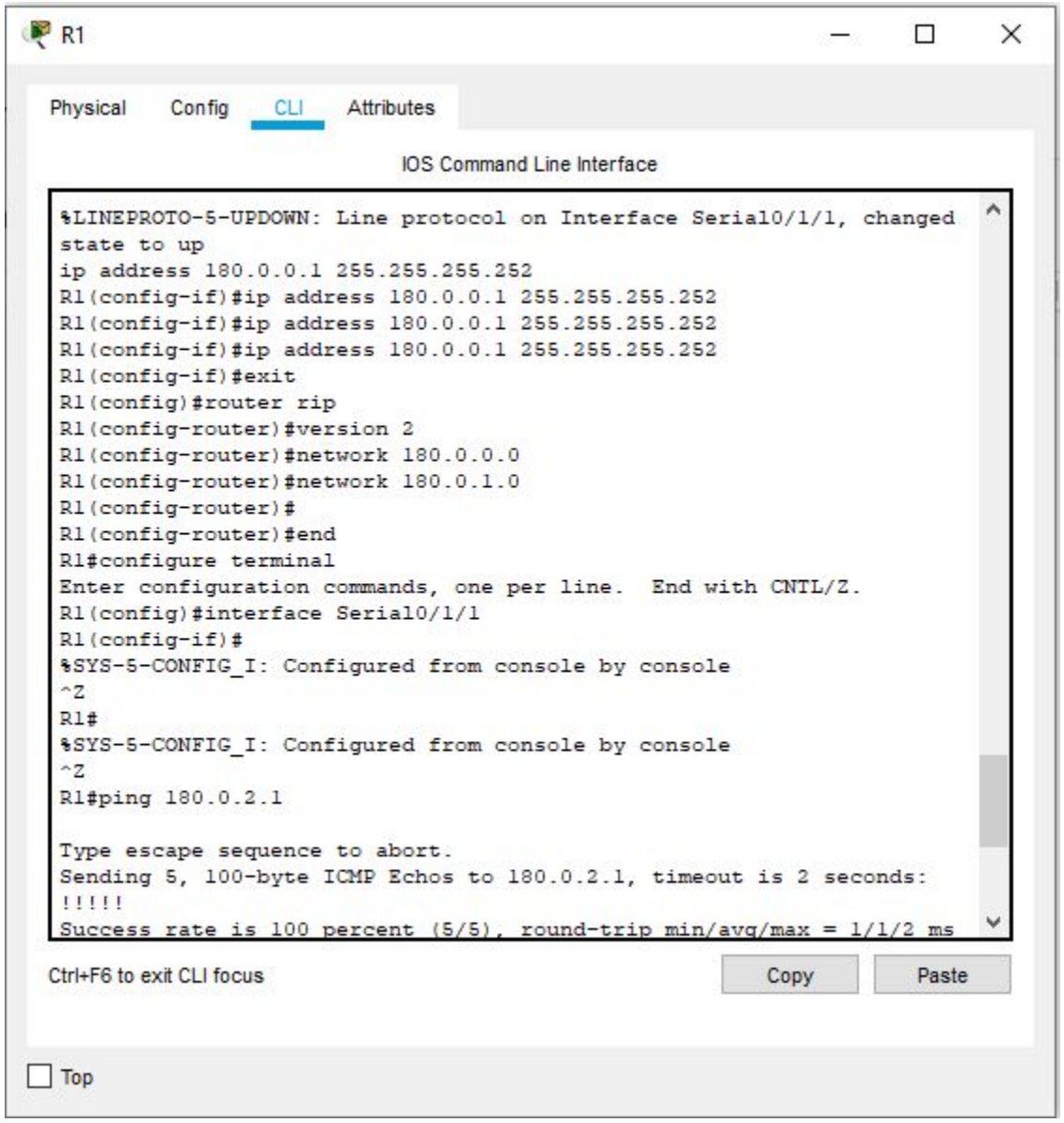
PUNTO 4

Partimos por realizar el diseño físico del backbone de internet, agregando los routers, agregando los módulos de puerto serial y configurando las conexiones seriales entre los mismos. Al tener que aplicar BGP asignamos un sistema autónomo a cada grupo de routers, para poder aplicar el protocolo. (ver más en diseño de packet tracer)

Luego configuramos RIP v2 en los routers para hacer posible comunicación al interior del sistema autónomo y realizamos una prueba de la conexión mediante el comando ping. A continuación algunos ejemplos de la configuración en el CLI.


R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
state to up
ip address 180.0.0.1 255.255.255.252
R1(config-if)#ip address 180.0.0.1 255.255.255.252
R1(config-if)#ip address 180.0.0.1 255.255.255.252
R1(config-if)#ip address 180.0.0.1 255.255.255.252
R1(config-if)#exit
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 180.0.0.0
R1(config-router)#network 180.0.1.0
R1(config-router)#
R1(config-router)#end
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface Serial0/1/1
R1(config-if)#
%SYS-5-CONFIG_I: Configured from console by console
^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console
^Z
R1#ping 180.0.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
Ctrl+F6 to exit CLI focus
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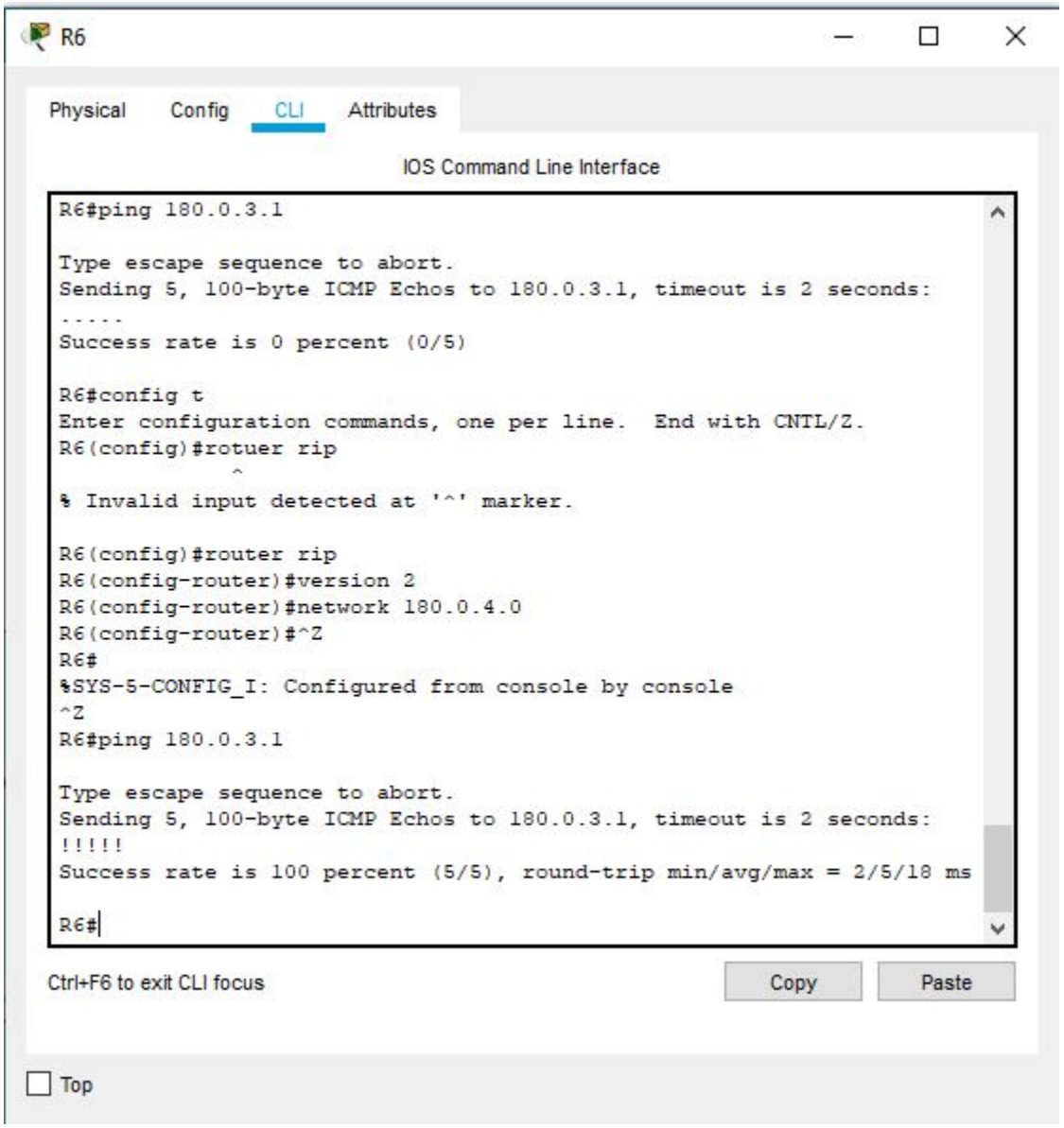
R6
Physical
Config
CLI
Attributes
IOS Command Line Interface
R6#ping 180.0.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.3.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R6#config t
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#rotuer rip
^
% Invalid input detected at '^' marker.
R6(config)#router rip
R6(config-router)#version 2
R6(config-router)#network 180.0.4.0
R6(config-router)#^Z
R6#
%SYS-5-CONFIG_I: Configured from console by console
^Z
R6#ping 180.0.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/5/18 ms
R6#
Ctrl+F6 to exit CLI focus
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Paste
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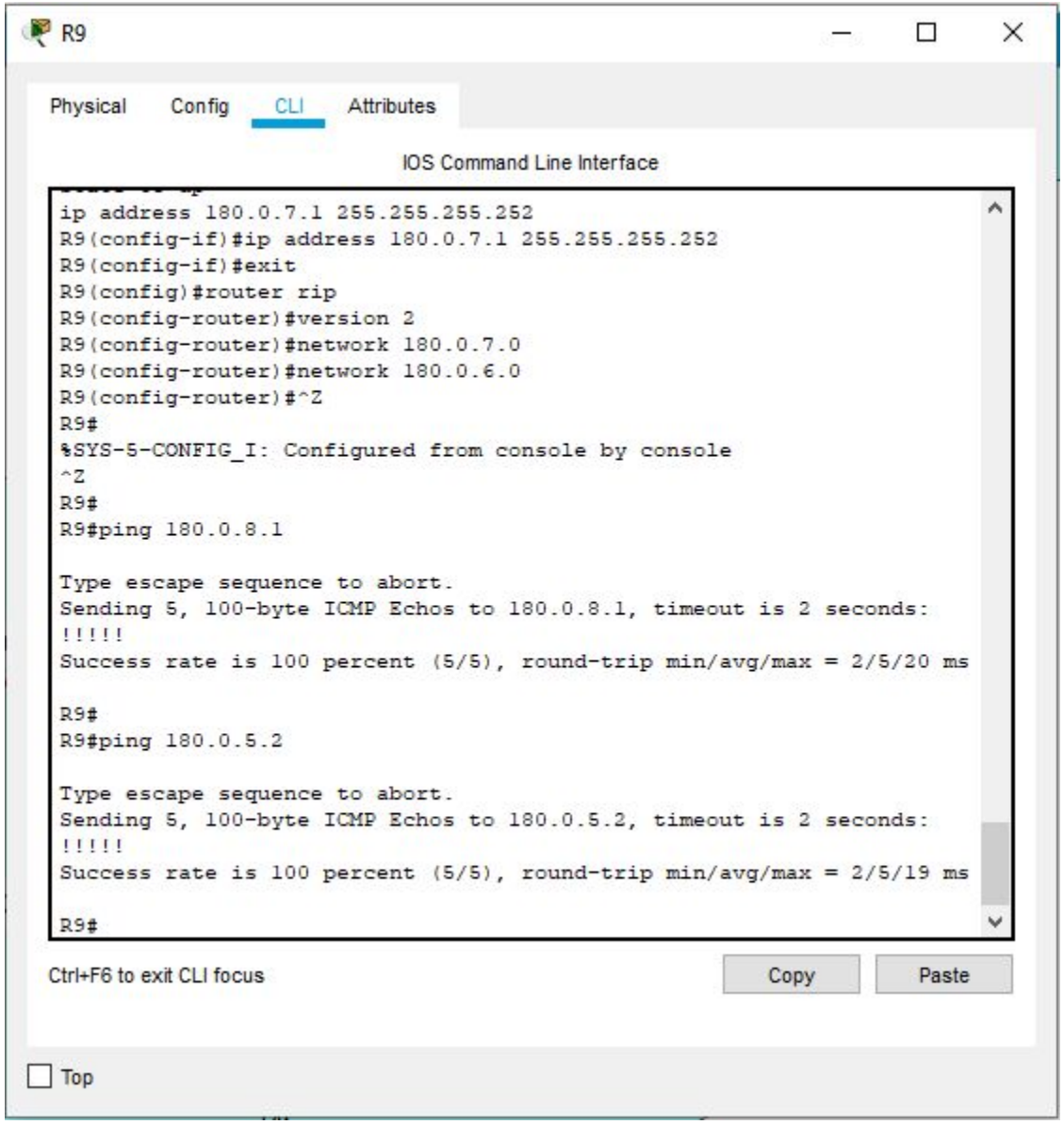
R9
Physical
Config
CLI
Attributes
IOS Command Line Interface
ip address 180.0.7.1 255.255.255.252
R9(config-if)#ip address 180.0.7.1 255.255.255.252
R9(config-if)#exit
R9(config)#router rip
R9(config-router)#version 2
R9(config-router)#network 180.0.7.0
R9(config-router)#network 180.0.6.0
R9(config-router)#^Z
R9#
%SYS-5-CONFIG_I: Configured from console by console
^Z
R9#
R9#ping 180.0.8.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.8.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/5/20 ms
R9#
R9#ping 180.0.5.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.5.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/5/19 ms
R9#
Ctrl+F6 to exit CLI focus
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Paste
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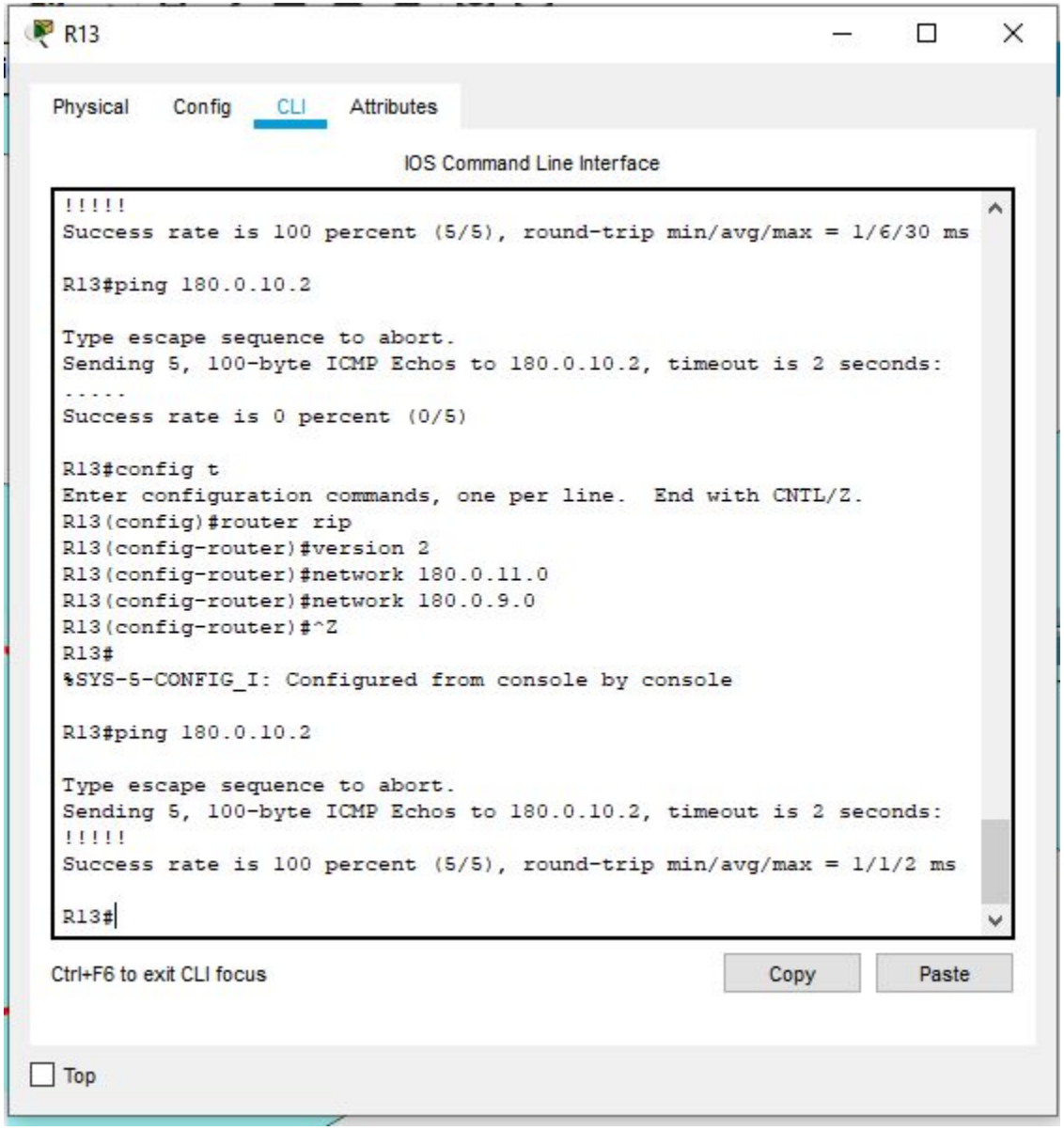
R13
Physical
Config
CLI
Attributes
IOS Command Line Interface
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/6/30 ms
R13#ping 180.0.10.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.10.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R13#config t
Enter configuration commands, one per line. End with CNTL/Z.
R13(config)#router rip
R13(config-router)#version 2
R13(config-router)#network 180.0.11.0
R13(config-router)#network 180.0.9.0
R13(config-router)#^Z
R13#
%SYS-5-CONFIG_I: Configured from console by console
R13#ping 180.0.10.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.10.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
R13#
Ctrl+F6 to exit CLI focus
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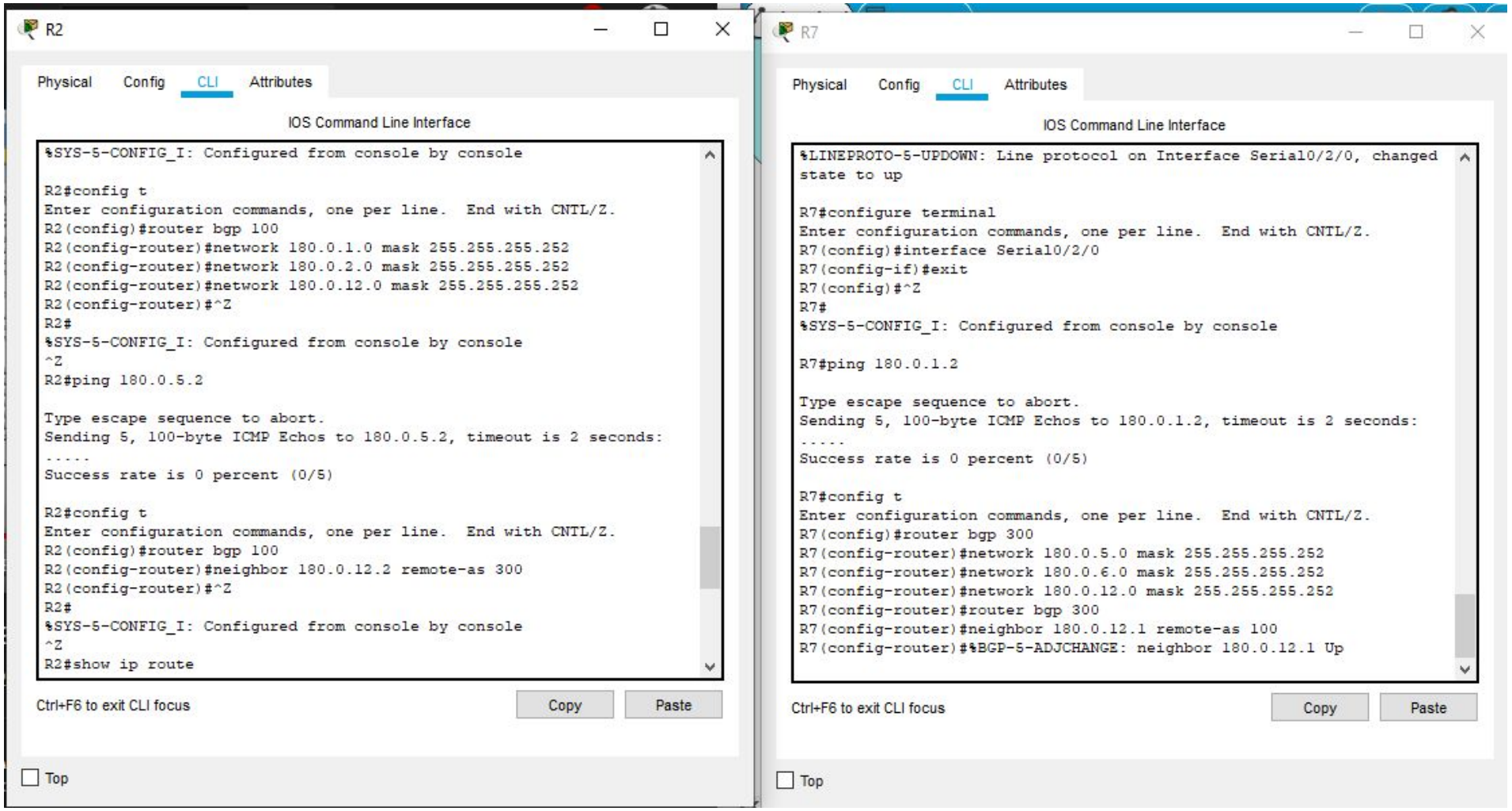
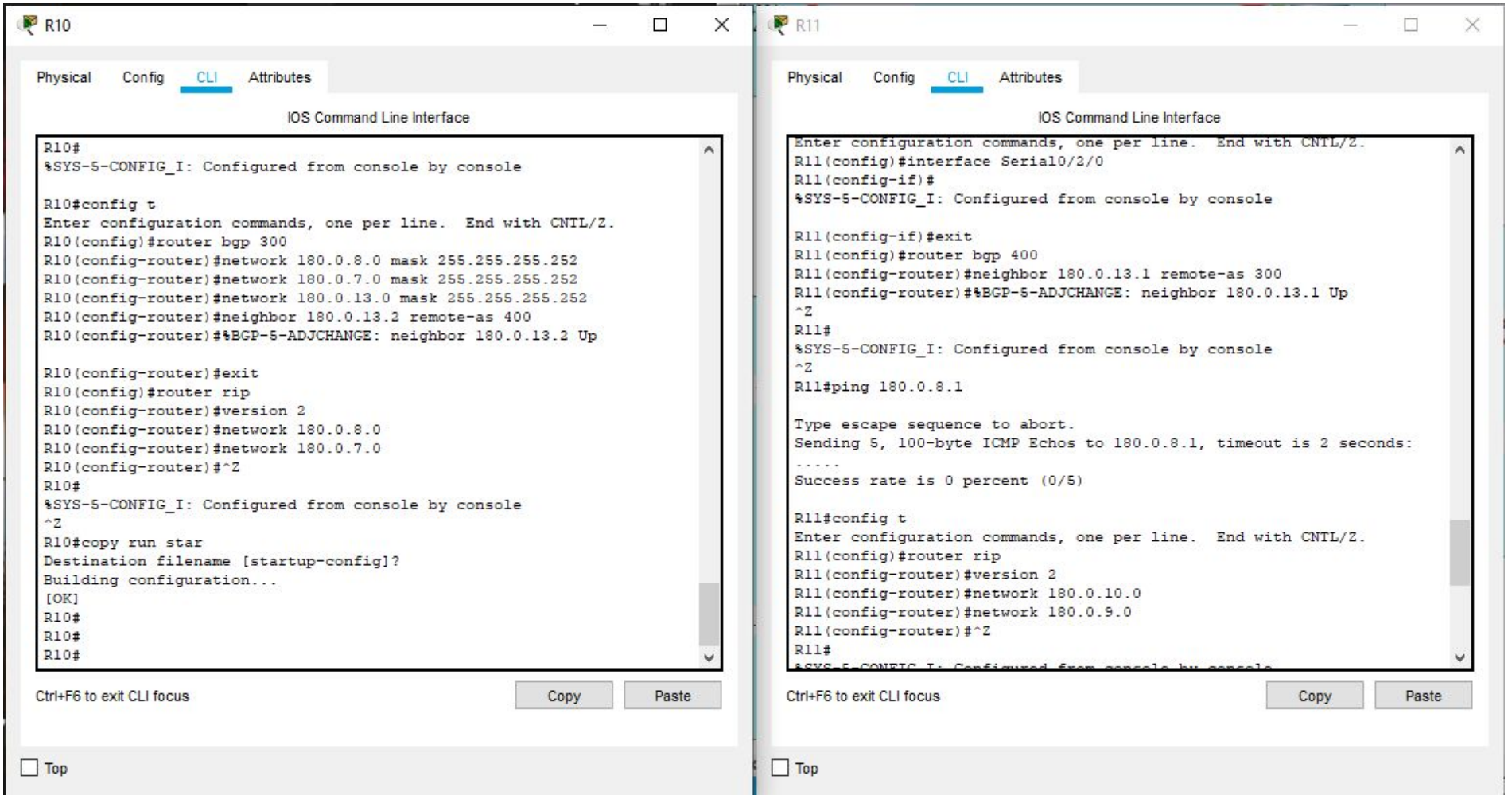
Una vez la comunicación entre routers es exitosa, procedemos a configurar el protocolo BGP en aquellos routers que tengan conexión con otros sistemas autónomos según el diseño Backbone propuesto. El proceso de configuración por

medio del CLI y las pruebas de conexión mediante el comando ping se muestran a continuación.




R10
Physical
Config
CLI
Attributes
IOS Command Line Interface
R10#
%SYS-5-CONFIG_I: Configured from console by console
R10#config t
Enter configuration commands, one per line. End with CNTL/Z.
R10(config)#router bgp 300
R10(config-router)#network 180.0.8.0 mask 255.255.255.252
R10(config-router)#network 180.0.7.0 mask 255.255.255.252
R10(config-router)#network 180.0.13.0 mask 255.255.255.252
R10(config-router)#neighbor 180.0.13.2 remote-as 400
R10(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.13.2 Up
R10(config-router)#exit
R10(config)#router rip
R10(config-router)#version 2
R10(config-router)#network 180.0.8.0
R10(config-router)#network 180.0.7.0
R10(config-router)#^Z
R10#
%SYS-5-CONFIG_I: Configured from console by console
^Z
R10#copy run star
Destination filename [startup-config]?
Building configuration...
[OK]
R10#
R10#
R10#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
R11
Physical
Config
CLI
Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
R11(config)#interface Serial0/2/0
R11(config-if)#
%SYS-5-CONFIG_I: Configured from console by console
R11(config-if)#exit
R11(config)#router bgp 400
R11(config-router)#neighbor 180.0.13.1 remote-as 300
R11(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.13.1 Up
^Z
R11#
%SYS-5-CONFIG_I: Configured from console by console
^Z
R11#ping 180.0.8.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.8.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R11#config t
Enter configuration commands, one per line. End with CNTL/Z.
R11(config)#router rip
R11(config-router)#version 2
R11(config-router)#network 180.0.10.0
R11(config-router)#network 180.0.9.0
R11(config-router)#^Z
R11#
Ctrl+F6 to exit CLI focus
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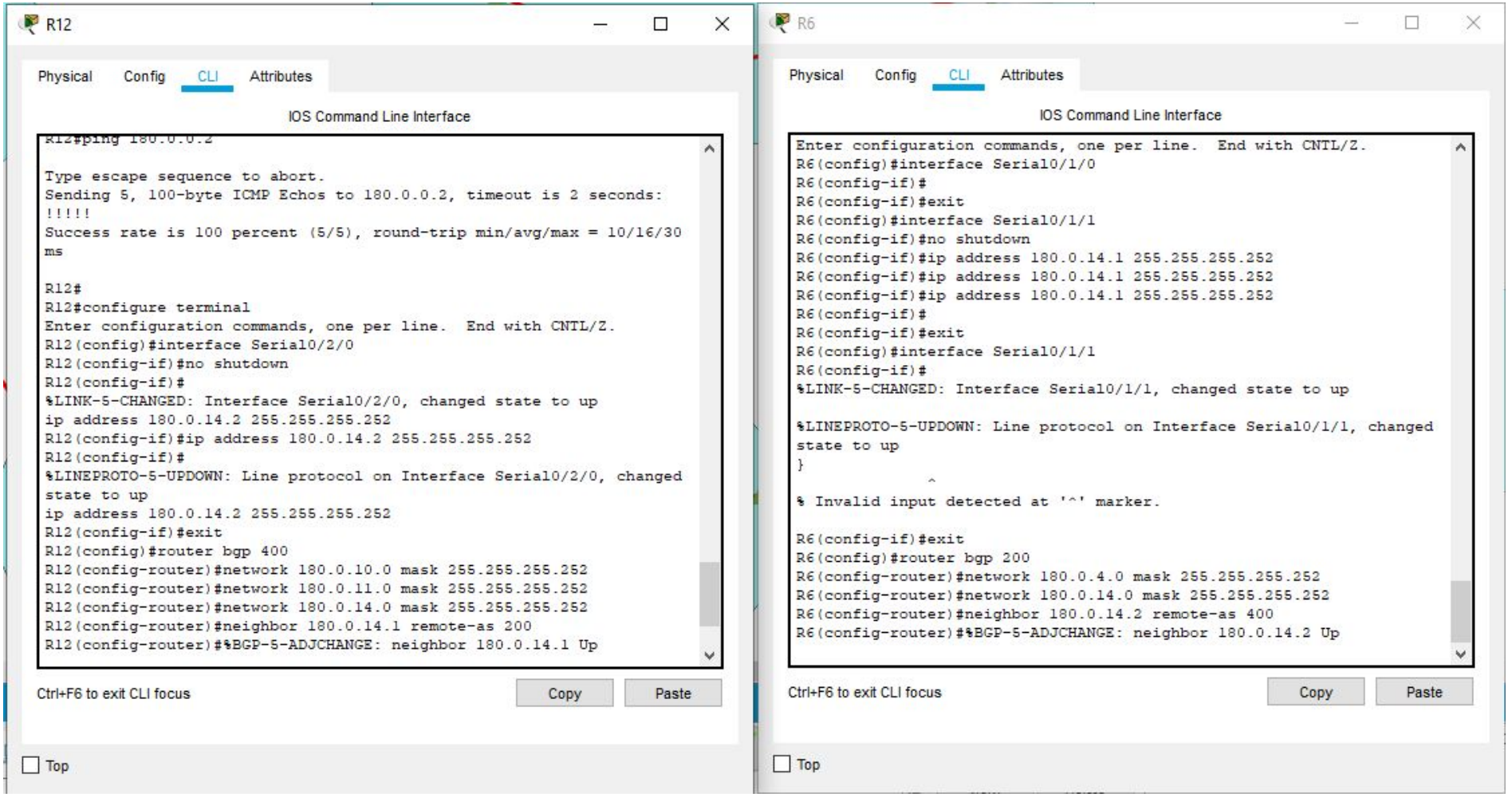
R12
Physical
Config
CLI
Attributes
IOS Command Line Interface
R12#ping 180.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 10/16/30
ms
R12#
R12#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R12(config)#interface Serial0/2/0
R12(config-if)#no shutdown
R12(config-if)#
%LINK-5-CHANGED: Interface Serial0/2/0, changed state to up
ip address 180.0.14.2 255.255.255.252
R12(config-if)#ip address 180.0.14.2 255.255.255.252
R12(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed
state to up
ip address 180.0.14.2 255.255.255.252
R12(config-if)#exit
R12(config)#router bgp 400
R12(config-router)#network 180.0.10.0 mask 255.255.255.252
R12(config-router)#network 180.0.11.0 mask 255.255.255.252
R12(config-router)#network 180.0.14.0 mask 255.255.255.252
R12(config-router)#neighbor 180.0.14.1 remote-as 200
R12(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.14.1 Up
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
R6
Physical
Config
CLI
Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#interface Serial0/1/0
R6(config-if)#
R6(config-if)#exit
R6(config)#interface Serial0/1/1
R6(config-if)#no shutdown
R6(config-if)#ip address 180.0.14.1 255.255.255.252
R6(config-if)#ip address 180.0.14.1 255.255.255.252
R6(config-if)#ip address 180.0.14.1 255.255.255.252
R6(config-if)#
R6(config-if)#exit
R6(config)#interface Serial0/1/1
R6(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
state to up
}
^
% Invalid input detected at '^' marker.
R6(config-if)#exit
R6(config)#router bgp 200
R6(config-router)#network 180.0.4.0 mask 255.255.255.252
R6(config-router)#network 180.0.14.0 mask 255.255.255.252
R6(config-router)#neighbor 180.0.14.2 remote-as 400
R6(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.14.2 Up
Ctrl+F6 to exit CLI focus
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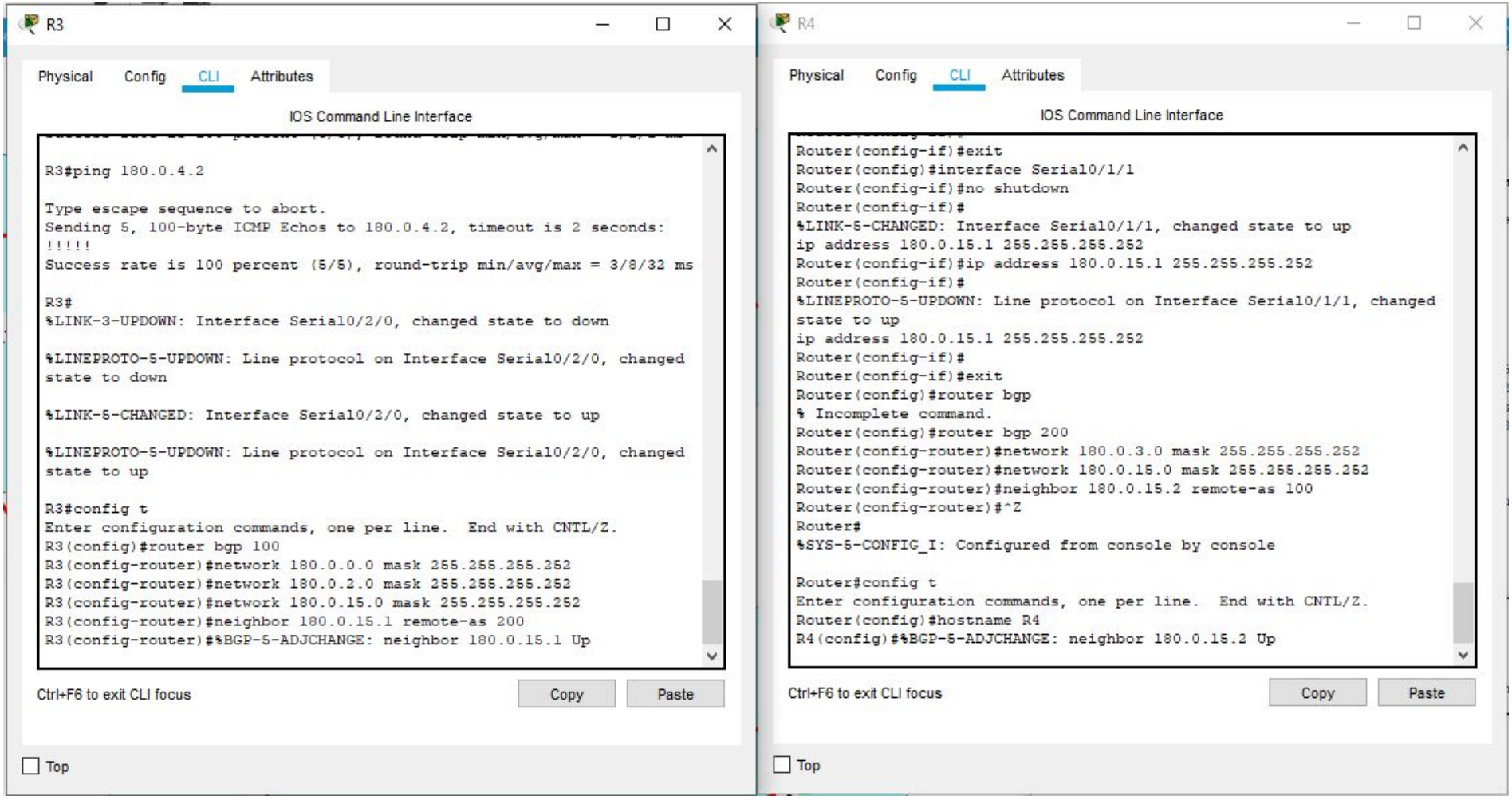
R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
R3#ping 180.0.4.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.4.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/8/32 ms
R3#
%LINK-3-UPDOWN: Interface Serial0/2/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed state to down
%LINK-5-CHANGED: Interface Serial0/2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed state to up
R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router bgp 100
R3(config-router)#network 180.0.0.0 mask 255.255.255.252
R3(config-router)#network 180.0.2.0 mask 255.255.255.252
R3(config-router)#network 180.0.15.0 mask 255.255.255.252
R3(config-router)#neighbor 180.0.15.1 remote-as 200
R3(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.15.1 Up
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
R4
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
ip address 180.0.15.1 255.255.255.252
Router(config-if)#ip address 180.0.15.1 255.255.255.252
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
ip address 180.0.15.1 255.255.255.252
Router(config-if)#
Router(config-if)#exit
Router(config)#router bgp
% Incomplete command.
Router(config)#router bgp 200
Router(config-router)#network 180.0.3.0 mask 255.255.255.252
Router(config-router)#network 180.0.15.0 mask 255.255.255.252
Router(config-router)#neighbor 180.0.15.2 remote-as 100
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
R4(config)#%BGP-5-ADJCHANGE: neighbor 180.0.15.2 Up
Ctrl+F6 to exit CLI focus
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Paste
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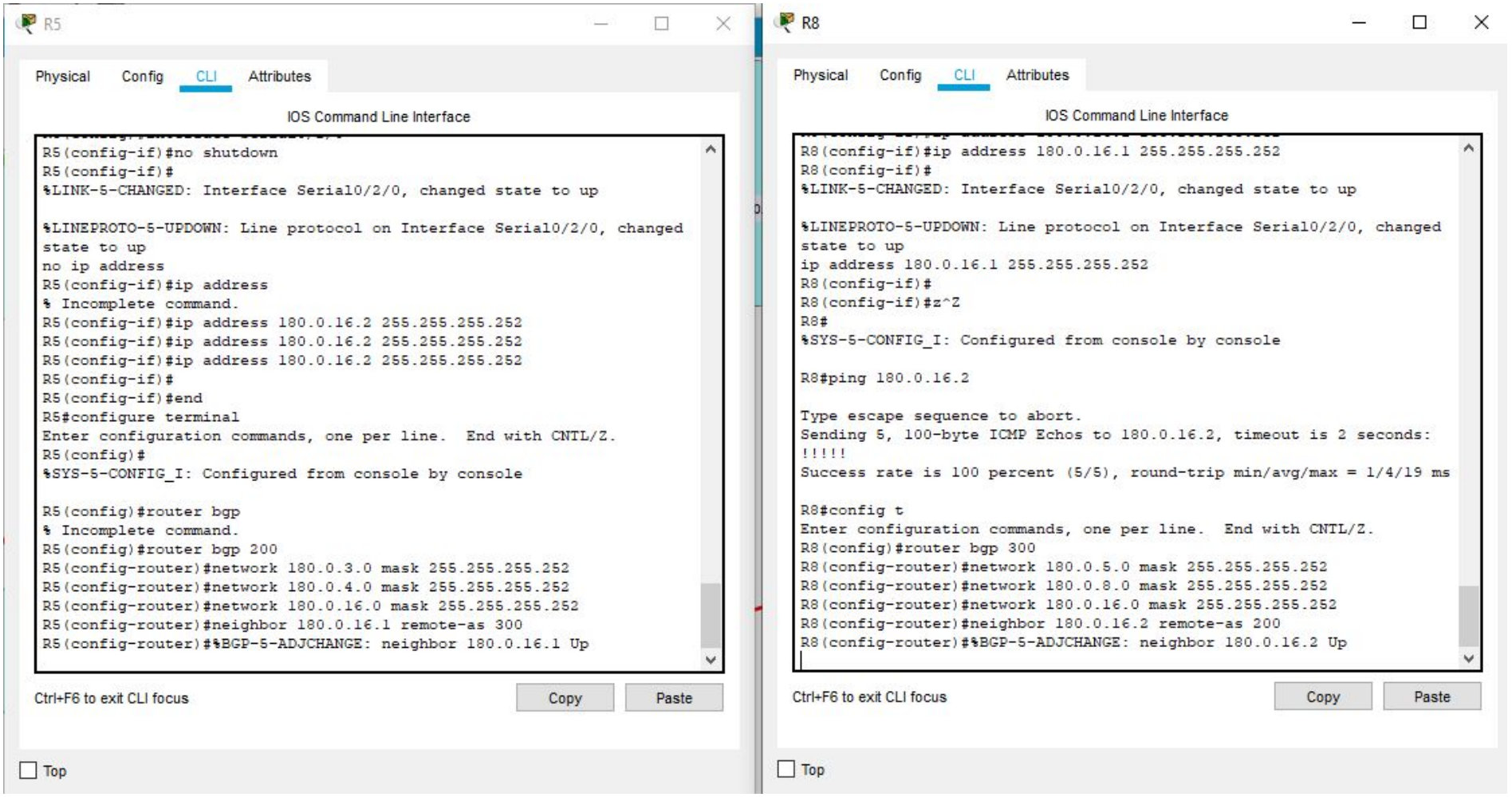
R5
Physical
Config
CLI
Attributes
IOS Command Line Interface
R5(config-if)#no shutdown
R5(config-if)#
%LINK-5-CHANGED: Interface Serial0/2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed state to up
no ip address
R5(config-if)#ip address
% Incomplete command.
R5(config-if)#ip address 180.0.16.2 255.255.255.252
R5(config-if)#ip address 180.0.16.2 255.255.255.252
R5(config-if)#ip address 180.0.16.2 255.255.255.252
R5(config-if)#
R5(config-if)#end
R5#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#
%SYS-5-CONFIG_I: Configured from console by console
R5(config)#router bgp
% Incomplete command.
R5(config)#router bgp 200
R5(config-router)#network 180.0.3.0 mask 255.255.255.252
R5(config-router)#network 180.0.4.0 mask 255.255.255.252
R5(config-router)#network 180.0.16.0 mask 255.255.255.252
R5(config-router)#neighbor 180.0.16.1 remote-as 300
R5(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.16.1 Up
Ctrl+F6 to exit CLI focus
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Paste
Top
R8
Physical
Config
CLI
Attributes
IOS Command Line Interface
R8(config-if)#ip address 180.0.16.1 255.255.255.252
R8(config-if)#
%LINK-5-CHANGED: Interface Serial0/2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed state to up
ip address 180.0.16.1 255.255.255.252
R8(config-if)#
R8(config-if)#z^Z
R8#
%SYS-5-CONFIG_I: Configured from console by console
R8#ping 180.0.16.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 180.0.16.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/19 ms
R8#config t
Enter configuration commands, one per line. End with CNTL/Z.
R8(config)#router bgp 300
R8(config-router)#network 180.0.5.0 mask 255.255.255.252
R8(config-router)#network 180.0.8.0 mask 255.255.255.252
R8(config-router)#network 180.0.16.0 mask 255.255.255.252
R8(config-router)#neighbor 180.0.16.2 remote-as 200
R8(config-router)#%BGP-5-ADJCHANGE: neighbor 180.0.16.2 Up
Ctrl+F6 to exit CLI focus
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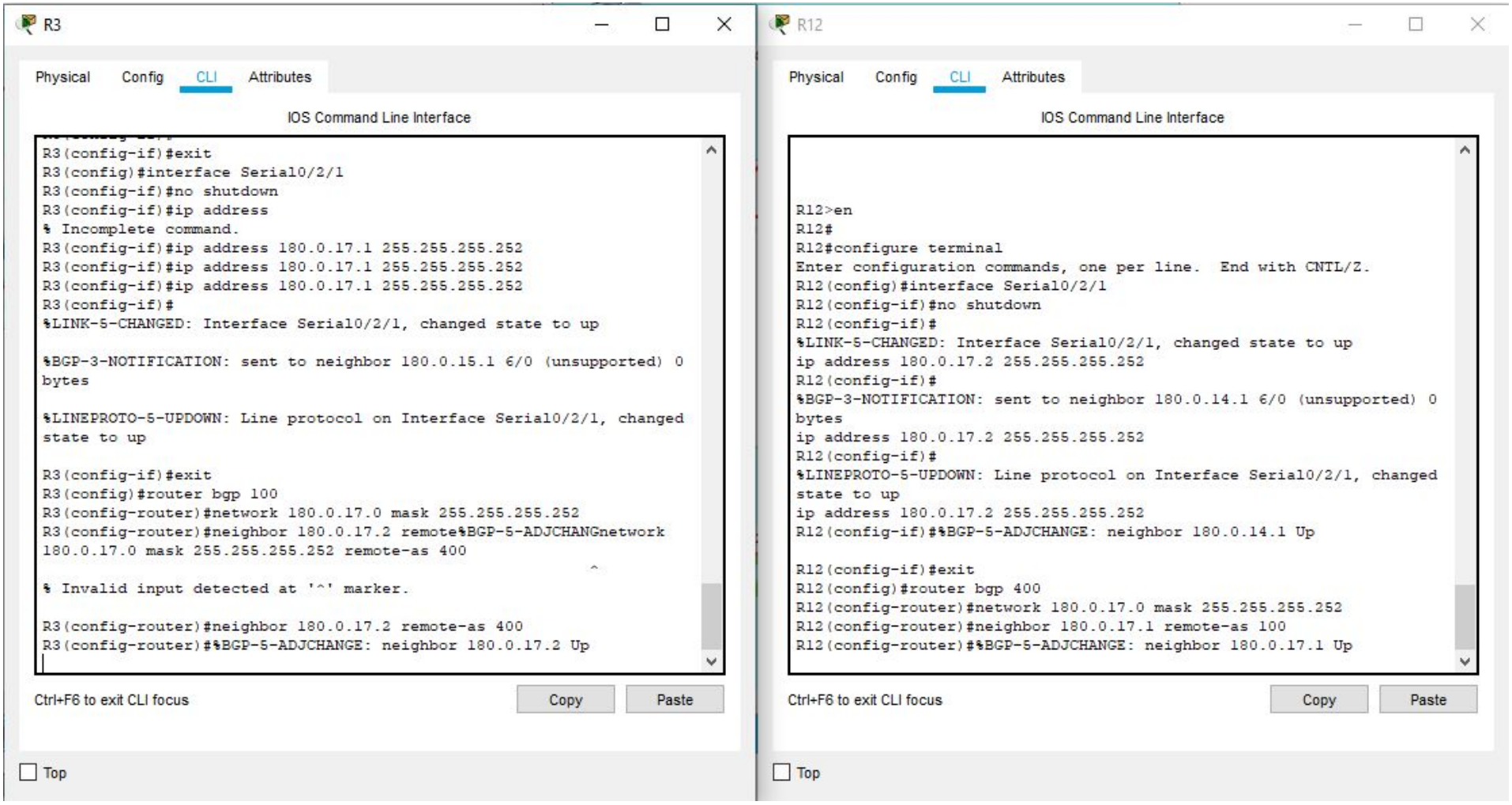

De esta manera, se configuró el diseño de backbone de internet. Por último realizamos pruebas enviando paquetes entre los diferentes sistemas autónomos, lo cual resulta exitoso. (El proceso anterior se puede verificar en el archivo de packet tracer adjunto a este documento).