NORTHWESTERN POLYTECHNIC
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Project: Remote Calculator + Expect Cron job + Email notice

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SSH Setup in Ubuntu

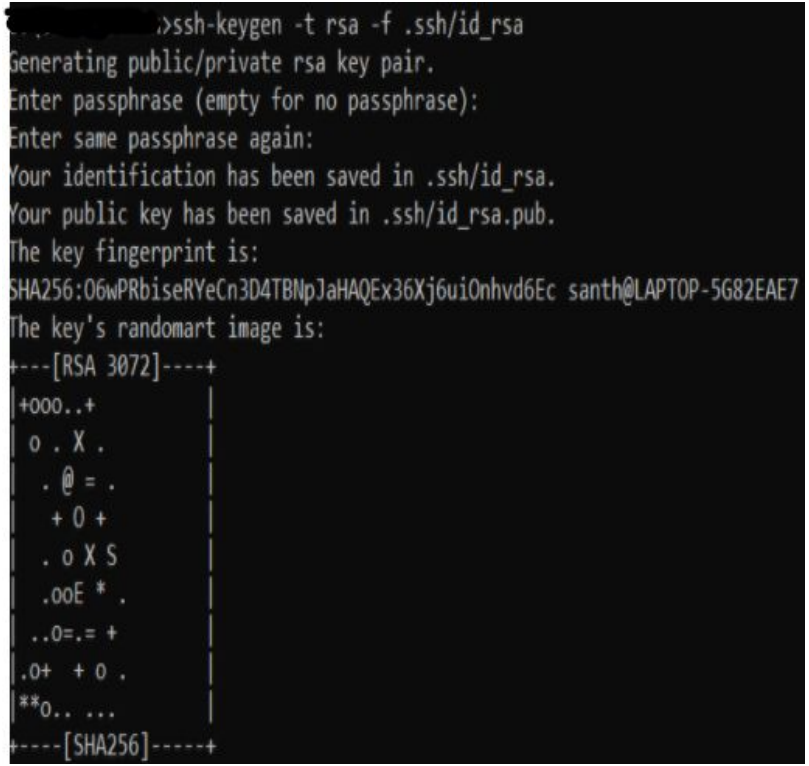
Steps to follow to connect SSH.

1.Create the key in Local Machine using Command:

- **ssh-keygen -t rsa -f .ssh/id_rsa**

Just press 'enter key' for “Enter passphrase”

2.Change directory to .ssh using Command:
cd .ssh



3.Below command will Create .ssh directory in remote site if it does not exist and copy the public key you created on your Machine to the remote in **authorized_keys** File.

cat id_rsa.pub | ssh username@server "mkdir ~/.ssh; cat >> ~/.ssh/authorized_keys”

4.Login into Remote Machine using below Command.

- **ssh username@server**

```
$ cat id_rsa.pub | ssh 19568@35.167.127.201 "mkdir ~/.ssh; cat >> ~/.ssh/authorized_keys"
19568@35.167.127.201's password:

santh@LAPTOP-5G82EAE7 MINGW64 ~/.ssh
$ ssh 19568@35.167.127.201
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 5.4.0-1058-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Tue Nov  2 14:20:08 PDT 2021

  System load:  0.0               Processes:           120
  Usage of /:   14.9% of 58.10GB  Users logged in:     1
  Memory usage: 29%               IP address for eth0: 172.26.3.73
  Swap usage:   0%

 * Ubuntu Pro delivers the most comprehensive open source security and
   compliance features.

   https://ubuntu.com/aws/pro

  Get cloud support with Ubuntu Advantage Cloud Guest:
    http://www.ubuntu.com/business/services/cloud

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

76 packages can be updated.
1 update is a security update.

New release '20.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


Last login: Tue Nov  2 14:16:20 2021 from 98.45.168.103
19568@CS522:~$ ls .ssh/
authorized_keys
```

Now you are in the remote system , and change the permissions of directories or files using below Command.

- **chmod 777 ~/.ssh**

You should be able to access your server account through SSH without a password in your Local Machine.

ssh username@server

```
[redacted]>ssh 19568@35.167.127.201 ls -la
total 28
drwxr-xr-x  6 19568 13176 4096 Nov  2 14:19 .
drwxr-xr-x 12 root  root  4096 Nov  1 16:46 ..
-rw-------  1 19568 13176 1302 Nov  2 20:44 .bash_history
drwx------  2 19568 13176 4096 Nov  2 13:01 .cache
drwx------  3 19568 13176 4096 Nov  2 13:01 .gnupg
drwx------  2 19568 13176 4096 Nov  2 20:37 .ssh
drwxr-xr-x  2 19568 13176 4096 Nov  2 13:31 1.ssh
```

```
19568@CS522:~$ ls -la
total 28
drwxr-xr-x  6 19568 13176 4096 Nov  2 14:19 .
drwxr-xr-x 12 root  root  4096 Nov  1 16:46 ..
-rw-------  1 19568 13176  599 Nov  2 18:22 .bash_history
drwx------  2 19568 13176 4096 Nov  2 13:01 .cache
drwx------  3 19568 13176 4096 Nov  2 13:01 .gnupg
drwx------  2 19568 13176 4096 Nov  2 14:19 .ssh
drwxr-xr-x  2 19568 13176 4096 Nov  2 13:31 1.ssh
19568@CS522:~$ chmod 777 ~/.ssh
19568@CS522:~$ ls -ls
total 4
4 drwxr-xr-x 2 19568 13176 4096 Nov  2 13:31 1.ssh
19568@CS522:~$ ls -la
total 28
drwxr-xr-x  6 19568 13176 4096 Nov  2 14:19 .
drwxr-xr-x 12 root  root  4096 Nov  1 16:46 ..
-rw-------  1 19568 13176  599 Nov  2 18:22 .bash_history
drwx------  2 19568 13176 4096 Nov  2 13:01 .cache
drwx------  3 19568 13176 4096 Nov  2 13:01 .gnupg
drwxrwxrwx  2 19568 13176 4096 Nov  2 14:19 .ssh
drwxr-xr-x  2 19568 13176 4096 Nov  2 13:31 1.ssh
19568@CS522:~$
```

Interactive Calculator: Server side

- Create an **Interactive Calculator** (**myscript**) Program to collect the user's inputs, instead of coming from command line.
- Run the Program(**myscript**) to test in server side using below command.
  - **./myscript**

```
19568@CS522:~$ ./myscript
N1:2
N2:4
Operation(+, -, *, /):+
6
19568@CS522:~$ ./myscript
N1:9
N2:67
Operation(+, -, *, /):-
-58
19568@CS522:~$
```

```
19568@CS522:~$ cat myscript
echo -n "N1:"
read N1

echo -n "N2:"
read N2

echo -n "Operation(+, -, *, /):"
read Operation

if [ "$Operation" = "+" ]
then
   (( result = N1 + N2 ))
elif [ "$Operation" = "-" ]
then
   if [ "$N1" -ge "$N2" ]
   then
      (( result = N1 - N2 ))
   else
      (( result = N2 - N1 ))
      result="-${result}"
   fi
elif [ "$Operation" = "*" ]
then
   (( result = N1 * N2 ))
elif [ "$Operation" = "/" ]
then
   (( result1 = N1 / N2 ))
   result="${result1}"
  #  (( result2 = N1 * 100 / N2 ))
  #  result="${result1}.${result2}"
else
   echo "Error: wrong operation $Operation"
   exit 1
fi

echo "$result"

19568@CS522:~$
```

Client side (your local machine)

- Create shell script(**Activate.sh**) to automatically execute the server side's program and use Expect to automate the process(**exp**) entering data to the Interactive Calculator Program.
- Use the command "shuf" to automatically generate random number from a range for N1 and N2.

Activate.sh

```
1 #!/bin/bash
2 N1=`shuf -i 1-100 -n 1`
3 N2=`shuf -i 1-100 -n 1`
4 ans=`shuf -i 1-4 -n 1`
5
6 if [ "$ans" -eq 1 ]
7 then
8   Operation="+"
9 elif [ "$ans" -eq 2 ]
10 then
11   Operation="\-"
12 elif [ "$ans" -eq 3 ]
13 then
14   Operation="*"
15 else
16   Operation="/"
17 fi
18
19 ./exp "$N1" "$N2" "$Operation"
```

Test the Calculator Program

- Run shell script(**Activate.sh**) to automatically execute the server side's Interactive Calculator (**myscript**) program using following command.
  - **./Activate.sh**

exp File

exp

```
1 #!/usr/bin/expect --
2 set timeout -1
3 set N1 [lindex $argv 0]
4 set N2 [lindex $argv 1]
5 set Operation [lindex $argv 2]
6 spawn ssh 19568@35.167.127.201 /home/19568/myscript
7 expect "N1:" { send "$N1\r" }
8 expect "N2:" { send "$N2\r" }
9 expect "Operation(+, -, *, /):" { send "$Operation\r" }
10 interact
```

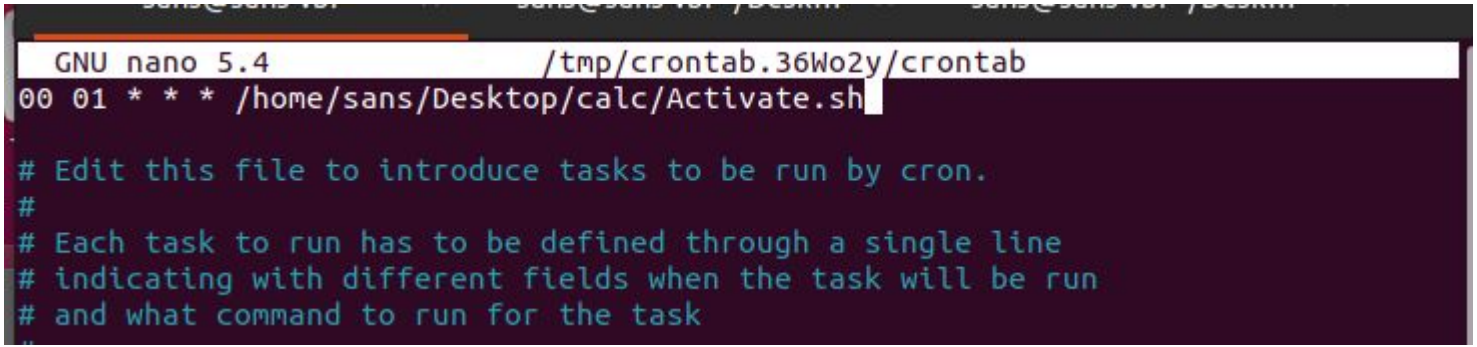
```
sans@sans-vb:~/Desktop/calc$ ./Activate.sh
spawn ssh 19568@35.167.127.201 /home/19568/myscript
N1:97
N2:75
Operation(+, -, *, /):*
7275
sans@sans-vb:~/Desktop/calc$ ./Activate.sh
spawn ssh 19568@35.167.127.201 /home/19568/myscript
N1:40
N2:48
Operation(+, -, *, /):*
1920
sans@sans-vb:~/Desktop/calc$ ./Activate.sh
spawn ssh 19568@35.167.127.201 /home/19568/myscript
N1:90
N2:34
Operation(+, -, *, /):+
124
```

Set up a cron job

- You can add or edit the cron jobs for the currently logged in user using below command. **Crontab -e**
- Schedule a cron job to run at “1.00 am” on everyday.

00 01 * * * /home/sans/Desktop/calc/Activate.sh

Here “00 01” refers to 1.00 am



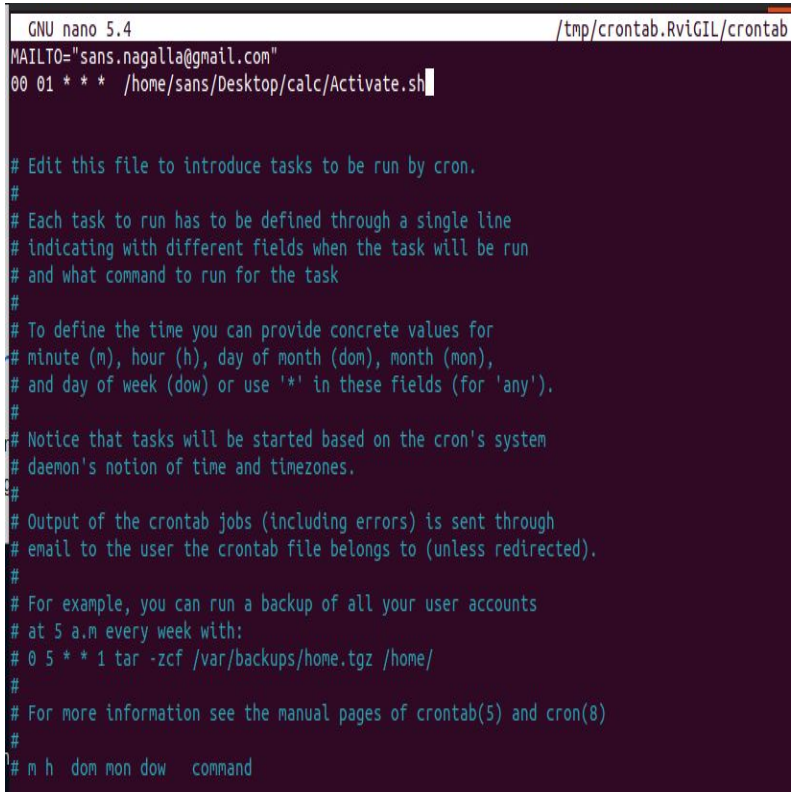
Configure cron job to support email

- You can setup a mail address on which you want to receive the notifications of executed cron jobs using below Commands.

MAILTO="santhi@gmail.com"

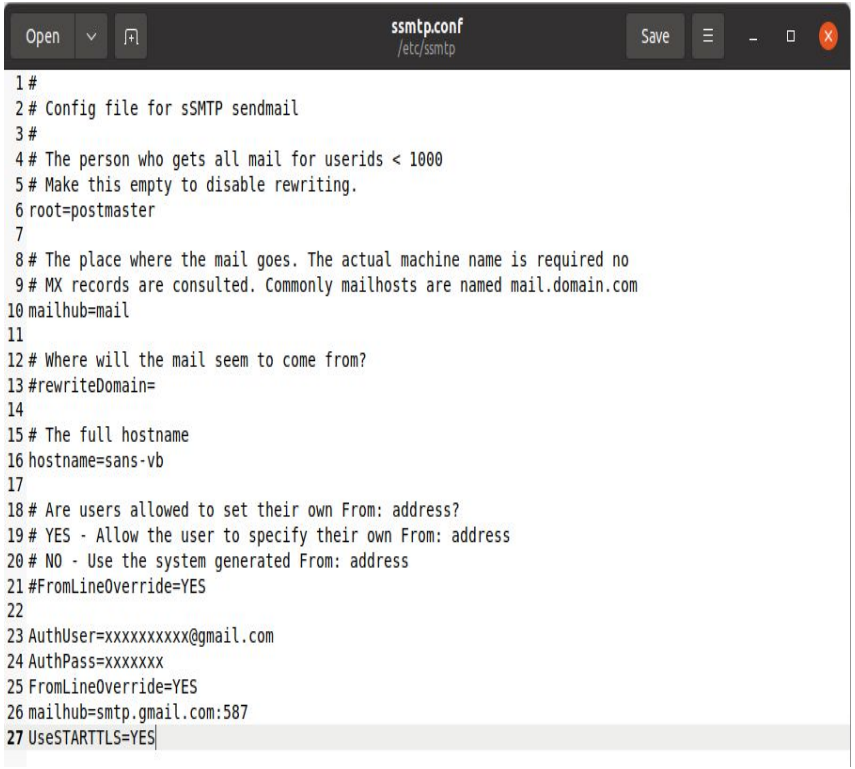
00 01 * * * /home/sans/Desktop/calc/Activate.sh

- If you see “No MTA installed, discarding output” error in your syslog it means that there is output from your cron job but your local machine does not have a Message Transfer Agent installed to process the output into an email.



Installing SSMTP on Ubuntu

- The installation process for this utility is pretty simple, use following command to install it.
  - **sudo apt-get install ssmtp**
- Let's edit "/etc/ssmtp/ssmtp.conf" file using any text editor application (Vi, Vim, Pico, Nano) , and specify the value for all parameters as shown.

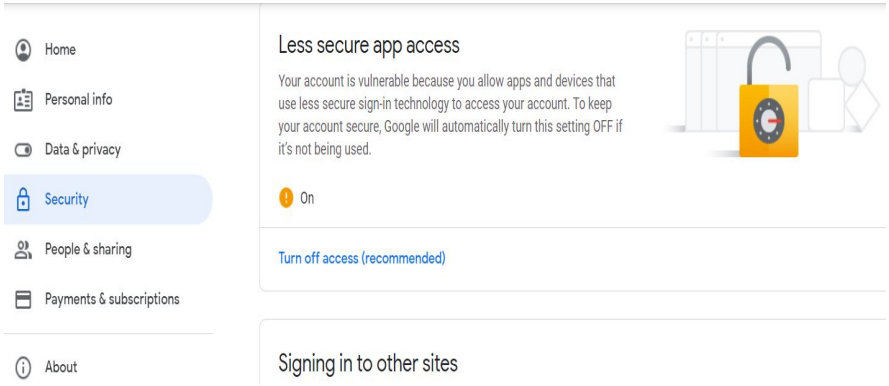


Verify email

- Save the configuration file and you are good to go.
- If you are using Google account you should turn on the option in google account under security “Less secure app access”.
- Once SSMTP has been configured, simply run following command on the terminal to verify that email is actually getting forwarded to the external mailhub.

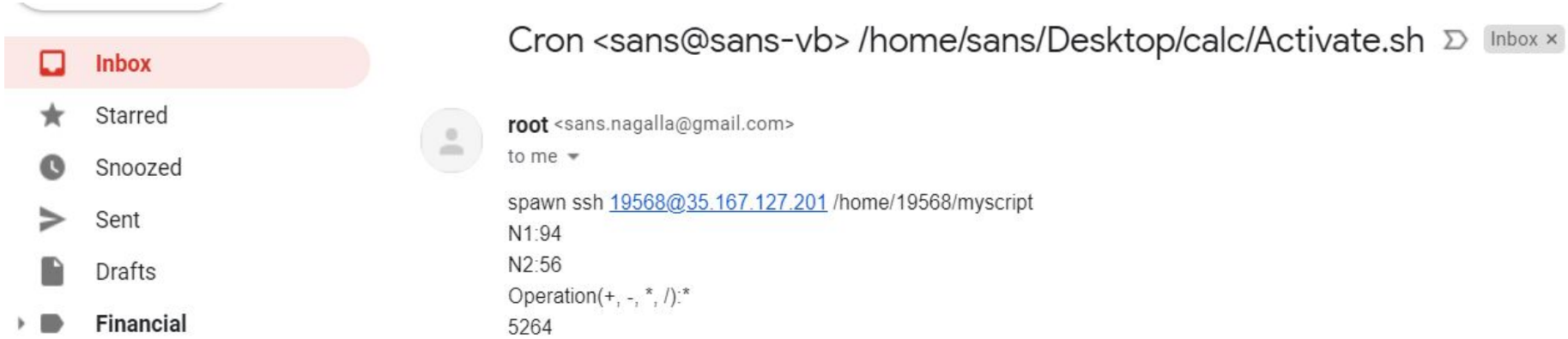
echo "Testing" | mail -s "Test Email"

santhi@gmail.com



Cron job Email Notice

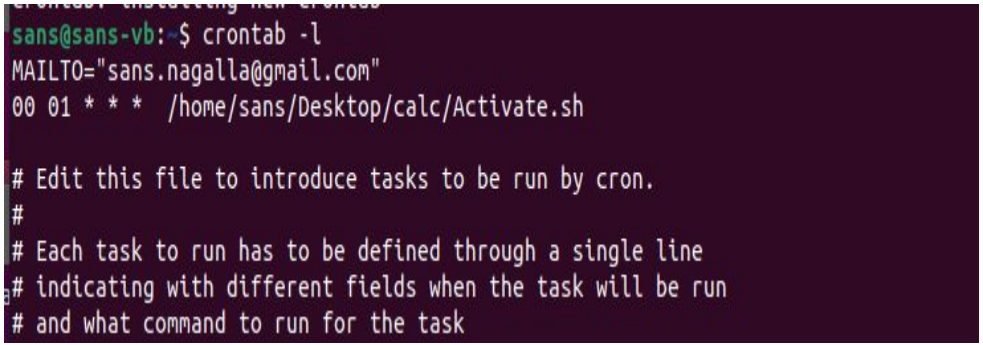
- Still if you see any issues to send out emails follow the link below.
  - https://www.unixmen.com/install-ssmtp-to-send-emails-to-gmail-and-office3655/
- After configuring the email, wait until the cron job triggers and mail is received.



Removing the cron jobs

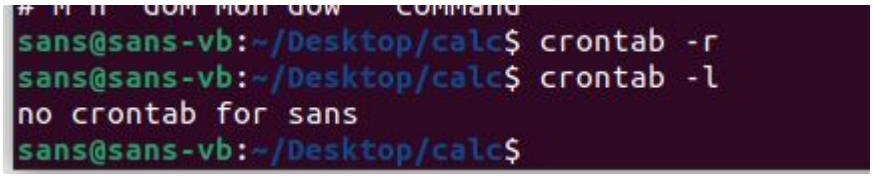
- The following command will list the scheduled cron jobs for the currently logged in user:

Crontab -l



- If you want to remove the cron jobs of currently logged in user, execute the following command:

Crontab –r



References

- GitHub URL - https://github.com/santhinagalla/Software-Quality-Assurance-and-Test-Automation/tree/main/Shell%20Script/Project
- https://npu85.npu.edu/~henry/npu/classes/shell_script/backup/slide/expect.html#calculator
- https://npu85.npu.edu/~henry/npu/classes/qa/cron_job/slide/cron.html#email
- https://www.unixmen.com/install-ssmtp-to-send-emails-to-gmail-and-office3655/
- https://stackoverflow.com/questions/2556190/random-number-from-a-range-in-a-bash-script