



Computer Networks-Lab 06



Instructor: HURMAT HIDAYAT

CL30001 – Computer Networks-Lab

SEMESTER Fall 2023

NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES, FAST- PESHAWAR CAMPUS
Department of Computer Science & Software Engineering

Computer Networks Lab 06

Objective

The objective of this lab is to provide students with practical experience in configuring email protocols (SMTP, POP3). Students will learn the fundamentals of email protocols, including their functionality and usage. Through hands-on experiments, students will configure SMTP and POP3 on a generic server, send emails between clients, and analyze the email transactions.

Learning Outcomes

By the end of this lab, students will be able to:

- Understand the purpose and functionality of email protocols such as SMTP, POP3, and IMAP and Configure SMTP and POP3 on a generic server, allowing for email communication.
- Analyze email transactions, including sending emails between clients and examining their contents.

Table of Contents

Objective	1
Learning Outcomes.....	1
Email protocols	3
What is SMTP?	3
What is POP3?	4
What is IMAP?	4
What is the difference between SMTP, POP3, and IMAP?	5
Incoming vs. outgoing protocols.....	5
IMAP vs. POP3.....	5
How to configure an email server in Packet Tracer	6
Tasks for students	13

Email protocols

Email is an essential part of business and personal communication online. The email protocols define the mechanism of the email exchange between servers and clients. This way, they allow us to send and receive messages over the network correctly.

Email is an essential part of business and personal communication online. The email protocols define the mechanism of the email exchange between servers and clients. This way, they allow us to send and receive messages over the network correctly.

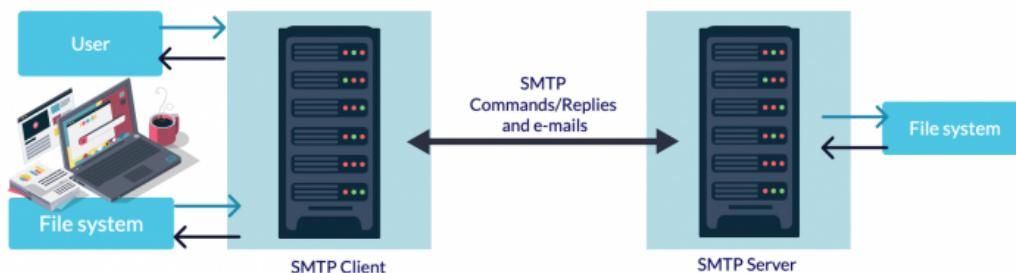
Email protocols list

Email is an essential part of business and personal communication online. The email protocols define the mechanism of the email exchange between servers and clients. This way, they allow us to send and receive messages over the network correctly.

What is SMTP?

SMTP stands for Simple Mail Transfer Protocol, and it is responsible for sending email messages. This protocol is used by email clients and mail servers to exchange emails between computers.

How SMTP works



A mail client and the SMTP server communicate with each other over a connection established through a particular email port. Both entities are using SMTP commands and replies to process your outgoing emails. Thanks to the Simple Mail Transfer Protocol, messages can be sent from the same account on different email applications.

What is POP3?

How POP3 works?

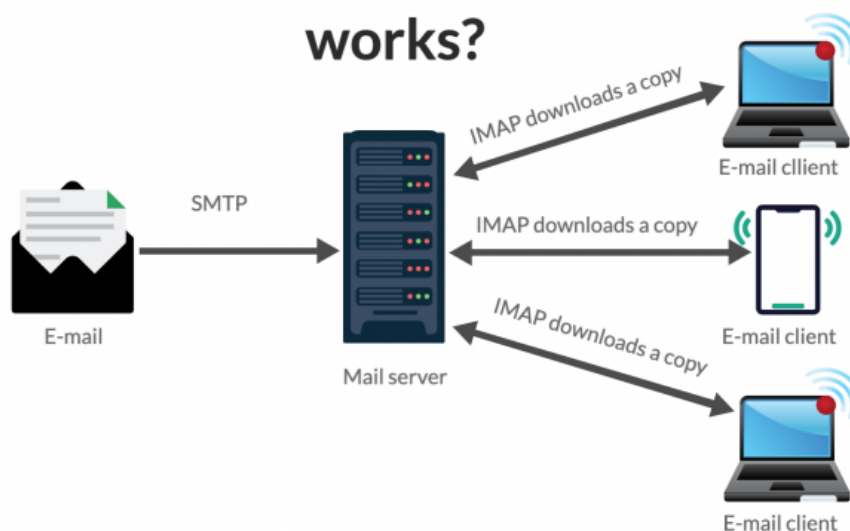


The POP3 abbreviation stands for Post Office Protocol version 3, which provides access to an inbox stored in an email server. It executes the download and delete operations for messages. Thus, when a POP3 client connects to the mail server, it retrieves all messages from the mailbox. Then it stores them on your local computer and deletes them from the remote server.

Thanks to this protocol, you are able to access the messages locally in offline mode as well. Modern POP3 clients allow you to keep a copy of your messages on the server if you explicitly select this option.

What is IMAP?

How IMAP works?



The Internet Message Access Protocol (IMAP) allows you to access and manage your email messages on the email server. This protocol permits you to manipulate folders, permanently delete and efficiently search through messages. It also gives you the option to set or remove email flags, or fetch email attributes selectively. By default, all messages remain on the server until the user specifically deletes them.

IMAP supports the connection of multiple users to a single mail server.

What is the difference between SMTP, POP3, and IMAP?

Incoming vs. outgoing protocols

POP3 and IMAP are handling the incoming emails and they operate in different ways to retrieve or access your email messages. Thus, they are considered mail access protocols.

On the other hand, the Simple Mail Transfer Protocol is behind the message transfer from server to server, or mail client to server. As this is the protocol handling the email sending from an email account, it is labeled as the outgoing protocol.

In short, thanks to IMAP and POP3, you are able to receive emails, and SMTP allows you to send messages.

IMAP vs. POP3

As we already mentioned, both of these protocols relate to email retrieval. All modern servers support both protocols, although they function in different manners.

While the POP3 protocol assumes that your email is being accessed only from one application, IMAP allows simultaneous access by multiple clients. This is why IMAP is more suitable for you, if you're going to access your email from different locations or if your messages are managed by multiple users.

On the other hand, POP3 downloads your emails to your local computer, deleting them from the server. Thus, it reduces the space your email account uses on your web server.

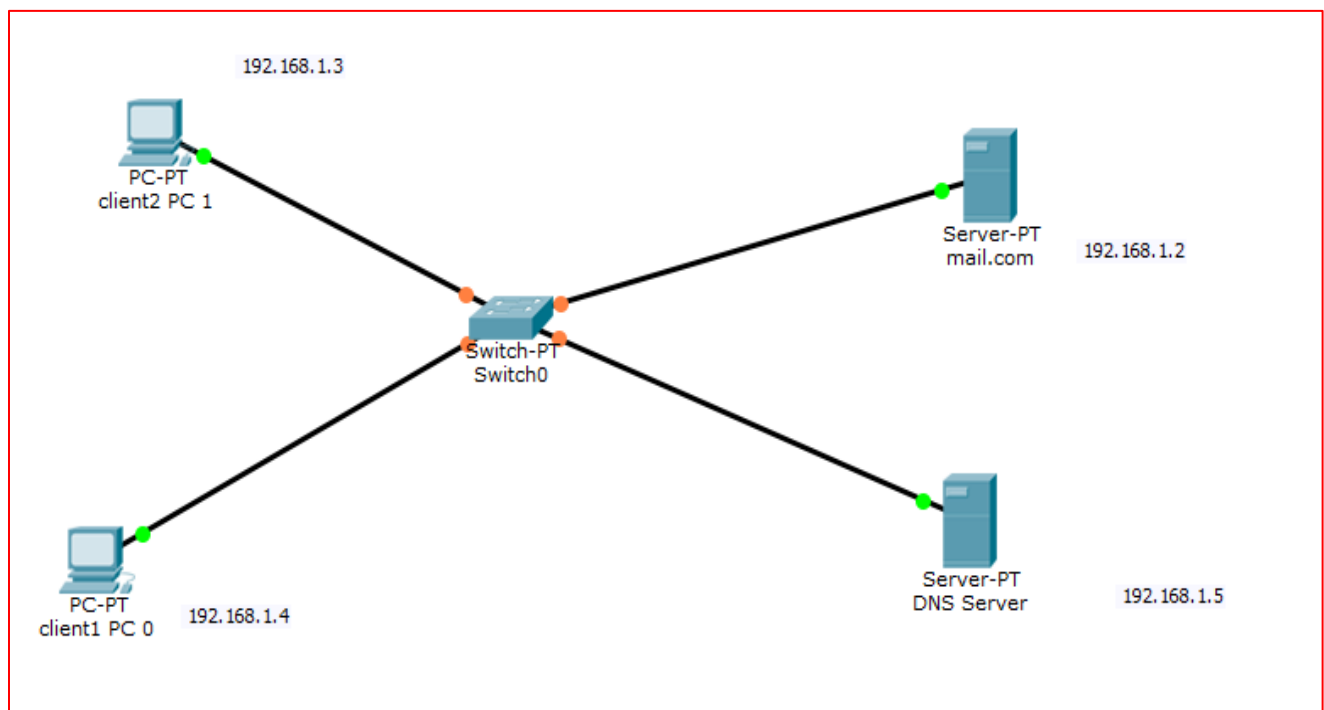
To sum it up, there are 3 email protocols – SMTP, POP3, and IMAP. Each of them works on specific port numbers and operates differently. If you are having trouble connecting to an incoming or outgoing server, try using an alternative port number.

How to configure an email server in Packet Tracer

We'll do a simple configuration of an email server in Packet Tracer. An email server, such as Gmail stores and sends email messages to email clients on request. We often send and receive emails on our mobile devices or computers. Have you ever imagined how this happens? Well, whenever you compose and send an email to another person, the message you send first goes to a mail server. It's the mail server which then sends the email when it is requested from the email client(e.g. Gmail App) of the recipient's device.

So now, let's configure a mail server in Packet Tracer. And have in mind that although our main focus is configuring an email server, we'll still need services of a DNS server at one point. Let's dive right in.

1. Build the network topology



2. Configure IP addresses on the PCs, DNS Server and the Mail Server

- Mail Server IP address: 192.168.1.2
- PC0 IP address: 192.168.1.4
- PC1 IP address: 192.168.1.3
- DNS server IP address: 192.168.1.5

3. Configure mail clients on the PCs and mail service on the generic server.

Mail Clients:

Click on **PC0**. Go to its **Desktop** tab, and click on **Email**. Configure the email client by filling in the user, server and login information. Be sure to **Save**.

PC0:

The screenshot shows a window titled 'client1 PC 0' with tabs for 'Physical', 'Config', 'Desktop', and 'Custom Interface'. The 'Config' tab is active, displaying a 'Configure Mail' dialog box. The dialog box has a blue title bar with a close button (X). It is divided into three sections: 'User Information', 'Server Information', and 'Logon Information'. In the 'User Information' section, 'Your Name' is 'client1' and 'Email Address' is 'client1@mail.com'. In the 'Server Information' section, both 'Incoming Mail Server' and 'Outgoing Mail Server' are 'mail.com'. In the 'Logon Information' section, 'User Name' is 'client1' and 'Password' is masked with dots. At the bottom are 'Save', 'Clear', and 'Reset' buttons.

Section	Field	Value
User Information	Your Name:	client1
	Email Address	client1@mail.com
Server Information	Incoming Mail Server	mail.com
	Outgoing Mail Server	mail.com
Logon Information	User Name:	client1
	Password:

PC1:

Configure mail client on PC1 in a similar way we did for PC0.

The screenshot shows a 'Configure Mail' window with the following fields and values:

Section	Field	Value
User Information	Your Name	client2@mail.com
	Email Address	client2@mail.com
Server Information	Incoming Mail Server	mail.com
	Outgoing Mail Server	mail.com
Logon Information	User Name	client2
	Password

Buttons at the bottom: Save, Clear, Reset.

Mail Server:

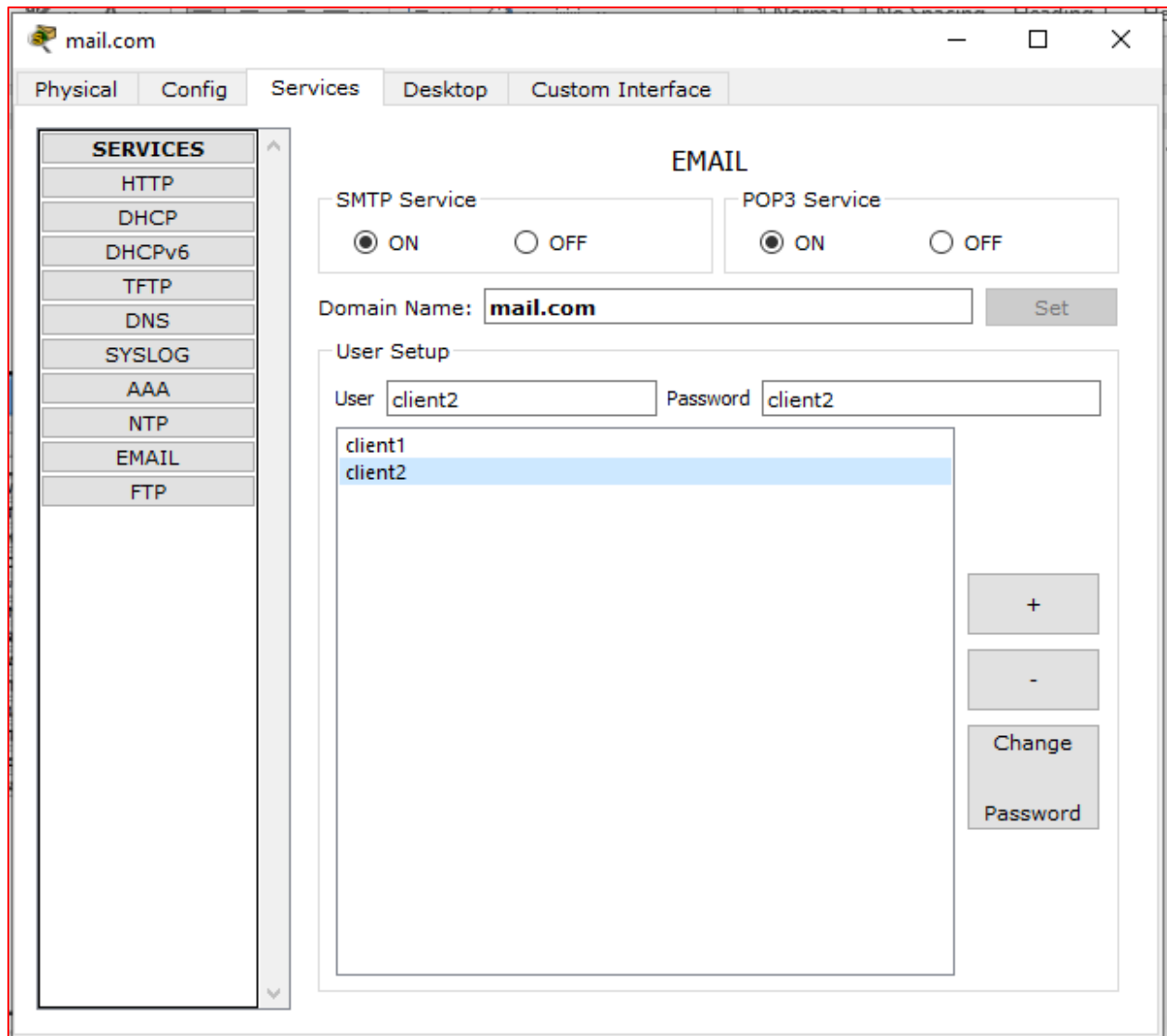
Next, we'll configure the **email server**.

To do this, click on the server, then click **Services** tab, pick **email** server from the menu.

Provide the **Domain name** of the server then click on **Set** to set it. In this example I've used the name 'mail.com'.

Proceed and add **users** and provide their **passwords**. I have two email clients(users) with usernames 'client1' and 'client2' with a common password 'admin'.

After entering a username and password, click on **Add(+)** to add the user to the server. You can optionally remove a user by clicking on **Remove (-)**. You can change a user's password by clicking on **change password**.

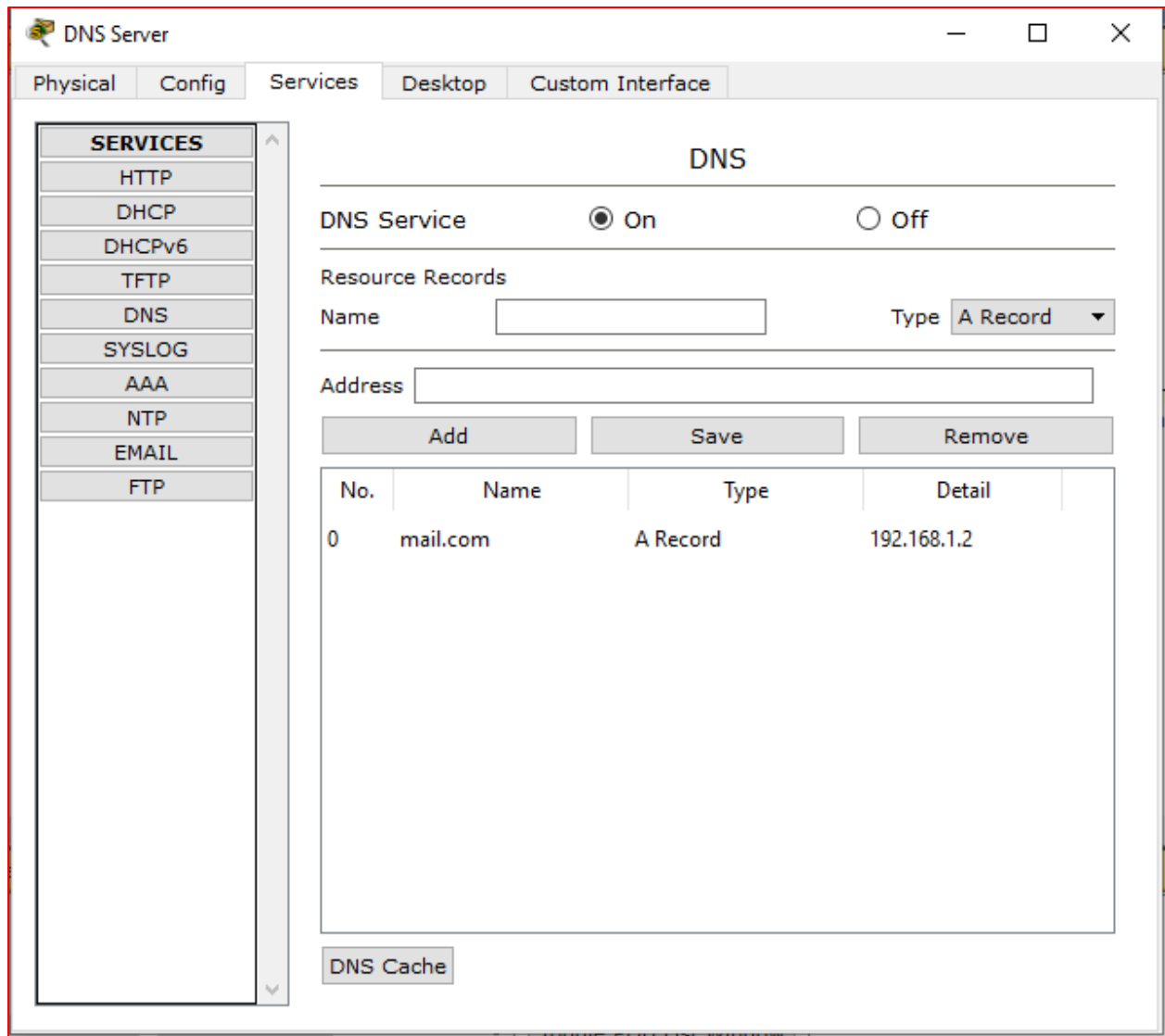


Try to relate this process to what happens when you register an email account with a mail service provider(mail server) like Gmail. The processes appear to agree, isn't it?

Now, notice that we set a **domain name** for the email server. For that reason, we should have a **DNS server** that will resolve this domain name (plus other domain names if there were) to an IP address.

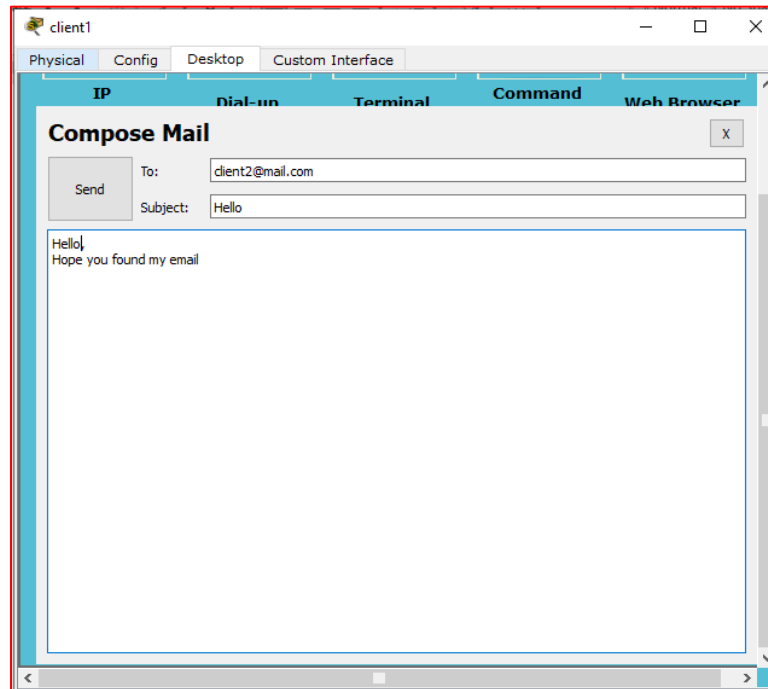
So let's configure a DNS server.

Click DNS server, click **Services** tab, then pick **DNS**. Turn the service **ON**. Set name-address pairs and add them to the server. You can view the DNS entry below:

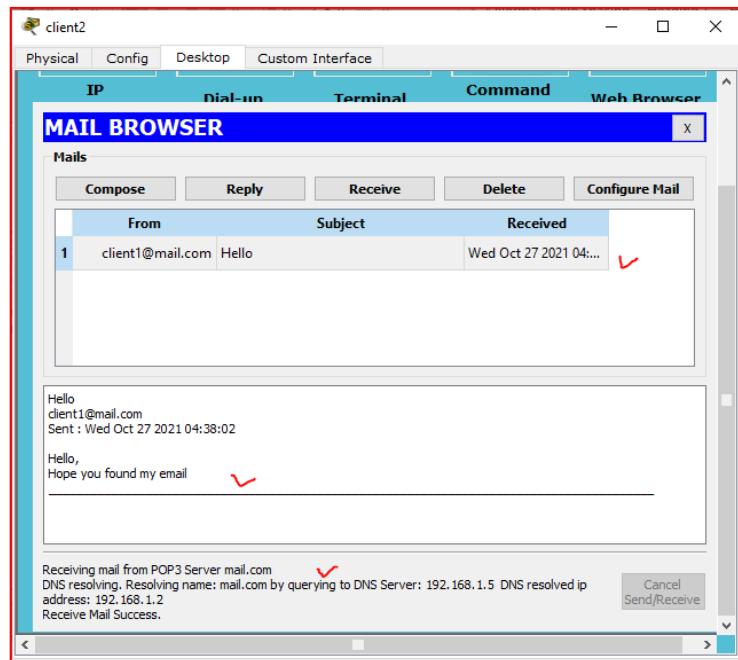


4. Lastly test the email service.

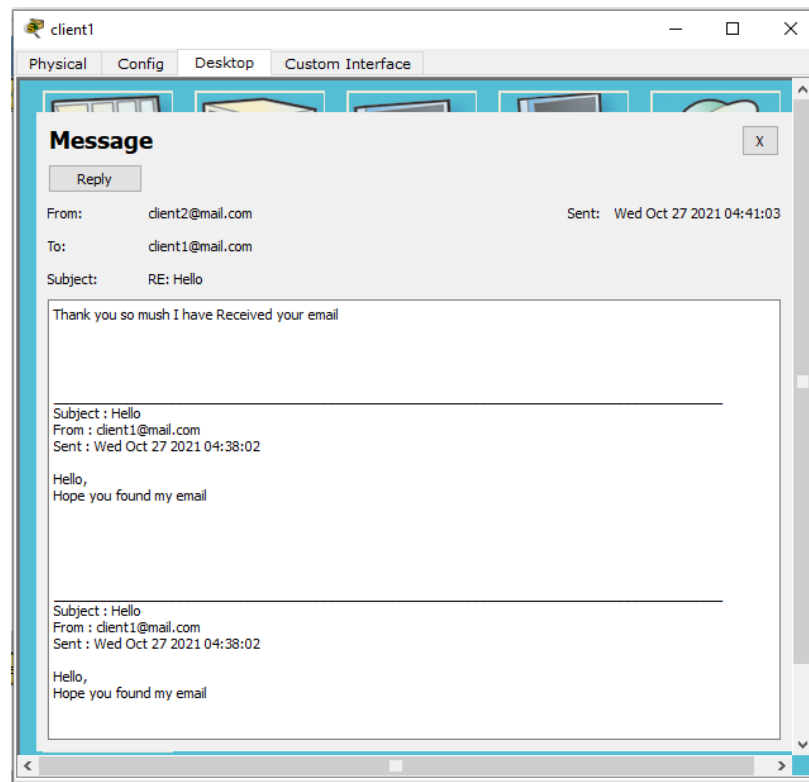
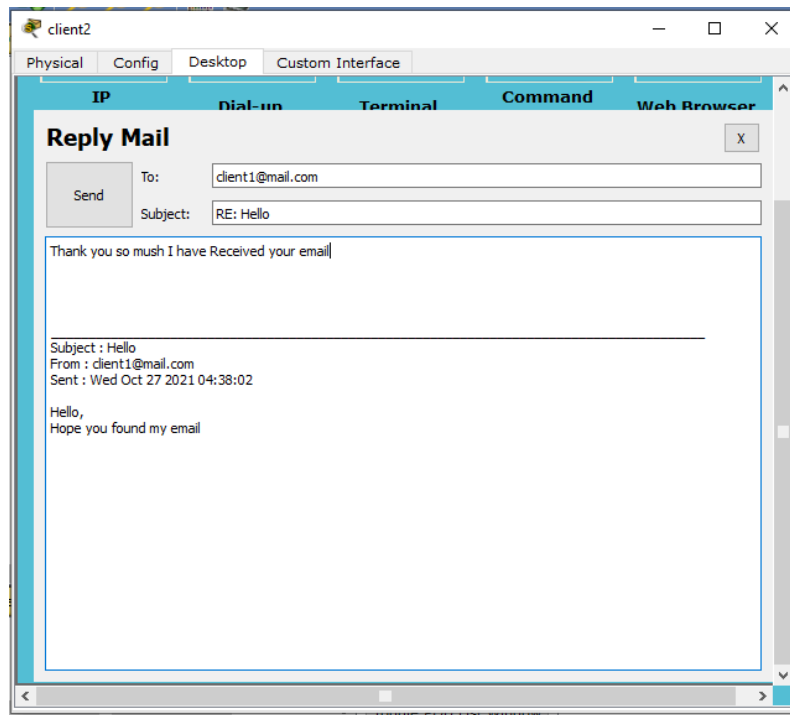
Go to **PC0** **email** client, **compose** an email and **send** it to **PC1** email address (**client2@mail.com**).



Try to see whether the email from PC0 is received on PC1. On the **email** client of PC1, click on **Receive**.



Note: If everything is well set up, the email from PC0 will be received on PC1.



Tasks for students

1. Configure an email server in Packet Tracer.
2. Being a Network Engineer you get a project to design network of a company named as **MasterTech**. Your client has two routers (directly connected with each other) and three switches. There are three departments in his office i.e Backend Department, Frontend Department, and Management. Your client wants to avoid static IP's configurations. Your client requirement is to host his website on a server, URL: (**www.mastertech.com**). Your client also wants email services in the network, email domain is "**mt.com**". Design, label and configure the network topology in Cisco Packet tracer.