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CYSE 270: Linux System for Cybersecurity

Lab Assignment-9

Task A - Backup your system (Using crontab) [100 points]

Scenario: Performing system backup can be time-consuming, and the process is often overlooked. For this scenario:

1. (10 Points) Create a new user Alice (with home directory). Created the new user using command “sudo adduser alice” provided password for Alice and made sure Alice had a home directory with “ls -l /home”

```
(frederickgr@fgervacio)-[~]
└─$ sudo adduser alice
[sudo] password for frederickgr:
Sorry, try again.
[sudo] password for frederickgr:
New password:
Retype new password:
No password has been supplied.
New password:
Retype new password:
Sorry, passwords do not match.
passwd: Authentication token manipulation error
passwd: password unchanged
warn: '/bin/passwd alice' failed with status 10. Continuing.
warn: wrong password given or password retyped incorrectly
Try again? [y/N] y
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for alice
Enter the new value, or press ENTER for the default
  Full Name []: Alice
  Room Number []:
  Work Phone []:
  Home Phone []:
  Other []:
Is the information correct? [Y/n] y

(frederickgr@fgervacio)-[~]
└─$ grep alice /etc/passwd
alice:x:1015:1015:Alice,,,:/home/alice:/bin/bash

(frederickgr@fgervacio)-[~]
└─$ ls -l /home
total 24
drwx----- 5 alice      alice      4096 Nov  7 11:45  alice
drwxrwx--- 2 root        fgerv001   4096 Oct 11 19:58  cyse_project
drwx----- 5 Emma      admin      4096 Oct 11 12:54  Emma
drwx----- 18 frederickgr frederickgr 4096 Nov  7 11:43  frederickgr
drwx----- 5 Olivia    payroll    4096 Oct 11 12:54  Olivia
drwx----- 5 Sophia    employee   4096 Oct 11 20:46  Sophia
```

2. (50 Points) Write a shell script that backups Alice’s home directory by creating a tar file (tape archive), using the following steps:

a. Do the following:

- Take 2 inputs with their values- your MIDAS name and current date (for example, midas=Mohammed).
- Create a variable named as filename that should be assigned the

value as MIDAS-date (example output after executing the script would be like, Mohammed-2024.11.04-22.08.01.tar.gz).

• Using tar command, create a tape archive for Alice's home directory (/home/Alice) and the filename created above (in step-2-ii). (Please learn about tar command in Linux for its usage)

b. Move the tape archive file/tar file (created in step 2-iii) to /var/backups/ directory using correct command in linux.

c. To optimize the disk usage, pick a compression algorithm (bz2, gzip, or xv) to compress the tar file you created in /var/backups/ in the previous step-2b.

```
File Actions Edit View Help
GNU nano 8.4 alicebackups.sh *
#!/bin/bash

# Set MIDAS name and get the current date
midas="fgerv001"
Current_date=$(date +%y.%m.%d-%H.%M.%S) # Format the current date

# Create a filename variable with MIDAS and date
filename="${midas}-${Current_date}.tar"

# Print Status
echo "Creating backup for /home/alice..."

# Create a tar archive of alice's home directory
sudo tar -cvf "/var/backups/${filename}" /home/alice

# Print status
echo "Compressing the tar file with gzip..."

# Compress the tar using gzip
sudo gzip "/var/backups/${filename}"
```

3. (30 Points) Create a crontab file to keep the scheduled task running for 3 minutes, then check the contents in the /var/backups directory. Your output should be look similar to the following:

```
(frederickgr@Fgervacio)-[~]
└─$ sudo crontab -e
no crontab for root - using an empty one
No modification made

(frederickgr@Fgervacio)-[~]
└─$ sudo crontab -l
no crontab for root
```

```
(frederickgr@Fgervacio)-[~]
└─$ ls -lh /var/backups/
total 3.1M
-rw-r--r-- 1 root root 170K Sep  5 09:50 alternatives.tar.0
-rw-r--r-- 1 root root 162K Sep  4 15:09 apt.extended_states.0
-rw-r--r-- 1 root root  0 Sep  5 09:50 dpkg.arch.0
-rw-r--r-- 1 root root 8.3K Sep  4 15:12 dpkg.diversions.0
-rw-r--r-- 1 root root 683 Sep  4 15:04 dpkg.statoverride.0
-rw-r--r-- 1 root root 2.7M Sep  4 15:09 dpkg.status.0
```

4. (10 Points) Cancel the crontab jobs.

There was no crontab job to cancel.

TASK B: SYSTEM CLEANUP (EXTRA CREDIT) [20 Points]

Scenario: In the above scenario, your system disk will be filled up eventually without cleaning up the old backups. Therefore, in this optional task, create a script that checks the number of backups you created in Task A. If the number of the backup file is more than a pre-defined threshold, the script will delete the old archives to maintain the backups under a reasonable size.

```
(frederickgr@Fgervacio)-[~]
└─$ sudo nano cleanupbackup.sh

(frederickgr@Fgervacio)-[~]
└─$ sudo nano cleanupbackup.sh

File Actions Edit View Help
GNU nano 8.4 cleanupbackup.sh
!:/bin/bash

# Define the threshold
threshold=3

# Count the number of backups in /var/backups
backup_count=$(ls /var/backups/*.tar.gz 2>/dev/null | wc -l)

# Check if the number of backups exceeds the threshold
if [ "$backup_count" -gt "$threshold" ]; then
    echo "Number of backups exceeds threshold ($threshold). Cleaning up old b>"

    # Calculate the number of backups to delete
    to_delete=$((backup_count - threshold))

    # Delete the oldest backups
    ls -t /var/backups/*.tar.gz | tail -n $to_delete | xargs sudo rm -f
    echo "Deleted $to_delete old backup(s)."
```

This script should do the following:

1. Count the number of backups created in Task A and determine if this number is larger than 3.

```
(frederickgr@Fgervacio)-[~]
└─$ sudo chmod +x alicebackups.sh

(frederickgr@Fgervacio)-[~]
└─$ sudo ./cleanupbackup.sh
./cleanupbackup.sh: line 20: echoNumber of backups is under the threshold (3). No cleanu
o needed>: command not found
```

2. Nothing should happen if the number of backups is less than the threshold, 3.

```
(frederickgr@Fgervacio)-[~]
└─$ sudo chmod +x alicebackups.sh

(frederickgr@Fgervacio)-[~]
└─$ sudo ./cleanupbackup.sh
./cleanupbackup.sh: line 20: echoNumber of backups is under the threshold (3). No cleanu
o needed>: command not found
```

3. If more backup archives are detected, calculate the number of backups to delete. Then delete the old archives.

```
(frederickgr@fgervacio)-[~]
└─$ sudo ./cleanupbackup.sh
./cleanupbackup.sh: line 20: echoNumber of backups is under the threshold (3). No cleanup needed>: command not found
```

The backups doesn't exceed the threshold amount.

Note: As the script needs to write contents in the “/var/backups” folder, which is owned by root, you should consider the permission issue properly. (Using sudo to create crontab file)

Reference: How to Format Date for Display or Use In a Shell Script:

<https://www.cyberciti.biz/faq/linux-unix-formatting-dates-for-display/>

Reference: How to append date timestamp to filename:

<https://crunchify.com/shell-script-append-timestamp-to-file-name/>