accept the license terms and click Next until you get to the "What do you want to do" screen.



Do not select "Upgrade this PC Now"

As noted above you do NOT want to upgrade your host PC.

Instead you want to select the second option and "Created Installation Media".

Click Next. The next screen will show you information about what you are going to download, again click next to continue.

On the next screen, you will most likely want to download an ISO file so you can mount it to your Virtual Machine.

If you want to install Windows 10 on a physical computer, you can chose instead to download to a USB drive.

We will select the ISO file and click next.

What do you want to do?

Upgrade this PC now

Create installation media (USB flash drive, DVD, or ISO file) for another PC

Select language, architecture, and edition

Please select from one of the available options to continue.

Language

Edition

Architecture

Choose which media to use

If you want to install Windows 10 on another partition, you need to create and then run the media to install it.

USB flash drive

It needs to be at least 8 GB.

ISO file

You'll need to burn the ISO file to a DVD later.

From here you need to chose a location to save the ISO file. I also like to rename the download from "Windows.iso" to "Windows10.iso" just so it is clear what the file is when you are using it later.

Save the file to your computer and wait for the download to complete.

While this download is in progress you can create a new VM and attach it to the same NAT network that your Windows Server VM is attached.

These steps are outlined in Chapter 3 of this eBook, so if you're unsure how to proceed please refer back to that chapter and complete the steps.

Here is a high level overview of what you need to do:

- Create a new VM named "Windows 10" (or whatever you'd like)
- Mount the Windows10.iso to this VM
- Attach the VM to the NAT Network you created in Chapter 3 (the same one your Windows Server VM is using)

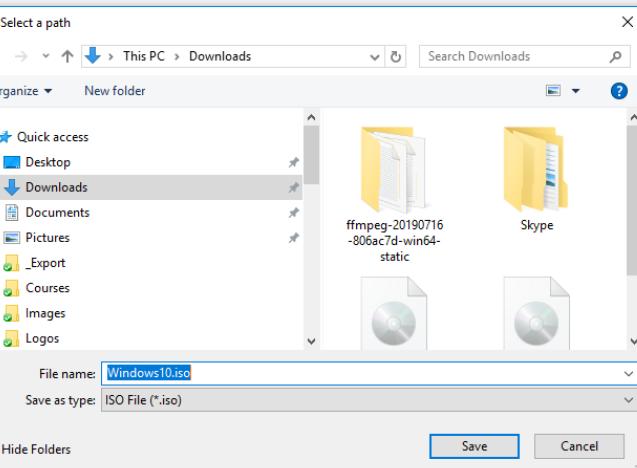
From this point you are ready to proceed with the installation of Windows 10. Launch the VM to begin the installation.

Click next to proceed, then "Install Now".

On the next screen you will be asked to enter your license key. If you don't have one, you can proceed with an evaluation installation by clicking "I don't have a product key".

If you're reinstalling Windows, select I don't have a product key. Your copy of Windows will be automatically activated later.

Privacy statement [I don't have a product key](#) Next



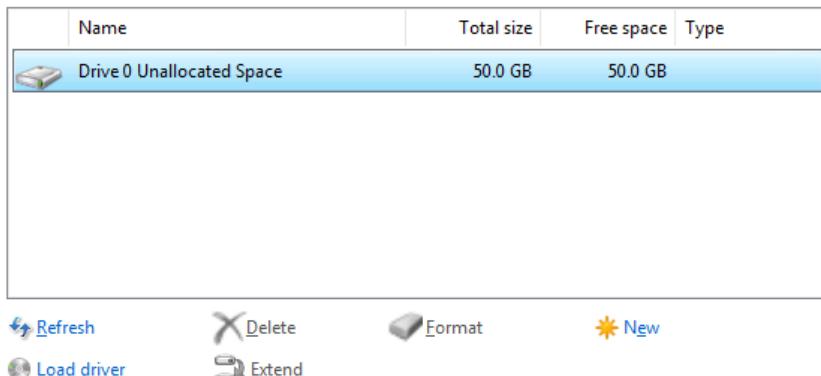
On the next screen you need to select the operating system that you want to install. Since you will likely want to be able to join the server to a VM, you will need to select "Windows 10 Pro" and click Next.

On the next screen you need to accept the license terms and again click Next.

Operating system	Architecture	Date modified
Windows 10 Home	x64	7/9/2019
Windows 10 Home N	x64	7/9/2019
Windows 10 Home Single Language	x64	7/9/2019
Windows 10 Education	x64	7/9/2019
Windows 10 Education N	x64	7/9/2019
Windows 10 Pro	x64	7/9/2019
Windows 10 Pro N	x64	7/9/2019

Description:
Windows 10 Pro

Click on the "Custom: Install Windows Only (advanced)" since this is a fresh installation of Windows. On the next screen select the drive you wish to install Windows 10 on and click Next to begin the installation.



After the installation you will need to configure some basic settings like your region, keyboard layout, or a second keyboard (skip this).

When you get to the "how would you like to set up?" screen, select "Set up for an organization" and click "Next".

On the next screen, select "Domain join instead". This will allow us to avoid using an online Microsoft account and later join the computer to a Windows domain.

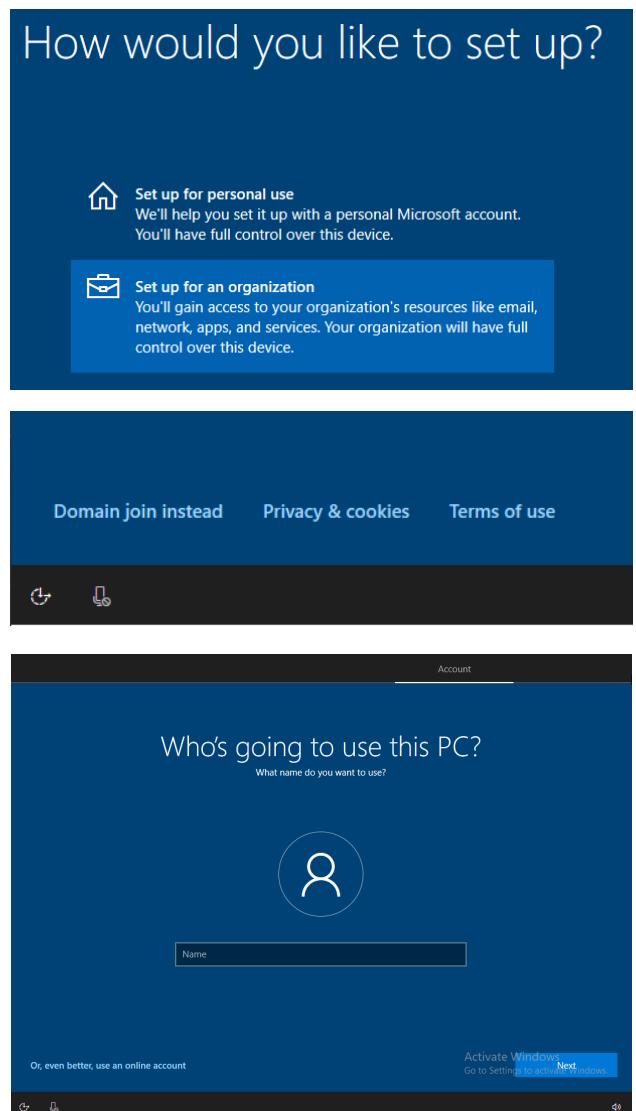
On the next few screens you need to create a username, password and three security questions and answers so you can unlock the account.

Configure these and click next through each prompt.

When you reach the screen that prompts you about activity history, click "No". Also click "Decline" when asked about the Digital Assistant.

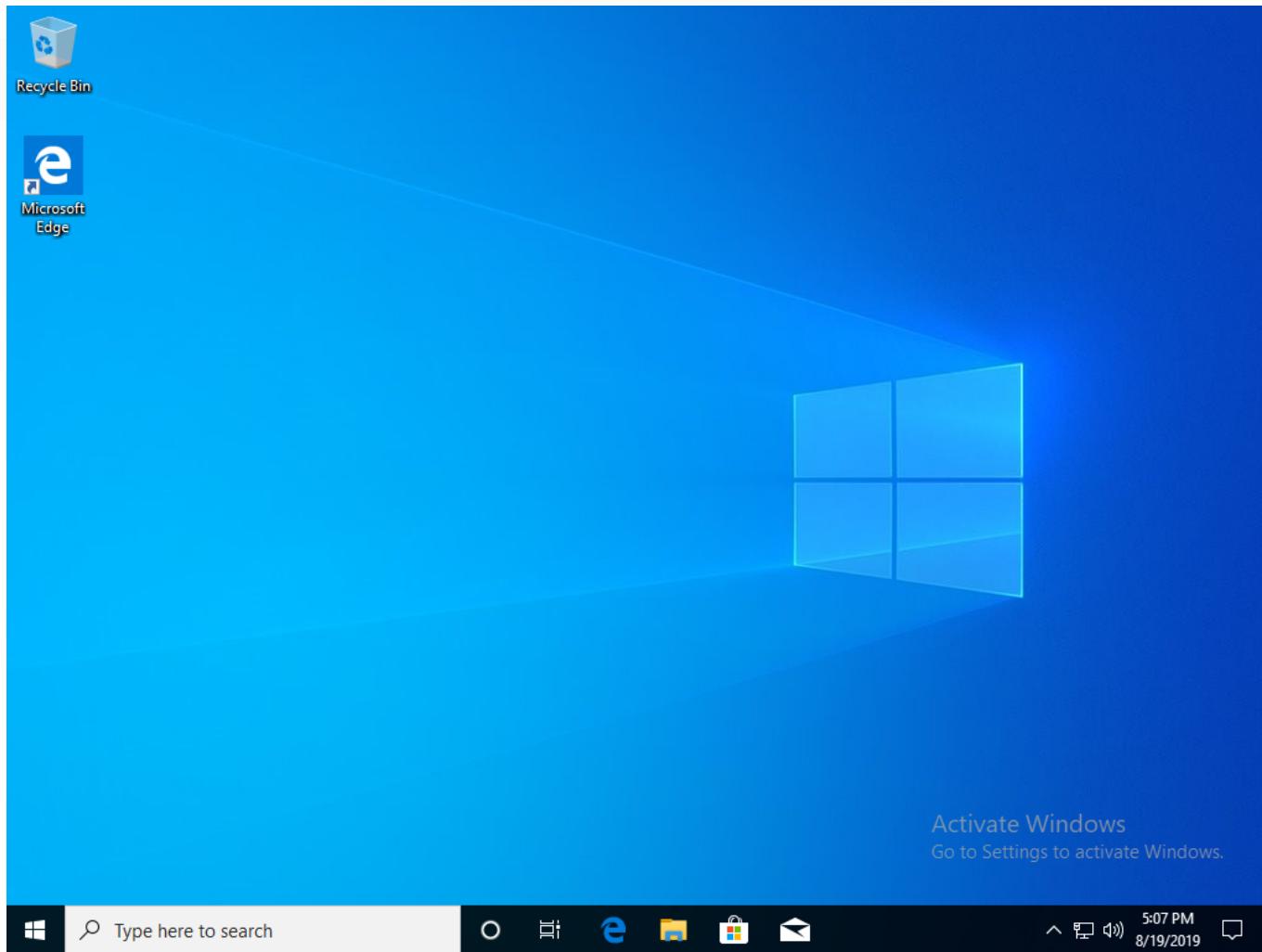
Configure your privacy settings (I turn off everything possible) and click "Accept".

At this point you will need to wait a bit longer before you are brought to the desktop.



WINDOWS UPDATES AND DRIVERS

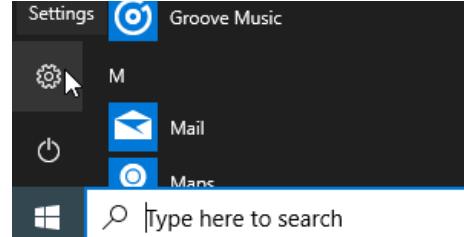
When you completed the installation of Windows 10 you should have been brought directly to the desktop.



Once you're logged in, there are a few things you should do right away:

- Configure your networking adapter
- Run Windows updates
- Update your device drivers

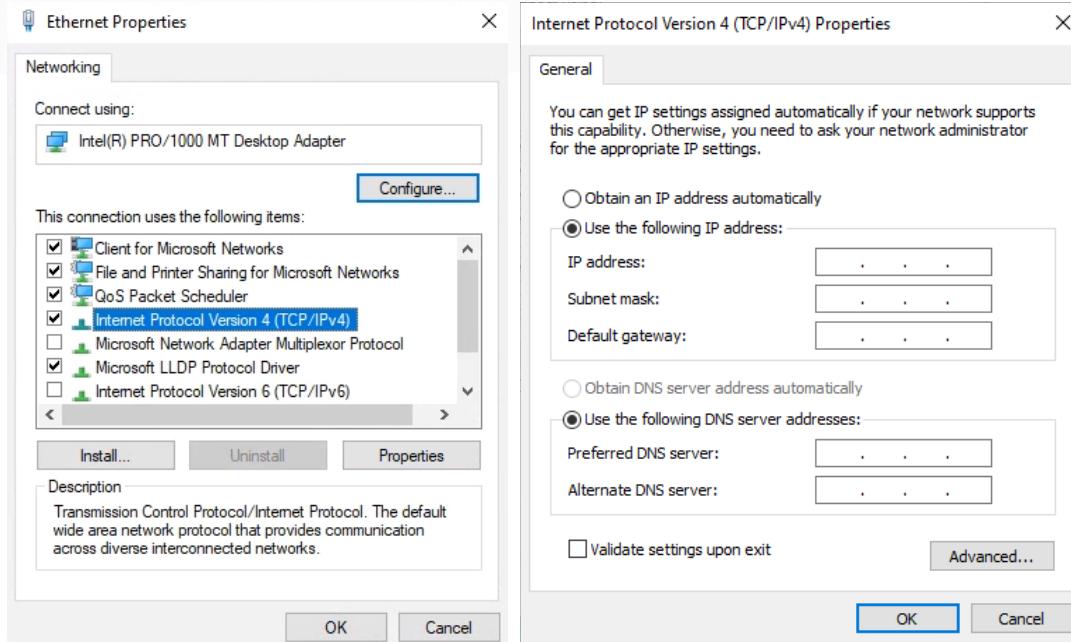
If your VM's network has a DHCP server, your computer will automatically be connected to the internet, if not you will need to configure a static IP address. You can do this by clicking the start button and "Settings":



Next select the "Network & Internet" option. From here click "Change adapter options".

Now you can right-click your network adapter and chose "Properties". If you're not using IPv6, go ahead and disabled it by un-selecting the checkbox.

Next select "Internet Protocol Version 6" and click "Properties".



From this point you can enter your manual IP address settings. In the lab we created in chapter 3, we were using the following settings:

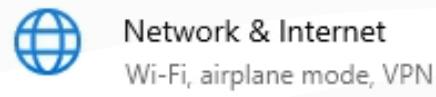
- IP Address: 10.0.2.100
- Subnet Mask: 255.255.255.0
- Default Gateway: 10.0.2.1
- Preferred DNS Server: 10.0.2.10
- Alternate DNS Server: 8.8.8.8

We are using the IP address of our domain controller as our preferred DNS server. This is extremely important because if we don't do this then we could not join the domain we created earlier. Once your computer is connected, you can test your connection by running a ping command to Google.com.

```
Windows [Version 10.0.18362.295]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Paul>ping google.com

Pinging google.com [172.217.7.142] with 32 bytes of data:
Reply from 172.217.7.142: bytes=32 time=8ms TTL=55
Reply from 172.217.7.142: bytes=32 time=9ms TTL=55
Reply from 172.217.7.142: bytes=32 time=8ms TTL=55
```



Now re-open settings (Windows Button > Settings). Next click "Updates & Security".



From here you just need to select "Check for updates". If new updates are found, you'll need to come back and install the new updates.

Two screenshots side-by-side. On the left, the Windows Start menu shows 'Windows Update' selected. On the right, a search results window titled 'All Apps' shows 'Device Manager' as the best match under the 'Control panel' category. A search bar at the bottom has 'device manager' typed into it.

Now let's update the drivers of the computer. Keep in mind that in a lab environment you could probably skip over this steps - but if you're installing Windows 10 in your office or at home you absolutely want to make sure you update your device drivers.

Click the start button and search for and launch "Device Manager".

You can update your device drivers by selecting a device and clicking "Update driver". This will open a new window that will ask you how you want to search for drivers. You can select "Search automatically". If the driver couldn't be located - you can search on the manufacturers website for driver downloads.

A screenshot of the Windows Device Manager. A context menu is open over a network adapter named 'Microsoft GIGABIT ETHERNET'. The 'Update driver' option is highlighted with a blue selection bar. To the right, there are two options: 'Search automatically for updated driver software' and 'Browse my computer for driver software'. Both have descriptive text below them. At the bottom left, a note says 'Launches the Update Driver Wizard for the selected device.'

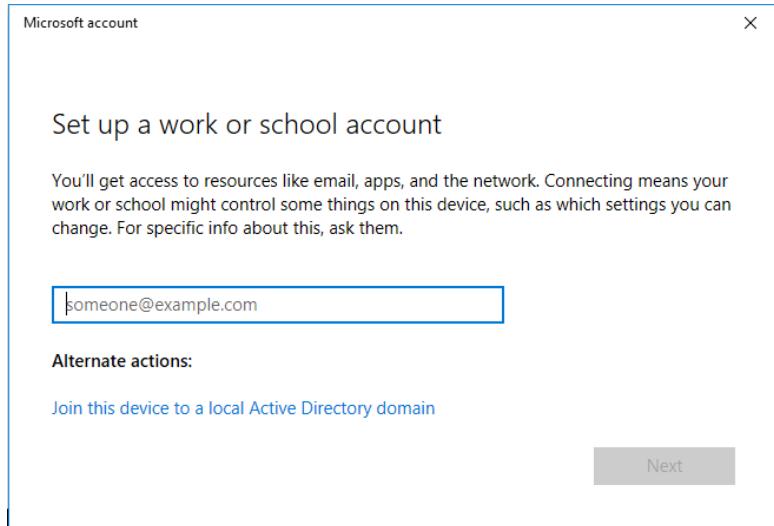
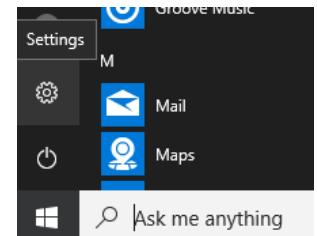
Every computer that has different hardware (devices) will require different drivers but you specifically want to check for the GPU, motherboard and peripheral device drivers when deploying a new operating system.

JOINING YOUR COMPUTER TO A WINDOWS DOMAIN

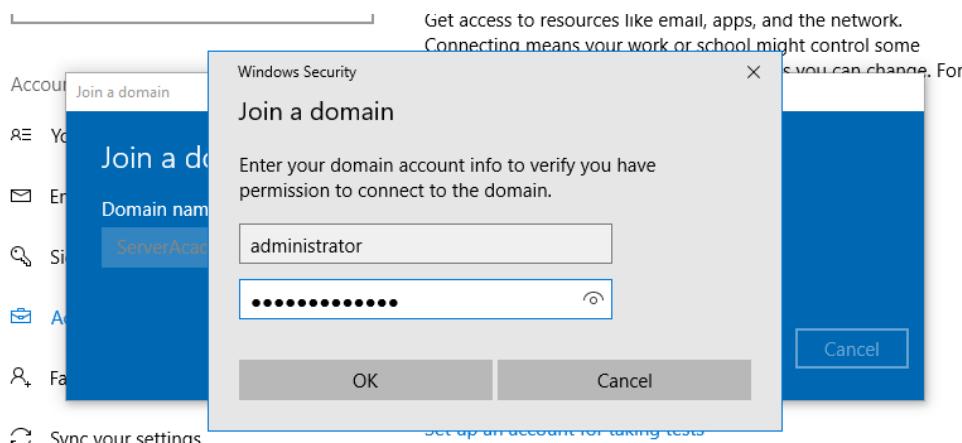
In order to manage this computer you will need to join it to a Windows domain. Before you can join a windows domain, you need to verify a couple of things of the new computer:

- (Optional) Rename the computer
- The computer is connected to the same network as a Domain Controller for the target domain
- The TCP/IPv4 DNS server is pointing to a Domain Controller for the target domain
- A Domain Controller for the target domain is powered on

Next, on the Windows 10 computer click the Windows button followed by "Settings". Next click on "Accounts" and "Access work or school". Click the "Connect" button.



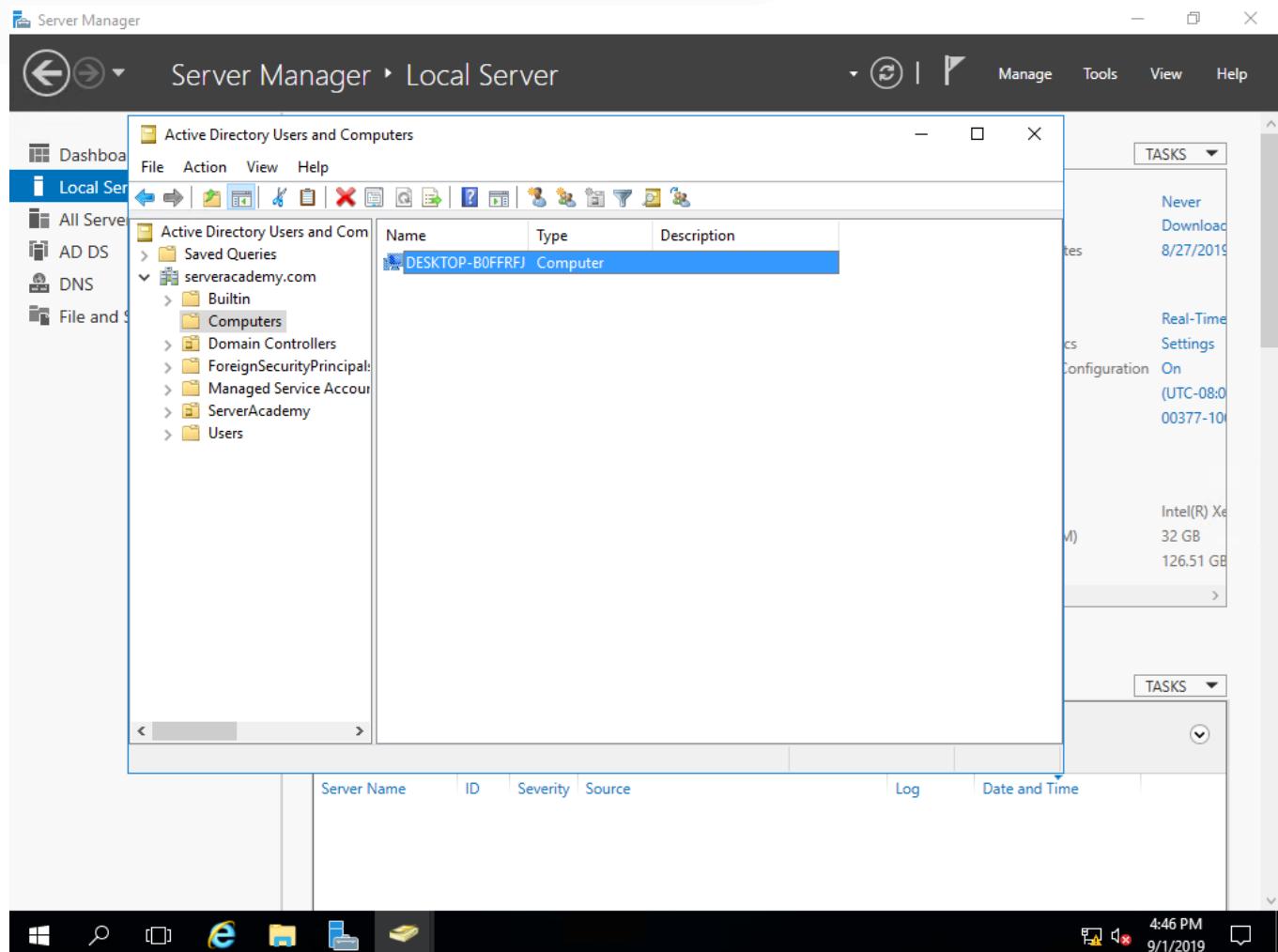
Click the blue text at the bottom that reads "Join this device to a local Active Directory domain". Type in the Domain Name (I used "ServerAcademy.com") and click OK.



The next screen will allow you to specify the Active Directory user account that will be using the computer. This is completely optional, but if you would like you may enter the account name of the user account and press Next.

The computer will reboot and when it powers back on you will be able to access the machine with any domain user account.

You will also be able to see the computer is listed within the Computers OU of Active Directory:



You can now create GPOs and link them to the Computers OU and configure settings for this computer if you'd like.

HOW TO GET AN IT JOB

Job hunting is another skill that you have to develop and it can be a long, frustrating journey. In this chapter, we are going to discuss a few strategies you can use to get better at job hunting and hopefully allow you to land the perfect IT job.

The IT (Information Technology) industry is a very high paying career field. With the rate that technology is advancing and evolving, you can be sure that the IT field is not going to disappear anytime soon and neither are the professionals who work in the IT field.

The IT field is perceived as a very difficult industry to get started in because people often cannot get an IT job without IT experience, but they are unable to get IT experience without getting an IT job. This catch 22 discourages many people from putting in the work required to get their first solid IT job.

With this eBook I am going to help you understand the proven steps that you must take in order to get an IT job in today's market.

There is no doubt that if you don't pay special attention to each of these five steps you will have a very difficult time securing a great IT job so make sure you read this eBook carefully and put each step into practice in your own job searches.

THE IMPORTANCE OF IT EXPERIENCE

The very first thing you must do before you can get an IT job is get IT experience. If you have read my eBook or taken my video course on "How to Build Your Own Windows Server IT Lab from Home," you will understand that you can gain valuable IT experience at home. Remember, any work you do with computers is valuable no matter if you're being paid for it or not.

The best way to get IT experience is to simply take online courses on a specific subject. Find course that teach skills – not theory. For example, if you want to get an entry level IT job, you should look at job descriptions and see what the requirements. If you see keywords like "Active Directory" or "Group Policy", you should take courses that will teach you how to use those tools, so you can add them to your resume. Of course, I teach those exact courses...just saying...

Another great way to gain experience is to volunteer your time at your local library, church, school, or various office buildings. After all, if it's a big building then they likely have computers and someone will need to work on those computers. Why not you as a volunteer?

I volunteered at my local church which I think is the easiest way to get started. I brought in a desktop computer, wireless hotspot and setup a streaming server that broadcasted their services to the internet.

This required me to answer phone calls and troubleshoot user's issues. It was great experience! At the time I thought I couldn't add the experience to my resume because I came up with the idea and I wasn't being paid, but one of the people there said I should add it to my resume anyway – so I did and it was key experience later on when I got my first full-time position.

A lot of big companies also offer both paid and unpaid internships which usually don't require any job experience but also require you to be enrolled in an IT related college program. I went to a community college and that allowed me to get a paid internship (although it was over an hour drive from my house).

A key point I want to make here is that I continued my volunteer work while I worked the internship, and my volunteer work is what allowed me to get my first fulltime IT job. In fact, they substituted a bachelor's degree for the 4 years of volunteer IT experience I gained at church. This is why I say that experience is experience no matter how it is gained.

EXERCISE

List three actionable steps you can use to gain IT experience within the next week

PREPARING YOUR RESUME

Regardless of how you gain experience, make sure you write ANY IT related things that you do on a resume. It's a great idea to download a sample resume so you can start to document your experience as you learn new skills.

Make sure your bullet points are detailed enough so that you can talk for two or three minutes about what you did when you are asked to explain a bullet point at an interview.

I cannot stress this enough. Be prepared for someone to go line-by-line over your resume. If you can't talk for two or three minutes for EACH bullet point, then you are not ready for a job interview. The ability to talk about your experience is what will convince the interviewers that you are the right candidate for the job.

Once you have a resume, share it with your friends, family, recruiters or other people you know who work in the IT field. This will help you gain valuable feedback and fix any grammatical errors that always seem to happen (I'm sure there are plenty in this eBook).

HOW TO APPLY TO JOBS

If you are unemployed or you want to get a better job, then your job right now is to find a job. You are a professional job hunter, so treat it like a job! Dedicate a set amount of time each day for you to apply to jobs.

We both know that it is a real pain applying to jobs over and over again as they all seem to require you to register a new account and you have to use a different password because they have a different password security policy...but this is something you HAVE to do if you want to get a job.

Apply to at least 10-15 jobs each day

Here is a small list of the most popular websites that you can use to start looking for IT related jobs:

- Indeed.com
- Monster.com
- CareerBuilder.com
- ClearanceJobs.com (if you have a security clearance)
- Ziprecruiter.com
- Snagajob.com
- LinkedIn.com (connect with and message recruiters)

Visit each of these every day and setup email alerts for jobs within 100 miles of where you live. Why 100 miles? Because some companies will allow you to work from home or work at an alternate (closer) office.

It's also not a bad idea to setup a new email address just for these job alerts. That way when you are ready to start applying to jobs you can log into your new email address and just go through each email applying to jobs as you receive them. This is easier than using your personal inbox that will get cluttered with friends sharing cat videos with you. The key is to stay focused!

IMPORTANT: Apply to jobs that you aren't qualified for!

The last four jobs I have gotten I wasn't fully qualified for. In fact, the last two jobs I got I didn't even have 50% of the qualifications.

When a hiring manager creates a job listing, they put down everything under the sun that they can think of that would be a "nice to have". In fact, companies are rarely EVER able to find a candidate that has all the requirements.

Believe it or not it is a very bad idea for you to take a job that you are fully qualified for because there will be no room for growth. Hiring managers know this as well.

You will be hired based on if you match most or some of the job requirements and how well you do in the interview as far as friendliness, punctuality, enthusiasm, confidence, communication skills, and ability to convince them that you are a good fit for the team.

Keep in mind that applying to jobs will be a LONG process before you finally get a call for an interview. That is why I say at least apply to 10-15 jobs. It took me an entire year of constantly applying before I was able to get my first IT internship – and I almost gave up several times.

GOOD JOB INTERVIEWING

Whether you have finally got an interview or not, it is time to start preparing. The first thing I would like you to do is to practice your “story”. Imagine answering the question, “so [your first name], tell me about yourself”.

This is the time for you to start talking about your experience. I like to start this by saying something along the lines of “I began my career as a volunteer at my local church doing Systems Administration...”

I then go through my resume highlighting my experience. The great thing about learning on your own time or volunteering is that you will be perceived as very self-motivated. That is a huge positive that you will have over others.

Your “story” should ideally last about 15 minutes (depending on how much experience you have). You need to practice answering the “Tell me about your-self” in an engaging and friendly manner. Do it in front of people or a mirror if you can – this will improve your chances of getting the job tremendously.

Of course, you should have a 2-3 minute explanation memorized for each line on your resume and this will greatly help you with your story. Prepare to answer those awkward questions like “what is your greatest weakness?”

It’s a good idea to research the most common interview questions and practice answering them. Remember that interviewing is a skill and you need to become a great interviewer! Researching common interview questions is a great way to improve your interviewing skills

Research the company, interview location, and memorize the job description. Plan on arriving at the interview 45-30 minutes early. This will help you if there is bad traffic or you can’t find the office building. Thankfully with Google street view, you shouldn’t have issues with directions. Also google will allow you to guess how long it will take to arrive at the interview from your house at a specific time.

Arriving so early not only allows you to avoid being late, but you can practice your “story” while you are waiting in the car. Try to walk into the office building and notify the front desk that you are here for the interview 10-15 minutes before scheduled.

When you are in the interview, do NOT appear nervous. Remember that everyone gets nervous if they are unprepared. You will be shocked at how well you will do when you have gone overboard when preparing. It will almost be easy! When interviewing becomes easy you will make a great impression on potential employers.

NEGOTIATING YOUR SALARY

After you go through several interviews you will eventually be contacted by the employer and told they want to give you an offer. A lot of times before this they will try to find out how much you are currently being paid. They use this as leverage to under pay you. When you are asked about salary requirements, you can counter the question with your own by asking what the salary range is for the position.

Every company has a salary range for a position but they usually don’t like to share it. You will usually hear it depends on experience. If they won’t talk numbers then you shouldn’t either. Try to be the last person to bring up an exact number.

When you are given a salary range, ask for the higher end of the range. For example, if you are told that a job pays 70-90k, say that you were looking for 85-95k.

Never lie about your current income. This can come back to haunt you. In fact, you could be fired if your employer hires you and later confirms your salary from your last job and finds out you lied.

When you are first starting out in the IT field (getting your first paid IT job), do NOT be picky about the salary. In fact, I wouldn’t even try to negotiate the salary unless it was less than 35-40k. Of course, this depends on where you live – I live in pretty close to DC so the cost of living is very high. In some parts of the US (and the world for that matter) 35-40k is a lot of money.

When it comes to your first job, the experience is more important than how much money you will make.

READY, SET, GO!

Congratulations, you got to the very end of this ebook! If there are things that you're still not sure you 100% understand, don't worry about it. You can always go back and check out specific areas of the ebook and practice some of these skills.

That will be the best way to become truly proficient as a System Administrator - practice. The information in this ebook was laid out in a way that helps you jump into IT without being overwhelmed with theory and stuff that you might not even need to get started.

Now that you have all the relevant info you should invest time into making these tasks feel like second nature. To be fair, it might take some time to get used to all of the processes that we went through in this ebook. Sometimes the readers need additional guidance to learn as fast as possible.

That's why we offer a guided membership program at Server Academy at very affordable prices. If you're interested in building your IT career the fast way, we highly recommend checking out our [membership program](#) and joining our community.

These are video lessons that walk you through each and every one of these IT skills in much greater detail. More importantly, we've designed these lessons by getting feedback from thousands and thousands of our members over the years.

Besides the fact that our founder, Paul Hill, tested all of these practices on his own journey to become a successful System Administrator, we also have over 150,000 satisfied students that demonstrate the massive opportunity this program offers. Specifically because of the layout of the membership program, but also because of our unique approach. The get-stuff-done approach, as opposed to the pass-a-test approach that many courses out there offer.

Make sure to use discount code member20 at the checkout. This discount code will give you 20% off and is available exclusively for the readers of this ebook.

Thank you for reading and please remember - now is the time to take action and become an expert in IT!

