My Linux Project

Implementing Secure User and Department Management in a Linux Environment

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Learning Objectives

- Understanding Linux File System Structure (Linux and MacOs)
- User and Group Management
- Permission Management
- Administrative User Roles
- Security Practices

Case Scenario

As the Linux Administrator for fast-growing company, you have been tasked with creating, modifying, and removing user accounts from the Linux server. The company has just hired 9 new employees to fill 3 newly designed departments. The departments that have been created are Engineering, Sales and IS. The server must be setup with the appropriate files, folders, users, groups and permissions to ensure a successful launch of the newly designed departments.

Objectives

- Create a directory at the root () of the file system for each department. This name should reflect the department name that will use the directory.
- Create a group for each department. This name should reflect the department name that the group will be assigned.
- Create an administrative user for each of the departments.
  - The user will have a Bash login shell.
  - The user will belong to the respective group for each department. This will need to be the user's primary group.
- Create two additional users for each department.
  - The users will have a Bash login shell.
  - The users will belong to their respective group for each department. This will need to be the user's primary group.
- For security reasons, the following modifications will need to be made to each of the departments' respective directories:
  - Ensure that the owner of each of the directories is the department administrator and the group ownership is the group for each department.
  - The department administrator will have full access to their respective department directories.
  - Ensure that only the owner of a file in the department's directory can delete the file. The user will also have ownership of their respective department folders.
  - Normal users in each department will have full access (Read, Write and Execute) to their respective department folders.
  - The department folders will ONLY be accessible by users/administrators in each of the respective departments. Ensure that no one else will have permissions to the folders.
- Create a document in each of the department directories.
  - The ownerships on this file will be the same as the directory it is located in.
  - The document should contain only one line of text that states, "This file contains confidential information for the department."
  - This file can be read by any user in the department, but can only be modified by the department administrator. No one else has permissions to this file.

Command Rundown

To make the directory for each department
mkdir /Management
mkdir /Technical
mkdir /Sales

To create groups for the departments
Linux terminal and macOs
 <Linux terminal>
groupadd Management
groupadd Technical
groupadd Sales

  # To view the the list of groups (Linux)
Grep <group_name> /etc/group

<macOs>
sudo dseditgroup -o create Sales
sudo dseditgroup -o create Technical
sudo dseditgroup -o create Management

  # To view the the list of groups (macOs)
dscl . -list /Groups

To create users and add to a group
 <Linux>
useradd -m -s /bin/bash -g Management mgmnt_admin
useradd -m -s /bin/bash -g Technical tech_admin
useradd -m -s /bin/bash -g Sales sales_admin

useradd -m -s /bin/bash -g Management mgmnt_user1
useradd -m -s /bin/bash -g Management mgmnt_user2

useradd -m -s /bin/bash -g Sales sales_user1
useradd -m -s /bin/bash -g Sales sales_user2

useradd -m -s /bin/bash -g Technical tech_user1
useradd -m -s /bin/bash -g Technical tech_user2

<macOs>
- First create each user
sudo sysadminctl -addUser mgmnt_admin -fullName "Management Admin"
sudo sysadminctl -addUser tech_admin -fullName "Technical Admin"
sudo sysadminctl -addUser sales_admin -fullName "Sales Admin"

sudo sysadminctl -addUser sales_user1 -fullName "Sales User 1"
sudo sysadminctl -addUser sales_user2 -fullName "Sales User 2"

{sudo sysadminctl -addUser smart -fullName "Smart Beyioku" -password password123 -admin }   -#this is the command to add a password and admin privileges

Command Rundown 2

sudo sysadminctl -addUser mgmnt_user1 -fullName "Management User 1"
sudo sysadminctl -addUser mgmnt_user2 -fullName "Management User 2"

sudo sysadminctl -addUser tech_user1 -fullName "Technical User 1"
sudo sysadminctl -addUser tech_user2 -fullName "Technical User 2"

- Assign the user to the groups

sudo dseditgroup -o edit -a tech_admin -t user Technical
sudo dseditgroup -o edit -a tech_userl -t user Technical
sudo dseditgroup -o edit -a tech_user2 -t user Technical

sudo dseditgroup -o edit -a sales_admin -t user Sales
sudo dseditgroup -o edit -a sales_user1 -t user Sales
sudo dseditgroup -o edit -a sales_user2 -t user Sales

sudo dseditgroup -o edit -a mgmnt_admin -t user Management
sudo dseditgroup -o edit -a mgmnt_user1 -t user Management
sudo dseditgroup -o edit -a mgmnt_user2 -t user Management

To check the groups of a user
 id <group name>

# To change both user and group ownership
sudo chown mgmnt_admin:Management Management/document.txt
sudo chown sales_admin:Sales Sales/document.txt
sudo chown tech_admin:Technical Technical/document.txt

# To set sticky permissions, so that only the owner can delete
sudo chmod 1770 Management
sudo chmod 1770 Sales
sudo chmod 1770 Technical

To create a document in each department directory with the administrators given full permissions
- Creating a file

sudo echo "This file contains confidential information for the Sales department." >Sales/document.txt
sudo echo "This file contains confidential information for the Technical department." >Technical/document.txt
sudo echo "This file contains confidential information for the Management department." >Management/document.txt

- Changing ownership of the departmental file to the departmental admin
sudo chown mgmnt_admin:Management Management/document.txt
sudo chown tech_admin:Technical Technical/document.txt
sudo chown sales_admin:Sales Sales/document.txt

Command Rundown 3

-Making Sure the file can be read by any user in the department but only modified by the department administrator

```
sudo chmod 740 document.txt          # For the Management
directory
sudo chmod 740 document.txt          # For the Technical directory
sudo chmod 740 document.txt          # For the Sales directory
```

```
[mac@SMARTS-Air 101024 % ls -l
total 0
drwxr-xr-x  2 root   admin   64 Jun 10 16:36 Management
drwxr-xr-x  2 root   admin   64 Jun 10 16:37 Sales
drwxr-xr-x  2 root   admin   64 Jun 10 16:37 Technical
mac@SMARTS-Air 101024 % 
```

```
[mac@SMARTS-Air 101024 % ls -l
total 8
drwxrwx--T  3 mgmnt_admin  Management      96 Jun 11 13:30 Management
drwxrwx--T  3 sales_admin  Sales           96 Jun 11 13:31 Sales
drwxrwx--T  3 tech_admin   Technical       96 Jun 11 13:32 Technical
-rwxrwxrwx@ 1 root         admin         3544 Jun 11 18:08 commands.sh
mac@SMARTS-Air 101024 % 
```

Some Commands Excerpts

```
[mac@SMARTS-Air 101024 % ls -l
total 8
drwxrwx--T  3 mgmnt_admin  Management    96 Jun 11 13:30 Management
drwxrwx--T  3 sales_admin  Sales         96 Jun 11 13:31 Sales
drwxrwx--T  3 tech_admin   Technical     96 Jun 11 13:32 Technical
-rwxrwxrwx@ 1 root         admin       3544 Jun 11 18:08 commands.sh
mac@SMARTS-Air 101024 %
```

```
[mac@SMARTS-Air 101024 % id mgmnt_admin
uid=504(mgmnt_admin) gid=20(staff) groups=20(staff),12(everyone),61(localaccounts),501(Management),70
09(com.apple.sharepoint.group.9),705(com.apple.sharepoint.group.5),707(com.apple.sharepoint.group.7),
3),711(com.apple.sharepoint.group.11),100(_lpoperator),704(com.apple.sharepoint.group.4),703(com.appl
[mac@SMARTS-Air 101024 % id sales_admin
uid=506(sales_admin) gid=20(staff) groups=20(staff),502(Sales),12(everyone),61(localaccounts),706(com
m.apple.sharepoint.group.9),705(com.apple.sharepoint.group.5),707(com.apple.sharepoint.group.7),712(c
1(com.apple.sharepoint.group.11),100(_lpoperator),704(com.apple.sharepoint.group.4),703(com.apple.sha
[mac@SMARTS-Air 101024 % id tech_admin
uid=505(tech_admin) gid=20(staff) groups=20(staff),503(Technical),12(everyone),61(localaccounts),706(
(com.apple.sharepoint.group.9),705(com.apple.sharepoint.group.5),707(com.apple.sharepoint.group.7),71
,711(com.apple.sharepoint.group.11),100(_lpoperator),704(com.apple.sharepoint.group.4),703(com.apple.
```

```
[mac@SMARTS-Air 101024 % cd Management
[mac@SMARTS-Air Management % ls -l
total 8
-rwxr-----  1 mgmnt_admin  Management  75 Jun 11 13:30 document.txt
mac@SMARTS-Air Management %
```

```
mac@SMARTS-Air Sales % ls -l
total 8
-rw-r--r--  1 sales_admin  Sales  70 Jun 11 18:00 document.txt
mac@SMARTS-Air Sales %
```

```
mac@SMARTS-Air Technical % ls -l
total 8
-rwxr-----  1 tech_admin  Technical  74 Jun 11 18:02 document.txt
mac@SMARTS-Air Technical %
```

System Software you can try this project with

| Windows (using WSL) | macOs | Any Linux OS |

MESSAGE ME FOR QUESTIONS AND COLLABORATIONS

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CHECK OUT MY GITHUB FOR ALL THE COMMANDS

@beyioku

THANK YOU