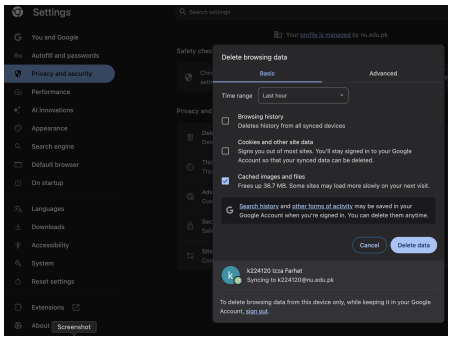
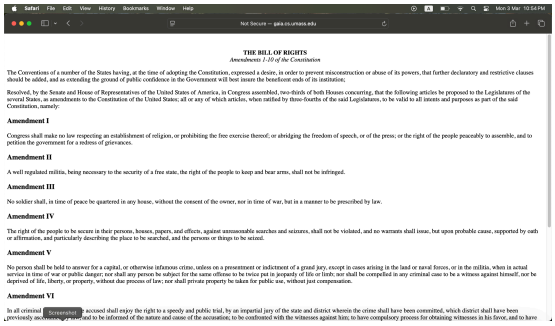
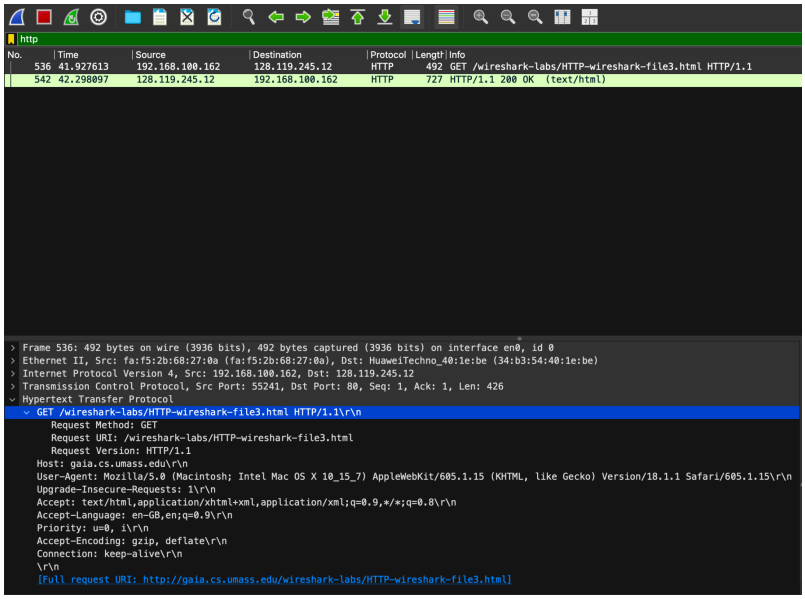
Lab Exercise

1. How many HTTP GET request messages did your browser send? Which packet number in the trace contains the GET message for the Bill or Rights?







- **Answer**:
  - **1 HTTP GET request** was sent.
  - The packet containing the GET request is **packet #536**.

2. Which packet number in the trace contains the status code and phrase associated with the response to the HTTP GET request?

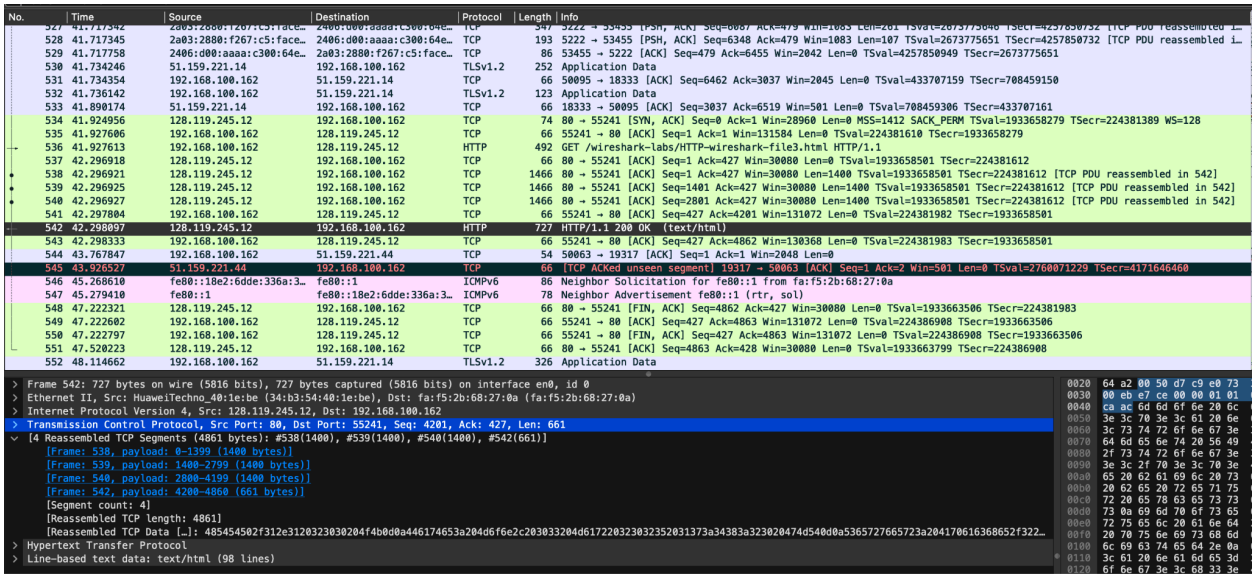
Answer:

- The packet containing the status code and phrase is **packet #542**.

3. What is the status code and phrase in the response?

- **Answer**:
  - **Status Code: 200 OK**
  - This indicates the request was successful, and the file is being sent.

4. How many data-containing TCP segments were needed to carry the single HTTP response and the text of the Bill of Rights?



- **4 data-containing TCP segments** were needed to carry the single HTTP response and the text of the Bill of Rights.

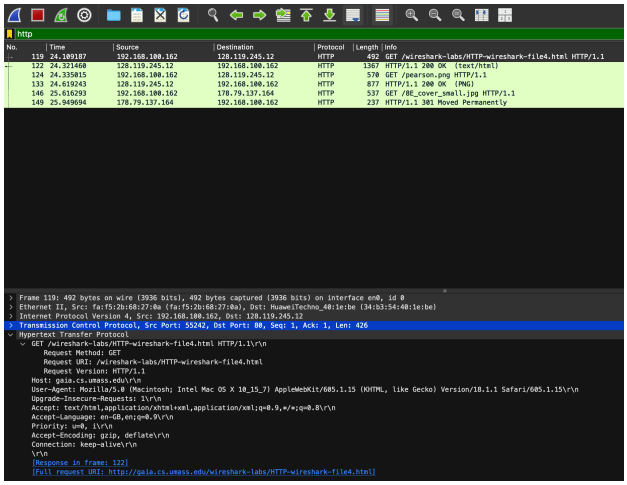
Lab Exercise

1. How many HTTP GET request messages did your browser send? To which Internet addresses were these GET requests sent?

Pearson

This little HTML file is being served by gaia.cs.umass.edu. It contains two embedded images. The image above, also served from the gaia.cs.umass.edu web site, is the logo of our publisher, Pearson. The image of our 8th edition book cover below is stored at, and served from, a WWW server kurose.cslash.net in France:

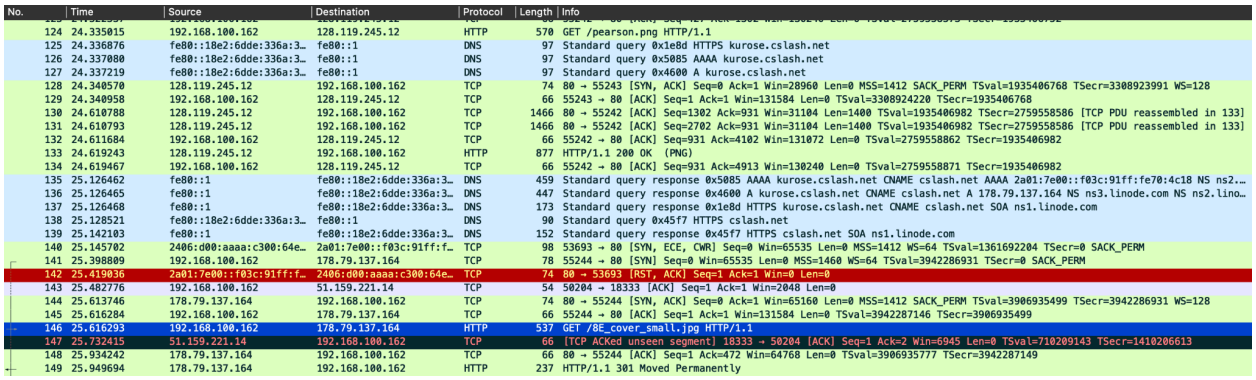
And while we have your attention, you might want to take time to check out the available open resources for this book at http://gaia.cs.umass.edu/kurose_ross.



1. **Packet 119**:
    - **Destination IP**: `128.119.245.12` (gaia.cs.umass.edu).
2. **Packet 124**:
    - **Destination IP**: `128.119.245.12` (gaia.cs.umass.edu).
3. **Packet 146**:
    - **Destination IP**: `178.79.137.164` (a different server).

2. **Total GET requests**: **3**.
3. The requests were sent to:
    1. `128.119.245.12` (for the HTML file and `pearson.png`).
    2. `178.79.137.164` (for `85_cover_small.jpg`).

2. Can you tell whether your browser downloaded the two images serially, or whether they were downloaded from the two web sites in parallel? Explain.

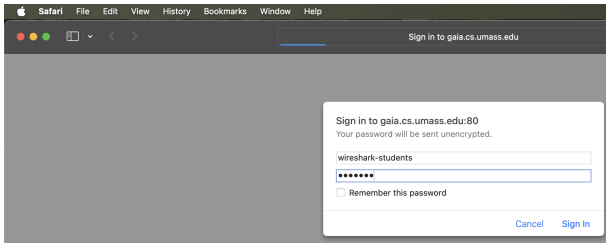


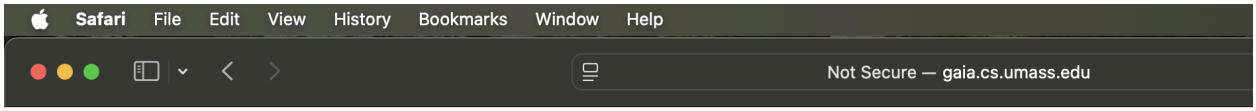
No.	Time	Source	Destination	Protocol	Length	Info
124	24.335015	192.168.100.162	128.119.245.12	HTTP	570	GET /pearson.png HTTP/1.1
125	24.336876	fe80::18e2:6dde:336a:3…	fe80::1	DNS	97	Standard query 0x1e8d HTTPS kurose.cslash.net
126	24.337080	fe80::18e2:6dde:336a:3…	fe80::1	DNS	97	Standard query 0x5085 AAAA kurose.cslash.net
127	24.337219	fe80::18e2:6dde:336a:3…	fe80::1	DNS	97	Standard query 0x4600 A kurose.cslash.net
128	24.340570	128.119.245.12	192.168.100.162	TCP	74	80 → 55243 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1412 SACK_PERM TSval=1935406768 TSecr=3308923991 WS=128
129	24.340958	192.168.100.162	128.119.245.12	TCP	66	55243 → 80 [ACK] Seq=1 Ack=1 Win=131584 Len=0 TSval=3308924220 TSecr=1935406768
130	24.610788	128.119.245.12	192.168.100.162	TCP	1466	80 → 55242 [ACK] Seq=1302 Ack=931 Win=31104 Len=1400 TSval=1935406982 TSecr=2759558586 [TCP PDU reassembled in 133]
131	24.610793	128.119.245.12	192.168.100.162	TCP	1466	80 → 55242 [ACK] Seq=2702 Ack=931 Win=31104 Len=1400 TSval=1935406982 TSecr=2759558586 [TCP PDU reassembled in 133]
132	24.611684	192.168.100.162	128.119.245.12	TCP	66	55242 → 80 [ACK] Seq=931 Ack=4102 Win=131072 Len=0 TSval=2759558862 TSecr=1935406982
133	24.619243	128.119.245.12	192.168.100.162	HTTP	877	HTTP/1.1 200 OK (PNG)
134	24.619467	192.168.100.162	128.119.245.12	TCP	66	55242 → 80 [ACK] Seq=931 Ack=4913 Win=130240 Len=0 TSval=2759558871 TSecr=1935406982
135	25.126462	fe80::1	fe80::18e2:6dde:336a:3…	DNS	459	Standard query response 0x5085 AAAA kurose.cslash.net CNAME cslash.net AAAA 2a01:7e00::f03c:91ff:fe70:4c18 NS ns2.…
136	25.126465	fe80::1	fe80::18e2:6dde:336a:3…	DNS	447	Standard query response 0x4600 A kurose.cslash.net CNAME cslash.net A 178.79.137.164 NS ns3.linode.com NS ns2.lino…
137	25.126468	fe80::1	fe80::18e2:6dde:336a:3…	DNS	173	Standard query response 0x1e8d HTTPS kurose.cslash.net CNAME cslash.net SOA ns1.linode.com
138	25.128521	fe80::18e2:6dde:336a:3…	fe80::1	DNS	90	Standard query 0x45f7 HTTPS cslash.net
139	25.142103	fe80::1	fe80::18e2:6dde:336a:3…	DNS	152	Standard query response 0x45f7 HTTPS cslash.net SOA ns1.linode.com
140	25.145702	2406:d00:aaaa:c300:64e…	2a01:7e00::f03c:91ff:f…	TCP	98	53693 → 80 [SYN, ECE, CWR] Seq=0 Win=65535 Len=0 MSS=1412 WS=64 TSval=1361692204 TSecr=0 SACK_PERM
141	25.398809	192.168.100.162	178.79.137.164	TCP	78	55244 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=64 TSval=3942286931 TSecr=0 SACK_PERM
142	25.419036	2a01:7e00::f03c:91ff:f…	2406:d00:aaaa:c300:64e…	TCP	74	80 → 53693 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
143	25.482776	192.168.100.162	51.159.221.14	TCP	54	50204 → 18333 [ACK] Seq=1 Ack=1 Win=2048 Len=0
144	25.613746	178.79.137.164	192.168.100.162	TCP	74	80 → 55244 [SYN, ACK] Seq=0 Ack=1 Win=65160 Len=0 MSS=1412 SACK_PERM TSval=3906935499 TSecr=3942286931 WS=128
145	25.616284	192.168.100.162	178.79.137.164	TCP	66	55244 → 80 [ACK] Seq=1 Ack=1 Win=131584 Len=0 TSval=3942287146 TSecr=3906935499
146	25.616293	192.168.100.162	178.79.137.164	HTTP	537	GET /8E_cover_small.jpg HTTP/1.1
147	25.732415	51.159.221.14	192.168.100.162	TCP	66	[TCP ACKed unseen segment] 18333 → 50204 [ACK] Seq=1 Ack=2 Win=6945 Len=0 TSval=710209143 TSecr=1410206613
148	25.934242	178.79.137.164	192.168.100.162	TCP	66	80 → 55244 [ACK] Seq=1 Ack=472 Win=64768 Len=0 TSval=3906935777 TSecr=3942287149
149	25.949694	178.79.137.164	192.168.100.162	HTTP	237	HTTP/1.1 301 Moved Permanently

- In this case, the request for `85_cover_small.jpg` starts at **25.616293 seconds**, which is **after** the first image (`pearson.png`) has finished downloading at **24.619243 seconds**.
- The two image requests do **not overlap** in time.
- This indicates that the images were downloaded **serially** (one after the other).

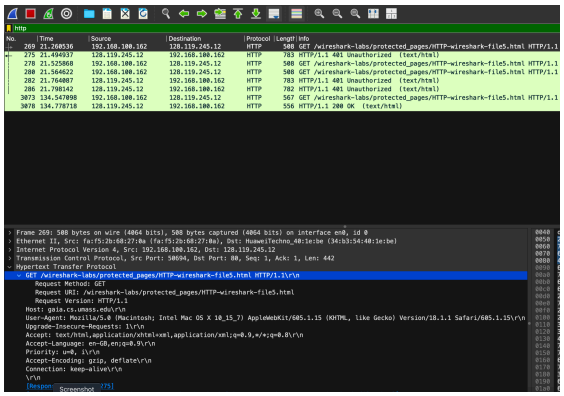
Lab Exercise

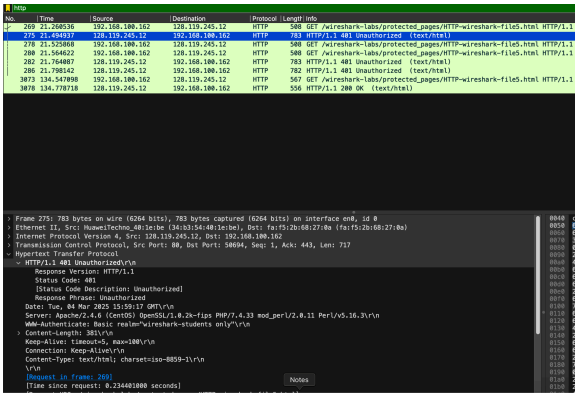
1. What is the server's response (status code and phrase) in response to the initial HTTP GET message from your browser?





This page is password protected! If you're seeing this, you've downloaded the page correctly
Congratulations!





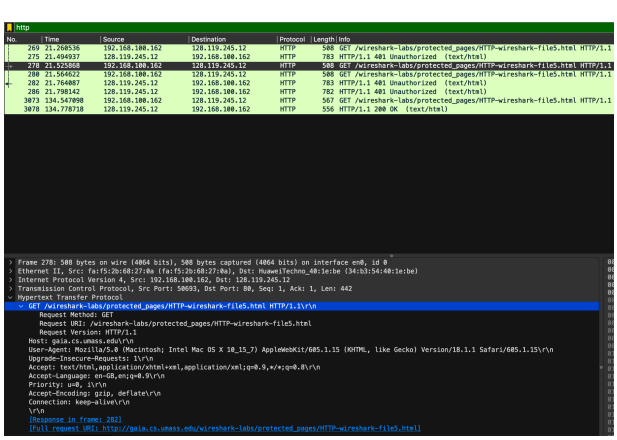
Initial HTTP GET Request:

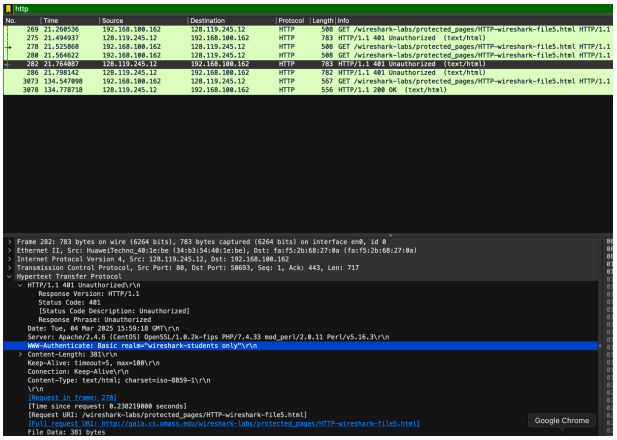
- This is **packet #269** in the trace.

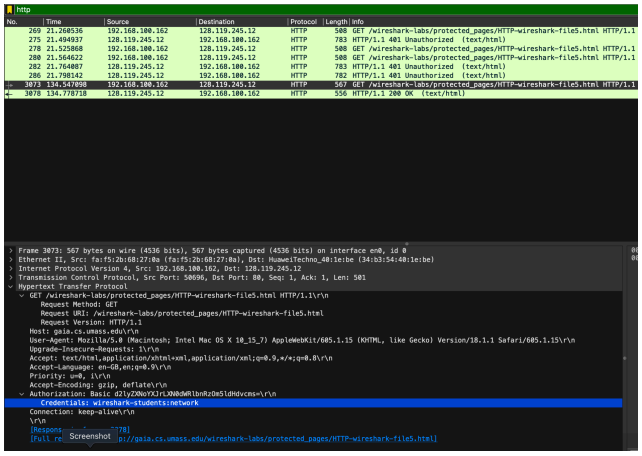
the Server's Response:

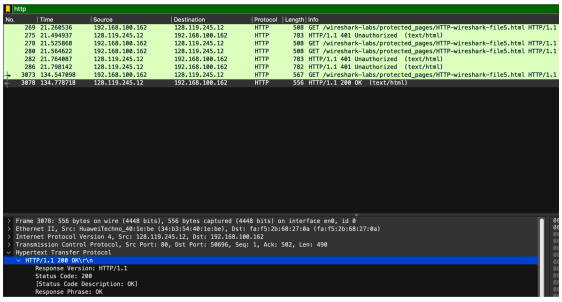
- for corresponding HTTP response from the server.
- This is **packet #275** in the trace.
- The status code and phrase indicate the result of the request.
- For the initial request, the server responds with **401 Unauthorized** because the client has not provided valid credentials.
- The server's response to the initial HTTP GET message is:
    - **Status Code: 401 Unauthorized**
    - **Phrase: Unauthorized**

2. When your browser's sends the HTTP GET message for the second time, what new field is included in the HTTP GET message?







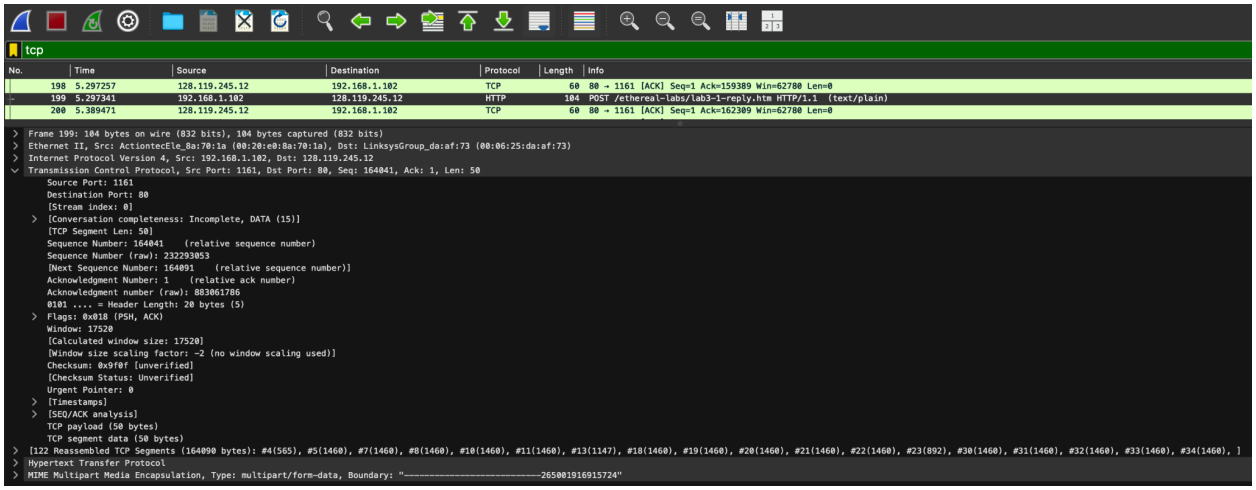


When the browser sends the HTTP GET message for the next time, the new field included is:

- **`Authorization`**
- **This field contains the Base64-encoded credentials (username and password).**

Lab Exercise

1. What is the IP address and TCP port number used by the client computer (source) that is transferring the file to gaia.cs.umass.edu? To answer this question, it's probably easiest to select an HTTP message and explore the details of the TCP packet used to carry this HTTP message, using the "details of the selected packet header window".



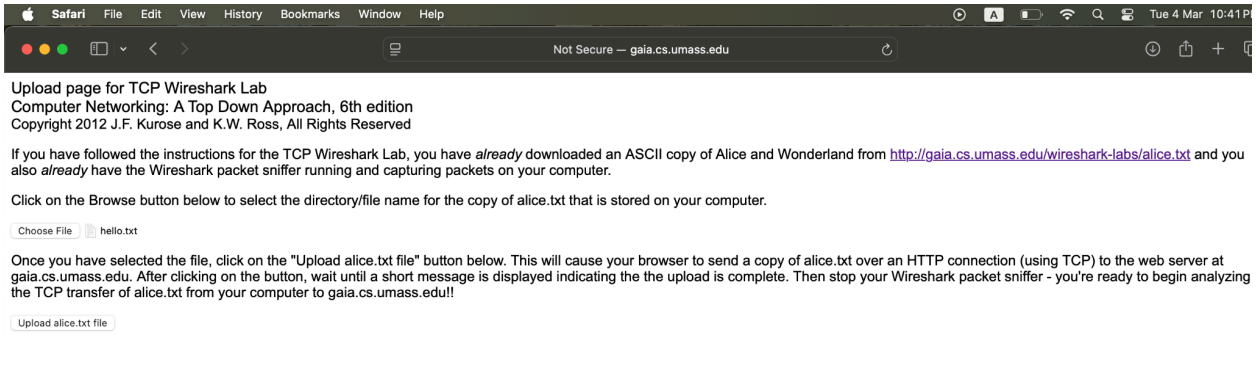
1. **The provided trace shows Frame 203, which is an HTTP response from the server (`128.119.245.12`) to the client (`192.168.1.102`). The HTTP response has a status code of 200 OK, indicating a successful request.**
2. **Determine the Client's IP Address and Port:**
    - **The client is the destination of the HTTP response.**
    - **Destination IP Address: `192.168.1.102` (client IP).**
    - **Destination Port: `1161` (client port).**

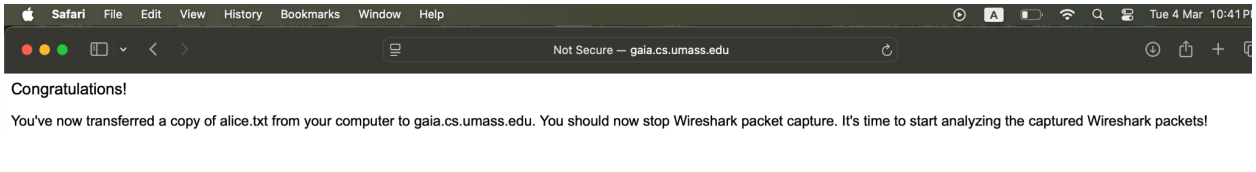
2. What is the IP address of gaia.cs.umass.edu? On what port number is it sending and receiving TCP segments for this connection?

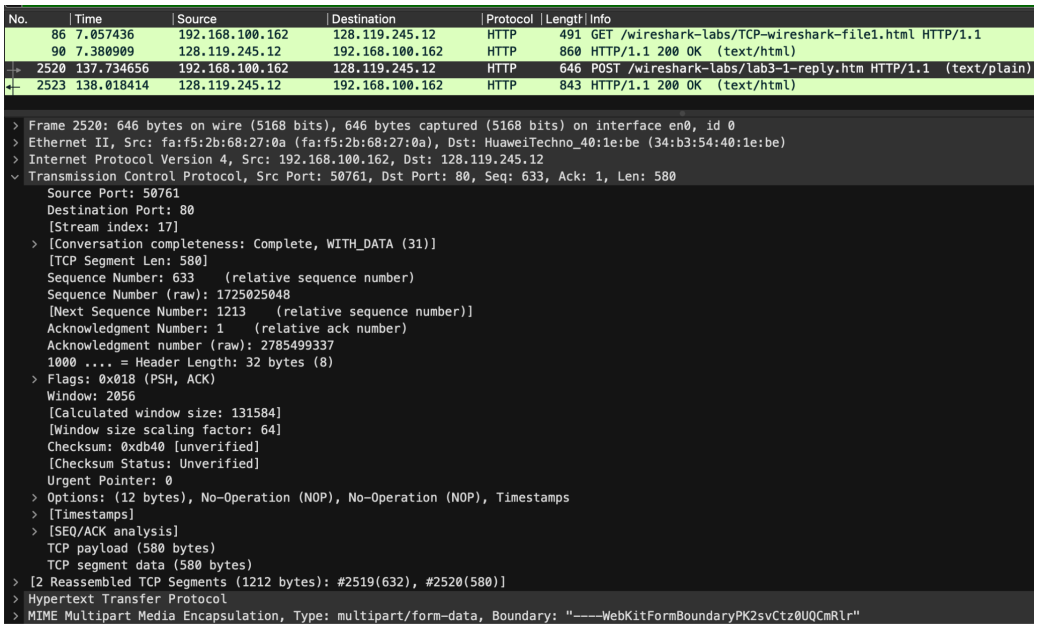
- **The server is the source of the HTTP response.**
- **Source IP Address: `128.119.245.12` (server IP, `gaia.cs.umass.edu`).**
- **Source Port: `80` (server port, HTTP).**

If you have been able to create your own trace, answer the following question:

3. What is the IP address and TCP port number used by your client computer (source) to transfer the file to gaia.cs.umass.edu?





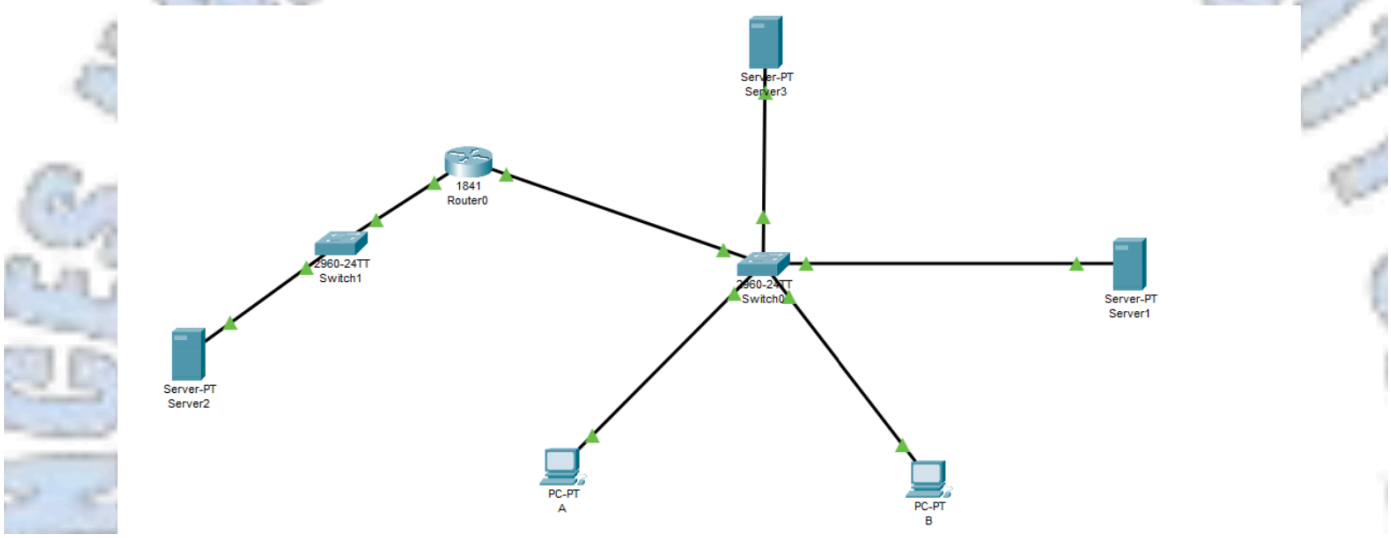


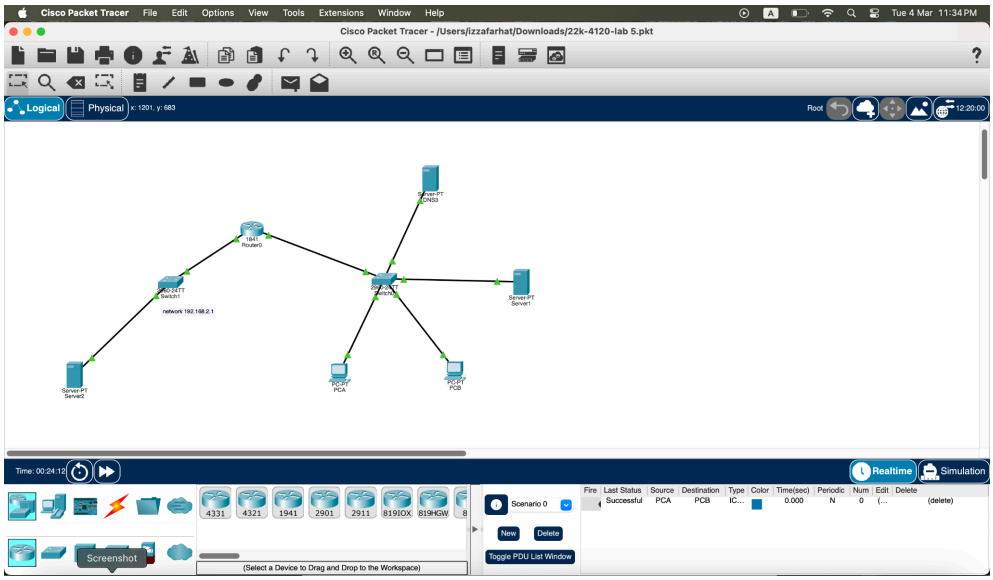
- **Source IP Address: `192.168.100.162` (client IP).**
- **Source Port: `50761` (client port).**
- **Destination IP Address: `128.119.245.12` (server IP, `gaia.cs.umass.edu`).**
- **Destination Port: `80` (HTTP port).**

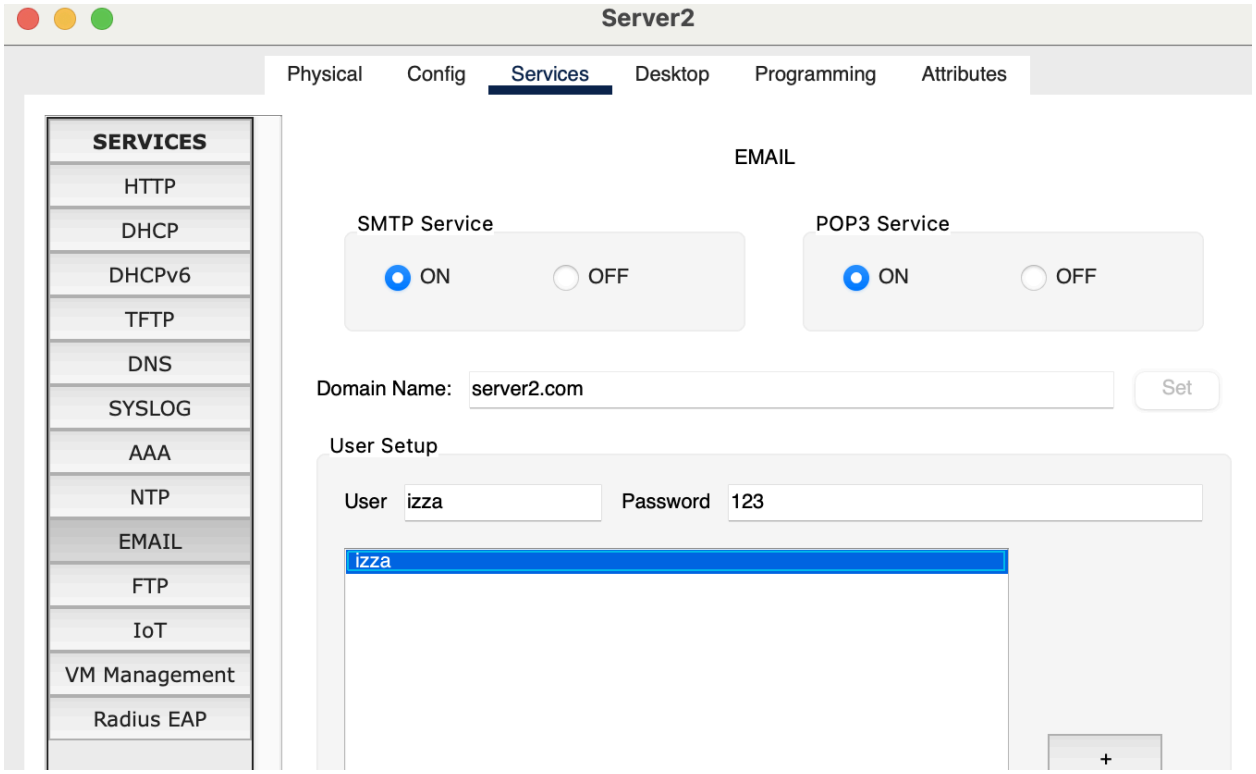
Lab Exercises

1. Let's suppose your organization need to create it's on small server (for provide some services) based network. With bellow mentioned topology and instructions:

a) Configure SMTP (create account with your last name along with last 3 digits roll number) send mail from PC A to PC-B.
b) PC A should be configured to have the SMTP account of Server 2 while PC B should be having an account of Server 1.
c) Configure FTP server create account with your first name, password with your roll number and filename with your last name (.bin extension) show all connection results. The FTP Server should be established on both Server 2 and Server 3.






Server2
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
EMAIL
SMTP Service
ON
OFF
POP3 Service
ON
OFF
Domain Name:
server2.com
Set
User Setup
User
izza
Password
123
izza
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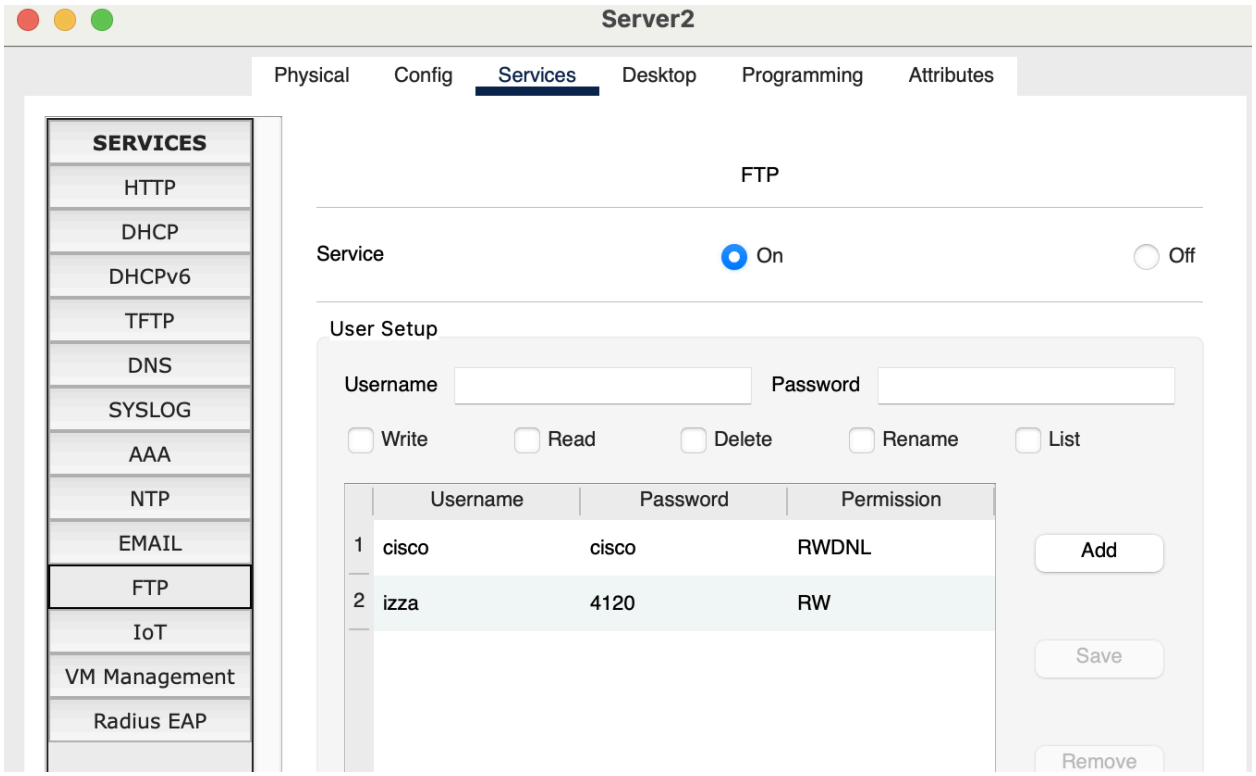
Server2
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Programming
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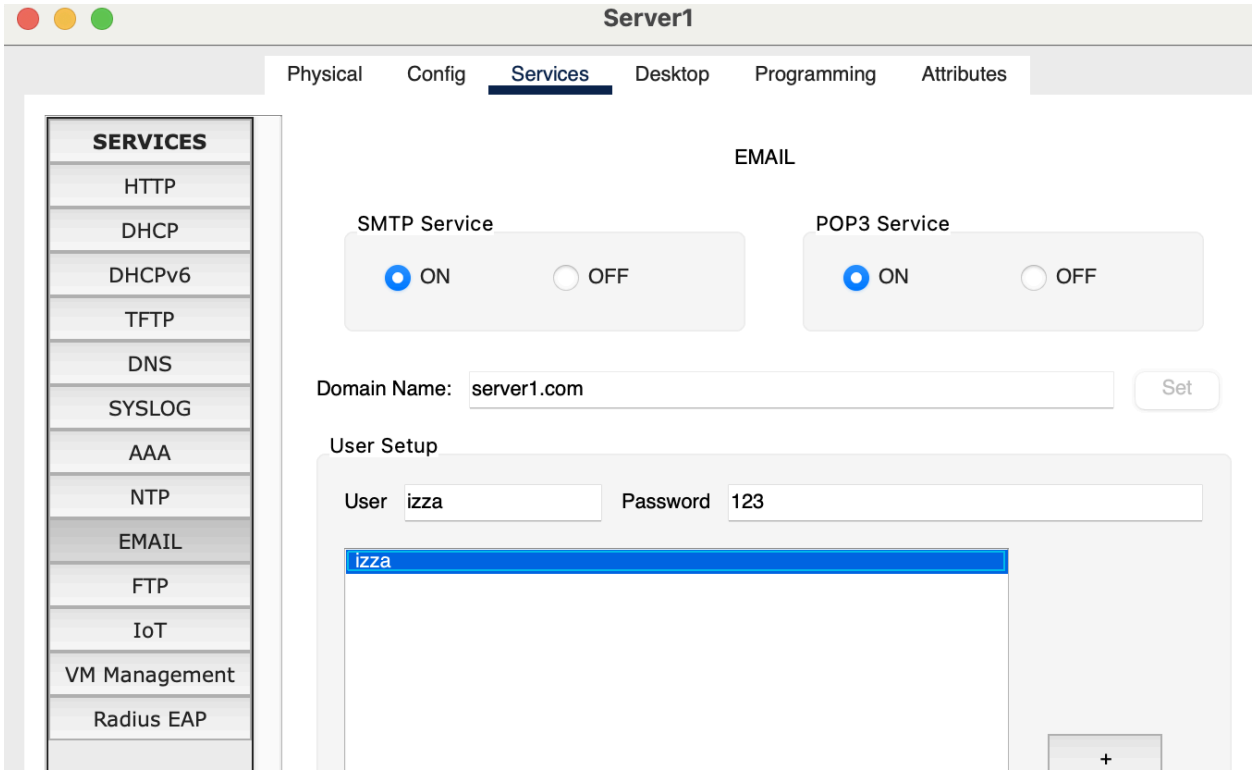
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
FTP
Service
On
Off
User Setup
Username
Password
Write
Read
Delete
Rename
List
Username
Password
Permission
1
cisco
cisco
RWDNL
2
izza
4120
RW
Add
Save
Remove


Server1
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Services
Desktop
Programming
Attributes
SERVICES
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DHCPv6
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DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
EMAIL
SMTP Service
ON
OFF
POP3 Service
ON
OFF
Domain Name:
server1.com
Set
User Setup
User
izza
Password
123
izza
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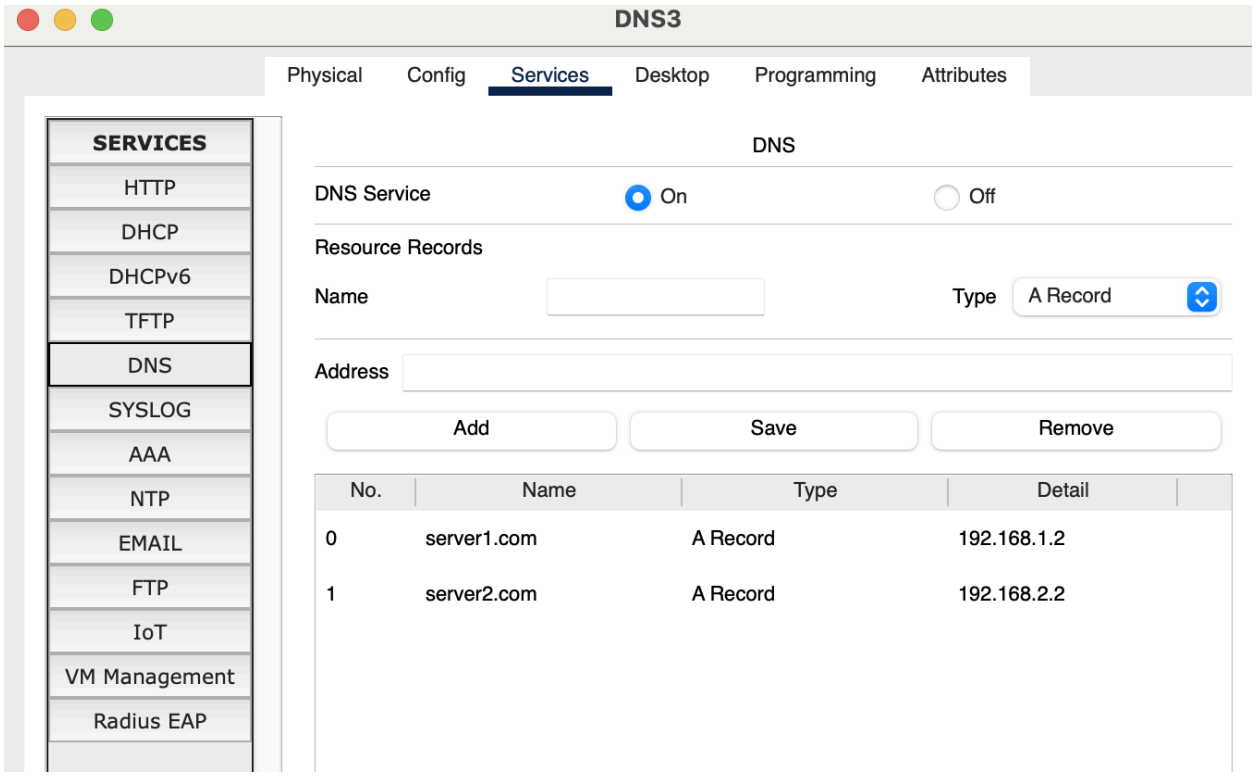
DNS3
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Programming
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DHCPv6
TFTP
DNS
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AAA
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EMAIL
FTP
IoT
VM Management
Radius EAP
DNS
DNS Service
On
Off
Resource Records
Name
Type
A Record
Address
Add
Save
Remove
No.
Name
Type
Detail
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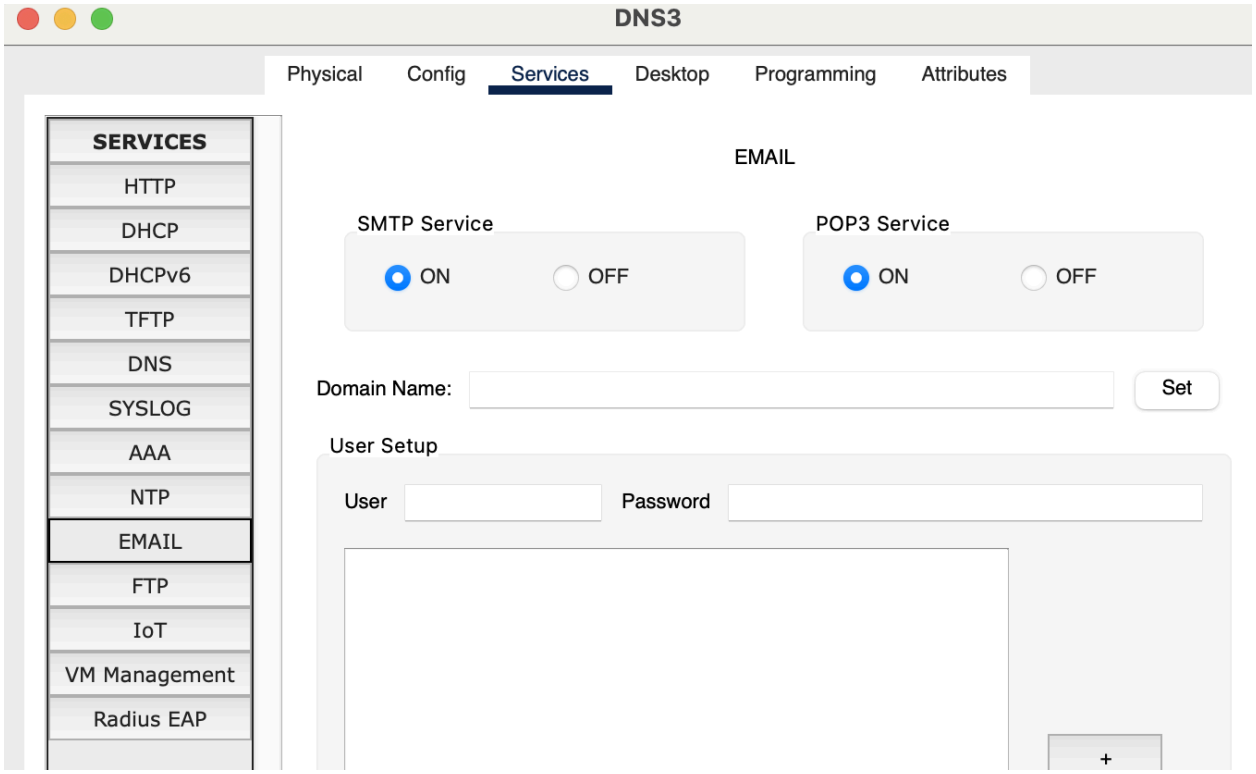
192.168.1.2
1
server2.com
A Record
192.168.2.2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DHCPv6
TFTP
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EMAIL
FTP
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VM Management
Radius EAP
EMAIL
SMTP Service
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OFF
POP3 Service
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Domain Name:
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User Setup
User
Password
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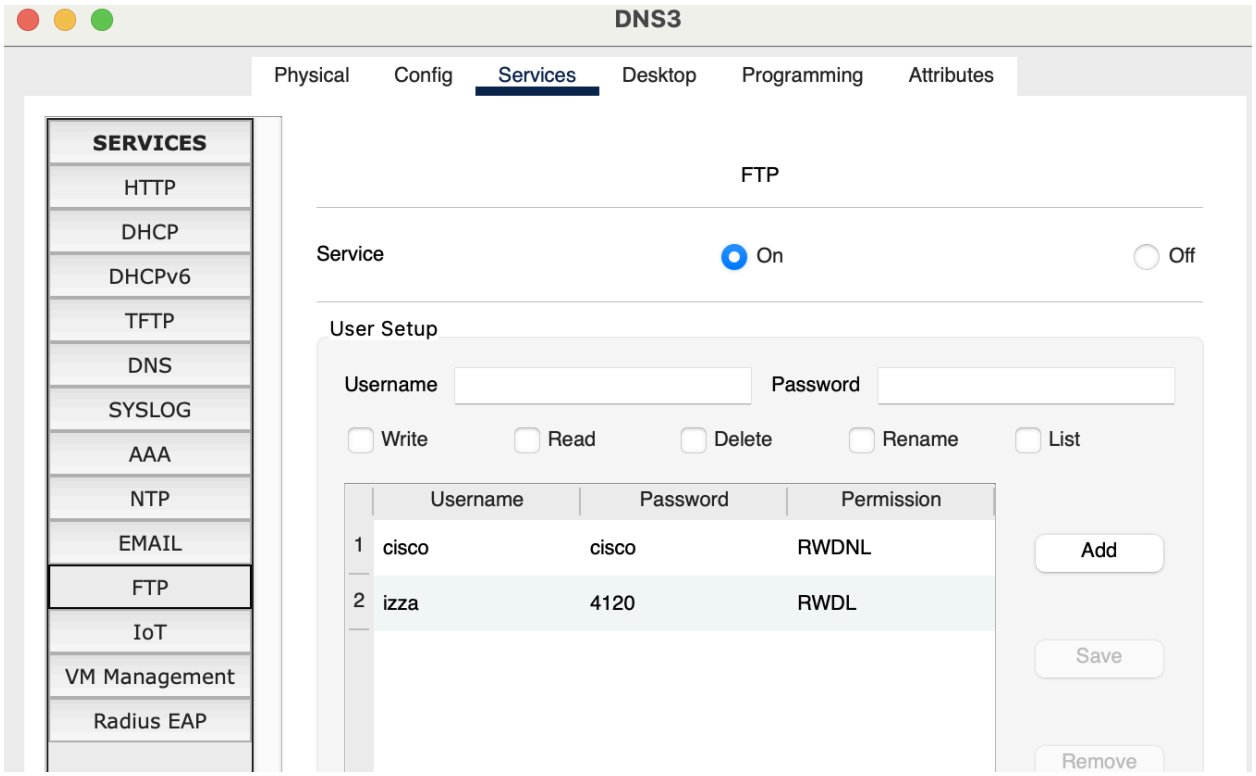
DNS3
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DHCPv6
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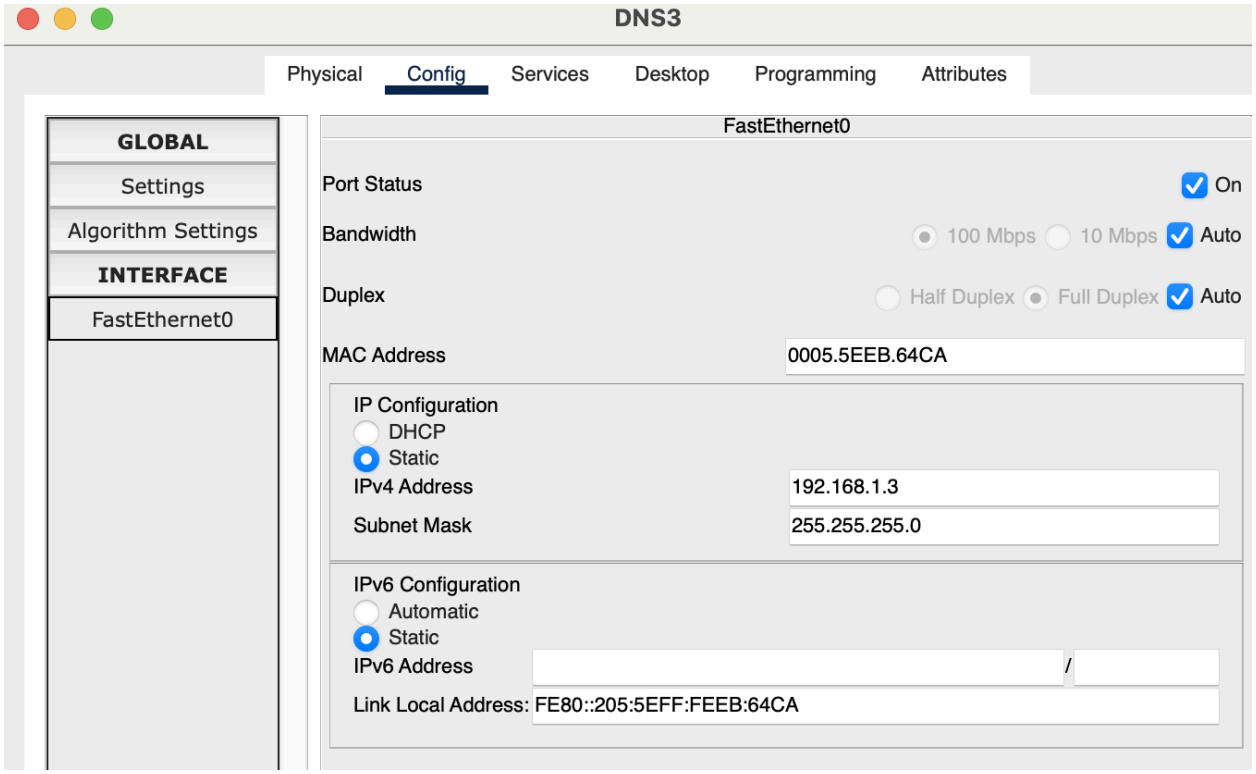
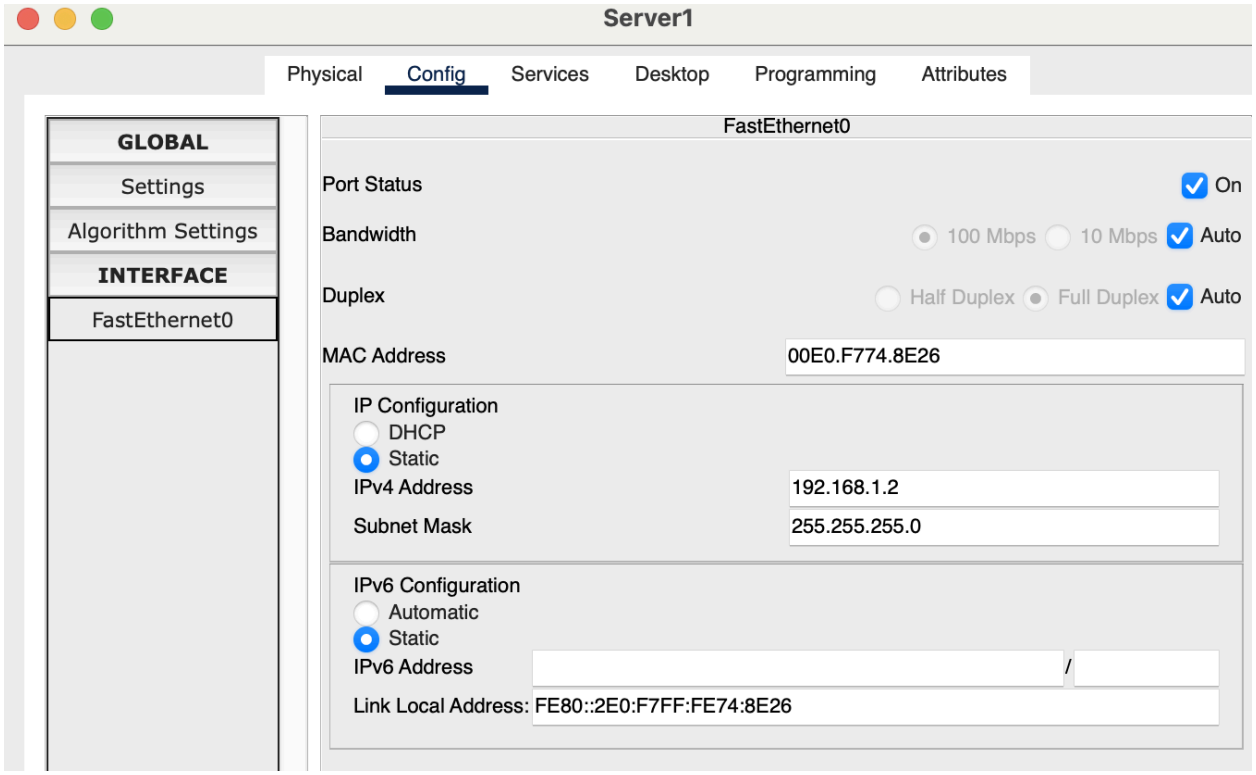
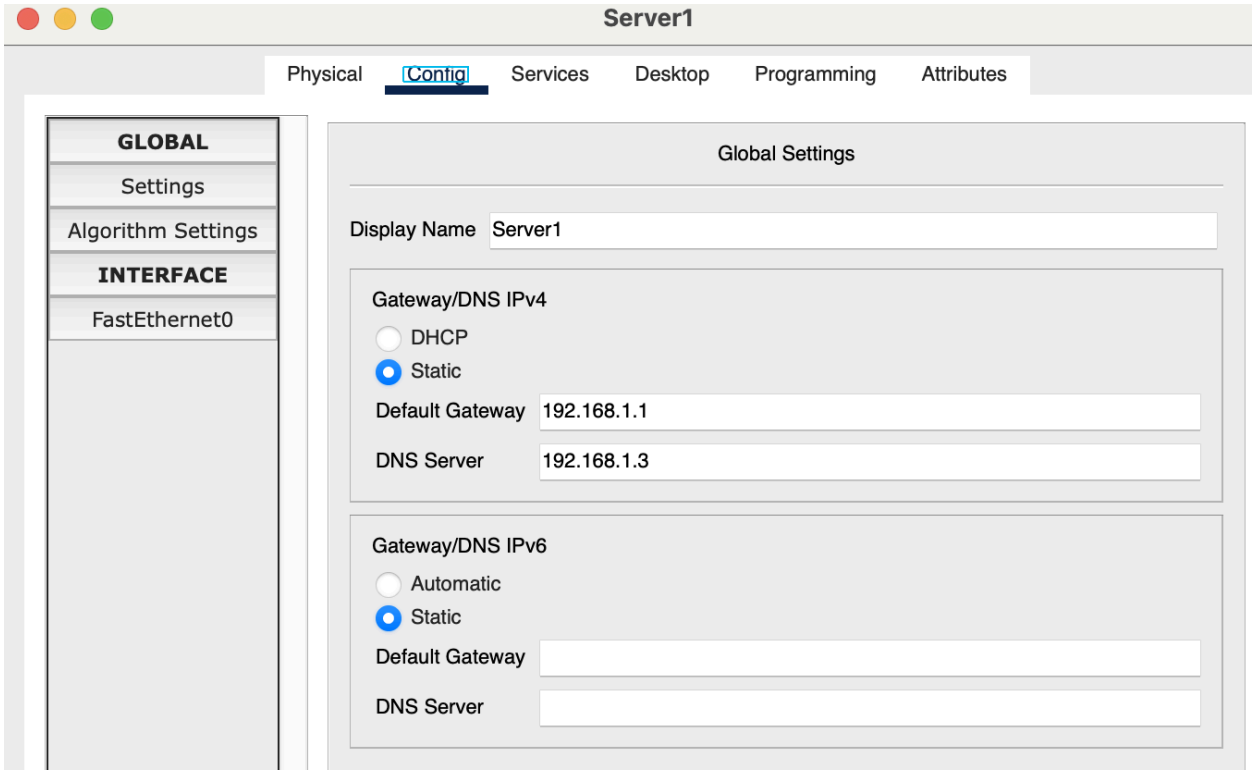
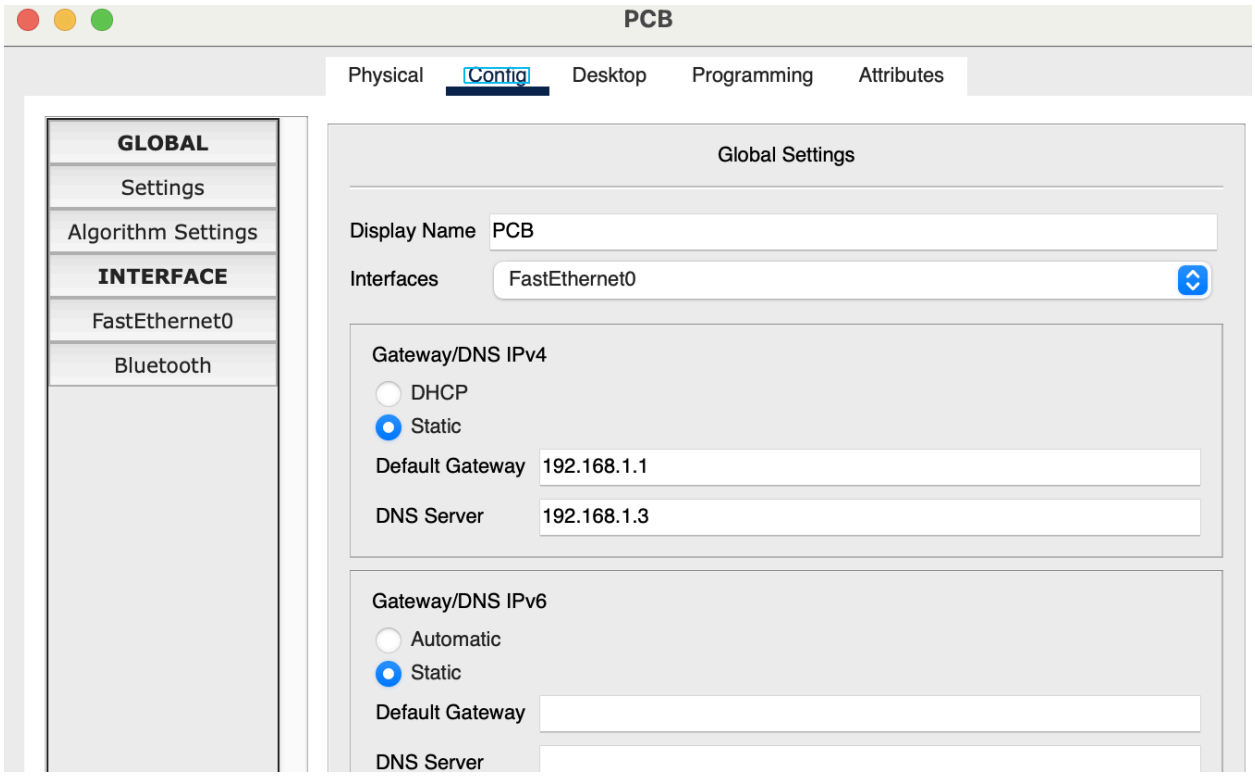
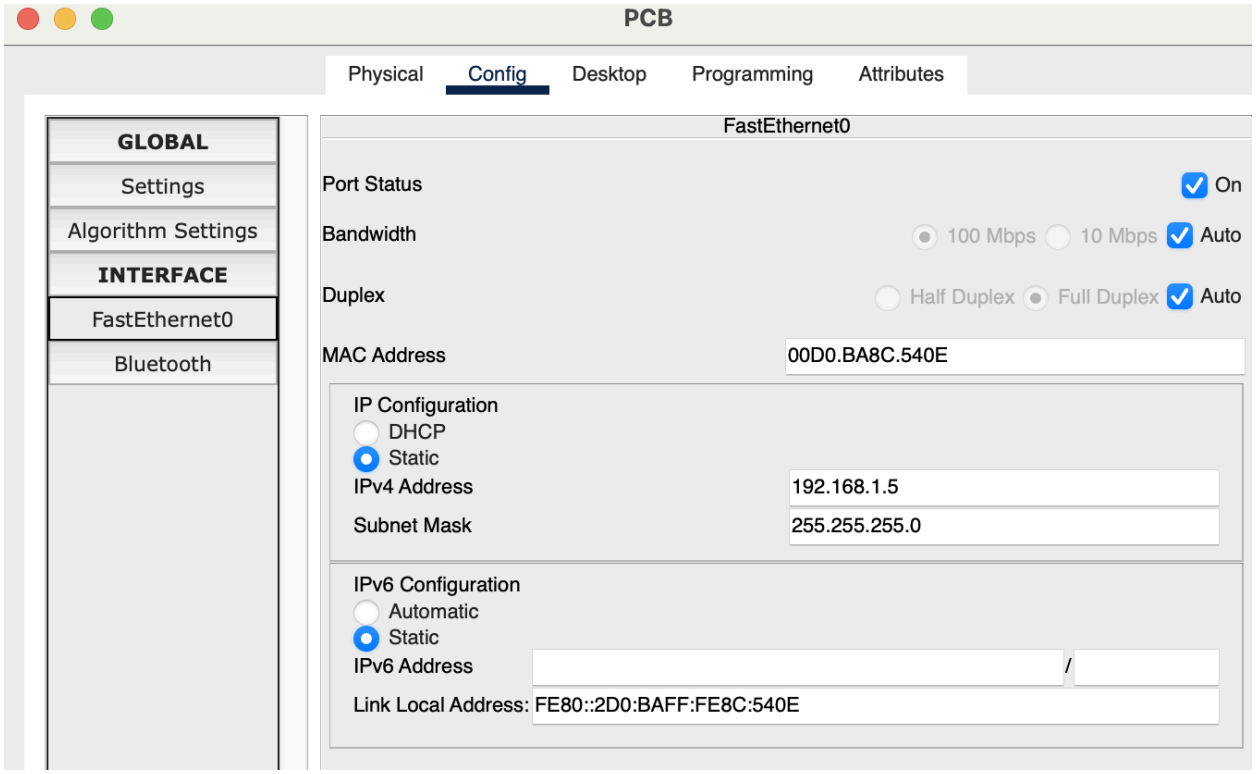
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
FTP
Service
On
Off
User Setup
Username
Password
Write
Read
Delete
Rename
List
Username
Password
Permission
1
cisco
cisco
RWDNL
2
izza
4120
RWDL
Add
Save
Remove

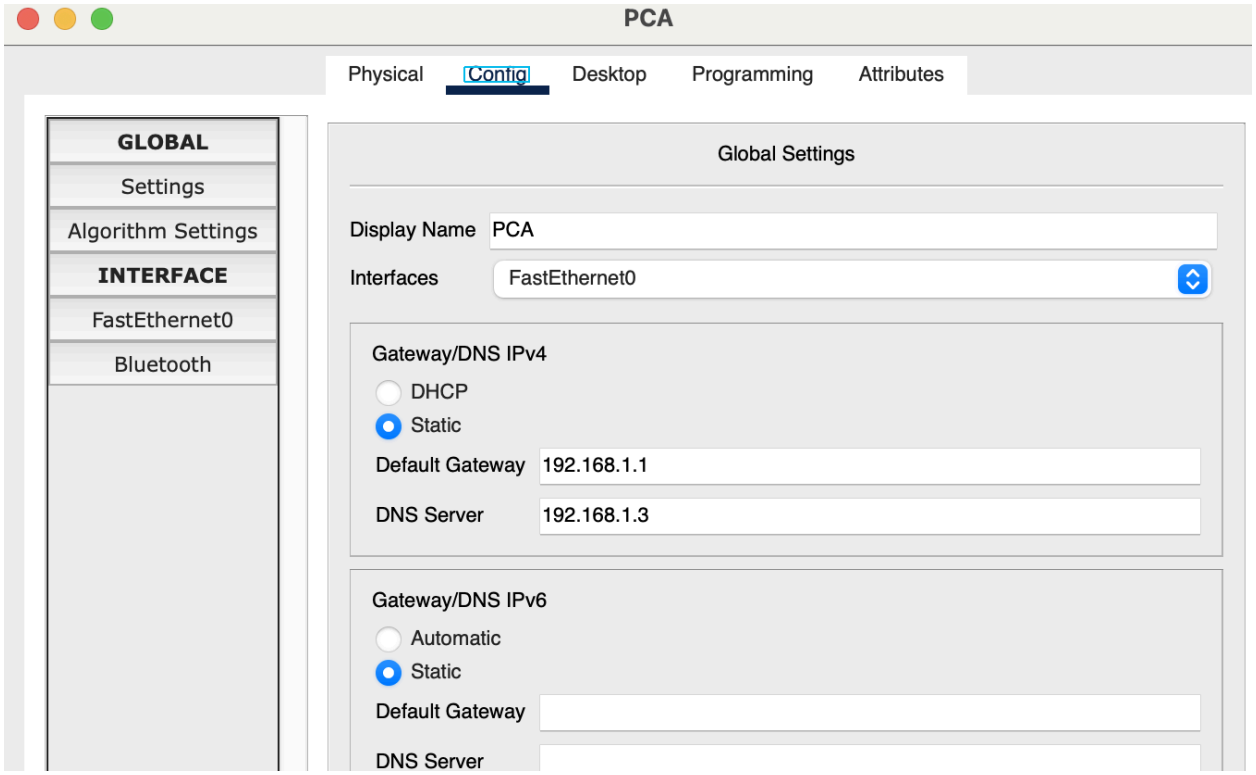

DNS3
Physical
Config
Services
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0005.5EEB.64CA
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.3
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address:
FE80::205:5EFF:FEEB:64CA

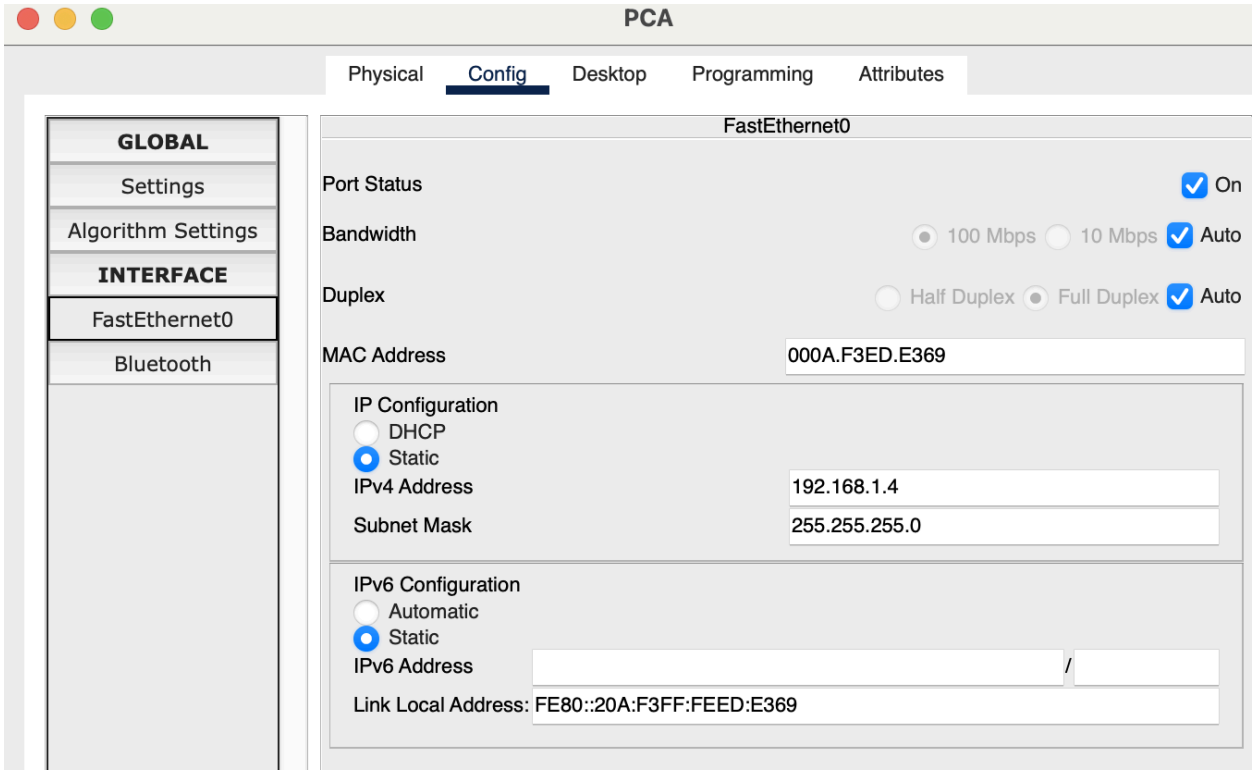

Server1
Physical
Config
Services
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.F774.8E26
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.2
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address:
FE80::2E0:F7FF:FE74:8E26

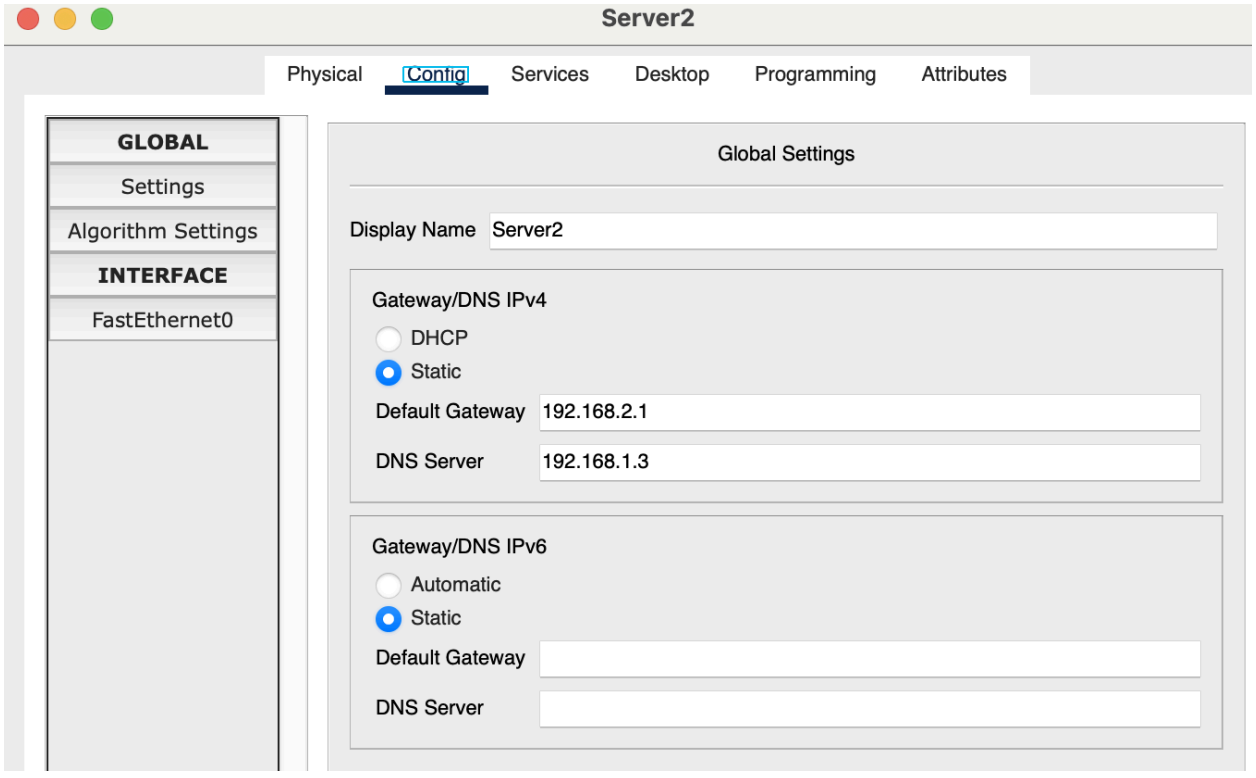

Server1
Physical
Config
Services
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Global Settings
Display Name
Server1
Gateway/DNS IPv4
DHCP
Static
Default Gateway
192.168.1.1
DNS Server
192.168.1.3
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server

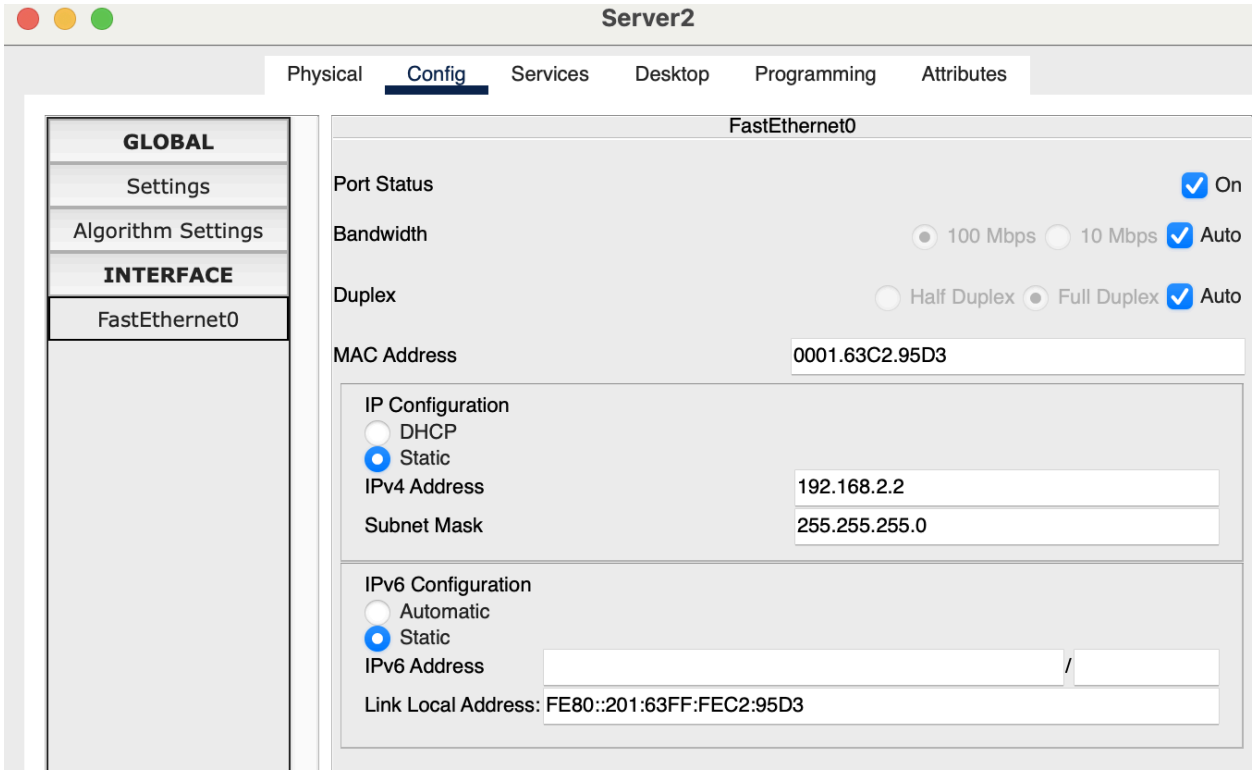

PCB
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
Global Settings
Display Name
PCB
Interfaces
FastEthernet0
Gateway/DNS IPv4
DHCP
Static
Default Gateway
192.168.1.1
DNS Server
192.168.1.3
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server

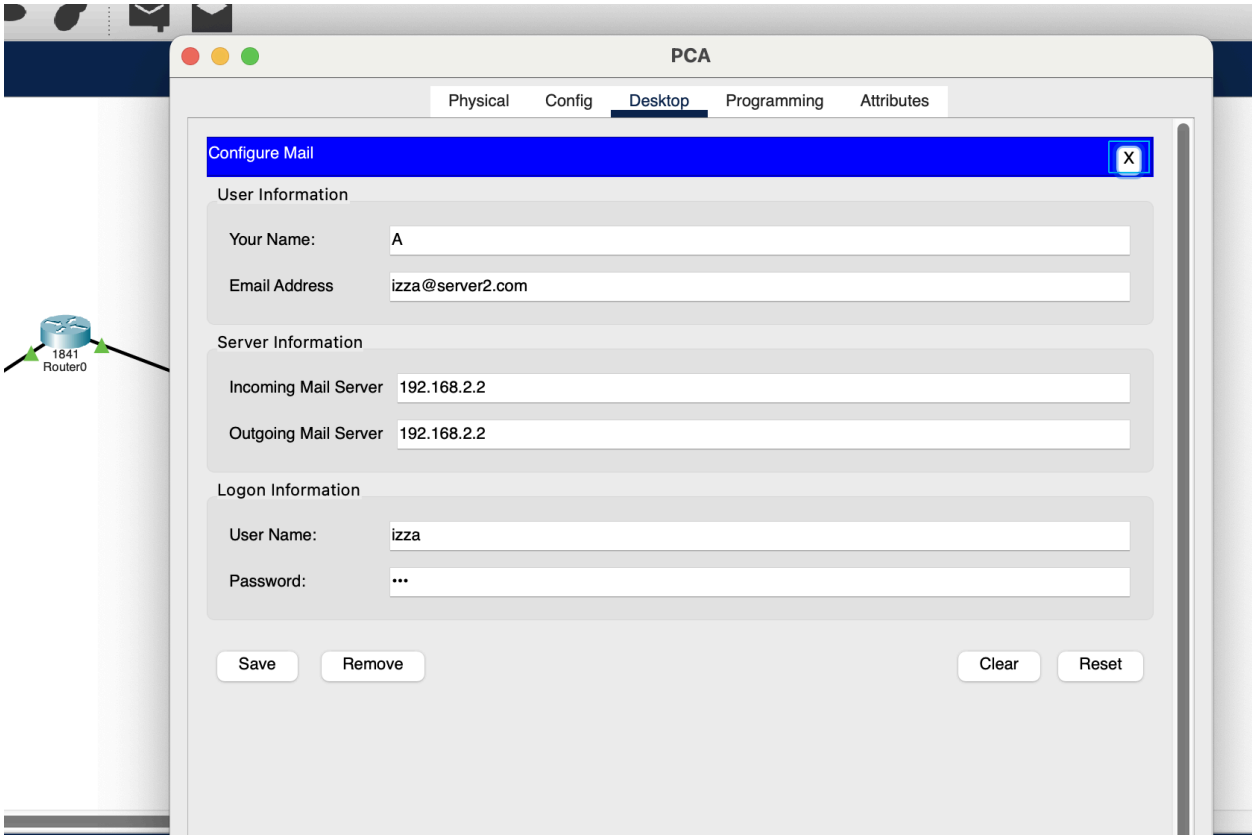

PCB
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00D0.BA8C.540E
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.5
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address:
FE80::2D0:BAFF:FE8C:540E

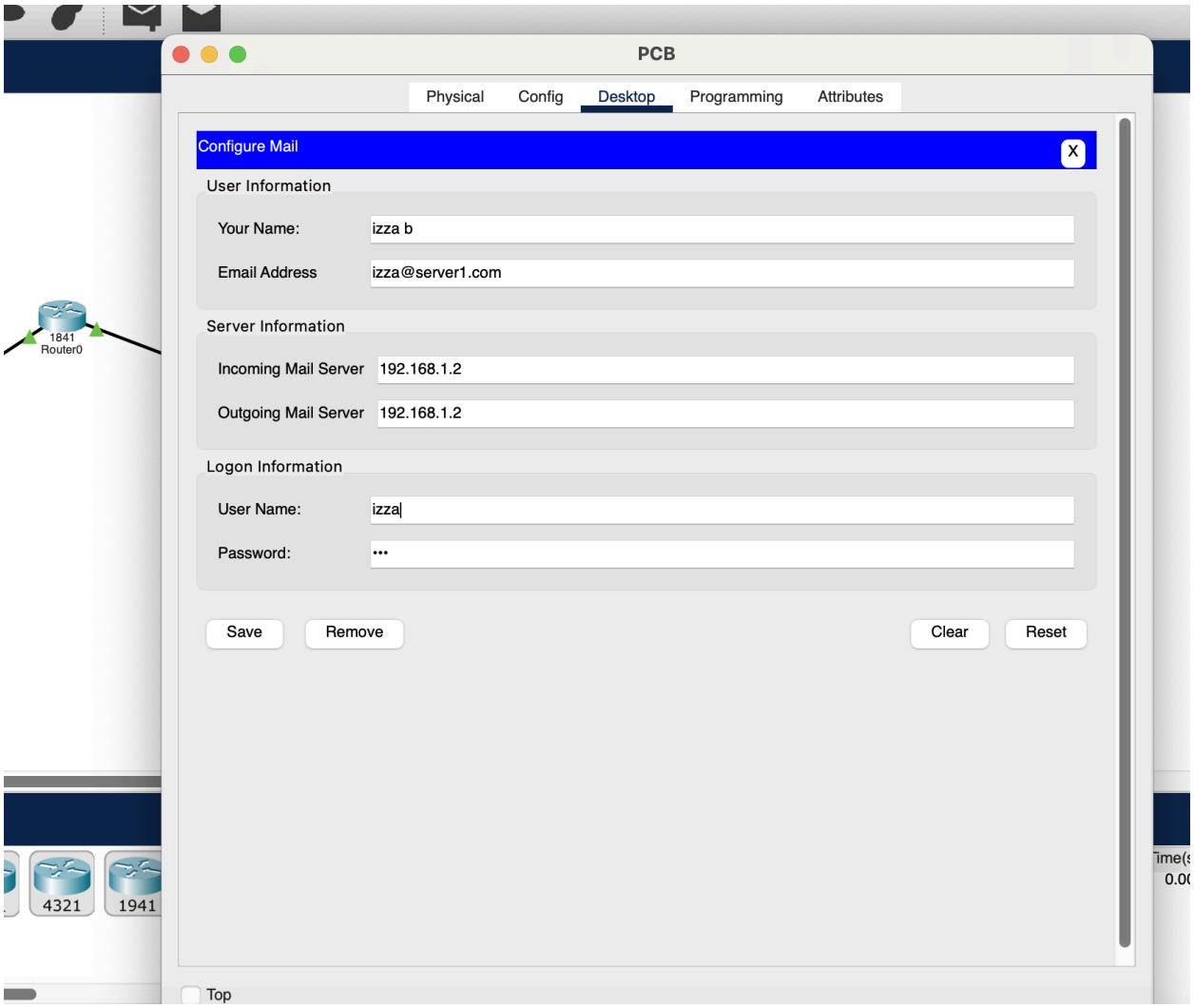

PCA
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
Global Settings
Display Name
PCA
Interfaces
FastEthernet0
Gateway/DNS IPv4
DHCP
Static
Default Gateway
192.168.1.1
DNS Server
192.168.1.3
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server

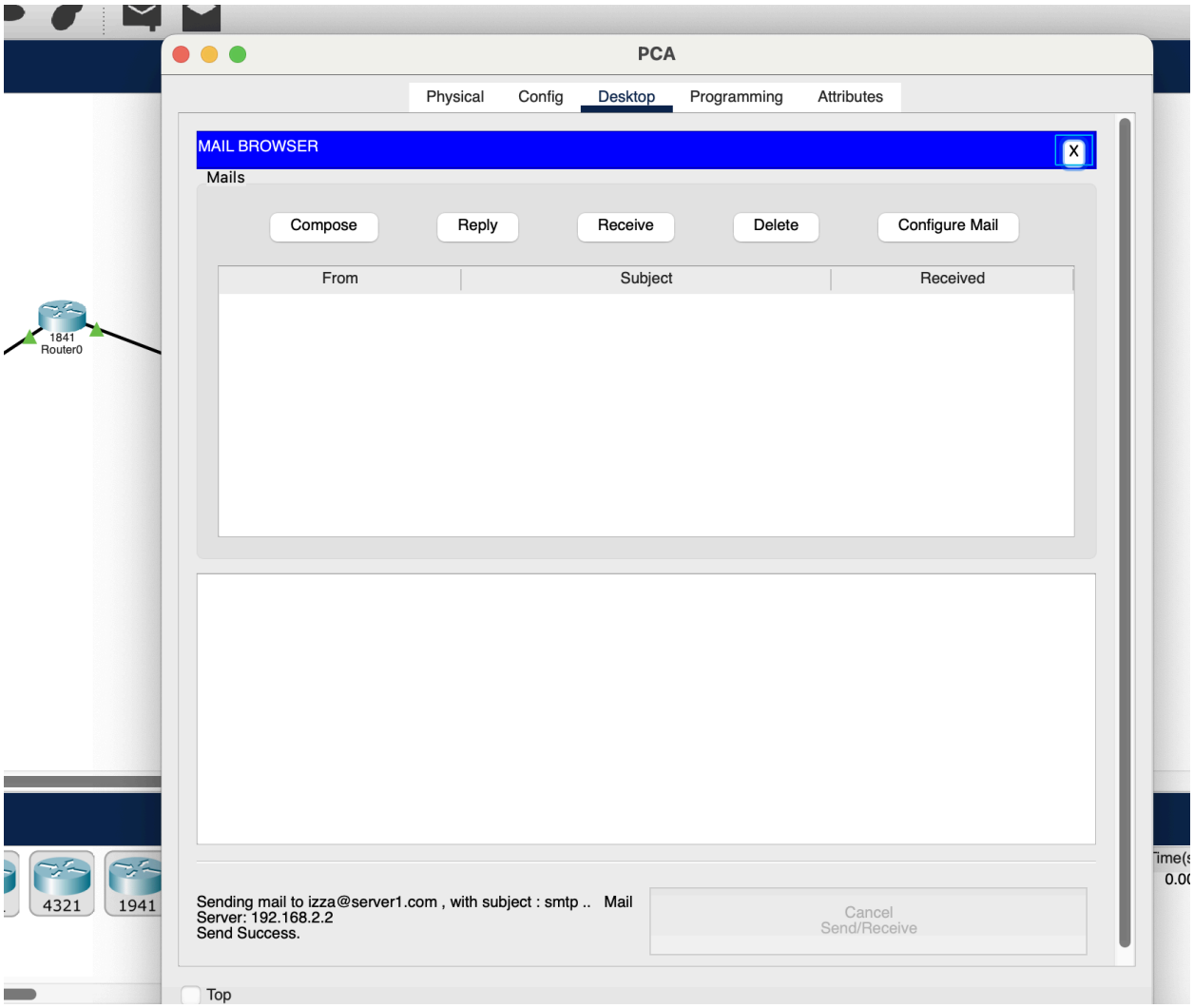

PCA
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
000A.F3ED.E369
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.4
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address:
FE80::20A:F3FF:FEED:E369

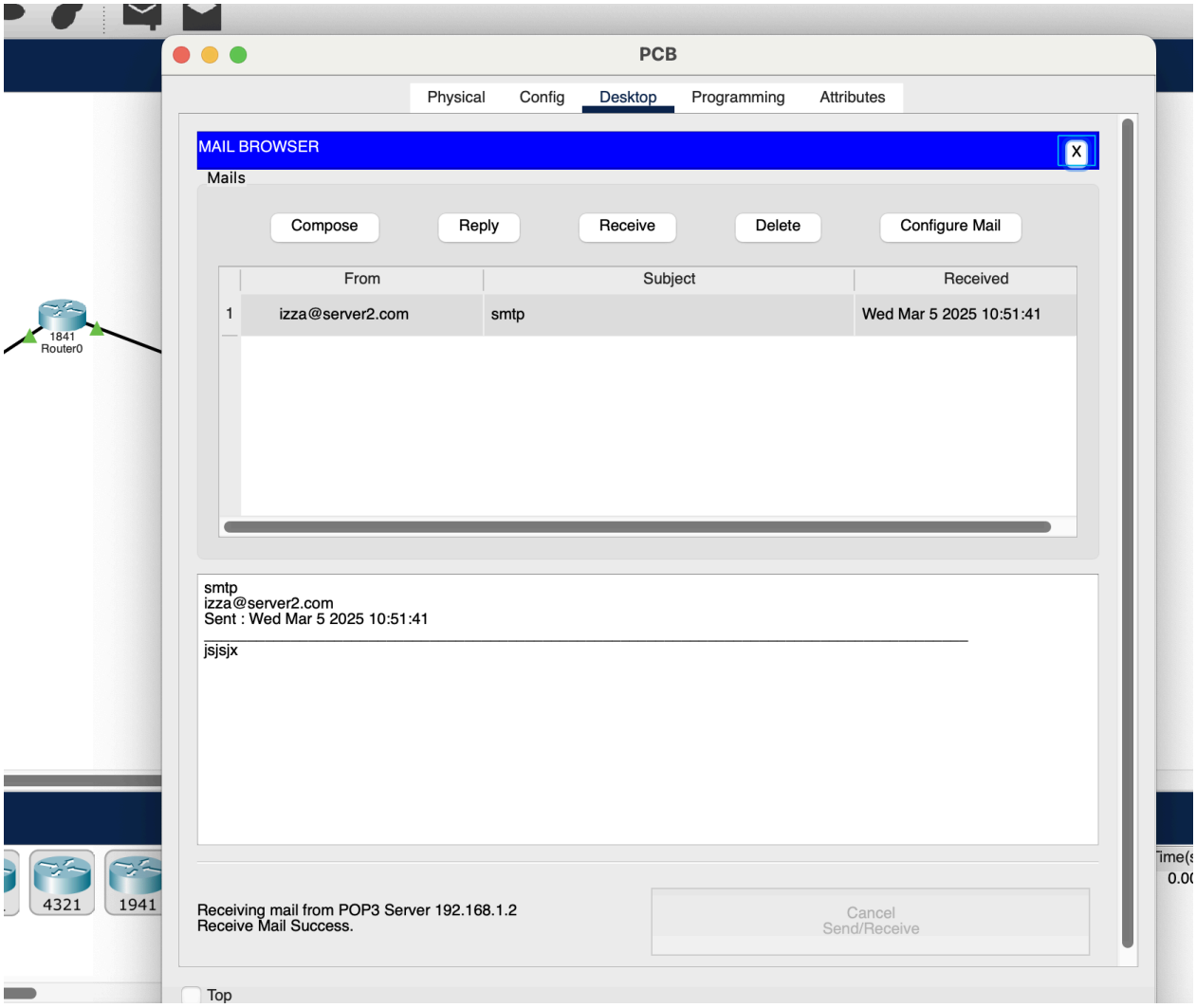

Server2
Physical
Config
Services
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Global Settings
Display Name
Server2
Gateway/DNS IPv4
DHCP
Static
Default Gateway
192.168.2.1
DNS Server
192.168.1.3
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server


Server2
Physical
Config
Services
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.63C2.95D3
IP Configuration
DHCP
Static
IPv4 Address
192.168.2.2
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address:
FE80::201:63FF:FEC2:95D3


PCA
Physical
Config
Desktop
Programming
Attributes
Configure Mail
X
User Information
Your Name:
A
Email Address
izza@server2.com
Server Information
Incoming Mail Server
192.168.2.2
Outgoing Mail Server
192.168.2.2
Logon Information
User Name:
izza
Password:
•••
Save
Remove
Clear
Reset
1841
Router0


PCB
Physical
Config
Desktop
Programming
Attributes
Configure Mail
X
User Information
Your Name:
izza b
Email Address
izza@server1.com
Server Information
Incoming Mail Server
192.168.1.2
Outgoing Mail Server
192.168.1.2
Logon Information
User Name:
izza
Password:
Save
Remove
Clear
Reset
1841
Router0
4321
1941
Top


PCA
Physical
Config
Desktop
Programming
Attributes
MAIL BROWSER
X
Mails
Compose
Reply
Receive
Delete
Configure Mail
From
Subject
Received
Sending mail to izza@server1.com , with subject : smtp .. Mail Server: 192.168.2.2
Send Success.
Cancel
Send/Receive
Top
1841
Router0
4321
1941


PCB
Physical
Config
Desktop
Programming
Attributes
MAIL BROWSER
X
Mails
Compose
Reply
Receive
Delete
Configure Mail
From
Subject
Received
1
izza@server2.com
smtp
Wed Mar 5 2025 10:51:41
smtp
izza@server2.com
Sent : Wed Mar 5 2025 10:51:41
jsjsjx
Receiving mail from POP3 Server 192.168.1.2
Receive Mail Success.
Cancel
Send/Receive
Top
1841
Router0
4321
1941