ministry of higher education
Erbil Polytechnic University
Erbil Technical Engineering College
Information System Engineering Dept.
Web: http://*epu.edu.iq*

Network
Practical 11

زانکۆی پۆلیتەکنیکی هەولێر
ERBIL POLYTECHNIC UNIVERSITY

Lab-1

(Network Access)

Objectives

- Switch and Router OS
- CLI mode
- Basic configuration
- Console port configuration
- Ethernet port configuration

By: Hasan A. Saeed
hasan.saeed@epu.edu.iq

Router Memory Types

- Router or switch cannot function without an operating system
- Internetwork Operating System (IOS) is the system software in Cisco devices
- Cisco IOS are generally accessed using a command line interface (CLI)
- The features of Cisco IOS include (**Routing, Security, Interfaces and Addressing**)
- **RAM** :This is where the running configuration is located. After the device boots up, the IOS software is loaded into RAM. Also, RAM holds routing tables, network parameters during operation etc. When configuring the router, we actually change the running-configuration which as we said is stored into RAM
- **NVRAM** :When we save the running-configuration (using the command "**write**") it is stored into the NVRAM and becomes the startup-configuration. After rebooting the router, the startup-configuration is loaded from the NVRAM.
- **Flash** :This is like the hard-disk of a PC. It holds the IOS software image file and any backup configurations that you might save from time to time.

Cisco Router and Switch

Cisco Switch Memory Types

RAM
(Working Memory and Running Configuration)

Flash
(Cisco IOS Software)

ROM
(Bootstrap Program)

NVRAM
(Startup Configuration)

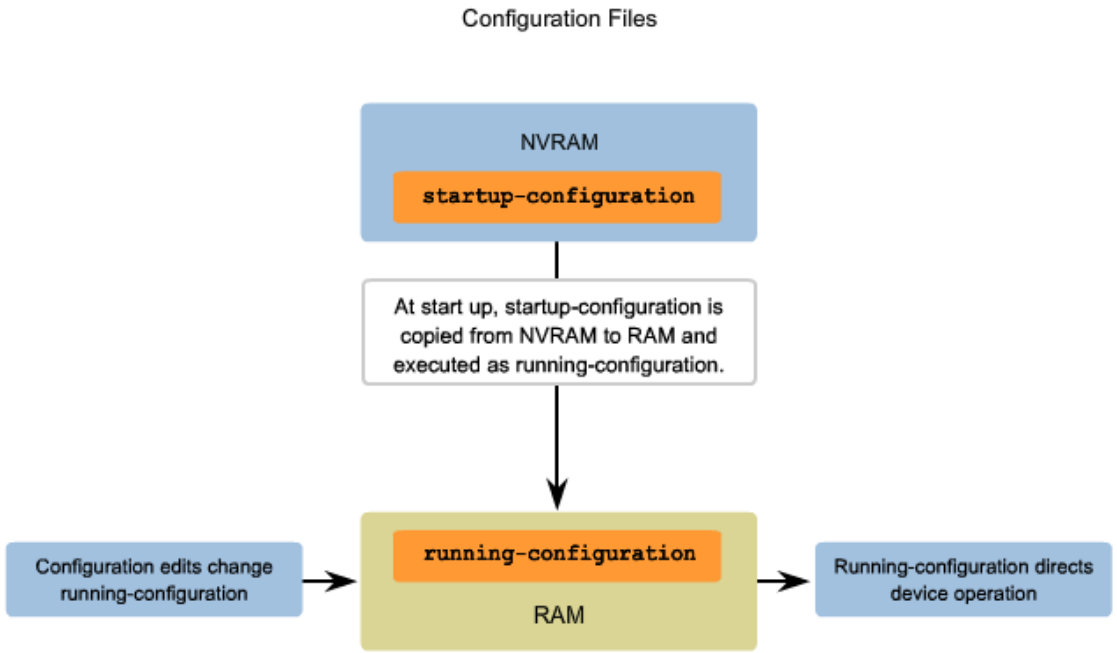
Configuration

Startup Configuration File

The startup configuration file startup-config file is stored in non-volatile RAM (NVRAM).

Running Configuration

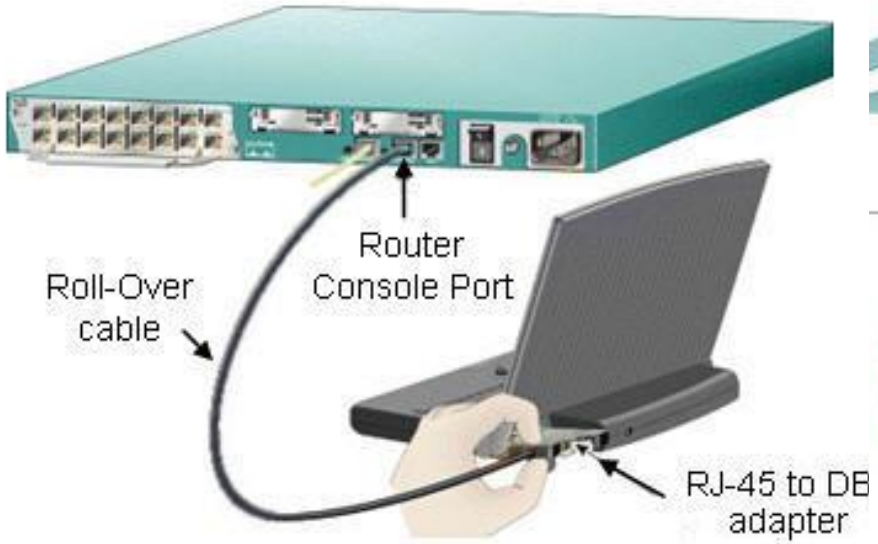
The running configuration is modified when the network administrator performs device configuration



Connection

Console port:

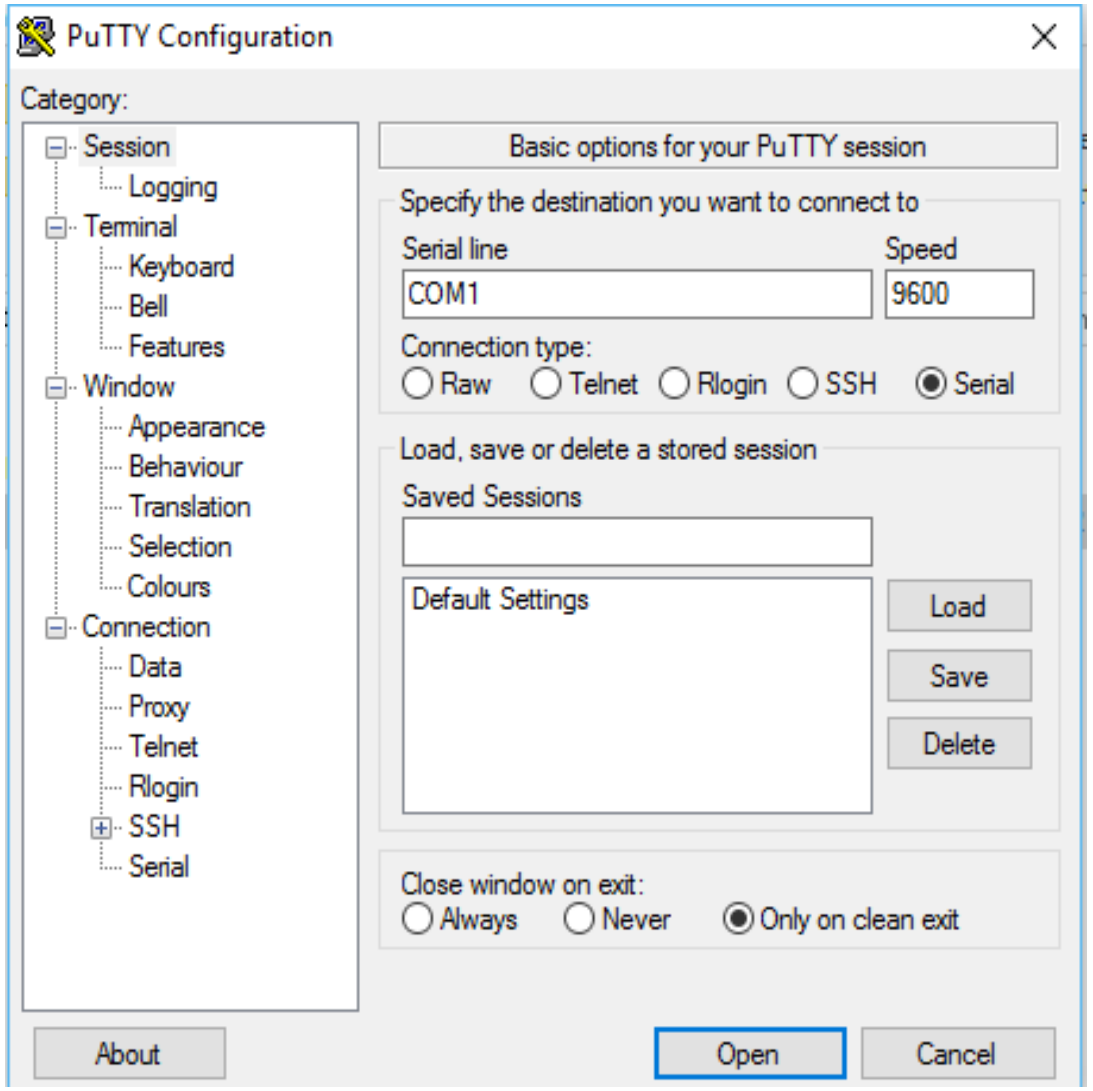
- The initial configuration of the network device
- troubleshooting where remote access is not possible
- to access a device when the networking services have not
- been started or have failed



Connection

Connection with console (PC or Laptop)

- New routers are not configured.
- must be initially configured using the console port
- **PuTTY** use to access the physical CLI Router or Switch



CLI Mode

User mode : This is the first mode a user has access to after logging into the router. The user mode can be identified by the > prompt following the router name

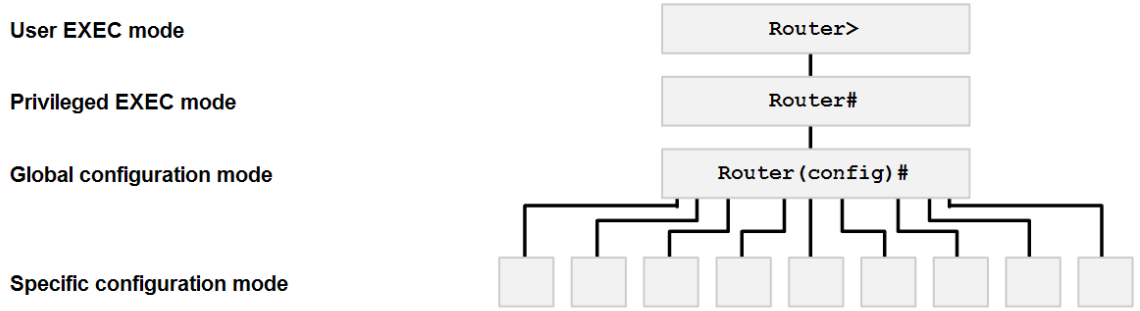
Privileged mode: This mode allows users to view the system configuration, restart the system, and enter configuration mode. It also allows all the commands that are available in user mode. Privileged mode can be identified by the # prompt following the router name.

Configuration mode: This mode allows users to modify the running system configuration. To enter configuration mode, enter the command **configure terminal** from privileged mode. Configuration mode has various submodes, starting with **global configuration mode**, which can be identified by the (config)# prompt following the router name

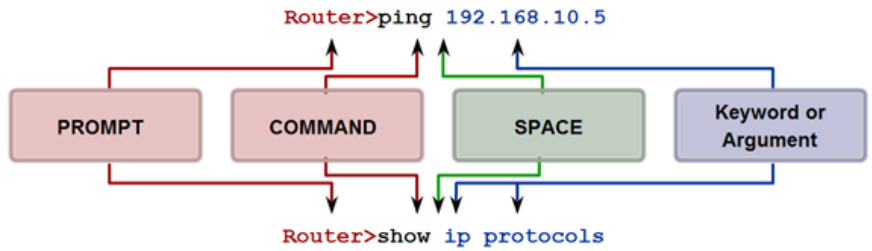
Configuration

```
Router>    // User EXEC Mode
Router#    // Privileged EXEC mode
Router(config)#    // Global Configuration Mode
Router(config-if)#  // Interface Configuration Mode
Router(config-line)#  // Line Configuration Mode
```

IOS Configuration Modes



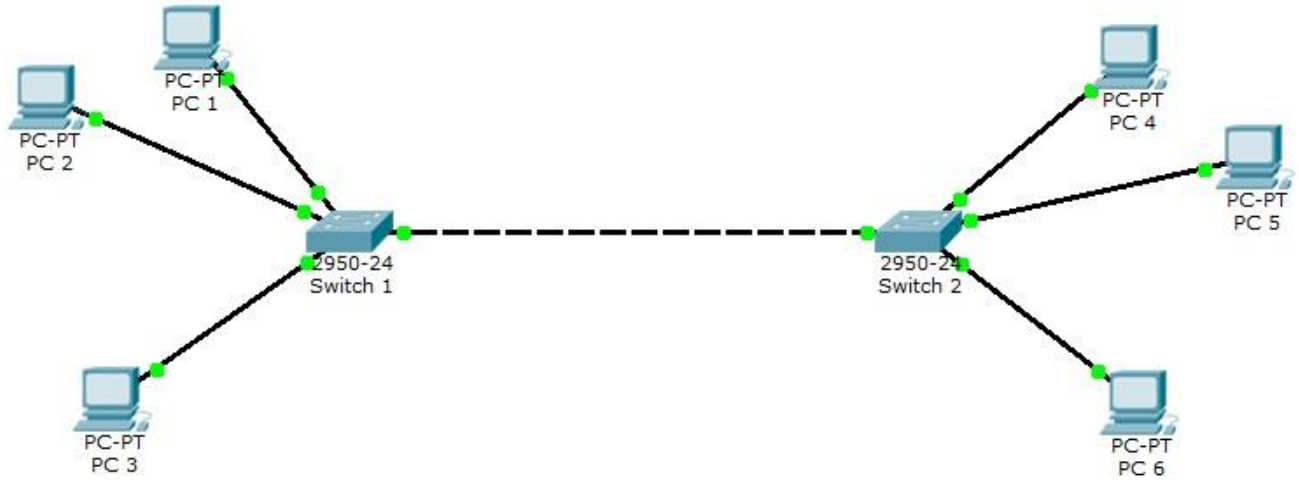
Configuration Mode	Prompt
Interface	Router(config-if)#
Line	Router(config-line)#
Routers	Router(config-router)#



Basic Configuration

Example 1 : Basic switch configuration a Cisco Switch

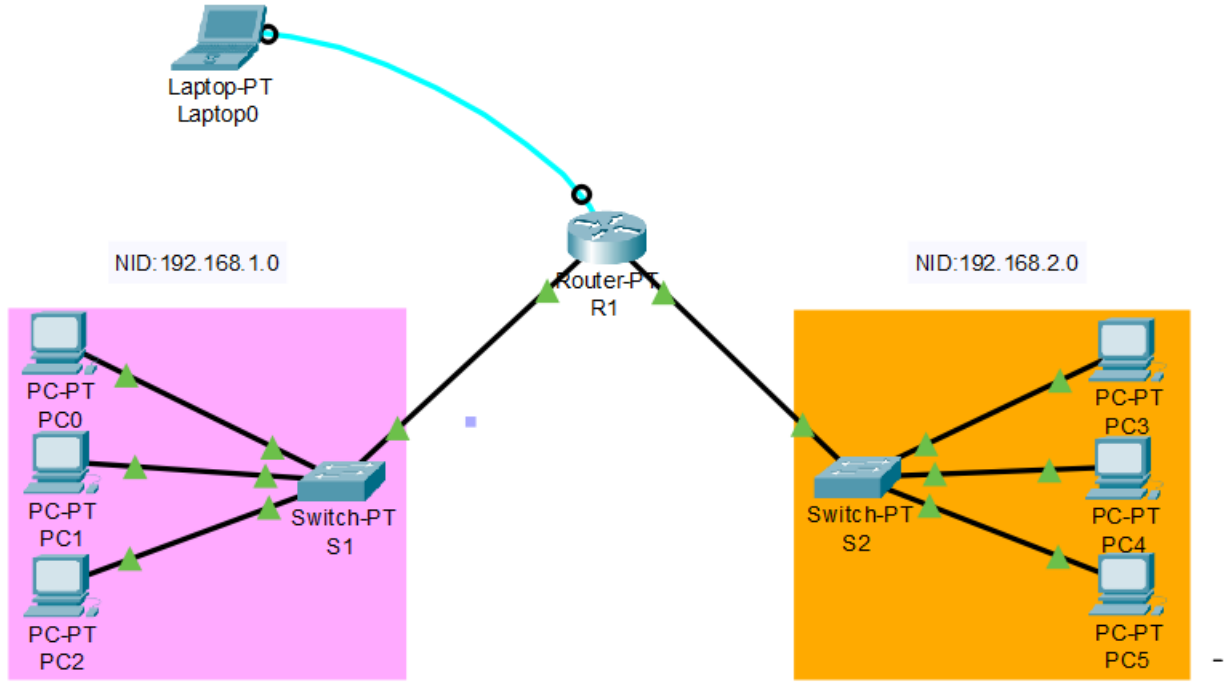
- Console port configuration
- Hostname (Router Name)
- Secret Password
- Save configuration



Basic Configuration

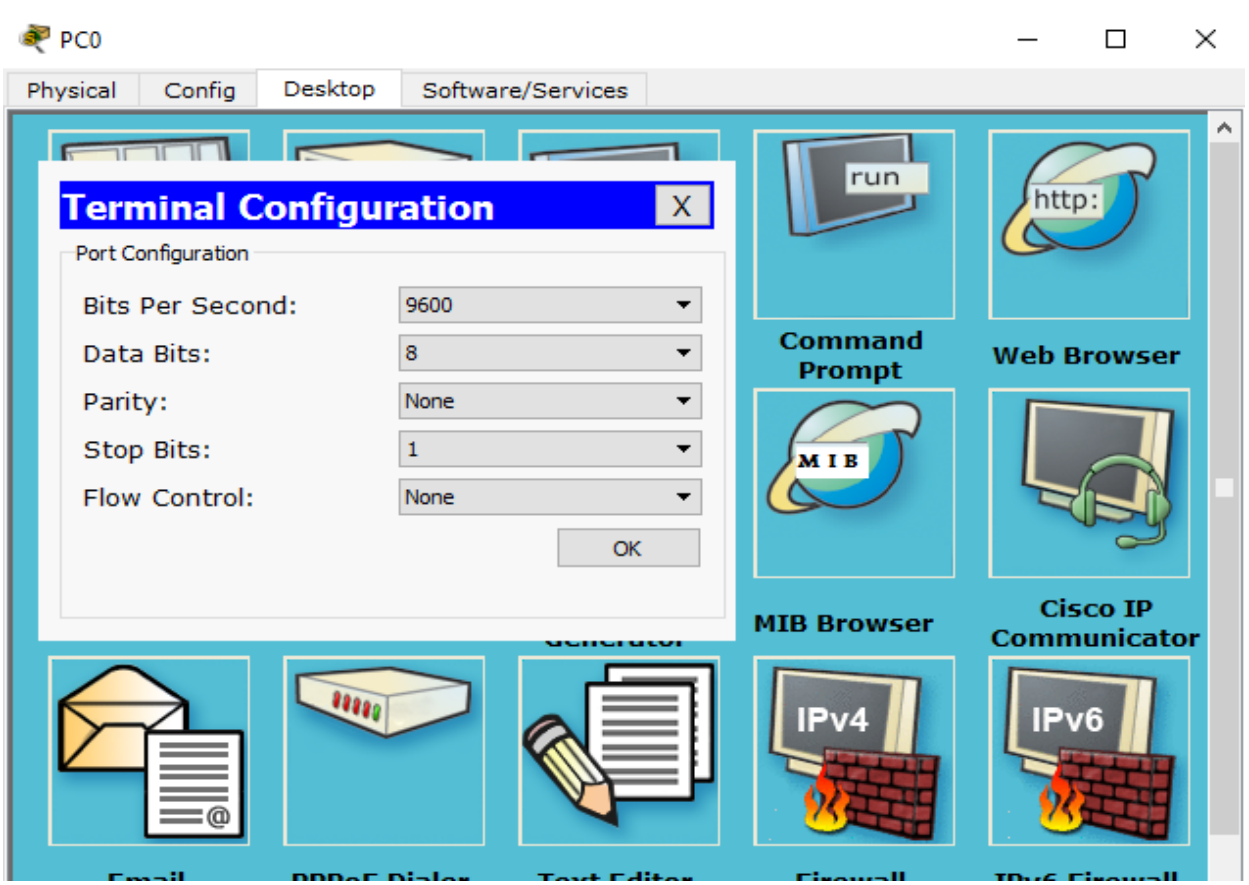
Example 2 : Using the Router to connect two different networks

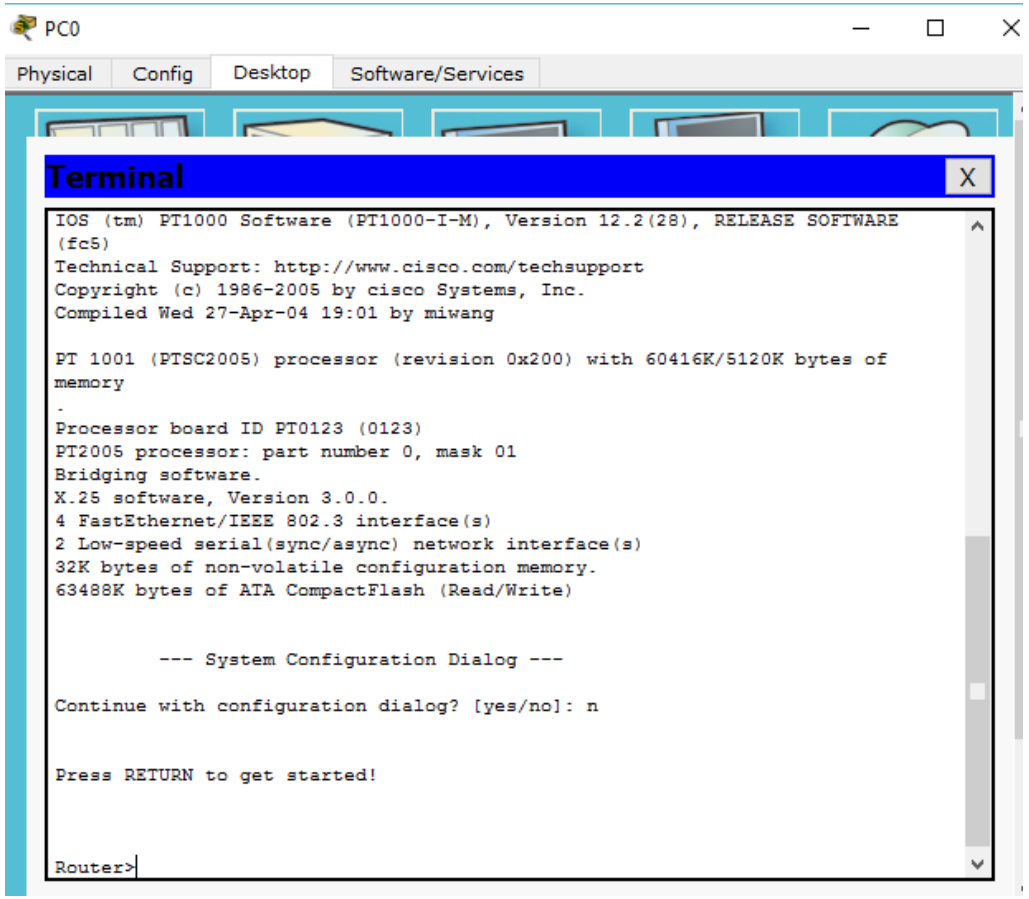
- Console port configuration
- Hostname (Router Name)
- Secret Password
- Ethernet configuration
  - Static IP (Router & PC)
  - Default Gateway
- Save configuration



Connection

Connection with console (packet tracer)





Basic Configuration


```
Router> enable    // ena
Router# configure terminal    // conf t
Router(config)#


Router# disable    // (ctrl+z)
Router>

Router>? Router#? R1(config)# ? //Help Command
```

Basic Configuration

Hostname:

```
Router#conf t
Router(config)#hostname R1
R1(config)#exit
```

Password :

```
R1(config)#enable secret 123
```

Banner:

```
R1(config)#banner motd #Main Router#

R1(config)#banner login #Access for admin only#
```

Console port Configuration

Console port:

```
R1#conf t
R1(config)#
R1(config)#line console 0
R1(config-line)#password 123
R1(config-line)#login
R1(config-line)#exit
```

Save configuration:

```
R1# copy running-config startup-config
```

Ethernet port Configuration

Ethernet-1:

```
R1#conf t
R1(config)#interface FastEthernet 0/0
R1(config-if)#description  myLAN interface
R1(config-if)#ip add 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
```

Ethernet-2:

```
R1#conf t
R1(config)#interface FastEthernet 1/0
R1(config-if)#description  myLAN2 interface
R1(config-if)#ip add 192.168.2.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
```

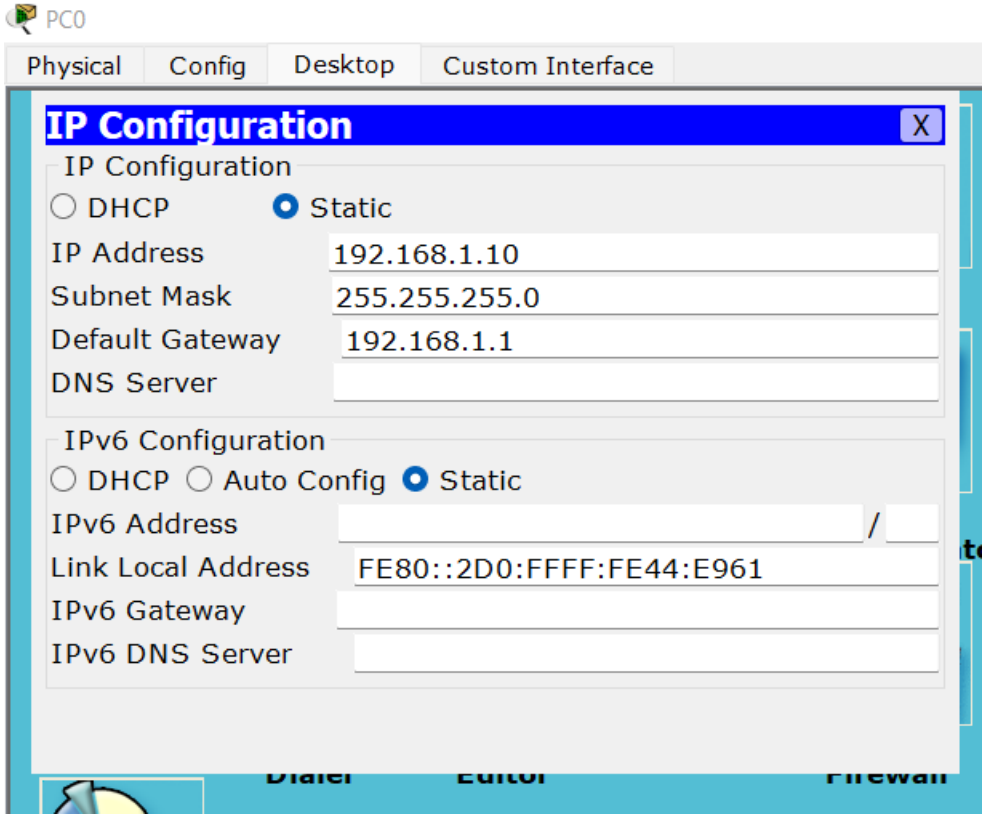
Save configuration: `R1# copy r S`

Configuration

Geteway (PC1,PC2)=192.168.1.1 //net1
Geteway (PC3,PC4)=192.168.2.1 // net2

PC-1 :

ping Geteway IP (same network) FastEthernet 0/0
ping Geteway IP (other network) FastEthernet 1/0



Troubleshooting

```
R1#show startup-config

R1#show interfaces

R1#sh ip interface
```