IMPLEMENTING SMTP & IMAP USING PYTHON

Report submitted to the SASTRA Deemed to be University
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CSE302: COMPUTER NETWORKS

Submitted by

AKASH S

Reg. No.: 124004393

B. Tech. Electronics and Communication Engineering

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SCHOOL OF ELECTRIC AND ELECTRONICS ENGINEERING.

THANJAVUR, TAMIL NADU, INDIA – 613 401

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING.

THANJAVUR – 613 401

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Project Based Work *Viva voce* held on __________

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Abbreviations

IP	Internet Protocol
GUI	Graphical User Interface
SMTP	Simple Mail Transfer Protocol
IMAP	Internet Message Access Protocol
POP3	Post Office Protocol 3
TCP	Transmission Control Protocol
MTA	Mail Transfer Agent
MUA	Mail User Agent
DNS	Domain Name Server
MX	Mail eXchanger
TLS	Transport Layer Security
SSL	Secure Sockets Layer
MIME	Multipurpose Internet Mail Extensions
ASCII	American Standard Code for Information Interchange
RFC	Requests for Comments

Abstract

Email is an effective method of business communication that is fast, accessible, and cheap. Using email can be greatly beneficial even for small-scale communications such as conversations between friends or a teacher sending documents & notes to his/her students. One of the main advantages of email is that you can send digital files such as Text Documents, Images, etc. quickly and simultaneously. Many business companies use Email to sendin their invoices and receipts to their customers.

A Mail Server is set locally to mimic the large-scale public mail servers in warehouses.User accounts are created in the mail server software to receive emails fromother mail addresses of the same domain. Currently, we can only receive from or send to the user with the same domain name. In the future, we require a machine with a static public IP address to host our mail server. By doing so, we can send or receive emails from other domainstoo.

A GUI application has been created using Python to access our Mailboxes and send emails. This application uses SMTP and IMAP methods to send & retrieve mail respectively. This isa small-scale application that can send emails, and read & delete mails from Inbox, Sent & Trash mailboxes. Also, attachments of any type & size can be sent or downloaded to your local directory.

KEYWORDS: SMTP, IMAP, Mail Server, Domain, Mailbox

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INTRODUCTION

A server is a computer that sends and receives email over a network known as Mail Server.In many cases, web servers and mail servers are combined into a single machine. However, large companies like Gmail and Hotmail have dedicated Mail servers to reduce traffic on their servers. Every mail server must include mail server software for the machine to act as a mail server. Mail Server Software allows the system to administer, create and manage email accounts for any domains hosted on the server.

Standard email protocols are used by the mail server for sending and receiving emails. SMTP sends messages and handles outgoing mail requests. IMAP and POP3 receive mail and are used to process incoming mail. When a user logs on to the mail server using an email client, these protocols handle all the connections behind the scenes. These protocols use TCP for establishing a connection between the user and the mail server.

Firstly, emails are composed using Mail Transfer Agent (MTA) by the user. The email client assembles the email by joining the content of the mail with the recipient, subject, date, etc. The email client uses SMTP to send mail to the outgoing mail server. The outgoing mail server with the help DNS server finds the IP address of the recipient. This is done with the help of the server's MX records After getting the necessary details, SMTP sends the email to the recipient's incoming mail server. The receiving server will store the mail in its database for the access of the user.

The mail server of the recipient doesn't straight away accept mail from anyone. It always checks for the existence of the sender of the mail. The DNS server makes this possible for the server with the help of MX records. Accessing the stored emails from the server is done withthe help of IMAP or POP3. Mail User Agent (MUA) makes it possible for the user who can read the emails from his/her mailbox.

SYSTEM REQUIREMENTS:

- OS: Windows 11, 10, 8.1, 8, 7, Vista, XP Professional
- Python 3.6 or above
- Tkinter module

PROTOCOLS

SMTP:

SMTP stands for “Simple Mail Transfer Protocol”. It is part of the Application Layer of the TCP/IP protocol. It instructs how the mail must move from one MTA to another MTA. Mails might move to many mail servers before reaching the recipient’s server. SMTP uses the “Store and Forward” feature to send tail emails TP and provides a set of codes that simplify the communication of email between servers. It breaks the mail into chunks for easy transmission. SMTP works on port 25 (standard for mail transfer), port 465 (not compliant with RFC), and port 587 (TLS encrypted).

Advantages:

- SMTP provides the simplest form of email communication.
- Emails can be sent quickly and effectively.
- Offers reliability in terms of outgoing mail.

Disadvantages:

- SMTP can only send plain text messages, not fancy items like attachments or fonts. This part is done by the MIME. It converts non-text elements to plain text.
- SMTP is limited to 7-bit ASCII characters.
- Some firewalls may block common ports required by SMTP.

IMAP:

IMAP stands for “Internet Message Access Protocol”. It is part of the Application Layer of the TCP/IP protocol. Emails are stored on the servers. IMAP is used to access the mail irrespective of your geographical location. Unlike POP, emails stay in the servers for future access even after retrieving them. IMAP can be used from multiple devices since the mail is only read when it is first accessed not deleted from the server. IMAP works on port 143 (non-encrypted), and port 993 (TLS/SSL encrypted).

Advantages:

- Emails can be accessed from any place, via as many devices as you want.
- Attachments aren’t downloaded by default. This makes reading the body of the email quicker.
- Even after reading, the mail stays in the server for future reading, unlike POP which deletes the mail after downloading.

Disadvantages:

- It is mandatory for an internet connection whenever using IMAP.
- Accessing the mailbox is slower than POP as all folders need to get synchronized every time.

POP3:

POP3 stands for “Post Office Protocol 3”. It is part of the Application Layer of the TCP/IP protocol. POP3 allows users to download emails from the server and read them offline. Using POP3 is simple and easy to use. This protocol was designed keeping in mind the users having only a temporary internet connection. POP3 works on port 110 (non-encrypted),and port 995 (TLS/SSL encrypted).

Advantages:

- No internet connection is needed to read emails once the emails are downloaded.
- Big storage is not needed for the server, since after downloading, emails are deleted from the server.

Disadvantages:

- If the device where the emails are stored is lost, emails are lost too.
- Storage on the user side is required for storing mail.

IMPLEMENTATION

SETTING UP A MAIL SERVER LOCALLY:

- Download hMailSever from the official website
- Install hMailServer on your local machine
- Connect to the hostname “localhost”
- Under Domain, click the “Add Domain” button
- Click “Add”, enter your domain name (e.g., test.com), and click “Save”
- Under Settings -> Protocols -> SMTP, click the “Delivery of e-mail” tab. Enter“localhost” in the Local host name entry text field, click “Save”
- Under Domains -> “Your Domain name” -> Accounts, click “Add”
- Enter your Username in the Address text field, Password in the Password text field, and click “Save”
- Continue the previous step with as many users as required.
- Minimize the application
- Open C:\Windows\System32\drivers\etc\hosts using Notepad as Administrator.
- Enter “127.0.0.1 your domain.XYZ” in the file and save

WORKING OF APPLICATION:

This application uses smtplib and imaplib Python modules. The user is prompted to enter his/her email credentials to connect to his/her mailbox using SMTP and IMAP. The credentials can either be from the previously created mail server or Gmail login credentials. After entering the credentials, if the credentials are valid, the user is taken to the next screen, or else the login page persists.

In the next screen, the user is shown the basic mail client look. The screen contains buttons like “Compose”, “Inbox”, “Sent”, and “Logout”. The user can select any of those buttons. Log out button is available so that the user can log out of his/her mailbox. The “Compose” button lets the user compose a MIME-enabled email and send it to any address of any domain if the user is logged in using his/her Gmail credentials or only sends it to the users within the same domain. “Inbox”, “Send t”, and “Trash” buttons let the user view his/her respective mailbox. The “Delete” button lets the user delete unwanted mail present in Inbox and send it to the

Trash folder. If a mail contains attachments, the user is able is download those to his local machine's F:\Mail Attachments folder.

The basic underlying working code is borrowed from the smtplib and imaplib modules. SMTP_SSL and SMTP classes with mail server addresses as constructors inside smtplib create an SMTP object with secured and unencrypted connection respectively. Log in to the respective mailbox is done by the login() function. sendmail() inside the SMTP class lets the usersend MIME-enabled emails.

IMAP4_SSL and IMAP4 classes with mail server addresses as constructors inside imaplib create IMAP objects with secured and unencrypted connections respectively. Log in to the respective mailbox is done by the login() function. Because of its high functionality, IMAP is complex at the code level. After object creation, the selection of mailboxes is required. Then, searching for emails is required. After searching, fetching the selected mail is done. The mail is general in the byte string formal. After formatting the string, we get the mail in a readable format.

The application when the "Send" button is clicked after composing the mail, gets all the input data and converts them to a byte string, and sent as a parameter to the sendmail() function. Also, while retrieving the mail, the application converts them into a human-readable format and displays the mail.

When a mail is deleted, a copy of the mail is made in the Trash folder and marks the mail as deleted with the help of the \\Deleted flag. expunge() function is called, which permanently removes emails that are marked as \\Deleted. When a mail is deleted from the Trash folder, no copy is made but directly deleted from the mailbox.

Attachments are downloaded to the local drive using Python's open() function. Generally,the attachments are sent after encoding them as text. Here, the application decodes the text and writes the bytes to F:\Mail Attachments folder. Inside the Mail Attachments folder, the corresponding folder is created and files are written into the folder.

Additionally, the email module is used to convert the attachment part to text format. An object of class EmailMessage() is used to convert any type of file to a text file with base64 encoding. While reading the emails, the message_from_bytes() function is used to convert the email messages to a human-readable format.

SOURCE CODE

```
# Importing necessary modules
from tkinter import *
from tkinter import messagebox
from tkinter import filedialog
from tkinter.scrolledtext import ScrolledText
from email.message import EmailMessage
import smtplib
import imaplib
import email
import os
import time

# Attachment Directory
attachment_dir = 'F:/Mail Attachments'
# Creating SMTP & IMAP objects
smtp = None
imap = None
Gmail_Login = True

def objectCreation(email_var):
    global smtp
    global imap
    global Gmail_Login
    # Clearing previous user contents
    mail_list.clear()
    scrl.delete(1.0, END)
    listbox.delete(0)
    attach_label.config(text="")
    no_of_mails.config(text="")
    if email_var.get().split('@')[-1] == 'gmail.com':
        smtp = smtplib.SMTP_SSL('smtp.gmail.com', 465)
        imap = imaplib.IMAP4_SSL('imap.gmail.com')
    else:
        smtp = smtplib.SMTP('localhost', 587)
        imap = imaplib.IMAP4('localhost', 143)
    Gmail_Login = False

# Creating a Toggle function
```

```
def toggle(togg=[0]):
    togg[0] = not togg[0]
    if togg[0]:
        top.deiconify()
        top.state('zoomed')
        root.withdraw()
    else:
        top.withdraw()
        print(smtp.quit())
        print(imap.logout())
        root.deiconify()

# Creating Login Check function (SMTP)
def login_check_smtp(email_var, password_var):
    try:
        print(smtp.login(email_var.get(),
                         password_var.get()))
        return 1
    except:
        return 0

# Creating Login Check function (IMAP)
def login_check_imap(email_var, password_var):
    try:
        print(imap.login(email_var.get(),
                         password_var.get()))
        return 1
    except:
        return 0

# Creating Toggle & Login function
def toggle_and_login_check(email_var, password_var):
    if email_var.get() == '' or password_var.get() == '':
        print('Either empty Username or Password')
        root_info_label.config(text='Username or Password is Empty')
    else:
        objectCreation(email_var)

    if login_check_smtp(email_var, password_var) == 1 and
login_check_imap(email_var, password_var) == 1:
        toggle()
    else:
        root_info_label.config(text='Login Unsuccessful')

# Creating Send Mail function
def send_mail(from_addr, to_var, cc_var, bcc_var, subject_var, body_var, attach, 
attachments=[]):
    to = to_var.get()
    cc = cc_var.get()
    bcc = bcc_var.get()
    subject = subject_var.get()
    body = body_var.get(1.0, END).strip()
    print('To addr', to)
    print('Subject', subject)
    print('Body', body)
    if to == '' or subject == '' or body == '':
        messagebox.askokcancel('Error!!', 'Either Empty To address, Subject or 
Body')
    else:
        msg = EmailMessage()
        msg['To'] = str(to)
        msg['Subject'] = subject
        msg['From'] = from_addr
        msg['Cc'] = cc
        msg['Bcc'] = bcc
        msg['Date'] = time.ctime(time.time())
        msg.set_content(body)

    print('Before:', attachments)
    if attachments != []:
        print('After:', attachments)
        for value in attachments:
            with open(value, 'rb') as f:
                file_name = f.name.split('/')[-1]
                file_data = f.read()
                print('Filename', file_name)
        msg.add_attachment(file_data, maintype='application', subtype='octet-stream', 
filename=file_name)
        try:
            smtp.send_message(msg)
            print('Main sent')
            if Gmail_Login == False:
                imap.append('Sent', '\\Seen', imaplib.Time2Internaldate(time.time()), 
msg.as_string().encode('utf8'))
            messagebox.askokcancel('Success!!', 'Mail sent successfully!!')
            to_var.delete(0, END)
            cc_var.delete(0, END)
            bcc_var.delete(0, END)
            subject_var.delete(0, END)
            body_var.delete(1.0, END)
            attach.config(text='')
            attachments = None
        except:
            messagebox.askokcancel('Error!!', 'Cannot send mail, check Inputs!!')
attachment_list = []
attachment_label = None
mail_list = []
mb = ""
dir_name = ""

# Creating Put Content in ListBox function
def put_content(l):
    listbox.delete(0, END)
    for index, value in enumerate(l[::-1]):
        str_value = 'Date: {}, Subject: {},To: {}, From: {}'.format(value['Date'],
value['Subject'], value['To'],
                                                        value['From'])
        listbox.insert(index, str_value)
        no_of_mails.config(text='Total no. of mails: {}'.format(len(l)))



# Creating Print Content in ScrolledText function
def print_content(event, l):
    scrl.delete(1.0, END)
    print(listbox.curselection()[0])
    scrl.insert(1.0, l[::-1][listbox.curselection()[0]]['Body'])
    if l[::-1][listbox.curselection()[0]]['Attachment']:
        attach_label.config(text='Attachment(s) available!!')
    else:
        attach_label.config(text='')

# Creating Get Body function
def get_body(msg):
    if msg.is_multipart():
        return get_body(msg.get_payload(0))
    else:
        return msg.get_payload(None, True)
```

```
# Creating Get Attachment(s) function
def get_attachments(msg):
    for part in msg.walk():
        if part.get_content_maintype() == 'multipart':
            continue
        if part.get('Content-Disposition') is None:
            continue
        filename = part.get_filename()
        if bool(filename):
            global dir_name
            dir_name = filedialog.askdirectory(initialdir='D:')
            filepath = os.path.join(dir_name, filename)

        if os.path.isfile(filepath) == False:
            with open(filepath, 'wb') as f:
                f.write(part.get_payload(decode=True))
        else:
            a = 1
            while True:
                temp = filename.split('.')
                alt_filename = temp[0] + ' ({})'.format(a) + '.' + temp[1]
                alt_filepath = os.path.join(dir_name, alt_filename)
                if os.path.isfile(alt_filepath) == False:
                    with open(alt_filepath, 'wb') as f:
                        f.write(part.get_payload(decode=True))
                    break
                a += 1

# Creating Reverse List Mail order function
def download_attachment():
    _, search = imap.search(None, 'ALL')
    _, data = imap.fetch(search[0].split()[::-1][listbox.curselection()[0]], '(RFC822)')
    msg = email.message_from_bytes(data[0][1])
    if check_attachment(msg):
        get_attachments(msg)
        messagebox.askokcancel('Success!!', 'Attachment(s) downloaded!! in ' +
dir_name)
    else:
        messagebox.askokcancel('Missing!!', "Attachment for this mail doesn't
exist!!")
```

```
# Creating Check Attachment(s) function
def check_attachment(msg):
    for part in msg.walk():
        if part.get_content_maintype() == 'multipart':
            continue
        if part.get('Content-Disposition') is None:
            continue
        return bool(part.get_filename())
# Creating Delete Mail function
def delete_mail():
    global mail_list
    _, search = imap.search(None, 'ALL')
    ####imap.store(search[0].split()[::-1][listbox.curselection()[0]], '+FLAGS',
'"[Gmail]/Trash"')####
    if Gmail_Login == True:
        imap.store(search[0].split()[::-1][listbox.curselection()[0]], '+X-GM-
LABELS', '\\Trash')
    else:
        _, s_d = imap.search(None, 'ALL')
        try:
            if imap.state == 'SELECTED':
                _, da = imap.fetch(s_d[0].split()[::-1][listbox.curselection()[0]], '(UID)')
            else:
                messagebox.askokcancel('Wait!!', 'No mail has been selected!!')
        except:
            messagebox.askokcancel('Wait!!', 'No mail has been selected!!')
        if mb != 'Trash':
            res = imap.uid('COPY', da[0].decode().split()[-1].split(')')[0], 'Trash')
            if res[0] == 'OK':
                _, da = imap.uid('STORE', da[0].decode().split()[-1].split(')')[0],
'+FLAGS', '\\Deleted')
                imap.expunge()
        elif mb == 'Trash':
            _, da = imap.uid('STORE', da[0].decode().split()[-1].split(')')[0], '+FLAGS',
'\\Deleted')
            imap.expunge()
    print(mail_list.pop(len(mail_list) - 1 - listbox.curselection()[0]))
    listbox.delete(listbox.curselection()[0])
    scrl.delete(1.0, END)
    no_of_mails.config(text='Total no. of mails: {}'.format(len(mail_list)))

# Creating Receive Mail function
def recv_mail(mailbox='INBOX'):
    if mailbox == 'Sent' and Gmail_Login == True:
        mailbox = '"[Gmail]/Sent Mail"'
    elif mailbox == 'Trash' and Gmail_Login == True:
        mailbox = '"[Gmail]/Bin"'
    mail_list.clear()
    scrl.delete(1.0, END)
    listbox.delete(0)
    if attach_label != None:
        attach_label.config(text="")
    imap.select(mailbox)
    global mb
    mb = mailbox
    _, search_data = imap.search(None, 'ALL')
    for num in search_data[0].split():
        email_data = {}
        _, data = imap.fetch(num, '(RFC822)')
        email_msg = email.message_from_bytes(data[0][1])
        for header in ['Subject', 'To', 'From', 'Date']:
            email_data[header] = email_msg[header]
        email_data['Body'] = email.message_from_bytes(get_body(email_msg))
        email_data['Attachment'] = check_attachment(email_msg)
        mail_list.append(email_data)
    put_content(mail_list)

# Creating Add Attachment function
def put_attachment():
    global attachment_list
    temp = filedialog.askopenfilenames(initialdir='D:\\', title='Select Attachment(s)',
                                       filetypes=(('All files', '*.*'), ('JPEG files', '*.jpeg')))
    for k in temp:
        attachment_list.append(k)
    print('Inside function', attachment_list)
    attachment_str = []
    for value in attachment_list:
        attachment_str.append(value.split('/')[-1])
        attachment_label.config(text=','.join(attachment_str))

# Creating Compose Mail function
def compose_mail():
    # Creating Compose Mail Window
    com = Toplevel()
    com.title('Compose Mail')
    com.iconbitmap('./email.ico')
    # Creating Entry Variables
    to_entry_variable = StringVar()
    cc_entry_variable = StringVar()
    bcc_entry_variable = StringVar()
    subject_entry_variable = StringVar()
    scrolled_text_variable = StringVar()
    print('Outside function before calling', attachment_list)
    # Creating To Label
    to_label = Label(com, text='To', font=('', 10))
    to_label.grid(row=0, column=0, padx=10, pady=10)
    # Creating CC Label
    cc_label = Label(com, text='CC', font=('', 10))
    cc_label.grid(row=1, column=0, padx=10, pady=10)
    # Creating BCC Label
    bcc_label = Label(com, text='BCC', font=('', 10))
    bcc_label.grid(row=2, column=0, padx=10, pady=10)
    # Creating Subject Label
    subject_label = Label(com, text='Subject', font=('', 10))
    subject_label.grid(row=3, column=0, padx=10, pady=10)
    # Creating Body Label
    body_label = Label(com, text='Body', font=('', 10))
    body_label.grid(row=4, column=0, padx=10, pady=10, sticky=N)
    # Creating To Entry
    to_entry = Entry(com, font=('', 10), width=60)
    to_entry.grid(row=0, column=1, padx=10, pady=10, sticky=W)
    # Creating CC Entry
    cc_entry = Entry(com, font=('', 10), width=60)
    cc_entry.grid(row=1, column=1, padx=10, pady=10, sticky=W)
    # Creating BCC Entry
    bcc_entry = Entry(com, font=('', 10), width=60)
    bcc_entry.grid(row=2, column=1, padx=10, pady=10, sticky=W)
    # Creating Subject Entry
    subject_entry = Entry(com, font=('', 10), width=60)
    subject_entry.grid(row=3, column=1, padx=10, pady=10, sticky=W)
    # Creating Body ScrolledText
    scrolled_text = ScrolledText(com, wrap=WORD, font=('Verdana', 12))
    scrolled_text.grid(row=4, column=1, padx=10, pady=10)
    # Creating Attach button
    attachment_btn = Button(com, text='Attach', fg='white', bg='blue', font=('', 10),
command=put_attachment)
    attachment_btn.grid(row=5, column=1, sticky=E, padx=10, pady=10)
    # Creating Send Button
    send_btn = Button(com, text='Send', bg='blue', fg='white', font=('', 12),
                      command=lambda: send_mail(root_email_entry.get(),
                                                to_entry, cc_entry, bcc_entry, subject_entry,
scrolled_text,
                                                attachment_label, attachment_list))
    send_btn.grid(row=5, column=0, padx=10, pady=10)
    # Creating Attachment Label
    global attachment_label
    attachment_label = Label(com, font=('', 10))
    attachment_label.grid(row=5, column=1, sticky=W, padx=10, pady=10)

# Creating Root Window Destroy function
def on_closing():
    if messagebox.askyesno('Quit', 'Do you want to quit?'):
        root.destroy()



# Creating Login Window Destroy function
def on_closing_top(x):
    if messagebox.askyesno('Quit', 'Do you want to quit?'):
        x.destroy()
        root.deiconify()

# Creating Login Window (Main)
root = Tk()
root.title('SMTP & IMAP')
root.iconbitmap('./email.ico')
root.config(bg='black')

# Screen Details
app_width = 550
app_height = 400
screen_width = root.winfo_screenwidth()
screen_height = root.winfo_screenheight()
x = (screen_width // 2) - (app_width // 2)
y = (screen_height // 2) - (app_height // 2)
root.geometry(f'{app_width}x{app_height}+{x}+{y}')
# Creating Login Frame
root_frame = Frame(root, bg='yellow')
root_frame.place(in_=root, anchor='c', relx=.5, rely=.5)
# Creating Login page variables
```

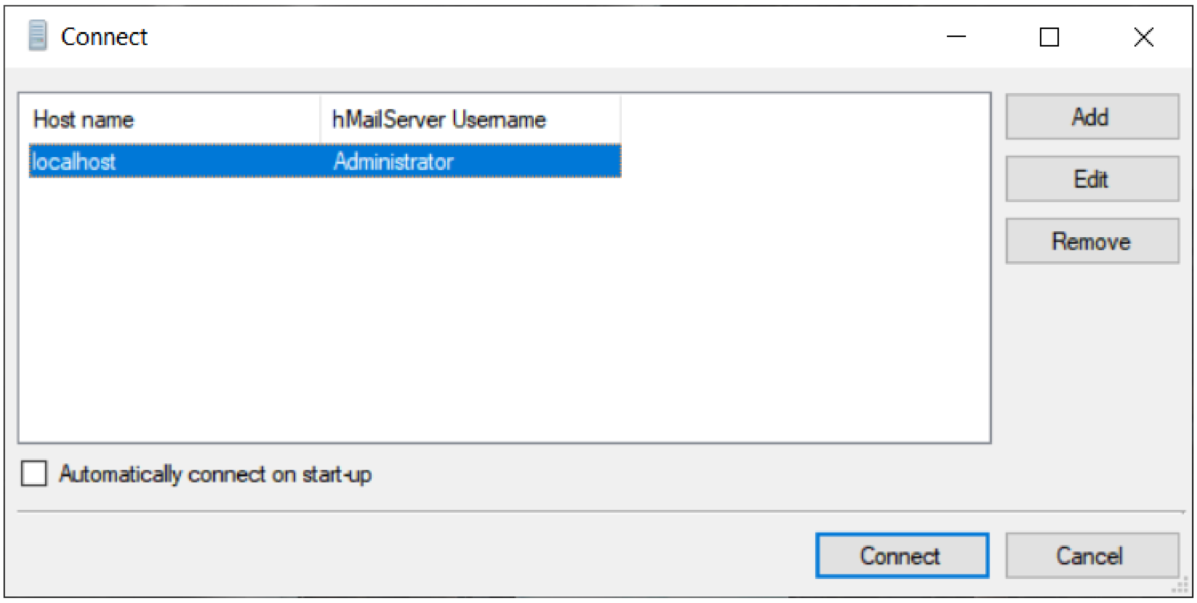
```
root_email_variable = StringVar()
root_password_variable = StringVar()
# Creating Email Label
root_email_label = Label(root_frame, text='Email', font=('', 16), bg='white')
root_email_label.grid(row=0, column=0, padx=5, pady=5)
# Creating Email Entry
root_email_entry = Entry(root_frame, font=('Verdana', 16), textvariable=
root_email_variable, width=30)
root_email_entry.focus_set()
root_email_entry.grid(row=0, column=1, padx=5, pady=5)

# Creating Password Label
root_password_label = Label(root_frame, text='Password', font=('', 16), bg='white')
root_password_label.grid(row=1, column=0, padx=5, pady=5)
# Creating Password Entry
root_password_entry = Entry(root_frame, font=('Verdana', 16), show='*',
textvariable=root_password_variable, width=30)
root_password_entry.grid(row=1, column=1, padx=5, pady=5)
# Creating Login Button
root_login_button = Button(root_frame, text='Login', font=('', 16),
command=lambda:
toggle_and_login_check(root_email_variable, root_password_variable))
root_login_button.grid(columnspan=2, padx=5, pady=5)
# Creating Info Label
root_info_label = Label(root_frame, text='', fg='red', font=('', 16), bg='yellow')
root_info_label.grid(columnspan=2, padx=5, pady=5)
# Creating Mail sending Window
top = Toplevel()
top.withdraw()
top.iconbitmap('./email.ico')
# Creating Mail Window frames
left_frame = Frame(top, borderwidth=5, highlightthickness=3)
left_frame.pack(side=LEFT, expand=False, fill=Y)
right_frame = Frame(top)
right_frame.pack(side=LEFT, expand=True, fill='both')
mails_frame = Frame(right_frame)
mails_frame.pack(side=TOP, expand=True, fill='both')
view_frame = Frame(right_frame)
view_frame.pack(side=TOP, expand=True, fill='both')
# Creating Compose Button
compose_btn = Button(left_frame, text='Compose', font=('', 16), command=
compose_mail)
```

```
compose_btn.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Inbox Button
inbox_btn = Button(left_frame, text='Inbox', font=('', 16), command=lambda:
recv_mail('INBOX'))
inbox_btn.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Sent Mail Button
sent_mail_button = Button(left_frame, text='Sent', font=('', 16), command=lambda:
recv_mail('Sent'))
sent_mail_button.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Trash Button
trash_button = Button(left_frame, text='Trash', font=('', 16), command=lambda:
recv_mail('Trash'))
trash_button.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Delete Mail Button
delete_button = Button(left_frame, text='Delete', font=('', 16),
command=delete_mail)
delete_button.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Number of mails Label
no_of_mails = Label(left_frame, font=('', 16))
no_of_mails.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Attachment Label
attach_label = Label(left_frame, font=('', 16))
attach_label.pack(side=TOP, padx=30, pady=20, fill='both')
# Creating Logout Button
logout_btn = Button(left_frame, text='Logout', font=('', 16), command=toggle)
logout_btn.pack(side=BOTTOM, padx=30, pady=10, fill='both')
# Creating Download Attachment Button
download_attach = Button(left_frame, text='Download', font=('', 16),
command=download_attachment)
download_attach.pack(side=BOTTOM, padx=30, pady=20, fill='both')
# Creating ListBox for Mails view (Scrollable)
scrl_x = Scrollbar(mails_frame, orient='horizontal')
scrl_x.pack(side=BOTTOM, fill='both', padx=5)
listbox = Listbox(mails_frame, font=('Verdana', 12))
listbox.pack(side=LEFT, padx=5, pady=5, fill='both', expand=True)
listbox.bind('<Double-1>', lambda event: print_content(event, mail_list))
scrl_y = Scrollbar(mails_frame)
scrl_y.pack(side=RIGHT, fill='both', pady=5)
listbox.config(xscrollcommand=scrl_x.set, yscrollcommand=scrl_y.set)
scrl_x.config(command=listbox.xview)
scrl_y.config(command=listbox.yview)
# Creating a Viewing area for Mail
```

```
scrl = ScrolledText(view_frame, width=40, height=10, font=('Verdana', 14),
wrap=WORD)
scrl.pack(side=LEFT, padx=5, pady=5, fill='both', expand=True)
# Closing Windows protocols
root.protocol("WM_DELETE_WINDOW", on_closing)
top.protocol("WM_DELETE_WINDOW", lambda: on_closing_top(top))
root.mainloop()
```

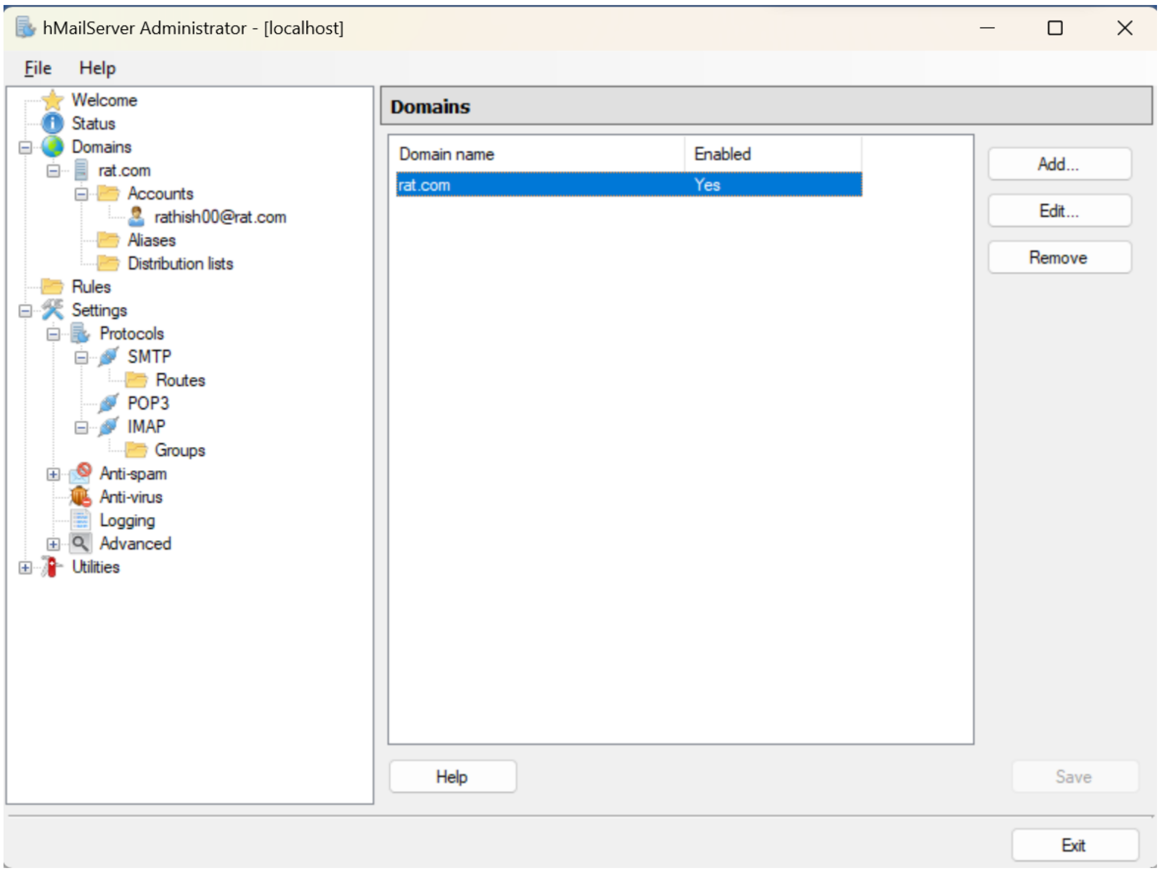
SNAPSHOTS



Host name	hMailServer Username
localhost	Administrator

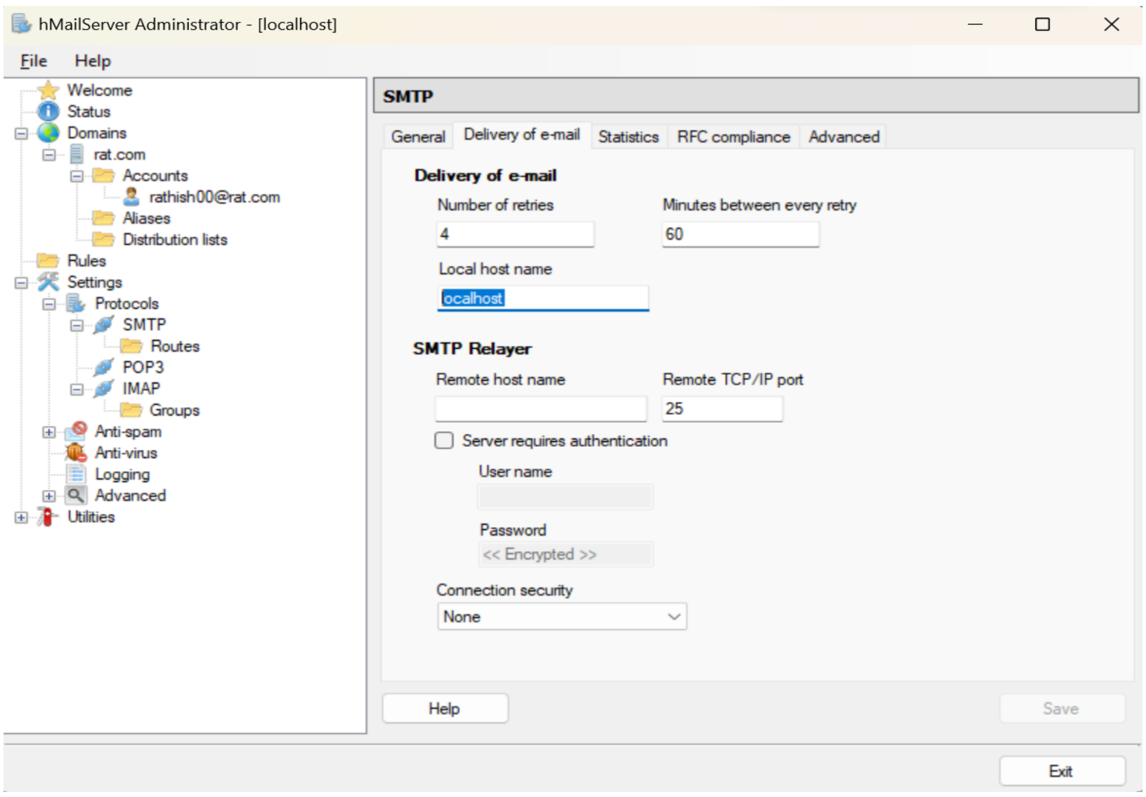
☐ Automatically connect on start-up

Fig. 5.1. Connecting to hMailServer software



Domain name	Enabled
rat.com	Yes

Fig.5.2.Creating Domain



Delivery of e-mail

Number of retries: 4

Minutes between every retry: 60

Local host name: localhost

SMTP Relayer

Remote host name:

Remote TCP/IP port: 25

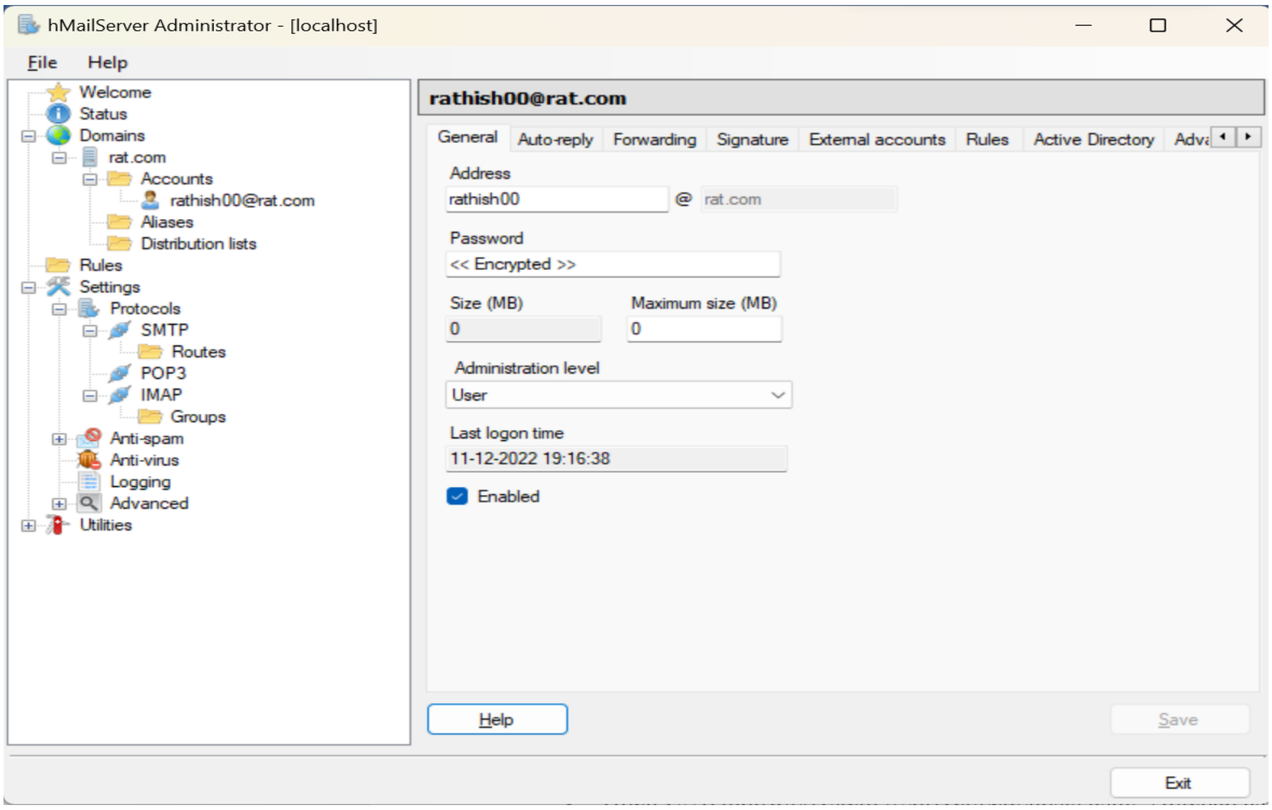
☐ Server requires authentication

User name:

Password: << Encrypted >>

Connection security: None

Fig. 5.3. Naming Local Host Name in SMTP



Address: rathish00 @ rat.com

Password: << Encrypted >>

Size (MB): 0

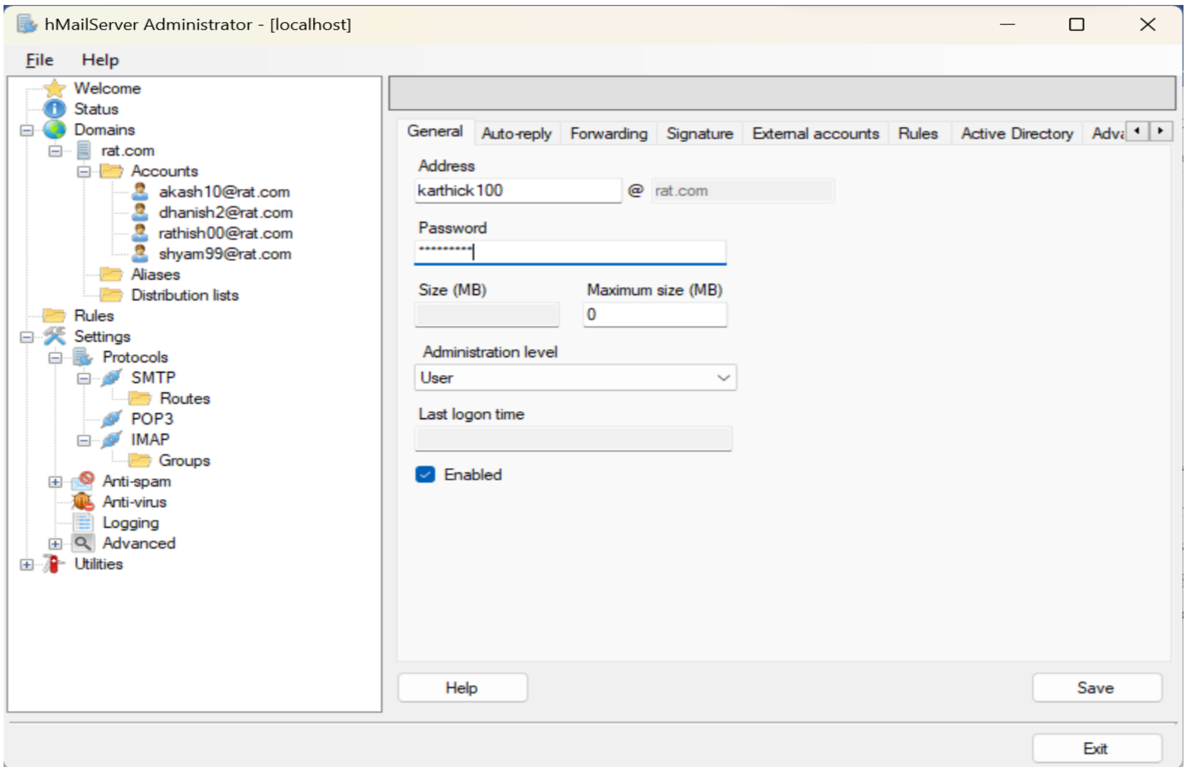
Maximum size (MB): 0

Administration level: User

Last logon time: 11-12-2022 19:16:38

☑ Enabled

Fig. 5.4. Creating Accounts with Address and Password


hMailServer Administrator - [localhost]

File Help

- Welcome
- Status
- Domains
  - rat.com
    - Accounts
      - akash10@rat.com
      - dhanish2@rat.com
      - rathish00@rat.com
      - shyam99@rat.com
    - Aliases
    - Distribution lists
- Rules
- Settings
  - Protocols
    - SMTP
      - Routes
    - POP3
    - IMAP
      - Groups
  - Anti-spam
  - Anti-virus
  - Logging
  - Advanced
- Utilities

General | Auto-reply | Forwarding | Signature | External accounts | Rules | Active Directory | Adva

Address: karthick100 @ rat.com

Password: *********

Size (MB):

Maximum size (MB): 0

Administration level: User

Last logon time:

[✓] Enabled

Help Save Exit

Fig.5.5. Creating Multiple Accounts

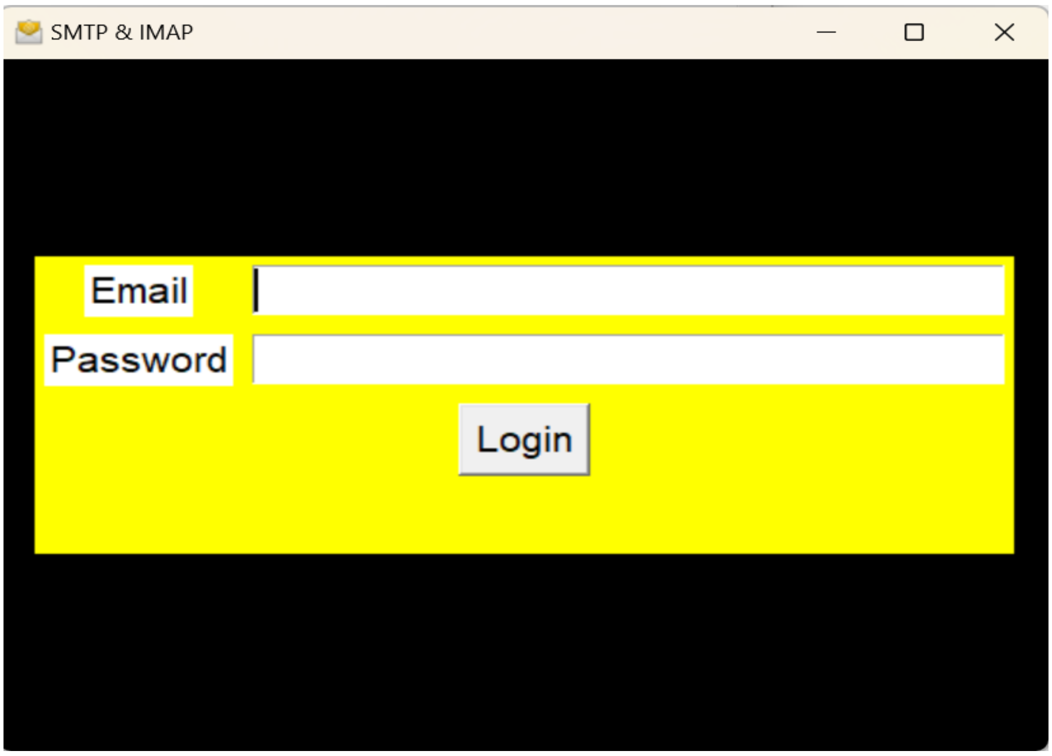
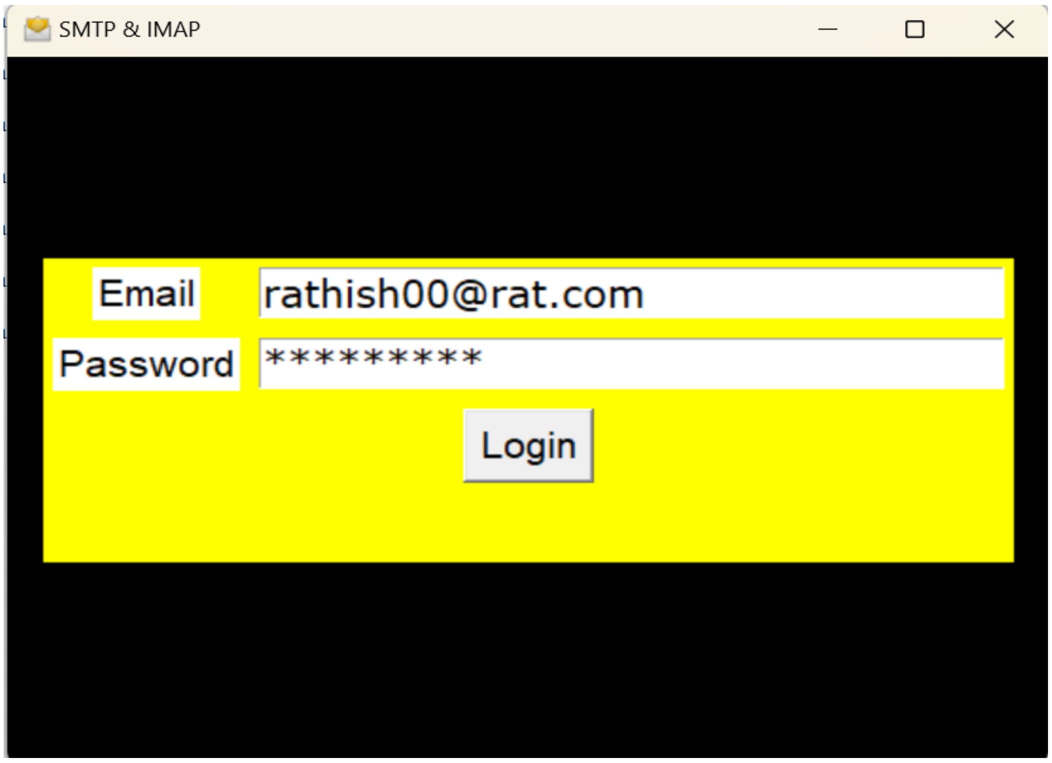


Fig. 5.6. Home Screen of Application


SMTP & IMAP

Email: rathish00@rat.com

Password: *********

Fig.5.7. Login into the application using the Address and password entered before

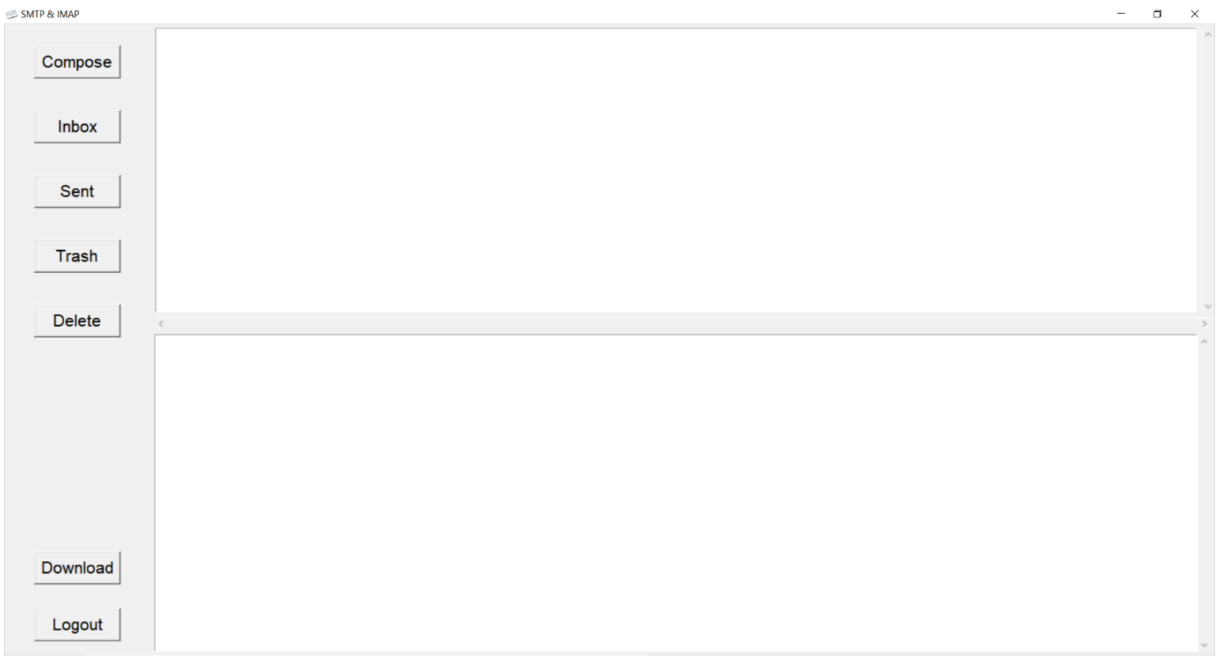
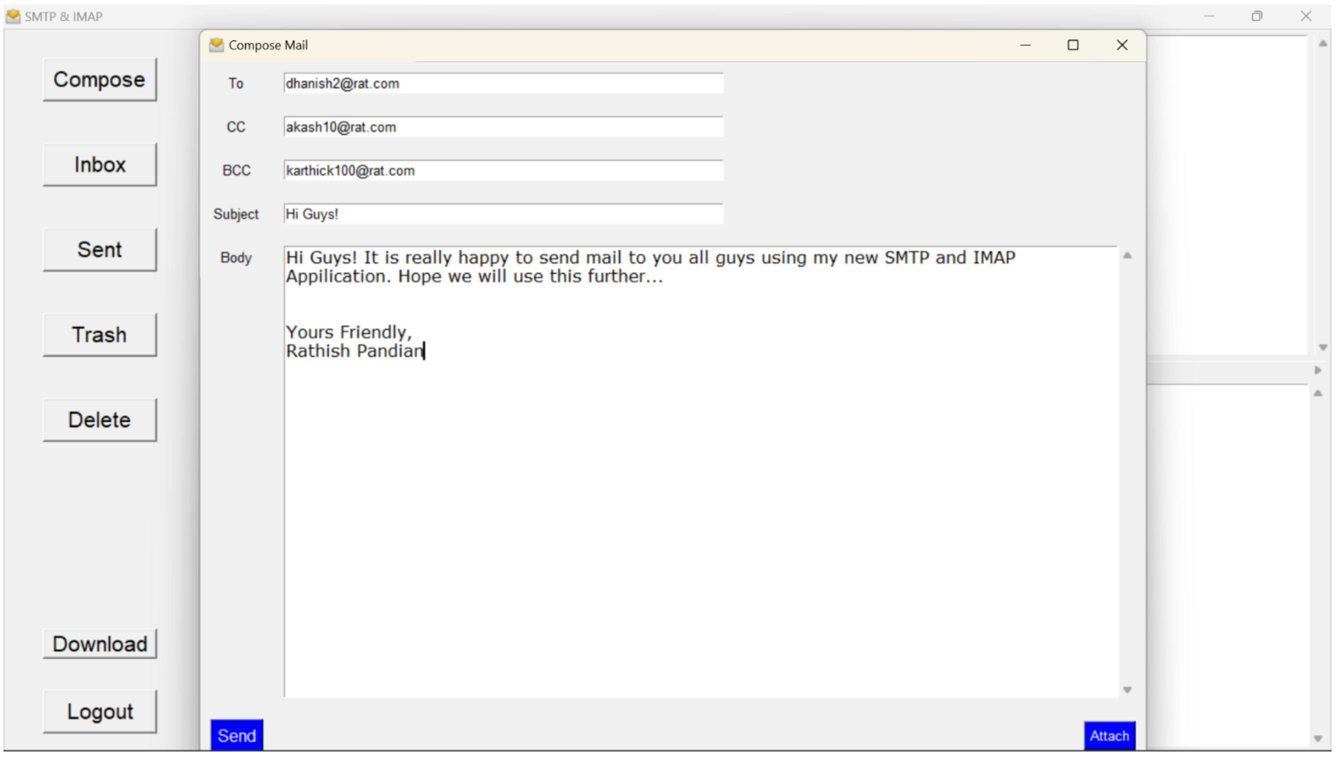


Fig.5.8. Application’s Home Screen



To: dhanish2@rat.com

CC: akash10@rat.com

BCC: karthick100@rat.com

Subject: Hi Guys!

Body: Hi Guys! It is really happy to send mail to you all guys using my new SMTP and IMAP Appilication. Hope we will use this further...

Yours Friendly,
Rathish Pandian

Fig. 5.7. Compose the mail screen in the Application

CONCLUSION

A basic Mail server and a domain has been created. This enabled us to visualize how a mail server works. The same method can be implemented on a large scale for a full-fledged application. SMTP & IMAP were used to send and retrieve emails respectively.
SMTP was used because of its monopoly over sending emails to MTAs. IMAP was used because of its features and since it preserves mail in the server too. Since a part of the TCP/IPprotocol was used, we can ensure the security & reliability of packets that have beentransmitted.

Future upgrades to the code will be done to enhance the experience of the user. While the application provides basic functions like sending, and reading emails, unique features like adding Labels, and adding Important folders are lacking. Also, from the custom domain mail address, emails can only be sent to or received from the same domain address. In the future, a dedicated VPS will be installed to ensure that the domain will be available publicly and emails can be sent to other domains too.

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