ATOL: Logical Volume Management

Marek Grác
xgrac@fi.muni.cz

Red Hat Czech s.r.o. / Faculty of Informatics, Masaryk University

Advanced Topics of Linux Administration

What is Logical Volume Manager?

- A layer of abstraction that allows easy manipulation of volumes. Including resizing of filesystems.
- Allow reorganization of filesystems across multiple physical devices
  - Devices are designated as Physical Volumes (PV)
  - One or more PV are used to create a Volume Group (VG)
  - PV are defined with Physical Extents of a fixed size
  - Logical Volumes (LV) are created on PV and are composed of Physical Extents
  - Filesystems may be created on Logical Volumes

Creating Logical Volumes

- ► Create physical volumes
  - ► *pvcreate /dev/sda3*
- ► Assign physical volumes to volume groups
  - ► *vgcreate vg0 /dev/sda3*
- ► Create logical volumes from volume groups
  - ► *lvcreate -L 256M -n data vg0*
  - ► *mke2fs -j /dev/vg0/data*

Resizing Logical Volumes

- Growing Volumes
  - *lvextend* can grow logical volumes
  - *resize2fs* can grow EXT3 filesystems online
  - *vgextend* adds new physical volumes to an existing volume group
- Shrinking Volumes
  - Filesystem have to be reduced first
  - Requires a filesystem check and cannot be performed online
  - *lvreduce* can then reduce volume
- Volume Groups can be reduced with:
  - *pvmove /dev/sda3*
  - *vgreduce vg0 /dev/sda3*

Test Your Abilities 1/2

- ▶ Create a physical volume (PV) on loopback device
- ▶ Create a volume group (VG) on top of this device
- ▶ Create a logical volume (LV) which fills VG completely
- ▶ Create a filesystem with ext3 and mount it
- ▶ Do not umnount filesystem in next steps when it is not needed

Test Your Abilities 2/2

- ▶ Create new PV on separate loopback device
- ▶ Extend LV with space available on a new PV
- ▶ Extend filesystem on our LV so free space will be available for users
- ▶ Remove first loopback from the system (emulate removing old disk)

Lab: Prepare a paper

- Themes:
  - Compare software and hardware RAID
  - Compare new filesystems in Linux (ext4, zfs, reiser4, ...)
- Format:
  - Short presentation (15–20 minutes; 5-7 slides)
  - Paper containing comparision (1000 words)