

WORKSHOP:

Running a Virtual Machine in the Cloud

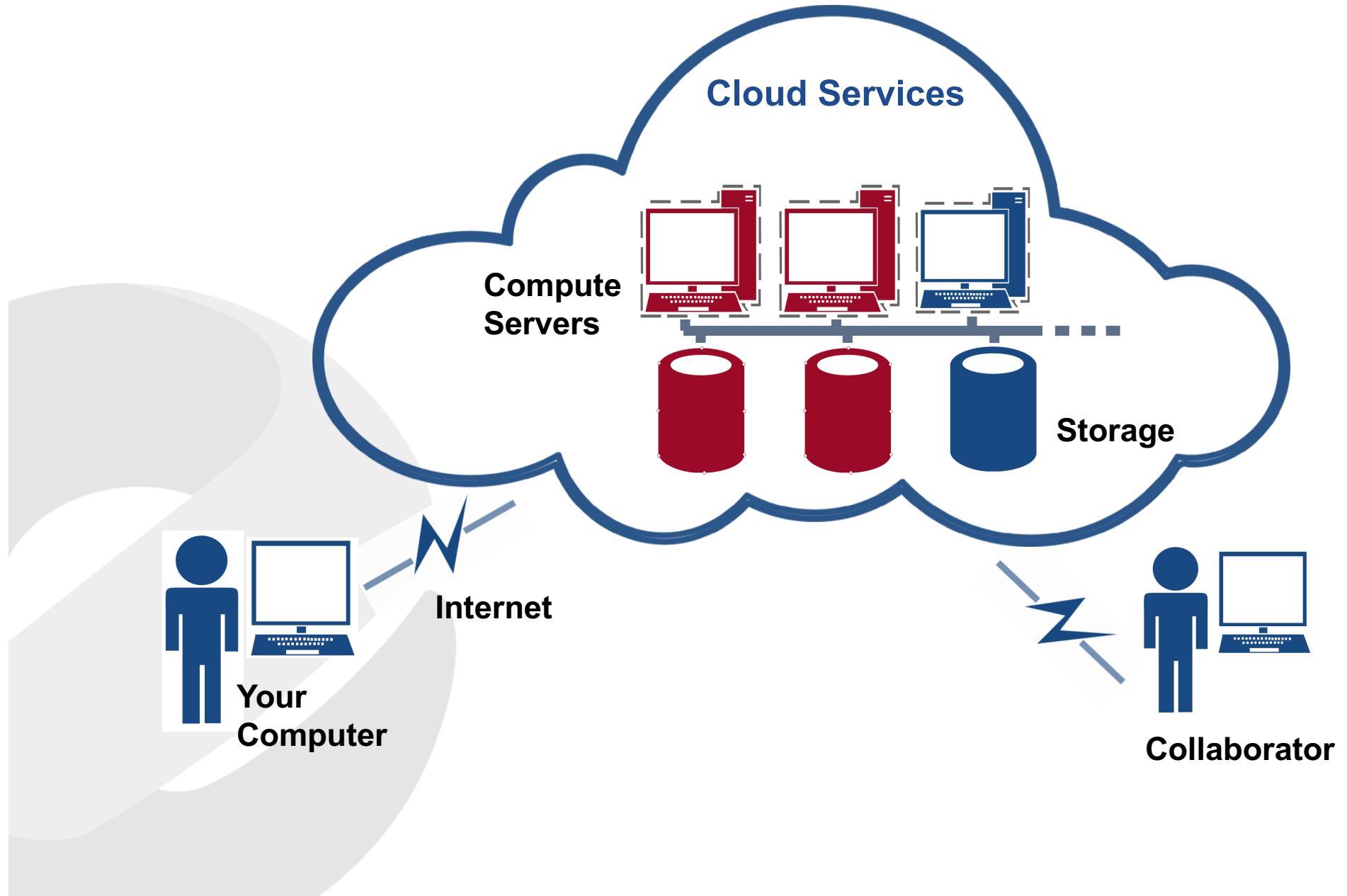


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WORKSHOP: Running a Virtual Machine in the Cloud

WHAT IS CLOUD COMPUTING?



Quick Google Search Definition

cloud computing

noun

the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.



Translations, word origin, and more definitions

Feedback

[Cloud computing - Wikipedia](#)

https://en.wikipedia.org/wiki/Cloud_computing ▾

Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand.

[Cloud computing providers](#) · [Cloud infrastructure](#) · [Economies of scale](#) · [Nimbus](#)

Quick Google Search Definition

NECTAR CLOUD

Your gateway to the global research community

Nectar Cloud provides flexible scalable computing power to all Australian researchers, with computing infrastructure, software and services that allow the research community to store, access and run data, remotely, rapidly and autonomously. Nectar Cloud self-service structure allows fast, efficient desktop access to data and a powerful platform for collaboration.

Let's brainstorm use case scenarios for the Australian research cloud....

- As an alternative to using your desktop computer
- As an alternative to setting up a server
- As an alternative to using a supercomputer/HPC system

When to use the Cloud

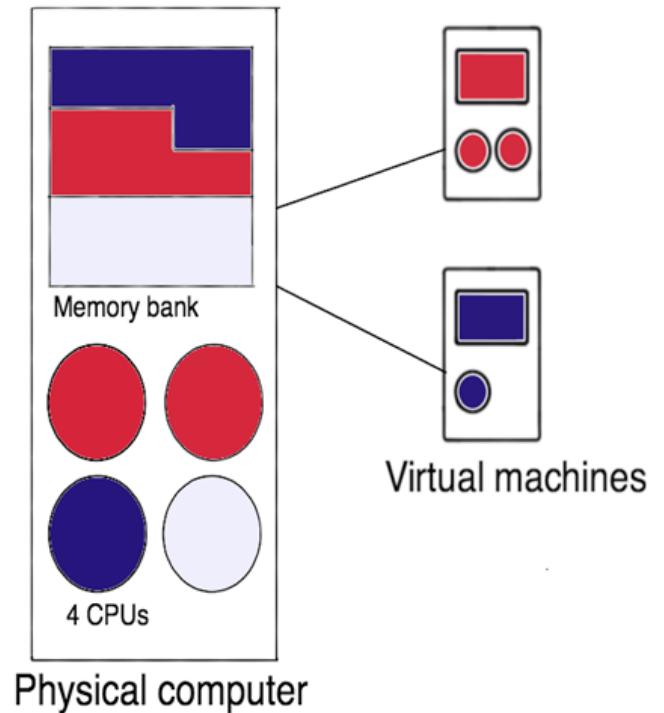
- You want **instant availability** of large-scale computing resources.
- Possibility of **software choice**: design virtual machines to suit your need, incl. choice of OS.
- The simple case: you need **easy access to computing infrastructure**.

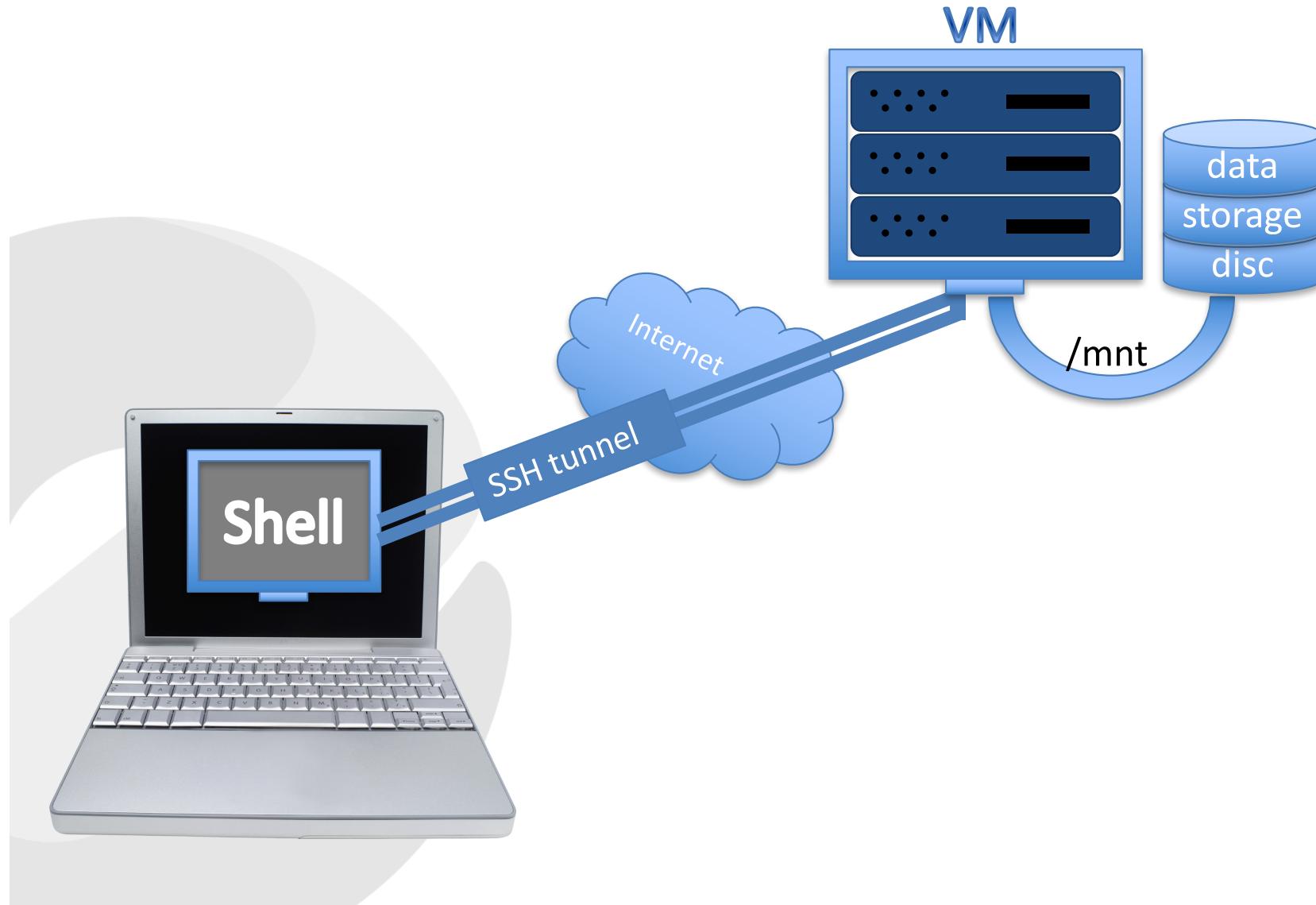
THE STRUCTURE OF THE VIRTUAL MACHINE

- Discs
- File Structure
- Users

Virtualization

- **Virtualization** basically means that the hardware is “simulated”.
- We can simulate a whole computer including the Operating System.
- Several virtual computers can run on one larger, more powerful computer







THE NECTAR DASHBOARD

Quick Google Search Definition

OpenStack

From Wikipedia, the free encyclopedia

OpenStack is a free and open-source software platform for cloud computing, mostly deployed as an infrastructure-as-a-service (IaaS).^[3] The software platform consists of interrelated components that control diverse, multi-vendor hardware pools of processing, storage, and networking resources throughout a data center. Users either manage it through a web-based dashboard, through command-line tools, or through a RESTful API. OpenStack.org released it under the terms of the Apache License.

Quick Google Search Definition

instance

/'inst(ə)ns/ 

noun

1. an example or single occurrence of something.

Instance - OpenStack terminology for a virtual machine.

Quick Openstack Definition

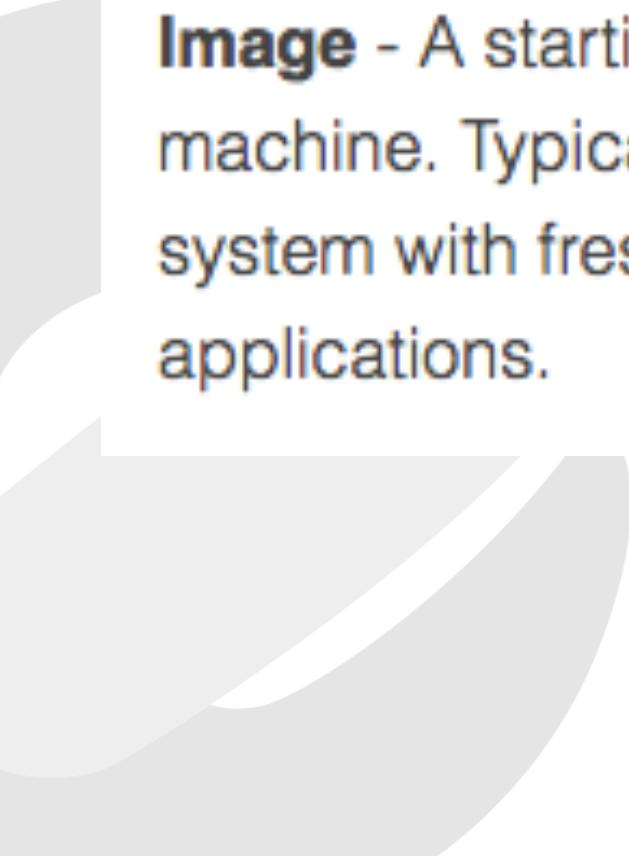


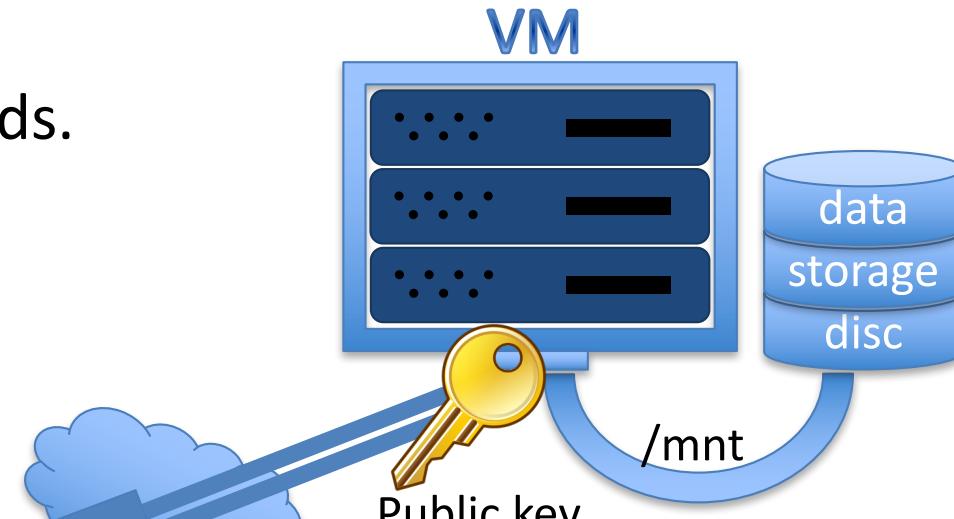
Image - A starting state for a new "clean" virtual machine. Typical consists of an image of a file system with freshly installed operating system and applications.

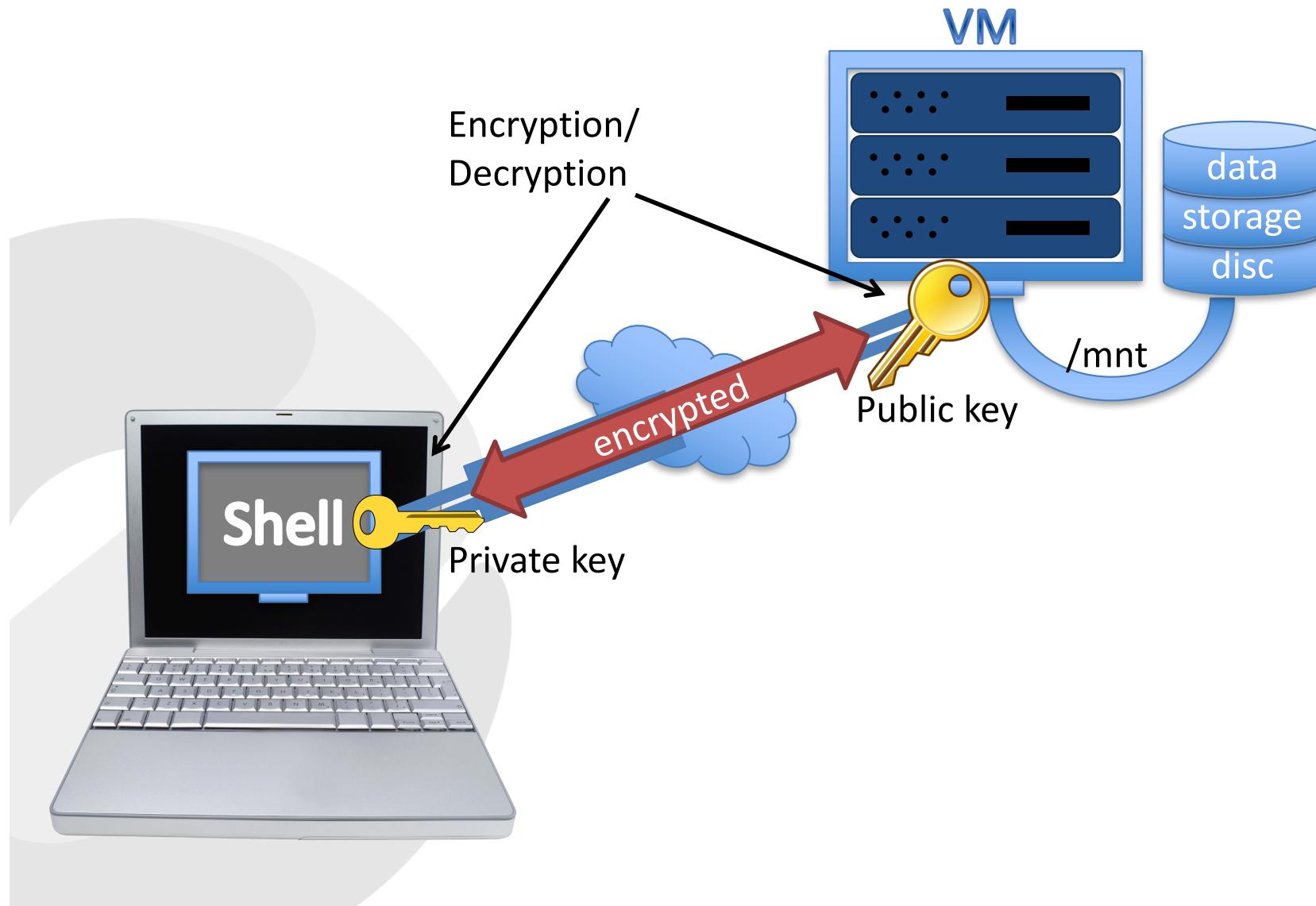
Access and Security tab



Key pairs and Security groups

Nectar uses “keypairs”
for authentication,
rather than passwords.





Quick Definition

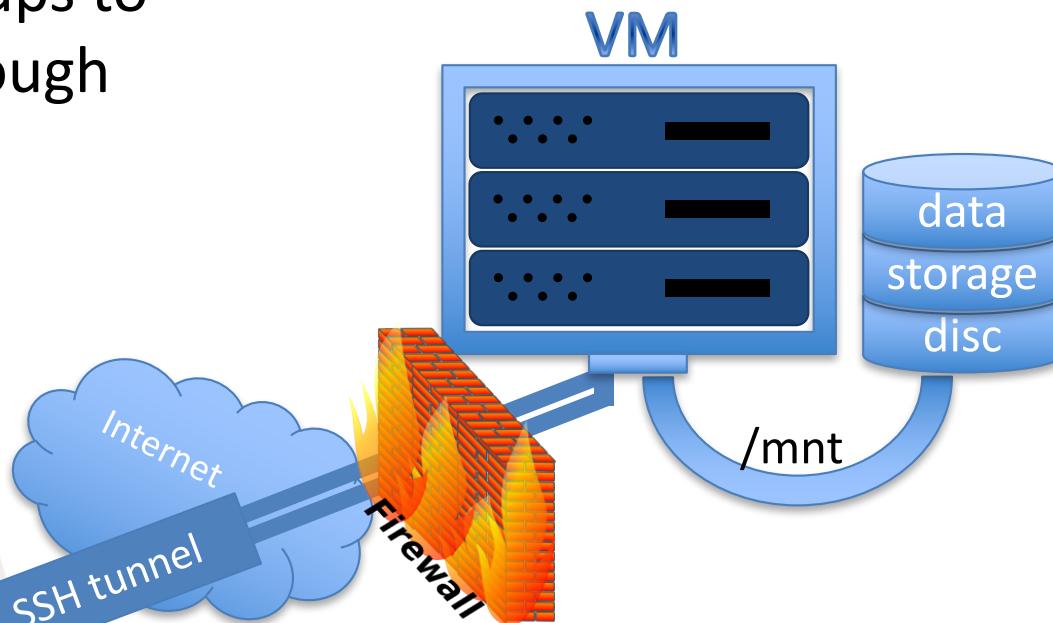
What is an SSH?



Secure Shell (**SSH**), sometimes known as Secure Socket Shell, is a UNIX-based command interface and protocol for securely getting access to a remote computer. It is widely used by network administrators to control Web and other kinds of servers remotely.

[What is Secure Shell \(SSH\)? - Definition from WhatIs.com](#)
searchsecurity.techtarget.com/definition/Secure-Shell

Use security groups to allow access through the firewall



Quick Definition

Firewall

Computing



In computing, a firewall is a network security system that monitors and controls the incoming and outgoing network traffic based on predetermined security rules. [Wikipedia](#)

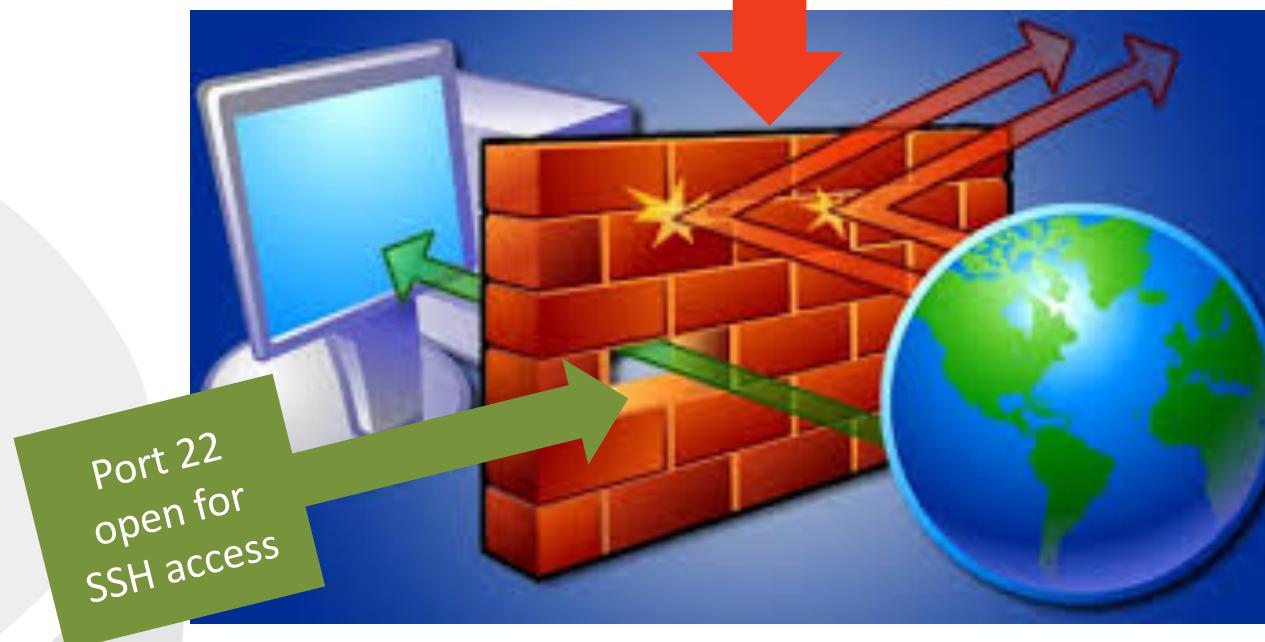
Quick Definition

Security Group - A set of **Access Rules** that may be applied to one or more instances.

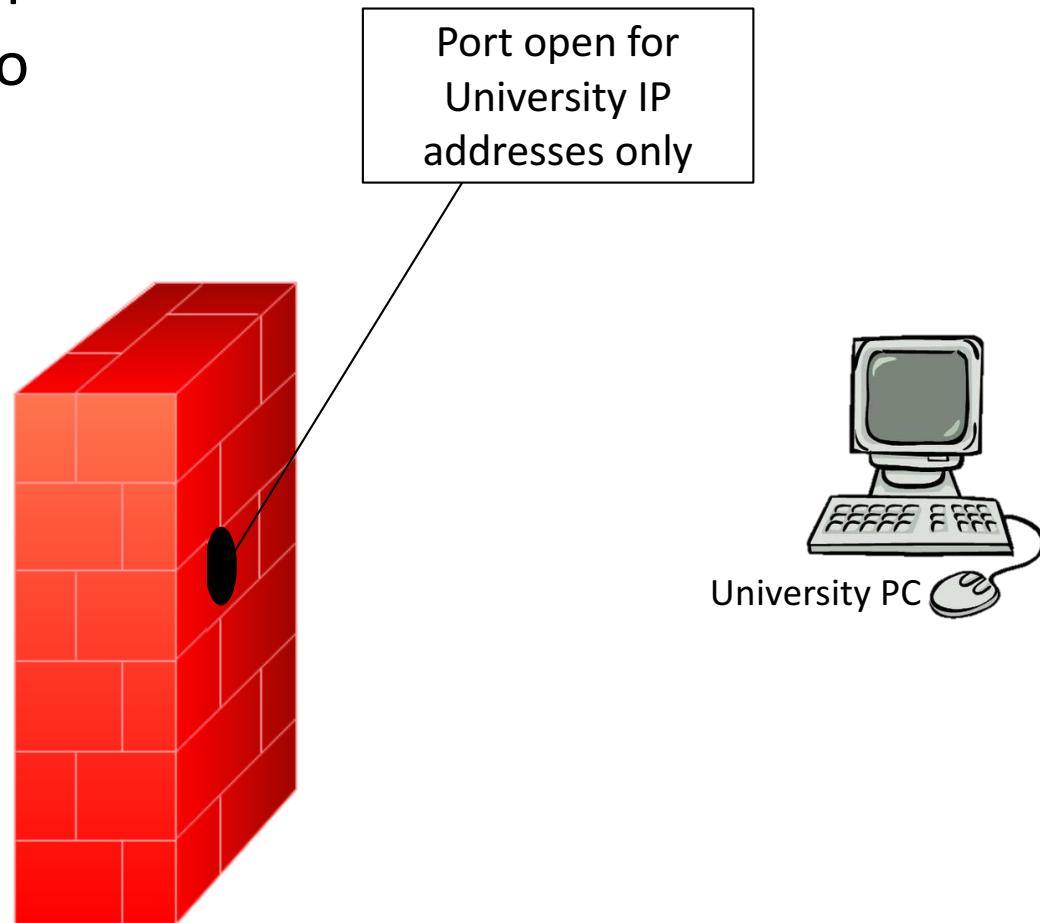
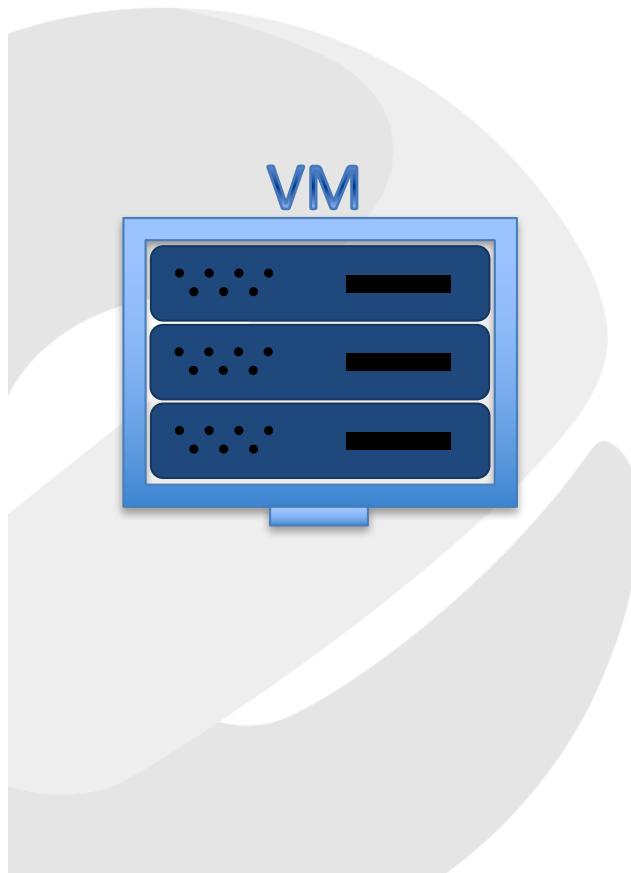
At NeCTAR by default the **Security Group** applied to new instances does not contain an access rule for **SSH**. Meaning that new users often find their new virtual machines inaccessible via SSH until they add the appropriate access rule.

Use security groups to allow access through the firewall

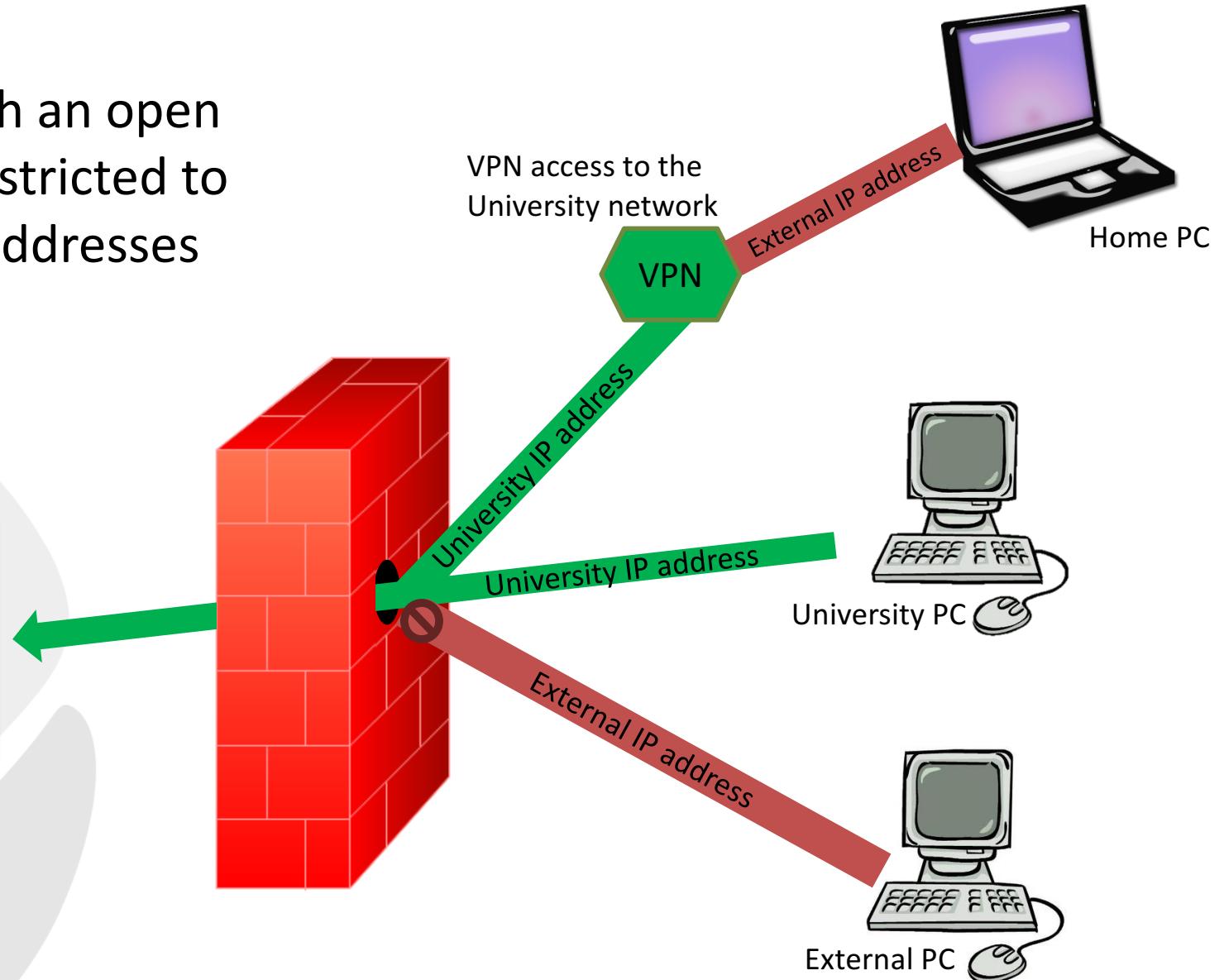
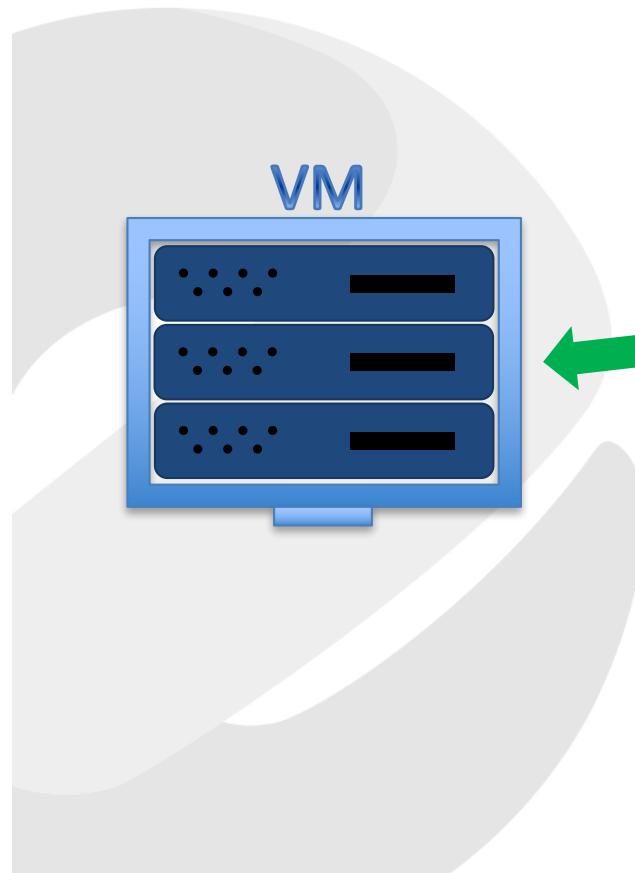
Other ports closed



Access through an open port can be restricted to a range of IP addresses



Access through an open port can be restricted to a range of IP addresses



Instances Tab

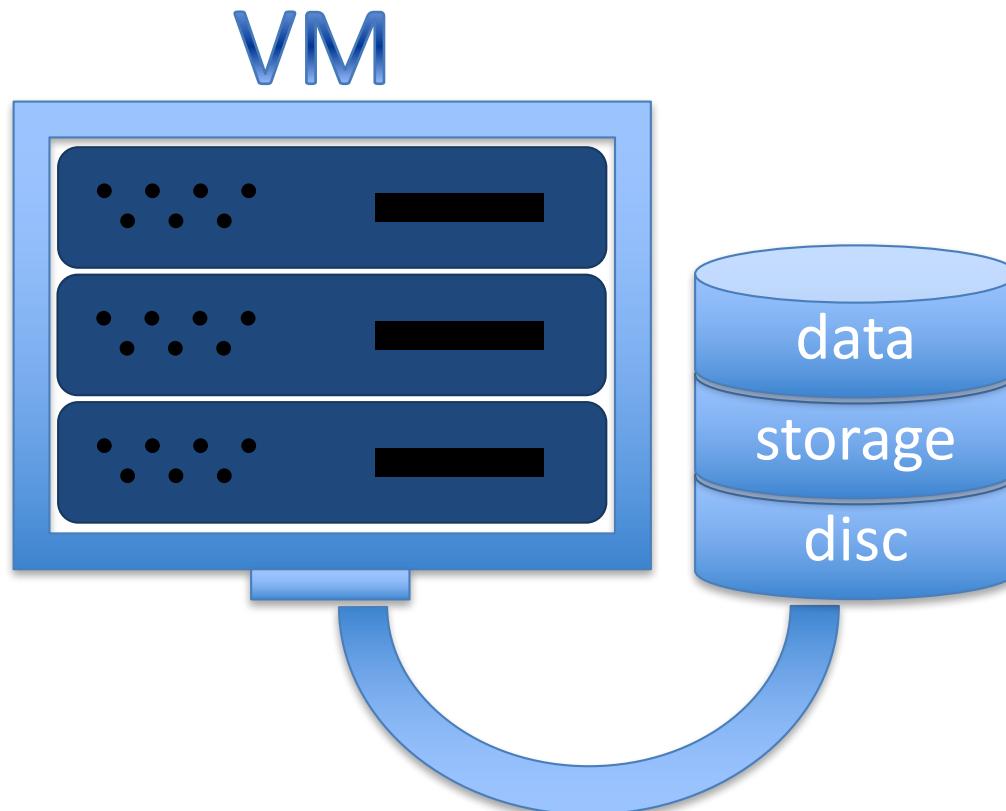


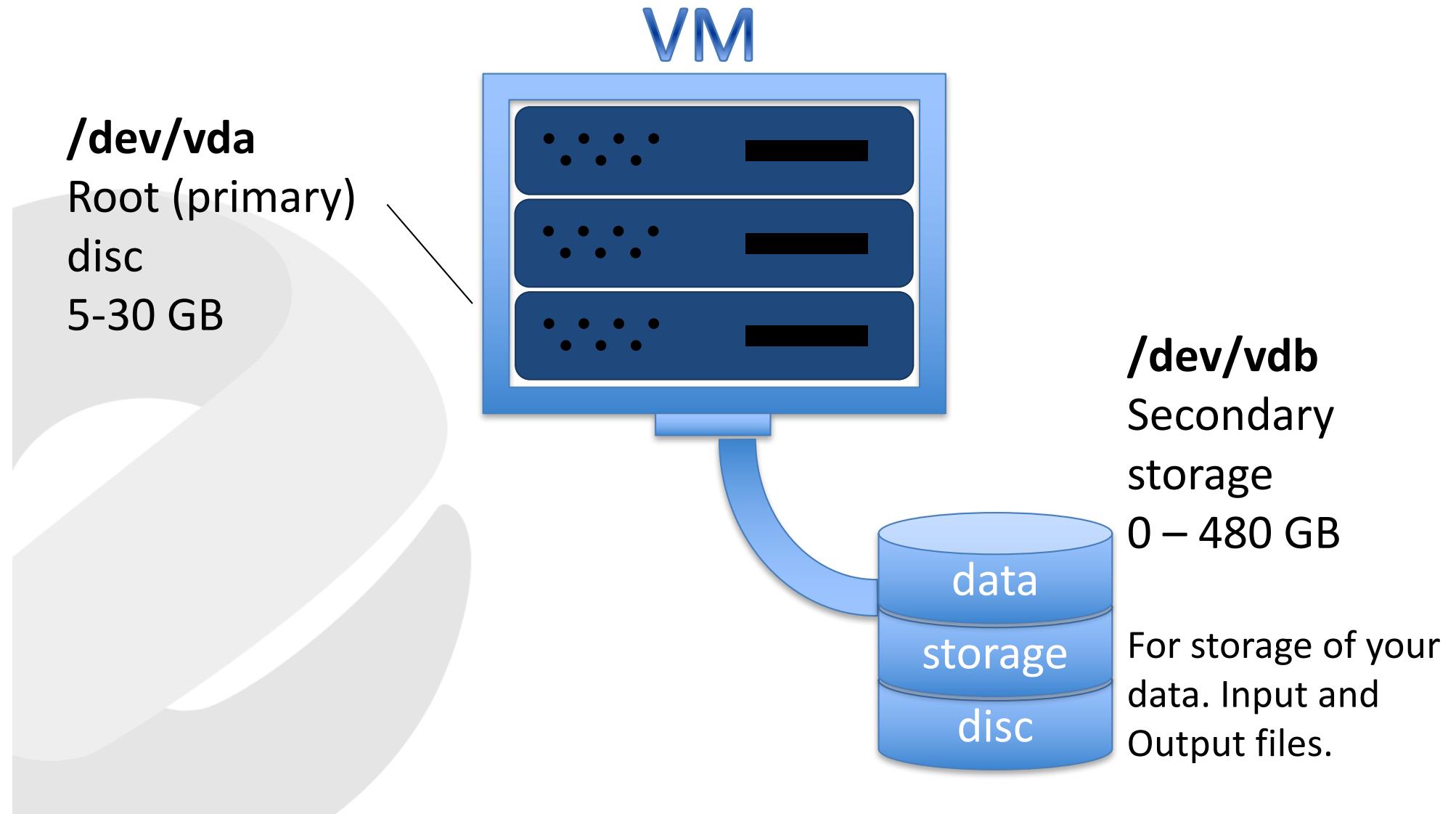
Design your Virtual Machine

Understand the Flavors

/dev/vda
Root disc
5-30 GB

For the operating
system and
software
applications





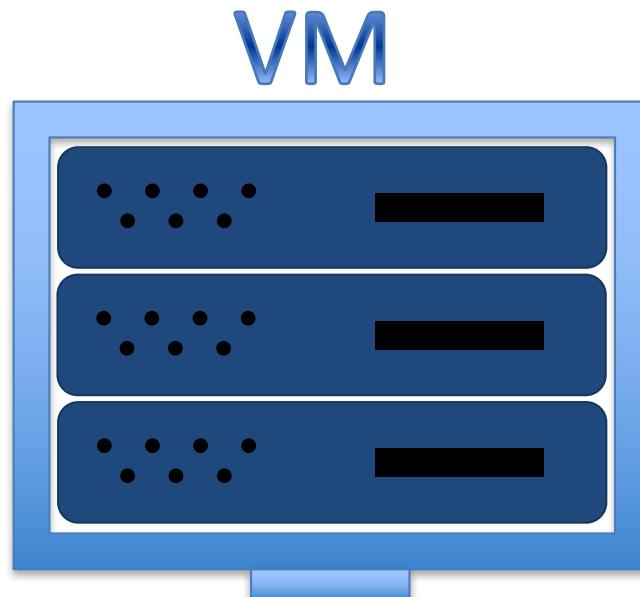
/dev/vdc

Volume storage

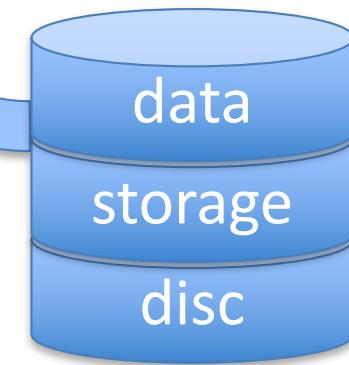
- available by allocation



/dev/vda
Root (primary) disc
5-30 GB



/mnt



/dev/vdb
Secondary storage
0 – 480 GB

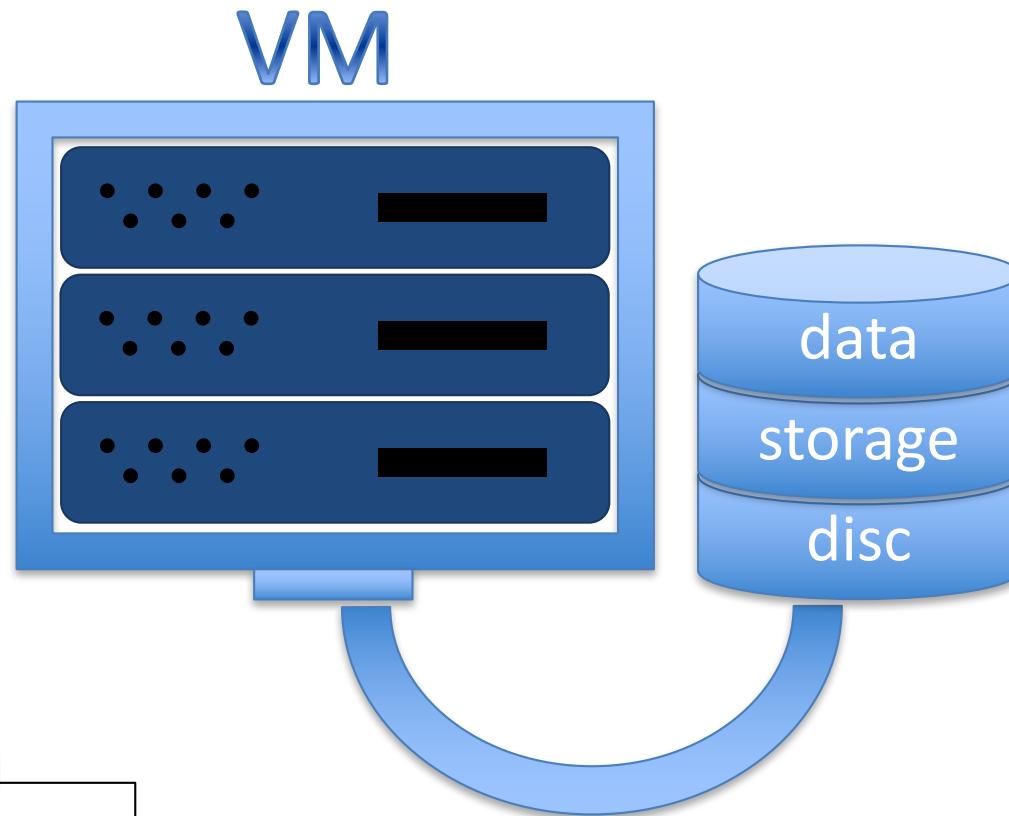
Investigating the File Structure on your VM

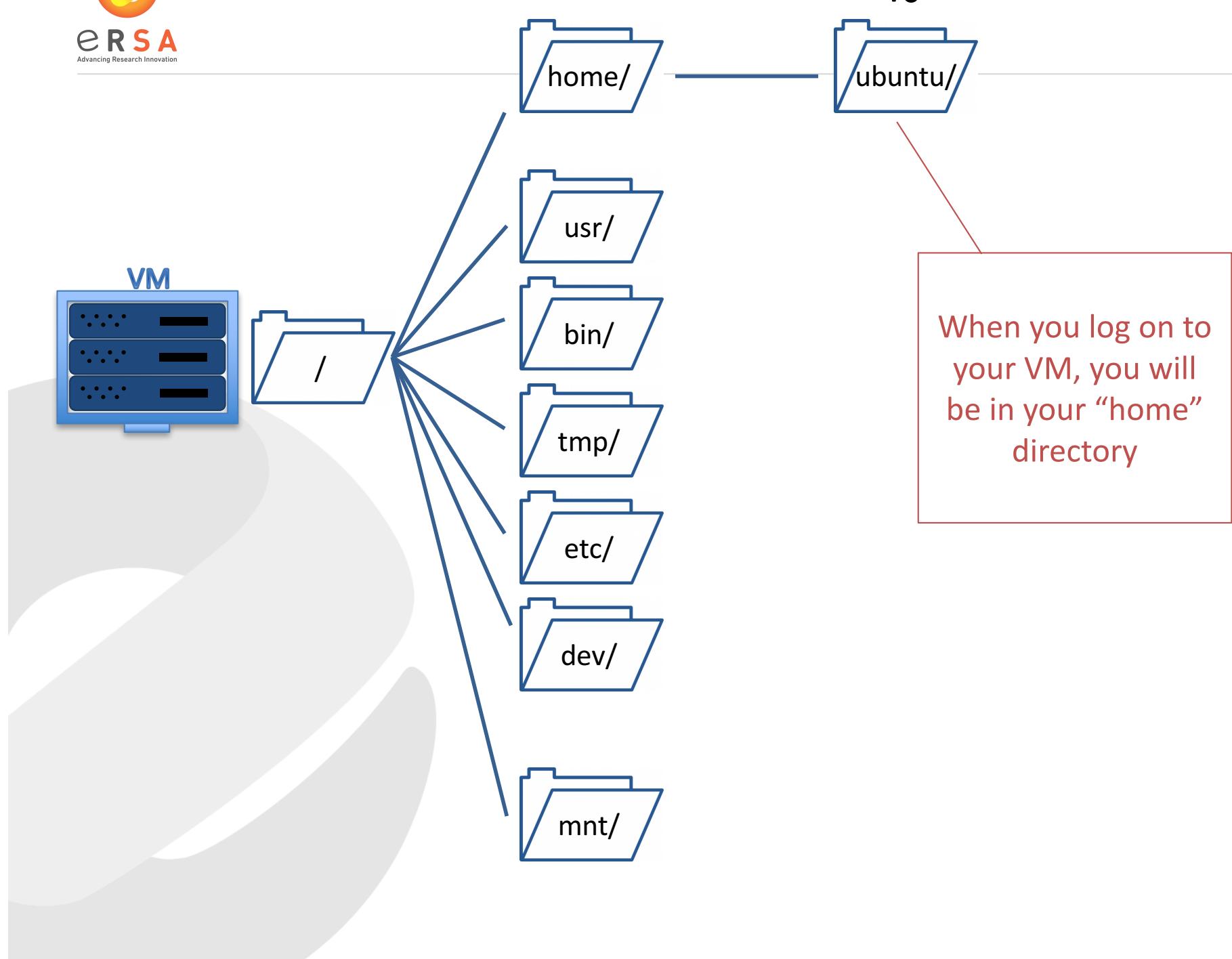
- Use Shell commands such as
 - ls -lah
 - df -hT
 - lsblk
 - pwd
- Use FileZilla to navigate through files with a GUI

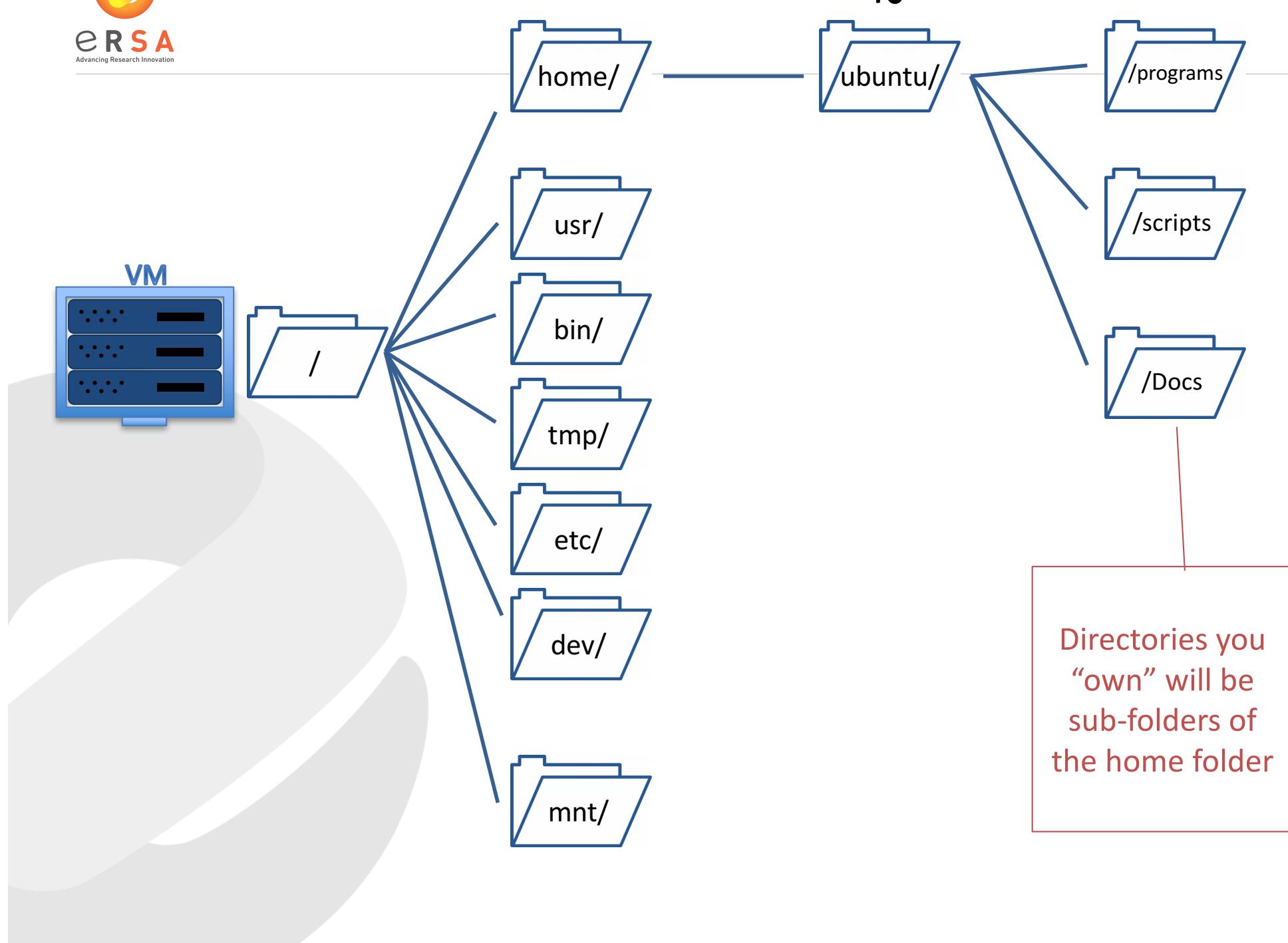
/dev/vda
Root disc
5-30 GB

For the operating system and software applications

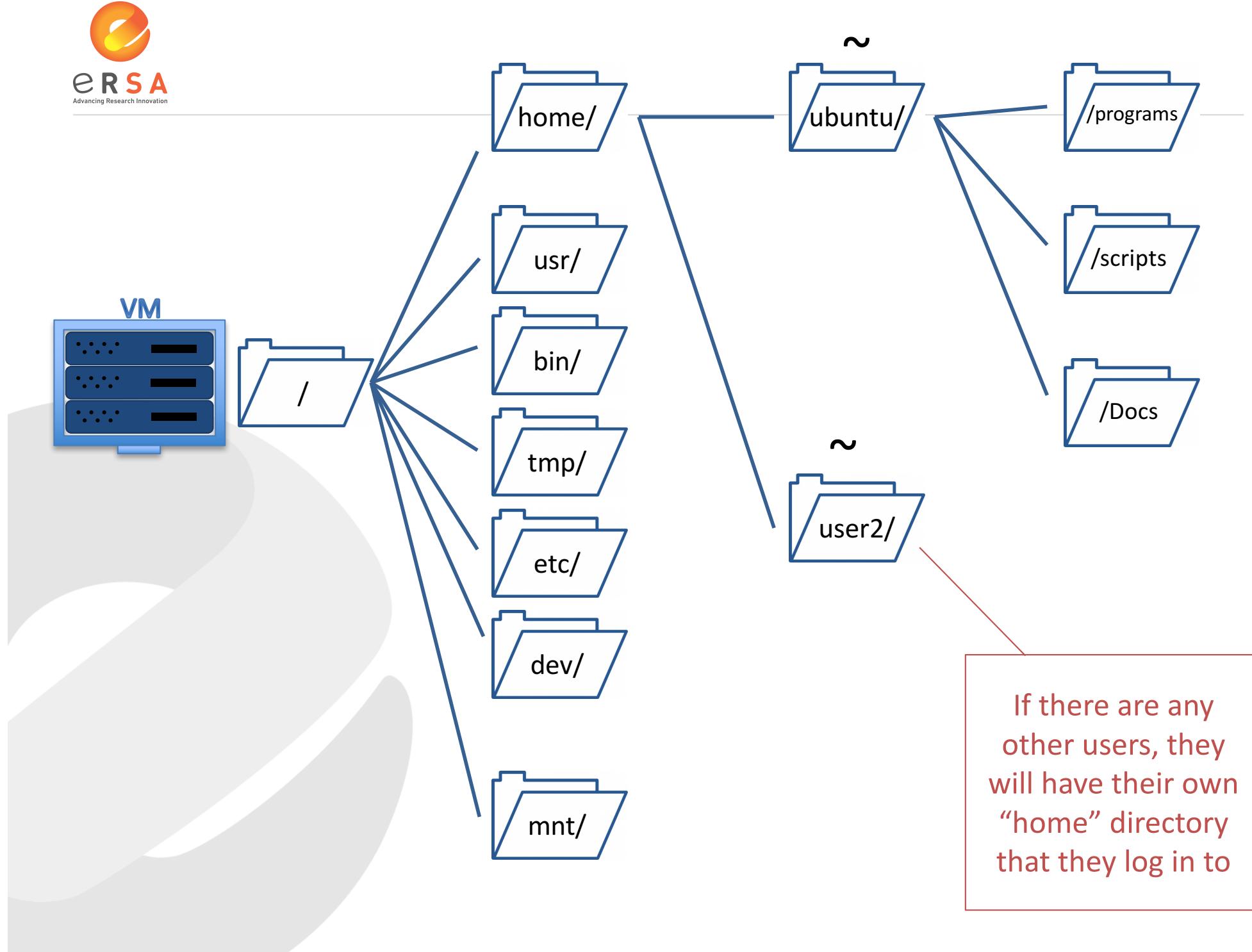
/ Root Directory
Includes user directories (\$HOME directories)



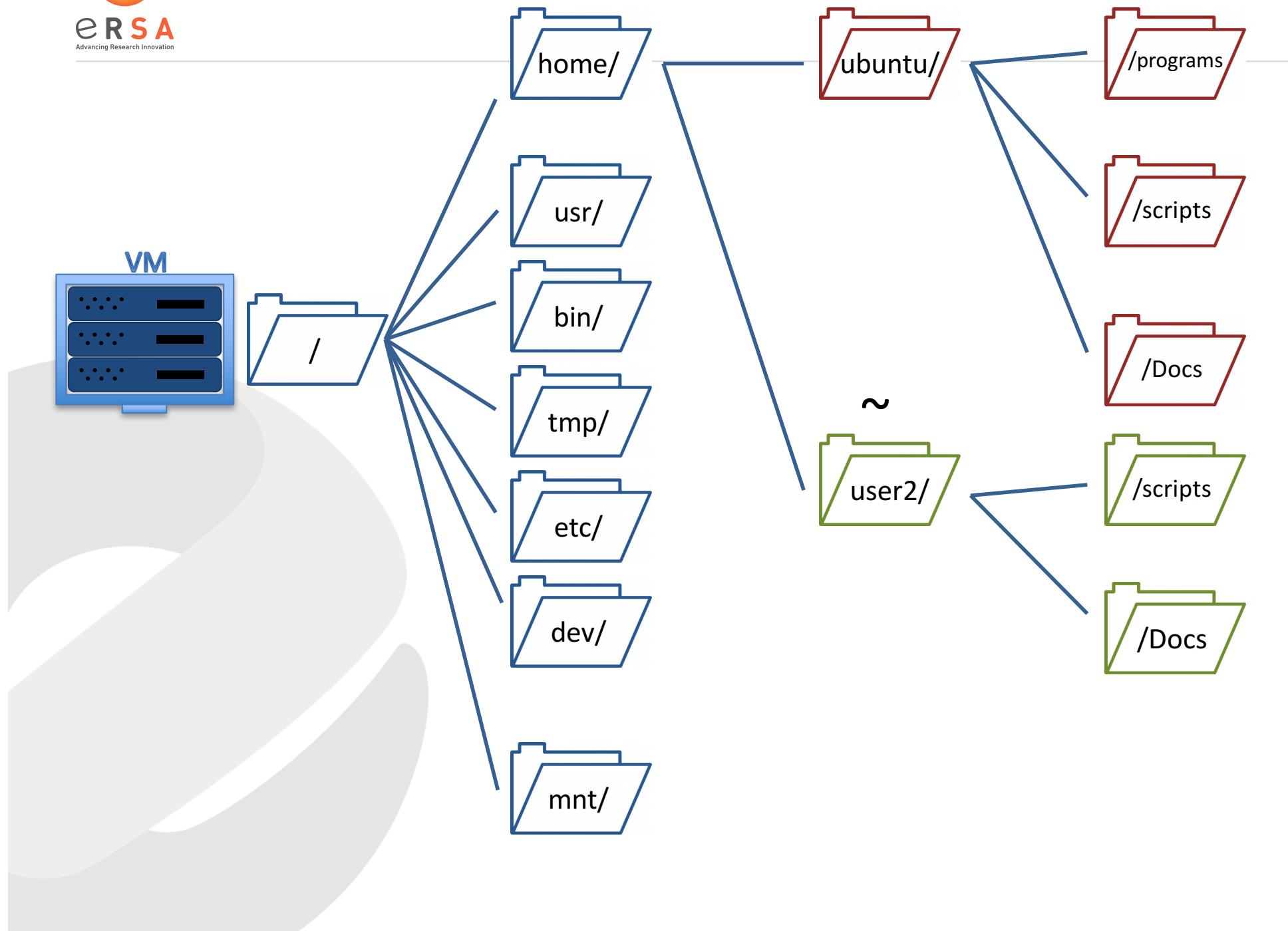




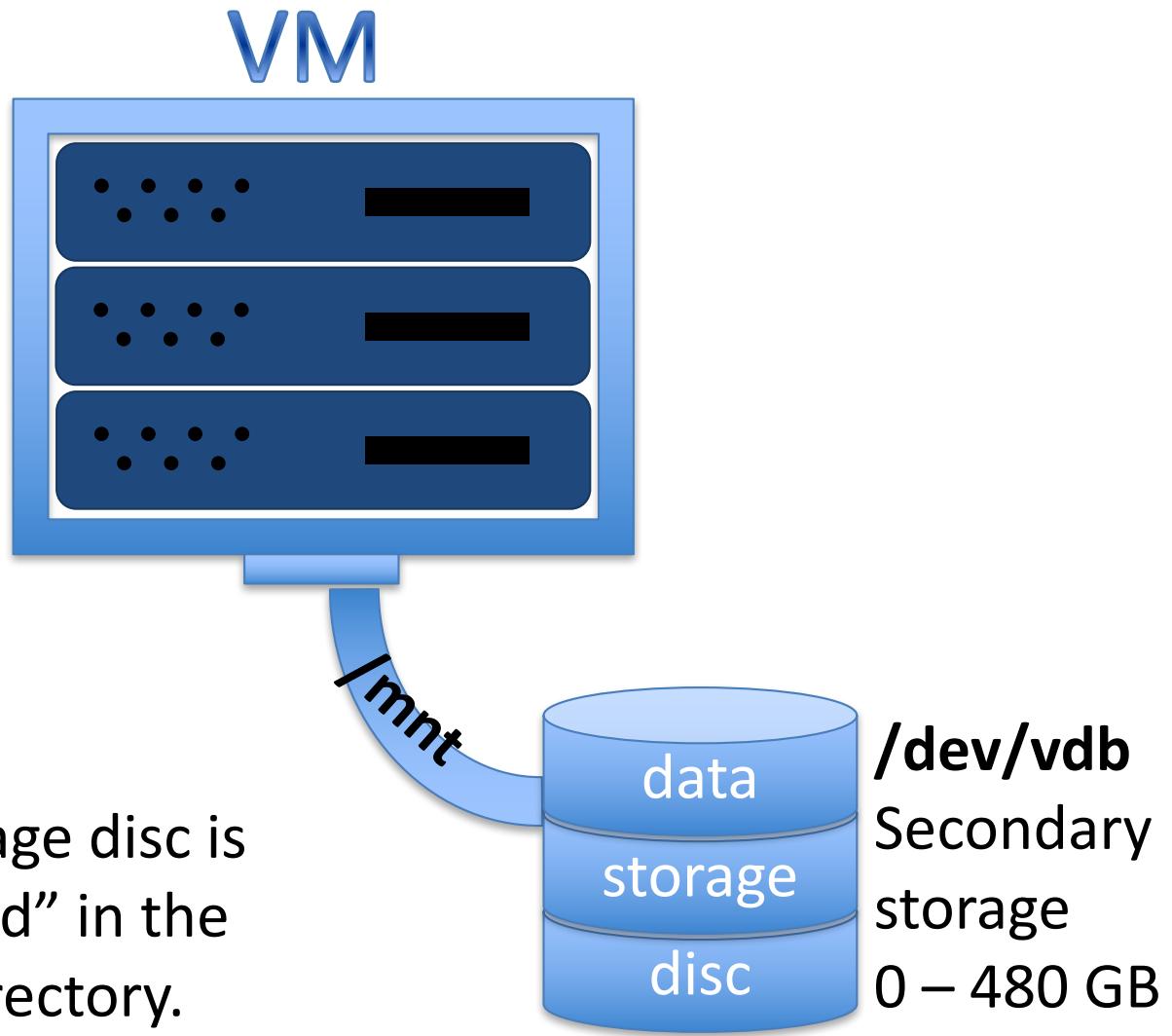
Directories you
“own” will be
sub-folders of
the home folder

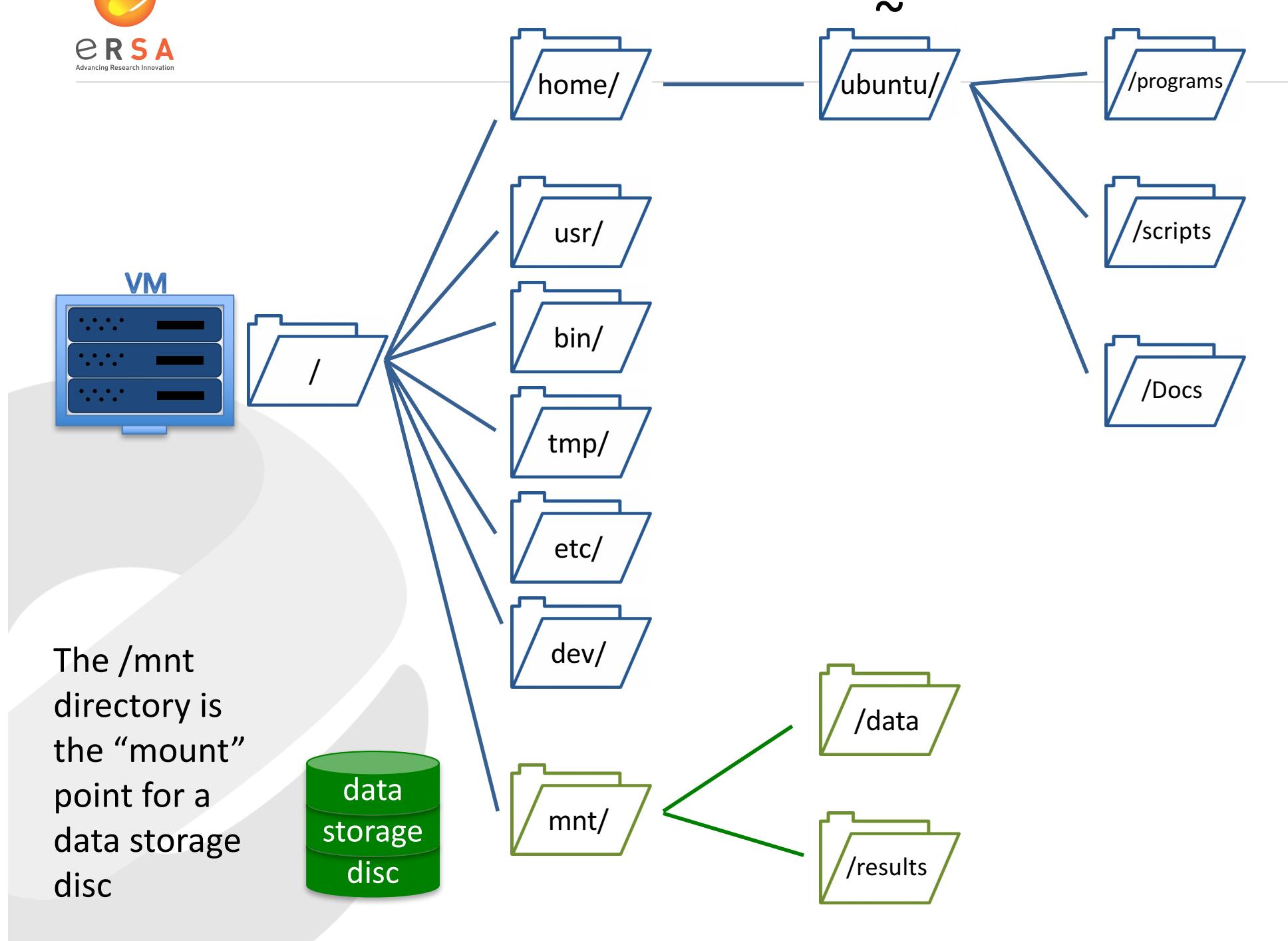


If there are any other users, they will have their own “home” directory that they log in to



/dev/vda
Root (primary)
disc
5-30 GB

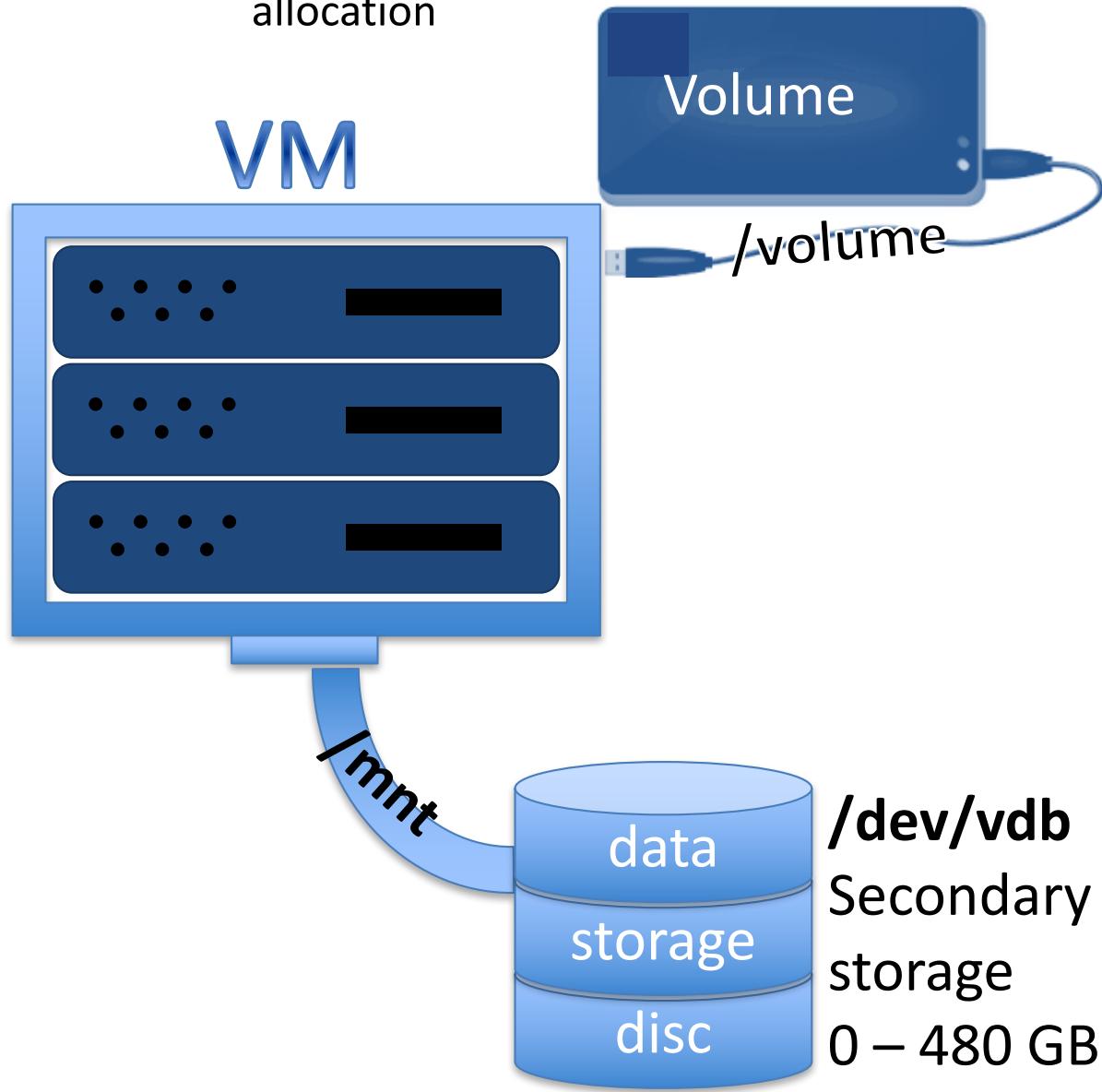


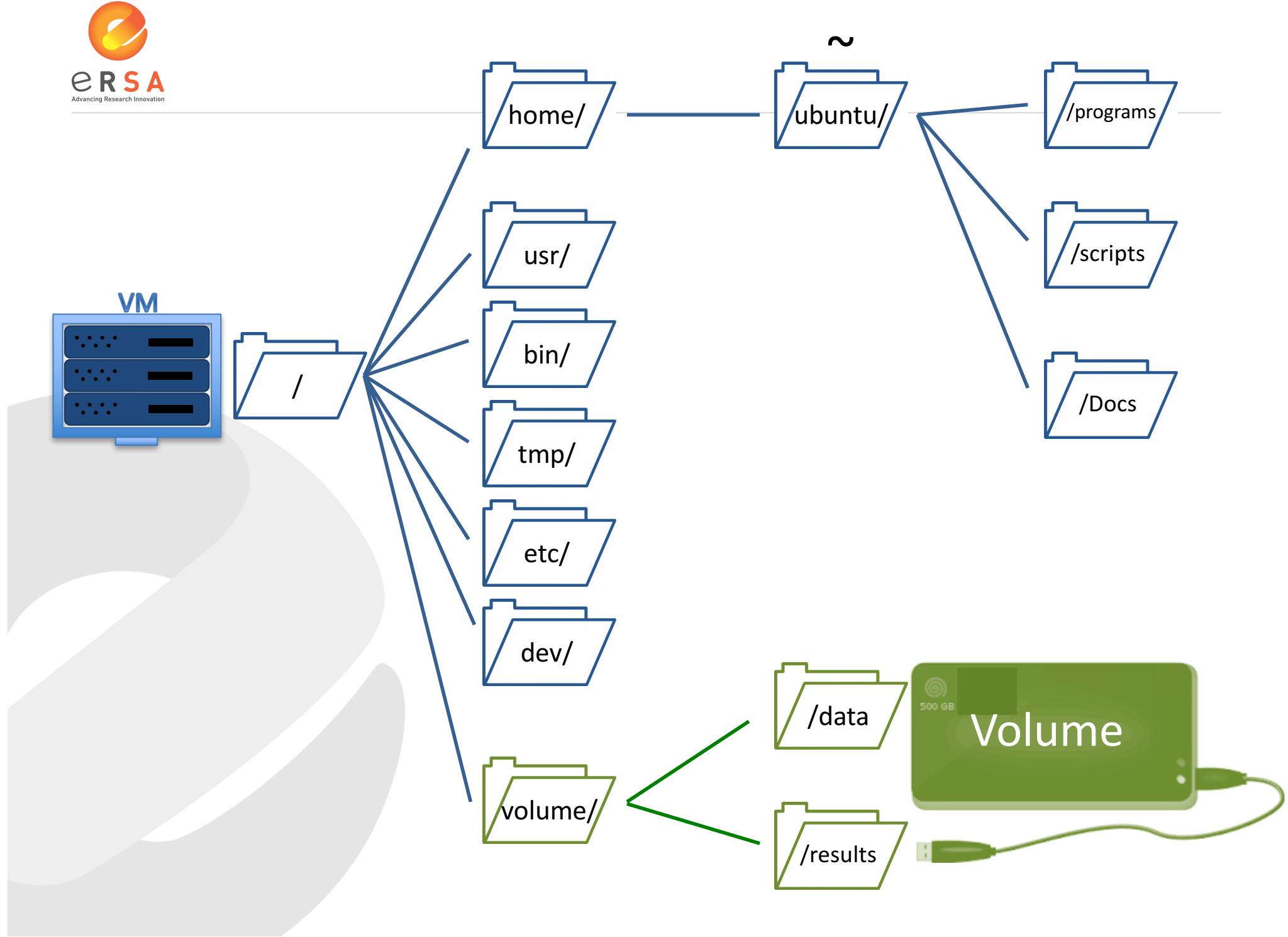


/dev/vda
Root (primary)
disc
5-30 GB

/dev/vdc
Volume storage
- available by
allocation

Volume storage also
must be mounted in a
root directory





Quick Definition

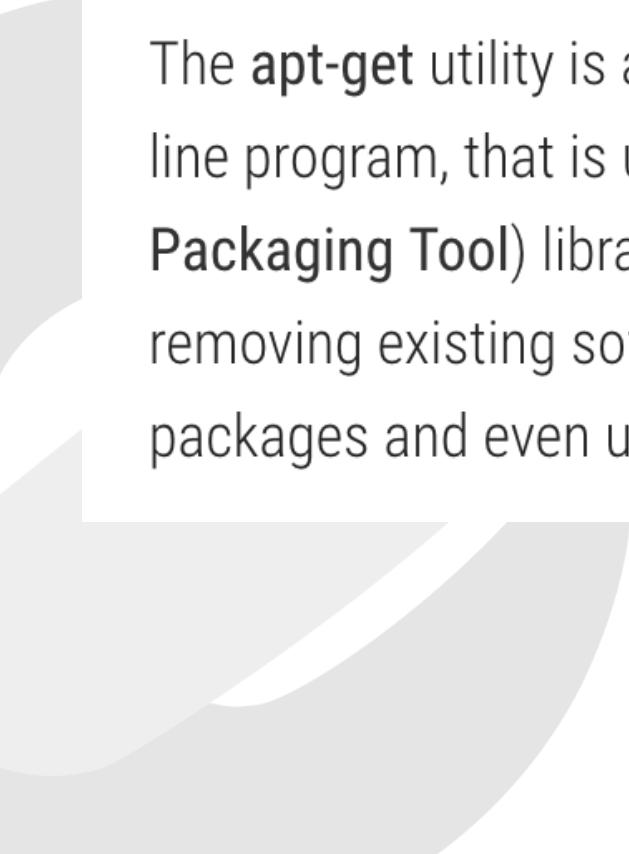
What is the meaning of Sudo?

Sudo (superuser do) is a utility for UNIX- and Linux-based systems that provides an efficient way to give specific users permission to use specific system commands at the root (most powerful) level of the system. **Sudo** also logs all commands and arguments.

[What is sudo \(superuser do\)? - Definition from WhatIs.co
searchenterpriselinux.techtarget.com/definition/sudo](https://searchenterpriselinux.techtarget.com/definition/sudo)

Quick Definition

What is apt-get?

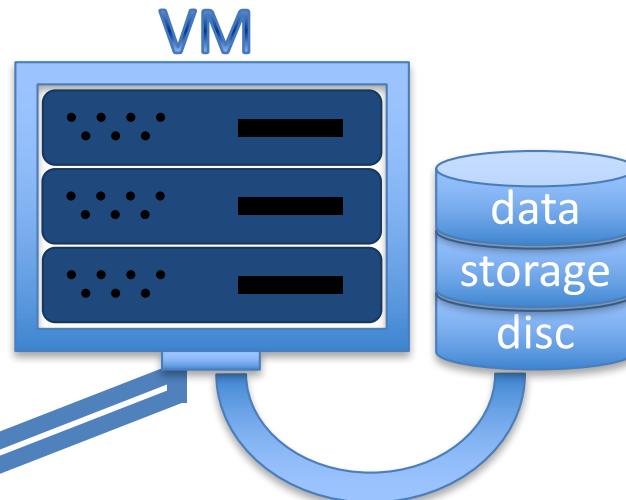


The **apt-get** utility is a powerful and free package management command line program, that is used to work with **Ubuntu's APT (Advanced Packaging Tool)** library to perform installation of new software packages, removing existing software packages, upgrading of existing software packages and even used to upgrading the entire operating system.

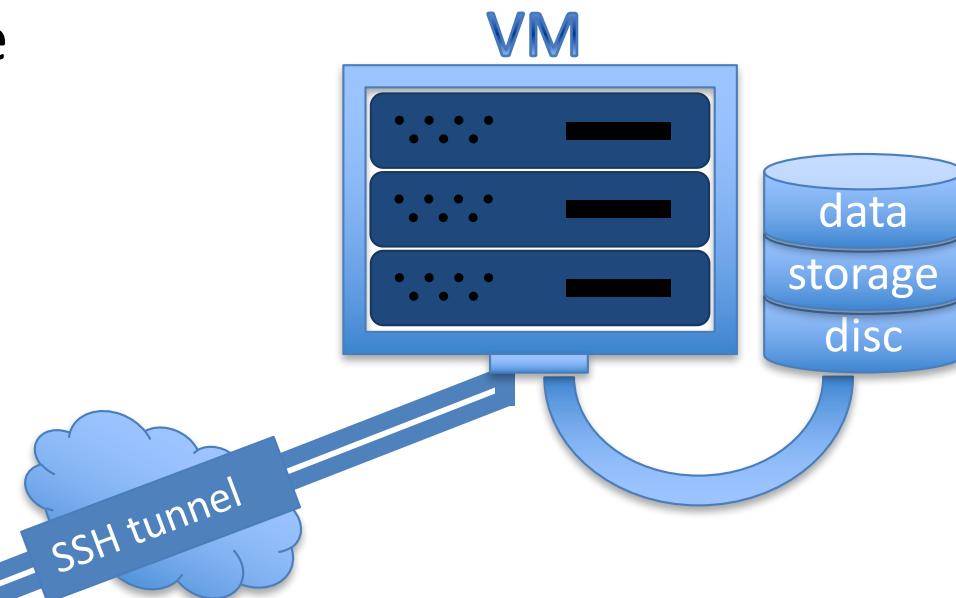
Many users prefer the usability of a remote desktop connection, rather than shell commands.

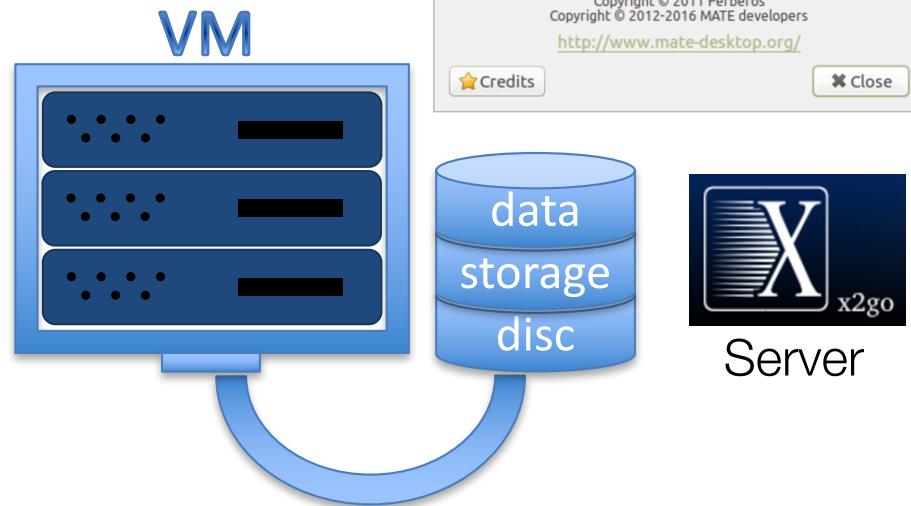


SSH tunnel



Many users prefer the usability of a remote desktop connection, rather than shell commands.





Creating the familiar GUI desktop feel to a remote connection is a bit more complex.

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GNU PARALLEL

GNU Parallel

- A major advantage of NeCTAR cloud computing, is the power to launch VM's with multiple CPUs
- Multiple CPUs can efficiently process more jobs simultaneously.
- GNU parallel is a command-line utility to manage the distribution of a list of jobs to the available CPU cores.

GNU Parallel

- The GNU parallel utility will allow the user to simultaneously run as many processes as there are CPUs.
- If there are 32 jobs to do and 4 CPUs, parallel will send the first 4 to be done, and as each job finishes a new one will commence.



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time

