# Lab2

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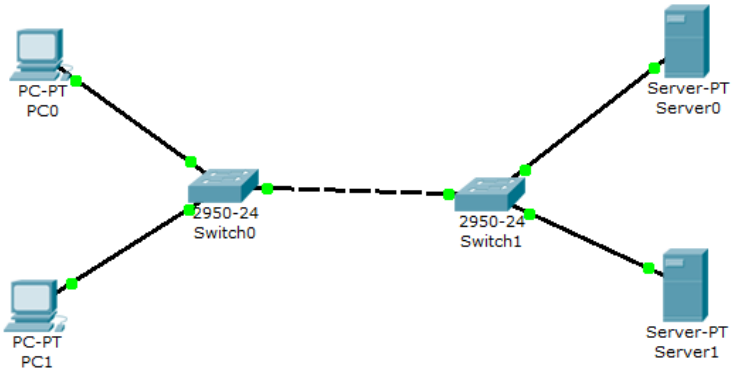
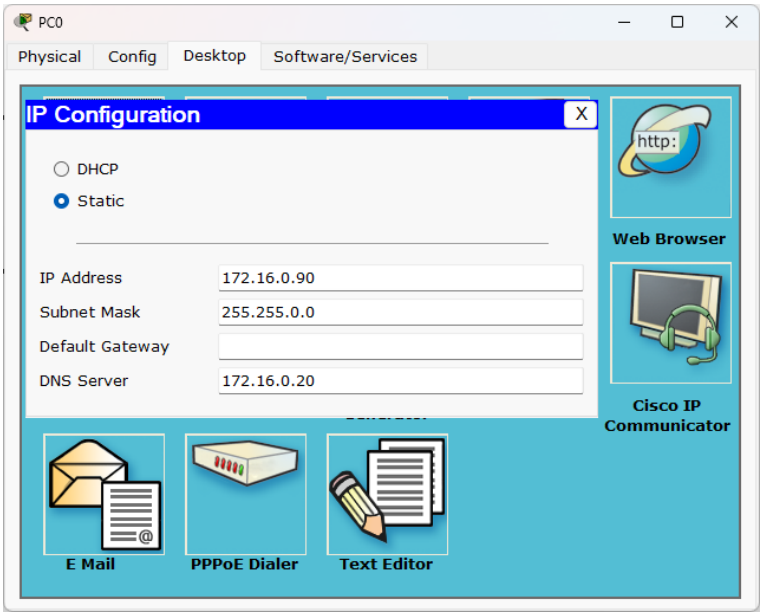
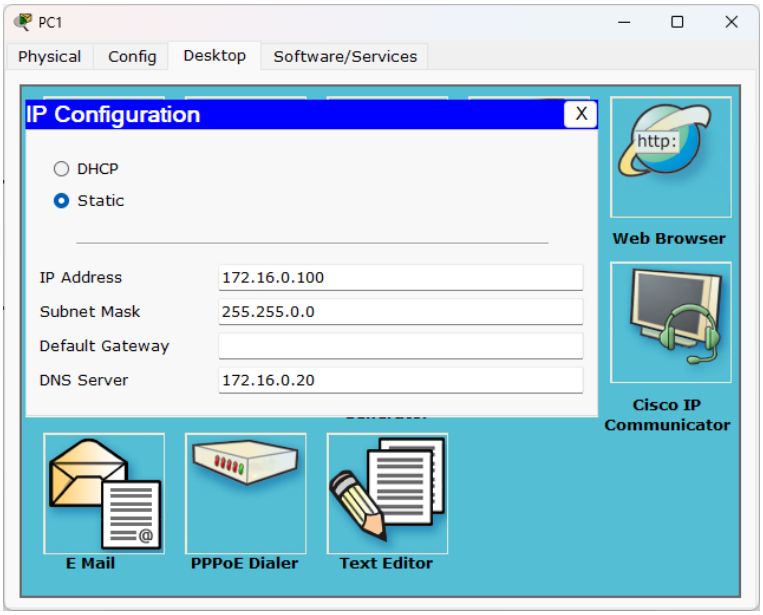
ID: 222320008

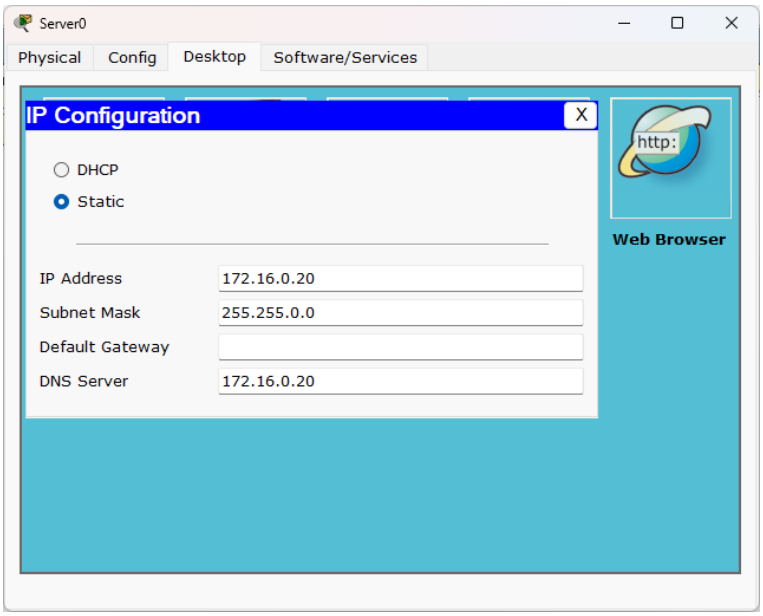
1. Building a network topology

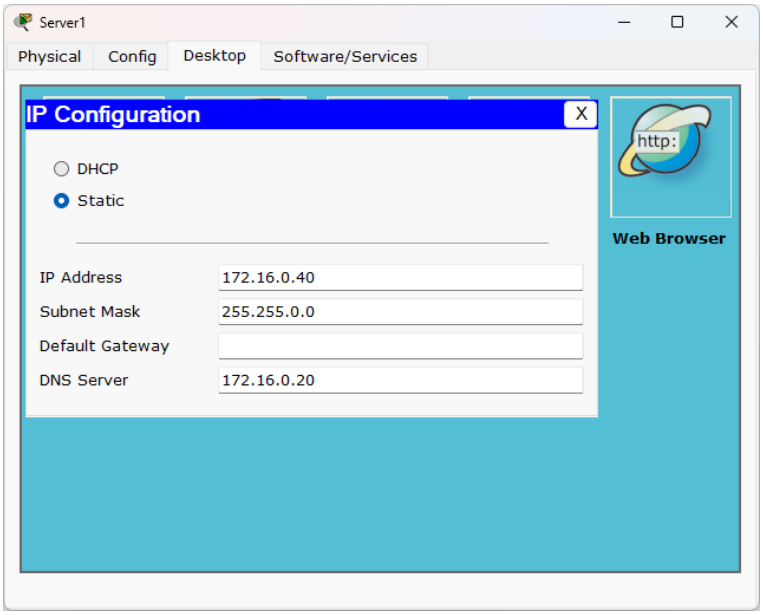



Meanwhile, configure network devices according to the specified parameters.

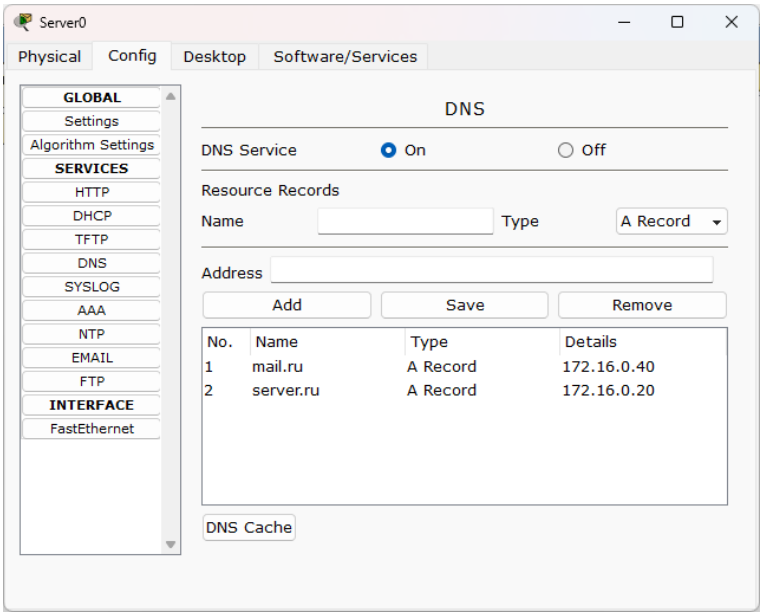


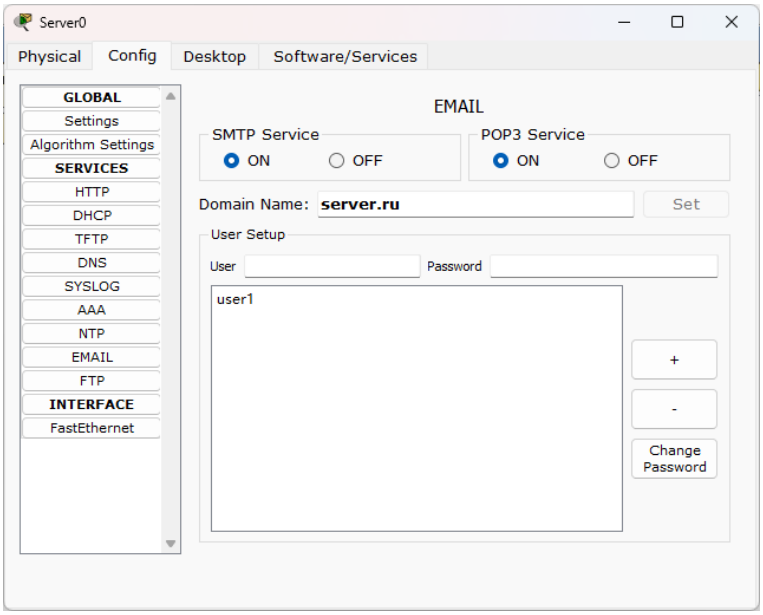

PC1
Physical
Config
Desktop
Software/Services
IP Configuration
X
DHCP
Static
IP Address
172.16.0.100
Subnet Mask
255.255.0.0
Default Gateway
DNS Server
172.16.0.20
Web Browser
Cisco IP Communicator
E Mail
PPPoE Dialer
Text Editor

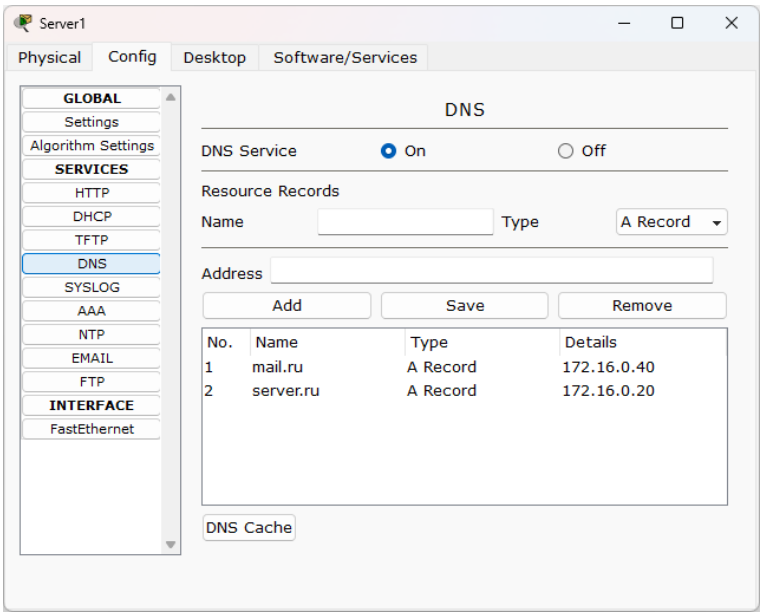

Server0
Physical
Config
Desktop
Software/Services
IP Configuration
X
DHCP
Static
IP Address
172.16.0.20
Subnet Mask
255.255.0.0
Default Gateway
DNS Server
172.16.0.20
Web Browser

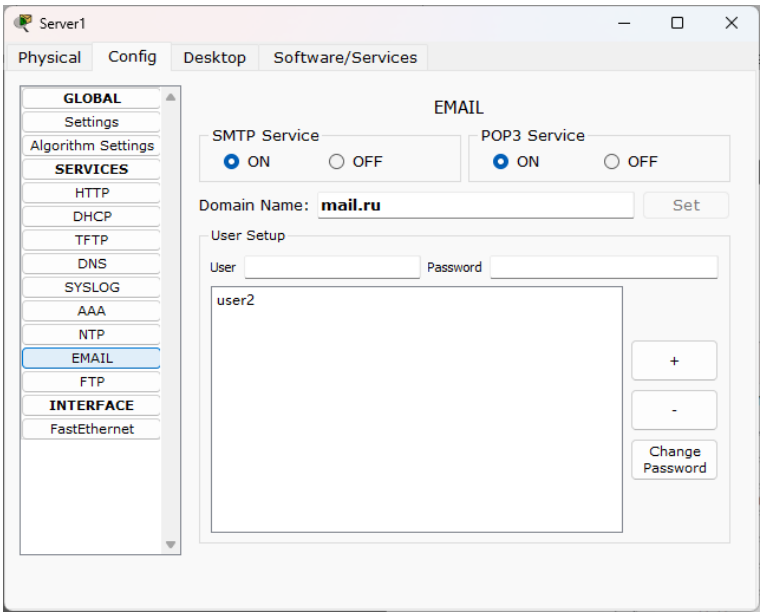


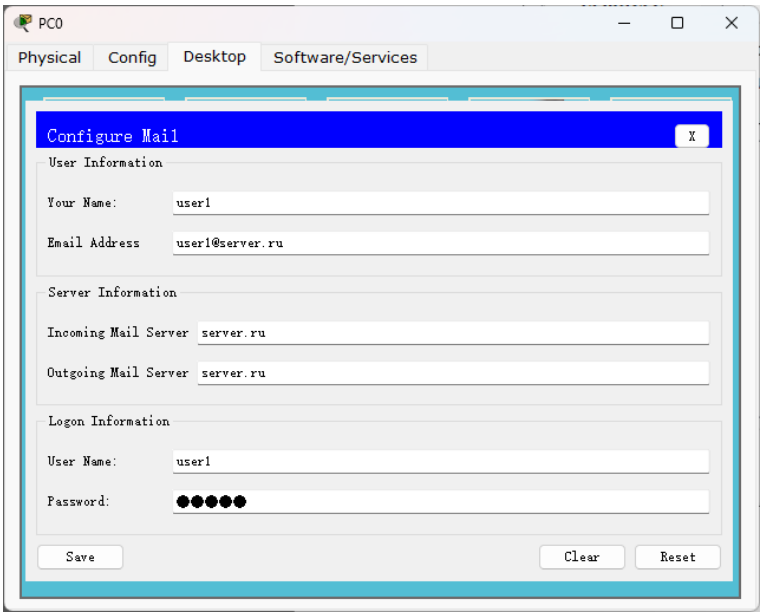

2. Setting up the mail server

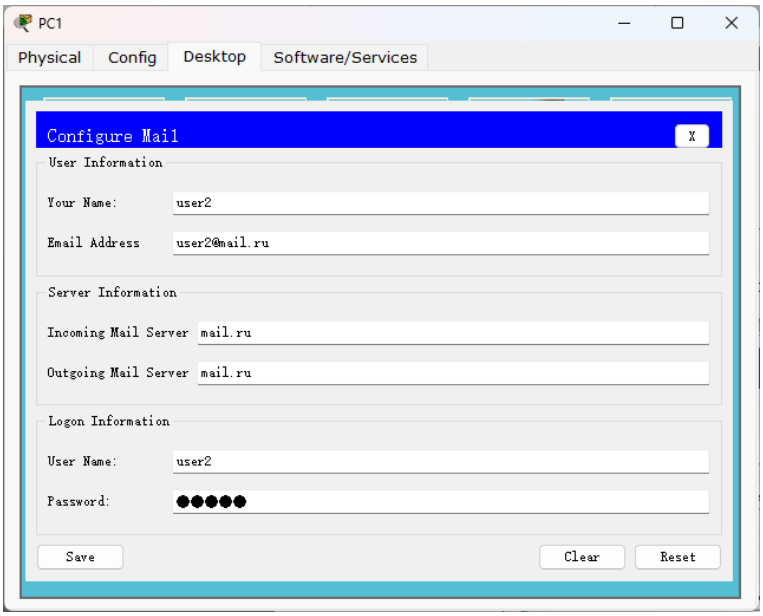



Server0
Physical
Config
Desktop
Software/Services
GLOBAL
Settings
Algorithm Settings
SERVICES
HTTP
DHCP
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
INTERFACE
FastEthernet
EMAIL
SMTP Service
ON
OFF
POP3 Service
ON
OFF
Domain Name: server.ru
Set
User Setup
User
Password
user1
+
-
Change Password

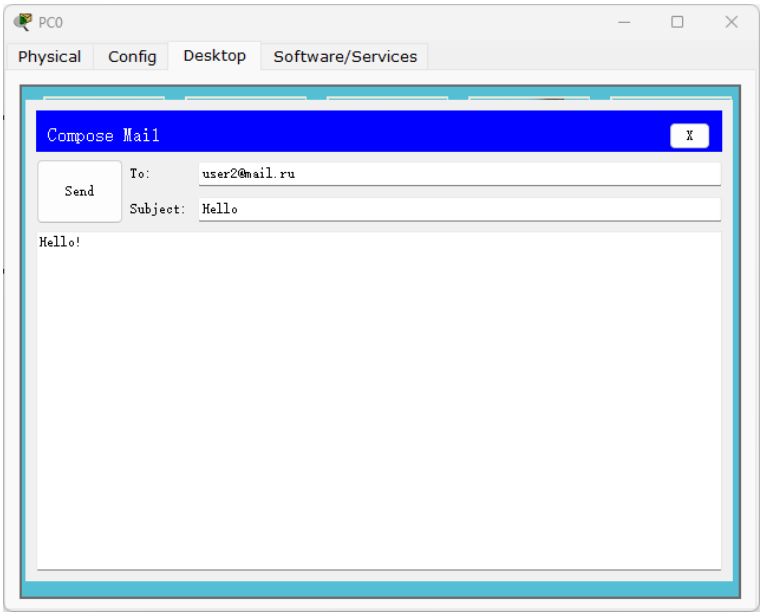

Server1
Physical
Config
Desktop
Software/Services
GLOBAL
Settings
Algorithm Settings
SERVICES
HTTP
DHCP
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
INTERFACE
FastEthernet
DNS
DNS Service
On
Off
Resource Records
Name
Type
A Record
Address
Add
Save
Remove
No.
Name
Type
Details
1
mail.ru
A Record
172.16.0.40
2
server.ru
A Record
172.16.0.20
DNS Cache


Server1
Physical
Config
Desktop
Software/Services
GLOBAL
Settings
Algorithm Settings
SERVICES
HTTP
DHCP
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
INTERFACE
FastEthernet
EMAIL
SMTP Service
ON
OFF
POP3 Service
ON
OFF
Domain Name:
mail.ru
Set
User Setup
User
Password
user2
+
-
Change Password

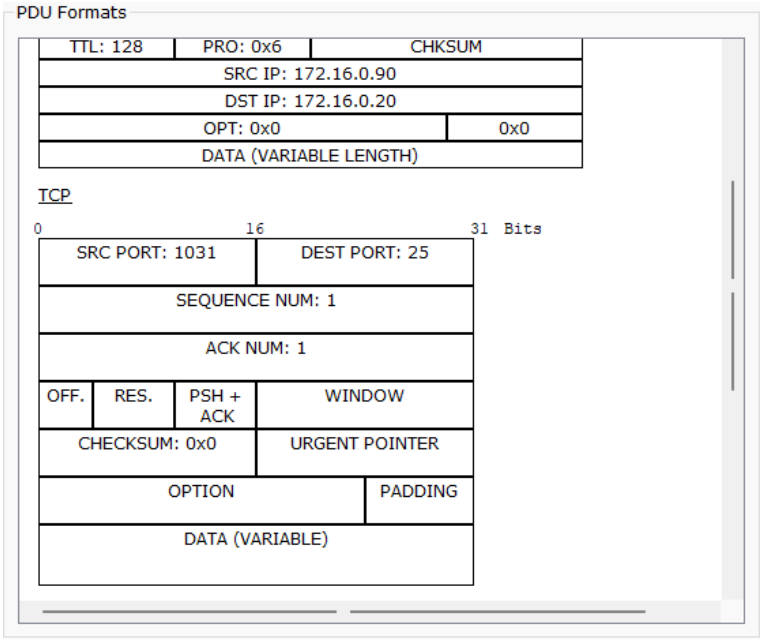

PC0
Physical
Config
Desktop
Software/Services
Configure Mail
X
User Information
Your Name:
user1
Email Address
user1@server.ru
Server Information
Incoming Mail Server
server.ru
Outgoing Mail Server
server.ru
Logon Information
User Name:
user1
Password:
Save
Clear
Reset

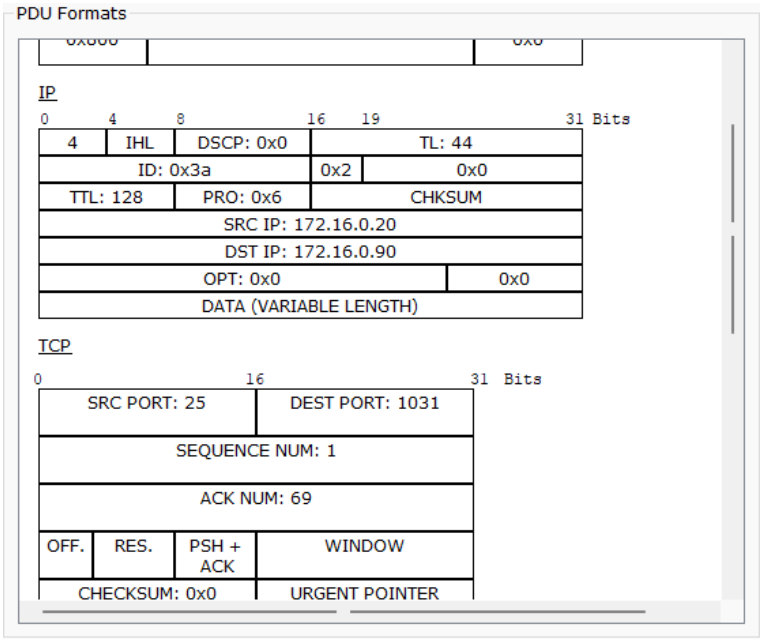



3. Research of applied mail protocols in simulation mode




We need to press “Send” button to send the letter. And the node will produce a SMTP package. The message is sending from 172.16.90:1031 to 172.16.20:25 with the contents of the mail. And the server will response the SMTP package back to PC0.




Sever0 accesses the DNS server for mail.ru and sends the mail from 1031 port of itself to the port 25 of specified server. And the specified server will also send a response back to server0.

PDU Formats

IP

| 0 | 4 | 8 | 16 | 19 | 31 Bits |
|---|---|---|---|---|---|
| 4 | IHL | DSCP: 0x0 | TL: 88 | | |
| ID: 0x3e | | | 0x2 | 0x0 | |
| TTL: 128 | | PRO: 0x6 | CHKSUM | | |
| SRC IP: 172.16.0.20 | | | | | |
| DST IP: 172.16.0.40 | | | | | |
| OPT: 0x0 | | | | 0x0 | |
| DATA (VARIABLE LENGTH) | | | | | |

TCP

| 0 | 16 | 31 Bits |
|---|---|---|
| SRC PORT: 1028 | DEST PORT: 25 | |
| SEQUENCE NUM: 1 | | |
| ACK NUM: 1 | | |
| OFF. RES. | PSH + ACK | WINDOW |
| CHECKSUM: 0x0 | URGENT POINTER | |

PDU Formats

IP

| 0 | 4 | 8 | 16 | 19 | 31 Bits |
|---|---|---|---|---|---|
| 4 | IHL | DSCP: 0x0 | TL: 44 | | |
| ID: 0x14 | | | 0x2 | 0x0 | |
| TTL: 128 | | PRO: 0x6 | CHKSUM | | |
| SRC IP: 172.16.0.40 | | | | | |
| DST IP: 172.16.0.20 | | | | | |
| OPT: 0x0 | | | | 0x0 | |
| DATA (VARIABLE LENGTH) | | | | | |

TCP

| 0 | 16 | 31 Bits |
|---|---|---|
| SRC PORT: 25 | DEST PORT: 1028 | |
| SEQUENCE NUM: 1 | | |
| ACK NUM: 69 | | |
| OFF. RES. | PSH + ACK | WINDOW |
| CHECKSUM: 0x0 | URGENT POINTER | |

Until now, the mail has successfully sent to the destination server. However, if the PC1 wants to receive the mail, it has to send POP3 package to its own mail server to pull the mail store in it. The POP3 package returned by server will contain all the mail sending to PC1. The ports for this are 1028 on PC1 and 110 on server.

PDU Formats

IP

| 0 | 4 | 8 | 16 | 19 | 31 Bits |
|---|---|---|---|---|---|
| 4 | IHL | DSCP: 0x0 | TL: 42 | | |
| ID: 0x16 | | | 0x2 | 0x0 | |
| TTL: 128 | | PRO: 0x6 | CHKSUM | | |
| SRC IP: 172.16.0.100 | | | | | |
| DST IP: 172.16.0.40 | | | | | |
| OPT: 0x0 | | | | 0x0 | |
| DATA (VARIABLE LENGTH) | | | | | |

TCP

| 0 | 16 | 31 Bits |
|---|---|---|
| SRC PORT: 1028 | DEST PORT: 110 | |
| SEQUENCE NUM: 1 | | |
| ACK NUM: 1 | | |
| OFF. / RES. / PSH + ACK | WINDOW | |
| CHECKSUM: 0x0 | URGENT POINTER | |

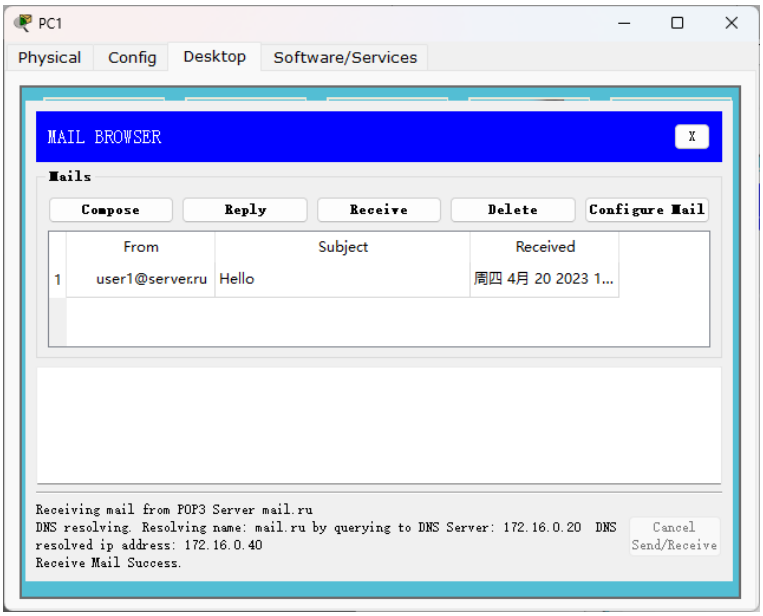
PDU Formats

IP

| 0 | 4 | 8 | 16 | 19 | 31 Bits |
|---|---|---|---|---|---|
| 4 | IHL | DSCP: 0x0 | TL: 42 | | |
| ID: 0x17 | | | 0x2 | 0x0 | |
| TTL: 128 | | PRO: 0x6 | CHKSUM | | |
| SRC IP: 172.16.0.40 | | | | | |
| DST IP: 172.16.0.100 | | | | | |
| OPT: 0x0 | | | | 0x0 | |
| DATA (VARIABLE LENGTH) | | | | | |

TCP

| 0 | 16 | 31 Bits |
|---|---|---|
| SRC PORT: 110 | DEST PORT: 1028 | |
| SEQUENCE NUM: 1 | | |
| ACK NUM: 23 | | |
| OFF. / RES. / PSH + ACK | WINDOW | |
| CHECKSUM: 0x0 | URGENT POINTER | |




4. Conclusion

- routes of the passages

  The mail will be sent to the server of server.ru in SMTP package. After response to the source device of the mail, the server uses DNS to find the destination server of mail.ru and sends to it. The destination server also needs to response the server of server.ru. Until this, the mail sending has done. Then, the destination device of the mail sends POP3 package to pull the mails from the server of mail.ru. The server response with mails sent to the device in POP3 package. Finally, the mail is received successfully.

- contents

  SMTP: 172.16.0.90:1031 <-> 172.16.0.20:25

  SMTP: 172.16.0.20:1031 <-> 172.16.0.40:25

  POP3: 172.16.0.100:1028 <-> 172.16.0.40:100

- explanation of the results obtained

  SMTP packages will send the mails to the server of the destination of the mails. The users can only receive the mails after POP3 packages pull the mails from the server of its own mail server.