Working with the File System

> **Note**
>
> In the previous two labs, you received basic information about Linux and your current sessions. From here on, you will be on a minor adventure that will combine all your previous knowledge to solidify and reinforce your capabilities. You can reference your previous labs to help yourself complete of each of the remaining labs.

Objectives

In this lab, you will:

- Create a folder structure that this lab provides
- Create files
- Copy and move files and directories
- Delete files and directories

Duration

This lab requires approximately **30 minutes** to complete.

AWS service restrictions

In this lab environment, access to AWS services and service actions might be restricted to the ones that you need to complete the lab instructions. You might encounter errors if you attempt to access other services or perform actions beyond the ones that this lab describes.

Accessing the AWS Management Console

1. At the top of these instructions, choose Start Lab to launch your lab.
   A **Start Lab** panel opens, and it displays the lab status.

   > **Tip**: If you need more time to complete the lab, choose the Start Lab button again to restart the timer for the environment.

2. Wait until you see the message *Lab status: ready*, then close the **Start Lab** panel by choosing the **X**.
3. At the top of these instructions, choose AWS.
   This opens the AWS Management Console in a new browser tab. The system will automatically log you in.

> **Tip**: If a new browser tab does not open, a banner or icon is usually at the top of your browser with a message that your browser is preventing the site from opening pop-up windows. Choose the banner or icon and then choose **Allow pop ups**.

4. Arrange the AWS Management Console tab so that it displays along side these instructions. Ideally, you will be able to see both browser tabs at the same time so that you can follow the lab steps more easily.

Task 1: Use SSH to connect to an Amazon Linux EC2 instance

In this task, you will connect to a Amazon Linux EC2 instance. You will use an SSH utility to perform all of these operations. The following instructions vary slightly depending on whether you are using Windows or Mac/Linux.

Windows Users: Using SSH to Connect

These instructions are specifically for Windows users. If you are using macOS or Linux, skip to the next section.

5. Select the Details drop-down menu above these instructions you are currently reading, and then select Show. A Credentials window will be presented.
6. Select the **Download PPK** button and save the **labsuser.ppk** file.
   Typically your browser will save it to the Downloads directory.
7. Make a note of the **PublicIP** address.
8. Then exit the Details panel by selecting the **X**.
9. Download **PuTTY** to SSH into the Amazon EC2 instance. If you do not have PuTTY installed on your computer, download it here.
10. Open **putty.exe**
11. Configure PuTTY timeout to keep the PuTTY session open for a longer period of time.:
    - Select **Connection**
    - Set **Seconds between keepalives** to `30`
12. Configure your PuTTY session:
    - Select **Session**
    - **Host Name (or IP address):** Paste the **Public DNS or IPv4 address** of the instance you made a note of earlier.
      Alternatively, return to the EC2 Console and select **Instances**. Check the box next to the instance you want to connect to and in the *Description* tab copy the **IPv4 Public IP** value.
    - Back in PuTTY, in the **Connection** list, expand **SSH**
    - Select **Auth** *(don't expand it)*
    - Select **Browse**
    - Browse to and select the lab#.ppk file that you downloaded
    - Select **Open** to select it
    - Select **Open** again.

13. Select **Yes**, to trust and connect to the host.
14. When prompted **login as**, enter: `ec2-user`
    This will connect you to the EC2 instance.
15. Windows Users: Select here to skip ahead to the next task.

macOS and Linux Users

These instructions are specifically for Mac/Linux users. If you are a Windows user, skip ahead to the next task.

16. Select the Details drop-down menu above these instructions you are currently reading, and then select Show. A Credentials window will be presented.
17. Select the **Download PEM** button and save the **labsuser.pem** file.
18. Make a note of the **PublicIP** address.
19. Then exit the Details panel by selecting the **X**.
20. Open a terminal window, and change directory `cd` to the directory where the *labsuser.pem* file was downloaded. For example, if the *labuser.pem* file was saved to your Downloads directory, run this command:

    ```
    cd ~/Downloads
    ```

21. Change the permissions on the key to be read-only, by running this command:

    ```
    chmod 400 labsuser.pem
    ```

22. Run the below command *(replace **<public-ip>** with the **PublicIP** address you copied earlier)*.
    Alternatively, return to the EC2 Console and select **Instances**. Check the box next to the instance you want to connect to and in the *Description* tab copy the **IPv4 Public IP** value.:

    ```
    ssh -i labsuser.pem ec2-user@<public-ip>
    ```

23. Type `yes` when prompted to allow the first connection to this remote SSH server.
    Because you are using a key pair for authentication, you will not be prompted for a password.

Task 2: Create a Folder Structure

In this task, you create a specific folder structure. A picture of the files and folders is provided, and your task is to recreate the structure in the new machine.

Using the terminal, you recreate the following structure on the Linux machine.

```
/home/ec2-user/CompanyA/
/home/ec2-user/CompanyA/Finance/
/home/ec2-user/CompanyA/Finance/ProfitAndLossStatements.csv
/home/ec2-user/CompanyA/Finance/Salary.csv
/home/ec2-user/CompanyA/HR/
/home/ec2-user/CompanyA/HR/Assessments.csvv
/home/ec2-user/CompanyA/HR/TrialPeriod.csv
/home/ec2-user/CompanyA/Management/
/home/ec2-user/CompanyA/Management/Managers.csv
/home/ec2-user/CompanyA/Management/Schedule.csv
```

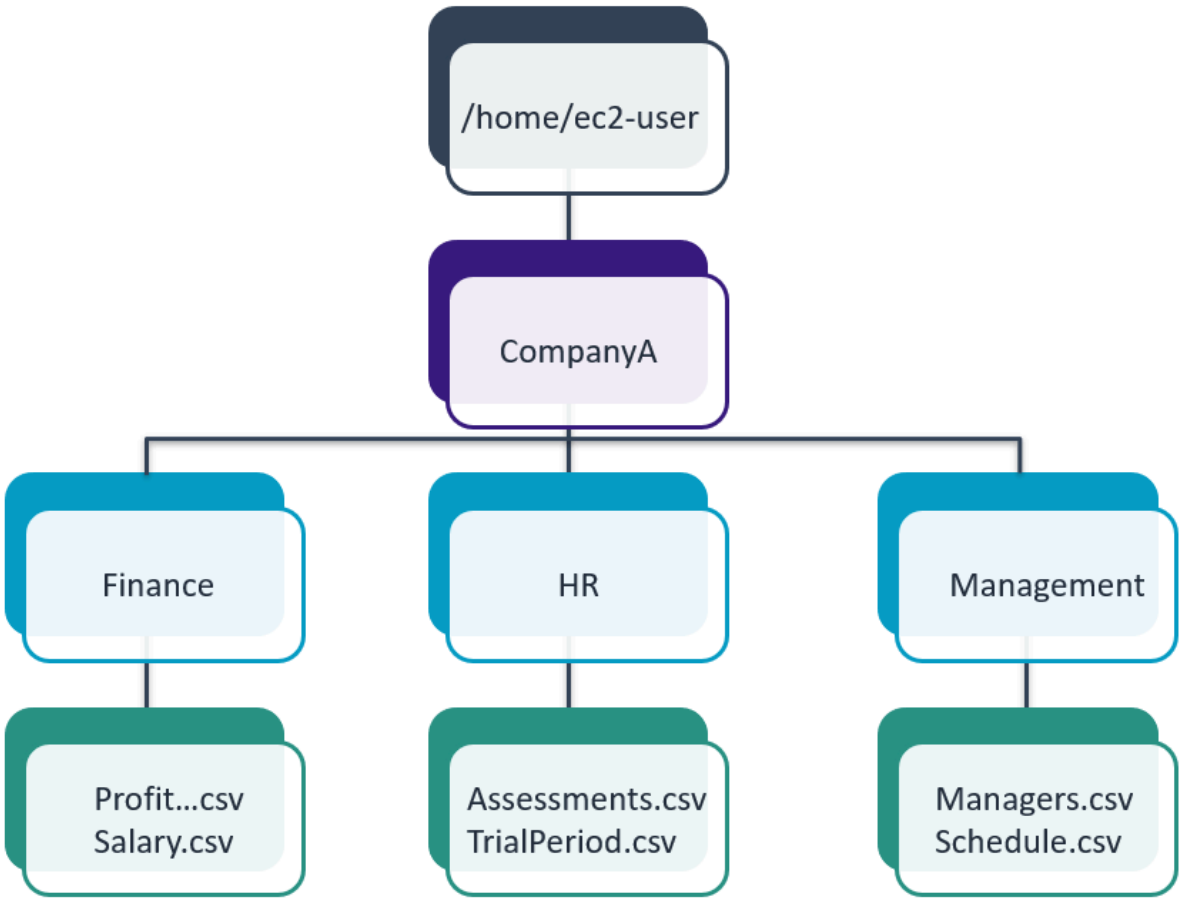

Figure: The folder structure starts with the /home/ec2-user folder. Within this folder, you will make a CompanyA directory. Within Company A directory, there will be three directories: Finance, HR, and Management. In the finance folder, you will see a Salary.csv and a ProfitAndLossStatements.csv files. In the HR folder, you will see an Assessments.csv and TrialPeriod.csv files. Within the Management folder, you will see Managers.csv and Schedule.csv files.

> **Helpful Hint**
>
> Use the `ls` and `pwd` commands after each step to validate that you have created the files correctly.

24. To validate that you are in the home folder of your current user, enter `pwd` and press Enter. If you're not in the home folder, enter `cd /home/ec2-user`
25. In the terminal, enter `mkdir CompanyA` and press Enter to create the top-level folder.

26. To change directories, enter `cd CompanyA` and press Enter.
27. To create all the sub folders, enter `mkdir Finance HR Management` and press Enter.
28. To validate that the folders were created, enter `ls` and press Enter.

```
[ec2-user@ CompanyA]$ ls
Finance HR Management
[ec2-user@ CompanyA]$
```

29. To change your current directory to the **HR** directory, enter `cd HR` and press Enter.
30. To create the empty files inside the **HR** folder, enter `touch Assessments.csv TrialPeriod.csv` and press Enter.
31. To validate that the files were created, enter `ls` and press Enter.

```
[ec2-user@ HR]$ ls
Assessments.cvs TrialPeriod.csv
[ec2-user@ HR]$
```

32. To change your current directory to **Finance**, enter `cd ../Finance` and press Enter.
33. To create the empty files inside the **Finance** folder, enter `touch Salary.csv ProfitAndLossStatements.csv` and press Enter.
34. To validate that the files were created, enter `ls` and press Enter.

```
[ec2-user@ Finance]$ ls
Salary.csv  ProfitAndLossStatements.csv
[ec2-user@ Finance]$
```

35. To change directories back one level to the **CompanyA** folder, enter `cd ..` and press Enter.
36. To create the new empty files in the **Management** folder, enter `touch Management/Managers.csv Management/Schedule.csv` and press Enter.
37. To validate that the files were created, enter `ls Management` and press Enter.

```
[ec2-user@ CompanyA]$ ls Management
Managers.csv  Schedule.csv
[ec2-user@ Finance]$
```

> **Note**:
>
> In the previous steps, you used the `touch` and `ls` command two ways:
>
> - Directly in the working folder: The `ls` command lists the current directory, and `touch myFile.csv` creates **myFiles.csv** in the current directory.
> - By using a path relative to the current folder: `ls Management` or `touch Management/myFile.csv` work in the **Management** folder inside the current folder.
>
> `cd ../` navigates back to the parent folder and `touch ../Management/myFile.csv` creates the **myFile.csv** file in the **Management** folder located in the parent folder of the current folder.

38. To validate that all the files and folders from the **CompanyA** folder down have been created, enter `ls -laR` and press Enter.

```
[ec2-user@ CompanyA]$ ls -laR
.:
total 0
drwxr-xr-x 5 ec2-user root     49 Aug 10 13:36 .
drwx------ 4 ec2-user ec2-user 90 Aug 10 13:25 ..
drwxrwxr-x 2 ec2-user ec2-user 59 Aug 10 13:39 Finance
drwxrwxr-x 2 ec2-user ec2-user 52 Aug 10 13:37 HR
drwxrwxr-x 2 ec2-user ec2-user 46 Aug 10 13:39 Management

./Finance:
total 0
drwxrwxr-x 2 ec2-user ec2-user 59 Aug 10 13:39 .
drwxr-xr-x 5 ec2-user root     49 Aug 10 13:36 ..
-rw-rw-r-- 1 ec2-user ec2-user  0 Aug 10 13:39 ProfitAndLossStatements.csv
-rw-rw-r-- 1 ec2-user ec2-user  0 Aug 10 13:39 Salary.csv

./HR:
total 0
drwxrwxr-x 2 ec2-user ec2-user 52 Aug 10 13:37 .
drwxr-xr-x 5 ec2-user root     49 Aug 10 13:36 ..
-rw-rw-r-- 1 ec2-user ec2-user  0 Aug 10 13:37 Assessments.cvs
-rw-rw-r-- 1 ec2-user ec2-user  0 Aug 10 13:37 TrialPeriod.csv

./Management:
total 0
drwxrwxr-x 2 ec2-user ec2-user 46 Aug 10 13:39 .
drwxr-xr-x 5 ec2-user root     49 Aug 10 13:36 ..
-rw-rw-r-- 1 ec2-user ec2-user  0 Aug 10 13:39 Managers.csv
-rw-rw-r-- 1 ec2-user ec2-user  0 Aug 10 13:39 Schedule.csv

[ec2-user@ CompanyA]$
```

Task 3: Delete and reorganize folders

A few weeks later, you are tasked with reorganizing the content as follows:

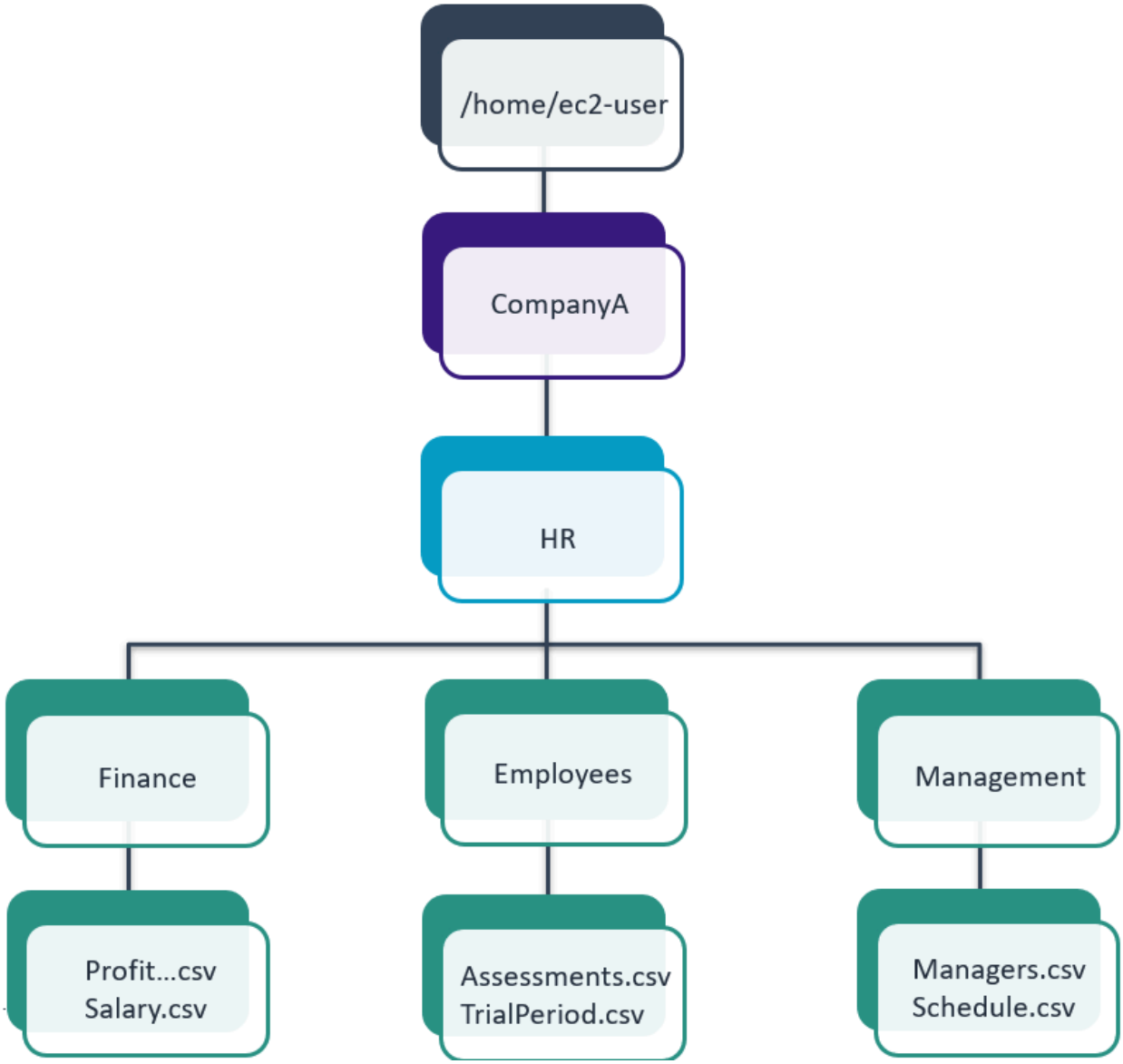

Figure: The folder structure starts with the /home/ec2-user folder. Within this folder, the CompanyA folder will stay in the same place. Within CompanyA, HR will still fall directly under it. However, Finance and Management are now moved underneath HR. A new Employee folder is also created under HR as well. In the Finance folder, you will see the following files: ProfitAndLossStatements.csv and Salary.csv. In the newly created Employees folder, you will see Assessments.csv and TrialPeriod.csv files. Within the Management folder you will see Managers.csv and Schedule.csv files.

For this task, you:

- Copy the **Finance** folder and its content to the **HR** folder, and remove the previous **Finance** folder
- Move the **Management** folder inside the **HR** folder
- Create an **Employees** folder inside the **HR** folder, and move the **Assessments.csv** and **TrialPeriod.csv** file inside the **Employees** folder

39. To ensure that you are in the appropriate **CompanyA** folder, enter `pwd` into the terminal and press Enter.

```
[ec2-user@ CompanyA]$ pwd
/home/ec2-user/CompanyA
```

40. To copy the **Finance** folder and its content, enter `cp -r Finance HR` and press Enter.
41. To verify that the folder and the content was copied, enter `ls HR/Finance` and press Enter.

```
[ec2-user@ CompanyA]$ ls HR/Finance
ProfitAndLossStatements.csv Salary.csv
```

42. To remove the **Finance** folder from the **CompanyA** folder structure, enter `rmdir Finance` and press Enter.

```
[ec2-user@ companyA]$ rmdir Finance
rmdir: failed to remove ‘Finance/’: Directory not empty
```

> **Note**:
> **rmdir** works only on an empty directory.
> To remove the folder, you have two options:
>
> - Remove the files inside the folder and then remove the **Finance** folder.
> - Use the `rm` command with the `-r` option to recursively delete the folder and its content.

43. To remove the files inside the **Finance** folder, enter `rm Finance/ProfitAndLossStatements.csv Finance/Salary.csv` and press Enter.
44. To verify that the folder is empty, enter `ls Finance` and press Enter.

```
[ec2-user@ CompanyA]$ ls Finance
[ec2-user@ CompanyA]$
```

45. To remove the folder, enter `rmdir Finance` and press Enter.
46. To verify that the folder was removed, enter `ls` and press Enter.

```
[ec2-user@ companyA]$ ls
HR Management
[ec2-user@ companyA]$
```

47. To move the **Management** folder inside the **HR** folder, enter `mv Management HR` and press Enter.
48. To verify that the folder and files were moved, enter `ls . HR/Management` and press Enter.

```
[ec2-user@ CompanyA]$ ls . HR/Management
.:
HR

HR/Management:
Managers.csv  Schedule.csv
[ec2-user@ CompanyA]$
```

49. To navigate inside the **HR** folder, enter `cd HR` and press Enter.
50. To create the **Employees** folder, enter `mkdir Employees` and press Enter.
51. To move the files to this folder, enter `mv Assessments.csv TrialPeriod.csv Employees` and press Enter.
52. To verify that the files were moved, enter `ls . Employees` and press Enter.

```
[ec2-user@ HR]$ ls . Employees
.:
Employees  Finance  Management

Employees/:
Assessments.csv  TrialPeriod.csv
[ec2-user@ HR]$
```

Lab Complete

Congratulations! You have completed the lab.

53. Select End Lab at the top of this page and then select **Yes** to confirm that you want to end the lab.
    A panel will appear, indicating that "DELETE has been initiated... You may close this message box now."
54. Select the **X** in the top right corner to close the panel.

About the AWS component

Amazon EC2 provides a wide selection of *instance types* optimized to fit different use cases. Instance types comprise varying combinations of CPU, memory, storage, and networking capacity and give you the flexibility to choose the appropriate mix of resources for your applications. Each instance type includes one or more *instance sizes* so that you can scale your resources to the requirements of your target workload.

This lab uses a **t3.micro** instance, which should be selected by default. This instance type has 1 virtual CPU and 1 GiB of memory.

Additional resources

- Amazon EC2 Instance Types
- Amazon Machine Images (AMI)
- Status Checks for Your Instances
- Amazon EC2 Service Quotas
- Terminate Your Instance

or more information about AWS Training and Certification, see https://aws.amazon.com/training/.

Your feedback is welcome and appreciated.

If you would like to share any suggestions or corrections, please provide the details in our AWS Training and Certification Contact Form.