# 3.3t:transcript

Welcome to this week's practical, so in this tutorial we're going to look at how VirtualBox can virtualize internal networks so that virtual machines, that you have listed within the environment, can communicate between each other

This doesn't necessarily mean these guest machines have to be able to communicate with the host machines as we mentioned in the slides for this week as well.

That adds a layer of security for us, so it's an ideal scenario for testing because it creates a kind of sandbox environment where network traffic cannot escape from the virtual machines, unless we instruct them to do so via VirtualBox.

So in this tutorial we'll use the Ubuntu machines we set up last week, so we're going to use the desktop one rather than the server ones, because I think the desktops are a lot more simple and straight forward, and what we're going to do is we're going to create a clone of the desktop machine and set both machines up so that they can communicate within the VirtualBox, that way only two virtual machines can communicate in it.

Now, however before we do that you may have noticed I've already got my virtual machine up and running there's a reason for this, before you actually do anything with the networking side of things we have to make sure we've got everything installed.

So, what we're going to do is just to make a few various checks.

Now, I've already done all of this to my machine but obviously it's going to help you if I just kind of show you what I mean.

If you click on where it says activities, once you've got your Ubuntu up and running, and if you type terminal or start typing terminal and you see it pops up. Click on terminal and it opens a VirtualBox command line so what we're going to do is just check some various things.

I'm going to type ifconfig so this is a way in Linux that we actually check what's our Ethernet settings our, what our IP addresses and so forth like that.

You can see here, I've got an Internet address, IP address, 192.168.1.116, subnet mask broadcast range all of that this has actually been picked up via my host machine, if we remember from last week. If I click  back over here, under Network use the bridged adapter so my bridged adapter allows me to connect to the network.

Now what you may find if you type ifconfig at this stage you might get an error, if you do get an error it might say something on the lines of its not installed or so on, you have to issue a new command. That command is sudo space apt space install net – tools.

Okay I'll just type that in for you now, so it's sudo apt install net - tools ok.

Now I've already installed this as you can see, I've got ifconfig installed if I was to hit enter now it will install this package for me and enable me to use ifconfig and so on.

I suggest you all do that first, then shut that machine down completely and then when we're ready come back to the video.

I'll pause for now and when we're ready to start again I'll explain what we're going to do next.

Okay so hopefully you've done all that shut your Ubuntu machine down and you should just be looking at the VirtualBox manager.

Okay so what we're going to do is we're going to be looking at creating an internal network between two Ubuntu two devices so first thing we're going to is on our Ubuntu desktop, the machine we created last week, under network you see where we had a bridged adapter, we did that last week so we're bridging our adapter last week over to our host machine, this time we're going to change it we're going to go for internal network.

Now here you can change the name to anything you like I'm just going to leave it to the defaults Intnet you can call it whatever you want, I'm going to hit OK and I'm going to start my machine up.

So, my Ubuntu machines going to boot I'm just going to pause this while it does the booting because we've no need to see that and I'll get back to you in a second.

Ok so my machine is booted, it's sat there ready to go so what I need to do next up here you're actually see there's no connection, an error popped up saying connection failed. It’s failed simply because I'm no longer using the adapter on my on my guest machine, so we don't have any internet connection, we don't have anywhere for a connection, so we're going to set one up effectively.

If you click on that little triangle pointing down,  wired connecting, that gets a bit confusing if you're using a wireless system say a laptop that this is based on, as far as the host machine is concerned it's a wired setting it doesn't actually see a wireless adapter.

We'll go into the wired settings and you'll see that little sprocket there the standard sign for settings click on that and under ipv4. We can actually see there it is set to automatic DHCP, dynamic host configuration protocol, so up until now our machine was looking for an IP address from a server, it can't communicate with anything so we're going to do is we're going to check that to manual and we're going to give it an IP address so 172.10.1.1 and I’ll give it a subnet mask of 255.255.0.0.

I'm using what's called a slash 16 address and I'm using 172 range, the reason I’m doing this is deliberately to show that it's completely different from my host operating system which was a 192 system you saw earlier. So I'm going to apply that and close that window down that will vanish in a moment, that's now done.

I'm going to stop recording we're going to shut the Machine down again and then we're going to clone it, so I'll pause, and I'll see you in a few moments.

Okay so I've powered my machine off ready I hope you have too next I'm going to clone it so the machine I'm interested in if I right click the mouse button you can see clone.

It comes up with a name it just adds clone to the end, I'm going to leave mine as that. The only thing we need to change at this point is where it says MAC address policy, so we're going to generate a new MAC address for all network adapters that's because we want these two machines to be completely different from each other in that respect. So, I'll hit next I'm going to do a full clone, clone it okay, I'm going to pause the video while we do this because it can take some time.

Okay so your Ubuntu clone should now be ready mine is sat  there at the bottom, I’m just to show you as well we've inherited from our original, it is set to internal network, it’s set to the same Intnet as well by its name as well. So, we can okay that and what we're going to do is we're going to start up our clone.

I'll hit start again, I'll pause while you do yours and then we'll starts again once were all booted.

Okay my clone is now booted, so you see Ubuntu clone running, so connection failed, now it's failing because it didn't transfer the IP address, which I don't want it to and that's that part where I reset the MAC addresses, so this is now seen, as far as a network goes, as a completely different device from my original one.

So we're going to do the same again, we're going to go into our wired connection, into our wired settings and into the settings in the cog icon, and under ipv4 you can see it's gone to automatic DHCP, we will go to manual and 172.10.4.1, I'll use a mask of 255.255.0.0

Okay so I'm in the same network 172.10 but my 4.1 part completely different machine so I'll apply that, close that there.

Now just to be a hundred percent sure what I'm going to do is actually going to reboot the Machine as well so I suggest you do the same so I'll do that and I'll pause the video while it reboots.

Okay my clone is just finishing rebooting now while that's doing that, I'm going to start off my original desktop system as well this one at the top. We changed the IP address first on that one remember we're just going to hit start on that and let that boot up.

 Okay so back over up my clone here I go to activities and terminal and if I do I ifconfig you can see now I've got an IP address there of 172.10.4.1 and a mask of 255.255.0.0 and don't worry about the broadcast addresses it's pick that up for itself, we'll talk about that when we do some more networking in future modules.

So, my original machine, I'm just going to log into this as well, just while my VirtualBox their boots up. What I will do is if I pull over the command prompt from my host machine you can see here the host machine has an IP address of 192.168.1.115 on a 255.255.255.0 address. The host machine and our virtual machines are in completely separate networks, or at least they are for me if by some chance the machine you are working on is on a 172 well it's still the same, trust me about that, but I've done it completely separate so you can really see the differences between the two.

So, if I go to our original Ubuntu system and let's call up the terminal and again if I do ifconfig and you see I'm 172.10.1.1 the subnet mask is 255.255.0.0 as well.

So what I can actually do now is perform the most simple networking test of all, which is a ping, ping is an ICMP packet so I'm going to ping the 172.10.4.1 machine, so I'm pinging from my original Ubuntu machine 172.10.1.1 and I'm going to ping 172.10.4.1 my clone if you like. If I hit enter and you can see it's starting to send and receive ICMP packets over our internal network, over this virtual network we've constructed between these two devices.

If I press ctrl + C it will break out of doing that ping, if I try to ping 192.168.1.115, that's the host machine, if we look down here you can see that is my host IP address and if I try to ping it, it should fail, network is unreachable.

So what we've actually created in this is we've built ourselves a network, ok it only got 2 machines as of the moment we can add more as we wanted to but these two networks are solely working on the same network, the host machine is completely barred from it, so we could use this for a whole variety of things if we were looking at cyber security we might decide to install something like Kali Linux and we can actually launch a Metasploit attack on a separate machine, we won't be doing any harm whatsoever to our hosts at that point in time. These systems are really important to us, we could if we wanted to as well back over on our VirtualBox, if we have a look down at network over here,  you would also need to shut the host down in order to make this effective, I could actually go to that network address translation on NAT network and that Network would allow us to actually tunnel through our existing configuration of our host and get us out to the internet. So we'd actually have a sealed-off network between these virtual devices that would not be affecting my hosts, but they would be tunnelling their way through the network to get out.

Okay so what I want you to do this week is continue having to play around with this, maybe launch some of the servers maybe add a new operating system and actually get them into our internal virtualized Network here and just see what services you can run and have a play around with.

That's all for this week as far the videos are concerned, have fun with the rest of the module there's a quiz at the end and I'll see you next week.

Thanks