786

Name: Muhammad Sherjeel Akhtar

Subject: Computer Networks Lab

Roll No: 20p-0101

Section: 5B

Lab Assignment No: 1

Submitted To Respected Ma'am: **Miss Hurmat Hidayat**

Operation 1:

First of all place a Router from the available routers list.

Demonstration:

Operation 2: Changing Mode

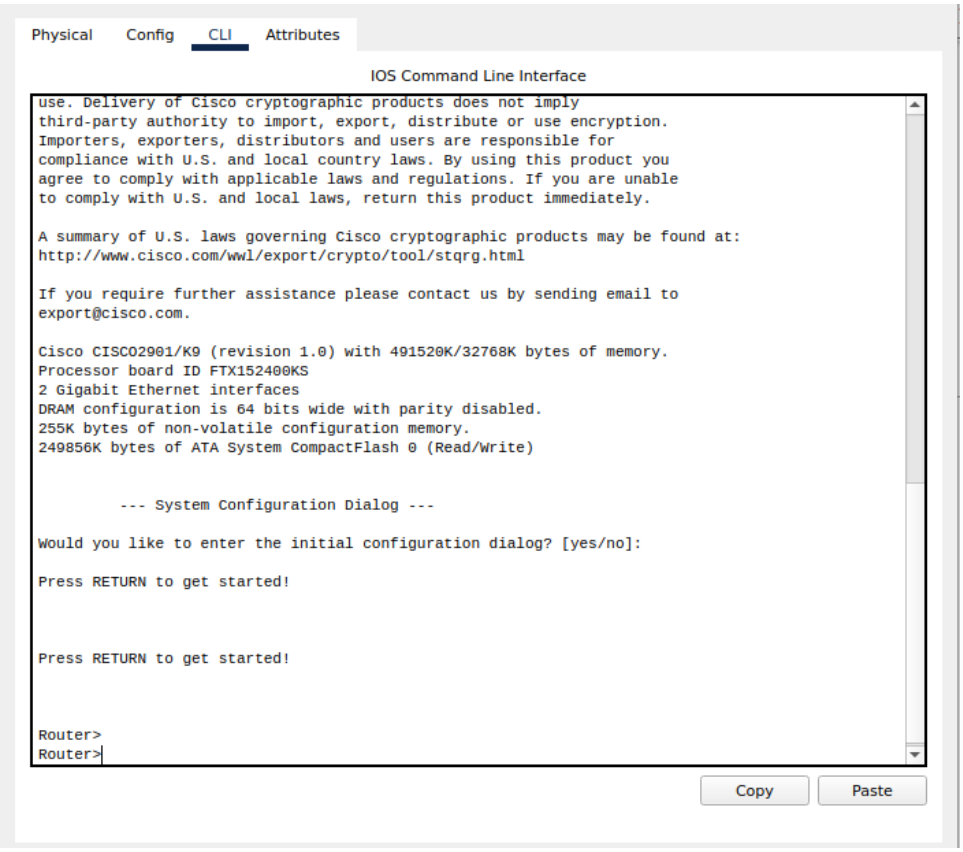
Now first of all we will look into the modes of the router.

Mode 1: EXEC Mode

The EXEC mode is represented by 'Router >'

By default the router is in EXEC Mode.

Demonstration:

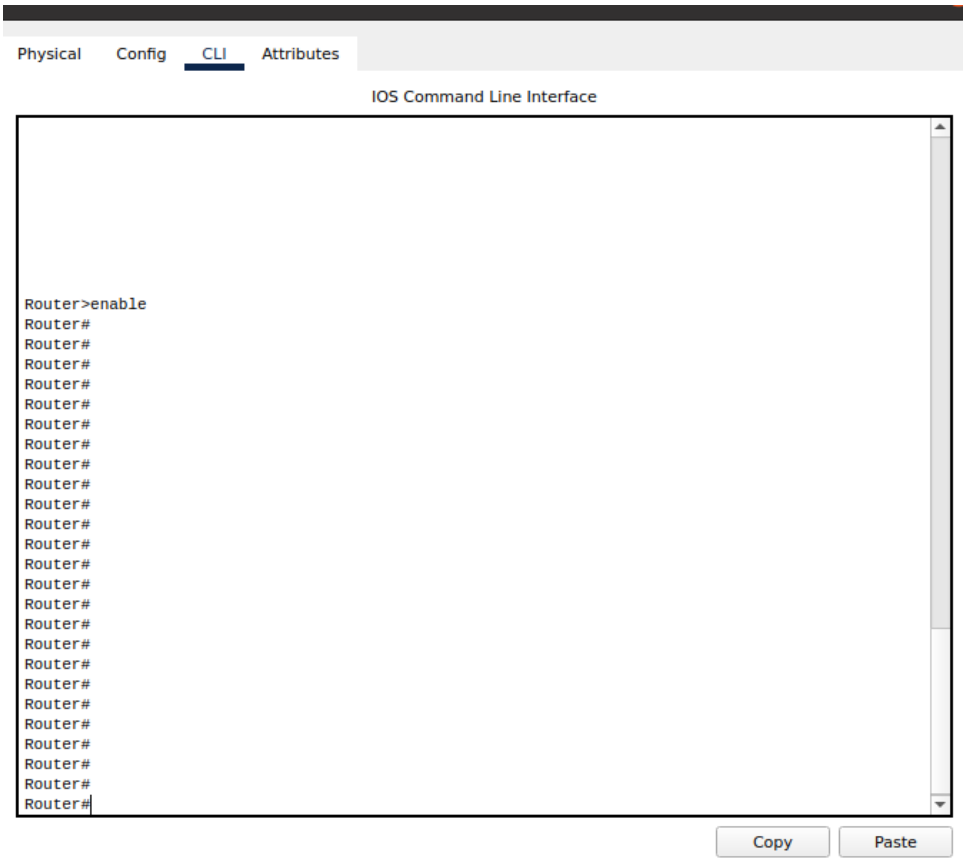


Mode 2: Privileged EXEC Mode

The Privileged EXEC Mode is represented by ‘Router #’ .

To enter this mode, we have to write ‘enable’ in the Command Line Interface.

Demonstration:

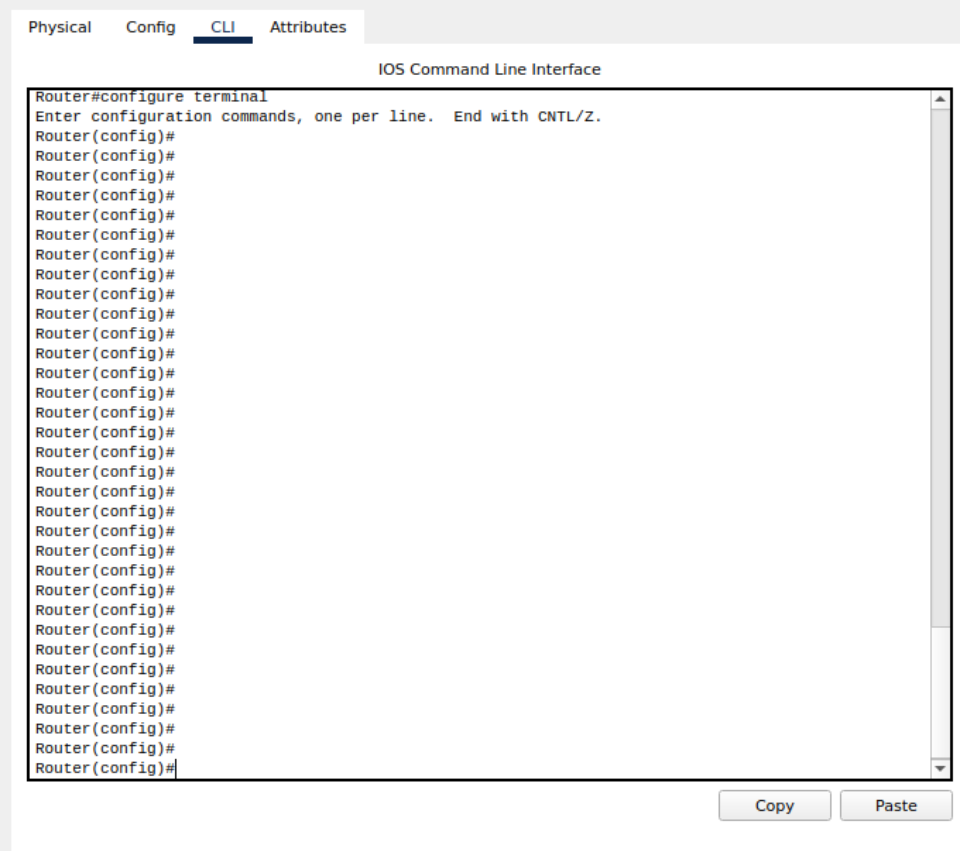


Mode 3: Global Configuration Mode

The global configuration mode is represented by 'Router(config)#'.

To enter 'router configuration mode', we have to write 'configure terminal' in the CLI.

Demonstration:



Mode 4: Interface Configuration

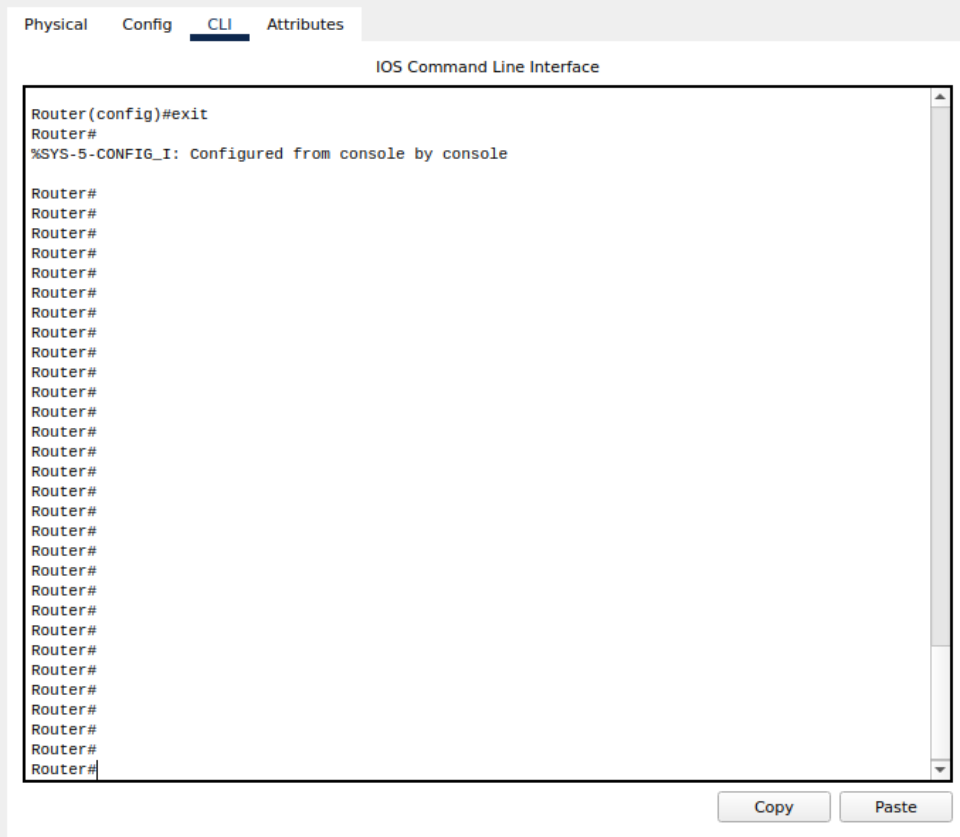
The interface configuration mode is represented by 'Router(config-if)#'.

To enter 'Interface Configuration' mode, we have to write 'interface <interface name+number>' in the CLI.

Exiting Mode:

To exit any mode. Simply type the word 'exit' in the CLI.

Demonstration:



HOST Name:

Changing Host Name:

The Host Name of the router can also be changed.

To change the host name of a router, the 'HOSTNAME ' command is used in the CLI.

To change the host name, first of all you have to change the mode of the router.

Chain Of Command:

To change the host name of a router. Enter the following commands in order.

Command 1: Router> enable

Command 2: Router#configure terminal
Command 3: Router(config)#hostname NP

Command 4: Router(config)# exit

Command 5: NP#

Demonstration:
Command 1:

```
Router>enable
Router#
```

Command 2:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
```

Command 3:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname NP
NP(config)#
```

Command 4:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname NP
NP(config)#exit
NP#
%SYS-5-CONFIG_I: Configured from console by console
```

Command 5:

Command 5 is actually the demonstration of the final product 'NP'

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname NP
NP(config)#exit
NP#
%SYS-5-CONFIG_I: Configured from console by console

NP#
```

Date And Time:

Configuring Date And Time Of Router:

The Date And Time of the router can also be changed.

This whole process is done via the Commands in the CLI.

Chain Of Commands:
In order to change the Date and Time of the router, use the following chain of commands in the particular order.

Command 1: clock set?

Command 2: clock set 12:15:00 ?

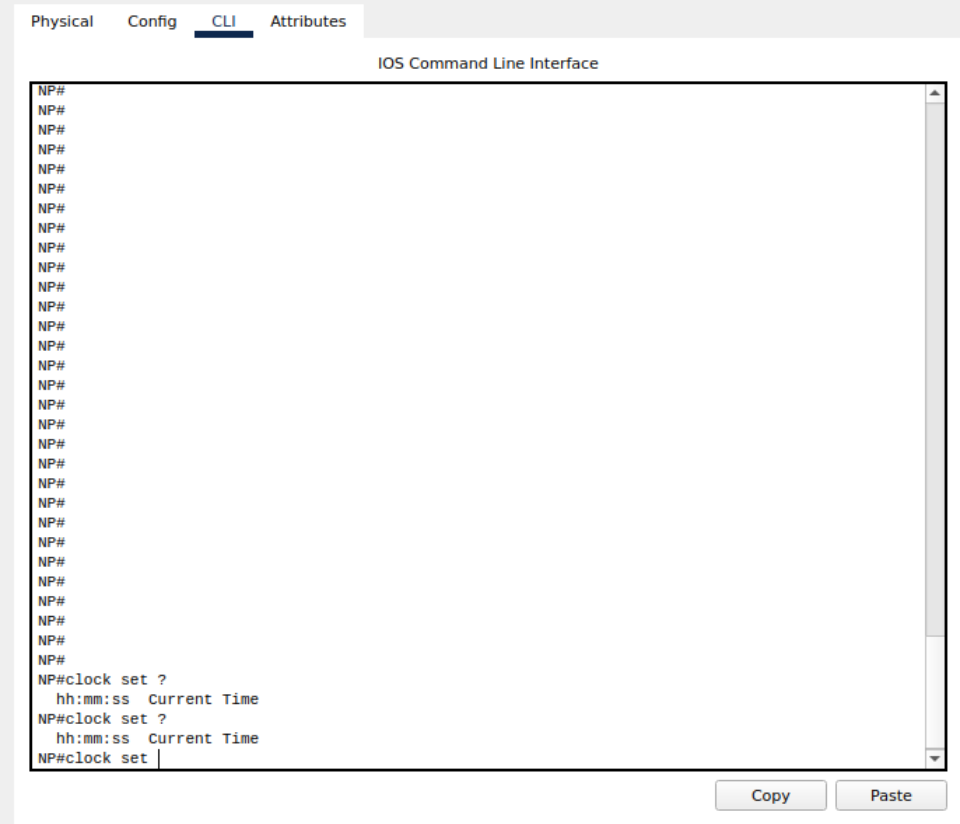
Command 3: clock set 12:15:00 17 ?

Command 4: clock set 12:15:00 17 March 2021

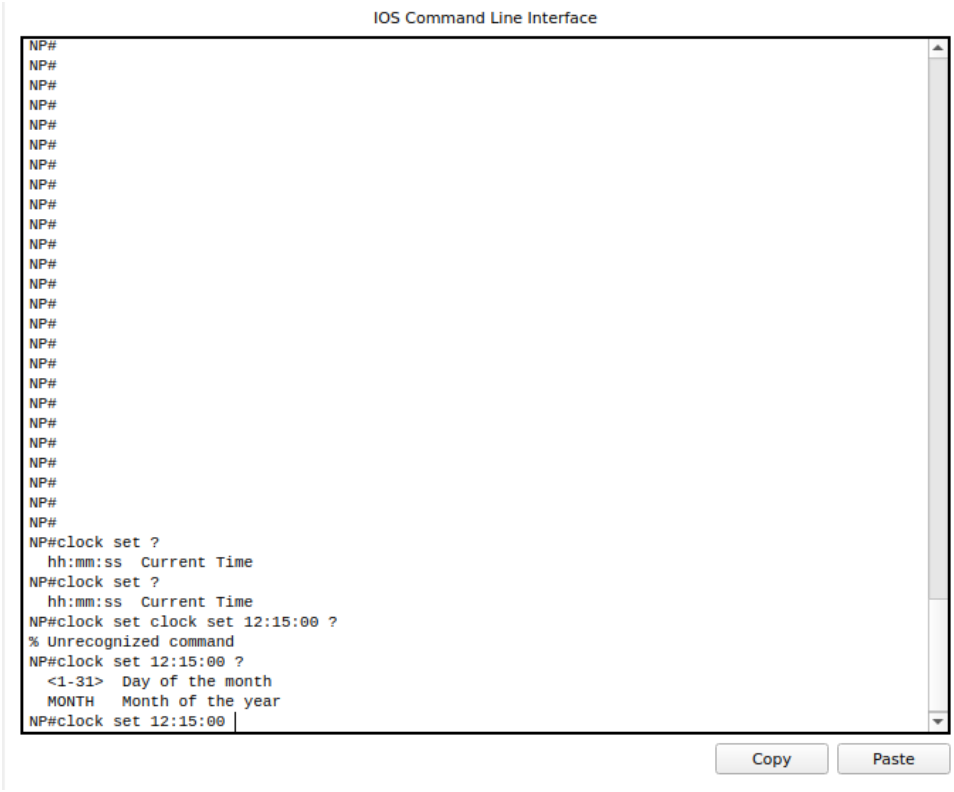
Command 5: For Verification, use command 'show clock'

Demonstration:

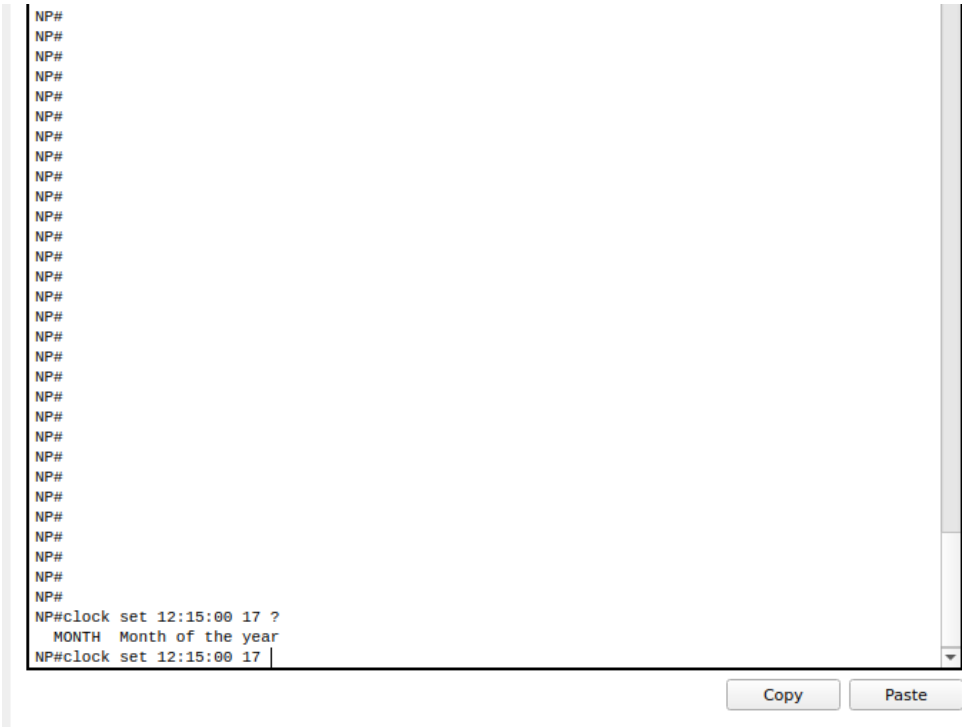
Command 1:



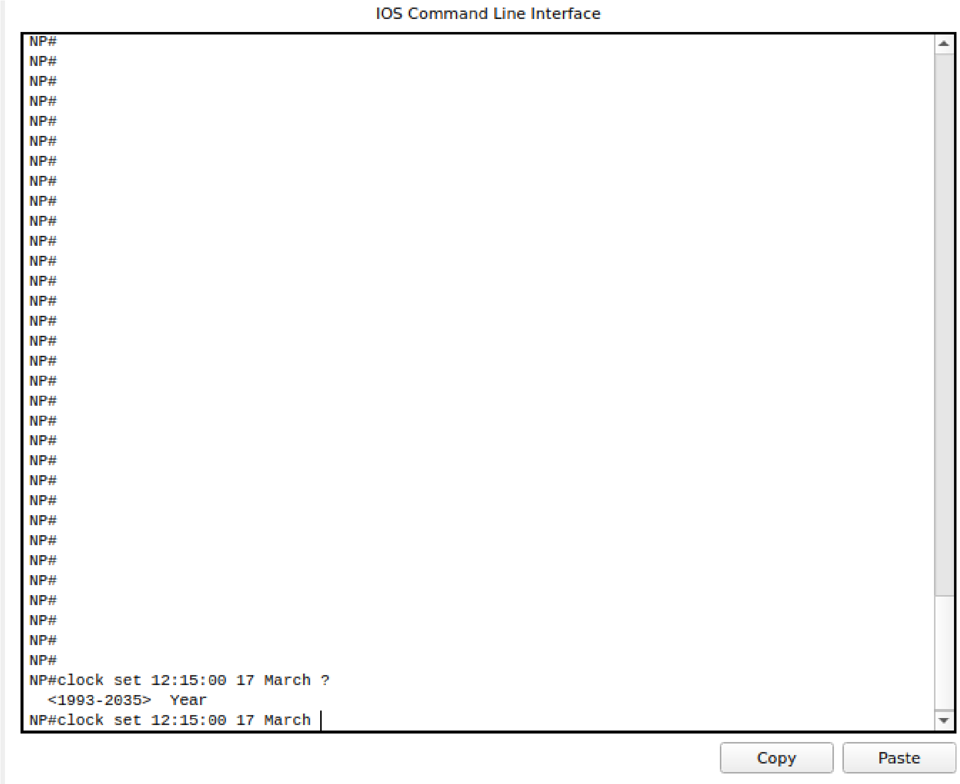
Command 2:



Command 3:



Command 4:

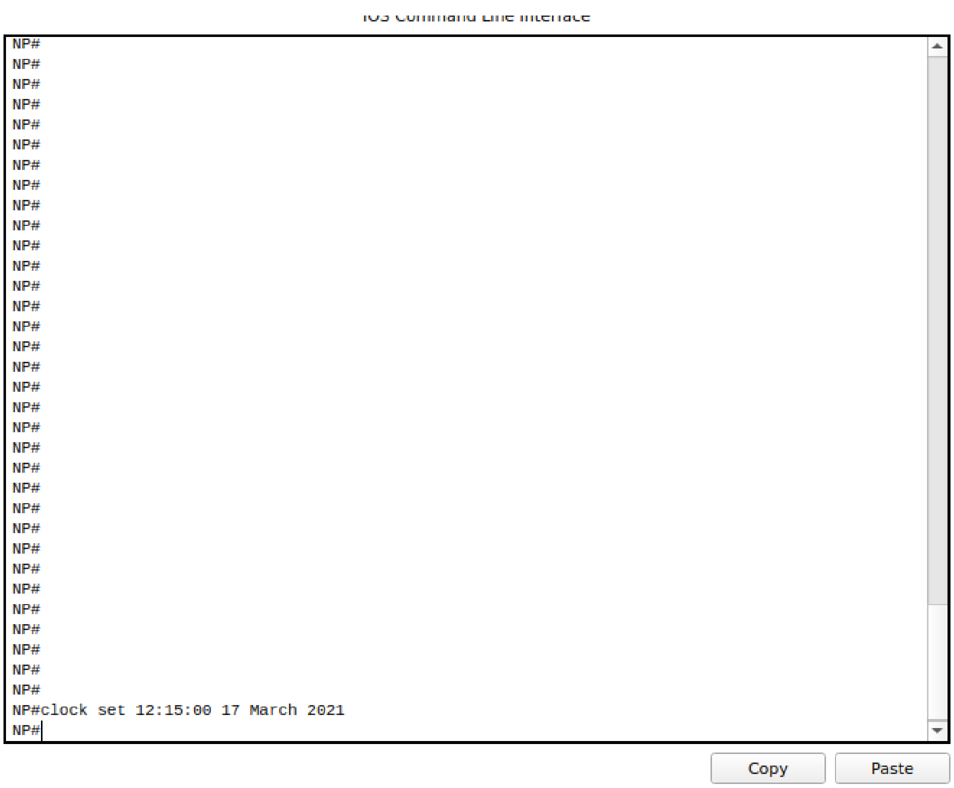


IOS Command Line Interface

```
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#clock set 12:15:00 17 March ?
  <1993-2035>  Year
NP#clock set 12:15:00 17 March
```

Copy Paste

Command 5:

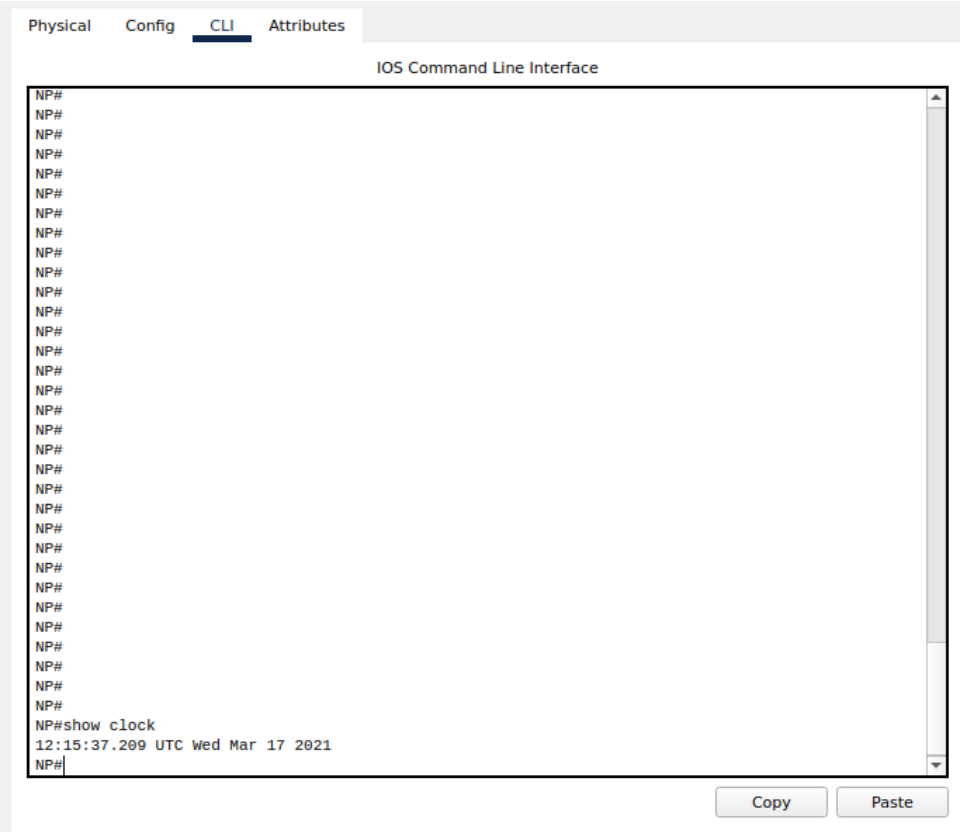


```
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#clock set 12:15:00 17 March 2021
NP#
```

Copy Paste

Command 6:

For verification, use this command.



Banner of Router:

When someone connects to the router, a pop-up show up. This pop-up is called as the banner.

Setting Banner Of The Router:

We can also set the Banner for our Router.

This banner can be configured for the router by using the Command Line (CLI).

Chain Of Commands:

To set the banner for a router, use the following chain of commands in the order.

Command 1: enable

Command 2: configure terminal

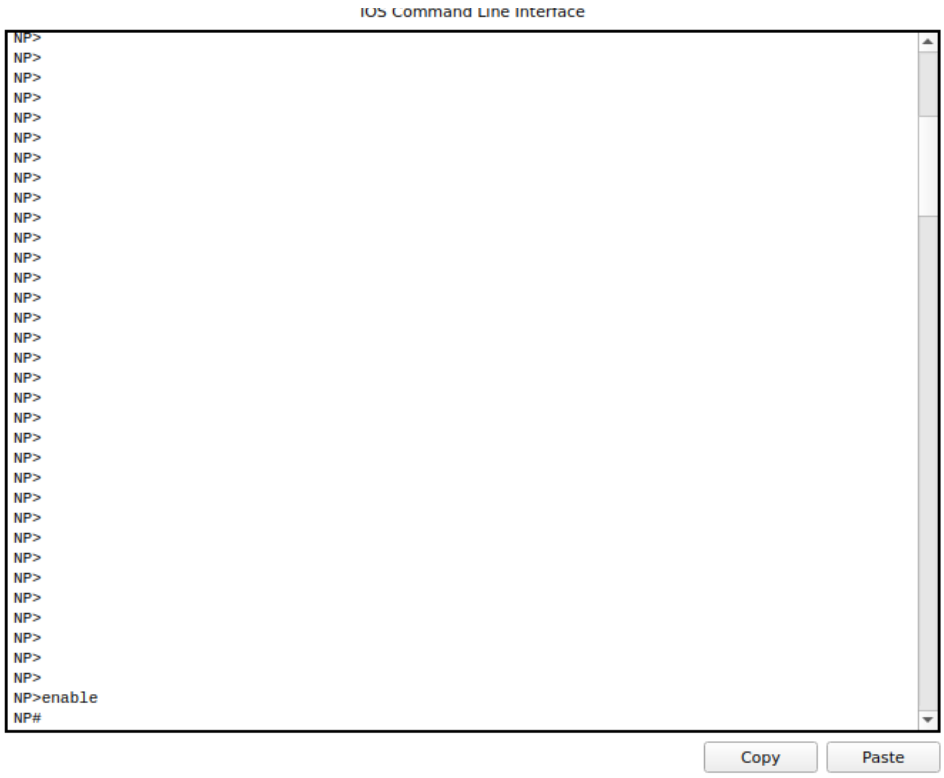
Command 3: banner motd # welcome to Networks Professionals #

Command 4: exit

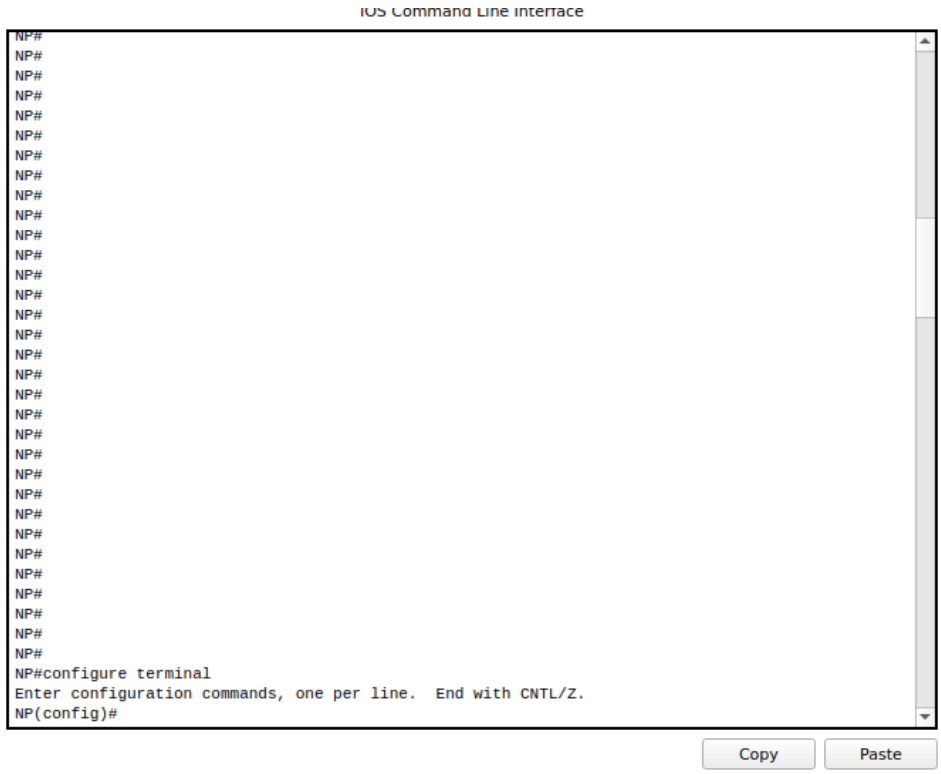
Command 5: exit

Demonstration:

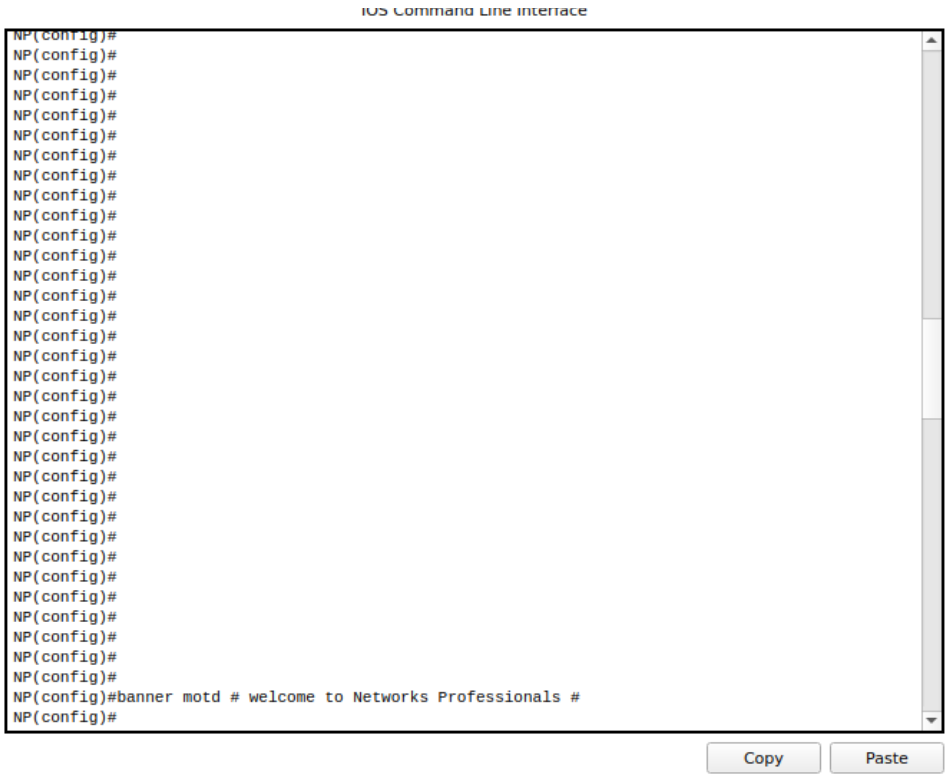
Command 1:



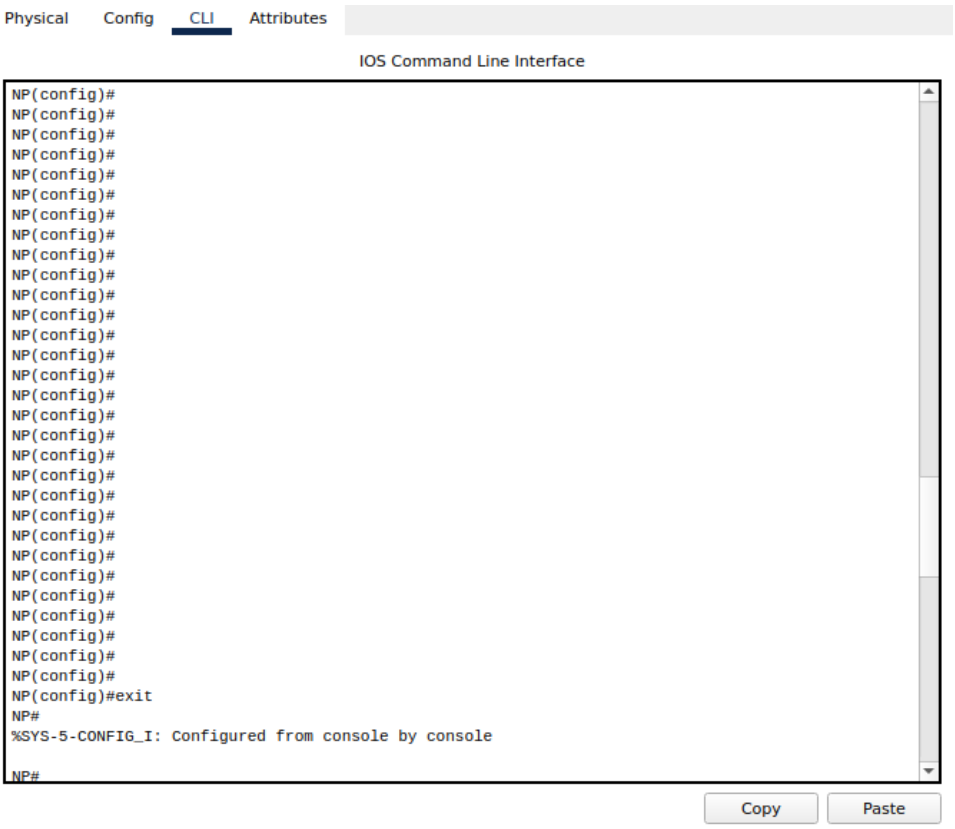
Command 2:



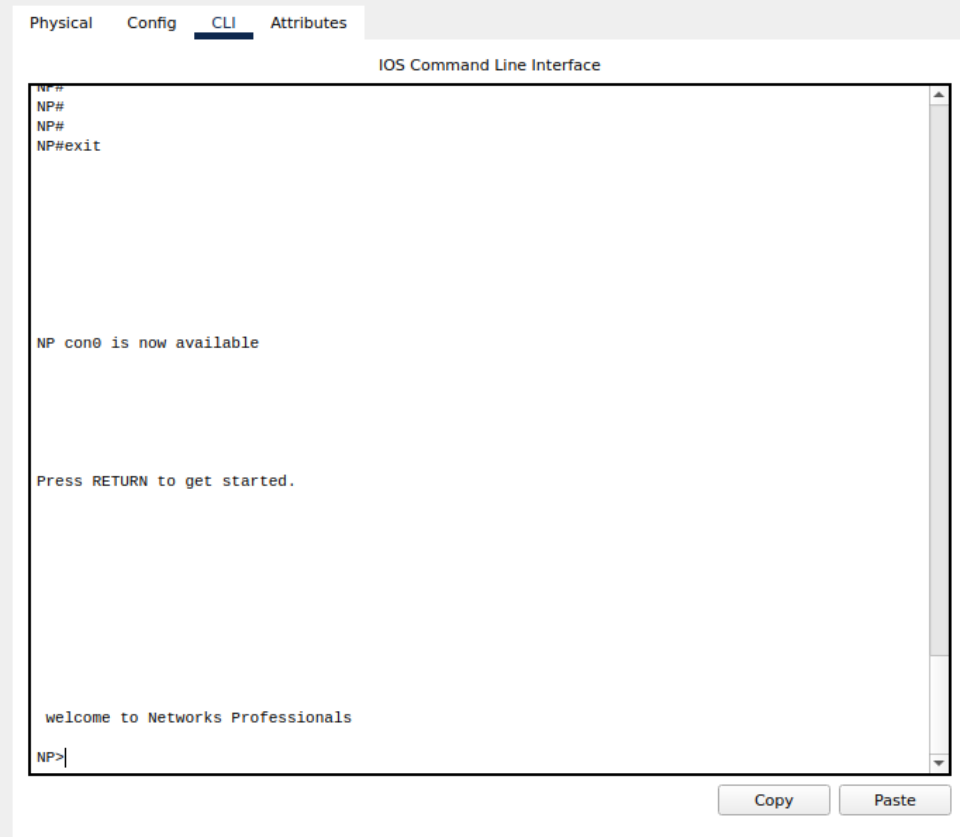
Command 3:



Command 4:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#exit
NP#
%SYS-5-CONFIG_I: Configured from console by console
NP#
Copy
Paste

Command 5:



Running Configurations And Startup Configurations Of The Router:

Displaying Running Configurations And Startup Configurations Of The Router:

We can also display the running and startup configurations of the router by using the CLI.

Chain Of Commands:

Use the following chain of commands in order to display the startup and running configurations of the router.

Command 1: enable

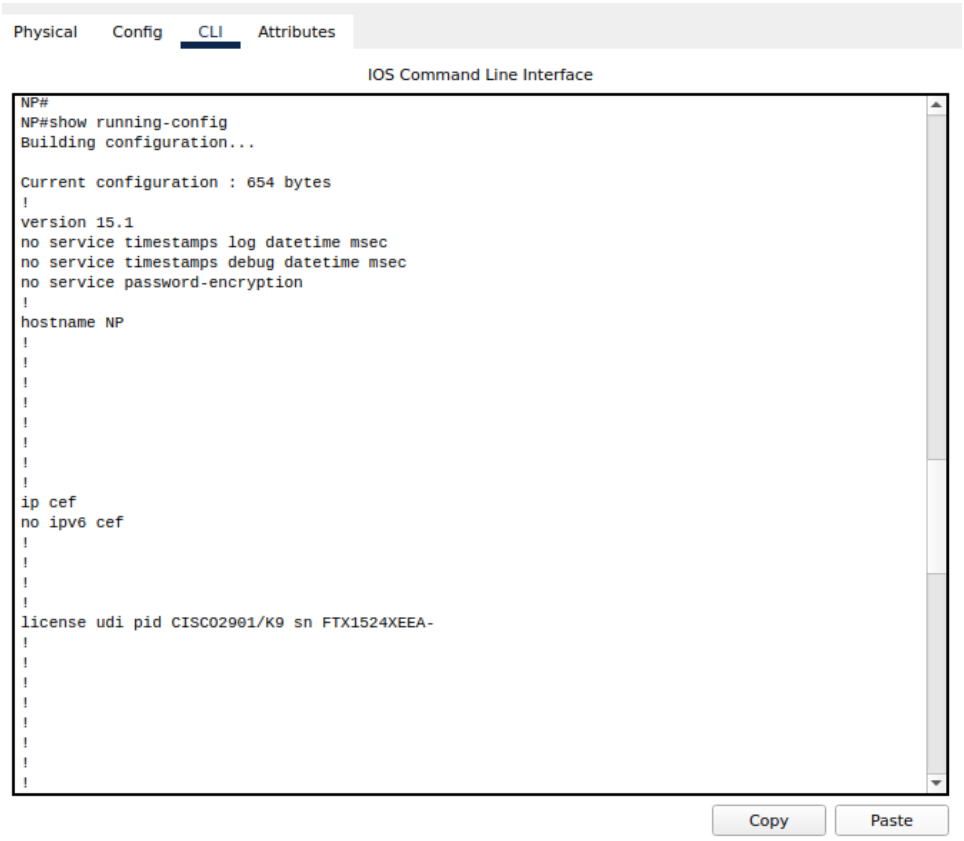
Command 2: show running-config

Demonstration:

Command 1:


IOS Command Line Interface
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>enable
NP#
NP#
NP#
Copy
Paste

Command 2:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP#
NP#show running-config
Building configuration...
Current configuration : 654 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname NP
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX1524XEEA-
!
!
!
!
!
!
!
!
Copy
Paste

Physical Config CLI Attributes

IOS Command Line Interface

```
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
```

Copy Paste

Physical Config CLI Attributes

IOS Command Line Interface

```
 no ip address
 shutdown
!
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^C welcome to Networks Professionals ^C
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end


NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
```

Copy Paste

Password and Enable Secret Password with the Encryption Techniques/Levels:

Enabling Password and Enable Secret Password with the Encryption Techniques/Levels:

We can also set Password and Secret Password for our router.

Chain Of Command:
Use the following chain of command to set the Password and Secret Password for the router.

Starting Command: enable
Command 1: configure terminal

Command 2: enable password NP222

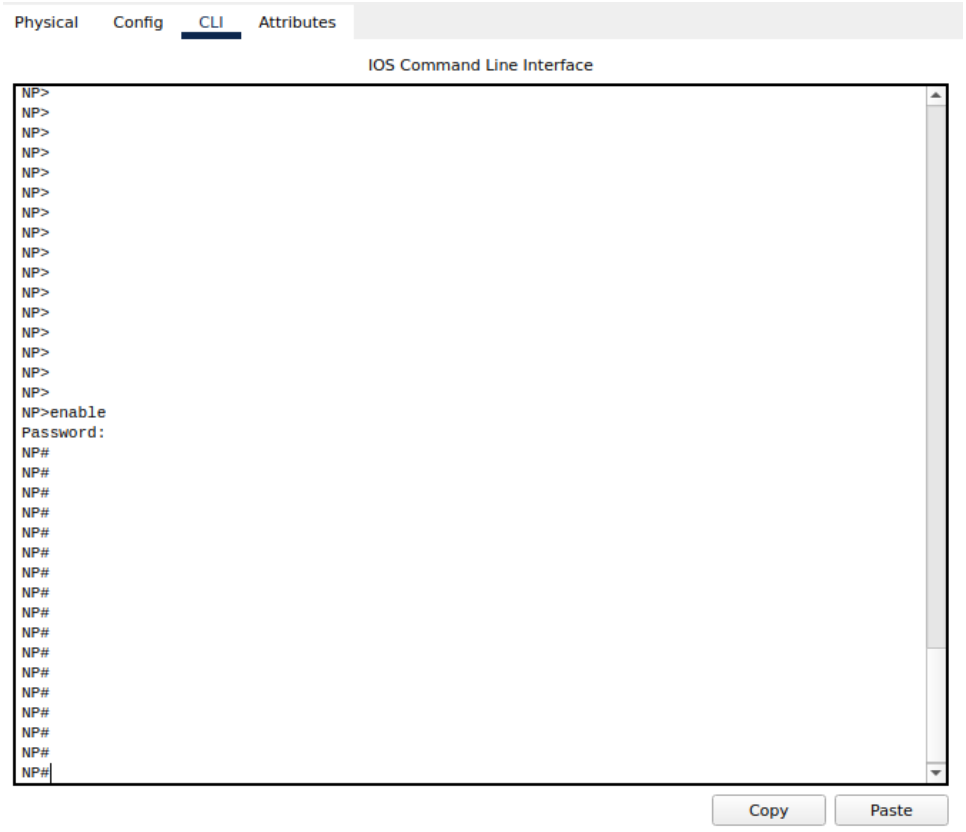
Command 3: exit

Command 4: enable

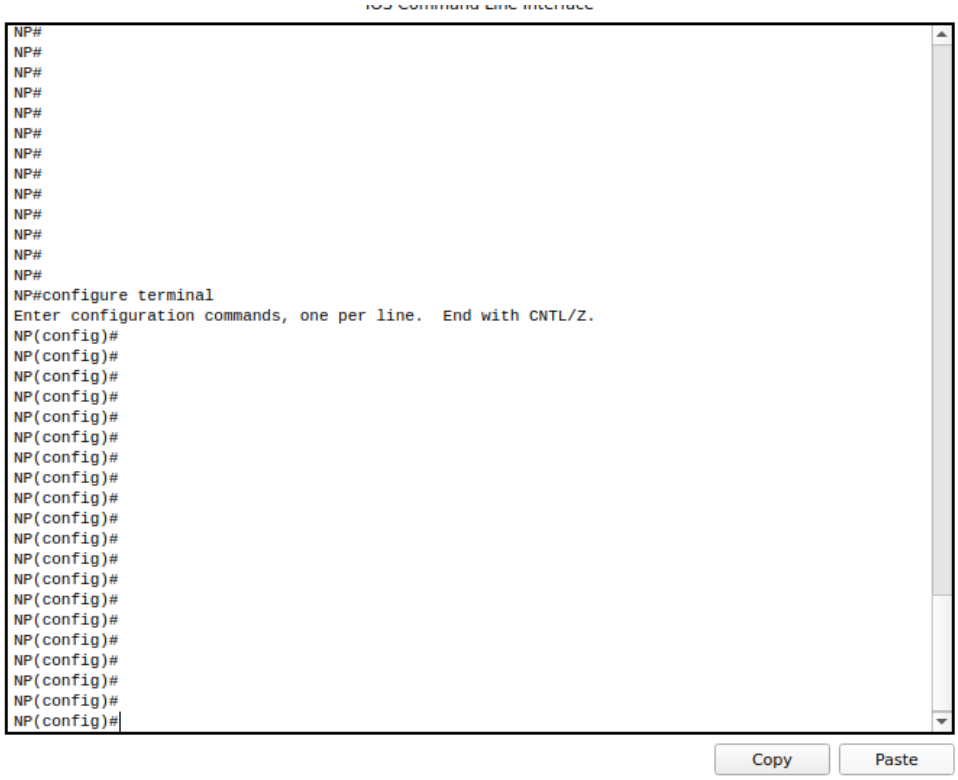
Message: Enter Password

Demonstration:

Starting Command:



Command 1:



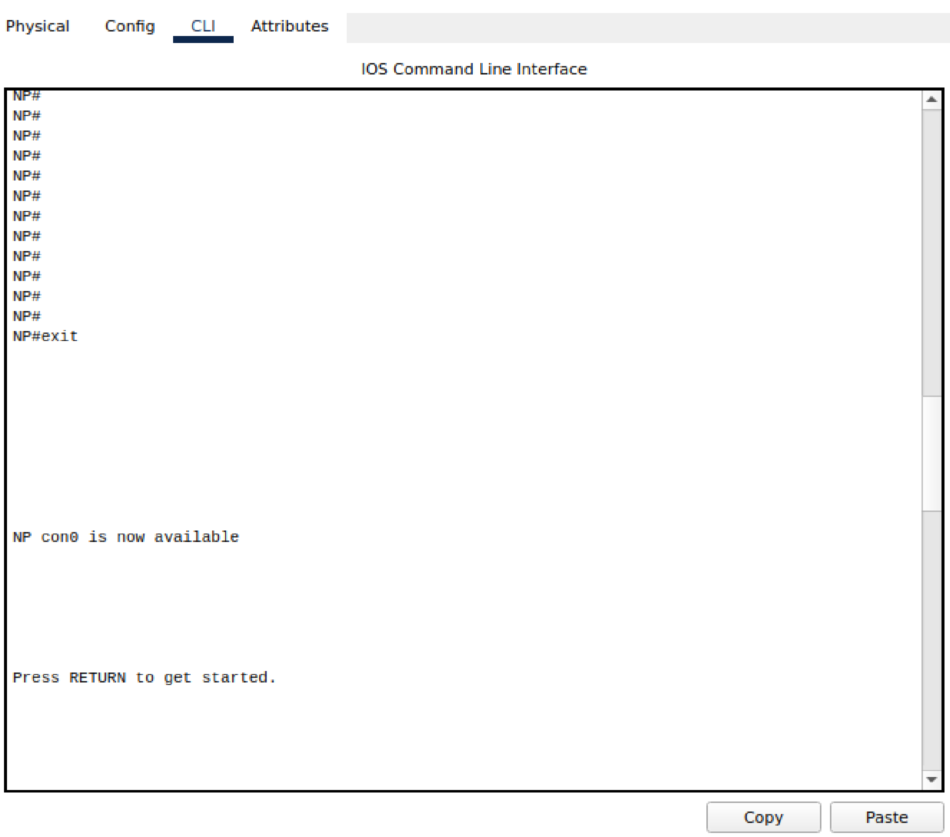
Command 2:

```
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#enable password NP222
```

Command 3:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#exit
NP#
%SYS-5-CONFIG_I: Configured from console by console
NP#
NP#
NP#

Command 4:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#exit
NP con0 is now available
Press RETURN to get started.
Copy
Paste

Physical Config CLI Attributes

IOS Command Line Interface

```
 welcome to Networks Professionals

NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
```

Copy Paste

Physical Config CLI Attributes

IOS Command Line Interface

```
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>enable
Password:
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
NP#
```

Copy Paste

Secret Password For Privileged Mode:

You can also set a secret password for a router.

Chain Of Commands:

Use the following chain of commands.

Command 1: enable

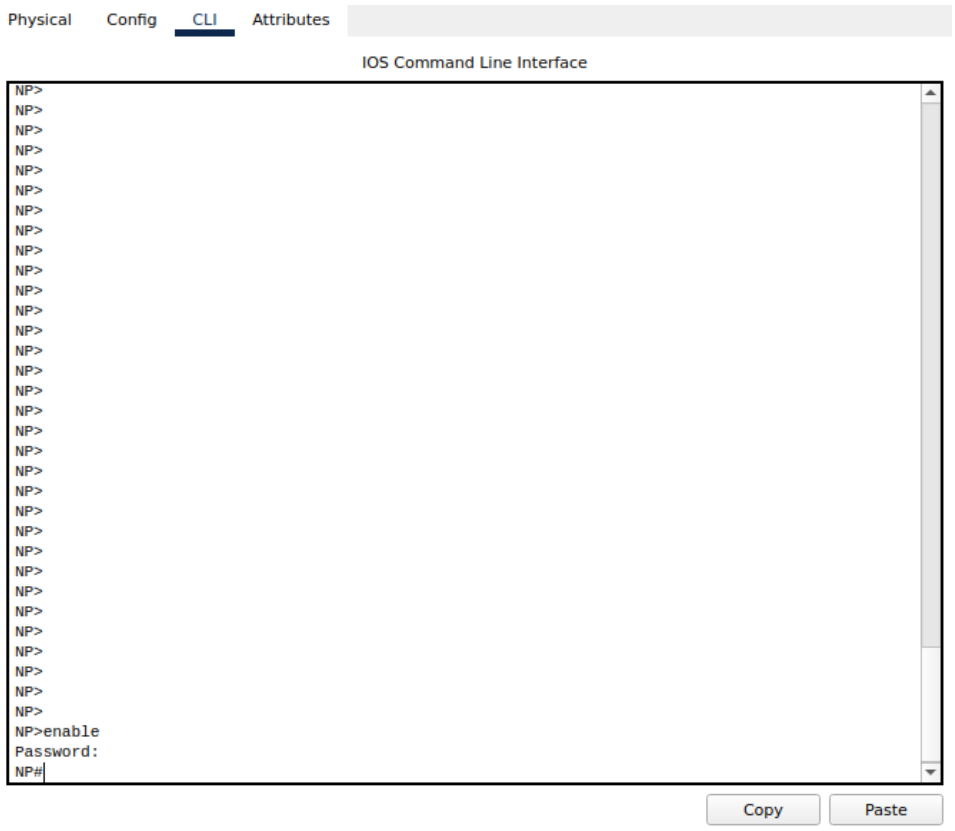
Command 2: configure terminal

Command 3: enable ?

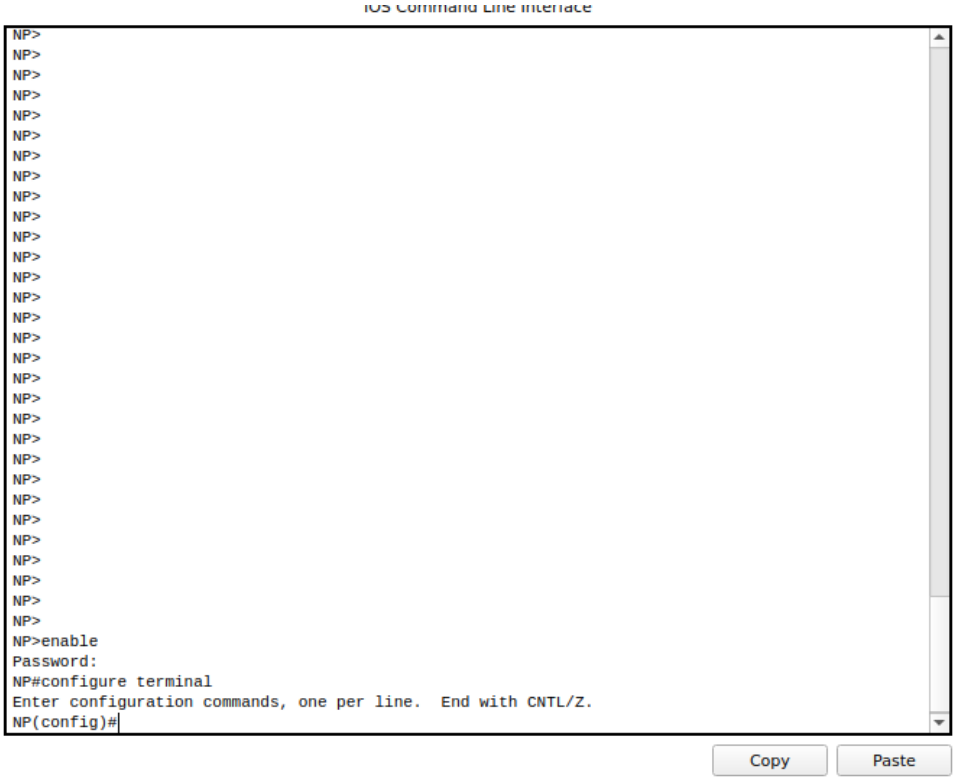
Command 4: enable secret NP333
Command 5: exit

Demonstration:

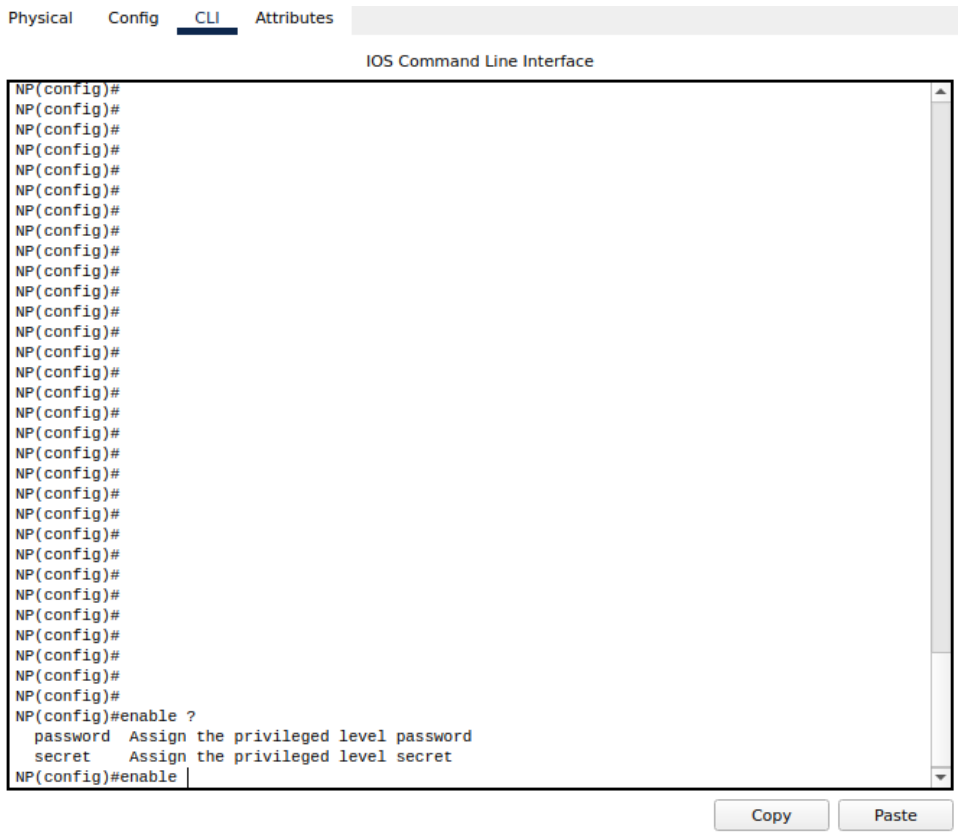
Command 1:



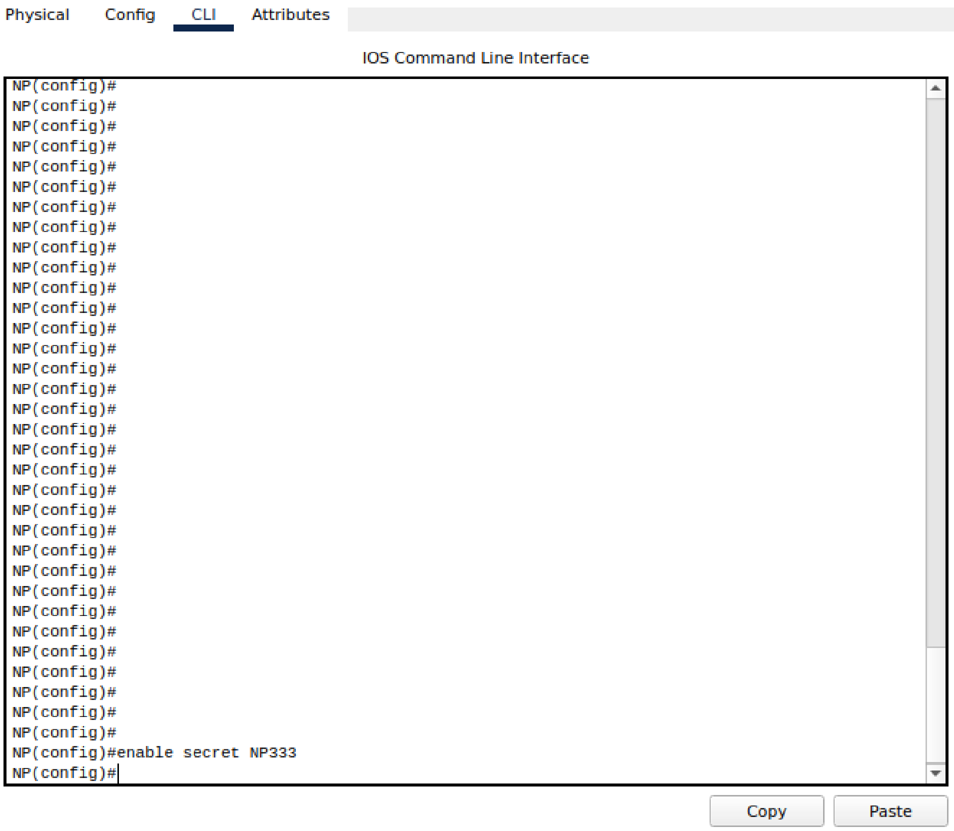
Command 2:


IOS Command Line Interface
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>
NP>enable
Password:
NP#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
NP(config)#
Copy
Paste

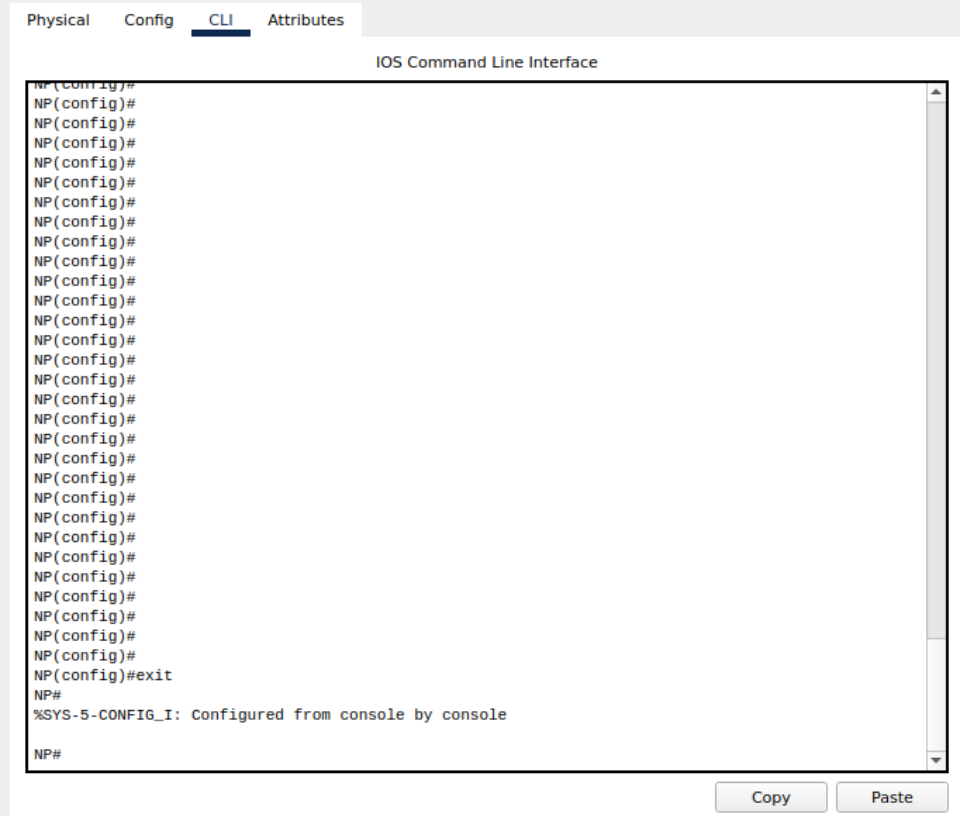
Command 3:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#enable ?
password Assign the privileged level password
secret   Assign the privileged level secret
NP(config)#enable
Copy
Paste

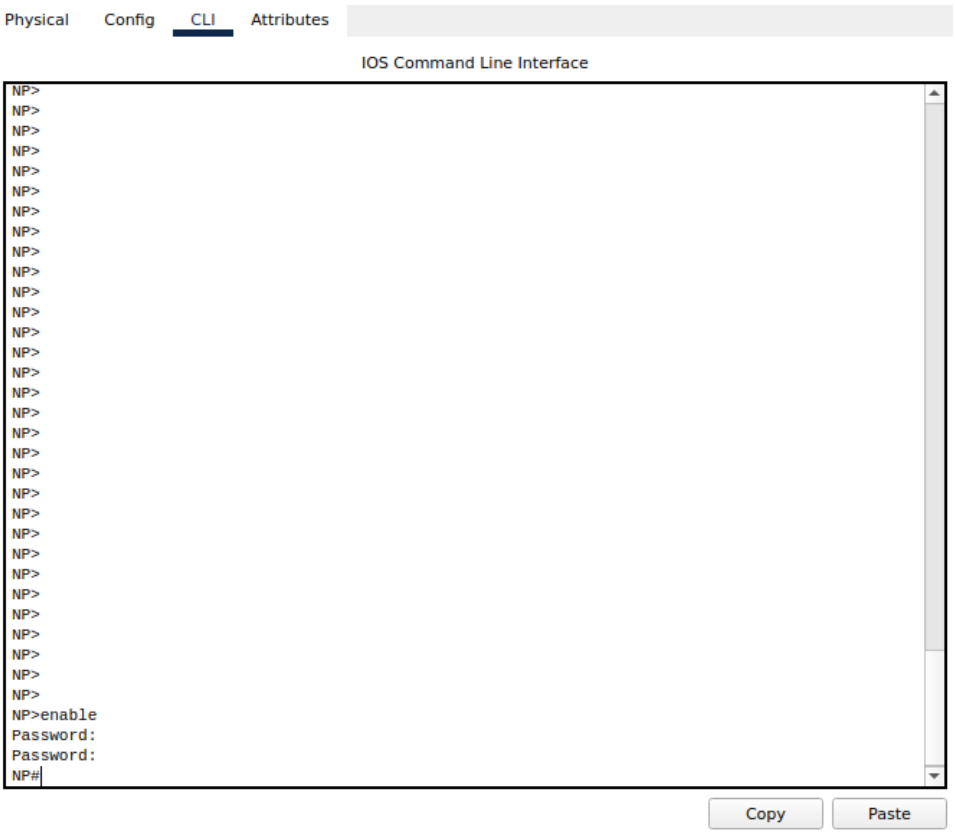
Command 4:



Command 5:



Verification:



Line Console Password:

You can also set the Line Console Password for a router.

Chain Of Commands:

Enter the following commands in order.

Command 1: enable

Command 2: configure terminal

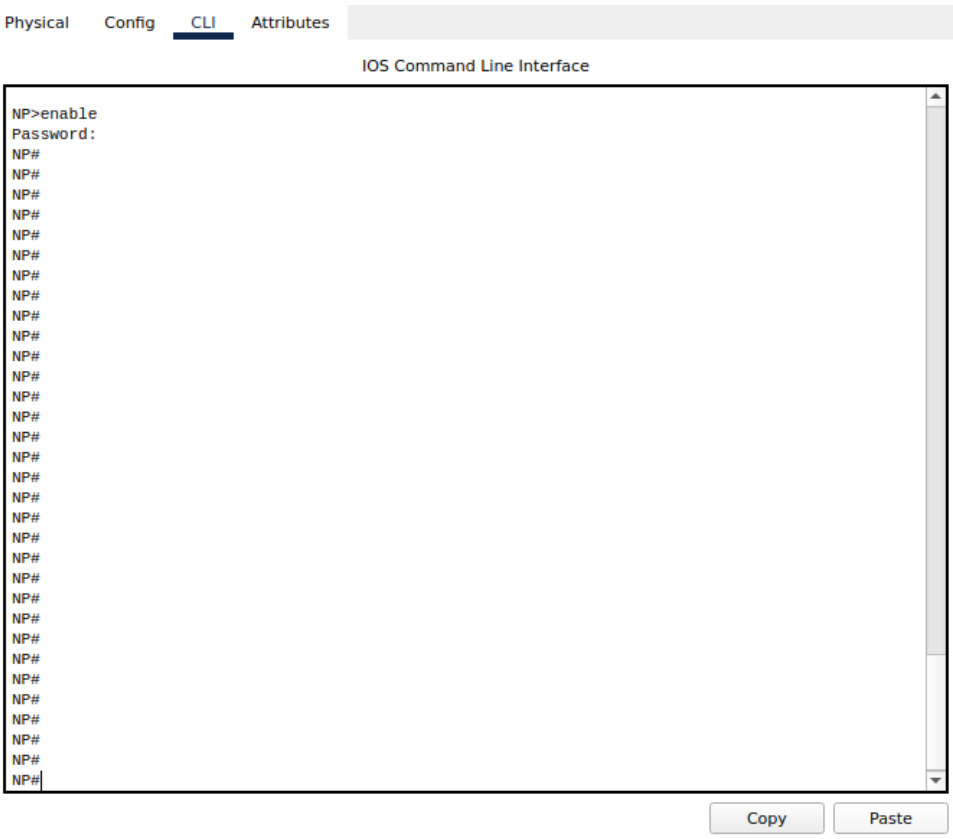
Command 3: line console 0

Command 4: password NP123
Command 5: login

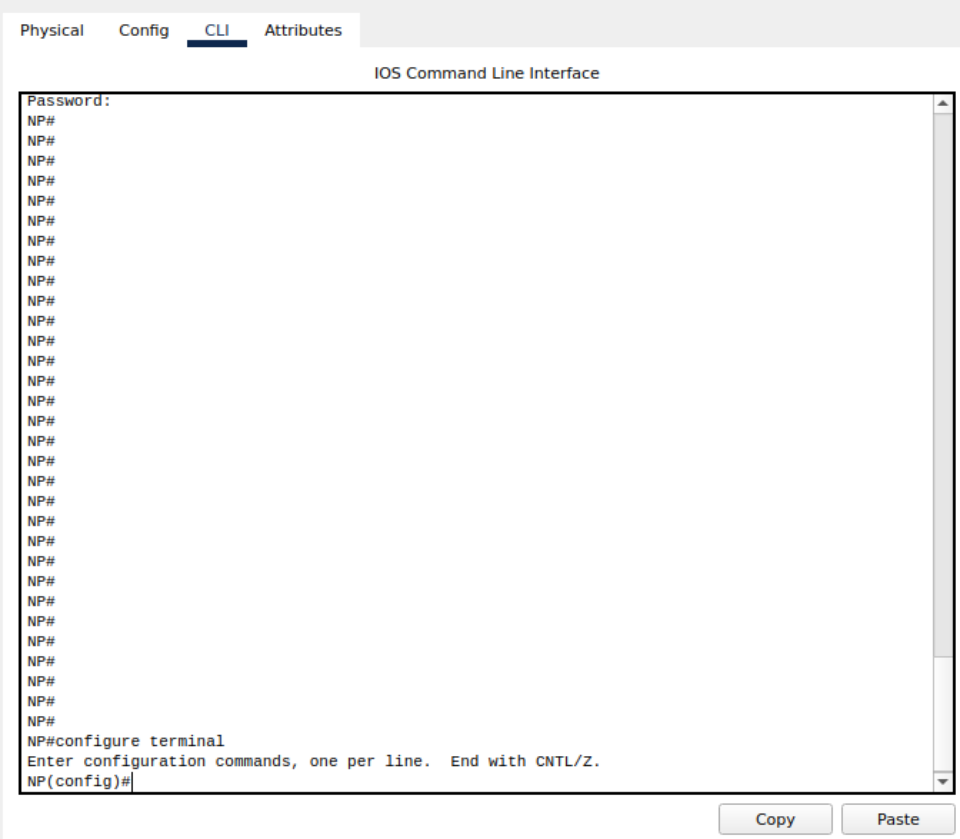
Command 6: end

Demonstration:

Command 1:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP>enable
Password:
NP#
Copy
Paste

Command 2:



Command 3:

```
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#line console 0
```

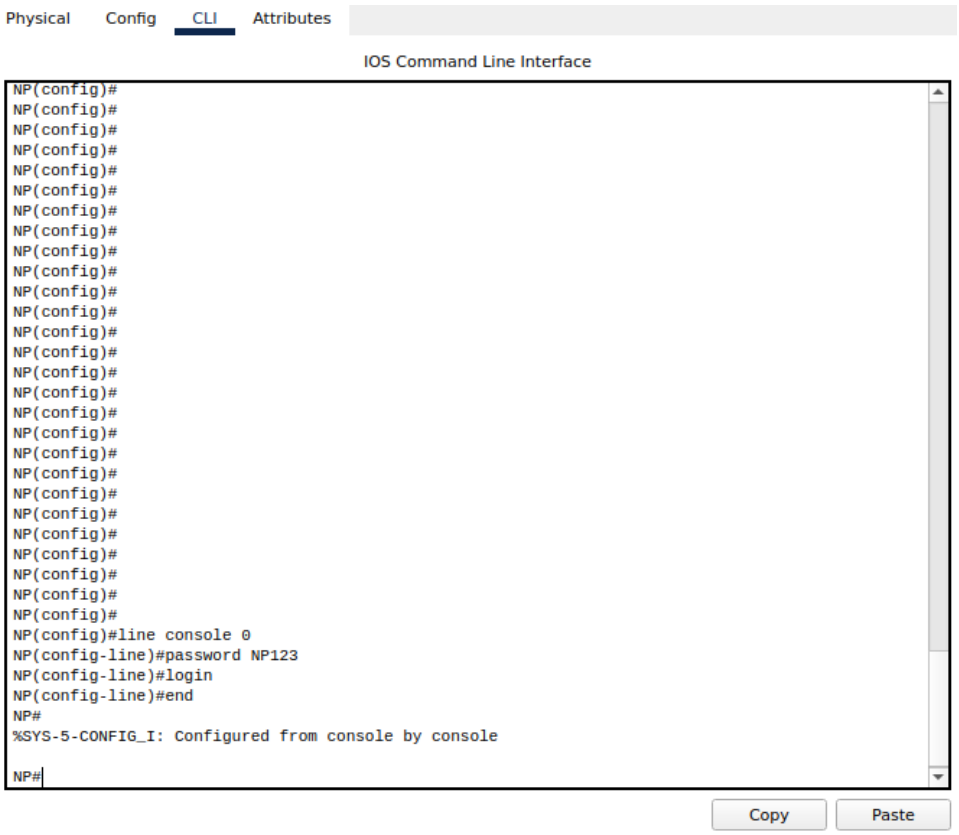
Command 4:

```
NP(config-line)#password NP123
```

Command 5:

```
NP(config-line)#login
```

Command 6:



Telnet:

What is Telnet?

Answer:

Telnet is a network protocol used to virtually access a computer and to provide a two-way, collaborative and text-based communication channel between two machines. It follows a user command Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocol for creating remote sessions.

Telnet is a text-based program that lets you access the console on a router or other device and issue commands. You can Telnet into a router using the Telnet client included with Windows. ... Unlike other protocols, Telnet isn't secure and shouldn't be used over the Internet.

How to Telnet?

Answer: Typing telnet hostname would connect a user to a hostname named hostname. Telnet enables a user to manage an account or device remotely. For example, a user may telnet into a computer that hosts their website to manage his or her files remotely. ... As shown, a telnet session is a command line interface.

Line VTY/Telnet Password:
Use the following chain of command to for Line VTY/Telnet Password.

Command 1: enable

Command 2: configure terminal

Command 3: line vty 0 4

Command 4: password NP456

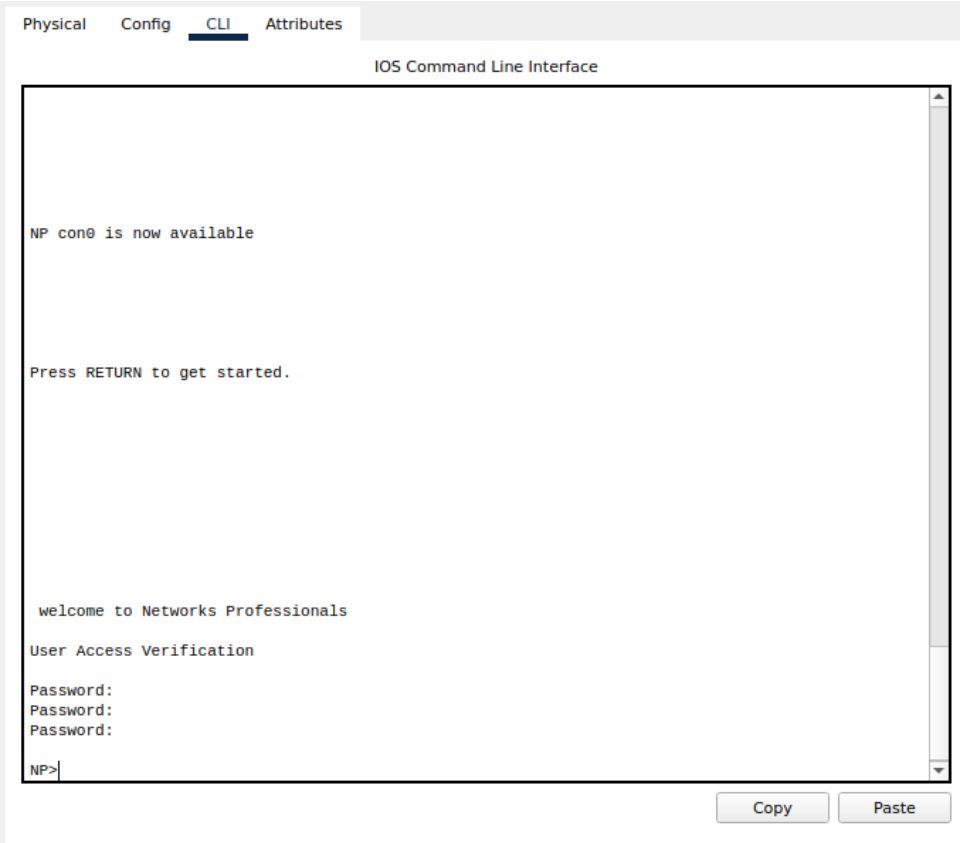
Command 5: login

Command 6: exit

Command 7: exit

Demonstration:

Command 1:



Command 2:

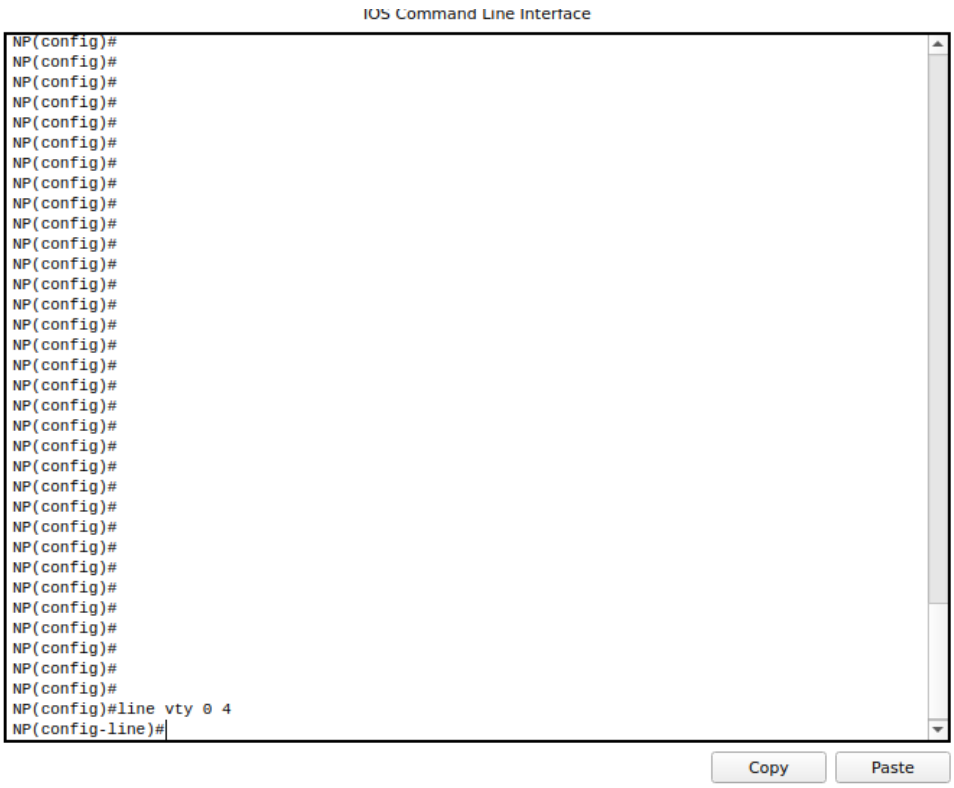
```
 welcome to Networks Professionals

User Access Verification

Password:

NP>enable
Password:
NP#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
NP(config)#
NP(config)#
```

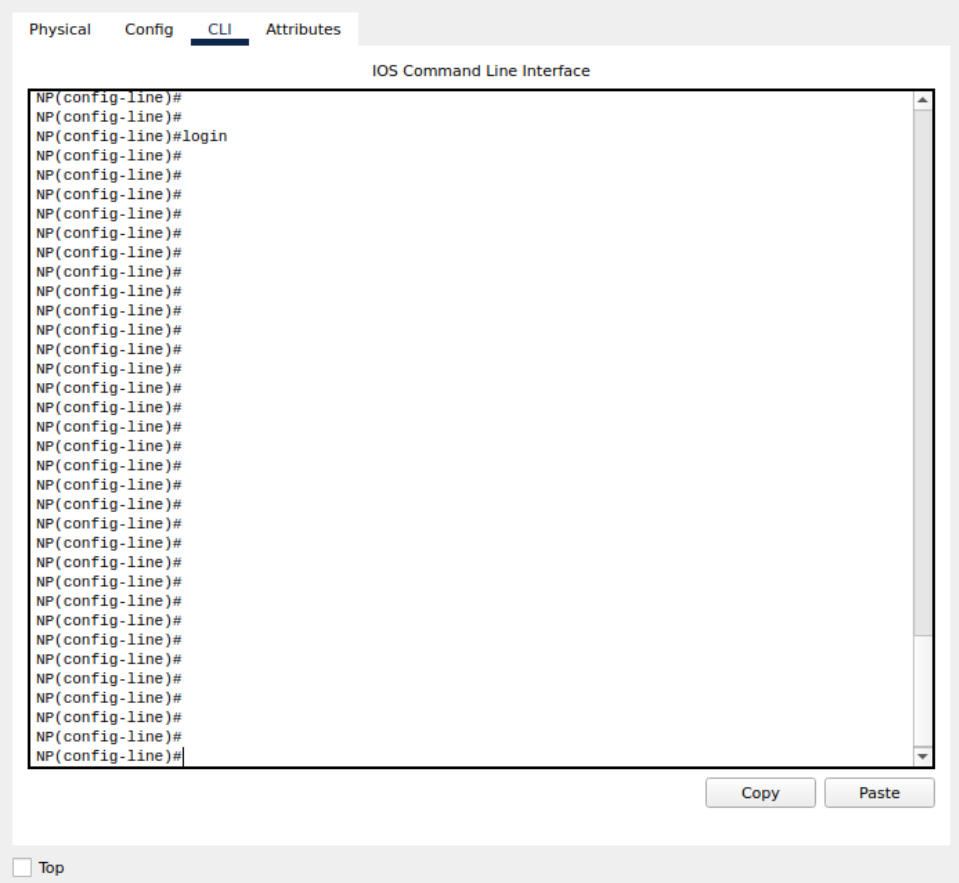
Command 3:



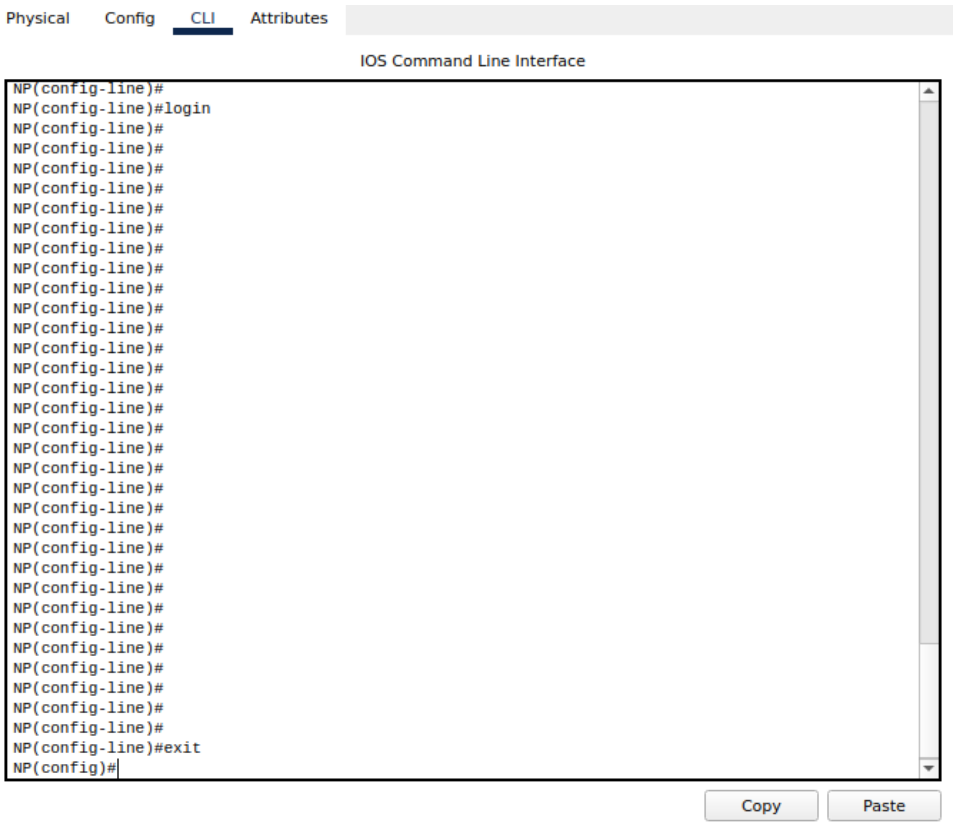
Command 4:

```
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#password NP456
NP(config-line)#
```

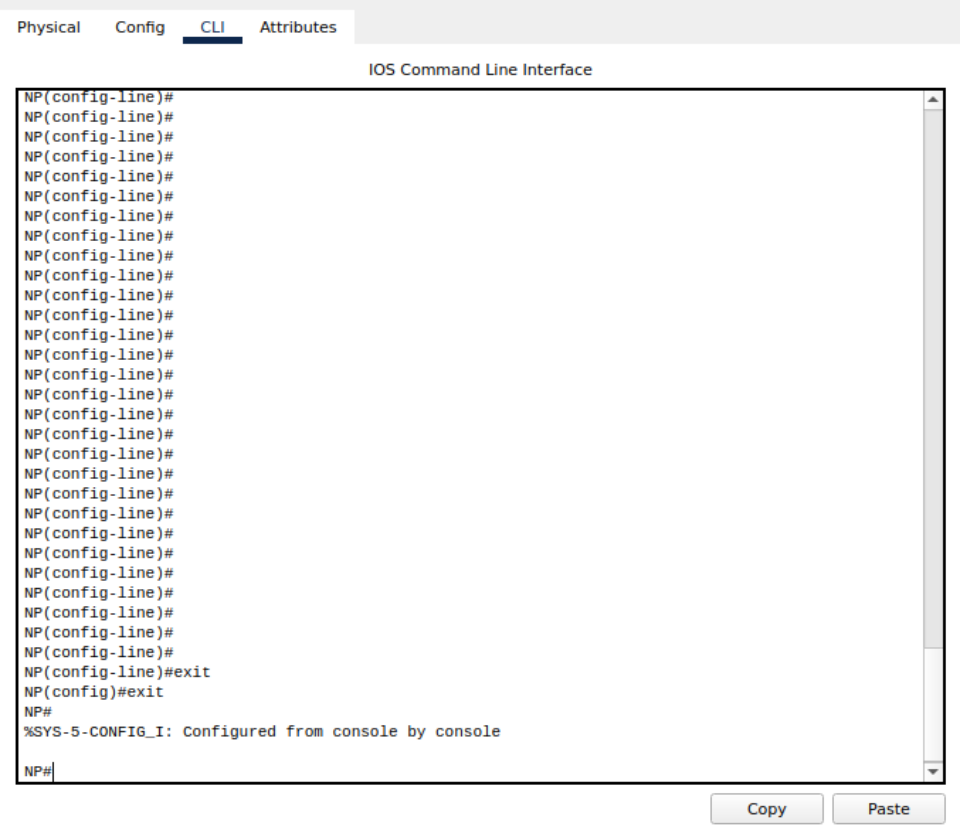
Command 5:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config-line)#
NP(config-line)#
NP(config-line)#login
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
Copy
Paste
Top

Command 6:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config-line)#
NP(config-line)#login
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#exit
NP(config)#
Copy
Paste

Command 7:



Auxiliary Line Password:

You can also auxiliary line password on your router.

Chain Of Commands:

Use the following chain of commands.

Command 1: configure terminal

Command 2: line aux 0

Command 3: password NP@786

Command 4: exit

Command 5: login

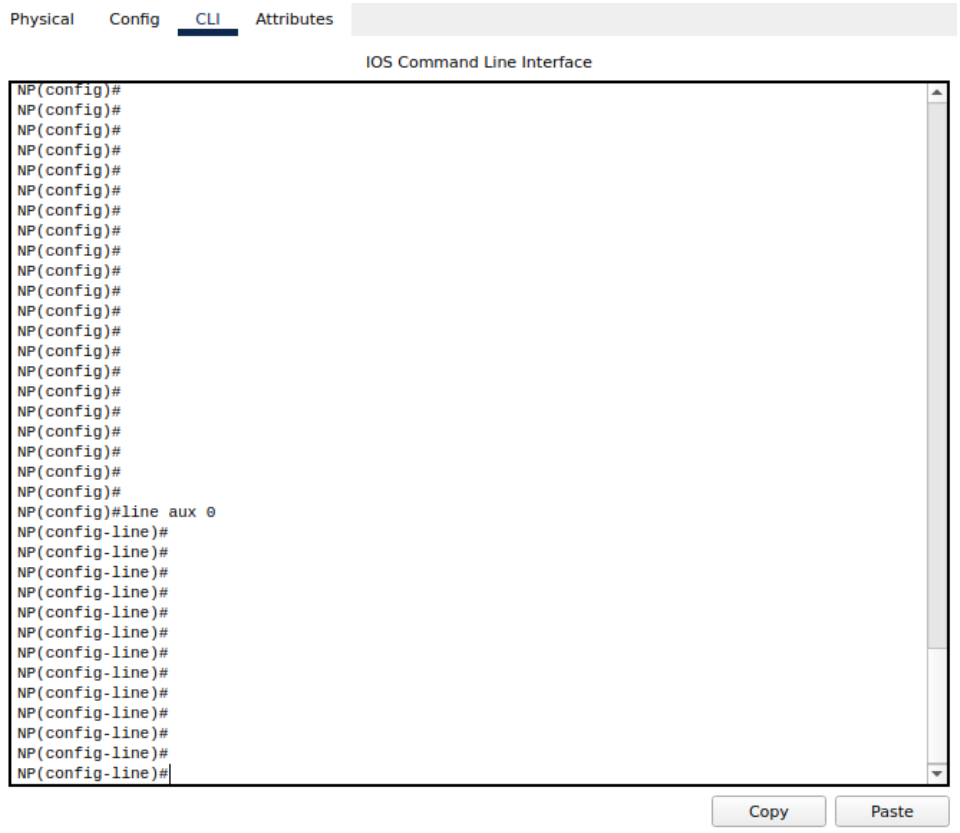
Command 6: exit

Demonstration:

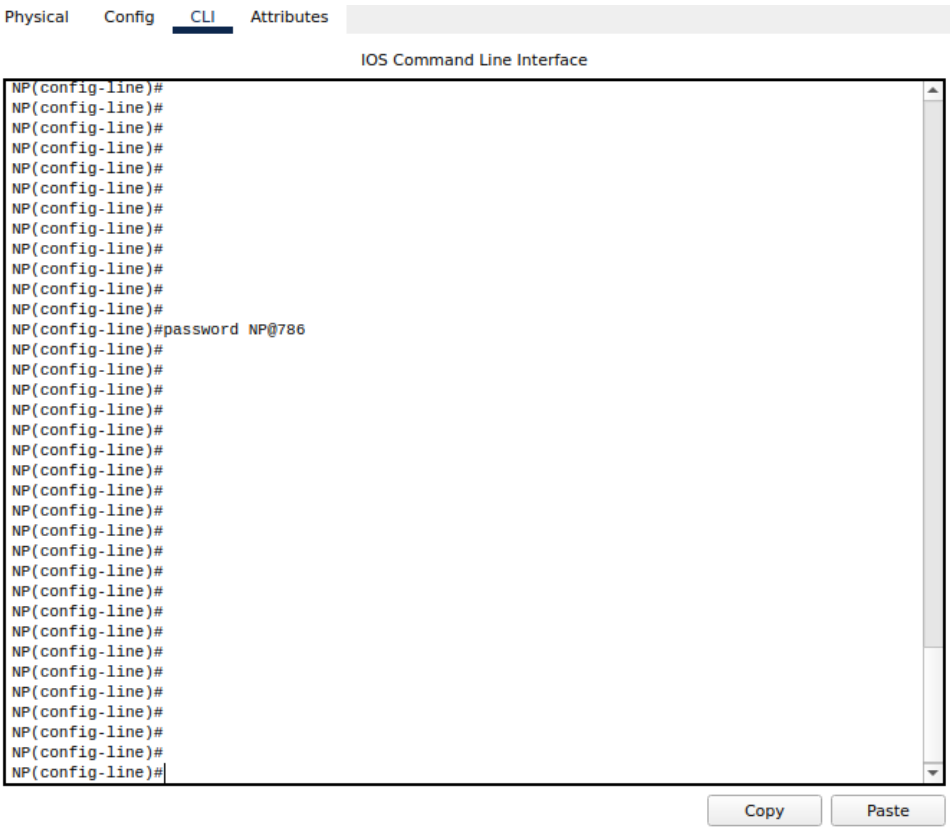
Command 1:

```
NP#
NP#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
```

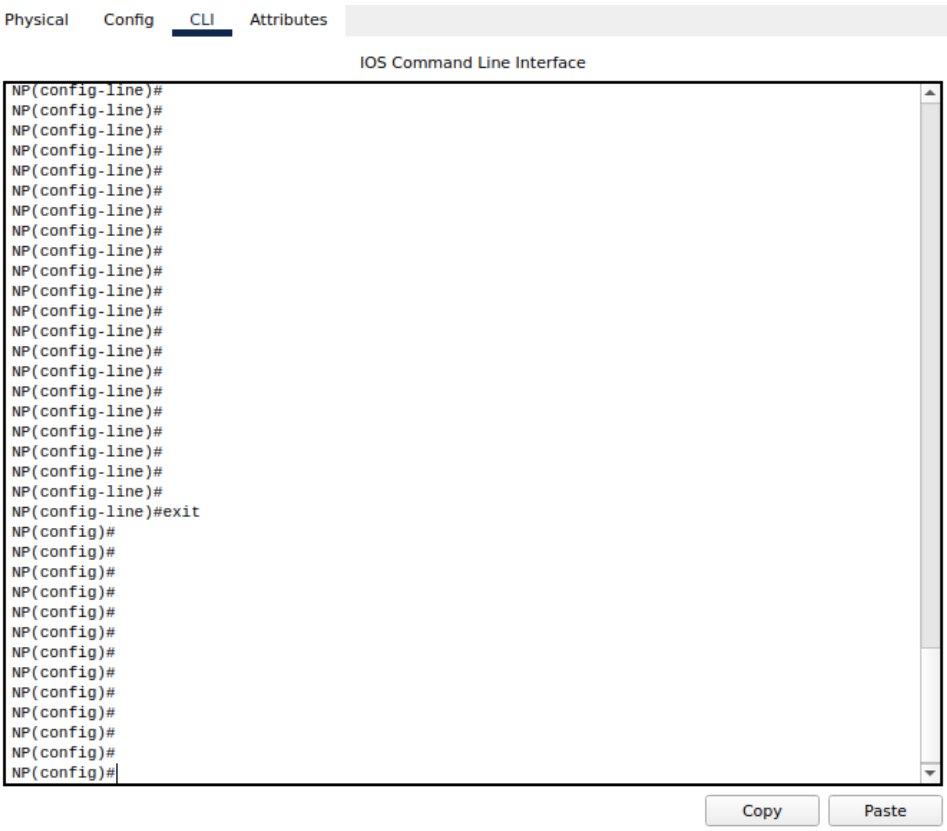
Command 2:



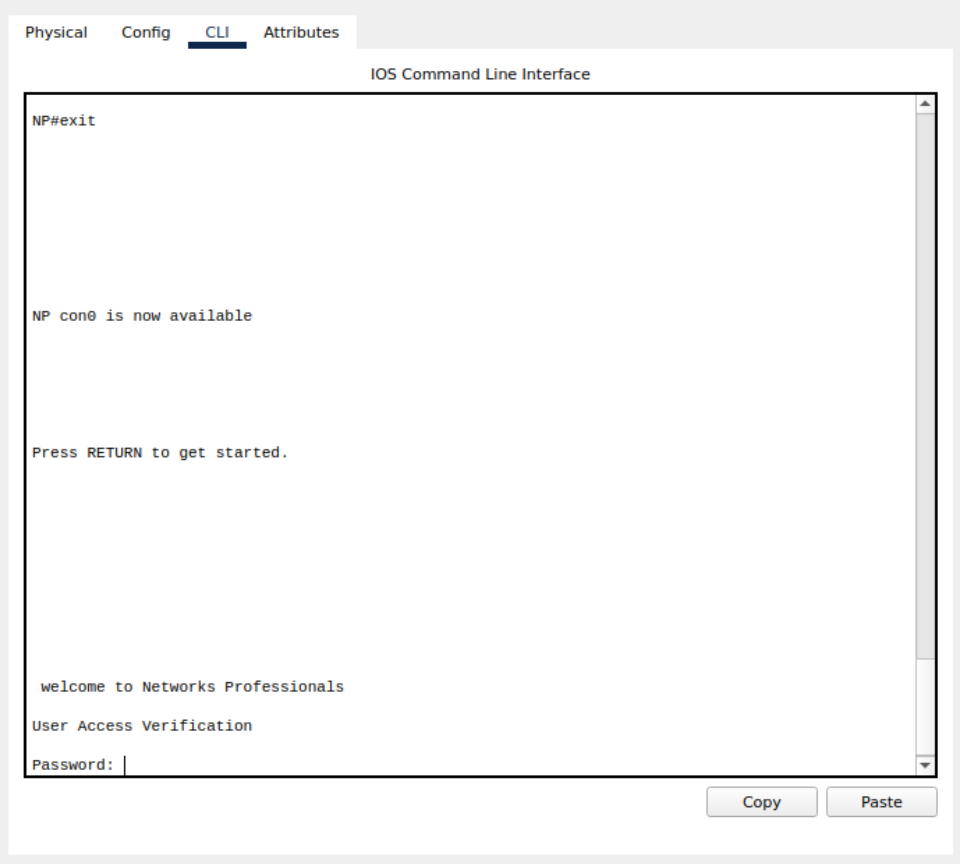
Command 3:

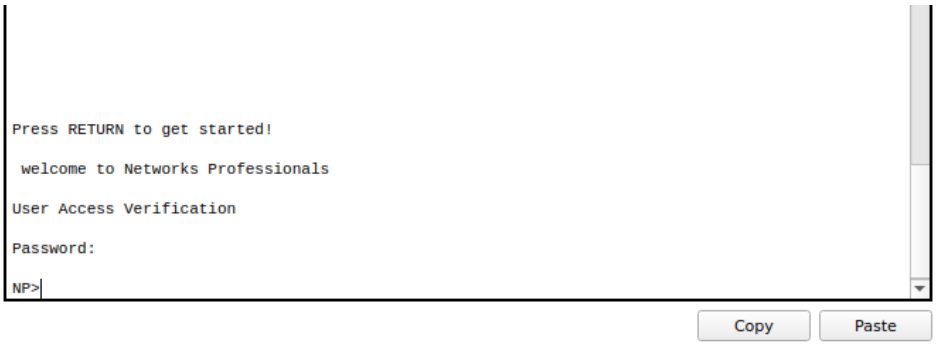

Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#password NP@786
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
Copy
Paste

Command 4:


Physical
Config
CLI
Attributes
IOS Command Line Interface
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#
NP(config-line)#exit
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
NP(config)#
Copy
Paste

Command 5:





Usage Of Routers With Different Topology:

Following are the few uses of Routers in different Networks in different topologies.

- RPL Routing in Smart Object Networks
- Global and detailed routing

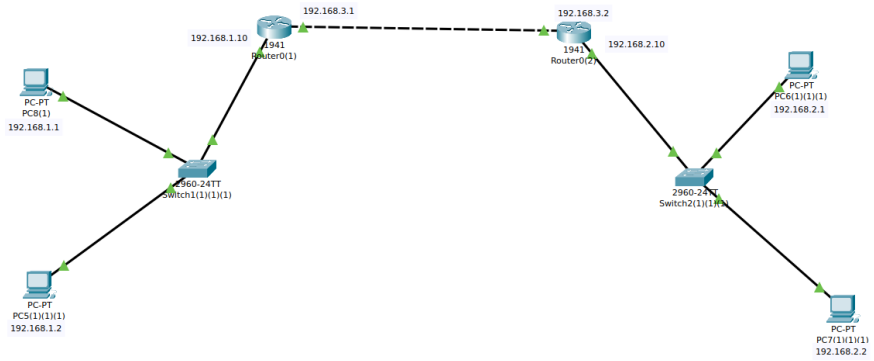
- Distributed Information Resources
- Exchange Transport and Routing
- Spark and dask performance analysis based on ARL image library
- Synthesis of clock and power/ground networks
- Managing the Hub Transport Server Role
- Routing Protocols
- Cloud Access and Cloud Interconnection Networks
- Cloud Computing
  Cyber Security
  Network Testing
- Stress Testing
- Denial Of Services Attacks

These were the few topologies where Routers are widely used.

Few Self-Created Router Topologies:

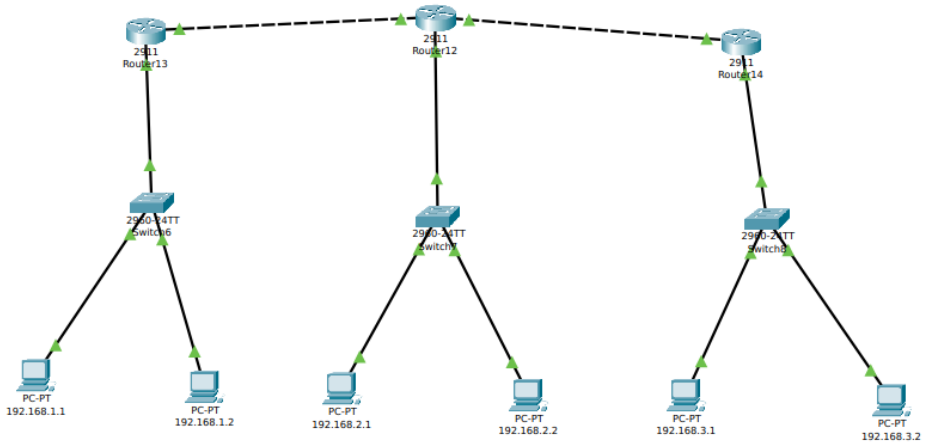
Topology 1:

Using two routers with two different IP's and maintaining a connection b/w four computers.



Topology 2:

Connecting three routers and establishing a connection between 6 computers.



Topology 3:

Router topology for connecting 4 computers over a single network.