In this practice, we are going to learn how to connect a GNU/Linux client to the Internet using a Windows Internet Connection Sharing (ICS).

Daniel Sánchez Fernández – 30/04/2023

ICS-Win-Linux

Implantación de Sistemas Operativos

Contents

[Materials for this practice 2](#_Toc133797208)

[Scenario and objectives of the practice 2](#_Toc133797209)

[Setting up the network interfaces 2](#_Toc133797210)

[Setting up the network interfaces on Windows 2](#_Toc133797211)

[Setting up the network interfaces in Ubuntu 3](#_Toc133797212)

[Making the DNS server permanent 4](#_Toc133797213)

[Checking the security of ICS 5](#_Toc133797214)

[Conclusion 6](#_Toc133797215)

[Copyrights 6](#_Toc133797216)

[Social networks 6](#_Toc133797217)

[Webgraphy 6](#_Toc133797218)

# Materials for this practice

* For this practice we will need:
  + A Windows machine with two network interfaces
    - One connected to the Internet and with ICS and DHCP enabled
    - The other on a local area network (LAN)
  + A GNU/Linux client with a network interface connected to the LAN
  + Internet connection

# Scenario and objectives of the practice

* The scenario to be followed in this practice is as follows:

Windows

Internet

Ubuntu with ICS

NAT

LAN

* The objective of this practice is to output a GNU/Linux client to the Internet through a Windows machine with DHCP and ICS enabled.

# Setting up the network interfaces

* The first thing to do is to configure the network interfaces on the Windows machine, enabling ICS.

## Setting up the network interfaces on Windows

* First, we configure the interface that will be connected to the local network through which it will connect to our GNU/Linux client.

Interfaz de usuario gráfica, Texto, Aplicación

Descripción generada automáticamente

These are the hardware specifications of the Windows machine

* Go to the adapter configuration and leave the Host-only (LAN) interface with the local network configuration

Interfaz de usuario gráfica, Texto, Aplicación

Descripción generada automáticamente

My local network is "192.168.20.X".

* Once you have the IP, we must enable "ICS", for this we will go to the network interface "NAT" > "Sharing" tab (to the right of the "Network functions" tab).

Interfaz de usuario gráfica, Texto, Aplicación, Correo electrónico

Descripción generada automáticamente

We must enable this option

When enabled, the following message will appear. Basically what it means is that the IP of the LAN interface will be changed to another IP. So in order to be able to use an IP to our liking, we will have to change it again. I will use the same IP as before (192.168.20.20).

Texto

Descripción generada automáticamente

* I also recommend removing the Windows Firewall to avoid possible connection problems between the machines.
* Let's configure now the local network interface of the Ubuntu machine

## Setting up the network interfaces in Ubuntu

* This is the hardware configuration of my Ubuntu machine

Interfaz de usuario gráfica, Texto, Aplicación

Descripción generada automáticamente

* Let's now modify the network interface of our Ubuntu machine, so that it is on the same local network as the Windows machine

Interfaz de usuario gráfica, Aplicación

Descripción generada automáticamente

We configure an IP address in the same network and mark as gateway the IP of our other machine (which works by redirecting to the Internet as if it were a router).

* Once the network interface is configured, we restart it to save the changes and check that it has connectivity with the local Windows interface.

Texto

Descripción generada automáticamente

We see that the machines see each other.

* The next step is to configure the DNS name resolution. To do this, we go to the DNS configuration file "/etc/resolv.conf".

Texto

Descripción generada automáticamente

Here we add a new record of type "nameserver" and give it the IP of the Windows LAN interface (192.168.20.20)

* After that, we restart the network with the command "sudo systemctl reset NetworkManager".
* Once restarted, we will try to ping Google

Texto

Descripción generada automáticamente

We can see that, indeed. It goes out to the Internet

* With this, we have already been able to go out to the Internet through a network interface on LAN through another machine that acts as a server for the first one.

## Making the DNS server permanent

* The "/etc/resolv.conf" file loses all configuration when the machine is rebooted. So we are going to make a permanent configuration.
* To do this we will go to the configuration of our network interface:
  + In the case of my machine being a "Desktop" type, I will use the configuration through the "GUI". But in other machines like "Ubuntu Server", you can use Netplan or Ifupdown.
* We will then go to the configuration of the Ubuntu LAN adapter.

Interfaz de usuario gráfica, Texto, Aplicación, Correo electrónico

Descripción generada automáticamente

We remove the "Automatic" option and add the DNS server of our Windows machine.

* After this, we apply.
* I will restart the machine to show that the configuration is no longer lost.

Texto

Descripción generada automáticamente

With a "history" I show that I have indeed rebooted.

And with the command "nmcli dev show", I show all the current network configuration of my machine.

Texto

Descripción generada automáticamente

* Let's check if it is still working

Texto

Descripción generada automáticamente

Indeed, it is

* Let's now check the security of this method...

# Checking the security of ICS

* To do this, I am going to install a sniffer on the Windows machine (which gives the output to the internet). This will allow us to check if Windows is able to monitor all the connections of those who connect to the internet through it.
  + For this, I will use "Wireshark". We run the program and select the LAN interface (since this is where all the packets coming from and going to the LAN pass through, i.e. the machine connected to my Windows machine).

Imagen que contiene Texto

Descripción generada automáticamente

Select the LAN by "double clicking".

* Once selected, we will go to the Ubuntu machine and do for example a ping to "Google.com".

Texto

Descripción generada automáticamente

I show how I ping 4 times to Google.com

* Let's now take a look at the screenshot taken by Wireshark:

Interfaz de usuario gráfica, Aplicación, Tabla

Descripción generada automáticamente

We can see that it has indeed "intercepted" the ICMP connections between the Ubuntu machine and Google.com.

* It was quite obvious that this would happen, since a sniffer monitors all connections going through the given interface and in order to get out to the Internet, our machine sends connections directly to this interface.
* This indicates that it is an efficient method of going online. But it also carries its risks since the connection can be continuously monitored. And attacking a computer like this Windows that has several computers connected, can become a noticeably big problem for the security of the network.
* Therefore, although it seems to me a good method and meets its objective. It also has its risks and should be considered when implementing it.

# Conclusion

* In this brief practice, we have learned to share Internet connection to another computer through the same local network. It seems to me a quite efficient method and can be especially useful in certain scenarios and situations. However, it has its risks, so I would not recommend it for a company or environments where security is an issue to pay attention to.

# Copyrights

* All the practice has been carried out and tested by me: Daniel Sánchez Fernández - ASIR1-20, with the information provided by the professor and indicated in the webgraphy of the document.

# Social networks

* LinkedIn
  + <https://www.linkedin.com/in/daniel-s%C3%A1nchez-fern%C3%A1ndez-6b948923a/>

# Webgraphy

* [Compartir conexión a Internet (ICS) en Windows 10 - YouTube](https://www.youtube.com/watch?v=gjJkaRPWfpk)
* <https://learn.microsoft.com/es-es/troubleshoot/windows-server/networking/set-up-internet-connection-sharing>
* <https://support.ringcentral.com/article-v2/Enable-Internet-Connection-Sharing-ICS.html?brand=RC_US&product=RingCentral_MVP&language=en_US>
* <https://www.zeppelinux.es/configuracion-del-archivo-etc-resolv-conf/>