# Lab 2: Linux Commands, Apache Sites & Groff



In this lab you will learn basic Linux commands and host a simple page in Apache, this will also introduce Groff (GNU Troff). All of the packages and tools in this lab were developed by the GNU project as replacements for original Unix packages, apart from Apache of course - because the Apache software foundation created that.

## Part 1: Linux Commands

1.1 You need to know some commands to get started, use the following table for reference, use these commands to answer the questions below?

|  |  |
| --- | --- |
| pwd | Print working directory |
| date | Shows the date |
| cd | Change directory |
| ls | List |
| sort | Sorts things alphabetically |
| cal | Calendar |
| cat | Print (concatenate) the contents of a file(s) |

What date does the system think it is? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is your current working directory? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.2 The cal command is moderately useful, if you type man cal you can see the options you can add to it, an option or a switch is applied using a space then a minus sign/hyphen. For example ls -l creates a long list. Using that information, investigate the system calendar and figure out how to determine the following:

What day of the week was 01/Nov/1972? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What day of the week is 31/Dec/3072? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## **Part 2: Examine System Resources**

2.1 The # with the blinking cursor in front of it is called the prompt. Enter the disk free command to see how much space you have left on the current file system. The dot after the disk free command means ‘current directory’. Fill out this table with the disk free information of the system.

# df -kh .

|  |  |
| --- | --- |
| Filesystem |  |
| Size |  |
| Used |  |
| Available |  |
| Utilisation % |  |

2.2 Now run the commands:

# cat /proc/meminfo

# vmstat

2.3 Both commands in 2.2 provide memory information, but what if I told you there was a much nicer one...Free memory, these numbers are in megabytes how much total, used, free and swap memory do you have. Fill in this table with the totals – remember the swap partition we created!

# free -m

|  |  |
| --- | --- |
| Total Memory |  |
| Total Swap |  |
| Free Memory |  |
| Free Swap |  |
| Buff/Cache |  |

2.4 top (table of processes) shows CPU information and ps -ef shows the current processes running on the machine. Investigate the systemd process and fill this table out:

# top

# ps -ef

|  |  |
| --- | --- |
| Systemd PID (process id) |  |
| Systemd %CPU |  |
| Systemd %MEM |  |
| Systemd USER |  |

## Part 3: vi vi vi – the editor of champions

3.1 cd to /home/USERNAME (If you want to find your username type whoami)

Make a shopping list in vi with 4 items:

for example, type:

# vi shopping\_list (then press i to go into insert mode)

Enter the following items into the list:

apples

pears

oranges

curly wurly

3.2 Sort the shopping list into alphabetical order (hint – part 1?)

3.3 Use these instructions to complete the task below, looks like a poem:

*Position the cursor where you want to begin cutting.*

*Press v to select characters (or uppercase V to select whole lines).*

*Move the cursor to the end of what you want to cut.*

*Press d to cut (or y to copy).*

*Move to where you would like to paste.*

*Press P to paste before the cursor, or p to paste after*

3.4 Using cut and paste (mark/yank in vi) edit the shopping list with vi and move the top item to the bottom and the bottom item to the top using the instructions above, once you have cut and pasted fill out this table:

|  |  |
| --- | --- |
| **vi Command** | **Key used in NORMAL (ESC) mode** |
| Select from the cursor |  |
| Select the whole line from the cursor |  |
| Cut |  |
| Copy |  |

## Part 4: HTML Hosting – Make sure Apache is running

4.1 su to root and then cd to /var/www/html, list out the contents of this directory, which file is located here?

4.2 Now make a simple page called index2.html in this directory, here is an example of a simple page:

<!DOCTYPE html>

<head>

<title>My Web Page!</title>

</head>

<body bgcolor="red">

<h1>My Test Page</h1>

</body>

</html>

Navigate to your new test page by browsing to your ip address/index2.html, feel free to change the colour from red to another simple colour or a hex code, remember to refresh the page to see any changes – note if you change a style sheet you have to CTRL+F5 to reflect this. Add a screenshot of the page loaded here:

## Part 5: Groff (GNU Troff)



When we enter man and then a program as the first argument we and see the man page, man pages are made with Groff, GNU Troff – install Groff onto the system, if it is not already installed.

# apt install groff -y

# groff /usr/share/man/man1/ls.1.gz | less

This is showing the output in post script (the language printers speak). Groff uses a markdown syntax to compile this post script into md files - or other formats.

The markdown syntax is always at the start of the line.

5.1 Create the following file:

# vi myfile

.TL

My Document Title

.AU

My Name

.AU

EC-STUDENTNUMBER

.AI

Edinburgh College

.SH

.bp

.bp

Introduction

5.2 Now Groff the file, can you see the postscript, a very large amount is required for such a small file.

# groff myfile

Now lets compile your file to a pdf and move it to the web server

# groff -ms -T pdf myfile > myfile.pdf

# cp myfile.pdf /var/www/html/

Navigate to localhost/myfile.pdf in Firefox, you should see your file there, add a screenshot of your file on the web server here:

5.3 Lets add some other content to the file, vi myfile and add these lines, your file file should look like this.

.TL

My Document Title

.AU

My Name

.AU

EC-STUDENTNUMBER

.AI

Edinburgh College

.SH

.bp

.bp

Introduction

.LP

This is my first paragraph.

.B bold ). (

.SH

First Section

.LP

This is my 2nd paragraph

.br

.CW

This is an example of a code insert in a monospaced font

5.4 Write quit vi then press up to get your compile command back, then press up until you get your cp command back, you should see the updated file, add a screenshot of your updated file displayed in the browser here:

5.5 Now use groff but set the -T flag to html instead of pdf and create an html page from myfile. If you see the page, **well done**. Add a screenshot here:

5.6 What command did you use to compile the file to html, and which command did you use to copy it to the web root.

Groff Command\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Copy Command\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_