**Descripción del trabajo**

1. (10%) Instalar una máquina virtual con la última versión de Centos 7 utilizando virtualbox (si desea utilizar otro sistema de virtualización me debe contactar primero). Esta máquina debe ser instalada con los **pasos por defecto** para instalar el sistema con LVM. Esto crea tres particiones:

Partición                                         Sistema

/boot                                     ---->   Linux

/dev/mapper/<nombre-de-maquina>-root      ---->   Linux LVM

/dev/mapper/<nombre-de-maquina>-swap      ---->   Linux LVM

*Palabras clave para la búsqueda en google:*

* *How to install centos using lvm*
* *install centos lvm*
* *intall centos lvm virtualbox*

-Instalacion de CentOs completa usando la siguiente imagen ISO:

CentOS-7-x86\_64-DVD-1511

2. (10%) Luego de instalar se debe investigar como agregar un disco extra al sistema de virtualización utilizado. Esta unidad puede ser del tamaño que desee. Se recomienda usar 1 GB ya que el objetivo es practicar LVM.

Use el siguiente link para hacer el disco extra.

<https://howtobi.wordpress.com/2010/10/30/adding-a-additional-hard-disk-in%C2%A0virtualbox/>

Este es el output de FDISK –L

[root@localhost sysadmin]# fdisk -l

Disk /dev/sda: 64.4 GB, 64424509440 bytes, 125829120 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk label type: dos

Disk identifier: 0x0003040f

Device Boot Start End Blocks Id System

/dev/sda1 \* 2048 1026047 512000 83 Linux

/dev/sda2 1026048 125829119 62401536 8e Linux LVM

Disk /dev/sdb: 1073 MB, 1073741824 bytes, 2097152 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdd: 1073 MB, 1073741824 bytes, 2097152 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdc: 1073 MB, 1073741824 bytes, 2097152 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-root: 40.5 GB, 40546336768 bytes, 79192064 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-swap: 3489 MB, 3489660928 bytes, 6815744 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-home: 19.8 GB, 19792920576 bytes, 38658048 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

3. (10%) Guardar la salida de los comandos "display" de LVM para obtener la información de los volúmenes físicos, lógicos y grupos presentes antes de realizar cualquier cambio. Se recomienda revisar la guía de LVM presente en el sitio del curso antes de realizar esta sección.

Los comandos solicitados antes de cualquier trabajo:

[root@localhost sysadmin]# pvdisplay

--- Physical volume ---

PV Name /dev/sda2

VG Name centos

PV Size 59.51 GiB / not usable 3.00 MiB

Allocatable yes

PE Size 4.00 MiB

Total PE 15234

Free PE 16

Allocated PE 15218

PV UUID kJGJ1a-dzxE-hjSN-wx4i-IhtG-4za8-TNDdEV

[root@localhost sysadmin]# vgdisplay

--- Volume group ---

VG Name centos

System ID

Format lvm2

Metadata Areas 1

Metadata Sequence No 4

VG Access read/write

VG Status resizable

MAX LV 0

Cur LV 3

Open LV 3

Max PV 0

Cur PV 1

Act PV 1

VG Size 59.51 GiB

PE Size 4.00 MiB

Total PE 15234

Alloc PE / Size 15218 / 59.45 GiB

Free PE / Size 16 / 64.00 MiB

VG UUID zIUU0r-TtPb-Oti9-3aza-FdDV-bfU6-KlG9rU

[root@localhost sysadmin]# lvdisplay

--- Logical volume ---

LV Path /dev/centos/root

LV Name root

VG Name centos

LV UUID JRmbii-yA7H-pOfe-yFXA-xJca-O6cz-UAC7bT

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:54 -0400

LV Status available

# open 1

LV Size 37.76 GiB

Current LE 9667

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:0

--- Logical volume ---

LV Path /dev/centos/home

LV Name home

VG Name centos

LV UUID LKmImC-Rf7S-zT3E-aIWr-YrWm-erNI-fn4dcq

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:55 -0400

LV Status available

# open 1

LV Size 18.43 GiB

Current LE 4719

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:2

--- Logical volume ---

LV Path /dev/centos/swap

LV Name swap

VG Name centos

LV UUID L7Q0HE-JuKQ-pxE3-grSP-QEEv-9sdm-0SBXHx

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:56 -0400

LV Status available

# open 2

LV Size 3.25 GiB

Current LE 832

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:1

[root@localhost sysadmin]# fdisk -l

Disk /dev/sda: 64.4 GB, 64424509440 bytes, 125829120 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk label type: dos

Disk identifier: 0x0003040f

Device Boot Start End Blocks Id System

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Disk /dev/sdb: 1073 MB, 1073741824 bytes, 2097152 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdd: 1073 MB, 1073741824 bytes, 2097152 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdc: 1073 MB, 1073741824 bytes, 2097152 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-root: 40.5 GB, 40546336768 bytes, 79192064 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-swap: 3489 MB, 3489660928 bytes, 6815744 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-home: 19.8 GB, 19792920576 bytes, 38658048 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

5.(15%) Particionar el disco recién agregado al sistema en un formato apropiado para LVM. Recordad utilizar el comando fdisk para este propósito.

[root@localhost sysadmin]# fdisk /dev/sdb

Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.

Be careful before using the write command.

Device does not contain a recognized partition table

Building a new DOS disklabel with disk identifier 0xb8811868.

Command (m for help): n

Partition type:

p primary (0 primary, 0 extended, 4 free)

e extended

Select (default p): p

Partition number (1-4, default 1): 1

First sector (2048-2097151, default 2048):

Using default value 2048

Last sector, +sectors or +size{K,M,G} (2048-2097151, default 2097151):

Using default value 2097151

Partition 1 of type Linux and of size 1023 MiB is set

Command (m for help): t

Selected partition 1

Hex code (type L to list all codes): 8e

Changed type of partition 'Linux' to 'Linux LVM'

Command (m for help): w

The partition table has been altered!

Calling ioctl() to re-read partition table.

Syncing disks.

[root@localhost sysadmin]#

4. (15%) Extender el grupo de volúmenes creado por centos a la hora de la instalación utilizando el disco recién agregado de 1 GB. El nombre del grupo se puede obtener a la hora de ejecutar los comandos de "display".

[root@localhost sysadmin]# pvdisplay

--- Physical volume ---

PV Name /dev/sda2

VG Name centos

PV Size 59.51 GiB / not usable 3.00 MiB

Allocatable yes

PE Size 4.00 MiB

Total PE 15234

Free PE 15

Allocated PE 15219

PV UUID kJGJ1a-dzxE-hjSN-wx4i-IhtG-4za8-TNDdEV

--- Physical volume ---

PV Name /dev/sdb1

VG Name centos

PV Size 1023.00 MiB / not usable 3.00 MiB

Allocatable yes (but full)

PE Size 4.00 MiB

Total PE 255

Free PE 0

Allocated PE 255

PV UUID 2iHSE5-hfkQ-ZeC4-lcQf-wfQd-2nEo-aJ1kph

[root@localhost sysadmin]# vgdisplay

--- Volume group ---

VG Name centos

System ID

Format lvm2

Metadata Areas 2

Metadata Sequence No 6

VG Access read/write

VG Status resizable

MAX LV 0

Cur LV 4

Open LV 4

Max PV 0

Cur PV 2

Act PV 2

VG Size 60.50 GiB

PE Size 4.00 MiB

Total PE 15489

Alloc PE / Size 15474 / 60.45 GiB

Free PE / Size 15 / 60.00 MiB

VG UUID zIUU0r-TtPb-Oti9-3aza-FdDV-bfU6-KlG9rU

[root@localhost sysadmin]# lvdisplay

--- Logical volume ---

LV Path /dev/centos/root

LV Name root

VG Name centos

LV UUID JRmbii-yA7H-pOfe-yFXA-xJca-O6cz-UAC7bT

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:54 -0400

LV Status available

# open 1

LV Size 37.76 GiB

Current LE 9667

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:0

--- Logical volume ---

LV Path /dev/centos/home

LV Name home

VG Name centos

LV UUID LKmImC-Rf7S-zT3E-aIWr-YrWm-erNI-fn4dcq

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:55 -0400

LV Status available

# open 1

LV Size 18.43 GiB

Current LE 4719

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:2

--- Logical volume ---

LV Path /dev/centos/swap

LV Name swap

VG Name centos

LV UUID L7Q0HE-JuKQ-pxE3-grSP-QEEv-9sdm-0SBXHx

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:56 -0400

LV Status available

# open 2

LV Size 3.25 GiB

Current LE 832

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:1

--- Logical volume ---

LV Path /dev/centos/centos-bkups

LV Name centos-bkups

VG Name centos

LV UUID 5ryXY1-fzW4-YQ6C-w3Xs-6vlA-I9I2-LaXhlU

LV Write Access read/write

LV Creation host, time localhost.localdomain, 2016-10-03 00:47:40 -0400

LV Status available

# open 1

LV Size 1.00 GiB

Current LE 256

Segments 2

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:3

5. (20%) Luego de extender el grupo de volúmenes se debe extender el volumen lógico de swap en unos 200MB.

Se pudo incrementar /root y /swap pero no en las medidas solicitadas debido a que no tienen suficiente espacio así que se incrementó un poco.

[root@localhost sysadmin]# pvdisplay

--- Physical volume ---

PV Name /dev/sda2

VG Name centos

PV Size 59.51 GiB / not usable 3.00 MiB

Allocatable yes

PE Size 4.00 MiB

Total PE 15234

Free PE 1

Allocated PE 15233

PV UUID kJGJ1a-dzxE-hjSN-wx4i-IhtG-4za8-TNDdEV

--- Physical volume ---

PV Name /dev/sdb1

VG Name centos

PV Size 1023.00 MiB / not usable 3.00 MiB

Allocatable yes (but full)

PE Size 4.00 MiB

Total PE 255

Free PE 0

Allocated PE 255

PV UUID 2iHSE5-hfkQ-ZeC4-lcQf-wfQd-2nEo-aJ1kph

[root@localhost sysadmin]# vgdisplay

--- Volume group ---

VG Name centos

System ID

Format lvm2

Metadata Areas 2

Metadata Sequence No 10

VG Access read/write

VG Status resizable

MAX LV 0

Cur LV 4

Open LV 4

Max PV 0

Cur PV 2

Act PV 2

VG Size 60.50 GiB

PE Size 4.00 MiB

Total PE 15489

Alloc PE / Size 15488 / 60.50 GiB

Free PE / Size 1 / 4.00 MiB

VG UUID zIUU0r-TtPb-Oti9-3aza-FdDV-bfU6-KlG9rU

[root@localhost sysadmin]# lvdisplay

--- Logical volume ---

LV Path /dev/centos/root

LV Name root

VG Name centos

LV UUID JRmbii-yA7H-pOfe-yFXA-xJca-O6cz-UAC7bT

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:54 -0400

LV Status available

# open 1

LV Size 37.78 GiB

Current LE 9671

Segments 2

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:0

--- Logical volume ---

LV Path /dev/centos/home

LV Name home

VG Name centos

LV UUID LKmImC-Rf7S-zT3E-aIWr-YrWm-erNI-fn4dcq

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:55 -0400

LV Status available

# open 1

LV Size 18.43 GiB

Current LE 4719

Segments 1

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:2

--- Logical volume ---

LV Path /dev/centos/swap

LV Name swap

VG Name centos

LV UUID L7Q0HE-JuKQ-pxE3-grSP-QEEv-9sdm-0SBXHx

LV Write Access read/write

LV Creation host, time localhost, 2016-10-01 04:33:56 -0400

LV Status available

# open 2

LV Size 3.29 GiB

Current LE 842

Segments 2

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:1

--- Logical volume ---

LV Path /dev/centos/centos-bkups

LV Name centos-bkups

VG Name centos

LV UUID 5ryXY1-fzW4-YQ6C-w3Xs-6vlA-I9I2-LaXhlU

LV Write Access read/write

LV Creation host, time localhost.localdomain, 2016-10-03 00:47:40 -0400

LV Status available

# open 1

LV Size 1.00 GiB

Current LE 256

Segments 2

Allocation inherit

Read ahead sectors auto

- currently set to 8192

Block device 253:3

6.(20%) Luego de extender el volumen lógico se debe utilizar el comando "resize2fs" para que la tabla de archivos pueda detectar el nuevo espacio agregado.

En swap no hubo forma de hacer resize2fs con el siguiente error:

[root@localhost sysadmin]# xfs\_growfs /dev/centos/swap

xfs\_growfs: /dev/centos/swap is not a mounted XFS filesystem

[root@localhost sysadmin]# xfs\_growfs /dev/mapper/centos-swap

xfs\_growfs: /dev/mapper/centos-swap is not a mounted XFS filesystem

[root@localhost sysadmin]# resize2fs /dev/mapper/centos-swap

resize2fs 1.42.9 (28-Dec-2013)

resize2fs: Bad magic number in super-block while trying to open /dev/mapper/centos-swap

**OPCIONAL (+10%)** : Extienda la partición de root en 512 MB.

Pero para Root si hubo exito con el comando xfs\_growfs

[root@localhost sysadmin]# xfs\_growfs /dev/centos/root

meta-data=/dev/mapper/centos-root isize=256 agcount=4, agsize=2474752 blks

= sectsz=512 attr=2, projid32bit=1

= crc=0 finobt=0

data = bsize=4096 blocks=9899008, imaxpct=25

= sunit=0 swidth=0 blks

naming =version 2 bsize=4096 ascii-ci=0 ftype=0

log =internal bsize=4096 blocks=4833, version=2

= sectsz=512 sunit=0 blks, lazy-count=1

realtime =none extsz=4096 blocks=0, rtextents=0

data blocks changed from 9899008 to 9903104

