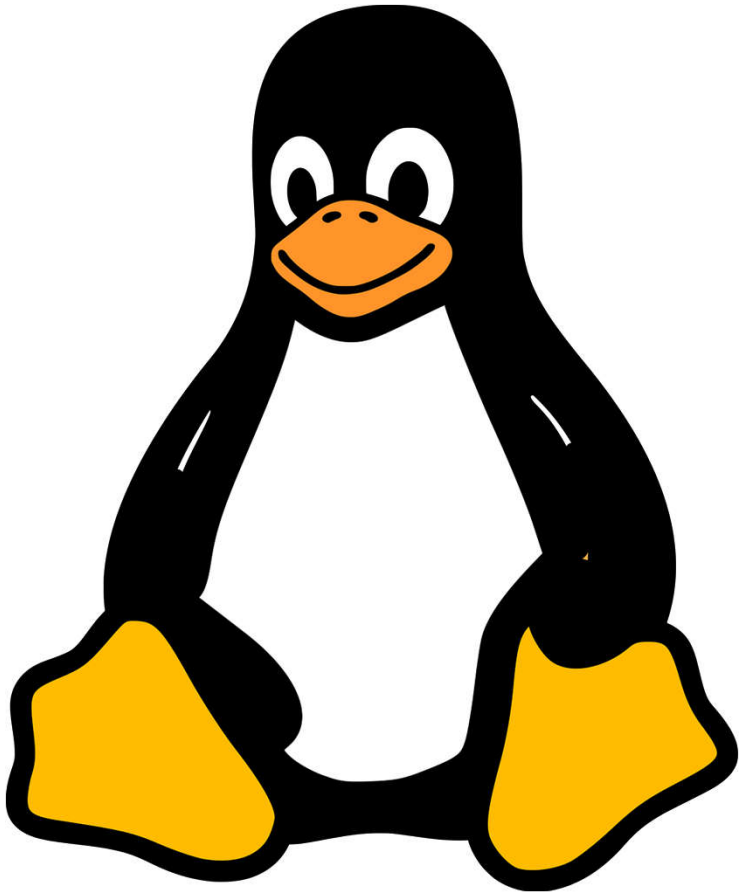
Introduction to Linux Operating System

Harvesting, Storing, and Retrieving Data

What is an Operating System (OS)

The most crucial program that runs on a computer is the operating system. It controls the memory and operations of the computer, as well as all of its software and hardware. It also allows you to communicate with the computer even if you don't understand its language. A computer is useless without an operating system.



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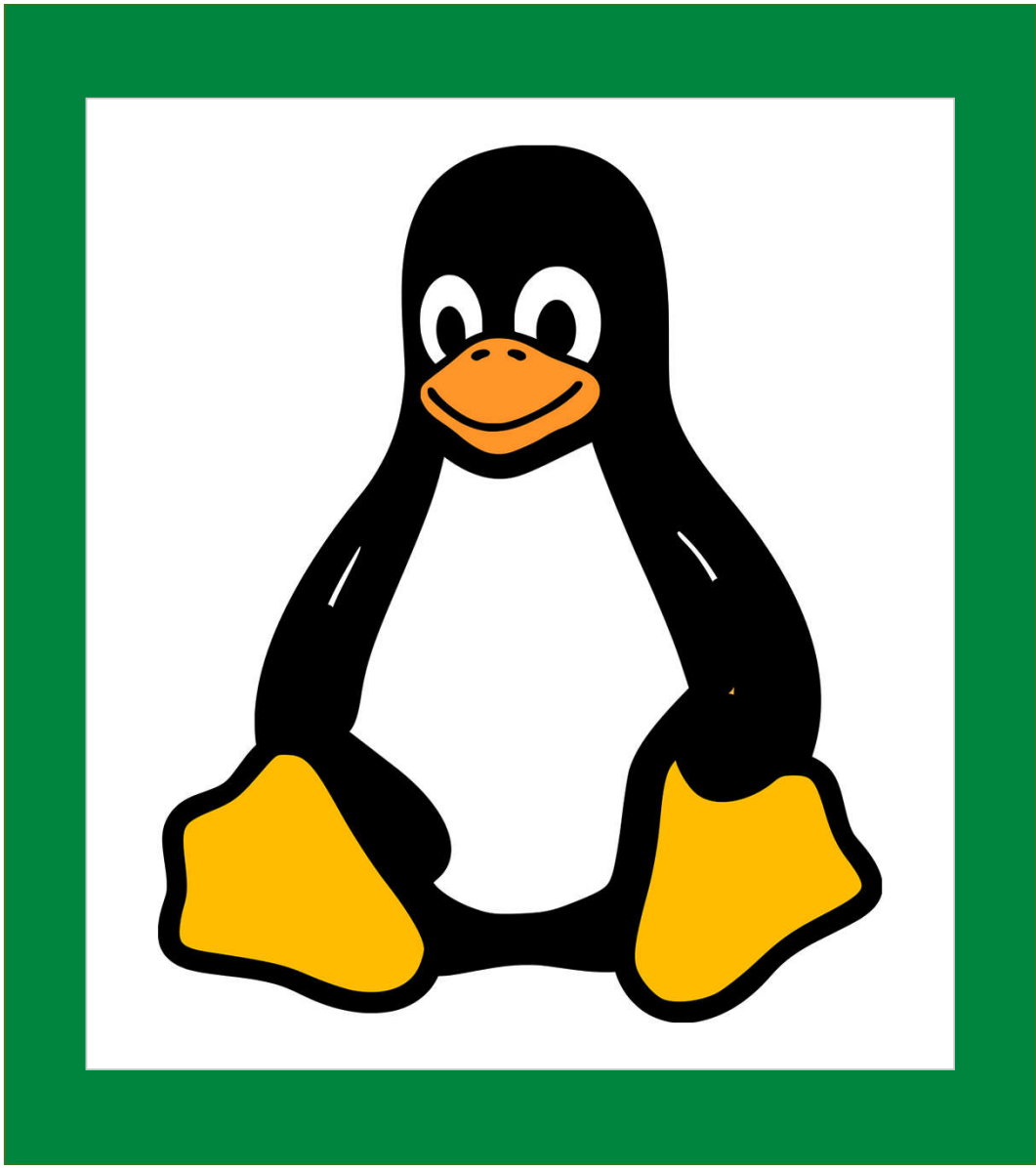
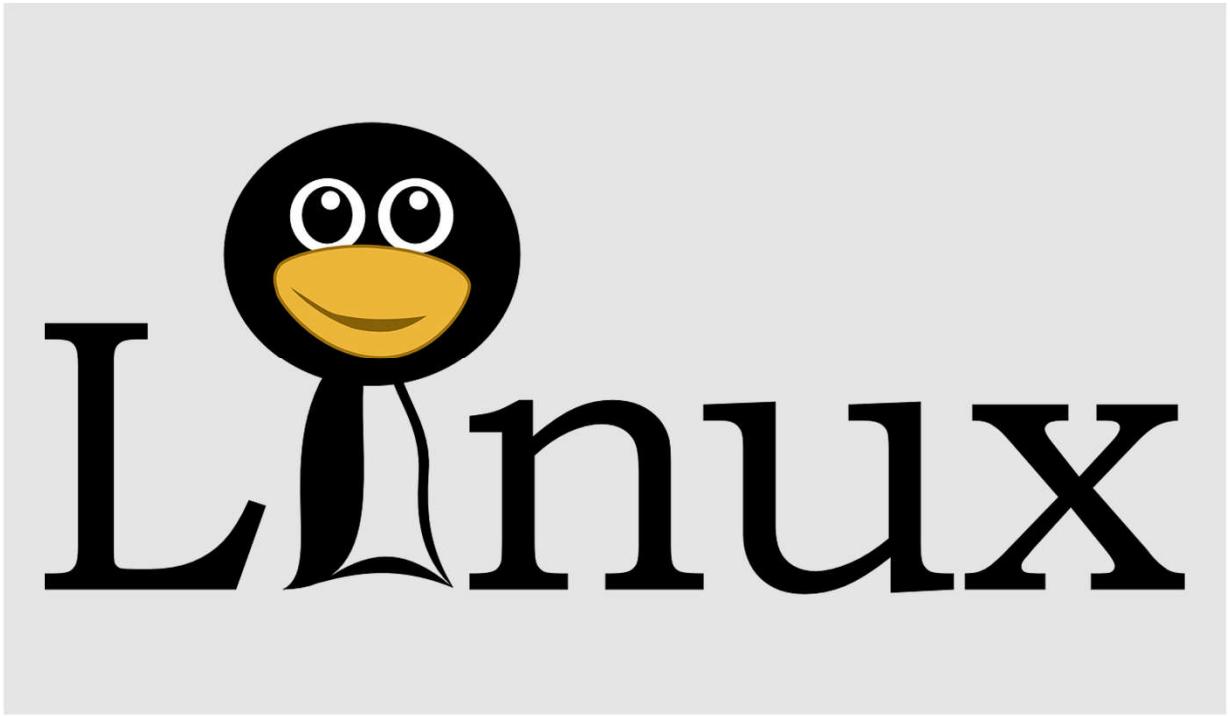
What is Linux

Linux (pronounced LINN-ux) is a group of open-source operating systems that anybody can modify and distribute all over the world. Unlike proprietary software such as Windows, which can only be modified by the corporation that owns it, open-source software can be modified by anybody. Linux has the advantages of being free and having a wide variety of distributions (or versions) to select from.

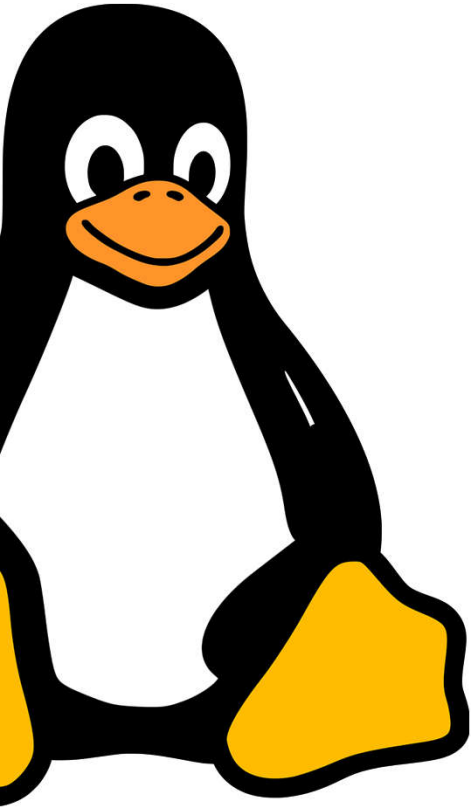


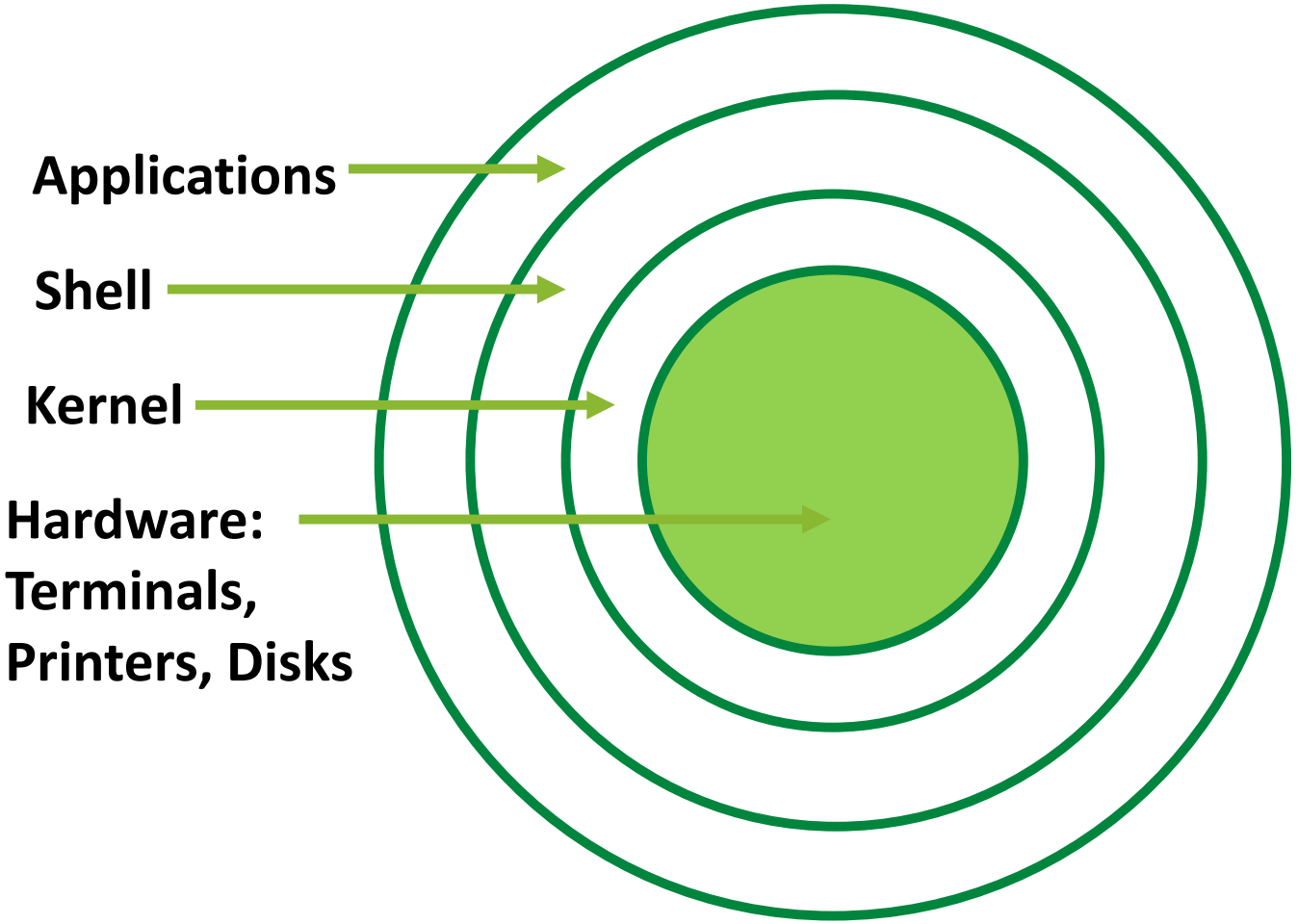


Why Should I Care about Linux

- High Security
- High Stability
- Ease of Maintenance
- Runs on any Hardware
- Free
- Open-source
- Easy to Use
- Customization
- Support

Simplified Architecture of Linux





Brief History of Linux

1970 — Unix rewritten which led to the creation of Linux.

1983 — Richard Stallman began a GNU project wanting to create a Unix-like OS

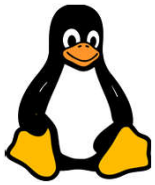
1991 — Linus Torvald began a project that was later known as the Linux Kernel.

1994 — Linux 1.0 was launched.

1996 — Linux Kernel version 2.0 was released, and the penguin was suggested to be the mascot.

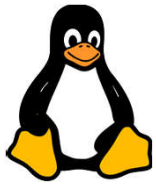
1999 — Linux Kernel version 2.2 released.

2021 — Latest release of version 5.14.



Role and Function of Linux

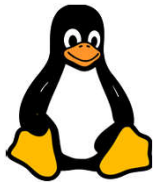
- Application Platform
- Hardware Moderator
- Data Storage
- Security
- Connectivity



Bash – the Linux shell

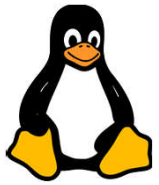
- BASH is a programming/scripting language
- BASH shell is the Linux equivalent of the Windows cmd
- BASH is a command processor that typically runs in a text window, where the user types commands that cause actions
- BASH runs script (Python, Perl, etc)

- The Golden Rule of BASH – when you do not know what a command does:
- Man stands for manual
  - man ls
  - man cd
  - nan grep



Exploring Remote Virtual Machine in the Cloud

- The remote virtual machine in the cloud has Linux as its installed OS.
- Linux Operating System: A multi-user computing system
- A multi-user operating system allows many different users to take advantage of the computer's resources simultaneously.
- The multi-user operating system must make sure:
  - The requirements of various users are balanced.
  - Each of the programs they are using has sufficient and separate resources so that a problem caused by one user does not affect the entire community of users.



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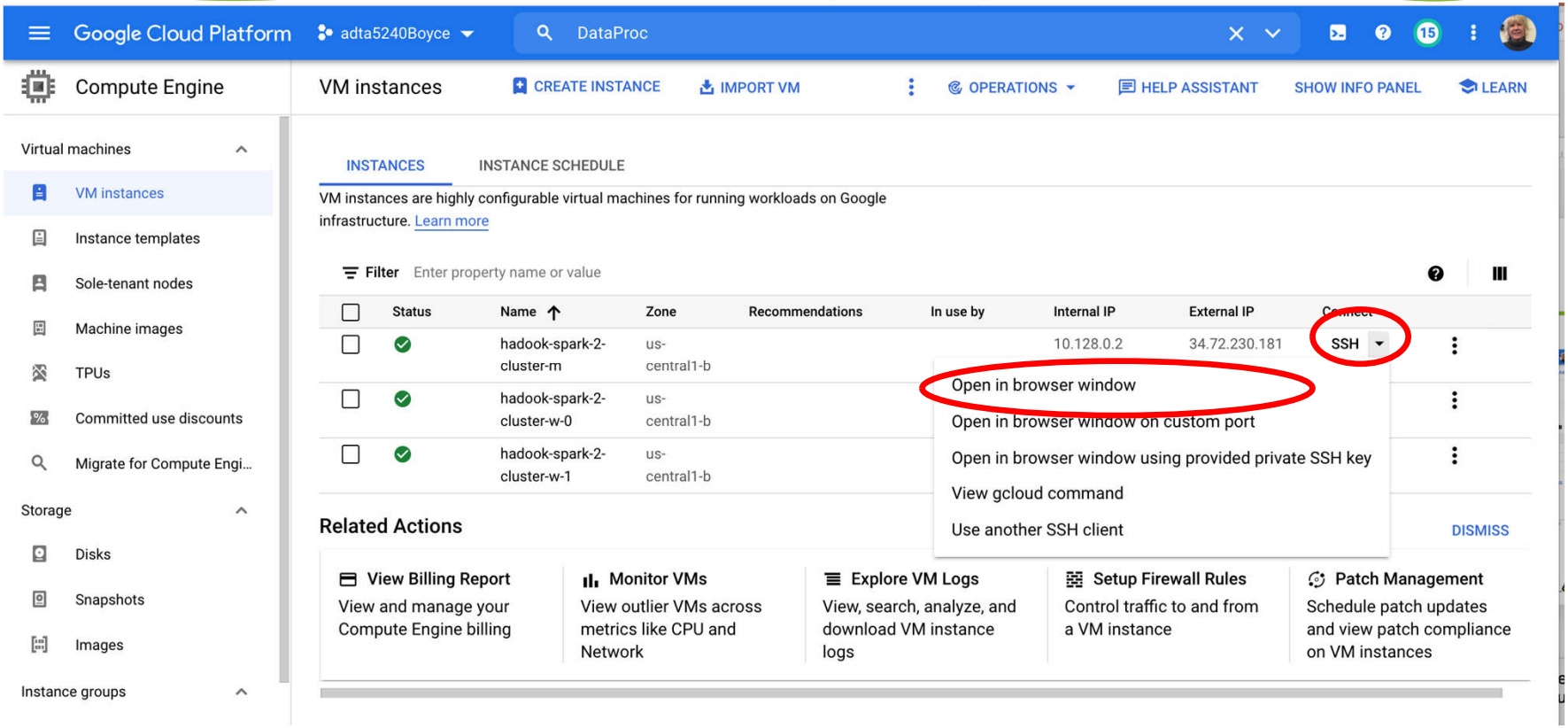

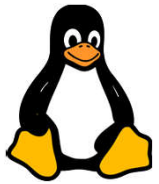

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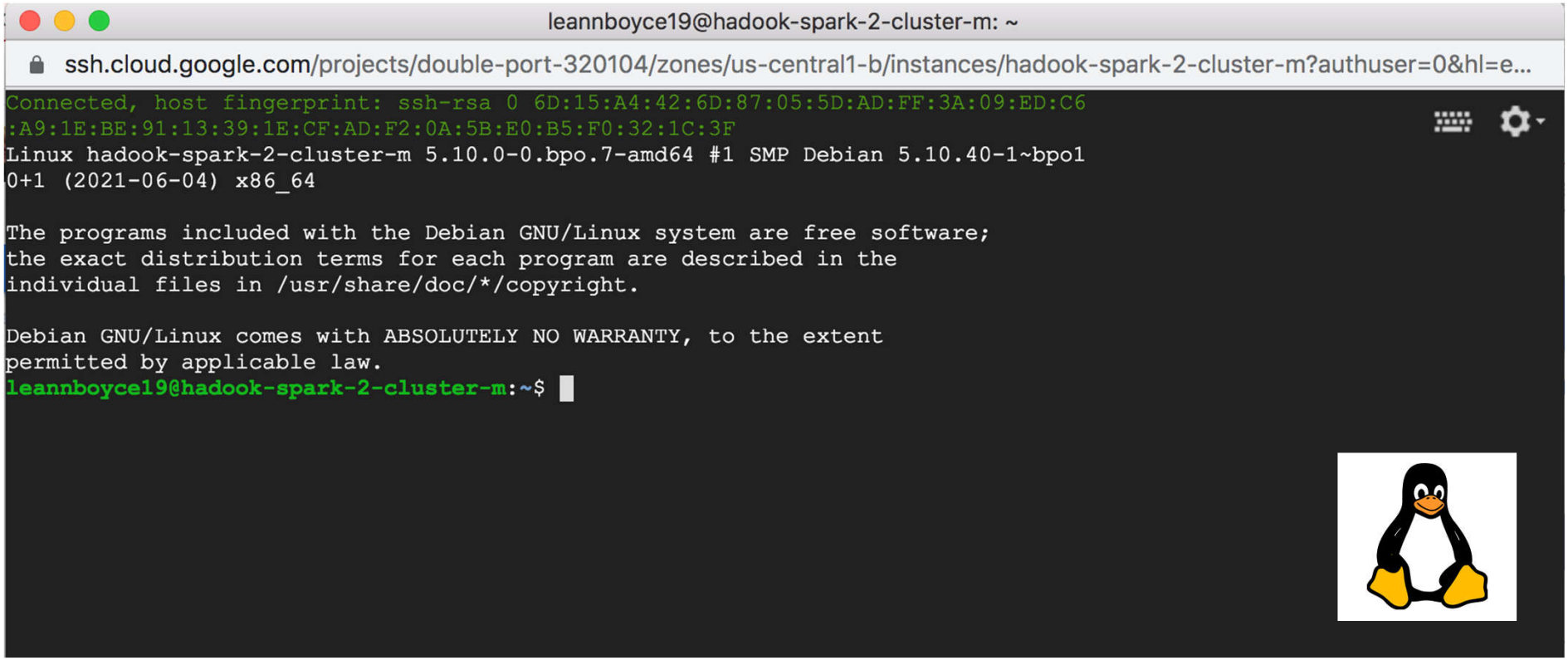
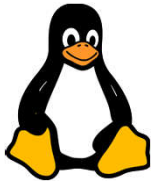
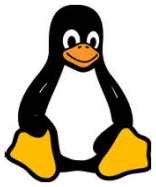




Exploring Remote Virtual Machine in the Cloud: Two users in Linux System

- "**root**" is the **super-user in** a Linux system
- "**root**" is the first user created during the process of installing a Linux OS.
- Most administration tasks, such as adding new users or managing file systems, are required to be done with the privilege of the "root" user.
- "**root**" has unlimited powers and can do anything on the system.
- The "**root**" account: Is also known as the "super-user" account



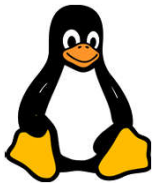
Exploring Remote Virtual Machine in the Cloud

- "**User**": The normal user in the Linux system
- Based on the permission modes set for a folder, a **normal user**:
- May or may not access (read) the contents
- May or may not change (write) the contents
- May or may not execute the executable contents
- Based on the permission set for a file, a normal user:
- May or may not access (read) the contents of the file
- May or may not change (write) the contents of the file
- May or may not execute the file if it is an executable one
- To find out the permission modes of a directory/folder or a file::
  - Use the command line: "**ls -l**<directory/file name>

Exploring Remote Virtual Machine in the Cloud

Permission	Description
Owner	Permission used by the assigned owner of the file or directory
Group	Permissions used by members of the group that owns the file or directory
Other	Permissions used by all users other than the file owner, and members of the group that owns the file or the directory

Permission	Access for a file	Access for a directory
Read	You can display file contents and copy the file.	You can list the directory contents with the ls command.
Write	You can modify the file contents.	You can modify the contents of a directory, such as by deleting a file. You must also have the execute permission for this to happen.
Execute	You can execute the file if it is an executable. You can execute a shell script if you also have read and execute permissions.	You can use the cd command to access the directory. If you also have read access, you can run the ls l command on the directory to list contents. If you do not have read access, you can run the ls command as long as you know the file name.



Exploring Remote Virtual Machine in the Cloud

-rw-r—r— 1 root root 0 July 19 23:49 file

Owner (r--)

Group (r--)

Owner (rw-)

File type

Permission Type

r = Readable

w = Writeable

x = Executable

- = Denied

Exploring Remote Virtual Machine in the Cloud

Few Basic Linux Command Lines

whoami :

- **Display the username of the current user**

pwd:

- **Print working directory: Display the full path of the current working directory**

cd<sub directory name> name>:

- **Change directory (forward) to a sub folder**

cd<full path of a directory>:

- **Change directory to the folder of which the full path is specified**

cd...:

- **Change directory (backward) to the folder that is immediately one level before this one**
- **NOTES : cd ..” is the real command line to go a folder**.

Exploring Remote Virtual Machine in the Cloud

Few Basic Linux Command Lines

mkdir<a directory name>:

- Create a new directory

rmdir<a directory name> :

- Delete a directory if it is empty

rm<a file name>:

- Delete a file

rm-rf<a directory name>:

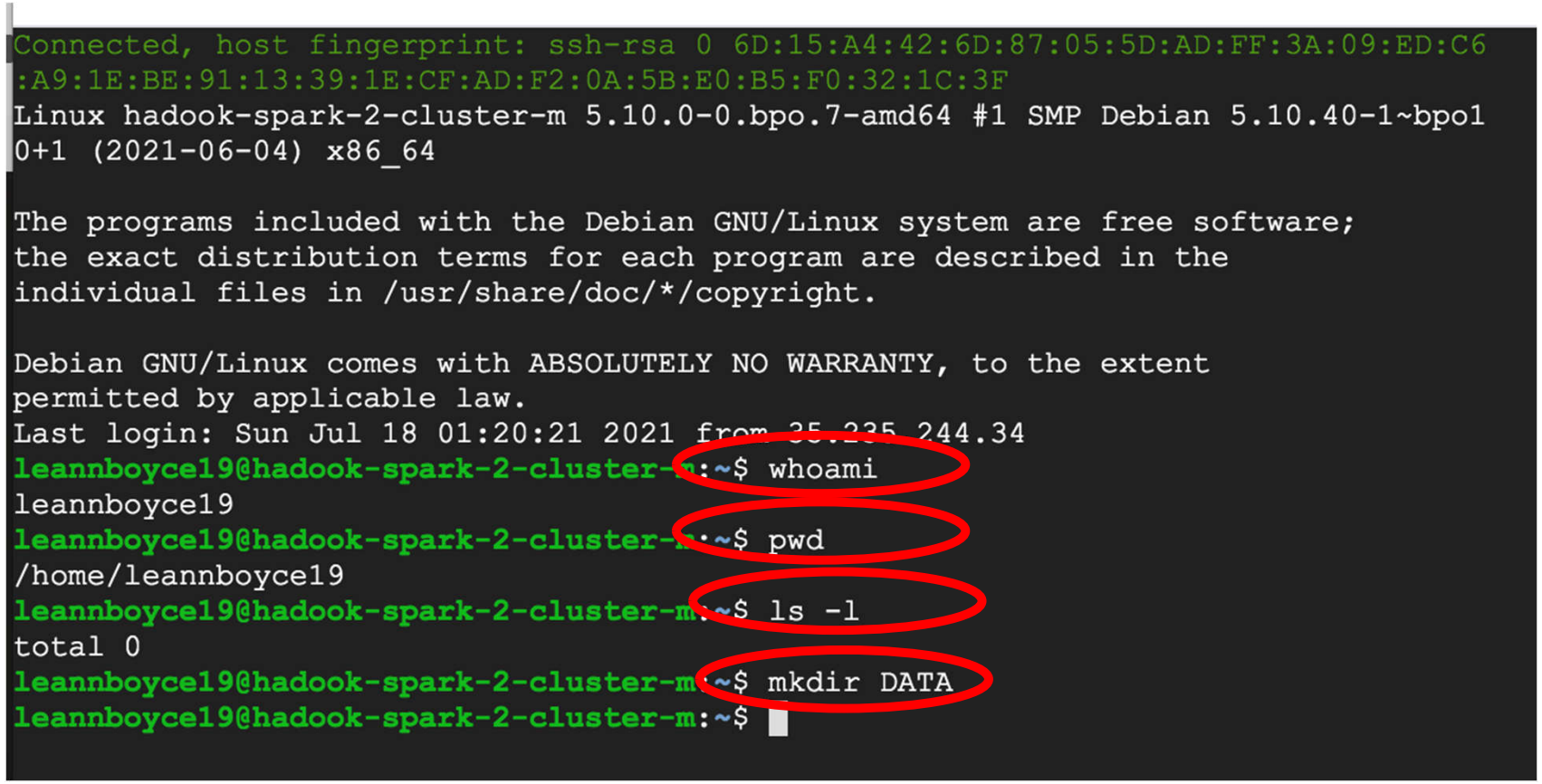
- Delete all the files and sub-directories of a directory

rm*.txt:

- Delete all the text files with the suffix .txt

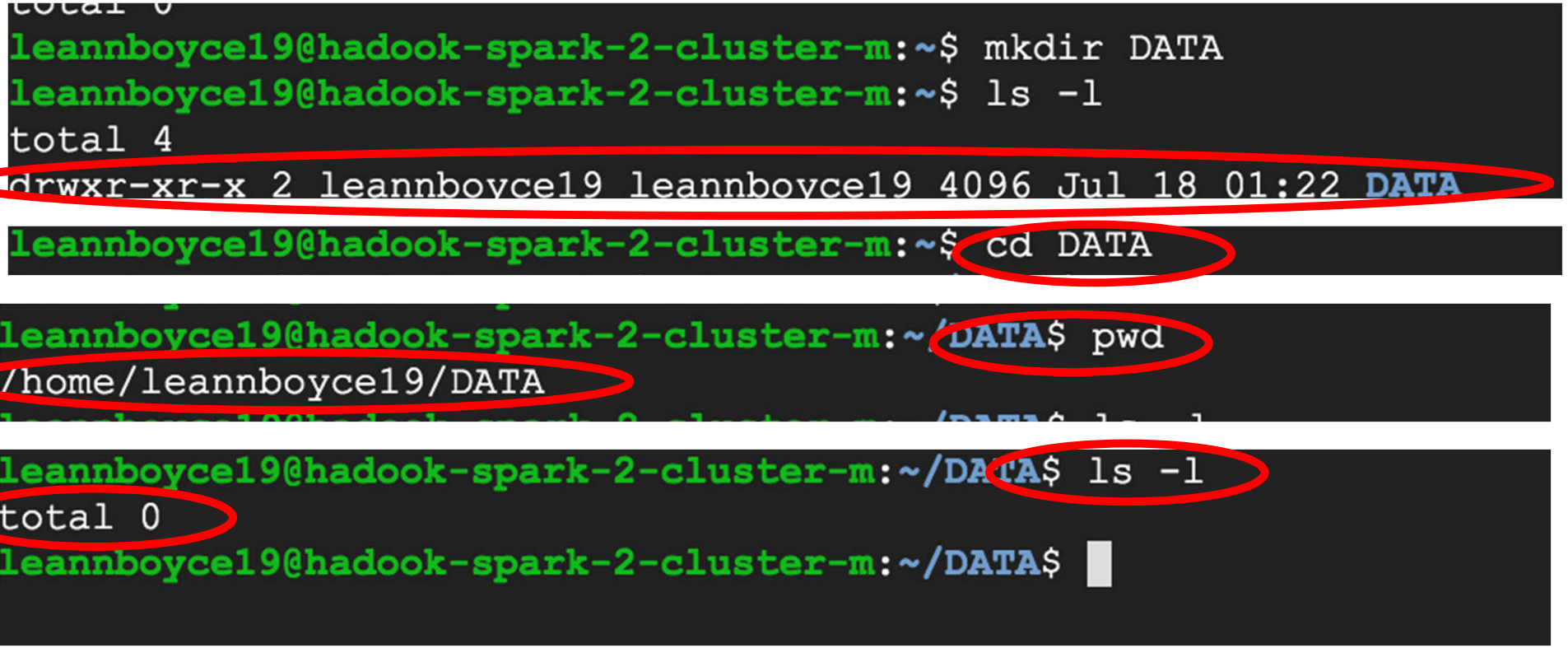
Exploring Remote Virtual Machine in the Cloud

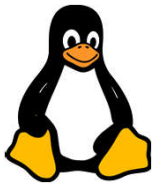
Linux command line to explore remote server



Exploring Remote Virtual Machine in the Cloud

Linux command line to explore remote server





Exploring Remote Virtual Machine in the Cloud

Don’t forget to turn off your clusters in GCP!!