CS312 Homework Solutions #1

January 27, 2015

Answers

1. `$ yum install curl jwhois lsof man man-pages man-pages-overrides nc net-tools`

2. `$ rpm -qf /bin/bash`

3. `$ curl http://cs312.osuosl.org/_static/hw/pkgs -o - | awk 'print $2' | sort | uniq -c`

4. `du -L` dereferences symbolic links, so it counts the size of /home/centos/zeros. `/tmp` does not contain `1.1G` of data

5. `du` and `df` measure different things, and both can be correct but differ. `du` reads file metadata and directory entries, whereas `df` reads filesystem metadata. If a process has an open file handle, but that file is removed from a directory `df` will report the usage while `du` will not report that space as used.

6. `$*` - Expands positional parameters, when double quoted it expands as a single word
   `$@` - Expands positional parameters, when double quoted it expands all parameters as individual words.

`$?` - Expands to the exit status of the last executed pipeline in the foreground
`$!` - Expands to the PID of the process most recently placed in the background
`$$` - Expands to the PID of the current shell, and not the subshell. It is not necessarily the same as `$BASHPID`.

7. The Agile Methods have contributed to the growth of DevOps in the following ways: it has encouraged mixing of Ops, Devs, and QA Teams; it has encouraged inclusion of Ops and QA earlier in the process; it has encouraged growth and use of Systems-related tooling; it has encouraged innovation and faster changes

8. Linus Torvalds created the kernel, and still maintains it. The first Linux distribution is arguably SLS Linux or MCC Interim. MCC Interim came first, but SLS received far greater adoption and fathered several modern distros.

9. Ext 2 is legacy and does not support journaling. Ext 3 is older, and introduced journaling, but not much else. Ext 4 introduced a larger file size, larger file system size, single phase transaction journaling, as well as a myriad of other features.
   Generally Ext 3 is no longer used, Ext 2 is used for some legacy boot loaders and on devices where the write overhead of journaling is not wanted (USB drives, CF cards, etc). Ext 4 is used everywhere else.

10. They are installed in `/usr/local`, with the executables in `/usr/local/bin` or `/usr/local/sbin`.

11. `chkconfig --add ntpd` to enable it; `/etc/init.d/ntpd start` to start it.

12. `dd if=/dev/zero of=disk-image bs=20M count=1`

13. `mkfs.ext4 disk-image` or `mkfs -t ext4 disk-image`

```
mke2fs 1.41.12 (17-May-2010)
disk-image is not a block special device.
Proceed anyway? (y,n) y
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
Stride=0 blocks, Stripe width=0 blocks
5016 inodes, 20000 blocks
1000 blocks (5.00%) reserved for the super user
First data block=1
Maximum filesystem blocks=20709376
3 block groups
8192 blocks per group, 8192 fragments per group
1672 inodes per group
Superblock backups stored on blocks:
        8193

Writing inode tables: done
Creating journal (1024 blocks): done
Writing superblocks and filesystem accounting
   ↪ information: done

This filesystem will be automatically checked every
   ↪  35 mounts or
180 days, whichever comes first.  Use tune2fs -c or
   ↪  -i to override.
```

14. (2pt) `losetup /dev/loop0 disk-image`

```
$ mount /dev/loop0 /mnt
$ df -h /mnt
Filesystem      Size  Used Avail Use% Mounted on
/dev/loop0       18M  170K   17M   1% /mnt
```

15. `umount /mnt; fsck.ext4 disk-image`

```
e2fsck 1.41.12 (17-May-2010)
```

```
disk-image: clean, 11/5016 files, 1832/20000 blocks
```

We must unmount the filesystem because you cannot perform a filesystem check on a mounted disk. The technical reason is that both fsck and other programs can be reading (or in the latter case, modifying!) the disk with no coordination which will produce inaccurate results for fsck - the superblocks will be changing as fsck is reading them!
If you have a good reason to perform fsck anyway, you can do it live with: `fsck.ext4 -n <mount-point>` This performs a read-only check, and will report false errors.

16. `tune2fs -l disk-image | grep Maximum mount count`

    ```
    Maximum mount count:       35
    ```

    To change the Maximum mount count, run `tune2fs -i 10d disk-image`. Due to the wording of the problem, `tune2fs -c <number> disk-image` is acceptable as well.

17. `resize2fs disk-image`