Red Hat System Administration II

Course Outlines

- Advanced File System Management
  - RAID
  - LVM

RAID

Software RAID Configuration

- Types of RAID
  - RAID 0
  - RAID 1
  - RAID 5
- Steps to set up RAID
  - Use the fdisk command to create RAID partitions of type RAID (fd)
  - Use mdadm command to create RAID device, command options
    - v: for verbose mode
    - C: create device specified
    - --level: the device RAID level
    - --raid-devices: the number of devices in the RAID

Software RAID Configuration Con't

- Create new file system using mke2fs command which has special options for the RAID
  - -R stride=n
- Mount the RIAD device and add it to fstab file
- Example

```
# fdisk /dev/hda
# mdadm –v –C /dev/md0 --level 5 --raiddevices=3
   /dev/hda9 /dev/hda10 /dev/hda11
# mke2fs -j -b 4096 -R stride=16 /dev/md0
# mkdir /data
# mount /dev/md0 /data
```

Software RAID Configuration Con't

```
# mount | grep /dev/md0
    /dev/md0 on /data type ext3 (rw)
```

- To view information about RAID status

  ```
  # cat /proc/mdstat
  # mdadm --detail /dev/md0
  ```

LVM

Flexible Filesystems with LVM

- LVM is used to create virtual partitions called logical volumes from the space that is available on one or more hard drives, disk partitions, or RAID devices.

- For LVM to use these devices, they need to be initialized as physical volumes and assigned to a "container" called a volume group.

- You can assign multiple physical volumes to the same volume group and use a volume group to create multiple logical volumes

Flexible Filesystems with LVM

- Each volume group divides its disk space pool into extents of identical size.
- An extent's size is set for a particular volume group when that volume group is created.
- An extent is typically between 1 MB and 64 MB in size.
- A single logical volume may contain at most 65,534 extents, so larger extent sizes allow larger logical volumes.

Creating Volume Groups and Logical Volumes

- Create LVM configuration files
- Create physical volumes
- Create volume groups which function equivalent to a disk
- Create logical volumes which is equivalent to a partition
- Create file system

Example

vgscan // store information in /etc/lvm

pvcreate /dev/hda9

Physical volume “/dev/hda9 successfully created

pvcreate /dev/hda10

Physical volume “/dev/hda10 successfully created

pvcreate /dev/hda11

Physical volume “/dev/hda11 successfully created

pvcreate /dev/hda12

Physical volume “/dev/hda12 successfully created

Example

vgcreate vg0 /dev/hda9 /dev/hda10 //A directory under /dev directory is created called vg0

Volume group “vg0” successfully created

vgcreate vg1 /dev/hda11 /dev/hda12

Volume group “vg1” successfully created

lvcreate –L 100M –n lv1 vg0 // A device file called /dev/vg0/lv1 is created

Logical volume “lv1” created

mkfs –t ext3 /dev/vg0/lv1

mount /dev/vg0/lv1 /data

Example

```
# df –h
    Filesystem            Size  Used  Avail  Use%  Mounted on
    /dev/mapper/vg0-lv1   97M   5.6M  87M    7%    /data
# lvextend –L +40M /dev/vg0/lv1
    Extending logical volume lv1 to 140.00 MB
    Logical volume lv1 successfully resized
# ext2online /data
# df –h /data
    Filesystem            Size  Used  Avail  Use%  Mounted on
    /dev/mapper/vg0-lv1   135M  5.6M  127.4M 7%    /data
```

Other LVM Commands

- To add physical volumes to a volume group : vgextend
- To Move data in a physical volume to other physical volumes in the volume group : pvmove needed before removing a physical volume from the volume group
- To remove a physical volume from a volume group : vgreduce
- To display information about a physical volume : pvdisplay
- To display information about a volume group : vgdisplay
- To display information about a logical volume : lvdisplay

Thanks ☺

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