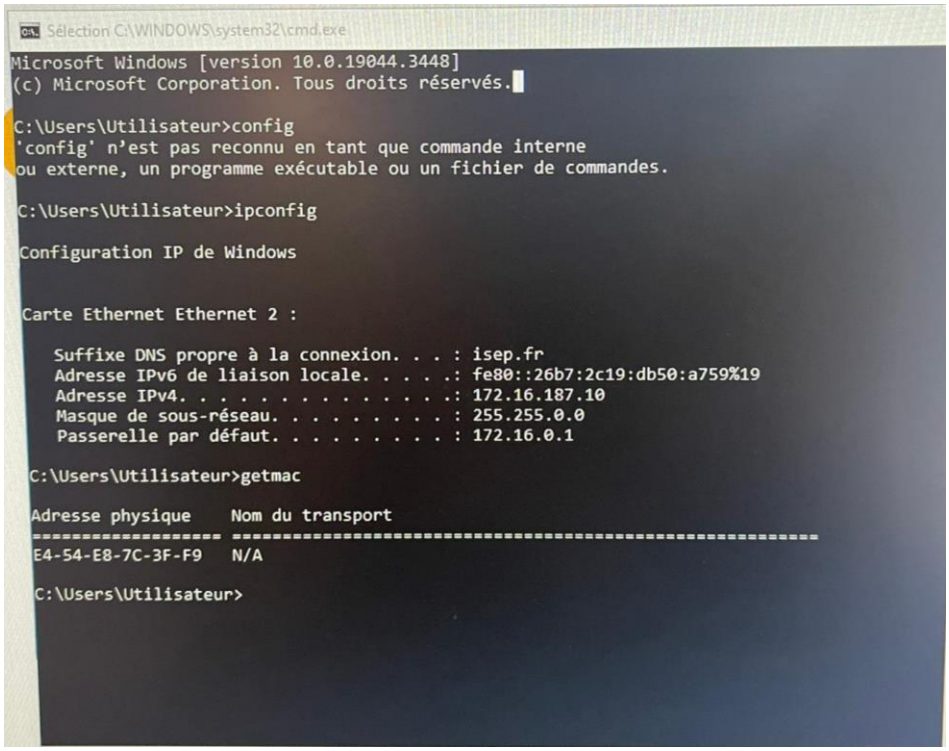
Lab – How to analyze Network Traffic with Wireshark

Part 1:

Step 1: a) b)

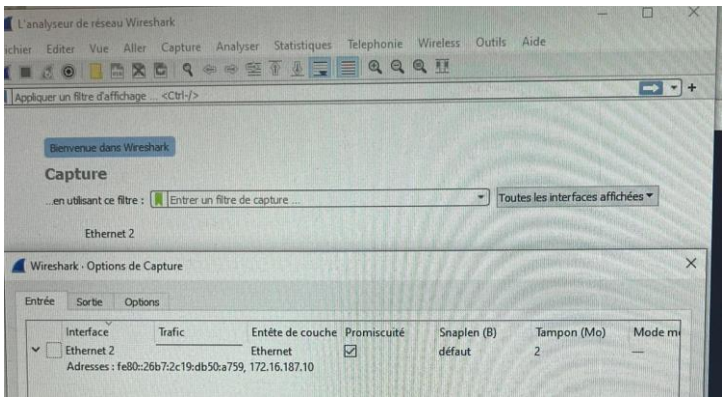


Step 1: c) The IP address is typically in IPv4 format (172.16.187.10), consisting of 32 bits. The MAC address is a 48-bit address typically represented in hexadecimal format (E4-54-E8-7C-3F-F9).

Step 1: d) The network mask is also known as the subnet mask. It is used to determine the network portion of an IP address. 255.255.0.0(In binary form 11111111.11111111. 00000000.00000000) means that the first 16 bits (16 bits from the third octet) are allocated for the network (binary number 1). The remaining 16 bits are available for host addresses within that network (binary number 0).

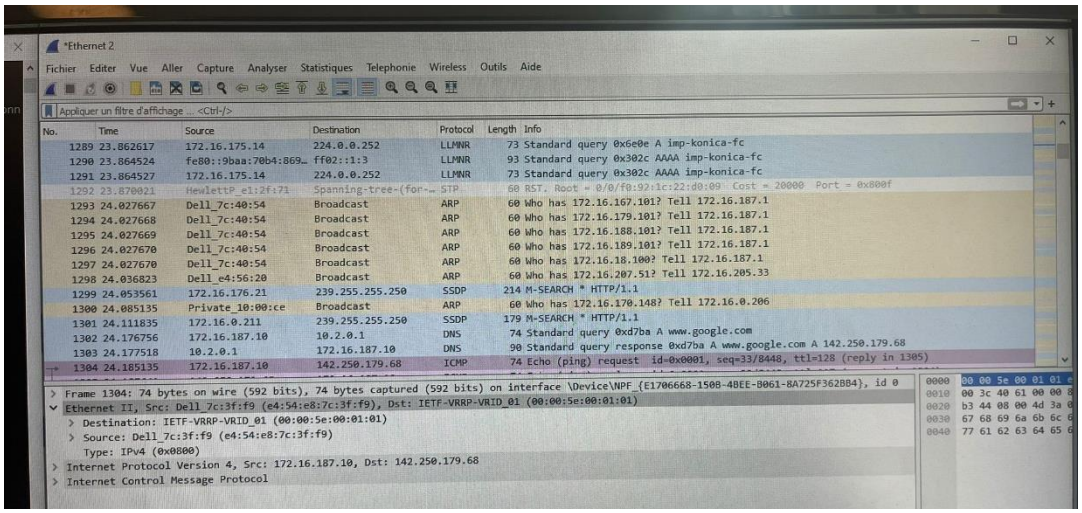
Step 1: e) For this WLAN, we can have the most 2^16 hosts.

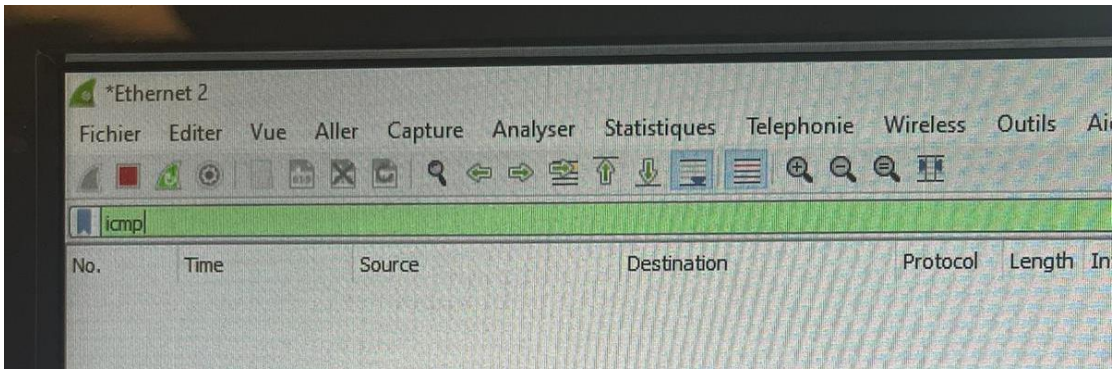
Step 2: a-d) IP is 172.16.187.10

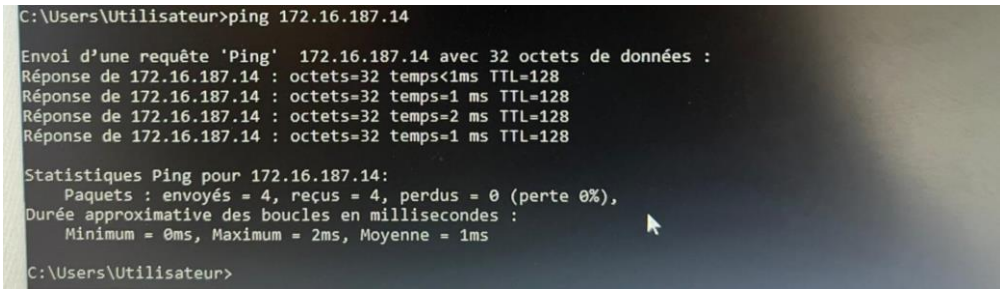


Step 2: e-f) ping is used to test and diagnose network connections. It is often used

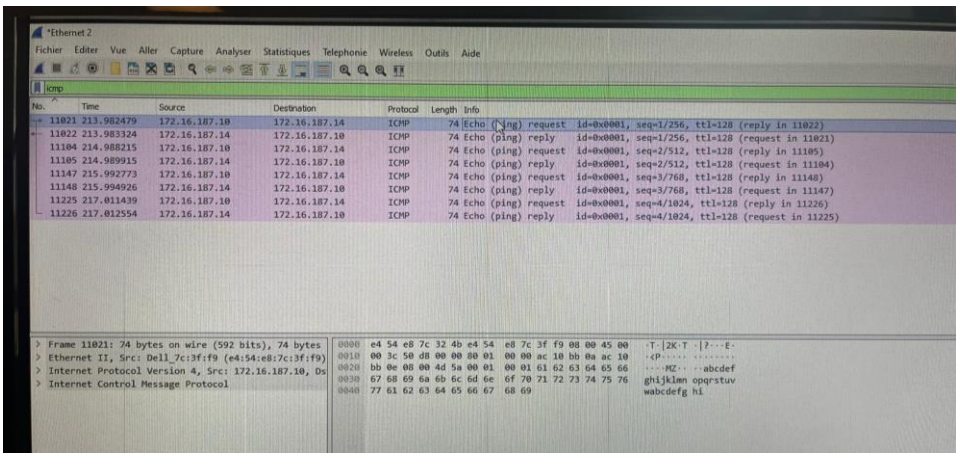
to check the status of communication between hosts.



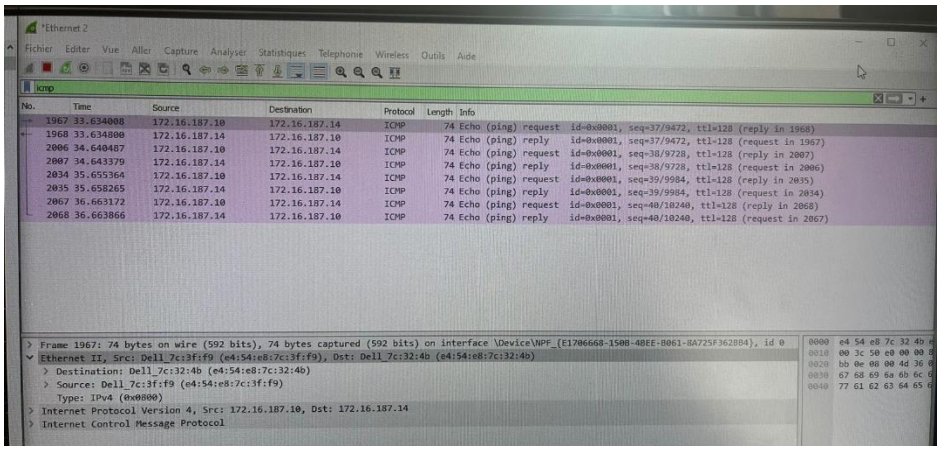




Step 3: a)



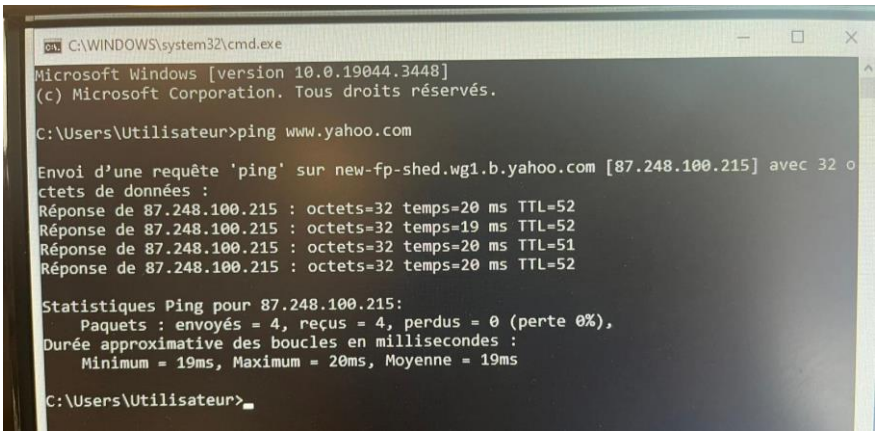
Step 3: b)



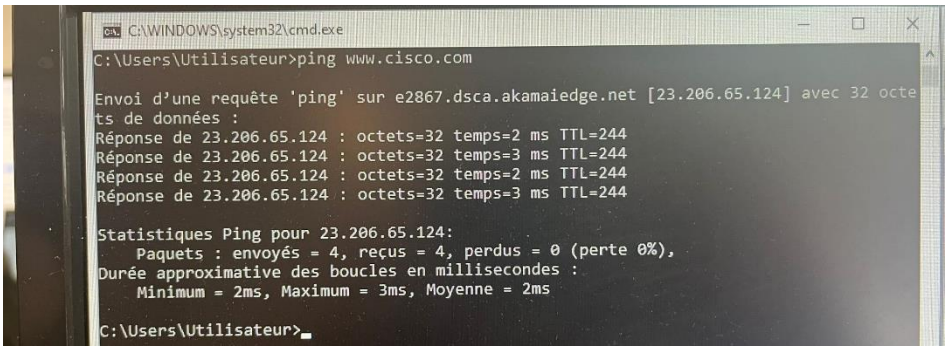
1. The Source MAC address matches my PC's interface.
2. The Destination MAC address in Wireshark match my team member's MAC address.
3. The MAC address of the pinged machine is obtained by PC through the Address Resolution Protocol (ARP). When PC wants to communicate with another machine on the same local network, it uses ARP to discover the MAC address associated with the IP address of the target machine. ARP resolves the IP address to the corresponding MAC address, allowing PC to construct Ethernet frames for communication on the local network.

Part 2:

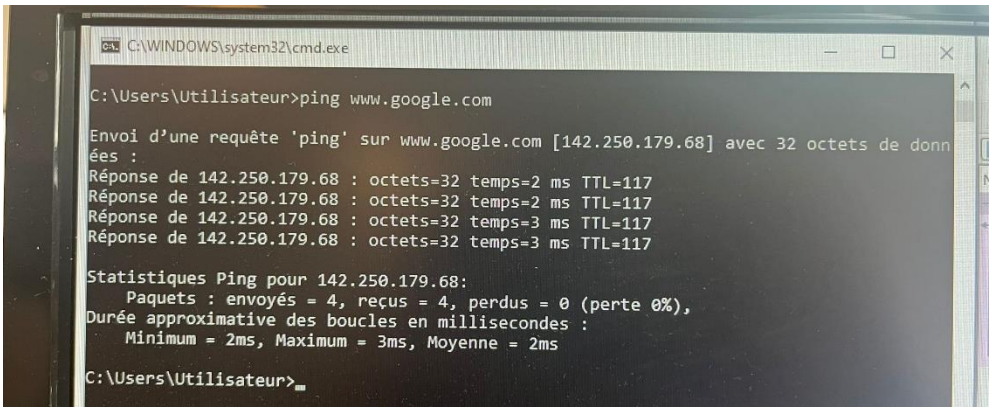
Step 1: a-b) The computer finds the IP addresses of website URLs by querying DNS (Domain Name System) servers. DNS servers provide the mapping between domain names and their corresponding IP addresses. When ping a website URL, computer checks its local cache, the hosts file, and then queries DNS servers to obtain the IP address associated with the domain name.



IP: 87.248.100.215

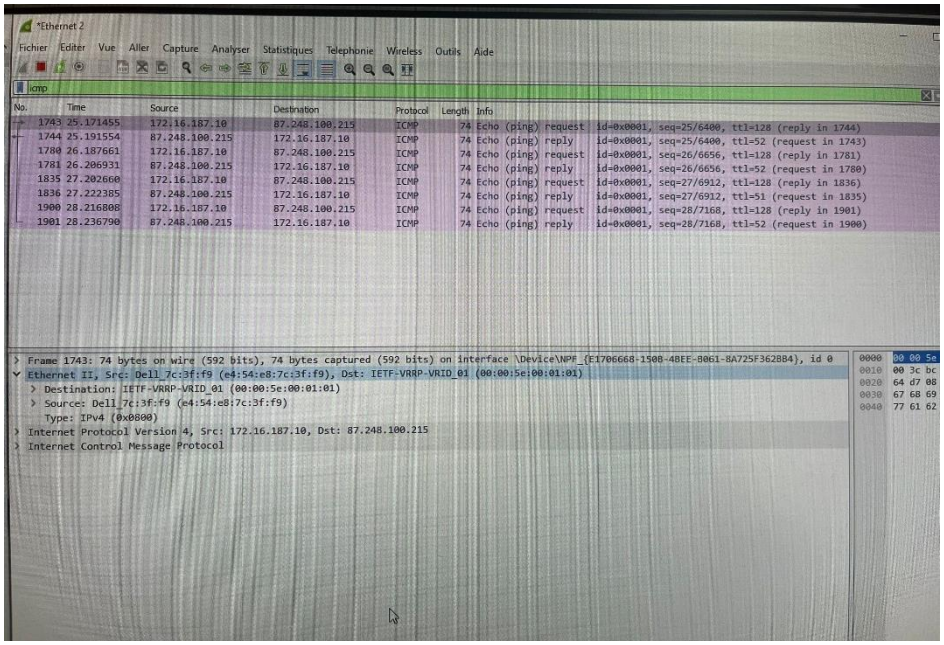


IP:23.206.65.124



IP:142.250.179.68

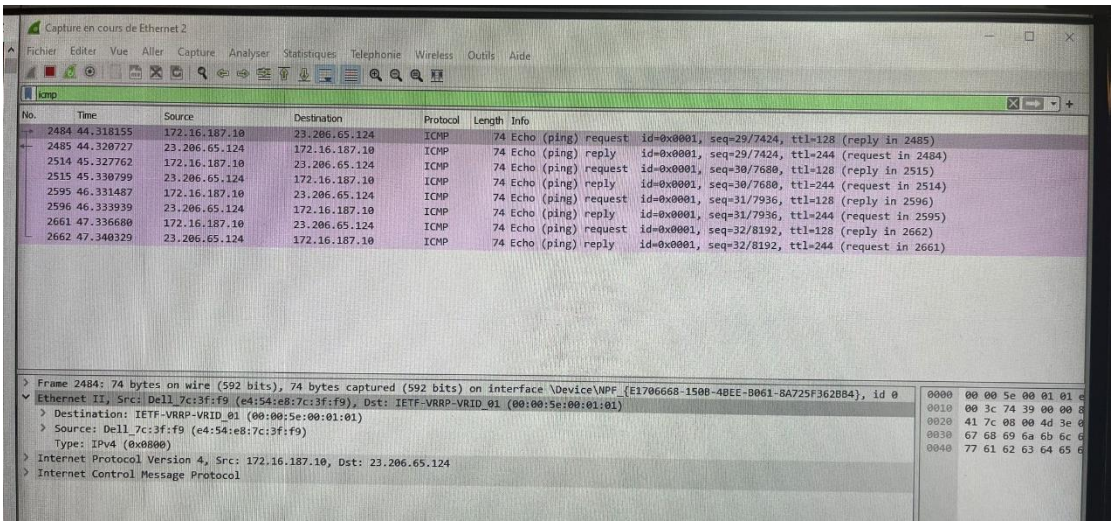
Step 2: a-b)



FOR www.yahoo.com

Destination IP: 87.248.100.215

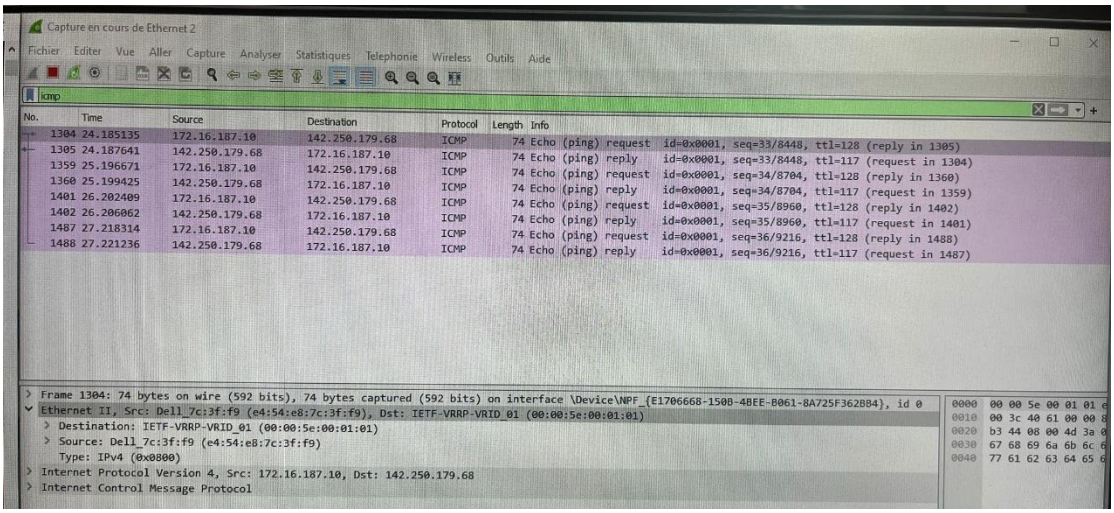
MAC addresses: IETF-VRRP-VRID_01



FOR www.cisco.com

Destination IP: 23.206.65.124

MAC addresses: IETF-VRRP-VRID_01



FOR www.google.com

Destination IP: 142.250.179.68

MAC addresses: IETF-VRRP-VRID_01

1) MAC addresse formats are different: Web Ping uses a public IP address without requiring direct knowledge of the target server's MAC address.

2) What is the main difference between a local and a remote communication?

For Local Communication: the scope within the local network, the characteristics faster, lower latency, direct communication.

For Remote Communication: the scope across different networks, the characteristics may involve routers, higher latency, relies on external infrastructure.

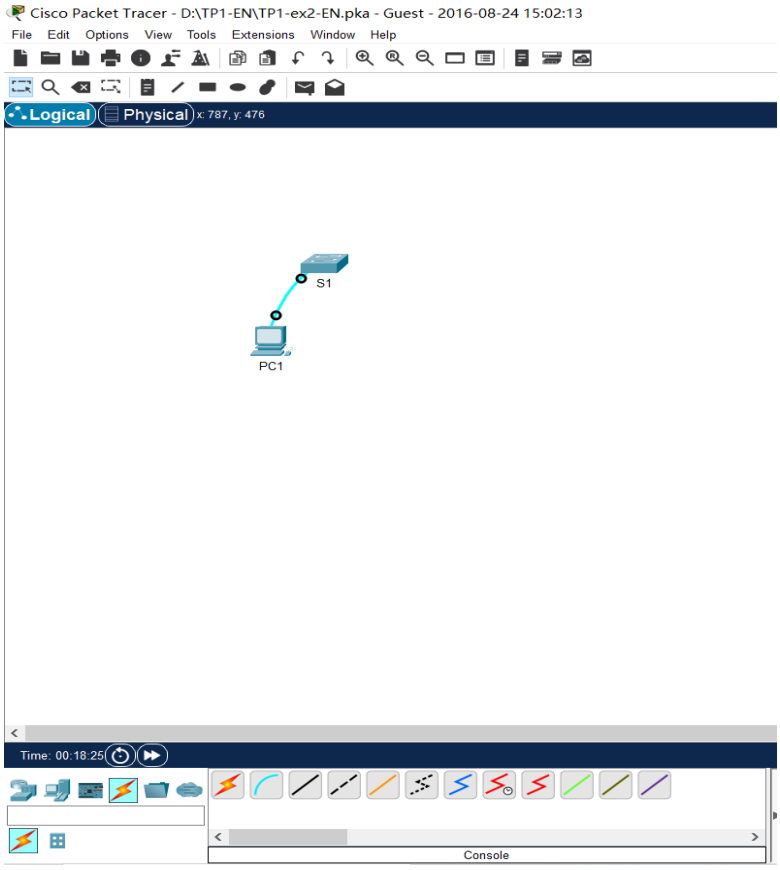
Packet Tracer - Navigating the IOS

Packet Tracer - Basic Switch and End Device Configuration - Physical Mode

Part 1:

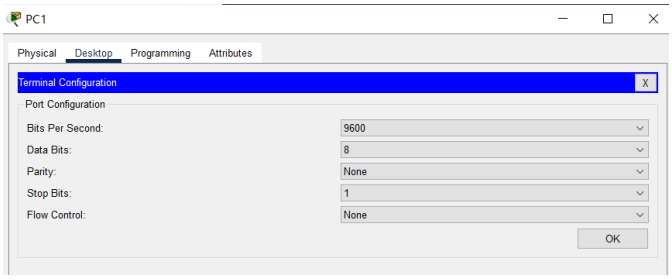
Step 1: Packet Tracer – Navigating the IOS

Connect PC1 to S1 using a console cable



Step 2: Establish a terminal session with S1.

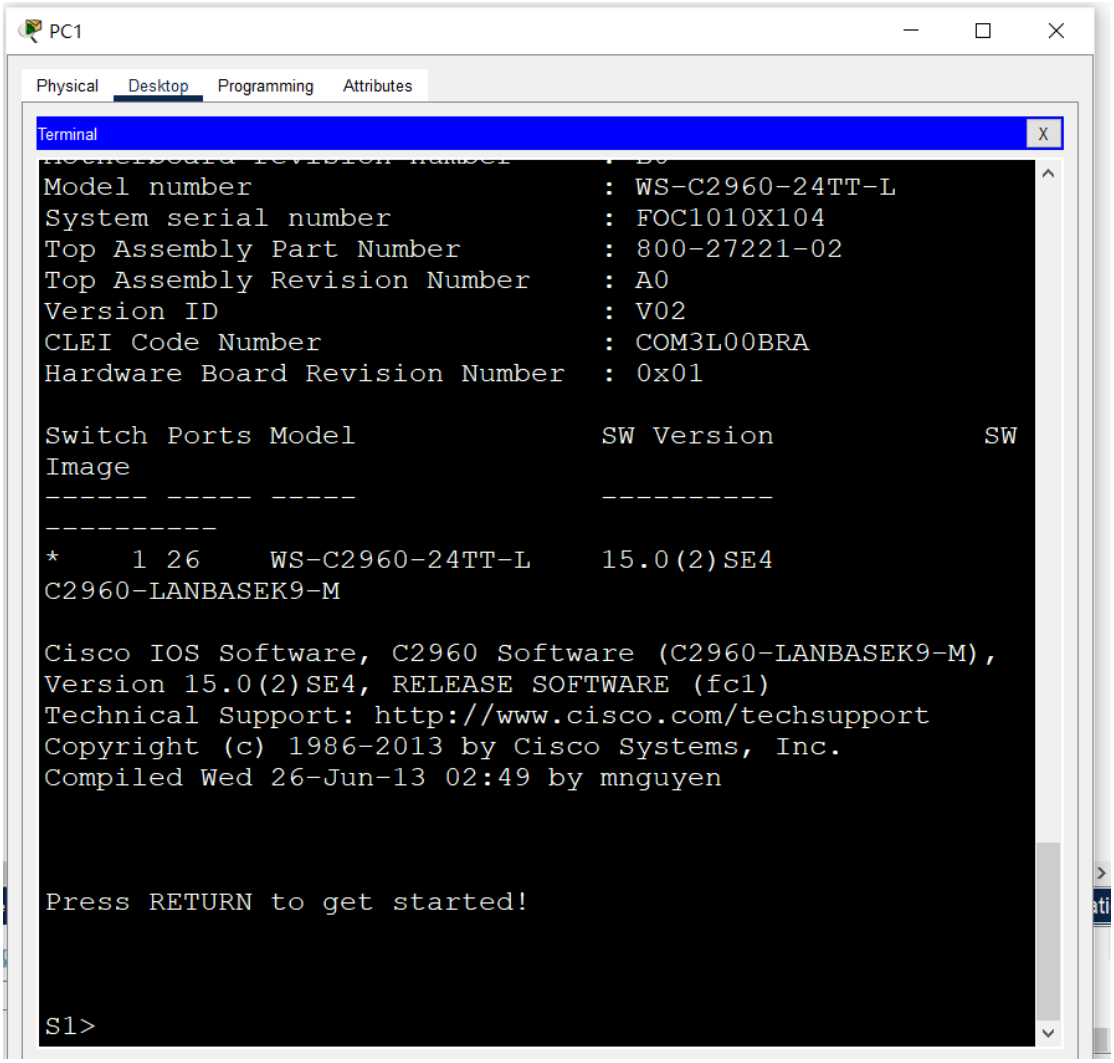
b.)



What is the setting for bits per second?

The setting for bits per second is 9600.

d.



What is the prompt displayed on the screen?

"S1>" is displayed on the screen.

Step 3: Explore the IOS Help

a.

```
S1>?
Exec commands:
  connect     Open a terminal connection
  disable     Turn off privileged commands
  disconnect  Disconnect an existing network connection
  enable      Turn on privileged commands
  exit        Exit from the EXEC
  logout      Exit from the EXEC
  ping        Send echo messages
  resume      Resume an active network connection
  show        Show running system information
  ssh         Open a secure shell client connection
  telnet      Open a telnet connection
  terminal    Set terminal line parameters
  traceroute  Trace route to destination
```

Which command begins with the letter ‘C’?
The command of connect begins with the letter ‘C’.

b.

```
S1>t?
telnet   terminal   traceroute
```

Which commands are displayed?
‘telnet’, ‘terminal’, ‘traceroute’ are displayed.

c.

```
S1>te?
telnet   terminal
```

Which commands are displayed?
‘telnet’ and ‘terminal’ are displayed.

Part2 : Explore EXEC Modes

Step 1 :

a.

```
S1>?
Exec commands:
  connect     Open a terminal connection
  disable     Turn off privileged commands
  disconnect  Disconnect an existing network connection
  enable      Turn on privileged commands
  exit        Exit from the EXEC
  logout      Exit from the EXEC
  ping        Send echo messages
  resume      Resume an active network connection
  show        Show running system information
  ssh         Open a secure shell client connection
  telnet      Open a telnet connection
  terminal    Set terminal line parameters
  traceroute  Trace route to destination
```

What information is displayed that describes the enable command?
Turn on privileged commands.

b.

```
S1>en
S1>enable
```

What displays after pressing the Tab key?

The enable command has been completed.

```
S1>te
S1>te
```

What would happen if you typed te<Tab> at the prompt?
The command will not be completed because the commands starting with 'te' include telnet and terminal, and the system does not know which command to complete it into.

c.

```
S1>enable
S1#
```

Enter the enable command and press ENTER. How does the prompt change?
The symbol after S1 changes from > to #.

d.

```
S1#?
Exec commands:
  clear        Reset functions
  clock        Manage the system clock
  configure    Enter configuration mode
  connect      Open a terminal connection
  copy         Copy from one file to another
  debug        Debugging functions (see also 'undebug')
  delete       Delete a file
  dir          List files on a filesystem
  disable      Turn off privileged commands
  disconnect   Disconnect an existing network connection
  enable       Turn on privileged commands
  erase        Erase a filesystem
  exit         Exit from the EXEC
  logout       Exit from the EXEC
  more         Display the contents of a file
  no           Disable debugging informations
  ping         Send echo messages
  reload       Halt and perform a cold restart
  resume       Resume an active network connection
  setup        Run the SETUP command facility
  show         Show running system information
 --More--
```

```
S1#c?
clear  clock  configure  connect  copy
```

How many commands are displayed now that privileged EXEC mode is active?
5 commands. They are clear, clock, configure, connect and copy.

Step2：

a.

```
S1#c?
clear  clock  configure  connect  copy
S1#co?
configure  connect  copy
S1#co?
configure  connect  copy
S1#con?
configure  connect
S1#conf?
configure
S1#conf
S1#configure
Configuring from terminal, memory, or network
[terminal]?
```

What is the message that is displayed?
Configuring form terminal, memory, or network.

b.

```
S1#configure
Configuring from terminal, memory, or network
[terminal]?
Enter configuration commands, one per line.  End with
CNTL/Z.
S1(config)#
```

How does the prompt change?
The prompt change from S1# to S1(config)#.

c.

```
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console
```

Part 3 : Set Clock

a.

```
S1#show clock
*0:51:45.406 UTC Mon Mar 1 1993
S1#
```

What information is displayed? What is the year that is displayed?
'0:51:45.406 UTC Mon Mar 1 1993' is displayed. 1993 is the year that is displayed.

b.

```
S1#clock
% Incomplete command.
```

What information is being requested?
Incomplete command.

c.

```
S1#clock ?
  set  Set the time and date
```

What information is being requested?
Set the time and date.

d.

```
S1#clock set ?
  hh:mm:ss  Current Time
```

What information is being requested?
The specific hours, minutes and seconds of the clock.

```
S1#clock set
% Incomplete command.
```

What would have been displayed if only the clock set command had been entered, and no request for help was made by using the question mark?
Incomplete command.

e.

```
S1#clock set 15:00:00 ?
  <1-31>  Day of the month
  MONTH   Month of the year
```

f.

```
S1#clock set ?
  hh:mm:ss  Current Time
S1#clock set
% Incomplete command.
S1#clock set 15:00:00 ?
  <1-31>  Day of the month
  MONTH   Month of the year
S1#clock set 15:00:00 31 01?
% Unrecognized command
S1#clock set 15:00:00 31 Jan?
MONTH
S1#clock set 15:00:00 31 Jan 2035 ?
  <cr>
S1#clock set 15:00:00 31 Jan 2035
```

g.

```
S1#show clock
15:0:6.520 UTC Wed Jan 31 2035
```

Step 2 : Explore additional command messages.

a.

```
S1#cl
S1#cl
```

What information was returned?
It returned 'cl'.

b.

```
S1#clock
% Incomplete command.
```

What information was returned?
Incomplete command.

c.

```
S1#clock set 25:00:00
             ^
% Invalid input detected at '^' marker.
```

What information was returned?
Invalid input detected at '^' marker. Because 25 is not the correct expression for hours.

d.

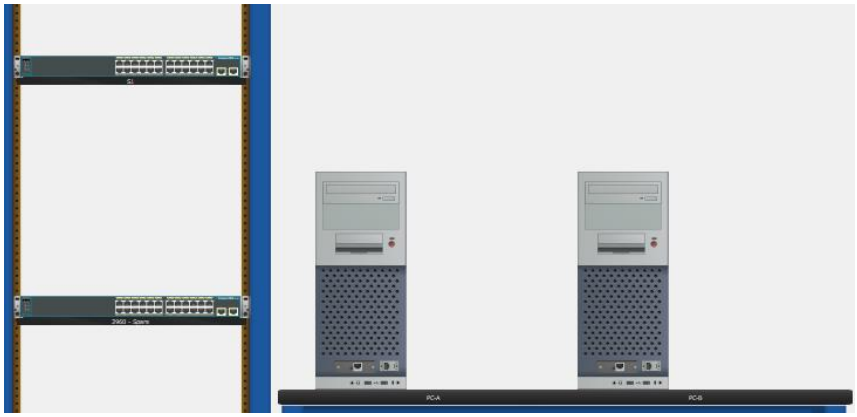
```
S1#clock set 15:00:00 32
                      ^
% Invalid input detected at '^' marker.
```

What information was returned?
Invalid input detected at '^' marker. Because 32 is not a correct date expression.

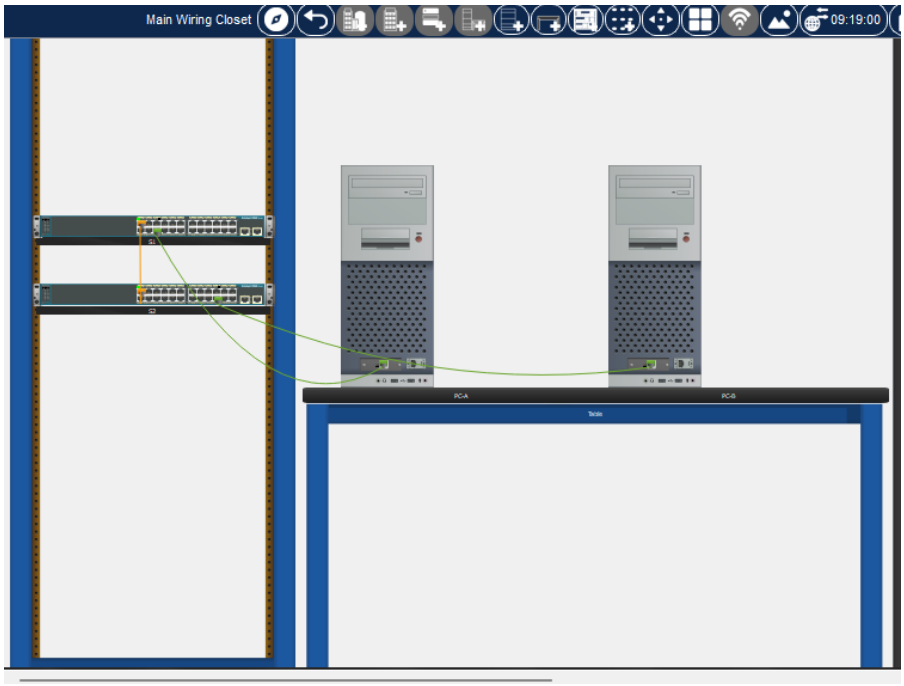
Lab - Basic Switch and End Device Configuration Physical Mode

Part 1: Set Up the Network Topology

(a) Click and drag switches to the Rack, click two PCs to the Table and Powered them.



(b) Connect the switches with PCs by cable to set up the network topology



Part 2 Configure PC Hosts

(a) Configure static IP address information on the PCs according to the Addressing Table. Enter the IP address for PC-A (192.168.1.10) and the subnet mask (255.255.255.0), as listed in the IP addressing table.

```
 Connection-specific DNS Suffix..:
 Physical Address.................: 000A.F355.6C9E
 Link-local IPv6 Address.........: FE80::20A:F3FF:FE55:6C9E
 IPv6 Address.....................: ::
 IPv4 Address.....................: 192.168.1.10
 Subnet Mask......................: 255.255.255.0
 Default Gateway..................: ::
                                    0.0.0.0
 DHCP Servers.....................: 0.0.0.0
 DHCPv6 IAID......................:
 DHCPv6 Client DUID...............: 00-01-00-01-15-DB-75-3D-00-0A-F3-55-6C-9E
 DNS Servers......................: ::
                                    0.0.0.0
```

(b) Repeat the previous steps to assign the IP address information for PC-B

```
Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Physical Address.................: 0001.42D3.ABE6
   Link-local IPv6 Address.........: ::
   IPv6 Address.....................: ::
   IPv4 Address.....................: 0.0.0.0
   Subnet Mask......................: 0.0.0.0
   Default Gateway..................: ::

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128

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

C:\>
```

Part 3: Configure and Verify Basic Switch Settings

Connect the console cable between S1 and PC-A.

Connect the console cable between S2 and PC-B.

PC-A

Physical Config Desktop Programming

Terminal

```
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
GigabitEthernet0/1     unassigned      YES manual down                  down
GigabitEthernet0/2     unassigned      YES manual down                  down
Vlan1                  192.168.1.1     YES manual up                    up
S1#
```

```
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname s1
s1(config)# enable secret class
s1(config)#line console 0
s1(config-line)#password cisco
s1(config-line)#login
s1(config-line)#exit
s1(config)#
```

```
sl(config)#int vlan 1
sl(config-if)#ip address 192.168.1.1 255.255.255.0
sl(config-if)#no shutdown

sl(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
```

```
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 ip address 192.168.1.1 255.255.255.0
!
banner motd ^CUnauthorized Access is Prohibited!^C
!
!
!
line con 0
 password cisco
 login
!
line vty 0 4
 login
line vty 5 15
 login
!
!
!
!
end


sl#
```

```
s1# show version
Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team

ROM: C2960 Boot Loader (C2960-HBOOT-M) Version 12.2(25r)FX, RELEASE SOFTWARE (fc4)

System returned to ROM by power-on

Cisco WS-C2960-24TT (RC32300) processor (revision C0) with 21039K bytes of memory.


24 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)

63488K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address       : 00E0.F780.A6A8
Motherboard assembly number     : 73-9832-06
Power supply part number        : 341-0097-02
Motherboard serial number       : FOC103248MJ
Power supply serial number      : DCA102133JA
Model revision number           : B0
Motherboard revision number     : C0
Model number                    : WS-C2960-24TT
System serial number            : FOC1033Z1EY
Top Assembly Part Number        : 800-26671-02
Top Assembly Revision Number    : B0
Version ID                      : V02
CLEI Code Number                : COM3K00BRA
Hardware Board Revision Number  : 0x01


Switch   Ports  Model              SW Version            SW Image
------   -----  -----              ----------            ----------
*    1   26     WS-C2960-24TT      12.2                  C2960-LANBASE-M

Configuration register is 0xF
```

Repeat the steps on the PC-b

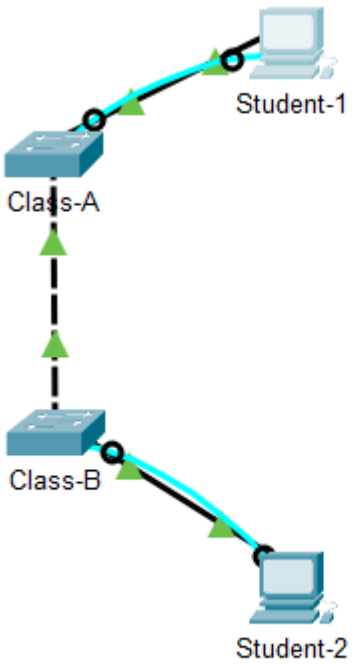
```
s2#show ip int brife
               ^
% Invalid input detected at '^' marker.

s2#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual up                    up
FastEthernet0/2        unassigned      YES manual down                  down
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual down                  down
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual up                    up
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
GigabitEthernet0/1     unassigned      YES manual down                  down
GigabitEthernet0/2     unassigned      YES manual down                  down
Vlan1                  192.168.1.2     YES manual up                    up
s2#
```

Packet Tracer - Skills Integration Challenge

Requirements

1.



2.

```
Switch>
Switch>enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname Class-A
Class-A(config)#interface vlan 1
Class-A(config-if)#ip address 128.107.20.10 255.255.255.0
Class-A(config-if)#no shutdown

Class-A(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
exit
Class-A(config)#exit
Class-A#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#interface vlan 1
S1(config-if)#ip address 128.107.20.15 255.255.255.0
S1(config-if)#no shutdown

S1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
exit
S1(config)#hostname Class-B
Class-B(config)#exit
Class-B#
%SYS-5-CONFIG_I: Configured from console by console

Class-B#
```