



Instituto Politécnico Nacional.  
Escuela Superior De Cómputo.



**Materia:**  
**Administración de Servicios en Red.**

**Tema:**  
**Auto configuración de SSH.**

**Profesor:**  
**Ricardo Martínez Rosales.**

**Alumno:**  
**Mario Alberto Miranda Sandoval.**

**Grupo:**  
**4CM1**

# Objetivo.

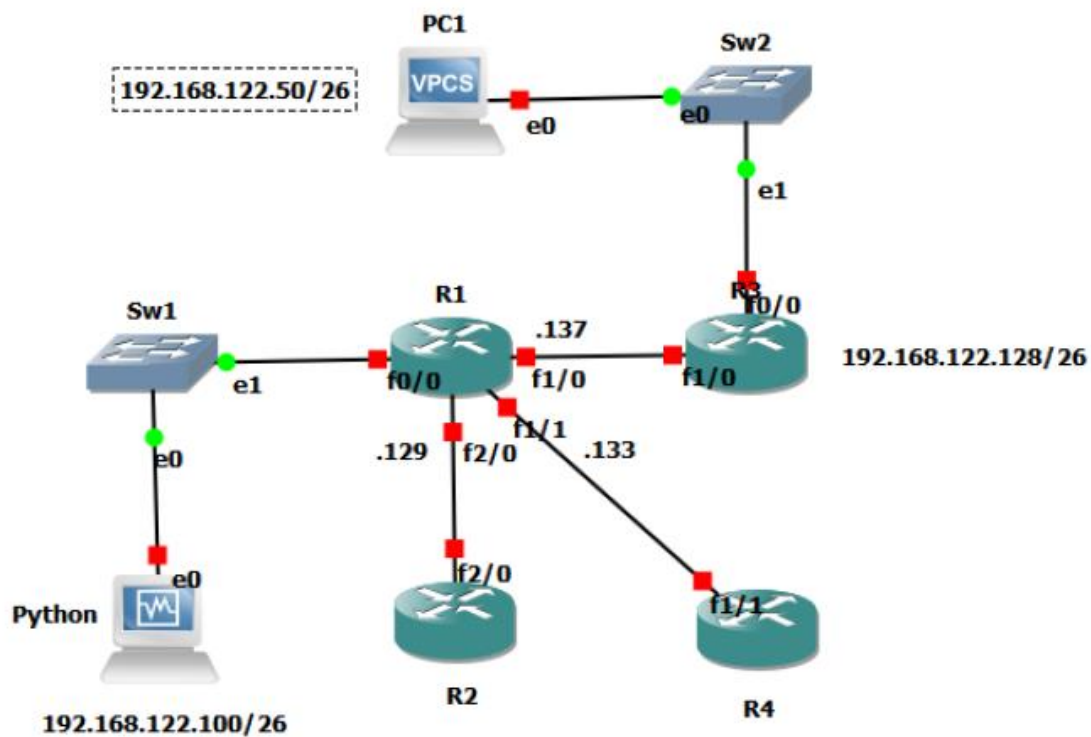
Realizar la configuración automática de SSH en los dispositivos de la red mediante un programa en Python.

Ejecutar una configuración básica de SSH a partir de una conexión remota de TELNET.

## Requerimientos.

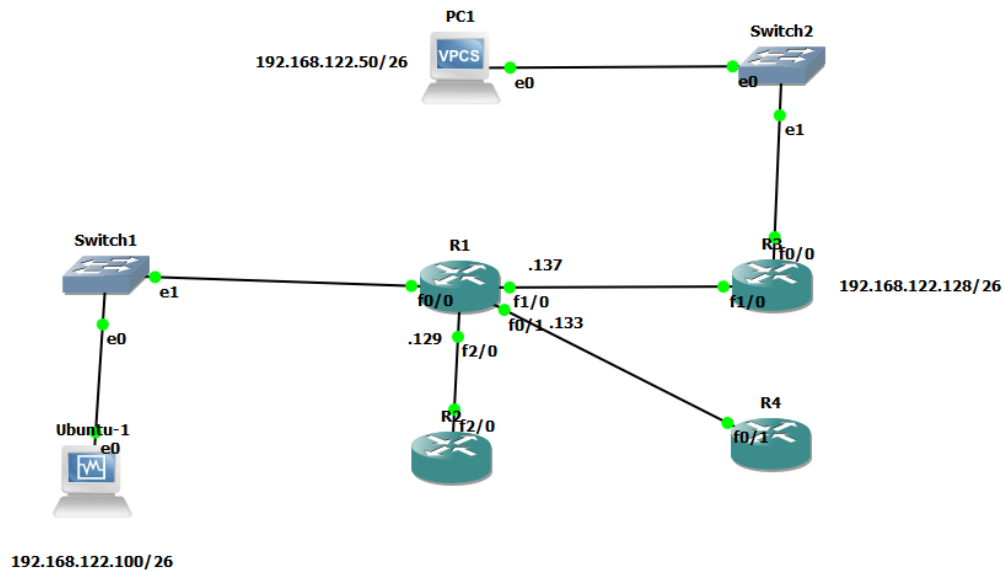
- Una computadora personal.
- Software para emulación de redes.

## Objetivo visual de la actividad.



# Desarrollo de la práctica.

Primeramente, armamos la topología en GNS3.



Ahora describiré las tablas de enrutamiento para cada componente.

Máquina Virtual.		
Interfaz	Dirección IP	Máscara.
e0	192.168.122.100	255.255.255.192

La puerta de enlace de la máquina virtual será la red  
192.168.122.56

R1 (configuración)		
Interfaz	Dirección IP	Máscara
f0/0	192.168.122.65	255.255.255.192
f0/1	192.168.122.133	255.255.255.252
f1/0	192.168.122.137	255.255.255.252
f2/0	192.168.122.129	255.255.255.252

R1 (enrutamiento)		
IP origen	Máscara	IP destino
192.168.122.0	255.255.255.192	192.168.122.138
192.168.122.132	255.255.255.252	192.168.122.134
192.168.122.128	255.255.255.252	192.168.122.130
192.168.122.64	255.255.255.192	192.168.122.137
192.168.122.64	255.255.255.192	192.168.122.136
192.168.122.64	255.255.255.192	192.168.122.132
192.168.122.64	255.255.255.192	192.168.122.128

R2 (configuración)		
Interfaz	Dirección IP	Máscara.
f2/0	192.168.122.130	255.255.255.252

R2 (enrutamiento)		
IP origen	Máscara	IP destino
192.168.122.64	255.255.255.192	192.168.122.129
192.168.122.0	255.255.255.192	192.168.122.129
192.168.122.136	255.255.255.252	192.168.122.129
192.168.122.132	255.255.255.252	192.168.122.129

R3 (configuración)		
Interfaz	Dirección IP	Máscara.
f0/0	192.168.122.1	255.255.255.192
f1/0	192.168.122.138	255.255.255.252

R3 (enrutamiento)		
IP origen	Máscara	IP destino
192.168.122.64	255.255.255.192	192.168.122.137
192.168.122.132	255.255.255.252	192.168.122.137
192.168.122.128	255.255.255.252	192.168.122.137

R4 (configuración)		
Interfaz	Dirección IP	Máscara.
f1/1	192.168.122.134	255.255.255.252

R4 (enrutamiento)		
IP origen	Máscara	IP destino
192.168.122.0	255.255.255.192	192.168.122.138
192.168.122.136	255.255.255.252	192.168.122.133
192.168.122.128	255.255.255.252	192.168.122.133
192.168.122.64	255.255.255.192	192.168.122.133

PC1.		
Interfaz	Dirección IP	Máscara.
e0	192.168.122.50	255.255.255.192

La puerta de enlace de la PC1 será la red 192.168.122.1

Ahora la configuración de los routers será de la siguiente manera, esta aplica para el router 1 pero los demás routers será de manera similar.

```
conf t
enable secret 1234
service password-encryption
interface f0/0
ip address 192.168.122.65 255.255.255.192
no shutdown
interface fa2/0
ip address 192.168.122.129 255.255.255.252
no shutdown
interface f1/1
ip address 192.168.122.133 255.255.255.252
no shutdown
interface f1/0
ip address 192.168.122.137 255.255.255.252
no shutdown
exit
line vty 0 15
password 12345678
login local
transport input telnet
exit
username admin password admin01
exit
conf t
ip route 192.168.122.0 255.255.255.192 192.168.122.138
ip route 192.168.122.132 255.255.255.252 192.168.122.134
ip route 192.168.122.128 255.255.255.252 192.168.122.130
ip route 192.168.122.64 255.255.255.192 192.168.122.137
ip route 192.168.122.64 255.255.255.192 192.168.122.136
ip route 192.168.122.64 255.255.255.192 192.168.122.132
ip route 192.168.122.64 255.255.255.192 192.168.122.128
write
```

Ahora pasamos a hacer las pruebas.

```
PC1> ping 192.168.122.100
84 bytes from 192.168.122.100 icmp_seq=1 ttl=62 time=38.463 ms
84 bytes from 192.168.122.100 icmp_seq=2 ttl=62 time=35.829 ms
84 bytes from 192.168.122.100 icmp_seq=3 ttl=62 time=37.474 ms
84 bytes from 192.168.122.100 icmp_seq=4 ttl=62 time=59.081 ms
84 bytes from 192.168.122.100 icmp_seq=5 ttl=62 time=26.543 ms
PC1> █
```

Aquí hacemos un ping de la PC1 a la máquina virtual.

```
mario@mario-VirtualBox: ~
mario@mario-VirtualBox:~$ ping 192.168.122.50
PING 192.168.122.50 (192.168.122.50) 56(84) bytes of data.
64 bytes from 192.168.122.50: icmp_seq=1 ttl=62 time=41.7 ms
64 bytes from 192.168.122.50: icmp_seq=2 ttl=62 time=41.4 ms
64 bytes from 192.168.122.50: icmp_seq=3 ttl=62 time=39.5 ms
64 bytes from 192.168.122.50: icmp_seq=4 ttl=62 time=39.9 ms
64 bytes from 192.168.122.50: icmp_seq=5 ttl=62 time=40.6 ms
64 bytes from 192.168.122.50: icmp_seq=6 ttl=62 time=39.2 ms
64 bytes from 192.168.122.50: icmp_seq=7 ttl=62 time=42.7 ms
^C
--- 192.168.122.50 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6009ms
rtt min/avg/max/mdev = 39.181/40.730/42.682/1.181 ms
mario@mario-VirtualBox:~$
```

En la imagen se aprecia el ping inverso a la PC1 desde la máquina virtual.

```
mario@mario-VirtualBox: ~
mario@mario-VirtualBox:~$ ssh admin@198.168.122.65
ssh: connect to host 198.168.122.65 port 22: No route to host
mario@mario-VirtualBox:~$
```

Tratamos de hacer conexión de ssh a un router antes de configurarlo con el programa y observamos como es rechazado.

```
mario@mario-VirtualBox: ~/Documentos
mario@mario-VirtualBox:~$ cd Documentos/
mario@mario-VirtualBox:~/Documentos$ python3 Practica2.py
Trying 192.168.122.65...
Connected to 192.168.122.65.
Escape character is '^['.

User Access Verification

Username: admin
admin
Password: admin01

R1>enable
enable
Password: 1234

R1#terminal length 0
conf t
ip domain-name adminredes.escom.ipn.mx
ip ssh rsa keypair-name sshkey
crypto key generate rsa usage-keys label sshkey modulus 1024
ip ssh v 2
ip ssh authentication-retries 3
line vty 0 15
login local
transport input ssh
end
Trying 192.168.122.130...
Connected to 192.168.122.130.
```

```
mario@mario-VirtualBox: ~/Documentos
end
Trying 192.168.122.130...
Connected to 192.168.122.130.
Escape character is '^['.

User Access Verification

Username: admin
admin
Password: admin01

R2>enable
enable
Password: 1234

R2#terminal length 0
conf t
ip domain-name adminredes.escom.ipn.mx
ip ssh rsa keypair-name sshkey
crypto key generate rsa usage-keys label sshkey modulus 1024
ip ssh v 2
ip ssh authentication-retries 3
line vty 0 15
login local
transport input ssh
end
Trying 192.168.122.138...
Connected to 192.168.122.138.
Escape character is '^['.

mario@mario-VirtualBox: ~/Documentos
Navegador web Firefox
Connected to 192.168.122.134.
Escape character is '^['.

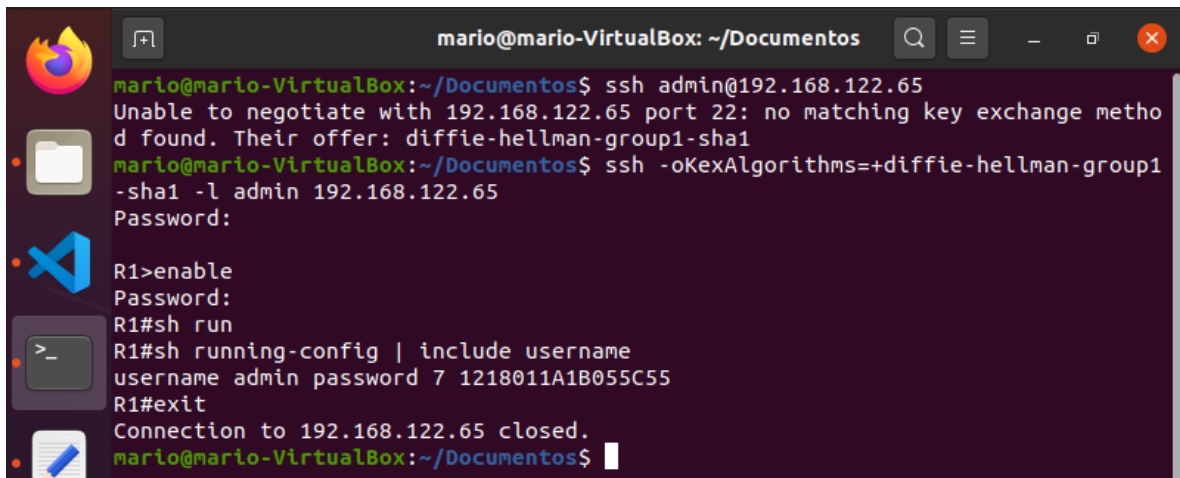
User Access Verification

Username: admin
admin
Password: admin01

R4>enable
enable
Password: 1234

R4#terminal length 0
conf t
ip domain-name adminredes.escom.ipn.mx
ip ssh rsa keypair-name sshkey
crypto key generate rsa usage-keys label sshkey modulus 1024
ip ssh v 2
ip ssh authentication-retries 3
line vty 0 15
login local
transport input ssh
end
```

Podemos observar como ha terminado el programa.

A terminal window titled 'mario@mario-VirtualBox: ~/Documentos' with standard window controls. The terminal shows a sequence of commands and their outputs. First, 'ssh admin@192.168.122.65' is run, resulting in an error about key exchange methods. Then, 'ssh -oKexAlgorithms=+diffie-hellman-group1-sha1 -l admin 192.168.122.65' is run, prompting for a password. The user enters 'R1>enable', then 'R1#sh run', which outputs 'R1#sh running-config | include username' and 'username admin password 7 1218011A1B055C55'. After 'R1#exit', the connection closes. The prompt returns to 'mario@mario-VirtualBox: ~/Documentos\$'.

```
mario@mario-VirtualBox:~/Documentos$ ssh admin@192.168.122.65
Unable to negotiate with 192.168.122.65 port 22: no matching key exchange method found. Their offer: diffie-hellman-group1-sha1
mario@mario-VirtualBox:~/Documentos$ ssh -oKexAlgorithms=+diffie-hellman-group1-sha1 -l admin 192.168.122.65
Password:
R1>enable
Password:
R1#sh run
R1#sh running-config | include username
username admin password 7 1218011A1B055C55
R1#exit
Connection to 192.168.122.65 closed.
mario@mario-VirtualBox:~/Documentos$
```

Ahora añadimos el algoritmo y vemos como podemos hacer el ssh sin ningún problema.

\*En caso de que marque errores con las llaves, poner en la terminal ssh-keygen <dirección ip>, con esto queda solucionado.