Multithreaded Email Service

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Problem Statement

We generally do mass mailing, when we use an application and it has a lot of users, and we need to inform or notify them about something. While performing this (let's say sending a mail sequentially for around 10,000 people), it would take a lot of time to complete this process (around 1-2 hrs or more). Also load on the remaining application would increase and the performance of the application could be affected because of that. Also, if we have any duplicate emails in the csv file, mail would be sent to the same email address again and again.

Aim

- Decreasing the load on the application by initializing separate threads for mailing (other than the one in which the application is running).
- Increase the speed at which emails are sent (number of mails/second).
- Should not send the same mail again and again to the same id (duplicates).
- Should be able to add attachments to the mail, send a HTML template as mail body and read data from CSV files.

Approach

Implementation of library:

We have made a python library that can automate sending of mails and templating the mail context. The library uses a new file format with extension .tmplt. These are "template" files which help to create templates for emails. This file is used to create a template of the mail that you wish to send. A template file has 3 parts,

1. The Subject
2. Text Content
3. HTML Content

Each of these sections are separated by 3 tilde characters ~~~.

Usage of this library (including how to attach files) has been clearly mentioned in the LIB_README.md file in the source code folder. And two sample usage codes have been provided, one is serially done and the other is multi-threaded. The implementation of the multi-threaded one is described below.

Multi-threading:

Using the concept of multithreading, we are starting a new thread for each mail to be sent and then creating a mail instance for it. This increases the speed at which emails are sent and also decreases the load on the application. Here each task (mail that is to be sent) is assigned to a single thread, so that they could execute parallelly and as thread requests are sent independently to the SMTP server and are all present there before sending it to actual users, it removes duplicates leading to efficient work.

Reading Data:

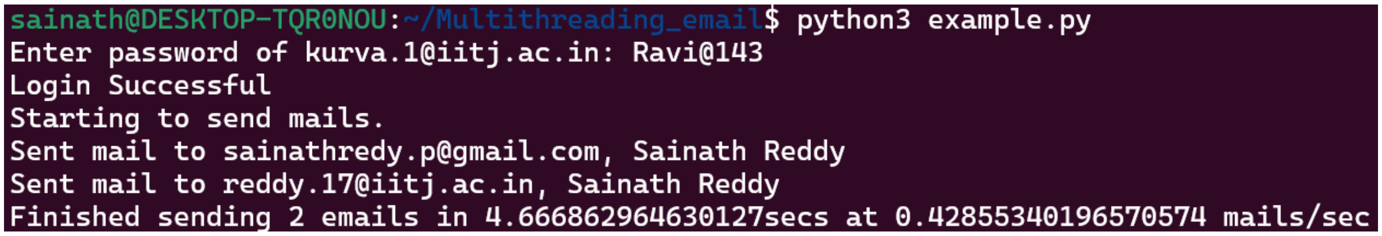
We are reading the recipients details from a CSV file (Name, Email, so on…). And the body and subject are read from the template files.

Outcomes

Performance:

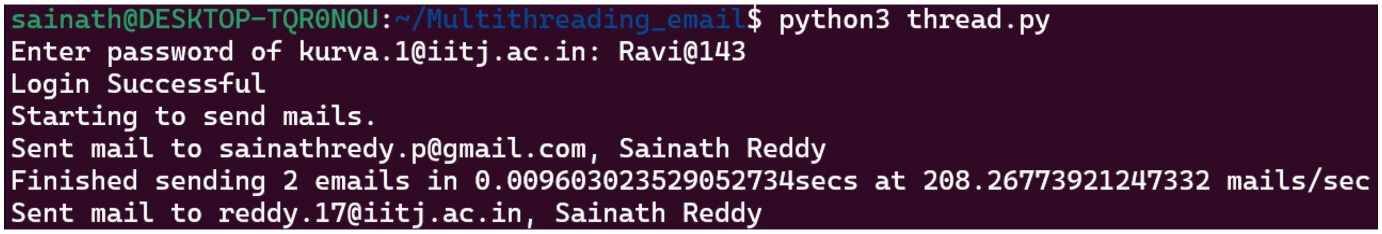
A Significant increase in speed at which emails are sent was observed. The output generated has been attached below

- **Without Threading:**



```
sainath@DESKTOP-TQR0NOU:~/Multithreading_email$ python3 example.py
Enter password of kurva.1@iitj.ac.in: Ravi@143
Login Successful
Starting to send mails.
Sent mail to sainathredy.p@gmail.com, Sainath Reddy
Sent mail to reddy.17@iitj.ac.in, Sainath Reddy
Finished sending 2 emails in 4.666862964630127secs at 0.42855340196570574 mails/sec
```

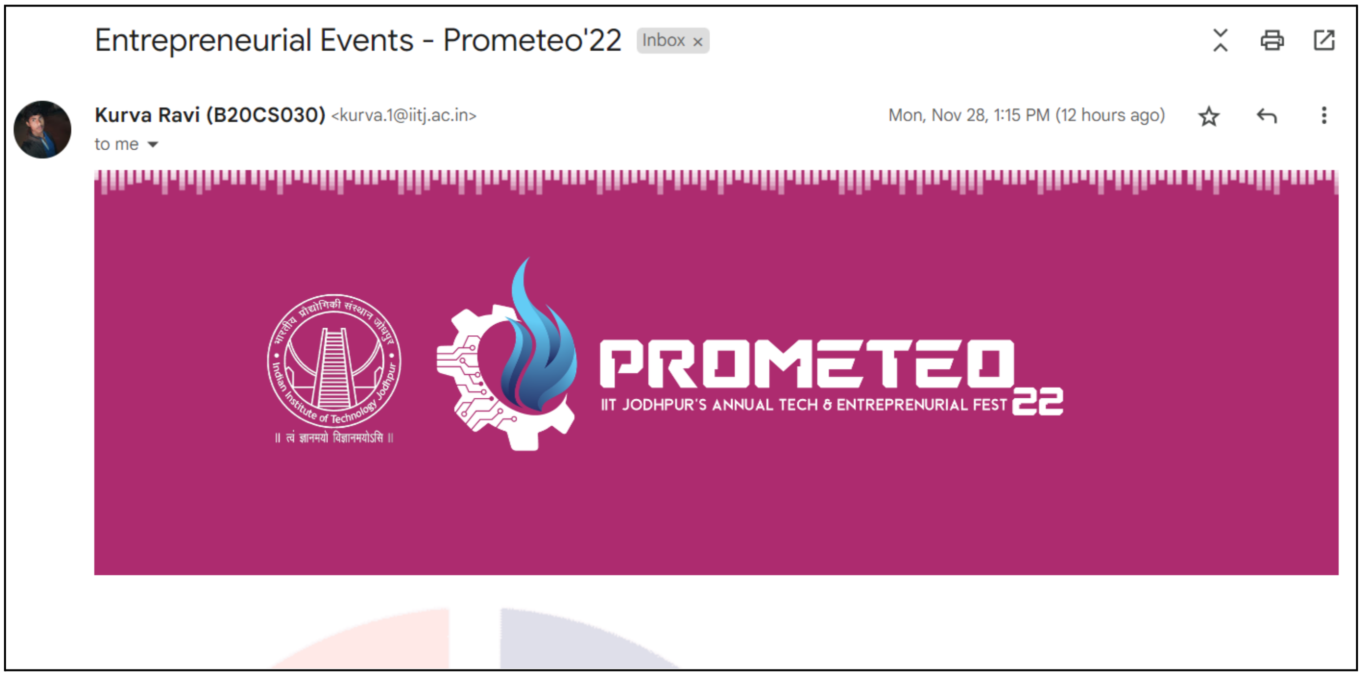
- **With Threading:**



```
sainath@DESKTOP-TQR0NOU:~/Multithreading_email$ python3 thread.py
Enter password of kurva.1@iitj.ac.in: Ravi@143
Login Successful
Starting to send mails.
Sent mail to sainathredy.p@gmail.com, Sainath Reddy
Finished sending 2 emails in 0.009603023529052734secs at 208.26773921247332 mails/sec
Sent mail to reddy.17@iitj.ac.in, Sainath Reddy
```

Results:

A mail that has been sent using thread.py



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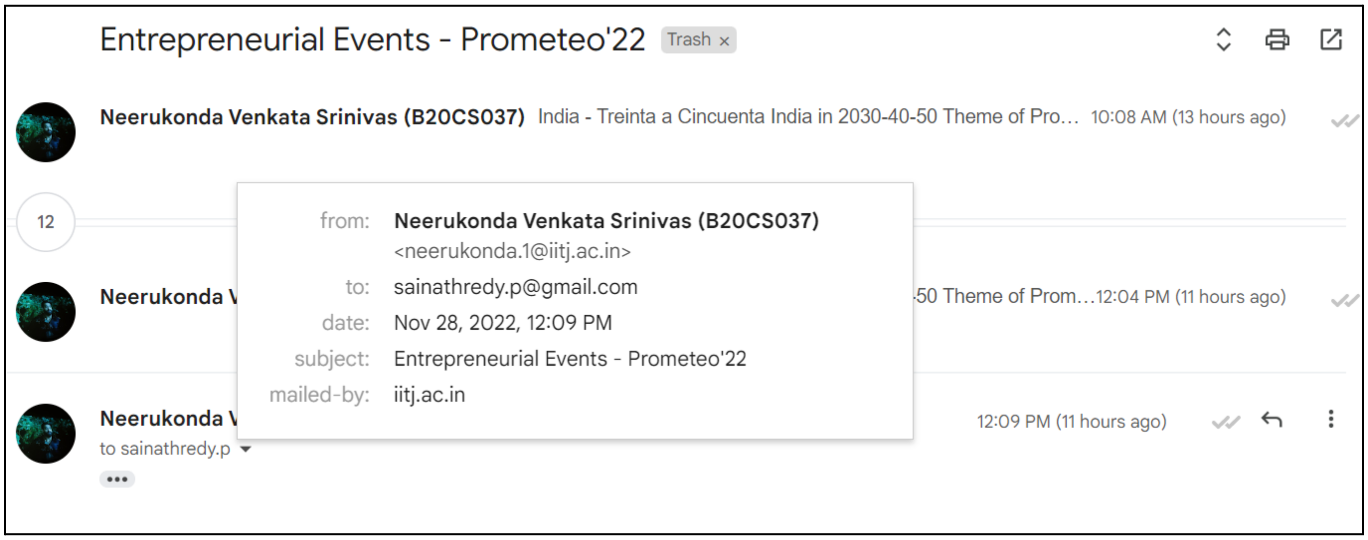
Kurva Ravi (B20CS030) <kurva.1@iitj.ac.in>

to me

Mon, Nov 28, 1:15 PM (12 hours ago)

The following picture shows how we get mails repeatedly if duplicate email ID is provided and we send mails serially, instead of sending them through separate threads,



Entrepreneurial Events - Prometeo'22 Trash ×

Neerukonda Venkata Srinivas (B20CS037) India - Treinta a Cincuenta India in 2030-40-50 Theme of Pro… 10:08 AM (13 hours ago)

12

Neerukonda V -50 Theme of Prom…12:04 PM (11 hours ago)

Neerukonda V 12:09 PM (11 hours ago)

to sainathredy.p

from: Neerukonda Venkata Srinivas (B20CS037) <neerukonda.1@iitj.ac.in>

to: sainathredy.p@gmail.com

date: Nov 28, 2022, 12:09 PM

subject: Entrepreneurial Events - Prometeo'22

mailed-by: iitj.ac.in