# DevOps-Notes Documentation

*Release 2.0.2*

**Vinay Hegde**

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# Basic-Concepts

CHAPTER 1

# Overview

Welcome to my notes on various topics related to the DevOps / SRE terminology such as -

- Linux Operating Systems
- Networking
- Web / Email / DNS / Database Servers
- GIT
- Configuration Management Tools (*Chef, Ansible, Puppet*)
- Programming (*Python, Ruby, Shell Scripting*)..and many more

## 1.1 Tech Stack:

- **reStructuredText (RST)** - To write .rst files for the formatting. You can start learning via this
- **Sphinx** - The engine generating content in **HTML**, **LaTeX**, **ePub**. A beginner's guide can be found on their page
- **GitHub** - For maintaining the source code in version control.
- **ReadTheDocs** - Hosting my documentation. Refer this excellent document to help you get up and running in no time.

## 1.2 How-To-Use

- Please click any link on the Left Hand side of this webpage to read more such as **Utilities**, **CPU**, **Monitoring** among others.
- Then you will find subsections (*varies upon topics*) expandable by clicking on the + icon to read them.

- You can find *keywords* in the **Search Box** present in the top Left Corner of this webpage to return relevant results.

## 1.3 Please Note:

- Due to dynamic content for any topic in here, this will forever be a work in progress. Feedback, suggestions and queries are always appreciated!
- For contributions, please read the guidelines on how to share Contributing to this project.
- At all times, please refer to the Code-of-Conduct guidelines on interacting with other community members in a respectful and cordial manner.

### 1.3.1 Boot Process

*Some useful links to explain the concepts of the Boot Process*

#### Concepts

#### Overview of the Linux Boot process

- https://www.ibm.com/developerworks/library/l-linuxboot/
- https://0xax.gitbooks.io/linux-insides/content/Booting/linux-bootstrap-1.html
- http://www.slashroot.in/linux-booting-process-step-step-tutorial-understanding-linux-boot-sequence
- http://www.golinuxhub.com/2014/03/step-by-step-linux-boot-process.html?
- http://www.tecmint.com/linux-boot-process/
- https://www.digitalocean.com/community/tutorials/the-upstart-event-system-what-it-is-and-how-to-use-it
- http://linoxide.com/booting/boot-process-of-linux-in-detail/
- http://bencane.com/2013/09/16/understanding-a-little-more-about-etcprofile-and-etcbashrc/

#### Difference between commands for bringing down a linux server

- http://unix.stackexchange.com/questions/195898/what-is-the-difference-between-these-commands-for-bringing-down-a-linux-s

#### Difference between GRUB / LILO

- https://www.ibm.com/developerworks/library/l-bootload/index.html

#### Is a separate boot partition necessary in Linux OS?

- http://superuser.com/questions/522971/is-a-boot-partition-always-necessary

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To answer the outright question: **no**, a separate partition for `/boot` is certainly not necessary in e case.

**However**, even if you do not split anything else, it is generally recommended to have separate partitions for `/`, `/boot` and swap. I would also *strongly suggest* putting `/home` on a separate partition as well, even if you do not split the file system hierarchy any further.

The reason for putting /boot on a partition separate from the regular root file system is that you ca reduce on-disk file system complexity, which reduces the demands on the boot loader to bootstra kernel and initial RAM disk. This becomes particularly interesting if you are running a non-trivial se maybe you are running RAID, or an unusual file system such as ZFS on the root partition, or an encrypted root partition. The partition for /boot can then be formatted using e.g. plain ext2fs. Since partition only needs to be small (a few hundred megabytes is plenty; /boot on my current system i 100 MB, and I do not feel any constraints from that), the downsides of a non-journaled file system such as ext2 need not be that great because checks are so fast anyway, and the relative simplicity the file system as well as it being largely static might make undetected corruption less likely. That boot loader doesn't need to natively understand an exotic file system or disk setup is another poss advantage.

The reason for putting /home on a separate partition is that, even if something goes rogue and sta filling it up (or if you do so yourself), you never risk it causing problems for non-user processes (w rarely run out of /home) or the boot process itself. Also, it becomes much easier to reinstall the O switch distributions, if you can simply tell the installer to leave /home as it is and reformat `/` to fill with its own files. As a last-ditch recovery effort if something truly goes wrong software-wise, this make a major difference.

Running a swap file is not a recommended setup on Linux, and I'm not even sure most common distributions' stock kernels *support* (or allow) file-based swap. There are multiple reasons for this, large reason being performance (largely due to the risk for fragmentation). Swap is already hideou slow compared to RAM (it's more of a stopgap measure than a fix), so there is little reason to mak even slower by risking fragmentation. And a swap partition can safely be shared between Linux distributions in a multi-boot environment; perhaps not a consideration in the general case, but cert a consideration for some. A swap partition can also be placed on a separate physical disk with different characteristics; maybe a SSD these days, or a 10krpm drive running off a separate contr channel (that last is less a consideration nowadays when every SATA disk is on a separate chann but could make a difference back in the PATA days).

Personally these days, I separate /, /boot, and swap, with / on my current system being 100 GB (I' nowhere near using all of that; curent usage is 8.9 GB, and that gives me everything I need in term software and then some). The rest of the primary disk is made up of a single file system, which by personal convention I mount at /da (`d`isk `a`). A second disk would be /db, then /dc and so on. (I doubt the FHS really approves of this scheme, but it works well for me in practice.) I then bind-mo /home into /da, meaning I can move the physical directory around without having to worry about updating every single path referencing it or repartitioning just because I realized that I am running short of disk space for /home.

#### Commands

#### Configuration

- http://www.if-not-true-then-false.com/2012/delete-remove-old-kernels-on-fedora-centos-red-hat-rhel/
- https://linuxconfig.org/how-to-remove-unused-kernel-images-from-centos-linux-system
- https://markmcb.com/2013/02/04/cleanup-unused-linux-kernels-in-ubuntu/
- http://www.ostechnix.com/how-to-create-bootable-usb-drive-using-dd-command/
- https://blog.packagecloud.io/eng/2016/03/08/how-to-extract-and-disassmble-a-linux-kernel-image-vmlinuz/

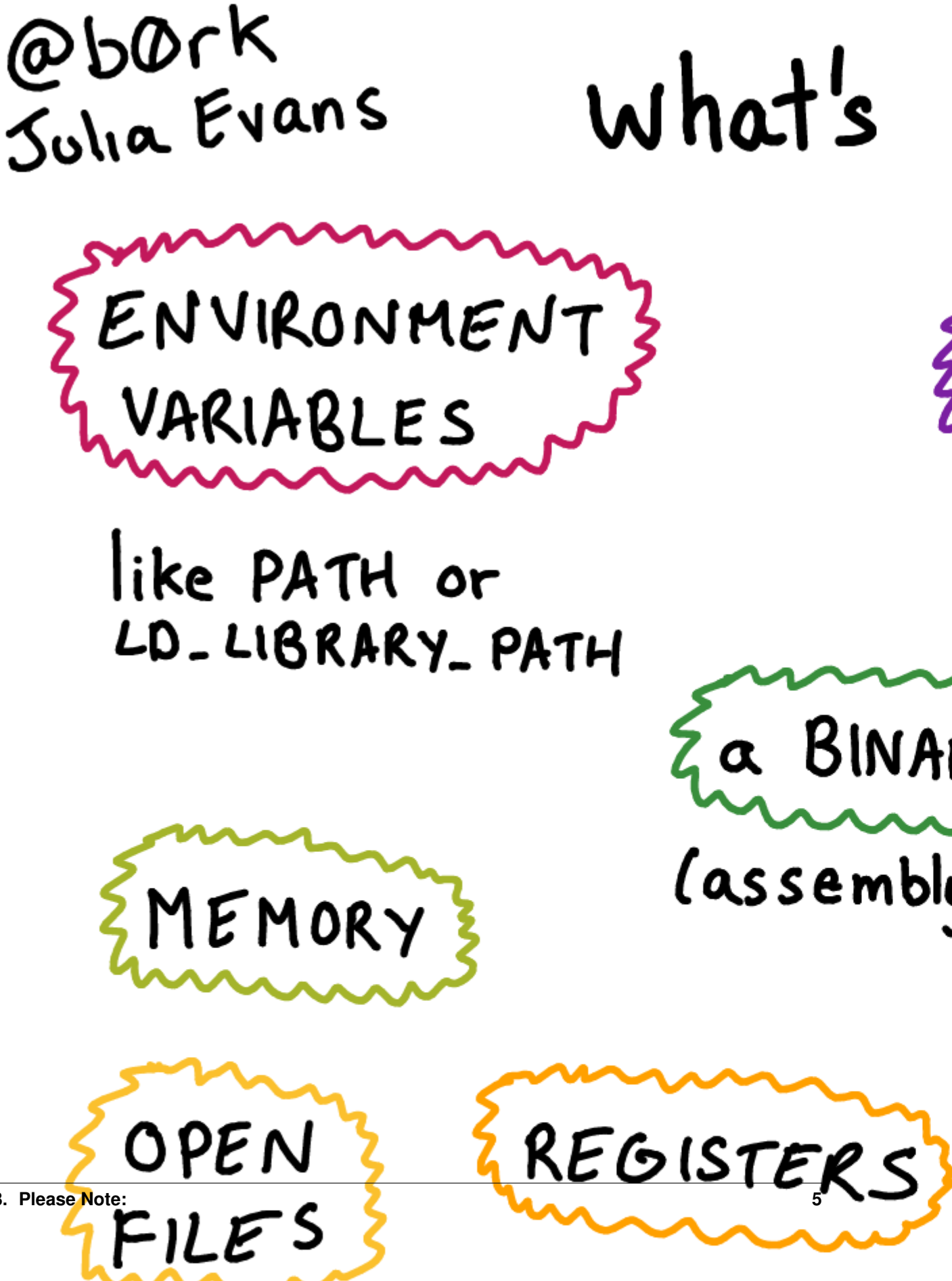
#### Troubleshooting & Log Parsing

### 1.3.2 CPU

*Some useful links to explain the concepts of CPU processing*

#### Concepts

- https://www.slashroot.in/difference-between-process-and-thread-linux
- http://blog.scoutapp.com/articles/2009/07/31/understanding-load-averages


@b0rk
Julia Evans
what's
ENVIRONMENT VARIABLES
like PATH or LD_LIBRARY_PATH
a BINA
(assembl
MEMORY
OPEN FILES
REGISTERS

### Types of Processes

- http://www.gmarik.info/blog/2012/orphan-vs-zombie-vs-daemon-processes/

### Output of ps command - Explained

- http://superuser.com/questions/117913/ps-aux-output-meaning

```
$ ps aux
USER       PID  %CPU %MEM  VSZ RSS     TTY   STAT START   TIME COMMAND
timothy  29217  0.0  0.0 11916 4560 pts/21   S+   08:15   0:00 pine
root     29505  0.0  0.0 38196 2728 ?        Ss   Mar07   0:00 sshd: can [priv]
can      29529  0.0  0.0 38332 1904 ?        S    Mar07   0:00 sshd: can@notty
```

- **USER** = user owning the process
- **PID** = process ID of the process
- **%CPU** = It is the CPU time used divided by the time the process has been running.
- **%MEM** = ratio of the process's resident set size to the physical memory on the machine
- **VSZ** = virtual memory usage of entire process (in KiB)
- **RSS** = resident set size, the non-swapped physical memory that a task has used (in KiB)
- **TTY** = controlling tty (terminal)
- **STAT** = multi-character process state
- **START** = starting time or date of the process
- **TIME** = cumulative CPU time
- **COMMAND** = command with all its arguments

- http://thelinuxstuff.blogspot.in/2012/08/process-state-codes-in-ps-output.html

### Process state codes

The codes used are:

| Code | Meaning |
|---|---|
| D | Uninterruptible sleep (usually IO) |
| R | Running or runnable (on run queue) |
| S | Interruptible sleep (waiting for an event to complete) |
| T | Stopped, either by a job control signal or because it is being traced. |
| W | paging (not valid since the 2.6.xx kernel) |
| X | dead (should never be seen) |
| Z | Defunct ("zombie") process, terminated but not reaped by its parent. |

For BSD formats and when the stat keyword is used, additional characters may be displayed:

| Code | Meaning |
|---|---|
| < | high-priority (not nice to other users) |
| N | low-priority (nice to other users) |
| L | has pages locked into memory (for real-time and custom IO) |
| s | is a session leader |
| l | is multi-threaded (using CLONE_THREAD, like NPTL pthreads do) |
| + | is in the foreground process group |

**D state** occurs then the process is in uninterruptible sleep. This state is bad, because you can't do anythin with the process in D state.

Fortunately, process normally remains in such state not for so long. But if you have a heap of D state processes then some logic in system is disrupt.

If that is happening, the very important thing is to determine where this unlucky sleep occurs. It is easy to do with ps command with / option. WCHAN column shows the name of the kernel function where the process is sleeping:

#### Commands

#### NoHUP &

- https://stackoverflow.com/questions/15595374/whats-the-difference-between-nohup-and-ampersand
- https://unix.stackexchange.com/questions/3886/difference-between-nohup-disown-and

# shell - Difference between nohup, disown a

4-5 minutes

---

Let's first look at what happens if a program is started from an interactive sh
to a terminal) without `&` (and without any redirection). So let's assume you'v
`foo`:

- The process running `foo` is created.
- The process inherits stdin, stdout, and stderr from the shell. Therefore it i
  connected to the same terminal.
- If the shell receives a `SIGHUP`, it also sends a `SIGHUP` to the process (wh
  causes the process to terminate).
- Otherwise the shell waits (is blocked) until the process terminates.

Now, let's look what happens if you put the process in the background, that
`&`:

- The process running `foo` is created.
- The process inherits stdout/stderr from the shell (so it still writes to the te
- The process in principle also inherits stdin, but as soon as it tries to read
  halted.
- It is put into the list of background jobs the shell manages, which means
  - It is listed with `jobs` and can be accessed using `%n` (where `n` is the job
  - It can be turned into a foreground job using `fg`, in which case it continu
    would not have used `&` on it (and if it was stopped due to trying to read

### top

- http://www.thegeekstuff.com/2010/01/15-practical-unix-linux-top-command-examples/
- http://www.slashroot.in/linux-cpu-performance-monitoring-tutorial
- http://www.tecmint.com/command-line-tools-to-monitor-linux-performance/
- http://tecadmin.net/understanding-linux-top-command-results-uses/
- http://linuxaria.com/howto/understanding-the-top-command-on-linux
- http://www.tecmint.com/12-top-command-examples-in-linux/
- http://linoxide.com/linux-command/linux-top-command-examples-screenshots/
- http://www.dowdandassociates.com/blog/content/howto-troubleshoot-with-linux-top-command/
- http://www.linuxjournal.com/magazine/hack-and-linux-troubleshooting-part-i-high-load
- http://www.crucialp.com/resources/tutorials/server-administration/server-loads-explained-linux-unix/
- https://haydenjames.io/use-atop-linux-server-performance-analysis/
- https://alvinalexander.com/linux/unix-linux-process-memory-sort-ps-command-cpu
- https://math-linux.com/linux/tip-of-the-day/article/find-out-biggest-cpu-memory-consuming-processes-with-ps-command

### SAR

- http://www.thegeekstuff.com/2011/03/sar-examples/
- http://linoxide.com/linux-command/linux-system-performance-monitoring-using-sar-command/
- http://www.slashroot.in/examples-using-sar-command-system-monitoring-linux
- http://www.blackmoreops.com/2014/06/18/sysstat-sar-examples-usage/
- http://linoxide.com/linux-command/linux-pidstat-monitor-statistics-procesess/
- http://www.thegeekstuff.com/2014/11/pidstat-examples/
- http://www.yourownlinux.com/2014/08/sar-command-in-linux-tutorial-with-examples.html
- https://crybit.com/sar-command/
- http://www.cyberciti.biz/open-source/command-line-hacks/linux-monitor-process-using-pidstat/

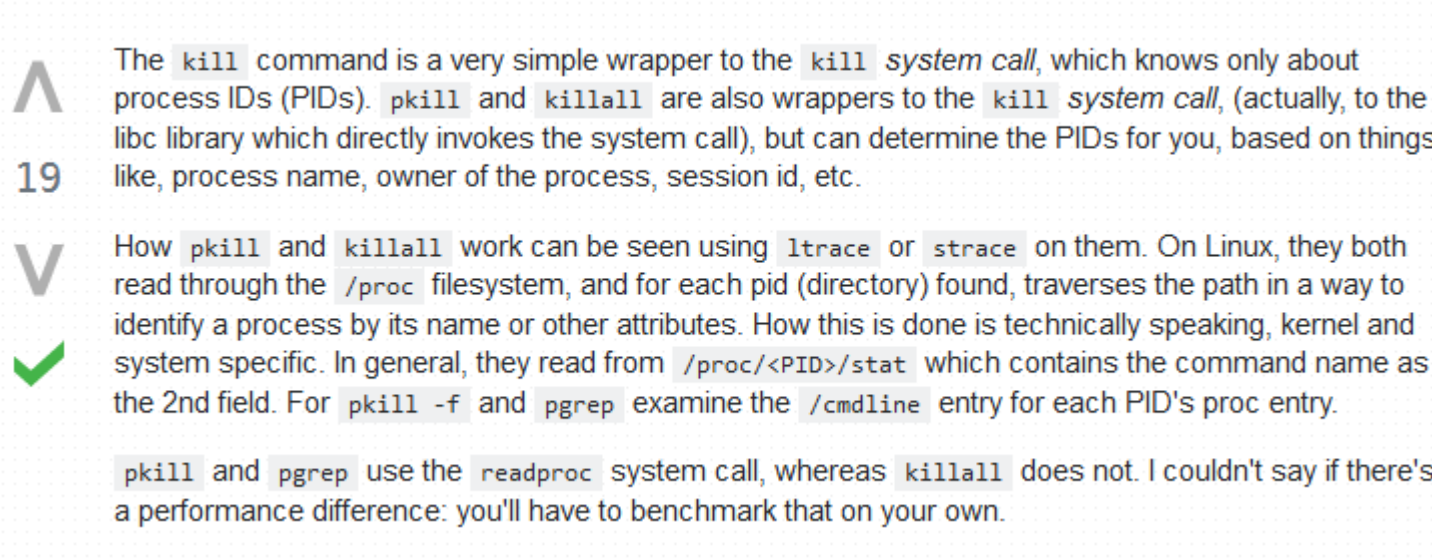
### Nice / Renice / IOnice

- https://www.faqforge.com/linux/reduce-load-of-backup-scripts-with-nice-and-ionice/
- http://www.slashroot.in/nice-and-renice-command-usage-examples-process-priority-linux

### KILL

- http://www.thegeekstuff.com/2012/03/linux-signals-fundamentals/
- https://www.quora.com/What-is-the-difference-between-Kill-and-Kill-9-command-in-Unix
- http://bencane.com/2014/04/01/understanding-the-kill-command-and-how-to-terminate-processes-in-linux/
- https://rtcamp.com/tutorials/linux/kill-all-processes/

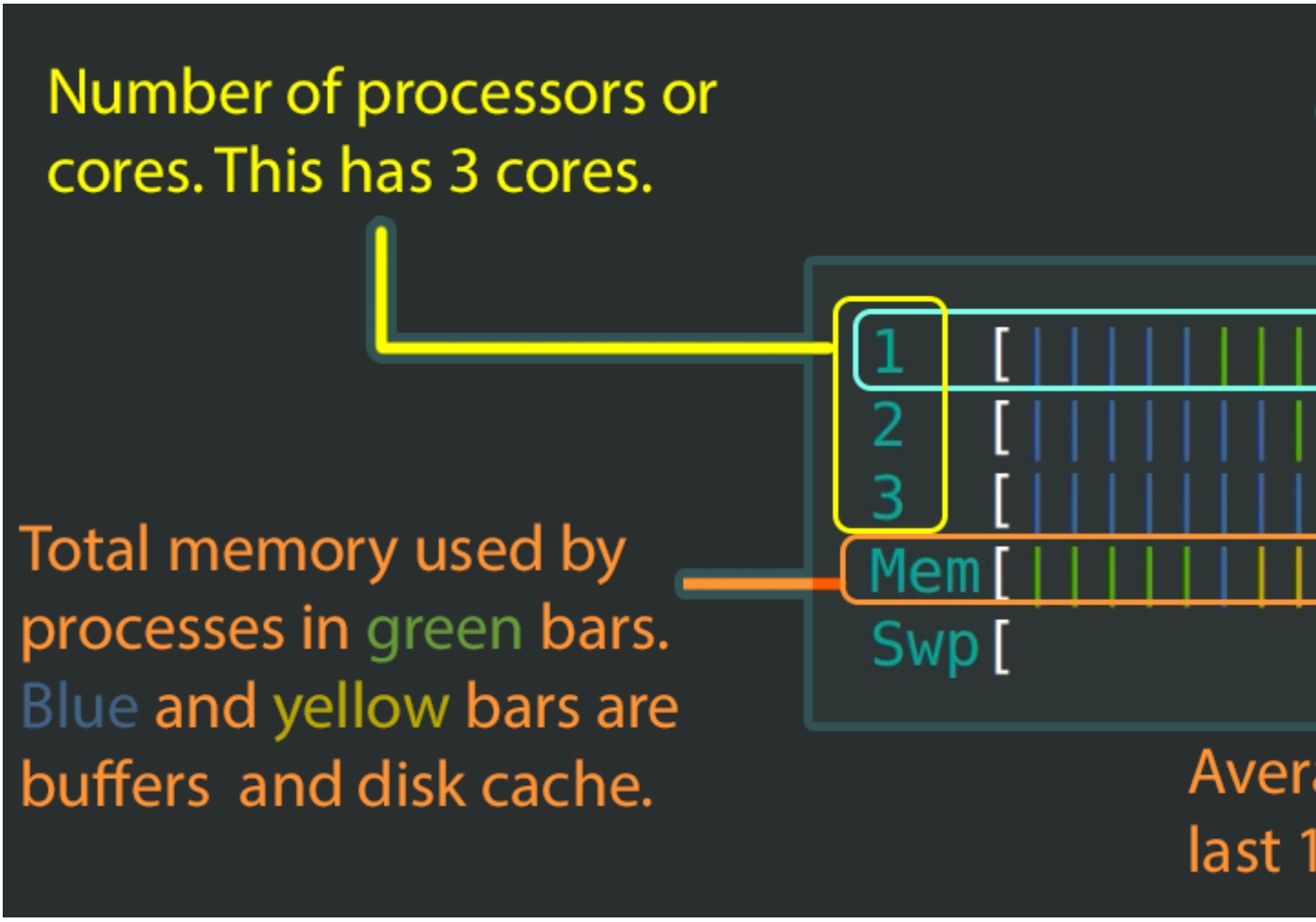
- http://www.tecmint.com/how-to-kill-a-process-in-linux/
- https://www.digitalocean.com/community/tutorials/how-to-use-ps-kill-and-nice-to-manage-processes-in-linux
- http://www.cyberciti.biz/faq/unix-linux-killall-command-examples-usage-syntax/
- https://unix.stackexchange.com/questions/252349/what-is-the-difference-between-kill-pkill-and-killall




### HTop

#### Visual representation of all HTop parameters

- https://codeahoy.com/2017/01/20/hhtop-explained-visually/




#### HTop command - Explained

- https://peteris.rocks/blog/htop/
- http://www.servercraftmen.com/performance-tuning-htop-usage/
- http://www.webhostingbuzz.com/wiki/install-htop-linux/
- https://www.tecmint.com/install-htop-linux-process-monitoring-for-rhel-centos-fedora/
- https://delightlylinux.wordpress.com/2014/03/24/htop-a-better-process-viewer-then-top/
- http://www.thegeekstuff.com/2011/09/linux-htop-examples

#### SysDig

- https://sysdig.com/blog/sysdig-vs-dtrace-vs-strace-a-technical-discussion/
- https://www.sysdig.org/wiki/sysdig-user-guide/
- https://github.com/draios/sysdig/wiki/Sysdig-Examples
- https://sysdig.com/blog/linux-troubleshooting-cheatsheet/

- http://bencane.com/2014/04/18/using-sysdig-to-troubleshoot-like-a-boss/
- http://xmodulo.com/monitor-troubleshoot-linux-server-sysdig.html

#### Configuration

#### Troubleshooting & Log Parsing

- **Find the most number of processes running on the system**

```
sudo ps -AL --no-headers | awk -F: '{print $3}' | cut -d' ' -f2 | sort | uniq -c |␣
↪sort -n | tail -10
```

- **Check for zombie processes with PPID**

```
sudo ps axo stat,ppid,pid,comm | grep -w defunct
```

- **View Column Headers in ps output**

```
sudo ps aux | head -1 && sudo ps aux | grep <process-name> | grep -v grep
```

### 1.3.3 Memory

*Some useful links to explain the concepts of Memory*

#### Concepts

- http://blog.ioflood.com/2015/03/27/making-sense-of-linux-memory-usage-part-1-how-to-read-top-in-centos/
- https://www.reddit.com/r/linux/comments/1hk5ow/free_buffer_swap_dirty_procmeminfo_explained/

#### Commands

#### Free Command - Explained

- http://corlewsolutions.com/articles/article-6-understanding-the-free-command-in-ubuntu-and-linux
- http://www.linuxatemyram.com/
- http://www.cloudibee.com/know-about-procmeminfo/
- http://www.linuxnix.com/find-ram-details-in-linuxunix/

#### Other Commands

- http://www.thegeekstuff.com/2010/08/ipcs-command-examples/

"ipcs -p " can not show the semaphores of the process holding, that must be a bug, or it's a limit because it's hard to show. You have to query by yourslef.

1. run "ipcs -s" to get all semid
2. for each semid run "ipcs -s -i "
3. for each semnum, to get owner pid, if the owner pid is you wish, then show the current semid a semnum.

Note: if the process just read semaphores, then you may cannot get such information via ipcs command.

- http://www.tecmint.com/dstat-monitor-linux-server-performance-process-memory-network/

#### Configuration

- http://github.com/pixelb/scripts/commits/master/scripts/ps_mem.py

#### Create a RAM Disk

- https://www.jamescoyle.net/how-to/943-create-a-ram-disk-in-linux

#### Troubleshooting & Log Parsing

### 1.3.4 Swap

*Some useful links to explain the concepts of Swap*

#### Concepts

- https://www.linux.com/news/all-about-linux-swap-space
- http://www.linux-tutorial.info/modules.php?name=MContent&pageid=311
- http://aarvik.dk/what-is-swap-memory-and-how-to-use-it/
- http://blog.scoutapp.com/articles/2015/04/10/understanding-page-faults-and-memory-swap-in-outs-when-should-you-worry

#### Commands

- **Check total swap space used & sort it descending**

```
for file in /proc/*/status ; do awk '/VmSwap|Name/{printf $2 " " $3}END{ print ""}'
↪$file; done | sort -k 2 -nr | head -10
for file in /proc/*/status ; do awk '/VmSwap|Name/{printf $2 " " $3}END{ print ""}'
↪$file; done | awk  '{print $1 " " $2/1024 " MB" }'|sort -k 2 -n -r | head -10
```

- **Alternatively - run below command**

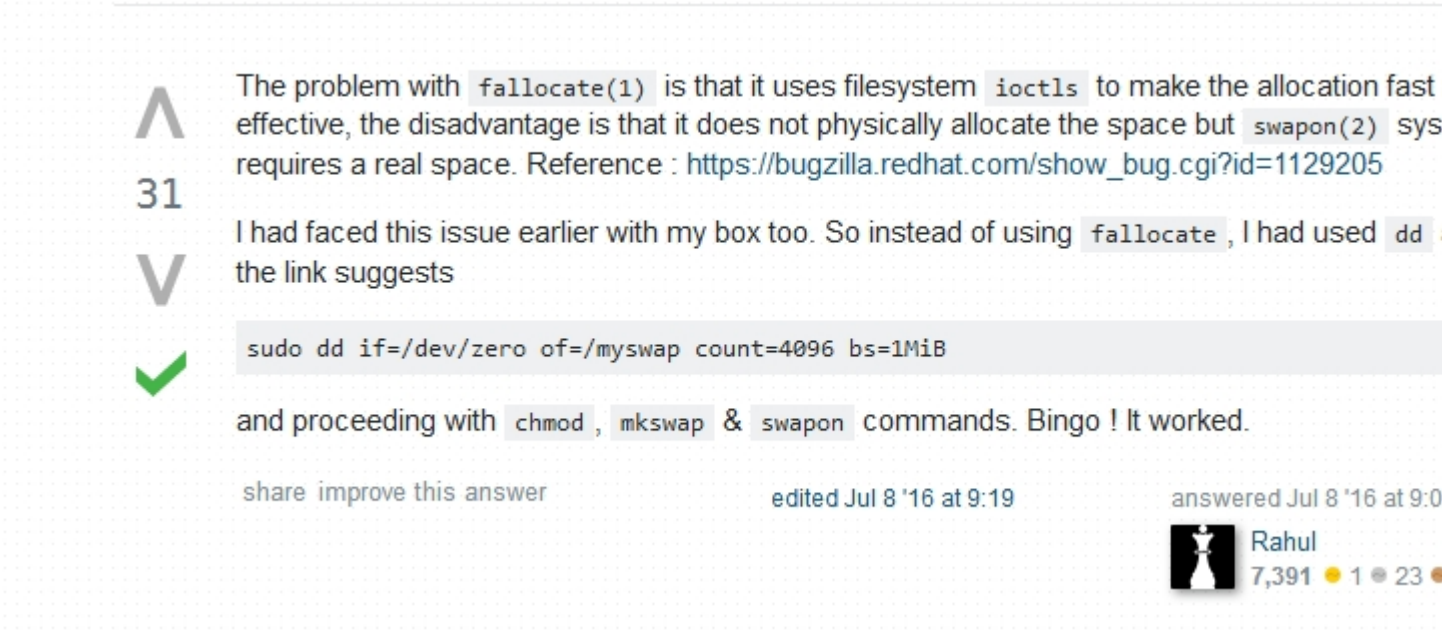
```
sudo nice top (Press Shift+o → p (To sort processes by swap usage)
```

### Configuration

- http://www.cyberciti.biz/faq/linux-add-a-swap-file-howto/
- http://bencane.com/2016/05/18/creating-a-swap-file-for-tiny-cloud-servers/
- https://www.digitalocean.com/community/tutorials/how-to-add-swap-on-centos-7

### Troubleshooting & Log Parsing

- http://northernmost.org/blog/find-out-what-is-using-your-swap/
- http://www.digitalinternals.com/unix/linux-swap-usage-per-process/379/
- http://www.cyberciti.biz/faq/linux-which-process-is-using-swap/
- https://unix.stackexchange.com/questions/294600/i-cant-enable-swap-space-on-centos-7




## 1.3.5 Storage

*Some useful links to explain the concepts of Storage, I/O*

### Concepts

- http://linuxbsdos.com/2011/09/18/guide-to-disks-and-disk-partitions-in-linux/
- http://www.howtogeek.com/howto/35676/how-to-choose-a-partition-scheme-for-your-linux-pc/
- http://www.slashroot.in/linux-system-io-monitoring
- http://www.cyberciti.biz/tips/linux-disk-performance-monitoring-howto.html

- http://xmodulo.com/how-to-monitor-disk-io-in-linux.html
- http://www.cyberciti.biz/tips/freebsd-why-command-df-and-du-reports-different-output.html
- http://yoonusp.blogspot.in/2012/06/du-and-ls-output-show-different-sizes.html
- http://www.howtogeek.com/howto/38125/htg-explains-what-is-the-linux-fstab-and-how-does-it-work/
- http://linoxide.com/file-system/understanding-each-entry-of-linux-fstab-etcfstab-file/
- http://geek-university.com/linux/etc-fstab-file/

#### GRUB

- https://linuxnorth.wordpress.com/2011/03/09/grub2-revisited/
- http://askubuntu.com/questions/2793/how-do-i-remove-or-hide-old-kernel-versions-to-clean-up-the-boot-menu
- http://askubuntu.com/questions/218286/how-can-i-safely-remove-extra-grub-installs
- http://docs.fedoraproject.org/en-US/Fedora/20/html/Installation_Guide/sn-medialess-editing-grub-conf.html
- https://ask.fedoraproject.org/en/question/32771/multiple-fedora-entries-in-grub/

#### LVM

- http://www.tecmint.com/create-lvm-storage-in-linux/
- http://www.howtogeek.com/howto/40702/how-to-manage-and-use-lvm-logical-volume-management-in-ubuntu/
- http://www.cyberciti.biz/tips/fdisk-unable-to-create-partition-greater-2tb.html
- https://www.atlantic.net/community/howto/configure-2tb-partitioning-parted-mdadm/
- http://www.tecmint.com/parted-command-to-create-resize-rescue-linux-disk-partitions/
- http://www.thegeekstuff.com/2012/08/2tb-gtp-parted/
- http://www.thegeekstuff.com/2011/09/parted-command-examples/
- http://magicmonster.com/kb/os/linux/large_hdd.html
- http://www.cyberciti.biz/tips/fdisk-unable-to-create-partition-greater-2tb.html

#### RAID

- http://www.slashroot.in/raid-levels-raid0-raid1-raid10-raid5-raid6-complete-tutorial
- http://www.tecmint.com/understanding-raid-setup-in-linux/
- http://www.thegeekstuff.com/2010/08/raid-levels-tutorial/
- http://www.thegeekstuff.com/2011/11/raid2-raid3-raid4-raid6/
- http://www.thegeekstuff.com/2011/10/raid10-vs-raid01/
- https://www.pugetsystems.com/labs/articles/RAID-Explained-24/
- http://www.tldp.org/HOWTO/Software-RAID-HOWTO-11.html
- http://www.gagme.com/greg/linux/raid-lvm.php
- https://wiki.archlinux.org/index.php/Software_RAID_and_LVM
- https://www.cyberciti.biz/tips/raid-hardware-vs-raid-software.html

- http://www.olearycomputers.com/ll/linux_mirrors.html
- https://raid.wiki.kernel.org/index.php/Linux_Raid
- http://cavepopo.hd.free.fr/wordpress/linux/how-to-create-a-raid-array-using-omconfig-omreport-cli/

### GlusterFS

- https://www.interserver.net/tips/kb/what-is-glusterfs/
- http://www.slashroot.in/gfs-gluster-file-system-complete-tutorial-guide-for-an-administrator
- http://www.tecmint.com/introduction-to-glusterfs-file-system-and-installation-on-rhelcentos-and-fedora/
- https://www.digitalocean.com/community/tutorials/how-to-create-a-redundant-storage-pool-using-glusterfs-on-ubuntu-servers
- https://gluster.readthedocs.io/en/latest/Quick-Start-Guide/Quickstart/

### NFS

- http://cavepopo.hd.free.fr/wordpress/linux/about-nfs/
- http://cavepopo.hd.free.fr/wordpress/network/nfs-the-network-file-system-practical-examples/
- http://www.cyberciti.biz/faq/mhddfs-linux-combines-a-several-mount-points-into-single-one/
- https://romanrm.net/mhddfs
- http://www.tecmint.com/how-to-setup-nfs-server-in-linux/

### SCP

- http://www.tecmint.com/scp-commands-examples/
- http://www.binarytides.com/linux-scp-command/
- http://www.garron.me/en/linux/scp-linux-mac-command-windows-copy-files-over-ssh.html

### Rsync

- http://www.server-world.info/en/note?os=CentOS_6&p=rsync
- https://www.linode.com/docs/tools-reference/tools/introduction-to-rsync
- http://www.evbackup.com/support-commonly-used-rsync-arguments/
- http://www.tecmint.com/rsync-local-remote-file-synchronization-commands/
- http://www.thegeekstuff.com/2010/09/rsync-command-examples/
- http://www.howtogeek.com/175008/the-non-beginners-guide-to-syncing-data-with-rsync/
- http://www.techonthenet.com/linux/commands/rsync.php
- https://unix.stackexchange.com/questions/4712/rsync-two-file-types-in-one-command/4713#4713
- http://www.crucialp.com/resources/tutorials/server-administration/how-to-copy-files-across-a-network-internet-in-unix-linux-re
- https://stackoverflow.com/questions/20244585/how-does-scp-differ-from-rsync/20257021#20257021

297

The major difference between these tools is how they copy files.

`scp` basically reads the source file and writes it to the destination. It performs a plain linear copy, locall or over a network.

`rsync` also copies files locally or over a network. But it employs a special delta transfer algorithm and few optimizations to make the operation a lot faster. Consider the call.

```
rsync A host:B
```

- `rsync` will check files sizes and modification timestamps of both **A** and **B**, and skip any further processing if they match.
- If the destination file **B** already exists, the delta transfer algorithm will make sure only differences between **A** and **B** are sent over the wire.
- `rsync` will write data to a temporary file **T**, and then replace the destination file **B** with **T** to make the update look "atomic" to processes that might be using **B**.

Another difference between them concerns invocation. `rsync` has a plethora of command line options allowing the user to fine tune its behavior. It supports complex filter rules, runs in batch mode, daemon mode, etc. `scp` has only a few switches.

In summary, use `scp` for your day to day tasks. Commands that you type once in a while on your interactive shell. It's simpler to use, and in those cases `rsync` optimizations won't help much.

For recurring tasks, like `cron` jobs, use `rsync`. As mentioned, on multiple invocations it will take advantage of data already transferred, performing very quickly and saving on resources. It is an excellent tool to keep two directories synchronized over a network.

Also, when dealing with large files, use `rsync` with the `-P` option. If the transfer is interrupted, you can resume it where it stopped by reissuing the command. See Sid Kshatriya's answer.

- https://unix.stackexchange.com/questions/4712/rsync-two-file-types-in-one-command/4713#4713

### LsyncD

- http://www.nginxtips.com/lsyncd-live-file-syncronization-linux/
- http://www.rackspace.com/knowledge_center/article/install-and-configure-lsyncd
- http://crosstek.net/2013/06/28/two-way-sync-with-lsyncd-in-a-clustered-wordpress-installation/

### Explanation of lsyncd.conf parameters

- https://www.lucasrolff.com/ha/replication-using-lsyncd/
- https://github.com/axkibe/lsyncd/wiki/Manual%20to%20Lsyncd%202.1.x

### Max User Watches Error of Lsyncd

- https://xopo3o.blogspot.in/2015/11/how-to-lsyncd-error-consider-increasing.html
- https://unix.stackexchange.com/questions/13751/kernel-inotify-watch-limit-reached

**Is it safe to raise that value and what would be the consequences of a too high value?**

Yes, it's safe to raise that value and below are the possible costs [source]:

- Each *used* inotify watch takes up 540 bytes (32-bit system), or 1 kB (double - on 64-bit) [sources: 1, 2]
- This comes out of *kernel memory*, which is unswappable.
- Assuming you set the max at 524288 and all were used (improbable), you'd be using approximately 256MB/512MB of 32-bit/64-bit kernel memory.
  - Note that your application will also use additional memory to keep track of the inotify handles, file/directory paths, etc. -- how much depends on its design.

**To check the max number of inotify watches:**

```
cat /proc/sys/fs/inotify/max_user_watches
```

**To set max number of inotify watches**

Temporarily:

- Run `sudo sysctl fs.inotify.max_user_watches=` with your preferred value at the end.

Permanently (more detailed info):

- put `fs.inotify.max_user_watches=524288` into your sysctl settings. Depending on your syst they might be in one of the following places:
  - Debian/RedHat: `/etc/sysctl.conf`
  - Arch: put a new file into `/etc/sysctl.d/` , e.g. `/etc/sysctl.d/40-max-user-watches.co`
- you may wish to reload the sysctl settings to avoid a reboot: `sysctl -p` (Debian/RedHat) o `sysctl --system` (Arch)

**Check to see if the max number of inotify watches have been reached:**

Use `tail` with the `-f` (follow) option on any old file, e.g. `tail -f /var/log/dmesg` : - If all is we will show the last 10 lines and pause; abort with Ctrl-C - If **you are out of watches**, it will fail wi this somewhat cryptic error:

```
tail: cannot watch '/var/log/dmsg': No space left on device
```

**To see what's using up inotify watches**

```
find /proc/*/fd -lname anon_inode:inotify |
   cut -d/ -f3 |
   xargs -I '{}' -- ps --no-headers -o '%p %U %c' -p '{}' |
   uniq -c |
   sort -nr
```

The first column indicates the number of inotify fds (not the number of watches though) and the second shows the PID of that process [sources: 1, 2].

### Configuration

- http://askubuntu.com/questions/109856/how-to-mount-a-windows-folder-in-linux
- https://access.redhat.com/solutions/448263
- http://www.tecmint.com/fdisk-commands-to-manage-linux-disk-partitions/
- http://www.thegeekstuff.com/2010/09/linux-fdisk/
- https://wiki.ubuntu.com/MountWindowsSharesPermanently
- http://www.cyberciti.biz/faq/linux-finding-using-uuids-to-update-fstab/
- https://codesilence.wordpress.com/2013/03/14/live-resizing-of-an-ext4-filesytem-on-linux/
- https://www.tecmint.com/parted-command-to-create-resize-rescue-linux-disk-partitions/

### Creating & mounting a 2nd Hard drive in linux

- http://geektnt.com/how-to-format-and-mount-second-hard-drive-on-linux.html

### Good explanation fstab parameters

- http://ubuntuforums.org/showthread.php?t=1604251

If you use a UUID or Label, you need to declare it as such. e.g. "LABEL=*Windows*", "UUID=*ABCDEFGHIJKLKLMNOP*".

- Next, **where should it be mounted**?
  This part is simple: where do you want the partition to be accessible from? Ubuntu mounts partitions in /media by d
  sure that the folder isn't being used already, and run

  Code:

  ```
  sudo mkdir /media/Windows
  ```

- Next, **which filesystem should it be mounted as**?
  Since we're mounting an ntfs partition, specify "ntfs-3g" for this column. Don't use "ntfs" unless you don't want to b
- Next, **what options should it be mounted with**?
  This is the most important column in this case, this is where you specify permissions. How you do this isn't immediat

  This is a comma separated list, so don't use spaces or tabs, or else you'll find that the mount line doesn't work as e
  - uid=*####* specifies which userid should own the files on the partition. e.g. "uid=1000" means that the user w
  - gid=*####* specified which groupid should own the files on the partition. e.g. "gid=1000" means that the grou
    Now, Ubuntu normally creates a group for every user, with the same ID as the UID, so you can probably use y
    will contain the following items: name, an encrypted password, the GID, and a list of users in the group. Find
  - umask=*UGO* is the most important of the three options; it specifies what the permissions will be for the user,
    permissions, so while "7" means "read, write, and execute" in normal permission setting, in fstab "7" means "r
    others. See this for more details about umask.

  You may also add other things to this list. Generally speaking, it's best to start with the "defaults" option. "auto" ma
- **The final two columns should be "0" and "0"**.
  These two columns are only used for Linux filesystems, so setting them to 0 stops any complications from arising.

A finished fstab line may look like:

Code:

```
UUID=ABCDEFGHIJKLKLMNOP /media/Windows ntfs-3g defaults,auto,uid=1000,gid=1000,umask=002 0 0
```

another example:

Code:

```
/dev/sdb5 /mnt/Music ntfs-3g defaults,uid=1002,gid=1500,umask=227 0 0
```

The next time you boot up, or the next time you run "sudo mount -a", the partition should be mounted where you want it, w

### Troubleshooting & Log Parsing

- http://www.tecmint.com/linux-performance-monitoring-with-vmstat-and-iostat-commands/
- http://linoxide.com/linux-command/linux-iostat-command/
- http://www.thegeekstuff.com/2011/07/iostat-vmstat-mpstat-examples/
- https://www.linode.com/docs/uptime/monitoring/use-vmstat-to-monitor-system-performance

- https://www.thomas-krenn.com/en/wiki/Linux_Performance_Measurements_using_vmstat
- https://www.thomas-krenn.com/en/wiki/SMART_tests_with_smartctl
- https://www.cyberciti.biz/hardware/linux-iotop-simple-top-like-io-monitor/
- http://articles.slicehost.com/2010/11/12/using-iotop-to-check-i-o-and-swap

#### Online Visual RAID Calculator

- https://www.synology.com/en-global/support/RAID_calculator
- http://grijpink.eu/tools/raid/index.php

### 1.3.6 File Systems

*Some useful links to explain the concepts of File Systems*

#### Concepts

- https://www.nixtutor.com/linux/understanding-the-linux-directory-layout/
- https://www.slashroot.in/understanding-file-system-superblock-linux
- https://unix.stackexchange.com/questions/4402/what-is-a-superblock-inode-dentry-and-a-file
- http://www.cyberciti.biz/faq/understanding-unix-linux-bsd-device-files/
- http://askubuntu.com/questions/397493/what-does-the-first-character-of-unix-mode-string-indicate

#### ext(2|3|4)

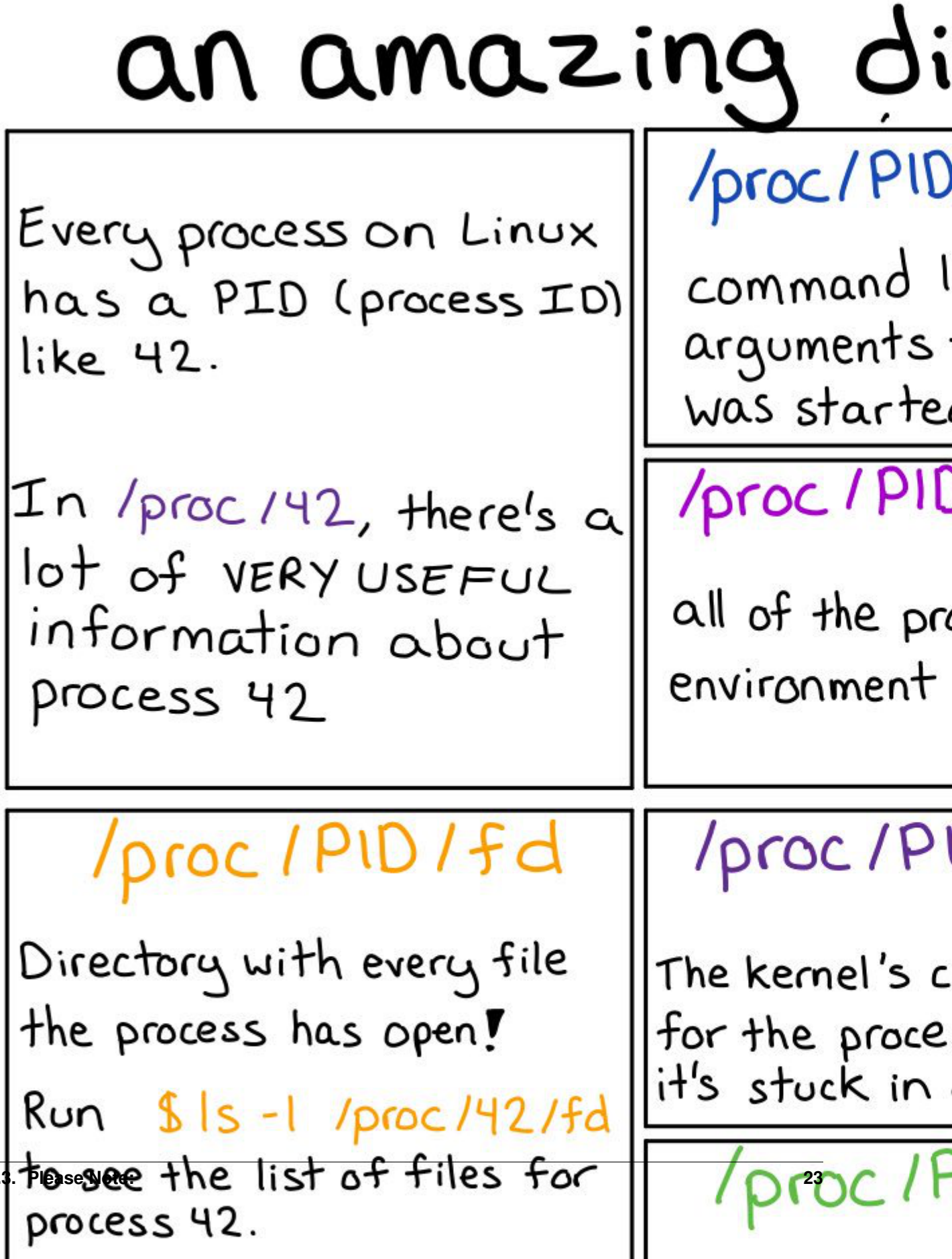
- http://www.thegeekstuff.com/2011/05/ext2-ext3-ext4/
- https://adarsh5388.wordpress.com/2013/11/29/difference-between-ext2-ext3-and-ext4-filesystem-in-linux/
- https://kerneltalks.com/disk-management/difference-between-ext2-ext3-and-ext4/amp/
- https://linoxide.com/how-tos/explained-in-detail-linux-ext2-ext3-and-ext4-filesystem/amp/

#### File Descriptors

- https://linuxmeerkat.wordpress.com/2011/12/02/file-descriptors-explained/amp/
- https://www.bottomupcs.com/file_descriptors.xhtml
- http://www.cyberciti.biz/tips/linux-procfs-file-descriptors.html

#### Proc File Systems

- http://www.slashroot.in/proc-file-system-linux-explained
- http://www.thegeekstuff.com/2010/11/linux-proc-file-system/
- https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/3/html/Reference_Guide/s1-proc-directories.html


an amazing di
Every process on Linux has a PID (process ID) like 42.
In /proc/42, there's a lot of VERY USEFUL information about process 42
/proc/PID
command l
arguments
was starte
/proc/PID
all of the pr
environment
/proc/PID/fd
Directory with every file the process has open!
Run $ ls -l /proc/42/fd to see the list of files for process 42.
/proc/P
The kernel's c
for the proce
it's stuck in
/proc/F

#### ULimit

- https://easyengine.io/tutorials/linux/increase-open-files-limit/
- http://posidev.com/blog/2009/06/04/set-ulimit-parameters-on-ubuntu/
- http://www.cyberciti.biz/faq/linux-increase-the-maximum-number-of-open-files/
- http://askubuntu.com/questions/181215/too-many-open-files-how-to-find-the-culprit

#### Directory Structures

- http://askubuntu.com/questions/34880/use-of-opt-and-usr-local-directories-in-the-context-of-a-pc
- http://www.ghacks.net/2009/04/04/get-to-know-linux-the-etcinitd-directory/
- http://askubuntu.com/questions/19320/how-to-enable-or-disable-services

#### Inodes

- http://www.slashroot.in/inode-and-its-structure-linux
- https://tecadmin.net/what-is-inode-number-in-linux/
- http://www.grymoire.com/Unix/Inodes.html
- http://teaching.idallen.com/dat2330/04f/notes/links_and_inodes.html

#### Commands

#### S-Trace command

- https://blog.packagecloud.io/eng/2016/02/29/how-does-strace-work/
- http://linoxide.com/linux-command/linux-strace-command-examples/
- http://hokstad.com/5-simple-ways-to-troubleshoot-using-strace
- http://www.cyberciti.biz/tips/linux-strace-command-examples.html
- https://blog.packagecloud.io/eng/2015/11/15/strace-cheat-sheet/
- https://www.ibm.com/developerworks/aix/library/au-unix-strace.html

### 1.3.7 Provisioning

*Some useful links to explain the concepts of Cobbler / Kickstart*

- https://www.ibm.com/developerworks/library/l-cobbler/
- http://cobbler.github.io/manuals/quickstart/
- https://cobbler.readthedocs.io/en/latest/installation-guide.html
- http://cavepopo.hd.free.fr/wordpress/linux/how-to-basic-pxe-infrastructure-3-tftp-server-installation-and-setup/
- http://www.networkworld.com/article/2224075/opensource-subnet/set-up-a-local-linux-installation-and-update-server-with-kick
  html

- https://marclop.svbtle.com/creating-an-automated-centos-7-install-via-kickstart-file
- https://dark.ca/2009/08/03/complex-partitioning-in-kickstart/
- https://help.ubuntu.com/community/Cobbler/Preseed
- https://thornelabs.net/2014/12/19/problems-provisioning-ubuntu-with-cobbler-and-kickstart-profiles.html
- https://awaseconfigurations.wordpress.com/2011/09/29/cobbler-set-up-network-installation-of-ubuntu-11-04/

### 1.3.8 Package-Management

*Some useful links to explain the concepts of Package-Management*

#### Concepts

- https://www.digitalocean.com/community/tutorials/package-management-basics-apt-yum-dnf-pkg
- https://blog.packagecloud.io/eng/2015/10/26/use-alien-to-convert-deb-to-rpm-and-rpm-to-deb/

#### Difference between yum update / yum upgrade

`yum upgrade` forces the removal of obsolete packages, `yum update` may or may not also do this
From `man yum`:

> update
>
> If run without any packages, update will update every currently installed package. If one or more packages or package globs are specified, Yum will only update the listed packages. While updating packages, yum will ensure that all dependencies are satisfied. (See Specifying package names for more information) If the packages or globs specified match to packages which are not currently installed then update will not install them. update operates on groups, files, provides and filelists just like the "install" command. **If the main obsoletes configure option is true (default) or the --obsoletes flag is present yum will include package obsoletes in its calculations - this makes it better for distro-version changes, for example: upgrading from somelinux 8.0 to somelinux 9.**
>
> upgrade
>
> Is **the same as the update command with the --obsoletes flag set**. See update for more details.

The removal of obsolete packages can be risky, as it may remove packages that you use.

#### RPM

- https://rpmbuildtut.wordpress.com/development-packages/
- http://www.tldp.org/HOWTO/RPM-HOWTO/build.html

- https://fedoraproject.org/wiki/How_to_create_an_RPM_package
- http://www.tecmint.com/20-practical-examples-of-rpm-commands-in-linux/

### YUM

- http://www.slashroot.in/yum-repository-and-package-management-complete-tutorial
- http://www.tecmint.com/20-linux-yum-yellowdog-updater-modified-commands-for-package-mangement/
- https://blog.packagecloud.io/eng/2015/04/05/yum-cheat-sheet/
- https://www.digitalocean.com/community/tutorials/how-to-set-up-and-use-yum-repositories-on-a-centos-6-vps
- http://www.rpm.org/max-rpm-snapshot/

### DNF

- https://dnf.readthedocs.io/en/latest/index.html
- http://linoxide.com/linux-how-to/dnf-commands-manage-rpm-linux/

### Configuration

- http://www.2daygeek.com/install-enable-rpm-fusion-repository-on-centos-fedora-rhel/
- http://www.tecmint.com/how-to-enable-epel-repository-for-rhel-centos-6-5/
- http://www.cyberciti.biz/tips/rhel5-fedora-core-add-new-yum-repository.html
- http://sharadchhetri.com/2014/02/22/yum-command-to-download-rpm-file-without-installing-in-linux-system/
- http://www.linuxtechi.com/download-rpm-using-yumdownloader-centos-7-rhel-7/
- https://blog.packagecloud.io/eng/2015/10/13/inspect-extract-contents-rpm-packages/

### Rollback or Revert YUM Changes

- https://www.if-not-true-then-false.com/2010/yum-history-list-info-summary-repeat-redo-undo-new/
- http://www.itechlounge.net/2012/08/linux-how-to-rollback-yum-updates-on-rhel-centos/
- http://www.cyberciti.biz/faq/howto-yum-downgrade-packages-on-rhel-centos-fedora-scientific-linux/

### Downloading packages for RPM based OS

- https://pkgs.org/

### Delta-RPMs

- https://unix.stackexchange.com/questions/277900/do-i-need-to-do-something-about-delta-rpms-disabled
- https://www.certdepot.net/rhel7-get-started-delta-rpms/

### Troubleshooting & Log Parsing

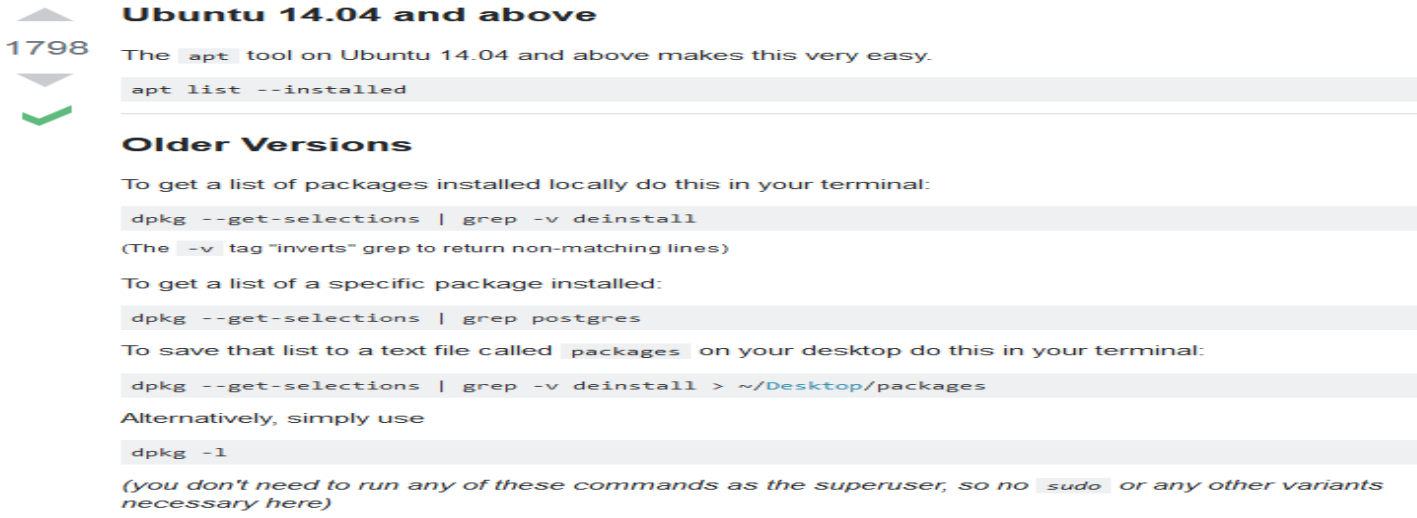
- https://major.io/2007/05/27/rpmdb-lock-table-is-out-of-available-locker-entries/
- http://www.serveradminblog.com/2010/10/yum-problem-rpmdb-lock-table-is-out-of-available-locker-entries/
- http://www.if-not-true-then-false.com/2012/delete-remove-old-kernels-on-fedora-centos-red-hat-rhel/
- http://xmodulo.com/check-rpm-package-dependencies-fedora-centos-rhel.html
- http://xmodulo.com/how-to-fix-yum-errors-on-centos-rhel-or-fedora.html
- https://blog.packagecloud.io/eng/2015/04/20/working-with-source-rpms/

### APT

- https://askubuntu.com/questions/18804/what-do-the-various-dpkg-flags-like-ii-rc-mean
- https://unix.stackexchange.com/questions/6284/check-package-version-using-apt-get-aptitude
- https://blog.packagecloud.io/eng/2015/03/30/apt-cheat-sheet/
- https://help.ubuntu.com/community/Repositories/CommandLine
- https://www.tecmint.com/useful-basic-commands-of-apt-get-and-apt-cache-for-package-management/

### Working With Packages

- https://askubuntu.com/questions/44122/how-to-upgrade-a-single-package-using-apt-get
- https://askubuntu.com/questions/80655/how-can-i-check-dependency-list-for-a-deb-package
- https://askubuntu.com/questions/17823/how-to-list-all-installed-packages


1798

**Ubuntu 14.04 and above**

The `apt` tool on Ubuntu 14.04 and above makes this very easy.

```
apt list --installed
```

**Older Versions**

To get a list of packages installed locally do this in your terminal:

```
dpkg --get-selections | grep -v deinstall
```

(The `-v` tag "inverts" grep to return non-matching lines)

To get a list of a specific package installed:

```
dpkg --get-selections | grep postgres
```

To save that list to a text file called `packages` on your desktop do this in your terminal:

```
dpkg --get-selections | grep -v deinstall > ~/Desktop/packages
```

Alternatively, simply use

```
dpkg -l
```

*(you don't need to run any of these commands as the superuser, so no `sudo` or any other variants necessary here)*

### Configuration

- http://www.tecmint.com/apt-advanced-package-command-examples-in-ubuntu/
- http://www.cyberciti.biz/faq/debian-ubuntu-linux-show-detailed-description-info/

- https://blog.packagecloud.io/eng/2015/10/13/inspect-extract-contents-debian-packages/

### Troubleshooting & Log Parsing

#### Is apt-get autoremove safe

- https://askubuntu.com/questions/393212/is-it-safe-to-use-the-command-apt-get-autoremove-in-this-particular-scenario/393215

51

To focus on your past experience, if `autoremove` is going to remove "more than you intended", it's only doing that because those packages are no longer depended upon. That happens when you accidentally remove something :)

A common example from the good old days would be removing something Compiz-related. `apt-get` would show you a list of Compiz packages it was going to remove and you'd miss that `ubuntu-desktop` was also in there. `ubuntu-desktop` is just a meta-package that depends on all the packages that make up the desktop so removing it doesn't directly remove anything...

... But when you do an subsequent `autoremove`, all those things that `ubuntu-desktop` was the sole dependency... They're going bye-bye.

A few lessons:

- `sudo apt-get remove <package>` will warn you what it's going to remove directly. It won't notify you about knock-on effects.
- `sudo apt-get autoremove` should also warn you what it's going to do.
- Use `apt-get -s autoremove` to do a simulated dry run if you're unsure. You can use that on all `apt-get` commands.
- If you reboot and you're staring at TTY1 wondering what the monkeys you've nuked this time, `/var/log/apt/history.log` should have you most recent activity.
- If in doubt, check `ubuntu-desktop` is installed.

Is `autoremove` *safe*? It's heavy machinery so it's only as safe as the driver... But that said, it's hard to do permanent damage.

share improve this answer

answered Dec 20 '13 at 3:00

Oli ♦

218k ● 85 ● 550 ● 759

#### Difference between apt-get update / apt-get upgrade

- https://askubuntu.com/questions/94102/what-is-the-difference-between-apt-get-update-and-upgrade

253

You should first run `update`, then `upgrade`. Neither of them automatically runs the other.

- `apt-get update` updates the list of available packages and their versions, but it does not install or upgrade any packages.
- `apt-get upgrade` actually installs newer versions of the packages you have. After updating th lists, the package manager knows about available updates for the software you have installed This is why you first want to `update`.

share improve this answer

edited Dec 28 '12 at 13:00
gertvdijk
43k • 17 • 120 • 204

answered Jan 9 '12 at 17:16
Timo Kluck
3,883 • 1 • 11 • 16

### 1.3.9 Hardware

*Some useful links to explain the concepts of Hardware (Dell / SuperMicro)*

- http://www.thegeekstuff.com/2008/11/how-to-get-hardware-information-on-linux-using-dmidecode-command/
- http://www.tecmint.com/how-to-get-hardware-information-with-dmidecode-command-on-linux/
- http://linoxide.com/linux-command/how-to-display-system-hardware-information-in-bios/
- http://www.thegeekstuff.com/2014/04/lspci-examples
- https://linuxconfig.org/getting-know-a-hardware-on-your-linux-box
- https://blog.mattbrock.co.uk/monitoring-perc-raid-controllers-and-storage-arrays-on-dell-poweredge-servers-with-debian-and-u

#### Dell OMSA

#### Concepts

- http://cavepopo.hd.free.fr/wordpress/linux/dell-server-utility-omreport/
- http://public.support.unisys.com/pcproducts/esx/docs/delldocs5.4/en/dosa/storageug/cli.html
- https://stuff.mit.edu/afs/athena/dept/cron/documentation/OldFiles/Manuals/dell-server-admin/en/Dosa/CLI/storage.htm
- https://discuss.zendesk.com/hc/en-us/articles/201831218-Useful-omreport-commands-for-DCA-V1
- https://cs.uwaterloo.ca/~brecht/servers/docs/PowerEdge-2600/en/Dosa/CLI/cli_cc5s.htm

#### Commands

- **We use 2 commands to monitor / change parameters in Dell servers**

```
omreport - Checks the server details via specified parameters.

omconfig - Modifies the server details via specified parameters.
```

#### Examples :

- **Will list all possibly available system / chassis / storage domain commands**

```
sudo omreport system -?  | omreport chassis -?  | omreport storage -?
```

- **Retrieve general system information**

```
sudo omreport system summary | less
```

- **Display the Hardware logs**

```
sudo omreport system esmlog
```

- **Retrieve the RAID configuration**

```
sudo omreport storage vdisk controller=0
```

- **Clearing the logs**

```
sudo omconfig system esmlog action=clear (Replace esmlog with alertlog or cmdlog,␣
↪esmlog is the hardware log)
```

#### Configuration

- http://cavepopo.hd.free.fr/wordpress/linux/how-to-create-a-raid-array-using-omconfig-omreport-cli/
- http://cavepopo.hd.free.fr/wordpress/linux/how-to-expand-a-raid-array-using-omconfig-omreport-cli/

#### IPMITool

- https://discuss.zendesk.com/hc/en-us/articles/206396927-How-to-work-on-IPMI-and-IPMITOOL

#### MegaCLI

- https://artipc10.vub.ac.be/wordpress/2011/09/12/megacli-useful-commands/
- https://things.maths.cam.ac.uk/computing/docs/public/megacli_raid_lsi.html

### 1.3.10 SSH

*Some useful links to explain the concepts of SSH*

#### Concepts

- http://cavepopo.hd.free.fr/wordpress/linux/about-ssh-the-secure-shell/
- https://www.hostinger.com/tutorials/ssh-tutorial-how-does-ssh-work
- https://www.slashroot.in/secure-shell-how-does-ssh-work
- https://www.ibm.com/developerworks/aix/library/au-sshsecurity/index.html
- https://www.ibm.com/developerworks/library/l-keyc/index.html

- https://www.ssh.com/ssh/port

### Commands

### Configuration

### SSH key-based logins

- https://www.digitalocean.com/community/tutorials/ssh-essentials-working-with-ssh-servers-clients-and-keys
- https://www.digitalocean.com/community/tutorials/how-to-configure-ssh-key-based-authentication-on-a-freebsd-server
- https://www.linode.com/docs/security/use-public-key-authentication-with-ssh
- http://blog.nowherelan.com/2014/01/04/two-step-authentication-for-ssh-on-centos-6-using-google-authenticator/
- https://www.linux.com/blog/securing-ssh-two-factor-authentication-using-google-authenticator
- http://www.thegeekstuff.com/2008/11/3-steps-to-perform-ssh-login-without-password-using-ssh-keygen-ssh-copy-id/
- https://www.digitalocean.com/community/tutorials/how-to-configure-custom-connection-options-for-your-ssh-client
- https://www.ssh.com/ssh/config/
- https://stackoverflow.com/questions/10197559/ssh-configuration-override-the-default-username/10197697#10197697

### Tuning & Hardening

- https://superuser.com/questions/718346/openssh-ssh-config-host-specific-overrides-not-working
- https://www.digitalocean.com/community/tutorial_series/how-to-troubleshoot-ssh
- https://www.digitalocean.com/community/tutorials/how-to-tune-your-ssh-daemon-configuration-on-a-linux-vps
- https://stackoverflow.com/questions/10310299/proper-way-to-sudo-over-ssh
- https://security.stackexchange.com/questions/150540/is-it-completely-safe-to-publish-an-ssh-public-key
- https://hackerific.net/2017/04/23/ssh-audit—a-tool-for-checking-ssh-server-security/
- https://superuser.com/questions/868998/how-can-i-find-a-list-of-macs-ciphers-and-kexalgorithms-that-my-openssh-client


### Correct permissions of .ssh directory

- https://superuser.com/questions/215504/permissions-on-private-key-in-ssh-folder

36

I was struggling with this forever and finally figured out what is needed. Replace `user` everywhe with the SSH username you want to log into on the server. If you're trying to login as `root` you would need to use `/root/.ssh` etc., instead of `/home/root/.ssh` which is how it is for non-root users.

- Home directory on the server should not be writable by others: `chmod go-w /home/user`
- SSH folder on the server needs 700 permissions: `chmod 700 /home/user/.ssh`
- Authorized_keys file needs 644 permissions: `chmod 644 /home/user/.ssh/authorized_keys`
- Make sure that `user` owns the files/folders and not `root` : `chown user:user authorized_key` and `chown user:user /home/user/.ssh`
- Put the generated public key (from `ssh-keygen` ) in the user's `authorized_keys` file on the server
- Make sure that user's home directory is set to what you expect it to be and that it contains th correct `.ssh` folder that you've been modifying. If not, use `usermod -d /home/user user` to f the issue
- Finally, restart ssh: `service ssh restart`
- Then make sure client has the public key and private key files in the local user's `.ssh` folder and login: `ssh user@host.com`

### Run same commands via SSH on multiple servers

- https://www.linux.com/news/parallel-ssh-execution-and-single-shell-control-them-all
- http://serverfault.com/questions/321167/add-correct-host-key-in-known-hosts-multiple-ssh-host-keys-per-hostname
- http://unix.stackexchange.com/questions/19008/automatically-run-commands-over-ssh-on-many-servers
- http://www.cyberciti.biz/tips/execute-commands-on-multiple-linux-or-unix-servers.html
- http://unix.stackexchange.com/questions/107800/using-while-loop-to-ssh-to-multiple-servers
- http://stackoverflow.com/questions/20254906/bash-script-to-ssh-multiple-servers-in-a-loop-and-issue-commands
- http://unix.stackexchange.com/questions/182101/script-to-ssh-to-multiple-linux-server-and-execute-a-find-command
- http://cavepopo.hd.free.fr/wordpress/linux/ssh-the-secure-shell-practical-examples/
- http://thornelabs.net/2013/08/21/simple-ways-to-send-multiple-line-commands-over-ssh.html
- http://nerderati.com/2011/03/17/simplify-your-life-with-an-ssh-config-file/
- http://aarvik.dk/ssh-fundamentals-cssh-and-fabric/
- http://aarvik.dk/how-to-create-socks-proxy-through-ssh/

### TMux

Some useful links to cover the working of TMux.

- https://danielmiessler.com/study/tmux/
- https://tmuxcheatsheet.com/
- http://lukaszwrobel.pl/blog/tmux-tutorial-split-terminal-windows-easily
- https://robots.thoughtbot.com/a-tmux-crash-course
- http://blog.hawkhost.com/2010/06/28/tmux-the-terminal-multiplexer/
- http://www.sitepoint.com/tmux-a-simple-start/
- http://fideloper.com/mac-vim-tmux
- http://blog.victorquinn.com/tmux-tutorial
- https://www.codementor.io/tmux/tutorial/beginners-guide-to-tmux-navigating-and-configuring-your-tmux
- https://marc.cortinasval.cat/blog/2013/11/29/tmux-the-best-choice/
- http://www.hamvocke.com/blog/a-guide-to-customizing-your-tmux-conf/
- https://github.com/rothgar/awesome-tmux

#### Troubleshooting & Log Parsing

### 1.3.11 Editors

*Some useful links to explain the concepts of Editors*

#### VIM Basics

- http://vim.rtorr.com/
- https://danielmiessler.com/study/vim/
- https://vim.swaroopch.com/

#### Customizing VIM

#### VIM Color Schemes

- https://vimcolors.com
- https://vimawesome.com/
- https://github.com/rafi/awesome-vim-colorschemes
- https://github.com/flazz/vim-colorschemes

#### Making your own .vimrc

- https://dougblack.io/words/a-good-vimrc.html

### VI Editor Cheat Sheet


## Modes & Controls

| | |
|---|---|
| **Command Mode** | ESC (commands preceded by :) |
| **Insertion Mode** | Entered on insertion or change |

### Starting VI (command line)

| | |
|---|---|
| **vi <filename>** | Edit *filename* |
| **vi -r <filename>** | Edit last version of *filename* after crash |
| **vi + *n* <filename>** | Edit *filename* at line *n* |
| **vi + <filename>** | Edit *filename* at end of file |
| **vi +/*str* <filename>** | Edit *filename* at first occurance of *str* |

In insertion mode the following should be preceded by ESC:

| | |
|---|---|
| **:w** | Save |
| **:x** | Save & Exit |
| **:q** | Exit if no changes made |
| **:q!** | Exit & discard any changes |

## Cursor Navigation

| | |
|---|---|
| **h or ◀** | Cursor left |
| **j or ▼** | Cursor down |
| **k or ▲** | Cursor up |
| **l or ▶** | Cursor right |
| **w** | Next word |
| **W** | Next blank delimited word |
| **b** | Start of word |
| **B** | Start of blank delimited word |
| **e** | End of word |
| **E** | End of blank delimited word |

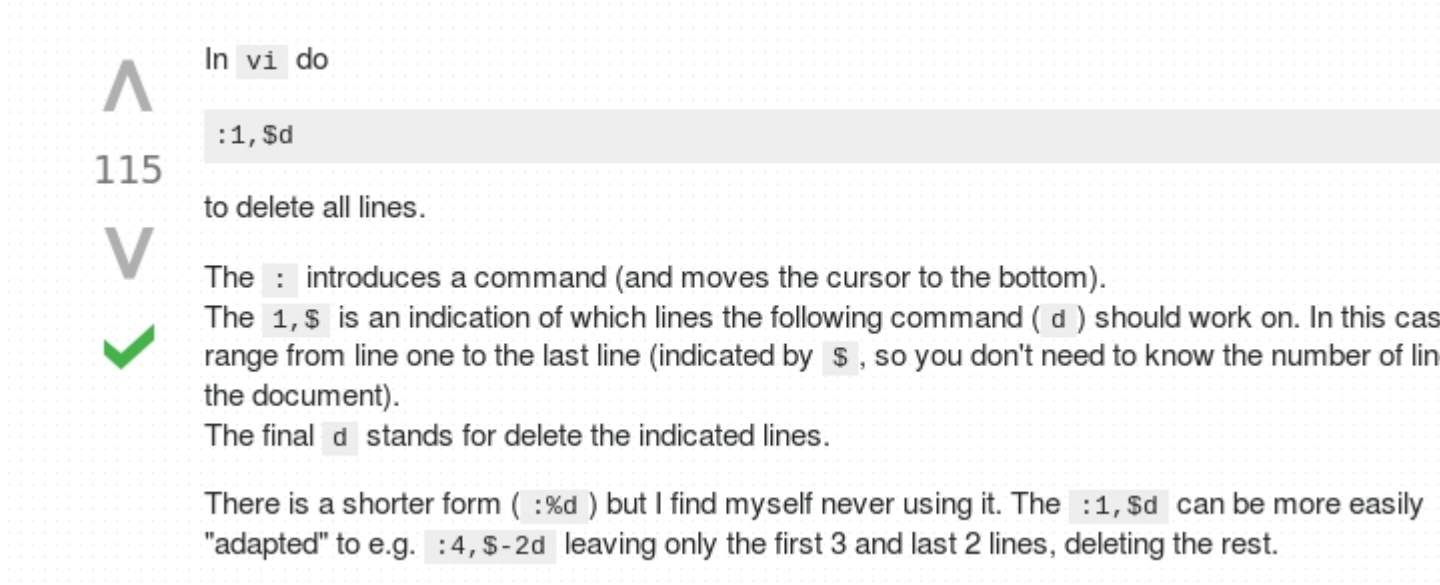
## Inserting Text

| | |
|---|---|
| **i** | Insert before cu |
| **a** | Append after c |
| **I** | Insert before li |
| **A** | Append after li |
| **o** | Add new line a |
| **O** | Add new line b |
| **r** | Overwrite one |
| **R** | Overwrite man |
| **:r <file>** | Reads *file* and i |
| **p** | Put after the po |
| **P** | Put before the |
| **C** | Rewrite the wh |

## Deleting Text

| | |
|---|---|
| **x** | Delete charac |
| **X** | Delete charac |
| **D** | Delete the res |
| **dd or :d** | Delete curren |
| **ndw** | Deletes the n |
| **ndb** | Deletes the p |
| **ndd** | Deletes n line |
| **:x,yd** | Delete lines x |
| **:r <file>** | Reads *file* and |
| **d{nav_cmd}** | Overwrite ma |

### To delete all lines in vim




### SED && AWK

- http://www.yourownlinux.com/2015/04/sed-command-in-linux-delete-lines-from-file.html

### Converting New-Lines to Spaces

- http://unix.stackexchange.com/questions/26788/using-sed-to-convert-newlines-into-spaces
- https://stackoverflow.com/questions/13610639/tr-command-how-to-replace-the-string-n-with-an-actual-newline-n
- https://stackoverflow.com/questions/1251999/how-can-i-replace-a-newline-n-using-sed
- https://stackoverflow.com/questions/19151954/how-to-use-variables-in-a-command-in-sed

### AWK Notes

- http://www.theunixschool.com/2012/06/awk-10-examples-to-group-data-in-csv-or.html
- https://stackoverflow.com/questions/15758814/turning-multiple-lines-into-one-line-with-comma-separated-perl-sed-awk
- https://stackoverflow.com/questions/8714355/bash-turning-multi-line-string-into-single-comma-separated
- http://linoxide.com/linux-command/awk-linux-famous-oneliners/
- http://www.linuxnix.com/category/programming/awk/

### Markdown

### Syntax

- https://www.markdownguide.org/basic-syntax

- https://paperhive.org/help/markdown

#### Online Editors

- https://stackedit.io/
- https://dillinger.io/
- https://typora.io
- https://markable.in
- https://hackmd.io

#### Atom

#### Configuration

- https://stackoverflow.com/questions/30006827/how-to-save-atom-editor-config-and-list-of-packages-installed
- https://discuss.atom.io/t/how-to-backup-all-your-settings/15674

### 1.3.12 Utilities

#### Environment Variables {ENV}

*Some useful links to explain the concepts of Environment Variables*

- https://www.guru99.com/linux-environment-variables.html
- https://www.digitalocean.com/community/tutorials/how-to-read-and-set-environmental-and-shell-variables-on-a-linux-vps
- https://www.slashroot.in/difference-between-bashrc-and-bashprofile
- https://www.cyberciti.biz/faq/linux-list-all-environment-variables-env-command/

#### Crontab

*Some useful links to cover the working of Crontab*

- http://www.thegeekstuff.com/2009/06/15-practical-crontab-examples/
- http://www.cyberciti.biz/faq/linux-show-what-cron-jobs-are-setup/
- https://www.pantz.org/software/cron/croninfo.html

An example of crontab format with commented fields is as follows:

```
# Minute    Hour    Day of Month        Month           Day of Week         Com
# (0-59)   (0-23)      (1-31)     (1-12 or Jan-Dec)   (0-6 or Sun-Sat)
    0         2          12              *                  *              /usr/
```

This line executes the "find" command at 2AM on the 12th of every month.

- http://corntab.com/crontab_syntax

# WHAT IS THE CRONTAB SYNTAX?

A crontab entry consists of a schedule expression and a command that will be run when
schedule expression consists of 5 fields: minute, hour, day of month (date), month, and d
ONLY in the system-wide crontab (/etc/crontab).

The 5 standard fields each support `*` for any matched value (`*` in the hour field matche
match the 1st and 15th day of the month), `-` for a range of values (`5-7` would match Ma
ranges (`*/5` would match every 5 minutes).

30 23 *

minute hour day of month

## crontab minute field

| | |
|---|---|
| 0-59 | allowed values; 0 is the top of the hour |
| * | first-last (every minute) |
| , | a list of minutes; ie. 0,30 would be the 0 AND 30th minutes |
| - | a range of minutes; ie. 0-5 would be minutes 0, 1, 2, 3, 4, and 5 (you |
| / | step values will skip the specified number within a range; ie */5 is e minutes |

## crontab hour field

| | |
|---|---|
| 0-23 | allowed values; 0 is midnight |
| * | first-last (every hour) |
| , | a list of hours; ie. 0,12 would be the 0 AND 12th hours |
| - | a range of hours; ie. 19-23 would be hours 19, 20, 21, 22, and 23 (yo |

### Online Utilities to generate crons

- http://cronchecker.net/
- http://crontab-generator.org/
- http://www.cronmaker.com/
- http://htmlminifiers.com/cron-maker.php
- http://blog.endpoint.com/2008/12/best-practices-for-cron.html

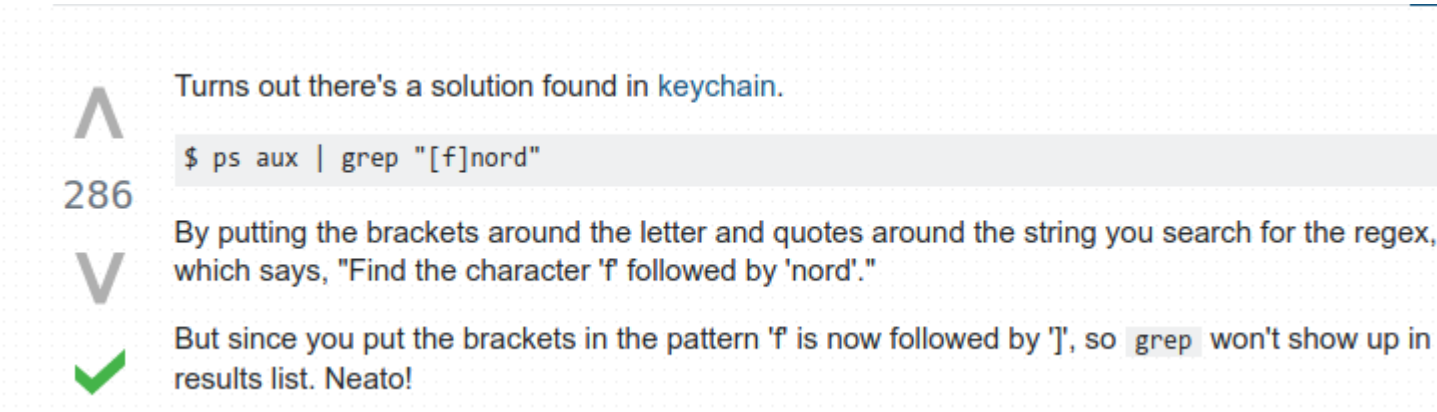
### GREP

*Some useful links to cover the working of Grep*

- https://www.linode.com/docs/tools-reference/search-and-filter-text-with-grep
- https://danielmiessler.com/study/grep/
- http://www.cyberciti.biz/faq/searching-multiple-words-string-using-grep/
- http://www.thegeekstuff.com/2011/10/grep-or-and-not-operators/
- http://xmodulo.com/how-to-grep-multiple-terms-or-strings.html
- https://www.digitalocean.com/community/tutorials/using-grep-regular-expressions-to-search-for-text-patterns-in-linux
- https://alvinalexander.com/unix/edu/examples/grep.shtml
- https://stackoverflow.com/questions/2427913/how-can-i-grep-for-a-string-that-begins-with-a-dash-hyphen
- https://stackoverflow.com/questions/221921/use-grep-exclude-include-syntax-to-not-grep-through-certain-files
- https://stackoverflow.com/questions/25853722/how-to-suppress-binary-file-matching-results-in-grep

### Grepping ps output without showing the grep process

- https://www.safaribooksonline.com/library/view/bash-cookbook/0596526784/ch17s18.html
- https://unix.stackexchange.com/questions/74185/how-can-i-prevent-grep-from-showing-up-in-ps-results



### FIND

*Some useful links to cover the working of Find*

- https://danielmiessler.com/study/find/
- https://www.digitalocean.com/community/tutorials/how-to-use-find-and-locate-to-search-for-files-on-a-linux-vps
- http://tecadmin.net/delete-files-older-x-days/
- http://www.tecmint.com/find-and-sort-files-modification-date-and-time-in-linux/
- https://www.linode.com/docs/tools-reference/tools/find-files-in-linux-using-the-command-line
- https://alvinalexander.com/blog/post/linux-unix/find-how-multiple-search-patterns-filename-command
- https://stackoverflow.com/questions/5475905/linux-delete-file-with-size-0/18052644#18052644

To search and delete empty files in the current directory and subdirectories:

112

```
find . -type f -empty -delete
```

`-type f` is necessary because also directories are marked to be of size zero.

---

The dot `.` (current directory) is the starting search directory. If you have GNU find (e.g. not Mac OS), you can omit it in this case:

```
find -type f -empty -delete
```

From GNU `find` documentation:

> If no files to search are specified, the current directory (.) is used.

### User Management

- https://www.linode.com/docs/tools-reference/linux-users-and-groups
- https://linux-audit.com/unused-linux-users-delete-or-keep/
- https://askubuntu.com/questions/515103/how-can-i-display-all-users-and-groups-with-a-command

180

You can display with the help of `compgen` builtin command as follows:

1. To display all users run following command:

```
compgen -u
```

2. To display all groups run following command:

```
compgen -g
```

However you can also display all users by `cut -d ":" -f 1 /etc/passwd` .

share edit

edited Jun 8 '16 at 18:31
wjandrea
9,693 • 4 • 27 • 66

answered Aug 23 '14 at 14:26
Pandya
21k • 28 • 99 • 157

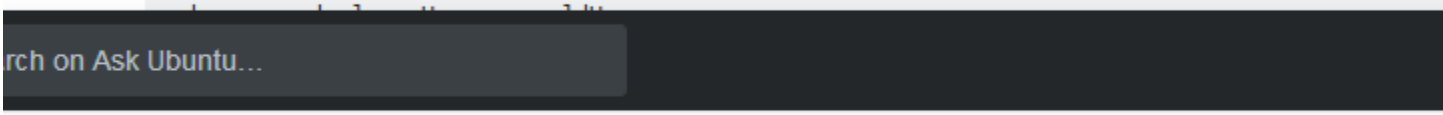
- https://askubuntu.com/questions/34074/how-do-i-change-my-username

275

Unix-like operating systems decouple the user name from the user identity, so you may safely change the name without affecting the ID. All permissions, files, etc are tied to your identity (uid), not your username.

To manage every aspect of the user database, you use the `usermod` tool.

To change username (it is probably best to do this without being logged in):




To change home-folder, use

```
sudo usermod -d /home/newHomeDir -m newUsername
```

after you changed the username.

For instance, you could logout, drop to a console (Ctrl+Alt+F1), and `sudo su -` to become true root (as opposed to `sudo -s`, where $HOME is still /home/yourname.) Maybe you also have to kill some still running processes from this user first. To do so, enter `ps -u username`, look for the matching PID and kill them by `kill PID-number`.

Update: as arrange mentioned, some files may reference your old home directory. You can either kee a symlink for backward compatibility, e g `ln -s /home/newname /home/oldname` or you can change the file contents with `sed -i.bak 's/*oldname*/*newname*/g' *list of files*` It creates a backup for each file with a .bak extension.

Some additional information for not so experienced users like me:
As I only have ONE user account (administrator), it would not let me change the username ("you are already logged in" was the response in TTY1 (Ctrl+Alt+F1). To get around this:

1. Login with your old credentials and add a new user, e.g. "temporary" in TTY1:

   ```
   sudo adduser temporary
   ```

   set the password.
2. Allow the temporary user to run sudo by adding the user to sudo group:

   ```
   sudo adduser temporary sudo
   ```

3. Log out with the command `exit`.
4. Return to tty1: Login with the 'temporary' user account and password. Change your username a folder as mentioned above. `exit` (until you get the login prompt)
5. Go back to TTY7 (Ctrl+Alt+F7) to login on the GUI/normal desktop screen and see if this works.
6. Delete temporary user and folder:

   ```
   sudo deluser temporary
   sudo rm -r /home/temporary
   ```

### File Permissions

*Some useful links to cover the working of File Permissions*

- https://www.linux.com/learn/getting-know-linux-file-permissions
- http://www.penguintutor.com/linux/file-permissions-reference
- https://www.linux.com/learn/understanding-linux-file-permissions
- http://www.linuxnix.com/chmod-command-explained-linuxunix/
- https://unix.stackexchange.com/questions/21251/execute-vs-read-bit-how-do-directory-permissions-in-linux-work
- http://www.grymoire.com/Unix/Permissions.html
- http://www.thegeekstuff.com/2010/06/chmod-command-examples/
- https://danielmiessler.com/study/unixlinux_permissions/
- https://www.linux.com/learn/how-easily-back-and-restore-linux-file-permissions
- https://unix.stackexchange.com/questions/102286/ls-gives-no-such-file-or-directory-message

### Why sudo cd <path-to-dir> doesn't work

- https://superuser.com/questions/241129/why-wont-sudo-cd-work

46

`cd` is a shell builtin. `sudo` only works with executables. You could do `sudo sh -c 'cd dirname'` but a soon as the shell exits, you're returned to the directory you started from. If you say what it is you're trying to accomplish then I can help you find a way to do that.

share improve this answer

answered Feb 3 '11 at 8:29

Dennis Williamson
70.4k • 12 • 117 • 153

1 But then `sudo pwd` wouldn't work either? (I always figured that `sudo cd` *does* work, but you're just not seeing the result after `sudo` returns. But that was just a wild guess. Maybe neither `cd` nor `pwd` are actually built-in in Bash on a Mac. Running `which cd` *does* indeed give me results. Running `sudo cd /` does not give me an error, but indeed does not result in a changed working directory.) – Arjan Feb 3 '11 at 9:00

2 @Arjan: `pwd` is also an external executable so it will work. Note that on some systems, there is a `cd` executable, but it's mostly useless. Try using `type -a cd` it's much more informative than `which`, by the way. – Dennis Williamson Feb 3 '11 at 9:06

1 Nice! `type -a cd` shows both `cd is a shell builtin` and `cd is /usr/bin/cd` on my Mac. And likewise for `pwd` and `echo`. And both `sudo pwd` and `sudo echo "Hello world"` do give me a result. However, `type -a return` only yields `return is a shell builtin`, and `sudo return 3` shows me `sudo: return: command not found`. So, I guess the question is: does the OP get an error message, or does the OP not see the `cd` work without any error? (Or: what OS is the OP using.) – Arjan Feb 3 '11 at 9:12

`sudo sh -c 'cd dirname'` doesn't do anything for me. – Peter Niederwieser Aug 9 '11 at 14:43

@Peter: See the part of my answer which begins "but..." – Dennis Williamson Aug 11 '11 at 22:08

@Dennis: I misunderstood that part. The answer would be easier to understand if `cd dirname` was followed up with something (e.g. `; ...`). – Peter Niederwieser Aug 12 '11 at 0:50

add a comment

- https://askubuntu.com/questions/291666/why-doesnt-sudo-cd-var-named-work

14

It's also worth remembering that, `cd` 's status as a shell builtin or external binary notwithstanding **sudo works by spawning a new process to run the command specified.**

Why is this important? Because the basic execution flow of sudo becomes something very similar to this:

1. The shell spawns off a subprocess to run sudo with the given parameters
2. sudo authenticates the user and confirms their right to execute the specified command
3. sudo spawns off a subprocess to execute the specified command
4. sudo waits for the subprocess spawned off in step 3 to exit
5. sudo exits, returning to the shell
6. The subprocess spawed in step 1 exits, returning the user to the shell prompt

(This *may* be *technically* slightly incorrect; there is a system call which actually *replaces* the running process with a new one (that's the C library's `execve()` ). However, for the purposes of this explanation, the two are equivalent.)

This becomes important when you consider that the current working directory is a property of each process and is *inherited but not promoted*. So if process A spawns off a new process B, then process B starts with the same working directory that process A was in. (This is why something as mundane as `ls ./` does what you'd expect.) But if process B changes *its* working directory, then unless process A goes out of its way looking for that, A is completely unaware of that change. (This, in turn, is why if you run something like `find /` and abort it half-way through, you don't end up in some seemingly random location in the file system just because find happened to be looking there at the moment it was aborted.)

So even if `sudo cd /somewhere` did exactly what it says on the tin, by the time `sudo` exits, you are brought right back where you started. Hence effectively from the point of view of the user, it becomes a no-op. The fact that `cd` , while it was executing, called the `chdir()` system library function to set a new working directory, doesn't help you, the user.

As Warren Hill pointed out, **the proper solution** (I actually wouldn't call it a workaround) is to use `sudo -i` which drops you to a root shell where you can navigate around the filesystem freely and execute whatever commands you feel like. Do note however that when you exit this shell, you are *still* brought right back where you started in the directory hierarchy for exactly the same reason as I described above.

share improve this answer

edited Jun 7 '17 at 20:05

answered May 7 '13 at 7:27

Michael Kjörling

666 • 5 • 17

This explanation was nice and your bit about "So even if `sudo cd /somewhere` did exactly what it says on the tin, by the time `sudo` exits, you are brought back where you started." was helpful. +1 – harperville Dec 20 '16 at 15:14

- https://askubuntu.com/questions/468901/how-to-show-only-hidden-files-in-terminal/468902#468902

### Sudoers

- http://cavepopo.hd.free.fr/wordpress/linux/sudo-command-sudoers-file-concepts-and-practical-examples/
- http://serverfault.com/questions/364334/test-whether-a-user-has-sudo-privileges-without-requiring-user-input
- https://www.digitalocean.com/community/tutorials/how-to-add-delete-and-grant-sudo-privileges-to-users-on-a-debian-vps
- http://www.thegeekstuff.com/2010/09/sudo-command-examples/
- https://www.garron.me/en/linux/visudo-command-sudoers-file-sudo-default-editor.html
- https://www.digitalocean.com/community/tutorials/how-to-edit-the-sudoers-file-on-ubuntu-and-centos
- https://askubuntu.com/questions/73864/how-to-modify-an-invalid-etc-sudoers-file

328

+50

On a modern Ubuntu system (and many other GNU/Linux distributions), fixing a corrupted `sudoers` file is actually quite easy, and doesn't require rebooting, using a live CD, or physical access to the machine

To do this via SSH, log in to the machine and run the command `pkexec visudo`. If you have physical access to the machine, SSH is unnecessary; just open a Terminal window and run that `pkexec` command.

Assuming you (or some other user) are authorized to run programs as `root` with PolicyKit, you can enter your password, and then it will run `visudo` as `root`, and you can fix your `/etc/sudoers`.

If you need to edit one of the configuration files in `/etc/sudoers.d` (which in uncommon in this situation but possible), use `pkexec visudo -f /etc/sudoers.d/filename`.

If you have a related situation where you have to perform additional system administration commands as root to fix the problem (also uncommon in this circumstance, but common in others), you can start an interactive root shell with `pkexec bash`. Generally speaking, any non-graphical command you'd run with `sudo` can be run with `pkexec` instead.

(If there is more than one user account on the system authorized to run programs as `root` with PolicyKit, then for any of those actions, you'll be asked to select which one you want to use, before being asked for your password.)

---

If that doesn't work--for example, if there are no users authorized to run programs as root via PolicyKit--then boot from an Ubuntu live CD (like the CD you probably used to install Ubuntu) and mount the filesystem for the installed system. You can do this by running `sudo parted -l` to view your partitions--there is probably just one ext4 partition, and that's the root filesystem.

Suppose the installed Ubuntu system's root filesystem is on /dev/sda1. Then you could mount it with `sudo mount /dev/sda1 /mnt`. Then you can edit the installed system's sudoers file with `sudo nano -w /mnt/etc/sudoers`. Or, even better, you can edit it with

```
sudo visudo -f /mnt/etc/sudoers
```

(which will prevent you from saving a sudoers file with incorrect syntax).

- https://askubuntu.com/questions/799669/etc-sudoers-file-corrupted-and-i-cant-run-pkexec-visudo-over-ssh

10

I ran into this problem also and with some digging, found a working solution. The original solution is fro
this github issue for NixOS by EstalillaJ.

1. Open two ssh sessions to the target server.
2. In the first session, get the PID of bash by running:

```
echo $$
```

3. In the second session, start the authentication agent with:

```
pkttyagent --process (pid from step 2)
```

4. Back in the first session, run:

```
pkexec visudo
```

5. In the second session, you will get the password prompt. visudo will start in the first session.

share improve this answer

answered Jul 9 at 18:41
Satyen A.
101 • 1 • 3

### UserMod Command

- http://www.tecmint.com/usermod-command-examples/
- http://linoxide.com/linux-command/linux-usermod-command-to-modify-user-details/
- http://crybit.com/15-switches-of-usermod-command-with-example-unixlinux/
- https://muffinresearch.co.uk/linux-changing-uids-and-gids-for-user/
- http://www.htpcbeginner.com/safely-change-primary-group-group-in-linux/
- http://www.cyberciti.biz/faq/howto-linux-add-user-to-group/

### SetUID and SetGID

- http://www.tutonics.com/2012/12/linux-file-permissions-chmod-umask.html
- https://www.slashroot.in/suid-and-sgid-linux-explained-examples
- https://www.thegeekstuff.com/2013/02/sticky-bit/
- http://www.linuxnix.com/suid-set-suid-linuxunix/
- https://unix.stackexchange.com/questions/28363/whats-the-difference-between-s-and-s-in-ls-la

### UMask Values

- → UMask contains default permissions for newly created files / directories based on base permissions for those

- → Base permissions for files is 666 (read-write permissions for owner-group-other : execute permissions are excluded by for files as security measure)
- → Similarly, the base permissions for directories are 777 (read-write-execute permissions for owner-group-other)
- → The UMask values are inverse to regular file permissions → i.e: chmod
- → UMask values = Base permissions - required permissions All UMasks
- https://www.computerhope.com/unix/uumask.htm
- http://www.cyberciti.biz/tips/understanding-linux-unix-umask-value-usage.html
- https://www.digitalocean.com/community/tutorials/linux-permissions-basics-and-how-to-use-umask-on-a-vps

### SymLinks

*Some useful links to cover the working of SymLinks*

- http://www.cyberciti.biz/tips/understanding-unixlinux-symbolic-soft-and-hard-links.html
- http://www.thegeekstuff.com/2010/10/linux-ln-command-examples/
- http://bencane.com/2013/10/10/symlinks-vs-hardlinks-and-how-to-create-them/
- http://geek-university.com/linux/symbolic-links/
- http://geek-university.com/linux/hard-links/

### Others

### XArgs vs Exec

- http://unix.worldiswelcome.com/what-is-the-difference-between-exec-and-xargs
- https://danielmiessler.com/blog/linux-xargs-vs-exec/
- http://www.differencebetween.co.in/technology/difference-between-xargs-and-exec/
- https://stackoverflow.com/questions/16758525/make-xargs-handle-filenames-that-contain-spaces

149

The `xargs` command takes white space characters (tabs, spaces, new lines) as delimiters. You can narrow it down only for the new line characters ('\n') with `-d` option like this:

```
ls *.mp3 | xargs -d '\n' mplayer
```

It works only with GNU xargs. For BSD systems, use the `-0` option like this:

```
ls *.mp3 | xargs -0 mplayer
```

This method is simpler and works with the GNU xargs as well.

share edit

edited Jul 29 at 10:54

Peter Mortensen
13.1k • 19 • 83 • 111

answered Sep 15 '15 at 15:28

Ray
2,023 • 1 • 14 • 11

4 Best answer for general use! This works even if your previous command is not "find" – nexayq Jun 18 '16 at 17:02

21 Unfortunately, this option is not available on OS X. – Thomas Tempelmann Nov 14 '16 at 15:42

19 @Thomas For OS X, the flag is `-E`, ex: `xargs -E '\n'` – user2062950 Jan 18 '17 at 18:09

13 On OS X, -E '\n' didn't have an effect for me, nor would I expect it to as it modified the eofstr and not the record separator. However, I was able to utilize the -0 flag as a solution, even if the previous command is not 'find', by simulating the effect of find's -print0 flag in my input, e.g.: ls *mp3 | tr '\n' '\0' | xargs -0 mplayer – biomiker Jul 5 '17 at 7:23

5 For OS X, you can "brew install findutils", which gives you the "gxargs" command that *does* have the -d switch. – Tom De Leu Mar 16 at 9:37

- https://askubuntu.com/questions/666001/piping-find-name-to-xargs-results-in-filenames-with-spaces-not-being-passed-to/666004

40

You can tell `find` and `xargs` to both use null terminators

```
find . -name "*.txt" -print0 | xargs -0 rm
```

or (simpler) use the built-in `-delete` action of `find`

```
find . -name "*.txt" -delete
```

or (thanks @kos)

```
find . -name "*.txt" -exec rm {} +
```

either of which should respect the system's `ARG_MAX` limit without the need for `xargs`.

share edit

edited Aug 26 '15 at 15:25

answered Aug 26 '15 at 12:19

steeldriver

64k • 11 • 100 • 169

@kos thanks - added – steeldriver Aug 26 '15 at 15:26

1 Can't upvote it twice tough :) since you mentioned `ARG_MAX` I'll also mention that `find . -name "*.txt" -exec rm {} \;` would be a "safe shot" – kos Aug 26 '15 at 15:36

3 Thus sayeth the master: always remember xargs -0. – Joshua Aug 26 '15 at 19:46

Super important point: `-print0` must be the last option (or at least after `-name "*.txt"`) otherwise this will hit files *no longer limited to* `*.txt` ... – Kev Sep 8 at 9:49

add a comment

### NTP

- http://support.ntp.org/bin/view/Support/TroubleshootingNTP
- https://support.rackspace.com/how-to/using-ntp-to-sync-time/
- https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/com.ibm.aix.cmds4/ntpdate.htm

### Renaming / Deleting multiple files

- http://www.cyberciti.biz/tips/renaming-multiple-files-at-a-shell-prompt.html
- http://tips.webdesign10.com/how-to-bulk-rename-files-in-linux-in-the-terminal
- https://www.linux.com/blog/linux-shell-tip-remove-files-names-contains-spaces-and-special-characters-such
- http://www.cyberciti.biz/faq/linux-bash-delete-all-files-in-directory-except-few/
- https://www.tecmint.com/delete-all-files-in-directory-except-one-few-file-extensions/

- https://askubuntu.com/questions/470134/how-to-find-the-creation-time-of-a-file
- https://www.if-not-true-then-false.com/2011/linux-display-show-file-contents-tabs-line-breaks-non-printing-characters/

### Rename multiple files with different extensions

- https://superuser.com/questions/865826/linux-mv-command-for-moving-multiple-files-with-different-extensions

Simplest way would be to use a mix of brace expansion and globbing

```
mv -iv -- *.{png,jpg} dir/
```

Which gets expanded to

```
mv -iv -- *.png *.jpg dir/
```

Which gets expanded to (all files -- including dirs/symlincs -- ending in `.png` or `.jpg`)

```
mv -iv -- 1.png 2.jpg ... dir/
```

Note: `-iv --` is including for safety/verbosity

```
-i, --interactive
       prompt before overwrite
-v, --verbose
       explain what is being done
[GETOPT] The special argument "--" forces an end of option-scanning
         regardless of the scanning mode.
         (Meaning everything after it gets treated as an argument)
```

### Command Prompt Tweaks

- http://computers.tutsplus.com/tutorials/speed-up-your-terminal-workflow-with-command-aliases-and-profile–mac-30515
- http://blog.taylormcgann.com/2012/06/13/customize-your-shell-command-prompt/

### Random Tools

- http://aarvik.dk/blacklist-check-unix-linux-utility/
- http://www.tecmint.com/progress-monitor-check-progress-of-linux-commands/
- http://www.tecmint.com/screen-command-examples-to-manage-linux-terminals/
- http://www.thegeekstuff.com/2009/04/chage-linux-password-expiration-and-aging/
- https://danielmiessler.com/study/tar/
- https://danielmiessler.com/blog/collection-of-less-commonly-used-unix-commands/

- http://www.commandlinefu.com/commands/browse
- https://distrochooser.de/en
- https://www.cyberciti.biz/open-source/command-line-hacks/compgen-linux-command/
- https://www.dynacont.net/documentation/linux/Useful_SystemD_commands/

#### SysCTL

*Some useful links to cover the working of SysCTL*

- https://rtcamp.com/tutorials/linux/sysctl-conf
- https://www.cyberciti.biz/faq/linux-kernel-etcsysctl-conf-security-hardening
- https://www.slashroot.in/linux-network-tcp-performance-tuning-sysctl
- https://www.linux.com/news/kernel-tuning-sysctl

#### LSOF

- https://danielmiessler.com/study/lsof/
- http://www.catonmat.net/blog/unix-utilities-lsof/
- http://www.thegeekstuff.com/2012/08/lsof-command-examples/
- https://www.ibm.com/developerworks/aix/library/au-lsof.html
- https://unix.stackexchange.com/questions/253321/how-to-display-size-human-readable-in-lsof-grep-var

#### DIFF

- https://www.lifewire.com/compare-two-text-files-linux-3861434

#### Comparing difference between files / directories on 2 servers

- http://xmodulo.com/how-to-diff-remote-files-over-ssh.html
- http://zuhaiblog.com/2011/02/14/using-diff-to-compare-folders-over-ssh-on-two-different-servers/

### 1.3.13 Fundamentals

*Some useful links to explain the concepts of Web-Servers*

#### Concepts

- http://computer.howstuffworks.com/web-server2.htm
- https://serversforhackers.com/hosting-web-applications
- https://danielmiessler.com/study/web-performance/
- https://launchschool.com/books/http/read/introduction
- https://github.com/alex/what-happens-when

- https://howhttps.works/
- https://dev.to/pratikaambani/explain-http-verbs-like-im-five-b10
- http://stackoverflow.com/questions/224664/difference-between-proxy-server-and-reverse-proxy-server
- https://dev.to/swyx/every-web-performance-test-tool-naj

### Load Balancing

- https://blog.envoyproxy.io/introduction-to-modern-network-load-balancing-and-proxying-a57f6ff80236
- https://avinetworks.com/what-is-load-balancing
- https://levelup.gitconnected.com/l4-vs-l7-load-balancing-d2012e271f56

### HTTP request lifecycle overview

- https://dev.to/dangolant/things-i-brushed-up-on-this-week-the-http-request-lifecycle-

### Difference between `http 443 and https 80`

- http://serverfault.com/questions/705197/http-over-port-443-vs-https-over-port-80

13

*http* and *https* refer to the protocol in use.

*http* is used for unencrypted cleartext communication, which means transferred data may be intercepted and read in plain by a human. Username/password fields may for instance be capture and read.

*https* refers to ssl/tsl encrypted communication. It must be decrypted to be read. Normally/ideally the endpoints are capable of encrypting/decrypting the data, although this is a statement with cav (*see edit below*).

Therefore https may be considered more secure than http.

:80 and :443 refer only to the server port in use (i.e. it is "just a number") and carries no significan all with regards to security.

However, there is a strong convention to send http over port 80 and https over port 443, which ma the combinations in the question more than a little unorthodox. They are technically perfectly usab though, as long as the endpoints are in agreement and no intermediary filter objects.

So to answer, *http://example.com:443* is less secure than *https://example.com:80* and the differe is practical (even though it can be offset in a number of ways) and not merely theoretical.

You can easily test the validity of these statements using a webserver and client where you manip the serverport and the encryption status, whilst capturing and comparing each session with a pro decoder such as wireshark.

[*EDIT - caveats regarding the security of the client/server path*]

What essentially amounts to an https man-in-the-middle attack can be performed for purposes of eavesdropping or impersonation. It may be done as an act of malevolence, benevolence or as it tu out even due to ignorance, depending on circumstance.

The attack can be done either through exploiting a protocol weakness such as the heartbleed bug the Poodle vulnerability, or through instantiating an https proxy between the client and server in the network path or directly on the client.

Malevolent use does not need much explanation, I think. Benevolent use would be for example an organisation proxying incoming https connections for purposes of logging/ids, or outgoing https connections for filtering allowed/denied applications. An example of ignorant use would be the Len Superfish example linked above or the recent Dell variation of the same slip-up.

share improve this answer

edited Dec 8 '15 at 8:58

answered Jul 12 '15 at 19:29

ErikE

3,754 ● 1 ● 10 ● 22

### HTTP status codes

- http://www.restapitutorial.com/httpstatuscodes.html
- https://httpstatuses.com/
- https://stackoverflow.com/questions/50143518/401-unauthorized-vs-403-forbidden-which-is-the-right-status-code-for-when-the
- https://stackoverflow.com/questions/3297048/403-forbidden-vs-401-unauthorized-http-responses
- https://geekflare.com/http-status-code-infographics/


HTTP STATUS CODE DEFINITION
TYPES OF STATUS CODE
INFORMATIONAL, SUCCESS, REDIRECTION, CLIENT ERROR, SERVER ERROR
Here are some common Status Code and it's meaning
Success Response
200: OK – The server processes your request successfully and server provided the requested page.
202: Accepted – The server has accepted your request and yet to process them.
206: Partial Content – The server has delivered partial content due to a range header sent by the client.
Redirection Response
301: Moved permanently – Your requested page have been moved permanently to a new location. Let Search Engine bot know that your page or site has permanently moved to a new location.
302: Moved temporarily – Your request is served from a different location but this is temporarily arrangement. Let Search Engine bot know to crawl and index the original location.
305: Use proxy – The requested resource is only available through a proxy. That means you must use relevant proxy to request page.
Client Error
400: Bad request – The server is confused what you have requested. probably bad syntax or trying to be jerk.
401: not authorized – Your requested page is protected and require authentication. You might get login page.
403: Forbidden – You are trying to access which you don't have permission. This happens when you requested protected folder, bypassing directory listing compliance or entered credential is not accepted.
404: Not Found – Your requested page is not found on server. You are trying to access something. which doesn't exist.
405: Method Not Allowed – You are requesting a page with wrong method. For example, you are doing GET on POST data.
408: Request Timeout – The server timed out waiting for the request.
411: Length required – Your request doesn't meet the length of it's content, which is required by the requested resource.
Server Error
500: Internal Server Error – A very generic error when server encountered an error due to various reasons. Logs must be examined to see why server has responded Internal Error.
502: Bad Gateway – The server was acting as a gateway or proxy and received invalid response from the upstream server.
503: Service Unavailable – The server can't serve your request. Server is too busy in other stuff or almost not responding.
504: Gateway timeout – The server was acting as a gateway or proxy and didn't receive response within time from upstream server.
Created by Chandan Kumar - www.chandank.com
Create infographics
infogr.am

#### Check website-availability issues - Tools

- https://www.site24x7.com/tools.html
- https://geopeeker.com/
- https://httpstatus.io/

#### cURL

- http://www.thegeekstuff.com/2012/04/curl-examples/
- http://www.slashroot.in/curl-command-tutorial-linux-example-usage
- https://curl.haxx.se/docs/httpscripting.html
- https://ec.haxx.se/curl.html
- http://www.codediesel.com/tools/6-essential-curl-commands/
- https://robots.thoughtbot.com/back-to-basics-http-requests
- https://blog.josephscott.org/2011/10/14/timing-details-with-curl/
- https://stackoverflow.com/questions/46362284/run-multiple-curl-commands-in-parallel
- http://http-prompt.com/

#### wGET

- http://www.thegeekstuff.com/2009/09/the-ultimate-wget-download-guide-with-15-awesome-examples/
- http://www.tecmint.com/10-wget-command-examples-in-linux/
- http://www.labnol.org/software/wget-command-examples/28750/
- http://www.linuxtechi.com/wget-command-practical-examples/
- https://alvinalexander.com/linux-unix/how-to-make-offline-mirror-copy-website-with-wget

### 1.3.14 Apache

*Some useful links to explain the concepts of Apache*

#### Concepts

- http://code.tutsplus.com/tutorials/an-introduction-to-apache–net-25786
- http://fideloper.com/quick-caching-explanation
- https://anturis.com/blog/get-insight-into-your-website-performance-with-key-apache-statistics/
- http://middlewaretechnologies.blogspot.in/2013/04/have-you-ever-tried-installing-apache.html

### Information about MPM (Multi Processing Modules)

- https://prakash-khadka.com.np/apache-mpm/
- http://articles.slicehost.com/2010/12/3/configuring-the-apache-mpm-on-gentoo
- https://serverfault.com/questions/383526/how-do-i-select-which-apache-mpm-to-use

### prefork

`mpm_prefork` is.. well.. it's compatible with everything. It spins off a number of child processes for serving requests, and the child processes only serve one request at a time. Because it's got the server process sitting there, ready for action, and not needing to deal with thread marshaling, it's actually *faster* than the more modern threaded MPMs when you're only dealing with a single request at a time - but concurrent requests suffer, since they're made to wait in line until a server process is free. Additionally, attempting to scale up in the count of prefork child processes, you'll easily suck down some serious RAM.

It's probably not advisable to use prefork unless you need a module that's not thread safe.

**Use if:** You need modules that break when threads are used, like `mod_php`. Even then, consider using FastCGI and `php-fpm`.

**Don't use if:** Your modules won't break in threading.

### worker

`mpm_worker` uses threading - which is a big help for concurrency. Worker spins off some child processes, which in turn spin off child threads; similar to prefork, some spare threads are kept ready if possible, to service incoming connections. This approach is much kinder on RAM, since the thread count doesn't have a direct bearing on memory use like the server count does in prefork. It also handles concurrency much more easily, since the connections just need to wait for a free thread (which is usually available) instead of a spare server in prefork.

**Use if:** You're on Apache 2.2, or 2.4 and you're running primarily SSL.

**Don't use if:** You really can't go wrong, unless you need prefork for compatibility.

However, note that the treads are attached to *connections* and not *requests* - which means that a keep-alive connection always keeps a hold of a thread until it's closed (which can be a long time, depending on your configuration). Which is why we have..

### event

`mpm_event` is very similar to worker, structurally; it's just been moved from 'experimental' to 'stable' status in Apache 2.4. The big difference is that it uses a dedicated thread to deal with the kept-alive connections, and hands requests down to child threads only when a request has actually been made (allowing those threads to free back up immediately after the request is completed). This is great for concurrency of clients that aren't necessarily all active at a time, but make occasional requests, and when the clients might have a long keep-alive timeout.

The exception here is with SSL connections; in that case, it behaves identically to worker (gluing a given connection to a given thread until the connection closes).

**Use if:** You're on Apache 2.4 and like threads, but you don't like having threads waiting for idle connections. Everyone likes threads!

**Don't use if:** You're not on Apache 2.4, or you need prefork for compatibility.

### Configuration

- http://fideloper.com/ubuntu-12-04-lamp-server-setup
- https://www.linode.com/docs/websites/apache/apache-web-server-on-centos-6
- https://www.linode.com/docs/websites/lamp/lamp-on-centos-6/
- http://www.erikwebb.net/blog/compile-and-install-apache-24-red-hat-enterprise-linux-rhel-6-or-centos-6/
- https://www.digitalocean.com/community/tutorials/how-to-install-linux-apache-mysql-php-lamp-stack-on-centos-6
- http://shapeshed.com/domain_forwarding_in_apache/
- https://www.linode.com/docs/websites/apache-tips-and-tricks/redirect-urls-with-the-apache-web-server
- http://www.tecmint.com/creating-your-own-webserver-and-hosting-a-website-from-your-linux-box/
- https://serversforhackers.com/video/php-fpm-configuration-the-listen-directive
- https://coderwall.com/p/hmsr5a/have-php-fpm-listen-on-unix-socket

### Virtual Hosting

- http://www.thegeekstuff.com/2011/07/apache-virtual-host/
- https://support.rackspace.com/how-to/how-to-serve-multiple-domains-using-virtual-hosts/
- https://mobile.serverwatch.com/tutorials/article.php/1127571/Apache-Guide-Setting-Up-Virtual-Hosts.htm
- https://serversforhackers.com/configuring-apache-virtual-hosts
- http://www.thegeekstuff.com/2011/07/apache-virtual-host/
- https://www.digitalocean.com/community/tutorials/how-to-set-up-apache-virtual-hosts-on-centos-6
- https://www.digitalocean.com/community/tutorials/how-to-create-a-ssl-certificate-on-apache-for-centos-6
- http://aarvik.dk/good-apache-virtualhost/

### HTaccess checks and guides

- http://www.htaccesscheck.com/
- http://htaccess.madewithlove.be/
- http://www.askapache.com/htaccess/htaccess.html
- http://socreativedigital.com/7-htaccess-file-examples-that-work-for-seo-2013-05-04

### Tuning & Hardening

### Apache Server Status Page

- http://www.tecmint.com/monitor-apache-web-server-load-and-page-statistics/
- http://www.coscale.com/blog/apache-troubleshooting-and-monitoring
- https://anturis.com/blog/get-insight-into-your-website-performance-with-key-apache-statistics/
- https://blog.serverdensity.com/monitor-apache/

### Other Optimizations

- http://www.tecmint.com/apache-performance-tuning/
- http://www.ubuntufree.com/how-to-optimize-apache/
- https://www.maketecheasier.com/series/apache-server-guide/
- http://linuxbsdos.com/2015/02/17/how-to-reduce-php-fpm-php5-fpm-ram-usage-by-about-50/
- http://blog.chrismeller.com/configuring-and-optimizing-php-fpm-and-nginx-on-ubuntu-or-debian
- https://serversforhackers.com/video/php-fpm-process-management
- http://linuxconfig.org/apache-web-server-ssl-authentication
- https://geekflare.com/apache-web-server-hardening-security/
- https://geekflare.com/category/web-infrastructure/apache/
- http://www.acunetix.com/blog/articles/10-tips-secure-apache-installation/
- http://www.tecmint.com/apache-security-tips/
- http://www.thegeekstuff.com/2011/03/apache-hardening/
- https://haydenjames.io/strip-apache-improve-performance-memory-efficiency/
- http://www.serverlab.ca/tutorials/linux/web-servers-linux/configuring-selinux-policies-for-apache-web-servers/
- http://geekflare.com/apache-web-server-hardening-security/

### Troubleshooting & Log Parsing

### Find Original IPs of sites using CDNs like Cloudflare

- https://censys.io/

### Levels of traffic with Apache access log

- http://www.inmotionhosting.com/support/website/server-usage/view-level-of-traffic-with-apache-access-log
- http://www.inmotionhosting.com/support/website/website-troubleshooting/determine-cause-of-server-usage-spike
- http://www.cyberciti.biz/faq/apache-logs/
- http://www.serverwatch.com/tutorials/article.php/1127521/Apache-Guide-Logging-with-ApacheUnderstanding-Your-accesslog.htm
- http://list.xmodulo.com/web-server-benchmarking-tools-linux.html
- http://stackoverflow.com/questions/9234699/understanding-apache-access-log
- http://logz.io/blog/apache-log-analyzer/
- http://www.the-art-of-web.com/system/logs/

### Commands

- **Find hits by IP to server from access log in ascending order**

```
sudo tail -n 10000 <path-to-log-file> | awk '{print $2}' | sort | uniq -c | sort -n
sudo grep 'text' <path-to-access-log> | cut -d' ' -f1 | sort | uniq -c | sort -r
```

- **Finding connections to all server IPs source/destination & sorting in ascending order**

```
sudo netstat -antulp | awk '{print $4}' | cut -d":" -f1 | sort | uniq -c | sort -n
sudo netstat -antulp | awk '{print $5}' | cut -d":" -f1 | sort | uniq -c | sort -n
```

## 1.3.15 Nginx

*Some useful links to explain the concepts of NGinx*

### Concepts

- https://www.digitalocean.com/community/tutorials/understanding-nginx-server-and-location-block-selection-algorithms
- https://www.nginx.com/resources/wiki/start/
- https://www.digitalocean.com/community/tutorials/understanding-the-nginx-configuration-file-structure-and-configuration-conte
- https://www.linode.com/docs/websites/nginx/how-to-configure-nginx
- https://www.digitalocean.com/community/tutorials/understanding-nginx-http-proxying-load-balancing-buffering-and-caching
- https://www.atulhost.com/nginx

### Configuration

- http://fideloper.com/ubuntu-12-04-lemp-nginx-setup
- https://blog.serverdensity.com/monitor-nginx/
- http://devdocs.io/nginx/
- http://nginx.org/en/docs/
- https://rtcamp.com/tutorials/nginx/
- http://articles.slicehost.com/nginx
- https://rtcamp.com/wordpress-nginx/tutorials/
- https://geekflare.com/category/web-infrastructure/nginx/
- https://geekflare.com/nginx-webserver-security-hardening-guide/
- https://www.digitalocean.com/community/tutorials/how-to-create-temporary-and-permanent-redirects-with-apache-and-nginx
- https://www.nginx.com/blog/creating-nginx-rewrite-rules/
- https://www.godaddy.com/garage/tech/config/how-to-install-and-configure-nginx-on-fedora/

#### Nginx with HTTPS using SSL via LetsEncrypt

- https://shawnliu.me/post/using-lets-encrypt-for-nginx-on-centos-7/
- https://www.e2enetworks.com/help/knowledge-base/free-ssl-for-ngnix-on-centos-by-lets-encrypt/
- https://www.imagescape.com/blog/2017/11/27/free-and-auto-renewing-ssl-certificates-letsencrypt-quick-setup-2017-edition/

#### Visual Editor for NGinx Config

- https://nginxconfig.io

#### Tuning & Hardening

- http://linuxbsdos.com/2015/02/17/how-to-reduce-php-fpm-php5-fpm-ram-usage-by-about-50/
- https://www.nginx.com/blog/10-tips-for-10x-application-performance/
- http://www.tokiwinter.com/building-a-highly-available-load-balancer-with-nginx-and-keepalived-on-centos/
- http://www.cyberciti.biz/faq/rhel-centos-fedora-keepalived-lvs-cluster-configuration/
- https://lincolnloop.com/blog/rate-limiting-nginx/
- https://www.nginx.com/blog/benefits-of-microcaching-nginx/
- https://anturis.com/blog/nginx-vs-apache/
- http://www.thegeekstuff.com/2013/11/nginx-vs-apache/
- https://www.fissionblue.com/blog/mask-domain-entire-site-using-nginx-ssl/
- https://www.digitalocean.com/community/tutorials/apache-vs-nginx-practical-considerations
- https://www.digitalocean.com/community/tutorials/how-to-optimize-nginx-configuration

#### Troubleshooting & Log Parsing

- http://logz.io/blog/nginx-log-analysis/
- http://logz.io/blog/nginx-access-log-monitoring-dashboard/

### 1.3.16 HAProxy

*Some useful links to explain the concepts of HAProxy*

#### Concepts

#### Official Documentation

- https://cbonte.github.io/haproxy-dconv/
- https://linuxacademy.com/howtoguides/posts/show/topic/12012-introduction-to-haproxy
- https://www.digitalocean.com/community/tutorials/an-introduction-to-haproxy-and-load-balancing-concepts

### Configuration

- https://serversforhackers.com/using-ssl-certificates-with-haproxy
- https://cbonte.github.io/haproxy-dconv/configuration-1.5.html
- https://coelhorjc.wordpress.com/2015/03/26/how-to-load-balance-an-http-server-using-with-haproxy-or-pound/
- http://blog.haproxy.com/haproxy/haproxy-and-ssl/
- https://www.digitalocean.com/community/tutorials/how-to-implement-ssl-termination-with-haproxy-on-ubuntu-14-04
- http://ubtutorials.com/tutorial/436/how-implement-ssl-termination-haproxy-ubuntu-1404
- https://www.howtoforge.com/high-availability-load-balancer-haproxy-heartbeat-debian-etch
- http://support.severalnines.com/entries/23612682-Install-HAProxy-and-Keepalived-Virtual-IP-
- http://behindtheracks.com/2014/04/redundant-load-balancers-haproxy-and-keepalived/
- https://serversforhackers.com/load-balancing-with-haproxy
- http://www.linuxnix.com/heartbeat-clustering/
- https://www.digitalocean.com/community/tutorials/how-to-create-a-high-availability-setup-with-heartbeat-and-floating-ips-on-u
- https://www.digitalocean.com/community/tutorials/how-to-create-a-high-availability-setup-with-corosync-pacemaker-and-floati
- https://marc.cortinasval.cat/blog/2013/12/04/a-cheap-web-balancer-nginxhaproxypacemaker/
- http://support.severalnines.com/entries/23612682-Install-HAProxy-and-Keepalived-Virtual-IP-
- https://www.howtoforge.com/setting-up-a-high-availability-load-balancer-with-haproxy-keepalived-on-debian-lenny
- https://www.freecodecamp.org/news/how-we-fine-tuned-haproxy-to-achieve-2-000-000-concurrent-ssl-connections-d017e61a4c
- https://delta.blue/blog/haproxy-timeouts

### Tuning & Hardening

### SNI on HAProxy

- http://stuff-things.net/2016/11/30/haproxy-sni/
- http://www.networkinghowtos.com/howto/reload-haproxy-config-with-minimal-downtime/
- http://blog.haproxy.com/2012/04/13/enhanced-ssl-load-balancing-with-server-name-indication-sni-tls-extension/
- https://medium.com/@siddharth.d/securing-haproxy-and-nginx-via-http-headers-54020d460283

### Troubleshooting & Log Parsing

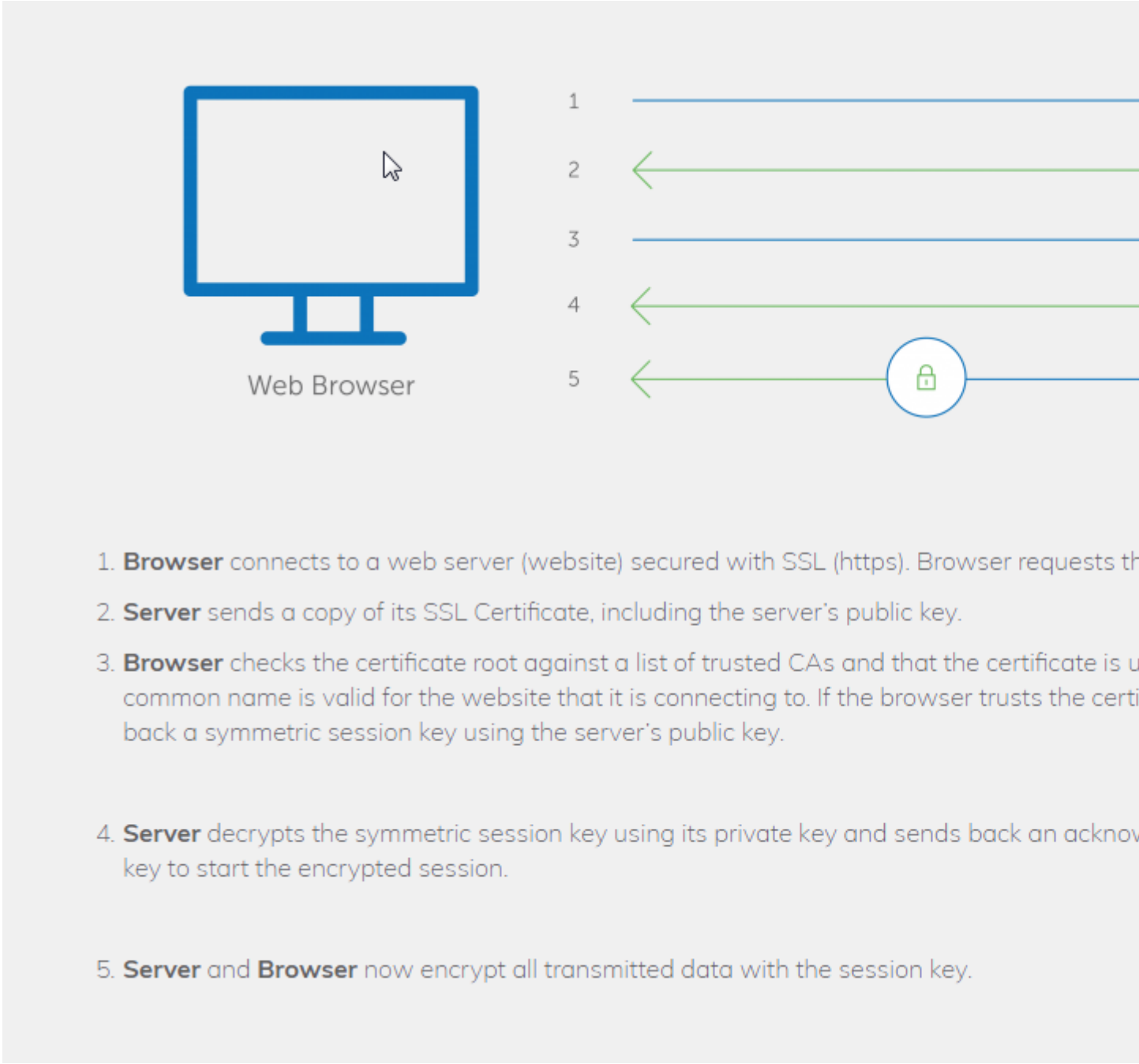
- https://www.linux.com/blog/how-analyze-haproxy-logs
- http://logz.io/blog/monitor-haproxy-elk-stack/
- https://github.com/gforcada/haproxy_log_analysis
- https://serversforhackers.com/so-you-got-yourself-a-loadbalancer
- http://www.networkinghowtos.com/howto/viewing-haproxy-statistics/
- https://www.datadoghq.com/blog/monitoring-haproxy-performance-metrics/
- https://www.datadoghq.com/blog/how-to-collect-haproxy-metrics/

### 1.3.17 SSL

*Some useful links to explain the concepts of SSL*

#### Concepts

- https://tls.ulfheim.net
- https://www.digitalocean.com/community/tutorials/a-comparison-of-let-s-encrypt-commercial-and-private-certificate-authorities
- https://scotthelme.co.uk/https-cheat-sheet/
- https://www.digicert.com/ssl.htm




- http://grahamc.com/blog/openssl-madness-how-to-create-keys-certificate-signing-requests-authorities-and-pem-files/
- https://www.digicert.com/csr-creation.htm
- http://swift.siphos.be/aglara/certificates.html
- https://www.openssl.org/docs/manmaster/apps/verify.html
- http://www.openssl.org/docs/manmaster/apps/x509.html
- http://www.slashroot.in/understanding-working-secure-socket-layerssl
- http://www.slashroot.in/understanding-ssl-handshake-protocol

### FAQs on SSL

- https://timnash.co.uk/guessing-ssl-questions/
- http://www.martfox.com/customer/knowledgebase/140/Why-a-SSL-Requires-Dedicated-IP.html
- https://dzone.com/articles/introduction-to-ssl-for-managers
- https://www.nutsandboltsmedia.com/does-your-website-really-need-ssl/
- https://www.slashroot.in/how-does-ssltls-chain-certificates-and-its-validation-work
- https://blog-cloudflare-com.cdn.ampproject.org/c/s/blog.cloudflare.com/rfc-8446-aka-tls-1-3/amp/
- https://serverfault.com/questions/9708/what-is-a-pem-file-and-how-does-it-differ-from-other-openssl-generated-key-file
- https://www.troyhunt.com/life-is-about-to-get-harder-for-websites-without-https/
- https://www.troyhunt.com/on-the-perceived-value-ev-certs-cas-phishing-lets-encrypt/
- https://www.troyhunt.com/extended-validation-certificates-are-dead/

### Server Name Indication

- https://devcentral.f5.com/articles/ssl-profiles-part-7-server-name-indication
- http://wiki.apache.org/httpd/NameBasedSSLVHostsWithSNI
- https://www.digicert.com/ssl-support/apache-multiple-ssl-certificates-using-sni.htm

### Configuration

### Basics of OpenSSL Commands for CSR, Keys & Certs

- https://www.digitalocean.com/community/tutorials/openssl-essentials-working-with-ssl-certificates-private-keys-and-csrs

### Wildcard SSL on sub-domain

- http://stackoverflow.com/questions/2115611/wildcard-ssl-on-sub-subdomain
- http://serverfault.com/questions/566426/does-each-subdomain-need-its-own-ssl-certificate
- http://serverfault.com/questions/104160/wildcard-ssl-certificate-for-second-level-subdomain

### Switching from HTTP to HTTPs

- https://www.smashingmagazine.com/2017/06/guide-switching-http-https/
- http://searchengineland.com/http-https-seos-guide-securing-website-246940
- https://yoast.com/moving-your-website-to-https-ssl-tips-tricks/

### Creating SAN SSL certificate

- https://geekflare.com/san-ssl-certificate/

### Tuning & Hardening

- http://heartbleed.com/
- http://www.troyhunt.com/2014/04/everything-you-need-to-know-about.html
- https://www.yahoo.com/tech/heres-what-you-need-to-know-about-the-heartbleed-bug-82120054478.html
- http://thehackernews.com/2014/04/heartbleed-bug-explained-10-most.html
- http://kb.odin.com/en/118918
- https://security.stackexchange.com/questions/8210/what-vulnerabilities-could-be-caused-by-a-wildcard-ssl-cert
- http://www.jamescoyle.net/how-to/1073-bash-script-to-create-an-ssl-certificate-key-and-request-csr
- https://rtcamp.com/wordpress-nginx/tutorials/ssl/multidomain-ssl-subject-alternative-names/

### Hardening Your Web Server's SSL Ciphers

- https://hynek.me/articles/hardening-your-web-servers-ssl-ciphers/
- https://cipherli.st/
- https://mozilla.github.io/server-side-tls/ssl-config-generator/

### Troubleshooting & Log Parsing

- https://www.sslshopper.com/ssl-certificate-tools.html
- https://cheapsslsecurity.com/ssltools/
- http://geekflare.com/ssl-test-certificate/
- https://serversforhackers.com/self-signed-ssl-certificates

### Commands

- https://www.sslshopper.com/article-most-common-openssl-commands.html
- http://www.shellhacks.com/en/HowTo-Check-SSL-Certificate-Expiration-Date-from-the-Linux-Shell
- https://cryptoreport.websecurity.symantec.com/checker/
- https://www.digicert.com/help/

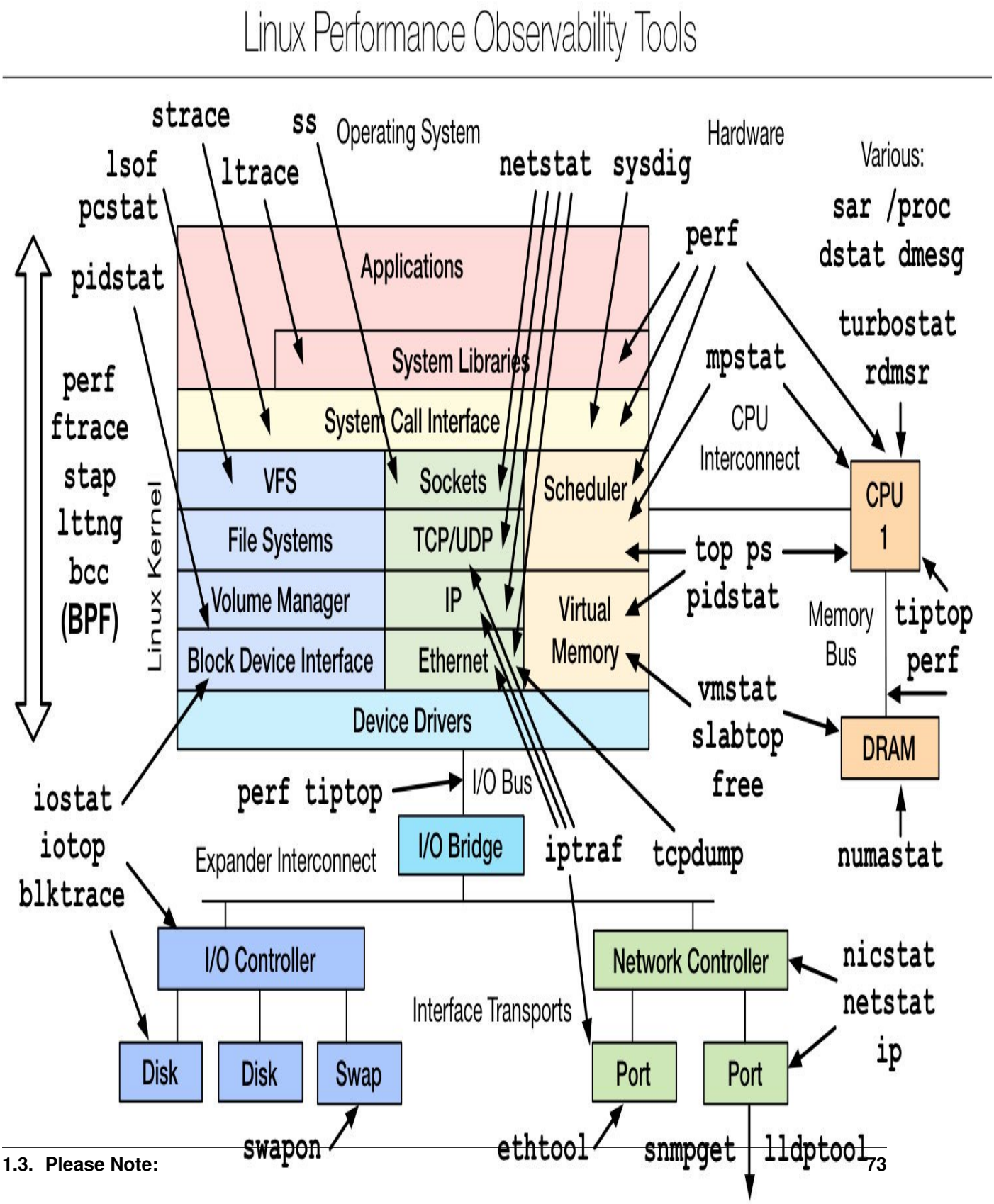
### Free SSL Certificates : LetsEncrypt

- https://www.digitalocean.com/community/tutorials/an-introduction-to-let-s-encrypt
- https://geekflare.com/free-ssl-tls-certificate/
- https://serversforhackers.com/video/letsencrypt-for-free-easy-ssl-certificates
- https://letsencrypt.org/
- https://digitz.org/blog/lets-encrypt-ssl-centos-7-setup/
- https://certbot.eff.org/lets-encrypt/centosrhel7-nginx.html

### 1.3.18 Monitoring

*Some useful links to explain the concepts of Monitoring*

**Concepts**




1.3. Please Note:

- https://www.datadoghq.com/blog/monitoring-101-alerting/
- https://blog.serverdensity.com/what-ive-learnt-from-using-ansible-exclusively-for-2-years/
- https://blog.serverdensity.com/80-linux-monitoring-tools-know/
- https://serversforhackers.com/monitoring-processes-with-supervisord
- http://supervisord.org/

### Nagios

- http://nagios.sourceforge.net/docs/nagioscore/4/en/toc.html
- http://users.telenet.be/mydotcom/howto/nagios/index.html
- http://www.linuxquestions.org/questions/linux-newbie-8/nagios-internal-server-error-903798/

### What Nagios does

- Monitoring of network services (SMTP, POP3, HTTP, NNTP, ICMP, SNMP, FTP, SSH)
- Monitoring of host resources (processor load, disk usage, system logs) on a majority of network operating systems, including Microsoft Windows with the NSClient++ plugin or Check MK.
- Monitoring via remotely run scripts via Nagios Remote Plugin Executor or through SSH or SSL encrypted tunnels.
- Contact notifications when service or host problems occur & get resolved (via e-mail, pager, SMS, or any user-defined method through plugin system)
- The ability to define event handlers to be run during service or host events for proactive problem resolution. Automatic log file rotation. Support for implementing redundant monitoring hosts
- An optional web-interface for viewing current network status, notifications, problem history, log files, etc. Data storage via text files rather than database

### Configuration

### Host / Service Monitoring

- http://www.opensourceforu.com/2011/07/nagios-setup-guide/
- http://www.productionmonkeys.net/guides/nagios/nagios-server-installation/advanced-configuration/service-and-servicegroups

### Deploying SSH Checks For Nagios

- http://tecadmin.net/monitor-remote-linux-system-nagios-via-ssh/
- http://www.techrepublic.com/blog/linux-and-open-source/remotely-monitor-servers-with-the-nagios-check-by-ssh-plugin/
- http://www.opensourceforu.com/2011/07/nagios-setup-guide/
- http://tuxradar.com/content/nagios-made-easy
- https://geekpeek.net/nagios-plugin-bash/

#### Check HTTP

- http://linux.101hacks.com/unix/check-http/

### 1.3.19 Graphing

*Some useful links to explain the concepts of Graphing*

#### Concepts

**Cacti**

- http://www.cacti.net/index.php

**Metrics**

- http://blog.4aiur.net/2012/01/installing-and-configuring-graphite-on-centos/
- http://kaivanov.blogspot.in/2014/07/metrics-visualisation-and-collection.html

#### Ganglia

- http://www.slashroot.in/introduction-ganglia-monitoring-and-graphing-tool
- https://www.digitalocean.com/community/tutorials/introduction-to-ganglia-on-ubuntu-14-04
- https://sachinsharm.wordpress.com/2013/08/17/setup-and-configure-ganglia-3-6-on-centosrhel-6-3/

#### What Ganglia does

- *Graph different properties of a server such as CPU,memory,load,etc*
- *Compare the graphing trend of those properties with previous trend & identify which node or host is causing the issue easily from the trend.*
- *Make custom metrics for graphing for different process.*
- *Machines from different data centers which are part of one single cluster must be represented in that single cluster in a single interface.*

#### Important points

- **Node** : *SINGLE machine sending data to Ganglia monitoring daemon. (All individual servers are nodes, can or can't be part of a cluster)*
- **Cluster** : *All nodes that are used for any particular purpose is a CLUSTER.*
- **Grid** : *Collection of clusters is a GRID.*

### Parts of Ganglia Monitoring Tool

- **1. Gmond :**
  - *Ganglia Monitoring daemon (Service that needs to be installed on each & every node that needs to be monitored)*
  - *Sends data via XML over TCP & main configuration file* : `/etc/gmond.conf`
- **2. Gmetad :**
  - *Collects data from Gmond daemons & stores in RRD (Round robin database)*
  - *Main configuration file is /etc/gmetad.conf & should be installed on one node of each cluster*
- **3. RRD tool :**
  - *Used by Ganglia to store data for visualization (graphing) & store data of particular time intervals & then graphs the same.*
- **4. PHP Front-End :**
  - *A web interface on the master node that displays graphs and metrics from data in the RRD tool.*

### Configuration

- http://linuxdrops.com/install-ganglia-monitoring-system-on-centos-rhel/
- https://sachinsharm.wordpress.com/2013/08/17/setup-and-configure-ganglia-3-6-on-centosrhel-6-3/
- https://sachinsharm.wordpress.com/2013/08/19/setup-and-configure-ganglia-python-modules-on-centosrhel-6-3/
- http://a4amittripathi.blogspot.in/2014/01/how-to-configure-and-install-ganglia-in.html
- http://www.ibm.com/developerworks/library/l-ganglia-nagios-1/

### Troubleshooting & Log Parsing

- https://ahmadchaudary.wordpress.com/tag/ganglia-monitoring/
- http://rowsandcolumns.blogspot.in/2010/07/compiling-ganglia-errors-and-problems.html

## 1.3.20 Logging

*Some useful links to explain the concepts of Logging*

### Concepts

- https://syslog-ng.org/
- https://www.loggly.com/ultimate-guide/linux-logging-basics/
- https://www.loggly.com/ultimate-guide/access-and-error-logs/

### Linux Logs

- http://www.thegeekstuff.com/2011/08/linux-var-log-files/
- https://www.loggly.com/ultimate-guide/managing-linux-logs/
- https://blog.logentries.com/2012/05/logging-on-linux-part-1-ive-got-a-bunch-of-linux-boxes-what-should-i-be-looking-out-for-
- https://www.eurovps.com/blog/important-linux-log-files-you-must-be-monitoring

### Configuration

### Log-rotate

- https://serversforhackers.com/managing-logs-with-logrotate
- http://articles.slicehost.com/2010/6/30/understanding-logrotate-on-ubuntu-part-1
- http://articles.slicehost.com/2010/6/30/understanding-logrotate-on-centos-part-1
- http://www.rackspace.com/knowledge_center/article/understanding-logrotate-utility
- http://www.softpanorama.org/Commercial_linuxes/RHEL/rhel_log_rotation.shtml
- https://www.digitalocean.com/community/tutorials/how-to-manage-log-files-with-logrotate-on-ubuntu-12-10
- http://linuxers.org/howto/howto-use-logrotate-manage-log-files
- http://linuxconfig.org/setting-up-logrotate-on-redhat-linux
- http://www.thegeekstuff.com/2010/07/logrotate-examples/
- http://www.techrepublic.com/article/manage-linux-log-files-with-logrotate/
- https://www.linode.com/docs/uptime/logs/use-logrotate-to-manage-log-files

### Troubleshooting & Log Parsing

- https://www.loggly.com/ultimate-guide/troubleshooting-with-linux-logs/
- https://www.loggly.com/ultimate-guide/centralizing-windows-logs/
- https://blog.logentries.com/2016/09/avoid-these-things-when-logging-from-your-application/

### ELK Stack

*Some useful links to explain the concepts of the ELK stack - ElasticSearch, Logstash and Kibana*

- http://logz.io/learn/complete-guide-elk-stack/
- http://logz.io/blog/10-elasticsearch-concepts/

### ElasticSearch

- http://logz.io/blog/elasticsearch-tutorial/
- http://vichargrave.com/ossec-log-management-with-elasticsearch
- http://aarvik.dk/a-bit-on-elasticsearch-logstash-kibana-the-elk-stack/

#### Logstash

- http://logz.io/blog/logstash-tutorial/
- https://www.digitalocean.com/community/tutorials/how-to-use-logstash-and-kibana-to-centralize-and-visualize-logs-on-ubuntu-
- http://logz.io/blog/fluentd-logstash/
- http://www.slashroot.in/logstash-tutorial-linux-central-logging-server

#### Kibana

- http://logz.io/blog/kibana-tutorial/
- http://logz.io/blog/kibana-visualizations/
- https://www.digitalocean.com/community/tutorials/how-to-use-kibana-dashboards-and-visualizations
- https://marc.cortinasval.cat/blog/2014/03/05/kibana-help-us-to-analyze-cdn-logs/

### 1.3.21 Networking

*Some useful links to explain the concepts of Networking Protocols*

#### Concepts

#### OSI Model Mnemonic : `Please Do Not Teach Students Pointless Acronyms`

- https://www.cybrary.it/0p3n/osi-model-7-layers-basic-understanding/

| | OSI Layer | TCP |
|---|---|---|
| Software | **Layer 7** Application | HTTP, SMTP, IMAP, |
| | **Layer 6** Presentation | ASCII Characters, Compression (Encryp |
| | **Layer 5** Session | NetBIOS, SAP, Hands |
| | **Layer 4** Transport | TCP, |
| | **Layer 3** Network | IPv4, IPv6, ICMP, I |
| Hardware | **Layer 2** Data Link | Ethernet, 802.1x, Channel, MPLS, FDI |
| | **Layer 1** Physical | Cables, Connectors, 10BaseT, 100Ba |

- https://www.thomas-krenn.com/en/wiki/Two_Default_Gateways_on_One_System
- http://cavepopo.hd.free.fr/wordpress/linux/networking-on-linux-practical-examples/
- http://www.linuxhomenetworking.com/
- https://askleo.com/why_cant_i_connect_with_a_169254xx_ip_address/

#### Finding optimum MTU (`Maximum Transmission Unit`) size

- http://homenetworkadmin.com/what-is-mtu-size/
- https://www.tp-link.com/us/FAQ-190.html
- https://www.linksys.com/us/support-article?articleNum=134914

### Category Cables

- https://www.networkcablingdirectory.com/articles/structured-network-cabling-id_1151.htm
- http://35.154.102.183/ethernet-cable-cat5-vs-cat6-vs-cat6a-vs-cat7-vs-cat8/amp/
- https://planetechusa.com/blog/ethernet-different-ethernet-categories-cat3-vs-cat5e-vs-cat6-vs-cat6a-vs-cat7-vs-cat8/

### MAC Addresses : Explained

There are $2^{48}$ or 281 474 976 710 656 different potential combinations.

They are reasonably unique.

- The first 3 octets define the manufacturer.
- The last 3 octets are usually generated at the time of PROM burning. It's up to the manufacturer how they do this.

That obviously gives 16 777 215 possible unique MAC addresses per manufacturer. That's quite alot, so the manufacturer *shouldn't* re-use one. Some are lazy though, and don't check if they have already allocated a MAC address.

It is quite often possible to change the MAC address using software, so if you do get a duplicate you can map around it.

### Private / Public / LocalHost IPs:

- http://www.tech-faq.com/127-0-0-1.html
- https://www.howtogeek.com/225487/what-is-the-difference-between-127.0.0.1-and-0.0.0.0/
- http://theydiffer.com/difference-between-public-and-private-ip-address/
- https://www.iplocation.net/public-vs-private-ip-address

| Class | Address Range | Default Subnet Mask |
|---|---|---|
| A | 10.0.0.0 - 10.255.255.255 | 255.0.0.0 |
| B | 172.16.0.0 - 172.31.255.255 | 255.255.0.0 |
| C | 192.168.0.0 – 192.168.255.255 | 255.255.255.0 |

- http://serverfault.com/questions/49765/how-does-ipv4-subnetting-work/49836
- https://danielmiessler.com/study/subnetting/
- http://computer.howstuffworks.com/internet/basics/question549.htm
- http://unixadminschool.com/blog/2014/01/ipv6-the-solution-for-ipv4-exhaustion/

#### TCP

#### States of a TCP Connection

- https://community.apigee.com/articles/7970/tcp-states-explained.html
- https://blog.confirm.ch/tcp-connection-states/
- https://www.frozentux.net/iptables-tutorial/chunkyhtml/x1425.html
- http://www.masterraghu.com/subjects/np/introduction/unix_network_programming_v1.3/ch02lev1sec6.html
- https://www.ibm.com/support/knowledgecenter/en/SSLTBW_2.1.0/com.ibm.zos.v2r1.halu101/constatus.htm
- https://danielmiessler.com/study/tcpflags/
- https://vincent.bernat.ch/en/blog/2014-tcp-time-wait-state-linux

#### LIST of TCP / UDP Ports

- https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers

#### UDP

#### ICMP

- https://danielmiessler.com/study/icmp/

- https://protechgurus.com/ip-routing-process-step-step-explanation/
- https://www.techrepublic.com/article/ip-routing-in-40-short-steps/

### VLAN

#### Simple Overview

- https://www.lifewire.com/virtual-local-area-network-817357

#### Conceptual Overview

- http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/12-2/25ew/configuration/guide/conf/vlans.html

#### Difference between access & trunk ports

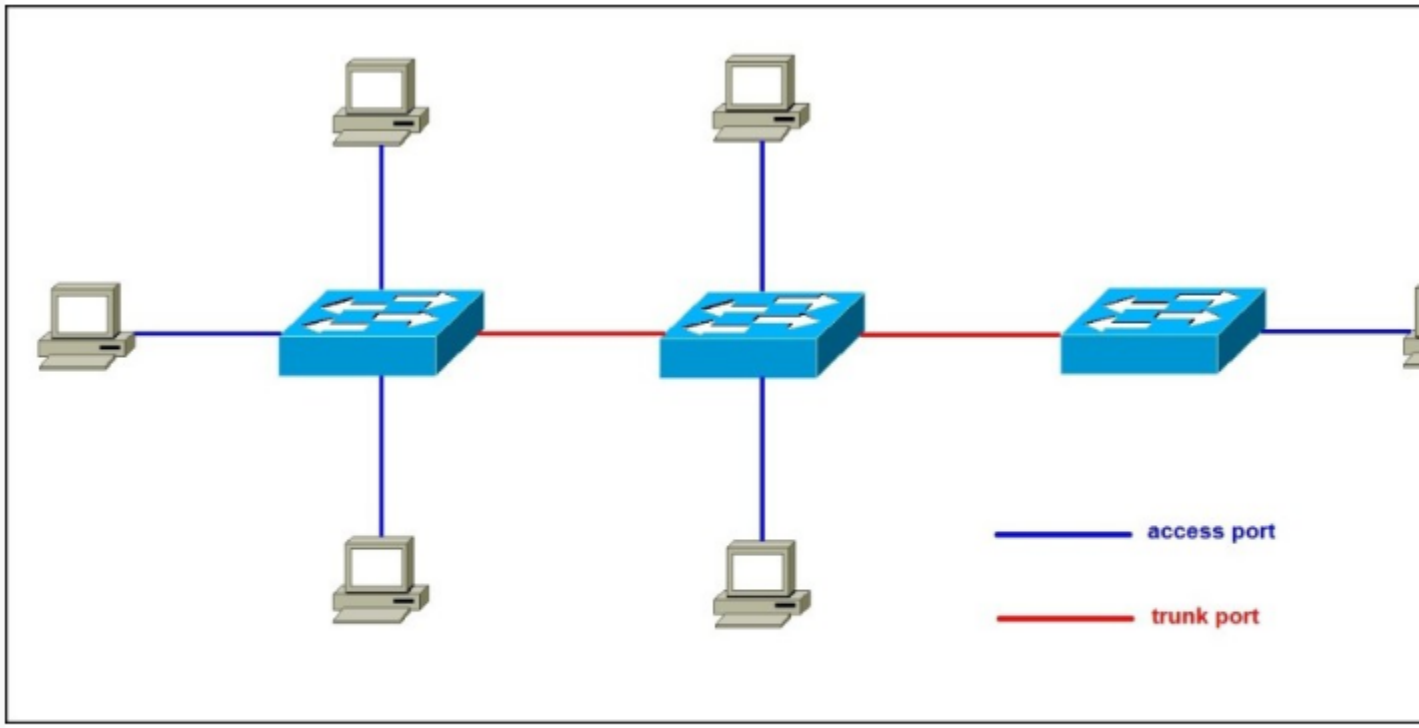
- https://bit.ly/2rXuh6M

# Access and trunk ports explained

Each port on a Cisco switch can be configured as either an **access** or a **trunk** port. The type of a po
switch determines the incoming frame's VLAN. Here is a description of these two port types:

- **access port** – a port that can be assigned to a single VLAN. The frames that arrive on an access
  to be part of the access VLAN. This port type is configured on switch ports that are connected to d
  normal network card, for example a host on a network.
- **trunk port** – a port that is connected to another switch. This port type can carry traffic of multiple V
  allowing you to extend VLANs across your entire network. Frames are tagged by assigning a VLA
  as they traverse between switches.

The following picture illustrates the difference between access and trunk ports:




As you can see from the picture above, the ports on the switches that connect to hosts are configure
The ports between switches are configured as trunk ports.

### Commands

- http://www.alexonlinux.com/useful-linux-networking-commands
- https://www.lifewire.com/find-a-mac-address-using-an-ip-address-818132

- http://www.thegeekstuff.com/2012/04/ip-routing-intro/
- http://www.thegeekstuff.com/2012/04/route-examples
- http://computernetworkingnotes.com/linux/rhce6-study-guide/

### PING

- https://www.computerhope.com/unix/uping.htm
- http://www.slashroot.in/what-ping-sweep-and-how-do-ping-sweep

### IFCONFIG

- http://www.tecmint.com/ifconfig-command-examples/
- https://www.linux.com/learn/replacing-ifconfig-ip
- http://cavepopo.hd.free.fr/wordpress/linux/bash-command-tips-ethtool/
- http://www.cyberciti.biz/faq/check-network-connection-linux/

### TRACEROUTE

- http://www.slashroot.in/how-does-traceroute-work-and-examples-using-traceroute-command
- http://www.mavetju.org/networking/basicnetworktroubleshooting.php
- https://www.maxcdn.com/one/tutorial/how-to-read-a-traceroute/
- https://archive.nanog.org/meetings/nanog47/presentations/Sunday/RAS_Traceroute_N47_Sun.pdf

### TCPDUMP

- https://danielmiessler.com/study/tcpdump/
- http://www.slashroot.in/packet-capturing-tcpdump-command-linux
- http://www.tecmint.com/12-tcpdump-commands-a-network-sniffer-tool/
- http://www.rationallyparanoid.com/articles/tcpdump.html

### NETSTAT

- https://www.linux.com/learn/intro-to-linux/2017/7/introduction-ss-command
- http://www.slashroot.in/netstat-command-examples-and-its-usage
- http://www.binarytides.com/linux-ss-command/
- https://pcarleton.com/2018/05/31/netstat-vs-ss/

### IFTOP

- http://www.slashroot.in/linux-iptraf-and-iftop-monitor-and-analyse-network-traffic-and-bandwidth
- http://www.thegeekstuff.com/2008/12/iftop-guide-display-network-interface-bandwidth-usage-on-linux/
- http://linoxide.com/monitoring-2/iftop-network-traffic/

### NMap

- https://danielmiessler.com/study/nmap/
- http://www.plugged.in/network/nmap-scanning-methods.html
- http://www.plugged.in/network/nmap-target-specification-in-detail.html
- http://www.cyberciti.biz/networking/nmap-command-examples-tutorials/

**Nmap Command - Free IPs in a particular subnet**

```
for i in `sudo nmap -sP <subnet/CIDR> | grep -i 'Nmap scan report for' | awk '{print
↪$5}'`;do ping -c 1 $i;done | grep from
```

### ARP

- http://www.thegeekstuff.com/2012/01/arp-cache-poisoning/
- http://www.cyberciti.biz/faq/linux-duplicate-address-detection-with-arping/
- https://www.linux.com/news/ping-icmp-vs-arp
- http://xmodulo.com/how-to-add-or-remove-static-arp-entry-on-linux.html
- https://www.tummy.com/articles/networking-basics-how-arp-works/
- http://www.cyberciti.biz/faq/linux-duplicate-address-detection-with-arping/

### NETCAT

- http://aarvik.dk/netcat-basics-and-a-few-smart-examples/

### LLDP

- http://www.marcoach.nl/lldp-network-discovery/

### Configuration

### Basic NIC configuration & Bonding

- http://xmodulo.com/how-to-find-ethernet-network-interface-card-information-in-linux.html
- http://www.tecmint.com/configure-network-interface-in-rhel-centos-7-0/
- https://linuxconfig.org/how-to-add-new-static-route-on-rhel7-linux

- http://www.cyberciti.biz/tips/linux-bond-or-team-multiple-network-interfaces-nic-into-single-interface.html
- http://login2linux.blogspot.in/2015/01/how-to-remove-nic-bonding-in-linux.html
- http://www.configserverfirewall.com/ubuntu-linux/ubuntu-set-static-ip-address/
- https://www.swiftstack.com/docs/install/configure_networking.html
- http://www.itzgeek.com/how-tos/mini-howtos/change-default-network-name-ens33-to-old-eth0-on-ubuntu-16-04.html

### Virtual IPs

- http://www.cyberciti.biz/faq/linux-creating-or-adding-new-network-alias-to-a-network-card-nic/
- https://linuxconfig.org/configuring-virtual-network-interfaces-in-linux
- http://www.cyberciti.biz/faq/linux-command-to-remove-virtual-interfaces-or-network-aliases/
- http://www.jamescoyle.net/how-to/307-create-a-virtual-ip-address-in-linux
- http://www.tecmint.com/create-multiple-ip-addresses-to-one-single-network-interface/

### Static Routing

- http://www.thegeekstuff.com/2012/04/route-examples/
- http://bencane.com/2013/05/12/adding-and-troubleshooting-static-routes-on-red-hat-based-linux-distributions/
- http://www.cyberciti.biz/faq/linux-route-add/
- http://www.thetechnicalstuff.com/how-to-add-and-delete-route-in-linux/

### DHCP

- http://tecadmin.net/configuring-dhcp-server-on-centos-redhat/
- http://linuxconfig.org/what-is-dhcp-and-how-to-configure-dhcp-server-in-linux
- http://www.hecticgeek.com/2012/01/command-line-ip-subnet-calculator-ubuntu-linux/
- https://www.geeksforgeeks.org/how-dhcp-server-dynamically-assigns-ip-address-to-a-host/

### VPN

- https://zero.pritunl.com
- https://github.com/trailofbits/algo

### Tuning, Troubleshooting & Log Parsing

### Advanced Configuration

- http://www.slashroot.in/linux-kernel-rpfilter-settings-reverse-path-filtering
- http://www.slashroot.in/vlan-configuration-linux-nic-interface

- http://www.cyberciti.biz/faq/linux-unix-tcp-port-forwarding/
- http://www.thewindowsclub.com/how-to-fix-network-internet-connection-problems-in-windows

#### Digging deeper into the Linux Networking stack

- https://blog.packagecloud.io/eng/2017/02/06/monitoring-tuning-linux-networking-stack-sending-data/
- https://blog.packagecloud.io/eng/2016/10/11/monitoring-tuning-linux-networking-stack-receiving-data-illustrated/
- https://blog.packagecloud.io/eng/2016/06/22/monitoring-tuning-linux-networking-stack-receiving-data/

#### Disable Network Manager in Linux

- http://xmodulo.com/disable-network-manager-linux.html

#### Disable Network Manager from over-writing resolv.conf in Linux

- https://www.reddit.com/r/linux4noobs/comments/3keuhd/how_to_stop_networkmanager_from_overriding_my/

### 1.3.22 Security

*Some useful links to explain the concepts of Security in Linux OS*

#### Concepts

- https://www.thefanclub.co.za/how-to/how-secure-ubuntu-1604-lts-server-part-1-basics
- https://github.com/imthenachoman/How-To-Secure-A-Linux-Server
- https://dev.to/danlebrero/kerberos-explained-in-pictures

#### Rootkits

- https://www.digitalocean.com/community/tutorials/how-to-use-rkhunter-to-guard-against-rootkits-on-an-ubuntu-vps
- http://www.woktron.com/secure/knowledgebase/79/Installation-Rootkit-Hunter-rkhunter-on-CentOS-5-and-6.html
- http://www.tecmint.com/install-rootkit-hunter-scan-for-rootkits-backdoors-in-linux/

#### Fail2Ban

- https://www.digitalocean.com/community/tutorials/how-to-protect-ssh-with-fail2ban-on-centos-6
- https://www.digitalocean.com/community/tutorials/how-fail2ban-works-to-protect-services-on-a-linux-server
- http://www.tecmint.com/install-fail2ban-on-rhel-centos-fedora/
- http://www.the-art-of-web.com/system/fail2ban-log/
- http://www.dghost.com/techno/internet/the-power-of-fail2ban

- http://www.fail2ban.org/wiki/index.php/MANUAL_0_8
- http://aarvik.dk/prevent-intrusion-with-fail2ban/

#### TCP Wrappers

- https://jamalahmed.wordpress.com/2010/03/19/using-etchosts-allow-and-etchosts-deny-to-secure-unix/
- http://static.closedsrc.org/articles/dn-articles/hosts_allow.html
- http://www.tecmint.com/secure-linux-tcp-wrappers-hosts-allow-deny-restrict-access/
- http://www.aboutlinux.info/2005/10/using-tcp-wrappers-to-secure-linux.html
- http://www.cyberciti.biz/faq/tcp-wrappers-hosts-allow-deny-tutorial/
- http://bastille-linux.sourceforge.net/
- https://grsecurity.net/index.php

#### SELinux

#### Concepts of SELinux

- https://www.digitalocean.com/community/tutorial_series/an-introduction-to-selinux-on-centos-7
- http://www.linuxpathfinder.com/how-to-disable-selinux-temporarily-or-permanently
- http://www.revsys.com/writings/quicktips/turn-off-selinux.html

#### DDoS

- http://www.digitalattackmap.com/understanding-ddos/
- https://blog.cloudflare.com/the-ddos-that-almost-broke-the-internet/
- https://www.incapsula.com/ddos/ddos-attacks/

#### Configuration

- http://bencane.com/2013/01/14/mitigating-dos-attacks-with-a-null-or-blackhole-route-on-linux/
- http://www.mkyong.com/linux/how-to-block-attackers-ip-with-null-route-command/
- http://www.opensourceforu.com/2011/04/securing-apache-part-8-dos-ddos-attacks/
- https://developers.google.com/speed/public-dns/docs/security#introduction-dns-security-threats-and-mitigations
- http://www.tldp.org/HOWTO/Firewall-Piercing/index.html
- http://www.ubuntufree.com/how-to-stop-a-ddos-attack-on-ubuntu/
- http://ubtutorials.com/tutorial/1139/how-stop-small-ddos-attacks-ubuntu

### 1.3.23 IPTables

*Some useful links to explain the concepts of IPTables*

### Concepts

- https://www.digitalocean.com/community/tutorials/what-is-a-firewall-and-how-does-it-work
- https://www.digitalocean.com/community/tutorials/how-the-iptables-firewall-works
- https://www.digitalocean.com/community/tutorials/how-to-choose-an-effective-firewall-policy-to-secure-your-servers
- http://www.thegeekstuff.com/2011/01/iptables-fundamentals/
- https://wiki.centos.org/HowTos/Network/IPTables

### Configuration

- http://fideloper.com/iptables-tutorial
- http://www.cyberciti.biz/tips/linux-iptables-examples.html
- http://www.thegeekstuff.com/2011/06/iptables-rules-examples
- https://linuxconfig.org/collection-of-basic-linux-firewall-iptables-rules
- http://blog.ls20.com/securing-your-server-using-ipset-and-dynamic-blocklists/
- http://www.cyberciti.biz/faq/how-do-i-block-an-ip-on-my-linux-server/
- http://www.tecmint.com/basic-guide-on-iptables-linux-firewall-tips-commands/
- http://www.cyberciti.biz/faq/rhel-fedorta-linux-iptables-firewall-configuration-tutorial/
- http://www.howtogeek.com/177621/the-beginners-guide-to-iptables-the-linux-firewall/
- https://www.digitalocean.com/community/tutorials/how-to-list-and-delete-iptables-firewall-rules
- https://www.digitalocean.com/community/tutorials/how-to-setup-a-basic-ip-tables-configuration-on-centos-6
- https://www.digitalocean.com/community/tutorials/7-security-measures-to-protect-your-servers
- https://www.frozentux.net/iptables-tutorial/chunkyhtml/x1309.html
- https://www.digitalocean.com/community/tutorials/iptables-essentials-common-firewall-rules-and-commands
- https://jadendreamer.wordpress.com/2013/04/18/linux-tutorial-blocking-ip-addresses-from-your-server/
- http://www.linuxjournal.com/content/advanced-firewall-configurations-ipset
- https://www.digitalocean.com/community/tutorials/how-to-set-up-a-firewall-using-firewalld-on-centos-7
- http://blog.nintechnet.com/how-to-block-w00tw00t-at-isc-sans-dfind-and-other-web-vulnerability-scanners/

### Tuning and Hardening

- https://www.digitalocean.com/community/tutorials/how-to-test-your-firewall-configuration-with-nmap-and-tcpdump

### IP Conntrack

- http://www.cyberciti.biz/faq/ip_conntrack-table-ful-dropping-packet-error/
- http://www.pc-freak.net/blog/resolving-nf_conntrack-table-full-dropping-packet-flood-message-in-dmesg-linux-kernel-log/
- http://blackbird.si/ip_conntrack-table-full-dropping-packet-conclusions-about-connection-tracking/
- https://www.scalescale.com/tips/nginx/ip_conntrack-table-full-dropping-packet/

- http://www.rigacci.org/wiki/lib/exe/fetch.php/doc/appunti/linux/sa/iptables/conntrack.html
- https://bobcares.com/blog/2011/04/21/ip-connection-tracking-ip_conntrack/
- https://timanovsky.wordpress.com/2009/04/10/tuning-linux-firewall-connection-tracker-ip_conntrack/

### 1.3.24 Generic

*Some useful links to explain the concepts of Programming*

#### Concepts

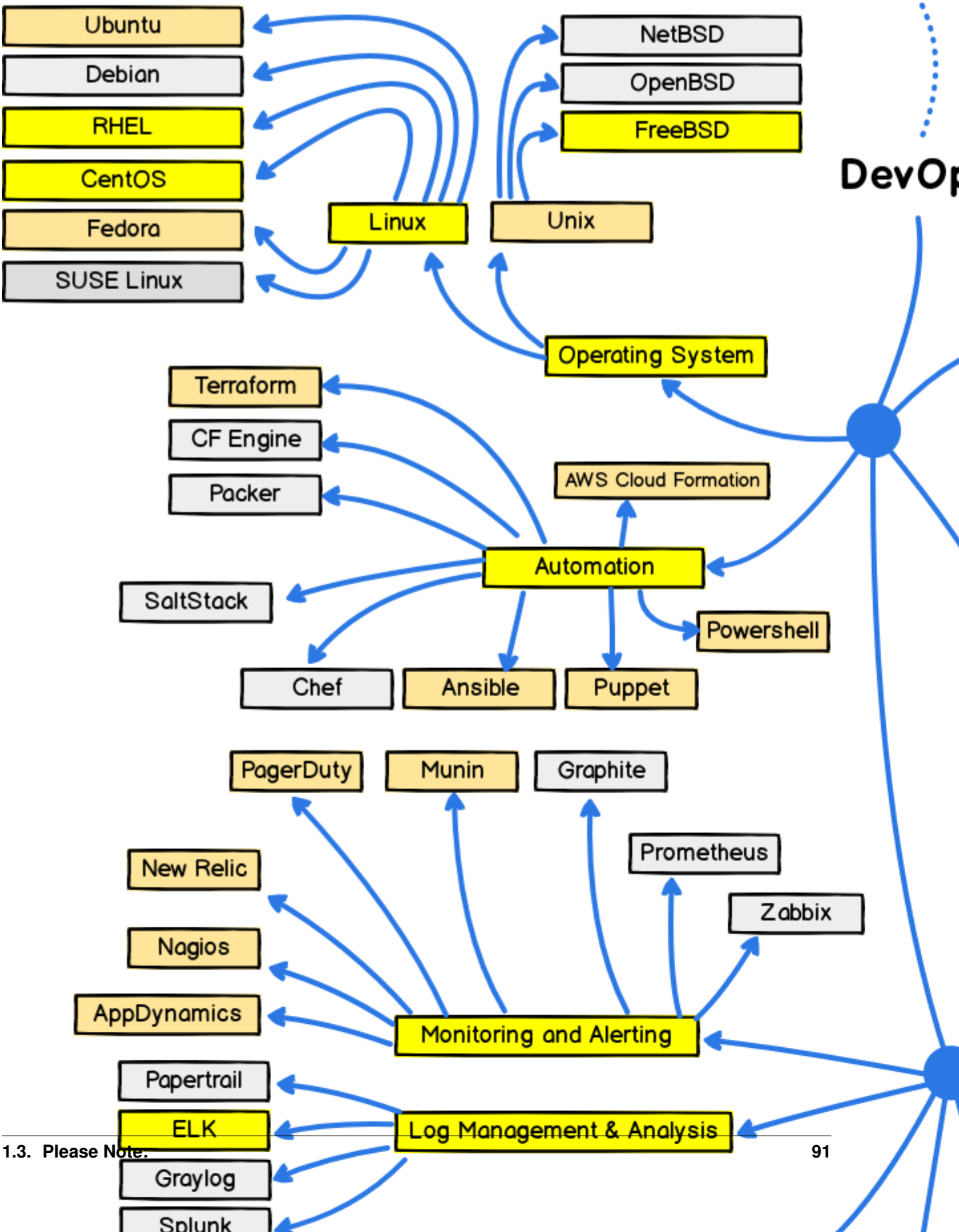
- http://regex.learncodethehardway.org/book/
- https://techdifferences.com/differenece-between-for-and-while-loop.html#KeyDifferences
- https://dev.to/sandordargo/8-books-every-junior-developer-should-read–4p5h
- https://dev.to/perigk/fantastic-youtube-channels-with-top-quality-learning-for-software-engineers–263i
- https://dev.to/tapudp/github-repos-for-learners-634
- https://dev.to/codehakase/how-i-learned-go-programming
- https://dev.to/brpaz/my-linux-development-environment-of-2018-ch7
- https://dev.to/rpalo/powershell-tutorial-especially-for-people-who-hate-powershell-2g25
- https://devdocs.io
- https://books.goalkicker.com/
- https://robertheaton.com/2020/04/06/systems-design-for-advanced-beginners/

#### Configuration

#### Online Interpreter for Multiple Languages

- https://tio.run/

### DevOps


Ubuntu
Debian
RHEL
CentOS
Fedora
SUSE Linux
NetBSD
OpenBSD
FreeBSD
Linux
Unix
Operating System
Terraform
CF Engine
Packer
AWS Cloud Formation
Automation
SaltStack
Powershell
Chef
Ansible
Puppet
PagerDuty
Munin
Graphite
Prometheus
New Relic
Zabbix
Nagios
AppDynamics
Monitoring and Alerting
Papertrail
ELK
Log Management & Analysis
Graylog
Splunk

- https://devops.zeef.com/christian.peper
- https://dev-ops-tools.zeef.com/richard.kraayenhagen
- https://dev.to/
- https://xebialabs.com/glossary/
- https://xebialabs.com/the-ultimate-devops-tool-chest/
- https://xebialabs.com/periodic-table-of-devops-tools/
- https://zachholman.com/posts/deploying-software
- https://www.ibm.com/developerworks/learn/devops/
- https://learn-anything.xyz/programming/software-development/devops
- http://itrevolution.com/devops-blog/
- https://continuousdelivery.com
- http://dev2ops.org
- https://codeascraft.com
- http://www.devopsbookmarks.com
- https://www.amazon.com/Phoenix-Project-DevOps-Helping-Business/dp/0988262592
- https://increment.com/on-call/
- https://medium.com/cleartax-engineering/cleartaxs-requirements-from-a-deployment-pipeline-1b77a55ba08c
- http://www.humanops.com/

### 1.3.25 Python

*Some useful links to explain the concepts of Python*

#### Concepts

- http://www.codeconquest.com/blog/the-50-best-websites-to-learn-python/
- http://simeonfranklin.com/python-fundamentals/
- https://python.zeef.com/yakup.keskindag
- https://www.tutorialspoint.com/python/index.htm

#### Official Python Documentation

- https://docs.python.org/2/index.html
- https://docs.python.org/

#### Python Books

**A Byte of Python** - https://python.swaroopch.com/

**Learn Python the Hard Way** - https://learnpythonthehardway.org/book/

### Online Courses

- https://www.codecademy.com/learn/python
- https://www.udacity.com/course/programming-foundations-with-python–ud036
- http://campus.codeschool.com/courses/try-python/level/1/section/1/video/1
- https://www.coursera.org/learn/python
- https://dev.to/jessicagarson/resources-for-learning-python-hd6
- https://www.youtube.com/watch?v=_uQrJ0TkZlc

### Intermediate Python

- http://book.pythontips.com/en/latest/
- https://automatetheboringstuff.com/
- https://gist.github.com/diyan/f3c24653e63c24c99137

### Solving Python Problems to Learn Concepts

- https://www.hackerrank.com/domains/python/py-introduction

### Configuration

- http://aarvik.dk/python-for-system-administration/
- https://github.com/h2oai/h2o-2/wiki/installing-python-2.7-on-centos-6.3.-follow-this-sequence-exactly-for-centos-machine-only
- https://superuser.com/questions/143119/how-do-i-add-python-to-the-windows-path

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### For Windows 10/8/7:

1. Open `System Properties` (Right click `Computer` in the start menu, or use the keyboard shortc
   Win + Pause )
2. Click `Advanced system settings` in the sidebar.
3. Click `Environment Variables...`
4. Select `PATH` in the `System variables` section
5. Click `Edit`
6. Add Python's path to the end of the list (the paths are separated by semicolons). For example

```
C:\Windows;C:\Windows\System32;C:\Python27
```

### For Windows XP:

1. Open `System Properties` (Type it in the start menu, or use the keyboard shortcut Win +
   Pause )
2. Switch to the `Advanced` tab
3. Click `Environment Variables...`
4. Select `PATH` in the `System variables` section
5. Click `Edit`
6. Add Python's path to the end of the list (the paths are separated by semicolons). For example

```
C:\Windows;C:\Windows\System32;C:\Python27
```

- https://stackoverflow.com/questions/6318156/adding-python-path-on-windows-7?

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When setting Environmental Variables in Windows, I have gone wrong on many, many occasions. I thought I should share a few of my past mistakes here hoping that it might help someone. (These apply to all Environmental Variables, not just when setting Python Path)

Watch out for these possible mistakes:

1. Kill and reopen your shell window: Once you make a change to the ENVIRONMENTAL Variables, you have to **restart** the window you are testing it on.
2. **NO SPACES** when setting the Variables. Make sure that you are adding the `;C:\Python27` WITHOUT any spaces. (It is common to try `C:\SomeOther; C:\Python27` That space (_) after the semicolon is *not okay.)*
3. USE A **BACKWARD SLASH** when spelling out your full path. You will see forward slashes when you try `echo $PATH` but only backward slashes have worked for me.
4. **DO NOT ADD a final backslash**. Only `C:\Python27` NOT `C:\Python27\`

Hope this helps someone.

- https://techglimpse.com/error-executing-python3-5-command-solution/
- https://stackoverflow.com/questions/24205624/how-do-i-resolve-not-fully-installed-package-python3-setuptools
- https://stackoverflow.com/questions/38132755/importerror-no-module-named-encodings

#### Visual IDE for Python

- http://pythontutor.com/
- http://www.skulpt.org/

### 1.3.26 Bash

*Some useful links to explain the concepts of Bash Scripting*

#### Concepts

- http://linuxcommand.org
- http://tldp.org/LDP/Bash-Beginners-Guide/html/index.html
- http://www.linuxnix.com/category/programming/bash/
- https://dev.to/thiht/shell-scripts-matter
- http://www.thegeekstuff.com/2010/08/bash-shell-builtin-commands/
- http://bash.cyberciti.biz
- https://github.com/dylanaraps/pure-bash-bible
- https://dev.to/awwsmm/101-bash-commands-and-tips-for-beginners-to-experts-30je

### Conditional Statements, Loops

- http://bencane.com/2014/01/27/8-examples-of-bash-if-statements-to-get-you-started/
- https://superuser.com/questions/615043/while-loop-in-bash-until-file-size-does-not-change
- https://unix.stackexchange.com/questions/247187/bash-if-not-multiple-conditions-without-subshell
- https://www.lifewire.com/write-bash-while-loops-2200576
- http://www.compciv.org/topics/bash/loops/
- https://dev.to/rpalo/bash-brackets-quick-reference-4eh6
- https://www.cyberciti.biz/faq/howto-check-if-a-directory-exists-in-a-bash-shellscript/
- https://unix.stackexchange.com/questions/52800/how-to-do-an-if-statement-from-the-result-of-an-executed-command

### Editing & Formatting Text

- http://misc.flogisoft.com/bash/tip_colors_and_formatting
- https://google.github.io/styleguide/shell.xml
- https://stackoverflow.com/questions/11102360/read-lines-starting-from-a-line-number-in-a-bash-script
- https://www.cyberciti.biz/faq/unix-howto-read-line-by-line-from-file/

### Configuration

### Online IDE for Bash Scripts

- https://www.shellcheck.net/
- https://github.com/koalaman/shellcheck

### Operators in Bash

- https://unix.stackexchange.com/questions/159513/what-are-the-shells-control-and-redirection-operators
- http://www.tecmint.com/chaining-operators-in-linux-with-practical-examples/
- http://bencane.com/2014/09/02/understanding-exit-codes-and-how-to-use-them-in-bash-scripts/
- https://dev.to/oyagci/shell-redirections-explained-2h9

### Avoid Temp files in Shell scripts

- https://dev.to/philgibbs/avoiding-temporary-files-in-shell-scripts

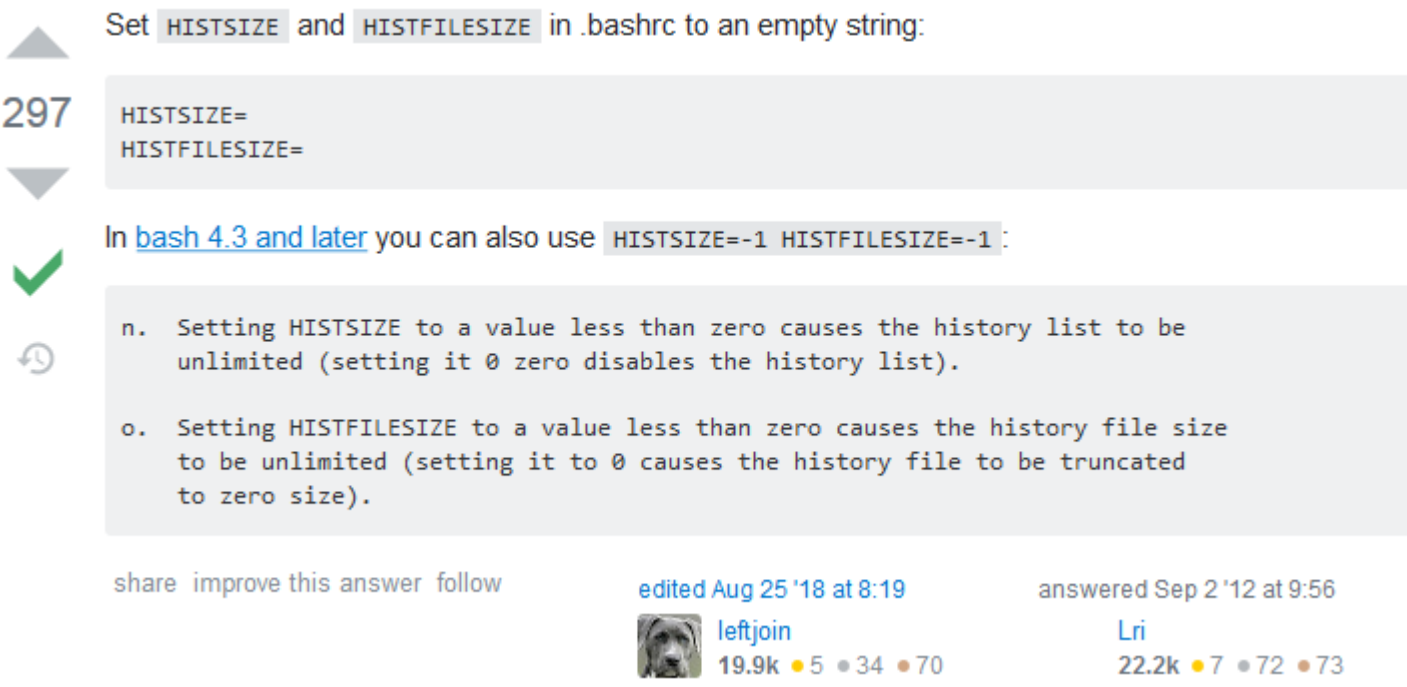
### Variables, Functions in Bash

- http://www.compciv.org/topics/bash/variables-and-substitution/
- https://stackoverflow.com/questions/1809899/how-can-i-assign-the-output-of-a-function-to-a-variable-using-bash
- https://ryanstutorials.net/bash-scripting-tutorial/bash-functions.php

- https://www.digitalocean.com/community/tutorials/an-introduction-to-useful-bash-aliases-and-functions
- https://www.shellscript.sh/functions.html

### Configure Bash History Retention

- https://stackoverflow.com/questions/9457233/unlimited-bash-history/12234989#12234989



297

Set `HISTSIZE` and `HISTFILESIZE` in .bashrc to an empty string:

```
HISTSIZE=
HISTFILESIZE=
```

In bash 4.3 and later you can also use `HISTSIZE=-1 HISTFILESIZE=-1`:

```
n.  Setting HISTSIZE to a value less than zero causes the history list to be
    unlimited (setting it 0 zero disables the history list).

o.  Setting HISTFILESIZE to a value less than zero causes the history file size
    to be unlimited (setting it to 0 causes the history file to be truncated
    to zero size).
```

share improve this answer follow

edited Aug 25 '18 at 8:19 — leftjoin — 19.9k ● 5 ● 34 ● 70

answered Sep 2 '12 at 9:56 — Lri — 22.2k ● 7 ● 72 ● 73

- https://unix.stackexchange.com/questions/1288/preserve-bash-history-in-multiple-terminal-windows/48113#48113

So, this is all my history-related `.bashrc` thing:

260

```
export HISTCONTROL=ignoredups:erasedups  # no duplicate entries
export HISTSIZE=100000                   # big big history
export HISTFILESIZE=100000               # big big history
shopt -s histappend                      # append to history, don't overwrite it

# Save and reload the history after each command finishes
export PROMPT_COMMAND="history -a; history -c; history -r; $PROMPT_COMMAND"
```

Tested with bash 3.2.17 on Mac OS X 10.5, bash 4.1.7 on 10.6.

share improve this answer follow

edited Jun 21 '14 at 20:52
dawud
1,991 ● 13 ● 19

answered Sep 19 '08 at 17:49
kch
2,701 ● 2 ● 11 ● 4

- https://askubuntu.com/questions/15926/how-to-avoid-duplicate-entries-in-bash-history/15929#15929

From the `bash` man page:

135

> HISTCONTROL
>
> > A colon-separated list of values controlling how commands are saved on the history list. If the list of values includes `ignorespace`, lines which begin with a space character are not saved in the history list. A value of `ignoredups` causes lines matching the previous history entry to not be saved. A value of `ignoreboth` is shorthand for `ignorespace` and `ignoredups`. A value of `erasedups` causes all previous lines matching the current line to be removed from the history list before that line is saved. Any value not in the above list is ignored. If HISTCONTROL is unset, or does not include a valid value, all lines read by the shell parser are saved on the history list, subject to the value of HISTIGNORE. The second and subsequent lines of a multi-line compound command are not tested, and are added to the history regardless of the value of HISTCONTROL.

So put the following line in your `~/.bashrc`:

```
export HISTCONTROL=ignoreboth:erasedups
```

#### Troubleshooting & Log Parsing

- https://www.tutorialkart.com/bash-shell-scripting/write-output-of-bash-command-to-log-file-example
- http://www.shellhacks.com/en/7-Tips-Tuning-Command-Line-History-in-Bash
- https://github.com/kward/shunit2
- https://github.com/bmizerany/roundup
- https://github.com/sstephenson/bats

### 1.3.27 Ruby

*Some useful links to explain the concepts of Ruby*

#### Concepts

#### Official Ruby Documentation

- https://www.ruby-lang.org/en/documentation/
- https://ruby-doc.org/

#### Configuration

- https://stackoverflow.com/questions/15708916/use-rvmrc-or-ruby-version-file-to-set-a-project-gemset-with-rvm
- https://stackoverflow.com/questions/4667150/what-is-the-best-way-to-uninstall-gems-from-a-rails3-project
- https://dev.to/molly_struve/how-to-setup-a-readonly-rails-console-1j1a
- http://syndicode.co/2018/01/29/books-and-tutorials-for-learning-and-mastering-ruby-language

#### Troubleshooting & Log Parsing

- https://stackoverflow.com/questions/14289217/im-getting-rvm-is-not-a-function-error-on-mac-os-x-and-no-posted-solutions-w
- https://www.exceptionalcreatures.com/bestiary/Net/OpenTimeout.html
- https://dev.to/exampro/testunit-writing-test-code-in-ruby-part-1-of-3-44m2
- http://engineering.pivotal.io/post/debugging-ruby-memory-issues-cloud-foundry-cloud-controller/

### 1.3.28 GIT

*Some useful links to explain the concepts of GIT*

#### Concepts

#### Official Git Documentation

- https://git-scm.com/book/en/v2/
- https://danielmiessler.com/study/git/

- https://about.gitlab.com/2015/05/18/simple-words-for-a-gitlab-newbie/
- http://slidetocode.com/2013/08/25/how-git-works/
- http://juristr.com/blog/2013/04/git-explained/
- https://betterexplained.com/articles/aha-moments-when-learning-git/
- http://readwrite.com/2013/09/30/understanding-github-a-journey-for-beginners-part-1/
- http://2ndscale.com/rtomayko/2008/the-thing-about-git
- http://eagain.net/articles/git-for-computer-scientists/
- https://www.sbf5.com/~cduan/technical/git/git-1.shtml
- https://launchschool.com/books/git/read/introduction
- http://githowto.com/
- http://gitimmersion.com/lab_01.html
- http://swift.siphos.be/aglara/centralcmdb.html
- http://www.gitguys.com/topics/
- https://robots.thoughtbot.com/tags/git
- https://www.linux.com/learn/finding-everything-git
- http://slidetocode.com/2013/08/25/how-git-works/
- http://juristr.com/blog/2013/04/git-explained/
- http://pcottle.github.io/learnGitBranching/
- http://rogerdudler.github.io/git-guide/
- https://dev.to/raha198/how-to-master-the-art-of-git
- http://www.sitepoint.com/git-for-beginners/
- https://dev.to/maxwell_dev/the-git-rebase-introduction-i-wish-id-had

### Configuration

- https://www.atlassian.com/git/tutorials/
- http://eev.ee/blog/2015/04/24/just-enough-git-to-be-less-dangerous/
- http://kushagragour.in/blog/2014/01/build-git-learn-git/
- http://wildlyinaccurate.com/a-hackers-guide-to-git/
- https://www.digitalocean.com/community/tutorials/how-to-use-git-effectively
- https://www.digitalocean.com/community/tutorials/how-to-use-git-branches
- http://redmine.jamoma.org/projects/1/wiki/Working_with_GIT_branches
- https://try.github.io/levels/1/challenges/1
- https://help.github.com/articles/which-remote-url-should-i-use/
- https://help.github.com/articles/using-ssh-over-the-https-port/
- https://medium.com/@haydar_ai/learning-how-to-git-using-ssh-instead-of-https-91f09cff72de
- https://rtcamp.com/tutorials/git/

- https://git-scm.com/book/en/v2/Git-Basics-Viewing-the-Commit-History
- https://coderwall.com/p/fasnya/add-git-branch-name-to-bash-prompt
- Update multiple git repos : https://github.com/earwig/git-repo-updater

### Self-hosted GitHub Clones

- https://gogs.io/
- https://gitea.io/en-US/
- https://gitlab.com/

### Reviews || Configuration of the above

- https://blog.ifloop.org/2017/10/12/gitlab-vs-gogs-vs-gitea/
- https://www.reddit.com/r/git/comments/6y68vr/gitlab_vs_bitbucket_server_vs_gitea_vs_gogs/
- https://github.com/MartinThoma/MartinThoma.github.io/blob/pelican/content/2017-09-06-git-repository-managers.md
- https://gitbucket.github.io/gitbucket-news/gitbucket/2017/03/29/benchmark-of-gitbucket.html
- https://blog.hypriot.com/post/run-your-own-github-like-service-with-docker/

### Troubleshooting

- http://www.gitguys.com/topics/merging-with-a-conflict-conflicts-and-resolutions/
- https://help.github.com/articles/error-permission-denied-publickey/
- http://www.ikriv.com/blog/?p=1905

### Remove local commits NOT pushed to remote

- http://stackoverflow.com/questions/927358/how-to-undo-last-commits-in-git
- http://stackoverflow.com/questions/1611215/remove-a-git-commit-which-has-not-pushed

### Understanding .gitignore file

- https://www.git-tower.com/learn/git/faq/ignore-tracked-files-in-git
- https://github.com/github/gitignore
- https://www.gitignore.io/
- https://stackoverflow.com/questions/1274057/how-to-make-git-forget-about-a-file-that-was-tracked-but-is-now-in-gitignore

`.gitignore` will prevent untracked files from being added (without an `add -f`) to the set of files tracked by git, however git will continue to track any files that are already being tracked.

To stop tracking a file you need to remove it from the index. This can be achieved with this command.

```
git rm --cached <file>
```

The removal of the file from the head revision will happen on the next commit.

WARNING: While this will not remove the physical file from your local, it will remove the files from other developers machines on next `git pull`.

share improve this answer

edited Jan 29 at 0:01

PHPst
8,342 • 12 • 75 • 136

answered Aug 13 '09 at 20:40

CB Bailey
516k • 78 • 555 • 611

### Git Operations (Stash, Merge, Diff, Rebase)

- https://www.atlassian.com/git/tutorials/saving-changes/git-stash
- https://www.git-tower.com/learn/git/faq/save-changes-with-git-stash
- https://stackoverflow.com/questions/19003009/how-to-recover-stashed-uncommitted-changes
- https://www.atlassian.com/git/tutorials/using-branches/git-merge
- https://stackoverflow.com/questions/20106712/what-are-the-differences-between-git-remote-prune-git-prune-git-fetch-prune
- https://blog.algolia.com/master-git-rebase/
- https://stackoverflow.com/questions/4099742/how-to-compare-files-from-two-different-branches

`git diff` can show you the difference between two commits:

```
git diff mybranch master -- myfile.cs
```

Or, equivalently:

```
git diff mybranch..master -- myfile.cs
```

Using the latter syntax, if either side is `HEAD` it may be omitted (e.g. `master..` compares `master` to `HEAD`).

You may also be interested in `mybranch...master` (from `git diff` docs):

> This form is to view the changes on the branch containing and up to the second `<commit>`, starting at a common ancestor of both `<commit>`. `git diff A...B` is equivalent to `git diff $(git-merge-base A B) B`.

In other words, this will give a diff of changes in `master` since it diverged from `mybranch` (but without new changes since then in `mybranch`).

---

In all cases, the `--` separator before the file name indicates the end of command line flags. This is optional unless Git will get confused if the argument refers to a commit or a file, but including it is not a bad habit to get into. See https://stackoverflow.com/a/13321491/54249 for a few examples.

---

The same arguments can be passed to `git difftool` if you have one configured.

share improve this answer

edited May 23 '17 at 10:31
Community ♦
1 • 1

answered Nov 4 '10 at 18:13

dahlbyk
53.3k • 8 • 88 • 113

### Git on Windows

- https://gist.github.com/adamjohnson/5682757
- https://stackoverflow.com/questions/11000869/command-line-git-on-windows
- http://guides.beanstalkapp.com/version-control/git-on-windows.html

### Better GIT Workflow

- https://sandofsky.com/blog/git-workflow.html
- https://pixelbrackets.github.io/git_cheat_sheet/
- https://github.com/git-tips/tips

- https://github.com/so-fancy/diff-so-fancy
- https://dev.to/shreyasminocha/how-i-do-my-git-commits-34d?
- https://gist.github.com/PurpleBooth/109311bb0361f32d87a2
- http://michaelwales.com/articles/make-gitconfig-work-for-you/
- https://blog.scottnonnenberg.com/better-git-configuration/
- https://howtogit.net/
- https://githooks.com/
- https://nvie.com/posts/a-successful-git-branching-model/
- https://dev.to/_darrenburns/8-productivity-tips-for-github-44kn
- https://scotch.io/tutorials/using-git-hooks-in-your-development-workflow
- https://stackoverflow.com/questions/3651860/which-characters-are-illegal-within-a-branch-name/3651867#3651867
- https://stackoverflow.com/questions/3580013/should-i-use-past-or-present-tense-in-git-commit-messages/3580764#3580764

#### Random Notes

- https://svnvsgit.com

### 1.3.29 Ansible

*Some useful links to explain the concepts of Ansible*

#### Concepts

- https://blog.josephkahn.io/articles/ansible/
- http://engineering.waveapps.io/post/80595462671/an-ansible-primer
- http://tjheeta.github.io/2015/04/15/ansible-vs-chef/
- https://andidog.de/blog/2017-04-24-ansible-best-practices

#### Official Documentation

- https://docs.ansible.com/ansible/2.4/index.html

#### Configuration

#### Ansible.cfg

- https://raw.githubusercontent.com/ansible/ansible/devel/examples/ansible.cfg
- http://techadminblog.com/get-execution-time-of-each-task-ansible/
- https://blog.ssdnodes.com/blog/step-by-step-ansible-guide/
- https://stackoverflow.com/questions/27733511/how-to-set-linux-environment-variables-with-ansible

### Run one Task - Ansible Playbook

- https://stackoverflow.com/questions/23945201/how-to-run-only-one-task-in-ansible-playbook

You should use `tags:` as documented in http://docs.ansible.com/playbooks_tags.html

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If you have a large playbook it may become useful to be able to run a specific part of the configuration without running the whole playbook.

Both plays and tasks support a "tags:" attribute for this reason.

Example:

```
tasks:

    - yum: name={{ item }} state=installed
      with_items:
         - httpd
         - memcached
      tags:
         - packages

    - template: src=templates/src.j2 dest=/etc/foo.conf
      tags:
         - configuration
```

If you wanted to just run the "configuration" and "packages" part of a very long playbook, you could do this:

```
ansible-playbook example.yml --tags "configuration,packages"
```

On the other hand, if you want to run a playbook without certain tasks, you could do this:

```
ansible-playbook example.yml --skip-tags "notification"
```

You may also apply tags to roles:

```
roles:
  - { role: webserver, port: 5000, tags: [ 'web', 'foo' ] }
```

And you may also tag basic include statements:

```
- include: foo.yml tags=web,foo
```

Both of these have the function of tagging every single task inside the include statement.

#### Basic Ansible Tutorials

- https://serversforhackers.com/c/an-ansible2-tutorial
- https://leucos.github.io/ansible-files-layout
- https://www.linode.com/docs/applications/configuration-management/automatically-configure-servers-with-ansible-and-playboo
- https://www.digitalocean.com/community/tutorials/how-to-manage-multistage-environments-with-ansible
- http://codeheaven.io/15-things-you-should-know-about-ansible/
- https://symfonycasts.com/screencast/ansible/handlers

#### Ansible Roles

- https://www.digitalocean.com/community/tutorials/how-to-use-ansible-roles-to-abstract-your-infrastructure-environment

#### Managing Users with Ansible

- https://www.alibabacloud.com/blog/managing-system-users-using-ansible_593861
- https://serverfault.com/questions/830302/ensure-only-specific-list-of-users-exist-with-ansible
- http://minimum-viable-automation.com/ansible/managing-users-accounts-ansible/

#### NGinx Setup via Ansible

- https://symfonycasts.com/screencast/ansible/nginx-conf-template
- https://blog.serverdensity.com/deploying-nginx-with-ansible/
- https://meritocracy.is/blog/2017/07/24/manage-nginx-configurations-ansible/
- https://liquidat.wordpress.com/2016/01/26/howto-introduction-to-ansible-variables/
- https://mydbops.wordpress.com/2019/04/17/jinja2-for-better-ansible/

#### Troubleshooting

- https://stackoverflow.com/questions/20563639/ansible-playbook-shell-output
- https://docs.ansible.com/ansible/latest/user_guide/playbooks_delegation.html
- https://docs.ansible.com/ansible/latest/user_guide/playbooks_filters.html

### 1.3.30 Puppet

*Some useful links to explain the concepts of Puppet*

#### Concepts

- http://logz.io/blog/chef-vs-puppet/
- https://www.linkedin.com/learning/mastering-puppet-for-large-infrastructures/the-course-overview

#### Official Documentation

- https://docs.puppet.com/puppet/
- https://docs.puppet.com/guides/style_guide.html

#### Others

- http://www.harker.com/puppet/BayLISA100715.html
- http://www.slashroot.in/puppet-tutorial-introduction-puppet-configuration-management-tool
- http://www.slashroot.in/puppet-tutorial-how-does-puppet-work
- http://www.slashroot.in/puppet-hiera-tutorial-example-configuration
- http://www.example42.com/tutorials/PuppetTutorial/
- http://www.pindi.us/blog/getting-started-puppet
- https://www.youtube.com/watch?v=73xeSTz8AeA&list=PLtNErhYMkHnEu1_ZHSJt1xF–zU35dRgZ
- https://www.digitalocean.com/community/tutorials/how-to-install-puppet-to-manage-your-server-infrastructure
- https://www.digitalocean.com/community/tutorials/getting-started-with-puppet-code-manifests-and-modules
- http://codingbee.net/tutorials/puppet/puppet-what-is-puppet/
- http://www.puppetcookbook.com/
- http://opensourceforu.efytimes.com/2009/06/puppet-show-automating-unix-administration/
- http://www.linuxuser.co.uk/tutorials/puppet-server-management
- https://www.linux.com/learn/tutorials/325201-introduction-to-puppet-streamlined-system-configuration
- http://www.linuxjournal.com/magazine/automate-system-administration-tasks-puppet
- http://www.infoworld.com/article/2614204/data-center/puppet-or-chef–the-configuration-management-dilemma.html
- http://puppetlunch.com/contents/

### 1.3.31 Chef

*Some useful links to explain the concepts of Chef*

#### Concepts

- https://www.hpe.com/us/en/insights/articles/what-is-chef-a-primer-for-devops-newbies-1704.html
- https://learn.chef.io

#### Configuration

#### Troubleshooting

### 1.3.32 Docker

*Some useful links to explain the concepts of Docker*

### Official Docker Documentation

- https://docs.docker.com/

### Concepts

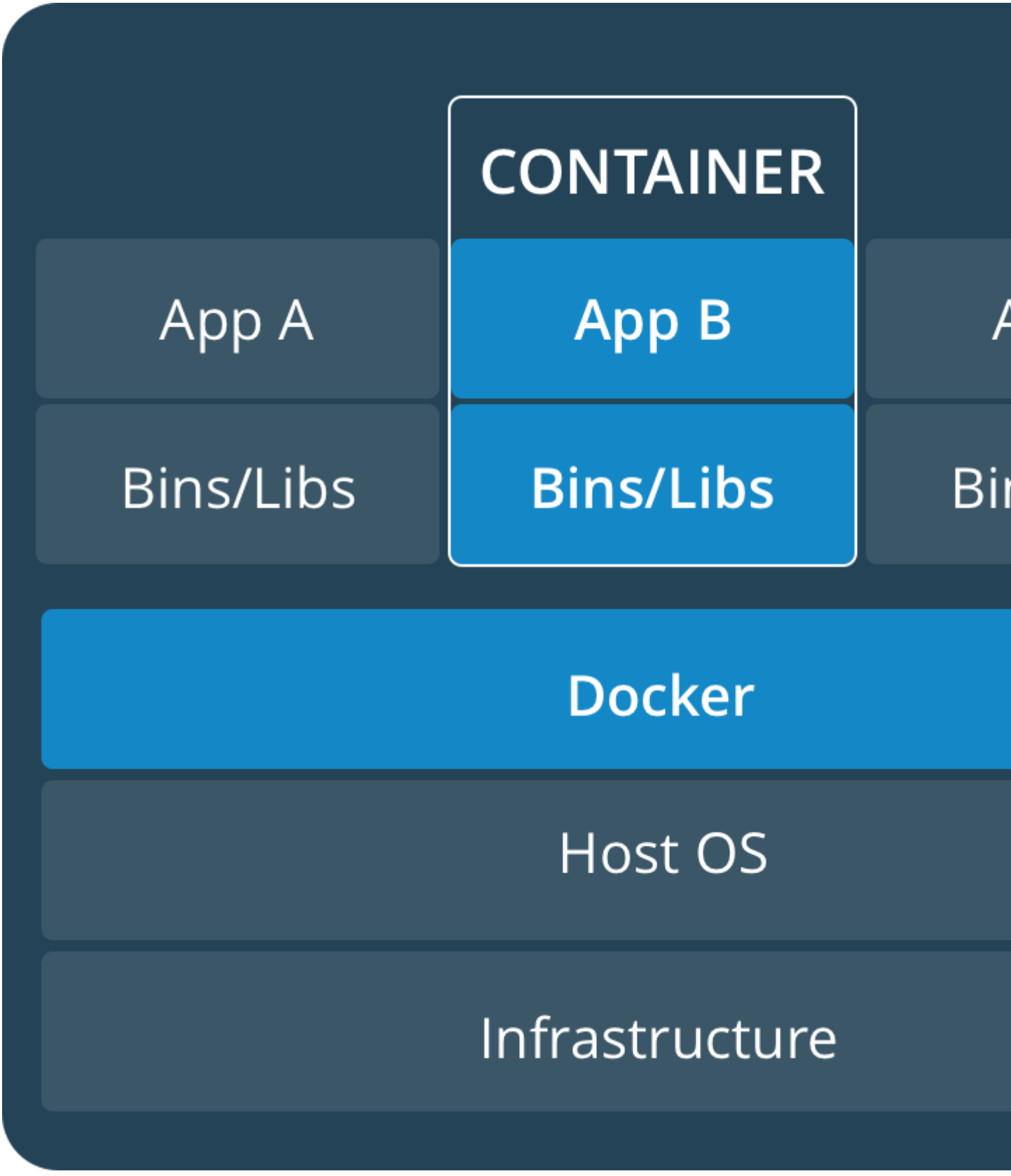
- https://docker.zeef.com/lim
- https://medium.freecodecamp.org/a-beginner-friendly-introduction-to-containers-vms-and-docker-79a9e3e119b
- https://dev.to/softchris/5-part-docker-series-beginner-to-master-3m1b?
- https://hackernoon.com/beginners-guide-to-microservices-explaining-it-to-a-5-year-old-4481f5aba466
- https://jvns.ca/blog/2019/11/18/how-containers-work–overlayfs

### Good Explanation of Namespaces : needed for Docker

- https://www.toptal.com/linux/separation-anxiety-isolating-your-system-with-linux-namespaces

### Difference between containers and VMs

- https://stackoverflow.com/questions/16047306/how-is-docker-different-from-a-normal-virtual-machine


CONTAINER
App A
App B
Bins/Libs
Bins/Libs
Docker
Host OS
Infrastructure

### Docker Image Layers : Easy Explanation

- http://tuhrig.de/layering-of-docker-images/

### Docker Swarm Working

- https://docs.docker.com/engine/swarm/how-swarm-mode-works/services/

### Configuration

- http://bencane.com/2015/12/01/getting-started-with-docker-by-dockerizing-this-blog/
- https://docs.docker.com/config/containers/resource_constraints/
- https://stackoverflow.com/questions/29480099/docker-compose-vs-dockerfile-which-is-better

## Dockerfile


A Dockerfile is a simple text file that contains the commands a user could call to assemble an image.

Example, **Dockerfile**

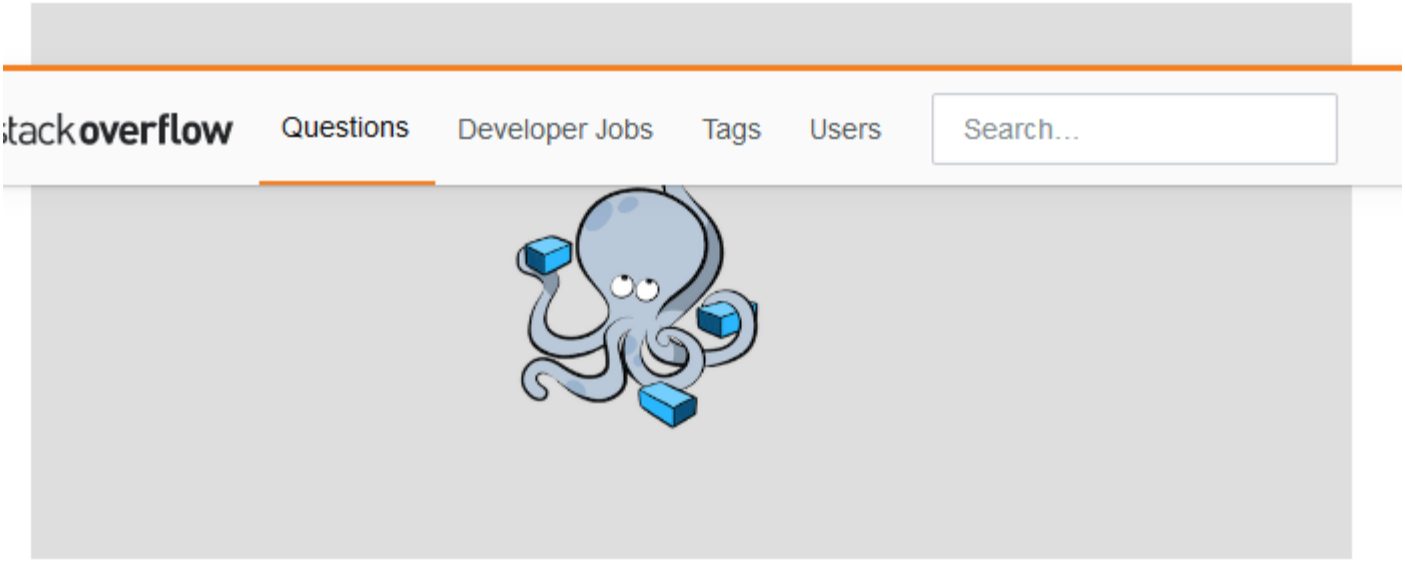
```
FROM ubuntu:latest
MAINTAINER john doe

RUN apt-get update
RUN apt-get install -y python python-pip wget
RUN pip install Flask

ADD hello.py /home/hello.py

WORKDIR /home
```

## Docker Compose




**Docker Compose**

- is a tool for defining and running multi-container Docker applications.
- define the services that make up your app in `docker-compose.yml` so they can be run together in

- https://www.digitalocean.com/community/tutorials/how-to-use-traefik-as-a-reverse-proxy-for-docker-containers-on-ubuntu-18-0
- https://blog.codeship.com/orchestrate-containers-for-development-with-docker-compose/

#### Troubleshooting & Log Parsing

- https://stackoverflow.com/questions/28320134/how-to-list-all-tags-for-a-docker-image-on-a-remote-registry
- https://stackoverflow.com/questions/24481564/how-can-i-find-a-docker-image-with-a-specific-tag-in-docker-registry-on-the-do 32622147
- https://codefresh.io/docker-tutorial/not-ignore-dockerignore/

#### Tuning & Hardening

- https://cloudvedas.com/how-to-cap-or-limit-memory-usage-of-a-docker-container/
- https://56k.cloud/blog/put-the-brakes-on-docker-containers/

#### Training & Certification

#### Docker Training

- http://training.play-with-docker.com/ops-landing/
- http://training.play-with-docker.com/alacart/
- https://katacoda.com/login
- http://container.training/
- https://github.com/veggiemonk/awesome-docker
- https://docker-curriculum.com/

#### Docker Certified Associate

- https://www.bretfisher.com/docker-certified-associate/
- https://www.linode.com/docs/applications/containers/when-and-why-to-use-docker/
- https://www.reddit.com/r/docker/comments/3yo0e8/is_there_any_advantage_to_using_docker_for/

### 1.3.33 Kubernetes

*Some useful links to explain the concepts of Kubenetes*

#### Concepts

- https://dev.to/techworld_with_nana/kubernetes-simply-explained-for-beginners-33em
- https://dev.to/aurelievache/kubernetes-sketchnotes-pods-4ib0
- https://speakerdeck.com/thockin/the-ins-and-outs-of-networking-in-google-container-engine

### Official Documentation

- https://kubernetes.io/docs/home
- https://kubectl.docs.kubernetes.io

### Configuration

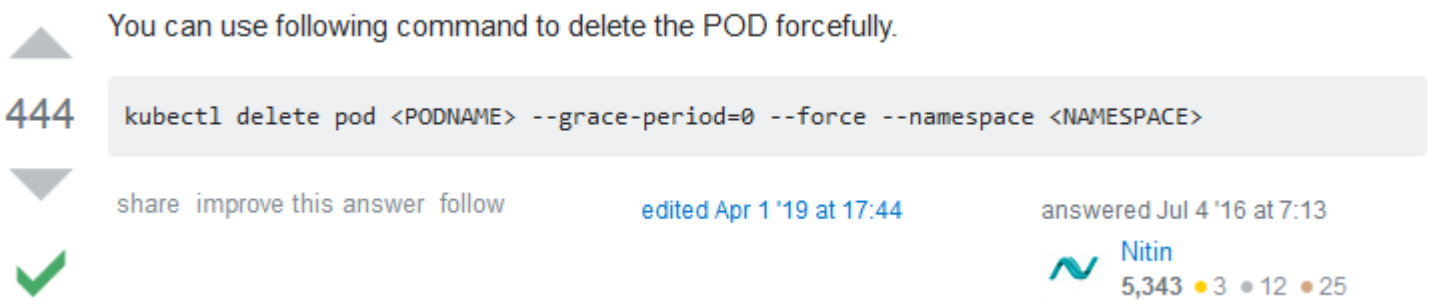
- https://medium.com/@jmarhee/managing-kubernetes-config-contexts-fbe710fa756a
- https://nikgrozev.com/2019/10/03/switch-between-multiple-kubernetes-clusters-with-ease/
- https://sysdig.com/blog/kubernetes-limits-requests/
- https://speakerdeck.com/thockin/bringing-traffic-into-your-kubernetes-cluster

### Tuning & Hardening

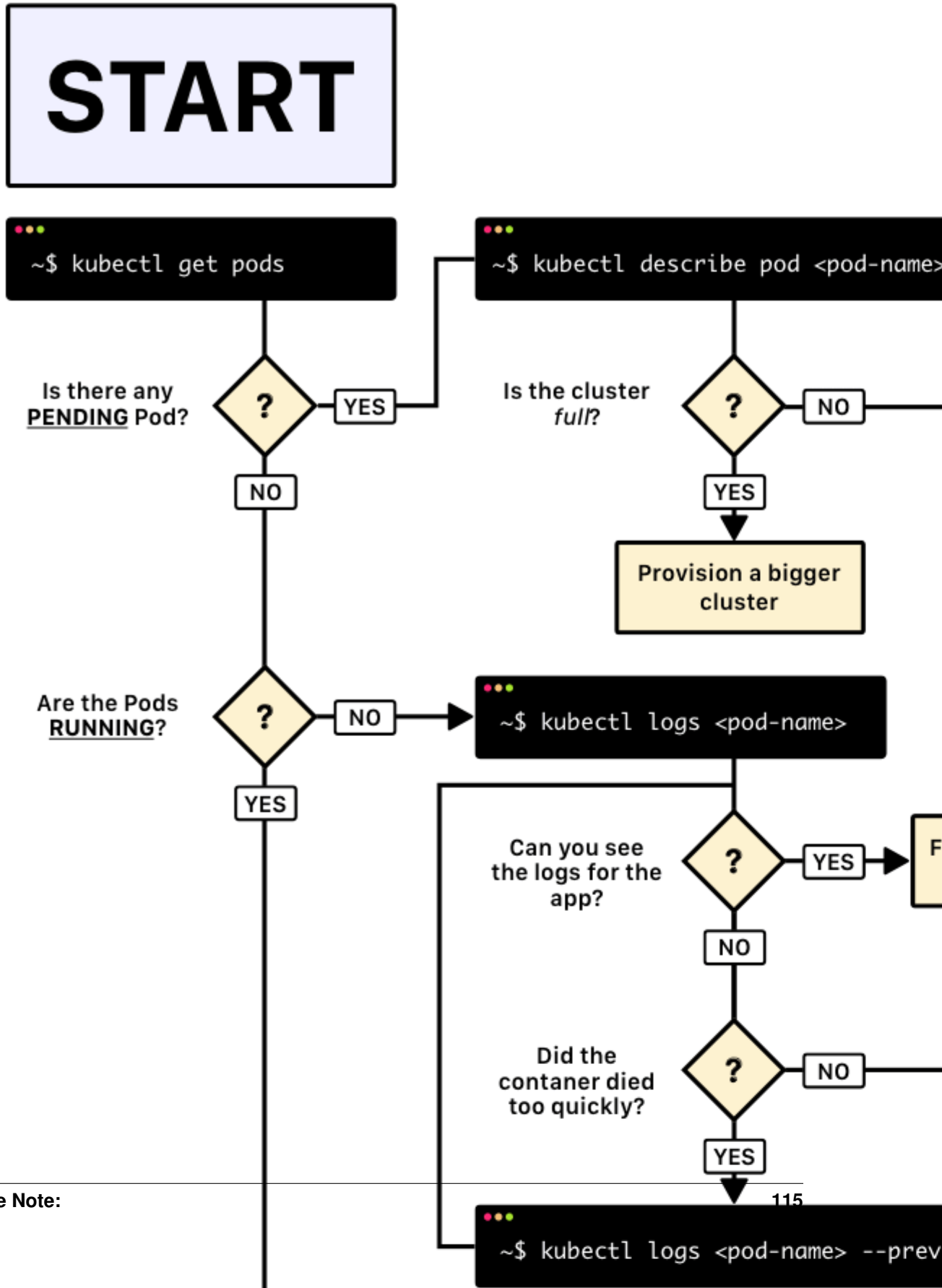
- https://github.com/derailed/popeye

### Troubleshooting

- https://stackoverflow.com/questions/57161481/kubectl-how-to-display-pod-logs-without-specyfing-the-pod-name-explicitly/57161894#57161894
- https://stackoverflow.com/questions/54821044/how-to-stop-pause-a-pod-in-kubernetes/54822866#54822866
- https://stackoverflow.com/questions/35453792/pods-stuck-in-terminating-status/38178833#38178833




- https://learnk8s.io/troubleshooting-deployments


START
~$ kubectl get pods
~$ kubectl describe pod <pod-name>
Is there any PENDING Pod?
YES
NO
Is the cluster full?
NO
YES
Provision a bigger cluster
Are the Pods RUNNING?
NO
YES
~$ kubectl logs <pod-name>
Can you see the logs for the app?
YES
NO
Did the contaner died too quickly?
NO
YES
~$ kubectl logs <pod-name> --prev

### 1.3.34 AWS

*Some useful links to explain the concepts of AWS*

#### Official AWS Documentation

- https://docs.aws.amazon.com/

#### Concepts

- https://dev.to/itscoderslife/aws-in-5-minutes-lif
- https://dev.to/helenanders26/aws-series-aws-from-a-to-z-45b1
- https://start.jcolemorrison.com/aws-iam-policies-in-a-nutshell/

#### Configuration

- https://serverfault.com/questions/778426/aws-ec2-describe-instances-filtering-by-multiple-ec2-tags
- https://serverfault.com/questions/560337/search-ec2-instance-by-its-name-from-aws-command-line-tool
- https://www.onica.com/blog/using-aws-cli-to-find-untagged-instances/
- https://stackoverflow.com/questions/24938971/list-public-ip-addresses-of-ec2-instances

#### s3cmd

- http://tecadmin.net/install-s3cmd-manage-amazon-s3-buckets/
- http://tecadmin.net/s3cmd-file-sync-with-s3bucket/
- http://jayendrapatil.com/tag/s3/

#### AWS Instances

- https://ec2instances.info/

#### Troubleshooting & Log Parsing

- http://www.fizerkhan.com/blog/posts/Resize-EBS-volume-without-rebooting-in-AWS.html
- https://linuxroutes.com/how-to-resolve-instance-does-not-have-a-volume-attached-at-root-dev-sda1-error/

#### Tuning & Hardening

- https://www.sohamkamani.com/blog/2016/12/21/web-security-cors/
- https://www.altcademy.com/questions/amazon-aws-s3-error-no-access-control-allow-origin-header-is-present-on-the-requested-
- http://virtuallyhyper.com/2013/08/cors-with-cloudfront-s3-and-multiple-domains/

#### Training & Certification

- https://www.quora.com/What-is-the-AWS-Certified-Cloud-Practitioner-exam
- https://www.quora.com/I-am-a-fresher-Which-AWS-certification-is-better-for-me-AWS-solution-architect-or-AWS-developer
- http://blog.rowanudell.com/what-aws-certification-should-you-get/
- https://acloud.guru
- https://www.kylegalbraith.com/learn-aws/
- https://cantrill.io/2018/07/05/Passing-the-aws-certified-sysops-administrator-associate-exam.html

### 1.3.35 MySQL

*Some useful links to explain the concepts of MySQl*

#### Concepts

- http://etutorials.org/SQL/MySQL/
- https://serversforhackers.com/series/mysql
- http://www.rathishkumar.in/2016/04/understanding-mysql-architecture.html?

#### Difference between MyISAM and InnoDB Storage engines

- http://blog.danyll.com/myisam-vs-innodb/
- http://www.rapidprogramming.com/questions-answers/differences-between-innodb-and-myisam-in-mysql-innodb-vs-myisam-1

#### Commands

- http://www.mysqltutorial.org/

#### Configuration

- https://www.percona.com/blog/2014/11/12/log-rotate-and-the-deleted-mysql-log-file-mystery/
- http://blog.oneiroi.co.uk/mysql/mysql-slow-query-log-rotation/
- http://mysql.az/2015/05/12/mysql-logrotate-script/
- https://www.question-defense.com/2009/12/20/configure-logrotate-to-rotate-and-flush-mysql-logs-without-a-password
- http://etutorials.org/SQL/MySQL/Part+III+MySQL+Administration/Chapter+11.+General+MySQL+Administration/Maintaining+Log+Files/
- https://opensourcedbms.com/dbms/how-to-upgrade-mysql-5-5-to-mysql-5-6-on-centos-6-3-red-hat-fedora/

### Backing Up | Restore Databases via Command Line

- https://in.godaddy.com/help/backup-mysql-databases-on-your-server-linux-17547
- http://www.mysqltutorial.org/how-to-backup-database-using-mysqldump.aspx
- https://www.liquidweb.com/kb/how-to-back-up-mysql-databases-from-the-command-line/
- https://www.tecmint.com/mysql-backup-and-restore-commands-for-database-administration/

### Configuring MariaDB for remote access

- https://mariadb.com/kb/en/library/configuring-mariadb-for-remote-client-access/

### Removing a MySQL user with his privileges

- https://nsaunders.wordpress.com/2007/04/30/removing-a-mysql-user/
- https://www.a2hosting.in/kb/developer-corner/mysql/managing-mysql-databases-and-users-from-the-command-line

### Information on MySQL Bin logs

- http://www.cyberciti.biz/faq/what-is-mysql-binary-log/

### Replication (Master-Master)

- https://www.digitalocean.com/community/tutorials/how-to-set-up-mysql-master-master-replication

### Replication (Master-Slave)

- http://www.tecmint.com/how-to-setup-mysql-master-slave-replication-in-rhel-centos-fedora/
- https://www.rackspace.com/knowledge_center/article/mysql-master-slave-replication
- https://www.digitalocean.com/community/tutorials/how-to-set-up-master-slave-replication-in-mysql
- http://sharadchhetri.com/2013/11/21/setup-mysql-master-slave-replication-in-centos-6/
- http://aarvik.dk/how-to-set-up-master-slave-replication-in-mysql/
- http://plusbryan.com/mysql-replication-without-downtime
- https://blog.marceloaltmann.com/en-how-does-mysql-replication-works-pt-como-funciona-a-replicacao-no-mysq/

### Reset forgotten MySQL password

- https://www.digitalocean.com/community/tutorials/how-to-reset-your-mysql-or-mariadb-root-password
- http://www.cyberciti.biz/faq/mysql-change-root-password/
- https://www.liquidweb.com/kb/change-a-password-for-mysql-on-linux-via-command-line/
- https://www.codeenigma.com/community/blog/restoring-mysql-root-user

### Tuning & Hardening

- http://blog.webyog.com/2012/11/20/how-to-monitor-mysql-replication/
- https://www.digitalocean.com/community/tutorials/how-to-secure-mysql-and-mariadb-databases-in-a-linux-vps
- https://www.percona.com/blog/2013/04/18/rotating-mysql-slow-logs-safely/
- http://www.pontikis.net/blog/how-and-when-to-enable-mysql-logs
- https://serversforhackers.com/c/mysql-network-security
- http://www.proxysql.com
- https://severalnines.com/resources/database-management-tutorials/mysql-load-balancing-haproxy-tutorial

### To change the value of expire_log_days without MySQL restart

- https://www.sebastien-han.fr/blog/2013/02/15/purge-mysql-binary-logs/

### To enable various logs via my.cnf or on the fly without restart

- http://www.pontikis.net/blog/how-and-when-to-enable-mysql-logs

### Perl script to analyses system MySQL variables & optimize accordingly

- https://major.io/mysqltuner/

### Tool to convert xls files into SQL

- https://sqlizer.io/

### Troubleshooting

- https://alvinalexander.com/blog/post/mysql/how-show-open-database-connections-mysql
- https://www.tecmint.com/mysqladmin-commands-for-database-administration-in-linux/
- http://www.plugged.in/databases/mysql-server-wont-start-pid-file-errors.html
- https://major.io/2008/06/24/mysql-error-1040-too-many-connections/
- https://www.digitalocean.com/community/tutorials/how-to-use-mytop-to-monitor-mysql-performance

### Checking for replication Lags

- https://www.percona.com/blog/2007/10/12/managing-slave-lag-with-mysql-replication/
- https://www.percona.com/blog/2014/05/02/how-to-identify-and-cure-mysql-replication-slave-lag/

#### Various MySQL error codes

- http://www.fromdual.com/mysql-error-codes-and-messages
- https://major.io/2007/08/09/mysql-error-codes/

#### Fix for the ERROR 1396

- https://stackoverflow.com/questions/5555328/error-1396-hy000-operation-create-user-failed-for-jacklocalhost

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yes this bug is there. However, I found a small workaround.

- Assume the user is there, so drop the user
- After deleting the user, there is need to flush the mysql privileges
- Now create the user.

That should solve it. Assuming we want to create the user admin @ localhost, these would be the commands:

```
drop user admin@localhost;
flush privileges;
create user admin@localhost identified by 'admins_password'
```

Cheers

### 1.3.36 PostgreSQL

*Some useful links to explain the concepts of PostgreSQl*

#### Concepts

- http://swift.siphos.be/aglara/databaseserver.html
- https://postgresql.zeef.com/dennis.brouwer

#### Commands

- http://www.postgresqltutorial.com/

#### Configuration

- http://www.postgresql.org/docs/9.3/static/high-availability.html
- http://www.uptimemadeeasy.com/databases/centos-install-postgres-9-3/
- http://tecadmin.net/install-postgresql-on-centos-rhel-and-fedora/
- http://www.davidghedini.com/pg/entry/install_postgresql_9_on_centos

- https://chartio.com/resources/tutorials/how-to-list-databases-and-tables-in-postgresql-using-psql
- http://www.thegeekstuff.com/2009/04/15-practical-postgresql-database-adminstration-commands/
- https://launchschool.com/blog/how-to-install-postgres-for-linux
- https://www.digitalocean.com/community/tutorials/how-to-use-roles-and-manage-grant-permissions-in-postgresql-on-a-vps–2

#### Replication using Slony

- http://www.hack.net.br/2015/02/24/postgresql-replication-with-slony/
- https://www.howtoforge.com/configuring-slony-i-cascading-replication-on-postgresql-8.3
- https://opensourcedbms.com/dbms/setup-replication-with-postgres-9-2-on-centos-6redhat-el6fedora/
- http://www.linuxjournal.com/article/7834?page=0,0
- http://raghavt.blogspot.in/2012/07/simple-slony-i-replication-setup.html
- https://miceliux.com/blog/2013/02/09/postgresql-replication-with-slony/

#### Tuning & Hardening

- https://www.digitalocean.com/community/tutorials/how-to-secure-postgresql-against-automated-attacks
- https://spapas.github.io/2016/11/02/postgresql-backup/

#### Troubleshooting

- https://stackoverflow.com/questions/17443379/psql-fatal-peer-authentication-failed-for-user-dev/21889759

#### FAQ - When pg-cancel-backend / pg-terminate-backend doesn't work

- https://serverfault.com/questions/35332/what-do-i-do-when-pg-cancel-backend-doesnt-work

#### Removing PostgreSQL queries on TCP Level - when pg-cancel-backend / pg-terminate-backend fails

- https://tech.zalando.com/blog/hack-to-terminate-tcp-conn-postgres/?gh_src=4n3gxh1

#### Official Links

- http://slony.info/documentation/index.html
- http://slony.info/documentation/tutorial.html

### 1.3.37 NoSQL

*Some useful links to explain the concepts of NoSQL*

#### Concepts

- https://nosql.zeef.com/stefan.edlich
- https://dev.to/mushketyk/should-you-use-dynamodb-5m5

#### Configuration

#### Troubleshooting

### 1.3.38 Redis

*Some useful links to cover the concepts of Redis*

#### Concepts

#### Official Redis Documentation

- https://redis.io/documentation

#### Configuration

#### Tuning & Hardening

- http://ozzimpact.github.io/development/redis-setup-and-high-availability

#### Troubleshooting & Log Parsing

- https://redis.io/commands

### 1.3.39 Kafka

*Some useful links to cover the concepts of Kafka*

#### Concepts

- https://www.cloudkarafka.com/blog/2016-11-30-part1-kafka-for-beginners-what-is-apache-kafka.html

#### Official Kafka Documentation

- https://kafka.apache.org/documentation

#### Configuration

#### Tuning & Hardening

#### Troubleshooting & Log Parsing

### 1.3.40 Email

*Some useful links to explain the concepts of Email*

#### Concepts

#### E-Mail status Codes

- https://tools.ietf.org/html/rfc1893

#### Article on E-Mail Ports

- http://blog.mailgun.com/25-465-587-what-port-should-i-use/

### 1.3.41 Postfix

*Some useful links to explain the concepts of Postfix*

#### Concepts

#### Configuration

- http://blog.schaal-24.de/mail/postscreen-im-kampf-gegen-spam/?lang=en
- https://www.howtoforge.com/hardening-postfix-for-ispconfig-3
- https://workaround.org/ispmail/squeeze/postfix-domain-types
- https://workaround.org/article/postfix-database-configuration
- https://www.howtoforge.com/virtual_postfix_antispam
- https://rtcamp.com/tutorials/mail/
- https://www.linode.com/docs/email
- https://www.linode.com/docs/email/running-a-mail-server

#### SSL/TLS on Postfix

- https://blog.kruyt.org/postfix-and-tls-encryption/

### Troubleshooting & Log Parsing

### Queue Management

- http://www.postfix.org/QSHAPE_README.html
- https://easyengine.io/tutorials/mail/postfix-queue/
- http://wiki.zimbra.com/wiki/Managing_The_Postfix_Queues
- http://www.tullyrankin.com/managing-the-postfix-queue
- https://www.wirehive.net/blog/2014/11/07/5-top-tips-for-reviewing-your-postfix-mail-queue

### Commands

- **Sorting queued mails by From address**

```
sudo mailq | awk '/^[0-9,A-F]/ {print $7}' | sort | uniq -c | sort -n
```

- **Holding queued mails by From address**

```
sudo mailq| grep '^[A-Z0-9]'| grep <sender-ID>| cut -f1 -d' ' | tr -d \*|sudo␣
↪postsuper -h -
```

- **Holding queued mails by To address**

```
sudo mailq | tail -n +2 | grep -v '^ *(' | awk  'BEGIN { RS = "" } { if ($8 == "
↪<recipient>") print $1 } ' | tr -d '*!' | sudo postsuper -h -
```

- **Holding queued mails by Domain**

```
sudo mailq| grep '^[A-Z0-9]'| grep @<domain>| cut -f1 -d' ' | tr -d \*|sudo postsuper␣
↪-h -
```

- **Holding emails from the [active|deferred] queue based on subject**

```
sudo find /var/spool/postfix/[active|deferred]/ -type f  -exec grep -il '<subject>' '
↪{}' \; | xargs -n1 basename | sudo postsuper -h -
```

- **Removing Mails based on sender Address**

```
sudo mailq| grep '^[A-Z0-9]'| grep <sender-ID>| cut -f1 -d' ' | tr -d \*|sudo␣
↪postsuper -d -
```

- **Removing Mails based on Domain**

```
sudo mailq| grep '^[A-Z0-9]'| grep @<domain>| cut -f1 -d' ' | tr -d \*|sudo postsuper␣
↪-d -
```

- **Delete mails to a specific mail address**

```
sudo mailq | tail -n +2 | grep -v '^ *(' | awk  'BEGIN { RS = "" } { if ($8 == "
↪<recipient-ID>") print $1 } ' | tr -d '*!' | sudo postsuper -h -
```

### 1.3.42 Exim

*Some useful links to explain the concepts of Exim*

#### Concepts

#### Configuration

#### Queue Management

- http://www.cyberciti.biz/faq/exim-remove-all-messages-from-the-mail-queue/
- http://www.electrictoolbox.com/show-exim-mail-queue/
- https://www.ndchost.com/wiki/mail/exim-management

### 1.3.43 Dovecot

*Some useful links to explain the concepts of Dovecot*

#### Concepts

- http://www.stefan-seelmann.de/wiki/mailserver-postfix-dovecot
- http://wiki2.dovecot.org/FrontPage

#### Configuration

- http://bobcares.com/blog/dovecot-sendmail-perfect-mail-server/
- http://www.stefan-seelmann.de/wiki/mailserver-postfix-dovecot
- https://www.digitalocean.com/community/tutorials/how-to-set-up-a-postfix-email-server-with-dovecot-dynamic-maildirs-and-lr
- https://workaround.org/ispmail/squeeze/setting-up-dovecot

#### Troubleshooting & Log Parsing

### 1.3.44 Milters

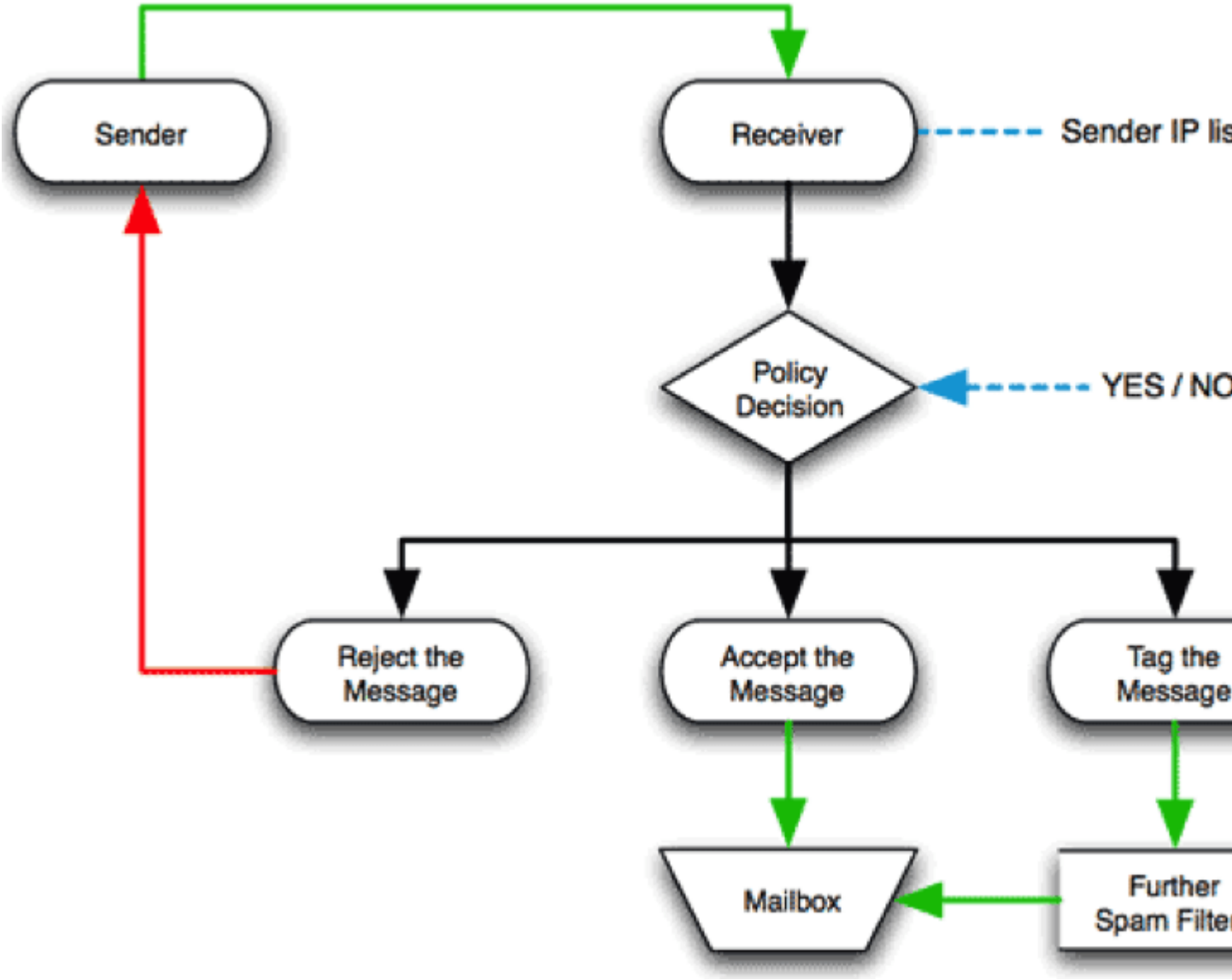
*This section covers the basics of how Milters works*

#### Concepts

#### Email RBLs (real-time block-hole lists) Primer

- https://en.wikipedia.org/wiki/DNSBL
- https://en.wikipedia.org/wiki/Comparison_of_DNS_blacklists
- https://www.spamhaus.org/whitepapers/dnsbl_function/
- https://kb.mailchimp.com/delivery/spam-filters/how-blacklists-work

- https://www.pinpointe.com/blog/how-do-i-know-if-im-on-a-spam-blacklist
- https://rbltracker.com/blog/2015/07/what-are-rbls-and-how-do-they-work-part-1/
- https://blog.returnpath.com/blacklist-basics-the-top-email-blacklists-you-need-to-know-v2/
- https://techtalk.gfi.com/dns-blacklists-work/
- https://sendgrid.com/blog/email-blacklist/




### Configuration

### Check multiple global RBLs online

- http://multirbl.valli.org/lookup/
- http://mxtoolbox.com/
- http://www.dnsbl.info/

#### Troubleshooting & Log Parsing

### 1.3.45 SPF & DKIM

*Some useful links to explain the concepts of SPF & DKIM*

#### Concepts

#### SPF Records

- http://blog.postmarkapp.com/post/86506131503/explaining-spf
- http://blog.hyperfive.com/2011/05/spf-records-explained.html
- http://www.openspf.org/SPF_Record_Syntax

#### Configuration

- https://www.digitalocean.com/community/tutorials/how-to-use-an-spf-record-to-prevent-spoofing-improve-e-mail-reliability
- https://cheriches.com/linux/mail-server-series/2014-09-07-dedicated-mail-server-hosting-multiple-domains-step-5-antispam.html
- https://kura.io/2015/01/03/debian-wheezy-tls-mailserver-with-mysql-clamav-domainkeys-dkim-spf-solr-imap-search/#ssl
- http://www.stevejenkins.com/blog/2010/09/how-to-get-dkim-domainkeys-identified-mail-working-on-centos-5-5-and-postfix-us
- https://easyengine.io/tutorials/mail/setup-opendkim/

#### Troubleshooting and Log Parsing

### 1.3.46 ClamAV

*Some useful links to explain the concepts of ClamAV*

#### Concepts

- https://forums.freebsd.org/threads/can-anyone-explain-clamav-to-me.29798/
- https://cheriches.com/linux/mail-server-series/2014-09-16-clamav-milter.html

#### Configuration

- https://z0z0.me/2014/10/26/install-postfix-dovecot-auth-tls-mysql-postfixadmin-spamassassin-and-clamav-on-centos7/
- http://swimminginthought.com/postfix-and-clamav-milter-gotchas-how-to-fix-them-and-keep-your-sanity/
- http://linux.die.net/man/8/clamd
- http://www.devguerrilla.com/notes/2014/09/linux-speeding-up-clamav-with-clamd-on-rhel/
- http://pantestmb.blogspot.in/2013/10/fedora-19-systemctl-sendmail-clamav.html

### Troubleshooting & Log Parsing

## 1.3.47 DNS

*Some useful links to explain the concepts of DNS*

### Concepts

- **Authoritative NS**
  - *When a DNS query is made to a server which has the domain's data, it is an authoritative NS, otherwise it will point to other NS or serve cached copies of other NS*
- **Zone file**
  - *simple text file containing the mapping between domain names and IP addresses, e.g : www.google.com*
- **Root Servers**
  - *13 servers - a to h, routed to the nearest mirror of the server*
- **TLD servers :**
  - *.com [others are : .org, .net, .edu etc]*
- **Domain Level NS**
  - *the server containing the actual records of the requested domain (ns1.google.com, ns2.google.com etc)*
- **TTL - Time to live**
  - *A timer. Caching name servers can use this until the TTL runs out*
- Records

```
domain.com.  IN SOA ns1.domain.com. admin.domain.com. (
12083 ; serial number  - incremented on zone file change, slave NS checks if master NS serial > cached serial & if yes, slave NS requests for updated zone else serves same zone file.
3h; refresh interval -  Slave NS waits this period to poll the master NS for changes
30m; retry interval -  Slave NS will retry querying master NS every this period for zone transfer updates
3w; expiry period -   if slave NS can not contact master for this time, it will no longer return authoritative response for the queried zone
1h ; negative TTL -  a NS will cache errors for this period
)
```

### Domain Transfer (AXFR)

- The original DNS specifications RFC-1034 & RFC-1035 envisaged that **slave** (or secondary) DNS servers would poll the **master**.
- The time between such 'polling' is determined by the refresh value on the domain's SOA Resource Record
- The polling process is accomplished by the 'slave' sending a query to the **master** and requesting its current SOA record.

- If serial number of this record is higher than the current one maintained by the **slave** a zone transfer (AXFR) is requested & done on **TCP** Port 53.

### DNS uses UDP for DNS queries over port 53

- DNS uses UDP for to replying to client DNS queries such as client asking DNS server for a Name to IP or IP to NAME resolution.
- The reason is that UDP is not connection oriented, so its light-weight & fast, resulting in faster data transmission of results to client compared to TCP.
- At the same time, if needed then DNS can also work over TCP to serve the DNS queries, but UDP is always preferred because of greater speed.

### Why DNS uses TCP for Zone files transfer over port 53

- DNS uses a **master** & **slave** architecture, in which one main authoritative Name server having all the entries & others are replicated (zone files transferred) from master & also serve DNS queries.
- As there can't be any inconsistency in Zone files, so to transfer these Zone files DNS uses TCP as the communication protocol, which makes sure that the zone files are transferred reliably.

### Resource Records

- **A record**
  - map a host to an IP address

```
host IN A IPv4_address host IN AAAA IPv6_address
```

- **MX Record**
  - map a mail exchange used for the domain

```
IN MX 10 mail.domain.com. (where 10 is record priority. Priority is given to
MX with lower values at DNS lookup)
```

- **PTR**
  - maps an IP address to a reverse name

### How do resolvers work

- **What happens when you set resolvers in PC (Windows) And / Or Router**
  - *A browser 1st checks its internal cache of recent queries which it checks initially otherwise it asks the system resolver for DNS queries (/etc/hosts) else it forwards requests to another resolver.*

Now that you understand how the whole process works, here is what would happen.

1. You can set Google's DNS 8.8.8.8 in your router settings and now all computers on that network will automatically use that DNS server.
2. Your can set Google's DNS 8.8.8.8 on your computer only and now only your computer will use Google's DNS while the rest of your devices will use whatever DNS servers are configured in your router
3. If you let the router get its DNS servers configured by the ISP's DHCP server, which is the default, the router will configure your network to use the ISP's DNS servers. In case of AT&T, it is definitely not advisable. I've seen AT&T and Comcast DNS go down more than once.
4. Configuring redundant DNS, such as 8.8.8.8 (Google) and 4.2.2.4 (Verizon) means the system will try to resolve the query via Google first. If it fails, it will NOT try to resolve it through Verizon. If Google's DNS server is unreachable (more likely to be filtered than down), the system will try to reach the Verizon DNS server. Under normal operations, the system will never query the secondary DNS server. Note: this is for Windows. Other operating systems might behave differently.

### Types of DNS Servers

- **Recursive:**
  - *A DNS server which queries other servers until it finds answer to the queried domain. They maintain a cache which is initially checked before sending the app's query to another NS.*
- **Iterative:**
  - *To be explained*
- **Authoritative-Only :**
  - *Only answers those queries for which it stores the zones. Does not respond to recursive queries & cache query results.*
- **Caching :**

  - *It handles recursive queries from clients which handles queries received from the OS stub resolver (/etc/hosts).*

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### Configuration

### Bind Configuration / Tweaks

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### Managing DNS Better

- https://blog.powerdns.com/2015/03/11/introducing-dnsdist-dns-abuse-and-dos-aware-query-distribution-for-optimal-performanc
- https://www.digitalocean.com/community/tutorials/how-to-deploy-and-manage-your-dns-using-dnscontrol-on-ubuntu-18-04

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- http://www.cyberciti.biz/faq/dnstop-monitor-bind-dns-server-dns-network-traffic-from-a-shell-prompt/

### Check DNS Propagation Issues

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- https://www.nslookup.io/
- https://www.site24x7.com/dns-lookup.html
- http://viewdns.info/