
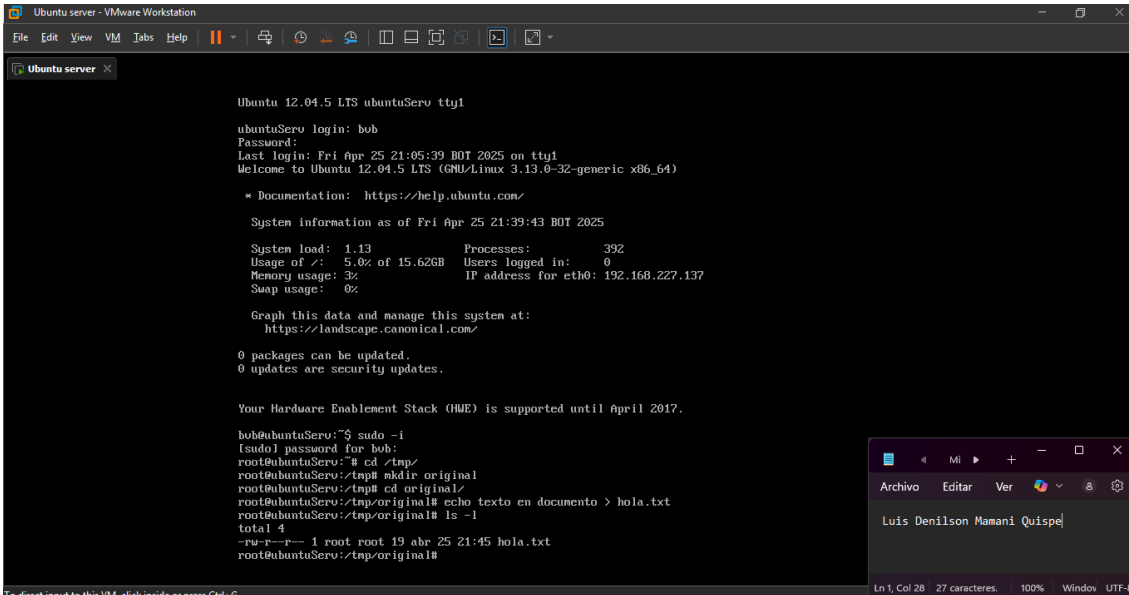


LABORATORIO N ° 7 SEGURIDAD DE SISTEMAS SIS-737S1		
Estudiante: Luis Denilson Mamani Quispe		

## Desarrollo

Entramos en nuestro Ubuntu Server 12.04 y nos ponemos en modo super-usuario con **sudo-i**

Nos vamos al **/tmp** y creamos un directorio llamado original con un fichero **hola.txt**



```

Ubuntu 12.04.5 LTS ubuntuSero tty1
ubuntuSero login: bob
Password:
Last login: Fri Apr 25 21:05:39 BOT 2025 on tty1
Welcome to Ubuntu 12.04.5 LTS (GNU/Linux 3.13.0-32-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

System information as of Fri Apr 25 21:39:43 BOT 2025

System load:  1.13           Processes:    392
Usage of /:   5.0% of 15.62GB Users logged in:   0
Memory usage: 3%           IP address for eth0: 192.168.227.137
Swap usage:   0%

Graph this data and manage this system at:
https://landscape.canonical.com/

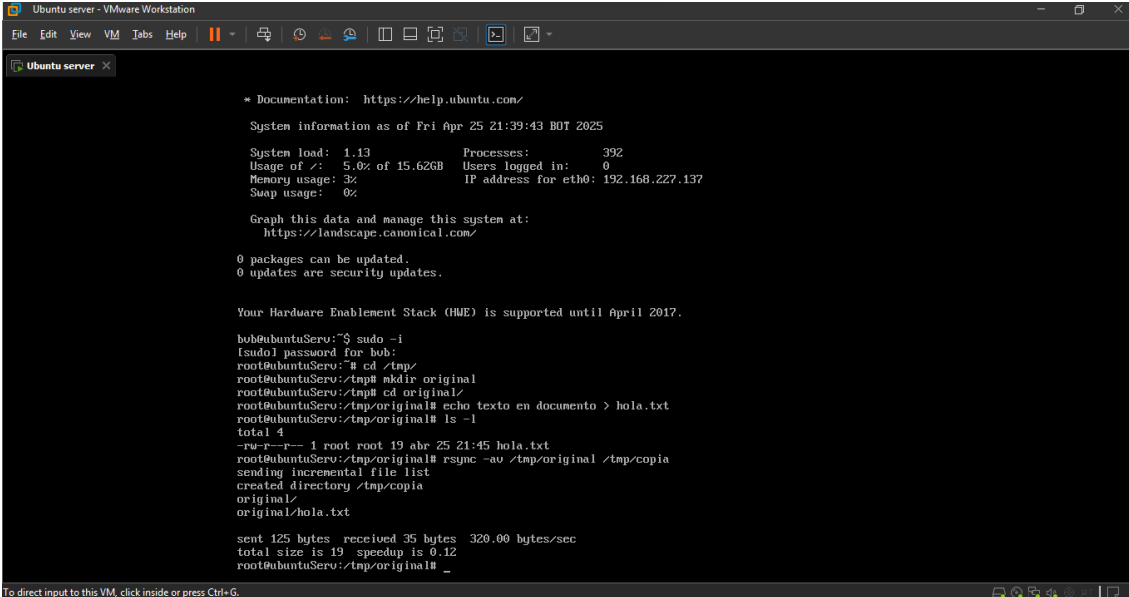
0 packages can be updated.
0 updates are security updates.

Your Hardware Enablement Stack (HWE) is supported until April 2017.

bob@ubuntuSero:~$ sudo -i
[sudo] password for bob:
root@ubuntuSero:~# cd /tmp/
root@ubuntuSero:/tmp# mkdir original
root@ubuntuSero:/tmp# cd original/
root@ubuntuSero:/tmp/original# echo texto en documento > hola.txt
root@ubuntuSero:/tmp/original# ls -l
total 4
-rw-r--r-- 1 root root 19 abr 25 21:45 hola.txt
root@ubuntuSero:/tmp/original#

```

Ahora creamos una copia de original mediante el comando: **#rsync -av /tmp/original /tmp/copia**



```

* Documentation:  https://help.ubuntu.com/

System information as of Fri Apr 25 21:39:43 BOT 2025

System load:  1.13           Processes:            392
Usage of /:   5.0% of 15.62GB Users logged in:      0
Memory usage: 3%            IP address for eth0: 192.168.227.137
Swap usage:   0%

Graph this data and manage this system at:
https://landscape.canonical.com/

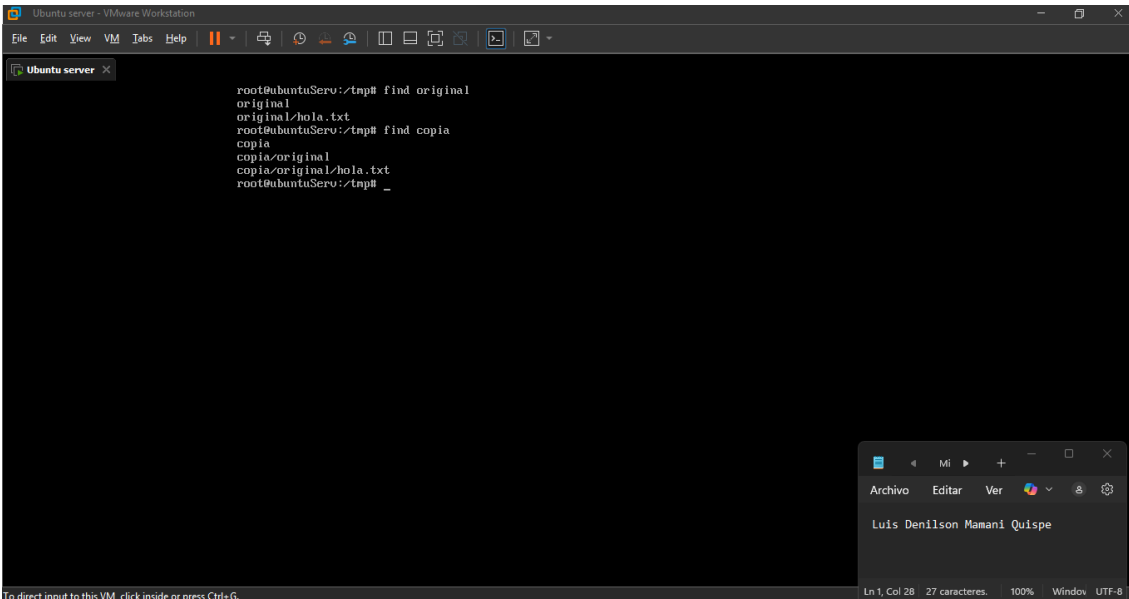
0 packages can be updated.
0 updates are security updates.

Your Hardware Enablement Stack (HWE) is supported until April 2017.

hob@ubuntuServo:~$ sudo -i
lsudol password for hob:
root@ubuntuServo:~# cd /tmp/
root@ubuntuServo:/tmp# mkdir original
root@ubuntuServo:/tmp# cd original/
root@ubuntuServo:/tmp/original# echo texto en documento > hola.txt
root@ubuntuServo:/tmp/original# ls -l
total 4
-rw-r--r-- 1 root root 19 abr 25 21:45 hola.txt
root@ubuntuServo:/tmp/original# rsync -av /tmp/original /tmp/copia
sending incremental file list
created directory /tmp/copia
original/
original/hola.txt

sent 125 bytes  received 35 bytes  320.00 bytes/sec
total size is 19  speedup is 0.12
root@ubuntuServo:/tmp/original# _
```

Como se ve en la figura, la herramienta nos avisa de que va a crear el directorio /tmp/copia (no lo habíamos creado) y muestra los ficheros que ha traspasado y un resumen de bytes transferidos.



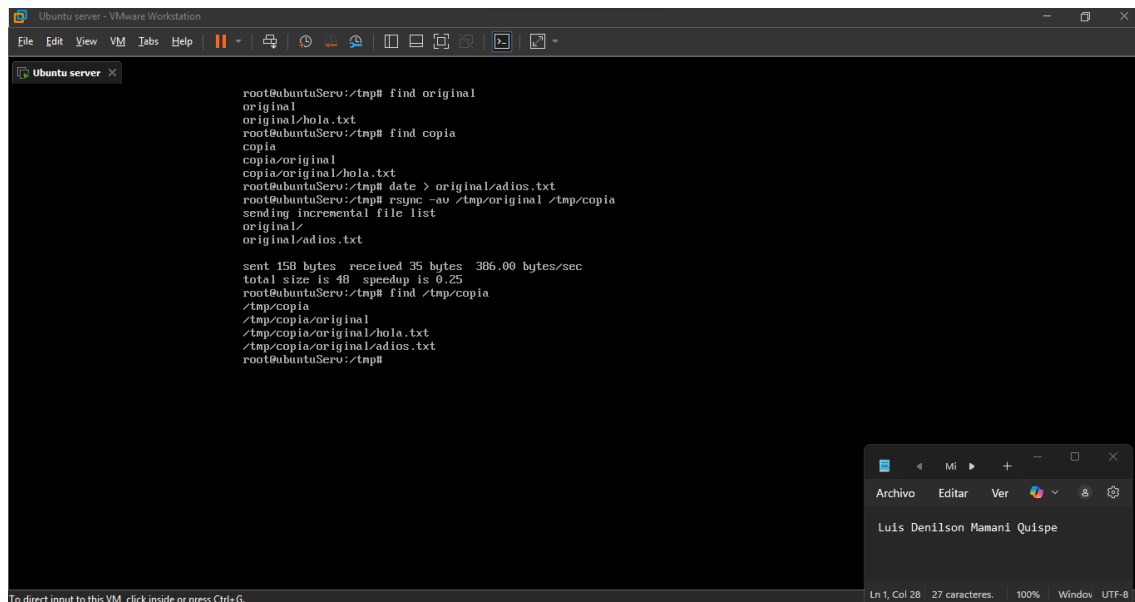
```

root@ubuntuServo:/tmp# find original
original
original/hola.txt
root@ubuntuServo:/tmp# find copia
copia
copia/original
copia/original/hola.txt
root@ubuntuServo:/tmp# _
```

Ln 1, Col 28 27 caracteres. 100% Window UTF-8

El directorio copia reproduce la estructura de carpetas de original, no solo los ficheros.

¿En qué se diferencia de hacer una copia normal mediante cp? Pues en que rsync no copia todo, sino solo los ficheros nuevos o los que han cambiado. Por ejemplo, creamos un fichero nuevo llamado "adios" y sincronizamos. Solo se traspasa ese fichero Usamos **find** para visualizar el contenido



```
root@ubuntuServ:/tmp# find original
original
original/hola.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
root@ubuntuServ:/tmp# date > original/adios.txt
root@ubuntuServ:/tmp# rsync -av /tmp/original /tmp/copia
sending incremental file list
original/
original/adios.txt

sent 158 bytes, received 35 bytes 386.00 bytes/sec
total size is 48, speedup is 0.25
root@ubuntuServ:/tmp# find /tmp/copia
/tmp/copia
/tmp/copia/original
/tmp/copia/original/hola.txt
/tmp/copia/original/adios.txt
root@ubuntuServ:/tmp#
```

Ln 1, Col 28 27 caracteres. 100% Window UTF-8

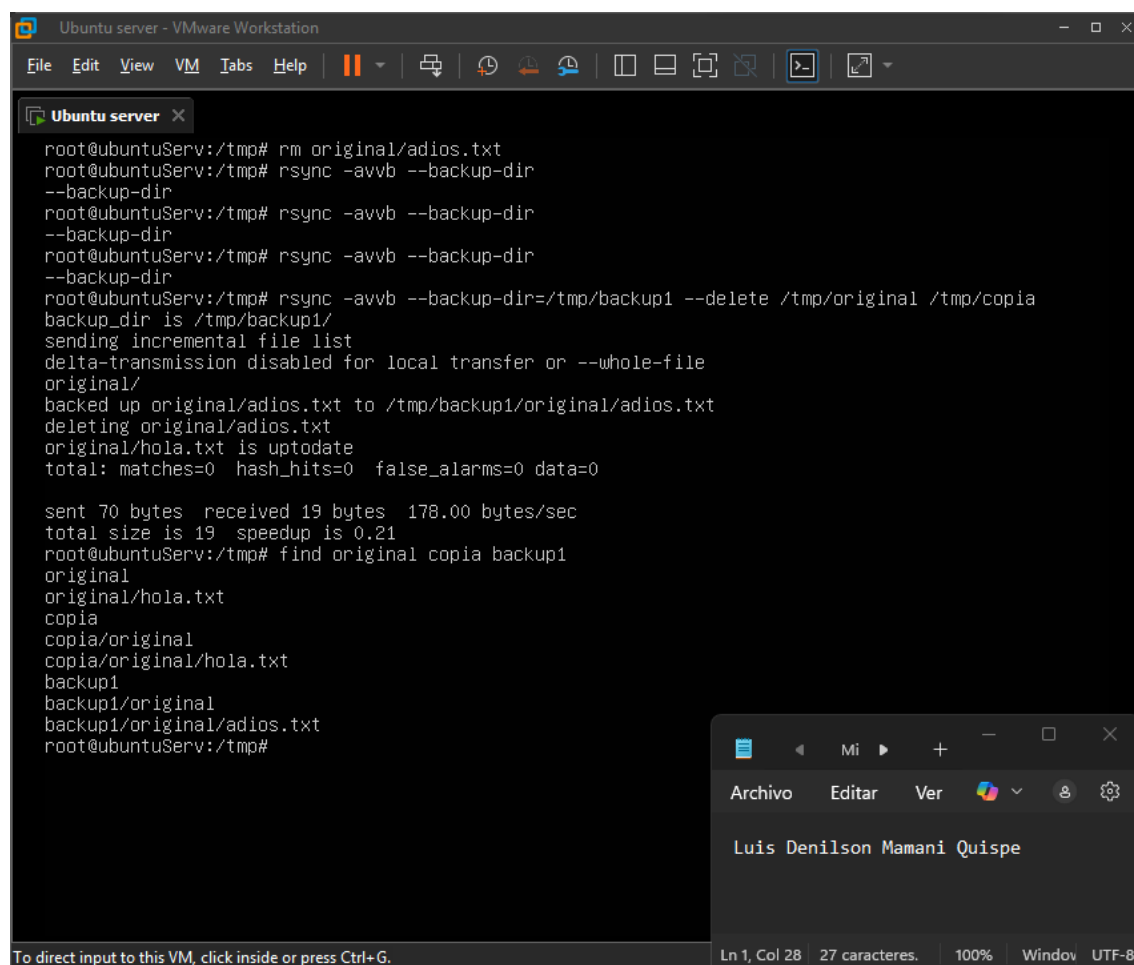
Si hemos borrado un fichero en el original y queremos que se actualice la copia, hay que incluir el parámetro --delete

## PARTE 2

Con lo que hemos visto hasta ahora solo podemos hacer backups completos. El directorio copia lo podemos llevar a cualquier dispositivo extraíble o podría ser un disco en red. Para hacer backups incrementales ejecutaremos los siguientes comandos:

```
# rsync --avvb --delete --backup dir=/tmp/backup1 /tmp/original/tmp/copia
```

Esta vez la sincronización deja en el directorio **/tmp/backup1** los ficheros que resultan modificados o eliminados; en **/tmp/copia** siempre está la versión actual. En nuestro ejemplo vamos a borrar el fichero adios.txt y al sincronizar vemos que ya no está en original ni en copia, pero sí en backup1



```
root@ubuntuServ:/tmp# rm original/adios.txt
root@ubuntuServ:/tmp# rsync -avvb --backup-dir
--backup-dir
root@ubuntuServ:/tmp# rsync -avvb --backup-dir
--backup-dir
root@ubuntuServ:/tmp# rsync -avvb --backup-dir
--backup-dir
root@ubuntuServ:/tmp# rsync -avvb --backup-dir=/tmp/backup1 --delete /tmp/original /tmp/copia
backup_dir is /tmp/backup1/
sending incremental file list
delta-transmission disabled for local transfer or --whole-file
original/
backed up original/adios.txt to /tmp/backup1/original/adios.txt
deleting original/adios.txt
original/hola.txt is uptodate
total: matches=0 hash_hits=0 false_alarms=0 data=0

sent 70 bytes received 19 bytes 178.00 bytes/sec
total size is 19 speedup is 0.21
root@ubuntuServ:/tmp# find original copia backup1
original
original/hola.txt
copia
copia/original
copia/original/hola.txt
backup1
backup1/original
backup1/original/adios.txt
root@ubuntuServ:/tmp#
```

Finalmente, como es imprescindible que el backup se ejecute con regularidad, vamos a probar a meterlo en cron. Le pondremos que se ejecute cada minuto (lo normal sería una vez al día), y en ese tiempo haremos cambios para comprobar el funcionamiento.

Crearemos un script llamado mibackup.sh (darle permisos de lectura escritura y ejecución) que invocaremos desde el cron. Para distinguir las distintas copias incrementales, el script utiliza la fecha en que se ejecuta, además que dejaremos un log para comprobar las copias.

El script deberá contener el siguiente código (no olvide guardar):

Ubuntu server - VMware Workstation

File Edit View VM Tabs Help

root@ubuntuServ:/tmp# nano mibackup.sh

Ubuntu server - VMware Workstation

File Edit View VM Tabs Help

GNU nano 2.2.6 File: mibackup.sh Modified

```
#!/bin/sh
FECHA=$(date +%y%m%d%H%M)
rsync -avvb --backup-dir=/tmp/backup1 --delete /tmp/original /tmp/copia >> /tmp/log_$(FECHA)
```

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page  
^X Exit ^U Justify ^W Where Is ^V Next Page

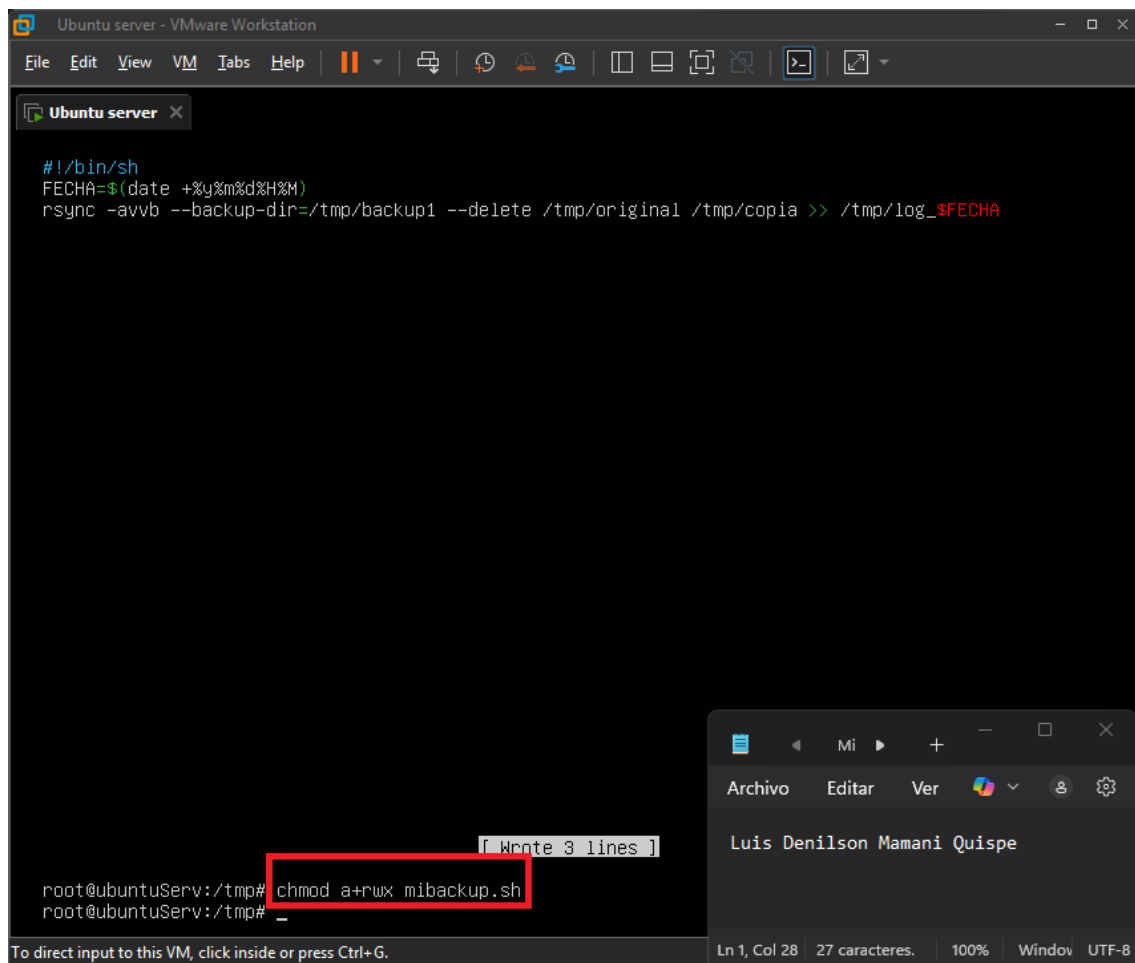
To direct input to this VM, click inside or press Ctrl+G.

Ln 1, Col 28 27 caracteres. 100% Window UTF-8

Archivo Editar Ver

Luis Denilson Mamani Quispe

## Permisos



The screenshot shows a VMware Workstation window titled "Ubuntu server - VMware Workstation". Inside the window is a terminal window titled "Ubuntu server" with the following content:

```
#!/bin/sh
FECHA=$(date +%y%m%d%H%M)
rsync -avvb --backup-dir=/tmp/backup1 --delete /tmp/original /tmp/copia >> /tmp/log_$(FECHA)
```

Below the terminal, there is a text box containing the text "[ Wrote 3 lines ]".

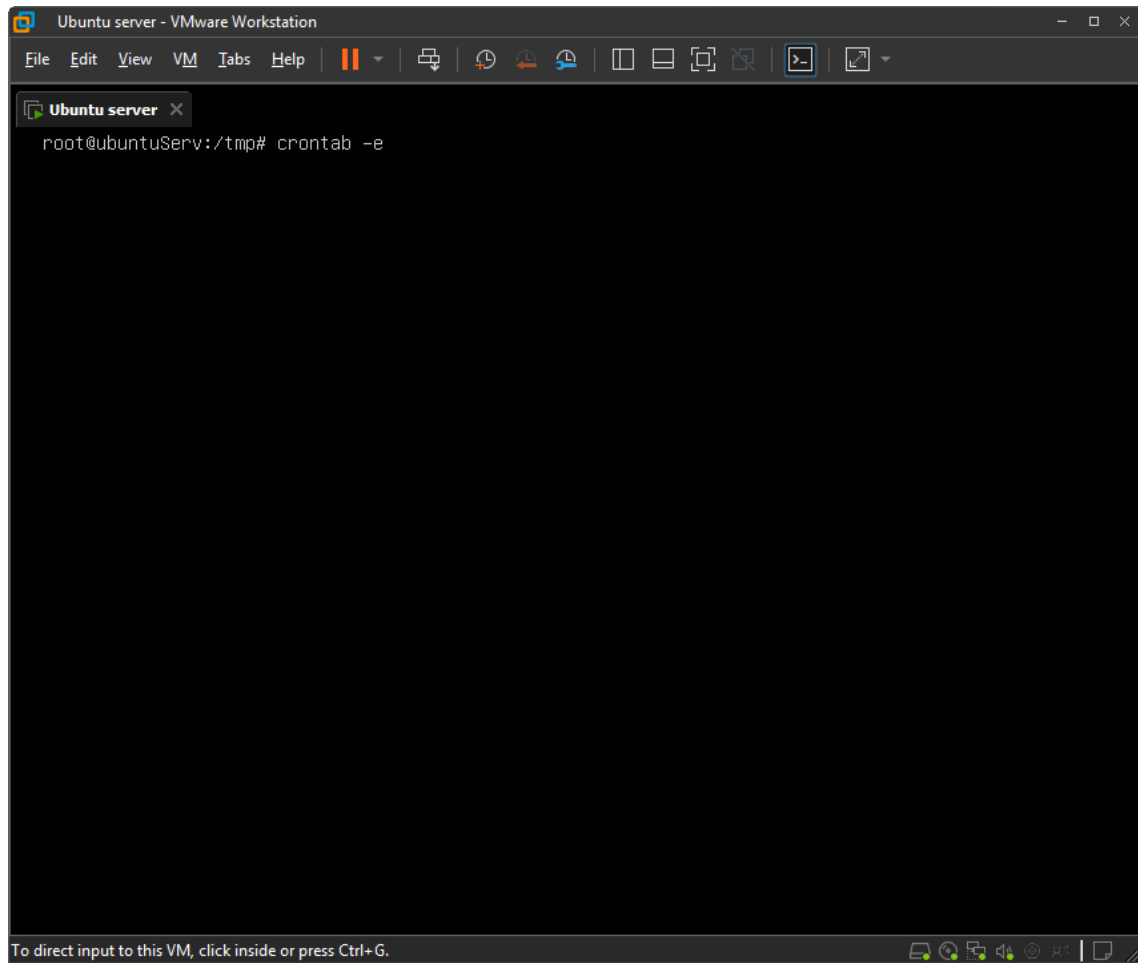
At the bottom of the terminal, the following commands are shown:

```
root@ubuntuServ:/tmp# chmod a+rwX mibackup.sh
root@ubuntuServ:/tmp# _
```

Overlaid on the bottom right of the terminal window is a code editor window. The code editor has a menu bar with "Archivo", "Editar", and "Ver". The text "Luis Denilson Mamani Quispe" is visible in the editor. The status bar at the bottom of the code editor shows "Ln 1, Col 28", "27 caracteres.", "100%", "Window", and "UTF-8".

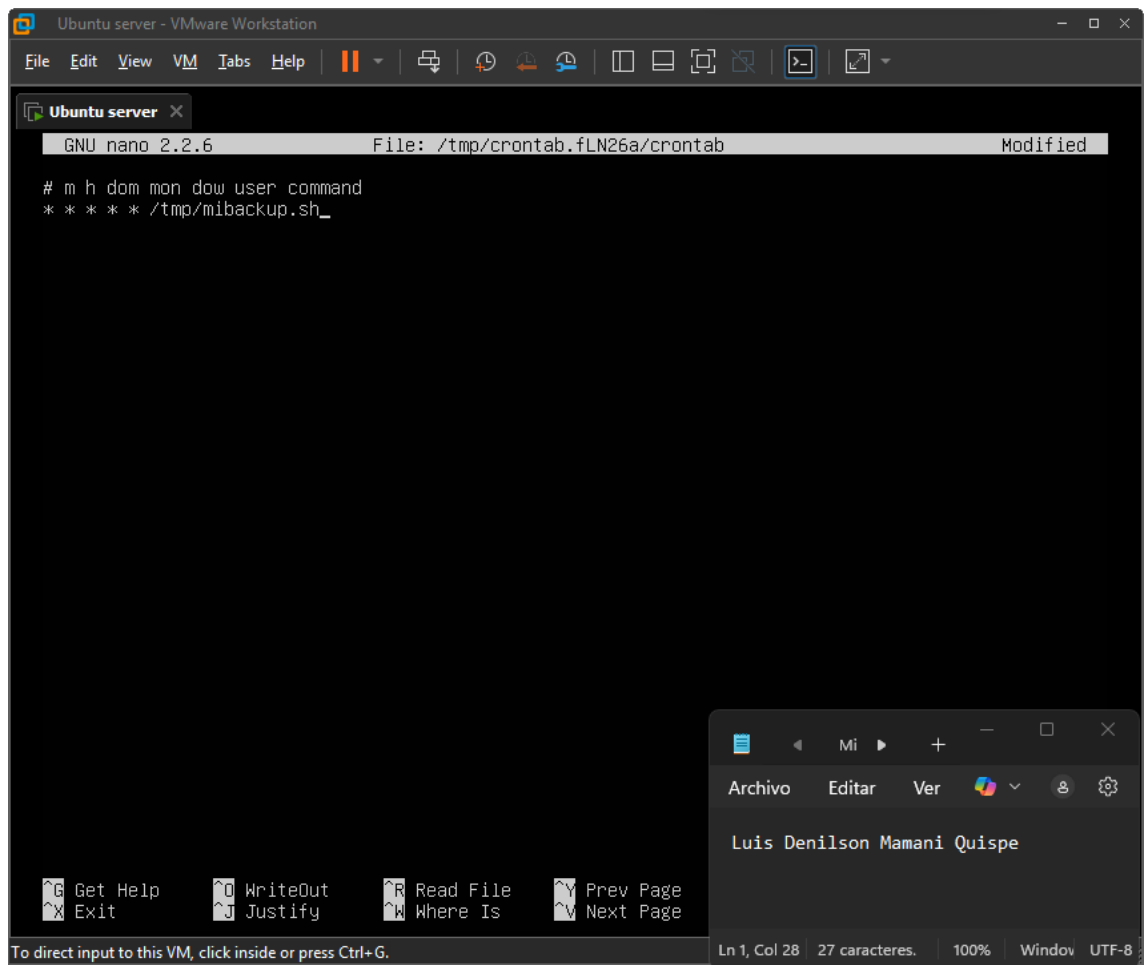
At the very bottom of the VMware Workstation window, there is a status bar that reads: "To direct input to this VM, click inside or press Ctrl+G."

Procedemos a editar el cron ingresando el comando: **crontab -e**



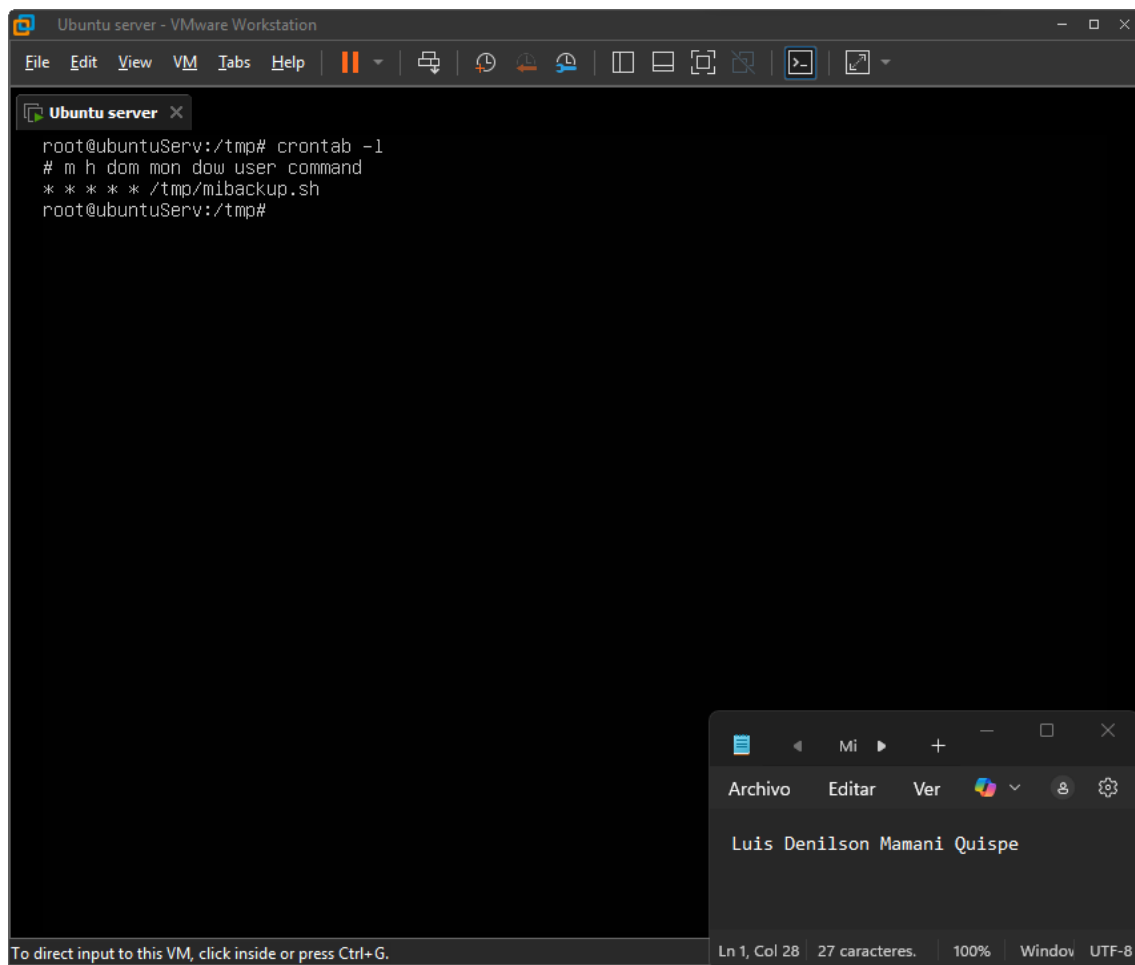
The image shows a VMware Workstation window titled "Ubuntu server - VMware Workstation". The window contains a terminal window titled "Ubuntu server" with the prompt "root@ubuntuServ:/tmp#". The command "crontab -e" has been entered into the terminal. The terminal window is dark-themed. The VMware Workstation interface includes a menu bar (File, Edit, View, VM, Tabs, Help) and a toolbar with various icons. At the bottom of the window, there is a status bar with the text "To direct input to this VM, click inside or press Ctrl+G." and several system icons.

```
root@ubuntuServ:/tmp# crontab -e
```





Si queremos ver el contenido de crontab utilizamos: **crontab -l**

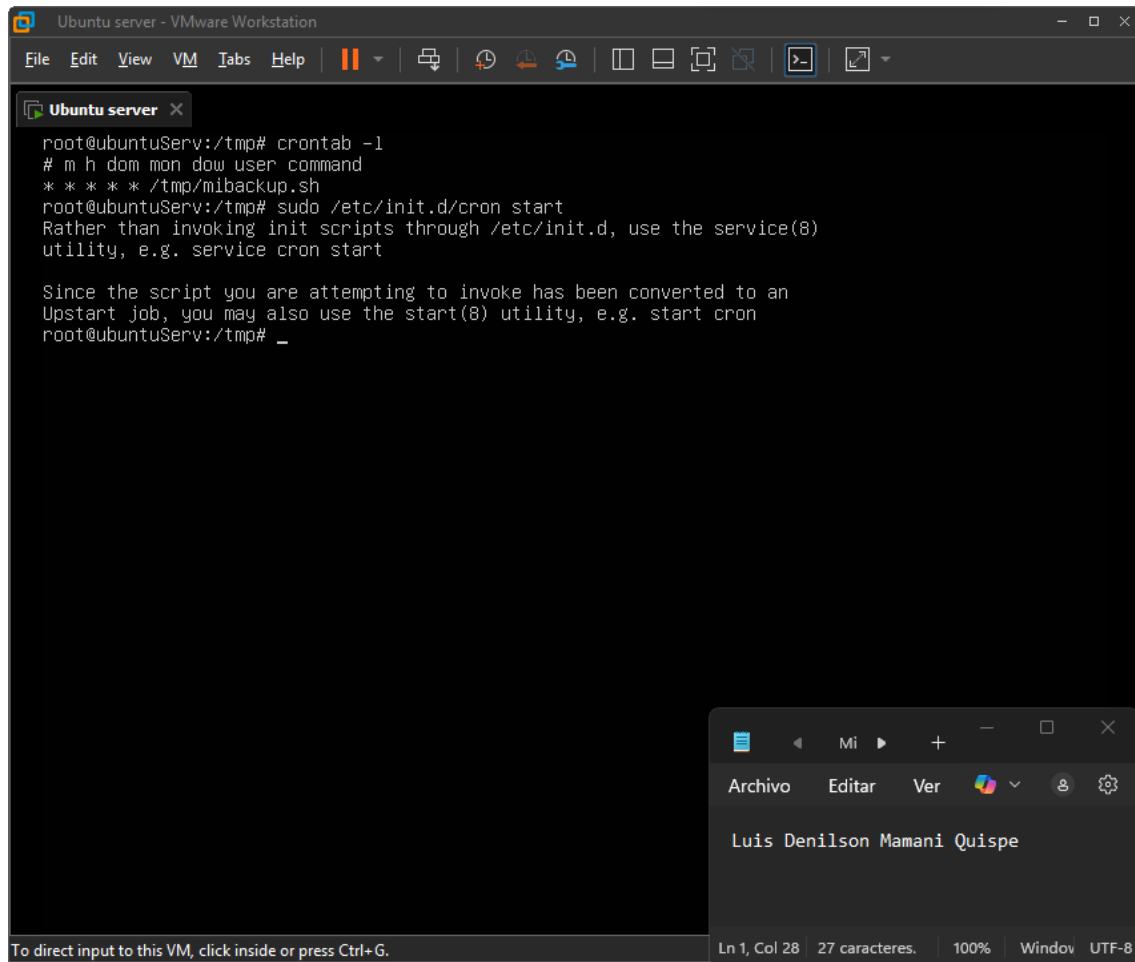


The image shows a terminal window titled "Ubuntu server - VMware Workstation". The terminal prompt is `root@ubuntuServ:/tmp#`. The command `crontab -l` has been entered, and the output is displayed. The output shows the crontab file's structure with a header line `# m h dom mon dow user command` and a single cron job `* * * * * /tmp/mibackup.sh`. The terminal prompt returns to `root@ubuntuServ:/tmp#`.

```
root@ubuntuServ:/tmp# crontab -l
# m h dom mon dow user  command
* * * * * /tmp/mibackup.sh
root@ubuntuServ:/tmp#
```

At the bottom right, there is a small window titled "Luis Denilson Mamani Quispe" showing the text "Luis Denilson Mamani Quispe". The status bar at the bottom of the terminal window indicates "Ln 1, Col 28 | 27 caracteres. | 100% | Window | UTF-8".

A continuación, iniciamos el servicio:



```
root@ubuntuServ:/tmp# crontab -l
# m h dom mon dow user  command
* * * * * /tmp/mibackup.sh
root@ubuntuServ:/tmp# sudo /etc/init.d/cron start
Rather than invoking init scripts through /etc/init.d, use the service(8)
utility, e.g. service cron start

Since the script you are attempting to invoke has been converted to an
Upstart job, you may also use the start(8) utility, e.g. start cron
root@ubuntuServ:/tmp# _
```

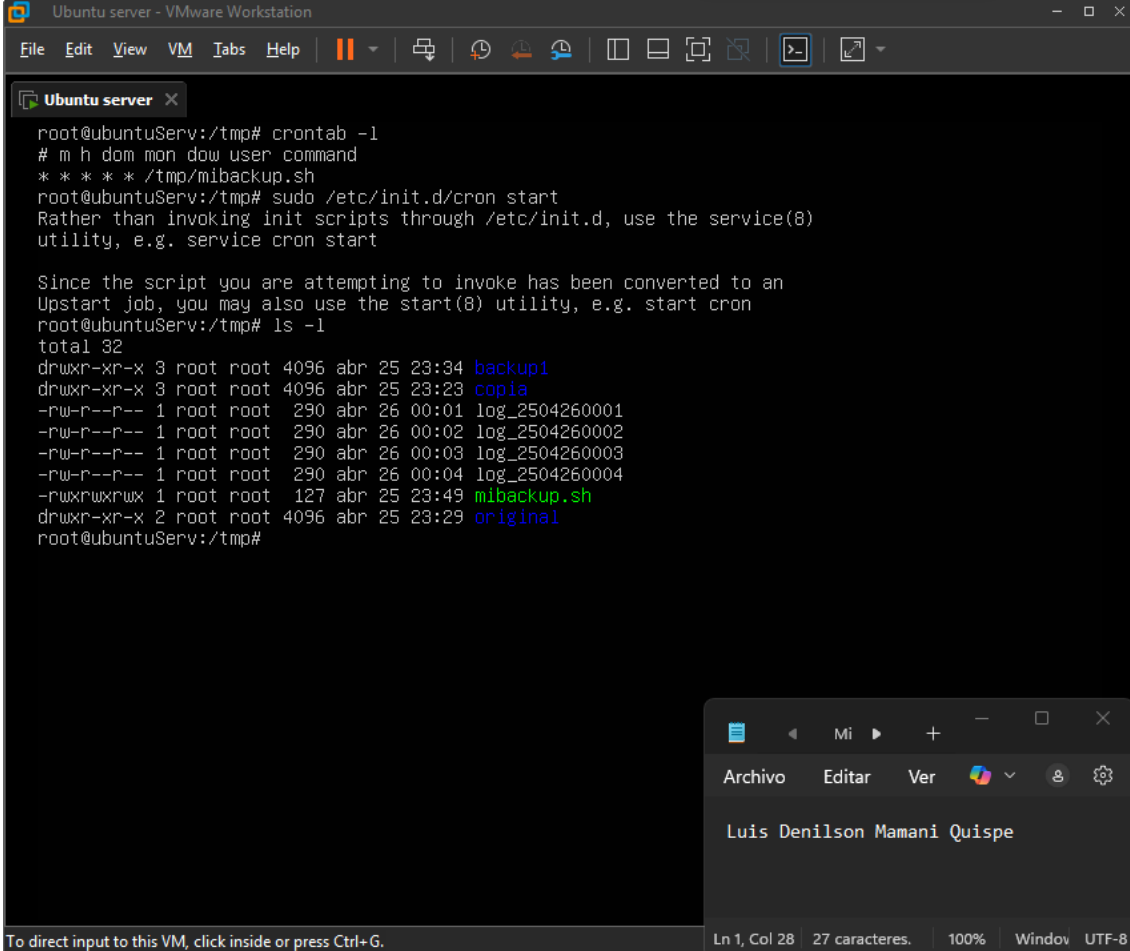
File Edit View VM Tabs Help

Ln 1, Col 28 27 caracteres. 100% Window UTF-8

Archivo Editar Ver

Luis Denilson Mamani Quispe

Si listamos después de cada minuto un nuevo log aparecerá, indicando que la copia se realizó, en este caso cada minuto.



The screenshot shows a terminal window titled 'Ubuntu server - VMware Workstation'. The terminal output is as follows:

```
root@ubuntuServ:/tmp# crontab -l
# m h dom mon dow user  command
* * * * * /tmp/mibackup.sh
root@ubuntuServ:/tmp# sudo /etc/init.d/cron start
Rather than invoking init scripts through /etc/init.d, use the service(8)
utility, e.g. service cron start

Since the script you are attempting to invoke has been converted to an
Upstart job, you may also use the start(8) utility, e.g. start cron
root@ubuntuServ:/tmp# ls -l
total 32
drwxr-xr-x 3 root root 4096 abr 25 23:34 backup1
drwxr-xr-x 3 root root 4096 abr 25 23:23 copia
-rw-r--r-- 1 root root 290 abr 26 00:01 log_2504260001
-rw-r--r-- 1 root root 290 abr 26 00:02 log_2504260002
-rw-r--r-- 1 root root 290 abr 26 00:03 log_2504260003
-rw-r--r-- 1 root root 290 abr 26 00:04 log_2504260004
-rwxrwxrwx 1 root root 127 abr 25 23:49 mibackup.sh
drwxr-xr-x 2 root root 4096 abr 25 23:29 original
root@ubuntuServ:/tmp#
```

Below the terminal window, there is a small floating window titled 'Mi' with a menu bar containing 'Archivo', 'Editar', and 'Ver'. The text 'Luis Denilson Mamani Quispe' is visible in this window.

At the bottom of the terminal window, a status bar indicates: 'To direct input to this VM, click inside or press Ctrl+G. Ln 1, Col 28 27 caracteres. 100% Window UTF-8'.

Para detener el servicio utilizamos **cron stop**, caso contrario se llenará el disco de respaldos.

Ubuntu server - VMware Workstation

File Edit View VM Tabs Help

Ubuntu server x

```
root@ubuntuServ:/tmp# crontab -l
# m h dom mon dow user command
* * * * * /tmp/mibackup.sh
root@ubuntuServ:/tmp# sudo /etc/init.d/cron start
Rather than invoking init scripts through /etc/init.d, use the service(8)
utility, e.g. service cron start

Since the script you are attempting to invoke has been converted to an
Upstart job, you may also use the start(8) utility, e.g. start cron
root@ubuntuServ:/tmp# ls -l
total 32
drwxr-xr-x 3 root root 4096 abr 25 23:34 backup1
drwxr-xr-x 3 root root 4096 abr 25 23:23 copia
-rw-r--r-- 1 root root 290 abr 26 00:01 log_2504260001
-rw-r--r-- 1 root root 290 abr 26 00:02 log_2504260002
-rw-r--r-- 1 root root 290 abr 26 00:03 log_2504260003
-rw-r--r-- 1 root root 290 abr 26 00:04 log_2504260004
-rwxrwxrwx 1 root root 127 abr 25 23:49 mibackup.sh
drwxr-xr-x 2 root root 4096 abr 25 23:29 original
root@ubuntuServ:/tmp# sudo /etc/init.d/cron stop
Rather than invoking init scripts through /etc/init.d, use the service(8)
utility, e.g. service cron stop

Since the script you are attempting to invoke has been converted to an
Upstart job, you may also use the stop(8) utility, e.g. stop cron
cron stop/waiting
root@ubuntuServ:/tmp#
```

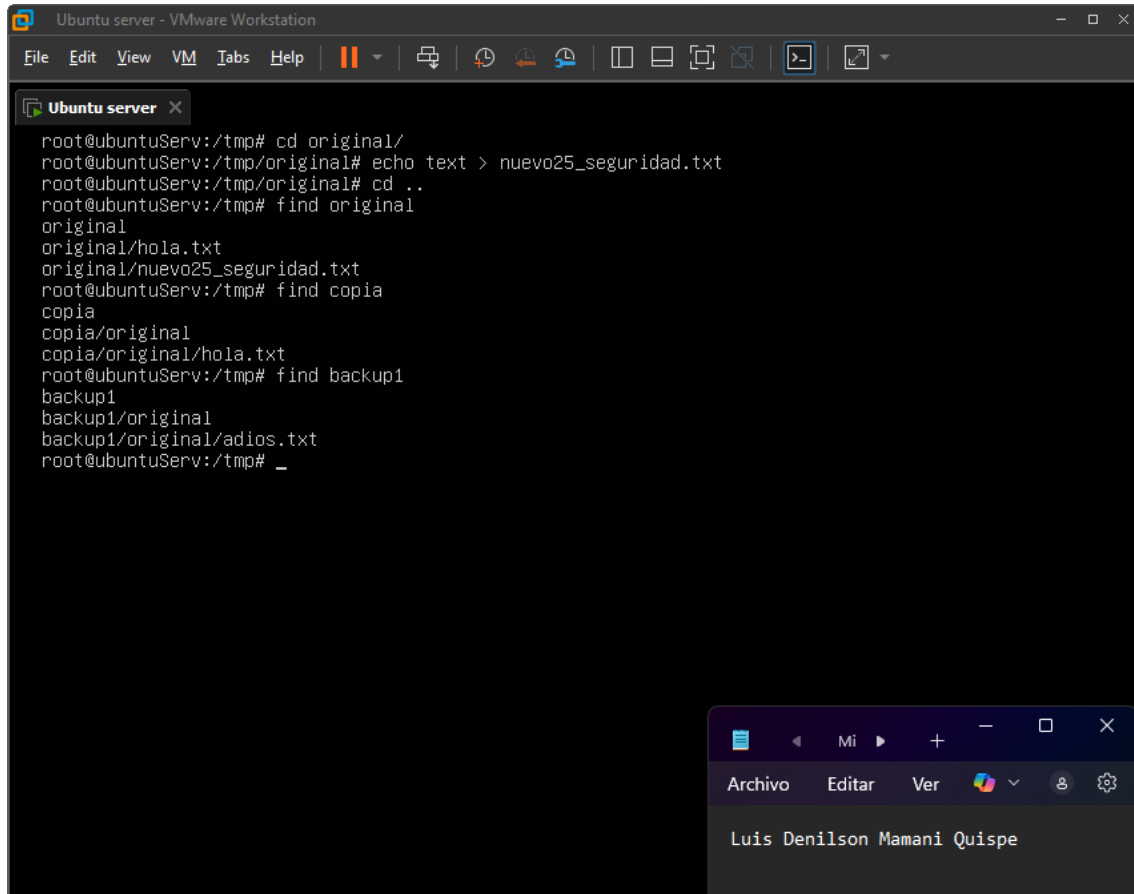
To direct input to this VM, click inside or press Ctrl+G.

Ln 1, Col 28 27 caracteres. 100% Window UTF-8

Archivo Editar Ver Luis Denilson Mamani Quispe

## EVALUACIÓN

1.- Primeramente, detenga el servicio de cron. Ahora cree un nuevo archivo de texto en la carpeta original con el nombre **nuevo25\_seguridad.txt**, y ayudado por el comando **find** que utilizó en la primera parte, observe el comportamiento de las 3 carpetas.



```
root@ubuntuServ:/tmp# cd original/
root@ubuntuServ:/tmp/original# echo text > nuevo25_seguridad.txt
root@ubuntuServ:/tmp/original# cd ..
root@ubuntuServ:/tmp# find original
original
original/hola.txt
original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
root@ubuntuServ:/tmp# find backup1
backup1
backup1/original
backup1/original/adios.txt
root@ubuntuServ:/tmp# _
```

Comando **find** que utilizó:

```
root@ubuntuServ:/tmp# find original
```

```
root@ubuntuServ:/tmp# find copia
```

```
root@ubuntuServ:/tmp# find backup1
```

¿Qué archivos están inicialmente en original, copia y backup1?

**original/**

hola.txt

nuevo25\_seguridad.txt

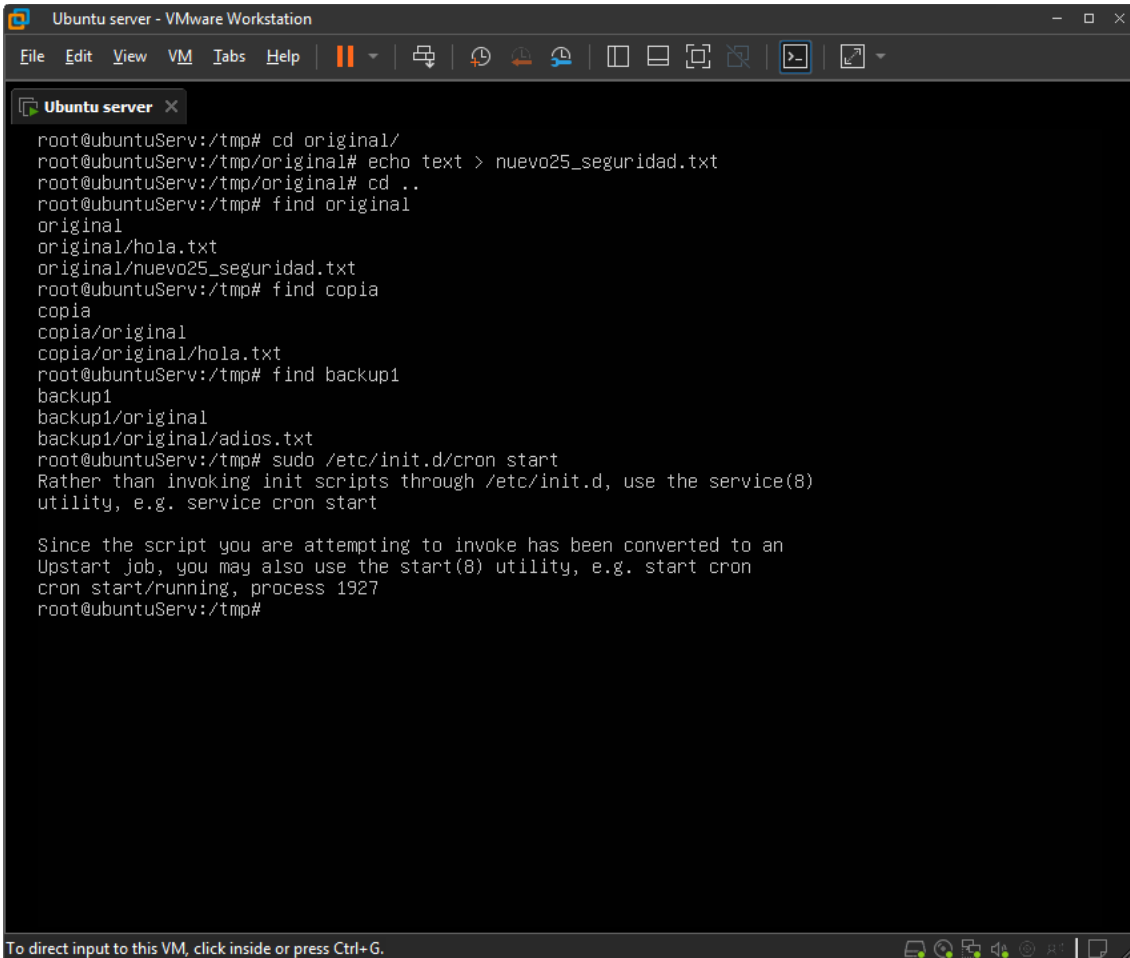
**copia/**

hola.txt

**backup1**

adios.txt

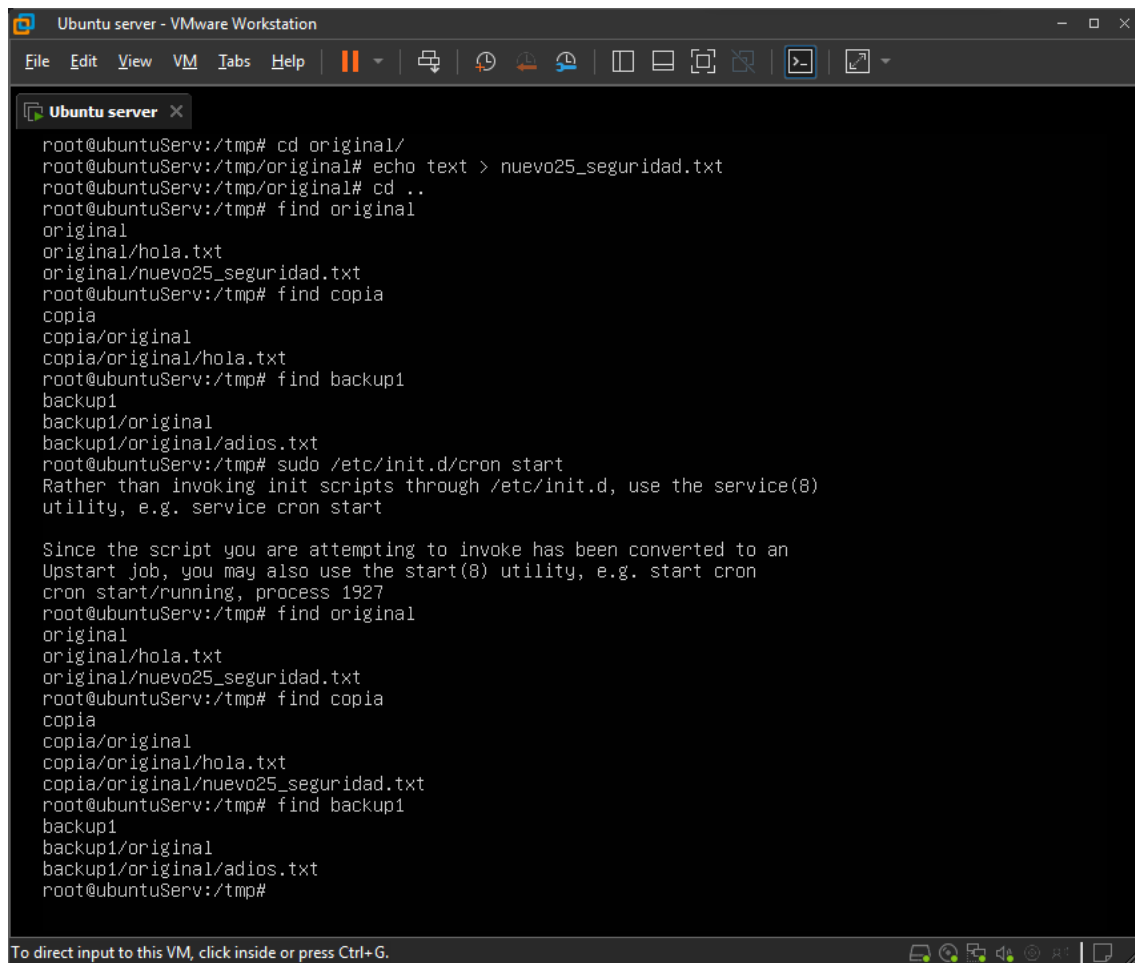
2.- Vuelva a iniciar el servicio de cron, Pasado 1 minuto vuelva a ver las mismas carpetas mediante **find** ¿Qué cambios ocurrieron?



```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
root@ubuntuServ:/tmp# cd original/
root@ubuntuServ:/tmp/original# echo text > nuevo25_seguridad.txt
root@ubuntuServ:/tmp/original# cd ..
root@ubuntuServ:/tmp# find original
original
original/hola.txt
original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
root@ubuntuServ:/tmp# find backup1
backup1
backup1/original
backup1/original/adios.txt
root@ubuntuServ:/tmp# sudo /etc/init.d/cron start
Rather than invoking init scripts through /etc/init.d, use the service(8)
utility, e.g. service cron start

Since the script you are attempting to invoke has been converted to an
Upstart job, you may also use the start(8) utility, e.g. start cron
cron start/running, process 1927
root@ubuntuServ:/tmp#
```

To direct input to this VM, click inside or press Ctrl+G.



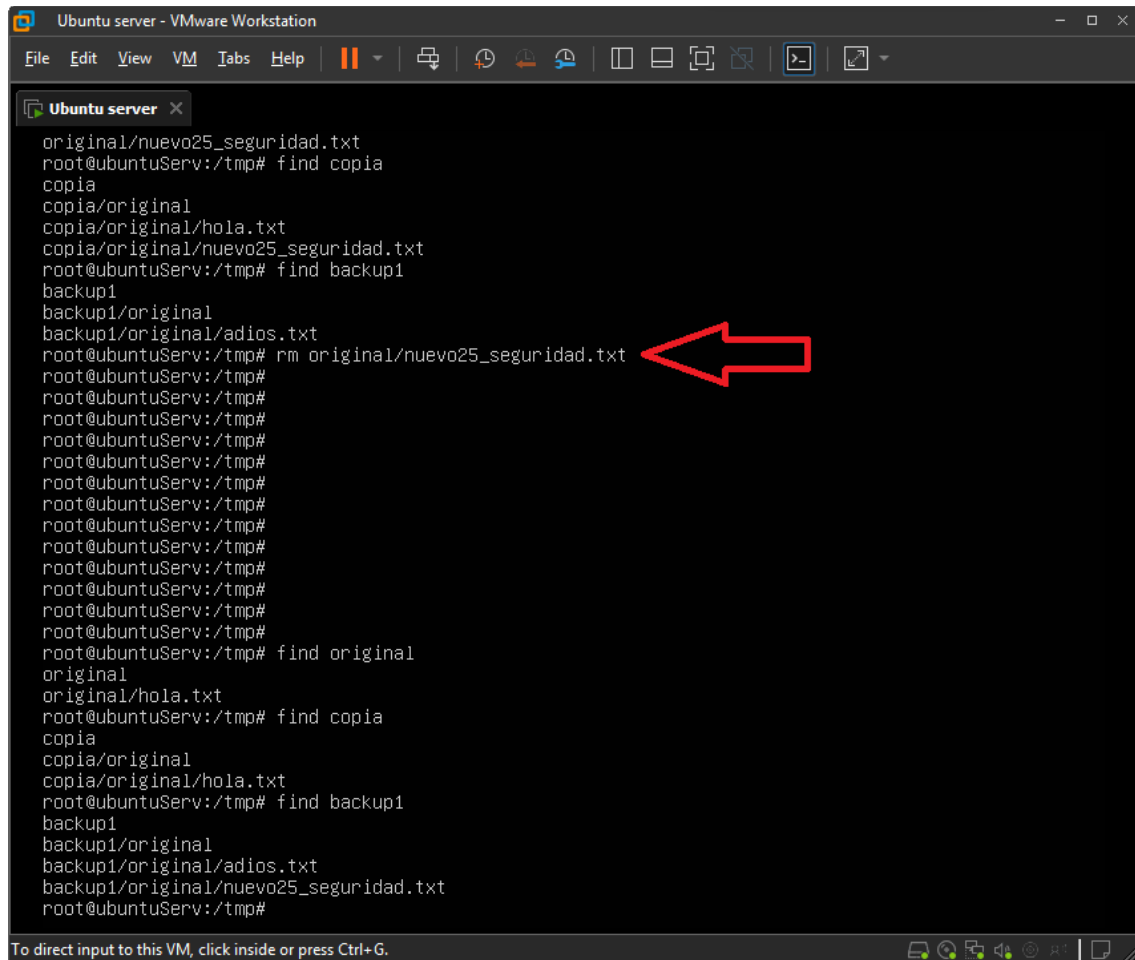
```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
root@ubuntuServ:/tmp# cd original/
root@ubuntuServ:/tmp/original# echo text > nuevo25_seguridad.txt
root@ubuntuServ:/tmp/original# cd ..
root@ubuntuServ:/tmp# find original
original
original/hola.txt
original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
root@ubuntuServ:/tmp# find backup1
backup1
backup1/original
backup1/original/adios.txt
root@ubuntuServ:/tmp# sudo /etc/init.d/cron start
Rather than invoking init scripts through /etc/init.d, use the service(8)
utility, e.g. service cron start

Since the script you are attempting to invoke has been converted to an
Upstart job, you may also use the start(8) utility, e.g. start cron
cron start/running, process 1927
root@ubuntuServ:/tmp# find original
original
original/hola.txt
original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
copia/original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find backup1
backup1
backup1/original
backup1/original/adios.txt
root@ubuntuServ:/tmp#
```

To direct input to this VM, click inside or press Ctrl+G.

Se hizo una backup del archivo **nuevo25\_seguridad.txt** en **copia/**

3.- Borre el archivo **nuevo25\_seguridad.txt**, pasado 1 minuto ¿Qué ocurrió? Utilice **find**



The screenshot shows a terminal window titled "Ubuntu server - VMware Workstation". The terminal output is as follows:

```
original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
copia/original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp# find backup1
backup1
backup1/original
backup1/original/adios.txt
root@ubuntuServ:/tmp# rm original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp#
root@ubuntuServ:/tmp# find original
original
original/hola.txt
root@ubuntuServ:/tmp# find copia
copia
copia/original
copia/original/hola.txt
root@ubuntuServ:/tmp# find backup1
backup1
backup1/original
backup1/original/adios.txt
backup1/original/nuevo25_seguridad.txt
root@ubuntuServ:/tmp#
```

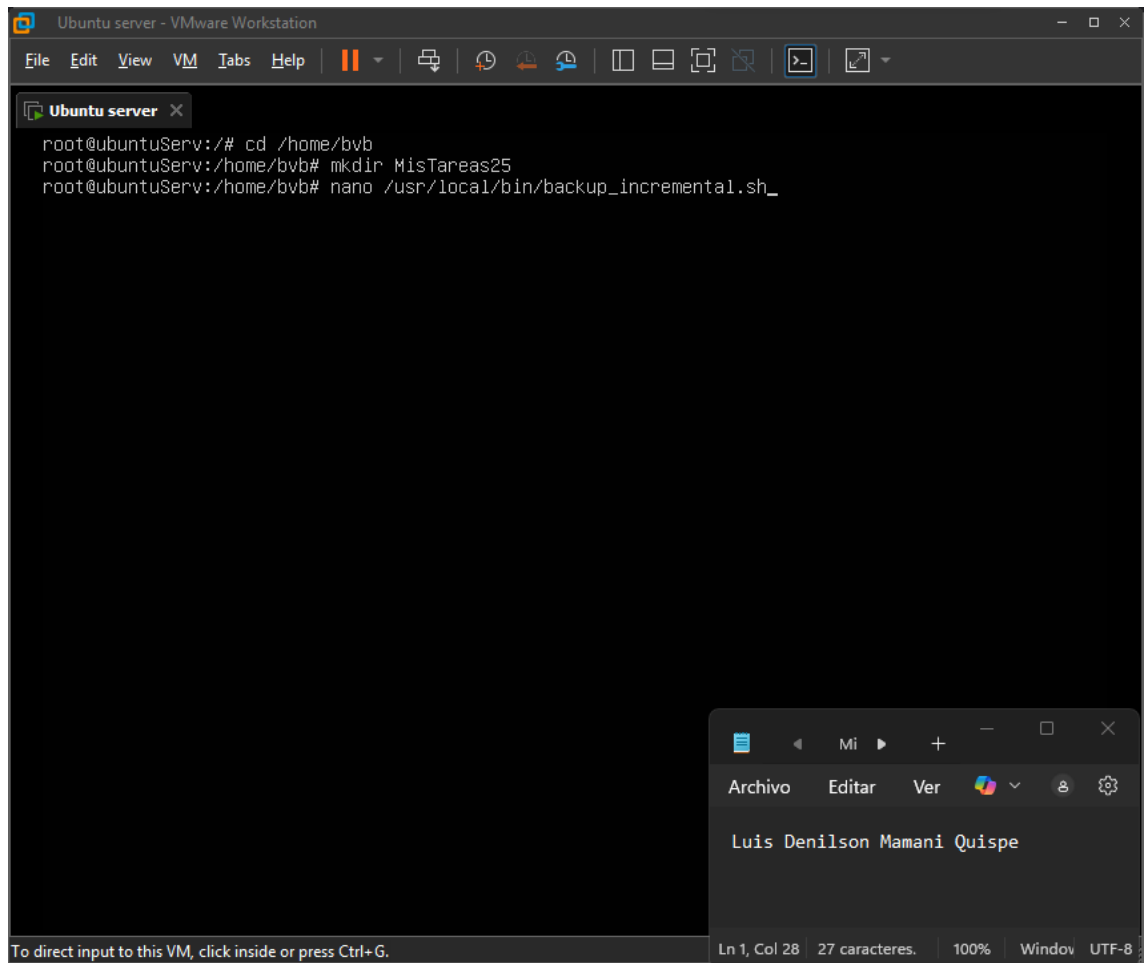
A red arrow points to the command `rm original/nuevo25_seguridad.txt`.

At the bottom of the terminal window, there is a status bar that reads: "To direct input to this VM, click inside or press Ctrl+G."

Se elimino el archivo en **original/**, se elimino el backup en **copia/** y al final se hizo un backup del archivo eliminado en **backup1/**



4.- Realice las tareas necesarias para realizar una copia de seguridad incremental a un directorio llamado MisTareas25, para que se realicen automáticamente cada día sábado a las 19:30.



The screenshot shows a VMware Workstation window titled "Ubuntu server - VMware Workstation". Inside the window, there is a terminal window titled "Ubuntu server" with the following commands and output:

```
root@ubuntuServ:/# cd /home/bvb
root@ubuntuServ:/home/bvb# mkdir MisTareas25
root@ubuntuServ:/home/bvb# nano /usr/local/bin/backup_incremental.sh_
```

Below the terminal, a nano editor window is open, showing the text "Luis Denilson Mamani Quispe". The nano editor has a menu bar with "Archivo", "Editar", and "Ver", and a status bar at the bottom indicating "Ln 1, Col 28", "27 caracteres.", "100%", "Window", and "UTF-8".

Ubuntu server - VMware Workstation

File Edit View VM Tabs Help

GNU nano 2.2.6 File: /usr/local/bin/backup\_incremental.sh Modified

```
#!/bin/bash

ORIGEN="/home/bvb"
DESTINO="/home/bvb/MisTareas25"
FECHA=$(date +%Y-%m-%d)

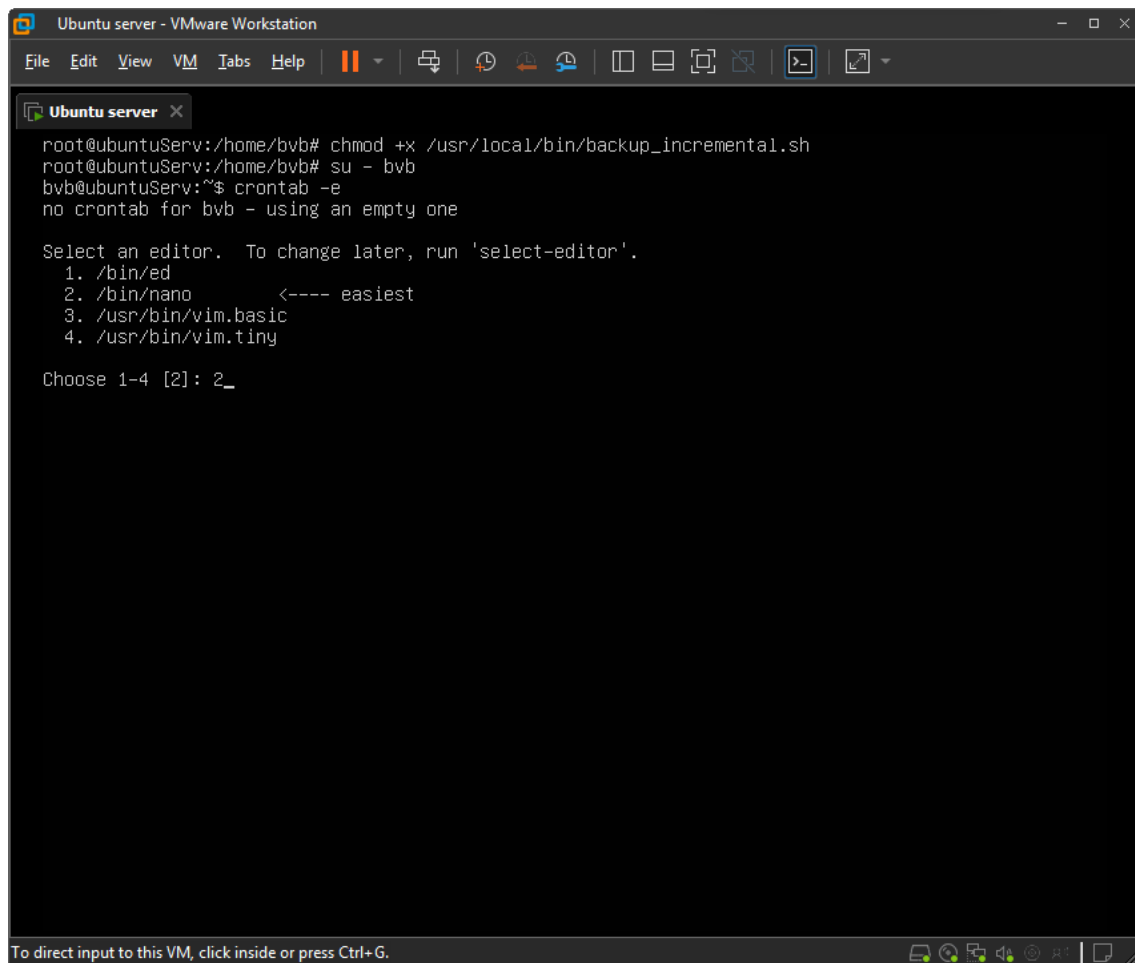
mkdir -p "$DESTINO/$FECHA"

rsync -a --delete --link-dest="$DESTINO/ultima" "$ORIGEN/" "$DESTINO/$FECHA" --exclude=MisTareas25

rm -f "$DESTINO/ultima"
ln -s "$DESTINO/$FECHA" "$DESTINO/ultima"
```

Get Help Exit WriteOut Justify Read File Where Is Prev Page Next Page Cut Text UnCut Text Cur Pos To Spell

To direct input to this VM, click inside or press Ctrl+G.



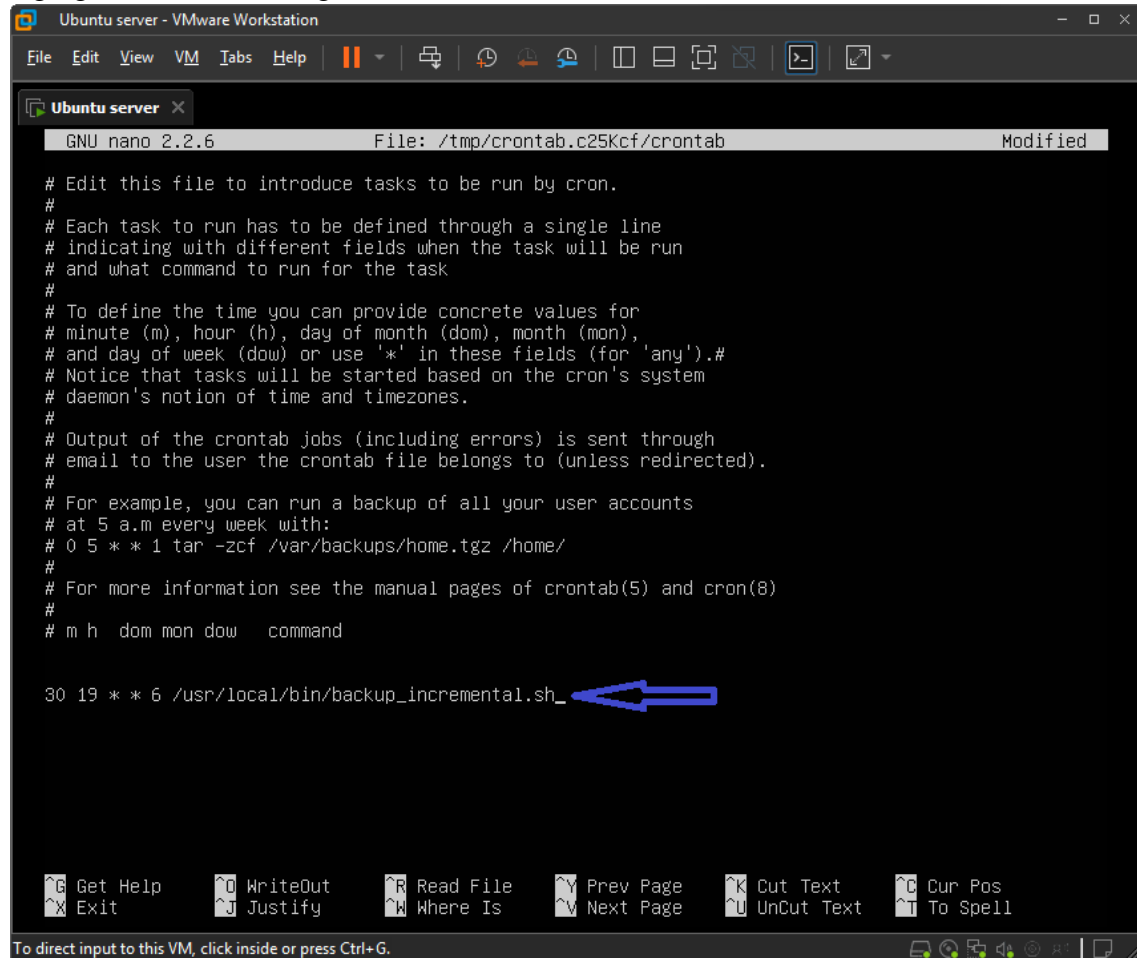
```
root@ubuntuServ:/home/bvb# chmod +x /usr/local/bin/backup_incremental.sh
root@ubuntuServ:/home/bvb# su - bvb
bvb@ubuntuServ:~$ crontab -e
no crontab for bvb - using an empty one

Select an editor. To change later, run 'select-editor'.
 1. /bin/ed
 2. /bin/nano      <---- easiest
 3. /usr/bin/vim.basic
 4. /usr/bin/vim.tiny

Choose 1-4 [2]: 2_
```

To direct input to this VM, click inside or press Ctrl+G.

Agregamos al final lo siguiente:



```
GNU nano 2.2.6 File: /tmp/crontab.c25Kcf/crontab Modified

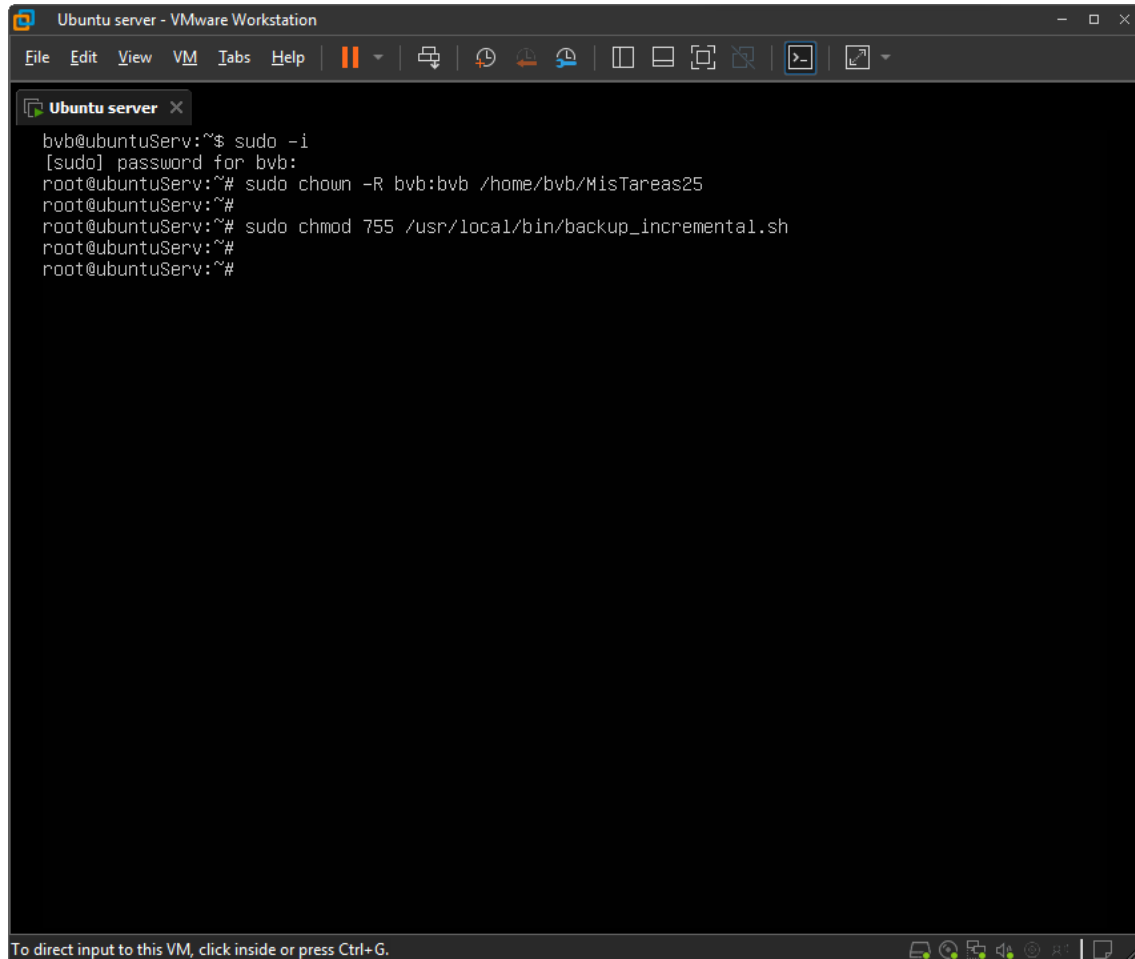
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command

30 19 * * 6 /usr/local/bin/backup_incremental.sh_
```

Lo cual programa la ejecución del script todos los sábados a las 19:30 pm

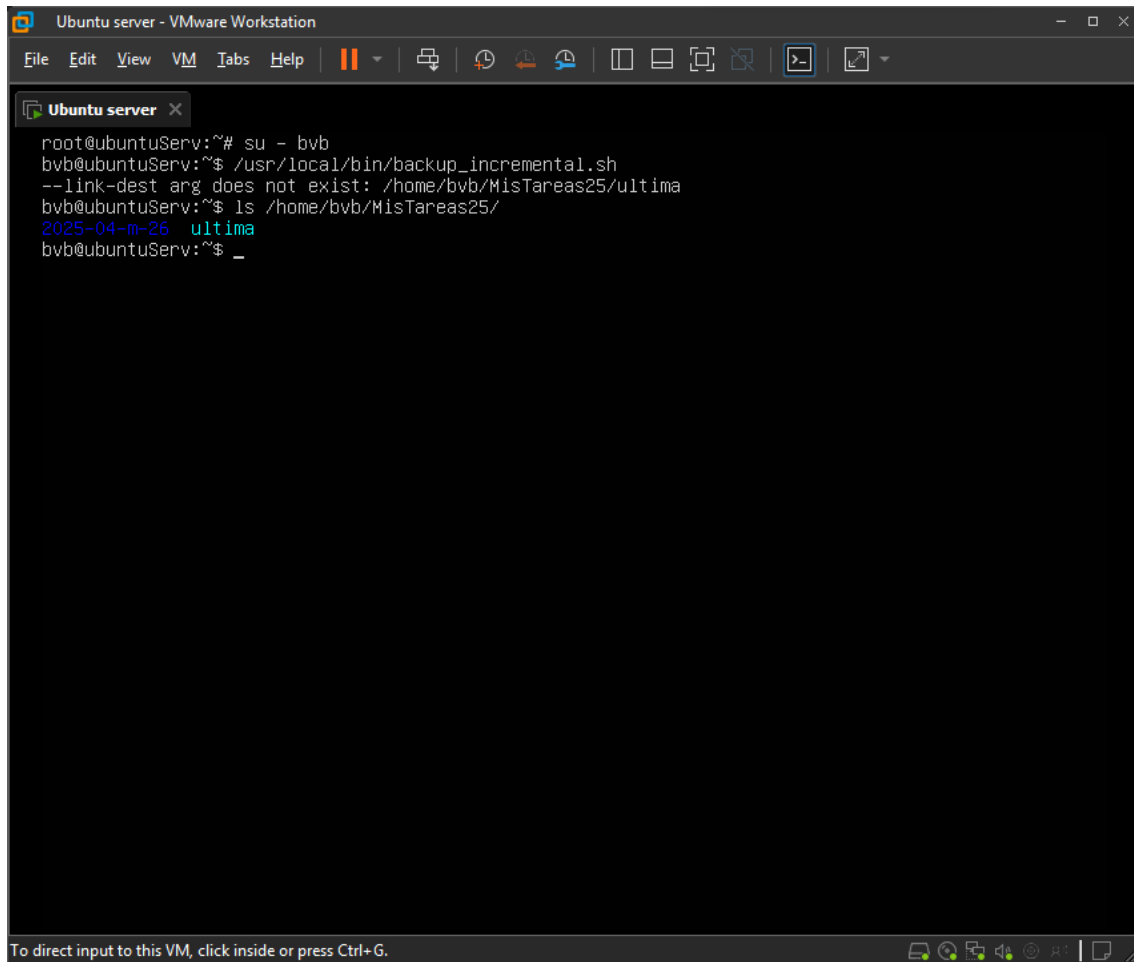
Importante:

Como creamos la carpeta MisTareas25 y el script backup\_incremental.sh con root tenemos que cambiar de dueño MisTareas25 al usuario bvb y dar los permisos correctos al script.



```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
bvb@ubuntuServ:~$ sudo -i
[sudo] password for bvb:
root@ubuntuServ:~# sudo chown -R bvb:bvb /home/bvb/MisTareas25
root@ubuntuServ:~#
root@ubuntuServ:~# sudo chmod 755 /usr/local/bin/backup_incremental.sh
root@ubuntuServ:~#
root@ubuntuServ:~#
To direct input to this VM, click inside or press Ctrl+G.
```

Nos logueamos con el usuario bvb y ejecutamos el script



```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
root@ubuntuServ:~# su - bvb
bvb@ubuntuServ:~$ /usr/local/bin/backup_incremental.sh
--link-dest arg does not exist: /home/bvb/MisTareas25/ultima
bvb@ubuntuServ:~$ ls /home/bvb/MisTareas25/
2025-04-m-26  ultima
bvb@ubuntuServ:~$ _
```

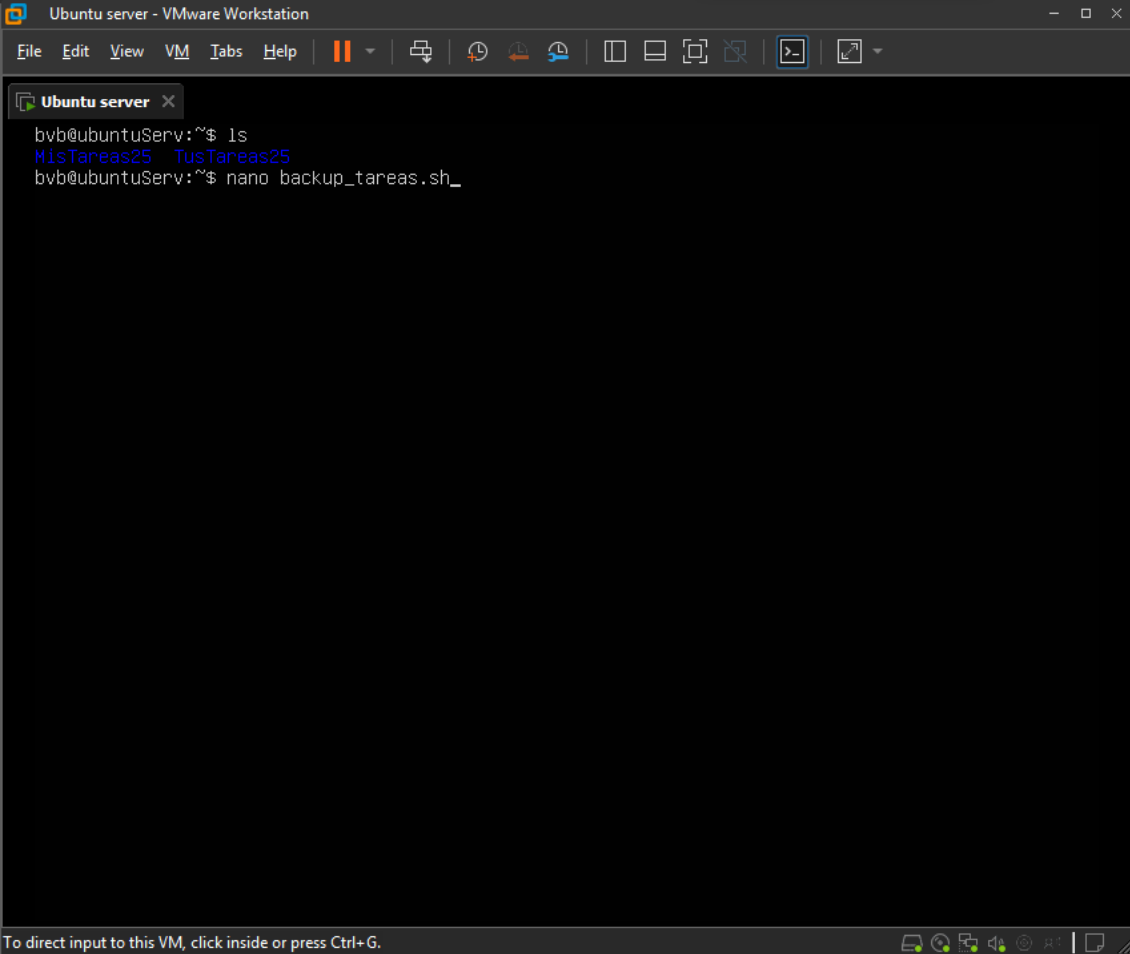
To direct input to this VM, click inside or press Ctrl+G.

Resultado:

Al ejecutar el script por primera vez, nos mostro el aviso de que la última no existía fue al esperado.

En la foto nos muestra que el script creo una copia completa con la fecha de hoy y estableció el enlace simbólico ultima.

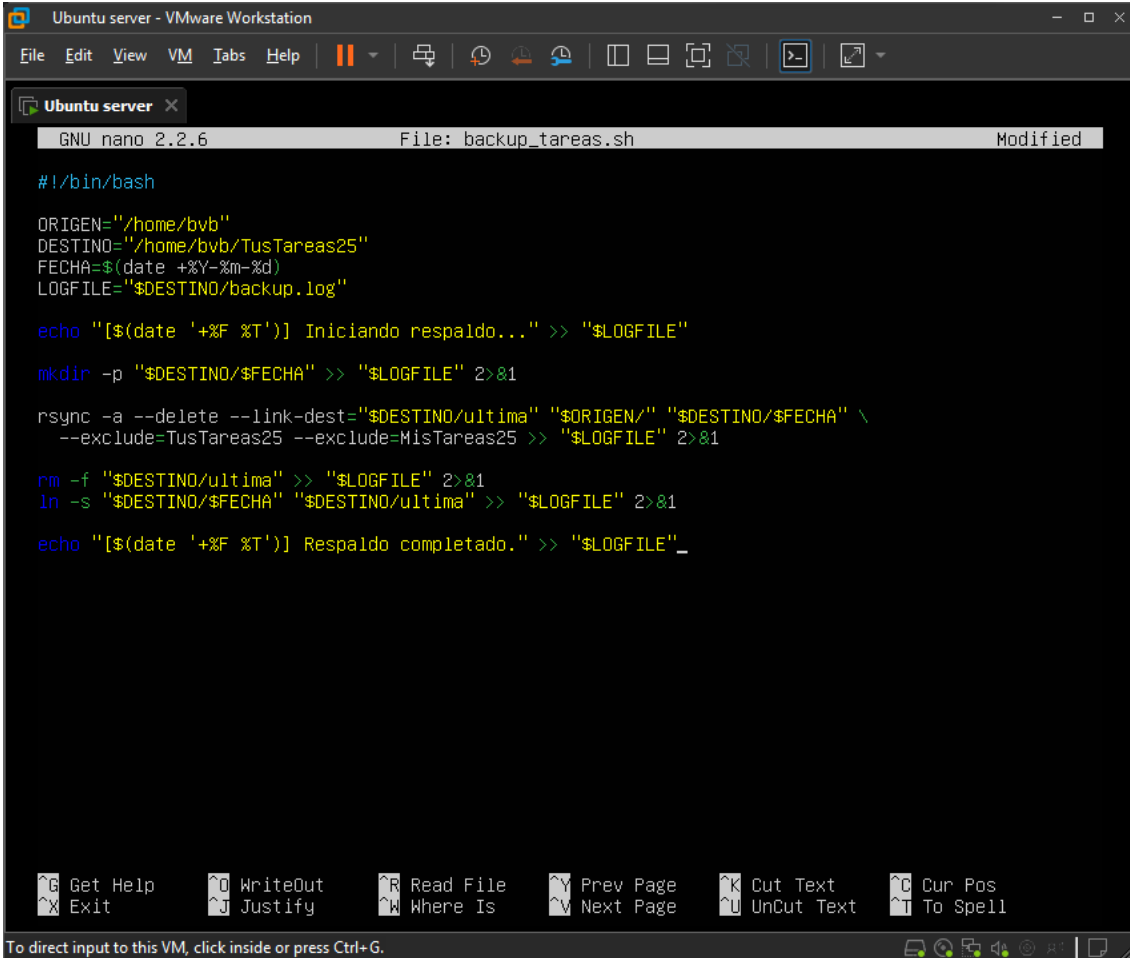
5.- Realice las tareas necesarias para realizar una copia de seguridad incremental a un directorio llamado TusTareas25, para que se realicen automaticamente los días lunes, miércoles y viernes a las 00:55 am.



```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
bvb@ubuntuServ:~$ ls
M1STareas25  TusTareas25
bvb@ubuntuServ:~$ nano backup_tareas.sh_

To direct input to this VM, click inside or press Ctrl+G.
```

Script:



The screenshot shows a VMware Workstation window titled "Ubuntu server - VMware Workstation". Inside the window, a terminal window titled "Ubuntu server" is open, displaying the GNU nano 2.2.6 editor. The editor is editing a file named "backup\_tareas.sh". The script content is as follows:

```
#!/bin/bash

ORIGEN="/home/bvb"
DESTINO="/home/bvb/TusTareas25"
FECHA=$(date +%Y-%m-%d)
LOGFILE="$DESTINO/backup.log"

echo "[$(date +%F %T)] Iniciando respaldo..." >> "$LOGFILE"

mkdir -p "$DESTINO/$FECHA" >> "$LOGFILE" 2>&1

rsync -a --delete --link-dest="$DESTINO/ultima" "$ORIGEN/" "$DESTINO/$FECHA" \
--exclude=TusTareas25 --exclude=MisTareas25 >> "$LOGFILE" 2>&1

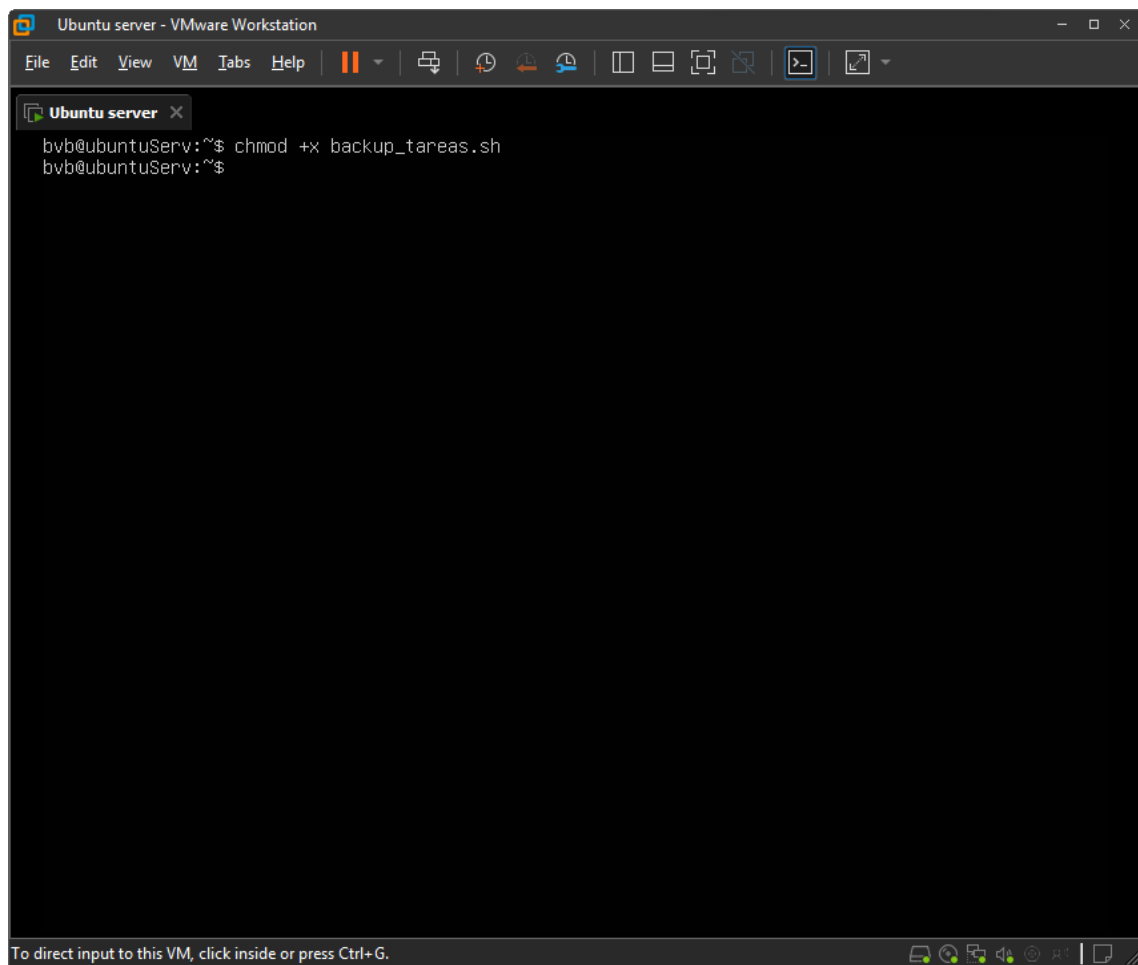
rm -f "$DESTINO/ultima" >> "$LOGFILE" 2>&1
ln -s "$DESTINO/$FECHA" "$DESTINO/ultima" >> "$LOGFILE" 2>&1

echo "[$(date +%F %T)] Respaldo completado." >> "$LOGFILE"
```

The bottom of the window shows a status bar with various shortcuts: ^G Get Help, ^X Exit, ^O WriteOut, ^J Justify, ^R Read File, ^W Where Is, ^Y Prev Page, ^V Next Page, ^K Cut Text, ^U UnCut Text, ^C Cur Pos, and ^T To Spell. Below the status bar, a message reads "To direct input to this VM, click inside or press Ctrl+G."



## Permisos

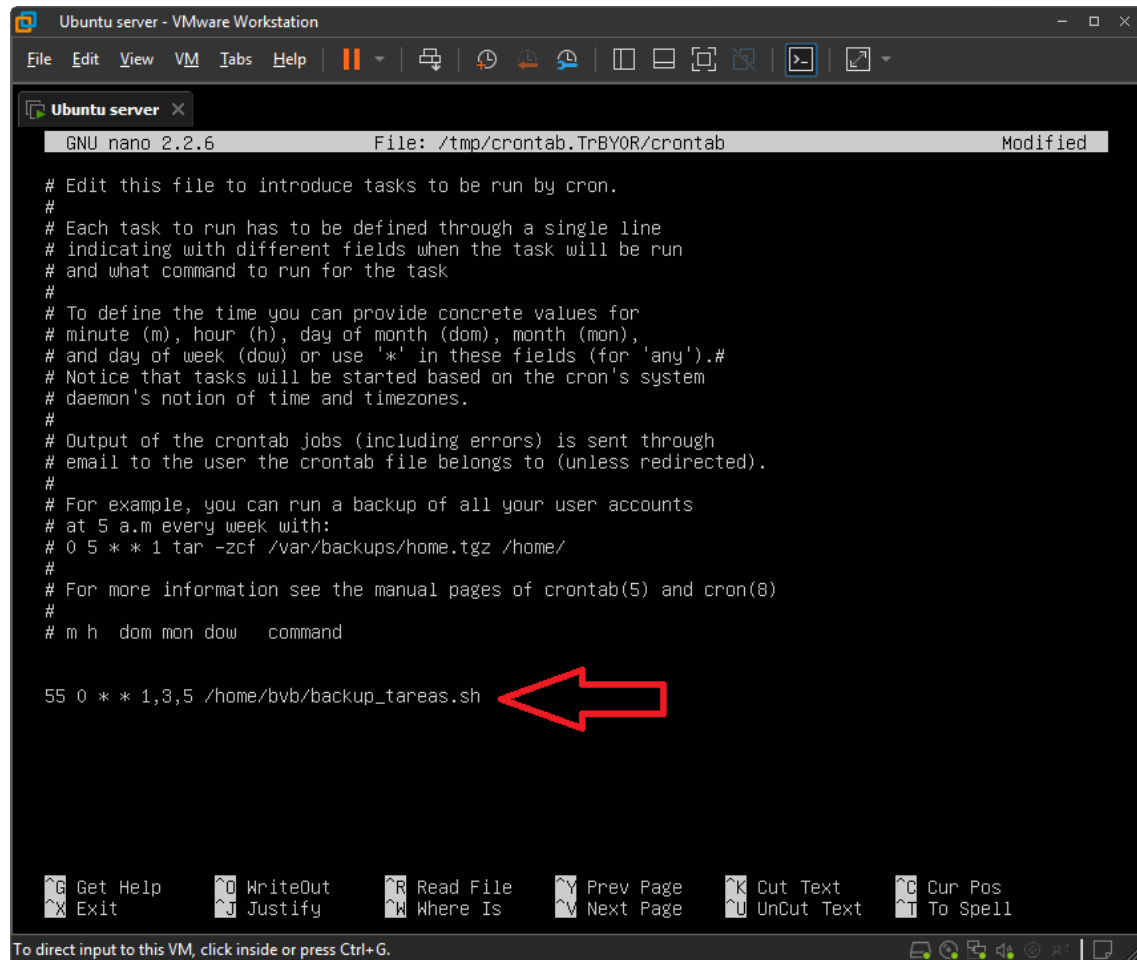


The image shows a VMware Workstation window titled "Ubuntu server - VMware Workstation". The window contains a terminal window titled "Ubuntu server" with the following text:

```
bvb@ubuntuServ:~$ chmod +x backup_tareas.sh
bvb@ubuntuServ:~$
```

The terminal window is dark-themed. The VMware Workstation window has a menu bar with "File", "Edit", "View", "VM", "Tabs", and "Help". Below the menu bar is a toolbar with various icons. At the bottom of the VMware Workstation window, there is a status bar with the text "To direct input to this VM, click inside or press Ctrl+G." and several system icons.

## Cron



The screenshot shows a VMware Workstation window titled "Ubuntu server - VMware Workstation". Inside, a terminal window titled "Ubuntu server" is open, running the nano text editor. The editor is editing a file named "/tmp/crontab.TrBY0R/crontab". The file contains a crontab configuration with several comments and one cron job. A red arrow points to the cron job line: "55 0 \* \* 1,3,5 /home/bvrb/backup\_tareas.sh".

```
GNU nano 2.2.6 File: /tmp/crontab.TrBY0R/crontab Modified

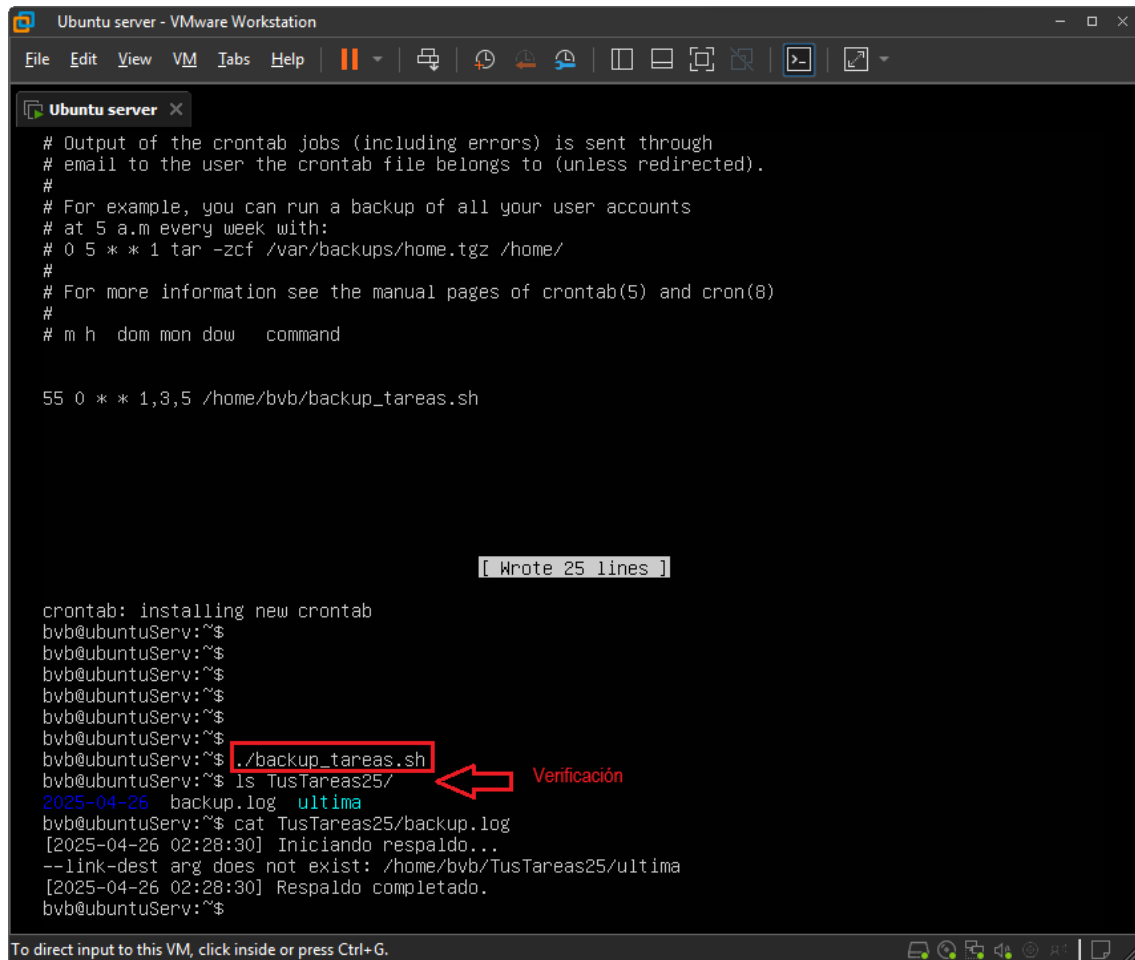
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command

55 0 * * 1,3,5 /home/bvrb/backup_tareas.sh
```

At the bottom of the nano editor, there is a menu bar with the following options: ^G Get Help, ^O WriteOut, ^R Read File, ^Y Prev Page, ^K Cut Text, ^C Cur Pos, ^X Exit, ^J Justify, ^W Where Is, ^V Next Page, ^U UnCut Text, ^T To Spell.

To direct input to this VM, click inside or press Ctrl+G.

## Corremos el script



The screenshot shows a terminal window titled "Ubuntu server - VMware Workstation". The terminal displays the content of a crontab file, which includes a comment about email output, an example backup command, and a scheduled job entry: "55 0 \* \* 1,3,5 /home/bvb/backup\_tareas.sh". Below this, a status message "[ Wrote 25 lines ]" is shown. The user then enters "crontab: installing new crontab" and runs several empty commands. Finally, the user runs "./backup\_tareas.sh", which is highlighted with a red box and a red arrow pointing to it with the label "Verificación". The output of the script shows the creation of a backup log file "ultima" and the execution of a backup command, which results in an error: "--link=dest arg does not exist: /home/bvb/TusTareas25/ultima". The terminal concludes with the message "[2025-04-26 02:28:30] Respaldo completado."

```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command

55 0 * * 1,3,5 /home/bvb/backup_tareas.sh

[ Wrote 25 lines ]

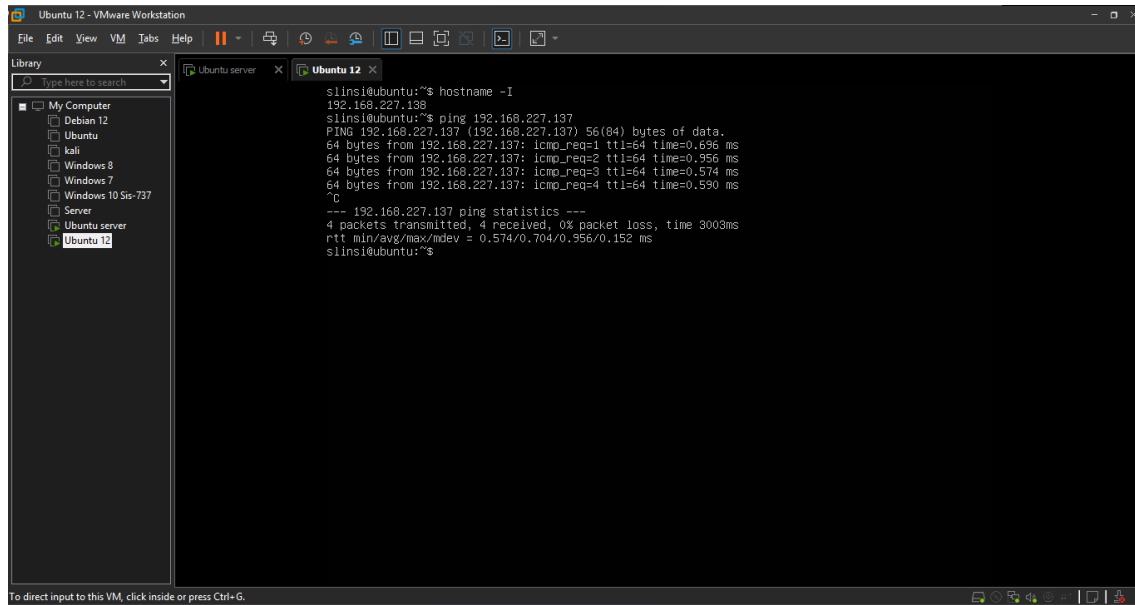
crontab: installing new crontab
bvb@ubuntuServ:~$
bvb@ubuntuServ:~$
bvb@ubuntuServ:~$
bvb@ubuntuServ:~$
bvb@ubuntuServ:~$
bvb@ubuntuServ:~$
bvb@ubuntuServ:~$ ./backup_tareas.sh
bvb@ubuntuServ:~$ ls TusTareas25/
2025-04-26 backup.log ultima
bvb@ubuntuServ:~$ cat TusTareas25/backup.log
[2025-04-26 02:28:30] Iniciando respaldo...
--link=dest arg does not exist: /home/bvb/TusTareas25/ultima
[2025-04-26 02:28:30] Respaldo completado.
bvb@ubuntuServ:~$
```

To direct input to this VM, click inside or press Ctrl+G.

6.- Usando como destino otra máquina virtual, realice una copia programada desde Ubuntu server a la máquina destino mediante red para un día domingo a las 05:20am.

Procedemos a hacer ping entre las maquinas para ver si tienen comunicación

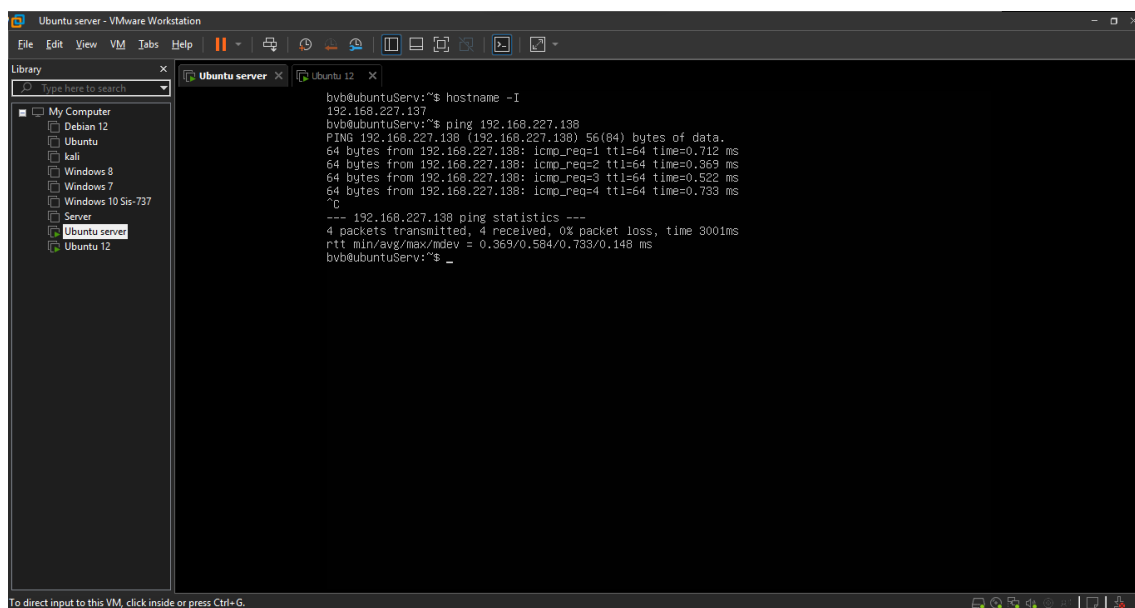
## Ubuntu



The screenshot shows the VMware Workstation interface with the 'Ubuntu 12' virtual machine selected in the Library. The terminal window displays the following commands and output:

```
siinsi@ubuntu:~$ hostname -I
192.168.227.138
siinsi@ubuntu:~$ ping 192.168.227.137
PING 192.168.227.137 (192.168.227.137) 56(84) bytes of data:
64 bytes from 192.168.227.137: icmp_req=1 ttl=64 time=0.696 ms
64 bytes from 192.168.227.137: icmp_req=2 ttl=64 time=0.956 ms
64 bytes from 192.168.227.137: icmp_req=3 ttl=64 time=0.974 ms
64 bytes from 192.168.227.137: icmp_req=4 ttl=64 time=0.590 ms
^C
--- 192.168.227.137 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 0.574/0.704/0.956/0.192 ms
siinsi@ubuntu:~$
```

## Ubuntu server



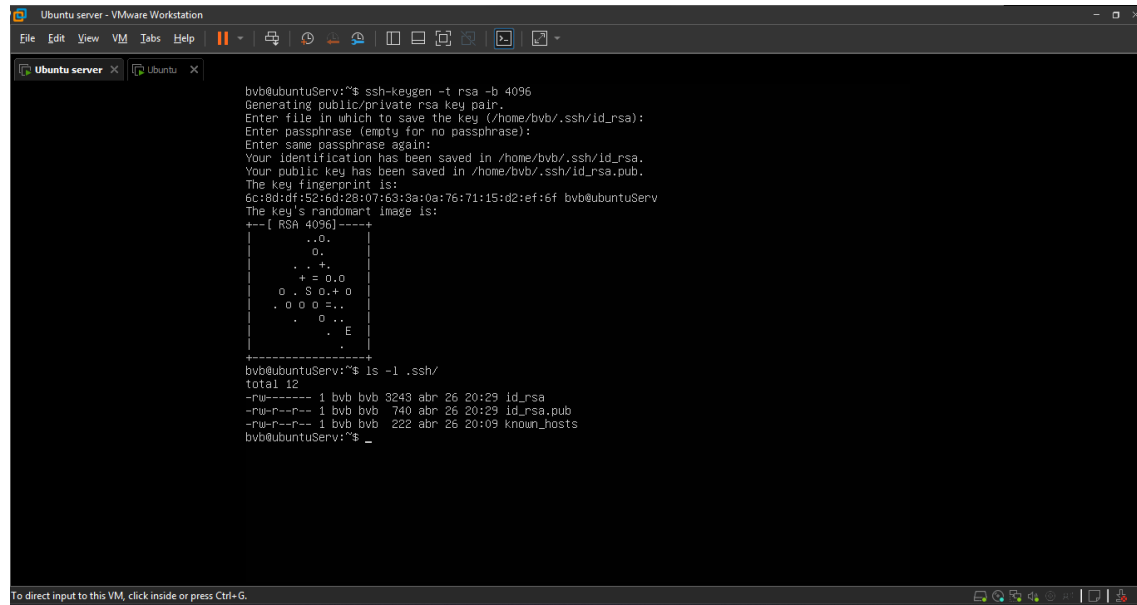
The screenshot shows the VMware Workstation interface with the 'Ubuntu server' virtual machine selected in the Library. The terminal window displays the following commands and output:

```
bvb@ubuntuServer:~$ hostname -I
192.168.227.137
bvb@ubuntuServer:~$ ping 192.168.227.138
PING 192.168.227.138 (192.168.227.138) 56(84) bytes of data:
64 bytes from 192.168.227.138: icmp_req=1 ttl=64 time=0.712 ms
64 bytes from 192.168.227.138: icmp_req=2 ttl=64 time=0.369 ms
64 bytes from 192.168.227.138: icmp_req=3 ttl=64 time=0.922 ms
64 bytes from 192.168.227.138: icmp_req=4 ttl=64 time=0.733 ms
^C
--- 192.168.227.138 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 0.369/0.584/0.733/0.148 ms
bvb@ubuntuServer:~$
```

Procedemos con la copia

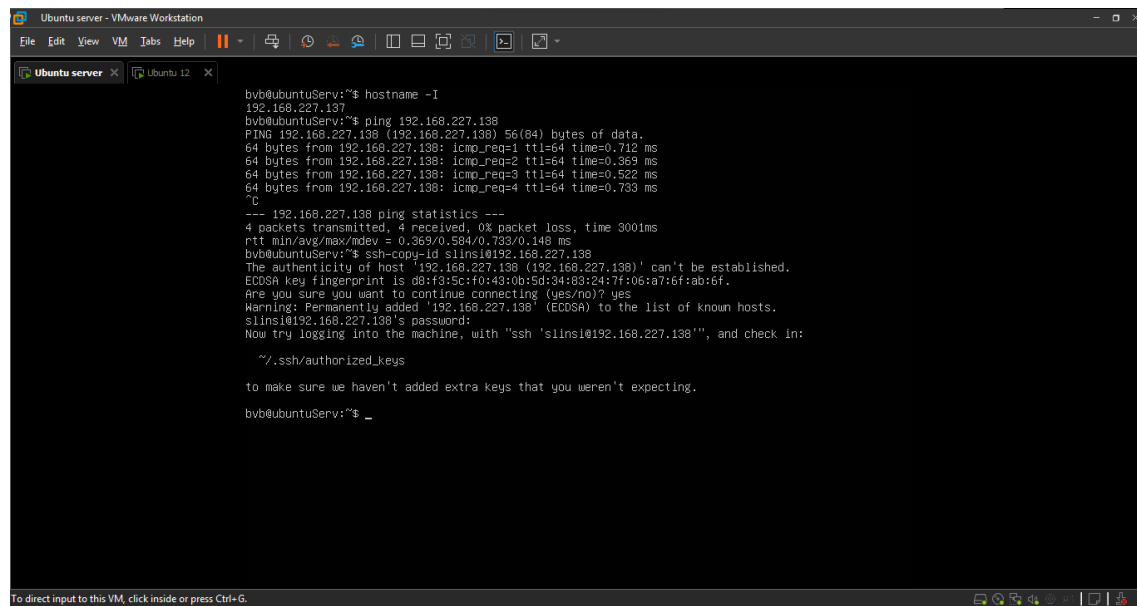
## Paso 1: CONFIGURACION AUTENTICACION SSH sin contraseña

### 1.- Generar una clave SSH



```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
Ubuntu server X Ubuntu X
bvb@ubuntuServ:~$ ssh-keygen -t rsa -b 4096
Generating public/private rsa key pair.
Enter file in which to save the key (/home/bvb/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/bvb/.ssh/id_rsa.
Your public key has been saved in /home/bvb/.ssh/id_rsa.pub.
The key fingerprint is:
6c:8d:df:52:6d:28:07:63:3a:0a:76:71:15:d2:ef:6f bvb@ubuntuServ
The key's randomart image is:
+--[ RSA 4096 ]-----+
|.O.
|O.
|..+
|+=O.O
|O.S.O.+O
|.O.O.O=..
|.O..
|.E
|..
+-----+
bvb@ubuntuServ:~$ ls -l .ssh/
total 12
-rw-r----- 1 bvb bvb 3243 abr 26 20:29 id_rsa
-rw-r--r-- 1 bvb bvb 740 abr 26 20:29 id_rsa.pub
-rw-r--r-- 1 bvb bvb 222 abr 26 20:09 known_hosts
bvb@ubuntuServ:~$
```

### 2.- Copiamos la clave publica a la maquina destino, nos pedirá la contraseña

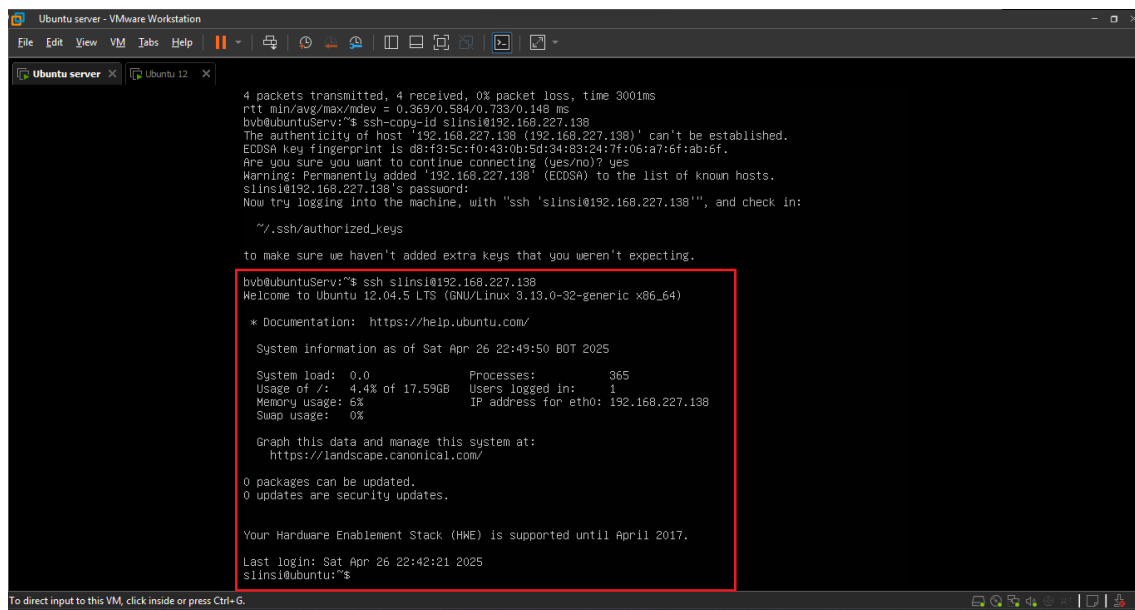


```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
Ubuntu server X Ubuntu 12 X
bvb@ubuntuServ:~$ hostname -I
192.168.227.137
bvb@ubuntuServ:~$ ping 192.168.227.138
PING 192.168.227.138 (192.168.227.138) 56(84) bytes of data:
64 bytes from 192.168.227.138: icmp_req=1 ttl=64 time=0.712 ms
64 bytes from 192.168.227.138: icmp_req=2 ttl=64 time=0.369 ms
64 bytes from 192.168.227.138: icmp_req=3 ttl=64 time=0.522 ms
64 bytes from 192.168.227.138: icmp_req=4 ttl=64 time=0.733 ms
^C
--- 192.168.227.138 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 0.369/0.584/0.733/0.148 ms
bvb@ubuntuServ:~$ ssh-copy-id slinsi@192.168.227.138
The authenticity of host '192.168.227.138 (192.168.227.138)' can't be established.
ECDSA key fingerprint is d8:f8:5c:f0:43:0b:5d:34:83:24:7f:0b:a7:6f:ab:6f.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.227.138' (ECDSA) to the list of known hosts.
slinsi@192.168.227.138's password:
Now try logging into the machine, with "ssh 'slinsi@192.168.227.138'", and check in:

  ~/.ssh/authorized_keys

to make sure we haven't added extra keys that you weren't expecting.
bvb@ubuntuServ:~$
```

### 3.- verificamos el acceso sin contraseña



```
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 0.369/0.584/0.733/0.148 ms
bvb@ubuntuServ:~$ ssh-copy-id siinsi@192.168.227.138
The authenticity of host '192.168.227.138 (192.168.227.138)' can't be established.
ECDSA key fingerprint is d8:f8:5c:f0:49:0b:5d:3d:89:24:7f:06:a7:6f:ab:6f.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.227.138' (ECDSA) to the list of known hosts.
siinsi@192.168.227.138's password:
Now try logging into the machine, with "ssh 'siinsi@192.168.227.138'", and check in:

  ~/.ssh/authorized_keys

to make sure we haven't added extra keys that you weren't expecting.
bvb@ubuntuServ:~$ ssh siinsi@192.168.227.138
Welcome to Ubuntu 12.04.5 LTS (GNU/Linux 3.13.0-32-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

System information as of Sat Apr 26 22:49:50 BOT 2025

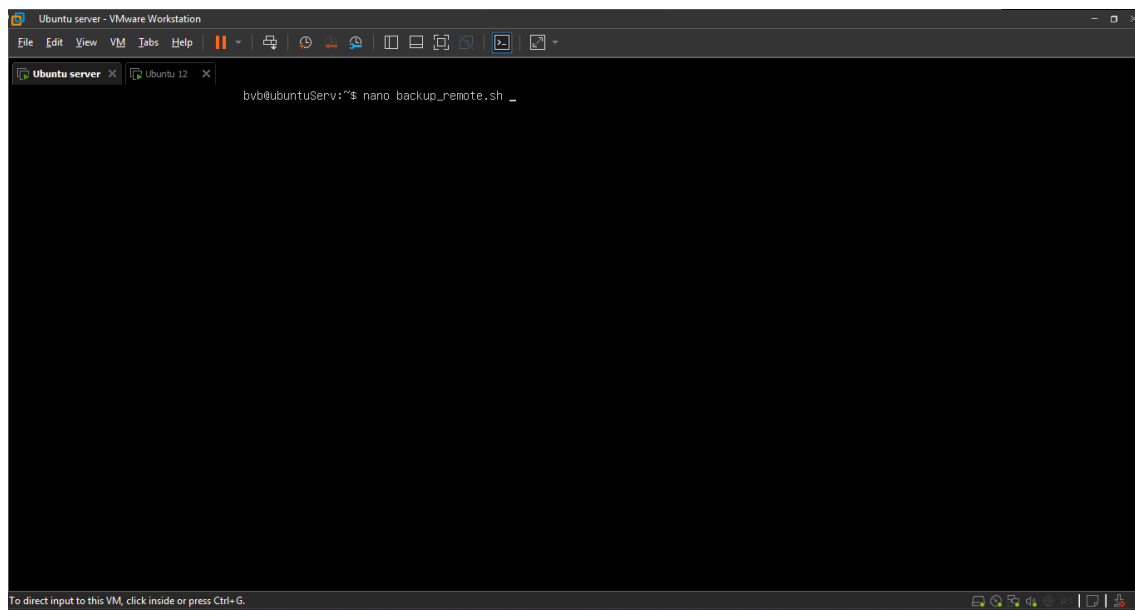
System load:  0.0               Processes:    365
Usage of /:   4.4% of 17.59GB    Users logged in: 1
Memory usage: 6%               IP address for eth0: 192.168.227.138
Swap usage:  0%

Graph this data and manage this system at:
https://landscape.canonical.com/

0 packages can be updated.
0 updates are security updates.

Your Hardware Enablement Stack (HWE) is supported until April 2017.
Last login: Sat Apr 26 22:42:21 2025
siinsi@ubuntu:~$
```

### PASO 2: Crear el script de backup



```
bvb@ubuntuServ:~$ nano backup_remote.sh _
```

## 2.- agregar el script

```
GNU nano 2.2.6 File: backup_remote.sh Modified

#!/bin/bash

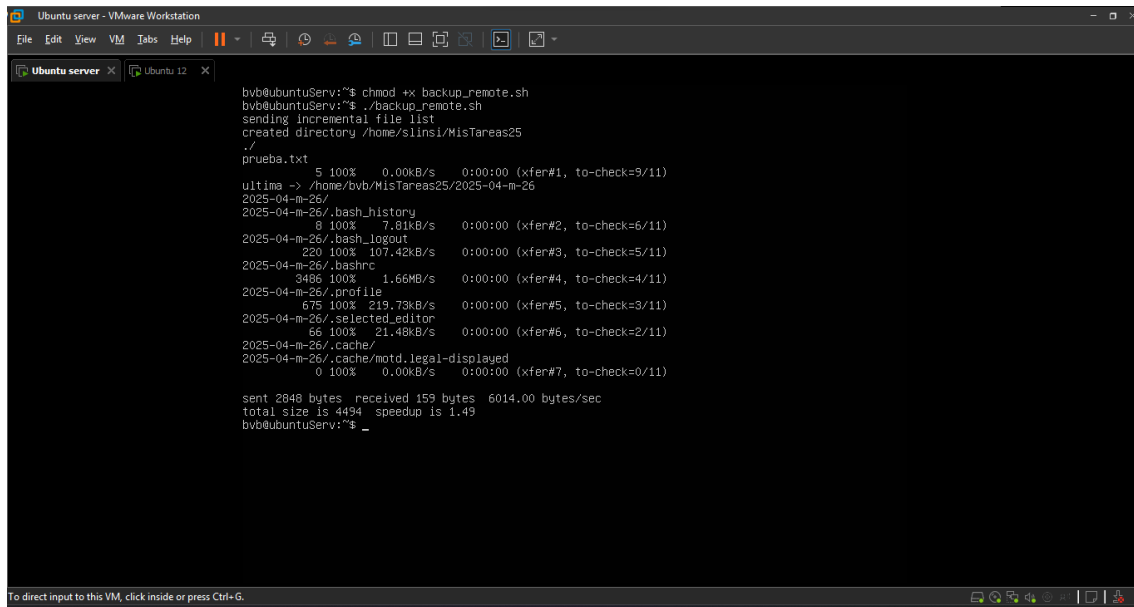
ORIGIN="/home/bvb/MisTareas25/"
DESTINO="slinsl0192.168.227.198:/home/slinsl/MisTareas25/"

rsync -avz --progress "$ORIGIN" "$DESTINO_"
```

## 3.- Dar permisos

```
bvb@ubuntuServ:~$ chmod +x backup_remote.sh
```

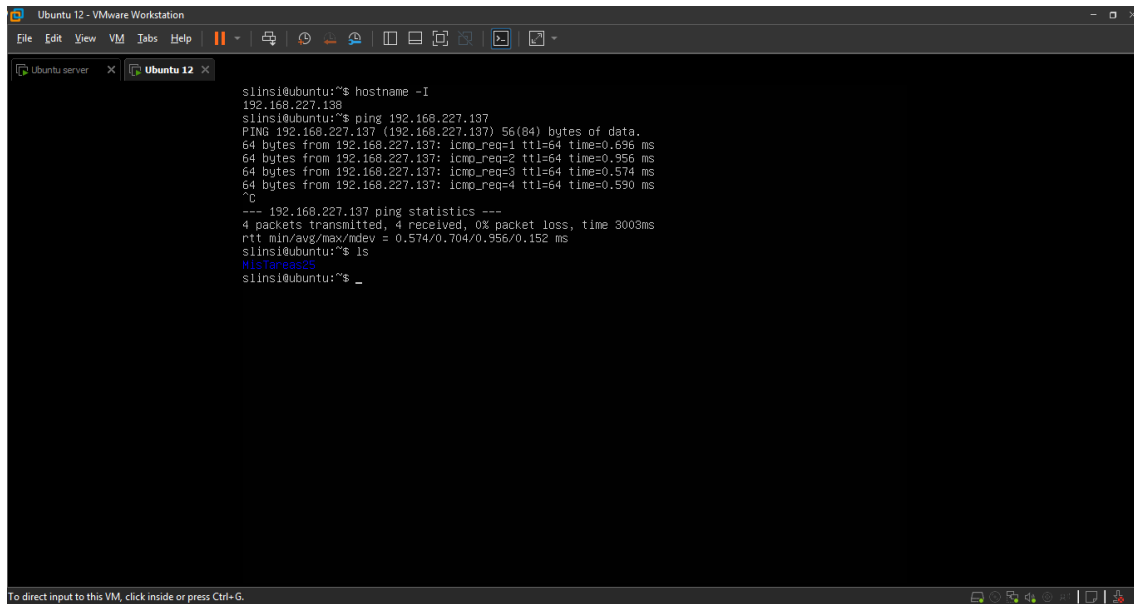
## 4.- Probar manualmente



```
Ubuntu server - VMware Workstation
File Edit View VM Tabs Help
Ubuntu server x Ubuntu 12 x

bvb@ubuntuServ:~$ chmod +x backup_remote.sh
bvb@ubuntuServ:~$ ./backup_remote.sh
sending incremental file list
created directory /home/slinsi/MisTareas25
./
prueba.txt
  5 100% 0.00kB/s 0:00:00 (xfer#1, to-check=9/11)
ultima -> /home/bvb/MisTareas25/2025-04-m-26
2025-04-m-26/
2025-04-m-26/.bash_history
  8 100% 7.81kB/s 0:00:00 (xfer#2, to-check=6/11)
2025-04-m-26/.bash_logout
 220 100% 107.42kB/s 0:00:00 (xfer#3, to-check=5/11)
2025-04-m-26/.bashrc
 3486 100% 1.66MB/s 0:00:00 (xfer#4, to-check=4/11)
2025-04-m-26/.profile
  675 100% 219.73kB/s 0:00:00 (xfer#5, to-check=3/11)
2025-04-m-26/.selected_editor
  66 100% 21.48kB/s 0:00:00 (xfer#6, to-check=2/11)
2025-04-m-26/.cache/
2025-04-m-26/.cache/motd.legal-displayed
  0 100% 0.00kB/s 0:00:00 (xfer#7, to-check=0/11)

sent 2848 bytes received 159 bytes 6014.00 bytes/sec
total size is 4494 speedup is 1.49
bvb@ubuntuServ:~$ _
```

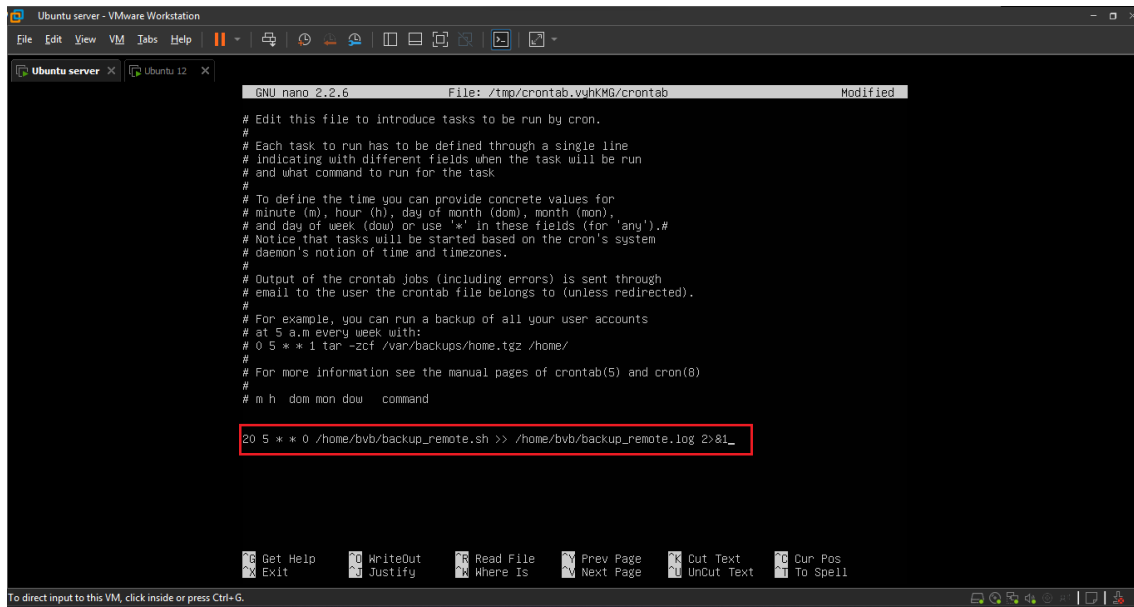


```
Ubuntu 12 - VMware Workstation
File Edit View VM Tabs Help
Ubuntu server x Ubuntu 12 x

slinsi@ubuntu:~$ hostname -I
192.168.227.138
slinsi@ubuntu:~$ ping 192.168.227.137
PING 192.168.227.137 (192.168.227.137) 56(84) bytes of data.
64 bytes from 192.168.227.137: icmp_req=1 ttl=64 time=0.696 ms
64 bytes from 192.168.227.137: icmp_req=2 ttl=64 time=0.956 ms
64 bytes from 192.168.227.137: icmp_req=3 ttl=64 time=0.574 ms
64 bytes from 192.168.227.137: icmp_req=4 ttl=64 time=0.590 ms
^C
--- 192.168.227.137 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 0.574/0.704/0.956/0.152 ms
slinsi@ubuntu:~$ ls
MisTareas25
slinsi@ubuntu:~$ _
```



## Paso 3: Configurar cron



The screenshot shows a terminal window titled 'Ubuntu server - VMware Workstation' with a tab for 'Ubuntu 12'. The terminal is running the nano text editor to edit the crontab file at '/tmp/crontab.vvhKMG/crontab'. The file contains standard cron job syntax instructions. A new cron job is being added, highlighted with a red box: '20 5 \* \* 0 /home/bvb/backup\_remote.sh >> /home/bvb/backup\_remote.log 2>&1\_'. The bottom of the terminal shows various keyboard shortcuts like 'Get Help', 'Exit', 'WriteOut', 'Justify', 'Read File', 'Where Is', 'Prev Page', 'Next Page', 'Cut Text', 'UnCut Text', 'Cur Pos', and 'To Spell'.

```
GNU nano 2.2.6 File: /tmp/crontab.vvhKMG/crontab Modified

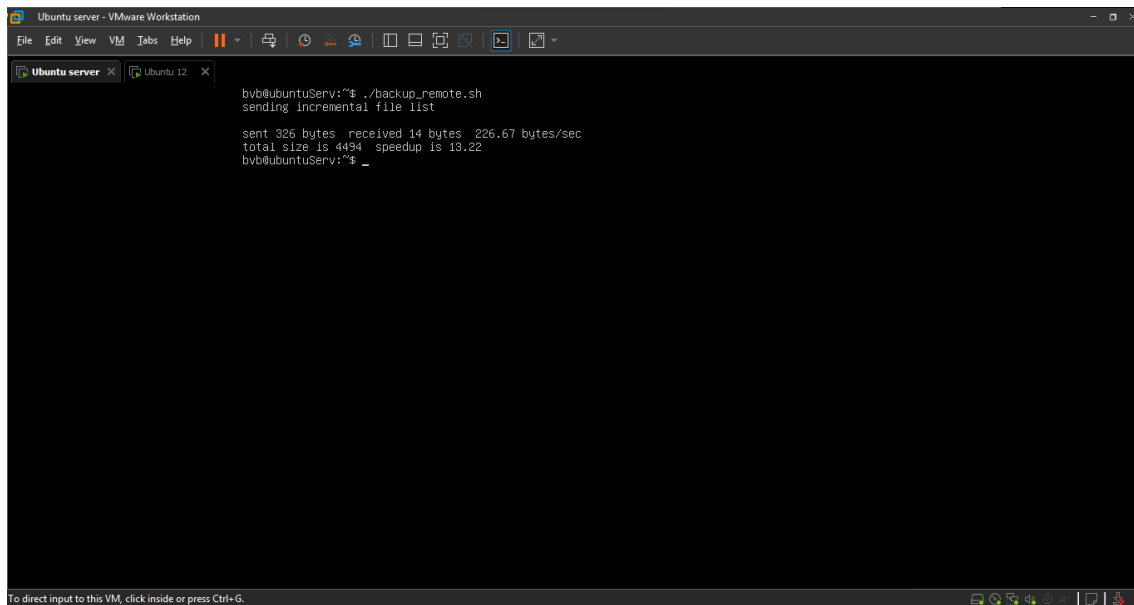
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command

20 5 * * 0 /home/bvb/backup_remote.sh >> /home/bvb/backup_remote.log 2>&1_

Get Help  WriteOut  Read File  Prev Page  Cut Text  Cur Pos
Exit      Justify   Where Is  Next Page  UnCut Text To Spell
```

## PASO 3: Probar el archivo de log

### 1.- Ejecutar el script



The screenshot shows a terminal window titled 'Ubuntu server - VMware Workstation' with a tab for 'Ubuntu 12'. The terminal shows the execution of the script './backup\_remote.sh'. The output indicates that an incremental file list is being sent, with statistics: 'sent 326 bytes received 14 bytes 226.67 bytes/sec', 'total size is 4494 speedup is 13.22'. The prompt returns to 'bvb@ubuntuServ:~\$'.

```
bvb@ubuntuServ:~$ ./backup_remote.sh
sending incremental file list

sent 326 bytes received 14 bytes 226.67 bytes/sec
total size is 4494 speedup is 13.22
bvb@ubuntuServ:~$ _
```

Importante: El archivo backup\_remote.log se creara el domingo a las 05:20am