TCN6213 Project
Group 1 CNN2

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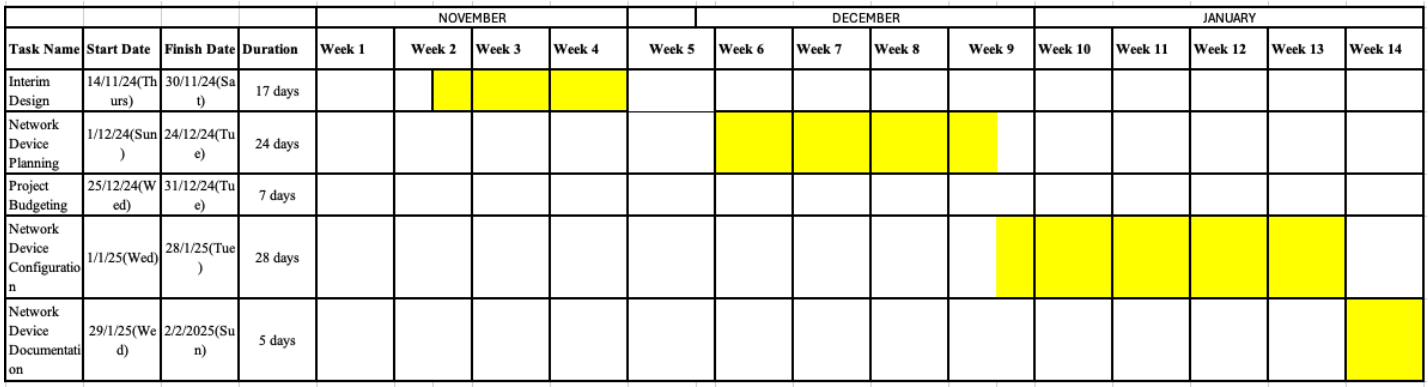
Project Implementation

Time and Flow

Task Name	Start Date	Finish Date	Duration
Interim Design	14/11/24(Thurs)	30/11/24(Sat)	17 days
Network Device Planning	1/12/24(Sun)	24/12/24(Tue)	24 days
Project Budgeting	25/12/24(Wed)	31/12/24(Tue)	7 days
Network Device Configuration	1/1/25(Wed)	28/1/25(Tue)	28 days
Network Device Documentation	29/1/25(Wed)	2/2/2025(Sun)	5 days

Gantt Chart



Project Budget

Total Cost

Hardware			
Hardware	Quantity	Cost per one (RM)	Total(RM)
Cisco 2901 Integrated Services Router(Router)	3	5,165.66	15,496.98
Cisco 2911 Integrated Services Router(Router)	1	6,984.12	6,984.12
CISCO CATALYST 2960-24TT-L(Switch)	7	8,615.38	60,307.66
CISCO UCS C220 M7 (Server)	4	16,528.00	66,112.00
Cisco Aironet 1815i Access Point	1	2,414.53	2,414.53
RS PRO Cat6 Ethernet Cable	500 meter	4.29 per meter	2,145.00
CAB-SS-2626X-10FT Cisco Smart Serial Crossover Cable	2	133.60	267.20
			153,727.46

Network Hardware and Components

Router

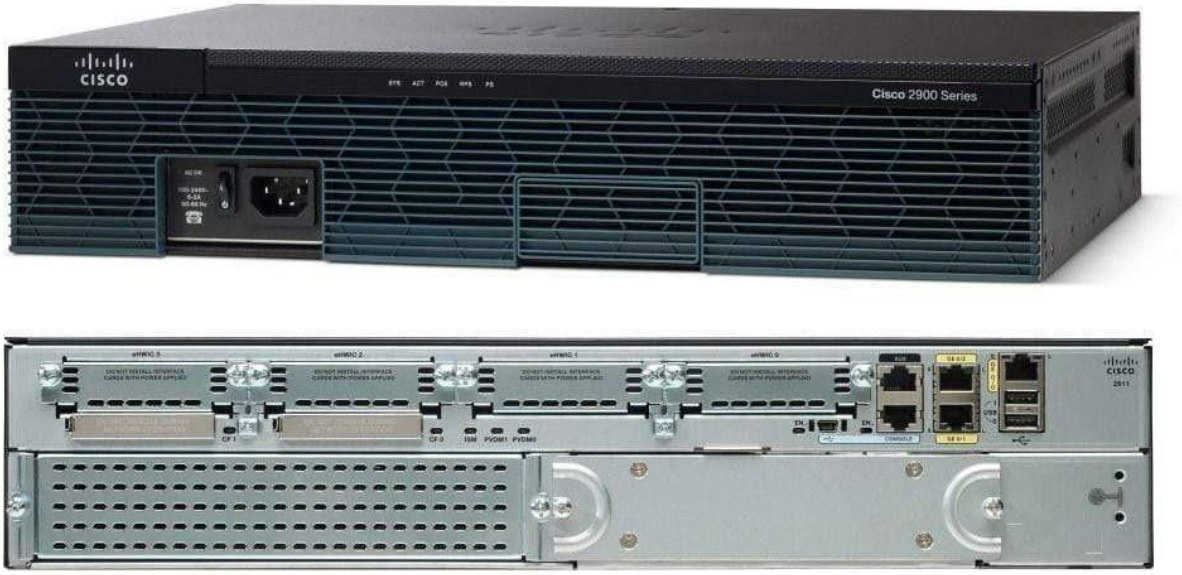
Cisco 2901 Integrated Services Router

Cisco 2901 router are integrated contrivance that ensures security of data of all types for small businesses. These routers successful bear the legacy of Cisco's 25 years of market leadership and innovation. The Cisco 2901 router is designed to become instrumental in the branch office expansion and development. The router supports rich-media collaboration/virtualization while saving operational costs to a great extent. This Gen-2 Cisco router is equipped with Gigabit Ethernet switching features, high-capacity DSP support, multi-core CPU and comes with advanced energy control and monitoring capabilities. As the best-in-class offering of the existing Cisco 2800 series Integrated Services Routers, Cisco 2901 router had attracted lots of attention all over the world. It offers embedded hardware encryption acceleration, voice- and video-capable digital signal processor (DSP) slots, optional firewall, intrusion prevention, call processing, voicemail, and application services. In addition, the platforms support the industries wildest range of wired and wireless connectivity options such as T1/E1, T3,E3, xDSL, copper and fiber GE.

Features and Benefits

Features	Benefits
2 integrated 10/100/1000 Ethernet ports	• offer increased levels of services integration with voice, video, security, wireless, mobility, and data services, enabling greater efficiencies and cost savings.
4 enhanced high-speed WAN interface card slots	• enables high-bandwidth module-to-module communication without compromising routing performance.
2 onboard digital signal processor (DSP) slots	• Platform flexibility and ongoing development of both hardware and software capabilities
1 onboard Internal Service Module for application services	• maximizes investment protection
Fully integrated power distribution to modules supporting Power over Ethernet (PoE) and Cisco Enhanced PoE	• High efficiency power supplies are provided with each platform.
Advanced security features (firewall, IPS, Content Flitering)	• quickly deploy advanced features without downloading a new IOS image.

Cisco 2911 Integrated Services Router



The Cisco 2911 router is equipped with 3 onboard Gigabit Ethernet ports, 1 onboard service module slot, and 2 onboard Digital Signal Processor (DSP) slots. It also has an integrated security and voice capabilities, making it an ideal solution for branch-office environments that require a high level of security, performance, and reliability. The Cisco 2911 supports various WAN connectivity options such as T1/E1, ISDN, xDSL, and serial and also include built-in 4-port Gigabit Ethernet switch, with PoE and PoE+, allowing you to easily connect and power devices such as IP phones, wireless access points, and security cameras. The router isalso able to provide advanced security features like firewall, VPN, and intrusion prevention, that help to protect your network against unauthorized access and malicious attacks. Additionally, the Cisco 2911 supports Cisco IOS Software Release 15.x and support Cisco IPBase and Cisco Security feature set.

Features and Benefits

Features	**Benefits**
3 onboard Gigabit Ethernet ports	• Provides high-speed connectivity to other devices and networks
1 onboard service module slot	• Allows you to add additional functionality to the router, such as WAN interfaces, security, or wireless capabilities

Switch

Cisco Catalyst 2960-24TT-L

The Cisco Catalyst 2960-24TT-L is a member of the Cisco Catalyst 2960 series of fixed-configuration, stackable Ethernet switches. The 2960-24TT-L model is a 24-port switch that comes with 2x Gigabit Ethernet SFP uplink ports.The switch supports advanced security features, such as Cisco TrustSec, which helps to protect your network against unauthorized access and malicious attacks. Additionally, the switch supports EnergyWise technology, which allows you to monitor and control power consumption to help lower your energy costs. The 2960-24TT-L switch also supports various Quality of Service (QoS) features, such as classification, marking, policing, and shaping, which allows you to prioritize different types of traffic to ensure that your most important traffic is delivered reliably.

Features and Benefits

Features	Benefits
24 Fast Ethernet ports with PoE support	● Provides fast connectivity and power to devices such as IP phones, wireless access points, and security cameras
2 Gigabit Ethernet SFP uplink ports	● Provides high-speed uplink connectivity to other devices and networks
Cisco TrustSec security features	● Protects your network against unauthorized access and malicious attacks
EnergyWise technology	● Allows you to monitor and control power consumption to help lower energy costs
2 onboard Digital Signal Processor (DSP) slots	● Enables advanced voice and video capabilities
Built-in 4-port Gigabit Ethernet switch with PoE and PoE+ support	● Provides power and connectivity toIP phones, wireless access points, and other powered devices
Support for various WAN connectivity options (T1/E1, ISDN, xDSL, serial)	● ● Provides flexibility and redundancy for WAN connections
Advanced security features (firewall, VPN, intrusion prevention)	● Protects your network from unauthorized access and malicious attacks
Support for Cisco IOS Software Release15.x	● Provides the latest features and capabilities
Cisco IP Base and Cisco Security feature set support	● Enables advanced networking and security functionality
Quality of Service (QoS) features (classification, marking, policing, and shaping)	● Allows you to prioritize different types of traffic to ensure that your mo
Stackable	● Allows you to stack multiple switches together for ease of management and expansion

Access Point

Cisco Aironet 1815i Access Point

The Cisco Aironet 1815i is a compact device that can be easily mounted on a wall or ceiling. It has dimensions of 8.9 x 8.9 x 2.3 in (22.6 x 22.6 x 5.8 cm) and weighs 1.9 lbs (0.86 kg). The Cisco Aironet 1815i access point is well-suited for high-density wireless environments, like universities where many devices will connect to it at once and provide robust and secure wireless network coverage. It is also able to be managed via Cisco DNA Center and Cisco wireless control system (WCS) making it more flexible and easy to manage.

Features and Benefits

Features	Benefits
Dual-band, 2x2:2 MU-MIMO 802.11ac Wave 2 wireless access point	● High-density wireless environments, like universities where many devices
	● will connect to it at once and providerobust and secure wireless network coverage.
Integrated Bluetooth Low Energy (BLE) andZigbee radios	● Provides additional communication capabilities and connectivity options.
Support for the latest wireless security standards, including WPA3	● Enhanced security features that protect your wireless network from unauthorized access.
Advanced RF management capabilities, such as Cisco CleanAir Express	● Enhances the wireless performance by managing the RF environment
BeamFlex+ adaptive antenna technology	● Adjusts to the environment to provide optimal coverage and capacity
Flexible deployment options, including controller-based and controllerless (CiscoFlexConnect)	● Can be deployed in various ways to best suit your needs.
Support for Cisco DNA Spaces for locationservices and analytics	● Provides location-based services and analytics capabilities

Server

CISCO UCS C220 M7

The Cisco UCS C220 M7 Rack Server is a highly adaptable general-purpose infrastructure and application server. This high-density 1RU rack server with two sockets provides industry-leading performance and efficiency for a wide range of workloads, including virtualization, collaboration, and bare-metal applications. The UCS C220 M7 Rack Server expands the capabilities of the Cisco UCS rack server range. It features 5th version Intel Xeon Scalable Processors, which have 50% more cores per socket than the preceding version. Built-in accelerators in CPUs will significantly improve the performance and efficiency of many applications. The Cisco UCS C-Series Rack Servers can be deployed as standalone servers or in conjunction with Cisco Intersight to benefit from Cisco standards-based unified computing technologies that can help lower your Total Cost of Ownership (TCO) and boost business agility.

Features and Benefits

Features	Benefits
Up to 2x 5th Gen Intel Xeon Scalable processors	• High-performance computing capabilities that support high-density virtualization and large-scale data center workloads.
32 DDR5 for up to 4 TB of memory	• Large memory capacity that supports big data analytics, software development, and databases.
Up to 10 x 2.5-inch SAS and SATA HDDs, SSD, NVMe drives, with the option of up to 4 direct-attach NVMe drives	• Large storage capacity and high I/O performance for various data center and enterprise workloads.
Up to three PCI Express 4.0 slots	• High-speed network connectivity and support for virtualization and other high-bandwidth applications.
Support for third-party network and storage adapters	• Scalability and expandability for additional hardware such as storage and networking adapters.
Support for Cisco UCS VIC 15000 Series with secure boot, enabling centralized management using Cisco Intersight and UCS adapters Manager	• Designed for denser environments that do not require maximum storage.
Flexible hardware management options such as Cisco Intersight Infrastructure Service SaaS, Cisco UCS Manager and CIMC	• Decrease server Operating Expenses (OpEx) for power and cooling, management, and maintenance

Network Software and Configurations

Addressing Table

Router, Switch, Cloud

Device	**Connect From**	**Connect To**	**IPv6 Address**	**Link-local Address**
Main_Router	Ser0/3/0	Lab_Router S0/3/0	2024:1110:4197:C::1/64	FE80::1
	Gig0/0	Server_Switch Gig9/1	2024:1110:4197:D::1/64	FE80::1
	Se0/3/1	Office_Router Se0/3/1	2024:1110:4197:B::1/64	FE80::1
	Se0/2/0	Classroom_Router Se0/3/0	2024:1110:4197:A::1/64	FE80::1
	Se0/2/1	Cloud Se0	2024:1110:4197:AAAA::10/64	FE80::1
Lab_Router	Gig0/0	Switch(L1) Gig0/2	2024:1110:4197:C1::1/64	FE80::1
	Gig0/1	Switch(L2) Gig0/2	2024:1110:4197:C2::1/64	FE80::1
	Ser0/3/0	Main_Router S0/3/0	2024:1110:4197:C::2/64	FE80::1
Office_Router	Gig0/0	Admin_Switch G0/1	2024:1110:4197:B1::1/64	FE80::1
	Gig0/1	Office_Switch G0/1	2024:1110:4197:B2::1/64	FE80::1
	Gig0/2	WirelessAP	2024:1110:4197:B3::1/64	FE80::1
	Se0/3/1	Main_Router Se0/3/1	2024:1110:4197:B::2/64	FE80::1
Classroom_Router	Se0/3/0	Main_Router Se0/2/0	2024:1110:4197:A::2/64	FE80::1
	Gig0/0	Classroom_Switch G0/1	2024:1110:4197:A1::1/64	FE80::1
External_Router	Se0/3/0	Cloud Se1	2024:1110:4197:AAAA::20/64	FE80::2
	Gig0/0	External_Switch Gig0/1	2024:1110:4197:BBBB::1/64	FE80::1

Server

Device	Interface	IPv6 Address	Default-Gateway
Web_Server	Gig6/1	2024:1110:4197:D::100/64	FE80::1
File_Server	Gig7/1	2024:1110:4197:D::200/64	FE80::1
DNS_Server	Gig8/1	2024:1110:4197:D::300/64	FE80::1
External_Server	Gig0/2	2024:1110:4197:BBBB::100/64	FE80::1

Lab 1

Device	Connect From	Connect To	IPv6 Address	Link-local Address
PC0(Instructor L1)	Fa0	Switch(L1) Gig0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC1(L1)	Fa0	Switch(L1) Fa0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC2(L1)	Fa0	Switch(L1) Fa0/2	DHCPv6 auto assigned	DHCPv6 auto assigned
PC3(L1)	Fa0	Switch(L1) Fa0/3	DHCPv6 auto assigned	DHCPv6 auto assigned
PC4(L1)	Fa0	Switch(L1) Fa0/4	DHCPv6 auto assigned	DHCPv6 auto assigned
PC5(L1)	Fa0	Switch(L1) Fa0/5	DHCPv6 auto assigned	DHCPv6 auto assigned
PC6(L1)	Fa0	Switch(L1) Fa0/6	DHCPv6 auto assigned	DHCPv6 auto assigned
PC7(L1)	Fa0	Switch(L1) Fa0/7	DHCPv6 auto assigned	DHCPv6 auto assigned
PC8(L1)	Fa0	Switch(L1) Fa0/8	DHCPv6 auto assigned	DHCPv6 auto assigned
PC9(L1)	Fa0	Switch(L1) Fa0/9	DHCPv6 auto assigned	DHCPv6 auto assigned
PC10(L1)	Fa0	Switch(L1) Fa0/10	DHCPv6 auto assigned	DHCPv6 auto assigned
PC11(L1)	Fa0	Switch(L1) Fa0/11	DHCPv6 auto assigned	DHCPv6 auto assigned
PC12(L1)	Fa0	Switch(L1) Fa0/12	DHCPv6 auto assigned	DHCPv6 auto assigned
PC13(L1)	Fa0	Switch(L1) Fa0/13	DHCPv6 auto assigned	DHCPv6 auto assigned
PC14(L1)	Fa0	Switch(L1) Fa0/14	DHCPv6 auto assigned	DHCPv6 auto assigned
PC15(L1)	Fa0	Switch(L1) Fa0/15	DHCPv6 auto assigned	DHCPv6 auto assigned
PC16(L1)	Fa0	Switch(L1) Fa0/16	DHCPv6 auto assigned	DHCPv6 auto assigned
PC17(L1)	Fa0	Switch(L1) Fa0/17	DHCPv6 auto assigned	DHCPv6 auto assigned
PC18(L1)	Fa0	Switch(L1) Fa0/18	DHCPv6 auto assigned	DHCPv6 auto assigned
PC19(L1)	Fa0	Switch(L1) Fa0/19	DHCPv6 auto assigned	DHCPv6 auto assigned
PC20(L1)	Fa0	Switch(L1) Fa0/20	DHCPv6 auto assigned	DHCPv6 auto assigned
PC21(L1)	Fa0	Switch(L1) Fa0/21	DHCPv6 auto assigned	DHCPv6 auto assigned
PC22(L1)	Fa0	Switch(L1) Fa0/22	DHCPv6 auto assigned	DHCPv6 auto assigned
PC23(L1)	Fa0	Switch(L1) Fa0/23	DHCPv6 auto assigned	DHCPv6 auto assigned
PC24(L1)	Fa0	Switch(L1) Fa0/24	DHCPv6 auto assigned	DHCPv6 auto assigned

Lab 2

Device	Connect From	Connect To	IPv6 Address	Link-local Address
PC0(Instructor L1)	Fa0	Switch(L2) Gig0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC1(L2)	Fa0	Switch(L2) Fa0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC2(L2)	Fa0	Switch(L2) Fa0/2	DHCPv6 auto assigned	DHCPv6 auto assigned
PC3(L2)	Fa0	Switch(L2) Fa0/3	DHCPv6 auto assigned	DHCPv6 auto assigned
PC4(L2)	Fa0	Switch(L2) Fa0/4	DHCPv6 auto assigned	DHCPv6 auto assigned
PC5(L2)	Fa0	Switch(L2) Fa0/5	DHCPv6 auto assigned	DHCPv6 auto assigned
PC6(L2)	Fa0	Switch(L2) Fa0/6	DHCPv6 auto assigned	DHCPv6 auto assigned
PC7(L2)	Fa0	Switch(L2) Fa0/7	DHCPv6 auto assigned	DHCPv6 auto assigned
PC8(L2)	Fa0	Switch(L2) Fa0/8	DHCPv6 auto assigned	DHCPv6 auto assigned
PC9(L2)	Fa0	Switch(L2) Fa0/9	DHCPv6 auto assigned	DHCPv6 auto assigned
PC10(L2)	Fa0	Switch(L2) Fa0/10	DHCPv6 auto assigned	DHCPv6 auto assigned
PC11(L2)	Fa0	Switch(L2) Fa0/11	DHCPv6 auto assigned	DHCPv6 auto assigned
PC12(L2)	Fa0	Switch(L2) Fa0/12	DHCPv6 auto assigned	DHCPv6 auto assigned
PC13(L2)	Fa0	Switch(L2) Fa0/13	DHCPv6 auto assigned	DHCPv6 auto assigned
PC14(L2)	Fa0	Switch(L2) Fa0/14	DHCPv6 auto assigned	DHCPv6 auto assigned
PC15(L2)	Fa0	Switch(L2) Fa0/15	DHCPv6 auto assigned	DHCPv6 auto assigned
PC16(L2)	Fa0	Switch(L2) Fa0/16	DHCPv6 auto assigned	DHCPv6 auto assigned
PC17(L2)	Fa0	Switch(L2) Fa0/17	DHCPv6 auto assigned	DHCPv6 auto assigned
PC18(L2)	Fa0	Switch(L2) Fa0/18	DHCPv6 auto assigned	DHCPv6 auto assigned
PC19(L2)	Fa0	Switch(L2) Fa0/19	DHCPv6 auto assigned	DHCPv6 auto assigned
PC20(L2)	Fa0	Switch(L2) Fa0/20	DHCPv6 auto assigned	DHCPv6 auto assigned
PC21(L2)	Fa0	Switch(L2) Fa0/21	DHCPv6 auto assigned	DHCPv6 auto assigned
PC22(L2)	Fa0	Switch(L2) Fa0/22	DHCPv6 auto assigned	DHCPv6 auto assigned
PC23(L2)	Fa0	Switch(L2) Fa0/23	DHCPv6 auto assigned	DHCPv6 auto assigned
PC24(L2)	Fa0	Switch(L2) Fa0/24	DHCPv6 auto assigned	DHCPv6 auto assigned

Administration

Device	Connect From	Connect To	IPv6 Address	Link-local Address
PC35	Fa0	Admin_Switch Fa0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC36	Fa0	Admin_Switch Fa0/2	DHCPv6 auto assigned	DHCPv6 auto assigned
PC37	Fa0	Admin_Switch Fa0/3	DHCPv6 auto assigned	DHCPv6 auto assigned
PC38	Fa0	Admin_Switch Fa0/5	DHCPv6 auto assigned	DHCPv6 auto assigned
PC39	Fa0	Admin_Switch Fa0/4	DHCPv6 auto assigned	DHCPv6 auto assigned

Office

Device	Connect From	Connect To	IPv6 Address	Link-local Address
PC40	Fa0	Office_Switch Fa0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC41	Fa0	Office_Switch Fa0/2	DHCPv6 auto assigned	DHCPv6 auto assigned
PC42	Fa0	Office_Switch Fa0/3	DHCPv6 auto assigned	DHCPv6 auto assigned
PC43	Fa0	Office_Switch Fa0/4	DHCPv6 auto assigned	DHCPv6 auto assigned
PC44	Fa0	Office_Switch Fa0/5	DHCPv6 auto assigned	DHCPv6 auto assigned
PC45	Fa0	Office_Switch Fa0/6	DHCPv6 auto assigned	DHCPv6 auto assigned
PC46	Fa0	Office_Switch Fa0/7	DHCPv6 auto assigned	DHCPv6 auto assigned
PC47	Fa0	Office_Switch Fa0/8	DHCPv6 auto assigned	DHCPv6 auto assigned

Server Room

Device	Connect From	Connect To	IPv6 Address	Link-local Address
ServerAdmin1	Fa0	Server_Switch Fa0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
ServerAdmin2	Fa0	Server_Switch Fa1/1	DHCPv6 auto assigned	DHCPv6 auto assigned

Classroom

Device	Connect From	Connect To	IPv6 Address	Link-local Address
PC1(Classroom)	Fa0	Classroom_Switch Fa0/1	DHCPv6 auto assigned	DHCPv6 auto assigned
PC2(Classroom)	Fa0	Classroom_Switch Fa0/2	DHCPv6 auto assigned	DHCPv6 auto assigned
PC3(Classroom)	Fa0	Classroom_Switch Fa0/3	DHCPv6 auto assigned	DHCPv6 auto assigned
PC4(Classroom)	Fa0	Classroom_Switch Fa0/4	DHCPv6 auto assigned	DHCPv6 auto assigned
PC5(Classroom)	Fa0	Classroom_Switch Fa0/5	DHCPv6 auto assigned	DHCPv6 auto assigned
PC6(Classroom)	Fa0	Classroom_Switch Fa0/6	DHCPv6 auto assigned	DHCPv6 auto assigned
PC7(Classroom)	Fa0	Classroom_Switch Fa0/7	DHCPv6 auto assigned	DHCPv6 auto assigned

Wireless

Device	Connect From	Connect To	IPv6 Address	Link-local Address
Laptop0	Wireless	WirelessAP	DHCPv6 auto assigned	DHCPv6 auto assigned
Laptop1	Wireless	WirelessAP	DHCPv6 auto assigned	DHCPv6 auto assigned

Router Configurations

IPv6 Address Configuration

Main_Router

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Main_Router
Main_Router(config)#ipv6 unicast-routing
Main_Router(config)#interface GigabitEthernet0/0
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:D::1/64
Main_Router(config-if)#no shut down

Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/0
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:A::1/64
Main_Router(config-if)#no shut down

%LINK-5-CHANGED: Interface Serial0/2/0, changed state to down
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/1
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:AAAA::10/64
Main_Router(config-if)#no shut down

Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/3/1
```

```
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:B::1/64
Main_Router(config-if)#no shut down

%LINK-5-CHANGED: Interface Serial0/3/1, changed state to down
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/3/0
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:C::1/64
Main_Router(config-if)#no shut down

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down
Main_Router(config-if)#end
```

Main_Router

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Router>ipv6 address FE80::1 link-local
               ^
% Invalid input detected at '^' marker.

Router>ipv6 address 2024:1110:4197:D::1/64
               ^
% Invalid input detected at '^' marker.

Router>no shut down
Translating "no"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Main_Router
Main_Router(config)#ipv6 unicast-routing
Main_Router(config)#interface GigabitEthernet0/0
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:D::1/64
Main_Router(config-if)#no shut down

Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/0
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:A::1/64
Main_Router(config-if)#no shut down

%LINK-5-CHANGED: Interface Serial0/2/0, changed state to down
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/1
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:AAAA::10/64
Main_Router(config-if)#no shut down

Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/3/1
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:B::1/64
Main_Router(config-if)#no shut down

%LINK-5-CHANGED: Interface Serial0/3/1, changed state to down
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/3/0
Main_Router(config-if)#ipv6 address FE80::1 link-local
Main_Router(config-if)#ipv6 address 2024:1110:4197:C::1/64
Main_Router(config-if)#no shut down

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down
Main_Router(config-if)#end
Main_Router#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/2/1, changed state to up

%SYS-5-CONFIG_I: Configured from console by console
```

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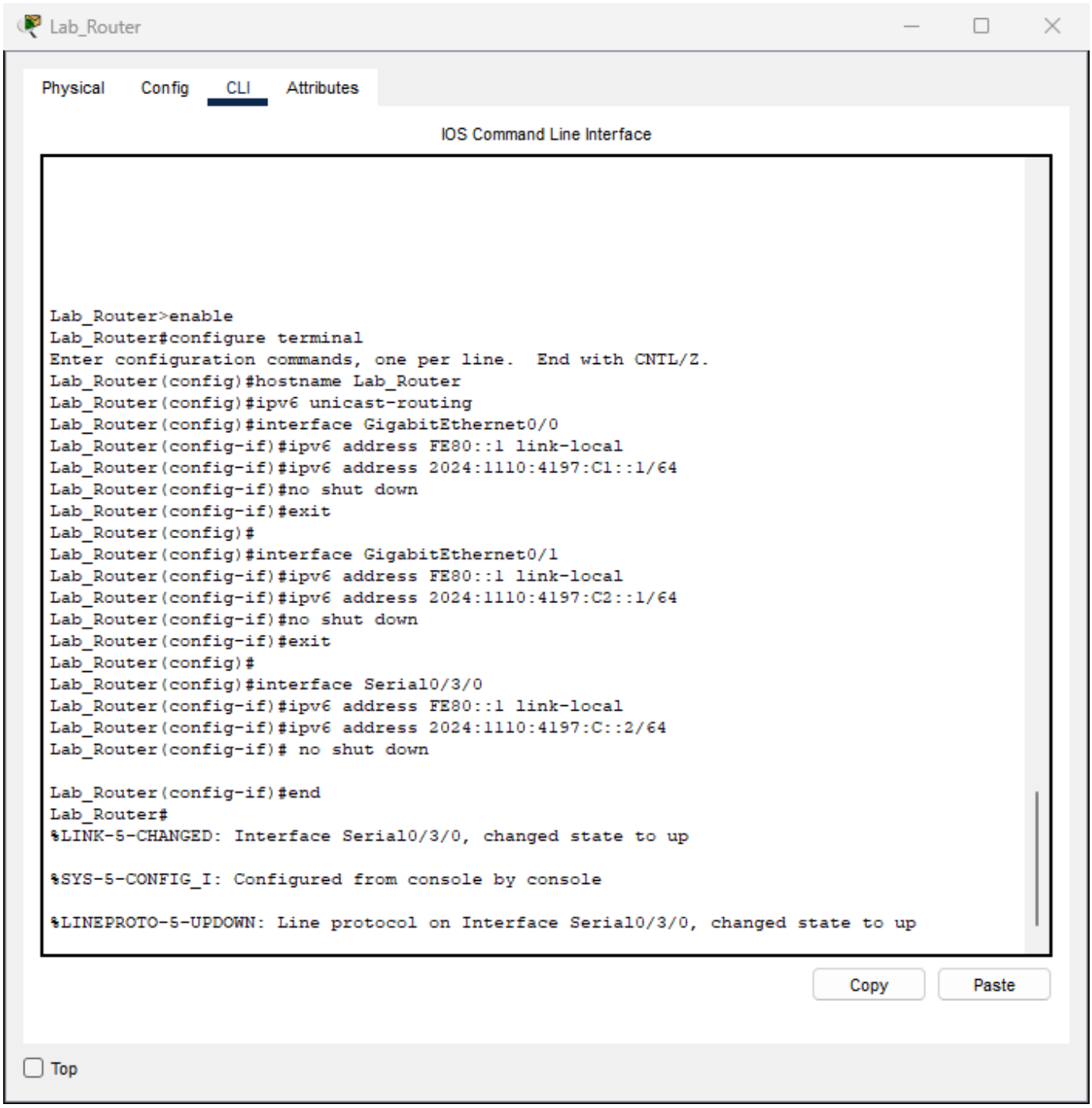
Top

Lab Router

```
Lab_Router>enable
Lab_Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Lab_Router(config)#hostname Lab_Router
Lab_Router(config)#ipv6 unicast-routing
Lab_Router(config)#interface GigabitEthernet0/0
Lab_Router(config-if)#ipv6 address FE80::1 link-local
Lab_Router(config-if)#ipv6 address 2024:1110:4197:C1::1/64
Lab_Router(config-if)#no shut down
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/1
Lab_Router(config-if)#ipv6 address FE80::1 link-local
Lab_Router(config-if)#ipv6 address 2024:1110:4197:C2::1/64
Lab_Router(config-if)#no shut down
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface Serial0/3/0
Lab_Router(config-if)#ipv6 address FE80::1 link-local
Lab_Router(config-if)#ipv6 address 2024:1110:4197:C::2/64
Lab_Router(config-if)# no shut down

Lab_Router(config-if)#end
Lab_Router#
%LINK-5-CHANGED: Interface Serial0/3/0, changed state to up
```

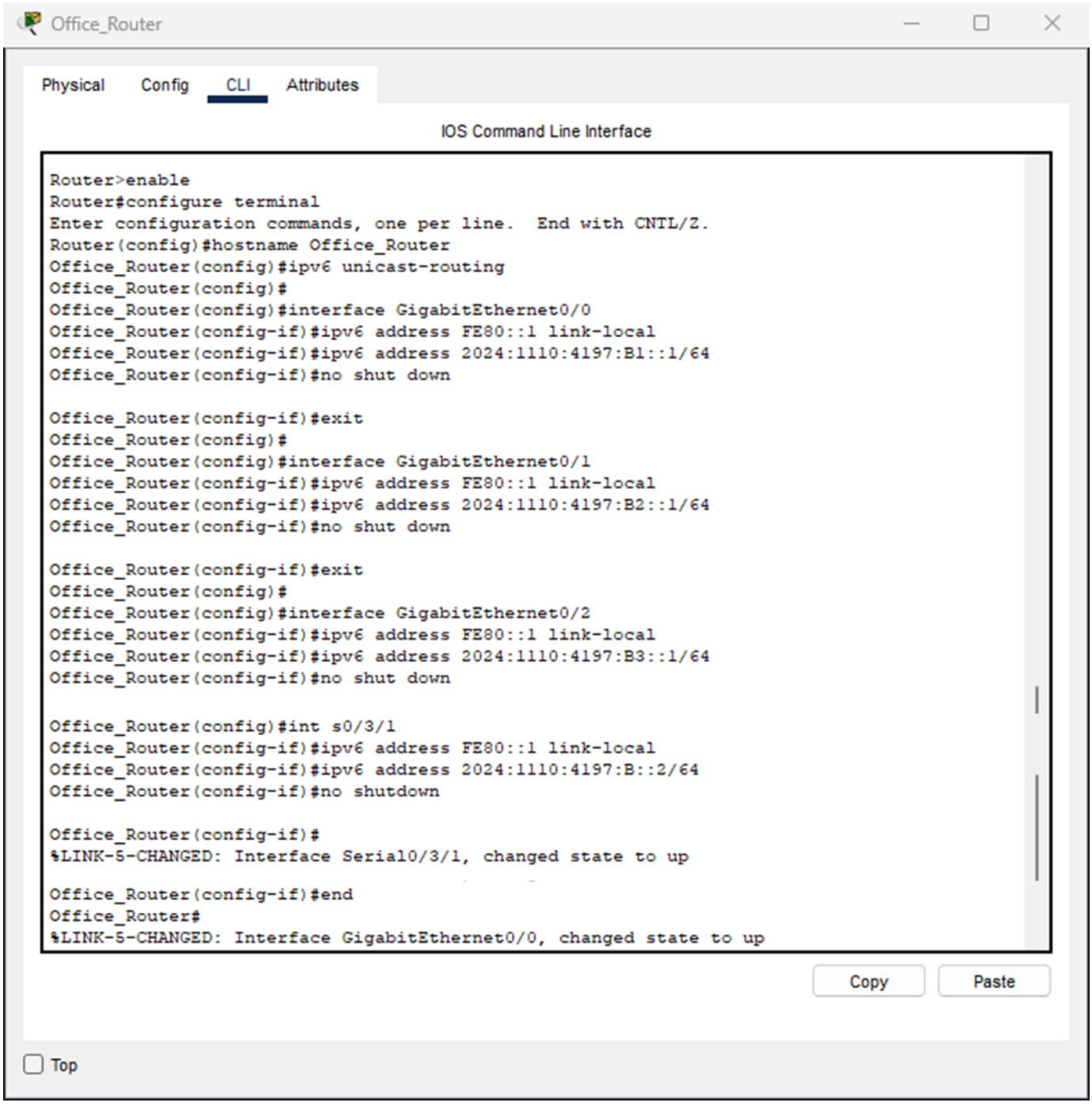

Lab_Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Lab_Router>enable
Lab_Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Lab_Router(config)#hostname Lab_Router
Lab_Router(config)#ipv6 unicast-routing
Lab_Router(config)#interface GigabitEthernet0/0
Lab_Router(config-if)#ipv6 address FE80::1 link-local
Lab_Router(config-if)#ipv6 address 2024:1110:4197:C1::1/64
Lab_Router(config-if)#no shut down
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/1
Lab_Router(config-if)#ipv6 address FE80::1 link-local
Lab_Router(config-if)#ipv6 address 2024:1110:4197:C2::1/64
Lab_Router(config-if)#no shut down
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface Serial0/3/0
Lab_Router(config-if)#ipv6 address FE80::1 link-local
Lab_Router(config-if)#ipv6 address 2024:1110:4197:C::2/64
Lab_Router(config-if)# no shut down
Lab_Router(config-if)#end
Lab_Router#
%LINK-5-CHANGED: Interface Serial0/3/0, changed state to up
%SYS-5-CONFIG_I: Configured from console by console
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
Copy
Paste
Top

Office Router

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Office_Router
Office_Router(config)#ipv6 unicast-routing
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/0
Office_Router(config-if)#ipv6 address FE80::1 link-local
Office_Router(config-if)#ipv6 address 2024:1110:4197:B1::1/64
Office_Router(config-if)#no shut down

Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/1
Office_Router(config-if)#ipv6 address FE80::1 link-local
Office_Router(config-if)#ipv6 address 2024:1110:4197:B2::1/64
Office_Router(config-if)#no shut down

Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/2
Office_Router(config-if)#ipv6 address FE80::1 link-local
Office_Router(config-if)#ipv6 address 2024:1110:4197:B3::1/64
Office_Router(config-if)#no shut down

Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface Serial0/3/1
Office_Router(config-if)#ipv6 address FE80::1 link-local
Office_Router(config-if)#ipv6 address 2024:1110:4197:B::2/64
Office_Router(config-if)#no shut down
```

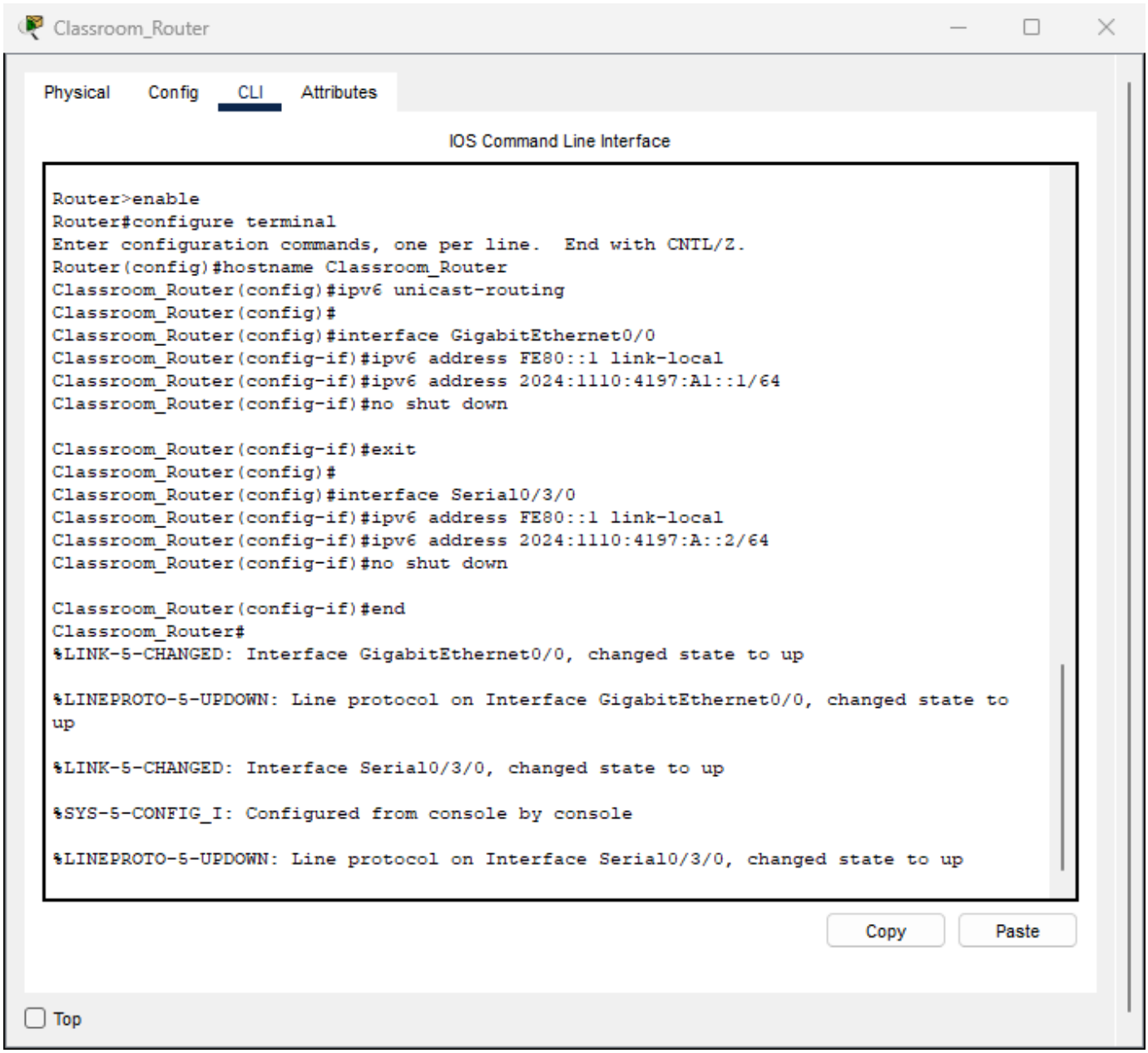
%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down

Office_Router(config-if)#end



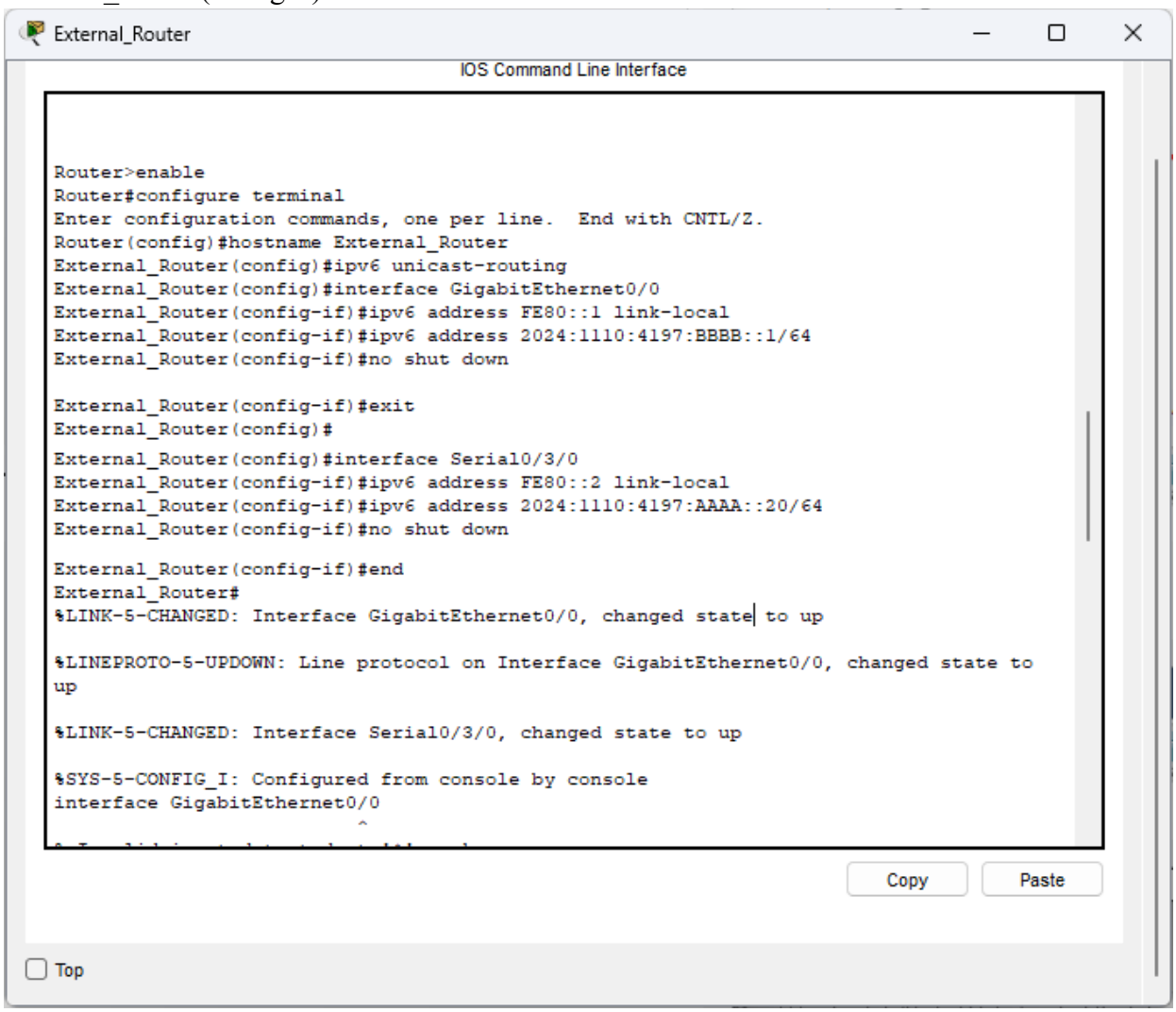
Classroom

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Classroom_Router
Classroom_Router(config)#ipv6 unicast-routing
Classroom_Router(config)#
Classroom_Router(config)#interface GigabitEthernet0/0
Classroom_Router(config-if)#ipv6 address FE80::1 link-local
Classroom_Router(config-if)#ipv6 address 2024:1110:4197:A1::1/64
Classroom_Router(config-if)#no shut down

Classroom_Router(config-if)#exit
Classroom_Router(config)#
Classroom_Router(config)#interface Serial0/3/0
Classroom_Router(config-if)#ipv6 address FE80::1 link-local
Classroom_Router(config-if)#ipv6 address 2024:1110:4197:A::2/64
Classroom_Router(config-if)#no shut down

Classroom_Router(config-if)#end
Classroom_Router#
```


Classroom_Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Classroom_Router
Classroom_Router(config)#ipv6 unicast-routing
Classroom_Router(config)#
Classroom_Router(config)#interface GigabitEthernet0/0
Classroom_Router(config-if)#ipv6 address FE80::1 link-local
Classroom_Router(config-if)#ipv6 address 2024:1110:4197:A1::1/64
Classroom_Router(config-if)#no shut down
Classroom_Router(config-if)#exit
Classroom_Router(config)#
Classroom_Router(config)#interface Serial0/3/0
Classroom_Router(config-if)#ipv6 address FE80::1 link-local
Classroom_Router(config-if)#ipv6 address 2024:1110:4197:A::2/64
Classroom_Router(config-if)#no shut down
Classroom_Router(config-if)#end
Classroom_Router#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
%LINK-5-CHANGED: Interface Serial0/3/0, changed state to up
%SYS-5-CONFIG_I: Configured from console by console
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
Copy
Paste
Top

External

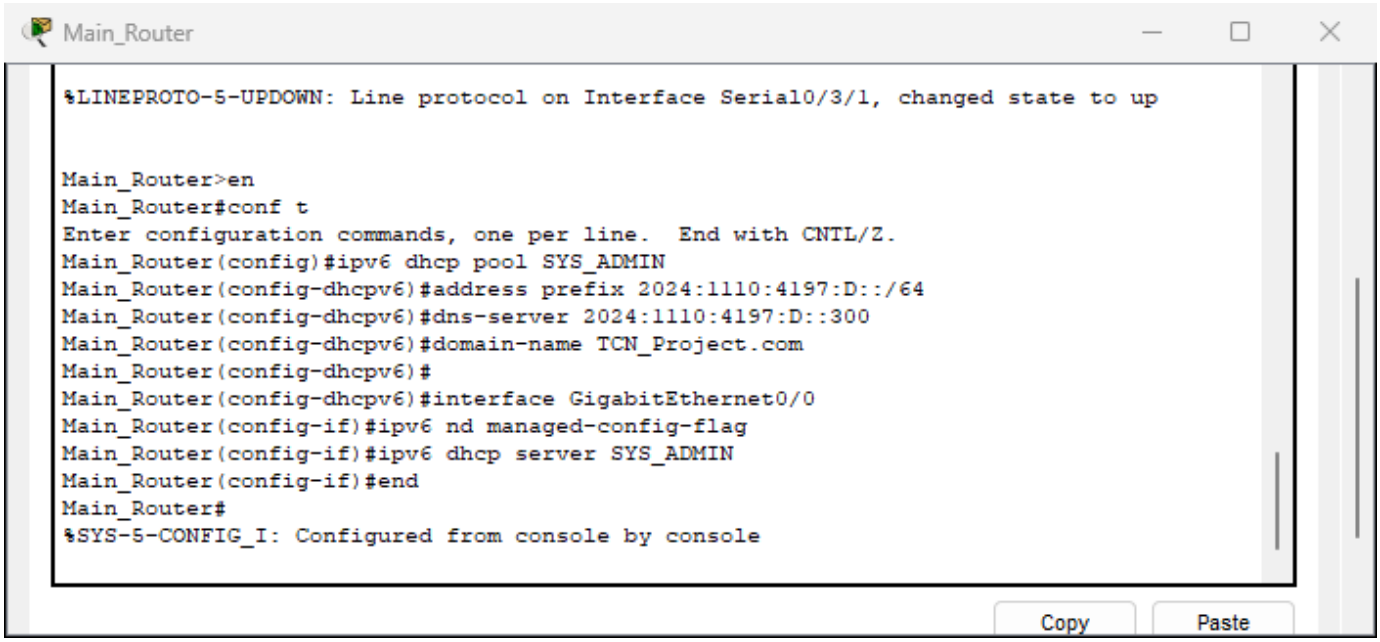
```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname External_Router
External_Router(config)#ipv6 unicast-routing
External_Router(config)#interface GigabitEthernet0/0
External_Router(config-if)#ipv6 address FE80::1 link-local
External_Router(config-if)#ipv6 address 2024:1110:4197:BBBB::1/64
External_Router(config-if)#no shut down

External_Router(config-if)#exit
External_Router(config)#
External_Router(config)#interface Serial0/3/0
External_Router(config-if)#ipv6 address FE80::2 link-local
External_Router(config-if)#ipv6 address 2024:1110:4197:AAAA::20/64
External_Router(config-if)#no shut down

External_Router(config-if)#end
```



DHCPv6 Configurations

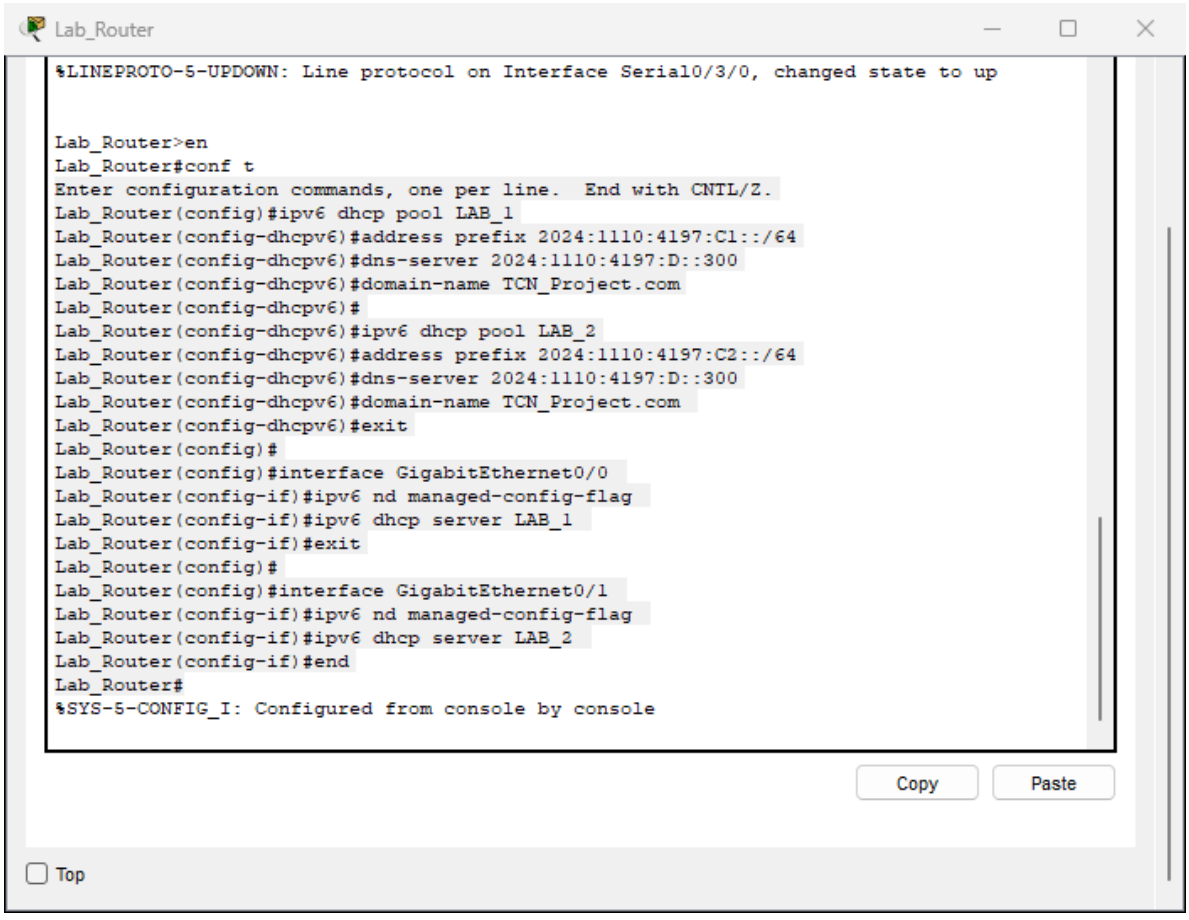
Main Router

```
Main_Router>en
Main_Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Main_Router(config)#ipv6 dhcp pool SYS_ADMIN
Main_Router(config-dhcpv6)#address prefix 2024:1110:4197:D::/64
Main_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Main_Router(config-dhcpv6)#domain-name TCN_Project.com
Main_Router(config-dhcpv6)#
Main_Router(config-dhcpv6)#interface GigabitEthernet0/0
Main_Router(config-if)#ipv6 nd managed-config-flag
Main_Router(config-if)#ipv6 dhcp server SYS_ADMIN
Main_Router(config-if)#end
```



Lab Router

```
Enter configuration commands, one per line. End with CNTL/Z.
Lab_Router(config)#ipv6 dhcp pool LAB_1
Lab_Router(config-dhcpv6)#address prefix 2024:1110:4197:C1::/64
Lab_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Lab_Router(config-dhcpv6)#domain-name TCN_Project.com
Lab_Router(config-dhcpv6)#
Lab_Router(config-dhcpv6)#ipv6 dhcp pool LAB_2
Lab_Router(config-dhcpv6)#address prefix 2024:1110:4197:C2::/64
Lab_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Lab_Router(config-dhcpv6)#domain-name TCN_Project.com
Lab_Router(config-dhcpv6)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/0
Lab_Router(config-if)#ipv6 nd managed-config-flag
Lab_Router(config-if)#ipv6 dhcp server LAB_1
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/1
Lab_Router(config-if)#ipv6 nd managed-config-flag
Lab_Router(config-if)#ipv6 dhcp server LAB_2
Lab_Router(config-if)#end
Lab_Router#
```



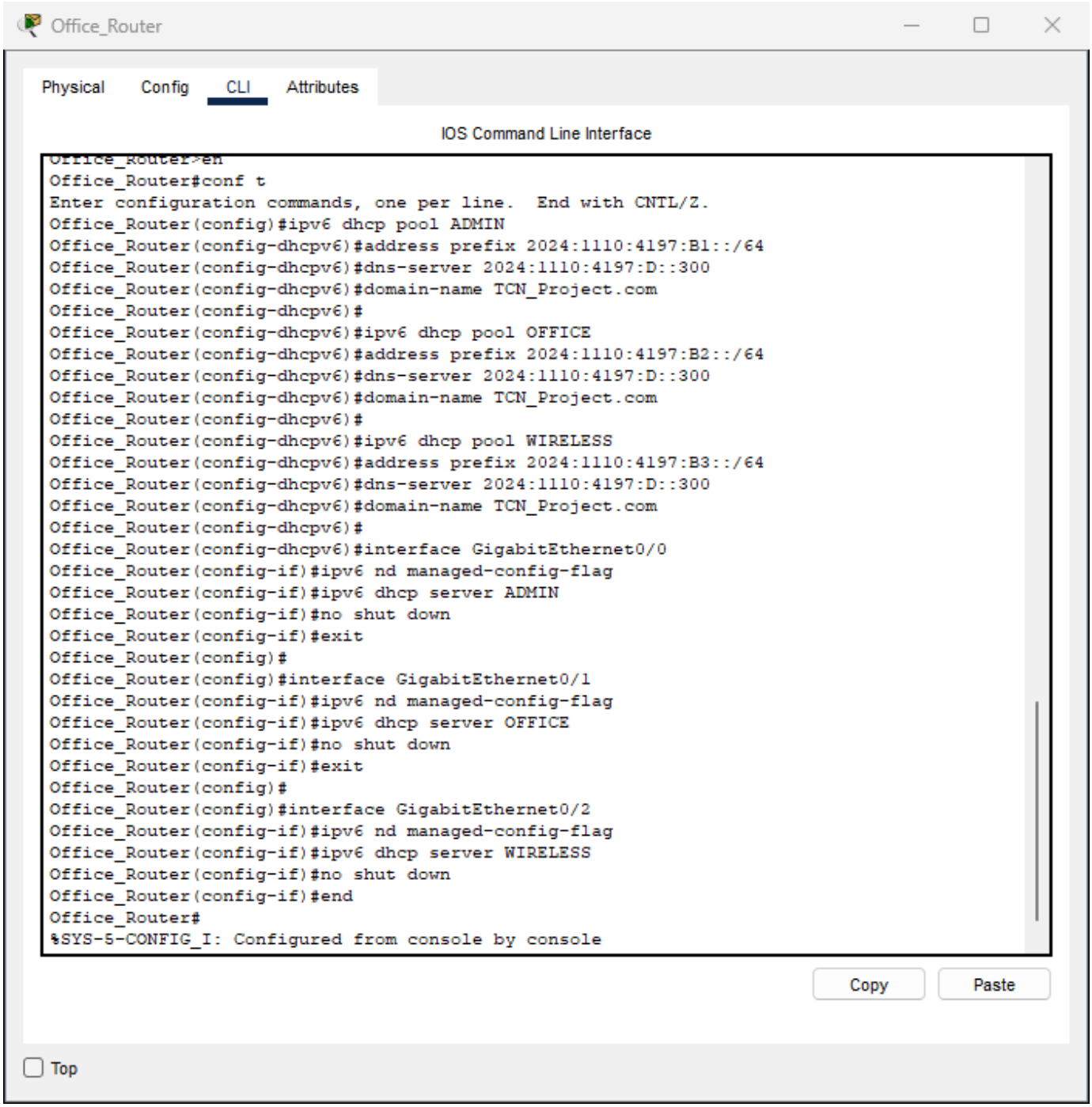
Office

```
Enter configuration commands, one per line. End with CNTL/Z.
Office_Router(config)#ipv6 dhcp pool ADMIN
Office_Router(config-dhcpv6)#address prefix 2024:1110:4197:B1::/64
Office_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Office_Router(config-dhcpv6)#domain-name TCN_Project.com
Office_Router(config-dhcpv6)#
Office_Router(config-dhcpv6)#ipv6 dhcp pool OFFICE
Office_Router(config-dhcpv6)#address prefix 2024:1110:4197:B2::/64
Office_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Office_Router(config-dhcpv6)#domain-name TCN_Project.com
Office_Router(config-dhcpv6)#
Office_Router(config-dhcpv6)#ipv6 dhcp pool WIRELESS
Office_Router(config-dhcpv6)#address prefix 2024:1110:4197:B3::/64
Office_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Office_Router(config-dhcpv6)#domain-name TCN_Project.com
Office_Router(config-dhcpv6)#
Office_Router(config-dhcpv6)#interface GigabitEthernet0/0
Office_Router(config-if)#ipv6 nd managed-config-flag
Office_Router(config-if)#ipv6 dhcp server ADMIN
Office_Router(config-if)#no shut down
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/1
Office_Router(config-if)#ipv6 nd managed-config-flag
Office_Router(config-if)#ipv6 dhcp server OFFICE
Office_Router(config-if)#no shut down
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/2
Office_Router(config-if)#ipv6 nd managed-config-flag
```

Office_Router(config-if)#ipv6 dhcp server WIRELESS

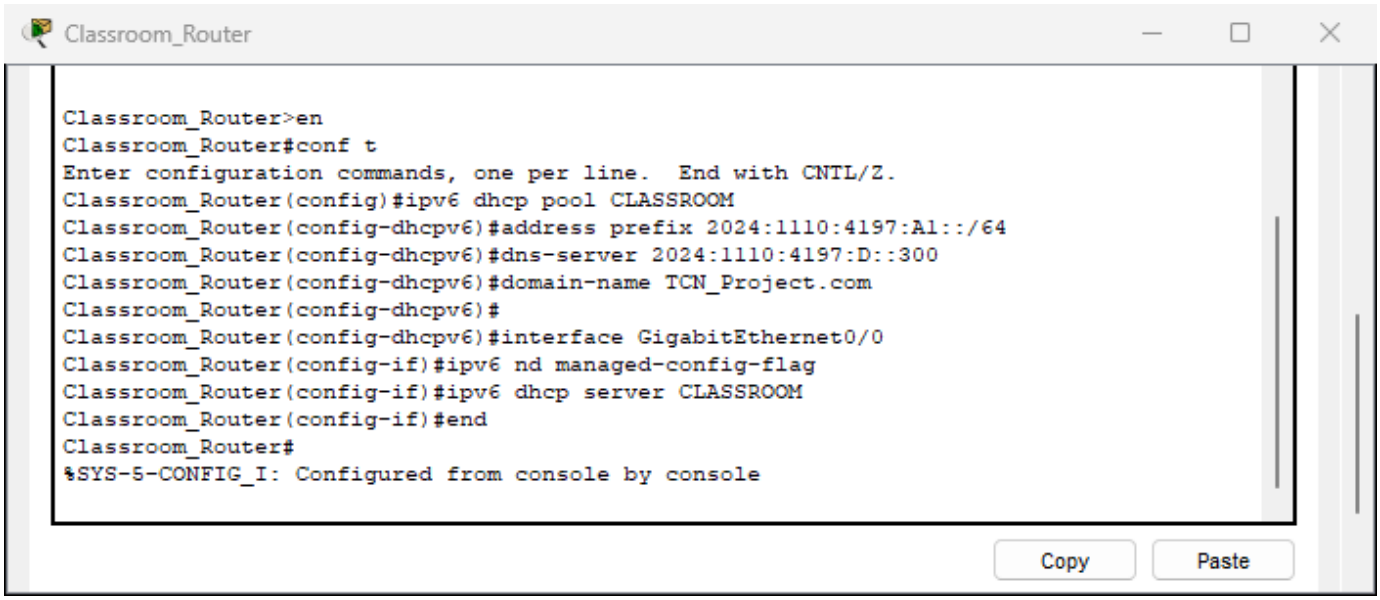
Office_Router(config-if)#no shut down

Office_Router(config-if)#end



Classroom

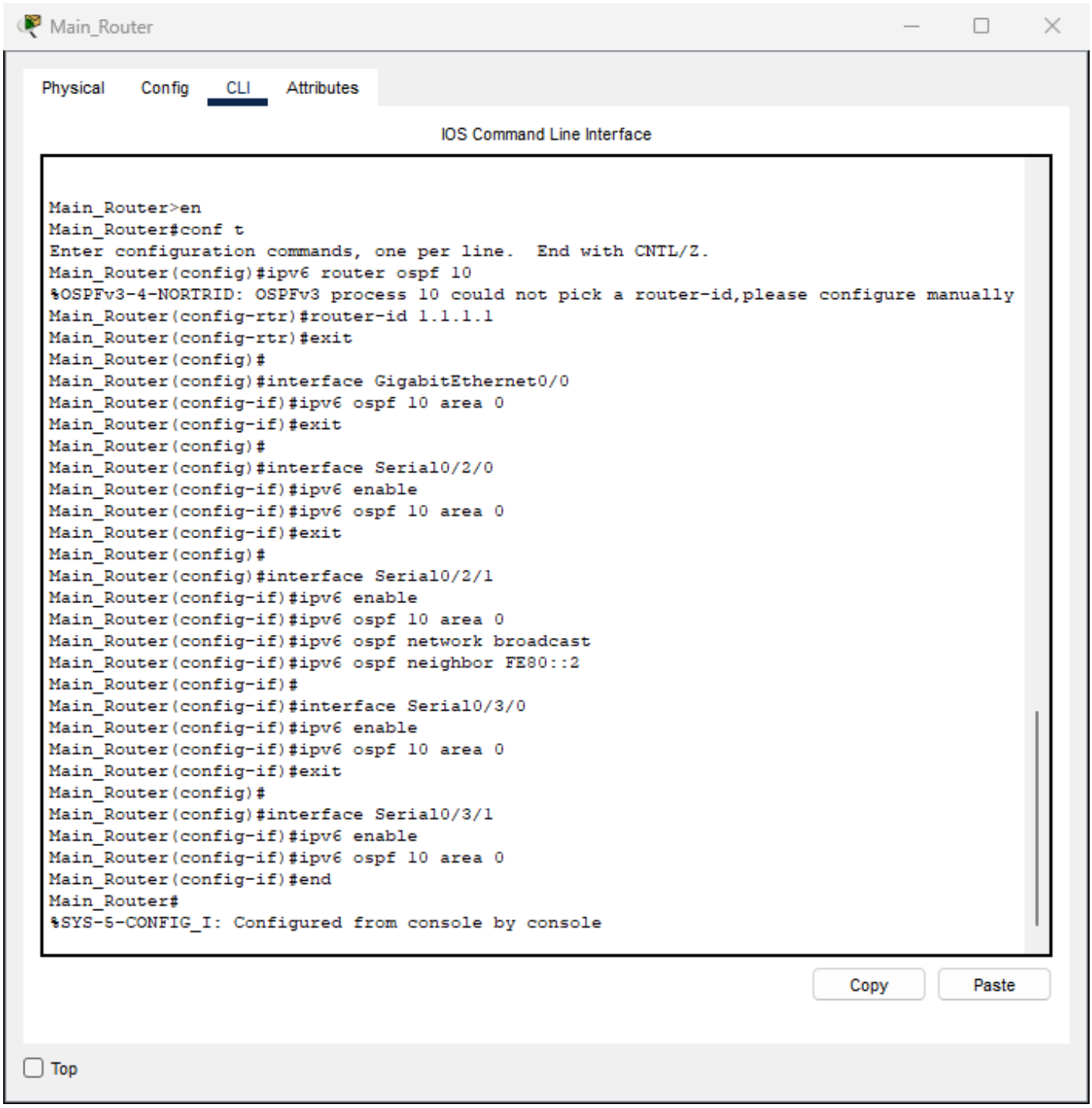
Classroom_Router(config)#ipv6 dhcp pool CLASSROOM
Classroom_Router(config-dhcpv6)#address prefix 2024:1110:4197:A1::/64
Classroom_Router(config-dhcpv6)#dns-server 2024:1110:4197:D::300
Classroom_Router(config-dhcpv6)#domain-name TCN_Project.com
Classroom_Router(config-dhcpv6)#
Classroom_Router(config-dhcpv6)#interface GigabitEthernet0/0
Classroom_Router(config-if)#ipv6 nd managed-config-flag
Classroom_Router(config-if)#ipv6 dhcp server CLASSROOM
Classroom_Router(config-if)#end
Classroom_Router



OSPF Configuration

Main_Router

```
Main_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
Main_Router(config-rtr)#router-id 1.1.1.1
Main_Router(config-rtr)#exit
Main_Router(config)#
Main_Router(config)#interface GigabitEthernet0/0
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/0
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/1
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#ipv6 ospf network broadcast
Main_Router(config-if)#ipv6 ospf neighbor FE80::2
Main_Router(config-if)#
Main_Router(config-if)#interface Serial0/3/0
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/3/1
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#end
Main_Router#
Main_Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```


Main_Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Main_Router>en
Main_Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Main_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
Main_Router(config-rtr)#router-id 1.1.1.1
Main_Router(config-rtr)#exit
Main_Router(config)#
Main_Router(config)#interface GigabitEthernet0/0
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/0
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/2/1
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#ipv6 ospf network broadcast
Main_Router(config-if)#ipv6 ospf neighbor FE80::2
Main_Router(config-if)#
Main_Router(config-if)#interface Serial0/3/0
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#exit
Main_Router(config)#
Main_Router(config)#interface Serial0/3/1
Main_Router(config-if)#ipv6 enable
Main_Router(config-if)#ipv6 ospf 10 area 0
Main_Router(config-if)#end
Main_Router#
%SYS-5-CONFIG_I: Configured from console by console
Copy
Paste
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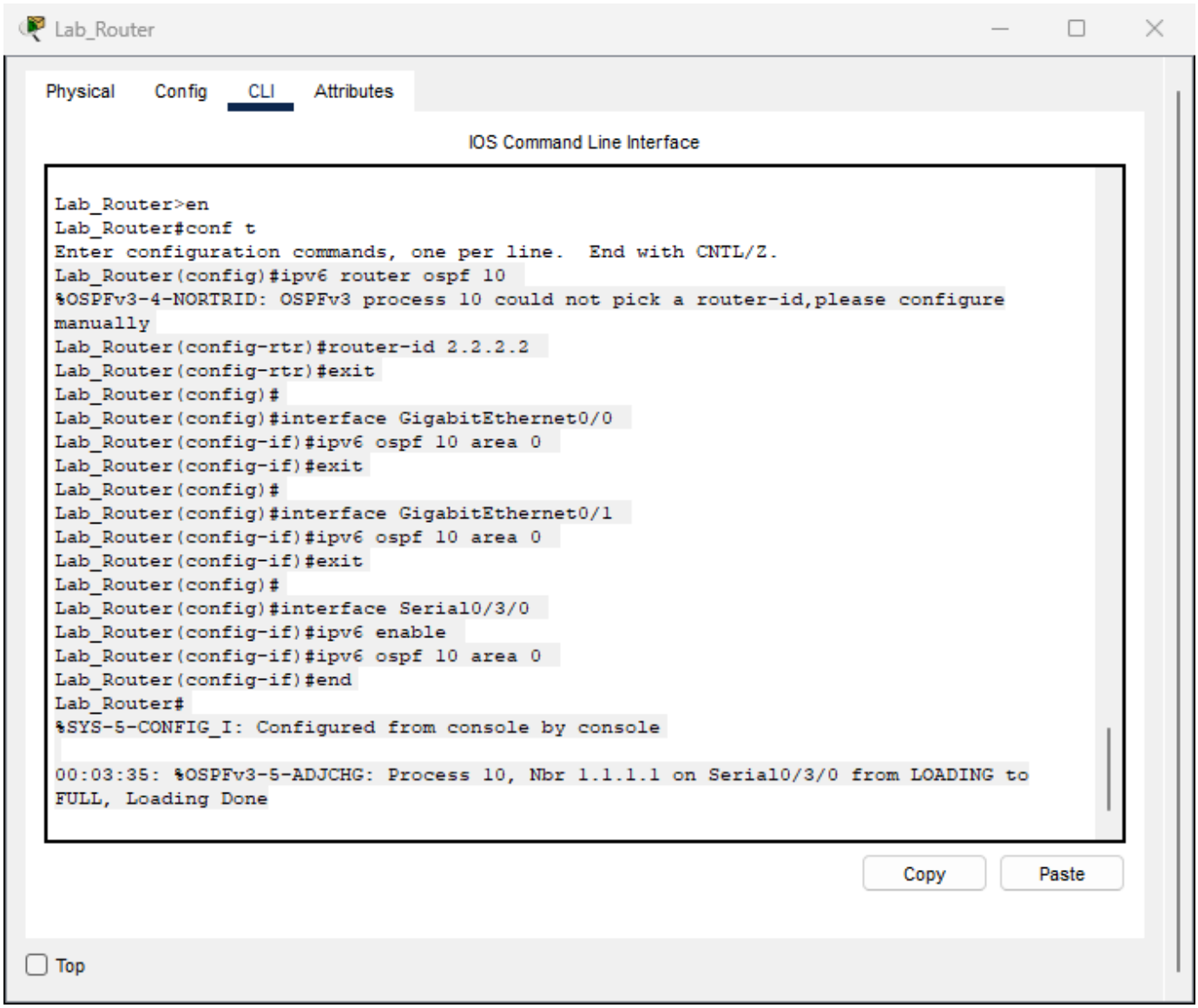
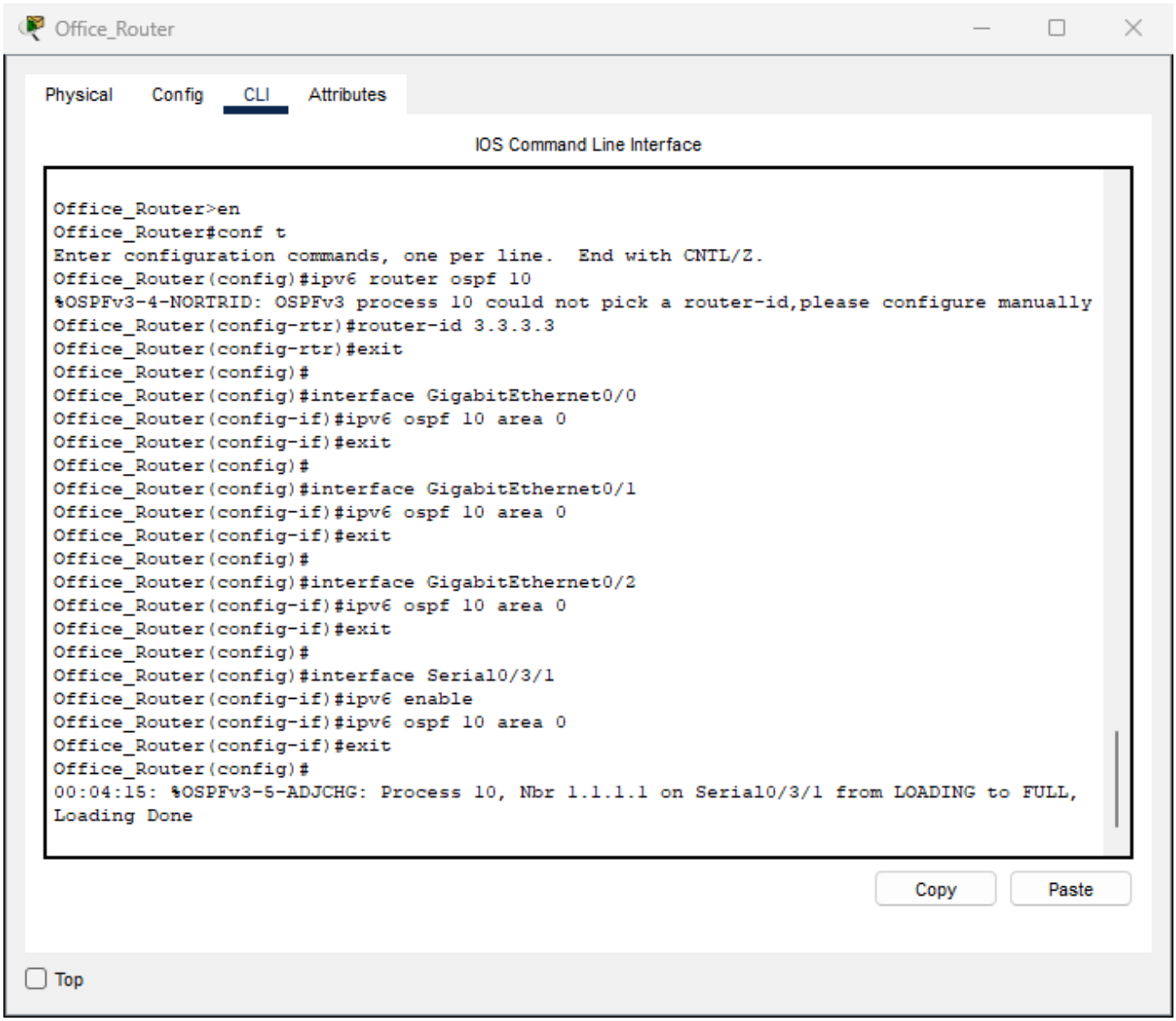
Lab

```
Lab_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
Lab_Router(config-rtr)#router-id 2.2.2.2
Lab_Router(config-rtr)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/0
Lab_Router(config-if)#ipv6 ospf 10 area 0
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/1
Lab_Router(config-if)#ipv6 ospf 10 area 0
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface Serial0/3/0
Lab_Router(config-if)#ipv6 enable
Lab_Router(config-if)#ipv6 ospf 10 area 0
Lab_Router(config-if)#end
Lab_Router#
%SYS-5-CONFIG_I: Configured from console by console

00:03:35: %OSPFv3-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/3/0 from LOADING to FULL,
Loading Done
Lab_Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```


Lab_Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Lab_Router>en
Lab_Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Lab_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
Lab_Router(config-rtr)#router-id 2.2.2.2
Lab_Router(config-rtr)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/0
Lab_Router(config-if)#ipv6 ospf 10 area 0
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface GigabitEthernet0/1
Lab_Router(config-if)#ipv6 ospf 10 area 0
Lab_Router(config-if)#exit
Lab_Router(config)#
Lab_Router(config)#interface Serial0/3/0
Lab_Router(config-if)#ipv6 enable
Lab_Router(config-if)#ipv6 ospf 10 area 0
Lab_Router(config-if)#end
Lab_Router#
%SYS-5-CONFIG_I: Configured from console by console
00:03:35: %OSPFv3-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/3/0 from LOADING to FULL, Loading Done
Copy
Paste
Top

Office

```
Office_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
Office_Router(config-rtr)#router-id 3.3.3.3
Office_Router(config-rtr)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/0
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/1
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/2
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface Serial0/3/1
Office_Router(config-if)#ipv6 enable
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#

00:04:15: %OSPFv3-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/3/1 from LOADING to FULL, Loading Done
Office_Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```


Office_Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Office_Router>en
Office_Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Office_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
Office_Router(config-rtr)#router-id 3.3.3.3
Office_Router(config-rtr)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/0
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/1
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface GigabitEthernet0/2
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
Office_Router(config)#interface Serial0/3/1
Office_Router(config-if)#ipv6 enable
Office_Router(config-if)#ipv6 ospf 10 area 0
Office_Router(config-if)#exit
Office_Router(config)#
00:04:15: %OSPFv3-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/3/1 from LOADING to FULL,
Loading Done
Copy
Paste
Top

Classroom

Classroom_Router(config)#ipv6 router ospf 10

%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually

Classroom_Router(config-rtr)#router-id 4.4.4.4

Classroom_Router(config-rtr)#exit

Classroom_Router(config)#

Classroom_Router(config)#interface GigabitEthernet0/0

Classroom_Router(config-if)#ipv6 ospf 10 area 0

Classroom_Router(config-if)#exit

Classroom_Router(config)#

Classroom_Router(config)#interface Serial0/3/0

Classroom_Router(config-if)#ipv6 enable

Classroom_Router(config-if)#ipv6 ospf 10 area 0

Classroom_Router(config-if)#exit

Classroom_Router(config)#

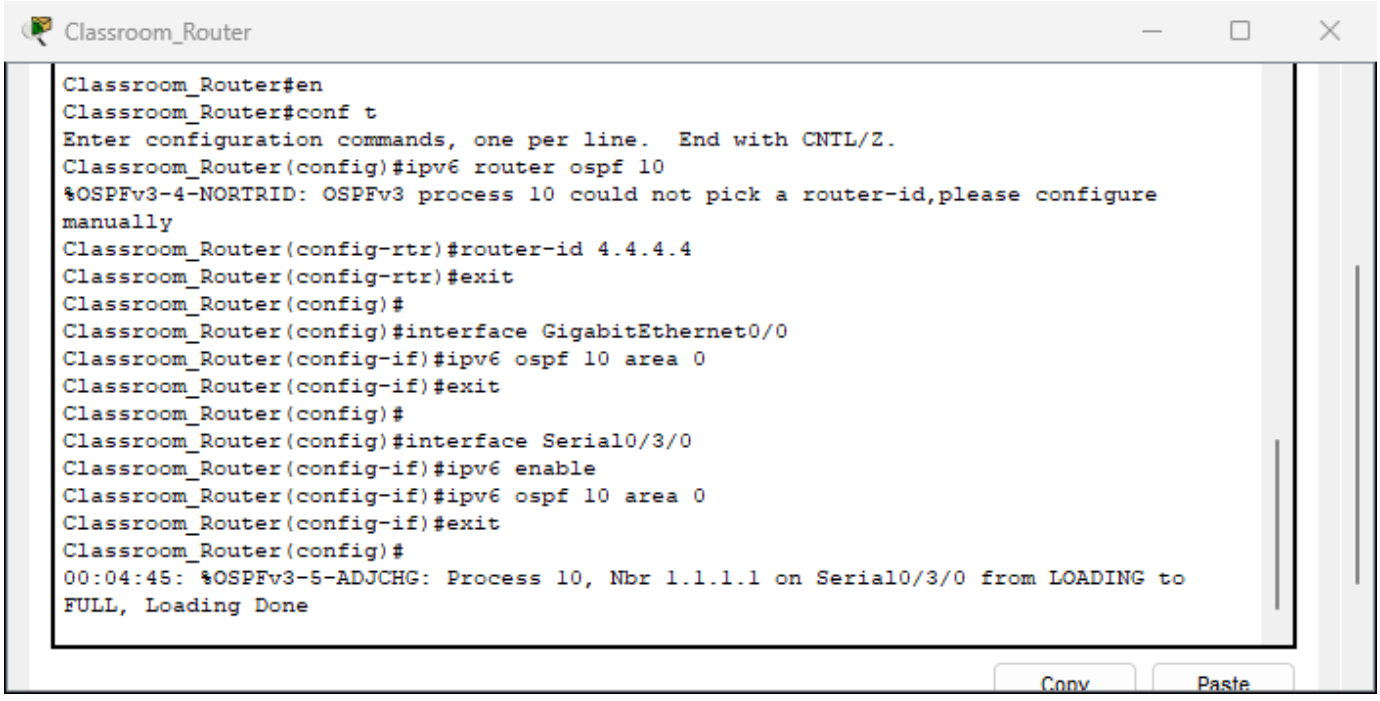
00:04:45: %OSPFv3-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/3/0 from LOADING to FULL, Loading Done

Classroom_Router#copy running-config startup-config

Destination filename [startup-config]?

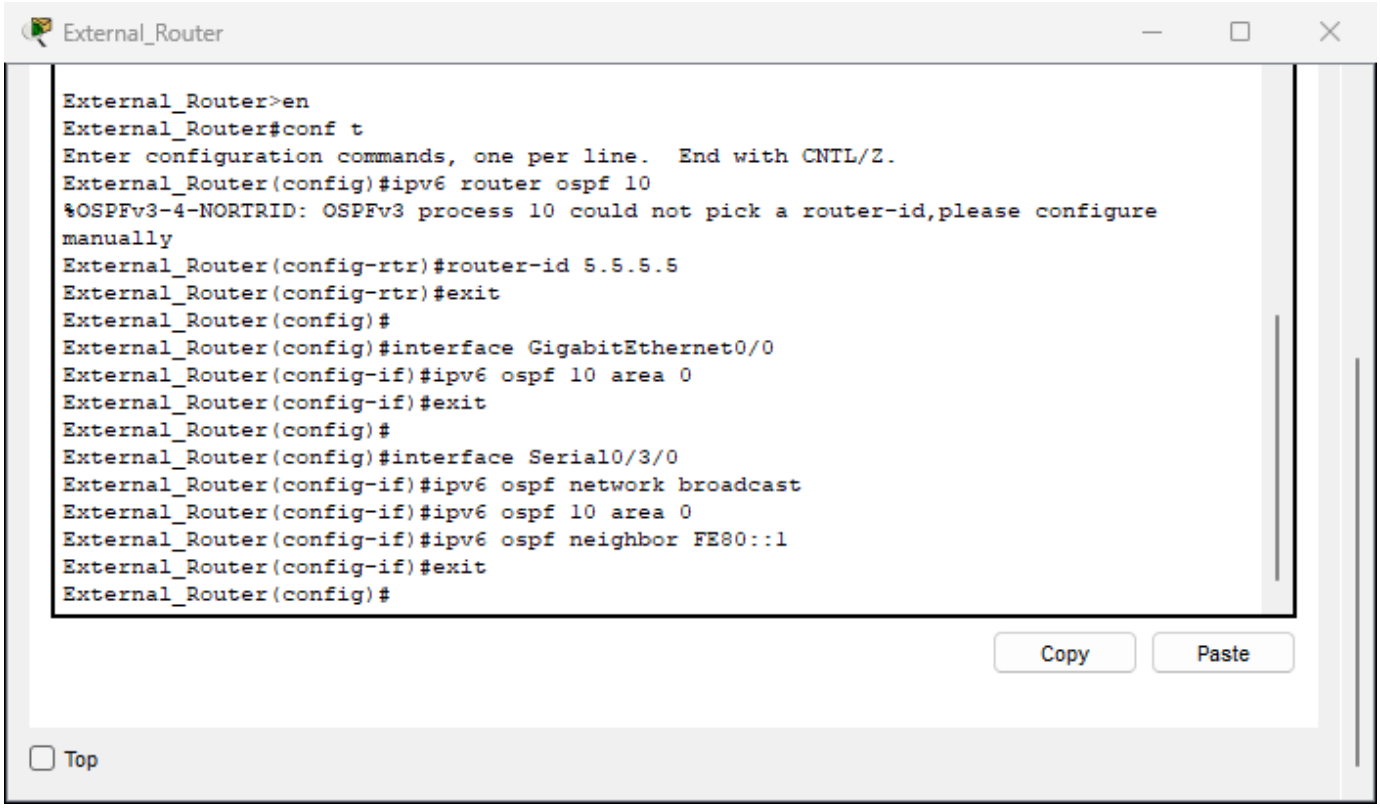
Building configuration...

[OK]

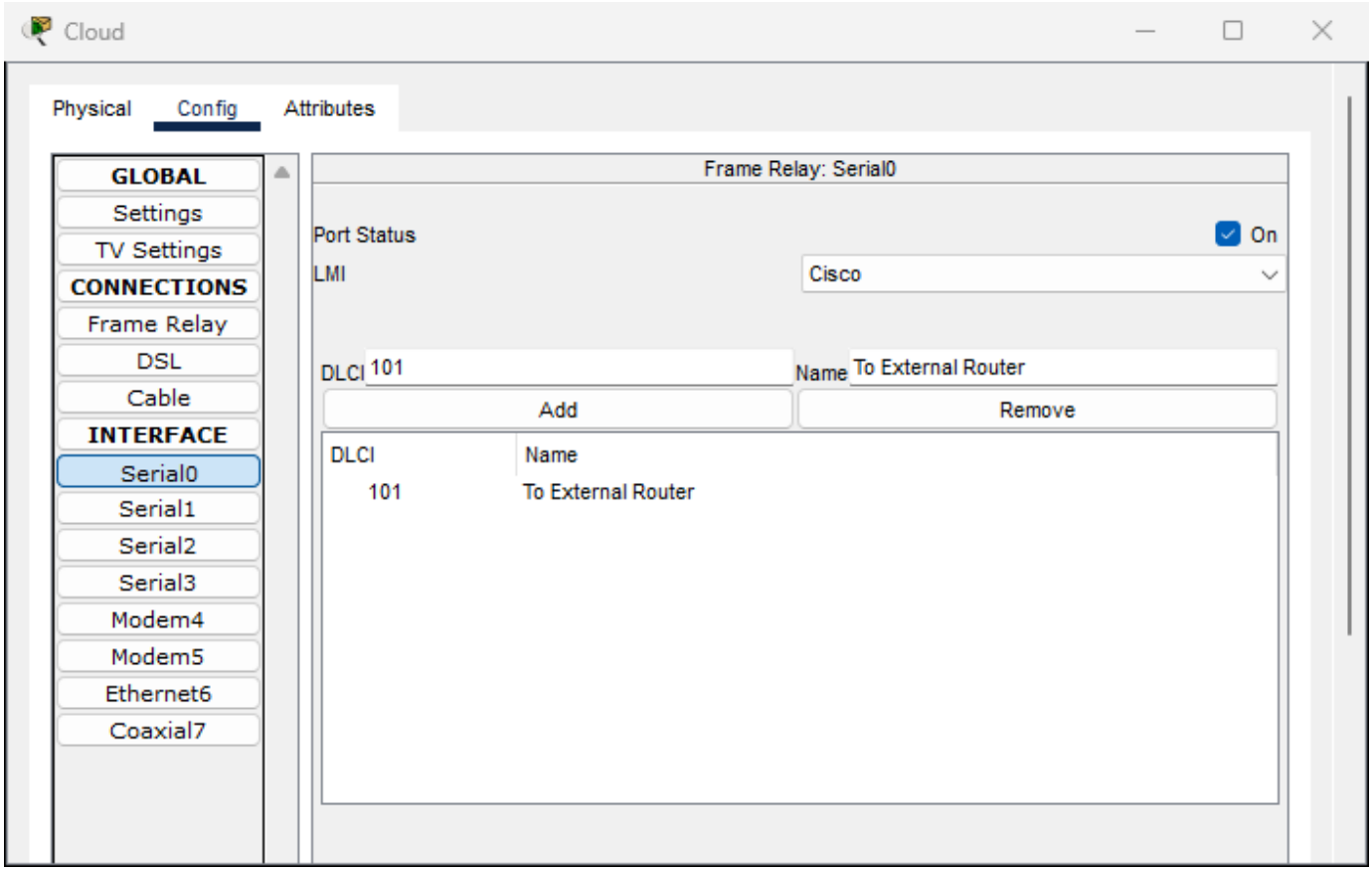


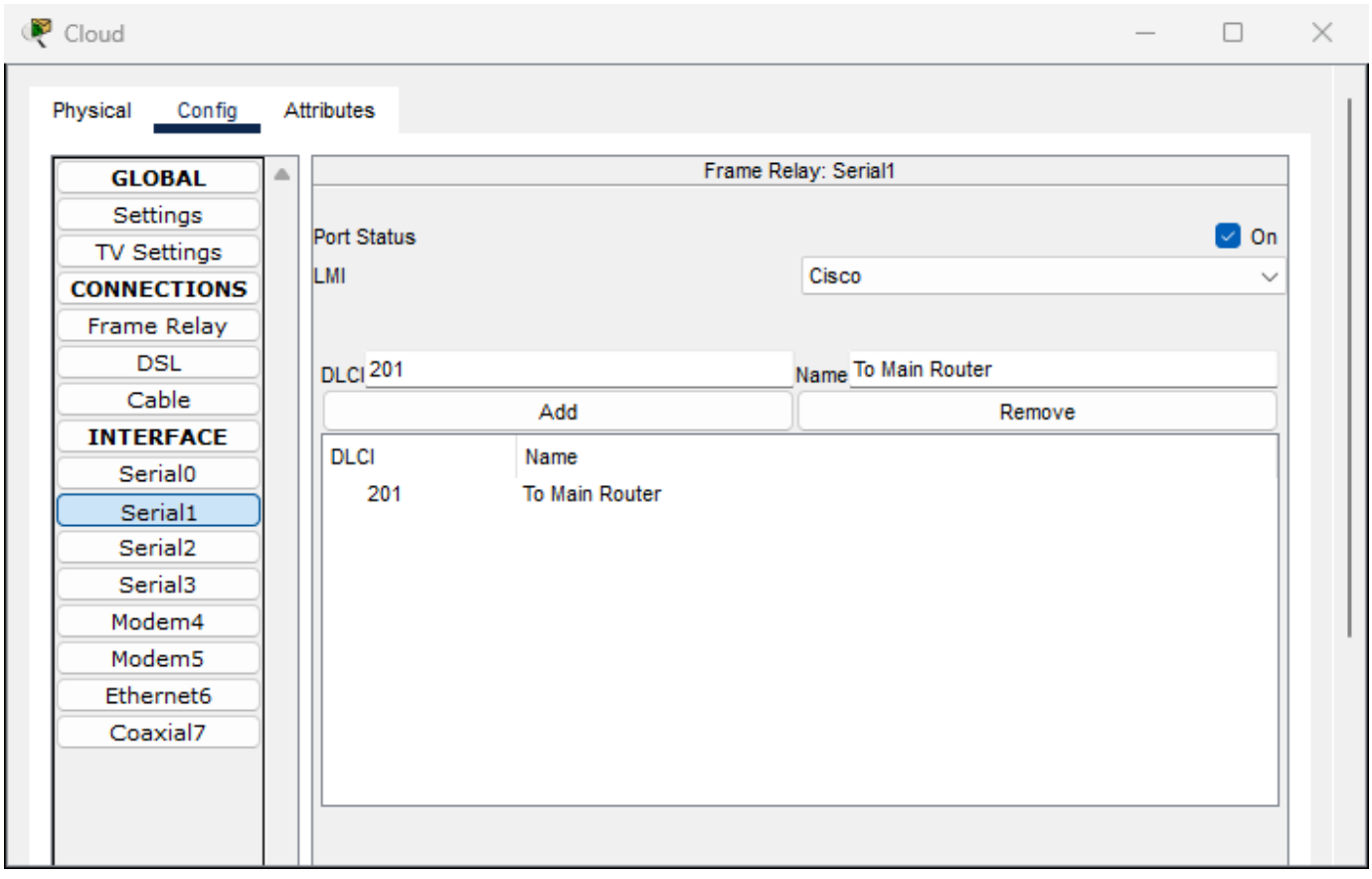
External

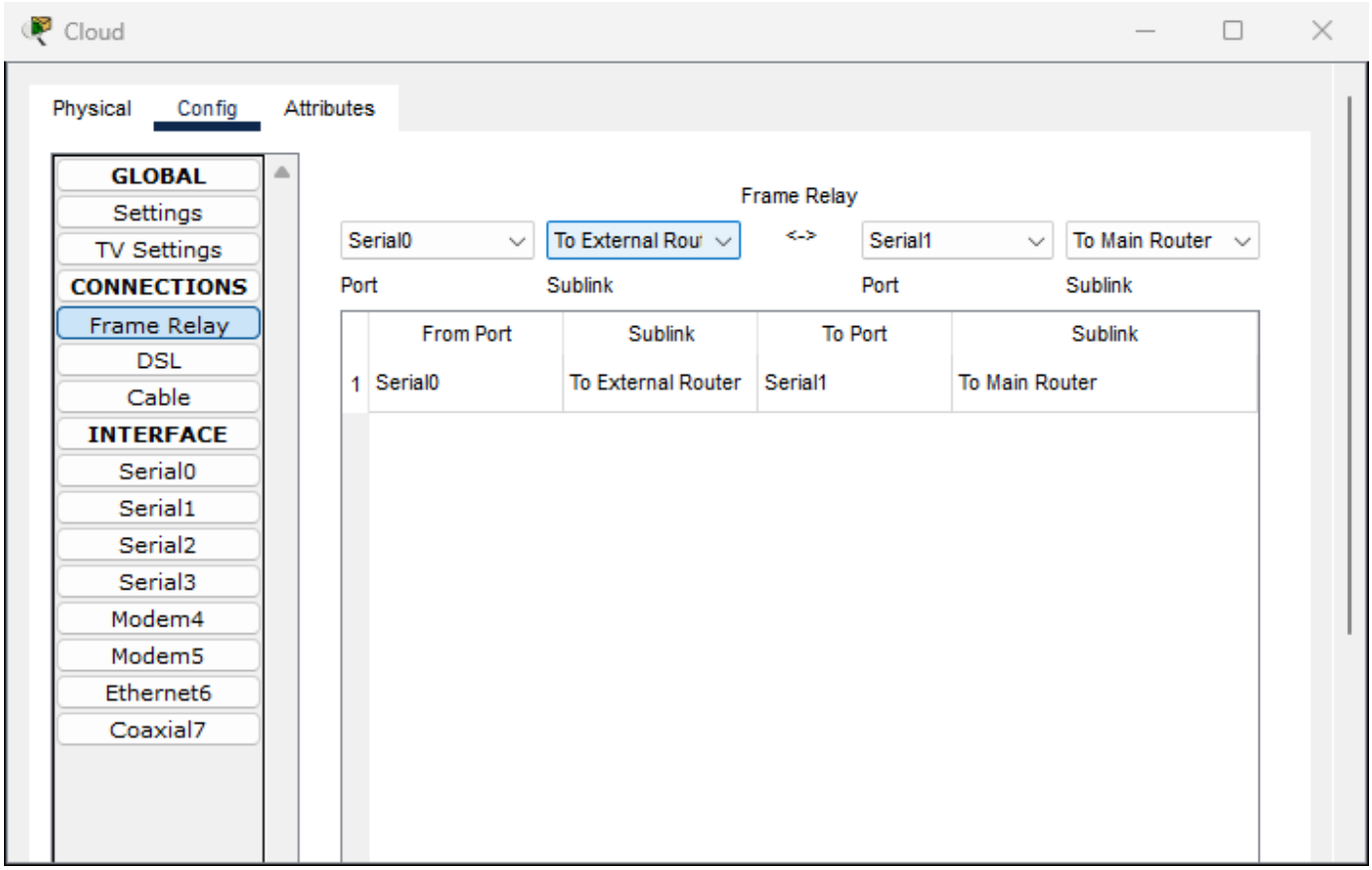
External_Router(config)#ipv6 router ospf 10
%OSPFv3-4-NORTRID: OSPFv3 process 10 could not pick a router-id,please configure manually
External_Router(config-rtr)#router-id 5.5.5.5
External_Router(config-rtr)#exit
External_Router(config)#
External_Router(config)#interface GigabitEthernet0/0
External_Router(config-if)#ipv6 ospf 10 area 0
External_Router(config-if)#exit
External_Router(config)#
External_Router(config)#interface Serial0/3/0
External_Router(config-if)#ipv6 ospf network broadcast
External_Router(config-if)#ipv6 ospf 10 area 0
External_Router(config-if)#ipv6 ospf neighbor FE80::1
External_Router(config-if)#exit
External_Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]



Frame Relay Configuration







Frame Relay			
From	Sublink	To Port	Sublink
Serial0	To external router	Serial1	To main router

External router

External_Router(config)#interface Serial0/3/0

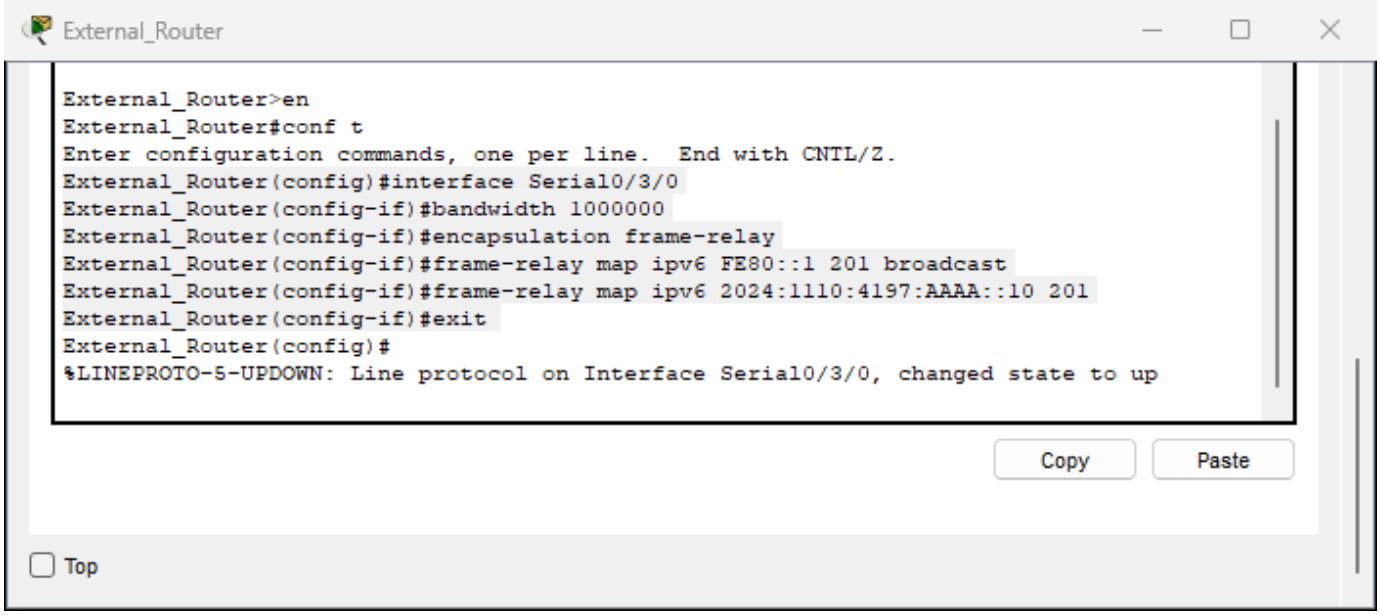
External_Router(config-if)#bandwidth 1000000

External_Router(config-if)#encapsulation frame-relay

External_Router(config-if)#frame-relay map ipv6 FE80::1 201 broadcast

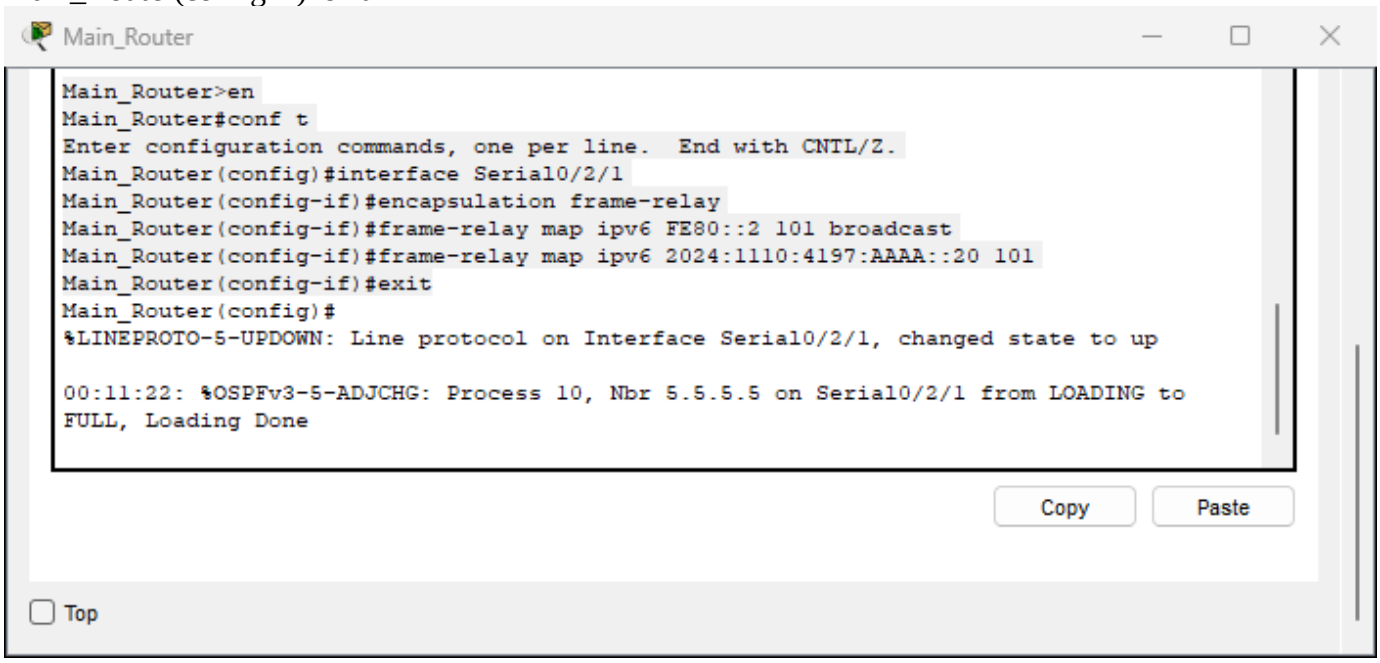
External_Router(config-if)#frame-relay map ipv6 2024:1110:4197:AAAA::10 201

External_Router(config-if)#exit



Main router

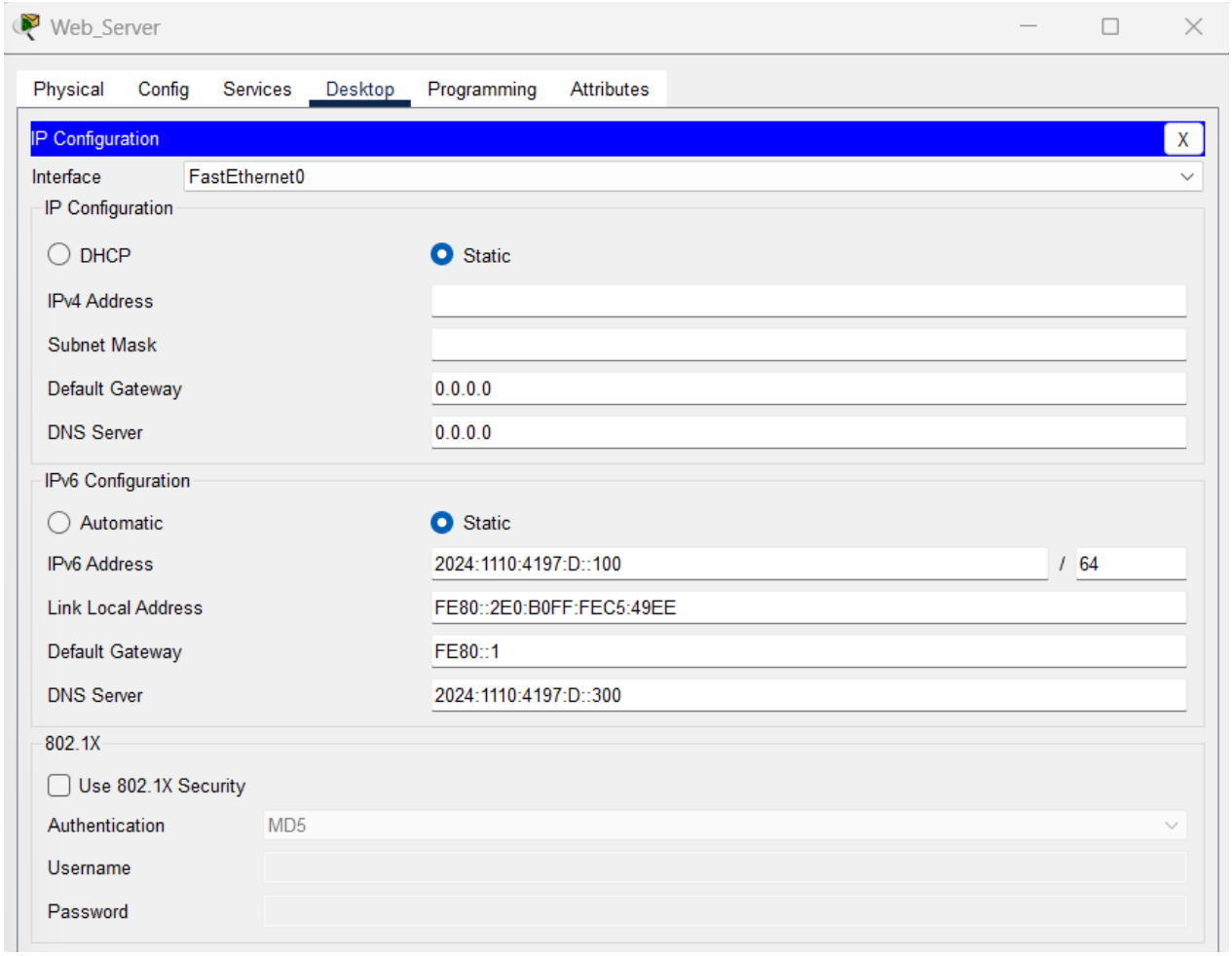
```
Main_Router>en
Main_Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Main_Router(config)#interface Serial0/2/1
Main_Router(config-if)#encapsulation frame-relay
Main_Router(config-if)#frame-relay map ipv6 FE80::2 101 broadcast
Main_Router(config-if)#frame-relay map ipv6 2024:1110:4197:AAAA::20 101
Main_Router(config-if)#exit
```



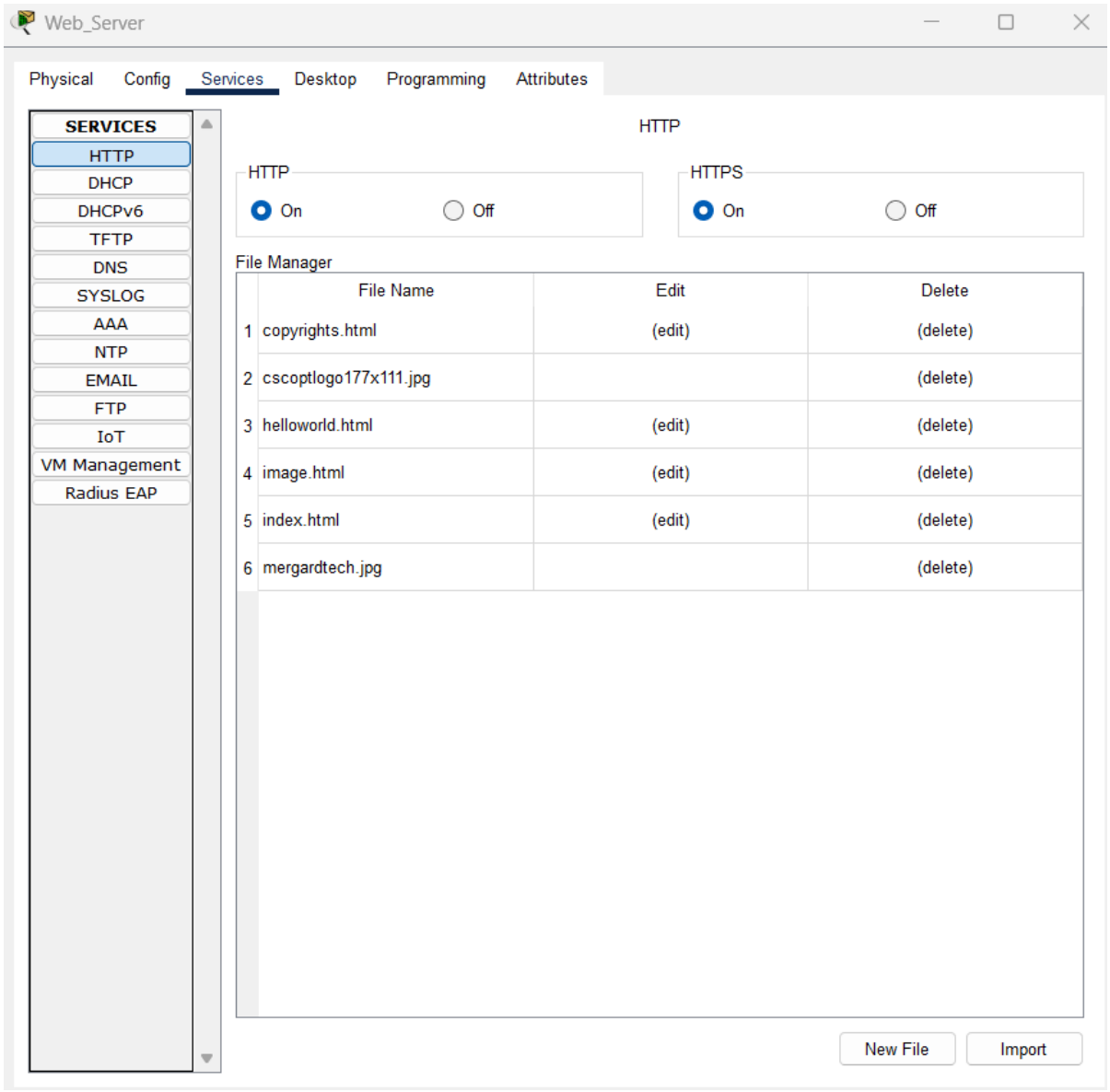
Access Control List Configuration

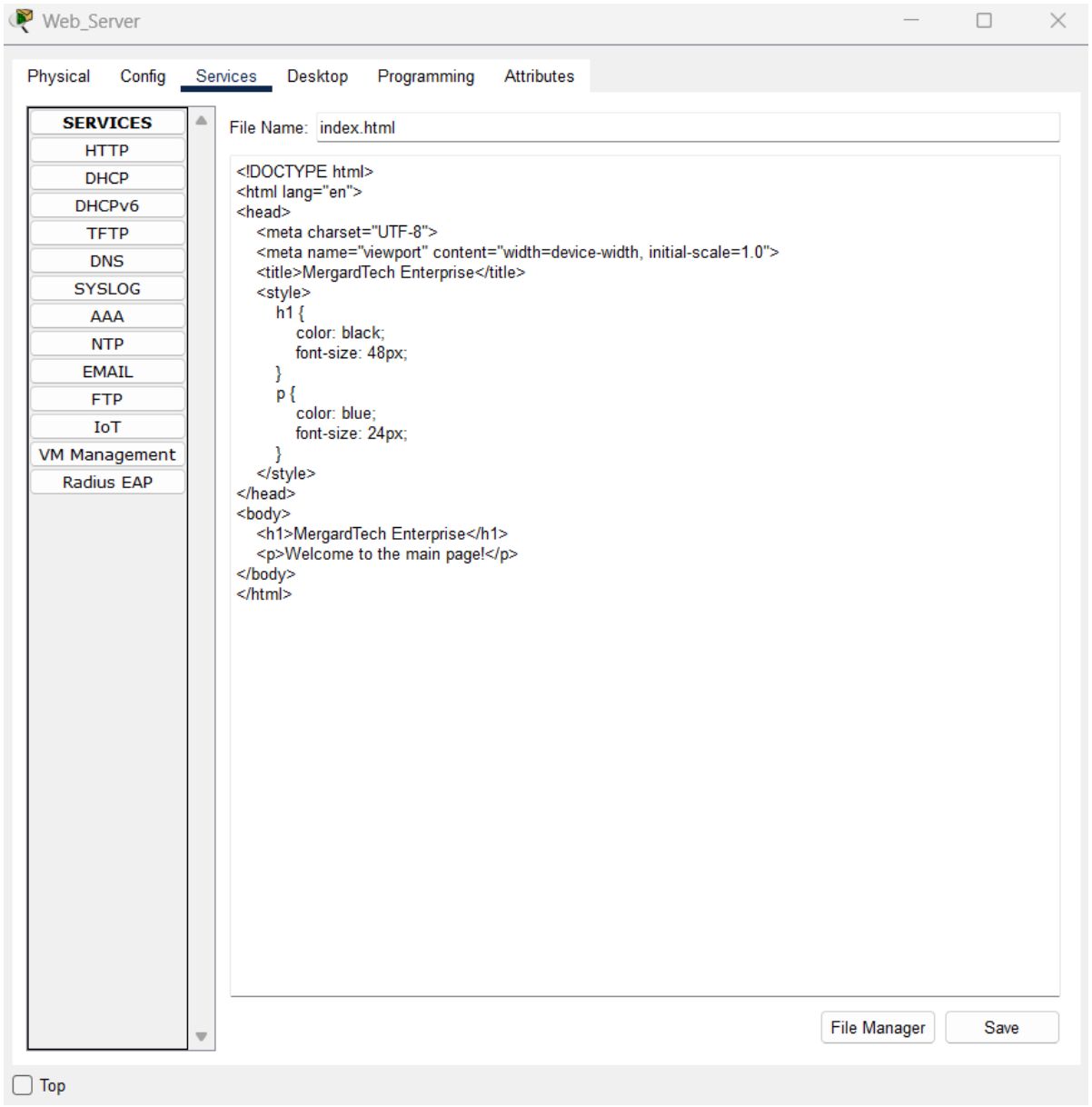
Web server configuration

Internal Web server



Web_server	
IPv6 Address	2024:1110:4197:D::100/64
Default Gateway	FE80::1
DNS Server	2024:1110:4197:D::300/64


Web_Server
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
HTTP
HTTP
On
Off
HTTPS
On
Off
File Manager
File Name
Edit
Delete
1 copyrights.html (edit) (delete)
2 cscoptlogo177x111.jpg (delete)
3 helloworld.html (edit) (delete)
4 image.html (edit) (delete)
5 index.html (edit) (delete)
6 mergardtech.jpg (delete)
New File
Import

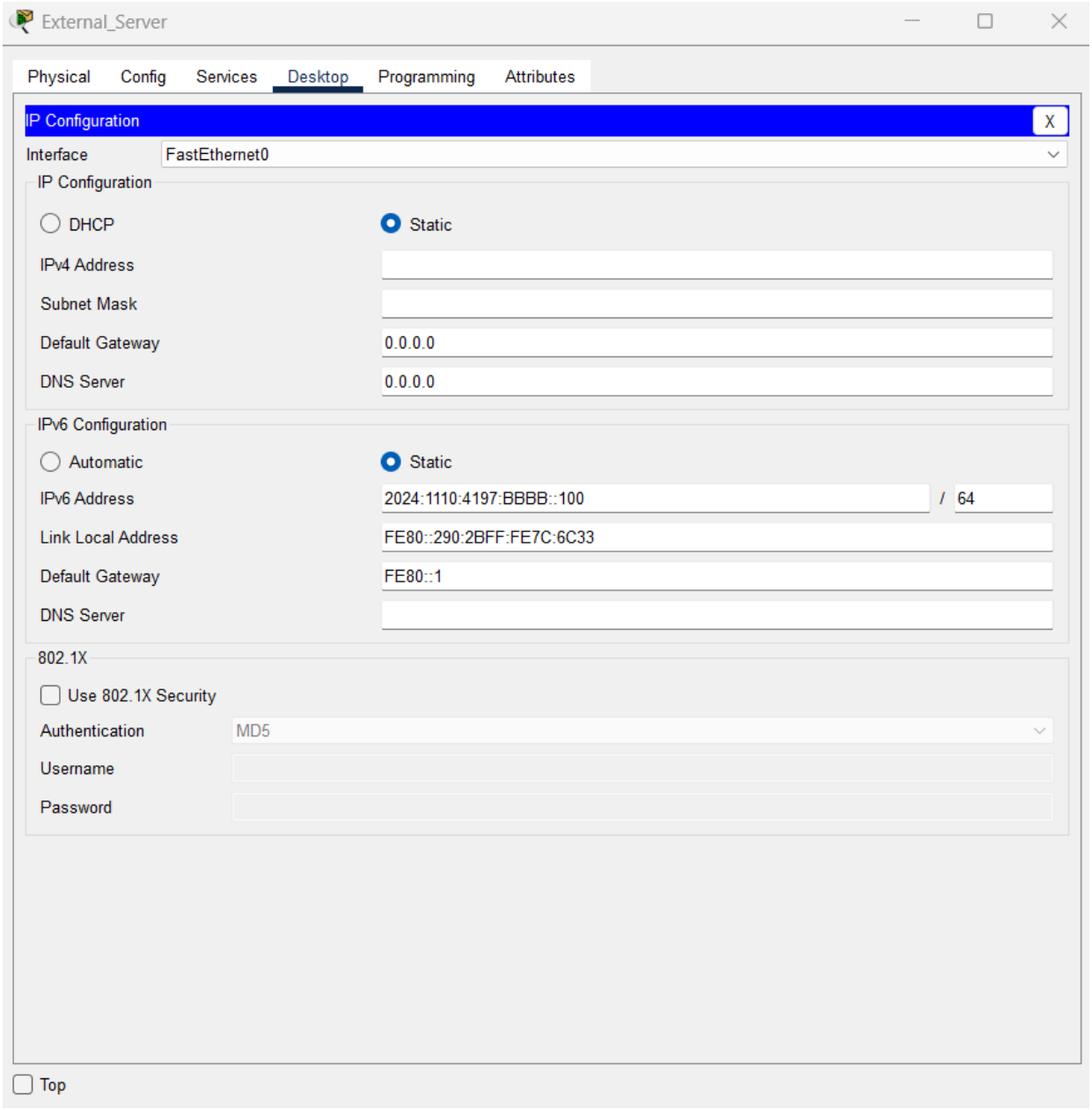


HTTP/HTTPS services	
Status	On

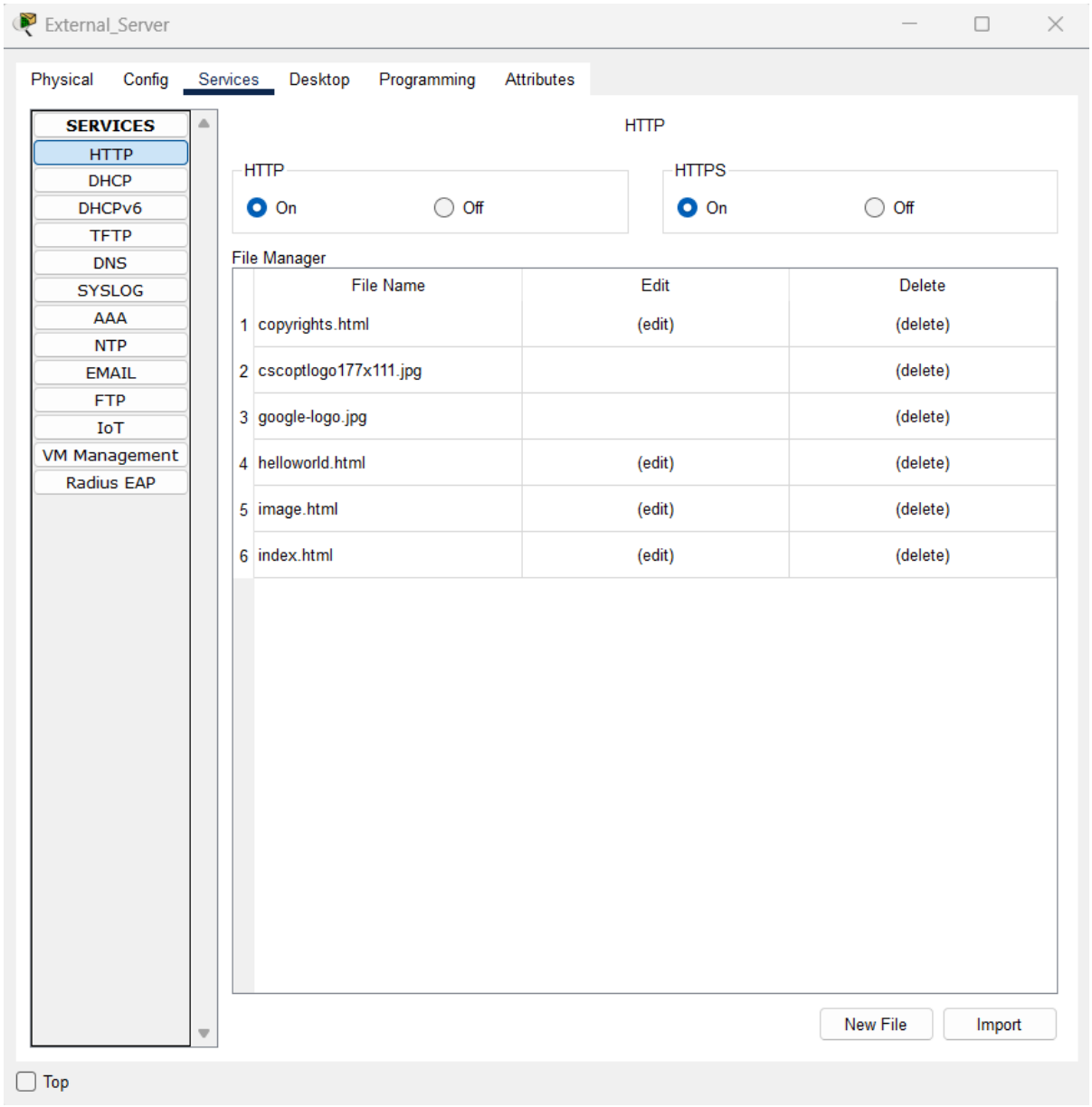
index.html	<!DOCTYPE html>
	<html lang="en">
	<head>
	<meta charset="UTF-8">
	<meta name="viewport" content="width=device-width, initial-scale=1.0">
	<title>MergardTech Enterprise</title>
	<style>
	h1 {
	color: black;
	font-size: 48px;
	}

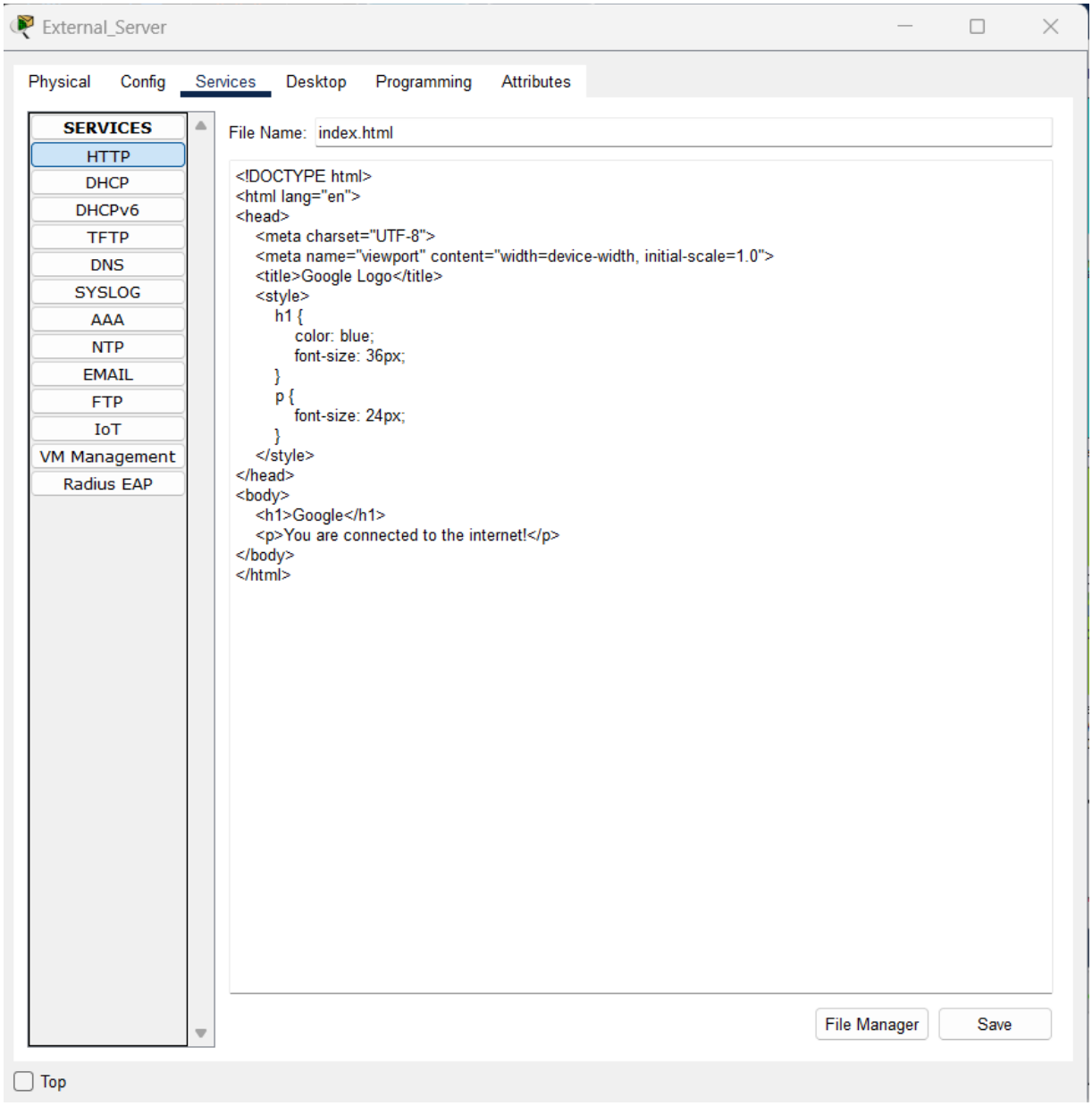
	p {
	color: blue;
	font-size: 24px;
	}
	</style>
	</head>
	<body>
	 MergardTech Enterprise
	 Welcome to the main page!
	</body>
	</html>

External server



External_server	
IPv6 Address	2024:1110:4197:BBBB::100/64
Default Gateway	FE80::1

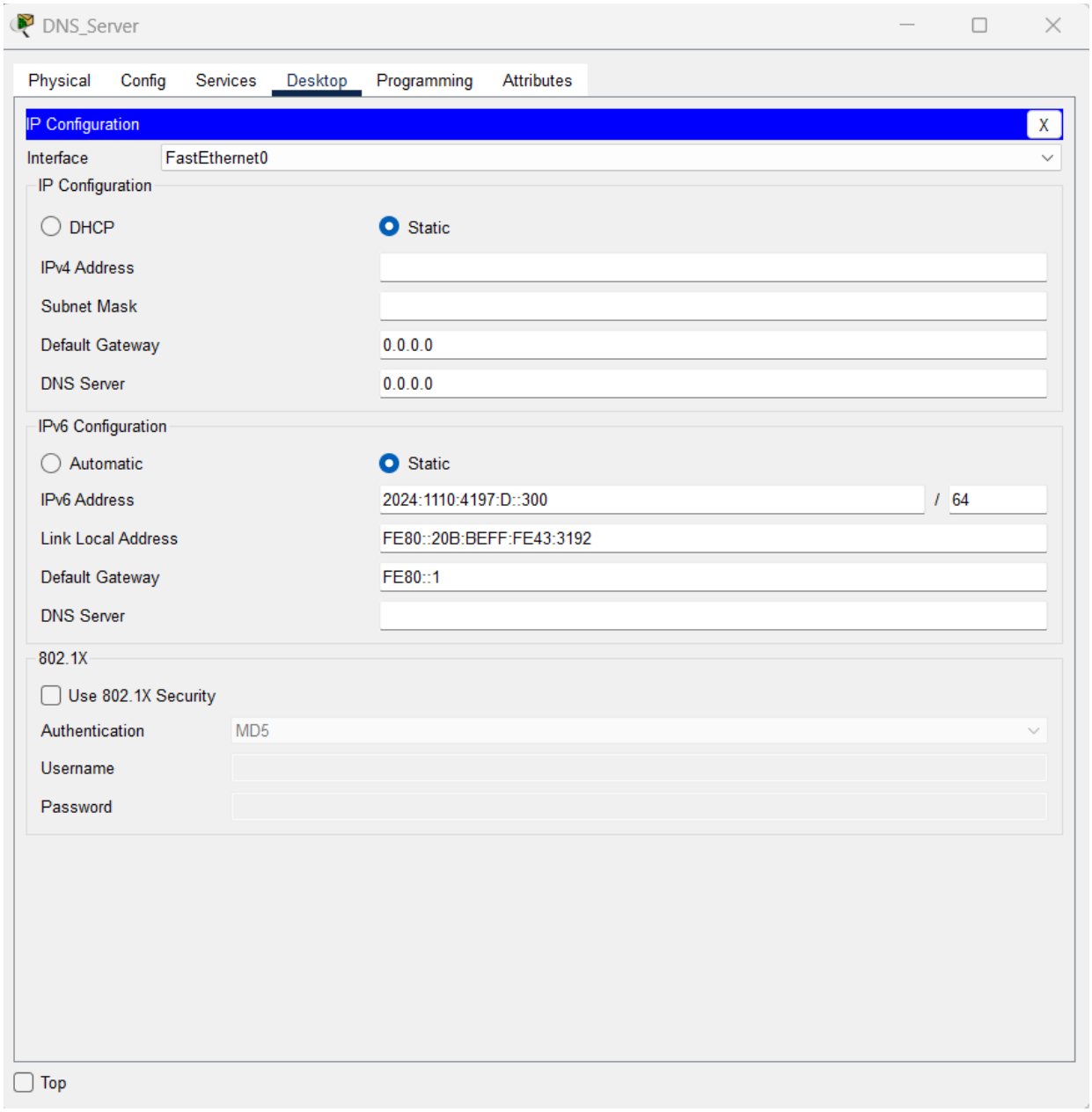

External_Server
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
HTTP
HTTP
On
Off
HTTPS
On
Off
File Manager
File Name
Edit
Delete
1 copyrights.html (edit) (delete)
2 cscoptlogo177x111.jpg (delete)
3 google-logo.jpg (delete)
4 helloworld.html (edit) (delete)
5 image.html (edit) (delete)
6 index.html (edit) (delete)
New File
Import
Top


External_Server
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
File Name: index.html
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Google Logo</title>
<style>
h1 {
color: blue;
font-size: 36px;
}
p {
font-size: 24px;
}
</style>
</head>
<body>
<h1>Google</h1>
You are connected to the internet!
</body>
</html>
File Manager
Save
Top

HTTP/HTTPS services	
Status	On

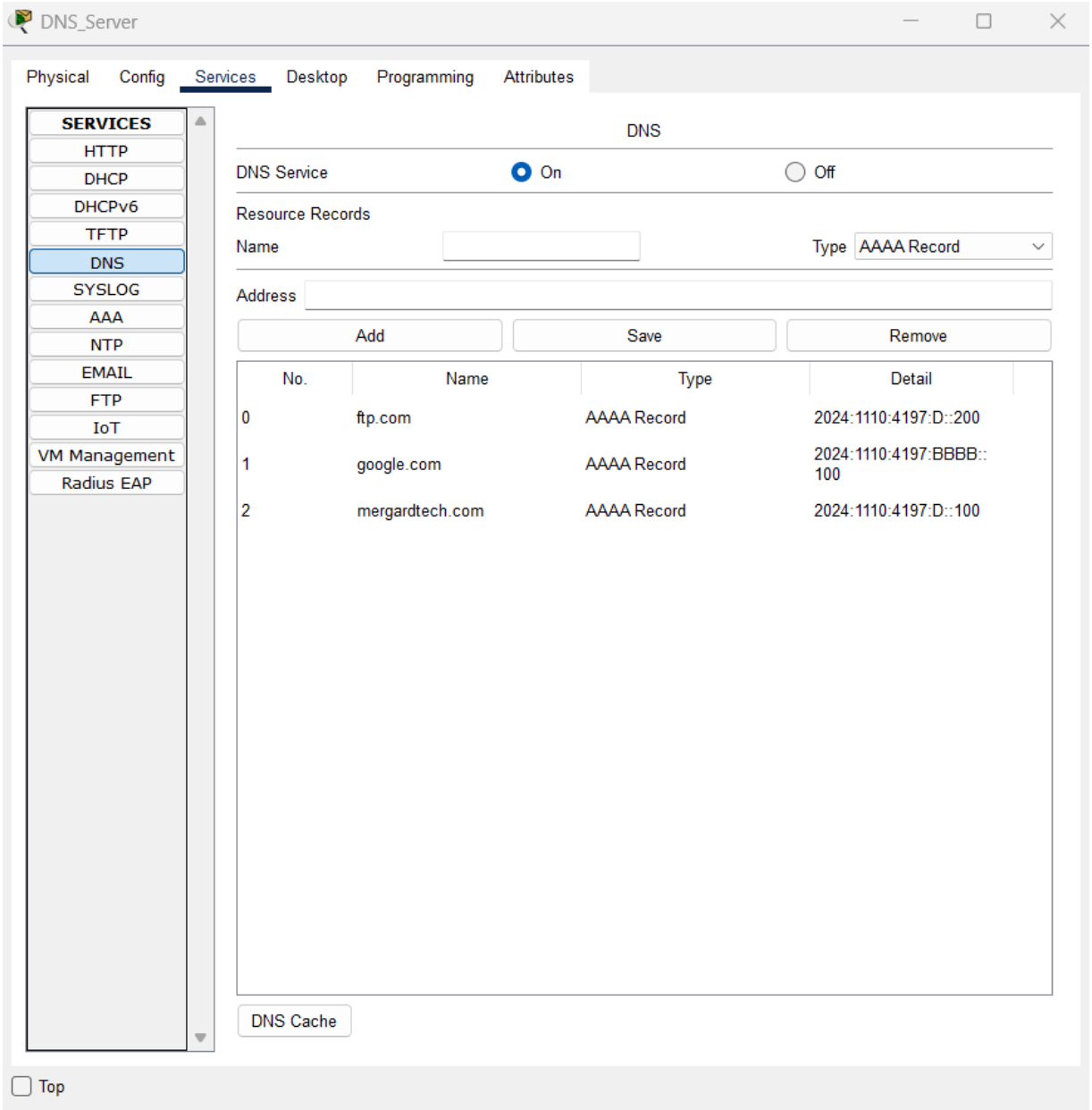
index.html	<!DOCTYPE html>
	<html lang="en">
	<head>
	<meta charset="UTF-8">
	<meta name="viewport" content="width=device-width, initial-scale=1.0">
	<title>Google Logo</title>
	<style>
	h1 {
	color: blue;
	font-size: 36px;
	}
	p {
	font-size: 24px;
	}
	</style>
	</head>
	<body>
	 Google
	 You are connected to the internet!
	</body>
	</html>

DNS server configuration



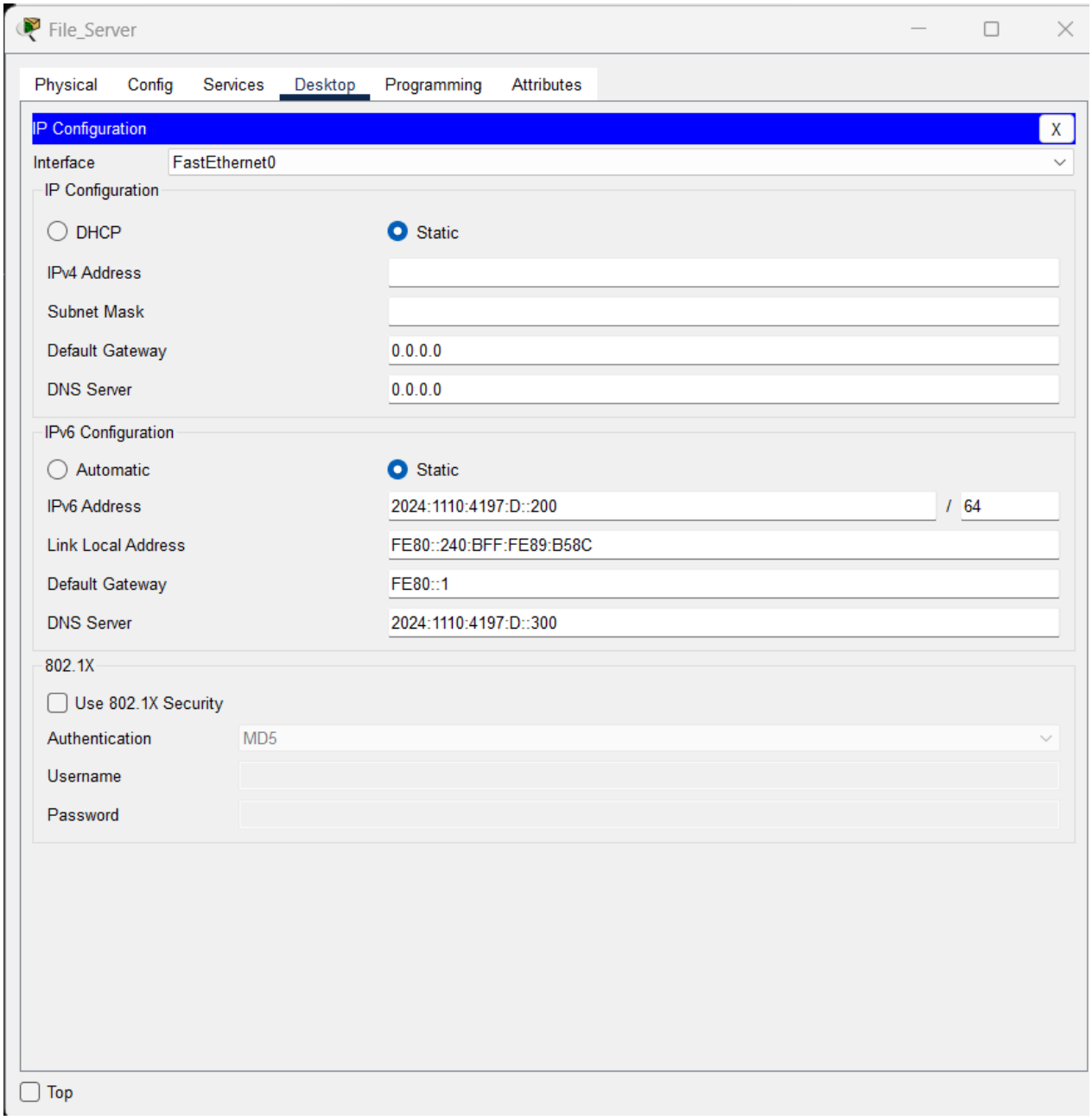
DNS server	
IPv6 Address	2024:1110:4197:D::300/64

Default Gateway	FE80::1

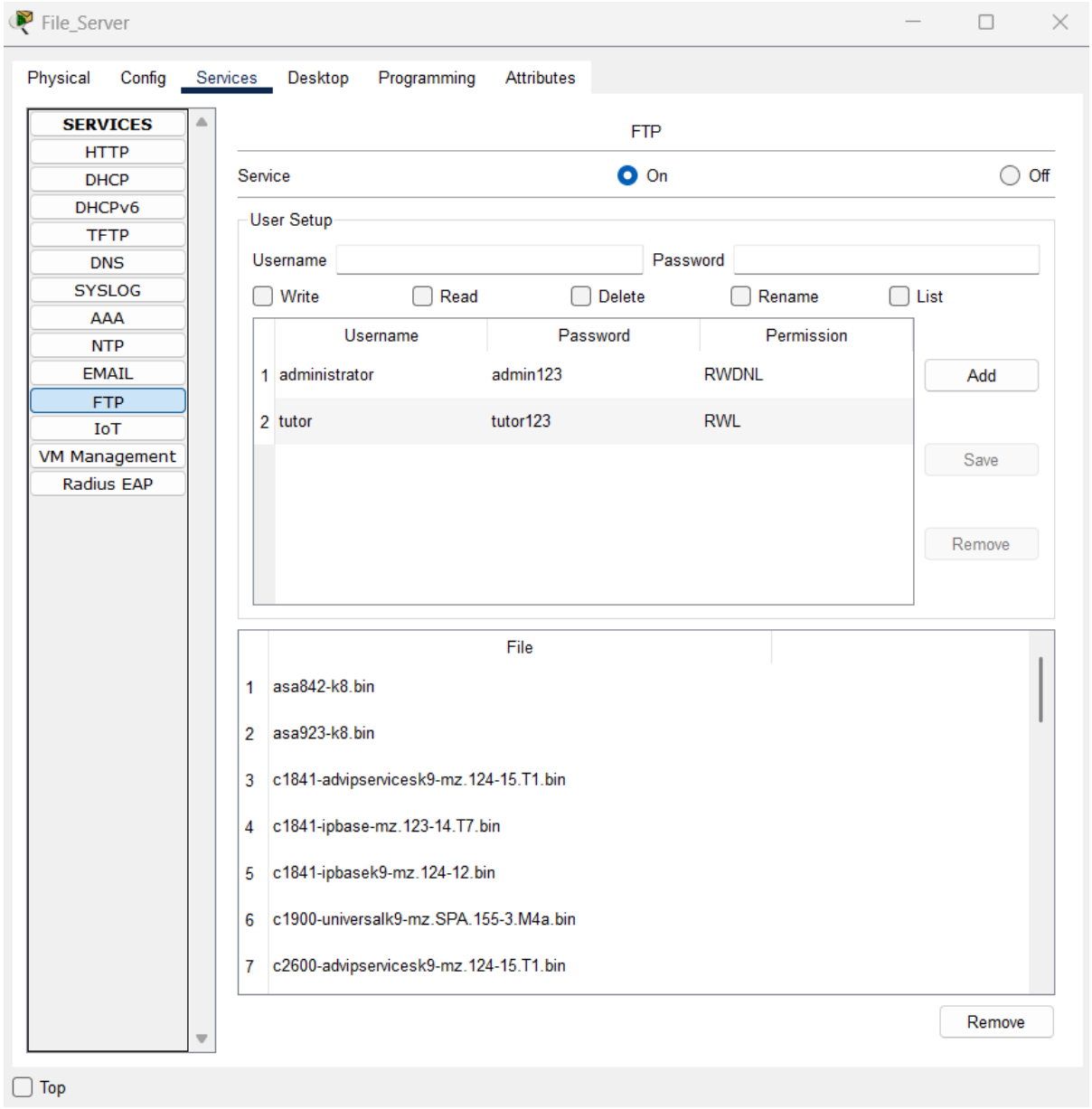


DNS server			
No	Domain Name	Type	IPv6 address
0	ftp.com	AAAA Record	2024:1110:4197:D::200/64
1	google.com	AAAA Record	2024:1110:4197:BBBB::100/64
2	mergardtech.com	AAAA Record	2024:1110:4197:D::100/64

FTP server configuration



FTP_server	
IPv6 Address	2024:1110:4197:D::200/64
Default Gateway	FE80::1
DNS Server	2024:1110:4197:D::300/64



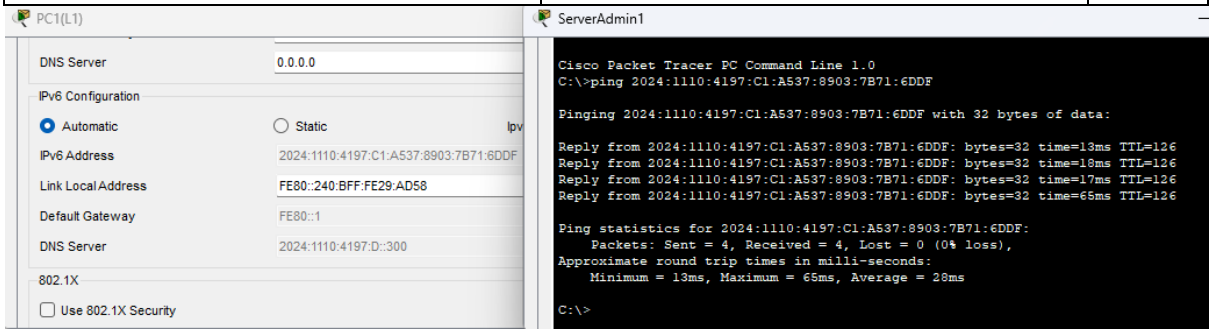
FTP services		
Username	Password	Permission
administrator	admin123	• Read • Write • Delete • Rename • List
tutor	tutor123	• Read • Write • List

Verify Connection

Ping (ICMP)

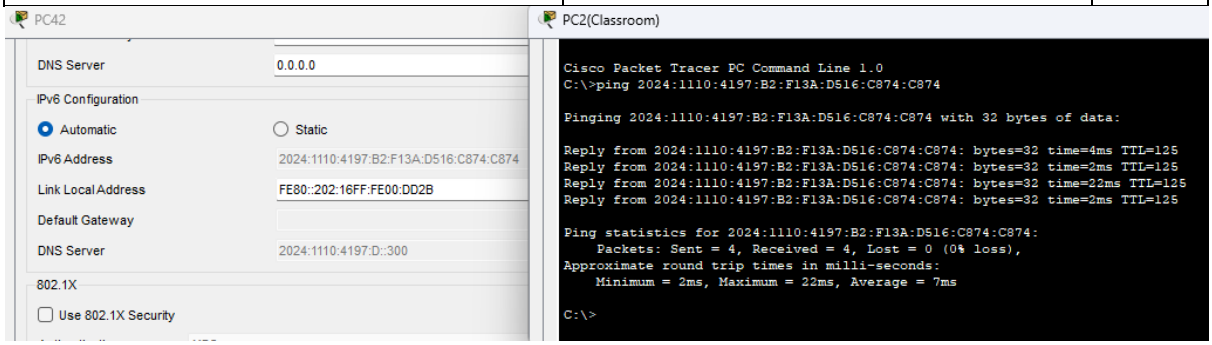
Server Room

Source	Destination	Result
ServerAdmin1 2024:1110:4197:D:21C6:5A2:E97E:DBDB	Lab1 PC1(L1) 2024:1110:4197:C1:A537:8903:7B71:6DDF	Success



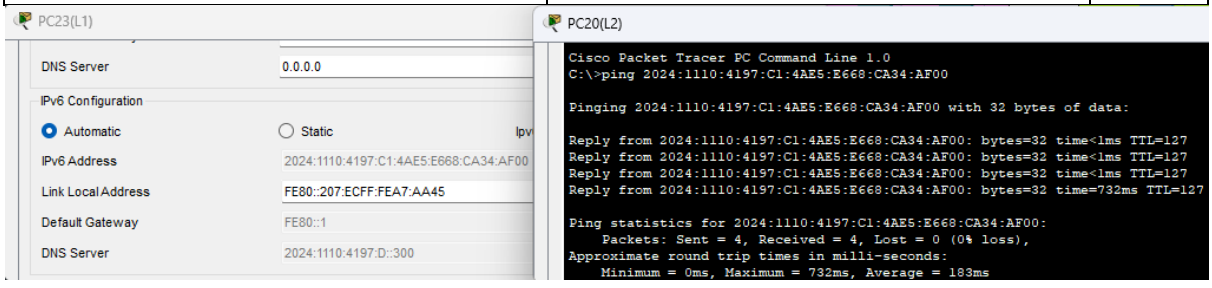
Classroom

Source	Destination	Result
PC2(Classroom) 2024:1110:4197:A1:E1F3:C5CF:A9AB:A9AB	Office PC42 2024:1110:4197:B2:F13A:D516:C874:C874	Success



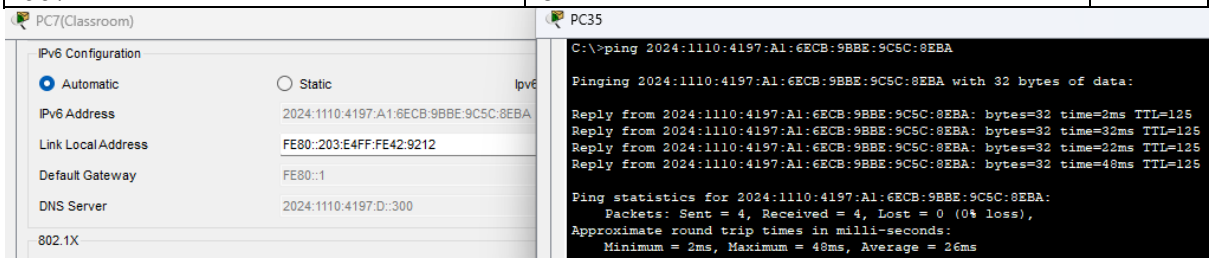
Lab 2

Source	Destination	Result
Lab 2 PC20(L2) 2024:1110:4197:C2:28A8:E05F:C42B:C42B	Lab1 PC23(L1) 2024:1110:4197:C1:4AE5:E668:CA34:AF00	Success



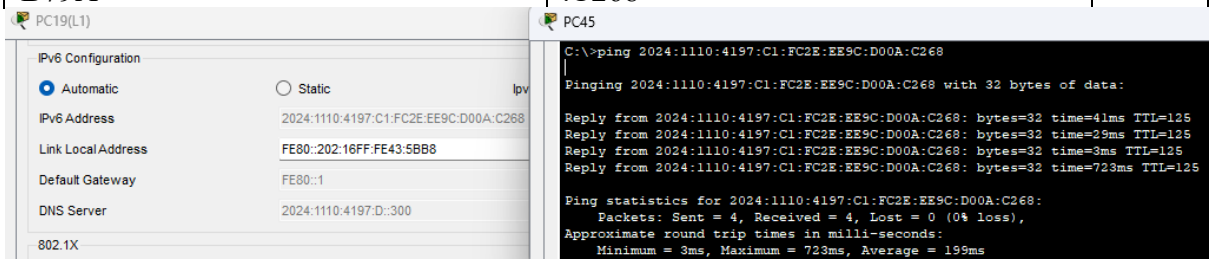
Administration

Source	Destination	Result
PC35 2024:1110:4197:B1:904A:7416:6674:6674	Classroom PC7(Classroom) 2024:1110:4197:A1:6ECB:9BBE:9C5C:8EBA	Success



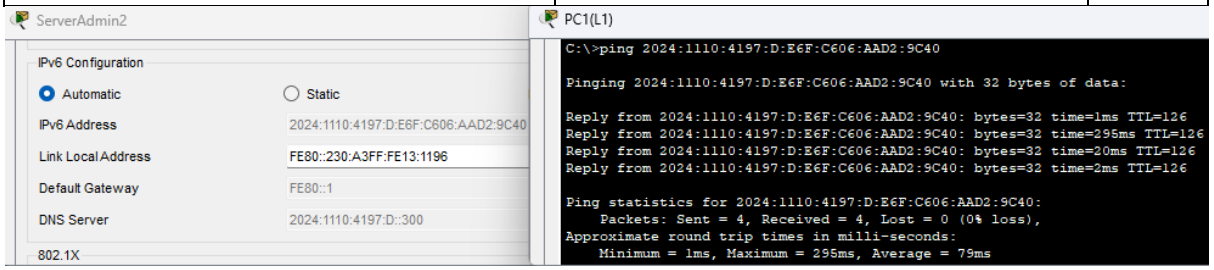
Office

Source	Destination	Result
PC45 2024:1110:4197:B2:E150:C52C:B79A:B79A	Lab1 PC19(L1) 2024:1110:4197:C1:FC2E:EE9C:D00A:C268	Success



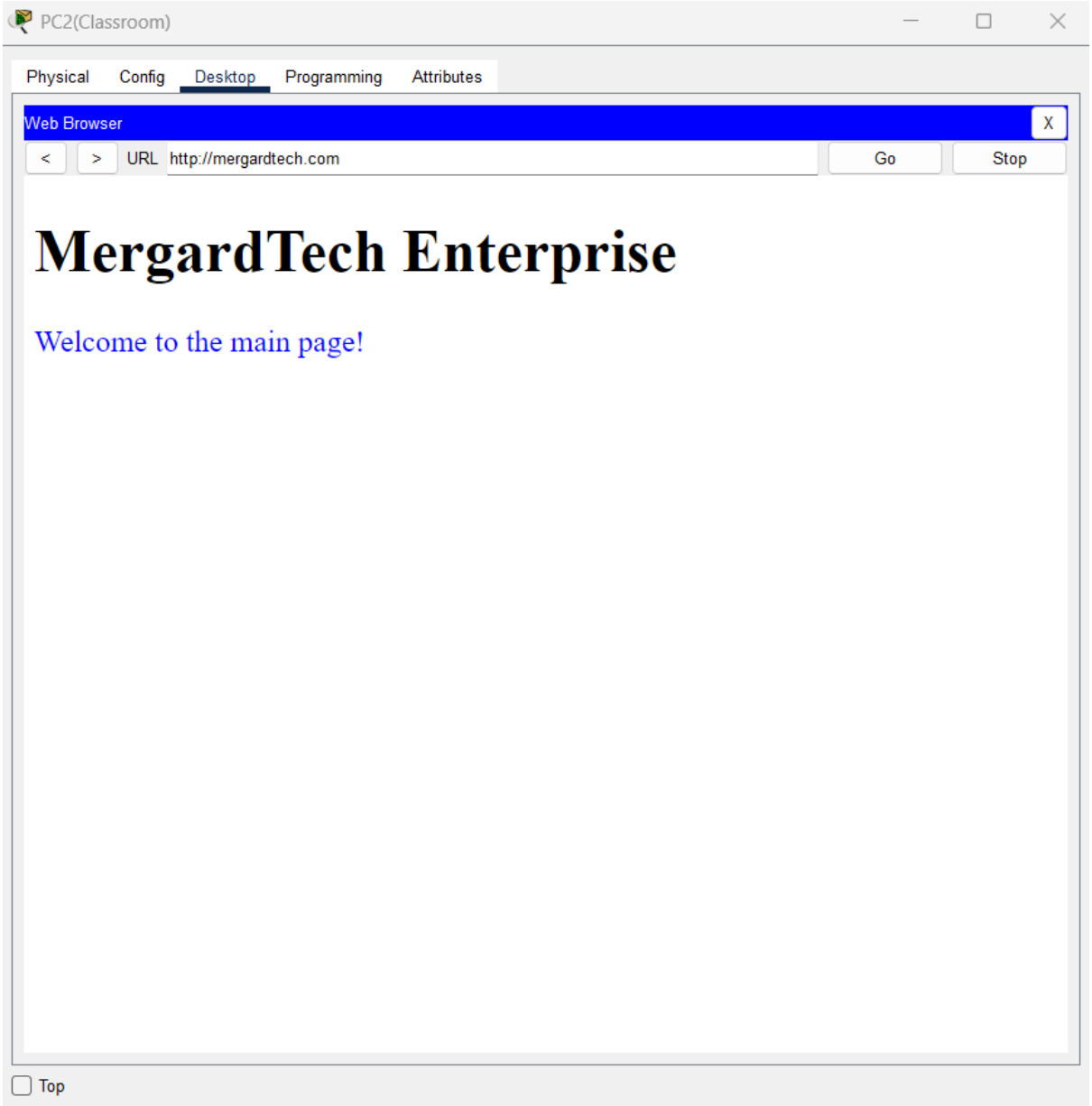
Lab 1

Source	Destination	Result
PC1(L1) 2024:1110:4197:C1:A537:8903:7B71:6DDF	Server Room ServerAdmin2 2024:1110:4197:D:E6F:C606:AAD2:9C40	Success

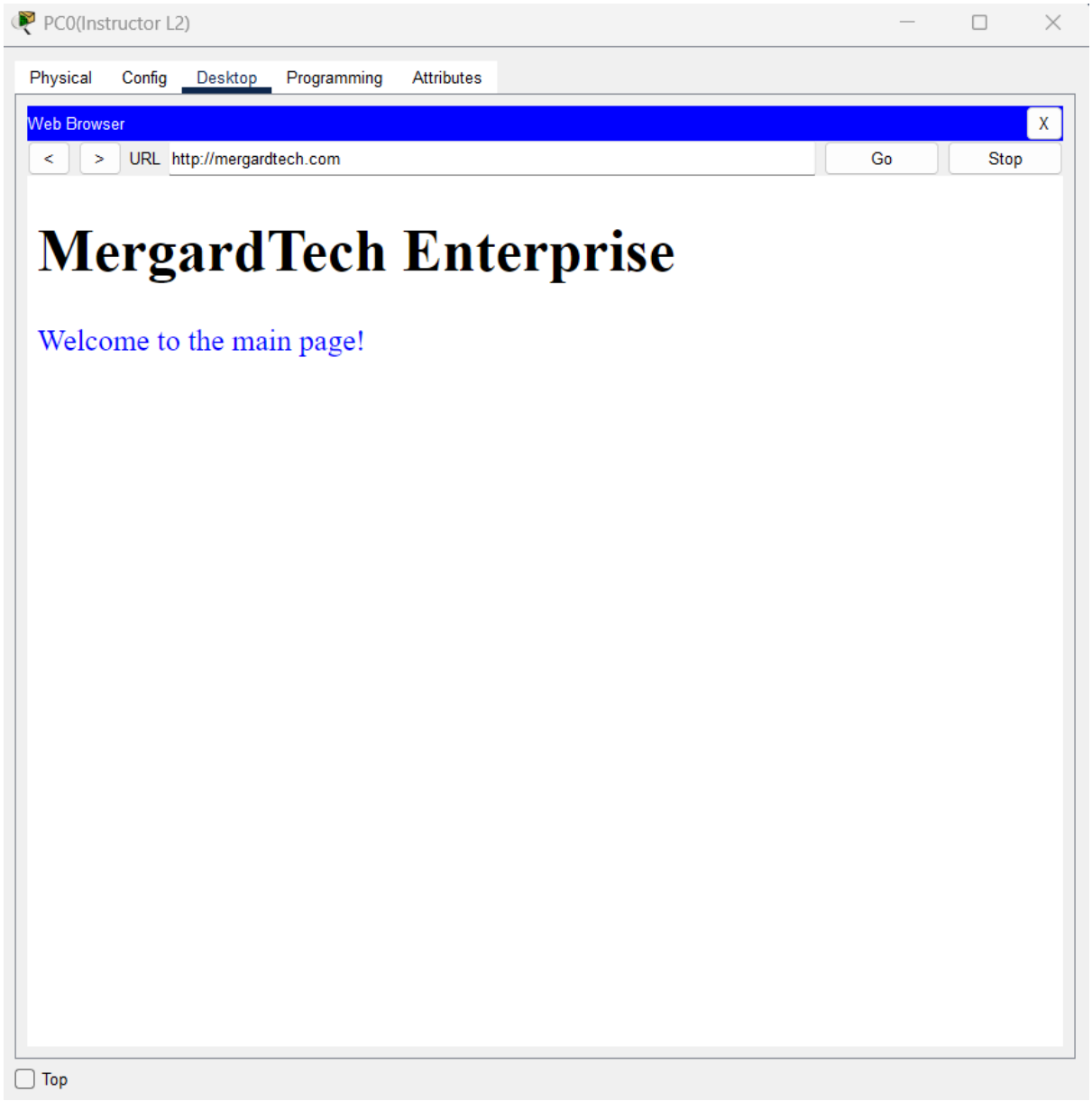


Web Browser

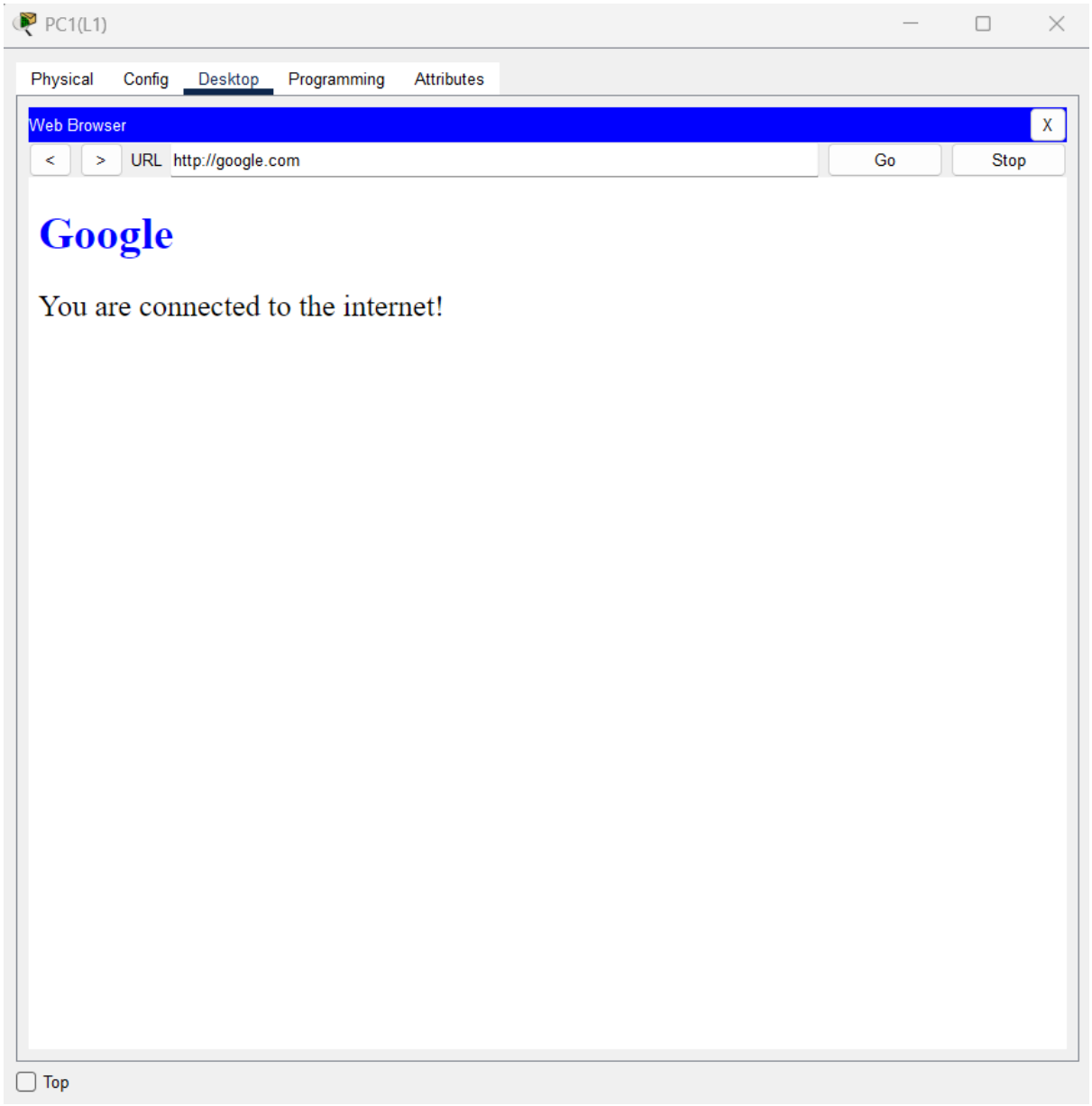
PC2(Classroom) -> Web_Server



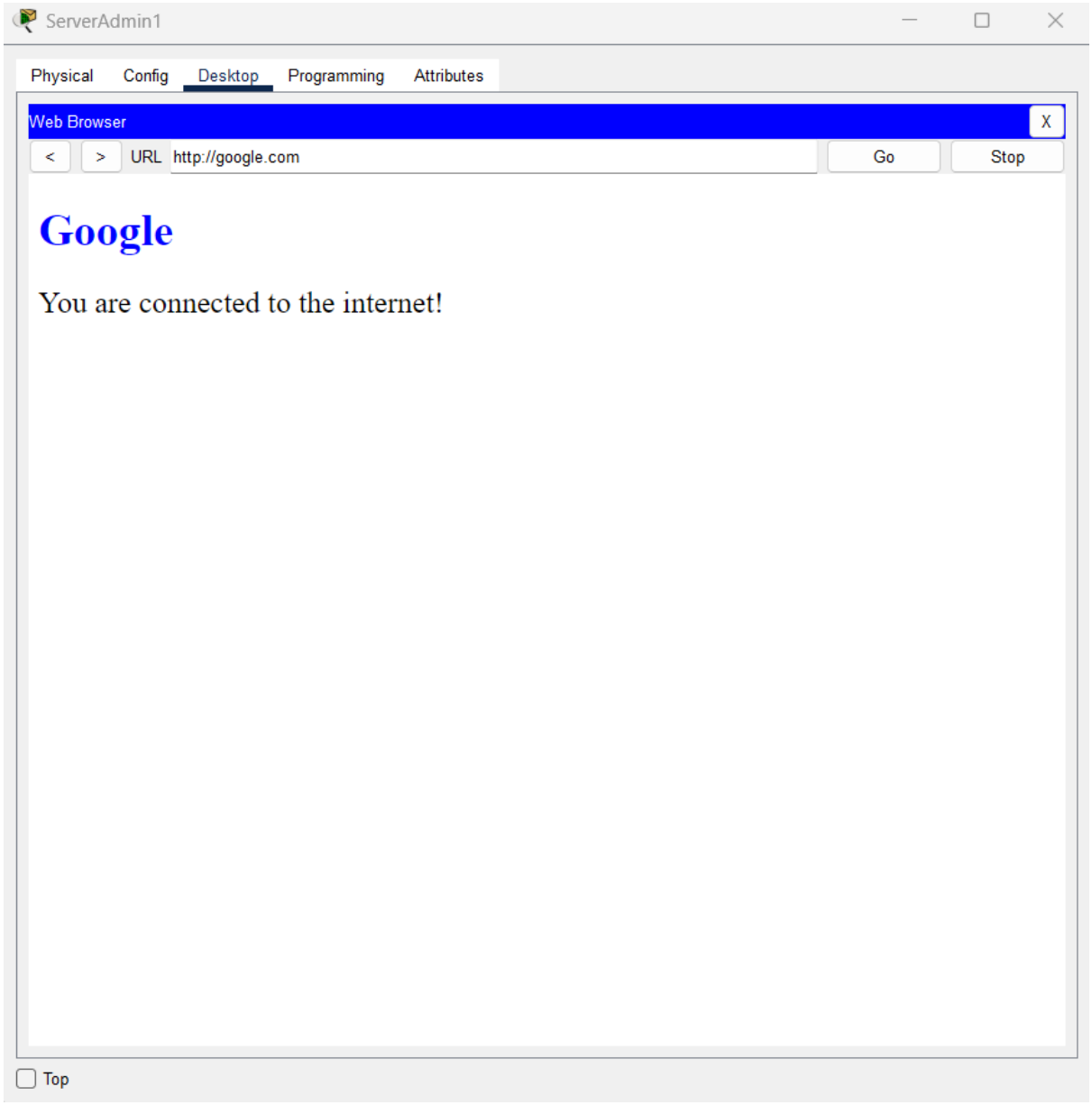
PC0(Instructor L2) -> Web_Server



PC1(L1) -> Internet/External_Server

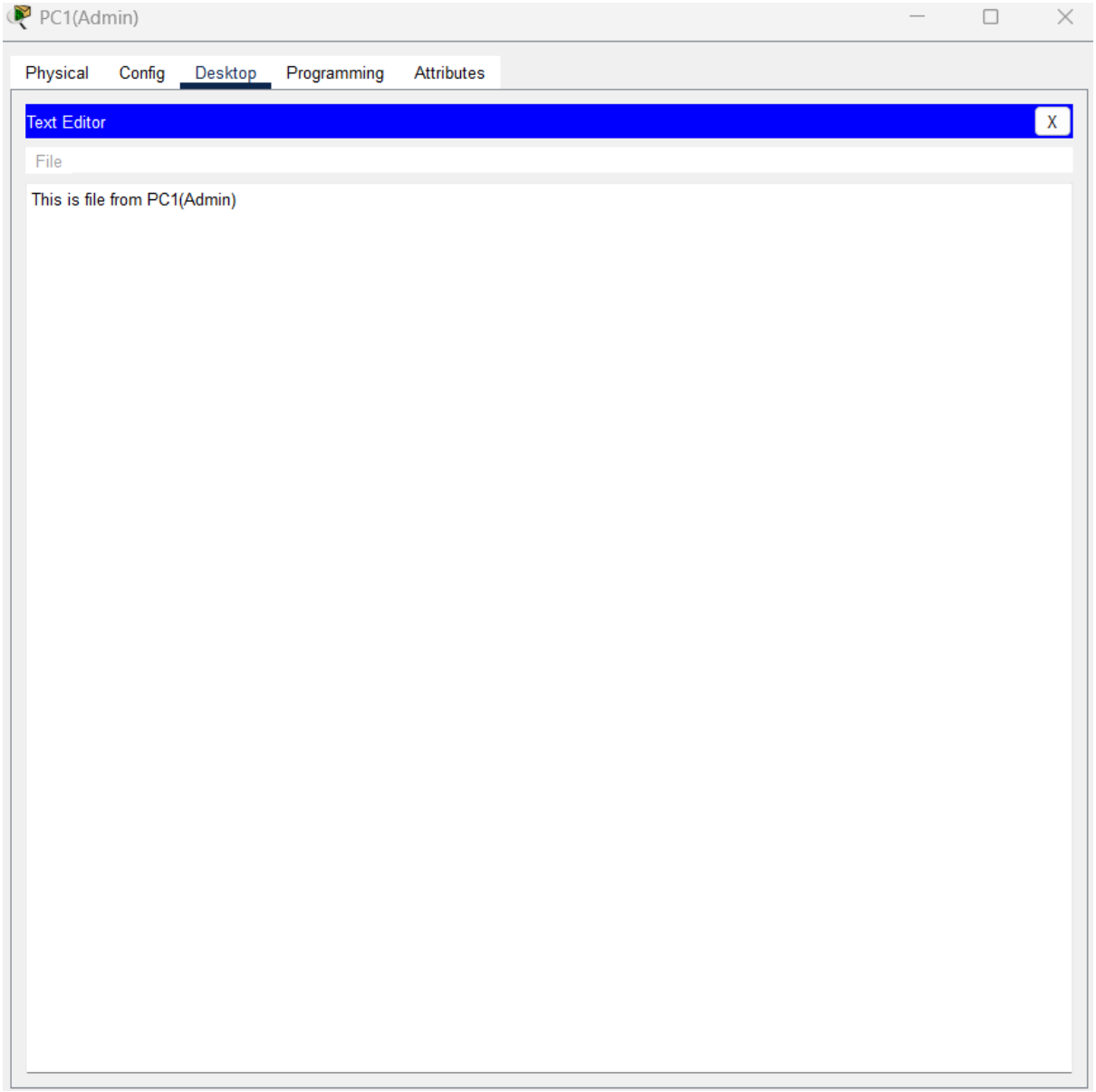


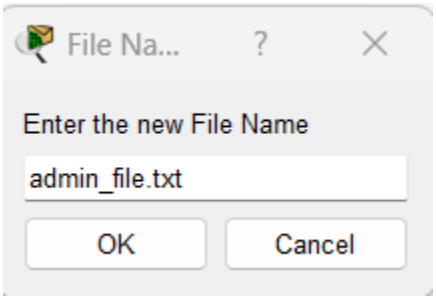
ServerAdmin1 -> Internet


ServerAdmin1
Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
http://google.com
Go
Stop
Google
You are connected to the internet!
Top

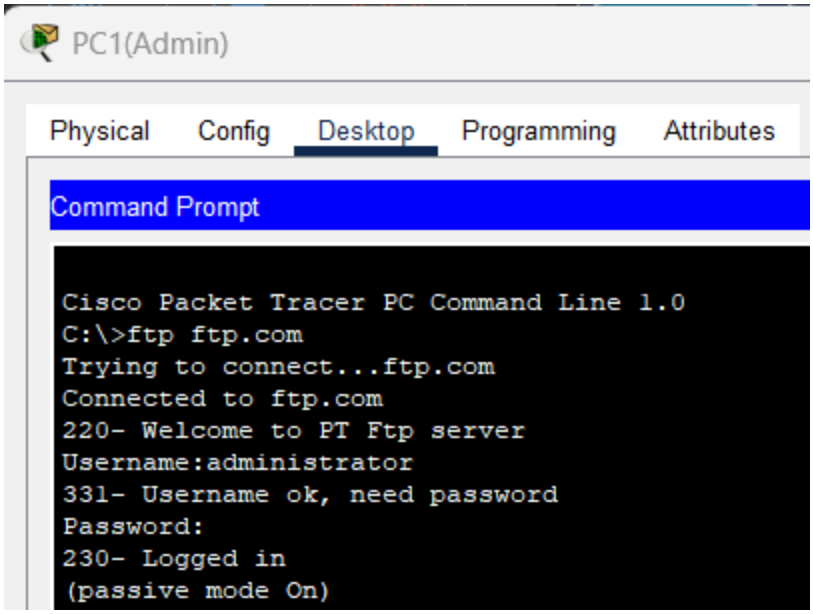
FTP Server

Create a file from PC1(Admin)





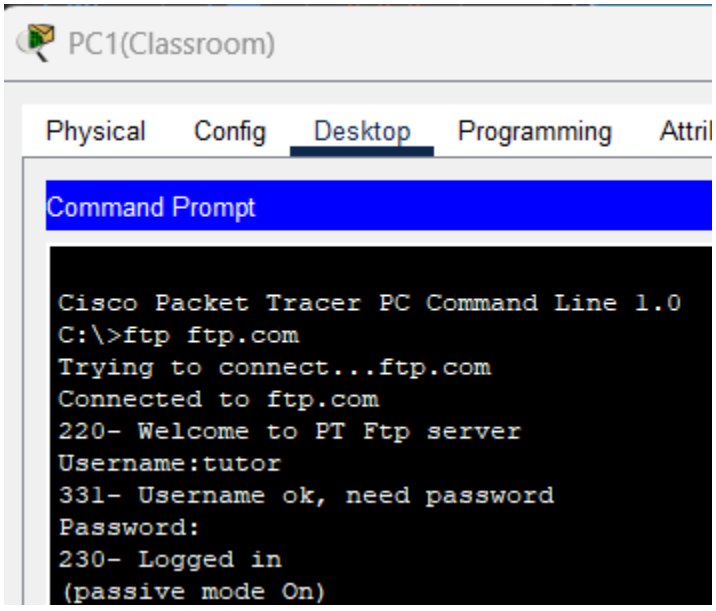
Login to FTP server



Upload the file into the server.

```
ftp>put admin_file.txt

Writing file admin_file.txt to ftp.com:
File transfer in progress...

[Transfer complete - 28 bytes]

28 bytes copied in 0.034 secs (823 bytes/sec)
```

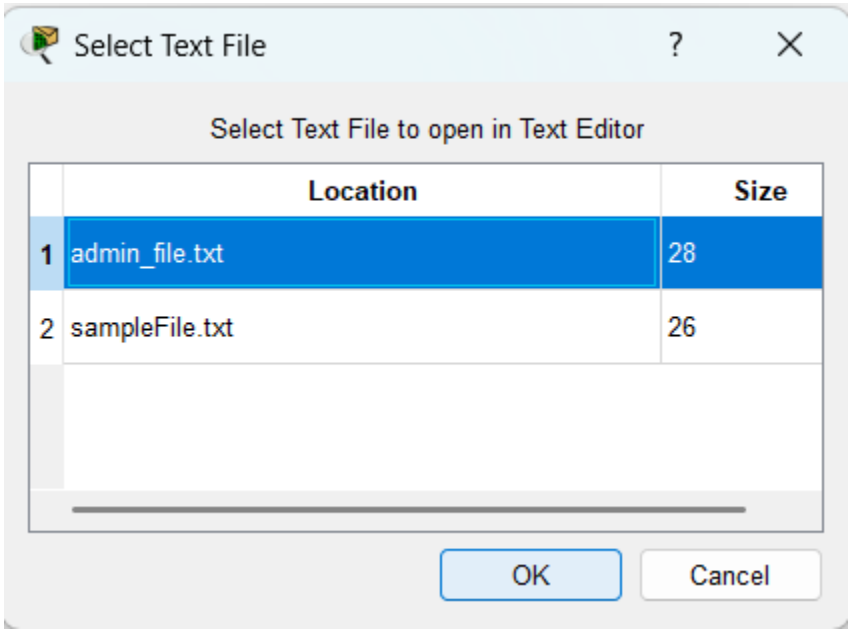
Login to FTP server from PC1(Classroom)

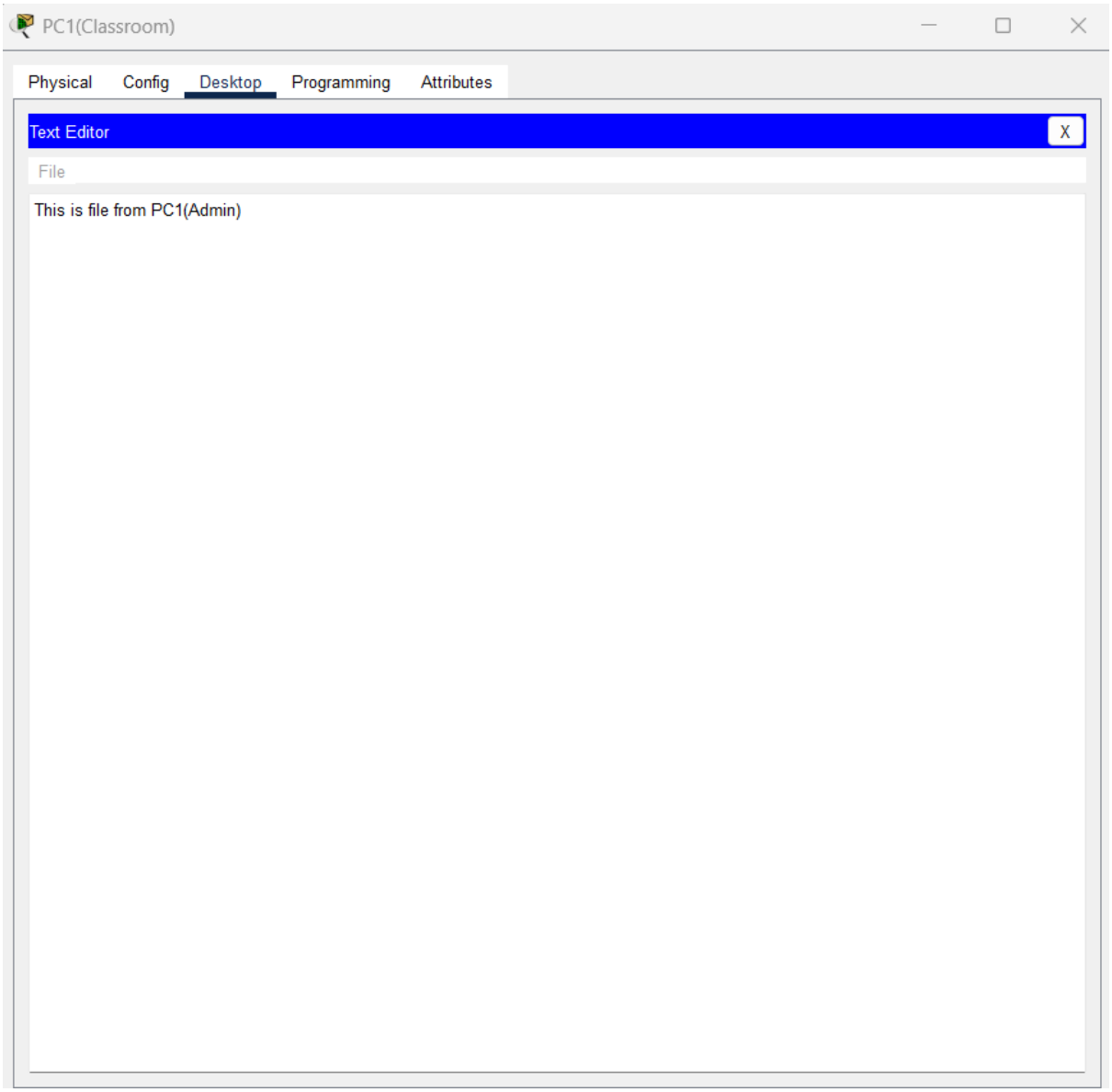


Get the file from the FTP server.

```
ftp>get admin_file.txt

Reading file admin_file.txt from ftp.com:
File transfer in progress...

[Transfer complete - 28 bytes]

28 bytes copied in 0 secs
```

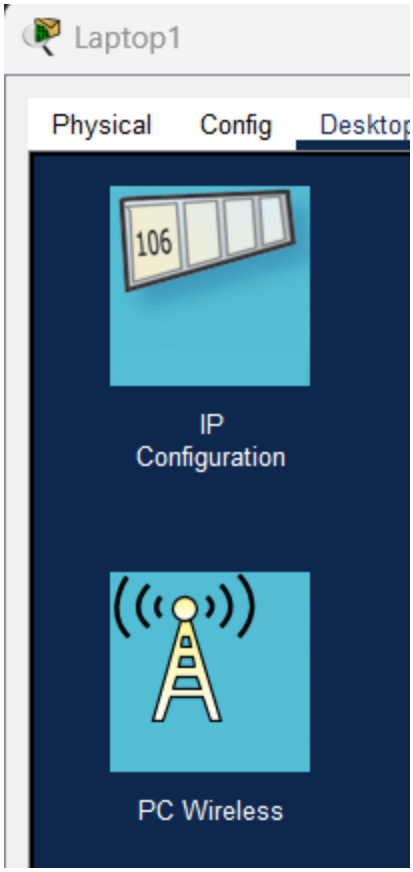
Open the file.

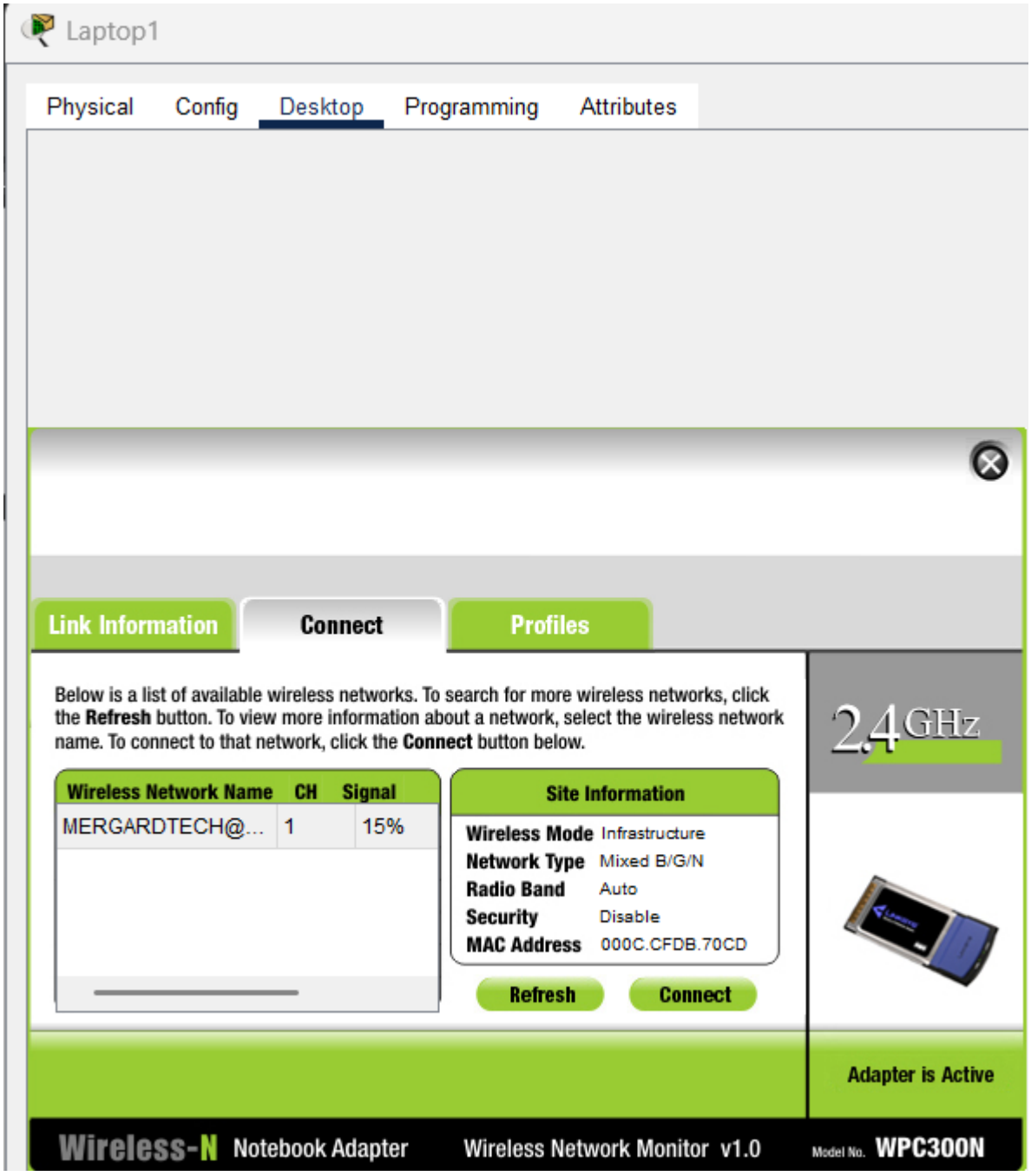




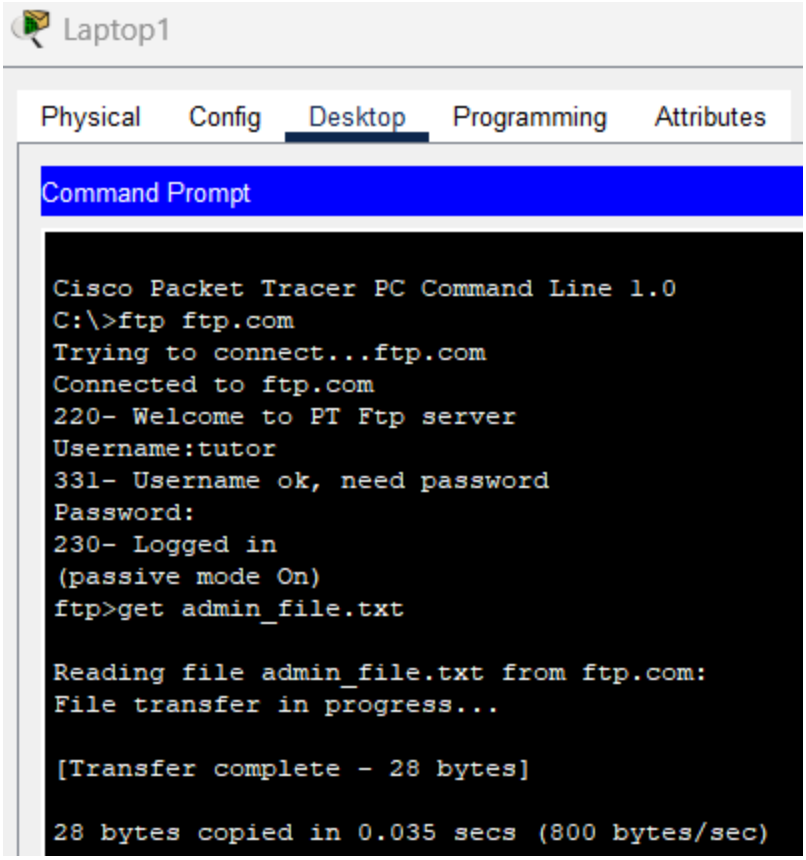
Wireless FTP

Connect to the wireless network.

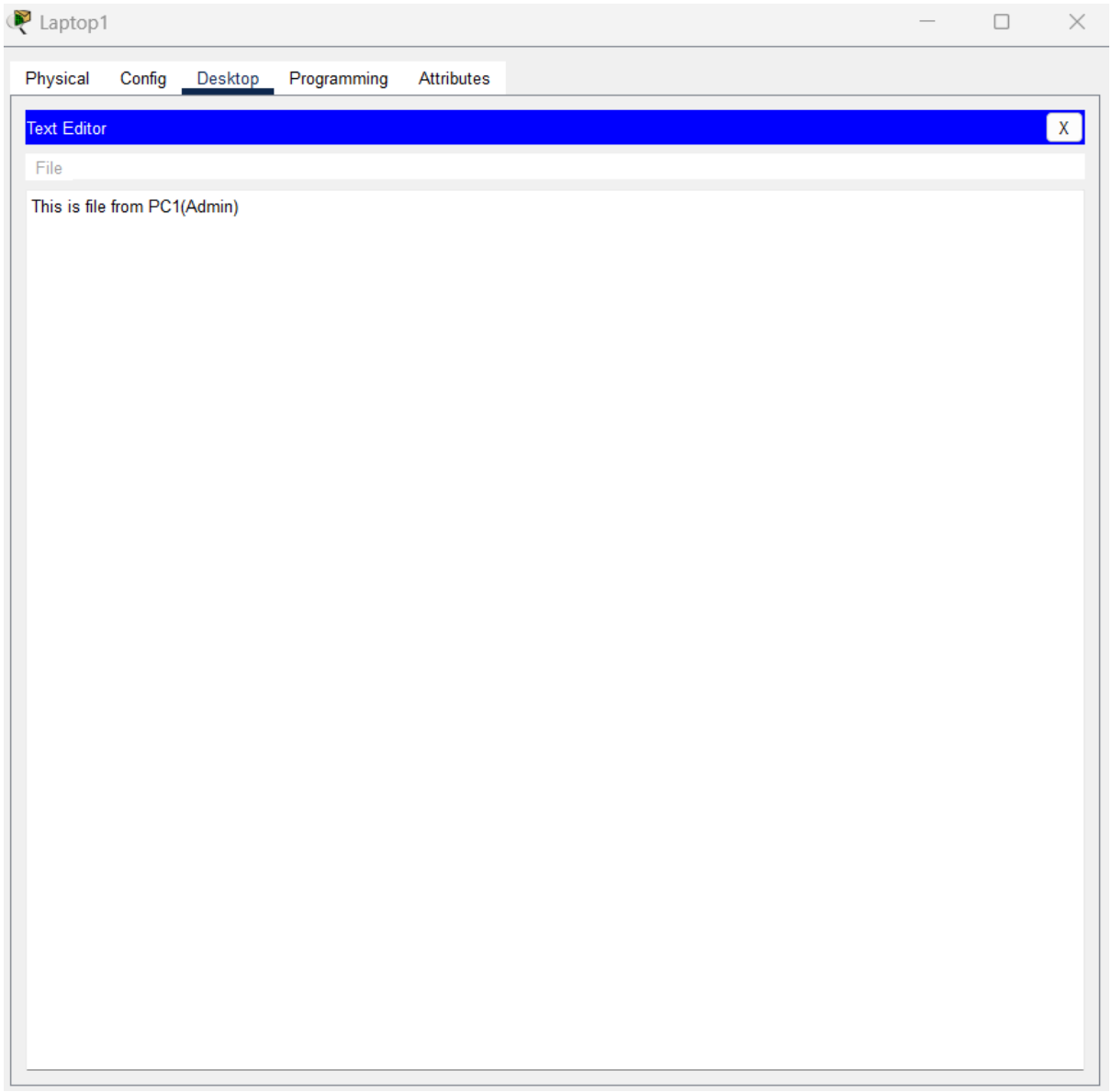

Laptop1
Physical
Config
Desktop
106
IP
Configuration
PC Wireless



Get the file from FTP server.



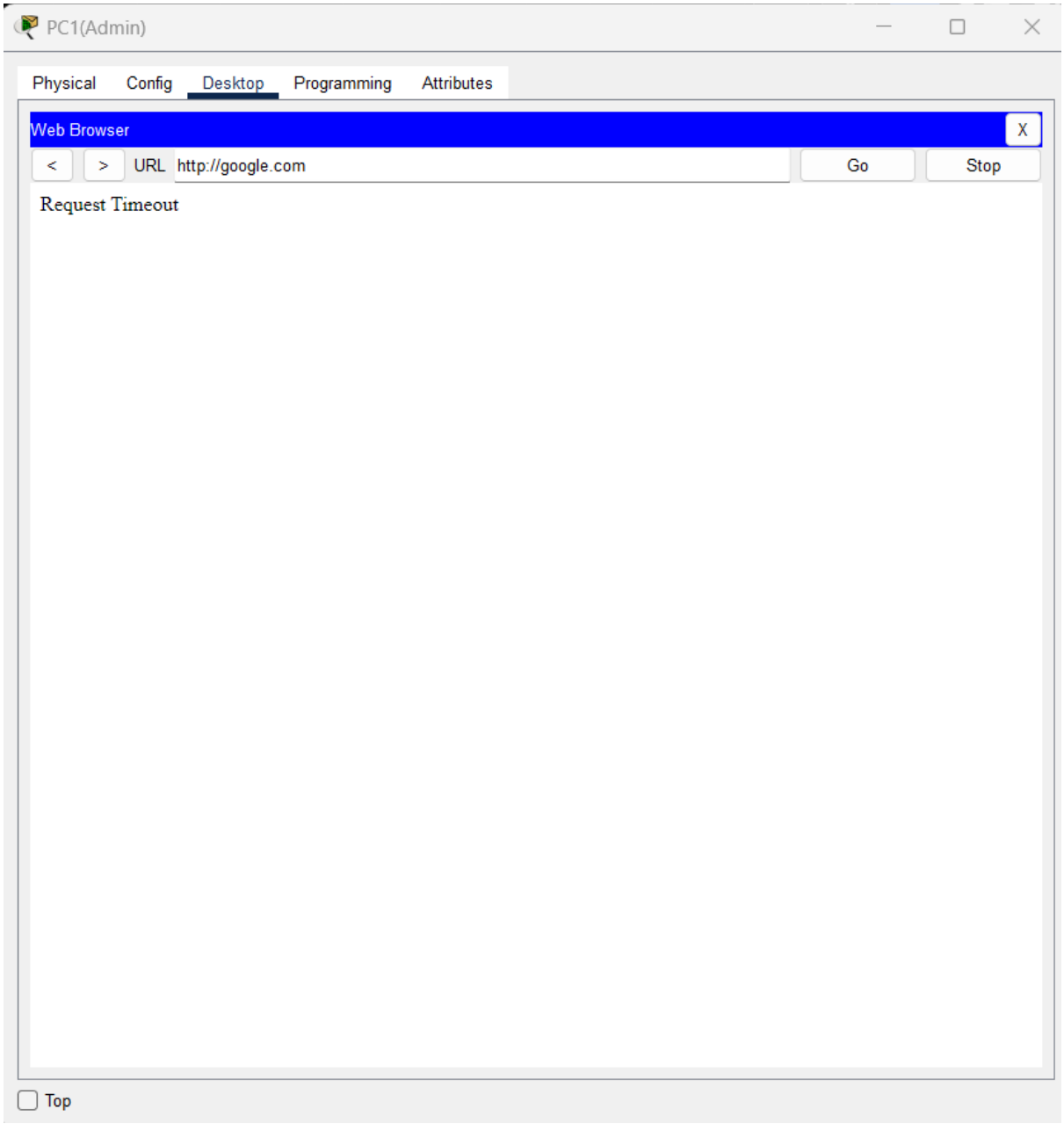
View the file.


Laptop1
Physical
Config
Desktop
Programming
Attributes
Text Editor
X
File
This is file from PC1(Admin)

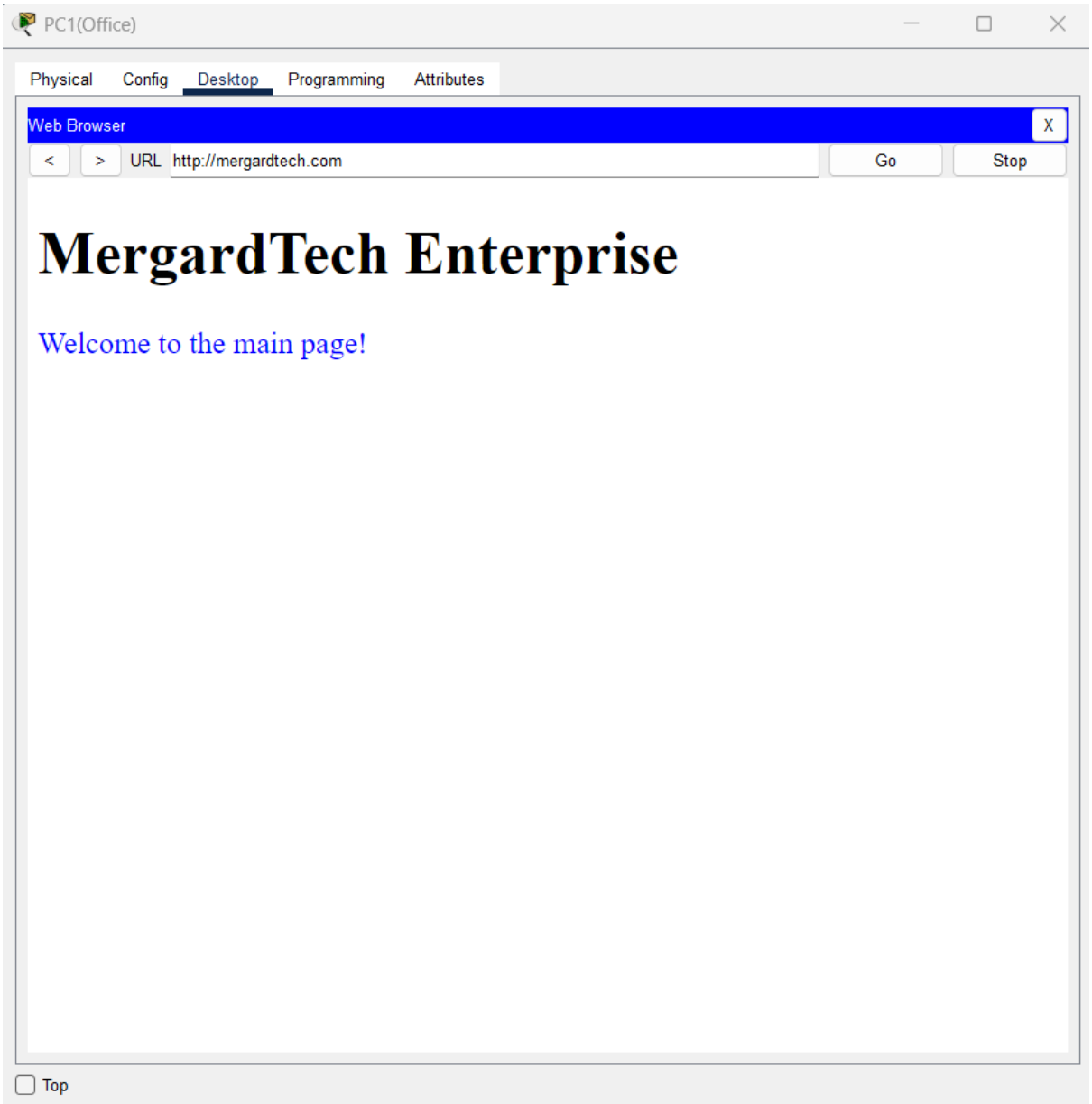
Access Control

Administration, Tutor's office and wireless network shouldn't be able to connect to the Internet, only to the internal web and file servers.

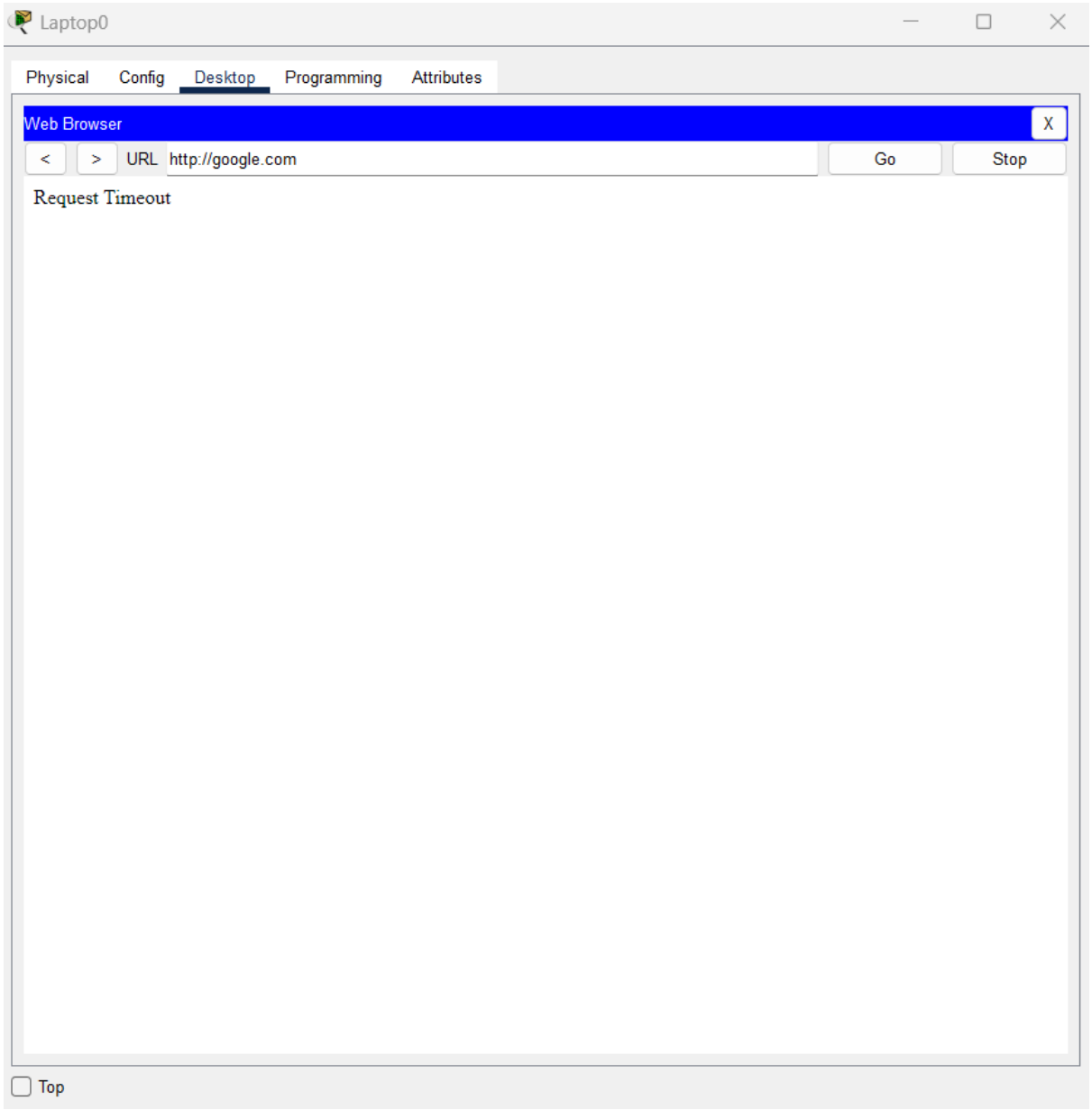
PC1(Admin) -> Internet



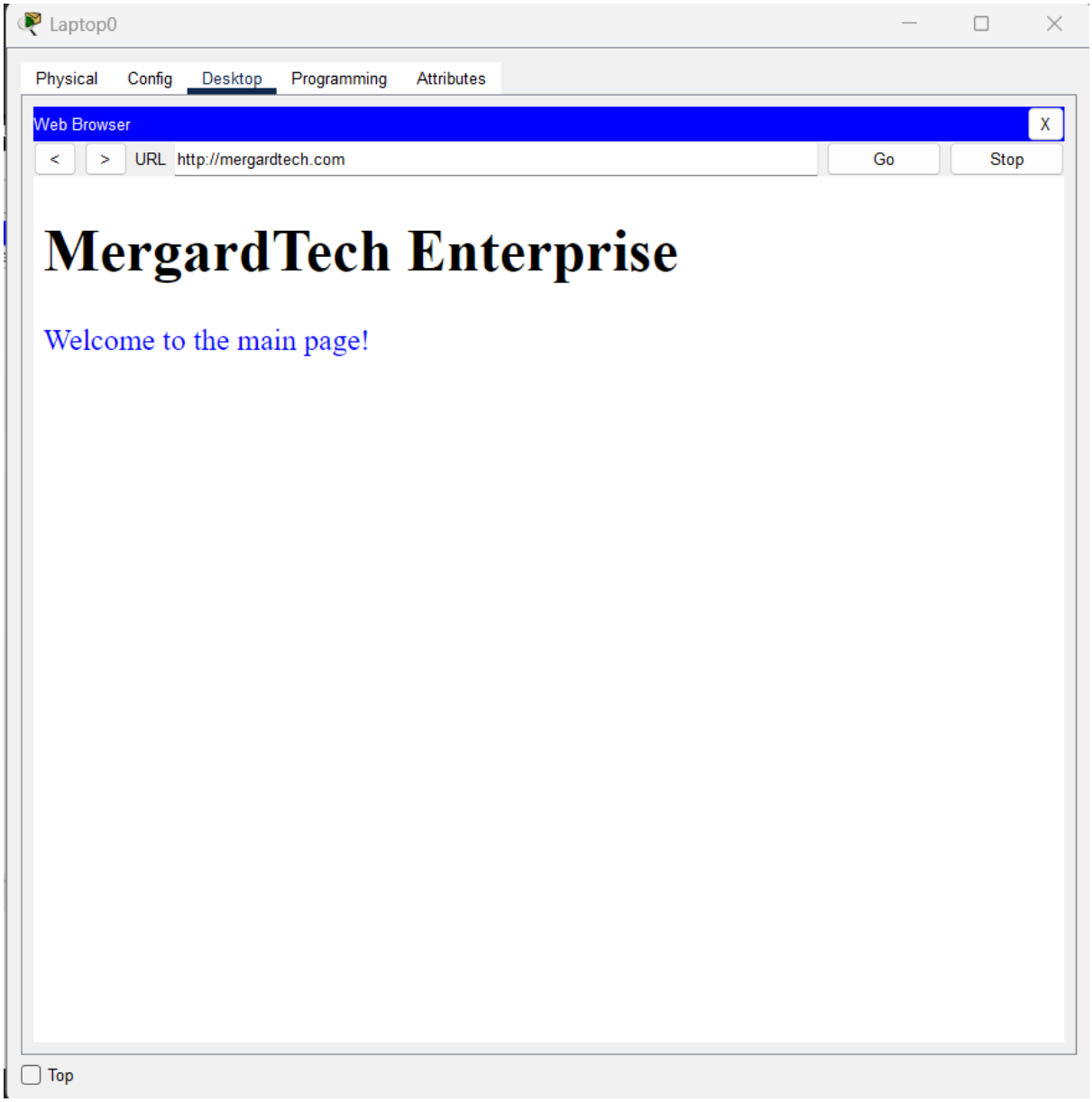
PC1(Office) -> Web Server



Laptop0 -> Internet



Laptop0 -> Web Server



Referring to the previous section, wireless devices and administration can also access ftp.

Cabling and Sockets Components

RS PRO Cat6 Ethernet Cable

The RS PRO Cat6 Ethernet Cable is ideal for a variety of networking applications, including home networks, office networks, data centres, and industrial environments. It is suitable for connecting devices like computers, printers, servers, and other network-enabled equipment. The cable is often available in multiple colours, which can help with cable management and organization in complex networking setups.

Key features and benefits of RS PRO Cat6:

- Reliable: RS PRO Cat6 guaranteeing stable and high-speed data transmission by reducing latency and packet loss for smooth operations

- Durability: RS PRO Cat6 made of PVC jacket that suitable for harsh environments and high traffic areas
- Easy Installation: Pre-terminated with RJ45 connectors for plug-and-play installation, saving time and effort during setup

- Wide compatibility: backwards compatible with Cat5 and Cat5e cables and supports awide range of network protocols, such as 10BASE-T, 100BASE-TX, 1000BASE-T, and 10GBASE-T

- Cost-Effectiven:Provides a cost-effective solution for setting up high-performance networks.

CAB-SS-2626X-10FT Cisco Smart Serial Crossover Cable

The CAB-SS-2626X-10FT Cisco Smart Serial Crossover Cable is a specialized networking cable designed for connecting Cisco devices with Smart Serial interfaces. This cable is a crossover cable, meaning it is specifically wired to connect two similar devices directly (e.g., router to router or switch to switch) without the need for a hub or switch in between.

Key features and Benefit of CAB-SS-2626X-10FT:

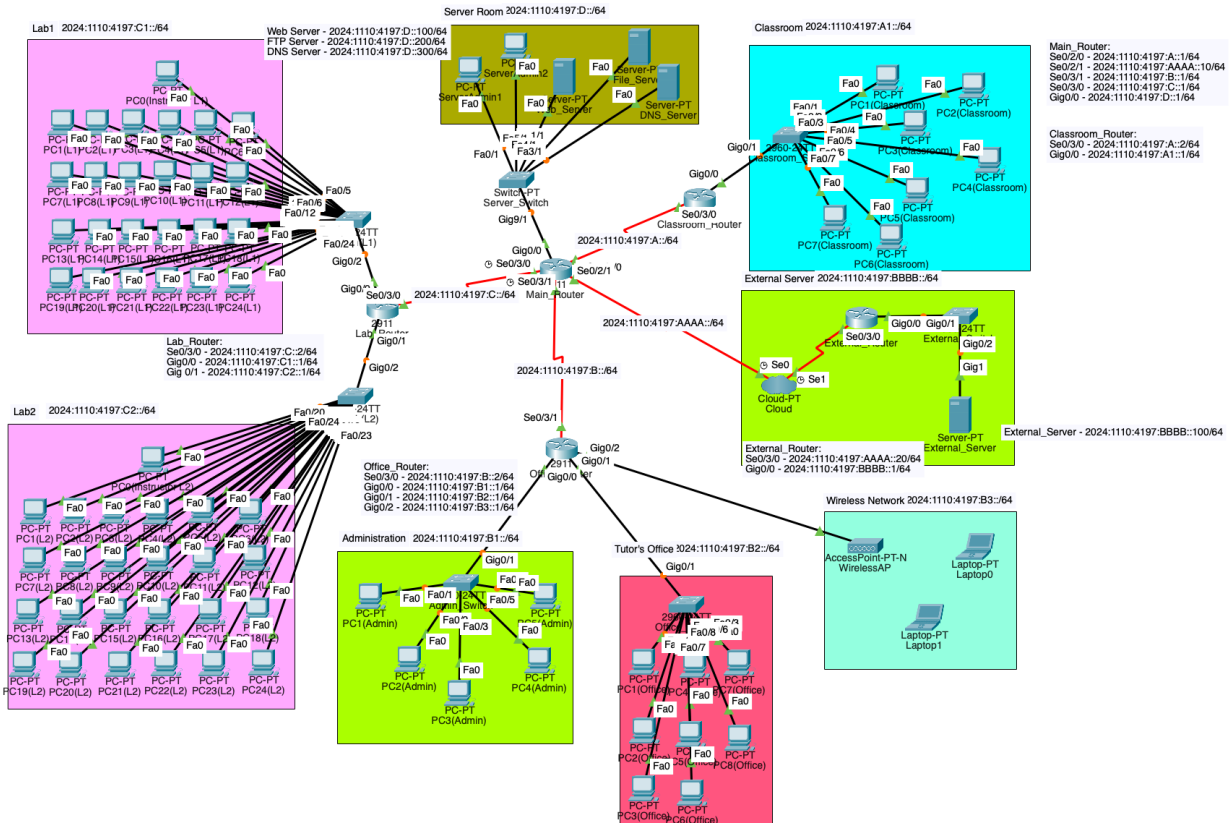
- Direct Connections: Eliminates the need of additional networling hardware when connecting similar devices.
- Reliable performance: Ensure reliable and high-speed data transfer
- Durability: Long-lasting use and resistance to the demands of professional networking environments
- Easy installation: Plug-and-play design

Man-Hour Requirements

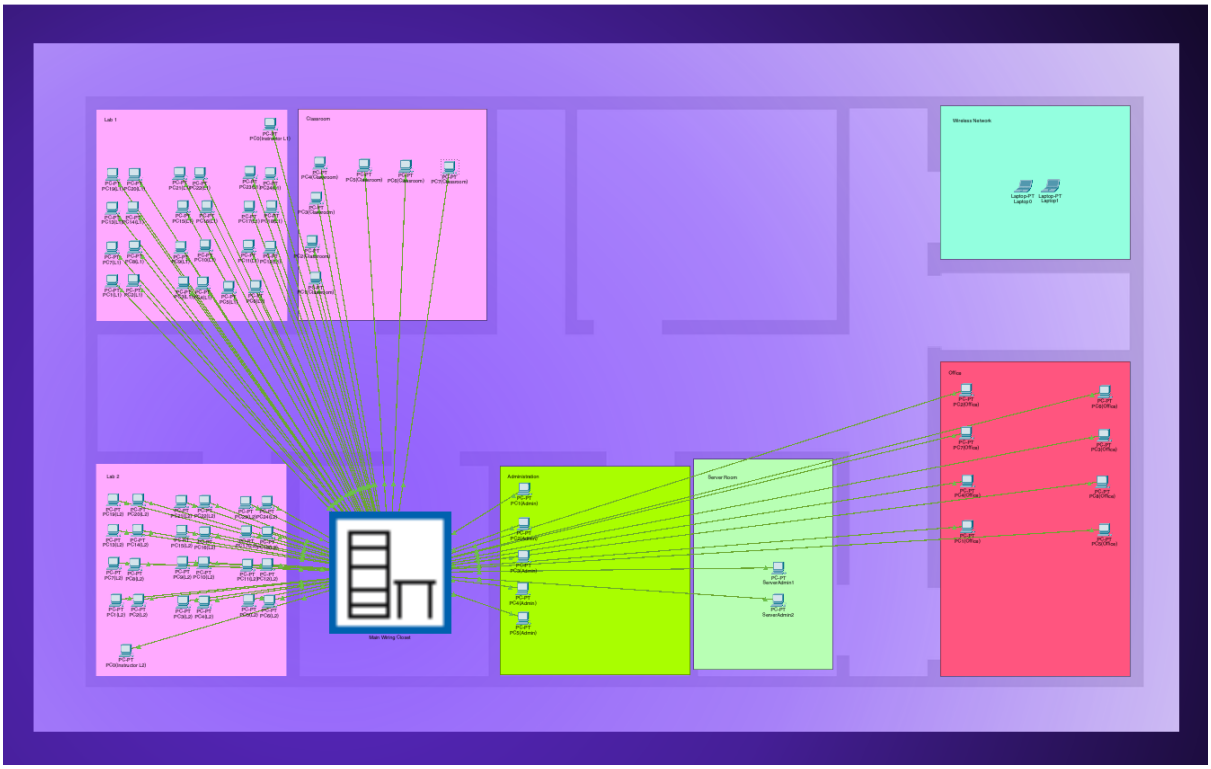
Man Hour Budget	
Number of hours worked a day	2 hours
Total number of workers	3 workers
Specific period of time: 14 November 2024 - 2 February 2025	Public Holiday = 4 Weekend = 24
Man-Hour	81 days - 28 days = 53 days Hence; Man-hour = 2 x 3 x 53 = 318 hours

Network Topology

Logical Design



Physical Design



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