Independent University, Bangladesh (IUB)
Department of Computer Science & Engineering
Data Communication & Networking (CSE 316)

EXPERIMENT#1: INITIAL ROUTER CONFIGURATIONS

Objective:

1. Learn how to set up a router and login through a router console port from a workstation using the terminal program.
2. How to configure a Router with Global Parameters
3. How to assign IP to a local interface of the router
4. Enable Remote login for the router with TELNET/SSH
5. Remote login to a router from workstation

Tools and Materials:

In a real life Scenario:
Workstation with terminal Program (such as putty), Cisco router, rollover cable, cross-over RJ45 cable
For Lab Purpose:
Cisco Packet Tracer Software

Instructions:

Connect Workstation and Router using Console port and access router CLI from the Worksation terminal emulator software:

All routers have a console port. It will be used at least once in a life, because that's the port you use when you configure a brand new switch/router for a first time (or a used router with no configuration at all).

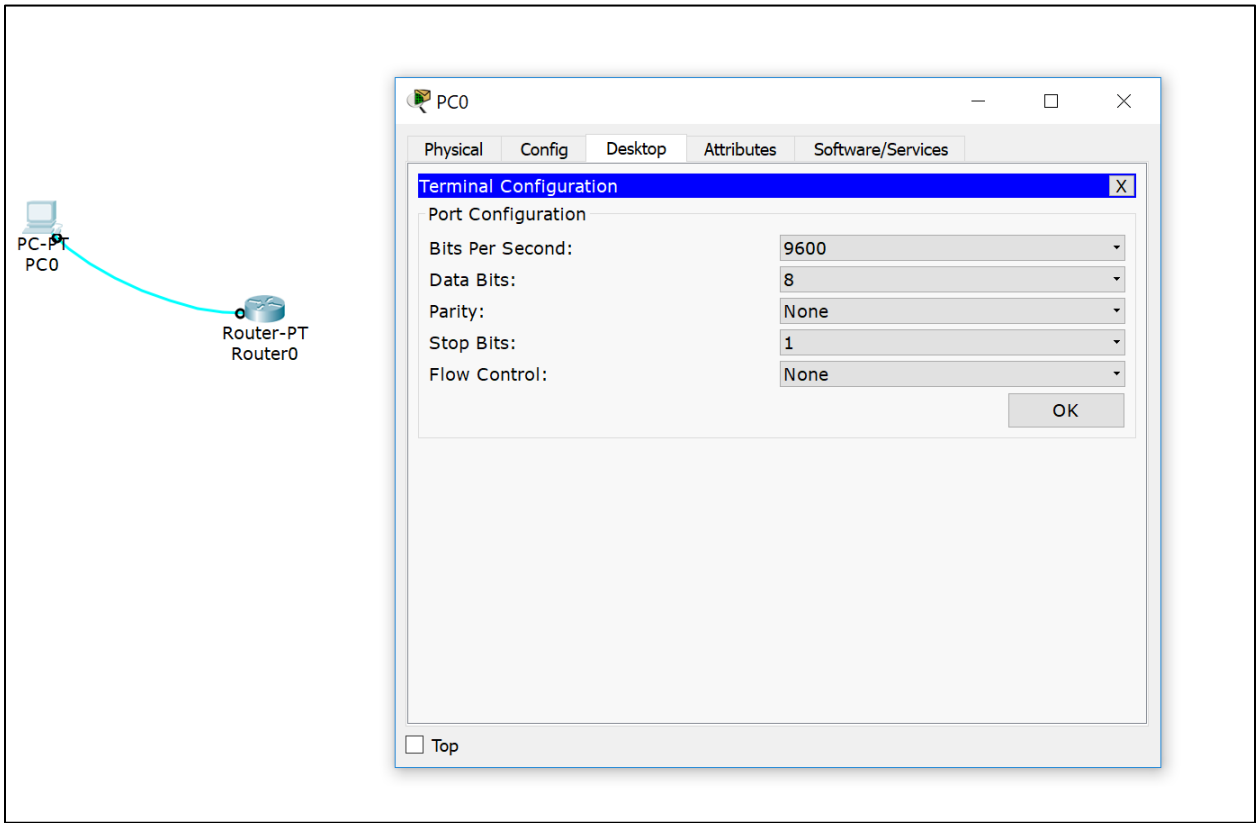
This experiment shows how to connect it using the Cisco simulator software Packet Tracer.

First, connect the PC to the Router using a console cable. The PC port will be the RS-232 and the router port will be the Console port.

Next, click on the PC and access the Desktop tab. Click on the Terminal icon. A small window will appear with the following settings:

- Bits per second: 9600
- Data bits: 8
- Parity: None

- Stop bit: 1
- Flow control: None



Click OK to accept the default settings and the router CLI will appear. Just hit ENTER in your keyboard and you will get to the user mode (Router>).

The default settings in that small screen represent what you would set in a third-party software to connect to the router. Windows can use open source terminal emulator software Putty. In the Putty you would set a connection use the same settings of that small screen

Configure Router using initial setup:

Continue with configuration dialog? [yes/no]: **no**
A good Network Administrator will never use initial configuration mode. It is far too time consuming and is unlikely to produce the configuration you need.

Router> **enable**
Enters router enable mode

Router# **show version**
Shows software version and detail regarding the router

```
Router#show version
Cisco Internetwork Operating System Software
IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 27-Apr-04 19:01 by miwang
Image text-base: 0x8000808C, data-base: 0x80A1FECC

ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
ROM: PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)

System returned to ROM by reload
System image file is "flash:pt1000-i-mz.122-28.bin"

PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
.
Processor board ID PT0123 (0123)
PT2005 processor: part number 0, mask 01
Bridging software.
X.25 software, Version 3.0.0.
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

Configuration register is 0x2102
```

Router# **show history**

To list the commands you have entered in the current EXEC session, use the show history command in EXEC mode

```
Router#show history
  enable
  show version
  show history
```

Router# **show flash**

To display the layout and contents of a Flash memory file system. The flash memory is where the Cisco router IOS image is stored in a compress file, (.bin).

```
Router#show flash

System flash directory:
File  Length   Name/status
  3   5571584  pt1000-i-mz.122-28.bin
  2   28282    sigdef-category.xml
  1   227537   sigdef-default.xml
[5827403 bytes used, 58188981 available, 64016384 total]
63488K bytes of processor board System flash (Read/Write)
```

Router# **terminal history size** *50*

The number of commands that the history buffer will record is determined by the terminal history size EXEC command

Router# **show clock**

Displays the system clock

```
Router#show clock
*0:8:31.169 UTC Mon Mar 1 1993
```

Router# **clock set** *16:00:20 16 may 2018*

To change the software clock settings, use the clock set command in EXEC mode Admin EXEC mode

Router# **show clock**

```
Router#clock set 16:00:20 16 may 2018
Router#show clock
16:0:23.400 UTC Wed May 16 2018
```

Router# **show startup-config**

Displays the contents of NVRAM (if present and valid) or displays the configuration file pointed to by the CONFIG_FILE environment variable

```
Router#show startup-config
startup-config is not present
```

Router# **show running-config**

Displays contents of the currently running configuration file. Current running configuration file is stored in RAM.

```
Router#show running-config
Building configuration...

Current configuration : 345 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
 history size 50
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Router# **copy running-config startup-config**

Copies the running configuration (stored in RAM) to the startup configuration (stored in NVRAM).

```
Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Router# **show startup-config**

```
Router#show startup-config
Using 345 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
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!
!
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
 history size 50
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Router# **show ip interface brief**

Provides a quick status of the interfaces on the router, including their IP address, Layer 2 status, and Layer 3 status.

```
Router#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  administratively down down
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              unassigned      YES unset  administratively down down
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
```

Router# **show protocols**

To display the configured protocols.

```
Router#show protocol
Global values:
  Internet Protocol routing is enabled
FastEthernet0/0 is administratively down, line protocol is down
FastEthernet1/0 is administratively down, line protocol is down
Serial2/0 is administratively down, line protocol is down
Serial3/0 is administratively down, line protocol is down
FastEthernet4/0 is administratively down, line protocol is down
FastEthernet5/0 is administratively down, line protocol is down
```

Router# **show ip route**

Displays information about all IP routes/routing table

```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set
```

Router# **configure terminal**

Privileged EXEC command to enter global configuration mode. You are in global configuration mode when the prompt changes to Router(config)#.

Router(config)# **hostname** *CSE316*

Specifies the hostname for the ASA or for a context. This name can be up to 63 characters. The hostname must start and end with a letter or digit, and have only letters, digits, or a hyphen

CSE316(config)# **enable secret** *cisco*

Password is used for restricting access to enable mode and to the global configuration mode of a router

CSE316(config)# **no ip domain-lookup**
Disables DNS lookup function

CSE316(config)# **ip domain-name** *CSE316.cisco.com*
Specifies the DNS domain name

CSE316(config)# **username** *student* **secret** *cse*
Create user and assign password. The Clear Text Password is MD5 Encrypted

CSE316(config)# **crypto key generate rsa**
To generate Rivest,Shamir, and Adelman (RSA) key pairs, use the crypto key generate rsa command in global configuration mode

```
The name for the keys will be: CSE316.CSE316.cisco.com
Choose the size of the key modulus in the range of 360 to
2048 for your
  General Purpose Keys. Choosing a key modulus greater
than 512 may take
  a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-
exportable...[OK]
```

CSE316(config)# **line console** *0*
Enter line configuration mode for Console port

CSE316(config-line)# **password** *c1234*
CSE316(config-line)# **login**
Configure the password, and enable password checking at login.

CSE316(config-line)# **exit**
Go back to previous mode; in this case global configuration mode

CSE316(config)# **service password-encryption**
To make password entered encrypted

Ctrl+C / CSE316(config)# **end**
Return back to router enable mode

CSE316# **configure terminal**
Privileged EXEC command to enter global configuration mode. You are in global configuration mode when the prompt changes to Router(config)#.

CSE316(config)# **line vty** *0 15*
Giving range of vty(virtual terminal line) from 0 to 15 (means all 16 lines)

CSE316(config-line)# **login** *local*

Use local usename and password. Alternatively authenticate using aaa method list can be used

CSE316(config-line)# **transport input** *all*
Both Telnet and SSH can be used to remotely log into the router

Ctrl+C / CSE316(config-line)# **end**
Return back to router enable mode

CSE316# **configure terminal**
CSE316(config)# **interface** *fastEthernet 0/0*
Interface fastEthernet 0/0 is chosen for configuration

CSE316 (config-if)# **ip address** *192.168.1.1 255.255.255.0*
Provide IP address and subnet mask for fastEthernet 0/0 Interface

CSE316 (config-if)# **no shutdown**
Make fastEthernet 0/0 Interface administratively up

Ctrl+C / CSE316(config-if)# **end**
Return back to router enable mode

CSE316# **configure terminal**
Privileged EXEC command to enter global configuration mode. You are in global configuration mode when the prompt changes to Router(config)#.

CSE316(config)# **interface** *loopback 0*
Loopback 0 is chosen for configuration

CSE316 (config-if)# **ip address** *10.0.0.1 255.255.255.0*
Provide IP address and subnet mask for loopback 0 Interface.

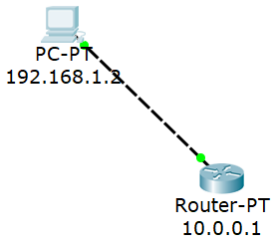
CSE316 (config-if)# **no shutdown**
Make loopback0 Interface administratively up

Ctrl+C / CSE316(config-if)# **end**
Return back to router enable mode

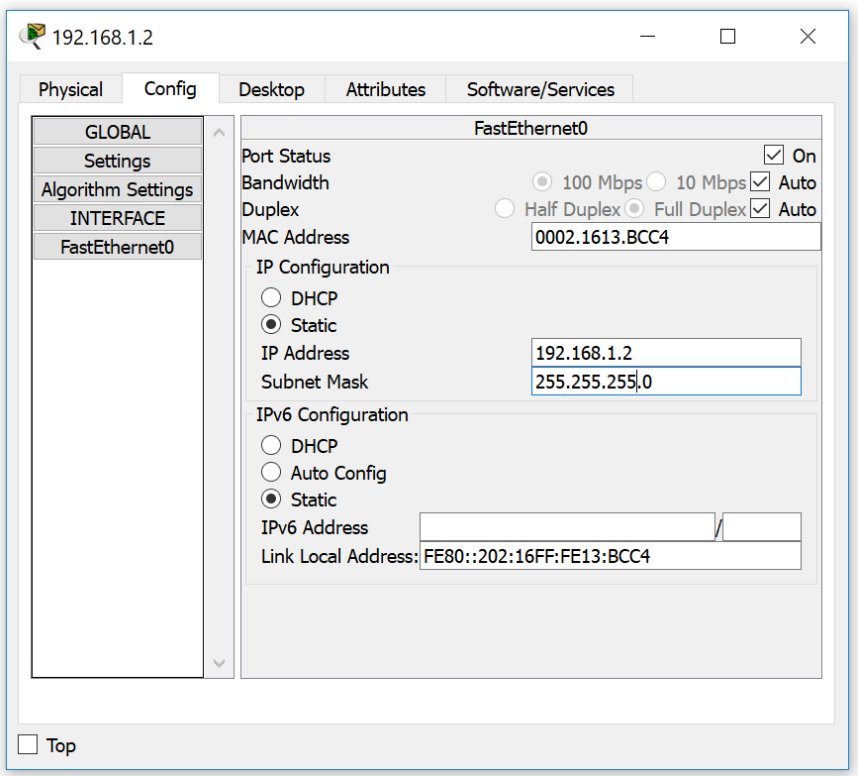
CSE316# **show ip interface brief**

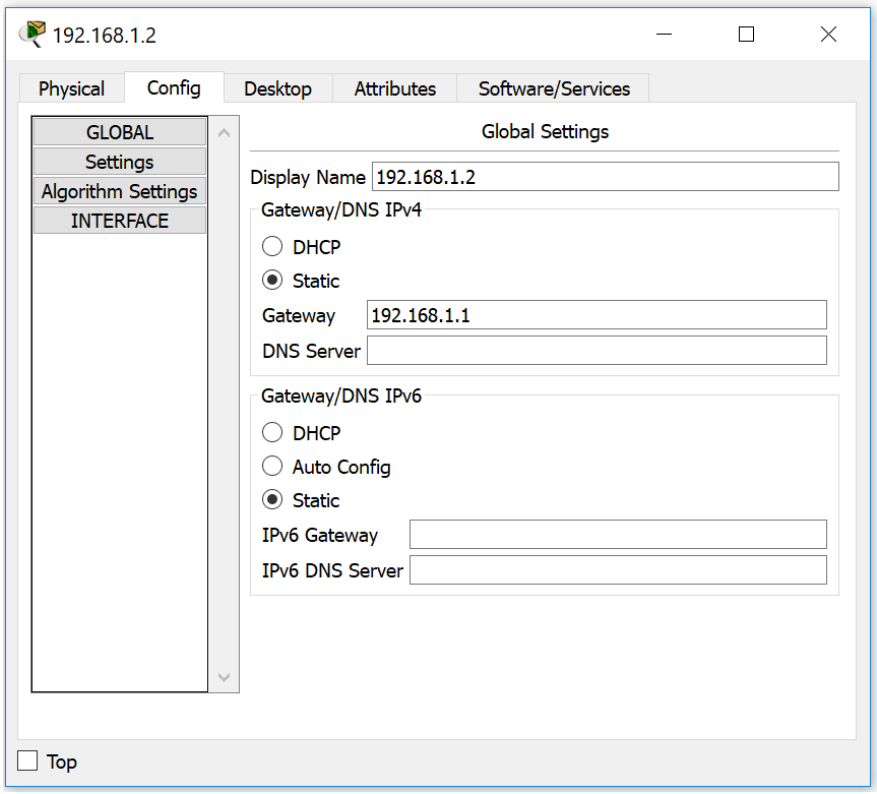
```
CSE316#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.1.1     YES manual up                    down
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              unassigned      YES unset  administratively down down
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
Loopback0              10.0.0.1        YES manual up                    up
```

Disconnect Workstation and Router by deleting the console cable between them. Then reconnect Workstation and the router using Copper cross-over cable between Respectable fastethernet0/0 ports

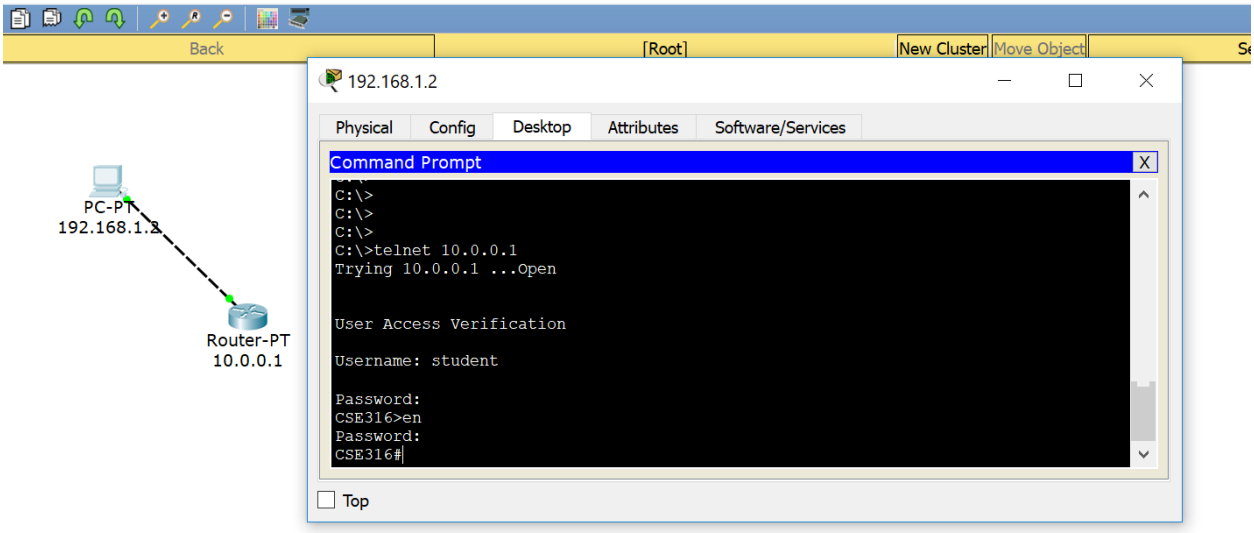


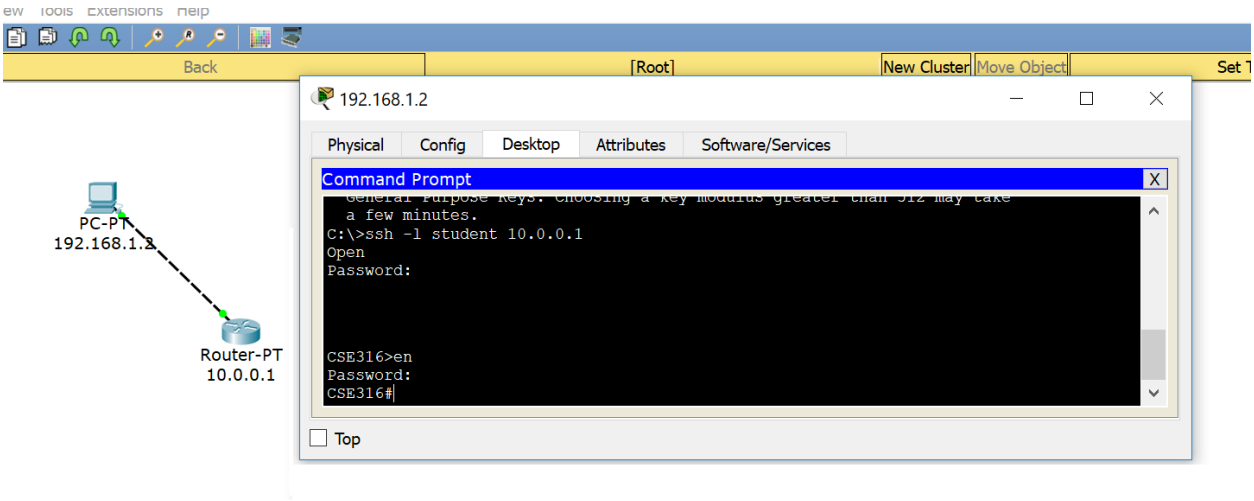
Static IP Address, Subnet Mask and Gateway Setup for the workstation as shown in the two figures below:





Remote connection from workstation to Router using both TELNET and SSH as shown respectively in the two figures below:




ew Tools Extensions Help
Back
[Root]
New Cluster
Move Object
Set T
192.168.1.2
Physical
Config
Desktop
Attributes
Software/Services
Command Prompt
X
a few minutes.
C:\>ssh -l student 10.0.0.1
Open
Password:
CSE316>en
Password:
CSE316#
Top
PC-PT
192.168.1.2
Router-PT
10.0.0.1