

Open Source Practical

Ubuntu Systems Administration Part 1

By: Dr. Edward Danso Ansong

Department of Computer Science
University of Ghana



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College of Education

School of Continuing and Distance Education

Content

- Installation
- Ubuntu / Redhat
- Server Configuration [DNS, Web, SQL, DHCP,...]
- Monitoring utilities
- Troubleshooting



History Lesson

- Ubuntu is Debian based – (RedHat is RPM based)
- Server Vrs Desktop
- Version numbering [year. Month]
- Deb package management -apt system
- No root password by default [sudo] – (Redhat requires a password)
- RPM /etc/sysconfig => /etc/default



Ubuntu Versions

- 2 releases per year
 - 16.04
 - 15.10
 - 15.04
 - 14.10
 - 14.04

Non LTS

supported for 9 months

LTS

supported for 5 years



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Hard Drives & Partitioning

- /else -> Everything goes here unless somewhere else
- /boot -> Kernel, ramdisk,
- /usr -> Lots of read I/O
- /home -> Lots of I/O
- /var -> Lots of write I/O
- /tmp -> Lots of I/O
- /swap -> Page file in windows, Lots of I/O if undersized RAM
- Read about Solid State Drive and Hard Disk Drive



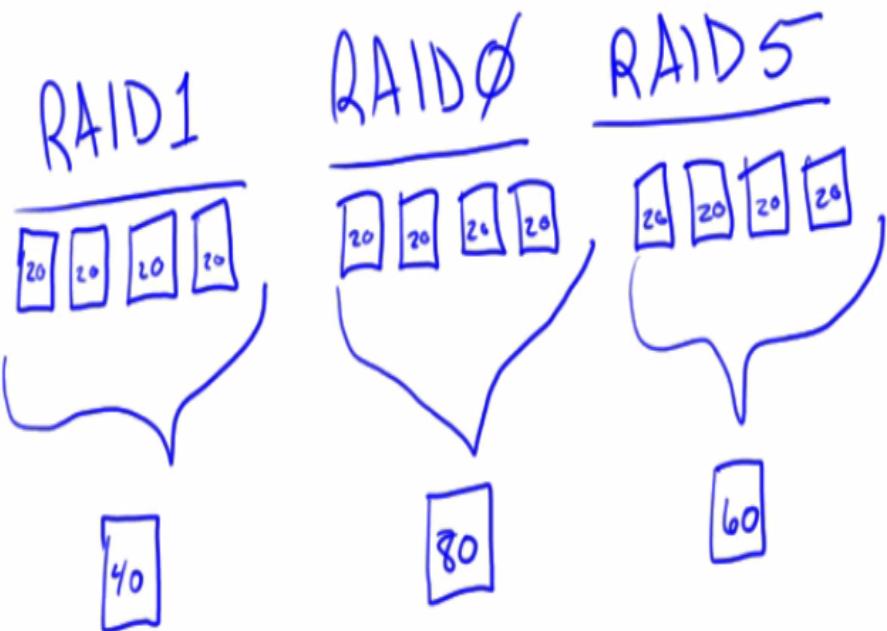
RAID & LVM – Work best when used together

- Redundant Array of Independent Disk
 - Performance & Reliability
 - RAID 1- Mirror
 - RAID 0- Across disks
 - RAID 5- Across drives with 1 Parity Disk for backup
 - RAID 10 – RAID 1&0
 - RAID 6- Across drives with 2 Parity Disks for backup
- Logical Volume Manager
 - Flexibility & Sanity



RAID

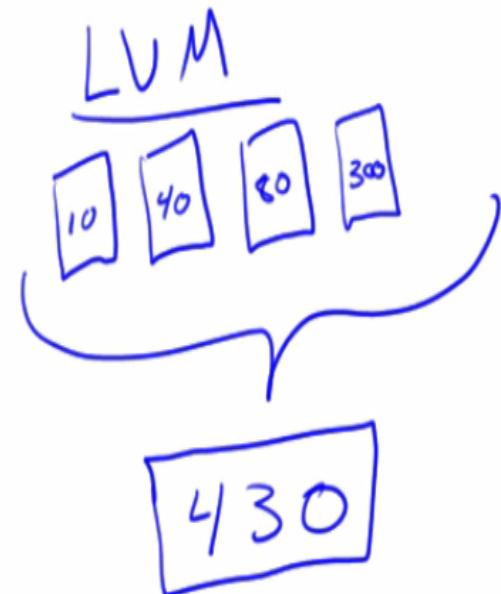
- performance & reliability



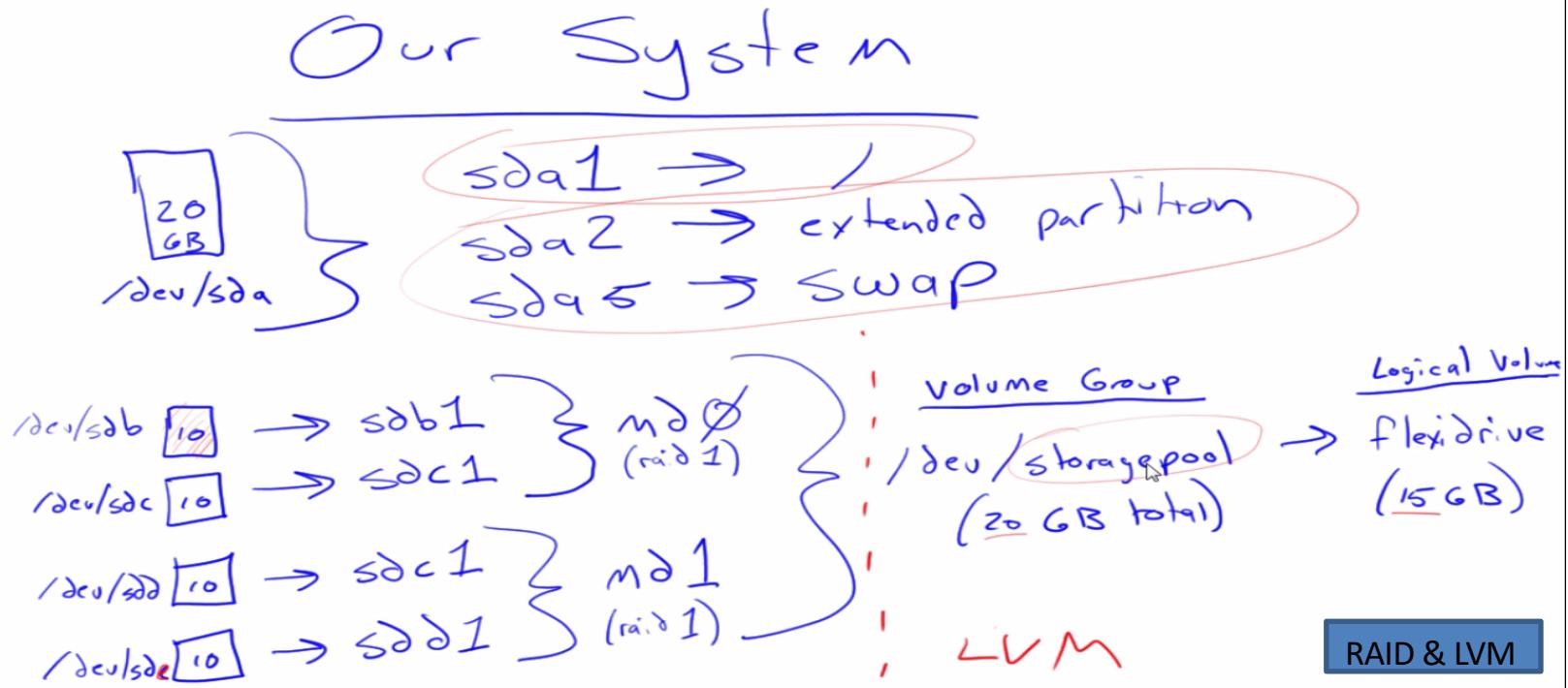
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LVM

- flexibility & sanity



Combining RAID and LVM



Command Line

- ls -l /dev/sd* -> to view the various drives

```
root@cbtserver:~# ls -l /dev/sd*
brw-rw---- 1 root disk 8,  0 Jun 19 12:29 /dev/sda
brw-rw---- 1 root disk 8,  1 Jun 19 12:00 /dev/sda1
brw-rw---- 1 root disk 8,  2 Jun 19 12:00 /dev/sda2
brw-rw---- 1 root disk 8,  5 Jun 19 12:00 /dev/sda5
brw-rw---- 1 root disk 8, 16 Jun 19 12:02 /dev/sdb
brw-rw---- 1 root disk 8, 17 Jun 19 12:06 /dev/sdb1
brw-rw---- 1 root disk 8, 32 Jun 19 12:03 /dev/sdc
brw-rw---- 1 root disk 8, 33 Jun 19 12:06 /dev/sdc1
brw-rw---- 1 root disk 8, 48 Jun 19 12:03 /dev/sdd
brw-rw---- 1 root disk 8, 49 Jun 19 12:06 /dev/sdd1
brw-rw---- 1 root disk 8, 64 Jun 19 12:03 /dev/sde
brw-rw---- 1 root disk 8, 65 Jun 19 12:06 /dev/sde1
root@cbtserver:~# cat /proc/mdstat
Personalities : [raid1]
md1 : active raid1 sde1[1] sdd1[0]
      10476416 blocks super 1.2 [2/2] [UU]

md0 : active raid1 sdc1[1] sdb1[0]
      10476416 blocks super 1.2 [2/2] [UU]
```



pvdisplay – Physical Volume Display

```
unused devices: <none>
root@cbtserver:~# pvdisplay
--- Physical volume ---
PV Name              /dev/md0p1
VG Name              storagepool
PV Size              9.99 GiB / not usable 1.88 MiB
Allocatable          yes (but full)
PE Size              4.00 MiB
Total PE             2557
Free PE              0
Allocated PE         2557
PV UUID              FPhpei-nbWa-2Kb6-tFFH-NpD9-hunu-Wt8LQi

--- Physical volume ---
PV Name              /dev/md1p1
VG Name              storagepool
PV Size              9.99 GiB / not usable 1.88 MiB
Allocatable          yes
PE Size              4.00 MiB
Total PE             2557
Free PE              1274
Allocated PE         1283
PV UUID              xRJfGy-Gq1a-ohJC-AUyb-q0sz-f3xF-HAuUun
```



lvdisplay – Logical Volume Display

```
PV Size          9.99 GiB / not usable 1.88 MiB
Allocatable      yes
PE Size          4.00 MiB
Total PE         2557
Free PE          1274
Allocated PE     1283
PV UUID          xRJfGy-Gq1a-ohJC-AUyb-q0sz-f3xF-HAuUun

root@cbtserver:~# lvdisplay
--- Logical volume ---
LV Name           /dev/storagepool/flexidrive
VG Name           storagepool
LV UUID           dJichH-xPfT-YyuQ-DQGf-XkDY-r5wW-JQbHHv
LV Write Access   read/write
LV Status         available
# open            0
LV Size           15.00 GiB
Current LE        3840
Segments          2
Allocation        inherit
Read ahead sectors auto
- currently set to 256
Block device      252:0
```



Installation

- Network
- Ubuntu Netinstall (Minimal CD) –small iso image [boot code]
- kickstart – preconfigured script
- iso – installing servers on a VMware installs the easy Install – barebone installation without much options of server roles
- USB
 - Startup disk creator
 - Unetbootin – to create a bootable flash drive





Installer boot menu

Install

Command-line install

Advanced options >

Help

Press ENTER to boot or TAB to edit a menu entry



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[!!] Select your location

The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.

This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.

Country, territory or area:

- Antigua and Barbuda
- Australia
- Botswana
- Canada
- Hong Kong
- India
- Ireland
- New Zealand
- Nigeria
- Philippines
- Singapore
- South Africa
- United Kingdom
- United States**
- Zambia
- Zimbabwe
- other

[<Go Back>](#)

<Tab> moves; <Space> selects; <Enter> activates buttons



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Configuring the network with DHCP

0%

This may take some time.

<Cancel>



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[!] Configure the network

Please enter the hostname for this system.

The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.

Hostname:

ub

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!] Choose a mirror of the Ubuntu archive

The goal is to find a mirror of the Ubuntu archive that is close to you on the network --
be aware that nearby countries, or even your own, may not be the best choice.

Ubuntu archive mirror country:

- Swaziland
- Sweden
- Switzerland
- Syrian Arab Republic
- Taiwan
- Tajikistan
- Tanzania, United Republic of
- Thailand
- Timor-Leste
- Togo
- Tokelau
- Tonga
- Trinidad and Tobago
- Tunisia
- Turkey
- Turkmenistan
- Turks and Caicos Islands
- Tuvalu
- Uganda
- Ukraine
- United Arab Emirates
- United Kingdom
- United States**



[<Go Back>](#)

<Tab> moves; <Space> selects; <Enter> activates buttons



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- Syrian Arab Republic
- Taiwan
- Tajikistan
- Tanzania, United Republic of
- Thailand
- Timor-Leste
- Togo
- Tokelau
- Tonga
- Trinidad and Tobago
- Tunisia
- Turkey
- Turkmenistan
- Turks and Caicos Islands
- Tuvalu
- Uganda
- Ukraine
- United Arab Emirates
- United Kingdom
- United States**



[<Go Back>](#)

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Choose a mirror of the Ubuntu archive

Please enter the hostname of the mirror from which Ubuntu will be downloaded.

An alternate port can be specified using the standard [hostname]:[port] format.

Ubuntu archive mirror hostname:

mirror

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Choose a mirror of the Ubuntu archive |

Please enter the directory in which the mirror of the Ubuntu archive is located.

Ubuntu archive mirror directory:

/ubuntu/

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<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!] Set up users and passwords

A user account will be created for you to use instead of the root account for non-administrative activities.

Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.

Full name for the new user:

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Set up users and passwords

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

Choose a password for the new user:

[<Go Back>](#)

[<Continue>](#)

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!] Set up users and passwords

You may configure your home directory for encryption, such that any files stored there remain private even if your computer is stolen.

The system will seamlessly mount your encrypted home directory each time you login and automatically unmount when you log out of all active sessions.

Encrypt your home directory?

<Go Back>

<Yes>

<No>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!] Configure the clock

Based on your present physical location, your time zone is America/New_York.

If this is not correct, you may select from a full list of time zones instead.

Is this time zone correct?

<Go Back>

<Yes>

<No>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you can do it manually. With guided partitioning you will still have a chance later to review and customise the results.

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.

Partitioning method:

- Guided - resize SCSI3 (0,0,0), partition #1 (sda) and use freed space
- Guided - use entire disk
- Guided - use entire disk and set up LVM
- Guided - use entire disk and set up encrypted LVM
- Manual

[<Go Back>](#)

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.

Guided partitioning
Configure software RAID
Configure the Logical Volume Manager
Configure encrypted volumes
Configure iSCSI volumes

SCSI3 (0,0,0) (sda) - 21.5 GB VMware, VMware Virtual S
#1 primary 20.4 GB B ext4
#5 logical 1.1 GB F swap swap

Undo changes to partitions
Finish partitioning and write changes to disk

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



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[!] Partition disks

You are editing partition #1 of SCSI3 (0,0,0) (sda). This partition is formatted with the Ext4 journaling file system.

Partition settings:

Use as: do not use

Bootable flag: on

Resize the partition (currently 20.4 GB)

Copy data from another partition

Erase data on this partition

Delete the partition

Done setting up the partition

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



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Guided partitioning
Configure software RAID
Configure the Logical Volume Manager
Configure encrypted volumes
Configure iSCSI volumes

SCSI3 (0,0,0) (sda) - 21.5 GB VMware, VMware Virtual S
pri/log 21.5 GB FREE SPACE

Undo changes to partitions
Finish partitioning and write changes to disk

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



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Guided partitioning

Configure software RAID

Configure the Logical Volume Manager

Configure encrypted volumes

Configure iSCSI volumes

SCSI3 (0,0,0) (sda) - 21.5 GB VMware, VMware Virtual S
pri/log 21.5 GB FREE SPACE

Undo changes to partitions

Finish partitioning and write changes to disk

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

Before RAID can be configured, the changes have to be written to the storage devices. These changes cannot be undone.

When RAID is configured, no additional changes to the partitions in the disks containing physical volumes are allowed. Please convince yourself that you are satisfied with the current partitioning scheme in these disks.

The partition tables of the following devices are changed:

SCSI3 (0,0,0) (sda)

Write the changes to the storage devices and configure RAID?

<Yes>

<No>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

This is the software RAID (or MD, "multiple device") configuration menu.

Please select one of the proposed actions to configure software RAID.

Software RAID configuration actions

Create MD device

Delete MD device

Finish

<Go Back>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

Please choose the type of the software RAID device to be created.

Software RAID device type:

- RAIDO
- RAID1
- RAIDS
- RAID6
- RAID10

<Go Back>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

The RAID1 array will consist of both active and spare devices. The active devices are those used, while the spare devices will only be used if one or more of the active devices fail. A minimum of 2 active devices is required.

NOTE: this setting cannot be changed later.

Number of active devices for the RAID1 array:

2

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.

Guided partitioning
Configure software RAID
Configure the Logical Volume Manager
Configure encrypted volumes
Configure iSCSI volumes

SCSI3 (0,0,0) (sda) - 21.5 GB VMware, VMware Virtual S
pri/log 21.5 GB FREE SPACE

Undo changes to partitions
Finish partitioning and write changes to disk

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

After the Logical Volume Manager is configured, no additional changes to the partitions in the disks containing physical volumes are allowed. Please decide if you are satisfied with the current partitioning scheme in these disks before continuing.

Keep current partition layout and configure LVM?

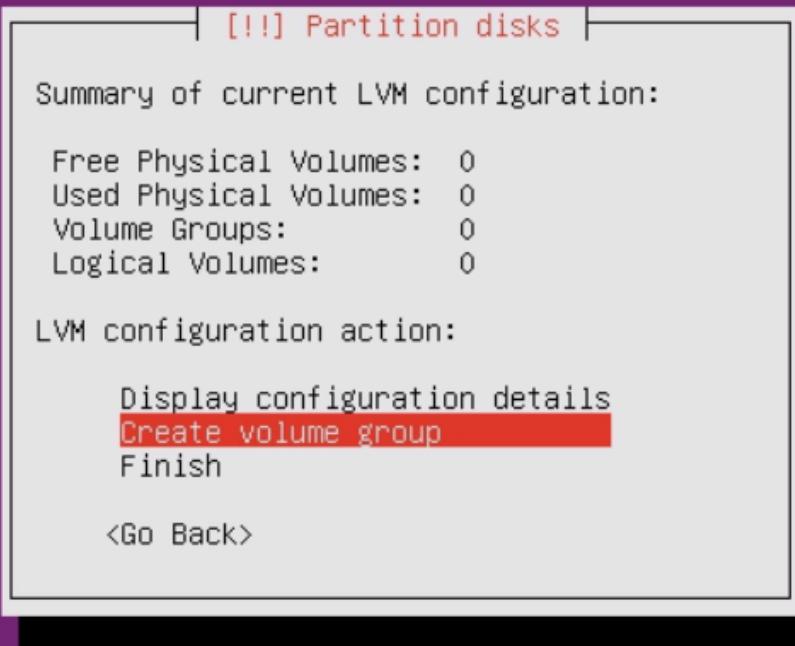
<Yes>

<No>

<Tab> moves; <Space> selects; <Enter> activates buttons



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<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

Please enter the name you would like to use for the new volume group.

Volume group name:

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

Please select the devices for the new volume group.

You can select one or more devices.

Devices for the new volume group:

[*] /dev/sda free #1 (21474MB; FREE SPACE)

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!] Partition disks

Before the Logical Volume Manager can be configured, the current partitioning scheme has to be written to disk. These changes cannot be undone.

After the Logical Volume Manager is configured, no additional changes to the partitioning scheme of disks containing physical volumes are allowed during the installation. Please decide if you are satisfied with the current partitioning scheme before continuing.

The partition tables of the following devices are changed:

SCSI3 (0,0,0) (sda)

Write the changes to disks and configure LVM?

<Yes>

<No>

<Tab> moves; <Space> selects; <Enter> activates buttons



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[!!] Partition disks

Summary of current LVM configuration:

Free Physical Volumes: 0
Used Physical Volumes: 1
Volume Groups: 1
Logical Volumes: 0

LVM configuration action:

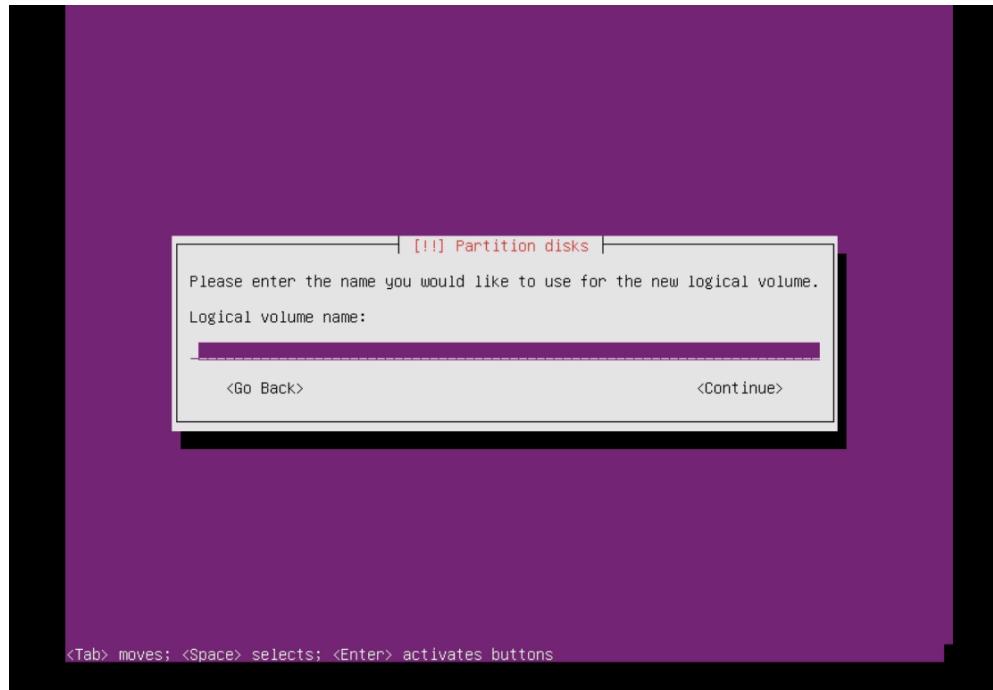
Display configuration details
Create logical volume
Delete volume group
Finish

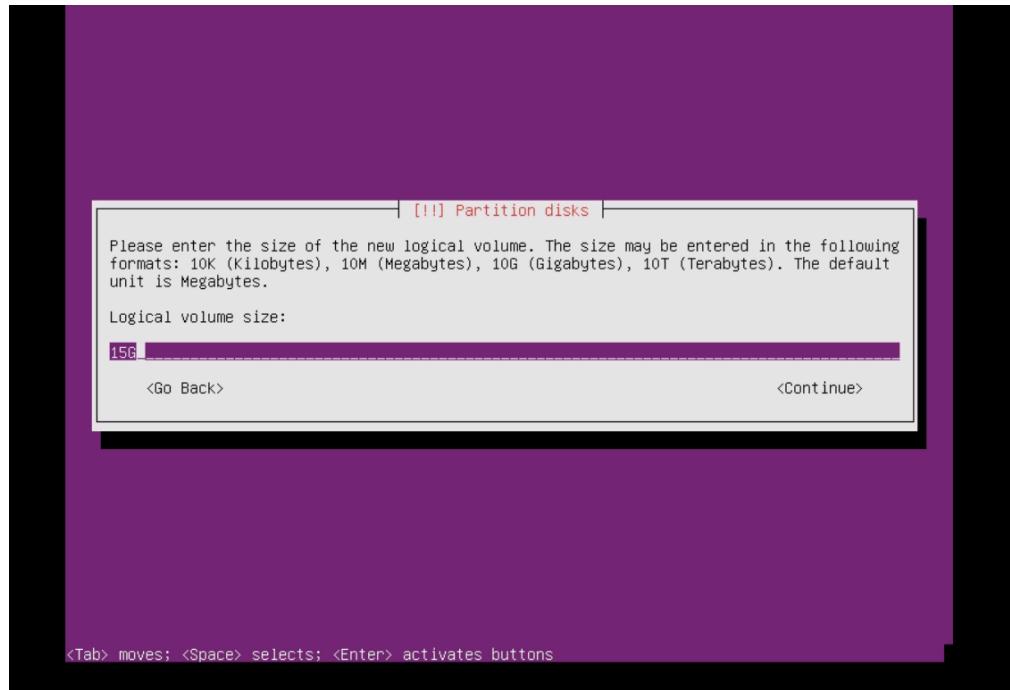
<Go Back>

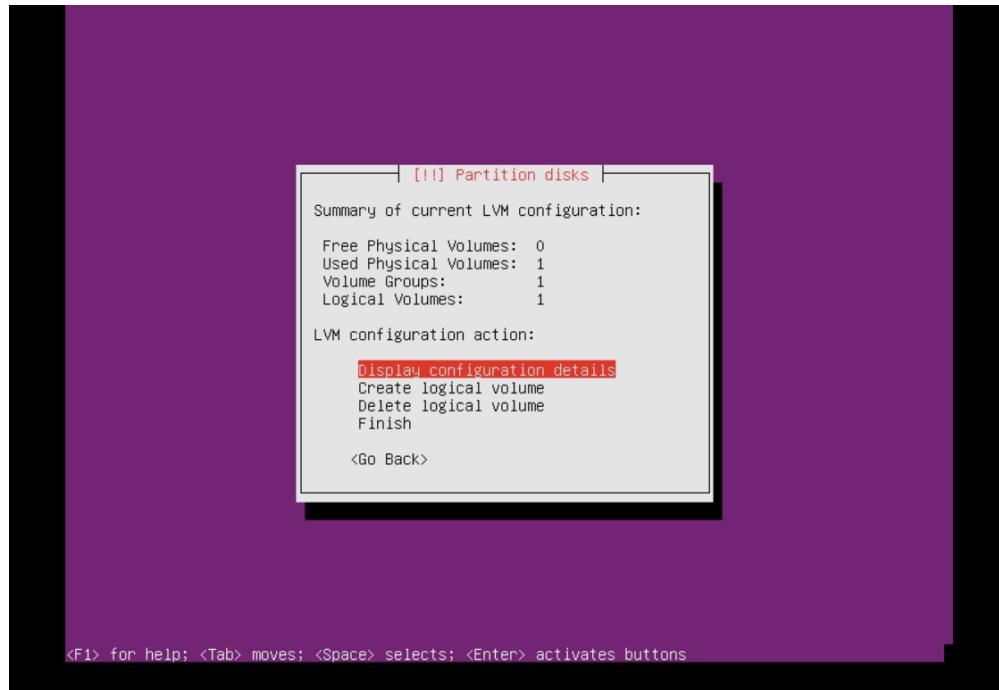
<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons

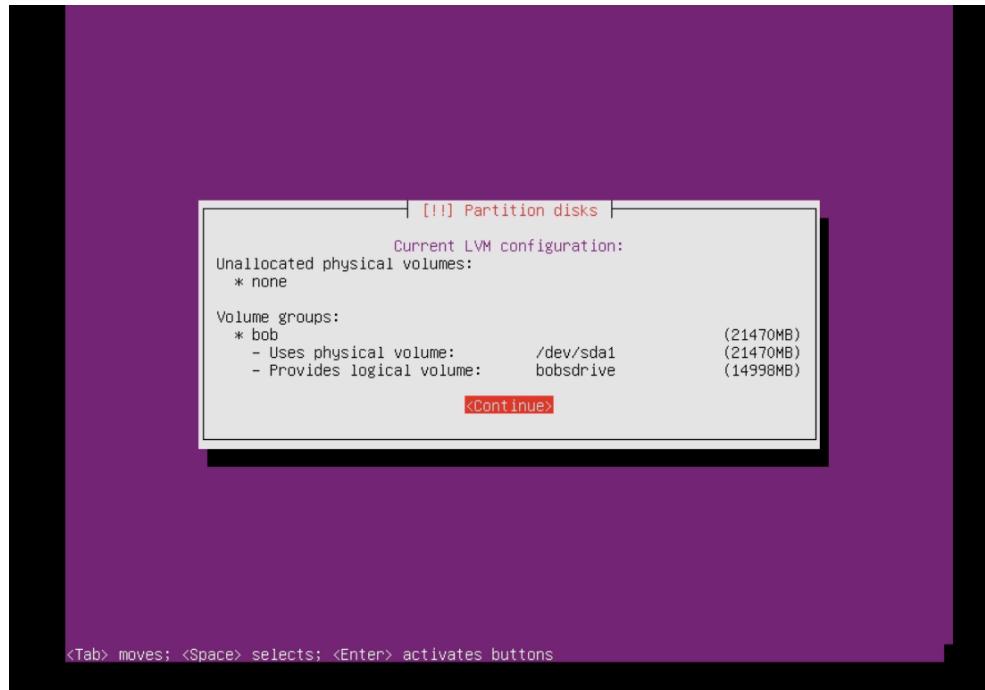


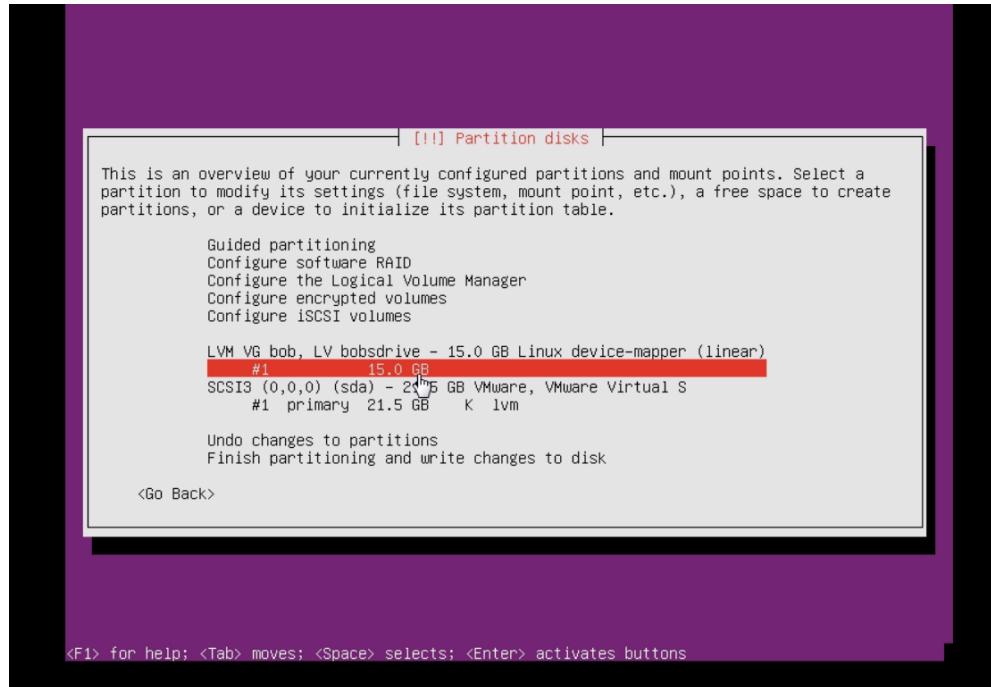
UNIVERSITY OF GHANA

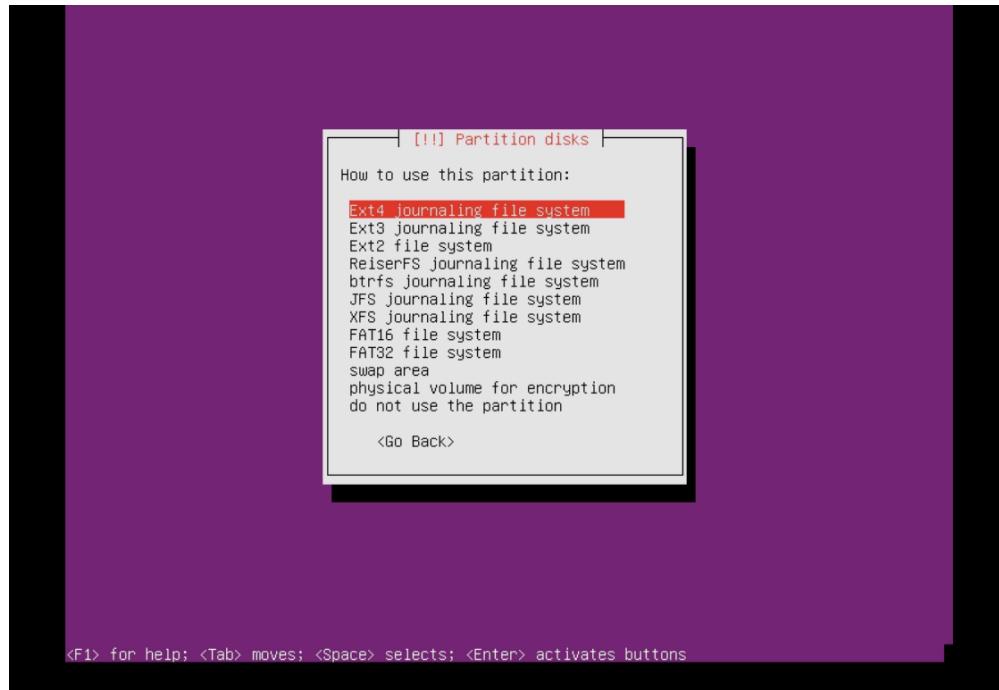


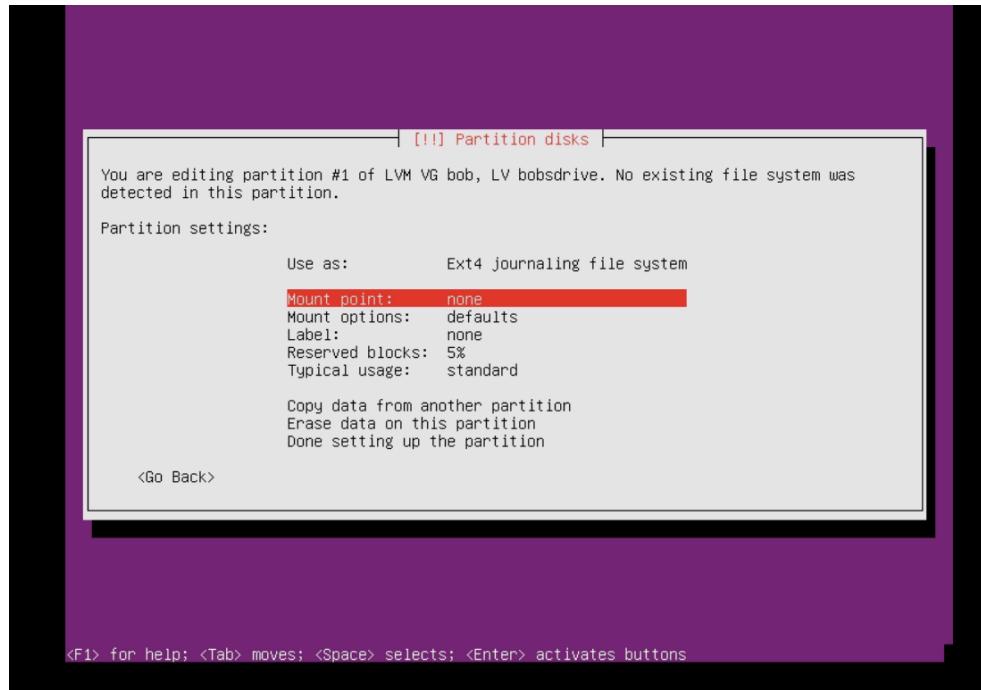


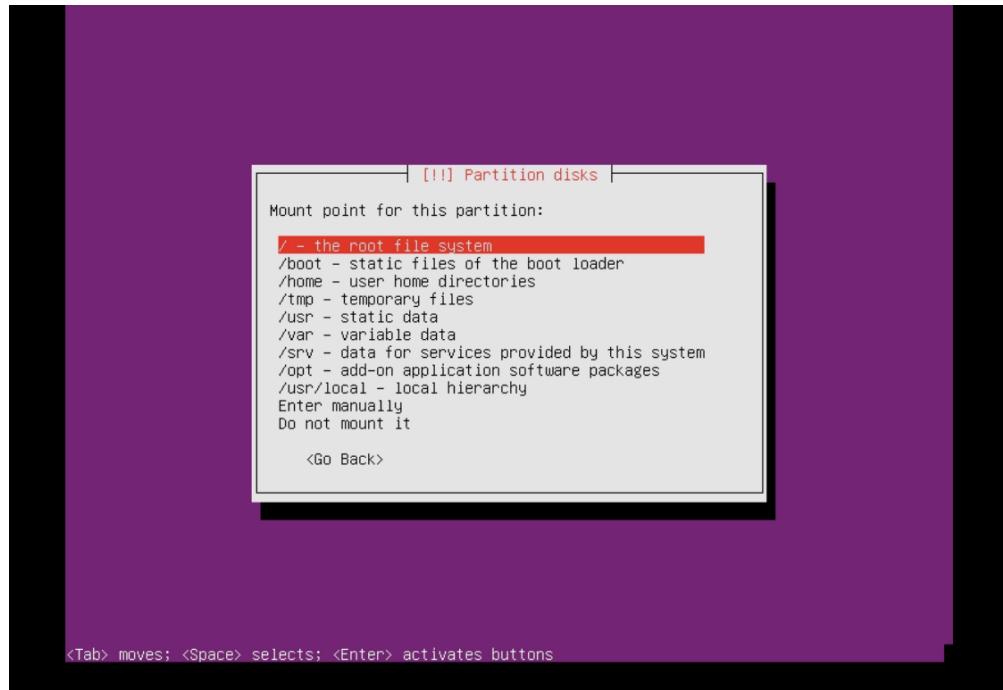


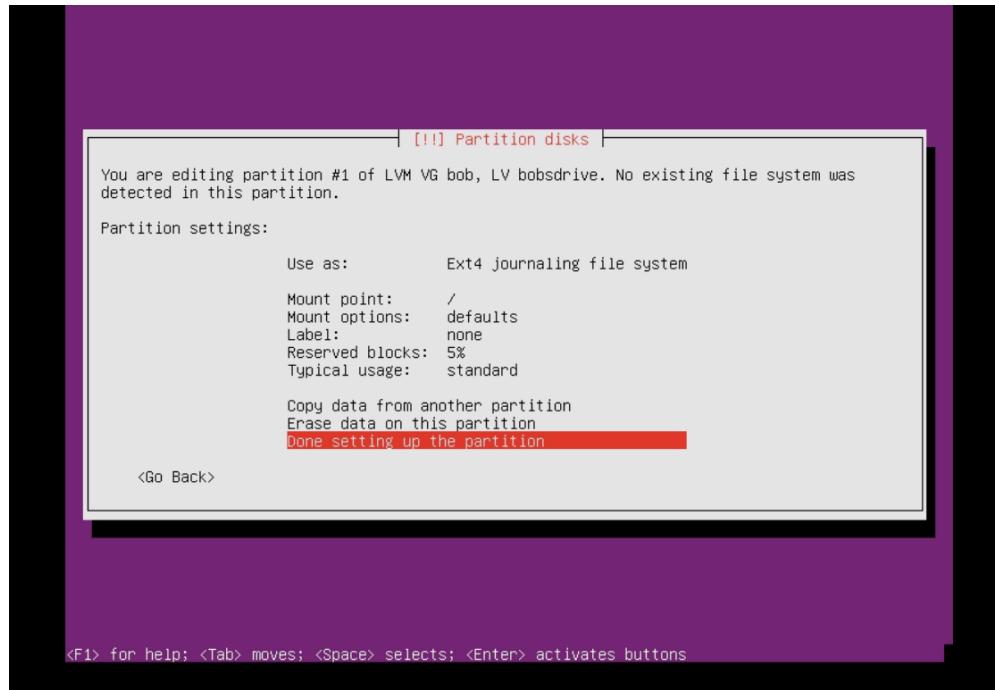


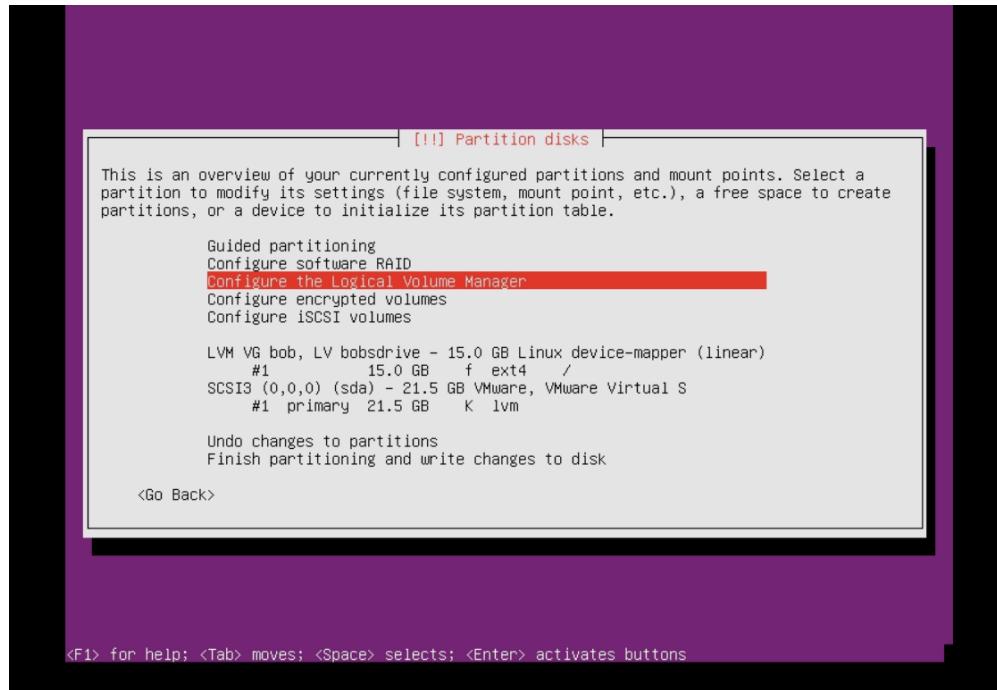


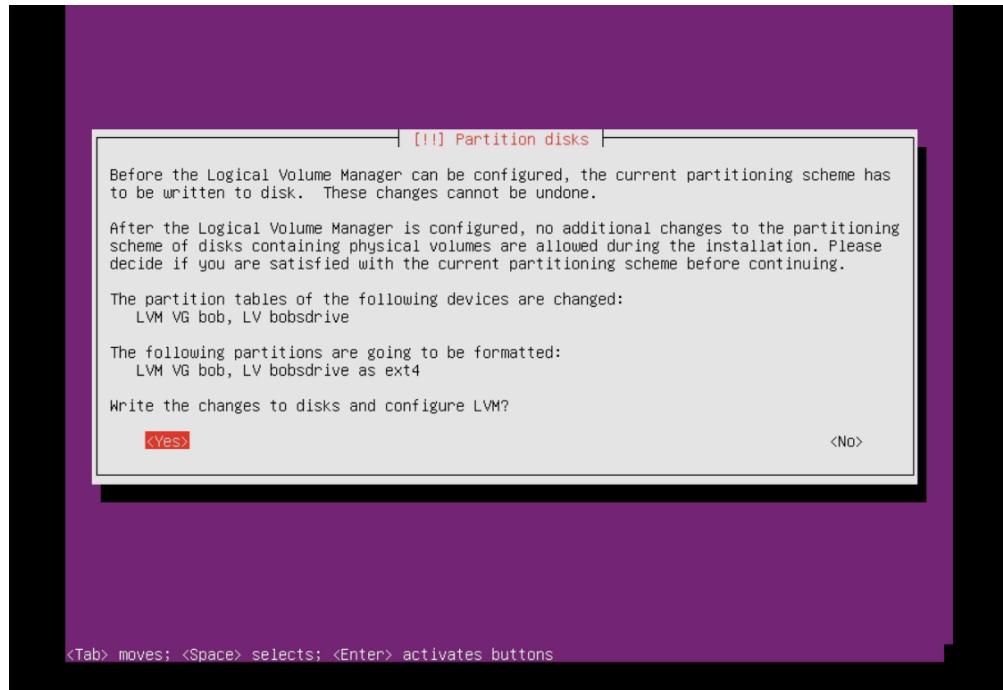


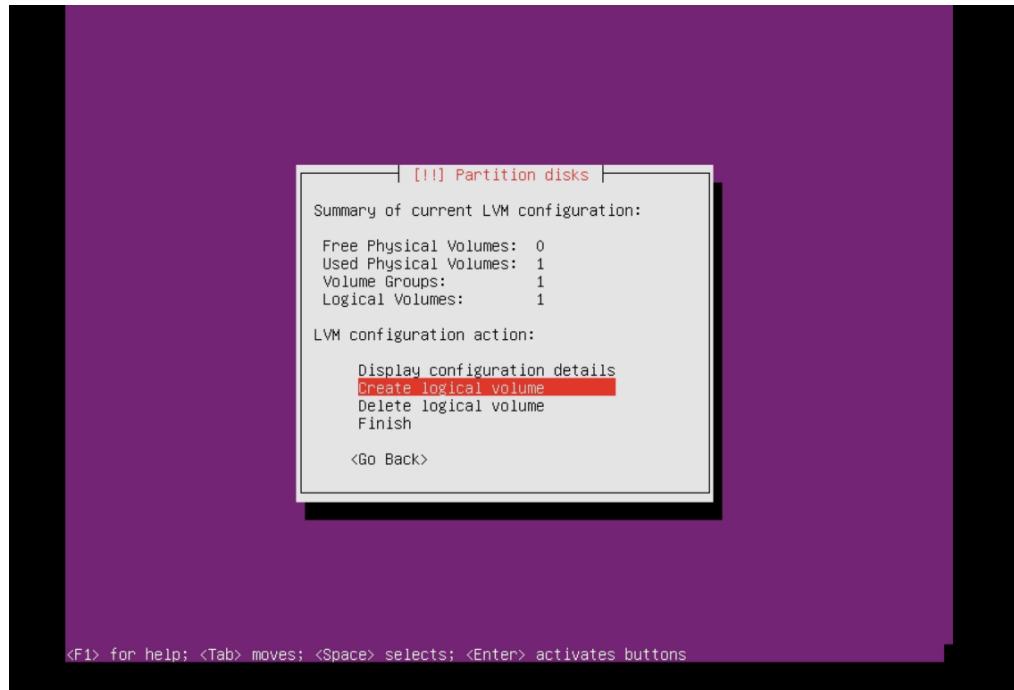


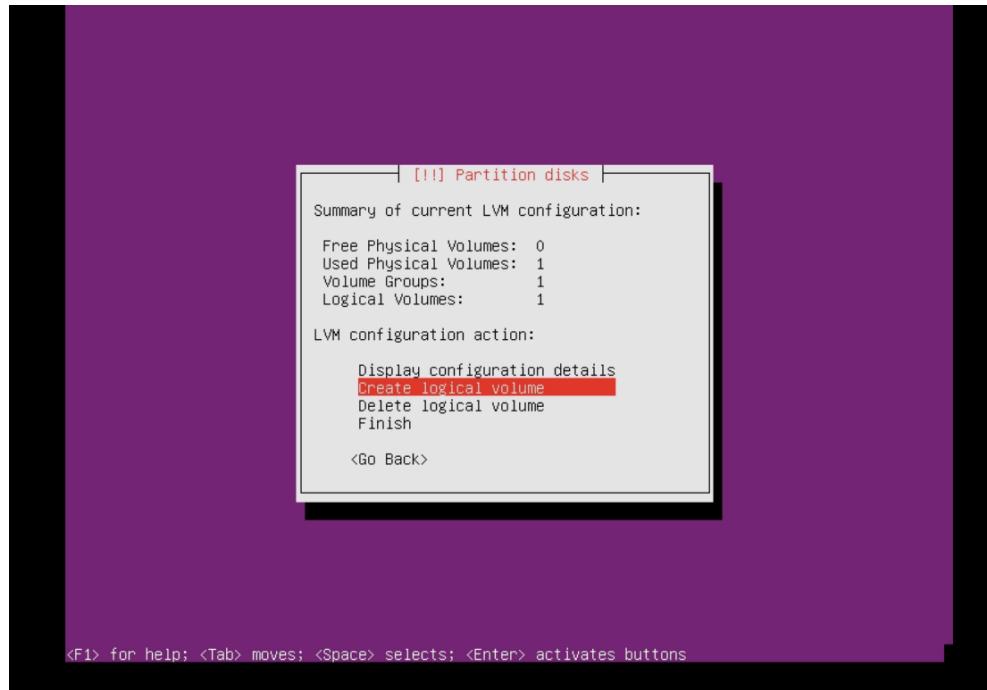


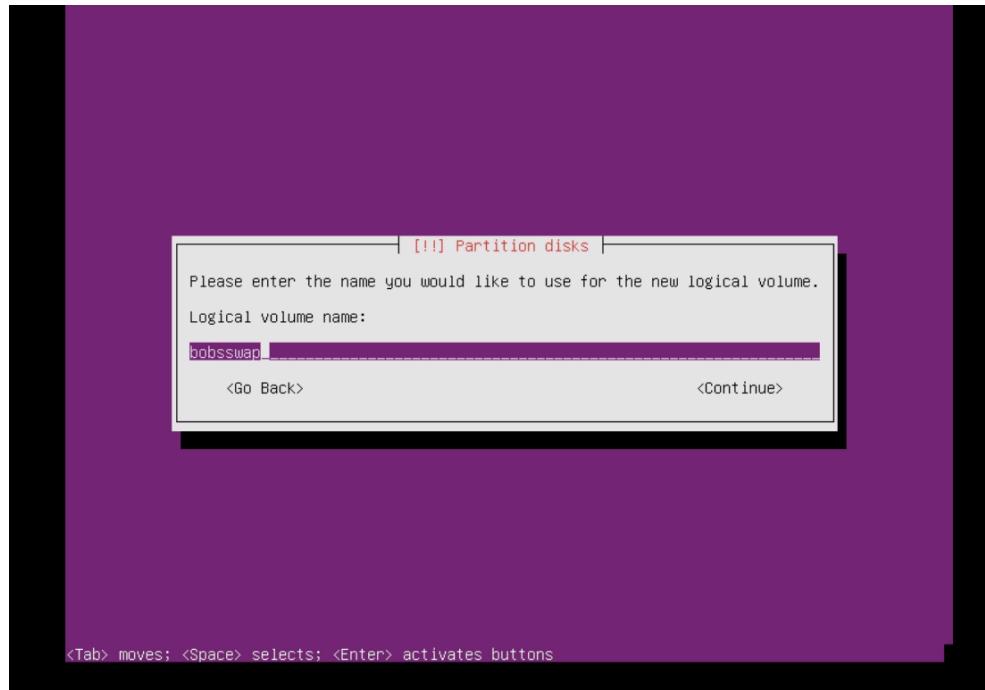


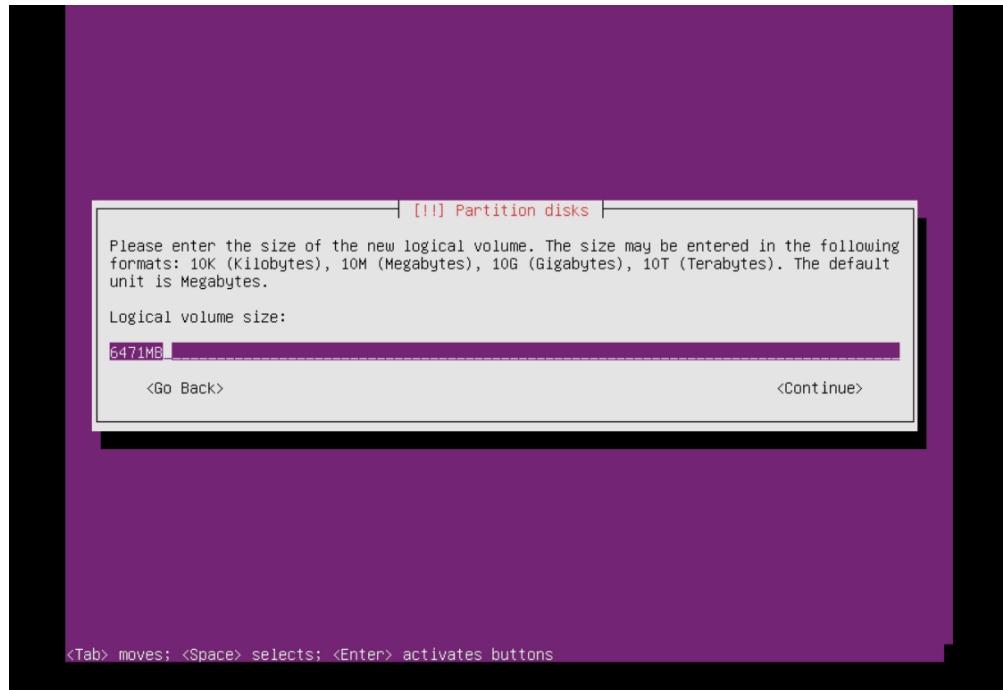


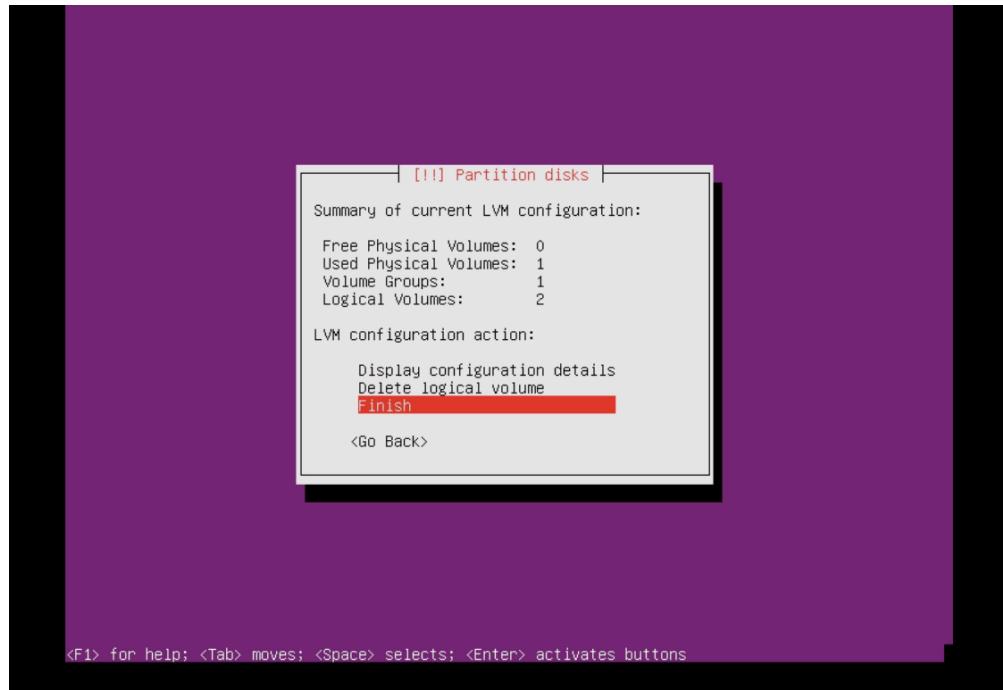


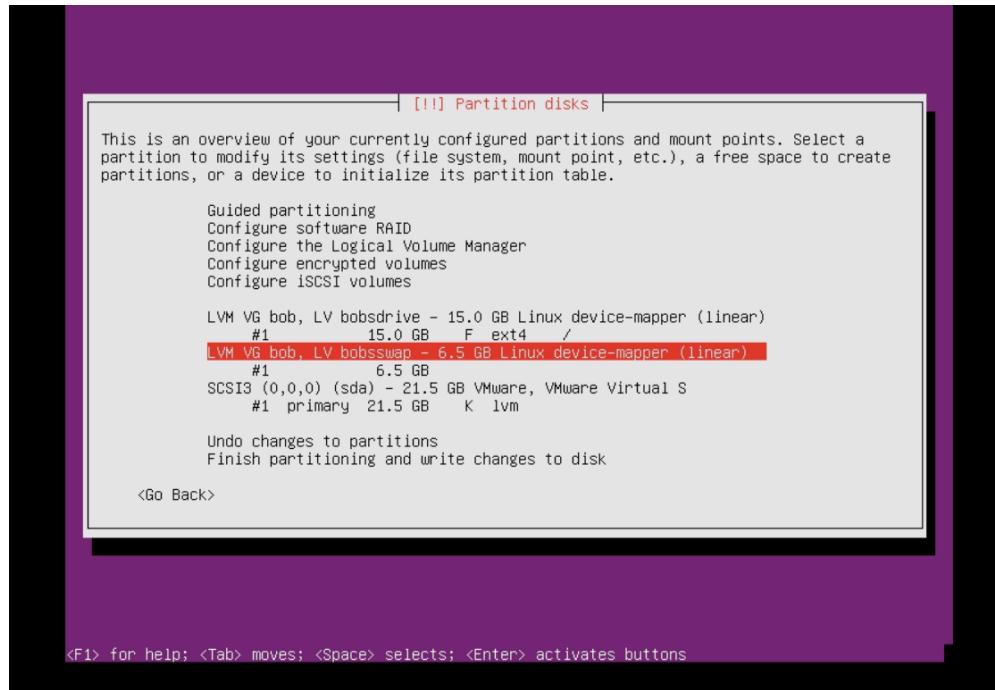


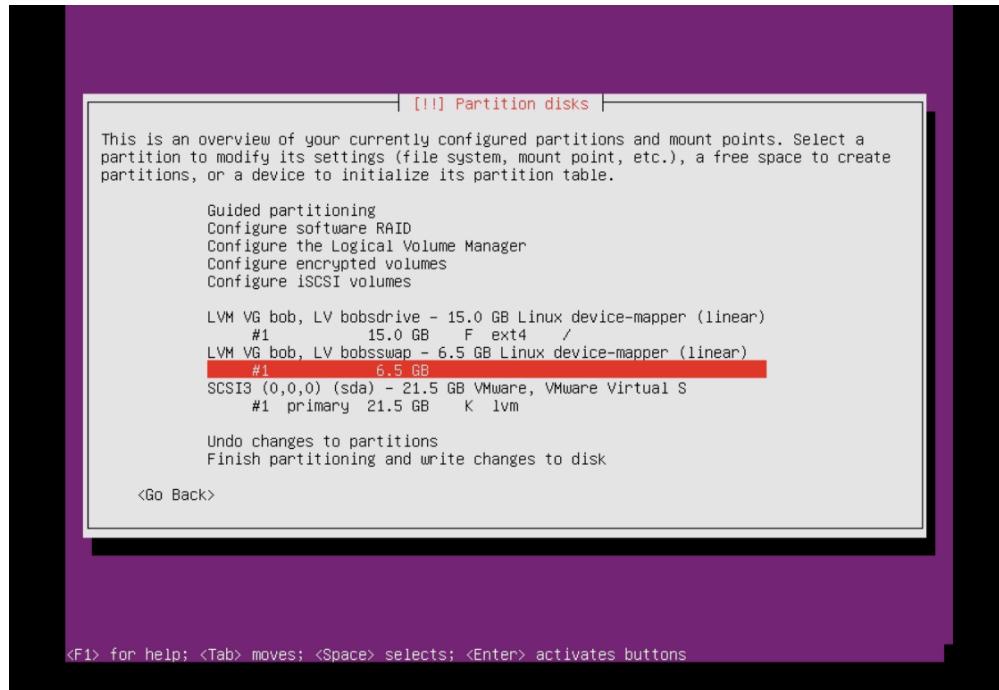


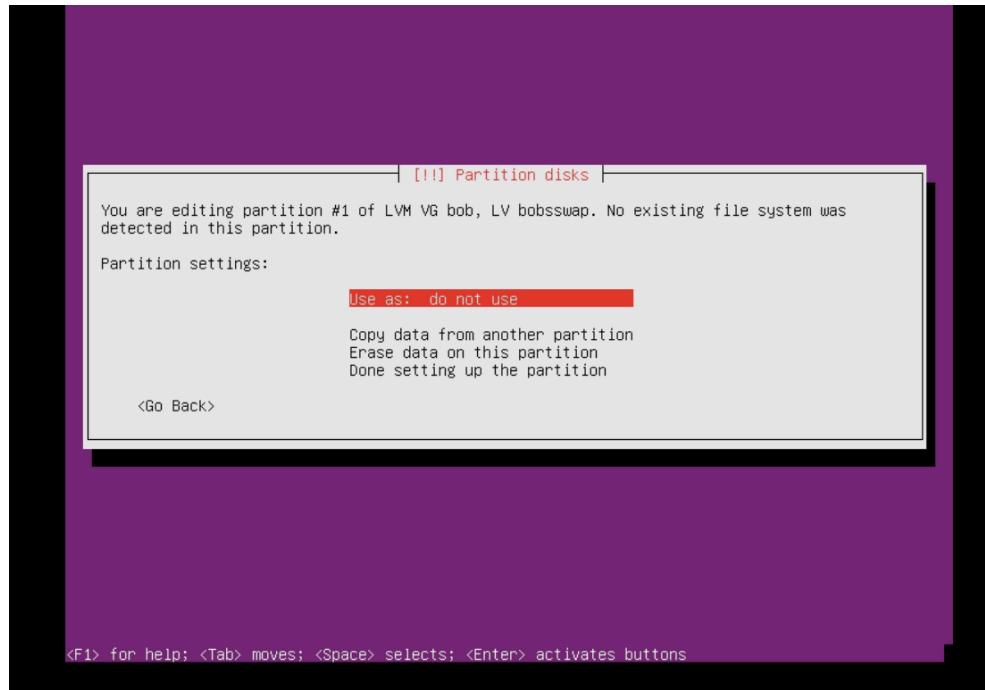


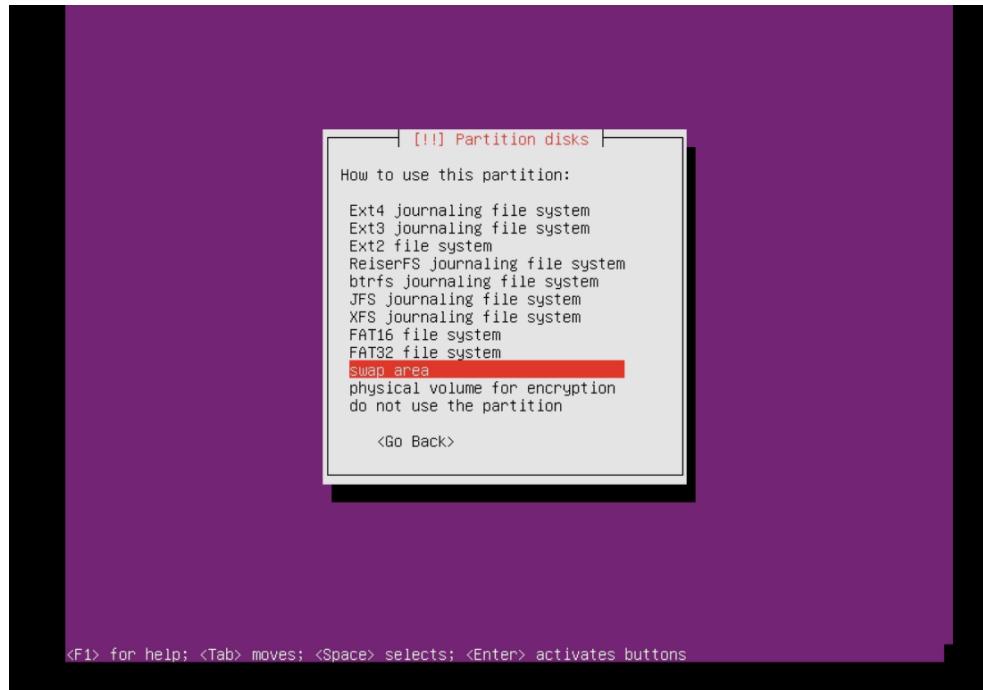


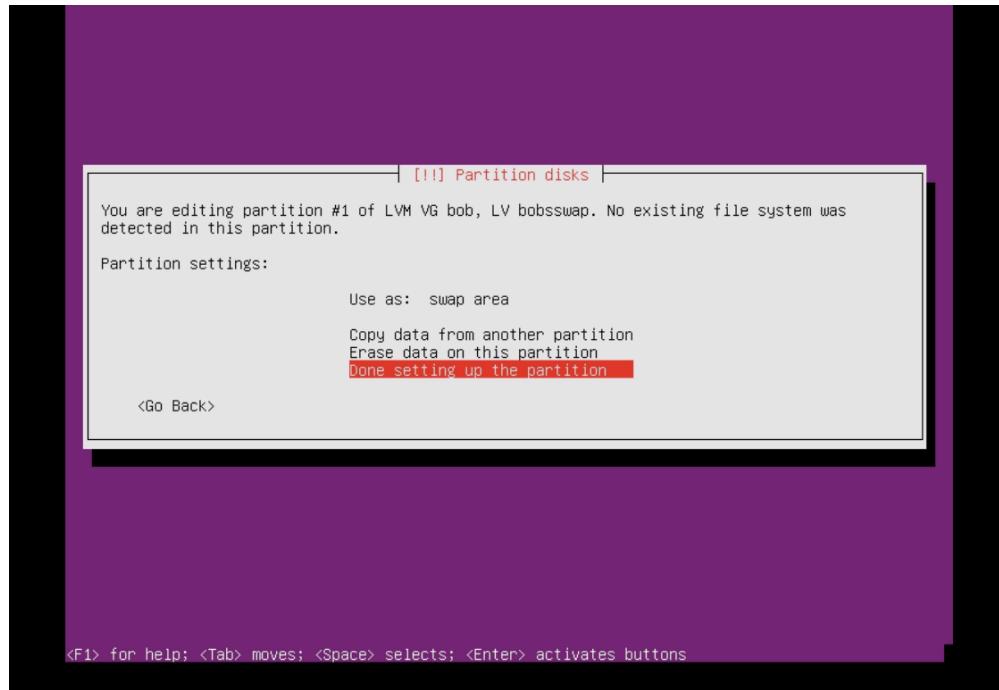


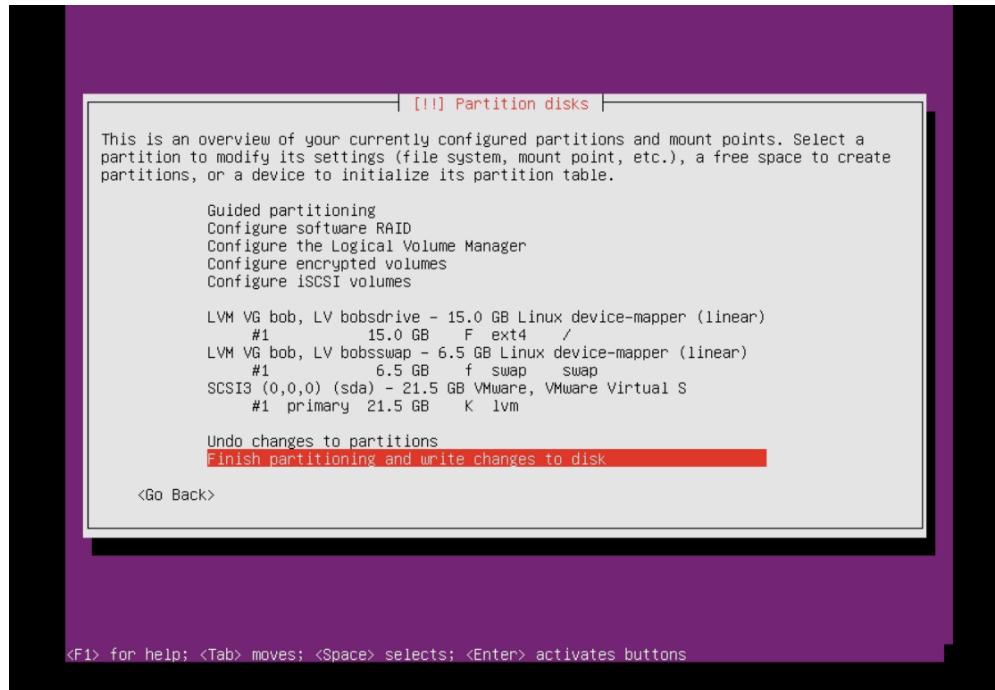


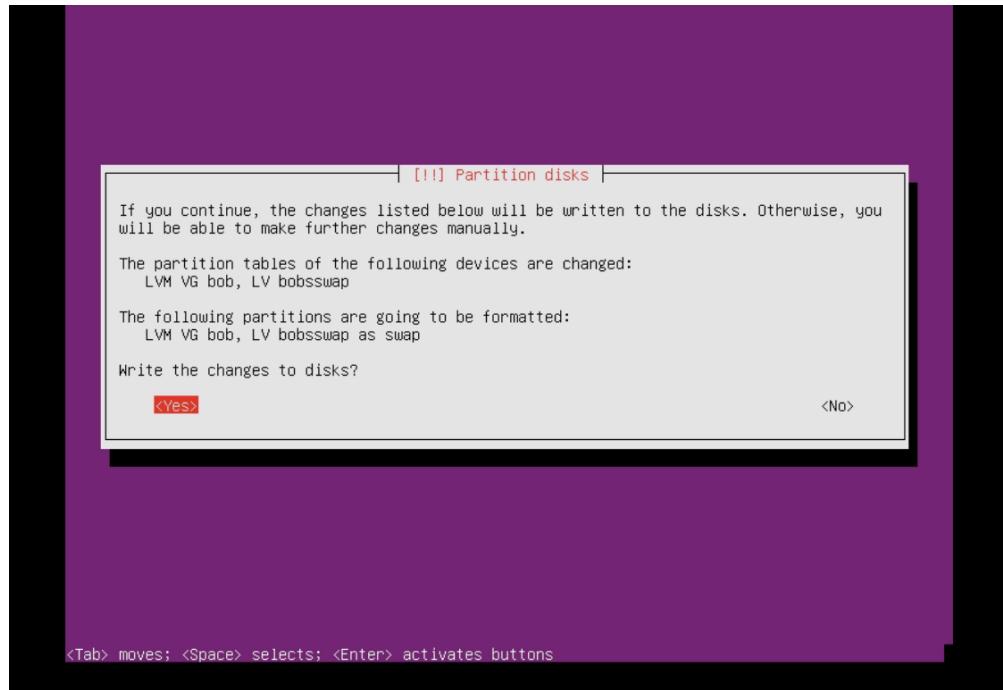


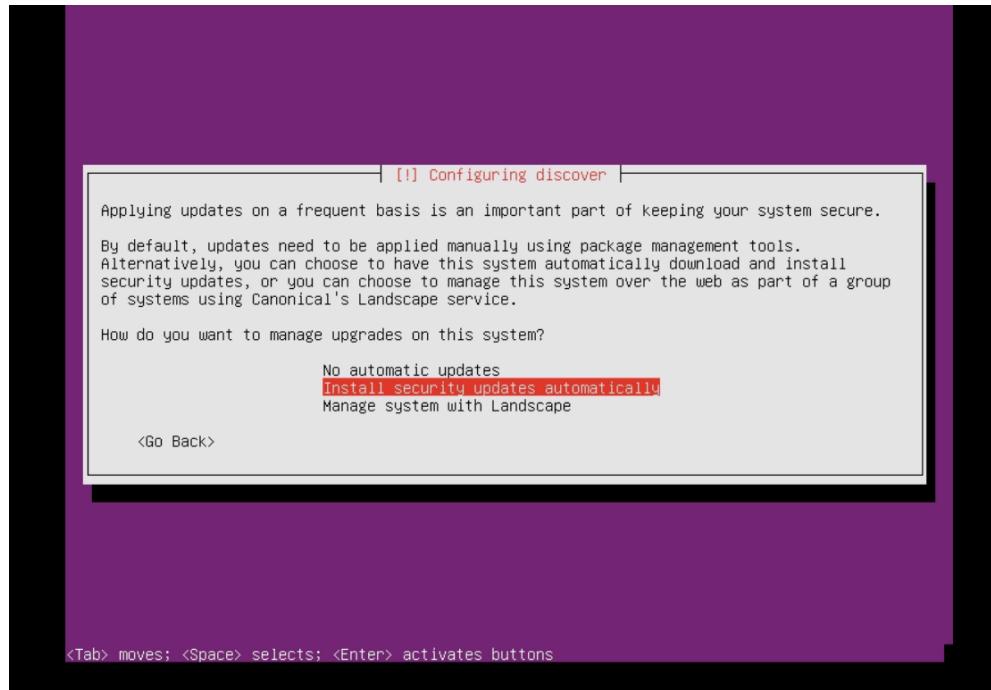


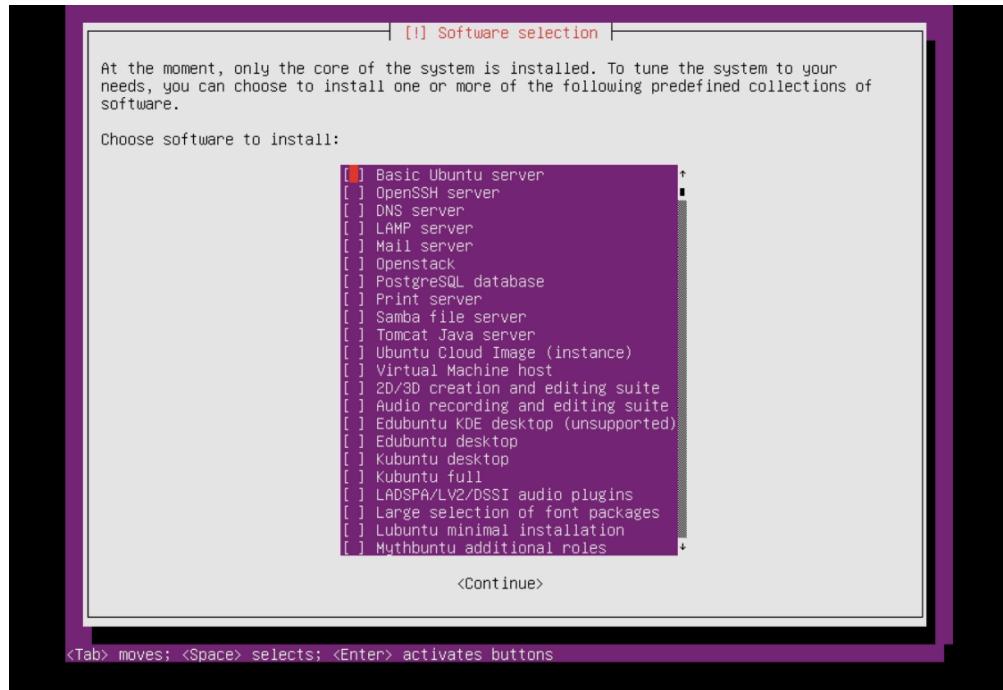


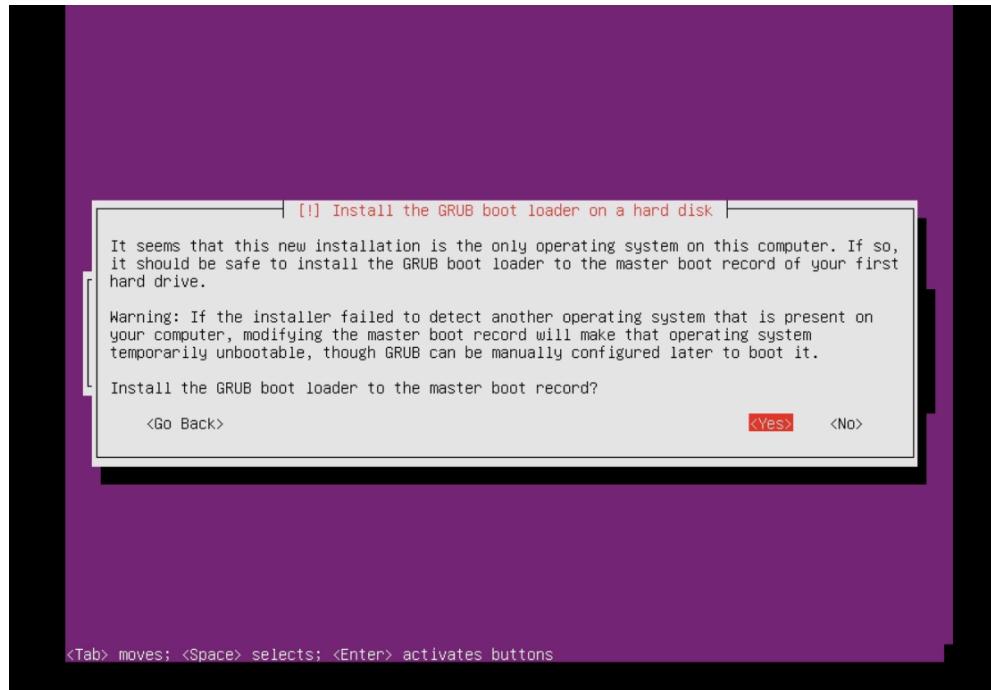


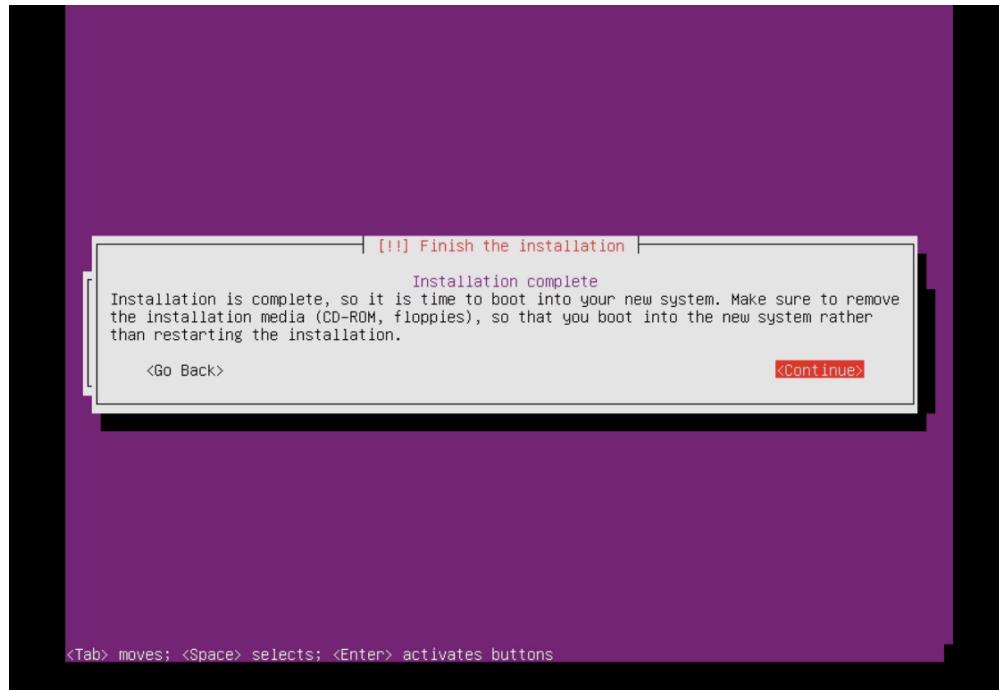












Repositories

- Security
- Updates
- Main
 - official supported software
- Restricted
 - not completely free but supported
- Universe
 - community supported
- Multiverse
 - restricted by copyright or legality
- Partner
 - 3rd party apps
- Extras
 - new apps ported to previous versions
- Back ports
 - new versions of existing apps that have not been added to Proposed
 - official release
- Source
 - source code for custom compilation



Repository Directory

- Cd /etc/apt



Some recommended utilities

- Axel - download accelerate
- Openssh server - diect connection to server
- Htop -
- Monitoring tool -



Mirror

- rsync - this allows you to set up a local mirror
- <https://help.Ubuntu.com/community/Rsyncmirror>
- debmirror- Connection could be done through http



Package Management

- APT
 - Old method
 - Simpler
 - More commands to memorize
 - Endosed by canonical endorsed
 - apt-get update
 - apt-get install
 - apt-get remove
- Aptitude
 - latest
 - more complex
 - not much
 - Debian official
 - aptitude search
 - aptitude install
 - aptitude purge



apt- options

- apt-get update -> refreshes repo info
- apt-get install xxx-> installs package and dependancy
- apt-get remove xxx-> removes package but not configs
- apt-get purge xxx-> removes package and configs
- apt-get upgrade -> upgrdes installed packages
- apt-get dist-upgrade-> upgrades all packages, even if new dependencies are needed
- apt-cache search xxx-> search for packages by keywords



RPM

- RPM installer is used in installing packages on rpm based distributions such as Redhat, CentOS, Fedora etc.
 - rpm -Uvh filename.rpm
- **How to List Installed RPMs**
- rpm -qa command will list all the packages installed on your system
 - rpm -qa
- Listing Files in RPM
 - rpm –qpl dhcp-3.0pl1-23.i386.rpm
- Unisntalling RPMs
 - rpm –e package-name



RPM

- The wget command can be used to download files quickly when you already know the URL at which the RPM is located
- wget
<http://linux.stanford.edu/pub/mirrors/fedora/linux/core/2/i386/os/Fedora/RPMS/dhcp-3.0pl2-6.16.i386.rpm>
- -U qualifier is used for updating an RPM to the latest version
- -h qualifier gives a list of hash # characters during the installation
- -v qualifier prints verbose status messages while the command is run
- rpm -Uvh mysql-server-3.23.58-9.i386.rpm



Linux Users

- Super user – unrestricted access to all system resources and files, root
- User ID of 0
- The primary user can become the root user using the sudo su – command
- Add Linux groups to your server – groupadd groupname
- How to add users and assign to a group
- Useradd –g groupname ansong
- Useradd danso creates a user danso with default group same as name
- passwd ansong to change password



Deleting users

- userdel ansong
- userdel – r ansong deletes everything including the users home content
- Telling a group which a user belong
 - Groups Ansong



THANK YOU



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