RAHUL PRAJAPATI

SOLUTION

=> Login to root user on server-a using redhat as the password

1) Create a file named redhat.txt
-> having the following content
"This is RedHat Enterprise Version 9"

```
[root@servera ~]# echo "This is Redhat Enterprise Version 9" >> redhat.txt
[root@servera ~]# cat redhat.txt
This is Redhat Enterprise Version 9
[root@servera ~]#
```

2) Create a hardlink name /tmp/rhel-backup of /root/redhat.txt
-> Edit the hardlink, with following content
"This is the Latest Version"

```
[root@servera ~]# #ln /root/redhat.txt /tmp/rhel-backup
[root@servera ~]# ls -li redhat.txt
25179479 -rw-r--r--. 2 root root 36 Aug 19 12:57 redhat.txt
[root@servera ~]# ls -li /tmp/rhel-backup
25179479 -rw-r--r--. 2 root root 36 Aug 19 12:57 /tmp/rhel-backup
[root@servera ~]#
```

3) Create a softlink of name /root/tmp-backup of /tmp
=> Move to student user on server-a

```
[root@servera ~]# ln -s /tmp /root/rhel-backup
[root@servera ~]# ls -l
total 4
-rw-r--r--. 1 root root 36 Aug 19 12:57 redhat.txt
lrwxrwxrwx. 1 root root  4 Aug 19 13:08 rhel-backup -> /tmp
[root@servera ~]# su - student
Last login: Tue Aug 19 13:04:15 UTC 2025 on pts/0
```

4) Create the follwing Directory: /home/student/Documents/project_plans
-> Create two empty files in the ~/Documents/project_plans directory:
season1_project_plan.pdf and season2_project_plan.pdf
-> Create a total of 12 files with names tv_seasonX_episodeY.ogg. Replace X with the season number and Y with that season's episode, for two seasons of six episodes each.
-> move all files of tv_season1 to ~/Documents/project_plans/season1
-> move all files of tv_season2 to ~/Documents/project_plans/season1
-> Seems like you don't require season1_project_plan.pdf and season2_project_plan.pdf, please remove them
-> The name of project_plan dir needs to be chnaged with Upcoming_Project-plan

```
[student@servera ~]$ mkdir -p /home/student/Documents/project_plans
[student@servera ~]$ ls -R
.:
Documents

./Documents:
project_plans

./Documents/project_plans:
[student@servera ~]$ touch ~/Documents/project_plans/season{1..2}_project_plan.pdf
[student@servera ~]$ ls ~/Documents/project_plans/
season1_project_plan.pdf  season2_project_plan.pdf
[student@servera ~]$ touch tv_season{1..2}_episode{1..6}.ogg
[student@servera ~]$ ls
Documents                tv_season1_episode5.ogg  tv_season2_episode4.ogg
tv_season1_episode1.ogg  tv_season1_episode6.ogg  tv_season2_episode5.ogg
tv_season1_episode2.ogg  tv_season2_episode1.ogg  tv_season2_episode6.ogg
tv_season1_episode3.ogg  tv_season2_episode2.ogg
tv_season1_episode4.ogg  tv_season2_episode3.ogg
[student@servera ~]$ mkdir ~/Documents/project_plans/season1
[student@servera ~]$ mv tv_season1_episode{1..6}.ogg
mv: target 'tv_season1_episode6.ogg' is not a directory
[student@servera ~]$ mv tv_season1_episode{1..6}.ogg ~/Documents/project_plans/seaso
n1/
[student@servera ~]$ ls ~/Documents/project_plans/season1/
tv_season1_episode1.ogg  tv_season1_episode3.ogg  tv_season1_episode5.ogg
tv_season1_episode2.ogg  tv_season1_episode4.ogg  tv_season1_episode6.ogg
[student@servera ~]$ mv tv_season2_episode{1..6}.ogg ~/Documents/project_plans/seaso
n1/
[student@servera ~]$ ls ~/Documents/project_plans/season1/
tv_season1_episode1.ogg  tv_season1_episode5.ogg  tv_season2_episode3.ogg
tv_season1_episode2.ogg  tv_season1_episode6.ogg  tv_season2_episode4.ogg
tv_season1_episode3.ogg  tv_season2_episode1.ogg  tv_season2_episode5.ogg
tv_season1_episode4.ogg  tv_season2_episode2.ogg  tv_season2_episode6.ogg
[student@servera ~]$ rm -rf ~/Documents/project_plans/season{1..2}_project_plan.pdf
[student@servera ~]$ ls ~/Documents/project_plans/
season1
[student@servera ~]$ mv ~/Documents/project_plans ~/Documents/upcoming_Project-plan
[student@servera ~]$ ls ~/Documents/
upcoming_Project-plan
[student@servera ~]$
```

5) Configuring ssh for devops user on serverb

=> Login to Root user on Server-a

-> Configure public and private keys at default locations

-> Do not provide the passphrase

-> share the public key with devops user on serverb

-> Try connecting with devops on serverb, it should not prompt for password

```
[root@servera ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): my_devops
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in my_devops
Your public key has been saved in my_devops.pub
The key fingerprint is:
SHA256:OJCi1+6TzL3AqmWlBMi6hxLZdq+n+m4KZhtR60hZeAA root@servera.lab.example.com
The key's randomart image is:
+---[RSA 3072]----+
|E.               |
|o o  .           |
|oo.+o            |
|.==o.. .         |
|=+=.+ o S        |
|.B+* . .         |
|===++o.          |
|+=oo*oo          |
|.o+**+..         |
+----[SHA256]-----+
[root@servera ~]# ssh-copy-id -i my_devops.pub devops@serverb
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "my_devops.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out
any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted n
ow it is to install the new keys
devops@serverb's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'devops@serverb'"
and check to make sure that only the key(s) you wanted were added.

[root@servera ~]# ls
my_devops  my_devops.pub  my_key  my_key.pub  redhat.txt  rhel-backup
[root@servera ~]# ssh -i my_devops devops@serverb
Register this system with Red Hat Insights: insights-client --register
Create an account or view all your systems at https://red.ht/insights-dashboard
Last login: Tue Aug 19 13:26:16 2025 from 172.25.250.10
[devops@serverb ~]$
```

6) Configuring ssh for student user on serverb

=> Generate ssh keys from root user on server-a, the file that stores the keys shall be named as /root/.ssh/student-key

-> Give RedHat as the passphrase to secure the keys

-> Share the public key with student user in server-b

-> Try connection to student@serverb , it shal prompt for passpharase

-> To avaoid shoulder surfing, pls generate the agent process for this newly generated key.

-> Change configuration on server-b such that no one can loginto it's root user account

```
[root@servera ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): /root/.ssh/student-key
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/student-key
Your public key has been saved in /root/.ssh/student-key.pub
The key fingerprint is:
SHA256:b5P9TodYqcLEaZyIZK1wN7/XyzDmvLpg2bzAaR4etbU root@servera.lab.example.com
The key's randomart image is:
+---[RSA 3072]----+
|                 |
|       .         |
|    . + +        |
|     = + * o   . |
|      o S X . o  |
|       . @ * * . |
|        @ % E + .|
|       = * O * o |
|        o +o+o=  |
+----[SHA256]-----+
[root@servera ~]# ssh-copy-id -i /root/.ssh/student-key.pub student@serverb
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/student-ke
y.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out
any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted n
ow it is to install the new keys
student@serverb's password:
Permission denied, please try again.
student@serverb's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'student@serverb'"
and check to make sure that only the key(s) you wanted were added.

[root@servera ~]# ssh -i /root/.ssh/student-key student@serverb
Enter passphrase for key '/root/.ssh/student-key':
Activate the web console with: systemctl enable --now cockpit.socket

Register this system with Red Hat Insights: insights-client --register
Create an account or view all your systems at https://red.ht/insights-dashboard
Last login: Tue Aug 19 13:43:03 2025 from 172.25.250.10
[student@serverb ~]$
[student@serverb ~]$ exit
logout
Connection to serverb closed.
[root@servera ~]# eval $(ssh-add)
[root@servera ~]# eval $(ssh-agent)
Agent pid 1770
[root@servera ~]# ssh-add /root/.ssh/student-key
student-key      student-key.pub
[root@servera ~]# ssh-add /root/.ssh/student-key
Enter passphrase for /root/.ssh/student-key:
Identity added: /root/.ssh/student-key (root@servera.lab.example.com)
```

```
[root@servera ~]# ssh -i /root/.ssh/student-key student@serverb
Activate the web console with: systemctl enable --now cockpit.socket

Register this system with Red Hat Insights: insights-client --register
Create an account or view all your systems at https://red.ht/insights-dashboard
Last login: Tue Aug 19 13:44:54 2025 from 172.25.250.10
[student@serverb ~]$
```

```
[root@serverb ~]# vim /etc/ssh/sshd_config
[root@serverb ~]# systemctl restart sshd.service
[root@serverb ~]# exit
logout
[student@serverb ~]$ exit
logout
Connection to serverb closed.
[student@workstation ~]$ ssh root@serverb
root@serverb: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
[student@workstation ~]$
```

```
# Authentication:

#LoginGraceTime 2m
PermitRootLogin no
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10
```

Perform below questions from root user on servera

7)Managing users and Groups
-> Add a group named managers.
-> Add a user alice who belongs to managers as a secondary group.
-> Add a user vince also belongs to managers as a secondary group.
-> Add a user susan who does not have access to an interactive shell on system and who not a member of managers.
-> The users alice, vince, susan has password " sestiver "

```
[root@servera ~]# useradd -G managers alice
[root@servera ~]# useradd -G managers vince
[root@servera ~]# tail -n 5 /etc/passwd
devops:x:1001:1001:Devops User:/home/devops:/bin/bash
libstoragemgmt:x:986:986:daemon account for libstoragemgmt:/:/usr/sbin/nologin
cloud-user:x:1002:1002:Cloud User:/home/cloud-user:/bin/bash
alice:x:1003:1004::/home/alice:/bin/bash
vince:x:1004:1005::/home/vince:/bin/bash
[root@servera ~]# tail -n 3 /etc/group
managers:x:1003:alice,vince
alice:x:1004:
vince:x:1005:
[root@servera ~]# useradd -s /sbin/nologin susan
[root@servera ~]# cat /etc/passwd | grep susan
susan:x:1005:1006::/home/susan:/sbin/nologin
[root@servera ~]# passwd alice
Changing password for user alice.
New password:
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary
word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@servera ~]# passwd vince
Changing password for user vince.
New password:
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary
```

```
word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@servera ~]# passwd susan
Changing password for user susan.
New password:
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary
word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@servera ~]# su - alice
[alice@servera ~]$ su - vince
Password:
[vince@servera ~]$ su - susan
Password:
This account is currently not available.
[vince@servera ~]$
```

8) Modifying user and group features
-> Alice primary group should be wheel
-> Groupid of managers should be 6060

-> All the members of managers group should be able to run any command as sudo, without requring the password

```
[root@servera ~]# usermod -g wheel alice
[root@servera ~]# id alice
uid=1003(alice) gid=10(wheel) groups=10(wheel),1003(managers)
[root@servera ~]# groupmod -g 6060 managers
[root@servera ~]# tail -n 5 /etc/group
cloud-user:x:1002:
managers:x:6060:alice,vince
alice:x:1004:
vince:x:1005:
susan:x:1006:
[root@servera ~]# vim /etc/sudoers.d/managers
[root@servera ~]# vim /etc/sudoers.d/managers
[root@servera ~]# su - alice
Last login: Tue Aug 19 14:42:58 UTC 2025 on pts/0
[alice@servera ~]$ id root
uid=0(root) gid=0(root) groups=0(root)
[alice@servera ~]$ tail -n 2 /etc/passwd
vince:x:1004:1005::/home/vince:/bin/bash
susan:x:1005:1006::/home/susan:/sbin/nologin
[alice@servera ~]$
```

```
%managers       ALL=(ALL:ALL)   ALL
~
```

9) Working on the password policies
-> Configure the password policy for alice, such that:
-> she has to change the password every 30days.
-> she is warned 3 days before password expiry
-> Her accound expires after 120 days of creation
-> Configure Global password policies such that
-> All newly added users cannot change password of 3 days.
-> All newly added users must change their password every 15 days
-> All newly added users should be warned 5 days before their password expires
-> Confirm the above changes by adding natasha user

```
[root@servera ~]# chage -M 30 alice
[root@servera ~]# chage -l alice
Last password change                                    : Aug 19, 2025
Password expires                                        : Sep 18, 2025
Password inactive                                       : never
Account expires                                         : never
Minimum number of days between password change          : 0
Maximum number of days between password change          : 30
Number of days of warning before password expires       : 7
[root@servera ~]# chage -W 3 -E $(date -d +120days +%Y-%m-%d) alice
[root@servera ~]# chage -l alice
Last password change                                    : Aug 19, 2025
Password expires                                        : Sep 18, 2025
Password inactive                                       : never
Account expires                                         : Dec 17, 2025
Minimum number of days between password change          : 0
Maximum number of days between password change          : 30
Number of days of warning before password expires       : 3
[root@servera ~]# vim /etc/login.defs
[root@servera ~]# useradd natasha
[root@servera ~]# chage -l natasha
Last password change                                    : Aug 19, 2025
Password expires                                        : Sep 03, 2025
Password inactive                                       : never
Account expires                                         : never
Minimum number of days between password change          : 3
Maximum number of days between password change          : 15
Number of days of warning before password expires       : 5
[root@servera ~]#
```

```
PASS_MAX_DAYS   15
PASS_MIN_DAYS   3
PASS_WARN_AGE   5
```

10) Output Redirection
-> Save a time stamp for later reference at /tmp/saved-timestamp
-> In the same file add number of days passed in 2023 after the following line "The Number of days passed in 2023 are".

```
[root@servera ~]# date >> /tmp/saved-timestamp
[root@servera ~]# echo "the number of days are passed in 2023 are $(date -d "2023-12
-31" +%j)" >> /tmp/saved-timestamp
[root@servera ~]# cat /tmp/saved-timestamp
Tue Aug 19 15:10:10 UTC 2025
the number of days are passed in 2023 are 365
[root@servera ~]#
```

11) Managing File Permissions
-> Create a directory called /home/Managers.
-> Change the group ownership of /home/Managers to managers group that you previously created.
-> Set permission such that user owner and group has the full access on the directory but others does not have any access.
-> Any files created in the future inside /home/Managers should by default get group ownership of managers group.
-> Verify the same by creating files in /home/Managers by vince(is member of managers) and student(not a member)
- Configure the umask for user alice such that:
- Any files created by alice should have permission set to "r--r--r--"
- Any Directories created by alice should have permission set to "r-xr-xr-x"

```
[root@servera ~]# mkdir /home/Managers
[root@servera ~]# ls -l /home/Managers
total 0
[root@servera ~]# ls -l /home
total 0
drwxr-xr-x. 2 root       root         6 Aug 19 15:31 Managers
[root@servera ~]# chown :managers /home/Managers
[root@servera ~]#
[root@servera ~]# ls -l /home
total 0
drwxr-xr-x. 2 root       managers     6 Aug 19 15:31 Managers
[root@servera ~]# chmod 770 /home/Managers
[root@servera ~]# chmod g+s /home/Managers
[root@servera ~]# su - student
Last login: Tue Aug 19 15:35:22 UTC 2025 on pts/0
[student@servera ~]$ touch /home/Managers/studentfile
touch: cannot touch '/home/Managers/studentfile': Permission denied
[student@servera ~]$ su - alice
Password:
Last login: Tue Aug 19 14:53:34 UTC 2025 on pts/0
[alice@servera ~]$ touch /home/Managers/alicefile
[alice@servera ~]$ ls -l /home/Managers/
total 0
-rw-r--r--. 1 alice managers 0 Aug 19 15:42 alicefile
[alice@servera ~]$
```

```
[alice@servera ~]$ umask 333
[alice@servera ~]$ umask
0333
[alice@servera ~]$ touch file | ls -l
total 0
-r--r--r--. 1 alice wheel 0 Aug 19 15:45 file
[alice@servera ~]$ umask 222
[alice@servera ~]$ mkdir test
[alice@servera ~]$ ls -l test
total 0
[alice@servera ~]$ ls -l
total 0
-r--r--r--. 1 alice wheel 0 Aug 19 15:45 file
dr-xr-xr-x. 2 alice wheel 6 Aug 19 15:46 test
```

12) Process

-> Find out load avg on your CPU.

-> Find out number of CPUs.

```
[student@servera ~]$ lscpu | grep "CPU(s)"
CPU(s):                          2
On-line CPU(s) list:             0,1
NUMA node0 CPU(s):               0,1
[student@servera ~]$ uptime
 15:52:51 up  1:56,  2 users,  load average: 0.28, 0.07, 0.02
[student@servera ~]$ #0.28/2
[student@servera ~]$ #0.07/2
[student@servera ~]$ #0.02/2
[student@servera ~]$ #0.28/2 = 0.14
[student@servera ~]$ #0.07/2 = 0.035
[student@servera ~]$ #0.02/2 = 0.01
```

13) Service Managment

-> Stop and Disable your firewalld.service

-> Verify by service status

```
[root@servera ~]# systemctl stop firewalld.service ; systemctl disable firewalld.ser
vice
Removed "/etc/systemd/system/multi-user.target.wants/firewalld.service".
Removed "/etc/systemd/system/dbus-org.fedoraproject.FirewallD1.service".
[root@servera ~]# systemctl status firewalld.service
○ firewalld.service - firewalld - dynamic firewall daemon
     Loaded: loaded (/usr/lib/systemd/system/firewalld.service; disabled; preset: e>
     Active: inactive (dead)
       Docs: man:firewalld(1)

Aug 19 13:56:53 servera.lab.example.com systemd[1]: Starting firewalld - dynamic fi>
Aug 19 13:56:56 servera.lab.example.com systemd[1]: Started firewalld - dynamic fir>
Aug 19 15:58:13 servera.lab.example.com systemd[1]: Stopping firewalld - dynamic fi>
Aug 19 15:58:13 servera.lab.example.com systemd[1]: firewalld.service: Deactivated >
Aug 19 15:58:13 servera.lab.example.com systemd[1]: Stopped firewalld - dynamic fir>
lines 1-10/10 (END)
```

14) Configuring rsyslog

-> Configure rsyslog on servera to log all messages with the debug priority, or higher, for any service into the new /var/log/messages-debug log file by adding the rsyslog configuration file /etc/rsyslog.d/debug.conf.

```
[root@servera ~]# vim /etc/rsyslog.conf
[root@servera ~]# vim /etc/rsyslog.d/debug.conf
[root@servera ~]# systemctl restart systemd-journal
systemd-journal-catalog-update.service  systemd-journald-dev-log.socket
systemd-journal-flush.service           systemd-journald.service
systemd-journald-audit.socket           systemd-journald.socket
[root@servera ~]# systemctl restart systemd-journald.service
[root@servera ~]# systemctl restart rsyslog.service
[root@servera ~]# logger -p user.debug "this is generated log"
[root@servera ~]# cat /var/lo
local/ lock/  log/
[root@servera ~]# cat /var/log/messages-debug
Aug 19 16:10:21 servera systemd[1]: Stopping System Logging Service...
Aug 19 16:10:21 servera rsyslogd[1105]: [origin software="rsyslogd" swVersion="8.210
2.0-117.el9" x-pid="1105" x-info="https://www.rsyslog.com"] exiting on signal 15.
Aug 19 16:10:21 servera systemd[1]: rsyslog.service: Deactivated successfully.
Aug 19 16:10:21 servera systemd[1]: Stopped System Logging Service.
Aug 19 16:10:21 servera systemd[1]: Starting System Logging Service...
Aug 19 16:10:21 servera rsyslogd[2251]: [origin software="rsyslogd" swVersion="8.210
2.0-117.el9" x-pid="2251" x-info="https://www.rsyslog.com"] start
Aug 19 16:10:21 servera systemd[1]: Started System Logging Service.
Aug 19 16:10:21 servera rsyslogd[2251]: imjournal: journal files changed, reloading.
..  [v8.2102.0-117.el9 try https://www.rsyslog.com/e/0 ]
Aug 19 16:11:16 servera root[2256]: this is generated log
[root@servera ~]#
```

```
*.debug                                         /var/log/messages-debug
~
```

15) Network Time Protocol

-> Make sure servera uses 'classroom.example.com' as the NTP server

```
[root@servera ~]# vim /etc/chrony.conf
[root@servera ~]# systemctl restart chrony
chrony-wait.service  chronyd.service
[root@servera ~]# systemctl restart chrony
chrony-wait.service  chronyd.service
[root@servera ~]# systemctl restart chronyd.service
[root@servera ~]# chronyc source
sourcename   sources      sourcestats
[root@servera ~]# chronyc source
sourcename   sources      sourcestats
[root@servera ~]# chronyc sources
MS Name/IP address         Stratum Poll Reach LastRx Last sample
===============================================================================
^* classroom.example.com         3   6    17    53  -1822ns[-6555ns] +/- 8142us
[root@servera ~]#
```