



IUS
INSTITUT
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DES SCIENCES

Faculté des Sciences et Technologie

(FST)

Niveau : L3-FST

Réseaux 1

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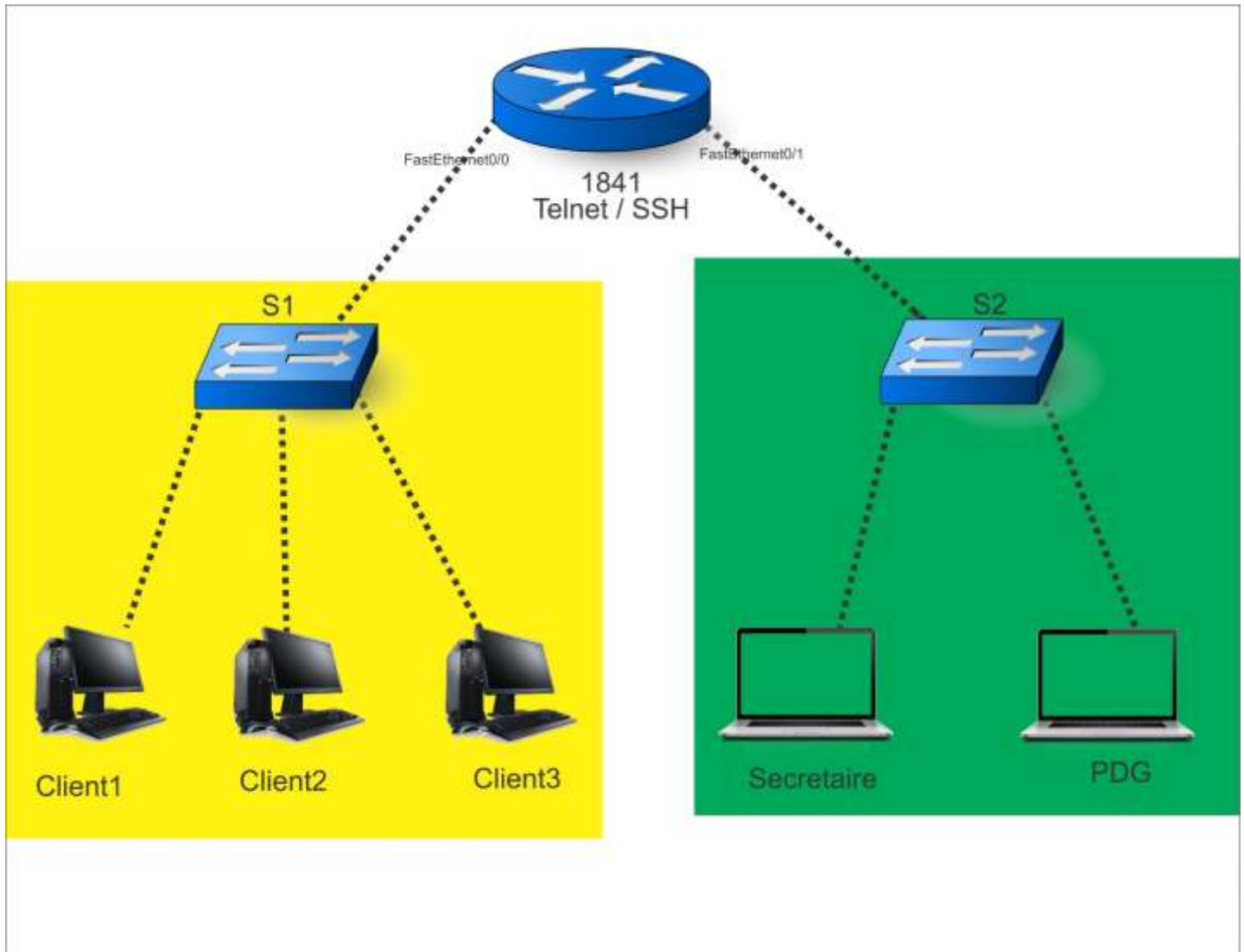
Projet 1 : Étude et Mise en Œuvre des Protocoles Telnet et SSH.

Objectif du Projet

Ce projet vise à :

1. Comparer et analyser les protocoles Telnet et SSH en termes de fonctionnement, sécurité, et applications.
2. Configurer et sécuriser des connexions à distance sur des équipements réseau en utilisant ces protocoles.
3. Expérimenter les vulnérabilités de Telnet et comprendre l'importance de SSH en tant que protocole sécurisé.

1) Diagramme de topologie réseau.



2) Configuration réseau.

Scripts ou fichiers de configuration pour chaque appareil utilisé dans le projet.

The image displays two screenshots of a network simulation environment, likely Packet Tracer, showing a switch configuration process.

Top Screenshot: The network diagram shows a central switch connected to three PC-PT clients (Client 1, Client 2, Client 3). A Telnet/SSH window is open, showing the initial configuration dialog and the beginning of the configuration script. The script includes commands to enable the router, configure the terminal, set the hostname to R1, and configure the interfaces.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface F0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#
%LINK-3-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-3-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
R1(config)#interface F0/1
R1(config-if)#ip address 192.168.2.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#
%LINK-3-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-3-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
exit
R1(config)#line cty 0 4
R1(config)#line vty 0 4
R1(config-line)#login
% Login disabled on line 194, until 'password' is set
% Login disabled on line 195, until 'password' is set
% Login disabled on line 196, until 'password' is set
% Login disabled on line 197, until 'password' is set
% Login disabled on line 198, until 'password' is set
R1(config-line)#password douda
R1(config-line)#login
R1(config-line)#enable secret douda
```

Bottom Screenshot: The same network diagram is shown, but the Telnet/SSH window displays the completion of the configuration script. The script includes commands to set the password to 'douda', enable the secret, and exit the configuration mode. The final output shows that the configuration is complete and the router is now available.

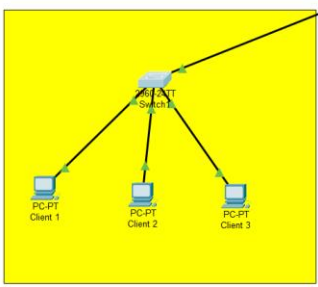
```
R1(config-line)#enable secret douda
R1(config-line)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console
exit

R1 con0 is now available.

Press RETURN to get started.
```

File Edit Options View Tools Extensions Window Help

Logical Physical x 584, y 328



Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
ALINK-S-CHANGED: Interface FastEthernet0/1, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
ALINK-S-CHANGED: Interface FastEthernet0/4, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
ALINK-S-CHANGED: Interface FastEthernet0/1, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch>enable
Switch>conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#int vlan1
S1(config-if)#ip address 192.168.1.2 255.255.255.0
S1(config-if)#no shut

S1(config-if)#
ALINK-S-CHANGED: Interface Vlan1, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface Vlan1, changed state to up
exit
S1(config)#ip default-gateway 192.168.1.1 255.255.255.0
S1(config)#exit
S1#
NS1S-S-CONFIG_I: Configured from console by console
```

Copy Paste

Delete (delete)

Time: 11:30:32

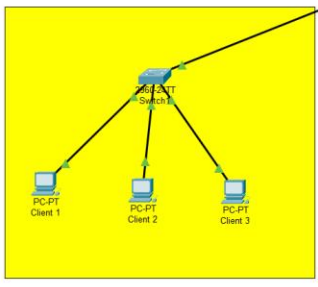
Automatically Choose Connection Type

Finance headline

File Edit Options View Tools Extensions Window Help

Logical Physical x 582, y 274

Logical Physical x 582, y 274



Switch2

Physical Config CLI Attributes

IOS Command Line Interface

```
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
ALINK-S-CHANGED: Interface FastEthernet0/1, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch>enable
Switch>conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#int vlan1
S2(config-if)#ip add 192.168.2.2 255.255.255.0
S2(config-if)#no shut

S2(config-if)#
ALINK-S-CHANGED: Interface Vlan1, changed state to up
ALINK-S-UPDOWN: Line protocol on Interface Vlan1, changed state to up
exit
S2(config)#ip default-gateway 192.168.1.1
S2(config)#exit
S2#
NS2S-S-CONFIG_I: Configured from console by console
exit

S2 con0 is now available

Press RETURN to get started.
```

Copy Paste

Delete (delete)

Time: 11:30:50

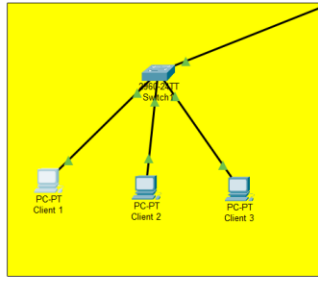
Automatically Choose Connection Type

Watchlist Ideas

File Edit Options View Tools Extensions Window Help

Logical Physical x 654, y 635

Logical Physical x 654, y 635



Client 1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.10

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80:20A:41FF:FE95:7A9D

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Time: 11:31:07

Automatically Choose Connection Type

Watchlist Ideas

File Edit Options View Tools Extensions Window Help

Logical Physical x 654, y 635

File Edit Options View Tools Extensions Window Help

Logical Physical x: 650, y: 123

Client 2

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.11

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80:2D0:97FF:FE54:1ECA

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Time: 11:31:20

Watchlist Ideas

Search

Realtime

Delete (delete)

Automatically Choose Connection Type

Top

File Edit Options View Tools Extensions Window Help

Logical Physical x: 654, y: 451

Client 3

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.12

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80:202:4AFF:FEC0:E3D

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Time: 11:31:33

Watchlist Ideas

Search

Realtime

Delete (delete)

Automatically Choose Connection Type

Top

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x 897, y 473

Secretaire

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.10

Subnet Mask 255.255.255.0

Default Gateway 192.168.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80:202:17FF:FEA4:999C

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Time: 11:31:48

78°F Partly cloudy

PC-PT Client 1 PC-PT Client 2 PC-PT Client 3

1941 Telnet / S

Realtime

Delete (delete)

Automatically Choose Connection Type

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x 375, y 120

PDG

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.11

Subnet Mask 255.255.255.0

Default Gateway 192.168.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80:2E0:8FFF:FE79:29B5

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Time: 11:32:00

78°F Partly cloudy

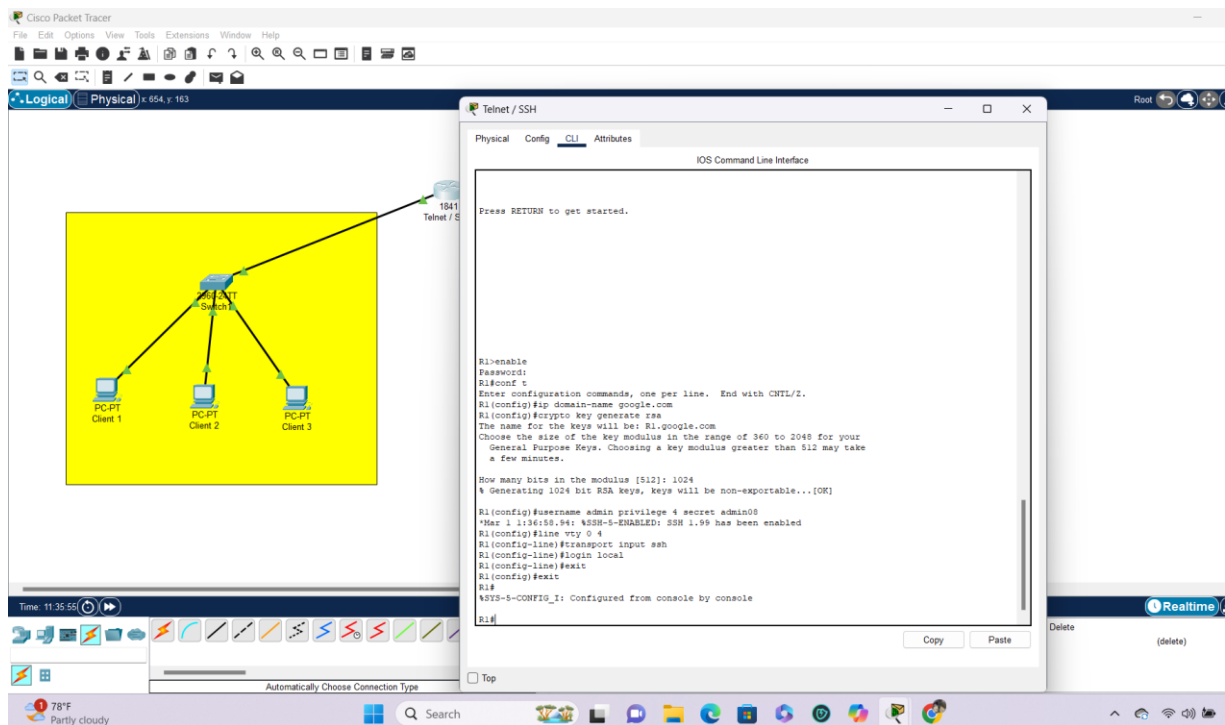
PC-PT Client 1 PC-PT Client 2 PC-PT Client 3

1941 Telnet / S

Realtime

Delete (delete)

Automatically Choose Connection Type



```

R1>show ip ssh
SSH Enabled - version 1.99
Authentication timeout: 120 secs; Authentication retries: 3
R1>show arp
Protocol Address           Age (min)  Hardware Addr   Type   Interface
Internet 192.168.1.1              -    0002.1754.6801  ARPA   FastEthernet0/0
Internet 192.168.1.10            78    000A.4105.7A9D  ARPA   FastEthernet0/0
Internet 192.168.1.11            77    00D0.9754.1ECA  ARPA   FastEthernet0/0
Internet 192.168.1.12            62    0002.4AC0.0E3D  ARPA   FastEthernet0/0
Internet 192.168.2.1              -    0002.1754.6802  ARPA   FastEthernet0/1
Internet 192.168.2.10            64    0002.17A4.999C  ARPA   FastEthernet0/1
Internet 192.168.2.11            78    00E0.8F79.29B5  ARPA   FastEthernet0/1
  
```


3) Analyse des Protocoles.

Comparaison des protocoles Telnet et SSH, avec une analyse de la sécurité.

- **Telnet**

Avantages : Simplicité, facilité d'utilisation.

Inconvénients : Non sécurisé (transmission des données en clair)

Cas d'utilisation : Environnement sécurisés ou internes.

Sécurité : Non chiffré, expose les données à des risques d'interception.

- **SSH**

Avantages : Sécurisé (chiffrement des données), authentification forte.

Inconvénients : Complexité de configuration.

Cas d'utilisation : Accès distant sécurisé.

Sécurité : Chiffrement des connexions, protection des données échangées.

4) Tests et Observations

The image displays two sequential screenshots of a network simulation environment, likely Cisco Packet Tracer, showing a central switch connected to three PC-PT clients (Client 1, Client 2, and Client 3) and a Telnet/Switch interface. The simulation is running in a window titled 'PDG' (Physical Desktop GUI).

Top Screenshot: The 'Command Prompt' window shows the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.11: bytes=32 time=5ms TTL=127
Reply from 192.168.1.11: bytes=32 time=1ms TTL=127
Reply from 192.168.1.11: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 2ms

C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Bottom Screenshot: The 'Command Prompt' window shows the following output:

```
C:\>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127
Reply from 192.168.1.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.11: bytes=32 time=5ms TTL=127
Reply from 192.168.1.11: bytes=32 time=1ms TTL=127
Reply from 192.168.1.11: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 2ms

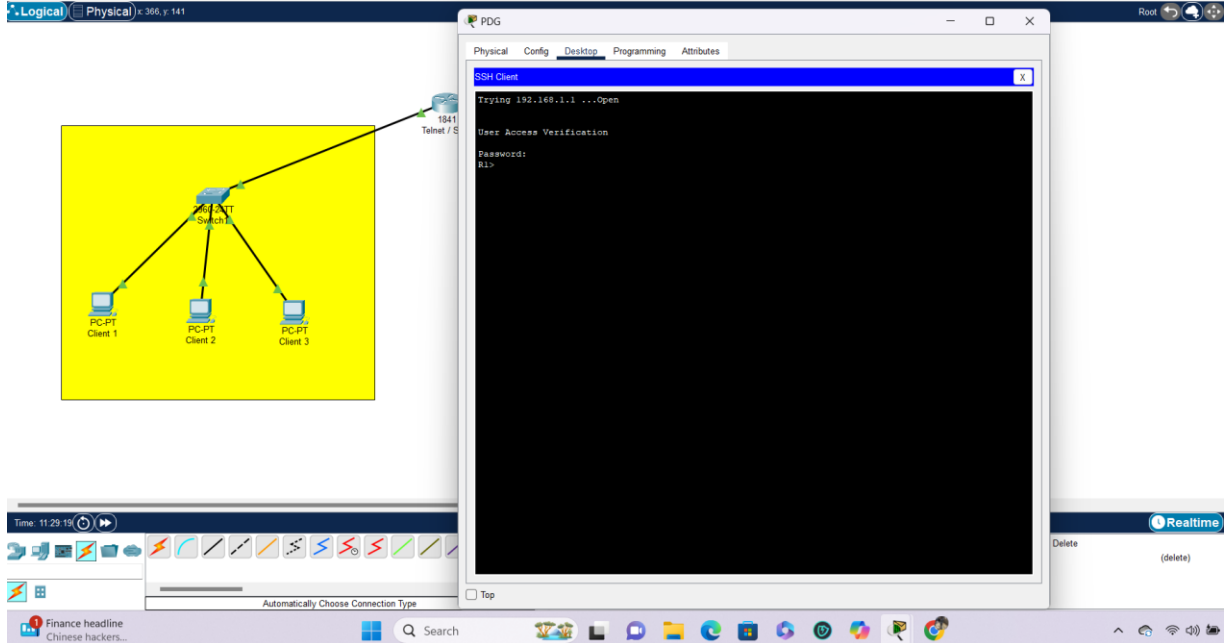
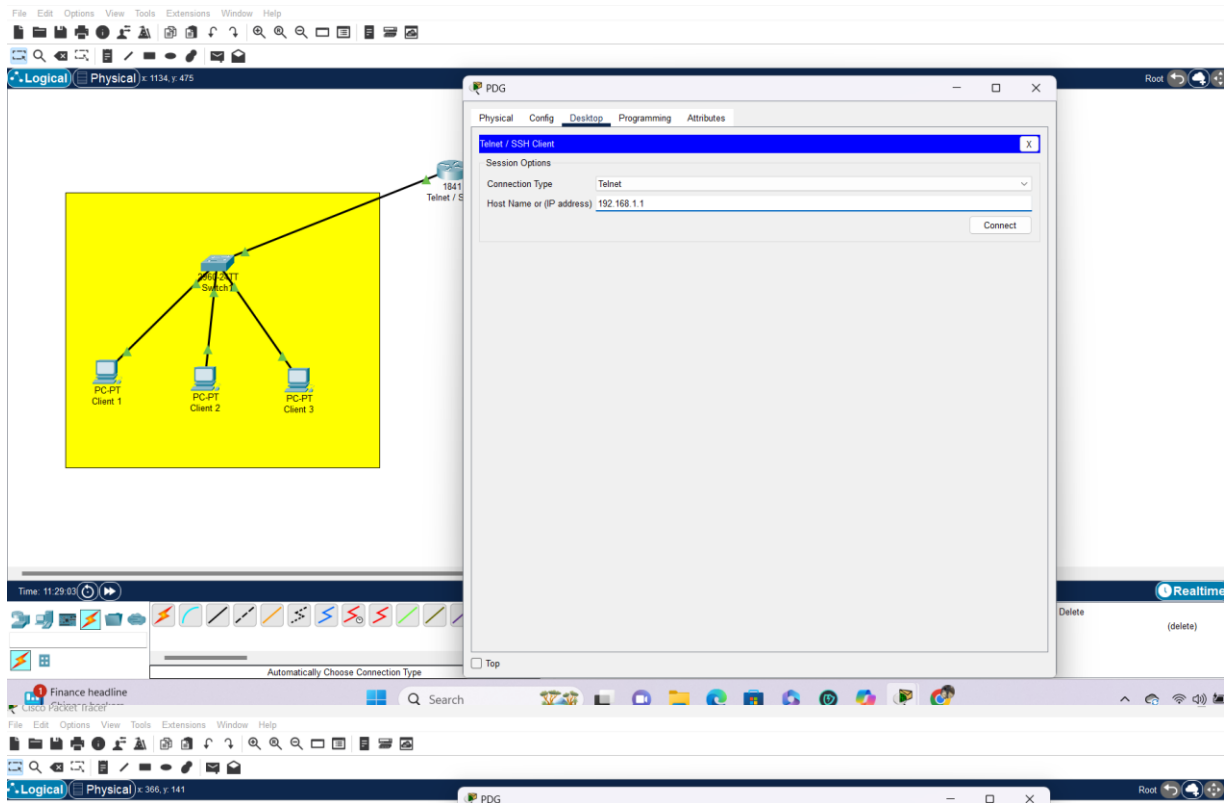
C:\>ping 192.168.2.10

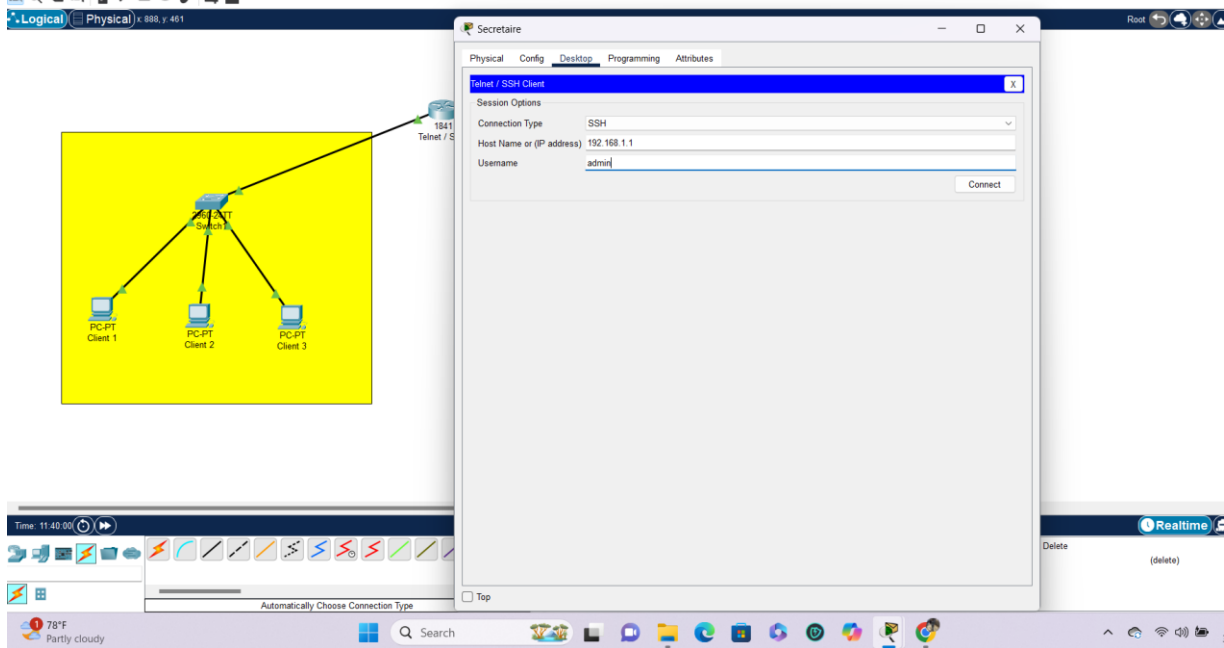
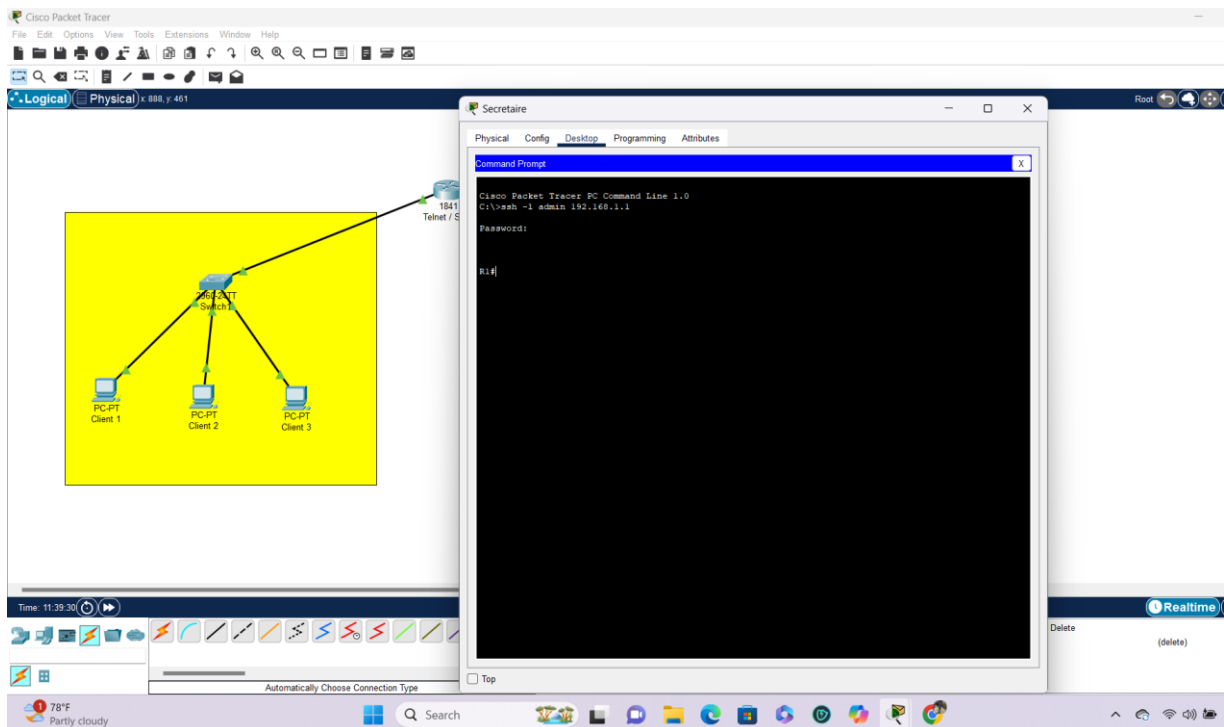
Pinging 192.168.2.10 with 32 bytes of data:
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128
Reply from 192.168.2.10: bytes=32 time=1ms TTL=128

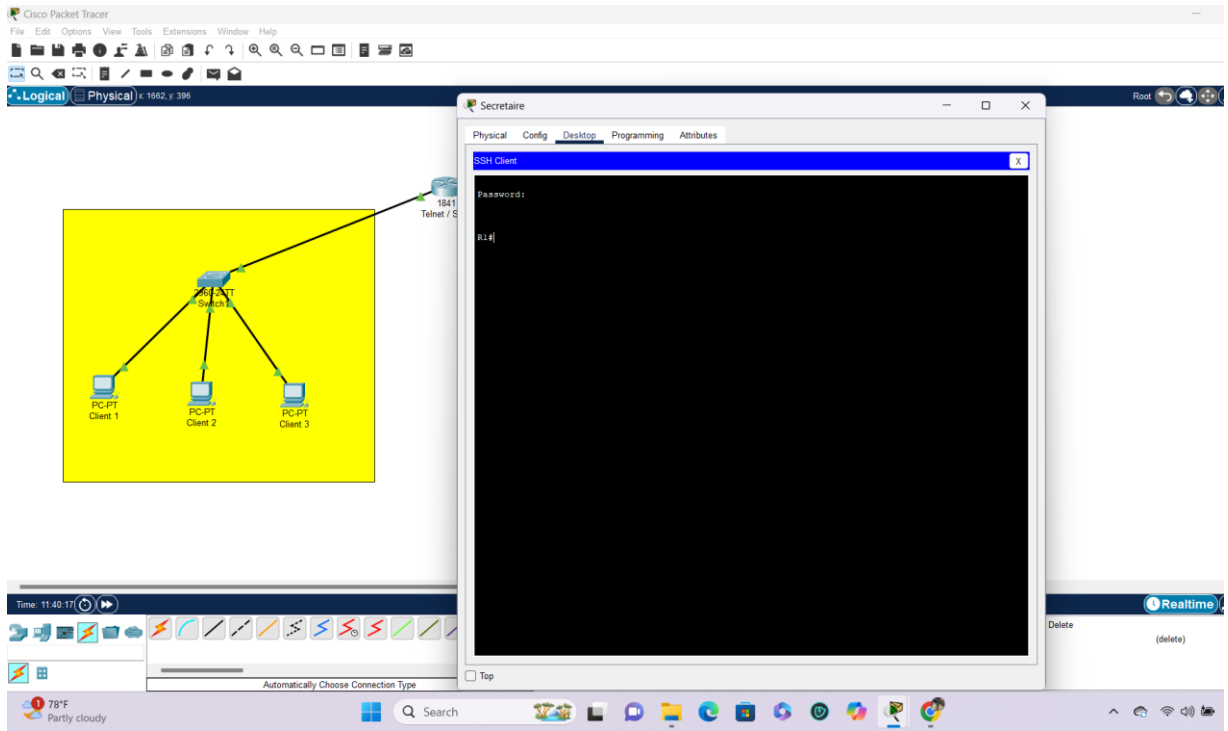
Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open

User Access Verification
Password:
#>
```







5) Conclusion

Ce projet permet de comprendre l'importance des protocoles de communication sécurisés dans les réseaux modernes. En analysant Telnet et SSH, nous mettons en lumière les enjeux de sécurité associés aux connexions à distance et la nécessité d'adopter des pratiques sécurisées dans la gestion des réseaux.