ESCOLA
SUPERIOR
DE TECNOLOGIA
E GESTÃO

P.PORTO

REDES DE COMPUTADORES I – Endereçamento IP

Sumário

1. Public vs. Private
2. IPv4 vs. IPv6
3. IPv4 subnetting
4. IPv6 concepts
5. Virtual IP (VIP)
6. Subinterfaces

Binário

- IPv4 32 bits
- IPv6 128 bits
- Base 10

128	64	32	16	8	4	2	1
7	6	5	4	3	2	1	0
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Binário

128	64	32	16	8	4	2	1
1	0	0	1	0	1	1	0

128	64	32	16	8	4	2	1	
1								1x128
1	0							1x128+0x64
1	0	0						1x128+0x64+0x32
1	0	0	1					1x128+0x64+0x32+1x16
1	0	0	1	0				1x128+0x64+0x32+1x16+0x8
1	0	0	1	0	1			1x128+0x64+0x32+1x16+0x8+1x4
1	0	0	1	0	1	1		1x128+0x64+0x32+1x16+0x8+1x4+1x2
1	0	0	1	0	1	1	0	1x128+0x64+0x32+1x16+0x8+1x4+1x2+0x1

15
0

Binário

- Exercício

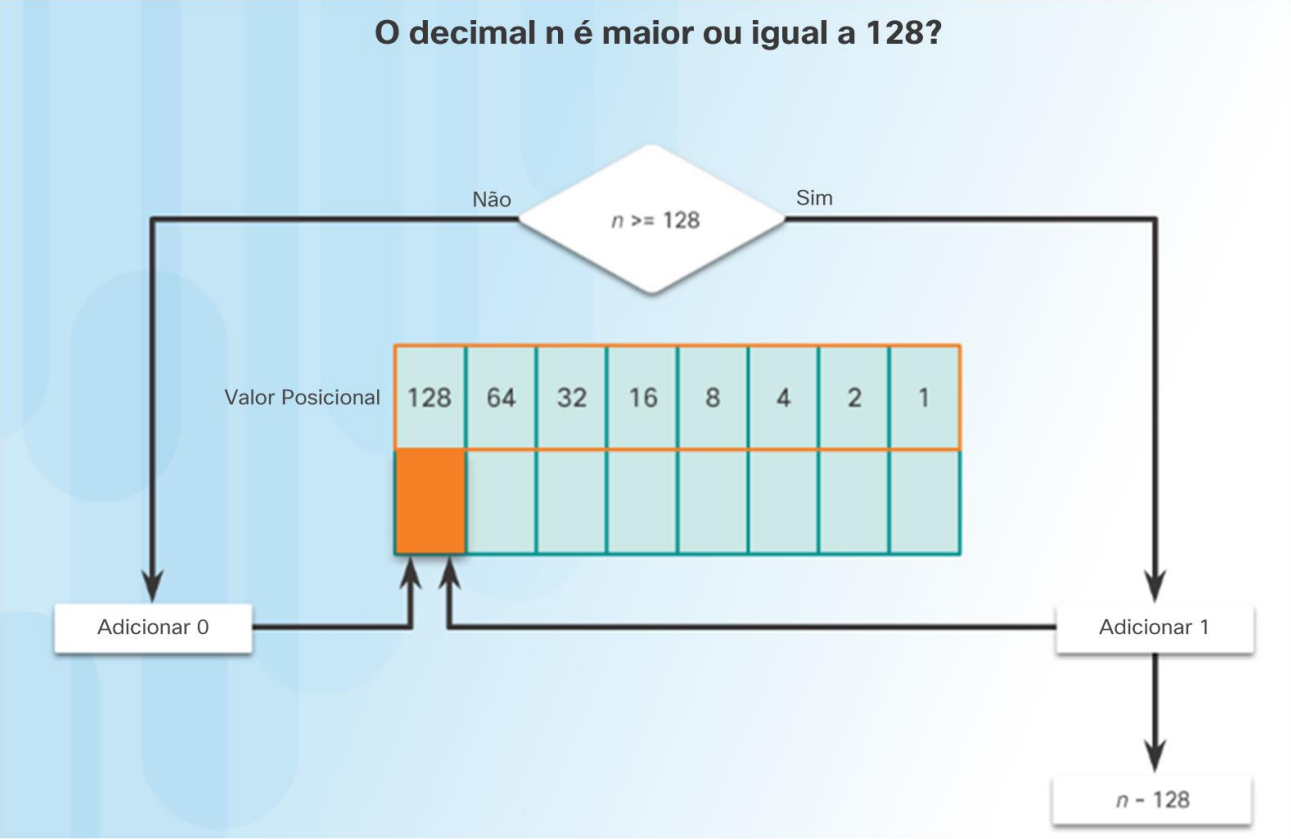
128	64	32	16	8	4	2	1
1	0	0	1	0	1	0	0

Binário

- Exercício

128	64	32	16	8	4	2	1
0	1	1	0	1	0	1	1

Conversão de decimal para binário



Conversão de decimal para binário

Exemplo: 192.168.10.11

128	64	32	16	8	4	2	1
1	1	0	0	0	0	0	0

11000000 . _____ . _____ . _____

Exemplo: 192.168.10.11

Valor Posicional	128	64	32	16	8	4	2	1
	1	0	1	0	1	0	0	0

11000000 . 10101000 . _____ . _____

Exemplo: 192.168.10.11

Valor Posicional	128	64	32	16	8	4	2	1
	0	0	0	0	1	0	1	0

11000000 . 10101000 . 00001010 . _____

Exemplo: 192.168.10.11

Valor Posicional	128	64	32	16	8	4	2	1
	0	0	0	0	1	0	1	1

11000000 . 10101000 . 00001010 . 00001011

Conversão de decimal para binário

- Exercício

128	64	32	16	8	4	2	1
49							

Conversão de decimal para binário

- Exercício

128	64	32	16	8	4	2	1
236							

Conversão de decimal para binário

- Exercício

128	64	32	16	8	4	2	1
236							

IPv4 Address Structure

- IPv4 32 bits
- Subnet mask A 32-bit value (in IPv4) that indicates what portion of the IP address is the network ID versus what portion is the host ID.

Dotted-Decimal Notation	10	1	2	3
Binary Bits	00001010	00000001	00000010	00000011
	Octet 1	Octet 2	Octet 3	Octet 4

IPv4 Address Structure

- network address
  - 255.0.0.0
  - /8

Dotted-Decimal Notation	10	1	2	3
IP Address (in Binary)	00001010	00000001	00000010	00000011
Subnet Mask	**11111111**	00000000	00000000	00000000

Network Bits | Host Bits

Classes of Addresses

Address Class	Value in First Octet	Classful Mask (Dotted Decimal)	Classful Mask (Prefix Notation)
Class A	1–126	255.0.0.0	/8
Class B	128–191	255.255.0.0	/16
Class C	192–223	255.255.255.0	/24
Class D	224–239	—	—
Class E	240–255	—	—

Loopback Address

Address Class	Value in First Octet	Classful Mask (Dotted Decimal)	Classful Mask (Prefix Notation)
Class A	1–126	255.0.0.0	/8
Class B	128–191	255.255.0.0	/16
Class C	192–223	255.255.255.0	/24
Class D	224–239	—	—
Class E	240–255	—	—

127.0.0.1/32

Internet Corporation for Assigned Names and Numbers (ICANN) globally manages publicly routable IP addresses.

Private IP Networks

Address Class	Address Range	Default Subnet Mask
Class A	10.0.0.0– 10.255.255.255	255.0.0.0
Class B	172.16.0.0– 172.31.255.255	255.255.0.0
Class B	169.254.0.0– 169.254.255.255	255.255.0.0
Class C	192.168.0.0– 192.168.255.255	255.255.255.0

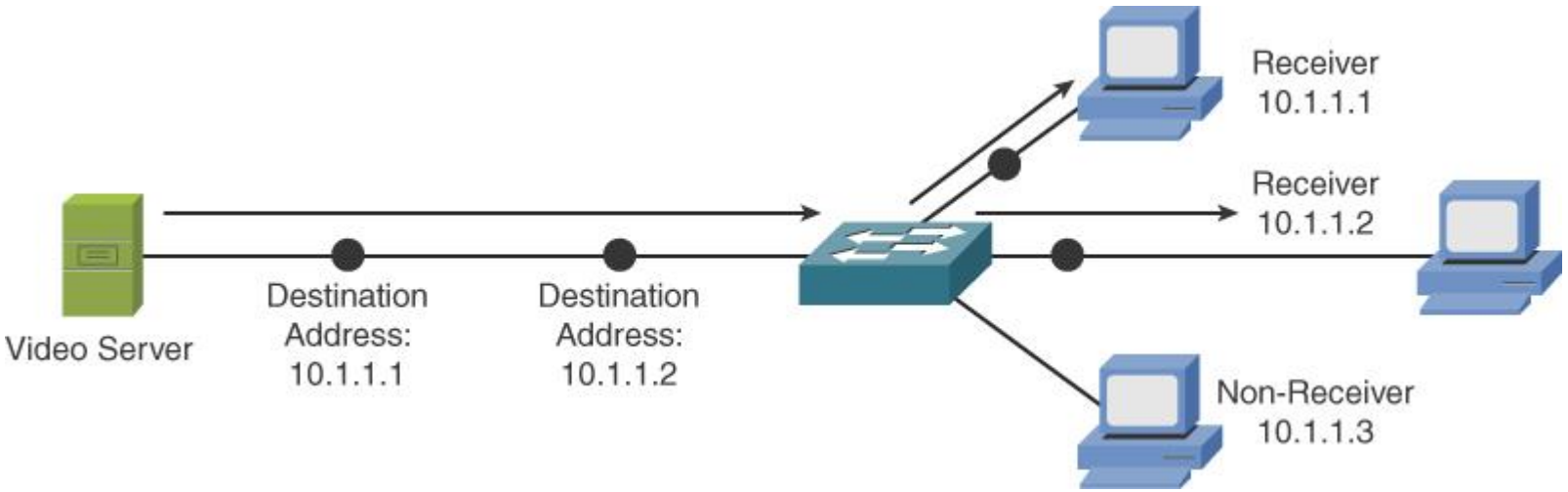
RFC (Private) 1918 Addresses

Private IP Networks APIPA

- Automatic Private IP Addressing (APIPA)
- 169.254.0.0–169.254.255.255 address range is not routable

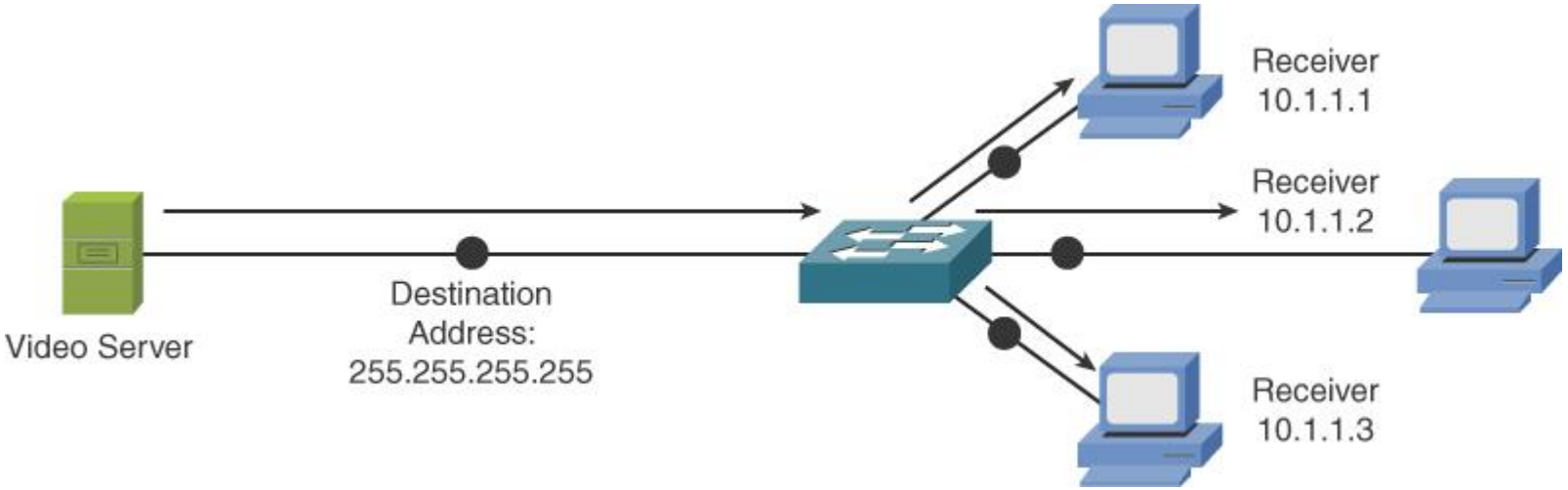
Types of Addresses

- Unicast A one-to-one communication flow.



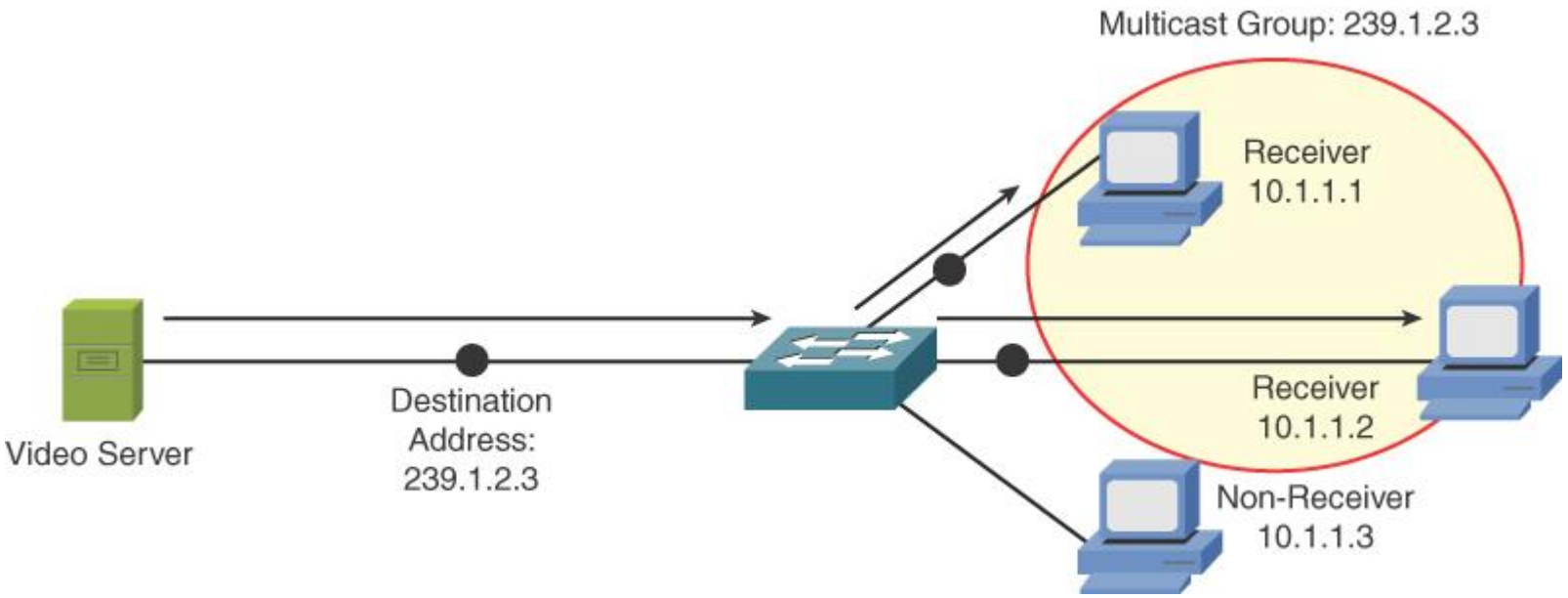
Types of Addresses

- Broadcast A a single source to all destinations on a network (*broadcast domain*)



Types of Addresses

- Multicast A one-to-many communication flow.

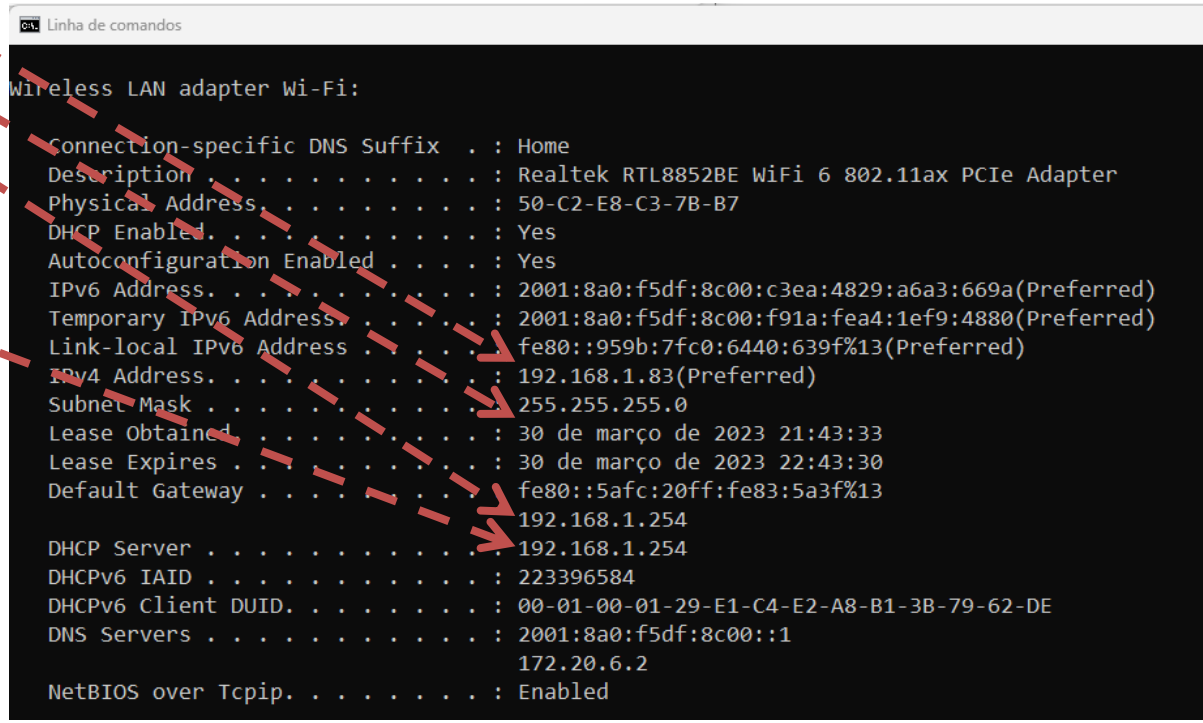


Assigning IPv4 Addresses

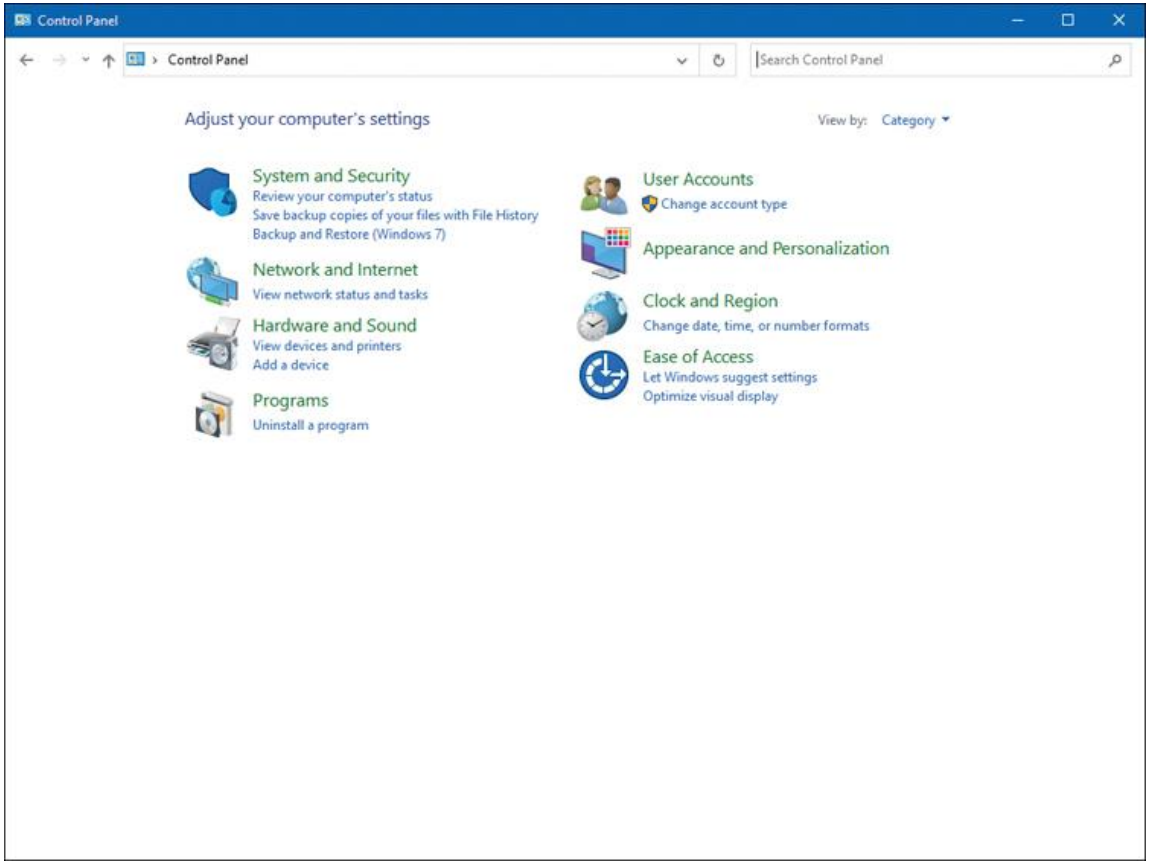
- A network address defines the entire network and all of the hosts inside it. This address cannot be assigned to a specific device.
- A host address defines one specific device inside of that network. This address can be assigned to a single device.
- A broadcast address represents all of the hosts within a specific network. All devices within the network are programmed to accept messages sent to this address.

Assigning IPv4 Addresses

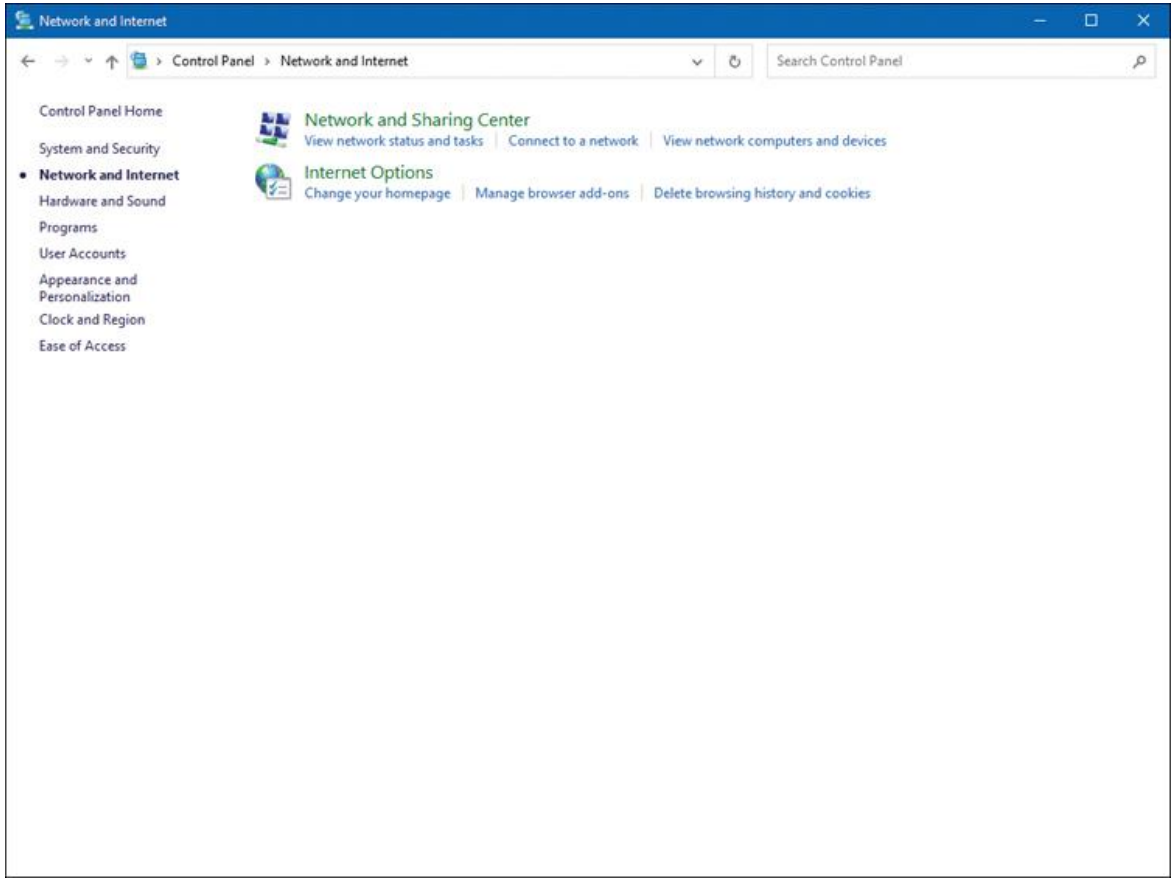
- IP address
- Subnet mask
- Default gateway
- Server address



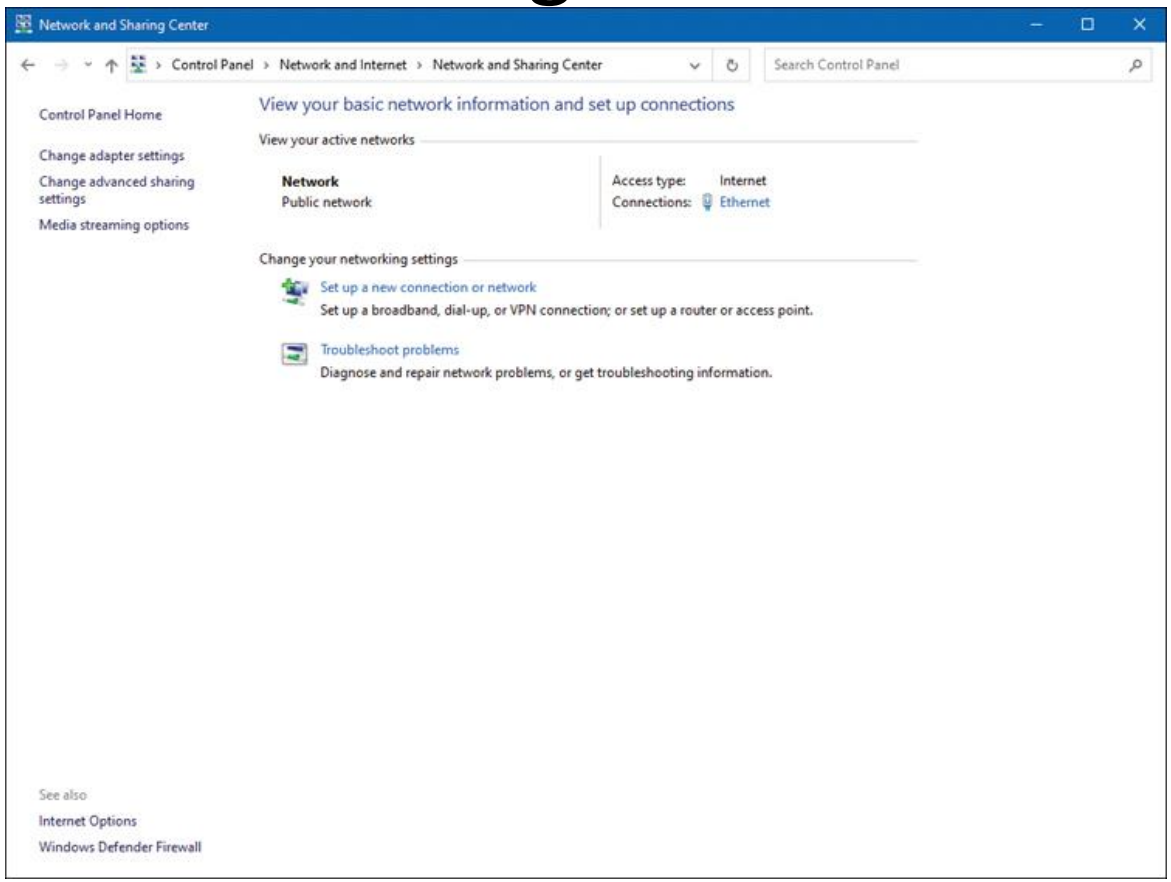
Assigning IPv4 Addresses Static Configuration



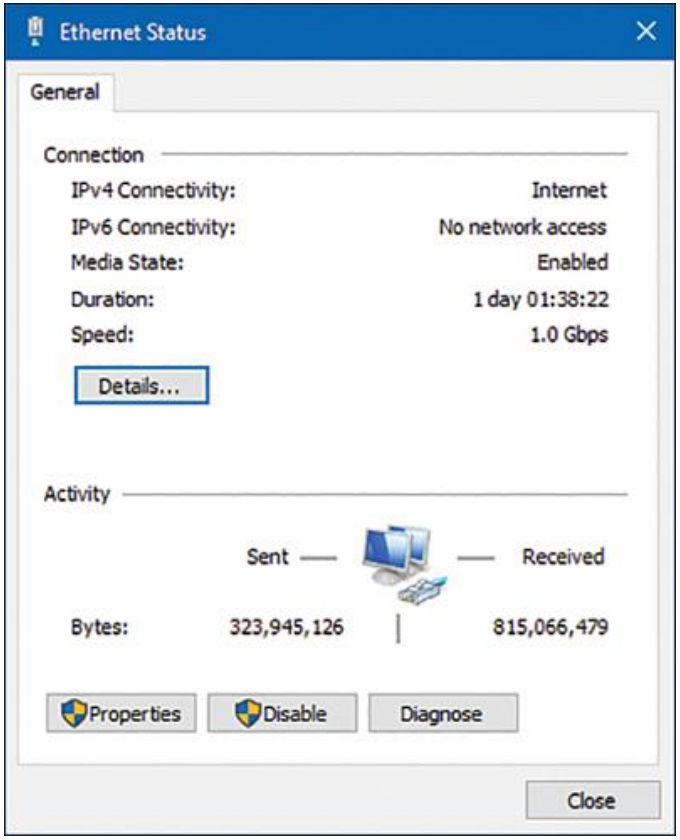
Assigning IPv4 Addresses Static Configuration

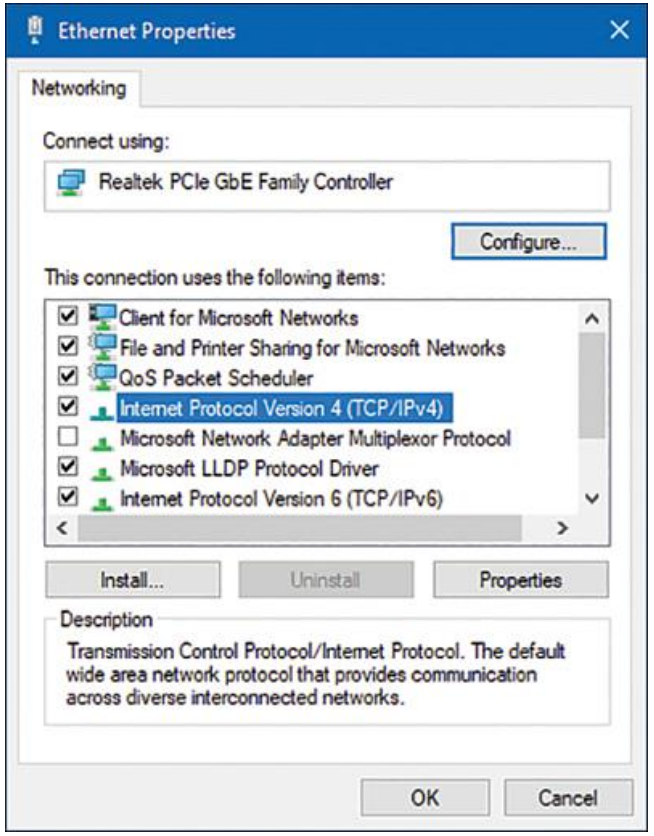


Assigning IPv4 Addresses Static Configuration

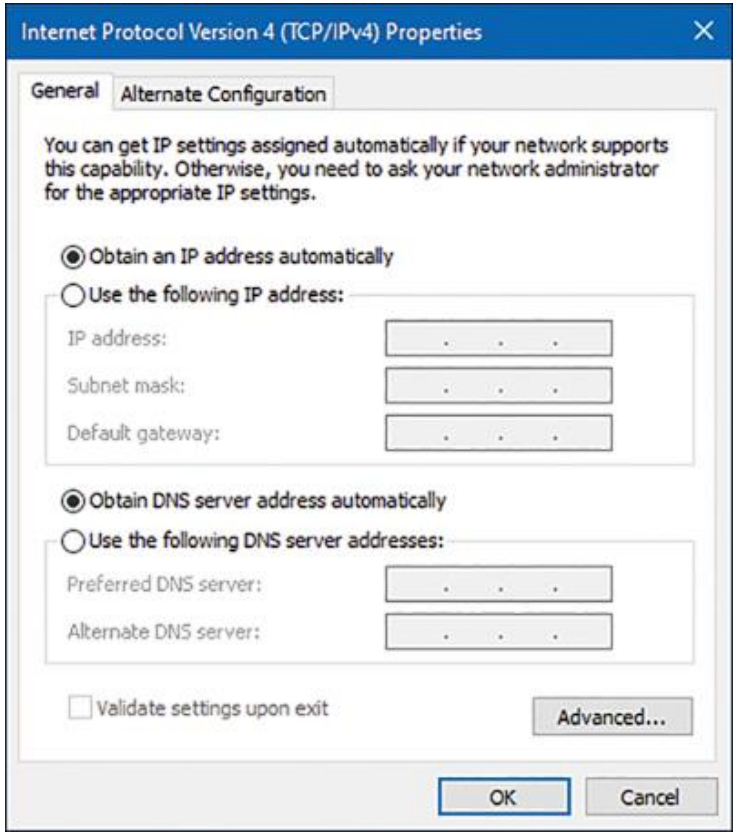


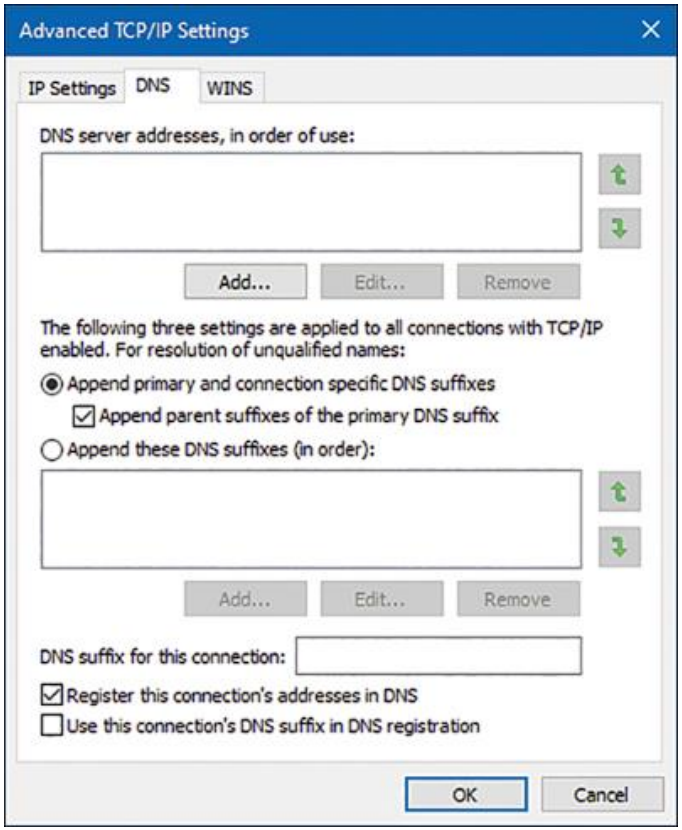
Assigning IPv4 Addresses Static Configuration





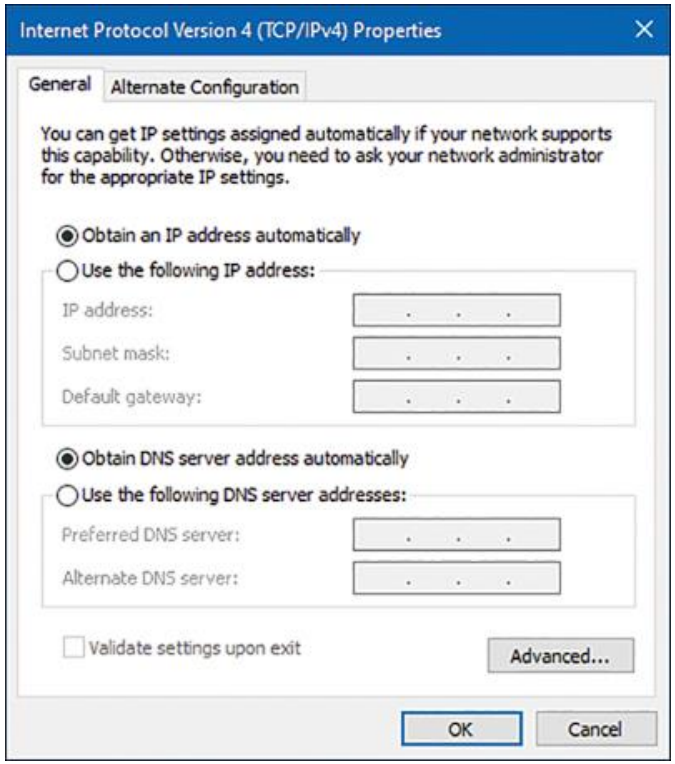
Assigning IPv4 Addresses Static Configuration





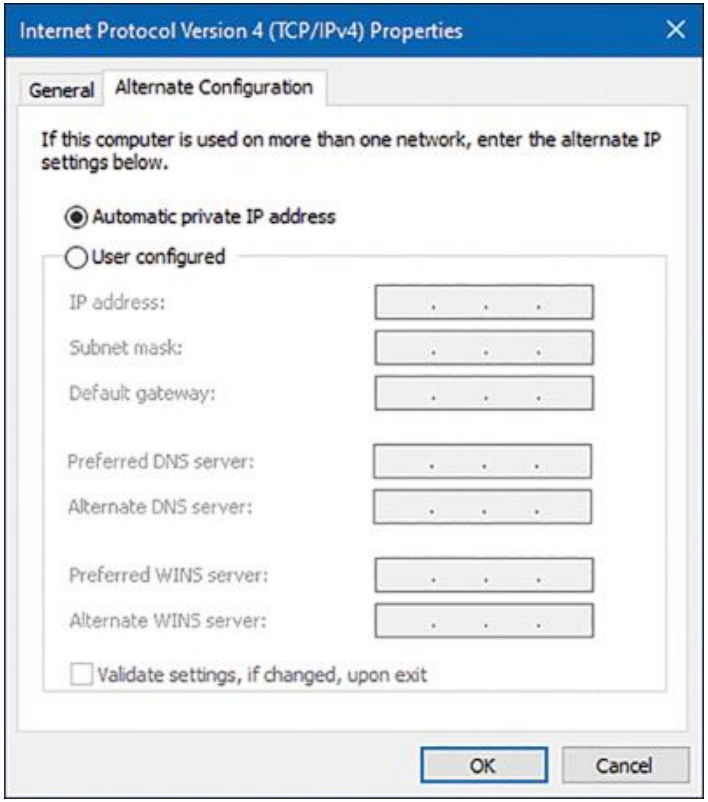
Assigning IPv4 Addresses Dynamic Configuration

Dynamic Host Configuration Protocol (DHCP) A protocol that dynamically assigns IP address information (for example, IP address, subnet mask, DNS server's IP address, and default gateway's IP address) to network devices.



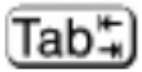
Assigning IPv4 Addresses Automatic Private IP Addressing

Automatic Private IP Addressing (APIPA) A feature that allows a networked device to self-assign an IP address from the 169.254.0.0/16 network. Note that this address is usable only on the device's local subnet (meaning that the IP address is not routable).



Assigning IPv4 Addresses – Network Devices

Cisco CLI:

Router# sh 

= Router# show

Entrar no modo EXEC privilegiado

Router >enable

Router#

Lists all commands available in the current command mode

Router#?

Lists all the possible choices that start with the letter c

Router#c?

Assigning IPv4 Addresses – Network Devices

Logs a user off:

Router# exit

Moves you back one level

Router(config-if)# exit

Moves you from privileged EXEC mode back to user mode

Router# disable

Displays information about the current Cisco IOS Software

Router# show

Displays configuration information

Router# show runningconfig

Assigning IPv4 Addresses – Network Devices

Saves the configuration to NVRAM

ISP# copy running-config startup-config

Moves to global configuration mode

Router># configure terminal

Moves to interface configuration mode

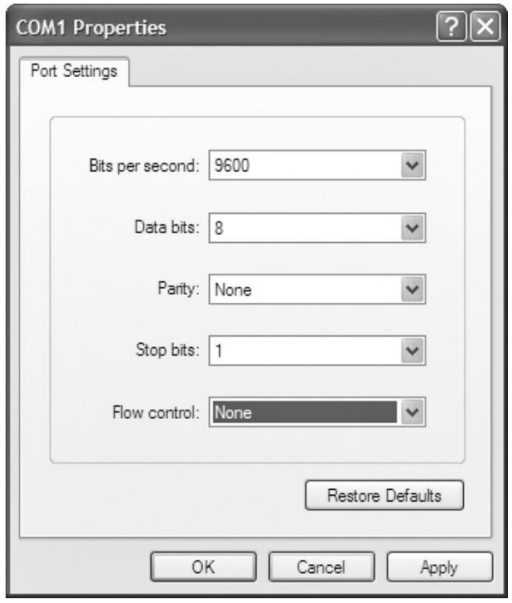
CORP(config)# interface serial 0/0/0

Assigns an IP address and netmask

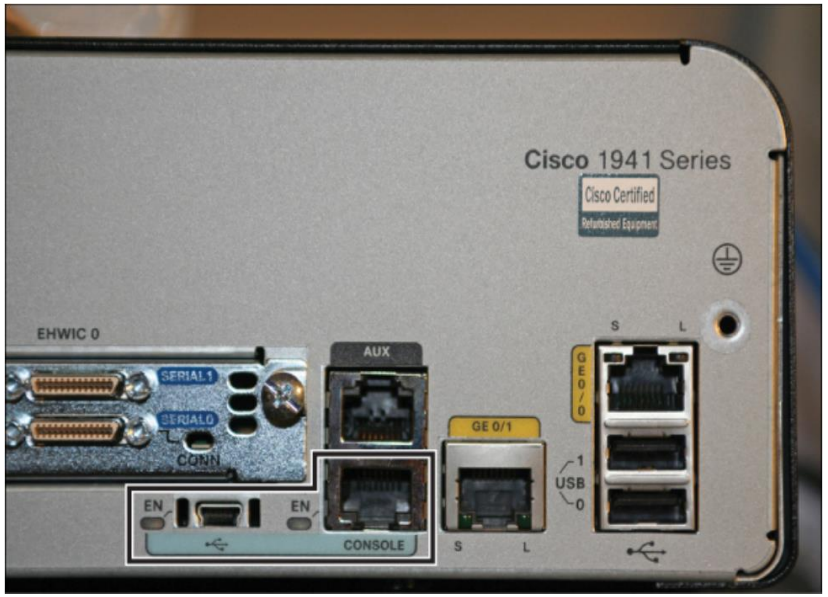
CORP(config-if)# ip address 192.31.7.6 255.255.255.252

Enables the interface

CORP(config-if)# no shutdown


COM1 Properties
Port Settings
Bits per second: 9600
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None
Restore Defaults
OK
Cancel
Apply

LABS


Cisco 1941 Series
Cisco Certified
EHWIC 0
SERIAL1
SERIAL0
CONN
AUX
GE 0/1
EN
EN
CONSOLE
USB

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- ODOM, Wendell. *CCNA 200-301 Official Cert Guide, Volume 2*. Cisco Press, 2019.
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