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Practical 10

Aim: Create a network and implement eBGP

eBGP: eBGP (External Border Gateway Protocol) is a type of Border Gateway Protocol (BGP) used to exchange routing information between different autonomous systems (ASes) on the internet.

1. What is BGP?

- BGP is a standardized exterior gateway protocol used to exchange routing information across the internet.
- It is a path vector protocol, which makes routing decisions based on paths, network policies, and rules.

2. What is an Autonomous System (AS)?

- An AS is a collection of IP networks and routers under a single administrative domain that presents a common routing policy.
- Each AS is identified by a unique Autonomous System Number (ASN).

3. What is eBGP?

- eBGP (External BGP) is used between routers in different ASes.
- For example, an ISP's router communicating with another ISP or with a large enterprise is an eBGP session.

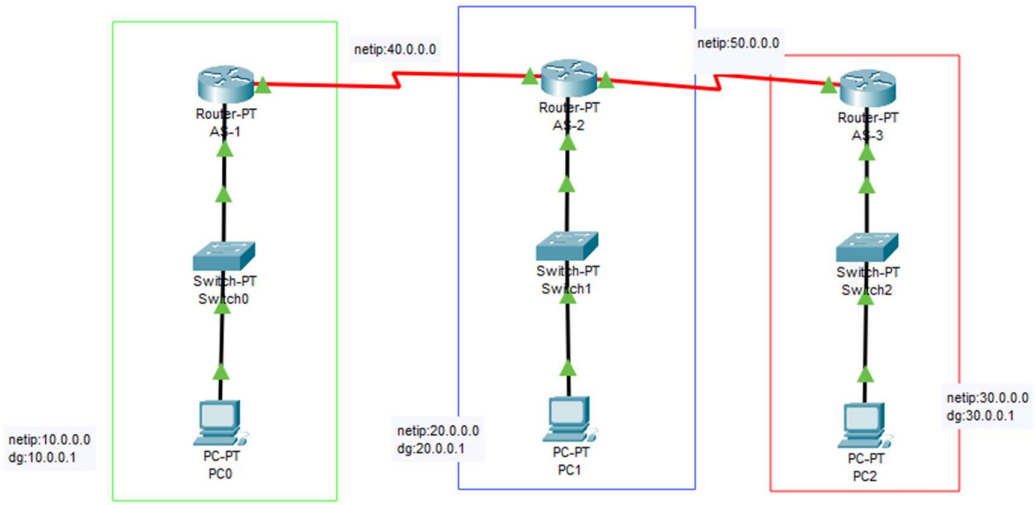
iBGP: iBGP (Internal Border Gateway Protocol) is a type of BGP (Border Gateway Protocol) used to exchange routing information within the same Autonomous System (AS).

1. What is iBGP?

- **iBGP** is used between routers that **belong to the same AS**.
- It allows routers inside an AS to **share routes learned via eBGP** with each other.
- Like eBGP, iBGP also uses **TCP port 179** for communication.

iBGP vs eBGP

Feature	iBGP	eBGP
Used Between	Routers in the **same AS**	Routers in **different ASes**
Default TTL	255	1
AS_PATH Behavior	Not modified	Adds local AS to AS_PATH
Next-hop Attribute	**Preserved**	Usually **changed to sender IP**
Full Mesh Requirement	Yes (unless route reflectors or confederations are used)	No
Purpose	Internal route distribution	Inter-AS route exchange



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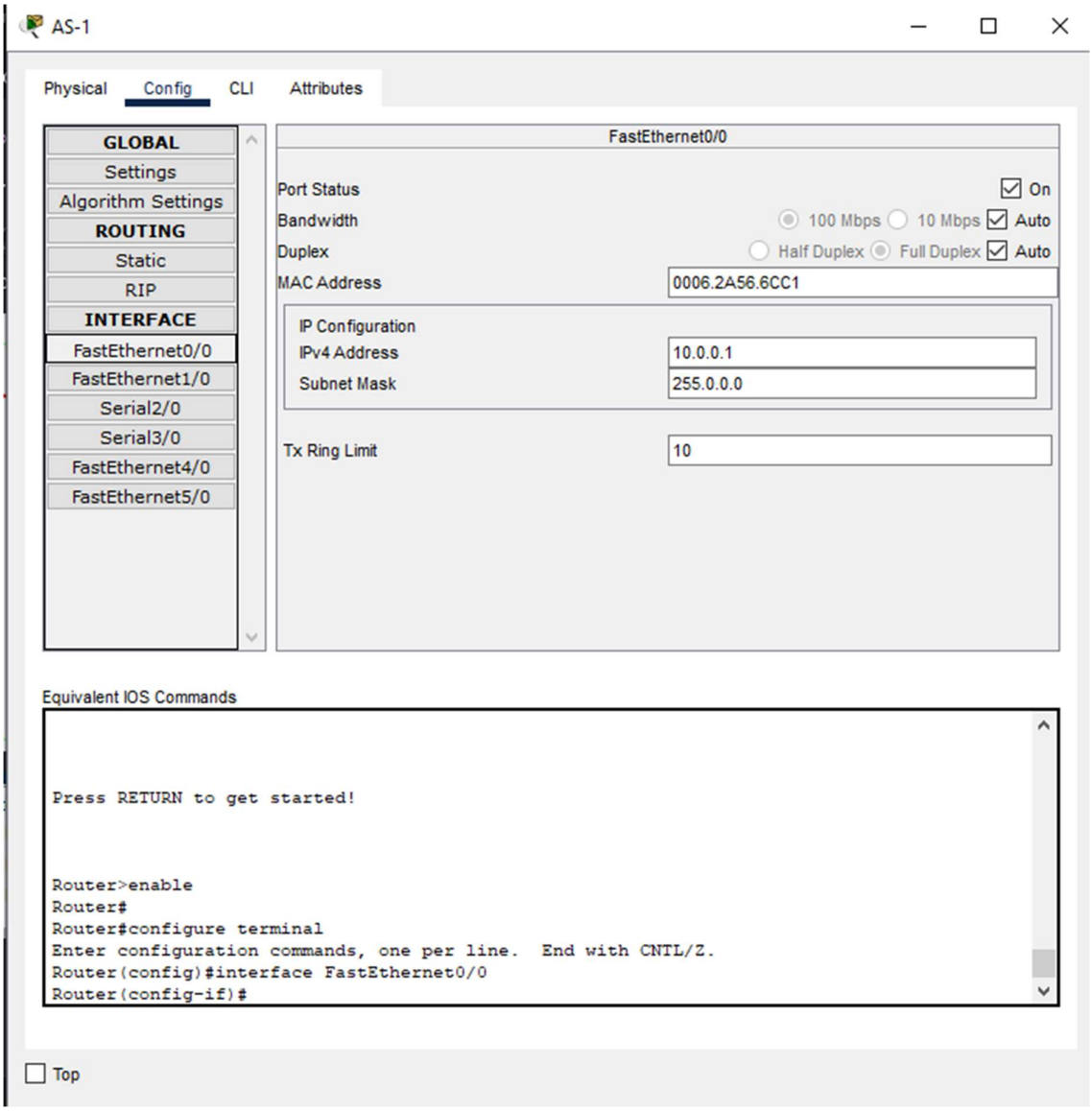
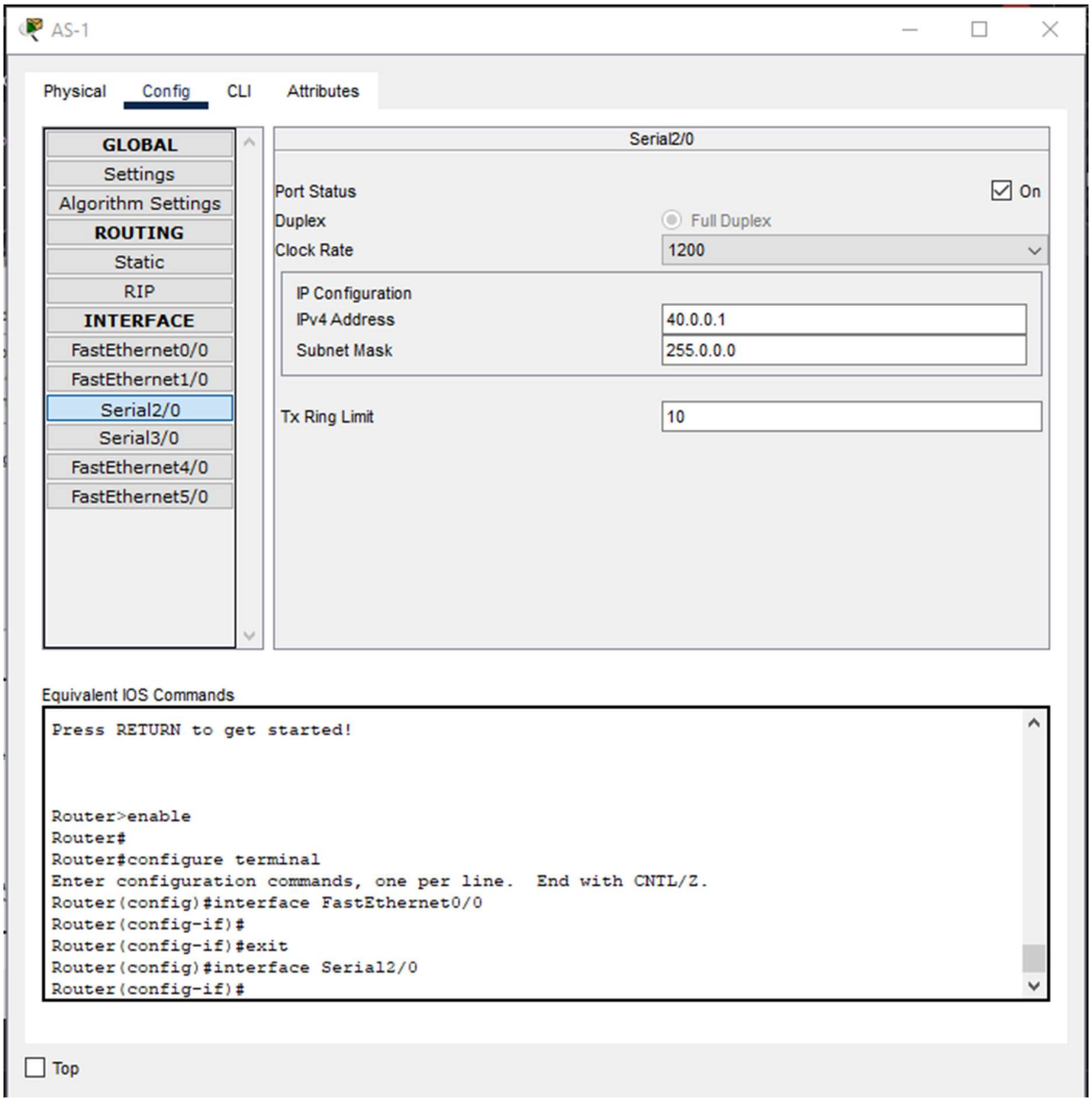
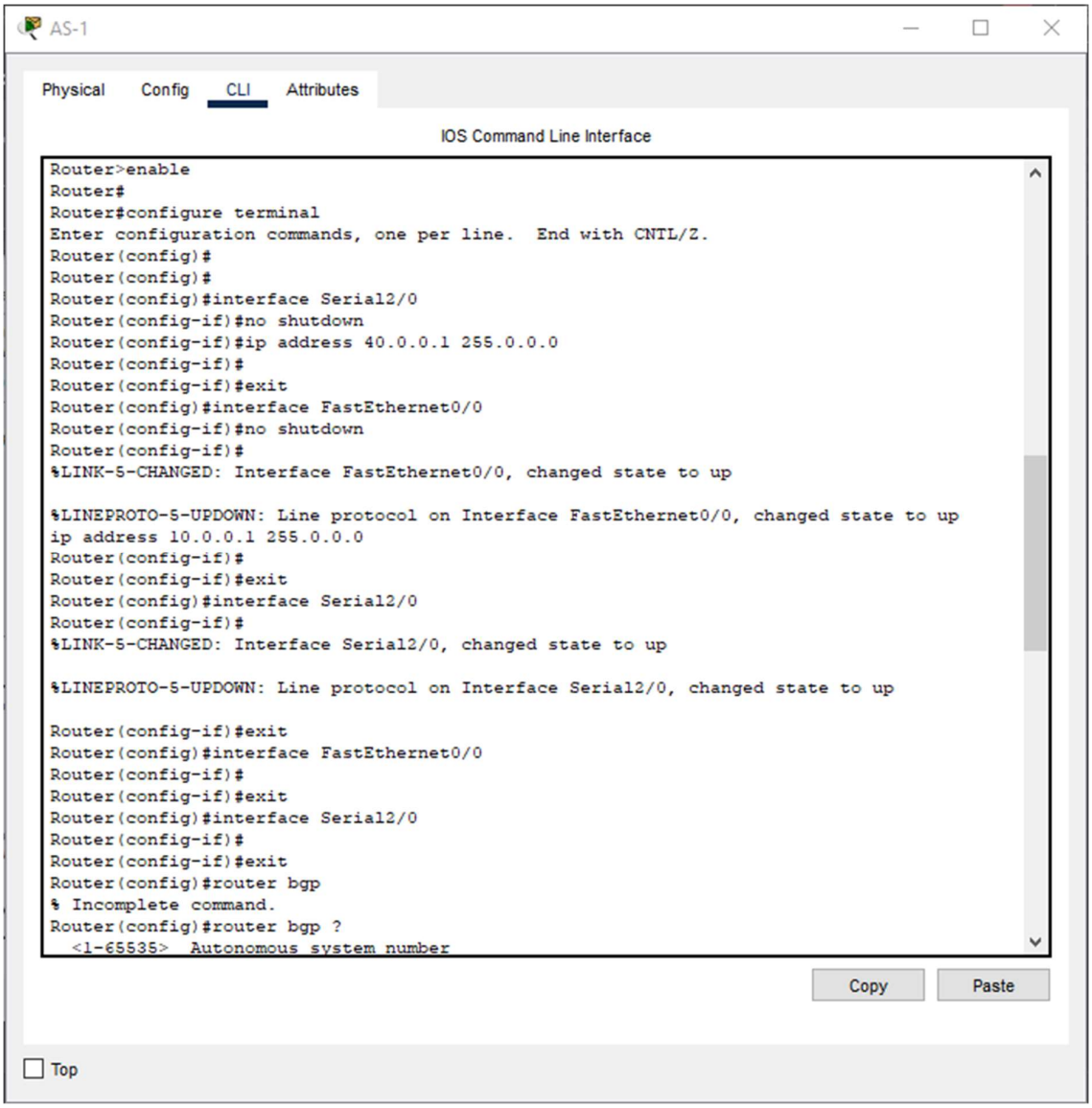
	Failed	PC1	PC2	ICMP		0.000	N	7	(ec
	Successful	PC1	PC2	ICMP		0.000	N	8	(ec
	Successful	PC0	PC1	ICMP		0.000	N	9	(ec

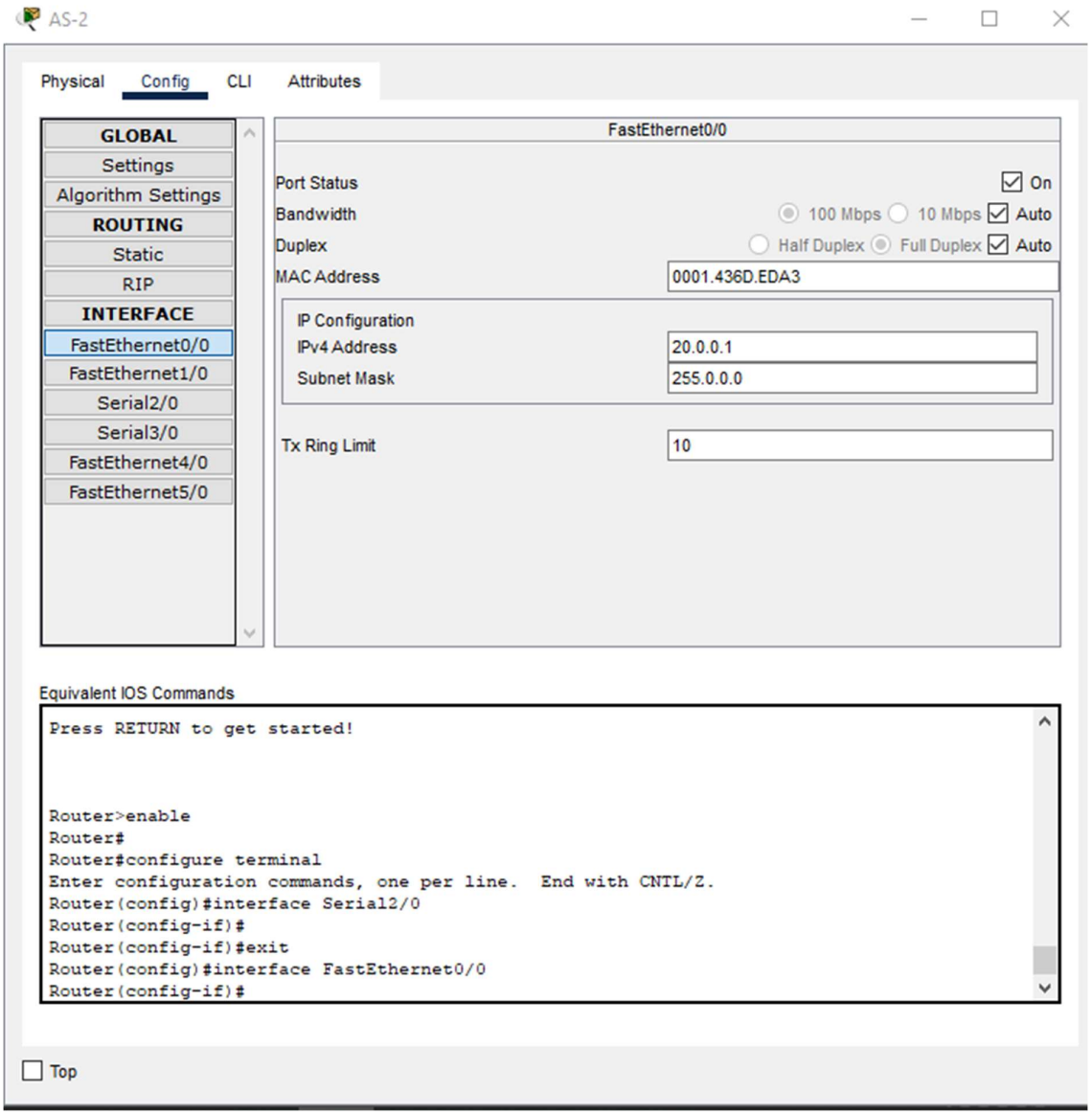
Router Configuration AS-1

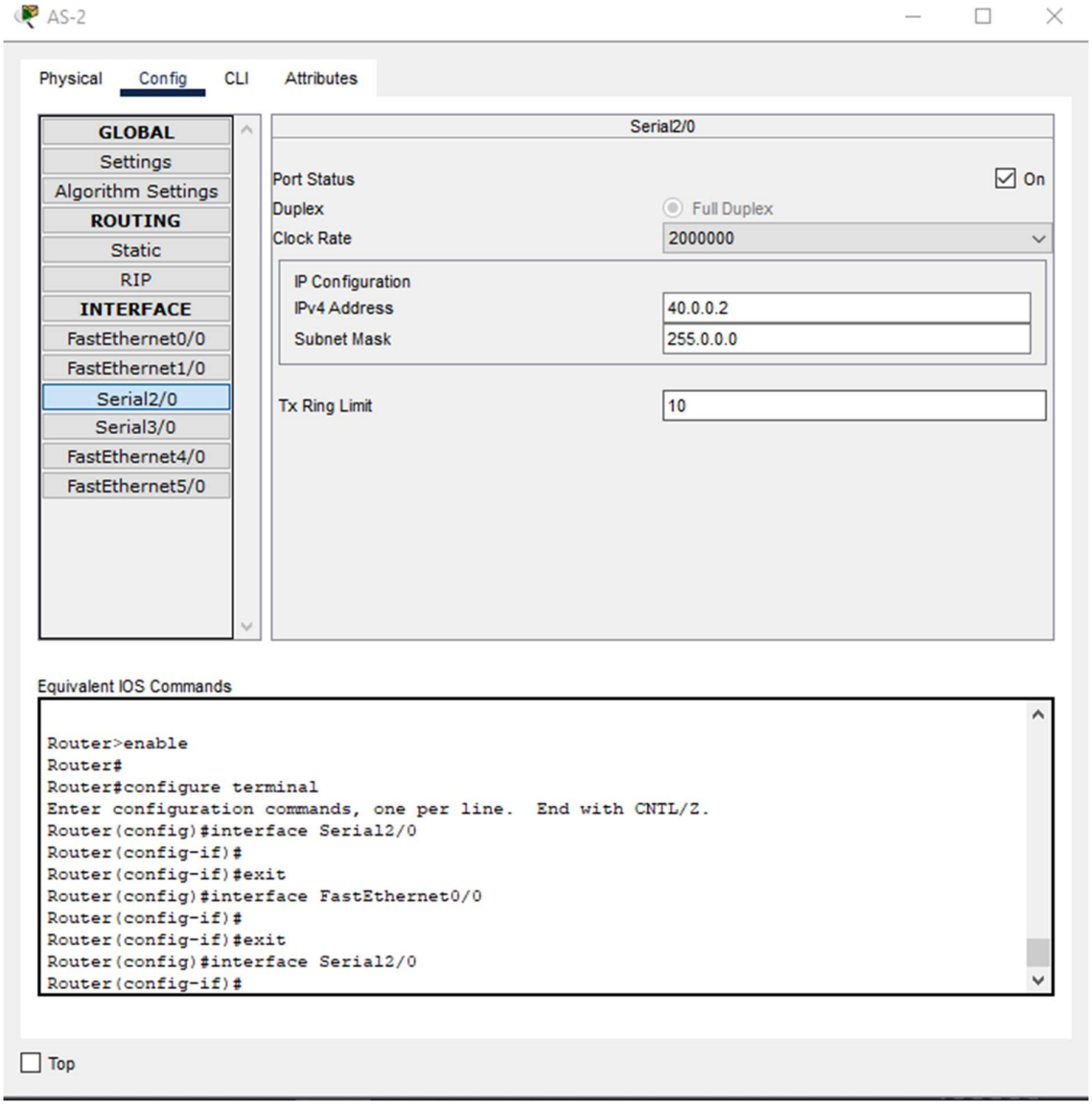


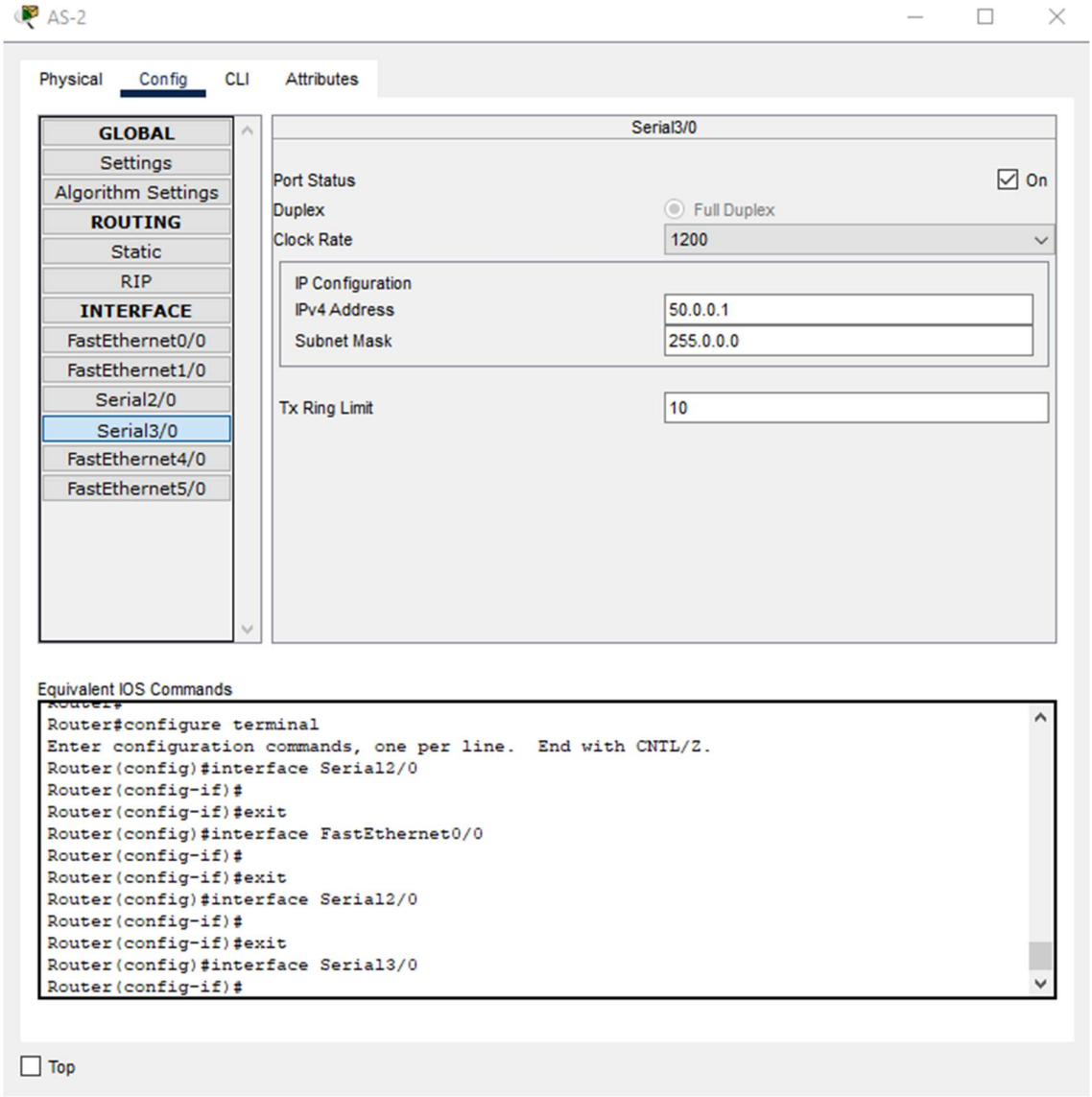

AS-1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
Serial2/0
Serial3/0
FastEthernet4/0
FastEthernet5/0
Serial2/0
Port Status
On
Duplex
Full Duplex
Clock Rate
1200
IP Configuration
IPv4 Address
40.0.0.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Press RETURN to get started!
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Top

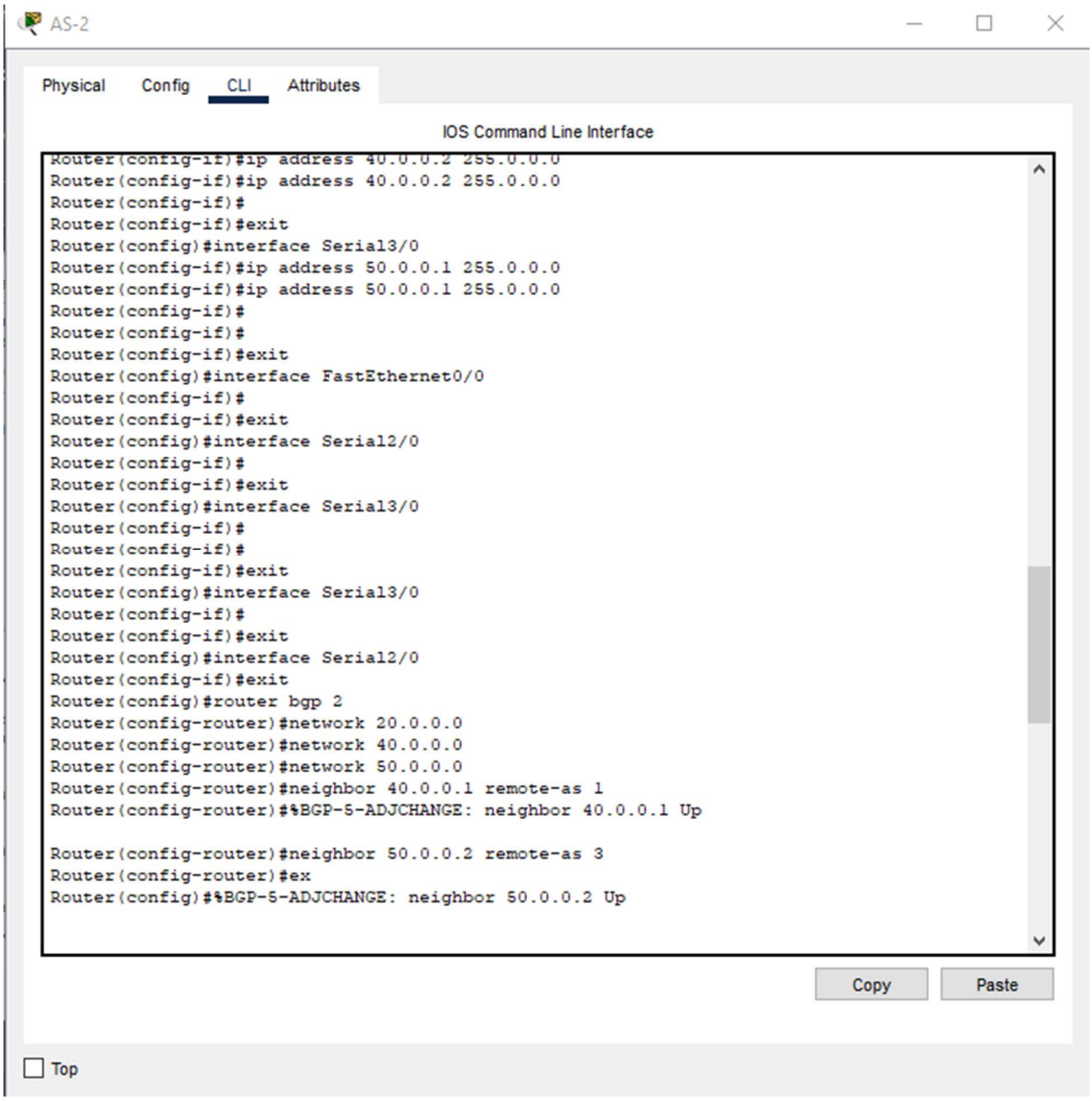

AS-1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#interface Serial2/0
Router(config-if)#no shutdown
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
ip address 10.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#router bgp
% Incomplete command.
Router(config)#router bgp ?
<1-65535> Autonomous system number
Copy
Paste
Top

Router Configuration of AS-2




AS-2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
Serial2/0
Serial3/0
FastEthernet4/0
FastEthernet5/0
Serial2/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
40.0.0.2
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Top


AS-2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
Serial2/0
Serial3/0
FastEthernet4/0
FastEthernet5/0
Serial3/0
Port Status
On
Duplex
Full Duplex
Clock Rate
1200
IP Configuration
IPv4 Address
50.0.0.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#
Top


AS-2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config-if)#ip address 40.0.0.2 255.0.0.0
Router(config-if)#ip address 40.0.0.2 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#exit
Router(config)#router bgp 2
Router(config-router)#network 20.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#neighbor 40.0.0.1 remote-as 1
Router(config-router)#%BGP-5-ADJCHANGE: neighbor 40.0.0.1 Up
Router(config-router)#neighbor 50.0.0.2 remote-as 3
Router(config-router)#ex
Router(config)#%BGP-5-ADJCHANGE: neighbor 50.0.0.2 Up
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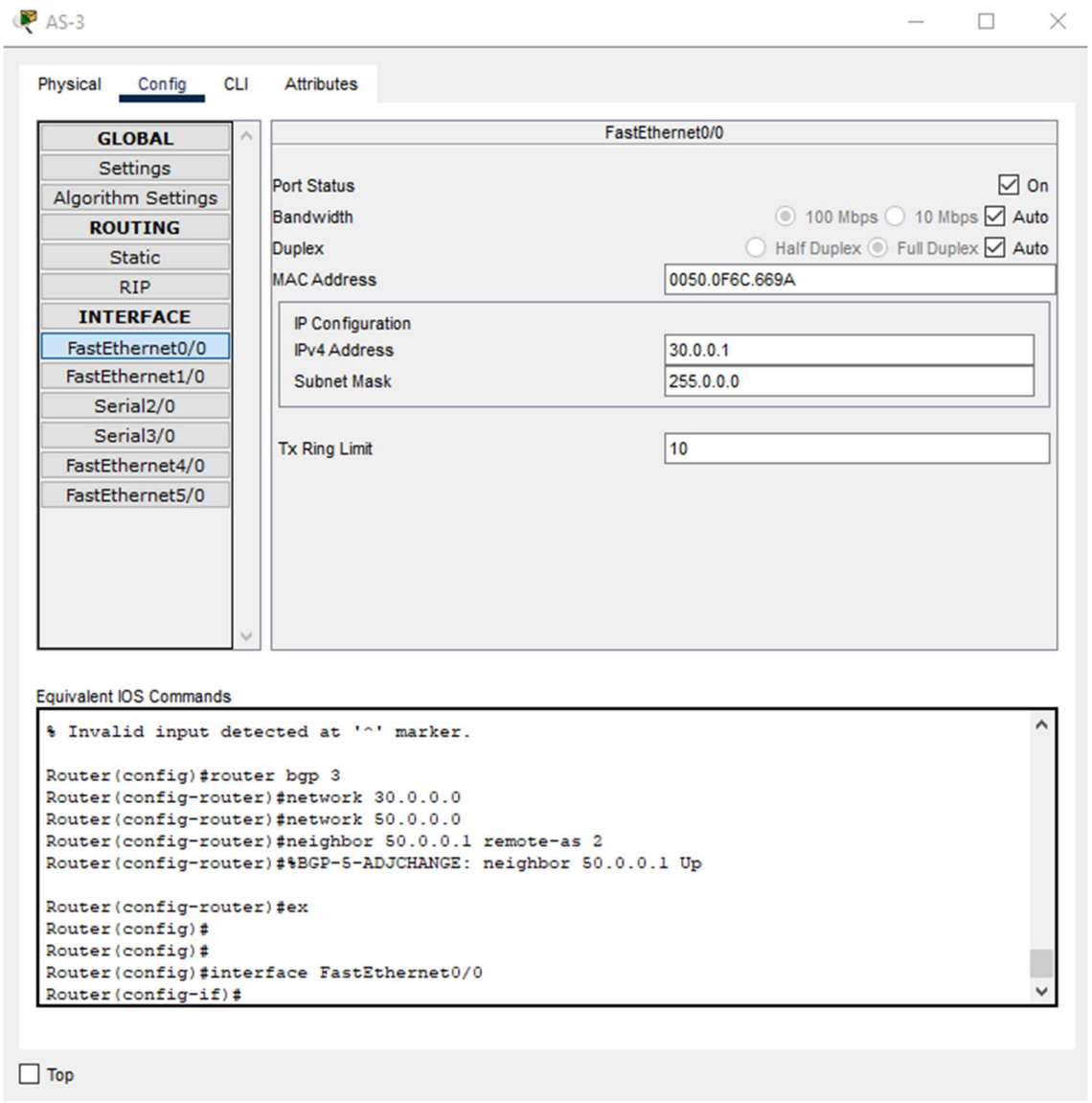
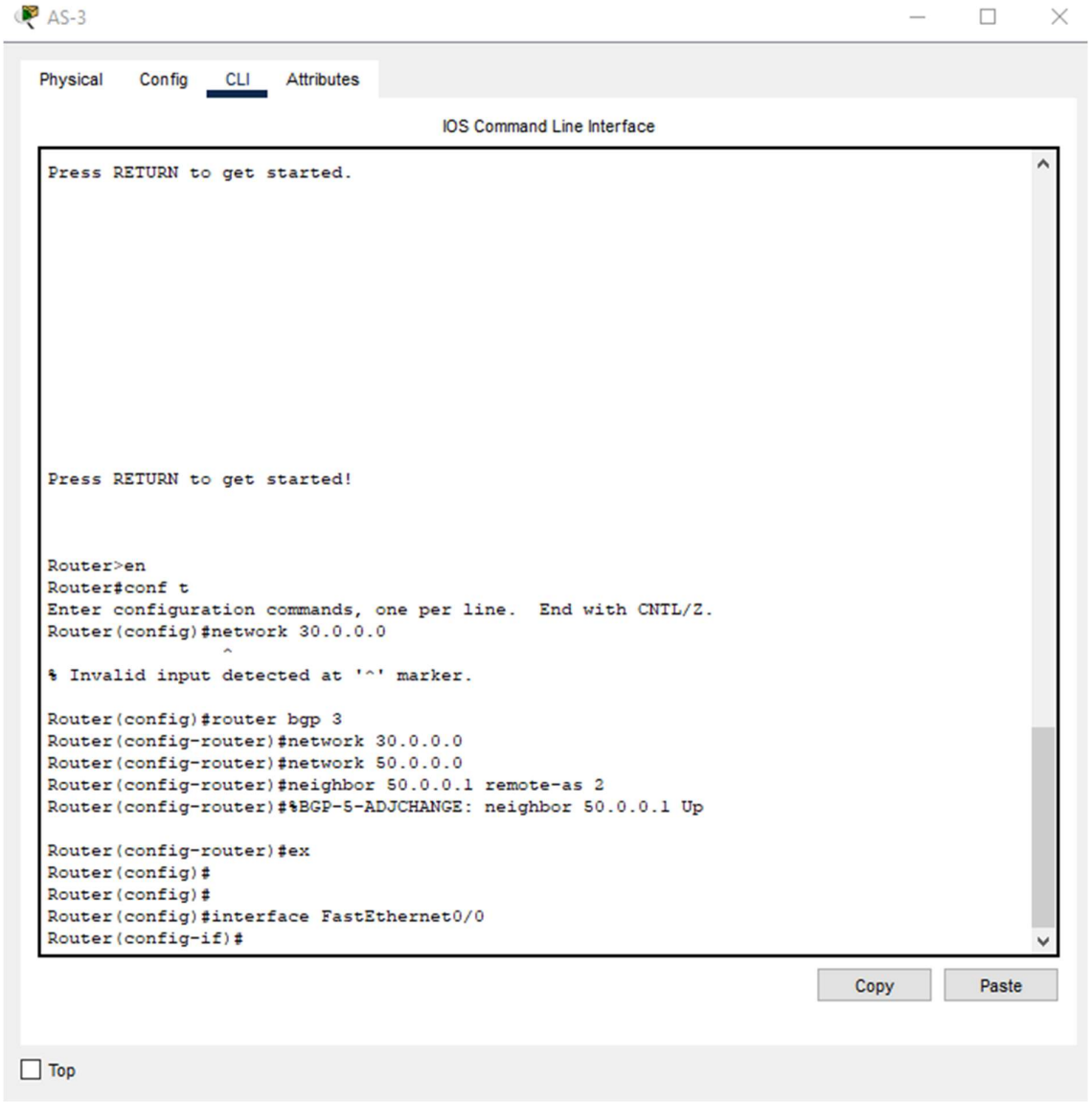
Top

Router Configuration of AS-3




AS-3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Press RETURN to get started.
Press RETURN to get started!
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#network 30.0.0.0
^
% Invalid input detected at '^' marker.
Router(config)#router bgp 3
Router(config-router)#network 30.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#neighbor 50.0.0.1 remote-as 2
Router(config-router)#%BGP-5-ADJCHANGE: neighbor 50.0.0.1 Up
Router(config-router)#ex
Router(config)#
Router(config)#
Router(config)#interface FastEthernet0/0
Router(config-if)#
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