# Linux admin utilities and configuration

# Time and date

- Configuration files:
  - /etc/timezone  #default time zone variable is set in here
  - /etc/localtime  #can you tell what your current time zone is set to?
  - Look under /usr/share/zoneinfo
- `sudo dpkg-reconfigure tzdata` (Ubuntu/Debian) OR `timedatectl set-timezone <timezone>` (for others)
- `tzselect`
  - Variable TZ can be used to change the shell time-zone display for your user or session
- `date`
- `hwclock`

# Network Time Protocol (NTP)

- Utility: `ntpdate`
  - http://www.ntp.org/ # everything you may (not) want to know about ntp
  - http://doc.ntp.org/4.1.1/ntpdate.htm # ntpdate utility documentation from the developers
  - https://linux.die.net/man/8/ntpdate #man pages for the command
- Configuration file:
  - /etc/default/ntpdate
- Can run as a daemon to constantly keep the time and date synced with the ntp server
  - /etc/ntp.conf

# Host identification

- Hostname can be set in the following locations:
  - `/etc/hostname`
  - `/etc/hosts`
- Use `hostname` command to display your hostname
- Use `hostnamectl` to display more comprehensive identification and to change hostname
- Ubuntu server specific (uses Cloud-init for cloud compatibility):
  - `/etc/cloud/cloud.cfg`
    - `Preserve_hostname: true/false`
  - Read about “Cloud-init” here: https://cloudinit.readthedocs.io/en/latest/

# RAM and Swap memory

- RAM is physical memory
  - free #use this command to display memory stats (ex.: `free -h`)
- Swap is “virtual” memory. i.e. stored on the hard disk
  - undesirable to use when running an application (means system run out of RAM)
  - Desirable if an application or data is just cached
    - For example if a process is sleeping it can be swapped out of RAM for another application that is actively running, yet we are not discarding the sleeping application and its data
  - Dedicated “swap” partitions or files
    - Use `lsblk` to see if there are any swap partitions on your system
    - Allocate space on your disk for swap: use `fallocate` , then `mkswap`
  - Other commands:
    - `swapon` # use this to see your current swap file, and its usage
    - `swapoff`

# Comparing files

- The `cmp` command to compare contents of files (byte-by-byte binary compare)
  - Can tell you if two files are exactly the same or not
- The `diff` command can be used to compare text files
  - Can tell you if two text files are the same or not
  - Can tell you what the differences are
  - `$: diff <file1> <file2>`
    - Output uses "`<`" and "`>`" to let you know which lines are different between the files
    - Also outputs "line" and "column" where the differences are located

```
ali@ers20095559:~$ diff network.txt network2.txt
1c1
<    *-network:0
---
>    *-network:2
16c16
<    *-network:1
---
>    *-network:3
```

# System Processes

- A “process” is the code, data, and control information for a program as it runs
  - Control information is stored by PID (process id.) in the kernel’s process table
    - uid of user who started the program
    - gid that the process running as
    - Environment of the process
  - Process uid and gid determines access to resources
- Commands:
  - `ps`
  - `pstree`
  - `kill`
  - `top` and its other derivatives (usually not installed by default): `htop`, `slabtop`, `atop`, `iotop`, `iftop`, `gtop`, etc…

# User management

- `pwck`: check for passwd and shadow file inconsistencies
  - Check inside `/etc/passwd` and `/etc/shadow` to find potential issues or errors
- User profiles: `/etc/skel`
  - Anything in this folder is copied into new user's home directory.
  - Can also customize user settings and shell environment
    - For example include custom .bashrc, .ssh, .config, etc…
- Commands:
  - `lslogings` #Display information about known users in the system
  - `getent [passwd, group, etc.. ]` #get entries from Name Service Switch libraries
  - `id`, `who`, `w`, `last`

# Special groups

- `sudo` and `wheel`: groups for sudo and su commands
- `adm`: used for system monitoring tasks
- `lpadmin`, `lp`: group for administrating/using printers
- `lxd`, `libvirtd`: lxd container access
- `plugdev`, `cdrom`, `floppy`, `tape`: removable media access
- Full list of Debian default groups (short and interesting read):
  - https://wiki.debian.org/SystemGroups